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Discovering COMPUTERS

COMPLETE

Your Interactive Guide
to the Digital World



SHELLY | VERMAAT



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 - Microsoft Windows® Vista™
 - Microsoft Windows® 7

Discovering COMPUTERS

Your Interactive Guide to the Digital World

COMPLETE



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Preface

The Shelly Cashman Series® offers the finest textbooks in computer education. We are proud of the fact that the previous sixteen editions of this textbook have been the most widely used in computer education. With this edition of *Discovering Computers*, we have implemented significant improvements based on current computer trends and comments made by instructors and students, and are introducing an interactive, multi-media e-book and CourseMate Web site. *Discovering Computers: Your Interactive Guide to the Digital World* continues with the innovation, quality, and reliability you have come to expect from the Shelly Cashman Series.

In *Discovering Computers: Your Interactive Guide to the Digital World*, you will find an educationally sound, highly visual, interactive, and easy-to-follow pedagogy that, with the help of animated figures, relevant video, and interactive activities in the e-book, presents an in-depth treatment of introductory computer subjects. Students will finish the course with a solid understanding of computers, how to use computers, and how to access information on the Web.

Objectives of this Text, e-Book, and CourseMate Web Site

Discovering Computers: Your Interactive Guide to the Digital World, Complete is intended for use as a stand-alone solution or in combination with an applications, Internet, or programming textbook in a full-semester introductory computer course. No experience with computers is assumed. The objectives of this offering are to:

- Present the most-up-to-date technology in an ever-changing discipline
- Give students an in-depth understanding of why computers are essential components in business and society
- Teach the fundamentals of computers and computer nomenclature, particularly with respect to personal computer hardware and software, and the Web
- Present the material in a visually appealing, interactive, and exciting manner that motivates students to learn
- Assist students in planning a career
- Provide exercises, lab assignments, and interactive learning activities that allow students to learn by actually using the computer and the Web

Hallmarks of Discovering Computers

To date, more than six million students have learned about computers using *Discovering Computers*. With the Web integration and interactivity, streaming up-to-date audio and video, extraordinary step-by-step visual drawings and photographs, unparalleled currency, and the Shelly and Cashman touch, this book will make your computer concepts course exciting and dynamic. Hallmarks of Shelly Cashman Series *Discovering Computers* include:

A Proven Pedagogy

Careful explanations of complex concepts, educationally-sound elements, and reinforcement highlight this proven method of presentation.

A Visually Appealing Book that Maintains Student Interest

The latest technology, pictures, drawings, and text are combined artfully to produce a visually appealing and easy-to-understand book. Many of the figures include a step-by-step presentation (see page 145), which simplifies the more complex computer concepts. Pictures and drawings reflect the latest trends in computer technology. This combination of pictures, step-by-step drawings, and easy-to-read text layout sets the standard for computer textbook design.



- Present strategies for purchasing a desktop computer, a notebook computer, a Tablet PC, and personal mobile devices
- Provide alternative learning techniques and reinforcement via the Web
- Offer distance-education providers a textbook with a meaningful and exercise-rich digital learning experience

Distinguishing Features

Discovering Computers: Your Interactive Guide to the Digital World includes a variety of compelling features, certain to engage and challenge students, making learning with *Discovering Computers* an enriched experience. These compelling features include:

- Multi-media rich and interactive e-book and CourseMate Web site that engage students in learning about computer concepts.

- Animations, relevant and timely video, interactive in-chapter activities and Quiz Yourself reinforcement exercises embedded in the e-book, combined with the integration of interactive activities, videos, and end-of-chapter student assignments on the CourseMate Web site offer students an exceptional learning solution.
- Living Digitally and Web 2.0 features introduce and familiarize students with new and developing technology, making the technology accessible for introductory students.
- Innovative Computing, FAQ and Ethics & Issues boxes, Companies on the Cutting Edge, Technology Trailblazers, and High-Tech Talk articles enable relevant classroom discussion.



Latest Technologies and Terms

The technologies and terms your students see in *Discovering Computers* are those they will encounter when they start using computers. Only the latest application software is shown throughout the book.

Web Integrated

This book uses the Web as a major learning tool. The purpose of integrating the Web into the book is to (1) offer students additional information and currency on important topics; (2) use its interactive capabilities to offer creative reinforcement and online quizzes; (3) make available alternative learning techniques with Web-based learning games, practice tests, and interactive labs; (4) underscore the relevance of the Web as a basic information tool that can be used in all facets of society; (5) introduce students to doing research on the Web; and (6) offer instructors the

opportunity to organize and administer their traditional campus-based or distance-education-based courses on the Web using various learning management systems.

Extensive End-of-Chapter Student Assignments

A notable strength of *Discovering Computers* is the extensive student assignments and activities at the end of each chapter. Well-structured student assignments can make the difference between students merely participating in a class and students retaining the information they learn. The student assignments in *Discovering Computers: Your Interactive Guide to the Digital World* include: Chapter Review, Key Terms, Checkpoint, Problem Solving @ Home, Problem Solving @ Work, Learn It Online, Learn How To, Web Research, and Critical Thinking. The Problem Solving and Critical Thinking student assignments also include Collaboration exercises, encouraging team work amongst students.

Instructor Resources

The Instructor Resources include both teaching and testing aids.

Instructor's Manual Includes lecture notes summarizing the chapter sections, figures and boxed elements found in every chapter, teacher tips, classroom activities, lab activities, and quick quizzes in Microsoft Word files.

Syllabus Easily customizable sample syllabi that cover policies, assignments, exams, and other course information.

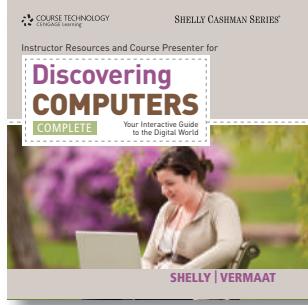


Figure Files Illustrations for every figure in the textbook in electronic form. Figures are provided both with and without callouts.

Solutions to Exercises

Includes solutions for all end-of-chapter student assignments. Also includes Tip Sheets, which are suggested

starting points for the Problem Solving exercises.

PowerPoint Presentations — Course Presenter A one-click-per-slide presentation system that provides PowerPoint slides for every subject in each chapter. Several computer-related video clips are available for optional presentation. Course Presenter provides consistent coverage for multiple lecturers.

Test Bank & Test Engine Test Banks include 220 questions for every chapter, featuring objective-based and critical thinking question types, and including page number references and figure references, when appropriate. Also included is the test engine, ExamView, the ultimate tool for your objective-based testing needs.

Printed Test Bank A Rich Text Format (.rtf) version of the test bank that you can print.

Test Out/Final Exam Objective-based exam that can be used to test students out of your course, or as a final examination. Includes a master answer sheet.

Pretest/Posttest Carefully prepared tests that can be used at the beginning and the end of the semester to measure student progress. Includes master answer sheet.



NEW! Computer Concepts CourseMate

The new Computer Concepts CourseMate for *Discovering Computers* is the most expansive digital site for any computer concepts text in the market today! The content in the

CourseMate solution is integrated into each page of the text, giving students easy access to current information on important topics, reinforcements activities, and alternative learning techniques. Integrating the Computer Concepts CourseMate into the classroom keeps today's students engaged and involved in the learning experience.

The Computer Concepts CourseMate includes an integrated, multi-media rich and interactive digital book, and a variety of interactive Quizzes and Learning Games, Exercises, Web Links, Videos, and other features that specifically reinforce and build on the concepts presented in the chapter. These interactive activities are tracked within the CourseMate Engagement Tracker, making it easy to assess students' retention of concepts. This digital solution encourages students to take learning into their own hands and explore related content on their own to learn even more about subjects in which they are especially interested.

All of these resources on the Computer Concepts CourseMate for *Discovering Computers* enable students to get more comfortable using technology and help prepare students to use the Internet as a tool to enrich their lives.

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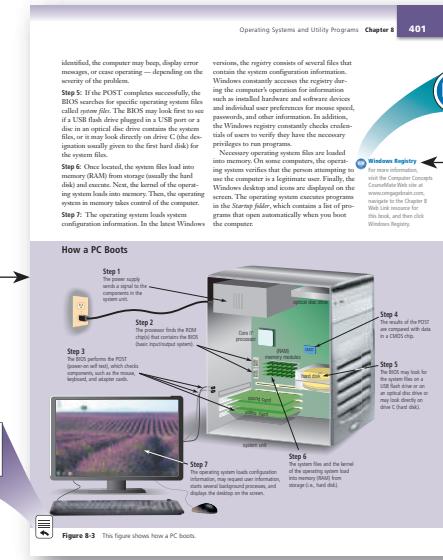
Visual Walkthrough of the Book

Current. Relevant. Innovative. Teaching the Significance of Today's Digital World.



Initial Chapter Figure

Carefully study the first figure in each chapter because it provides an easy-to-follow overview of the major purpose of the chapter.

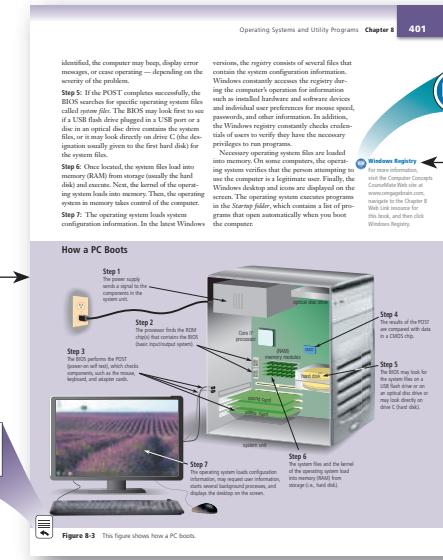


Step Figures

Each chapter includes numerous step figures that present the more complex computer concepts using a step-by-step pedagogy.

Interactive e-Book Activity Icon

Several elements in each chapter are interactive learning activities in the e-book and are identified by this icon.



Chapter Opener

Before reading the chapter, carefully read through the Objectives to familiarize yourself with the material in each chapter.

CourseMate Icon

Visit the Computer Concepts CourseMate Web site for access to many of the interactive chapter elements.

Web Links

Obtain current information and a different perspective about key terms and concepts by visiting the Web Links found in the margins throughout the book.

FAOS

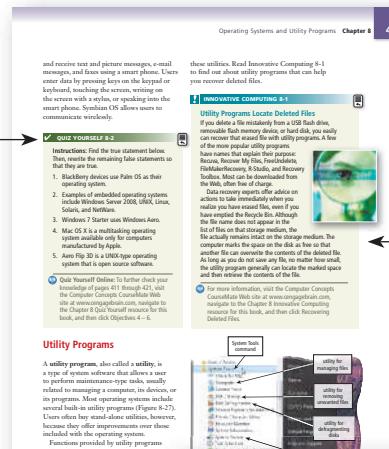
FAQ (frequently asked questions) boxes offer common questions and answers about subjects related to the topic at hand.



Figure 8-9 Spooling increases both processor and printer efficiency by placing documents to be printed in a buffer on disk before they are printed. This figure illustrates three documents in the queue with one document printing.

Quiz Yourself

Three Quiz Yourself boxes per chapter help ensure retention by reinforcing sections of the chapter material, rather than waiting for the end of chapter to test. Use Appendix A for a quick check of the answers, and access additional Quiz Yourself quizzes via the Computer Concepts CourseMate Web site for interactivity and easy use.



Microsoft Word - 2010-01-11.pptx

Innovative Computing

Discover different and innovative ways of using various technologies and learn how computing is applied creatively to solve problems.



Looking Ahead

The Looking Ahead boxes offer a glimpse of the latest advances in computer technology that will be available, usually within five years.

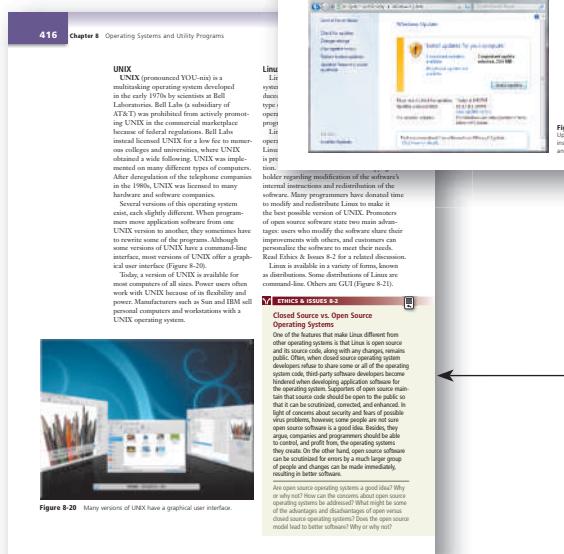


Figure 8-20 Major antigen of LCMV has a conserved core region.

UNIX (pronounced YOO-nix) is a multitasking operating system developed in the early 1970s at Bell Laboratories. Bell Labs (a subsidiary of AT&T) was prohibited from actively marketing UNIX in the commercial market because of federal regulations. Bell Labs instead licensed UNIX for a low fee to various colleges and universities, where it obtained a wide following. UNIX was implemented on many different types of computers. After deregulation of the telephone industry in the 1980s, UNIX was licensed to commercial companies.

In the 1980s, UNIX was licensed to hardware and software companies. Several versions of this operating system exist, each slightly different. When programmers move application software from UNIX to another, they sometimes rewrite some of the programs. Although some versions of UNIX have a command interface, most versions of UNIX offer a graphical user interface (Figure 8-20).

CNA operating system.

FIGURE 10-2 **Linux vs. Open Source Operating Systems**

One of the features that make Linux different from other operating systems is that Linux is open source and anyone can see the source code for the operating system. Often, when closed source operating system developers release their software, they keep the operating system code, third-party developers become frustrated when developing applications off the shelf. This is because the source code for the main function of the software cannot be seen or used. In the light of concerns about security and fears of possible viruses, many people believe that using an open source software is a good idea. Besides, they argue, it is better to have more people involved in control, and profit, from the operating systems. On the other hand, open source software can be erratic and unpredictable. The merging of people and changes can be made immediately, resulting in a chaotic situation.

An open source operating system is good idea? Why or why not? How can concerns about open source operating systems be addressed? What are the pros and cons of the advantages and disadvantages of open versus closed source software? Is it better to have an open source model lead to better software? Why or why not?

Ethics & Issues

Ethics & Issues boxes raise controversial, computer-related topics of the day, challenging readers to consider closely general concerns of computers in society.

Computer Usage @ Work

Learn about how computers are used in fifteen different professional industries, including transportation, hospitality, education, sports, and construction.

High-Tech Talk

The High-Tech Talk article at the end of each chapter expands on a topic covered in the chapter and presents a more technical discussion.

QUIZ YOURSELF 8-3

Instructions: Find the true statement below, then rewrite the remaining false statements so that they are true.

1. A pop-up blocker shrinks the size of a file(s).
2. An anti-spam program protects a computer against viruses by identifying and removing any computer viruses found in memory, on storage media, or on incoming files.
3. A personal firewall is a utility that detects and protects a personal computer from unauthorized intruders.
4. You should uninstall files and disks regularly in the event your originals are lost, damaged, or destroyed.
5. Web filtering software writes text, graphics, audio, and video files to a recordable or rewritable disc.
6. Fragmenting a disk is the process of reorganizing it so that the files are stored in contiguous sectors.

Quiz Yourself Online: To further check your knowledge of pages 421 through 428, visit the Computer Concepts CourseMate Web site at www.cengagebrain.com, navigate to the Chapter 8 Quiz Yourself resource for this book, and then click Objective 7.

Chapter Summary

This chapter defined an operating system and then discussed the functions common to most operating systems. The chapter introduced a variety of stand-alone operating systems, server

operating systems, and embedded operating systems. Finally, the chapter described several utility programs.

Computer Usage @ Work

Education

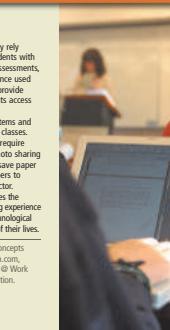
Teachers have been using computers in education for many years. Teachers have been able to advantage of advances in computer technology to help provide a better educational experience for their students.

Many grade schools throughout the United States, as well as other countries, enable parents to track their child's performance online. In the past, parents would rely solely on their child bringing home graded assignments and tests to know what he or she was learning. In some cases, parents would be surprised when they saw their child's grades on report cards every two to three

At the college level, many instructors today rely largely on e-learning systems to provide students with Web-based access to course materials and assessments, discussion forums, chat rooms, and e-mail. Once used mainly in online classes, e-learning systems provide institutions the ability to allow students access to the class at any time of the day.

Most instructors go beyond e-learning systems and use additional technologies to enhance their classes. For example, digital cameras often require students to upload their assignments to a photo sharing community, and an English instructor might save paper is to upload research papers to are them with the instructions for the assignment. This allows the instructor and student to interact with each other and provides the instructor and learning experience provides students with technological benefit that is the rest of their lives.

For more information, visit the Computer Concepts Web site at www.cengagebrain.com, chapter 8 Computer Usage @ Work book, and then click Education.



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High-Tech Talk

Touch Screen Technology: How the Screen Is So Smart

Touch screen technology is becoming a larger part of everyday life for many individuals. As presented in Chapter 5, a touch screen is a touch-sensitive display device that users can interact with by touching areas of the screen. People have been using touch screens for more than 30 years, and this technology is being used in more places, such as in smart phones, point-of-sale terminals, automated teller machines, mobile GPS receivers, home security systems, and tablet PCs.

Touch screen technology has evolved since its creation in the late 1960s. The first touch screen devices were developed for use in aircraft only one area at a time with the tip of their fingers and they were much less accurate than today's touch screens. As the technology advanced, touch screens began to perform additional tasks, such as dragging their finger across the screen and touching more than one area of the screen at a time. For example, you can use a touch screen to allow you to zoom in pictures or other objects on the screen by placing two fingers close together on the screen, and then slowly moving them apart. Three types of touch screens are most in use today: resistive, capacitive, and surface acoustic wave touch screens.

electrical charge, reducing the charge on the capacitive layer. Circuits located at each corner of the capacitive touch screen measure the change in electrical charge. The circuits then send the data to the touch screen controller to determine the location on the computer. The controller then uses the data to calculate the location where the finger is touching the screen. Capacitive touch screens are typically anti-shock and unaffected by items that do not conduct electrical charges.

An example of the components of a capacitive touch screen is shown in Figure 8-10.

The second type of touch screen is a resistive touch screen. A metallic conductive and resistive layer held apart by spacers cover a resistive touch screen. When a user touches a resistive touch screen, the two conductive and resistive layers connect in the location of the touch. An electronic current runs between the two layers, and the interruption in the current is detected by a touch screen controller to calculate the exact location of the touch.

Although resistive touch screens usually are more affordable than capacitive touch screens, they are not as clear and can be damaged more easily.

The third type of touch screen uses surface wave technology. Surface wave technology passes ultrasonic waves over the touch screen. Touching the screen absorbs portions of the waves, which then allows the

touch screen controller to calculate the position at which the object touched the screen. Because ultrasonic waves pass over the touch screen, it is easy for outside elements to damage the device. Touch screens using surface wave technology are the most advanced and often the most expensive of the three types.

There are other types of touch screen technologies exist, but they are not used as widely as the capacitive, resistive, and surface

wave touch screens. Optical touch screens use cameras mounted around the perimeter of the touch screen to detect objects close to the surface.

Infrared touch screens use light emitting diodes and light detectors at the edges of the touch screen to detect objects that break the beam of light sent from the diodes to the detectors.

As touch screen prices continue to decrease, they most likely will be incorporated in an increasing number of computers and mobile devices. Touch screens are considered productivity by allowing people to interact with devices more quickly than they can with a mouse or keyboard.

For more information, visit the Computer Concepts CourseMate Web site at www.cengagebrain.com, navigate to the Chapter 8 High-Tech Talk resource for this book, and then click Touch Screen Technology.

Operating Systems and Utility Programs

431 Chapter 8

Companies on the Cutting Edge

VERISIGN Internet Infrastructure Services

Technology users desire immediate access to information and services. Their ability to communicate and conduct commerce securely is aided in large part by VeriSign. More than 100 million companies use VeriSign services to protect the Internet, and their purchases, text messages, downloads, and other transactions are enabled and protected by VeriSign's infrastructure services.

Companies like Semantic acquired VeriSign's Authentication division business in 2010 to strengthen encryption and identity services and

RESEARCH IN MOTION (RIM) Wireless Mobile Communications Devices Manufacturer

By 2012, 500 million people worldwide are expected to access social networking Web sites on smart phones, up from \$2 billion in 2007. Research in Motion (RIM) helped fuel this networking frenzy by partnering with MySpace in 2008 to help connect networks on the Web. They also created BlackBerry, a mobile e-mail smart phone, which is RIM's key product.

The Canadian company was founded in 1984 by Mike Lazaridis, who serves as its president and co-CEO. Lazaridis's vision for wireless technology developed

For more information, visit the Computer Concepts CourseMate Web site at www.cengagebrain.com and then navigate to the Chapter 8 Companies on the Cutting Edge resource for this book.

Technology Trailblazers

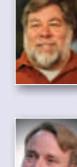
STEVE WOZNIAK Apple Co-founder

Mixing fun with work comes naturally for Steve Wozniak. As Apple's cofounder, he says his creative design career has always been a hobby. He loves mixing creativity, humor, games, and education. In his opinion, Apple's success evolved because he designed computers that had minimal parts and maximum performance.

Wozniak joined Apple in 1975 with Steve Jobs, Steve Wozniak, and Steve Jobs, and wrote most of the software. Ten years later he cofounded Pixar, the award-winning animation studio. He left Apple in 1985 to spend time with his family while working on projects, and then became an advisor to NeXT.

Wozniak was inducted into the Consumer Electronics Hall of Fame and the National Inventors Hall of Fame. One of his current passions is applying artificial intelligence to robots and self-repairing robots. He also is a member of the Silicon Valley Mavericks, a polo team that plays using Segway electric transportation devices.

For more information, visit the Computer Concepts CourseMate Web site at www.cengagebrain.com and then navigate to the Chapter 8 Technology Trailblazers resource for this book.

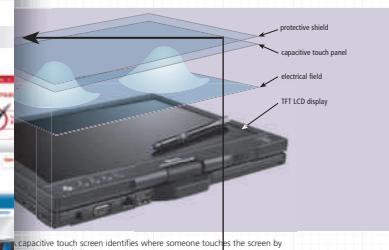


LINUS TORVALDS Linux Creator

Inductees to the Computer History Museum in Mountain View, CA, are noted for their contribution to computer technology. Linus Torvalds joined the Museum's Hall of Fellows in 2008 for his creation of the open source operating system, Linux.

While working on an operating system in 1991, he announced his project in an Internet newsgroup. He made the source code available and asked readers for suggestions to enhance the product. Computer users responded with many useful suggestions and enhancements. Three years later he released a greatly enhanced version he called Linux.

For more information, visit the Computer Concepts CourseMate Web site at www.cengagebrain.com and then navigate to the Chapter 8 Technology Trailblazers resource for this book.



Companies on the Cutting Edge and Technology Trailblazers

Everyone who interacts with computers should be aware of the key computer-related companies and of the more famous leaders of the computer industry.

End-of-Chapter Student Assignments

432 Chapter 8 Operating Systems and Utility Programs

Chapter Review

The Chapter Review reinforces the main concepts presented in this chapter.

To listen to an audio version of this Chapter Review, visit the Computer Concepts CourseMate Web site at www.cengagebrain.com and then navigate to the Chapter 8 Chapter Review resource for this book.

1. What is System Software, and What Are the Two Types of System Software?

System software consists of the programs that control or maintain the operations of a computer and its devices. Two types of system software are operating systems and utility programs. An **operating system** (OS) is a set of programs designed to make the computer work together to coordinate all the activities among computer hardware resources. A **utility program**, also called a **utility**, performs maintenance-type tasks, usually related to managing a computer, its devices, or its programs.

2. What Are the Functions of an Operating System?

The operating system starts and shuts down a computer, provides a user interface, manages programs, manages memory, coordinates tasks, configures devices, establishes an Internet connection, performs security, optimizes system utilities, updates automatically, controls a network, and administers security. The **user interface** controls how data and instructions are entered and how information is displayed on a screen. Two types of user interfaces are a **graphical user interface (GUI)** and a **command-line interface**. Manager programs refer to many users, and how many programs are open at one time. An operating system can support many users. An operating system may be **single user/single tasking**, **multiuser/multitasking**, or **multiprocessing**. **Memory management** optimizes the use of random access memory (RAM). If memory is insufficient, the operating system may use **virtual memory**, which allocates a portion of a storage medium to fast memory.

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that provides updates to the program. A **server operating system** is an operating system that organizes and coordinates how multiple users access and share network resources. Network administrators typically have an **administrator account** that enables them to access files, install programs, and specify system settings, including creating accounts and establishing permissions.

3. What Is the Startup Process on a Personal Computer?

Booting is the process of starting up or restarting a computer. When a user turns on a computer, the power supply sends a signal to the system unit. The processor chip (the ROM chip) that contains the BIOS (*basic input/output system*), which is firmware with the processor's startup instructions, sends a signal to the *power-on self test (POST)* to check the system components and compare the results with data in a CMOS chip. If the POST completes successfully, the BIOS searches for the *system files* and the *kernel* of the operating system, which manages memory, processes, and loads them into memory. Finally, the operating system loads configuration information, starts services, and loads user applications. The operating system executes programs in the *Startup folder*, which contains a list of programs that open automatically when you boot the computer.

To visit the Computer Concepts CourseMate Web site at www.cengagebrain.com, navigate to the Chapter 8 Quiz Yourself resource for this book, and then click

organizing capabilities, and an easy-to-use interface. Most users choose from Windows 7, Windows 7 Home Premium, Windows 7 Starter, or Windows 7 Professional editions. Mac OS X is a multitasking operating system available only for Apple computers. UNIX is a multitasking operating system developed at Bell Laboratories. Linux is a popular, multitasking UNIX-type operating system that is *open source software*, which means its code is available to the public for use, modification, and redistribution.

5. What Are Various Server Operating Systems?

Server operating systems include Windows Server 2008, Ubuntu Linux, Solaris, and others. Windows Server 2008 is an upgrade to Windows Server 2003 and includes features of previous Windows Server versions. UNIX like Linux is a **multiprocessor operating system** because it is both a stand-alone and server operating system. Solaris, a version of UNIX developed by Sun Microsystems, is a server operating system designed specifically for e-commerce applications. Novell's NetWare is a server operating system designed for client/server networks.

6. What Are the Features of Several Embedded Operating Systems?

Mobile devices and many consumer electronics have an **embedded operating system** that resides on a ROM chip. Popular embedded operating systems include Windows Embedded CE, Windows Phone 7, Palm OS, iPhone OS, BlackBerry, Google Android, Kindle, Nook, and Symbian OS. Windows Embedded CE is a scaled-down Windows-based system designed for use on compact devices, instrumentation, and computing devices with limited functionality. Windows Phone 7, which is a successor Windows Mobile, provides a user interface designed specific types of smart phones. Palm OS is an aging mobile device.

Windows Phone 7, which is a successor Windows Mobile, provides a user interface designed specific types of smart phones. Palm OS is an aging mobile device.

As iPhone OS, developed by Apple, is



an operating system for the iPhone and iPod touch. The iPhone OS is based on the handheld devices developed by RIM, Google Android, and operating systems developed by Google for mobile devices.

Embedded Linux is a scaled-down Linux operating system for smart phones, PDAs, portable media players, and other devices requiring an embedded operating system. Symbian OS is an open source multitasking operating system designed for smart phones.

To visit the Computer Concepts CourseMate Web site at www.cengagebrain.com, navigate to the Chapter 8 Quiz Yourself resource for this book, and then click Objectives 4–6.

7. What Is the Purpose of Several Utility Programs?

Most operating systems include several built-in utility programs. A **file manager** performs functions related to file management. A **search utility** attempts to locate a file on your computer based on criteria you specify. An **image viewer** allows you to view images and convert the formats of graphics files, such as photos. A **calculator** removes a program and any associated entries in the system files. A **disk cleanup utility** searches for and removes unnecessary files. A **disk defragmenter** organizes the files and unused space on a computer's hard disk. A **backup utility** is used to copy, or *back up*, selected files and entire drives to another location. A **restore utility** attempts to restore the backup process and returns backed up files to their original form. A **screen saver** displays a moving image or blank screen if no keyboard or mouse activity occurs for a specified time. A **personal firewall** detects and protects a personal computer from unauthorized intrusions. An **antivirus program** protects computers against a virus, or potentially damaging computer program, by identifying and removing any computer viruses. A **spyware remover** detects and deletes spyware and other similar programs. An **adware remover** detects and deletes adware. Internet security software includes **Web filtering**, **spam filters**, an anti-spam program, a **firewall**, and a **pop-up blocker**. A **file compression utility** shrinks the size of a file so it takes up less storage space. A **media player** allows you to view images and animation, listen to audio, and watch video files on a computer. **Disk burning software** writes text, graphics, audio, and video to removable media, such as rewritable CD, DVD, or Blu-ray Disc. A **personal computer maintenance utility** identifies and fixes operating system problems and improves a computer's performance.

To visit the Computer Concepts CourseMate Web site at www.cengagebrain.com, navigate to the Chapter 8 Quiz Yourself resource for this book, and then click Objective 7.

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Key Terms

You should know the Primary Terms and be familiar with the Secondary Terms. The list below helps focus your study.

To see an example of and a definition for each term, and to access current and additional information from the Web, visit the Computer Concepts CourseMate Web site at www.cengagebrain.com and then navigate to the Chapter 8 Key Terms resource for this book.

Primary Terms

(bolded terms black, characters in the chapter)

anti-spam program (427)

antivirus program (426)

automatic update (409)

backup utility (424)

BIOS (402)

boot disk (402)

boot drive (402)

booting (400)

browsing (400)

cold boot (400)

defragmenting (424)

disk burning software (428)

disk defragmenter (423)

driver (400)

embedded operating

system (418)

file compression utility

(427)

file manager (422)

folder (422)

image viewer (423)

iPhone (420)

Linux (416)

log on (410)

Mac OS X (415)

Macintosh operating

system (415)

media player (427)

memory management (406)

operating system (OS) (398)

password (410)

performance monitor (408)

personal computer

maintenance utility (428)

personal firewall (425)

phishing filter (427)

Plug and Play (408)

Aero Flip 3D (414)

AntiVirus

Antivirus

Automatic Update

Backup

BIOS

Boot

Boot Disk

Boot Drive

Booting

Browsing

Cold Boot

Defragmenting

Disk Burning Software

Disk Defragmenter

Driver

Embedded Operating System

File Compression Utility

File Manager

Folder

Image Viewer

iPhone

Linux

Log On

Mac OS X

Memory Management

Operating System (OS)

Password

Performance Monitor

Personal Computer

Maintenance Utility

Personal Firewall

Phishing Filter

Plug and Play

Aero Flip 3D

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Automatic Update

Backup

BIOS

Boot

Boot Disk

Boot Drive

Booting

Browsing

Cold Boot

Defragmenting

Disk Burning Software

Disk Defragmenter

Driver

Embedded Operating System

File Compression Utility

File Manager

Folder

Image Viewer

iPhone

Linux

Log On

Mac OS X

Memory Management

Operating System (OS)

Password

Performance Monitor

Personal Computer

Maintenance Utility

Personal Firewall

Phishing Filter

Plug and Play

Aero Flip 3D

AntiVirus

Antivirus

Automatic Update

Backup

BIOS

Boot

Boot Disk

Boot Drive

Booting

Browsing

Cold Boot

Defragmenting

Disk Burning Software

Disk Defragmenter

Driver

Embedded Operating System

File Compression Utility

File Manager

Folder

Image Viewer

iPhone

Linux

Log On

Mac OS X

Memory Management

Operating System (OS)

Password

Performance Monitor

Personal Computer

Maintenance Utility

Personal Firewall

Phishing Filter

Plug and Play

Aero Flip 3D

AntiVirus

Antivirus

Automatic Update

Backup

BIOS

Boot

Boot Disk

Boot Drive

Booting

Browsing

Cold Boot

Defragmenting

Disk Burning Software

Disk Defragmenter

Driver

Embedded Operating System

File Compression Utility

File Manager

Folder

Image Viewer

iPhone

Linux

Log On

Mac OS X

Memory Management

Operating System (OS)

Password

Performance Monitor

Personal Computer

Maintenance Utility

Personal Firewall

Phishing Filter

Plug and Play

Aero Flip 3D

AntiVirus

Antivirus

Automatic Update

Backup

BIOS

Boot

Boot Disk

Boot Drive

Booting

Browsing

Cold Boot

Defragmenting

Disk Burning Software

Disk Defragmenter

Driver

Embedded Operating System

File Compression Utility

File Manager

Folder

Image Viewer

iPhone

Linux

Log On

Mac OS X

Memory Management

Operating System (OS)

Password

Performance Monitor

Personal Computer

Learn It Online

The Learn It Online exercises, which include At the Movies online CNET videos, practice tests, interactive labs, learning games, and Web-based activities offer a wealth of online reinforcement.

438 Chapter 8 Operating Systems and Utility Programs

Problem Solving @ Home

The Problem Solving @ Home exercises extend your knowledge of the chapter concepts by seeking solutions to practical computer problems that you may encounter at home or school. The Collaboration exercise should be completed with a team.

In the real world, practical problems often can be solved in multiple ways. Provide one solution to each of the following problems using available resources, such as articles on the Web or in print, blogs, podcasts, videos, television, user guides, other individuals, and electronics and computer stores. You may need to use multiple resources to obtain an answer. Present your solutions in the form requested by your instructor (brief report, presentation, discussion, or other means).

- Computer Cannot Boot** You recently purchased a computer from a friend. When you turn on the computer, a message displays that says, "Operating system not found." What steps will you take before calling technical support?
- Improper Shut Down** During the startup process, your computer displays a message indicating that the computer did not shut down properly. You are certain that you shut down the computer properly when you last used it. The message also lists options to start Windows normally or start Windows in safe mode. How will you respond? Why?
- Incorrect Display Settings** You recently turned on your computer and noticed that the screen resolution, desktop background, and color scheme had changed, even though you have not changed the display settings since purchasing the computer several months ago. What might have caused Windows to change the display settings? What are your next steps?
- Unreadable Taskbar Buttons** While using your computer for a research project, you start multiple programs. With so many programs running, you are unable to determine which buttons correspond to each program. How can you determine which button to click to access the desired program?
- Poor Computer Performance** Your friend sends you an e-mail message stating that her computer is running slowly. She asks if you know of any programs that are included with Windows that will help increase her computer's performance. How will you respond?
- Maximum CPU Usage** Because your computer is performing slowly, you start the Windows Task Manager to investigate. You see that the CPU usage is near 100%. You are not aware of any other programs currently running. What might be causing this?
- Command Not Displaying** While using a computer in your school's computer lab, you decide to use the Control Panel to change the desktop background. When you click the Start button, the Control Panel command does not display on the Start menu. What could be the reason for this?
- Unwanted Programs** The new computer that you ordered online arrived today. You anxiously unpack it, connect all components, and then turn it on. After answering a series of questions to set up the computer, you notice it includes programs that you do not want. How will you remove these unwanted programs?

Collaboration

Slow Computer A fellow classmate has been complaining that his computer does not seem to be working properly. He complains that Windows takes too long to start and that it runs very slowly. You would like more practice troubleshooting computer problems, so you offer to look at his computer. When you start Windows, you notice that the hard disk has less than 100 MB of free space, and more than 50 Windows updates are available for the computer. Form a team of three people and determine how to use the software that is included with Windows, in addition to any third-party software that may be needed, to resolve these computer problems. Compile your findings and submit them to your instructor.

Problem Solving @ Home, Problem Solving @ Work, and Collaboration

Tackle everyday computer problems and put the information presented in each chapter to practical use with the Problem Solving @ Home and Problem Solving @ Work exercises. Work as a team to solve the Collaboration exercises.

437 Chapter 8 Operating Systems and Utility Programs

Learn It Online

The Learn It Online exercises are interactive Web exercises designed to reinforce and expand your understanding of the chapter concepts. The descriptions below briefly summarize each exercise.

At the Movies — Free Online Antivirus To complete the Learn It Online exercises, visit the Computer Concepts CourseMate Web site at www.cengagebrain.com, navigate to the Chapter 8 resources for this book, click the link for the exercise you want to complete, and then read the instructions.

- Wheel of Terms** Identify important key terms presented in this chapter by playing the Shelly Cashman Series version of this popular game.
- You're Hired!** Embark on the path to a career in computers by answering questions and solving puzzles related to concepts discussed in this chapter.
- Crossword Puzzle Challenge** Complete an interactive crossword puzzle to reinforce concepts presented in this chapter.
- Windows Exercises** Step through the Windows 7 exercises to learn about Windows, using a screen saver, changing desktop colors, customizing the desktop for multiple users, and customizing a computer.
- Practice Test** Take a multiple choice test that checks your knowledge of the chapter concepts and review resulting study guide.
- Who Wants To Be a Computer Genius?** Play the Shelly Cashman Series version of this popular game to answer questions to find out if you are a computer genius. Panic buttons are available to provide assistance during game play.



for Windows Update. What could be causing this?

Antivirus Schedule You recently changed your work schedule so that you work until 6:00 p.m. instead of 5:00 p.m. At 5:00 p.m. each day, you notice that the antivirus program on your computer automatically runs a scan of the entire hard disk. This process slows your computer, and the program usually still is scanning when you leave the office. How can you change the configuration so that the antivirus program does not start until after you leave?

Minimum Battery Power When you use your notebook computer and it is not plugged in, the battery lasts for only one hour, but the documentation states that the computer can last for two hours on battery power. What are some ways that you can increase the battery life?

Collaboration

Computers in Education A private elementary school in your neighborhood has received a grant to create a computer lab with Internet access so that students can learn about computers and related technologies. Your neighbor, who also is a teacher at the school, asks for advice regarding how they should spend the grant money. Form a team of three people to determine the best configuration for the lab. One team member should research whether a PC or Mac is more beneficial. Another team member should research the application software that should be installed on these computers, and the other team member should determine what, if any, peripheral devices should be attached to the computers in the lab. Compile your findings and submit them to your instructor.

439 Chapter 8 Operating Systems and Utility Programs

Problem Solving @ Work

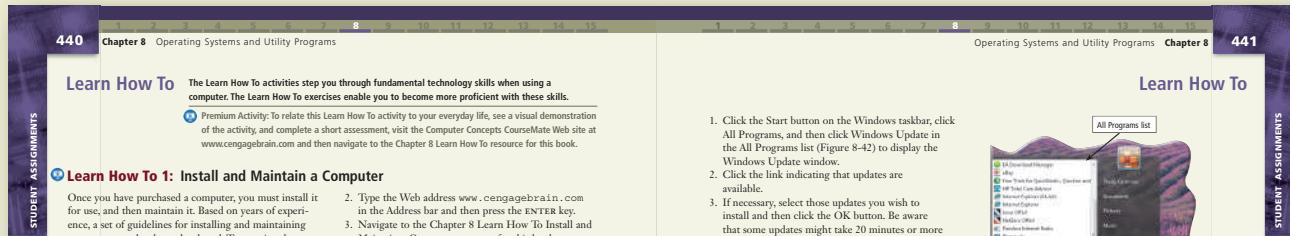
The Problem Solving @ Work exercises extend your knowledge of the chapter concepts by seeking solutions to practical computer problems that you may encounter at home or school. The Collaboration exercise should be completed with a team.

