

1 The Environment and the Tools



Introduction

Using new and developing technologies, even beginner web developers can create professional-looking websites that include multimedia, social media, and dynamic content viewable on various devices and screen sizes. Applying web technologies is only one part of what is required to produce a successful website: a website that effectively communicates, educates, entertains, or provides a venue for conducting business transactions also requires good web design. This book explains the basic elements of good web design and shows you how to develop compelling websites and webpages for specific purposes or audiences. This chapter begins the process by describing the Internet and the World Wide Web. Next, you learn about the various ways users connect to the Internet. The chapter then describes different types of websites and the tools for creating them. Finally, the chapter discusses the various roles, responsibilities, and skills essential to successful web design.

Objectives

After completing this chapter, you will be able to:

1. Describe the Internet and the World Wide Web
2. Discuss ways to access the Internet and the web
3. Categorize types of websites
4. Identify web design tools
5. Explain web design principles, roles, and required skills

The Internet and the World Wide Web

A computer **network** consists of connected computers, mobile devices, printers, and data storage devices that share computing resources and data. Computer networks are everywhere—in home offices, in student computer labs, in public places such as coffee shops and libraries, and in the offices of organizations and businesses around the world. The **Internet** is a worldwide public network (Figure 1-1) that connects millions of these private networks. For example, on a college campus, the student lab network, the faculty computer network, and the administration network all can connect to the Internet.



Figure 1-1 The Internet is a worldwide public network that connects private networks.

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Q&A Are the Internet and the web the same thing?

Although some use the terms *Internet* and *web* interchangeably, the Internet and the web are not one and the same. The Internet is a worldwide public network that links private networks and gives users access to a variety of resources for communication, research, file sharing, and commerce. The web, a subset of the Internet, is just one of those resources.

Q&A What is a landing page?

A **landing page** is the page on a website that a visitor sees when he or she clicks a link from an ad, search engine result, or social media promotion. The copy on a landing page is specific to the method by which the user arrived at the page and often is a marketing tool. A landing page can be, but is not always, a website's home page.

World Wide Web

The **World Wide Web (web)** is a part of the Internet that consists of connected computers called **web servers** that store electronic documents called **webpages**. A **webpage** is a specially formatted document that can contain images, text, interactive elements, and hyperlinks. A **hyperlink**, or simply a **link**, is a word, phrase, or image that connects webpages. A **website** is a group of related webpages. A website's primary page, or **home page**, typically provides information about the website's purpose and content. Figure 1-2 shows the home page of Jive Software. Jive's home page includes standard home page elements, including a company logo, navigation elements, a search feature, and links to additional content.

As previously stated, a link provides access to other webpages. Figure 1-3 shows the Gourmet.com home page and the webpage that appears when you click a link on the home page. You often can identify a text link by its appearance. Text links usually are bold, underlined, or differ in color from the rest of the text. An image link might be more difficult to identify visually; however, if you are using a desktop or laptop computer, pointing to either a text or image link with the mouse pointer changes the pointer from



Figure 1-2 A website's primary page is its home page.



Figure 1-3 Webpages at the same website or across different websites are connected by links.

an arrow to a hand pointer. When you click a link, you might view a picture or video, listen to a song, jump to a different webpage at the same website, or move to a webpage at a different website. **Browsing** or **surfing the web** is exploring the web by moving from one webpage to another. To visually indicate that you have previously clicked a text link, the color of the text link might change. You can see this change in color when you return to the webpage containing the clicked link.

Q&A Who originally created the World Wide Web? Historians credit Tim Berners-Lee, a programmer at CERN in Switzerland, with the early vision and technological developments that led to today's World Wide Web.

Whether you choose to indicate hyperlinks in text by color, bold, or underline, be consistent throughout your website.

DESIGN TIP

Influence on Society

The Internet and the web have influenced the way the world communicates, educates, entertains, and conducts business significantly. Friends, families, and business colleagues electronically exchange messages, documents, and information using texting, email, collaborative workspaces, and chat programs. Students use the web for research, to access podcasts or transcripts of lectures, or to collaborate on a group project. Individuals access the Internet and the web for entertainment using gaming, music, video, and other apps on their computers or mobile devices. Consumers who shop online save time, gas, and sometimes money by taking advantage of online shopping websites and websites that offer reviews and pricing comparisons. Businesses use Internet and web technologies to interact with their suppliers and customers for increased productivity and profitability. Businesses also can use tools such as videoconferencing to reduce costs associated with business travel or to allow employees to telecommute.

OSA Is the Internet's societal influence all good? Being constantly connected has its price. In the past, employees' workdays were done when they physically left the office. Now employees might feel pressure to keep on top of work-related communication during what used to be personal, family, or leisure time. The need to constantly check social media, sports scores, or text messages can have a negative effect on human relationships. To learn more, use a search engine to search for the Internet's negative effects.

COMMUNICATION Individuals and organizations of all types use websites to communicate ideas and information. By effectively designing webpages and selectively choosing content, you can ensure that your website's webpages deliver the website's message successfully and persuasively. When a webpage's design is consistent, balanced, and focused, and the content communicates trustworthiness, timeliness, and value, such as the MSN home page shown in Figure 1-4, you are more likely to spend time on it and even return to it. You can save a link to the webpage, called a **bookmark** or **favorite**, create a **shortcut** to it on your desktop or mobile device's home screen, or access the company or organization's social media profiles. On the other hand, you quickly will move on from a poorly designed website or if the content appears unreliable, outdated, or trivial. You will learn more about design values in Chapter 2.

Other communication options that rely on Internet and web technologies include email, blogging, social networking, social bookmarking, chat, instant messaging, virtual meetings and collaborative workspaces, video sharing, VoIP, interactive gaming, and 3D virtual worlds.

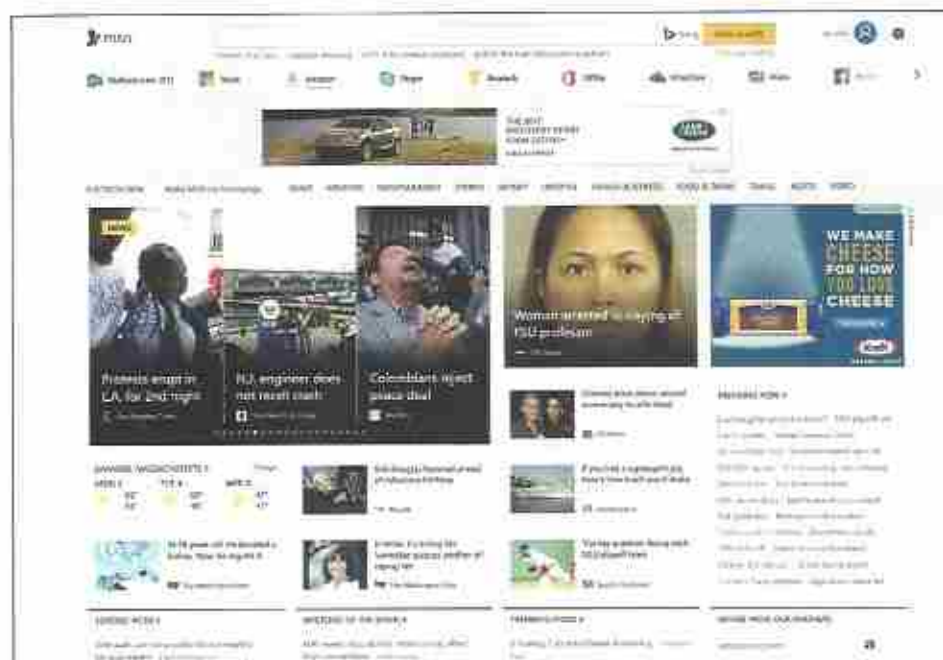


Figure 1-4 The MSN home page communicates up-to-date, accurate information.

Design your website so that it communicates trustworthiness, timeliness, and value.

DESIGN TIP

Businesses and individuals heavily rely on electronic messages called **email**. Popular email software, such as Mozilla® Thunderbird®, Microsoft Outlook®, or Google Gmail™, allows users to attach graphics, video, sound, and other computer files to email messages. Email is a fast, inexpensive, and widely used online communication tool.

Internet Relay Chat (IRC) and **web chat** are communication technologies that provide a venue, such as a group chat or discussion forum, where a group of users can exchange text, video, files, or multimedia messages in real time. **Instant messaging**, also called **IM chat**, and **group messaging apps** are another popular way individuals can exchange messages in real time using a chat window that is only visible to those participating in the chat. Examples of IM chat programs are AOL's AIM®, Yahoo! Messenger, and Trillian™. IRC chats are public exchanges between two or more people in a chat room, who may or may not know each other or share a connection in social media. With an IM or group messaging program, you privately chat with people with whom you have opted to connect using the group messaging platform or social media. Social networking platforms such as Facebook (Figure 1-5) and Twitter include IM technology.

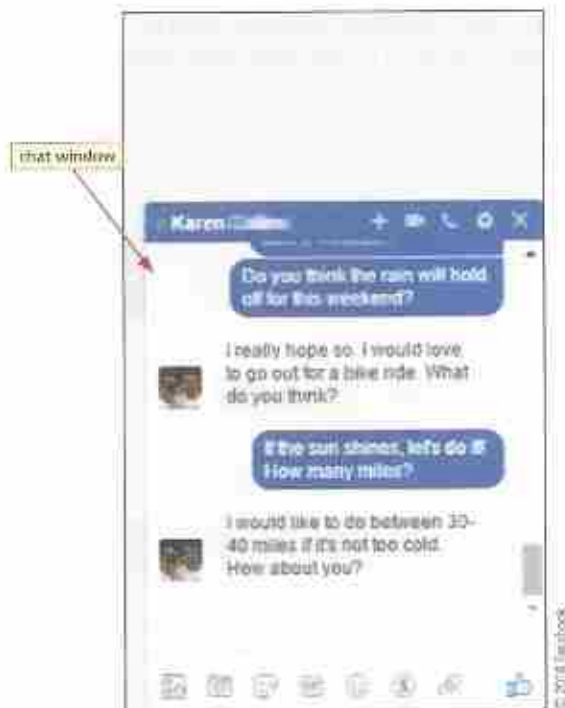


Figure 1-5 IM chat programs allow users to exchange private messages in real time.

Group conferencing software, such as Skype for Business, WebEx, and GoToMeeting (Figure 1-6), provides access to **collaborative workspaces** or **virtual meeting spaces**, which are websites that allow users to communicate with each other using text, audio, video, whiteboard, and shared files without leaving their own desks. Businesses that use collaborative workspaces and virtual meeting spaces can improve employee productivity and reduce expenses.

Q&A

What is cloud computing?
The term **cloud computing** refers to an environment where files and software are stored and shared online. For example, Google Drive™ provides a suite of online software, file storage, and collaboration tools. You can edit, save, and share documents without downloading either the software or the files to your computer.

Q&A

What is an app?
An **app** (short for **application**) is a software program. The term **app** typically refers to programs that run on mobile devices (**mobile apps**) or the web (**web apps**). Apps are an integral part of internet technology. This book focuses on general web design principles rather than app development, design, and integration.

Q&A

What is text speak?
Text speak describes abbreviations and shortcuts for phrases commonly used by text and chat users, such as LOL (laugh out loud) or gr8 (great). For more information, use a search engine to search for **text speak**.



Figure 1-6 Collaborative workspaces support teamwork from remote locations.

