5TH EDITION

WEB DEVELOPMENT AND DESIGN FOUNDATIONS WITH XHTML



TERRY FELKE-MORRIS

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Addison-Wesley

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Preface

Web Development and Design Foundations with XHTML is intended for use in a beginning Web development course. Since CSS has become a standard for Web design, this edition introduces CSS early on and integrates this topic throughout the text, including CSS-based page layouts. The text covers the basics that Web developers need to develop their skills:

- Internet concepts
- Creating Web pages with XHTML
- Configuring text, color, and page layout with CSS
- Web design best practices
- Accessibility standards
- The Web development process
- Using media and interactivity on Web pages
- Web site promotion
- E-commerce and the Web
- JavaScript[™]

A special feature of this text is the *Web Developer's Handbook*, which is a collection of appendixes providing resources such as an XHTML reference; a comparison of HTML, XHTML, and HTML 5; a CSS reference; and Section 508 Standards reference.

New to This Edition

The 5th Edition integrates XHTML and CSS topics such as text configuration, color configuration, and page layout with an enhanced focus on the topics of design, accessibility, and Web standards. Building on the textbook's successful 4th edition, updates for the the 5th edition feature:

- Expanded coverage of CSS topics
- Expanded coverage of design topics

- Updated code samples and web resources
- Updated accessibility coverage for Web Content Accessibility Guidelines (WCAG) 2.0
- Expanded section on Designing Your Web Pages for Promotion
- New sections on Domain Name Selection, Styling for the Mobile Web, Social Media Optimization, the Favorites Icon, and an overview of HTML 5

Student files are available for download from the Companion Website for this book at http://www.pearsonhighered.com/felke-morris. These files include solutions to the Hands-On Practice exercises, Web Site Case Study starter files, and an introduction to FTP. See the access card in the front of this book for further instructions.

Organization of the Text

The textbook is designed to be used in a flexible manner, and it can adapt easily to suit a variety of course and student needs. Chapter 1 provides introductory material, which may be skipped or covered depending on the background of students. Chapters 2 through 4 introduce XHTML and CSS coding. Chapter 5 discusses Web design best practices and can be covered anytime after Chapter 3 (or even along with Chapter 3). Chapters 6 through 9 continue with XHTML and CSS topics.

Any of the following chapters may be skipped or assigned as independent study, depending on time constraints and student needs: Chapter 10 (Web Site Development), Chapter 11 (Web Multimedia and Interactivity), Chapter 12 (E-Commerce Overview), Chapter 13 (Web Promotion), and Chapter 14 (A Brief Look at JavaScript). The Companion Website at http://www.pearsonhighered.com/felke-morris also provides an FTP tutorial and a bonus chapter on frames. A chapter dependency chart is shown in Figure P.1.

Brief Overview of Each Chapter

Chapter 1: Introduction to the Internet and the World Wide Web. This brief introduction covers the terms and concepts related to the Internet and the Web with which Web developers need to be familiar. For many students, some of this will be a review. Chapter 1 provides the base of knowledge on which the rest of the book is built.

Chapter 2: XHTML Basics. As HTML and XHTML are introduced, examples and exercises encourage students to create sample pages and gain useful experience. Solution pages for the Hands-On Practice are available in the student files.

Chapter 3: Configuring Color and Text with CSS. The technique of using Cascading Style Sheets to configure the color and text on Web pages is introduced. Students are encouraged to create sample pages as they read through the text. Sample pages for the Hands-On Practice are available in the student files.

Chapter 4: Visual Elements and Graphics. This chapter discusses the use of color and graphics on Web pages. Students are encouraged to create pages as they read through the text. Sample pages for the Hands-On Practice are available in the student files.



The textbook is flexible and can be adapted to individual needs



Chapter 5: Web Design. This chapter focuses on recommended Web site design practices and accessibility. Some of this is reinforcement because hints about recommended Web site design practices is incorporated into the XHTML chapters.

Chapter 6: Page Layout with CSS. This chapter continues the study of CSS begun earlier and introduces techniques for positioning and floating Web page elements, including a two-column CSS page layout. Sample pages for the Hands-On Practice are available in the student files.

Chapter 7: More on Links, Lists, and Layout. This chapter revisits earlier topics and introduces more advanced techniques related to hyperlinks, configuring navigation links in an unordered list, and a three-column CSS page layout. Students are encouraged to create pages as they read through the text. Sample pages for the Hands-On Practice are available in the student files.

Chapter 8: Tables. This chapter focuses on the XHTML elements used to create tables. Methods of configuring the table with CSS are introduced. Students are encouraged to create pages as they read through the text. Sample pages for the Hands-On Practice are available in the student files.

Chapter 9: XHTML Forms. This chapter focuses on the XHTML elements used to create forms. Methods of configuring the form with CSS are introduced. Students are encouraged to create sample pages as they read through the text. Sample pages for the Hands-On Practice are available in the student files.

Chapter 10: Web Site Development. A focus on the process of Web site development includes the job roles needed for a large-scale project, the Web development process, and Web hosting. A Web host checklist is included in this chapter.

Chapter 11: Web Multimedia and Interactivity. This chapter offers an overview of topics related to adding media and interactivity to Web pages. These topics include video, audio, Flash[®], Java[™] applets, JavaScript, DHTML, and Ajax. Students are encouraged to create pages as the topics are discussed. Sample pages for the Hands-On Practice are available in the student files.

Chapter 12: E-Commerce Overview. This chapter introduces e-commerce, security, and order processing on the Web.

Chapter 13: Web Promotion. This chapter discusses site promotion, from the Web developer's point of view, focusing on search engines and indexes.

Chapter 14: A Brief Look at JavaScript. This chapter provides an introduction to client-side scripting using JavaScript. Sample pages for the Hands-On Practice are available in the student files.

Web Developer's Handbook Appendixes: The *Handbook* contains appendixes that include resources and tutorials useful to students, such as an XHTML reference, a list of special characters, a CSS property reference, a comparison of HTML and XHTML—including an overview of HTML 5—and a Section 508 Standards reference.

Features of the Text

Well-Rounded Selection of Topics. This text includes both "hard" skills such as XHTML, CSS and JavaScript (Chapters 2, 3, 4, 6, 7, 8, 9, and 14) and "soft" skills such as Web design (Chapter 5), Web site promotion (Chapter 13), and e-commerce (Chapter 12). A tutorial about publishing to the Web using FTP is located in the student files. This well-rounded foundation will help students as they pursue careers as Web professionals. Students and instructors will find classes more interesting because they can discuss, integrate, and apply both hard and soft skills as students create Web pages and Web sites.

Hands-On Practice. Web development is a skill and skills are best learned by hands-on practice. This text emphasizes hands-on practice through practice exercises within the chapters, end-of-chapter exercises, and the development of Web sites through ongoing real-world case studies. The variety of exercises provides instructors with a choice of assignments for a particular course or semester.

Web Site Case Studies. There are four case studies that continue throughout most of the text (beginning at Chapter 2). An additional case study begins in Chapter 5. The case studies serve to reinforce skills discussed in each chapter. Instructors can cycle assignments from semester to semester or allow students to choose the case study that most interests them. Sample solutions to the case studies are available on the Instructor Resource Center at http://www.pearsonhighered.com/irc.

Web Research. Each chapter offers Web research activities that encourage students to study topics introduced in the chapter.

Focus on Web Design. Most chapters offer additional activities that explore Web design topics related to the chapter. These activities can be used to reinforce, extend, and enhance the course topics.



FAQs. In her Web development courses, the author is frequently asked similar questions by students. They are included in the book and are marked with the identifying FAQ logo.



Checkpoints. Each chapter contains two or three Checkpoints—groups of questions intended for students to self-assess their understanding of the material. A special Checkpoint icon appears with each group of questions.



Go to the end of the book for a full color version of this figure **Focus on Accessibility.** Developing accessible Web sites is more important than ever, and this text is infused with accessibility techniques throughout. The special icon shown here makes accessibility information easy to find.

Focus on Ethics. Ethics issues as related to Web development are highlighted throughout the text with the special ethics icon shown here.

Color Section. Some figures also appear in the full-color section, located at the end of the book. These figures are identified with the icon shown here.

Reference Materials. Web Developer's Handbook Appendixes offer reference material, including an XHTML reference, a list of special characters, a CSS property reference, a comparison of HTML and XHTML, and a Section 508 Standards reference.

Supplemental Materials

Student Resources. The following resources are available to all readers of this book at its Companion Website http://www.pearsonhighered.com/felke-morris:

- Student files for Web page exercises and Web Site Case Study assignments
- FTP tutorial
- Bonus XHTML frames chapter

A complimentary access code for the Companion Website is available with a new copy of this book. Subscriptions may also be purchased online.

Instructor Resources. The following supplements are available to qualified instructors only. Visit the Pearson Instructor Resource Center (http://www.pearsonhighered.com/irc) or send an e-mail to computing@aw.com for information on how to access them:

- Solutions to the end-of-chapter exercises
- Solutions for the case study assignments
- Study guides
- Test questions
- PowerPoint[®] presentations
- Sample syllabi

Author's Web Site. In addition to the publisher's Companion Website for this book, the author maintains a Web site at http://www.webdevfoundations.net. This Web site contains additional resources including a color chart, Flash learning/review games, Adobe Flash Tutorial, Adobe Fireworks[®] Tutorial, Adobe Photoshop[®] Tutorial, and a page for each chapter with examples, links, and updates. This Web site is not supported by the publisher.

World Organization of Webmasters (WOW). The World Organization of Webmasters designated this book as a recommended learning resource (http://www.webprofessionals.org/education/resources/self_study/s2.html) for the WOW Certified Web Designer Associate (CWDSA) certification exam.

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About the Author

Terry Felke-Morris is an Associate Professor at William Rainey Harper College in Palatine, Illinois. She holds a Master of Science degree in information systems and numerous certifications, including Adobe Certified Dreamweaver 8 Developer, WOW Certified Associate Webmaster, Microsoft Certified Professional, Master CIW Designer, and CIW Certified Instructor.

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Introduction to the Internet and **World Wide Web**

Chapter Objectives In this chapter, you will learn about ...

- The evolution of the Internet, Internet standards organizations, and the difference between the Internet, intranets, and extranets
- The beginning of the World Wide Web, ethical use of information on the Web, Web accessibility, and future Internet trends
- The client/server model, Internet protocols, networks, URLs and domain names, and markup languages

The Internet and the Web are parts of our daily lives.

How did they begin? What networking protocols and programming languages work behind the scenes to display a Web page? This chapter provides an introduction to some of these topics and is a foundation for the information that Web developers need to know. Some material in this chapter may be a review from your life experience or earlier studies.

1.1 Evolution of the Internet

The **Internet**, the interconnected network of computer networks, seems to be everywhere today. It has become part of our lives. You can't watch television or listen to the radio without being urged to visit a Web site. Even newspapers have their place on the Net.

The Internet began as a network to connect computers at research facilities and universities. Messages in this network would travel to their destination by multiple routes or paths. This would allow the network to function even if parts of it were broken or destroyed. The message would be rerouted through a functioning portion of the network while traveling to its destination. This network was proposed to the Advanced Research Projects Agency (ARPA)—and the ARPAnet was born. Four computers (located at UCLA, Stanford Research Institute, University of California Santa Barbara, and the University of Utah) were connected by the end of 1969.

As time went on, other networks, such as the National Science Foundation's NSFnet, were created and connected with the ARPAnet. The communications protocol that enabled all this to happen is the Transmissions Control Protocol/Internet Protocol (TCP/IP), propsed by Vinton Cerf and Robert Kahn. Use of this interconnected network, or Internet, was originally limited to government, research, and educational purposes. Even with this restriction, by 1989 there were over 100,000 hosts on the Internet. The ban on commercial use was lifted in 1991, and by the end of 1992 there were over 1 million hosts connected. Hobbes' Internet Timeline reports that as of 2006, there were over 439 million host computers on the Internet. The growth of the Internet continues—Internet World Stats (http://www.internetworldstats.com/emarketing.htm) reported over 1.5 billion users on the Internet in early 2009.

If you are interested in the history of the Internet, visit either of the following links for more information.

- A brief history of the Internet written by the people who created it can be found at http://www.isoc.org/internet/history/brief.shtml.
- For a classic treatment of the Internet's history, visit Hobbes' Internet Timeline at http://www.zakon.org/robert/internet/timeline/.



How can I tell whether a Web page is a reliable source of information?

There are many Web sites—but which ones are reliable sources of information? When visiting Web sites to find information it is important not to take everything at face value.

First, evaluate the credibility of the Web site itself. Does it have its own domain name, such as http://mywebsite.com, or is it a free Web site consisting of just a folder of files hosted on a free Web server? The URL of a site hosted on a free Web server usually includes part of the free Web server's name and might begin with something such as http://mysite.tripod.com or http://www. angelfire.com/foldername/mysite. Information obtained from a Web site that has its own domain name will usually (but not always) be more reliable than information obtained from a free Web site.

Evaluate the type of domain name—is it a nonprofit organization (.org), a business (.com or .biz), an educational institution (.edu)? Businesses may provide information in a way that gives them an advantage, so be careful. Nonprofit organizations or schools will sometimes treat a subject more objectively.

Another item to look at is the date the Web page was created or last updated. Although some information is timeless, very often a Web page that has not been updated for several years is outdated and not the best source of information.

1.2 Internet, Intranets, and Extranets

The Internet is an interconnected network of computer networks that is globally available. When an organization needs the communication capabilities of the Internet but doesn't want its information to be available to everyone, either an intranet or extranet is appropriate.

An **intranet** is a private network that is contained within an organization or business. Its purpose is to share organizational information and resources among coworkers. When an intranet connects to the outside Internet, usually a gateway or firewall protects the intranet from unauthorized access.

An extranet is a private network that securely shares part of an organization's information or operations with external partners such as suppliers, vendors, and customers. Extranets can be used to exchange data, share information exclusively with business partners, and collaborate with other organizations. Privacy and security are important issues in extranet use. Digital certificates, encryption of messages, and virtual private networks (VPNs) are some technologies used to provide privacy and security for an extranet. Digital certificates and encryption used in e-commerce are discussed in Chapter 12.

The Evolution of the World Wide Web

Recall that the original Internet—the ARPAnet—began with four hosts. The number of host computers connected to the Internet grew each year. However, the communication was text-based and the information stored on computers connected to the Internet was not easy to obtain. Initially, the use of the Internet was limited to academics, researchers, students, and government employees. Even with these restrictions there were over 300,000 hosts in 1990.

Why did the Internet grow from 300,000 hosts in 1990 to over 109 million in just over a decade? In the early 1990s, the convergence of three events occurred to cause explosive growth of the Internet.

In 1991, the NSFnet removed the restriction on commercial use of the Internet, setting the stage for future electronic commerce. Businesses were now welcome on the Internet. However, while businesses were no longer banned, the Internet was still text-based and not easy to use. The next developments solved this issue.

While working at CERN, a research facility in Switzerland, Tim Berners-Lee envisioned a means of communication for scientists where they could easily "hyperlink" to another research paper or article and immediately view it. Berners-Lee created the **World Wide Web** to fulfill this need and in 1991 he posted the code in a newsgroup. This version of the World Wide Web used **Hypertext Transfer Protocol (HTTP)** to communicate between the client computer and the Web server, used **Hypertext Markup Language** (**HTML**) to format the documents, and was text-based.

In 1993, the first graphics-based Web browser, Mosaic, became available. Marc Andreessen and graduate students working at the National Center for Supercomputing Applications (NCSA) at the University of Illinois Urbana-Champaign developed Mosaic. Some individuals in this group later created another well-known Web browser— Netscape Navigator. The combination of commercial use, HTTP, and a graphical user interface made the information on the Internet much easier to access. The World Wide Web—the graphical user interface to the information stored on computers connected to the Internet—had arrived!

1.3 Standards and Coordination

You are probably aware that no single person or group runs the entire Internet. Each separate network is managed individually. However, there are a number of groups that develop standards and guidelines. These groups are a driving force in the growth and evolution of the Internet.

The Internet Society, http://www.isoc.org, is a professional organization that provides leadership in issues related to the future of the Internet. The Internet Society is the organizational home for the groups responsible for Internet infrastructure standards, including the Internet Engineering Task Force (IETF) and the Internet Architecture Board (IAB).

You can think of the IETF as the protocol engineering and development arm of the Internet. It is the principal body engaged in the development of new Internet standard specifications. The IETF is an open international community of network designers, operators, vendors, and researchers concerned with the evolution of Internet architecture and the smooth operation of the Internet. The actual technical work of the IETF is completed in its working groups. These working groups are organized into areas by topic, such as security and routing.

The IAB is a committee of the IETF and provides guidance and broad direction to the IETF. As a function of this purpose, the IAB is responsible for the publication of the **Request for Comments (RFC)** document series.

An RFC is a formal document from the IETF that is drafted by a committee and subsequently reviewed by interested parties. RFCs are available for online review at http://www.ietf.org/rfc.html. Some RFCs are informational in nature, while others are meant to become Internet standards. In the latter case, the final version of the RFC becomes a new standard. Future changes to the standard must be made through subsequent RFCs.

The Internet Corporation for Assigned Numbers and Names (ICANN), http://www. icann.org, was created in 1998 and is a nonprofit organization. Its main function is to coordinate the assignment of Internet domain names, IP address numbers, protocol parameters, and protocol port numbers. Prior to 1998, the Internet Assigned Numbers Authority (IANA) coordinated these functions. IANA still performs certain functions under the guidance of ICANN and maintains a Web site at http://www.iana.org.

1.4 Standards and the World Wide Web Consortium

As with the Internet in general, no one person or group runs the World Wide Web. However, the World Wide Web Consortium (W3C), http://www.w3.org, takes a proactive role in developing recommendations and prototype technologies related to the Web. Four major areas that the W3C addresses are Web architecture, user interface, technology and society, and the **Web Accessibility Initiative** (WAI). In an effort to standardize Web technologies, the W3C produces specifications called recommendations.

The W3C Recommendations are created in working groups with input from many major corporations involved in building Web technologies. These recommendations are not rules; they are guidelines. Major software companies that build Web browsers, such as Microsoft and Netscape, do not always follow the W3C Recommendations. This makes life difficult for Web developers because not all browsers will display a Web page in exactly the same way.

The good news is that there is a convergence toward the W3C Recommendations in new versions of major browsers. There are even organized groups such as The Web Standards Project, http://webstandards.org, whose mission is to promote W3C Recommendations (often called Web standards) not only to the creators of browsers but also to Web developers and designers.

Accessibility and the Web

The Web Accessibility Initiative (WAI), http://www.w3.org/WAI/, is a major area of work by the W3C. Since the Web has become an integral part of daily life, there is a need for all individuals to be able to access it. According to Tim Berners-Lee at http://www.w3.org/WAI/, "The power of the Web is in its universality. Access by every-one regardless of disability is an essential aspect."

The Web can present barriers to individuals with visual, auditory, physical, and neurological disabilities. The WAI has developed recommendations for Web content developers, Web authoring tool developers, Web browser developers, and developers of other user agents to facilitate use of the Web by those with special needs. See the WAI's Web Content Accessibility Guidelines (WCAG) at http://www.w3.org/WAI/WCAG20/ quickref/ for a list of these recommendations.

The Americans with Disabilities Act (ADA) of 1990 is a Federal civil rights law that prohibits discrimination against people with disabilities. The ADA requires that business, federal, and state services are accessible to individuals with disabilities. A 1996 Department of Justice ruling, http://www.usdoj.gov/crt/foia/cltr204.txt, indicated that ADA accessibility requirements apply to Internet resources.

Section 508 of the Federal Rehabilitation Act was amended in 1998 to require that U.S. government agencies give individuals with disabilities access to information technology that is comparable to the access available to others. This law requires developers creating information technology (including Web pages) for use by the federal government to provide for **accessibility**. The Federal IT Accessibility Initiative, http://www.section508.gov, provides accessibility requirement resources for information technology developers. In recent years, state governments have also begun to encourage and promote Web accessibility. The Illinois Information Technology Accessibility Act (IITAA) guidelines, http://www.dhs.state.il.us/IITAA/IITAAWebImplementationGuidelines.html, are an example of this trend.

Forward-thinking Web developers design with accessibility in mind. Providing access for visitors with visual, auditory, and other challenges should be an integral part of Web design rather than an afterthought.



A person with visual difficulties may not be able to use graphical navigation buttons and may use a screen reader device to provide an audible description of the Web page. By making a few simple changes, such as providing text descriptions for the images and perhaps providing a text navigation area at the bottom of the page, Web developers can make the page accessible. Often, providing for accessibility increases the usability of the Web site for all visitors. For example, text in high contrast to the background is easier for everyone to read. As this text introduces Web development and design techniques, corresponding Web accessibility and usability issues are discussed.

Ethical Use of Information on the Web



This wonderful technology called the World Wide Web provides us with information, graphics, and music—all virtually free (after you pay your Internet service provider, of course). Let's consider the following issues relating to the ethical use of this information:

- Is it acceptable to copy someone's graphic to use on your own Web site?
- Is it acceptable to copy someone's Web site design to use on your own site or on a client's site?
- Is it acceptable to copy an essay that appears on a Web page and use it or parts of it as your own writing?
- Is it acceptable to insult someone on your Web site or link to their site in a derogatory manner?

The answer to all these questions is no. Using someone's graphic without permission is the same as stealing it. In fact, if you link to it you are actually using up some of their bandwidth and may be costing them money. Copying the Web site design of another person or company is also a form of stealing. The Web site http://pirated-sites.com presents a somewhat quirky look at this issue. Any text or graphic on a Web site is automatically copyrighted in the United States whether or not a copyright symbol appears on the site. Insulting a person or company on your Web site or linking to them in a derogatory manner could be considered a form of defamation.

Issues like these, related to intellectual property, copyright, and freedom of speech are regularly discussed and decided in courts of law. Good Web etiquette requires that you ask permission before using others' work, give credit for what you use ("fair use" in the U.S. copyright law), and exercise your freedom of speech in a manner that is not harmful to others. The **World Intellectual Property Organization** (WIPO), http://wipo.int, is dedicated to protecting intellectual property rights internationally.

What if you'd like to retain ownership but make it easy for others to use or adapt your work? Creative Commons, http://creativecommons.org, is a nonprofit organization that provides free services that allow authors and artists to register a type of a copyright license called a Creative Commons license. There are several licenses to choose from—depending on the rights you wish to grant. The Creative Commons license informs others exactly what they can and cannot do with your creative work. See http://meyerweb.com/eric/tools/color-blend for a Web page licensed under a Creative Commons Attribution-ShareAlike 1.0 License with "Some Rights Reserved."

CHECKPOINT 1.1

- 1. Describe the difference between the Internet and an intranet.
- 2. Explain three events that contributed to the commercialization and exponential growth of the Internet.
- 3. Describe the difference between the Internet and the Web.

1.5 Network Overview

A network consists of two or more computers connected for the purpose of communicating and sharing resources. Common components of a network are shown in Figure 1.1 and include the following:

- Server computer(s)
- Client workstation computer(s)
- Shared devices such as printers
- Networking devices (router and switch) and the media that connect them



The clients are the computer workstations used by individuals, such as a PC on a desk. The server receives requests from client computers for resources such as files. Computers used as servers are usually kept in a protected, secure area and are only accessed by network administrators. Networking devices such as hubs and switches provide network connections for computers, and routers direct information from one network to another. The media connecting the clients, servers, peripherals, and networking devices may consist of copper cables, fiber optic cables, or wireless technologies.

Networks vary in scale. A Local Area Network (LAN) is usually confined to a single building or group of connected buildings. Your school computer lab may use a LAN. If you work in an office, you probably use a computer connected to a LAN. Recently, many people have begun to set up LANs in their homes to share resources among computers. A **Metropolitan Area Network (MAN)** connects users with computer resources in a geographical area. It also can be used to connect two or more LANs. A **Wide Area Network** (**WAN**) is geographically dispersed and usually uses some form of public or commercial communications network. For example, an organization with offices on both the East and West Coasts of the United States probably uses a WAN to provide a link between the LANs at each of the offices. See Figure 1.2 for a diagram of this connectivity.





A **backbone** is a high-capacity communication link that carries data gathered from smaller links that interconnect with it. On the Internet, a backbone is a set of paths that local or regional networks (MANs) connect to for long-distance interconnection. The Internet is a group of interconnected networks with very high-speed connectivity provided by the Internet backbones. Figure 1.3 shows a commercial backbone network map generated by http://www.caida.org/tools/visualization/mapnet/Backbones.



1.6 The Client/Server Model

The term **client/server** dates from the last millennium (the 1980s) and refers to personal computers joined by a network. Client/server can also describe a relationship between two computer programs—the client and the server. The client requests some type of service (such as a file or database access) from the server. The server fulfills the request and transmits the results to the client over a network. While both the client and the server programs can reside on the same computer, typically they run on different computers. It is common for a server to handle requests from multiple clients.

The Internet is a great example of client/server architecture at work. Consider the following scenario: An individual is at a computer using a Web browser client to access the Internet. The individual uses the Web browser to visit a Web site, let's say http://www.yahoo.com. The server is the Web server program running on the computer with an IP address that corresponds to yahoo.com. It is contacted, locates the Web page and related resources that were requested, and responds by sending them to the individual.

In short, here's how to distinguish between Web clients and Web servers:

Web Client

- Connected to the Internet when needed
- Usually runs Web browser (client) software such as Internet Explorer or Netscape
- Uses HTTP
- Requests Web pages from a server
- Receives Web pages and files from a server

Web Server

- Continually connected to the Internet
- Runs Web server software (such as Apache or Internet Information Server)
- Uses HTTP
- Receives a request for the Web page
- Responds to the request and transmits the status code, Web page, and associated files

When clients and servers exchange files, they often need to indicate the type of file that is being transferred; this is done through the use of a MIME type. **Multi-Purpose Internet Mail Extensions (MIME)** are rules that allow multimedia documents to be exchanged among many different computer systems. MIME was initially intended to extend the original Internet e-mail protocol, but it is also used by HTTP. MIME provides for the exchange of seven different media types on the Internet: audio, video, image, application, message, multipart, and text. MIME also uses subtypes to further describe the data. The MIME type of a Web page is text/html. MIME types of gif and jpeg images are image/gif and image/jpeg respectively.

A Web server determines the MIME type of a file before it is transmitted to the Web browser. The MIME type is sent along with the document. The Web browser uses the MIME type to determine how to display the document.

How does information get transferred from the Web server to the Web browser? Clients (such as Web browsers) and servers (such as a Web server) exchange information through the use of communication protocols such as HTTP, TCP, and IP.

1.7 Internet Protocols

Protocols are rules that describe how clients and servers communicate with each other over a network. There is no single protocol that makes the Internet and Web work—a number of protocols with specific functions are needed.

File Transfer Protocol (FTP)

File Transfer Protocol (FTP) is a set of rules that allow files to be exchanged between computers on the Internet. Unlike HTTP, which is used by Web browsers to request Web pages and their associated files in order to display a Web page, FTP is used simply to move files from one computer to another. Web developers commonly use FTP to transfer Web page files from their computers to Web servers. FTP is also commonly used to download programs and files from other servers to individual computers.

E-mail Protocols

Most of us take e-mail for granted, but there are two servers involved in its smooth functioning—an incoming mail server and an outgoing mail server. When you send e-mail to others, Simple Mail Transfer Protocol (SMTP) is used. When you receive e-mail, Post Office Protocol (POP; currently POP3) and Internet Message Access Protocol (IMAP) can be used.

Hypertext Transfer Protocol (HTTP)

HTTP is a set of rules for exchanging files such as text, graphic images, sound, video, and other multimedia files on the Web. Web browsers and Web servers usually use this protocol. When the user of a Web browser requests a file by typing a Web site address or clicking a hyperlink, the browser builds an HTTP request and sends it to the server. The Web server in the destination machine receives the request, does any necessary processing, and responds with the requested file and any associated media files.

Transmission Control Protocol/Internet Protocol (TCP/IP)

Transmission Control Protocol/Internet Protocol (TCP/IP) has been adopted as the official communication protocol of the Internet. TCP and IP have different functions that work together to ensure reliable communication over the Internet.

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TCP. The purpose of TCP is to ensure the integrity of network communication. TCP starts by breaking files and messages into individual units called packets. These packets (see Figure 1.4) contain information such as the destination, source, sequence number, and checksum values used to verify the integrity of the data.



TCP is used together with IP to transmit files efficiently over the Internet. IP takes over after TCP creates the packets, using IP addressing to send each packet over the Internet using the best path at the particular time. When the destination address is reached, TCP verifies the integrity of each packet using the checksum, requests a resend if a packet is damaged, and reassembles the file or message from the multiple packets.

IP. Working in harmony with TCP, IP is a set of rules that controls how data is sent between computers on the Internet. IP routes a packet to the correct destination address. Once sent, the packet gets successively forwarded to the next closest router (a hardware device designed to move network traffic) until it reaches its destination.

Each device connected to the Internet has a unique numeric IP address. These addresses consist of a set of four groups of numbers, called octets. The current version of IP, IPv4, uses 32-bit (binary digit) addressing. This results in a decimal number in the format of xxx.xxx.xxx, where each xxx is a value from 0 to 255. The IP address may correspond to a domain name. The Domain Name System (DNS) associates these IP addresses with the text-based URLs and domain names you type into a Web browser address box (more on this later). For example, at the time this was written the IP address of Google was 74.125.95.104.

You can enter this number in the address text box in a Web browser (as shown in Figure 1.5), press [Enter], and the Google home page will display. Of course, it's much



Figure 1.4 TCP packet

Figure 1.5

Entering an IP

browser

easier to type "google.com," which is why domain names such as google.com were created in the first place!

Since long strings of numbers are difficult for humans to remember, the Domain Name System was introduced as a way to associate text-based names with numeric IP addresses.

1.8 URIs, URLs, and Domain Names

URIs and URLs

A Uniform Resource Identifier (URI) identifies a resource on the Internet. A Uniform Resource Locator (URL) is a type of URI which represents the network location of a resource such as a Web page, a graphic file, or an MP3 file. The URL consists of the protocol, the domain name, and the hierarchical location of the file on the Web server.

The URL http://www.webdevfoundations.net, shown in Figure 1.6, denotes the use of HTTP protocol and the Web server named www at the domain name of webdevfoundations.net. In this case, the root file (usually index.html or index.htm) will be displayed.



http://www.webdevfoundations.net



If the URL was of the form http://www.webdevfoundations.net/chapter1/links.html, as shown in Figure 1.7, it would denote the use of HTTP protocol and a Web server named www at the domain name of webdevfoundations.net. The resource to be displayed is the Web page named links.html in the chapter1 folder.



Officially, URL stands for Uniform Resource Locator; but originally, Tim Berners-Lee (the inventor of the Web) envisioned a Universal Resource Locator. That is why some texts or Web pages refer to the URL in that manner. Read Tim Berners-Lee's book *Weaving the Web* for an interesting view of the creation of the Web.

Figure 1.8 shows a URL used to display files available for FTP download in the format of ftp://ftp.microsoft.com. This denotes the use of the FTP protocol, the server named ftp, and the domain name of microsoft.com.



ftp://ftp.microsoft.com FTP Protocol FTP Server Computer Name

Domain Names

A domain name locates an organization or other entity on the Internet. The purpose of the Domain Name System (DNS) is to divide the Internet into logical groups and understandable names by identifying the exact address and type of the organization. The DNS associates the text-based domain names with the unique numeric IP address assigned to a device.

Let's consider the domain name www.yahoo.com. The .com is the top-level domain name. The portion yahoo.com is the domain name that is registered to Yahoo! and is considered a second-level domain name. The www is the name of the Web server (sometimes called **Web host server**) at the yahoo.com domain. Taken all together, www.yahoo.com is considered to be a **Fully-Qualified Domain Name** (FQDN).

Top-Level Domain Names (TLDs). A top-level domain (TLD) identifies the rightmost part of the domain name. A TLD is either a generic top-level domain, such as com for commercial, or a country code top-level domain, such as fr for France. ICANN administers the generic top-level domains shown in Table 1.1.

Generic TLD	Used By
.aero	Air-transport industry
.asia	Pan-Asia and Asia Pacific community
.biz	Businesses
.cat	Catalan linguistic and cultural community
.com	Commercial entities
.coop	Cooperative
.edu	Restricted to accredited degree-granting institutions of higher education
.gov	Restricted to government use
.info	Unrestricted use
.int	International organization (rarely used)
.jobs	Human resource management community
.mil	Restricted to military use
.mobi	Corresponds to a .com Web site-the .mobi site is designed for easy access by mobile devices
.museum	Museums
.name	Individuals
.net	Entities associated with network support of the Internet, usually Internet service providers or
	telecommunication companies
.org	Nonprofit entities
.pro	Accountants, physicians, and lawyers
.tel	Contact information for individuals and businesses
.travel	Travel industry

Table 1.1 Top-level domains

The .com, .org, and .net TLD designations are currently used on the honor system, which means that an individual who owns a shoe store (not related to networking) can register shoes.net.

Country Code Top-Level Domain Names. Two-character country codes have also been assigned as top-level domain names. These were originally intended to be meaningful and relate the domain name country code to the geographical location of the individual or organization that registered the name. In practice, it is fairly easy to obtain a domain name with a country code TLD that is not local to the registrant. See http://register.com and many other domain name registration companies for examples. Table 1.2 lists some popular country codes used on the Web.

Country Code	
TLD	Country
.au	Australia
.de	Germany
.in	India
.jp	Japan
.nl	The Netherlands
.US	United States
.eu	European Union (a group of countries rather than a single country)

Table 1.2	Country	codes
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The IANA Web site at http://www.iana.org/cctld/cctld-whois.htm has a complete list. Domain names with country codes are often used for municipalities, schools, and community colleges in the United States. The domain name www.harper.cc.il.us denotes the United States, Illinois, community college, Harper, and the Web server named www as the site for William Rainey Harper College in Illinois.

The DNS associates domain names with IP addresses. The following happens each time a new URL is typed into a Web browser:

- **1.** The DNS is accessed.
- 2. The corresponding IP address is obtained and returned to the Web browser.
- **3.** The Web browser sends an HTTP request to the destination computer with the corresponding IP address.
- 4. The HTTP request is received by the Web server.
- 5. The necessary files are located and sent by HTTP responses to the Web browser.
- 6. The Web browser renders and displays the Web page and associated files.

The next time you wonder why it's taking so long to display a Web page, think about all of the processing that goes on behind the scenes.

1.9 Markup Languages

Markup languages consist of sets of directions that tell the browser software (and other user agents such as mobile phones) how to display and manage a Web document. These directions are usually called tags and perform functions such as displaying graphics, formatting text, and referencing hyperlinks.

Standard Generalized Markup Language (SGML)

Standard Generalized Markup Language (SGML) is a standard for specifying a markup language or tag set. SGML in itself is not a document language, but a description of how to specify one and create a document type definition (DTD). When Tim Berners-Lee created HTML, he used SGML to create the specification.

Hypertext Markup Language (HTML)

HTML is the set of markup symbols or codes placed in a file intended for display on a Web browser. The Web browser renders the code in the HTML file and displays the Web page document and associated files. The W3C (http://www.w3.org) sets the standards for HTML. Although the most recent version of HTML is called **XHTML** 1.1, this text uses XHTML 1.0 because it is less strict and is well-supported by popular browsers.

Extensible Markup Language (XML)

XML was developed by the W3C as a flexible method to create common information formats and share the format and the information on the Web. It is a text-based syntax designed to describe, deliver, and exchange structured information. It is not intended to replace HTML, but to extend the power of HTML by separating data from presentation. Using XML, developers can create whatever tags they need to describe their information.

Extensible Hypertext Markup Language (XHTML)

XHTML was developed by the W3C to reformulate HTML 4.01 as an application of XML. It combines the formatting strengths of HTML 4.01 *and* the data structure and extensibility strengths of XML.

The primary advantages of XHTML include the ability to extend the language by creating new tags and the promise of increased platform interoperability as mobile devices are used more frequently to access the Web.

HTML 5—The Next Version of (X)HTML

As this was written, the W3C's HTML Working Group (HTML WG) was busy creating a draft recommendation for HTML 5—which is intended to be the next version of HTML 4 and will replace XHTML. HTML 5, currently in draft status, incorporates features of both HTML and XHTML, adds new elements, and is intended to be backward compatible. Check the blog on the textbook's Web site, http://webdevfoundations.net, for new developments.



CHECKPOINT 1.2

- 1. Describe the components of the client/server model as applied to the Internet.
- 2. Identify two protocols used on the Internet to convey information that use the Internet but do not use the Web.
- 3. Explain the similarities and differences between a URL and a domain name.

1.10 Internet and Web Trends

E-commerce, the buying and selling of goods on the Internet, is already an important part of the Web. According to a recent study by Jupiter Research (http://www.jupitermedia.com/corporate/releases/06.02.06-newjupresearch.html), revenue generated by e-commerce will continue to grow. By 2012, over \$183 billion in online retail sales are projected by eMarketer (http://www.emarketer.com/Article.aspx?R=1006813). With over 1.5 billion people online worldwide (http://www.internetworldstats.com/ emarketing.htm), that's quite a few potential shoppers!

As wireless Web access becomes more commonplace, e-commerce and Internet access not only will be regularly done from stationary computers but also from mobile devices—Palm Pilots, netbooks, smartphones, and devices we haven't even imagined yet.

How do we keep track of all the devices (wireless and otherwise) that are connected to the Internet? You are already aware that each device on the Internet is assigned a unique number called an IP address. Currently, IPv4 is being used. Theoretically, this allows for at most 4 billion possible IP addresses (although many potential addresses are reserved for special uses). With the proliferation of mobile devices, even this many addresses may not be enough. **IP Version 6 (IPv6)** will provide a huge increase in the number of possible addresses and many technological advances.



What is IPv6?

IPv6, Internet Protocol Version 6, is the most recent version of the Internet Protocol. IPv6 was designed as an evolutionary set of improvements to the current IPv4 and is backwardly compatible with it. Service providers and Internet users can update to IPv6 independently without having to coordinate with each other.

IPv6 provides for more Internet addresses because the IP address is lengthened from 32 bits to 128 bits. This means that there are potentially 2¹²⁸ unique IP addresses possible, or 340,282,366,920,938,463,463,347,607,431,768,211,456. (Now there will be enough IP addresses for everyone's PC, notebook, cell phone, pager, PDA, automobile, toaster, and so on!)

The development of the Internet2 is another effort in advancing Internet technology. The Internet2 consortium comprises more than one hundred U.S. universities in partnership with industry and government. Their mission is to develop and deploy advanced network applications and technologies, focusing on applications related to learning and research such as telemedicine, digital libraries, and virtual laboratories. Visit the Internet2 Web site at http://www.internet2.edu for information on this initiative.

Another technology to be aware of is web services. A **web service** is a self-describing, self-contained application that provides some business functionality through an Internet connection. For example, an organization could create a Web service to facilitate information exchange with its partners or vendors. The Universal Discovery,

Description, and Integration (UDDI) standard, http://uddi.xml.org, is backed by a number of technology companies, including IBM, Microsoft, and Sun Microsystems. Essentially, UDDI provides a method of describing a service, invoking a service, and locating available services. Microsoft's .NET platform supports Web services. Microsoft and IBM jointly developed Web Services Description Language (WSDL) to facilitate the use of Web services.

While the Web service initiative is driven by large corporations, the trend of keeping a Web log, or blog, has been driven by individuals as a forum for personal expression. A blog is a journal that is available on the Web—it's a frequently updated page with a chronological list of ideas and links. Blog topics range from political journals to technical information to personal diaries. Blogs can focus on one subject or range across a diverse group of topics-it's up to the person, called a blogger, who creates and maintains the blog. Bloggers usually update their blogs daily with easy-to-use software designed to allow people with little or no technical background to update and maintain the blog. The PEW Internet & American Life Project (http://www. pewinternet.org) reports that 42 percent of American adults read blogs daily and about 12 percent of American adults keep a blog. Many blogs are hosted at blog communities such as http://blogspot.com, http://wordpress.com, or http://www. xanga.com. Others are hosted at individual Web sites, such as the blog kept by the CSS expert Eric Meyer at http://meyerweb.com. Businesses have noted the value of blogs as communication and customer relationship tools. Companies such as IBM, http://www.ibm.com/developerworks/blogs/, and Adobe, http://feeds.adobe.com, utilize blogs in this manner.

A wiki is a Web site that can be updated immediately at any time by visitors using a simple form on a Web page. Some wikis are intended for a small group of people, such as the members of an organization. The most powerful wiki is Wikipedia, http://wikipedia.org, an online encyclopedia, which can be updated by anyone at any-time. This is a form of social software in action—visitors sharing their collective knowledge to create a resource freely used by all. While there have been isolated incidents of practical jokes and occasionally inaccurate information posted at Wikipedia, the information and resource links are a good starting point when exploring a topic.

Blogs and wikis provide Web visitors new methods to utilize and interact with Web sites and other people—referred to as **social computing** or **social networking**. A trendy activity these days is participating in a social networking site such as Facebook (http://facebook.com), MySpace (http://myspace.com), or LinkedIn (http://linkedin.com). The PEW Internet & American Life Project reported that in a recent three year period, the use of a social networking site by American adults increased from 8% to 35%. The popularity of these sites seems to keep growing—Facebook welcomed its 200 millionth active user in 2009! While LinkedIn was created with professional and business networking in mind, businesses have also found it useful to create Facebook and MySpace site to promote their products and services.

Twitter (http://twitter.com) is a social networking site for microblogging, or frequently communicating with a brief messages (140 characters or less) called a **tweet**. Twitter users (called twitterers) tweet to update a network of friends and followers with daily activities and observations. The PEW Internet & American Life Project reported over 11% of American adults used a microblogging service such as Twitter in 2008. The research firm eMarketer (http://www.emarketer.com/Article.aspx?R=1007059) predicted that there would be over 18 million Twitter users by 2010. However, Twitter is not
limited to personal use only. The business world has also discovered the marketing reach that Twitter can provide. Business Week reported that Dell's use of Twitter resulted in \$500,000 of new orders within a 12-month period.

Really Simple Syndication or Rich Site Summary (RSS) is used to create newsfeeds from blog postings and other Web sites. The RSS feeds contain a summary of new items posted to the site. The URL to the RSS feed is usually indicated by the letters XML or RSS in white text within an orange rectangle. A newsreader is needed to access the information. Some browsers, such as Firefox, Safari, and Internet Explorer (version 7 or later) can display RSS feeds. Commercial and shareware newsreader applications are also available. The newsreader will poll the feed URL at intervals and display the new headlines when requested. RSS provides Web site developers with a method to push new content to interested parties and (hopefully) generate return visits to the site.

Podcasts are audio files on the Web—they may take the format of an audio blog, radio show, or interview. Podcasts are typically delivered by an RSS feed but can also be made available by recording an MP3 file and providing a link on a Web page. These files can be saved to your computer or to an MP3 player (such as an iPod) for later listening. Forrester Research (http://forrester.com/Research/Document/Excerpt/0,7211,36428,00.html) predicts that by 2010 more than 12 million households will access podcasts.

Flickr (http://www.flickr.com/) and del.icio.us (http://del.icio.us/) are two social software sites that provide information-sharing opportunities. Flickr, a photo sharing site, calls itself the "best way to store, search, sort, and share your photos." Acquired by Yahoo!, del.icio.us is a collection of favorite sites—allowing registered users to post lists of favorites, share their favorites with others, and discover new sites. Web sites such as Wikipedia, Flickr, Twitter, and del.icio.us are examples of what is called Web 2.0. While a consensus on the definition of Web 2.0 still needs to be reached, think of it as the next step in the transition of the Web from isolated static Web sites to a platform that utilizes technology to provide rich interfaces and social networking opportunities. Visit http://www.go2web20.net and use the search engine to find Web 2.0 sites. Read Tim O'Reilly's informative Web 2.0 essay at http://oreillynet.com/pub/a/oreilly/tim/news/2005/ 09/30/what-is-web-20.html for more information on this developing topic.

The single future trend that you can expect to remain the same is the trend of constant change. Internet- and Web-related technologies are in a constant state of development and improvement. If constant change and the need to learn something new excites you, Web development is a fascinating field. The skills and knowledge you gain in this book should provide a solid foundation for your future learning.



The Web is changing by the minute. Check the textbook's companion Web site at http://webdevfoundations.net for a blog that will help you stay current about Web trends.

CHAPTER SUMMARY

This chapter provided a brief overview of Internet, Web, and introductory networking concepts. Much of this information may be familiar to you. Visit the textbook Web site at http://www.webdevfoundations.net for the links listed in this chapter and for updated information.

Key Terms

accessibility backbone blog client/server clients domain name Domain Name System (DNS) extranet File Transfer Protocol (FTP) Fully-Qualified Domain Name (FQDN) Hypertext Markup Language (HTML) Hypertext Transfer Protocol (HTTP) Internet Internet Architecture Board (IAB) Internet Assigned Numbers Authority (IANA) Internet Corporation for Assigned Numbers and Names (ICANN) Internet Engineering Task Force (IETF) Internet Message Access Protocol (IMAP) Internet Society

intranet IP IP address IP Version 6 (IPv6) Local Area Network (LAN) markup languages media microblogging Metropolitan Area Network (MAN) Multi-Purpose Internet Mail Extensions (MIME) network newsreader packets podcasts Post Office Protocol (POP3) protocols Really Simple Syndication or Rich Site Summary (RSS) Request for Comments (RFC) server Simple Mail Transfer Protocol (SMTP) social computing social networking

Standard Generalized Markup Language (SGML) TCP Top-level domain (TLD) Transmission Control Protocol/Internet Protocol (TCP/IP) tweet Uniform Resource Indicator (URI) Uniform Resource Locator (URL) Web 2.0 Web Accessibility Initiative (WAI) Web host server Web service Wide Area Network (WAN) wiki World Intellectual Property Organization (WIPO) World Wide Web World Wide Web Consortium (W3C) **XHTML** XML

Review Questions

Multiple Choice

- **1.** Of the following organizations, which one coordinates applications for new TLDs?
 - a. Assigned Numbers Authority (IANA)
 - b. Engineering Task Force (IETF)
 - c. Corporation for Assigned Numbers and Names (ICANN)
 - d. World Wide Web Consortium (W3C)
- **2.** Which of the following is a network that covers a small area, such as a group of buildings or campus?
 - a. LAN
 - b. WAN
 - c. Internet
 - d. WWW

- **3.** Which of the markup languages listed below is intended to extend the power of HTML by separating data from presentation?
 - a. XML
 - b. XHTML
 - c. HTML 5
 - d. SGML
- **4.** What is a unique text-based Internet address corresponding to a computer's unique numeric IP address called?
 - a. IP address
 - b. domain name
 - c. URL
 - d. user name
- **5.** Which of the organizations listed below take a proactive role in developing recommendations and prototype technologies related to the Web?
 - a. World Wide Web Consortium (W3C)
 - b. Web Professional Standards Organization (WPO)
 - c. Internet Engineering Task Force (IETF)
 - d. Internet Corporation for Assigned Numbers and Names (ICANN)

True or False

6. _____ Markup languages contain sets of directions that tell the browser software how to display and manage a Web document.

- 7. ____ The World Wide Web was developed to allow companies to conduct e-commerce over the Internet.
- **8.** _____ A URL is one type of URI.
- **9.** <u>A domain name that ends in .net indicates</u> that the Web site is for a networking company.

Fill in the Blank

- **10.** ______ combines the formatting strengths of HTML 4.0 and the data structure and extensibility strengths of XML.
- A standard language used for specifying a markup language or tag set is _____.
- 12. ______ is the set of markup symbols or codes placed in a file intended for display on a Web browser.
- The World Wide Web was developed by an individual working at _____.
- **14.** Frequently communicating by posting brief messages at a social networking site is called
- **15.** The purpose of ______ is to ensure the integrity of the communication.

Hands-On Exercise

1. Create a blog to document your learning experiences as you study Web development. Visit one of the many sites that offer free blogs, such as http://blogspot.com, http://www.wordpress.com, or http://www.xanga.com. Follow their instructions to establish your own blog. Your blog could be a place to note Web sites that you find useful or interesting. You might report on sites that contain useful Web design resources. You might describe sites that have interesting features, such as compelling graphics or easy to use navigation. Write a few sentences about the site that you find intriguing. After you begin to develop your own sites, you could include the URLs and reasons for your design decisions. Share this blog with your fellow students and friends. Display your page in a browser and print the page. Hand in the printout to your instructor.

Web Research

- **1.** The World Wide Web Consortium creates standards for the Web. Visit its site at http://www.w3c.org and then answer the following questions:
 - a. How did the W3C get started?
 - b. Who can join the W3C? What does it cost to join?
 - c. The W3C home page lists a number of technologies. Choose one that interests you, click its link, and read the associated pages. List three facts or issues you discover.
- **2.** The Internet Society takes an active leadership role in issues related to the Internet. Visit its site at http://www.isoc.org and answer the following questions:
 - a. Why was the Internet Society created?
 - b. Determine the local chapter closest to you. Visit its Web site. List the Web site URL and an activity or service that the chapter provides.
 - c. How can you join the Internet Society? What does it cost to join? Would you recommend that a beginning Web developer join the Internet Society? Why or why not?
- **3.** The World Organization of Webmasters (WOW) is a professional association dedicated to the support of individuals and organizations that create and manage Web sites. Visit its site at http://www.joinwow.org and answer the following questions:
 - a. How can you join WOW? What does it cost to join?
 - b. List one of the events that WOW participates in. Would you like to attend this event? Why or why not?
 - c. List three ways that WOW can help you in your future career as a Web developer.

Focus on Web Design

- Visit a Web site referenced in this chapter that interests you. Print the home page or one other pertinent page from the site. Write a one-page summary and your reaction to the site. Address the following topics:
 - a. What is the purpose of the site?
 - b. Who is the intended audience?
 - c. Do you think that the site reaches its intended audience? Why or why not?
 - d. Is the site useful to you? Why or why not?
 - e. List one interesting fact or issue that this site addresses.
 - f. Would you encourage others to visit this site?
 - g. How could this site be improved?

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C H A P T E R

XHTML Basics

Chapter Objectives In this chapter, you will learn about ...

- The development of HTML
- The transition from HTML to XHTML
- XHTML syntax, elements, and document type definitions
- The anatomy of a Web page
- Formatting the body of a Web page

- Formatting the text on a Web page
- Physical and logical style elements
- Special characters
- Using the anchor element to link from page to page
- · Creating absolute, relative, and e-mail links

This chapter introduces Hypertext Markup Language

(**HTML**), the language used to create Web pages, and eXtensible Hypertext Markup Language (XHTML), the most recent standardized version of HTML. The chapter begins with an introduction to the syntax of XHTML, continues with the anatomy of a Web page, and introduces block-level and inline formatting and demonstrates hyperlinks as sample pages are created. You will learn more if you work along with the sample pages in the text. Coding XHTML is a skill and every skill improves with practice.

2.1 What is HTML?

The World Wide Web is composed of files containing Hypertext Markup Language (HTML) and other markup languages that describe Web pages. HTML was developed using Standard Generalized Markup Language (SGML). SGML prescribes a standard format for embedding descriptive markup within a document and for describing the structure of a document. SGML is not in itself a document language, but rather a description of how to specify one and create a document type definition (DTD).

The W3C, http://w3c.org, sets the standards for HTML and its related languages. HTML (like the Web itself) is in a constant state of change.

HTML is the set of markup symbols or codes placed in a file intended for display on a Web browser page. These markup symbols and codes identify structural elements such as paragraphs, headings, and lists. HTML can also be used to place media (such as graphics, video, and audio) on a Web page and describe fill-in forms. The browser interprets the markup code and renders the page. HTML permits the platformindependent display of information across a network. That is, no matter what type of computer a Web page was created on, any browser running on any operating system can display the page.

Each individual markup code is referred to as an **element** or **tag**. Each tag has a purpose. Tags are enclosed in angle brackets, the < and > symbols. Most tags come in pairs: an opening tag and a closing tag. These tags act as containers and are sometimes referred to as container tags. For example, the text that is between the <title> and </title> tags on a Web page would display in the title bar on the browser window.

Some tags are used alone and are not part of a pair. For example, a tag that displays a horizontal line on a Web page, <hr />, is a stand-alone or self-contained tag and does not have a closing tag. You will become familiar with these as you use them. Most tags can be modified with **attributes** that further describe their purpose.

2.2 Why XHTML and Not HTML?

The most recent standardized version of HTML used today is actually eXtensible HyperText Markup Language (XHTML). XHTML uses the tags and attributes of HTML 4 along with the syntax of XML. HTML was originally developed to provide access to electronic documents via a Web browser. Web browsers that evolved along with HTML were written to forgive coding errors, ignore syntax errors, and allow "sloppy" HTML code. Web browsers contain many program instructions that are designed to ignore mistakes such as missing ending tags and to guess how the developer meant the page to display. This is not a problem for a personal computer, which has relatively large processing power. However, this could be an issue for electronic devices with fewer resources, such as a personal digital assistant (PDA) or mobile phone.

Also, as new versions of Web browsers were developed and competed for market share, they often created their own proprietary extensions to HTML—tags that were not part of the standard and supported by one browser only. This created a lot of nonstandard HTML pages, and browsers are coded to accept this and ignore tags they don't recognize. However, this extra processing is not efficient, especially for devices with limited resources.

Finally, HTML is a structural language—it was originally intended to mark up printed documents for online viewing. It describes the structure of the document instead of the contents or information contained in the document. The Web has changed from a medium used to display electronic versions of paper documents to a medium that provides diverse information for a variety of devices. HTML does not fit this need. How will a table 600 pixels wide be displayed on a mobile phone? With the expansion of the Web to include devices other than personal computers, the need for a descriptive rather than structural language became evident and XHTML was created.

The purpose of XHTML was to provide a foundation for device-independent Web access. XHTML was developed by the W3C to be the reformulation of HTML as an application of XML. Tim Berners-Lee, the W3C director and inventor of the Web, stated in a press release (http://www.w3.org/2000/01/xhtml-pressrelease), "XHTML 1.0 connects the present Web to the future Web. It provides the bridge to page and site authors for entering the structured data, XML world, while still being able to maintain operability with user agents that support HTML 4." XHTML combines the formatting strengths of HTML and the data structure and extensibility strengths of XML. Since XHTML was designed using XML, let's take a quick look at XML.

XML (eXtensible Markup Language) is the W3C standard method for creating new markup languages that will support the display of nontraditional content such as mathematical notation, as well as support newer display devices such as PDAs and mobile phones. XML can fulfill these diverse needs because it is an extensible language—it is designed to allow the definition of new tags or markup. The syntax of XML is very exacting so that the portable devices will not have to waste processing power guessing how the document should display, but will be able to display information efficiently. XHTML, which combines the language of HTML with the syntax of XML, is a markup language that should adapt to future needs. An XML document must be well formed. A well-formed document is a document that adheres to the syntax rules of the language. The XHTML examples in the text will guide you in creating well-formed Web pages using XHTML.

2.3 Document Type Definition

Because multiple versions and types of HTML and XHTML exist, the W3C recommends identifying the type of markup language used in a Web page document. The three types of XHTML 1.0, XHTML 1.0 Transitional, XHTML 1.0 Strict, and XHTML 1.0 Frameset, are defined in Table 2.1.

Document Type Definition	Description
XHTML 1.0 Transitional	The least strict specification for XHTML 1.0; allows the use of Cascading Style Sheets and traditional formatting instructions such as fonts; used for most of the coding in this book
XHTML 1.0 Strict	Requires the exclusive use of Cascading Style Sheets; not used in this book
XHTML 1.0 Frameset	Required for pages using XHTML framesets; not used in this book

Table 2.1	XHTML	document	types
-----------	-------	----------	-------

The version and type of XHTML is listed in the Document Type Definition (DTD) tag (commonly called the **DOCTYPE**). The DTD identifies the version and type of XHTML contained in your document. Browsers and HTML code validators can use the information in the DTD when processing the Web page. The DTD tag is placed at the top of a Web page document, even before the **<html>** tag. The DTD for XHTML 1.0 Transitional is as follows:

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

You will place the DTD as the second line in each Web page document you create. Are you ready to create your first Web page?

2.4 Your First Web Page

After the DTD, each Web page begins with an opening <html> tag and ends with a closing </html> tag. These tags indicate that the text between them is HTML formatted. It tells the browser how to interpret the document.

There are two sections on a Web page: the head and the body. The head section, sometimes called the header, contains information that describes the Web page document. Tags that are located in the head section include the title of the Web page, meta tags that describe the document (such as the character encoding used and information that may be accessed by search engines), and references to scripts and styles. Many of these do not show directly on the Web page. The head section begins with the <head> tag and ends with the </head> tag. You'll always code at least two other tags in the head section: a <title> tag and a <meta /> tag.

The first tag in the head section, the **<title> tag**, contains the text that will appear in the title bar of the browser window. This text is called the **title** of the Web Page and is accessed when Web pages are bookmarked and printed. The title should be descriptive. If the Web page is for a business or organization, the title should include the name of the organization or business.

The meta tag is used to describe a characteristic of a Web page, such as the character encoding. Character encoding is the internal representation of letters, numbers, and symbols in a file such as a Web page or other file that is stored on a computer and may be transmitted over the Internet. There are many different character encoding sets. However, it is common practice to use a character encoding set that is widely supported, such as utf-8, which is a form of Unicode. The meta tag shown below indicates that the content of the document is a Web page that uses utf-8 character encoding.

<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>

The body section contains text and elements that do show directly on the Web page. The purpose of the body section is to describe the contents of the Web page. You will spend most of your time coding XHTML in the body of a Web page. If you type text in the body section, it will appear directly on the page.

The body section begins with the **<body>** tag and ends with the **</body>** tag.

The following code sample describes the anatomy of a Web page: a header section followed by a body section.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html>
   <html>
   <head>
    ... header information goes here
   </head>
   <body>
    ... body information goes here
   </body>
   </html>
```

Notice that the XHTML tags are lowercase. This conforms to XML syntax. Notice also that the DTD statement does not follow this syntax. The DTD statement indicates the markup language being used and has its own formatting—mixed case.

In XHTML, the <html> tag also needs to describe the XML namespace (xmlns), which is the location of the documentation for the elements being used. This additional information is added to the <html> tag in the form of an attribute. The xmlns attribute points to the URL of the XHTML namespace used in the document, the standard http://www.w3.org/1999/xhtml. The optional lang and xml:lang attributes specify the spoken language of the document. For example, lang="en" xml:lang="en" indicate the English language. Search engines and screen readers may access these attributes.



What are Web page editors?

No special software is needed to create an XHTML document—all you need is a text editor. Notepad is a text editor that is included with Microsoft Windows. TextEdit is distributed with the Mac OS X operating system. BBEdit is another popular editing program for Mac users. An alternative to using a simple text editor or word processor is to use a commercial Web authoring tool, such as Microsoft Expression Web or Adobe Dreamweaver. There are also many free or shareware editors available, including PageBreeze and Emacs. Regardless of the tool you use, having a solid foundation in XHTML will be useful. The examples in this text use Notepad.

The final version of the basic anatomy of a Web page follows. Note that with the exception of the specific page title, the first eight lines will usually be the same on every Web page that you create.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
    <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
```

```
<head>
<title>Page Title Goes Here</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
</head>
<body>
... body information goes here
</body>
</html>
```



What if I'm using a Mac?

No worries! Use the Mac's built-in TextEdit application—but first you'll need to set some preferences. Launch TextEdit and select Preferences.

- Set the new document format to plain text.
- Set the saving option to not save documents with a .txt extension.
- Set the rich text processing preference to: Ignore rich text commands in HTML files.

See http://support.apple.com/kb/TA20406 for more configuration information. Now you're ready to edit Web pages with TextEdit! As you follow along with the book, just launch TextEdit when you are directed to use Notepad.



Launch Notepad or another text editor and type in the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
   <head>
   <title>My First Web Page</title>
   <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
   </head>
   <body>
   Hello World
   </body>
   </html>
```

Notice that the first lines in the file contain the DTD. The XHTML code begins with an opening <html> tag and ends with a closing </html> tag. The purpose of these tags is to indicate that the content between the tags makes up a Web page. The head section is delimited by <head> and </head> tags and contains a pair of title tags with the words "My First Web Page" in between along with a <meta /> tag to indicate the character encoding. The meta tag is used alone—it is not used as a pair of opening and closing tags. It is considered to be a stand-alone or self-contained tag. Because you are using XHTML (which follows XML syntax), the meta tag is coded with an ending />, which indicates a self-contained tag. The body section is delimited by <body> and </body>

.

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tags. The words "Hello World" are typed on a line between the body tags. See Figure 2.1 for a screenshot of the code as it would appear in Notepad. You have just created the source code for a Web document.





No. A browser can display a page even if all the tags follow each other on one line with no spaces. Humans, however, find it easier to write and read XHTML if line breaks and indentation (more on this later) are used.

Save Your File

You will save your file with the name of hello.html. Web pages use either an .htm or .html file extension. Select File from the menu bar, and then select Save As. The Save As dialog box appears. Using Figure 2.2 as an example, type the file name.



Why does my file have a .txt file extension?

In some older versions of Windows, Notepad will automatically append a .txt file extension. If this happens, type the name of the file within quotes, "hello.html", and save your file again.

Click the Save button after you type the file name. Sample solutions for the Hands-On Practice exercises are available in the student files. If you would like, compare your work with the solution (Chapter2/hello.html) before you test your page.

Test Your Page

There are two ways to test your page as follows:

 Launch Windows Explorer. Navigate to your hello.html file. Double-click hello.html. The default browser will launch and will display your hello.html page. Your page should look similar to the one shown in Figure 2.3.

Figure 2.3 Web page displayed by Internet Explorer		
	☆ Favorites	
	Done R Computer Protected Mode: Off R 100% V	100

2. Launch a Browser. (If you are using Internet Explorer 8, select Tools, Menu Bar.) Select File, Open, Browse, My Computer, and then select your drive. Double-click hello.html and click OK. If you used Internet Explorer, your page should look similar to the one shown in Figure 2.3. A display of the page using Firefox is shown in Figure 2.4.

Figure 2.4	My First Web Page - Mozilla Firefox	
Web page displayed	<u>File Edit View History Delicious Bookmarks Accessibility</u>	Cools Help
by Firefox	Hello World	/E:/Chapter2/hello.html 🟠 🔹 🕞 Google 🔎
	Done Done	📑 🔀 🖂 🦑 🕢 0 errors / 0 warnings 💵 💽

Examine your page. Look carefully at the browser window. Notice how the title bar of the browser window contains the title text, "My First Web Page." Some search engines need the text surrounded by the <title> and </title> tags to help determine relevancy of keyword searches, so make certain that your pages contain descriptive titles. The <title> tag is also used when viewers bookmark your page or add it to their Favorites. An engaging and descriptive page title may entice a visitor to revisit your page. If your Web page is for a company or an organization, it's a good idea to include the name of the company or organization in the title.

You might be thinking "Hmmm ... white background, black text, no images, can't we make the page look more interesting?" Sure we can. That's what you'll begin to learn in the next section.

\checkmark

CHECKPOINT 2.1

- 1. Describe the origin, purpose, and features of HTML.
- 2. Explain why you would use XHTML instead of HTML.
- 3. Describe the purpose of the header and body sections of a Web page.

2.5 XHTML—Body and Text Basics

Have you noticed the wide variety of page designs on Web sites? Whether a Web page contains mostly text, uses blocks of color, displays images, employs animation, or is interactive, the foundation of the page is the <body> tag.

The Body Element

The purpose of the <body> element is to contain the text and XHTML elements that will display in the browser window. As you noticed when you created your first Web page, any text that you type in the body section of a Web page document will be displayed by the browser in the actual Web page. Often, this text is organized by structural elements that indicate important headings, text paragraphs, and lists. These structural elements are **block-level elements**—they control blocks of text such as headings, paragraphs, and lists. Tags that affect individual sections of text are called **inline-level elements**. Web development is a skill—the more you practice, the better you get. Why not try each example as you read?

The Heading Element

Headings are block-level elements that are organized into levels h1 through h6. The size of the text is largest for **<h1>** and smallest for **<h6>**. Depending on the font being used (more on fonts in Chapter 3), text contained in **<h5>** and **<h6>** tags may be displayed smaller than the default text size.

HANDS-ON PRACTICE 2.2

Launch Notepad or another text editor and type in the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
   <head>
   <title>Sample Heading Tags</title>
   <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
   </head>
```

```
<body>
<h1>Heading Level 1</h1>
<h2>Heading Level 2</h2>
<h3>Heading Level 3</h3>
<h4>Heading Level 3</h4>
<h5>Heading Level 4</h4>
<h5>Heading Level 5</h5>
<h6>Heading Level 6</h6>
</body>
</html>
```

Save the file as heading.html. Launch a browser such as Internet Explorer or Firefox to test your page. It should look similar to the page shown in Figure 2.5. You can compare your work with the solution found in the student files (Chapter2/heading.html).

Notice that each heading in Figure 2.5 is on its own line and that there is a blank line between headings. The heading tag is a container tag. Notice how there are always corresponding opening <h#> and closing </h#> tags. It's a good idea to use headings to emphasize important topics or sections on a Web page.



Accessibility and Headings



Heading tags can help to make your pages more accessible and usable. To indicate areas within a page hierarchically, code heading tags numerically as appropriate (h1, h2, h3, and so on) and include page content in block-level elements such as paragraphs and lists. Visually challenged visitors who are using a screen reader can configure the software to display a list of the headings used on a page to focus on the topics that interest them. Your well-organized page will be more usable for every visitor to your site, including those who are visually challenged.

The Paragraph Element

Paragraph elements are block-level elements used to group sentences and sections of text together. Text that is contained by and tags will have a blank line above and below it.



Open your heading.html file in a text editor. Use the following sample code and add a paragraph of text to your page below the line with the <h1> tags and above the line with the <h2> tags. Save your page as heading2.html.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd"
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Sample Heading Tags</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
</head>
<body>
  <h1>Heading Level 1</h1>
  This is a sample paragraph about HTML and XHTML. XHTML is the
newest version of HTML. XHTML uses the tags and attributes of HTML
along with the syntax of XML.
  <h2>Heading Level 2</h2>
  <h3>Heading Level 3</h3>
  <h4>Heading Level 4</h4>
  <h5>Heading Level 5</h5>
  <h6>Heading Level 6</h6>
</body>
</html>
```

Launch a browser to test your page. It should look similar to the page shown in Figure 2.6 and to the solution in the student files (Chapter2/heading2.html).



Notice how the text wraps automatically as you resize your browser window. If you wanted to have the second sentence in the paragraph begin on its own line, you would need to add a line break.

The Line Break Element

The line break tag, **<br** />, is used to force a new line when the text on the Web page document is displayed by a browser. The line break tag is used alone—it is not used as a pair of opening and closing tags. It is considered to be a stand-alone or self-contained tag. If you were using HTML syntax, the line break tag would be coded as **
. Because you are using XHTML (which follows XML syntax), the line break tag is coded as **<br /> (the ending /> indicates a self-contained tag).

HANDS-ON PRACTICE 2.4

Open your heading2.html file in Notepad. Place your cursor after the first sentence in the paragraph (after "This is a sample paragraph about HTML and XHTML."). Press the Enter key. Save your page. Test your page in a browser and notice that even though your source code showed the "This is a sample paragraph about HTML and XHTML." sentence on its own line, the browser did not render it that way. A
 tag is needed to configure the browser. Open the heading2.html file in Notepad and add a
 tag after the first sentence in the paragraph. Save your page as heading3.html. Your source code should look similar to the following:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
   <head>
   <title>Sample Heading Tags</title>
```

<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/> </head>

<body>

<h1>Heading Level 1</h1>

This is a sample paragraph about HTML and XHTML.
 XHTML is the newest version of HTML. XHTML uses the tags and attributes of HTML along with the syntax of XML.

```
<h2>Heading Level 2</h2>
<h3>Heading Level 3</h3>
<h4>Heading Level 4</h4>
<h5>Heading Level 5</h5>
<h6>Heading Level 6</h6>
</body>
</html>
```

Launch a browser to test your page. It should look similar to the page shown in Figure 2.7. You can compare your work with the solution found in the student files (Chapter2/heading3.html).

As you tested your Web pages, you may have noticed that the headings and text begin near the left margin. This is called **left alignment** and is the default alignment for Web pages. There are times when you want a paragraph or heading to be centered or rightaligned (justified). The align attribute can be used for this. The purpose of an **attribute** is to modify the properties of an XHTML element. In this case, the align attribute modifies the element's horizontal alignment (left, center, or right) on a Web page. To center an element on a Web page use the attribute align="center". To right-justify an element on a Web page, use align="right". The default alignment is left. The align attribute can be used with a number of block level elements, including the paragraph () and heading (<h1> through <h6>) tags.





Figure 2.7

A
 tag

sentence

Why does my Web page still look the same?

Often, students make changes to a Web page but get frustrated because their browser shows an older version of the page. The following troubleshooting tips are helpful when you know you modified your Web page but the changes do not show up in the browser:

- **1.** Make sure you save your page after you make the changes.
- 2. Verify the location that you are saving your page to-the hard drive, a particular folder.
- 3. Verify the location that your browser is requesting the page from—the hard drive, a particular folder.
- 4. Be sure to click the Refresh or Reload button in your browser.

Open your heading3.html file in Notepad. Modify the heading to be centered. Change the <h1> tag to <h1 align="center"> but do not change the closing </h1> tag. Also modify the paragraph to be centered on the Web page. Change the tag to , but do not change the closing tag. Save your page as heading4.html and test it in a browser. Your page should look similar to the page shown in Figure 2.8. You can compare your work with the solution found in the student files (Chapter2/heading4.html).

Legacy Alert. You will find many Web pages that use the align attributes to center block-level elements such as paragraphs and headings. Be aware that the align attribute is supported in XHTML 1.0 Transitional but is deprecated. In Chapters 3 and 6, you will learn to use Cascading Style Sheets (CSS) to configure alignment of text on a Web page.



The Blockquote Element

Besides organizing text in paragraphs and headings, sometimes you need to add a quotation to a web page. The **<blockquote>** tag is intended to be used to display a block of quoted text in a special way—indented from both the left and right margins. A block of indented text begins with a **<blockquote>** tag and ends with a **</blockquote>** tag.



Launch Notepad or another text editor and type in the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Blockquote Example</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
</head>
<body>
  <h1>Power of the Web</h1>
According to Tim Berners-Lee at
http://www.w3.org/WAI/:
   <blockquote>
     The power of the Web is in its universality. Access by everyone
regardless of disability is an essential aspect.
   </blockquote>
</body>
</html>
```

Save your file as blockquote.html. Launch a browser and test your file. Your page should look similar to the page shown in Figure 2.9 and the solution in the student files (Chapter2/blockquote.html). Notice how the text that was entered between <blockquote> tags is indented.



2.6 XHTML—List Basics

Lists are used on Web pages to organize information. When writing for the Web, remember that headings and bulleted lists make your pages clear and easy to read. XHTML can be used to create three types of lists: definition lists, ordered lists, and unordered lists.

Definition Lists

Definition lists help to organize terms and their definitions. The terms stand out and their definitions can be as long as needed to convey your message.

Definition lists are also handy for organizing Frequently Asked Questions (FAQs) and their answers. The questions and answers are offset with indentation. Each defined term begins on its own line at the margin. Each definition begins on its own line and is indented. See Figure 2.10 for an example of a Web page that uses a definition list.

Any type of information that consists of a number of corresponding terms and longer descriptions is well suited to being organized in a definition list.

Definition lists begin with the **<dl>** tag and end with the **</dl>** tag. Each defined term in the list begins with the **<dt>** tag and ends with the **</dt>** tag. Each term definition (data definition) begins with the **<dd>** tag and ends with the **</dd>** tag. A definition list is created in the following Hands-On Practice.





Open a new file in Notepad. Use the following sample code to create a definition list.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Definition List</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
</head>
<body>
  <hl>Sample Definition List</hl>
    <d1>
      <dt>TCP</dt>
        <dd>Transmission Control Protocol is a method (protocol) used
along with the Internet Protocol (IP) to send data in the form of
message units, called packets, between computers over the
Internet.</dd>
      <dt>IP</dt>
```

 <dd>Internet Protocol is the method or protocol by which data is sent from one computer to another on the Internet. Each computer on the Internet is uniquely identified by an IP address.</dd> <dt>FTP</dt>

Save your file as definitionlist.html and test it in a browser. Your page should look similar to the one shown in Figure 2.10 and to the solution in the student files (Chapter2/definitionlist.html). Don't worry if the word wrap is a little different—the important formatting is that each <dt> term should be on its own line and the corresponding <dd> definition should be indented under it. Try resizing your browser window and notice how the word wrap on the definition text changes.

Ordered Lists

Ordered lists use a numbering or lettering system to organize the information contained in the list. An ordered list can be organized by the use of numerals (the default), uppercase letters, lowercase letters, uppercase Roman numerals, and lowercase Roman numerals. See Figure 2.11 for a sample ordered list.

Figure 2.11 Sample ordered list

Popular Web Servers

- 1. Apache Web Server
- Microsoft IIS
- 3. Sun Java System Web Server

Ordered lists begin with an tag and end with an tag. Each list item begins with an tag and ends with an tag. The type attribute can be used to change the symbol used for ordering the list. For example, to create an ordered list organized by uppercase letters, use **<ol** type="A">. Table 2.2 documents the type attribute and its values for ordered lists.

Table 2.2 type attributes for ordered lists

Attribute	Value	Symbol	
type	1	Numerals (the default)	
	А	Uppercase letters	
	a	Lowercase letters	
	I	Roman numerals	
	i	Lowercase Roman numerals	



Why is the XHTML code in the Hands-On Practice examples indented?

It doesn't matter to the browser if XHTML code is indented, but humans find it easier to read and maintain code when it is logically indented. Review the definition list created in Hands-On Practice 2.6. Notice how each tag level (<dl>, <dt>, and <dd>) is indented two spaces. This makes it easier for you or another Web developer to understand the source code in the future. There is no "rule" as to how many spaces to indent, although your instructor or the organization you work for may have a standard. Consistent indentation helps to create more easily maintainable Web pages.

The XHTML code to create the ordered list shown in Figure 2.11 follows:

```
<hl>Popular Web Servers</hl>

Apache Web Server
Microsoft IIS
Sun Java System Web Server
```

Unordered Lists

Unordered lists show a bullet before each entry in the list. This bullet can be one of several types: disc (the default), square, and circle. See Figure 2.12 for a sample unordered list.

Figure 2.12 Sample unordered list

Popular Web Servers

- · Apache Web Server
- Microsoft IIS
- Sun Java System Web Server

Unordered lists begin with an tag and end with an tag. Each list item begins with an tag and ends with an tag. The type attribute can be used to change the type of bullet. For example, to create an unordered list organized with square bullets, use . Table 2.3 documents the type attribute and its values for unordered lists.

 Table 2.3 type attributes for unordered lists

Attribute	Value	
type	disc (the default)	
	square	
	circle	

The XHTML code to create the unordered list shown in Figure 2.12 follows:

```
<hl>Popular Web Servers</hl>

Apache Web Server
Microsoft IIS
Sun Java System Web Server
```

Legacy Alert. You will find many Web pages that use the type attribute to configure the numbering system of ordered lists and the bullet style of unordered lists. Be aware that the type attribute is supported in XHTML 1.0 Transitional but is deprecated. In Chapter 7 you will learn to use Cascading Style Sheets (CSS) to configure ordered and unordered lists.



In this Hands-On Practice you will use heading tags and lists on the same page. Launch Notepad or another text editor and type in the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Headings and Lists</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
</head>
<body>
 <h1>Web Servers and Web Browsers</h1>
   <h2>Popular Web Servers</h2>
     <01>
       Apache Web Server
       Microsoft IIS
       Sun Java System Web Server
     <h2>Popular Web Browsers</h2>
     Internet Explorer
       Firefox
       Opera
     </body>
</html>
```

Save your file as heading5.html. Launch a browser and test your page. It should look similar to the page shown in Figure 2.13. You can compare your work with the solution in the student files (Chapter2/heading5.html).



Take a few minutes to experiment with the type attribute. Configure the unordered list to use square bullets. Configure the ordered list to use uppercase letters instead of numerals. Save your page as heading6.html. Test your page in a browser. It should look similar to the page shown in Figure 2.14 and the solution in the student files (Chapter2/heading6.html).





CHECKPOINT 2.2

- 1. Describe the features of a heading element and how it configures the text.
- 2. Describe the difference between ordered lists and unordered lists.
- 3. Describe the purpose of the blockquote element.

2.7 XHTML—Text Formatting

Text can be formatted in various ways using logical style elements, physical style elements, and special characters. These are considered to be inline-level elements because they can apply to either a section of text or a single character of text. This is not the only method for formatting text; Cascading Style Sheets (introduced in Chapter 3) is commonly used for this purpose.



What about the font tag?

The **** tag allows you to configure the typeface, color, and size of the text between the **** and **** container tags. However, the **** tag is deprecated. A **deprecated** XHTML element or attribute is still supported by XHTML 1.0 Transitional and currently popular browsers, but may not be supported in the future. The W3C recommends using Cascading Style Sheets (see Chapter 3) to format text instead of using the **** tag. If you'd like more information about the **** tag, see Appendix A, XHTML Reference.

XHTML Logical Style Elements

Logical style elements, sometimes called phrase elements, indicate the logical style used to display the text between the container tags. It is up to each browser to interpret that style. For example, the **** element indicates that the text associated with it be displayed in a "strong" manner in relation to normal text on the page. Usually, but not always, the browser (or other user agent) will display **** text in bold. A screen reader, such as Jaws or Window-Eyes, might interpret **** text to indicate that the text should be more strongly spoken. With more and more devices used to access the Web, the use of logical style elements instead of physical style elements (whenever possible) is preferred. Both are still used on the Web.

Note that all logical style elements are container tags—an opening and a closing tag should be used. For example, if you wanted the phone number in the following line to have a strong logical style

Call for a free quote for your Web development needs: 888.555.5555

the XHTML would look like

Call for a free quote for your Web development needs: 888.555.5555

Notice that the opening and closing tags are contained within the paragraph tags (and). This XHTML code is nested properly, follows XML syntax, and is considered to be well formed. An example of improper nesting follows:

Call for a free quote for your Web development needs: 888.555.5555

When improperly nested, the and tag pairs overlap each other instead of being nested within each other. Improperly nested code will not pass XHTML validation testing (see section 2.9) and may cause display issues. Appendix D, Comparison of HTML and XHTML, contains a list of the key syntax rules of XML.

Table 2.4 lists logical style tags and examples of their use.

Table 2.4 Logical style elements

Element	Example	Usage
	strong text	Causes text to be emphasized or to stand out from surrounding text; usually displayed in bold
	emphasized text	Causes text to be emphasized in relation to other text; usually displayed in italics
<cite></cite>	cite text	Identifies a citation or reference; usually displayed in italics
<code></code>	code text	Identifies program code samples; usually a fixed-space font
<dfn></dfn>	<i>dfn</i> text	Identifies a definition of a word or term; usually displayed in italics
<kbd></kbd>	kbd text	Identifies user text to be typed; usually a fixed-space font
<samp></samp>	samp text	Shows program sample output; usually a fixed-space font
<var></var>	<i>var</i> text	Identifies and displays a variable or program output; usually displayed in italics



Why do the displays look so similar?

As you look at Table 2.4, you may notice that some tags, such as <cite> and <dfn>, result in the same type of display (italics) as the tag in today's browsers. These tags are logically describing the text as a citation or definition, but the physical display is usually italics in both cases. Cascading Style Sheets (see Chapter 3) are a better way to format elements than logical style tags. However, logical style tags are preferred over physical style tags. If you find this a little confusing and think that there are too many tags with similar purposes, you are correct. Please keep in mind that Cascading Style Sheets is the preferred method to format text not physical style and logical style elements. However, we introduce physical style and logical style elements in this chapter because they are still used on the Web.

XHTML—Physical Style Elements

Physical style elements are sometimes called font style elements because they provide specific font instructions for the browser. This type of tag is still commonly used and generated by some Web authoring tools. Be aware that logical style elements and Cascading Style Sheets provide for a wider range of Web access. Physical style elements are included in this book because many existing Web pages use them. Table 2.5 lists physical style tags and examples of their use.

Element	Example	Usage
	bold text	Displays text as bold
<i>></i>	emphasized text	Displays text in italics
<big></big>	big _{text}	Displays text larger than normal size
<small></small>	small text	Displays text smaller than normal size
	_{sub} text	Displays small text below the baseline
	^{sup} text	Displays small text above the baseline
<strike></strike>	strike text	Displays text with a line through it (deprecated)
<u></u>	<u>u</u> text	Displays text underlined; avoid using this because underlined text can be con- fused with hyperlinks (deprecated)
<tt></tt>	teletype text	Displays text in teletype or fixed-space font

Table 2.5 Physical style elements

You may have noticed that the logical style tag usually has the same effect as the physical style tag. Also, the logical style tag usually has the same effect as the <i> physical style tag. In order to create XHTML that describes logical styles instead of font instructions for browsers, use instead of and use instead of <i>. As you continue to study Web development, you will learn about Cascading Style Sheets and their use in text formatting.

Special XHTML Characters

In order to use special characters such as quotation marks, greater than (>), lesser than (<), and the copyright symbol (©) in your Web document, you need to use special characters, sometimes called entity characters. For example, if you wanted to include a copyright line on your page as follows:

© Copyright 2008 My Company. All rights reserved.

You would use the special character **©**; to display the copyright symbol. The XHTML would look as follows:

© Copyright 2008 My Company. All rights reserved.

Another useful special character is , which stands for nonbreaking space. You may have noticed that Web browsers treat multiple spaces as a single space. If you need a small number of spaces in your text, you may use multiple times to indicate multiple blank spaces. This is acceptable if you simply need to tweak the position of an element a little. If you find that your Web pages contain many special characters in a row, you should use a different method to align elements, such as a table or Cascading Style Sheets.

See Table 2.6 and Appendix B, Special Characters, for a description of special characters and their codes.

Table 2.6 Common special characters

Character	Entity Name	Code
II	Quotation mark	"
©	Copyright symbol	©
&	Ampersand	&
Empty space	Nonbreaking space	
_	Em dash	—
1	Vertical Bar	



HANDS-ON PRACTICE 2.8

Figure 2.15 shows the Web page you will create. Launch Notepad and open one of the Web page files that you have already created, such as blockquote.html from Hands-On Practice 2.5. Modify the title of the Web page by changing the text between the <title> and </title> tags to Web Design Steps. Since our Web Design Steps page will be quite different from the previous page you created, delete the code between the <body> and </body> tags. Save the file as design.html.



The sample page shown in Figure 2.15 contains a heading, an unordered list, and copyright information.

Configure the heading Web Design Steps as a level 1 heading (<h1>) as follows:

<h1>Web Design Steps</h1>

Now create the unordered list. The first line of each bulleted item is the title of the Web design step. In the sample, each step title should be strong, or stand out from the rest of the text. The code for the beginning of the unordered list follows:

Determine the Intended Audience

The colors, images, fonts, and layout should be tailored to the
preferences of your audience. The type of site content
(reading level, amount of animation, etc.) should be appropriate for
your chosen audience.

Edit your design.html file and code the entire ordered list. Remember to code the closing tag at the end of the list. Don't worry if your text wraps a little differently your screen resolution or browser window size may be different.

Finally, configure the copyright information. This should be smaller than the rest of the text. Use the special character, ©, for the copyright symbol. The code for the copyright line follows:

```
<small>Copyright &copy; 2008 Your name. All Rights Reserved.
</small>
```

How did you do? Compare your work to the sample in the student files (Chapter2/design.html).

2.8 XHTML—Hyperlinks

The Anchor Element

The anchor element can be used to specify a hyperlink reference (href) to a Web page you want to display. Each hyperlink begins with an <a> tag and ends with an tag. The opening and closing anchor tags surround the text to click to perform the hyperlink.

You have probably seen many links on the Web but may have never thought about how they are created. To create an **absolute link** to a Web site such as Yahoo!, you would create a hyperlink with the URL for Yahoo! for the value of the **href attribute** as follows:

Yahoo!

"Yahoo!", the text contained between the anchor tags, is displayed in the browser window. By default, this text is underlined and blue. Figure 2.16 shows an example of a hyperlink to the Yahoo! Web site in a browser.



Absolute and Relative Links

The link to Yahoo! you just created is an absolute link. Notice that the XHTML code for the link indicates the protocol being used, http://, and continues with the domain name, yahoo.com. This indicates the absolute location of the Web resource. Use absolute links when you are creating links to other Web sites.

When you need to link to Web pages within your site, use a **relative link**. This link does not begin with http://. It only contains the file name or file name and folder of the Web page you want to display. The link location is relative to the page currently being displayed. For example, if you had a home page called index.html and wanted to link to a page with your resumé (called resume.html) located in the same folder as index.html, the XHTML for the relative link would be as follows:

My Resume



The best way to learn XHTML is by writing it. Let's experiment with the anchor tag and create a sample Web site to use to practice creating hyperlinks.

First, create a new folder called mywebsite.

- Windows XP Users. Launch Windows Explorer by selecting Start, Programs, Windows Explorer with your pointing (mouse) cursor. Click your drive to select it. Select File, New, Folder.
- Windows Vista Users. Launch the Computer folder by selecting Start, Computer with your pointing (mouse) cursor. Click your drive to select it. Select Organize, New Folder.
- Mac Users. Look in the Dashboard for the Finder icon and click on it with your pointing (mouse) cursor. Select the Documents folder. Select File, New Folder.

Name your folder mywebsite. This site is an example of a personal Web site. It will contain a home page called index.html and two content pages called resume.html and favorites.html. A sample site map that was created using Adobe Dreamweaver (see Figure 2.17) shows the architecture of the site—a home page (index.html) with major links to two pages (resume.html and favorites.html).





Now create the home page for your mywebsite Web site. Launch Notepad or another text editor and type in the tags found on every Web page (see Hands-On Practice 2.1). In the body of the Web page create the following:

- A heading: My Web Site
- An absolute link to Yahoo!

- An absolute link to the Web site of your school
- A relative link to resume.html
- A relative link to favorites.html

Save your page as index.html in the mywebsite folder. Display your page in a browser. It should look similar to the page shown in Figure 2.18. Compare your work to the sample in the student files (Chapter2/2.9/index.html). *Hint*: Check Appendix B, Special Characters, for the XHTML code for the "é".

Figure 2.18 Sample index.html	My Web Site File Edit View History Bookmarks Window Help	
displayed in the Apple Safari browser	My Web Site	
	Search Yahoo!	
	Harper College	
	My Resumé	
	Favorite Web Sites	
	Go to "http://yahoo.com/"	11.

Test your page by clicking each link. When you click the absolute links to Yahoo! and your school you should see those pages displayed if you are connected to the Internet. The relative links should not work yet—let's create those pages next.

Create the resume.html page. Launch Notepad or another text editor and type in the tags found on every Web page (see Hands-On Practice 2.1). In the body of the Web page place the following:

- A heading of Resumé
- Some text that describes your job objective
- A navigation bar that contains a relative link to the Home page (index.html), and a relative link to the Favorites page (favorites.html)



What if my absolute links don't work?

Check the following:

- Are you currently connected to the Internet?
- Are you certain that you spelled the URLs of the Web sites correctly?
- Did you begin with http://?
- When you place your mouse over a link, the URL will display in the status bar in the lower edge of the browser window. Verify that this is the correct URL.
- *Hint*: When you are about to put an absolute link in a Web page, display the Web site in a browser, then copy and paste the URL. Don't rely on typing the URL accurately.

See Figure 2.19 for a sample Resumé page. Save your Resumé page as resume.html in your mywebsite folder.

Figure 2.19 Sample resume.html	Resumé 🛛 🖛 File Edit View History Bookmarks Window Help	1
	Resumé	
	Job Objective: Entry-Level Web Developer Home Resumé <u>Favorites</u>	

Test your index.html page again. This time when you click the Resumé link, your new page should display. Use the Home link on your resume.html page to redisplay your home page.

Create the favorites.html page. Launch Notepad or another text editor and type in the tags found on every Web page (see Hands-On Practice 2.1). In the body of the Web page place the following:

- A heading: Favorite Sites
- An unordered list that contains the following categories:
 - Hobbies XHTML JavaScript Professional Groups
- A navigation bar that contains a relative link to the Home page (index.html) and a relative link to the Resumé page (resume.html)

See Figure 2.20 for a sample Favorites page. Save your page as favorites.html in your mywebsite folder.



Test your index.html page again and try the links between the Home page, Resumé page, and Favorites pages. Don't worry if the links don't work perfectly the first time. If

you have problems, carefully examine the source code of the pages and verify the existence of the files using Windows Explorer.

What if my relative links don't work?

Check the following:

- Did you save your index.html and resume.html pages in your mywebsite folder?
- Did you save the files with the names as requested? Use Windows Explorer or My Computer to verify the actual names of the files you saved.
- Did you type the file names correctly in the link's href property? Check for typographical errors.
- When you place your mouse over a link, the file name of a relative link will display in the status bar in the lower edge of the browser window. Verify that this is the correct file name.
- On many operating systems such as UNIX or Linux, the use of uppercase and lowercase in file names matters—make sure that the file name and the reference to it are in the same case. It's a good practice to always use lowercase for file names used on the Web.
- *Hint*: Tiny details such as spelling file names correctly and consistently are very important in Web development.

E-Mail Links

The anchor tag can also be used to create e-mail links. An e-mail link will automatically launch the default mail program configured for the browser. It is similar to an external hyperlink with the following two exceptions:

- It uses mailto: instead of http://.
- It launches the default e-mail application for the visitor's browser with your e-mail address as the recipient.

For example, to create an e-mail link to the e-mail address help@terrymorris.net, code the following:

help@terrymorris.net

It is good practice to place the e-mail address both on the Web page and within the anchor tag. Not everyone has an e-mail program configured with his or her browser. By placing the e-mail address in both places, you increase usability for all your visitors.



Open the home page of your mywebsite Web site and add an e-mail link to the bottom of the page. Save and test it in a browser. The page should look similar to the page shown in Figure 2.21. Compare your work with the sample in the student files (Chapter2/2.10/index.html).

My Web Site File Edit View History Bookmarks Window Help				
My Web Site				
Search <u>Yahoo!</u>				
Harper College				
My Resumé				
Favorite Web Sites				
Contact: firstname@lastname.com				
	My Web Site File Edit View History Bookmarks Window Help My Web Site Search Yahoo! Harper College My Resumé Favorite Web Sites Contact: firstname@lastname.com			

This section provided a quick introduction to the anchor element. You should now be able to code different types of text hyperlinks: e-mail links, links relative to a Web page, and absolute links to other Web sites. As you continue to study, you will learn to use images as hyperlinks (Chapter 4), to code links internal to a Web page (Chapter 7), and to target specific windows (Chapter 7).

Accessibility and Links

Focus on Accessibility

Visually challenged visitors who are using a screen reader can configure the software to display a list of the hyperlinks in the document. In addition, some popular browsers, such as Opera (visit http://www.opera.com for free download information), provide this feature as a convenience for all users. However, a list of links is only useful if the text describing each link is actually helpful and descriptive. For example, on your college Web site a "Search the course schedule" link would be more useful than a link that simply says "More information." Keep this in mind as you are coding hyperlinks in your Web pages.



Can you share some tips on using links?

- Make your link names descriptive and brief to minimize possible confusion.
- Avoid using the phrase "Click here for" in your links. In the beginning of the Web, this phrase
 was needed because clicking links was a new experience for Web users. Now that the Web
 is a daily part of our lives, this phrase seems slightly redundant and almost archaic.
- Try not to bury links in large blocks of text—use bullets or definition lists. It is more difficult to read Web pages than printed pages.
- Be careful when linking to external Web sites. The Web is dynamic and it's possible that the external site may change the name of the page or even delete the page. If this happens, your link will be broken.



CHECKPOINT 2.3

- 1. Provide a reason for using logical style tags rather than physical style tags.
- 2. Describe the purpose of special characters.
- 3. Describe when to use an absolute link. Is the http protocol used in the href value?
- 4. Describe when to use a relative link. Is the http protocol used in the href value?

2.9 XHTML Validation

The W3C has a free Markup Validation Service available at http://validator.w3.org/ that will validate your XHTML code and check it for syntax errors. XHTML validation provides students with quick self-assessment—you can prove that your code uses correct syntax. In the working world, XHTML validation serves as a quality assurance tool. Invalid code may cause browsers to render the pages slower than otherwise.



In this Hands-On Practice you will use the W3C Markup Validation Service to validate a Web page. This example uses the design.html page completed in Hands-On Practice 2.8 (student files Chapter2/design.html). Locate design.html and open it in Notepad. We will add an error to the design.html page. Delete the first closing
tag. This modification should generate several error messages. The first error message will be a direct result of the incorrect syntax.

Next, attempt to validate the design.html file. Launch a browser and visit the W3C Markup Validation Service file upload page at http://validator.w3.org/#validate_by_upload. Click the Browse button and select the Chapter2/design.html file from your computer. Select More Options. Verify that the check boxes next to Show Source and Verbose Output are checked, as shown in Figure 2.22. Click the Check button to upload the file to the W3C site.

Figure 2.22	//walidator.w3.org/#validate_by_upload - Windows Internet Explorer	
Validate your page	Image: W3 http://validator.w3.org/#validate_by_upload+wit 44 X Image: Solution of the	• ٩
	Sig Favorites W3 The W3C Markup Validation Service	
	Warkup Validation Service Check the markup (HTML, XHTML,) of Web documents Validate by URI Validate by File Upload Validate by Direct Input	
	Validate by File Upload	E.
	Upload a document for validation:	
	File: F:\Chapter2\design.html Browse	
	✓ More Options	
	Character Encoding (detect automatically)	
	Document Type (detect automatically) - C Only if missing	
	Show Source Clean up Markup with HTML Tidy	
	□ Show Outline □ Validate error pages □ Verbose Output	
	Check	-
	Internet Protected Mode: On	√a ▼ € 100% ▼
Your display should be similar to that shown in Figure 2.23. Notice the "Errors found while checking this document" message.



You can view the errors by scrolling down the page, as shown in Figure 2.24.



Notice that the message indicates line 14—which is the first line after the missing closing
 tag. XHTML error messages often point to the line that follows the error.

The validation results indicate

errors

The text of the message 'document type does not allow element "li" here; missing one of "ul", "ol", "menu", "dir" start-tag' lets you know that something is wrong. It's up to you to figure out what it is. A good place to start is to check your container tags and make sure they are in pairs. In this case, that is the problem. You can scroll down to view the other errors. However, since multiple error messages are often displayed after a single error occurs, it's a good idea to fix one item at a time and then revalidate.

Edit the design.html file in Notepad and add the missing
 tag. Save the file.
 Launch a browser and visit http://validator.w3.org/#validate_by_upload. Select your file, select More Options, and verify the Show Source and Verbose Output check boxes are checked. Click the Revalidate button to begin the validation.

Your display should be similar to that shown in Figure 2.25. Notice the "This document was successfully checked as XHTML 1.0 Transitional!" message. This means your page passed the validation test. Congratulations, your design.html page is a valid XHTML page! It's a good practice to validate your Web pages. However, when validating code use common sense. Since Web browsers still do not completely follow W3C recommendations, there will be situations, such as when adding multimedia to a Web page, when XHTML code configured to work reliably across a variety of browsers and platforms will not pass XHTML validation.

	p Validation of design.html - W3C
	arkup Validation Service ck the markup (HTML, XHTML,) of Web documents
	Jump To: Congratulations · Icons
This document w	as successfully checked as XHTML 1.0 Transitiona
	Passed
Result:	



CHAPTER SUMMARY

This chapter provided an introduction to XHTML. It began with an introduction to HTML, discussed the transition to XHTML, continued with the anatomy of a Web page, introduced inline- and block-level formatting, and demonstrated coding anchor elements to link Web pages. If you worked along with the samples in the chapter, you should be ready to create some Web pages on your own. The Hands-On Exercises and Web Case Studies that follow will provide some practice.

Visit the textbook Web site at http://www.webdevfoundations.net for the links listed in this chapter and for updated information.

Key Terms

© <a> <blockquote> <body>
 <dd> <d1> <dt> <h1> <h6> <head> <html> <1i> <meta /> <01> <title>

absolute link anchor element attribute block-level element body character encoding definition list deprecated DOCTYPE document type definition (DTD) element e-mail link eXtensible HyperText Markup Language (XHTML) head header headings href attribute hyperlink

Hypertext Markup Language (HTML) inline-level element left alignment logical style element ordered list paragraph element physical style element relative link special characters tag unordered list well-formed document XHTML 1.0 Frameset XHTML 1.0 Strict XHTML 1.0 Transitional XHTML validation XML (eXtensible Markup Language) XML namespace (xmlns)

Review Questions

Multiple Choice

1. Which tag pair contains text that is indented from both the left and right margins?

```
a.  
b. <blockquote> </blockquote>
c.
```

```
d. <strong> </strong>
```

- **2.** Which tag pair is used to create the largest heading?
 - a. <h1> </h1>
 - b. <h9> </h9>
 - c. <h type="largest"> </h></h>
 - d. <h6> </h6>

- **3.** Which tag configures the next text or element to display on a new line?
 - a. <new line />
 b. <nl />
 c.

 d. <line />
- 4. Which tag is used to link Web pages to each other?
 - a. <link> tag
 - b. <hyperlink> tag
 - c. <a> tag
 - d. <body> tag
- **5.** What is the default alignment for headings and paragraphs?
 - a. center
 - b. left
 - c. right
 - d. wherever you type them in the source code
- **6.** Which type of XHTML list will automatically number the items for you?
 - a. numbered list
 - b. ordered list
 - c. unordered list
 - d. definition list
- 7. Which of the following is a reason why the text contained by the title tag should be descriptive and include the business or organization name?
 - a. The title is saved by default when a visitor bookmarks a web page.
 - b. The title may be printed when a visitor prints a web page.
 - c. The title may be listed in search engine results.
 - d. All of the above are reasons why the text contained by the title tag should be descriptive and include the business or organization name.

- **8.** When do you need to use a fully qualified URL in a hyperlink?
 - a. always
 - b. when linking to a Web page file on the same site
 - c. when linking to a Web page file on an external site
 - d. never
- **9.** Which tag pair contains the items in an ordered or unordered list?
 - a. <item> </item>
 - b. <1i> </1i>
 - c. <dd> </dd>
 - d. all of the above
- **10.** What does an e-mail link do?
 - a. automatically sends you an e-mail message with the visitor's e-mail address as the reply-to field
 - b. launches the default e-mail application for the visitor's browser with your e-mail address as the recipient
 - c. displays your e-mail address so that the visitor can send you a message later
 - d. links to your mail server

Fill in the Blank

- **11.** The <meta/> tag can be used to
- **12.** _____ can be used to display characters such as the copyright symbol.
- **13.** The _______ is the preferred element to use when you need to emphasize text.
- 14. The ______ is used to place a nonbreaking space on a Web page.

Short Answer

15. Explain why it is good practice to place the e-mail address on the Web page and within the anchor tag when creating an e-mail link.

Apply Your Knowledge

1. Predict the Result. Draw and write a brief description of the Web page that will be created with the following XHTML code:

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
 "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Predict the Result</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
</head>
<body>
<h1><em>Favorite Sites</em></h1>
<a href="http://myspace.com">My Space</a>
<a href="http://google.com">Google</a>
small>Copyright © 2011 Your name here</small>
</body>
</html>
```

 Fill in the Missing Code. This Web page should display a heading and a definition list, but some XHTML tags, indicated by <_> are missing. Fill in the missing code.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Door County Wild Flowers</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
</head>
<body>
  < >Door County Wild Flowers< >
  <d1>
    <dt>Trillium< >
      < >This white flower blooms from April through June in
wooded areas.< >
      < >Lady Slipper< >
      < >This yellow orchid blooms in June in wooded areas.</d>
    < >
</body>
</html>
```

3. Find the Error. Why won't this page display in a browser?

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
   <head>
   <title>Find the Error<title>
   <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
   </head>
   <body>
        <h1>Why don't I display?</h1>
   </body>
   </html>
```

Hands-On Exercises

- 1. Write the XHTML to display your name in the largest size heading element.
- **2.** Write the XHTML to create an absolute link to a Web site whose domain name is google.com.
- **3.** Write the XHTML for an unordered list to display the days of the week.
- **4.** Write the XHTML for an ordered list that uses uppercase letters to order the item. This ordered list will display the following terms: HTML, XML, and XHTML.
- **5.** Think of a favorite quote by someone you admire. Write the XHTML code to display the person's name in a heading and the quote in a blockquote.
- **6.** Modify the following code snippet to use logical style tags instead of physical style tags.

A diagram of the organization of a web site is called a site map or storyboard. <i>Creating the site map is one of the initial steps in developing a web site.</i>

- 7. Modify the blockquote.html Web page you created in Hands-On Practice 2.5. Configure the URL http://www.w3.org/WAI/ as a hyperlink. Save the file as blockquote2.html. Open your file in Notepad and print the source code for the page. Display your page in a browser and print the page. Hand in both printouts to your instructor.
- 8. Create a Web page that uses a definition list to display three network protocols (see Chapter 1) and their descriptions. Include a hyperlink to a Web site that provides information about the protocols. Add an appropriate heading to the page. Save the page as network.html. Open your file in Notepad and print the source code for the page. Display your page in a browser and print the page. Hand in both printouts to your instructor.
- **9.** Create a Web page about your favorite musical group. Include the name of the group, the individuals in the group, a hyperlink to the group's Web site, your favorite three (or fewer if the group is new) CD releases, and a brief review of each CD.
 - Use an unordered list to organize the names of the individuals.
 - Use a definition list for the names of the CDs and your reviews.

Save the page as band.html. Open your file in Notepad and print the source code for the page. Display your page in a browser and print the page. Hand in both printouts to your instructor.

10. Create a Web page about your favorite recipe. Use an unordered list for the ingredients and an ordered list to describe the steps needed to prepare the food. Include a hyperlink to a Web site that offers free recipes. Save the page as recipe.html. Open your file in Notepad and print the source code for the page. Display your page in a browser and print the page. Hand in both printouts to your instructor.

Web Research

- 1. There are many HTML and XHTML tutorials on the Web. Use your favorite search engine to discover them. Choose two that are helpful. For each, print out the home page or other pertinent page and create a Web page that contains the answers to the following questions:
 - a. What is the URL of the Web site?
 - b. Is the tutorial geared toward the beginner level, intermediate level, or both levels?
 - c. Would you recommend this site to others? Why or why not?
 - d. List one or two concepts that you learned from this tutorial.

Open your file in Notepad and print the source code for the page. (*Hint*: Select File, Print.) Display your page in a browser and print the page. Hand in both printouts to your instructor.

Focus on Web Design

- You are learning the syntax of XHTML. However, coding alone does not make a Web page—design is very important. Surf the Web and find two Web pages—one that is appealing to you and one that is unappealing to you. Print each page. Create a Web page that answers the following questions for each of your examples.
 - a. What is the URL of the Web site?
 - b. Is the page appealing or unappealing? List three reasons for your answer.
 - c. If the page is unappealing, what would you do to improve it?

Open your file in Notepad and print the source code for the page. Display your page in a browser and print the page. Hand in both printouts to your instructor.

WEB SITE CASE STUDY

Each of the following case studies continues throughout most of the text. This chapter introduces each Web site scenario, presents the site map or storyboard, and directs you to create two pages for the site.

JavaJam Coffee House

Julio Perez is the owner of the JavaJam Coffee House, a gourmet coffee shop that serves snacks, coffee, tea, and soft drinks. Local folk music performances and poetry readings are held a few nights during the week. The customers of JavaJam are mainly college students and young professionals. Julio would like a Web presence for his shop that will display his services and provide a calendar for the performances. He would like a home page, menu page, music performance schedule page, and job opportunities page.

A site map for the JavaJam Coffee House Web site is shown in Figure 2.26.

The site map describes the architecture of the Web site, a Home page with three main content pages: Menu, Music, and Jobs.



Figure 2.27 displays a sample layout for the pages. It contains a site logo, a navigation area, a content area, and a footer area for copyright information.

Figure 2.27 JavaJam page layout

Site Logo
Navigation
Content
Footer

You have two tasks in this case study:

- **1.** Create the Home page: index.html.
- **2.** Create the Menu page: menu.html.

Hands-On Practice Case

Create a folder called javajam to contain your JavaJam Web site files.

1. The Home Page. You will use Notepad to create the Home page for the JavaJam Coffee House Web site. The Home page is shown in Figure 2.28.



Launch Notepad and create a Web page with the following specifications:

- Web page: Use a descriptive page title—the company name is a good choice for a business Web site.
- Logo area: Use <h1> for the JavaJam Coffee House logo.
- Navigation: Place the following text within a paragraph:
 - Home Menu Music Jobs

Code anchor tags so that Home links to index.html, Menu links to menu.html, Music links to music.html, and Jobs links to jobs.html.

• Content: Place the following content in an unordered list:

Specialty Coffee and Tea

Bagels, Muffins, and Organic Snacks

Music and Poetry Readings

Open Mic Night

• **Contact information:** Place the address and phone number information within a paragraph below the unordered list. *Hint*: Use line break tags to help you configure this area.

12312 Main Street

Mountain Home, CA 93923

1-888-555-5555

• Footer: Place the following information in a small text size (use the <small> physical style element) and emphasized font style (use the logical style element):

Copyright © 2011 JavaJam Coffee House

Place your name in an e-mail link on the line under the copyright information.

The page in Figure 2.28 may seem a little sparse, but don't worry, as you gain experience and learn to use more advanced techniques, your pages will look more professional. White space (blank space) on the page can be added with
br /> tags where needed. Your page does not need to look exactly the same as the sample. Your goal at this point should be to practice and get comfortable using XHTML.

Save your page in the javajam folder and name it index.html.

2. The Menu Page. Create the Menu page shown in Figure 2.29. A productivity technique is to create new pages based on existing pages—so you can benefit from your previous work. Your new Menu page will use the index.html page as a starting point.

Open the index.html page for the JavaJam Web site in Notepad. Select File, Save As, and save the file with the new name of menu.html in the javajam folder. Now you are ready to edit the page.

- Modify the page title. Change the text contained between the <title> and </title> tags to JavaJam Coffee House Menu.
- Delete the unordered list and the contact information.
- Add the menu content to the page using a definition list. Use the <dt> element to contain each menu item name. Configure the menu item name to display in bold text (use the element). Use the <dd> element to contain the menu item description.



• The menu items names and descriptions are as follows:

Just Java Regular house blend, decaffeinated coffee, or flavor of the day. Endless Cup \$2.00 Cafe au Lait

House blended coffee infused into a smooth, steamed milk. Single \$2.00 Double \$4.00

Iced Cappuccino Sweetened espresso blended with icy-cold milk and served in a chilled glass. \$4.75

Save your page and test it in a browser. Test the hyperlink from the menu.html page to index.html. Test the hyperlink from the index.html page to menu.html. If your links do not work, review your work with close attention to these details:

- Verify that you have saved the pages with the correct names in the correct folder.
- Verify your spelling of the page names in the anchor tags.
- After you make changes, test again.

Fish Creek Animal Hospital

Magda Patel is a veterinarian and owner of the Fish Creek Animal Hospital. Her customers are local pet owners who range in age from children to senior citizens. Magda would like a Web site to provide information to her current and potential customers. She has requested a home page, a services page, an ask the vet page, and a contact page.

A site map for the Fish Creek Animal Hospital Web site is shown in Figure 2.30.

The site map describes the architecture of the Web site, a Home page with three main content pages: Services, Ask the Vet, and Contact.

layout



Figure 2.31 displays a sample page layout. It contains a site logo, a navigation area, a content area, and a footer area for copyright information.



You have two tasks in this case study:

- **1.** Create the Home page: index.html.
- 2. Create the Services page: services.html.

Hands-On Practice Case

Create a folder called fishcreek to contain your Fish Creek Web site files.

1. The Home Page. You will use Notepad to create the Home page for the Fish Creek Animal Hospital Web site. The Home page is shown in Figure 2.32.

Launch Notepad and create a Web page with the following specifications:

- Web page: Use a descriptive page title—the company name is a good choice for a business Web site.
- Logo area: Use <h1> for the Fish Creek Animal Hospital logo.
- Navigation: Place the following text using the logical style element within a paragraph:

Home Services Ask the Vet Contact

Code anchor tags so that Home links to index.html, Services links to services.html, Ask the Vet links to askvet.html, and Contact links to contact.html.



- Content: Place the following content in a definition list:
 - Full Service Facility

Veterinarians and staff are on duty 24 hours a day, 7 days a week.

Years of Experience

Fish Creek Veterinarians have provided quality, dependable care for your beloved animals since 1984.

Open Door Policy

Our professionals welcome owners to stay with their pets during any medical procedure.

• Contact information: Place the address and phone number information within a paragraph below the definition list. *Hints*: Use line break tags to help you configure this area. The text size is configured with the <small> physical style element.

1-800-555-5555

1242 Grassy Lane

Fish Creek, WI 55534

• Footer: Place the following information in a small text size (use the <small> physical style element) and emphasized font style (use the logical style element):

Copyright © 2011 Fish Creek Animal Hospital

Place your name under the copyright information.

The page in Figure 2.32 may seem a little sparse, but don't worry, as you gain experience and learn to use more advanced techniques, your pages will look more professional. White space (blank space) on the page can be added with
> tr /> tags where needed. Your page does not need to look exactly the same as the sample. Your goal at this point should be to practice and get comfortable using XHTML.

Save your page in the fishcreek folder and name it index.html.

2. The Services Page. Create the Services page shown in Figure 2.33. A productivity technique is to create new pages based on existing pages—so you can benefit from your previous work. Your new Services page will use the index.html page as a starting point.



Open the index.html page for the Fish Creek Web site in Notepad. Select File, Save As, and save the file with the new name of services.html in the fishcreek folder. Now you are ready to edit the page.

- Modify the page title. Change the text contained between the <title> and </title> tags to Fish Creek Animal Hospital Services.
- Delete the definition list and the contact information.
- Add the services content to the page using an unordered list. Configure the name of each services category to be bold (use the logical style element). Code line breaks after each category name.
- The service categories and descriptions are as follows:

Medical Services

We offer state-of-the-art equipment and technology.

Surgical Services

Full range of surgical procedures including orthopedics and emergency surgeries.

Dental Care

A dental exam can determine whether your pet needs preventive dental care such as scaling and polishing.

House Calls

The elderly, physically challenged, and multiple pet households often find our in-home veterinary service helpful and convenient.

Emergencies

At least one of our doctors is on call every day and night.

Figure 2.33

Fish Creek

services.html

Save your page and test it in a browser. Test the hyperlink from the services.html page to index.html. Test the hyperlink from the index.html page to services.html. If your links do not work, review your work with close attention to these details:

- Verify that you have saved the pages with the correct names in the correct folder.
- Verify your spelling of the page names in the anchor tags.
- After you make changes, test again.

Pasha the Painter

Pasha Poduslawa is an independent home painter and decorator. He would like to have a Web site to advertise his business. His clients are mainly homeowners in the middleclass suburbs of a large city. They range in age from thirties to fifties. Pasha would like a site that contains a home page, a services page, an estimates page, and a testimonial page.

A site map for the Pasha the Painter Web site is shown in Figure 2.34.



The site map describes the architecture of the Web site, a Home page with three main content pages: Services, Testimonials, and Estimates.

Figure 2.35 displays a sample page layout. It contains a site logo, a navigation area, a content area, and a footer area for copyright information.

You have two tasks in this case study:

- **1.** Create the Home page: index.html.
- 2. Create the Services page: services.html.

Figure 2.35 Pasha the Painter page layout	Site Logo Navigation
	Content
	Footer

Hands-On Practice Case

Create a folder called painter to contain your Pasha the Painter Web site files.

1. The Home Page. You will use Notepad to create the Home page for the Pasha the Painter Web site. The Home page is shown in Figure 2.36.



Launch Notepad and create a Web page with the following specifications:

- Web page: Use a descriptive page title—the company name is a good choice for a business Web site.
- Logo area: Use <h1> for the Pasha the Painter logo. The motto should be contained within an <h3> element. Emphasize (display in italics) the motto: Serving the Northwest Chicago Suburbs since 1986.
- Navigation: Place the following text using the logical style element within a paragraph:

Home Services Testimonials Estimates

Code anchor tags so that Home links to index.html, Services links to services.html, Testimonials links to testimonials.html, and Estimates links to estimates.html.

• Content: Place this sentence in a paragraph: We will work with you to create the home of your dreams.

Place the following content in an unordered list:

- **Interior Painting**
- **Exterior** Painting
- Wallpaper Removal
- Wallpaper Installation
- Drywall
- Footer: Place the following information in a small text size (use the <small> physical style element) and emphasized font style (use the logical style element):

Copyright © 2011 Pasha the Painter

Place your name in an e-mail link on the line under the copyright information.

Figure 2.36

index.html

The page in Figure 2.36 may seem a little sparse, but don't worry, as you gain experience and learn to use more advanced techniques, your pages will look more professional. White space (blank space) on the page can be added with
tags where needed. Your page does not need to look exactly the same as the sample. Your goal at this point should be to practice and get comfortable using XHTML.

Save your page in the painter folder and name it index.html.

2. The Services Page. Create the Services page shown in Figure 2.37. A productivity technique is to create new pages based on existing pages—so you can benefit from your previous work. Your new Services page will use the index.html page as a starting point.



Open the index.html page for the Pasha the Painter Web site in Notepad. Select File, Save As, and save the file with the new name of services.html in the painter folder. Now you are ready to edit the page.

- Modify the page title. Change the text contained between the <title> and </title> tags to Pasha the Painter Services.
- Delete the content paragraph and unordered list.
- Add the services content to the page using an unordered list. Configure the name of each services category to be bold (use the logical style element). Code line breaks after each category name.

• The service categories and descriptions are as follows:

Interior Services

If you need it painted, textured, or papered, Pasha the Painter can do it!

Exterior Services

If you need it washed, painted, stained, or just touched up, Pasha the Painter can do it!

Painting

Pasha has the most dependable and professional painting staff in the area and uses only quality paint.

Wallcovering

Our design specialists are experts at applying wallpaper and other wallcoverings

Save your page and test it in a browser. Test the hyperlink from the services.html page to index.html. Test the hyperlink from the index.html page to services.html. If your links do not work, review your work with close attention to these details:

- Verify that you have saved the pages with the correct names in the correct folder.
- Verify your spelling of the page names in the anchor tags.
- After you make changes, test again.

Prime Properties

Prime Properties is a small real estate company that specializes in residential properties. The owner, Maria Valdez, would like a Web site to showcase her listings and provide a point of contact for her clients, who are mainly middle-class working adults who are looking for a home in the northwest Chicago suburbs. Maria would like a home page, a listings page that contains information about her properties, a financing page, and a contact page.

A site map for the Prime Properties Web site is shown in Figure 2.38.



The site map describes the architecture of the Web site, a Home page with three main content pages: Listings, Financing, and Contact.

Figure 2.39 displays a sample page layout. It contains a site logo, a navigation area, a content area, and a footer area for copyright information.

You have two tasks in this case study:

- **1.** Create the Home page: index.html.
- 2. Create the Financing page: financing.html.



Navigation Content
Content
Footer

Hands-On Practice Case

Create a folder called prime to contain your Prime Properties Web page files.

1. The Home Page. You will use Notepad to create the Home page for the Prime Properties Web site. The Home page is shown in Figure 2.40.



Launch Notepad and create a Web page with the following specifications:

- Web page: Use a descriptive page title—the company name is a good choice for a business Web site.
- Logo area: Use <h1> for the Prime Properties logo.
- Navigation: Configure the following text to display in bold font (use the logical style element) within a paragraph:

Home Listings Financing Contact

Code anchor tags so that Home links to index.html, Listings links to listings.html, Financing links to financing.html, and Contact links to contact.html.

- Content: Place each line of text shown below in its own paragraph.
 - Prime Properties is prepared to market and sell your property.
 - The philosophy of Prime Properties is to promote our clients, not ourselves.
 - We can also help you find the property that meets your needs:
 - Place the following content in an unordered list:
 - location
 - price
 - features
- Contact information: The address and phone information should display in small text (use the <small> physical style element).
 - Prime Properties
 - 3055 Bode Road
 - Schaumburg, IL 60194
 - 847-555-5555
- Footer: Place the following information in a small text size and emphasized font style (use <small> and elements):

Copyright © 2011 Prime Properties

Place your name in an e-mail link on the line under the copyright information.

The page in Figure 2.40 may seem a little sparse, but don't worry, as you gain experience and learn to use more advanced techniques, your pages will look more professional. White space (blank space) on the page can be added with
tags where needed. Your page does not need to look exactly the same as the sample. Your goal at this point should be to practice and get comfortable using XHTML.

Save your page in the prime folder and name it index.html.

2. The Financing Page. Create the Financing page shown in Figure 2.41. A productivity technique is to create new pages based on existing pages—so you can benefit from your previous work. Your new Financing page will use the index.html page as a starting point.

Open the index.html page for the Prime Properties Web site in Notepad. Select File, Save As, and save the file with the new name of financing.html in the prime folder. Now you are ready to edit the page.

- Modify the page title. Change the text contained between the <title> and </title> tags to Prime Properties :: Financing.
- Delete the content paragraphs, unordered list, and contact information.
- Add the financing content to the page.
 - First, configure the following text in an <h2> element: Financing.

Next, place the following sentence in a paragraph:

We work with many area mortgage and finance companies.

Finally, configure the following phrase with an <h3> element:

Mortgage FAQs



Use a definition list to configure the FAQs. Use <dt> elements for the questions and <dd> elements for the answers. The FAQ questions and answers are as follows:

- What amount of mortgage do I qualify for?
- The total basic monthly housing cost is normally based on 29% to 41% of your gross monthly income.
- Which percentage is most often used?
- The percentage used depends on the lending institution and type of financing.
- How do I get started?
- Contact us today to help you arrange financing for your home.

Save your page and test it in a browser. Test the hyperlink from the financing.html page to index.html. Test the hyperlink from the index.html page to financing.html. If your links do not work, review your work with close attention to these details:

- Verify that you have saved the pages with the correct names in the correct folder.
- Verify your spelling of the page names in the anchor tags.
- After you make changes, test again.

This page intentionally left blank

Configuring **Color and Text** with CSS

Chapter Objectives In this chapter, you will learn how to ...

- Describe the evolution of style sheets from print media to the Web
- List advantages of using Cascading Style Sheets
- Use color on Web pages
- Create style sheets that configure common color and text properties
- Apply inline styles
- Use embedded style sheets
- Use external style sheets
- Create CSS class and id selectors

C H A <u>P</u> T E R

Validate CSS

Now that you have been introduced to XHTML, you are

ready to explore Cascading Style Sheets (CSS). CSS is not new-it was first proposed as a standard by the W3C in 1996. However, browsers and other user agents have only supported this technology consistently for the past several years. Now that there is fairly steady support, Web developers have begun to use CSS to separate the presentation style of a Web page from the information on the Web page itself. CSS is used to configure text, color, and page layout.

This chapter introduces you to the use of CSS on the Web as you explore configuring color and text.

3.1 Overview of Cascading Style Sheets

For years, style sheets have been used in desktop publishing to apply typographical styles and spacing instructions to printed media. CSS provides this functionality (and much more) for Web developers. It allows Web developers to apply typographic styles (typeface, font size, and so on) and page layout instructions to a Web page. The CSS Zen Garden, http://www.csszengarden.com, exemplifies the power and flexibility of CSS. Visit this site for an example of CSS in action. Notice how the content looks dramatically different depending on the design (CSS style rules) you select. Although the designs on CSS Zen Garden are created by CSS masters, at some point these designers were just like you—starting out with CSS basics.

CSS is a flexible, cross-platform, standards-based language developed by the W3C. Its description of CSS can be found at http://www.w3.org/Style/. Be aware that CSS, even though it has been in use for many years, is still considered an emerging technology and the two most popular browsers do not support it in exactly the same way. There are CSS reference pages at http://reference.sitepoint.com/css and http://www.westciv.com/ style_master/academy/browser_support that list the way styles are supported by various browsers and platforms. This chapter concentrates on those aspects of CSS that are well supported by popular browsers.

Advantages of Cascading Style Sheets

There are several advantages to using CSS:

- **Typography and page layout can be better controlled.** These features include font size, line spacing, letter spacing, indents, margins, and element positioning.
- **Style is separate from structure.** The format of the text and colors used on the page can be configured and stored separately from the body section of the Web page document.
- **Styles can be stored.** You can store styles in a separate document and associate them with the Web page. When the styles are modified, the XHTML remains intact. This means that if your client decides to change the background color from red to white you only need to change one file that contains the styles, instead of each Web page document.
- **Documents are potentially smaller.** The formatting is separate from the document; therefore, the actual documents should be smaller.
- **Site maintenance is easier.** Again, if the styles need to be changed it's possible to complete the modifications by changing the style sheet only.

Do you see that there might be advantages to using CSS? You may be wondering if there are any disadvantages to using CSS. In fact, there is one large disadvantage—CSS technology is not yet uniformly supported by browsers. This disadvantage will be less of an issue in the future as browsers comply with standards.

Types of Cascading Style Sheets

There are four methods used to incorporate CSS technology in a Web site: inline, embedded, external, and imported.

- Inline styles are coded in the body of the Web page as an attribute of an XHTML tag. The style only applies to the specific element that contains it as an attribute.
- Embedded styles are defined in the header of a Web page. These style instructions apply to the entire Web page document.
- External styles are coded in a separate text file. This text file is associated with the Web page by using a **<link** /> element in the header section.
- Imported styles are similar to external styles in that they can connect styles coded in a separate text file with a Web page document. An external style sheet can be imported into embedded styles or into another external style sheet by using the @import directive. This chapter concentrates on the other three uses of CSS.

Introduction to CSS Syntax

Style sheets are composed of rules that describe the styling to be applied. Each rule contains a selector and a declaration. The selector can be an XHTML element, a class name (that you create yourself), or an id name (that you create yourself). This example concentrates on applying styles to XHTML elements. The declaration is the property you are setting (such as color or typeface) and the value you are assigning to it.

For example, the CSS rule shown in Figure 3.1 would set the color of the text used on a Web page to blue. The selector is the XHTML body tag and the declaration sets the **color property** to the value of blue.



If you wanted the background color of the Web page to be yellow, the CSS rule could be expanded as follows:

body { color: blue; background-color: yellow; }

This could also be written using hexadecimal color values as follows:

body { color: #0000FF; background-color: #FFFF00; }

Notice that both the background-color and text color properties were configured in the previous example. To avoid surprising results caused by default browser colors, the W3C recommends that the **background-color property** is set when the text color is configured.