This mean automatically? update

the following user guides, over means.

from

and install



Learn How To

Apply the concepts in the chapter to everyday life with these hands-on activities. Learn how the Learn How To activities fit into your life with relevant scenarios, visual demonstrations, and practice questions via the Computer Concepts CourseMate Web site.

A screenshot of a computer screen displaying Chapter 8: Operating Systems and Utility Programs. The page number 441 is at the top right. A large rectangular callout box is positioned above the 'Learn How To' section, pointing downwards. The 'Learn How To' section contains text and a link to a premium activity.

Learn How To The Learn How To activities step you through fundamental technology skills when using a computer. The Learn How To exercises enable you to become more proficient with these skills.

Premium Activity: To relate this Learn How To activity to your everyday life, see a visual demonstration of the activity, and complete a short assessment, visit the Computer Concepts CourseMate Web site at www.cengagebrain.com and then navigate to the Chapter 8 Learn How To resource for this book.

Learn How To 1: Install and Maintain a Computer

Once you have purchased a computer, you must install it for use, and then maintain it. Based on years of experience, a set of guidelines for installing and maintaining your computer has been developed. To examine these guidelines, complete the following steps:

1. Start the browser on your computer.

Exercises

1. Using your search skills, research the latest recommendations with respect to proper ergonomics for using a computer. What information did you find that you did not know before? What changes would you make to your current computer setup that might make you more productive? Submit your answers to your instructor.
2. Many people report illnesses or injuries from using computers. Perform research in a library or on the Web to discover the five most common ailments associated with using a computer. Determine the actions people can take to minimize or eliminate these ailments. Submit a report to your instructor describing your findings.
3. On either your computer or the computer on which you are working, perform a hardware and software inventory of at least five hardware devices and five application programs. List the vendor, product, vendor Web address, vendor e-mail address, and vendor support telephone number. Submit the inventory to your instructor.

Learn How To 2: Burn Files to an Optical Disc

Many people use USB flash drives to transport files from one location to another. If they wish to share files with someone else, however, they might choose to distribute these files on an optical disc. To learn how to burn files to an optical disc using Windows 7, complete the following steps:

1. Insert a blank optical disc into the optical disc drive.
2. When the AutoPlay dialog box is displayed, click the Burn files to disc using Windows Explorer link.

Exercise

1. Locate photos on your computer that you are willing to share with others. If you are unable to locate any photos or are using someone else's computer, download at least three photos from the Internet. Insert a blank optical disc into your optical disc drive and then burn the photos to the disc. Once you have finished burning the disc, eject it, write your name on it, and then submit it to your instructor.

Learn How To 3: Keep Windows Up-to-Date

Keeping Windows up-to-date is a critical part of keeping your computer in working order. The updates made available by Microsoft for no charge over the Internet

can help to keep errors from occurring on your computer and attempt to ensure that all security safeguards are in place. To update Windows, complete the next steps:

1. Click the Start button on the Windows taskbar, click All Programs, and then click Windows Update in the All Programs list (Figure 8-42) to display the Windows Update window.
2. Click the link indicating that updates are available.
3. If necessary, select those updates you wish to install and then click the OK button. Be aware that some updates might take 20 minutes or more to download and install, based primarily on your Internet access speed.
4. Often, after installation of updates, you must restart your computer to allow those updates to take effect. Be sure to save any open files before restarting your computer.



Figure 8-42

- You also can schedule automatic updates for your computer. To do so, complete the following steps:
1. Click the Start button on the Windows taskbar and then click Control Panel on the Start menu.
 2. In the Control Panel window, click System and Security to open the System and Security window.
 3. In the System and Security window, click 'Turn automatic updating on or off' to open the Change settings window (Figure 8-43).
 4. Select the option you want to use for Windows updates. Microsoft, together with all security and operating system experts, strongly recommends you select 'Install updates automatically' so that updates will be installed on your computer automatically. Notice that if you select 'Install updates automatically', you also should select a time when your computer will be on and be connected to the Internet. A secondary choice is to download the suggested updates and then choose when you want to install them, and a third choice allows you to check for updates and then choose when you want to download and install them.
 5. When you have made your selection, click the OK button in the Change settings window.

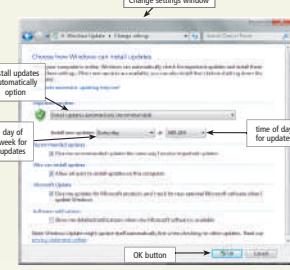


Figure 8-43

Updating Windows on your computer is vital to maintain security and operational integrity.

Exercises

1. Open the Windows Update window. Make a list of the important updates to Windows on the computer you are using. Add to the list the optional updates that are available. If you are using your own computer, install the updates of your choice on your computer. Submit the list of updates to your instructor.
2. Optional: If you are not using your own computer, do not complete this exercise. Open the Control Panel, click System and Security, and then click 'Turn automatic updating on or off'. Select the level of automatic updates you want to use. Write a report justifying your choice of automatic updates and then submit the report to your instructor.



Web Research

The Web Research exercises broaden your understanding of the chapter concepts by presenting questions that require you to search the Web for answers.

1 Search Sleuth

Use one of the search engines listed in Figure 2-10 in Chapter 2 on page 88 or your own favorite search engine to find the answers to the following questions. Copy and paste the Web address from the Web page where you found the answer. Some questions may have more than one answer. If required, submit your answers to your instructor. (1) Who are the "geeks" who run Dell? (2) What does the term "green IT" mean? (3) What does the term "Netbooks" mean? (4) Why do some computer experts consider the term, *spam*, a backronym? (5) What are the benefits of using a laptop? (6) What is the key combination used to reboot a computer? (7) Which virus did the Farooq Alvi brothers invent? (8) Why are UNIX programmers concerned about the "Year 2038 problem"?

2 Green Computing

Operating systems can help monitor computer energy use and suggest methods of reducing electricity through efficient power management. Experts claim monitoring systems can reduce each computer at least \$60 per year in electricity costs. Suggestions include turning a screen saver, turning down a monitor's brightness level, and using a high performance power setting that balances processing power with notebook computer battery life. View online Web sites that provide information about power management. Which methods are effective in reducing power consumption for notebook computers? Which sleep times setting provides significant power savings? Which power management settings are recommended for balanced, power saving, and high performance? Write a report summarizing your findings, and include a table of links to Web sites that provide additional details.

3 Social Networking

Social networking Web site advertisers in the United States spent \$108 million in 2009, an increase of 19 percent from 2008. Millions of registered online social networking users have posted demographic information about themselves, including age, gender, and geographical location. This data helps marketing managers deliver specific advertisements to each user in an attempt to raise revenue. Acknowledge

(adweek.com) is one of the primary companies that gather and analyze data regarding online users and then sells targeted ads on social networking, e-mail, and gaming Web sites. Visit the Adweek Web site, view the information about targeting social network consumers, and then read articles in the About Us and Press Room sections. How are advertisers using virtual currency? How do traffic networks help advertisers create marketing campaigns? View the posts in the Advertising Web site (adweek.com) to read about interactive marketing trends. Summarize the information you read and viewed.

4 Blogs

A number of the search engine Web sites feature blogs describing popular search topics. Ask.com's blog (blog.ask.com), for example, lists its Blogroll, which gives recommended research and search engine websites. Google's blog (googleblog.blogspot.com) includes news about consumer search trends (Voodoo Buzz) and innovations in Web search technology. Google Blog Search (search.google.com) has search engines to help users find blogs about particular topics, including technology and business. Visit these sites and read the posts. What topics are discussed? Consider the types of issues and products discussed in this chapter, such as personal firewalls or antivirus programs, and read a few of the blogs describing these topics. Summarize the information you read.

5 Ethics in Action

Several automobile insurers, including Progressive Casualty Insurance Company, are promising drivers insurance premiums discounts up to 25 percent if they install a data recorder in their cars voluntarily to track their driving and then encourage safe driving behavior. Progressive and other insurance companies will offer this monitoring system and that it eventually will become mandatory. These critics fear that negative data will be used against drivers. View online Web sites that provide information about vehicle monitoring devices. Write a report summarizing your findings, and include a table of links to Web sites that provide additional details.



Web Research

Each Web Research exercise requires follow-up research on the Web and suggests writing a short article or presenting the findings of the research to the class.

Critical Thinking

Exercise your mind and construct creative solutions to these thought-provoking exercises presented in each chapter. The Critical Thinking exercises are constructed for class discussion, presentation, and independent research. The Collaboration exercise is designed for a team environment.

Critical Thinking

The Critical Thinking exercises challenge your assessment and decision-making skills by presenting real-world situations associated with the chapter concepts. The Collaboration exercise should be completed with a team.

To evaluate the situations below, use personal experiences and available resources such as articles on the Web or in print, blogs, podcasts, videos, television, user guides, other individuals, and electronics and computer stores. You may need to use multiple resources to form conclusions and make recommendations.

1. Class Discussion — Downloading Music

Many students at the local college have been using the college's computers to download music from the Internet. You have been asked to serve on a student committee to analyze and discuss this questionable use of the college's computers based on the following questions. Be sure to include responses to block music downloads? Who will lose? How will the college prevent students from downloading music? What is the difference between recording a song from the radio and downloading music from the Internet? Should violators be expelled, fined, required to attend a seminar on the ethical use of computers, or given a verbal warning? What recommendations would you give to the committee regarding the downloading of music?

2. Class Presentation — Windows 7 Editions

Your cousin is buying a new computer both for personal use and for operating his consulting business, which he runs out of his home. He is undecided about which edition of the Windows 7 operating system to purchase with his new computer. Windows 7 Professional is designed for business users; Windows 7 Home Premium is designed for home computing. Windows 7 Ultimate contains features both for home and business users. He has asked you to review the differences between each edition and help him decide which he should buy. Prepare a presentation comparing the similarities and contrasting the differences among the three editions. Be sure to include items such as features that are included with one edition that are not available in another and cost differences. At the end of your presentation, provide a recommendation and the reasons why the edition you chose would be best.

3. Research — Complete Security Solutions

Your neighbor started a new construction business and operates it from his garage. He is impressed by your computer knowledge and would like to hire you to set up his new computers. He mentions that because of the increasing security concerns on the Internet, he first would like you to install a program or program designed to protect his computers from various security threats. What types of security threats exist on the Internet? Write a brief report describing two programs that provide a comprehensive solution. What are the pros and cons of each? What are the costs, if any exist? Do the programs appear to be easy to install? What is their cost? Are subscription fees charged in order to receive automatic updates? In your opinion, are the programs worth the price? Why or why not?

Collaboration

4. Operating Systems

Your team members are employed as analysts at Soap-in-Suds, an international manufacturer of laundry detergents. The company currently uses an early version of the Windows operating system on its 5,000 desktop computers. This year, the company plans to upgrade the operating system and, if necessary, its desktop computers. The vice president of information technology has asked your team to compare the latest desktop versions of the Windows operating system, Mac OS, and the Linux operating system. Assign each member of your team an operating system. Each member should use the Web and/or print media to develop a feature/benefit analysis along with the answers to the following questions: What are the pros and cons of each? What are the costs? What are the memory and storage requirements? What type of operating system requires the company to purchase new computers? Are training costs involved? Which operating system is best at avoiding viruses, spam, and spyware? Which operating system is easier to use? Why? Can the latest version of Microsoft Office run with the operating system? As a team, merge your findings into a team presentation and share your findings and recommendation with the class.

606 Special Feature

Digital Forensics

824 Special Feature

Living Digitally

54 Special Feature

Timeline

Milestones in Computer History

124 Special Feature

Making Use of the Web

55 Special Feature

Digital Communications

712 Special Feature

Web 2.0 Program Development

444 Special Feature

Buyer's Guide: How to Purchase Computers and Mobile Devices

772 Special Feature

Enterprise Order Processing: A Case Study

Figure 1 Programmers use a variety of tools to provide Web 2.0 applications to home, mobile, and enterprise users.

Figure 1 A typical enterprise order processing infrastructure involves several aspects of the enterprise computing environment.

Special Features

Nine special features following Chapters 1, 2, 3, 6, 8, 11, 13, 14, and 15 encompass topics from the history of computers, to hot topics on the Web, including Web 2.0, to a buyer's guide, to the latest in new technology and digital communications.

Visual Walkthrough of the Computer Concepts

CourseMate for Discovering Computers

Interactive. Current. Engaging.

Your Interactive Guide to the Digital World!

Introduce the most current technology into the classroom with the Computer Concepts CourseMate for Discovering Computers. An integrated e-book and a wide range of online learning games, quizzes, practice tests, videos, and Web links expand on the topics covered in the text with hands-on reinforcement. The Pointer Icon integrated into each page of the text illustrates when to access the CourseMate Web site and quickly shows students the connection between the text and the digital solution.

Who Wants to Be a Computer Genius?²

The Who Wants to Be a Computer Genius?² learning game allows students to quiz themselves on chapter content within a dynamic and entertaining game scenario. Question results are provided instantly so that students quickly see which concepts they understand and which concepts they need to study. Page remediation is included with question results so students know exactly where in the text to find the information they need.

The screenshot shows the CourseMate interface. On the left, there's a sidebar with a 'Select Chapter' dropdown and various resource links like 'eBook', 'Key Terms', 'Quizzes', etc. The main area shows a 'Welcome to CourseMate!' message and a thumbnail of the textbook. Below it is a large game window titled 'Who Wants to be a COMPUTER GENIUS?'. It displays a question: '1. Some ____ have their own built-in Web browser.' with four options: A. Internet service providers (ISPs), B. online service providers (OSPs), C. wireless service providers (WSPs), and D. limited access services (LASs). There are also 'Panic Buttons' for 'Survey' and 'Book' at the bottom right.

The screenshot shows the Engagement Tracker interface. It has a dashboard with student names and progress bars. Below it is a 'WHEEL OF TERMS' game window. The wheel has various terms on its segments. A keyboard is shown at the bottom, and a 'Type Guess' input field is at the bottom right. The game shows 'Rounds 11 Total Score \$0'.

EngagementTracker

EngagementTracker makes assessing students easy by tracking student progress on the interactive activities. Clear and visual reports illustrate the class progress as a whole.

Wheel of Terms

Wheel of Terms is an interactive study tool for learning the Key Terms in each chapter. This learning game presents students with a short definition of one of the chapter's Key Terms and prompts them to type the correct term as the answer.

Online Content



Student Edition Labs

Our Web-based interactive labs help students master hundreds of computer concepts, including input and output devices, file management and desktop applications, computer ethics, virus protection, and much more. Featuring up-to-the-minute content, eye-popping graphics, and rich animation, the highly interactive Student Edition Labs offer students an alternative way to learn through dynamic observation, step-by-step practice, and challenging review questions. Access the Student Edition Labs from the Discovering Computers: Your Interactive Guide to the Digital World Computer Concepts CourseMate Web site at www.cengagebrain.com or see the Student Edition Lab exercises on the Learn It Online pages at the end of each chapter. Also available on CD at an additional cost.



SAM 2010: Assessment & Training and Project Grading Solutions

SAM (Skills Assessment Manager) is a robust assessment, training and project-based system that enables students to be active participants in learning valuable Microsoft Office 2010 skills. A set of testbank questions ties directly to each chapter in this book. Let SAM be an integral part of your students' learning experience!

Content for Online Learning

Course Technology has partnered with the leading distance learning solution providers and class-management platforms today. To access this material, instructors will visit our password-protected instructor resources available at <http://www.cengage.com/coursecare/cartridge/>. Instructor resources include the following: additional case projects, sample syllabi, PowerPoint presentations per chapter, and more. For additional information or for an instructor username and password, please contact your sales

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representative. For students to access this material, they must have purchased a Course Cartridge PIN-code specific to this title and your campus platform. The resources for students may include (based on instructor preferences), but not limited to: topic review, review questions and practice tests.



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Our fast-paced world is driven by technology. You know because you are an active participant — always on the go, always keeping up with technological trends, and always learning new ways to embrace technology to power your life. Let CourseCasts, hosted by Ken Baldauf of Florida State University, be your guide to weekly updates in this ever-changing space. These timely, relevant podcasts are produced weekly and are available for download at <http://coursecasts.course.com> or directly from iTunes (search by CourseCasts). CourseCasts are a perfect solution to getting students (and even instructors) to learn on the go!

CourseNotes — Technology in a Flash!

Course Technology's CourseNotes are six-panel quick reference cards that reinforce the most important and widely used features of a software application in a visual and user-friendly format. CourseNotes serve as a great reference tool during and after the student completes the course. CourseNotes are available for software applications, such as Microsoft Office 2010, Word 2010, PowerPoint 2010, Excel 2010, Access 2010, and Windows 7. Topic-based CourseNotes are available for Best Practices in Social Networking, Hot Topics in Technology, and Web 2.0. Visit www.cengage.com/ct/coursenotes to learn more!

Computer Acronyms

Acronym	Description	Page	Acronym	Description	Page
ONF	zero normal form	540	ARPA	Advanced Research Projects Agency	75
1NF	first normal form	540	ARPANET	Advanced Research Projects Agency network	75
2NF	second normal form	540	ASCII	American Standard Code for Information Interchange	221
3DES	Triple Data Encryption Standard (Triple-DES)	592	ASF	Advanced Streaming (or Systems) Format	95
3GL	third-generation language	666	ATC	advanced transfer cache	227
3NF	third normal form	540	ATM	Asynchronous Transfer Mode	485
4GL	fourth-generation language	674	ATM	automated teller machine	284
AAC	Advanced Audio Coding	95	AUP	acceptable use policy	565
AC	alternating current	239	AWC	Association for Women in Computing	797
ACE	Adobe Certified Expert	804	B2B	business-to-business	100
ACI	Adobe Certified Instructor	804	B2C	business-to-consumer	98
ACM	Association for Computing Machinery	797	BAN	body area network	471
ADA	Americans with Disabilities Act	286	BASIC	Beginner's All-purpose Symbolic Instruction Code	675
ADSL	asymmetric digital subscriber line	484	BD-R	Blu-ray Disc recordable	376
AES	Advanced Encryption Standard	592	BD-RE	Blu-ray Disc rewritable	376
AGP	Accelerated Graphics Port	238	BD-ROM	Blu-ray Disc read-only memory	375
AI	artificial intelligence	737	BI	business intelligence	725
AIFF	Audio Interchange File Format	95	BIOS	basic input/output system	400
AIS	Association for Information Systems	797	bit	binary digit	221, 518
AITP	Association of Information Technology Professionals	797	BLOB	binary large object	518
Ajax	Asynchronous JavaScript and XML	684	BLS	Bureau of Labor Statistics	784
ALGOL	ALGOrithmic Language	675	BMP	bit map	93
ALU	arithmetic logic unit	213	BPA	business process automation	726
AMD	Advanced Micro Devices	216, 217	BPM	business process management	725
ANN	artificial neural network	758	BSA	Business Software Alliance	572
ANSI	American National Standards Institute	691	BSB	backside bus	237
AOL	America Online	78, 89, 111	btw	by the way	108
APCUG	Association of Personal Computer Users Group	798	C2C	consumer-to-consumer	100
API	application programming interface	684	CA	certificate authority	574
APL	A Programming Language	675	CAD	computer-aided design	160, 728

Acronym	Description	Page
CAE	computer-aided engineering	728
CAI	computer-aided instruction	171
CAM	computer-aided manufacturing	38, 729
CAPTCHA	Completely Automated Public Turing test to tell Computers and Humans Apart	567
CASE	computer-aided software engineering	642
CAT	computerized adaptive testing	803
CATV	cable television	483
CBT	computer-based training	171
CCD	charge-coupled device	272
CCE	Certified Computer Examiner	806
CCFE	Certified Computer Forensics Examiner	806
CCIE	Cisco Certified Internetwork Expert	806
CCNA	Cisco Certified Network Associate	806
CCNP	Cisco Certified Network Professional	806
ccTLD	country code top-level domain	80
CD	compact disc	8, 94, 97, 375
CDMA	Code Division Multiple Access	495
CDP	continuous data protection	754
CD-R	compact disc-recordable	373
CD-ROM	compact disc read-only memory	372
CD-RW	compact disc-rewritable	373
CE	computer engineering	795
CEECS	Certified Electronic Evidence Collection Specialist	806
CEO	Chief Executive Officer	723
CERT/CC	Computer Emergency Response Team Coordination Center	558
CES	Consumer Electronics Show	798
CF	CompactFlash	364
CFO	Chief Financial Officer	723
CGI	Common Gateway Interface	537, 680
CIFI	Certified Information Forensics Investigator	806
CIM	computer-integrated manufacturing	729
CIM	customer interaction management	731
CIO	chief information officer	732, 788
CIPA	Children's Internet Protection Act	589

Acronym	Description	Page
CIS	computer information systems	795
CISSP	Certified Information Systems Security Professional	807
CIW	Certified Internet Webmaster	807
CLP	Novell Certified Linux Professional	804
CLR	Common Language Runtime	670
CMOS	complementary metal-oxide semiconductor	229
CMS	content management system	739
coax	coaxial cable	493
COBOL	Common Business-Oriented Language	55, 668
COO	Chief Operating Officer	723
COPPA	Children's Online Privacy Protection Act	589
CPU	central processing unit	7, 213
CRM	customer relationship management	737
CRPG	computer role-playing game	829
CRT	cathode-ray tube	313
CS	computer science	795
CSC	common short code	464
CSDA	Certified Software Development Associate	805
CSDP	Certified Software Development Professional	805
CSO	chief security officer	646, 789
CSS	cascading style sheet	683
CTO	chief technology officer	788
CTS	carpal tunnel syndrome	579
CUG	C/C++ Users Group	798
CVS	computer vision syndrome	579
CWP	Certified Web Professional	807
DA	database analyst	538
DBA	database administrator	538
DBMS	database management system	515
DC	direct current	239
DDoS attack	distributed denial of service attack	562
DDR SDRAM	double data rate synchronous dynamic random access memory	225
DES	Data Encryption Standard	592
DFD	data flow diagram	632

Acronym	Description	Page	Acronym	Description	Page
DHCP	Dynamic Host Configuration Protocol	110	e-form	electronic form	530
DHTML	Dynamic Hypertext Markup Language	683	EFS	Encrypting File System	592
DIMM	dual inline memory module	225	EFT	electronic funds transfer	471
DL	distance learning	176	EIDE	Enhanced Integrated Drive Electronics	361
DLP projector	digital light processing projector	326	EIS	executive information system	735
DMCA	Digital Millennium Copyright Act	589	e-mail	electronic mail 12, 31, 74, 75, 77, 78, 81, 88, 89, 91, 98, 100, 101, 102, 103, 105, 108, 109, 142, 144, 150, 156, 157, 159, 173, 174, 176	12, 31, 74, 75, 77, 78, 81, 88, 89, 91, 98, 100, 101, 102, 103, 105, 108, 109, 142, 144, 150, 156, 157, 159, 173, 174, 176
DMS	Document Management System	743	ENIAC	Electronic Numerical Integrator and Computer	54
DNS	domain name system	80	ERD	entity-relationship diagram	632
DOM	document object model	683	e-retail	electronic retail	99, 747
DoS attack	denial of service attack	562	ERM system	employee relationship management system	728
dpi	dots per inch	273, 316	ERP	enterprise resource planning	738
DRAM	dynamic random access memory	225	eSATA	external Serial Advanced Technology Attachment	361
DRM	digital rights management	582	EULA	end-user license agreement	571
DSL	Digital Subscriber Line	76, 484	EVDO	Evolution Data Optimized	495
DSS	decision support system	734	e-zine	electronic magazine	638
DTP	desktop publishing	160	FAQ	frequently asked questions	14, 108
DTV	digital television	312	fax	facsimile	320, 321
DV camera	digital video camera	275	FEK	file encryption key	592
DVD	digital versatile disc or digital video disc	8, 26, 64, 68, 97, 375	FORTRAN	FORmula TRANslator	55, 675
DVD+R	digital versatile disc or digital video disc recordable	376	FRED	Forensic Recovery of Digital Evidence	613
DVD-R	digital versatile disc or digital video disc recordable	376	FSB	front side bus	237
DVD+RAM	digital versatile disc or digital video disc + random access memory	376	FTP	File Transfer Protocol	107, 462, 482
DVD-ROM	digital versatile disc or digital video disc read-only memory	375	FTTB	Fiber to the Building	484
DVD+RW	digital versatile disc or digital video disc + rewritable	376	FTTH	Fiber to the Home	484
DVD-RW	digital versatile disc or digital video disc + rewritable	376	FTTP	Fiber to the Premises	76
DVI	Digital Video Interface	310	fwiw	for what it's worth	108
EB	exabyte	354	fyi	for your information	108
e-commerce	electronic commerce	30, 32, 62, 63, 98, 100, 109	GB	gigabyte	223, 354
ECPA	Electronic Communications Privacy Act	589	GBps	gigabytes per second	355
EDGE	Enhanced Data GSM Environment	495	Gbps	gigabits per second	478
EDI	electronic data interchange	471, 742	GHz	gigahertz	216
EEPROM	electrically erasable programmable read-only memory	228	GIF	Graphics Interchange Format	93
e-filing	electronic filing	167	GIGO	garbage in, garbage out	516
			GIS	geographic information system	534

Acronym	Description	Page
GLBA	Graham-Leach-Bliley Act	589
GPRS	General Packet Radio Service	595
GPS	global positioning system	466
GPU	graphics processing unit	310
GSM	Global System for Mobile Communications	495
gTLD	generic top-level domain	80
GUI	graphical user interface	15, 402
GWT	Google Web Toolkit	714, 716
HD	high density	375
HD VMD	high-density Versatile Multilayer Disc	375
HDMI	High-Definition Media Interface	310
HDTV	high-definition television	312
HIPAA	Health Insurance Portability and Accountability Act	380
HMD	head-mounted display	308
HP	Hewlett-Packard	319, 331
HR	Human Resources	727
HRIS	Human Resources Information Systems	728
HTML	Hypertext Markup Language	678
HTPC	home theater PC	20
http	Hypertext Transfer Protocol	82, 462
IACRB	Information Assurance Certification Review Board	806
IACSS	International Association for Computer Systems Security	797
IBM	International Business Machines	55, 56, 57, 58, 67, 76, 146
ICANN	Internet Corporation for Assigned Names and Numbers	80
I-CASE	integrated computer-aided software engineering	642
ICCA	Independent Computer Consultants Association	797
ICCP	Institute for the Certification of Computing Professionals	801
ICRA	Internet Content Rating Association	591
ICSA Labs	International Computer Security Association Labs	646
IDE	integrated development environment	669
IDEA	International Data Encryption Algorithm	592

Acronym	Description	Page
IEEE	Institute of Electrical and Electronics Engineers	797
IM	instant messaging	104
IMDb	Internet Movie Database	125
imho	in my humble opinion	108
IOUG	Independent Oracle Users Group	798
IP	intellectual property	582
IP address	Internet Protocol address	79, 110
IPng	Internet Protocol Next Generation	110
IPO chart	input, processing, output chart	687
IPv6	Internet Protocol version 6	80, 110
IR	infrared	494
IrDA	Infrared Data Association	235, 480
IS	information system	27, 620
ISDN	Integrated Services Digital Network	484
ISP	Internet service provider	78
ISSA	International Systems Security Association	797
IT	information technology	27
JAD session	joint-application design session	626
JIT compiler	just-in-time compiler	670
JPEG	Joint Photographic Experts Group	93
JUG	Java Users Groups	798
K	kilobyte	223
KB	kilobyte	223, 354
KBps	kilobytes per second	355
Kbps	kilobits per second	480
KM	knowledge management	737
KMS	knowledge management software	737
L1 cache	Level 1 cache	227
L2 cache	Level 2 cache	227
L3 cache	Level 3 cache	227
LAN	local area network	57, 472
LCD	liquid crystal display	308
LINQ	Language Integrated Query	671
LISP	LISP Processing	675
LUGWW	Linux Users Group WorldWide	798
M2	Memory Stick Micro	364

Acronym	Description	Page	Acronym	Description	Page
Mac OS	Macintosh Operating System	415	MX	mail exchange	382
Mac OS X	Macintosh Operating System X	415	NAP	National Association of Programmers	797
MAN	metropolitan area network	473	NAS	network attached storage	360, 749
MB	megabyte	223, 354	NCA	Novell Certified Administrator	806
MBps	megabytes per second	355	NCE	Novell Certified Engineer	806
MBps	megabits per second	375	NET Act	No Electronic Theft Act	589
MCAP	Microsoft Certified Application Professional	804	netiquette	Internet etiquette	108
MCAS	Microsoft Certified Application Specialist	804	NIC	network interface card	487
MCDST	Microsoft Certified Desktop Support Technician	804	NLQ	near letter quality	322
MCITP	Microsoft Certified IT Professional	804, 808	ns	nanosecond	229
m-commerce	mobile commerce	98	NSF	National Science Foundation	75
MCPD	Microsoft Certified Professional Developer	805	OCP	Oracle Certified Professional	808
MCSA	Microsoft Certified Systems Administrator	806	OCR	optical character recognition	279
MCTS	Microsoft Certified Technology Specialist	804	OIS	office information system	732
MFP	multifunction peripheral	320, 329, 331	OLAP	online analytical processing	735
MHz	megahertz	229	OLE	object linking and embedding	59
MIB	Medical Information Bureau	380	OLED	organic light emitting diode	308
MICR	magnetic-ink character recognition	281	OLTP	online transaction processing	733
MIS	management information system	734	OMR	optical mark recognition	279
MLP	multilayer perception	758	OO	object-oriented	634, 689
MMOG	massively multiplayer online game	829	OODB	object-oriented database	534
MMS	multimedia message service	464	OOP language	object-oriented programming language	669
modem	modulate/demodulate	8, 461, 485	OQL	object query language	535
MP	million pixels	273	OS	operating system	398
MP3	Moving Pictures Experts Group Audio Layer 3 (MPEG-3)	94, 95	OSI reference model	Open Systems Interconnection reference model	498
MPEG	Moving Pictures Experts Group	96	OSP	online service provider	78
MRAM	magnetoresistive random access memory	225	P2P	peer-to-peer	475
MRP	Material Requirements Planning	729	PATRIOT Act	Provide Appropriate Tools Required to Intercept and Obstruct Terrorism Act	589
MRP II	Manufacturing Resource Planning II	730	PB	petabyte	354
μs	microsecond	229	PC	personal computer	19, 20
ms	millisecond	229	PCI bus	Peripheral Component Interconnect bus	238
MSIL	Microsoft Intermediate Language	670	PCIe	PCI Express	238
MSN	Microsoft Network, The	78, 81, 85, 89	PCL	Printer Control Language	319
MT/ST	Magnetic Tape>Selectric Typewriter	56	PCS	Personal Communications Services	496
			PDA	personal digital assistant	22
			PDF	Portable Document Format	158

Acronym	Description	Page
PDL	page description language	319
PDLC	program development life cycle	686
Perl	Practical Extraction and Report Language	682
PERT	Program Evaluation and Review Technique	624
PGP	Pretty Good Privacy	574
PHP	PHP: Hypertext Preprocessor	682
PILOT	Programmed Inquiry Learning Or Teaching	675
PIM	personal information manager	156
PIN	personal identification number	284, 568
pixel	picture element	273, 278, 308
PL/I	Programming Language One	675
PNG format	Portable Network Graphics format	93
POP	Post Office Protocol	103
POP3	Post Office Protocol 3	103
POS	point of sale	284
POST	power-on self test	400
ppi	pixels per inch	273
Prolog	PROgramming LOGic	675
PROM chip	programmable read-only memory chip	228
ps	picosecond	229
PSTN	public switched telephone network	482
PUE	power usage effectiveness	583
QBE	query by example	528
QT	QuickTime	95
RA	RealAudio	95
RAD	rapid application development	669
RAID	redundant array of independent disks	360, 748
RAM	random access memory	224
RDRAM	Rambus dynamic random access memory	225
Rexx	REstructured eXtended eXecutor	682
RFI	request for information	638
RFID	radio frequency identification	280, 481
RFP	request for proposal	638
RFQ	request for quotation	638
RHCE	Red Hat Certified Engineer	804

Acronym	Description	Page
RHCT	Red Hat Certified Technician	804
RIAA	Recording Industry Association of America	64
RIMM	Rambus inline memory module	225
ROM	read-only memory	228
RoR	Ruby on Rails	683
RPG	Report Program Generator	675
rpm	revolutions per minute	358
RSI	repetitive strain injury	579
RSS 2.0	Really Simple Syndication	92, 679
RTLS	real time location system	570
RUP	Rational Unified Process	634
SAN	storage area network	749
SAS	serial-attached SCSI	235, 362
SATA	Serial Advanced Technology Attachment	361
SCEA	Sun Certified Enterprise Architect	805
SCJD	Sun Certified Java Developer	805
SCJP	Sun Certified Java Programmer	805
SCMAD	Sun Certified Mobile Application Developer	805
SCNA	Security Certified Network Architect	807
SCNA	Sun Certified Network Administrator	806
SCNP	Security Certified Network Professional	807
SCNS	Security Certified Network Specialist	807
SCSA	Sun Certified System Administrator	804
SCSI	small computer system interface	235, 362
SD	Secure Digital	364
SDHC	Secure Digital High Capacity	364
SDLC	system development life cycle	620
SDRAM	synchronous dynamic random access memory	225
SFA	sales force automation	730
S-HTTP	secure hypertext transfer protocol	575
SIGs	special interest groups	797
SIMM	single inline memory module	225
SMB	small- and medium-sized business	720
SMS	short message service	463
SMTP	simple mail transfer protocol	103

Acronym	Description	Page	Acronym	Description	Page
SOA	service-oriented architecture	743	UXGA	Ultra Extended Graphics Array	311
SOHO	small office/home office	30	VAN	value-added network	471
SQL	Structured Query Language	534, 674	VAR	value-added reseller	638
SRAM	static random access memory	225	VBA	Visual Basic for Applications	676
SSCP	Systems Security Certified Practitioner	807	VBScript	Visual Basic, Scripting Edition	683
SSD	solid state drive	363	VoIP	Voice over Internet Protocol	100, 325
SSID	service set identifier	578	VPE	visual programming environment	673
SSL	Secure Sockets Layer	575	VPN	virtual private network	575, 744
SUT	system under test	648	VR	virtual reality	96
SVG	Standard Vector Graphics	698	VSTO	Visual Studio Tools for Office	671
SVGA	Super Video Graphics Array	311	W3C	World Wide Web Consortium	76
SXGA	Super Extended Graphics Array	311	WAN	wide area network	473
TB	terabyte	223, 354	WAP	Wireless Application Protocol	482
Tcl	Tool Command Language	682	WAV	Windows waveform	95
TCP/IP	Transmission Control Protocol/ Internet Protocol	478	WBT	Web-based training	181
TFT display	thin-film transistor display	308	Wi-Fi	wireless fidelity	76, 479
TIFF	Tagged Image File Format	93	WiMAX	Worldwide Interoperability for Microwave Access	482
TLD	top-level domain	80	WIPS	Web Interactions Per Second	648
TLS	Transport Layer Security	575	WIRT	Web Interaction Response Time	648
TPC-W	Transaction Processing Performance Council Workload	648	WISP	wireless Internet service provider	462
TPS	transaction processing system	733	WLAN	wireless local area network	472
TTL	Time To Live	382	WMA	Windows Media Audio	95, 98
ttfn	ta ta for now	108	WML	wireless markup language	679
tyvm	thank you very much	108	WPA	Wi-Fi Protected Access	578
UL 1449 standard	Underwriters Laboratories 1449 standard	576	WQXGA	Wide Quad Extended Graphics Array	311
UMD	Universal Media Disc	375	WSXGA	Wide Super Extended Graphics Array	311
UML	Unified Modeling Language	634, 692	WUXGA	Wide Ultra Extended Graphics Array	311
UMPC	Ultra-Mobile PC	22	WWW	World Wide Web	80
UMTS	Universal Mobile Telecommunications System	495	WXGA	Wide Extended Graphics Array	311
UNIVAC I	UNIVersal Automatic Computer	54	XGA	Extended Graphics Array	311
UPC	Universal Product Code	280	XHTML	Extensible Hypertext Markup Language	678
UPS	uninterruptible power supply	576	XML	Extensible Markup Language	468, 679
URL	Uniform Resource Locator	82	XP	extreme programming	695
USB	universal serial bus	234, 367	XSL	Extensible Stylesheet Language	679
user ID	user identification	410	XSLT	Extensible Style Language Transformations	679
UWB	ultra-wideband	480	YB	yottabyte	354
			ZB	zettabyte	354

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Coding Schemes and Number Systems

Coding Schemes

As discussed in Chapter 4, a computer uses a coding scheme to represent characters. This section of the appendix presents the ASCII, EBCDIC, and Unicode coding schemes and discusses parity.

ASCII and EBCDIC

Two coding schemes that represent characters in a computer are ASCII and EBCDIC. The **American Standard Code for Information Interchange**, or ASCII (pronounced ASK-ee), coding scheme is the most widely used coding scheme to represent data. The **Extended Binary Coded Decimal Interchange Code**, or EBCDIC (pronounced EB-see-dik), coding scheme sometimes is used on mainframe computers and high-end servers. As shown in Figure C-1, the combination of bits (0s and 1s) is unique for each character in the ASCII and EBCDIC coding schemes.

When a computer uses the ASCII or EBCDIC coding scheme, it stores each represented character in one byte of memory. Other binary formats exist, however, that the computer sometimes uses to represent numeric data. For example, a computer may store, or pack, two numeric characters in one byte of memory. The computer uses these binary formats to increase storage and processing efficiency.

Unicode

The 256 characters and symbols that are represented by ASCII and EBCDIC codes are sufficient for English and western European languages but are not large enough for Asian and other languages that use different alphabets. Further compounding the problem is that many of these languages use symbols, called **ideograms**, to represent multiple words and ideas. One solution to this situation is Unicode. **Unicode** is a 16-bit coding scheme that has the capacity of representing all the world's current languages, as well as classic and historical languages, in more than 65,000 characters and symbols.

Unicode is implemented in several operating systems, including Windows, Mac OS, and Linux. Unicode-enabled programming languages and software include Java, XML, Microsoft Office, and Oracle. Some experts believe that Unicode eventually will replace all other coding schemes.

ASCII	SYMBOL	EBCDIC
00110000	0	11110000
00110001	1	11110001
00110010	2	11110010
00110011	3	11110011
00110100	4	11110100
00110101	5	11110101
00110110	6	11110110
00110111	7	11110111
00111000	8	11111000
00111001	9	11111001
01000001	A	11000001
01000010	B	11000010
01000011	C	11000011
01000100	D	11000100
01000101	E	11000101
01000110	F	11000110
01000111	G	11000111
01001000	H	11001000
01001001	I	11001001
01001010	J	11010001
01001011	K	11010010
01001100	L	11010011
01001101	M	11010100
01001110	N	11010101
01001111	O	11010110
01010000	P	11010111
01010001	Q	11011000
01010010	R	11011001
01010011	S	11100010
01010100	T	11100011
01010101	U	11100100
01010110	V	11100101
01010111	W	11100110
01011000	X	11100111
01011001	Y	11101000
01011010	Z	11101001
00100001	!	01011010
00100010	"	01111111
00100011	#	01111011
00100100	\$	01011011
00100101	%	01101100
00100110	&	01010000
00101000	(01001101
00101001)	01011101
00101010	*	01011100
00101011	+	01001110

Figure C-1

A Unicode code for a symbol (Figure C-2) is obtained by appending the symbol's corresponding digit in the left-most column to the end of the symbol's corresponding three-digit code in the column heading. For example, the Unicode for the capital letter C is 0043. In Unicode, 30,000 codes are reserved for future use, such as ancient languages, and 6,000 codes are reserved for private use. Existing ASCII coded data is fully compatible with Unicode because the first 256 codes are the same.