A **blog** (short for *weblog*), such as What's Your Brave? (Figure 1-7), is an online journal or diary. Millions of people go online to share ideas and information by hosting and participating in blogs—a process called **blogging**. Many blogs enable and encourage users to add comments to posts. **Video sharing** websites, such as YouTube (Figure 1-7) and Vimeo, allow users to share and comment on personal and professional videos and also feature video blogs (vlogs).



Figure 1-7 Text and video blogging websites allow web users to share ideas, information, and video files.

Social networking is the term used to describe websites and apps, such as Twitter, Instagram, Facebook, and LinkedIn (Figure 1-8), that allow participants to create a personal network of friends or business contacts. Users then use communication tools provided by the website or app to interact with those in their personal network by sharing text, comments, pictures, articles, videos, contacts, and more. **Social bookmarking**, provided by websites such as Delicious, Pinterest, and Digg (Figure 1-8), allows users to share their webpage favorites, news articles, bookmarks, and **tags**—keywords that reference specific images or documents—with others.



Figure 1-8 Social networking and social bookmarking websites allow users to share information with one another.

Gamers by the millions interact with each other by playing **massively multiplayer online games (MMOGs)**, such as *Minecraft*TM and *World of Warcraft*[®]. Others create alternative personas that live exclusively online in **3D virtual worlds**, such as *Second Life*[®] or *Entropia Universe*[®].

A **wiki** is a group of related webpages to which users add, edit, or delete content. A well-known example of a wiki is *Wikipedia*, an online encyclopedia. Figure 1-9 shows a *Wikipedia* webpage that displays information about Wi-Fi.



Figure 1-9 Wikipedia and other wiki websites enable users to catalog and manage content collaboratively.

EDUCATION There are very few topics you cannot learn about on the web. You can take an online course from an academic institution to earn a degree or certificate, or watch a video or read a blog post by amateurs or experts. Many universities and academic institutions, such as MIT (Figure 1-10), publish some or all of their educational materials online, including homework and video lectures, so that they are free and open to everyone. A **Massive Open Online Course (MOOC)** is an online course delivered over the web, often for free. Many MOOCs are self-guided, but others offer interactive user forums and provide virtual assistance and other resources.

Q&A What does it mean to "go viral"?
 When many users view and share an article, blog entry, website, or video with others using social networking, blogs, and mass media, exposing the content to hundreds of thousands or millions of users in a short amount of time, inspiring commentary and in some cases imitations, the content has "gone viral."

Q&A What role do hashtags play in web communications?
 A hashtag is a word or phrase preceded by the # symbol. Posters on Twitter and social networking websites such as Instagram commonly use hashtags. Use of hashtags creates an easily searched group of related messages, such as all messages regarding a TV show, a certain celebrity, or an event such as an election. More recently, hashtags have evolved as a form of commentary, a statement of solidarity within a social movement, or a means to generate awareness of a topic or event.



Figure 1-10 The web offers formal and informal teaching and learning opportunities.

Q&A Are online classes real time or any time? Some online classes are synchronous, or real time, requiring students to be online to listen or participate in lessons and lectures at a certain time. Others are any time, or asynchronous, meaning that students can download lectures as podcasts or transcripts and add comments or answer questions at the student's convenience.

Instructors often use the web to publish podcasts or videos of lectures, webpage links for research, syllabi and grades, and more for their students. A **learning management system (LMS)** is a program or app that provides a scheduling, communication, and document sharing platform for students and teachers. Many LMS apps, such as Blackboard®, Moodle™ (Figure 1-11), or SkillSoft®, offer additional learning and testing resources.

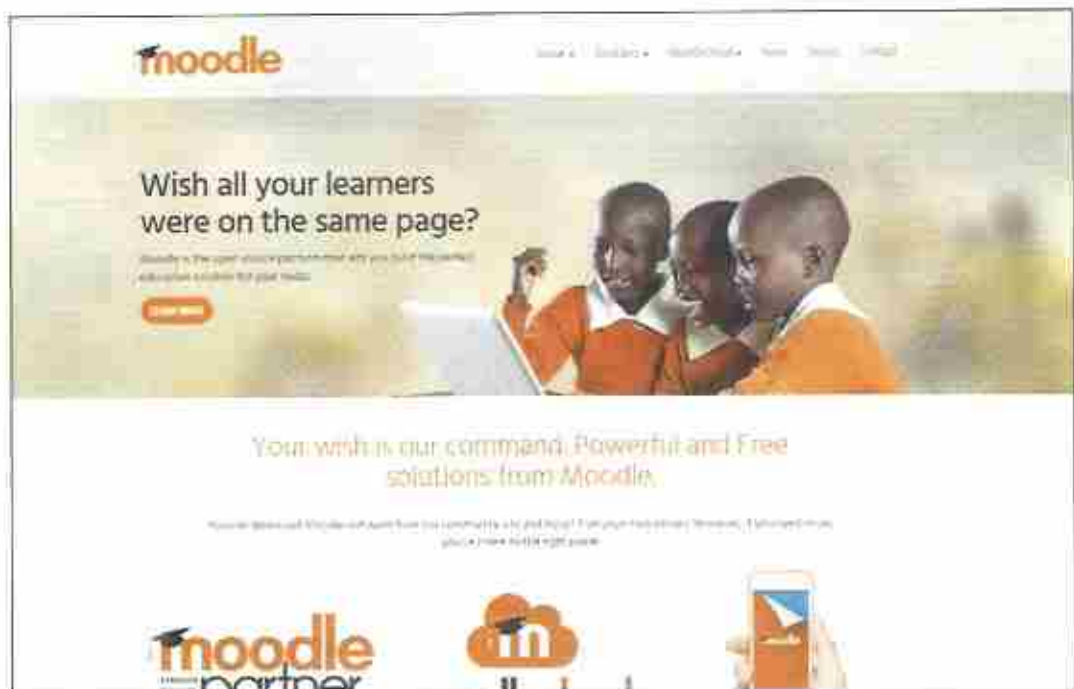


Figure 1-11 An LMS enables communication and file sharing among teachers and students.

Any formal or informal educational website should contain content that is timely, accurate, and appealing. Such websites also should include elements to provide feedback, maintain records, and assess learning. In addition, educational websites should supply information about the authority or experience of the website's content providers.

DESIGN TIP

ENTERTAINMENT AND NEWS Interactive multimedia experiences and continually updated content lure millions of people to the web for entertainment and news. Popular entertainment websites offer music, videos, sports, games, and more. For example, you can use the web to watch last night's episode of your favorite television program, check out entertainment news at IMDb (Figure 1-12), or play fantasy baseball at mlb.com. At sophisticated entertainment and news websites such as NBCNews.com (Figure 1-12), you can read news stories or watch video clips from programs or live broadcasts of event coverage. Additionally, the NBC News website provides interactive elements, such as immersive 360 videos of news events or the ability to share an article on your social media profile.



Figure 1-12 Entertainment and news websites provide continually updated multimedia content.

include methods to share your website's content by providing links to allow users to send content using email, or post to a Facebook page, RSS feed, or account on Pinterest or Twitter. Also provide links to related content that your users would find interesting and relevant.

DESIGN TIP

E-COMMERCE Electronic commerce or e-commerce encompasses a wide variety of online business activities, including consumer shopping and investing and the exchange of business data and transactions within a company or among multiple companies (Figure 1-13). For example, a pet groomer might offer his or her services using an e-commerce website where a pet owner could find valuable information, such as the groomer's telephone number, location, list of services, and rates charged; the pet owner then could schedule an appointment online. At the other end of the e-commerce spectrum, a large manufacturing company could use the Internet and the web to communicate policies and procedures to its employees, exchange business information with its vendors and other business partners, process sales transactions, and provide online support to its customers.



Figure 1-13 E-commerce involves all business transactions that use the Internet.

E-commerce websites can be categorized by the participants involved in the transactions (Figure 1-14), such as businesses and consumers.

E-Commerce Transaction Types

Category	Description
Business-to-consumer (B2C) e-commerce	B2C e-commerce involves the sale of an endless assortment of products and services directly to consumers. Transactions take place between an online business and an individual consumer.
Business-to-business (B2B) e-commerce	B2B e-commerce involves the sale of products and services and the exchange of data between businesses, and accounts for the majority of e-commerce transactions in the corporate world.
Consumer-to-consumer (C2C) e-commerce	In C2C e-commerce, business transactions occur between consumers. Examples of C2C e-commerce include online auctions and person-to-person classified ads.

Figure 1-14 B2C, B2B, and C2C are types of e-commerce transactions.

DESIGN TIP

To develop an e-commerce website, you must determine the potential customers for your products or services. If appropriate to do so, associate your e-commerce website with a database that supplies up-to-date product information such as available inventory, sizes, colors, and more. Provide a search feature so that customers can easily find what they need, as well as electronic payment services, such as direct purchase or a third-party payment service such as PayPal.

Ways to Access the Internet and the Web

Users access the Internet and web using a variety of means. In the earliest days of the web, the most common way to access the Internet was using a telephone line.

The speed at which data travels from one device to another is the **transfer rate**. Transfer rates measure the number of bits the line can transmit in one second (expressed as *bits per second*, or *bps*). Transfer rates range from thousands of bits per second (called *kilobits per second* or **kbps**) to millions of bits per second (called *megabits per second* or **Mbps**). A faster transfer rate translates into more expensive Internet access. Higher-quality connections are better suited for viewing or listening to **streaming media**—video or sound that downloads to a computer continuously to be watched or listened to in real time, such as watching TV programs, web conferencing, and gaming. Transfer rate has a direct impact on the user's experience with a website; Chapter 2 discusses the effect of Internet access speeds on web design considerations.

Broadband Connections

Today, most individuals and businesses are able to access the Internet and web over a broadband connection. The term **broadband** defines high-speed data transmissions over a communication channel that can transmit multiple signals at one time. Types of broadband connections available include:

- **Digital subscriber line (DSL):** A **digital subscriber line (DSL)** is a dedicated digital line that transmits at fast speeds on existing standard copper telephone wiring. An **asymmetrical digital subscriber line (ADSL)** is a type of DSL that supports faster transmissions when receiving data than when sending data.
- **Cable television (CATV) line:** Data can travel very rapidly through a cable modem connected to a **cable television (CATV) line**, enabling home or business users to connect to the Internet over the same coaxial cable that delivers television transmissions. Using a splitter, the line from the cable company connects to both the television and computer.
- **FTTP: Fiber to the Premises (FTTP)** uses fiber-optic cable to provide high-speed Internet access to homes and businesses. FTTP requires a permanent physical location for the network and router; costs for FTTP are decreasing steadily.
- **Satellite:** Using a satellite dish that communicates with a satellite modem, this method provides high-speed wireless Internet connections.

Connecting to the Internet and the Web

Most homes and businesses today use the aforementioned wireless and wired methods to connect a network to the Internet and web; users then connect to the network typically using wireless methods. People not physically connected to a network can use their computer or mobile device to access the Internet and web using **mobile wireless** technologies, which include radio signals, **wireless fidelity (Wi-Fi)** technologies, cellular telephones, and wireless providers' broadband networks. Wi-Fi provides wireless connectivity to devices within a certain range. A Wi-Fi network may be password-protected or open to the public.

Q&A **What is fixed wireless connectivity?**
Fixed wireless is an Internet connectivity service that uses satellite technology to connect stationary objects. Radio signals transferred between a transmitting tower and an antenna on a house or business provide a high-speed connection.

