chapter
2

Surfing and Searching the Internet

"On the Internet, there is no there."

—*Anna Paquin, MCI Commercial*

- List and define the six things you must have in order to connect to the Internet.

- Use a Web browser to go surfing on the Internet, bookmark important sites, and share bookmarked favorites with coworkers.

- Download and install multimedia plug-ins and viewers that are not built into the browser.

- Configure the browser's advanced security settings to help guard against malicious code such as viruses, worms, and Trojans that can be harmful to your computer.

- Use the appropriate search engine to conduct subject-oriented as well as full-text searches by keyword or concept, including multimedia searches that can find pictures, audio, and video as well as text.

- Download found objects from the Internet and define the types of files that are commonly found.

EVERYONE reading this book has most likely been on the Internet. You have probably surfed the Web, for example, and you may consider yourself pretty good at surfing. But do you understand the theory of surfing well enough to truly glide across the Net and find things quickly? Do you know the proper way to download and handle the different kinds of resources you can find on the Internet? Are you sure you know the most cost-effective way to connect to the Internet? Do you know the best way to configure your security settings to safeguard against viruses, worms, Trojans, and other kinds of Internet attacks?

So you can get more out of the Internet, this part of the book helps you understand how best to connect and surf the Net safely, productively, and cost effectively. To get the most out of your online experience, you learn how to download and configure the latest multimedia plug-ins. Then you will be ready to use the search engines not only to find but also to play the multimedia objects of your desire. Before you can do any of these things, however, you need to learn about getting connected, so that is where this chapter begins.

Getting Connected

To get connected to the Internet, you need the following six things:

- **Internet-Ready Computer**   A computer is Internet ready if it has the physical hardware needed to connect to the Internet, such as a modem or a network interface card.

- **Operating System**   Most computers come with an operating system preinstalled. The most popular operating systems are Microsoft Windows, the Macintosh OS, UNIX, and Linux.

- **TCP/IP**   In Chapter 1, you learned that computers communicate with the Internet through a protocol suite called TCP/IP. To get on the Internet, therefore, the computer must have TCP/IP installed.

- **Client Software**   Client software is the application program you run when you access services on the Internet. The most popular examples of Internet clients include programs that let you read your e-mail, browse the Web, and IM (i.e., instant message) your friends and colleagues.

- **Internet Connection**   The connection from your computer to the Internet is called your *Internet connection*. The next part of this chapter covers different ways of creating this physical connection to the Internet.

- **Internet Address**   To go somewhere on the Internet, you need to know the destination address of the service or resource you are planning to access. This destination could be the address of a Web site, the e-mail address of a person to whom you are sending a message, or the FTP address of a server from which you want to download a file.

Internet Service Providers

Most users get their Internet connection from an **Internet Service Provider (ISP)**. An ISP is a networking company that connects you to the Internet and provides you with Internet services, including access to the World Wide Web, e-mail, listserv, chat, and newsgroups.

In the past, some ISPs charged an hourly fee. If you use the Internet a lot, however, paying by the hour can be very expensive. Listed here are four of the most popular ISPs, all of which provide unlimited dialup usage for a flat fee of about $24 per month.

America Online

America Online, also known as AOL, is the largest Internet Service Provider. The number of AOL subscribers has skyrocketed to 32 million users. Each user gets up to seven e-mail accounts and an allotment of 2MB of personal Web space for each account. AOL uses a channel-style of presentation to make it easy to navigate its many offerings. A huge amount of AOL content is not otherwise available on the Internet. Parental controls enable parents to limit access to adult content. To find out more about AOL, go to www.aol.com.

AT&T WorldNet

AT&T WorldNet Service provides fast, reliable Internet access nationwide. You get six e-mail accounts, each of which has 10MB of personal Web space. For more information about AT&T WorldNet Service, go to www.att.net.

Microsoft Network

The Microsoft Network (MSN) provides up to nine e-mail accounts, the MSN Messenger service for talking with your friends online, and up to 30MB of space for your photos and personal Web pages. To find out more about the Microsoft Network, go to www.msn.com.

EarthLink

In 2000, EarthLink merged with Mindspring to become the nation's second-largest ISP (Bloomberg News, 2000). Its partnership with the Snap! Portal provides EarthLink users with an intuitive user interface. Every user gets an allotment of Web space with a personal start page including an e-mail indicator, a search engine, headline news, stock quotes, weather, and personal reminders. You can find EarthLink on the Web at www.earthlink.net.

Regional and Local Networks

By looking up "Internet Services" in the yellow pages of your telephone directory, you will probably find some regional and local ISPs listed in addition to the nationwide service providers discussed so far. For example, a regional ISP called *Starpower* offers Internet services in Washington, DC, northern Virginia, and Maryland. Starpower can also provide telephone and cable TV services. To contact Starpower, go to www.starpower.net.

An excellent source for finding out about other ISPs in your area is on the Web at thelist.internet.com.

School and College Networks

Schools and colleges commonly operate computer networks that provide Internet services for free to their faculty, staff, and students. If you are lucky enough to belong to such a user community, your local school or college serves as your ISP. Because these services are free, however, the resources are sometimes inadequate to meet the demand, and it is not uncommon for members of school and college networks to also subscribe to one of the commercial ISPs. Some campuses have even negotiated deals with commercial ISPs to get a lower price for individuals to subscribe to the commercial service.

User Satisfaction

Consumer Reports magazine rates ISPs in terms of customer satisfaction. In a survey of 1,640 dialup modem users, for example, AT&T WorldNet, BellSouth, and EarthLink were highly rated. AOL and MSN users, on the other hand, reported problems with interruptions during dialup sessions. Both AOL and MSN have pledged to work to correct these problems. For the latest rankings of Internet service providers, go to consumersearch.com/www/computers/internet_service_providers.

Transport Medium

The transport medium is the physical connection over which information travels on the Internet. Very high-speed transmission lines carry the backbone of the Internet across the country and over the world. Most often these backbone lines are fiber-optic cables or copper transmission lines. The major ISPs have very high-speed connections to the Internet's backbone.

The physical connection between your computer and your ISP is often the most critical part of the transport medium, because it determines the bandwidth of your connection to the Net. Most Internet connections use wires or cables you can see and touch. It is also possible to use wireless connections such as cell phones and satellites that communicate via radio signals. Depending on the medium you choose, you need to have specific hardware installed in your computer to handle the communication.

Telephone Modems

The most common means of connecting to the Internet from home is via plain old telephone service, also known as *POTS*. To communicate with the Internet over an ordinary telephone line, your computer must have a modem. The term **modem** is a combination of the terms *mo*dulate and *dem*odulate, which describe how your computer sends and receives digital information over analog phone lines. Modems are so popular that most computers being sold today come with modems built in. Other models require the addition of external modems that connect to your computer's serial port or modem cards that plug into one of your computer's expansion slots. Figure 2-1 contains a block diagram that describes how modems work.

Modems have gotten steadily faster as computer technology has advanced. Modem speed is important because it determines how long you have to wait for information to arrive. Modem speed is often expressed in units known as **bits per second (bps)** or kilobits per second (**Kbps**). A **kilobit** is a thousand bits. Common speeds are 14,400 bps (14.4 Kbps), 28,800 bps (28.8 Kbps), 33,600 bps (33.6 Kbps), and 56,000 bps (56 Kbps). For example, information traveling at 14,400 bps takes twice as long to arrive as it would at 28,800 bps.

Just because you have a superfast modem, such as 56 Kbps, does not necessarily mean information actually travels that fast to and from your computer. The telephone lines and the equipment (routers and switches) the lines pass through on their way to your ISP may preclude your superfast modem from using its highest speed. Many modems have built-in compression and decompression features that enable them to pack information more tightly in the communication packets, thereby achieving an actual transmission rate higher than their advertised data rate. This feature only works, however, for data that have not already been compressed.

As data communications technology continues to advance, modems will continue to increase in speed. Someday, the so-called high speeds discussed in this book will seem slow.
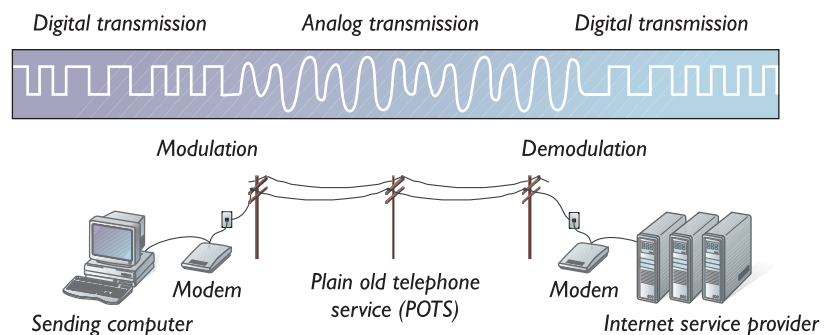
Digital transmission   Analog transmission   Digital transmission

Modulation   Demodulation

Modem   Plain old telephone service (POTS)   Modem

Sending computer   Internet service provider

FIGURE 2-1   *Follow the signal to see how modems work by modulating the computer's digital signal into an analog signal that can be transmitted over plain old telephone service (POTS) to your ISP, where the signal is demodulated into a digital signal.* ■

PPP vs. SLIP

The two most popular protocols for telephone modems are **Point to Point Protocol (PPP)** and **Serial Line Internet Protocol (SLIP)**. True to its name, SLIP handles the Internet Protocol only. PPP, which is the more modern of the two, supports not only TCP/IP but also NetBEUI and IPX/SPX, which are communication protocols you will study in the networking part of this book. SLIP has faded in popularity due to the superiority of PPP, which has better error checking and supports user ID and password authentication. Another reason PPP has become the telephone modem protocol of choice is that PPP can assign IP addresses automatically, whereas SLIP requires a preassigned IP address. PPP is built in to the Windows XP operating system, which uses PPP when modem users dial up to the Internet.

Ethernet

The invention of **Ethernet** (pronounced *ee-thur-net*) in Bob Metcalfe's Harvard Ph.D. thesis in 1973 was a data communications breakthrough that fueled the explosion of local area networks (LANs) throughout academia and industry. Ethernet networks transmit data at high speed, typically up to 10 megabits per second (**Mbps**). (Mega means a million, so 10 **megabits** means 10 million bits.) At Ethernet speeds, a file that takes 10 minutes to transmit over a 14.4 Kbps modem arrives in just 1 second. Actual downloading times may vary, depending on compression schemes, network traffic, and the number of users sharing the Ethernet.

If you work at a school or company that has its PCs connected to the Internet at high speeds, chances are the communications medium is an Ethernet. At first, Ethernet required the use of coaxial cable, the kind of wire used in cable TV. Now there is a so-called **10BaseT** Ethernet that can use Category 5 twisted-pair telephone wiring. A faster **10/100BaseT** Ethernet can move data at rates up to 100 megabits per second. There is also a 10 gigabit Ethernet standard known as **10GbE**. Officially ratified in the summer of 2002, the 10GbE standard uses fiber optics to push Ethernet into speeds ranging up 10 gigabits per second (**Gbps**). The prefix giga means billion; a **gigabit** is one billion bits and 10 Gbps is therefore 10 billion bits per second.

ISDN

ISDN stands for **Integrated Services Digital Network**. It is the digital telephone system the regional Bell companies are installing in most of the United States; when this book went to press, about 80 percent of the country could get ISDN.

ISDN signals are carried over two or more 64-Kbps (64,000 bits per second) circuit-switched channels to carry voice and data and a lower-speed packet-switched channel that carries control signals. The Basic Rate Interface (BRI) service of ISDN is 144 Kbps, made up of two 64-Kbps data channels and one 16-Kbps control channel. A special version of PPP called *multilink PPP* combines the two 64-Kbps data channels to create an effec-

tive data rate of 128 Kbps. The Primary Rate Interface (PRI) service uses 23 data channels and a 64-Kbps control channel to boost the data rate to 1,544 Kbps (1.544 Mbps), which is capable of real-time videoconferencing in addition to more traditional data services.

To use ISDN to connect to the Internet, you need to contact both your local telephone company and your Internet Service Provider to find out whether ISDN is available in your area and to make sure your ISP supports it. ISDN lines cost more than ordinary phone lines, so be prepared to pay more for the higher data rate.

Cable Modems

A **cable modem** is a network adapter used to connect PCs to TV cables in neighborhoods where cable TV companies offer Internet services over TV cables. Cable modems are potentially faster than telephone modems because TV cables, being coaxial, are capable of carrying high-speed Ethernet signals in addition to conventional television signals. The term **broadband** is used to refer to this type of connection that carries multiple channels of information over a single cable.

To find out if cable modems are available in your neighborhood, follow this book's Web site link to the cable modem Zip code search.

DSL, SDSL, and ADSL

DSL stands for **Digital Subscriber Line**, which is a broadband method of connecting to the Internet over existing telephone lines. There are two kinds of DSL: synchronous and asynchronous. Synchronous DSL (SDSL) supports the same high-speed data rate for both upstream and downstream traffic. Asynchronous DSL (ADSL) lowers the cost of DSL connections by using a high-speed data rate for downloads but a slower rate for uploads. Download speeds range from 384 Kbps to 8 Mbps, and upload speeds range from 128 Kbps to 1 Mbps. The faster the speed, the higher the cost.

The typical home user spends a lot more time downloading than uploading. When you click to play a movie, for example, very little information goes up from your computer to the movie site to trigger the playing of the movie. When the movie comes down to your PC, on the other hand, the amount of bandwidth required is huge. ADSL models itself after this trend of home users downloading much more information than they upload. Another advantage of ADSL is that you can use the same telephone line for voice as well as data transmissions. SDSL, on the other hand, cannot operate simultaneously with voice transmissions on the same wire.

When this book went to press, DSL was available in about 75 percent of the United States. To find out whether you can get DSL at your home or business, follow this book's Web site link to the DSL area code search and use the menus to find out if access is available in your locale, and how much it costs to connect at different speeds. Be prepared to see some pretty high prices for the faster speeds.

To learn more about DSL and compare the relative merits of SDSL and ADSL, follow the link to the DSL Resource Center.

Satellite

Where cable or DSL is not available, satellite Internet service is an attractive alternative in areas that have a clear view of the southern sky. Like ADSL, satellite Internet service has a faster download than upload speed. Typical transmission speeds are 500 Kbps downstream and 150 Kbps upstream. In extremely bad weather, the speeds can decline due to the obstructed view. Whereas most DSL vendors permit subscribers to connect more than one computer, satellite providers normally restrict usage to a single computer per subscription. To learn more, follow this book's Web site links to satellite Internet providers.

Comparing the Ways to Connect

To summarize the many alternatives presented in this chapter, Table 2-1 compares the different ways to connect to the Internet. By studying this comparison, you should be able to select an option that suits your needs and budget.

To test the bandwidth your connection actually provides, follow this book's Web site link to the bandwidth meter.

Prepaid Internet Cards

Computer users who travel may be interested in prepaid Internet calling cards. Manufactured by Sprint and AT&T, the prepaid Internet cards let you purchase a number of hours of Internet connection time in advance of using it.

Transport Medium	Time to Download 100KB Picture	Time to Download 900KB Audio	Time to Download 10MB Movie	Estimated Monthly Communications Cost
14.4 Kbps modem	55 seconds	500 seconds	93 minutes	$23
28.8 Kbps modem	28 seconds	250 seconds	46 minutes	$23
33.6 Kbps modem	24 seconds	214 seconds	40 minutes	$23
56 Kbps modem	14 seconds	128 seconds	24 minutes	$23
128 Kbps ISDN	6 seconds	56 seconds	10 minutes	$35
256 Kbps DSL	3 seconds	28 seconds	5 minutes	$129
500 Kbps satellite downstream, 159 Kbps upstream	1.6 seconds	14.4 seconds	2.6 minutes	$70
1.5 Mbps DSL	0.54 seconds	4.8 seconds	54 seconds	$309
1.5 Mbps ADSL downstream, 128 Kbps upstream	0.54 seconds	4.8 seconds	54 seconds	$49
3 Mbps cable modem	0.27 seconds	2.4 seconds	27 seconds	$35-50

Note: Cable modem speeds vary depending on the number of simultaneous users of the local cable network.

TABLE   2-1   *Internet Connection Comparison Matrix* ■

The prepaid Internet card may also be of interest to people who seldom connect to the Internet and wish to avoid paying a regular monthly fee. The prepaid Internet market is expected to grow from $10 million in 2001 to $280 million in 2005. To learn more, follow this book's Web site links to prepaid Internet cards.

Direct Connections

An Internet connection that is always on is called a **direct connection**. To use the Internet over a direct connection, you simply begin using the client software with which you wish to access the Internet. Of the various ways this chapter has presented for connecting to the Internet, the following provide you with a direct connection:

- Ethernet
- ISDN
- Cable modem
- DSL
- Satellite

Connections that are not direct, on the other hand, require you to do something special to get connected. To use a dialup connection, for example, you must dial up to your ISP to get connected.

Sometimes even a direct connection can stop working. When hurricane Isabel hit the mid-Atlantic United States, for example, my ISDN line was out of service for several days. To work online in the meantime, I used a modem to dial up, which enabled business to continue, albeit at a lower speed. Many users with direct connections keep a prepaid Internet card on hand for emergency use during such outages.

Cross Check

Comparing the Ways to Connect

As you have learned so far in this chapter, there are many ways to connect to the Internet. Keeping them straight in your own mind is important if you want to advise people regarding the appropriate way to connect to the Internet in their particular circumstances. See if you can match the ways of connecting on the left with their operational descriptions on the right.

_____ telephone modem	**A.** Broadband coaxial connection that carries high-speed Ethernet signals as well as conventional television
_____ Ethernet	**B.** Typical transmission speeds are 550 Kbps downstream and 150 Kbps upstream
_____ ISDN	**C.** Broadband method of connecting to the Internet over existing telephone lines
_____ cable modem	**D.** Basic service is 144 Kbps, made up of two 64-Kbps data channels and one 16-Kbps control channel
_____ DSL	**E.** Operates over category 5 twisted-pair telephone wiring at speeds up to 10 Mbps
_____ satellite	**F.** Modulates the computer's digital signal into an analog signal that can be transmitted over POTS

Browsing the Web

Most of the people reading this book have probably already had their first surfing experience. Many may consider themselves adept at surfing, and some could even be addicted to it.

Whether or not you have surfed the Net, studying the concepts in this chapter will enable you to become a better surfer than if you "just do it." If you have become addicted, the techniques you learn here will help you gain control over the Net instead of allowing it to control you.

In telecommunications, the term **surf** means to browse by going from place to place in search of something that interests you. On TV, you surf by changing channels continually until you find a program you want to watch; this is known as *channel surfing*. On the Net, surfing means to use a program called a browser to go from site to site in search of information that interests you.

The most popular place to surf on the Internet is the World Wide Web. As you learned in Chapter 1, the Web is a worldwide hypertext system that interconnects millions of documents. The connections are made through links, which can be textual or graphical. A **link** is a hot spot that, when selected, triggers the object of the link. You select the link by clicking on the word or picture that triggers it. Progressively clicking through the Web by triggering the links that interest you is known as **browsing**, a term synonymous with surfing the Net.

What Is a Browser?