Parity

Regardless of the coding scheme used to represent characters in memory, it is important that the computer store characters accurately. For each byte of memory, most computers have at least one extra bit, called a **parity bit**, that the computer uses for error checking. A parity bit can detect if one of the bits in a byte has been changed inadvertently. While such errors are extremely rare (most computers never have a parity error during their lifetime), they can occur because of voltage fluctuations, static electricity, or a memory failure.

Computers are either odd- or even-parity machines. In computers with odd parity, the total number of on bits in the byte (including the parity bit) must be an odd number (Figure C-3). In computers with even parity, the total number of on bits must be an even number. The computer checks parity each time it uses a memory location. When the computer moves data from one location to another in memory, it compares the parity bits of both the sending and receiving locations to see if they are the same. If the computer detects a difference or if the wrong number of bits is on (e.g., an odd number in a computer with even parity), an error message is displayed. Many computers use multiple parity bits that enable them to detect and correct a single-bit error and detect multiple-bit errors.

	003	004	005	006	007
0	0 0030	@ 0040	P 0050	` 0060	p 0070
1	1 0031	A 0041	Q 0051	a 0061	q 0071
2	2 0032	B 0042	R 0052	b 0062	r 0072
3	3 0033	C 0043	S 0053	c 0063	s 0073
4	4 0034	D 0044	T 0054	d 0064	t 0074
5	5 0035	E 0045	U 0055	e 0065	u 0075
6	6 0036	F 0046	V 0056	f 0066	v 0076
7	7 0037	G 0047	W 0057	g 0067	w 0077
8	8 0038	H 0048	X 0058	h 0068	x 0078
9	9 0039	I 0049	Y 0059	i 0069	y 0079
A	:	J 004A	Z 005A	j 006A	z 007A
B	;	K 004B	[005B	k 006B	{ 007B
C	< 003C	L 004C	\ 005C	l 006C	 007C
D	= 003D	M 004D] 005D	m 006D	} 007D
E	> 003E	N 004E	^ 005E	n 006E	~ 007E
F	? 003F	O 004F	_ 005F	o 006F	[DEL] 007F

Figure C-2

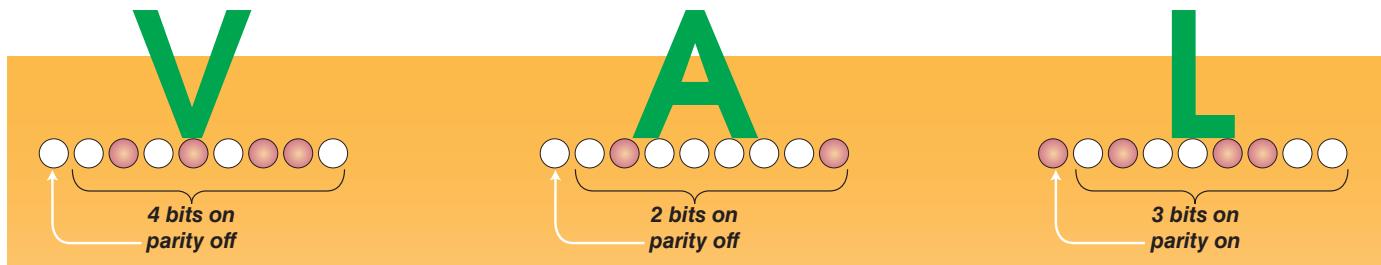


Figure C-3

Number Systems

This section of the appendix describes the number systems used with computers. Technical computer personnel require a thorough knowledge of this subject, but most users need only a general understanding of number systems and how they relate to computers.

The binary (base 2) number system is used to represent the electronic status of the bits in memory. It also is used for other purposes such as addressing the memory locations. Another number system commonly used with computers is **hexadecimal** (base 16). The computer uses the hexadecimal number system to communicate with a programmer when a problem with a program exists, because it would be difficult for the programmer to understand the 0s and 1s of binary code. Figure C-4 shows how the decimal values 0 through 15 are represented in binary and hexadecimal number systems.

DECIMAL	BINARY	HEXADECIMAL
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

Figure C-4

The mathematical principles that apply to the binary and hexadecimal number systems are the same as those that apply to the decimal number system. To help you better understand these principles, this section starts with the familiar decimal system, then progresses to the binary and hexadecimal number systems.

The Decimal Number System

The decimal number system is a base 10 number system (deci means ten). The base of a number system indicates how many symbols it uses. The decimal number system uses 10 symbols: 0 through 9. Each of the symbols in the number system has a value associated with it. For example, 3 represents a quantity of three and 5 represents a quantity of five.

The decimal number system also is a positional number system. This means that in a number such as 143, each position in the number has a value associated with it. When you look at the decimal number 143, the 3 is in the ones, or units, position and represents three ones (3×1); the 4 is in the tens position and represents four tens (4×10); and the 1 is in the hundreds position and represents one hundred (1×100). The number 143 is the sum of the values in each position of the number ($100 + 40 + 3 = 143$). The chart in Figure C-5 shows how you can calculate the positional values (hundreds, tens, and ones) for a number system. Starting on the right and working to the left, the base of the number system, in this case 10, is raised to consecutive powers ($10^0, 10^1, 10^2$). These calculations are a mathematical way of determining the place values in a number system.

When you use number systems other than decimal, the same principles apply. The base of the number system indicates the number of symbols that it uses, and each position in a number system has a value associated with it. By raising the base of the number system to consecutive powers beginning with zero, you can calculate the positional value.

power of 10	10^2	10^1	10^0		1	4	3	=
positional value	100	10	1		(1×10^2)	$+ (4 \times 10^1)$	$+ (3 \times 10^0)$	=
number	1	4	3		(1×100)	$+ (4 \times 10)$	$+ (3 \times 1)$	=

Figure C-5

The Binary Number System

As previously discussed, binary is a base 2 number system (bi means two), and the symbols it uses are 0 and 1. Just as each position in a decimal number has a place value associated with it, so does each position in a binary number. In binary, the place values, moving from right to left, are successive powers of two ($2^0, 2^1, 2^2, 2^3$ or 1, 2, 4, 8). To construct a binary number, place ones in the positions where the corresponding values add up to the quantity you want to represent and place zeros in the other positions. For example, in a four-digit binary number, the binary place values are (from right to left) 1, 2, 4, and 8. The binary number 1001 has ones in the positions for the values 1 and 8 and zeros in the positions for 2 and 4. Therefore, as shown in Figure C-6, the quantity represented by binary 1001 is 9 ($8 + 0 + 0 + 1$).

power of 2	2^3	2^2	2^1	2^0
positional value	8	4	2	1
binary	1	0	0	1

The Hexadecimal Number System

The hexadecimal number system uses 16 symbols to represent values (hex means six). These include the symbols 0 through 9 and A through F (Figure C-4 on the previous page). The mathematical principles previously discussed also apply to hexadecimal (Figure C-7).

The primary reasons the hexadecimal number system is used with computers are (1) it can represent binary values in a more compact and readable form, and (2) the conversion between the binary and the hexadecimal number systems is very efficient.

An eight-digit binary number (a byte) can be represented by a two-digit hexadecimal number. For example, in the ASCII code, the character M is represented as 01001101. This value can be represented in the hexadecimal number system as 4D. One way to convert this binary number (4D) to a hexadecimal number is to divide the binary number (from right to left) into groups of four digits, calculate the value of each group, and then change any two-digit values (10 through 15) to the symbols A through F that are used in the hexadecimal number system (Figure C-8).

$$\begin{array}{ccccccc}
 & 1 & 0 & 0 & 1 & = \\
 (1 \times 2^3) + (0 \times 2^2) + (0 \times 2^1) + (1 \times 2^0) & = \\
 (1 \times 8) + (0 \times 4) + (0 \times 2) + (1 \times 1) & = \\
 8 + 0 + 0 + 1 & = 9
 \end{array}$$

Figure C-6

power of 16	16^1	16^0	A	5	=
positional value	16	1	(10×16^1)	(5×16^0)	=
hexadecimal	A	5	(10×16)	(5×1)	=
			160	5	= 165

Figure C-7

positional value	8421	8421
binary	0100	1101
decimal	4	13
hexadecimal	4	D

Figure C-8

Index

10-Gigabit Ethernet: Ethernet standard that supports transfer rates up to 10 Gbps. **478**

100-Gigabit Ethernet: Ethernet standard that supports transfer rates up to 100 Gbps. **478**

128-bit encryption: Higher-level Web browser encryption protection level. **574, 592**

1024-bit encryption: Higher-level Web browser encryption protection level. **574**

1G: Abbreviation for first generation, used in reference to cellular transmission standards, used to transmit analog data. **495**

INF (first normal form). **540**

2G: Abbreviation for second generation, used in reference to cellular transmission standards, that transmits digital data at speeds from 9.6 Kbps to 19.2 Kbps. **495**

3-D visualization: Technique used by engineers that allows them to interact with a product without the need to build a prototype. **729**

3G: Abbreviation for third generation, used in reference to cellular transmission standards, that transmits digital data at speeds from 144 Kbps to 2.4 Mbps. **495**

40-bit encryption: Web browser encryption protection level. **574**

40-Gigabit Ethernet: Ethernet standard that supports transfer rates up to 40 Gbps. **478**

4G: Abbreviation for fourth generation, used in reference to cellular transmission standards, that transmits digital data at speeds up to 15 Mbps. **495**

4GL: Fourth-generation language; nonprocedural language that enables users and programmers to access data in a database. **674, 700**

802.11: Series of network standards developed by IEEE that specifies how two wireless devices communicate over the air with each other. **479, 501.**

See also Wireless Ethernet standard

802.11i: Sometimes called WPA2, a network standard developed by IEEE with enhanced security for wireless communications. **578, 595**

802.16: Worldwide Interoperability for Microwave Access. Newer network standard developed by IEEE that specifies how wireless devices communicate over the air in a wide area. **482.** *See also WiMAX*

A

A+: Hardware certification that tests entry-level knowledge of personal computer setup, configuration, maintenance, troubleshooting; basic networking skills; and system software. **805**

Abrupt cutover: Conversion strategy where the user stops using an old system and begins using a new system on a certain date. **644.** *See also Direct conversion*

AC adapter: External power supply, used by some external peripherals, that converts AC power into DC power that the peripheral requires. **239**

Accelerated Graphics Port (AGP): Expansion bus designed by Intel to improve the speed with which 3-D graphics and video transmit. **238**

acceptable use policy (AUP), **565–568, 609**

Acceptance test: Test performed by end-users during the program development cycle that checks the new system to ensure that it works with actual data. **644**

Access (Microsoft). **528–529, 531**

Access control: Security measure that defines who can access a computer, when they can access it, and what actions they can take while accessing the computer. **565, 594**
wireless, **578**

Access point mapping: Intrusion technique in which an individual attempts to detect wireless networks via their notebook computer while driving a vehicle through areas they suspect have a wireless network. **578.**

See also War driving

access points, **464–465**

Access privileges: Restrictions that establish who can enter new data, change existing data,

delete unwanted data, and view data in a database. **531, 543**

Access provider: Business that provides individuals and organizations access to the Internet free or for a fee. **12, 77, 112**

Access time: Measurement of the amount of time it takes the process to read data, instructions, and information from memory. **229, 355, 384**

Accessible information:

Information that is available when the decision maker needs it. **516–517, 542**

Accounting software: Software that helps companies record and report their financial transactions. **146, 158, 159, 180**

Accurate information:

Information that is error free. **516, 542**

Active-matrix display: LCD monitor or screen technology that uses a separate transistor to apply charges to each liquid crystal cell and thus displays high-quality color that is viewable from all angles. **308.**
See also TFT (thin-film transistor) display

ActiveX: Set of object-oriented technologies by Microsoft that allows components on a network to communicate with one another. **680**

ActiveX control: Small program that runs on a client computer, instead of the server. **680**

Actor: User or other entity such as a program represented in a use case diagram. **634**

Ada: Programming language derived from Pascal, developed by the U.S. Department of Defense, named after Augusta Ada Lovelace Byron, thought to be the first female computer programmer. **675**

Adapter card: Circuit board that enhances functions of a component of a system unit and/or provides connections to peripherals. **212, 230, 245**
types of, **230–231**

Adaptive maintenance:

Operation, support, and security phase process of including new features or capabilities in an information system. **645**

adding

music files to computer, **299**

RAM to computers, **226**

records to databases, **520**

Add-on: Program that extends the capability of a browser; often used to enhance multimedia. **97, 113.** *See also Plug-in*

Address: Unique number that identifies the location of a byte in memory. **223, 242**

Address book: List of names and e-mail addresses, created and stored by a user. Also called contacts folder. **102**

Address bus: The part of a bus that transfer information about where data should reside in memory. **237, 245**

addresses

Internet, **79–80**

IP, **79, 110**

of memory cells, **242**

searching Web for, **120**

symbolic, **666**

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Administrator account:

Computer account held by computer and network administrators that enables them to access all files and programs on the computer or network, install programs, and specify settings that affect all users on a computer or network. **410, 432**

Adobe Certified Associate:

Application software certification that tests user's expertise in a variety of Adobe software including Flash and Dreamweaver. **804**

Adobe Certified Expert (ACE):

Application software certification that tests a user's expertise on Adobe software. **804**

Adobe Certified Instructor (ACI):

Application software certification that demonstrates a user's ability to provide instruction on Adobe software. **804**

Adobe InDesign, **809**

Adobe Systems, **71**

company profile, **179**

Web page authoring software, **685**

ADSL (asymmetric digital

subscriber line): Type of DSL that supports faster transfer rates when receiving data than when sending data. **484**

Advanced Encryption Standard (AES), 592

Advanced Search features, 87

Advanced transfer cache: L2 cache built directly on the processor chip. 227

advocacy Web sites, 91

Adware: Program that displays an online advertisement in a banner or pop-up window on Web pages, e-mail, or other Internet services. 426, 433, 588, 595

Adware remover: Program that detects and deletes adware from a user's computer. 426, 433

Aero Flip 3D: Windows feature that works with the mouse to flip through open windows arranged in a stack. 414

After image: Copy of a database file after changes were made. 532

agricultural uses of computers, 497

Air mouse: Motion-sensing mouse that, in addition to the typical buttons, allows you to control objects, media players, and slide shows by moving the mouse in predetermined directions through the air. 263–264, 290

airline reservations OLTP, 733

airport screening, damage to hard disks, 367

Ajax: Asynchronous JavaScript and XML. Method of creating interactive Web applications designed to provide immediate response to user requests. 684, 701, 714, 716

ALGOL: ALGOrithmic Language. The first structured procedural programming language. 675

Alcatel-Lucent, 499

Algorithm: Set of steps. 668

Allen, Paul, 41

All-in-one device: Output device that looks like a printer or copy machine but provides the functionality of a printer, scanner, copy machine, and perhaps a fax machine. 320, 333. *See also Multifunction peripheral*

Allocation unit: Smallest unit of disk space that stores data and information. 357. *See also Cluster*

Alphabetic check: Validity check that ensures users enter only alphabetic data in a field. 523, 542

Alphanumeric: Text that can include letters, numbers, or special characters. 518

ALU: Acronym for arithmetic logic unit; component of a

processor that performs arithmetic, comparison, and other operations. 214, 244

Amazon MP3, 826

Amazon.com, 41, 60

AMD processors, 71, 216–218

Americans with Disabilities Act (ADA): Federal law that requires any company with 15 or more employees to make reasonable attempts to accommodate the needs of physically challenged workers. 286

Analog: Continuous (wave form) signals. 221

video formats, 345

Analysis phase: Step in system development that consists of two major activities: (1) conduct a preliminary investigation, and (2) perform detailed analysis. 620–621, 629–637, 650

Anderson, Tom, 41

Andreessen, Marc, 60

Animated GIF: Animation technique that combines several GIF images in a single GIF file. 94

Animation: Appearance of motion created by displaying a series of still images in sequence. 94, 113

Annotation symbol: Flowchart symbol that explains or clarifies logic in a solution algorithm. 691. *See also Comment symbol*

anonymous comments, and cyberbullying, 108

Anonymous FTP: Feature of many FTP sites whereby anyone can transfer some, if not all, available files. 107

ANSI flowchart symbols (fig.), 691

anti-aliasing, 330

Anti-spam program: Program that attempts to remove spam before it reaches a user's inbox. 427, 433, 587

Antivirus program: Program that protects a computer against viruses by identifying and removing any computer viruses found in memory, on storage media, or on incoming files. 144, 426, 433, 560–561, 594

AOL (America Online), 78

API: Application programming interface; collection of tools that programmers use to interact with an environment such as a Web site or operating system. 684

APL: A Programming Language; scientific language designed to

manipulate tables of numbers. 675

Apple computers, 19–20, 41, 331

historic milestones, 57, 60, 62, 65,

66, 67, 68, 70

iPhone OS, 420

Macintosh operating system, 415

Applet: Interpreted program that runs on a client, but is compiled. 680

Application generator: Program that creates source code or machine code from a specification of the required functionality. 676, 700

application layer, OSI model, 498

Application software: Program designed to make users more productive and/or assist them with personal tasks. 16, 42, 142, 180

certification, 804

for communications, 174–176

for home, personal, and educational use, 165–172

installing, uninstalling, 188–189

overview of, 142–145

saving files in, 188

applications

computer, in society, 34–38

Archive disc: CD that stores photos from an online photo center in jpg file format, usually at a maximum resolution of 7200 pixels per photo. 374

Arithmetic logic unit:

Component of a processor that performs arithmetic, comparison, and other operations. 214, 244

Arithmetic operations: Basic calculations such as addition, subtraction, multiplication, and division. 214–215

arrays, 242

art Web sites, 139

Articulation agreement:

Agreement between educational institutions that ensures credits will be received for courses taken at another school. 794

Artificial intelligence (AI): The application of human intelligence to computers. 737

ARPA: Advanced Research Projects Agency; agency of the U.S. Department of Defense that built an early computer network called ARPANET. 75

ARPANET: Network developed by the Pentagon's Advanced Research Projects Agency (ARPA) that linked scientific and academic researchers across the United States. 56, 75, 499

artificial neural networks (ANNs), 758

ASCII: American Standard Code for Information Interchange; the most widely used coding system to represent data. 221, 222, 244

ASCII file: File that does not contain any formatting, that is, no graphics, italics, bold, underlining, styles, bullets, shading, color, or any other type of graphical format. 694

Aspect ratio: Defines a display's width relative to its height. 310

ASP.NET: Web application framework that provides the tools necessary for the creation of dynamic Web sites. 670–671, 714, 716, 717

Assembler: Program used by programmers to convert assembly language source program into machine language. 666

Assembly language:

Programming language in which a programmer writes instructions using symbolic instruction codes. 665–666, 700

Association for Computing

Machinery (ACM): Scientific and educational organization dedicated to advancing knowledge and proficiency of information technology. 797, 812

Association of Information

Technology Professionals

(AITP): Professional organization with more than 9,000 members consisting of programmers, systems analysts, and information processing managers. 797–798, 812

asterisk (*)

database flag, 522

search engine operator, 87

astronomy

Binary Black Hole Coalescence, 756

Large Synoptic Survey Telescope (LSST), 640

Asymmetric key encryption:

Type of encryption that uses two encryption keys: a public key and a private key. 573.

See also Public key encryption

Asynchronous Transfer Mode:

Service that carries voice, data, video, and multimedia at very high speeds. 485

AT&T, 78

Atanasoff, Dr. John V., 54

ATM: Asynchronous Transfer Mode; service that carries voice,

- data, video, and multimedia at very high speeds. **485, 501**
- ATM cards:** 377
- Atom:** Specification sometimes used by content aggregators to distribute content. **92**
- ATOM:** XML application that content aggregators use to distribute content to subscribers. **679**
- attachments
to databases, 518
e-mail, 102, 120
- Attribute:** Each data element in an object. **533, 543, 634.** *See also Property*
- auctions Web sites, 133
- Audio:** Music, speech, or any other sound. **94, 113**
- output, 305
- speakers, headphones, earbuds, 323–325
- Audio editing software:** Application software that allows a user to modify audio clips, produce studio-quality soundtracks, and add audio to video clips. **159, 162, 181**
- for personal use, 165, 170
- Audio input:** Process of entering any sound, such as speech, music, and sound effects, into the computer. **274**
- Audio output device:** Component of a computer that produces music, speech, or other sounds, such as beeps. **323, 333**
- types and features, 323–325
- Audit trail:** Computer file that records both successful and unsuccessful access attempts. **565, 594**
- Authentication:** Access control that verifies an individual is the person he or she claims to be. **565**
- biometric, 288
- Automated teller machine (ATM):** Special-purpose terminal, connected to a host computer through a network that functions as a self-service banking machine. **284, 291, 568**
- ATM cards, 377
- Automatic update:** Operating system feature that automatically provides updates to a program. **409, 432**
- automobiles
automakers' use of computers, 697
- embedded computers in, 26
- online mapping services, 173
- robots in manufacturing, 38
- travel and mapping software, 170–171
- AutoSave feature, word processing software, 150
- Availability:** Measure of how often hardware is online. **752, 761**
- B**
- Back door:** Program or set of instructions in a program that allow users to bypass security controls when accessing a program, computer, or network. **562, 594**
- Back end:** Application that supports a front-end program. **525**
- Back up:** To make a copy of selected files or an entire hard disk to another storage medium. **424, 433, 577**
- files on offsite Internet server, 602
- Background:** Programs that are running, but not in use. **404**
- backpropagation, 758
- Backside bus (BSB):** Bus that connects the processor to cache. **237, 245**
- Backup:** Duplicate of a file, program, or disk placed on a separate storage medium that can be used if the original is lost, damaged, or destroyed. **358, 543, 577, 595**
- procedures, 754–756
- Time Machine utility, 415
- Backup plan:** Component of a disaster recovery plan that specifies how a company uses backup files and equipment to resume information processing. **755–756, 761**
- Backup utility:** Utility program that allows users to copy, or back up, selected files or an entire hard disk to another storage medium, such as another hard disk, optical disc, USB flash drive, or tape. **424, 433**
- Backward compatible:** Term used to refer to a device's capability of supporting older devices, as well as newer devices. **234**
- Backward recovery:** Technique for recovering data in a database where the DBMS uses the log to undo any changes made to a database during a certain period, such as an hour. **532, 543.** *See also Rollback*
- Ballmer, Steve, 811
- Bandwidth:** The amount of data, instructions, and information that can travel over a communications channel. **491**
- Bar chart:** Chart that displays bars of various lengths to show the relationship of data. **152.**
- See also Column chart*
- Bar code:** Identification code consisting of either vertical lines and spaces of different widths or a two-dimensional pattern of dots, squares, and other images that represent a manufacturer and an item. **280, 291**
- Bar code reader:** Optical reader that uses laser beams to read bar codes by using light patterns that pass through the bar code lines. **259, 280, 291.**
- See also Barcode scanner*
- Bar code scanner:** Optical reader that uses laser beams to read bar codes by using light patterns that pass through the bar code lines. **280, 291.** *See also Barcode reader*
- barcode of life, 538
- Bardeen, John, 54
- baseball memorabilia databases, 523
- BASIC:** Beginners All-purpose Symbolic Instruction Code. Programming language developed by John Kemeny and Thomas Kurtz as a simple, interactive problem-solving language. **675**
- Basic input/output system:** Firmware that contains the computer's startup instructions. **400, 432**
- Batch processing:** Processing technique in which the computer collects data over time and processes all transactions later, as a group. **733**
- batteries for digital cameras, 300
- Bay:** Opening inside the system unit in which additional equipment can be installed. **238**
- BD-R:** High-capacity DVD-recordable format. **372, 376**
- BD-RE:** High-capacity rewritable DVD format. **372, 376, 385**
- BD-ROM:** *See Blu-ray Disc-ROM.*
- Bebo online social network, 552
- Before image:** Copy of a database file before changes were made. **532**
- behavioral diagrams, 693
- BehaviorIQ, 585
- Bell Labs, 416
- Benchmark test:** Test that measures the performance of hardware or software. **639, 648**
- bendable notebook computers, 236
- Berners-Lee, Tim, 58, 111
- Berry, Clifford, 54
- Beta:** Program that has most or all of its features and functionality implemented. **696**
- Better Business Bureau (BBB), 747
- Bezos, Jeff, 41
- Bill and Melinda Gates Foundation, 41
- billboards, digital, 306
- Binary digit:** The smallest unit of data a computer can process. **221, 244.** *See also Bit*
- Binary system:** Number system used by computers that has just two unique digits, 0 and 1, called bits. **221, 244**
- Bing Maps, 129, 173
- Bing Web site, 126
- bioinformatics, 810
- Biometric device:** Device that translates a personal characteristic into a digital code that is compared with a digital code stored in a computer. **282–283, 291, 568, 594**
- Biometric identifier:** Physiological or behavioral characteristic, such as fingerprints, hand geometry, facial features, voice, signatures, and eye patterns. **282**
- Biometric payment:** Payment method where the customer's fingerprint is read by a fingerprint scanner that is linked to a payment method such as a checking account or credit card. **568**
- Biometrics:** Technology of authenticating a person's identity by verifying a personal characteristic. **282**
- BIOS:** Basic input/output system; firmware that contains the computer's startup instructions. **400, 432**
- Bit:** The smallest unit of data a computer can process. Bit is short for binary digit. **221, 244, 518**
- Bit depth:** The number of bits a video card uses to store information about each pixel. **310.**
- See also Color depth*
- BitLocker Drive Encryption, 592
- BlackBerry:** Operating system that runs on handheld devices supplied by RIM (Research In Motion). **420, 433**
- Blackout:** A complete power failure. **575**
- Blade:** Single card in a blade server. **751, 761**
- Blade server chassis:** Component in which blades in a blade server are held. **751**

Blade server: Complete computer server, such as a Web server or network server, packed on a single card. **751, 761.** *See also Ultradense server*

BLOB: Binary large object. **518**

Blog: Informal Web site consisting of time-stamped articles, or posts, in a diary or journal format, usually listed in reverse chronological order. Short for Web log. **14, 52, 90, 113, 122, 193, 462**

- automotive, 190
- creating, 50–51
- personal and business perspective, 200–201
- Web sites, 127

Blog software: Software needed by blogger to create/maintain a blog. **174, 181**

Blogger: Author of a Weblog. **90, 127**

Bloglines, 510

Blogosphere: Worldwide collection of blogs. **90, 127**

Blogware: Short for blog software. Software needed by blogger to create/maintain a blog. **174, 181**

Blowfish encryption, 592

Bluetooth: Network standard, specifically a protocol, that defines how two Bluetooth devices use short-range radio waves to transmit data. **234, 245, 480, 501, 829**

voice input, 274

Bluetooth printing: Type of printing process that uses radio waves to transmit output to a printer. **314, 332**

Bluetooth wireless port adapter: Adapter that will convert an existing USB port into a Bluetooth port. **234–235**

Blu-ray Disc-ROM: Newer, expensive type of DVD with storage capacities of 100 GB, with expectations of exceeding 200 GB in the future. **375, 385**

Blu-ray Discs, 8, 68

BMP graphic format, 93

body area networks (BANs), 471

Bookmark: Saved Web address that you access by clicking its name in a list. **83.** *See also Favorite*

- books, digital, 368
- books Web sites, 133

Boolean: Consisting of Yes or No, or True or False, values. **518**

Boot disk: Special disk that contains a few system files capable of starting a computer, which is used when the computer cannot

boot from its hard disk. **402.** *See also Recovery disk*

Boot drive: Drive from which a personal computer boots (starts). **402**

boot sector virus, 178

Booting: Process of starting or restarting a computer. **400–401, 432**

Borg, Anita, 759

Bot: Program that performs a repetitive task on a network. **562**

Botnet: Group of compromised computers connected to a network such as the Internet that are used as part of a network that attacks other networks, usually for nefarious purposes. **562, 594.** *See also Zombie army*

Braille printer: Type of printer that prints information on paper in Braille for use by visually impaired users. **329, 333**

brain waves, behavior tracking, 569

Brattain, Walter, 54

brick-and-click businesses, 123

Bricklin, Dan, 57, 179

Brin, Sergey, 111

British Library's Online Gallery, 368

Broadband: High-speed Internet connection provided through cable, DSL, fiber, radio signals, or satellite. **76, 77, 112, 446, 491**

Broadband modem: Digital modem that sends and receives digital data over the cable television (CATV) network. **486, 501.** *See also Cable modem*

Broadcast radio: Wireless transmission medium that distributes radio signals through the air over long distances such as between cities, regions, and countries and short distances such as within an office or home. **494**

Brooch, Grady, 634

Brownout: A prolonged under-voltage. **575**

Browser: Application software that allows users to access and view Web pages. **81, 112.** *See also Web browser*

- browsing
- tabbed, 84
- the Web, 81–82
- Web Standards Project, 698

Buddies: Established list of friends, family, and coworkers used in instant messaging. **104**

Buffer: Segment of memory or storage in which items are placed while waiting to be transferred from an input

device or to an output device. **407**

Bugs: Program errors. **409, 696**

Burning: Process of writing on an optical disc. **373**

files to optical discs, 440

Burns, Ursula, 331

Bus: Electrical channel that transfers electronic bits internally within the circuitry of a computer, allowing the devices both inside and attached to the system unit to communicate with each other. **237–238, 245, 476**

Bus network: Type of network topology in which a single central cable connects all computers and other devices. **476, 500**

Bus width: The size of a bus, which determines the number of bits that a computer can transmit at one time. **237, 245**

Business intelligence (BI): Several types of applications and technologies for acquiring, storing, analyzing, and providing access to information to help users make more sound business decisions. **725, 760**

Business process automation (BPA): Automation that provides easy exchange of information among business applications, reduces the need for human intervention in processes, and utilizes software to automate processes wherever possible. **726, 760**

Business process management (BPM): Set of activities that enterprises perform to optimize their business processes, such as accounting and finance, hiring employees, and purchasing goods and services. **725, 760**

Business software: Application software that assists people in becoming more effective and efficient while performing their daily business activities. **146, 180**

types of, 146–159

Business Software Alliance (BSA): Organization formed by a number of major software companies to promote a better understanding of software piracy problems and, if necessary, to take legal action. **572**

businesses

- brick-and-click, 123
- reason for using networks, 470
- searching Web for, 120
- business/marketing Web sites, 89–90

Business-to-business (B2B) e-commerce: E-commerce

that takes place between businesses. **100, 113**

Business-to-consumer (B2C)

e-commerce: The sale of goods and services to the general public. **98–99, 113**

Button: Graphical element that is activated to cause a specific action to occur. **144, 180**

Byron, Augusta Ada Lovelace, 675

Byte: Eight bits that are grouped together as a unit. A byte provides enough different combinations of 0s and 1s to represent 256 individual characters. **221, 223, 244, 518**

Bytecode: Resulting object code in a Java program. **670**

C

C: Programming language developed in the early 1970s at Bell Laboratories used for business and scientific applications. **668, 700**

C#: Object-oriented programming language based on C++ developed primarily by Anders Hejlsberg at Microsoft. **671, 700**

C++: Object-oriented programming language developed at Bell Laboratories that is an extension of the C programming language. **671, 700**

Cable Internet service: High-speed Internet access provided through the cable television network via a cable modem. **76, 112**

Cable modem: Digital modem that sends and receives digital data over the cable television (CATV) network. **79, 486, 501.** *See also Broadband modem*

cabling, transmission media, 493

Cache: Area of memory that stores the contents of frequently used data or instructions. **227**

calculations with spreadsheet software, 151–152

calculators, online, 668

CAM: Use of computers to assist with manufacturing processes such as fabrication and assembly. **38, 43**

camera, digital, 272–273

Camera phone: Phone that can send picture messages. **22**

camera pills, 36, 37

Candela: Standard unit of luminous intensity. **310**

capacitor, 242

Capacity: Number of bytes a storage medium can hold. **354, 384**

- CAPTCHA:** Completely Automated Public Turing test to tell Computers and Humans Apart; program used by some Web sites to provide further protection for a user's password by verifying that user input is not computer generated. **567, 594**
- Card reader/writer:** Device that reads and writes data, instructions, and information stored on flash memory cards. **364, 365, 384**
- purchasing considerations, **446**
- career Web sites, **138**
- careers in computer industry certification, **800–808**
- preparing for, **794–799**
- types of, **786–793**
- Carnivore, **394**
- Carpal tunnel syndrome (CTS):** Inflammation of the nerve that connects the forearm to the palm of the wrist. **579, 595**
- cartography Web sites, **129**
- Cascading style sheet (CSS):** Contains formats for how a particular object should be displayed in a Web browser. **683**
- Case control structure:** Type of selection control structure that can yield one of three or more possibilities. **690, 701**
- Cathode-ray tube (CRT):** Large, sealed glass tube whose front, the screen, is coated with dots of red, green, and blue phosphor material. **313, 332**
- cashless society, **377**
- cathode-ray tube (CRT), **313**
- ccTLD:** Country code TLD (top-level domain). **80**
- CDMA:** Code Division Multiple Access. 3G standard for mobile communications. **495**
- CD-R:** Multisession optical disc on which users can write, but not erase, their own items such as text, graphics, and audio. **372, 373, 385. See also Compact disc-recordable**
- CD-ROM:** Type of optical disc that uses laser technology to store data, instructions, and information that users can read but not write on or erase. **372–373, 385. See also Compact disc read-only memory**
- CD-ROM drive:** Drive that can read CD-ROM discs and sometimes audio CDs. **372**
- CD-RW:** Erasable multisession optical disc on which users can write data, instructions, and information multiple times.
- 372, 373, 385. See also Compact disc-rewritable**
- CD-RW drive:** Drive that can read audio CDs, standard CD-ROMs, CD-Rs, CD-RWs, and can write on, or record, CD-RWs. **373**
- Celeron:** Intel processor used by less-expensive basic PCs. **216, 244**
- Cell:** Intersection of a column and a row in a worksheet. **151**
- cell phones, use as primary line, **463**
- Cellular radio:** High-speed Internet connection for devices with built-in compatible technology or computers with wireless modems. **76, 112, 495**
- Central processing unit (CPU):** Electronic component on a computer's motherboard that interprets and carries out the basic instructions that operate the computer. **213, 244. See also Processor**
- Centralized:** Approach to information technology in which a company maintains central computers supported by a central information technology department. **723**
- Centrino 2:** Mobile technology that integrates wireless capabilities in notebook computers and Tablet PCs. **217**
- CERT/CC:** Computer Emergency Response Team Coordination Center; federally funded Internet security research and development center. **558**
- Certificate authority:** Authorized person or company that issues and verifies digital certificates. **574**
- Certification:** Process of verifying the technical knowledge of an individual who has demonstrated competence in a particular area. **800, 818**
- guide to, **803–808**
- overview of, **800–803**
- Certified Computer Examiner (CCE):** Digital forensics certification that tests core knowledge of acquisition, marking, handling, and storage of computer evidence using a particular operating system. **806**
- Certified Computer Forensics Examiner (CCFE):** Digital forensics certification that tests in-depth knowledge of forensic imaging, examination, collection, and reporting. **806**
- Certified Electronic Evidence Collection Specialist (CEECS):** Digital forensics certification that tests basic knowledge of forensic ethics, imaging, examination, collection, and reporting. **806**
- Certified Information Forensics Investigator (CIFI):** Digital forensics certification that tests knowledge of information forensics in areas related to auditing, incident response, law and investigation, tools and techniques, traceback, and countermeasures. **806**
- Certified Information Systems Security Professional (CISSP):** Security certification that tests in-depth knowledge of access control methods, information systems development, cryptography, operations security, physical security, and network and Internet security. **807**
- Certified Internet Webmaster (CIW):** Internet certification that tests knowledge of Web development, security, and administration. **807**
- Certified Software Development Associate (CSDA):** Programmer/developer certification that tests basic knowledge of software development processes and tools. **805**
- Certified Software Development Professional (CSDP):** Programmer/developer certification that tests advanced knowledge of software development process and tools. **805**
- Certified Web Professional (CWP):** Internet certification that tests advanced knowledge in areas of Web site design and development, and server administration and security. **807**
- CGI (common gateway interface):** Communications standard that defines how a Web server communicates with outside sources. **680**
- CGI (Common Gateway Interface) script:** Program that manages the sending and receiving of data between the front end and the database server. **537, 543**
- CGI script:** Program that manages sending and receiving across a CGI. **680–681**
- Change management:** Skill required for project leaders so they can recognize when a change in a project has occurred, take actions to react to the change, and plan for opportunities because of the change. **624**
- changing digital photos, **162**
- display resolution, **308–310**
- Character:** A number, letter, punctuation mark, or other symbol that is represented by a single byte in the ASCII and EBCDIC coding schemes. **518, 542**
- Charge-coupled device:** Digital camera chip that generates an analog symbol that represents an image. **272**
- Charting:** Spreadsheet software feature that depicts data in a graphical form. **152**
- Chassis:** Case of the system unit made of metal or plastic that protects the internal electronic components from damage. **210**
- Chat:** Real-time typed conversation that takes place on a computer. **105**
- Chat client:** Program that allows a user to connect to a chat server to participate in a chat session. **105**
- Chat room:** Location on an Internet server that permits users to chat with each other. **105, 113, 462**
- application software, **174**
- personal and business perspective, **202–203**
- CheatHouse.com, **149**
- Check digit:** Validity check consisting of a number(s) or character(s) that is appended to or inserted in a primary key value. **523–524, 542**
- Check Disk utility, **392–393**
- Chief information officer (CIO):** Employee who directs the company's information service and communications functions. **723, 732, 788. See also Chief technology officer (CTO)**
- Chief security officer (CSO):** Employee responsible for physical security of an organization's property and people; in charge of security computing resources. **645, 651, 789**
- Chief technology officer (CTO):** Employee who directs the company's information service and communications functions. **788. See also Chief information officer (CIO)**
- Child:** Term used in three-generation backups to refer to

the most recent copy of the file. **577, 595**

Chip: Small piece of semiconducting material, usually silicon, on which integrated circuits are etched. **212–213, 216–217, 228, 244**

PC processors, **216–218**
pet identification, **213**
chumby, **830**

Ciphertext: Encrypted (scrambled) data. **571–572, 573**

Cisco Certified Internetwork Expert (CCIE): Internet certification that tests expert level knowledge in areas of internetwork communications, security, routing, and switching. **806**

Cisco Certified Network Associate (CCNA): Networking certification that tests basic knowledge of installing, configuring, and operating LAN, WAN, and dial-up access services for small networks. **806**

Cisco Certified Network Professional (CCNP): Networking certification that tests advanced knowledge of installing, configuring, and operating LANs and WANs. **806**

Cisco Systems, **499**
city guide Web sites, **129**

Clark, Jim, **60**

Class diagram: Analysis and design tool in the UML that graphically shows classes and subclasses in a system. **635, 651**

cleaning
computers, mobile devices, **240**
hard disks, **355**
optical discs, **371**
Click: The act of moving the mouse pointer to a button and then pressing and releasing a button on the mouse (usually the left mouse button). **84, 144, 180, 290**
mouse operations, **264**

Click stream: Collection of every action that users make as they move through a Web site. **742**