Q&A **Are there risks to using Wi-Fi?**
Security experts recommend that when using a public or municipal Wi-Fi network, avoid accessing personal information, such as financial transactions. If you have a Wi-Fi network in your home or business, use passwords and encryption to avoid unauthorized and potentially damaging access by others. For more information, use a search engine to search for *public and municipal Wi-Fi safety tips*.

Q&A **What is Bluetooth?**
Bluetooth is a popular, short-range wireless connection that uses a radio frequency to transmit data between two electronic devices, such as a smartphone and an earpiece.

Q&A What is 5G and when can I expect it?

5G systems will continue to provide increased transfer speeds, as well as widen coverage areas. Experts expect 5G systems to make an impact in 2020.

Mobile Internet Access

Generations classify standards for mobile communications, including voice, mobile Internet access, video calls, and mobile TV. **3G**, the third generation, provides mobile broadband access to devices such as laptop computers and smartphones. 3G devices support speech and data services, as well as data rates of at least 200 kbps. **4G** systems improve on 3G standards by supporting services such as gaming apps and streaming media.

Mobile devices that provide Internet access include smartphones, tablets, ebook readers, laptop computers, and other handheld and mobile devices. These devices use an internal antenna or wireless card to connect to the Internet either at a **hot spot**, a location that provides public Internet access, or directly to a wireless provider's network. Some mobile devices enable you to set them up as a mobile hot spot. You can pay for mobile access on a per-kb basis, or buy a flat-rate monthly plan with unlimited text and data usage.

DESIGN TIP

Although large images and multimedia elements on webpages can degrade the audience's viewing experiences at slower Internet access speeds, most websites now assume that users have broadband connectivity.

Q&A Should I use Wi-Fi with my mobile devices?

You should check your mobile provider's recommendations and your data plan to decide which method is best for you. Typically, mobile devices use significantly less cellular data when you are connected to Wi-Fi than when you are using cellular service. Many mobile plans promise limited high-speed data transfer rates per month; once a user reaches the limit of high-speed data transfer, data transfer drops to a lower rate.

Internet Service Providers

An **Internet service provider (ISP)** is a business that has a permanent Internet connection and provides temporary Internet connections to individuals and companies. ISPs are either regional or national. A **regional ISP** provides Internet access for customers (individuals or businesses) in a specific geographic area. A **national ISP** provides Internet access in most major cities and towns nationwide. National ISPs may offer more services and generally have larger technical support staffs than regional ISPs. A cable company, such as Verizon (Figure 1-15), can be an ISP as well as provide cable television and telephone access. Negotiating one price for all of those services can save you money and hassle, but it also may limit your options. If you are tied into one provider for all three services, you can choose only from within the plans offered by that provider for each service.

Q&A How can I keep safe while using the Internet?

Using the Internet is not without risks, including exposure to computer viruses, accidentally sharing personal information, and more. Be aware that others could share anything you type and any video or photo you post, even if you consider the exchange to be private. For more information, use a search engine to search for *Internet safety tips*.

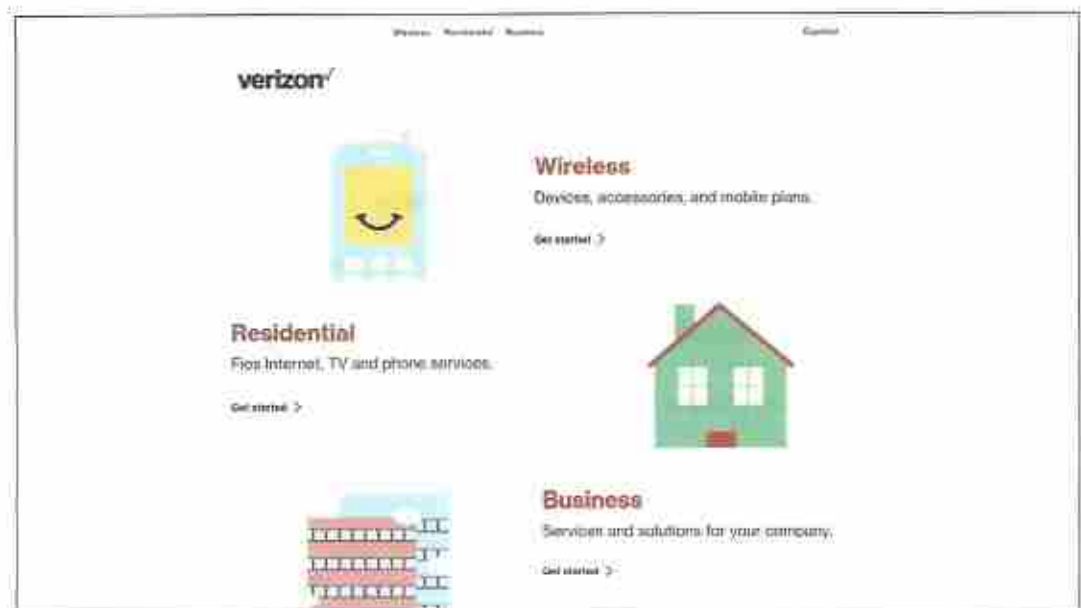


Figure 1-15 ISPs provide Internet access to homes and businesses.

Web Browsers

To view webpages, you need a **web browser**, also called a **browser**, which is a program or app that requests, downloads, and displays webpages stored on a web server. Most browsers share common features, such as an Address bar, a Favorites list, a History list, tabs that open multiple pages in one browser window, and Back and Forward buttons for navigating. The Google Chrome browser (Figure 1-16) is the most widely used browser software on desktop and laptop computers. Microsoft Edge (which replaces Internet Explorer) (Figure 1-16) and Mozilla Firefox make up a majority of the rest of the browser market, along with Opera and Safari.



Figure 1-16 Google Chrome and Microsoft Edge are examples of web browsers.

The size of a smartphone or tablet screen is much smaller than that of a desktop or laptop computer. Browsers for mobile devices take into consideration the size of your screen when displaying webpage content. Most mobile devices also include a touch screen, which enables you to interact with the device by tapping, dragging, and other touch gestures. Mobile web browsers are capable of resizing and reordering the content and navigation on a webpage to make browsing easier for mobile users. Some companies create mobile versions of their websites. Increasingly, web designers use a design strategy called **responsive web design (RWD)**. The goal of RWD is to create websites that adjust layout, and in some cases, content, to the device and screen displaying the webpages. You will learn more about RWD in later chapters. Mobile web browsers exist for tablets, smartphones, ebook readers, and other devices. Some mobile web browsers are scaled-down versions of browsers used for desktop or laptop computers. Others, such as Android, are device-specific. The website for Slate uses RWD; Figure 1-17 shows how the Slate home page appears when viewed on a desktop or laptop (left) and using a smartphone (right).

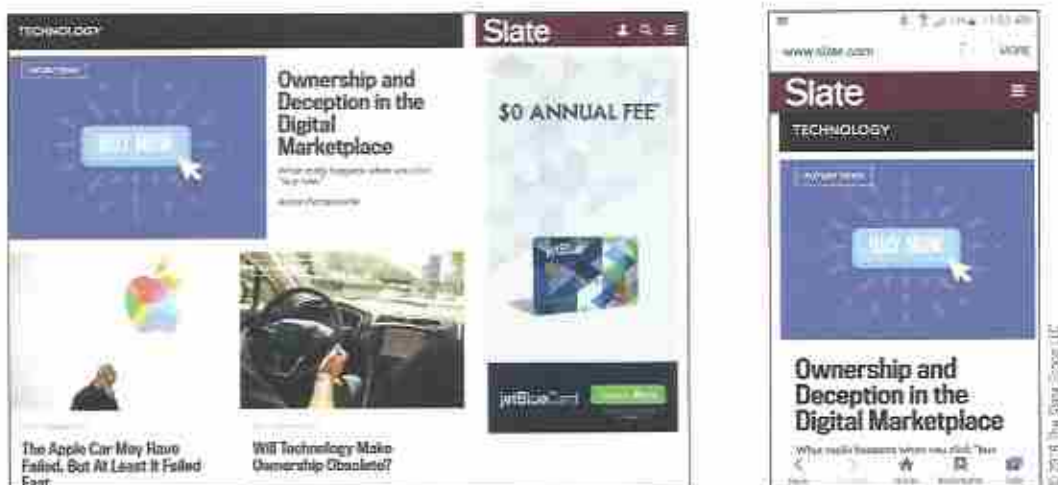


Figure 1-17 Responsive web design adjusts content and layout to fit different screen sizes.

DESIGN TIP

Web designers who follow the RWD approach assume that their websites will be used with mobile devices and prioritize design considerations, navigation, and layout strategies that work best with mobile devices and browsers.

You can access a webpage by entering its unique address, called the **Uniform Resource Locator (URL)**, in a browser's Address bar (Figure 1-18). At a minimum, a URL consists of a domain name and a top-level domain designation. Many URLs also include folder and file designations indicating the path to a specific webpage. If a URL includes folder and file names, a forward slash character follows the top-level domain designation. Other URLs specify a website category before the domain.



Figure 1-18 A URL identifies a webpage or other resource on the Internet.

Q & A Who controls the registration of domain names? ICANN controls the Domain Name System (DNS) and the registration of domain names through its accredited registrars, such as GoDaddy.

An **IP address** is the numeric address for a computer connected to the Internet. Every device in a computer network has an IP address. The Internet Corporation for Assigned Names and Numbers (ICANN) works with regional and local entities to assign IP addresses. A **domain name** is the text version of a computer's numeric IP address. Companies known as domain name registrars are responsible for assigning domain names. A **top-level domain (TLD)** designation (Figure 1-19) indicates the type of organization or general domain—commercial, nonprofit, network, military,

Top-Level Domains

Top-Level Domain	Domain Type	Top-Level Domain	Domain Type
.aero	Air-transportation industry	.jobs	Human resources managers
.asia	Asia Pacific community	.mil	U.S. military
.biz	Businesses	.mobi	Consumers and providers of mobile products and services
.cat	Catalan linguistic community	.museum	Museums
.com	Commercial, personal	.name	Individuals
.coop	Cooperative associations	.net	Network providers
.edu	Postsecondary institutions	.org	Noncommercial community
.gov	U.S. government	.pro	Credentialed professionals
.info	General information	.tel	Business and individual contact data
.int	International treaty organization	.travel	Travel industry

Figure 1-19 Top-level domains identify the type of organization or general domain for a registered domain name.

and so forth—of the domain name. Some countries have their own TLDs, such as Australia (.au), France (.fr), and Canada (.ca).

In a URL, a **protocol**, or rule, precedes the domain name and top-level domain designation. The protocol specifies the format used for transmitting data. For webpages, that protocol is the **Hypertext Transfer Protocol (HTTP)**, which is the communications standard for transmitting webpages over the Internet. It generally is not necessary to type the protocol when you enter the webpage domain name and top-level domain designation in the browser's Address bar.

Select a short, easy-to-remember domain name that ties directly to a website's purpose or publisher's name. Examples of effective domain names include *business.com* (business-oriented search directory) and *ask.com* (search tool).

DESIGN TIP

Exploring Domain Name Registration

YOUR TURN

1. Identify three to five possible domain names for a computer repair business.
2. Use a search engine to search for domain registry services.
3. Click one of the domain registry services to open it in your browser.
4. Follow the steps on the domain registry website to search existing domain names and determine whether your possible domain names are available. Locate pricing information, as well as available alternate names and TLDs.
5. Rank the options, taking both price and effectiveness into account. Which would you choose, and why?
6. Submit the results of your domain name search in the format requested by your instructor.