The program you run when you surf the Web is called a **browser**. Because you surf the Web to receive content, the browser is an example of client software. As this chapter proceeds, you will learn how to use a browser not only to surf Web pages but also to search for and download pictures, audio, and video content. You will learn how to configure the browser to display multimedia content by using the plug-in of your choice. To keep your computer safe, you will also learn how to configure the browser's security settings to protect your computer from Internet attacks.

Selecting a Web Browser

Microsoft makes the most popular browser, called **Internet Explorer (IE)**. More than 90 percent of Internet users browse the Web with Internet Explorer. It is an excellent choice for computers that run the Windows operating system. Internet Explorer comes in both desktop and handheld versions. The handheld version is called Pocket Internet Explorer and runs under Windows CE on the Pocket PC family of handheld computers. Internet Explorer is preinstalled on most computers sold today. Users who do not have Internet Explorer can download it freely from www.microsoft.com/windows/ie, where the latest updates are also available. If you have trouble downloading the browser, ask your Internet Service Provider to help you get a setup disk that will install the browser for you.

On the Macintosh, an important Web browser change occurred in 2003. Before then, the default browser was the Macintosh version of Internet Explorer. In 2003, however, Microsoft announced that it was discontinuing work on the Macintosh version of IE. Apple now produces its own Web browser, which is called **Safari** and ships on every Macintosh as the default Web browser. Macintosh users can download the latest version or get updates at www.apple.com/safari. To run Safari, Macintosh users need to be running the Mac OS X operating system.

Another popular Web browser is **Netscape Navigator**. In 2003, however, Netscape's parent company, America Online, officially stopped all work on the Netscape Navigator product. Work continues on an open source version called **Mozilla**. The term **open source** refers to software for which the source code is available to the general public free of charge. Anyone can download the source code, use it freely, and make enhancements. People who make enhancements to Mozilla can submit them to the Mozilla Foundation, which maintains the official master copy of the Mozilla software. You can download the Windows, Linux, or Macintosh version of Mozilla from www.mozilla.org.

Legacy Browsers

In computing, the term legacy refers to something old. The term **legacy browser** refers to old versions of Web browsers. You need to be aware that some people have not upgraded to the latest version and are using a legacy browser. Some Web page elements may display differently or may not work at all in the older browsers. In Chapter 8, for example, you learn how cascading style sheets (CSS) provide you with some powerful new ways of formatting and laying out Web pages. Legacy browsers, however, do not support all the CSS features. Web pages that use CSS, therefore, may display differently, depending on the age of the browser. Internet Explorer did not support style sheets prior to version 3, and Netscape began supporting CSS with version 4. Chapter 8 provides you with a link to a chart that shows which CSS features are supported in which versions of the legacy browsers.

The legacy browsers you will encounter most often are the earlier versions of Internet Explorer and Netscape Navigator. Table 2-2 compares the features they support. The Web authoring tutorial in Part II of this book shows you how to create Web pages using all these features. In my opinion, users who have legacy browsers should upgrade to the latest versions rather than expect Web developers to shy away from the newer features.

Try This!

Update Your Browser

To make sure you have the latest version of your Web browser, you should go to the download site for the brand of Web browser you are using primarily on your computer. Check to see if a new version of your browser is available. If so, follow the onscreen instructions to download and install the update. Here are the sites to check:

- To update Internet Explorer, go to www.microsoft.com/windows/ie.
- To update Netscape, go to www.netscape.com.
- To update Mozilla, go to www.mozilla.org.
- To update Safari, go to www.apple.com/safari.

Browser	Frames	Inline Frames	Plug-Ins	JavaScript	Style Sheets	Dynamic HTML	XML
IE 6.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IE 5.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IE 5.0	Yes	Yes	Yes	Yes	Yes	Yes	Some
IE 4.0	Yes	Yes	Yes	Yes	Yes	Yes	No
IE 3.0	Yes	Yes	Yes	Yes	Yes	No	No
IE 2.0	No	No	No	No	No	No	No
IE 1.0	No	No	No	No	No	No	No
Netscape 7.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Netscape 6.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Netscape 6.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Navigator 4.7	Yes	No	Yes	Yes	Yes	Yes	No
Navigator 4.5	Yes	No	Yes	Yes	Yes	Yes	No
Navigator 3.0	Yes	No	Yes	Yes	No	No	No
Navigator 2.0	Yes	No	Yes	Some	No	No	No
Navigator 1.1	No	No	No	No	No	No	No

TABLE 2-2   *Windows Legacy Browser Comparison Chart* ■

Understanding URLs

Every place you can go on the Web has a global address known as a **Uniform Resource Locator (URL)**. Most often the resources are hypertext documents, but they can also be pictures, sounds, movies, animations, or application software. URLs can also bring up newsgroups, chat rooms, search engines, and real-time audio and video streams.

Elements of a URL

A URL can have several parts, which always appear in this order:

- Protocol
- Server name
- Port number (optional)
- Path/filename (optional)
- Anchor (optional)

Here is what the different parts of a URL mean:

protocol	Protocols include HTTP, FTP, mailto, and news; the Web's protocol is HTTP, which stands for *hypertext transfer protocol*.
server name	The server name is the Internet address of the computer or file server on which the resource resides.
port number	Port numbers rarely appear in URLs, because almost every file server is on the Web's default port, which is port 80.

path/filename	The filename is the name the file has on the server. If the file is in a folder or subfolder on the server, the filename includes the path to the file as well as the name of the file. If a URL that begins with http does not contain a filename, the default filename (usually index.html) gets served.
anchor	The anchor is a named bookmark within an HTML file. Anchors are optional. If a URL does not contain an anchor, the browser begins display at the start of the file.

The following analysis shows how the various parts of a URL get combined into a specific address on the World Wide Web. This example is the URL for the professional experience section of my résumé.

http://www.udel.edu/fth/resume.html#professional

protocol	**http**
server name	**www.udel.edu**
path/filename	**fth/resume.html**
anchor	**professional**

Web Sites

Every hypertext document on the World Wide Web resides on one of the computers connected to the network. The place where the hypertext document is stored on that computer is known as its **Web site**. Every Web site has a URL.

For example, Sony's Web site is http://www.sony.com. CNN's Web site is http://www.cnn.com. Netscape is at http://www.netscape.com. Microsoft is at http://www.microsoft.com. Do you notice the similarity in these corporate Web site addresses? Almost every company in the world has a Web site address in the form of http://www.*company_name*.com.

HTTP is the default protocol for Web pages. It is not necessary to type http:// because the browser assumes this is the protocol and inserts it automatically. Typing www.cnn.com takes you to the same place as typing http://www.cnn.com, for example. You need to type the protocol only if it is not HTTP.

Web Pages

Like books, each site on the Web consists of one or more pages. Each page at a Web site is known as a **Web page**. Unlike the pages in books, however, Web pages can contain more information than you can see at once. Scrollbars let you move the page up and down inside your browser window, which displays the text and graphics on the Web page.

Every Web page has a URL. As mentioned earlier, the URL of my résumé is http://www.udel.edu/fth/resume.html. By analyzing this URL, you can see that this Web page is stored in the *fth* folder (*fth* are my initials) at the University of Delaware's Web site. The filename of the Web page is *resume.html*. The filename extension *html* is the standard format used for documents on the Web. HTML stands for *h*yper*t*ext *m*arkup *l*anguage. You will learn HTML in the Web page authoring tutorial in Part II of this book.

Surfing Concepts and Techniques

Surfing the Net is a lot more involved than channel surfing television. Instead of just flipping through the relatively limited number of channels available on a TV, surfing the Net enables you to navigate a world full of interconnected information, discover new sites you did not know about, keep track of where you have been so you can easily get there again, and download things that interest you. By practicing the surfing concepts and techniques presented here, you can master the art of navigating the Net so you can get where you want quickly and accomplish your purpose for going there. Even if you consider yourself an accomplished surfer, studying these concepts will probably teach you some new techniques that will make you even more productive in surfing the Net.

Entering URLs

Oftentimes you will have been given a specific URL or Web address that you want to go to. For example, you may have seen an ad for a Sony product that told you to go to the Web site www.sony.com for more information. To go there (or to any other site for which you know the URL), you simply type the URL into your Web browser's address or location field, and press the ENTER key. If your browser's address or location field is not visible, follow these steps to get the URL field onscreen and go to a URL with Microsoft Internet Explorer:

1. Microsoft Internet Explorer calls the URL field the Address field.

2. If the Address field is not visible, pull down the View menu, select Toolbars, and if the Address Bar is not checked, select the Address Bar to display it. If the Address field still is not visible, click your right mouse button on the toolbar and select Address Bar.

3. Click once inside the Address field to position your cursor in it.

4. Type the URL you want to go to. In this example, type **www.sony.com**.

5. Press ENTER.

To activate the URL field so you can type a URL into it, click once inside the URL field to position your cursor there. Erase any URL that might be there currently by dragging your cursor over the URL to select it and then pressing the DELETE key to delete it. Or you can just position your cursor at the end of the URL and backspace over the URL to delete it. Now type **www.sony.com** and press ENTER. Your browser takes you to the Sony site.

Home Pages

Home is a relative concept. For example, a person from London considers England to be home. To fly to Hawaii, that person takes off from London's Heathrow airport. When someone from Los Angeles flies to Hawaii, how-

ever, the plane takes off from the Los Angeles airport. So it is on the Web, where your **home page** is your taking-off point. Many people create their own home page, to which they link documents and resources they want people who visit their home page to be able to access. Almost every company has a home page, as do government offices, schools, and colleges. Home pages organize the information at that site and help you access it. If you were considering going to graduate school at Princeton University, for example, you could find out a lot about it by going to their home page at www.princeton.edu.

A huge mass of information is out there on the Net. Other people's home pages help you make sense out of their stuff. Eventually, after you complete the Web page creation tutorial in Part II, your home page will organize your stuff and help other people make sense out of it.

Default Pages

If you go to a Web site without requesting a specific document, you view that site's **default page**. For example, when you went to www.sony.com, you were taken to the default page of the Sony site. The default page is often the home page of the company or person who owns the site. In Chapter 6, you learn how to make your home page function as the default startup page for your Web site.

Links

Links are perhaps the most important surfing concept, because without links, there would be no Web! Links form the pathways that interconnect the documents and resources on the Web. You activate a link by clicking it. There are two kinds of links: hypertext and hypergraphic.

Hypertext Links

A **hypertext link** consists of one or more words that you click to trigger the events that are linked to the text. Hypertext links are also known as **hot words**, because they make things happen when you click them. So you can tell which words are hot, the hypertext links are underlined or printed in a different color than the rest of the text. Usually, links you have not visited are colored blue and visited links dark pink. When you move your cursor over a hypertext link, the cursor shape changes from an arrow to a hand pointer.

You can change the default color of the hot words by modifying your browser's preferences. To change the color of the hypertext links in Netscape Navigator, pull down the Edit menu, choose Preferences, click Colors, and click the color swatches for Visited Links and Unvisited Links. In Microsoft Internet Explorer, pull down the Tools menu, choose Internet Options, click Colors, and click the color swatches for Visited and Unvisited links. Even though you can change the colors, however, it is recommended that you not modify them unless you have a special reason for doing so.

Sometimes the color selections you make have no effect on the colors you see on a Web page. That is because the Web page author may have preset the hypertext links to specific colors that you cannot change. Unless the author has preset the colors on the Web page, the color preferences you choose will take effect.

Hypergraphic Links

Hypergraphic triggers are pictorial HotSpots you click to trigger events linked to images on the screen. The images can be little icons or larger graphics.

Well-designed Web pages make it obvious where to click to make different things happen. Poorly designed pages can be confusing if they're not clear what will happen when you trigger a link. In Chapter 5, you will learn how to design Web pages that make it clear what will happen when users trigger a link.

Figure 2-2 shows a Web page with an interesting combination of hypertext and hypergraphic links. Its URL is http://www.loc.gov. Point your browser there (to "point" your browser means to go to the URL) and try triggering the different hypertext and hypergraphic links.

n o t e   *In Chapter 8, you learn how to use cascading style sheets to change the appearance of unvisited and visited hyperlinks. Chapter 8 also teaches you how to make the link's appearance change when users move their cursors over the link. When you mouse over a link, you are said to **hover** over it. The color of a moused-over link is called its hover color.*

Hypergraphic links

Hypertext links

FIGURE 2-2   *Analysis of a Web page with a combination of hypertext and hypergraphic links. When you mouse over these links, notice that your cursor changes shape to indicate that you are hovering on a hot spot.* ■

Image Maps

A graphic may have more than one hot spot; if so, clicking different parts of the graphic triggers different links. Consider the question being asked in Figure 2-3. The user is being asked to click Middle C on a piano keyboard. The image has triggers on the region of the keyboard below C, above C, and on Middle C itself. Depending on where the user clicks, the appropriate feedback is given.

Figure 2-4 maps the triggers in Figure 2-3. The technique used to map multiple triggers onto an image is known as an *image map*. In Chapter 7, you learn how to create image maps.

Image Map   **Where's Middle C?**
Can you find Middle C on the music keyboard below? Click the key that you think's Middle C, and then I'll tell you if your answer is too low, too high, or just right.

Image Map   **Where's Middle C?**
Can you find Middle C on the music keyboard below? Click the key that you think's Middle C, and then I'll tell you if your answer is too low, too high, or just right.

FIGURE 2-3   *The student is asked to click Middle C on a music keyboard.* ■

FIGURE 2-4   *Mapping of the triggers in Figure 2-3.* ■

Try This!

Can You Find Middle C on an Image Map?

Now you can have a little fun trying out the Middle C image map illustrated in Figure 2-3. This image map is a little game that teaches users how to find Middle C on a music keyboard. To play the game, follow these steps:

1. Go to www.udel.edu/fth/middle-c. Your browser displays the music keyboard illustrated in Figure 2-3.
2. Try clicking different places on the keyboard, and observe the feedback you get.
3. If you do not know where Middle C is, the feedback will eventually teach you.
4. You can also look up the answer by studying Figure 2-4.
5. In Chapter 7, you learn the HTML codes for creating this kind of an image map. By using these codes, you can create an image map for any conceivable image you would like to present onscreen for users to interact with and make different things happen depending on where the user clicks.

Navigation Buttons

At the top of your browser you should see a row of navigation buttons with names such as Forward, Back, Home, and Stop. Figure 2-5 shows how the buttons appear in Microsoft Internet Explorer.

One of the most useful navigation buttons is the Back button. If you end up someplace you did not want to go, clicking the Back button returns you to the page from which you triggered the ill-chosen link. Conversely, the Forward button moves you ahead to pages you visited earlier in your current browsing session. Right-clicking on Back or Forward pops out a menu that shows the whole path you covered, and you can click a site to jump directly to it.

n o t e *Macintosh users, you trigger the menu on a Mac by holding down* CONTROL *during the click or by holding down the mouse button until the menu pops out.*
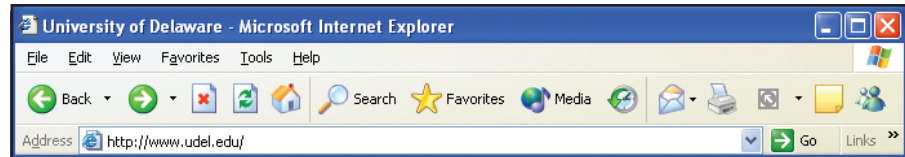
FIGURE 2-5 *Navigation buttons in Microsoft Internet Explorer. If these buttons are not visible, pull down the View menu, choose Toolbars, and select Standard Buttons. If the navigation buttons still do not appear, right-click the toolbar and choose Standard Buttons.* ■

Any time you want to return to your browser's default home page, just click the Home button. If you want to change the Internet Explorer's default home page, follow these steps:

1. Pull down the Tools menu and choose Internet Options.

2. Click the General tab, if it is not already selected.

3. In the Address field, type the URL of your desired home page.

4. Click OK to close the dialog.

Manipulating URLs

You can play some tricks with URLs to help find information. For example, suppose you have been told to go to the URL http://www.microsoft.com/windows/ie/enthusiast/default.asp for a list of tips to help you learn more about the features in Microsoft Internet Explorer. You find the list helpful, and you are curious to see what else is available at this site. By progressively stripping off the subfolder names of the path to the original document you were given, you can go to the higher levels of the Web site and use them as surfing-off points. For example, http://www.microsoft.com/windows/ie/ takes you to a menu of other links related to Microsoft Internet Explorer. Stripping off the last part of the URL (i.e., /ie) and trying http://www.microsoft.com/windows/ brings up a list of feature articles related to Windows technologies. Going all the way back to http://www.microsoft.com takes you to the Microsoft default page.

Stripping off parts of the URL in this manner normally brings you to the home page of the Web site where the page is hosted. Taking a look at the hosting site's home page reveals the source of the information, which can help you judge how reliable the information is. Remember that anyone can publish pages to the Web. If you discover that one page about airplanes, for example, came from the Smithsonian's air and space museum and another page came from a four-year-old child learning how to build paper airplanes, you would consider the page from the Smithsonian to have greater authority. Going to the source of the information can also help you find related information available at the site and correct errors in the URL if the original file could not be found.

Inside Info

Using the Stop Button to Interrupt Your Browser

Sometimes you may think the Internet has gotten stuck after you click a trigger to go somewhere. If you wait for a while with no response, try clicking the Stop button to cancel the request, and then click the trigger again. This usually gets things moving again. Another use of the Stop button is to cancel a process that is taking too long. For example, you may have clicked a trigger that downloads a movie that could take more than an hour to arrive over a slow Internet connection. Clicking the Stop button interrupts the download so you do not have to wait an hour.

Try This!

Manipulating the URL Field

You can easily manipulate URLs by using your browser's Address field. If your browser's Address field is not visible, pull down the View menu and select Toolbars; if the Address Bar is not checked, select the Address Bar to display it. Click once inside the Address field to position your cursor there and erase anything that already appears in the field. Then type the URL **http://www.loc.gov/exhibits/flw/flw03.html** and press ENTER to go there. Next complete the following steps, which will help you learn how to manipulate a URL:

1. Position your cursor at the end of the Address field and use the backspace key to erase the last part of the URL, which is /flw03.html. Press ENTER. Your Web browser displays the Web page of the manipulated URL.

2. Once again, position your cursor at the end of the Address field and use the backspace key to erase the last part of the URL, which is /flw. Press ENTER to go to the manipulated URL.

3. Repeat this process for each part of the URL until all you have in the Address field is http://www.loc.gov—this is the URL of the Library of Congress Web server. LOC stands for Library of Congress.

Bookmarking Favorite Sites

Web browsers have built-in support for bookmarks, which make it quick and easy for you to take note of your favorite Web pages and return to them later on. In a Web browser, a **bookmark** is a pointer to a Web page that enables you to jump directly to that page, without having to navigate the Web to get there.

As you surf the Net and become familiar with the wealth of resources available, you will begin to favor certain sites over others. To save time getting to your favorite sites, you can bookmark them. To bookmark a site on the Web, simply pull down the Favorites menu and click Add to Favorites. To jump to any site you bookmarked, pull down the Favorites menu and select the bookmark you want. Your browser will take you to the bookmarked Web page.