Click Wheel: Touch-sensitive scroll pad on a portable media player that users rotate to browse through song, picture, or movie lists and press to play or pause media, display a menu, and other actions. **267**

Clickjacking: Scam in which an object that can be clicked on a Web site, such as a button,

image, or link, contains a malicious program. **588**

Client: Computer on a network that requests resources from the server. Also called a workstation. **10**

Client operating systems: Term used to refer to some stand-alone operating systems that also work in conjunction with a server operating system. **412**

Clients: Other computers and mobile devices on a network that rely on a server for its resources. **473, 500**

Client/server network: Network in which one or more computers act as a server, and the other computers on the network request services from the server. **473**

Clip art: Collection of electronic drawings, photos, and other images. **147**

Clip art/image gallery: A collection of clip art and photos included with application software. **169, 181**

Clipboard: Temporary storage location for document content that is used in cutting and pasting or copying and pasting operations. **149**

Clock cycle: One tick of the system clock. **216**

Clock speed: Pace of the system clock, measured by the number of ticks per second. **216, 217**

Closed: Term used to describe information systems that are more difficult to interoperate with other information systems. **753.** See also **Proprietary**

closed vs. open source software, **416**

closing programs, **50**

Cloud computing: Internet service that provides computing needs to computer users. **745, 761**

and Web 2.0 program development, **715**

Cloud storage: Internet service that provides storage to computer users. **70, 353, 368–369, 385**

CLR: Common Language Runtime; environment that enables programmers to develop .NET programs using a variety of languages. **670**

Cluster: Smallest unit of disk space that stores data and information. **357.** See also **Allocation unit**

CMOS (complementary metal-oxide semiconductor): Technology used by some RAM chips, flash memory chips, and other types of memory chips that provides high speeds and consumes little power by using battery power to retain information even when the power to a computer is off. **229, 245, 383**

CNET blog, **52**

Coax: Short for coaxial; a single copper wire surrounded by at least three layers: (1) an insulating material, (2) a woven or braided metal, and (3) a plastic outer coating. **493.** See also **Coaxial cable**

Coaxial cable: A single copper wire surrounded by at least three layers: (1) an insulating material, (2) a woven or braided metal, and (3) a plastic outer coating. **493, 501.** See also **Coax**

COBOL: COmmon Business-Oriented Language. Programming language designed for business applications, which evolved out of a joint effort between the United States government, businesses, and major universities in the early 1960s. **55, 668–669, 675, 700**

cochlear implants, **36**

Cocoa programming language, **675**

Codd, E.F., **541**

Code: Programming term meaning to write. **664**

Code of conduct: Written guidelines that help determine whether a specific computer action is ethical or unethical. **582–583, 595**

Code review: Process of programmers, quality control testers, and/or peers reviewing code in order to locate and fix errors so that the final programs work correctly. **694**

Code snippets: Prewritten code and templates associated with common programming tasks. **671**

codec, **347**

Coding: Translating a solution algorithm into a programming language and then typing the programming language code into the computer. **694**
data representation, **221–222**

Cold boot: Process of turning on a computer that has been powered off completely. **400**

Cold site: Separate facility that mirrors a critical site, but does

not become operational until the critical site becomes unavailable. **756**

Collaborate: Work online with other users connected to a server. **468, 500**

Collaborative databases: Web databases where users store and share photos, videos, recordings, and other personal media with other registered users. **536**

Collaborative software: Software that includes tools that enable users to share documents via online meetings and communicate with other connected users. **468**

Color depth: The number of bits a video card uses to store information about each pixel. **310.** See also **Bit depth**

Color library: Standard set of colors used by designers and printers to ensure that colors will print exactly as specified. **161**

Column: Term used by users of relational databases for field. **533, 543**

Column chart: Chart that displays bars of various lengths to show the relationship of data. **152.** See also **Bar chart**

Command: Instruction on a menu that causes a program to perform a specific action. **144, 259, 290**

Command language: The set of commands entered into a computer with a command-line interface. **403**

Command-line interface: Type of user interface in which a user types commands or presses special keys on the keyboard (such as function keys or key combinations) to enter data and instructions. **403, 432**

Comment symbol: Flowchart symbol that explains or clarifies logic in a solution algorithm. **691.** See also **Annotation symbol**

Comments: Internal documentation contained in a program. **694**

Common Business-Oriented Language: Programming language designed for business applications, which evolved out of a joint effort between the United States government, businesses, and major universities in the early 1960s. **668–669, 700.** See also **COBOL**

Common short code (CSC): Four- or five-digit number

- assigned to a specific content or wireless service provider. **464**
- Communications:** Process in which two or more computers or devices transfer data, instructions, and information. **460**
application software for, 174–176
network standards, 477–482
uses of computer, 461–469
- Communications channel:** Transmission media on which data, instructions, or information travel. **460**, 491–492, 500
- Communications device:** Hardware component that enables a computer to send (transmit) and receive data, instructions, and information to and from one or more computers. **8**, 42, **485**
- Communications satellite:** Space station that receives microwave signals from an earth-based station, amplifies (strengthens) the signals, and broadcasts the signals back over a wide area to any number of earth-based stations. **496**, 501
- Communications software:** Programs that (1) help users establish a connection to another computer or network; (2) manage the transmission of data, instructions, and information; and (3) provide an interface for users to communicate with one another. **482**, 501
- Compact disc read-only memory:** Type of optical disc that uses laser technology to store data, instructions, and information that users can read but not write on or erase. **372**, 385. *See also CD-ROM*
- Compact disc-recordable:** Multisession optical disc on which users can write, but not erase, their own items such as text, graphics, and audio. **373**, 385. *See also CD-R*
- Compact disc-rewritable:** Erasable multisession optical disc on which users can write data, instructions, and information multiple times. **373**, 385. *See also CD-RW*
- CompactFlash (CF):** Memory card capable of storing between 512 MB and 100 GB of data. **364**, 365, 384
- Comparison operations:** Operations that involve comparing one data item with another to determine whether the first item is greater than, equal to, or less than the other item. **214**
- compatibility:** PC-compatible computers, 19 of software with computers, 17
- Compiler:** Separate program that converts an entire source program into machine language before executing it. **666**–667, 700
just-in-time (JIT), 670
- Complementary metal-oxide semiconductor (CMOS):** Technology used by some RAM chips, flash memory chips, and other types of memory chips that provides high speeds and consumes little power by using battery power to retain information even when the power to a computer is off. **229**
- Completeness check:** Validity check that verifies that a required field contains data. **523**, 542
- component diagrams, 693
- Composite key:** Primary key that consists of multiple fields. **519**
- Compositor:** Employee who formats and combines text and graphics to produce publication-ready materials. **789**. *See also Desktop publisher*
- Compress:** To shrink the size of a file. **424**
compressed files, 107, 189
- Computer:** Electronic device, operating under the control of instructions stored in its own memory, that can accept data, process the data according to specified rules, produce results, and store the results for future use. **6**, 42
adding RAM, 226
advantages and disadvantages of using, 9–10
agricultural usage of, 497
applications in society, 34–38
career preparation, 794–799
careers in computer industry, 786–793
categories of, 18–19
cleaning, 240
in construction industry, 177
described, components, 6–8
diagnosing problems, 792
easing eyestrain while using, 306
and entertainment industry, 109
examples of usage, 28–33
fault-tolerant, 405
getting virus through e-mail, 103
government search and seizure of, 217
health sciences usage, 538
health-related issues, 579–581
historical milestones, 54–71
in hospitality industry, 287
industry overview, 784–785
installing and maintaining, 440
IP address, 110
living digitally (feature), 824–830
manufacturing use of, 697
meteorology and, 381
municipal services' use of, 757
organizing, managing files on, 550
overview of, 4–5
printer control from, 341
professional organizations (fig.), 797
purchasing, installing memory in, 252–253
purchasing considerations, 445–452
recycling, 39
signs of virus infection, 425
software compatibility, 17
software types, 15–18
and space exploration, 329
sports usage of, 240
starting and shutting down, 400–401
stopping thrashing, 407
textile industry usage, 647
thinking, 214
Web sites, 133
wireless LAN configuration, 472
- Computerworld*, 799
- Computer addiction:** Growing health problem that occurs when the computer consumes someone's entire social life. **581**, 595
- Computer crime:** Any illegal act involving a computer. **556**, 594
- Computer Emergency Response Team Coordination Center:** Federally funded Internet security research and development center. **558**. *See also CERT/CC*
- Computer engineering (CE):** Curriculum that teaches students how to design and develop the electronic components found in computers and peripheral devices. **795**, 812
- Computer equipment field:** Consists of manufacturers and distributors of computers and computer-related hardware such as magnetic and optical drives, monitors, printers, and communications and networking devices. **790**, 812
- Computer ethics:** Moral guidelines that govern the use of computers and information systems. **581**, 595
- Computer forensics:** The discovery, collection, and analysis of evidence found on computers and networks. **569**. *See also Cyberforensics, Digital forensics, or Network forensics*
- Computer games designer/programmer:** Employee who designs computer games and translates the design into a computer program using an appropriate computer language. **788**
- Computer information systems (CIS):** Curriculum that teaches students technical knowledge and skills and focuses on how to apply these skills. Also called management information systems (MIS) or management information technology. **795**, 812
- Computer literacy:** Having a current knowledge and understanding of computers and their uses. **5**, 42. *See also Digital literacy*
- Computer operator:** Employee who performs equipment-related activities such as monitoring performance, running jobs, backup, and restore. **789**
- Computer output microfilm recorder:** Device that records images on microfilm and microfiche. **378**
- Computer program:** Series of instructions that directs a computer to perform tasks. **664**
- computer role-playing games (CRPGs), 829
- Computer salespeople:** Job that requires a general understanding of computers and a specific knowledge of the product being sold. **792**, 812
- Computer science (CS):** Curriculum that focuses on the theory of programming and operating systems. **795**, 812
- Computer science/IT instructor:** Professional who teaches basic computer courses in addition to specialized classes such as computer engineering, Internet development, networking, programming, or systems analysis and design. **789**
- Computer Sciences Corporation (CSC), 56, 649
- Computer scientist:** Employee who researches, invents, and develops innovative solutions to complex software requirements or problems. **788**
- Computer security plan:** Written summary of all the safeguards that are in place to protect an

- organization's information assets. **645, 651**
- Computer security risk:** Any event or action that could cause a loss of or damage to computer hardware, software, data, information, or processing capability. **556, 594**
- Computer security specialist:** Employee responsible for the security and data and information stored on computers and mobile devices within an organization. **789.** *See also* **Mobile security specialist**
- Computer service and repair field:** Provides preventive maintenance, component installation, and repair services to customers. **791–792, 812**
- Computer software field:** Consists of companies that develop, manufacture, and support a wide range of software. **790–791, 812**
- Computer technician:** Employee who installs, maintains, and repairs hardware; installs, upgrades, and configures software; and troubleshoots hardware problems. **789**
- Computer vision syndrome:** Eyestrain due to prolonged computer usage. **579–580, 595**
- Computer-aided design (CAD):** Software that aids in engineering, drafting, and design. **177, 647, 697, 728–729, 760**
- Computer-aided design (CAD) database:** Database that stores data about engineering, architectural, and scientific designs. **534, 543**
- Computer-aided design (CAD) software:** Sophisticated type of application software that assists a professional user in creating engineering, architectural, and scientific designs. **160, 180**
- Computer-aided engineering (CAE):** Use of computers to test product designs. **728–729, 760**
- Computer-aided manufacturing:** Use of computers to assist with manufacturing processes such as fabrication and assembly. **38, 43**
- Computer-aided manufacturing (CAM):** Use of computers to assist with manufacturing processes such as fabrication and assembly. **647, 697, 729, 760**
- Computer-aided software engineering (CASE):** Software tools designed to support one or more activities of the system development cycle, typically including diagrams to support both process and object modeling. **642, 649, 651**
- Computer-based training (CBT):** Type of education in which students learn by using and completing exercises with instructional software. Also called computer-aided instruction (CAI). **170, 685**
- Computer-integrated manufacturing (CIM):** Use of computers to integrate the many different operations of the manufacturing process. **729, 760**
- Computerized adaptive testing (CAT):** Testing technique where the tests analyze a person's responses while taking the test. **803**
- conducting interviews, **658–659**
- configurations
- RAM, **226**
 - suggested minimums, by user (fig.), **239**
- configuring devices, **408**
- connecting
- to the Internet, **76, 408**
 - to unsecured networks, **480**
 - to wireless networks, **577–578**
- Connector:** Device that joins a cable to a port. **232, 245**
- Consistency check:** Validity check that tests the data in two or more associated field to ensure that the relationship is logical and their data is in the correct format. **523, 542**
- Consortium for Barcode of Life, **538**
- Construct:** Used during program design, a depiction of the logical order of program instructions. **689, 701.** *See also* **Control structure**
- Consumer-to-consumer (C2C) e-commerce:** E-commerce that occurs when one consumer sells directly to another, such as in an online auction. **100, 113**
- contact lenses monitoring
- glaucoma, **409**
- Content aggregator:** Business that gathers and organized Web content and then distributes, or feeds, the content to subscribers for free or a fee. **92, 113**
- Content filtering:** Process of restricting access to certain material on the Web. **589–590, 595**
- Content management system (CMS):** An information system that is a combination of databases, software, and procedures that organizes and allows access to various forms of documents and other files, including images and multimedia content. **739, 760**
- content sharing, **204–205**
- Context diagram:** Top level DFD that identifies only major processes. **632–633**
- Continuous backup:** Backup plan in which all data is backed up whenever a change is made. **532, 543**
- continuous data protection (CDP), **754, 755**
- Continuous-form paper:** Type of paper, used by most dot-matrix printers, which consists of thousands of pages connected together end to end. **323**
- Contrast ratio:** Difference in light intensity between the brightest white and darkest black that can be displayed on an LCD monitor. **310, 332**
- Control structure:** Used during program design, a depiction of the logical order of program instructions. **689, 701.** *See also* **Construct**
- Control unit:** Component of a processor that directs and coordinates most of the operations in the computer. **214**
- Controlling:** Management activity that involves measuring performance and, if necessary, taking corrective action. **725**
- Convergence:** Term used to refer to the trend of manufacturers offering computers and devices with technologies that overlap. **18**
- Convertible tablet:** Type of Tablet PC that has an attached keyboard. **21**
- converting letters to binary form and back, **222**
- Cookie:** Small text file that a Web server stores on a computer. **585–587, 595**
- cooking Web sites, **135**
- copying software illegally, **791**
- copyleft, **592**
- Copyright:** Exclusive rights given to authors and artists to duplicate, publish, and sell their materials. **582**
- and creativity, **635**
- Cordless keyboard:** Battery-powered keyboard that transmits data using wireless technology, such as radio waves or infrared light waves. **262.** *See also* **Wireless keyboard**
- Cordless mouse:** Battery-powered device that transmits data using wireless technology, such as radio waves or infrared light waves. **264, 290.** *See also* **Wireless mouse**
- Core:** Family of Intel processors used in most high-performance PCs. **216, 244**
- Core activities:** Activities that relate to the main mission of a company. **723**
- corporate blogs, **127**
- Corporate trainer:** Employee who teaches employees who to use software, design and develop systems, program, and perform other computer-related activities. **789**
- Corrective maintenance:** Operation, support, and security phase process of diagnosing and correcting errors in an information system. **645**
- Cost/benefit feasibility:** Measure of whether lifetime benefits of a proposed information system will be greater than its lifetime costs. **625, 650.** *See also* **Economic feasibility**
- Cost-effective information:** Information that gives more value than it costs to produce. **517, 542**
- Counter:** Web site element that tracks the number of visitors to a Web site. **680**
- CPU (central processing unit):** Electronic component on a computer's motherboard that interprets and carries out the basic instructions that operate the computer. **7.** *See also* **Processor**
- Cracker:** Someone who accesses a computer or network illegal with the intent of destroying data, stealing information, or other malicious action. **556, 594**
- Create:** To enter text or numbers, insert images, and perform other tasks with a document using an input device such as a keyboard, mouse, or digital pen. **149, 180**
- creating
- blogs, **50–51**
 - video resume, **820–821**
 - Visual Basic program, **672**
- Creative Suite (Adobe), **179**
- credit report accuracy, **517**
- Crimeware:** Software used by cybercriminals. **556**
- criminal databases, sharing of, **526**
- Cross-platform:** Program that runs the same on multiple operating systems. **399**

CRT monitor: Type of desktop monitor that contains a cathode-ray tube. **313, 332**

Cursor: Symbol on a computer screen, usually a blinking vertical bar, that indicates where the next character a user types will appear. **261, 290.** *See also Insertion point*

Custom software: Software that performs functions specific to a business or industry, developed by a user or at a user's request. **142, 180, 636, 651**

Customer interaction

management (CIM): Software that manages the day-to-day interactions with customers, such as telephone calls, e-mail interactions, Web interactions, and instant messaging sessions. **731–732, 760, 775–778, 780**

Customer relationship

management (CRM): System that manages information about customers, interactions with customers, past purchases, and interest. **737, 760, 773, 774, 776, 780**

customer service systems in the enterprise, **727**

CVS: Computer vision syndrome; eyestrain due to prolonged computer usage. **579**

cyberbullying, **108**

Cybercafé: Coffeehouse, restaurant, or other location that provides personal computers with Internet access to its customers. **466, 500**

Cybercrime: Online or Internet-based illegal acts. **562, 556, 594, 606–610, 608**

punishing cybercriminals, **562**

Cyberextortionist: Someone who uses e-mail as a vehicle for extortion. **557, 594**

Cyberforensics: The discovery, collection, and analysis of evidence found on computers and networks. **569.** *See also Computer forensics, Digital forensics, or Network forensics*

Cyberterrorist: Someone who uses the Internet or network to destroy or damage computers for political reasons. **557, 594, 608**

Cyberwarfare: Computer or network attack whose goal ranges from disabling a government's computer network to crippling a country. **557**

Cylinder: The vertical section of a hard disk track that passes through all platters. **358, 384**

Cypher: Set of steps that can convert readable plaintext into unreadable ciphertext. **571–572, 573.** *See also Encryption algorithm*

D

Dance pad: Flat electronic device divided into panels that users press with their feet in response to instructions from a music video game. **270, 291**

Data: Collection of unprocessed items, which can include text, numbers, images, audio, and video. **6, 42, 258, 290, 514, 542** accidentally accessing stolen, **531** hierarchy of, **517** maintaining, **520–524** privacy of cloud storage, **369** sample valid and invalid (fig.), **523**

Data bus: Part of a bus that transfers actual data. **237, 245**

Data center: Centralized location for managing and housing hardware and software. **740**

Data collection device: Device that obtains data directly at the location where the transaction or event takes place. **282**

Data communications analyst: Employee who evaluates, installs, and monitors data and/or voice communications equipment and software; maintains connections to the Internet and other WANs. **789**

Data conversion: Converting existing manual and computer files so a new computer system can use them. **644**

Data dictionary: A DBMS element that contains data about each file in a database and each field in those files. **527–528, 543, 634, 640, 651.** *See also Repository*

Data entry form: Window on the screen that provides areas for entering or changing data in a database. **530.** *See also Form*

Data file: Collection of related records stored on a storage medium such as a hard disk, CD, or DVD. **519, 542**

Data flow: Element in a DFD, indicated by a line with an arrow, that shows the input or output of data or information into or out from a process. **632, 651**

Data flow diagram: Systems analysis and design tool that

graphically shows the flow of data in a system. **632–633, 651**

Data integrity: The quality of data that is entered in a database. **516, 525–526, 542**

data link layer, (OSI model), **498**

Data mart: Smaller version of a data warehouse that contains a database that helps a specific group or department make decisions. **536, 543**

Data mining: Process used with data warehouses to find patterns and relationships among data. **536**

Data model: Rules and standards that define how a database organizes data. **533, 543, 640**

Data modeler: Person who focuses on the meaning and usage of data, including proper placement of fields, defining the relationships among data, and identifying users' access privileges. **538, 543.** *See also Data modeler*

security breach responsibility, **537** system certification, **807–808** Web, **536–537**

Database administrator (DBA):

Person who creates and maintains the data dictionary, manages security of a database, monitors the performance of a database, and checks backup and recovery procedures. **538, 543, 789, 807**

Database analyst: Employee who uses modeling techniques and tools to analyze tune, and specify data usage within an application area. **788**

Database analyst (DA): Person who focuses on the meaning and usage of data, including proper placement of fields, defining the relationships among data, and identifying users' access privileges. **538, 543.** *See also Data modeler*

Database approach: System used to store and manage data in which many programs and users share the data in a database. **524–526, 542**

Database management system (DBMS):

Program that allows user to create a computerized database; add, modify, and delete data in the database, sort and retrieve data from the database; and create forms and reports from the data in the database. **515, 542.** *See also Database software*

popular (fig.), **527**

SQL and, **674**

types, components, workings of, **526–532**

Database server: Server that stores and provides access to a database. **474, 537, 543**

Database software: Application software used to create, access, and manage a database; add, change, and delete data in the database; sort and retrieve data from the database; and create forms and reports using the data in the database. **153–154, 180, 515**

overview of, **153–154**

popular (fig.), **146**

DBA, **807**

DCS1000, **394**

DDoS (distributed DoS) attack:

More devastating type of denial of service attack in which a zombie army is used to attack multiple computer networks. **562**

DDR SDRAM: Double Data Rate SDRAM; type of RAM that is

- even faster than SDRAM because it transfers data twice for each clock cycle, instead of just once. **225**
- DDR2:** Second generation of DDR; type of RAM that is faster than DDR. **225**
- DDR3:** Third generation of DDR; type of RAM, faster than DDR2, designed for computers with multi-core processors. **225**
- Dead code:** Any program instructions that a program never executes. **696**
- Dean, Mark, 383
- Debug utility:** Utility that assists programmers with identifying syntax errors and finding logic errors. **696.** *See also Debugger*
- Debugger:** Utility that assists programmers with identifying syntax errors and finding logic errors. **696.** *See also Debug utility*
- Debugging:** Process of locating and correcting syntax and logic errors in a program. **696**
- DEC computers, 56
- Decentralized:** Approach to information technology in which departments and divisions maintain their own information systems. **723**
- Decision support system (DSS):** Information system that helps users analyze data and make decisions. **734–735, 760**
- Decision table:** Table that lists a variety of conditions and the actions that correspond to each condition. **633, 651**
- Decision tree:** Graphic representation showing a variety of conditions and the actions that correspond to each condition. **633, 651**
- Decoding:** Processor operation that translates a program instruction into signals the computer can execute. **215, 244**
- Decrypt:** Process of deciphering encrypted data into a readable form. **571–572, 573**
- Dedicated line:** Type of always-on connection that is established between two communications devices (unlike a dial-up line where the connection is reestablished each time it is used). **483, 501**
- Dedicated servers:** Servers that perform specific tasks and can be placed with other dedicated servers to perform multiple tasks. **473–474**
- Default value:** Value that a DBMS initially displays in a field. **528**
- DEF CON, 710
- Defragmenting:** Reorganizing a disk so that the files are stored in contiguous sectors, thus speeding up disk access and the performance of the entire computer. **362, 393, 424**
- deleting database records, 522
- Deliverable:** Any tangible item such as a chart, diagram, report, or program file. **624**
- Dell, Michael, 811
- Dell Certified Systems Expert:** Hardware certification that tests knowledge of computer configuration and installation, troubleshooting, operating system fundamentals, and hardware replacement. **805**
- Dell company profile, 811
- Dell Computers, 71
- Delphi:** Powerful visual programming tool that is ideal for large-scale enterprise and Web application development. **673, 700**
- DeMarco, Tom, 649
- Denial of service attack:** Assault on a computer or network whose purpose is to disrupt computer access to an Internet service such as the Web or e-mail. **562, 594.** *See also DoS attack*
- Density:** Number of bits in an area on a storage medium. **359**
- deployment diagrams, 693
- depth of field, 330
- DES (Data Encryption Standard), 592
- Design phase:** Phase of the system development cycle that consists of two major activities: (1) if necessary, acquire hardware and software and (2) develop all of the details of the new or modified information system. **620–621, 629–636, 638–643, 651**
- Design tools:** Tools such as pseudocode and program flowcharts that help programmers document a solution algorithm. **691, 701**
- designing databases, 537
- GUIs, 708–709
- Desk check:** Validation technique in which programmers use test data to step through a program's logic. **693**
- Desktop:** On-screen work area that has a graphical user interface. **144, 180**
- Desktop computer:** Computer designed so the system unit, input devices, output devices, and any other devices fit entirely on or under a desk or table. **20, 210**
- memory card slot, 364
- processors compared (fig.), 217
- purchasing, 445–449
- Desktop Gadget Gallery:** Windows 7 feature that allows users to display a variety of gadgets on the Windows desktop. **414**
- Desktop or mobile application programmer/developer:** Employee who converts the system design into the appropriate computer language, such as Visual Basic, Java, C#, and C+. **788**
- Desktop publisher:** Employee who formats and combines text and graphics to produce publication-ready materials. **789.** *See also Compositor*
- Desktop publishing (DTP) software:** Application software used by professional designers to create sophisticated documents that can contain text, graphics, and many colors. **160–161, 180–181**
- Detailed analysis:** Activity in the system development cycle that involves three major activities: (1) study how the current system works; (2) determine the users' wants, needs, and requirements; and (3) recommend a solution. **631, 650.** *See also Logical design*
- Detailed report:** Report generated by a management information system that lists just transactions. **734**
- Developer:** Person who writes and modifies computer programs. **17, 664, 700.** *See also Programmer*
- certification, 805
- sandboxes, 683
- Device driver:** Small program that tells an operating system how to communicate with a specific device. **408, 432.** *See also Driver*
- Device-dependent:** Program that runs only on a specific type or make of computer. **411**
- Device-independent:** Operating systems that run on computers provided by a variety of manufacturers. **411**
- configuring, 408
- personal information managers (PIMs), 156
- De Wolfe, Chris, 41
- DFD:** Systems analysis and design tool that graphically shows the flow of data in a system. **632–633, 651**
- diagnosing computer problems, 792
- Dialog box:** Special window that provides information, presents available options, or requests a response. **145**
- Dial-up access:** Internet access that takes place when the modem in your computer connects to the Internet via a standard telephone line that transmits data and information using an analog (continuous wave pattern) signal. **76, 112, 446**
- Dial-up line:** Temporary connection that uses one or more analog telephone lines for communications. **483**
- Dial-up modem:** Communications device that can convert digital signals to analog signals and analog signals to digital signals, so that data can travel along an analog telephone line. **485**
- Digital:** Representation of data using only two discrete states: on (1) and off (0). **221**
- digital billboards, 306
- digital books, 368
- Digital camera:** Mobile device that allows users to take pictures and stores the photographed images digitally, instead of on traditional film. **23, 28, 64, 272, 291**
- batteries, 300
- display, 307
- and docking station, 315
- memory card slot, 364
- purchasing, 454–456
- purchasing video camera, 345–346
- Digital certificate:** A notice that guarantees a user or a Web site is legitimate. **574**
- digital communications
- blogs and wikis, 200–201
- content sharing, 204–205
- e-mail, 194–195
- messaging, 196–197
- online social networks, chat rooms, Web conferences, 202–203
- overview of, 192–193
- in personal life, 206–207
- voice, 198–199
- Digital forensics:** The discovery, collection, and analysis of evidence found on computers and networks. **569.** *See also Computer forensics,*

- Cyberforensics, or Network forensics** analyzing evidence, 609–610 certification, 806 examiners, 608–609 identity theft scenario, 609–615 introduction to, 606–608 tools, 613–614
- Digital forensics examiner:** Employee who collects and analyzes evidence found on computers and networks. 789
- Digital light processing (DLP) projector:** Projector that uses tiny mirrors to reflect light, which produces crisp, bright, colorful images that remain in focus and can be seen clearly, even in a well-lit room. 326
- Digital literacy:** Having a current knowledge and understanding of computers and their uses. 5, 42. *See also Computer literacy*
- Digital modem:** Communications device that sends and receives data and information to and from a digital line. 486
- Digital pen:** Input device that looks like a small ink pen but uses pressure instead of ink. 21, 268, 290, 450
- digital photo frames, 308, 830
- digital photos, altering, 162, 688
- Digital photo printer:** Thermal printer that uses heat to transfer colored dye to specially coated paper. 321. *See also Dye-sublimation printer*
- digital receipts, 29
- Digital rights management (DRM):** Strategy designed to prevent illegal distribution of movies, music, and other digital content. 582
- Digital signature:** Encrypted code that a person, Web site, or organization attaches to an electronic message to verify the identity of the message sender. 574
- Digital subscriber line:** Type of digital technology that provides high-speed Internet connections using regular copper telephone lines. Commonly called DSL. 484
- Digital television (DTV):** Television that receives digital television signals and produces a higher-quality picture. 312
- Digital versatile disc-read-only memory:** Extremely high capacity optical disc on which users can read, but not write or erase, that is capable of storing 4.7 GB to 17 GB of data. 375, 385. *See also DVD-ROM; Digital versatile disc-ROM; Digital video disc-read-only memory*
- digital video capture device, purchasing considerations, 446
- Digital video disc-read-only memory:** Extremely high capacity optical disc on which users can read, but not write or erase, that is capable of storing 4.7 GB to 17 GB of data. 375, 385. *See also DVD-ROM; Digital versatile disc-read-only-memory; Digital versatile disc-ROM; Digital video disc-ROM*
- Digital video (DV) cameras:** Video camera that records video as digital signals instead of as analog signals. 275
- digital video recorders (DVRs), 827
- digital video (DV) technology, 64, 344–349
- digital voice communications, personal and business perspective, 198–199
- Digitizer:** Large-scale application term for a graphics tablet. 268. *See also Graphics tablet*
- Dijkstra, Dr. Edsger, 56
- DIMM (dual inline memory module):** Type of memory module that has pins on opposite sides of the circuit board that do not connect, thereby forming two sets of contacts. DIMMs typically hold SDRAM chips. 225
- Direct access:** Type of data access in which the storage device can locate a particular data item or file immediately, without having to move consecutively through items stored in front of the desired data item or file. 376. *See also Random access*
- Direct conversion:** Conversion strategy where the user stops using an old system and begins using a new system on a certain date. 644. *See also Abrupt cutover*
- Director:** Multimedia authoring program with powerful features that allow programmers to create highly interactive multimedia applications. 685, 701
- Disaster recovery plan:** Written plan describing the steps a company would take to restore computer operations in the event of a disaster. Contains four major components: emergency plan, backup plan, recovery plan, and test plan. 755, 761
- Disc burning software:** Utility program that writes text, graph-
- ics, audio, and video files to a recordable or rewriteable CD, DVD, or Blu-ray Disc. 428, 433
- Discovering Computers 2011 Online Companion, 51
- Disk cache:** Memory chips on a hard disk that store frequently accessed items such as data, instructions, and information. Sometimes called a buffer. 359
- Disk Cleanup, 362, 392–393
- Disk cleanup:** Utility that searches for and removes unnecessary files. 362, 423, 433
- Disk controller:** Special-purpose chip and electronic circuits that control the transfer of data, instructions, and information between a disk and the system bus and other components in a computer. 361, 384
- Disk defragmenter:** Utility that reorganizes the files and unused space on a computer's hard disk so that the operating system accesses data more quickly and programs run faster. 362, 393, 423, 433
- Display:** Output device that visually conveys text, graphics, and video information. 306. *See also Display device*
- Display device:** Output device that visually conveys text, graphics, and video information. 306, 332. *See also Display*
- DisplayPort:** Port that is an alternative to DVI that also supports HDMI. 310
- disposal of old electronics, 39
- of toner cartridges, 320
- Distance Learning (DL):** Delivery of education at one location while the learning takes place at other locations. 176
- Distributed database:** Database in which the data exists in many separate locations throughout a network or the Internet. 536
- distributing videos, 349
- Distribution systems:** Provides forecasting for inventory control, manages and tracks shipping of products, and provides information and analysis on inventory in warehouses. 727, 731, 760
- in the enterprise, 727
- DNA** barcode of life, 538
- bioinformatics, 810
- DNS server:** Internet server that usually is associated with an Internet access provider. 80, 382
- Docking station:** External device that attaches to a mobile computer or device and provides power connections to peripherals, along with memory cards, optical disc drives, and other devices. 236
- for camera, 315
- Document management software:** Application software that provides a means for sharing, distributing, and searching through documents by converting them into a format that can be viewed by any user. 158–159, 180
- Document management system (DMS):** System for storage and management of a company's documents, such as word processing documents, presentations, and spreadsheets. 468, 743, 761
- Document object model (DOM):** Format that defines every item on a Web page as an object, allowing developers to change properties, such as color or size, of any or all of the objects on the Web page. 683
- Documentation:** Collection and summarization of data and information. 625, 650
- documents creating word processing, 149–150 improving quality of scanned, 278 source, 277
- Dolby, Ray, 826
- Domain name:** Text version of an IP address. 79–80, 112
- Domain name system (DNS):** Method that the Internet uses to store domain names and their corresponding IP addresses. 80
- do-not-track list, 84
- DoS attack:** Assault on a computer or network whose purpose is to disrupt computer access to an Internet service such as the Web or e-mail. 562. *See also Denial of service attack*
- Do-until control structure:** Type of repetition control structure similar to a do-while control structure, except it tests the condition at the end of the loop and continues looping until the condition is true. 690, 701
- Do-while control structure:** Type of repetition control structure that repeats one or more times as long as a condition is true. 690, 701

Dot pitch: The distance in millimeters between pixels on a display device. **310, 332.** *See also Pixel pitch*

Dot-matrix printer: Type of impact printer that produces printed images when tiny wire pins on a print head mechanism strike an inked ribbon. **323, 332**

Dots per inch (dpi): Printer resolution measurement of the number of dots a printer can print. **273, 316**

Downlink: Transmission from a satellite to an earth-based station. **496**

Download: With digital cameras, refers to transferring a copy of images from the digital camera to the computer's hard disk. **272**

Downloading: Process of a computer receiving information, such as a Web page, from a server on the Internet. **82, 113**

iTunes, 95

programs, 16

songs to portable media player, 298–299

taxes on, 428

Downstream rate: The transfer rate that is achieved when data is being received on a communications channel. **484**

Downtime: Any time a computer crashes, needs repairs, or requires installation of replacement or upgrade parts. **752**

dpi (dots per inch), 273

drag, mouse operations, 264

dragnets, database, 519

Dragon Naturally Speaking, 274

DRAM (dynamic random access memory), 242

Dreamweaver: Web page authoring program by Adobe Systems that allows Web developers to create, maintain, and manage professional Web sites. **685, 701**

Drive bay: Rectangular opening in the system unit that typically holds disk drives. **238**

Driver: Small program that tells an operating system how to communicate with a specific device. **408, 432.** *See also Device driver*

DRM: Strategy designed to prevent illegal distribution of movies, music, and other digital content. **582.** *See also Digital rights management*

DriveSavers, 360

driving directions, searching Web for, 120

DSL: Acronym for digital subscriber line; type of digital technology that provides high-speed Internet connections using regular copper telephone lines. **76, 112, 484, 501**

DSL modem: Modem that sends digital data and information from a computer to a DSL line and receives digital data and information from a DSL line. **486, 501**

Dual-core processor: Processor chip that contains two separate processor cores. **213, 244**

DVD drives, 8

DVD kiosk: Self-service DVD rental machine that connects to a host computer through a network. **285, 291**

DVD+R: DVD-recordable format with up to 4.7 GB capacity that allows users to write on the disc once and read it many times. **372, 376, 385**

DVD+RAM: Rewritable DVD format with capacities up to 4.7 GB per side. **376, 385**

DVD+RW: Rewritable DVD format with capacities up to 4.7 GB per side. **372, 376, 385**

DVD-R: DVD-recordable format with up to 4.7 GB capacity that allows users to write on the disc once and read it many times. **372, 376, 385**

DVD-ROM: High-capacity optical disc on which users can read, but not write or erase. **372, 375, 385.** *See also Digital versatile disc-read-only memory and Digital video disc-read-only memory*

DVD-ROM drive: Device that can read a DVD-ROM. Most DVD-ROM drives also can read audio CDs, CD-ROMs, CD-Rs, and CD-RWs. **375**

DVD-RW: Rewritable DVD format with capacities up to 4.7 GB per side. **372, 376, 385**

DVI (Digital Video Interface)

port: Video card port that enables digital signals to transmit directly to an LCD monitor. **310**

Dvorak keyboard, 261

Dye-sublimation printer:

Thermal printer that uses heat to transfer color dye to specially coated paper, creating images of photographic quality. **321.** *See also Digital photo printer*

Dynamic Host Configuration Protocol (DHCP), 110

Dynamic HTML (DHTML):

Type of HTML that allows Web developers to include more graphical interest and interactivity in a Web page. **683, 701**

dynamic IP addresses, 110

Dynamic RAM: Type of RAM chip that must be re-energized constantly or lose its contents. **225, 242**

dynamic random access memory (DRAM), 242

Dynamic Web page: A Web page that allows visitors to customize some or all of the viewed content. **81**

E

Earbuds: Audio output device that rests inside the ear canal. **23, 95, 228, 324, 333.** *See also Earphones*

Earphones: Audio output device that rests inside the ear canal. **324, 333.** *See also Earbuds*

Earth Album, 684

EarthLink, 78

eBay, 61, 111, 572, 759

E-book: Electronic version of a printed book, readable on computers and other digital devices. Also called a digital book. **22**

E-book reader: Short for electronic book reader; handheld device that is used primarily for reading e-books. **22.** *See also E-reader*

Echelon global surveillance system, 300

Eckert, J. Presper, Jr., 54

Eclipse: Open source, advanced development environment that works with a variety of programs including Java and C++. **670**

E-commerce: Short for electronic commerce, a business transaction that occurs over an electronic network such as the Internet. **30, 62, 98–100, 113, 747**

case study, 772–781

enterprise and, 747

overview of, 98–100

E-commerce director: Employee who supervised the development and execution of Internet or e-commerce systems; works with the company's marketing and customer service divisions. **788**

Economic feasibility: Measure of whether lifetime benefits of a proposed information system will be greater than its lifetime costs. **625, 650.** *See also Cost/benefit feasibility*

EcoSearch, 122

EDGE: Enhanced Data GSM Environment; 3G standard for mobile communications. **495**

EDI (electronic data interchange): Standard that defines how data transmits across telephone lines or other means. **471, 742**

Edit: To make changes to the existing content of a document. **149, 180**

editing videos, 348–349

education career preparation for computer industry, 794–799 computer applications in, 34, 429 and Internet plagiarism, 149 technology provided to students, teachers, 226 Web-based training (WBT), 176

Educational software: Application software that teaches a particular skill. **171, 181**

EEPROM chip: Variation of a PROM chip that allows a programmer to erase microcode with an electric signal. **228**

E-filing: Filing state and federal tax returns online. **167**

E-form: Electronic form used as a means to secure data while it is transported across a network. **530**

EIDE (Enhanced Integrated Drive Electronics): Interface that uses parallel signals to transfer data, instructions, and information and can support up to four hard disks at 137 GB per disk. **361**

E-learning: Short for electronic learning; delivery of education via some electronic method such as the Internet, networks, or optical discs. **176, 429**

Electronic Arts (EA), 699

Electronic commerce: A business transaction that occurs over an electronic network such as the Internet. **98–100, 113**

Electronic form: A form that sends entered data across a network or the Internet. **530**