Have you ever wondered why some text-based links are not underlined? This can be accomplished with a style applied to the anchor tag. The following style rule selects the anchor tag (denoted by a) and sets the **text-decoration property** (the underline) to none:

a { text-decoration: none }

You might be asking yourself how you would know what properties and values are allowed to be used. This chapter introduces you to some of the CSS properties commonly used to configure color and text. Table 3.1 presents a summary of the CSS properties used in this chapter. Appendix C, CSS Property Reference, contains a more detailed list. In the next sections, we'll take a look at how color is used on Web pages and we'll explore how to use CSS to configure color.

 Table 3.1
 CSS properties used in this chapter

Property	Description	Values
background- color	Background color on the Web page	Any valid color
color	Text color	Any valid color
font-family	Name of a font or font family	Any valid font or a font family such as serif, sans-serif, fantasy, monospace, Or cursive
font-size	The size of the text font	This varies; a numeric value with pt (standard font point sizes), px (pixels), the unit em (which corre- sponds to the width of the uppercase M of the current font); numeric percentage; the text values xx-small, x-small,small, medium, large, x-large, and xx-large are also valid
font-style	The style of the font	normal, italic, oblique
font-weight	The "boldness" or weight of the font	This varies; the text values normal, bold, bolder, and lighter; the numeric values 100, 200, 300, 400, 500, 600, 700, 800, and 900
line-height	The spacing allowed for the line of text	It is most common to use a percentage for this value; for example, a value of 200% would be double- spaced
margin	Shorthand notation to config- ure the margin surrounding an element	A numeric value (px or em); for example, body { margin: 10px} will set the page margins in the document to 10 pixels. When eliminating the margin, do not use the px or em unit, for example, body {margin:0}
margin-left	Configures the space in the left margin of the element	A numeric value (px or em), auto, or 0
margin-right	Configures the space in the right margin of the element	A numeric value (px or em), auto, or 0
text-align	The alignment of text	center, justify, left, right
text- decoration	Determines whether text is underlined; this style is most often applied to hyperlinks	The value none will cause a hyperlink not to be underlined in a browser that normally processes in this manner
width	The width of an element	A numeric value (px or em), numeric percentage, or auto (default)

3.2 Using Color on Web Pages

Monitors display color as a combination of different intensities of red, green, and blue, also known as **RGB color**. RGB intensity values are numerical from 0 to 255. Each

RGB color will have three values, one each for red, green, and blue. These are always listed in that order (red, green, blue) and specify the numerical value of each color used. For example, the RGB values for red are (255,0,0)—all red, no green and no blue. The RGB values for blue are (0,0,255)—no red, no green, and all blue. These colors can also be specified using hexadecimal values.

Hexadecimal is the name for the Base 16 numbering system, which uses the characters 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F to specify numeric values. When a hexadecimal value is used to specify RGB color, the numeric value pairs range from 00 to FF (0 to 255 in Base 10). The hexadecimal value contains three numeric value pairs written sequentially as one number. Each pair is associated with the amount of red, green, and blue displayed. Using this notation, the color red would be specified as #FF0000 and the color blue as #0000FF. The # symbol signifies that the value is in hexadecimal. You can use either uppercase or lowercase letters in hexadecimal color values–#FF0000 and #ff0000 both configure the color red.

Don't worry—you won't need to do calculations to work with Web colors. Just become familiar with the numbering scheme. See Figure 3.2 (shown also in the color insert section) for an excerpt from the color chart at http://webdevfoundations.net/color.

Figure 3.2	#FFFFFF	#FFFFCC	#FFFF99	#FFFF66	#FFFF33	#FFFF00
Partial color chart	#FFCCFF	#FFCCCC	#FFCC99	#FFCC66	#FFCC33	#FFCC00
	#FF99FF	#FF99CC	#FF99999	#FF9966	#FF9933	#FF9900
	#FF66FF	#FF66CC	#FF6699	#FF6666	#FF6633	#FF6600
Go to the end of the book for a full color	#FF33FF	#FF33CC	#FF3399	#FF3366	#FF3333	#FF3300
version of this figure	#FF00FF	#FF00CC	#FF0099	#FF0066	#FF0033	#FF0000

Take a few moments to examine the color chart. You will observe a display of colors and their associated hexadecimal RGB values in hexadecimal. You may notice that there is a pattern to the hexadecimal numbers (pairs of 00, 33, 66, 99, CC, or FF). This pattern signifies a color on the **Web Safe Color Palette** (more on this later). As you examine the color chart further, you will see a list of colors using color names. Some Web developers find it easier to use the color names. However, the names are not uniformly supported by all versions of all browsers, so the W3C recommends using numeric color values instead of color names.

Web Color Palette

A Web developer usually has no way of knowing what type of computer or browser the Web site visitors will be using. The various operating systems and browsers display colors differently, and sometimes not at all. The Web Safe Color Palette, also known as the Web Color Palette, is a collection of 216 colors that display the same on both the Windows and Mac OS platforms. It is easy to tell if a color is on the Web Color Palette when you consider the individual hexadecimal RGB value pairs. The values of 00, 33, 66, 99, CC, and FF are the only values for hexadecimal RGB value pairs on the Web Color Palette. Take another look at the color chart at http://webdevfoundations.net/ color and note that all the colors listed by RGB follow this numbering scheme—they comprise the Web Color Palette. See Figure 3.3 (shown also in the color insert section) Figure 3.3

Web safe colors display predictably

This background color, #800000, is NOT on the Web Color Palette. The color may display differently depending on the operating system and the monitor. This background color, #CC0000, is on the Web Color Palette. The color should display in a similar maner on both Macs and PCs.

Go to the end of the book for a full color version of this figure

for a comparison of a Web Safe Color, #CC0000, and a non-Web safe color, #880000. Both are a shade of red; however, the Web safe color will display predictably across Windows and Mac OS platforms and the other color will not. Using Web safe colors has become less important now that most monitors display billions of colors. The Web Color Palette is rather limited and it is common for today's Web designers to choose colors creatively rather than select them from the Web Color Palette.

Making Color Choices

You may be wondering how to select colors to display on Web pages. One easy way to choose colors is to use a monochromatic color scheme—all shades or tints of the same color. Try the Color Blender at http://meyerweb.com/eric/tools/color-blend to select colors for a monochromatic color scheme. Another way to create a color scheme is to base it on a photograph or image. Visit http://www.colr.org to generate a color scheme based on an image from the Web or one that you upload. If you have a favorite color and would like to create a color scheme around it, visit one of the following sites that suggest color schemes:

- http://colorsontheweb.com/colorwizard.asp
- http://kuler.Adobe.com
- http://www.leestreet.com/QuickColor.swf
- http://colorschemedesigner.com/
- http://www.colorjack.com/articles/color_formulas.html

Accessibility and Color



While using color can help you create a compelling Web page, keep in mind that not all your visitors will see or be able to distinguish between colors. Some visitors will use a screen reader and will not experience your colors, so your information must be clearly conveyed even if colors cannot be viewed. Other visitors may be challenged with color vision deficiency (color blindness) and will not see the colors as you intended. According to Vischeck (http://www.vischeck.com/vischeck/) about 1 out of 20 people experience some type of color deficiency. To increase Web page accessibility, choose background and text colors with a high amount of contrast. The choice of colors is important—avoid using red, green, brown, gray, or purple next to each other. White, black, and shades of blue and yellow are easier for individuals with color vision deficiencies to differentiate. Visit http://www.vischeck.com/vischeck/vischeck/URL.php to simulate how a person with a color deficiency experiences the colors on a Web page. Using color on Web pages will be revisited in Chapter 5, Web Design.

3.3 Configuring Color with Inline CSS

Now that you are aware of how color on Web pages is specified and where to get ideas for color schemes on Web pages, let's start configuring color with inline styles. Inline styles are coded as attributes on XHTML tags.

The Style Attribute

The **style** attribute is used with the value of the style rule declaration you need to set. Recall that a declaration consists of a property and a value. Each property is separated from its value with a colon (:). The following code will set the text color of an <h1> tag to a shade of red:

```
<h1 style="color:#cc0000">This is displayed as a red heading</h1>
```

If there is more than one property, they are separated by a semicolon (;). The following code configures the heading with a red text color and a gray background color.

```
<h1 style="color:#cc0000;background-color:#cccccc">This is displayed
as a red heading on a gray background</h1>
```

The following code example uses an inline style to set the background color to green and text color to white:

```
This paragraph is using
an inline style.
```



Are there different ways to configure colors using CSS?

CSS syntax allows you to configure colors in a number of ways, including hexadecimal color values, color names, and decimal color values. For example, Table 3.2 shows the syntax for setting the color of text in a paragraph to red.

The examples in this book use either hexadecimal color value or color name to configure colors using CSS. The color chart on this textbook's companion Web site at http://webdevfoundations.net/color provides examples of the color created by hexadecimal values in the Web Color Palette.

Table 3.2 Syntax for setting the color of text in a paragraph to red

CSS Syntax	Color Type
<pre>p { color: red }</pre>	Color name
p { color: #FF0000 }	Hexadecimal color value
p { color: #F00 }	Shorthand hexadecimal (one character for each hexadecimal pair)
p { color: rgb(255,0,0) }	Decimal color value (RGB triplet)



By now you are aware that the best way to learn new coding technologies is to practice them. In this Hands-On Practice you will configure a paragraph using inline styles. The styles will specify a green background with white text. A sample is shown in Figure 3.4.



Launch Notepad and type in the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Inline Styles</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
</head>
<body>
This paragraph is
using an inline style.
This paragraph is NOT using an inline style.
</body>
</html>
```

Save your file as inline.html. Test your page in a browser and compare it with Figure 3.4. The student files contain a sample solution at Chapter3/inline.html. Note that the paragraph that used a style has the green background and white text. The paragraph that does not use a style is displayed using default browser settings.

3.4 Configuring Color with Embedded Styles

In the previous Hands-On Practice you added inline styles for one of the paragraphs. You needed to code a style attribute on the paragraph element. But what if you needed to configure the styles for ten or twenty paragraphs instead of just one. Using inline styles, you might be doing a lot of repetitive coding! While inline styles apply to one XHTML element, embedded styles apply to an entire Web page.

Figure 3.4

inline styles

The Style Element

Embedded styles are placed within a **<style> element** located in the header section of a Web page. The opening **<style>** tag begins the embedded style rules and the closing **</style>** tag ends the area containing embedded style rules. When using the **<style>** tag, you do not need the **style** attribute. However, the **<style>** tag does use a **type** attribute that should have the value of "text/css".





The following code is an example of a Web page (shown in Figure 3.5) that uses embedded styles to set the text color and background color of the page.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Embedded Styles</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
<style type="text/css">
body { background-color: #CCFFFF;
      color: #000033;
}
</style>
</head>
<bodv>
  <h1>Embedded Styles</h1>
  This page uses embedded styles.
</bodv>
</html>
```

Notice the way the style rules were coded with each rule on its own line. The formatting is not required for the styles to work, but it makes the styles more readable and easier to maintain than one long row of text. The styles are in effect for the entire Web page document because they were applied to the <body> tag using the body selector.



Now let's see a working example. Launch Notepad and open the starter.html file from the Chapter3 folder in the student files.

Save your page as embedded.html and test it in a browser. Your page should look similar to the one shown in Figure 3.6.



Open the file in Notepad and view the source code. Notice that the XHTML code uses the <h1>, <h2>, , <u1>, and <1i> elements. In this Hands-On Practice you'll code embedded styles to configure selected background and text colors. You'll use the body selector to configure the default background color (#E6E6FA) and default text color (#191970) for the entire page. You'll also use the h1 and h2 selectors to configure different background and text colors for the heading areas.

Edit the embedded.html page in Notepad and add the following code below <title> element in the head section of the Web page.

```
<style type="text/css">
body { background-color: #E6E6FA;
color: #191970;
}
h1 { background-color: #191970;
color: #E6E6FA;
}
h2 { background-color: #AEAED4;
color: #191970;
}
</style>
```

Save and test your file in a browser. Figure 3.7 (shown also in the color insert section) displays the Web page along with color swatches. The monochromatic color scheme was chosen using the Color Blender at http://meyerweb.com/eric/tools/color-blend. Notice how the repetition of a limited number of colors adds interest and unifies the design of the Web page.

View the source code for embedded.html and review the CSS and XHTML code. Note that all the styles were located in a single place on the Web page. Since embedded styles are coded in a specific location, they are easier to maintain over time than inline styles. Also notice that you only needed to code the styles for the h2 selector once (in the head



section) and *both* of the <h2> XHTML elements applied the h2 style. This is more efficient than coding the same inline style on each <h2> element.



My CSS doesn't work, what can I do?

Coding CSS is a detail-oriented process. There are several common errors that can cause the browser not to apply CSS correctly to a Web page. With a careful review of your code and the following tips, you should get your CSS working:

- Verify that you are using the : and ; symbols in the right spots—they are easy to confuse. The : should separate the properties from their values, the ; should be placed between each *property:value* configuration.
- Check that you are not using = signs instead of : between each property and its value.
- Verify that the { and } symbols are properly placed around the style rules for each selector.
- Check the syntax of your selectors, their properties, and property values for correct usage.
- If part of your CSS works, and part doesn't—read through the CSS and check to determine the first rule that is not applied. Often the error is in the rule above the rule that is not applied.
- Use a program to check your CSS code. The W3C has a free CSS code validator at http://jigsaw.w3.org/css-validator. The W3C's CSS validator can help you find syntax errors. See Section 3.9 for an overview of how to use this tool to validate your CSS.



CHECKPOINT 3.1

- 1. List three reasons to use CSS on a Web page.
- When designing a page that uses colors other than the default colors for text and background, explain why it is a good reason to configure both properties: text color and background color.
- 3. Describe one advantage to using embedded styles instead of inline styles.

3.5 Configuring Text with CSS

In Chapter 2 you discovered how to use XHTML to configure some characteristics of text on Web pages, including logical style tags (such as the element) and physical style tags (such as the <small> element). You've also already configured text color using the CSS color property. In this section you'll learn how to use CSS to configure additional characteristics of text, including font typeface, font weight, font style, and font size. Using CSS to configure text is more flexible (especially when using an external style sheet as you'll discover later in the chapter) than using XHTML elements and is the method preferred by today's Web developers.

CSS and Fonts

Let's take a closer look at the CSS properties useful for configuring fonts: font-weight, font-style, font-size, and font-family.

The **font-weight property** configures the boldness of the text. You can use either numeric values (100, 200, 300, 400, 500, 600, 700, 800, and 900) or text values (including normal (default), bold, bolder, and lighter). Configuring the CSS rule font-weight:bold has a similar effect as the or XHTML element.

The **font-style** property typically is used to configure text displayed in italics (the same visual effect as an <i> or XHTML element). The font-style property values are normal (default), italic, and oblique.

The **font-size** property sets the size of the font. There are a wide variety of text and numeric values. Text values for font-size include xx-small, x-small, small, medium (default), large, x-large, and xx-large. Valid numeric values include units of px (pixels), pt (standard font point sizes), percentage values, and em. Figure 3.8 demonstrates examples of text with various font-size configurations displayed in the Firefox

Text Values	Em Units	Px Units	Pt Units	Percentage
xx-small	.5 em	10 px	6 pt	50%
x-small	.60 em	11 px	8 pt	60%
small	.75 em	13 px	10 pt	75%
medium	1 em	16 px	12 pt	100%
x-large	1.5 em	24 px	18 pt	150%
xx-large	2 em	28 px	24 pt	200%



browser on a monitor set to 1440×900 screen resolution. Compare font sizes on your own computer— launch a browser and view chapter3/fonts.html in the student files.

Be aware that the text values and the pt (point) unit size are browser dependent. For example, text configured with the CSS rule font-size: 12pt may look different when various browsers are used to display Web pages. The px (pixel) unit is monitor resolution dependent and looks different depending on the screen resolution used. The **em unit** is a relative font unit that has its roots in the print industry. Recall that printers used to set type manually with blocks of characters. An em unit is the width of a square block of type (typically the uppercase M) for a particular font and type size. On Web pages an em unit corresponds to the width of the font and size used in the parent element (typically the body element). With this in mind, the size of an em unit is relative to the font typeface and default size. Percentage values work in a similar manner to em units. For example, font-size: 100% and font-size: 1em should render the same in a browser.

Focus on Accessibility

With all these available choices, what's the best way to configure font-sizes? The W3C recommends the use of em units or percentages in their specification for CSS2 at http://www.w3.org/TR/REC-CSS2/fonts.html. So, usually the best choice is either em units or percentages. In addition, modern browsers such as Firefox, Opera, Google Chrome, and Internet Explorer 8 allow visitors to increase (or "zoom") the text size on the page easily even if nonrelative units, such as px, are used to configure font size. Expect to see more browser support of page customization and zoom features in the future. For certain graphic-dependent designs that require "pixel-perfect" rendering, px units might be more appropriate than em units or percentages-it's up to you to choose. As you work through the Hands-On Practice and Case Study exercises in this book, you'll gain experience using a variety of font-size configurations. In all cases, it is crucial to test your Web pages in a variety of client platforms (including browser and monitor resolution). This testing is part of the Web design and development process. Statistics available at http://thecounter.com indicate that at the time this was written Internet Explorer at 1028×768 resolution is most commonly used, although use of the Firefox browser continues to grow.

The **font-family property** configures font typefaces. A Web browser displays text using the fonts that have been installed on the user's computer. For example, the CSS rule <code>font-family: Arial</code> causes the browser to display text using Arial instead of the default browser font. Table 3.3 shows font family categories and some common font typefaces. See http://www.ampsoft.net/webdesign-l/WindowsMacFonts.html for a list of "Web-safe" fonts.

Table 3.3 Common fonts

Font-family Category	Font Typeface
serif	Times New Roman, Georgia, Times
sans-serif	Arial, Verdana, Geneva
monospace	Courier New, Lucida Console
cursive	Brush Seript M7, Comic Sans MS
fantasy	Jokerman, Curlz Mi

When a font is specified that is not installed on the Web visitor's computer, the default font is substituted. Times New Roman is the default font displayed by most Web browsers. You can list multiple fonts and categories for the value of the font face attribute. The browser will attempt to use the fonts in the order listed. When processing a CSS rule such as font-family: Arial, Verdana, sans-serif, the browser will use Arial if it is installed. If Arial is not installed, the browser will use Verdana if it is installed. If neither Arial nor Verdana are installed, the browser will use any sans-serif font installed on the computer. Finally, if no sans-serif fonts are installed on the computer, the default font face will be used.

Now that you are familiar with font configuration using CSS, we'll quickly explore three other CSS properties that modify the appearance of text: text-align, text-decoration, and line-height.

As you already know, the default alignment of text on a Web page is at the left margin, called left alignment. The **text-align property** is used to specify the alignment of text. Values for the text-align property are left (default), right, and center.

Have you ever seen a hyperlink on a Web page that was not underlined? This is typically configured with the **text-decoration property** (text-decoration: none). See Table 3.1 for additional values that are less commonly used with the text-decoration property.

The **line-height property** modifies the default height of a line of text. For example, code line-height: 200% to configure text to appear double-spaced.



HANDS-ON PRACTICE 3.3

Now that you've got a collection of new CSS properties for font and text configuration, let's try them out and modify the embedded.html page. Launch Notepad and open embedded.html. You'll code additional CSS style rules to configure the text on the page. When complete, your Web page will look similar to the one shown in Figure 3.9.



Set Default Font Properties for the Page

As you have already seen, CSS rules applied to the body selector apply to the entire page. Modify the CSS for the body selector to display most text using a sans-serif font. The new font typeface style rule will apply to the entire Web page unless more specific styles rules are applied to a selector (such as h1 or p), a class, or an id (more on classes and ids later).

```
body { background-color: #E6E6FA;
    color: #191970;
    font-family: Arial, Verdana, sans-serif;
}
```

Save your page as embedded1.html and test it in a browser. Your page should look similar to the one shown in Figure 3.10. Notice that just a single line of CSS changed the font typeface of all the text on the page!



Configure the h1 Selector

}

You will configure the line-height and font-family CSS properties. Set the lineheight property to 200%—this will add a bit of empty space above and below the heading text. (In Chapter 6 you'll explore other CSS properties, such as the margin, border, and padding that are more commonly used to configure space surrounding an element.) Next, modify the h1 selector to use a serif font. When a font name contains spaces, type quotes as indicated in the code below. While it is generally recognized that blocks of text using sans-serif fonts are easier to read, it is common to use a serif font to configure page or section headings.

```
h1 { background-color: #191970;
    color: #E6E6FA;
    line-height: 200%;
    font-family: Georgia, "Times New Roman", serif;
```

Figure 3.10

Text is displayed using a sans-serif font
Save and test your page in a browser. If you notice that the Trillium Media Design text seems to crowd the left margin, add a nonbreaking space special character in the body of the Web page after the opening <n1> tag.

Configure the h2 Selector

Configure the CSS rule to use the same font typeface as the h1 selector.

```
h2 { background-color: #AEAED4;
    color: #191970;
    font-family: Georgia, "Times New Roman", serif;
}
```

Add a New Paragraph Element Selector

Configure text in paragraphs to display just slightly smaller than the default text size. Use the font-size property set to .90em.

p { font-size: .90em; }

Configure the Unordered List

Configure the text displayed in the unordered list to be bold.

```
ul { font-weight: bold; }
```

Save your page as embedded2.html and test it in a browser. Your page should look similar to the one shown in Figure 3.9. The student files contain a sample solution at Chapter3/embedded2.html. CSS is quite powerful—just a few lines of code significantly changed the appearance of the Web page. You may be wondering if even more customization is possible. For example, what if you did not want all the paragraphs to display in exactly the same way? While you could add inline styles to the Web page code, that's usually not the most efficient technique. The next section introduces the CSS class and id selectors, which are widely utilized to configure specific page elements.



Is there a quick way to apply the same styles to more than one XHTML tag or more than one class?

Yes, you can apply the same style rules to multiple selectors (such as XHTML elements, classes, or ids) by listing the selectors in front of the rule. The code sample below shows the font-size of lem being applied to both the paragraph and line item elements.

p, li { font-size: lem; }

3.6 The Class and Id Selectors

The Class Selector

There are times when you'd like to apply a CSS rule to a certain class of elements on a Web page and not necessarily tie the style to a particular XHTML tag. This is when

you use the **class selector**. For example, perhaps you would prefer if the paragraph containing the navigation area information in embedded2.html was displayed with large, bold text. When setting a style for a class, configure the class name as the selector. Place a dot or period (.) in front of the class name in the style sheet. The following code configures a class called nav in a style sheet.

```
.nav { font-weight: bold;
     font-size: 1.25em;
}
```

The styles set in the nav class can be applied to any XHTML element you wish. You do this by using the **class attribute**, such as class="nav". Do not write the dot in front of the class value in the XHTML tag where the class is being applied. The following code will apply the nav class styles to a element:

```
 This paragraph will be displayed using the styles in the nav class.
```



Why is the class called nav?

You can choose almost any name you wish for a CSS class. However, CSS class names are more flexible and easier to maintain over time if they are descriptive of the structure rather than of specific formatting. For example, a class name of largeBold would no longer be meaning-ful if the design was changed to display the area differently; but a structural class name such as nav, logo, footer, content, or subheading is meaningful regardless of how the area is configured. Here are more hints for class names:

- Use short but descriptive names.
- Avoid class names that are the same as XHTML element names—they could be confusing to anyone working on the page.
- Both letters and numbers may be used.
- Avoid spaces in class names.
- Class names are not case sensitive, but consistency will make page maintenance easier.

A final tip about CSS classes is to be wary of "classitis"— that is, creating a brand new class each time you need to configure text a bit differently. Decide ahead of time how you will configure page areas, code your classes, and apply them. The result will be a more cohesive and better organized Web page.

The Id Selector

Use an **id** selector instead of a class selector if you plan to identify and apply a CSS rule uniquely to a single area on a Web page. For example, perhaps you would prefer if the paragraph containing the copyright information in the page footer area of embedded2.html was displayed with small italics text. While a class selector could be used, an id selector is more appropriate if your page layout contains a single footer area. For example, you can create a style for an id named footer to configure the

footer area to use small, italicized text. When setting a style for an id, place a hash mark (#) in front of the id name in the style sheet. The following code will configure an id called footer in a style sheet:

```
#footer { font-size: .75em;
      font-style: italic;
}
```

The styles set in the footer id can be applied to any XHTML element you wish by using the **id** attribute, id="footer". Do not write the # in front of the id value in the XHTML tag.

The following code will apply the footer id styles to a tag:

This paragraph will be displayed using styles
configured in the footer id.

Using CSS with an id selector is similar to using CSS with a class selector. It's common practice to use an id selector to refer to a *single* XHTML element and a class selector to refer to multiple XHTML elements.



In this Hands-On Practice you will modify the CSS and the XHTML in the Trillium Technologies page—configuring the navigation and page footer areas. Launch Notepad and open embedded2.html.

Configure the Navigation Area

The navigation links would be more prominent if they displayed in a larger and bolder font. Create a class named nav, which sets the font-size and font-weight properties. The code follows:

```
.nav { font-weight: bold;
      font-size: 1.25em;
}
```

Modify the opening paragraph tag of the navigation area. Add a class attribute that associates the paragraph with the nav class as follows:

```
<a href="index.html">Home</a>
<a href="services.html">Services</a>
<a href="contact.html">Contact</a>
```

Configure the Footer Area

Create an id named footer, which sets the font-size and font-style properties.

Modify the opening paragraph tag of the footer area. Add an id attribute that associates the paragraph with the id class.

Copyright © 2011 Your Name Here



Save your file embedded3.html and test it in a browser. Your page should look similar to the image shown in Figure 3.11. The student files contain a sample solution at Chapter3/embedded3.html. Notice how the class and id styles are applied.

3.7 The Div and Span XHTML Elements

The **<div>** and **** XHTML elements are used along with CSS to format page areas. The block-level **<div>** element configures a section or division on a Web page with a line break above and below. Use the **<div>** tag when you need to format a section that is separated from the rest of the Web page by line breaks. The **<div>** element is also useful to define a section that contains block-level elements, such as , **<blockquote>**, , , and even other **<div>** elements within it. In Chapter 6 you will see how **<div>** elements are used to configure a page layout with CSS.

In contrast, the element defines a section on a Web page that is *not* physically separated from other areas by line breaks. Use the tag if you need to format an area that is contained within another, such as within a , <blockquote>, , or <div> element.



You will experiment with the <div> and elements in this Hands-On Practice. First, you will place the navigation area within a <div> element. Next, you will configure a new class to format the company name when displayed within the text on the page and use the element to apply this class. Open the embedded3.html file in Notepad. Your Web page will look similar to the one shown in Figure 3.12 after the changes are complete.



Configure the Navigation Area

View the source code of embedded3.html and notice that the hyperlinks (anchor elements) in the navigation area are contained within a paragraph element. While this is valid XHTML, it isn't the best choice *semantically* since the navigation is a list of hyperlinks and not a true paragraph of text. Replace the tags with <div> tags as follows:

```
<div class="nav"><a href="index.html">Home</a>
<a href="services.html">Services</a>
<a href="contact.html">Contact</a></div>
```

Save your file as embedded4.html and test in a browser. You'll notice that the navigation area does not look any different— however, "under the hood" the code is better semantically (see Chapter 7 for more information about this topic).

Configure the Company Name

View Figure 3.12 and notice that the company name, Trillium Technologies, is displayed in bold and serif font within the first paragraph. You'll code both CSS and XHTML to accomplish this. First, create a new CSS rule that configures a class called companyname as bold, serif font, and 1.25em in size. The code follows:

```
.companyname { font-weight: bold;
    font-family: Georgia, "Times New Roman", serif;
    font-size: 1.25em;
}
```

Next, modify the beginning of the first paragraph of XHTML to use the element to apply the class as follows:

Save your file and test in a browser. Your page should look similar to the one shown in Figure 3.12. The student files contain a sample solution at Chapter3/embedded4.html.

3.8 Using External Style Sheets

External style sheets are contained in a text file separate from the XHTML documents. The <link /> element is a self-contained tag used in the header section of an XHTML document to associate the style sheet with the Web page. This allows multiple Web pages to link to the same external style sheet file. The external style sheet text file is saved with the file extension .css and contains style rules only—it does not contain any XHTML tags.

The advantage of this technique is that styles are configured in a single file. This means that when styles need to be modified only one file needs to be changed, instead of multiple Web pages. On large sites this can save a Web developer much time and increase productivity. Let's get some practice with this useful technique.



```
body { background-color: #0000FF;
      color: #FFFFFF;
}
```

Figure 3.13 shows the external color.css style sheet displayed in Notepad. Notice that there is no XHTML in this file. <style> tags are not coded within an external style sheet. Only CSS rules (selectors, properties, and values) are coded in an external style sheet.

Figure 3.13 The external style

sheet color.css



Next, associate that style to a Web page using the <link /> element in the header section of the page. Three attributes are used with the <link /> element to associate a Web page with an external style sheet: rel, href, and type. The value of the rel attribute is stylesheet. The value of the href attribute is the name of the style sheet file. The value of the type attribute is text/css, which is the MIME type for a style sheet. The XHTML code to link color.css to a Web page is as follows:

<link rel="stylesheet" href="color.css" type="text/css" />

Ready to try it out? Launch Notepad and type in the following XHTML:

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
 "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>External Styles</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
<link rel="stylesheet" href="color.css" type="text/css" />
</head>
<body>
This web page uses an external style sheet.
</body>
</html>
```

Save the file as external.html in the same folder as color.css. Test your page in a browser. Your file should look similar to Figure 3.14.



The color.css style sheet can be associated with any number of Web pages. If you ever need to change the style of formatting, you only need to change a single file (color.css) instead of multiple files (all the Web pages). As mentioned earlier, this technique can boost productivity on a large site.

This is a simple example, but the advantage of having only a single file to update is significant for both small and large Web sites. In the next Hands-On Practice you'll modify the Trillium Technologies home page to use an external style sheet.

HANDS-ON PRACTICE 3.7

In this Hands-On Practice you continue to gain experience using external style sheets as you create the external style sheet file named trillium.css, modify the Trillium Technologies home page to use external styles instead of embedded styles, and associate a second Web page with the trillium.css style sheet.

A version of the Trillium home page is in the student files. Open the embedded4.html file in a browser. The display should be the same as the Web page shown in Figure 3.12 from Hands-On Practice 3.5.

Now that you've seen what you're working with let's begin. Launch Notepad and save the file as index.html in a folder called trillium. You are ready to convert the embedded CSS to external CSS. Select the CSS rules (all the lines of code between, but not including, the opening and closing <style> tags). Use Edit, Copy or press the Ctrl+C keys to copy the CSS code to the clipboard. You will place the CSS in a new file. Launch Notepad, paste the CSS style rules (use Edit, Paste or press the Ctrl+V keys), and save the file as trillium.css. See Figure 3.15 for a screenshot of the new trillium.css file in Notepad. Notice that there are no XHTML elements in trillium.css— not even the <style> element. The file contains CSS rules only.

Figure 3.15

The external style sheet named trillium.css

I trillium.	css - Notepad		
File Edit	Format View Help		
body {	<pre>background-color: #E6E6FA; color: #191970; font-family: Arial, Verdana, sans-serif;</pre>		Î
} h1 {	<pre>background-color: #191970; color: #E6E6FA; line-height: 200%; font-family: Georgia, "Times New Roman",</pre>	serif;	
} h2 {	<pre>background-color: #AEAED4; color: #191970; font-family: Geogria, "Times New Roman",</pre>	serif;	
p {	font-size: .90em;		
ul { }	font-weight: bold;		
.nav {	font-weight: bold; font-size: 1.25em;		
foote	r { font-size: .75em; font-style: italic;		
.compa	nyname { font-weight:bold; font-family: Georgia, "Times New Roman", font-size: 1.25em;	serif;	-

Next, edit the index.html file in Notepad. Delete the CSS code you just copied. Delete the closing </style> tag. Replace the opening <style> tag with a <link> element to associate the style sheet named trillium.css. The <link> element code follows:

<link href="trillium.css" rel="stylesheet" type="text/css" />

Save the file and test in a browser. Your Web page should look just like the one shown in Figure 3.12. Although it looks the same, the difference is in the code—the page now uses external instead of embedded CSS.

Now, for the fun part—you'll associate a second page with the style sheet. The student files contain a services.html page for Trillium at Chapter3/services.html. When you display this page in a browser it should look similar to the one shown in Figure 3.16. Notice that although the structure of the page is similar to the home page, the styling of the text and colors are absent.

Launch Notepad to edit the services.html file. If you view the XHTML code you'll notice that this page is ready for our trillium.css styles—for example, the nav class and footer id have been coded as attributes in the corresponding navigation and page footer areas. All that's left for you to do is to code an XHTML <link> element to associate the services.html Web page with the trillium.css external style sheet. Place the following code in the header section above the closing </head>



Save your file and test in a browser. Your page should look similar to Figure 3.17—the CSS rules have been applied!

If you click the Home and Services hyperlinks, you can move back and forth between the index.html and services.html pages in the browser. The student files contain a sample solution in the Chapter3/3.7 folder.



Notice that when using an external style sheet, if the use of color or fonts on the page ever needs to be changed, modifications only need to be made to the external style sheet. Think about how this can improve productivity on a site with many pages. Instead of modifying hundreds of pages to make a color or font change, only a single file—the CSS external style sheet— needs to be updated. Becoming comfortable with CSS and other technologies such as Extensible Style Sheet Language (XSL) will be important as you develop your skills and increase your technical expertise.



CHECKPOINT 3.2

- 1. Describe a reason to use embedded styles. Explain where embedded styles are placed on a Web page.
- 2. Describe a reason to use external styles. Explain where external styles are placed and how Web pages indicate they are using external styles.
- 3. Write the code to configure a Web page to associate with an external style sheet called mystyles.css.



When designing a new Web page or Web site, how do I begin to work with CSS?

The following guidelines can be helpful when configuring a page using CSS:

- Review the design of the page—check if common fonts are used. Define global properties (the default for the entire page) for characteristics such as fonts and colors attached to the **body** selector.
- Identify typical elements used for organization in the page (such as <h1>, <h3>, and so on) and declare style rules for these if different from default.
- Identify various page areas such as logo, navigation, footer, and so on—and list any special configurations needed for these areas. You may decide to configure classes or ids in your CSS to configure these areas.
- Create one prototype page that contains most of the elements you plan to use and test. Revise your CSS as needed.
- Plan and test. These are important activities when designing a Web site.

3.9 Centering XHTML Elements with CSS

Recall that by default, XHTML elements are left-aligned— they begin at the left margin. In Chapter 2 (Hands-On Practice 2.4) you used the XHTML align="center" attribute to center text on a Web page. While this is valid, it is more efficient to configure the alignment using CSS. The CSS text-align property configures the alignment of text. The CSS code sample below configures an <h1> XHTML element to have centered text.

```
h1 { text-align:center;
}
```

While it can be quite effective to center the text displayed in Web page headings, be careful about centering text in paragraphs. According to WebAIM (http://www.webaim .org/techniques/textlayout), studies have shown that centered text is more difficult to read than left-aligned text.

Center the Page Content

A popular page layout design that is easy to accomplish with just a few lines of CSS is to center the entire content of a Web page within a browser window. The Web page shown in Figure 3.18 uses this type of page layout.



Compare the left and right margins of Figure 3.18 to the Web page displayed in Figure 3.12. It's easy to configure this centered layout. Create a <div> to contain, or wrap, the page content and then configure it with the CSS margin-left property, margin-right property, and width property. As will be discussed further in Chapter 6, the margin is the empty space surrounding an element. In the case of the body element, the margin is the empty space between the page content and the edges of the browser window. As you might expect, the margin-left and margin-right properties configure the space in the left and right margins. The margins can be set to 0, pixel units, em units, percentages, or auto. When margin-left and margin-right are both set to auto, the browser calculates the amount of space available and divides it evenly between the left and right margins. The width property configures the width of a block-level element. The CSS code sample below sets the width of an id named wrapper to 700 pixels and centered (using margin-left:auto and margin-right:auto).

```
#wrapper { width: 700px;
    margin-left: auto;
    margin-right: auto;
```

```
}
```

The XHTML code follows:

```
<body>
<div id="wrapper">
... page content goes here
</div>
</body>
```



In this Hands-On Practice you will code CSS properties to configure a centered page layout. We'll use the files from Hands-On Practice 3.7 as a starting point. Create a new folder called trillium2. Locate the Chapter3/3.7 folder in the student files. Copy the index.html, services.html, and trillium.css files to your trillium2 folder. Open the trillium.css file in a text editor. Create an id named container. Add the margin-left, margin-right, and width style properties to the style rules as follows:

```
#container { margin-left: auto;
    margin-right: auto;
    width:80%;
```

}

Save the file.

Open the index.html file in a text editor. Add the XHTML code to configure a <div> assigned to the id container that "wraps" or contains the code within the body section. Save the file. When you test your index.html file in a browser, it should look similar to the one shown in Figure 3.18. The student files contain a sample solution in the Chapter3/3.8 folder.

3.10 CSS Validation

The W3C has a free Markup Validation Service (http://jigsaw.w3.org/css-validator/) that will validate your CSS code and check it for syntax errors. **CSS validation** provides students with quick self-assessment—you can prove that your code uses correct syntax. In the working world, CSS validation serves as a quality assurance tool. Invalid code may cause browsers to render the pages slower than otherwise.



In this Hands-On Practice you will use the W3C CSS Validation Service to validate an external CSS style sheet. This example uses the color.css file completed in Hands-On Practice 3.6 (student files Chapter3/color.css). Locate color.css and open it in Notepad. We will add an error to the color.css file. Find the body selector style rule and delete the

first "r" in the background-color property. Remove the # from the color property value. Save the file.

Next, attempt to validate the color.css file. Visit the W3C CSS Validation Service page at http://jigsaw.w3.org/css-validator and select the "by File Upload" tab. Click the Browse button and select the color.css file from your computer. Click the Check button. Your display should be similar to that shown in Figure 3.19. Notice that two errors were found. The selector is listed followed by the reason an error was noted.



Figure 3.20

The valid CSS is displayed below the errors (and warnings, if any)



Notice that the first message in Figure 3.19 indicates that the "backgound-color" property does not exist. This is a clue to check the syntax of the property name. Edit color.css and correct the error. Test and revalidate your page. Your browser should now look similar to the one shown in Figure 3.20 and report only one error.

The error reminds you that FFFFFF is not a color value and expects you to already know that you need to add a "#" character to code a valid color value, #FFFFFF. Notice how any valid CSS rules are displayed below the error messages. Correct the color value, save the file, and test again.

Your results should look similar to those shown in Figure 3.21. There are no errors listed. The Valid CSS Information contains all the CSS style rules in color.css. This means your file passed the CSS validation test. Congratulations, your color.css file is valid CSS syntax! It's a good practice to validate your CSS style rules. The CSS validator can help you to identify code that needs to be corrected quickly and indicate which style rules a browser is likely to consider valid. Validating CSS is one of the many productivity techniques that Web developers commonly use.



CHAPTER SUMMARY

This chapter introduced Cascading Style Sheet rules associated with color and text on Web pages. There is much more that you can do with CSS: positioning, hiding and showing page areas, formatting margins, and formatting borders. As you continue your study of Web development with this textbook, you will study these additional uses. To learn more about CSS, check out the tutorials at http://echoecho.com/css.htm and http://www.w3schools.com/css/, or visit the W3C site for official specifications.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

- <div> <link /> <style> background-color property Cascading Style Sheets (CSS) class attribute class selector color property CSS validation declaration em unit embedded styles
- external styles font-family property font-size property font-style property font-weight property hexadecimal color values id attribute id selector imported styles inline styles line-height property margin-left property
- pixels point property rel attribute RGB color rule selector style attribute text-align property text-decoration property type attribute Web Safe Color Palette width property

Review Questions

Multiple Choice

- **1.** Which of the following can be a CSS selector?
 - a. an XHTML element
 - b. a class name
 - c. an id name
 - d. all of the above
- **2.** Which of the following is the CSS property used to set the background color of a Web page?
 - a. bgcolor
 - b. background-color
 - c. color
 - d. none of the above

- **3.** Which type of CSS is coded in the body of the Web page as an attribute of an XHTML tag?
 - a. embedded
 - b. inline
 - c. external
 - d. imported
- 4. Which of the following describe two components of CSS rules?
 - a. selectors and declarations
 - b. properties and declarations
 - c. selectors and attributes
 - d. none of the above

5. Which of the following associates a Web page with an external style sheet?

a. <style rel="external" href="style.css">

```
b. <style src="style.css">
```

- c. <link rel="stylesheet"</pre>
- type="text/css" href="style.css" />
 d. <link rel="stylesheet"</pre>
 - type="text/css" src="style.css" />
- **6.** Which of the following is the declaration property used to set the font typeface for an area of a Web page?
 - a. font-face
 - b. face
 - c. font-family
 - d. size
- **7.** Which of the following do you configure to apply a style to only one area on a Web page?
 - a. group
 - b. class
 - c. id
 - d. none of the above
- **8.** Where do you place the code to associate a Web page with an external style sheet?
 - a. in the external style sheet
 - b. in the DOCTYPE of the Web page document
 - c. in the body section of the Web page document
 - d. in the head section of the Web page document
- **9.** Which of the following configures a background color of **#FFF8DC** for a Web page using CSS?
 - a. body { background-color: #FFF8DC; }
 - b. document { background: #FFF8DC; }
 - c. body {bgcolor: #FFF8DC;}
 - d. none of the above

10. Which of the following configures a class called news with red text, large font, and Arial or a sans-serif font using CSS?

a. news {	color: red;
	<pre>font-size: large;</pre>
	font-family: Arial,
	<pre>sans-serif;}</pre>
bnews {	color: red;
	<pre>font-size: large;</pre>
	font-family: Arial,
	<pre>sans-serif;}</pre>
cnews {	text: red;
	<pre>font-size: large;</pre>
	font-family: Arial,
	<pre>sans-serif;}</pre>
d. #news {	text: red;
	<pre>font-size: large;</pre>
	font-family: Arial,
	<pre>sans-serif;}</pre>
	, ,

Fill in the Blank

- The _______ element is useful for creating logical areas on a Web page that are embedded within paragraphs or other block formatting elements.
- 12. CSS is a technology that is ______ supported by browsers.
- **13.** The _____ CSS property can be used to center text on a Web page.
- 14. The ______ element is useful for creating areas on a Web page that are physically separated from other areas.
- 15. CSS was first proposed as a standard by the W3C in _____.

Apply Your Knowledge

```
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/> <style type="text/css">
```

```
background-color: #000066;
 body {
           color: #CCCCCC;
           font-family: Arial,sans-serif;
  }
  h1 { background-color: #FFFFFF;
        color: #000066;
  }
  .footer { font-size: 80%;
             font-style: italic;
  }
  </style>
  </head>
  <body>
    <div>
      <h1>Trillium Media Design</h1>
      <br />
      Home <a href="about.html">About</a>
        <a href="services.html">Services</a>
      </div>
  Our professional staff takes pride in its working relationship
 with our clients by offering personalized services that listen to
  their needs, develop their target areas, and incorporate these
  items into a well presented Web site that works.
   
   
    <div>
    Contact <a</pre>
      href="mailto:web@trilliumtechnologies.com">
      web@trilliumtechnologies.com</a><br />
    Copyright & copy; 2011 Trillium Media Design
    </div>
  </body>
  </html>
2. Fill in the Missing Code. This Web page should be configured so that the back-
  ground and text colors have good contrast. The <h2> tag should use Arial. Some
  CSS properties and values, indicated by " " (underscore), are missing. Some
 XHTML tags, indicated by <_>, are missing. Fill in the missing code.
```

```
< >
  <body>
    <h2>Trillium Media Design</h2>
    > Our professional staff takes pride in its working
  relationship with our clients by offering personalized services
  that listen to their needs, develop their target areas, and
  incorporate these items into a well presented Web site that works.
    </body>
  </html>
3. Find the Error. Why won't this page display properly in a browser?
  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
  <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
  <head>
  <title>Trillium Media Design</title>
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
  <style type="text/css">
  body { background-color: #000066;
         color: #CCCCCC;
         font-family: Arial,sans-serif;
         font-size: 12px;
  }
  <style>
  </head>
  <body>
    <h2>Trillium Media Design</h2>
    > Our professional staff takes pride in its working
  relationship with our clients by offering personalized services
  that listen to their needs, develop their target areas, and
  incorporate these items into a well presented Web site that works.
    </body>
  </html>
```

Hands-On Exercises

- **1.** Write the XHTML for a paragraph that uses inline styles to configure the background color of red and the text color of white.
- **2.** Write the XHTML and CSS code for an embedded style sheet that configures a background color of #eaeaea and a text color of #000033.
- **3.** Write the CSS code for an external style sheet that configures the text to be brown, 1.2em in size, and in Arial, Verdana, or a sans-serif font.
- **4.** Write the XHTML and CSS code for an embedded style sheet that configures a class called new, that is bold and italic.

- **5.** Write the XHTML and CSS code for an embedded style sheet that configures links without underlines; background color of white; text color of black; is in Arial, Helvetica, or a sans-serif font; and has a class called new that is bold and italic.
- 6. Write the CSS code for an external style sheet that configures a page background color of #FFF8DC; has a text color of #000099; is in Arial, Helvetica, or a sans-serif font; and has an id called new that is bold and italic.
- **7. Practice with External Style Sheets.** In this exercise you will create two external style sheet files and a Web page. You will experiment with linking the Web page to the external style sheets and note how the display of the page is changed.
 - a. Create an external style sheet (call it format1.css) to format as follows: document background color of white, document text color of #000099, and document font family of Arial, Helvetica, or sans-serif. Hyperlinks should have a background color of gray (#CCCCCC). <h1> elements should use the Times New Roman font with red text color.
 - b. Create an external style sheet (call it format2.css) to format as follows: document background color of yellow, document text color of green. Hyperlinks should have a background color of white. <h1> elements should use the Times New Roman font with white background color and green text color.
 - c. Create a Web page about your favorite movie that displays the movie name in an <h1> tag, a description of the movie in a paragraph, and an unordered (bulleted) list of the main actors and actresses in the movie. The page should also have a hyperlink to a Web site about the movie. Place an e-mail link to yourself on the Web page. This page should be associated with the format1.css file. Save the page as moviecss1.html. Be sure to test your page in more than one browser. Hand in printouts of format1.css, the moviecs1.html source code (print in Notepad), and the browser display of your moviecss1.html to your instructor.
 - d. Modify the moviecss1.html page to link to the format2.css external style sheet instead of the format1.css file. Save the page as moviecss2.html and test it in a browser. Notice how different the page looks! Hand in printouts of format2.css, the moviecss2.html source code (print in Notepad), and the browser display of your moviecss2.html.
- **8. Practice with the Cascade.** In this exercise you will create two Web pages that link to the same external style sheet. After modifying the configuration in the external style sheet, you will test your pages again and find that they automatically pick up the new style configuration. Finally, you will add an inline style to one of the pages and find that it takes effect and overrides the external style.
 - a. Create a Web page that includes an unordered list describing at least three advantages of using CSS. The text CSS Advantages should be contained within <h1> tags. This page should include a hyperlink to the W3C Web site. Write the XHTML code so that one of the advantages is configured to be a class called news. Place an e-mail link to yourself on the Web page. The Web page should use the external style sheet called ex3.css. Save the page as advantage.html.
 - b. Create a Web page that includes an unordered list describing at least three disadvantages of utilizing Cascading Style Sheets. The text CSS Disadvantages should be contained within <h1> tags. This page should include a hyperlink to the W3C Web site. Write the XHTML code so that one of the disadvantages is

configured to be a class called news. Place an e-mail link to yourself on the Web page. The Web page should use the external style sheet called ex3.css. Save the page as disadvantage.html.

- c. Create an external style sheet (call it ex3.css) to format as follows: document background color of white, document text color of #000099 and document font family of Arial, Helvetica, or sans-serif. Hyperlinks should have a background color of gray (#cccccc). <h1> elements should use the Times New Roman font with black text color. The news class should use red italic text.
- d. Launch a browser and test your work. Display the advantage.html page. It should use the formatting configured in ex3.css. Modify the Web page and/or the css file until your page displays as requested. Display the disadvantage.html page. It should also use the formatting configured in the ex3.css file. Create printouts of ex3.css, advantage.html, disadvantage.html source code (print in Notepad), the browser display of advantage.html, and the browser display of disadvantage.html. Label these printouts Exercise 8d.
- e. Change the configuration of the external style sheet (ex3.css) to use a document background color of black, document text color of white, and <h1> text color of gray (#cccccc). Save the file. Launch a browser and test the advantage.html and disadvantage.html pages. Notice how they each pick up the styles from the external style sheet. Create printouts of the advantage.html and disadvantage.html browser display and label them Exercise 8e.
- f. Modify the advantage.html file to use an inline style. The inline style should be applied to the <h1> tag and configure it to have red text. Save the advantage.html page and test in a browser. Notice how the <h1> text color specified in the style sheet is overridden by the inline style. Print the browser display of advantage.html and label it Exercise 8f.
- **9. Practice Validating CSS.** Choose a CSS external style sheet file to validate—perhaps you have created one for your own Web site. Otherwise, use an external style sheet file that you worked with in this chapter. Use the W3C free CSS validator. Visit http://jigsaw.w3.org/css-validator/. If your CSS does not immediately pass the validation test, modify it and test again. Repeat this process until the W3C validates your CSS code. Write a one or two paragraph summary about the validation process. Answer the following questions. Was it easy to use? Did anything surprise you? Did you encounter a number of errors or just a few? How easy was it to determine how to correct the CSS file? Would you recommend this to other students? Why or why not?

Web Research

- **1.** This chapter introduced you to using CSS to configure Web pages. Use a search engine to search for CSS resources. The following resources can help you get started:
 - http://www.w3.org/Style/CSS/
 - http://positioniseverything.net
 - http://www.dezwozhere.com/links.html

Create a Web page that provides a list of at least five CSS resources on the Web. For each CSS resource provide the URL, Web site name, and a brief description. Your Web page should contain a table and use color. Place your name in the e-mail address at the bottom of the Web page. Print the source code (from Notepad) and the browser view of your Web page.

- **2.** There is still much for you to learn about CSS. A great place to learn about Web technology is the Web itself. Use a search engine to search for CSS tutorials. The following resources can help you get started:
 - http://www.echoecho.com/css.htm
 - http://www.w3schools.com/css/
 - http://www.davesite.com/webstation/css/

Choose a tutorial that is easy to read. Select a section that discusses a CSS technique that was not covered in this chapter. Create a Web page that uses this new technique. The Web page should provide the URL of your tutorial, the name of the Web site, and a description of the new technique you discovered. Place your name in the e-mail address at the bottom of the Web page. Print the external style sheet (if you used one), the Web page source code (from Notepad), and the browser view of your Web page.

Focus on Web Design

In this chapter you learned how to configure color and text with CSS. In this activity you will design a color scheme, code an external CSS file for the color scheme, and code an example Web page that applies the styles you configured. Use any of the following sites to help you get started with color and Web design ideas:

Psychology of Color

- http://www.infoplease.com/spot/colors1.html
- http://coe.sdsu.edu/eet/Articles/wadecolor/start.htm
- http://iit.bloomu.edu/vthc/Design/psychology.htm
- http://www.my-photoshop.com/bydesign/id-tutorials/color-psychology.html

Color Theory

- http://www.colormatters.com/colortheory.html
- http://colortheory.liquisoft.com/
- http://www.digital-web.com/articles/color_theory_for_the_colorblind/

Color Scheme Generators

- http://meyerweb.com/eric/tools/color-blend
- http://colorschemer.com/schemes/
- http://www.colr.org
- http://colorsontheweb.com/colorwizard.asp
- http://kuler.adobe.com/
- http://colorschemedesigner.com/

You have the following tasks:

- a. Design a color scheme. List three hexadecimal color values (in addition to white (#FFFFFF) or black (#000000) in your design.
- b. Describe the process you went through as you selected the colors. Describe why you chose these colors. What type of Web site would they be appropriate for? List the URLs of any resources you used.
- c. Create an external CSS file name color1.css that configures font properties, text color, and background color selections for the document, h1 selector, p selector, and footer class using the colors you have chosen.
- d. Create a Web page named color1.html that shows examples of the CSS style rules.

Open your files in Notepad and print the source code for color1.css and color1.html. Display your page in a browser; print the page. Hand in all printouts to your instructor.

WEB SITE CASE STUDY: Implementing CSS

Each of the following case studies continues throughout most of the text. This chapter implements CSS in the Web sites.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House Case Study. Figure 2.26 shows a site map for the JavaJam Web site. The Home page and Menu page were created in Chapter 2. You will use the existing Web site as a start while you create a new version that uses an external style sheet to configure text and color.

You have the following tasks:

- 1. Create an external style sheet named javajam.css that configures the color and text for the JavaJam Web site.
- 2. Modify the Home page to utilize an external style sheet to configure colors and fonts. The new Home page and color swatches are shown in Figure 3.22 (also shown in the color insert section).
- **3.** Modify the Menu page to be consistent with the new Home page.
- 4. Configure centered page layout.



Hands-On Practice Case

Create a folder called javajamcss. Copy all the files from your javajam folder into the javajamcss folder.

- **1. The External Style Sheet.** Launch Notepad. You will create an external style sheet named javajam.css. Code the CSS to configure the following:
 - Global styles for the document background color (#ffffcc), text color (#330000), and Verdana, Arial, or any sans-serif font
 - Style rules for the h1 selector that configure background color (#ccaa66), text color (#000000), 200% line height, and centered text
 - Style rules for the centered navigation area (use an id named nav)
 - Style rules for the page footer area (use an id named footer) for background color (#ccaa66), text color (#000000), small font size (.60em), italics, and centered

Save the file as javajam.css in the javajamcss folder. Check your syntax with the CSS validator (http://jigsaw.w3.org/css-validator). Correct and retest if necessary.

- **2. The Home Page.** Launch Notepad and open the index.html file. You will modify this file to apply styles from the javajam.css external style sheet as follows:
 - Add a <link /> element to associate the Web page with the javajam.css external style sheet file. Save and test your index.html page in a browser and you'll notice that the styles configured with the body and h1 selectors are already applied!
 - Configure the navigation area. Since the navigation is not semantically a "paragraph" (a collection of sentences about a central topic), replace the element with a <div> element. Assign this <div> to the id named nav.
 - Configure the content area with a div assigned to an id named "content". Code the opening div tag on a new line after the navigation div. Code the closing div tag after the end of the paragraph that contains the address and phone number. This content id will be styled with CSS in later chapters.

- Configure the page footer area. Replace the elements with <div> elements. Remove the <small> and elements because the font-size and font-style are configured as part of the footer id. Assign this <div> to the id named footer.
- Save the index.html file and test in a browser. Your page should look similar to the one shown in Figure 3.22 except that your page content will be left-aligned instead of centered. Don't worry—you'll center your page layout in Step 4 of this case study.
- **3.** The Menu Page. Launch Notepad and open the menu.html file. You will modify this file in a similar manner—add the <link /> element, configure the navigation area, configure a div to contain the content, and configure the page footer area. Save and test your new menu.html page. It should look similar to the one shown in Figure 3.23 except for the alignment.



4. Centered Page Layout with CSS. Modify javajam.css, index.html, and menu.html to configure page content that is centered with width set to 80%. Refer to Hands-On Practice 3.8 if necessary. Save your files and retest your pages. The index.html and menu.html pages should closely match the samples shown in Figures 3.22 and 3.23.

Experiment with modifying the javajam.css file. Change the page background color, the font family, and so on. Test your pages in a browser. Isn't it amazing how a change in a single file can affect multiple files when external style sheets are used?

Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows a site map for the Fish Creek Web site. The Home page and Services page were created in Chapter 2. You will use the existing Web site as a start while you create a new version that uses an external style sheet to configure text and color.

You have the following tasks:

- **1.** Create an external style sheet named fishcreek.css that configures the color and text for the Fish Creek Web site.
- 2. Modify the Home page to use an external style sheet to configure colors and fonts. The new Home page and color swatches are shown in Figure 3.24 (shown also in the color insert section).



3. Modify the Services page to be consistent with the new Home page. Configure centered page layout.

Hands-On Practice Case

Create a folder called fishcreekcss. Copy all the files from your fishcreek folder into the fishcreekcss folder.

- 1. The External Style Sheet. Launch Notepad. You will create an external style sheet named fishcreek.css. Code the CSS to configure the following:
 - Global styles for the document background color (#6699ff), text color (#d5e3ff), and Verdana, Arial, or any sans-serif font
 - Style rules for the h1 selector that configure background color (#6699ff), text color (#003366), serif font, and 200% line height
 - Style rules for a navigation area (use an id named nav) that displays text in bold
 - Style rules for a class named category with bold font, background-color (#6699ff), text color (#003366), and larger font size (1.1em)
 - Style rules for the page footer area (use an id named footer) with a small font size (.70em) and italic text

Save the file as fishcreek.css in the fishcreekcss folder. Check your syntax with the CSS validator (http://jigsaw.w3.org/css-validator). Correct and retest if necessary.

- **2. The Home Page.** Launch Notepad and open the index.html file. You will modify this file to apply styles from the fishcreek.css external style sheet.
 - Add a <link /> element to associate the Web page with the fishcreek.css external style sheet file. Save and test your index.html page in a browser and you'll notice that the styles configured with the body and h1 selectors are already applied!
 - Configure the navigation area. Since the navigation is not semantically a "paragraph" (a collection of sentences about a central topic), replace the element with a <div> element. Assign this <div> to the id named nav. Remove the element from this area.
 - Configure each <dt> element to apply the category class. Remove the elements from this area.
 - Configure the page footer area. Replace the elements with <div> elements. Assign this <div> to the id named footer. Remove the <small> and elements because the font-size and font-style are configured as part of the footer id.
 - Save the index.html file and test in a browser. Your page should look similar to the one shown in Figure 3.24 except that your page content will be left-aligned instead of indented from the margins. Don't worry—you'll configure your page layout in Step 4 of this case study.
- 3. The Services Page. Launch Notepad and open the services.html file. You will modify this file in a similar manner—add the <link /> element, configure the navigation area, configure the category classes (use elements), and configure the page footer area. Save and test your new services.html page. It should look similar to the one shown in Figure 3.25 except for the alignment.



4. Centered Page Layout with CSS. Modify fishcreek.css, index.html, and services.html to configure page content that is centered with width set to 80%. Refer to Hands-On Practice 3.8 if necessary. Save your file and retest your pages. The index.html and services.html pages should closely match the samples shown in Figures 3.24 and 3.25.

Experiment with modifying the fishcreek.css file. Change the page background color, the font family, font color, and so on. Test your pages in a browser. Notice that multiple pages display differently because they link to the single file (fishcreek.css) that configures their formatting.

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for the Pasha the Painter Web site. The Home page and Services page were created in Chapter 2. You will use the existing Web site as a start while you create a new version of this Web site that uses an external style sheet to configure text and color.

You have the following tasks:

- 1. Create an external style sheet named painter.css that configures the color and text for the Pasha the Painter Web site.
- 2. Modify the Home page to utilize an external style sheet to configure colors and fonts. The new Home page and color swatches are shown in Figure 3.26 (shown also in the color insert section).



3. Modify the Services page to be consistent with the new Home page.

Hands-On Practice Case

Create a folder called paintercss. Copy all the files from your painter folder into the paintercss folder.

- **1. The External Style Sheet.** Launch Notepad. You will create an external style sheet named painter.css. Code the CSS to configure the following:
 - Global styles for the document background color (#ffffff), text color (#000000), and Verdana, Arial, or any sans-serif font
 - Style rules for the logo class that configure background color (#ffffff), text color (#336633), and Georgia, Times New Roman, or any serif font
 - Style rules for a navigation area (use an id named nav) that displays text in bold
 - Style rules for a class named category with a bold, serif font, background-color (#ffffff), text color (#336633), and a larger font size (1.2em)
 - Style rules for the page footer area (use an id named footer) with a small font size (.60em) and italic text

Save the file as painter.css in the paintercss folder. Check your syntax with the CSS validator (http://jigsaw.w3.org/css-validator). Correct and retest if necessary.

- **2. The Home Page.** Launch Notepad and open the index.html file. You will modify this file to apply styles from the painter.css external style sheet.
 - Add a <link /> element to associate the Web page with the prime.css external style sheet file. Save and test your index.html page in a browser and you'll notice that the styles configured with the body selector are already applied!
 - Configure the logo area. Code a <div> element that contains the <h1> and <h3> elements in the logo area. Assign the <div> to the logo class.
 - Configure the navigation area. Since the navigation is not semantically a "paragraph" (a collection of sentences about a central topic), replace the element with a <div> element. Assign this <div> to the id named nav. Remove the element from this area.
 - Configure the to apply the category class.
 - Configure the page footer area. Replace the elements with <div> elements. Assign this <div> to the id named footer. Remove the <small> and elements because the font-size and font-style are configured as part of the footer id.
 - Save the index.html file and test in a browser. Your page should look similar to Figure 3.26.
- 3. The Services Page. Launch Notepad and open the services.html file. You will modify this file in a similar manner— add the <link /> element, configure the logo area, configure the navigation area, configure the category classes (use elements and remove the element from this area), and configure the page footer area. Save and test your new services.html page. It should look similar to the one shown in Figure 3.27.

Experiment with modifying the painter.css file. Change the page background color, the font family, and so on. Test your pages in a browser. Notice how a change in a single file can affect multiple files when external style sheets are used.



Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case Study. Figure 2.38 shows a site map for the Prime Properties Web site. The Home page and Financing page were created in Chapter 2. You will use the existing Web site as a start while you create a new version of this Web site that uses an external style sheet to configure text and color.

You have the following tasks:

- 1. Create an external style sheet named prime.css that configures the color and text for the Prime Properties Web site.
- 2. Modify the Home page to use an external style sheet to configure colors and fonts. The new Home page and color swatches are shown in Figure 3.28 (shown also in the Color Insert Section).
- **3.** Modify the Financing page to be consistent with the new Home page.

Hands-On Practice Case

Create a folder called primecss. Copy all the files from your prime folder into the primecss folder.

- **1. The External Style Sheet.** Launch Notepad. You will create an external style sheet named prime.css. Code the CSS to configure the following:
 - Global styles for the document background color (#ffffcc), text color (#003300), and Arial, Helvetica, or any sans-serif font
 - Style rules for the h2 selector that configure background color (#ffffcc) and text color (#003366)
 - Style rules for the h3 selector that configure background color (#ffffcc) and text color (#006600)



- Style rules for the dd selector that configure italic, smaller than the default (.90em) font size, with 200% line height
- Style rules for the logo class that configure background color (#ffffcc) and text color (#48751A)
- Style rules for a navigation area (use an id named nav) that displays text in bold, large (1.2em) font
- Style rules for a class named contact with bold, smaller than the default (.90em) using the Times New Roman or any serif font
- Style rules for the page footer area (use an id named footer) with small font size (.60em) and italic text

Save the file as prime.css in the primecss folder. Check your syntax with the CSS validator (http://jigsaw.w3.org/css-validator). Correct and retest if necessary.

- **2. The Home Page.** Launch Notepad and open the index.html file. You will modify this file to apply styles from the prime.css external style sheet.
 - Add a <link /> element to associate the Web page with the prime.css external style sheet file. Save and test your index.html page in a browser and you'll notice that the styles configured with the body selector are already applied!
 - Configure the logo area. Assign the <h1> element to the class named logo.
 - Configure the navigation area. Since the navigation is not semantically a "paragraph" (a collection of sentences about a central topic), replace the element with a <div> element. Assign this <div> to the id named nav. Remove the element from this area.
 - Configure the paragraph containing the address and phone information. Assign this area to the class named contact. Remove the <small> element from this area.

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- Configure the page footer area. Replace the elements with <div> elements. Assign this <div> to the id named footer. Remove the <small> and elements because the font-size and font-style are configured as part of the footer id.
- Save the index.html file and test in a browser. Your page should look similar to the one shown in Figure 3.28.
- **3.** The Financing Page. Launch Notepad and open the financing.html file. You will modify this file in a similar manner—add the <link /> element, configure the logo area, configure the navigation area, and configure the page footer area. Save and test your new financing.html page. It should look similar to the one shown in Figure 3.29.



Experiment with modifying the prime.css file. Change the page background color, the font family, and so on. Test your pages in a browser. Notice how a change in a single file can affect multiple files when external style sheets are used.



Visual Elements and Graphics

Chapter Objectives In this chapter, you will learn how to ...

- Create and format lines and borders on Web pages
- Decide when to use graphics and what graphics are appropriate
- Apply the image element to add graphics to Web pages
- Configure images as backgrounds on Web pages
- Configure images as hyperlinks
- Find free and fee-based graphics sources
- Follow recommended Web design guidelines when using graphics on Web pages

A key component of a compelling Web site is the use of interesting and appropriate graphics. This chapter introduces you to working with visual elements on Web pages.

When you include images on your Web site, it is important to remember that not all Web users are able to view them. Some users may have vision problems and need assistive technology such as a screen reader application that reads the Web page to them. In addition, search engines send out spiders and robots to walk the Web and catalog pages for their indexes and databases; such programs do not access your images. As a Web developer, you should create pages that are enhanced by graphical elements but that are usable without them.

4.1 Configuring Lines and Borders

Web designers often use visual elements such as lines and borders to separate or define areas on Web pages. In this section you'll explore two coding techniques to configure a line on a Web page: the XHTML horizontal rule element and the CSS border and padding properties.

The Horizontal Rule Element

A horizontal rule or line visually separates areas of a page. The **<hr** /> element configures a horizontal line across a Web page. Since the horizontal rule element does not contain any text, it is coded as a stand-alone tag, and not in a pair of opening and closing tags.

HANDS-ON PRACTICE 4.1

Open the Web page found at chapter4/starter1.html in the student files in a text editor. This file should be familiar to you; it is similar to the Web page you worked with in Chapter 3 (see Figure 3.12). Add an <hr /> tag above the paragraph that contains the page footer (id="footer").

Save your file as hr.html and test it in a browser. The lower portion of your Web page should look similar to the partial screenshot shown in Figure 4.1. Compare your work with the solution in the student files (Chapter4/hr.html).

Figure 4.1

The <hr /> element configures a horizontal line

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Horizontal rules are centered within their container element (in this case the Web page body) by default. A number of attributes exist for the <hr /> tag but they are deprecated or not officially supported by the W3C. Appendix A contains a list of these attributes and descriptions.

While a horizontal rule can be easily created using XHTML, a more modern technique is to use CSS to configure a border for a Web page element.

The border and padding Properties

As you may have noticed when you configured background colors for heading elements in Chapter 3, block-level XHTML elements form the shape of a rectangular box on a Web page. This is known as the CSS box model, which you will explore in detail in Chapter 6. For now, let's focus on two CSS properties that can be configured for the "box"—the border and padding properties.

The border Property. The **border** property configures the border, or boundary, around an element. By default, the border has a width set to 0 and does not display. You can set the **border-width**, **border-color**, and **border-style**. And there's more—you can even configure individual settings for border-top, border-right, border-bottom, and border-left. You'll get some practice configuring properties for just the top border (border-top) in the next Hands-On Practice.

The border-style property also offers a variety of formatting options including inset, outset, double, groove, ridge, solid, dashed, and dotted. Be aware that these property values are not all uniformly applied by browsers. Figure 4.2 shows how Firefox 3 and Internet Explorer 8 render various border-style values.



The CSS to configure the borders shown in Figure 4.2 uses a border-color of #000033, border-width of 3 pixels, and the value indicated for the border-style property. For example, the style rule to configure the dashed border follows:

```
.dashedborder { border-color: #000033;
            border-width: 3px;
            border-style: dashed;
}
```

A shorthand notation allows you to configure all the border properties in one style rule by listing the values of border-width, border-style, and border-color. An example follows:

.dashedborder { border: 3px dashed #000033 }

The padding Property. The **padding** property configures empty space between the content of the XHTML element (usually text) and the border. By default, the padding is set to 0. If you configure a background color for an element, the color is applied to both the padding and the content areas. You'll apply the padding property in the next Hands-On Practice. You may want to refer to Table 4.1, which presents a description of the CSS properties introduced in Chapter 4, as you work through the Hands-On Practice exercises.

Table 4.1 New CSS properties introduced in this chapter

Property	Description	Values
background-image	Background image on an element	url(imagename.gif) or url(imagename.jpg)
background- position	Position of the background image	Two percentage values or numeric pixel values. The first value configures the horizontal position and the second configures the vertical position starting from the upper-left corner of the con- tainer's box. Text values can also be used: left, top, center, bottom, right.
background-repeat	Controls how the background image will repeat	Text values repeat (default), repeat-y, (vertical repeat), repeat-x (horizontal repeat) , no-repeat (no repeat)
border	Shorthand notation to configure the values for border-width, border-style, and border-color of an element	The values for border-width, border-style, and border-color separated by spaces; for example: border: 1px solid #000000;
border-bottom	Shorthand notation to configure the bottom border of an element	The values for border-width, border-style, and border-color separated by spaces; for example:
		border-bottom: 1px solid #000000;
border-color	The color of the border around an element	Any valid color
border-left	Shorthand notation to configure the left border of an element	The values for border-width, border-style, and border-color separated by spaces; for example:
1 1		border-left: lpx solid #000000;
border-right	Shorthand notation to configure the right border of an element	border-style, and border-color separated by spaces; for example:
hordor stulo	The type of border around an	border-right: 1px solid #000000;
border-style	element	(the default), outset, ridge, solid, dashed, dotted, hidden
border-top	Shorthand notation to configure the top border of an element	The values for border-width, border-style, and border-color separated by spaces; for example:
		border-top: 1px solid #000000;
border-width	The width of a border around an element	A numeric pixel value (such as 1px) or the text values thin, medium, thick
min-width	Configures a minimum width for an element	A numeric pixel value or percentage

Property	Description	Values
padding	Shorthand notation to configure the amount of padding—the blank space between the element and its border	 A single numeric value (px or em); configure padding on all sides of the element. Two numeric values (px or em); the first value configures the top and bottom padding, the second value configures the left and right padding; for example: padding: 20px 10px; Four numeric values (px or em) or percent- ages. The values configure the padding in the follow- ing order: padding-top, padding-right, padding-bottom, padding-left.
padding-bottom	Blank space between an element and its bottom border	A numeric value (px or em) or percentage
padding-left	Blank space between an element and its left border	A numeric value (px or em) or percentage
padding-right	Blank space between an element and its right border	A numeric value (px or em) or percentage
padding-top	Blank space between an element and its top border	A numeric value (px or em) or percentage

 Table 4.1
 New CSS properties introduced in this chapter (continued)



In this Hands-On Practice you will work with the border and padding properties. Launch a text editor and open the Web page found at chapter4/starter2.html in the student files. You will modify the CSS style rules for the h1 selector, h2 selector and footer id. When you are finished, your page should look similar to the one shown in Figure 4.3.

Modify the CSS style rules as follows:

• Modify the style rules for the h1 selector. Remove the line-height style rule because you will configure the empty space using padding. Add a style rule to set the padding to 15 pixels. The code follows:

padding: 15px;

• Add a style rule to the h2 selector to configure a 2 pixel, dashed, bottom border in the color #191970. The code follows:

border-bottom: 2px dashed #191970;

• Add style rules to the footer id to configure a thin, solid, top border in the color #aeaed4 along with 10 pixels of top padding. The code follows:

border-top: thin solid #aeaed4;
padding-top: 10px;

Save your file as border.html.


Test in multiple browsers. Expect your page to look slightly different in browsers such as Internet Explorer and Firefox. See Figure 4.3 for a screenshot of the page using Firefox. Figure 4.4 shows the page displayed in Opera. The student files contain a sample solution (Chapter4/border.html).



Figure 4.4

Opera renders the dashed border differently than Firefox



My page looks different in various browsers. What can I do?

Do not expect your Web pages to always look the same in every browser and every browser version. Web pages that look different in various browsers are a frustrating part of life in the world of Web developers. The good news is that browser manufacturers are finally beginning to be less inventive and more compliant with the W3C standards. Also, organizations such as The Web Standards Project at http://www.webstandards.org have lobbied for standards compliance in browsers. Look for more compliance in the future!

Notice how objects even as simple as dashed borders appear different depending on the way the browsers display the page. To deal with this, remember the following:

- Design for the browser you think most of your visitors will use.
- Design the page so that it looks okay (degrades gracefully) in other browsers.

Perhaps the most exciting way to add visual interest to a Web page is to add graphics. The next section continues with a discussion of types of graphics used on Web pages.



CHECKPOINT 4.1

- 1. Is it reasonable to try to code a Web page that looks exactly the same on every browser and every platform? Explain your answer.
- 2. When a Web page containing the style rules below is rendered in a browser, the border does not display. Describe what is incorrect with the following code:

```
h2 { background-color: #ff0000
border-top: thin solid #000000
```

- }
- True or False? CSS can be used to configure visual elements such as rectangular shapes and lines on Web pages.

4.2 Types of Graphics

Graphics help to make Web pages compelling. Unfortunately, they can also make pages very slow to load. This section discusses types and features of graphic files used on the Web: GIF, JPEG, and PNG.

Browsers render, or display, Web page documents in order, line-by-line, starting at the top of the document. They also display standard images as the files are read in order from top to bottom. The top of a standard image begins to display after 50 percent of the image has been read by a browser. As you read about types of images, look for techniques you can use to make your pages load faster.

GIF Images

Graphic interchange format (GIF) is best used for flat line drawings containing solid tones and simple images such as clip art. The maximum number of colors in a GIF file is 256 (although most do not use more than the 216 colors in the Web Color Palette). GIF images have a .gif file extension.

Transparency. The format GIF89A used by GIF images supports image transparency. In a graphics application such as Adobe Photoshop or Adobe Fireworks one color (usually the background color) of the image can be set to be transparent. This helps the image to blend in with the Web page background or table background. Figure 4.5 shows two GIF images, one that does not use transparency and one with a background color configured to be transparent.



When working with transparent GIFs you should also be aware of the **halo effect**—a fringe of color around parts of the transparent image. Transparent GIFs are usually optimized for display on a particular background color. Displaying them on a background other than the type they were designed for can produce the halo effect.

The GIF used in Figure 4.6 was created to display on a light background. When it is shown on a dark background, the halo of light pixels is noticeable. This halo can only be fixed by modifying the image in a graphics application such as Adobe Photoshop or Adobe Fireworks and saving a version that is optimized for display on a dark background.



Animation. Animated GIF images also use the .gif file extension. They are contained in a GIF file that consists of several images or frames, each of which is slightly different. When the frames flash on the screen in order, the image appears animated—animated GIFs can be created in a graphics application such as Adobe Fireworks or Adobe

Figure 4.5 Comparison of

Figure 4.6 Notice the halo

effect on the dark background

nontransparent and transparent GIFs

ImageReady. Shareware GIF animation applications such as the GIF Construction Set are also commonly used. There are advantages to using an animated GIF to add action to your Web page. This format is widely supported, does not require a browser plug-in, and is relatively easy to create.

When you decide to add an animated GIF to your Web page, try to use the image for special emphasis only. If you're like most people, at some time you have been annoyed by a flashing ad banner at the top of a Web page. Use animated gifs sparingly.

Compression. When a GIF file is saved, **lossless compression** is used. This means that nothing in the original image is lost and that the compressed image, when rendered by a browser, will contain the same pixels as the original.

Optimization. To avoid slow-loading Web pages, graphic files should be optimized for the Web. **Image optimization** is the process of creating an image with the lowest file size that still renders a good quality image—balancing image quality and file size. GIF images are typically optimized by reducing the number of colors in the image. The image shown in Figure 4.6 was created using 235 colors and is 12KB in size. A graphics application such as Adobe Photoshop can be used to optimize the image for the Web—reducing the number of colors, which decreases the file size. The image shown in Figure 4.7 uses only eight colors and has a file size less than 5KB. However, the image quality is unacceptable.

Figure 4.7 This GIF image is

less than 5KB but is poor quality



Go to the end of the book for a full color version of this figure

Figure 4.8 shows the optimized image with acceptable quality using 128 colors and a file size of 10KB—the best balancing of quality and file size for this particular image.

Figure 4.8

Optimization is a trade-off between file size and image quality

poseWood Cabins

Go to the end of the book for a full color version of this figure

Interlacing. When a GIF graphic file is created it can be configured as interlaced. This changes the way that browsers render the image. Remember that browsers display standard (noninterlaced) images as the file is read from top to bottom and only begin to display the image after 50 percent of the file has been downloaded by a browser. An **interlaced image** progressively displays and seems to fade in as it downloads. The image first appears fuzzy but gradually becomes clearer and sharper. Interlaced images are repeatedly scanned from left to right. The first time about 13 percent of the image is displayed. The next pass renders about 25 percent. This process continues until the image is completely displayed. When you are using complex GIF images, consider interlacing to improve the perceived load time of your page.



Why does my text image look jagged?

If your image looks jagged, your graphic designer did not use **antialiasing** (sometimes called smoothing). Antialiasing is the process of creating a slight blur to smooth the jagged (stair-step) edges found in digital images. In Figure 4.9, the top image was created using antialiasing and the bottom was not. Note the jagged edges in the bottom image. The only letters not affected are the "I" and "i" because the shapes of these letters are perfectly horizontal and vertical.

Figure 4.9

Notice the smoother look of the top line of text

Antialiased Aliased

JPEG Images

Joint Photographic Experts Group (JPEG) images are best used for photographic images. In contrast to a GIF image, a JPEG image can contain 16.7 million colors. However, JPEG images cannot be made transparent and they cannot be animated. JPEG images usually have a .jpg or .jpeg file extension.

Compression. Another difference between GIF and JPEG images is that when JPEG images are saved **lossy compression** is used. This means that some pixels in the original image are lost or removed from the compressed file. When a browser renders the compressed image, the display is similar but not exactly the same as the original image.

Optimization. There are trade-offs between the quality of the image and the amount of compression. An image with less compression will have higher quality and result in a larger file size. An image with more compression will have lower quality and result in a smaller file size. Most graphics applications allow you to preview the quality/compression trade-off and choose the image that best suits your needs.

When you take a photo with a digital camera, the file size is too large for optimal display on a Web page. Figure 4.10 shows a JPEG image that is stored in a 205KB file. The same image was saved using a graphics application at various quality levels: Figure 4.11 was saved with 80 percent quality and is 55KB; Figure 4.12 was saved with 20 percent quality and is 19KB, but its quality is unacceptable. View these images to gain a perspective on the quality/size trade-off. You should notice that the quality of the image degrades as the file size decreases. The square blockiness you see in Figure 4.12 is called **pixelation**.

Another method to optimize JPEG images is to use a graphics application to reduce the dimensions of the images. Figure 4.13 shows a small version, or thumbnail, image of acceptable quality.

Figure 4.10 Initial JPEG image (205KB file size)



Go to the end of the book for a full color version of this figure

Figure 4.11

JPEG saved at 80 percent quality (55KB file size)



Go to the end of the book for a full color version of this figure

Figure 4.12 JPEG saved at 20 percent quality

(19KB file size)



Go to the end of the book for a full color version of this figure

Figure 4.13 This small image is only 5KB



Progressive JPEG. When a JPEG file is created it can be configured as progressive. A progressive JPEG is similar to an interlaced GIF in that the image progressively displays and seems to fade in as it downloads. Consider using this for complex images since the general shapes will initially appear and then sharpen as the file is progressively scanned and displayed by the browser.

PNG Images

PNG, pronounced "ping," stands for portable network graphic. Browsers have only recently begun to support this type of image. It combines the best of GIF and JPEG images and will be a replacement for the GIF in the future. PNG graphics can support millions of colors. They can support variable transparency levels and use lossless compression. PNG images also support interlacing. PNG is the native file format of some graphics applications, such as Adobe Fireworks.

4.3 Using Graphics

Now that you've been introduced to the types of graphic files displayed on Web pages, we'll discuss how to place graphics on your Web pages.

The Image Element

The , pronounced image, element is used to place graphics on a Web page. These graphics can be photographs, banners, company logos, navigation buttons—you are limited only by your creativity and imagination.

The image tag is used alone, not in a pair of opening and closing tags. The image file should be either in the same folder as your Web site or in a subfolder of your site. For example, to place an image called logo.gif on your Web page, you would use the following XHTML code:

The **src** attribute is used to specify the file name of the image. A number of optional attributes can be applied to images. It is a good idea to include the height, width, and alt attributes. The **height** attribute and width attribute can cause the Web page to load more efficiently and quickly. The **alt** attribute provides a text replacement, typically a text description, of the image. Table 4.2 lists attributes and their values. Commonly used attributes are shown in bold.

Attribute	Value
align	right, left (default), top, middle, bottom (Deprecated)
alt	Text phrase that describes the image
border	Image border size in pixels (Deprecated) 0 will prevent the border from being displayed.
height	Height of image in pixels
hspace	Amount of space that is blank to the left and right of the image in pixels (Deprecated)
id	Text name, alphanumeric, beginning with a letter, no spaces—the value must be unique and not used for other id values on the same XHTML document
longdesc	URL of a Web page that contains a text description of the image
name	Text name, alphanumeric, beginning with a letter, no spaces—this attribute names the image so that it can be easily accessed by client-side scripting languages such as JavaScript. This attribute is deprecated in XHTML but is used to provide backward compatibility with browsers that support HTML.
src	The URL or file name of the image
title	A text phrase containing advisory information about the image—typically more descriptive than the alt text
vspace	Amount of space that is blank above and below the image in pixels (Deprecated)
width	Width of image in pixels

Table 4.2 Attributes of the tag

Use height and width attributes to help the browser render your page more efficiently. If you omit the attributes, the browser must often adjust and shift the other page elements after your images load. This slows down the loading of your Web page. The browser reserves the correct amount of space for your image if you use the height and width attributes with values either equal to or approximately the size of the image.



What if I don't know the height and width of an image?

Most graphics applications can display the height and width of an image. If you have a graphics application such as Adobe Photoshop or Adobe Fireworks handy, launch the application and open the image. These applications include options that will display the properties of the image, such as height and width.

If you don't have a graphics application available, you can determine the dimensions of an image using a browser. Display the image on a Web page. Right-click on the image to display the context-sensitive menu. Select properties and view the dimensions (height and width) of the image. (*Warning*: if the height and width are specified on the Web page, those values will be displayed even if the image's actual height and width are different.)

Focus on Accessibility

Accessibility and Images

Use the alt attribute to provide accessibility. Recall from Chapter 1 that Section 508 of the Rehabilitation Act requires the use of accessibility features for new information

technology (including Web sites) associated with the federal government. The alt attribute configures an alternative text description of the image. This alt text is used by the browser in two ways. The browser will show the alt text in the image area before the graphic is downloaded and displayed. Some browsers will also show the alt text as a tool tip whenever the Web page visitor places a mouse over the image area. Applications such as screen readers will read the text in the alt attribute out loud.

Standard browsers such as Internet Explorer and Safari are not the only type of application or user agent that can access your Web site. Major search engines run programs called spiders or robots; these programs index and categorize Web sites. They cannot process images, but some process the value of the alt attributes in image tags.

Focus on Accessibility

The **longdesc** attribute is used to provide accessibility when the alt text description is too short to convey the meaning of the image. The value of the longdesc attribute is the URL of a Web page that contains a detailed text description and explanation of the image. Most current browsers do not support this attribute but you can expect expanded support in the future.

Legacy Alert. The align, vspace, and hspace attributes help position the image on the page relative to text. Examples of formatting images and text using vertical alignment properties are shown in Figure 4.14.

Figure 4.15 provides examples of horizontal alignments, the **hspace attribute**, and the **vspace attribute**. The hspace and vspace attributes are used to add space around an image symmetrically.

Since you'll find many pages on the Web coded using the deprecated attributes of the image element (align, hspace, vspace, border), it's a good idea to become familiar with them. CSS techniques that replicate the functionality of these attributes will be discussed in Chapter 6.

Figure 4.14 Examples of vertical alignment

Vertical Alignment

align="top" default alignment align="middle" Figure 4.15

Examples of horizontal alignment

Horizontal Alignment

The XHTML tag for this star image is coded with align="right". This causes the text to be placed to the left and wrap around the image. If the text continues, it will wrap under the image.



The XHTML tag for this star image is coded with align="left". This causes the text to be placed to the right and wrap around the image. If the text continues, it will wrap under the image.



In this Hands-On Practice you will place a graphical logo banner on a Web page. Create a new folder called trilliumch4. The graphic used in this Hands-On Practice is located in the student files: Chapter4/starters folder. Save trilliumbanner.jpg file in your trilliumch4 folder. A starter version of the Trillium Media Design Home page is ready for you in the student files. Save the chapter4/starter3.html file to your trilliumch4 folder. Launch a browser to display the starter3.html Web page—notice a monochromatic green color scheme has been configured with CSS. When you are finished with this Hands-On Practice, your page will look similar to the one shown in Figure 4.16 with a logo banner.

Figure 4.16

The new Trillium Home page with a logo banner



Launch a text editor and open starter3.html in the Chapter4 folder.

Configure the image as follows:

Replace the text contained between the <h1> opening and closing tags. Code an element to display trilliumbanner.jpg in this area. Remember to include the src, alt, height, and width attributes. Sample code follows:

```
<img src="trilliumbanner.jpg" alt="Trillium Media Design" width="700" height="86" />
```

Modify the h2 selector as follows:

Let's review working with the CSS padding property. Add a style rule to configure 10 pixels of padding on the left side of the h2 element. The new style rule follows:

```
padding-left: 10px;
```

Save your page as index.html in the trilliumch4 folder. Launch a browser and test your page. It should look similar to the one shown in Figure 4.16. *Note*: if the image did not display on your Web page, verify that you have saved the trilliumbanner.jpg file in the trilliumch4 folder and that you have spelled the file name correctly in the element. The student files contain a sample solution in the Chapter4/4.3 folder. Isn't it interesting how just one image can add visual interest to a Web page?

Image Links

The XHTML to make an image function as a hyperlink is very easy. To create an image link all you need to do is surround your element with anchor tags. For example, to place a link around an image called home.gif, use the following XHTML code:

```
<a href="index.html"><img src="home.gif" height="19" width="85" alt="Home" /></a>
```

When an image is used as a hyperlink, the default is to show a blue outline (border) around the image. If you would prefer not to display this outline, you could use the border="0" attribute in your image tag as follows:

```
<a href="index.html"><img src="home.gif" height="19"
width="85"alt="Home" border="0" /></a>
```

A more modern approach is to use CSS to configure the border on the img selector. The next Hands-On Practice will demonstrate this technique as you add image links to a Web page.

HANDS-ON PRACTICE 4.4

You will add image links to the Trillium Media Design Home page in this Hands-On Practice. You should already have the index.html and trilliumbanner.jpg files in your trilliumch4 folder. The graphics used in this Hands-On Practice are located in the student files: Chapter4/starters folder. Save the home.gif, services.gif, and contact.gif files to your trilliumch4 folder. View Figure 4.17 to see how your page should look after you are done with this Hands-On Practice.

Focus on Accessibility

Let's get started. Launch a text editor and open index.html. Notice that the anchor tags are already coded—you'll just need to convert the text links to image links! However, before you start changing the code, let's take a minute to discuss accessibility. Whenever the main navigation consists of media, such as an image, some individuals may not be able to see the images (or may have images turned off in their browser). To provide



navigation that is accessible to all, configure a set of plain text navigation links in the page footer area as follows:

- Copy the <div> element containing the navigation area to the lower portion of the page and paste it above the page footer.
- 2. Modify the style rules in the nav class. Change the font size to .75em.
- **3.** Now, focus on the top navigation area. Replace the text contained between each pair of anchor tags with an image element. Use home.gif for the link to index.html, services.gif for the link to services.html, and contact.gif for the link to contact.html. A sample follows:

```
<a href="index.html"><img src="home.gif" alt="Home" width="120" height="40" /></a>
```

 Create a new style rule that configures no border for the img selector. The code follows:

img {border:none}

5. Save your page as index.html. Launch a browser and test your page. It should look similar to the one shown in Figure 4.17. As you test your page, resize the browser window—make it smaller—and note how the image links move around. To prevent this, add a new style rule to the body selector that sets a minimum width for the page. This will cause the browser to automatically display a horizontal scroll bar if the Web page visitor resizes the browser window below the size specified:

min-width: 700px;

Save and test your page again.

The student files contain a sample solution in the Chapter4/4.4 folder.



Background Images

Using the CSS background-color property to configure the background color of a Web page was introduced in Chapter 3. The W3C recommends that Web developers use the hexadecimal numeric value rather than the color name when setting a background color. For example, the following CSS code configures the background of a Web page to be a soft yellow:

body { background-color: #ffff99; }

In addition to a background color, you can also choose to use an image for the background of a Web page. Be careful not to choose an image that is too busy; it could interfere with your text and graphics. Use the CSS **background-image property** to configure a background image for a Web page. For example, the following CSS code configures the background of a Web page to be the image background1.gif located in the same folder as the Web page:

body { background-image: url(background1.gif); }

You can use a graphics application to create your own backgrounds or find a free background image on the Web.

Legacy Alert. If you work with Web pages created by others you may find that the XHTML attributes bgcolor and background have been used to configure the page instead of CSS properties. See Appendix A for more information on the <body> element and these attributes.



Can I use both a background-color and a background-image attribute on the body selector?

Yes, you can! The background color (specified by the **background-color** property) will display first. Then the image specified as the Web page background will be loaded and tiled across the page. It's a good idea to choose a background color of a hue similar to the major color in your Web page background image. By coding both a background color and a background image you provide your visitor with a more pleasing visual experience. If the background image does not load for some reason, the page background will still have the expected contrast with your text color. If the background image is smaller than the Web browser window and the Web page is configured with CSS to not automatically tile (repeat), the page background color will display in areas not covered by the background image. The CSS for a page with both a background color and a background image is as follows:

```
body { background-color: #cccccc;
     background-image: url(mybackground.gif);
```

}

You may think that a graphic created to be the background of a Web page would always be about the size of a browser window. This can be done; however, often the background image is actually much smaller than the typical browser window. The shape of a background image is usually either a long, thin rectangle or a small rectangular block. Unless otherwise specified in a style rule, Web browsers repeat, or tile, these images to cover the page background. The images have small file sizes so that they download as quickly as possible. Figure 4.18 shows a long, thin rectangular image that will repeat down the page. The Web page shown in Figure 4.19 uses a small rectangular image that is repeated or tiled on the page. In each of these cases, the small background image has the effect of a much larger image that fills the screen.

Figure 4.18 A long, thin background image tiles down the page

Background Image

Browser Display



Figure 4.19

A small rectangular background is repeated to fill the Web page window

Background Image

Browser Display



Configuring Background Images with CSS

The default behavior of a browser is to repeat, or tile, background images to cover the entire element's background. Figures 4.18 and 4.19 display examples of this type of tiling for a Web page background. This behavior also applies to other elements, such as backgrounds for headings, paragraphs, and so on. You can change this tiling behavior with the CSS **background-repeat property**. The background-repeat property has a number of values: repeat (default), repeat-y (vertical repeat of background image), repeat-x (horizontal repeat of background image), and no-repeat (background image does not repeat). Figure 4.20 provides examples of the actual background image and the result of applying various background-repeat property values.

You will explore configuring image backgrounds in the next Hands-On Practice.





You will update the index.html file from the previous Hands-On Practice (shown in Figure 4.17). In this Hands-On Practice you will configure the h2 selector with a background image that does not repeat. Obtain the trilliumbullet.gif image from the student

files in the Chapter4/starters folder. Save the images in your trilliumch4 folder. When you are completed with this exercise, your page should look similar to the one shown in Figure 4.21.

Figure 4.21

The background image in the <h2> areas is configured with background-repeat: no-repeat



Launch Notepad and open index.html.

Modify the style rule for the h2 selector and configure the background-image and background-repeat properties. Set the background image to be trilliumbullet.gif. Set the background to not repeat. The h2 selector style rules follow:

```
h2 { background-color: #d5edb3;
    color: #5c743d;
    font-family: Georgia, "Times New Roman", serif;
    padding-left: 30px;
    background-image: url(trilliumbullet.gif);
    background-repeat: no-repeat;
}
```

Save your page as index.html. Launch a browser and test your page. It should look similar to the one shown in Figure 4.21. The student files contain a sample solution in the Chapter4/4.5 folder.



What if my images are in their own folder?

It's a good idea to organize your Web site by placing all your images in a folder separate from your Web pages. Notice that the CircleSoft Web site shown in Figure 4.22 has a folder called images, which contains a number of GIF files. To refer to these files in XHTML or CSS code, you also need to refer to the images folder. The following are some examples:

• The CSS code to configure the background.gif file from the images folder as the page background is as follows:

body { background-image: url(images/background.gif); }

• XHTML to display the logo.jpg file from the images folder is as follows:

Figure 4.22

A folder named "images" contains the graphic files

📗 CircleSoft

	images
_	background.gif
	logo.jpg
- 🖺	circle.css
- E i	ndex.html
	services.html

\checkmark

CHECKPOINT 4.2

- Describe the CSS to configure a graphic named circle.jpg to display once in the background of all <h1> elements. Code sample CSS to demonstrate this.
- 2. Describe the CSS that configures a file named bg.gif to repeat vertically down the background of a Web page. Code sample CSS to demonstrate this.
- 3. Explain how the browser will render the Web page if you use CSS to configure both a background image and a background color.

4.4 XHTML Images and More

This section introduces additional XHTML coding techniques associated with using images on Web pages. Topics discussed include image maps, thumbnail images, and image slicing.

Image Maps

An **image map** is an image that can be used as one or more hyperlinks. An image map will have at least one clickable area and usually multiple clickable areas that link to another Web page or Web site. The clickable areas are sometimes called **hotspots**. You have probably used image maps many times but never realized it. One common use of image maps is to create real clickable maps that Web site visitors can manipulate to choose a location. Figure 4.23 shows the home page of Recreation.gov with a map of the United States. Visitors use the map to select the state they are interested in. You can also visit the textbook's Web site at http://webdevfoundations.net to try out an image map.



Most Web authoring software, such as Adobe Dreamweaver, have wizards or other tools to help you create image maps quickly and easily. If you don't have access to a Web authoring tool to create an image map, the most difficult part is determining the pixel coordinates of the hyperlink area. The coordinates are in pairs of numbers that signify the number of pixels from the top and the number of pixels from the left edge of the image. If you are working with a graphic artist, he or she may be able to supply you with the coordinates. Another option is to open the image in a graphics application such as Adobe Fireworks, Adobe Photoshop, or even MS Paint to obtain approximate coordinates. You can modify these coordinate values as you work with the XHTML on your Web page. Image maps can be used to create clickable areas in three shapes: rectangles, circles, and polygons.

An image map uses two new elements: <map> and <area />. The <map> tag is a container tag and is used to begin and end the image map. The name attribute is used to correspond the <map> tag with its associated image. The image tag uses the usemap attribute to indicate which <map> to use. For example, will be associated with the image map described by <map name="boat" id="boat">>. The id attribute is part of XHTML. The name attribute is required for backward compatibility with older browsers that were written to process HTML.

The **<area />** tag is used to define the coordinates or edges of the map area and uses shape, coords, alt, and href attributes. Table 4.3 describes the type of coordinates (coords) needed for each shape value.

Figure 4.23

An image map is used to select a location on this Web site

Shape	Coordinates	Meaning
rect	"x1,y1, x2,y2"	The coordinates at point (x1,y1) represent the upper-left corner of the rectangle. The coordinates at point (x2,y2) represent the lower-right corner of the rectangle.
circle	"Х,У,Г"	The coordinates at point (x,y) indicate the center of the circle. The value of r is the radius of the circle in pixels.
polygon	"x1,y1, x2,y2, x3,y3", etc.	The values of each (x,y) pair represent the coordinates of a corner point of the polygon.

Table 4.3 Shape coordinates

This text focuses on rectangular image maps. For a rectangular image map, the value of the shape attribute is rect and the coordinates indicate the pixel positions as follows: upper-left corner distance from left side of image, upper-left corner distance from top of image, lower-right corner distance from left edge of image, and lower-right corner distance from top of image.

Figure 4.24 shows an image with a fishing boat. The dotted rectangle around the fishing boat indicates the location of the hotspot. The coordinates shown (24, 188) indicate that the top-left corner is 24 pixels from the left edge of the image and 188 pixels from the top of the image. The pair of coordinates in the lower-right corner (339, 283) indicates that this corner is 339 pixels from the left image edge and 283 pixels from the image top. The XHTML code to create this image map follows:

```
<map name="boat" id="boat">
<area href="http://www.doorcountyvacations.com" shape="rect"
coords="24, 188, 339, 283" alt="Door County Fishing" />
</map>
```

```
<img src="fishingboat.jpg" usemap="#boat" alt="Door County" width="416" height="350" />
```



This example is for a client-side image map. No special Web server processing is needed for this image map to work. Another, more complex type of image map is a server-side image map. This type requires a program on the Web server to coordinate the linking.



Server-side maps are no longer commonly used because they require resources on the Web server. It is more efficient to distribute processing to be on the Web browser client whenever possible. This way, the resources of the Web server can be reserved for the tasks that only it can perform.

Most Web developers do not hand-code image maps. As mentioned previously, the easiest way to create a client-side image map is to use a Web authoring tool. Some shareware programs, such as CoffeeCup Image Mapper (http://www.coffeecup.com) and HTML Map Designer Pro (http://www.imagecure.com/) also provide this feature.

Thumbnail Images

A **thumbnail image** is a smaller version of an image you would like to include on a Web site. It is usually placed within anchor tags that link to the larger, more detailed version of the image. Large images can significantly increase the load time of a Web page. If you are creating a page with multiple detailed images, consider displaying thumbnail images instead. This way, visitors who are interested in the images and willing to wait can use the thumbnail image to link to the larger image. Most graphics applications can create thumbnail images.

The Favorites Icon

Ever wonder about the small icon you sometimes see in the address bar or tab of a browser? That's a favorites icon, usually referred to as a **favicon**, which is a square image (either 16×16 pixels or 32×32 pixels) associated with a Web page. The favicon, shown in Figure 4.25, may display in the browser address bar, tab, or the favorites/bookmarks list.



You can create a favicon in a graphics application, such as Adobe Fireworks, or at a number of Web sites including http://www.favicongenerator.com, http://www.favicon.cc, and http://www.freefavicon.com. While earlier versions of Internet Explorer (such as version 5 and 6) expected the file to be named favicon.ico and to reside in the root directory of the Web server, a more modern approach is to associate the favicon.ico file with a Web page using the link element. Recall that in Chapter 3 you coded the link /> tag in the header section of a Web page to associate an external style sheet file with a Web page file. You can also use the <link /> tag to associate a favorites icon with a Web page. Three attributes are used to associate a Web page with a favorites icon: rel,

Figure 4.25

The favorites icon displays in the browser tab and address bar href, and type. The value of the rel attribute is icon. The value of the href attribute is the name of the image file. The value of the type attribute describes the MIME type of the image—which defaults to image/x-icon for .ico files. The XHTML code to associate a favorites icon named favicon.ico to a Web page is as follows:

<link rel="icon" href="favicon.ico" type="image/x-icon" />

Note that to be compatible with Internet Explorer and follow Microsoft's proprietary syntax, you'll also need to code a second link tag:

<link rel="shortcut icon" href="favicon.ico" type="image/x-icon" />

Be aware that Internet Explorer's support of the favorites icon is somewhat buggy. You may need to publish your files to the Web (see the FTP tutorial in the student files) in order for the favicon to display in even current versions of Internet Explorer. Other browsers, such as Firefox, Safari, Google Chrome, and Opera, display favicons more reliably and also support GIF and PNG image formats. You'll get a chance to practice using a favicon in Hands-On Exercise #6 at the end of the chapter.

Advanced Techniques: Image Slicing

Graphic artists and designers can create complex Web page images. Sometimes parts of these images are better optimized as GIFs than as JPEGs. Some parts of these images may be better optimized as JPEGs than as GIFs. By **image slicing** the single, complex images into multiple, smaller images, you can optimize all portions for the most efficient display. There may be times when you plan special mouse rollover effects for parts of a large, complex image. In this case, parts of the image need to be individually accessible to scripting languages and the image needs to be sliced. When an image is sliced, it is broken into multiple graphic files. These multiple graphic files are formatted using an XHTML table. Most graphics applications, such as Adobe Fireworks and Adobe Photoshop, have features for image slicing that automatically create the XHTML for you. Visit the textbook Web site at http://webdevfoundations.net/5e/chapter4.html for more information on image slicing.

4.5 Sources and Guidelines for Graphics

How do you obtain graphics for your pages? What are recommended ways to use graphics? This section will help you answer these questions and discuss sources of graphics as well as guidelines for using images on Web pages.

Sources of Graphics

There are many ways to obtain graphics: you can create them using a graphics application, download them from a free site, purchase and download them from a graphics site, purchase a graphics collection on a CD, take digital photographs, scan photographs, scan drawings, or hire a graphic designer to create graphics for you. Popular graphic applications include Adobe Photoshop, Adobe Fireworks, and Jasc Paint Shop Pro. These applications usually include tutorials and sample images to help you get started. Visit the textbook Web site at http://webdevfoundations.net/5e/chapter4.html, for tutorials on using Adobe Fireworks and Adobe Photoshop to create a logo banner image.



However, one thing that you should definitely not do is right-click and download graphics that others have created without first obtaining their permission. Materials on a Web site are copyrighted (even if a copyright symbol or notice does not appear) and are not free to use unless the owner of the site permits it.

There are many Web sites that offer free graphics, although some graphics are free for nonprofit use only. Choose a search engine and search for "free graphics"—you'll get more results than you have time to view. The following are a few sites that you may find helpful when looking for images:

- Microsoft Clip Art: http://office.microsoft.com/clipart/default.aspx
- FamFamFam: http://www.famfamfam.com
- Free Stock Photo Search Engine: http://www.everystockphoto.com
- Free Images: http://www.freeimages.co.uk
- The Stock Solution: http://www.tssphoto.com
- SuperStock: http://www.superstock.com
- iStockphoto: http://www.istockphoto.com

It is also possible to create a banner or button image online. There are a number of sites that offer this feature—some include advertising with your free image, some offer paid memberships, others are simply free. Search for "create free online banner" to find sites offering this service.

- Animation Online: http://www.animationonline.com
- Web 2.0 LogoCreator: http://creatr.cc/creatr
- Cooltext.com: http://www.cooltext.com
- Ad Designer.com: http://www.addesigner.com

Guidelines for Using Images

Images can help your Web page by creating an engaging, interesting user experience. Images can hurt your Web pages by slowing down their performance to a crawl and discouraging visitors.

Consider Image Load Time. Be careful when using images on Web pages—it takes time for them to load. A suggested maximum file size for both the Web page and all the media files used by it is 60KB. If your banner graphic is 25KB, that does not leave much room for other images or even for your Web page XHTML. Use images when they are necessary to convey a message or complement a Web site's look and feel. Table 4.4 lists the download time for file sizes of 30KB, 60KB, and 90KB at various connection speeds.

File Size	Approximate Connection Speed				
	28.8KB	33.6KB	56KB	ISDN (128KB)	T-1 (1.544MB)
30KB	8 seconds	7 seconds	4 seconds	1 second	Less than 1 second
60KB	17 seconds	14 seconds	8 seconds	3 seconds	Less than 1 second
90KB	25 seconds	21 seconds	13 seconds	5 seconds	Less than 1 second

Table 4.4 Download times

Reuse Images. Once an image from your site is requested for a Web page, it is stored in the cache on your visitor's hard drive. Subsequent requests for the image will use the file from the hard drive instead of another download. This results in faster page loads for all pages that also use the image. It is recommended that you reuse common graphics such as logos and navigation buttons on multiple pages instead of creating different versions of these common graphics.

Consider the Size/Quality Issue. When using a graphics application to create an image, you can choose among varying levels of image quality. There is a correspondence between the quality of the image and the size of the image file—the higher the quality, the larger the file size. Choose the smallest file that gives you appropriate quality. You may need to experiment until you get the right match. Also be aware of the file size when using graphics created by others—the image may look great but if it is 300KB, you really shouldn't use it on a Web page.

Use Appropriate Resolution. Web browsers display images at relatively low resolution—72ppi (pixels per inch) or 96ppi. Many digital cameras and scanners can create images with much higher resolution. Of course, higher resolution means larger file size. Even though the browser does not display the depth of resolution, more bandwidth is still used for the large file size. Be careful when taking digital photographs or scanning. Use a resolution setting appropriate for Web pages. A one-inch image saved at 150ppi could appear close to two inches wide on a 72ppi monitor.

Specify Dimensions. Always use accurate height and width attributes on image tags. This will allow the browser to allocate the appropriate space on the Web page for the image and load the page faster. Do not try to resize the appearance of an image by modifying the settings of the height and width attributes. While this will work, your page will load slower and your image quality may suffer. Instead, use a graphics application to create a smaller or larger version of the graphic when needed.

Be Aware of Brightness and Contrast. Gamma refers to the brightness and contrast of the monitor display. Monitors used with Macintosh and Windows operating systems use a different default gamma setting (Macintosh 1.8, Windows 2.2). Images that have good contrast on a computer running Windows may look slightly washed out on a Macintosh. Images created on a Macintosh may look darker with less contrast when displayed on a computer with a Windows operating system. Be aware that even monitors on the same operating system may have slightly different gamma values than the default for the platform. A Web developer cannot control gamma, but should be aware that images will look different on various platforms because of this issue.

Accessibility and Visual Elements



Even though images help to create a compelling, interesting Web site, remember that not all your visitors will be able to view your images. The Web Accessibility Initiative has a number of guidelines for Web developers in the use of color and images.

• Don't rely on color alone. Some visitors may have color perception deficiencies. Use high contrast between background and text color.

- Provide a text equivalent for every nontext element. Use the alt attribute on your image tags.
- If your site navigation uses image links, provide simple text links at the bottom of the page.

Vinton Cerf, the coinventor of TCP/IP and the former Chairman of the Internet Society, said, "The Internet is for everyone." Follow Web accessibility guidelines to ensure that this is true.

CHECKPOINT 4.3

- 1. Search for a site that uses image links to provide navigation. List the URL of the page. What colors are used on the image links? If the image links contain text, is there good contrast between the background color and letters on the image links? Would the page be accessible to a visitor who is sight-challenged? How have accessibility issues been addressed? Is the alt attribute used to describe the image link? Is there a row of text links in the footer section of the page? Answer these questions and discuss your findings.
- 2. When configuring an image map, describe the relationship between the image, map, and area tags.
- 3. True or False? Save your images using the smallest file size possible.

CHAPTER SUMMARY

This chapter introduced the use of visual elements and graphics on Web pages. As you continue to create Web pages, refer to the guidelines and accessibility issues related to graphics. The number one reason visitors leave Web pages is long download times. When using images, be careful to minimize download time. Also, provide alternatives to images (such as text links) and use the alt attribute on your pages.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

<area /> <hr /> <map> alt attribute animated GIFs antialiasing background-image property background-repeat property border property border-color property border-style property border-width property favicon gamma GIF halo effect height attribute hotspots hspace attribute image link image map image optimization image slicing interlaced image JPEG longdesc attribute lossless compression lossy compression min-width property padding property pixelation PNG progressive JPEG resolution src attribute thumbnail image transparency usemap attribute vspace attribute width attribute

Review Questions

Multiple Choice

- **1.** Which CSS property is used to change the back-ground color?
 - a. bgcolor
 - b. background-color
 - c. color
 - d. none of the above
- **2.** Which is the correct CSS syntax to configure the text color dark blue (#000033)?