Types of Websites

Types of websites include personal, organizational/topical, and commercial. A website's type differs from its purpose. The type, determined by the company or individual responsible for the website's creation, is the category of website. The purpose of a website is its reason for existence—to sell products, share information, collect feedback, and so on. Chapter 3 provides detailed discussion about defining purpose. An overview of personal, organizational/topical, and commercial websites follows, along with the individual design challenges they present.

Personal Websites

Individuals create their own **personal websites** for a range of communication purposes. You might use a personal website to promote your employment credentials, share news and photos with friends and family, or share a common interest or hobby with fellow enthusiasts. Depending on your website's purpose, you might include your résumé, blog, photo gallery, biography, email address, or a description of whatever you are passionate about—from Thai food to NASCAR® racing.

Creating a personal website generally is less complex than creating other types of websites, and designers typically have fewer resources available than when creating a commercial website. Working independently, however, means you must assume all the roles

Q&A **Should I reserve a personal domain?**
Even if you have no current need for creating a personal website, many experts recommend reserving a personal domain name for yourself. For more information, use a search engine to search for *reserving a personal domain*.

necessary to build the website. Web roles are discussed later in this chapter. Despite these challenges, you can publish a successful website to promote yourself and your services. You also can use a content management system, discussed later in the chapter, to allow you to focus on the content of your website and not its structure. The web offers a range of tools for creating personal websites. For free alternatives to creating a personal website to communicate and share information with your friends and acquaintances, you can turn to blogging or social networking tools, such as Facebook. Rather than create a website to provide your résumé, references, and business connections to potential employers, LinkedIn provides a platform for showcasing your experience, education, and skills and also enables you to network with colleagues and others in your industry.

DESIGN TIP

Be careful what you put online, whether it is on a personal website or a social networking website. Employers and college recruiters can find information, posts, or photos quite easily, even with privacy settings enabled. Unscrupulous users scan the web for personal information, which they use for malicious purposes, such as identity theft. Assume that anything you put online has the potential to stay there forever, even if you attempt to delete or hide it.

Organizational and Topical Websites

Q&A **How can I evaluate web content?**
As you browse the web, you will find that some organizational and topical websites lack accurate, timely, objective, and authoritative content. You must always carefully evaluate a website's content for these four elements. For more information, use a search engine to search for *critical evaluation of webpage content*.

A website owned by a group, association, or organization, whether it is a professional or amateur group, is an **organizational website**. A **topical website** focuses on a specific subject. For example, if you belong to a national photography association, you might volunteer to create an organizational website to promote member accomplishments or to encourage support and participation. Conversely, as a photographer, you might choose to design a website devoted to black-and-white photography to share your knowledge with others, including tips for amateurs, photo galleries, and online resources. The purpose of both types of websites is to provide a resource about a subject.

Professional, nonprofit, international, social, volunteer, and various other types of organizations abound on the web. Figure 1-20 shows the World Health Organization's



Figure 1-20 Organizational websites are owned by a group, association, or organization.

organizational website. An organization that lacks funding might encounter the same challenges creating its website as an individual creating a website—specifically, limited resources, including people to create and maintain the website.

Take care to ensure that your webpages contain accurate, current, objective, and authoritative content.

DESIGN TIP

Commercial Websites

The goal of many **commercial websites** is to promote and sell the products or services of a business, from the smallest home-based business to the largest international enterprise. The design and content of a large enterprise's website might be much more sophisticated and complex than that of a small business's website. Figure 1-21 contrasts the home page for a large B2B enterprise, SAP, which sells and supports software, with that of a small B2C business, Constructure, which is a construction and design firm.

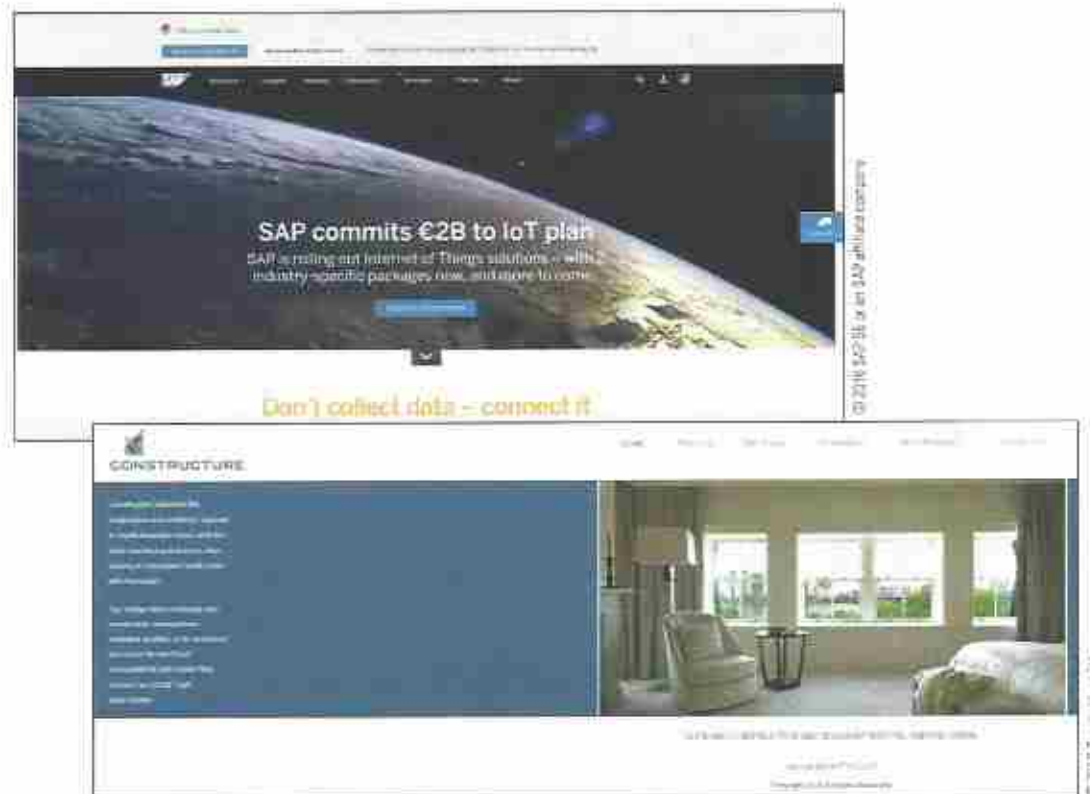


Figure 1-21 Commercial websites promote and sell products and services.

In addition to websites that promote and sell products or services, commercial websites also include websites that generate their revenue largely from online services such as advertising—search tool websites and portal websites.

SEARCH TOOLS Search tools are websites that locate specific information on the web based on a user's search requirements. Such tools include search engines, metasearch engines, and search directories.

Q&A **Should I create an account on a website?** Many websites offer customized news, information, and experiences to users who register for an account. Registration enables a website to track content preferences to provide a custom experience. Before creating a website account, ensure that your security will be maintained by reviewing the website's privacy policies and researching user reviews.

A **search engine** is a web-based search tool that locates a webpage using a word or phrase found in the page. To find webpages on particular topics using a popular search engine, such as Google, Bing, or ask.com, you enter terms or phrases, called **keywords**, in the search engine's text box and click a button usually labeled *Search* or *Go*. The search engine compares your search keywords or phrases with the contents of its database of webpages and then displays a list of relevant pages. A **hit** is a match between a keyword search and the resulting occurrence.

A search engine might use a variety of methods to create its website database, called its **index**. For example, most search engines use **web crawlers** or **spiders**, which are programs that browse the web for new pages and then add the webpages' URLs and other information to their indexes. Some search engines might also use meta tags to build their indexes. **Meta tags**, which are special codes added to webpages, contain information such as keywords and descriptive data regarding a webpage. Other search engines might also use the information in a webpage title—the text that appears in the browser title bar when a webpage downloads—or keywords in the page text to index a webpage.

A **metasearch engine** is a search engine, such as Yippy, Info.com, or Dogpile, that performs a keyword search using multiple search engines' indexes. Figure 1-22 shows an example of a keyword search *SEO techniques* using the popular search engine Google. Figure 1-23 illustrates the same keyword search using the Info.com metasearch engine.

SEO Tools

To learn more about meta tags and other SEO tools, see Appendix D.

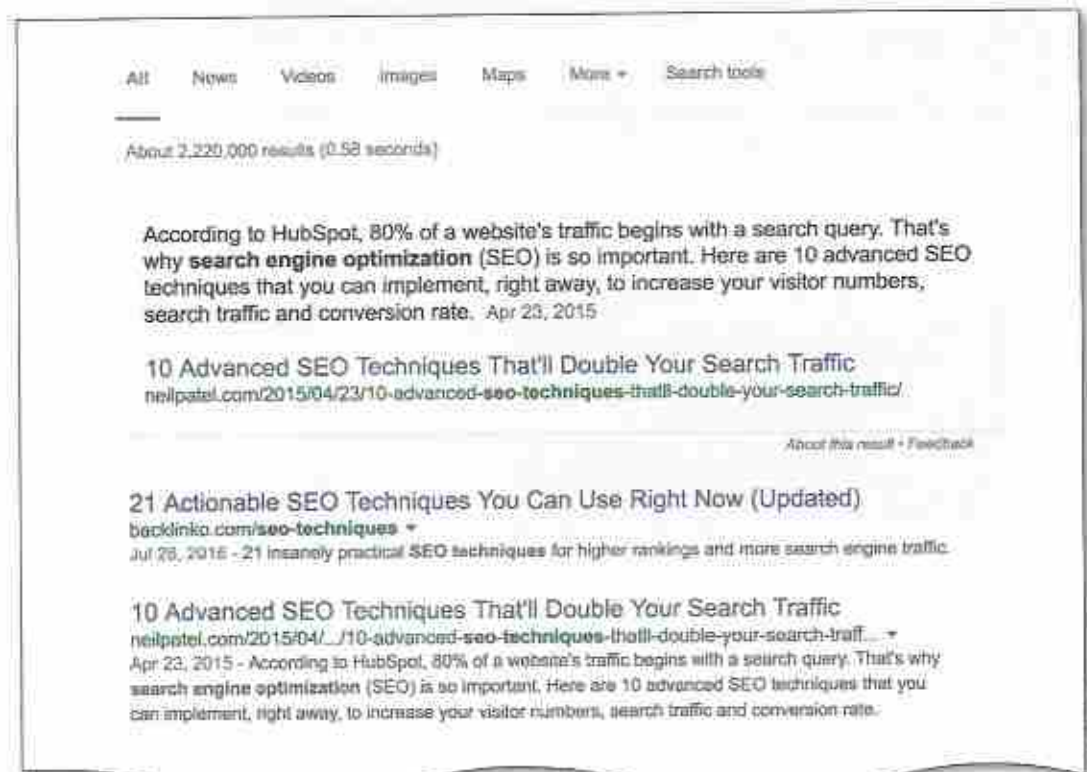


Figure 1-22 A keyword search using a search engine returns a list of webpages related to the keyword or phrase.