Electronic funds transfer (EFT): Service in which users connected to a network can transfer money from one bank account to another via transmission media. **471**

electronic funds transfer (EFT), 471

Electronic magazine: Publication available on the Web. **638.** *See also E-zine*

- Electronic mail:** The transmission of messages and files via a computer network. **101, 113.** *See also E-mail*
- electronic profiles, 585
- Electronic storefront:** Online business a customer visits that contains product descriptions, graphics, and a shopping cart. **99**
- electronics, recycling old, 39
- electrostatic discharge, protecting against, 240
- Elements:** HTML words, abbreviations, and symbols that specify links to other documents and indicate how a Web page is displayed when viewed on the Web. **678.** *See also Tags*
- Ellison, Larry, 541
- E-mail:** Short for electronic mail; the transmission of messages and files via a computer network. **101, 113, 462**
- application software, 174
- described, 101–103
- getting virus through, 103
- headers and digital forensics, 615
- impact on communication, 100
- and lying, 627
- personal and business perspective, 194–195
- E-mail address:** Combination of a user name and a domain name that identifies a user so that he or she can receive Internet e-mail. **102**
- E-mail filtering:** Service that blocks e-mail messages from designated sources. **587**
- e-mail message
- attaching file to, 102, 120
 - percent of Americans using, 29
 - and virus infections, 559
- E-mail program:** Software used to create, send, receive, forward, store, print, and delete e-mail messages. **101**
- E-mail spoofing:** Spoofing that occurs when the sender's address or other components of the e-mail header are altered so that it appears the e-mail originated from a different sender. **563**
- Embedded computer:** Special-purpose computer that functions as a component in a larger product. **19, 26, 34, 43**
- Embedded Linux:** Scaled-down Linux operating system designed for smart phones, PDAs, portable media players, Internet telephones, and many other types of devices and computers requiring an embedded operating system. **420, 433**
- Embedded operating system:** The operating system that resides on a ROM chip inside most PDAs and small devices. **418–420, 433**
- EMC company profile, 759
- Emergency plan:** Component of a disaster recovery plan that specifies the steps to be taken immediately after a disaster strikes. **755, 761**
- Emoticons:** Symbols used on the Internet to express emotion. **108, 113**
- Employee monitoring:** The use of computers to observe, record, and review an employee's use of a computer, including communications such as e-mail messages, keyboard activity (used to measure productivity), and Web sites visited. **590, 595**
- Employee relationship management (ERM) system:** Information system that automates and manages much of the communications between the employees and the business. **728–729, 760**
- Empowering:** Business trend of providing nonmanagement users with access to information necessary to make decisions that previously were made by managers. **725**
- Encapsulation:** Concept of packaging data and procedures into a single object. **689**
- EnCase (Guidance Software), 613
- Encrypting File System (EFS), 592
- Encryption:** The process of encoding data and information to an unreadable form. **411, 571–572, 573–575, 592**
- Encryption algorithm:** Set of steps that can convert readable plaintext into unreadable ciphertext. **571–572, 573, 592.** *See also Cypher*
- Encryption key:** Set of characters that the originator of the encrypted data uses to encrypt the plaintext and the recipient of the data uses to decrypt the ciphertext. **573**
- End-user certifications:** Software certifications. **804**
- End-user license agreement (EULA):** License agreement included with software purchased by individual users. **571.** *See also Single-user license agreement*
- ENERGY STAR program:** Program developed by the United States Department of Energy (DOE) and the United States Environmental Protection Agency (EPA) to help reduce the amount of electricity used by computers and related devices. **583, 584**
- Engelbart, Douglas, 289
- engineering, systems in the enterprise, 727
- Enhanced keyboard:** Keyboard that has twelve function keys along the top; two Control (CTRL) keys and two Alternate (ALT) keys along the bottom; and a set of keys and additional keys between the typing area and the numeric keypad. **260**
- Enhanced resolution:** Digital camera resolution calculated by a special formula that adds pixels between those generated by optical resolution. **273**
- ENIAC computer, 54
- Enterprise:** Term that commonly describes a business or venture of any size. **720, 760**
- information systems in the, 726–739
- levels of users in, 723–724
- types of, organizational structure, 722–723
- use of wikis, 742
- Enterprise computing:** Term large companies use to refer to the use of a huge network of computers that meets their diverse computing needs. **31, 720, 760**
- backup procedures, 755–757
- e-commerce, 747–748
- enterprise order processing (case study), 772–781
- enterprise-wide technologies, methodologies, 740–746
- hardware, storage, 748–752
- high-availability, scalability, interoperability, 752–755
- information systems in the enterprise, 726–740
- overview of, 720–726
- popular (fig.), 146
- software, 159
- Enterprise hardware:** Devices geared for heavy use, maximum availability, and maximum efficiency that large organizations use to manage and store information and data. **748, 761**
- Enterprise information:** Information gathered in the ongoing operations of an enterprise-sized organization. **725**
- enterprise order processing (case study), 772–781
- enterprise portal software, 739
- Enterprise resource planning (ERP):** Provides centralized, integrated software to help manage and coordinate the ongoing activities of the enterprise. **738, 760**
- Enterprise search:** Technology that allows users to perform searches across many enterprise-wide information systems and databases. **740**
- Enterprise storage system:** Strategy that focuses on the availability, protection, organization, and backup of storage in a company. **379, 750, 761**
- Enterprise user:** Computer user working for a business that has hundreds or thousands of employees or customers that work in or do business with offices across a region, the country, or the world. **32, 33, 43**
- hardware and software for, 33
- suggested output devices for, 327
- suggested storage devices, by user (fig.), 380
- Enterprise-wide systems:** General purpose information system in an enterprise that crosses the boundaries of functional units and is used by one or more functional units in an enterprise. **732, 760**
- entertainment
- e-commerce examples, 747
 - Web sites, 91, 109, 125
- Entertainment software:** Application software, such as interactive games, videos, and other programs designed to support a hobby or provide amusement and enjoyment. **172, 181**
- Entity:** Object in a system that has data. **632**
- Entity-relationship diagram:** Systems analysis and design tool that graphically shows the connections among entities in a system. **632, 650**
- environment
- computers' impact upon the, 10
 - Web sites, 130
- Environmental Defense Fund Web site, 130
- EnXnet, 372
- Epstein, Bob, 541
- ERD:** Systems analysis and design tool that graphically shows the connections among entities in a system. **632, 650**

E-reader: Short for electronic book reader; handheld device that is used primarily for reading e-books. **22.** *See also E-book reader*

e-receipts, **29**

E-retail: Occurs when businesses use the Web to sell products. **99, 747**

Ergonomic keyboard: Keyboard whose design reduces the chance of wrist or hand injuries. **262**

Ergonomics: The science of incorporating comfort, efficiency, and safety into the design of the workplace. **262, 580**

eSATA: External SATA; hard disk interface that is much faster than USB and FireWire. **361**

eSATA port: Short for external SATA; special-purpose port that allows you to connect an external SATA (Serial Advanced Technology Attachment) hard disk to a computer. **235, 245**

E-retail: Short for electronic retail; occurs when businesses use the Web to sell products. **99, 747**

E-tail: Business transaction that occurs when retailers use the Web to sell their products and services. **747.** *See also E-retail*

Ethernet: Network standard that specifies no central computer or device on the network should control when data can be transmitted. **57, 478, 489, 500, 747**

Ethical Hacker Network, The, **190**
ethics

access provider claims for Internet access speeds, **492**

access providers controlling Internet usage, **474**

accidentally accessing stolen data, **531**

AI and expert systems, **737**

biometric devices in public places, **568**

college instruction in hacking, **681**

connecting to unsecured networks, **480**

database security breach responsibility, **537**

digital photo facelifts, **688**

e-mail and lying, **627**

employees using mobile devices at work, **724**

government search and seizure of computers, **217**

government using databases for dragnets, **519**

Internet databases, and personal privacy, **516**

manipulating search results, **87**
misuse of confidential information, **792**

monitoring customer behavior, **585**

online auctions and pirated software, **572**

punishing cybercriminals, **562**

radiation from cell phones, antenna, devices, **494**

responsibility for bugs, **696**

Sarbanes-Oxley (SOX) Act, **751**
states sharing criminal databases, **526**

telecommuting's effect on productivity, **745**

evaluating GUIs, **708–709**

EVDO: Evolution Data Optimized. 3G standard. **495**

Event: An action to which a program responds. **669**

Event-driven program: Program that checks for and responds to events. **669**

exabyte (EB), **354**

exams, certification, **803**

Exception criteria: Out-of-the-ordinary conditions that define the normal activity or status range in an exception report. **734**

Exception report: Report generated by a management information system that identifies data outside of a normal condition. **734**

Execute: Process of a computer carrying out the instructions in a program. **17, 666**

Executing: Processor operation that carries out commands; part of the machine cycle. **215, 244**

Executive information system (EIS): A special type of decision support system that supports the strategic information needs of executive management. **735, 773, 781**

Executive management: The highest management positions in a company, which focuses on the long-range direction of the company. **724, 760**

Expansion bus: Bus that allows the processor to communicate with peripherals. **237–238, 245**

Expansion card: Circuit board that enhances functions of a component of a system unit and/or provides connections to peripherals. **230, 245.** *See also Adapter card*

Expansion slot: Socket on a motherboard that can hold an adapter card. **230, 245**

Expert system: Information system that captures and stores the knowledge of human experts and then imitates human reasoning and decision making. **735–737, 760**

ExpressCard module: Removable flash memory device that can be used to add memory, storage, communications, multimedia, and security capabilities to a computer. **231, 245, 366, 385**

ExpressCard slot: Special type of expansion slot in desktop, notebook, and mobile computers that holds an ExpressCard. **231, 245**

Expression Web: Microsoft's Web page authoring program that enables Web developers to create professional, dynamic, interactive Web sites. **685, 701**

extensible HTML (XHTML), **678**

Extensible Markup Language (XML), **679**

External bay: Drive bay that allows users to access openings in the bay from outside the system unit. **238**

External hard disk: Separate free-standing hard disk that connects with a cable to a USB port or FireWire port on the system unit. **352, 360, 384**

purchasing considerations, **446**

External SATA port: Special-purpose port that allows you to connect an external SATA (Serial Advanced Technology Attachment) hard disk to a computer. **235**

External sources: Source of data obtained from outside an enterprise, which might include interest rates, trends, or raw material pricing. **735**

Extranet: Portion of a company's network that allows customers or suppliers of a company to access parts of an enterprise's intranet. **477, 742, 761**

Extreme programming (XP):

Strategy that proposed that programmers should immediately begin coding and testing solutions as soon as requirements are defined. **695**

Extreme project management:

Team-driven project management approach in which a project leader is more of a participant and facilitator than a

manager during the project. **623, 650**

eyestrain, easing, **580**

E-zine: Publication available on the Web. **638.** *See also Electronic magazine*

F

F#: Programming language included with Visual Studio 2010 that combines the benefits of an object-oriented language with the benefits of a functional language. **671**

Face recognition system:

Biometric device that captures a live face image and compares it with a stored image to determine if the person is a legitimate user. **282–283, 291, 591**

face tracking, **298**

Facebook, **14, 52, 65, 91, 111, 368**

Failover: Process of one system automatically taking the place of a failed system. **756**

Fair Credit Reporting Act: 1970 law that limits the rights of others viewing a credit report to only those with a legitimate business need. **588**

Fanning, Shawn, **63**

fans

heat sinks, pipes, **219**

in system unit, **239**

FAQ (frequently asked question):

List that helps a user find answers to frequently asked questions. **14, 108, 113**

Fast Ethernet: Recent Ethernet standard with a data transfer rate of 100 Mbps, which is 10 times faster than the original standard. **478**

Fast infrared port: A high-speed IrDA port. **235**

Fault-tolerant computer:

Computer that has duplicate components so that it can continue to operate when one of its main components fail. **405, 577**

Favorite: Saved Web address that you access by clicking its name in a list. **83.** *See also Bookmark*

Feasibility: Measure of how suitable the development of a system will be to the company. **624, 650**

feasibility reports, **630**

Feasibility study: Investigation that determines the exact nature of a problem or improvement and decides whether it is worth pursuing. **629–630.** *See also Preliminary investigation*

- FedWorld Web site, 132
FEK (file encryption key), 592
Fetching: Processor operation that obtains a program instruction or data item from memory. **215**, 244
Fibre Channel: Technology used to connect to storage systems at data rates up to 4 Gbps. **750**
Fiber to the Building. *See* FTTB (Fiber to the Building)
Fiber to the Home. *See* FTTH (Fiber to the Home)
Fiber to the Premises. *See* FTTP (Fiber to the Premises)
Fiber-optic cable: Dozens or hundreds of thin strands of glass or plastic that use light to transmit signals. **493**, 501
Field: Each column in a database that contains a specific category of data within a record. **154**, 518, 542
Field camera: Portable digital camera with many lenses and other attachments. **272**
Field name: Name that uniquely identifies each field in a database. **518**
Field size: Defines the maximum number of characters a field can contain. **518**
File: Named unit of storage. **77**, 144–145
 attaching to e-mail message, 120
 burning to optical discs, 440
 compressed, uncompressed, 107
 locating deleted, 421
 organizing, managing on computers, 550
 saving in application software, 188
 searching for, 551
 signs of virus infection, 425
 system, 401
 zipping, 189
File compression utility: Utility program that shrinks the size of a file(s), so that the file takes up less storage space than the original file. **427**, 433
file encryption key (FEK), 592
file formats
 audio (fig.), 95
 graphics (fig.), 93
 video, 345, 347
File maintenance: Procedures that keep data current. **520**, 542
process of, 520–524
File manager: Utility that performs functions related to file management. **422**, 433
File name: Unique combination of letters of the alphabet, numbers, or other characters that identifies a file. **145**
File processing system: System used to store and manage data in which each department or area within an organization has its own set of files. **524**, 542
vs. database systems, 524–526
File server: Server that stores and manages files. **474**
File sharing network: Type of peer-to-peer network on which users access each other's hard disks and exchange files directly over the Internet. **475**. *See also P2P*
 file virus, 178
 Filo, David, 811
 Filter by Form (Access), 529
Filters: Audio editing software feature designed to enhance audio quality. **162**
finance
 computer applications in, 34–35
 e-commerce examples, 747
 personal finance software, 166
 systems in the enterprise, 726–728
 Web sites, 131
Fingerprint reader: Biometric device that captures curves and indentations of a fingerprint and compares them with those of a stored image. **6**, 282, 288, 291, 568
purchasing considerations, 446
Firewall: Hardware and/or software that protects a network's resources from intrusion by users on another network such as the Internet. **558**–**562**, 563–564, 594
Windows Firewall, 603
hardware, 488
personal, 425
FireWire bus: Expansion bus that eliminates the need to install cards in expansion slots. **238**
FireWire hub: Device that plugs in a FireWire port on the system unit and contains multiple FireWire ports in which you plug cables from FireWire devices. **234**
FireWire port: Port that can connect multiple types of devices that require faster data transmission speeds. **234**, 245. *See also IEEE 1394 port*
fireworks software, 160
Firmware: ROM chips that contain permanently written data, instructions, or information, recorded on the chips when they were manufactured. **228**
Fixed disk: Name sometimes given to the hard disk mounted inside a system unit. **355**
Fixed wireless: High-speed Internet connection that uses an antenna on a house or business to communicate with a tower location via radio signals. **76**, 112, 496
Flame wars: Exchanges of flames using the Internet. **108**
Flames: Abusive or insulting messages sent using the Internet. **108**, 113
Flash: Web page authoring program by Adobe Systems that enables Web developers to combine interactive content with text, graphics, audio, and video. **685**, 701
flash drives, 8
Flash memory: Type of nonvolatile memory that can be erased electronically and rewritten. **228**, 245
removable, 231
storage, 362–367
variety of mobile media, 366
Flatbed scanner: Type of light-sensing input device that scans a document and creates a file of the document in memory instead of a paper copy. **277**–**278**, 291
Flat-panel display: Display device with a shallow depth and flat screen that typically uses LCD or gas plasma technology. **65**, 306, 332
Flickr, 684
Flowchart: Graphically shows the logic in a solution algorithm. **691**, 701. *See also Program flowchart*
Flowcharting software: Software used by programmers to help develop flowcharts. **692**
Focus groups: Lengthy, structured, group meetings in which users and IT professionals work together to design or develop an application. **626**. *See also Joint application design (JAD)*
Folder: Specific named location on a storage medium that contains related documents. **422**
 searching for, 551
 Startup, 401
Font: Name assigned to a specific design of characters. **149**
Font size: Size of the characters in a particular font. **149**
Font style: Font design, such as bold, italic, and underline, that can add emphasis to a font. **149**
Food Network Web site, 135
Footer: Text that appears at the bottom of each page of a document. **148**
Force feedback: Technology that sends resistance to a joystick or wheel in response to actions of the user. **326**, 333
Foreground: Program with which the user currently is interacting. **404**
Forensic Duplicator, 613
Forensic Recovery of Digital Evidence (FRED), 613
Forensic Toolkit (FTK), 613
Form: Window on the screen that provides areas for entering or changing data in a database. **530**, 543, 676, 680. *See also Data entry form*
Form factor: Term used to refer to size and shape of a desktop personal computer system unit. **210**, 358
Format: To change a document's appearance. **149**, 180
Formatting: Process of dividing a disk into tracks and sectors so that the operating system can store and locate data and information on the disk. **357**, 384
Formula: Expression used to perform calculations on the data in a worksheet and display the resulting value in a cell. **151**
Forth: Programming language similar to C, used for small computerized devices. **675**
FORTRAN: FORMula TRANslator. One of the first high-level programming languages used for scientific applications. **55**, 675
Forward recovery: Technique for recovering data in a database where the DBMS uses the log to reenter changes made to a database since the last save or backup. **532**, 543. *See also Rollforward*
Fourth-generation language: Nonprocedural language that enables users and programmers to access data in a database. **674**–**675**, 700
Fractional T1: T-carrier line in which users share a connection to the T1 line with other users. **485**
Fragmented: State of a file whose contents are scattered across two or more noncontiguous sectors of a disk. **423**
frame correction tools, 348
Frankston, Bob, 57
Freeware: Copyrighted software provided at no cost to a user by

an individual or a company that retains all rights to the software. **143, 180**

Friendster Web site, 342

Front end: Program that generally has a more user-friendly interface than a DBMS. **525**

Front side bus (FSB): Bus that is part of the motherboard and connects the processor to main memory. **237, 245**. *See also System bus*

Fry's Electronics, 133

FTP: File Transfer Protocol; an Internet standard that permits file uploading and downloading with other computers on the Internet. **107, 113, 462**
application software, 174

FTP server: Computer that allows users to upload and/or download files using FTP. **107**

FTTB (Fiber to the Building): Type of FTTP that provides extremely high-speed Internet access to small businesses that use fiber-optic cables to access the Internet. **484**

FTTH (Fiber to the Home): Type of FTTP that provides extremely high-speed internet access for home users via fiber-optic cable. **484, 501**

FTTP (Fiber to the Premises): Dedicated line that uses fiber-optic cable to provide extremely high-speed Internet access to a user's physical permanent location. **484, 501**

Full backup: Backup procedure that copies all program and data files in the computer. Also called archival backup. **577, 595, 754**

fun Web sites, 125

Function: Predefined worksheet formula that performs common calculations. **151–152**

Function keys: Special keys programmed to issue commands to a computer. **260, 290**

Functional language:

Programming language whose natural programming structure is useful in mathematical programs. **671**

Functional units: Individual operating entities in an enterprise. **721, 760**

information systems within, 726–739

functions, typical spreadsheet (fig.). **152**

Future Attribute Screening Technologies (FAST), 569

G

Gadget: Mini-program with limited functionality that connects to another program or provides information. **414, 713**. *See also Widget*

Game console: Mobile computing device designed for single-player or multiplayer video games. **19, 24, 43, 211, 827**

Game controller: Input device that directs movements and actions of on-screen objects in video and computer games. **259, 270, 271**

Gamepad: Input device that controls the movement and actions of players or objects in video games or computer games. **270, 290**

gaming, living digitally (feature), **829**

Gaming desktop computer:

Desktop computer that offers high-quality audio, video, and graphics with optimal performance for sophisticated single-user and networked or Internet multiplayer games. **20**

Gaming keyboard: Keyboard designed specifically for users who enjoy playing games on the computer. **260–261, 290**

Gantt, Henry L., 623

Gantt chart: Bar chart developed by Henry L. Gantt that uses horizontal bars to show project phases or activities. **623–624**

GarageBand, 828

Garbage in, garbage out:

Computing phrase that points out the accuracy of a computer's output depends on the accuracy of the input. **9, 516**

Gates, Bill, 41, 57, 69, 640, 811

GBps: Gigabytes per second. **355**

Gender changer: Device that joins a port and a connector that are both female or both male. **232**

geocaching, 466

Geschke, Charles, 179

Gesture recognition: Computer's capability of detecting human motion. **286, 291**

Ghosting: The permanent etching of images on a monitor's screen. **425**

GIF: Graphics format that uses compression techniques to reduce file sizes. **93, 94**

Giabit Ethernet: Ethernet standard with transfer rates of 1Gbps (1 billion bits per second). **478**

Gigabyte (GB): Approximately 1 billion bytes. **223, 354**

Gigahertz (GHz): One billion ticks of the system clock per second. **216**

GIS: Geographic information system. Type of database that stores maps and other geographic data. **534**

GIS database, 535

glaucoma-detection, 409

Global comments: Internal documentation, usually at the top of a program, that explains the program's purpose and identify the program name, its author, and date written. **694–695**

Global positioning system

(**GPS**): Navigation system that consists of one or more earth-based receivers that accept and analyze signals sent by satellites in order to determine the receiver's geographic location. **466–467, 500**

GNU/Linux Project, 592

good practices

blogs, wikis, 200–201

digital voice communications, **198–199**

e-mail, 194–195

messaging, 196–197

online social networks, chat rooms, Web conferences, **202–203**

Google, 62, 111

Google Android: Operating system designed by Google for mobile devices. **420**

Google bombing, 87

Google Checkout, 100

Google Chrome, 69

Google Docs, 172, 368, 429, 468

Google Earth, 172

Google Health, 137

Google Maps, 129, 173, 684

Google search engine, 86

Google Wave, 71

Google Web Toolkit (GWT), 714, **716–717**

Google's social networking Web site, 300

Gosling, James, 699

government

computer applications in, 35

and do-not-track list, 84

hard drive cleaning requirement, **355**

privacy laws (fig.), 589

search and seizure of computers, **217**

states sharing criminal databases, **526**

taxes on downloads, 428

using databases for dragnets, 519

Web sites, 132

GPRS: General Packet Radio

Service; 3G standard for mobile communications. **495**

and digital forensics, 610

triangulation and, 40

GPS receiver: Handheld, mountable, or embedded device that contains an antenna, or radio receiver, and a processor. **466–467, 610, 829**

Grandparent: Term used in three-generation backups to refer to the oldest copy of a file. **577, 595**

Graphic: Digital representation of nontext information such as a drawing, chart, or photo. **93, 113**. *See also Graphical image*

Graphic designer: Employee who develops visual impressions of products for advertisements and marketing materials. **789**

Graphical image: Digital representation of nontext information such as a drawing, chart, or photo. **93**. *See also Graphic*

Graphical user interface (GUI):

Type of user interface that allows a user to interact with software using text, graphics, and visual images, such as icons. **15, 402, 432**

designing, evaluating, 708–709

graphics

and multimedia software, **159–164**

output, 304

three-dimensional (3-D), 330

Web formats, 93

Graphics card: Adapter card that converts computer output into a video signal that travels through a cable to the monitor, which displays an image on the screen. **230, 245**. *See also Video card*

Graphics processing unit (GPU): Chip that controls the manipulation and display of graphics on a display device. **310**

Graphics tablet: Flat, rectangular, electronic, plastic board that is used to create drawings and sketches. **259, 268**

Green computing: Practices that involve reducing the electricity consumed and environmental waste generated when using a computer. **10, 52, 70, 122, 583–584, 595**

green graffiti, 325

Green Grid, 552

green organizations, 797

Grid computing: Technology that combines many servers and/or

- personal computers on a network to act as one large computer. **746, 761, 770**
- Groupware:** Software that helps groups of people work together on projects and share information over a network. **467, 500**
- Groupware database:** Database that stores documents such as schedules, calendars, manuals, memos, and reports. **534, 543**
- GSM:** Global System for Mobile Communications; 3G standard for mobile communications. **495**
- gTLD:** Generic TLD (top-level domain). **80**
- Guidance Software's EnCase, 613
- H**
- Hacker:** Someone who accesses a computer or network illegally. **190, 425, 556, 594**
- DEFCON, 710
- ethics of college instruction in hacking, 681
- Hand geometry system:** Biometric device that measures the shape and size of a person's hand and compares these measurements to stored measurements. **283, 291**
- Handheld computer:** Computer small enough to fit in one hand. **22–23, 211.** *See also Handhelds or Ultra-Mobile PC (UMPC)*
- Handhelds:** Computers small enough to fit in one hand. **22.** *See also Handheld computer or Ultra-Mobile PC (UMPC)*
- Handwriting recognition software:** Software that translates handwritten letters and symbols into characters that a computer or device can process. **268, 290**
- Hard copy:** Printed information that exists physically and is a more permanent form of output than that presented on a display device (soft copy). **313.** *See also Printout*
- broadband connections' impact on print media, 465
- Hard disk:** Type of storage device that contains one or more inflexible, circular platters that use magnetic particles to store data, instructions, and information. **352, 355, 384.** *See also Hard disk drive*
- airport screening damage, 367
- imaging, 611
- improving performance, 362
- maintaining, 392–393
- purchasing considerations, 446
- recovering files from failed, 360
- types and characteristics of, 355–362
- hard disk controllers, 361–362
- Hard disk drive:** Type of storage device that contains one or more inflexible, circular platters that use magnetic particles to store data, instructions, and information. **355, 384.** *See also Hard disk*
- Hardware:** Electric, electronic, and mechanical components contained in a computer. **6, 42**
- certification, 805
- purchasing for desktop computers, 446–448
- setting up for Wi-Fi home network, 490
- theft and vandalism, 570
- Hardware firewall:** Built-in feature in routers that prevents unauthorized users from accessing files and computers in a network. **488**
- Hardware theft:** The act of stealing computer equipment. **570, 594**
- Hardware vandalism:** The act of defacing or destroying computer equipment. **570, 594**
- Hash:** Mathematical formula that generates a code from the contents of an electronic message. **574**
- Hawthorne Effect, 625
- Hayes modems, 57
- HD VMD (Versatile Multilayer Disc):** High-density format that potentially will contain up to 20 layers, each with a capacity of 5 GB. **375**
- HDMI (High-Definition Media Interface) port:** Port that combines DVI with high-definition (HD) television and video. **310**
- HDTV:** High-definition television; the most advanced form of digital television, working with digital broadcast signals, transmitting digital sound, supporting wide screens, and providing resolutions up to 1920 × 1080 pixels. **312**
- Head crash:** Type of hard disk failure that occurs when a read/write head touches the surface of a platter. **358**
- Header:** Text that appears at the top of each page of a document. **148**
- Head-mounted display:** Display that uses OLED technology in a helmet, goggles, or glasses. **308**
- Head-mounted pointer:** Pointer that is placed on a user's head and can be used by a physically challenged person. **286, 291**
- Headphones:** Audio output device that covers or is placed outside the ear. **324, 333**
- Headset:** Device that functions as both headphones and a microphone. **324, 333**
- health**
- avoiding repetitive strain injuries, 262
- easing eyestrain while using computers, 306
- e-commerce examples, 747
- glaucoma-detection, 409
- Internet Addiction Disorder (IAD), 342
- monitoring status remotely, 276
- risks of using computers, 9
- sciences, computer usage, 538
- Web sites, 137
- health care, computer applications in, 36–37
- Health Insurance Portability and Accountability Act (HIPAA), 380, 610
- Heat pipe:** Small cooling device used to cool processors in notebook computers. **219, 244**
- Heat sink:** Small ceramic or metal component with fins on its surface that absorbs and ventilates heat produced by electrical components. **219, 244**
- Hejlsberg, Anders, 671
- help
- online and Web-based, 175
- Windows 7 sample, 736
- Help desk specialist:** Employee who answers hardware, software, or networking questions in person, over the telephone, and/or in a chat room. **789**
- Hertz:** One clock cycle per second. **216**
- Hewlett, William, 331
- Hibernate:** Operating system function that saves any open documents and programs to a hard disk before removing power from the computer. **402**
- Hierarchy chart:** Structured design tool that shows program modules graphically. **688.** *See also Structure chart*
- High-availability system:** System that continues running and performing tasks for at least 99 percent of the time. **752–753, 761**
- High-definition television:** The most advanced form of digital television, working with digital
- broadcast signals, transmitting digital sound, supporting wide screens, and providing resolutions up to 1920 × 1080 pixels. **312.** *See also HDTV*
- High-level language:** Programming language in which each language instruction typically equates to multiple machine instructions. **665**
- HIPAA (Health Insurance Portability and Accountability Act),** 380
- Hi-Speed USB:** More advanced and faster type of USB. **234.** *See also USB 2.0*
- historical milestones in computer history, 54–71
- Hits:** Web page names displayed by a search engine that contain the search text specified by a user. **86, 112**
- Hoff, Dr. Ted, 57
- Hoffman, Mark, 541
- Home design/landscaping software:** Application software that assists users with the design, remodeling, or improvement of a home, deck, or landscape. **170, 181**
- Home network:** Network consisting of multiple devices and computers connected together in a home. **489, 501**
- setting up, installing Wi-Fi, 508–509
- wireless, 490
- Home page:** First page that a Web site displays. **82, 112**
- Home theater PC (HTPC):** Desktop computer that combines the features of a high-definition video/audio entertainment system with a desktop computer that is designed to be connected to a television and includes a Blu-ray Disc, digital video recorder, and digital cable television connectivity. **20**
- Home user:** User who spends time on a computer at home. **28, 33, 43**
- hardware and software for, 33
- suggested output devices for, 327
- suggested storage devices, by user (fig.), 380
- homegroup settings (Windows 7), 565
- Honeypot:** Vulnerable computer that is set up to entice an intruder to break into it in order to allow a company to learn how intruders are exploiting its network. **564**
- Hopper, Dr. Grace, 55, 668

Horizontal market software:

Packaged software that meets the needs of many different types of organizations. **635**

Host: Any computer that provides services and connections to other computers on a network. **75****Host computer:** Computer that controls access to the hardware, software, and other resources on a network and provides a centralized storage area for programs, data, and information. **473**, 500. *See also Server***Hot plugging:** Feature that allows you to insert or remove a removable flash memory device and other devices while the computer is running. **231****Hot site:** Separate facility that mirrors the systems and operations of a critical site. **755–756****Hot spot:** Wireless network that provides Internet connections to mobile computers and devices. **464–465****Hot spots:** Wireless network that provides Wi-Fi Internet connections to mobile computers and other devices. **68**, **76****Hot-swapping:** Feature that allows components to be replaced while the rest of the system continues to perform its tasks. **753**

households, living digitally (feature), **830**

HowStuffWorks Web site, **135**

HP (Hewlett-Packard)

company profile, **331**

historic milestones, **57**

HTML: Hypertext Markup Language; special formatting language that programmers use to format documents for display on the Web. **678**, 685, 700**http:** A set of rules that defines how pages transfer on the Internet. **82**. *See also Hypertext Transfer Protocol***Hub:** The device that provides a common central connection point for nodes on a network. **476**, 488, 489, 501

Hubble Space Telescope, **93**

Human Genome Project, **541**, **810**

Human resources information system (HRIS): Information system that manages one or more human resources function(s). **727**, **728**, **760**

Hurley, Chad, **759**

Hypercube: The multiple dimensions in which data is stored in

a multidimensional database. **535**, **543**

Hyperlink: Built-in connection to another related Web page or part of a Web page. **82**, **84**, **112**, **518**, **524**. *See also Link***Hypermedia:** Web page content consisting of text-based links combined with graphic, audio, and video links. **83****Hypermedia database:** Database that contains text, graphics, video, and sound. **534**, **543****HyperTalk:** Object-oriented programming language developed by Apple to manipulate cards that can contain text, graphics, and sound. **675****Hypertext:** Term that refers to links in text-based documents. **83****Hypertext database:** Database that contains text links to other types of documents. **534**, **543****Hypertext Markup Language:** Special formatting language that programmers use to format documents for display on the Web. **678**, **700****Hypertext Transfer Protocol:** A set of rules that defines how pages transfer on the Internet. **82**. *See also http***I**

IBM, **55**, **56**, **57**, **383**
company profile, **759**
historic milestones, **67**

IBM Certified Professional for Lotus Software: Application software certification that tests a user's knowledge of Lotus programs. **804****IBM Certified Solution**

Developer: Programmer/developer certification that tests knowledge of developing XML applications with Web services. **805**

IBM Certified Solutions Expert - DB2:

Database certification that tests skills of administration of the DB2 database management system. **808**

IBM Certified Solutions Expert - Informix:

Database certification that tests advanced skills of administration of the Informix database management system. **808**

IBM Certified Specialist:

Operating system certification that tests knowledge of AIX operating system and network security. **804**

IBM eServer Certified Specialist:

Hardware certification that tests knowledge of IBM eServer line. **805**

ICANN: Acronym for Internet Corporation for Assigned Names and Numbers; group that assigns and controls top-level domains. **80****I-CASE:** Integrated case products. Also called a CASE workbench. **642****Icon:** Small image displayed on a computer screen that represents a program, a document, or some other object. **15**, **144****IDE (integrated development environment):** Includes program development tools for building graphical user interfaces, an editor for entering program code, a compiler and/or interpreter, and a debugger. **669**

IDEA (International Data Encryption Algorithm), **592**

Identification: Access control that verifies an individual is a valid user. **565**

identity theft, **13**, **569**, **609–610**
digital forensics scenario, **609–615**

Idestam, Fredrik, **289**

IEEE 802.11 standards, **479**

IEEE 1394 port: Port that can connect multiple types of devices that require faster data transmission speeds. **234**. *See also FireWire port***If-then-else control structure:**

Type of selection control structure that yields only one of two possibilities: true or false. **689**, **701**

iGoogle Web pages, **715**

iLife, **828**

Illustration software: Application software that allows users to draw pictures, shapes, and other graphical images with various on-screen tools. **161**, **181**. *See also Paint software***Illustrator:** Employee who develops visual impressions of products for advertisements and marketing materials. **789**

iLounge.com, **52**

image

drawing, **168**

forensics, **611**

graphical, **93**

Image editing software:

Application software that provides the capabilities of paint software and also includes the capability to enhance and

modify existing images and pictures. **161**, **181**

Image map: Graphical image that points to one or more Web addresses. **680****Image processing:** Business practice that consists of capturing, storing, analyzing, displaying, printing, and manipulating images with scanners. **278****Image processing system:**

Storing and indexing electronic documents to provide access to exact reproductions of the original documents. **278**

Image stitching: Process of combining multiple images into a larger image. **161****Image viewer:** Utility that allows users to display, copy, and print the contents of a graphics file, such as a photo. **423**, **433**
imaging, **611****Impact printer:** Type of printer that forms characters and graphics on a piece of paper by striking a mechanism against an inked ribbon that physically contacts the paper. **322–323**, **332****Implementation:** Process of generating or writing code that translates a program design into a program and, if necessary, creating the user interface. **694****Implementation phase:** Phase of the system development cycle during which the new or modified system is constructed, or built, and then delivered to the users. Four major activities performed include: (1) develop programs, (2) install and test the new system, (3) train users, and (4) convert to the new system. **620–621**, **643–645**, **651****Import:** To bring graphics into a document. **155**

incremental backup, **754**

Index: Search utility feature that stores a variety of information about a file, including its name, date created, date modified, author name, and so on. **422****Indexes:** Arranging content so that it later can be searched. **739****Inference rules:** Component of an expert system that contains a set of logical judgments that are applied to the knowledge base each time a user describes a situation to the expert system. **736**

informatics, **810**

Information: Processed data that conveys meaning and is useful to people. **6**, **42**, **514**, **542**

- accuracy, 582
exchanging personal, 35
qualities of valuable, 516–517
- Information architecture:** Overall technology strategy of a company. **732**
- Information privacy:** Right of individuals and companies to deny or restrict the collection and use of information about them. **584–591, 595**
- Information processing cycle:** Series of input, process, output, and storage activities performed by a computer. **6**
- Information system:** Hardware, software, data, people, and procedures that a computer requires to generate information. **27, 43, 726**
elements of, 27
in the enterprise, 726–739
- Information system (IS):** Collection of hardware, software, data, people, and procedures that work together to produce quality information. **620, 650, 760**
- Information technology (IT) department:** Group of employees who keeps the computers and networks running and determines when the company requires new hardware or software. **31, 43**
functional unit in the enterprise, 727, 732
- Information theft:** Computer security risk that occurs when someone steals personal or confidential information. **572–575**
informational Web sites, 89
InfoWorld, 799
- Infrared printing:** Printing that uses infrared light waves to transmit output to a printer. **314, 332**
infrared transmission media, 494
- Inheritance:** Concept of lower levels inheriting methods and attributes of higher levels in a class diagram. **635, 651**
- Ink-jet printer:** Type of nonimpact printer that forms characters and graphics by spraying tiny drops of liquid ink on a piece of paper. **316–317, 332**
- Inoculate:** Capability of an antivirus program to record information such as file size and file creation date in a separate file in order to detect viruses. **561**
- Input:** Any data and instructions entered into the memory of a computer. **258–259, 290**
for smart phones, 268–269
- Input device:** Any hardware component that allows users to enter data and instructions into a computer. **6, 42, 213**
for physically challenged, 286
suggested, by user (fig.), 285
types and features, 260–286
- Insertion point:** Symbol on a computer screen, usually a blinking vertical bar, that indicates where the next character a user types will appear. **260, 290**. *See also Cursor*
- Inspection:** Formal review of any system development deliverable. **642**
- Installing:** Process of setting up software to work with the computer, printer, and other hardware components. **16**
application software, 188–189
computer memory, 252–253
and maintaining computers, 440
programs, 16–17
Web cam, 298
Wi-Fi home network, 508–509
- Instant message:** Real-time Internet communication where you exchange messages with other connected users. **22**
- Instant messenger:** Software used by people to participate in instant messaging. **105**
- Instant messaging (IM):** Real-time Internet communications service that notifies a user when one or more people are online and then allows the user to exchange messages or files or join a private chat room with those people. **104, 113, 196–197, 462**
- Institute for the Certification of Computing Professionals (ICCP):** Professional organization that offers certifications and defines standards designed to raise the competence level for the computer industry. **801**
application software, 174
overview of, 104–105
personal and business perspective, 196–197
wireless, 464
- Instant Search boxes, 87
- Institute for the Certification of Computing Professionals (ICCP), 801
- Instructions:** Steps that tell the computer how to perform a particular task. **6**
and RAM, 224
- Integrated circuit:** Electronic component that contains many microscopic pathways capable of carrying electrical current. **212**
- Integration test:** Test performed during the program development cycle that verifies an application works with other applications. **644**
- Intel-compatible processors:** Processors that have an internal design similar to that of Intel processors, perform the same functions as Intel processors, and can be as powerful, but often are less expensive. **216, 244**
- Intel**
company profile, 243
-compatible processors, 216
Health Guide, 276
historic milestones, 57, 58, 60, 61, 62, 63, 64, 67, 68, 70
processors, 216–218
- Intellectual property (IP):** Unique and original works such as ideas, inventions, art, writings, processes, company and product names, and logos. **582**
- Intellectual property rights:** Rights to which creators are entitled for their work. **582, 595**
- Intelligent Computer Solutions' Road MASter-3, 611
- Intelligent home network:** Home network that extends basic network capabilities to include features such as lighting control, thermostat adjustment, and a security system. **489**
- Interactive whiteboard:** Touch-sensitive device, resembling a dry-erase board, that displays the image on a connected computer screen. **326, 333**
- Internal bay:** Drive bay that is concealed entirely within the system unit. **238**
- Internal comments:** Documentation that appears throughout the body of the program that explains the purpose of the code statements within the program. **694**
- internal hard disk, 352
- Internal sources:** Source of data obtained from inside an enterprise, which might include sales order, inventory records, or financial data from accounting and financial analyses. **735**
- International Computer Electronics Show (CES):** Large technology trade show, which brings together more than 130,000 attendees. **798, 812**
- International Computer Security Association (ICSA):** Organization that provides assistance via the telephone or the Web to organizations and individuals that need help with computer security plans. **645**
- Internet:** Worldwide collection of networks that connects millions of businesses, government agencies, educational institutions, and individuals. **10, 42, 74, 112, 462**
addresses, 79–80
backing up files on offsite server, 602
certification, 807
cyberbullying, 108
establishing connection, 408
evolution of, 75–80
example of request, using communications channel, 491
home user examples, 28–29
line types, and connection speeds, 483
locating devices on the, 382
overview of, 11–14, 74
percent of Americans using, 29
plagiarism, 149
privacy, security concerns, 35
security attacks, 558–564
services, 100–107
- Internet access providers, claims of access speed, 492
- Internet Addiction Disorder (IAD), 342
- Internet backbone:** Major carriers of network traffic on the Internet. **78**
- Internet backup:** Storage of data, information, and instructions on the Web. **750**
- Internet Content Rating Association (ICRA):** Organization that developed a rating system in order to filter content on the Web. **590–591**
- Internet Explorer (IE):** Web browser included with Windows operating system. **61, 67, 68, 70, 82, 413**
- Internet postage:** Digital postage technology that allows users with an authorized postage account to buy and print digital postage. **322**
- Internet Protocol (IP), 498
- Internet Public Library, 135
- Internet solutions provider:** Company that provides Web hosting services that include managing shopping carts, inventory, and credit card processing. **636**