Bookmark Folders

You can organize your bookmarks in folders. This is recommended if you have a lot of bookmarks so you can organize them according to topics. You might make a folder called SearchEngines, for example, to hold bookmarks to your favorite search engines. Similarly, you might create a folder called Shopping in which you bookmark your favorite shopping sites. To create a bookmark folder, follow these steps:

1. Pull down the Favorites menu and choose Add to Favorites; the Add Favorite dialog appears.

2. Click the Create In button to expand the dialog to appear as shown here.
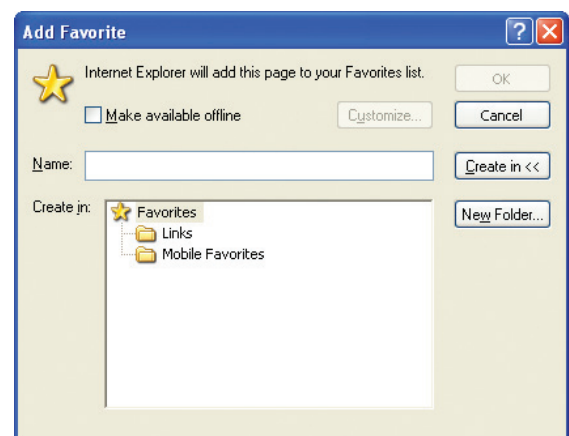
3. Click the New Folder button to make the Create New Folder dialog appear.

4. In the Folder Name field, type the name you want the new folder to have.

5. Click OK to close the Create New Folder dialog, and click OK to close the Add Favorite dialog.

6. To bookmark a Web site in a folder, pull down the Favorites menu, choose Add to Favorites, click Create In, select the desired folder, and click OK.

Importing and Exporting Bookmarked Favorites

Bookmarked favorites are so important that the browser has a built-in mechanism for importing and exporting them. Suppose you just bought a new computer. Its browser will not have any knowledge of the bookmarked favorites on your old computer. You can use the export/import mechanism to move your bookmarks from your old browser to your new computer's browser. Another situation in which you need to be able to export bookmarks is when you want to share your bookmarks with other users, such as at home, at school, or in your workplace. At the end of this chapter, Lab Project 2-2 gives you practice exporting bookmarks.

Retracing Your Steps: The History Folder

The IE browser remembers your most recently visited sites and makes it possible for you to jump back to a previous site without having to press the Back button repeatedly to back through the sites one by one. To jump back to a site you previously visited, follow these steps:

1. Click the History button; a History pane opens up to provide a visual display of the sites you visited.

2. Click a category in the history to expand it, and then click a Web site to go there.

3. If you want to hide the history, click the X in the upper-right corner of the History pane to close it.

Auto Completion

The IE browser has a feature called *Auto Completion*. If you begin typing into the browser's URL field the address of a Web site you visited previously, the browser auto-completes the entry to save you time. If you do not mean to go exactly to the address that gets auto-completed, just keep on typing, and the auto-completed address adjusts to what you type.

When you begin typing a Web address you visited previously, IE pops out a menu of similar addresses you visited. If you see the address you want in the menu, just click the address to go to it.

Try This!

Creating More Screen Space

No matter how large your computer screen is, you will sometimes wish it were larger so more information would fit into it. You can increase the viewing area of your Web browser by turning off some of the options that make your browser use extra screen space. For example, turning off the display of the URL field saves a little screen space and increases the viewing area inside the browser. Turning off the navigation buttons frees even more screen space. You can still navigate by using your browser's shortcut navigation keys, or you can turn the navigation buttons back on again when you want them to reappear. To create more screen space with the IE browser, follow these steps:
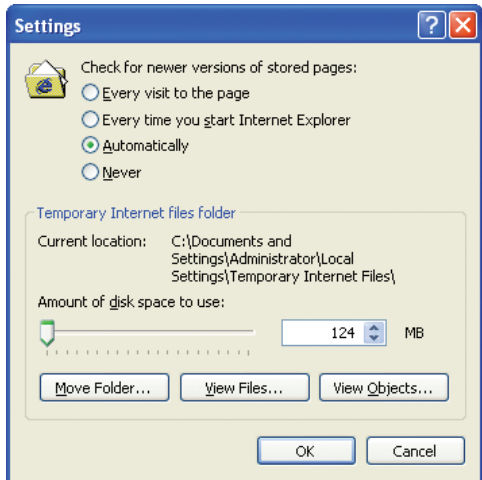
1. Pull down the View menu, choose Toolbars, and see if the Standard Buttons option is checked; if so, click Standard Buttons to turn the buttons off.

2. Pull down the View menu, choose Toolbars, and see if the Address Bar option is checked; if so, click Address Bar to turn it off.

3. Pull down the View menu and see if the Status Bar option is checked; if so, click Status Bar to turn it off.

4. To turn the toolbars back on, pull down the View menu, select Toolbars, and click the toolbars to turn them back on.

5. To turn the status bar back on, pull down the View menu and select Status Bar.

6. Another way to create more screen space is to click the IE browser's full-screen button, which is the F11 function key. To return to normal view, press F11 again. This full-screen option is also found on the View menu.

Managing Your Web Browser's Cache

When you surf the Web, your browser keeps copies of the most recently visited Web sites in a place on your hard disk called the **cache** (pronounced *cash*). As you navigate back and forth around the Web and revisit one of the sites in the cache, your browser checks to see if the timestamp on the Web site has changed since your local copy was cached. If the site has not changed, the browser redisplays the site from the cache instead of downloading it again. Thus the cache speeds your use of the Web and reduces traffic on the Net.

If you want to increase the number of pages your cache can hold, you can change the size and location of the browser's cache. You can also purge (i.e., delete) the cache, which you might want to do if you have been reading sensitive information that you would not want someone else using your computer to find. Purging the cache can also fix problems when Web pages do not work properly, especially Web pages with Java, for which purging the cache causes the Java to reload. To manipulate your cache in the IE browser, follow these steps:

1. Pull down the Tools menu and choose Internet Options; the Internet Options dialog appears.

2. If the General tab is not already selected, click the General tab.

Settings

Check for newer versions of stored pages:
- ○ Every visit to the page
- ○ Every time you start Internet Explorer
- ● Automatically
- ○ Never

Temporary Internet files folder

Current location: C:\Documents and
Settings\Administrator\Local
Settings\Temporary Internet Files\

Amount of disk space to use:

[124 ▲▼] MB

[Move Folder...] [View Files...] [View Objects...]

[OK] [Cancel]

3. The Temporary Internet Files group contains your cache controls. Click the Settings button to make the cache settings appear, as shown to the left.

4. You can change the amount of your hard disk that is used for the cache by dragging the slider. Do not change this unless you're sure you want to modify this setting; most users never need to change this.

5. To move the cache to a different folder, click the Move Folder button. Do not do this unless you know what you are doing. Most users never need to change the location of the cache.

6. To view the contents of your cache, click the View Files button. This opens a file window, which you can close when you are done viewing the file window's contents.

7. Click OK to close the Settings dialog.

8. To purge the cache, click the Delete Files button in the Temporary Internet Files group.

9. Click OK to close the Internet Options dialog.

Advanced Browser Settings

IE comes with scads of settings that let you adjust all kinds of things. Earlier in this chapter, for example, you learned how to set the home page and change the browser's cache settings. Here, we take a look at advanced settings that affect how the browser works behind the scenes.

To reveal the advanced settings, you pull down the Tools menu and choose Internet Options. When the Internet Options dialog appears, you click the Advanced tab to reveal the advanced options. There are so many advanced options that you will see a scrollbar that you can move down and up to reveal all the settings. Some of the settings are self-explanatory. The setting that says "Automatically check for Internet Explorer updates," for example, is self-explanatory. If you check it, the browser will automatically check to see if newer versions or security patches are available. If you do not check this option, you'll need to run Windows Update to check for updates. You can run Windows Update by pulling down the Tools menu and choosing Windows Update.

Some of the other options will not make as much sense until you complete the later chapters in this book. In the Accessibility section, for example, the option to always expand ALT text will not make sense unless you know what the ALT tag does. In Chapter 9, "Making Web Pages Accessible," you will learn that the ALT tag creates alternate text, which is an accessibility feature that does not otherwise appear unless the user mouses over the image that has alternate text. Chapter 9 teaches how to create alternate text and experience how it works onscreen.

Many of the advanced options are there for security reasons, to help protect you from downloading viruses, worms, Trojans, or other kinds of Internet attacks. The option to warn about invalid site certificates, for example, is a setting you will want to leave on. You will learn about certificates and other advanced security settings in Part III, Networking Fundamentals.

Resetting the Browser Settings

Should a situation arise in which you want to reset the browser to its factory settings, IE has a feature built right in to handle this. Follow these steps:

1. Pull down the Tools menu and click Reset Web Settings.

2. The Reset Web Settings dialog appears as shown here.

3. If you do not want to reset the home page, click the box to unselect the option that resets your home page.

4. Click Yes to reset the browser settings, or click No if you decided not to do it.
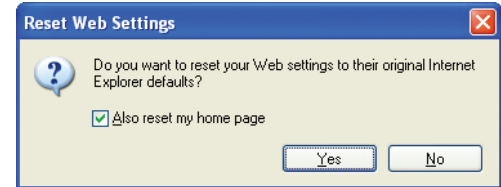
Wireless Web Browsing and the Wireless Application Protocol (WAP)

The **Wireless Application Protocol (WAP)** was invented to provide mobile telephone users with a way of accessing the Internet by routing requests through a WAP server that translates Web pages into a format appropriate for display on mobile phones. Depending on the capabilities of the phone being used, the WAP server may strip off the graphics and send to the phone only the textual portions of the Web page. The text is formatted according to the rules of a markup language called WML, which stands for **Wireless Markup Language**.

As this book goes to press, mobile phones are coming out with multimedia capabilities that will diminish the need for a WAP server. As the phone takes on more of the capabilities of a personal computer, the need for translating the Internet's TCP/IP signal into a specially formatted WAP signal will diminish. To learn more about the evolving mobile Internet technologies, go to www.openmobilealliance.org. To see how a Web site will appear when viewed on a mobile phone via WAP, go to www.gelon.net and use the Wapalizer. Type in the URL you want to view, and then click the Wapalize button to see how the site will appear on the phone.

Handling Multimedia Objects, Plug-ins, and Viewers

As defined in my *Multimedia Literacy* textbook, "**multimedia** is the use of a computer to present and combine text, graphics, audio, and video with links and tools that let the user navigate, interact, create, and communicate" (Hofstetter, 2001:2). More simply stated, multimedia brings the Web to life with stereo sound, colorful movies, and alluring animations. To hear the sound or see the video on a Web page, your Web browser must be configured to handle the multimedia resource contained on the Web page. Multimedia is an emerging technology that is undergoing a lot of research and development. As a result of this research, there are a lot of different ways to do multimedia.

Web browsers use a clever approach to handling this diversity. First, the browsers have built-in support for the most common kinds of multimedia.

You do not need to do anything special to get these to work as long as you have a multimedia computer that is capable of making sound and showing movies. Second, multimedia companies make plug-ins and add-ins that install inside the browser to play their company's brand of multimedia files. Third, some browsers enable you to define so-called helper apps that the browser launches to handle other kinds of multimedia files.

This chapter shows you how to do all three kinds of multimedia browsing. You will learn how to use built-in support and define helpers for file types that are not built in. You can go to this book's Web site to download the most popular plug-ins and add-ins for handling proprietary multimedia file types. Then you will be ready to visit some of the hottest multimedia Web sites in the world.

Built-In Browser Support for Multimedia

The first browsers had no support for multimedia built in. Everything had to be handled through a so-called **helper app**, an application the browser launches to help it handle something for which a player is not built in. Today, the trend is for browsers to contain built-in support for the most common multimedia file types.

Audio Controls

Internet Explorer comes preset to play audio through the Windows Media Player shown in Figure 2-6. If you want to install the latest version, go to www.microsoft.com/windows/windowsmedia and follow the link to download Windows Media Player. To find out whether your browser is configured to use the Windows Media Player, you can simply browse to some audio to find out what application launches to play it. On this book's Web site, you'll find an example of an audio file you can play. It is a waveform audio file of me greeting you. To hear this greeting, go to Chapter 2 of the Web site and click the link to my audio greeting. If the Windows Media Player is configured to play your audio, you will get controls like those displayed in Figure 2-6. Another popular player is Apple QuickTime. If your browser is configured to play audio via Apple QuickTime, the controls will appear as illustrated in Figure 2-7.
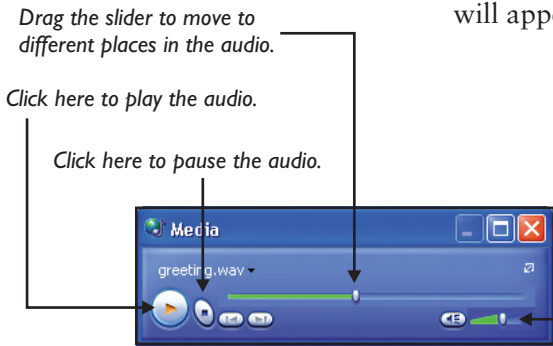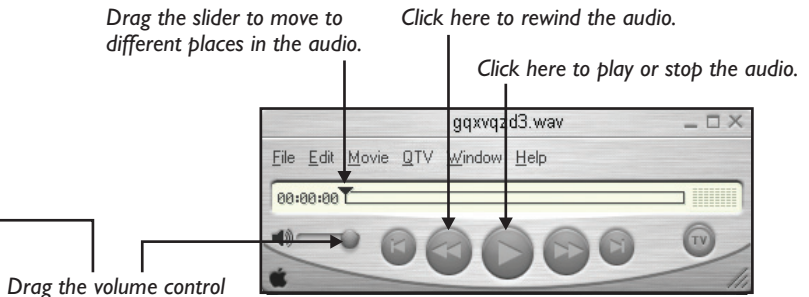
Drag the slider to move to different places in the audio.

Click here to play the audio.

Click here to pause the audio.

Drag the slider to move to different places in the audio.

Click here to rewind the audio.

Click here to play or stop the audio.

FIGURE 2-6   *Windows Media audio controls* ■

Drag the volume control to make the sound louder or softer.

FIGURE 2-7   *QuickTime audio controls* ■

Click here to
play the video.

Click here to stop the video.

Drag the slider to move to
different places in the video.

Drag the volume control to make
the sound louder or softer.

Click here to
adjust the sound.

Click here to
skip back.

Click here to play or
pause the video.

Click here to
skip ahead.

Drag the slider to move to
different places in the video.

FIGURE 2-9

Apple's QuickTime
movie controller

Video Controls

The IE browser is preset to play video by the Windows Media Player, illustrated in Figure 2-8. Another popular video player is QuickTime for Windows, shown in Figure 2-9. The next part of this chapter teaches you how to configure the IE browser on Windows computers to play the video via QuickTime for Windows, should you wish to do so. You can download the latest version from www.apple.com/quicktime.

Step-by-Step 2-1

Windows Filename Associations for Internet Explorer

In the Windows operating system, Microsoft Internet Explorer uses the Windows filename associations to determine what application will be used to handle different multimedia file types. When you trigger the playing of a multimedia file, your browser looks to see what application is associated with that type of file on your computer, and the associated app then plays the file. If you want to inspect or change the filename associations on your computer, you can do so with the Windows Explorer. Follow these steps:

Step 1   Get the Windows Explorer 🔍 running, pull down the Tools menu, and choose Folder Options.

Step 2   Click the File Types tab, scroll the list to find the filename whose association you want to see, and click once on the filename to select it. Figure 2-10 shows the setting for an MPEG movie file.

Step 3   To change the filename association, click the Change button; the Open With dialog appears.

Step 4   In the Open With dialog, click one of the recommended programs or click the Browse button to choose a different program.

Step 5   Make your changes, and then click OK. Do not make any changes, however, unless you are sure the program you are choosing can handle this type of file properly. In this example, the QuickTime player would be a reasonable choice if you want MPEG movies to play in QuickTime instead of in Microsoft Media Player.
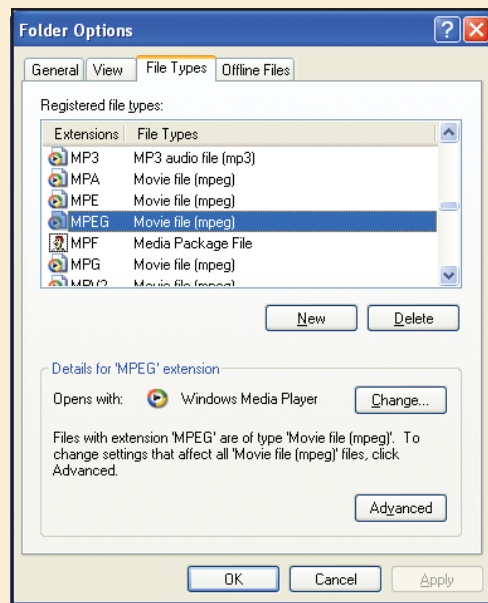
FIGURE 2-10   *When you click to inspect the filename association of the MPEG movie file type, you can see what application is configured to handle it now. If you want to change this handler, click the Change button and follow the onscreen instructions.* ■

Streaming Media

As you learned in Chapter 1, the process of digitalization is changing the world by converging the world's communications media into a digital data stream that can be delivered over the Internet. No matter what you want to say, and no matter how you want to say it—text, speech, graphics, animations, music, video—it can all be digitized and published to the Web. When a user clicks to access your content, it gets delivered over the Internet to the user's Web browser.

When content gets digitized, however, some of the media create larger data files than others. Consider this paragraph, for example. If you type it into a word processor, this paragraph takes up 989 bytes of file space. That is a relatively small amount of data that can be transmitted over the Internet very quickly. Because it is a small amount of data, we say it is low bandwidth, meaning not much time or space is needed to send it over the Web. When the user clicks to see the paragraph, the text appears very quickly. If you read this paragraph aloud and record it with your computer's microphone, on the other hand, the resulting audio file is many times larger. It has higher bandwidth, and it takes longer to transmit over the Internet. Add a webcam to record video while you speak into the microphone, and the file becomes very large. Its bandwidth is now so high that the user may lose interest while waiting for the video to arrive and the content to start playing.

Streaming was invented to avoid this kind of delay. Multimedia content creators are using streaming to deliver high-bandwidth media quickly and efficiently over the Internet. This enables you to visit Web sites where audio

and video recordings are standing by, ready to begin streaming on demand to your computer as soon as you click them. In addition to playing prerecorded streams, you can also visit real-time sites, such as news channels and radio stations that are playing right now, using streaming media to deliver what is happening right now to your desktop.

What Is a Stream?

A **stream** is a real-time feed from an audio or video source, encoded in such a way that the media can begin playing steadily without making users wait for the entire file to download to their computers. Streaming media, therefore, is the simultaneous transfer and display of the sounds and images on the World Wide Web. Streaming media enables users to watch and listen to a movie while it is being sent to their browsers, for example, instead of waiting minutes or hours to download and then play it.

Streaming media can also be used to broadcast real-time events over the Internet. **Webcasting** is the term used to describe the simultaneous broadcast of a live event over the Web. Webcasting software gives you the option to make an archive, which means to save the Webcast in a computer file from which you can replay the broadcast sometime after the event. On the Web, the commercial news sites such as cnn.com, msnbc.com, cbs.com, and abc.com make news archives available. When you click to play an archive, you see the same video as the audience that viewed the stream live.

When this book went to press, the three most popular platforms for streaming media were Apple QuickTime, Microsoft Media Player, and RealNetworks. All three of these products plug in seamlessly to the leading Web browsers.