The screenshot shows a search results page on Info.com for the query "SEO techniques". The page is divided into several sections:

- Search results from:** Includes logos for Google, Bing, and Yahoo!
- Web results from:** Lists search engines like All the Way Search Engine, Web, Jobs, Images, News, and Video.
- Organic Search Results:**
 - Google AdWords™ - Grow your business online:** A sponsored result from Google.
 - Search Engine Optimization:** A result from www.seoconsultants.com with a sub-heading "Increase Your Search Ranking By a Phenomenal Degree. Get Us Today!"
 - Learn SEO Techniques - Free SEO Bootcamp Crash Course:** A result from www.seo101.com with a sub-heading "Download Your Free Resources Today!"
 - Use Google AdWords:** A result from www.people.com.au with a sub-heading "Use Google AdWords to Help You Sell More Business for Your Business."
- Are you looking for?:** A section with links to "SEO Techniques 2018", "SEO And How It Works", "Google SEO Tools", "Search Engine Optimization Techniques", "What is SEO Marketing", and "SEO Optimization Techniques 2018".
- 21 Actionable SEO Techniques You Can Use Right Now (updated):** A result from www.digitalsocialmarketing.com dated Jul 26, 2018.
- Some Topics:** A circular diagram with "Search Engine Optimization" in the center, surrounded by other topics like "Social", "Content", "Local Business", "Ranking", "SEO", "Website & Digital Content", "Email", and "Analytics".
- 10 Advanced SEO Techniques That'll Double Your Search Traffic:** A result from www.digitalsocialmarketing.com dated Apr 23, 2018.
- Related Searches:** A list of related search terms including "SEO Techniques 2018", "Search Engine Optimization Techniques", "SEO And How It Works", "What is SEO Marketing", "Crash SEO Tools", "SEO Optimization Techniques 2018", "Mobile Search Optimization Best Practices", and "Best Free SEO Software".
- Sponsored search results:** A yellow box with a red arrow pointing to it, containing the text "Sponsored search results".

Figure 1-23 A metasearch engine searches the indexes of multiple search engines.

Search engine optimization (SEO) is the process of designing a webpage to increase the likelihood that the webpage will appear high in a search engine's search results list and to increase the likelihood of the webpage being visited. Search engine optimization tools include meta tags, descriptive page titles, relevant inbound links from other websites, and clearly written text.

Adding meta tags to your webpages and carefully wording each webpage title can increase the probability that your webpages will be included in many search engines' indexes and that your pages will appear in search results lists for important keywords and phrases. Only include meta tags that directly relate to your website content and purpose.

In addition to designing and writing your content for SEO, you can include paid or sponsored placements in your website marketing plan. In a paid or sponsored placement, the website publisher pays the search engine a fee to list their webpages at or near the top of the search results list when a visitor uses specific keywords. Figure 1-23 illustrates an Info.com search results list for the phrase *SEO techniques*; paid placements are sponsored search results and appear prominently above the list. You will learn more about using paid or sponsored placement as a marketing tool in Chapter 7.

Unlike a search engine, a **search directory** builds its webpage index using human interaction. Website owners can submit website information to a search directory.

Q&A **What is spamdexing?**
Spamdexing is an example of SEO abuse, where a website uses repeated phrases, unrelated tags, and misleading headers to attempt to manipulate search results to gain a higher ranking.

DESIGN TIP

OS **When should I use a search directory or search engine?**

Humans review and categorize the entries in a search directory, so if you are looking for information on a specific topic, a directory is a good place to start. Search engines will return a wider array of results, but might not be as accurate.

The search directory's editors review webpages they find or that are submitted to them, classifying them into categories such as arts and entertainment, jobs, health and fitness, travel, and news. The search directory's own webpages present a hierarchy of links—from the most general to the most specific—allowing users to target information in an organized fashion. Website directories can be general or cover only specific topics. Website directories also can include paid links within their results.

To use a search directory, such as DMOZ (Figure 1-24), you can click category and subcategory links to work your way down from the top of the hierarchy to eventually find webpages with useful information about a specific topic. For example, clicking the Food link in the search directory's general Recreation category link leads to a webpage with additional links to Food subcategories, such as Spicy. Within the Spicy subcategory, you will find links on topics ranging from Cooking to Science to Shopping, which you can click to see further categories and more specific results.



Figure 1-24 A search directory provides a hierarchy of linked categories and subcategories.

YOUR TURN**Conducting a Search Using a Search Engine**

1. Use a web browser to locate the Google.com website.
2. Use the search box to search for spamdexing.
3. Click the first link and then follow additional links as necessary to locate information about spamdexing and other SEO abuse tactics.
4. Find known examples of SEO abuse and how search engines addressed them. How would you as a web designer ensure that your website followed approved SEO tactics?
5. Submit your plan in the format requested by your instructor.

Today, many popular search tools are hybrids that combine a search engine with a search directory. Additionally, some search tools actually provide the webpage indexes used by other search tools. Because search tools' webpage indexes are created in a variety of ways, the indexes can vary substantially from search tool to search tool. For best results, you should become comfortable searching the web for specific information using more than one search tool.

PORTALS Portals—websites that offer a starting point for accessing information—can be general consumer portals, personal portals, vertical or industry portals, or corporate portals.

- A **general consumer portal** website offers a variety of features, including search services, email, chat rooms, news and sports, maps, and online shopping. Many web users begin their web-based activities, including searching for specific information, from a portal, often setting a portal as a personal home page. Two early ISPs—AOL and MSN—and some of the web's original search tools, such as Excite and Yahoo!, have evolved into general consumer portals.
- A **personal portal** is a version of a general consumer portal, such as MyYahoo!, which a user can customize for personal preferences.
- A **vertical portal**, such as usa.gov (Figure 1-25), provides a starting point for finding information about specific areas of interest—in this example, U.S. government agency websites.
- A **corporate portal**, run on a company's intranet, provides an entry point for a company's employees and business partners into its private network.



Figure 1-25 Portals offer a variety of services, links, media, and information.

**YOUR
TURN****Exploring Consumer Portals**

1. Use multiple tabs in a search engine to search for Excite, AOL, and MSN. Open each portal website in a different browser tab.
2. In each tab, click the portal in the search results to display the portal page.
3. Review the features offered by each of the portals. Identify the five features you believe are common to most portals.
4. Consider how analyzing the features of existing portal websites can help you plan the content for a new consumer portal website.
5. Determine how you might design a vertical portal for an area of interest. Include details such as the intended audience (for example, music fans, foodies, or outdoor enthusiasts) and sample content.
6. Submit your findings in the format requested by your instructor.

Other Types of Websites

Many other types of websites exist (Figure 1-26). Users visit travel and mapping websites to book flights or rent automobiles, get driving directions to a restaurant, or plan a bike ride. Financial websites enable users to pay bills, transfer funds between bank accounts, and make investments. Career websites provide searchable job databases, online resumes, and networking opportunities. Almost anything you would like to learn about can be found on the web: recipes, language translations, home décor, pet care, and much, much more.

Types of Websites

Category	Purpose	Examples
Travel	Book a flight or hotel	Travelocity, Expedia
Mapping	Get driving directions or plan a bike ride or run	Mapquest, MapMyRun
Financial	Pay bills, transfer funds between bank accounts, and make investments	Citizens Bank, E*Trade
Career	Search job databases, post online resumes, and network	Monster, LinkedIn, CareerBuilder
Web publishing	Publish web content in a blog or website	WordPress, Joomla!

Figure 1-26 Diverse websites exist for a variety of purposes.**Web Design Tools**

Web technology is constantly changing—a new browser feature, touch screen technology, scripting language, or mobile platform seemingly revolutionizes the way the world accesses the Internet. As soon as these new technologies surface, some web designers charge ahead to implement these latest advances on their websites. Websites undoubtedly should implement web technology that represents true improvement; however, it is

important first to determine the merit of new technologies. As a web designer, you should ask the following questions:

- Does the new technology meet currently accepted standards for web development and design?
- What specifically can the new technology do to further the purpose of my website?
- How will implementation of the new technology affect my website's visual appeal, accessibility, and usability?
- What impact will adding this technology have on security and other website elements?
- What are the direct and indirect costs of implementing the new technology?
- How soon will I see a return on investing in this new technology?

After evaluating the impact a new technology will have on your website, you can then make an informed decision about implementing the technology.

Make sure to integrate any new technologies with the design, features, and content of your website. Only add the new technology if it will enhance the experience for website visitors.

DESIGN TIP

Various tools exist to help you to create webpages and add dynamic content, animation, and interactivity. Successfully using these tools requires varying levels of skill and knowledge. Webpage creation tools include markup languages, Cascading Style Sheets (CSS), scripting languages, text editors, HTML editors, web development tools, web templates, and content management systems (CMS).

Markup Languages

A **markup language** is a coding system that uses tags to provide instructions about the appearance, structure, and formatting of a document. The markup languages used to create webpages are HTML, XML, and XHTML.

HTML The **Hypertext Markup Language (HTML)** is a markup language used to create webpages. The HTML markup language uses predefined codes called **HTML tags** to define the format and organization of webpage elements. HTML tags must be in lowercase, surrounded by brackets, and inserted in pairs to define the beginning and the end of the target of the tag. For example, the `<form>...</form>` HTML tag pair indicates the beginning and the end of a webpage form, respectively. An attribute may be added to a tag to define an aspect of the target, such as the number of rows and columns in a text area. Attributes are used in the tag pair `<textarea rows="3" cols="60">...</textarea>`, for example, to specify that an area displaying text is 3 rows of text, 60 columns wide.

When a webpage downloads into a browser, the browser reads and interprets the HTML tags to display the webpage with organized and formatted text, images, and links. Figure 1-27 shows the home page of a baker, Bisousweet, and the underlying HTML code for the page.

TOOLKIT

HTML Tags

See Appendix A for more information on HTML tags and tag modifiers, called **attributes**, and how they are used.

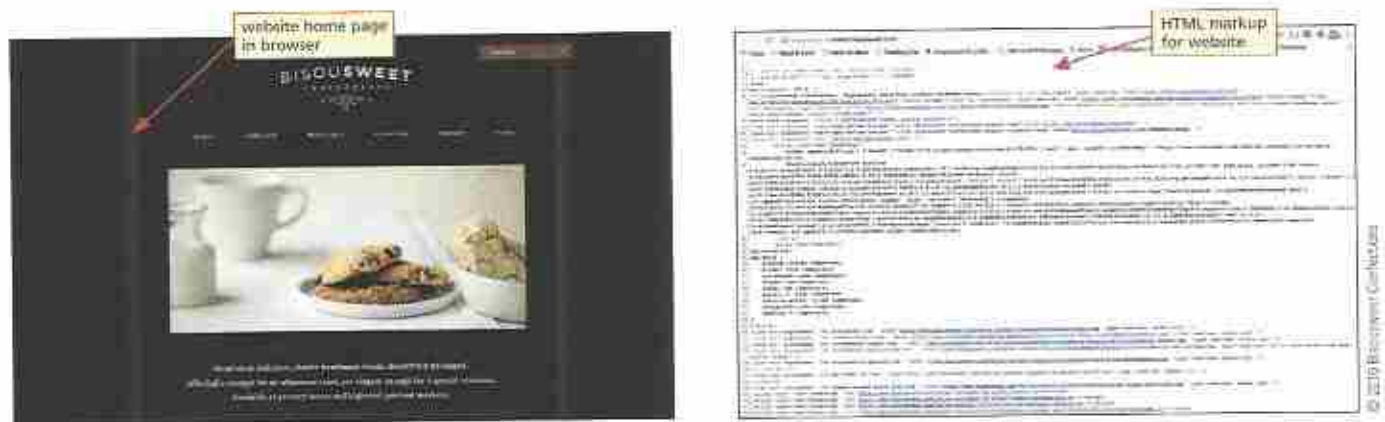


Figure 1-27 HTML tags define webpage elements.