Internet telephony: Technology that allows users to speak to other users over the Internet. **106, 113.** *See also Voice over IP (Internet Protocol) or VoIP*

Internet2, 76

Internet-enabled: Technology that allows mobile devices to connect to the Internet wirelessly. **21**

Interoperability: Sharing information with other information systems within an enterprise. **753–754, 761**

Interpreter: Program used to convert a source program into machine language and then executes the machine language instructions. **667, 700**

interviews, conducting, 626, 658–659

Intranet: An internal network that uses Internet technologies. **477**

Intrusion detection software: Program that automatically analyzes all network traffic, assesses system vulnerabilities, identifies any unauthorized intrusions, and notifies network administrators of suspicious behavior patterns or system breaches. **564, 594**

IP address: A number that uniquely identifies each computer or device connected to the Internet. **79, 110, 112**

IP spoofing: Spoofing technique where an intruder computer fools a network into believing its IP address is associated with a trusted source. **563**

iPhone, 68, 70, 82, 179, 675

iPhone OS: Operating system developed by Apple for the iPhone and iPod touch. **420, 433**

IPO chart: Chart that identifies a program's inputs, its outputs, and the processing steps required to transform the inputs into the outputs. **687**

iPod, 23, 826, 827, 829

IPv4, 110

IPv6: New IP addressing scheme that may increase the number of available IP addresses. **80, 110**

IrDA: Infrared Data Association; network standard used to transmit data wirelessly via infrared (IR) light waves. **235, 262, 480–481, 501**

IrDA port: Port that uses infrared light waves to transmit signals between a wireless device and a computer. **235, 245**

Iris verification system:

Biometric device that uses iris recognition technology to read patterns in the iris of the eye. **283, 291**

ISDN (Integrated Services

Digital Network: Set of standards for digital transmission of data over standard copper telephone lines. **484, 501**

ISDN modem: Modem that sends digital data and information from a computer to an ISDN line and receives digital data and information from an ISDN line. **486, 501**

ISP (Internet service provider):

Regional or national Internet access provider. **78, 112**

IT consultant: Employee, typically hired based on computer expertise, who provides computer services to his or her clients. **639, 793, 812**

IT department: Group of employees who work together as a team to meet the information requirements of their organization and are responsible for keeping all the computer operations and networks running smoothly. **786, 812**

IT professionals

careers in computer industry, 786–793

demand for, 784–785

Itanium: Intel processor used by workstations and low-end servers. **216, 244**

iTunes, 94, 95, 826, 827

downloading to portable media player, 299

iTunes U, 175

Iwata, Satoru, 289

iWeb, 828

J

Jack: Term sometimes used to identify an audio or video port. **232**

Jacobsen, Ivar, 634

JAD sessions, 626

Java: Object-oriented programming language developed by Sun Microsystems. **61, 670, 699, 700**

Java EE (Java Platform,

Enterprise Edition: Set of technologies built on Sun's Java EE that allows programmers to develop and deploy Web services for a company, often used in Web 2.0 environments. **670**

Java Platform, Micro Edition

(Java ME): Java platform used to create programs for smart

phones and other mobile devices. **670**

Java Platform, Standard Edition

(Java SE): Java platform developed by Sun Microsystems to create stand-alone programs for desktop computers and servers. **670**

JavaScript: Interpreted language that allows a programmer to add dynamic content and interactive elements to a Web page. **675, 682, 698, 701**

Jewel box: Protective case that is used to store optical discs when not in use. **371**

job-hunting Web sites, 138, 796–797

Jobs, Steven, 41, 57, 289, 331

Joint-application design (JAD):

Lengthy, structured, group meetings in which users and IT professionals work together to design or develop an application. **626, 650.** *See also Focus groups*

Joule: Unit of energy a surge protection device can absorb before it can be damaged. **576**

Joystick: Handheld vertical lever mounted on a base used to control actions of a simulated vehicle or player. **270, 290**

purchasing considerations, 446

JPEG: Joint Photographic Experts Group; format that compresses graphics to reduce their file size. **93**

Just-in-time (JIT) compiler:

Program that converts bytecode into machine-dependent code that is executed immediately.

670, 700

K

Kay, Alan, 699

KBps:

Kilobytes per second. **355**

Kernel: The core of an operating system that manages memory and devices, maintains the computer's clock, starts programs, and assigns the computer's resources. **400, 432**

Kerneny, Dr. John, 56

Keyboard:

Input device that contains keys users press to enter data and instructions into a computer. **260, 290**

described, 6–7

ergonomics, 262

monitoring software, 261

on notebook computers, 20

purchasing considerations, 446

types and features, 260–263

Keygen: Short for key generator; program that creates software

registration numbers and sometimes activation codes used for software theft. **571**

Keyguard: Metal or plastic plate placed over the keyboard that allows users to rest their hands on the keyboard without accidentally pressing any keys. **286, 291**

keylogger, 261

Keyword: Each word entered as search text when using a search engine. **85, 112**

using in searches, 85–88

Keywords: Command words used in programming. **695**

Kilby, Jack, 55, 243

Kilobyte (KB or K): Exactly 1,024 bytes. **223, 354**

Kindle portable reader, 41

Kinset, Inc., 100

Kiosk: Free-standing computer that usually includes a touch screen. **266, 290**

Knowledge base: Component of an expert system that contains the combined subject knowledge and experiences of human experts. **736**

Knowledge management (KM): The process by which an enterprise collects, archives, indexes, and retrieves its knowledge, or resources. **737**

Knowledge management

software (KMS): Software that assists in the task of knowledge management and captures the expertise of knowledge workers, so that their knowledge is not lost when they leave the company. **737**

Knowledge workers: Individuals whose jobs center on the collection, processing, and application of information. **737**

Kodak digital cameras, 58

Kodak Picture CD, 374

L

L1 cache: A type of memory cache that is built directly into the processor chip, with a capacity of 8 KB to 128 KB. **227**

L2 cache: A type of memory cache that is slightly slower than L1 cache, but has a much larger capacity, ranging from 64 KB to 16 MB. **227**

L3 cache: Cache on the motherboard that is separate from the processor. **227**

Label: Text entered in a worksheet cell that identifies the worksheet data and helps organize the worksheet. **151**

Label printer: Small printer that prints on adhesive-type material that can be placed on items such as envelopes, packages, optical discs, photos, file folders, and toys. 322, 333

Landscape orientation: A print-out that is wider than it is tall with information printed across the widest part of the paper. 313–314

Laptop computer: Portable, personal computer often designed to fit on your lap. 20. *See also Notebook computer*

Large Synoptic Survey Telescope (LSST), 640

Large-format printer: Printer that creates photo-realistic quality color prints, used mainly by graphic artists. 322, 333

Laser mouse: Mouse type that uses a laser sensor. 263, 290

Laser printer: Type of high-speed, high-quality nonimpact printer that creates images using a laser beam and powdered ink called toner. 318, 332

laser tagging, 325

Latency: The time it takes a signal to travel from one location to another on a network. 491

law enforcement

biometric devices in public places, 568

brain waves, behavior tracking, 569

computer usage in, 35

digital forensics. *See digital forensics*

monitoring in public places, 283

pirated software, 572

privacy laws (fig.), 589

laws, privacy, 588–589

layers of video, 348

Layout chart: Technical chart that contains programming-like notations for data items. 641

Lazaridis, Mike, 431

LCD monitor: Desktop monitor that uses a liquid crystal display instead of a cathode-ray tube to produce images on a screen, resulting in a sharp, flicker-free display. 306, 307, 332, 455

LCD projector: Projector that uses liquid crystal display technology that attaches directly to a computer and uses its own light source to display the information shown on the computer screen. 325

Leading: Management activity, sometimes referred to as directing, that involves

communicating instructions and authorizing others to perform the necessary work. 725

learning (education) Web sites, 135

LED screens, 830

Legacy system: Information system that has existed within an organization for an extended length of time and is relied upon heavily. 748

Level 1: RAID storage design that writes data on two disks at the same time to duplicate the data. 748–749. *See also Mirroring*

Legal software: Application software that assists in the preparation of legal documents and provides legal information to individuals, families, and small businesses. 167, 181

popular (fig.), 165

Library of Congress Web site, 132

License agreement: An agreement issued by a software manufacturer that gives the user the right to use the software. 571, 594

licenses, computer repair technician, 240

LifeNaut online social network, 510

Light gun: Input device used in video and computer games to shoot targets and moving objects after you pull the trigger on the weapon. 270, 291

LightScribe technology:

Technology used by some optical drives that can etch labels directly on a specially coated optical disc, as opposed to placing an adhesive label on the disc. 370

Line chart: Chart that shows a trend during a period of time, as indicated by a rising or falling line. 152

Line-of-sight transmission:

Requirement for infrared that the sending device and the receiving device be in line with each other so that nothing obstructs the path of the infrared light wave. 480

Line printer: Type of high-speed impact printer that prints an entire line at a time. 323, 332

Link: Built-in connection to another related Web page or part of a Web page. Short for hyperlink. 82–84, 112

LinkedIn Web site, 189

Linux: Popular, multitasking UNIX-type operating system. 60, 62, 65, 416–418, 420, 431, 433, 592

Liquid cooling technology: A continuous flow of fluid(s), such as water and glycol, that transfers the heated fluid away from the processor, cools the liquid, then returns the cooled fluid to the processor. 219–220, 244

Liquid crystal display (LCD): Type of display that uses a liquid compound to present information on a display device. 308

LISP: LISt Processing.

Programming language used for artificial intelligence applications. 675

literature Web sites, 139

living digitally (feature), 824–830

Loaded: Copied from a computer's hard disk into memory. 144, 180

Loads: Process of a computer copying a program from storage to memory. 17

Local area network (LAN):

Network that connects computers and devices in a limited geographical area such as a home, school computer laboratory, office building, or closely positioned group of buildings. 472, 500

lockdown, user, 418

Loebner Prize, 214

Log: Listing of activities that change the contents of a database. 532, 543

log files and digital forensics, 607

Log on: To access a computer or network as a user. 410

logic bomb, 178

Logic error: Flaw in program design that causes inaccurate results. 693

Logical design: Activity in the system development cycle that involves three major activities: (1) study how the current system works; (2) determine the users' wants, needs, and requirements; and (3) recommend a solution. 631, 650. *See also Detailed analysis*

Logitech, 289

LOGO: An educational tool used to teach programming and problem-solving to children. 675

Longitudinal recording: Storage technique in which magnetic particles are aligned horizontally around the surface of the disk. 356, 384

Loop: Type of control structure that enables a program to perform one or more actions repeatedly as long as a certain

condition is met. 690. *See also Repetition control structure*

Lossless: Compression method in which a compressed file can be returned to its exact original state. 427

Lossy: File compression method in which a file cannot be returned to its exact original state after compression, because the quality of a file decreases each time it is compressed. 427

Lotus Development Corporation, 57

Louvre Museum Web site, 139

Low Voltage processors, 220

Low-level language:

Programming language that is machine dependent. 664

Lucent Technologies, 499

LucidTouch sensors, 171

M

Mac OS, 19–20, 68

Mac OS X: Multitasking operating system that is the latest version of the Macintosh operating system. 415, 433

Machine cycle: The four basic operations (fetching, decoding, executing, and storing) performed by a processor. 215–216, 244

Machine language: The only language a computer directly recognizes, using a series of binary digits or a combination of numbers and letters that represent binary digits. 665, 700

Machine-dependent language:

Programming language that runs on only one particular type of computer. 664

Machine-independent language: Programming language that can run on many different types of computers and operating systems. 665

Macintosh operating system: Operating system for Apple's Macintosh computer. 415

Macro: Sequence of keystrokes and instructions that a user records and saves. 148, 666, 676, 677, 700

Macro recorder: Program development tool that records all actions until it is turned off. 676

macro virus, 178

Macros: Instructions saved in software such as a word processor or spreadsheet program. 560

Magnetic stripe card: Credit card, entertainment card, bank card, or other similar card,

- with a stripe that contains information identifying you and the card. **377, 385**
- magnetic disks**, life expectancy, **378**
- Magnetic stripe card reader**: Reading device that reads the magnetic stripe on the back of credit, entertainment, bank, and other similar cards. **281**. *See also Magnetic stripe reader*
- Magnetic-ink character recognition**: Technology that reads text printed with magnetized ink. **281, 291**
- Magnetoresistive RAM**: Newer type of RAM that stores data using magnetic charges instead of electrical charges. **225**
- Magnifier feature (Windows), **328**
- Magstripe reader**: Reading device that reads the magnetic stripe on the back of credit, entertainment, bank, and other similar cards. **281, 291**. *See also Magnetic stripe card reader*
- Mailing list**: Group of e-mail names and addresses given a single name. Also called an e-mail list or a distribution list. **103, 113**
- Main memory**: Type of memory that can be read from and written to by the processor and other devices. Programs and data are loaded into RAM from storage devices such as a hard disk and remain in RAM as long as the computer has continuous power. **224, 245**. *See also RAM or Random access memory*
- Main module**: Main function of a program. **688, 701**. *See also Main routine*
- Main routine**: Main function of a program. **688, 701**. *See also Main module*
- Mainframe**: Large, expensive, powerful computer that can handle hundreds or thousands of connected users simultaneously, storing tremendous amounts of data, instructions, and information. **19, 25, 43, 801**
- Maintaining**: Act of correcting errors or adding enhancements to an existing program. **686**
- computers, **440**
- data, **520–524**
- hard disks, **392–393**
- optical discs, **371**
- Web sites, **98**
- Malicious software**: Programs that act without a user's knowledge and deliberately alter a computer's operations. **558–559**
- malicious-logic programs, **178**
- Malware**: Short for malicious software; programs that act without a user's knowledge and deliberately alter a computer's operations. **144, 426, 558–559**
- Management information system (MIS)**: Information system that generates accurate, timely, and organized information, so that managers and other users can make decisions, solve problems, supervise activities, and track progress. **734, 760, 795**
- Management information technology**: Curriculum that teaches students technical knowledge and skills and focuses on how to apply these skills. **795**
- Managers**: Employees responsible for coordinating and controlling an organization's resources. **725, 760**
- managing
- files on computers, **550**
 - memory, **406–407**
 - printing, **341**
 - programs, **404–405**
 - videos, **346–347**
- manufacturing
- computer applications in, **38**
 - systems in the enterprise, **727, 729–730, 773**
- Manufacturing Resource Planning II (MRP II)**: Extension of MRP that includes software that helps in scheduling, tracking production in real time, and monitoring product quality. **730, 775, 777, 778, 779, 781**
- mapping software, **170–171**
- MapQuest**, **121, 129**
- Margins**: The portion of a page outside the main body of text, including the top, the bottom, and both sides of the paper. **147**
- Marini, Giacomo, **289**
- Market research system**: Type of marketing information system that stores and analyzes data gathered from demographics and surveys. **730**
- Marketing information system**: Information system that serves as a central repository for the tasks of the marketing functional unit. **730, 727, 760**
- marketing systems in the enterprise, **727**
- Mars lander mission, **643**
- Mashup**: Web application that combines services from two or more sources, creating a new application. **469**
- social networking, and Web 2.0, **714–715**
- Massachusetts Institute of Technology, **794**
- massively multiplayer online games (MMOGs), **829**
- Massively parallel processing**: Large scale parallel processing that involves hundreds or thousands of processors. **220**
- master videos, **349**
- matching, in biometric authentication, **288**
- Materials Requirements Planning (MRP)**: Approach to information management in a manufacturing environment that uses software to help monitor and control processes related to production. **729–730, 760**
- Mauchly, Dr. John W., **54**
- Mbps**: Megabytes per second. **355**
- McAfee company profile, **592**
- McAfee, John, **592**
- McAfee antivirus software, **561**
- M-commerce**: E-commerce that takes place using mobile devices. **98–100**
- media
- digital forensics analysis of, **609–615**
 - life expectancies (fig.), **378**
 - transmission, **492–496**
- Media player**: Utility program that allows you to view images and animation, listen to audio, and watch video files. **427–428, 433**
- Media sharing Web site**: Specific type of online social network that enables members to share media such as photos, music, and videos. **91, 128, 345, 349**
- uploading videos to, **349**
- medical
- advice, from video games, **271**
 - health sciences, computer usage, **538**
 - monitoring health status remotely, **276**
 - records privacy, **380**
 - uses of Nintendo Wii, **24**
 - Web sites, **137**
- Megabyte (MB)**: Approximately 1 million bytes. **223, 354**
- Memory**: Electronic components in a computer that store instructions waiting to be executed by the processor, the data needed by those instructions, and the results of processing the data. **7, 211, 213, 223**
- managing, **406–407**
- purchasing, installing in computers, **252–253**
- types of, **223–229**
- video card, **310–311**
- Memory cache**: Cache that helps speed the processes of a computer by storing frequently used instructions and data. **227**
- Memory card**: Removable flash memory device, usually no bigger than 1.5" in height or width, that you insert and remove from a slot in a personal computer, game console, mobile device, or card reader/writer. **231, 245, 315, 353, 364, 384**
- types, features, function, **364–366**
- Memory management**: Operating system activity that optimizes the use of random access memory (RAM). **406–407, 432**
- Memory module**: Small circuit board that houses RAM chips and is held in a memory slot on the motherboard. **225**
- Memory resident**: Remaining in memory while a computer is running. **400**
- Memory slots**: Slots on the motherboard that hold memory modules. **225**
- Memory Stick**: Type of memory card capable of storing between 1 and 16 GB of data. **364, 365, 384**
- Memory Stick Micro (M2)**: Memory card capable of storing between 1 and 16 GB of data. **364, 365, 384**
- Memory Stick PRO Duo, **365**
- Menu**: Item on the computer screen that contains a list of commands from which a user can make selections. **144, 180**
- Menu generator**: Application generator feature that enables users to create a menu for the application options. **676**
- Message board**: Popular Web-based type of discussion group that does not require a newsreader. **107, 113**
- application software, **174**
- Metadata**: Detailed data in a data dictionary about the data in a database. **528, 739**
- Metcalf, Robert, **57, 499**
- meteorology, and computers, **381**
- Method**: Procedure in an object that contains the activities that read or manipulate the data. **634**. *See also Operation*
- Metropolitan area network (MAN)**: High-speed network

- that connects local area networks in a metropolitan area such as a city or town and handles the bulk of communications activity across that region. **473, 500**
- MICR:** Technology that reads text printed with magnetized ink. **281, 291**
- MICR reader:** Reading device that converts MICR characters into a form that a computer can process. **281**
- Microblog:** Blog that allows users to publish short messages, usually between 100 and 200 characters, for others to read. **14, 90**
- Microbrowser:** Special type of browser designed for the small screens and limited computing power of Internet-enabled mobile devices. **82**
- Microcode:** Instructions programmers use to program a PROM chip. **228**
- Microfiche:** A small sheet of film, usually about 4 inches by 6 inches in size, on which microscopic images of documents are stored. **378, 385**
- Microfilm:** A roll of film, usually 100 to 215 feet long, on which microscopic images of documents are stored. **352, 378**
- microphone
described, 6–7, 295
purchasing considerations, 446
- Microprocessor:** Term used by some computer and chip manufacturers to refer to a processor chip for a personal computer. **213.** *See also Processor*
- MicroSD:** Memory card capable of storing between 1 and 2 GB of data. **364, 365, 384**
- MicroSDHC:** Memory card capable of storing between 4 and 16 GB of data. **364, 365, 384**
- Microsoft, 41
certifications generally, 800
company profile, 179
historic milestones, 57, 58, 60, 61, 62, 63, 64, 66, 67, 68, 70, 71
LucidTouch sensors, 171
.NET, 670–671
- Microsoft Access, 528–529, 531
- Microsoft Certified Desktop Support Technician (MCDST):** Application software certification that tests a user's skills solving problems associated with applications that run on Windows and the operating system itself. **804**
- Microsoft Certified IT Professional (MCITP):**
- Database certification that tests skills required to use SQL Server to design or install, manage, and maintain a database system. **808**
- Microsoft Certified Professional Developer (MCPD):** Programmer/developer certification that tests knowledge of developing Web and Windows-based applications using programs in the Visual Studio suite and the .NET framework. **805**
- Microsoft Certified Systems Administrator (MCSA):** Operating systems certification that tests technical expertise in one of several areas including managing and troubleshooting networks using Windows operating systems. **806**
- Microsoft Certified Technology Specialist (MCTS):** Operating systems certification that tests technical expertise in a specialized area including Windows and .NET environments. **804**
- Microsoft Excel, 173
macro in, 676–677
- Microsoft Intermediate Language (MSIL):** Resulting object code compiled by a .NET-compatible language. **670**
- Microsoft Office Specialist (MOS) - Core:** Application software certification that tests a user's basic skills of Microsoft Office programs and other related programs. **804**
- Microsoft Office Specialist (MOS) - Expert:** Application software certification that tests a user's advanced skills of Microsoft Office Word and Excel in industry applications such as budgets, publications, and collaboration. **804**
- Microsoft Office, Visual Studio Tools for Office (VSTO), 671
- Microsoft Surface:** Touch screen with a 30-inch tabletop display that allows one or more people to interact with the screen using their fingers or hands. **179, 267, 290**
- Microsoft Visual Web Developer, 717
- Microsoft Windows. *See Windows*
- Microsoft Windows Live, 715
- Microsoft's WorldWide Telescope, 93
- Microwave station:** Earth-based reflective dish that contains the antenna, transceivers, and other equipment necessary for microwave communications. **496**
- Microwaves:** Radio waves that provide a high-speed signal transmission. **496, 501**
- Middle management:** Level of management responsible for implementing the strategic decision of executive management. **724, 760**
- MIDI and audio input, 274
- MIDI port:** Special type of serial port that connects the system unit to a musical instrument, such as an electronic keyboard. **235–236, 245**
- MIMO:** Multiple-input multiple-output. **479**
- Mini discs:** Optical disc with a size of three inches or less used by smaller computers and devices. **370**
- miniature hard disk, 353, 361
- Mirroring:** RAID storage design that writes data on two disks at the same time to duplicate the data. **748.** *See also Level 1*
- MITTS, Inc., 57
- MMS (multimedia message service):** Multimedia message service; service that allows users to send graphics, pictures, video clips, and sound files, as well as short text messages to another smart phone or other personal mobile device. **464**
- Mobile computer:** Personal computer that a user can carry from place to place. **19, 20, 43**
- classroom bans of, 219
ethics of using at work, 724
hardware and software for, 33
keyboards for, 262–263
protecting, 570
security issues, 269
suggested output devices for, 327
suggested storage devices, by user (fig.), 380
- Mobile device:** Computing device small enough for a user to hold in his or her hand. **19, 20, 43, 71**
- classroom bans of, 219
cleaning, 240
ethics of using at work, 724
keyboards for, 262–263
security issues, 269
types of, 21
- Mobile printer:** Small, light-weight, battery-powered printer used by a mobile user to print from a notebook computer, smart phone, or other mobile device while traveling. **321, 333**
- Mobile security specialist:** Employee responsible for the security and data and information stored on computers and mobile devices within an organization. **789.** *See also Computer security specialist*
- Mobile TV:** Service that provides television programs over the cellular network. **495**
- Mobile users:** Users who work on a computer while away from a main office, home office, or school. **31, 33, 43**
- mobile wireless networks, 464–465
- Mockup:** Sample of the input or output that contains actual data. **641**
- modem
function of, 79
purchasing considerations, 446
types of, 485–487
wireless, 78
- Moderator:** Systems analyst who acts as leader during a JAD session. **626**
- Modula-2:** Successor to Pascal programming language used for developing systems software. **675**
- Modules:** Smaller sections into which a main routine is broken down by a programmer during structured design. **688, 701.** *See also Subroutines*
- modifying database records, 521
modules, 688
money, cashless society, 377
- Monitor:** Display device that is packaged as a separate peripheral. **306, 332**
- health considerations, 579–580
purchasing considerations, 446
- monitoring
keyboard activity at work, 261
packet routes, 616
performance, 408–409
in public places, 283
RFID tags, 280
workers, and productivity, 625
- Monochrome:** Display device capability in which information appears in one color on a different color background. **306**
- Monster, job-searching with, 796
- Moore Gordon, 243
- Moore's Law, 243
- morphing, 348
- Morris Worm, 592
- Motherboard:** Main circuit board of the system unit, which has some electronic components attached to it and others built into it. **212, 244.** *See also System board*
- Motion-sensing game controllers:** Input devices used

- with computer and video games that allow the user to guide on-screen elements by moving a handheld input device in predetermined directions through the air. **271, 291**
- Mouse:** Pointing device that fits comfortably under the palm of a user's hand. **263–264, 290**
described, **6–7**
invention of, **289**
purchasing considerations, **446**
- Mouse gestures:** Capability that allows users to perform certain operations by holding a mouse button while moving the mouse in a particular pattern. **264, 290**
- Mouse pointer:** Small symbol displayed on a computer screen whose location and shape changes as a user moves a mouse. **263, 290**
- Mouse rollover:** Event that occurs when text, a graphic, or other object changes as the user moves the mouse pointer over an object on the screen. **682.**
See also Mouseover
- Mouseover:** Event that occurs when text, a graphic, or other object changes as the user moves the mouse pointer over an object on the screen. **682.**
See also Mouse rollover
- movies
transferring from old to new media, **376**
watching inappropriate, in public, **312**
- Moving Pictures Experts Group (MPEG), **96**
- Mozilla Firefox browser, **65, 67, 69**
- MP:** One million pixels. **273**
- MP3:** Format that reduces an audio file to about one-tenth of its original size, while preserving much of the original quality of the sound. **94, 95, 826**
- MP4:** Popular video compression standard. **96**
- MPEG:** Moving Pictures Experts Group. **96**
- MPEG-4:** Current version of a popular video compression standard. **96**
- MSN (Microsoft Network), **78, 81**
- MSN Money Web site, **131**
- Multi-core processor:** Single chip with two or more separate processor cores. **213, 244**
- Multidimensional database:** Database that stores data in dimensions. **535, 543**
- Multifunction peripheral:** Output device that looks like a printer or copy machine but provides the functionality of a printer, scanner, copy machine, and perhaps a fax machine. **320, 333.**
See also All-in-one device
- multilayer perceptron (MLP), **758**
- Multimedia:** Any application that combines text with graphics, animation, audio, video, and/or virtual reality. **30, 92–93**
virus-infected files, **559**
on the Web, **92–93**
- Multimedia authoring software:** Software that allows users to combine text, graphics, audio, video, and animation in an interactive application and that often is used for computer-based training and Web-based presentations. **162–163, 181, 685, 701**
- Multimedia database:** Database that stores images, audio clips, and/or video clips. **534, 543**
multimedia software, **159–164**
- Multiplexing:** ISDN line technique of carrying three or more signals at once through the same line. **484**
- Multiprocessing:** In reference to operating systems, supports two or more processors running programs at the same time. **405, 432**
- Multipurpose operating system:** Operating system that is both a stand-alone operating system and a server operating system. **418, 433**
- Multisession:** Optical disc that can be written on more than once, allowing users to save additional data on the disc at a later time. **373, 385**
- Multi-threaded program:** Software written to support multiple threads. **217**
- Multi-touch:** Term used to describe touch screens that recognize multiple points of contact at the same time. **266, 290**
- Multiuser:** In reference to operating systems, enables two or more users to run programs simultaneously. **405, 410, 432**
- music
creating vocal accompaniments, **275**
downloading, **94, 95, 298–299**
how portable media player stores, **228**
living digitally (feature), **826**
purchasing, downloading iTunes, **95**
- Web sites, **133**
- Music production software:** Software that allows users to record, compose, mix, and edit music and sounds. **274**
- Musical Instrument Digital Interface:** Electronic music industry's standard that defines how devices represent sounds electronically. **235**
- MX record, **382**
- MySong (Microsoft), **275**
- MySpace, **41, 64, 91, 122, 368, 431**
- N**
name servers, **382**
- Nanosecond:** One billionth of a second. **229**
- Napster, **63**
- NAS:** Network attached storage; server connected to a network with the sole purpose of providing storage. **360**
- NASA's *Phoenix Mars Lander* Mission, **643**
- NASA's Web site, **136**
- NASCAR's use of computers, **240**
- National Hurricane Center, **381**
- National ISP:** Internet service provider that provides Internet access in cities and towns nationwide. **78**
- National Science Foundation Web site, **136**
- Native resolution:** The specific resolution for which an LCD is geared. **308**
- navigating Web pages, **83–84**
- Near letter quality (NLQ):** Printer output that is slightly less clear than what is acceptable for business letters. **322**
- Net:** Worldwide collection of networks that links millions of businesses, government agencies, educational institutions, and individuals. **74, 112.** *See also Internet*
- .NET:** Microsoft's set of technologies that allows almost any type of program to run on the Internet or an internal business network, as well as stand-alone computers and mobile devices. **670–671, 714, 742**
- Netbook:** A type of notebook computer that is smaller, lighter, and often not as powerful as a traditional notebook computer. **20**
- Netflix, **69, 830**
- Netiquette:** Short for Internet etiquette, the code of acceptable behaviors users should follow while on the Internet. **108, 113**
- netomania, **342**
- NetWare:** Server operating system designed by Novell for client/server networks. **418, 433**
- Network:** Collection of computers and devices connected together, often wirelessly, via communications devices and transmission media, allowing computers to share resources. **10, 42, 470**
access providers controlling Internet usage, **474**
body area, **471**
communications standards, **477–482**
connecting to unsecured, **480**
controlling, **410**
firewalls, **563–564**
and the Internet, **11–14**
neural, **36, 758**
overview of, **10–11**
security. *See security*
types, configurations, architectures, **470–477**
workstations on, **20**
- Network administrator:** Employee who configures, installs, and maintains LANs, WANs, intranets, and Internet systems; identifies and resolves connectivity issues. **410, 788**
- Network architecture:** The design of computers, devices, and media in a network. **473**
- Network attached storage:** Server connected to a network with the sole purpose of providing storage. **360, 384, 749–750, 761.** *See also NAS*
- Network card:** Communications device that enables a computer or device that does not have built-in networking capability to access a network. **487, 501.**
See also Network interface card (NIC)
- Network forensics:** The discovery, collection, and analysis of evidence found on computers and networks. **569.** *See also Computer forensics, Cyberforensics, or Digital forensics*
- Network interface card (NIC):** Communications device that enables a computer or device that does not have built-in networking capability to access a network. **487.** *See also Network card*
- network layer, OSI model, **498**
- Network license:** Legal agreement that allows multiple users to access the software on a server simultaneously. **471**
- Network security administrator:** Employee who configures

- routes and firewalls; specifies Web protocols and enterprise technologies. **789**
- Network server:** Server that manages network traffic. **474**
- Network Solutions Web site, 110
- Network standard:** Guidelines that specify the way computers access the medium to which they are attached, the type(s) of medium used, the speeds used on different types of networks, and the type(s) of physical cable and/or the wireless technology used. **477**, 500
widely used, 478–482
- Network topology:** Layout of computers and devices in a communications network. **475**
- Network+:** Networking certification that tests competency in several network areas including transmission media and topologies, protocols, and standards. **806**
- networking certifications, 806
- Neural network:** System that attempts to imitate the behavior of the human brain. **36**, 758
- news Web sites, 89, 134
- Newsgroup:** Online area in which users have written discussions about a particular subject. **107**, 113, 462
application software, 174
- Newsreader:** Program necessary for participating in a newsgroup. **107**
- Nintendo, 289
- Nintendo Game Boy, 58
- Nintendo Wii, 24, 40, 67, 829
- Nintendo Wii Remote, 271
- Nit:** Unit of visible light intensity that is equal to one candela per square meter. **310**
- Node:** Term used to refer to each computer or device on a network. **472**
- Noise:** Electrical disturbance that can degrade communications. **493**, 571–572, 575
- Nokia company profile, 289
- Nokia Booklet 3G, 289
- noncompete agreements, ethics of, 798
- Nonimpact printer:** Type of printer that forms characters and graphics on a piece of paper without actually striking the paper. **315**, 332
- Nonmanagement employees:** Production, clerical, and other personnel. **724**, 760
- Nonprocedural language:** Type of programming language in which a programmer writes English-like instructions or interacts with a graphical environment to retrieve data from files or a database. **674**
- Nonresident:** Instructions that remain on a storage medium until they are needed. **400**
- Nonvolatile memory:** Type of memory that does not lose its contents when a computer's power is turned off. **223**, 245
- Normalization:** Process designed to ensure the data within the relations (tables) in a database contains the least amount of duplication. **534**, 540
- Norton SystemWorks, 428
- Note taking software:** Application software that enables users to enter typed text, handwritten comments, drawings, or sketches anywhere on a page. **156**, 180
- Notebook computer:** Portable, personal computer often designed to fit on your lap. **20**, 71, 193. *See also Laptop computer*
- bendable, 236
cleaning, 240
display, 307
processors compared (fig.), 217
protecting, 570
purchasing, 450–452
touchpads, 265
- Notepad, 694
- Novell Certified Administrator (NCA):** Networking certification that tests knowledge of Novell's networking products including NetWare, IntraNetWare, and GroupWise. **806**
- Novell Certified Engineer (NCE):** Networking certification that tests knowledge of designing, configuring, implementing, administering, and troubleshooting the Novell network system. **806**
- Novell Certified Linux Professional (CLP):** Operating systems certification that tests technical expertise in installing, managing, and troubleshooting the Linux operating system. **804**
- ns:** One billionth of a second. **229**. *See also Nanosecond*
- NSFnet:** The National Science Foundation's network of five supercomputers. **75–76**, 112
- Numeric check:** Validity check that ensures users enter only numeric data in a field. **523**, 542
- NVIDIA company profile, 243
- O**
- Object:** Database item that contains data, as well as the actions that read or process the data. **534**, 543
- object linking and embedding (OLE), 59, 634, 651, 669, 700
- Object code:** Machine language version of a program that results from compiling a 3GL source program. **666**, 700. *See also Object program*
- Object modeling:** Analysis and design technique that combines data with the processes that act on that data into a single unit, called an object. **634**. *See also Object program*
- Object program:** Machine language version of a program that results from compiling a 3GL source program. **666**, 700. *See also Object code*
- Object query language (OQL):** Query language used with object-oriented and object-relational databases to manipulate and retrieve data. **535**, 543
- Object-oriented database (OODB):** Database that stores data in objects. **534**, 543
- Object-oriented (OO) design:** Analysis and design technique that combines data with the processes that act on that data into a single unit, called an object. **689**, 701. *See also Object modeling*
- Object-oriented programming (OOP) language:** Programming language used to implement an object-oriented design. **669**, 700
- Object-relational databases:** Databases that combine features of the relational and object-oriented data models. **533**
- OCR (optical character recognition):** Software that enables scanners to read and convert text documents into electronic files. **278**
- OCR devices:** Optical character recognition devices that include small optical scanners for reading characters and sophisticated software to analyze what is read. **279**
- Office automation:** Information system that enables employees to perform tasks using computers and other electronic devices, instead of manually. **732**. *See also Office information system (OIS)*
- Officer information system (OIS):** Information system that enables employees to perform tasks using computers and other electronic devices, instead of manually. **732**, 760. *See also Office automation*
- Offline UPS:** Type of UPS device that switches to battery power when a problem occurs in the power line. **576**. *See also Standby UPS*
- Offsite:** Location separate from a computer site. **577**
backing up, 602
- One Laptop per Child, 226
- Online:** Describes the state of a computer when it is connected to a network. **10**
- Online analytical processing (OLAP):** Term used to refer to programs, such as those in a decision support system, that analyze data. **735**
- Online auction:** E-commerce method that allows consumers to bid on an item being sold by someone else. **100**, 111, 113
and pirated software, 572
- Online banking:** Online connection to a bank's computer to access account balances, pay bills, and copy monthly transactions to a user's computer. **34**, 43, **166**, 747
- online calculators, 668
- Online community:** Web site that joins a specific group of people with similar interests or relationships. **89**
- Online Help:** Electronic equivalent of a user manual that usually is integrated in a program. **175**, 181
- Online investing:** Use of a computer to buy and sell stocks and bonds online, without using a broker. **35**
- online mapping services, 173
- Online meeting:** Meeting conducted online that allows users to share documents with others in real time. **468**
- Online security service:** Web site that evaluates a computer to check for Internet and e-mail vulnerabilities. **558**
- Online service provider (OSP):** Company that provides Internet access as well as many members-only features. **78**, 112

Online social network: Web site that encourages members in its online community to share their interests, ideas, stories, photos, music, and videos with other registered users. 14, 90–91, 113. *See also Social networking Web site*
personal and business perspective, 202–203
Web sites, 128

Online transaction processing (OTP): Processing technique in which the computer processes each transaction as it is entered. 733

Online UPS: Type of UPS device that always runs off a battery, which provides continuous protection. 577

On-screen keyboard: Type of keyboard, sometimes used by physically challenged users, in which a graphic of a standard keyboard is displayed on the user's screen. 286, 291

Open: Term used to describe information systems that more easily share information with other information systems. 753

Open language: Term that refers to a language anyone can use without purchasing a license. 682

Open source software: Software provided for use, modification, and redistribution. 62, 143, 180, 416, 433