Plug-ins

A **plug-in** is a software component that adds functionality when installed into an existing computer application. The advantage of plug-ins over helper apps is that the plug-in usually gives you better integration of the media. Plug-ins normally make multimedia play in the browser's window, whereas helper apps often launch a separate window to play the file.

Apple QuickTime

One of Apple Computer's greatest gifts to the world is **QuickTime**, Apple's brand of multimedia. Originally for the Macintosh only, QuickTime is now one of the finest cross-platform tools available for multimedia creation and delivery. It plugs in seamlessly to Microsoft Internet Explorer, and it works on Windows as well as Macintosh computers.

The QuickTime player is free. For a modest fee, you can upgrade the free player to QuickTime Pro, which lets you edit audio and video clips as well as play them. To download either the free player or the more fully featured QuickTime Pro, go to www.apple.com/quicktime.

Microsoft Media Player

Microsoft is aggressively pursuing the market for streaming video and has created its own product line of streaming media servers. The player, which is free, is called the **Microsoft Media Player**. If you have Windows, there is probably a version of the Microsoft Media Player installed on your computer. To find out, click your computer's Start button, select Programs, and look under Accessories or Multimedia for the Microsoft Media Player. To check whether a more recent version is available, go to www.microsoft.com/windows/windowsmedia.

RealNetworks

RealNetworks is one of the best-known multimedia streaming companies on the Internet. Marketed under **RealOne**, which is the RealNetworks brand name, the two main families of products are RealOne Music and RealOne Player. True to its name, RealOne Music provides more than 75,000 songs by top artists plus more than 2,000 radio stations. RealOne Player adds moving pictures to the audio experience. Best of all, the basic player is free. According to RealNetworks, the RealOne Player can play more than 85 percent of the multimedia content on the Web.

The free RealOne Player includes the media player, a music jukebox, and a built-in media browser to play a wide variety of streaming media formats on the Web. The free RealOne Player does not include access to exclusive RealOne channels or programming, premium player features, or RealOne member services.

To start listening or watching live streaming content, go to www.real.com and follow the link to the Real Guide, which connects you to networks and channels that use the RealOne Player. If your computer does not have the RealOne Player installed or if your player is outdated, you will be prompted to install the latest version of the player. There is also a more fully featured version of the player called RealOne Player Plus, for which you pay a small fee to download.

To learn more about RealOne Player and RealOne Player Plus and to download the player of your choice, go to www.real.com and follow the link to free downloads. RealNetworks has proposed that its streaming protocol become an Internet standard. The name of the protocol is Real Time Streaming Protocol (RTSP). If you want the technical background, go to www.ietf.org/rfc/rfc2326.txt.

Flash

Flash is a very popular multimedia plug-in. Distributed by Macromedia, the Flash Player is freely downloadable from www.macromedia.com. According to Macromedia, the Flash Player is installed on more than 97 percent of the Internet's end-user computers. Macromedia Flash is so popular, in fact, that the Flash Player is built right into the latest browsers.

Web designers create Flash applications with a tool called Macromedia Flash MX Professional. Figure 2-11 shows that this tool uses a timeline
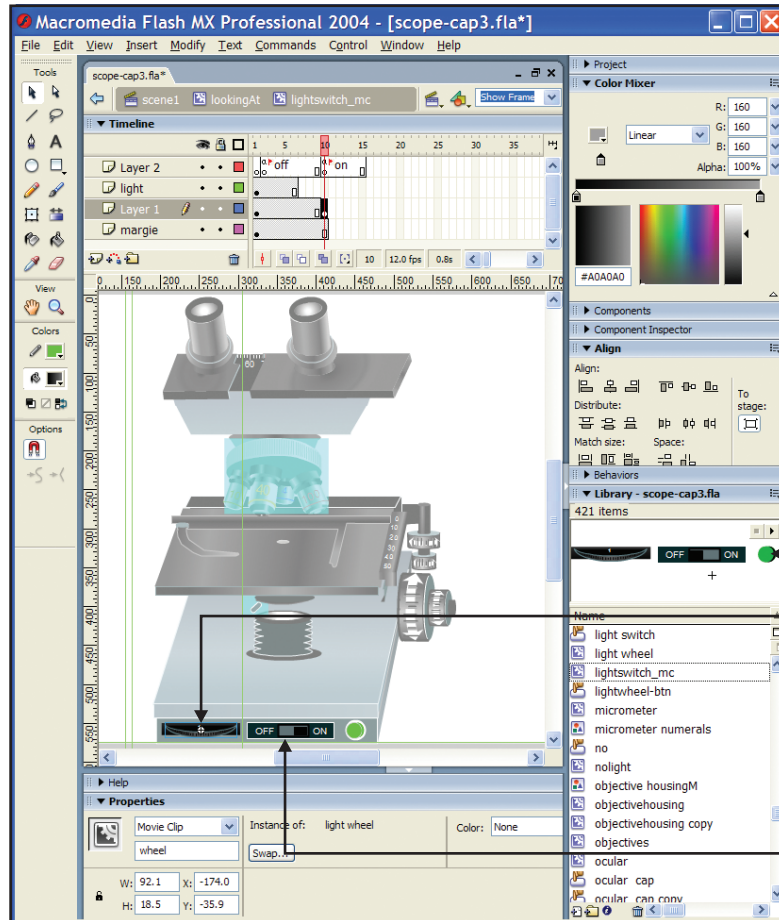
This action moves the switch, causes the little green light to glow or not glow, and causes other lights to appear elsewhere on the scope.

Drag this rheostat wheel to control the intensity of the light.

Turn the light on and off by dragging the switch or clicking the spot you want it to move to.

FIGURE 2-11 *Flash developer Becky Kinney created this light-switch animation for use in a microscope simulation at the University of Delaware. You can run this application by browsing to www.udel.edu/Biology/ketcham/microscope/scope.html. To contact Becky, send e-mail to becky@moonlightmultimedia.org. Her company's Web site has a section devoted to "Flash for Educators" at http://moonlightmultimedia.org/f4e, which offers free tools and templates.*

metaphor. Authors create rich media content by dragging media objects and behaviors onto the timeline. In addition to creating animated slides, movies, and sound tracks, the latest version lets authors import Adobe PDF documents, design Web forms, and use CSS to create a common style for the Flash plug-in and the surrounding Web page.

To experience some examples of award-winning Flash applications, go to www.macromedia.com, click Showcase, and follow the link to the Flash Showcase.

Browser Support for Plug-Ins

Both Netscape and Microsoft have special support for plug-ins. If you have Netscape Navigator, you can pull down the Tasks menu and choose About Plug-ins to find out what plug-ins are installed in your browser. Then you follow the links to Netscape's Index of Plug-ins to download other plug-ins you want.

If you have Microsoft Internet Explorer, pull down the Tools menu and choose Windows Update. This takes you to the Windows Update Center, which will take a look around your computer, see what options you have, and give you a list of new items you can add. Especially useful is the notification of new drivers that may be available for devices connected to your computer.

Security Risks

Every user needs to be aware that whenever you download code that executes on your computer, you run the risk of getting a virus that could cause serious problems on your PC. If you are downloading code from reputable vendor sites, such as Microsoft, Apple, and Macromedia, the chance of your getting a virus is highly unlikely. Downloading code from unknown sources, however, could open the door to trouble.

Even if the code you download is virus-free, it could contain back doors and loopholes through which malicious programmers called *crackers* could send you viruses or cause other problems on your computer. For example, a security hole in one of the major vendor's plug-ins allowed malicious Web page developers to create a movie that could read a user's e-mail messages and upload them to a server, without the user knowing anything about it. Instructions on how to do this were published on the Internet, where any malicious programmer could learn how to do it.

The vendors respond quickly to plug such loopholes by providing fixes called *patches*. To make sure you have the latest patches, check the download center for your brand of Web browser. If you have Microsoft Internet Explorer, for example, pull down the Tools menu and choose Windows Update.

Object Development and Runtime Environments

In computing, an **object** is a software entity that is programmed to perform certain tasks or behave in certain ways depending on the context in which it is used. Objects can be used on Web pages to provide dynamic content. A page that tells you what the current time is, for example, uses a Date object to determine the current date and time to print onscreen. You will learn how to use the Date object in the JavaScript Clock tutorial in Chapter 8. Objects can also be used to display animations onscreen and provide users with controls that can calculate, simulate, and illustrate real-time data onscreen.

Java

Java is an object-oriented programming language invented by Sun Microsystems. Its main advantage over other programming languages is machine independence. Instead of creating code that can run only on a specific machine (such as a Macintosh or a Windows PC), Java creates an intermediate code that can run on any computer that knows how to interpret it. As a result, Java runs under Windows, Macintosh, UNIX, Linux, and many other operating systems, such as the OS9 system used to program

set-top boxes for the Internet. Machine independence has made Java one of the hottest languages on the planet. For more information about the Java programming language, go to java.sun.com.

Java Applets

Java can be used to create a little application called an **applet** that can be transmitted over the Internet as part of a Web page. Applets bring Web pages to life in several ways. For example, scrolling tickers can move information across the screen. You can use a mouse to rotate three-dimensional objects that would otherwise appear flat on a static Web page. Active spreadsheets let users manipulate data right on the Web page.

With Java, Web pages can even contain graphics editors that enable users to create their own graphics. Applets can contain games, such as Hangman or Tic-Tac-Toe, or more complex simulations. By following this book's Web site link to the Tokamak Nuclear Reactor, for example, you can run the same nuclear reactor simulation that Princeton University scientists use to determine optimal settings for tokamak fusion reactors. Figure 2-12 shows how the tokamak applet lets you manipulate sliders that control the plasma density, heating power, and magnetic field. By letting you play with these parameters, the applet enables you to develop an intuitive feel for the process scientists go through in designing tokamak reactors. To explore a wide range of Web pages that use Java applets, go to java.sun.com/applets.

JavaScript

Developing applets in Java is time-consuming and requires advanced programming skills. Does this mean Web page programming is beyond the scope of the typical Web page author? No, thanks to **JavaScript**, a client-side object-based programming language that enables you to create dynamic Web pages without having to become a full-fledged Java programmer. JavaScript has become so popular that virtually all browsers support it, including IE, Mozilla, and Safari. Thus, JavaScript has become the best way for nonprogrammers to create dynamic Web pages that will work in the latest versions of the browsers. JavaScript runs differently on different platforms, however, so you need to test any scripts you create with any browsers that will be used to execute them. Chapter 8 steps you through a little tutorial to get you started with JavaScript.
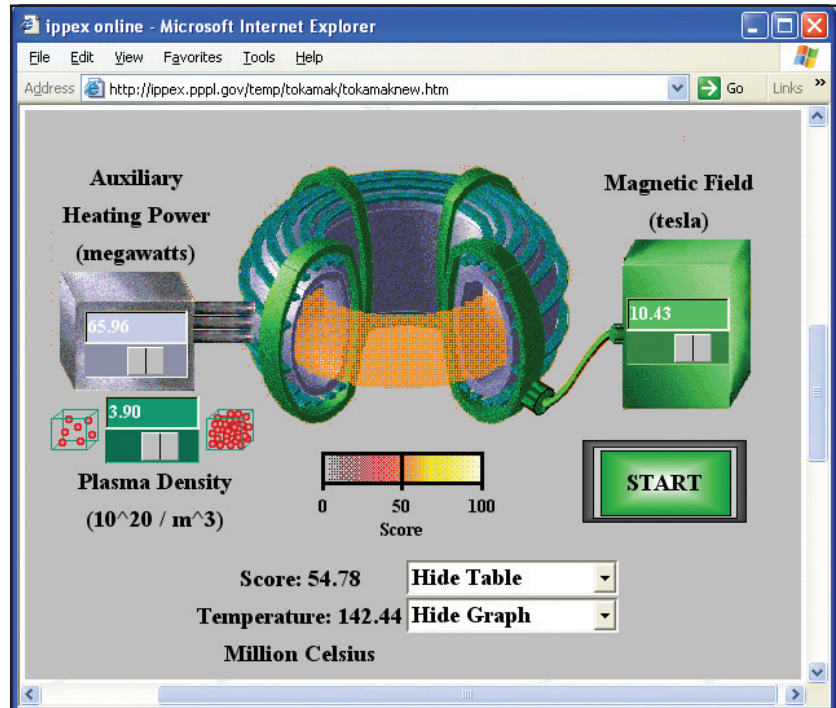

FIGURE 2-12 *A fascinating virtual field trip awaits you at the Internet Plasma Physics Education eXperience (IPPEX) online, where the tokamak nuclear reactor applet lets you manipulate sliders that control the plasma density, heating power, and magnetic field. By dragging the three sliders and clicking the Start button, you can observe the effects different settings have on the reaction onscreen and thereby discover how these parameters interact.* ∎

For more information about the origins and applications of JavaScript, follow this book's Web site link to JavaScript Developer Central. There you will find sample code for creating rollovers, graphs, menus, dialogs, calendar pop-ups, and layering effects. Figure 2-13 shows one of the rollover effects you can create with JavaScript. For even more JavaScript resources, go to www.cnet.com and search for JavaScript.

C#

The C# (pronounced C sharp) programming language is the latest in a series of languages that have progressed from the original C through versions called C+ (pronounced C plus) and C++ (C plus plus). The C# language was invented by Microsoft for use in the .NET (pronounced dot net) Framework, the software architecture that underlies the Windows 2003 operating system. You can use the C# language to create native Windows applications as well as Web applications that use the browser window as the display surface.

J#

J# (pronounced J sharp) is Microsoft's version of the Java programming language. Like C#, the J# language was created for the .NET Framework. A development environment called Visual Studio .NET provides programmers with a powerful set of tools for building applications for Microsoft Windows, the Web, and mobile devices. To learn more about Visual Studio .NET, go to msdn.microsoft.com/vstudio.

JScript

True to its name, Microsoft's JScript language is very similar to JavaScript. If you know one, it is easy to learn the other. Where the two languages differ, however, is in where they run. As you learned earlier in this chapter, JavaScript is a client-side language, which means the scripts run in the browser itself. JScript, on the other hand, was invented as a server-side lan-

FIGURE 2-13 *A rollover effect created with JavaScript at the Library of Congress. To try this effect, go to www.loc.gov and move your cursor over the menu choices. Notice that the photo on the right changes as you mouse over the choices.* ■

guage, which means the scripts run on the server. On the server, scripts can access databases and file systems that, primarily for security reasons, are not accessible in JavaScript. JScript began as one of Microsoft's Active Server Page (ASP) languages. There is also an ASP.NET version that is called JScript.NET.

VBScript

Visual Basic (VB) is one of Microsoft's legacy languages. It lives on in the form of VBScript, which is one of the ASP scripting languages, and VBScript.NET, which is the .NET Framework version. You can use VBScript to program virtually anything you can script in JScript, and for that reason, my *Advanced Web Design* textbook splits into columns to show tutorial examples in both JScript and VBScript.

ActiveX

ActiveX was begun by Microsoft as a way to create and distribute information over the Internet, using existing software applications and data. At first, developers were somewhat reluctant to embrace the ActiveX technology because it was not an open standard, as was Java. In 1996, Microsoft released ActiveX to The Open Group, an industry consortium experienced in promoting cross-platform technologies. As a result, ActiveX is widely accepted by Windows developers across the industry today.

ActiveX involves three concepts: controls, scripts, and documents. ActiveX controls enable a wide variety of applications and content to be embedded in HTML documents. Through Microsoft's object linking and embedding technology, you can use ActiveX controls to incorporate any supported data type directly into the window of an ActiveX-enabled Web browser such as the Microsoft Internet Explorer. More than a thousand ActiveX controls are available, from multimedia sound and video players to spreadsheets, charts, graphs, calculators, and paint programs. The Microsoft Internet Explorer itself is an ActiveX control that can be embedded inside other applications. For more information, follow this book's Web site link to ActiveX. To see dozens of controls you can download and use, follow the link to the CNET ActiveX Control Library.

Objects and Security Issues

Because embedded objects cause software to be downloaded to your computer at runtime, you run the risk of downloading viruses, worms, and Trojans. A **virus** is malicious or unwanted code that installs itself on your computer without your knowledge by hiding inside other programmed objects. Viruses are dangerous because they can consume all the memory on your computer, destroy data, and spread across the network to other computers that are connected to yours. A **worm** is a special kind of virus that can replicate itself without hiding inside other objects. A **Trojan** (also called a *Trojan horse*) is a malicious application that masquerades as a desired object that you download knowingly to your computer. When the Trojan executes, it can take over or destroy the data on your computer.

The Story of the Trojan Horse

The term Trojan horse comes from a story in Homer's Iliad *in which the Greeks gave a giant wooden horse to their enemies, the Trojans, who thought the horse was a peace offering. After the Trojans brought the horse inside their city walls, however, Greek soldiers sneaked out of the horse's hollow belly and opened the city gates, allowing the rest of the Greek army to come in and capture the city of Troy.*

The next part of this chapter covers the steps you can take to configure the browser's security settings to minimize the risk of downloading these kinds of attacks.

Configuring Browser Security

Anyone who has been the victim of an Internet attack will understand why browser security is important. Attackers who gain access to your computer can corrupt or destroy data, rendering the computer useless except perhaps as a very expensive paperweight. Over the years, I have been the victim of two attacks so severe that my computer had to be totally reformatted and rebuilt from the ground up. Thankfully, no data was lost, because I have learned to keep backups of all essential data. Everyone reading this book must also form such a religious habit of backing up all data, anything you wouldn't want to lose. Even if you have complete backups, however, you can lose a lot of precious time if you need to rebuild a corrupted system. That is why the browser has built-in ways of helping to safeguard against these kinds of attacks.

Step-by-Step 2-2

Configuring Security Zones

One of the ways the browser helps you safeguard against attacks is by letting you configure different security settings for different zones. On the Internet, a **zone** is a predefined range or selection of Web sites or addresses. The IE browser lets you configure different security settings in four different zones. As illustrated in Figure 2-14, these four zones are called

- **Internet,** which contains all Web sites you haven't placed in other zones

- **Local intranet,** which contains all Web sites on your organization's intranet

- **Trusted sites,** into which you place Web sites you trust not to damage your computer or your data

- **Restricted sites,** into which you place Web sites you believe could cause damage to your computer or your data.

To set the security settings for any one of these zones, follow these steps:

Step 1   Pull down the IE Tools menu, choose Internet Options, and click the Security tab to make the security zones appear, as illustrated in Figure 2-14.

Step 2   Click the name or icon of the zone you want to change.

Step 3   To set the security level to Microsoft's recommended settings, click the Default Level button.

Step 4   To change the security level, move the slider up to make the settings more restrictive or down to make the settings less restrictive. If you move the slider lower than Microsoft recommends, you will get a warning to that effect.

Step 5   When you are in the Local intranet, Trusted sites, or Restricted sites zone, the Sites button is activated. To put specific sites into one of those zones, click the Sites button when you are in that zone and follow the onscreen instructions.