The most current HTML standard is HTML5, which includes tags for creating webpage sections and easily adding video and audio. HTML5 also incorporates standards and protocols that enable RWD and other adaptive features that incorporate adjustments for mobile browsers. Technology standards for the web are set by the World Wide Web Consortium (W3C). The W3C, through an HTML working group, continues to pursue advancements in the HTML standard.

DESIGN TIP

Even if you are designing a website using a CMS or web development tool (both described later in this chapter) that does not require the use of markup codes, it is important to understand the basic principles of markup languages to understand how webpages are coded.

Q&A **What is Wireless Markup Language?** The **Wireless Markup Language (WML)** is an XML-based markup language intended for use in designing webpages specifically for mobile browsers.

XML **Extensible Markup Language (XML)** is a markup language that uses both predefined and customized tags to facilitate the consistent sharing of information, especially within large groups. Whereas HTML defines the appearance and organization of webpage content, XML defines the content itself. For example, using XML, a programmer can define the custom tag `<serialnum>` to indicate that the information following the tag is a product serial number.

YOUR TURN

Exploring a Webpage's Underlying Markup Language

1. Start your browser and type the URL of the webpage of your choice in the Address bar.
2. View the webpage's underlying markup tags in a new window. (*Hint:* if you are using a desktop or laptop, right-click or **CTRL+** click the webpage, then click **View Source** or **View Page Source** or press **F12**. If you are using a mobile browser, you might not be able to
- view the HTML code, or you might need to install an app to do so.)
3. Scroll the window to view the markup tags.
4. Identify several of the markup tags and their purpose.
5. Submit your findings in the format requested by your instructor.

Cascading Style Sheets

A **Cascading Style Sheet (CSS)** is a document that uses rules to standardize the appearance of webpage content by defining styles for elements such as font, margins, positioning, background colors, and more. Web designers store CSS specifications for a website in a separate document, called a **style sheet**. A web designer can attach the style sheet to multiple website pages; any changes made to the style sheet automatically apply to the associated webpages. For example, changing a heading font in the CSS automatically will update that heading font in all webpages associated with the CSS. Cascading refers to the order in which the different styles are applied. Chapter 4 discusses CSS in greater detail.

TOOLKIT

CSS Benefits

See Appendix B for the benefits and guidelines for using CSS.

Apply Cascading Style Sheets (CSS) to all pages in a website to ensure that all the pages have the same look.

DESIGN TIP

Scripting Languages

Scripting languages are programming languages used to write short programs, called scripts, that execute in real time at the server or in the web browser when a webpage downloads. **Scripts** make webpages dynamic and interactive by adding features such as multimedia, animation, and forms or by connecting webpages to underlying databases. JavaScript, PHP: Hypertext Preprocessor (commonly abbreviated as PHP), and CoffeeScript are examples of scripting languages.

A web designer might choose to purchase ready-made scripts to perform routine or common functions, such as e-commerce shopping carts, FAQ (frequently asked questions) lists, and banner ad management.

DESIGN TIP

Active content is webpage content created using a scripting language such as JavaScript and PHP. Examples of active content include polls, streaming video, maps, embedded objects, and animated images. Most webpages today include some active content to enhance the user's experience and keep content dynamic and current.

Q&A

Are there risks to active content?

Unfortunately, hackers can use active content to transmit malware. **Malware** is malicious software, including computer viruses and Internet worms, which can infect a single computer or an entire network. Some visitors' browsers might block active content by default, requiring visitors to instruct their browsers to display the content.

Text and HTML Editors

You can create a simple webpage by typing HTML tags and related text into a document created in a plain text editor, such as Notepad (Figure 1-28), the text editor available with the Windows operating system. A **text editor** is software used to create plain (ASCII) text files. Some web designers or programmers prefer to use an HTML editor to create webpages. An **HTML editor** is a text editor enhanced with special features that easily insert HTML tags and their attributes. HTML-Kit, CoffeeCup HTML Editor, BBEdit, and NoteTab are examples of HTML editors.

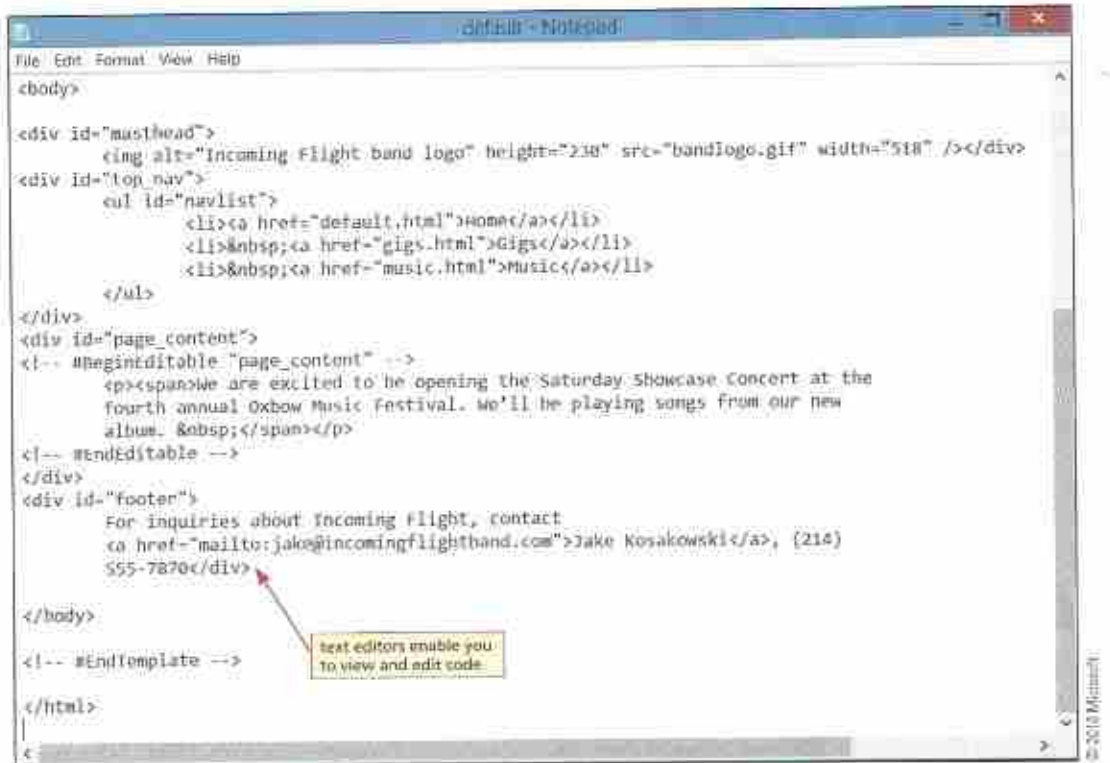


Figure 1-28 Web designers can use text editors such as Notepad to create webpages.

Web Development Tools

Many web designers use **web development tools**, such as Adobe® Dreamweaver® CC (Figure 1-29) or InnovaStudio® ContentBuilder.js, to create webpages. Another term for web development tools is **WYSIWYG editor** (WYSIWYG stands for “what you see is what you get”). Inserting and formatting text and inserting images or links in a webpage using a web development tool are similar to creating a document in a word processor, such

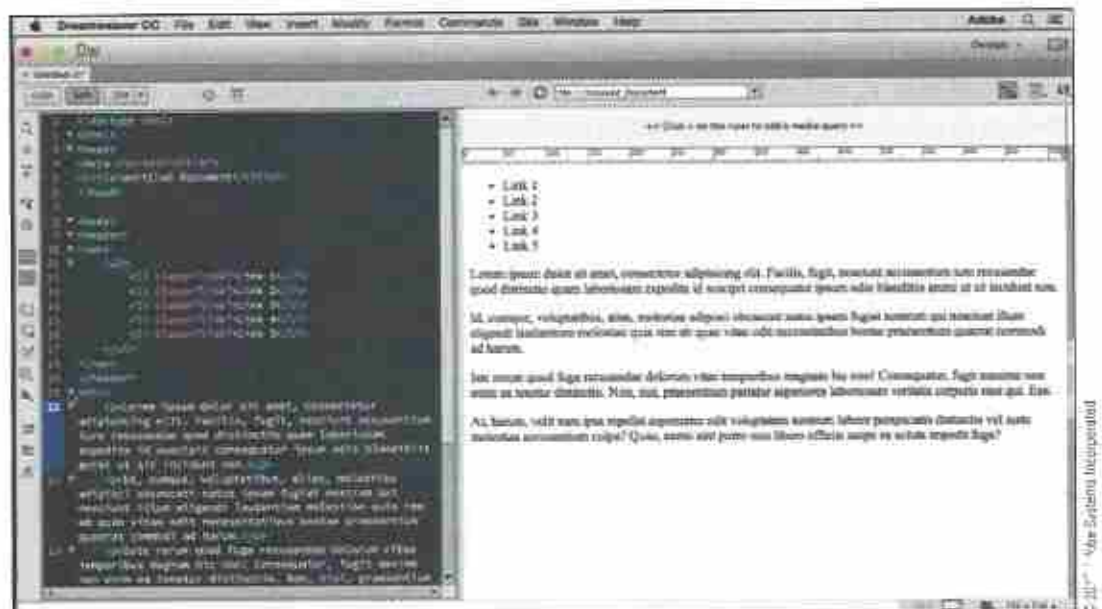


Figure 1-29 Web designers use web development tools to create and manage complex, interactive websites.

as Microsoft Word. Additionally, using a web development tool to create webpages eliminates the need to learn a markup language, which can involve complex coding procedures, because the web development tool automatically generates the underlying markup language tags as you insert and format text, images, and links. Most web development tools also allow you to view and manipulate the underlying HTML code, if desired. Additional benefits of using web development tools include the capability to create webpages rapidly.

If you are looking for a professional-strength web development tool to create and manage complex, interactive, and animated webpages, an **integrated development environment (IDE)**, such as Microsoft® Visual Studio Community, WebStorm, or Eclipse offers sophisticated website design, publishing, and management capabilities. Software vendors who create web development tools often provide additional support and resources at their websites, such as clip art and multimedia, training seminars, user forums, and newsletter subscriptions.

Using a web development tool presents some challenges:

- Although most web development tools have a preview option to simulate how a webpage looks in a browser, in fact, the webpage might look quite different when viewed with various versions of different browsers. Proprietary, nonstandard code generated by some web development tools contributes to the inconsistent display. Some critics claim that WYSIWYG editors are really WYSINWYG editors—“what you see is *not* what you get.”
- A second challenge is that some web development tools insert unnecessary code, creating larger, slower-loading webpages.
- Finally, some web development tools—especially older versions—might not adhere to the latest markup language standards.

Chapter 2 discusses inconsistent display between web browsers and browser versions in more detail. Even if your web development tool includes features for previewing, accessibility checking, and compatibility checking, you still should perform additional testing using multiple browsers and devices before publishing your website.

Web Templates and Content Management Systems

With little or no knowledge of HTML or other web design tools, users quickly can create a website and its webpages using a web template or a CMS.

A **web template** or **theme** is a predesigned model webpage that you can customize for fast website or webpage creation and updating. Some web hosting websites, such as Wix, Squarespace, and Homestead, provide web templates (in addition to hosting services) that make it quick and easy for a small business owner to create his or her e-commerce website, focusing on the webpage’s content rather than on the design details.