```
a. body: color=#000033
```

b. { body color:#000033 }

```
c. body { color:#000033 }
```

```
d.body { text-color:#000033 }
```

- **3.** Which of the following creates an image link to the index.html page when the home.gif graphic is clicked?
 - a. <a href="index.html" src="home.gif"
 alt="Home">
 - b.
 - c. <img src="home.gif" href="index.html"
 alt="Home">
 - d. none of the above

4. Why should you include height and width attributes on an tag?

- a. They are required attributes and must always be included.
- b. They help the browser render the page faster because it reserves the appropriate space for the image.
- c. They help the browser display the image in its own window.
- d. none of the above
- **5.** Which attribute specifies text that is available to browsers and other user agents that do not support graphics?
 - a.alt
 - b. text
 - c. src
 - d. none of the above
- **6.** What is the term used to describe a square icon that is associated with a Web page and is displayed in the browser address bar or tab?
 - a. background
 - b. bookmark icon
 - c. favicon
 - d. logo
- **7.** Which of the following graphic types is best suited to photographs?
 - a. GIF
 - b. photo
 - c. BMP
 - d. none of the above
- **8.** Which of the following graphic types can be made transparent?
 - a. GIF
 - b. JPG
 - c. BMP
 - d. photo

- **9.** Which of the following configures empty space between the content of the XHTML element (usually text) and the border?
 - a. vspace property
 - b. padding property
 - c. margin property
 - d. none of the above
- **10.** Which of the following configures a graphic to repeat vertically down the side of a Web page?
 - a. hspace="10"
 - b. background-repeat:repeat;
 - c. valign="left"
 - d. background-repeat: repeat-y;

Fill in the Blank

- **11.** A background image will automatically be repeated, or _____, by a Web browser.
- 12. If your Web page uses graphic links, include_______ at the bottom of the page to increase accessibility.
- **13.** A ______ image is a smaller version of a larger image that usually links to the larger image.
- One method to obtain graphics for your Web site is to ______.
- **15.** A(n) ______ is an image that can be used as one or more hyperlinks.

Apply Your Knowledge

- **1. Predict the Result.** Draw and write a brief description of the Web page that will be created with the following XHTML code:
 - <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd"> <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">

```
<head>
  <title>Predict the Result</title>
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
  </head>
  <body>
    <div>
      <img src="logo.gif" alt="CircleSoft Design"
      height="150" width="600" />
                                       <br />
      Home <a href="about.html">About</a>
         <a href="services.html">Services</a>
      </div>
    <img src="people.jpg" alt="Professionals at CircleSoft</p>
  Design" height="300" width="300" align="right" /> Our professional
  staff takes pride in its working relationship with our clients by
  offering personalized services which listen to their needs,
  develop their target areas, and incorporate these items into a
  well presented Web Site that works.
    </div>
  </body>
  </html>
2. Fill in the Missing Code. This Web page contains an image link and should be con-
  figured so that the background and text colors have good contrast. The image used
  on this Web page should link to a page called services.html. Some XHTML attrib-
```

```
on this Web page should link to a page called services.html. Some XHTML attrib-
ute values, indicated by "_" are missing. Some CSS style rules indicated by "_" are
incomplete.
```

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>CircleSoft Design</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
.body { " ": " ";
         color: " ";
}
</style>
</head>
<body>
<div>
  <a href=" "><img src="logo.gif" alt=" " height="100" width="600"/>
  <br />Enter CircleSoft Design</a>
</div>
</body>
</html>
```

3. Find the Error. This page displays an image called trillium.jpg. The image is 100 pixels wide by 200 pixels high. When this page is displayed, the image does not look right. Find the error. Describe the attributes that you would code in the tag to provide accessibility.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
   <head>
   <title>Find the Error<title>
   <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
   </head>
   <body>
   <img src="trillium.jpg" height="100" width="100" alt="Trillium
flower" />
   </body>
   </html>
```

Hands-On Exercises

- **1.** Write the XHTML to place an image called primelogo.gif on a Web page. The image is 100 pixels high by 650 pixels wide.
- **2.** Write the XHTML to create an image hyperlink. The image is called schaumburgthumb.jpg. It is 100 pixels high by 150 pixels wide. The image should link to a larger image called schaumburg.jpg. There should be no border on the image.
- **3.** Write the XHTML to create a <div> containing three images used as navigation links. Table 4.5 provides information about the images and their associated links.

Table 4.5

Image Name	Link Page Name	Image Height	Image Width	
home.gif	index.html	50	200	
products.gif	products.html	50	200	
order.gif	order.html	50	200	

- 4. Experiment with page backgrounds.
 - a. Locate the twocolor.gif file in the student files chapter4/starters folder. Design a Web page that uses this file as a background image that repeats down the left side of the browser window. Save your file as bg1.html. Hand in printouts of the source code (print in Notepad) and the browser display of your page to your instructor.
 - b. Locate the twocolor1.gif file in the student files chapter4/starters folder. Design a Web page that uses this file as a background image that repeats across the top of the browser window. Save your file as bg2.html. Hand in printouts of the source code (print in Notepad) and the browser display of your page to your instructor.
- **5.** Visit one of your favorite Web sites. Note the colors used for background, text, headings, images, and so on. Write a paragraph that describes how the site uses color for these elements and if the Web Safe Color Palette is used. Code a Web page (either a new page or you can use the index.html file from the student files, Chapter4/index.html) that uses colors in a similar manner.
- **6. Practice with Favicon.** Obtain the favicon.ico file from the student files in the Chapter4/starters folder. In this exercise you will use your files from Hands-On Practice 4.5 (see the student files Chapter4/4.5 folder) as a starting point. You are

going to associate the favorites icon, favicon.ico, with the index.html page—you'll need to use the link tag (refer back to Section 4.4). Hand in printouts of the source code to your instructor.

7. Design a new Web page about your favorite movie. Configure a background color for the page, and either background images or background colors for at least two sections of the page. Search the Web for a photo of a scene from the movie, an actress in the movie, or an actor in the movie.

Include the following information on your Web page:

- Title of the movie
- Director or producer
- Leading actor
- Leading actress
- Rating (R, PG-13, PG, G, NR)
- A brief description of the movie
- An absolute link to a review about the movie

Save the page as movie3.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page to your instructor.



(*Note*: It is unethical to steal an image from another Web site. Some Web sites have a link to their copyright policy. Most Web sites will give permission for you to use an image in a school assignment. If there is no available policy, e-mail the site's contact person and request permission to use the photo. If you are unable to obtain permission, you may substitute with clip art or an image from a free site instead.)

8. Design a Web page that provides a list of resources for free clip art and free photographs. The list should contain at least five different Web sites. Use your favorite graphic sites, the sites suggested in this chapter, or sites you have found on the Web. Save the page as freegraphics.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page to your instructor.

9. Design a Web page about your favorite musical group. Use a background color for the page and either background images or background colors for at least two sections of the page. Search the Web for a photo of the group.

Include the following information about the group on your Web page:

- Name of group
- Type of music
- Names of principle group members
- Photo of group
- Link to another Web page with information about the group.

Save the page as band3.html. Hand in printouts of the source code (print in Notepad) and the browser display of your page to your instructor.



(*Note*: It is unethical to steal an image from another Web site. Some Web sites have a link to their copyright policy. Most Web sites will give permission for you to use an image in a school assignment. If there is no available policy, e-mail the site's contact person and request permission to use the photo. If you are unable to obtain permission, you may substitute clip art or an image from a free site.) **10.** Visit the textbook Web site at http://webdevfoundations.net/5e/chapter4.html and follow the link to the Adobe Fireworks or Adobe Photoshop tutorial. Follow the instructions to create a logo banner. Hand in the printouts described in the tutorial to your instructor.

Web Research

Providing access to the Web for all people is an important issue. Visit the W3C's Web Accessibility Initiative and explore their WCAG 2.0 Quick Reference at http://www.w3.org/WAI/WCAG20/quickref/ (the textbook Web site at http://webdevfoundations.net/5e/chapter4.html has an updated link if needed). View additional pages at the W3C's site as necessary. Explore the checkpoints that are related to the use of color and images on Web pages. Create a Web page that uses color, uses images, and includes the information that you discovered. Print both the source code (from Notepad) and the browser view of your Web page.

Focus on Web Design

Visit a Web sites that interests you. Print the home page or one other pertinent page from the site. Write a one-page summary and reaction to the Web site you chose to visit. Address the following topics:

- a. What is the purpose of the site?
- b. Who is the intended audience?
- c. Do you believe the site reaches its audience?
- d. Was this site useful to you? Why or why not?
- e. List the colors that were used on the home page of this Web site: background, backgrounds of page sections, text, logo, navigation buttons, and so on.
- f. How did the use of color enhance the Web site?

WEB SITE CASE STUDY: Using Graphics

Each of the following case studies continues throughout most of the text. This chapter adds images to the Web sites, creates a new page, and modifies existing pages.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House Case Study. Figure 2.26 shows a site map for the JavaJam Web site. The Home page and Menu page were created in earlier chapters. You will continue to work with this Web site here.

You have the following tasks:

1. Modify the Home page to display a logo, a JPEG image, and additional text, as shown in Figure 4.26 (shown also in the color insert section).



- **2.** Modify the Menu page to be consistent with the Home page.
- 3. Create a new Music page, as shown in Figure 4.27.
- 4. Modify the style rules in the javajam.css file as needed.



Hands-On Practice Case

Obtain the images used in this case study from the student files. The images are located in the Chapter4/CaseStudyStarters/JavaJam folder. The images are: melanie.jpg (Figure 4.28), melaniethumb.jpg (Figure 4.29), greg.jpg (Figure 4.30), gregthumb.jpg (Figure 4.31), javalogo.gif (Figure 4.32), windingroad.jpg (Figure 4.33), and background.gif (Figure 4.34). Save them in your javajam folder.

Figure 4.28 Melanie Morris (melanie.jpg)



Figure 4.29

Melanie Morris thumbnail (melaniethumb.jpg)

Figure 4.30 Greg (greg.jpg)



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(gregthumb.j



Figure 4.33

Winding road (windingroad.jpg)

JarvaJam Coffee House



Figure 4.34 Background (background.gif)

- **1. The Home Page.** Launch Notepad and open the index.html file from your javajam folder. Modify the index.html file to look similar to the Web page shown in Figure 4.26.
 - Replace the JavaJam Coffee House heading with the javalogo.gif, Figure 4.32. Be sure to include the alt, height, and width attributes on the tag for the graphic.
 - Configure windingroad.jpg, Figure 4.33, to display on the right side of the paragraph. Be sure to include the alt, height, and width attributes. *Hint*: Use the align="right" attribute on the tag. *Note*: In Chapter 6 you'll learn to use CSS to configure this alignment.

Save and test your new index.html page.

2. The Menu Page. Launch Notepad and open the menu.html page from your javajam folder. Modify the menu.html page in a similar manner—adding the logo banner. Save and test your new menu.html page. **3.** The Music Page. Use the Menu page as the starting point for the Music page. Launch Notepad and open the menu.html file in the javajam folder that you previously created. Save the file as music.html.

Modify the music.html file to look similar to the Music page, as shown in Figure 4.27:

- Change the page title to an appropriate phrase.
- Delete the definition list from the page.
- The main content in the page will consist of an introductory paragraph below the navigation and two sections describing music performances.
- The content of the paragraph is as follows:

The first Friday night each month at JavaJam is a special night. Join us from 8pm to 11pm for some music you won't want to miss!

Place a line break tag after the first sentence.

- The section describing each music performance consists of an <h3> element, a paragraph, and an image link. You'll need to configure the paragraph, so assign it to a class named content.
- January Music Performance:

Configure an <h2> with the following text: January

Configure a paragraph assigned to the content class with the following text:

- Melanie Morris entertains
- with her melodic folk style.
- Check out the podcast!
- CDs are now available.

Add line breaks as indicated above.

- Configure the melaniethumb.jpg as an image link to melanie.jpg. Code appropriate attributes on the element, including align="right"
- February Music Performance:

Configure an <h2> with the following text: February

Configure a paragraph assigned to the content class with the following text:

Tahoe Greg's back from his tour.

New songs

- New stories
- CDs are now available.

Add line breaks as indicated above.

- Configure the gregthumb.jpg as an image link to greg.jpg. Code appropriate attributes on the element, including align="right"
- Save the music.html file. If you test your page in a browser you'll notice that it looks different from Figure 4.27—you still need to configure style rules.
- 4. Configure the CSS. Open javajam.css in Notepad. Edit the style rules as follows:
 - Modify the body selector style rules. Configure background.gif (see Figure 4.34) as the background image.
 - Modify the container id. Configure the background color to be #ffffcc. Configure a minimum width of 700px (use min-width).

- Modify the content id. Now that the page has a background image, the content seems to be crowding the left and right sides. Configure 20 pixels of left and right padding (use padding-left and padding-right).
- Modify the h1 selector. Remove the line-height style rule.
- Add a new style rule for the h2 selector that configures a background color (#ccaa66), font size (1.2em), left padding (10px) and bottom padding (5px). The style rules follow:

```
background-color: #ccaa66;
font-size: 1.2em;
padding-left: 10px;
padding-bottom: 5px;
```

- Configure the class named details to add 20 percent left and right padding (use padding-left and padding-right). Notice how this adds empty space either side of the music performance description and image.
- Configure the img selector not to display a border.

Save the javajam.css file. Test it in a browser. If your images do not appear or your image links do not work, examine your work carefully. Use Windows Explorer to verify that the images are saved in your javajam folder. Examine the src attribute on the tags to be sure you spelled the image names correctly. Another useful trouble-shooting technique is to validate the XHTML and CSS code. See Chapters 2 and 3 for Hands-On Practice exercises that describe how to use these validators.

Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows a site map for Fish Creek. The Home page and Services page were created in earlier chapters. You will continue to work with this Web site in this case study, creating the Ask the Vet page, shown in Figure 4.35 (shown also in the color insert section). You will then modify the other pages so they are consistent with the new design.



Hands-On Practice Case

Obtain the images used in this case study from the student files. The images are located in the Chapter4/CaseStudyStarters/FishCreek folder. The images are: fishcreeklogo.gif (Figure 4.36), home.gif (Figure 4.37), services.gif (Figure 4.38), askthevet.gif (Figure 4.39), and contact.gif (Figure 4.40). Save the files in your fishcreek folder.



1. The Ask the Vet Page. Use the Services page as the starting point for the Ask the Vet page. Launch Notepad and open the services.html file in the fishcreek folder that you previously created. Save the file as askvet.html.

Modify your file to look similar to the Ask the Vet page, as shown in Figure 4.33.

- Change the page title to an appropriate phrase.
- Replace the Fish Creek Animal Hospital heading with the fishcreeklogo.gif, as shown in Figure 4.36. Be sure to include the alt, height, and width attributes on the tag for the graphic.
- Move the text links to the bottom of the page right above the copyright information (see Figure 4.35).
- See Figure 4.35 and add image links under the logo area. Use a <div> element to contain this area. Assign the <div> to an id named imgnav. The home.gif (Figure 4.37) should link to index.html. The services.gif (Figure 4.38) should link to services.html. The askthevet.gif (Figure 4.39) should link to askvet.html. The contact.gif (Figure 4.40) should link to contact.html. Use appropriate attributes on the tag: alt, height, width.
- Delete the unordered list that was part of the services.html page.
- The page content consists of a paragraph of text followed by a definition list that contains a question and answer.
- Replace the text in the paragraph as follows:

Contact us if you have a question that you would like answered here.

The word "Contact" should link to the contact.html page.

• The definition list displays the question and answer. The <dt> element configures the question. Assign the <dt> element to the category class used on the Services page. The <dd> element configures the answer. See Appendix B Special Characters for the character code to display the em dash (—).

- The content of the definition list is as follows:
 - Question: Our dog, Sparky, likes to eat whatever the kids are snacking on. Is it OK for the dog to eat chocolate?"

Answer: Chocolate is toxic to dogs. Please do not feed your dog chocolate. Try playing a game with your children—when you feed them people treats they can feed Sparky dog treats.

- 2. Configure the CSS. Open fishcreek.css in Notepad. Edit the style rules as follows:
 - The fish navigation image area is quite wide. Modify the style rules and change the width of the page content container id from 80 percent to 700 pixels.
 - Modify the style rules for the h1 selector. Delete the existing style rules. Add a new style rule to center the image (use text-align:center).
 - Configure the id named imgnav to be centered (use text-align:center).
 - Configure the img selector not to display a border.

Save the fishcreek.css file.

- 3. Save and Test. Save your page and test it in a browser. If your images do not appear or your image links do not work, examine your work carefully. Use Windows Explorer to verify that the images are saved in your fishcreek folder. Examine the src attribute on the image tags to be sure you spelled the image names correctly. Another useful troubleshooting technique is to validate the XHTML and CSS code. See Chapters 2 and 3 for Hands-On Practice exercises that describe how to use these validators.
- **4. The Home and Services Pages.** Modify the Home page (index.html) and Services page (services.html) to look similar to the Ask the Vet page you just created. Save and test your pages. Notice how the use of coordinating logo and navigation images helped to unite the Web site visually. To provide accessibility, the original text navigation links were not deleted. Instead, they were moved to the bottom of the page. It is common for sites that use images for main navigation to provide simple text links at the lower portion of each Web page.

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for Pasha the Painter. The Home page and Services page were created in earlier chapters. You will continue to work with this Web site in this case study and create the Testimonials page, as shown in Figure 4.41 (shown also in the color insert section). You will then modify the other pages so they are consistent with the new design.

Hands-On Practice Case

Obtain the images used in this case study from the student files. The images are located in the Chapter4/CaseStudyStarters/Painter folder. The images are: painterlogo.gif (Figure 4.42), paintroom.jpg (Figure 4.43), paintroom_small.jpg (Figure 4.44), undecorated.jpg (Figure 4.45), and undecorated_small.jpg (Figure 4.46). Save the files in your painter folder.

1. The Testimonials Page. Use the Services page as the starting point for the Testimonials page. Launch Notepad and open the services.html file in the painter




Figure 4.42

Pasha the Painter logo (painterlogo.gif)



Figure 4.43 Painted room (paintroom.jpg)



Figure 4.44 Painted room thumbnail (paintroom_small.jpg)







Figure 4.46 Undecorated room thumbnail (undecorated_small.jpg)



folder that you previously created. Save the file as testimonials.html Modify your file to look similar to the Testimonials page, as shown in Figure 4.41:

- Change the page title to an appropriate phrase.
- Replace the Pasha the Painter heading with the painterlogo.gif, Figure 4.42. Be sure to include the alt, height, and width attributes on the tag for the graphic.
- Delete the unordered list that was copied as part of the services.html page.
- The main content consists of two sections describing testimonials with an <h2> element, a paragraph, and an image hyperlink. See Appendix B Special Characters for the character code to display the em dash (—).

Painting Testimonial

- Configure an <h2> with the following text: Painting
- Configure a paragraph with the following text:

We were selling our home and needed a room painted quickly. Pasha's team promptly came out and gave an estimate. It was quite reasonably priced.

- They started and finished the very next day!—The Morris Family.
- Configure the paintroom_small.jpg as an image link to paintroom.jpg. Code appropriate attributes on the element, including align="left". Note: In Chapter 6 you'll learn to use CSS to configure this alignment.

Remodeling Testimonial

- Configure an <h2> with the following text: Remodeling
- Configure a paragraph with the following text:
 - We needed to "undecorate" a room—the previous owners had been a little too creative. Pasha's team provided an estimate, promptly began work, and within a few days our room was looking great!—The Felkes.
- Configure the undecorated_small.jpg as an image link to undecorated.jpg. Code appropriate attributes on the element, including align="left".

Save the testimonials.html file. If you test your page in a browser you'll notice that it looks different from Figure 4.41—you still need to configure style rules.

- 2. Configure the CSS. Open painter.css in Notepad. Edit the style rules as follows:
 - Add a new style rule for the h2 selector that configures a background color (#336633), text color (#ffffff), font typeface (Georgia, Times New Roman, or serif), font size of 1.2em, left padding (10px), and bottom padding (5px).
 - Modify the CSS to configure an id named container with width set to 620 pixels.
 - Configure the img selector as follows: 10 pixels of right padding and do not display a border.

Save the painter.css file.

3. Configure the container id on each page. Modify the index.html, services.html, and testimonials.html pages to utilize a wrapper <div> that configures the page width as indicated. On each page, assign the container id to a <div> element that contains the page content (see Section 3.9 for a review). Configure this <div> on each page as follows:

```
<body>
```

```
<div id="container">
... page content goes here
</div>
/body>
```

- </body>
- 4. Test. Test your pages in a browser. If your images do not appear or your image links do not work, examine your work carefully. Use Windows Explorer to verify that the images are saved in your painter folder. Examine the src attribute on the tags to be sure you spelled the image names correctly. Another useful troubleshooting technique is to validate the XHTML and CSS code. See Chapters 2 and 3 for Hands-On Practice exercises that describe how to use these validators.
- **5.** The Home and Services Pages. Modify the Home page (index.html) and Services page (services.html) to display the Pasha the Painter logo (painterlogo.gif) image and look similar to the Testimonials page you just created. A cohesive Web site uses color and images in a consistent manner. Save and test your pages.

Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case Study. Figure 2.38 shows a site map for Prime Properties. A Home page and Financing page were created in earlier chapters. You will continue to work with this Web site in this case study and create the Listings page, as shown in Figure 4.47 (shown also in the color insert section). You will then modify the other pages so that they are consistent with the new design.

Hands-On Practice Case

Obtain the images used in this case study from the student files. The images are located in the Chapter4/CaseStudyStarters/Prime folder. The images are: primelogo.gif (Figure 4.48), primehomenav.gif (Figure 4.49), primehomebtn.gif (Figure 4.50), primelistingsnav.gif (Figure 4.51), primelistingsbtn.gif (Figure 4.52), primefinancingnav.gif (Figure 4.53), primefinancingbtn.gif (Figure 4.54), primecontactnav.gif (Figure 4.55), primecontactbtn.gif (Figure 4.56), schaumburg.jpg (Figure 4.57), schaumburgthumb.jpg (Figure 4.58), libertyville.jpg (Figure 4.59), libertyvillethumb.jpg (Figure 4.60). Save the files in your prime folder.

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Figure 4.48 **Prime Properties** logo (primelogo.gif)

(primefinancingnav.gif)



(primefinancingbtn.gif)

Figure 4.55 Contact navigation button (primecontactnav.gif)



Figure 4.56 Contact page placeholder button (primecontactbtn.gif)



Figure 4.57 Schaumburg listing photo (schaumburg.jpg)



Figure 4.58 Schaumburg listing thumbnail (schaumburgthumb.jpg)



Figure 4.59



Figure 4.60 Libertyville listing thumbnail (libertyvillethumb.jpg)



- 1. The Listings Page. Use the Financing page as the starting point for the Listings page. Launch Notepad and open the financing.html file in the prime folder that you previously created. Save the file as listings.html. Modify your file to look similar to the Listings page, as shown in Figure 4.47.
 - Change the title to an appropriate phrase.
 - Replace the Prime Properties heading with the primelogo.gif, Figure 4.48. Be sure to include the alt, height, and width attributes on the tag for the graphic.

Move the div with the navigation links to the bottom of the page right above the copyright information (see Figure 4.47).

- See Figure 4.47 and add a div with image links under the logo area. The navigation buttons use color as a visual cue for visitors. The navigation button links use a green background. The button for the current page is not a link and uses a blue background. To configure this area for the Listings page, use primehomenav.gif (link to index.html), primelistingsbtn.gif (no link), primefinancingnav.gif (link to financing.html), and primecontactnav.gif (link to contact.html). Use appropriate attributes on the tag: alt, height, and width.
- Replace the heading Financing with the heading Listings.
- Delete the text between the Listings heading and the text navigation near the footer section of the Web page.
- The section describing each listing consists of an <h3> element, a paragraph, an image link, and an unordered list.

Schaumburg Colonial Listing

- Configure an <h3> with the following text: Schaumburg Colonial
- Configure a paragraph with the following text:
 - This single family home is a two-story colonial on a large lot.
- Configure the schaumburgthumb.jpg as an image link to schaumburg.jpg. Assign the element to a class named property. Code appropriate attributes on the element, including align="left". Note: In Chapter 6 you'll learn to use CSS to configure this alignment.
- Configure an unordered list with the following text:
 - Four bedrooms
 - Two and 1/2 baths
 - Finished family room
 - Two car garage
 - Listing #3432535
- Code a line break between the two listings.

Libertyville Condo Listing

- Configure an <h3> with the following text: Libertyville Condo
- Configure a paragraph with the following text: New construction condo in downtown Libertyville.

- Configure the libertyvillethumb.jpg as an image link to libertyville.jpg. Assign the element to a class named property. Code appropriate attributes on the element, including align="left".
- Configure an unordered list with the following text:
 - Close to train
 - Two bedrooms
 - Two baths
 - Two indoor parking spaces
 - Listing #3432432
- Configure a line break after the unordered list.

Save the listings.html file. If you test your page in a browser you'll notice that it looks different from Figure 4.47—you still need to configure style rules.

- 2. Configure the CSS. Open prime.css in Notepad. Edit the style rules as indicated.
 - Configure the img selector to not display a border.
 - Configure the nav id for the new page design. Remove the existing style rules. Configure .70em font size.
 - Configure a class named property to have 30 pixels of right padding, and 5 pixels of top padding.

Save the prime.css file.

- 3. Test. Test the listings.html page in a browser. If your images do not appear or your image links do not function, examine your work carefully. Use Windows Explorer to verify that the images are saved in your prime folder. Examine the src attributes on the tags to be sure you spelled the image names correctly.
- **4. The Home and Financing Pages.** Modify the Home page (index.html) and Financing page (financing.html) to be similar to the Listings page you just created. Pay close attention to the navigation buttons. Refer to Step 2 if necessary. Save and test your pages. Isn't it interesting how just a few images can add a professional look to a Web site?

<u>Chapter</u>

Web Design

Chapter Objectives In this chapter, you will learn how to ...

- Describe the most common types of Web site organization
- Create clear, easy Web site navigation
- Design user-friendly Web pages
- Improve the readability of the text on your Web pages
- Use graphics appropriately
- Create accessible Web pages
- Describe design principles
- Describe Web page design techniques
- Apply best practices of Web design

As a Web site visitor, you have probably found that cer-

tain Web sites are appealing and easy to use while others seem awkward or just plain annoying. What separates the good from the bad? This chapter discusses recommended Web site design practices. The topics include site organization, site navigation, page design, text design, graphic design, and accessibility considerations.

Whatever your personal preferences, your Web site should be designed to appeal to your target audience—the people who will use your Web site. They may be teens, shoppers, college students, young couples, the list goes on and on. You should follow all of the recommended Web site design practices with an eye toward your target audience.

For example, NASA's site, http://www.nasa.gov (Figure 5.1), features compelling graphics and has a different look and feel from the text-based, linkintensive Web site of the Agency for Healthcare Research and Quality (see http://www.ahrq.gov, Figure 5.2).

Figure 5.1 NASA - Home - Mozilla Firefox Eile Edit View History De us <u>B</u>ookmarks <u>A</u>ccessibility <u>I</u>ools <u>H</u>elp The compelling graphic draws you in HOME NEWS MISSIONS MULTIMEDIA ABOUT NASA COLLABORATE NASA Search Send 10.1 v Crew Members Arrive at International Space Station Researchers Map Ocean Plant Health from Fluorescent Light Signals on Accomplished: Leaving Hubble Better Than Even NIASA Take one space shuttle s and one lege

Go to the end of the book for a full color version of this figure

Figure 5.2

This text-intensive Web site offers numerous choices

is text-intensive eb site offers mercus choices	U.S. Department of Health & Human Services			Skip Navigation www.hhs.gov
Go to the end of the	Advancing Excellence in AHRQ Home Questin	ncy for Healthcare Research a n Health Care ons? Contact Us Site Map Wha	ats New Browse Información en español	AHRQ Go www.ahrq.gov
	A-Z Quick Menu Select Topic • AHRQ Home Clinical Information For Your Health	Clinical Information Evidence-based Practice Outcomes & Effectiveness Effective Health Care Technology Assessments Preventive Services Clinical Practice Guidelines National Guideline	•For Your Health • Staying Healthy • Choosing Quality Care • Cetting Safer Care • Understanding Diseases & Conditions • Comparing Medical Treatments • Questions Are the Answer	Questions are the Answer
	Punding Opportunities Data & Surveys Research Findings Specific Populations Quality & Patient Safety Health IT Public Health Preparedness		Data & Surveys MEPS Medical Expenditure Panel Survey HCUP Heathcare Cost & Utilization Project HCUPnet Interactive Tool for Hospital Statistics HIV & AIDS Cost & Use USHIK U.S. Heath Information Knowledgebase Requests for Assistance on Health heiteber	More Sites With Videos: Real Men Wear Gowns Superhéroes Spotlight Dr. Clancy: Coordinating Your Care with a Medical Home Panister Nour AMPO's

The first site engages you and draws you in. The second site provides you with a wide range of choices so that you can quickly get down to work. With your target audience in mind, take a look at some common recommended Web site design practices.

5.1 Web Site Organization

How will visitors move around your site? How will they find what they need? This is largely determined by the Web site's organization or architecture. There are three common types of Web site organization:

- Hierarchical
- Linear
- Random (sometimes called Web organization)

A diagram of the organization of a Web site is called a **site map** or **storyboard**. Creating the site map is one of the initial steps in developing a Web site (more on this in Chapter 10).

Hierarchical Organization

Most Web sites use **hierarchical organization**. A site map for hierarchical organization, such as the one shown in Figure 5.3, is characterized by a clearly defined home page with links to major site sections. Web pages within sections are placed as needed.





It is important to be aware of pitfalls of hierarchical organization. Figure 5.4 shows a site design that is too shallow—there are too many major site sections.



This site design needs to be broken down into small, easily managed topics or units, a process called **chunking**. In the case of Web page design, each unit of information is a page. George A. Miller, a research psychologist for Princeton University's WorldNet (http://www.cogsci.princeton.edu/~wn/) found that humans can store only five to nine chunks of information at a time in short-term memory (see http://www.nwlink.com/ ~donclark/hrd/learning/memory.html). He called this the "seven plus or minus two" principle. Following this principle, many Web designers try not to place more than nine major navigation links on a page, unless they are creating a very large site. Even then, they may try to chunk the navigation links into visually separate sections on the page with each group having no more than nine links.

Figure 5.4 This site design uses a shallow

hierarchy

Another design pitfall is designing a site that is too deep. Figure 5.5 shows an example of this. The interface design "three click rule" says that a Web page visitor should be able to get from any page on your site to any other page on your site with a maximum of three hyperlinks. In other words, a visitor who cannot get what they want in three mouse clicks will begin to feel frustrated and may leave your site. This rule may be very difficult to satisfy on a large site, but in general, the goal is to organize your site so that your visitors can easily navigate from page to page within the site structure.



This site design uses a deep hierarchy



An example of hierarchical organization is the Map Collections area of the Library of Congress site at http://memory.loc.gov/ammem/gmdhtml/gmdhome.html. A partial site map is shown in Figure 5.6.



The Map Collections Home Page contains navigation to the main map areas. It functions as a map to the site (see Figure 5.7) and it is intentionally different from the content pages.



The main section content pages of a site usually have a similar look and feel. Two content pages are shown in Figure 5.8.



Each main section may have one or more subpages. Some sites with a hierarchical organization may use a consistent design for the home page and the content pages. Either method is acceptable. Most commercial sites, such as http://amazon.com and http://ebay.com use hierarchical site organization.

Linear Organization

When the purpose of a site or series of pages on a site is to provide a tutorial, tour, or presentation that needs to be viewed sequentially, **linear organization**, as shown in Figure 5.9, is useful.



In linear organization, the pages are viewed one after another. Some Web sites use hierarchical organization in general, but with linear organization in a few small areas. An example of this is the National Library of Medicine site at http://www.nlm.nih.gov. The main site organization is hierarchical with linear organization used for tutorials. Notice the "Next" link in Figure 5.10; it's the link to the next page in the linear presentation.



Random Organization

Random organization (sometimes called Web organization) offers no clear path through the site, as shown in Figure 5.11 There is often no clear home page and no discernable structure. Random organization is not as common as hierarchical or linear organization and is usually found only on artistic sites or sites that strive to be especially different and original. This type of organization is typically not used for commercial Web sites.

Figure 5.9 Linear site organization

Figure 5.10

Tutorial linear organization using the "Next" link







Where do I begin?

Sometimes it is difficult to begin creating a site map for a Web site. Some design teams meet in a room with a blank wall and a package of large Post-it[®] Notes. They write the titles of topics and subtopics needed on the site on the Post-it[®] Notes. They arrange the notes on the wall and discuss until the site structure becomes clear and there is consensus within the group. If you are not working in a group, you can try this on your own and then discuss the way you have chosen to organize the Web site with a friend or fellow student.

5.2 Web Site Navigation—Best Practices

Ease of Navigation

Sometimes Web developers are so close to their sites that they can't see the forest for the trees. A new visitor will wander on to the site and not know what to click or how to find out what it offers. Clearly labeled navigation on each page is helpful—it should be in the same location on each page for maximum usability. A visitor should not feel lost in the site. Jakob Nielsen, a well-known Web usability and Web design professional, favors what he calls **breadcrumb trails** for larger sites. Figure 5.12 shows a page from http://www.cabq.gov, a site that has a well-organized main navigation area below the logo area in addition to personalized breadcrumb trails for each visitor. To access the What is Global Warming page currently displayed, the visitor has already viewed the Home, Albuquerque Green, and Stop Global Warming pages. Note the breadcrumb navigation at the top of the main content area: Home > Albuquerque Green > Stop Global Warming > What is Global Warming? Visitors can easily retrace their steps or jump back to a previously viewed page. The left side of this page also contains a vertical navigation bar with links for the Albuquerque Green section.

Navigation Bars

Clear navigation bars, either graphic- or text-based, make it obvious to Web site users where they are and where they can go next. The site shown in Figure 5.13 includes a vertical text navigation bar down the left side of the page.

Figure 5.12

Visitors can follow the "breadcrumbs" to retrace their steps through the site



Figure 5.13

Vertical text-based navigation is used at http://www.usdoj.gov



The display of the Current Vacancies link shown on a contrasting background color, provides a visual cue that the visitor is at that location. The page header and page title also display the text "Current Vacancies." The **navigation bar** indicates other choices available to the Web site visitor.

Sometimes graphics are used to convey navigation, as in the Web site for the Department of Transportation (http://www.dot.gov), as shown in Figure 5.14.

The "text" for the navigation is actually stored in image files. This technique of placing text in navigation images is used to create interactive Web pages. In this case, JavaScript is used to detect when the Web page visitor has placed the mouse over an image of text,



The tabs provide horizontal graphicsbased navigation



which then displays an alternate image. Even though images provide the main navigation of the site, the site is still accessible: a row of text links appear in the footer section of the page (not shown in Figure 5.14) and the image tags are configured with text descriptions using the alt attribute. Combinations of text with graphic images can be helpful to your visitors and add visual interest. Figure 5.15 shows a graphical navigation bar at http://www.genome.gov.



Technologies such as Adobe Flash can be combined with XHTML to create interactive, interesting navigation. See the screenshot in Figure 5.16 of http://www.loc.gov/wiseguide. The designers of this site used Flash to create the dynamic navigation and interactive images.

Java applets and Dynamic HTML (DHTML) can also be used to create similar interactive effects. Chapter 11 discusses using these technologies to create interactive Web pages.

In Figure 5.17, "For Visitors" has been selected causing the vertical menu to appear. This type of navigation on a large complex site keeps the visitor from feeling overwhelmed by choices. The visitor first chooses a major menu category, and then sees the individual additional choices that can be made.



Figure 5.17

The City of Fresno (http://www.fresno .gov) Web site uses DHTML to create dynamic navigation menus



Short Pages

A Web page is considered long if it is three or more screen lengths. Long pages are usually slow to load. Your visitors are probably only interested in portions of a long page, so consider breaking a long page into multiple short pages—possibly using linear organization to link the ideas.

Table of Contents

When a long Web page must be kept as a single file, a **table of contents** or bulleted list at the top of the page can provide links to specific parts of the page. This will help visitors find exactly what they need. An example of this is the page shown in Figure 5.18. Note the list of questions—they all link to corresponding answers at another location on the same page.

Figure 5.18

A list of FAQ links to answers on the page



Site Map and Site Search Features

The Ready.gov Web site shown in Figure 5.19 has a site search and site map on the same page. The site map allows a visitor to scan the contents of the site visually. The search helps visitors find information that is not apparent from the navigation or the site map features. A Web developer could add the title attribute to these anchor tags to provide a brief text description.



Commercial site search applications are available, including FreeFind (http://www.freefind.com), Zoom (http://wrensoft.com/zoom), and FusionBot (http://www.fusionbot. com), which provide a free service for sites that are under a certain number of pages.

You are now familiar with Web site organization and navigation. The next section continues with a discussion of visual design principles.

5.3 Design Principles

There are four visual design principles that you can apply to the design of just about anything: **repetition**, **contrast**, **proximity**, and **alignment**. Whether you are designing a Web page, a button, a logo, a CD cover, a brochure or a software interface—the design principles of repetition, contrast, proximity, and alignment will help to create the "look and feel" of your project and will determine whether your message is effectively communicated.

Repetition: Repeat Visual Elements throughout Design

When applying the principle of repetition, the designer repeats one or more elements through the product. The repeating aspect ties the work together. Figure 5.20 displays the home page of the Tennesee Web site (http://www.tn.gov). The page design demonstrates the use of repetition in a variety of design components, including shape, color, font, and images. The main navigation links on the left side of the page are the same rectangular shape. Notice how background color is used within the repetition of the navigation rectangles to differentiate the type of link—blue indicates target audience, medium gray indicates site section, and light gray indicates "housekeeping" (site map, contact page, etc.). The gray colors are also repeated in the governor's section in the lower middle of the page and in the bottom border of the right sidebar categories. The

Figure 5.20

The design principles of repetition, contrast, proximity, and alignment are well used on this site



Go to the end of the book for a full color version of this figure use of only two font typefaces on the page also demonstrate repetitions and helps to create a cohesive look. Arial is the default font. Page headings are configured with Verdana font. The large rectangular visual element in the middle of the page engages the visitor and incorporates repetition of three thumbnail images. The services area also utilizes several thumbnail images. Whether it is color, shape, font, or image, repetition of elements helps to unify a design.

Contrast: Add Visual Excitement and Draw Attention

To apply the principle of contrast, the designer should make elements very different (add contrast) in order to make the design interesting and direct attention. When designing Web pages, there should be good contrast between the background color and the text. Notice how the navigation area in Figure 5.20 uses text color with good contrast (either light text with the blue and medium gray background or dark text with the light gray background). The main content areas use dark text on a medium or light background to provide good visual contrast and easy reading.

Proximity: Group-Related Items

When designers apply the principle of proximity, related items are placed physically close together. Unrelated items should have space separating them. The placing of interface items close together gives visual clues to the logical organization of the information or functionality. In Figure 5.20, the vertical navigation links are all placed in close proximity to each other. This creates a visual group on the page and makes the navigation easier to use. Notice the proximity of the options in the governor's section, services options, and right-sidebar links. Proximity is used well on this page to group related elements.

Alignment: Align Elements to Create Visual Unity

Another principle that helps to create a cohesive Web page is alignment. When applying this principle, the designer organizes the page so that each element placed has some alignment (vertical or horizontal) with another element on the page. The page shown in Figure 5.20 also applies this principle. Notice how the page components are vertically aligned in columns. Examine the services area (Driver Online Services, Renew Health License, Annual Report Filing) and observe the alignment of the thumbnail images, headings, and text.

Repetition, contrast, proximity, and alignment are four principles that can greatly improve your Web page designs. If you apply these principles effectively, your Web pages will look more professional and you will communicate your message more clearly. Keep these visual design principles in mind as you explore recommended Web site design practices related to **page layout**, text, graphic, and accessibility in the next section.

5.4 Web Page Design—Best Practices

The major components of Web page design are as follows:

- Page layout design
- Text design

- Graphic design
- Accessibility considerations

Web sites that look great and are easy to use don't happen by accident. Outstanding Web sites are carefully planned and created by using recommended design practices. (They also require a little bit of talent!) There are a number of factors to consider when designing a Web page. Some factors relate to the usability, accessibility, and appeal of the site to the target audience—use of color, text, graphics, and animations. Other factors relate to the medium of the Web itself—load time issues, browser support, and monitor screen resolution.

Load Time

The last thing you want to happen is for your visitors to leave your page before it has even finished loading! Make sure your pages load as quickly as possible. How long do you generally wait for a page to load? Many Web page visitors will not wait more than several seconds. It's a good practice to limit the total file size of a Web page and all of its associated images and media files to under 60KB. It takes about eight seconds at 56KB for a browser to display a Web page and associated files of 60KB.

According to a recent study by the PEW Internet and American Life Project, the percentage of U.S. Internet users with a broadband (cable, DSL, and so on) connection at home or at work is rising. Fifty-five percent of adult Americans have access to broadband at home. Even with the trend of increasing bandwidth available to your visitors, keep in mind that 45% of households do not have broadband Internet access. For the most up-to-date statistics, visit http://www.pewinternet.org and http://www.clickz.com.

The 60KB per page limit is a guideline—it's better if the file size of your home page and associated media files is smaller. Go over the limit for content pages only when you are sure your visitors will be interested enough to wait to see what your site is presenting. The chart shown in Figure 5.21 (created using the calculator at http://www.t1shopper. com/tools/calculate/downloadcalculator.php) compares file sizes and connection speed download times.





times and Internet connection speeds

One method to help determine if the load time of your page is acceptable is to view the size of your Web site files in Windows Explorer. Calculate the total file size of your Web

page plus all its associated images and media. If the total file size for a single page and its associated files is over 60KB and it is likely that your target audience may not be using broadband access, take a closer look at your design. Consider if you really need to use all the images to convey your message. Perhaps the images can be better optimized for the Web or the content of the page should be divided into multiple pages. This is a time for some decision making!

Popular Web authoring tools such as Microsoft Expression Web and Adobe Dreamweaver will calculate load time at various transmission speeds.

Perceived Load Time

Perceived load time is the amount of time a Web page visitor is aware of waiting while your page is loading. Since visitors often leave a Web site if a page takes too long to load, it is important to shorten their perception of waiting. A common technique is to shorten the perceived loading time by breaking the long page into multiple smaller pages using the methods described earlier. This might even aid in the organization of your Web site.

Web pages containing large graphics may appear to load very slowly. Image slicing dividing or slicing large images into multiple smaller images (see Chapter 4), divides large images into several smaller graphics. Since each graphic displays as it loads, the perceived load time is shorter than it is for a single large graphic. Even though the total download time is about the same, the visitor sees the browser window changing and perceives the wait as being shorter.

Above the Fold

Placing important information **above the fold** is a technique borrowed from the newspaper industry. When newspapers are placed on counters and in vending machines waiting to be sold, the portion above the fold in the page is viewable. Publishers noticed that more papers were sold when the most important, attention-getting information was placed in this location. You may use this technique to attract and keep visitors on your Web pages. Arrange interesting content above the fold—the area the visitor sees before scrolling down the page. At a screen resolution of 800 pixels wide by 600 pixels high, the amount of screen viewable above the fold (after accounting for Web browser menus and controls) is about 410 pixels. At 1024×768 resolution, you can expect there to be close to 600 pixels above the fold—but keep in mind that the amount of browser chrome (the browser menus, address bar, and scroll bar) varies and that not everyone will be visiting your Web site with a maximized browser viewport.

Web Page "Real Estate"

There is a saying in the real estate field that the three most important factors about a property are location, location, and location. The Web page location you choose for high-profile components such as logo banners, page headings, and navigation is also important. Web page visitor eye tracking studies reported by The Poynter Institute (http://www.poynterextra.org/eyetrack2004/main.htm) indicate that "eyes most often fixated first in the upper-left of the page, then hovered in that area before going left to right." This makes the most valuable Web page "real estate" the upper-left side and top center of the page. Avoid placing important information and navigation on the far right side—this area may not be initially displayed by browsers at some screen resolutions.

Horizontal Scrolling

In order to make it easy for Web page visitors to view and use your Web pages, avoid creating pages that are too wide to be displayed in the browser window. These pages require the user to scroll horizontally. Using the screen resolution of 800 pixels wide by 600 pixels high, the amount of viewable screen (after accounting for area used by the Web browser) is about 760 pixels. However, the most popular screen resolution is currently 1024×768. Cameron Moll (http://www.cameronmoll.com/archives/001220 .html) suggests that the optimal Web page width for display at 1024×768 screen resolution is 960 pixels. Be mindful that all your web page visitors will not maximize their browser viewport. One approach when designing a wide page is to place less important content on the right. An easy way to make sure your page will not require horizontal scrolling is to place the page contents in a layout table that uses a percentage width of 100 percent or less. Another method is to use a fixed width set to the value you have chosen—760 pixels or less (for 800×600) or 960 pixels or less (for 1024×768). If you expect your pages to be printed often, use CSS to configure styles for printing (see Chapter 7).

Adequate White Space

This term **white space** is also borrowed from the publishing industry. Placing blank or white space (because paper is usually white) in areas around blocks of text increases the readability of the page. Placing white space around graphics helps them to stand out. Allow for some blank space between blocks of text and images. How much is adequate? It depends—experiment until the page is likely to look appealing to your target audience.

Target Audience

Use of Color. Younger audiences, such as children and preteens, prefer bright, lively colors. The United States Mint's Site for Kids home page (http://usmint.gov/kids) shown in Figure 5.22, features bright graphics, lots of color, and interactivity.



Individuals in their late teens and early twenties generally prefer dark background colors with occasional use of bright contrast, music, and dynamic navigation. Figure 5.23 shows http://underatedrock.com, a Web site designed by Michael Martin for this age group.



Note how it has a completely different look and feel from the site designed for children.

If your goal is to appeal to everyone, follow the example of the popular Amazon.com and eBay.com Web sites in their use of color. These sites use a neutral white background with splashes of color to add interest and highlight page areas. Use of white as a background color was also reported by Jakob Nielsen and Marie Tahir in Homepage Usability: 50 Websites Deconstructed, a book that analyzed 50 top Web sites. According to this study, 84 percent of the sites used white as the background color and 72 percent used black as the text color. This maximized the contrast between text and background—providing maximum readability.

For an older target audience, light backgrounds, well-defined images, and large text are appropriate. The screenshot of the Senior Health site (http://nihseniorhealth.gov) shown in Figure 5.24 is an example of a Web page intended for the over 55 group.

Focus on Accessibility

Another issue related to color is the fact that many individuals experience color deficiency (color blindness). The inability to differentiate between red and green, called deuteranopia, is the most common type of color deficiency. To increase the accessibility of Web pages for these individuals, a Web designer can use high contrast between background and text. The choice of colors is important—avoid using red, green, brown, gray, or purple next to each other. White, black, and shades of blue and yellow are easier for these individuals to differentiate. To see what your pages look like to a person with color blindness, try the online simulator at http://www.vischeck.com/vischeck/.



Reading Level. Match the reading level and style of writing to your target audience. Use vocabulary that they will be comfortable with.

Animation. Use animation only if it adds to your site. Don't include an animated GIF just because you have one. In general, animation appeals more to younger audiences than to older audiences. The United States Mint's Site for Kids (Figure 5.22) is geared to children and uses lots of animation. This would be too much animation for a Web site targeted to adult shoppers. However, a well-done navigation animation or an animation that describes a product could be appealing to almost any target group. Adobe Flash is frequently used on the Web to add animation to Web pages and even to create entire animated Web sites.



Which browser is everyone using?

A recent survey by Net Applications (http://marketshare.hitslink.com/browser-market-share. aspx?qprid=0) indicates that while Microsoft's Internet Explorer is still the most popular Web browser, the Firefox open source browser has been gaining ground. The survey reports that about 65 percent of users use Internet Explorer and 24 percent use Firefox (http://www.mozilla. org/products/firefox/). It is important to test your site in the major browsers (and versions). You never know which browser your next client will favor!

If you are developing for an intranet, ask what browser (and version) is installed at the organization. If you are developing for a client, ask what browser he or she regularly uses.

Browser-Friendly

Just because your Web page looks great in your favorite browser, doesn't automatically mean that all browsers will render it well. Determine the browser most likely to be used by your target audience. A good source of statistics is http://www.thecounter.com/stats. Develop the site so that it looks great in your target audience's most popular browser and looks acceptable (degrades gracefully) in other browsers. Visit http://www.upsdell. com/BrowserNews for timely information about current browsers.

Always try to test your pages in the most popular versions of browsers and in the newest versions. At the time of this writing, these are Firefox 3, Internet Explorer 8, Safari (both Mac and Windows versions), Opera 10, and Google's Chrome browser. While it is possible to install multiple versions of Firefox on the same computer, dual installs cannot easily be done with Internet Explorer. Unless you have multiple computers to work with, test with the most popular version of Internet Explorer. If you can, it is also a good idea to test your pages on both the Mac and PC platforms.

Large information technology departments and Web design firms will dedicate a number of computers with various operating systems and browser versions for compatibility testing. Many Web page components, including default text size and default margin size, are different among browsers, browser versions, and operating systems.

Screen Resolution

Higher resolutions are becoming more popular. The most commonly used screen resolutions are currently 1024×768, 1280×800, and 1280×1024. Design your pages to avoid horizontal scrolling at these resolutions. However, depending on your target audience, you still may have some visitors using 640×480 screen resolution! Also, be mindful that mobile web browsers have very low screen resolution. One way to create a page that looks good in multiple screen resolutions is to center the entire page. Refer back to Section 3.9 Centering Elements with CSS for code samples.



Which screen resolution is everyone using?

A recent survey by Net Applications (http://marketshare.hitslink.com/report.aspx?qprid=17) reported that 1024×768 is currently the most popular screen resolution. Of visitors surveyed, 30 percent use 1024×768, 20 percent use 1280×800, 11 percent use 1280×1024, 9 percent use 1440×900, 6 percent use 1680×1050, and less than 4 percent use 800×600.

Wireframes and Page Layout

A wireframe is a sketch or blueprint of a Web page that shows the structure (but not the detailed design) of basic page elements such as the logo, navigation, content, and footer. Depending on the purpose of a particular Web site, the wireframe may incorporate additional components including pull quotes, news items, and interactive features such as a login or search function. Wireframes are used as part of the design process to experiment with various page layouts, develop the structure and navigation of the site, and provide a basis for communication among project members. Figures 5.25 through 5.27 can be considered very basic wireframes. See the textbook website at http://www. webdevfoundations.net/5e/chapter5.html, for more detailed examples.



Figure 5.26

this page layout more interesting



Figures 5.25, 5.26, and 5.27 show diagrams of three possible Web page layouts. Note that the exact content (text, images, logo, and navigation) does not need to be placed in the diagram in order to illustrate this concept. The page area where the content will appear is indicated. This type of sketch, called a wireframe, can be used to experiment with page structures and find the one that will work best for a site. Figure 5.25 shows a diagram of a Web page with a logo, navigation area, content area, and a footer area.



This layout is adequate and may be appropriate for some content, but it's not very interesting. Figure 5.26 shows a diagram of a Web page containing about the same content, but formatted in three-columns.

This is an improvement, but something is still missing. Figure 5.27 shows a diagram of the same content but formatted in three columns of varying widths, with graphics interspersed.



This is the most interesting page layout of the three. Notice how images and tables make the same content more appealing. Try using this concept when designing your pages. In Chapters 6 and 7 you'll learn how to use CSS to configure Web pages with multiple columns.

Often the page layout (sometimes called a storyboard) for the home page is different from the page layout used for the content pages. Even when this is the case, a consistent logo and color scheme will produce a more cohesive Web site. Using style sheets to create interesting page layouts can keep visitors engaged in your Web site. Web authoring tools such as Microsoft Expression Web and Adobe Dreamweaver offer templates and example sites to assist you with layout ideas.

5.5 Page Layout Design Techniques

Now that you have been introduced to Web page design best practices and page layout, it's time to consider three popular techniques of Web page layout design: ice, jello, and liquid.

Ice Design

The ice design technique is sometimes referred to as a solid or fixed design. The page hugs the left margin and generally either CSS is used to configure a fixed-width block-level element or an XHTML table (see Chapter 8) is used to format the page. A CSS style rule is shown below that configures an id named wrapper in this manner.

```
#wrapper { width: 700px; }
```

Due to the fixed width, the designer has much control over the layout and formatting configuring the page to look best at a certain screen resolution (often 1024×768) and degrade gracefully when other screen resolutions are used. The right-hand side of the browser window will often contain much empty space—especially at higher screen resolutions.

The Energy Star site (http://www.energystar.gov), shown in Figure 5.28, is an example of ice design. This particular page is formatted with a fixed width. Other sites that currently use this technique include http://www.cabelas.com and http://www.league.org.

Figure 5.28

This page is configured with a fixed width and demonstrates ice design



Jello Design

}

The jello design technique configures content that is centered and may be of a fixed width or a percentage width such as 80 percent. A CSS style rule that configures an id named wrapper in this manner follows:

Jello design pages typically are more pleasing to view at higher screen resolutions than ice design pages. No matter the screen resolution, the content is centered in the page with even margins on both sides. The Department of Energy site (http://energy.gov), as shown in Figure 5.29, uses jello design. Other sites currently using this technique include http://www.pbs.org and http://www.officedepot.com.



Liquid Design

The **liquid design** technique results in a fluid Web page with content that takes up 100 percent of the browser window regardless of the screen resolution. There is no blank margin on the left or right—the multicolumn content will flow to fill whatever size

Figure 5.29

The left and right margins are balanced on this page using jello design window is used to display it. This type of design can be created with CSS or with XHTML using a table with width set to 100 percent (see Chapter 8). Using CSS instead of a table to configure Web page layout has a number of advantages, including smaller Web page document file sizes, quicker loading pages, and more accessible pages that are easier for screen readers to access. Figure 5.30 shows a page from the State of Illinois site at http://www.illinois.gov/tech/. Other sites currently using this technique include http://www.amazon.com and http://moodle.org.



Sites designed using ice, jello, and liquid techniques can be found throughout the Web. Ice and jello designs using a fixed-width layout provide the Web developer the most control over the page configuration but result in pages with large empty areas when viewed at higher screen resolutions.

Figure 5.31 shows the National Park Service (http://nps.gov) site viewed using 1280×1024 screen resolution. Note how more than one-third of the browser window is empty. Liquid design avoids this awkwardness and takes advantage of the entire browser window.



Figure 5.30

This page uses liquid design to adjust content to fill the browser window

Figure 5.31

At 1280×1024 resolution the right side of this page is mostly empty See the liquid-designed Census Bureau (http://www.census.gov) site using 1280×1024 screen resolution in Figure 5.32—the site still fills the browser window. Since liquid design pages are intended to stretch, it's very important to test pages using this technique at various screen resolutions.

Figure 5.32

This page stretches to fill the browser window—even at 1280×1024 resolution

Census Bureau Home Page - Mozilla F	irefox	THE REAL POINT AND A DESCRIPTION OF A DE	
e <u>E</u> dit <u>V</u> iew History Delicious <u>B</u> e	okmarks Accessibility	Icols Help	0
Scheduled Downtime			
U.S. Census I	Bureau	FAQs Subjects A to Z Help	SEARCH: GO
Americans with Disabilities Act	Census 2010	2010 Census · News · Become a Census Taker American Community Survey · Census 2000	Data Finders Population Clocks U.S. 306,554,255 World 5, 782,677,200
New on the Site	People &	Estimates · Projections · Housing · Income State Median Income · Poverty ·	19:30 GMT (EST+5) May 31, 2009
Data Tools	Households	Health Insurance · International · Genealogy · More	Population Finder
American FactFinder Jobs@Census	Business & Industry	Economic Census · Get Help with Your Form · Economic Indicators · NAICS · Survey of Business Owners · Government · E-Stats · Eoreign Trade Export Codes ·	or state Select a state
Catalog		Local Linguyment Lynamica indie	24
Are You in a Survey?	Geography	Maps · TIGER · Gazetteer · More	Find An Area Profile with QuickFacts
About the Bureau	Newsroom	Releases · Facts For Features · Minority Links · Broadcast & Photo Services ·	Select a state •
Regional Offices		Embargo/News Release Subscription · More	. ANN
Doing Business with Us Related Sites	Special Topics	Phishing & Email Scams · Census Bureau Data and Emergency Preparedness ·	Latest Economic Indicators • New Home Sales

Ice, jello, and liquid designs using CSS for page layout can be displayed on most browsers used today. Keep the preferences of your target audience in mind as you make design choices.



CHECKPOINT 5.1

- 1. List the four basic principles of design. View the home page of your school and describe how each principle is applied.
- 2. View http://www.walmart.com, http://www.mugglenet.com/, and http://www. sesamestreet.org/muppet. Describe the target audience for each site. How do their designs differ? Do the sites meet the needs of their target audiences?
- 3. View your favorite Web site (or a URL provided by your instructor). Maximize and resize the browser window. Decide whether the site uses ice, jello, or liquid design. Adjust the screen resolution on your monitor (Start, Control Panel, Display, Settings) to a different resolution than you normally use. Does the site look similar or very different? List two recommendations for improving the design of the site.

5.6 Text Design—Best Practices

Long blocks of text and long paragraphs are difficult to read on the Web. Use the text equivalent of sound bytes—short sentences and phrases. It's important to be concise. Bulleted lists stand out on the page and are easily read. Long-winded sentences and explanations are often found in academic textbooks and romance novels, but they really are not appropriate on a Web page.

You may be wondering how to know if a page is easy to read. The following are some suggestions that will help increase the readability of your pages:

• Use common fonts such as Arial, Verdana, or Times New Roman. Remember that the Web page visitor must have the font installed on his/her computer in

order for that particular font to appear. Your page may look great with Gill Sans Ultra Bold Condensed, but if your visitor doesn't have the font, the browser's default font will be displayed. Explore the list of "Web-safe" fonts at http://www.ampsoft.net/webdesign-l/WindowsMacFonts.html.

- Serif fonts, such as Times New Roman, were originally developed for printing text on paper—not for displaying text on a computer monitor. Research shows that sans serif fonts, such as Arial, are easier to read than serif fonts when displayed on a computer screen (see http://www.alexpoole.info/academic/ literaturereview.html or http://www.wilsonweb.com/wmt6/html-email-fonts.htm for details). The sans serif Verdana font, designed by Microsoft specifically for display on a computer screen, may be more readable than Arial due to the increased width and openness of the letters.
- Be careful with the size of the fonts—12 point font size is the same as "Medium" size and is the same as 1 em. Be aware that fonts display smaller on a Mac than on a PC. Even within the PC platform, the default font size displayed by browsers may not be the same. Consider creating prototype pages of your font size settings to test on a variety of browsers and screen resolution settings.
- Use appropriate color combinations. Students often choose color combinations for Web pages that they would never dream of using in their wardrobe. An easy way to choose colors that contrast well and look good together is to select colors from an image or logo you will use for your site. Make sure your page back-ground color properly contrasts with your text and hyperlink colors. Refer to Chapter 3 for additional color scheme ideas.
- Be aware of line length and alignment—use white space and multiple columns if possible. Review Figures 5.25, 5.26, and 5.27 for examples of text placement on a Web page.
- Bold (use the element) or emphasize (use the element to configure italics) important text.
- Hyperlink keywords or phrases—do not hyperlink entire sentences.
- Avoid the use of the words "click here"—users know what to do by now.

Finally, check spelling and grammar. Many Web sites every day contain misspelled words. Most Web authoring tools have built-in spell checkers; consider using this feature. Also, be sure that you proofread and test your site thoroughly. It is very helpful if you can find Web developer buddies—you check their sites and they check yours. It's always easier to see someone else's mistake than your own.

5.7 Graphic Design—Best Practices

Chapter 4 discussed the use of graphics on Web pages. This section summarizes and adds to the recommended practices discussed in that chapter.

- If you would like your site to have the most consistent display on various monitors using various computer platforms, choose from the 216 colors on the Web Color Palette.
- Use antialiased text in images. Antialiasing introduces intermediate colors to smooth jagged edges in digital images. Graphic applications such as Adobe Photoshop and Adobe Fireworks can be used to create antialiased text images. The graphic shown in Figure 5.33 was created using antialiasing.

Figure 5.33 Antialiased text

Figure 5.34

This graphic has a jagged look and was not saved using antialiasing

Figure 5.35

This is Sparky—but do you really need to see a picture of my dog in this book? Use necessary images only.



Figure 5.36

Scrolling to the bottom of this page will display simple text links, which provide accessibility

Antialiased

Figure 5.34 contains an image that did not use antialiasing; note the jagged edges.



The only letters not affected are the i and I because the edges of these letters are perfectly horizontal and vertical.

• Use only necessary images. Don't use extra images, just because you have them. Oh, by the way, isn't my dog (see Figure 5.35) cute?



- Keep both the file size and the dimensions of images as small as possible. Try to display only exactly what is needed to get your point across. Use a graphic application to crop an image or create a thumbnail image that links to a larger version of the image.
- Make sure the site is usable if images are not displayed. If a Web page visitor is using an assistive technology, such as screen reader, he or she will not see your images but will still want to navigate through your Web site. If your main navigation uses images, DHTML, Flash, or other interactive technologies, place a plain text navigation bar at the bottom of each page. The Studentjobs.gov Web site, http://www.studentjobs.gov, shown in Figure 5.36, uses this technique.



Image links are used for the main navigation in the tabs below the logo area. There are plain text links to the main site categories at the bottom of the page. These text links provide for accessibility.



It is also a good idea to include text descriptions of important concepts or key points that your site is trying to communicate. Don't rely on images alone—some individuals may not be able to see them—they may have set their browser not to display images or use an assistive technology such as a screen reader to visit your page.

- Use alternate text for images. Place the alt attribute with descriptive text on each tag. (See Chapter 4 for a discussion of the tag and use of the alt attribute.)
- Limit the use of animated items. Only use animation if it makes the page more effective. Consider limiting how long an animation plays.
- Create a text only version of the page. If there are a large number of images, or the images are integral to your content, consider creating an alternate version of the page that contains text only. Keep in mind that this means double maintenance for all future page modifications. Figure 5.37 displays both the standard and text-only versions of the National Hurricane Center page, http://www.nhc.noaa.gov.



Focus on Accessibility

• Provide a method to skip repetitive navigation links. It is easy for visitors without vision and mobility challenges to scan a Web page and quickly focus on the page content. However, long, repetitive navigation bars quickly become tedious to access when utilizing a screen reader or a keyboard to visit a Web page. Consider adding a Skip Navigation or Skip to Content hyperlink before your main navigation bar that links to a named fragment (see Chapter 7, Linking to Fragment

Figure 5.37

The standard page provides a link to the text-only version Identifiers) at the beginning of the content section of your page. The Senior Health site (see Figure 5.24) displays a "Skip Navigation" link in the upper left corner-this could be accessed by a person using a screen reader to jump directly to the page content. The Department of Transportation site, as shown in Figure 5.14, uses a transparent image link to provide this feature. Since the image is "invisible," visitors using a graphical browser are not even aware of the additional functionality.

Figure 5.38 contains comparison screenshots of the page when viewed with Internet Explorer and Firefox's Web Developer extension (available at https://addons.mozilla. org/en-US/firefox/addon/60) to display image alt attribute text instead of images. Notice the Skip Navigation alternate text displayed in the upper-right-hand cornerconvenient for visitors using screen readers or nongraphical browsers.

Figure 5.38

link

The Firefox Web Developer extension can display the text descriptions of each image



Figure 5.39 presents another way to implement this feature. Visitors using a screen reader will immediately encounter the Skip to Content link in the upper-left side of the http://stopalcoholabuse.gov Web page.



5.8 Design to Provide Accessibility



Vinton Cerf, the coinventor of TCP/IP and the former chairman of the Internet Society, proclaimed that "The Internet is for everyone" (see http://www.isoc.org/isoc/media/ speeches/foreveryone.shtml). Tim Berners-Lee, the inventor of the World Wide Web, states that "The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect" (see http://www.w3.org/WAI).

Who benefits from increased accessibility? Consider the following scenarios:

- Maria, a young woman in her twenties with physical challenges who cannot manipulate a mouse and who uses a keyboard with much effort
- Leotis, a college student who is deaf and wants to be a Web developer
- Jim, a middle-aged man who has a dial-up Internet connection and is using the Web for personal enjoyment
- Nadine, a mature woman with age-related macular degeneration who has difficulty reading small print
- Karen, a college student using a different type of user-agent, such as a cell phone, to access the Web
- Prakesh, a man in his thirties who is legally blind and needs access to the Web to do his job

All these individuals benefit from Web pages designed with accessibility in mind. A Web page that is designed to be accessible is typically more usable for all—even a person who has no physical challenges and is using a broadband connection benefits from the improved presentation and organization of a well-designed Web page.

The Internet and Web are such a pervasive part of our culture that accessibility is protected by laws in the United States. Section 508 of the Rehabilitation Act requires electronic and information technology, including Web pages, used by federal agencies to be accessible to people with disabilities.

The accessibility recommendations presented in this text are intended to satisfy the Section 508 standards and the W3C Web Accessibility Initiative guidelines See http://www.access-board.gov/sec508/guide/1194.22.htm for an informative, descriptive list of the Section 508 Standards for Web pages (Web-based intranet and Internet information and applications).

The federal government is promoting accessibility by law and the private sector is following its lead.

The W3C is also active in this cause and has created the Web Accessibility Initiative (WAI) (see http://www.w3.org/WAI/) to create guidelines and standards applicable to Web content developers, authoring tool developers, and browser developers. The most recent version of the WAI's guidelines are the Web Content Accessibility Guidelines 2.0 (WCAG 2.0). The following four principles are essential to conformance with WCAG 2.0—Perceivable, Operable, Understandable, and Robust. Use the acronym POUR to remember them.)

- **1.** Content must be Perceivable
- 2. Interface components in the content must be Operable
- 3. Content and controls must be Understandable
- Content should be Robust enough to work with current and future user agents, including assistive technologies
See http://www.w3.org/TR/WCAG20/Overview for a description of the WCAG 2.0 guidelines. These guidelines are segmented into three levels of conformance: Level A, Level AA, and Level AAA.

In addition to satisfying the Section 508 guidelines, the accessibility recommendations discussed in this textbook are also intended to fully satisfy the WCAG 2.0 Level AA (includes Level A) guidelines and partially satisfy the Level AAA guidelines. Visit http://www.w3.org/WAI/WCAG20/quickref for an interactive checklist of these guidelines. You're already well on your way to creating accessible web pages—see the list of Level AA guidelines below:

WCAG 2.0 Quick Reference List

Perceivable

- **1.1 Text Alternatives:** Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols, or simpler language. *You've already begun to satisfy this guideline by coding the alt attribute on img tags. More on this in Chapter 11.*
- **1.2 Time-based Media:** Provide alternatives for time-based media. We won't be creating time-based media in this textbook, but keep this in mind for the future—if you create animation or use client-side scripting for features such as interactive slide shows. More on this topic in Chapter 11.
- **1.3 Adaptable:** Create content that can be presented in different ways (for example, simpler layout) without losing information or structure. You've already used block elements (such as divs, headings, paragraphs, and lists) to create single-column Web pages. In future chapters you'll continue to expand your CSS skills as you create multi-column Web pages (Chapter 6, Chapter 7) AND you'll explore the use of XHTML tables (Chapter 8) to configure information. You are aware that text-only Web pages can be created if needed.
- **1.4 Distinguishable:** Make it easier for users to see and hear content including separating foreground from background. *You are aware of the importance of good contrast between text and background*.

Operable

- **2.1 Keyboard Accessible:** Make all functionality available from a keyboard. *In Chapter 7, you'll configure a skip to content link. In Chapter 9, you'll explore configuring the tabindex to help a visitor move around in a Web page form.*
- **2.2 Enough Time:** Provide users enough time to read and use content. We won't be creating time-based media in this textbook, but keep this in mind for the future—if you create animation or use client-side scripting for features such as interactive slide shows.
- **2.3 Seizures:** Do not design content in a way that is known to cause seizures. You won't learn to create animation in this textbook, but be careful when you use

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animation created by others; Web pages should not contain elements that flash more than three times in a one-second period. More on this in Chapter 11.

• **2.4 Navigable:** Provide ways to help users navigate, find content and determine where they are. You've explored many ways to configure navigation in this chapter, including the importance of providing text navigation links in the footer section of a Web page when media such as images or Flash are used for main navigation. In Chapter 7, you'll configure a Skip to Content link.

Understandable

- **3.1 Readable:** Make text content readable and understandable. You've begun to explore methods of writing for the Web in this chapter.
- **3.2 Predictable:** Make Web pages appear and operate in predictable ways. *The Web pages you create are predictable with clearly labeled and functioning hyper-links.*
- **3.3 Input Assistance:** Help users avoid and correct mistakes. *In Chapter 14, you'll explore how client-side scripting can be use to edit Web page forms and provide feedback to users.*

Robust

• **4.1 Compatible:** Maximize compatibility with current and future user agents, including assistive technologies. *You have learned to write code that follows XHTML and CSS standards; this will provide for future compatibility.*

Developing accessible Web sites is an important aspect of Web site design. Web authoring tools such as Adobe Dreamweaver provide extensions that will help you create accessible sites. WebAim has created a WCAG 2.0 checklist with helpful tips at http://webaim.org/standards/wcag/checklist. Worldspace Online (http://worldspace. deque.com) is a free Web page validator that will check your Web page for common accessibility issues. The University of Toronto (http://achecker.ca/checker/index.php) also provides a free accessibility validation service. Both online validators test one page at a time.

Finally, the Section 508 Standards require that if a Web page cannot comply with accessibility requirements, then a separate text-only version of the Web page must be provided and regularly updated. Although the text pages could be coded manually, other options exist to provide this functionality. The LIFT Text Transcoder server, available from UsableNet (http://www.usablenet.com), dynamically generates text-only, accessible pages that comply with accessibility standards. For a live example of this technology in action, compare the graphical University of Illinois home page (http://www.uiuc.edu) with the text-only version generated by UsableNet at (http://transcoder.usablenet.com/tt/ http://www.uiuc.edu).

5.9 Best Practices Checklist

Table 5.1 contains a checklist of recommended Web design practices. Use this as a guide to help you create easy to read, usable, and accessible Web pages.

Table 5.1 Web Design Best Practices Checklist

Page Layout			
	1.	Appealing to target audience	
	2.	Consistent site header/logo	
	3.	Consistent navigation area	
	4.	Informative page title that includes the company/organization/site name	
	5.	Page footer area—copyright, last update, contact e-mail address	
	6.	Good use of basic design principles: repetition, contrast, proximity, and alignment	
	7.	Displays without horizontal scrolling at 1024×768 and higher resolutions	
	8.	Balance of text/graphics/white space on page	
	9.	Good contrast between text and background	
	10.	Repetitive information (header/logo and navigation) takes up no more than one-quarter to one-third of the browser window at 1024×768 resolution	
	11.	Home page has compelling, interesting information above the fold (before scrolling down) at 1024×768 resolution	
	12.	Home page downloads within 10 seconds on dial-up connection	
Brow	vser C	ompatibility	
	1.	Displays on current versions of Internet Explorer (7+)	
	2.	Displays on current versions of Firefox (3+)	
	З.	Displays on current versions of Opera (9+)	
	4.	Displays on current versions of Safari (both Mac and Windows)	
	5.	Displays on current versions of Google Chrome	
Navig	gation		
	1.	Main navigation links are clearly and consistently labeled	
	2.	Navigation is easy to use for target audience	
	3.	If image, Flash, or DHTML is the main navigation, clear text links are in the footer section of the page (accessibility)	
	4.	Navigational aids, such as site map, skip to content link, or breadcrumbs, are used	
	5.	All navigation hyperlinks work	
Colo	r and	Graphics	
	1.	Use of different colors in page backgrounds/text is limited to a maximum of three or four	
	2.	Color is used consistently	
	3.	Color has good contrast with associated text	
	4.	Color is not used alone to convey meaning (accessibility)	
	5.	Use of color and graphics enhances rather than distracts from the site	
	6.	Graphics are optimized and do not slow download significantly	
	7.	Each graphic used serves a clear purpose	
	8.	Image tags use the alt attribute to configure alternate text to display if the browser or user agent does not support images (accessibility)	
	9.	Animated images do not distract from the site and either do not repeat or only repeat a few times	

Multi	media	(See Chapter 11)
	1.	Each audio/video/Flash file used serves a clear purpose
	2.	The audio/video/Flash files used enhance rather than distract from the site
	З.	Captions are provided for each audio or video file used (accessibility)
	4.	Download times for audio or video files are indicated
	5.	Links to downloads for media plug-ins are provided
Cont	ent Pr	esentation
	1.	Common fonts such as Arial or Times New Roman are used
	2.	Techniques of writing for the Web are used: headings, bullet points, short sentences in short para- graphs, use of white space, and so on
	З.	Fonts, font sizes, and font colors are consistently used
	4.	Content provides meaningful, useful, information
	5.	Content is organized in a consistent manner
	6.	Information is easy to find (minimal clicks)
	7.	Timeliness: The date of the last revision and/or copyright date is accurate
	8.	Content does not include outdated material
	9.	Content is free of typographical and grammatical errors
	10.	Content provides links to other useful sites
	11.	Avoids the use of "Click here" when writing text for hyperlinks
	12.	If standard link colors are not used, all links use a consistent set of colors to indicate visited/nonvisited status
	13.	If graphics and/or media is used to convey meaning, the alternate text equivalent of the content is provided (accessibility)
Func	tionali	ity
	1.	All internal hyperlinks work
	2.	All external hyperlinks work
	З.	All forms function as expected
	4.	No JavaScript (see Chapters 11 and 14) errors are generated by the pages
Acce	ssibili	ty
	1.	If image, Flash, or DHTML is the main navigation, clear text links are in the footer section of the page
	2.	Color is not used alone to convey meaning
	З.	Image tags use the alt attribute to configure alternate text replacement
	4.	Captions are provided for each audio or video file used
	5.	Use attributes designed to improve accessibility such as alt, longdesc, title, and summary where appropriate
	6.	If the site uses frames, use frame titles and place meaningful content in the noframes area
	7.	To assist screen readers, the html element's lang and xml:lang attributes indicate the spoken language of the page.

 Table 5.1
 Web Design Best Practices Checklist (continued)

Note: Web Design Best Practices Checklist is copyrighted by http://terrymorris.net. Used by permission.



CHECKPOINT 5.2

- 1. View the home page of your school. Use the Best Practices Checklist (Table 5.1) to evaluate the page. Describe the results.
- 2. List three best practices of writing text for the Web. The following text was found on a real Web site. The company name and city have been changed. Use the hints in the text design best practices described earlier in the chapter to rewrite the following content for the Web:

"Acme, Inc. is a new laboratory instrument repair and service company. Our staff at this time has a combined total of 30 plus years of specimen preparation instrumentation service and repair.

Our technicians are EPA refrigeration certified. We are fully insured and all of our workers are fully covered by workman's compensation insurance. A proof of insurance certificate can be provided upon request.

We are located in Chicago, Illinois. Which houses shop repair facilities and offices. Acme, Inc. technicians are factory trained and equipped with the best diagnostic and repair equipment available.

We keep a separate file on every piece of equipment we work on. When a technician is sent on a repair, he has a file which lists the whole repair history on that piece of equipment. These files also help us answer any of your questions about past repairs.

Our rates are \$100.00 per hour for Labor and Travel with a 2 hour minimum. \$0.40 per mile and all related expenses PARTS are not included."

3. List three best practices of using graphics on Web pages. View the home page of your school. Describe the use of graphic design best practices on this page.



CHAPTER SUMMARY

This chapter introduced recommended Web site design practices. The choices you make in the use of color, graphics, and text should be based on your particular target audience. Developing an accessible Web site should be the goal of every Web developer.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

above the fold alignment antialiased text breadcrumb trails chunking contrast hierarchical organization horizontal scrolling ice design jello design linear organization liquid design load time navigation bar page layout perceived load time proximity random organization repetition screen resolution site map site search storyboard table of contents target audience WAI (Web Accessibility Initiative) WCAG 2.0 (Web Content Accessibility Guidelines 2.0) white space wireframe

Review Questions

Multiple Choice

- **1.** Which of the following would a consistent Web site design *not* have?
 - a. a similar navigation area on each content page
 - b. the same fonts on each content page
 - c. a different background color on each page
 - d. the same logo in the same location on each content page
- **2.** Which of the following are the three most common methods of organizing Web sites?
 - a. horizontal, vertical, and diagonal
 - b. hierarchical, linear, and random
 - c. accessible, readable, maintainable
 - d. none of the above
- **3.** Which of the following is not a Web design recommended practice?
 - a. design your site to be easy to navigate
 - b. colorful pages appeal to everyone
 - c. design your pages to load quickly
 - d. limit the use of animated items

- **4.** Which are the four principles of the Web Content Accessibility Guidelines?
 - a. contrast, repetition, alignment, proximity
 - b. perceivable, operable, understandable, robust
 - c. accessible, readable, maintainable, reliable
 - d. hierarchical, linear, random, sequential
- **5.** Which of the following is a sketch or blueprint of a Web page that shows the structure (but not the detailed design) of basic page elements?
 - a. drawing
 - b. HTML code
 - c. site map
 - d. wireframe
- **6.** Which of the following are influenced by the intended or target audience of a site?
 - a. the amount of color used on the site
 - b. the font size and styles used on the site
 - c. the overall look and feel for the site
 - d. all of the above

- **7.** Which of the following recommended design practices apply to a Web site that uses images for its main site navigation?
 - a. provide alternative text for the images
 - b. place text links at the bottom of the page
 - c. both a and b
 - d. no special considerations are needed
- 8. Which of the following is known as white space?
 - a. the empty screen area around blocks of text and images
 - b. the background color of white used for a page
 - c. both a and b
 - d. none of the above
- 9. Which of the following should you do when creating text hyperlinks?
 - a. create the entire sentence as a hyperlink
 - b. include the words "click here" in your text
 - c. use a key phrase as a hyperlink
 - d. none of the above

- **10.** Which of the following is the design technique used to create pages that stretch to fill the browser window?
 - a. ice
 - b. liquid
 - c. iello
 - d. none of the above

Fill in the Blank

- **11.** The most common Web site structure used for commercial Web sites is _____ Web site organization.
- **12.** Animation should be used only if it to your Web site.
- **13.** All browsers and browser versions display Web pages in exactly the same way.
- _____ is a group whose mission is to **14.** The create guidelines and standards for Web accessibility.

Short Answer

15. Describe one of the four principles of WCAG 2.0.

Hands-On Exercises

- **1.** Web Design Evaluation. In Chapter 5 you've explored Web page design, including navigation design techniques and the design principles of contrast, repetition, alignment, and proximity. In this Hands-On Exercise, you'll review and evaluate screenshots of Web pages.
 - a. Review Figure 5.40 and complete the following information.



The Atmospheric

Radiation Measurement (ARM) Program Web site at http://www.arm.gov

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Indicate the type(s) of navigation evident.

Describe how the design principles of contrast, repetition, alignment, and proximity are applied. Be specific.

b. Review Figure 5.41 and complete the following information.

Figure 5.41

SmokeFree.gov's site for women at http://women.smokefree.gov





Indicate the type(s) of navigation evident.

Describe how the design principles of contrast, repetition, alignment, and proximity are applied. Be specific.

c. Review Figure 5.42 and complete the information below.

Figure 5.42

Telework.gov at http://www.telework.gov



Indicate the type(s) of navigation evident.

Describe how the design principles of contrast, repetition, alignment, and proximity are applied. Be specific.

- 2. Practice creating site maps for the following situations. You may either draw your site map using a pencil and a ruler or use software such as Microsoft Visio, Microsoft Word, or Microsoft PowerPoint.
 - a. Doug Kowalski is a freelance photographer specializing in nature photography. He often gets work on contract, shooting photos for textbooks and journals. Doug would like a Web site that showcases his talents and that provides publishers with an easy way to contact him. He would like a home page, a few pages with samples of his nature photographs, and a contact page. Create a site map based on this scenario.
 - b. Mary Ruarez owns a business, named Just Throw Me, that handcrafts specialty pillows. She currently sells at craft fairs and local gift shops but would like to expand her business to the Web. She would like a Web site with a home page, a page that describes her products, a page for each of her seven pillow styles, and an order page. She has been advised that since she is collecting information from individuals, a page describing her privacy policy would be a good idea. Create a site map based on this scenario.

- c. Prakesh Khan owns a dog-grooming business named A Dog's Life. He would like a Web site that includes a home page, a page about grooming services, a page with a map to his shop, a contact page, and a section that explains how to select a good pet. The content for the part of the Web site on selecting a pet will be a step-by-step presentation. Create a site map based on this scenario.
- **3.** Practice creating wireframe page layouts with the following situations. Use the style for page layout composition shown in Figures 5.25, 5.26, and 5.27, where places for logo, navigation, text, and images are indicated. Do not worry about exact wording or exact images. If you prefer, use an application such as PowerPoint to create the wireframes, otherwise use a pencil, ruler, and paper to draw the diagrams.
 - a. Create sample page layout wireframes for Doug Kowalski's photography business, described in 2(a). Create one page layout wireframe for the home page. Create another page layout diagram for the content pages.
 - b. Create sample page layout wireframes for the Just Throw Me Web site described in 2(b). Create one page layout wireframe for the home page. Create another page layout wireframe for the content pages.
 - c. Create sample page layout wireframes for the A Dog's Life Web site described in 2(c). Create one page layout wireframe for the home page and the regular content pages. Create another page layout wireframe for the presentation pages.
- **4.** Choose two sites that are similar in nature or have a similar target audience such as the following:
 - http://amazon.com and http://bn.com
 - http://kohls.com and http://jcpenney.com
 - http://cnn.com and http://msnbc.com

Describe how the two sites you chose to review exhibit the design principles of repetition, contrast, alignment, and proximity.

- **5.** Choose two sites that are similar in nature or have a similar target audience such as the following:
 - http://www.crateandbarrel.com and http://www.potterybarn.com
 - http://www.harpercollege.edu and http://www.clcillinois.edu
 - http://chicagobears.com and http://greenbaypackers.com

Describe how the two sites you chose to review exhibit Web design best practices. How would you improve these sites? Recommend three improvements for each site.

- 6. Think about the following scenarios and how you would design a home page using the ice design technique. Describe the advantages this technique provides for the Web developer. Describe the advantages this technique provides for the Web site visitor. Create a wireframe page layout for the home page.
 - a. See 2(a) for the description of Doug Kowalski's photography business.
 - b. See 2(b) for the description of Just Throw Me.
 - c. See 2(c) for the description of A Dog's Life.
- **7.** Think about the following scenarios and how you would design a home page using the jello design technique. Describe the advantages this technique provides for the

Web developer. Describe the advantages this technique provides for the Web site visitor. Create a wireframe page layout for the home page.

- a. See 2(a) for the description of Doug Kowalski's photography business.
- b. See 2(b) for the description of Just Throw Me.
- c. See 2(c) for the description of A Dog's Life.
- 8. Think about the scenarios described below and how you would design a home page using the liquid design technique. Describe the advantages this technique provides for the Web developer. Describe the advantages this technique provides for the Web site visitor. Create a wireframe page layout for the home page.
 - a. See 2(a) for the description of Doug Kowalski's photography business.
 - b. See 2(b) for the description of Just Throw Me.
 - c. See 2(c) for the description of A Dog's Life.

Web Research

This chapter offered suggestions for organizing text on Web pages. In this research exercise, take this topic a step further and investigate writing for the Web. A few resources are listed here:

- http://www.useit.com/papers/webwriting
- http://www.efuse.com/Design/web_writing_basics.html. Explore the article "Writing for the Web."
- http://www.webreference.com/content/writing. If you cannot find that page, visit webreference.com and search for "writing for the Web."
- http://www.webwritingthatworks.com
- http://www.alistapart.com/articles/writeliving

If these resources are no longer available, search the Web for information on "writing for the Web." Read one or more articles. Select five techniques that you would like to share with others. Write a one-page summary of your findings. Include the URLs of your resources.

Focus on Web Design

- This chapter discusses recommended Web design practices. Sometimes it is helpful to learn about good design by examining poor design. Visit http://www.webpagesthatsuck .com and read about their examples of poor design. Try to think of Web sites that you have visited on the Web. Do any of them have similar qualities? Find two Web sites that use poor Web design practices. Write a one-page report that includes an introduction about the design practices not followed at the Web sites, a link to each site, and a description of how each site has practiced poor Web site design.
- **2.** Visit any of the Web sites referenced in this chapter that interested you. Print the home page or one other pertinent page from the site. Write a one-page summary and reaction to the Web site you chose to visit. Address the following topics:
 - What is the purpose of the site?
 - Who is the intended audience?
 - Do you think the site reaches the intended audience?
 - List three examples of how this Web site uses recommended Web design guidelines.
 - How could this site be improved?

WEB SITE CASE STUDY: Web Design Best Practices

Each of the following case studies continues throughout most of the text. This chapter asks you to analyze the design of the Web sites.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House case. Figure 2.26 shows a site map for the JavaJam Web site. Three pages for this site were created in earlier chapters. In this case study you will review the site for recommended Web site design practices.

Hands-On Practice Case

- 1. Examine the site map in Figure 2.26. What type of site organization is used for the JavaJam Web site? Is it the most appropriate organization for the site? Why or why not?
- 2. Review the recommended Web page design practices from this chapter. Use the Web Design Best Practices Checklist (Table 5.1) to evaluate the JavaJam site that you created in earlier chapters. Cite three design practices that have been well implemented. Cite three design practices that could be implemented in a better way. How else would you improve the Web site?

Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case. Figure 2.30 shows a site map for the Fish Creek Web site. Three pages for the site were created in earlier chapters. In this case study you will review the site for recommended Web site design practices.

Hands-On Practice Case

- 1. Examine the site map in Figure 2.30. What type of site organization is used for the Fish Creek Web site? Is it the most appropriate organization for the site? Why or why not?
- 2. Review the recommended Web page design practices from this chapter. Use the Web Design Best Practices Checklist (Table 5.1) to evaluate the Fish Creek site that you created in earlier chapters. Cite three design practices that have been well implemented. Cite three design practices that could be implemented in a better way. How else would you improve the Web site?

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case. Figure 2.34 shows a site map for the Pasha the Painter Web site. Three pages for the site were created in earlier chapters. During this case study you will review the site for recommended Web site design practices.

Hands-On Practice Case

- 1. Examine the site map in Figure 2.34. What type of site organization is used for the Pasha the Painter Web site? Is it the most appropriate organization for the site? Why or why not?
- 2. Review the recommended Web page design practices from this chapter. Use the Web Design Best Practices Checklist (Table 5.1) to evaluate the Pasha the Painter site that you created in earlier chapters. Cite three design practices that have been well implemented. Cite three design practices that could be implemented in a better way. How else would you improve the Web site?

Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case. Figure 2.38 shows a site map for the Prime Properties Web site. Three pages for the site were created in earlier chapters. During this case study you will review the site for recommended Web site design practices.

Hands-On Practice Case

- 1. Examine the site map in Figure 2.38. What type of site organization is used for the Prime Properties Web site? Is it the most appropriate organization for the site? Why or why not?
- 2. Review the recommended Web page design practices from this chapter. Use the Web Design Best Practices Checklist (Table 5.1) to evaluate the Prime Properties site you created in earlier chapters. Cite three design practices that have been well implemented. Cite three design practices that could be implemented in a better way. How else would you improve the site?

Web Project

The purpose of this Web Project Case Study is to design a Web site using recommended design practices. Your Web site might be about a favorite hobby or subject, your family, a church or club you belong to, a company that a friend owns, the company you work for, and so on. Your Web site will contain a home page and at least six (but no more than ten) content pages. In the Chapter 5 Web Project Case Study you will complete the following documents: Topic Approval, Site Map, and Page Layout Design. You will not develop Web pages as part of the Chapter 5 Web Project Case Study—you will complete that task in later chapters.

Hands-On Practice Case

- **1. Web Project Topic Approval.** The topic of your Web site must be approved by your instructor. Complete the following:
 - What is the purpose of the site?
 - List the reason you are creating the site.
 - What do you want the site to accomplish?
 - List the goals you have for the site.

Describe what needs to happen for you to consider your site a success.

• Who is your target audience?

Describe your target audience by age, gender, socio-economic characteristics, and so on.

- What opportunity or issue is your site addressing? *Note*: Your site might be addressing the opportunity of providing information about a topic to others, creating an initial Web presence for a company, and so on.
- What type of content might be included in your site? Describe the type of text, graphics, and media you will need for the site.
- List at least two related or similar sites found on the Web. Hand in this document to your instructor for approval of your Web project
 - Hand in this document to your instructor for approval of your Web project topic.
- **2.** Web Project Site Map. Use the drawing features of a word processing program, a graphic application, or paper and pencil to create a site map of your Web site that shows the hierarchy of pages and relationships between pages. Hand in this document to your instructor.
- **3.** Web Project Page Layout Design. Use the drawing features of a word processing program, a graphic application, or paper and pencil to create wireframe page layouts for the home page and content pages of your site. Unless otherwise directed by your instructor, use the style for page layout composition shown in Figures 5.25, 5.26, and 5.27. Indicate where the logo, navigation, text, and images will be located. Do not worry about exact wording or exact images. Hand in these documents to your instructor.

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Page Layout with CSS

Chapter Objectives In this chapter, you will learn how to ...

- Describe reasons to use CSS for page layout
- Use relative and absolute positioning
- Apply the CSS Box Model

- Configure basic page layouts using CSS
- Configure two-column page layouts using CSS
- Locate CSS page layout resources

Now that you are familiar with using CSS to format

text and color, you are ready to explore using CSS to configure Web page layout. This method relies on CSS properties rather than XHTML tables to design a Web page. The technology for this layout is often called CSS-P, for CSS positioning. This chapter introduces you to configuring page layouts using CSS.

6.1 CSS Page Layout Overview

You've been using CSS to configure presentation (fonts, colors, and so on) of the structural XHTML elements including headings, paragraphs, divs, and lists. You may have noticed that using CSS results in smaller Web page documents (html files), which saves on bandwidth and eases site maintenance. You will soon see that using CSS to configure page layout enhances these advantages.

First, here is a little background about CSS and some acronyms you should be familiar with. As you already know, the W3C produced a recommendation for CSS (http://www.w3.org/TR/REC-CSS1-961217.html), now called CSS Level 1 (CSS1), in 1996. They continued their work and produced a recommendation for CSS Level 2 or CSS2, (http://www.w3.org/TR/1998/REC-CSS2-19980512/) in 1998. CSS2 built on CSS1 and introduced new properties needed for positioning—known as CSS-P. CSS3 is currently under development (http://www.w3.org/Style/CSS/current-work).

Even though CSS2 was introduced in the last millennium, commercial Web sites have only recently begun to utilize its features. You may wonder why it has taken so long. The reason is lack of browser support of the W3C recommendations. Only very recently have the most current versions of commonly used browsers begun to support these recommendations reliably and consistently. Even so, you will encounter differences in rendering when displaying pages coded using CSS-P page layout techniques in various browsers. Keep in mind that not all Web page visitors will be using the most current browser version. There are a number of ways to handle this issue—including coding alternate pages or allowing the browser display to degrade gracefully. Visitors using an older browser will see a usable, but not highly formatted Web page. Let's take a look at an example of a Web site that uses CSS to configure page layout.

Figure 6.1 shows the DisabilityInfo.gov (http://www.disabilityinfo.gov) home page rendered by Firefox. The Web site uses CSS for page layout to configure a page with multiple columns.



A visitor using an outdated, older browser such as Netscape 4.7 experiences a plain vanilla version of the site, as shown in Figure 6.2. The content is displayed in the order

Figure 6.1

The DisabilityInfo.gov home page displayed in Firefox, a modern browser





it is coded in the Web page. Because the site configures most of its graphics as background images within the external CSS style sheet, these graphics are unavailable to the older browser. The visitor experience is not exactly compelling when using an out-ofdate browser. However, the site can still be navigated and information can be obtained.

Figure 6.3 shows the same page displayed using the Firefox LynxView extension to simulate a text browser. The text content is displayed in the order it is coded in the Web page. Notice how even with the newer CSS page layout techniques utilized, the page is usable when rendered in a text browser.

Figure 6.3

A text browser simulation of DisabilityInfo.gov's home page

٢	
	^
<pre>#[1]DisabilityInfo.gov Site Updates</pre>	
Links to items on this page	E
* [2]Skip to Page Content	
DisabilityInfo.gov Online Resource for People with Disabilities	
Links to items in this site	
* [3]About Us	
* [4] Partners	
* [5]Link to Us	
* [6]Press Room	
* [7]Site Map	
DisabilityInfo.gov Menu	
* [8]Employment	
* [9]Education	
* [10]Housing	
* [11] Transportation	
* [12]Health	
* [13]Benefits	
* [14] Technology	
* [15]Community Life	
* [16]Civil Rights	
Welcome to DisabilityInfo.gov.	-
· · · · · · · · · · · · · · · · · · ·	-
	,

Web developers have long delayed using CSS for page layout because of these rendering issues. What has recently changed? As modern browser support of CSS has increased, the number of Web visitors who use older browsers has decreased. For a typical Web site, less than 1 percent of visitors use these older browsers. Depending on your site's target audience, this figure could be higher or lower—your Web logs (see Chapter 13) will provide this information. For example, TruGreen (http://trugreen.com) and wired (http://wired.com) are two organizations of many that use CSS for page layout. Although some existing Web sites use XHTML tables (see Chapter 8) to configure page layout, most Web sites developed today use CSS for this purpose.

Advantages of Using CSS for Page Layout

When CSS is used to configure page layout in addition to formatting text and color, the following advantages of using CSS for formatting are enhanced:

- **Greater Typography Control.** This includes font size, line spacing, letter spacing, indents, margins, and element positioning without using the XHTML table element (discussed in Chapter 8).
- **Style Is Separate from Structure.** The formatting and page layout can be configured and stored separately from the body section of the Web page document. When the styles are modified, the XHTML remains intact. This means that if your client decides to change something as small as the background color or as potentially huge as the page layout, you may only need to change one file that contains the styles, instead of each Web page document. For a look at how very powerful this can be, visit http://www.csszengarden.com and be amazed at how different pages with the same content and XHTML code (but different CSS) can look!
- **Potentially Smaller Documents.** Since both the formatting and page layout are separate from the document, the actual .html documents should be smaller.
- Easier Site Maintenance. Again, if the styles or page layout need to be changed it may be possible to complete the modifications by changing a single file only—the style sheet.
- **Increased Page Layout Control.** CSS used in conjunction with modern standardscompliant browsers provides a variety of positioning options (even down to the pixel) along with an ability to overlap elements. This gives the Web developer more control over the layout compared to the use of the previously popular XHTML tables.
- Increased Accessibility. Pages designed using XHTML tables for layout are easy to view with a traditional browser but can be very tedious when using a screen reader or other assistive technology. By reserving the use of XHTML tables for organizing tabular information and using CSS for page layout—the pages become more accessible.
- Ability to Define Styles for Multiple Media Types. Since presentation is separated from content, CSS can be used to set a separate style for printing, or possible use of a screen reader.
- **Support of the Semantic Web.** The Semantic Web is Tim Berners-Lee's vision of the future of the Internet (http://www.w3.org/2001/sw/). According to Berners-Lee, "The Semantic Web is an extension of the current Web in which information is given well-defined meaning, better enabling computers and people to work in cooperation." While much development is being done in this area, Web developers can take small steps, including using XHTML syntax and using CSS to separate styles from structure.

Disadvantages of Using CSS for Page Layout

If you review the screenshots of a site that uses CSS for page layout (Figures 6.1 and 6.2) you'll see a very obvious disadvantage. Visitors using older browsers will not experience your Web site in the same way as visitors using modern browsers. If you are using tables for page layout, this is not an issue. Why then are developers beginning to code mainstream Web sites using CSS for page layout? With good support of CSS by modern browsers and the increasing use of modern browsers, the advantages of using CSS to configure page layout usually outweigh the disadvantages. Of course, the target audience of a Web site should be a deciding factor. For example, if your target audience for an intranet site is a company that for some reason has standardized on Netscape 4.7 for the desktop, none of the advantages would be realized and it would be better to design the site using tables for page layout. You'll also learn about a CSS page layout technique in Chapter 8 that uses the CSS display property to configure a table-like layout, but versions of Internet Explorer earlier than Internet Explorer 8 do not support this technique. The projected (and eventually actual) target audience should be considered when deciding on a page layout technique.

Even with the increased CSS support of modern browsers, there are still differences and bugs in their implementation of the W3C Recommendations. This is a disadvantage for Web developers, since coding and testing time is increased. Leading developers have created Web sites that document and discuss these issues (see http://www.quirksmode.org and http://www.positioniseverything.net). The CSS techniques in this chapter have been tested with Internet Explorer 8, Opera 9.64, Firefox 3, Google Chrome 2.0, Safari for Windows 3.2.3, and Safari for Mac 3.2.1.

Another potential disadvantage is the fact that experienced Web developers who are adept at coding pages using XHTML tables for layout will see productivity drop temporarily as they learn about CSS techniques and properties. Using CSS positioning is different from configuring pages with XHTML tables. Time and practice are needed when learning something new.

At this point you've seen some examples of using CSS for page layout and are aware of the issues related to using this technology. The next section discusses the CSS Box Model—a crucial building block of CSS positioning.



Should XHTML tables never be used?

Many commercial Web sites still use XHTML tables for page layout. This is for a very good reason—tables are widely supported by browsers. As a Web developer you will most likely work on sites that use XHTML layout tables and you'll work with these in Chapter 8. However, a growing trend is to configure pages using CSS (sometimes called table-less layout). This does not mean that tables are bad, ineffective, or that they are never coded on Web sites that use CSS for page layout. Even Web sites with so-called "table-less" layouts may include tables to present information in a tabular manner or facilitate design of a small portion of the page.

6.2 The Box Model

Each element in a document is considered to be a rectangular box. As shown in Figure 6.4, this box consists of a content area surrounded by padding, a border, and margins. This is known as the Box Model.



- The **content** area can consist of a combination of text and Web page elements such as images, paragraphs, headings, lists, and so on. The **visible width** of the element on a Web page is the total of the content width, the padding width, and the border width.
- The **padding** area is between the content and the border. The default padding value is zero. When configuring the background of an element, the background is applied to both the padding and the content areas.
- The **border** area is between the padding and the margin. The default border has a value of 0 and does not display. You have already worked with borders in Hands-On Practice 4.2. As shown in Figure 4.2, this area can be set to various styles.
- The margin determines the empty space between the element and any adjacent elements. The margin is always transparent. The solid line in Figure 6.4 that contains the margin area does not display on a Web page. Keep in mind that browsers often have default margin values set for the Web page document and for certain elements such as paragraphs, headings, forms, and so on. Use the margin property to override the default browser values.

Figures 6.5 and 6.6 display <div> elements containing text content. Let's take a closer look. Figure 6.5 shows a screenshot of two <div> elements placed one after another on a Web page. In Figure 6.6 the boxes are nested inside each other. In both cases, the browser used **normal flow** (the default) and displayed the elements in the order that

Figure 6.5 Two <div> elements displaying the box model</div>	This is the first box.	Figure 6.6 Nested elements showing the box model	This is the outer box. This is the inner box.
	This is the second box.		

they appeared in the source code. As you've worked through the exercises in the previous chapters, you created Web pages that the browser rendered using normal flow. You'll practice this a bit more in the next Hands-On Practice, then later in the chapter you'll experiment with positioning to configure the flow, or placement, of elements on a Web page.



You will explore the box model in this Hands-On Practice as you create the Web pages shown in Figure 6.5 and Figure 6.6.

Practice with Normal Flow

Launch a text editor and open the Chapter6/starter1.html file from the student files. Save the file with the name box1.html. This page is displayed in Figure 6.5. Edit the body of the Web page and add the following code to configure two <div> elements:

```
<div class="div1">
This is the first box.
</div>
<div class="div2">
This is the second box.
</div>
```

Now let's add the CSS to configure the "boxes." Add a new style rule for a class named div1 to configure a light blue background, dashed border, width of 200, height of 200, and 5 pixels of padding. The code follows:

```
.div1 { width: 200px;
    height: 200px;
    background-color: #D1ECFF;
    border: dashed;
    padding: 5px;
```

}

Create a style rule for a class named div2 to configure a width and height of 100, white background color, ridged border, 10 pixel margin, and 5 pixels of padding. The code follows:

```
.div2 { width: 100px;
    height: 100px;
    background-color: #ffffff;
    border: ridge;
    padding: 5px;
    margin: 10px;
}
```

Save the file. Launch a browser and test your page. It should look similar to the one shown in Figure 6.5. The student files contain a sample solution at chapter6/box1.html.

Practice with Normal Flow and Nested Elements

Launch a text editor and open the box1.html file from the student files. Save the file with the name box2.html. This page is displayed in Figure 6.6.

Edit the code. You will not modify the CSS but you will edit the XHTML. Delete the content from the body section of the Web page. Add the following code to configure two <div> elements—one nested inside the other.

```
<div class="div1">
This is the outer box.
   <div class="div2">
This is the inner box.
   </div>
</div><//div>
```

Save the file. Launch a browser and test your page. It should look similar to the one shown in Figure 6.6. Notice how the browser renders the nested <div> elements—this is an example of normal flow. The student files contain a sample solution at Chapter6/box2.html.

The examples in the Hands-On Practice happened to use two <divs>. However, the box model applies to XHTML elements in general—not just to <divs>. You will get more practice using the box model in this chapter. Notice that since the CSS did not use any configurations for positioning, normal flow was used and the second box is nested within the first box because it is coded inside the first <div> in the XHTML. Next, we will take a look at some properties that affect positioning: position, float, display, and z-index.

6.3 CSS Positioning Properties

You've seen how normal flow causes the browser to render the elements in the order that they appear in the XHTML source code. When using CSS for page layout there are times where you will want to specify the location of an element on the page—either the absolute pixel location, the location relative to where the element would normally display, or floating on the page. There are even times when you will want to modify the way an element displays or cause an element to appear partially or completely over another element. The CSS properties used to accomplish these tasks are discussed next.

Relative and Absolute Positioning

Use relative positioning to change the location of an element slightly, relative to where it would otherwise appear in normal flow. Use the position:relative property along with either a left, right, and/or top property. The left property configures the position of the element in relation to the left side of the containing element. The **right property** sets the position of the element in relation to the right side of the containing element. The **top property** indicates the position of the element in relation to the top of the document area in the containing element. The **bottom property** configures the position of the element in relation to the source of the property configures the position of the element in relation to the bottom property configures the position of the element in relation to the bottom of the containing element.

Figure 6.7 shows a Web page (see the student files, Chapter6/relative.html) that uses relative positioning and the left property to configure the placement of a <div> (assigned to the id mycontent) to the left of the normal flow. In this case, the containing element is the body of the Web page.

Figure 6.7

The paragraph is configured using relative positioning



The result is that the content of the <div>—the paragraph—is rendered 30 pixels in from the left where it would normally be placed at the browser's left margin. W3C Recommendations call for positioning to be applied to any element and Internet Explorer follows this recommendation. However, cross-browser support of positioning is more reliable when the <div> element is used for positioning. Notice also how the padding and background-color properties configure the heading element. The CSS follows:

```
<div id="myContent">
   This paragraph uses CSS relative positioning to be placed 30
pixels in on the left side.
</div>
```

Use absolute positioning to specify the location of an element precisely in a browser window. The position:absolute property along with either a left, right, and/or top property is needed to configure the placement.

Figure 6.8 shows a screenshot of a Web page that uses absolute positioning to configure a <div> (see the student files, Chapter6/absolute.html).

The <div> is assigned to the content id which is positioned 200 pixels in from the left margin and 100 pixels down from the top of the browser window. The result is that the paragraph contained within the <div> is rendered 200 pixels in from the left side and 100 pixels down from the top of the document area in the browser window. The width

Figure 6.8

The paragraph is configured using absolute positioning



of the <div> is set to 300 pixels. Again, padding and background-color are used to configure the heading element. The CSS follows:

The XHTML source code follows:

```
<hl>Absolute Positioning</hl>
</div id="content">
</div id="content">

This paragraph is contained in a div which uses CSS absolute
positioning to be placed 200 pixels in from the left and 100 pixels
down from the top of the browser window. A width of 300 pixels is
also configured.
<//div>
```

When working with absolute positioning it is important to be aware that elements not absolutely positioned will be rendered following normal flow by the browser. Elements that are absolutely positioned are rendered outside of normal flow. You'll explore this behavior in the next Hands-On Practice.

HANDS-ON PRACTICE 6.2

Figure 6.9 shows screenshots of two Web pages with similar XHTML content. The Web page in the upper screenshot does not have any CSS applied. The Web page in the lower screenshot uses CSS to configure text, color, and the absolute position of a paragraph element. Launch a text editor and open the Chapter6/starter2.html found in the student files. When a browser renders the page it will use normal flow and display the XHTML elements in the same order as they are coded: <h1>, <div>, , and <u1>. Launch a browser and display the page to verify.



Let's add the CSS to make this page more "stylish" and look like the lower screenshot in Figure 6.9. Save the file with the name trillium.html. With trillium.html open in a text editor, modify the code as follows:

1. This page uses embedded styles. Code opening and closing <style> tags in the header section.

```
<style type="text/css">
</style>
```

2. Create style rules for the h1 selector. Configure a background color (#B0C4DE), text color (#000080), a 3 pixel solid bottom border in the color #000080, and 5 pixels of padding on the bottom and left sides.

```
h1 { border-bottom: 3px solid #000080;
    color: #000080;
    background-color: #B0C4DE;
    padding: 0 0 5px 5px;
}
```

Note: The padding can be set for each side individually using the padding-top, padding-right, padding-bottom, and padding-left properties. You can use shorthand notation to set all four values in one padding property. The order of the numeric values determines which box side is configured (top, right, bottom, left).

3. Create style rules for a class named content. Configure the position to be absolute, 200 pixels from the left, 75 pixels from the top, a width of 300 pixels, and Arial or sans serif font typeface.

```
.content { position: absolute;
    left: 200px;
    top: 75px;
    font-family: Arial,sans-serif;
    width: 300px;
```

- }
- 4. Assign the paragraph to the content class. Add class="content" to the opening paragraph tag in the body of the Web page.

Save the file. Launch a browser and test your page. It should look similar to the lower Web page shown in Figure 6.9. The student files contain a sample solution at Chapter6/trillium.html. Note that even though the unordered list is coded in the page after the paragraph, it's displayed immediately after the heading. This is because the paragraph is absolutely positioned (position: absolute). Browsers render absolutely positioned elements *outside* of normal flow.

Note: This Hands-On Practice used embedded CSS for ease of editing. However, for an actual Web site with more than one page the most efficient solution is to use an external CSS file. See Chapter 3 if you'd like to review using external style sheets. You'll use external style sheets later in this chapter.



What's a good name for a class or id and how do I decide which to use?

That's actually two questions, but here goes... A class or id name should be descriptive of the purpose (such as nav, news, footer, and so on) rather than being descriptive of the presentation (such as redText). According to Google's Web Authoring Statistics Study, http://code.google.com/webstats, the 10 most commonly used class names are footer, menu, title, small, text, content, header, nav, copyright, and button.

If the style can be used on more than one element on a page, configure the style as a class. Use the . (dot) notation in the style sheet. Use the class attribute in the XHTML.

If the style is specific to only one element or if the element will be manipulated using DHTML (see Chapter 11), configure the style as an id. Use the # notation in the style sheet. Use the id attribute in the XHTML.

The float Property

Elements that seem to float on the right or left side of either the browser window or another element are often configured using the **float property**. The browser renders these elements using normal flow, and then shifts them as far as possible within their container (usually either the browser window or a <div>) to either the right or left. Use CSS to specify a width for a floated element unless the element already has an implicit width—such as an img element. Other content will flow around the float. Only block-level elements (such as divs, paragraphs, and images) can be configured to float. When floating an image, the margin property is useful to configure empty space between the image and text on the page.

Figure 6.10 shows a Web page (see the student files, Chapter6/float.html) with an image that has been configured with float:right.



View Figure 6.10 and notice how the image stays on the right side of the browser viewport. An id called yls was created that applies the float, margin, and border properties. The attribute id="yls" was placed on the image tag. The CSS follows:

```
h1 { background-color: #A8C682;
    padding: 5px;
    color: #000000;
}
p { font-family:Arial,sans-serif;
}
#yls { float: right;
    margin: 0 0 5px 5px;
    border: solid;
}
```

The XHTML source code follows:

```
<hl>Wildflowers</hl>
<img id="yls" src="yls.jpg" alt="Yellow Lady Slipper" height="100" width="100" />
The heading and paragraph follow normal flow. The Yellow Lady Slipper pictured on the right is a wildflower. It grows in wooded areas and blooms in June each year. The Yellow Lady Slipper is a member of the orchid family.
```

HANDS-ON PRACTICE 6.3

In this Hands-On Practice you'll practice using the CSS float property as you configure the Web page shown in Figure 6.11.



Create a folder named ch6float. Copy the starter3.html and yls.jpg files from the Chapter6 folder in the student files into your ch6float folder. Launch a text editor and open the starter3.html file. Notice the order of the images and paragraphs. Notice that there is no CSS configuration for floating the images. Display starter3.html in a browser. The browser renders the page using normal flow and displays the XHTML elements in the order they are coded.

Let's add CSS to float the image and look more similar to Figure 6.11. Save the file with the name floatyls.html. With floatyls.html open in a text editor, modify the code as follows:

 Add a style rule for a class name float that configures float, margin, and border properties.

```
.float { float:left;
    margin-right:10px;
    border:ridge;
}
```

2. Assign the image element to the class named float (use class="float").

Save the file. Launch a browser and test your page. It should look similar to the Web page shown in Figure 6.11. The student files contain a sample solution at Chapter6/floatyls.html.

Take a moment to examine your file in a browser (see Figure 6.11) and consider how the browser rendered the page. The <div> is configured with a light background color to demonstrate how floated elements are rendered outside of normal flow. Observe that the image and the first paragraph are contained within the <div>. The <h2> follows the div. If all the elements were rendered using normal flow, the area with the light background color would contain both the child elements of the <div>: the image and the first paragraph. Additionally, the <h2> would be placed on its own line under the <div>. However, because the image is floated it is *outside* of normal flow—that's why the light background color only appears behind the first paragraph and why the <h2> text begins immediately after the first paragraph and appears next to the floated image. In the following sections you'll explore properties that can "clear" this float and improve the display.

The clear Property

The **clear property** is often used to terminate, or "clear", a float. You can set the value of the clear property to left, right, or both—depending on the type of float you need to clear. In our example, we need to clear the left float. Review Figure 6.11 and the code sample in the student files at Chapter6/floatyls.html. Notice that although the <div> contains both an image and the first paragraph, the light background color of the <div> only displays behind the screen area occupied by the first paragraph—it stops a bit earlier than expected. Clearing the float will help take care of this display issue. A common technique to clear a float within a container element is to add a line break element configured with the clear property. See the example in the student files at Chapter6/floatylsclear1.html. Observe that a CSS class is configured to clear the left float:

.clearleft { clear: left; }

Also, a line break tag assigned to the clearleft class is coded before the closing </div>tag. The code for the <div> is shown below:

```
<div>
  <img class="float" src="yls.jpg" alt="Yellow Lady Slipper"
  height="100" width="100" />
   The Yellow Lady Slipper grows in wooded areas and blooms in June
each year. The flower is a member of the orchid family.
   <br class="clearleft" />
  </div>
```

Figure 6.12 displays a screen shot of this page. Review Figure 6.12 and note two changes: the light background color of the <div> extends farther down the page and the <h2> text begins on its own line under the image.



If you are not concerned about the light background color display, another option is to omit the line break tag and, instead, apply the clearleft class to the <h2> tag. This does not change the display of the light background color, but it does force the <h2> text to begin on its own line, as shown in Figure 6.13 (see the student files at Chapter6/floatylsclear2.html).



The overflow Property

The **overflow** property can also be used to clear a float, although its intended purpose is to configure how content should display if it is too large for the area allocated. The default value of the overflow property is visible—the content is displayed, and if it's too large, the content will "overflow" outside the area allocated to it. Other values for the overflow property include hidden (the content is clipped to fit the room allocated), auto

Figure 6.12

is applied to a line break tag

(the content fills the area and, if needed, scroll bars are displayed to allow access to the remaining content), and scroll (the content is rendered in the area allocated to it and scroll bars are displayed). When using overflow, to ensure cross-browser compatibility you also must configure a height or width for the selector. We'll use the auto value for our purpose of clearing the left-floated image. Review Figure 6.11 and the code sample in the student files at Chapter6/floatyls.html. Observe the <div> which contains the floated image and first paragraph on the page. Notice that although the <div> contains both an image and the first paragraph, the light background color of the <div> does not extend as far as expected; it is only visible in the area occupied by the first paragraph. You can use the overflow property assigned to the container element to resolve this display issue and clear the float. In this case we'll apply the overflow and width properties to the div selector. The CSS to configure the div in this manner is shown below:

```
div { background-color:#F3F1BF;
      overflow:auto;
      width:100%;
```

}

This CSS is all that is needed to be added to the code to clear the float and cause the Web page to display similar to Figure 6.14 (found in student files hapter6/floatylsoverflow.html).



Note that Figure 6.12 and Figure 6.14 are very similar. Keep in mind that you could configure additional CSS properties (such as margin or padding) to further modify the browser display.

You may be wondering about which CSS property (clear or overflow) is the best to use when you need to clear a float. The clear property is widely used and you should become familiar with its use. However, when it is likely that the floated content will take up more vertical space on the Web page than its companion content and the container element is configured with a background color and/or border, apply the overflow property to the container element (for example, a <div>). This will clear the float, avoid adding an extra line break tag, and ensure that the container element expands to enclose the entire floated element. You'll get more practice with the float, clear, and overflow properties as you continue working through the book. Floating elements is a key technique in designing multicolumn page layouts with CSS.

The display Property

Recall from Chapter 2 that some XHTML elements, such as the paragraph and heading elements, are block elements. A division (<div>) is also a block element. The browser renders these elements with 100 percent of the available width and displays a line break above and below—forming a "block." Other elements, such as anchor tags and span tags, are rendered directly inline—with no line break before or after them. These are called inline elements.

The **display property** configures if and how an element is displayed. An element configured with display:none will not be displayed. This is sometimes used when configuring styles to print a Web page. An element configured with display:block will be rendered as a block element (even if it is actually an inline element, such as an anchor tag). You will work with the display property in Chapter 7 and Chapter 8.

The z-index Property

The **z-index** property is used to modify the stacking order of elements on a Web page. When using only XHTML there is no easy way to "stack" elements other than configuring backgrounds for pages or tables. The z-index property provides flexibility in the display of elements. The default z-index value is "0". Elements with higher z-index values will appear stacked on top of elements with lower z-index values rendered on the same position of the page. Figure 6.15 is configured using absolute positioning and z-index properties.





Notice how the three flower photos and the logo are arranged. It would be difficult to recreate this just using XHTML. This type of page design may be appropriate for the splash page of a Web site. You will recreate this Web page when you complete the next Hands-On Practice. The term splash page originates from client-server applications that display an introductory (or splash) screen while the program loads. Splash pages, sometimes called splash screens, can set the tone or introduce a Web site.

You have been introduced to the position, float, clear, overflow, display, and z-index properties. For your reference, Table 6.1 contains a list of CSS properties often used with formatting and page layout.

Table 6.1 CSS properties used with formatting and page layout

Property	Description	Commonly Used Values
background-color	Background color on an element	Any valid color
background-image	Background image on an element	url(imagename.gif) Or url(imagename.jpg)
background-position	Position of the background image	Two percentage values or numeric pixel val- ues. The first value configures the horizontal position and the second configures the vertical position starting from the upper-left corner of the container's box. Text values can also be used: left, top, center, bottom, right.
background-repeat	Controls how the background image will repeat	Text values repeat (default), repeat-y (vertical repeat), repeat-x (horizontal repeat), no-repeat (no repeat)
border	Shorthand notation to configure the border-width, border- style, and border-color of an element	The values for border-width, border- style, and border-color separated by spaces. For example: border:1px solid #000000;
border-color	Color of the border around an element	Any valid color
border-style	Type of border around an element	Text values double, groove, inset, none (the default), outset, ridge, solid, dashed, dotted, hidden
border-width	Width of a border around an element	A numeric pixel value (such as 1px), percentage value, or the text values thin, medium, thick
bottom	Distance up from the bottom (of the containing element) to display an element	A numeric value (px or em) or percentage
clear	Specifies the display of an element in relation to floating elements	Text values left, right, both, none (default)
color	Text color	Any valid color
display	Controls how and if the element will display	Text values none, block, inline, list-item. Display set to "none" causes the element not to display.
float	Configures the horizontal place- ment (left of right) of an element within in a parent element	right or left
font-family	Name of a font or font family	Any valid font or a font family such as serif, sans-serif, fantasy, monospace, or cursive
font-size	Size of the text font	This varies; pt (standard font point sizes), px (pixels), the unit em (which corresponds to the width of the capital M of the current font), or percentages; the text values xx-small, small, medium, large, x-large, and xx-large are also valid

Property	Description	Commonly Used Values
font-style	Style of the font	normal (default), italic, oblique
font-weight	Boldness or weight of the font	This varies: the text values normal, bold, bolder, and lighter can be used; the numeric values 100, 200, 300, 400, 500, 600, 700, 800, and 900 can be used
height	Height of an element	A numeric value (px or em), numeric percent- age, or auto (default)
left	Distance in from the left (of the containing element) to display an element	A numeric pixel value or percentage
line-height	Spacing allowed for the line of text	It is most common to use a percentage for this value. For example, a value of 200% is double space.
list-style-image	Image used to replace "bullets" in an XHTML list	url(imagename.gif) Or url(imagename.jpg)
list-style-type	Indicates the type of list item marker	Text values none, disc, circle, square, decimal, lower-roman, upper-roman, lower-alpha, upper-alpha
margin	Shorthand notation to configure the margin surrounding an element	A numeric value (px or em) or percentage; for example: body {margin: 10px; } will set page margins in the document to 10 pixels. If you set a value to 0 pixels, omit the px. Four numeric values (px or em) can be speci- fied. The values configure the margins in the following order (margin-top, margin-right, margin-bottom, margin-left).
margin-bottom	Size of an element's bottom margin	A numeric value (\mathtt{px} or \mathtt{em}) or percentage
margin-left	Size of an element's left margin	A numeric value (px or em) or percentage
margin-right	Size of an element's right margin	A numeric value (px or em) or percentage
margin-top	Size of an element's top margin	A numeric value (px or em) or percentage
min-width	The minimum width of an element	A numeric value (\mathtt{px} or \mathtt{em}) or percentage
overflow	Controls the display of a block- level element if the element exceeds its set height or width	Text values visible (default), hidden, auto, scroll
padding	Shorthand notation to configure the amount of padding—the blank space between the element and its border	Two numeric values (px or em) or percentages. The first value configures the top and bottom padding, the second value configures the left and right padding: padding: 20px 10px; Four numeric values (px or em) or percent- ages. The values configure the padding in the following order: padding-top, padding- right, padding-bottom, padding-left.
padding-bottom	Blank space between an element and its bottom border	A numeric value (px or em) or percentage

Table 6.1 CSS properties used with formatting and page layout (continued)

Property	Description	Commonly Used Values
padding-left	Blank space between an element and its left border	A numeric value (px or em) or percentage
padding-right	Blank space between an element and its right border	A numeric value (px or em) or percentage
padding-top	Blank space between an element and its top border	A numeric value (px or em) or percentage
position	Configures the positioning of an element	The value relative will position the element in relation to the normal flow. The value absolute will position the element at the exact pixel location.
right	Distance in from the right (of the containing element) to display an element	A numeric pixel value or percentage
scrollbar-arrow-color	Color of the arrow on the scroll bar (IE only)	Any valid color
scrollbar-face-color	Color of the sliding scroll bar (IE only)	Any valid color
scrollbar-track-color	Color of the track the scroll bar slides in (IE only)	Any valid color
text-align	The alignment of text	Text values center, justify, left, right
text-decoration	Determines whether text is under- lined; this style is most often applied to hyperlinks	The text value none will cause a hyperlink not to be underlined in a browser thatnormally processes in this manner. The text value underline will configure hyperlink to be underlined.
text-indent	Indents first line of a block element	A numeric value (em or px), percentage
text-transform	Modifies appearance of text	Text values none (default), capitalize, uppercase, lowercase
top	Disance down from the top (of the containing element) to display an element	A numeric pixel value or percentage
vertical-align	Modifies the alignment of an inline element	Text values middle, bottom, text-bottom, text-top, top, super, sub, or a percentage value
visibility	Controls whether an element displays and takes up space on a Web page	Text values visible, hidden, inherit
width	Width of an element	A numeric value (px or em), percentage
z-index	The stack order of an element on a Web page; a higher value will display in front of elements with lower values	A numeric value; the default value is 0. May be negative although this can cause problems in Netscape.

Table 6.1 CSS properties used with formatting and page layout (continued)



Of course, the best way to learn new coding technologies is to practice them. In this Hands-On Practice you will configure two files: an external style sheet (wildflower.css), and a splash page similar to the one shown in Figure 6.15. You will use CSS to format and position the page elements.

Getting Started

Locate the yls.jpg, pls.jpg, showy.jpg, and trillium.jpg files in the Chapter 6 folder in the student files. Create a new folder called wildflowers. Copy the files to the wildflowers folder.

Part 1—Code the Splash Page

Review Figure 6.15 and notice the page elements: three images (yls.jpg, pls.jpg, and trillium.jpg), a logo, and a link. Figure 6.16 shows a wireframe of these elements arranged on the page.



In this part of the Hands-On Practice you will code each page element using XHTML and wrap it in a <div> that is assigned to an id. Then, in Part 2 you will code CSS to configure a number of properties including the absolute position, border, font-family, and so on. As you code the splash page, splash.html, you will place the elements on the page and assign id values. In essence, you are configuring a set of boxes (using the box model). Launch Notepad and type in the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
```

"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd"> <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en"> <head>

```
<title>Door County Wildflowers</title>
```

<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
```
<link rel="stylesheet" href="wildflower.css" type="text/css" />
</head>
<body>
<div id="splashlogo">
  <h1>Door County Wildflowers</h1>
</div>
<div id="trillium">
  <img src="trillium.jpg" alt="Trillium" width="200" height="150" />
</div>
<div id="yls">
  <img src="yls.jpg" alt="Yellow Lady Slipper" width="200"
height="150" />
</div>
<div id="pls">
  <img src="pls.jpg" alt="Pink Lady Slipper" width="200" height="150" />
</div>
<div id="enter">
  <a href="page1.html">Enter</a>
</div>
</body>
</html>
```

Save your file as splash.html in the wildflowers folder. Test your page in a browser and compare it with the one shown in Figure 6.17.

The browser has displayed the page using normal flow—following the order of the elements in the source code. Don't worry that your elements are not positioned as they should be. Next, you'll configure the positioning properties as you create the wildflower.css.



Part 2—Code the External Style Sheet

Let's take a moment to consider what type of positioning is needed for the splash page: the splash screen logo, the three images, and the link. Refer to the wireframe sketch in Figure 6.16 and to the screenshot shown in Figure 6.15. Type the CSS in your wildflower.css file as the styles are discussed as follows:

• Splash Screen Logo Area. This should be configured with the id value of splashlogo. This id will use absolute positioning, appear 210 pixels from the top and 80 pixels from the left of the browser viewport, use the background color of #e8b9e8, use a text color of black, display in Times New Roman or serif font with center-aligned text, have about 5 pixels of padding on the top and bottom sides, and have 20 pixels of padding on the left and right sides. There should be a 2 pixel solid border. This element will overlap the images so it must have a higher z-index value than the three images. The CSS follows:

```
#splashlogo { background-color: #e8b9e8;
                 padding: 5px 20px;
                 color: #000000;
                 font-family: "Times New Roman", serif;
                 position: absolute;
                 text-align: center;
                 z-index: 4;
                 top: 210px;
                 left: 80px;
                 border: 2px solid #000000;
 }
• Trillium Image Area
 #trillium { position: absolute;
              z-index: 3;
              left: 220px;
              top: 80px;
 }
• Pink Lady Slipper Image Area
 #pls { position: absolute;
         z-index: 2;
         left: 420px;
         top: 130px;
 }

    Yellow Lady Slipper Image Area

 #yls { position: absolute;
         z-index: 3;
         left: 300px;
         top: 270px;
 }

    Hyperlink Area

 #enter { position: absolute;
           left: 520px;
           top: 350px;
           font-family: Verdana,sans-serif;
 }
```

Save the wildflower.css file in the wildflowers folder.



How do I know exactly what values to use for absolute positioning?

Lots of testing! When hand-coding a page that uses absolute positioning there is a lot of trial and error. It is helpful to sketch the page or create a prototype using a graphics application. Be patient—make your best guess, test, and repeat until the configuration is complete. The good news is that Web authoring tools such as Adobe Dreamweaver provide a visual editor that greatly streamlines this process.

Part 3—Test the Splash Page

Now that your styles are coded, test the splash.html page again. Your page should be similar to the screenshot shown in Figure 6.15. If there are differences, verify the id values in your XHTML and check the syntax of your CSS. You may find the W3C CSS validator at http://jigsaw.w3.org/css-validator helpful when verifying CSS syntax. The student files contain a copy of wildflower.css and splash.html in the Chapter6 folder.



CHECKPOINT 6.1

- 1. State three reasons to use CSS for page layout on a commercial site being developed today.
- 2. Describe the difference between relative and absolute positioning.
- 3. Describe the purpose of the z-index CSS property.

6.4 Exploring CSS Page Layout

You've just configured a Web page using CSS to position elements. You'll continue to explore using CSS for page layout as you create another page for the Door County Wildflowers site. As discussed earlier in this chapter, the CSS float property causes the browser to display XHTML elements outside of the normal flow. Elements configured with the float property appear to float on the right or left side of either the browser window or another XHTML element such as a paragraph. For best results, elements that float should have an intrinsic width (such as an image element) or have their width configured. In the next Hands-On Practice you'll gain more practice using floats.

HANDS-ON PRACTICE 6.5

In the previous Hands-On Practice you created the splash page for the Door County Wildflowers Web site. In this Hands-On Practice you'll add to this site—create a new content page (page1.html) and modify the wildflower.css external CSS file to configure page1.html to display similar to the one shown in Figure 6.18 (shown also in the color insert section).



Getting Started

Locate the wildflowers folder you created in the previous Hands-On Practice.

Part 1—Code the Content Page

Review Figure 6.18 and notice the page elements: the logo, navigation area, floating right image, page content, and page footer. Figure 6.19 shows a wireframe sketch of these elements on the page.

imagelogo

In this part of the Hands-On Practice, you will code each element in an XHTML document. These will be coded to use ids and classes that correspond to CSS, which configures a number of properties including the margin, padding, border, font-family,

Figure 6.19

Note how the elements are arranged on the page and so on. As you code the content page, page1.html, you will place the elements on the page and assign id and class values. You are applying the box model—the page layout is a combination of adjacent and nested boxes. Launch Notepad and type in the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
  <title>Door County Wildflowers</title>
 <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
  <link rel="stylesheet" href="wildflower.css" type="text/css" />
</head>
<body>
<div id="wrapper">
 <img id="imagelogo" src="pls.jpg" alt="Pink Lady Slipper"
 width="200" height="150" />
 <div id="contentlogo">
   <h1>Door County Wildflowers</h1>
   <div class="nav">
        <a href="home.html">Home</a>
        <a href="spring.html">Spring</a>
        <a href="summer.html">Summer</a>
        <a href="fall.html">Fall</a>
        <a href="winter.html">Winter</a>
   </div>
 </div>
  <div class="content">
    Wisconsin's Door County Peninsula is a unique,
  ecologically diverse place with upland and boreal forest, bogs,
  swamps, sand and rock beaches, limestone escarpments, and
  farmlands. A wide array of wildflowers grow in the county because
  of this variety of ecosystems.
    Explore the beauty of Door County Wildflowers....
    <div class="footer">
      Copyright & copy; 2010 Door County Wild Flowers<br />
      Last Updated on 06/07/10
    </div>
 </div>
</div>
</body>
</h+ml>
```

Save your page in the wildflowers folder and test it in a browser. It will not look like Figure 6.18 since you have not yet configured all the ids and classes in the external style sheet. Your page should look similar to the one shown in Figure 6.20.

Figure 6.20

The page before CSS for positioning is configured



Part 2—Add Styles to the External Style Sheet

Open your wildflower.css file with Notepad and prepare to add additional styles to configure the page1.html page. Let's take a moment to consider what type of positioning is needed for the page shown in Figure 6.18, the page1.html page. Locate the following areas on the sketch in Figure 6.19: wrapper, logo area, logo image, navigation links, content, and footer. Type the CSS in your wildflower.css file as the styles are discussed as follows:

• **Wrapper.** Configure a container, or wrapper, area to contain page and configure a width of 700 pixels:

```
#wrapper { width: 700px;
}
```

• Logo Area. This should be configured with the id value of contentlogo. Configure this id so that the background-color is #e8b9e8, the text color is black, the font-size is larger, the minimum width is 500 pixels, and the padding is 10 pixels. The CSS to configure this follows:

```
#contentlogo { background-color: #e8b9e8;
    font-size: larger;
    min-width: 500px;
    padding: 10px;
    color: #000000;
```

- }
- Logo Image. Notice how this image floats at the right edge of the browser window. Configure the id imagelogo with a right float. We have most often set the margin to be the same for all sides of an element's box. The margins can be set for each side individually using the margin-top, margin-right, margin-bottom, and margin-left properties. A short-hand version of this is to set all four values in one margin property. The order of the numeric values determines which box side is configured (top, right, bottom, left). In this page layout the margin at the top and right of the imagelogo should be set to 0; the bottom and left margins should be set to 5 pixels. Configure a solid border. The CSS follows:

```
#imagelogo { float: right;
    margin: 0 0 5px 5px;
    border: solid;
```

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• Navigation Links. You could configure a class and apply that class to each anchor tag in the navigation area of your Web page. However, there is a more elegant method use a descendant selector—which provides a way to reduce the number of classes and ids in your coding. In this case we will eliminate the redundant assignment of each navigation anchor tag to the same class. Using descendant selectors allows you to select elements that are descendants of (or contained within) another element. The container specified can be an html selector, a class, or an id. You specify the descendent selector with the following: container element, class or id name, a blank space, and the descendent element(s). For example, to configure styles for the anchor tags within the class named nav, the descendant selector is coded as ".nav a". Configure this to use 5 pixels padding, a background color of #e8b9e8, text color of dark blue (#000066), no underline (text-decoration: none), and Verdana, Arial or other sans-serif font. The CSS follows:

```
.nav a { padding: 5px;
        background-color: #e8b9e8;
        color: #000066;
        text-decoration: none;
        font-family: Verdana, Arial, sans-serif;
   }
• Overall Content. Configure the content class to use Verdana, Arial, or sans-serif
   font and have a margin of 10 pixels.
   .content { font-family: Verdana, Arial, sans-serif;
        margin: 10px;
   }
• Page Footer. Configure a class called footer with xx-small font that is centered as
   follows:
```

Save the wildflower.css file in the wildflowers folder.

Part 3—Test the Content Page

Now that your styles are coded, test the page1.html page again. Your display should be similar to the screenshot shown in Figure 6.18. If there are differences, verify the id and class values in your XHTML. Also check the syntax of your CSS. You may find the W3C CSS validator at http://jigsaw.w3.org/css-validator helpful when verifying CSS syntax. The student files contain a copy of splash.html, page1.html, and wildflower.css in the Chapter6/wildflowers folder.

6.5 Two-Column Page Layout

A common design for a Web page is a two-column layout with left-column navigation and right-column logo and content. Figure 6.21 shows a page designed in this format using CSS.



Figure 6.22 wrapper The two-column page layout leftcolumn rightcolumn logo logo content floatright

footer

The page contains a number of elements, as shown in Figure 6.21. Compare the wire-frame sketch in Figure 6.22 with the page displayed in Figure 6.21 (shown also in the color insert section).

The page is designed with a number of boxes that correspond to the following page areas: wrapper, left column, right column, logo, content, right-floating image, and footer. Each of these areas will correspond to a class or id configured using CSS. The key to this layout is that the left column is coded to float to the left using float:left. With the left column navigation area floating to the left, the browser renders the other content down the page using normal flow. In the next Hands-On Practice you will code the XHTML and CSS to create the page shown in Figure 6.21.

HANDS-ON PRACTICE 6.6

In this Hands-On Practice you will develop your first two-column Web page using CSS. As you create the Web page and CSS, keep in mind that using this technique is like creating a series of nested boxes. Refer to the Web page screenshot shown in Figure 6.21 and the page layout sketch in Figure 6.22 as you complete this Hands-On Practice.

Getting Started

Locate the showy.jpg file in the Chapter6 folder in the student files. Create a new folder called wildflowers2. Copy the file to the folder.

Part 1—Code the XHTML

Review Figures 6.21 and 6.22. Notice the following page elements: wrapper, left column, right column, logo, content, right-floating image, and footer. Each of these areas will be coded to use an id or class that corresponds to CSS, which configures a number of properties including the padding, border, font-family, and so on. As you code the XHTML document, you will place the elements on the page, assigning id and class values that correspond to the areas in the sketch shown in Figure 6.22. Launch Notepad and type in the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en" >
<head>
 <title>Door County Wildflowers</title>
 <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<div id="wrapper">
  <div id="leftcolumn">
    <a href="index.html">Home</a>
    <a href="spring.html">Spring</a>
    <a href="summer.html">Summer</a>
    <a href="fall.html">Fall</a>
    <a href="winter.html">Winter</a>
  </div>
  <div id="rightcolumn">
    <div id="logo">
      <h1>Door&nbsp;County&nbsp;Wildflowers</h1>
    </div>
  <div class="content">
      <img src="showy.jpg" width="200" height="150" id="floatright"
        alt="Showy Lady Slippers" />
      Wisconsin's Door County Peninsula is a unique,
```

Save your page as twocolumn.html in your wildflowers2 folder. Test the page in a browser. Your display will not look like the one shown in Figure 6.21 because you have not yet configured the CSS. Your page should look similar to the page shown in Figure 6.23.



Part 2—Configure the CSS

For ease of editing, in this Hands-On Practice you will code the CSS as embedded styles in the header section of the Web page. However, if you were creating an entire Web site you would most likely use an external style sheet as you did in the previous Hands-On Practice.

Launch Notepad and open twocolumn.html. Let's take a moment to consider what type of layout is needed for the page shown in Figure 6.21: wrapper, left column with navigation, right column, logo, content, right-floating image, and footer. Locate these areas on the sketch shown in Figure 6.22. Notice that the same font is used throughout the page and the page begins right at the browser margin. Launch Notepad and open your twocolumn.html file. In the header section of your Web page document, add a tag to begin the embedded styles: <style type="text/css"><

Now let's consider the CSS configuration. Type the CSS in your document as it is discussed as follows:

• **Body Tag.** This should be configured with the default fonts of Verdana, Arial, or any sans-serif font. The page margin should be set to 0 pixels.

```
body { font-family: Verdana,Arial,sans-serif;
    margin: 0;
}
```

• Wrapper. Configure a container, or wrapper, area to contain the two columns and configure default background color (#e8b9e8), text color (#000066), width (100%), and minimum width (800px).

• Left Column. The key to this two-column page layout is that the left 100 pixel wide column is designed to float to the left. The left column uses the background and text colors configured in the wrapper id.

```
#leftcolumn { float: left;
      width: 100px;
```

- }
- **Right Column.** Since the left column is 100 pixels wide and floats on the left side, assign a 100 pixel wide left margin to the right column. Note the correspondence between the width of the floated left element and the left margin of the companion page content. This margin value should be equal to or greater than the width of the floated element to provide the look of a two-column layout. Configure a background (#ffffff) and text (#000000) color.

```
#rightcolumn { margin-left: 100px;
            background-color: #ffffff;
            color: #000000;
```

- }
- Logo. The logo is configured with a background color of #eeeeee, text color of #cc66cc, an extra large font size, 10 pixels of padding, and a solid black border that is 1 pixel wide.

```
#logo { background-color: #eeeeee;
    color: #cc66cc;
    font-size: x-large;
    border-bottom: 1px solid #000000;
    padding: 10px;
}
```

• **Content.** The content area will be easier to read if there is additional empty space on the top, right, and left sides. This can be configured using the padding property. Typically, you have set the same padding value for all four sides of the element's box. The padding set for the logo is an example of this. Padding can be set for each side individually using the padding-top, padding-right,

padding-bottom, and padding-left properties. A short-hand version of this is to set all four values in one padding property. The order of the numeric values determines which box side is configured (top, right, bottom, left). In this page layout the padding at the top, right, and left sides of the content should be set to 20 pixels.

```
.content { padding: 20px 20px 0 20px;
}
```

• **Image Floating at the Right.** Configure the image with a 10 pixel margin and float:right.

```
#floatright { margin: 10px;
                             float: right;
}
```

- }
- Footer. Configure the page footer with very small text that is centered. A clear:right is needed to clear the float of the image. Configure 20 pixels of padding on the bottom of the footer.

```
#footer { font-size: xx-small;
    text-align: center;
    clear: right;
    padding-bottom: 20px;
}
```

• Navigation Area. You will use a descendent selector (#leftcolumn a) to indicate the styles for anchor tags within the leftcolumn id. Configure these navigation links with no underlines (text-decoration:none), a 15 pixel margin, and to use display:block, which will allow each anchor tag to act as a block element and be displayed on a separate line.

Save the twocolumn.html file in the wildflowers2 folder.