Step 6   If you want to customize the IE security settings, you can do so by clicking the Custom Level button to bring up a detailed list of security settings. To change a setting, click to select the option you want and then click OK to make the changes take effect or click Cancel to ignore the changes.
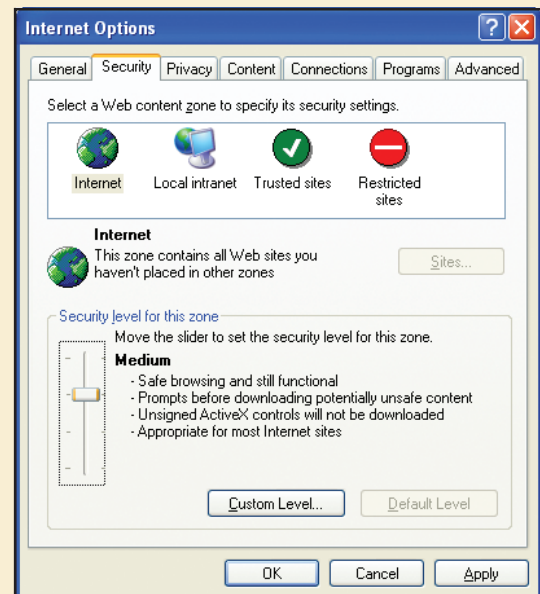
FIGURE 2-14   *When you pull down the IE Tools menu, choose Options, and click the Security tab, you can inspect or change the security settings for the four IE security zones.* ∎

Finding Things with Search Engines

The Internet is the richest source of information on the planet. According to Bergman's (2001) white paper on the deep Web, more than 100,000 searchable databases exist, containing nearly 550 billion documents, 95 percent of which are publicly available.

Just about anything you could ever want to know is available online. Especially for students and scholars conducting research, the Internet is a fantastic resource for finding out what has been done in your field.

Although so much information is available online, finding what you want to know is not always easy because knowledge gets organized and stored in different ways. To find what you want, you need to understand how the different kinds of search engines work. Then you will be ready to conduct a search that has a better chance of finding what you seek.

Subject-Oriented Searching of Directories

When you research a topic, it is wise to begin by conducting a subject-oriented search of one or more of the Web's directories. This will tell you how much information is available about your topic as a subject that other people have written about. The subject-oriented directories use a combination of human beings and robots called **spiders** that search the Web continually, organizing what is found into a hierarchical directory of topics. When you conduct a subject-oriented search, the search engine searches this directory and provides you with a list of items related to your topic. To retrieve the item, you simply click it.

Step-by-Step 2-3

Searching Yahoo!

As this book goes to press, Yahoo! is the most popular subject-oriented directory. Its Web address is www.yahoo.com. There is also a version for kids at www.yahooligans.com, whose directory indexes materials appropriate for the needs and interests of children. To perform a Yahoo! search, follow these steps:

Step 1   Point your Web browser at www.yahoo.com; the Yahoo! home page appears.

Step 2   If you want to search all of Yahoo!, type your search term(s) into the blank search field and click the Search button.

Step 3   If you want to search within a Yahoo! subject area, scroll down through the subjects listed on the Yahoo! home page, and click the subject area you want—the Yahoo! subject area page appears.

Step 4   If subtopics are listed on the subject area page, scroll down through the subtopics and select the one you want. Repeat this process until you have narrowed the subject area of your search.

Step 5   When you are ready to conduct a search, type your search term(s) into the blank search field.

Step 6   Click the option to search all Yahoo! or just the subject area you have chosen.

Step 7   Click the Search button; Yahoo! performs the search and displays the items that match your search terms.

Step 8   Scroll down through the matches to see what Yahoo! found. All the matches are hot-linked; to see an item, click a highlighted word.

Step 9   If there are more matches to be displayed, you will find "Next 20 matches" printed at the bottom of the search results. Click "Next 20 matches" if you want to see more.

Step 10 By default, Yahoo! combines your search terms with the Boolean AND, which means you will get a match only when all the search terms are found together in an item. If you want a Boolean OR done instead, click the Advanced Search option that you see printed next to the Search button.

Step 11 In addition to letting you perform the Boolean OR option by searching for "any of these words," the advanced options also let you search for an exact phrase. I find this very helpful in troubleshooting technical problems. If some process gives you a cryptic error message, for example, you can use the Yahoo! exact phrase option to search for that reported error. Chances are someone else has already encountered this error and has written on the Internet about how to solve the problem.

Keyword Searching

Like subject-oriented directories, keyword search engines have spiders that are constantly combing the Web and feeding information into a database. Instead of organizing the Web according to subject areas, however, keyword search engines let you search for keywords in documents, regardless of the subject of the documents. Therefore, keyword search engines are likely to find more than subject-oriented searches, but what is found may not be as relevant to your subject.

AltaVista

The AltaVista search engine was invented by the Digital Equipment Corporation as the Web's first full-text keyword search engine. Now a freestanding company, AltaVista's Web address is www.altavista.com. AltaVista has been awarded more search-related patents than any other company. According to Digital, AltaVista is the fastest search service available (0.4–0.5 seconds average response time), with the most up-to-date content (refreshed every 28 days). When this book went to press, AltaVista's index included 350 million Web pages.

Because you are likely to get thousands of hits when you search AltaVista for a keyword, AltaVista sorts the hits according to the relevance or level of importance of the information found. This is done through statistical analysis that organizes pages with similar content into groups.

While conducting searches at the AltaVista site, you may notice that the commercial ads that appear onscreen often relate to your keywords. This is done by matching the content of the ads to the concept analysis of your keywords. This kind of concept mapping is used at many commercial search sites. Advertisers pay to have their ads come onscreen when someone conducts a search in the product's concept area.

Advanced Boolean Searching

Boolean logic is named after the nineteenth-century mathematician George Boole, who invented a form of algebra in which all values reduce to either TRUE or FALSE. The Boolean operators AND, OR, and NOT are

widely used in computer programming and in search engines to construct queries that narrow a search to find precisely what you are looking for. The simplest form of a Boolean query uses AND to find things that contain two items that must be found together in the same document, such as

> hot AND cold

Such a search will find fewer documents than the following search, which is less exclusive:

> hot OR cold

The opposite of that search is:

> hot AND NOT cold

More complex searches can be done by using parentheses to create more complex queries:

> sunny AND NOT (hot OR cold)

To search for exact phrases, you can use quotation marks, as in

> sunny AND NOT ("too hot" or "too cold")

Try This!

Conducting a Boolean Search

Learning how to conduct a Boolean search will make you very powerful because the Boolean logic enables you to narrow your search down to find just what you are looking for. The best way to learn to do a Boolean search is to simply try one. Follow these steps:

1. Browse to www.altavista.com; the AltaVista home page appears.

2. Click the Advanced Search option to make the advanced search screen appear.

3. Click the option to search with a Boolean expression.

4. In the Boolean Expression field, type:
   "Martin Luther"
   Be sure to type the quote signs, which force the search engine to look for the words *Martin* and *Luther* appearing next to each other. Click the Find button, and make note of the number of hits you get.

5. In the Boolean Expression field, type:
   "Martin Luther" AND NOT "Martin Luther King"
   Click the Find button, and make note of the number of hits you get. Can you explain why you get fewer hits than when you searched for "Martin Luther" by itself?

6. In the Boolean Expression field, type:
   "Martin Luther King" AND ("I Have a Dream" OR "Letter from a Birmingham Jail")
   Click the Find button. Notice that this search finds documents mentioning Martin Luther King and either his famous *I Have a Dream* speech or his *Letter from a Birmingham Jail*.

7. Almost anything in the world you want to know is retrievable once you develop skill at using the advanced search syntax. For more information about advanced searching, click the AltaVista Help option and follow the link to free-form Boolean queries using special search terms.

Concept Searching

Some users are better at keyword searching than others. Finding the right combination of keywords and logical operators (AND, OR, NOT) to get a search engine to find the kind of information you seek can be time-consuming and tedious. Concept-oriented search engines can help users who have difficulty with keyword searching.

Excite

Excite is a concept-based search engine that you will find at www.excite.com. It uses a search technology called Excite Precision Search to analyze more than 250 million Web pages in the Excite search index. Evaluations of link authority and Web page popularity combine with text indexing, semantic matching, and link analysis to select the most relevant and popular Web pages that match your search query.

But Excite is much more than a search engine. It also provides customizable newsfeeds and stock reports, shopping and weather, live chats and bookmarks. Quick Tools include a personal address book, a calendar, horoscopes, maps/directions, and yellow pages. Excite also offers a free start page that includes e-mail, clubs, chat, and your own personal portfolio. Perhaps even more than being a search engine, Excite wants to become your personal portal to the Internet. To check out its wide range of Internet services, go to www.excite.com.

Google

The Google search engine adds a new twist to searching by using an automated method that ranks relevant Web sites based on the link structure of the Internet itself. When you conduct a search, Google sorts the results in order of importance, based on how the site is linked to and referred to by other sites. The assumption is that the more a site is linked, the more of an authority it is. Google certainly takes a lot of Web pages into consideration; when this book went to press, Google indexed more than three billion Web pages. To search them, go to www.google.com.

Metasearching

By now you may be getting overwhelmed by the number of search engines and the subtle distinctions in how they work. **Metasearching** provides an alternative to trying many individual search engines to find the information you seek. Metasearching is the searching of searching, which you perform with a metasearch engine that invokes the other search engines automatically. Behind the scenes, the metasearch engine conducts different kinds of searches for you, collates the results into one list of hits, and reports back to you.

MetaCrawler

MetaCrawler conducts searches by sending your queries to several Web search engines, including AltaVista, FindWhat, Yahoo!, Ask Jeeves, LookSmart, Google, About, and Overture. MetaCrawler organizes the results into a uniform format and displays them in the order of the combined confidence scores given to each reference by the services that return it. You also have the option of scoring the hits, enabling what is found to be sorted in a number of different ways, such as by date, locale, and organization. MetaCrawler supports the advanced search syntax explained in the section on Boolean searching. MetaCrawler is on the Web at www.metacrawler.com.

Dogpile

Research attorney Aaron Flin created Dogpile when he became frustrated with finding too few results with subject-oriented directories such as Yahoo!, and then trying keyword search engines such as AltaVista that returned 30,000 or more documents in response to the same query. Dogpile is a metasearch engine that sends your Web queries to the Internet's top search engines, including Google, Yahoo!, AltaVista, Ask Jeeves, About, FAST, FindWhat, and LookSmart. Dogpile also searches FTP sites, newsfeeds, yellow pages, white pages, classifieds, auctions, audio, and image files. You can find Dogpile on the Web at www.dogpile.com.

CNET Search.com

CNET's Search.com is a metasearch engine that searches more than 800 engines, including Yahoo!, AltaVista, Magellan, Lycos, Inktomi, Direct Hit, and Snap. A special feature is the channel, which lets you customize the search engines used to look for information in different content areas. Channels include categories such as automotive, business, computing, entertainment, government, music, people, shopping, and travel. To search these channels and more, go to www.search.com.

Human-based Searching

When you do not have time to wade through the tens of thousands of documents that a keyword search engine can return in response to a search, you may wish to consider using a human-based search service. A person skilled in searching published information sources, proprietary databases, and the Internet will find an answer and e-mail you the results.

Ask An Expert

Pitsco's Ask An Expert site is a free searching service that connects you to hundreds of real-world experts, ranging from astronauts to zookeepers. You can ask questions in 14 different categories, including Science/Technology, Animals, Education, Career/Industry, Health, Internet/Computer, Recreation/Entertainment, International/Cultural, Resources, Money/Business, Arts/Humanities, Law, Home Improvement, and Repair/Trades.

The answers come to you from real-world experts who have volunteered to answer your questions. The Ask An Expert site is on the Web at www.askanexpert.com.

Scholarly Searching

One of the problems with searching for information on the Internet is that the Web is a public resource. Anyone can create a Web page about any topic, regardless of how much (or how little) the Web page author knows about the subject. When you use a search engine such as AltaVista to find information about that topic, the results contain a mix of pages written by people who know a lot about what they are talking about along with people who may not know much and may even write misleading or false information.

One way of filtering out the bad information is to use a search engine that restricts itself to scholarly information that has been published in refereed journals.

ERIC

ERIC stands for Educational Resources Information Center. The ERIC database includes more than a million abstracts of articles from education journals and other scholarly documents, including books, conference proceedings, symposia, studies, and tests. Figure 2-15 illustrates accessing ERIC at www.eric.ed.gov, where you can search the database by keyword, author, title, or topic. If you are unsure of your topic, you can use the ERIC thesaurus to select a topic.

About.com

Formerly known as The Mining Company, About.com takes a unique approach to providing access to scholarly sources. It hires real scholars to serve as guides in more than 700 subject areas. (I was invited to be the educational technology guide, for example, but had to decline due to other writing commitments, such as this book.) The guides at About.com organize the links, keep them updated, write new articles, host discussions and chats, and answer questions online. To find out more and to search your subject area, go to www.about.com.
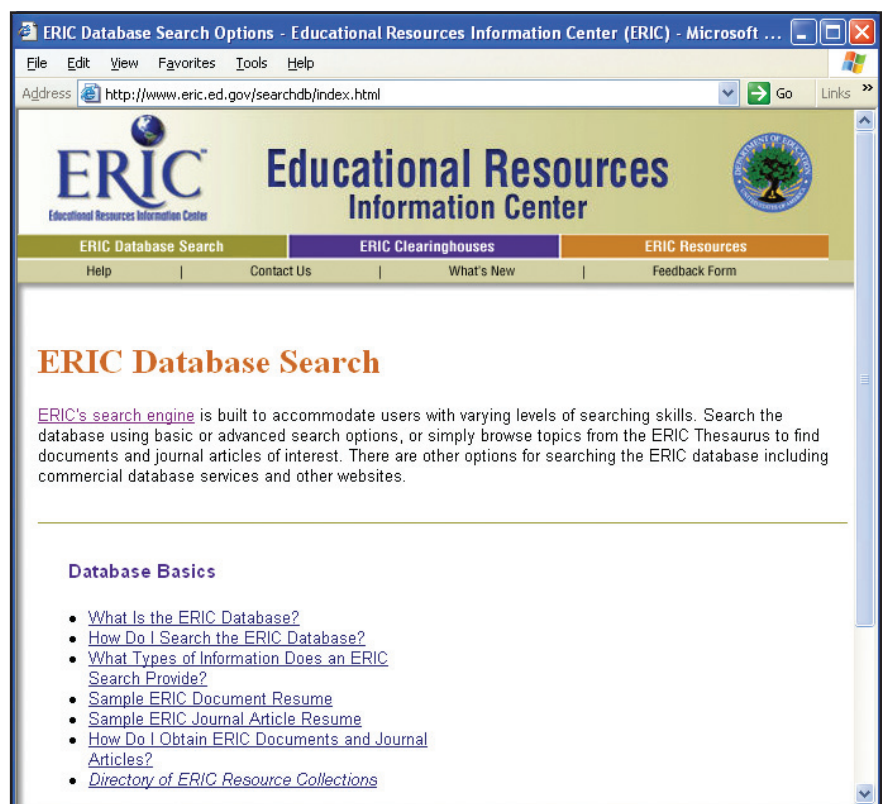

FIGURE 2-15 *The ERIC database at www.eric.ed.gov lets you freely search the world's largest source of educational information, which contains more than a million abstracts of journal articles and education documents.* ■

Britannica.com

Britannica.com is a Web-based knowledge and learning center that includes the complete, online version of the *Encyclopaedia Britannica.* The obvious advantage of the online version is that you have access to all the latest information at once, without needing to conduct separate searches through the 32 printed volumes and the annual *Book of the Year.* The online version also includes hundreds of articles not found in the printed encyclopedia, including selected articles from *Newsweek, Discover,* and *The Economist.* There are also thousands of links to Web sites selected by Britannica editors.

To search the *Encyclopaedia Britannica* online, go to www.britannica .com. Although you can search the encyclopedia for free, you must pay a subscription fee to view the full text of encyclopedia articles over the Internet. Free-trial subscriptions are available that permit you to try out the service before you begin paying for it.

XanEdu

XanEdu offers access via the Web to thousands of publications indexed by ProQuest, a global leader in the collection, organization, and distribution of value-added information to researchers, faculty, and students in libraries, government, universities, and schools in more than 160 countries. In addition to providing a search tool for the entire ProQuest database, XanEdu has created a ReSearch Engine for General Studies, Education, and MBA business majors. These three ReSearch Engines provide access to thousands of the world's best newspapers, magazines, and scholarly journals. The education engine keys these materials to education standards and textbooks. A special section on "Teaching as a Profession" helps teachers keep up with the latest news and issues including school reform, labor issues, and certification standards. For more information, visit www.xanedu.com, where you can get a free trial subscription to try out the service.

Multimedia Searches

Multimedia is becoming increasingly popular on the Internet. You can find millions of pictures, audio files, animations, and videos to play on your computer. The challenge is to find the ones you are interested in. Happily, most of the search engines provide ways for you to search for multimedia.

Lycos Multimedia

At the Lycos Web site at www.lycos.com, you can click the multimedia option, or you can go directly to multimedia.lycos.com. After you enter your keywords, select the kind of media you are looking for, and press the Search button, the Lycos search engine returns a list of pictures, movies, streams, or sounds dealing with your topic. You then preview the objects and download the ones you want.

If your intended use of a picture or a sound found on the Internet is not a fair use, you will need to seek copyright permission by contacting the administrator of the Web site where the object was found. Chapter 4 provides detailed information and guidelines regarding the fair use of multimedia.

AltaVista Multimedia

AltaVista has a multimedia section where you can search for images, audio, and video. The audio search includes the popular MP3 audio file format for sharing music over the Internet and downloading it to play on your computer or a portable digital audio device. To perform a multimedia search, go to www.altavista.com. Depending on what you are looking for, click either Images, MP3/Audio, or Video.

With the Images search, you can look for photos, graphics, or buttons and banners, either in color or in black and white. The audio search lets you specify whether you want MP3, WAV, Windows Media, or Real audio, lasting for more or less than a minute. The video search finds movies lasting more or less than a minute in AVI, MPEG, QuickTime, Windows Media, or Real video formats. You learn more about these file formats in the last part of this chapter, which covers the types of files you are likely to find when downloading from the Internet.

Singingfish

Singingfish specializes in the development and delivery of search engines that can find streaming media content on the Web. Included is access to music, news, movies, sports, TV, radio, finance, and live events. Singingfish is a wholly owned subsidiary of Thomson multimedia. To check out their services, or to conduct a multimedia search, go to www.singingfish.com.

Newsgroup Searches

Newsgroups are a rich source of information about current research in progress. Most disciplines have active newsgroups where current research topics are discussed. Some of the keyword-oriented search engines discussed earlier in this chapter have options for searching newsgroups as well as Web pages. AltaVista, Dogpile, Excite, Google, InfoSeek, and Yahoo! all provide a newsgroup search option.

At groups.google.com, for example, you can perform keyword searches of information written in more than 700 million USENET messages over the past twenty years. The search terms can include the names of the people who wrote the messages. You can also search only on a name, to get an index of all the topics and messages a given person may have written in a newsgroup.

Some users have expressed surprise upon learning that users can now search through newsgroups and find out what has been written by specific people about specific topics. Some consider this to be a retroactive invasion of privacy. If you want to prevent messages you write in newsgroups

from being visible to search engines, you must set the x-no-archive flag when you write the message. You can set this flag by making the first line in the body of your message read as follows:

L 2-1   `x-no-archive: yes`

File Searches

As you learned in Chapter 1, FTP stands for File Transfer Protocol. There are millions of files you can download to your computer from FTP sites all over the Internet. Many of these files are Web pages you can find with the Web-based search engines discussed earlier in this chapter. Some files, however, are not in Web page format. To find these other kinds of files, you need to use a search engine that can do FTP file searches.