Other websites, such as DreamTemplate, Theme Circle, and TemplateMonster (Figure 1-30), sell an enormous variety of predesigned web templates for creating personal, organizational/topical, and commercial websites. Additionally, a number of websites, such as PixelMill or Expression Graphics, sell web templates for a specific web development tool. Finally, many web development tools also provide web templates for fast website and webpage creation.

Q&A **What is Bootstrap?**
Bootstrap is a web design framework that supports HTML and CSS. Bootstrap includes templates and tools that help you incorporate RWD into your website.

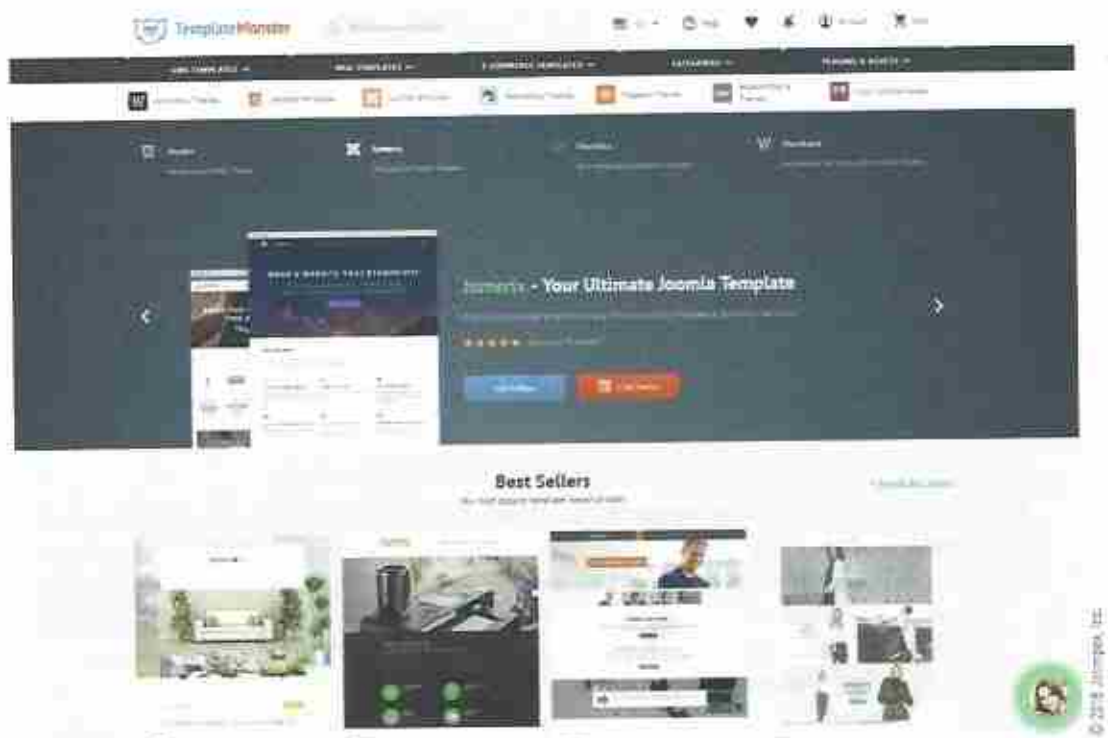


Figure 1-30 Web templates are customizable model webpages.

Q&A What is a software development kit? A software development kit (SDK), sometimes called a *devkit*, contains the technology and tools needed to create apps or software to be used on a certain platform or device. SDKs often contain guidelines and rules about the type and format of programs; developers must license the SDK and abide by all guidelines.

A **content management system (CMS)** is software that provides website creation and administrative tools that enable the management of web content development, including authoring, reviewing, editing, and publishing. Content providers working within a CMS use web templates, style sheets, and other administrative tools to efficiently create, manage, update, and upload webpage content. The templates, style sheets, and other frequently used content elements, such as a logo graphic, are stored in a database called a **content repository**. Drupal, WordPress, and Joomla are examples of robust CMS software applications.

In addition to creating public webpages with templates or a CMS, website designers can use these technologies to control the look and function of all the internal website pages on a company's intranet. An **intranet** is a private network within a large organization or commercial entity that uses Internet and web technologies to share information among its members, employees, or business partners. Employees who have no web design experience or programming expertise can add webpages or update content on existing webpages on the intranet.

Web Design Roles

People plan and develop websites of all sizes working independently, in small groups, or as part of a large team. Ongoing communication between web development team members is crucial to the success of any website design project that involves multiple participants.

The following are responsibilities that can be an individual's only role or can be considered just one part of a job's skill set. Depending on the circumstances and the complexity of the web development project, you might take on one or more of the following web design roles. Regardless of your individual responsibilities, you should be familiar with both creative and technical aspects of website creation.

Creative Roles

If you assume a creative role, your focus primarily will be on how the website looks and its content. Jobs or skills in the creative role category include content writer/editor, SEO expert, web designer, user interface or user experience manager, artist/graphic designer, and multimedia producer.

As a **content writer/editor** or **SEO expert**, you create and revise the text that visitors read when they visit a website, and choose the links, images, video, or other media that enhance your text content. To achieve your website's purpose, you must write specifically for the web environment and a targeted web audience and take into consideration current SEO practices. An employer frequently looks for a highly creative applicant with demonstrated print and Internet writing experience, including SEO and social media.

As a **web designer**, your responsibilities might include graphic design as well as website setup and maintenance. To be a marketable webpage designer, you must communicate effectively, have a thorough knowledge of webpage design technologies, be familiar with RWD and other techniques for designing for multiple devices, have graphic design talent, understand your audience's needs, and possess some programming skills.

User interface (UI) or user experience (UX) managers focus on the experience of a user when viewing and interacting with a website. The goal of UI and UX is to create a website that not only is enjoyable to visit, but also enables the user to locate, use, and purchase the features and products promoted by the website.

The role of a **web artist/graphic designer** is to create original art such as logos, stylized typefaces, and avatars or props for 3D virtual worlds. This highly creative role demands experience with high-end illustration and image-editing software, such as Adobe Creative Cloud, as well as digital image capturing and editing devices and programs.

As a **multimedia producer**, you design and produce animation, digital video and audio, 2D and 3D models, and other media elements to include in a website. This role demands experience with sophisticated hardware and software, as well as familiarity with art theory and graphic design principles.

Technical Roles

If you play a technical role, your focus will be primarily on a website's technology, functionality, and security. Jobs or skills in the technical role category include webpage programming, security, and database development and maintenance.

A **web programmer** or **web developer** must be highly skilled in languages, such as JavaScript, PHP: Hypertext Preprocessor, and ASP.NET Core. Programmers use these languages to create interactive and dynamic webpages. Scripted webpages also handle data from web-based forms, such as those you complete when registering for an account on a website.

Q&A

How can I find a career in web design?

Many entry-level positions exist for web designers who have basic skills or interests. Certifications in web design show potential employers you possess some knowledge about web design. For more information about certifications that can help you train for a career in web design, use a search engine to search for *web design certifications*.

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Careers in SEO

For more information about SEO careers, see Appendix D.

Frequently, web development roles are specialized and fall into one of two categories: front end or back end. A **front-end web developer** focuses on aspects that are visible to the website visitor, such as design, multimedia, and interactivity, creating webpages that combine text, images, and links. They must be able to use tools such as markup languages; CSS; and text, HTML, and web development tools. A **back-end web developer** is responsible for behind-the-scenes web technologies, such as databases, programming, and security. A web developer with both front- and back-end responsibilities is a **full-stack web developer**.

A **database developer** must possess the technical skills to plan, create, secure, and maintain databases of varying complexity. A large percentage of website content derives from databases, including storage of customer data and products on e-commerce websites. Database developers need to know how to integrate databases successfully with webpages and to protect the data from unauthorized access.

A **web server administrator** ensures the day-to-day functionality of the network and protects it from internal and external threats. Duties and responsibilities include ongoing network inspection, maintenance, and upgrades. An administrator must be aware of security alerts and advisories, protect the network with intrusion-detection software, and have a fully developed plan of action if the security of the network is compromised.

Oversight Roles

If you assume an oversight role, your focus is either on managerial and administrative issues or marketing/customer service. Examples of types of jobs in the oversight role category include web administrator, system architect, tester, and social media expert.

The responsibilities of **web administrator** vary. If he or she is working alone, the web administrator is responsible for creative, technical, and oversight roles. In an organizational or business setting, the web administrator might oversee a web development team that includes creative and technical roles. A web administrator must have familiarity with databases, markup and scripting languages, content development, creative design, marketing, and hardware.

Sometimes the web administrator takes on the role of the system architect. A **system architect** determines the structure and technical needs required to build, maintain, and expand the website.

All websites need to go through a testing process. **Testers** examine the website for usability and performance across different browsers and devices.

A **social media expert** determines the social media platforms to support, how the website shares content using social media, and methods for users to share content using social media.

Other Web Roles

As technology changes and develops, new roles are created to incorporate these trends. Some jobs that have emerged in recent years include e-commerce director, cloud architect, mobile app developer, and mobile strategy expert.

Exploring Web Design Roles

1. Use a search engine to identify job search websites, such as monster.com.
2. Click one of the job search websites to open it in your browser.
3. Follow the steps on the job search website to search for jobs related to three of the web design roles discussed in this chapter, including one of the newer roles.
4. Summarize your research by listing the job description, skill requirements, salary information, and job location for at least two job postings for each of the three web design roles you would be interested in.
5. Compare the skills needed for the job with your own skill set; what additional training will you need?
6. Submit the results of your job research in the format requested by your instructor.

**YOUR
TURN**

Chapter Review

The Internet is a worldwide public network that links millions of private networks. The highly visual, dynamic, and interactive World Wide Web is a subset of the Internet. The Internet and the web have dramatically changed the communication, education, entertainment, and business practices of millions of people worldwide.

Users can access the Internet and the web over wired and wireless methods. Transfer rates determine the speed at which data moves between a server and a computer or device. Internet service providers (ISPs) provide Internet connections to individuals, businesses, and other organizations.

A browser is a software program or app that requests, downloads, and displays webpages. To view a webpage, enter its unique address, called a Uniform Resource Locator (URL), in the browser's Address bar. Three popular web browsers are Google Chrome, Mozilla Firefox, and Microsoft Edge.

Websites can be categorized as personal, organizational/topical, or commercial. Commercial websites include B2C, B2B, and C2C e-commerce; search tools; and portal websites.

Web design technologies include markup languages, Cascading Style Sheets (CSS), scripting languages, text and HTML editors, web development tools, and predesigned web templates and content management systems. Responsive web design techniques enable websites to adapt layout and content for different screen sizes and resolutions.

Depending on resources, developing a website might be the job of an individual person, two or three people, or a large web development team. Although actual titles vary and responsibilities can overlap, web design roles include creative, technical, and oversight, as well as those dealing with new technologies and strategies.

TERMS TO KNOW

After reading the chapter, you should know each of these key terms.