Part 3—Test the Page

Now that your styles are coded, test the twocolumn.html page again. Your page should be similar to the screenshot shown in Figure 6.21. If there are differences, verify the id and class values in your XHTML and check the syntax of your CSS. You may find the W3C CSS validator at http://jigsaw.w3.org/css-validator helpful when verifying CSS syntax. The student files contain a copy of twocolumn.html in the Chapter6/wildflowers2 folder.

This is just one of many ways that a two-column page layout can be coded. The best way to learn is to experiment by changing some of the properties and noting the result. It is a very good idea to test your pages in more than one browser. The pages in this chapter were tested using Internet Explorer 8, Opera 9, Safari for Windows and Mac, Google Chrome, and Firefox 3.



How do I create a custom-color scroll bar?

It can be fun to color-coordinate the scroll bar with your Web site! Keep in mind that not all your Web visitors will see your handiwork. While this effect is supported by Internet Explorer, it is not supported by all browsers. To configure a scroll bar with colors that you choose, add the following styles to the body tag: scrollbar-face-color, scrollbar-arrow-color, scrollbar-track-color. For example:

```
body { scrollbar-face-color: #cc66cc;
      scrollbar-arrow-color: #006600;
      scrollbar-track-color: #cccccc;
}
```

Note: Your CSS will not pass W3C validation tests if you use these Internet Explorer only properties.

6.6 CSS Debugging Tips

Using CSS for page layout requires some patience. It takes a while to get used to it. One of the biggest issues is that even modern browsers implement CSS in slightly different ways. Testing is crucial. Don't make it your goal that the pages must look exactly the same on every browser. Expect your pages to look slightly different on various browsers. Design so they look best on the most commonly used browser (currently Internet Explorer) and display acceptably well on other browsers. There are Web pages devoted to CSS bugs and browser support of CSS. The following are a few that you will find helpful:

 http://web.archive.org//20040202153928/http://devedge.netscape.com/library/xref/ 2003/css-support/css1/mastergrid.html

The original "Master List" created by Eric Meyer

http://www.westciv.com/style_master/academy/browser_support/index.html

A comprehensive browser compatibility list

http://www.positioniseverything.net

John and Holly Bergevin's site focuses on CSS bugs in modern browsers—it contains some great sample CSS page layouts

http://www.quirksmode.org

Peter-Paul Koch's site is dedicated to studying and defeating browser incompatibilities related to CSS and JavaScript

http://reference.sitepoint.com/css
 Sitepoint's CSS Reference

CSS Debugging Techniques

Debugging CSS can be frustrating. The following are helpful techniques to use:

• Manually Check Syntax Errors. Sometimes a CSS style does not apply due to a syntax error. Carefully check your code. Many times the error is in the line above the style that is not correctly applied.

- **Programmatically Check Syntax Errors.** As mentioned earlier, you can use the W3C's CSS Validator at http://jigsaw.w3.org/css-validator to verify your syntax.
- **Configure Temporary Background Colors.** Sometimes your code is valid but the browser window is not configured the way you would expect. If you temporarily assign distinctive background colors such as red or yellow and test again, it should be easier to see where the "boxes" are ending up.
- **Configure Temporary Borders.** Similar to the temporary background colors, you could temporarily configure an element with a 3 pixel red solid border—this will really jump out at you and help you recognize the issue sooner.
- Use Comments to Find the Unexpected Cascade. Styles and XHTML attributes configured farther down the page can override earlier styles. If your styles are misbehaving, try commenting out (see below) some styles and test with a smaller group of statements. Then add the styles back in one by one to see where or when the breakdown occurs. Work patiently and test the entire style sheet in this manner.

Note that Comment Areas Are Ignored by Browsers. A style sheet comment begins with /* and ends with */. Comments can span multiple lines. A code snippet with CSS comments follows:

```
/* Set Page Margins to Zero */
body { margin: 0
}
/* temporarily commented out during testing
.nav { text-decoration: none;
}
*/
```

The first comment is used to document the style sheet and describe the style applied to the body tag. The second comment spans multiple lines. It begins on the line above the nav class and ends on the line below the nav class. This causes the browser to skip the nav class when applying the style sheet. This technique can be useful in testing when you are experimenting with a number of properties.

6.7 CSS Page Layout Resources

This chapter introduces you to using CSS for page layout configuration and should get you started in your exploration of this technology. It may help you to know that you are not alone in your quest to learn CSS. There are many resources with documentation, tutorials, and support for this technology. The page layout techniques discussed in this textbook are just an introduction to using this technology. There are many Web sites that offer additional insight and techniques for configuring page layout with CSS. The following are a few that you may find useful:

http://glish.com/css

Large collection of CSS page layouts and links to tutorials

http://www.websitetips.com/css/index.shtml

Comprehensive list of tutorials and CSS-related sites

http://www.meyerweb.com/eric/css

The site of Eric Meyer, a leading-edge Web developer

- http://www.w3.org/Style/CSS/learning
 W3C's list of CSS resources
- http://www.bluerobot.com/web/layouts A "reservoir" of CSS page layouts
- http://www.blooberry.com/indexdot/css CSS syntax reference list
- http://www.w3.org/TR/1998/REC-CSS2–19980512
 W3C CSS Level 2 Recommendation
- http://www.w3.org/TR/REC-CSS1–961217.html
 W3C CSS Level 1 Recommendation



CHECKPOINT 6.2

- 1. The two-column layouts you created in the previous Hands-On Practice did not use absolute positioning. Open the twocolumn.html page in a browser. Resize the browser window. Describe what happens. What type of page design layout (ice, jello, or liquid) is being used?
- 2. Describe one CSS debugging tip that you have found helpful.
- 3. Describe how to choose whether to configure an XHTML tag, create a class, or create an id when working with CSS.



CHAPTER SUMMARY

This chapter introduced Cascading Style Sheet rules associated with page layout. Techniques for positioning and floating elements and configuring two-column page layouts were demonstrated. This topic is very deep and you have much to explore. Visit the resources in the chapter to continue learning about this technology.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

- absolute positioning border clear property content CSS Box Model CSS-P descendent selector
- display property float property left property margin normal flow overflow property padding
- position property relative positioning right property top property visible width z-index property

Review Questions

Multiple Choice

- **1.** Which of the following is used to change the location of an element slightly in relation to where it would otherwise appear on the page?
 - a. relative positioning
 - b. the float property
 - c. absolute positioning
 - d. this cannot be done with CSS
- **2.** Which of the following, from outermost to innermost, are components of the box model?
 - a. margin, border, padding, content
 - b. content, padding, border, margin
 - c. content, margin, padding, border
 - d. margin, padding, border, content
- 3. Which of the following is the default value of the border and padding properties for an element?
 - a. 1 pixel
 - b. 0 pixels
 - c. 3 pixels
 - d. 10 pixels

- 4. Which of the following configures a class called nav to float to the left?
 - a. .nav { left: float; }
 b. .nav { float: left; }
 c. .nav { float-left: 200px; }
 d. none of the above
- **5.** Which of the following is the rendering flow used by a browser by default?
 - a. XHTML flow
 - b. normal display
 - c. browser flow
 - d. normal flow
- 6. Which of the following is an example of using a descendent selector to configure the anchor tags within the .nav class?
 - a. nav. a
 - b. a nav.
 - c. .nav a
 - d. this cannot be done with CSS

7. Which of the following will configure padding that is 15 pixels on the top, 0 pixels on the left and right, and 5 pixels on the bottom?

```
a. margin: 0px 5px 0px 15px;
b. margin: top-15, left-0, right-0, bottom-5;
c. padding: 15px 0 5px 0;
d. padding: 0 0 15px 5px;
```

- 8. Which of the following is used along with the left, right and/or top property to configure the position of an element precisely?
 - a. position: relativeb. position: absolutec. position: floatd. none of the above
- **9.** Which of the following will configure a class called news to stack on top of other elements that have a z-index of 5?

```
a. .news { z-index: high; }
b. .news { z-index: 4; }
c. .news { z-index: 6; }
d. none of the above
```

10. Which of the following will insert a comment in CSS?

```
a. // comment //
b. /* comment */
c. /- comment -/
d. <* comment *>
```

- Fill in the Blank
- Configure a style with a(n) ______ if the style will only apply to one element on a page.
- 12. If an element is configured with float:right, the other content on the page will appear to its
- **13.** The ______ is always transparent.
- 14. Use the position:relative property along with the _____, ____, and/or ______ property to configure the position of an element in relation to the normal flow.
- **15.** Configure a style with a ______ if the style could apply to more than one element on a page.

Apply Your Knowledge

</head>

```
1. Predict the Result. Draw and write a brief description of the Web page that will be
  created with the following XHTML code:
  <html>
  <head>
    <title>CircleSoft Web Design</title>
    <style type="text/css">
    h1 { border-bottom: 1px groove #333333;
          color: #006600;
          background-color: #cccccc
    }
    #content { position: absolute;
                left: 200px;
                top: 75px;
                font-family: Arial,sans-serif;
                width: 300px;
    }
    .nav a { font-weight: bold;
    }
    </style>
```

```
<body>
 <h1>CircleSoft Web Design</h1>
 <div id="content">
    Our professional staff takes pride in its working
relationship with our clients by offering personalized services
that listen to their needs, develop their target areas, and
incorporate these items into a well-presented Web site that
works.
 </div>
 Home
   <a href="about.html">About</a>
   <a href="services.html">Services</a>
 </div>
</body>
</html>
```

2. Fill in the Missing Code. This Web page should be configured as a two-column page layout with a right column 150 pixels wide. The right column should have a 1 pixel border. The padding in the left column content area needs to allow for the room that will be used by the right column. Some CSS properties and values, indicated by " ", are missing. Fill in the missing code.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en" >
<head>
<title>Trillium Media Design</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
body { margin: 0;
       font-family: Verdana, Arial, sans-serif;
}
#rightcolumn { " ":" ";
               width: " ";
               background-color: #cccccc;
               height: 400px;
               border: " ";
}
#rightcolumn {
ł
#logo { background-color: #cccccc;
        color: #663333;
        font-size: x-large;
        border-bottom: 1px solid #333333;
}
.content { padding: " ";
}
```

```
.footer { font-size: xx-small;
          text-align: center;
          clear: "_";
}
div#" " a { color: #000066;
            text-decoration: none;
            padding: 3px;
            margin: 15px;
            display: " ";
}
</style>
</head>
<body>
<div id="rightcolumn">
  <a href="index.html">Home</a>
  <a href="products.html">Products</a>
  <a href="services.html">Services</a>
  <a href="about.html">About</a>
</div>
<div id="leftcolumn">
  <div id="logo">
    <h1>Trillium Media Design</h1>
  </div>
  <div class="content">
    Our professional staff takes pride in its working
relationship with our clients by offering personalized services
that listen to their needs, develop their target areas, and
incorporate these items into a well-presented Web site that
works.
  </div>
  <div class="footer">
    Copyright & copy; 2010 Trillium Media Design<br />
    Last Updated on 06/08/10
  </div>
</div>
</body>
</html>
```

3. Find the Error. When this page is displayed using Internet Explorer 7, the heading information obscures the paragraph text. Correct the errors and describe the process you followed.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd" >
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en" >
<head>
<title>CSS Float</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
```

```
h1 { background-color: #eeeeee;
     padding: 5px;
     color: #666633;
     position: absolute;
     left: 200px;
     top: 20px;
}
p { font-family: Arial, sans-serif;
     position;
     absolute;
     left: 100px;
     top: 100px;
}
#yls { float:right;
       margin: 0 0 5px 5px;
       border: solid;
}
</style>
</head>
<body>
<img id="yls" src="yls.jpg" alt="Yellow Lady Slipper" height="100"</pre>
  width="100" />
<h1>Floating an Image</h1>
> The Yellow Lady Slipper pictured on the right is a wildflower.
It grows in wooded areas and blooms in June each year. The Yellow
Lady Slipper is a member of the orchid family.
</body>
</html>
```

Hands-On Exercises

- 1. Write the CSS for a class with the following attributes: a light blue background color, Arial or sans-serif font, dark blue text color, 10 pixels of padding, and a narrow dashed border in a dark blue color.
- **2.** Write the CSS for an id with the following attributes: float to the left of the page, light beige background, Verdana or sans-serif large font, and 20 pixels of padding.
- **3.** Write the CSS to configure a class that will produce a headline with a dotted line underneath it. Choose a color that you like for the text and dotted line.
- **4.** Write the CSS for an id that will be absolutely positioned on a page 20 pixels from the top and 40 pixels from the right. This area should have a light gray background and a solid border.
- **5.** Write the CSS for a class that is relatively positioned. This class should appear 15 pixels in from the left. Configure the class to have a light green background.
- **6. Extending Hands-On Practice 6.6.** Design a two-column page layout with the navigation on the right side. Use the twocolumn.html file from Hands-On Practice 6.6 as a starting point. This file is in the Chapter6/wildflowers2folder in the student files.

Code an external style sheet file called rightcolumn.css and a Web page called rightcolumn.html. The Web page should have two columns. The right column will be the navigation column and the left column will be the content column. Hand in printouts of rightcolumn.css, the rightcolumn.html source code (print in Notepad), and the browser display of your rightcolumn.html to your instructor.

- 7. Extending Hands-On Practice 6.6. Design a two-column page layout with a logo area across the top. Review the Hands-On Practice 6.6 twocolumn.html file for some examples. These files are in the Chapter6/wildflowers2 folder in the student files. Code an external style sheet file called mydesign.css and a Web page called mydesign.html. The Web page should have two columns and a logo area across the top. Hand in printouts of mydesign.css, the mydesign.html source code (print in Notepad), and the browser display of your mydesign.html to your instructor.
- 8. Extending Hands-On Practice 6.6. In Hands-On Practice 6.6 you created two files for a version of the Door County Wildflowers Web site. The files are available in the Chapter6/wildflowers2 folder in the student files. You will create two additional content pages for the Door County Wildflowers site, called spring.html and summer.html, in this exercise. Be sure that all CSS is placed in an external style sheet, called mywildflower.css. (Modify pre-existing pages to use this style sheet.) Here is some content to include on the new pages:

Spring Page (spring.html):

- Use the trillium.jpg image (see the Chapter 6 folder in the student files).
- Trillium facts: 8–18 inches tall, perennial, native plant, grows in rich moist deciduous woodlands, white flowers turn pink with age, fruit is a single red berry, protected flower species.

Summer Page (summer.html):

- Use the yls.jpg image (see the Chapter 6 folder in the student files).
- Yellow Lady's Slipper facts: 4–24 inches tall, perennial, native plant, grows in wet shaded deciduous woods, swamps, and bogs, an orchid, official flower of Door County.

Hand in printouts of mywildflower.css, spring.html source code (print in Notepad), summer.html source code, the browser display of spring.html, and the browser display of summer.html to your instructor.

9. Extending Hands-On Practice 6.6. Modify the twocolumn.html page you created in Hands-On Practice 6.6. This file is in the Chapter6/wildflowers2 folder in the student files. Recall from Chapter 5 that a Web page using jello design has content in the center of the Web page with blank margins on either side. You can code this using CSS by configuring the margin property of the body tag to use percentages for the left and right. For example:

body {margin: 0 10%;}

Hand in printouts of the source code (print in Notepad) and browser display for the Web page to your instructor.

 Design a splash page called moviesplash.html about your favorite movie. Use absolute positioning and z-index to create an interesting display. First sketch the areas for images, text, and link to the first page on the site. Search the Web for photos of the movie. Next, locate images from the movie. When you code your page use embedded CSS unless your instructor directs you otherwise. Hand in printouts of the moviesplash.html source code (print in Notepad), and the browser display of moviesplash.html to your instructor.



(*Note*: It is unethical to steal an image from another Web site. Some Web sites have a link to their copyright policy. Most Web sites will give permission for you to use an image in a school assignment. If there is no available policy, e-mail the site's contact person and request permission to use the photo. If you are unable to obtain permission, you may substitute clip art or an image from a free site.)

Web Research

This chapter introduced using CSS to configure Web page layout. Use the resources listed in the text as a starting point. You can also use a search engine to search for CSS resources.

Create a Web page that provides a list of at least five CSS resources on the Web. For each CSS resource provide the URL, Web site name, and a brief description. Your Web page should use absolute positioning. Print both the source code (from Notepad) and the browser view of your Web page.

Focus on Web Design

There is still much for you to learn about CSS. A great place to learn about Web technology is on the Web itself. Use a search engine to search for CSS page layout tutorials. Choose a tutorial that is easy to read. Select a section that discusses a CSS technique that was not covered in this chapter. Create a Web page that uses this new technique. Consider how the suggested page layout follows (or does not follow) principles of design such as contrast, repetition, alignment, and proximity (see Chapter 5). The Web page should provide the URL of your tutorial, the name of the Web site, a description of the new technique you discovered, and a discussion of how the technique follows (or does not follow) principles of design. Print the external style sheet (if you used one), the Web page source code (from Notepad), and the browser view of your Web page.

WEB SITE CASE STUDY: Implementing CSS Two-Column Page Layout

Each of the following case studies continues throughout most of the text. This chapter implements CSS two-column page layout in the Web sites.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House case. Figure 2.26 shows a site map for the JavaJam Web site. The pages were created in earlier chapters. In this case study you will implement a new two-column CSS page layout for JavaJam. You will modify the external style sheet and the Home, Menu, and Music pages. Unless your

instructor directs you otherwise, use the Chapter 4 JavaJam Web site as a starting point for this case study.

Figure 6.24 displays a wireframe for the two-column page layout with a page container, logo, left column, right column, floating, and footer areas.



Hands-On Practice Case

- 1. **Create a Folder.** Create a folder called javajamcss. Copy all the files from your Chapter 4 javajam folder into the javajamcss folder. You will modify the javajam.css file and each Web page file (index.html, menu.html, and music.html) to implement the two-column page layout shown in Figure 6.24. See the new JavaJam Home page, as shown in Figure 6.25 (shown also in the color insert section).
- 2. Configure the CSS. Open javajam.css in Notepad. Edit the style rules as follows:
 - Add the following style declarations to the container id: background color (#e8d882), text color (#000000), and a 2 pixel black double border (border: 2px double #000000).
 - Configure the logo area. Create a new id named logo with a background (#ccaa66) and text (#000000) color, center alignment (text-align: center), no margin (margin: 0;), and a bottom border that is 2 pixels, double, and black (border-bottom: 2px double #000000).
 - Configure the left column navigation area. Add the following style rules to the nav id to configure an area that floats to the left, is 100 pixels wide, and has 10 pixels of padding on the top side.



• Configure the navigation hyperlinks. Use a descendant selector to add a new style rule for the anchor tags div within the nav id. Configure this selector to have no underlines on hyperlinks, a 15 pixel margin, have centered text, and be displayed as a block element (with line breaks above and below) by the browser.

```
#nav a { text-decoration: none;
    margin: 15px;
    text-align: center;
    display: block;
}
```

• Configure the right column content area with style rules for the content id to configure an area with a 150 pixel left margin, background (#f1e8b0) and text (#000000) color, 10 pixels of top and bottom padding, 20 pixels of left and right padding, and overflow set to auto to clear floating elements within the content area.

```
#content { margin-left: 150px;
            background-color: #fle8b0;
            color: #000000;
            padding: 10px 20px;
            overflow: auto;
}
```

• Configure an area that floats to the right. Notice how the winding road graphic shown in Figure 6.25 floats on the right side—this is configured with the floatright class. Images are more compelling when separated from other elements (such as text) by empty space. Add 20 pixels of padding to the left side of this area.

```
}
```

• Modify the footer id to display a 2 pixel double black top border (bordertop: 2px double #000000). Also configure 20 pixels of padding-top and padding-bottom in the footer id.

Save the javajam.css file.

- 3. Modify the index.html File. Add <div> elements and modify the code as follows:
 - Configure the logo area. Assign the <h1> to the id logo.
 - Configure the left column navigation area. The navigation links are the only content in the left column. Remove other code, including any characters that may be present.
 - The right column content area should already be contained within the div assigned to the content id.
 - Configure the area that floats to the right. Modify the winding road image element. Remove the align="right" attribute and add class="floatright" to the winding road image element.

Save the index.html file. It should look similar to the Web page shown in Figure 6.25. Remember that validating your XHTML and CSS can help you find syntax errors. Test and correct this page before you continue.

- **4. Modify the menu.html and music.html Files.** Modify the code in these Web page files in a similar manner as you did in Step 3. Save and test your pages in a browser. As you test your pages, use the CSS and XHTML validators to help you find syntax errors.
- **5.** Bonus Style: text-transform. Figure 6.26 shows an alternate design for the music.html page. Notice how the <h2> elements are styled differently—with all uppercase text (using a new property, text-transform) different background and text colors, font size, bottom border, and margin. Open javajam.css in a text editor and replace the h2 selector style rules with the following:

```
h2 { text-transform: uppercase;
    background-color: #ffffcc;
    color: #663300;
    font-size: 1.2em;
    border-bottom: 1px solid #000000;
    margin-right: 20px;
}
```

Save the javajam.css file. Test your pages in a browser. Your music.html page should look similar to the one shown in Figure 6.26. The other pages do not use <h2> elements and should appear as they did at the end of Step 4.

In this case study you changed the page layout of the JavaJam Web site pages. Notice that with just a few changes in the CSS and XHTML code, you configured a two-column page layout.



Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows a site map for the Fish Creek Web site. The pages were created in earlier chapters. In this case study you will implement a new two-column CSS page layout. You will modify the external style sheet and the Home, Services, and Ask the Vet pages. Unless your instructor directs you otherwise, use the Chapter 4 Fish Creek Web site as a starting point for this case study.

Figure 6.27 displays a wireframe for the two-column page layout with a page container, logo, left column, right column, and footer areas.

logo		
leftcolumn	rightcolumn	
	footer	

Figure 6.27
Fish Creek two-
column page layout

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Hands-On Practice Case

 Create a Folder. Create a folder called fishcreekcss. Copy all the files from your Chapter 4 fishcreek folder into the fishcreekcss folder. You will modify the fishcreek.css file and each Web page file (index.html, services.html, and askvet.html) to implement the two-column page layout, as shown in Figure 6.27. See the new Fish Creek home page, as shown in Figure 6.28 (shown also in the color insert section).



- 2. Configure the CSS. Open fishcreek.css in Notepad. Edit the style rules as follows:
 - Configure a subtle background image for the body selector. Use the gradientblue.jpg file found in the student files (Chapter6/gradientblue.jpg).
 - Configure the logo area. Remove the h1 selector and style rules. Create a new id named logo with 55 pixels of padding on the left side (padding-left: 70px).
 - Configure the left column area. Add a new style rule for the leftcolumn id to configure an area that floats to the left and is 140 pixels wide.

```
#leftcolumn { float: left;
    width: 140px;
```

- }
- Configure the navigation area. Remove the imgnav id. Add a property to the style rules for the img selector—configure 10 pixels of padding (padding: 10px).
- Configure the right column area. Add a new style rule for the rightcolumn id to configure an area with a 170 pixel left margin.
- Configure the category class. Since the page now uses a gradient background image, remove the background-color style rule from this class.

• Configure the footer area. Configure the footer id to display centered text (text-align: center;). Remove the nav id.

Save the fishcreek.css file.

- 3. Modify the index.html File. Add <div> elements and modify the code as follows:
 - Configure the logo area. Assign the <h1> to the id logo.
 - Configure the left column. The navigation image links are the only content in the left column. Change <div id="imgnav"> to <div id="leftcolumn">. Remove other code, including any characters that may be present.
 - Configure the right column. This area contains the definition list and the paragraph with the contact information. Code a <div> that surrounds this area. Assign the <div> to the id rightcolumn.
 - Configure the page footer area. You need to adjust the starting location of the footer id. Locate <div id="footer"> in the code and remove it. Next, change <div id="nav"> to <div id="footer">. The area assigned to the footer id now includes the text navigation, copyright information, and e-mail link. Replace the closing div tag between the text navigation and the copyright information with a line break tag.

Save the index.html file. It should look similar to the Web page shown in Figure 6.28. Remember that validating your XHTML and CSS can help you find syntax errors. Test and correct this page before you continue.

4. Modify the services.html and askvet.html Files. Modify these Web page files in a similar manner as you did in Step 3. Save and test your pages in a browser. As you test your pages, use the CSS and XHTML validators to help you find syntax errors.

In this case study you changed the page layout of the Fish Creek Web site pages. Notice that with just a few changes in the CSS and XHTML code, you configured a two-column page layout.

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for the Pasha the Painter Web site. The pages were created in earlier chapters. In this case study you will implement a new two column CSS page layout for Pasha the Painter. You will modify the external style sheet and of the Home, Services, and Testimonials pages. Unless your instructor directs you otherwise, use the Chapter 4 Pasha the Painter Web site as a starting point for this case study.

Figure 6.29 displays a wireframe for the two-column page layout with a page container, logo, left column, right column, and footer areas.

Figure 6.29 Pasha the Painter two-column page layout	container
	leftcolumn rightcolumn
	footer

Hands-On Practice Case

1. Create a Folder. Create a folder called paintercss. Copy all the files from your Chapter 4 folder into the paintercss folder. You will modify the painter.css file and each Web page file (index.html, services.html, and testimonials.html) to implement the two-column page layout shown in Figure 6.29. See the new Pasha the Painter home page, as shown in Figure 6.30 (shown also in the color insert section).



book for a full color version of this figure

- 2. Configure the CSS. Open painter.css in Notepad. Edit the style rules as follows:
 - Configure the left column area. Add a new style rule for the leftcolumn id to configure an area that floats to the left and is 150 pixels wide.

• Configure the navigation area. Remove the nav id. Add a descendent selector style rule for the navigation class to configure the anchor tags within the leftcolumn id as follows: with bold font, a 15 pixel margin on the right, bottom, and left sides, and displayed as a block element (with line breaks above and below) by the browser.

```
#leftcolumn a { font-weight: bold;
            margin: 0 15px 15px 15px;
            display: block;
```

- }
- Configure the right column area. Add a new style rule for the rightcolumn id to configure an area with a 150 pixel left margin and a 10 pixel top margin (margin: 10px 0 0 150px).
- Configure an area that floats to the right. Add a new style rule for the floatright class.

```
.floatright { float: right;
      padding: 5px;
```

}

Save the painter.css file.

- 3. Modify the index.html File. Add <div> elements and modify the code as follows:
 - Configure the logo area. Assign the <h1> to the id logo.
 - Configure the left column. The navigation links are the only content in the left column. Change <div id="nav"> to <div id="leftcolumn">. Remove other code, including any characters that may be present.
 - Configure the right column. This area contains the content (paragraph and unordered list elements) and the footer section. Code a <div> that surrounds this area. Assign the <div> to the rightcolumn id.

Save the index.html file. It should look similar to the Web page shown in Figure 6.30. Remember that validating your XHTML and CSS can help you find syntax errors. Test and correct this page before you continue.

- 4. Modify the services.html and testimonials.html Files. Modify these Web page files in a similar manner as you did in Step 3. Configure the room images on the testimonials.html page—on the opening image tag for each room photo, remove the align="left" attribute and add class="floatright".
- **5.** Save and Test Your Pages in a Browser. As you test your pages, use the CSS and XHTML validators to help you find syntax errors.
- 6. Bonus Style. Figure 6.31 shows an alternate design for the testimonials.html page. Notice how the <h2> elements are styled differently—it is set to float and is configured with a *negative* top margin. This allows the dark green box to stand out better on the page. The paragraph elements in this area are each assigned to a new class named .desc that configures a top border of the same color green and



extra padding. Open painter.css in a text editor and update the style rules with the following:

```
h2 { margin: -10px 5px 5px 0px;
    padding: 5px;
    font-family: Verdana, sans-serif;
    font-size: .90em;
    float: left;
    width: 200px;
    background-color: #336600;
    color: #ffffff;
    text-transform: uppercase;
}
.desc { padding: 5px 0 20px 0;
    border-top: 1px solid #336600;
}
```

Save the painter.css file. Modify the testimonials.html page by assigning the paragraphs to the desc class. Save your file. Test your pages in a browser. Your testimonials.html page should be similar to the one shown in Figure 6.31. The other pages should display as they did at the end of Step 4. Consider modifying the unordered list on the Services page (services.html) to use <h2> and elements (assigned to the desc class) instead—the result will be a more cohesive design for your Web site.

In this case study you changed the page layout of the Pasha the Painter Web site pages. Notice that with just a few changes in the CSS and XHTML code, you configured a two-column page layout.

Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case Study. Figure 2.38 shows a site map for the Prime Properties Web site. The pages were created in earlier chapters. In this case study you will implement a new two-column CSS page layout for Prime Properties. You will modify the external style sheet and the Home, Listings, and Financing pages. Unless your instructor directs you otherwise, use the Chapter 4 Prime Properties Web site as a starting point for this case study.

Figure 6.32 displays a wireframe for the two-column page layout with a page wrapper, logo, left column, right column, and footer areas.



Hands-On Practice Case

- 1. **Create a Folder.** Create a folder called primecss. Copy all the files from your Chapter 4 prime folder into the primecss folder. You will modify the prime.css file and each Web page file (index.html, listings.html, and financing.html) to implement the two-column page layout shown in Figure 6.32. See the new Prime Properties Home page, as shown in Figure 6.33 (shown also in the color insert section).
- **2. Configure the CSS.** Open prime.css in Notepad. Edit the style rules as follows:
 - Configure the page background. Modify the style rules for the body selector. Set the background-color property to #003366. Configure the background image to be the primevertical.png image from the student files (see Chapter6/primevertical.png).



• Create a new wrapper id to contain the page content. Configure the area with a width of 680 pixels and centered (margin:0 auto). Set the minimum width to 680 pixels, also. Configure the background (#ffffcc) and text (#003300) colors. Set the left padding to 10 pixels.

```
#wrapper { width: 680px;
    min-width: 680px;
    margin: 0 auto;
    background-color: #ffffcc;
    color: #003300;
    padding-left: 10px;
```

}

• Configure the left column area. Add a new style rule for the leftcolumn id to configure an area that floats to the left and is 150 pixels wide.

```
#leftcolumn { float: left;
      width: 150px;
```

- }
- Configure the navigation area. Configure a descendent selector style rule to configure the anchor tags within the leftcolumn id as follows: block element with a 15 pixel right, bottom, and left margin.

- Configure the right column area. Add a new style rule for the rightcolumn id to configure an area with a 150 pixel left margin and 20 pixels of right and bottom padding (padding: 0 20px 20px 0).
- Configure the images on the listings.html page to float to the left. Add a new float:left style rule to the property class.

Save the prime.css file.

- **3. Modify the index.html File.** Add <div> elements and modify the code as indicated below.
 - Configure the logo area. Assign the <h1> to the id logo.
 - Configure the left column. The navigation image links are the only content in the left column. Assign the <div> that contains the image links to the leftcolumn id, <div id="leftcolumn">. Remove other code, including any characters that may be present.
 - Configure the right column. This area contains the content (paragraphs, unordered list, and text navigation links) and the footer section. Code a <div> that surrounds this area. Assign the <div> to the rightcolumn id.

Save the index.html file. It should look similar to the Web page shown in Figure 6.33. Remember that validating your XHTML and CSS can help you find syntax errors. Test and correct this page before you continue.

- 4. Modify the listings.html and financing.html Files. Modify these Web page files in a similar manner as you did in Step 3. Configure the property images on the listings.html page—on the opening image tag for each property photo, remove the align="left" attribute. Save and test your pages in a browser. As you test your pages, use the CSS and XHTML validators to help you find syntax errors.
- **5. Bonus Style.** Figure 6.34 shows an alternate design for the financing.html page. Notice the image near the center of the content with the text "Mortgage FAQs."



This was configured with CSS using an interesting technique. The XHTML is straightforward:

```
<h3 class="home">Mortgage FAQs</h3>.
```

CSS creates the effect. Styles are declared for the home class with the following properties: a background image that does not repeat and is positioned very carefully, a width of 200 pixels, light text, and generous padding.

```
.home { background-image: url(schaumburg.jpg);
    background-position: -100px -260px;
    background-repeat: no-repeat;
    color: #ffffcc;
    padding: 60px 5px 20px 5px;
    width: 200px;
```

}

Notice that the background-position property is used with carefully chosen values. As indicated in Table 6.1, the background-position property can use two numeric pixel values—horizontal and vertical. The *negative numbers* cause the background image to shift 100 pixels to the left and 260 pixels down from the top. The effect is somewhat abstract and ends up displaying just part of the image. In this case, it is a part of a house to tie in with the home financing theme. Padding is set quite high to allow room for the image to display around the text. The text color is light in order to contrast well with the image.

Save the prime.css file. Modify the financing.html page as indicated above—add class="home" to the <h3> element. Save the financing.html file. Test your pages in a browser. Your financing.html page should look similar to the one shown in Figure 6.34. The other pages should display as they did at the end of Step 4.

In this case study you changed the page layout of the Prime Properties Web site pages. Notice that with just a few changes in the CSS and XHTML code, you configured a two-column page layout.

Web Project

See Chapter 5 for an introduction to the Web Project case. As you completed the Chapter 5 Web Project Case Study activities you completed a Web Project Topic Approval, Web Project Site Map, and Web Project Page Layout Design. In this case study you will use your design documents as a guide as you develop the pages for your Web Project using CSS (external style sheet) for both formatting and page layout.

Hands-On Practice Case

- 1. Create a folder called project. All your project files and graphics will be organized in this folder and subfolders as needed.
- 2. Refer to your Site Map to view the pages that you need to create. Jot down a list of the file names. Add these to the Site Map.
- 3. Refer to the Page Layout Design. Make a list of the common fonts and colors used on the pages. These may become the CSS you configure for the body element. Note where typical elements used for organization (such as headings, lists, paragraphs, and so on) may be used. You may want to configure CSS for these elements. Identify various page areas such as logo, navigation, footer, and so on—

and list any special configurations needed for these areas. These will be configured as classes in your CSS. Create an external style sheet, called project.css, which contains these configurations.

4. Using your design documents as a guide, code a representative page for your site. Use CSS to format text, color, and layout. Be sure to apply classes and ids where appropriate. Associate the Web page to the external style sheet.

Save and test the page. Modify both the Web page and the project.css file as needed. Test and modify until you have achieved the look you want.

- **5.** Using the completed page as a template wherever possible, code the rest of the pages on your site. Test and modify them as needed.
- **6.** Experiment with modifying the project.css file. Change the page background color, the font family, and so on. Test your pages in a browser. Notice how a change in a single file can affect multiple files when external style sheets are used.
This page intentionally left blank



More on Links, Lists, and Layout

Chapter Objectives In this chapter, you will learn how to ...

- Code relative hyperlinks to Web pages in folders within a Web site
- Configure a hyperlink to a named fragment internal to a Web page
- Add interactivity to Web pages with CSS pseudo-classes
- Configure a navigation layout list with CSS
- Configure three-column page layouts using CSS
- Configure CSS for screen, print, and mobile device display
- Utilize the "cascade" in CSS

Now that you've had some experience coding XHTML

and CSS, you're ready to explore a variety of techniques in this chapter including XHTML relative hyperlinks and named fragment hyperlinks, CSS pseudo-classes, navigation list layout, three-column page layout, styling for print, styling for mobile Web browsers, and an overview of the "cascade" in CSS.

7.1 Another Look at XHTML Hyperlinks

Hyperlinks make the Web a "web" of interconnected information. In this section you'll revisit the topic of hyperlinks and explore coding relative links, using the target attribute to open Web pages in a new browser window, and coding hyperlinks that are internal to a Web page.

More on Relative Linking

As indicated earlier in Chapter 2, a relative link is used to link to Web pages within your site. You've been coding relative links to display Web pages within the same folder. There are times when you need to link to files in other folders on your Web site. Let's consider the example of a Web site for a dog groomer that highlights services and products. The Web developer for this site created separate folders called services and products in order to organize the site. See the folder and file listing shown in Figure 7.1.

Figure 7.1

The dog groomer site contains the images, products, and services folders

index.	html
contac	ct.html
0	images
P	products
	collars.html
	shampoo.html
P	services
-	bathing.html
	daycare.html

groomer

Relative Link Examples

• To review, when linking to a file in the same folder or directory, the value of the href is the name of the file. For example, to link to the contact.html page from the home page (index.html), code the anchor element as follows:

```
<a href="contact.html">Contact</a>
```

• When linking to a folder located within the current directory, use both the folder name and the file name in the relative link. For example, to link to the collars.html page in the products folder from the home page (index.html), code the anchor element as follows:

Collars

• In Figure 7.1 the collars.html page is located in a subfolder of the groomer folder. The home page for the site, index.html is located in the groomer folder. When linking to a file that is up one directory level from the current page use "../" notation. To link to the home page for the site from the collars.html page, code the anchor element as follows:

Home

• When linking to a file that is in a folder on the same level as the current folder, the href value will use the "../" notation to indicate moving up one level and then down to the chosen folder. For example, to link to the bathing.html page in the services folder from the collars.html page in the products folder, code the anchor element as follows:

Dog Bathing

Don't worry if the use of ".../" notation and linking to files in different folders seems new and different. In most of the exercises in this book you will code either absolute links to other Web sites or relative links to files in the same folder.

Opening a Link in a New Browser Window

The **target** attribute can be used on the anchor to open a link in a new browser window. For example,

```
<a href="http://yahoo.com" target=" blank">Yahoo!</a>
```

will open Yahoo!'s home page in a new window. Why not create a test page and try it? The target attribute with the value "_blank" configures the Web page to open in a new browser window.

By now you should be comfortable with hyperlinks. You may have noticed that these links display the top of the Web page. Sometimes it is helpful to link to an exact position on a Web page instead of to the top of the page. Internal links are used for this function.

Linking to Fragment Identifiers

There are times when you need to provide the capability to link to a specific portion of a Web page. You can accomplish this by coding a hyperlink to a **fragment identifier** (sometimes called a named fragment or fragment id) which is simply an XHTML element assigned to an id. Lists of frequently asked questions (FAQs) often use this technique. Other applications of fragment identifiers include hyperlinks that skip to the content of a page or skip back to the top of the page.

There are two components to your coding when using fragment identifiers:

- 1. The tag that identifies the named fragment of a Web page. The tag must be assigned to an id. For example, <div id="content">.
- 2. The anchor tag that links to the named fragment on a Web page.



To see how these two components are used, consider that to provide for accessibility, Web pages may have a fragment identifier to indicate the beginning of the actual page content. When the visitor clicks on the "skip to content" hyperlink, the browser links to the fragment identifier and shifts focus to the content area of the page. This "skip to content" or "skip navigation" link provides a way for screen reader users to skip repetitive navigation links (see Figure 7.2). This is accomplished in two steps as follows:

- Establish Target. Create the "skip to content" fragment identifier by configuring a <div> that contains the page content with an id, for example:
 <div id="content">
- 2. **Reference Target.** At the point of the page where you want to place a hyperlink to the content, type an anchor element. Use the href attribute and place a #



(sometimes called a hash mark) before the name of the fragment identifier. The XHTML for a hyperlink to the named fragment "content" is

Skip to Page Content>

The hash mark indicates that the browser should search for an id on the same page. If you forget to type the hash mark, the browser will not look on the same Web page; it will look for an external file. See Chapter 5 (Figures 5.24, 5.38, and 5.39) for more examples of "Skip to Content" or "Skip Navigation" hyperlinks. A named fragment does not have to be at the beginning of page content; it can be just about anywhere that would be useful to your Web visitors.

Legacy Alert. Fragment identifiers are not part of HTML 4, but you may find references to named anchors. Named anchors used the now-deprecated name attribute to identify or name the fragment. For example, .



You will work with fragment identifiers in this Hands-On Practice. Locate the Chapter7/starter1.html file in the student files. Figure 7.3 shows a partial screenshot of this Web page.

Launch Notepad and open the starter1.html file. Save the file as favorites.html. Examine the source code and notice that the top portion of the page contains an unordered list with categories of interest (such as Hobbies, XHTML, CSS, and Professional Organizations) that correspond to the text displayed in the <h2> elements below. After each <h2> element is a definition list of topics and URLs related to that category. It might be helpful to Web page visitors if they can click a category item and immediately jump to the page area that has information related to that item. This could be a useful application of linking to fragment identifiers!



Modify the page as follows:

- Code a named fragment for each <h2> element in the definition list. For example:
 <h2 id="hobbies">Hobbies</h2>
- Add hyperlinks to the items in the unordered list so that each entry will link to its corresponding <h2>.
- **3.** Add a named fragment near the top of the page.
- 4. Near the bottom of the favorites.html page add a hyperlink to the top of the page.

Save the file and test it. Compare your work with the sample found in the student files (Chapter7/favorites.html).

There may be times when you need to link to a named fragment on another Web page. To accomplish this, place a "#" followed by the fragment identifier id value after the file name in the anchor tag. So, to link to the "Professional Groups" (given that it is a named fragment called "prof") from any other page on the same Web site, you could use the following XHTML:

```
<a href="favorites.html#prof">Professional Organizations</a>
```



Why don't some of my hyperlinks to name fragments work?

A Web browser cannot display less than the height of the browser window. If there is not enough space left on the bottom of the page below the named reference, it cannot be displayed at the top of the page. Try adding some blank lines (use the
 tag) to the lower portion of the Web page. Save your work and test your hyperlinks again.

7.2 CSS Pseudo-Classes and Links

Have you ever visited a Web site and found that the text hyperlinks changed color when you moved the mouse pointer over them? Often, this is accomplished using a special technique in CSS called a pseudo-class. The four pseudo-classes that can be applied to the anchor tag are shown in Table 7.1. The **link pseudo-class** configures the appearance of the hyperlink before it is clicked. The **visited pseudo-class** configures the appearance of the hyperlink after it is clicked. The **focus pseudo-class** configures the appearance of the hyperlink when it has keyboard focus—for example, by pressing the Tab key. This is helpful for users with a physical disability because it can inform them when they have reached a specific hyperlink when using the keyboard. The **hover pseudo-class** configures the hyperlink as the mouse is held or "hovered" over it. The **active pseudo-class** configures the appearance of the hyperlink as the mouse is held or "hovered" over it. The **active pseudo-class** configures the appearance of the hyperlink while it is being clicked.

Notice the order in which the pseudo-classes are listed in Table 7.1. Anchor element pseudoclasses must be coded in this order (although it's okay to omit one or more of those listed). If you code the pseudo-classes in a different order, the styles will not be reliably applied. It's common practice to configure the focus and active pseudo-classes with the same styles.

	Commonly	used	CSS	pseudo-classes	

Pseudo-class	When Applied
link	Default state for a hyperlink that has not been clicked (visited)
visited	Default state for a visited hyperlink
focus	Triggered when the link has focus (for example, by pressing the Tab key on the keyboard)
hover	Triggered when the mouse moves over the hyperlink
active	Triggered when the hyperlink is actually clicked

The syntax of pseudo-classes uses a colon (:) to apply the **pseudo-class** to the anchor selector. The following code sample will configure text hyperlinks to be red initially. The sample also uses the hover pseudo-class, a:hover, to configure the links to change their appearance when the visitor places the mouse pointer over them so that the underline disappears and the color changes.

```
<style type="text/css">
a:link { color: #ff0000;
}
a:hover { text-decoration: none;
color: #000066;
}
</style>
```

Figure 7.4 shows part of a Web page that uses a similar technique. Note the position of the mouse pointer over the Print This Page hyperlink—the text color has changed and has no underline.

While some Web design experts, such as Jakob Nielsen, recommend that Web developers not change the default look of text links, this technique is often used. Most modern browsers support CSS pseudo-classes. However, some visitors using mobile devices may not have easy access to mouse-like controls, see section 7.6 for some tips on coding CSS for mobile visitors.

Focus on Accessibility

WWW



1. Text hyperlinks are underlined by default.

Print This Page

2. The hover pseudo-class is triggered by the mouse. The browser no longer displays the underline below the hyperlink.

HANDS-ON PRACTICE 7.2

You will use pseudo-classes to create interactive hyperlinks in this Hands-On Practice as you create a series of pages that contain hyperlinks styled in different ways.

Part 1

The first page contains text links that you will configure to use CSS pseudo-classes. A sample is shown in Figure 7.5. When the mouse hovers over a link, it will change color and the underline will disappear. You will code embedded CSS to configure the link, visited, focus, hover, and active pseudo-classes for the anchor selector.



Launch Notepad and type the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
   <head>
   <title>CSS Pseudo-class Example 1</title>
   <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
   <style type="text/css">
   body { margin: 0 auto;
        width: 400px;
        text-align: center;
   }
}
```

```
a:link { background-color: #ffffff;
         color: #ff0000;
}
a:visited { background-color: #ffffff;
            color: #00ff00;
3
a:focus { background-color:#000000;
          color: #cccccc;
          text-decoration:none;
}
a:hover { background-color: #ffffff;
          color: #000066;
          text-decoration: none;
3
a:active { background-color: #ffffff;
           color: #cccccc;
           text-decoration:none;
}
</style>
</head>
<body>
<div>
  <h1>Navigation Links</h1>
  <a href="http://yahoo.com">Yahoo!</a>
  <a href="http://google.com">Google</a>
</div>
</body>
</html>
```

Save your file as link1.html. Test your page in a browser and compare it with Figure 7.5. The student files contain a sample solution at Chapter7/link1.html. The browser applies the CSS pseudo-class rules to every link on the page. Experiment with hovering over the hyperlinks or using your keyboard to tab to the links. Press the Enter key to use the keyboard to activate a hyperlink. In this example, the CSS was coded using embedded styles, but an external style sheet also could have been used.

Part 2

Now you will create a page that uses CSS and pseudo-classes to configure navigation links that look like buttons. These can be used in place of image links to save on the bandwidth used by graphics. See the sample in Figure 7.6. When the mouse hovers over a navigation button, the text color and border change.



You will use the border and padding CSS properties to configure the buttons. Let's review these properties. The border property configures the width (border-width), style (border-style), and color (border-color) of the border around an element. The padding property configures the amount of padding—the blank space between the element and its border.

Launch Notepad and type the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>CSS Pseudo-class Example 2</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
        margin: 0 auto;
body {
        width: 550px;
        text-align: center;
}
#button a { border: 2px inset #CCCCCC;
            padding: 3px 15px;
            color: #FFFFFF;
            background-color: #000066;
            font-family: Arial, Helvetica, sans-serif;
            font-size: 1.2em;
            font-weight: bold;
            text-align: center;
            text-decoration: none;
}
#button a:link { color: #FFFFFF;
3
#button a:visited { color: #CCCCCC;
3
#button a:focus { background-color:#000000;
                  color: #DDA0DD;
                  border:2px outset #000000;
}
#button a:hover { color: #66CCFF;
                  border:2px outset #cccccc;
}
#button a:active { color: #DDA0DD;
                   border:2px outset #000000;
}
</style>
</head>
```

```
<body>
<h1>CSS Buttons!</h1>
<div id="button">
<a href="index.html">Home</a>
<a href="products.html">Products</a>
<a href="services.html">Services</a>
<a href="contact.html">Contact</a>
<a href="about.html">About</a>
</div>
</body>
</html>
```

Save your file as link2.html. Test your page in a browser and compare it with Figure 7.6. The student files contain a sample solution at Chapter7/link2.html. The div that contains the navigation buttons was assigned to the id button. The anchor tags within the button id were configured to have a button look with the border, background-color, and padding attributes. Then, CSS rules using an anchor selector with the button id and link, visited, focus, hover, and active pseudo-classes were configured.

Part 3

It is often the case that the design of the Web page requires the main navigation links to look different from the links within the content of the pages. You have already created a page, link2.html, with specially configured navigation links. You used the id called button to configure these links. In this part of the Hands-On Practice, you will add a line of text containing a hyperlink to the page to verify that the hyperlink retains the default browser appearance and behavior. Figure 7.7 shows a sample page.





Launch Notepad and open your link2.html file. Save the file as link3.html. Modify the title to be "CSS Pseudo-class Example 3" and add the following paragraph under the navigation links:

```
Visit <a href="http://yahoo.com">Yahoo!</a>.
```

Save your file, test your page in a browser, and compare it with the one shown in Figure 7.7. The student files contain a sample solution at Chapter7/link3.html. Because the new link is not part of the defined id button, it retains the default hyperlink characteristics. If you needed yet another set of characteristics for links in another section of the page such as the footer, you could define a new id or class with a unique name and configure pseudo-classes, as was done in Part 2 of this Hands-On Practice.

As you can see, pseudo-classes—along with careful configuration of ids or classes, can be a powerful tool for a Web developer.

7.3 CSS Navigation Layout Using Lists

One of the advantages of using CSS for page layout involves the use of semantically correct code. Writing semantically correct code means using the markup tag that most accurately reflects the purpose of the content. Using the various levels of heading tags for content headings and subheadings, or placing paragraphs of text within paragraph tags (rather than using line breaks) are examples of writing semantically correct code. This type of coding is a step in the direction to support the Semantic Web. Leading Web developers such as Eric Meyer, Mark Newhouse, Jeffrey Zeldman, and others have promoted the idea of using unordered lists to configure navigation menus. After all—a navigation menu is a list of hyperlinks—semantically speaking it's a much better fit than coding hyperlinks in separate paragraphs or using the display:block property on anchor tags. Configuring navigation with a list also helps provide for accessibility. Screen reader applications offer easy keyboard access and verbal cues for information organized in lists, such as the number of items in the list.



Figure 7.8 shows the top portion of a revised twocolumn.html (the page you created in Hands-On Practice 6.6). In this version the CSS declaration for the navBar class was changed (display:block and margin:15px were removed), the left column was widened a bit, and the navigation links were coded in an unordered list. An XHTML code snippet follows:

```
<div id="leftcolumn">

    <a href="index.html">Home</a>
    <a href="spring.html">Spring</a>
    <a href="summer.html">Summer</a>
    <a href="fall.html">Fall</a>
    <a href="winter.html">Winter</a>
```



An unordered list to configure the navigation menu



Perhaps you would prefer that the bullets in the unordered list were not displayed. Use the **list-style-type property** to configure the list-item markers (bullets). The property **list-style-type:** none prevents the browser from displaying the bullets. See Appendix C for more list-style-type values.

Figure 7.9 shows the effect of configuring list-style-type:none for the new unordered list in the left column. The CSS is below:

#leftcolumn ul { list-style-type:none; }



If you would like a custom image to replace the bullet, use the **list-style-image property**. In Figure 7.10 an image named arrow.gif was configured to replace the bullets using: list-style-image:url(arrow.gif). View the twocolumn1.html file in the Chapter7 folder in the student files to examine the code.

You may be wondering how to apply this technique to a horizontal navigation menu such as the one coded on the page1.html page used in Hands-On Practice 6.5. The answer is CSS! List items are block elements. They need to be configured as inline elements to display in a single line. The display:inline property is used to accomplish this. Figure 7.11 displays a new version of the page using this technique. The page looks about the same as the original (Figure 6.18) when displayed in a browser even though the XHTML and CSS are configured to use a list.



Figure 7.9

An unordered list with list-styletype:none The XHTML code snippet is the same as the one used for the vertical navigation menus shown at the beginning of this section. For the horizontal list to display properly, you must add a CSS configuration for the selector within the nav class as follows:



View the home0.html and wildflower0.css files in the Chapter7 folder in the student files to experiment with this technique. See Chapter7/skipnav.html for a version of this page that includes a transparent image configured as an internal link to the named fragment maincontent. This "skip navigation" method allows visitors using screen readers to easily skip repetitive navigation links.

7.4 Three-Column CSS Page Layout

Often a Web page layout will consist of a header across the top of the page with three columns below: navigation, content, and sidebar. If you are thinking about this layout as a series of boxes—you're thinking correctly for configuring pages using CSS! Figure 7.12 shows a wireframe sketch of this page layout design. Figure 7.13 (shown also in the color insert section) shows a Web page configured using this design. You will create this page in the next Hands-On Practice.



container

left right news item	logoimag	je logo	
image	left navBar side image	center	right news item news item





In this Hands-On Practice you will develop your first three-column Web page using CSS. The same techniques that you used to configure the two-column page will apply here—think of the page as a series of elements or boxes. Assign ids or classes to the elements as you code the XHTML. Configure the CSS to correspond to the ids and classes. Recall that a key technique in creating a two-column page with left column navigation was to design the left column to float to the left. A key technique in our three-column page is to code the left column with float:left and the right column with float:right. The center column occupies the middle of the browser window. Refer to Figures 7.12 and 7.13 as you complete this Hands-On Practice.

Getting Started

Locate the showybg.jpg, plsthumb.jpg, and trillium.jpg files in the Chapter 7 folder in the student files. Create a new folder called wildflowers3. Copy the files to the folder.

Part 1—Code the XHTML

Review Figures 7.12 and 7.13. Notice the page elements: a logo area with both a logo and a background image that repeats; a left column with a navigation area and an image; a center column with paragraphs of text, a heading, and an image that floats to the right; a right column with two news items; and a footer. These will all be coded to use ids and classes corresponding to CSS, which configures a number of properties including the float, margin, border, font-family, and so on. The navigation menu

links will be configured using an unordered list. As you code the XHTML document, you will place the elements on the page and assign id and class values that correspond to the areas in the sketch in Figure 7.12. Launch Notepad and type in the following XHTML:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
 "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Door County Wildflowers</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
</head>
<body>
<div id="container">
 <div id="logo">
   <h1>Door County Wildflowers</h1>
 </div>
 <div id="left">
   <a href="index.html">Home</a>
    <a href="spring.html">Spring</a>
    <a href="summer.html">Summer</a>
    <a href="fall.html">Fall</a>
    <a href="winter.html">Winter</a>
   <img class="sideimages" src="plsthumb.jpg" width="100"
   height="100" alt="Showy Pink Lady Slipper" />
 </div>
 <div id="right">
   <h4>The Ridges</h4>
   The Ridges Nature Sanctuary offers wild
   orchid hikes during the summer months. For more info, visit
   <a href="http://www.ridgesanctuary.org">The Ridges</a>.
   <h4>Newport State Park</h4>
   The Newport Wilderness Society sponsors free
   meadow hikes at 9am every Saturday. Stop by the park office to
   register.
 </div>
 <div id="center">
   Wisconsin's Door County Peninsula is a unique, ecologically
   diverse place with upland and boreal forest, bogs, swamps, sand
   and rock beaches, limestone escarpments, and farmlands.
   A wide array of wildflowers grow in the county because
   of this variety of ecosystems.
   <img src="trillium.jpg" width="200" height="150" alt="Trillium"
   id="floatright" />
```

```
<h3>Explore the beauty <br />of Door County Wildflowers....</h3>
With five state parks, tons of county parks, and private
nature sanctuaries, Door County is teeming with natural areas
for you to stalk your favorite wildflowers.
</div>
</div id="footer">
Copyright © 2010 Door County Wild Flowers<br />
Last Updated on 06/10/10
</div>
</div>
</div>
```

Save your page as threecolumn.html in your wildflowers3 folder. Test the page in a browser. Your display will not look like Figure 7.13 since you have not yet configured the CSS. The top of your page should look similar to the page shown in Figure 7.14.



Part 2—Code the Basic CSS

For ease of editing, in this Hands-On Practice you will code the CSS as embedded styles in the header section of the Web page. However, if you were creating an entire Web site you would most likely use an external style sheet as you did in Hands-On Practice 6.5.

Launch Notepad and open threecolumn.html. Let's take a moment to consider the main elements used on the page shown in Figure 7.13: logo, left column, right column, center column, and footer. The left column will contain a navigation area and a small image. The center column will contain paragraphs, a heading, and a right-floating image. The right column will contain a series of headings and news items. Locate these areas on the sketch in Figure 7.12. Notice also that the same font is used throughout the page and the page begins right at the browser margin. Launch Notepad and open your threecolumn .html file. In the header section of your Web page document, add a tag to begin the embedded styles:

```
<style type="text/css">
```

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Now let's consider the CSS configuration. Type the CSS in your document as it is discussed as follows:

1. Body Selector. Set the margin to 0 pixels. Configure the background color to #ffffff.

```
body { margin:0;
     background-color: #ffffff;
}
```

2. Container. Configure this area with background (#eeeeee) and text (#006600) colors, a minimum width of 700 pixels, and with font family of Verdana, Arial or sans-serif.

3. Logo. Code this area so that the image showybg.jpg will repeat using background-image:url(showybg.jpg). The text should be set to 2.5em font size and bold. The height of the logo area is 100 pixels—this corresponds to the height of the background image. Although it will most likely never display, configure the background color to #eeeeee. The text color should be #cc66cc. Set the left padding to 20 pixels. Configure a 2 pixel solid black border across the bottom of this area as follows:

```
#logo { color: #cc66cc;
background-color: #eeeeee;
border-bottom: 2px solid #000000;
height: 100px;
background-image: url(showybg.jpg);
padding-left: 20px;
```

}

4. Left Column. One of the keys to this three-column page layout is that the left column is designed to float to the left of the browser window. Configure a width of 150.

```
#left { float: left;
    width: 150px;
}
```

5. Right Column. One of the keys to this three-column page layout is that the right column is designed to float to the right of the browser window. Configure a width of 200 pixels.

```
#right { float: right;
    width: 200px;
}
```

6. Center. The center column will take up all the room that is available after the left and right columns float. The content area has a special need for margins since the left and right columns are floating on either side. Set the left margin to 150 pixels, the right margin to 200 pixels, and the remaining side margins to 0. Configure

}

padding for this area, also. Set the background (#fffff) and text (#006600) colors for this area.

```
#center { margin: 0 200px 0 150px;
    padding: 1px 10px 20px 10px;
    background-color: #ffffff;
    color: #006600;
```

7. Footer. Configure the page footer with very small text that is centered. Configure the background (#ffffff) and text (#006600) colors for this area. Set the top padding to 10 pixels. A clear:both is needed to clear the float of the right and left columns as follows:

```
#footer { font-size: .70em;
    text-align: center;
    color: #006600;
    background-color: #ffffff;
    padding-top: 10px;
    clear:both;
}
```

At this point you have configured the main elements of the three-column page layout. It's a good idea to save and do a quick test to make sure you are on the right track. Code the closing XHTML style tag: </style>.

Save the threecolumn.html file in the wildflowers3 folder. Test your page in a browser. It should look similar to the one shown in Figure 7.15. Note that there is still some detail work to do but you are well on your way!



Figure 7.15 The CSS for the basic elements of the three-column layout is complete

Part 3—Continue Coding CSS

Now you are ready to continue with your styles. Open the threecolumn.html page in Notepad and position your cursor on a blank line above the closing style tag. First we will configure the components in the left column as follows:

 Logo Area. Notice the extra space above the "Door County Wildflowers" text which is contained within <h1> element in the logo area. You can eliminate this extra space by setting a 0 top margin for the h1 selector. Also configure the fontsize to 3em for the h1 selector.

```
h1 { margin-top: 0;
font-size: 3em;
}
```

2. Navigation Menu. Configure the unordered list to provide for a 20 pixel top margin and not to display any bullets.

}

Configure the navigation links to have no underline (text-decoration:none). Configure the font size to 1.2em. Pseudo-classes should be configured for link, visited, hover, active, and focus with different text colors as follows:

3. Left Column Image (sideimages). Configure this class with a margin of 30 pixels as follows:

.sideimages { margin: 30px;}

Next, we'll configure the contents of the center column. Styles for paragraphs, heading elements, and an image that floats to the right need to be constructed.

4. Configure the paragraph selector to use a margin of 20 pixels as follows:

p { margin: 20px; }

5. Configure the h3 selector with the same text color as the logo and the same background color as the main body of the page as follows:

```
h3 { color: #cc66cc;
background-color: #ffffff;
}
```

6. Image Floating at the Right. Set the floatright id to use a 10 pixel margin and float:right as follows:

```
#floatright { margin: 10px;
     float: right;
}
```

Now, we'll configure the styles for the contents of the right column. The announcements consist of a heading (contained within <h4> tags) and a paragraph (assigned to a class called newsitem).

7. Configure the heading to have a 1 pixel black solid bottom border, 2 pixels of padding at the bottom, a 10 pixel margin, the same text color as the logo, and the same background color as the right column:

```
h4 { padding-bottom: 2px;
    border-bottom: 1px solid #000000;
    margin: 10px;
    color: #cc66cc;
    background-color: #eeeeee;
}
```

8. News Items. Configure a class called newsitem that uses a small font and has a 10 pixel margin as follows:

```
.newsitem { font-size:.9em;
    margin: 10px;
```

}

Save the threecolumn.html file in the wildflowers3 folder.

Part 4—Test the Page

Now that your styles are coded, test the threecolumn.html page again. Your page should look similar to the screenshot shown in Figure 7.13. If there are differences, verify the id and class values in your XHTML. Also check the syntax of your CSS. You may find the W3C CSS validator at http://jigsaw.w3.org/css-validator helpful when verifying CSS syntax. The student files contain a copy of threecolumn.html in the Chapter7 folder.



How do I create a custom-color scroll bar?

It can be fun to color-coordinate the scroll bar with your Web site! Keep in mind that not all your Web visitors will see your handiwork. While this effect is supported by Internet Explorer, it is not supported by all browsers. To configure a scroll bar with colors that you choose, add the following styles to the body tag: scrollbar-face-color, scrollbar-arrow-color, and scrollbar-track-color. For example:

```
body { scrollbar-face-color:#cc66cc;
    scrollbar-arrow-color:#006600;
    scrollbar-track-color:#cccccc;
```

}

Note: Your CSS will not pass W3C validation tests if you use these Internet Explorer only properties.



CHECKPOINT 7.1

- 1. Describe a reason to organize the files in a Web site using folders and subfolders.
- 2. State a reason to use an unordered list to configure navigation links.
- 3. You are using CSS pseudo-classes on a Web page to configure the navigation links to look like buttons. You want the "regular" links in the Web page content to be configured as they normally would (not look like a button). Describe how you could configure the styles and XHTML to accomplish this.

7.5 CSS Styling for Print

Even though the advent of the "paperless society" has been talked about for decades, the fact is that many people still love paper and you can expect your Web pages to be printed. CSS offers you some control over what gets printed and how the printouts are configured.

This is easy to do using external style sheets. Create one external style sheet with the configurations for browser display and a second external style sheet with the special printing configurations. Associate both of the external style sheets to the Web page using two <link> elements. The <link> elements will utilize a new attribute, called media which is described in Table 7.2.

Value	Purpose
screen	The default value; indicates the style sheet that configures typical browser viewport display on a color computer screen
print	Indicates the style sheet that configures the printed formatting
handheld	Indicates the style sheet that configures display on handheld mobile devices

Table 7.2 The media attribute

Modern browsers will use the correct style sheet depending on whether they are rendering a screen display or preparing to print a document. Configure the link element for your browser display with media="screen". Configure the link element for your printout with media="print". An example of the XHTML follows:

```
<link rel="stylesheet" href="wildflower.css" type="text/css"
media="screen" />
<link rel="stylesheet" href="wildflowerprint.css" type="text/css"
media="print" />
```

Often display:none is used in the print style sheet to prevent banner ads, navigation, or other extraneous areas from appearing on the printout. Another common practice is to configure the font sizes on the print style sheet to use pt sizes—this will better control the text on the printout. You can also use styles to configure areas in the document, such as detailed contact info, that are only printed out and do not appear in the browser window. Figure 7.16 shows the print preview of the content page you created in Hands-On Practice 6.5 (see Figure 6.18). Notice that the print preview includes the navigation area. Figure 7.17 displays an alternate version of the page that uses CSS to prevent the navigation area from printing. You will explore this technique in the next Hands-On Practice.





Print preview using CSS to remove the navigation from the printout



HANDS-ON PRACTICE 7.4

In this Hands-On Practice you will code special styles to use when printing a Web page. We will use the page1.html and wildflower.css files that you created in Hands-On Practice 6.5 as a starting point. Figure 6.18 shows the browser display of the page1.html file. You will create a new version of the page1.html file and a new style sheet configured for printing. When printed, the logo will be configured using a 24 pt size and the navigation will not display.

Getting Started

Locate the pls.jpg, wildflower.css, and page1.html files in the student files, Chapter7 folder. Create a new folder called wildflowersPrint. Copy the files to the folder.

Part 1—Code the XHTML

Launch Notepad and open page1.html. This page is associated with an external style sheet called wildflower.css. The styles in wildflower.css should be used when the Web page is displayed on the screen. Add the media attribute with the value of screen to the link element for wildflower.css. Code a new link element to invoke an external style sheet called wildflowerprint.css for printing (media="print"). The XHTML follows:

```
<link rel="stylesheet" href="wildflower.css" type="text/css"</pre>
    media="screen" />
<link rel="stylesheet" href="wildflowerprint.css" type="text/css"</pre>
    media="print" />
```

Save the page1.html file in the wildflowersPrint folder.

Part 2—Code the New CSS

Launch Notepad and open wildflower.css. Since you want to keep most of the styles for printing, you will start by creating a new version of the external style sheet. Save wildflower.css with the name of wildflowerprint.css in the wildflowersPrint folder. You will modify three areas on this style sheet: the contentlogo id, the content class, and the nav class configuration.

1. Modify the contentlogo id so that the printer will use 24 point font size and has no background color. The CSS follows:

```
#contentlogo { color: #000000;
               font-size: 24pt;
               padding: 10px;
```

2. Modify the content class so that the printer will use 12 point font size. The CSS follows:

```
.content { font-family: Verdana,Arial,sans-serif;
           font-size: 12pt;
           margin: 10px;
```

}

3. Configure the nav class to not be printed with the page. Delete all styles associated with the nav class and replace them with the following CSS:

```
.nav { display: none;
}
```

Save your file in the wildflowersPrint folder.

Part 3—Test Your Work

Test your page1.html file in a browser. Select Print, Preview. Your display should look similar to the page shown in Figure 7.17. The logo and content font sizes have been configured. The navigation does not display. The student files contain a copy of page1.html and wildflowerprint.css in the Chapter7/wildflowersPrint folder.



7.6 CSS Styling for the Mobile Web

Have you noticed how connected everyone seems to be these days? Access to the Web from cell phones, smartphones, and Internet tablets makes it possible to always be online. The research firm eMarketer.com predicts significant growth for mobile Web access, with a projected 134.3 million mobile Internet users by 2013. With this growth in mind, it's becoming more important to design Web pages that are accessible and usable for your mobile visitors. There are a few schools of thought on the best way to accomplish this, including developing a new mobile site with a .mobi TLD (see Chapter 1 to review TLDs), creating a separate Web site hosted within your current domain targeted for mobile users, and using CSS to create a style sheet to configure your current Web site for display on mobile devices. We'll focus on the third approach with CSS in this section.

You can create a separate style sheet to configure the display on handheld devices, just as you configured a separate style sheet to control the printed format of a Web page. Associate the style sheet with your Web page using the media attribute (media="handheld") on the <link> tag. An example is shown below:

```
<link href="mobile.css" rel="stylesheet" type="text/css" media="handheld" />
```

Now that you know how to associate a handheld style sheet with a Web page, what's the best way to configure the page? Compare the regular browser display of the Disabilityinfo.gov site in Figure 7.18 with the handheld display in Figure 7.19—there's quite a difference!

Figure 7.18

The browser display of http://disabilityinfo.gov



Users of handheld devices experience a number of usability constraints. The list below describes these constraints and provides some recommended design, XHTML, and CSS techniques to overcome or compensate for limitations experienced by mobile Web users. However, a good starting point, whether you are designing for a standard browser or

Figure 7.19

http://disabilityinfo. gov displayed with the dotMobi emulator (http:// emulator.mtld.mobi/ emulator.php)

Image © Copyright 2009. dotMobi (mTLD Top Level Domain Ltd.) All rights reserved.



for a mobile device, is to code standards-based XHTML and CSS that passes W3C validation tests.

• Small screen size. According to Opera Software, some currently common phone screen sizes include 128×160 pixels, 176×220 pixels, 240×320 pixels, 352×416 pixels, 640×320 pixels, and 640×480 pixels (large-screen phones). Even on one of the large phones, that's not a lot of pixels to work with! The workaround is to use a one-column design and avoid the use of floats, absolute positioning, tables (see Chapter 8), and frames (see Appendix A). Descriptive page titles and heading tags will help to establish an effective mobile Web presence. Centered content and borders can work well for small screen display. Eliminate nonessential content with the CSS display:none property. For example:

#sidebar { display:none; }

• Low bandwidth (slow connection speed). Although the use of faster 3G networks is becoming more widespread, many mobile users experience slow connection speeds. Images usually take up quite a bit of bandwidth on a typical Web site. Techniques to improve mobile Web usability related to images include providing descriptive text for images, optimizing the file size of images, and avoiding using images for navigation. Consider replacing images with others configured for small-screen display. For example:

```
#imagelogo { background-image: url(smalllogo.gif); }
```

• Font issues. Mobile devices may have very limited font support. Configure font size using ems or percentages. Include generic font family names in your style sheet. For example:

```
p { font-family: Arial, sans-serif; }
```

- **Color issues.** Mobile devices may have very limited color support. Choose colors carefully to maximize contrast.
- Awkward controls. While smartphones with touch controls are becoming more popular, many mobile users will not have access to mouselike controls. Provide keyboard access to assist these users. Configure your XHTML using headings, navigation in ordered lists (some cell phones will provide numeric keypad access), Skip to Content hyperlinks, and Skip to Top hyperlinks to help your mobile visitors more conveniently navigate your site.
- Flash support issues. Many mobile devices do not support Adobe Flash multimedia. (See Chapter 11 for more information on Flash and providing alternate content.)
- Limited processor and memory. Although mobile device processing speed and available memory are improving, they still cannot compare to the resources of a desktop computer. While this won't be an issue for the Web sites you create now, be mindful of this issue in the future as you continue to develop your skills and create Web applications.
- **Cost per kilobyte.** Depending on the service plan, some mobile Web visitors may be paying per kilobyte. Be aware of this and eliminate unnecessary images as described above.



As you reviewed the list above, you may have noticed that some of the techniques such as writing descriptive alt text for images, choosing text and background colors with good contrast, and configuring Skip to Content hyperlinks—are the same as the recommended practices to provide for accessibility. In fact, there is quite an overlap in the design and coding techniques needed to create a Web site that is accessible for visitors with disabilities and those intended for mobile Web visitors. See http://www.w3.org/ WAI/mobile/ for more information on this topic.

Once you've applied the design and coding techniques described above, it's important to test your Web site in mobile devices and/or emulators. Figure 7.20 shows a modified version of the Door County Wildflowers site displayed in the Opera browser's small screen view. Notice some differences with the regular browser display of this page in Figure 7.11—the logo image does not display, the navigation links are configured in a list, and there are additional navigation aids (Skip to Content and Back to Top hyperlinks). The

Figure 7.20

Opera's small screen view



effect of a new handheld style sheet and a few XHTML coding changes/additions to the navigation is a Web page that is more usable and accessible for mobile visitors.

As mobile devices evolve and mobile bandwidth improves, there are sure to be new developments in this area of Web design. If you are interested in exploring this topic further, you'll find the resources below helpful.

- http://dev.opera.com/articles/view/the-phone-factor-2/
- http://www.cameronmoll.com/archives/000577.html
- http://patterns.littlespringsdesign.com/index.php/ Mobile_Style_Guides_Screen_Design,_Part_1
- http://patterns.littlespringsdesign.com/index.php/ Mobile_Style_Guides_Screen_Design,_Part_2
- http://www.w3.org/TR/2008/REC-mobile-bp-20080729/



Will every mobile device use my "handheld" style sheet?

Many mobile devices will apply the handheld style sheet when displaying your Web page. However, some mobile devices, such as the iPhone, iTouch, and Nokia Internet Tablet, run mini-browsers that render the style sheet configured for media="screen" and ignore the media="handheld" style sheet. You'll need to test your mobile device. For a quick check, visit http://htmldog.com/test/handheld.html to determine if your device applies a handheld style sheet.

7.7 The "Cascade"

Figure 7.21 shows the "cascade" (**rules of precedence**) that applies the styles in order from outermost (external styles) to innermost (actual XHTML coded on the page). This way site-wide styles can be configured but overridden when needed by more granular (or page-specific) styles.





External styles can apply to multiple pages. If a Web page contains both a link to an external style sheet and embedded styles, the external styles will be applied first, and then the embedded styles will be applied. This allows a Web developer to override global external styles on selected pages.

If a Web page contains both embedded styles and inline styles, the embedded styles are applied first, and then the inline styles are applied. This allows a Web developer to override page-wide styles for particular XHTML tags or classes.

Any XHTML tag or attribute will override styles. For example, a tag will override corresponding font-related styles configured for an element. If no attribute or style is applied to an element, the browser default is applied. The appearance of the browser default may vary by browser and you might be disappointed with the result. Specify the properties of your text and Web page elements using CSS. Avoid depending on the browser default.

The overall CSS cascade was described above. In addition to this general cascade of CSS types, the style rules themselves follow rules of precedence. Style rules applied to more local elements (such as a paragraph) take precedence over those applied to more global elements (such as a <div> which contains the paragraph).

Let's look at an example of the cascade. The CSS and XHTML code is shown below. The CSS has two style rules: a rule creating a class named content which configures text using the Arial (or generic sans-serif) font family, and a rule configuring all paragraphs to use the Times New Roman (or generic serif) font family. The CSS follows:

```
.content { font-family:Arial, sans-serif; }
p { font-family: "Times New Roman", serif; }
```

The XHTML on the page contains a <div> with multiple elements, such as headings and paragraphs. Partial code follows:

```
<div class="content">
   <hl>Main Heading</hl>
   This is a paragraph. Notice how the paragraph is contained in
   the div.
   </div>
```

Here's how the browser would render the code:

- The text contained in the heading is displayed with Arial font because it is part of the <div> assigned to the content class. It inherits the properties from its parent (<div>) class. This is an example of inheritance, in which certain CSS properties are passed down to elements nested within a container element, such as a <div> or <body> element. Text-related properties (font-family, color, etc.) are generally inherited but box-related properties (margin, padding, width, etc.) are not. See http://www.w3.org/TR/CSS21/propidx.html for a detailed list of CSS properties and their inheritance status.
- 2. The text contained in the paragraph is displayed with Times New Roman font because the browser applied the styles associated with the most local element (the paragraph). Even though the paragraph was contained in (and is considered a child of) the content class, the local paragraph style rules took precedence and were applied by the browser.

Don't worry if CSS and rules of precedence seem a bit overwhelming at this point. CSS definitely becomes easier with practice. You'll get a chance to practice with the "cascade" as you complete the next Hands-On Practice.

HANDS-ON PRACTICE 7.5

You will experiment with the "cascade" in this Hands-On Practice as you work with a Web page that uses external, embedded, and inline styles. Begin by creating an external style sheet called site.css that sets the background-color of the Web page to a shade of yellow (#FFFFCC) and the text color to black (#000000). The code follows:

```
body { background-color: #FFFFCC;
      color: #000000;
```

}

Next, create a Web page called mypage1.html that is associated with the file site.css and has an embedded style that sets the text color to blue. The file mypage1.html will contain two paragraphs of text. The XHTML used to code the first paragraph will not use any styles. The XHTML used to code the second paragraph will use inline styles to set the text color to red. The code for mypage1.html follows:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
 "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>External Styles</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
 <link rel="stylesheet" href="site.css" type="text/css" />
 <style type="text/css">
 body { color: #0000FF;
 </style>
</head>
<body>
This paragraph applies the external and embedded styles —
note how the blue text color that is configured in the embedded
styles takes precedence over the black text color configured in the
external stylesheet.
Inline styles configure this paragraph to
have red text and take precedence over the embedded and external
styles.
</body>
</html>
```

Save both site.css and mypage1.html in the same folder. Display mypage1.html in a browser. Your page should look similar to the sample shown in Figure 7.22. The student files contain a sample solution at Chapter7/mypage1.html.



Take a moment to examine the mypage1.html Web page and compare it with its source code. The Web page picked up the yellow background from the external style sheet. The embedded style configured the text to be the color blue, which overrides the black text color in the external style sheet. The first paragraph in the Web page does not contain any inline styles, so it inherits the style rules in the external and embedded style sheets. The second paragraph contains an inline style of red text color—this setting overrides the corresponding external and embedded styles.



Is there a quick way to apply the same styles to more than one XHTML tag or more than one class?

Yes, you can apply the same style rules to multiple selectors (such as XHTML elements, classes, or ids) by listing the selectors in front of the rule. The code sample below shows the font-size of 1em being applied to both the paragraph and line item elements.

p, li { font-size: lem; }



CHECKPOINT 7.2

- 1. State an advantage of using CSS to style for print.
- 2. Describe how to choose whether to configure an XHTML tag, create a class, or create an id when working with CSS.
- 3. List the following terms in the order that the properties and attributes are applied when using CSS.

Inline styles External styles XHTML attributes Embedded styles

CHAPTER SUMMARY

This chapter explored a variety of Web development topics including XHTML relative hyperlinks, linking to fragment identifiers, CSS pseudo-classes, navigation list layout, three-column page layout, styling for print, styling for the mobile Web, and an overview of the "cascade" in Cascading Style Sheets.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

active pseudo-class the "cascade" focus pseudo-class fragment identifier hover pseudo-class inheritance link pseudo-class list-style-type property list-style-image property media attribute named fragment pseudo-class rules of precedence target attribute visited pseudo-class

Review Questions

Multiple Choice

- **1.** Which of the following attributes define a fragment identifier in a page?
 - a.id
 - b. name
 - c. fragment
 - d. bookmark
- 2. How would you link to the named fragment #jobs on the page employ.html from the home page of the site?
 - a.
 Employment Opportunities
 - b. Employment Opportunities
 - c.
 Employment Opportunities
 - d. none of the above
- **3.** Which of the following causes an element not to display either in the browser window or on a printed page?
 - a. display:block;
 - b. display: 0px;
 - c. display:none;
 - d. this cannot be done with CSS

- **4.** Which attribute below can be applied to an anchor tag to open a link in a new browser window?
 - a. window
 - b. target
 - c. rel
 - d. media
- **5.** Which of the following is the attribute used to indicate whether the style sheet is for printing, screen display, or for mobile devices?
 - a. rel
 - b. type
 - c. media
 - d. content
- **6.** Which of the following is true if a Web page contains both a link to an external style sheet and embedded styles?
 - a. embedded styles will be applied first, then the external styles will be applied
 - b. the inline styles will be used
 - c. external styles will be applied first, and then the embedded styles will be applied
 - d. Web page will not display

- 7. Which property and value is used to configure an unordered list item so that the bullet does not display?
 - a. list-bullet:none;
 - b. list-style-type:none;
 - c. list-style-type:off;
 - d. list-marker:none;
- 8. Which of the following pseudo-classes is triggered when the hyperlink has keyboard focus?
 - a. hover
 - b. link
 - c. active
 - d. focus
- **9.** Which of the following properties configures an image to use as a bullet point in an unordered list?
 - a. bullet-image
 - b. image-style
 - c. list-style-image
 - d. bullet-style-image

- **10.** Which of the following pseudo-classes is the default state for a hyperlink that has already been clicked?
 - a. hover
 - b. link
 - c. onclick
 - d. visited

Fill in the Blank

- To indicate that an external style sheet is used to configure printing, code ______ on the <link> element.
- **12.** The ______ is always transparent.
- The ______ pseudo-class can be used to modify the display of a hyperlink when a mouse passes over it.
- 14. ______ is an attribute of the anchor element that can cause the new Web page to open in its own browser window.
- **15.** The rules of ______ describe how Cascading Style Sheet rules, XHTML attributes, and browser defaults are applied.

Apply Your Knowledge

1. Predict the Result. Draw and write a brief description of the Web page that will be created with the following XHTML code:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Predict the Result</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
body { background-color: #000066;
       color: #CCCCCC;
       font-family: Arial,sans-serif;
}
h1 { background-color: #FFFFFF;
     color: #000066;
     padding: 20px;
}
.navBar li { list-style-type: none;
             display: inline;
             padding: 20px;
}
```

```
.navBar a { text-decoration: none;
              font-size: 1.2em;
  }
  .navBar a:link {color: #eeeeee; }
  .navBar a:visited {color: #778899; }
  .navBar a:hover {color: #3399CC; }
  </style>
  </head>
  <body>
  <h1>Trillium Media Design</h1>
  <a href="index.html">Home</a>
    <a href="about.html">About</a>
    <a href="services.htm">Services</a>
  Our professional staff takes pride in its working relationship
 with our clients by offering personalized services that listen to
  their needs, develop their target areas, and incorporate these
  items into a well presented web site that works.
  </body>
  </html>
2. Fill in the Missing Code. This Web page should be configured so that the left naviga-
  tion column has a light pastel background color and floats on the left side of the
```

```
browser window. Instead, the navigation displays with a white background color.
CSS properties and values, indicated by "_" (underscore), are missing. Fill in the
missing code to correct the error.
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
```

```
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Fill in the Missing</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
body { background-color: #d5edb3;
       color: #000066;
       font-family: Verdana, Arial, sans-serif;
}
#leftcolumn { float: left;
              width: 120px;
}
#rightcolumn { " ": " ";
               background-color: #ffffff;
               color: #000000;
               padding: 20px;
}
</style>
</head>
```

```
<body>
<div id="leftcolumn">
  <a href="index.html">Home</a>
    <a href="spring.html">Spring</a>
    <a href="summer.html">Summer</a>
    <a href="fall.html">Fall</a>
    <a href="winter.html">Winter</a>
  </div>
<div id="rightcolumn">
  <h1>Trillium Media Design</h1>
  Our professional staff takes pride in its working relationship
  with our clients by offering personalized services that listen to
  their needs, develop their target areas, and incorporate these
  items into a well presented web site that works.
  </div>
</body>
</html>
```

3. Find the Error. The page below is intended for the navigation area to display on the right side of the browser window. What needs to be changed to make this happen?

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Find the Error</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
body { background-color: #d5edb3;
       color: #000066;
       font-family: Verdana, Arial, sans-serif;
}
#rightcolumn { float: left;
              width: 120px;
}
#maincontent { padding: 20px 150px 20px;
              background-color: #ffffff;
              color: #000000;
}
</style>
</head>
<body>
<div id="rightcolumn">
  <a href="index.html">Home</a>
   <a href="spring.html">Spring</a>
   <a href="summer.html">Summer</a>
```

Hands-On Exercises

- **1.** Write the XHTML to create a fragment identifier at the beginning of a Web page designated by "top".
- 2. Write the XHTML to create a hyperlink to the named fragment designated by "top".
- **3.** Write the XHTML to associate a Web page with an external style sheet named myprint.css to configure a printout.
- **4.** Write the XHTML to associate a Web page with an external style sheet named mobile.css to configure display for handheld devices.
- **5.** Write the CSS to configure an image file named myimage.gif as the "bullet" in an unordered list.
- 6. Write the CSS to configure an unordered list not to display a "bullet".
- **7. Extending Hands-On Practice 7.3.** In Hands-On Practice 7.3 you created files for a version of the Door County Wildflowers Web site. These files are also available in the Chapter7 folder in the student files. In this exercise, you will create two additional content pages for the Door County Wildflowers site, called spring.html and summer.html. Be sure that all CSS is placed in an external style sheet, called mywildflower.css. (Modify pre-existing pages to use this style sheet). Rename threecolumn.html as appropriate. The following is some content to include on the new pages:

Spring Page (spring.html):

- Use the trillium.jpg image (see the Chapter7 folder in the student files).
- Trillium facts: 8–18 inches tall, perennial, native plant, grows in rich moist deciduous woodlands, white flowers turn pink with age, fruit is a single red berry, protected flower species.

Summer Page (summer.html):

- Use the yls.jpg image (see the Chapter7 folder in the student files).
- Yellow Lady's Slipper facts: 4–24 inches tall, perennial, native plant, grows in wet shaded deciduous woods, swamps, and bogs, an orchid, official flower of Door County.
Hand in printouts of mywildflower.css, spring.html source code (print in Notepad), summer.html source code, the browser display of spring.html, and the browser display of summer.html to your instructor.

- 8. Configure Printing for Hands-On Practice 7.3. Configure special printing for the threecolumn.html file created in Hands-On Practice 7.3. Use the threecolumn.html file from Hands-On Practice 7.3 as a starting point. This file is in the Chapter7 folder in the student files. Save a copy of this file as threecolumnprint.html. Modify the file so that it links to an external style sheet called threecolumn.css instead of using embedded styles. Save and test your page. Create a new style sheet, called myprint.css, which will prevent the navigation from displaying when the page is printed. Modify the threecolumnprint.html page to link to this file. Review the use of the media attribute on the link element. Save all files and test your page. Select File, Print Preview to test the print styles. Hand in printouts of myprint.css, threecolumnprint.html source code (print in Notepad), and the browser display of threecolumprint.html to your instructor.
- **9.** Modify the Design of Hands-On Practice 7.3. Locate the threecolumn.html page you created in Hands-On Practice 7.3. This file is in the Chapter7 folder in the student files. Recall from Chapter 5 that a Web page using jello design has content in the center of the Web page with blank margins on either side. Configure the style rules for threecolumn.html to display the page in this manner. Refer to Chapter 5 for CSS style rule suggestions. Hand in printouts of the source code (print in Notepad) and browser display for the Web page to your instructor.
- **10. Practice Validating CSS.** Choose a CSS external style sheet file to validate—perhaps you have created one for your own Web site. Otherwise, use an external style sheet file that you worked with in this chapter. Use the W3C free CSS validator (http:// jigsaw.w3.org/css-validator/). If your CSS does not immediately pass the validation test, modify it and test again. Repeat this process until the W3C validates your CSS code. Write a one or two paragraph summary about the validation process. Answer the following questions. Was it easy to use? Did anything surprise you? Did you encounter a number of errors or just a few? How easy was it to determine how to correct the CSS file? Would you recommend this to other students? Why or why not?

Web Research

You've been working a lot with navigation links in this chapter. There is one aspect that we did not discuss—configuring background images in navigation links using CSS, sometimes referred to as CSS Sprites. There are numerous tutorials on the Web that present this technique. Visit the following sites and choose a tutorial you find easy to read.

- http://www.cssplay.co.uk/menus/menu5teen.html
- http://www.from-the-couch.com/post.cfm/title/how-to-use-css-sprites
- http://www.alistapart.com/articles/sprites
- http://css-tricks.com/css-sprites
- http://www.smashingmagazine.com/2009/04/27/the-mystery-of-css-spritestechniques-tools-and-tutorials
- http://www.shapeshed.com/journal/overlapping_tabbed_navigation_in_css

Choose and follow one of the tutorials listed above. Create a Web page that uses this new technique. The Web page should provide the URL of your tutorial, the name of the Web site, and a description of the new technique you discovered. Place your name in the e-mail address at the bottom of the Web page. Print the external style sheet (if you used one), the Web page source code (from Notepad), and the browser view of your Web page.

Focus On Web Design

Take a few moments and visit the CSS Zen Garden at http://www.csszengarden.com. Explore the site and note the widely different designs. What thought processes and decisions are needed as a person creates a new design for this site? Visit http://stopdesign.com/ archive/2003/06/02/design-process.html, http://manisheriar.com/blog/anatomy-of-adesign-process, or http://www.bobbyvandersluis.com/articles/gardenparty.php for a behind-the-scenes look at how Web developers have approached this task. Reflect on their stories and suggestions. Write a one page (double-spaced) essay that describes ideas about the design process you'll be able to use as you begin to design Web sites for personal or professional use. Be sure to include the URL of the resources you used.



Each of the following case studies continues throughout most of the text. This chapter configures the main navigation in your Web sites to utilize an unordered list.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House Case Study. Figure 2.26 shows a site map for the JavaJam Web site. The pages were created in earlier chapters. You will use the existing Web site in the javajamcss folder (unless your instructor specifies otherwise) as a start and create a new version that configures the main navigation using an unordered list.

Hands-On Practice Case

- Review Section 7.2 CSS Pseudo-classes and Links and Section 7.3 CSS Navigation Layout using Lists.
- 2. Modify the javajam.css file as needed to configure the main navigation links in an unordered list without "bullets". Also configure the main navigation links to change color when a mouse hovers over them.
- **3.** Modify the index.html, menu.html, and music.html Web pages to display the main navigation links in an unordered list.
- **4.** Launch a browser and test the pages in the javajamcss folder. Modify your java.css file as needed to configure your pages. Be sure to test in more than one browser.

Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows a site map for the Fish Creek Web site. The pages were created in earlier chapters. You will use the existing Web site in the fishcreekcss folder (unless your instructor specifies otherwise) as a start and create a new version that configures the main navigation and footer navigation using an unordered list.

Hands-On Practice Case

- 1. Review Section 7.3 CSS Navigation Layout using Lists.
- 2. Modify the fishcreek.css file as needed to configure the main navigation links and footer navigation links in an unordered list without "bullets". *Hint*: To eliminate the extra space on the left side of the fish navigation links, use CSS to configure the unordered list to have 0 margin and padding on the left side.
- **3.** Configure the anchor selector's link, visited, and hover pseudo-classes to have light-colored text (for example, #CCCCCC, #CCFFCC, or #FFFFFF).
- **4.** Modify the index.html, services.html, and askvet.html Web pages to display the main navigation links in an unordered list.
- **5.** Modify the index.html, services.html, and askvet.html Web pages to display the footer navigation links in an unordered list.
- **6.** Launch a browser and test the pages in the fishcreekcss folder. Modify your fishcreek.css file as needed to configure your pages. Be sure to test in more than one browser.

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for the Pasha the Painter Web site. The pages were created in earlier chapters. You will use the existing Web site in the paintercss folder (unless your instructor specifies otherwise) as a start and create a new version that configures the main navigation using an unordered list.

Hands-On Practice Case

- Review Section 7.2 CSS Pseudo-classes and Links and Section 7.3 CSS Navigation Layout using Lists.
- 2. Modify the painter.css file as needed to configure the main navigation links in an unordered list without "bullets". Also configure the main navigation links to change color when a mouse hovers over them. *Hint*: To eliminate the extra space on the left side of the main navigation links, use CSS to configure the unordered list to have 0 margin and padding on the left side.
- **3.** Modify the index.html, services.html, and testimonials.html Web pages to display the main navigation links in an unordered list.
- **4.** Launch a browser and test the pages in the paintercss folder. Modify your painter.css file as needed to configure your pages. Be sure to test in more than one browser.

Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case Study. Figure 2.38 shows a site map for the Prime Properties Web site. The pages were created in earlier chapters. You will use the existing Web site as in the primecss folder (unless your instructor specifies otherwise) as a start and create a new version that configures the main navigation and footer navigation using an unordered list.

Hands-On Practice Case

- Review Section 7.2 CSS Pseudo-classes and Links and Section 7.3 CSS Navigation Layout using Lists.
- 2. Modify the prime.css file as needed to configure the main navigation links and footer navigation links in an unordered list without "bullets". Also remove the image buttons and, instead, configure CSS buttons with text that changes color when the mouse hovers over them. *Hint*: To eliminate the extra space on the left side of the main navigation links, use CSS to configure the unordered list to have 0 margin and padding on the left side.
- **3.** Modify the index.html, financing.html, and listings.html Web pages to display the main navigation links in an unordered list.
- **4.** Modify the index.html, financing.html, and listings.html Web pages to display the footer navigation links in an unordered list.
- **5.** Launch a browser and test the pages in the primecss folder. Modify your prime.css file as needed to configure your pages. Be sure to test in more than one browser.

Web Project

See Chapters 5 and 6 for an introduction to the Web Project case. You will modify the main navigation and footer navigation to use an unordered list. If appropriate, also add interactivity to the main navigation area with CSS pseudo-classes.

Hands-On Practice Case

- Review Section 7.2 CSS Pseudo-Classes and Links and Section 7.3 CSS Navigation Layout Using Lists.
- **2.** Modify your project's external CSS file and Web page files as needed to configure the main navigation and footer navigation in an unordered list.
- **3.** Optional: Modify your project's external style sheet to configure CSS link and hover pseudo-classes for your main navigation hyperlinks.
- **4.** Launch a browser and test the Web pages. Modify your files as needed to configure your pages. Be sure to test in more than one browser.

This page intentionally left blank

CHAPTER

Tables

Chapter Objectives In this chapter, you will learn how to ...

- Create a table on a Web page
- Apply attributes to format tables, table rows, and table cells
- Format an entire Web page within a table
- Use nested tables
- Use CSS to configure an XHTML table

Tables can be used to organize Web page content. They

can also be used to provide structure and format the layout of an entire Web page. In this chapter, you will become familiar with coding XHTML tables to both organize information and format page layout. You'll configure tables using both XHTML and CSS.

8.1 Using Tables on Web Pages

Tables are commonly used on Web pages in two ways:

- To organize information
- To format the layout of an entire Web page

Although it is increasingly common to use CSS to configure page layout, some wellknown sites, such as http://www.yankeecandle.com, http://www.league.org, and http://www.craigslist.org use the older method of XHTML tables for this function.

Overview of an XHTML Table

An XHTML table is composed of rows and columns, like a spreadsheet. Each individual table cell is at the intersection of a specific row and column. Each table begins with a tag and ends with a tag. There are a number of optional attributes for the element, such as border, width, summary, cellspacing, and cellpadding. Each table row begins with a **table** data) begins with a **table** tag and ends with a **tag**. Table cells can contain text and graphics. In fact, table cells usually contain other XHTML tags such as paragraphs, headings, and tables. Be very careful to use opening and closing tags when working with tables. If you omit or misplace a tag the results are unpredictable and your page may not display at all. Figure 8.1 shows a sample table with three rows, four columns, and a border.

Figure 8.1

Table with three rows, four columns, and a border

Name Birthday		Phone	E-mail	
Jack	5/13	857-555-5555	jack04521@gmail.com	
Sparky	11/28	303-555-5555	sparky@iname.com	

The following is the sample XHTML code for the table shown in Figure 8.1:

```
Name
 Birthday
 Phone
 E-mail
Jack
 5/13
 857-555-5555
 jack04521@gmail.com
Sparky
 11/28
 303-555-5555
 sparky@iname.com
```

Notice how the table is described row by row. Also, each row is described cell by cell. This attention to detail is crucial to the successful use of tables.

What if you don't want a border on your table? The **border attribute** is optional. The table shown in Figure 8.1 uses a border with its width set to 1. If you omit the border attribute, the table displays with no visible border. Figure 8.2 shows the same table with the border attribute omitted.

Name Birthday Phone Figure 8.2 Table with no visible Jack 5/13 border

E-mail 857-555-5555 jack04521@gmail.com Sparky 11/28 303-555-5555 sparky@iname.com

XHTML Table Headings

The >, or table heading, element can be used to distinguish column headings from table content. Figure 8.3 shows a table that uses the element.

Figure 8.3 Using tags on a table

Name	Birthday	Phone	E-mail
Jack	5/13	857-555-5555	jack04521@gmail.com
Sparky	11/28	303-555-5555	sparky@iname.com

The XHTML for the table shown in Figure 8.3 is shown below. Notice that the first row uses instead of tags.

```
\langle t,r \rangle
  Name
  Birthday
  Phone
  E-mail
 Jack
  5/13
  857-555-5555
  jack04521@gmail.com
 Sparky
  11/28
  303-555-5555
  sparky@iname.com
```

XHTML Table Captions

The **<caption>** element is often used with a data table to describe its contents. The table shown in Figure 8.4 uses <caption> tags to set the caption to Birthday List.

Figure 8.4

The caption for this table is Birthday List

Birthday List				
Name	Birthday	Phone	E-mail	
Jack	5/13	857-555-5555	jack04521@gmail.com	
Sparky	11/28	303-555-5555	sparky@iname.com	

The XHTML for the table follows:

```
<caption>Birthday List</caption>
 Name
  Birthday
  Phone
  E-mail
 </t.r>
 Jack
  5/13
  857-555-5555
  jack04521@gmail.com
 Sparky
  11/28
  303-555-5555
  sparky@iname.com
```

Notice how the <caption> element was placed after the beginning tag but before the first tag.



You will work with a new version of the Trillium Web site. Create a new folder called trilliumch8 and copy the files index.html, services.html, trillium.css, trilliumbanner.jpg, and trilliumbullet.gif files from the student files Chapter8/starters folder.

Launch a text editor and open the services.html page from your trilliumch8 folder. You will modify the services page to look similar to the display shown in Figure 8.5. Locate the <h2> element. Create a table under this element with four rows and two columns. Configure the first cell in each row as a table heading. Use Figure 8.5 as a guide and type text in the table cells. Save your page and test it in a browser. A solution is located in the student files Chapter8/8.1 folder.



XHTML Table Attributes

Common element attributes include align, border, bordercolor, width, cellspacing, cellpadding, bgcolor, summary, and title. The default display of rows and cells in tables can also be modified using attributes. The most commonly used attributes with the element to configure table cells are bgcolor, valign, rowspan, and colspan. Since XHTML table attributes are widely used on the Web, it's a good idea to become familiar with them. You'll discover how to configure most of these features using CSS later in this chapter. Let's take a closer look at attributes used with elements.



Why doesn't my table display?

While Internet Explorer will display a table even if you forget about a closing tag here or there, other browsers such as Firefox can be very picky. Be sure to use Firefox to test pages that contain tables. Internet Explorer will often ignore a missing or misspelled tag and display your table. However, when Firefox encounters missing or unmatched table tags, it sometimes will not display parts of your Web page or display only a portion of the table.

As you read about each element attribute, experiment with the Birthday List table. The best way to learn to write XHTML is to practice it.

The align Attribute. This attribute specifies the alignment of the table with the values right, center, and left. The table shown in Figure 8.6 has the align attribute set to center.



Even though it is still often used, the W3C has deprecated the use of the align attribute with the tag. Later in this chapter you'll use CSS to replace the functionality of most of the table attributes—including configuring the horizontal alignment, borders, width, padding, and background color of XHTML tables.

The border Attribute. This attribute specifies whether and what type of visible border the table will have. The value ranges from 0 to 100, with 0 indicating that no border will be visible. The values between 1 and 100 determine the thickness of the visible border, where 1 indicates a relatively thin border and 100 indicates a very thick border. The table shown in Figure 8.7 has a border set to 10.

		Birthday Lis	st	
Name	Birthday	Phone	E-mail	
Jack 5/13		857-555-5555	jack04521@gmail.com	
Sparky	11/28	303-555-5555	sparky@iname.com	

Figure 8.7	
Table with a border	Б
set to 10	Ľ

The browser determines the border color and shading based on the page background color. If you want a specific color, also use the bordercolor attribute.

The bordercolor Attribute. This attribute specifies the color of the border. The values can be a color name or numeric value. See the color chart at http://webdevfoundations.net/color. The browser displays the border color as a solid color and does not shade the border when the bordercolor attribute is used. The bordercolor attribute is not part of the official W3C Recommendations but is included here because it is widely used and well supported by browsers. The table shown in Figure 8.8 has a border set to 5 and bordercolor set to a dark color.

Birthday List				
Name	Birthday	Phone	E-mail	
Jack	5/13	857-555-5555	jack04521@gmail.com	
Sparky	11/28	303-555-5555	sparky@iname.com	

The width Attribute. This attribute specifies the width of the table in either pixels or in a percentage of the Web page. The table will stretch to fit the entire width of the page if 100% is used. If width is not specified, the browser determines the width of a particular table by calculating the width of the elements and text it contains. Use the width attribute when you want more control over your Web page. The table shown in Figure 8.6 is centered and has a width set to 75%. The XHTML code for the table tag is



Figure 8.8 Table with

bordercolor set to a dark color

Which is better, specifying width by pixels or by percentage?

It depends. Keep in mind that visitors to your Web page will use monitors with different screen resolutions. If you need your table to have a fixed width that you specify, use pixels. If you'd like your table to be flexible and to resize with the browser window, use percentages. It's a good idea to test your Web pages using different screen resolutions.

The cellspacing Attribute. This attribute specifies the distance between the cells in pixels. If you omit the cellspacing attribute, the default value (usually around 2 pixels) is determined by the browser. The table shown in Figure 8.9 has cellspacing set to 10. The XHTML code for the tag follows:

Figure 8.9
Table with
cellspacing set
to 10

Birthday List					
Name	Birthday	Phone	E-mail		
Jack 5/13		857-555-5555	jack04521@gmail.com		
Sparky	11/28	303-555-5555	sparky@iname.com		

The cellpadding Attribute. This attribute specifies the distance in pixels between the cell contents and the edge of the cell. If you omit the cellpadding attribute, the default value is 1 pixel. An example with cellpadding set to 10 is shown in Figure 8.10. The XHTML code for the tag follows:

Figure 8.10 Table with cellpadding set to 10

Birthday List					
Name	Birthday	Phone	E-mail		
Jack	5/13	857-555-5555	jack04521@gmail.com		
Sparky	11/28	303-555-5555	sparky@iname.com		

AQ

Can I mix and match fixed widths and percentages?

Yes. The width attribute can be applied to table cells (elements) as well as to the entire table (element). If you are using a table to format an entire page, you might want a particular column used for navigation links to have a fixed width while the entire table uses a percentage width. As always, test your Web pages using different screen resolutions to make sure that you achieve your desired effect.

The bgcolor Attribute. This deprecated attribute specifies a background color for the table. The values can be a color name or numeric value. See the color chart at http://webdevfoundations.net/color. An example with a background color, no border, and cellpadding of 10 is shown in Figure 8.11. The XHTML code for the tag follows:

Figure 8	8.11
----------	------

Borderless table using cellpadding set to 10 along with a background color





The summary Attribute. This attribute specifies a summary of the table contents that can be accessed by a screen reader. The Web Accessibility Initiative (WAI) suggests using the summary attribute with tables containing data. For example:

```
summary="This table contains a birthday list. Each row provides
birthday and contact information for an individual. The columns
contain name, birthday, phone, and e-mail address.">
```



The title Attribute. This attribute specifies a title of the table that can be accessed by a screen reader. The value of the title attribute is displayed by some browsers, such as Internet Explorer 5 (or later), when the mouse passes over the table area. The WAI prefers using the summary attribute or the caption element instead of the title attribute.

Applying Attributes to Rows and Cells

Many of the element attributes discussed above can also be applied to , , and tags to customize the look of your table. In particular, the bgcolor, align, and width attributes are most often used. The following are commonly used

attributes for , , and elements. Later in the chapter you'll use CSS to configure the background color, alignment, and width of these page areas.

The align Attribute. This attribute can be used to align the contents of a table row or table cell within a table. In Figure 8.12, the cells containing birthday information are configured to be centered by the align attribute on the elements containing the birthday information.

Figure 8.12	Birthday List			
Table with birthday	Name	Birthday	Phone	E-mail
information center-	Jack	5/13	857-555-5555	jack04521@gmail.com
aligned	Sparky	11/28	303-555-5555	sparky@iname.com

The XHTML code for the table follows:

```
Name
 Birthday
 Phone
 E-mail
Jack
 5/13
 847-555-5555
 jack04521@gmail.com
Sparky
 11/28
 303-555-5555
 sparky@iname.com
```

The bqcolor Attribute. This deprecated attribute can be used to apply a background color to a table row or cell. See Figure 8.13 for an example of applying a background color to alternating rows of a table using this attribute.

Figure 8.13 Table using a background color on alternate rows

	Birthday List					
Name	Birthday	Phone	E-mail			
Jack	5/13	857-555-5555	jack04521@gmail.com			
Sparky	11/28	303-555-5555	sparky@iname.com			

The XHTML code for the table follows:

```
Name
Birthday
```

```
Phone
 E-mail
Jack
 5/13
 857-555-5555
 jack04521@gmail.com
Sparky
 11/28
 303-555-5555
 sparky@iname.com
```



What if I want a more interesting table?

You can alter the gridlike look of a table by applying the colspan and rowspan attributes to elements. As you get into more complex table configurations like these, be sure to sketch the table on paper before you start typing the XHTML code.

The colspan Attribute. This attribute specifies the number of columns that a cell will occupy. Figure 8.14 shows a row that spans two columns.

Figure 8.14

Table with a row that spans two columns

```
This spans two column
Column 1 Column 21
```

The XHTML code for the table follows:

```
    This spans two columns

    Column 1
    Column 1

    > > > > > > > > > > > > > >
```

The rowspan Attribute. This attribute specifies the number of rows that a cell will occupy. An example of a column that spans two rows is shown in Figure 8.15.

Figure 8.15 Table with a column that spans two rows

This spans two rows	Row 1 Column 2
	Row 2 Column 2

The XHTML code for the table follows:

```
    This spans two rows
    Row 1 Column 2
    Row 1 Column 2
    Row 2 Column 2Row 2 Col
```

The valign Attribute. This attribute specifies the alignment of the text or image in the cell. The default vertical alignment is middle, shown in the rowspan example in Figure 8.15. Use the valign attribute when you need the contents of a cell to be vertically aligned at the top or bottom of a cell. Common values for the valign attribute are top, middle, and bottom. Figure 8.16 shows the valign attribute used to top align the contents of the first cell.

Figure 8.16				
The first cell in this				
table uses the				
valign attribute				

This spans two rows	Row 1 Column 2	
	Row 2 Column 2	

The XHTML code for the table follows:

```
    This spans two rows
    Row 1 Column 2
    Row 1 Column 2
    Row 2 Column 2
```

HANDS-ON PRACTICE 8.2

You will continue to work with the Trillium Web site. Launch Notepad or another text editor and open the services.html page from your trilliumch8 folder. Center the table on the page with the align="center" attribute. Configure the width of the table to 75%. Set the cellpadding to 5 and the cellspacing to 0. See Figure 8.17 for an example.

Be sure to use the summary attribute to help provide for accessibility. Save your page and test it in a browser. Compare your work to the sample in the student files (Chapter8/8.2).



Accessibility and Tables



This chapter has introduced two recommended methods to increase the accessibility of tables:

- Use elements to indicate column or row headings.
- Use the summary attribute on the table element to provide an overview of the table contents.

If you are coding a simple data (informational) table it is sufficient to code tags to indicate row or column headers. However, for more complex tables the group recommends specifically associating the table cell values with their corresponding headers. This technique uses the id attribute (usually in a element) to identify a specific header cell and the **headers attribute** in a element. Figure 8.18 shows a table that has been configured in this manner.

Figure 8.18

This informational table was coded with techniques to improve accessibility

School Attended	Years	Subject	Degree Awarded
Schaumburg High School	2005-2009	College Prep	H.S. Diploma
Harper College	2009-2010	Internet & Web Development	Web Developer Certificate

The XHTML code for the table follows:

```
School Attended
 Years
 Subject
 Degree Awarded
Schaumburg High School
 2005 - 2009
 College Prep
 H.S. Diploma
Harper College
 2009 - 2010
 Internet & Web Development
 Web Developer Certificate
```



What about the scope attribute?

The scope attribute specifies the association of table cells and table row or column headers. It is used to indicate whether a table cell is a header for a column (scope="col") or row (scope="row"). An example of the code for the table in Figure 8.18 that uses this attribute is shown below.

```
School Attended
 Years
 Subject
 Degree Awarded
Schaumburg High School
 2005 - 2009
 College Prep
 H.S. Diploma
< t.r >
 Harper College
 2009 - 2010
 Internet & amp; Web Development
 Web Developer Certificate
```

As you reviewed the code sample above, you may have noticed that using the scope attribute to provide for accessibility requires less coding than implementing the headers and id attributes. However, due to inconsistent screen reader support of the scope attribute, the W3C's Web Accessibility Initiative (WAI) WCAG 2.0 recommendations for coding techniques encourage the use of headers and id attributes rather than the scope attribute.

XHTML Table Row Groups

There are lots of configuration options when coding tables. Table rows can be put together into three types of table row groups: table head (<thead>), table body (), and table footer (<tfoot>). This can be useful when you need to configure the areas in the table in different ways, using either attributes or CSS (see Section 8.3). The tag is required if you configure a <thead> or <tfoot> area, although you can omit either the table head or table footer if you like. The code sample below (see student files Chapter8/tables/tablesections.html) configures the table shown in Figure 8.18 using <thead> and groups.

```
<thead>
 \langle t,r \rangle
  School Attended
  Years
  Subject
  >Degree Awarded
 </thead>
Schaumburg High School
  2005 - 2009
  College Prep
  H.S. Diploma
 Harper College
  2009 - 2010
  Internet & amp; Web Development
  Web Developer Certificate
```

When you use table row groups, the <thead> and <tfoot> sections must be coded *before* the section to pass W3C XHTML validation. See Chapter8/tables/ tfoot.html for an example.

CHECKPOINT 8.1

- 1. Describe two reasons to use tables on a Web page.
- 2. Describe the difference between the cellpadding and cellspacing table attributes.
- 3. Describe one coding technique that increases the accessibility of an XHTML table.

8.2 XHTML—Table Page Layout

You may be wondering about the title of this section because you've been configuring page layout using CSS. While CSS page layout configuration is a more modern and preferred method, some current Web sites are still designed with table-based page layouts. You'll explore this coding technique in this section. Let's take a look at some well-known sites that at the time this was written use tables to format their Web pages http://www.yankeecandle.com, http://www.league.org, and http://www.craigslist.org. As you surf the Web and analyze these and other sites, look for a Web page layout that appeals to you. View the source code by selecting View, Source from the browser menu bar (for IE7+ select Page, View Source). Examine how the page was formatted. You will find that many of the pages use tables. It is important not to copy a page, but rather to get ideas from many sources and organize them in a fresh, new way that is all your own. When designing a new Web page, it's a good idea to sketch your ideas on paper first.

Figure 8.19 shows a sketch of a common format consisting of a horizontal banner and three columns. Notice that the middle cell in the second row is used for spacing purposes only—to separate the navigation area from the content area. Sample XHTML code for this type of table layout follows:

```
    <h1>This is the banner area</h1>

    Place Navigation here
    vidth="20%" valign="top">Place Navigation here
    vidth="10"> 
    vidth="10"> <tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10">&nbsp;<tdvidth="10"</td><tdvidth="10">&nbsp;<tdvidth="10"</td><tdvidth="10"</td><tdvidth="10">&nbsp;<tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvidth="10"</td><tdvi
```



Using a table to format a Web page



A Web page using this type of table layout is shown in Figure 8.20 and can be found in the student files (Chapter8/tables/table1.html).



The character is coded in the table displayed by Figure 8.20 as a placeholder in the cell used for a spacer. Recall from Chapter 2 that is a special character that creates a nonbreaking space.

The alignment of the table will be to the left by default. This can sometimes make the page look unbalanced when it is viewed with a monitor set to a higher resolution, such as 1280×1024. To prevent this display issue, use the align attribute (or CSS as described later in the chapter) to center the table. Assign the table a percentage width of the Web page. These techniques will cause all browsers of varying resolutions to display the table centered and extended across 80 percent of the Web page.

Figure 8.21 shows a similar Web page layout—only the cellspacing and cellpadding attributes on the table tag were changed. This layout uses cellspacing set to 0 and cellpadding set to 10. Note how the cellspacing value of 0 merges the table cell backgrounds while the cellpadding value configures additional empty space around the text. Examine the source code in the student files (Chapter8/tables/table1a.html).

Accessibility and Layout Tables



You've become aware that tables are often used to configure Web page layouts on the Web. This technique has been used for years. When using a table in this manner it is important to understand that screen readers and other assistive technologies typically access a table in a *linear manner*—that is, they "read" the table row by row.

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This table is

to 0

Review the table layout sketch shown in Figure 8.19. A screen reader would access the table row by row, from top to bottom. The order of the areas "read" would be: banner, navigation, spacer, and content. This would occur on each page configured in this manner. One major disadvantage of the layout shown in Figure 8.19 is that the navigation links would be "read" over and over as each page on the Web site is rendered. Refer to the Linking to Fragment Identifiers section in Chapter 7 for a coding technique that allows visitors to skip the repetitive navigation.

As you explore other table layout designs in this chapter and create your own, keep in mind the way a screen reader would access the content. You may want to download a free screen reader and listen yourself! Try free trial versions of JAWS (http://www. freedomscientific.com/fs_downloads/jaws.asp) and Window-Eyes (http://www.gwmicro. com/Window-Eyes/Demo/).

More Sample Page Layout Tables

There are a variety of commonly used designs for page layout tables. This section contains examples of three commonly used page layouts to get you started using this technique.

The layout shown in Figure 8.22 shows banner, horizontal navigation, and two content columns. The narrower content column on the right (called a sidebar) is commonly used for advertisements or to showcase products and services offered. A page using this

layout can be found in the student files (Chapter8/tables/table2.html). Sample code for this type of table layout follows:

```
        <h1>Logo Banner</h1>

     <h1>Logo Banner</h1>

        <h2>Navigation</h2>

        <h2>Navigation</h2>

        Sidebar

        Sidebar
```

Figure 8.22

Horizontal navigation with right sidebar



Figure 8.23 Notice the symmetry of the left and right columns in this design

Banner			
Nav	Content	Side bar	

There are many ways to combine table rows and columns to create interesting, usable Web pages. The page layout shown in Figure 8.23 uses a vertical left-side navigation, center main content area, and right sidebar area.

The vertical navigation area allows room to display a wide variety of links and is more useful for a large site than the previous layout. A page using this layout can be found in the student files (Chapter8/tables/table3.html). Sample code follows:

```
<h1>Logo Banner</h1>
Navigation
width="100" valign="top">Sidebar
```

Flexible and Fixed Table Widths

The examples in the section above use a percentage table width of 80%. This creates a **flexible-width table** that the browser stretches to take up 80% of the browser window regardless of the screen resolution or window size. Review the table page layout examples in the student files (Chapter8/tables). In these examples, the columns used for navigation or sidebars are configured with a fixed width. The table cells used for the banner and main content are not configured with a width—this will cause the browser to

stretch these cells to fill the available space. This provides a pleasing look on most browsers at most screen resolutions.

You do not have to use 80% for the percentage width. A table width set to 100% is used when you want the page to fill the entire browser window. See http://www.co.door.wi.gov for an example of a page configured in this manner.

You can also use a fixed value for a table width. This will provide a more consistent look across different browsers and platforms. Often the **fixed-width table** is centered on the page. The RedBox site, http://www.redbox.com, uses this technique with a width set to 746 pixels. The content is displayed in the center of the browser window with a balanced margin of dark red background on either side.

At this point you should have a basic understanding of the use of tables on Web pages. The best way to learn is to practice. Why not create a few experimental pages of your own?



You will work with the Chapter 4 Trillium Web site you created in Hands-On Practice 4.5. Create a new folder called trilliumch8table and copy the contents of the Chapter4/4.5 folder found in the student files.You will create an alternate version of the home page that uses a table for the page layout. Launch Notepad or another text editor and open the index.html page from your trilliumch8table folder. Your page will look similar to the one shown in Figure 8.24.



In Notepad, you will modify this page so that it uses a table for layout. See Figure 8.19 for a layout sketch containing a top banner row that spans three columns and a second row with three columns: navigation area, spacer, and main content. The sample page is shown in Figure 8.25 (shown also in the color insert section).



Compare it with the previous version of index.html page shown in Figure 8.24. The content is very similar but the pages look quite different! The table layout with vertical navigation creates visually separate areas. The page still uses the embedded style sheet.

The page content has been moved into a table. The XHTML code for the table follows:

```
<hl>This is the banner area</hl>
Place Navigation here
 
valign="top">Place Navigation here
```

The layout of the new version of the home page is configured as follows:

- The table has border, cellspacing, and cellpadding set to 0; and a width of 80%.
- The background color on the table cell used for the banner area is set to #d5edb3.

- The background color on the table cell that contains the main navigation is set to #5c743d.
- The summary table attribute is set to the value "" since the table configures the page layout.

Move the page contents into the table as indicated below:

- Replace This is the banner area with the logo image trilliumbanner.jpg.
- Replace Place navigation here with the div that contains the navigation images.
- Replace Page content goes here with the remaining code for the page. After making these modifications, save the newindex.html page and test it in a browser. Your page should look similar to the one shown in Figure 8.25. Compare your work to the sample in the student files (Chapter8/8.3/index.html).

Are you surprised at the way the content of the Web page was transformed just by using a table page layout and some color? While configuring page layout using CSS is a more modern and preferred method, some current Web sites are designed with table-based page layouts. Later on in the chapter you'll explore using CSS to configure properties of XHTML tables. In the next section, you'll get some practice coding nested tables.

Nested Tables

Recall that tables have two common uses on Web pages—to organize information and to format the page layout. Figure 8.26 shows a Web page that uses two tables—the school history table used in Figure 8.18 and the page layout table from Figure 8.19.

The technique used to nest a table within another is to place the interior table within a table cell () of the exterior table. Sample code for this type of table nesting follows. Examine the source code of the Web page shown in Figure 8.26 in the student files (Chapter8/tables/table4.html).

Figure 8.26	🕲 Table Sample 4 - Mo	ozilla Firefox		
table is nested inside the page layout table	<u>Eile E</u> dit <u>V</u> iew Higt	ory Delicious <u>B</u> ookmarks <u>A</u> ccessib Logo Banne	ility Iools Help r Area	
	Navigation	Page Content H School History	eading	
	0	School Attended	Subject	
		Schaumburg High School	College Prep	
		Harper College	Internet & Web Development	

```
<h1>Logo Banner Area</h1>
 Navigation
   
  <h2>Page Content Heading</h2>
   <h3>School History</h3>
   <table width="90%" border="1" summary="This table lists
   educational background. Each row describes educational
   experience at a specific school. Columns contain school
   attended and subject.">
    < t.r >
      School Attended
      Subject
    Schaumburg High School
      College Prep
    Harper College
      Internet & amp; Web Development
```

Use this technique when a Web page layout is configured with a table and you also want to use a table to further organize information on the page. Be careful to nest tables only when needed because **nested tables** can slow the browser display of Web pages. When designing a page with nested tables it is helpful to sketch your page on paper before hand-coding. You can nest more than one set of tables inside one another.

When HTML was developed it was not intended to be a page layout language—the table element was intended to display tabular data and to organize information. Disadvantages to using multiple levels of nested tables on a Web page include complicated and difficult to read source code (resulting in a larger .html file size and a slower browser display). Some browsers, such as Netscape, have difficulty displaying complicated nested tables. Even with these disadvantages, tables are still widely used for page layout.

Legacy Alert. Although page layout tables will continue to be used on the Web for many years, a newer and preferred design technique uses CSS to configure Web page layouts instead of tables. That is the reason why some of the attributes used with (align and bgcolor), (bgcolor), (bgcolor), (bgcolor), and (bgcolor, width) elements are deprecated. Throughout most of this textbook, you've been using CSS to configure page layout. There are advantages to using CSS—easier-to-read source code, smaller .html file sizes, and

more efficient display by browsers that support this technology. Today's Web developers must be aware of both legacy page layout coding techniques (such as tables), and newer techniques such as CSS. In the next section you'll explore using CSS to configure properties associated with table elements.

~

CHECKPOINT 8.2

- 1. Describe a reason to use a percentage width for a table that configures a Web page layout. Provide an example of a page that uses this technique.
- 2. Describe a reason to use a fixed pixel width for a table that configures a Web page layout. Provide an example of a page that uses this technique.
- 3. True or False? Tables can be nested within other tables.

8.3 Using CSS to Style a Table

Earlier in this chapter you used XHTML attributes such as align, width, cellpadding, cellspacing, and bgcolor to configure the display of a table. In this section you'll explore using CSS to replace the functionality of these attributes. Table 8.1 lists corresponding CSS properties with XHTML attributes used to style tables. These properties are also described in Appendix C.

XHTML Attribute CSS Property To align a table, configure the width and margin properties for the table selector. aliqn For example, to center a table: table { width: 75%; margin: auto; } To align items within table cells: text-align width width height height cellpadding padding To configure the table cells to share a common border and eliminate the default space cellspacing between table cells configure the border-collapse property for the table selector. For example: table { border-collapse: collapse; } bgcolor background-color valign vertical-align border, bordercolor border, border-style none background-image

Table 8.1 CSS properties used to style tables

HANDS-ON PRACTICE 8.4

In this Hands-On Practice you will code CSS style rules to configure an informational table on a Web page. Create a new folder named trilliumtableCSS. Copy the following files from the Chapter8/starters folder to your trilliumtableCSS folder: myservices.html, trilliumbanner.jpg, and trilliumbullet.gif files. We'll use embedded styles for ease of editing and testing your page. Display the myservices.html file in a browser; the file should look similar to the one shown in Figure 8.17. Launch Notepad or another text editor and open the myservices.html file from your trilliumtableCSS folder. Locate the opening table>tag as follows:

cellspacing="0" summary="A description of the Web site design, interactive animation, e-commerce solution, and usability study services provided by Trillium Media Design. Each row explains a service with the name of the service in the first column and the description of the service in the second column.">

Notice the attributes that configure the border, width, alignment, cellpadding, and cellspacing of the table. Delete these attributes from the tag. You will code CSS to replace the functionality of these attributes.

 Configure the table selector. Locate the embedded styles in the header section of the Web page. Add a style rule for the table selector in this area that configures the table to be centered, have a border, and a width of 75%.

table { border: 1px solid #5c743d; width: 75%; margin: auto; }

Save the file and display your page in a browser. The table area will look similar to the one shown in Figure 8.27. Notice that this configures a border surrounding the entire table but not surrounding each table cell.

Web Site Design	Whether your needs are large or small, Trillium can get your company on the Web!	
Interactive Animation	Multimedia training and marketing animations are our specialty.	
E-Commerce Solutions	Trillium offers quick and easy entry into the e-commerce marketplace.	
Usability Studies	Trillium can assess the usability of your current site and suggest improvements.	

2. Configure the td and th selectors. Add a style rule that configures a border and padding.

td, th { border: 1px solid #5c743d; padding: 5px; }

Save the file and display your page in a browser. The table area should look similar to the one shown in Figure 8.28. Each table cell is now outlined with a border.

Figure 8.27

The border outlines the table

Figure 8.28

CSS configures border and padding for each table cell

Web Site Design	Whether your needs are large or small, Trillium can get your company on the Web!	
Interactive	Multimedia training and marketing animations are	
Animation	our specialty.	
E-Commerce	Trillium offers quick and easy entry into the	
Solutions	e-commerce marketplace.	
Usability Studies	Trillium can assess the usability of your current site and suggest improvements.	

3. Notice the empty space between the table cells borders. The **border-collapse** property can be used to eliminate this space and "collapse" the table border. Add a style rule with the border-collapse property to the table selector as shown below.

```
table { border: 1px solid #5c743d;
        width: 75%;
        margin: auto;
        border-collapse: collapse;
```

Save the file and display your page in a browser. The table area should look similar to the one shown in Figure 8.29.

Web Site Design	Whether your needs are large or small, Trillium can get your company on the Web!	
Interactive Animation	Multimedia training and marketing animations are our specialty.	
E-Commerce Solutions	Trillium offers quick and easy entry into the e-commerce marketplace.	
Usability Studies	Trillium can assess the usability of your current site and suggest improvements.	

4. Let's experiment with a slightly different design that uses background colors for the rows instead of cell borders. Modify the style rules, configuring the td and th selectors to have padding but without configuring a border.

td, th { padding:5px; }

Create a new class called altrow that sets a background color.

.altrow { background-color:#d5edb3; }

Modify the elements in the XHTML: assign the first and third elements to the altrow class.