Archie

Archie is a search tool for FTP servers. It was written by the Archie Group (Peter Deutsch, Alan Emtage, Bill Heelan, and Mike Parker) at McGill University in Montreal, Canada. The name Archie is easy to remember because it is very close to the word *archive,* which refers to the collection of files in the FTP database. The Archie program searches the names of the files in this archive, which consists of the millions of files that are available on anonymous FTP sites.

You can search the Archie database in two ways. You can either telnet to a server that hosts the Archie program, or you can use an ArchiePlex, which is a Web page that provides Web access to the Archie search engine. **Telnet** is a network service that enables you to log on remotely to other networks on the Internet. You will learn how to use telnet in Chapter 3.

Archie is a legacy tool that is waning in popularity as many other Internet search engines have acquired more efficient ways of helping you find the files you want. When this book went to press, there was a working ArchiePlex at www.usgs.gov/Mosaic/cgi-bin/archie.html. To find others, search Google or Yahoo! for ArchiePlex. To learn about the current status of FTP searches, go to www.ftpsearchengines.com.

Gopher, Veronica, and Jughead

Another legacy tool on the Internet is **Gopher**, a protocol for organizing information hierarchically on the Internet. Gopher was the rage in the early 1990s, prior to the release of the graphical Web browser. Gopher was invented in 1991 at the University of Minnesota, home of the Golden Gophers. Its function on the Internet is to help you "go fer" things; thus, the term Gopher is a play on words. Some related tools are Veronica, a search tool for finding Gopher files, and Jughead, which added keyword search and Boolean operator capabilities to Gopher search. Veronica was Archie's girlfriend in the classic Jughead comic strip. As an acronym, Veronica stands for Very Easy Rodent-Oriented Net-wide Index to Computerized Archives, and Jughead stands for Jonzy's Universal Gopher Hierarchy Excavation and Display.

Although the Gopher is used little in actual practice today, it earned its place in history as one of the first killer applications on the Internet. Although most people who used the Internet in the early 1990s used the Gopher, hardly anyone uses it today. To find out about its current status, go to www.searchenginewatch.com and search for Gopher.

Download.com

CNET's Download.com is a handy site for finding and downloading useful files to your computer. The file categories include MP3/audio, business/finance, desktop enhancements, development tools, games, Internet, multimedia/design, Web authoring, utilities, and drivers. The menus make it easy to drill down to the file you want to download. There are in-depth reviews and spotlight articles highlighting featured downloads of the day. To peruse the latest list of downloads, go to download.com.

How to Find People

In addition to helping you find Web pages, newsgroups, files, and scholarly documents, the Internet can also help you locate people.

Bigfoot

Located at www.bigfoot.com, Bigfoot offers a huge catalog of e-mail addresses and white page directories. These catalogs enable you to search for someone's e-mail address or white-page street address.

WhoWhere

WhoWhere lets you look up e-mail addresses, residential listings, toll-free 800 numbers, and millions of businesses, including maps and directions. Now that WhoWhere has become part of the Lycos network, you will find WhoWhere at www.whowhere.lycos.com.

Switchboard

You can use the Switchboard white pages service to find people and businesses. It handles more than 5 million lookups for people and businesses each week. You can find Switchboard at www.switchboard.com.

People.yahoo.com

There is a free online white pages search and listing service at people.yahoo.com. You can search by the person's name, city, or state to find out the person's e-mail address or street address. You can also search thousands of public databases with one click to find addresses, property records, licenses, and court records.

Finding Places

Have you ever gotten lost when driving somewhere? Have you encountered road closings or construction delays that you wish you had known about in advance? The next time you plan a trip, treat yourself by getting a map and a list of specific driving instructions before you take to the roads.

MapQuest

You can visit the most popular interactive mapping service on the Web at www.mapquest.com. MapQuest can help you find more than three million locations worldwide, print driving directions, and create and save personalized maps. Live traffic updates are a popular feature that can save you time when roads close or traffic snarls.

As one of the busiest sites on the Internet, MapQuest serves on the average more than 10 million maps per day. MapQuest's tools provide maps and directions tailored to different types of travelers. MapQuest's clients include Yahoo!, Lycos, the National Geographic Society, the American Auto Association, Fodor's, and many yellow page directories. As a personal user of MapQuest, I can attest to the quality and accuracy of its maps and driving instructions. Best of all, MapQuest is free.

Finding Legal Information

If you know where to look, the Web is an excellent source of legal information. By visiting the sites that follow, you will see why the Web has become the legal profession's primary source of news and information.

Law.com

American Lawyer Media (ALM) is one of the leading sources of news and information for the legal industry in the United States. ALM sponsors a Web site at Law.com, where many legal professionals go to get their news. The search engine at Law.com enables you to search the wire services for news about current legal cases. You can also read or search the full text of more than 20 legal publications, including *The National Law Journal*, *The American Lawyer*, *New York Law Journal*, and *Legal Times*. To peruse these and other ALM services, go to www.law.com.

FindLaw

True to its name, the FindLaw site enables you to search for all kinds of legal information. It can also match you up with a lawyer, if you need legal help or advice. FindLaw has channels for legal news, professionals, students, businesses, and the public at large. The search engine enables you to perform keyword searches of the U.S. Constitution, the Supreme Court, government sites, legal sites, the legal news channel, a legal dictionary, and an online library of legal articles. To visit the FindLaw site, go to www.findlaw.com.

LexisONE

Sponsored by LexisNexis, the LexisONE Web site brands itself as "The Resource for Small Law Firms." It features a free legal headline news service and provides free keyword searches of the news, case law, and legal forms. To perform these free searches, however, you must first register at the site. To do so, go to www.lexisone.com. To find out about other LexisNexis services, go to www.lexisnexis.com.

Index of Collected Search Engines

Search engines are undergoing a lot of research and development on the Internet. By the time you read this, new search engines will be announced that were not available when this book went to press. You can use Yahoo! to find the latest information about new search engines and what they do. At www.yahoo.com, go to the section on Computers and Internet, and do a search for the keyword *search*.

Another good place to learn about search engines is the Search Engine Watch, where you will find announcements of the latest search services and Web searching tips. Hosted by Internet.com, you will find the Search Engine Watch at searchenginewatch.internet.com.

Adding a Web Site to a Search Engine

In Part II of this book, you learn how to create a Web site and publish it on the Internet. Automatically, spiders will begin finding your site and listing it in selected search indexes. There is no guarantee, however, that your site will be listed by all the search engines. To help ensure that it gets included in a certain index, you can go to the desired search engine site and follow that site's procedure for adding your site to its search engine. Here are some examples:

- **Yahoo!**   At www.yahoo.com, go to the appropriate subject category and click the option to Suggest a Site. You will get an online form to fill out and submit, along with an explanation of how much it will cost to list your site.

- **AltaVista**   At www.altavista.com, near the bottom of the page, click the menu option to Submit a Site. You will get a screen explaining the different listing services. The free service is called Basic Submit; the other services cost money. The amount you spend will depend on the level to which you want AltaVista to promote your site.

- **Lycos**   At www.lycos.com, click Site Submit to bring up the search engine submission screen. Follow the links to learn about the different kinds of site listings and ad services that are available. There is a free site submission option, but you must register to use it.

■ **bCentral**   There is a Web page listing service at www.bcentral.com called Submit It, where you can submit Web pages to about 400 different search engines and indexes. You pay an annual fee for this listing service. To check it out, go to www.bcentral.com and follow the link to Search Engine Submissions.

Downloading from the Internet

You need to know how to download five basic types of files from the Internet, namely, text, graphics, audio, video, and software. After showing you how to download and handle these files, this chapter concludes by teaching you how to download and unpack a zipped (i.e., compressed) archive, which can contain any combination of these five file types.

Commonly Found Text File Formats

There are three families of text formats: plaintext, hypertext, and word processor files. Plaintext means just that—the text and nothing but the text. Hypertext contains the text intermingled with markup codes called *tags* that determine how the text is to appear and which words in the text serve as triggers that launch things when clicked. Word processors such as Microsoft Word and WordPerfect use proprietary formatting to encode the text and its properties, including font, size, margins, borders, headings, and pagination.

Step-by-Step 2-4

Downloading Text from the Internet

The quickest way to download text from the Internet is to copy the text onto your computer's Clipboard, from which you can paste the text into any other window on your screen. To perform this copy-and-paste method of downloading text from the Internet, follow these steps:

Step 1   Use your browser to display the text you want to download.

Step 2   Drag your mouse to select the text you want to copy; the selected text appears highlighted. Or, if you want to select all the text on the Web page, pull down the browser's Edit menu and choose Select All.

Step 3   Press the Copy keys (CTRL-C on Windows or COMMAND-C on a Macintosh) or pull down the Edit menu and choose Copy.

Step 4   If the application into which you want to paste the text is not already running, get it running now.

Step 5   Position your cursor at the spot in the window to which you want to want to paste the text.

Step 6   Press the Paste keys (CTRL-V on Windows or ⌘-V on a Macintosh) or pull down the application's Edit menu and choose Paste.

TXT (PlainText)

Plaintext files are identified by the filename extension *.txt*. When you see a filename such as *history.txt,* you know it is a plaintext file because of its *.txt* filename extension. In computer jargon, plaintext files are known as *ASCII files*. ASCII (pronounced *askee*) stands for American Standard Code for Information Interchange. Every text editor and word processor has an option for reading and writing files in ASCII format. Sometimes the format is called plaintext or DOS text instead of ASCII text.

Because plaintext files are so common on the Internet, the Web browsers have a built-in ability to display them. To download a copy of a plain-text file you are viewing with a Web browser, simply pull down the browser's File menu, choose Save As, and use the Save controls to save a copy in the plain text file format.

HTML (Hypertext)

HTML stands for hypertext markup language. Files in HTML format have the filename extension *.html* or *.htm*. HTML is the most prevalent file format on the World Wide Web, because most Web pages are encoded in HTML. True to its name, an HTML file contains the text that gets displayed on a Web page, along with special codes known as *markup* that define (1) how the text should appear on-screen, (2) which words in the text are hyper, and (3) what gets triggered when the user clicks the hypertext. For example, Figure 2-16 shows how a Web page displays an HTML file, and Figure 2-17 shows how the same file appears when viewed with a text editor. The codes inside <brackets> are the markup that tells the Web browser how to interpret the text. You learn more about the HTML codes in the Web page creation tutorial in Part II of this book.

Whenever you want to download a Web page that you are viewing with your Web browser, simply pull down the browser's File menu, choose Save As, and use the Save controls to save a copy in the HTML format.

FIGURE 2-16 *The State of the Union Address as viewed with a Web browser* ■
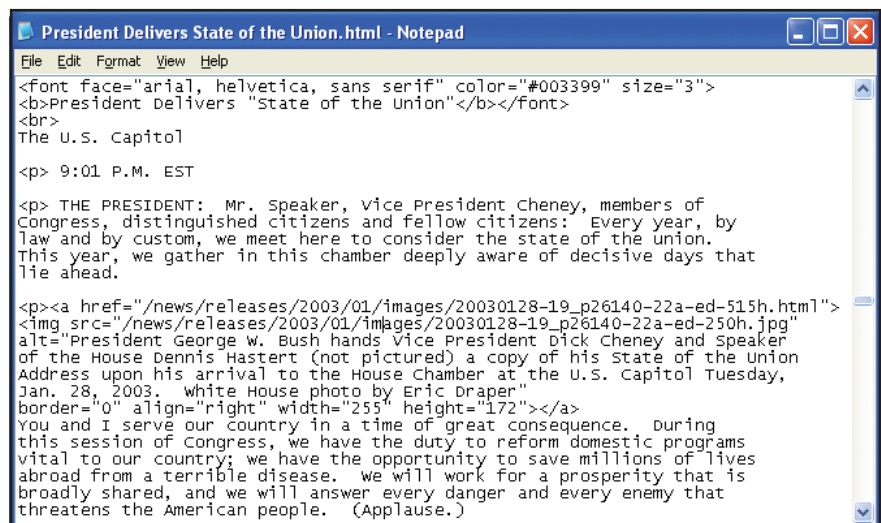

FIGURE 2-17 *The State of the Union Address as viewed with a text editor* ■

DOC (Microsoft Word) and WPD (WordPerfect)

Among the many word processor formats, the most common are Microsoft Word's DOC format and WordPerfect's WPD format. DOC stands for document, and WPD stands for *WordPerfect document*. Web browsers do not usually contain built-in support for word processor file formats. Instead, your browser calls on a helper application to display the file on demand. There are two ways to download this kind of file. First, you can wait for the helper app to display the file, pull down the helper app's File menu, and use the Save option to make yourself a local copy of the file. Second, you can right-click (Windows) or CONTROL-click (Macintosh) the link that otherwise launches the file. When the quick menu pops out, choose the option to save the file.

Portable Document Format (PDF)

Adobe realizes that a huge amount of printed text is not yet accessible on the Web. To provide a way to digitize printed text into a format that can be viewed on any computer platform, Adobe created the **Portable Document Format (PDF)**, for which the filename extension is *.pdf*. A quick way of creating PDF files is to scan printed documents into your word processor. If you have a lot of pages to scan, you can use a sheet feeder to speed the scanning process. Then you can print the scanned pages to a PDF file.

You view PDF files with the Adobe Acrobat Reader, a free plug-in that any user can get from the Adobe Web site. You will make some pretty amazing discoveries when you use the Adobe Acrobat Reader to view a PDF document. Because you are looking at what appears to be pictures of the original document, you do not expect to be able to select, copy, paste, and search for text as you could on a regular Web page. You will be pleasantly surprised to find, however, that all these functions are available unless the author disabled them. Perhaps your biggest surprise will come when you choose to print the document. Instead of printing the bitmap version of the image you see onscreen, Acrobat prints the document using the fonts on your printer. As a result, the printed version may appear better than the original.

To learn more about the PDF file format, go to www.adobe.com and follow the link to Adobe PDF.

Commonly Found Graphics File Formats

The computer industry has produced so many graphics formats (more than 30 at last count) that there is no true standard across the industry. Table 2-3 lists a few of the more popular graphics file formats and describes what they are used for. On the Web, however, there are only two file formats that every Web browser can be guaranteed to support: GIF and JPEG.

Filename Extension	Intended Purpose
.bmp	Windows bitmap. The *.bmp* file is the most efficient format to use with Windows.
.gif	Graphics Interchange Format. Invented by CompuServe for use on computer networks, GIF is the most prevalent graphics format for images on the World Wide Web.
.pcd	Kodak's Photo CD graphics file format; contains five different sizes of each picture, from "wallet" size to "poster" size.
.jpg or .jpeg	JPEG image, named for the standards committee that formed it: Joint Photographic Experts Group. Intended to become a platform-independent graphics format, this is arguably the best choice for publishing full-color photographs on the Web.
.pict	Macintosh graphics format.
.png	Portable Network Graphics format. Pronounced *ping*, PNG is the patent- and license-free format approved by the W3C (World Wide Web Consortium) to replace the patented GIF format. Because the PNG format is not yet fully supported by all browsers, Web authors typically convert graphics to GIF or JPEG for use on Web pages.
.tga	Truevision Targa format; *tga* stands for Targa, which is a video capture board.
.tif	TIFF file; stands for Tagged Image File Format. Known as "the variable standard" because there are so many kinds of TIFF subformats.
.wpg	WordPerfect graphics format.

TABLE 2-3 *The Most Common Computer Graphics Formats* ■

Step-by-Step 2-5

Downloading Images from the Internet

The quickest way to download an image from the Internet is to use your Web browser's option for saving the image to a file. When you save the image to a file, you have the option of changing its name. If you change the filename, make sure you keep the filename extension the same as the original filename's, because that is how other programs recognize it as the type of file it is. For example, if the image you are saving is in GIF format, make sure the filename extension on the file to be saved is *.gif*.

If the image you are saving is in JPEG format, make sure the filename extension on the file to be saved is *.jpg*. Renaming the filename extension of a *.gif* file to *.jpg* does not change the format of the file. If you want to change the format of the file, you must use a file-conversion program such as Paint Shop Pro, which you learn how to use in Chapter 6. To download an image from the Internet, follow these steps:

Step 1 Use your browser to display the image you want to download.

Step 2 Right-click (Windows) or CONTROL-click (Macintosh) the image you want to download, and a menu will pop out. On a Mac, you can also trigger the menu by holding down the mouse button until the menu pops out.

Step 3 The popout menu provides you with options you can do with the image; choose the option to "Save image as" or "Save picture as." The Save As dialog appears.

Step 4 In the File name field, you should see the name of the file this image has on the Internet. You can change the name if you want, but make sure you leave the filename extension the same as in the original.

Step 5   You can use the Save As dialog to navigate to a different drive or folder on your computer, or you can type a complete path onto the beginning of the filename to specify exactly where you want the image file to be saved on your computer.

Step 6   Click the Save button when you are ready to save the file.

Warning: Although you can easily download files from the Web, you should not do so without permission. Under U.S. copyright law, Web content is the legal property of its author and is not automatically free for the taking. Unless the material is in the common domain or is clearly marked as being free, you may need to seek permission to use it lawfully in other works. Chapter 4 provides you with guidelines for determining when you need to ask for permission.

GIF

GIF stands for **Graphics Interchange Format**. Invented by CompuServe for use on computer networks, GIF is highly efficient. Instead of containing the RGB (red, green, blue) value of every pixel (picture element) in the image, a GIF file contains a table defining the different pixel patterns found in the image, with pointers into the table indicating where the patterns go onscreen. It is important to understand that although GIF files are compressed, none of the original information in the graphic gets lost in the compression process. The decompressed image you see onscreen is exactly the same as the one that got compressed into the GIF file. Because nothing gets lost, this kind of encoding process is known as **lossless** compression. GIF files are limited to a palette of 256 colors; however, if you need more than 256 different colors in a picture, you should use the JPEG format.

JPEG

JPEG (pronounced *Jay-peg*) stands for **Joint Photographic Experts Group**, which is the name of the international standards committee that created it. JPEG was invented as a platform-independent graphics format. JPEG images can contain millions of colors, whereas GIF images are limited to a palette of 256 colors. JPEG uses a lossy compression algorithm to reduce the amount of space it would otherwise require to store so many colors. **Lossy** means that some of the image data can become lost, depending on how much compression is used when the image gets saved. JPEG compresses the image by dividing it into tiny cubes and averaging the color values within the cubes. Most people are unable to notice the tiny cubes in the image. One of the settings you can vary when saving a JPEG image is the size of the cubes. The larger the cubes, the more compression you will get, but the cubes will also be more noticeable.

PNG

The World Wide Web Consortium is working on a new graphics format called **Portable Network Graphics (PNG)**. The goal is to create a fast, lossless, patent-free file format that can handle pictures containing up to

Downloading a Picture from the Internet

Now that you have completed the section on images and graphical file formats, this would be a good time to test your ability to download a picture from the Internet. The Library of Congress Web site, for example, has many interesting pictures. Follow these steps:

1. Use your Web browser to go to www.loc.gov, and download one of the pictures to your computer. If you have trouble, refer to the instructions in the previous section, "Downloading Images from the Internet."