Open Systems Interconnection (OSI) reference model, 498
OpenCourseWare (OCW) project, 794

Operating system: Set of programs that coordinates all the activities among computer hardware devices. 15, 42
automatic update, 410
certification, 804
embedded, 418–421
functions, 400–411
most popular, 412
overview of, 398–399
types of, 411–418

Operation: Procedure in an object that contains the activities that read or manipulate the data. 634. *See also Method*

Operation, support and security phase: Phase of the system development cycle that consists of three major activities: (1) perform maintenance activities, (2) monitor system performance, and (3) assess system security. 645–647, 651

Operational decision: Decision that involves day-to-day activities within a company. 724, 760

Operational feasibility: Measure of how well a proposed information system will work. 624, 650

Operational management: Level of management that supervises the production, clerical, and other nonmanagement employees of a company. 724, 760

Operations: Core activities of a business involving the creation, selling, and support of the products and services that the company produces. 723
mouse (fig.), 264
operations, IT department jobs, 789

operators, search engine (fig.), 87

Optical character recognition (OCR): Optical reader technology that involves reading typewritten, computer-printed, or hand-printed characters from ordinary documents and translating the images to a form that a computer can process. 279, 291

Optical disc: Type of storage medium that consists of a flat, round, portable disc made of metal, plastic, and lacquer that is written on and read by a laser. 352, 370, 385, 828
burning files to, 440
cleaning, 371
life expectancy (fig.), 378
types and characteristics of, 370–376

optical disc creation software, 349
optical disc drive, purchasing considerations, 446

Optical disc jukebox: Server that holds hundreds of optical discs that can contain programs and data. 750. *See also Optical disc server*

Optical disc server: Server that holds hundreds of optical discs that can contain programs and data. 750. *See also Optical disc jukebox*

Optical fiber: Single strand of a fiber optic cable. 493

Optical mark recognition (OMR): Optical reader technology that reads hand-drawn marks such as small circles or rectangles. 259, 279, 291

Optical mouse: Mouse that uses devices, such as optical sensors or lasers, that emit and sense

light to detect the mouse's movement. 263, 290

Optical reader: Device that uses a light source to read characters, marks, and codes and then converts them into digital data that a computer can process. 279, 291

Optical resolution: The actual photographed resolution at which a digital camera can capture a digital image. 273, 291

Optical scanner: Light-sensing input device that reads printed text and graphics and then translates the results into a form the computer can process. 277, 291

optical touch screens, 430

OR search engine operator, 87

Oracle, 699

Oracle Certified Professional (OCP): Database certification that tests knowledge of developing and deploying large-scale Oracle database management systems. 808

Oracle company profile, 541

Organic LED (OLED): TFT technology that uses organic molecules that produce an even brighter, easier-to-read display than standard TFT displays. 308

organization charts, 722–723

Organized information:

Information that is arranged to suit the needs and requirements of the decision maker. 516, 542

Organizing: Management activity that includes identifying and combining resources, such as money and people, so that the company can reach its goals and objectives. 725

organizing, managing files on computers, 550

OSI reference model, 498

Ousterhout, Dr. John, 682

Outlook e-mail program, 101

Output: Data that has been processed into a useful form. 304, 332

examples of, 304–305
producing printed, 314–315

Output device: Any hardware component that conveys information to one or more people. 7, 42, 213, 305, 332

display devices, 306–313
for physically challenged, 328–329

suggested, by user (fig.), 327

Outsource: Having a source outside a company develop software for the company. Some

companies outsource just the software development aspect of their IT operation, while others outsource more or all of their IT operation. 636

Outsourcing: Practice of offloading storage management to an outside organization or online Web service. 751

Overtoltage: Electrical disturbance that occurs when the incoming electrical power increases significantly above the normal 120 volts. 571–572, 575. *See also Power surge*

P

P2P: Type of peer-to-peer network on which users access each other's hard disks and exchange files directly over the Internet. 475, 500. *See also File sharing network*

Packaged software: Mass-produced, copyrighted retail software that meets the needs of a wide variety of users, not just a single user or company. 142, 180, 635, 651

Packard, David, 331

packet sniffers, 616

Packet switching: Network technique of breaking a message into individual packets, sending the packets along the best route available, and then reassembling the data. 478

Packets: Small pieces into which messages are divided by TCP/IP. 478, 498, 501

Page: Amount of data and program instructions that can swap at a given time. 406

Page, Larry, 111

Page description language:

Software that tells a printer how to lay out the contents of a printed page. 319

Page layout: Process of arranging text and graphics in a document on a page-by-page basis. 160

Paging: Technique of swapping items between memory and storage. 406

Paint software: Application software that allows users to draw pictures, shapes, and other graphical images with various on-screen tools. 145, 161, 181. *See also Illustration software*

paint/image editing software, 159, 165

Palm OS: Scaled-down operating system that runs on smart phones and PDAs. 419, 433

- PalmPilot, 61
paper, reusable, 314
- Parallel conversion:** Conversion strategy where the old system runs alongside the new system for a specified time. **644**
- Parallel processing:** Processing method that uses multiple processors simultaneously to execute a single program or task in order to speed processing times. **220**
- Parent:** Term used in three-generation backups to refer to the second oldest copy of the file. **577**
- Pascal:** Programming language developed to teach students structured programming concepts, named in honor of Blaise Pascal, a French mathematician who developed one of the earliest calculating machines. **675**
- parentheses (()), search engine operator, 87
partial backup, 754
- Passive-matrix display:** LCD monitor or screen technology that uses fewer transistors, requires less power, and is less expensive than an active-matrix display. **308**
- Passphrase:** Private combination of words, often containing mixed capitalization and punctuation, associated with a user name that allows access to certain computer resources. **566**, 594
- Password:** Private combination of characters associated with a user name that allows access to certain computer resources. **410–411**, 566, 594
protecting mobile computers with, 570
- Pasting:** Process of transferring an item from a clipboard to a specific location in a document. **149**
- Payload:** Destructive event or prank a malicious-logic program is intended to deliver. **558–559**
- payload, virus, 178
PayPal, 100, 111, 759
- PC Card:** Thin, credit-card-sized removable flash memory device that primarily is used today to enable traditional notebook computers and Tablet PCs to access the Internet wirelessly. **231**, 245
- PC Card bus:** Expansion bus for a PC Card. **238**
- PC Card slot:** Special type of expansion slot in desktop, notebook, and mobile computers that holds a PC Card. **231**, 245
- PC computer repair technician licensing, 240
- PC Magazine*, 799
- PC video camera:** Type of digital video camera that enables a home or small business user to capture video and still images, send e-mail messages with video attachments, add live images to instant messages, broadcast live images over the Internet, and make video telephone calls. **275**, 291. *See also Web cam*
- PC-compatible:** Any personal computer based on the original IBM personal computer design. **19**
- PC World*, 799
- PC-compatible, 19
- PCI bus:** High-speed expansion bus that connects higher speed devices. **238**
- PCI Express (PCIe) bus:** Expansion bus that expands on and doubles the speed of the original PCI bus. **238**
- PCL (Printer Control Language):** Standard printer language that supports the fonts and layout used in standard office documents. **319**
- PCS:** Personal Communications Services; term used by the U.S. Federal Communications Commission (FCC) to identify all wireless digital communications. **496**
- PDA:** Lightweight mobile device that provides personal information management functions such as a calendar, appointment book, address book, calculator, and notepad. **22**. *See also Personal digital assistant*
- PDF:** Portable Document Format; a popular file format used by document management software to save converted documents. **158**, 809
- Peer:** Any of the computers on a peer-to-peer network. **474**
- Peer-to-Peer network:** Simple, inexpensive network that typically connects fewer than 10 computers. **474**
- Pen input:** Input method in which you touch a stylus or digital pen on a flat surface to write, draw, and make selections. **268**, 290
- Pentium:** Family of Intel processors used by less expensive, basic PCs. **60**, 62, 63, **216**, 244
- Perfective maintenance:** Operation, support, and security phase process of making an information system more efficient and reliable. **645**
- performance
improving hard disk, 362
monitoring, 408–409
- Performance monitor:** Operating system program that assesses and reports information about various computer resources and devices. **408**, 432
- Performance monitoring:** Operation, support, and security phase activity that determines whether a system is inefficient or unstable at any point. **645**
- Peripheral:** Device that connects to a system unit and is controlled by the processor in the computer. **230**, 245
- Perl:** Practical Extraction and Report Language; scripting language developed at NASA's Jet Propulsion Laboratory as a procedural language similar to C and C++. **682**, 701
- Permissions:** Define who can access certain resources and when they can access those resources. **410**
- Perpendicular recording:** Storage technique in which magnetic particles are aligned vertically, or perpendicular to the disk's surface, making much greater storage capacities possible. **356**, 384
- Personal computer:** Computer that can perform all of its input, processing, output, and storage activities by itself and contains a processor, memory, and one or more input and output devices, and storage devices. **19**, 43, 211
- PCs vs. Apple, 20
purchasing, 218–219
- Personal computer blade:** Server configuration that works much like a blade server. **752**
- Personal computer maintenance utility:** Utility program that identifies and fixes operating system problems, detects and repairs disk problems, and includes the capability of improving a computer's performance. **428**, 433
- Personal digital assistant:** Lightweight mobile device that
- provides personal information management functions such as a calendar, appointment book, address book, calculator, and notepad. **22**. *See also PDA*
- Personal DTP software:** Application software that helps home and small office/home office users create newsletters, brochures, advertisements, postcards, greeting cards, letterhead, business cards, banners, calendars, logos, and Web pages. **167–168**, 181
- Personal finance software:** Simplified accounting program that helps home users or small office/home office users manage finances. **165**, **166**, 181
- Personal firewall:** Utility program that detects and protects a personal computer from unauthorized intrusions. **425**, 433, 564
- Personal identification number (PIN):** Numeric password, either assigned by a company or selected by a user. **284**, 568
- Personal information manager (PIM):** Application software that includes features to help users organize personal information. **156**, 180
popular (fig.), 146
- Personal paint/image editing software:** Application software that provides an easy-to-use interface, usually with more simplified capabilities that allows users to draw pictures, shapes, and other images. **168**, 181
- Personal photo editing software:** Application software that allows users to edit digital photos by removing red-eye, erasing blemishes, restoring aged photos, adding special effects, enhancing image quality, or creating electronic photo albums. **168–169**, 181
- personal Web sites, 92
- Personalization:** Customization of portal pages to meet users' needs. **740**
- perspective, 330
- PERT chart:** Program Evaluation and Review Technique chart; systems analysis and design tool developed by the U.S. Department of Defense to analyze the time required to complete a task and identify the minimum time required for an entire project. **624**
- pet identification chips, 213
petabyte (PB), 354

Phanfare Web site, 128
Pharming: Scam, similar to phishing, where a perpetrator attempts to obtain your personal and financial information, except they do so via spoofing. **588**
Phased conversion: Conversion strategy used by larger systems with multiple sites where each location converts at a separate time. **644**
Phases: Categories into which system development activities are grouped: (1) planning phase, (2) analysis phase, (3) design phase, (4) implementation phase, and (5) support phase. **620–621**
Phishing: Scam in which a perpetrator attempts to obtain your personal and/or financial information. **13, 66, 427, 587–588, 595**
Phishing filter: Program that warns or blocks you from potentially fraudulent or suspicious Web sites. **427, 433, 587–588**
Phoneline network: Easy-to-install and inexpensive home network that uses existing telephone lines in the home. **489, 501**
phoneline network, 489
phones
 business software for, 156
 text messaging, 174
photo editing software, 159, 165
Photo management software: Application software that allows users to view, organize, sort, catalog, print, and share digital photos. **169, 181**
Photo printer: Type of nonimpact color printer that produces photo-lab-quality pictures. **318, 332**
memory card slot, 364
Photo scanner: Sheet-fed scanner model designed specifically for photos. **277**
Photo sharing community: Specific type of social networking Web site that allows users to create an online photo album and store and share their digital photos. **14**
photographs
 altering digital, 162, 688
 digital camera quality, 273
 digital frames for, 308
 photolithography, 243
PHP: PHP: Hypertext Preprocessor; free, open source scripting language. **682, 701**

Physical design: Detailed design that specifies hardware and software – the physical components required – for automated procedures. **640. See also Detailed design**
physical layer, OSI model, 498
Physical transmission media: Type of media that use wire, cable, and other tangible materials to send communications signals. **492, 501**
and OSI reference model, 498
types of, 492–496
physically challenged users
input devices for, 286
output devices for, 328–329
W3C accessibility guidelines, 328
PictBridge: Standard technology used with photo printers that allows you to print photos directly from a digital camera by connecting a cable from the digital camera to a USB port on the printer. **317**
Picture CD: Single-session CD-ROM that stores digital versions of film using a jpg file format at a lower resolution, typically 1024×1536 pixels. **374, 385**
Picture message: Photo or other image, sometimes along with sound and text, sent to or from a smart phone or other mobile device. **22**
application software, 174
personal and business perspective, 196–197
Picture messaging: Photo or other image, sometimes along with sound and text, sent to or from a smart phone or other mobile device. **22, 463**
Pie chart: Chart that is displayed in the shape of a round pie cut into slices to show the relationship of parts to a whole. **152**
PILOT: Programmed Inquiry Learning Or Teaching; programming language used to write computer-aided instruction programs. **675**
Pilot conversion: Conversion strategy where only one location in an organization uses a new system – so that it can be tested. **644**
Pipelining: Concept in which the processor begins fetching a second instruction before it completes the machine cycle for the first instruction. **215–216**
Piracy: Unauthorized and illegal duplication of copyrighted material. **571–572**
Pixar Animation Studios: 331
Pixel: The smallest element in an electronic image. Short for picture element. **273, 308**
Pixel pitch: The distance in millimeters between pixels on a display device. **310, 332. See also Dot pitch**
Pixels per inch: Number of pixels in one inch of screen display. **273**
PL/I: Programming Language One; business and scientific programming language that combines many features of FORTRAN and COBOL. **675**
plagiarism, Internet, 149
PlagiarismDetect.com, 52
Plaintext: Unencrypted, readable data. **571–572, 573**
Planning: Management activity that involves establishing goals and objectives. **725**
Web sites, 98
Planning phase: Step in the system development cycle that begins when a steering committee receives a project request. **628–629, 650**
Plasma monitor: Display device that uses gas plasma technology, which sandwiches a layer of gas between two glass plates. **311, 332**
Platform: Set of programs containing instructions that coordinate all the activities among computer hardware resources. **399**
Platter: Component of a hard disk that is made of aluminum, glass, or ceramic and is coated with an alloy material that allows items to be recorded magnetically on its surface. **357, 359, 384**
Playaway, 368
Player: Software used by a person to listen to an audio file on a computer. **94**
PlayStation, 65
PlayStation (Sony), 65
PlayStation 3 (Sony), 24, 67, 756, 829
Plotters: Sophisticated printers that produce high-quality drawings such as blueprints, maps, and circuit diagrams using a row of charged wires (called styli) to draw an electrostatic pattern on specially coated paper and then fuse toner to the pattern. **322, 333**
Plug and Play: Technology that gives a computer the capability to configure adapter cards and other peripherals automatically as a user installs them. **231, 408**
Plug-in: Program that extends the capability of a browser; often used to enhance multimedia. **97, 113. See also Add-on**
PNG: Graphics format that improves upon the GIF format. **93**
Pocket hard drive: Term that refers to smaller external hard disks because they enable users easily to transport photos and other files from one computer to another. **361**
Podcast: Recorded audio, usually an MP3 file, stored on a Web site that can be downloaded to a computer or a portable media player such as an iPod. **14, 68, 94**
Point: Measure of font size, equal to about 1/72 of an inch in height. **149**
point of sale (POS) terminal, 284
Point-and-shoot camera: Affordable and lightweight camera that provides acceptable quality photographic images for home or small office users. **272**
Pointer: Small symbol displayed on a computer screen whose location and shape changes as a user interacts with a mouse or other pointing device. **144, 180, 263**
Pointing device: Input device that allows a user to control a pointer on the screen. **263, 290**
types of, 263–266
Pointing stick: Pressure-sensitive pointing device shaped like a pencil eraser that is positioned between keys on a keyboard and moved by pushing the pointing stick with a finger. **266**
polymorphic virus, 178
POP3: Latest version of Post Office Protocol. **103**
Pop-up ad: Internet advertisement that suddenly appears in a new window in the foreground of a Web page displayed in the user's browser. **427**
Pop-up blocker: Filtering program that stops pop-up ads from displaying on Web pages. **427, 433**
Port: Point at which a peripheral attaches to or communicates with a system unit so it can send data to or receive information from the computer. **232**
purchasing considerations, 447
types of, 232–236

Port replicator: External device that attaches to a mobile computer to provide connections to peripherals through ports built into the replicator. 236

Portable: The capability of a storage medium to be removed from one computer and carried to another computer. 355

Portable keyboard: Full-size keyboard used with a smart phone or PDA. 268, 290

Portable media player: Mobile device on which you can store, organize, and play digital media. 23, 28–29, 535
adding music files, 299
display, 307
downloading songs to, 298–299
how stores music, 228
memory card slot, 364
most popular, 267
purchasing, 453–454
storage on database, 537

Portal: Web site that offers a variety of Internet services from a single, convenient location. 60, 89, 113, 740–741, 760

Portrait orientation: A printout that is taller than it is wide, with information printed across the shorter width of the paper. 313–314

POS terminal: Terminal used by retail stores to record purchases, process credit or debit cards, and update inventory. 284, 291

Possessed object: Any item that a user must carry to gain access to a computer or computer facility. 568, 594

Post Office Protocol:

Communications protocol used by some incoming mail servers. 103

Postage printer: Special type of label printer that prints postage stamps. 322, 333

PostScript: Standard printer language used by professionals in the desktop publishing and graphics arts fields, designed for complex documents with intense graphics and colors. 319
postage Web sites, 132

Post-implementation system review: Operation, support, and security phase activity that involves holding a meeting to discover whether an information system is performing according to users' expectations. 645

Posttest: Process used in a do-until control structure that tests

a condition at the end of the loop. 690, 701

Power supply: Component of the system unit that converts wall outlet AC power to the DC power that is used by a computer. 239, 245

Power surge: Electrical disturbance that occurs when the incoming electrical power increases significantly above the normal 120 volts. 575. *See also Overvoltage*

Power usage effectiveness (PUE):

Ratio that measures how much power enters a computer facility or data center against the amount of power required to run the computers. 583

Power user: User who requires the capabilities of a workstation or other powerful computer, typically working with multimedia applications and using industry-specific software. 30, 33, 43

hardware and software for, 33
suggested output devices for, 327
suggested storage devices, by user (fig.), 380

PowerBuilder: Powerful program development RAD tool developed by Sybase that is best suited for Web-based, .NET, and large-scale enterprise object-oriented applications. 674, 700

Powerline cable network: Type of home network that uses the same lines that bring electricity into the house and requires no additional wiring. 489

Power-on self test (POST):

Series of tests that is executed by the BIOS to make sure the computer hardware is connected properly and operating correctly. 400, 432

Practical Extraction and Report Language:

Scripting language developed at NASA's Jet Propulsion Laboratory as a procedural language similar to C and C++. 682

Predictive text input: Smart phone technology where you press one key on the keypad for each letter in a word and software on the phone predicts the word you want. 262

Preemptive multitasking: Process in which the operating system interrupts a program that is executing and passes control to

another program waiting to be executed. 405

Preliminary investigation:

Investigation that determines the exact nature of a problem or improvement and decides whether it is worth pursuing. 629–631, 650. *See also Feasibility study*

Presentation software:

Application software that allows a user to create visual aids for presentations to communicate ideas, messages, and other information to a group. 146, 154–155, 180

Pretest: Process used in a do-while control structure that tests a condition at the beginning of the loop. 690, 701

Pretty Good Privacy (PGP):

Popular e-mail encryption program that is free for personal, noncommercial use. 574

preventing
computers thrashing, 407
electrostatic discharge when opening computer, 240
identify theft, 13, 584
information theft, 572–575
malware infections, 560–561
repetitive strain injuries, 262
software theft, 571–572
system failure, 576–577
virus infections, 178, 560–561

Primary key: Field in a database that uniquely identifies each record in a file. 519

Principle of least privilege:

Policy adopted by some organizations, where users' access privileges are limited to the lowest level necessary to perform required tasks. 531

Print: Placing the copy of a document on paper or some other medium. 150

print media, broadband connections' impact on, 465

Print server: Server that manages printers and print jobs. 474

Print spooler: Program that intercepts documents to be printed from the operating system and places them in a queue. 407

Printer: Output device that produces text and graphics on a physical medium such as paper. 313, 332

controlling from computers, 341
purchasing considerations, 447
types of, 313–323

Printout: Printed information that exists physically and is a more permanent form of output than that presented on a display

device (soft copy). 313. *See also Hard copy*

privacy
brain waves, behavior tracking, 569
cloud storage, 369
and computer usage, 35

computers and, 10
do-not-track list, 84
government using databases for dragnets, 519

information, 584–591
and Internet databases, 516
keyboard monitoring at work, 261

laws (fig.), 589
medical records, 380
monitoring in public places, 283
RFID chip monitoring, 280
on social network Web sites, 394

text messages, 590
watching inappropriate movies in public, 312

Private key encryption: Type of encryption where both the originator and the recipient use the same secret key to encrypt and decrypt the data. 573. *See also Symmetric key encryption*

Procedural language: Type of programming language in which a programmer writes instructions that tell the computer what to accomplish and how to do it using a series of English-like words to write instructions. 666. *See also Third-generation language (3GL)*

Procedure: Instruction or set of instructions a user follows to accomplish an activity. 726
backup, 754–756

Process: Element in a DFD, indicated by a circle, that transforms an input data flow into an output data flow. 632, 651

Process modeling: Analysis and design technique that describes processes that transform inputs into outputs. 631, 650. *See also Structured analysis and design*

Processing form: Web site element that collects data from site visitors, who fill in blank fields and then click a button that sends the information. Often simply called a form. 680

Processor: Electronic component on a computer's motherboard that interprets and carries out the basic instructions that operate the computer. 7, 211,

213–214, 244. *See also Central processing unit (CPU)*

cooling, 219–220

guidelines for buying, 218

purchasing considerations, 447

Product activation: Technique that some software manufacturers use to ensure that software is not installed on more computers than legally licensed. **143, 571–572**

product development, systems in the enterprise, 727

Professional photo editing software: Type of image editing software that allows photographers, videographers, engineers, scientists, and other high-volume digital photo users to edit and customize digital photos. **162, 181**

Program: Series of related instructions that tells a computer what tasks to perform and how to perform them. **15, 258, 290.** *See also Software*
closing, 50
creating Visual Basic, 672
e-mail, 101
installing and running, 16–17
instructions, and RAM, 224
managing, 404–405
multi-threaded, 217

Program development: Series of steps programmers use to build computer programs. **686**
evaluating GUIs, 708–709
multimedia, 685
phases of, 687–697
Web 2.0, 684, 712–715
Web page development, 678–683

Program development life cycle (PDLC): Series of steps programmers use to build computer programs, consisting of six steps: (1) analyze requirements, (2) design solution, (3) validate design, (4) implement design, (5) test solution, and (6) document solution. **643, 651, 686, 701**

Program development tool: Program that provides a user-friendly environment for building programs. **664, 700**

Program flowchart: Graphically shows the logic in a solution algorithm. **691, 701.** *See also Flowchart*

Program logic: Graphical or written description of the step-by-step procedures to solve a problem. **687.** *See also Solution algorithm*

Program specification package: Item prepared during program

design that identifies the required programs and the relationship among each program, as well as the input, output, and database specifications. **641**

Programmer: Person who writes and modifies computer programs. **18, 664.** *See also Developer*

certification, 805

Programming language: Set of words, abbreviations, and symbols that enables a programmer to communicate instructions to a computer. **17, 664, 675, 700**
classic (fig.), 675
object-oriented, 669–674
types of, 664–669

Programming team: A group of programmers that may develop programs during the program development cycle. **687**

Project dictionary: Record that contains all the documentation and deliverables of a project. **633, 651.** *See also Repository*

Project leader: Member of a project team who manages and controls the budget and schedule of the project. **623, 650**

Project leader/manager: Employee who oversees all assigned projects, allocates resources, selects teams, performs systems analysis and programming tasks, and conducts performance appraisals. **788**

Project management: Process of planning, scheduling, and then controlling the activities during the system development cycle. **623, 650**

Project management software: Application software that allows a user to plan, schedule, track, and analyze the events, resources, and costs of a project. **146, 157, 180, 623, 649**

Project manager: Member of a project team who controls the activities during system development. **623, 650**

Project notebook: Record that contains all documentation for a single project. **625, 626, 650**

Project plan: Record of project elements, including goal, objectives, and expectations of the project; required activities; time estimates for each activity; cost estimates for each activity; order of activities; and activities that can take place at the same time. **623, 650**

Project request: Written, formal request for a new or modified

system. **626–627, 650.** *See also Request for system services*

Project team: Group of people that consists of users, the systems analyst, and other IT professionals. **623**

Prolog: PROgramming LOGic.

Programming language used for development of artificial intelligence applications. **675**

PROM (programmable read-only memory): Blank ROM chip on which a programmer can write permanently. **228**

Proof of concept: Working model of a proposed system. **641.** *See also Prototype*

Property: Each data element in an object. **634.** *See also Attribute*

Proprietary: Term used to describe information systems that are more difficult to interoperate with other information systems. **753.** *See also Closed*

Proprietary software: Software that is privately owned and limited to a specific vendor or computer model. **411**

Protocol: Standard that outlines characteristics of how two network devices communicate. **477**

Prototype: Working model of a proposed system. **641–642, 642, 651.** *See also Proof of concept*

Prototype, 714

Proxy server: Server outside a company's network that controls which communications pass into the company's network. **564**

PS3 Gravity Grid, 756

Pseudocode: Design tool that uses a condensed form of English to convey program logic. **692, 701**

PSPgo (Sony), 70

Public key encryption: Type of encryption that uses two encryption keys: a public key and a private key. **573.** *See also Asymmetric key encryption*

Public switched telephone network (PSTN): Worldwide telephone system that handles voice-oriented telephone calls. **482**

publications, computer, 799

Public-domain software: Free software that has been donated for public use and has no copyright restrictions. **143, 180**

Publish: Process of creating a Web page and making it available on the Internet for others to see. **13**

publishing

computer applications in, 37

computer usage in industry, 809

resumes on the Web, 121

Web, 97

Pull: Request information from a Web server. **83**

purchasing

computer memory, 252–253

desktop computers, 445–449

digital cameras, 454–456

notebook computers, 450–452

personal computers, 218–219

portable media players, 453–454

smart phones, 452–453

video cameras, 345–346

Push: Process of a Web server sending content to a computer at regular intervals, such as current sport scores or weather reports. **83**

pyrotechnics software, 160

Python programming language, 675

Q

Quad-core processor: Chip with four separate processor cores. **213, 244**

Quality assurance specialist:

Employee who reviews programs and documentation to ensure they meet the organization's standards. **789**

Quality control software:

Software that uses statistical analysis to identify and predict product defects and problems with the company's processes. **730, 760**

Quality control system: System used by an organization to maintain or improve the quality of its products or services. **730, 760**

Quarantine: Separate area of a hard disk that holds the infected file until a virus can be removed. **561**

QuarkPress, 809

Query: Request for specific data from a database. **154, 528**

Query by example (QBE):

DBMS feature that has a graphical user interface to assist users with retrieving data. **528–529, 543**

Query language: Language used with databases that consists of simple, English-like statements that allows users to specify the data to display, print, or store. **528, 543**

Queue: Lineup of multiple print jobs within a buffer. **407**

QuickBooks, 639

QuickTime, 415

quotation marks ("), search engine operator, 87
QWERTY keyboard, 261

R

RAD: Rapid application development; method of developing software in which a programmer writes and implements a program in segments instead of waiting until an entire program is completed. 669, 673, 700

radio, broadband and cellular, 494

Radio frequency identification:

Standard, specifically a protocol, that defines how a network uses radio signals to communicate with a tag placed in or attached to an object, an animal, or a person. 280, 291, 481

RAID (redundant array of independent disks): Group of two or more integrated hard disks that acts like a single large hard disk. 360, 384, 595, 748–749, 761

Rails: Ruby on Rails; open source framework that provides technologies for developing object-oriented, database-driven Web sites. 683, 701. *See also Ruby; RoR; Ruby on Rails*

RAM: Type of memory that can be read from and written to by the processor and other devices. Programs and data are loaded into RAM from storage devices such as a hard disk and remain in RAM as long as the computer has continuous power. 224, 245. *See also Main memory or Random access memory*

purchasing considerations, 447
types and configurations, 224–226

writing and reading to, 242

Random access: Type of data access in which the storage device can locate a particular data item or file immediately, without having to move consecutively through items stored in front of the desired data item or file. 376. *See also Direct access*

Random access memory: Type of memory that can be read from and written to by the processor and other devices. Programs and data are loaded into RAM from storage devices such as a hard disk and remain in RAM as long as the computer has

continuous power. 224, 242, 245. *See also Main memory or RAM*

Range check: Validity check that determines whether a number is within a specified range. 523, 542

Rapid application development: Method of developing software in which a programmer writes and implements a program in segments instead of waiting until an entire program is completed. 669, 700

Rapid PHY Selection (RPS), 510

Rational Unified Process (RUP): Popular methodology that uses the UML. 634

ray-tracing, 330

RDRAM: Rambus DRAM; type of RAM that is much faster than SDRAM because it uses pipelining techniques. 225

Reading: Process of transferring data, instructions, and information from a storage medium into memory. 354, 384

data from RAM, 242
devices, 277–282

Read-only memory (ROM): Type of nonvolatile memory that is used to store permanent data and instructions. 228, 245

Read/write head: Mechanism in a disk drive that reads items or writes items as it barely touches the disk's recording surface.

358, 359, 384

Real time: Describes users and the people with whom they are conversing being online at the same time. 104, 113

Real time location system

(RTLS): Safeguard used by some businesses to track and identify the location of high-risk or high-value items. 570

Really Simple Syndication:

Specification that content aggregators use to distribute content to subscribers. 92, 134. *See also RSS 2.0*

real-time clock, 216

RECAPTCHA, 567

Receiving device: Device that accepts the transmission of data, instructions, or information. 460, 500

Reciprocal backup relationship:

Agreement with another firm, where one firm provides space and sometimes equipment to the other in case of a disaster. 756

Record: Each row in a database that contains data about a given

person, product, object, or event. 153–154, 519, 542

adding, modifying, deleting, 520–522

recording multimedia, 828

recording videos, 346, 820–821, 827

recovering files, 360, 421

Recovery disk: Special disk that contains a few system files capable of restarting a computer, which is used when the computer cannot boot from its hard disk. 402. *See also Boot disk*

Recovery plan: Component of a disaster recovery plan that specifies the actions to be taken to restore full information processing operations. 756, 761

Recovery utility: DBMS feature that uses logs and/or backups to restore a database when it becomes damaged or destroyed. 532, 543

recycling
of electronics, 39
toner cartridges, 320
used printer ink cartridges, 790

Red Hat Certified Engineer

(RHCE): Operating system certification that tests technical expertise of setting up and administering network services and the Linux operating system. 804

Red Hat Certified Technician

(RHCT): Operating system certification that tests basic knowledge of setting up and managing a Linux operating system. 804

Redundancy: Duplicate hardware components used in case one piece of hardware in a system breaks, another part can assume its tasks. 748

Redundant components:

Components used so that a functioning computer can take over automatically the tasks of a similar component that fails.

753

Reference software: Application software that provides valuable and thorough information for all individuals. 171, 181

popular (fig.), 165

reflectance, 330

refresh operation, 242

Regional ISP: Internet service provider that usually provides Internet access to a specific geographic area. 78

Registers: Small, high-speed storage locations in a process that

temporarily hold data and instructions 216

Registrar: Organization that sells and manages domain names. 80

Registry: Several files that contain the system configuration information. 401

Relation: Term used by developers of relational databases for file. 533

Relational database: Database that stores data in tables that consist of rows and columns, with each row having a primary key and each column having a unique name. 533

Relationship: Link within the data in a database. 533

Remote surgery: Surgery in which a surgeon performs an operation on a patient who is not located in the same physical room as the surgeon. 36. *See also Telesurgery*

Removable hard disk: Hard disk that can be inserted and removed from a drive. 360, 384

removing USB flash drives, 408

Repetition control structure: Type of control structure that enables a program to perform one or more actions repeatedly as long as a certain condition is met. 690, 701. *See also Loop*

Repetitive strain injury (RSI): Injury or disorder of the muscles, nerves, tendons, ligaments, and joints. 262, 265, 579, 595

Report generator: DBMS feature that allows users to design a report on the screen, retrieve data into the report design, and then display or print the report. 531, 543. *See also Report writer*

Report writer: DBMS feature that allows users to design a report on the screen, retrieve data into the report design, and then display or print the report. 531, 543, 676. *See also Report generator*

Repository: A DBMS element that contains data about each file in a database and each field in those files. 527, 543, 633, 642, 743. *See also Data dictionary*

Request for information (RFI): Less formal document sent to a vendor during the system development cycle that uses a standard form to request

- information about a product or service. **638**
- Request for proposal (RFP):** Document sent to a vendor during the system development cycle where the vendor selects the product(s) that meets specified requirements and then quotes the price(s). **638**
- Request for quotation (RFQ):** Document sent to a vendor during the system development cycle that identifies required products. **638**
- Request for system services:** Written, formal request for a new or modified system. **626–627.** *See also* Project request research
- using wikis, **90**
 - Web sites, **126**
- Research In Motion (RIM), **431**
- Research Papers Online, **149**
- resistive touch screen, **430**
- Resolution:** The number of horizontal and vertical pixels in a display device. **273, 291, 308, 332**
- effects of changing, **308–310**
- Resources:** Hardware, software, data, and information shared using a network. **10, 42**
- Response time:** The time in milliseconds (ms) that it takes to turn a pixel on or off. **308**
- Restore:** To copy backed up files by copying them to their original location on the computer. **577**
- Restore utility:** Program that reverses the backup process and returns backed up files to their original form. **424, 433**
- R****Estructured eXtended eXecutor:** Procedural interpreted scripting language for both professional programmers and nontechnical users. **682.** *See also* Rexx
- resumes, publishing on Web, **121**
- Retinal scanners:** Biometric devices that scan patterns of blood vessels in the back of the retina. **283, 291**
- reusable paper, **314**
- Revolutions per minute (rpm):** The number of times per minute that a hard disk platter rotates. **358, 384**
- Rexx:** Restructured Extended Executor. Procedural interpreted scripting language for both professional programmers and nontechnical users. **682, 701**
- RFID:** Short for radio frequency identification; standard,
- specifically a protocol, that defines how a network uses radio signals to communicate with a tag placed in or attached to an object, an animal, or a person. **65, 280, 291, 481, 501**
- RFID reader:** Reading device that reads information on an RFID tag via radio waves. **280–281, 481**
- RFID tags, **570, 773, 775, 777, 779**
- RIAA (Recording Industry Association of America), **64**
- right-click mouse operations, **264**
- RIMM (Rambus inline memory module):** Type of memory module that houses RDRAM chips. **225**
- Ring network:** Type of network topology in which a cable forms a closed loop (ring) with all computers and devices arranged along the ring. **476, 500**
- Ripping:** Process of copying audio and/or video data from a purchased disc and saving it on digital media. **373**
- Ritchie, Dennis, **668**
- robots
- in manufacturing, **38**
 - types of, **214**
- Rollback:** Technique for recovering data in a database where the DBMS uses the log to undo any changes made to a database during a certain period, such as an hour. **532, 543.** *See also* Backward recovery
- Rollforward:** Technique for recovering data in a database where the DBMS uses the log to reenter changes made to the database since the last save or backup. **532, 543.** *See also* Forward recovery
- root name server, **382**
- Rootkit:** Program that hides in a computer and allows someone from a remote location to take full control of the computer. **178, 558, 594**
- RoR:** Ruby on Rails; open source framework that provides technologies for developing object-oriented, database-driven Web sites. **683, 701.** *See also* Ruby; Rails; Ruby on Rails
- Rosetta Project, **379**
- Router:** Communications device that connects multiple computers or other routers together and transmits data to its correct destination on a network. **488, 501**
- Row:** Term used by users of relational databases for record. **533, 543**
- RPG:** Report Program Generator; programming language used to assist businesses in generating reports and to access/update data in databases. **675**
- RSS, **462, 684, 714**
- RSS 2.0:** Really Simple Syndication. Specification that content aggregators use to distribute content to subscribers. **92, 134**
- RSS aggregator application software, **174**
- Ruby:** Ruby on Rails. Open source framework that provides technologies for developing object-oriented, database-driven Web sites. **683.** *See also* RoR; Rails; Ruby on Rails
- Ruby on the Rails:** Open source framework that provides technologies for developing object-oriented, database-driven Web sites. **675, 683, 714.** *See also* Ruby; Rails; RoR
- Run:** Process of using software. **17**
- Run-time error:** Program error or event that causes the program to stop running. **695**
- Russo, Patricia, **499**
- S**
- safe harbor, telecommunications law, **474**
- safety
- digital billboards, **306**
 - of online shopping, **99, 747**
 - preventing electrostatic discharge when opening computer, **240**
 - public, computers and, **10**
 - of social network Web sites, **29**
- salaries in computer industry, **787–789**
- Sales force automation (SFA):** Software that equips traveling salespeople with the electronic tools they need to be more productive. **730–731, 760**
- sales systems in the enterprise, **727**
- Samsung Electronics company profile, **331**
- ‘sandboxes’ for developers, **683**
- SanDisk Corporation, **383**
- Sans serif font:** Font that does not have the short decorative lines at the upper and lower ends of the characters. **149**
- Sarbanes-Oxley (SOX), **610, 751**
- SAS (serial-attached SCSI):** Newer type of SCSI that uses serial signals to transfer data,
- instructions, and information. **235, 362**
- SATA (Serial Advanced Technology Attachment):** Hard disk interface that uses serial signals to transfer data, instructions, and information and has transfer rates of up to 300 MBps and higher. **361**
- Satellite Internet service:** Provides high-speed Internet connections via satellite to a satellite dish that communicates with a satellite modem. **76, 112**
- Satellite speakers:** Speakers positioned around one or two center speakers and positioned so that sound emits from all directions. **324**
- Save:** To transfer a document from a computer’s memory to a storage medium. **150, 186**
- documents as PDF files, **158**
- file in application software, **188**
- Scalability:** Measure of how well computer hardware, software, or an information system can grow to meeting increasing performance demands. **753, 761**
- Scanner:** Light-sending input device that reads printed text and graphics and then translates the results into a form the computer can process. **259, 277, 291.** *See also* Optical scanner
- described, **6–7**
- purchasing considerations, **447**
- types of, **277–278**
- Schedule feasibility:** Measure of whether established deadlines for a project are reasonable. **625, 650**
- scheduling
- projects, **157**
 - Windows updates, **440–441**
- schools
- admissions department’s processing, **515–516**
 - banning mobile computers, devices from, **219**
 - career preparation for computer industry, **794–799**
 - college instruction in hacking, **681**
 - illegal copies of software, **791**
 - and Internet plagiarism, **149**
- See also* education
- science
- computer applications in, **36–37**
 - Web sites, **136**
- Scope:** The goal, required activities, time estimates for each activity, cost estimates for each activity, order of activities, and activities that can take place