Display your page in a browser. The table area should look similar to the one shown in Figure 8.30.

Figure 8.30 Rows are configured with alternating background colors	Web Site Design	Whether your needs are large or small, Trillium can get your company on the Web!
	Interactive Animation	Multimedia training and marketing animations are our specialty.
	E-Commerce Solutions	Trillium offers quick and easy entry into the e-commerce marketplace.
	Usability Studies	Trillium can assess the usability of your current site and suggest improvements.

Figure 8.29

The CSS bordercollapse property in action

}

Notice how the background color of the alternate rows adds subtle interest to the Web page. Compare your work with the sample located in the student files (Chapter8/8.4/myservices .html). In this Hands-On Practice you configured the display of an XHTML table using CSS. You'll see this coding technique used increasingly in the future.

Recall from Section 8.1 that the <thead>, , and <tfoot> tags designate groups of table rows. Figure 8.31 demonstrates the use of CSS to configure a table head, table body, and table footer with different styles.

Figure 8.31

CSS configures the thead, tbody, and tfoot selectors

Time Sheet

Day	Hours
Monday	4
Tuesday	3
Wednesday	5
Thursday	3
Friday	3
Total	18

The CSS styles a centered 200-pixel-wide table with a caption that is rendered in large, bold font; a table head section with a light gray (#eaeaea) background color; a table body section styled with slightly smaller text (.90em) using Arial or sans serif font; table body td selectors set to display with some left padding and a dashed bottom border; and a table footer section that has centered, bolded text and a light gray background color (#eaeaea). The CSS code is shown below.

```
table { width: 200px;
    margin: auto;}
caption { font-size: 2em;
    font-weight: bold;}
thead { background-color: #eaeaea;}
tbody { font-family: Arial, sans-serif;
    font-size:.90em;}
tbody td { border-bottom: 1px #000033 dashed;
    padding-left: 25px;}
tfoot { background-color: #eaeaea;
    font-weight: bold;
    text-align: center;}
```

```
The XHTML code for the table follows.
<table summary="This table presents a time sheet. Rows contain days
of the week and the total hours. Columns contain days and hours.">
<caption>Time Sheet</caption>
<thead>
< t.r >
 Day
 Hours
</thead>
<tfoot>
<+r>
 Total
 18
</tfoot>
Monday
  4
 Tuesday
  3
 Wednesday
  5
 Thursday
  3
 Friday
  3
```

The example above demonstrates the power of CSS in styling documents. The tags within each table row group selector (<thead>, , and <tfoot>) inherited the font styles configured for their parent group selector. Notice how a descendent selector (refer back to Chapter 6) configures padding and border only for tags that are contained within (actually, "children of") the element. A file with the code shown above is located in the student files (Chapter8/tables/tfoot.html). Take a few moments to explore the Web page code and display the page in a browser.



Is there a way to create a "table-like" page layout with CSS?

Yes; if you'd like to explore using CSS to style table-like layouts on Web pages, check out the CSS display property. As you may recall from Chapter 6, the CSS display property configures if and how an element is displayed. You've already worked with display:none, display:block, and display:inline. Internet Explorer 8 was the last major browser to add support for the display:table property values. Rachel Andrew's article, *Everything You Know About CSS Is Wrong*, at http://www.digital-web.com/articles/everything_you_know_ about_CSS_ls_wrong, encourages developers to embrace the display:table coding methods. Be aware that this technique is still quite limited. For example, there is no built-in mechanism to emulate the rowspan or colspan attribute in XHTML tables. However, this is in the works with the CSS3 draft recommendation at http://www.w3.org/Style/CSS/ current-work, which includes new CSS specifications for working with multicolumn layouts and grid positioning.

CHAPTER SUMMARY

This chapter introduces both the XHTML techniques used to code tables to organize information and configure page layout and the CSS properties that configure the display of tables on Web pages. As you use these skills to design Web pages, keep in mind that while you'll see many examples of table page layout on the Web, configuring page layout with CSS is the preferred method.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

<caption> <tfoot> <thead> align attribute

- border attribute border-collapse property cell cellpadding attribute cellspacing attribute colspan attribute fixed-width table flexible-width table
- headers attribute nested tables rowspan attribute scope attribute summary attribute title attribute vertical-align property valign attribute

Review Questions

Multiple Choice

- **1.** Which XHTML attribute specifies the distance between the edges of each cell?
 - a. cellpad
 - b. cellpadding
 - c. cellspacing
 - d. cellborder
- **2.** Which XHTML attribute specifies the distance between the cell text and the cell border?
 - a. cellpad
 - b. cellpadding
 - c. cellspacing
 - d. cellborder
- **3.** Which XHTML tag pair is used to group rows in the footer of a table?

```
a. <footer> </footer>
```

- b.
- c. <tfoot> </tfoot>
- d. none of the above

- **4.** Which XHTML element uses a border attribute to display a table with a border?
 - a.
 - b.
 - c.
 - d. <tableborder>
- **5.** Which XHTML tag pair is used to specify table headings?
 - a.
 - b.
 - c. <head> </head>
 - d.

- **6.** Which XHTML attribute specifies the back-ground color of a table?
 - a. background
 - b. bgcolor
 - c. background-color
 - d. none of the above
- **7.** Which XHTML tag pair is used to begin and end a table row?
 - a.
 - b.
 - c.
 - d. none of the above
- **8.** Which of the following are common uses of tables on Web pages?
 - a. configuring the layout of an entire page
 - b. organizing information
 - c. forming hyperlinks
 - d. both a and b
- **9.** Which CSS property specifies the background color of a table?
 - a. background
 - b. bgcolor
 - c. background-color
 - d. none of the above

Fill in the Blank

- **10.** The CSS ______ property can be used to configure the color and width of a table border.
- **11.** The ______ attribute specifies the vertical alignment of the contents of a cell in a table.
- 12. A table with a width set to 600 pixels will look _______ on a monitor with resolution set to 640×480 than on a monitor with resolution set to 1024×768.
- **13.** ______ is an attribute of the element that provides accessibility.
- 14. ______ is a CSS property that can be used to configure the padding of table cells.

Short Answer

15. Explain why it is a good practice to use CSS to configure page layout instead of an XHTML table.

Apply Your Knowledge

1. Predict the Result. Draw and write a brief description of the Web page that will be created with the following XHTML code:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<html xmlns="multical_delty_lang="en" xml:lang="en">
<html xmlns="multical_delty_lang="en" xml:lang="en" >
</html >
```

```
vidth="150">Home<br /><a href="about.html">About</a><br /><a href="services.html">Services</a><br /><a href="products.html">Products</a>&<</td><</td>More than just another web development firm, TrilliumMedia Design strives to celebrate creativity and the efficient
```

flow of information.

We aren't satisfied until every site we build is the best in its class.

```
</body>
</html>
```

2. Fill in the Missing Code. This Web page should have a table with a background color of #cccccc and a border. Some CSS properties and values, indicated by "_", are missing. Fill in the missing code.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>CircleSoft Web Design</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
table { " ":" ";
        " ":" ";
}
</style>
</head>
<body>
<h1>CircleSoft Web Design</h1>
<caption>Contact Information</caption>
 Name
   Phone
 Mike Circle
    920-555-5555
 </body>
</html>
```
3. Find the Error. Why doesn't the table information display in the order it was coded?

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>CircleSoft Web Design</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>CircleSoft Web Design</h1>
<caption>Contact Information</caption>
 < t.r >
   Name
   Phone
 Mike Circle
   920-555-5555
 </body>
</html>
```

Hands-On Exercises

- 1. Write the XHTML for a two-column table that contains the names of your friends and their birthdays. The first row of the table should span two columns and contain the following heading: Birthday List. Include at least two people in your table.
- 2. Write the XHTML for a three-column table to describe the courses you are taking this semester. The columns should contain the course number, course name, and instructor name. The first row of the table should use th tags and contain descriptive headings for the columns. Use the table row grouping tags <thead> and in your table.
- **3.** Write the XHTML for table with three rows, two columns and no border. The cell in the first column of each row will contain one of the following terms: HTML, XML, and XHTML. The corresponding cell in the second column of each row will contain a definition of the term. Configure alternating rows to use the background color #cccccc.
- 4. Use CSS to configure a table that has a border around both the entire table and the table cells. Write the XHTML to create a table with three rows and two columns. The cell in the first column of each row will contain one of the following terms: HTML, XML, and XHTML. The corresponding cell in the second column of each row will contain a definition of the term.
- **5.** Think of one of your favorite quotes by someone you admire. Write the XHTML code for a table to display the person's name in a table heading, their quote in a paragraph, and an absolute link to a Web site about them.

- **6.** Modify the table you created in Hands-On Exercise 5 to be centered on the page, use a background color of #CCCC99, and display text in Arial or the browser default sans-serif font. Configure this table using CSS.
- **7.** Create a Web page about your favorite movie that uses a two-column table containing details about the movie. Use CSS to style the table border and background color. Include the following in the table:
 - Title of the movie
 - Director or producer
 - Leading actor
 - Leading actress
 - Rating (R, PG-13, PG, G, NR)
 - A brief description of the movie
 - An absolute link to a review about the movie

Place an e-mail link to yourself on the Web page. Save the page as movie8.html. Hand in printouts of the source code (print in Notepad) and the browser display of your page to your instructor.

- 8. Create a Web page that uses a table and describes two organizations that perform work related to Internet/Web standards and guidelines (see Chapter 1). Place the information in a table that comprises at least three columns and three rows. Include links to the Web site of each organization. Place an e-mail link to yourself on the Web page. Save the page as organization.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page to your instructor.
- **9.** Create a Web page about your favorite music CD that uses a four-column table. The column headings should be as follows:
 - **Group:** Place the name of the group and the names of its principal members in this column.
 - Tracks: List the title of each music track or song.
 - Year: List the year the CD was recorded.
 - Links: Place at least two absolute links to sites about the group in this column.

Include an e-mail link to yourself on the Web page. Save the page as band8.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page to your instructor.

10. Create a Web page about your favorite recipe. Organize the ingredients and directions in a single table. Use two columns for the ingredients. Use a row that spans two columns to contain the instructions for creating your culinary delight. Save the page as recipe8.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page to your instructor.

Web Research

Search the Web and find a Web page configured with one or more XHTML tables. Print the browser view of the page. Print out the source code of the Web page. (*Hint*: To print the source code, display the page using Internet Explorer, and select Page, View Source. Notepad will launch and display the page. Select File and Print.) On the printout, highlight or circle the tags related to tables. On a separate sheet of paper create some XHTML notes by listing the tags and attributes related to tables found on your sample page, along with a brief description of their purpose. Hand in the browser view of the page, source code printout, and your XHTML notes page to your instructor.

Focus on Web Design

Good artists view and analyze many paintings. Good writers read and evaluate many books. Similarly, good Web designers view and scrutinize many Web pages. Surf the Web and find two Web pages, one that is appealing to you and one that is unappealing to you. Print out each page. Create a Web page that answers the following questions for each of your examples:

- a. What is the URL of the Web site?
- b. Does this page use tables? If so, for what purpose—page layout, organization of information, or another reason?
- c. Does this page use CSS? If so, for what purpose—page layout, text and color configuration, or another reason?
- d. Is this page appealing or unappealing? List three reasons for your answer.
- e. If this page is unappealing, what would you do to improve it?

Open your file in Notepad and print the source code for the page. Display your page in a browser and print the page. Hand in both printouts to your instructor.

WEB SITE CASE STUDY: Using Tables

Each of the following case studies continues throughout most of the text. This chapter incorporates an XHTML table in the case study Web sites.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House Case Study. Figure 2.26 shows a site map for JavaJam. The pages were created in earlier chapters. You will use the existing Web site in the javajamcss folder (unless your instructor specifies otherwise) for this case study. You will modify the menu page (menu.html) to display information in an XHTML table. You will use CSS to style the table. You have two tasks:

- 1. Add style rules to the javajam.css file that will configure the new table.
- **2.** Modify the menu.html page to use a table to display information. Refer to Figure 8.32.



Hands-On Practice Case

- 1. **Configure the CSS.** Modify the external style sheet, javajam.css. Review Figure 8.32 and note the menu descriptions, which are coded in an XHTML table. Add style rules to the javajam.css external style sheet to configure a table that is centered, td and th selectors with 10 pixels of padding, and displays a background color of #ccaa66 in alternate rows (use a class). Save the javajam.css file.
- 2. Modify the Menu Page. Edit the Menu file (menu.html) in Notepad. The menu descriptions are configured with a definition list. Replace the definition list with a table that has three rows and two columns. Use and elements where appropriate.

Save your page and test it in a browser. If the page does not display as you intended, review your work, validate the CSS, validate the XHTML, modify as needed, and test again.

Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows a site map for Fish Creek. The pages were created in earlier chapters. You will use the existing Web site in the fishcreekcss folder (unless your instructor specifies otherwise). You will modify the services page (services.html) to display information in an XHTML table. You will use CSS to style the table. You have two tasks:

- 1. Add style rules to the fishcreek.css file that will configure the new table.
- **2.** Modify the Services page (services.html) to use a table to display information. Refer to Figure 8.33.

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Hands-On Practice Case

- **1. Configure the CSS.** Modify the external style sheet, fishcreek.css. Review Figure 8.33 and note the services descriptions, which are coded in an XHTML table. Add style rules to the fishcreek.css external style sheet as indicated:
- a. Configure a table that has a solid, dark blue, 2 pixel border.
- b. Configure the borders in the table to collapse.
- c. Configure td and th selectors with 10 pixels of padding and a solid, dark blue, 1 pixel border.

Save the fishcreek.css file.

2. Modify the Services Page. Edit the Services file (services.html) in Notepad. The services descriptions are configured with an unordered list. Replace the unordered list with a table that has five rows and two columns. Use and elements where appropriate. *Hint*: Assign the element to the category class.

Save your page and test it in a browser.

If the page does not display as you intended, review your work, validate the CSS, validate the XHTML, modify as needed, and test again.

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for Pasha the Painter. The pages were created in earlier chapters. You will use the existing Web site in the paintercss folder (unless your instructor specifies otherwise).



You will modify the services page (services.html) to display information in an XHTML table. You will use CSS to style the table. You have two tasks:

- 1. Add style rules to the painter.css file that will configure the new table.
- **2.** Modify the services.html file to use a table to display information. Refer to Figure 8.34.

Hands-On Practice Case

- Configure the CSS. Modify the external style sheet, painter.css. Review Figure 8.34 and note the services descriptions, which are coded in an XHTML table. Add a style rule to the painter.css external style sheet that configures a class named service. The service class has a background color (#336633), text color (#ffffff), Verdana or sans-serif font typeface, bold font, font size of .90em, 5 pixels of padding, uppercase text (use text-transform), and a solid, black, 1 pixel bottom border. Save the painter.css file.
- 2. Modify the Services Page. Edit the services file (services.html) in Notepad. The names of the services are contained in <h3> elements. The descriptions of the services are contained within tags assigned to the category class. You will modify the code to display the services information using a table that has eight rows and one column with each service name and each service description is in its own row. Each table row (tag pair) contains one tag pair. As you code the table, remove the h3 tags and span tags. Assign the elements that contain the service names to the service class.

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Save your page and test it in a browser.

If the page does not display as you intended, review your work, validate the CSS, validate the XHTML, modify as needed, and test again.

Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case Study. Figure 2.38 shows a site map for Prime Properties. The pages were created in earlier chapters. You will use the existing Web site in the primecss folder (unless your instructor specifies otherwise). You will modify the listings page (listings.html) to display information in an XHTML table. You will use CSS to style the table. You have two tasks:

- 1. Add style rules to the prime.css file that will configure the new table.
- **2.** Modify the listings.html page to use a table to display information. Refer to Figure 8.35.



Hands-On Practice Case

- **1. Configure the CSS.** Modify the external style sheet, prime.css. Review Figure 8.35 and note the property listing information, which is coded in two XHTML tables. Add style rules to the prime.css external style sheet to configure the following:
- a. A table with a background color (#ffffff) and 5 pixels of padding
- b. A th selector with left-aligned text in a green color (#006600)
- c. A td selector that is aligned vertically to the top

Save the prime.css file.

2. Modify the Listings Page. Edit the Listings file (listings.html) in Notepad. The listings information currently uses the <h4>, image, paragraph and unordered lists elements. You will reconfigure this area with two tables—one for each real estate listing. Each table will have two rows. Refer to Figure 8.35. The first row in each table consists of one table cell that spans two columns—containing the real estate listing name. The second row in each table consists of two table cells. The first table cell in this row contains the image (remove the floatleft class from the image element). The second table cell contains the paragraph and unordered list.

Save your page and test it in a browser.

If the page does not display as you intended, review your work, validate the CSS, validate the XHTML, modify as needed, and test again.

Web Project

See Chapters 5 and 6 for an introduction to the Web Project case. You will modify the design of one of the pages to display information in an XHTML table. Use CSS to style the table.

Hands-On Practice Case

- 1. Choose one of your project Web pages to modify. Sketch a design of the table you plan to create. Decide on borders, background color, padding, alignments, and so on.
- **2.** Modify your project's external CSS file (project.css) to configure the table (and table cells) as needed.
- **3.** Update your chosen Web page and add the XHTML code for a table.

Save and test the page. Modify both the Web page and the project.css file as needed. Test and modify until you have achieved the look you want. This page intentionally left blank

<u>Chapter</u>

XHTML Forms

Chapter Objectives In this chapter, you will learn how to ...

- Describe common uses of forms on Web pages
- Create forms on Web pages using the <form>, <input />, <textarea>, and <select> elements
- Create forms that provide additional accessibility features using the accesskey and tabindex attributes
- Associate form controls and groups using <label>, <fieldset>, and <legend>

- Create custom image buttons and use the <button> element
- Use CSS to style a form
- Describe the features and common uses of server-side processing
- Invoke server-side processing to handle form data
- Find free server-side processing resources on the Web

Forms are used for many purposes all over the Web.

They are used by search engines to accept keywords and by online stores to process e-commerce shopping carts. Web sites use forms to help with a variety of functions-accepting visitor feedback, encouraging visitors to send a news story to a friend or colleague, collecting e-mail addresses for a newsletter, and accepting order information. This chapter introduces a very powerful tool for Web developers-forms that accept information from Web page visitors.

9.1 Overview of Forms

Every time you use a search engine, place an order, or join an online mailing list, you use a **form**. A form is an XHTML element that contains and organizes objects called **form controls**—such as text boxes, check boxes, and buttons—that can accept information from Web site visitors.

For example, look at Yahoo!'s search form shown in Figure 9.1. You may have used this many times but never thought about how it works. The form is quite simple; it contains just two form controls: the text box that accepts the keywords used in the search, and the search button that submits the form and gets the search started.



Figure 9.2 shows a more detailed form, used to enter shipping information at irs.gov. This form contains text boxes to accept information such as name and address. Select lists (sometimes called drop-down boxes) are used to capture information with a limited number of correct values, such as state and country information. When a visitor clicks the continue button, the form information is submitted and the ordering process continues. Whether a form is used to search for Web pages or to order a publication, the form alone cannot do all the processing. The form needs to invoke a program or script on the server in order to search a database or record an order. There are usually two components of a form:

- 1. The XHTML form itself, which is the Web page user interface
- 2. The server-side processing, which works with the form data and sends e-mail, writes to a text file, updates a database, or performs some other type of processing on the server

The search form on Yahoo!'s home page

Figure 9.1

contains a box to enter text and a button. Reproduced with permission of Yahoo! Inc. ©2006 Yahoo! Inc. Yahoo! and the Yahoo! logo are trademarks of Yahoo! Inc.

				_
			~ ~ .	
_	_		_	

This form accepts information needed to place an order

Shipping Address Entry	
Name:	
Company:	
Address Line 1:	
Address Line 2:	
City:	
State:	•
Zip Code:	-
Country:	United States 👻
Continue Clear All	

9.2 XHTML—Using Forms

Now that you have a basic understanding of what forms do, let's focus on the XHTML code to create a form. The **<form> element**, **<input /> element**, and their attributes will be introduced while you create a sample form page. Once you've experimented a little with this form, you will be ready for a detailed discussion of the elements and attributes.



In this Hands-On Practice you will experiment with a form. Create a new folder called trilliumch9 and copy the files index.html, services.html, contact.html, trillium.css, trilliumbanner.jpg, and trilliumbullet.gif files from the student files Chapter9/starters folder. You will add a form to the contact page (contact.html). The form, shown in Figure 9.3, only contains two elements: a text box to accept the visitor's e-mail address, and a submit button.

Figure 9.3 The initial version of	E-mail:		
the form	Submit Query		

The form will be added to the contact.html page, as shown in Figure 9.4.



Let's get started. Launch Notepad and open the contact.html file. Add a paragraph below the <div> assigned to the content id element that says "Complete this form and a Trillium representative will contact you."

You are ready to configure the form area. The first XHTML in a form is the <form> element. Place your cursor on a blank line under the paragraph you just added and type in a <form> tag as follows:

<form>

As you read through the chapter you will find that a number of attributes can be used with the <form> element. In your first form, we are using the minimal XHTML needed to create the form.

To create the form control for the visitor's e-mail address to be entered, type the following XHTML:

```
E-mail: <input type="text" name="CustEmail" id="CustEmail" />
<br /><br />
```

This places the text "E-mail:" in front of the text box used to enter the visitor's e-mail address. The <input /> tag has a type attribute with the value of text that causes the browser to display a text box. The name attribute assigns the name CustEmail to the information entered into the text box (the value) and could be used by server-side processing. The id attribute is included for forward compatibility with XHTML. Since the <input /> tag is a self-contained tag, it needs to be closed with />. The
br /> elements configure line breaks.

Now you are ready to add the submit button to the form. The XHTML code is as follows:

```
<input type="submit" />
```

This causes the browser to display a button with the default value of "Submit Query." Finally, you are ready to enter the closing form tag, </form>. A sample with all of the XHTML for the form follows:

```
<form>
E-mail: <input type="text" name="CustEmail" id="CustEmail" />
<br /><br />
<input type="submit" />
</form>
```

Save your contact.html file. Test your page in a browser. It should look similar to the page shown in Figure 9.4.

You can compare your work with the solution found on the student files in the Chapter9/9.1 folder. Try entering some information into your form. Try clicking the button. Don't worry if the form redisplays but nothing seems to happen when you click the button—you haven't configured this form to work with any server-side processing. Connecting forms to server-side processing is demonstrated in Section 9.5. In the next section you'll take a detailed look at the elements and attributes used to create forms.

The Form Element

The <form> tag specifies the beginning of a form area on a Web page. Its closing tag, </form>, specifies the ending of a form area on a Web page. There can be multiple forms on a Web page, but they cannot be nested inside each other. The <form> tag can be configured with attributes that specify what server-side program or file will process the form, how the form information will be sent to the server, and the name of the form. Attributes such as name, method, and action are used to configure these options. These attributes are listed in Table 9.1. The most commonly used attributes are shown in bold.

For example, to configure a form with the name of order, using the post method, and invoking a script called order.php in a folder called cgi-bin on your Web server, the XHTML is as follows:

```
<form name="order" method="post" id="order"
action="cgi-bin/order.php">
form elements go here . . .
</form>
```



What's the difference between the get and post methods?

You should usually use **post** as the value of the method on your forms. When you use get as the value the form data is appended to the end of the URL. This URL area (called the HTTP_REFERER) can be captured and stored in Web site logs. You probably don't want your visitor's form data showing up in someone else's Web server logs. This makes the **get** method much less private than the post message, which sends the form data in the entity body of the HTTP Request.

Table 9.1 <form> tag attributes

Attribute	Values	Purpose
action	When used to invoke server-side processing, the value should be a valid file name on a Web server. This is often a PHP script (.php extension), a Microsoft Active Server Pages (.asp extension), or a Sun JavaServer Pages (.jsp extension) file. When used to send an e-mail, the value should be mailto: followed by a valid e-mail address.	This attribute is optional. It is commonly used to specify what server-side program or script will process your form data using CGI. Although not recommended, this attribute can also be used to specify an e-mail address that the form information will be sent to. If no action attribute is present, the Web page containing the form is requested and redisplayed by the browser.
id	Alphanumeric, no spaces. The value must be unique and not used for other id values on the same XHTML document.	This attribute is optional. It provides a unique identifier for the form.
method	get	This attribute is optional, but defaults to a value of get if omitted. The value of get causes the form data to be appended to the URL and sent to the Web server.
	post	The post method is more private and trans- mits the form data in the body of the HTTP response. This method is preferred by the W3C.
name	Alphanumeric, no spaces, begins with a letter. Choose a form name value that is descriptive but short. For example, OrderForm is better than Form1 or WidgetsRUsOrderForm.	This attribute is optional. It names the form so that it can be easily accessed by client- side scripting languages, such as JavaScript, to edit and verify the form information before the server-side processing is invoked.



How can I send form information in an e-mail?

Forms usually need to invoke some type of server-side processing to perform functions such as sending e-mail, writing to text files, updating databases, and so on. Another option is to set up a form to send information using the e-mail program configured to work with the Web page visitor's browser. In what is sometimes called using a mailto: URL, the <form> tag is coded to use your e-mail address in the action attribute:

<form method="post" action="mailto:lsnblf@yahoo.com">

When a form is used in this manner the Web visitor will see a warning message. The warning message presents a nonprofessional image and is not the best way to inspire trust and confidence in your Web site or business.

Be aware that information sent in e-mail messages is not secure. Sensitive information, such as credit card numbers, should not be transmitted using e-mail. See Chapter 12 for information about using encryption to transmit data securely.

There are other reasons not to use the mailto: URL. For example, when people share a computer —they may not be using the default e-mail application. In this case, filling out the form is a waste of time. Even if the person using the computer also uses the default e-mail application,

perhaps he or she may not want to divulge this particular e-mail address. Perhaps they have another e-mail address that is used for forms and newsletters, and do not want to waste time filling out your form. In either case, the result is an unhappy Web site visitor. So, while using the mailto: URL is easy, it does not always create the most usable Web form for your visitors. What's a Web developer to do? Use server-side processing (see Hands-On Practice 9.4) to handle form data instead of the mailto: URL.

Form Controls

The purpose of a form is to gather information from a Web page visitor; form controls are the objects that accept the information. Types of form controls include text boxes, scrolling text boxes, select lists, radio buttons, check boxes, and buttons. XHTML tags that configure these form controls include the <input />, <textarea>, <select>, and <option> tags. Most form controls are configured with the <input /> tag, which is self-contained. The text box, password box, check box, radio button, scrolling text box, select list, submit button, reset button, button, and hidden form element fields are introduced in the following sections.

Text Box. This form control is configured by the <input /> tag and accepts text or numeric information such as names, e-mail addresses, phone numbers, and other text. A sample text box is shown in Figure 9.5.

Figure 9.5

The <input /> tag with type="text" configures this form element

Sample Text Box

E-mail:	
Out mit Ourses	1

The XHTML code follows:

E-mail: <input type="text" name="email" id="email" />

Common text box attributes are listed in Table 9.2.

Table	9.2	Common	text	box	attributes

Common		
Attributes	Values	Usage
type	text	Configures the text box.
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client- side scripting languages (such as JavaScript) or by server-side process- ing. The name should be unique.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
size	Numeric	Configures the width of the text box as displayed by the browser. If size is omitted, the browser displays the text box with its own default size.
maxlength	Numeric	Configures the maximum length of data accepted by the text box.
value	Text or numeric characters	Assigns an initial value to the text box that is displayed by the browser. Accepts information typed in the text box. This value can be accessed by client-side scripting languages and by server-side processing.

Password Box. The <input /> tag configures this form control. The password box is similar to the text box but it accepts information that needs to be hidden as it is entered, such as a password. When the user types information in a password box, asterisks (*) are displayed instead of the characters that have been typed, as shown in Figure 9.6.

Sample Password Box

The characters secret999 were typed, but the browser displays ******** (*Note*: your browser may use a different symbol to "hide" the characters.)

Figure 9.6

Sampie	
Password:	

This hides the information from someone looking over the shoulder of the person typing. The actual characters typed are sent to the server and the information is not really secret or hidden. See Chapter 12 for a discussion of encryption and security.

The XHTML code follows:

```
Password: <input type="password" name="myPassword"
id="myPassword" />
```

Common password box attributes are listed in Table 9.3.

Common		
Attributes	Values	Usage
type	password	Configures the password box.
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client-side scripting languages or by server-side processing. The name should be unique.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
size	Numeric	Configures the width of the password box as displayed by the browser. If size is omitted, the browser displays the password box with its own default size.
maxlength	Numeric	Optional. Configures the maximum length of data accepted by the password box.
value	Text or numeric characters	Assigns an initial value to the text box that is displayed by the browser. Accepts the information typed in the password box. This value can be accessed by client-side and by server-side processing.

Table 9.3	Common	password	box	attributes
-----------	--------	----------	-----	------------

Check Box. This form control is configured by the <input /> tag and allows the user to select one or more of a group of predetermined items. A sample check box is shown in Figure 9.7.

Figure 9.7

Use a check box when one or more selections is appropriate

Sample Check Box

Choose the browsers you use:

- Firefox
- Opera

The XHTML code follows:

```
Choose the browsers you use:<br />
<input type="checkbox" name="IE" id="IE" value="yes" />
Internet Explorer<br />
<input type="checkbox" name="Firefox" id="Firefox" value="yes" />
Netscape<br />
<input type="checkbox" name="Opera" id="Opera" value="yes" /> Opera
```

Note that the value of all the check boxes just happened to be yes. You can set the value to be any meaningful word or phrase. The name of each check box should be unique.

Common check box attributes are listed in Table 9.4.

Table 9.4 Common check box attributes

Attribute	Values	Usage
type	checkbox	Configures the check box.
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client- side scripting languages or by server-side processing. The name of each check box should be unique.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
checked	checked	Configures the check box to be checked by default when displayed by the browser.
value	Text or numeric characters	Assigns a value to the check box that is triggered when the check box is checked. This value can be accessed by client-side and by server-side processing.

Radio Button. The <input /> tag configures this form control. Radio buttons allow the user to select exactly one item from a group of predetermined items. Each radio button in a group is given the same name and a unique value. Because the name is the same, the elements are identified as part of a group and only one may be selected. A sample radio button group is shown in Figure 9.8.

Figure 9.8

choice is an

Use radio buttons when only one

appropriate response

Sample Radio Buttons

Select your favorite browser:

- Internet Explorer
- Firefox
- Opera

The XHTML code follows:

```
Select your favorite browser:<br />
<input type="radio" name="favbrowser" id="favIE"
value="IE" /> Internet Explorer<br />
<input type="radio" name="favbrowser" id="favFirefox"
value="Firefox" /> Firefox<br />
<input type="radio" name="favbrowser" id="favOpera"
value="Opera" /> Opera<br />
```

Notice that the name attributes all have the same value—favbrowser. This is what creates the group. Each radio button in the same group can be uniquely identified by its **value** attribute. Each radio button in the same group is configured with a different value.

Common radio button attributes are listed in Table 9.5.

Table 9.5 Common radio button attributes

Attribute	Values	Usage
type	radio	Configures the radio button.
name	Alphanumeric, no spaces, begins with a letter	Required. All radio buttons in a group must have the same name. This attribute also names the form element so that it can be easily accessed by client-side scripting languages or by server-side processing.
id.	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
checked	checked	Configures the radio button to be selected by default when displayed by the browser.
value	Text or numeric characters	Assigns a value to the radio button that is triggered when the radio button is selected. This should be a unique value for each radio but- ton in a group. This value can be accessed by client-side and by server-side processing.

Scrolling Text Box. The <textarea> tag configures a scrolling text box. A scrolling text box is used for accepting free-form comments, questions, or descriptions. A sample scrolling text box is shown in Figure 9.9.

Figure 9.9

Scrolling text boxes accept free-form comments from Web page visitors

Sample Scrolling Text Box

Comments:

```
Enter your comments here
```

The XHTML code follows:

```
Comments:<br />
<textarea name="ordercomments" id="ordercomments" cols="40"
rows="2">>Enter your comments here</textarea>
```

Notice that the <textarea> tag is a container tag. The text that you place between the opening <textarea> and closing </textarea> will be initially displayed in the scrolling text box.

Common scrolling text box attributes are listed in Table 9.6.

Table 9.6 Common scrolling text box attributes

Common Attributes	Values	Usage
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client-side scripting languages (such as JavaScript) or by server-side processing. The name should be unique.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
cols	Numeric	Configures the width in character columns of the scrolling text box. If cols is omitted, the browser displays the scrolling text box with its own default width.
rows	Numeric	Configures the height in rows of the scrolling text box. If rows is omitted, the browser displays the scrolling text box with its own default height.

Select List. The <select> container tag (along with <option> tags) configures a select list. This form control has several names: select list, select box, drop-down list, drop-down box, and option box. It allows the visitor to select one or more items from a list of predetermined choices. The <option> container tag configures the choices in a select list. Sample select lists are shown in Figures 9.10 and 9.11.

Figure 9.10

A select list with size set to 1 functions as a drop-down box when the arrow is clicked

Select your favorite browser	×
	_

Figure 9.11

This select list has size set to 4; since there are more than four choices, the browser displays a scroll bar



The XHTML code for Figure 9.10 follows:

```
<select size="1" name="favbrowser" id="favbrowser">
    <option selected="selected" >Select your favorite browser</option>
    <option value="Internet Explorer">Internet Explorer</option>
    <option value="Firefox">Firefox</option>
    <option value="Opera">Opera</option>
  </select>
The XHTML code for Figure 9.11 follows:
```

```
<select size="4" name="jumpmenu" id="jumpmenu">
   <option value="index.html">Home</option>
   <option value="products.html">Products</option>
   <option value="services.html">Services</option>
   <option value="about.html">About</option>
   <option value="contact.html">Contact</option>
   </select>
```

Common select list attributes are listed in Table 9.7.

Table 9.7 Common select list attributes

Common	Veluee	llaare
Auributes	values	Usage
Select List <se< th=""><th>elect> Tag</th><th></th></se<>	elect> Tag	
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client-side scripting languages (such as JavaScript) or by server- side processing. The name should be unique.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
size	Numeric	Configures the number of choices the browser will display. If set to 1, element functions as a drop-down list (see Figure 9.10). Scroll bars are automatically added by the browser if the number of options exceeds the space allowed.
multiple	multiple	Configures a select list to accept more than one choice. By default, only one choice can be made from a select list.
Select List <o< th=""><th>ption> Tag</th><th></th></o<>	ption> Tag	
value	Text or numeric characters	Assigns a value to the option. This value can be accessed by client-side and by server-side processing.
selected	selected	Configures an option to be initially selected when displayed by a browser.

Submit Button. This form control is configured by the <input /> tag and is used to submit the form. It triggers the action method on the <form> tag and causes the browser to send the form data (the name and value pairs for each form control) to the Web server. The Web server will invoke the server-side processing program or script listed on the form's action property. A sample submit button is shown in Figure 9.12.

Figure 9.12

Clicking the submit button invokes the server-side processing configured in the action property of the <form> tag



Submit Query

The XHTML code follows: <input type="submit" /> Common submit button attributes are listed in Table 9.8.

Common Attributes	Values	Usage
type	submit	Configures the submit button.
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client-side scripting languages (such as JavaScript) or by server- side processing. The name should be unique.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
value	Text or numeric characters	Configures the text displayed on the submit button. By default, the text "Submit Query" is displayed.

Reset Button. This form control is configured by the <input /> tag and is used to reset the form fields to their initial values. A sample reset button is shown in Figure 9.13.

Figure 9.13

mistakes

The reset button gives Web page visitors a chance to reset or clear their

Sample	Reset	Button
--------	-------	--------

Reset

The XHTML code follows: <input type="reset" /> Common reset button attributes are listed in Table 9.9.

Table 9.9 Common reset button attributes

Table 9.8 Common submit button attributes

Common Attributes	Values	Usage
type	reset	Configures the reset button.
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client-side scripting languages (such as JavaScript) or by server-side processing. The name should be unique.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
value	Text or numeric characters	Configures the text displayed on the reset button. By default, the text "Reset" is displayed.

Button. This form control is configured by the <input /> tag and offers a flexible user interface. There is no default action when the button is clicked. Form information is not sent to the Web server when this button is clicked.

This control is usually used with client-side scripting such as JavaScript, to cause some processing to occur on the client (see Chapters 11 and 14). Types of client-side processing may include calculations, edits, or other functions such as displaying a different page. A sample button is shown in Figure 9.14.

Figure 9.14

This button has no default action; it is often used with client-side scripting such as JavaScript



The XHTML code follows:

```
<input type="button" value="Show Details" name="myButton"
id="myButton" />
```

Common button attributes are listed in Table 9.10.

 Table 9.10
 Common button attributes

Common Attributes	Values	Usage
type	button	Configures the button.
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client-side scripting lan- guages (such as JavaScript) or by server- side processing. The name should be unique.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
value	Text or numeric characters	Configures the text displayed on the button.

Hidden. This form control is configured by the <input /> tag and is not displayed on the Web page. Hidden form fields can be accessed by both client-side and server-side scripting and sometimes contain information needed as the visitor moves from page to page.

The XHTML to create a hidden form control with the name sendto and the value of an e-mail address follows:

<input type="hidden" name="sendto" id="sendto" value="order@site.com"/>

Common hidden attributes are listed in Table 9.11.

Common Attributes	Values	Usage
type	hidden	Configures the hidden form element.
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client- side scripting languages (such as JavaScript) or by server-side pro- cessing. The name should be unique.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
value	Text or numeric characters	Assigns a value to the hidden control. This value can be accessed by client-side scripting languages and by server-side processing.

Table 9.11 Common hidden attributes



Why use both the name and the id attributes on form controls?

The reason both attributes are used is for forward and backward compatibility with different versions of HTML and XHTML.

The name attribute is supported by both HTML and XHTML. It is used to name the form element so that it can be easily accessed by client-side scripting languages such as JavaScript or by server-side processing languages such as PHP. The value given to a name attribute for a form element should be unique for that form.

The id attribute is included for use with CSS and is supported by XHTML. The value of the id attribute should be unique to the entire Web page document that contains the form. Use the id attribute to be compatible with CSS and XHTML in the future.

Forward thinking Web developers use both the name and id attributes on their form elements. Typically, the values assigned to the name and id attribute on a particular form element are the same.

As you have seen, there are a number of form controls, each with a specific purpose. This would be a good time to visit a few Web sites and examine how they use forms. Take a look at sites such as http://yahoo.com, http://amazon.com, http://ebay.com, or one of your favorites and identify when and how they use forms and form controls.



HANDS-ON PRACTICE 9.2

In this Hands-On Practice you will modify the form you created in Hands-On Practice 9.1 (see Figure 9.3). Recall that the purpose of the form is to allow Web page visitors to request that a company representative contacts them. You will modify the form to include a reset button and to accept the customer's name, phone number, and a question or comment in addition to the e-mail address. This modified form is shown in Figure 9.15.

Figure 9.15	Name:
the contact form	E-mail:
	Phone: ###-####
	Question or Comments:
	Please type your question or comment here
	Submit Reset

Launch Notepad and open the contact.html page that you created in Hands-On Practice 9.1. Perform the following edits:

 Place the cursor after the <form> tag and press Enter to create a new line. Configure the area where the customer name will be entered. Type Name: to create the label for the text box. Now create an <input /> tag that has type configured to text, name set to CustName, id set to CustName, and size configured to 30. The label and text box should be on their own line. (*Hint*: Use two
 elements.) The XHTML follows:

```
Name: <input type="text" name="CustName" id="CustName" size="30" />
<br /><br />
```

2. Verify that the e-mail form element you coded in Hands-On Practice 9.1 is on the next line. The XHTML follows:

```
E-mail: <input type="text" name="CustEmail" id="CustEmail" />
<br /><br />
```

3. Press Enter to create a new line under the E-mail text box. Type Phone: to create the label for the text box. Now create an <input/> tag that has type configured to text, name set to CustPhone, id set to CustPhone, size configured to 15, and maxlength set to 12. View Figure 9.16 and notice that the phone number text box initially displays the characters ###-####. Configure this by setting the value attribute to ###-####. The label and text box should be on their own line. The XHTML follows:

4. Now you will configure the area for customer comments or questions. On its own line, type Question or Comments: Use a
 element to cause this text to display on its own line in the Web browser. Next, configure a scrolling text box with 4 rows, 60 columns, the name CustComment, and the id set to CustComment. Configure the default text to display between the <textarea> and </textarea> tags as Please type your question or comment here.

Figure 9.16	Trillium Media Design - Contact - Mozilla Firefox	
The new contact	Eile Edit View Higtory Delicious Bookmarks Accessibility Tools Help	214
page	Trillium Media Design	
	Home Services Contact	
	Design Design	
	Complete this form and a Trillium representative will contact you.	
	Name:	
	E-mail:	
	Phone: ###-####	
	Question or Comments:	
	Please type your question or comment here	
	Submit Reset	
	Home Services Contact	
	Copyright © 2010 Your Name Here	
		-

Configure a blank line underneath the scrolling text box. The XHTML follows:

```
Question or Comments:<br />
<textarea rows="4" cols="60" name="CustComment" id="CustComment">
Please type your question or comment here</textarea><br /><br />
```

5. Notice that in Figure 9.15 the submit button displays "Submit." Use the value attribute to configure this as follows:

<input type="submit" value="Submit" />

6. Add a blank space next to the submit button, and then add a reset button to the form. The XHTML follows:

<input type="reset" />

7. Save your contact.html file and test it in a browser. It should look similar to that shown in Figure 9.16. The solution can be found in the student files in the Chapter9/9.2 folder.

As you view your form (or Figure 9.16) you may notice that it looks a little messy—the form controls don't align under each other. A technique often used to align form elements is to format the form area with a table. See Figure 9.17 for a more orderly version of the form formatted with a table.

Figure 9.17 A table was used to format this form	Name: E-mail: Phone: ###-###### Question or Comments:	
	Please type your question or comment here	
	Submit Reset	

A table with five rows and two columns was added to the page in Figure 9.17, within the <form> and </form> container tags. The text labels for the Name:, E-mail:, and Phone: form elements were each placed in their own table cell and right-aligned. Each text box and button was placed in its own table cell. The scrolling text box was placed in a table cell that spans two columns. (See Chapter 8 to review tables.) The table was configured to have no border and to take up 75 percent of the browser window. The first column was configured to take up 10 percent of the table width. The revised XHTML for the form and table is shown here with the table code in color. Notice that since a table is used to format the form, fewer
br /> tags are needed.

```
<form>
 Name: 
    <input type="text" name="CustName" id="CustName" size="30" />
    E-mail: 
    <input type="text" name="CustEmail" id="CustEmail" />
   Phone: 
    <input type="text" name="CustPhone" id="CustPhone"
      size="15" maxlength="12" value="###-###### />
  Question or Comments:<br />
    <textarea rows="4" cols="60" name="CustComment"
     id="CustComment">Please type your question or comment
     here</textarea>
   \langle tr \rangle
    <input type="submit" value="Submit" />
    <input type="reset" />
```

Tables are often used to organize forms on Web pages. Modify your page as indicated here. Save the file with a new name, contact2.html, test in a browser, and compare your result with Figure 9.17. The solution can be found in the student files at Chapter9/9.2/contact2.html.

Now you are familiar with using forms on Web pages, with different controls that can be placed on forms, and with using a table to format a form. Additional detailed information on these form elements and their attributes may be found in Appendix A, XHTML Reference.



CHECKPOINT 9.1

- You are designing a Web site for a client who sells items in a retail store. They want to create a customer list for e-mail marketing purposes. Your client sells to consumers and needs a form that accepts a customer's name and e-mail address. Would you recommend using two input boxes (one for the name and one for the e-mail) or three input boxes (one each for the first name, last name, and e-mail address)? Explain your answer.
- 2. You are designing a survey form for a client. One of the questions has 10 possible responses. Only one response can be selected per question. What type of form control would you use to configure this question on the Web page?
- 3. True or False? In a radio button group, the **value** attribute is used by the browser to process the separate radio buttons as a group.

9.3 Form Enhancements

There are additional XHTML tags that can enhance your forms by associating text labels with form controls and by visually grouping form controls together.

The Label Element



The **<1abe1>** element is a container tag that is used to associate a text description with a form control. It is sometimes difficult for a person using a screen reader to match up the text descriptions on forms with their corresponding form controls. The purpose of the label element is to explicitly associate a form control with the text label that describes it. The label element also benefits individuals without fine motor control. Clicking anywhere on either a form control or its associated text label will set the cursor focus to the form control. In addition, the label element can serve as a fragment identifier or bookmark and allow the form control to be directly linked to other parts of the Web page (or other Web pages, if needed). There are two ways to associate a label with a form control. The first method places the <label> tag as a container around both the text description and the XHTML form element. The code follows:

```
<label>E-mail: <input type="text" name="CustEmail" id="CustEmail" />
</label>
```

The second method uses the id attribute to associate the label with a particular XHTML form element. This is more flexible and is better suited for forms that are formatted with a table. The code follows:

```
<label for="email">E-mail: </label>
<input type="text" name="email" id="email" />
```

Notice that the value of the **for attribute** on the <label> tag is the same as the value of the id attribute on the <input> tag. This creates the association between the <label> and the form control. The <input> tag uses both the name and id attributes for different purposes. The name attribute can be used by client-side and by server-side scripting. The id attribute creates an identifier that can be used by the <label> and anchor tags.

The Fieldset and Legend Elements



Figure 9.18 A <fieldset> organizes the customer information area You have seen an example using a table to format a form. Another technique that can be used to create a more visually pleasing form is to group elements with the <fieldset> tag. Browsers that support this feature will place a visual cue, such as an outline or a border, around form elements grouped in a <fieldset>. The <legend> tag can be used to provide a label for this grouping Figure 9.18 shows the CustName, CustEmail, and CustPhone elements grouped in this manner.

Name:			
E-mail:			
Phone:	###-###-####		

The XHTML to create the grouping shown in Figure 9.18 follows:

```
<fieldset><legend>Customer Information</legend>
<label>Name:
    <input type="text" name="CustName" id="CustName" size="30" />
    </label> <br /><br />
<label>E-mail:
    <input type="text" name="CustEmail" id="CustEmail" />
    </label><br /></br />
<label>Phone: <input type="text" name="CustPhone" id="CustPhone"
    size="15" maxlength="12" value="###-####" /></label>
    </fieldset>
```

The grouping and visual effect of the <fieldset> element creates an organized and appealing Web page containing a form. Using the <fieldset> and <legend> tags to

group form controls enhances accessibility by organizing the controls both visually and semantically. The <fieldset> and <legend> tags can be accessed by screen readers and are useful tools to configure groups of radio buttons and check boxes on Web pages.

The tabindex Attribute



Some of your Web page visitors may have difficulty using the mouse and will access your form with a keyboard. They may use the Tab key to move from one form control to another. The default action for the Tab key is to move to the next form control in the order the form controls are coded in the XHTML. This is usually appropriate. However, if the tab order needs to be changed for a form, use the **tabindex attribute** on each form control. For each form tag (<input>, <select>, <textarea>), code a tabindex attribute with a numeric value, beginning with 1, 2, 3, and so on in numerical order. The XHTML code to configure the customer e-mail text box as the initial position of the cursor is: <input type="text" name="CustEmail" id="CustEmail" tabindex="1" />. The tabindex attribute is not supported in older browsers such as Netscape 4. If you configure a form control with tabindex="0", it will be visited after all other form controls that are assigned tabindex. If you happen to assign two form controls the same tabindex value, the one that is coded first in the XHTML will be visited first.

The accesskey Attribute

Focus on Accessibility

Another technique that can make your form keyboard-friendly is the use of the **accesskey** attribute on form elements. Assigning the accesskey a value of one of the characters (letter or number) on the keyboard will create a hot key that your Web page visitor can press to move the cursor immediately to a form control. The method used to access this hot key varies depending on the operating system. Windows users will press the Att key and the character key. The combination is the \mathbb{H} key and the character key for Mac users. For example, if the form shown in Figure 9.18 had the customer e-mail text coded with an accesskey="E", the Web page visitor using Windows could press the Att and E keys to move the cursor immediately to the e-mail text box. The XHTML code for this follows:

```
<input type="text" name="CustEmail" id="CustEmail" accesskey="E" />
```

The accesskey attribute is not supported in older browsers such as Netscape 4. Even when browsers do support the accesskey feature, you cannot rely on the browser to indicate that a character is an access key, also called a hot key. You will have to manually code information about the hot key. A visual cue may be helpful, such as displaying the hot key in bold or by placing a message such as (Alt + E) after a form control that uses a hot key. When choosing accesskey values, avoid combinations that are already used by the operating system (such as [Alt]+[F] to display the File menu). Testing hot keys is crucial.

Accessibility and Forms



Using the XHTML elements and attributes just discussed—label, fieldset, legend, accesskey, and tabindex—will increase the accessibility of your Web forms. This makes it easier for individuals with vision and mobility challenges to use your form pages. Often, these accessibility modifications, such as use of the <fieldset> and

<legend> tags, increase the readability and usability of the Web form for all visitors. Be sure to include contact information (e-mail address and/or phone number) just in case a visitor is unable to submit your form successfully and requires additional assistance.

HANDS-ON PRACTICE 9.3



In this Hands-On Practice you will modify the contact form (contact.html) you worked with in Hands-On Practice 9.2 to use the fieldset, legend, and label elements (see Figure 9.19).

Launch Notepad and open the contact.html page that you created in Hands-On Practice 9.2. Perform the following edits:

- **1.** Add an opening <fieldset> tag after the opening <form> tag.
- 2. Immediately after the opening <fieldset> tag code <legend> tags containing the following text: Customer Information.
- **3.** Add a <label> element for each of the Customer Name, Customer E-mail, Customer Phone, and Customer Comments form elements.
- 4. Choose an appropriate location to code the closing <fieldset> tag.

This contact form	Image: Second	
legend, and label elements to provide for accessibility	Trillium Media Design	Î
	Home Services Contact	
	🖗 Contact Trillium Media Design	
	Complete this form and a Trillium representative will contact you.	
	Name:	E
	E-mail:	
	Phone: ###-###-####	
	Question or Comments:	
	Flease type your question or comment here	
	Submit Reset	÷

5. Save your contact.html file and test in a recent browser. It should look similar to the one shown in Figure 9.19. You can compare your work with the solution found in the student files (Chapter9/9.3). You may notice that when you activate the submit button, the form redisplays. This is because there is no action property in the <form> element. You'll work with setting the action property in Section 9.5.

CHECKPOINT 9.2

- 1. Describe the purpose of the <fieldset> and <legend> tags.
- 2. Describe the purpose of the accesskey attribute and how it supports accessibility.
- 3. When designing a form, should you use the standard submit button, an image button, or a button tag? Are these different in the way that they provide for accessibility? Explain your answer.

Image Buttons and the Button Element

As you have worked with forms in this chapter, you may have noticed that the standard submit button (see Figure 9.12) is a little plain. You can make the form area that you click to submit the form more compelling and visually interesting in two ways: by creating custom images that are configured with the <input /> tag or by using the <button> tag.

Figure 9.20 shows an image used in place of the standard submit button. This is called an image button. When an image button is clicked, the form is submitted. The image button is coded using the <input /> tag along with type="image" and a src attribute with the value of the name of the image file. For example, to use the image called login.gif as an image button the XHTML code is as follows:

```
<input type="image" src="login.gif" alt="Login Button" />
```

Figure 9.20 The Web page visitor will click the

visitor will click the image button to submit the form

Name: Password:	
	Log In

Another way to add more interest to a form is to use the <button> element. This element can be used to configure not only images but also blocks of text as the clickable area that can submit or reset a form. The <button> tag is a container tag. Any Web page content that is between the <button> and </button> tags is configured to be part of the button. Table 9.12 lists common attributes of the <button> tag.

Table 9.12 Common attributes of the <button> tag

Common Attributes	Values	Usage
type	submit	Functions as a submit button.
	reset	Functions as a reset button.
	button	Functions as a button.
name	Alphanumeric, no spaces, begins with a letter	Names the form element so that it can be easily accessed by client-side scripting languages (such as JavaScript) or by server-side processing. The name should be unique.
alt	Brief text description of the image	Provides accessibility to visitors unable to view the image.
id	Alphanumeric, no spaces, begins with a letter	Provides a unique identifier for the form element.
value	Text or numeric characters	A value given to a form element that is passed to the form handler

Figure 9.21 shows a form that has an image (signup.gif) configured as a submit button using the <button> element.

Figure 9.21

The <button> element configured as a submit button

Name:	
E-mail:	
	Sign Up
	Sign up for free newsletter

The following XHTML code creates the button shown in Figure 9.21:

```
<button type="submit">
<img src="signup.gif" width="80" height="28" alt="Sign Up for
Newsletter" />
</button>
```

As you visit Web pages and look at their source code, you will find that the <button> element is not used as often as the standard submit button or the image button.

9.4 Using CSS to Style a Form

Many Web developers cruise along using CSS for page layout until they need to code a form. Tables (usually avoided when coding CSS page layouts) are traditionally used to configure forms. This section will show you two approaches to using CSS to style a form—the first uses a table whose attributes have been configured with CSS instead of with XHTML, the second does not use an XHTML table.

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Styling Forms with Tables and CSS

XHTML Tables Meet CSS Properties. This is considered to be a *transitional* approach. In this method, the form is organized by a table configured with CSS rather than with XHTML properties. While this is not completely table-less design and your instructor may be aghast at this suggestion, using a table to configure a small portion of a page that otherwise utilizes CSS is an alternate method to consider. It would be best to reserve the use of a table for pure tabular data—such as price lists and budgets. However, the purpose of this example is to show how CSS can be used to streamline even the XHTML needed by a table. Figure 9.22 shows a Web page (see Chapter9/form1.html in the student files) with the form area coded with a table.

Figure 9.22	Form with Table & CSS - Mozilla Firefox	
This page uses a table styled with CSS	Eile Edit View Higtory Delicious Bookmarks Accessibility Tools Help Sign up for our Newsletter!	<u></u>
	Name: E-mail:	
	Comments:	
	Get Newsletter	

The table is configured with CSS rather than with XHTML attributes. CSS is used to configure the and properties that would otherwise be defined with XHTML attributes. CSS is also used to configure a class to right-align the text on the form.

```
The CSS follows:
table { border: solid 3px #000000;
        width: 100%;
}
td { padding: 5px;
}
.myLabel { text-align: right;
}
```

In the following XHTML code, the and tags have no attributes for table properties since these are all configured with CSS. The XHTML follows:

```
<form method="post">
<label for="myName">Name:</label>
```

```
<label for="myEmail">E-mail:</label>
    <input type="text" name="myEmail" id="myEmail" />
   <label for="myComments">Comments:</label>
    <textarea name="myComments" id="myComments" rows="2"
     cols="60"></textarea>
   <input type="submit" value="Get Newsletter" />
    </form>
```

Styling Forms with Only CSS

Using "Pure" CSS to Style a Form. In this method, the CSS box model is used to create a series of boxes, as shown in Figure 9.23: the outermost box defining the form area, a series of boxes contained in the form area (one for each line in the form), and the innermost boxes to align the form text. CSS is used to configure each of the box types previously described. The myForm id declares properties for the entire form area. The myRow class sets the height of a typical line in the form. The mySubmit class configures the display of the submit button with declarations for the left and top margins. The labelCol class is the key to aligning the text. The area has a width of 100 pixels and the text will align to the right.

Figure 9.23

A sketch of the box model used to configure the form

myRow	
labelCol	text box
myRow labelCol	text box
labelCol	text area
mySubmit	submit button

Figure 9.24 displays a Web page with a form configured in this manner (see Chapter9/form2.html in the student files).

As you view the following CSS and XHTML, note that the labelCol class floats to the left side of the form and results in a neatly aligned text label for each input box.

Figure 9.24	Form with Pure CSS - Mozilla Firefox	
use a table—just CSS	Eile Edit View Higtory Delicious Bookmarks Accessibility Iools Help Sign up for our Newsletter!	ن ا
	Name:	
	E-mail:	
	Comments:	
	Get Newsletter	

The CSS follows:

```
#myForm { border: 3px solid #000000;
        padding: 10px;
        margin: 10px;
        min-width: 500px;
}
.myRow { padding-bottom: 20px;
}
.mySubmit { margin-top: 10px;
        margin-left: 110px;
}
.labelCol { float: left;
        width: 100px;
        text-align: right;
        padding-right: 10px;
}
```

The XHTML code follows. Note the use of <div> elements.

```
<div id="myForm">
  <form method="post">
    <div class="myRow">
        <label class="labelCol" for="myName">Name:</label>
        <input type="text" name="myName" id="myName" />
        </div>
        <label class="myRow">
            <label class="myRow">
            <label class="labelCol" for="myEmail">E-mail:</label>
            <input type="text" name="myEmail" id="myEmail" />
            </div>
        <label class="labelCol" for="myComments">Comments:</label>
        </label class="labelCol" for="myComments">comments:</label>
        </div>
        <label class="labelCol" for="myComments">Comments:</label>
        </label>
        <label class="labelCol" for="myComments">comments:</label>
        <label>
        <label>
        <label class="labelCol" for="myComments" rows="2" cols="60">
        </label>
        <label class="labelCol" for="myComments" rows="2" cols="60">
        </label>
        <label class="labelCol" for="myComments" rows="2" cols="60">
        </label>
        <label class="labelCol" for="myComments" rows="2" cols="60">
```
This section provided you with two methods to configure forms. Both methods use advantages of CSS. Which method you choose for a particular Web site depends on the browsers used by the target audience. Testing the way that different browsers render the form is crucial.

As you've coded and displayed the forms in this chapter, you may have noticed that when you click the submit button, the form just redisplays—the form doesn't "do" anything. This is because there is no action property in the <form> tag. The next section focuses on the second component of using forms on Web pages—server-side processing.

9.5 Server-Side Processing

Your Web browser requests Web pages and their related files from a Web server. The Web server locates the files and sends them to your Web browser. Then the Web browser renders the returned files and displays the requested Web pages. Figure 9.25 illustrates the communication between the Web browser and the Web server.



Sometimes a Web site needs more functionality than static Web pages—possibly a site search, order form, e-mail list, database display, or other type of interactive, dynamic processing. This is when server-side processing is needed. Early web servers used a protocol called **Common Gateway Interface** (CGI) to provide this functionality. CGI is a protocol, or standard method, for a Web server to pass a Web page user's request (which is typically initiated through the use of a form) to an application program and to accept information to send to the user. The Web server typically passes the form information to a small application program that is run by the operating system and processes the data, and it usually sends back a confirmation.

Server-side scripting is a technology in which a server-side script is embedded within a Web page document saved with a file extension such as .php (PHP), .asp (Active Server Pages), .cfm (Adobe ColdFusion), .jsp (Sun JavaServer Pages), or .aspx (ASP.Net). Server-side scripting differs from CGI in that it uses direct execution—the script is run either by the Web server itself or by an extension module to the Web server.

A Web page invokes server-side processing by either an attribute on a form or by a hyperlink—the URL of the script is used. Any form data that exists is passed to the script. The script completes its processing and may generate a confirmation or response Web page with the requested information. The Web server returns this page to the Web browser. Every time you perform a search using Yahoo! or other search engines, you are using server-side processing.

Steps in Utilizing Server-Side Processing

- 1. Web page invokes server-side processing by a form action attribute or by a hyperlink.
- 2. Web server executes a server-side script.
- 3. Server-side script accesses requested database, file, or process.
- **4.** Web server returns Web page with requested information or confirmation of action.

When invoking a server-side script, the Web developer and the server-side programmer must communicate about the form **method** attribute (get or post), form **action** attribute (URL of the server-side script), and any special form element control expected by the server-side script. The value of the name attribute on each form control is passed to the server-side script and may be used as a variable name in the server-side processing. In the next Hands-On Practice, you will invoke a server-side script from a form.



In this Hands-On Practice you will modify the contact.html page that you created earlier in this chapter, configuring the form so that it uses the post method to invoke a serverside script. Please note that your computer must be connected to the Internet when you test your work. The post method is recommended by the W3C and is more private than the get method. The post method does not pass the form information in the URL; it passes it in the entity-body of the HTTP Request, which makes it more private.

When using a server-side script you will need to obtain some information, or documentation, from the person or organization providing the script. You will need to know the location of the script, whether it requires any specific names for the form controls, and whether it requires any hidden form elements. The action attribute is used on the <form> tag to invoke a server-side script. A server-side script has been created at http://webdevfoundations.net/scripts/formdemo.asp for students to use for this exercise. The documentation for the server-side script is listed in Table 9.13.

Table 9.13	Server-side script	documentation
	Convor bido compt	accounternation

Location of Script:	http://webdevfoundations.net/scripts/formdemo.asp
Purpose of Script:	Use the method="post" when invoking this script. This script will accept form input and display the form control names and values in a Web page. This is a sample script for student assignments. It demonstrates that server-side processing has been invoked. A script used by an actual Web site would perform a function such as sending an e-mail message or updating a database.

Now you will add the configuration required to use the formdemo.asp server-side processing with your form. Launch Notepad and open the contact.html file you created in Hands-On Practice 9.3, also found in the Chapter9/9.3 folder. Modify the <form> tag by adding a method attribute with a value of "post" and an action attribute with a value of "http://webdevfoundations.net/scripts/formdemo.asp". The XHTML code for the revised <form> tag follows:

<form method="post"

```
action="http://webdevfoundations.net/scripts/formdemo.asp" >
```

Save your page as contact.html and test it in a browser. Your screen should look similar to the one shown in Figure 9.21.

Now you are ready to test your form. You must be connected to the Internet to test your form successfully. Enter information in the form controls and click the submit button. You should see a confirmation page similar to the one shown in Figure 9.26.



The formdemo.asp script creates a Web page that displays a message and the form information you entered. Where did this confirmation page originate? This confirmation page was created by the server-side script on the action attribute in the <form> tag. Sometimes students wonder what code is used in the formdemo.asp file. Writing scripts for serverside processing is beyond the scope of this textbook. However, if you are curious, visit http://webdevfoundations.net/5e/chapter9.html to see the source code for this script.



Figure 9.26 The server-side

script has created this page in response to the form

Privacy and Forms

You've just learned how to collect information from your Web site visitors. Do you think your visitors may want to know how you plan to use the information you collect? The guidelines that you develop to protect the privacy of your visitors' information is called a **privacy policy**. Web sites either indicate this policy on the form page itself or create a separate page that describes the privacy policy (and other company policies). For example, the order form page at mymoney.gov (http://mymoney.gov/mymoneyorder.shtml) indicates the following:

"WE WILL NOT SHARE OR SELL ANY PERSONAL INFORMATION OBTAINED FROM YOU WITH ANY OTHER ORGANIZATION, UNLESS REQUIRED BY LAW TO DO SO."

For a more detailed example of a Web site's privacy notice, visit http://www.nps.gov/ privacy.htm, as shown in Figure 9.27. If you browse popular sites such as Amazon.com or eBay.com you'll find links to their privacy policies (sometimes called a privacy notice) in the page footer area.

If you've ever filled out a form on a Web site and suddenly received lots of annoying SPAM, you will most likely agree that you'd rather not have Web sites sharing your information with others and you'd like to know up front if this will occur. Your visitors probably feel the same way. Include a privacy notice in your site to inform your visitors how you plan to use the information they share with you. The Better Business Bureau provides a sample privacy notice at http://www.bbbonline.org/privacy/sample_privacy.asp.

Figure 9.27

This privacy notice describes what information is collected

Privacy Statement

We collect no personal information about you when you visit our website unless you choose to provide this information to us. However, we collect and store certain information automatically. Here is how we handle information about your visit to our website.

What We Collect and Store Automatically

If you do nothing during your visit but browse through the website, read pages, or download information, we will gather and store certain information about your visit automatically. This information does not identify you personally. We automatically collect and store only the following information about your visit:

- The Internet domain (for example, "xcompany.com" if you use a private Internet access account, or "yourschool.edu" if you connect from a university's domain) and IP address (an IP address is a number that is automatically assigned to your computer whenever you are surfing the Web) from which you access our website;
- The type of browser and operating system used to access our site;
- The date and time you access our site;
- The pages you visit; and
- If you linked to our website from another website, the address of that website. We use the information we collect to count the number and type of visitors to the different pages on our site, and to help us make our site more useful to visitors like you.

If You Send Us E-mail

You may choose to provide us with personal information, as in e-mail with a comment or question. We use the information to improve our service to you or to respond to your request. Sometimes we forward your e-mail to other government employees or authorized



Server-Side Processing Resources

Sources of Free Remote-Hosted Form Processing. If your Web host provider does not support server-side processing, free remotely hosted scripts may be an option. The script is not hosted on your server so you don't need to worry about installing it or whether your Web host provider will support it. The disadvantage is that there usually is some advertising displayed. The following are a few sites that offer this service:

- http://formbuddy.com
- http://www.expressdb.com
- http://response-o-matic.com
- http://www.formmail.com
- http://www.master.com
- http://www.wufoo.com
- http://www.formassembly.com
- http://www.iceberg.com

Sources of Free Server-Side Scripts. To use free scripts you need to have access to a Web server that supports the language used by the script. Contact your Web host provider to determine what is supported. Be aware that many free Web host providers do not support server-side processing (you get what you pay for!). The following are a few sites that offer free scripts and other resources:

- http://www.scriptarchive.com
- http://cgi.resourceindex.com/Programs_and_Scripts
- http://www.asp101.com
- http://php.resourceindex.com

Exploring Server-Side Processing Technologies

Many types of technologies can be used for server-side scripting, form processing, and information sharing:

- JavaServer Pages (http://java.sun.com/products/jsp)
- Active Server Pages (http://msdn.microsoft.com and search for "Active Server Pages")
- ColdFusion (http://www.adobe.com/products/coldfusion)
- PHP (http://www.php.net)
- Ruby on Rails (http://www.rubyonrails.org, http://tryruby.hobix.com)
- Microsoft's .NET Framework (http://www.microsoft.com/net)
- Web Services (http://www.webservicesarchitect.com, http://webservices.org, and http://uddi.xml.org)

Any of these technologies would be a good choice for future study. Web developers often learn the client-side first (HTML, CSS, and JavaScript), and then progress to learning a server-side scripting or programming language.



CHECKPOINT 9.3

- 1. Describe server-side processing.
- 2. Code a Web page form that will use the post method to invoke a server-side script at http://webdevfoundations.net/scripts/subscribe.asp. The form will have three text boxes as described in Table 9.14.
- 3. Describe why communication is needed between the developer of a server-side script and the Web page designer.

Table 9.14 Form element names

Form Control	Name Attribute Value	
First Name	fname	
Last Name	lname	
E-mail Address	email	

CHAPTER SUMMARY

This chapter introduced the use of forms on Web pages. You learned how to configure form controls and provide for accessibility. You also learned how to configure a form to access server-side processing.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

<button> <fieldset> <form> <input /> <label> <legend> <option> <select> <textarea> accesskey attribute action attribute

- button check box Common Gateway Interface (CGI) for attribute form form control hidden form control method attribute name attribute password box
- privacy policy radio button reset button scrolling text box select list server-side scripting submit button tabindex attribute text box value attribute

Review Questions

Multiple Choice

- **1.** Which of the following form controls would be appropriate for an area that your visitors can use to type in comments about your Web site?
 - a. text box
 - b. select list
 - c. radio button
 - d. scrolling text box
- 2. Which attribute of the <form> tag is used to specify the name and location of the script that will process the form field values?
 - a. action
 - b. process
 - c. method
 - d.id

- **3.** Forms contain various types of _______ such as text boxes and buttons, that accept information from a Web page visitor.
 - a. hidden elements
 - b. labels
 - c. form controls
 - d. legends
- Choose the XHTML tag that would configure a text box with the name "city" and a width of 40 characters.
 - a. <input type="text" id="city"
 width="40" />
 b. <input type="text" name="city"
 size="40" />
 - c. <input type="text" name="city"
 space="40" />
 - d. <input type="text" width="40"/>

- **5.** Which of the following form controls would be appropriate for an area that your visitors can use to type in their e-mail address?
 - a. select list
 - b. text box
 - c. scrolling text box
 - d. none of the above
- **6.** You would like to conduct a survey and ask your Web page visitors to vote for their favorite search engine. Which of the following form controls is best to use for this purpose?
 - a. check box
 - b. radio button
 - c. text box
 - d. scrolling text box
- 7. You would like to conduct a survey and ask your Web page visitors to indicate the Web browsers that they use. Which of the following form controls is best to use for this purpose?
 - a. check box
 - b. radio button
 - c. text box
 - d. scrolling text box
- 8. An order form contains an area for Web visitors to select their preferred method of shipping. You need to limit the amount of space on the form that is used for this feature. Which of the following form controls is best to use for this purpose?
 - a. check box
 - b. radio button
 - c. text box
 - d. select list
- **9.** Which XHTML tag would configure a scrolling text box with the name comments, 2 rows, and 30 characters?

```
a. <textarea name="comments" width="30"
rows="2"></textarea>
```

- b. <input type="textarea"</pre>
- name="comments" size="30" rows="2" />
- c. <textarea name="comments" rows="2"
 cols="30"></textarea>
- d. none of the above

- Choose the XHTML that would associate a label displaying the text E-Mail: with the text box named email.
 - a. E-mail <input type="textbox"
 name="email" id="email" />
 - b. <label>E-mail: <input type="text"
 name="email" id="email" /> </label>
 - c. <label for="email">E-mail
 </label><input type="text"
 name="email" id="email" />
 - d. both b and c

Fill in the Blank

- To group a number of form controls visually on the page, use the ______ tag.
- To cause a number of radio buttons to be treated as a single group, the value of the attribute must be

identical.

Short Answer

- Explain why a Web developer should avoid using mailto: to process form information.
- **15.** List one purpose of using a form on a Web page.

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Apply Your Knowledge

```
1. Predict the Result. Draw and write a brief description of the Web page that will be
  created with the following XHTML code:
  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
  <html xmlns=http://www.w3.org/1999/xhtml lang="en" xml:lang="en">
  <head>
  <title>Predict the Result</title>
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
  </head>
  <body>
    <div align="center">
      <h1>Contact Us</h1>
      <form action="myscript.php">
        <fieldset><legend>Complete the form and a consultant will
        contact you</legend>
        Email: <input type="text" name="email" id="email" size="40"
         /><br />
        Please indicate which services you are interested in:<br/>>br />
           <select name="inquiry" id="inquiry" size="1">
             <option value="development">Web Development</option>
             <option value="redesign">Web Redesign</option>
             <option value="maintain">Web Maintenance</option>
             <option value="info">General Information</option>
           </select>
           <br />
           <input type="submit" />
         </fieldset>
      </form>
      <a href="index.htm">Home</a>
        <a href="services.htm">Services</a>
        Contact
    </div>
  </body>
  </html>
```

2. Fill in the Missing Code. This Web page configures a survey form to collect information on the favorite search engine used by Web page visitors. The form action should submit the form to the server-side script, called survey.php. Some XHTML tags and their attributes, indicated by <_>, are missing. Some XHTML attribute values, indicated by "_", are missing.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
   <head>
```

```
<title>Fill in the Missing Code</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
  <h1>Vote for your favorite Search Engine</h1>
  <form method=" " action=" ">
    <input type="radio" name=" " id="Ysurvey" value="Yahoo" />
    Yahoo!<br />
    <input type="radio" name="survey" id="Gsurvey" value="Google" />
    Google<br />
    <input type="radio" name=" " id="Asurvey" value="AltaVista" />
    Alta Vista<br />
    < >
  </form>
</body>
</html>
```

3. Find the Error. Find the coding errors in the following subscription form:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Find the Error</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
  Subscribe to our monthly newsletter and receive free
  coupons!
  <form action="get" method="newsletter.php">
  E-mail: <input type="textbox" name="email" id="email" char="40">
  <br />
  <input type="button" /> <input type="reset" />
  </form>
</body>
</html>
```

Hands-On Exercises

- **1.** Write the XHTML to create a text box named username that will be used to accept the user name of Web page visitors. The text box should allow a maximum of 30 characters to be entered.
- **2.** Write the XHTML to create a group of radio buttons that Web site visitors can check to vote for their favorite day of the week.
- **3.** Write the XHTML to create a select list that asks Web site visitors to select their favorite social networking Web site.
- **4.** Write the XHTML to create a fieldset and legend with the text "Shipping Address" around the following form controls: AddressLine1, AddressLine2, City, State, ZIP.

- **5.** Write the XHTML to configure an image called signup.gif as an image button on a form.
- **6.** Write the XHTML to configure a hidden form control with the name of userid.
- 7. Write the XHTML to configure a password form control with the name of pword.
- 8. Write the XHTML to configure a form tag to invoke server-side processing using http://webdevfoundations.net/scripts/mydemo.asp and the post method.
- **9.** Write the XHTML to create a form that accepts requests for a brochure to be sent in the mail. Sketch out the form on paper before you begin.
- **10.** Write the XHTML to create a form that accepts feedback from Web site visitors. Sketch out the form on paper before you begin.
- **11.** Write a Web page that contains a music survey form similar to the example shown in Figure 9.28.

igure 9.28	Music Survey - Mozilla Firefox	
ample music	<u>File Edit View History Delicious Bookmarks Accessibility Iools Help</u>	() ()
urvey form		
	Music Survey	
	Name:	
	E-Mail:	
	Onland View Francista Turner of Municu	
	Select Your Favorite Types of Music:	
	Pop Classical Rock Folk	
	Rap Other	
	Select how often you purchase Music CDs:	
	Weekly O A few CDs each year	
	Monthly Never purchase	
	Select the locations you listen to CDs:	
	Select one or more locations	
	Athome	
	In the car 👻	
	What role does music play in your life?	
	Submit	

Include the following form controls:

- Text boxes for name and e-mail address
- A scrolling text box that is 60 characters wide and 3 rows high. (*Hint*: <textarea>)

- A radio button group with at least three choices
- A check box group with at least three choices
- A select box that initially shows three items but contains at least four items
- A submit button
- A reset button

Use a table to organize your form. Place your e-mail address at the bottom of the page. (*Hint*: Draw a sketch of your form and the table before you begin coding the XHTML.) Hand in printouts of both the source code (print in Notepad) and the browser display of your page to your instructor.

Web Research

1. This chapter mentioned a number of sources of free remotely hosted scripts, including http://formbuddy.com, http://www.formmail.com, http://response-o-matic.com, and http://master.com. Visit two of these sites or use a search engine to find other resources for free remotely hosted scripts. Register (if necessary) and examine the Web site to see exactly what is offered. Most sites that provide remotely hosted scripts have a demo you can view or try. If you have time (or your instructor asks you to) follow the directions and access a remotely hosted script from one of your Web pages. Now that you've at least been through a demo of the product or tried it yourself (even better!), it's time to write your review.

Create a Web page that lists the two resource sites you chose and provides a comparison of what they offer. Use a table to list the following:

- Ease of registration
- Number of scripts or services offered
- Type of scripts or services offered
- Site banner or advertisement
- Ease of use
- Your recommendation

Provide links to the resource sites you reviewed and place your name in the e-mail address at the bottom of the page. Print the source code (from Notepad) and the browser view of your Web page.

- 2. Search the Web for a Web page that uses an XHTML form. Print the browser view of the page. Print out the source code of the Web page. Using the printout, highlight or circle the tags related to forms. On a separate sheet of paper, create some XHTML notes by listing the tags and attributes related to forms found on your sample page along with a brief description of their purpose. Hand in the browser view of the page, source code printout, and your XHTML notes page to your instructor.
- **3.** Choose one server-side technology mentioned in this chapter: PHP, ASP, JSP, Ruby on Rails, or ASP.Net. Use the resources listed in the chapter as a starting point, but also search the Web for additional resources on the server-side technology you have chosen. Create a Web page that lists at least five useful resources along with information about each that provides the name of the site, the URL, a brief description of what is offered and a recommended page (such as a tutorial, free script, and so on).

Place your name in an e-mail link on the Web page. Print both the source code (from Notepad) and the browser view of your Web page.

Focus on Web Design

The design of a form, such as the justification of the labels, the use of background colors, and even the order of the form elements can either increase or decrease the usability of a form. Visit some of the following resources to explore form design:

- http://www.uie.com/articles/web_forms
- http://particletree.com/features/10-tips-to-a-better-form
- http://www.alistapart.com/articles/sensibleforms
- http://www.lukew.com/resources/articles/WebForms_LukeW.pdf

Create a Web page that lists the URLs of at least two useful resources along with a brief description of the information you found most interesting or valuable. Design a form on the Web page that applies what you've just learned in your exploration of form design. Place your name in an e-mail link on the Web page. Print both the source code (from Notepad) and the browser view of your Web page.

WEB SITE CASE STUDY: Adding a Form

Each of the following case studies continues throughout most of the text. This chapter adds a page containing a form that invokes server-side processing to the Web sites.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House Case Study. Figure 2.26 shows a site map for the JavaJam site. The Home page, Menu page, and Music page were created in earlier chapters. You will work with the Web pages in the javajamcss folder in this case study.

You have two tasks:

- **1.** Add style rules to the javajam.css file that will configure a form.
- 2. Create a Jobs page (jobs.html) as shown in Figure 9.29.

Hands-On Practice Case

- 1. **Configure the CSS.** Modify the external style sheet, javajam.css. The form is styled with CSS. Review Section 9.4. See Figures 9.29 and 9.30. Open javajam.css in Notepad. Add the style rules as follows:
 - Notice how the text labels for the form controls are on the left side of the content area but are right-aligned. Create a class called labelCol that will float to the left, has a width of 100 pixels, aligns text to the right, and has 10 pixels of padding on the right.

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Figure 9.30 The wireframe of the form	form myRow labelCol rext box myName
	IabelCol textarea myExperience mySubmit submit button

- Configure space around the rows of form controls. Create a class named myRow with bottom padding set to 20 pixels.
- Configure extra space surrounding the submit button by creating a class called mySubmit with a 10 pixel margin.

Save the javajam.css file.

2. The Jobs Page. Use the Music page as the starting point for the Jobs page. Launch Notepad and open the music.html file in the javajamcss folder that you previously

created. Save the file as jobs.html. Modify your jobs.html file to look similar to the Jobs page, shown in Figure 9.29, as follows:

- Change the page title to an appropriate phrase.
- The Jobs page will contain a paragraph and a form in the content div. Delete the current contents of the content div (but leave the opening and closing div tags in place).
- Add a paragraph that contains the following text: Want to work at JavaJam? Fill out the form below to start your application.
- Prepare to code the XHTML for the form area. Begin with a <form> tag that uses the post method and the action attribute to invoke server-side processing. Unless directed otherwise by your instructor, configure the action attribute to send the form data to http://webdevfoundations.net/scripts/javajam.asp.
- Configure the form control for the Name information. Code a <div> that is assigned to the myRow class. Create a <label> element that is assigned to the labelCol class. Code the text, Name:. Create a text box named myName.
- Configure the form control for the E-mail information. Code a <div> that is assigned to the myRow class. Create a <label> element that is assigned to the labelCol class. Code the text, E-mail:. Create a text box named myEmail.
- Configure the Experience area on the form. Code a <div>. Create a <label> element that is assigned to the labelCol class. Code the text, Experience:. Create a textarea named myExperience with rows set to 2 and cols set to 20.
- Configure the submit button on the form. Code a <div> that is assigned to the mySubmit class. Code an input element with type="submit" and value="Apply Now".

Save your page and test it in a browser. It should look similar to the page shown in Figure 9.29. If you are connected to the Internet, submit the form. This will send your form information to the server-side script configured in the <form> tag. A confirmation page that lists the form information and their corresponding names will be displayed.

Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows a site map for the Fish Creek site. The Home page, Services page, and Ask the Vet page were created in earlier chapters. You will work with the Web pages in the fishcreekcss folder in this case study.

You have two tasks:

- **1.** Add style rules to the fishcreek.css file that will configure a form.
- 2. Create a Contact page (contact.html) as shown in Figure 9.31.

Hands-On Practice Case

1. **Configure the CSS.** Modify the external style sheet, fishcreek.css. The form is styled with CSS. Review Section 9.4. See Figures 9.30 and 9.31. Open fishcreek.css in Notepad. Add the style rules as follows:

igure 9.31	B Fish Creek Animal Hospital Contact - Mozilla Fire	efox	
ish Creek	<u>File Edit View History Delicious Bookmarks</u>	Accessibility Iools Help	
ondoundin	Fish	Creek Animal Hospital	
	Con	tact Fish Creek	
	Home	Name:	
	Services E	-mail:	
	Ask the Vet Comm	nents:	
	Contact	Submit	
		Home <u>Services</u> <u>Ask the Vet</u> <u>Contact</u> Copyright © 2011 Fish Creek Animal Hospital <u>yourfirstname@yourlastname.com</u>	

- Notice how the text labels for the form controls are on the left side of the content area but are right-aligned. Create a class called labelCol that will float to the left, has a width of 100 pixels, aligns text to the right, and has 10 pixels of padding on the right.
- Configure space around the rows of form controls. Create a class named myRow with bottom padding set to 20 pixels.
- Configure extra space surrounding the submit button by creating a class called mySubmit with a left margin set to 110 pixels and all other margins set to 10 pixels.

Save the fishcreek.css file.

- **2. The Contact Page.** Use the Ask the Vet page as the starting point for Contact page. Launch Notepad and open the askvet.html file in the fishcreekcss folder that you previously created. Save the file as contact.html. Modify your file to look similar to the Contact page, as shown in Figure 9.31, as follows:
 - Change the page title to an appropriate phrase.
 - The Contact page will contain an <h2> element and a form in the rightcolumn div. Delete the Ask the Vet page content from the rightcolumn div (but leave the page footer in place).
 - Add an <h2> element that contains the following text: Contact FishCreek
 - Prepare to code the XHTML for the form area. Begin with a <form> tag that uses the post method and the action attribute to invoke server-side processing. Unless directed otherwise by your instructor, configure the action attribute to send the form data to http://webdevfoundations.net/scripts/fishcreek.asp.
 - Configure the form control for the Name information. Code a <div> that is assigned to the myRow class. Create a <label> element that is assigned to the labelCol class. Code the text, Name:. Create a text box named myName.

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- Configure the form control for the E-mail information. Code a <div> that is assigned to the myRow class. Create a <label> element that is assigned to the labelCol class. Code the text, E-mail:. Create a text box named myEmail.
- Configure the form control for the Comments. Code a <div>. Create a <label> element that is assigned to the labelCol class. Code the text, Comments:. Create a textarea named myComments with rows set to 2 and cols set to 20.
- Configure the submit button on the form. Code a <div> that is assigned to the mySubmit class. Code an input element with type="submit" and value="Submit".

Save your page and display it in a browser. It should look similar to the page shown in Figure 9.31. If you are connected to the Internet, submit the form. This will send your form information to the server-side script configured in the <form> tag. A confirmation page that lists the form information and their corresponding names will be displayed.

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for the Pasha the Painter site. The Home page, Services page, and Testimonials page were created in earlier chapters. You will work with the Web pages in the paintercss folder in this case study.

You have two tasks:

- 1. Add style rules to the painter.css file that will configure a form.
- 2. Create a Free Estimate page (estimates.html) as shown in Figure 9.32.

na the Painter <u>File Edit View Hig</u> t nates.html	ory Delicious Bookmarks Accessibility Iools Help	
	Pasha the Painter Serving the Northwest Chicago Suburbs since 1986	
Home	Request a Free Estimate.	
Testimonials	E-mail:	
	Type of Job:	
	Free Estimate	
	Copyright © 2011 Pasha the Painter yourfirstname@yourlastname.com	

Hands-On Practice Case

- 1. **Configure the CSS.** Modify the external style sheet, painter.css. The form is styled with CSS. Review Section 9.4. See Figures 9.30 and 9.32. Open painter.css in Notepad. Add the style rules as follows:
 - Notice how the text labels for the form controls are on the left side of the content area but are right-aligned. Create a class called labelCol that will float to the left, has a width of 100 pixels, aligns text to the right, and has 10 pixels of padding on the right.
 - Configure space around the rows of form controls. Create a class named myRow with bottom padding set to 20 pixels.
 - Configure extra space surrounding the submit button by creating a class called mySubmit with a left margin set to 110 pixels and all other margins set to 10 pixels.

Save the painter.css file.

- 2. The Free Estimate Page. Use the Testimonials page as the starting point for the Free Estimate page. Launch Notepad and open the testimonials.html file in the paintercss folder that you previously created. Save the file as estimates.html. Modify your file to look similar to the Free Estimate page, shown in Figure 9.32, as follows:
 - Change the page title to an appropriate phrase.
 - Delete the Testimonials page content from the rightcolumn div (but leave the phone number and page footer in place).
 - The Estimate page will contain an element and a form in the rightcolumn div.
 - Add a element that contains the following text: Request a Free Estimate.
 - Prepare to code the XHTML for the form area. Begin with a <form> tag that uses the post method and the action attribute to invoke server-side processing. Unless directed otherwise by your instructor, configure the action attribute to send the form data to http://webdevfoundations.net/scripts/painter.asp.
 - Configure the form control for the Name information. Code a <div> that is assigned to the myRow class. Create a <label> element that is assigned to the labelCol class. Code the text, Name:.Create a text box named myName.
 - Configure the form control for the E-mail information. Code a <div> that is assigned to the myRow class. Create a <label> element that is assigned to the labelCol class. Code the text, E-mail:. Create a text box named myEmail.
 - Configure the Type of Job area on the form. Code a <div>. Create a <label> element that is assigned to the labelCol class. Code the text, Type of Job:. Create a textarea named myJob with rows set to 2 and cols set to 20.
 - Configure the submit button on the form. Code a <div> that is assigned to the mySubmit class. Code an input element with type="submit" and value="Free Estimate".

Save your page and test it in a browser. It should look similar to the page shown in Figure 9.32. If you are connected to the Internet, submit the form. This will send your

Figure 9.33 Prime Properties contact.html form information to the server-side script configured in the <form> tag. A confirmation page that lists the form information and their corresponding names will be displayed.

Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case Study. Figure 2.38 shows a site map for the Prime Properties site. The Home page, Listings page, and Financing page were created in earlier chapters. You will work on the Web pages in the primecss folder in this case study.

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	Contac	ct 📃	E	E-mail:							
			Com	monts:							
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				_							
			Conta	ct							
			Home Listin	ngs Financing 2011 Prime Proc	Contact erties						
			yourfirstnam	e@yourlastname	.com						

You have two tasks:

- **1.** Add style rules to the prime.css file that will configure a form.
- 2. Create a Contact page (contact.html) as shown in Figure 9.33.

Hands-On Practice Case

- 1. **Configure the CSS.** Modify the external style sheet, prime.css. The form is styled with CSS. Review Section 9.4. See Figures 9.30 and 9.33. Open prime.css in Notepad. Add the style rules as follows:
 - Notice how the text labels for the form controls are on the left side of the content area but are right-aligned. Create a class called labelCol that will float to the left, has a width of 100 pixels, aligns text to the right, and has 10 pixels of padding on the right.
 - Configure space around the rows of form controls. Create a class named myRow with bottom padding set to 20 pixels.

• Configure extra space surrounding the submit button by creating a class called mySubmit with margins set to 10 pixels.

Save the prime.css file.

2. The Contact Page. Use the Financing page as the starting point for the Contact page. Launch Notepad and open the financing.html file in the primecss folder that you previously created. Save the file as contact.html.

Modify your file to be similar to the Contact page, as shown in Figure 9.33, as follows:

- Change the page title to an appropriate phrase.
- Replace the Financing subheading with Contact.
- Delete the rest of the Financing page content from the rightcolumn div (but leave the navigation and page footer in place).
- Prepare to code the XHTML for the form area. Begin with a <form> tag that uses the post method and action attributes to invoke server-side processing. Unless directed otherwise by your instructor, configure the action attribute to send the form data to http://webdevfoundations.net/scripts/prime.asp.
- Configure the form control for the Name information. Code a <div> that is assigned to the myRow class. Create a <label> element that is assigned to the labelCol class. Code the text, Name:. Create a text box named myName.
- Configure the form control for the E-mail information. Code a <div>. Create a <label> element that is assigned to the labelCol class. Code the text, E-mail:. Create a text box named myEmail.
- Configure the Comments area on the form. Code a <div>. Create a <label> element that is assigned to the labelCol class. Code the text, Comments:. Create a textarea named myComments with rows set to 2 and cols set to 20.
- Configure the submit button on the form. Code a <div> that is assigned to the mySubmit class. Code an input element with type="submit" and value="Contact".

Save your page and test it in a browser. It should look similar to the page shown in Figure 9.33. If you are connected to the Internet, submit the form. This will send your form information to the server-side script configured in the <form> tag. A confirmation page that lists the form information and their corresponding names will be displayed.

Web Project

See Chapters 5 and 6 for an introduction to the Web Project case. You will either add a form to an existing page in your Web site or create a new page that contains a form. Use CSS to style the form.

Hands-On Practice Case

- 1. Choose one of your project Web pages to contain the form. Sketch a design of the form you plan to create.
- **2.** Modify your project's external CSS file (project.css) to configure the form areas as needed.

- 3. Update your chosen Web page and add the XHTML code for the form.
- 4. The <form> tag should use the post method and action attributes to invoke server-side processing. Unless directed otherwise by your instructor, configure the action attribute to send the form data to http://webdevfoundations.net/scripts/ formdemo.asp.

Save and test the page. If you are connected to the Internet, submit the form. This will send your form information to the server-side script configured in the <form> tag. A confirmation page that lists the form information and their corresponding names will be displayed.

Web Site Development

Chapter Objectives In this chapter, you will learn how to ...

- Describe the skills, functions, and job roles needed for a successful Web project development
- Utilize the stages in the standard System **Development Life Cycle**
- Identify other common system development methodologies
- Apply the System Development Life Cycle to Web development projects
- Identify opportunities and determine goals during the Conceptualization phase
- Determine information topics and site requirements during the Analysis phase

 Create the site map, page layout, prototype, and documentation as part of the Design phase

<u>CHAP</u>TER

- Complete the Web pages and associated files during the Production phase
- Verify the functionality of the Web site and use a test plan during the Testing phase
- Obtain client approval and launch a Web site
- Modify and enhance the Web site during the Maintenance phase
- Compare the goals of the Web site to the results as part of the Evaluation phase
- Find the right Web host provider for your Web site
- Choose a domain name for your web site

This chapter discusses the skills needed for successful

large-scale project development and introduces you to common Web development methods. It is important to realize that each project is unique; each has its own needs and requirements. Choosing the right people to work on a Web project team can make it or break it.

10.1 Successful Large-Scale Project Development

Large-scale projects are not completed by only one or two individuals. They are created by a group of people working together as a team. The job roles of project manager, information architect, marketing representative, copywriter, editor, graphic designer, database administrator, network administrator, and Web developer are usually needed for large projects. In smaller companies or smaller organizations each person can wear many hats and juggle his or her job roles. In a smaller-scale project, one of the Web developers may double as the project manager, graphic designer, database administrator, and/or information architect. Job roles necessary for successful projects are discussed in this section.

Project Manager

The **project manager** oversees the Web site development process and coordinates team activities. The project manager creates the project plan and schedule. This individual is accountable for reaching project milestones and producing results. Excellent organizational, managerial, and communication skills are required.

Information Architect

The **information architect** clarifies the mission and goals of the site, assists in determining the functionality of the site, and is instrumental in defining the site organization, navigation, and labeling. Web developers and/or the project manager sometimes take on this role themselves.

Marketing Representative

The marketing representative handles the organization's marketing plan and goals. The marketing representative works with the Web designers to create a Web presence, or look and feel, that aligns with the marketing goals of the organization. The marketing representative also helps to coordinate the Web site with other media used for marketing, such as print, radio, and television marketing.

Copywriter and Editor

The **copywriter** prepares and evaluates copy. When material from existing brochures, newsletters, and white papers will be used on the Web site, it must be repurposed or reworked for the Web media. The content manager or **editor** may work with the copywriter to check the text for correct grammar and consistency.

Content Manager

The **content manager** participates in the strategic and creative development and enhancements of the Web site. He or she oversees changes in content. The skill set of a successful content manager includes editing, copywriting, marketing, technology, and communication. The person in this dynamic job role must be able to facilitate change.

Graphic Designer

The **graphic designer** determines appropriate use of color and graphics on the site, creates page layouts, and designs graphics. The graphic designer may work closely with the Web developers to create graphic buttons used in mouseover effects.

Database Administrator

A database administrator is needed if the site accesses information stored in databases. Database administrators create databases, create procedures to maintain databases (including backup and recovery), and control access to databases.

Network Administrator

The network administrator configures and maintains the Web server, installs and maintains system hardware and software, and controls access security.

Web Developer

The **Web developer** writes XHTML code and client-side scripting such as JavaScript. The Web developer may develop server-side processing such as PHP or ASP. Typically, there are multiple Web developers assigned to a large project, each with his or her area of expertise.

Project Staffing Criteria

Whether the project is large or small, finding the right people to work on it is crucial. When selecting staff for a project, consider each individual's work experience, portfolio, formal education, and industry certifications.

Another option to staffing a Web project (or developing an entire Web site) is to outsource the project—that is, hire another company to do the work for you. Sometimes portions of a project are outsourced, such as graphics creation, multimedia animation, or server-side scripting. When this option is chosen, communication between the project manager and the external organization is crucial. The outsource team needs to be aware of the project goals and deadlines.

Large or small, developed in-house or outsourced, the success of a Web site project depends on planning and communication. Formal project development methodology is used to coordinate and facilitate the planning and communication needed for a successful Web project.

10.2 The Development Process

Large corporate and commercial Web sites don't just happen. They are carefully built, usually by following a project development methodology. A methodology is a step-bystep plan that encompasses the life cycle of a project from start to finish. It comprises of a series of **phases**, each having specific activities and deliverables. Most modern methodologies have their roots in the **System Development Life Cycle (SDLC)**, a process that has been used for several decades to build large-scale information systems. The SDLC comprises a set of phases, sometimes called steps or stages. Each phase is usually completed before beginning the activities in the next phase. The basic phases of the standard SDLC (see Figure 10.1) are systems investigation, systems analysis, systems design, systems implementation, and maintenance.







Web sites are often developed using a variation of the SDLC that is modified to apply to Web projects. Large companies and Web design firms usually create their own special methodology for use on projects. The Web Site Development Cycle is a guide to successful Web project management. Depending on the scope and complexity of a particular project, some steps can be completed in a single meeting; other steps can take weeks or months.

The Web Site Development Cycle, shown in Figure 10.2, usually consists of the following steps: Conceptualization, Analysis, Design, Production, Testing, Launch, Maintenance, and Evaluation.





What about other Web site development methodologies?

The development methodology presented in this chapter is a version of the traditional SDLC modified for Web site development. Other development methods include the following:

- **Prototyping.** A small working model is created and shown to the client. It is continually revised by the developer until it is usable for the intended purpose. This method can easily be included in the Web Development Life Cycle during the Design phase.
- Spiral System Development. This is excellent for very large-scale or phased projects where it is important to reduce risk. Small portions of the project are completed one after the other in a spiral system of development.
- Joint Application Development (JAD). This type of development focuses on group meetings and collaboration between the users and developers of a Web site or system. It is generally used only with in-house development.
- Agile Software Development. This development methodology is viewed as innovative in that it stresses responsiveness based on generating and sharing knowledge within a development team and with the client. The philosophy emphasizes code over documentation and results in the project being developed in many small, iterative steps.
- Organization-Specific Development Methodologies. Large companies and Web development firms often create their own version or interpretation of site development methodology to be used on projects.

An important aspect of Web site development is that you are never finished—your site needs to be kept fresh and up-to-date, there will be errors or omissions that need to be corrected, and new components and pages will be needed. The first step is to decide why the Web site is needed in the first place.

Conceptualization

What opportunity or issue is the site addressing? What is the motivation for the site? Perhaps your client owns a retail store and wishes to sell products over the Internet. Perhaps your client's competitor just completed a Web site and your client needs to create one just to keep up. Perhaps you have a great idea that will be the next eBay!

Because the focus of your work is to make the site usable and appealing to your target audience, you must determine the site's intended audience. It is crucial to be aware of who your audience is and what their preferences are.

Another task during **conceptualization** is to determine the site's long-term and shortterm goals or mission. Perhaps a short-term goal is simply to publish a home page. Perhaps a long-term goal is for 20 percent of a company's product sales to be made on the Web site. Or you may simply want a certain number of Web site visitors each month. Whatever they are, it is better if the objectives are measurable. Decide how you will measure the success (or failure) of your Web site.

Determining the purpose and goals of a site is usually done with the cooperation of the client, project manager, and information architect. In a formal project environment, a document that details the results of this step is created, and then approved by the client before development can proceed.

Analysis

The Analysis phase involves meetings and interviews with key client personnel. Analysis is usually completed by the project manager, information architect or other analyst, and the client's marketing representative and related personnel. The network administrator and database administrator may be interviewed depending on the scope of the project. Common tasks completed during the Analysis phase follow:

- **Determine Information Topics.** Organize the information to be presented on the site into categories and create a hierarchy. These **information topics** will be used later as a starting point for developing the site navigation.
- **Determine Functionality Requirements.** State what the site will do, not how it will do it. For example, state "the site will accept credit card orders from customers," not "the site will perform order processing using Active Server Pages to look up each price and sales tax information in Oracle databases and use real-time credit card verification supplied by somewebsite.com." Note the difference in the level of detail of these functionality requirements.
- **Determine Environmental Requirements.** What environmental requirements, such as hardware, operating system, memory capacity, screen resolution, and bandwidth will your site visitors be using? What type of hardware and software requirements will the Web server need? (See Section 10.3 Web Hosting and Section 10.4 Choosing a Virtual Host for help with this question.)
- **Determine Content Requirements.** Does content already exist in another format brochures, catalogs, white papers? Determine who is responsible for creating and repurposing content for the site. Does the client company or marketing department have any **content requirements** that must be met? For example, is there a specific look and feel or corporate branding component that must be present on the site?
- **Compare the Old Approach to the New Approach.** Perhaps you are not creating a new Web site, but modifying an existing one. What benefits or added value will the new version provide?
- **Review Your Competitors' Sites.** A careful review of your competitors' Web presence will help you design a site that will stand out from the crowd and be more appealing to your shared customer base. Note the good and bad components of these sites.
- Estimate Costs. Create an estimate of the costs and time involved to create the site. A formal project plan is often created or modified at this point. Often, an application such as Microsoft Project is used to estimate costs and plan project schedules.
- **Do a Cost/Benefit Analysis.** Create a document that compares the costs and benefits of the site. Measurable benefits are the most useful and most appealing to clients. In a formal project environment, a document that details the results of this **cost/benefit analysis** must be approved by the client before the team can proceed.

Design

Once everyone knows what is needed, it is time to determine how it can be accomplished. The Design phase involves meetings and interviews with key client personnel. **Design** tasks are usually completed by the project manager, information architect or other analyst, graphic designer(s), senior Web developer(s), and the client's marketing representative and related personnel. Common tasks of the Design phase follow:

- **Choose a Site Organization.** As discussed in Chapter 5, common Web site organizational forms are hierarchical, linear, and random. Determine which is best for the project site and create a site map (sometimes called a flowchart or storyboard).
- **Prototype the Design.** As a starting point, sketch out the design on paper. Sometimes it's useful to sketch within an empty browser frame (see the student files Chapter10/sketch.doc). Often, a graphics application is used to create sample Web page mock-ups, or wireframes, as page layouts are created. These can be shown to clients as a prototype, or working model, of the system for approval. They can also be shown to focus groups for **usability testing**.
- **Create a Page Layout Design.** The overall layout, or look and feel, of the site should be designed. The page layout design is used as a guideline for the Home page and Content page layouts. Items such as the site color scheme, size of logo graphics, button graphics, and text should be determined. Using the page layout design and site map, create sample layouts for the Home page and Content pages. Use a graphic application to create mock-ups of these pages to get a good idea of how the site will function. If you use a Web authoring tool at this early stage, you run the risk of your manager or client thinking you already have the site half done and insisting on early delivery.
- **Document Each Page.** While this may seem unnecessary, lack of content is a frequent cause of Web site project delays. Prepare a content sheet for each page, such as the one shown in Figure 10.3 (available at Chapter10/contentsheet.doc in the student files), which describes the functionality of the document, text and graphic content requirements, source of content, and approver of content.

Content Documentation

Page Title: File Name: Purpose of Page

Suggested Graphic Elements

Other Special Features

Information Needs

Information Sources

Content Providers List name, e-mail, and phone number of each content provider

File Format of Content Date Required: Date Provided:

Content Approval

Figure 10.3

Sample content sheet

The site map and page design prototypes are usually approved by the client before the team can continue with the Production phase.

Production

During **production** all the previous work comes together (hopefully) in a usable and effective Web site. During the Production phase, the Web developers are on the critical path—their work must be done as scheduled or the project will be late. The other project members are consulted as needed for clarification and approval. Common tasks of the Production phase follow:

- **Choose a Web Authoring Tool.** The use of a Web authoring tool such as Adobe Dreamweaver or Microsoft Expression Web can greatly increase productivity. Specific productivity aids include designer notes, page templates, task management, and Web page check-in and check-out to avoid overlapping page updates. The use of an authoring tool will serve to standardize the XHTML used in the project pages. Any standards related to indentation, comments, and so on should be determined at this time.
- **Organize Your Site Files.** Consider placing images and media in their own folder. Also, place server-side scripts in a separate folder. Determine naming conventions for Web pages, images, and media.
- **Develop and Individually Test Components.** During this task the graphic designers and Web developers create and individually test their contributions to the site. As the images, Web pages, and server-side scripting are developed, they are individually tested. This is called **unit testing**. On some projects, a senior Web developer or the project manager will review the components for quality and standards compliance.

Once all components have been created and unit tested, it's time to put them together and begin the Testing phase.

Testing

The components should be published to a test Web server. This test Web server should have the same operating system and Web server software that the production (actual) Web server will be using. Some common site **testing** considerations follow:

- **Test on Different Browsers and Browser Versions.** It is very important to test your pages on commonly used browsers and versions of those browsers.
- Test with Different Screen Resolutions. Although as a Web developer, you may use a very high screen resolution, not everyone uses 1920×1200 screen resolution. The most commonly used screen resolutions at the time of this writing are 1024×768, 1280×800, and 1280×1024. Be sure to test your Web pages on various resolutions—you might be surprised at the results.
- Test Using Different Bandwidths. If you live and work in a metropolitan area, everyone you know may have broadband access to the Internet. However, many people still use dial-up connections to access the Web. It is important to test your site on both slow and fast connections. Images that look great over your school's T3 line may load very slowly over a 56K modem.

- **Test from Another Location.** Be sure to test your Web site using a computer other than the one the Web site was developed on, in order to simulate the Web page visitor experience more closely.
- Test Using Mobile Devices. Mobile use of the Web is increasing all the time—test your site on one or more of the currently popular smartphones.
- Test, Test, Test. There is no such thing as too much testing. Humans make mistakes. It is much better for you and your team to find the errors than for your client to point them out to you when they review the Web site.

Does this sound like a lot to keep track of? It is. That's why it's a good idea to create a test plan—a document that describes what will be tested on each page of a Web site. A sample test plan for a Web page, shown in Figure 10.4 (see Chapter10/testplan.pdf in the student files), can help you organize your testing as you check your document in different browsers and screen resolutions. The document validation section covers content, links, and any forms or scripting that are required for the page. Search engine optimization meta tags are discussed in Chapter 13. However, at this point you should be able to verify that the page title is descriptive and includes the company or organization name. Testing your page using different bandwidths is important because Web pages that take too long to download are often abandoned.



Automated Testing Tools and Validators. The Web authoring tool your project is using will have some built-in site reporting and testing features. Web authoring applications such as Adobe Dreamweaver and Microsoft Expression Web provide functions such as spell checks, link checks, and load time calculations. Each application has unique features. Dreamweaver's reporting includes link checking, accessibility, and code validation. There are other automated testing tools and validators available. The W3C

Markup Validation Service (http://validator.w3.org) can be used to validate both HTML and XHTML. Test CSS for proper syntax using the W3C CSS Validation Service (http:// jigsaw.w3.org/css-validator). Analyze the download speed of your page using the Web Page Analyzer (http://www.websiteoptimization.com/services/analyze). Adobe also offers cross-browser testing at http://browserlab.adobe.com. Testing tools that offer additional features such as spelling, browser compatibility, page load time, and broken-link checking are available from http://www.netmechanic.com and others. See http://www.softwareqatest.com/qatweb1.html for a partial list.

In addition to validating HTML and testing for broken links, consider using a tool such as HP Runner to load-test the Web server. The scope and complexity of your site will determine the amount of testing needed. For a simple site, validation and link checking will probably suffice. Other types of sites will benefit from more rigorous testing.

Accessibility Testing. In the design and coding process your team should have followed recommended techniques to provide accessibility. In fact, if your Web site will be used by an agency of the federal government, you are required to do so by law (Section 508 of the Rehabilitation Act). State governments have also begun to legislate accessibility requirements. For example, the recently passed Illinois Information Technology Act requires Illinois state agencies and universities to ensure that their information technology (including Web sites) is accessible. Prove your compliance by performing accessibility testing on your site. There are a variety of accessibility checkers available. Adobe Dreamweaver includes a built-in accessibility checker. Visit http://firefox.cita. uiuc.edu/ to download an accessibility extension for the FireFox browser. Popular online accessibility tests include Deque System's Worldspace Online (http://worldspace. deque.com), ATRC AChecker (http://www.achecker.ca/checker), and Cynthia Says (http://www.cynthiasays.com).

Usability Testing. Testing how actual Web page visitors use a Web site is called usability testing. It can be conducted at any phase of a Web site's development and is often performed more than once. A usability test is conducted by asking users to complete tasks on a Web site, such as placing an order, looking up the phone number of a company, or finding a product. The exact tasks will vary depending on the Web site being tested. The users are monitored while they try to perform these tasks. They are asked to think out loud about their doubts and hesitations. The results are recorded (often on video tape) and discussed with the Web design team. Often changes are made to the navigation and page layouts based on these tests. Complete Hands-On Exercise 6 at the end of this chapter and perform a small-scale usability test to become more familiar with this technique.

If usability testing is done early in the development phase of a Web site, it may use the paper page layouts and site map. If the Web development team is struggling with a design issue, sometimes a usability test can help to determine which design idea is the better choice.

When usability is done during a later phase, such as the Testing phase, the actual Web site is tested. This can lead to a confirmation that the site is easy to use and well designed, to last minute changes in the Web site, or to a plan for Web site enhancements in the near future.



Launch

Your client—whether another company or another department in your organization needs to review and approve the test Web site before the files are published to the live site. Sometimes this approval takes place at a face-to-face meeting. Other times, the test URL is given to the client and the client e-mails approval or requested changes.

Once the test Web site has been approved, it is published to your live production Web site (this is called a **launch**). If you think you are finished—think again! It is crucial to test all site components after publishing to make sure the site functions properly in its new environment. Marketing and promotion activities for the Web site (see Chapter 13) usually take place at this time.

Maintenance

A Web site is never finished. There are always errors or omissions that were overlooked during the development process. Clients usually find many new uses for a Web site once they have one and request modifications, additions, and new sections (this is called site **maintenance**). So at this point, the project team identifies the new opportunity or enhancement and begins another loop through the development process.

Other types of updates needed are relatively small—perhaps a link is broken, a word is misspelled, or a graphic needs to be changed. These small changes are usually made as soon as they are noticed. The question of who makes the changes and who approves them is often a matter of company policy. If you are a freelance Web developer, the situation is more straightforward—you will make the changes and your client will approve them.

Evaluation

Remember the goals set for the Web site in the Conceptualization phase? During evaluation it's time to review them and determine if your Web site meets them. If not, consider how you can enhance the site, and begin another loop through the development process.



CHECKPOINT 10.1

- 1. Describe the role of the project manager.
- 2. Explain why many different roles are needed on a large-scale Web project.
- 3. List three different techniques used to test a Web site. Describe each technique in one or two sentences.

10.3 Domain Name Overview

A crucial part of establishing an effective Web presence is choosing a **domain name**; it serves to locate your Web site on the Internet. If your business or organization is brandnew, then it's often convenient to select a domain name while you are deciding on a company name. If your organization is well established, you should choose a domain name that relates to your existing business presence. Although many domain names have already been purchased, there are still lots of options available.

Choosing a Domain Name

- **Describe Your Business.** Although there is a long-standing trend to use "fun" words as domain names (for example, yahoo.com, google.com, bing.com, woofoo.com, and so on), think carefully before doing so. Domain names for traditional businesses and organizations are the foundation of the organization's Web presence and should include the business name or purpose.
- **Be Brief, if Possible.** Although most people find new Web sites with search engines, some of your visitors will type your domain name in a browser. A shorter domain name is preferable to a longer one—it's easier for your Web visitors to remember.
- Avoid Hyphens ("-"). Using the hyphen character (commonly called a dash) in a domain name makes it difficult to pronounce the name. Also, someone typing your domain name may forget the dash and end up at a competitor's site! If you can, avoid the use of dashes in a domain name.
- There's More Than .com. While the .com TLD (top-level domain name) is still the most popular for commercial and personal Web sites, consider also registering your domain name with other TLDs, such as .biz, .net, .us, .mobi, and so on. Commercial businesses should avoid the .org TLD, which is the first choice for nonprofit organizations. You don't have to create a Web site for each domain name that you register. You can arrange with your domain name registrar (for example, http://register.com) for the "extra" domain names to point visitors to the domain name where your Web site is located. This is called domain name redirection.
- **Brainstorm Potential Keywords.** Think about words that a potential visitor might type into a search engine when looking for your type of business or organization. This is the starting point for your list of **keywords**. If possible, work one or more keywords into your domain name (but still keep it as short as possible).
- Avoid Trademarked Words or Phrases. The U.S. Patent and Trademark Office (USPTO) defines a trademark as a word, phrase, symbol, or design, or a combination of words, phrases, symbols, or designs, that identifies and distinguishes the source of the goods of one party from those of others. A starting point in researching trademarks is the USPTO Trademark Electronic Search System (TESS); visit http://www.uspto.gov/web/trademarks/workflow/start.htm and click on the link to TESS. See http://www.uspto.gov for more information about trademarks.
- **Know the Territory.** Explore the way your potential domain name and keywords are already used on the Web. It's a good idea to type your potential domain names (and related words) into a search engine to see what may already exist.
- Verify Availability. Check with one of the many domain name registrars to determine if your domain name choices are available. A few of the many sites that offer domain name registration services are listed below:
 - http://register.com
 - http://networksolutions.com
 - http://godaddycom

Each of these sites offers a WHOIS search feature that provides you a way to determine if a potential domain name is available, and if it is owned, who owns it. Often the domain name is already taken. If that's the case, the sites listed above will provide you with alternate suggestions that may be appropriate. Don't give up; a domain name is out there waiting for your business.

Registering a Domain Name

Once you've found your perfect domain name, don't waste any time in registering it. The cost to register a domain name varies, but is quite reasonable. The top rate for a .com one-year registration is currently \$35 (and there are numerous opportunities for discounts with multiyear packages or bundled Web hosting services). It's perfectly okay to register a domain name even if you are not ready to publish your Web site immediately. There are many companies that provide domain registration services, as listed above. When you register a domain name, your contact information (such as name, phone number, mailing address, and e-mail address) will be entered into the WHOIS database and available to anyone unless you choose the option for private registration. While there is usually a small annual fee for private registration, it shields your personal information from unwanted spam and curiosity seekers.

Obtaining a domain name is just one part of establishing a Web presence—you also need to host your Web site somewhere. The next section introduces you to factors involved in choosing a Web host.

10.4 Web Hosting

Where is the appropriate place for your Web project to "live"? Choosing the most appropriate **Web host** provider for your business or client could be one of the most important decisions you make. A good Web hosting service will provide a robust, reliable home for your Web site. A poor Web hosting service will be the source of problems and complaints. Which would you prefer?

Web Host Providers

The types of Web host providers range from local ISPs who have some empty space on their servers and Web developers who host sites on the side, to local hosting companies and national companies that guarantee 99.999 percent uptime. Understandably, the fees and the level of service are different. What does your business or client need? This section looks at needs of various size businesses.

One word of caution: Never consider using a "free" Web host provider for a business site. These free sites are great for kids, college students, and hobbyists, but they are unprofessional. The last thing you or your client wants is to be perceived as unprofessional or not serious about the business at hand.

As you consider different Web host providers, be sure to check references. Also, try contacting their support phone numbers and e-mail addresses to determine just how responsive they really are. It is common for Web host providers to charge a setup fee in addition to the monthly hosting fee. Hosting fees vary widely. The cheapest hosting

provider is not necessarily the one to use. Word of mouth, Web searches, the local phone directory, and online directories such as http://www.hosting-review.com are all resources in your quest for the perfect Web host provider.

Hosting Needs

Small- to Medium-Size Web Site. Suggested requirements include unlimited data transfer, 60MB or more of hard disk space, e-mail, and support of server-side scripting such as ASP or PHP. This type of hosting is usually virtual hosting. The Web host provider's server is divided into a number of virtual domains, and multiple Web sites are set up on the same computer.

Keep in mind that over time your Web site will grow and your processing needs will increase. Do you have access to your Web site log or will automatic reporting be included? Does the Web host provider offer an e-commerce package that you can use when you are ready? Does it offer CGI or database support? You may not need these technologies now, but keep your options open for the future. Moving a site from one Web host provider to another is not always an easy process. Choose a Web host provider that most likely will meet your future needs as well as your present needs.

Also consider the operating system and Web server application that your host offers. The UNIX operating system running an Apache Web server is quite common and very efficient. However, if the skill set of your organization is mainly Microsoft technologies, your staff will be more comfortable and more productive with a Web host that offers a Microsoft operating system running Internet Information Server as the Web server. Consider local Web hosting providers as well as national Web host providers in your search.



Why do I care about knowing which operating system my Web host provider uses?

Knowing the operating system used by your Web host provider is important because it can help you with troubleshooting your Web site. Often, students' Web sites work great on their own PC (usually with a Windows-based operating system) but fall apart (with broken links and images that do not load) after being published on a free Web server that uses a different operating system.

Some operating systems, such as Windows, treat uppercase and lowercase letters in exactly the same way. Other operating systems, such as UNIX and Linux, consider uppercase and lowercase letters to be different. This is called being case-sensitive. For example, when a Web server running on a Windows operating system receives a request generated by an anchor tag coded as My Page, it will return a file named with any combination of uppercase or lowercase letters. The values MyPage.html, myPage.html can all be used. However, when the request generated by the same anchor tag is received by a Web server running on a UNIX system (which is case-sensitive) the file would only be found if it were really saved as MyPage.html. If the file were named mypage.html, a 404 (not found) error would result. This is a good reason to be consistent when naming files—consider always using lowercase letters for file names.

Large- to Enterprise-Size Web Site. If you are expecting a high traffic site that may support a chat room or streaming media content, consider large national Web hosting services. Generally, these provide a high bandwidth Internet connection (typically OC-1 or higher), 24-hour staffing, hardware and media redundancy, and enhanced security. Determine the guaranteed level of service and response time. Also consider using a dedicated or co-located Web server at a national Web host provider. A dedicated or co-located Web server will be running your Web site only—you do not share the processor or hard drive with any other organization. There is an additional charge, but the added security and guarantee of processing may be worth it to your organization.

A dedicated Web server refers to the rental and exclusive use of a computer and connection to the Internet that is housed on the Web hosting company's premises. A dedicated server is usually needed for a Web site that could have a considerable amount of traffic, such as tens of millions of hits a day. The server can usually be configured and operated remotely from the client company or you can pay the Web host provider to administer it for you.

A **co-located Web server**, sometimes referred to as colocated or collocated, is a computer that your organization has purchased and configured. Your organization effectively rents space at the Web host provider's location. Your server is kept and connected to the Internet at its location. Your organization administers this computer. This provides your organization with additional control over the Web server, but it also means that you need to staff or contract an individual with Web server administration experience.

Large, national Web host providers can supply dedicated T1 or T3 Internet access, 24/7 support, network utilization statistics and log access, hardware and media redundancy, and the ability to cluster Web servers, support Web farms, e-commerce, and streaming media delivery. A Service-Level Agreement (SLA) that details the level of support and response time is also usually supplied by large, national Web host providers.

For your Web site—small, medium, or large—selecting the right Web host can be crucial to its success.

10.5 Choosing a Virtual Host

A number of factors to consider when choosing a Web host, including bandwidth, disk storage space, technical support, and the availability of e-commerce packages have been discussed. For a handy list of these factors and others to consider in your quest for a virtual Web host, review the Web host checklist shown in Table 10.1.
Operating System UNIX Some Web hosts offer a choice of the to integrate your Web site with your be to integrate your Web site with your be the same operating system for both. Web Server Apache These two Web server applications are the to integrate your web server applications are the top of top of the top of t	e the most popular. ux operating system. IIS
Web Server Apache These two Web server applications are	e the most popular. ux operating system. IIS led with selected versions
IIS Apache usually runs on a UNIX or Linu (Internet Information Services) is bundl of Microsoft Windows.	
Bandwidth Image: MB or GB Some Web hosts carefully monitor you and charge you for overages. While un it is not always available. A typical low between 100 and 200MB per month. should be okay with about 20GB of damonth.	ur data transfer bandwidth nlimited bandwidth is great, r-traffic Web site varies A medium-traffic site ata transfer bandwidth per
Technical Support E-mail Review the description of technical su site. Is it available 24 hours a day, seven phone a question to test it. If the orgation to you as a prospective customer, be of its technical support later.	pport on the Web host's en days a week? E-mail or nization is not responsive leery about the availability
Service Agreement Uptime guarantee A Web host that offers an SLA (Servic uptime guarantee shows that they value monitoring The use of automatic monitoring will in cal support staff when a server is not	e Level Agreement) with an ue service and reliability. nform the Web host techni- functioning.
Disk Space Image: MB Many virtual hosts routinely offer 100M Image: GB you have a small site that is not graph even use 40MB of disk storage space	/B+ disk storage space. If nic-intensive you may never a.
E-mail Most virtual hosts offer multiple e-mail can be used to filter messages—custo port, general inquiries, and so on.	mailboxes per site. These omer service, technical sup-
Uploading Files Image: FTP Access A Web host that offers FTP access with the offers FTP access	Il allow you the most flexibil- a Web-based file manager th options.
Canned Scripts Image: Form processing Many Web hosts supply canned, pre-training Image: I	written scripts to process
Scripting Support If you plan to use server-side scripting PHP which, if any, scripting is supported by Net	on your site determine / your Web host.
Database Support Image: MySQL If you plan to access a database with which, if any, database is supported by MS SQL Image: MS Access Image: MS SQL	your scripting, determine by your Web host.
E-Commerce If you plan to enter into e-commerce (easier if your Web host offers a shopp see if one is available.	see Chapter 12) it may be ing cart package. Check to
Scalability Scripting You probably will choose a basic (low-site. Note the scalability of your Web here is the scalability of your Web here is the scalability of your Web here is the scripting, database, e-commerce bandwidth or disk space available as your web here is the scalability of your	end) plan for your first Web nost—are there other plans packages, and additional your site grows?

Table 10.1 Web host checklist

Backups	DailyPeriodicNo backups	Most Web hosts will back up your files regularly. Check to see how often the backups are made and if they are accessible to you. Be sure to make your own site backups as well.
Site Statistics	Raw log fileLog reportsNo log access	The Web server log contains useful information about your visi- tors, how they find your site, and what pages they visit. Check to see if the log is available to you. Some Web hosts provide reports about the log. See Chapter 13 for more information on Web server logs.
Domain Name	 Required to register with host OK to register on your own 	Some Web hosts offer a package that includes registering your domain name. It is better if you register your domain name yourself (see http://register.com or http://networksolutions.com) and retain control of your domain name account.
Price	 Set up fee per month 	Price is last in this list for a reason. Do not choose a Web host based on price alone—the old adage "you get what you pay for" is definitely true here. It is not unusual to pay a one-time set-up fee and then a periodic fee—either monthly, quarterly, or annually.

 Table 10.1
 Web host checklist (continued)



CHECKPOINT 10.2

- 1. Describe the type of Web host that would meet the needs of a small company for its initial Web presence.
- 2. Describe the difference between a dedicated Web server and a co-located Web server.
- 3. Explain why price is not the most important consideration when choosing a Web host.

CHAPTER SUMMARY

This chapter introduced the system development life cycle and its application to Web development projects. The job roles related to Web site development were discussed. The chapter also included an introduction to choosing a domain name and a Web site host provider.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

accessibility testing analysis automated testing co-located Web server conceptualization content manager content requirements copywriter cost/benefit analysis database administrator dedicated Web server design domain name domain name registrars domain name redirection editor environmental requirements evaluation functionality requirements graphic designer information architect information topics keywords launch maintenance marketing representative network administrator phases production project manager Service Level Agreement (SLA) System Development Life Cycle (SDLC) test plan testing trademark unit testing usability testing validators virtual hosting Web developer Web host Web presence Web server

Review Questions

Multiple Choice

- **1.** Which of the following should testing a site include?
 - a. checking all of the hyperlinks within the site
 - b. viewing the site in a variety of Web browsers
 - c. viewing the site in a variety of screen resolutions
 - d. all of the above
- **2.** Which of the following does the role of an information architect include?
 - a. being instrumental in defining the site organization, navigation, and labeling
 - b. attending all meetings and collecting all information
 - c. managing the project
 - d. none of the above

- **3.** What is the purpose of private registration for a domain name?
 - a. it protects the privacy of your Web site
 - b. it is the cheapest form of domain name registration
 - c. it protects the privacy of your contact information
 - d. none of the above
- **4.** Which methodology is usually used by Web project teams?
 - a. the SDLC
 - b. a derivative of the SDLC similar to the one discussed in this chapter
 - c. decided on as the project is built
 - d. no development methodology is necessary

- **5.** What do team members do in the Analysis phase of a Web site project?
 - a. determine what the site will do—not how it will be done
 - b. determine the information topics of the site
 - c. determine the content requirements of the site
 - d. all of the above
- **6.** In which phase is a prototype of the Web site often created?
 - a. Design
 - b. Conceptualization
 - c. Production
 - d. Analysis
- **7.** Which of the following happens during the Production phase?
 - a. a Web authoring tool is often used
 - b. the graphics, Web pages, and other components are created
 - c. the Web pages are individually tested
 - d. all of the above
- 8. Which of the following happens during the Evaluation phase?
 - a. the goals for the site are reviewed
 - b. another loop through the development process may result
 - c. both a and b
 - d. none of the above
- 9. Which of the following is true about domain names?
 - a. It is recommended to register multiple domain names that are redirected to your Web site.
 - b. It is recommended to use long, descriptive domain names.

c. It is recommended to use hyphens in domain names.

- d. There is no reason to check for trademarks when you are choosing a domain name.
- Which Web hosting option is appropriate for the initial Web presence of an organization ?
 - a. dedicated hosting
 - b. free Web hosting
 - c. virtual hosting
 - d. co-located hosting

Fill in the Blank

- can be described as testing how actual Web page visitors use a Web site.
- **12.** The ______ determines appropriate use of graphics on the site, and creates and edits graphics.
- **13.** The ______ operating system(s) treat uppercase and lowercase letters differently.

Short Answer

- 14. Describe why the Web sites of competitors should be reviewed when designing a Web site.
- **15.** Why should you try to contact the technical support of a Web host provider before you are one of its customers?

Hands-On Exercises

1. Skip this exercise if you have completed Hands-On Practice 2.11 in Chapter 2. In this exercise you will validate a Web page. Choose one of the Web pages that you have created. Launch a browser and visit the W3C HTML Validator page at http://validator.w3.org. Notice the Validate by File Upload area. Click the Browse button, select a file from your computer, and click the Check button to upload the file to the W3C site. Your page will be analyzed and a Results page generated, which shows a report of violations of the DTD that is used by your Web page. The error messages display the offending code along with the line number, column number, and description of the error. Don't worry if your Web page does not pass the validate—even http://yahoo.com had validation errors at the time this was written. Modify your Web page document and revalidate it until you see a message that states "This page is valid XHTML 1.0 Transitional!" (See Figure 10.5.)



This page also provides you with some code and an image to display to tell the world that your page validated. Print the browser view of this page to hand in to your instructor.

You can also validate pages directly from the Web. Try validating the W3C's home page at http://w3.org, Yahoo! at http://yahoo.com, and your school's home page. Visit http://validator.w3.org and notice the Validate by URL area. Enter the URL of the Web page you would like to validate in the Address text box. Click the Check button. View the results. Experiment with the character encoding and doctype options. The W3C's page should pass the validation. Don't worry if the other pages do not validate. Validation is not required for Web pages. However, Web pages that pass the validation should display well in most browsers. (*Note*: If you have published pages to the Web, try validating one of them instead of your school's home page.)

2. The Cynthia Says site offers free accessibility testing at http://www.cynthiasays.com for your choice of Section 508 and WCAG 1.0 priority levels. Visit this site and test your school's home page for Section 508 compliance. After the Section 508 accessibility test is run, a report is displayed with categories corresponding to those listed at http://www.access-board.gov/sec508/guide/1194.22.htm. Print the browser view of the results page to hand in to your instructor. Were you surprised at the results? Did you notice that some criteria, such as "Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup," cannot be checked automatically and must be verified manually by a person?

Next, check the Web page according to the W3C's WCAG 1.0 Priority 1 accessibility criteria. Run the test again and select the WCAG – Priority 1 criteria. After the test is complete, a report is displayed with categories corresponding to those listed at http://www.w3.org/TR/WCAG10/full-checklist.html. Print out the browser view of the results page to hand in to your instructor.

Generally, it is easier to pass Section 508 validation than the WCAG 1.0 criteria. Why do you think this is so? (*Note*: If you have published pages to the Web, try validating one of them instead of your school's home page.)

3. Deque offers the free Worldspace Online application at http://worldspace.deque.com. Visit this site, select Accessibility Compliance Level WCAG 2.0 Level A, and test your school's home page. After the test is run, a report is displayed that shows the

level of W3C WCAG 2.0 compliance. A report is displayed with items corresponding to the guidelines listed at http://www.w3.org/TR/WCAG20. Print out the browser view of the results page to hand in to your instructor. (*Note*: If you have published pages to the Web, try validating one of them instead of your school's home page.)

- 4. NetMechanic offers a free sample of its HTML Toolbox Application at http://www .netmechanic.com/products/HTML_Toolbox_FreeSample.shtml. Visit this site and test your school's home page. After the test is run, a results page will be displayed with ratings related to link check, bad links, HTML check, browser compatibility, load time, and spell check. Each category has a link to a detailed display that describes the types of errors found. Print out the browser view of this results page to hand in to your instructor. (*Note*: If you have published pages to the Web, try validating one of them instead of your school's home page.)
- **5.** The Dr. Watson site offers free Web page validation at http://watson.addy.com. Visit this site and test your school's home page. After the test is run, a report is displayed with categories including server response, estimated download speed, syntax and style analysis, spell check, link verifications, images, search engine compatibility (see Chapter 13), site link popularity (see Chapter 13), and source code. Print out the browser view of this report page to hand in to your instructor. (*Note*: If you have published pages to the Web, try validating one of them instead of your school's home page.)
- **6.** Perform a small-scale usability test with a group of other students. Decide who will be the "typical users," the tester, and the observer. You will perform a usability test on your school's Web site.
 - The "typical users" are the test subjects.
 - The tester oversees the usability test and emphasizes that the users are not being tested—the Web site is being tested.
 - The observer takes notes on the user's reactions and comments.

Step 1: The tester welcomes the users and introduces them to the Web site they will be testing.

Step 2: For each of the following scenarios, the tester introduces the scenario and questions the users as they work through the task. The tester should ask the users to indicate when they are in doubt, confused, or frustrated. The observer takes notes.

- Scenario 1: Find the phone number of the contact person for the Web development program at your school.
- Scenario 2: Determine when to register for the next semester.
- Scenario 3: Find the requirements to earn a degree or certificate in Web development or a related area.

Step 3: The tester and observer organize the results and write a brief report. If this were a usability test for an actual Web site, the development team would meet to review the results and discuss necessary improvements to the site.

Step 4: Hand in a report with your group's usability test results. Complete the report using a word processor. Write no more than one page about each scenario. Write one page of recommendations for improving your school's Web site.

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Note: For more information on usability testing, see Keith Instone's classic presentation at http://instone.org/files/KEI-Howtotest-19990721.pdf. Another good resource is Steven Krug's book, *Don't Make Me Think*.

- **7.** See the description of usability testing in Hands-On Exercise 6. In a small group of students, perform usability tests on two similar Web sites, such as the following:
 - http://bn.com and http://powells.com
 - http://accuweather.com and http://www.wunderground.com
 - http://running.com and http://www.coolrunning.com

Decide on three scenarios. List them. Decide who will be the "users," the tester, and the observer. Follow the steps listed in Hands-On Exercise 6.

8. Pretend that you are on a job interview. Choose a role on a Web project team that interests you. In three to four sentences, describe why you would be an excellent addition to a Web development team in that role.

Web Research

- **1.** This chapter discussed options for hosting Web sites. In this research exercise you will search for Web host providers and report on three that meet the following criteria:
 - Support PHP and MySQL
 - Offer e-commerce capabilities
 - Provide at least 50MB hard disk space

Use your favorite search engine to find Web host providers or visit Web host directories such as http://www.hosting-review.com and http://www.hostindex.com. The Web server survey results provided by http://uptime.netcraft.com/perf/reports/Hosters may also be useful. Create a Web page that presents your findings. Include links to your three Web host providers. Your Web page should include a table of information such as set-up fees, monthly fees, domain name registration costs, amount of hard disk space, type of e-commerce package, and cost of e-commerce package. Use color and graphics appropriately on your Web page. Place your name and e-mail address at the bottom of your Web page. Print both the source code (from Notepad) and the browser view of your Web page.

2. This chapter discussed the different job functions that are needed to develop large Web sites. Choose a job role that interests you. Search for information about available jobs in your geographical area. Search for technology jobs with your favorite search engine or visit a job site such as http://monster.com, http://dice.com, http://hotjobs.com, or http://careerbuilder.com and search for your desired location and job type. Find three possible job positions that interest you and report on them. Create a Web page that includes a brief description of the job role you have chosen, a description of the three available positions, a description of the types of experience and/or educational background required for the job positions, and the salary range (if available). Organize your findings in a table. Use color and graphics appropriately on your Web page. Place your name and e-mail address at the bottom of your Web page. Print both the source code (from Notepad) and the browser view of your Web page.

Focus on Web Design

The U.S. Department of Health and Human Services offers a free online PDF book, *Research-Based Web Design & Usability Guidelines*, at http://www.usability.gov/pdfs/ guidelines.html with PDF downloads for each chapter. The book suggests guidelines for a variety of topics including navigation, text appearance, scrolling and paging, writing Web content, usability testing, and accessibility, Choose one chapter topic that interests you. Read the chapter. Note four guidelines that you find intriguing or useful. In a one-page report, describe why you chose the chapter topic and the four guidelines you noted.

WEB SITE CASE STUDY: Testing Phase

This case study continues throughout the rest of the text. In this chapter you will test the Web Project case study.

Web Project

See Chapter 5 for an introduction to the Web Project. In this chapter you will develop a test plan for the project. You will review the documents created in the previous chapters' Web Project and create a test plan.

Hands-On Practice Case

Part 1: Review the Design Documents and Completed Web pages. Review the Topic Approval, Site Map, and Page Layout Design documents that you created in the Chapter 5 Web Project. Review the Web pages you have created and/or modified in the Chapter 6, Chapter 7, Chapter 8, and Chapter 9 Web Project activities.

Part 2: Prepare a Test Plan. See Figure 10.4 for a sample test plan document (available in the student files, Chapter10/testplan.pdf). Create a test plan document for your Web site. Include CSS validation, XHTML validation, and accessibility testing.

Part 3: Test Your Web Site. Implement your test plan and test each page that you have developed for your Web Project. Record the results. Write a list of suggested improvements.

Part 4: Perform Usability Testing. Describe three scenarios that typical visitors to your site may encounter. Using Hands-On Exercise 6 as a guide, conduct a usability test for these scenarios. Write a one-page report about your findings. What improvements can be suggested for the Web site?

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CHAPTER

Web Multimedia and Interactivity

Chapter Objectives In this chapter, you will learn about ...

- Helper applications and plug-ins
- Audio file types and how to obtain them
- Adding sound to a Web page
- Podcasting
- Video file types and how to obtain them
- Adding video to a Web page
- Features and common uses of Adobe Flash
- Adding Flash animation to a Web page

- Features and common uses of Java applets
- Adding a Java applet to a Web page
- Features and common uses of JavaScript
- Features and common uses of DHTML
- Features and common uses of Ajax
- Free Flash, Java applets, JavaScript, DHTML, and Ajax resources on the Web

The saying goes, "A picture is worth a thousand

words." You already are aware that graphics help to make Web pages compelling. Other types of media, such as audio and video are introduced in this chapter. Appropriate movies and sounds on your Web pages can make them more interesting and informative. Sources of these media types, the XHTML code needed to place the media on a Web page, and suggested uses of the media are discussed.

You have probably experienced interactivity on Web pages many timesmoving the mouse to cause a new image to appear, clicking on radio buttons to take a survey, or clicking on a product while you watch and listen to a Flash movie about a company. These are all examples of Web page interactivity. Adding the right touch of interactivity to a Web page can make it engaging and compelling for your visitors.

Technologies commonly used to add interactivity to Web pages include Flash, Java applets, JavaScript, DHTML, and Ajax. This chapter introduces you to these techniques. Each of these topics is explored more fully in other books—each technology could be the sole subject of an entire book or college course. As you read this chapter and try the examples, concentrate on learning the features and capabilities of each technology, rather than trying to master the details.

11.1 Helper Applications and Plug-Ins

Web browsers are designed to display Web pages and GIF, JPG, and PNG images, among others. When the media is not one of these types, the browser searches for a **plug-in** or **helper application** configured to display the file type. If it cannot find a plug-in or helper application on the visitor's computer, the Web browser offers the visitor the option of saving the file to their computer. The visitor may have a program that can open the file or the visitor will simply be unable to experience the media file. This can be disappointing or frustrating to a Web page visitor. In order to provide your Web page visitors with a good experience, use media files that are supported by the most common helper applications and plug-ins (more on this later).

A helper application is a program that can handle a particular file type (such as .wav or .mp3) to allow the user to open the special file. The helper application runs in a window separate from the browser. A newer and more common method is for the browser to invoke a plug-in application. The plug-in can run directly in the browser window so that the visitor can open media objects directly within the Web page.

The most commonly used plug-ins include the following:

- Adobe Flash Player (http://www.adobe.com/products/flashplayer). The Flash Player displays .swf format files. These can contain audio, video, and animation, along with interactivity.
- Adobe Shockwave Player (http://www.adobe.com/products/shockwaveplayer). The Shockwave Player displays high-performance multimedia created using the Adobe Director application.
- Adobe Reader (http://www.adobe.com/products/acrobat/readstep2.html). Adobe Reader is commonly used to exchange information stored in .pdf format, such as printable brochures, documents, and white papers.
- Java Runtime Environment (http://www.java.com/en/download/manual.jsp). The JRE is used to run applications and applets utilizing Java technology.
- **RealPlayer (http://real.com).** The RealPlayer plug-in plays streaming audio, video, animations, and multimedia presentations on the Web.
- Windows Media Player (http://www.microsoft.com/windows/windowsmedia/ download). The Windows Media plug-in plays streaming audio, video, animations, and multimedia presentations on the Web.
- **Apple QuickTime (http://www.apple.com/quicktime/download).** The Apple QuickTime plug-in displays QuickTime animation, music, MIDI, audio, video, and VR panoramas and objects directly within the Web page.

You may be surprised at the number of plug-ins that exist. Mozilla provides a list of plug-ins and other browser extensions, or add-ons, used with its Firefox browser at

http://addons.mozilla.org/en-US/firefox/browse/type:7. Most plug-ins are free and can be easily downloaded and installed. As a Web developer, one of your goals should be usability. Some visitors will simply leave your page if you require them to download and install a new plug-in. Stick with audio and video files that use the most popular plug-ins because your visitors probably already have them.

Sounds can be used to set a mood for a Web site. They can also be used to provide additional information—an explanation of an image, a message from the company's chief executive officer, the pronunciation of a word, and so on. The next section discusses types of audio files used on the Web.

11.2 Multimedia File Types

The following file extensions are commonly used to designate audio files:

- .wav (Wave file). This format was originally created by Microsoft. It is a standard on the PC platform but is also supported by the Mac platform.
- .aiff (Audio Interchange File Format). This is one of the most popular audio file formats on the Mac platform. It is also supported on the PC platform (use the extension .aif).
- .mid (Musical Instrument Digital Interface—MIDI). These files contain instructions to recreate a musical sound rather than a digital recording of the sound itself. The advantage of this concise format is small file size, but the disadvantage is the limited number of types of sounds that can be reproduced.
- .au (Sun UNIX Sound File). This is an older type of sound file that generally has poorer sound quality than the newer audio file formats. It only uses 8-bit samples instead of the 16-bit samples used by some of the newer audio file types.
- .mp3 (MPEG-1 Audio Layer-3). This sound file uses an advanced compression algorithm that results in the MP3 file being about one-twelfth the size of the original audio file. As mentioned in Chapter 1, podcasts typically use the MP3 audio file format.
- .ogg (Ogg Vorbis). This sound file format uses a relatively new audio compression format that is comparable to MP3. However, it is open source. This means it is not patented and free to use. Visit http://www.vorbis.com for more information about this technology.
- .m4a (MPEG 4 Audio). This audio-only MPEG-4 format is supported by Quicktime, iTunes, and iPods.

The following file extensions are commonly used to designate video files:

- .mov (QuickTime). This format was originally created by Apple and used on the Macintosh platform. The QuickTime for Windows plug-in supports this file format on the Windows platform. Because it has universal support, this format is widely used on the Web. While other video file formats must download the entire video file before playback, QuickTime is smart enough to begin to play before the entire file is downloaded, giving the effect of streaming video.
- **.avi (Microsoft Audio Video Interleaved File for Windows).** This was the original standard video format for PC platforms and is still widely used.

- .flv (Flash Video File). A Flash-compatible video file exported by the Adobe Flash Video Exporter plug-in (or other application that supports FLV). This format is commonly used on http://YouTube.com.
- .wmv (Windows Media Video). This is a streaming video technology developed by Microsoft. The Windows Media Player supports this file format.
- .mpg (MPEG). The MPEG technology standards were developed under the sponsorship of the Moving Picture Experts Group (MPEG), http://www.chiariglione.org/ mpeg. This format is supported on both Windows and Mac platforms.
- .m4v and .mp4 (MPEG-4). This MPEG format is supported by Quicktime, iTunes, and iPods.
- **.3gp (3GPP Multimedia File).** Based on MPEG-4, this file format is a standard for delivery of multimedia over 3rd generation, high-speed wireless networks.

Obtaining Multimedia Files

There are a number of ways that you can obtain audio files. You can record your own sounds, download sounds or music from a free site, record music from a CD, or purchase a CD of sounds.



There are some ethical issues related to using sounds and music created by others. You may only publish sounds or music that you have created yourself or for which you have obtained the rights (sometimes called a license) to publish.

The Windows and Mac operating systems contain audio recording utilities. You need a sound card and microphone. If you are using Windows XP, launch the Sound Recorder application by selecting Start, Programs, Accessories, Entertainment, Sound Recorder (Window Vista users select Start, All Programs, Accessories, Sound Recorder). This will allow you to create and edit sound files.

Apple's Quicktime Pro (available at http://apple.com/quicktime/pro for both Windows and Mac) is a low-cost application which can be used to record audio. If you are using a Mac, another option is Apple's Garageband, which is a pre-installed music application that offers a range of options for recording and editing audio. Apple provides tutorials and documentation for Garageband (see http://www.apple.com/support/garageband/podcasts/recording for a tutorial about podcasting with GarageBand). A variety of audio application tutorials are available at http://depts.washington.edu/trio/quest/howto/media/audio/index.html.

Audacity is a free cross-platform digital audio editor (available at http://audacity. sourceforge.net for both Windows and Mac). You can use Audacity to record your voice for a podcast and mix in music loops to add interest. Once the .wav file is created, the LAME encoder (http://lame.sourceforge.net) or a similar application can be used to convert to MP3 format.



A commercial CD can only be copied for personal use and not for publishing to the Web. Contact the owner of the copyright to request permission to use the music.

There are many sources of audio files on the Web. Some offer free files, such as Microsoft's Clip Art and Media (http://office.microsoft.com/clipart), Loopasonic (http://www.loopasonic.com), and FreeAudioClips.com (http://www.freeaudioclips.com). Others, like SoundRangers (http://www.soundrangers.com), may offer one or two free sounds but ultimately are in the business of selling soundtracks and CDs. An interesting resource for free sound is at the Flash Kit site (http://www.flashkit.com); click on the Sound Loops link. While this site is intended for Adobe Flash developers, the sound files can be used without Flash. The Yahoo! (http://yahoo.com) and Google (http://google.com) search engines offer specific searches for both audio and video files.

Before you publish a media file on the Web, be sure to obtain the rights to use it from the creator or the copyright owner.

Audio files can be quite large and it is important to be aware of the amount of time required to download them for play. If you decide to use an audio file on a Web page, make it as brief as possible. If you are recording your own audio files, be aware that the sampling rate and bit depth will affect the file size. A **sampling rate** is a value related to the number of digital sound samples taken per second when the sound is recorded. It is measured in kilohertz (kHz). Common sampling rates vary from 8 kHz (AM radio quality sound or sound effects) to 44.1 kHz (music CD quality sound). As you would expect, a sound recorded at 44.1 kHz has a much larger file size than a sound recorded at 8 kHz. Bit depth or resolution is another factor in audio file size. A sound recorded with 8-bit resolution (useful for a voice or other simple sounds) will have a smaller file size than a sound recorded using 16-bit resolution (music CD quality).

Just as with audio files, there are a number of ways that you can obtain video files, including recording your own, downloading videos, purchasing a CD that contains videos, or searching for video files on the Web.



Be aware that there are ethical issues related to using videos that you did not create yourself. You must obtain the rights or license to publish videos created by other individuals before publishing them on your Web site.

Many digital cameras have the capability to take still photographs as well as short MPG movies. This can be an easy way to obtain short video clips. Digital video cameras and webcams record digital videos. Use a video capture card to access analog VHS videos. Once you have created your video, software such as Adobe Premiere (http:// www.adobe.com/products/premiere), Apple QuickTime Pro (http://www.apple.com/quicktime/pro), Apple iMovie (http://www.apple.com/ilife/imovie), or Microsoft Movie Maker (http://www.microsoft.com/windowsxp/using/moviemaker/ default.mspx) can be used to edit and configure your video masterpiece.

Now that you've got a sound or music file, what can you do with it? You can allow your Web page visitors to choose whether they want to listen to a sound. You can make an audio file available as a podcast. The XHTML code used to work with audio files is discussed in the next few sections.

11.3 Using Sound on a Web Page

One method to give your Web page visitors access to a sound is to create a simple hyperlink that references the sound file. The XHTML code to link to a sound file called WDFpodcast.mp3 follows:

```
<a href="WDFpodcast.mp3"
title="Podcast Episode 1 for Web Development
Foundations">Podcast Episode 1</a>
```

If your Web site visitor clicks on the link, the plug-in for .mp3 files that is installed on the computer (such as QuickTime) typically will display embedded in a new browser window or tab. Your Web page visitor can then use the plug-in to play the sound. This method is used for providing links to MP3 podcast files.





In this Hands-On Practice you will create a Web page similar that contains a hyperlink to an MP3 file, as shown in Figure 11.1. The Web page will also provide a hyperlink to a text transcript of that file to provide for accessibility.



Copy the WDFpodcast.mp3 and WDFpodcastTranscript.txt files from the Chapter11 folder in the student files and save them to a folder named podcast. Launch Notepad or another text editor. Create a Web page with the heading Web Design Podcast, a hyper-link to the MP3 file, and a hyperlink to the text transcript. Save your page as podcast.html and test it in a browser. Try to test your page in different browsers and browser versions. When you click on the MP3 hyperlink, an audio player (whichever player or plug-in is configured for the browser) will launch to play the file. When you click on the hyperlink for the text transcript, the text will display in the browser. Compare your work to the sample in the student files (Chapter11/podcast.html).

The Object Element

Another method to include sound on your Web page is to embed the audio file in the page and optionally display a control panel for the sound. In the past, the nonstandard <embed> element was often used for this purpose because it has been well-supported by browsers even though it is not part of the W3C HTML and XHTML recommenda-tions. However, to follow W3C standards and to be forward-thinking, use the <object> element to include (or "embed") audio and other media file types in a Web page. Modern browsers support the <object> element.

The <object> element is a container tag and should be closed with an </object> tag. Depending on the media type and plug-in or player to be used, additional configuration values, called parameters, will need to be coded using the param /> element. The <param /> tag is a self-contained tag with two attributes: name and value. All the <param /> tags for the object appear before the ending </object> tag. The player's documentation will indicate if parameters are needed and the format you should use. Table 11.1 lists the attributes of the <object> tag when used with media files. Table 11.2 lists common <param /> attribute values.

Attribute	Value	Usage
data	Valid file name, name of audio file	Required; provides the name of the file to be played
type	A valid MIME type such as audio/midi, audio/wav, audio/mpeg, video/quicktime, and so on	Optional; specifies the MIME type of the media file
width	Numeric, number of pixels	Optional; configures the width of media control console
height	Numeric, number of pixels	Optional; configures the height of media control console
classid	Uniquely identifies the player software QuickTime: classid="clsid:02BF25D5-8C17-4B23- BC80-D3488ABDDC6B" Windows Player: classid="6BF52A52-394A-11d3-B153- 00C04F79FAA6" Flash Shockwave Player: classid="clsid:D27CDB6E-AE6D-11cf- 96B8-444553540000"	The classid identifies an ActiveX control that must be installed on the visitor's PC; if the ActiveX control is not installed, the browser can automatically download and install it
codebase	<pre>Specifies a relative path for the location of the plug-in QuickTime: codebase="http://www.apple.com/ qtactivex/qtplugin.cab" Windows Player: codebase="http://activex.microsoft. com/activex/controls/mplayer/en/ nsmp2inf.cab#Version=6,0,02,902" Flash Shockwave Player: codebase="http://download.macromedia. com/pub/shockwave/cabs/flash/ swflash.cab#Version=8,0,22,0"</pre>	Facilitates the location and download of plug-in if needed
title	Brief text description	Optional; may be displayed by browsers or assistive technologies

Table 11.1 Common attributes of media <object> tags

Table 11.2 <param</th> > media attribute values

Parameter		
Name	Parameter Value	Usage
src	Valid file name, name of media file	Required; provides the name of the file to be played
loop	Numeric value, or true for continu- ous play (not uniformly supported)	Optional; determines how many times the media file will repeat
hidden	true (not uniformly supported)	Optional; hides the default media console
autoplay	true, false	Optional; determines if the media will play automatically when the page is loaded—if omitted, media may not automatically play
controller	true, false (not uniformly supported)	Optional; indicates whether the media control console will display

The basic XHTML code to use the <object> tag to embed a sound loop in a Web page follows:

```
<object data="soundloop.mp3" height="50" width="100" type="audio/mpeg"
  title="Music Sound Loop">
   <param name="src" value=soundloop.mp3" />
   <param name="controller" value="true" />
   <param name="autoplay" value="false" />
</object>
```

A sample page using this <object> tag can be found in the student files at Chapter11/musicbasic.html. See Figure 11.2 for a screenshot of this page displayed in the Internet Explorer and Chrome browsers. If you see warning messages when the <object> tag is used to play media, consult your network administrator or lab support staff for recommended security settings and/or plug-in installation.

Figure 11.2

The Google Chrome browser correctly renders the multimedia object

Coogle D X	Adding a Sound Using the Object Tag
- → C ☆ file:///C:/Users/T ► 🗅 - 🔎 -	Image: Second Secon
his page has a sound loop added to it using le <object> tag.</object>	This page has a sound loop added to it using the <object> tag.</object>

Review Figure 11.2. Notice that the Chrome browser correctly renders the <object> tag and displays a media player for the MP3. However, even though the XHTML is valid and satisfies W3C recommendations, Internet Explorer does not properly configure the object. Don't worry, there is a solution for this issue—configure another <object> tag that only Internet Explorer will process. This technique is described by Elizabeth Castro in an article at http://www.alistapart.com/articles/byebyeembed.

Internet Explorer requires the classid attribute (to indicate the player's ActiveX control) and its associated codebase attribute in order to properly render an <object> tag configured for audio or video files. The code to play an audio file with QuickTime within Internet Explorer is shown below:

```
<object data="soundloop.mp3" height="50" width="100"
    type="audio/mpeg"
    classid="clsid:02BF25D5-8C17-4B23-BC80-D3488ABDDC6B"
    codebase="http://www.apple.com/qtactivex/qtplugin.cab" >
    <param name="src" value="soundloop.mp3" />
    <param name="src" value="true" />
    <param name="autoplay" value="false" />
</object>
```

Castro describes a technique in her article to use BOTH <object> tags along with conditional comments (which only Internet Explorer follows) to direct non-IE browsers to the standard code. The solution (located in the student files Chapter11/music.html folder) is shown below.

```
<object data="soundloop.mp3" height="50" width="100"
    type="audio/mpeg"
    classid="clsid:02BF25D5-8C17-4B23-BC80-D3488ABDDC6B"
    codebase="http://www.apple.com/qtactivex/qtplugin.cab">
    <param name="src" value="soundloop.mp3" />
    <param name="controller" value="true" />
    <param name="autoplay" value="false" />
<!--[if !IE]>-->
 <object data="soundloop.mp3" height="50" width="100"</pre>
    type="audio/mpeg" >
    <param name="src" value="soundloop.mp3" />
    <param name="controller" value="true" />
    <param name="autoplay" value="false" />
  </object>
<!--<![endif]-->
</object>
```

Browsers render in a top-down line-by-line fashion. Only Internet Explorer understands the conditional comments. In this case, the conditional comment indicates that Internet Explorer should ignore the code within the comments. The conditional comment begins with <!--[if !IE]>--> and ends with <!--<![endif] -->. So, Internet Explorer will render the first <object> tag and skip the second, while other browsers will process one after another (within the same area in the browser viewport) and render using the code from the second <object> tag. If this sounds complicated—it is! Life would be so much less complex if browsers behaved in a more similar manner. You'll get some experience with the <object> tag in the next Hands-On Practice.

HANDS-ON PRACTICE 11.2

In this Hands-On Practice you will create a Web page that displays a controller to play a sound (see Figure 11.3). If you have not done so already, copy the music.mp3 or music2.mp3 sound file from the Chapter11 folder in the student files and save it to disk. Launch Notepad or another text editor and create a Web page that contains the heading Playing Sounds with the Object Tag and uses the <object> tag and <param /> tag to display a console that lets the Web page visitor control the audio file. Use the sample code above and the list of attributes and values in Table 11.1 and Table 11.2 as a guide. Experiment with the <object> element's width attribute—try the values 25, 50, 100, and 110 and notice how the display of the controller changes. Explore the <param /> element's autoplay value to configure the sound to automatically play when the page loads. Use the <param /> element's loop value to cause the sound to loop continuously. Save your page as object.html and test it in a browser. Try to test your page in different browsers and browser versions. Compare your work to the sample in the student files (Chapter11/object.html).

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Why doesn't my sound play?

Playing audio and video files on the Web depends on the plug-ins installed in your visitor's Web browsers. A page that works perfectly on your home computer may not work for all visitors— depending on the configuration of their computer. Some visitors will not have the plug-ins properly installed. Some visitors may have file types associated with incorrect plug-ins or incorrectly installed plug-ins. Some visitors may be using low bandwidth and have to wait an overly long time for your media file to download. Are you detecting a pattern here? Sometimes media on the Web can be problematic.

The Flash player plug-in is available for multiple platforms and browsers. According to Adobe, a high percentage of browsers have this plug-in installed. For these reasons (and also due to built-in streaming capabilities of Flash) many Web developers use the Adobe Flash application to create .swf files that can deliver their audio and video. See the section about Adobe Flash later in this chapter for more information on this technology.

By now you should have a feel for some of the issues involved with adding media to a Web page. If different browsers (and browser versions) offered uniform support for XHTML tags and attributes, a Web developer's job would be much easier.



Another consideration is accessibility for all your Web page visitors. Be aware that some of your visitors will not be able to hear the sounds or music. Include appropriate text descriptions or text transcriptions of these items.

11.4 Podcasting Overview

Recall from Chapter 1 that **podcasts** are audio files on the Web that may take the format of an audio blog, radio show, or interview. There are three steps in publishing a podcast: recording the podcast, uploading the podcast, and creating a Really Simple Syndication (RSS feed), which makes the podcast available. Section 11.2 discussed using a software application to record, edit, and convert your podcast to MP3 format. Upload the MP3 to your Web site. If your Web host does not permit MP3 files, an alternative is to upload to a site that accepts audio files at no cost such as http://archive.org or http://ourmedia.org. The next step is to make the podcast available. The most straightforward method is to code a hyperlink to the audio file (see Section 11.3). The hyperlink allows Web site visitors to access the podcast MP3 file but does not make the podcast available for subscription. An RSS feed must be created in order for your visitors to subscribe to your current and future podcasts. An RSS feed for a podcast is an XML file that lists information about your podcast. With a bit of patience, you can code your own RSS feed using a text editor (see http://www.downes.ca/cgi-bin/page.cgi?post = 56 or http://www.masternewmedia.org/news/2006/03/09/how_to_create_a_rss.htm). However, a number of Web sites (including http://ponyfish.com, http://feedburner.google.com, and http://rss.icerocket.com) provide a service that generates and hosts the RSS feed for you. After the RSS feed is uploaded to the Web (either your own or the RSS feed generator's site), code a link to the file. Apple provides instructions for submitting your podcast to iTunes at http://apple.com/itunes/whatson/podcasts/specs.html. Web visitors using software such as Apple's iTunes or a free RSS feed reader Web site (http://feedreader.com) can locate and automatically download your podcast.

The next section introduces the use of video on Web pages. Download time issues become even more important when video is included because both images and sounds are stored in the video file.

11.5 Using Video on a Web Page

The simplest method to give your Web page visitors access to a video is to create a hyperlink that references the video file. The XHTML code to link to a .mov video about my dog, Sparky, follows:

Sparky(.mov,1.2MB)

If your Web site visitor clicks on the link, the plug-in associated with.mov files installed on the computer (probably QuickTime, Windows Media Player, or Real Player) will display. He or she will have the option of playing the video. It's a good practice to include the file type and file size in the link (as shown in the previous code sample). There are other methods available for including videos directly on your Web page: the <object> tag and using the dynsrc attribute on an tag (Internet Explorer only). These methods are discussed next. Just as with audio files, testing in your target audience's environment is crucial to the successful use of video on the Web.



Remember to supply text descriptions of videos in order to provide accessible pages for your Web site visitors. Visit http://www.webaim.org/techniques/captions for information about video captioning—creating synchronous text descriptions/transcripts for your videos.

The Object Element

The <object> element can also be used to embed video files in Web pages. As indicated earlier in the chapter, it is a container tag and should be closed with an </object> tag. The attributes used by the <object> tag are listed in Table 11.1. Use both the <object> and <param /> elements to display a video on a Web page. Refer to Table 11.2 for commonly used attribute values of the <param /> tag.

A sample page using the <object> element to display a video can be found in the student files at Chapter11/video.html and is shown in Figure 11.4. Depending on your browser plug-ins, the video may not display on this page using the <object> tag. The sample pages were tested using the QuickTime plug-in for .mov files. This plug-in issue can be a problem for video components. Testing with your target audience in mind as well as giving your visitors hints on the most appropriate plug-ins will help.



Embedding video on a Web page using an <object> tag is similar to embedding audio. You'll use Castro's technique (http://www.alistapart.com/articles/byebyeembed) of coding two <object> tags and using Internet Explorer conditional comments. The code to play the sparky.mov video with QuickTime is shown below:

```
<object data="sparky.mov" height="150" width="160"</pre>
      type="video/quicktime"
      classid="clsid:02BF25D5-8C17-4B23-BC80-D3488ABDDC6B"
      codebase="http://www.apple.com/qtactivex/qtplugin.cab"
      title="Video of a cute Pekingese dog barking">
      <param name="src" value="sparky.mov" />
      <param name="controller" value="true" />
      <param name="autoplay" value="false" />
<!--[if !IE]>-->
  <object data="sparky.mov" height="150" width="160"</pre>
      type="video/quicktime"
      title="Video of a cute Pekingese dog barking" >
      <param name="src" value="sparky.mov" />
      <param name="controller" value="true" />
      <param name="autoplay" value="false" />
    A video of a cute Pekingese dog barking.
  </object>
<!--<![endif]-->
</object>
```



What happens if a browser or other user agent cannot display the video? Carefully review the code and notice that there is a descriptive phrase coded before each closing <object> tag. This phrase will display on the Web page if the object (in this case the

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video player) cannot be rendered. Also, to help provide for accessibility, the title attribute has been configured with a brief text description of the video. This area will be read by some assistive technologies such as screen readers.

HANDS-ON PRACTICE 11.3

In this Hands-On Practice you will create a Web page that uses the <object> tag to play a video clip for a Web page visitor. If you have not already done so, copy the lighthouse.mov file from the Chapter11 folder in the student files and save it to disk. Launch Notepad or another text editor and create a Web page, shown in Figure 11.5, that contains the heading "Door County Lighthouse Tours" and uses the <object> tag. Use the sample code and the list of attributes and values in Table 11.1 and Table 11.2 as a guide. Experiment with the <object> element's height and width attributes. Explore the <param /> element's, autoplay, and loop attributes. Save your page as lighthouse.html and test it in a browser. Try to test your page in different browsers and browser versions. Compare your work to the sample in the student files (Chapter11/lighthouse.html).



If you are interested in exploring additional methods to configure Web pages with media, you may want to check out the tutorial at http://www.apple.com/quicktime/tutorials/ embed.html. The tutorial provides an example of using JavaScript to dynamically write the XHTML to embed QuickTime media on a Web page. JavaScript is introduced later in this chapter and is the focus of Chapter 14.

Internet Explorer Only Option

Developers who design Web pages for an intranet may have the luxury of knowing that all of the users will be using a certain browser, such as Internet Explorer. When this is the case, you might consider taking advantage of a browser-specific feature such as the dynsrc (dynamic source) attribute. This attribute is non-standard and only supported by Internet Explorer. The non-standard dynsrc (dynamic source) attribute can be added to an tag to indicate a video.

The XHTML code for the tag follows:

A sample page using the code shown above can be found in the student files at Chapter11/dynsrc.html. While this is an interesting way to add video to your Web pages, it only works with Internet Explorer and will not pass W3C validation, so use it with caution.

11.6 Browser Compatibility and Accessibility

At this point, you should be familiar with adding standard audio and video to a Web page. It is critical that you test your page in the browsers (and browser versions) you expect your Web page visitors to use. When you configure the <object> tag to embed audio or video on a page, you are dependent on whether your Web site visitors have installed the corresponding player (in this case, Quicktime). For this reason, many Web sites, such as http://youtube.com and http://last.fm, use Flash to share video and audio files. You'll work with Flash later in this chapter.



Also, in order to provide a positive experience for all your Web page visitors, provide alternate content or text descriptions of the media files you use on your Web site. Applications such as Media Access Generator (MAGpie) can add captioning to videos. See the National Center for Accessible Media's Web site at http://ncam.wgbh.org/webaccess/magpie for the most up-to-date information on the application. Apple Quicktime Pro includes a captioning function—view the captioned version of the sparky.mov video in the student files at Chapter11/CaseStudyStarters/sparkycaptioned.mov.

Now that you are more knowledgeable about media and Web pages you may be wondering about copyright issues. What rights do you have as an author? What options do you have as a student? The next section discusses copyright as it applies to Web pages and media files. The concept of fair use of copyrighted materials is introduced.



11.7 Copyright Issues and Media Files

It is very easy to copy and download an image, audio, or video file from a Web site. It may be very tempting to place someone else's file in one of your own projects, but that may not be ethical or lawful. Only publish Web pages, images, and other media that you have personally created or have obtained the rights or license to use. If another individual has created an image, sound, video, or document that you think would be useful on your own Web site, ask permission to use the material instead of simply taking it. All work (Web pages, images, sounds, videos, and so on) is copyrighted—even if there is no copyright symbol and date on the material.

Be aware that there are times when students and educators can use portions of another's work and not be in violation of copyright law. This is called **fair use**. Fair use is use of a copyrighted work for purposes such as criticism, reporting, teaching, scholarship, or research. Criteria used to determine fair use follow:

- The use must be educational rather than commercial.
- The nature of the work copied should be factual rather than creative.
- The amount copied must be as small of a portion of the work as possible.
- The copy does not impede the marketability of the original work.

Visit http://copyright.gov and http://www.copyrightwebsite.com for some additional insights on copyright issues.

Some individuals may want to retain ownership of their work but make it easy for others to use or adapt it. Creative Commons, http://creativecommons.org, provides a free service which allows authors and artists to register a type of a copyright license called a **Creative Commons license**. There are several licenses to choose from—depending on the rights you wish to grant as the author. The Creative Commons license informs others exactly what they can and cannot do with the creative work.



CHECKPOINT 11.1

- 1. List three common Web browser plug-ins and describe their use.
- 2. Describe issues involved with adding media such as audio or video to a Web page.
- 3. True or False? Visit the plug-in or player's Web site for the most current information on the XHTML needed to invoke a plug-in successfully.

11.8 Adobe Flash

Flash is a popular multimedia application often used to create animation and multimedia effects on Web pages. The animations can be as simple as the Flash effect shown in Figure 11.6 (see the student files at Chapter11/flash1.html). Flash can also be used to play audio files and video files, and to create many more complex effects, including fullscreen animations, banner ads, and interactive site navigation using integrated audio clips.



Flash animations are stored in a file with a .swf file extension. Unlike other media, .swf files play as they download and give the perception of speedy display of complex graphic animations. Flash animations can be interactive; they can be scripted, with a language called ActionScript, to respond to mouse clicks, accept information in text boxes, and invoke CGI or other server-side scripting.

Flash requires a browser plug-in, which is free and readily available for download from Adobe. According to Adobe, 99 percent of Internet-enabled desktops have a Flash plugin installed (http://adobe.com/products/player_census/flashplayer). Recall that playing standard format audio and video files on Web pages is extremely dependent on the browser plug-ins visitors have installed. Recently, there has been an increasing use of Adobe Flash technology to play video (http://youtube.com) and audio (http://last.fm) files on Web pages. With the nearly ubiquitous Flash Player installed on most Web browsers, Web site developers are confident when using Flash technology.

Adobe licenses the Adobe Flash file format to third-party developers. This means that you can use applications other than Adobe Flash to create a Flash (.swf) effect. TechSmith's Cantasia (http://www.techsmith.com) and Swish (http://www.swishzone.com) are just two of the third-party tools that can be used to create media in the .swf format.

Common Uses of Flash

Navigation. Flash is often used to create an interactive navigation area on a Web page. See Figure 11.7 for the home page of the National Science Foundation (http://www.nsf.gov). It uses Flash to offer and describe main navigation choices. The site also uses the graphic animation features of Flash to provide a series of clickable images under the main navigation. These serve to highlight the site topics and create a more engaging user experience.



The home page of the National Park Service (http://www.nps.gov) uses Flash to display a continuous slide show of beautiful scenery—drawing the visitor into the site. Notice how Flash components—such as navigation bars and slide shows can be combined with XHTML to create an engaging user experience.



Figure 11.8

The Flash image slideshow adds visual interest and enhances the Web page



Splash Page. The term splash screen originates from client-server applications that display an introductory (splash) screen while the program loads. Splash screens, sometimes called splash pages, can set the tone or introduce a Web site. Although popular in the past, splash pages are typically not used today because most visitors would rather immediately view content of value. When using splash pages keep usability in mind—include a simple text link to the main page of your site that provides Web site visitors an easy option to skip the animation.

Rich Media Advertising. Flash can be used to create interactive ads on Web pages that respond to visitors' mouse movements with sound and animation. Results of a study by DoubleClick (http://www.doubleclick.com/insight/pdfs/The_Brand_Value_of_Rich_Media_ and_Video_Ads.pdf) about the value of rich media ads indicated that rich media (such as Flash with video) increases brand awareness, brand favorability, and purchase intent significantly more than other types of ads such as plain image ads or simple Flash banners.

Entire Web Site. Flash can be used to create entire Web sites, including navigation, content, and forms. A compelling example is 2advanced Studios (http://2advanced.com). All the interactivity—navigation, animation, and content—is coded in the Flash .swf file.

Delivery of Audio and Video. Media-intensive sites such as http://youtube.com and http://last.fm use Flash technology to present video and audio to Web visitors. The Flash Player is widely installed on devices ranging from desktop computers to smart phones. Web developers can avoid issues with media player plug-ins by using Flash (such as the Flash player available at http://www.search-this.com/tools) to deliver their audio and video files.

Flash Innovation and Imagination. As you viewed the sample sites you may have noticed the creativity, innovation, and sheer imagination that some of them exhibit. Visit the textbook Web site at http://www.webdevfoundations.net for additional links to Flash Web sites.



Web Design and Flash

Adobe provides a variety of design guidelines and accessibility hints for Flash developers (http://adobe.com/accessibility/products/flash), including tutorials, best practices, and case studies. The Flash Player offers integrated support for Microsoft Active Accessibility

(MSAA). This makes Flash content available to visitors using assistive technology such as the GW Micro Window-Eyes or Freedom Scientific JAWS screen reader. Expect more improvements in Flash and accessibility as Adobe continues to focus on this area.

Today's Web developer needs to know how to add a Flash .swf file to a Web page. If you are working on a large project, a graphic designer may create the effect and pass it to you for placement on a page. If you are working on a small project, you may be expected to create Flash .swf files yourself. Adobe offers a free trial download of the Flash application, including a few tutorials and lessons on using Flash.



According to Microsoft at http://silverlight.net, Silverlight is a plug-in for delivering media experiences and rich interactive applications for the Web. Microsoft Expression Blend is an application that creates interactive media for display by the Silverlight plug-in.

Adding a Flash Animation to a Web Page

You've seen some examples of Flash and are aware of issues related to Flash and Web usability. Now let's take a look at the XHTML that is needed to use Flash media on a Web page.

Previously, both the <object> tag and the non-standard <embed> tag were needed to reliably display Flash media on Web pages. Today's modern browsers support the <object> tag.

The <object> tag specifies the beginning of Flash media on a Web page. Its closing tag, </object>, specifies the ending of Flash media. As previously discussed, the <object> tag is a multipurpose tag for adding various types of objects to a Web page. The <object> tag's attributes vary, depending on the type of object being referenced. The minimum attributes required when working with Flash media are described in Table 11.3.

Table 11.3 Minimal Flash media attributes

<object></object>	
Attribute	Description and Value
accesskey	Optional; Specifies a hotkey for keyboard access, Windows users press the hotkey and the Ctrl key at the same time.
type	The MIME type of the object, use type="application/x-shockwave-flash"
data	File name of the Flash media (.swf file)
height	Specifies the height of the object area in pixels
tabindex	Optional; A numeric value that specifies the tabbing order of the Flash media
title	Optional; Specifies a brief text description that may be displayed by browsers or assistive technologies
width	Specifies the width of the object area in pixels

The Flash object uses special values, called parameters, to configure the name of the .swf file, quality of the media, and background color of the page areas. These are configured with param /> or parameter tags. Parameters used with Flash media are shown in Table 11.4.

Table 11.4 Flash media parameters

Parameter Name	Parameter Value
movie	File name of the Flash media (.swf file)
quality	Optional; Describes the quality of the media; usually the value high is used
bgcolor	Optional; Background color of the Flash media area; uses a hexadecimal color value
loop	Optional; Indicates whether the .swf loops; values are "true" and "false"
wmode	Optional; Configures transparent background of the Flash media area in browsers that support this feature; value is "transparent"

All the <param /> tags for the object appear before the ending </object> tag. An example will be given later in this section. An overview of this tag placement follows:

```
<object ... object attributes go here ...
<param name="movie" ... value attribute goes here ... />
<param name="quality" ... value attribute goes here ... />
<param name="bgcolor" ... />
XHTML code placed here will display if the <object> is not
supported by the browser.
</object>
```



Notice the code placed before the closing </object> tag in the example above. It is displayed if the browser does not support the multimedia object. Include a link to a Web page containing alternate text content if needed. While the developers of assistive technologies such as screen readers are working toward the support of Flash media, it is not yet universal.

HANDS-ON PRACTICE 11.4

In this Hands-On Practice you will launch Notepad and create a Web page that displays a Flash button. Your page will look like the one shown in Figure 11.9, which can be found in the student files at Chapter11/flash.html.



The Flash button on the page will animate when the mouse is placed on it and will link to the Adobe Web site when clicked (if you are connected to the Internet while viewing this page).

Let's get started. Create a folder called testflash on your disk. Copy the flashbutton.swf file from the student files Chapter11 folder and save it in your testflash folder.

Next, launch Notepad and create the page that will display this Flash button. The XHTML code follows:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Hands-On Practice 11.4</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>Flash Sample</h1>
<object type="application/x-shockwave-flash" width="147"</pre>
height="34" data="flashbutton.swf" title="Button links to the Adobe
Web site" >
<param name="movie" value="flashbutton.swf" />
<param name="quality" value="high" />
<param name="bgcolor" value="#FFFFFF" />
This is a Flash button that links to the
<a href="http://www.adobe.com">Adobe Web site</a>
</object>
</body>
</html>
```

Save your file in the testflash folder as flash.html and test it in a browser. Compare your work to the sample in the student files (Chapter11/flash.html).



If you used the code in this section to display Flash media on a Web page and your visitor's browser does not support Flash, the browser typically will display a message about needing a missing plug-in. The XHTML code in this section passes W3C XHTML validation and is the minimum code needed to display Flash media on a Web page. If you'd like more features, such as being able to offer an express install of the latest Flash player to your visitors, explore SWFObject at http://code.google.com/p/swfobject/wiki/documentation, which uses JavaScript to embed Flash content and is W3C XHTML standards compliant.

Flash Resources

There are many sources of free Flash animations and Flash tutorials on the Web. In addition to resources at the Adobe site, http://adobe.com, the following sites contain tutorials and news about Flash:

- http://flashkit.com
- http://www.actionscript.org
- http://www.scriptocean.com/flashn.html
- http://www.kirupa.com/developer/flash/index.htm

As you visit these and other Flash resource sites, keep in mind that some Flash media is copyrighted. Obtain permission from the creator of the media before using it on your site and follow any instructions for giving credit to the source. Some sites allow personal use of their Flash media for free but require licenses for commercial use.

Adobe has been working toward increasing the accessibility of Flash objects. Recent versions of Flash are accessible to assistive technologies, such as the Window-Eyes screen readers, enabling rich content for a wider audience of Web page visitors.

Flash supports Microsoft Active Accessibility (MSAA), which provides both a standard method for client technology to communicate with assistive technologies and a technique for developers to ensure that the client software they create to this standard can include Adobe Flash support. Visit Adobe's Web site (http://www.adobe. com/accessibility/products/flash) for the most up-to-date information on the issue of Flash and accessibility.

11.9 Java

Java is an object-oriented programming (OOP) language developed by Sun Microsystems. An object-oriented program consists of a group of cooperating objects that exchange messages for the purpose of achieving a common objective. Java is not the same language as JavaScript. It is more powerful and much more flexible than JavaScript. Java can be used to develop both stand-alone executable applications and applets that are invoked by Web pages.

Java applets are platform independent; that means they can be written and run on any platform—Mac, UNIX, Linux, and Windows. Java applets are compiled (translated from the English-like Java statements to an encoded form) and saved as .class files, which contain byte code. The byte code is interpreted by the Java Virtual Machine (JVM) in the Web browser. The JVM interprets the byte code into the proper machine language for the operating system. The applet is then executed and appears on the Web page. See Figure 11.10 for a diagram that shows this process. When a Java applet loads, the area reserved for it on the Web page displays an empty rectangular area until the applet begins to execute.





Common Uses of Java Applets

Processing Navigation Bars and Buttons. Java applets can process interactive navigation bars on Web pages. Visit http://javaboutique.internet.com/navigation/menu.html and http://www.apycom.com for a variety of navigation and menu Java applets.

Manipulating Images. Java can be used to manipulate images in a number of ways. Visit http://www.codebrain.com/java/codebrainslider for a sample slide show. Perhaps one of the best known Java applet images is the Lake Applet from http://javaboutique.internet.com/Lake, shown in Figure 11.11. This applet not only manipulates the lower portion of an image to make it look like a lake, it also functions as a hyperlink.

Figure 11.11 The classic lake applet

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100		

Creating Text Effects. Java applets can also be used to create text effects such as the sample applet shown in Figure 11.12 (see the student files, Chapter11/java1.html). Other text effects can be found at Web sites such as http://www.appletcollection.com/text.html.



Creating Games. Another popular use of Java applets is to create games for Web pages. Figure 11.13 shows a picture game processed by a Java applet at http://www.volunteerkids.gov/youth/youth_games_puzzle.htm. Try Java on the Brain http://www.javaonthebrain.com/brain.html) for other examples of classic games as Java applets.





Using Web and Business Applications. While image effects and games are fun, the use of Java applets in business applications has been increasing for functions such as financial calculations and visualization. The jars.com (http://www.jars.com) site provides a Java applet review service and describes applets that are useful in a business environment, such as NetCharts from http://visualmining.com. This type of applet often connects to databases on a Web server and can be very powerful tools if you need to display live data visually.

You can see that Java applets can perform a variety of functions on Web pages. As a Web developer your usual role will not be that of a Java programmer—that is, you should not be expected to write Java applets. However, you could be asked to work with a Java programmer to place his or her applets on your Web site. Whether you obtain an applet from a coworker or find one on a free site, you need to code XHTML to display the applet.

Adding a Java Applet to a Web Page

The W3C recommends using the <object> tag to configure a Java applet on a Web page and has deprecated the <applet> tag. However, in practice, the <applet> tag will more reliably display a Java applet on a Web page in commonly used browsers. This example will use the <applet> tag. The <applet> tag specifies the beginning of an applet area in the body of a Web page. Its closing tag, </applet>, specifies the ending of an applet area in the body of a Web page. The <applet> tag has a number of attributes described in Table 11.5.

Table 11.5 Attributes of the <applet> tag

Attribute	Value
code	Name of the applet file; this has a .class file extension
codebase	If the applet is not in the same folder as the Web page, the codebase indicates the folder that contains the applet
height	Specifies the height of the applet area in pixels
width	Specifies the width of the applet area in pixels
alt	A text description of the applet

In addition, most applets need special values, or parameters, to configure their processing. An applet that shows images and handles navigation would need parameters to accept the file names of the images and the URLs for the hyperlinks. The programmer who creates an applet determines the parameter values and names required by a specific Java applet. Therefore, expect each applet to require different parameters. Parameters are configured with <param /> tags. The <param /> tag is a self-contained tag with two attributes: name and value. The parameter name is provided in the applet documentation. The parameter value will be different depending on the function of the applet. One parameter might be used to set a background color; another parameter could be used to contain a person's name. A description of the type of value expected should be contained in the applet documentation.



In this Hands-On Practice you will launch Notepad and create a Web page that contains a Java applet. This example will use the Fader26 applet (provided by Johannes Schellen). This applet displays text messages one at a time. The list of text messages is obtained from a text file (.txt file extension) that you will create. An example of this applet at work can be found in the student files at Chapter11/java1.html.

Let's get started. Create a folder called testapplet on your disk. Copy the applet file (fader26.class) from the student files at Chapter11/fader26.class and place it in the testapplet folder. Do not change the name of the applet.

Whether you obtain an applet from a free Web site or from a coworker, each applet should have some accompanying documentation that indicates what parameter it expects. Documentation for the Fader26 applet appears in Table 11.6.

Table 11.6 Documentation for Fader26 applet

Parameter	Peremeter Value		
Name AppletHeme	http://www.crosswinds.pot/&simifador		
Data	The name of the text file containing the message to be displayed; (<i>Note</i> : each line in the text file should begin with text=)		
bgColor	This is the background color of the Java applet area; uses a hexadecimal color value		
	Launch Notepad and create a Web page that invokes this applet. The beginning XHTML is as follows:		
	<pre><!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd"> <html lang="en" xml:lang="en" xmlns="http://www.w3.org/1999/xhtml"> <head> <title>Hands-On Practice 11.5</title> <meta content="text/html; charset=utf-8" http-equiv="Content-Type"/> </head> <body></body></html></pre>		
	Now you are ready to add the XHTML to place the Java applet on your Web page. First, write the <applet> tag to reserve an area of the Web page that is 30 pixels high and 610 pixels wide for the fader26.class applet. The code follows:</applet>		
	<applet code="fader26.class" height="30" width="610"></applet>		
	Next, create the parameter tags. The code for the parameter tags follows:		
	<param name="AppletHome" value="http://www.crosswinds.net/~fader/"/> <param name="Data" value="mymessage.txt"/> <param name="bgColor" value="#FFFFFF"/>		
	Finally, an ending applet tag , ending body tag , and ending tag are needed. The code shown in Notepad is displayed in Figure 11.14.		
Figure 11.14 Sample Web page code using the fader26 Java applet	Image: State Stat		

Save the file in the testapplet folder with the file name of java.html. You are not yet ready to test the page—you need to create and format the text file that the applet expects. This applet expects each line of text to begin with text=. Figure 11.15 shows a sample text file created using Notepad.



The text file needed by the fader26 Java applet

🦳 mymessage.txt - Notepad 💦 💼 🗐	x
File Edit Format View Help	
text—This is a Java Applet text—This applet displays text	Â
text=one line at a time text=Isn't this fun?	Ŧ

Use this as a guide to create your text file. Save your text file as mymessage.txt in the testapplet folder. The name of the text file must match the value of the "Data" parameter in the XHTML code. Now launch your page in a browser. The applet should display your text one line at a time (Your browser may display a warning message about the fader26.class applet being created using an earlier version of java—just click OK or Continue).



To provide accessibility for all your Web page visitors, regardless of whether their browser or user-agent can process a Java applet, modify the <applet> tag to use an alt attribute and include a text description of the Java applet. The code is shown below:

```
<applet code="fader26.class" height="30" width="610"
alt="Java applet: displays a promotional message one line at a time">
<param name="AppletHome" value="http://www.crosswinds.net/~fader/" />
<param name="Data" value="mymessage.txt" />
<param name="bgColor" value="#FFFFFF" />
This Java applet displays a message one line at a time. Message:
This is a Java applet. This displays text one line at a time.
</applet>
```



Why doesn't my Java applet work?

If your applet does not function as expected, verify the following:

- Are Java applets enabled in your browser?
- Is the applet saved in the testapplet folder?
- Is the applet saved with the name fader26.class (all letters must be in lowercase)?
- Are the java.html and mymessage.txt files saved in the testapplet folder?
- Does the code attribute on the <applet> tag have the value of fader26.class?

Be aware that the disadvantage of using Java applets is the lag between the time the Web page is initially loaded and the time the applet actually begins to execute. Your Web page visitor will see a box in the area reserved for the applet until it begins executing.

Free Java Applet Resources

Now that you are familiar with applets, you may be wondering how to write them. The organization that developed the Java programming language, Sun Microsystems, offers documentation and other resources on their Web site at http://java.sun.com. Be aware that the Java programming language is very powerful, but quite complex. There are many resources for free and commercial Java applets on the Web. Here are a few helpful sites:

- http://www.appletcollection.com
- http://www.javaonthebrain.com
- http://www.echoecho.com/freeapplets.htm

As you visit these and other Java resource sites, keep in mind that some Java applets are copyrighted. Be sure to obtain permission from the creator of the applet before using it on your site. There may be some requirements for giving credit to the creator either by name or by linking to their Web site. Follow the instructions provided with the applet. Some applets are free to use in personal Web sites but require licenses for commercial use.





CHECKPOINT 11.2

- 1. Describe two uses of Flash on Web pages.
- 2. Describe two uses of Java applets on Web pages.
- 3. Describe two disadvantages of using interactive technologies such as Flash and Java applets on Web pages.

11.10 JavaScript

JavaScript is an object-based scripting language. In JavaScript you work with the objects associated with a Web page document: the window, the document, and the elements such as forms, images, and links. JavaScript, developed by Netscape, was originally called LiveScript. When Netscape collaborated with Sun Microsystems on modifications to the language, it was renamed JavaScript. JavaScript is not the same as the Java programming language. Unlike Java, JavaScript cannot be used to write stand-alone programs that can
run outside of a Web browser. JavaScript statements can be placed in a separate file (with a.js extension) accessed by a Web browser, but JavaScript statements are more commonly embedded directly in the Web page along with the XHTML. In either case, the Web browser interprets the JavaScript statements. JavaScript is considered to be a client-side scripting language---it runs on the Web client (the browser) and not the Web server. Note that although some Web servers (such as the Sun Java System Web server) can process server-side JavaScript, the language is most commonly used for client-side scripting.



this page

Don't all browsers support JavaScript?

Most modern browsers support JavaScript. However, they also offer the option to disable JavaScript, and some assistive technologies such as screen readers may not support JavaScript. You can't count on every person who visits your Web site to allow JavaScript. It's a good idea to offer your Web page visitors an alternative (plain text links, a phone number to call, and so on) if features of your Web site are dependent on JavaScript.

Common Uses of JavaScript

JavaScript is often used to respond to events such as moving the mouse, clicking a button, and loading a Web page. Figure 11.16 shows two screenshots from the Library of Congress Exhibitions site (http://www.loc.gov/exhibits). Notice how the image at the right is different depending on the position of the mouse. This "image swapping" is accomplished by using JavaScript. This technology is also often used to edit and verify information on XHTML form elements such as text boxes, check boxes, and radio buttons. JavaScript can be used to create pop-up windows, display the current date, perform calculations, and so on. There is an introduction to coding JavaScript in Chapter 14.



Free JavaScript Resources

There is a lot to learn about JavaScript, but there are many free resources for JavaScript code and JavaScript tutorials on the Web.

Here are a few sites that offer free tutorials or free scripts:

- JavaScript Tutorials (http://echoecho.com/javascript.htm)
- JavaScript Tutorial for the Non-Programmer (http://www.webteacher.com/javascript)
- JavaScript Tutorials (http://www.w3schools.com/JS)



As you visit these and other Web sites, be aware that it is unethical to copy and paste JavaScript that another person has written. Many Web sites that offer free JavaScript require that you link to them or place comments in the JavaScript to indicate the identity of the author. While it is unlikely that you would be sued for borrowing someone's JavaScript, the right thing to do is to ask permission, and if given, honor requests for links or identification.

Once you are comfortable with XHTML, the JavaScript language is a good technology to learn as you continue your studies. Try some of the resources listed and get your feet wet. See Chapter 14 for a more detailed introduction to JavaScript. The next section introduces Dynamic HTML, a technology that uses JavaScript.

11.11 Dynamic HTML (DHTML)

Dynamic HTML is not a single technology; it is a group of technologies that work together to change a Web page after it has been downloaded. These technologies allow the Web page to respond to user actions. The following technologies are used: Document Object Model, Cascading Style Sheets, and client-side scripting (JavaScript).

• Document Object Model (DOM). The DOM defines every object and element on a Web page. Its hierarchical structure can be used to access page elements and apply styles to page elements. A portion of a basic DOM common to most browsers is shown in Figure 11.17. A contributing factor to the complexity of DHTML is the fact that not all Web browsers use the same DOM. There are several different DOMs currently in use, including the W3C DOM, the Gecko DOM (used by the Mozilla and Firefox browsers), and the WebKit DOM (used by the Safari and Chrome browsers). It's good news for Web developers that current versions of browsers such as Internet Explorer, Firefox, and Opera support the W3C DOM (although it's common for browsers to support the W3C DOM along with browser-specific enhancements).

Figure 11.17

The Document



- Cascading Style Sheets (CSS). From previous chapters you already know that CSS can be used to apply formatting styles to Web page elements, position elements on a Web page, and even modify the visibility of elements. DHTML utilizes these features of CSS.
- Client-side Scripting (JavaScript). Scripting languages such as JavaScript, VBScript, or JScript are used to access the DOM and manipulate the elements.

DHTML frequently has a long learning curve because of the extent of the knowledge needed to combine the three technologies successfully. To further complicate matters, the DOM is implemented differently by major versions of the major browsers. Recently, there is better convergence between the DHTML implementations of modern browsers and it should become easier to write cross-browser DHTML in the future.

Common Uses of DHTML

Hiding and Showing Text. The appearance of text that describes anchor tags or images is another common effect that uses DHTML.

Navigation. The horizontal navigation shown in Figure 11.18 utilizes DHTML. This navigation type has become quite popular and is seen in both horizontal and vertical versions.

The lists of choices under each category (About USAID, Our Work, Locations, Policy, and so on) appear and disappear as you move your mouse pointer over the category heading. A good source of DHTML code, including navigation menus, is the Dynamic Drive Web site at http://www.dvnamicdrive.com.

Image Effects. Various image effects ranging from altering images to slide shows can be applied with DHTML. For several examples of using DHTML to create a slide show, visit http://dynamicdrive.com and search for "slide show."

Sources of Free DHTML

There are many available resources for DHTML on the Web. The following sites are helpful:

- http://dynamicdrive.com
- http://brainjar.com
- http://www.dhtmlgoodies.com

Figure 11.18

This Web site uses DHTML navigation





As you visit these and other DHTML resource sites, remember that some may be copyrighted. Be sure to obtain permission from the creator of the DHTML before using it on your site and follow any instructions for giving credit to the source. Some sites allow personal use of their DHTML free of charge but require licenses for commercial use.

If you choose to use free DHTML, be very careful about which browsers it is meant to work with. Some sites clearly indicate the browsers supported by each DHTML effect, such as dynamicdrive.com. Other sites, such as brainjar.com, contain code that is meant to work in the newer releases of browsers only and is not backward compatible to Netscape 4.x. Testing is crucial when you are using DHTML.



Also, always offer your visitors an alternate method in case the DHTML does not work. For example, if you use DHTML for a navigation bar, offer plain text navigation at the bottom of the page.

11.12 Ajax

Ajax, like DHTML, is not a single technology, but a combination of different technologies. Ajax stands for Asynchronous JavaScript and XML. These technologies are not new, but recently have been used together to provide a better experience for Web visitors and create interactive Web applications. Jesse James Garrett of Adaptive Path (http://www.adaptivepath.com/publications/essays/archives/000385.php) is credited with coining the term "Ajax." The technologies utilized in Ajax are listed below:

- Standards-based XHTML and CSS
- Document Object Model

- XML (and the related XSLT technology)
- Asynchronous data retrieval using XMLHttpRequest
- JavaScript

Some of these technologies may be unfamiliar to you. That's okay at this point in your Web development career. You're currently creating a strong foundation in XHTML and CSS and may decide to continue your studies in the future and learn additional Web technologies. Right now, it's enough to know that these technologies exist and what they can be used for.

Ajax is part of the **Web 2.0** movement—the transition of the Web from isolated static Web sites to a platform that uses technology to provide rich interfaces and social net-working opportunities for people. See http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-Web-20.html for an intriguing article about Web 2.0 by Tim O'Reilly, who was instrumental in the creation of the term "Web 2.0".

Ajax is a Web development technique for creating interactive Web applications. Recall the client/server model discussed in Chapters 1 and 9. The browser makes a request to the server (often triggered by clicking a link or a submit button) and the server returns an entire new Web page for the browser to display. Ajax pushes more of the processing on the client (browser) using JavaScript and XML and often uses "behind the scenes" asynchronous requests to the server to refresh a portion of the browser display instead of the entire Web page. The key is that when using Ajax technology, JavaScript code (which runs on the client computer within the confines of the browser) can communicate directly with the server-exchanging data and modifying parts of the Web page display without reloading of the entire Web page. For example, as soon as a Web site visitor types a Zip code into a form the value could be looked up on a Zip code database and the city/state automatically populated using Ajax—and all this takes place while the visitor is entering the form information before they click the submit button. The result is that the visitor perceives the Web page as being more responsive and has a more interactive experience. See http://webdevfoundations.net/css for an example of Ajax in action. As shown in Figure 11.19, hints are provided as you type the name of a CSS property—without refreshing the page.

Figure 11.19

Ajax technologies are used to update the page as the visitor types

CSS Property Review

- Use this page to review the purpose of commonly used CSS properties.
- Begin typing the name of a CSS property in the text box below.
- The page below uses Ajax technologies to "listen" as you type and display a list of suggested CSS property names.
 When you have finished typing the name of a CSS
- When you have finished typing the name of a CSS property, a description of the CSS property displays.



Common Uses of Ajax

Developers are using Ajax to support the Web applications that are part of Web 2.0— Flicker's photo sharing (http://www.flicker.com), del.icio.us's shared collection of

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favorite sites (http://del.icio.us), Google's e-mail (http://gmail.google.com), Amazon's A9 search engine (http://www.a9.com), and Microsoft Live (http://www.live.com).

Ajax Resources

Ajax is a very hot topic on the Web right now and there are many resources and articles available. Some helpful sites are listed here:

- http://www.ajaxpatterns.org
- http://www.webpasties.com/xmlHttpRequest
- http://www.alistapart.com/articles/gettingstartedwithajax
- http://www.tizag.com/ajaxTutorial



CHECKPOINT 11.3

- 1. Describe two uses of JavaScript.
- 2. Describe two uses of DHTML.
- 3. Describe two uses of Ajax.

11.13 Accessibility and Multimedia/Interactivity



Multimedia and interactivity can help to create a compelling, engaging experience for your Web site visitors. Please keep in mind that not every Web visitor will be able to experience these features.

- Provide links to free downloads for the plug-ins used by your multimedia. (The code provided to incorporate Flash media and Quicktime media includes these plug-in links.)
- Text descriptions and equivalent content (such as captions) of audio and video will provide access to those with hearing challenges.
- When you work with multimedia developers and programmers to create Flash animations or Java applets for your site, be sure to request features to provide accessibility—keyboard access, text descriptions, and so on. If you use Flash, a Java applet, or DHTML for site navigation—be sure it can be accessed with a keyboard and/or provide plain text navigation links in the footer section of the pages. Adobe provides a good resource for Web developers at their Accessibility Resource Center (http://www.adobe.com/resources/accessibility).
- Section 508 requires that certain rates of screen flickering (frequency greater than 2 Hz and lower than 55 Hz) are avoided. WCAG 2.0 guidelines (2.3.1) recommend that a Web page not contain any item which flashes more than three times per second. This is to prevent optically induced seizures. You may need to work with your multimedia developer to ensure that dynamic effects perform within a safe range.
- If you use JavaScript, be aware that some visitors may have JavaScript disabled or are unable to manipulate the mouse. Section 508 requires that your site is

functional at a basic level even if your visitor's browser does not support JavaScript. A site using Ajax to redisplay a portion of the browser window may have issues when accessed using an assistive technology or text browser. The importance of testing cannot be overemphasized. The W3C has developed ARIA (Accessible Rich Internet Applications), which is a protocol that supports accessibility for scripted and dynamic content, such as the Web applications created using Ajax. At the time this was written, ARIA was not uniformly supported by all commonly used browsers. See http://w3.org/WAI/intro/aria.php for more information about ARIA.

When you design with multimedia/interactivity accessibility in mind, you help those with physical challenges as well as those visitors using low bandwidth or who may have missing plug-ins on their browser. However, if the multimedia and/or interactivity used on a page cannot comply with accessibility guidelines, consider creating a separate text-only version of the page. Section 508 requires this feature for sites created for use by federal agencies.

CHAPTER SUMMARY

This chapter introduced technologies to add media and interactivity to Web pages. XHTML techniques used to configure sound and video were discussed. Adobe Flash, Java applets, JavaScript, DHTML, and Ajax were introduced. Accessibility, usability, and copyright issues related to these technologies were addressed. Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

.aiff	.wav	helper application
.au	.wmv	interactivity
.avi	<applet></applet>	Java
.class	<object></object>	Java applet
.flv	<param/>	Java Virtual Machine (JVM)
.m4a	Ajax	JavaScript
.m4v	audio files	media
.mid	background sound	playback
.mov	copyright	podcasting
.mp3	Creative Commons license	plug-in
.mp4	DHTML	RSS feed
.mpg	Document Object Model (DOM)	sampling rate
.ogg	fair use	video files
.swf	Flash	Web 2.0

Review Questions

Multiple Choice

- 1. What type of files are .wav, .aiff, .mid, and .au?
 - a. audio files
 - b. video files
 - c. both audio and video files
 - d. none of the above
- **2.** Which code provides a hyperlink to an audio file called hello.wav?
 - a. <object data="hello.wav"></object>
 - b. Hello (Audio
 File)
 - c. <object data="hello.wav"></object>
 - d. <link src="hello.wav"/>
- **3.** Which of the following should you do to provide for usability and accessibility?
 - a. use video and sound whenever possible
 - b. supply text descriptions of audio and video files that appear in your Web pages

- c. never use audio and video files
- d. none of the above
- **4.** Keeping in mind that it is easy to copy files from other's Web sites, which of the following is true?
 - a. there is no copyright on the Web
 - b. it is okay to use files created by others if you give them credit
 - c. you should obtain permission before using files created by others
 - d. none of the above
- **5.** What is an XML file that lists information about your podcast called?
 - a. subscription
 - b. RSS Feed
 - c. RSS blog
 - d. none of the above

- **6.** Which of the following can describe JavaScript?
 - a. an object-based scripting language
 - b. an easy form of Java
 - c. a language created by Microsoft
 - d. none of the above
- 7. Which of the following is true of Java applets?
 - a. they are contained in files with the .class extension
 - b. they are not copyrighted
 - c. they must be saved in a different folder than Web pages
 - d. none of the above
- 8. Which combination of technologies does DHTML use to create interactive Web pages?
 - a. client-side scripting, Document Object Model, Web browser
 - b. client-side Scripting, CSS, Java
 - c. Document Object Model, CSS, Web browser
 - d. Document Object Model, CSS, client-side scripting
- **9.** A file which contains a Flash animation uses the ______ file extension.
 - a. .class
 - b. .swf
 - c. .mp3
 - d. .flash
- **10.** Which of the following can describe Ajax?
 - a. an object-based scripting language
 - b. the same as Web 2.0

- c. a Web development technique for creating interactive Web applications
- d. none of the above

Fill in the Blank

- **11.** When recording human speech in an audio file, ______ resolution is sufficient.
- Use of a copyrighted work for purposes such as criticism, reporting, teaching, scholarship, or research is called ______.
- **13.** The ______ attribute for the image tag displays media but is only supported by Internet Explorer.
- **14.** When displaying a Java applet, the browser invokes the ______ to interpret the bytecode into the appropriate machine language.
- **15.** The ______ defines every object and element on a Web page.

Short Answer

- **16.** List at least two reasons not to use audio or video on a Web page.
- **17.** Describe a type of copyright license that empowers the author/artist to grant some but not all rights for using his or her work.

Apply Your Knowledge

1. Predict the Result. Draw and write a brief description of the Web page that will be created with the following XHTML code:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>CircleSoft Designs</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
body { background-color: #FFFFCC;
        color: #330000;
        font-family Arial,Helvetica,sans-serif; }
.content { width: 750px; }
</head>
```

```
<body>
 <div class="content">
  <h1>CircleSoft Design</h1>
<div><strong>CircleSoft Designs will </strong>
   work with you to create a Web presence that fits your
     company
     listen to you and answer your questions
     utilize the most appropriate technology for your sites:
     JavaScript, Java, PHP, databases, ASP, DHTML, XML, Flash and
     more
   <a href="podcast.mp3" title="CircleSoft Client"
   Testimonial">Listen to what our clients say</a>
   </div>
 </div>
</body>
</html>
```

2. Fill in the Missing Code. This Web page should display a Java applet named slideshow.class that is 200 pixels wide and 175 pixels high. Some XHTML attributes, indicated by "_" are missing. Fill in the missing code.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>Fill in the Missing Code</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>Trillium Media Design</h1>
  Visual Tour of Our Services <br />
<applet code=" " height=" " width=" ">
  <param name="image1" value="service1.jpg" />
  <param name="image2" value="service2.jpg" />
  <param name="image3" value="service3.jpg" />
</applet>
</body>
</html>
```

3. Find the Error. The purpose of the following Web page is to display a video named products.mov. The video only displays on Internet Explorer. Why?

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<html xmlns="multic" xml:lang="en" xml:lang="en" xml:lang="en">
<html xmlns="multic" xml:lang="en" xml:lang="en" xml:lang="en">
<html xmlns="multic" xml:lang="en" xml:lang="multic" xml:lang="m
```

Hands-On Exercises

- 1. Practice writing XHTML to configure media.
 - a. Write the XHTML for a hyperlink to a video called demo1.mov on a Web page.
 - b. Write the XHTML to embed an audio file called lesson1.wav on a Web page that can be controlled by the visitor.
- **2.** Practice writing XHTML.
 - a. Write the XHTML to place a Java applet called mylink.class on a Web page. This applet needs an area that is 300 pixels wide and 40 pixels high. Its parameters are documented as follows:

Parameter Name	Parameter Value
LinkURL	Any URL
LinkDescription	Text describing the link

- b. Write the XHTML to add a Flash file called intro.swf to a Web page. The effect needs an area that is 500 pixels wide and 200 pixels high.
- **3.** Create a Web page about your favorite movie that contains one of the following: an audio file containing your review of the movie (use Windows Sound Recorder or a similar program to record your voice), an audio clip from the movie, a video clip from the movie, or an audio clip from the movie soundtrack. Place an e-mail link to yourself on the Web page. Save the page as movie11.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page to your instructor.
- 4. Create a Web page about your favorite music CD that contains either a brief audio file containing your review of the CD (use Windows Sound Recorder or a similar program to record your voice) or an audio clip from the CD. Place an e-mail link to yourself on the Web page. Save the page as cd11.html. Hand in printouts of both

the source code (print in Notepad) and the browser display of your page to your instructor.

- 5. Create a Web page about a current political figure who you admire that contains one of the following: an audio file containing your thoughts about the political figure (use Windows Sound Recorder or a similar program to record your voice), an audio clip of an interview with the individual that you selected, or a brief video clip of the individual you selected. Place an e-mail link to yourself on the Web page. Save the page as political11.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page.
- **6.** Create a Web page about your favorite music group that uses either the Java applet described in Hands-On Practice 11.7 or a Java applet of your choice. The applet should display the names of songs performed by the group. Place an e-mail link to yourself on the Web page. Save the page as java11.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page.
- **7.** Visit the textbook Web site at http://webdevfoundations.net/flashcs4 and follow the instructions to create a Flash logo banner. Hand in the printouts described in the tutorial to your instructor.

Web Research

- 1. This chapter mentioned some software applications that can be used to create and edit media files. With those as a starting point, search for more applications on the Web. Create a Web page that lists at least five media authoring applications. Organize your page with a table that provides the name of the software application, the URL, a brief description, and the price. Place your name in an e-mail link on the Web page. Your page should include a hyperlink to a music audio file. Include an audio file (soundloop.mp3) from this chapter, record your own, or find an appropriate sound file on the Web. Print both the source code (from Notepad) and the browser view of your page.
- 2. Issues related to copyright were discussed in this chapter. With the resources provided as a starting point, search for additional information related to copyrights and the Web. Create a Web page that provides five helpful facts about copyright and the Web. Provide the URLs of the Web sites you used as resources. Place a media console on the page to allow visitors to play an audio file while they read your page. Include an audio file (soundloop.mp3) from this chapter, record your own, or find an appropriate sound file on the Web. Print both the source code (from Notepad) and the browser view of your Web page.
- **3.** Choose one method of Web interactivity discussed in this chapter: JavaScript, Java applets, DHTML, Flash, or Ajax. Use the resources listed in the chapter as a starting point, but also search the Web for additional resources on the interactivity method you have chosen. Create a Web page that lists at least five useful resources along with a brief description of each. Organize your Web page with a table that provides the name of the site, the URL, a brief description of what is offered, and a recommended page (such as a tutorial, free script, and so on) for each resource. Place your name in an e-mail link on the Web page. Print both the source code (from Notepad) and the browser view of the Web page.

4. Choose one method of Web interactivity discussed in this chapter: JavaScript, Java applets, DHTML, or Flash. Use the resources listed in the chapter as a starting point, but also search the Web for additional resources on the interactivity method you have chosen. Find either a tutorial or free download that uses the method of Web interactivity you are researching. Create a Web page that uses the code or download that you found. Describe the effect and list the URL of the resource on the Web page. Place your name in an e-mail link on the Web page. Print both the source code (from Notepad) and the browser view of the page.

Focus on Web Design

- **1.** Ajax is a relatively new technology and there are Web design usability and accessibility issues associated with it. Visit the following sites to become aware of these issues:
 - http://ajaxian.com/archives/ajax-usability-mistakes
 - http://www.sitepoint.com/blogs/2005/03/10/usability-and-accessibility-with-ajax
 - http://www.standards-schmandards.com/2005/ajax-and-accessibility
 - http://www.clickz.com/showPage.html?page=3624207

Write a one-page report that describes Ajax usability issues that Web designers should be aware of. Cite the URLs of the resources you used.

2. Read Jakob Nielson's (in)famous 2000 article about why Flash is 99 percent bad at http://www.useit.com/alertbox/20001029.html. Many years have passed, accessibility features have been built into Flash, and a new day has dawned. Some analysts say that Flash is 99 percent good (http://www.brajeshwar.com/2007/flash-99-good). In an interview (http://www.guardian.co.uk/technology/2007/apr/05/adobe.newmedia) Mark Anders, the senior principal scientist at Adobe, recommended Flash as "a great platform for building the next generation of rich Internet applications."

After you review the sources listed, decide on your own opinion of Flash and when, as a designer, you would recommend its use. Write a one-page paper that persuasively presents your opinion. Cite the URLs of your resources.

WEB SITE CASE STUDY: Adding Multimedia

Each of the following case studies continues throughout most of the text. This chapter adds media and interactivity to the Web sites.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House Case Study. Figure 2.26 shows a site map for the JavaJam Web site. The pages were created in earlier chapters. Use the Chapter 9 javajamcss folder. You have two tasks:

- 1. Configure a hyperlink to an audio file on the Music page (music.html).
- **2.** Replace the javalogo.gif with a Flash animated banner called javalogo.swf on each page. The Flash media is 620 pixels in width and 117 pixels in length.

Hands-On Practice Case

- 1. Configure a hyperlink to an audio file on the Music page (music.html).
 - Copy the greg.mp3 file from the student files in the Chapter11/CaseStudyStarters folder and save it to your javajamcss folder.
 - Launch Notepad and open the Music page (music.html) in the javajamcss folder. Modify music.html so that the text "New songs" links to the greg.mp3 file. See Hands-On Practice 11.1 as a guide. Save your page. Test your page using several browsers. You should hear the sound when you click on the hyperlink.
- **2.** Replace the logo image with a Flash animation on the Home page (index.html).
 - Copy the javalogo.swf file from the student files in the Chapter11/ CaseStudyStarters folder and save it to your javajamcss folder.
 - Launch Notepad and open the Home page (index.html) in the javajamcss folder. Modify index.html to display the Flash file (javalogo.swf) instead of the image (javalogo.gif). See Hands-On Practice 11.4 for help. Save your page. Test your page using several browsers. You should see the logo animate.
 - Modify the logo area on the rest of the JavaJam pages so that your Web site has a consistent design. Save and test your pages.

Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows a site map for the Fish Creek Web site. The pages were created in earlier chapters. Use the Chapter 9 fishcreekcss folder. You have three tasks:

- 1. Modify the fishcreek.css style rules to configure the placement of the Flash logo and Quicktime movie.
- **2.** Add a video to the Ask the Vet page (askvet.html). See Figure 11.20 for a sample screenshot.



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3. Replace the fishcreeklogo.gif with a Flash animated banner called fishcreeklogo.swf on each page. The Flash media is 400 pixels in width and 80 pixels in length.

Hands-On Practice Case

- **1.** Modify the fishcreek.css file.
 - Modify the logo id. Change the left padding to 120 pixels. This will align the new Flash logo with the right column.
 - Create a new id called movie. Configure the movie id to float to the right, have a 20 pixel left margin, and a 50 pixel bottom margin.
- 2. Add a video to the Ask the Vet page (askvet.html).
 - Copy the sparkycaptioned.mov video file from the student files in the Chapter11/CaseStudyStarters folder and save it to your fishcreekcss folder.
 - Launch Notepad and open the askvet.html file in the fishcreekcss folder. Modify the questions and answers on the askvet.html page to display a video along the right side of the page as shown in Figure 11.20. Use the <object> and <param /> elements to configure the video for display. See Section 11.5 as a guide. Use the attributes and values listed in Table 11.7 as you configure your page.

Save your page. Test your page using several browsers.

Attribute	Value
src	sparkycaptioned.mov
data	sparkycaptioned.mov
height	135
width	160
autoplay	false
controller	true
classid	clsid:02BF25D5-8C17-4B23-BC80-D3488ABDDC6B
codebase	http://www.apple.com/qtactivex/qtplugin.cab
type	video/quicktime

 Table 11.7
 Configuration requirements for sparky captioned .mov

- 3. Replace the logo image with a Flash animation on the Home page (index.html).
 - Copy the fishcreeklogo.swf file from the student files in the Chapter11/ CaseStudyStarters folder and save it to your fishcreekcss folder.
 - Launch Notepad and open the Home page (index.html) in the fishcreekcss folder. Modify index.html to display the Flash file (fishcreeklogo.swf) instead of the image (fishcreeklogo.gif). See Hands-On Practice 11.4 for help. Save your page. Test your page using several browsers. You should see the logo animate.
 - Modify the logo area on the rest of the Fish Creek Web pages to create a cohesive site with a consistent design. Save and test your pages.

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for the Pasha the Painter Web site. The pages were created in earlier chapters. Use the Chapter 9 paintercss folder. You have two tasks:

- **1.** Configure a hyperlink to an audio file on the Home page.
- 2. Modify the Home page to display a Flash slide show.

Hands-On Practice Case

- 1. Add a hyperlink to an audio file to the Home page (index.html).
 - Copy the pashapodcast.mp3 sound file from the student files in the Chapter11/CaseStudyStarters folder and save it to your paintercss folder.
 - Launch Notepad and open the Home page (index.html) in the paintercss folder. Modify index.html to display a hyperlink to the pashapodcast.mp3 file within a paragraph located in the rightcolumn content area above the footer. Use the following text for the hyperlink: Pasha Podcast (MP3). See Hands-On Practice 11.1 as a guide. Save your page. Test your page using several browsers. You should hear the podcast when you click on the link.
- **2.** Modify the Home page to display a Flash slideshow file called painter.swf. See Figure 11.21.
 - Copy the painter.swf file from the student files in the Chapter11 folder and save it to your paintercss folder. The Flash media is 213 pixels in width and 163 pixels in length.



Figure 11.21 Pasha the Painter

new Home page

• Launch Notepad and open the Home page (index.html) in the paintercss folder. Modify the content on index.html as follows:

Write the XHTML needed in the right column to display the Flash slideshow painter.swf file. See Hands-On Practice 11.4 as a guide. Assign the <object> tag to the floatright class.

Save your page and test it in a browser.

Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case Study. Figure 2.38 shows a site map for the Prime Properties Web site. The pages were created in earlier chapters. Use the Chapter 9 primecss folder. You have three tasks:

- **1.** Configure a hyperlink to an audio file on the Home page.
- 2. Modify the prime.css style sheet to configure the placement of the Flash swf.
- **3.** Modify the Home page to display a Flash slide show.

Hands-On Practice Case

- **1.** Add a hyperlink to an audio file to the Home page (index.html).
 - Copy the primepodcast.mp3 sound file from the student files in the Chapter11 folder and save it to your primecss folder.
 - Launch Notepad and open the Home page (index.html) in the primecss folder. Modify index.html so that a hyperlink to the audio file displays above the name and address area on the page (see Figure 11.22). See Hands-On Practice 11.1 as a guide.

Save your page and test it using several browsers. You should hear the sound when you click on the hyperlink.

- 2. Modify the prime.css file. Create a new class called floatright. Configure the floatright class to float to the right, have a 20 pixel left margin and a 60 pixel right margin.
- **3.** Modify the Home page to display a Flash slideshow file called prime.swf. See Figure 11.22.
 - Copy the prime.swf file from the student files in the Chapter11 folder and save it to your primecss folder. The Flash media is 213 pixels in width and 163 pixels in length.
 - Launch Notepad and open the Home page (index.html) in the primecss folder. Write the XHTML needed in the right column (above the unordered list) to display the Flash slideshow prime.swf file. See Hands-On Practice 11.4 as a guide. Assign the <object> tag to the floatright class.

Save your page and test in a browser.



Web Project

See Chapter 5 for an introduction to the Web Project Case. Review the goals of your Web site and determine if the use of media or interactivity would add value to your site. If so, you will add either media and/or interactivity to your project site. Check with your instructor for the required use of any specific media or technology that supports interactivity in your Web project.

Select one or more from the following:

- 1. Media: Choose one of the examples from the chapter, record your own audio or media file, or search the Web for royalty-free media.
- **2.** Flash: Choose one of the examples from the chapter, create your own.swf file, or search the Web for additional.swf files.
- **3.** Java applet: Choose one of the examples from the chapter, write your own if you have programming skills, or search the Web for free Java applets.
- Decide where to apply the media and/or interactive technology to your site. Modify, save the page(s), and test in various browsers.

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E-Commerce Overview

Chapter Objectives In this chapter, you will learn about ...

- E-commerce and the Web
- Benefits and risks of e-commerce
- E-commerce business models
- E-commerce security and encryption
- Electronic Data Interchange (EDI)

- Trends and projections for e-commerce
- Issues related to e-commerce
- Order and payment processing
- E-commerce solution options

E-commerce is the buying and selling of goods and

services on the Internet. Whether business-to-business, business-to-consumer, or consumer-to-consumer, Web sites that support e-commerce are everywhere. This chapter provides an overview of this topic.

12.1 What Is E-Commerce?

A formal definition of e-commerce is the integration of communications, data management, and security technologies, which allows individuals and organizations to exchange information related to the sale of goods and services. Major functions of e-commerce include the buying of goods, the selling of goods, and the performance of financial transactions on the Internet.

Advantages of E-Commerce

There are a number of advantages to both businesses and consumers when engaging in e-commerce. For businesses, the many advantages include the following:

- **Reduced Costs.** Online businesses can stay open 24 hours a day without the overhead of a brick-and-mortar facility. Many businesses establish a Web site before attempting e-commerce. When they add e-commerce functions to their Web site, the site becomes a source of revenue and, in many cases, pays for itself in short order.
- Increased Customer Satisfaction. Businesses can use their Web sites to improve communication with customers and increase customer satisfaction. E-commerce sites often contain an FAQ page. The availability of customer service representatives by e-mail, discussion forums, or even online chat (see http://liveperson.com) can improve customer relations.
- More Effective Data Management. Depending on the level of automation, e-commerce sites can perform credit card verification and authorization, update inventory levels, and interface with order fulfillment systems, thereby managing the organization's data more efficiently.
- **Potentially Higher Sales.** An e-commerce store that is open 24 hours a day, seven days a week and is available to everyone on the planet has the potential for higher sales than a traditional brick-and-mortar storefront.

Businesses aren't the only beneficiaries of e-commerce; consumers see some advantages as well, including the following:

- **Convenience.** Consumers can shop at any time of the day. There is no travel time to get to the store. Some consumers prefer Web site shopping over traditional catalog shopping because they can view additional images and join discussion forums about the products.
- **Easier Comparison Shopping.** There is no driving from store to store to check the price of an item. Customers can easily surf the Web and compare prices and value.
- Wider Selection of Goods. Since it is convenient to shop and compare, consumers have a wider selection of goods available for purchase.

As you can see, e-commerce provides a number of advantages for both businesses and consumers.

Risks of E-Commerce

There are risks involved in any business transaction, and e-commerce is no exception. Possible risk issues for businesses include the following:

- Loss of Sales if Technology Fails. If your Web site isn't available or your e-commerce form processing doesn't work, customers may not return to your site. It is always important to have a user-friendly, reliable Web site, but when you engage in e-commerce, reliability and ease of use are critical factors in the success of your business.
- **Fraudulent Transactions.** Fraudulent credit card purchases or crank orders placed by vandals (or thirteen-year-olds with time on their hands) are risks that businesses need to deal with.
- **Customer Reluctance.** Although more and more consumers are willing to purchase on the Web, the target market of your business may not be. However, by offering incentives such as free shipping or a "no questions asked" returns policy, your business may be able to attract these consumers.
- **Increased Competition.** Because the overhead for an e-commerce site can be much lower than that of a traditional brick-and-mortar store, a company operating out of a basement can be just as impressive as a long-standing organization if its Web site looks professional. Because it is much easier to enter the marketplace with an e-commerce store, your business will have increased competition.

Businesses are not alone in needing to deal with risks associated with e-commerce. Consumers may perceive the following risks:

- **Security Issues.** Later in this chapter you will learn how to determine whether a Web site has Secure Sockets Layer (SSL) for encryption and security of information. The general public may not know how to determine whether a Web site is using this encryption method and be wary of placing a credit card order. Another, possibly more important issue, is what the site does with information after it is transmitted over the Internet. Is the database secure? Are the database backups secure? These questions are difficult to answer. It's a good idea to purchase only from sites that you consider to be reputable.
- **Privacy Issues.** Many sites post privacy policy statements. These describe what the site will do (or will not do) with the information they receive. Some sites use the data for internal marketing purposes only. Other sites sell the data to outside companies. Web sites can and do change their privacy policies over time. Consumers may be leery of purchasing online because of the potential lack of privacy.
- **Purchasing Based on Photos and Descriptions.** There is nothing like holding and touching an item before you purchase it. Consumers run the risk of purchasing a product that they will not be happy with because they are making purchasing decisions based on photographs and written descriptions. If an e-commerce site has a generous return policy, consumers will feel more confident about purchasing.
- **Returns.** It is often more difficult to return an item to an e-commerce store than to a brick-and-mortar store. Consumers may not want to risk this inconvenience.

12.2 E-Commerce Business Models

Both businesses and consumers are riding the e-commerce wave. There are four common e-commerce business models: business-to-consumer, business-to-business, consumer-toconsumer, and business-to-government.

- **Business-to-Consumer (B2C).** Most of the business-to-consumer selling takes place in online stores. Some, like Amazon.com (http://amazon.com) are online only. Others are click-and-mortar—electronic storefronts for well-known brick-and-mortar stores such as Sears (http://sears.com).
- **Business-to-Business (B2B).** E-commerce between two businesses often takes the form of exchanging business supply chain information among vendors, partners, and business customers. Electronic Data Interchange (EDI) is also in this category.
- **Consumer-to-Consumer (G2C).** Individuals are selling to each other on the Internet. The most common format is that of the auction. The most well-known auction site is eBay (http://ebay.com), which was founded in 1995.
- **Business-to-Government (B2G).** Businesses are selling to the government on the Internet. There are very strict usability standards for businesses targeting governmental agencies. Section 508 of the Rehabilitation Act requires that electronic and information technology (including Web pages) used by federal agencies is accessible to people with disabilities. See http://www.section508.gov for more information.

Businesses began exchanging information electronically many years before the Web came into existence, using Electronic Data Interchange.

12.3 Electronic Data Interchange (EDI)

Electronic Data Interchange (EDI) is the transfer of data between companies over a network. This facilitates the exchange of standard business documents, including purchase orders and invoices. EDI is not new; it has been in existence since the 1960s. Organizations that exchange EDI transmissions are called trading partners.

The Accredited Standards Committee X12 (ASC X12) is chartered by the American National Standards Institute (ANSI) to develop and maintain EDI standards. These standards include transaction sets for common business forms, such as requisitions and invoices. This allows businesses to reduce paperwork and communicate electronically.

EDI messages are placed in transaction sets. A transaction set consists of a header, one or more data segments, which are strings of data elements separated by delimiters, and a trailer. Newer technologies such as XML and Web services are allowing trading partners virtually unlimited opportunities to customize their information exchange over the Internet.

Now that you are aware of possibilities of e-commerce and the types of business models, you may be wondering where the most money is being made. The next section discusses some statistics related to e-commerce.

12.4 E-Commerce Statistics

You may be surprised to discover that the most money is being made in B2B e-commerce businesses selling to other businesses. According to the U.S. Census Bureau, in 2007 business-to-business transactions accounted for 93% of e-commerce in the United States.

Up until the recent economic downturn, e-commerce demonstrated steady growth. The U.S. Census Bureau reported that online retail sales increased from \$24.1 billion in 2000 to \$128.1 billion in 2007. eMarketer (http://www.emarketer.com/Article.aspx? R=1007142) forecasts a decrease of B2C e-commerce sales in 2009 with a rebound expected when the economy improves (potentially 2010–2011).

You may be wondering what people are buying online. A report compiled by Jupiter Research (available at http://www.census.gov/compendia/statab/tables/09s1016.xls) indicated that the top four categories for retail online sales in 2007 (the most recent year with actual sales figures) were the following:

- 1. Computer hardware and software (\$24.1 billion)
- 2. Apparel, accessories, footwear, and jewelry (\$23.3 billion)
- 3. Home goods (\$18.8 billion)
- 4. Books, music, and videos (\$9.8 billion)

The chart in Figure 12.1 displays the online retail sales figures for these categories for the years 2001–2011 (projected).



Now that you know what is selling the best online, who are your potential online consumers? eMarketer predicted that in 2010, over 159 million Americans aged 14 and over will shop online. A survey by the PEW Internet & American Life Project (http://www.pewinternet.org/Static-Pages/Trend-Data/Whos-Online.aspx) indicated that while about the same percentage of men and women are online, Internet usage varies by age, income, and education. Table 12.1 shows an excerpt of this research.

Figure 12.1 E-commerce retail

sales categories

Category	Percentage Who Use the Internet
Men	78%
Women	76%
Age: 18–29	93%
Age: 30–49	83%
Age: 50–64	77%
Age: Over 65	43%
Household Income: Less than \$30,000	62%
Household Income: \$30,000 to \$49,999	84%
Household Income: \$50,000 to \$74,999	93%
Household Income: \$75,000 or higher	95%
Education: Did not graduate high school	37%
Education: High school graduate	72%
Education: Some college	87%
Education: College graduate	94%

Table 12.1 Online Population

12.5 E-Commerce Issues

Doing business on the Internet is not without its problems. The following are some common issues:

- Intellectual Property. There has been some recent controversy regarding intellectual property rights and domain names. Cybersquatting is the practice of registering a domain name that is a trademark of another entity in the hopes of profiting by selling the domain name to the entity. The Internet Corporation for Assigned Names and Numbers (ICANN) sponsors the Uniform Domain Name Dispute Policy at http://www.icann.org/udrp/udrp.htm, which can be used to combat cybersquatters.
- **Security.** Security is a constant issue on the Internet. Distributed denial of service (DDoS) attacks have shut down popular e-commerce sites. Some of these attacks are carried out by script kiddies (teenagers with technical knowledge and sometimes malicious intent) who literally have nothing better to do than cause havoc on the Web.
- Fraud. Fraudulent Web sites that ask for credit card numbers without any intent of delivering products or with fraudulent intent are an understandable source of concern for consumers.
- **Taxation.** State governments and local municipalities need sales taxes to fund education, public safety, health, and many other essential services. When an item is purchased at a retail store, the sales tax is collected from the purchaser by the seller at the time of sale and periodically remitted by the seller to the state in which the sale occurred.

When an item is purchased on the Internet, the seller usually does not collect and remit the sales tax. In this situation, many states require that consumers file a use tax and pay the amount that would have been collected. In reality, few consumers do this and few states attempt to enforce it. Our local governments are losing revenue to fund worthwhile programs. There have been some movements to require that sales tax is collected on all Internet purchases. At the time this was written, the moratorium on Internet sales tax was still in effect. However, state and local governments are losing sources of revenue as more consumers turn to online shopping. Look for the topic of Internet sales tax to continue to be controversial.

• International Commerce. Web sites that target a global audience have additional concerns. If a site will be offered in multiple languages there are options of automatic translation programs (http://www.systranlinks.com) and companies that provide customized Web site translation services (http://www.worldlingo.com). Be aware that the graphical user interface (GUI) that works with English may not work with other languages. For example, comparable words and phrases often take quite a few more letters in German than in English. If your GUI doesn't have enough white space in the English version of the site, how will it look in the German version?

How will your international customers pay you? If you accept credit cards, the credit card company will perform the currency conversion. What about the culture of your target international audience? Have you studied the target countries and made certain that your site is appealing and not offensive? Another issue related to international commerce is the cost of shipping and the availability of delivery to remote destinations.

Now that you are familiar with the concept of e-commerce, let's take a closer look at encryption methods and security. The next section introduces encryption methods, SSL, and digital certificates.

12.6 E-Commerce Security

Encryption

Encryption is used to ensure privacy within an organization and on the Internet. Encryption is the conversion of data into an unreadable form, called a ciphertext. Ciphertext cannot be easily understood by unauthorized individuals. Decryption is the process of converting the ciphertext into its original form, called plain text or clear text, so that it can be understood. The process of encryption and decryption requires an algorithm and a key.

Encryption is important on the Internet because information in a packet can be intercepted as it travels the communications media. If a hacker or business competitor intercepts an encrypted packet, he or she will not be able to use the information (such as a credit card number or business strategy) because it cannot be read.

A number of types of encryption are commonly used on the Internet, including symmetric-key encryption and asymmetric-key encryption.

Symmetric-Key Encryption. Symmetric-key encryption, shown in Figure 12.2, is also called single-key encryption because *both* the encryption and decryption use the same key. Since the key must be kept secret from others, both the sender and receiver must know the key before communicating using encryption. An advantage of symmetric-key encryption is speed.



Asymmetric-Key Encryption. Asymmetric-key encryption is also called public-key encryption because there is no shared secret. Instead, two keys are created at the same time. This key pair contains a public key and a private key. The public key and the private key are mathematically related in such a way that it is unlikely anyone would guess one of the pair even with knowledge of the other. Only the public key can decrypt a message encrypted with the private key and only the private key can decrypt a message encrypted with the public key (see Figure 12.3). The public key is available via a digital certificate (more on that later). The private key should be kept secure and secret. It is stored on the Web server (or other computer) of the key owner. Asymmetric-key encryption is much slower than symmetric-key encryption.



Figure 12.3 Asymmetric-key encryption uses a key pair

Figure 12.2 Symmetric-key

single key

Integrity

The encryption methods described above help to keep the contents of a message secret. However, e-commerce security is also concerned with making sure that messages have not been altered or damaged during transmission. A message is said to have integrity if it can be proven that is has not been altered. Hash functions provide a way to ensure the integrity of messages. A hash function, or hash algorithm, transforms a string of characters into a usually shorter fixed-length value or key, called a digest, which represents the original string.

These security methods—especially the techniques of symmetric-key and symmetric-key encryption-are used as part of SSL, the technology that helps to make commerce on the Internet secure. The next section introduces this technology.

Secure Sockets Layer (SSL)

Secure Sockets Layer (SSL) is a protocol that allows data to be privately exchanged over public networks. It was developed by Netscape and is used to encrypt data sent between a client (usually a Web browser) and a Web server. SSL utilizes both symmetric and asymmetric keys.

SSL provides secure communication between a client and server by using the following:

- Server and (optionally) client digital certificates for authentication
- Symmetric-key cryptography with a "session key" for bulk encryption
- Public-key cryptography for transfer of the session key
- Message digests (hash function) to verify the integrity of the transmission

You can tell that a Web site is using SSL by the protocol in the Web browser address text box—it shows https instead of http. Also, Internet Explorer and Netscape browsers display a lock icon when SSL is used, as shown in Figure 12.4.



FAQ

When some Web sites are displayed in a browser there is a color bar in the address area. What's up?

If a Web site displays a color bar in the address area of the browser in addition to the lock icons in the status bar, you know that it is using **Extended Validation SSL (EV SSL)**. EV SSL signifies that the business has undergone more rigorous background checks to obtain its digital certificate, including verification that:

- the applicant owns the domain
- the applicant works for the organization
- the application has authority to update the Web site
- the organization is a valid, recognized place of business

Digital Certificate

SSL enables two computers to communicate securely by posting a digital certificate for authentication. A **digital certificate** is a form of an asymmetric key that also contains information about the certificate, the holder of the certificate, and the issuer of the certificate. The contents of a digital certificate include the following:

- The public key
- Effective date of the certificate
- Expiration date of the certificate
- Details about the certificate authority-the issuer of the certificate
- Details about the certificate holder
- A digest of the certificate content

VeriSign (http://verisign.com) is a well-known certificate authority (CA). A recent version of its certificate is shown in Figure 12.5.



To obtain a certificate, you request a certificate from a certificate authority and pay the application fee. The certificate authority verifies your identity, issues your certificate, and supplies you with a public/private key pair. You store the certificate in your software—such as a Web server, Web browser, or e-mail application. The certificate authority makes your certificate publicly known.



Do I have to apply for a certificate?

If you are accepting any personal information on your Web site such as credit card numbers, you should be using SSL. One option is to visit a certificate authority (such as VeriSign or Thawte at http://www.thawte.com) and apply for your own certificate. There may be a waiting period and you will need to pay an annual fee.

As an alternative, your Web host provider may let you piggyback on its certificate. Normally, there is a setup and/or monthly fee for this service. Usually, the web host assigns you a folder on its secure server. You place the Web pages (and associated files such as images) that need to be securely processed in the folder. When linking to the Web pages you use "https" instead of "http" on your absolute links. Contact your Web host provider for details.

SSL and Digital Certificates

A number of steps are involved in the SSL authentication process. The Web browser and Web server go through initial handshaking steps, exchanging information about the server certificate and keys. Once trust is established, the Web browser encrypts the single secret key (symmetric key) that will be used for the rest of the communication. From this point on, all data is encrypted through the secret key. Table 12.2 shows this process.

At this point, you have a general idea of how SSL works to protect the integrity of information on the Internet, including the information exchanged in e-commerce transactions. The next section takes a closer look at order and payment processing in e-commerce.



Browser	\rightarrow	"hello"	\rightarrow	Server
Browser	\leftarrow	"hello" + server certificate	\leftarrow	Server
Browser	\leftarrow	The server's private key is used to encrypt a message. Only the public key can decrypt this message.	\leftarrow	Server

The browser now verifies the identity of the Web server. It obtains the certificate of certificate authority (CA) that signed the server's certificate. Then the browser decrypts the certificate digest using the CA's public key (held in a root CA certificate). Next, it takes a digest of the server's certificate. The browser compares the two digests and checks the expiration date of the certificate. If all is valid, the next step occurs.

Browser	\rightarrow	The browser generates a session key and encrypts with the server public key.	\rightarrow	Server
Browser	\leftarrow	The server sends a message encrypted with the session key.	\leftarrow	Server

All future transmissions between the browser and server are encrypted with the session key.



How do I find out about the most recent security issues?

The CERT Coordination Center at http://www.cert.org is a federally funded research and development center operated by Carnegie Mellon University. CERT is an acronym for Computer Emergency Response Team. One of its functions is to act as a clearinghouse of information related to security issues and incidents. CERT issues advisories that describe security problems and offers suggestions for preventing or correcting them.

Security issues are a real and growing problem. In 1989 CERT handled 132 incident reports. That number has grown each year. There were 21,756 incidents reported in 2000 and over 137,529 incidents reported in 2003, the final year that this statistic was released by CERT.

CHECKPOINT 12.1

- 1. Describe three advantages of e-commerce for an entrepreneur just starting a business.
- 2. Describe three risks that businesses face when engaging in e-commerce.
- 3. Define SSL. Describe how an online shopper can tell that an e-commerce site is using SSL.

12.7 Order and Payment Processing

In B2C e-commerce, the products for sale are displayed in an online catalog. On large sites, these catalog pages are dynamically created using server-side scripts to access databases. Each item usually has a button or image that invites visitors to "Buy Me" or "Add to Cart." Items selected are placed in a virtual shopping cart. When visitors are finished shopping, they click a button or image link indicating that they want to "Check Out" or "Place Order." At this point, the items in their shopping cart are usually displayed on a Web page with an order form.

Secure ordering is facilitated through the use of SSL. Once an order is placed, there are a number of methods to pay for the merchandise or service; the payment methods, called payment models, are cash, check, credit, and smart card.

Cash Model

The **cash model** is the most difficult to implement—how do you send cash through a computer? You don't. You use e-cash. You purchase digital money from a bank and deposit it in a digital wallet. The transfer of funds is immediate. Vendors who provide this service include InternetCashCard (http://www.internetcash.com) and ECash Direct (http://www.ecashdirect.net).

Check Model

In the **check model** the consumer writes a digital check to make the purchase. As with real-world checks, the availability of funds must be verified and the funds are not transferred immediately. One vendor that provides this service is PayByCheck (http://paybycheck.com).

Credit Model

Credit card payment processing is a very important component of an e-commerce Web site. Funds from the customer need to be transferred to the merchant's bank. In order to accept credit cards, the site owner must apply for a merchant account and be approved. A merchant account is an agreement between the business and the bank that allows you to take credit card orders. You may also need real-time credit card verification using a merchant gateway or third party such as Authorize.Net (http://www.authorizenet.com). A diagram of the credit model process is shown in Figure 12.6. Secure Electronic Transactions (SET) is a standard protocol that enables secure credit card transactions on the Internet. It provides security for credit card payments as they travel the Internet between merchant sites and processing banks. SET uses encryption and digital certificates.



While merchant accounts can be expensive, there are low-cost solutions such as PayPal (http://www.paypal.com). Originally intended for consumer-to-consumer credit card sales, PayPal now offers credit card and shopping cart services for business Web site owners.

Smart Card

The **smart card** model is widely used in Europe, Australia, and Japan. A smart card is similar to a credit card, but it has an integrated circuit instead of a magnetic strip embedded in it. The smart card is inserted into a smart card reader. Expect to see more smart card applications in the United States in the coming years.

You have probably shopped at online stores and found some easy to work with and others difficult. A large problem for e-commerce sites is abandoned shopping carts—visitors who begin to shop but never place an order. The next section explores types of storefront solutions and shopping carts.



What about micropayments?

The term **micropayment** describes a payment model in which small amounts of currency (sometimes called microcents) are easily exchanged over the Internet by merchants and consumers. To download content, consumers pay in small increments ranging from just under a dollar to tiny fractions of a penny. It is not feasible for sellers to use the credit card payment model for these tiny amounts due to transaction processing fees. So, various micropayment methods have been introduced. Companies such as Cybercoin, Millicent, and Digicash arrived with fanfare but soon faded away. Factors contributing to their failure included the unwillingness of consumers to pay for content.

12.8 E-Commerce Storefront Solutions

A number of different e-commerce storefront options are available to business owners and Web developers. They range from a simple instant online storefront supplied by another Web site, to building your own shopping cart system. This section examines some of the options.

Instant Online Storefront

You supply the products—the **instant online storefront** does the rest. There is no need to install software. All you do is use your Web browser to point and click your way to a virtual store. You use a template provided by the online storefront and choose features, configure settings, and add your products—upload images, descriptions, prices, and captions.

There are some disadvantages to this approach. You are limited by the templates offered by the online storefront provider. The number of products you can sell may also be limited. Your store may have a "look and feel" similar to the other instant stores hosted by the provider. However, this approach provides a low-overhead, low-risk approach for a small business owner with limited technical expertise. The storefront provider will often provide merchant account and payment automation.

Some instant storefront solutions are free with limited service or a limited number of products. Others are fee-based and may charge hosting fees, processing fees, and monthly fees. A few popular instant storefront solutions are Yahoo! (http://store.yahoo.com), Earthstores (http://earthstores.com), and Shopify (http://shopify.com). Figure 12.7 shows screenshots from a trial store on Yahoo!



Off-the-Shelf Shopping Cart Software

With this approach, software that provides a standardized set of e-commerce features is purchased, installed on your Web server, and customized. Many Web host providers offer this storefront software, which usually includes a shopping cart, order processing, and optional credit card payment processing. **Shopping cart software** provides an online catalog where your visitors can browse, add items to their virtual shopping cart, and check out through an order form when they are ready to purchase. Popular shopping carts offered by Web host providers are AgoraCart (http://agoracart.com), osCommerce (http://oscommerce.com), ZenCart (http://zencart.com), and Mercantec SoftCart (http://www.mercantec.com). Figure 12.8 shows a typical Web site shopping cart. It provides the options to place an order, continue shopping, or cancel an order.



Custom-Built Solution

Custom building a large-scale e-commerce Web site entirely from scratch usually requires expertise, time, and a sizable budget! The advantage is that you get exactly what you need. Software development tools for a custom-built site may include Adobe Dreamweaver, Microsoft Visual Studio.NET, Adobe ColdFusion, IBM's WebSphere Commerce Studio, a database management system (DBMS), and CGI or other serverside scripting. Custom-built solutions may also require a **commerce server**, which is a Web server enhanced with support for certain commerce activities. IBM's WebSphere Commerce Suite and Microsoft's Commerce Server are two choices.

Semi-Custom-Built Solutions on a Budget

If the scope of your e-commerce endeavor is small and you want to avoid the cookiecutter look of an instant storefront, some other options may be worth considering. These include getting pre-written shopping cart and order processing scripts, hiring a company such as PayPal, and buying e-commerce add-ons to popular Web authoring tools.



There are a number of free shopping cart scripts available on the Web. Search http://aspcode.net, http://php.resourceindex.com, or http://www.mals-e.com for some alternate solutions. The difficulty level and exact processing of these solutions vary. Each Web site has instructions and documentation about its product. Some may require you to register and provide you with specific XHTML code. Others may require you to download and install the scripts on your own Web server.

PayPal (http://paypal.com) offers shopping cart and payment verification for businesses at a very low cost. PayPal writes the code you need to place on your Web pages to interface with them. You only need to copy and paste it in.

A number of Adobe Dreamweaver add-ins, or extensions, provide shopping cart functionality. One easy solution is JustAddCommerce (http://www.richmediatech.com), which allows you to configure and add shopping cart and order buttons to your pages just as easily as you can add images and tables. Budget-wise solutions such as PayPal or JustAddCommerce work best for businesses that fit the standard business model and do not require special processing needs.



CHECKPOINT 12.2

- 1. List three payment models commonly used on the Web. Which one is the most popular? Why?
- 2. Have you purchased online? If so, think of the last item that you purchased. Why did you purchase it online instead of at a store? Did you check to see if the transaction was secure? Why or why not? How will your shopping habits be different in the future?
- 3. Describe three types of e-commerce solutions available. Which provides the easiest entry to e-commerce? Explain.



CHAPTER SUMMARY

This chapter introduced basic e-commerce concepts and implementations. Consider taking an e-commerce course to continue your study of this dynamic and growing area of Web development.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

asymmetric-key encryption Business-to-Business (B2B) Business-to-Consumer (B2C) Business-to-Government (B2G) cash model check model check model ciphertext clear text commerce server Consumer-to-Consumer (C2C) credit model cybersquatting

- decryption digest digital certificate e-commerce Electronic Data Interchange (EDI) encryption Extended Validation SSL (EV SSL) fraud hash functions instant online storefront integrity
- intellectual property international commerce micropayment Secure Electronic Transactions (SET) Secure Sockets Layer (SSL) security shopping cart software smart card symmetric-key encryption taxation

Review Questions

Multiple Choice

- **1.** Which of the following is a major function of e-commerce?
 - a. using SSL to encrypt orders
 - b. adding items to a shopping cart
 - c. buying and selling goods
 - d. none of the above
- **2.** For businesses, which is an advantage of using e-commerce?
 - a. reduced costs
 - b. potential for fraudulent transactions
 - c. using shopping carts
 - d. none of the above
- **3.** For businesses, which is a potential risk of using e-commerce?
 - a. increased customer satisfaction
 - b. the possibility of fraudulent transactions
 - c. inconvenience of returns
 - d. none of the above

- **4.** The most money is being generated in which type of e-commerce?
 - a. B2G
 - b. B2C
 - c. B2B
 - d. C2C
- **5.** Which of the following options best describes how a Web site owner can obtain a digital certificate?
 - a. digital certificates are automatically created when you register for a domain name
 - b. visit a certificate authority and apply for a digital certificate
 - c. digital certificates are automatically created when you are listed in a search engine
 - d. none of the above
- **6.** Which of the following issues are uniquely related to international e-commerce?
 - a. language and currency conversion
 - b. browser version and screen resolution
 - c. bandwidth and Internet service provider
 - d. none of the above
- 7. Which of the following is a standard protocol used to enable secure credit card transactions on the Internet?
 - a. SSL
 - b. SET
 - c. SSI
 - d. none of the above
- **8.** Which of the following is a disadvantage of an instant online storefront?
 - a. the store is based on a template and may look very similar to other online stores
 - b. the store can be ready in minutes
 - c. the store cannot accept credit cards
 - d. none of the above
- **9.** Which of the following include(s) an online catalog, a shopping cart, and a secure order form?
 - a. Web host providers
 - b. shopping cart software
 - c. Web server software
 - d. e-commerce hosting packages

- **10.** Which of the following is true?
 - a. a merchant account allows you to use SSL on your Web site
 - b. shopping cart add-ins or extensions are available for popular Web authoring tools such as Adobe Dreamweaver
 - c. instant storefronts are what most large-scale e-commerce sites use
 - d. none of the above

Fill in the Blank

- **11.** An encryption method that uses a single-shared, private key is ______.
- **12.** _____ can be described as the transfer of data between different companies using networks.
- A digital certificate is a form of a(n)
 <u>that also contains additional information about the entity holding the certificate.</u>
- 14. _____ is a protocol that allows data to be privately exchanged over public networks.

Short Answer

15. List one option for a Web site that needs to reach audiences that speak different languages.

Hands-On Exercise

- 1. In this Hands-On Exercise you will create an instant storefront. Choose one of the following Web sites that offer free trial online stores: http://www.earthstores.com, http://www.earthstore.com, http://www.earthstore.com, or http://www.easystorecreator.com. Web sites are constantly changing their policies, so these sites may no longer offer free trials when you do this assignment. If this is the case, check the textbook's Web site for updated information, ask your instructor for assistance, or search the Web for free online storefronts or trial stores. If you are certain you have found a Web site that offers a free trial store, continue with this exercise and create a store that meets the following criteria:
 - Name: Door County Images
 - Purpose: To sell fine quality prints of Door County scenery
 - Target Audience: Adults age 40+ who have visited Door County, are middle to upper class, and enjoy nature, boating, hiking, cycling, and fishing
 - Item 1: Print of Ellison Bay at Sunset, Size 11 inches by 14 inches, Price \$19.95
 - Item 2: Print of Ellison Bay in Summer, Size 11 inches by 14 inches, Price \$19.95

Figure 12.9 shows a page from a sample store using Earthstores instant storefront. Create a folder called doorcounty. The images shown in Figures 12.10, 12.11, 12.12, 12.13, and 12.14 can be found in the student files in the Chapter12 folder. Copy them into your doorcounty folder.



Figure 12.10

Door County Images logo (logo.jpg)

Figure 12.11 Ellison Bay in Summer thumbnail (summer_small.jpg)

Figure 12.12 Ellison Bay at Sunset thumbnail (sunset_small.jpg)

Figure 12.13 Ellison Bay in Summer (summer.jpg)

Door County Images



Figure 12.14 Ellison Bay at Sunset (sunset.jpg)



Once you are organized, visit the Web site you have chosen to host your free store. You will have to log in, choose options, and upload your images. Follow the instructions provided. Most free online store sites have an FAQ section or technical support to help you. After you have completed your store, print out the browser view of the home page and catalog page.

Web Research

- Just how popular is e-commerce? How many of your friends, family members, coworkers, and classmates purchase on the Web? Survey at least 20 people. Determine the following:
 - How many have purchased an item online?
 - How many have shopped but not purchased online?
 - How many purchase online once a year? Once a month? Once a week?
 - What is their age range (18 to 25, 26 to 39, 40 to 50, or over 50)?
 - What is their gender?
 - What is their level of education (high school, some college, college graduate, or graduate school)?
 - What is their favorite online shopping site?

Create a Web page that uses multiple tables that illustrate your findings. Also comment on the results and draw some conclusions. Search the Web for statistics that support your conclusions. Use http://pewinternet.org, http://www.ecominfocenter.com/ index.html, http://clickz.com, and http://www.ecommercetimes.com as starting points for your research. Place your name in an e-mail link on the Web page. Print the source code (from Notepad) and the browser view of your Web page.

2. This chapter provided a number of resources for e-commerce shopping cart and ordering systems. Use them as a starting point. Search the Web for additional resources. Find at least three shopping cart systems that you feel would be easy to use. Create a Web page that reports your findings. Organize your page with a table that lists the information along with the URLs of the Web sites you used as resources. Include information such as the product name, brief description, cost,

and Web server requirements (if any). Place your name in an e-mail link on the Web page. Print both the source code (from Notepad) and the browser view of your Web page.

Focus on Web Design

Visit the following sites as a starting point as you explore the Web design topic of shopping cart usability:

- http://www.surl.org/usabilitynews/42/shoppingcart.asp
- http://www.netmechanic.com/news/vol7/ecommerce_no6.htm
- http://www.4th-media.net/online_storefront/shopping_cart_usability.php
- http://www.webknowhow.net/dir/Other_Resources/articles/ 070625shoppingcarts5.html
- http://www.getelastic.com/add-to-cart-buttons

Write a one-page report that describes shopping cart usability issues that Web designers should be aware of. Cite the URLs of the resources you used.

WEB SITE CASE STUDY: Adding a Catalog Page for an Online Store

Each of the following case studies has continued throughout most of the text. This chapter adds a catalog page for an online store to the Web sites. This catalog page will connect to sample shopping cart and order pages on the textbook Web site at http://www.webdevfoundations.net.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House Case Study. Figure 2.26 shows the initial site map for the JavaJam Web site. The pages were created in earlier chapters. Use the Chapter 9 javajamcss folder.

As frequently happens with Web sites, the client, Julio Perez, is pleased with the response to the site and has an idea about a new use for it—selling JavaJam gear, such as T-shirts and coffee mugs. This new page, gear.html, will be part of the main navigation of the site. All pages should link to it. A revised site map is shown in Figure 12.15.



The Gear page should contain the description, image, and price of each product. It should link to a shopping cart system when the visitor wants to purchase an item. You may access a demonstration shopping cart/ordering system provided by the textbook's Web site. If you have access to a different shopping cart system, check with your instructor and ask if you can use it instead.

Figure 12.15 Revised JavaJam site map

Hands-On Practice Case

- 1. Copy the javamug.gif, javatshirt.gif, and viewtrans.gif image files from the Chapter12 folder in the student files and save them to disk in the javajamcss folder.
- 2. Launch Notepad and modify each existing Web page (index.html, jobs.html, music.html, menu.html) in the javajamess folder to link to the Gear page (gear.html) in the main navigation. See Figure 12.16 for an example.

Figure 12.16

Revised JavaJam text navigation

Figure 12.17

- Home Menu Music Gear
 - **3.** Configure CSS. Before you create the Gear page (gear.html) you will add a new style rule to your javajam.css external style sheet that configures a class named clearright. The clearright class will be used to clear a right float. The style rule follows:

```
.clearright {clear: right;}
```

4. Now you are ready to create the Gear page. Figure 12.17 shows a sample of the completed Gear page.



One way to be productive is to create pages based on your earlier work. Launch Notepad and open the Music page (music.html). Save the file as gear.html. This will give you a head start and ensure that the pages on the Web site are similar. Perform the following modifications:

- a. Change the page title to an appropriate phrase.
- b. Delete the contents of the <div> assigned to the rightcolumn id. You'll be adding code for the Gear page in this area.

- c. Notice that the View Cart image displays on the right side of the content area. Code an image element that displays the viewtrans.gif and is assigned to the floatright class. Code the text "JavaJam Gear" with an <h3> element.
- d. Configure the following image: javashirt.gif height="150" width="150". Configure appropriate alt text for the image. Assign the image to the floatright class.
- e. Configure the following text in a paragraph "JavaJam shirts are comfortable to wear to school and around town. 100% cotton. XL only. \$14.95".
- f. Configure a line break tag below the paragraph. Assign the line break tag to the clearright class.
- g. Configure the following image: javamug.gif height="150" width="150". Configure appropriate alt text for the image. Assign the image to the floatright class.
- h. Configure the following text in a paragraph "JavaJam mugs carry a full load of caffeine (12 oz.) to jump-start your morning. \$9.95".
- i. Next you will add a shopping cart button to each item for sale. This is placed in a form. The action on the form is the ASP script called http://www.webdevfoundations.net/scripts/cart.asp. Remember that whenever you use server-side scripts, there will be some documentation or specifications for you to follow. This script processes a limited shopping cart that works with two items only. The gear.html Web page will pass information to the script by using hidden fields in the form that contains the button to invoke the script. Please pay careful attention to detail when working on this.

To place the shopping cart button for the T-shirt, add the following code below the paragraph which describes the T-shirt and above the line break tag.