2. If you change the filename before you save the file, make sure the filename extension of the file you save matches the filename extension of the original.

3. Use the Windows Explorer or the Macintosh Finder to locate the file you saved in the preceding step, and double-click the file to launch it.

4. If the image appears properly, you have succeeded in learning how to download images to your computer; congratulations! If your computer tells you there is no program available to display the image, follow the steps in Chapter 6 to install Paint Shop Pro.

48 bits of color information per pixel. The screen captures in this book, for example, were transmitted in PNG format from my PC to the publisher's Macintosh. You can monitor the progress of the creation of PNG at www.w3.org/Graphics/PNG.

Step-by-Step 2-6

Downloading Audio and Video from the Internet

To download audio and video, you follow a process very similar to the method you learned earlier for downloading graphics. You right-click (Windows) or CONTROL-click (Macintosh) on the link that triggers the audio or video, and you use the quick menu to save a local copy on your computer. Detailed instructions are provided as follows:

Step 1 Use your browser to display the link that triggers the audio or video you want to download.

Step 2 Right-click (Windows) or CONTROL-click (Macintosh) the trigger. A pop-up menu provides you with options you can do with the object linked to the trigger; choose the "Save link as" or "Save target as" option to make the Save As dialog appear.

Step 3 In the File name field, you should see the name of the file that this object has on the Internet. You can change the name if you want, but make sure you leave the filename extension the same as in the original.

Step 4 Click the Save button when you are ready to save the file.

Every sound has a waveform that describes its frequency, amplitude, and harmonic content. Waveform audio digitizers capture sound by sampling this waveform thousands of times per second; the samples are stored in a computer file. Figure 2-18 shows a waveform in the process of being sampled. For each sample, a number gets written into the corresponding waveform audio file. The number tells how far the sample rose above or fell below the zero amplitude line. When you click to play the file, the samples play back through your computer's sound chip, and you hear the waveform audio. Waveform audio can be transmitted over the Net in several file formats.

WAV

On computers running Windows, the native waveform audio filename extension is *.wav,* which stands for waveform. When the Web started, you needed helper applications to play audio, because the first browsers lacked built-in support for *.wav* files. Happily, all the major browsers now contain native support for playing *.wav* files, on Macintosh as well as Windows operating systems.

AU and SND

The Sun audio format filename extension is *.au*, and *.snd* is the audio format that started on the NeXT workstation. These formats are essentially the same except that *.au* files do not have file headers to specify different sampling rates and compression formats. Thus an *.au* file gets recorded and played back at a "standard" rate, whereas *.snd* files can have different settings, depending on the nature of the sound and the purpose of the recording. The Macintosh has built-in support for *.snd* files. On the Java platform, *.au* is the native audio format.
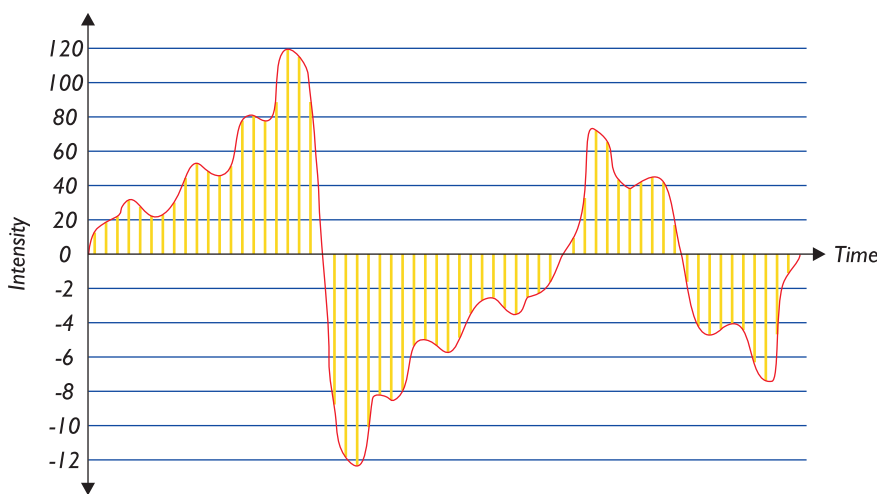
RA and RAM

Real-time audio streaming used in Internet radio broadcasts requires a special file format optimized for real-time transmission over the Internet. The RealAudio filename extensions are *.ra* and *.ram,* which stand for RealAudio metafile. A RealAudio metafile is a text file that contains the Web address (URL) of a RealAudio file. RealAudio files cannot be referenced directly by the Web page because this would cause them to be downloaded in their entirety before playback. For a RealAudio file

FIGURE   2-18   *A waveform in the process of being sampled; the vertical lines show the points at which samples are taken. Follow along the timeline, and imagine a number being written into a sound file to indicate how far each sample is above or below the zero line. That is how the process of sampling works.* ■

to be played in real time, it must be played through a RealAudio player and served by a RealAudio server. To accomplish this, you need a link between the Web server and the RealAudio server. The link is contained in the metafile.

AIF, AIFF, AIFC

AIFF stands for Audio Interchange File Format. Apple invented this file format to create and play audio files on the Macintosh. AIFC is a compressed version; the C stands for compressed. When you find an AIF file on the Web, chances are it was recorded on a Macintosh.

MP3

MP3 is one of the most popular audio formats on the Internet. **MP3** stands for MPEG audio layer 3. It is an audio file format that uses an MPEG audio codec to encode (compress) and decode (decompress) recorded music. MP3 can compress a CD audio track into a substantially smaller file requiring significantly less bandwidth (about 10 percent) to transmit over the Internet, without degrading the original sound track's quality.

To download a free MP3 player, find MP3 Web sites, and create MP3 files from your favorite audio CD, follow this book's Web site links to MP3. If you do not personally own the CD and/or if the MP3 files are not for your own personal use, please observe the copyright and fair use guidelines presented in Chapter 4. Because the MP3 technology makes copyright violation so easy, the kind of software used to create an MP3 file from an audio CD is called a *ripper*. Please be aware, however, that MP3 has many legitimate uses on the Web. Some recording artists are choosing to distribute their own songs in the MP3 format, for example, and some hit songs have appeared in MP3 format first before being distributed on CD. Little known artists use MP3 as a way to gain fans who may eventually want to hear them in concert or buy their CDs.

MIDI Synthesizer Format (MID)

Musical Instrument Digital Interface (MIDI) is a music synthesizer file format that requires very little bandwidth to transmit because the sound chip inside your multimedia PC does the work of generating the waveform you hear. What gets transmitted is the performance information required for your computer's sound chip to play the music. Accordingly, a MIDI file consists of a stream of codes that tells your computer when to turn notes on and off, how loud to make them, what instrument should make the sound (such as trumpet, flute, or drum), and whether to bend the notes or add other special effects. Compared to the amount of storage required for waveform audio recordings, MIDI takes up so little space that it is a very popular format for transmitting music over the Internet. MIDI files have a *.mid* filename extension.

This book's Web site provides some incredible indexes of MIDI files you can listen to. Follow the links to the MIDI archives, and you will get a list of indexes that contain thousands of songs in a wide variety of styles, ranging

from classical to modern and from funk to rock. You will also find music listed by artist, from Abba to Frank Zappa. You need to realize, however, that MIDI does not record the singer's voice. Thus, you will hear the synthesized instruments, but you will not hear the lyrics.

Video Formats

When a movie is digitized into a computer file, the digital data stream is enormous. To conserve file space and thereby reduce the bandwidth required to transmit the movie, the video gets compressed, down to as little as $1/200^{\text{th}}$ of its original size. One or more of the video compression schemes explained in Table 2-4 may be used.

AVI

The most common video format in the Windows world is Microsoft's AVI, which has the *.avi* filename extension. AVI stands for audio/video interleave, a clever scheme in which audio frames are interleaved with the video. The sound track plays without interruption because the audio always takes priority. Then your computer shows as many frames of video as it has time to process. If it is too late to show a given frame, the player just skips it and goes on to the next frame. Because the audio has priority, you get the aural illusion of uninterrupted playback.

Method	How It Works
YUV subsampling	Divides the screen into little squares and averages color values of the pixels in each square.
Delta-frame encoding	Shrinks data by storing only the information that changes between frames; for example, if the background scene does not change, there is no need to store the scene again.
Run-length encoding	Detects a "run" of identical pixels and encodes how many occur instead of recording individual pixels.

TABLE 2-4   *Video Compression Schemes* ■

MOV and QT

One of Apple Computer Corporation's greatest gifts to the field of multimedia is the QuickTime audio/video format. QuickTime is so robust and popular that it exists in both Macintosh and Windows versions. Because of its cross-platform

capabilities, QuickTime has become very popular on the Internet. The file-name extensions of QuickTime movies are *.qt* and *.mov*. For the latest information, go to www.apple.com/quicktime.

MPG, MPEG, and MPE

MPEG is emerging as the digital video standard for the United States and most of the world. MPEG stands for **Motion Picture Experts Group**, the International Standards Organization committee that created the standard. Endorsed by more than 70 companies, including IBM, Apple, JVC, Philips, Sony, and Matsushita, MPEG compresses video by using a discrete cosine transform algorithm to eliminate redundant data in blocks of pixels on the screen. MPEG compresses the video further by recording only changes from frame to frame; this is known as *delta-frame encoding*. MPEG is becoming the digital video standard for compact discs, DVD, cable TV, direct satellite broadcast, and high-definition television (HDTV).

Four versions of MPEG have been worked on:

- **MPEG-1** is the noninterlaced version designed for playback from CD-ROMs.

- **MPEG-2** is the interlaced version intended for the all-digital transmission of broadcast-quality TV. Adopted by the U.S. Grand Alliance HDTV specification, the European Digital Video Broadcasting Group, and the Digital Versatile Disc (DVD-ROM) consortium, MPEG-2 features surround sound. RCA's DirecTV service uses MPEG-2.

- **MPEG-3** was to be the HDTV version of MPEG, but then it was discovered that the MPEG-2 syntax could fulfill that need by simply scaling the bit rate, obviating the need for the third phase.

- **MPEG-4** is a low-bit-rate version of MPEG that is being invented for transmitting movies over mobile and wireless communications.

For more information, follow this book's Web site links to MPEG.

RM

One of the greatest challenges on the Internet is to deliver to your PC full-motion video in an uninterrupted real-time data stream. First to market with a product that does this was RealNetworks, the same company that brought you the RealAudio technology discussed earlier in this chapter. The name of the product is RealVideo, and the filename extension is *.rm,* which stands for Real metafile.

RealVideo follows the Real Time Streaming Protocol (RTSP) that RealNetworks invented for streaming audio and video over the Internet. To read about this and other technical details, go to www.rtsp.org.

Downloading Software and Data from the Internet

To download software and data from the Internet, you should begin by reading any special instructions that might appear onscreen explaining what will happen when you trigger the download. Almost all these instructions fall into one of three categories: documents, archived files, and self-extracting archives. Each kind is discussed in turn as follows.

Documents

When a document is linked to a Web page, you have two options. You can either click to view the document or, if you want to download it, you can right-click (Windows) or CONTROL-click (Macintosh) the link to pop out the menu that lets you save the document on your computer. The biggest problem beginners report is knowing where to save the downloaded document. If you have Windows, a good place is the folder called My Documents or My Downloads. On the Macintosh, beginners normally download a document onto the desktop, from which you can move it later to another folder if you want to file it away.

To download the document your Web browser is currently displaying, you pull down the browser's File menu, choose Save As, and use the Save dialog to save the file to a folder on your computer's hard drive. As always, please remember not to alter the filename extension when you save the file. If the file has a *.doc* filename extension, for example, do not change it to a *.txt* filename extension. Remember that your computer looks at the filename extension to determine what application will handle the file. Renaming the filename extension will confuse your computer when someone tries to access the file.

Compressed Archives

A popular method of distributing software and data over the Internet is via archived files. An **archive** is a container into which one or more files has been compressed to save space and packed into a single file that can be transmitted easily over a network. When you receive such a file, you need to use an extractor to unpack the archive and restore its contents onto your computer. Windows users normally unpack archived files with a product known as PKZIP for Windows or with a similar product such as WinZip, NetZip, or EasyZip. Macintosh users unpack archived files with Stuffit Expander, which is also available in a Windows version. Each of these products is described as follows.

PKZIP for Windows   PKWARE, Inc., is the industry leader in compression and decompression technology. Their product, PKZIP for Windows, takes its name from the *.zip* filename extension that archived files normally have on Windows-based machines. PKZIP for Windows makes it easy to zip and unzip files. After you download a zipped file from the Internet, you simply open it with PKZIP for Windows. As illustrated in Figure 2-19, PKZIP for Windows displays the contents of the zipped file.
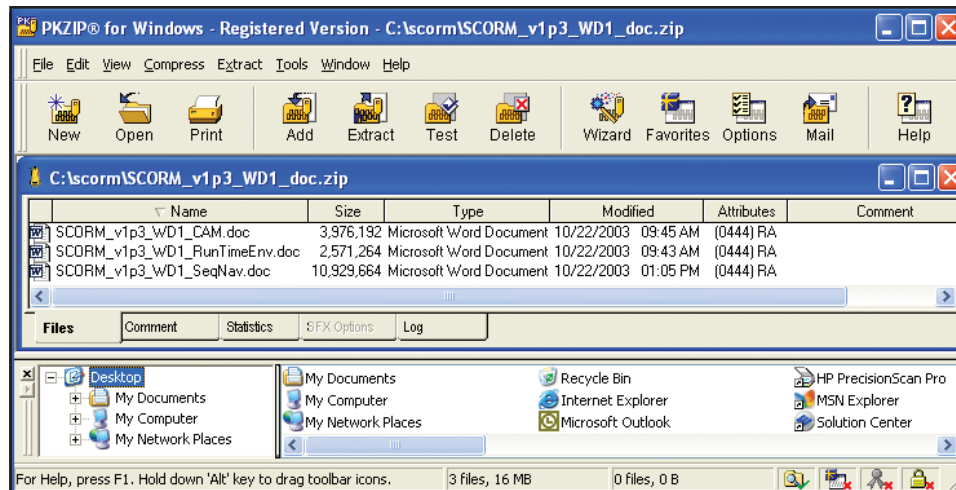
FIGURE 2-19 *When you open a .zip file, PKZIP for Windows displays the contents of the zipped archive. To expand the files into their original uncompressed format, you pull down the Extract menu, choose Extract Files, and follow the onscreen instructions to save the files in the folder of your choice.* ■

PKZIP for Windows is **shareware**, meaning you can download it for free, try it out for a limited time period (usually 30 to 60 days), and then, if you decide to keep using it, pay a reasonable fee (usually $29 to $39) to the vendor. To download a copy of PKZIP for Windows, go to www.pkware.com. If you have Windows XP, however, you may also wish to consider using the zipped option that is built in to the Windows XP File Manager. To learn about the built-in zipped option, click the Windows XP Start button, click Help, and search for the following phrase: zipped compressed folder. Installing PKZIP for Windows replaces the built-in Windows XP support with PKZIP support.

Stuffit Expander On the Macintosh, compressed archives are handled with a freeware program from Aladdin Systems called Stuffit Expander, which is also available in Windows and Linux versions. True to its name, Stuffit Expander can extract files from archives you download from the Internet. If you are using a Macintosh and you do not have Stuffit Expander, you can download it for free from www.stuffit.com.

When you ask Stuffit Expander to expand a file, it opens a new folder on the desktop and decompresses each file into that folder. As the files are expanded, a status bar shows the progress of the decompression. When Stuffit Expander is finished extracting the files of many applications, you need only to click the app's icon in the new folder to make it run. Other apps create an install program that you must run separately to set up the application.

Self-Extracting Archives

Another popular method of distributing software and data on the Internet is the **self-extracting archive**, which is a compressed executable file into which the files that comprise an application or set of data have been packed. On the Windows operating system, self-extracting archives typically

have the *.exe* executable filename extension. After you download a self-extracting archive to your computer, you simply run the archive to unpack the files and store them on your computer.

Most of the downloads at the CNET download.com site are distributed in self-extracting archives. When you click to download one of them, your browser asks whether you want to save the archive to disk or open it directly from the Web. If you choose the option to save to disk, a Save dialog appears. Use the Save dialog to save the archive in the folder of your choice, such as your computer's *temp* folder. Then run the self-extracting archive. If the archive's icon is not visible, follow these steps to start a program when its icon is not visible:

For Windows

1. Click the Windows Start button and choose Run to make the Run dialog appear.

2. Click the Browse button; the Browse dialog appears.

3. Use the browse controls to select the filename of the program you want to run.

4. Click Open; the filename of the program to be run appears in the Open field of the Run dialog.

5. Click OK to run the file.

6. If you are unable to locate the file by using this method, click the Windows Start button and use Search to locate the file. Then double-click the file to run it.

For Macintosh

1. If you have OS X, get Sherlock running by clicking Sherlock in the Dock. Set the option to search for Applications, enter the name of the program you are looking for, and click the find button.

2. Otherwise, click the Apple icon in the upper-left corner of the screen to pull down the menu, and then choose Find File.

3. Set the two drop-down menus to "Name" and "Contains" if they do not say that already.

4. In the blank field, type the name of the program you are looking for.

5. Press the Find button to make your computer find the file.

6. Double-click the file to run it.

To conserve space on your computer's hard disk after you run the self-extracting archive, you can delete the archive after extracting the files from it.

Safeguarding Against Viruses

Unfortunately, some geeks get their jollies from finding ways to send people viruses over the Internet. When you open files that you get from the Internet, you run the risk of infecting your computer with viruses that can

attach or embed themselves in certain kinds of files. The most vulnerable types of files are the executables, which cause code to run on your computer. Before you download an executable file, you need to check carefully the source from which you are downloading it. If the file is coming from a reputable site, such as Microsoft or Netscape or CNET's download.com, the file is most probably virus-free. The executable filename extensions to be most careful about are *.exe, .bat, .vbs,* and *.class*. Viruses can also be transmitted through macros in *.doc* and *.xls* files.

Whenever you download files from the Internet, you should run a virus scan on your computer to make sure you have not received a virus. You can make virus-scanning happen automatically if you set your antivirus software to scan incoming and outgoing mail and file transfers. It is important to remove viruses promptly, because letting them remain on your computer can cause disruptive things to happen, such as files disappearing, unwanted messages coming onscreen, software acting strangely, and even your entire hard disk losing its contents. Make sure your virus scanner is up-to-date so it will recognize the latest viruses. When a new virus hits the Net, updates are normally available within the day, and you should install the update promptly. For the latest information about viruses and how to remove them from your computer, go to antivirus.about.com, www.mcafee.com, and www.sarc.com.

Chapter 2 Review

■ Chapter Summary

After reading this chapter and completing the step-by-step tutorials and Try This! exercises, you should understand the following facts about connecting to the Internet, surfing the Web, and finding what you are looking for:

Getting Connected

■ To connect to the Internet, you must have six things: (1) an Internet-ready computer that has (2) an operating system with (3) TCP/IP installed, along with (4) client software you use to access the Internet over (5) an Internet connection that connects you physically to the (6) Internet address of your targeted service or resource.

■ The speed at which you connect to the Internet determines bandwidth, which is the amount of information your computer can send and receive.