- 3D virtual world (7)
- 3G (12)
- 4G (12)
- 5G (12)
- active content (25)
- app (5)
- application (5)
- asymmetrical digital subscriber line (ADSL) (11)
- attributes (23)
- back-end web developer (31)
- blog (6)
- blogging (6)
- Bluetooth (11)
- bookmark (4)
- broadband (11)
- browser (13)
- browsing the web (3)
- business-to-business (B2B) e-commerce (10)
- business-to-consumer (B2C) e-commerce (10)
- cable television (CATV) line (11)
- Cascading Style Sheet (CSS) (25)
- cloud computing (5)
- collaborative workspace (5)
- commercial website (17)
- consumer-to-consumer (C2C) e-commerce (10)
- content management system (CMS) (28)
- content repository (28)
- content writer/editor (29)
- corporate portal (21)
- database developer (30)
- digital subscriber line (DSL) (11)
- domain name (14)
- e-commerce (9)
- electronic commerce (9)
- email (5)
- Extensible Markup Language (XML) (24)
- favorite (4)
- Fiber to the Premises (FTTP) (11)
- fixed wireless (11)
- front-end web developer (30)
- full-stack web developer (30)
- general consumer portal (21)
- group messaging app (5)
- hashtag (7)
- hit (18)
- home page (2)
- hot spot (12)
- HTML editor (25)
- HTML tag (23)
- hyperlink (2)
- Hypertext Markup Language (HTML) (24)
- Hypertext Transfer Protocol (HTTP) (15)
- IM chat (5)
- index (18)
- instant messaging (5)
- integrated development environment (IDE) (27)
- Internet (2)
- Internet Relay Chat (IRC) (5)
- Internet service provider (ISP) (12)
- intranet (28)
- IP address (14)
- kbps (11)
- keyword (18)
- landing page (2)
- learning management system (LMS) (8)
- link (2)
- malware (25)
- markup language (23)
- Massive Open Online Course (MOOC) (7)
- massively multiplayer online game (MMOG) (7)
- Mbps (11)
- meta tag (18)
- metasearch engine (18)
- mobile wireless (11)
- multimedia producer (29)
- national ISP (12)
- network (2)
- organizational website (29)
- personal portal (21)
- personal website (15)
- portal (21)
- protocol (15)
- regional ISP (12)
- responsive web design (RWD) (13)
- script (25)
- scripting languages (25)
- search directory (19)
- search engine (18)
- search engine optimization (SEO) (19)
- SEO expert (29)
- shortcut (4)
- social bookmarking (6)
- social media expert (30)
- social networking (6)
- software development kit (SDK) (28)
- spamdexing (19)
- spider (18)
- streaming media (11)
- style sheet (25)
- surfing the web (3)
- system architect (30)
- tag (6)
- tester (30)
- text editor (25)
- text speak (5)

theme (27)
 topical website (16)
 top-level domain (TLD) (14)
 transfer rate (11)
 Uniform Resource Locator (URL) (14)
 user experience (UX) manager (29)
 user interface (UI) manager (29)
 vertical portal (21)
 video sharing (6)
 virtual meeting space (5)
 web administrator (31)
 web artist/graphic designer (29)
 web chat (5)
 web browser (13)
 web crawler (18)
 web designer (29)
 web developer (29)
 web development tool (26)
 web programmer (29)
 web server (2)
 web server administrator (30)
 web template (27)
 webpage (2)
 website (2)
 wiki (7)
 wireless fidelity (Wi-Fi) (11)
 Wireless Markup Language (WML) (24)
 World Wide Web (web) (2)
 WYSIWYG editor (26)
 XML (24)

Complete the Test Your Knowledge exercises to solidify what you have learned in the chapter.

TEST YOUR KNOWLEDGE

Matching Terms

Match each term with the best description.

- | | |
|-----------------------|---|
| _____ 1. app | a. A program or app that provides a scheduling, communication, and document sharing platform for students and teachers. |
| _____ 2. blog | b. A webpage's unique text address. |
| _____ 3. browser | c. A software program. |
| _____ 4. hyperlink | d. A business that has a permanent Internet connection and provides temporary Internet connections to individuals and companies for a fee. |
| _____ 5. ISP | e. A web content design technique that includes using meta tags, descriptive page titles, relevant inbound links from other websites, and clearly written text to increase the likelihood that the webpage will appear high in a search engine's search results list. |
| _____ 6. LMS | f. A specially formatted electronic document that contains text, graphics, and other information and is linked to similar, related documents. |
| _____ 7. MOOC | g. A document that a web designer can attach to multiple website pages to ensure design continuity. |
| _____ 8. SEO | h. A word, phrase, or graphical image that connects pages at the same website or pages across different websites. |
| _____ 9. web crawler | i. An online journal or diary. |
| _____ 10. style sheet | j. A software program used to request, download, and display webpages. |
| _____ 11. URL | k. An online course delivered over the web, often for free. |
| _____ 12. webpage | l. A program that browses the web for new pages and then adds the webpages' URLs and other information to its index. |

Short Answer Questions

Write a brief answer to each question.

1. Differentiate between the Internet and the World Wide Web.
2. Describe the difference between a search engine and a search directory.
3. List and describe four broadband methods for accessing the Internet and web.
4. Differentiate between commercial and organizational websites.
5. List and explain SEO techniques and tools.
6. Differentiate between front-end, back-end, and full-stack web developer roles.
7. Identify the primary responsibilities associated with each of the following web design roles: content writer/editor, artist/graphic designer, UI/UX manager, web designer, web programmer/developer, social media expert, and web administrator.
8. Define the following terms: instant messaging (IM chat), cloud computing, social bookmarking, wiki, and collaborative workspace.

TRENDS

Investigate current web design developments with the Trends exercises.

Write a brief essay about each of the following trends, using the web as your research tool. For each trend, identify at least one webpage URL used as a research source. Be prepared to discuss your findings in class.

1 | Responsive Web Design

Responsive web design (RWD) strategies optimize websites for viewing on multiple device types and screen sizes. Research guidelines and techniques for responsive web design. Submit your findings in the format requested by your instructor.

2 | Web Conferencing

How do businesses use web conferencing to conduct meetings? Visit at least one web conferencing website to see what benefits for businesses and business users are listed. Find reviews of web conferencing software and apps. Besides providing two-way video, what other services can users take advantage of during a web conference? Search the web for tips and techniques for participating in a professional web conference, such as attire, background, preparation, and etiquette. As a web designer, how might you use web conferencing to work with your clients and business partners?

Challenge your perspective of the web and web design technology with the **@Issue** exercises.

@ISSUE

Write a brief essay in response to the following issues, using the web as your research tool. For each issue, identify at least one webpage URL used as a research source. Be prepared to discuss your findings in class.

1 | Impact on Lifestyle

With developments in technology such as smartphones, people are able to stay connected constantly. Whether by phone calls, text messages, alerts from websites about new content, or social networking websites such as Facebook and Twitter, technology provides many distractions. How do these developments enhance daily life? How have they changed daily life from five or ten years ago? What is a negative impact? Discuss the impact of technology on your lifestyle and that of those around you.

2 | Meta Tag Abuse

Web designers use meta tags to enable search engines to easily categorize webpage content. Some web designers use meta tags that reflect popular search trends, but have nothing to do with their webpage content. Use a search engine to search for meta tag abuse. Is including unrelated meta tags unethical? How should search engines deal with websites that misuse meta tags? If possible, find examples of commonly misused meta tags. Discuss your conclusions regarding the ethical use of meta tags.

Use the World Wide Web to obtain more information about the concepts in the chapter with the **Hands On** exercises.

HANDS ON

1 | Explore and Evaluate: An E-commerce Website

Browse the web to locate an e-commerce website. Follow links from the home page to view at least three related pages at the website. Then answer the following questions; be prepared to discuss your answers in class.

- Who owns the website and what is its URL?
- What is the focus of the products or services on the website?
- Were the home page and related pages visually appealing? If yes, why? If no, why not?
- What social media does the website incorporate? How are they used?
- How easy was it to navigate to related pages using the home page links?
- Conduct a search for a specific product or product type. Were the search results relevant to your search?
- Were you able to identify any advertisements or paid promotional placements?
- How long did it take for you to find useful information at the website?

2 | Search and Discover: Mobile Web Browsers

Using a search engine, perform a keyword search to identify popular types of mobile browsers. Read industry expert and user reviews of one mobile browser. Answer the following questions and submit your answers in the format requested by your instructor.

- Which device(s) can use the mobile browser?
- Are the reviews positive? What features do the experts and users like or dislike?
- Are there any typical browser features that are missing? If so, what are they?
- Does the browser come embedded on a device or can users download it? If it is available for download, is it free?
- Is the browser's interface visually appealing? Why or why not?
- Are there any identified security risks to the browser?
- Do you have any experience using this browser? If so, describe your experience.
- Would you use or recommend this mobile browser? Why or why not?

TEAM APPROACH

Work collaboratively to reinforce the concepts in the chapter with the Team Approach exercises.

1 | Compare Content Management Systems

Pair up with one or more classmates and work as a team to research and compare content management systems. As a team, determine which systems you will research. Assign one CMS to each team member.

- Using a search engine, find at least three sources listing advantages or disadvantages of your chosen CMS.
- Answer the following questions:
 - What qualifications are necessary to use the CMS?
 - What are the two main advantages to using the CMS?
 - What are two disadvantages to using the CMS?
- Find three examples of websites created using the CMS.
- Present your findings to your other team member(s). As a group, determine which you would choose.
- Submit your findings in the format requested by your instructor.

2 | Team and Client Communication Challenges

Join with four or five classmates to establish a mock web development team. Assume the web development team has been hired by a client to plan and create a B2B e-commerce website. Each team member should choose one or more of the creative, technical, or oversight roles discussed in this chapter. Then use the web to research current challenges that individuals in each role might face, and identify potential resolutions to those challenges. Next, as a team, brainstorm communication issues that might arise among team members and between the team members and the client. Identify ways to resolve any potential communication issues. Finally, prepare a detailed report describing potential design and communication challenges and the team's approach to handling them. Submit the report to your instructor and be prepared to present your report to the class.

Apply the chapter concepts to the ongoing development process in web design with the Case Study.

CASE STUDY

The Case Study is an ongoing development process using the concepts, techniques, and Design Tips presented in each chapter.

Background Information

You now will begin the process of designing your own personal, organizational/topical, or commercial website. As you progress through the chapters in this book, you will learn how to use design as a tool to create effective webpages and websites. At each chapter's conclusion, you will receive instructions for completing another segment of the ongoing design process.

The following are suggestions for website topics. Choose one of these topics or determine your own. Select a topic that you find interesting, feel knowledgeable about, or are excited about researching.

1. Personal website
 - Share a hobby or special interest: music, remote control cars, mountain biking, fantasy sports, or other.
2. Organizational/topical website
 - Increase support and membership for: Habitat for Humanity, Red Cross, or a campus organization
 - Promote awareness of: health and fitness, endangered species, or financial assistance for college
3. Commercial website
 - Start a new business: childcare or dog walking, or expand an existing business with a web presence
 - Sell a service: tutoring, web design, graphic design, or home maintenance
 - Sell a product: laptop stickers, workout programs or gear, or beauty/boutique products

The evaluation of your completed website, which will consist of 5 to 10 webpages, will be based primarily on the application of good web design concepts.

Chapter 1 Assignment

Follow Steps 1–6 to complete a plan for developing your website.

1. Identify which type of website you will design—personal, organizational/topical, or commercial. Write a brief paragraph describing the website's overall purpose and its targeted audience. Create a name for your website.
2. List at least three general goals for your website. You will fine-tune these goals into a mission statement in a subsequent chapter.
3. List elements in addition to text—photos, music, animation, and so forth—that you could include on your website to support your general goals.
4. Identify the design tools you expect to use to develop your website.
5. Identify an available domain name and URL for your website. Research to make sure it is available.
6. Submit your findings in the format requested by your instructor. Be prepared to discuss your plan with the class.