```
<form method="post"
action="http://www.webdevfoundations.net/scripts/cart.asp">
<input type="hidden" name="desc1" id="desc1"
value="JavaJam Shirt" />
<input type="hidden" name="cost1" id="cost1" value="14.95" />
<input type="submit" value="Add to Cart" />
</form>
```

This XHTML invokes a server-side script that processes a demonstration shopping cart. The hidden fields named desc1 and cost1 are sent to the script when the Submit button is clicked. These indicate the name and cost of the item.

The process for adding the shopping cart button for the mug is similar, using hidden form fields named desc2 and cost2. Add the following code below the paragraph that contains the description of the mug.

j. Earlier you placed the viewtrans.gif image on the page on the same line as the "JavaJam Gear" text. Visitors will click on this image to view the contents of the shopping cart. Recall that when you use server-side scripts sometimes there are special configuration needs. Add anchor tags around the image to indicate that it is a special link to the cart. The XHTML follows:

```
<a href="http://www.webdevfoundations.net/scripts/
cart.asp?view=yes">image tag goes here</a>
```

Save your page and test it in a browser. It should look similar to the one shown in Figure 12.17. Click the Add to Cart button for the JavaJam shirt. The demonstration shopping cart will display and your screen should look similar to the one shown in Figure 12.18.

Experiment with the cart and try to purchase both items. Simulate placing an order, as shown in Figure 12.19. The shopping cart and order pages are for demonstration purposes only.





How does the cart.asp server-side script work?

The cart.asp file is an ASP script. It is coded to accept a number of form fields and process them. It creates a Web page based on the values and fields that were passed to it. Table 12.3 shows the form fields and values used by the cart.asp file.

Script URL	http://www.webdevfoundations.net/scripts/cart.asp		
Processing	This script accepts product and price information, displays a shopping cart, and finally displays an order page.		
Limitation	This script can only handle two products.		
Input Elements	desc1	Contains the description of the first product. It is displayed on the shopping cart page.	
	cost1	Contains the per item cost of the first product. It is displayed on the shop- ping cart page.	
	desc2	Contains the description of the second product. It is displayed on the shopping cart page.	
	cost2	Contains the per item cost of the second product. It is displayed on the shopping cart page.	
	view	If the value is "yes," the shopping cart is displayed.	
Output	Shopping Cart Web page	Displays the shopping cart. The Web page visitor is given the option to continue shopping or to display the order page to place an order.	
	Order Web page	Displays an order form. The Web page visitor is given the option to place the order or to continue shopping.	
	Order Confirmation page	Displays a message to confirm that an order was placed. If this were an actual Web site, the order would also be saved on a server-side file or database.	

Table 12.3 Specifications for cart.asp

Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows the initial site map for the Fish Creek Web site. The pages were created in earlier chapters. Use the Chapter 9 fishcreekcss folder.

Often, once a Web site is created, your client will think of additional ways to use it. The owner of Fish Creek, Magda Patel, is pleased with the response to the site and has a new use for it—selling sweatshirts and totebags with the Fish Creek logo. She already has these materials for sale at her front desk in the animal hospital and her customers seem to like them. This new Shop page, shop.html, will be part of the main navigation of the site. All pages should link to it. A revised site map is shown in Figure 12.20.



The Shop page should contain the description, image, and price of each product. It should link to a shopping cart system when the visitor wants to purchase an item. You may access a demonstration shopping cart/ordering system provided by the textbook's Web site. If you have access to a different shopping cart system, check with your instructor and ask if you can use it instead.

Hands-On Practice Case

1. Copy the fishtote.gif, fishsweat.gif, view.jpg, and shop.gif image files from the Chapter12 folder in the student files and save them to your fishcreekcss folder.

2. Configure navigation area. Launch Notepad and modify each existing Web page (index.html, services.html, askvet.html, contact.html) in the fishcreekcss folder to link to the Shop page (shop.html) in the main navigation. Add the shop.gif to the side navigation bar, as shown in Figure 12.21, on each page. Configure the image to link to shop.html. Add a text link "Shop" to shop.html in the page footer navigation area.



3. Confiure CSS. Before you create the Shop page (shop.html) you will configure the CSS for the product area. Add a new style rule to your fishcreek.css external style sheet that configures a class named shop. The shop class will contain the description and "Add to Cart" form. Configure the shop class to be 200 pixels wide and to float to the left. The style rule follows:

#shop {width: 200px; float: left;}

4. Now you are ready to create the Shop page. Figure 12.22 shows a sample of the completed page.



One way to be productive is to create pages based on your earlier work. Launch Notepad and open the Home page (index.html). Save the file as shop.html. This will give you a head start and ensure that the pages on the Web site are similar. Perform the following modifications:

- a. Change the page title to an appropriate phrase.
- b. Delete the definition list and the address/phone information from the page.
- c. Create a div that is assigned to the shop class. The div will contain a description and a form which will process the "Add to Cart" button. You will configure the description in this step. Type the following descriptive text in a paragraph: "Carry your pet supplies and accessories in a special tote from Fish Creek. 100% cotton. \$14.95".
- d. Configure the following image below the div: fishtote.gif height="150" width="150". Configure an alt text description for the image.
- e. Create another div that is assigned to the shop class. The div will contain a description and a form which will process the "Add to Cart" button. You will configure the description in this step. Type the following descriptive text in a paragraph: "A Fish Creek sweatshirt will warm you up on cool morning walks with your pet. 100% cotton. Size XL. \$29.95".
- f. Configure the following image below the div: fishsweat.gif height="150" width="150". Configure an alt text description for the image.
- g. Next, we will add a shopping cart button to each item for sale. This shopping cart button is placed in a form after the paragraph in each shop div. The action on the form is the ASP script called http://www.webdevfoundations.net/scripts/cart.asp. Remember that whenever you use server-side scripts, there will be some documentation or specifications for you to follow. This script processes a limited shopping cart that works with two items only. The shop.html Web page will pass information to the script by using hidden fields in the form that contains the button to invoke the script. Please pay careful attention to detail when working on this.

To place the shopping cart button for the tote, add the following code below the paragraph with the tote's description and within the shop div:

<form method="post"

```
action="http://www.webdevfoundations.net/scripts/cart.asp">
    <input type="hidden" name="desc1" id="desc1"
    value="Fish Creek Tote" />
    <input type="hidden" name="cost1" id="cost1" value="14.95" />
    <input type="submit" value="Add to Cart" />
</form>
```

This XHTML invokes a server-side script that processes a demonstration shopping cart. The hidden fields named desc1 and cost1 are sent to the script when the Submit button is clicked. These indicate the name and cost of the item.

The process for adding the shopping cart button for the sweatshirt is similar, using hidden form fields named desc2 and cost2. The XHTML follows:

```
<form method="post"
action="http://www.webdevfoundations.net/scripts/cart.asp">
<input type="hidden" name="desc2" id="desc2"
value="Fish Creek Shirt" />
```

```
<input type="hidden" name="cost2" id="cost2" value="29.95" />
<input type="submit" value="Add to Cart" />
</form>
```

h. Configure a paragraph with the view.jpg below the sweatshirt graphic, as shown in Figure 12.22. The view.jpg image should have no border. Use an appropriate value for the alt attribute. Visitors will click on this image to view the contents of the shopping cart. Recall that when you use server-side scripts there are sometimes special configuration needs. Add anchor tags around the image to indicate that it is a special link to the cart. The XHTML follows:

```
<a href="http://www.webdevfoundations.net/scripts/
cart.asp?view=yes">image tag goes here</a>
```

Save your page and test it in a browser. It should look similar to the one shown in Figure 12.22. Click the Add to Cart button for the tote. The demonstration shopping cart will display and your screen should look similar to the one shown in Figure 12.18. Experiment with the cart and try to purchase both items. You can simulate placing an order, as shown in Figure 12.19. The shopping cart and order pages are for demonstration purposes only.

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for the Pasha the Painter Web site. The pages were created in earlier chapters. Use the Chapter 9 paintercss folder.

Pasha Poduslawa is the owner of Pasha the Painter. He has begun to write how-to books for his clients and would like to offer them for sale on the Web site. He would like a new Store page that will offer two of his books. This new Store page, store.html, will be part of the main navigation of the site. All pages should link to it. A revised site map is shown in Figure 12.23.



The Store page should contain the description, image, and price of each product. It should link to a shopping cart system when the visitor wants to purchase an item. You may access a demonstration shopping cart/ordering system available on the textbook's Web site. If you have access to a different shopping cart system, check with your instructor and ask if you can use it instead.

Store

Hands-On Practice Case

- 1. Copy the primer.jpg, decorate.jpg, and viewtrans.gif image files from the Chapter 12 folder in the student files and save them to your paintercss folder.
- 2. Launch Notepad and modify each existing Web page (index.html, services.html, testimonials.html, estimates.html) in the paintercss folder to link to the Store page (store.html) in the main navigation. See Figure 12.24 for a sample navigation.

Figure 12.24 Revised Pasha the Painter navigation

Home Services Testimonials Estimates Store

> 3. Configure CSS. Before you create the Store page (store.html) you will add two new style rules to your painter.css external style sheet. Configure a class named clearright which will be used to clear a right float. Configure a new style rule to add 30 pixels of padding to the bottom of each form:

The style rules follow:

```
.clearright { clear: right; }
form { padding-bottom: 30px; }
```

4. Now you are ready to create the Store page. Figure 12.25 shows a sample of the completed page.



One way to be productive is to create pages based on your earlier work. Launch Notepad and open the Testimonials page (testimonials.html). Save the file as store.html. This will give you a head start and ensure that the pages on the Web site are similar. Perform the following modifications:

- a. Change the page title to an appropriate phrase.
- b. Configure the viewtrans.gif image to display at the top of the rightcolumn id area. Assign the viewtrans.gif to the floatright class. Add a line break tag below the image. Assign the line break tag to the clearright class.
- c. Delete the <h2>, paragraphs, and images from the rightcolumn id area.
- d. Configure the primer.jpg image to belong to the floatright class.
- e. Code a div to contain the heading, description, and "Add to Cart" button.
- f. Configure an <h2> to display the following text: Painting Primer.
- g. Code a paragraph that will display the text description. "Are you a do-it-yourselfer? Have we got the painting tips for you! Ranging from how to choose the right color to quick clean-up routines. 206 pages. Softcover. \$19.95"
- h. Add the Add to Cart button. The visitor will click a button to indicate that they wish to purchase an item. This shopping cart button is placed in a form. For this exercise, the action on the form is the ASP script called http://www.webdevfoundations.net/scripts/cart.asp. Remember that whenever you use server-side scripts, there will be some documentation or specifications for you to follow. This script processes a limited shopping cart that only works with two items. The store.html Web page will pass information to the script by using hidden fields in the form that contains the button to invoke the script. Please pay careful attention to detail when working on this. To add the shopping cart button for the Painting Primer book below the description paragraph, write the following code:

```
<form method="post"
action="http://www.webdevfoundations.net/scripts/cart.asp">
<input type="hidden" name="descl" id="descl"
value="Painting Primer" />
<input type="hidden" name="costl" id="costl" value="19.95" />
<input type="submit" value="Add to Cart" />
</form>
```

This XHTML invokes a server-side script that processes a demonstration shopping cart. The hidden fields named desc1 and cost1 are sent to the script when the Submit button is clicked. These indicate the name and cost of the item.

- i. Code a div to contain the heading, description, and "Add to Cart" button.
- j. Configure an <h2> to display the text "You Can Decorate!"
- k. Code a paragraph that will display the text description. "Ever wonder how the professionals put it all together? This easy to follow guide lets you in on their secrets. Lots of example rooms and suggestions. 145 pages. Softcover. \$24.95"
- 1. Add the Add to Cart button by writing the following XHTML for the form with the shopping cart button:

```
<form method="post"
```

action="http://www.webdevfoundations.net/scripts/cart.asp">

```
<input type="hidden" name="desc2" id="desc2"
value="You Can Decorate!" />
<input type="hidden" name="cost2" id="cost2" value="19.95" />
<input type="submit" value="Add to Cart" />
</form>
```

This XHTML invokes a server-side script that processes a demonstration shopping cart. The hidden fields named desc2 and cost2 are sent to the script when the Submit button is clicked. These indicate the name and cost of the item.

m. Add a special hyperlink to the viewtrans.gif image in the logo area. This will link to the server-side script described above in a very special way. When a visitor clicks the image, the server-side script will display the contents of his or her shopping cart. Recall that when you work with server-side scripts, they often have special configuration needs. Place anchor tags around the image tag to create the special hyperlink as follows:

```
<a href="http://www.webdevfoundations.net/scripts/
cart.asp?view=yes">image tag goes here</a>
```

Save your page and test it in a browser. It should look similar to the one shown in Figure 12.25. Click the Add to Cart button for the Painting Primer. The demonstration shopping cart will display and your screen should look similar to the one shown in Figure 12.18. Experiment with the cart and try to purchase both items. You can go ahead and simulate placing an order, as shown in Figure 12.19. The shopping cart and order pages are for demonstration purposes only.

Prime Properties

See Chapter 2 for an introduction to the Prime Properties case. Figure 2.38 shows a site map for the Prime Properties Web site. The pages were created in earlier chapters. Use the Chapter 9 primecss folder.

The owner, Maria Valdez, would like to showcase the company's services and provide an easy way for clients to choose their thank you gift. She would like a Services page that will briefly describe the services and offer a form for clients to select their gifts. The new Services page, services.html, will be part of the main navigation of the site. All pages should link to it. A revised site map is shown in Figure 12.26.



The Services page will contain the sub-heading Services, two short paragraphs of text about services, and the description and photograph of each gift selection. You may access a demonstration shopping cart/ordering system provided by the textbook's Web site. If you have access to a different shopping cart system, check with your instructor and ask if you can use it instead.

Hands-On Practice Case

- 1. Copy the sunnydays.jpg, jeweltone.jpg, and viewtrans.gif image files from the Chapter12 folder in the student files and save them to your primecss folder.
- 2. Launch Notepad and modify each existing Web page (index.html, listings.html, financing.html, and contact.html) in the primecss folder to link to the Services page (services.html) in the main navigation and footer navigation, as shown in Figure 12.27.



3. Configure CSS. Before you create the Services page (services.html) you will configure a new style rule to your prime.css external style sheet. Configure a class named floatright which will be used to float the images of the gifts to the right.

The style rule follows:

```
.floatright {float: right;}
```

4. Now you are ready to create the Services page. Figure 12.28 shows the completed page.

One way to be productive is to create pages based on your earlier work. Launch Notepad and open the Financing page (financing.html). Save the file as services.html. This will give you a head start and ensure that the pages on the Web site are similar. Perform the following modifications:

- a. Change the page title to an appropriate phrase.
- b. Modify the links on the page as appropriate.
- c. Configure the viewtrans.gif image to display at the top of rightcolumn id area. Assign the viewtrans.gif to the floatright class.
- d. Change the Financing heading to Services.
- e. Delete the other text on the page related to financing.
- f. Place your cursor on the line after the Services heading. Create a paragraph with the following text:

"Prime Properties values our clients and provides the professional service that you expect including a competitive market analysis, Web and newspaper marketing, and financing assistance."

- g. Next, add another paragraph of text: "When your purchase or sale closes we would like to present you with a thank you gift from the choices below."
- h. Configure an <h3> to display the text: Sunny Days Basket.
- i. Configure the sunnydays.jpg image.



- j. Configure an <h3> to display the text: Jewel-tone Basket.
- k. Configure the jeweltone.jpg.
- 1. Next, we will add a shopping cart button to each gift item for selection. The action on the form is the ASP script called http://webdevfoundations.net/scripts/cart1.asp. Remember that whenever you use server-side scripts, there will be some documentation or specifications for you to follow. This script processes a limited shopping cart that only works with two items. Since it is designed to function as a gift selector, no prices are displayed. The services.html Web page will pass information to the script by using a hidden field in the form that contains the button to invoke the script. Please pay careful attention to detail when working on this.

To place the shopping cart button for the Sunny Days Basket, add the following code below the image tag for the sunnydays.jpg graphic:

<form method="post"

```
action="http://www.webdevfoundations.net/scripts/cart1.asp">
    <input type="hidden" name="desc1" id="desc1"
    value="Sunny Days Basket" />
    <input type="submit" value="Place in Cart" />
</form>
```

501

This XHTML invokes a server-side script that processes a demonstration shopping cart. The hidden field named desc1 and its value are sent to the script when the Submit button is clicked. This passes the name of the item chosen to the server-side script.

The process for adding the shopping cart button for the Jewel-tone Basket is similar, using the hidden form field desc2. The XHTML follows:

```
<form method="post"
```

```
action="http://www.webdevfoundations.net/scripts/cart1.asp">
    <input type="hidden" name="desc2" id="desc2"
    value="Jewel-tone Basket" />
    <input type="submit" value="Place in Cart" />
</form>
```

m. The viewtrans.gif is an image that visitors click on to show the shopping cart. Add anchor tags around the image to indicate that it is a special link to the cart. The XHTML follows:

```
<a href="http://www.webdevfoundations.net/scripts/
cart1.asp?view=yes">image tag goes here</a>
```

Save your page and test it in a browser. It should look similar to the one shown in Figure 12.28. Click the Place in Cart button for the Sunny Days Basket. The demonstration shopping cart will display and your screen should be similar to the one pictured in Figure 12.18 (except that no price information will display). Experiment with the cart and try to select both items. You can simulate selecting gifts. The shopping cart and order pages are for demonstration purposes only.

Web Project

See Chapter 5 for an introduction to the Web Project. Review the goals of your Web site and determine if they include an e-commerce component. If so, you will add this component to your Web project.

Hands-On Practice Case

Revise the Site Map as needed to include the e-commerce component. Perhaps you will add a products page to your site. Perhaps the products page already exists and you are just adding functionality to the page. In either case, make sure the Site Map and Content Sheets reflect the new processing.

There are a number of free or low-cost shopping cart providers on the Web. Some are provided in the following list. Your instructor may have additional resources or suggestions. Choose one of the providers from the list to add a shopping cart to your Web site. When you subscribe or sign up for these services, be sure to note any potential costs.

- Mal's E-Commerce (free and low-cost service): http://mals-e.com
- PayPal (there is a cost per transaction for this service): http://paypal.com
- JustAddCommerce (free trial): http://www.richmediatech.com

Save and test your page. Experiment with the shopping cart. Welcome to the world of e-commerce!

Web Promotion

Chapter Objectives In this chapter, you will learn how to ...

- Identify commonly used search engines and search indexes
- Describe the components of a search engine
- Design Web pages that are friendly to search engines
- Submit a Web site for inclusion in a search engine or search directory

CHAPTER

- Monitor a search engine listing
- Describe other Web site promotion activities
- Create an inline frame

You've built it—now what can you do to attract visitors

to your Web site? Once you have visitors, how do you encourage them to return? Getting listed on search engines, site affiliations, and banner ads are some of the topics that are discussed in this chapter.

13.1 Search Engine Overview

What do you do when you need to find a Web site? Most people launch their favorite search engine. A Nielsen/NetRatings survey found that nine out of ten Web users visit a search engine, portal, or community site every month. These Web users also revisit the sites frequently, almost five times per month.

Using a **Search engine** is a popular way to navigate the Web and find Web sites. The PEW Internet Project (http://www.pewinternet.org/Reports/2008/Search-Engine-Use.aspx?r=1), reports "almost half of all internet users now use search engines on a typical day." A DM News report (http://dmnews.com/cms/dm-news/search-marketing/37367.html) on a Harris Interactive study states that 80 percent of Internet traffic begins at a search engine.

Appearance in a search engine lends an aura of legitimacy to a Web site. A study by NPD Group (http://www.justwebpromotion.com/top_ranking_search_engines.html) showed that consumers are five times more likely to purchase goods or services as a result of finding a site through a search engine listing than through a banner ad.

A search engine listing helps customers find your site and increases the chances that they will make a purchase. Search engine listings can be an excellent marketing tool for your business. To harness the power of search engines and search indexes (sometimes called search directories), it helps to know how they work.

13.2 Popular Search Engines

According to a survey by Nielsen/NetRatings (http://www.nielsennetratings.com/pr/ pr_090616.pdf), Google (http://google.com), and Yahoo! (http://yahoo.com) were the two most popular sites used to search the Web during a recent month. Of those surveyed, 64.6 percent used Google and 16 percent used Yahoo! during this time. Other major search engines include MSN/Bing, AOL, and Ask.com. Figure 13.1 contains a chart of the top five search sites reported in this survey. Check nielsennetratings.com for the most recent survey results.



Google's popularity has continued to grow since it began in the late 1990s. The simple and whimsical interface combined with quick-loading and useful results have made it a favorite of Web users. The second most popular search engine is Yahoo!. Although Yahoo! is now a search engine, it originally was a **search index** (also called a **search directory**). Each site that is submitted for inclusion in a search directory is reviewed



Over 60% of the searches done in a recent month used Google

by a person. An example of a current search index is the Open Directory Project at http://www.dmoz.org. It contains a hierarchy of topics and sites related to each topic. In this project anyone can volunteer to be an editor and site reviewer. There is no cost to submit your site to the Open Directory Project. An added benefit to being listed in the Open Directory Project is that the database containing the approved sites is used by a number of search engines, including Google, Ask.com, and AOL.

13.3 Components of a Search Engine

Search engines have the following components:

- Robot
- Database (also used by search directories)
- Search form (also used by search directories)

Robot

A **robot** (sometimes called a spider or bot) is a program that automatically traverses the hypertext structure of the Web by retrieving a Web page document and following the hyperlinks on the page. It moves like a robot spider on the Web, accessing and documenting Web pages. The robot categorizes the pages and stores information about the Web site and the Web pages in a database. Various robots may work differently, but in general, they access and may store the following sections of Web pages: title, meta tag keywords, meta tag descriptions, and some of the text on the page (usually either the first few sentences or the text contained in heading tags). Visit The Web Robots Pages at http://www.robotstxt.org if you'd like more details about Web robots.

Database

A database is a collection of information organized so that its contents can easily be accessed, managed, and updated. Database management systems (DBMSs) such as Oracle, Microsoft SQL Server, or IBM DB2 are used to configure and manage the database. The Web page that displays the results of your search has information from the database accessed by the search engine site. According to http://www.bruceclay.com/ searchenginerelationshipchart.htm, some search engines receive portions of their content from other search engines. For example, AOL Search receives its primary content from Google.

Search Form

The search form is the component of a search engine that you are most familiar with. You have probably used a search engine many times but haven't thought about what goes on "under the hood." The search form is the graphical user interface that allows a user to type in a word or phrase to search for. It is usually simply a text box and a submit button. The visitor to the search engine types words (called keywords) related to his or her search into the text box. When the form is submitted, the data typed into the text box is sent to a server-side script that searches the database using the keywords entered. The search results (also called a result set) is a list of information, such as the URLs for Web pages, that meet your criteria. This result set is formatted with a link to each page along with additional information that might include the page title, a brief description, the first few lines of text, or the size of the page. The type of additional information varies by search engine. Next, the Web server at the search engine site sends the search engine results page (SERP) to your browser for display.

The order in which the pages are displayed may depend on paid advertisements, alphabetical order, and link popularity (more on this later). Each search engine has its own policy for ordering the search results. Be aware that these policies can change over time.

The components of a search engine (robot, database, and search form) work together to obtain information about Web pages, store information about Web pages, and provide a graphical user interface to facilitate searching for and displaying a list of Web pages relevant to given keywords. Now that you are aware of the components of search engines, let's get to the most important part—how to design your pages to promote your Web site.

13.4 Designing Your Pages for Promotion

If you have followed recommended Web design practices you've already designed your Web site so that the pages are appealing and compelling to your target audience. How can you also make your site work with search engines? This section provides some suggestions and hints on designing your pages for search engines—a process called **Search Engine Optimization (SEO)**.

Keywords

Spend some time brainstorming about terms and phrases that people may use when searching for your site. These terms or phrases that describe your Web site or business are your **keywords**. Create a list of them and don't forget to add common misspellings of your keywords to the list.

Page Titles

A descriptive page title (the text between the <title> tags) which includes your company and/or Web site name will help your site market itself. It's common for search engines to display the text in the page title in the SERP. The page title is also saved by default when a visitor bookmarks your site and is often included when a visitor prints a page of your site. Avoid using the exact same title for every page; include keywords in the page title that are appropriate for the page. For example, instead of just "Trillium Media Design," configure the page title to include both the company name and the purpose of the page: "Trillium Media Design: Custom E-Commerce Solutions."

Heading Tags

Use structural tags such as <h1>, <h2>, etc., to organize your page content. If it is appropriate for the Web page content, also include some keywords in the text contained within heading tags. Some search engines will give a higher list position if keywords are included in a page title or headings. Also include keywords as appropriate within the page text content. However, avoid spamming keywords—that is, do not list them over and over again. The programs behind search engines become more sophisticated all the time, and you can actually be prevented from being listed if it is perceived that you are not being honest or are trying to cheat the system.

Description

What is special about your Web site that would make someone want to visit? With this in mind, write a few sentences about your Web site or business. This **description** should be inviting and interesting so that a person searching the Web will choose your site from the list provided by a search engine or search directory. Some search engines will display your description in their search engine results.

At this point you have created a description of your site and a list of appropriate keywords. You might be wondering how these apply to the actual Web pages. The keywords and description are placed on a Web page by adding XHTML meta tags to the page header area.

Meta Tags

Meta tags are self-contained tags that are placed in the header section of a Web page. They should follow the <title> tag. You've been using a meta tag to indicate character encoding. There are a number of other uses for meta tags. We concentrate here on their use to provide a description of the site and list of keywords for use by search engines.

The syntax of meta tags is as follows:

```
<meta name="value" content="value" />
```



What if I do not want a search engine to index a page?

Sometimes there will be pages that you do not want indexed, perhaps test pages or pages only meant for a small group of individuals (such as family or coworkers). Meta tags can be used for this purpose also. To indicate to a search engine robot that a page should not be indexed and the links should not be followed, do not place keywords and description meta tags in the page. Instead, add a "robots" meta tag to the page as follows:

```
<meta name="robots" content="noindex,nofollow" />
```

The **name** attribute indicates the use of the meta tag. The **content** attribute indicates values needed for that specific use. The **keywords** value for the **name** attribute indicates that the use of the meta tag is to list keywords. The **description** value for the **name** attribute indicates that the use of the meta tag is to provide a description. For example, the keywords and description meta tags for a Web site about a Web development consulting firm called Acme Design could be configured as follows:

<meta name="keywords" content="Acme Design web development e-commerce ecommerce consulting consultation maintenance redesign Akme" />

<meta name="description" content="Acme Design, a premier web consulting group that specializes in e-commerce, web site design, web site development, and web site redesign." />

Trends are continually changing in the field of SEO. Although it's still acceptable to use the keywords meta tag, be aware that it is not currently accessed as much by search engines as it was in the past. However, the content of the description meta tag is still utilized by many search engines—it is often displayed on the SERP by some search engines, such as Google.

Linking

Verify that all hyperlinks are working and not broken. Each page on your Web site should be reachable by a text hyperlink. The text should be descriptive—avoid phrases like "more info" and "click here"—and should include keywords as appropriate. Inbound links (sometimes called incoming links) are also a factor in SEO; see the link popularity section later in the chapter.

Page Layout

Avoid using complex or nested tables for page layout. Instead, utilize CSS for page layout; the result will be more streamlined XHTML code. Text navigation is not only more accessible for your human Web site visitors, it is also easier for search engine robots to follow.

Images and Multimedia

Be mindful that search engine robots do not "see" the text embedded within your images and multimedia. Configure meaningful alternate text for images. Include relevant keywords in the alternate text. Although some search engine robots, such as Google's Googlebot, have recently added functionality to index text and hyperlinks contained within Flash media, be aware that a Web site that depends on the use of technologies such as Flash and Silverlight will be less visible to search engines and may rank lower as a result.

Valid Code

Search engines do not require that your XHTML and CSS code pass validation tests. However, code that is valid and well structured is likely to be more easily processed by search engine robots. This may help with your placement in the search engine results.

Content of Value

Probably the most basic, but often overlooked, component of SEO is providing content of value contained within a Web site that follows Web design best practices (see Chapter 5). Your Web site should contain high-quality, well-organized content that is of value to your visitors.

13.5 Listing in a Search Engine and Search Index

According to a study by The Direct Marketing Association (http://www.the-dma.org), 66 percent of Web marketers surveyed rated search engines as the top method used to drive traffic to their sites. While very effective, it is not always easy to get listed in a search engine or search directory. Table 13.1 shows the steps involved in submitting your site to a search engine or search directory.

Table 13.1 Submission to a search engine or search directory

	Search Directory (Such as the Open Directory
Search Engine (Such as Google)	Project)
Step 1: Visit the search engine site (http://google.com) and look for the "Add site" or "List URL" link. This is usually on the home page (or about us page) of the search engine. Be patient—these links are sometimes not obvious. At Google, click the "About Google" link, click on the "Submit your content to Google" link, and then click on the "Add Your URL" link.	Step 1: Visit the search directory (http://dmoz.org) and follow the hierarchical listings until the page that is most suited for your site appears. Take time to choose the most appropriate category. Look for the "suggest URL" link on the page.
Step 2: Follow the directions listed on the page and submit the form to request that your site is added to the search engine. At other search engines there may be a fee for an automatic listing, called paid inclusion—more on this later. Currently, there is no fee to submit a site to Google.	Step 2: Follow the directions listed on the page and submit the form to request that your site be reviewed for inclusion in the directory. This does not guarantee inclusion.
Step 3: The spider from the search engine will index your site. This may take several weeks.	Step 3: An editor (a real person) will visit your site. This may take several weeks. Search directories such as the Open Directory (http://dmoz.org) review the content of the site—only sites with worthwhile content are included.

Step 4: Several weeks after you submit your Web site, check the search engine or search directory to see if your site is listed. If it is not listed, review your pages and check whether they are "friendly" to search engines and display in common browsers.

If the Web site is for a business you may want to consider paying for listing consideration in a search engine or directory (often referred to as an express submit or express inclusion), paying for preferential placement in search engine displays (called sponsoring or advertising), and paying each time a visitor clicks the search engine's link to your site. Many businesses regard payment for these types of services as another marketing expense, such as paying for a newspaper ad or a listing in the Yellow Pages.

Preferential Placement

Another trend for search engines and some search directories is to require payment for preferential placement. Each search engine has its own term for this feature. Yahoo! calls it Sponsor Results. Google uses the term AdWords. In these programs, payment is made when the site is submitted for review. If accepted, the site has a listing usually at the top or right margin of the search engine results. The Web site owners must pay each time a visitor clicks on the search engine link to their site—this is called a cost-per-click (CPC) fee.

Yahoo!'s Sponsored Search matches are powered by Yahoo! Search Marketing. See http://searchmarketing.yahoo.com for more information on this Web site promotion technique. Figure 13.2 shows a Yahoo! search page with Sponsor Results.

Figure 13.2

Yahoo! display with Sponsor Results highlighted. Reproduced with permission of Yahoo! Inc. ©2006 Yahoo! Inc. Yahoo! and the Yahoo! logo are trademarks of Yahoo! Inc.

(ahoo) My Yahoo) Mail Welcome, tfelke [Sign Out, My Account)	Search Home Help
Web Images Sponsored Search Results	Vahoo! Search Advanced Preferences or county lodging More
ategories: - Wisconsin > Door California > Alameda County > Door and Indow Construction • Mote • California > County > Door and Window Construction • Mote • County > Door and Window Construction • Mote • County > Door and Window Construction • Classic Inns and Resorts. Door County Wi the Classic Inns and Resorts of Door County offer family owned and managed establishments located in Fish Creek, Sturgeon Bay, Egg Harbor, Baileys Harbor, Ephraim, and Sister Bay. www.classicinnsandresorts.com County offer family owned on the context of the phrase factor of th	Stay in Beautiful Door County. Wi Visit the Ashbrocke, a Door County hotel destination. Located in Egg Harbor, we offer www.ashbrooke.net Door County B&B - High Point Inn High Point Inn, a Door County
picturesque Door County is on the National Register of Historic Places. We feature stunning water and sunset views as well as wonderful breakfasts. www.visitechraim.com	Wisconsin bed and breakfast, located in the town of www.highpointinn.com
<u>AppleCreek Resort</u> -Door County <u>Wisconsin</u> [®] A Door County all-season resort in Fish Creek, Wisconsin featuring an indoor pool, whirlpool, sun deck, whirlpool suites and more. Located 1 1/2 blocks from Peninsula State Park. www.applecreekresort.com	The Scofield House B&B - Door County. WI The Scofield House, an elegant high victorian bed and breakfast, providing Iodging
Door County B&B on the Shore P Fireside whirlpools, water views, balconies,	www.scofieldhouse.com
Analysis and beak as a complete privacy, bed and break as charm, bikes, kayaks. Romance in the heart of Door County, Wisconsin. www.theblacksmithinn.com	Eagle Harbor Inn. Door County.
	Gracious Door County Inn and suites for

Web sites that have paid for Google's AdWords program have preferential placement on the right-hand side of the search results, as shown in Figure 13.3. Expect to see search engines and search directories change their preferential placement programs over time.



Google Search: door county - Microsoft Internet Explorer provided by Come	cast High-Speed Internet
File Edit View Favorites Tools Help	At I
Address Addres	🛩 🛃 Go
Google Web Images Groups News Froogle more and Google's AdWords Program	dvanced Search references unty [definition]. (0.11 seconds)
Door County Advocate located in historic Sturgeon Bay, providing news, sports, vacation, tourist, lodging, dining and real estate information, on the Door County peninsula www.doorcountyadvocate.com/ - 21k - Jun 22, 2004 - <u>Cached</u> - <u>Similar pages</u> Door County Wisconsin Chamber of Commerce Vacation Travel <u>Guide</u> Summer Fun in Door County Summer fun framed Midwest. Photo Gallery Photo Gallery. Door County Golf. A Golfer's Vacation Dream. Door County www.doorcounty.com/ - 10k - <u>Cached</u> - <u>Similar pages</u> <u>Door County, Wisconsin - !Online Door County!</u> Door County, Wisconsin - !Online Door County! Door County, Wisconsin - 10nline Door County Advocate www.doorcounty-wi.com/ - 18k - <u>Cached</u> - <u>Similar pages</u>	Sponsored Links Door County, WI B&B Inn Gracious hosts, charming rooms and delicious homemade "full" breakfast www.villagegreenlodge.com Door County Navigator Reviews of Inns, Restaurants, Shops Door Deals Discount Book online! www.DoorCounty/Navigator.com Homestead Suites Located in beautiful Door County at entrance to Peninsula State Park. www.homesteadsuites.com Constituteers's Laice Home
	🔮 Internet

If you explore the paid advertising programs that search engines offer, you'll encounter a number of acronyms related to marketing. The most common are listed below:

• CPC: Cost Per Click

CPC (also referred to as PPC, Pay Per Click) is the price you are charged if you have signed up for a paid sponsor or ad program and a visitor clicks on a link to your Web site.

• CPM: Cost Per Impression

CPM is your cost for every 1,000 times that your ad is displayed on a Web page (whether or not the visitor clicks on your ad).

• CTR: Click Through Rate

CTR is the ratio of the number of times an ad is clicked on to the number of times an ad is viewed. For example, if your ad was shown 100 times and 20 people clicked on it, your CTR would be 20/100, or 20%.

Map Your Site

Google's Webmaster guidelines describe two types of site maps that are useful for SEO:

- An XHTML site map is a Web page with a "map of the site" that contains a hierarchical list of hyperlinks to the major pages in your Web site (see Figure 5.19). The information on the site map page is not only helpful for your Web site visitors, but also may assist search engine robots as they follow hyperlinks on your site.
- An XML Sitemap is an XML file that is used by search engines but is not accessed by your Web page visitors. A Sitemap provides information to a search engine, such as Google, about your Web site and is essentially a list of pages along with the following information: date each page was last modified, an indicator of how frequently each page changes, and a priority level for each page. An excerpt from a Sitemap file (sitemap.xml) is shown below:

```
<url>
 <loc>http://webdevfoundations.net/</loc>
 <lastmod>2009-11-03T08:10:09+00:00</lastmod>
 <changefreg>monthly</changefreg>
 <priority>1.00</priority>
</url>
<url>
 <loc>http://webdevfoundations.net/index.html</loc>
 <lastmod>2009-11-03T08:10:09+00:00</lastmod>
 <changefreq>monthly</changefreq>
  <priority>1.00</priority>
</url>
<url>
  <loc>http://webdevfoundations.net/4e/chapter1.html</loc>
 <lastmod>2009-07-22T15:09:07+00:00</lastmod>
 <changefreg>monthly</changefreg>
  <priority>0.800</priority>
</url>
```

Online Sitemap generators such as http://xml-sitemaps.com will automatically create a Sitemap file, named sitemap.xml, for you. You will need to upload the Sitemap to your Web site and notify Google of its URL. See http://google.com/support/webmasters for more information about Sitemaps.

Alliances

There are a number of alliances between certain search engines and search directories. The Open Directory Project (http://www.dmoz.org) provides directory services for a number of search engines, including Google. Note that these alliances can change over time. Awareness of search engine alliances will help you maximize the chances of your Web site turning up when a search is performed.



Is advertising on a search engine worth the cost?

It depends. How much is it worth to your client to be number one out of 713,000 matches? While costs and charges vary by search engine, at this time Google charges are based on cost per click. You select the keywords that will trigger the display of your ad. You also set your monthly budget and the maximum amount to pay for each click. You are charged each time a visitor to Google clicks on your ad.



CHECKPOINT 13.1

- 1. Describe the difference between a search engine and a search directory. Provide an example of each.
- 2. Describe the three components of a search engine.
- 3. Is it beneficial for a business to pay for preferential listing? Explain.

13.6 Monitoring Search Listings

Although you may want your Web site to appear instantaneously in search engines and search directories, some patience may be needed before your site appears in the SERPs. According to searchengineposition.com, it can take two days to two weeks for a Web site to be listed on Google. Also, be mindful that there is no guarantee when you submit your site that it will be listed—however, it is rare that a quality Web site with content of value is not indexed and included in search engine and search directory listings.

As your sites get listed, it becomes important to determine which keywords are working. Usually you need to fine-tune and modify your keywords over time. Here are a few methods to determine which keywords are working:

• Manual Checking. Visit search engines and type in the keywords. Assess the results. You might consider keeping a record of the search engine, keyword, and page ranking.

• Web Analytics. The Web Analytics Association defines Web analytics as "the measurement, collection, analysis and reporting of Internet data for the purposes of understanding and optimizing Web usage". Every visitor to your Web site, including those who were referred by search engines, is recorded in your Web site log files. A Web site log consists of one or more text files which record each visit to your site—capturing information about your visitors and about referring Web sites. You can discover whether your keywords are successful and which search engines are being used by analyzing your log. You can also determine the days and times your site is visited, the operating systems and browsers being used, the paths that visitors take through the site, and much more. The log is a rather cryptic text file. See Figure 13.4 for a partial log.

Figure 13.4

A Web site log file contains useful information but can be difficult to read

B_ex050302.log.txt - WordPad	- • ×	
File Edit View Insert Format Help		
□ ☞ 🖬 毎 🗟 🗰 🐇 ங 🏙 ∽ 🖫		
#Software: Microsoft Internet Information Services 6.0	<u>^</u>	
#Version: 1.0		
#Date: 2010-11-02 09:28:00		
#Fields: date time s-sitename s-computername s-ip cs-		
method cs-uri-stem cs-uri-query s-port cs-username c-ip		
cs-version cs(User-Agent) cs(Referer) sc-status sc-		
substatus sc-win32-status sc-bytes cs-bytes time-taken		
2010-11-02 09:28:00 W3sVC724 ORF-PREMIUM11B		
65.182.100.116 GET /fireworkscs4/page5.htm - 80 -		
66.194.55.242 HTTP/1.1 Ocelli/1.3+		
(http://www.globalspec.com/Ocelli) - 304 0 0 214 282		
265		
2010-11-02 09:28:07 W3SVC724 ORF-PREMIUM11B		
65.182.100.116 GET /fireworkscs4/page5.htm - 80 -	-	
For Help, press F1		

Web analytics software can analyze your log file and create easy-to-use charts and reports. If you have your own Web site and domain name, many Web host providers allow free access to the log and may even run Web analysis reports as part of the monthly Web hosting fee. By checking information in the log, you can determine not only what keywords are working, but also which search engines your visitors are using. Webtrends (http://webtrends.com) is a commonly used tool for web log analysis. See Figure 13.5 for part of a log analysis report showing keywords actually used at Yahoo! to find a particular Web site.

Web log analysis is a powerful marketing tool because you can determine exactly how visitors are finding your site. This lets you know which keywords are working and which are not. Perhaps with additional thought, you can add new variations of the productive keywords to your list. If you examine Figure 13.5 you will notice that

Figure 13.5 Partial log file analysis report

Top Search Engines with Keywords Detail			
Engines	Keywords	Keywords Found	% of Total
Yahoo	quotations	280	37.68%
	educational	182	24.49%
	education	144	19.38%
	web	83	11.17%
	background	73	9.82%
	javascript	59	7.94%
	pictures	54	7.26%
	on	36	4.84%
	quotation	31	4.17%
	java	28	3.76%

"quotations" and "educational" are the most popular keywords on Yahoo! for this particular Web site. The developers of this Web site could add keywords related to these keywords or common misspellings of the most popular keywords. Improving the keywords may increase the number of visitors to the site. Some search engines routinely revisit sites that they have listed. Other search engines must be explicitly notified to revisit the site to pick up the new keywords.

Google offers a free Web analytics service at http://google.com/analytics. The categories of reports provided are as follows:

- Visitors (including a geographical map and browser information)
- Traffic Sources (such as referring sites, keywords, and AdWords)
- Content (including landing pages, paths through the site, and exit pages)
- Goals (tracks business objectives)

Another option is to purchase a program that can help you monitor your search engine positioning. Applications, such as WebPosition (http://webposition.com), can create reports of your search engine rankings, analyze and track keywords, and even submit your sites to search engines.

13.7 Link Popularity

Link popularity is a rating determined by a search engine based on the number of sites that link to a particular Web site and the quality of those sites. For example, a link from a well-known site such as Oprah Winfrey's (http://oprah.com) would be considered a higher quality link than one from your friend's home page on a free Web server. The link popularity of your Web site can determine its order in the search engine results page. One way to check which sites link to yours is to analyze your log file. Another method is to visit a Web site that offers a link popularity checking service (options include http://linkpopularity.com and http://linkpopularitycheck.com). These sites will run a report that checks link popularity on a number of search engines. A third method is to visit particular search engines and check for yourself. At Google and AltaVista, type "link:yourdomainname.com" into the search box and the sites that link to yourdomainname.com will be listed.

Search engines and search directories are not the only tools you can use to bring visitors to your Web site. The next section takes a look at some other options.

13.8 Social Media Optimization

Reach out to your current and potential Web site visitors with Social Media Optimization (SMO), which is described by Rohit Bhargava as optimizing a Web site so that it is "more easily linked to, more highly visible in social media searches on custom search engines (such as Technorati), and more frequently included in relevant posts on blogs, podcasts and vlogs." Benefits of SMO include increased awareness of your brand and/or site along with an increase in the number of inbound links (which can help with SEO). This section introduces a variety of methods to implement SMO.

Social Bookmarking

A key principle of SMO is making tagging and bookmarking easy. **Social bookmarking** sites such as Digg (http://digg.com) and del.icio.us (http://del.icio.us) provide a way for people to store, share, and categorize Web sites. Make it easy for your visitors to add your site to social bookmarking services by adding quick buttons or links such as the Digg badges offered at http://digg.com/tools.

Blogs and RSS Feeds

Chapter 1 introduced **blogs**, which are easily updatable and readily available journals on the Web. The power of the blog to share information and elicit comments is being used by businesses of various types (ranging from Nike to Adobe) to build and expand customer relationships. Most blog hosting sites, such as http://blogspot.com and http://wordpress.com, offer free RSS (Really Simple Syndication or Rich Site Summary) feeds of blog content. The **RSS feed** for a blog is an XML file (with an .rss file extension) that contains a summary of postings with links to a blog or another Web site. Your customers or business partners can subscribe to the RSS feed and be automatically updated when you've posted new content. RSS feeds are usually identified by an orange button with "XML" or "RSS" in the text. The Firefox browser has a feature called Live Bookmarks, which displays RSS news and blog headlines. There are numerous free and low-cost RSS readers available, including Headline Viewer (http://www.headlineviewer.com) and NetNewsWire (http://ranchero.com/netnewswire). To see a blog in action, visit the textbook's blog at http://webdevfoundations.blogspot.com.

Social Networking

Join groups on social networking sites such as Facebook (http://facebook.com), MySpace (http://myspace.com), or LinkedIn (http://linkedin.com) to find and connect with current and potential visitors. Create portable content that promotes your Web site and publish it on YouTube (http://youtube.com), Slideshare (http://slideshare.net) and other similar sites. Be active on microblogging sites such as Twitter (http://twitter.com). As mentioned in Chapter 1, *BusinessWeek* reported that Dell's use of Twitter resulted in \$500,000 of new orders within a 12-month period. Blog and tweet about your content. Let viral marketing go to work for you as current and potential visitors find and share your content, which should increase awareness and bring new and returning visitors to your site.

13.9 Other Site Promotion Activities

There are a number of other ways you can promote your Web site, including affiliate programs, banner ads, banner exchanges, reciprocal link agreements, newsletters, personal recommendations, traditional media advertising, and URL placement on all promotional materials.

Affiliate Programs

The essence of affiliate programs is that one Web site (the affiliate) promotes another Web site's products or services (the merchant) in exchange for a commission. Both Web sites benefit from this association. Amazon.com reportedly began the first affiliate marketing program—and its Amazon Associate program is still going strong. By joining this program your Web site can feature books with a link to the Amazon Web site. If one of your visitors purchases a book, you get a commission. Amazon benefits because you have delivered an interested visitor who may purchase items now or in the future. Your site benefits from the prestige of being affiliated with a known site such as Amazon and the potential for income from the program.

View the Commission Junction Web site (http://www.cj.com) for a program that matches Web sites with potential affiliate programs. Their service allows publishers (Web site owners and developers) to choose from a wide range of advertisers and affiliate programs. Benefits to Web developers include the opportunity to partner with leading advertisers, earn additional revenue from Web site visitors or ad space, and view real-time tracking and reporting. Visit http://www.refer-it.com for a directory of affiliate, associate, and referral programs.

Banner Ads

A **banner** ad is typically a graphic image that is used to announce and advertise the name or identity of a site. Banner ads are image hyperlinks that display the advertised site when clicked. You probably see them many times as you surf the Web. They've been around quite some time—hotwired.com introduced the first banner ad in 1994 to promote AT&T.

There is no official size for a banner ad. However, research performed by the Interactive Advertising Bureau (http://www.iab.net) reports that the standard size for a full banner ad is 468×60 pixels. Visit its Web site for a full listing of types of ads and common sizes (http://www.iab.net/standards/adunits.asp). Costs to display your banner ad can vary. Some Web sites charge by the impression (usually in terms of cost per thousand, or CPM). Others charge for click-throughs only—when the banner ad is clicked. Some search engines sell banner ads and will display your ad on a results page for a keyword that relates to your site (for a fee, of course!). See Figure 13.6 for some timely marketing by a Web site that specializes in flowers.

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The effectiveness of banner ads has been a topic of study. If you are like most Web site visitors, you do not click on banner ads. This means that banner ads do not necessarily generate more immediate visitors to a site. The Interactive Advertising Bureau researched the relationship between banner ads and brand awareness. A report at ClickZ.com (http://www.clickz.com/stats/sectors/advertising/article.php/804761) on this classic study indicates that while standard banner ads helped boost brand awareness, other formats such as skyscrapers (long, skinny ads that run down one side of a page) and larger rectangular ads were three to six times more effective in increasing brand awareness and message association. Media technologies such as audio, video, and Flash also deliver greater impact and increase branding effectiveness. Of course, the thinking is that increased brand awareness will increase the likelihood of an actual Web site visit in the future.

If the costs associated with banner ads seem to outweigh their benefits, consider a "free" option, a banner exchange.

Banner Exchange

While the details of **banner exchange** programs vary, the idea is that you agree to show banners from other sites and they will show your banner. Information on banner exchanges may be found at http://www.exchangead.com and at http://www.impressionz.com. Banner exchanges can be beneficial to all parties because of the free advertising.

Reciprocal Link Agreements

A reciprocal link agreement is usually between two sites with related or complementary content. You agree to link to each other. The result should be more visitors for each site. If you find a site that you'd like to set up a reciprocal link agreement with, contact its webmaster (usually by e-mail) and ask! Since some search engines partially determine rankings on the number of quality links to a Web site, well-placed reciprocal link agreements can help both sites.

Newsletters

A newsletter can bring return visitors to your site. The first step is to collect e-mail addresses. Allow Web site visitors to opt in to your newsletter by filling out a form. See Figure 13.7 for a sample newsletter subscription form.

Figure 13.7 Sample newsletter subscription form	JavaJam Newsletter	
	Your E-mail Address:	Sign Up

Offer your visitors some perceived value—timely information on a topic, discounts, and so on. Send out the newsletter with fresh, compelling content regularly. This helps to remind your previous visitors about your site. They may even forward the newsletter to a colleague and bring a new visitor to your site.

Sticky Site Features

Updating your Web site often and keeping your content fresh will encourage visitors to return to your site. How to keep them there? Make your Web site sticky. **Stickiness** is the ability to keep visitors at your site. Display your interesting and compelling content along with features that encourage stickiness such as news updates, polls and surveys, and chats or message boards.

Personal Recommendations

While forwarding a newsletter is a form of **personal recommendation**, some sites make it even easier to tell a friend about them. They offer a link that is used with a phrase such as "E-mail this article," "Send this page to a friend" or "Tell a colleague about this site." This personal recommendation brings a new visitor who is likely to be interested in the content of your site. See Figure 13.8 for a partial screenshot of the FirstGov Web site (http://www.firstgov.gov), showing a personal recommendation link.



Figure 13.8

This site makes it easy to tell friends about interesting articles

Web Rings

Web rings are more appropriate for noncommercial sites than for businesses. However, a Web ring can bring quite a few visitors to a site. Join a ring of sites on a similar topic. Visitors can surf from site to site and expect that the content should interest them. You could even create your own Web ring. See WebRing (http://dir.webring.com/rw) or RingSurf (http://www.ringsurf.com) for more information.

Newsgroup and Listserv Postings

Subscribe to relevant Usenet **newsgroups**, **listservs**, or forums related to your Web site content. Do not reply to postings with an advertisement of your site. Instead, reply to postings when your response can offer assistance or advice. Include a signature line with your Web site URL. Be subtle—you can get banned from some listservs if the moderator perceives that you are merely advertising. However, by offering friendly, helpful advice in a newsgroup or listserv you can market your Web site in a subtle, positive manner at no cost other than your Internet connection.

Your Internet service provider may provide access to Usenet newsgroups. Google also provides access at http://groups.google.com. Listservs can be run by individuals or by organizations.

Traditional Media Ads and Existing Marketing Materials

Don't forget to mention your Web site in any print, TV, or radio ads your organization runs. Include the URL of your Web site on all brochures, stationery, and business cards. This will help make your Web site easily found by your current and potential customers.



CHECKPOINT 13.2

- 1. Are the results returned by various search engines really different? Choose a place, music group, or movie to search for. Enter the same search terms, such as "Door County" into the following three search engines: Google, Yahoo!, and Ask (http://www.ask.com). List the URLs of the top three sites returned by each. Comment on your findings.
- 2. How can you determine if your Web site has been indexed by a search engine? How can you determine which search engines are being used to find your site?
- 3. List four Web site promotion methods that do not use search engines. Which would be your first choice? Why?

13.10 Serving Dynamic Content with Inline Frames

How does Edmunds.com, the vehicle pricing and review site, display a banner ad on its home page that is hosted and controlled by another organization? How do the Chicago Bears (http://chicagobears.com) and the ABC (http://abc.com) home pages easily display a variety of multimedia clips? How are the potential customer referrals provided by Amazon.com's Associates initiated and tracked? How does Google facilitate Ad Sense advertisement displays and click-throughs on third party Web sites? At the time this was written, the answer to all these questions is inline frames. Inline frames are widely used on the Web for a variety of marketing and promotional purposes including displaying ad banners, playing multimedia that may be hosted on a separate Web server, and serving content for associate and partner sites to display. The advantage is separation of control. The dynamic content—such as the ad banner or multimedia clip—can be changed by a project team without allowing them access to change the rest of the Web site. For example, in the case of the ad banner served by Edmund's Web site—a third party organization (such as DoubleClick) has control over the ad content but is prevented from updating the other items on Edmund's home page. This is accomplished by configuring the dynamic content (in the form of ad banners) within an inline frame. Let's explore how inline frames are configured.

An **inline frame** (called a floating frame) can be placed on the body of any Web page, similar to the way you would place an image on a Web page. What is special about the inline frame is that it embeds another Web page within a scrolling area. Figure 13.9 shows the use of an inline frame (also found in the student file Chapter13/dcwildflowers folder). The white scrolling area is the inline frame—it displays another Web page that contains the image of the flower and a text description.

Figure 13.9

The white scrolling area on the page is an inline frame displaying a separate Web page

Door County Wild Flowers - Mozilla Firefox

Door County Wild Flowers

File Edit View History Delicious Bookmarks Accessibility Tools Help

Spring is a special time in Door County.

If you look carefully as you hike through the woods and meadows you will see many wild flowers.

- Trillium
- May Flowers
- Yellow Lady's Slipper



This lovely wild flower with a white bloom is common in wooded areas throughout Wisconsin.

The screenshots shown in Figure 13.10 are of the same Web page with different pages displayed in the inline frame area.



Figure 13.10

The same page with different content in the inline frame area

The code for the inline frame used to create this effect is as follows:

```
<iframe src="trillium.html" title="Trillium Wild Flower"
height="160" name="flower" width="350">
Description of the lovely Spring wild flower, the
<a href="trillium.html" target=" blank">Trillium</a></iframe>
```

As shown, an inline frame is created using the **<iframe>** element. The **<iframe>** element is a container tag. It is always used with its closing **</iframe>** tag. Any content that should be displayed if the browser does not support inline frames (such as a text description or link to the actual page) should be placed between the tags. The **<iframe>** tag configures an area on a Web page that can be used to display a different Web page document. This inline area is 150 pixels high and 300 pixels wide by default. The height and width attributes can be used to configure the exact dimensions. In the example code, the align attribute was used to align the inline frame to the right of the text on the Web page. The name attribute was used so that the inline frame could be targeted by links. Table 13.2 lists attributes for **<iframe>** tags. Commonly used attributes are shown in bold.

Attribute	Values	Purpose
align	right, center, left (default)	Specifies the horizontal alignment of the inline frame (deprecated—use CSS instead)
frameborder	0 indicates no visible borders 1 indicates borders display (default)	Determines whether borders should be displayed around this inline frame
height	Number of pixels or percentage	Gives height of the inline frame
id	Alphanumeric, no spaces; the value must be unique and not used for other id values on the same XHTML document	Provides a unique identifier for the inline frame
longdesc	Provides a detailed text description of the frame; may be accessed by assistive technologies	Gives URL of Web page with detailed description of the contents of the inline frame
marginheight	Number of pixels	Configures the top and bottom margins of the inline frame
marginwidth	Number of pixels	Configures the width of the right and left margins of an inline frame
name	Alphanumeric, no spaces, begin with a letter	Configures the name of the inline frame; required when using the target attribute to configure hyperlinks (deprecated in XHTML but is used to provide back- ward compatibility with browsers that support HTML)
scrolling	yes indicates that scrollbars are always present; no indicates that scrollbars are never displayed; auto indicates that scrollbars appear when needed (default)	Determines whether scrollbars will appear if the document displayed is larger than the size of the inline frame
src	Valid file name of a Web page document (required)	Configures the name of the file to be displayed in the inline frame
title	Text phrase that describes the inline frame	Configures the title of the inline frame; can be accessed by screen readers and is recommended by the W3C to improve accessibility
width	Number of pixels or percentage	Specifies width of the inline frame

Table 13.2 <iframe> tag attributes
Table 13.3 lists corresponding CSS properties with XTHML attributes utilized to configure inline frames. These properties are also described in Appendix C.

Inline frames are supported by the most recent versions of Internet Explorer, Firefox, and Safari. However, they may not be supported by all browsers, such as those used by mobile devices. Carefully consider a decision to use this technique.

XHTML Attribute	CSS Property
align	float
width	width
height	height
marginwidth,marginheight	margin, padding
bgcolor	background-color
frameborder	border, border-style

Table 13.3 CSS properties to style an inline frame



In this Hands-On Practice you will modify a CircleSoft Web Design home page that uses inline frames, an external style sheet named circlesoft.css, and three Web pages that display in the inline frame. To begin, create a new folder called circlesoftinline. Obtain the logo1.gif, index.html, circlesoft.css, about.html, contact.html, and clients.html files from the student files Chapter13/starters folder. Save the files in a folder named circlesoftinline. Launch Notepad and edit the home page, named index.html, for your circlesoftinline Web site. A sample is shown in Figure 13.11.



Add the <iframe> element in the <div> assigned to the rightcol id. The inline frame should initially display the about.html page, have the name set to "circlesoftinfo", and contain descriptive content between the <iframe> tags. For example:

```
<iframe src="about.html" title="About CircleSoft"
name="circlesoftinfo" >Description of the services offered by
<a href="about.html" target="_blank">Circlesoft</a></iframe>
```

Next, code appropriate keywords and description meta tags in the header section of the index.html Web page. Save your index.html page in the circlesoftinline folder.

You are ready to test your inline frames page. Launch a browser and display the index.html page. Your page should be similar to the page shown in Figure 13.11. Try the links; they should change the contents of the inline frame. If you'd like to experiment with a border-less look, add an *iframes* selector style rule in circlesoft.css to go with the code that follows.

```
iframe {border-style: none;
}
```

The student files contain a sample solution at in the Chapter13/13.1 folder.



Inline frames are not supported by all browsers and assistive technologies such as screen readers, so use them with caution. If you choose to use inline frames on your Web site, provide alternate means of accessing the content. Consider including both a description of the inline frame and a link to a text page between the <iframe> and </iframe> tags.

CHAPTER SUMMARY

This chapter introduced concepts related to promoting your Web site. The activities involved in submitting Web sites to search engines and search directories were discussed along with techniques for making your Web site optimized for search engines. Other Web site promotion activities such as social media optimization, banner ads and newsletters were also examined. At this point, you should have an idea of what is involved in the other side of Web site development—marketing and promotion. You can help the marketing staff by creating Web sites that work with search engines and directories by following the suggestions in this chapter.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

- <iframe> affiliate programs automated tools banner ad banner exchange blogs click through rate (CTR) cost per click (CPC) cost per impressions (CPM) database description indexed inline frame
- keywords link popularity listservs manual checking meta tags newsgroups newsletter pay per click (PPC) personal recommendation reciprocal link agreement robot RSS feed search directory
- search engine search engine optimization (SEO) search engine results page (SERP) search form search index search results Sitemap social bookmarking social media optimization (SMO) stickiness Web analytics Web rings

Review Questions

Multiple Choice

- **1.** The robot, database, and search form are components of which of the following?
 - a. a search directory
 - b. a search engine
 - c. both search directories and search engines
 - d. none of the above
- **2.** In which of the following sections of a Web page should meta tags be placed in?
 - a. header
 - b. body
 - c. comment
 - d. none of the above

- **3.** What is the first step in submitting your Web site to search engines and search directories?
 - a. join an affiliate program
 - b. visit the search engine and submit your Web site
 - c. prepare your pages for search engines by adding description meta tags
 - d. none of the above

- **4.** Often, how long can it take between the time you submit your site and the time it is listed in a search engine?
 - a. several hours
 - b. several days
 - c. several weeks
 - d. several months
- **5.** Which of the following contains information about which keywords are bringing visitors to your Web site?
 - a. Web position log
 - b. Web site log
 - c. search engine file
 - d. none of the above
- **6.** Which of the following is a rating determined by a search engine based on the number of links to a particular site and the qualities of those links?
 - a. line checking
 - b. reciprocal linking
 - c. link popularity
 - d. none of the above
- **7.** Which of the following is the most popular method used by visitors to find Web sites?
 - a. banner ads
 - b. hearing about Web sites on television
 - c. search engines
 - d. personal recommendations
- **8.** Which of the following is a promotion method whose main purpose is to bring return visitors to your Web site?
 - a. newsletter
 - b. banner exchange
 - c. TV ad
 - d. none of the above

- **9.** Which of the following is the main benefit of a banner ad?
 - a. bringing many new visitors to your site
 - b. increasing awareness of the Web site
 - c. both bringing many new visitors and increasing awareness of the site
 - d. none of the above
- **10.** In which of the following does one Web site promote another Web site's products or services in exchange for a commission?
 - a. newsletter
 - b. affiliate program
 - c. Web ring
 - d. none of the above

Fill in the Blank

- The ability to keep Web page visitors at your site is called ______.
- 12. Use ______ to indicate that you do not want a Web page to be indexed.
- **13.** Frequently used information research resources are _____.
- Besides listing in a search engine, a Web site can be promoted by _____.
- **15.** Paying to be listed preferentially in a search engine is considered by many organizations to be

Hands-On Exercises

- **1.** Practice writing keyword and description meta tags. For each scenario described here, write the XHTML to create appropriate meta tags and justify your choice of keywords.
 - a. Lanwell Publishing is a small independent publisher of English as a second language (ESL) books used for secondary school and adult continuing education learners. The Web site offers textbooks and teacher manuals.

- b. RevGear is a small specialty truck and auto repair shop in Schaumburg, Illinois. The company sponsors a local drag racing team.
- c. Morris Accounting is a small accounting firm that specializes in tax return preparation and accounting for small businesses. The owner, Greg Morris, is a CPA and Certified Financial Planner.
- 2. Choose one of the company scenarios listed in Hands-On Exercise 1 (Lanwell Publishing, RevGear, or Morris Accounting). Create a home page for the site that includes meta tags, appropriate page titles, and keywords used appropriately in headings. Place an e-mail link to yourself on the Web page. Save the page as scenario.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page to your instructor.
- **3.** Choose one of the company scenarios listed in Hands-On Exercise 1 (Lanwell Publishing, RevGear, or Morris Accounting). Create a Web page that lists at least three possible activities that could be used to promote the site in addition to search engine submission. For each activity, explain why it could be helpful for the Web site. Place an e-mail link to yourself on the Web page. Save the page as promotion.html. Hand in printouts of both the source code (print in Notepad) and the browser display of your page to your instructor.
- 4. Write the XHTML and CSS to create a page named inline.html that uses inline frames. Configure the inline frame to be 400 pixels wide and 200 pixels high. Use myframe for the name of the inline frame. Code a Web page named marketing.html to display in the inline frame. Configure the inline frame to display the marketing.html file.

Web Research

- This chapter discussed a number of Web site promotion techniques. Choose one method (social media optimization, search engine submission, affiliate programs, banner ads, and so on) to research. Obtain information from at least three different Web sites about the promotion technique you chose. Create a Web page that lists at least five hints or facts about the promotion method along with helpful links that provide additional information on the hint or fact. Provide the URLs of the Web sites that you used as resources. Organize your page with a table. Place your name in an e-mail link on the Web page. Hand in printouts of both the source code (from Notepad) and the browser display of your page to your instructor.
- **2.** Search engine and search directory submission rules are constantly changing. Research a search engine or search directory and determine the following:
 - Are free submissions accepted? If so, are they restricted to noncommercial sites?
 - What types of paid submissions are accepted? How do they work—what is the fee structure, listing guarantee, and so on?
 - What types of paid advertisements are available? How do they work—what is the fee structure, for example?
 - Is there any information about the usual time frame for the submission to be listed?

• Create a Web page that describes your findings. Provide URLs of the Web sites you used as resources. Place your name in an e-mail link on the Web page. Hand in printouts of both the source code (from Notepad) and the browser display of your page to your instructor.

Focus on Web Design

Explore how to design your Web site so that it is optimized for search engines (Search Engine Optimization, or SEO). Visit the following sites as a starting point as you search for three SEO tips or hints:

- http://www.sitepoint.com/article/skool-search-engine-success
- http://www.digital-web.com/articles/designing_for_search_engines_and_stars
- http://www.seoconsultants.com/seo/tips
- http://www.seo-writer.com/reprint/top-seo-tips.html
- http://www.searchenginewatch.com
- http://www.youtube.com/watch?v=65PQpHcAonw

Write a one-page report that describes the three tips you found interesting or potentially useful. Cite the URLs of the resources you used.

WEB SITE CASE STUDY: Meta Tags to Promote Web Sites

Each of the following case studies continues throughout most of the text. This chapter focuses on the description meta tag.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House Case Study. Figure 2.26 shows a site map for the JavaJam Web site. The pages were created in earlier chapters. Use the Chapter 9 javajamcss folder. Your task is to create and code a description meta tag on each page in the Web site.

Hands-On Practice Case

- 1. Review the JavaJam Case Study introduction in Chapter 2. Review the pages you have created in earlier chapters. Write a brief paragraph that describes the JavaJam site.
- Launch Notepad and edit the Web pages in the javajamcss folder. Add a description meta tag to each page. Save each page. Test your pages in a browser. They will not look different, but they are much friendlier to search engines!

Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows a site map for the Fish Creek Web site. The pages were created in earlier chapters. Use the Chapter 9 fishcreekcss folder. Your task is to create and code an appropriate description meta tag on each page in the Web site.

Hands-On Practice Case

- 1. Review the Fish Creek Case Study introduction in Chapter 2. Review the pages you have created in earlier chapters. Write a brief paragraph that describes the Fish Creek site.
- Launch Notepad and edit the Web pages in the fishcreekcss folder. Add a description meta tag to each page. Save each page. Test your pages in a browser. They will not look different, but they are much friendlier to search engines!

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for the Pasha the Painter Web site. The pages were created in earlier chapters. Use the Chapter 9 paintercss folder. Your task is to create and code an appropriate description meta tag on each page in the Web site.

Hands-On Practice Case

- 1. Review the Pasha the Painter Case Study introduction in Chapter 2. Review the pages you have created in earlier chapters. Write a brief paragraph that describes the Pasha the Painter site.
- Launch Notepad and edit the Web pages in the paintercss folder. Add a description meta tag to each page. Save each page. Test your pages in a browser. They will not look different, but they are much friendlier to search engines!

Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case Study. Figure 2.38 shows a site map for the Prime Properties Web site. The pages were created in earlier chapters. Use the Chapter 9 primecss folder. Your task is to create and code an appropriate description meta tag on each page in the Web site.

Hands-On Practice Case

- 1. Review the Prime Properties Case Study introduction in Chapter 2. Review the pages you have created in earlier chapters. Write a brief paragraph that describes the Prime Properties Web site.
- 2. Launch Notepad and edit the Web pages in the primecss folder. Add a description meta tag to each page. Save each page. Test your pages in a browser. They will not look different, but they are much friendlier to search engines!

Web Project

See Chapter 5 for an introduction to the Web Project case. Your task is to add appropriate keywords and description meta tags to each page in the Web site.

Hands-On Practice Case

- Review the Project Topic Approval document that you created in the Chapter 9 case study. Take a moment to view the pages you have created in earlier chapters. Write a brief paragraph that describes the Web Project Web site.
- 2. Launch Notepad and edit the Web pages in the project folder. Add a description meta tag to each page. Save each page. Test your pages in a browser. They will not look different, but they are now friendlier to search engines!

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CHAPTER

A Brief Look at JavaScript

Chapter Objectives In this chapter, you will learn how to ...

- Describe common uses of JavaScript in Web pages
- Describe the purpose of the Document Object Model and list some common events
- Create a simple JavaScript using the <script> tag and the alert() method
- Describe the considerations for XHTML conformance and JavaScript
- Use variables, operators and the, if control structure
- Create a basic form validation script

If a popup window mysteriously appears while you are

surfing the Web, you're experiencing the effects of JavaScript. JavaScript is a scripting language and JavaScript commands can be included in an XHTML file. Using JavaScript, you can incorporate techniques and effects that will make your Web pages come alive! You can display an alert box containing an important message for the user. You can display an image when a user moves the mouse pointer over a link, and much more. You don't have to be a programmer to be able to add a little sizzle to your Web pages. This chapter introduces JavaScript and some of its capabilities, and provides some samples that you can build on to create your own Web pages.

14.1 Overview of JavaScript

There are a variety of methods for adding interactivity to a Web page. As you learned in Chapter 7, CSS can be used to achieve a hover effect as you position your mouse pointer over a hypertext link. In Chapter 11 you saw examples of how Adobe Flash can be used to add interactivity and animation to a Web page. As also described in Chapter 11, JavaScript can be used to add interactivity and functionality to Web pages. It's not a question of using either JavaScript or one of these other technologies. You can use the strengths of each technology, and use JavaScript in addition to CSS, Flash, Java applets, or any number of other technologies.

So, what is JavaScript? It's an **object-based** client-side **scripting language** interpreted by a Web browser. JavaScript is considered to be object-based because it's used to work with the objects associated with a Web page **document**: the browser window, the document itself, and the elements such as forms, images, and links. Since JavaScript is interpreted by a browser, it is considered to be a client-side scripting language. A scripting language is a type of programming language, but no need to worry! You don't have to be a computer programmer to understand this.

Let's review clients and servers. In Chapter 10 we discussed hosting a Web site on a Web server. As you learned, a Web host provider stores your Web site and allows you to transfer your files to the Web server. Visitors to your site (also called users) are able to point their Web browsers to your Web site using the URL provided by your Web host provider. As you may recall, the user's Web browser is called a client.

JavaScript is interpreted by the client. This means that the JavaScript code, embedded in the XHTML document, will be rendered by the Web browser. The server's job is to send the XHTML document. The Web browser's job is to interpret the code in the XHTML file and display the Web page accordingly. Since all the processing is performed by the client (in this case, the Web browser), this is referred to as **client-side processing**. There are programming languages that are executed on the server, and these are referred to as server-side programming languages. **Server-side processing** may involve sending e-mail, storing items in a database, or tracking items in a shopping cart. In Chapter 9 you learned how to set the action of a form to point to a server-side script.

So, JavaScript is an object-based client-side scripting language interpreted by a Web browser. The JavaScript code is embedded in the XHTML file and the Web browser interprets it and displays the results as needed.

14.2 The Development of JavaScript

There is a popular misconception that Java and JavaScript are the same. Java and JavaScript are completely separate languages with very little in common. As noted in Chapter 11, Java is an object-oriented programming language. Java is robust, very technical, and can be used to build large applications for businesses, such as inventory control systems and payroll systems. Sun Microsystems developed Java in the 1990s and designed the language to run on an operating system such as Windows or Unix. The developers of Java also wanted the flexibility and popularity that would be available if their language could run in a Web browser. Independently, the team at Netscape was

developing a scripting language called LiveScript and eventually partnered with Sun Microsystems. This partnership was mutually advantageous as it produced the Java plug-in that enabled Web browsers to run Java applets in the browser, and the development of LiveScript continued and was renamed JavaScript. However, JavaScript is not the same as the Java programming language. JavaScript is much simpler than Java. The two languages have more differences than similarities.

14.3 Popular Uses for JavaScript

The uses of JavaScript range from providing some "bells and whistles" such as simple animation and fancy menus to functionality such as popping up a new window containing product information, detecting errors in a form, or detecting the browser version to determine appropriate features that can be used. Let's look at some examples of some of these uses.

Alert Message

An alert message is a popular technique used to draw the user's attention to something that is happening. For instance, a retail Web site may use an alert message to list errors in an order form or remind the user about an upcoming sale. Figure 14.1 illustrates an alert message thanking the user for visiting the page. This alert message is displayed when the user is leaving the Web site and surfing to a new site.



Notice that the user must click the OK button before the next page will load. This effectively grabs the user's attention, but it quickly becomes annoying if it is overused.

Popup Windows

And speaking of annoying, popup windows are instances of Web browser windows that seem to appear mysteriously. These windows can also pop under the current browser window so that you don't notice them until you are moving or closing windows on

Figure 14.1 Alert message displayed when the user leaves the Web site window

your desktop. This technique has some legitimate uses, such as popping up an information window containing a larger picture and description of a product when the user clicks on the product in the main window. Unfortunately, the use of popup windows has been so abused that most browsers allow users to disable popup windows. This also means that the useful popup windows are not displayed. Figure 14.2 shows a popup window that appears when the user clicks the link in the main page.



Browser Sniffing

Detecting the exact Web browser application and version is called browser sniffing and is sometimes important to the Web developer for determining appropriate features. Figure 14.3 shows the results in the Web browser of JavaScript detecting information about the user's browser.



Jump Menus

JavaScript can also be used to create jump menus based on a select list. The user can select a Web page from a select list, and click a button to load the selected Web page. Figure 14.4 shows this technique.

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Figure 14.4

Jump menu showing the selection of the Contact Information menu option

🕲 JavaScript Uses - Mozilla Firefox	Contact Information - Mozilla Firefox
Eile Edit View Higtory Delicious Bookmarks Accessibility Iools He Popular Uses for JavaScript Jump Menu	Eile Edit View Higtory Delicious Bookmarks Accessibility Iools H Contact Information Phone: 555-555-5555 E-Mail: webdevfoundations@gmail.com
Product Information Order Form Contact Information	

In this example, the user selected the Contact Information option from the select list, and clicked the Go button. The Contact Information page will either load in the current Browser window or open a new browser window containing the Contact Information page.

Mouse Movement Techniques

JavaScript can be used to perform a task based on mouse movement in the browser window. One popular technique is to display a submenu when the user hovers the mouse pointer over a menu item. Figure 14.5 shows this technique.



The window on the left shows the main menu and the window on the right shows the submenu displayed when the user hovers the mouse pointer over the Products menu item. When the user moves the mouse away from the Products menu item, the submenu disappears. This technique is also used for **image swapping** to give the illusion of depressing a button, moving a pointer, or changing the color of a menu item. In the case of image swapping, also known as rollover images, an image is displayed in the Web page when the page initially loads. When the user positions the mouse pointer on top of the image, the original image is swapped for a new image. When the user moves the mouse away from the image, the original image appears. This is commonly used for navigation button bars, but is also used for interesting effects for other images as well. Figure 14.6 shows the image swapping technique.



In this chapter we will touch on some of the highlights and concepts involved in using JavaScript. We will create some scripts to demonstrate the use of the alert message, mouseovers, and some of the techniques involved in checking a form for input errors. This chapter offers just a taste of JavaScript, but it will give you a peek at how some of the techniques are developed.

14.4 Adding JavaScript to a Web Page

JavaScript code is embedded in an XHTML Web page and is interpreted by the Web browser. This means that the Web browser is capable of understanding the code and running it. The examples in this chapter use the Mozilla Firefox Web browser. The code we will be creating will work in most Web browsers. However, we will use Firefox because it will provide us with helpful error messages that will be invaluable when we create and test our pages. If you have not already installed Mozilla Firefox on your computer, visit http://www.mozilla.com/firefox for a free download.

The Script Element

When JavaScript code is embedded in an XHTML document, it needs to be contained, or encapsulated, in **script>** and **script>** tags to identify it. Web pages are rendered by the Web browser from top to bottom. The impact on our scripts is that they will execute wherever they are located in the document, as we will see.

For XHTML conformance, the <script> tag must include an attribute to identify the scripting language as "text/javascript".

JavaScript Statement Block Template

For XHTML Strict DTD conformance, the JavaScript statement block must include a character data declaration. When the W3C validator checks for XHTML Strict conformance, it will check all the code on the page except for areas marked as character data sections. Since JavaScript is not part of XHTML, many validation errors would be generated unless the JavaScript is placed in an area marked as a character data section. This issue does not apply to Web pages coded using Transitional XHTML. However, it doesn't do any harm to add the character data declaration if you are using Transitional XHTML, so let's include it.

XHTML comments are contained between <!-- and --> markup symbols. These comment areas are ignored by the browser. Comments can also be used in JavaScript. The // (double slash) identifies a single comment line and the /* and */ symbols identify a comment block.

We'll use both XHTML and JavaScript comment types in our scripts. We'll use the XHTML comment tag at the beginning of the JavaScript statement block to hide JavaScript from older browsers. Some very old browsers will display the JavaScript code rather than execute it. Encapsulating the JavaScript block in XHTML comment tags hides the block from older browsers and the code is ignored by browsers that do not support it.

To address all of the issues mentioned above, each JavaScript block would need the following structure:

<script type="text/javascript">
<!-- <![CDATA[
... JavaScript code goes here
//]]> -->
</script>

Let's take it apart to understand each line. Figure 14.7 shows the parts of this code.



... JavaScript code goes here
// -->
</script>

The JavaScript code is placed inside the statement block. This block can appear anywhere in the XHTML document and the code will be executed. Let's see how this works, with a Hands-On example that will display an alert message. The alert message box is displayed using the **alert()** method. The structure is as follows:

alert("message to be displayed");

Each JavaScript command line generally ends with the semicolon, ;. Also, JavaScript is case-sensitive, which means that there's a difference between uppercase and lowercase characters and it will be important to be precise when typing JavaScript code.



In this Hands-On Practice you will create a simple script with an alert() message box.

Launch Notepad. Type the following XHTML and JavaScript code. Note that alert() does not contain a space between alert and the opening parentheses.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>Using JavaScript</h1>
<script type="text/javascript">
<!-- <![CDATA[
  alert("Welcome to my web page!");
// ]]> -->
</script>
<h2>When does this display?</h2>
</body>
</html>
```

Save this file as alert.html. Launch Firefox and load the alert.html file to test your page. Notice that the first heading appears, and then the alert message pops up as shown in Figure 14.8. After you click the OK button, the second heading appears. This illustrates the top-down processing of the Web page and embedded JavaScript. The JavaScript block is between the headings, and that's where the alert message appears as well.



Practice with Debugging

Sometimes your JavaScript code does not "work" the first time you test it. When this happens you'll need to **debug** the code—find the errors and correct them.

Let's look at a debugging technique. Edit the JavaScript alert to introduce a typing mistake as follows:

aalert("Welcome to my web page!");

Save the file and view it in the browser again. Notice that the alert box does not display this time. Firefox will point out some errors in JavaScript code, but we need to open the Error Console to see them.

In Firefox, select the menu items Tools, Error Console. The Error Console window will open and the error message will display, as shown in Figure 14.9.



Notice that the error is displayed, along with the line number where the error was detected. It's useful to create your documents in a text editor that displays the line numbers, but it's not necessary. If you are using Notepad, make use of the Go To feature in the Edit menu. This will allow you to specify a line number and the insertion point will be positioned at the beginning of that line.

Edit the alert.html file to correct the error and test it in the browser again. This time the alert box should display after the first heading, as we saw previously.



Will the Error Console display all of the errors in my JavaScript code?

It will display the syntax errors, which include things like missing brackets and items it does not recognize. Sometimes the error is above the line indicated, particularly if there is a missing bracket or quote. The errors displayed indicate that there is something wrong and they serve as a guide to where the error might be. Start by looking at the line indicated, and if that line looks correct, look at the lines above it.

Figure 14.9 Firefox Error

Console displaying error



CHECKPOINT 14.1

- 1. Describe at least three popular uses for JavaScript.
- 2. How many JavaScript code blocks can be embedded in an XHTML document?
- 3. Describe a method that can be used to find an error in a JavaScript code block.

14.5 Document Object Model Overview

JavaScript can manipulate the elements of an XHTML document. Elements include container tags such as paragraphs, and text contained in or <div> tags. Elements also include images, forms, and individual form elements such as text boxes and select lists. In order to access these elements, we need to understand a little about the Document Object Model (DOM).

In general, an **object** is an entity or a "thing". When using the DOM, the browser window, Web page document, and any XHTML element are considered to be objects. The browser window is an object. When a Web page loads in the browser, the Web page is considered to be a document. The document itself is an object. The document can contain objects such as images, headings, paragraphs, and individual form elements such as text boxes. The objects may have properties that can be detected or manipulated. For instance, a property of the document is its title. Another property of the document is its background color.

There are some actions that can be performed on some objects. For instance, the **window object** can display the alert message box, or display a prompt box. These actions are called **methods**. The command to display an alert message is referred to as a method of the window object. The DOM is the collection of objects, properties, and methods. JavaScript uses the DOM to detect and manipulate elements in the XHTML document.

Let's look at this system of objects, properties, and methods differently. Let's say that your car is an object. It has properties such as color, manufacturer, and year. Your car has elements such as the hood and trunk. The hood and trunk can be opened and closed. If we were to use a programming language to open and close the hood and trunk, the commands might look something like the following:

```
car.hood.open()
car.hood.close()
car.trunk.open()
car.trunk.close()
```

If we wanted to know the color, year, and manufacturer of the car, the commands might look something like the following:

```
car.color
car.year
car.manufacturer
```

When we use the values, car.color might be equal to "blue" and car.manufacturer might be equal to "Ford." We might be able to change the values, or only read them

without changing them. In this example, car is an object, and its properties are hood, trunk, color, year, and manufacturer. Hood and trunk could be considered properties as well. Open and close are methods of hood and are also methods of trunk.

With respect to the DOM, we can write to the document using the write() method of the document object. The structure is as follows:

document.write("text to be written to the document");

We can use this in JavaScript to write text and XHTML tags to a document and the browser will render it.

The alert() method used in the next Hands-On Practice is a method of the window object. It can be written as follows:

```
window.alert("message");
```

The window object is assumed to exist and can be omitted. If the window doesn't exist, the script doesn't exist either.

One property of the document is lastModified. This property contains the date on which the file was most recently saved or modified, and we can access it using document.lastModified. This is a read-only property that we can write to the document or use for some other purpose.



In this Hands-On Practice you will practice using the write() method of the document, and the lastModified property of the document. You will use document.write() to add text and some XHTML tags to an XHTML document. You will also use document.write() to write the date the file was last saved to the document.

Open the alert.html document and edit the script block as follows:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>Using JavaScript</h1>
<script type="text/javascript">
<!-- <! [ CDATA [
  document.write("Using document.write to add text");
  document.write("<h2>Notice that we can add XHTML tags too!</h2>");
// ]]> -->
</script>
<h3>This document was last modified on:
<script type="text/javascript">
```

```
<!-- <![CDATA[
document.write(document.lastModified);
// ]]> -->
</script>
</h3>
</body>
</html>
```

Save this file as documentwrite.html and view it in the browser. The text should display, as shown in Figure 14.10. If the text does not display, open the Error Console and correct any errors that appear.



JavaScript can be seen in the source code. To confirm this, use the View, Page Source menu commands to see the source code. Close the source code window when you have finished viewing the code.



Why would I use document.write when I can just type the XHTML code by itself?

You wouldn't use document.write to generate your Web page if you could just type the XHTML code by itself. You would use document.write in conjunction with other techniques. For instance, you might use JavaScript to detect the time of day, and if it is before noon use document.write to write "Good morning" to the document. If it is afternoon, write "Good afternoon" to the document, and if it is after 6:00 p.m., write "Good evening" to the document.

14.6 Events and Event Handlers

As the user is viewing a Web page, the browser detects mouse movement and events. **Events** are actions taken by the Web page visitor, such as mouse clicks, page loads, or form submissions. For instance, when you move your mouse pointer over a hypertext link, the browser detects a mouseover event. Table 14.1 lists a few of the events and their descriptions.

Event	Description
click	The user clicks an item. This could be an image, hypertext link, or button.
load	The browser displays the Web page.
mouseover	The mouse pointer hovers over an item. The mouse pointer does not have to rest on the object.
	This could be a hypertext link, image, paragraph, or another object.
mouseout	The mouse pointer is moved away from an item that it had previously hovered over.
submit	The user clicks the submit button on a form.
unload	The Web page unloads in the browser. This event occurs just before a new Web page loads.

Table 14.1 Events and their descriptions

When an event occurs, this can trigger some JavaScript code to execute. One widely used technique is to detect the mouseover and mouseout events and swap images or display a menu.

We need to indicate which events will be acted upon and what will be done when an event occurs. We can use an **event handler** to indicate which event to target. An event handler is embedded in an XHTML tag as an attribute and indicates some JavaScript code to execute when the event occurs. Event handlers use the event name prefixed by "on." Table 14.2 shows the event handlers that correspond to the events described in Table 14.1. For example, the **onload** event is triggered when browser renders ("loads") a Web Page. When you move your mouse pointer over a text hyperlink, a **mouseover** event occurs and is detected by the browser. If that hyperlink contains an onmouseover event handler, the JavaScript code indicated by the event handler will be executed. This code might pop up an alert message, display an image, or display a menu. Other event handlers such as **onclick** and **onmouseout** can cause JavaScript code to be executed when their corresponding event occurs.

Table 14.2 Events and event handlers

Event	Event Handler
click	onclick
load	onload
mouseover	onmouseover
mouseout	onmouseout
submit	onsubmit
unload	onunload



I've seen some code examples and sometimes the event handlers are written in mixed case, like onClick, and sometimes they're written in lower case, like onclick. What's the difference?

Using Transitional XHTML, event handlers can be written using mixed case, such as onClick and onMouseout. Conformance to Strict XHTML conformance requires that event handlers are written using all lowercase. To be safe, use all lowercase letters when coding event handlers on a Web page.

HANDS-ON PRACTICE 14.3

Let's practice using the onmouseover and onmouseout event handlers and alert messages to indicate when the event handler has been triggered. We will use simple hypertext links, and embed the event handlers in the <a> tags. We will not need the <script> block since event handlers are placed as attributes in the XHTML tags. We'll place the hypertext links in a table so that there's lots of room in the browser window to move the mouse pointer and test our script.

Open a text editor and enter the text as shown in the following code. Note the use of the double and single quotes in the onmouseover and onmouseout event handlers. We need quotes around the message in the alert() method, and we need quotes encapsulating the JavaScript for the event handler. XHTML and JavaScript will allow us to use either double quotes or single quotes. The rule is that they must match. So when you have a situation where you need two sets of quotes, you can use double and single. In this case, we have used double quotes for the outer set and single quotes for the inner set. In the anchor tag, the "#" symbol is used for the href value because we don't need the functionality of loading another Web page. We need the hypertext link to sense mouseover and mouseout events.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>Using JavaScript</h1>
<1i>
    <a href="#" onmouseover="alert('You moused over');">
    Mouseover test</a>
 <1i>
    <a href="#" onmouseout="alert('You moused out');">Mouseout test</a>
 </body>
</html>
```

Save this file as mouseovertest.html and load it in the browser. Move your mouse on top of the Mouseover test link. As soon as your mouse touches the link, the mouseover event occurs and the onmouseover event handler is triggered. This displays the alert box, as shown in Figure 14.11.

Click the OK button and position your mouse pointer over the Mouseout test link. Notice that nothing happens. This is because the mouseout event has not occurred yet.



Move the mouse pointer away from the link. As soon as the mouse pointer is no longer on the link, the mouseout event occurs and the onmouseout event handler is triggered. This displays the alert box, as shown in Figure 14.12.



You can combine event handlers in one hypertext link. This is the essence of the image swapping technique. The onmouseover event handler changes the image to a new image and the onmouseout event handler changes the image back to the original image. This technique is beyond the scope of this chapter, but perhaps this demonstration sheds some light on how image swapping is accomplished.



CHECKPOINT 14.2

- 1. With respect to objects, describe the difference between a property and a method. Feel free to use words like thing, action, description, attribute, and so on.
- 2. What is the difference between an event and an event handler?
- 3. Where are event handlers placed in the XHTML document?

14.7 Variables

Sometimes we need to be able to collect data from the user and do something with it. A simple example is prompting the user for a name and writing the name to the document. We would store the name in a **variable**. You probably took a math course at some point and used x and y as variables in equations as placeholders for values. The same principle applies when using variables in JavaScript (we won't do any tricky math, though, so relax!). JavaScript variables are also placeholders for data and the value of the variable can change. Robust programming languages like C++ and Java have all kinds of rules for variables and their data types. JavaScript is very loose that way. We won't have to worry about what type of data is contained in a variable.



Are there any tips for creating variable names?

It really is something of an art form, but first of all, you want to create a variable name that describes the data it contains. The underscore, or uppercase character, can be used for readability to imply more than one word. Do not use other special characters, though. Stick to letters and numbers. Be careful not to use JavaScript **reserved words** or **keywords**, such as **var**, **return**, **function**, and so on. A list of JavaScript keywords can be found at http://www.webreference.com/javascript/reference/core_ref. The following are some variable names that could be used for a product code:

- productCode
- prodCode
- product_code

Writing a Variable to a Web Page

Before we use a variable we can declare it with the JavaScript **var** keyword. This step isn't necessary but it is good programming practice. We can assign data to a variable using the assignment operator, the equals sign (=). A variable can contain a number or a string. A string is encapsulated in quotes, and can contain alphabetic characters, spaces, numbers, and special characters. For instance, a string can be a last name, e-mail address, street address, product code, or paragraph of information. Let's do a practice exercise of assigning data to a variable and writing it to the document.

HANDS-ON PRACTICE 14.4

In this Hands-On Practice you will declare a variable, assign string data to it, and write it to the document.

Open a text editor and type the following:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
```

```
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>Using JavaScript</h1>
<h2>Hello
<script type="text/javascript">
<!-- <![CDATA[
  var userName;
  userName = "Karen";
  document.write(userName);
// ]]> -->
</script>
</h2>
</body>
</html>
```

Notice that the <h2> tag is placed before the script block and the </h2> tag is placed after the script block. This renders the userName in the <h2> heading format. There is also a single space after the "o" in "Hello". If you miss this space, you'll see the userName value displayed right after the "o".

Notice that the variable is mixed case. This is a convention used in many programming languages to make the variable readable. Some developers might use an underscore, like user_name. Selecting a variable name is somewhat of an art form, but try to select names that indicate the contents of the variable.

Notice also, that the document.write() method does not contain quotes. The contents of the variable will be written to the document. If we had used quotes around the variable name, the variable name itself would be written to the document, and not the contents of the variable.

Save this document as variablewrite.html and load it in the browser. Figure 14.13 shows the variablewrite.html file in the browser.



Chopping up the <h2> heading so that it is placed before and after the script is a bit cumbersome. We can combine strings using the plus (+) symbol. You'll see later in this chapter that the plus symbol can also be used to add numbers. Combining strings using the plus (+) symbol is called **concatentation**. Let's concatenate the <h2> information as a string with the username value and the </h2> tag.

Edit the variablewrite.html document as follows:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>Using JavaScript</h1>
<script type="text/javascript">
<!-- <! [ CDATA [
  var userName;
  userName = "Karen";
  document.write("<h2>Hello " + userName + "</h2>");
// 11> -->
</script>
</body>
</html>
```

Be sure to remove the <h2> and </h2> information above and below the script block. Save the file as variablewrite2.html and display it in the browser window. You should not see any difference in the document in the browser.

Collecting Variable Values Using a Prompt

To demonstrate the interactive aspect of JavaScript and variables, we can use the prompt() method to request data from the user, and write this data to the Web page. For example, we will build on Hands-On Practice 14.4 and prompt the user for a name rather than hard code this data in the userName variable.

The **prompt()** method is a method of the window object. We could use window.prompt() but the window object is assumed, so we can write this as simply prompt(). The prompt() method can provide a message to the user. This method is generally used in conjunction with a variable, so that the incoming data is stored in a variable. The structure looks as follows:

someVariable = prompt("prompt message");

When this command executes, a prompt box pops up that displays the message and an input box for data entry. The user types in the prompt box, clicks the OK button, and the data is assigned to the variable.

Let's add this feature to the variablewrite2.html file.



In this Hands-On Practice you will use the prompt() method to gather data from the user and write it to the document.

Edit the variablewrite2.html file as follows:

```
<script type="text/javascript">
<!-- <![CDATA[
   var userName;
   userName = prompt("Please enter your name");
   document.write("<h2>Hello " + userName + "</h2>");
// ]]> -->
</script>
```

Only the userName variable assignment command has changed. The data typed by the user will be assigned to the variable, userName.

Save the file as variablewrite3.html file and display it in the browser. The prompt box will appear and you can type a name in the input box, and click the OK button, as shown in Figure 14.14. The name should appear in the browser window.



Let's do a variation on this and allow the user to type a color name. The user's preference will be used as the background color of the document. We will use the bgColor property of the document object and set it to the user's color preference. Pay attention to case, and ensure that the uppercase C is used when typing bgColor.

Edit the variablewrite3.html document as follows, and save it as changebackground.html.

```
<script type="text/javascript">
<!-- <![CDATA[
   var userColor;
   userColor = prompt("Please type the color name blue or red");
   document.bgColor = userColor;
// ]]> -->
</script>
```

We are prompting the user to type the color name "blue" or "red." You know from your XHTML experience that there are more options for color names. Feel free to experiment!

Save the document and display it in the browser. The prompt box will appear, and you can type a color name and click the OK button. You should notice the background color change immediately.

14.8 Introduction to Programming Concepts

Until now, we have used the DOM to access properties and methods for the window and document. We have also created some simple event handlers. There is another aspect to JavaScript, which is more like programming. In this section, we'll touch on just a small part of this to get a feel for the power of using programming concepts and build on this later to test input on a form.

Arithmetic Operators

When working with variables, it is often useful to be able to do some arithmetic. For instance, you may be creating a Web page that calculates the tax on a product. Once the user has selected a product, you can use JavaScript to calculate the tax and write the result to the document. Table 14.3 shows a list of **arithmetic operators**, descriptions, and some examples.

Operator	Description	Example	Value of Quantity
=	assign	quantity = 10	10
+	addition	quantity = $10 + 6$	16
-	subtraction	quantity = 10 - 6	4
*	multiplication	quantity = 10 * 2	20
/	division	quantity = 10 / 2	5

 Table 14.3
 Commonly used arithmetic operators

Programming languages differ greatly in capabilities, but they all have a few things in common. They all allow the use of variables, and have commands for decision making, command repetition, and reusable code blocks. Decision making would be used when different outcomes are required depending on the input or action of the user. In our Hands-On Practice example we will prompt the user for an age, and illustrate different messages printed to the document based on the age. Repetition of commands comes in handy when performing a similar task many times. For instance, it is tedious to create a select list containing the numbers 1 through 31 for the days of the months. We can use JavaScript to do this with a few lines of code. Reusable code blocks are handy when you want to refer to a block of code in an event handler rather than typing many commands in the XHTML tag's event handler. As this chapter is meant as a very brief taste of some concepts, it is beyond our scope to elaborate further. We will touch on decision making and reusable code in the Hands-On Practice examples.

Decision Making

As we've seen, we can use variables in JavaScript. We may wish to test the value of a variable, and perform different tasks based on the variable. For instance, perhaps an order form requires that the user enters a quantity greater than 0. We could test the quantity input box to be sure the number entered is greater than 0. If the quantity is not greater than 0 we could pop up an alert message instructing the user to enter a quantity greater than 0. The *if* control structure looks as follows:

```
if (condition)
{
    . . . commands to execute if condition is true
} else {
    . . . commands to execute if condition is false
}
```

Notice that there are two types of grouping symbols used: parentheses and brackets. The parentheses are placed around the condition and the brackets are used to encapsulate a block of commands. The *if* statement includes a block of commands to execute if the condition is *true* and a block of commands to execute if the condition is *false*. The brackets are aligned so that you can easily see the opening brackets and closing brackets. It's very easy to miss a bracket when you're typing, and then have to go hunting for the missing bracket. Aligning them makes it much easier to track them visually. As you are typing JavaScript code remember that parentheses, brackets, and quotations always are used in pairs. If a script isn't working as intended, verify that each of these items has a "partner."

If the condition evaluates as true, the first command block will be executed and the else block will be skipped. If the condition is false, the first command block will be skipped and the else block will execute.

For the purpose of an overview, this is quite simplified, but it will give you a sense of how conditions and the *if* control structure can be useful. The condition must be something that can be evaluated as either true or false. We can think of this as a mathematical condition. The condition will generally make use of an operator. Table 14.4 lists commonly used **comparison operators**. The examples in Table 14.4 could be used as conditions in an *if* structure.

			Sample Values of Quantity That
Operator	Description	Example	Would Result in true
= =	Double equals sign (equivalent) "is exactly equal to"	quantity = = 10	10
>	Greater than	quantity > 10	11, 12 (but not 10)
> =	Greater than or equal to	quantity $> = 10$	10, 11, 12
<	Less than	quantity < 10	8, 9 (but not 10)
< =	Less than or equal to	quantity $< = 10$	8, 9, 10
! =	Not equal to	quantity ! = 10	8, 9, 11 (but not 10)

Table 14.4 Commonly used comparison operators



What can I do when my JavaScript code doesn't seem to be working?

You can try the following debugging techniques:

- Open the Error Console in Firefox to see if there are any errors. Common errors include missing a semicolon at the end of a line, and typing errors in commands.
- Use alert() to print variables to verify the contents. For instance, if you have a variable named quantity, try alert(quantity); to see what is contained in the variable.
- Ask a classmate to look at your code. It's difficult to edit your own code because you tend to see what you think you wrote rather than what you actually wrote. It's easier to edit someone else's code.
- Try to explain your code to a classmate. Often, talking through the code will help you uncover errors.
- Verify that you are not using any JavaScript reserved words as variable names or function names. See http://www.webreference.com/javascript/reference/core_ref for a list of reserved words.



In this Hands-On Practice you will code the quantity example described earlier. The user will be prompted for a quantity and must enter a quantity greater than 0. We will assume that the user will enter a number. If the user enters a value of 0 or a negative number, there will be an error message displayed. If the user enters a value greater than 0, a message will be displayed thanking the user for the order. To stay focused on this task, we will use a prompt and will write messages to the document.

Open a text editor and enter the following. Notice that there are no semicolon characters (;) after the brackets:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>Using JavaScript</h1>
<script type="text/javascript">
<!-- <![CDATA[
  var quantity;
  quantity = prompt("Type a quantity greater than 0");
  if (quantity <= 0)
  {
    document.write("Quantity is not greater than 0.");
    document.write("Please refresh the web page.");
  } else {
    document.write("Quantity is greater than 0.");
  }
```

//]]> --> </script> </body> </html>

Save this document as quantityif.html and display it in the browser. If the prompt box does not appear, remember to check the Error Console for errors. When the prompt box appears, type the number 0 and click the OK button. You should see the error message you have created in the browser window, as shown in Figure 14.15.



Now refresh the page and this time enter a value greater than 0, as shown in Figure 14.16.

Figure 14.16

The browser on the left shows the prompt box with input of a value greater than 0 and the browser on the right shows the result



Functions

The Hands-On Practice 14.6 pops up the prompt box as soon as the page loads. What if we prefer to allow the user to decide when a particular script should be interpreted or run by the browser? Perhaps we could use an onmouseover event handler and run the script when the user moves the mouse pointer over a link or image. Another method, perhaps more intuitive for the user, is to make use of a button and direct the user to click the button to run the script. The Web page visitor doesn't need to be aware that a script will run, but can click a button to initiate some sort of functionality.

Three types of buttons were introduced in Chapter 9:

- A submit button <input type="submit" /> is used to submit a form.
- A reset button <input type="reset" /> is used to clear values entered on a form.
- The third type of button <input type="button" /> does not have any default action related to forms.

In this section we will make use of the button <input type="button" /> and the onclick event handler to run a script. The onclick event handler can run a single command or multiple commands. A sample follows:

```
<input type="button" value="Click to see a message"
onclick="alert('Welcome!');" />
```

In this sample, the button will display the text "Click to see a message." When the user clicks the button, the click event occurs and the onclick event handler executes the alert('Welcome!'); command. The message box appears. This method is very effective when there is only one JavaScript statement to execute. It quickly becomes unmanageable when there are more statements to execute. When that happens, it makes sense to place all JavaScript statements in a block and somehow point to the block to execute. If the statement block has a name, we can execute the block by pointing to the name. In addition to providing a shortcut name, this code is also easily reused. We can provide a name for a statement block by creating a function.

A function is a block of JavaScript statements with a specific purpose, which can be run when needed. A function can contain a single statement or a group of statements, and is defined as follows:

```
function function_name()
{
    ... JavaScript statements
}
```

The function definition starts with the keyword function followed by the name of the function. The parentheses are required, and more advanced functions make use of them. You can choose a name for the function, just like you choose a name for a variable. The function name should indicate the purpose of the function somehow. The statements are contained within the brackets. The block of statements will execute when the function is called.

Here's an example of a function definition:

```
function showAlerts()
{
    alert("Please click OK to continue.");
    alert("Please click OK again.");
    alert("Click OK for the last time to continue.");
}
```

The function can be called using the following statement:

showAlerts();

Now, we could include the showAlerts() function call in a button as follows:

```
<input type="button" value="click to see alerts" onclick="showAlerts();" />
```

When the user clicks the button, the showAlerts() function will be called, and the three alert messages will appear, one after the other. Typically, function definitions are placed in the <head> area of the XHTML document. This loads the function definition code but it does not execute until it is called. This ensures that the function definition is loaded and ready to use before the function is called.



In this Hands-On Practice you will edit the quantityif.html document to move the prompting script into a function and call it with an onclick event handler.

Edit the quantityif.html document as follows. There are a few things to note. The script has been moved into the <head> area and included in a function definition. The document.write() methods have been changed to alert() methods and the messages have been altered slightly. The document.write() methods will not work well after the page has already been written, as is the case in this exercise. Also, there have been some comments added to the end brackets for the if statement and the function definition. The indentation of the code blocks also helps to identify which brackets begin and end various statements.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<script type="text/javascript">
```

```
<!-- <![CDATA[
```

```
function promptQuantity()
{
```

```
var quantity;
```

```
quantity = prompt("Please type a quantity greater than 0");
    if (quantity <= 0)
    {
      alert("Quantity is not greater than 0.");
    } else {
      alert("Thank you for entering a quantity greater than 0.");
    }
      // end if
  } // end function promptQuantity
// ]]> -->
</script>
</head>
<body>
<h1>Using JavaScript</h1>
<input type="button" value="Click to enter quantity"
onclick="promptQuantity();" />
</body>
</html>
```

Save the document as quantityif2.html and display it in the browser. Open the Error Console in case there are typing errors when you run the script.

Click the button to test the script. If the prompt box does not appear, check the Error Console and correct any errors. Figure 14.17 shows the browser and prompt box after the button has been clicked, and the resulting alert box. Be sure to test for a value larger than 0 and a value of 0 or less.





- old and a different alert message for users who are 18 years or older.
- 3. What is a function definition?

14.9 Form Handling

As you discovered in Chapter 9, the data from a Web form can be submitted to a CGI or a server-side script. This data can be added to a database or used for some other purpose; therefore, it is important that the data submitted by a user is as accurate as possible. When the user enters information in a form, there is always a chance that the information will be incorrect or inaccurate. This is particularly true when text input boxes are used, since the user can easily mistype data. Often, the form data is checked for invalid data before it is submitted. Form data validation can be done by the server-side script, but it can also be done client-side, using JavaScript. Again, this topic is simplified here, but we can get a sense of how this might be done.

When the user clicks the form's submit button, the submit event occurs. We can make use of the **onsubmit** event handler to call a function that tests form data for validation. This technique is referred to as **form handling**. The Web developer can validate all form inputs, some inputs, or just one form input. The following list is a selection of some types of things that might be validated:

- Required fields such as name and e-mail addresses
- A required check box to acknowledge a license agreement
- A radio button indicating method of payment or delivery option
- A quantity entered that is numeric and within a particular range

When the user clicks the submit button, the onsubmit event handler calls a function that tests all of the appropriate form elements for valid data. Then the validation function confirms that the data is valid (true) or not valid (false). The form is submitted to the URL indicated in the <form> action if the data is valid (true). The form would not be submitted if the data is not valid (false) and some indication to the user regarding errors would be displayed. The overall structure of the Web page code related to declaring the function and handling the onsubmit event follows:

```
... XHTML begins the Web page
function validateForm()
{
    ... JavaScript commands to test form data go here
    if form data is valid
      return true
    else
      return false
}
... XHTML continues
<form method="post" action="URL" onsubmit="return validateForm( );">
    ... form elements go here
      <input type="submit" value="submit form" />
</form>
... XHTML continues
```

There is a new concept with regard to functions indicated here. A function can encapsulate a group of statements, but it can also send a value back to where it was called. This is referred to as "returning a value" and the JavaScript keyword return is used in the
JavaScript code to indicate the value that will be sent back. Our example will return a value of true if the data is valid, the function will return a value of true and a value of false if the data does not pass our validation tests. Notice that the onsubmit event handler also contains the keyword return. It works like this: if the validateForm() function returns a value of true, the onsubmit event handler becomes return true and the form is submitted. If the validateForm() function returns a value of false, the onsubmit event handler becomes return false and the form is not submitted. Once a function returns a value, it is finished executing regardless of whether or not there are more statements in the function.



In this Hands-On Practice you will create a form with inputs for name and age, and use JavaScript to validate the data such that there will be data in the name field and an age of 18 or greater. If there is nothing in the name field, an alert message will be displayed instructing the user to enter a name. If the age entered is less than 18, an alert message will be displayed instructing the user to enter an age of 18 or greater. If all data is valid, an alert message will be displayed indicating that the data is valid and the form will be submitted.

Let's start by creating the form. Open a text editor and type the following. Notice that the onsubmit form handler is embedded in the <form> tag and we will add the JavaScript code later. CSS is used to align and add space around the form elements.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<style type="text/css">
div { padding-bottom: 10px;
      width: 250px;
      text-align: right; }
label { padding-right: 5px; }
</style>
</head>
<body>
<h1>JavaScript Form Handling</h1>
<form method="post"
action="http://webdevfoundations.net/scripts/formdemo.asp"
onsubmit="return validateForm();">
 <div>
   <label for="userName">Name:</label>
   <input type="text" name="userName" id="userName" />
  </div>
```

```
<div>
<label for="userAge">Age:</label>
<input type="text" name="userAge" id="userAge" />
</div>
<div>
<input type="submit" value="Send information" />
</div>
</form>
</body>
</html>
```

Save the file as formvalidation.html and view it in the browser. Figure 14.18 shows the form in the browser.

Figure 14.18	() JavaScript Practice - Mozilla Firefox
I he formvalidation html	<u>File Edit View History Delicious Bookmarks Access</u>
file displayed in the browser	JavaScript Form Handling Name: Age:
	Send information

Feel free to click the submit button. You will notice that the inputs will be submitted. At the moment we have not coded the validateForm() function, so the form simply submits.

Accessing form inputs is a little tricky. The form is a property of the document object. Each form element is a property of the form object. A property of a form element can be a value. So, accessing the contents of an input box could look something like the following:

```
document.forms[0].inputbox name.value
```

The form is identified by forms[0] to indicate which form will be used. An XHTML document can contain multiple forms. Note that there is an "s" in forms[0]. The first form is forms[0]. A form could have a name attribute, but Strict XHTML does not allow form names to be used directly as a property. So we'll err on the side of caution and use the strict specification, forms[0] to indicate which form we need to use. To access the value in the userAge input box, we will need to use document.forms[0].userAge.value. This is a mouthful, for sure.

Also, notice that the values true and false are not enclosed in quotes. This is important because true and false are not strings, they are JavaScript reserved words, or keywords and represent special values. If you add quotes to them, they become strings and this function will not work properly. Let's start by adding the code to validate the age. Edit the formvalidation.html file to add the following script block in the <head> section above the </head> tag:

```
<script type="text/javascript">
<!-- <![CDATA[
  function validateForm()
  {
    if (document.forms[0].userAge.value < 18)</pre>
    {
      alert ("Age is less than 18. You are not an adult.");
      return false;
    } // end if
    alert ("Age is valid.");
    return true;
  } // end function validateForm
// ]]> -->
</script>
```

The validateForm() function will check the age in the userAge input box. If it is less than 18, the alert message will be displayed and a value of false will be returned and the function will finish executing. The onsubmit event handler will become "return false" and the form will not be submitted. If the age is 18 or greater, the statements in the if structure will be skipped and the alert("Age is valid."); will execute. After the user clicks the OK button in the alert message, the statement return true; will execute and the onsubmit event handler will become "return true"; thus, the form will be submitted. Let's test this out!

Type a value less than 18 in the userAge input box and click the submit button. If the form submits right away, there is likely an error in the JavaScript code. If this happens, open the Error Console and correct the errors indicated. Figure 14.19 shows the input in the Age box and the alert message displayed after clicking the submit button.



Figure 14.19

The validateform.html file displayed in the browser with input for age less than 18-notice the alert message

Click the OK button and type an age that is 18 or greater in the userAge input box. Click the submit button. Figure 14.20 shows the input in the userAge input box, the alert message after the submit button has been clicked, and the resulting Web page after the form has been submitted.



Now let's add another if statement to validate the name. To ensure that something has been entered in the userName input box, we will test to see if the value of the input box is empty. The **null** string is represented by two double quotes, "", or two single quotes ", without a space or any other character in between. We can compare the value of the userName text box to the null string. If the value of the userName box is equal to the null string, then we know that the user did not enter any information in this box. In our example, we will be sending only one error message at a time. If the user does not have a name in the userName box and also does not have an appropriate age in the userAge box, the user will only see the userName error appear. After the user corrects the name and resubmits, the user will see the userAge error appear. This is very basic form processing but it gives you an idea of how form handling might be accomplished. More sophisticated form processing would verify each form field and indicate all errors each time the form is submitted.

Let's add the code to validate the userName data. Edit the script block as follows. Note that two equals signs represent equivalent in the if statement. Some students find it helpful to read the two equal signs (==) as "is exactly equal to."

```
<script type="text/javascript">
<!-- <![CDATA[
function validateForm()
{
    if (document.forms[0].userName.value == "" )
    {
        alert("Name field cannot be empty.");
        return false;
    } // end if
</pre>
```

```
if (document.forms[0].userAge.value < 18)
    {
      alert("Age is less than 18. You are not an adult.");
      return false;
      // end if
    }
    alert("Name and age are valid.");
    return true;
  } // end function validateForm
// ]]> -->
</script>
```

Save the document and refresh it in the browser window. Click the submit button without entering data in the Name or Age input boxes. Figure 14.21 shows the alert message displayed when no data has been input and the submit button has been clicked.

14.21	JavaScript Practice - Mozilla Firefox
orm.html file d in the without he Name boxes; the ssage	<u>File Edit View History Delicious Bookmarks Accessibility Iool</u> JavaScript Form Handling Name: Age:
ubmitted	Send information
	[JavaScript Application]

Click the OK button, enter some text in the Name input box, and submit the form again. Figure 14.22 shows data in the Name input box and the alert message that appears due to validating the age. The age input box does not contain an age, and this is interpreted as a value of 0.

<u>File Edit View</u>	Hi <u>s</u> tory	Delicious	<u>B</u> ookmarks	Accessibility
JavaScrip	ot Fo	orm H	andling	g
Name:	Jack			
Age:				
		Send infor	mation	
[JavaScript App	lication]		- X
Age i	s less th	an 18. You a	are not an adu	ılt

Figure 14.22

The validateform.html file displayed in the browser, with input in the Name box and without input in the Age box; the alert message appears after the submit button is clicked

The validatefo displayed browser, input in t and Age alert mes appears form is s

Figure

Click the OK button, and enter an age that is 18 or greater. Click the submit button. Figure 14.23 shows data in the Name and Age input boxes and the alert message that displays after the submit button has been clicked. It also shows the resulting Web page after the successful submission when all data is valid.

Figure 14.23	IavaScript Practice - Mozilla Firefox	Form Handler - Mozilla Firefox
The	<u>File Edit View History Delicious Bookmarks Accessibility Iool</u>	Eile Edit View History Delicious Bookmarks Accessibility Tool
validateform.html file displayed in the browser, with valid	JavaScript Form Handling	Your information has
input in the Name	Name: Jack	been received.
and Age boxes and alert message; the	Age: 18	userName: Jack
browser on the right	Send information	userAge: 18
shows the Web	[JavaScript Application]	
valid input has been submitted	Name and Age are valid.	
	ОК	Back



CHECKPOINT 14.4

- 1. What is meant by the term "form data validation"?
- 2. Give three examples of form data that may require validation.
- 3. An XHTML document contains the <form> tag as follows:

<form method="post" action="http://webdevfoundations.net/scripts/formdemo.asp" onsubmit="return validateForm();"> What happens when the user clicks the submit button?

14.10 Accessibility and JavaScript



The interactivity and functionality that JavaScript can add to a Web page is exciting. However, be aware that some visitors may have JavaScript disabled, may not be able to see your visual effect, or may be unable to manipulate the mouse. Section 508 requires that your site is functional at a basic level even if your visitor's browser does not support JavaScript. If you use JavaScript to handle mouse events in your site navigation, you should also provide plain text navigation that does not require a mouse and can be easily accessed by a screen reader. If you use JavaScript for form validation, provide an e-mail address to provide physically challenged visitors a way to contact your organization and obtain assistance.

14.11 JavaScript Resources

This chapter has barely scratched the surface of the uses of JavaScript in Web development. You may wish to do further research using some of the following online resources:

- JavaScript Tutorial (http://www.w3schools.com/JS)
- JavaScript Tutorial for the Total Non-Programmer (http://www.webteacher.com/javascript)
- More Beginning JavaScript Tutorials (http://echoecho.com/javascript.htm)
- Core JavaScript 1.5 Reference Manual (http://www.webreference.com/javascript/ reference/core_ref)
- Creating Accessible JavaScript (http://www.webaim.org/techniques/javascript)



CHAPTER SUMMARY

This chapter introduced the use of JavaScript as a client-side scripting language in Web pages. You learned how to embed script blocks in Web pages, display an alert message, use an event handler, and validate a form.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

alert()
<script>
arithmetic operators
browser sniffing
case-sensitive
client-side processing
comments
comparison operators
concatentation
debug
document
events
event handler

form handling function if image swapping jump menus keywords methods mouseover null object object-based onclick onload onmouseout onmouseover onsubmit prompt() reserved words scripting language server-side processing var variable window object write()

Review Questions

Multiple Choice

- **1.** Which of the following is the document considered to be?
 - a. object
 - b. property
 - c. method
 - d. attribute
- 2. When the user positions the mouse pointer on a link, the browser detects which one of these events?
 - a. mouseon
 - b. mousehover
 - c. mouseover
 - d. mousedown

- **3.** When the user moves the mouse pointer away from a link it had been hovering over, the browser detects which one of these events?
 - a. mouseoff
 - b. mouseout
 - c. mouseaway
 - d. mouseup
- **4.** Which method of the window can be used to display a message to the user?
 - a. alert()
 - b. message()
 - c. status()
 - d. display()

- 5. Which of the following will assign the value 5 to the variable productCost?
 - a. productCost = > 5; b. productCost < = 5; c. productCost = = 5; d. productCost = 5;
- 6. A condition (productCost > 5) is used in an if statement. Which of the following values of productCost will result in this condition evaluated as true?
 - a. 4
 - b. 5
 - c. 5.1
 - d. none of the above
- **7.** Which of the following can describe JavaScript, as used in a Web page?
 - a. a scripting language
 - b. a markup language
 - c. an easy form of Java
 - d. a language created by Microsoft
- 8. Which of the following is the code to access the contents of an input box named userData on a form?
 - a. document.forms[0].userData
 - b. document.forms[0].userData.value
 - c. document.forms[0].userData.contents
 - d. document.forms[0].userData.data
- 9. Which of the following is the code to run a function called isValid() when the user clicks the submit button?
 - a. <input type="button"
 onclick="isValid();" />
 - b. <input type="submit"
 onsubmit="isValid();" />
 - c. <form method="post" action="URL"
 onsubmit="return isValid();">
 - d. <form method="post" action="URL"
 onclick="return isValid();">

- **10.** Which of the following is a technique for creating reusable JavaScript code?
 - a. define a function
 - b. create a script block
 - c. define an if statement
 - d. use an onclick event handler

Fill in the Blank

- **11.** The term ______ refers to using JavaScript to detect information about the Web browser application.
- **12.** A ______ is a select list that allows the user to select an option to load another Web page.
- **13.** The ______ object is assumed to exist and it is not necessary to include it as an object when referring to its methods and properties.
- 14. We do not need to declare a ______, but we could choose to do so with the var statement.
- 15. The <button> can be used with a(n) ______ event handler to run a script when the user clicks a button.

Short Answer

- **16.** Describe at least three popular uses for JavaScript.
- **17.** Describe how you could debug JavaScript code when it is not working properly.

Apply Your Knowledge

1. Predict the Result. Given the following code, what will happen when the user clicks the button?

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<script type="text/javascript">
<!-- <![CDATA[
  function mystery()
  {
    alert('hello');
  }
// ]]> -->>
</script>
</head>
<body>
<h1>Using JavaScript</h1>
<input type="button" value="click me" onclick="mystery();" />
</bodv>
</html>
```

2. Fill in the Missing Code. This Web page should prompt the user for the name of a song and print the song name in the document. The missing code is indicated by " ". Fill in the missing code.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
</head>
<body>
<h1>Using JavaScript</h1>
<script type="text/javascript">
<!-- <! [CDATA[
  var userSong;
  userSong = ("Please enter your favorite song title.");
  document. ( );
// ]]> -->
</script>
</body>
</html>
```

3. Find the Error. When this page is loaded in the Web browser it is supposed to display an error message if the user does not have any data in the Name input box. It is not working properly, and instead submits the form regardless of the missing

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input. Fix the errors so that the form does not submit if there is no input in the Name input box. Correct the errors and describe the process you followed.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
<title>JavaScript Practice</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<script type="text/javascript">
<!-- <! [CDATA]
  function validateForm()
  {
    if (document.forms[0].userName.value == "" )
    {
      aert("Name field cannot be empty.");
      return false;
    } // end if
  aert("Name and age are valid.");
  return true;
    // end function validateForm
  }
// ]]> -->
</script>
</head>
<body>
<h1>JavaScript Form Handling</h1>
<form method="post" action="http://webdevfoundations.net/scripts/
formdemo.asp" onsubmit="return validateUser();">
<label>Name: <input type="text" name="userName" /></label>
<br />
<input type="submit" value="Send information" />
</form>
</body>
</html>
```

Hands-On Exercises

1. Practice writing event handlers.

- a. Write the XHTML tag and event handler to pop up an alert message that says "Welcome" when the user clicks a button.
- b. Write the XHTML tag and event handler to pop up an alert message that says "Welcome" when the user moves the mouse pointer over a hypertext link that says "Hover for a welcome message".
- c. Write the XHTML tag and event handler to pop up an alert message that says "Welcome" when the user moves the mouse pointer away from a hypertext link that says "Move your mouse pointer here for a welcome message".
- Create a Web page that will pop up an alert message welcoming the user to the Web page. Use a script block in the <head> area for this task.

- **3.** Create a Web page that will prompt the user for a name, and age, and write the message using the name and age in the message. Use the prompt() method and variables to accomplish this.
- 4. Create a Web page that will prompt the user for a color name. Use this color name to write the text "This is your favorite color!". The fgColor property of the document changes the text color of all text in a document. Use this property to accomplish this task.
- **5.** Extend Hands-On Practice 14.8. Add a text box for the user's city. Ensure that this text box is not empty when the form is submitted. If the city text box is empty, pop up an appropriate alert message and do not submit the form. If the city text box is not empty, and other data is valid, submit the form.

Web Research

- 1. Use the resources listed in the chapter as a starting point, but also search the Web for additional resources on JavaScript. Create a Web page that lists at least five use-ful resources along with a brief description of each. Organize your Web page with a table that provides the name of the site, the URL, a brief description of what is offered, and a recommended page (such as a tutorial, free script, and so on) for each resource. Place your name in an e-mail link on the Web page. Print both the source code (from Notepad) and the browser view of the Web page.
- 2. Use the resources listed in the chapter as a starting point, but also search the Web for additional resources on JavaScript. Find either a tutorial or free download that uses JavaScript. Create a Web page that uses the code or download that you found. Describe the effect and list the URL of the resource on the Web page. Place your name in an e-mail link on the Web page. Print both the source code (from Notepad) and the browser view of the page.

WEB SITE CASE STUDY: Adding JavaScript

Each of the following case studies has continued throughout most of the text. This chapter adds JavaScript to selected Web pages from each of the case studies.

JavaJam Coffee House

See Chapter 2 for an introduction to the JavaJam Coffee House Case Study. Figure 2.26 shows a site map for the JavaJam Web site. The pages were created in earlier chapters. Use the Web pages indicated in this exercise from the Chapter 9 javajamcss folder. You have two tasks:

- 1. Add the date that the document was last modified to the bottom of the music.html page.
- **2.** Add an alert message to the music.html page. The alert message will indicate "Concerts sell out quickly so act fast!".

Hands-On Practice Case

- 1. Add the date that the document was last modified to the bottom of the music.html page. Launch Notepad and open the music.html page. Modify the page as follows:
 - In the page footer section after the e-mail link, add a script block that will write the following message to the document:

This page was last modified on: date

- Use the document.lastModified property to print the date.
- 2. Add alert messages to the music.html page such that an alert message will pop up when the user places the mouse over the phrase, "music you won't want to miss". The alert message will indicate "Concerts sell out quickly so act fast!". Launch Notepad and open the music.html page. Modify the page as follows:
 - Add a hypertext link to the first paragraph with an onmouseover event handler as follows:

```
<a href="#" onmouseover=
"alert('Concerts sell out quickly so act fast!');">music you
won't want to miss.</a>
```

Save the music.html page and test it in the browser. Figure 14.24 shows the alert message as a user places their mouse over the hyperlinked phrase. It also shows the date last modified.



Fish Creek Animal Hospital

See Chapter 2 for an introduction to the Fish Creek Animal Hospital Case Study. Figure 2.30 shows a site map for the Fish Creek Web site. The pages were created in earlier chapters. Use the Web pages indicated in this exercise from the Chapter 9 fishcreekcss folder. You have two tasks:

- **1.** Add rollover images for the navigation images to each Fish Creek Web site page.
- **2.** Add the date last modified to the home page.

JavaJam music.html

with the mouseover alert for performers' descriptions and the date last modified

Hands-On Practice Case

- Add rollover images for the navigation images to each Fish Creek Web site page. When a visitor places the mouse over one of the navigation images, the image will change—this is an image rollover. In this case study you will add image rollovers to all the pages on the Fish Creek site.
 - a. Your home page (index.html in the fishcreekcss folder) should already display the logo (fishcreeklogo.gif) and navigation images (home.gif, services.gif, askthevet.gif, contact.gif). If it doesn't, obtain the logo and navigation images from the student files (Chaper14/CaseStudyStarters folder) and save them to your fishcreekcss folder. Use Figure 14.25 as a guide. The images should each link to their corresponding pages.