■ Users who connect to the Internet via plain old telephone service (POTS) must have a modem. Named by a combination of the first syllable from the terms *mo*dulate and *dem*odulate, the modem is a communications device that enables a computer to send and receive digital information over analog phone lines. Many computers have modems built in.

■ The Point to Point Protocol (PPP) is the telephone modem protocol of choice, because PPP supports not only TCP/IP but also NetBEUI and IPX/SPX. An older Serial Line Internet Protocol (SLIP) supports only TCP/IP and requires a preassigned IP address.

■ Ethernet is a high-speed local area network (LAN) standard that is widely used across industry and academia. Originally requiring coaxial cables, Ethernet now can use category 5 twisted-pair telephone wiring in a so-called 10BaseT configuration. A faster 10/100BaseT Ethernet can move data at rates up to 100 megabits per second. There is also a 10 gigabit Ethernet standard known as 10GbE.

■ The Integrated Services Digital Network (ISDN) is the digital telephone system that the regional Bell companies are installing in most of the United

States. The Basic Rate Interface (BRI) service of ISDN is 144 Kbps, made up of two 64-Kbps data channels and one 16-Kbps control channel. The Primary Rate Interface (PRI) service uses 23 data channels and a 64-Kbps control channel to boost the data rate to 1,544 Kbps (1.544 Mbps).

■ A cable modem is a network adapter used to connect PCs to TV cables in neighborhoods where cable TV companies offer Internet services over TV cables. The term broadband is used to refer to this type of connection that carries multiple channels of information over a single cable.

■ DSL stands for Digital Subscriber Line, a broadband method of connecting to the Internet over existing telephone lines. Synchronous DSL (SDSL) supports the same high-speed data rate for both upstream and downstream traffic. Asynchronous DSL (ADSL) lowers the cost of DSL connections by using a high-speed data rate for downloads but a slower rate for uploads. Download speeds range from 384 Kbps to 8 Mbps, and upload speeds range from 128 Kbps to 1 Mbps. The faster the speed, the higher the cost.

■ An Internet connection that is always on is called a direct connection. Ethernet, ISDN, cable modem, DSL, and satellite all use direct connections.

Browsing the Web

■ On the Internet, surfing means to use a program called a browser to go from site to site in search of information that interests you.

■ A link is a hot spot that, when clicked, triggers the object of the link.

■ Progressively clicking through the Web by triggering the links that interest you is known as browsing, a term synonymous with surfing the Net. The program you use when you surf the Web is called a browser.

■ Microsoft makes the most popular Web browser, which is called Internet Explorer (IE). Other browsers include Netscape Navigator and Safari, the default browser that ships with every new Macintosh.

- The open source version of Netscape Navigator is called Mozilla.

- Old versions of Web browsers are called legacy browsers; in computing, the term legacy refers to something old.

- Every place you can go on the Web has an address known as a URL, which stands for Uniform Resource Locator.

- The first part of a URL is called the protocol. The Web's protocol is HTTP, which stands for hypertext transfer protocol. Other protocols include FTP, mailto, news, telnet, and Gopher.

- On the Web, the page you define as your take-off point or start page is called your home page. Almost every company has a home page, as do government offices, schools, and colleges.

- If you go to a Web site without requesting a specific document, you view that site's default page, which is often the home page of the company or person who owns the site.

- If you request a specific document that cannot be found, you get the error 404: file not found. If you strip the filename off of the URL and browse to the part of the site that formerly contained the document, you can sometimes find what you are looking for or get a clue as to what happened to the missing file.

- In a Web browser, a bookmark is a pointer to a Web page that enables you to jump directly to that page, without having to navigate the Web to get there. In the Internet Explorer, bookmarks are called favorites.

- When you surf the Web, your browser keeps copies of the most recently visited Web sites in a place on your hard disk called the cache. You can purge (i.e., delete) the cache if you have been reading sensitive information that you would not want someone else using your computer to find.

- The Wireless Application Protocol (WAP) was invented to provide mobile telephone users with a way of accessing the Internet by routing requests through a WAP server that translates Web pages into a format appropriate for display on mobile phones. The pages are formatted according to the rules of the Wireless Markup Language (WML).

Handling Multimedia Objects, Plug-ins, and Viewers

- Helpers are applications known as helper apps that the browser launches to handle certain kinds of multimedia files. In the Windows operating system, you can change the helper apps by redefining the filename associations in the Windows File Manager.

- Plug-ins are software modules that enable computer applications, such as browsers, to play media objects directly instead of launching a helper app to handle the file externally. Macromedia Flash is the most popular multimedia plug-in on the Internet.

- Java is an object-oriented programming language invented by Sun Microsystems. Java can be used to create little applications, called applets, that can be transmitted over the Internet as part of a Web page.

- JavaScript is a client-side object-based scripting language that enables you to create dynamic Web pages without having to become a full-fledged Java programmer.

- An Active Aerver Page (ASP) is a Web page that can execute on the server scripts written in either VBScript or JScript, which is very similar to JavaScript.

- C# and J# are newly invented server-side programming languages that are part of the Microsoft .NET Framework, which also contains .NET versions of JScript and VBScript.

- Invented by Microsoft, ActiveX is a plug-in technology that enables a wide variety of Windows controls to be embedded in HTML documents. The ActiveX Flash control, for example, enables Flash objects to be downloaded and executed as part of a Web page at runtime.

Configuring Browser Security

- On the Internet, a zone is a predefined range or selection of Web sites or addresses. The IE browser lets you configure different security settings in four different zones called (1) Internet, (2) Local intranet, (3) Trusted sites, and (4) Restricted sites.

- Into the Restricted sites zone, you place Web sites that you believe could damage your computer or data. You put sites you trust into the Trusted sites zone. The Local intranet zone contains Web sites on your organization's intranet. By definition, all other sites are in the Internet zone.

- Windows users should periodically pull down the IE Tools menu and run Windows Update to download and install the latest security patches that help safeguard against being attacked by viruses, worms, and Trojans. Setting Windows Update to run automatically is the best way to make sure you always have the latest updates.

- A virus is malicious or unwanted code that installs itself on your computer without your knowledge by hiding inside other programmed objects. A worm is a special kind of virus that can replicate itself without hiding inside other objects. A Trojan (also called a Trojan horse) is a malicious application that masquerades as a desired object that you download knowingly to your computer.

Finding Things with Search Engines

- Yahoo! is the Web's most famous subject-oriented search directory. Like most of the Internet's search engines, Yahoo! also now contains full-text keyword searching.

- AltaVista was one of the Web's first and finest full-text search engines. It is now being challenged by Google, which features full-text as well as subject-oriented searching.

- Most search engines support the advanced search syntax, which lets you use quote signs, parentheses, and the Boolean operators AND, OR, and NOT to refine a search that may not be finding what you are looking for.

- Metasearching is the searching of searching, which you perform with a metasearch engine that invokes the other search engines automatically, synthesizes the results, and reports back with a single integrated list of hits. MetaCrawler, Dogpile, and Search.com are the most popular metasearch engines.

- Scholarly search engines restrict a search to reputable sources of information that are more trusted and reliable than the public Internet. Examples of scholarly search engines are ERIC, About.com, Britannica.com, and XanEdu.

- Multimedia searches enable you to find pictures, audio, animations, and videos. Lycos, AltaVista, and Singingfish were the pioneers in multimedia searching.

- Newsgroups are searchable at several search sites, including AltaVista, Dogpile, Excite, Google, InfoSeek, and Yahoo! If you write messages in newsgroups, you need to realize that your messages are keyword searchable unless you set the x-no-archive flag when you write the message.

- Archie is a legacy tool that can search the filenames of the millions of files that are available on anonymous FTP sites.

- Gopher is another legacy protocol for organizing files in hierarchical menus on the Internet. Some related tools are Veronica, a search tool for finding Gopher files, and Jughead, a program that added keyword search and Boolean operator capabilities to Gopher search. Gopher, Veronica, and Jughead are legacy tools that do not have much practical use on the Internet today. In the early 1990s, however, Gopher was the killer application of the Internet.

- Good search engines for finding people are Bigfoot, WhoWhere, Switchboard, and Yahoo!'s people search.

- The best place to find places is MapQuest, which serves an average of more than 10 million maps per day.

- The best places to find legal information are Law.com, FindLaw.com, and LexisONE.com. These are the sites where lawyers go to get breaking legal news and conduct legal searches.

- Search engines are undergoing a lot of research and development on the Internet. A good place to keep up with what is happening is searchenginewatch.internet.com.

Downloading from the Internet

- The quickest way to download text from the Internet is to copy the text onto your computer's Clipboard, from which you can paste the text into any other window on your screen. You can also open a text file with your browser, pull down the File menu, and use the Save option to save the file on your computer.

- The Adobe Acrobat Reader is a free plug-in that reads files in the Portable Document Format (PDF), which Adobe created as a platform-independent mechanism for sharing documents across the Internet.

- To download an image from the Internet, use your browser to display it. Then right-click (Windows) or CONTROL-click (Macintosh) the image to pop out the quick menu, and choose the option to save the image or picture to your hard drive.

- On the Web, there are only two file formats that every Web browser can be guaranteed to support: GIF and JPEG. The World Wide Web Consortium, however, has created a Portable Network Graphics (PNG) format intended to replace the patented GIF format.

- To download audio and video, you right-click (Windows) or CONTROL-click (Macintosh) the link that triggers the audio or video, and use the quick menu to save a copy on your hard drive.

- MPEG is emerging as the digital video standard for the United States and most of the world. MPEG stands for Motion Picture Experts Group, the International Standards Organization committee that created it.

- An archive is a container into which one or more files have been compressed to save space and packed into a single file that can be transmitted easily over a network. When you receive such a file, you need to use an extractor to unpack the archive and restore its contents onto your computer. Windows users normally unpack archived files with a product known as PKZIP for Windows. Macintosh users unpack archived files with Stuffit Expander, which is also available in a Windows version.

- A self-extracting archive is an executable file which, when executed, automatically extracts the files that are contained in the archive.

- Whenever you save a downloaded file on your computer, make sure the file you save has the correct filename extension for the type of file it is.

- Whenever you download files from the Internet, you should run a virus scan on your computer to make sure you have not received a virus. You can make virus-scanning happen automatically if you set your antivirus software to scan all incoming and outgoing mail and file transfers.

■ Key Terms

10BaseT *(6)*
10/100BaseT *(6)*
10GbE *(6)*
ActiveX *(33)*
applet *(31)*
Archie *(44)*
archive *(58)*
bits per second (bps) *(5)*
bookmark *(19)*
Boolean *(37)*
broadband *(7)*
browser *(10)*
browsing *(10)*
cable modem *(7)*
cache *(21)*
default page *(15)*
Digital Subscriber Line (DSL) *(7)*
direct connection *(9)*
Ethernet *(6)*

Flash *(28)*
Gbps *(6)*
gigabit *(6)*
Gopher *(44)*
Graphics Interchange Format (GIF) *(52)*
helper app *(24)*
home page *(15)*
hot word *(15)*
hover *(16)*
HTML *(49)*
hypergraphic trigger *(16)*
hypertext link *(15)*
Integrated Services Digital Network (ISDN) *(6)*
Internet Explorer (IE) *(10)*
Internet Service Provider (ISP) *(3)*
Java *(30)*
JavaScript *(31)*

Joint Photographic Experts Group (JPEG) *(52)*
Kbps *(5)*
kilobit *(5)*
legacy browser *(11)*
link *(10)*
lossless *(52)*
lossy *(52)*
Mbps *(6)*
megabit *(6)*
metasearching *(39)*
Microsoft Media Player *(28)*
modem *(5)*
Motion Picture Experts Group (MPEG) *(57)*
Mozilla *(11)*
MP3 *(55)*
multimedia *(23)*
Musical Instrument Digital Interface (MIDI) *(55)*

Netscape Navigator *(11)*
object *(30)*
open source *(11)*
plug-in *(27)*
**Point to Point Protocol
    (PPP)** *(6)*
**Portable Document Format
    (PDF)** *(50)*
**Portable Network Graphics
    (PNG)** *(52)*
QuickTime *(27)*
RealOne *(28)*

Safari *(11)*
self-extracting archive *(59)*
**Serial Line Internet Protocol
    (SLIP)** *(6)*
shareware *(59)*
spider *(36)*
stream *(27)*
surf *(10)*
telenet *(44)*
Trojan *(33)*
**Uniform Resource Locator
    (URL)** *(12)*

virus *(33)*
Web page *(13)*
Web site *(13)*
Webcasting *(27)*
**Wireless Application Protocol
    (WAP)** *(23)*
**Wireless Markup Language
    (WML)** *(23)*
worm *(33)*
zone *(34)*

■ Key Terms Quiz

1. A networking company that connects you to the Internet is called a(n) _____.

2. The invention of _____ in Bob Metcalfe's Harvard Ph.D. thesis in 1973 was a data communications breakthrough that fueled the explosion of local area networks.

3. DSL stands for _____.

4. The term _____ refers to the type of connection that carries multiple channels of information over a single cable.

5. When you surf the Web, your browser keeps copies of the most recently visited Web sites in a place on your hard disk called the _____.

6. A(n) _____ is a real-time feed from an audio or video source, encoded in such a way that the media can begin playing steadily

without making the user wait for the entire file to download to their computer.

7. A(n) _____ is a software module that adds functionality when installed into an existing computer application.

8. Distributed by Macromedia, _____ is a very popular multimedia plug-in that is installed on more than 97 percent of the Internet's end-user computers.

9. In computing, a(n) _____ is a software entity that is programmed to perform certain tasks or behave in certain ways depending on the context in which it is used.

10. AND, OR, and NOT are _____ operators used in constructing a search with advanced search syntax.

■ Multiple-Choice Quiz

1. Which of the following things do you need to get connected to the Internet?
    a. Internet-ready computer
    b. Operating system
    c. TCP/IP
    d. Client software
    e. Internet connection
    f. Internet address
    g. All of the above

2. Which of the following ways of connecting to the Internet theoretically has the most bandwidth?
    a. Dialup modem
    b. ISDN Basic Rate Interface
    c. Cable modem
    d. Tin cans and a string

3. What kind of link triggers when you mouse over a hot word and click to follow the link?
    a. Hypergraphic
    b. Image map

   c. Inline
   d. Hypertext

4. The simultaneous broadcast of a live event over the Web is called a
   a. Cablecast
   b. Intercast
   c. Webcast
   d. Newscast

5. Microsoft's plug-in technology is called
   a. Flash
   b. Java
   c. ASP
   d. ActiveX

6. Java applications that can be transmitted over the Internet as part of a Web page are called
   a. Beans
   b. Modules
   c. Applets
   d. Servlets

7. A malicious application that masquerades as a desired object that you download knowingly to your computer is called a
   a. Virus
   b. Worm

   c. Trojan
   d. Patch

8. Into which zone do you place Web sites that you believe could cause damage to your computer or your data?
   a. Internet
   b. Local intranet
   c. Trusted sites
   d. Restricted sites

9. Which of the following is a metasearch engine?
   a. Yahoo!
   b. Google
   c. Dogpile
   d. ERIC

10. Which audio file format records a stream of performance information that tells your computer's sound chip when to turn notes on and off, how loud to make them, and what instrument should make the sound?
   a. AIFF
   b. MP3
   c. RAM
   d. MIDI

■ Essay Quiz

1. Follow this book's Web site link to the DSL lookup site, and find out whether DSL is available in your neighborhood. If DSL is available, what data rates are available in your neighborhood, and what do they cost?

2. Contact your cable TV company to find out if cable modems are available. If so, how much does it cost to get connected, and what is the ongoing cost? If your cable TV company tells you cable modem service is not available, follow this book's Web site link to the Cable Modem Area Code Search to find out if any other companies offer cable modems in your area.

3. Survey ten or more of the homes in your neighborhood to find out how they are connected to the Internet. List the kinds of connections you find (such as dialup modems, ISDN, cable modems, or DSL) and tell what percentage of your neighbors use each type of connection. If any of your neighbors are not connected, include on your list the percentage of homes you surveyed that are not on the Internet.

4. Flash can make your Web browser do some really neat stuff. Follow this book's Web site links to the Flash showcase. View some of the demonstrations you find there. Make a list of the features you find Flash supporting that you have not seen on Web pages that don't use Flash. What is your favorite Flash feature?

   Note: If you do not have the latest version of Flash, you will be prompted to install it. Go ahead and do so.

5. At this book's Web site, follow the links to the people-finder search engines listed in the section on how to find people. Look yourself up in the different directories. Does Bigfoot find you? How about WhoWhere? Do you find yourself listed in Switchboard and Yahoo! People Search? How do you feel about being included or excluded from these people finders? If you are not included and you would like to be, follow the onscreen instructions for getting yourself listed.

Lab Projects

• Lab Project 2-1: Connectivity Planning

For the employees of a company or school to work online, they need to be able to connect to the Internet. Imagine that you work for a small company or school that has decided to begin permitting its employees to do some of their work from home. Your employer has asked you to recommend the best method or strategy for your fellow employees to connect from home so they can telecommute over the Internet. In developing this recommendation, you will need to consider the following factors:

- **Time**   How many hours per week will the typical employee spend telecommuting?
- **Bandwidth**   Does your school or company require high bandwidth for some or all of its computing activities?
- **Geography**   Do the employees live within a local calling distance, or are they spread out over a broader space?
- **Cost**   In almost every school or company, you need to stay within a budget. Refer to the cost comparison in Table 2-1, and consider the cost of the telecommunication solutions you recommend.

Use a word processor to write up your telecommuting recommendation in the form of a brief essay describing the network strategy that seems appropriate for your coworkers to connect to the Internet from home. If your instructor has asked you to hand in the recommendation, make sure you put your name at the top and then save it on disk or follow any other instructions you may have been given for this assignment.

• Lab Project 2-2: Sharing Bookmarks and Favorites

One of the most valuable resources a school or company can have is a list of good, reliable, recommended Web sites where employees can go to accomplish the kinds of tasks typical of the workplace. In this chapter, you learned that the Internet Explorer contains a Favorites mechanism for accessing such sites quickly.

Imagine that your employer has asked you to create a common list of bookmarked favorites that your fellow employees can use to enhance productivity in your workplace. Follow these steps:

1. Use the IE Web browser to visit the sites you want included in the list of bookmarked favorites.
2. While you are at each site, follow the steps you learned in this chapter to bookmark it.
3. Your list should contain at least seven bookmarks. If you need help finding seven appropriate sites, use the search engines you learned in this chapter.
4. Pull down the File menu and choose Import and Export; the Import/Export wizard appears.
5. Click Next to begin the wizard, and follow the onscreen instructions.
6. When the wizard asks what you want to import or export, choose Export Favorites.
7. When the wizard asks what folder or subfolder of the favorites you want to export from, click what you want and click Next.
8. When the Wizard asks where you want to save the exported folder, click the Browse button to choose the folder of your choice. Your bookmark.htm file will be copied into the folder you designate. Click Next.

If your instructor has asked you to hand in the exported bookmark file, the file to submit will be named bookmark.htm. Copy that file to a disk, or follow the other instructions your instructor gave you for submitting this assignment. If you have trouble finding the bookmark file, click the Windows Start button and use the Search option to locate the file. Later in this book, after you learn how to publish files on the Web, you will be able to publish this bookmark file to a location from which your users can easily access it over the Web or import it into their browser's bookmarks or favorites.