Fish Cr	eek Anir	nal Hosp	ital - Mozill	a Firefox								X
e <u>E</u> dit	View	Higtory	Delicious	Bookmarks	Accessibility	Tools	Help					0
			Ala Bi &	ish C	reek	Ani	mal	Hos	pital	,		
	Hom	e	F	ull Serv Veter a wee	v ice Fac i inarians a ek.	ility and st	taff are	on dut	y 24 hoı	ırs a day	/, 7 day	/S
-	Servi	ces)	¥ ا	ears of Fish (care f	Experie Creek Vet or your b	erinar elove	rians ha d anim	ave prov als sinc	vided qu e 1984.	ality,dej	pendab	le
A	sk the	Vet	¢(0	pen Do Our p during	or Polic rofession J any med	y als w dical p	elcome procedu	owners ure.	s to stay	with th	eir pets	
	Conta	ict	1- 12 Fit	800-555-5 42 Grassy sh Creek, V	555 Lane VI 55534							
				Hor Co	<u>me</u> <u>Scrvices</u> pyright © 2011 <u>yourfirstnam</u>	<u>Ask tl</u> Fish Cree e@yourla	<u>he Vet</u> <u>Co</u> k Animal Ho stname.com	<u>ontact</u> Ispital				
				The page	was last mod	ified on.	: 07/21/20	009 10:35:	58			

- b. Copy the new images for this case from the student files (Chapter14/ CaseStudyStarters folder) and save them to your fishcreekcss folder. These are the images that will display when the user places the mouse pointer over one of the images links: serviceson.gif, asktheveton.gif, contacton.gif, and homeon.gif.
- c. Modify the index.html page to use JavaScript onmouseover and onmouseout event handlers.

Add the name attribute to each image used for navigation. For example, the tag for the Services image should be modified as follows:

Modify the Home, Ask the Vet, and Contact tags similarly. The value of the name attribute should not contain any spaces.

Add onmouseover and onmouseout event handlers to each image hypertext link. The event handlers will change the src attribute on the image to a new

Figure 14.25

Fish Creek Animal Hospital index.html page with rollover image for the services link and date last modified in the footer value. For example, the hypertext link for the services.html page should be modified as follows:

```
<a href="services.html"
onmouseover="document.services.src='serviceson.gif'"
onmouseout="document.services.src='services.gif'">
```

Note that document.services.src corresponds to the src attribute on the tag with the name attribute value of services. When the user places the mouse pointer over the image link, document.services.src is set to the new image file (serviceson.gif). When the user moves the mouse pointer off of the image link, document.services.src is set to the old image file (services.gif).

The image links for the Home, Ask the Vet, and Contact pages should be modified similarly to the Services image link. Save your page and test it in a browser. You should see the images swap.

In a similar manner, add image rollovers to the services.html, askthevet.html, and contact.html pages. Save your pages and test in a browser.

2. Add the date last modified to the home page.

Launch Notepad and open the index.html page. Modify the index.html page as follows:

• In the page footer section after the e-mail link, add a script block that will write the following message to the document:

This page was last modified on: date

• Use the document.lastModified property to display the date.

Pasha the Painter

See Chapter 2 for an introduction to the Pasha the Painter Case Study. Figure 2.34 shows a site map for the Pasha the Painter Web site. The pages were created in earlier chapters. Use the Web pages indicated in this exercise from the Chapter 9 paintercss folder. You have two tasks:

- 1. Add an alert message that welcomes the user to the Pasha the Painter Web site when the user displays the home page (index.html).
- 2. Add form data validation to the estimates.html page such that if the name, e-mail address, or phone number input boxes are empty, the form will display an error message and will not submit.

Hands-On Practice Case

- 1. Add an alert message that welcomes the user to the Pasha the Painter Web site when the user displays the home page (index.html).
 - Launch Notepad and open the index.html page from the paintercss folder.
 - Edit the <body> tag as follows:

<body onload=

"alert('Pasha the Painter can handle your painting needs!');">

• The load event occurs when the Web page begins to load in the browser. The onload event handler in this case pops up an alert message.

Save the file and test it in the browser.

- 2. Add form data validation to the estimates.html page such that if the name, e-mail address, or phone number input boxes are empty, the form will display an error message and will not submit.
 - Launch Notepad and open the estimates.html page from the paintercss folder.
 - Add a script block to the <head> area as follows:

```
<script type="text/javascript">
<!-- <![CDATA[
function validateForm()
{
    if (document.forms[0].myName.value == "" )
    {
        alert("Name field cannot be empty.");
        return false;
    } // end if
        alert("All data is valid.");
        return true;
    } // end function validateForm
// ]]> -->
</script>
```

Edit the <form> tag as follows:

```
<form method="post"
action="http://webdevfoundations.net/scripts/painter.asp"
onsubmit="return validateForm();">
```

• Verify that the input textbox that accepts the visitor's name has a name attribute with the value of myName. Sample code follows.

<input type="text" name="myName" id="myName" />

- Save the file and load it in a browser. Test it by clicking the submit button without input for the name input box. The alert box should pop up and the form should not be submitted. Test it again by entering information in the name input box and submit again. The alert box should pop up confirming that data is valid and the form should be submitted.
- Add data validation for the e-mail input box and phone number input box. Verify the value of the name attribute for each XHTML input element. Feel free to copy the *if* statement from the name validation and edit to point to the appropriate input boxes. Open the Error Console if necessary to find errors.

Save your file and refresh it in the browser as you add each validation to test it.

Prime Properties

See Chapter 2 for an introduction to the Prime Properties Case Study. Figure 2.38 shows a site map for the Prime Properties Web site. The pages were created in earlier chapters. Use the Web pages indicated in this exercise from the Chapter 9 primecss folder. You have two tasks:

1. Add onmouseover event handlers to the listing numbers in the listings.html page such that when the user hovers the mouse pointer over the listing number, an

alert message pops up reminding the user to click the contact link to contact an agent for more information.

2. Add the date last modified to the footer section of the listings.html page.

Hands-On Practice Case

- 1. Add onmouseover event handlers to the listing numbers in the listings.html page such that when the user hovers the mouse pointer over the listing number, an alert message pops up reminding the user to click the contact link to contact an agent for more information.
 - Launch Notepad and open the listings.html file from the primecss folder.
 - Add the following code around the listing number as follows:

```
<a href="#" onmouseover=
"alert('Please contact us for more information.');">
Listing #3432535</a>
```

• Similarly, add this code to the second listing paragraph.

Save the file and test it in a browser. The alert box should pop up when you move the mouse pointer over the listing link.

- **2.** Add the date last modified to the footer section of the listings.html page.
 - Launch Notepad and open the listings.html page if it is not already open. Modify the page as follows:
 - At the bottom of the page, after the e-mail link, add a script block that will write the following message to the document:
 - This page was last modified on: date
 - Use the document.lastModified property to display the date.

Web Project

See Chapter 5 for an introduction to the Web Project case. Review the goals of your Web site and determine if the use of JavaScript to add interactivity would add value to your site. If so, add it appropriately. Check with your instructor for the required use of interactivity in your Web project.

Select one or more from the following:

- Choose one of the examples from the chapter to add an alert message to grab the user's attention for important information.
- Choose one of the examples from the chapter to add validation to a form in your Web site. Consider using one or more of the following validation rules:
 - Required information such as name, address, e-mail, phone number
 - Numeric information within bounds such as a quantity greater than 0 or age greater than 18
- Consider adding image swapping as shown in the Fish Creek Animal Hospital Case Study in this section.

Decide where to apply the interactive technology to your site. Modify, save the page(s) and test it in the browser.

Web Developer's Handbook

In the following appendixes you will find a variety of resources that can help you be a more productive Web developer. Reference lists, tutorials, and links to Web resources are included.

APPENDIXES

- **Appendix A.** XHTML Reference contains detailed information about XHTML, along with an introduction to XML syntax
- **Appendix B.** Special Characters contains a list of codes needed to display symbols and other special characters on Web pages
- **Appendix C.** CSS Property Reference contains a list of commonly used properties and values. In addition, links to additional resources available on the Web are provided
- **Appendix D.** Comparison of HTML and XHTML discusses the syntax differences between these markup languages and provides side-by-side examples, including proposed HTML 5 syntax
- **Appendix E.** Section 508 Standards lists the Section 508 standards and the textbook chapters that discuss related coding or design techniques

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APPENDIX

XHTML Reference

XHTML uses the tags and attributes of HTML along with the syntax of XML. For the most part, you will use the same tags and attributes in HTML and XHTML; the major change is the syntax and additional restrictions in XHTML. This section provides an introduction to XML syntax and a detailed list of XHTML tags and attributes.

You will notice that a number of XHTML elements and attributes are deprecated, which means that they are currently supported but will be removed from the language in the future. Most of the deprecated elements relate to presentation features such as alignment text configuration. The W3C recommends using CSS to replace the functionality of the deprecated components. This section will be helpful as a reference as you design Web pages. It contains five major areas:

- XML Syntax
- General XHTML 1.0 Syntax Guidelines
- Basic Tags
- Header Section Tags
- Body Section Tags

A.1 XML Syntax

An XML document must be well formed. A well-formed document is a document that adheres to the syntax rules of the language. Here are the key syntax rules of XML:

- XML is case-sensitive.
- An XML document must contain one or more elements.
- All XML elements must have an opening tag and a closing tag. All tags are enclosed in angle brackets.

- All XML elements must be properly nested. Nesting is the use of one or more elements inside other elements. The most recently opened element must be the next one closed.
- All attribute values in XML must be contained in quotes.
- All XML documents must begin with a statement declaring it to be an XML document. The XML Declaration is shown below:

<?xml version="1.0" encoding="UTF-8"?>

While this technique is preferred by the W3C, the meta tag (see Chapter 2) is more commonly used. The reason is that there are incompatibility and display issues when the XML declaration is used with some browsers (such as certain versions of Internet Explorer).

• All XML documents must have opening and closing tags that form the root element within which all other elements in the document are contained. The <html> and </html> tags serve this purpose for Web page documents.

A.2 General XHTML Syntax Guidelines

Since XHTML uses the syntax of XML, it must follow the XML syntax rules. The following guidelines specify examples of how this is accomplished when using XHTML:

- 1. All XHTML elements (the tags and their attributes) should be lowercase.
- **2.** The <head> and <body> tags are required.
- **3.** The <title> tag is the first tag in the header section.
- 4. All container tags must use their opening and closing tags.
- 5. All self-contained tags (sometimes called empty elements) must be properly closed. For example, use <hr /> instead of <hr>.
- 6. All attribute values should be contained in quotation marks.
- 7. All attributes should have values. For example, use

```
<input type="checkbox" checked="checked" name="IE" id="IE" value="yes" />
```

instead of

```
<input type="checkbox" checked name="IE" value="yes" >.
```

 Tags should not overlap, they should be properly nested. For example, use This is important instead of

This is important.

- 9. The following tag-specific nesting restrictions apply:
 - A <form> tag cannot contain another <form> tag.
 - An <a> tag cannot contain another <a> tag.
 - A tag cannot contain any of the following tags: , <object>, <big>, <small>, <sub>, or <sup>.
- **10.** Formatting should be configured with style sheets and the tag should be avoided.
- The name attribute is deprecated in XHTML 1.0 as applied to bookmarks and named fragment identifiers. This has the greatest effect on <a> and <map> tags.

XHTML uses the id attribute to configure bookmarks and named fragment identifiers.

12. The Web page document should declare the character encoding. The W3C recommends that the Web page code begin with an XML declaration as follows:

<?xml version="1.0" encoding="UTF-8"?>

However, in practice, some browsers (such as Internet Explorer 6) experience display issues when a Web page includes an XML declaration. So, the workaround (which still passes W3C XHTML validation) is to indicate the character encoding with a meta tag in the header section as shown below:

<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />

13. If provided, the XML declaration should be followed with a Document Type Definition (DTD). Otherwise, the document should begin with a DTD. There are three DTDs: strict, transitional, and frameset. The strict DTD is not usually used by commercial Web sites because it requires the exclusive use of CSS and does not allow deprecated elements. Use the transitional DTD for most XHTML Web page documents. Use the Frameset DTD for Web page documents that describe a frameset. For more information see Table A.1.

Table A.1 XHTML document type definitions

DTD	Description
XHTML 1.0 Transitional	html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"<br "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
	This is the least strict specification for XHTML 1.0. It allows the use of both CSS and traditional formatting instructions such as fonts. This DTD is used for most of the coding in this text.
XHTML 1.0 Strict	html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"<br "http://www.w3.org/TR/xhtml1/DTD/xhtml1- Strict.dtd"> Bequires exclusive use of CSS Does not allow any deprecated elements
XHTML 1.0 Frameset	<pre><!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Frameset//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-frameset.dtd"> Boguired for pages using XHTML frames </pre>

Note: In the Description column of this table, the number one (1) is set bold where it might otherwise be confused with the letter "el."

14. The root element (immediately after the DTD) must be an <html> tag that refers to the XML namespace and indicates the language, as shown in the following example:

<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">

A.3 Basic Tags

The XML Declaration

<?xml version="1.0" encoding="UTF-8"?>

This XML declaration indicates that the document is based on the XML 1.0 standard. It also indicates that the character encoding (the internal representation of letters, numbers, and symbols) used by this document is UTF-8, a form of Unicode. This XML declaration is recommended by the W3C to be the first line in a Web page document. However, in practice, this line is omitted and, instead, a meta tag that indicates character encoding is typically coded in the header section of the Web page.

The **DOCTYPE** (DTD) Tag

The DOCTYPE or DTD tag identifies the markup language used in a document. Three DTDs are valid in XHTML. They are listed in Table A.1.

The <html> Tag

<html></html>

The <html> tag contains the code that describes the Web page document. The tag also describes the location of the documentation for the elements being used (called the XML namespace or xmlns). This additional information is added to the <html> tag in the form of an xmlns attribute. The xmlns attribute points to the URL of the XHTML namespace used in the document, the standard "http://www.w3.org/1999/xhtml." Optionally, you can add attributes to specify the language of the document (for example, English is "en," German is "de") to assist the interpreting of page content by search engines and screen readers. The lang and xml:lang attributes are used for this purpose. See http://www.loc. gov/standards/iso639-2/php/English_list.php for a list of language codes. The <html> tag is the first tag in a Web page after the DOCTYPE tag. For example:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
   <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
    ... the rest of your web page goes here ...
</html>
```

The <head> Tag

<head></head>

The <head> tag is required and encloses the header area of a Web page document. The main purpose of the header area is to describe the document. The header usually contains <title> and meta tags. It may also contain JavaScript code and CSS.

The <body> Tag

<body></body>

The <body> tag is required and contains the body area of a Web page document—the part of the document that is displayed in the browser window. It can contain many different types of XHTML tags along with text and JavaScript.

A.4 Header Section Tags

The <title> Tag

<title></title>

The <title> tag contains the title of the page, which displays in the browser's title bar. This tag must be the first tag in the header section.

The <meta /> Tag

<meta http-equiv="Content-Type" content="text/html; charset=utf-8" /> <meta name="keywords" content="a list of words that describe your site" /> <meta name="description" content="a brief description of your site" />

The self-contained meta tag has various purposes. The Content-Type meta tag declares the character encoding scheme used. Some meta tags such as keywords and description tags may be used by search engines.

The <link /> Tag

<link />

The self-contained <link /> tag associates a Web page with an external style sheet. Table A.2 shows <link /> tag attributes and their values.

Table A.2 <link /> tag attributes

Attribute	Values	Usage
href	URL of the external stylesheet (.css file)	Identifies which style sheet is being used.
rel	"stylesheet"	Indicates the link is a style sheet.
type	"text/css"	Indicates the MIME type of the style sheet file.
media	"print", "screen", "handheld",	Indicates the display medium (print, browser, mobile
	"aural"	device, screen reader, and so on) intended for display.

The <base /> Tag

<base />

The self-contained <base /> tag is most often used with pages displayed within a frameset. It sets a default target frame for the hyperlinks on the page. The attribute of target is set to the name of the window or frame in which all the hyperlinks should display.

The <script> Tag

<script></script>

This <script> tag configures a Web page to use client-side scripting. Table A.3 shows <script> tag attributes and their values.

Table	A.3	<script></script>
-------	-----	-------------------

Attribute	Value	Usage
language	Usually "javascript"	Optional. Indicates the scripting language being used.
src	URL of the external script file, usually a .js file	Identifies the external file containing scripting commands. If this attribute is omitted, the script is contained between the <script></script>

An example follows:

```
<script type="text/javascript">
    ... JavaScript statements go here ...
</script>
```

When strict XML syntax is applied, any JavaScript statements should be surrounded by character data (CDATA) statements. This tells the XML parser to ignore the JavaScript statements as arbitrary character data and not to process them. The syntax is as follows:

```
<script type="text/javascript">
<![CDATA[
... JavaScript statements go here ...
]]>
</script>
```

Unfortunately, this generates a JavaScript error in many current browsers; therefore, it's not commonly used. This problem can be circumvented by accessing external JavaScript files, as shown here:

```
<script type="text/javascript" src="script.js">
</script>
```

In this case all the JavaScript statements are located in the external file called script.js and no CDATA statement is needed.

The <style> Tag

<style></style>

The <style> tag configures a Web page to use an embedded style sheet. The attribute of type is set to "text/css" and indicates the MIME type of the style sheet.

A.5 Body Section Tags

The <body> Tag

<body></body>

The <body> tag contains the body area of a Web page document. <body> tag attributes configure properties for the Web page. Table A.4 shows <body> tag attributes and their values.

Attribute	Value	Usage
alink	A valid color; the W3C	Configures the color of the active hyperlinks recommends hexadecimal colors on the Web page. (Deprecated)
background	The name of an image file	Places a background image on the Web page.
		If the image is smaller than the page, it will be repeated, or tiled, on the browser window. (Deprecated)
bgcolor	A valid color; the W3C recom- mends hexadecimal colors	Configures the background color of the Web page. (Deprecated)
bgproperties	"fixed"	When combined with a background image, this property will fix the background image, simulating the effect of a water- mark as the Web page visitor scrolls down the page. Only used by Internet Explorer.
leftmargin	Number of pixels	Configures the left margin of the Web page. Only used by Internet Explorer.
link	A valid color; the W3C recom- mends hexadecimal colors	Configures the color of the hyperlinks on the Web page. (Deprecated)
marginheight	Number of pixels	Configures the top margin of the Web page. Only used by Netscape.
marginwidth	Number of pixels	Configures the left margin of the Web page. Only used by Netscape.
text	A valid color; the W3C recom- mends hexadecimal colors	Configures the color of the text on the Web page. (Deprecated)
topmargin	Number of pixels	Configures the top margin of the Web page. Only used by Internet Explorer.
vlink	A valid color; the W3C recom- mends hexadecimal colors	Configures the color of the visited hyperlinks on the Web page. (Deprecated)

Table A.4<body>tag attributes

A.6 Core XHTML Attributes

The following attributes may be used to configure most XHTML elements. These attributes are valid in all elements except base, head, html, meta, param, script, style, and title elements.

The class Attribute

The class attribute is used to associate an XHTML element with a class that has been defined using CSS. The value should be a class name found in either the embedded or external CSS property rules utilized by the Web page.

The id Attribute

The id attribute uniquely identifies an element on a Web page. If is often used to associate an XHTML element with a unique id (unique to the particular page) that has been defined using CSS. The value should be an id name found in either the embedded or external CSS property rules utilized by the Web page.

The style Attribute

The style attribute configures inline style rules for an XHTML element. The value should be a valid CSS property rule.

The title Attribute

The title attribute configures a description of an XHTML element and its contents. This text may be accessed using a screen reader. Some browsers may display this text in a tooltip or in a summary list of elements (such as hyperlinks) found on a Web page.

A.7 Block-Level Elements

The Tag

The tag creates a paragraph of text. The browser displays the paragraph with a blank line before and after the paragraph. The align attribute specifies the horizontal placement of the paragraph. The values for the align attribute are "left" (default), "right", and "center". The align attribute is deprecated.

The Heading Tag

<h1></h1>

The heading tag contains headings and important points. The text contained between the heading tags is placed on its own line. There are six levels of heading tags: <h1> (the largest), <h2>, <h3>, <h4>, <h5>, and <h6> (the smallest).

The align attribute specifies the horizontal placement of the heading. The values for the align attribute are "left" (default), "right", and "center". The align attribute is deprecated.

The <blockquote> Tag

<blockquote></blockquote>

The <blockquote> tag indents text. The text contained between <blockquote> tags is indented from the left and right margins.

The <div> Tag

<div></div>

The <div> tag creates a separate division, or logical area, on a Web page. A line break occurs before and after the division.

The align attribute specifies the horizontal placement of the division. The values for the align attribute are "left" (default), "right", and "center". The align attribute is deprecated.

The Tag

The tag creates a separate logical area on a Web page without any line breaks before or after. It is often used to apply styles.

A.8 List Tags

The <dl> Tag

<dl></dl>

The <dl> tag creates a definition list. It is used with the <dt> and <dd> tags.

The <dt> Tag

<dt></dt>

The <dt> tag identifies a defined term in a definition list.

The <dd> Tag

<dd></dd>

The <dd> tag identifies a definition in a definition list.

The Tag

The tag creates an ordered, or numbered, list. It is used together with tags. The deprecated type attribute on the tag configures the type of ordering. The deprecated start attribute configures the beginning value displayed in the list. Table A.5 shows tag attributes and their values.

Attribute	Value	Symbol
type	"1"	Numerals (the default)
	"A"	Uppercase letters
	"a"	Lowercase letters
	"I"	Roman numerals
	"i"	Lowercase Roman numerals
start	Numeric	Configures the beginning value displayed in the list

Table A.5 tag attributes

The Tag

<1i></1i>

The <1i> tag identifies a line item in ordered and unordered lists.

The Tag

The tag creates an unordered, or bulleted, list. It is used together with tags. The deprecated type attribute on the tag configures the bullet displayed. Table A.6 shows the tag attribute and its values.

Table A.6 tag attribute

Attribute	Value	
type	"disc" (default)	
	"circle"	
	"square"	

A.9 Text-Level Elements

The Tag

The tag formats text. This tag is deprecated. Table A.7 shows the tag attributes and their values.

Table A.7	 tag	attributes
-----------	-------------------	------------

Attribute	Value	Usage
color	A valid color; the W3C recommends hexa- decimal colors	Used to configure the color of the text. (Deprecated)
face	A valid font name such as "Arial" or "Times New Roman"	Configures the font type of the text. If the font speci- fied is not installed, the text will display in the browser's default font. (Deprecated)
size	Absolute size: integers ranging from "1" to "7"; the default is "3"	Configures the size of the text. "1" is the smallest, "7" is the largest. (Deprecated)

Logical Style Tags

Logical style tags specify the logical use and format of the text. Table A.8 shows logical style tags and examples of their use.

Table A.8 Logical style tags

Element	Example	Usage
	strong text	Causes text to be emphasized or to stand out from surrounding text. Usually displays in bold.
	<i>emphasized</i> text	Causes text to be emphasized in relation to other text on the page. Usually displayed in italic.
<cite></cite>	cite text	Identifies a citation or reference.
<code></code>	code text	Identifies program code samples. Usually a fixed-space font.
<dfn></dfn>	<i>dfn</i> text	Identifies a definition of a word or term.
<kbd></kbd>	kbd text	Identifies user text to be typed. Usually a fixed-space font.
<samp></samp>	samp text	Shows program sample output.
<var></var>	<i>var</i> text	Identifies and displays a variable or program output.

Physical Style Tags

Physical style tags configure the physical display of the text. Table A.9 shows physical style tags and examples of their use.

Table A.9	Physical style	e tags
-----------	----------------	--------

Element	Example	Usage
	bold text	Displays text in bold.
<i></i>	emphasized text	Displays text in italic.
<big></big>	big text	Displays text in larger than normal size.
<small></small>	small text	Displays text in smaller than normal size.
	subscript ^{text}	Displays in smaller text, below the baseline.
	superscript _{text}	Displays text in smaller text, above the baseline.
<strike></strike>	strikethrough text	Displays text with a line through it. (Deprecated)
<tt></tt>	teletype text	Displays text in teletype or fixed-space font.
<u></u>	underlined text	Displays text underlined; avoid using this because underlined text can be confused with hyperlinks. (Deprecated)

The
 Tag

The self-contained
 tag creates a line break. The next XHTML element is displayed on a new line. The values for the deprecated clear attribute on the
 tag are shown in Table A.10.

Table A.10 clear attribute values

clear Attribute Value	Result
"left"	The next element is displayed on a new line under any existing element blocking the left margin.
"right"	The next element is displayed on a new line after any existing element blocking the right margin.
"all"	The next element is displayed on a new line after any existing element blocking either the left or right margin.

The <hr /> Tag

<hr />

The self-contained <hr /> tag creates a horizontal line on the Web page. Table A.11 shows the <hr>> tag attributes and their values.

Table A.11 <hr>> tag attributes

Attribute	Value	Usage
align	"left"	Aligns the horizontal line on the Web page. (Deprecated)
	"center" (default)	
	"right"	
color	A valid color; the W3C recom- mends hexadecimal colors	Configures the color of the horizontal line. Not in W3C Recommendation; originally only used by Internet Explorer.
noshade	"noshade"	Prevents a shadow from being displayed under the line. (Deprecated)
size	Number of pixels	Configures the height of the line. (Deprecated)
width	Numeric percentage	Configures a line that takes up a percentage of the width of the browser window. <hr width="50%"/> (Deprecated)
	Number of pixels	Configures a line that takes up an exact number of pixels in the browser window. <hr width="60"/> (Deprecated)

The <a> Tag

<a>

The <a> tag, called the anchor tag, creates a hyperlink. The text or image contained between the <a> tags is displayed by the browser as a hyperlink, as in the following example:

```
<a href="http://mycompany.com">My Company</a>
```

This creates an absolute hyperlink to the URL specified, in this case mycompany.com.

My Page

This creates a relative link to the named file, in this case mypage.html.

My Page

This creates a relative link to the named file, in this case mypage.html. It will also display the text associated with the title attribute in a tooltip alongside the link when the visitor places the mouse pointer on the link.

Send e-mail to me@me.com

This creates a link to an e-mail address. If a default mail program is configured for the browser, the mail program will launch and get ready to send a message with the e-mail address provided, in this case me@me.com.

```
<a href="#top">Back to Top</a>
```

This creates an internal link to a bookmark or named fragment on the same Web page, in this case to the named fragment called top.

```
<a id="top"></a>
```

This identifies a portion of a Web page as a bookmark or named fragment, in this case, the named fragment called top.

My Page

This configures the window that the hyperlinked page will display in. The target attribute is most often used with frames. Table A.12 lists <a> tag attributes and their values. Values for the target attribute are shown in Table A.13.

Attribute	Value	Usage
accesskey	A character on the keyboard that appears in the hyperlink description	Configures a hot key to activate the link without using the mouse pointer.
href	A valid URL or Web page file name	Creates a link to the named page or named element.
id	Text name, alphanumeric, beginning with a letter, no spaces	Uniquely identifies the element. This value can be used by a corresponding hyperlink.
name	Text name, alphanumeric, beginning with a letter, no spaces	Identifies the element. This value is used by a correspon- ding <a> tag with an href attribute. This is deprecated in XHTML but is included for backward compatibility.
tabindex	Numeric	Changes the order of the links accessed by pressing the Tab key. Default order is the order the links are placed on the page.
target	See Table A.13	Configures the window that displays the link. The default is the current window. See Table A.13.
title	A brief text description	Configures a brief text description that will display in some browsers when a mouse pointer is placed over the link.

Table A.12 <a> tag attributes

Table A.13 target attribute values

target Attribute Value	Result
"_top"	Typically used to bust out of a frameset and display the hyperlinked page in the entire browser window.
"_blank"	Opens a new browser window to display the hyperlinked page.
"_parent"	Displays the hyperlinked page in the frame that contains the current frameset.
"_self"	Displays the hyperlinked page in the same window.
A valid frame name value configured	Displays the hyperlinked page in the named window.

in a frameset page

A.10 Graphic Tags

The Tag

The self-contained tag, called the image tag, displays an image file. Table A.14 shows tag attributes and their values.

Table A.14 tag attributes

Attribute	Value	Usage
align	"left" (default), "right", "top", "texttop", "middle", "absmiddle", "bottom"	Aligns the image relative to the text on the page. (Deprecated)
alt	A brief text description of the image	Provides accessibility to visitors unable to view the image.
border	Number of pixels for image border; "0" prevents the border from being displayed	Configures the border area on the image. (Deprecated)
height	Number of pixels	Configures the height of the image.
hspace	Number of pixels	Configures space to the left and right of the image. (Deprecated)
id	Text name, alphanumeric, beginning with a letter, no spaces	Identifies the image. The value must be unique and not used for other id values on the same XHTML document.
longdesc	URL of Web page with detailed description of the image	Used by some assistive technologies to provide acces- sibility to the information in the image.
name	Text name, alphanumeric, beginning with a letter, no spaces	Names the image so that it can be easily accessed by client-side scripting languages such as JavaScript. This attribute is deprecated in XHTML but is used to provide backward compatibility with browsers that support HTML.
src	Name of the image file (required)	Configures the image file to be displayed.
title	A brief text description	Configures a text description that will display when the visitor moves the mouse pointer over the image.

Table A.14 tag attributes (continued)

Attribute	Value	Usage
usemap	The text name of an image map	Corresponds to the name value on the associated
		<map> tag.</map>
vspace	Number of pixels	Configures space above and below the image.
		(Deprecated)
width	Number of pixels	Configures the width of the image.

The <map> Tag

<map></map>

The <map> tag is a container tag that identifies the beginning and the end of an image map. The name attribute is used to associate the <map> tag with its corresponding tag. The tag is configured with the usemap attribute to indicate which map to use. Table A.15 shows <map> tag attributes and their values.

Table A.15 <map> tag attributes

Attribute	Value	Usage
id	Text name, alphanumeric, begin- ning with a letter, no spaces	Identifies the map. This value is used by the corresponding tag. The value must be unique and not used for other id values on the same XHTML document.
name	Text name, alphanumeric, begin- ning with a letter, no spaces	Identifies the map. This value is used by the corresponding tag. This is deprecated in XHTML but is included for backward compatibility.

The <area /> Tag

<area />

The self-contained <area /> tag configures a hyperlink on an image map. Table A.16 shows <area /> tag attributes and their values.

Table A.16 <area /> tag attributes

Attribute	Value	Usage
alt	A brief text description of the portion of the image	Provides accessibility to visitors unable to view the
		Configures the energinetes of the elistication area
coords	Numeric pixels; see Table A.17	Configures the coordinates of the clickable image area.
href	URL or Web page document name	Configures the Web page that will display when the area is clicked.
shape	"rect" indicates rectangle	Configures the shape of the area.
	"circle" indicates circle	
	"poly" indicates polygon	

Each shape has a different syntax used to list the coordinates (coords) of the hyperlink area. See Table A.17.

Shape	Coords	Meaning
circle	"x,y,r"	The coordinates at point (x, y) indicate the center of the circle. The value of r is the radius of the circle.
poly	"x1, y1, x2, y2, x3, y3", and so on	The values of each (\mathbf{x}, \mathbf{y}) pair represent the coordinates of a corner point of the polygon.
rect	"x1, y1, x2, y2"	The coordinates at point $(x1, y1)$ represent the upper-left corner of the rectangle. The coordinates at point $(x2, y2)$ represent the lower-right corner of the rectangle.

Table A.17 <area /> tag shapes and coords attribute values

A.11 Table Tags

The Tag

The tag creates a table. Table A.18 shows tag attributes and their values.

Table A.18 tag attributes

Attribute	Value	Usage
align	"left" (default), "center", "right"	Specifies the horizontal alignment of the table. (Deprecated)
bgcolor	A valid color; the W3C recommends hexa- decimal colors	Specifies the color of the background. This attribute can also be used with , , and . (Deprecated)
border	Number of pixels; "0" indicates no border	Specifies the size of the border around the cells.
bordercolor	A valid color; the W3C recommends hexa- decimal colors	The color of the table border. Not part of the W3C Recommendation; originally only used by Internet Explorer.
cellpadding	Number of pixels	Specifies the amount of space between the cell's borders and its contents.
cellspacing	Number of pixels	Specifies the amount of space between cells.
frame	"void", "above", "below", "hsides", "lhs", "rhs", "vsides", "box", "border"	Specifies the parts of the outside border that should be visible.
rules	<pre>"rows" indicates the interior border dis- plays between rows only "groups" indicates the interior border dis- plays around groups only (see , <thead>, and <tfoot>) "all" indicates the default border display</tfoot></thead></pre>	Configures the interior border in a table.
summary	A text description of the contents/organiza- tion/purpose of the table	Provides for accessibility. A visitor may obtain an overview of the table without reading it cell by cell. This attribute may be accessed by screen readers.

Table A.18 tag attributes (continued)

Attribute	Value	Usage
title	A text description of the table	This brief description may be displayed as a tooltip by some browsers. This attribute may be accessed by some screen readers.
width	Number of pixels or a percentage	Specifies the width of the table.

The Tag

The tag creates a table row. Table A.19 shows tag attributes and their values.

Table A.19 > tag attributes

Attribute	Value	Usage
align	"left" (default), "center", "right"	Specifies the horizontal alignment of the cells.
bgcolor	A valid color; the W3C recommends hexadeci- mal colors	Specifies the color of the background.
valign	"top", "middle" (default), "bottom"	Specifies the vertical alignment of the cells.

The Tag

The tag creates a table cell. Table A.20 shows tag attributes and their values.

Table A.20 and tag attributes

Attribute	Value	Usage
align	"left" (default), "center", "right"	Specifies the horizontal alignment of the cell.
bgcolor	A valid color; the W3C recommends hexadecimal colors	Specifies the color of the background. (Deprecated)
colspan	Numeric	Specifies the number of columns spanned by a cell.
headers	The id value(s) of a column or row heading cell	Associates data cells with header cells. This attribute may be accessed by assistive technologies such as screen readers.
height	Number of pixels	Specifies the height of the cell. (Deprecated)
nowrap	"nowrap"	Forces the browser to display all the text in the cell on one line. (Deprecated)
rowspan	Numeric	Specifies the number of rows spanned by a cell.
scope	"row", "col"	Specifies the scope of the table cell contents (row or column). This attribute may be accessed by screen readers but is not as well supported as the headers and id attributes (see Chapter 8).
valign	"top", "middle" (default), "bottom"	Specifies the vertical alignment of the cell.
width	Number of pixels or a percentage	Specifies the width of the cell. (Deprecated)
The Tag

The tag creates a table header cell. Table header cells display text in bold font face and centered. Table A.20 shows tag attributes and their values.

The <caption> Tag

<caption></caption>

The <caption> tag creates a caption for the table. The valign attribute is used to place the caption above or below the table. The values for the valign attribute are "top" and "bottom". The deprecated align attribute specifies the placement of the caption. The values for the align attribute are "bottom", "center", "left", "right", and "top" (default).

A.12 Table Section Tags

The <thead> Tag

<thead></thead>

The <thead> tag defines a block of one or more table header rows.

The Tag

The tag divides a table into sections. It delineates one or more rows as a group. Use the rules attribute on the tag to indicate the group visually.

The <tfoot> Tag

<tfoot></tfoot>

The <tfoot> tag defines a block of one or more table footer rows.

A.13 Frames Tags

The <frameset> Tag

<frameset></frameset>

The <frameset> tag configures a Web page that uses frames. The browser window is divided into multiple smaller windows so that multiple Web pages can be displayed and individually scrolled at the same time. Table A.21 shows <frameset> tag attributes and their values. Examples of the rows and cols attributes are included.

Attribute	Value	Usage
bordercolor	A valid color; the W3C recommends hexadecimal colors	Specifies the color of the frame borders in the frame- set. Default color is gray. Not part of the W3C Recommendation.
cols	Number of pixels, percentage, or "*" to indicate remaining window area	Reserves vertical areas (columns) of the browser window.
frameborder	"0" or "1" (default)	"0" indicates that no frame borders will be visible in the frameset. "1" indicates that frame borders will display in the frameset (default). Not part of the W3C Recommendation.
framespacing	Number of pixels	Specifies the width of the frame borders in the frameset. Not part of the W3C Recommendation.
rows	Number of pixels, percentage, or "*" to indicate remaining window area	Reserves horizontal areas (rows) of the browser window.
title	A brief text description	Provides a text description of the frameset that can be used by assistive technologies.

Table A.21 <frameset> tag attributes

rows Attribute. The rows attribute specifies how the window will be divided vertically into rows of pixels (think of it as forming one row under another across the screen). The value can be a percentage of the browser window, a number of pixels, or the special asterisk value (*). The special asterisk value tells the browser to calculate the appropriate space for the window. A value is given for each frame row. There can be multiple frames. For example, to create a frameset with two horizontal frames—one using 25 percent of the window and the other using what is left of the window—the code is <frameset rows="25%,*">>.</u>

cols Attribute. The cols attribute specifies how the window will be divided horizontally into columns of pixels (think of it as forming one column next to another across the screen). The value can be a percentage of the browser window, a number of pixels, or the special asterisk value (*). The special asterisk value tells the browser to calculate the appropriate space for the window. A value is given for each frame column. There can be multiple frames. For example, to create a frameset with two vertical frames—one using 200 pixels of the window and the other using what is left of the window—the code is <frameset cols="200,*">>.</u>

The <frame /> Tag

<frame />

The self-contained <frame /> tag specifies a single frame or area of the window contained within a frameset. Table A.22 shows <frame /> tag attributes and their values.

The <noframes> Tag

<noframes></noframes>

The <noframes> tag configures what will display on browsers and other user agents that don't support frames.

Table A.22 <frame</th> /> tag attributes

Attribute	Value	Usage
bordercolor	A valid color; the W3C recommends hexa- decimal colors	Configures the color of the frame border. Not part of the W3C Recommendation.
frameborder	"0" or "1" (default)	"0" indicates that no frame borders will be visible for this frame."1" indicates that frame borders will display for this frame (default).
id	Alphanumeric, no spaces; the value must be unique and not used for other id val- ues on the same XHTML document	This attribute is optional. It provides a unique identi- fier for the frame.
longdesc	URL of Web page with detailed description of the frame	Provides a detailed text description of the frame. This may be accessed by assistive technologies.
marginheight	Number of pixels	Configures the top and bottom margins for the frame.
marginwidth	Number of pixels	Configures the width of the right and left margins for the frame.
name	Text name, beginning with a letter, no spaces	Names the frame, so that it may be targeted by other frames. This is deprecated in XHTML but is used to provide backward compatibility with browsers that support HTML.
noresize	"noresize"	Does not allow a Web page visitor to resize a frame by dragging the frame border with the mouse.
scrolling	"yes", "no", "auto" (default)	Configures whether the frame has a scroll bar. The default is "auto", which configures the browser to add a scroll bar automatically when needed.
src	URL or file name	Configures what Web page will be displayed in the frame (required).
title	Text phrase that describes the frame	Configures the title of the frame. This can be accessed by screen readers and is recommended by the W3C to improve accessibility.

The <iframe> Tag

<iframe></iframe>

The <iframe> tag configures an inline frame. This is a special scrolling area that displays a different Web page document. This does not need to be associated with a frameset and can be placed on the body of any Web page. Some older browsers, such as Netscape 4, do not support inline frames. If the inline frame is not supported, place content that should be displayed between the opening and closing <iframe> tags. Table A.23 shows <iframe> tag attributes and their values.

Attribute	Value	Usage
align	"left" (default), "right",	Specifies the horizontal alignment of the
	"top", "middle", "bottom"	iframe. (Deprecated)
frameborder	"0" or "1" (default)	"0" indicates that no frame borders will be visible for this inline frame. "1" indicates that frame borders will display for this inline frame (default).
height	Number of pixels or percentage	Height of the inline frame
id	Alphanumeric, no spaces; the value must be unique and not used for other id values on the same XHTML document	This attribute provides a unique identifier for the inline frame.
longdesc	URL of Web page with detailed description of the contents of the inline frame	Provides a detailed text description of the frame. This may be accessed by assistive technologies
marginheight	Number of pixels	Configures the top and bottom margins of the inline frame.
marginwidth	Number of pixels	Configures the width of the right and left margins of an inline frame.
name	Text name, beginning with a letter, no spaces	Configures the name of the inline frame. This is required when using the target attribute to con- figure hyperlinks. This attribute is deprecated in XHTML but is used to provide backward compati- bility with browsers that support HTML.
scrolling	"yes", "no", "auto" (default)	Determines whether scrollbars will appear if the document displayed is larger than the size of the inline frame.
src	Valid file name of a Web page document (required)	Configures the name of the file to be displayed in the inline frame.
title	Text phrase that describes the inline frame recommended by the W3C to improve	Configures the title of the inline frame. This can be accessed by screen readers and is accessibility.
width	Number of pixels or percentage	Configures the width of the inline frame.

Table A.23 <iframe> tag attributes

A.14 Form Tags

The <form> Tag

<form></form>

The <form> tag configures a form that can accept information from a Web site visitor. The form information may be processed using a server-side script or executable program. Table A.24 shows <form> tag attributes and their values.

Table A.24 <form> tag attributes

Attribute	Value	Usage		
action	File name or URL of the program or script that will handle the form data	Specifies the name of the server-side program or script that will handle the form data.		
id	Alphanumeric, no spaces; the value must be unique and not used for other id values.	Provides a unique identifier for the form.		
method	"post" "get" (default)	Preferred by the W3C. Sends the form data to the Web server as a part of the entity body of the HTTP response. Form data is not visible in the URL. Sends the form data to the Web server as part of the URL.		
enctype	"multipart/form-data"	Specifies that the form will accept a file as input (using an <input type="file"/> element).		
name	Text name, beginning with a letter, no spaces	This attribute is optional. It names the form so that it can be easily accessed by client-side scripting languages such as JavaScript to edit and verify the form information before the server-side processing is invoked. This attribute is deprecated in XHTML but is used to provide backward compatibility with browsers that support HTML.		
target	See Table A.13	Specifies the window used to display the form response. The default is the current window. See Table A.13.		

A.15 Form Element Tags

The <input /> Tag

<input />

The stand-alone <input /> tag configures an input element for a form. The attributes and their values determine the type of input element displayed on the Web page. Table A.25 shows <input /> tag attributes and their values.

Attribute	Value	Usage
type	"text", "checkbox", "radio",- "hidden", "submit", "reset", "button", "image", "password", "file"	Configures a specific form element (required).
accesskey	A character on the keyboard	Configures a hot key that immediately places the cursor on the form element.
checked	"checked"	Used with type="checkbox" or type="radio". Indicates that the form element is selected.
disabled	"disabled"	Prevents the cursor from being placed in the form element.

Table A.25 <input /> tag attributes

Attribute	Value	Usage
id	Text name, beginning with a letter, no spaces	Provides a unique identifier for the form element that can be used to associate the element with a <label> tag or act as a named fragment identifier.</label>
maxlength	Numeric	Configures the maximum number of characters allowed in a text input area.
name	Text name, beginning with a letter, no spaces	Names the form element. The name value is used by JavaScript, CGI, and other server-side processing.
readonly	readonly	Configures a textbox or password box as read only.
size	Numeric	Configures the width in characters of a text input area on screen.
src	File name of an image	Used with type="image"
tabindex	Numeric	Changes the order of the form element accessed by pressing the Tab key. Default order is the order the form elements are placed on the page.
title	A brief text description	Configures a brief text description that will display in some browsers when a mouse pointer is placed over the element.
value	Text or numeric characters	Provides the value given to a form element, which is passed to the form handler.

Table A.25 <input /> tag attributes (continued)

The <textarea> Tag

<textarea></textarea>

The <textarea> tag configures a multiline text input area on a form, sometimes called a scrolling text box. Text contained within the <textarea> tags will be initially displayed in the scrolling text box. Table A.26 shows <textarea> tag attributes and their values.

Attribute	Value	Usage
accesskey	A character on the keyboard	Configures a hot key that immediately places the cursor on the form element.
cols	Numeric	Configures the number of columns in the text area.
id	Text name, beginning with a letter, no spaces	Provides a unique identifier for the form element that can be used to associate the element with a <label> tag or act as a named fragment identifier.</label>
disabled	"disabled"	Prevents the cursor from being placed in the text area.
name	Text name, beginning with a letter, no spaces	Names the form element.
readonly	readonly	Configures a textarea as read only.
rows	Numeric	Configures the number of rows displayed on the screen in the text area. (continues)

Table A.26 <textarea> tag attributes

Attribute	Value	Usage
tabindex	Numeric	Changes the order of the form element accessed by pressing the Tab key. Default order is the order the form elements are placed on the page.
title	A brief text description	Configures a brief text description that will display in some browsers when a mouse pointer is placed over the element.

Table A.26 <textarea> tag attributes (continued)

The <select> Tag

<select></select>

The <select> tag configures a select box to display a menu of items, sometimes called a list box or drop-down list box. The individual menu items are configured with <option> tags. Table A.27 shows <select> tag attributes and their values.

Table A.27 <select> tag attributes

Attribute	Value	Usage
accesskey	A character on the keyboard	Configures a hot key that immediately places the cursor on the form element.
disabled	"disabled"	Prevents the cursor from being placed in the select list.
id	Text name, beginning with a letter, no spaces	Provides a unique identifier for the form element that can be used to associate the element with a <label> tag or act as a named fragment identifier.</label>
multiple	"multiple"	Allows multiple selections from the list.
name	Text name, beginning with a letter, no spaces	Names the form element.
size	Numeric	Provides the number of elements to be displayed. If size is configured, the select list is displayed as a scrolling list. If size is omitted, the select list is a drop-down list.
tabindex	Numeric	Changes the order of the form element accessed by pressing the Tab key. Default order is the order the form elements are placed on the page.
title	A brief text description	Configures a brief text description that will display in some browsers when a mouse pointer is placed over the element.

The <option> Tag

<option></option>

The <option> tag configures an item within a select element. The text contained between the <option> tags is displayed in the select box. Table A.28 shows <option> tag attributes and their values.

	1 0		
Attribute	Value	Usage	
selected	"selected"	Configures an option selected by default.	
value	Text or numeric characters	A value given to a form element that is passed to the form handler if the item is selected.	
disabled	disabled	Prevents this option from being selected.	

Table A.28 <option> tag attributes

The <label> Tag

<label></label>

The <label> tag configures a text label that is associated with a form element. Table A.29 shows <label> tag attributes and their values.

Table A.29 <label> tag attributes

Attribute	Value	Usage
accesskey	A character on the keyboard	Configures a hot key that immediately places the cursor on the form element.
for	Corresponds to the value of an id attribute on a form element	Associates a text label with a form element.
title	A brief text description	Configures a brief text description that will display in some browsers when a mouse is placed over the label.

The <fieldset> Tag

<fieldset></fieldset>

The <fieldset> tag configures a group of form elements. It is used together with the <legend> tag.

The <legend> Tag

<legend></legend>

The <legend> tag is only used within the <fieldset> tag. It configures a text description for the <fieldset> grouping. Table A.30 shows <legend> tag attributes and their values.

Table A.30	<legend></legend>	tag	attributes
------------	-------------------	-----	------------

Attribute	Value	Usage
accesskey	A character on the key- board	Configures a hot key that immediately places the cursor on the first form element in the legend area.
align	"top", "bottom", "left", "right"	Configures the alignment of the text legend. (Deprecated)
title	A brief text description	Configures a brief text description that will display in some browsers when a mouse pointer is placed over the text legend.

The <button> Tag

<button></button>

The <button> tag creates an area on the Web page that will act like a standard form button. It configures Web page content that is coded between the <button> and </button> tags as the form button. Table A.31 shows <button> tag attributes and their values.

Table A.31 <button> tag attributes

Attribute	Value	Usage
accesskey	A character on the key- board	Configures a hot key that immediately places the cursor on the area.
id	Text name, beginning with a letter, no spaces	Provides a unique identifier for the form element that can be used to associate the element with a <label> tag or act as a named fragment identifier.</label>
name	Text name, beginning with a letter, no spaces	Names the form element so that it can be easily accessed by client- side scripting languages (such as JavaScript) or by server-side pro- cessing. The name should be unique.
title	A brief text description	Configures a brief text description that will display in some browsers when a mouse pointer is placed over the area.
type	submit	Functions as a submit button.
	reset	Functions as a reset button.
	button	Functions as a button.
value	Text or numeric characters	A value given to a form element that is passed to the form handler.
disabled	disabled	Prevents the button from being clicked.

A.16 Miscellaneous Tags

The <abbr> Tag

<abbr title="World Wide Web Consortium">W3C</abbr>

The <abbr> tag provides a description for an abbreviation. Use the title attribute to specify the description.

The <acronym> Tag

<acronym title="World Wide Web Consortium">W3C</acronym>

The <acronym> tag provides a description for an abbreviation. Use the title attribute to specify the description.

The <address> Tag

<address></address>

The <address> tag contains an area with contact information (typically name and address) for a document.

The <applet> Tag

<applet></applet>

The <applet> tag is used to specify the beginning of a Java applet area in the body of a Web page. The closing tag, </applet>, specifies the ending of an applet area in the body of a Web page. Table A.32 shows <applet> tag attributes and their values. The <applet> tag and its attributes are deprecated.

Table A.32 <applet> tag attributes

Attribute	Value	Usage
alt	A text description of the applet.	Provides alternate content for visitors unable to access the applet.
code	The file name of a Java applet (.class extension); required	Configures the name of the applet file.
codebase	A folder name	Configures the name of the folder that con- tains the applet. This is needed if the applet is not in the same folder as the Web page.
height	Number of pixels	Configures the height of the applet area.
id	Alphanumeric, no spaces; the value must be unique and not used for other id values on the same XHTML document	Provides a unique identifier for the applet.
width	Number of pixels	Configures the width of the applet area.

The <param /> Tag

<param />

The <param> tag is used to pass values or parameters to an object or Java applet. This tag is always used with either an <applet> or <object> tag.

The <nobr> Tag

<nobr></nobr>

The <nobr> tag is not part of the W3C XHTML 1.0 specification. The tag is used to contain areas on a Web page, such as groups of images, which should remain on the same line regardless of the size of the browser window.

The Tag

The tag handles text in a special way. Any text contained between tags is considered to be preformatted text, such as computer program coding statements. Any line breaks or spacing will be preserved. This tag is rarely used.

The <object> Tag

<object></object>

The <object> tag can be used to place Java applets, audio, video, Flash, and other media on a Web page. It is a container tag and should be closed with an </object> tag. Table A.33 shows <object> tag attributes and values that are used to display media files.

Table A.33 <object> tag attributes

Attribute	Value	Usage
classid	Uniquely identifies the player software. For QuickTime, it must be set to "clsid:02BF25D5-8C17-4B23-BC80- D3488ABDDC6B"	Identifies an ActiveX control that must be installed on the visitor's PC. If the ActiveX control is not installed, the browser can automatically download and install it.
codebase	For QuickTime and Internet Explorer, this value must be http://www.apple.com/qtactivex/ qtplugin.cab—the location of the most recent version of the QuickTime player.	Specifies a relative path for the location of the plug-in.
data	Valid file name, name of media file (required)	Provides the name of the file to be played.
height	Number of pixels	Specifies the height of media control console.
type	A valid MIME type such as "audio/midi", "audio/wav", and so on	Specifies the MIME type of the media file.
width	Number of pixels	Configures the width of media control console.

The <embed /> Tag

<embed />

The <embed /> tag is not part of the W3C XHTML 1.0 specification but it is included here because it was often used in the past. The W3C recommends using the <object> tag instead. The <embed /> tag can be used to place sound and other media in a Web page. It is a self-contained tag and does not have a corresponding closing tag. Table A.34 shows <embed /> tag attributes and their values.

Table A.34 <embed /> tag attributes

Attribute	Value	Usage
align	"left", "right", "top", "bottom"	Optional; aligns the media control console.
autostart	"true", "false"	Determines whether the media will play automati- cally when the page is loaded. If omitted, media may not automatically play.
autoplay	"true", "false"	Optional. Used by some media players, including QuickTime. Determines if the media will play auto- matically when the page is loaded. If omitted, media may not automatically play.
codebase	For QuickTime and Internet Explorer, this value must be http://www.apple.com/qtactivex/ qtplugin.cab—the location of the most recent version of the QuickTime player.	Specifies a relative path for the location of the plug-in.

er the media control with QuickTime.
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e of the media control
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onsole.
nload page for
file to be played.
ME type of the media file.
edia control console.

Table A.34 <embed /> tag attributes (continued)

The <noembed> Tag

<noembed></noembed>

The <noembed> tag is not part of the W3C XHTML 1.0 specification but it is included here because it was often used in the past. The <noembed> tag is a container tag. It can appear after an <embed /> tag to provide alternate content that may be used by browsers or assistive technologies such as screen readers.

The Comment Tag

```
<!-- your comment goes here -->
```

The comment tag is special in that anything between the opening <!-- and the closing --> is considered to be a comment and is ignored by the browser. This tag can be used to document and describe XHTML.

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APPENDIX

Special Characters

Special characters, or entity characters, such as the copyright symbol and the nonbreaking space, often appear on Web pages. Table B.1 lists a selection of special characters in order of numeric codes. The most commonly used special characters are shown in bold. The W3C's list of special characters is found at http://www.w3.org/MarkUp/html-spec/html-spec_13.html.

Table B.1 Special characters

Entity Name	Numeric Code	Descriptive Code	Character
Quotation mark	"	"	33
Ampersand	&	&	&
Apostrophe	'		1
Less than sign	<	<	<
Greater than sign	>	>	>
Nonbreaking space			a blank space
Inverted exclamation	¡	¡	I
Cent sign	¢	¢	¢
Pound sterling sign	£	£	£
General currency sign	¤	¤	†
Yen sign	¥	¥	¥
Broken vertical bar	¦	¦	1
Section sign	§	§	§
Umlaut	¨	¨	
Copyright symbol	©	©	©
Feminine ordinal	ª	ª	а
Left angle quote	«	«	«
Not sign	¬	¬	7
Soft hyphen	­	­	-
Registered trademark symbol	®	®	®
Macron	¯	¯	—
Degree sign	°	°	0
Plus or minus	±	±	±
Superscript two	²	²	2
Superscript three	³	³	3
Acute accent	´	´	,
Micro (Mu)	µ	µ	μ
Paragraph sign	¶	¶	¶
Middle dot	·	·	
Cedilla	¸	<pre>¸</pre>	ذ
Superscript one	¹	¹	1
Masculine ordinal	º	º	0
Right angle quote	»	»	»
Fraction one-fourth	¼	¼	1/4
Fraction one-half	½	<pre>½</pre>	1/2
Fraction three-fourths	¾	¾	3/4
Inverted question mark	¿	¿	Ś

Entity Name	Numeric Code	Descriptive Code	Character
Small e, grave accent	è	è	è
Small e, acute accent	é	é	é
En dash	–	–	-
Em dash	—	—	-
Vertical bar			
Short, bold vertical bar	❘		1

Table B.1 Special characters (continued)

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CSS Property Reference

Cascading Style Sheet properties that are commonly

used to format and configure page layouts are listed in this section. Unless otherwise noted, each property applies to all XHTML elements.

You should find the information in Table C.1 and Table C.2 useful as a quick reference to commonly used CSS properties and values. However, these tables do not contain all the CSS properties and values. The W3C CSS2 Recommendation (http://www.w3.org/TR/REC-CSS2/) includes a Property Index with a complete listing of all CSS properties at http://www.w3.org/TR/REC-CSS2/propidx.html.

Table C.1 Cascading style sheet properties

Property	
background-color	
Common Values:	Valid hexadecimal color value, RGB color value, or color name.
Usage:	Configures the background color of an element.
Example:	background-color:#cccccc;
background-image	
Common Values:	URL keyword with valid image file name
Usage:	Configures an image file as the background of an element.
Example:	<pre>background-image:url(myimage.gif);</pre>
background-positi	ion
Common Values:	Two percentages, numeric pixel values, or position values ("left", "top", "center", "bottom", "right")
Usage:	Configures the position of the background image of an element.
Example:	<pre>background-position:-100px -200px;</pre>
	The first value configures the horizontal position and the second configures the vertical posi- tion starting from the upper-left corner of the container's box. Use negative values for a more abstract or artistic background effect.
background-repeat	
Common Values:	"repeat" (default), "repeat-y" (vertical repeat), "repeat-x" (horizontal repeat), "no-repeat" (no repeat)
Usage:	Configures how the background image of an element will repeat (or be prevented from repeating).
Example:	<pre>background-repeat:no-repeat;</pre>
border	
Common Values:	The border-width, border-style, and border-color values separated by spaces.
Usage:	Configures the border surrounding an element.
Example:	border:1px solid #000000;
border-bottom	
Common Values:	The border-width, border-style, and border-color values separated by spaces.
Usage:	Configures the bottom border of an element.
Example:	border-bottom:1px solid #000000;
border-collapse	
Common Values:	"separate" (default), "collapse"
Usage:	Configures the table and cell borders to collapse into a single border or display with separate borders.
Example:	border-collapse;
border-color	
Common Values:	Valid hexadecimal color value, RGB color value, or color name
Usage:	Configures the color of an element's border.
Example:	border-color:#333333;

Droporty	
Property	
border-left	
Common Values:	The border-width, border-style, and border-color values separated by spaces.
Usage:	Configures the left border of an element.
Example:	border-left:1px solid #000000;
border-right	
Common Values:	The border-width, border-style, and border-color values separated by spaces.
Usage:	Configures the right border of an element.
Example:	border-right:1px solid #000000;
border-style	
Common Values:	"none" (default), "double", "groove", "inset", "outset", "ridge", "solid", "dashed", "dotted", "hidden"
Usage:	Configures the type of border around an element.
Example:	border-style:dotted;
border-top	
Common Values:	The border-width, border-style, and border-color values separated by spaces.
Usage:	Configures the top border of an element.
Example:	border-top:1px solid #000000;
border-width	
Common Values:	A numeric value (such as 1px) or values "thin", "medium", "thick"
Usage:	Configures the width of a border around an element.
Example:	border-width:3px;
bottom	
Common Values:	A numeric value (px or em) or percentage
Usage [,]	Configures the offset position from the bottom of the containing element
Example [,]	bottom: 20px:
aloar	
	"loft" "right" "both" "none" (dofout)
	Specifica the display of an element in relation to floating elements
Usage.	Specifies the display of an element in relation to hoating elements.
Common Voluoo	Valid bevadesimal solar value. PCD colar value, or colar name
Common values:	
Usage:	Configures the foreground (text) color of an element.
Example:	color:#000011;
display	
Common Values:	"none", "block", "inline", "list-item", "table", "table-row", "table-cell"
Usage:	Controls how and if an element will display. Display set to "none" causes an element to not display.
Example:	display:block;

Table C.1 Cascading style sheet properties (continued)

(continues)

Property	
float	
Common Values:	"right", "left"
Usage:	Configures the horizontal placement (left or right) of an element in a parent element
Example:	<pre>float:left;</pre>
font-family	
Common Values:	Valid font name or a font family such as "serif", "sans-serif", "fantasy", "monospaced", or "cursive"
Usage:	Configures the type of font used to display an element.
Example:	<pre>font-family:Arial, Verdana, sans-serif;</pre>
font-size	
Common Values:	Numeric value (pt, px, or em), percentage, absolute size ("xx-small", "x-small", "small", "medium" (default), "large", "x-large", "xx-large"), relative size ("smaller", "larger")
Usage:	Configures the size of the font used to display an element.
Example:	<pre>font-size:smaller;</pre>
font-style	
Common Values:	"normal" (default), "italic", "oblique"
Usage:	Configures the style of the text.
Example:	<pre>font-style:italic;</pre>
font-variant	
Common Values:	"normal" (default), "small-caps"
Usage:	Configures the display as regular text or in small capital letters.
Example:	<pre>font-variant:small-caps;</pre>
font-weight	
Common Values:	Numeric value ("100", "200", "300", "400", "500", "600", "700", "800"), relative value ("normal" (default), "bold", "bolder", "lighter")
Usage:	Configures the boldness of the text.
Example:	<pre>font-weight:400;</pre>
height	
Common Values:	A numeric value (px or em), percentage, or $auto$ (default)
Usage:	Configures the height of an element.
Example:	height:300px;
left	
Common Values:	A numeric value (px or em) or percentage
Usage:	Configures the distance in from the left (of the containing element) to display an element.
Example:	left:100px;
line-height	
Common Values:	Numeric value, percentage
Usage:	Configures the spacing allowed for a line of text. The value 200% configures double-spaced text.
Example:	line-height:200%;

Property	
list-style-image	
Common Values:	URL keyword with valid image file name
Usage:	Configures an image to replace "bullets" in an XHTML list.
Example:	<pre>list-style-image:url(myimage.gif);</pre>
list-style-type	
Common Values:	"none", "disc", "circle", "square", "decimal", "lower-roman", "upper-roman", "lower-alpha", "upper-alpha"
Usage:	Configures the type of "bullet" (list item marker) for an element in a list.
Example:	list-style-type:circle;
margin	
Common Values:	Shorthand Notation: A numeric value (px or em), percentage, or "auto"
	<i>Full Notation:</i> Four numeric values (px or em), percentage, or "auto". The values configure the margins in the following order (margin-top, margin-right, margin-bottom, margin-left).
Usage:	Configures the margin surrounding an element.
Example:	Shorthand Notation: body { margin: 0} (sets the page margins in the document to zero) Full Notation: margin:0px 10% 0px 10%;
margin-bottom	
Common Values:	A numeric value (px or em) or percentage
Usage:	Configures the size of an element's bottom margin.
Example:	<pre>margin-bottom:20px;</pre>
margin-left	
Common Values:	A numeric value (px or em) or percentage
Usage:	Configures the size of an element's left margin.
Example:	<pre>margin-left:100px;</pre>
margin-right	
Common Values:	A numeric value (px or em) or percentage
Usage:	Configures the size of an element's right margin.
Example:	<pre>margin-right:20px;</pre>
margin-top	
Common Values:	A numeric value (px or em) or percentage
Usage:	Configures the size of an element's top margin.
Example:	<pre>margin-top:5px;</pre>

(continues)

Property	
max-width	
Common Values:	A numeric value (px or em), percentage, or "none" (default)
Usage:	Configures the maximum width of an element.
Example:	<pre>max-width:700px;</pre>
min-width	
Common Values:	A numeric value (px or em) or percentage
Usage:	Configures the minimum width of an element.
Example:	<pre>min-width:400px;</pre>
overflow	
Common Values:	"visible" (default), "hidden", "auto", "scroll"
Usage:	Controls the display of a block-level element if the element exceeds its set height or width.
Example:	overflow:scroll;
padding	
Usage:	Configures the amount of padding associated with an element.
Shorthand Notation	Option 1:
Common Values:	A numeric value (px or em) or percentage
Example:	padding:20px;
Shorthand Notation	Option 2:
Common Values:	Two numeric values (px or em) or percentages. The first value configures the top and bottom padding. The second value configures the left and right padding.
Example:	<pre>padding:10px 15px;</pre>
Full Notation:	
Common Values:	Four numeric values (px or em) or percentages. The values configure the padding in the following order (padding-top, padding-right, padding-bottom, padding-left).
Example:	padding:10px 15px 10px 20px;
padding-bottom	
Common Values:	A numeric value (px or em) or percentage
Usage:	Configures the blank space between an element and its bottom border.
Example:	padding-bottom:10px;
padding-left	
Common Values:	A numeric value (px or em) or percentage
Usage:	Configures the blank space between an element and its left border.
Example:	<pre>padding-left:10px;</pre>

Property		
padding-right		
Common Values:	A numeric value (px or em) or percentage	
Usage:	Configures the blank space between an element and its right border.	
Example:	<pre>padding-right:10px;</pre>	
padding-top		
Common Values:	A numeric value (px or em) or percentage	
Usage:	Configures the blank space between an element and its top border.	
Example:	<pre>padding-top:10px;</pre>	
page-break-after		
Common Values:	"always", "avoid", "auto" (default)	
Usage:	Configures whether page breaks will occur after a specified selector when the document is printed.	
Example:	h2 { page-break-after: avoid; }	
page-break-before	e	
Common Values:	"always", "avoid", "auto" (default)	
Usage:	Configures whether page breaks will occur before a specified selector when the document is printed.	
Example:	h2 { page-break-before: always; }	
position		
Common Values:	"relative", "absolute"	
Usage:	Configures the positioning of an element. Used in combination with left, right, and/or top properties.	
Example:	<pre>position:relative;</pre>	
right		
Common Values:	A numeric value (px or em) or percentage	
Usage:	Configures the distance in from the right (of the containing element) to display an element.	
Example:	right:20px;	
scrollbar-arrow-color		
Common Values:	Valid hexadecimal color value, RGB color value, or color name	
Usage:	Configures the color of the arrow on the scroll bar (Internet Explorer only).	
Example:	<pre>scrollbar-arrow-color:#ff0000;</pre>	
scrollbar-face-color		
Common Values:	Valid hexadecimal color value, RGB color value, or color name	
Usage:	Configures the color of the sliding scroll bar (Internet Explorer only).	
Example:	<pre>scrollbar-face-color:#00ff00;</pre>	

Table C.1 Cascading style sheet properties (continued)

(continues)

Property		
scrollbar-track-color		
Common Values:	Valid hexadecimal color value, RGB color value, or color name	
Usage:	Configures the color of the track the scroll bar slides (Internet Explorer only).	
Example:	<pre>scrollbar-face-color:#000000;</pre>	
text-align		
Common Values:	"center", "justify", "left", "right"	
Usage:	Configures the alignment of text in an element. This applies to block-level elements.	
Example:	<pre>text-align:center;</pre>	
text-indent		
Common Values:	A numeric value (em or px) or percentage	
Usage:	Configures the indent of the first line of a block element.	
Example:	<pre>text-indent:10px;</pre>	
text-decoration		
Common Values:	"none", "underline", "overline", "line-through", "blink"	
Usage:	Determines whether text in an element is underlined. This style is most often applied to	
- ·	nyperlinks to remove the underline.	
Example:	text-decoration:none;	
text-transform		
Common values:	"none", "capitalize", "uppercase", "lowercase"	
Usage:	Modifies the appearance of text in an element.	
Example:	text-transform:uppercase;	
top		
Common Values:	A numeric value (em or px) or percentage	
Usage:	Configures the distance down from the top of the containing element to display an element.	
Example:	top:100px;	
vertical-align		
Common Values:	A numeric value (em or px), percentage, values ("baseline", "sub", "super", "top", "text-top", "middle", "bottom", "text-bottom")	
Usage:	Configures the vertical alignment of an inline element.	
Example:	vertical-align:top;	
visibility		
Common Values:	"visible", "hidden", "inherit"	
Usage:	Configures whether an element displays and takes up space on a Web page.	
Example:	visibility:hidden;	

Table C.1 Cascading style sheet properties (continued)

Property	
width	
Common Values:	A numeric value (px or em), percentage, or auto (default)
Usage:	Configures the width of an element.
Example:	width:60%;
z-index	
Common Values:	A numeric value; the default value is 0
Usage:	The stack order of an element on a Web page. A higher value will display in front of elements with lower values.
Example:	z-index:10;

Table C.2 Pseudo-classes Used with the Anchor Element

Pseudo-class	Usage
link	Default state for a hyperlink that has not been clicked (visited)
	<pre>Example: a:link {color:#00FF00; }</pre>
visited	Default state for a visited link
	<pre>Example: a:visited {color:#003300; }</pre>
focus	Triggered when the link has focus (for example, by pressing the Tab key on the keyboard)
	<pre>Example: a:focus {color:#FFFF66; }</pre>
hover	Triggered when the mouse moves over the hyperlink
	<pre>Example: a:hover {color:#000000; }</pre>
active	Triggered when the hyperlink is actually clicked (or the Enter key is pressed when the hyper- link has focus)
	<pre>Example: a:active {color:#CCCCCC; }</pre>

This page intentionally left blank

APPENDIX

Comparison of HTML 4, XHTML, and HTML 5

As you traverse the Web and view the source code of

pages created by others, you may notice that the style and syntax of the coding is different from the XHTML syntax that you have been studying. Most likely, those pages were written following HTML syntax.

XHTML, eXtensible HyperText Markup Language, uses the tags and attributes of HTML along with the syntax of XML (eXtensible Markup Language). For the most part, you will use the same tags and attributes in HTML and XHTML; the major change is the syntax and additional restrictions in XHTML. These restrictions were added so that more efficient programs could be written to process Web pages automatically. XHTML 1.0 Transitional is backward compatible with HTML 4.01, commonly referred to as HTML 4. Most Web pages currently use HTML 4 or XHTML 1.0 Transitional. However, it is good to be aware of the trends in XHTML. At the time this was written, the W3C was in the process of drafting HTML 5.

In this section we'll concentrate on the differences between HTML 4, XHTML, and HTML 5—introducing you to some specific examples of syntax differences between HTML, XHTML, and HTML 5. Note that HTML 5 has two different acceptable syntaxes: HTML syntax and XHTML syntax. See http://dev.w3.org/html5/html-author for more information about writing HTML 5 documents.

D.1 XML Declaration

Since XHTML follows XML syntax, each document should begin with an XML declaration. HTML 4 has no such requirement.

HTML 4 Not required

XHTML

<?xml version="1.0" encoding="UTF-8"?>

HTML 5 (HTML Syntax)

Not required

HTML 5 (XHTML Syntax)

Not required

D.2 Document Type Definition

Both XHTML 1.0 and HTML 4 have three distinct document type definitions: strict, transitional, and frameset. XHTML 1.1 has one document type definition. The Document Type Definitions (DTDs) follow:

HTML 4 Strict DTD

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN"
    "http://www.w3.org/TR/html4/strict.dtd">
```

HTML 4 Transitional DTD

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">

HTML 4 Frameset DTD

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Frameset//EN" "http://www.w3.org/TR/html4/frameset.dtd">

XHTML 1.0 Strict DTD

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

XHTML 1.0 Transitional DTD

<!DOCTYPE html PUBLIC "-//W3C//DTD XHMTL 1.0 Transitional//EN"
 "http://www.w3.org/TR/xhtml1/DTD/xhmtl1-transitional.dtd">

XHTML 1.0 Frameset DTD

<!DOCTYPE html PUBLIC "-//W3C//DTD XHMTL 1.0 Frameset//EN"
 "http://www.w3.org/TR/xhtml1/DTD/xhmtl1-frameset.dtd">

HTML 5

<!doctype html>

HTML 5 (XHTML Syntax)

<!doctype html> Optional if the document is served as XML Required if the document is served as text/html

The <html> Tag

XHTML requires that the root element (immediately after the DTD) is an <html> tag that refers to the XML namespace. HTML 4 has no such requirement. To assist the interpreting of page content by search engines and screen readers, use the lang attribute to indicate the spoken language of the Web page content. See http://www.w3.org/TR/ REC-html40/struct/dirlang.html#adef-lang.

HTML 4

<HTML LANG="en">

XHTML

<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">

HTML 5 (HTML Syntax)

<html lang="en">

HTML 5 (XHTML Syntax)

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">

D.3 Uppercase versus Lowercase

The HTML 4 standard recommends that tags and attributes use uppercase. The XHTML standard follows XML syntax, which requires lowercase.

HTML 4

<TABLE>

XHTML

HTML 5 (HTML Syntax)

Either <TABLE> or Note: lowercase is preferred.

HTML 5 (XHTML Syntax)

D.4 Quotation Marks with Attributes

The XHTML standard requires that the values for all attributes are enclosed in quotation marks. This was valid in HTML 4, but not always done.

HTML 4

<P ID=article>

XHTML

HTML 5 (HTML syntax)

Either or

HTML 5 (XHTML syntax)

D.5 Container Tags

The XHTML standard requires that both the opening and closing tags for all container tags are used. HTML 4 does not require this.

HTML 4

This is the first paragraph. This is the second paragraph.

XHTML

This is the first paragraph.This is the second paragraph.

HTML 5 (HTML Syntax)

This is the first paragraph. This is the second paragraph.

HTML 5 (XHTML Syntax)

This is the first paragraph.This is the second paragraph.

D.6 Self-Contained Tags

The XHTML standard requires that all self-contained tags are properly closed using " />". HTML 4 does not require this.

HTML 4

This is the first line.

This is the second line.

XHTML

This is the first line.

This is the second line.

HTML 5 (HTML Syntax)

This is the first line.

This is the second line.

HTML 5 (XHTML Syntax)

This is the first line.

This is the second line.

D.7 Attribute Values

The XHTML standard requires that all attributes are assigned values. HTML 4 allows some attributes, such as noresize or checked, to be minimized. Since these attributes only have a single value, HTML 4 does not require that the value is provided.

HTML 4

<INPUT TYPE=RADIO CHECKED NAME=GENDER VALUE=male>

XHTML 1.0

<input type="radio" checked="checked" name="gender" id="gender" value="male" />

HTML 5 (HTML Syntax)

<input type=radio checked id=gender value=male>

HTML 5 (XHTML Syntax)

<input type="radio" checked="checked" id="gender" value="male" />

D.8 Required Tags

XHTML and HTML 5 require the <head> and <body> tags. This restriction does not apply to HTML 4.

D.9 Nesting Tags

XHTML and HTML 5 require appropriate nesting of tags. The opening and closing container tags must nest and not overlap each other. This restriction does not apply to HTML 4.

HTML 4

This is important

XHTML and HTML 5

This is important

D.10 The Tag

The tag is deprecated in XHTML. The tag is not part of HTML 5. It is recommended that Web developers use CSS to configure formatting instructions instead of the tag. While CSS can be used with HTML 4, it is more common to see tags.

HTML 4

This is a sentence.

XHTML and HTML 5

This is a sentence.

D.11 Bookmarks

The name attribute is deprecated in XHTML as applied to bookmarks and named fragment identifiers. This has the greatest effect on <a> and <map> tags. HTML 4 requires the name attribute. The name attribute is not supported by HTML 5.

HTML 4

XHTML

HTML 5 (HTML Syntax)

HTML 5 (XHTML Syntax)

D.12 JavaScript and the <script> Tag

XHTML considers JavaScript statements to be arbitrary character data (CDATA). The XML parser should not process them. The CDATA statement tells the XML parser to ignore the JavaScript. This is not part of HTML and not supported by many current browsers. A comparison of the XHTML and HTML 4 syntax follows:

HTML 4

```
<SCRIPT LANGUAGE="JavaScript" TYPE="text/javascript">
    ... JavaScript statements go here
</SCRIPT>
```

XHTML

```
<script type="text/javascript">
    ... JavaScript statements go here
</SCRIPT>
```

XHTML

```
<script type="text/javascript">
<![CDATA[
... JavaScript statements go here
]]>
</script>
```

HTML 5 (HTML Syntax)

```
<script>
   ... JavaScript statements go here
</script>
```

HTML 5 (XHTML Syntax)

```
<script>
<![CDATA[
... JavaScript statements go here
]]>
</script>
```

An alternative way to use JavaScript on a Web page that is supported by XHTML standards is to place JavaScript statements in their separate (.js) file. This file can be configured by the <script> tag. HTML also supports this syntax.

HTML 4

```
<SCRIPT SRC="myscript.js" LANGUAGE="JavaScript"
TYPE="text/javascript"></SCRIPT>
```

XHTML

<script src="myscript.js" type="text/javascript"></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></script></s

HTML 5 (HTML Syntax)

```
<script src="myscript.js">
```

HTML 5 (XHTML Syntax)

<script src="myscript.js"></script>

D.13 HTML 5

You've seen some examples of HTML 5 syntax; now let's delve deeper in to HTML 5. Currently in draft status, HTML 5 is a superset of HTML 4, provides for the use of XHTML-like syntax (such as enclosing attributes within quotation marks, and always coding both opening and closing tags), and is intended to be backward compatible. The working draft of HTML 5 is available at http://www.w3.org/TR/html5. An explanation of the differences between HTML 4 and HTML 5 is located at http://www.w3.org/TR/ html5-diff. Be aware that at the time this was written, HTML 5 was in a draft status and may change before it reaches recommendation status.

New elements and attributes have been added to HTML 5 that streamline the structuring of content, add more options for semantic markup of text content, and provide for multimedia and interactivity. This section will introduce you to several of the more interesting new elements.

Block-Level Elements

Take a moment and think about how you typically structure a Web page layout with <div> tags. You may find that it's common to use ids or classes with names such as header, nav, or footer. HTML 5 has several new block-level elements specifically intended for organizing Web pages:

- <header> contains the heading information of a section. It would typically contain a heading tag (such as <h1>, <h2>, etc.) and might optionally contain other information, such as the author's name.
- <nav> contains a section of navigation links.
- <aside> contains sidebar, note or other tangential content.
- <footer> contains the footer of a section.
- <article> contains an independent entry, such as a blog posting, comment, or e-zine article.
- <section> contains a "section" of a document, such as a chapter or topic. A section might contain <header>, <footer>, and other elements needed to display the content.
- <figure> associates a caption with an image or video.
- <dialog> configures a conversation and is used along with <dt> (the speaker's name) and <dd> (what they said) elements.

Semantic Inline Elements

HTML 5 contains new inline elements that are intended to provide more options for semantic markup of Web page content. A few of these new elements are listed below.

- <mark> configures text as "marked" or highlighted.
- <time> configures a date and/or time.
- <meter> configures a numeric value within a specified range.

Multimedia Elements

HTML 5 contains several new elements that are intended to simplify displaying multimedia in Web pages.

- <video> configures embedded video.
- <audio> configures embedded audio.
- embed> configures plug-in content.
- <canvas> provides for dynamically drawing graphics and interactive games with scripting (JavaScript).

Elements Eliminated

A number of elements were listed as deprecated in HTML 4 and XHTML. Some of these deprecated elements were eliminated from HTML 5, such as <big>, <center>, , <strike>, <u>, <frame>, <frameset>, and <noframes>.

Elements Reinvented

A few elements have been reinvented in HTML 5, such as the <small> and <menu> elements. The <small> element was an inline style element in HTML 4. In HTML 5, <small> configures small-size text but also now semantically indicates small or fineprint text, often used with legal notices. The formerly deprecated <menu> element is part of HTML 5 and now has the function of configuring a menu list.

"Hello World" HTML 5 Document

Web developers can choose to code HTML 5 documents using either HTML or XHTML syntax. See sections D.1 through D.12 for syntax examples. A basic HTML 5 document using XHTML syntax is shown below.

Experimenting with New HTML 5 Elements

Now that you've seen a few of the highlights of what HTML 5 offers for Web developers, you may be wondering how soon you'll be able to use the new HTML 5 elements. The answer is—it depends. You can experiment with HTML 5 today. See Figure D.1 for a wireframe.

Figure D.1

This wireframe indicates HTML 5 elements

header	
nav	_
section	
header	
article	1
header	
р	
article	٦
header	
р	
	_
footer	

So, now that you have a wireframe, how will current browsers "understand" the HTML 5 code? Remy Sharp has provided a "boilerplate" (see http://html5doctor.com/html-5boilerplates) that Web developers can use to manipulate current browsers to support some of the basic structural elements such as <header> and <section>. Sharp's technique uses CSS to configure these elements as block-level elements. For example:

```
header, section { display: block; }
```

However, a little bit more nudging is needed for Internet Explorer; you'll also need to include a <script> tag to invoke JavaScript code created by Sharp that Internet Explorer is directed to process via conditional comments (see Chapter 11). See Figure D.2 for a screen capture of a basic Web page created using an adaptation of Sharp's HTML 5 boilerplate.



The code is shown below:

```
<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
  <meta charset="UTF-8">
  <title>Experimenting with HTML 5</title>
  <!--[if IE]>
    <script src="http://html5shiv.googlecode.com/svn/trunk/html5.js">
      </script>
```

Figure D.2

coded with HTML 5

```
<![endif]-->
  <style>
    article, footer, header, nav, section { display: block; }
  </style>
</head>
<body>
  <header><h1>The Logo Area</h1></header>
  <nav>Navigation Area</nav>
  <section>
    <header><h2>Section Heading</h2></header>
    <article>
      <header><h3>Article Heading</h3></header>
      The article content
    </article>
    <article>
      <header><h3>Article Heading</h3></header>
      The article content
    </article>
  </section>
  <footer>The Page Footer</footer>
</body>
</html>
```

Even though it's intriguing to experiment with HTML 5, it's not yet ready for use on commercial Web sites. Keep in mind that the W3C still needs to complete the process to move HTML 5 from draft to recommendation status. Although new browser versions will offer increased support for HTML 5, not all your Web site visitors will install the latest version and workarounds will be likely (such as the CSS styles and script shown above). However, it's important to be aware of HTML 5—it's the way of the future! Explore the following resources to learn more about HTML 5:

• W3C's Web Developer's Guide to HTML 5

http://dev.w3.org/html5/html-author

- W3C's Interactive Chart of HTML 4 and HTML 5 Elements http://dev.w3.org/html5/html-author/#comparison-of-html-4.01-and-html-5-elements
- HTML 5 Doctor http://html5doctor.com
- HTML 5 Demos http://html5demos.com
- HTML 5 Cheat Sheet

http://media1.smashingmagazine.com/wp-content/uploads/images/ html5-cheat-sheet/html5-cheat-sheet.pdf

D.14 Summary

As you can see from these examples, there are many similarities between HTML 4, XHTML, and HTML 5. After learning to code in one of these markup languages, such as XHTML, it is easy to transition to the others if needed. Visit the W3C's Web site for the most up-to-date information about XHTML (http://www.w3.org/TR/xhtml1) and HTML 5 (http://www.w3.org/TR/html5).



Section 508 Standards

Information technology created for use by federal agencies is required by Section 508 of the Rehabilitation Act to be accessible by individuals with disabilities. The Section 508 Standards applicable to Web page development, along with the textbook chapters that discuss coding and/or design methods applicable to each standard, follow.

§§ 1194.22 Web-Based Intranet and Internet Information and Applications

- a. A text equivalent for every non-text element shall be provided (for example, via alt, longdesc, or in element content). Chapter 4, Chapter 11
- b. Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation. Chapter 11
- c. Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup. Chapter 4, Chapter 5
- d. Documents shall be organized so they are readable without requiring an associated style sheet. Chapter 2, Chapter 3
- e. Redundant text links shall be provided for each active region of a serverside image map. Chapter 4 introduces the use of client-side image maps see the next standard.
- f. Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape. Chapter 4
- g. Row and column headers shall be identified for data tables. Chapter 8
- Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers. Chapter 8
- i. Frames shall be titled with text that facilitates frame identification and navigation. Chapter 13

- j. Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz. Chapter 11
- k. A text-only page, with equivalent information or functionality, shall be provided to make a Web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes. Chapter 5, Chapter 11
- l. When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology. Chapter 11
- m. When a Web page requires that an applet, plug-in, or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l). Chapter 11
- n. When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues. Chapter 9
- o. A method shall be provided that permits users to skip repetitive navigation links. Chapter 5, Chapter 7
- p. When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required. Chapter 11

See the following resources for more information about Section 508 Standards:

- http://www.section508.gov
- http://www.section508.gov/index.cfm?FuseAction=Content&ID=12#Web
- http://www.access-board.gov/sec508/guide/1194.22.htm
- http://www.webaim.org/standards/508/checklist

At the time this was written, the United States Access Board was in the process of conducting a review and update of the Section 508 standards. For the most current information, see http://www.access-board.gov/sec508/update-index.htm.

Answers

Chapter 1

Checkpoint 1.1

- 1. The Internet is a public, globally connected network of computer networks. An intranet uses the same protocols as the Internet, but it is a private network used to share organizational information and resources among coworkers.
- 2. The commercialization and exponential growth of the Internet that occurred in the early 1990s was due largely to three main events: the removal of the restriction of commercial use on NSFnet, the development of the World Wide Web by Tim Berners-Lee at CERN, and the development of a graphical browser (called Mosaic) at the NCSA. These events combined to provide the commercial incentive and an easy way to share and access information in a way that had never been experienced.
- 3. The Internet is a global, interconnected network of computer networks a maze of phone lines, cable lines, and satellites that connect computers around the world. Information is stored in many formats on computers connected to the Internet. The World Wide Web, or Web, is a graphical user interface to some of the information stored on computers connected to the Internet—the computers that use HTTP to provide information in Web page format. The Web provides access to a portion of the information available on the Internet.

Checkpoint 1.2

1. An example of a Web client is a computer running a browser software application such as Internet Explorer. The computer is typically connected to the Internet only when needed. The Web browser software uses

HTTP to request Web pages and related resources from a Web server. A Web server is a computer that is continually connected to the Internet and that runs some type of Web server software application. It uses the HTTP protocol to receive requests for Web pages and related resources. It responds to these requests and sends the resources.

- 2. There are several protocols discussed in this chapter that use the Internet but do not use the Web. E-mail messages are transmitted using the Internet. SMTP (Simple Mail Transfer Protocol) is used to send e-mail messages. POP (Post Office Protocol) and IMAP (Internet Message Access Protocol) can be used to receive e-mail messages. FTP (File Transfer Protocol) can be used to exchange files (send and receive) with a computer connected to the Internet.
- 3. A URL (Uniform Resource Locator) represents the address of a resource that is available on the Internet. A URL consists of a protocol, a domain name, and the hierarchical location of the file or resource. An example of a URL is http://www.webdevfoundations.net/chapter1/index.htm. A domain name locates an organization or other entity on the Internet and is associated with a unique numeric IP address. A domain name is part of a URL.

Review Questions

- 1. c 2. a
- 3. a
- 4. b
- 5. a
- 6. True
- 7. False
- 8. True

- 9. False
- 10. XHTML
- 11. SGML
- 12. HTML
- 13. CERN
- 14. microblogging
- 15. TCP

Chapter 2

Checkpoint 2.1

- 1. HTML (Hypertext Markup Language), was developed by Tim Berners-Lee at CERN using SGML. HTML is the set of markup symbols or codes placed in a file intended for display on a Web browser. HTML configures a platform-independent display of information. Each markup code is referred to as an element (or tag).
- 2. XHTML is the most recent version of HTML. It was developed by the W3C to be the reformulation of HTML as an application of XML. XHTML combines the language of HTML with the syntax of XML. Like XML, XHTML is extensible and should be able to adapt to future needs.
- 3. The header section is located between the <head> and </head> tags on a Web page. This area is used to contain information that describes the Web page, such as the title of the page that will display in the menu bar of the browser window. The body section is located between the <body> and </body> tags. This area is

used to code text and tags that show directly in the browser's display of the Web page. The purpose of the body section is to describe the contents of the Web page.

Checkpoint 2.2

- The heading tag is used to display headings and subheadings of documents. The size of the heading is configured with the particular heading level used—ranging from 1 to 6. <h1> is the largest heading. <h6> is the smallest heading. Text contained between heading tags will be displayed using a bold font and will have a line break above and below.
- 2. Information on a Web page can be organized using ordered lists and unordered lists. Unordered lists display a small symbol or bullet in front of each item. Use the tag to configure an unordered list. Ordered lists by default display a sequence of numbers in front of each item. Use the tag to configure an ordered list. Configure individual items in both ordered and unordered lists using the tag.
- 3. The purpose of the blockquote tag is to indent a section of text on a Web page. A line break is placed before and after the text. The text is indented from both the left and right margins.

Checkpoint 2.3

- Physical file tags such as describe font instructions rather than general styles for the presentation of information. The Web is accessed by many applications other than regular browsers. For example, a screen reader may interpret to indicate that the text should be spoken stronger than normal.
- 2. Special characters are used to display items such as quotation marks, greater than (>), less than (<), and the copyright symbol © on a Web page. These special characters, sometimes called entity characters, are interpreted by the browser when the page is rendered.
- 3. Use an absolute link to display a Web page document from a Web site other than your own. The http protocol is used in the href value. Example:

Google

4. Use a relative link to display a Web page document from your Web site. The http protocol is not used in the href value.

Example: Contact Us

Review Questions

1.	b	7.	d
2.	a	8.	с
3.	c	9.	b
4.	c	10.	b
5.	b	11.	descr
6.	b		page,
			enco

describe a characteristic of a Web page, such as the character encoding.

- 12. special characters
- 13.
- 14.

15. Not everyone has an e-mail program configured with their browser. By placing the e-mail address in both places, you increase usability for all your visitors.

Chapter 3

Checkpoint 3.1

- 1. Reasons to use CSS on a Web page include the following: greater control of typography and page layout, separation of style from structure, potentially smaller Web page documents, and easier site maintenance.
- 2. Since visitors may set their browsers to certain colors, when changing a text color or a background color it is a good idea to configure the text color and the background color properties to provide good contrast between text and background.
- 3. Embedded styles are coded once in the header section of the Web page and apply to the entire page. This is more efficient than coding individual styles on HTML elements using inline styles.

Checkpoint 3.2

- Embedded styles can be used to configure the text and color formatting for an entire Web page. Embedded styles are placed in the header section of a Web page. The <style> tag is used to contain the CSS selectors and properties that configure the embedded styles.
- 2. External styles can be used to configure the text and color formatting for some or all of the pages on a Web site. This provides a single place for the formatting information. This single file can be changed and all the Web pages associated with it will display the new styles the next time they are rendered in a browser. External styles are placed in a separate text file using a .css file extension. Web pages use the <link /> tag to indicate that they are using an external style sheet.
- 3. <link rel="stylesheet" href="mystyles.css" type="text/css" />

Review Questions

- 1. d 2. b 3. b
- 4. a
- 5. c
- 6. c
- 7. c
- 8. d

- 9. a
- 10. b
- 11.
- 12. not uniformly
- 13. text-align
- 14. <div>
- 15. 1996

Chapter 4

Checkpoint 4.1

- 1. It is reasonable to code pages that look similar on various browsers; it is not reasonable to try to code pages that look exactly the same on various browsers and operating systems. As shown in this chapter, even a simple horizontal rule displays differently. Typically, Web developers code pages that look best on the browser and operating system most often used by their visitors. These pages should also look acceptable on other platforms. This is called "degrading gracefully." Look for more Web design tips in Chapter 5.
- 2. The first style rule is missing an ending semicolon (;).
- 3. True. CSS can be utilized to configure color, text, and even visual elements such as rectangular shapes and lines (with the border property).

Checkpoint 4.2

1. CSS background-image property configures the file that is displayed. The CSS background-repeat property configures the way the image is displayed on the page.

Suggested solution:

```
h1 { background-image: url(circle.jpg);
background-repeat: no-repeat;
```

- }
- 2. The CSS background-image property configures the file that is displayed. The CSS background-repeat property configures the way the image is displayed on the page.

Suggested solution:

```
body { background-image: url(bg.gif);
      background-repeat: repeat-y;
```

- }
- 3. The browser will display the background color immediately. Then, the browser will render the background image and repeat the image as specified in the CSS. The background color will appear in areas not covered by the background image.

Checkpoint 4.3

1. Answers will vary depending on the site that you choose to review. Suggested solution: The page reviewed is the home page of a travel soccer league. The URL is http://www.alithsa.org. Image links are used for the main navigation of the site. Each image link contains a rectangle with text and a soccer ball. There is good contrast between the black text and the background color of either yellow or green. Yellow background is used to indicate the current page. This page would not be easily accessible to a visitor who is site-challenged because of the alt attribute values used. Currently, every graphic has the same value for the alt attribute, "Picture". To improve accessibility the alt attribute values on each image tag should be modified to contain brief, descriptive phrases. On the plus

side, the page does display plain text links in the footer section. The images used as navigation links on this page contribute to the fun, sporty attitude of the site. The accessibility of the page needs to be improved.

- 2. The elements , <map>, and <area />—work together to create a functioning image map. The tag configures the image that will be used for the map and contains a usemap attribute whose value corresponds to the id value on the <map> tag associated with the image. The <map> tag is a container tag and surrounds one or more <area /> tags. There is one self-contained <area /> tag for each clickable hotspot on the image map. See the working example on the textbook Web site at http://webdevfoundations.net/5e/chapter4.html.
- 3. False. There is a trade-off between the quality of the image and the file size. The goal should be to save images using the smallest file size that provides acceptable display quality.

Review Questions

- 12. text links
- 13. thumbnail
- 14. Create them using a graphics application, download them from a free site, purchase and download them from a graphics site, purchase a graphics collection on CD, take digital photographs, scan photographs, scan drawings, or hire a graphic designer to create graphics.
- 15. image map

11. tiled

1. b

2. c

3. b

4. b

5. a

6. c

7. d

8. a

9. b

10. d

Chapter 5

Checkpoint 5.1

- 1. The four basic principles of design are repetition, contrast, proximity, and alignment. Descriptions of school home pages and how these principles are applied will vary.
- 2. http://www.walmart.com is an e-commerce site. It is designed to appeal to the general public—note the white background and high contrast and use of tabbed navigation, product hierarchy, and site search. This meets the needs of its target audience—teen and adult shoppers. http://www.sesameworkshop.org/sesamestreet is geared toward young children and their parents. It is bright and colorful with much interactivity and animation, which is appealing to the target audience. http://www.mugglenet.com is a fan site designed to appeal to teens and young adults. It is a dark, mysterious site with much interaction—the forums are very busy. This site appeals to its niche audience.
- 3. Answers will vary.

Checkpoint 5.2

- 1. Answers will vary.
- 2. Best practices for writing for the Web include the following: short paragraphs, bullet points, common fonts, white space, multiple columns if possible, bold or emphasized important text, and correct spelling and grammar.

Answers will vary. The following suggested solution adds interest with bullet points, places emphasis on important phrases, and includes editing of the original text:

Acme, Inc. is a new laboratory instrument repair and service company. Our staff at this time has a combined total of 30 plus years of specimen preparation instrumentation service and repair.

• EPA Refrigeration Certified

Acme, Inc. technicians are factory trained and equipped with the best diagnostic and repair equipment available.

• Fully Insured

Our workers are fully covered by workman's compensation insurance.

A proof of insurance certificate can be provided upon request.

• Convenient Location

Repair shop facilities and offices located in Chicago, Illinois.

• Service History

Your equipment is important to us.

A detailed repair history is kept and available to our service technicians.

• Rates

Labor and Travel \$100.00 per hour

2 hour minimum

\$0.40 per mile and all related expenses

Parts are not included

3. Best practices for using graphics on Web pages include the following: careful choice of colors (Web Safe Color Palette is recommended for the most similar cross-platform display), use of necessary images only, use of images as small as possible, a usable site even if images are not displayed, and use of the alt attribute to configure text descriptions for images.

Recommendations for school home pages will vary.

Review Questions

- 1. c
 8. a

 2. b
 9. c

 3. b
 10. b

 4. b
 11. hierarchical
- 5. d 12. adds value
- 6. d 13. will not
- 7. c 14. Web Accessibility Initiative (WAI)

- Student answers will vary. The four principles that are essential to complying with WCAG 2.0 are as follows: Perceivable, Operable, Understandable, and Robust.
 - 1. Content must be Perceivable
 - 2. Interface components in the content must be Operable

- 3. Content and controls must be Understandable
- 4. Content should be Robust enough to work with current and future user agents, including assistive technologies

Chapter 6

Checkpoint 6.1

- 1. Answers will vary. They could include the following: ease of site maintenance, separation of style from structure, increased accessibility, support of the Semantic Web, smaller documents, increased page layout control, support of multiple media types, and greater typography control.
- 2. Relative positioning allows you to alter the position of an element in relation to where it would otherwise be displayed using normal flow. Absolute positioning allows you to specify by pixels the exact location of an element in a Web page.
- 3. The z-index property provides flexibility in the display of elements. When using XHTML only there is no easy way to "stack" elements other than configuring backgrounds for pages or tables. The z-index property configures the stacking order of elements on a Web page. The default z-index value is 0. Elements with higher z-index values will appear stacked on top of elements with lower z-index values rendered on the same position of the page.

Checkpoint 6.2

- 1. The page layout is liquid. Attributes of liquid page design include the following: pages take up 100 percent of the browser window—there is no blank margin on the left or right side of the page. The middle area expands and contracts when the page is resized. The content flows to fill whatever size window is used to display it.
- 2. Answers will vary. Some of the suggestions listed in the debugging section may be used.
- 3. Configure the XHTML tag as a selector if the style is expected to be applied every time that tag is used. Configure an id if the style is for a specific element that is expected to occur only once on a page. Configure a class if the style is expected to be applied to a variety of different XHTML elements.

Review Questions

1.	a	5.	d
2.	a	6.	с
3.	b	7.	с
4.	b	8.	b

9.	c	13.	margin
10.	b	14.	left, right, top
11.	id	15.	class
12.	left		

Chapter 7

Checkpoint 7.1

- 1. Organizing a Web site into folders can help increase productivity by organizing the files into file type (such as images or media), file function (Web page or script), and/or Web site section (products, services, and so on). Using folders and subfolders can be helpful when a project team (see Chapter 10) is developing a large Web site.
- 2. Since a navigation menu is a list of links, it is semantically correct to configure the menu using an unordered list. This technique is popular among Web developers.
- 3. There are a number of approaches to handle this. One approach is to create a special class and configure the pseudo-classes for use with that class. Apply this class to the navigation links. This will allow the "regular" anchor tags to use the default configuration and the navigation anchor tags (using the class) to use the special configuration. In the following example, the class intended for the navigation links is called nav.

```
.nav { border: 1px solid #cccccc;
       padding: 3px 15px;
       width: 100px;
       color: #FFFFFF;
       background-color: #006600;
       font-family: Arial, Helvetica, sans-serif;
       font-size: 110%;
       font-weight: bold;
       text-align: center;
       text-decoration: none;
}
a.nav:link
               { color : #FFFFF; }
a.nav:visited { color : #CCCCCC; }
a.nav:hover
               { color : #66CC33; }
The XHTML for a navigation link is as follows:
<a class="nav" href="services.html">Services</a>
```

Checkpoint 7.2

- 1. The Web developer has the best of both worlds—the ability to configure both print and screen media.
- 2. Configure the XHTML selector if the style is expected to be applied every time that element is used. Configure an id if the style is for a specific element that is

expected to occur only once on a page. Configure a class if the style is expected to be applied to a variety of different XHTML elements.

3. This follows the "cascade": external styles, embedded styles, inline styles, XHTML attributes.

Review Questions

 1. a
 9. c

 2. a
 10. d

 3. c
 11. media="print"

 4. b
 12. margin

 5. c
 13. hover

 6. c
 14. target

 7. b
 15. precedence

 8. d
 10. d

Chapter 8

Checkpoint 8.1

- 1. Tables are often used to organize information and to format an entire Web page.
- 2. The cellspacing attribute configures the amount of empty space between the cells in a table. The cellpadding attribute configures the amount of empty space between the information contained within the cells and the edges of the cells.
- 3. There are a number of coding techniques that improve the accessibility of a table. These include the summary attribute, the title attribute, and configuring headers for columns or rows.

Checkpoint 8.2

- 1. Web site visitors use monitors with different resolutions. A Web page layout configured with a table using a percentage width is flexible. Examples will vary.
- 2. A Web page layout configured with a table using a fixed width will appear consistent when displayed on monitors with different resolutions. Often these pages are centered in the browser window. Examples will vary.
- 3. True. Tables can be nested within other tables. Nested tables are often used to organize information on a Web page document with a page layout configured by a table.

Review Questions

c	5. b
b	6. b
с	7. b
c	8. d
	c b c c

- 9. c
- 10. border
- 11. valign
- 12. larger
- 13. summary or title
- 14. padding

15. Although XHTML tables are still often used to configure page layout, CSS is a more modern and preferred method to configure page layout. Advantages of CSS include ease of maintenance and smaller Web page files (due to less XHTML code).

Chapter 9

Checkpoint 9.1

- While either solution would be appropriate, the solution that uses three input boxes (first name, last name, and e-mail address) is the more flexible solution. These separate values could be stored in a database by server-side processing where they could easily be selected and placed into personalized e-mail messages. This provides the most useful functionality of the collected information in future manipulations.
- 2. There are a number of possible solutions for this design question. If the responses are short and about equal length, perhaps a group of radio buttons would be appropriate. If the responses are lengthy or of widely varying lengths, a select list would be a good choice. Radio groups can accept only one response per group. Select lists by default accept only one response. Check boxes would not be appropriate because they allow more than one response to be selected.
- 3. False. In a radio button group, the name attribute is used by the browser to process separate elements as a group.

Checkpoint 9.2

- The <fieldset> tag creates a visual border around the elements contained within the fieldset. This can help to organize form elements and increase the usability of the form. However, this tag is not supported by all browsers. Test the form to verify that it is still usable even if the browser ignores the <fieldset> tag. The <legend> tag is used to provide a text description of the area bounded by the <fieldset> tag. This further serves to increase the usability of the form for visitors using browsers that support these tags.
- 2. The accesskey attribute allows a visitor to select an element immediately by using the keyboard instead of a mouse. This improves the accessibility of the page and can be very helpful to mobility-impaired visitors. The W3C recommends providing a visual cue of an underlined letter, bold letter, or message that indicates the hot keys to press to activate an element.
- 3. The Web designer and client decide which is used—standard submit button, image button, or a button tag. However, it makes sense to use the simplest possible technology that provides the needed functionality. In most cases, this is the standard submit button. The submit button's accessibility can be

increased by configuring it with an accesskey attribute. Visually challenged visitors using a screen reader will hear that a submit button has been encountered. Submit buttons automatically invoke the server-side processing configured in the form tag.

An image button will also automatically invoke the server-side processing configured for the form and can be more accessible if configured with the alt and accesskey attributes. Unless there is a very good reason or a very insistent client, avoid the <button> tag—why make a simple submit button so complex? If needed, configure the elements contained within the button area with attributes to improve accessibility such as alt and accesskey where appropriate.

Checkpoint 9.3

- 1. CGI (Common Gateway Interface) is a standard method for Web pages to request special processing on the Web server, such as querying databases, sending e-mails, or handling form data. CGI provides a standard way for a Web server to pass a Web visitor request to a program or script stored on the server, receive a response from the program or script, and send that response to the Web browser for display.
- 2. Suggested solution:

```
<form method="post"
```

```
action="http://webdevfoundations.net/scripts/subscribe.asp" >
First Name: <input type="text" name="fname" id="fname" /><br />
Last Name: <input type="text" name="lname" id="lname" /><br />
E-mail: <input type="text" name="email" id="email" /><br />
<input type="submit" />
</form>
```

3. The server-side script developer and the Web page designer must work together to get both parts of the form processing—the front-end Web page and the back-end server-side script—working together. They need to communicate regarding the method (get or post) to be used by the form, and the location of the server-side script. Since the names of the form elements are often used by the server-side script as variable names, the form element names are usually specified at this time.

Review Questions

- 1. d
- 2. a
- 3. c
- 4. b
- 5. b
- 6. b
- 7. a
- 8. d

- 9. c
- 10. d
- 11. maxlength
- 12. <fieldset>
- 13. name
- 14. This technique should be avoided because it presents an unprofessional image and can be inconvenient for Web page visitors. Its

- success depends on a visitor wanting to use the e-mail application configured with his or her browser. The visitor may not have configured an e-mail application or may not want to use the e-mail application that was configured. This technique can decrease the usability of a form.
- 15. Forms accept information from Web page visitors, such as a search keyword, newsletter subscription information, online ordering information, general feedback, and others.

Chapter 10

Checkpoint 10.1

- 1. The project manager directs the Web site development process—creating the project plan and schedule. He or she must keep the big picture in mind while communicating with the staff and coordinating team activities. The project manager is accountable for meeting project milestones and producing results.
- 2. A large-scale Web project is much more than brochure-ware—it is often a complex information application that the company depends on. This needs the special talents of a wide variety of individuals—including experts in graphics, organization, writing, marketing, coding, database administration, and so on one or two people simply cannot fulfill all these roles and create a quality Web site.
- 3. Answers will vary. Different testing techniques include the unit testing done by individual Web developers, automated testing performed by link checker programs, code testing and validation performed by code validation programs, and usability testing achieved by watching typical Web visitors use a Web site to perform tasks.

Checkpoint 10.2

- 1. A virtual Web host that offers reliability and scalability would meet the needs of a small company for their initial Web presence. The Web host chosen should offer higher-end packages with scripting, database, and e-commerce capabilities to allow for future growth.
- 2. A dedicated Web server is owned and supported by the Web host company. The client company may choose to administer it or may pay the Web host company to perform this task. A co-located server is owned by the client company and housed at the Web host provider. This offers both the advantage of a reliable Internet connection at the Web host and full control of the administration and support of the Web server.
- 3. If your Web site is down and your Web host is not responding to technical support requests, it doesn't matter that you are saving \$5.00 per month. When comparing Web host plans, check prices to know the currently prevailing fees. If the charges of a particular Web host seem abnormally low the company is probably cutting corners. Do not base your choice on price alone.

Review Questions

- 1. d
- 2. a
- 3. c
- 4. b
- 5. d
- 6. a
- 7. d
- 8. c
- 9. a
- 10. c
- 11. usability testing
- 12. graphic designer
- 13. UNIX and Linux
- 14. A careful review of your competitor's Web presence helps you design a site that will stand out from the

rest and be more appealing to your shared customer base. Note both the good and bad components of your competitors' sites.

15. Contacting technical support can give you a general idea of the responsiveness of the Web host provider to issues and problems. If the technical support staff is slow getting back to you at this point, don't be surprised if you get the same type of service when you have a problem and need immediate help. While not fail-safe, a quick response to a simple question at least gives the appearance of a well-organized, professional, and responsive technical support staff.

Chapter 11

Checkpoint 11.1

- 1. Answers will vary, and will include RealPlayer, Windows Media Player, Apple QuickTime, Adobe Reader, Adobe Flash Player, and Adobe Shockwave Player. Review Section 11.1 Helper Applications and Plug-Ins for more information.
- 2. Issues include bandwidth, unreliability of the delivery of the media due to platform, browser, and plug-in issues, and accessibility. It is a good idea to have alternate content available that does not rely on media alone.
- 3. True. Issues arise all the time with browsers, operating systems, and plug-ins/ players. Visit the plug-in or player's Web site for the most current information on successfully invoking a plug-in.

Checkpoint 11.2

- 1. Flash can be used to add interactive features, such as menus and banner ads to Web pages. Flash can also be used create an entire Web site. Uses of Flash seem to be limited only by our imaginations.
- 2. Java applets can be used for a variety of purposes, including navigation, image effects, text effects, and advanced applications such as charting and real-time stock quotes.
- 3. Every visitor is not able to use technologies such as Flash and Java applets. Therefore, you should provide alternate content—especially alternate navigation options—for use by those visitors. While the accessibility of Flash content has improved, "plain" XHTML/HTML Web pages are still more easily accessible.

The files used by these technologies take up bandwidth and slow the delivery of pages. If most of your target audience use a dial-up connection, this may be a concern.

Checkpoint 11.3

- 1. JavaScript can be used to add a wide range of interactive effects to a Web page including form validation, pop-up windows, jump menus, message boxes, image rollovers, status message changes, calculations, and so on.
- 2. DHTML can be used to add a wide range of dynamic interactive effects to a Web page, including dynamic navigation that displays based on mouse movements, hiding and showing elements such as navigation areas based on mouse movements, and animation in which the CSS positioning properties of elements are changed.
- 3. The combination of technologies called Ajax can respond to use actions (such as mouse clicks on text entry) by changing the position of a Web page display without refreshing the entire page. Web sites using Ajax include Google maps (http://maps.google.com), Flickr (http://www.flickr.com), and del.icio.us (http://del.icio.us).

Review Questions

- 1. a
- 2. b
- 3. b
- 4. c
- 5. b
- 6. a
- 7. a
- 8. d
- 9. b
- 10. c
- 11. 8-bit
- 12. fair use
- 13. dynsrc
- 14. Java Virtual Machine

Chapter 12

Checkpoint 12.1

1. There are many advantages when engaging in e-commerce. This is especially true for a small business owner who must watch costs carefully. Advantages include very low overhead, 24/7 business hours, and global sales potential.

- 15. Document Object Model (DOM)
- 16. Answers will vary but may include the following: large file size to download, uneven support of browser plug-ins, and the time, talent, and software required to create audio or video content.
- 17. Creative Commons at http:// creativecommons.org provides a free service which allows authors and artists to register a type of a copyright license. The Creative Commons license informs others exactly what they can and cannot do with the creative work

- 2. There are risks in any business venture, including e-commerce. Risks associated with e-commerce include increased competition, fraudulent transactions, and security issues.
- 3. SSL (Secure Sockets Layer) is a protocol that allows data to be privately exchanged over public networks such as the Internet. An online shopper can check the following to determine if SSL is being used:
 - The https protocol will display in the browser address bar instead of http.
 - A lock icon will display in the status bar area of the browser window. If this icon is clicked, information about the digital certificate and encryption level being used will display.

Checkpoint 12.2

- 1. Three payment models commonly used on the Web are cash, check, and credit. Credit is the most popular. Consumers are used to using credit cards. Processes used for accepting credit cards at stores are easily adapted to online use.
- 2. Answers will vary. People make online purchases for many reasons including the following: convenience, lower cost, and ease of shipping. If you did not check for SSL the last time you purchased an item on the Web, most likely, you'll look for it in the future.
- 3. E-commerce solutions include instant storefronts, off-the-shelf shopping cart software that you or your Web host installs, and custom solutions. The easiest entry to e-commerce is an instant storefront. Although this does not provide the most flexibility, you can get a store up and running in an afternoon. An easy semicustom solution would be to create your own Web site but use PayPal to process the shopping cart and credit card transactions.

Review Questions

1. c

2. a

3. b

4. c

5. b

6. a

7. b

8. a

9. d

- 10. b
- 11. symmetric encryption
- 12. EDI
- 13. asymmetric key
- 14. SSL
- 15. The Web site developers may use an automatic translation program or other customized Web translation service.

Chapter 13

Checkpoint 13.1

1. A search engine is programmatically driven. Individuals submit a form to request that the search engine's robot program visits their Web site. The robot (sometimes called a spider) program "walks" the Web site, following links. Based on the pro-

grammed criteria, the site may be listed and categorized in the search engine's database. There is no human involvement in this process. Google (http://www.google.com) is an example of a search engine. In contrast, when an individual submits a form to a search directory or index, a human (known as an editor at Open Directory) personally visits the site and decides whether to include the site in the directory and what category it should be placed in. The Open Directory (http://www.dmoz.org) is an example of a search directory.

- 2. Three components of a search engine are the robot, database, and search form. The robot is a special program that "walks" the Web and follows links to sites. The robot updates the search engine's database with the information it finds. The search form is the graphical user interface that is used to request a search by a visitor to the search engine site.
- 3. Yes, it may be beneficial for a business to pay for preferential listing. If your business is listed in the first page of search results, visitors are more likely to find your site than if you are in the hundredth page of search results. Paid programs such as preferential listings, Yahoo!'s Sponsored Search, and Google's AdWords should be carefully considered and may be a good match for the marketing goals of an organization.

Checkpoint 13.2

- 1. Answers will vary. In most cases the top three sites returned for a particular search phrase will not be the same. Consider optimizing your site so that the currently most popular search engine displays your site as high as possible in its results list.
- 2. A brute force method is to experiment by visiting a search engine, typing in keywords, and checking for your site in the search results. If your Web site host provides you with Web log reports, you can easily tell by examining the reports. You'll see the names of the robot/spider programs in the reports—Googlebot is the name of Google's spider (see http://www.robotstxt.org for more information on search engine robots). The Web log reports will also itemize the search engines used by visitors and which keywords are used to locate your site.
- 3. Answers will vary. Web site promotion methods that do not use search engines include the following: affiliate programs, banner ads, banner exchanges, reciprocal link agreements, newsletters, sticky site features such as polls, forums, surveys, personal recommendations, newsgroup/listserv postings, social media marketing techniques, blog posting, RSS feeds, traditional media ads, and existing paper marketing materials. Any of these are valid as a first choice—depending on the needs of the organization. The newsletter technique is an interesting promotion method to consider. Place a form on a Web page to allow visitors to opt-in to your newsletter. Send them a periodic e-mail with information of value related to your site (possibly even special offers). This encourages visitors to return to your site. They may even forward your e-mail to a friend.

Note: Be sure to provide a way for visitors to opt-out of the newsletter. For example, newsletters sent by TechLearning News include the following message: "UNSUBSCRIBE

To unsubscribe from this type of e-mail please reply to this message. unsub_techlearning@news.techlearning.com"

Review Questions

- 1. b
- 2. a
- 3. c
- 4. c
- 5. b
- 6. c
- 7. c
- 8. a
- 9. b
- 10. b
- 11. stickiness
- 12. <meta name="robots"
 description=
 "noindex,nofollow" />

- 13. search engines and search indexes
- 14. a variety of methods, including affiliate programs, banner ads, banner exchanges, reciprocal link agreements, blog posting, RSS feeds, newsletters, personal recommendations, social book-marking, traditional media advertising, or including a URL on all promotional materials
- 15. a reasonable expense related to advertising and marketing an organization

Chapter 14

Checkpoint 14.1

- 1. JavaScript can be used for rollover images, form data validation, popup windows, browser sniffing, interactivity such as alert messages and prompts, and mathematical calculations for tasks such as determining tax.
- 2. There is no limit to the number of script blocks that can be embedded in an XHTML document.
- 3. You can use the JavaScript Console in Firefox to find an error. You could also look through your code, paying particular attention to names of objects, properties, methods and statements, and missing semicolons.

Checkpoint 14.2

- 1. An object is a thing, a property is an attribute, and a method is an action.
- 2. An event is an occurrence such as click, load, and mouseover. An event handler is an attribute embedded in an XHTML tag such as onclick, onload, and onmouseover, that points to some JavaScript code to execute when the corresponding event occurs.
- 3. Event handlers are embedded in XHTML tags and are not placed in separate script blocks.

Checkpoint 14.3

1. The prompt() method could be used to gather a piece of data such as the user's age. The prompt() method should be used in conjunction with a variable so that the data will be stored in the variable.

2. The code might look something like the following:

```
if (userAge < 18)
{
    alert("You are under 18");
} else {
    alert("You are 18 or older");
}</pre>
```

3. A function definition begins with the keyword function, followed by the name of the function, and some JavaScript statements. It defines a function and calling that function results in the execution of the statements within it.

Checkpoint 14.4

- 1. Form data validation refers to checking form input against validation rules and not allowing the form to submit if the data does not conform to the rules.
- 2. Answers may vary, but may include required fields such as name, e-mail address, and phone number. Numeric fields may require validation to ensure that they are within particular bounds such as order quantity greater than 0 and age between 1 and 120.
- 3. When the user clicks the submit button, the submit event occurs and the onsubmit event handler executes the return validateForm() command. The validateForm function runs and tests the form data for validation. If the data is valid, validateForm() returns the value of true, and the form submits. If the data is not valid, validateForm() returns the value of false and the form does not submit.

Review Questions

- 1. a
- 2. c
- 3. b
- 4. a
- 5. d
- 6. c
- 7. a
- 8. b
- 9. c
- 10. a
- 11. browser sniffing
- 12. jump menu
- 13. window
- 14. variable
- 15. onclick
- 16. Common uses for JavaScript include rollover images, form data validation, popup windows,

browser sniffing, interactivity such as alert messages and prompts, and mathematical calculations.

17. The following techniques can be used when debugging JavaScript. Check the JavaScript code carefully for syntax errors. Verify that quotation marks, braces, and parentheses are used in pairs. Check for missing semicolons. Verify that your code uses the correct case (uppercase and lowercase characters) in variable, object, property, and method names. Use the JavaScript Console to help with debugging-it will provide some information about the error. Use an alert() to display the values of variables or to display messages as your script is running.

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Figure 3.2

Partial color chart

STEFFFF	#FFFFCC	#FFFF99	#FFFF66	#FFFF33	#FFFF00
#FFCCFF	*FFCCCC	#FFCC99	#FFCC66	#FFCC33	#FFCC00
4950089	4FF99CC	«FF9000	4579966	499933	4879900
419931	AFFORCE	477-1679	#FT-0660	499.0633	#776600
OFFINT	OFFICE	4893399	(1973306)	493030	(17330)
4FE0/FE	#FF00CC	4559099	493000	499003	463000

Figure 3.3

Web safe colors display predictably

This background color, #800000, is NOT on the Web Color Palette. The color may display differently depending on the operating system and the monitor.

This background color, #CC0000, is on the Web Color Palette. The color should display in a similar maner on both Macs and PCs.

Figure 3.7

embedded.html with styles applied







Figure 3.26

New Pasha the Painter index.html





• Drywall

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Figure 4.6

Notice the halo effect on the dark background



Figure 4.7

This GIF image is less than 5KB but is poor quality



Figure 4.8 Optimization is a trade-off between file size and image quality



Figure 4.10 Initial JPEG image (205KB file size)



Figure 4.11

JPEG saved at 80 percent quality (55KB file size)



Figure 4.12

JPEG saved at 20 percent quality (19KB file size)



Figure 4.16

The new Trillium Home page with a logo banner



Figure 4.25

The favorites icon displays in the browser tab and address bar.













The compelling graphic draws you in



Figure 5.2

This text-intensive Web site offers numerous choices



The design principles of repetition, contrast, proximity, and alignment are well used on this site



Figure 5.22 A typical site for children



Many teens and young adults find dark sites appealing



Figure 5.24

A site designed specifically for the 55 and over age range



The Atmospheric Radiation Measurement (ARM) Program Web site at http://www.arm.gov



Figure 5.41

SmokeFree.gov's site for women at http://women. smokefree.gov



Telework.gov at http://www.telework.gov



Figure 6.18

The image is floating on the page



Figure 6.21

A two-column page configured using CSS











Figure 7.13

This three-column page layout is designed using CSS





Web Safe Color Palette

#990033	#FF3366	#CC0033	#FF0033	#FF9999	#CC3366	#FFCCFF	#CC6699	#993366	#660033	#CC3399	#FF99CC	#FF66CC	#FF99FF	#FF6699	#CC0066
153:0:51	255:51:102	204:0:51	255:0:51	255:153:153	204:51:102	255:204:255	204:51:153	153:51:102	102:0:51	204:51:153	255:153:204	255:102:204	255:153:255	255:102:153	204:0:102
#FF0066	#FF3399	#FF0099	#FF33CC	#FF00CC	#FF66FF	#FF33FF	#FF00FF	#CC0099	#990066	#CC66CC	#CC33CC	#CC99FF	#CC66FF	#CC33FF	#993399
255:0:102	255:51:153	255:0:153	255:51:204	255:0:204	255:102:255	255:51:255	255:0:255	204:0:153	153:0:102	204:102:204	204:51:204	204:153:255	204:102:255	204:51:255	153:51:153
#CC00CC	#CC00FF	#9900CC	#990099	#CC99CC	#996699	#663366	#660099	#9933CC	#660066	#9900FF	#9933FF	#9966CC	#330033	#663399	#6633CC
204:0:204	204:0:255	153:0:204	153:0:153	204:153:204	153:102:153		102:0:153	153:51:204	102:0:102	153:0:255	153:51:255	153:102:204	51:0:51	102:51:153	102:51:204
#6600CC	#330066	#9966FF	#6600FF	#6633FF	#CCCCCFF	#99999FF	#99990CC	#6666CC	#66666FF	#6666699	#333366	#333399	#330099	#3300CC	#3300FF
#3333FF	#33333CC	#0066FF	#0033FF	#3366FF	#3366CC	#0000066	#000033	#00000FF	#000099	#0033CC	#00000CC	#336699	#0066CC	#99CCFF	#6699FF
#003366	#6699CC	#006699	#3399CC	#0099CC	51:102:204	#3399FF	#003399	#0099FF	#33CCFF	#00CCFF	#99FFFF	#66FFFF	0:102:204 #33FFFF	#00FFFF	#00CCCC
0:51:102 #009999	102:153:204	0:102:153	51:153:204	0:153:204	102:204:255 #660000	51:153:255 #339999	0:51:153 #336666	0:153:255	51:204:255 #003333	0:204:255 #00FECC	153:255:255 #33EECC	#3300.99	#000009	0:255:255 #66EECC	0:204:204
0:153:153	102:153:153	153:204:204	204:255:255	51:204:204	102:204:204	51:153:153	51:102:102	0:102:102	0:51:51	0:255:204	51:255:204	51:204:153	0:204:153	102:255:204	153:255:204
#00FF99 0:255:153	#339966 51:153:102	#006633 0:102:51	102:153:102	102:204:102	#99FF99 153:255:153	102:255:102	#990.099 153:204:153	#330033 51:102:51	102:255:153	#35FF99 51:255:153	#330000 51:204:102	9000000 0:204:102	102:204:153	#009966 0:153:102	#339933 51:153:51
#009933	#33FF66	#00FF66	#CCFFCC	#CCFF99	#99FF66	#99FF33	#00FF33	#33FF33	#00CC33	#33CC33	#66FF33	#00FF00	#66CC33	#006600	#003300
0:153:51	51:255:102	0:255:102	204:255:204	204:255:153	153:255:102	153:255:51	0:255:51	51:255:51	0:204:51	51:204:51	102:255:51	0:255:0	102:204:51	0:102:0	0:51:0
#009900	#33FF00	#66FF00	#99FF00	#66CC00	#00CC00	#33CC00	#339900	#99CC66	#669933	#99CC33	#336600	#669900	#99CC00	#CCFF66	#CCFF33
0:153:0	51:255:0	102:255:0	153:255:0	102:204:0	0:204:0	51:204:0	51:153:0	153:204:102	102:153:51	153:204:51	51:102:0	102:153:0	153:204:0	204:255:102	204:255:51
#CCFF00	#999900	#CCCC00	#CCCC33	#333300	#666600	#999933	#CCCC66	#666633	#999966	#CCCC99	#FFFFCC	#FFFF99	#FFFF66	#FFFF33	#FFFF00
204:255:0	153:153:0	204:204:0	204:204:51	51:51:0	102:102:0	153:153:51	204:204:102	102:102:51	153:153:102	204:204:153	255:255:204	255:255:153	255:255:102	255:255:51	255:255:0
#FFCC00	#FFCC66	#FFCC33	#CC9933	#996600	#CC9900	#FF9900	#CC6600	#993300	#CC6633	#663300	#FF9966	#FF6633	#FF9933	#FF6600	#CC3300
255:204:0	255:204:102	255:204:51	204:153:51	153:102:0	204:153:0	255:153:0	204:102:0	153:51:0	204:102:51	102:51:0	255:153:102	255:102:51	255:153:51	255:102:0	204:51:0
#996633	#330000	#663333	#996666	#CC99999	#993333	#CC6666	#FFCCCC	#FF3333	#CC3333	#FF6666	#660000	#990000	#CC0000	#FF0000	#FF3300
153:102:51	51:0:0	102:51:51	153:102:102	204:153:153	153:51:51	204:102:102	255:204:204	255:51:51	204:51:51	255:102:102	102:0:0	153:0:0	204:0:0	255:0:0	255:51:0
#CC9966 204:153:102	#FFCC99	#CCCCCCC	#999999	#666666	#333333	#FFFFF	#000000								

Most computers can display millions of colors, but they do not display the same colors consistently. One computer may display a Web page with a dark red background while another renders the same Web page with a brown background. If you want to make sure your Web pages look the same to everyone, select your colors from this palette of 216 Web safe colors. These colors will look the most similar on all computer platforms and computer monitors. The hexadecimal and decimal RGB values are shown for each color in the palette above.