- at the same time during system development.** **623**
- Scope creep:** Problem that occurs when one activity has led to another that was not originally planned, thereby causing the project to grow. **624**
- Screen saver:** Utility program that causes a display device's screen to show a moving image or blank screen if no mouse activity occurs for a specified time. **425**
- Scribe:** System development team member who records facts and action items assigned during a JAD session. **626**
- Script:** Interpreted program that runs on a client. **680**
- Script kiddie:** Someone who accesses a computer or network illegally with the intent of destroying data, stealing information, or other malicious action but does not have the technical skills and knowledge. **556**
- Scripting language:** Interpreted language that typically is easy to learn and use. **675, 682, 700**
types of, **682–683**
- Scripting News Web site, **552**
- Scrolling:** Process of moving different portions of a document on the computer's screen into view. **148**
- SCSI:** Small computer system interface. **235, 362**
- SCSI port:** Special high-speed parallel port to which peripherals, such as disk drives and printers, can be attached. **235, 245**
- SDRAM:** Synchronous DRAM; type of RAM, much faster than DRAM, that is synchronized to the system clock. **225**
- Seagate Technology, **383**
- Search engine:** Program that finds Web sites, Web pages, images, videos, news, maps, and other information related to a specific topic. **52, 85, 112**
using, **85–88**
search engine operators (fig.), **87**
- Search query:** Word or phrase entered in a search engine's text box that describes the item you want to find. **85, 112.** *See also Search text*
- Search text:** Word or phrase entered in a search engine's text box that describes the item you want to find. **85, 88, 112.** *See also Search query*
- search tools, widely used, **85**
- Search utility:** Program that attempts to locate a file on your computer based on criteria you specify. **422, 433**
- searching
for files, folders, **551**
the Web, **85**
- Web for driving directions, addresses, phone numbers, **120**
- second normal form, **540**
- Secondary storage:** The physical material on which a computer keeps data, instructions, and information. **353**
- Sectors:** The small arcs into which tracks on a disk are divided. **357, 384**
- Secure Digital High Capacity (SDHC):** Memory card capable of storing between 4 and 32 GB of data. **364, 365, 384**
- Secure Digital (SD):** Memory card capable of storing between 512 MB and 8 GB of data. **364, 365, 384**
- Secure HTTP (S-HTTP):** Security technique that allows users to choose an encryption scheme for data that passes between a client and a server. **575**
- Secure site:** Web site that uses encryption techniques to secure its data. **574**
- Secure Sockets Layer (SSL):** Security technique that provides encryption of all data that passes between a client and an Internet server. **575**
- security
administering, **410–411**
backing up, **577**
certification, **807**
computer ethics, **581–584**
computer risks, **556–557**
and computer usage, **35**
computer-related health issues, **579–581**
data, in DBMSs, **531**
developing computer security plan, **646**
hardware theft and vandalism, **570**
identify theft, **13, 569**
importance of computer, **790**
information theft, **572–575**
Internet and network attacks, **558–564**
IT department jobs, **789**
macro threats, **677**
mobile computer, device issues, **269**
national and local, **591**
outsourcing and, **637**
passwords, **410–411**
software theft, **571–572**
- system failure, **575–577**
wireless, **577–579**
- Security administrator:** Employee who administers network security access; monitors and protects against unauthorized access. **789**
- Security Certified Network Architect (SCNA):** Security certification that tests network security skills related to wireless security, e-mail security, digital certificates, digital signatures, and biometrics. **807**
- Security Certified Network Professional (SCNP):** Security certification that tests skills with firewalls and defending against network intrusions. **807**
- Security Certified Network Specialist (SCNS):** Security certification that tests basic network security skills. **807**
- Security software:** Software that enables an IT department to limit access to sensitive information. **732, 760**
- Selection control structure:** Type of control structure that tells the program which action to take, based on a certain condition. **689, 701**
- Selective backup:** Type of backup in which users choose which folders and files to include in the backup. Also called partial backup. **577, 595**
- Semantic Web, **81**
- sending e-mail messages using Outlook, **101**
- Sending device:** Device that initiates instructions to transmit data, instructions, or information. **460, 500**
- Sequential access:** Type of data access in which the storage device reads or writes data consecutively. **376**
- sense amplifier, **242**
- Sequence control structure:** Type of control structure that shows one or more actions following each other in order. **689, 701**
- Serial port:** Type of interface that connects a device to the system unit by transmitting data one bit at a time. **232, 235, 245**
- Serif font:** Font that has short decorative lines at the upper and lower edges of the characters. **149**
- Server:** Computer that controls access to the hardware, software, and other resources on a network and provides a centralized storage area for programs, data, and information. **10, 11, 25, 43, 473**
- backing up files on offsite Internet, **602**
- blade, **751**
- DNS, **80, 110, 382**
- FTP, **107**
- processors compared (fig.), **217**
- Server operating system:** Operating system that organizes and coordinates how multiple users access and share resources on a network. **410, 432**
types of, **417–418**
- Server virtualization:** Capability to logically divide a physical server into many virtual servers. **745, 761**
- Service pack:** Free downloadable software updates provided by the software manufacturer to users who have registered and/or activated their software. **409**
- Service-oriented architecture (SOA):** Architecture that enterprises use so that information systems provide services to other information systems in a well-defined manner over a network. **743, 761**
- services, Internet, **100–107**
- Servlet:** Applet that runs on a server. **680**
- Session cookie:** Type of cookie that is used by online shopping sites to keep track of items in a user's shopping cart. **586**
- session layer, OSI model, **498**
- sessions, **498**
- SETI@home project, **746**
- SharePoint Designer:** Web page authoring program that is part of the Microsoft Office and SharePoint families of products. **685, 701**
- Shareware:** Copyrighted software that is distributed at no cost for a trial period. **143, 180**
- sharing
data in DBMSs, **526**
files, **476**
- Shockley, William, **54**
- shopping
safety of online, **99, 747**
virtual experience, **100**
- Web sites, **133**
- See also e-commerce*
- Shopping cart:** Element of an electronic storefront that allows a customer to collect purchases. **99**

Short message service: Service that allows users to send and receive short text messages on a phone or other mobile device or computer. **463.** *See also Text messaging*

Shortcut: Icon on the desktop that provides a user with immediate access to a program or file. **422**

S-HTTP (Secure HTTP), **575**

Shugart, Alan, **56, 57, 383**

shutting down computers, **401**

Signature capture pad: Pen input device that captures handwritten signatures with a stylus or pen that is attached to the device. **268, 290**

Signature verification system: Biometric device that recognizes the shape of a person's handwritten signature and measures the pressure exerted and the motion used to write the signature. **283, 291**

SIMM (single inline memory module): Type of memory module that has pins on opposite sides of the circuit board that connect together to form a single set of contacts. SIMMs typically hold SDRAM chips. **225**

Simonyi, Charles, **640**

Simple Query Wizard (Access), **528–529**

simulations in CBT (computer-based training), **171**

Single user/multitasking: In reference to an operating system, allowing a single user to work on two or more programs that reside in memory at the same time. **404, 432**

Single user/single tasking: In reference to an operating system allowing only one user to run one program at a time. **404, 432**

Single-session disc: Disc on which manufacturers write all items at one time. **372, 385**

Single-use license agreement: License agreement included with software purchased by individual users. **571.** *See also End-user license agreement (EULA)*

Site license: Legal agreement that permits users to install software on multiple computers – usually at a volume discount. **471**

Skype, **768–769**

Slate tablet: Type of Tablet PC that has no keyboard, but provides other means for typing. **21**

Sleep mode: Operating system function that saves any open documents and programs to

RAM, turns off all unneeded functions, and then places the computer in a low-power state. **402**

Slide show: Display of a presentation on a large monitor or a projection screen. **154, 155, 180**

Slingbox, **495**

Small office/home office:

Describes any company with fewer than 50 employees, as well as the self-employed who work from home. **30, 33, 43.**

See also SOHO

Small- and medium-sized

business (SMB): Business that is smaller in size than an enterprise and typically does not have an international presence. **720–721**
hardware and software for, **33**
suggested output devices for, **327**
suggested storage devices for, **380**

Smalltalk: Object-oriented programming language. **675, 699**

Smart card: Card, similar in size to a credit card or ATM card, that stores data on a thin microprocessor embedded in the card. **352, 377, 385**

Smart phone: Internet-enabled telephone that usually also provides personal information management functions. **21, 65, 69, 186**
display, **307**
input for, **268–269**
memory card slot, **364**
purchasing, **452–453**
standard for, **418**
types of, **21–22**
WAP-enabled, **482**
SmartDraw, **692**

Smart tags: Word processing screen element that appears when you perform a certain action. **148**
SmartLane behavior-monitoring system, **585**

SMS: Short message service; service that allows users to send and receive short text messages on a phone or other mobile device or computer. **463.**

See also Text messaging

SMTP: Acronym for simple mail transfer protocol; communications protocol used by some outgoing mail servers. **103, 616**

Snipping Tool: Windows 7 feature that allows you to copy screen elements to a file on your computer. **415**

Social engineering: Gaining unauthorized access or obtaining confidential information by taking advantage of the

trusting human nature of some victims and the naivety of others. **590, 595**

Social networking Web site:

Online community that encourages its members to share their interests, ideas, stories, photos, music, and videos with other registered users. **14, 52, 70, 90–91, 113, 122, 193, 770, 822.**

See also Online social network

Google's, **300**

privacy on, **394**

safety of, **29**

social networking, and Web 2.0 mashups, **714–715**

Soft copy: Temporary output presented on a display device. **306**

Softbank, **179**

Software: Series of instructions that tells a computer what tasks to perform and how to perform them. **15, 42.**

See also Program

automatic update, safety of, **410**

closed source vs. open source, **416**

for home, personal, and educational use, **165–172**

illegal copies, **791**

sharing, **471**

types of, **15–18**

Software engineering:

Curriculum that focuses on the theory of programming and operating systems. **788**

Software suite: Collection of individual programs available together as a unit. **156, 180**

Software theft: Computer security risk that occurs when someone (1) steals software media, (2) intentionally erases programs, (3) illegally copies a program, or (4) illegally registers and/or activates a program. **571**

SOHO: Small office/home office; describes any company with fewer than 50 employees, as well as the self-employed who work from home. **30, 43**

Solaris: A version of UNIX developed by Sun Microsystems that is a server operating system designed specifically for e-commerce applications. **418, 433**

Solid state drive: Storage device that typically uses flash memory to store data, instructions, and information. **69, 353, 363, 384**

Solid state media: Term used to refer to components that consist entirely of electronic components, such as integrated circuits, and contain no moving parts. **362, 378, 384**

Solution algorithm: Graphical or written description of the step-by-step procedures to solve a problem. **687.** *See also Program logic*

Son, Masayoshi, **179**

Sound card: Adapter card that enhances the sound generating capabilities of a personal computer by allowing sound to be input through a microphone and output through external speakers or headset. **230, 245**
purchasing considerations, **447**

Source: Element in a DFD, indicated by a square, that identifies an entity outside the scope of a system. **632, 651**

Source document: Document that contains the original form of data to be processed. **277**

Source program: Program that contains the language instructions, or code, to be converted to machine language. **666, 700**

Spafford, Gene, **592**

Spam: Unsolicited e-mail message or newsgroups posting sent to many recipients or newsgroups at once. **66, 108, 113, 427, 587, 595**
purchasing considerations, **447**

SPEC benchmark tests, **648**

Special interest groups (SIGs): Organization that brings together members with shared interests, needs, knowledge, and experience. **797**

Speakers: Audio output devices that generate sound. **323, 333**

Speech recognition: Computer's capability of distinguishing spoken words. **274, 291.**

See also Voice recognition

Spelling checker: Feature in some application software that reviews the spelling of individual words, sections of a document, or the entire document. **148**

Spider: Program used to build and maintain lists of words found on Web sites. **88**

Spike: Electrical disturbance that occurs when an overvoltage lasts for less than one millisecond (one thousandth of a second). **575**

Spim: Spam sent through an instant messaging service. **66, 587**

Spit: Spam sent via VoIP. **66, 587**

Spoiler: Message that reveals a solution to a game or ending to a movie or program. **108, 113**

Sponsoring organizations:

Vendors that develop and administer examinations to determine whether a person is qualified for certification. **800–801**

Spoofing: Technique intruders use to make their network or Internet transmission appear legitimate to a victim computer or network. **563, 594**

Spooling: Operating system process that sends documents to be printed to a buffer instead of sending them immediately to the printer. **407**

sports Web sites, **134**

Spreadsheet software:

Application software that allows a user to organize data in rows and columns and to perform calculations on the data. **150–153, 180**

popular (fig.), **146**

Spyware: Program placed on a computer without the user's knowledge that secretly collects information about the user. **66, 426, 433, 588, 595**

Spyware remover: Program that detects and deletes spyware and other similar programs on a user's computer. **426, 433**

SQL: Query language that allows users to manage, update, and retrieve data in a relational DBMS. **674–675, 700**

Sroustrup, Bjarne, **671**

SSID: Service set identifier. **578**

Stallman, Richard, **592**

Stand-alone operating system:

Complete operating system that works on a desktop computer, notebook computer, or mobile computing device. **412, 432**

Standards: Sets of rules and procedures a company expects employees to accept and follow. **621, 650**

network communications, **477–482**

Standby UPS: Type of UPS device that switches to battery power when a problem occurs in the power line. **576.** See also **Offline UPS**

Star network: Type of network topology in which all computers and devices on the network connect to a central device, thus forming a star. **476, 500**

starting computers, **400–401**

Startup folder: Contains a list of programs that open automatically when you boot a computer. **401, 432**

static IP addresses, **110**

Static RAM: Type of RAM that is faster and more reliable than any variation of DRAM. **225**

Static Web page: A fixed Web page where visitors all see the same content. **81**

stealth virus, **178**

Steering committee: Decision-making body in a company. **623, 650**

Storage: Location in which data, instructions, and information are held for future use. **352**

cloud storage, **368–369**

data transfer speeds, **363**

enterprise, **379**

flash memory, **362–367**

hard disk, **355–362**

magnetic stripe cards, smart cards, **377**

media life expectancies (fig.), **378**

optical discs, **370–376**

overview, terminology, **352–355**

suggested, by user (fig.), **380**

tape, **376**

Storage administrator/analyst:

Employee who installs, maintains, and upgrades storage systems and analyzes an organization's storage needs. **789**

Storage appliance: Network attached storage server. **749**

Storage area network (SAN):

High-speed network with the sole purpose of providing storage to other servers to which it is attached. **749–750, 761**

protecting, **570**

Storage media: The physical material on which a computer keeps data, instructions, and information. **8, 42, 353, 384**

airport screening damage, **367**

Storage virtualization: Capability to create a single logical storage device from many physical storage devices. **746, 761**

Stored program concept:

Concept of using memory to store both data and programs. **223**

Storing: Processor operation that writes a result to memory. **215, 244**

music in flash memory, **228**

Strategic decisions: Decisions that center on a company's overall goals and objectives. **724, 760**

Streaming: Process of transferring data in a continuous and even flow. **94**

Streaming audio: Transfer of audio data in a continuous and

even flow, which allows users to listen to the audio file as it downloads. **94**

Streaming cam: Type of Web cam that has the illusion of moving images because it sends a continual stream of still images. **276**

Streaming video: Transfer of video data in a continuous and even flow, which allows users to view longer or live video images as they are downloaded. **96**

Striping: RAID storage technique that splits data, instructions, and information across multiple disks in the array. **749**

Structure chart: Structured design tool that shows program modules graphically. **688.** See also **Hierarchy chart**

Structured analysis and design: Analysis and design technique that describes processes that transform inputs into outputs. **631, 650.** See also **Process modeling**

Structured design: Program design approach in which a programmer typically begins with a general design and moves toward a more detailed design. **688, 701.** See also **Top-down design**

Structured English: Style of writing that describes the steps in a process; used to enter items in a project dictionary. **633, 651**

Structured Query Language (SQL): Query language used with databases that allows users to manage, update, and retrieve data. **534, 541, 543**

Studio camera: Stationary camera used for professional studio work. **272**

Style sheet: Contains descriptions of a document's characteristics. **679**

Stylus: Small metal or plastic device that looks like a ballpoint pen, but uses pressure instead of ink to write, draw, or make selections. **268, 290**

on mobile computers, devices, **262**

for PDAs, **22**

Subclasses: Lower levels in a class diagram that inherit the methods and attributes of the objects in its higher-level class. **635, 651**

Subject directory: Search tool that classifies Web pages in an

organized set of categories and subcategories. **85, 88, 112**

Subroutines: Smaller sections into which a main routine is broken down by a programmer during structured design. **688, 701.** See also **Modules**

Subscribe: Process of a user adding his or her e-mail name and address to a mailing list. **103**

Subwoofer: Speaker component that boosts low bass sounds. **324**

Sum Total Systems' ToolBook, **685**

Summary report: Report generated by a management information system that consolidates data usually with totals, tables, or graphs, so that managers can review it quickly and easily. **734**

Sun Certified Enterprise Architect (SCEA):

Programmer/developer certification that tests knowledge of creating and maintaining J2EE applications. **805**

Sun Certified Java Developer (SCJD):

Programmer/developer certification that tests advanced knowledge of Java programming language. **805**

Sun Certified Java Programmer (SCJP): Programmer/developer certification that tests basic knowledge of Java programming language. **805**

Sun Certified Mobile Application Developer (SCMAD):

Programmer/Developer certification that tests knowledge of using Java to create applications for mobile devices such as smart phones. **805**

Sun Certified Network Administrator (SCNA):

Networking certification that tests knowledge of administering Sun networks. **806**

Sun Certified System Administrator (SCSA):

Operating system certification that tests knowledge of administering the Solaris operating system. **804**

Sun Microsystems, **61, 670, 682**

company profile, **699**

data center storage solution, **740**

Sun Microsystems' Solaris, **418**

Supercomputer: Fastest, most powerful, and most expensive computer, capable of processing more than one quadrillion instructions in a single second. **19, 25, 43, 67**

Superscalar: Term describing processors that can execute more than one instruction per clock cycle. **216**

surface wave technology, **430**

Supporting activities: Activities relating to running a business. **723**

surface wave technology, **430**

Surfing the Web: Activity of using links to explore the Web. **83**

Surge protector: Device that uses special electrical components to smooth out minor noise, provide a stable current flow, and keep an overvoltage from reaching the computer and other electronic equipment. **571–572, 576, 577.** *See also Surge suppressor*

Surge suppressor: Device that uses special electrical components to smooth out minor noise, provide a stable current flow, and keep an overvoltage from reaching the computer and other electronic equipment. **571–572, 576.** *See also Surge protector*

SVGA: Super Video Graphics Array; video standard with a resolution of 800×600 . **311**

S-video port: Video card port that allows users to connect external analog devices such as a television, DVD player, or video recorder to the computer. **310, 346**

Swap file: Area of the hard disk used for virtual memory. **406**

Switch: The device that provides a common central connection point for nodes on a network. **476, 488, 489, 501**

SXGA: Super XGA; video standard with a resolution of 1280×1024 . **311**

Sybase, **541, 674**

Sybase Certified Professional: Database certification that tests skills in developing and administering Sybase database management systems. **808**

Symantec company profile, **592**

Symbian OS: An open source multitasking operating system designed for smart phones and allows users to perform a variety of functions in addition to making telephone calls. **420, 433**

Symbolic address: Meaningful name used with assembly languages that identifies a storage location. **666**

Symbolic instruction codes: Meaningful abbreviations used with an assembly language. **666, 700**

Symmetric key encryption: Type of encryption where both the originator and the recipient use the same secret key to encrypt and decrypt the data. **573.** *See also Private key encryption*

synaptic weights, **758**

syndication, and Web 2.0, **714**

Syntax: Set of grammar and rules that specifies how to write instructions for a solution algorithm. **694**

Syntax error: Program error that occurs when the code violates the syntax, or grammar, of the programming language. **695**

Synthesizer: Peripheral or chip that creates sound from digital instructions. **236**

System: Set of components that interact to achieve a common goal. **620**

System board: Name sometimes used for the motherboard. **212, 244.** *See also Motherboard*

System bus: Bus that is part of the motherboard and connects the processor to main memory. **237, 245.** *See also Front side bus (FSB)*

System clock: Small quartz crystal circuit that is used by the processor to control the timing of all computer operations. **216**

System development: Set of activities used to build an information system, including planning, analysis, design, implementation, and support. **620, 650**

analysis phase, **629–638**

design phase, **638–643**

Horizon Community College case study, **628**

implementation phase, **643–645**

initiation of, **626–628**

IT department jobs, **788**

operation, support, and security phase, **645–647**

phases, guidelines, overview, **620–626**

planning phase, **628–629**

System development life cycle (SDLC): Collection of phases in system development. **620–621, 650**

System failure: Prolonged malfunction of a computer. **571–572, 575–577**

System files: Specific operating system files. **401, 432**

System-on-a-chip: New type of processor that integrates the functions of a processor, memory, and a video card on a single chip. **218, 244**

System proposal: Document that assesses the feasibility of each alternative solution and then recommends the most feasible solution for a project. **635**

System software: Programs that control or maintain the operations of a computer and its devices. **15, 42, 143–144, 180, 398, 432**

system under test (SUT), **648**

System unit: Case that contains the electronic components of a computer that are used to process data. **7, 42, 210–212, 244**

fans in, **219**

overview of, **210–212**

ports on (fig.), **233**

Systems analyst: Person responsible for designing and developing an information system. **622, 650, 788.** *See also Systems developer*

Systems developer: Person responsible for designing and developing an information system. **623.** *See also Systems analyst*

Systems programmer: Employee who installs and maintains operating system software and provides technical support to the programming staff. **788**

Systems Security Certified Practitioner (SSCP): Security certification that tests basic knowledge of access controls, cryptography, data communications, and malicious code. **807**

Systems test: Test performed during the program development cycle that verifies all programs in an application work together properly. **644**

Systers, **759**

T

T1 line: The most popular T-carrier line. **484**

T3 line: The fastest T-carrier line, equal in speed to 28 T1 lines. **485**

Tabbed browsing: Option where the top of the browser displays a tab (similar to a file folder tab) for each Web page you open. **84**

Table: Term used by users of relational databases for file. **533, 543**

Tablet PC: Special type of notebook computer that you can interact with by touching the screen with your finger or a digital pen. **21, 64, 211, 306, 451**

Tactical decisions: Short-range decisions that apply specific programs and plans necessary to meet stated objectives. **724, 760**

Tactile output: Feature included with some input devices that provides the user with a physical response from the device. **327, 333**

Tags: HTML words, abbreviations, and symbols that specify links to other documents and indicate how a Web page is displayed when viewed on the Web. **678.** *See also Elements*

Tape: Magnetically coated ribbon of plastic capable of storing large amounts of data and information at a low cost. **376, 385**

Tape cartridge: Small, rectangular, plastic housing for tape. **376**

Tape drive: Device used to read and write data and information on tape. **376, 385**

Tape library: Separate cabinet for larger computers in which tape cartridges are mounted. **376, 750**

Task Manager, **405**

Tax preparation software:

Application software that is used to guide individuals, families, or small businesses through the process of filing federal taxes. **167, 181**

popular (fig.), **165**

taxes Web sites, **131**

taxing downloads, **428**

T-carrier line: Any of several types of long-distance digital telephone lines that carry multiple signals over a single communications line. **484–485, 501**

Tcl: Tool Command Language; interpreted scripting language maintained by Sun Microsystems Laboratories. **682**

TCP/IP: Short for Transmission Control Protocol/Internet Protocol; network standard, specifically a protocol, that defines how messages (data) are routed from one end of a

- network to the other, ensuring the data arrives correctly. **478**, 501
- Technical feasibility:** Measure of whether an organization has or can obtain the hardware, software, and people needed to deliver and then support a proposed information system. **625**
- Technical lead:** Employee who guides design, development, and maintenance tasks; serves as interface between programmer/developer and management. **788**
- Technical writer:** Employee who works with the analyst, programmer, and user to create system documentation and user materials. **788**
- technical services, IT department jobs, **789**
- technology overload, **9**
- Telecommunications Act of 1996, **494**
- Telecommuting:** Work arrangement in which employees work away from a company's standard workplace and often communicate with the office through the computer. **31**, **745**
- Telematics:** Wireless communications capabilities used in automobiles, including navigation systems, remote diagnosis and alerts, and Internet access. **26**
- Telemedicine:** Form of long-distance health care where health-care professionals in separate locations conduct live conferences on the computer. **36**, **63**
- telephone numbers, searching Web for, **120**
- telescopes, online, **93**
- Telesurgery:** Surgery in which a surgeon performs an operation on a patient who is not located in the same physical room as the surgeon. **36**. *See also Remote surgery*
- televisions, **312–313**
- Template:** Document that contains the formatting necessary for a specific document type. **148**
- enrollment, in biometric authentication, **288**
- Tendonitis:** Inflammation of a tendon due to repeated motion or stress on that tendon. **579**, **595**
- Terabyte (TB):** Approximately one trillion bytes. **223**, **354**
- Terasem Movement Foundation, **510**
- Terminal:** Device that consists of a keyboard, a monitor, a video card, and memory, which often all are housed in a single unit. **284**, **291**
- Test data:** Sample data that mimics real data a program will process once it is in production. **693–694**
- Test plan:** Component of a disaster recovery plan that contains information for simulating various levels of disasters and recording an organization's ability to recover. **756**, **761**
- Texas Instruments, **55**
- text output, **304**
- Text message:** Short note, typically fewer than 300 characters, sent to or from a smart phone or other mobile device. **22**, **463**
- application software, **174**
- personal and business perspective, **196–197**
- privacy of, **590**
- and typing skills, **174**
- Text messaging:** Service that allows users to send and receive short text messages on a smart phone or other mobile device or computer. **463**, **500**. *See also SMS (short message service)*
- TFT (thin-film transistor) display:** Thin-film transistor; LCD monitor or screen technology that uses a separate transistor to apply charges to each liquid crystal cell and thus displays high-quality color that is viewable from all angles. **308**. *See also Active-matrix display*
- theodolites, electronic, **24**
- Thermal printer:** Type of nonimpact printer that generates images by pushing electrically heated pins against heat-sensitive paper. **321**, **333**
- Thermal wax-transfer printer:** Thermal printer that generates images by using heat to melt colored wax onto heat-sensitive paper. **321**
- Thin client:** Small terminal-like computer that mostly relies on a server for data storage and processing. **752**, **761**
- third normal form, **540**
- Third-generation language (3GL):** Type of programming language in which a programmer writes instructions that tell the computer what to accomplish and how to do it using a series of English-like words to write instructions. **666**, **700**. *See also Procedural language*
- Thrashing:** The state of an operating system that spends much of its time paging, instead of executing application software. **406**, **407**
- Thread:** Group of newsgroup articles consisting of the original article and all subsequent related replies. **107**. *See also Threaded discussion*
- Threaded discussion:** Group of newsgroup articles consisting of the original article and all subsequent related replies. **107**. *See also Thread*
- Three-generation backup:** Backup policy that preserves three copies of important files: the grandparent, the parent, and the child. **577**, **595**
- Thumb drive:** Flash memory device that plugs in a USB port on a computer or portable device. **366**, **384**. *See also USB flash drive*
- Thumbnail:** Small version of a larger graphic. **94**
- TIBCO General Interface, **714**
- tiers of Web applications, **713**
- TIFF graphic format, **93**
- time bomb, **178**
- Time Machine, **415**
- Time To Live (TTL), **382**
- Timely information:** Information that has an age suited to its use. **516**, **542**
- Title bar:** Horizontal space, located at the top of a window, that contains the window's name. **144**
- Toggle key:** Key that switches between two states each time a user presses the key. **261**, **290**
- Token:** Special series of bits that functions like a ticket. **478**, **501**
- Token ring:** Network standard in which computers and devices on the network share or pass a special signal, called a token, in a unidirectional manner and in a preset order. **478**, **500**
- toll collection, electronic RFID, **481**
- Toner:** Type of powdered ink that is used by some laser printers and copy machines to produce output. **320**, **333**
- tongue-controlled joystick, **286**
- Tool Command Language:** Interpreted scripting language maintained by Sun Microsystems Laboratories. **682**
- ToolBook:** Multimedia authoring program with a graphical user interface that uses an object-oriented approach, so that programmers can design multimedia applications using basic objects. **685**, **701**
- Top-down design:** Program design approach in which a programmer typically begins with a general design and moves toward a more detailed design. **688**. *See also Structured design*
- Top-level domain (TLD):** Identifies the type of organization associated with the domain. **80**
- Torvalds, Linus, **60**, **431**
- Touch screen:** Touch-sensitive display device with which users interact by touching areas of the screen. **266**, **290**
- Touchpad:** Small, flat, rectangular pointing device that is sensitive to pressure and motion. **265**
- Touch-sensitive pad:** Input device that enables users to scroll through and play music, view pictures, watch videos or movies, adjust volume, and/or customize settings. **259**, **267**, **290**
- Tower:** Tall and narrow system unit that can sit on the floor vertically if desktop space is limited. **20**
- TPC benchmark tests, **648**
- Track:** Narrow recording band that forms a full circle on the surface of a disk. **357**
- Trackball:** Stationary pointing device with a ball on its top or side. **265**
- Trade publication:** Magazine written for a specific business or industry. **636**
- Trade school:** Educational institution that offers programs primarily in areas of programming, Web design and development, graphics design, hardware maintenance, networking, personal computer support, and security. Also called a technical school, vocational school, or career college. **794**, **812**
- Traffic:** Communications activity on the Internet. **76**
- Training:** Showing users exactly how they will use new hardware and software in a system. **644**
- computer education, training field, **792–793**
- IT department jobs, **789**
- Transaction:** Individual business activity. **733**
- Transaction processing system (TPS):** Information system that captures and processes data from day-to-day business activities. **733**, **760**

Transfer rate: The speed at which data, instructions, and information transfer to and from a device. **355, 384**

for LAN types, using physical transmission media, **492**
transferring movies from old to new media, **376**
videos, **346–347**

Transistor: Element of an integrated circuit that can act as an electronic switch that opens or closes the circuit for electrical charges. **54, 212, 242**
transitions, video, **349**

Transmission media: Materials or substances capable of carrying one or more signals in a communications channel. **491, 501**

physical, **492–494**
wireless, **494–496**

transport layer, OSI model, **498**

Transport Layer Security (TLS): Successor to Secure Sockets Layer (SSL), a security technique that provides encryption of all data that passes between a client and an Internet server. **574, 575**

transportation, computers and, **39, 757**

Transportation Security Administration, **367**

travel computer applications in, **38**
e-commerce examples, **747**
Web sites, **129, 742**

Travel and mapping software: Application software that enables users to view maps, determine route directions, and locate points of interest. **170–171, 181**
popular (fig.), **165**

Triple-DES (3DES) encryption algorithm, **592**

Trojan horse: Malicious-logic program named after the Greek myth that hides within or looks like a legitimate program. **178, 426, 558, 594**

troubleshooting virus, malware infections, **560–562**

TRUSTe, **747**

Trusted source: Company or person a user believes will not send a virus-infected file knowingly. **560, 594**

Tuple: Term used by developers of relational databases for record. **533, 543**

Turing, Alan, **54, 214**

Turing test, **214**

Turnaround document:

Document that a user returns to the company that has created and sent it. **279**

Turnkey solution: Complete systems offered by value-added resellers. **639**

Twisted-pair cable: Transmission media that consists of one or more twisted-pair wires bundled together. **493**

Twisted-pair wire: Two separate insulated copper wires that are twisted together. **493, 501**
typing improvement, and text messaging, **174**

Twitter, **14**

U

U3 smart drive: Special type of USB flash drive that includes preinstalled software accessed through a Windows-type interface. **367**

Ultra Low Voltage (ULV) processors, **220**

Ultradense server: Complete computer server, such as a Web server or network server, packed on a single card. **751, 761.** *See also Blade server*

Ultra-Mobile PC (UMPC): Computer small enough to fit in one hand. **22.** *See also Handheld computer or Handhelds*

Ultra-wideband: Network standard that specifies how two UWB devices use short-range radio waves to communicate at high speeds with each other. **480.** *See also UWB*

UMD: Universal Media Disc; mini-DVD used specifically with the PlayStation Portable handheld game console. **375**

UML: Unified Modeling Language; graphical tool that enables systems analysts to document a system, which has been adopted as a standard notation for object modeling and development. **634, 651, 673, 692–693, 701**

UMTS: Universal Mobile Telecommunications System. 3G standard for mobile communications. **495**

Unauthorized access: Use of a computer or network without permission. **564–569, 594**

Unauthorized use: Use of a computer or its data for unapproved or possibly illegal activities. **564–569, 594**

Uncompress: To restore a compressed, or zipped, file to its original form. **107, 427.** *See also Unzip*

Undervoltage: Electrical disturbance that occurs when the electrical supply drops. **571–572, 575**

Underwriters Laboratories (UL)

1449 standard: Safety specification that allows no more than 500 maximum volts to pass through an electrical line. **576**

Unicode: 16-bit coding scheme that has the capability of representing more than 65,000 characters and symbols. **221–222, 244, 518**

Unified Modeling Language:

Graphical tool that enables systems analysts to document a system, which has been adopted as a standard notation for object modeling and development. **634, 651, 673, 692–693, 701.** *See also UML*

Uniform Resource Locator:

Unique address for a Web page. **82, 112.** *See also URL or Web address*

uninstalling application software, **188–189**

Uninterruptible power supply (UPS):

Device that contains surge protection circuits and one or more batteries that can provide power during a temporary or permanent loss of power. **576, 595**

Uninstaller: Utility program that removes a program, as well as any associated entries in the system files. **423, 433**

Unit test: Test performed during the program development cycle that verifies each individual program or object works by itself. **644**

UNIVAC computer, **54–71**

Universal Flash Storage (UFS), **366**

Universal serial bus port: Port that can connect up to 127 different peripherals with a single connector type. **234, 245.** *See also USB port*

UNIX: Multitasking operating system that now is available for most computers of all sizes.

416, 418, 433

Unsubscribe: Process of a user removing his or her e-mail name and address from a mailing list. **103**

Unzip: To restore a compressed, or zipped, file to its original

form. **107, 427.** *See also Uncompress*

UPC (Universal Product Code): Bar code used by retail and grocery stores. **280**

updating device drivers, **408**
Windows, **440–441**

Uplink: Transmission from an earth-based station to a satellite. **496**

Uploading: Process of transferring documents, graphics, and other objects from a computer to a server on the Internet. **107, 113**
videos to YouTube, **340**

Upstream rate: The transfer rate that is achieved when data is being sent over a communications channel. **484**

Uptime: Measurement of availability. **752**

URL: Unique address for a Web page. **82, 112.** *See also Uniform Resource Locator or Web address*

U.S. Department of Homeland Security, **569, 591**

U.S. Government Web sites, **132**

U.S. Postal Service Web site, **132**

U.S. Robotics, **61**

USAJOBS Web site, **138**

USB 2.0: More advanced and faster type of USB. **234.** *See also Hi-Speed USB*

USB 3.0: USB that is more than 10 times faster than USB 2.0. **234**

USB flash drive: Flash memory storage device that plugs in a USB port on a computer or portable device. **8, 65, 231, 245, 353, 366, 384.** *See also Thumb drive*

purchasing considerations, **447**
removing, **408**

USB hub: Device that plugs in a USB port on the system unit and contains multiple USB ports in which cables from USB devices can be plugged. **234**

purchasing considerations, **447**

USB port: Port that can connect up to 127 different peripherals with a single connector type. **231, 232, 233, 234, 245.** *See also Universal serial bus port*

Use case: UML tool that graphically shows how actors interact with the information system. **634, 651**

Use case diagram: Analysis and design tool in the UML that graphically shows how actors

interact with the information system. 634, 651

Useful information: Information that has meaning to the person who receives it. 517, 542

User: Anyone who communicates with a computer or utilizes the information it generates. 9, 42 employee as database, 538 identifying, authenticating, 565–568

levels in the enterprise, 724–726

User group: Collection of people with common computer equipment or software interests that meets regularly to share information. 797, 798

User ID: Unique combination of characters, such as letters of the alphabet and/or numbers, that identifies a specific user. 410, 566. *See also User name*

User interface: The portion of software that defines how a user interacts with a computer, including how the user enters data and instructions and how information is displayed on the screen. 402, 432

User name: Unique combination of characters, such as letters of the alphabet and/or numbers, that identifies a specific user. 102, 410, 566, 594. *See also User ID*

User response: An instruction a user issues by replying to a question displayed by a program. 259, 290

Users: Anyone for whom the system is being built. 621, 650

Utility: Type of system software that allows a user to perform maintenance-type tasks, usually related to managing a computer, its devices, or its programs. 421, 432

Utility program: Type of system software that allows a user to perform maintenance-type tasks usually related to managing a computer, its devices, or its programs. 16, 42, 421, 432

some types of, 421–428

UWB (ultra-wideband): Network standard that specifies how two UWB devices use short-range radio waves to communicate at high speeds with each other. 480

UXGA: Ultra XGA; video standard with a resolution of 1600 × 1200. 311

V

Validate: Check for accuracy. 693, 694

Validation: Process of comparing data with a set of rules or values to find out if the data is correct. 522–524, 542

Validation rules: Check that analyzes entered data to help ensure that it is correct. 522. *See also Validity check*

Validity check: Check that analyzes entered data to help ensure that it is correct. 522, 542. *See also Validity rules*

Value: Number contained in a worksheet cell that can be used in a calculation. 151

Value-added network (VAN):

Third-party business that provides networking services such as secure data and information transfer, storage, e-mail, and management reports. 471

Value-added reseller (VAR):

Company that purchases products from manufacturers and then resells these products to the public – offering additional services with the product. 638–639

VBScript: Visual Basic, Scripting Edition; subset of the Visual Basic language that allows programmers to add intelligence and interactivity to Web pages. 683, 701

Verifiable information:

Information that can be proven as correct or incorrect. 516, 542

VeriSign, 431

Verizon, 499

Vertical market software:

Packaged software specifically designed for a particular business or industry. 636

Video: Images displayed in motion. 96, 113 creating, uploading to YouTube, 340

digital video (DV) technology, 344–345

editing, distributing, 348–349

living digitally (feature), 827

output, 305

popular standards (fig.), 311

recording, managing, 345–347

Video blog: Blog that contains video clips. 14, 68, 90

Video capture card: Adapter card that converts an analog video signal to a digital signal that a computer can process. 275, 346

Video card: Adapter card that converts computer output to a video

signal that travels through a cable to a monitor, which displays an image on the screen. 230, 245. *See also Graphics card*

memory on, 310–311

purchasing considerations, 447

Video conference: Meeting

between two or more geographically separated people who use a network or the Internet to transmit audio and video data. 276–277, 291, 462 application software, 174

Video editing software:

Application software that allows a user to modify a segment of video, called a clip. 159, 162, 165, 170, 347–349

video games

consumers of, 16

Electronic Arts (EA), 699

medical advice from, 271

Video input: Process of capturing

full-motion images and storing them on a computer's storage medium. 275–276

Video message: Short video clip,

usually about 30 seconds, sent to or from a smart phone or other mobile device. 22, 463 application software, 174

personal and business perspective, 196–197

Video messaging: Wireless messaging service that allows users to send short video clips, usually about 30 seconds in length, in addition to all picture messaging services. 464, 500

Video phone: Phone that can send video messages. 22

Video resume: Resume in video form posted to Web sites. 796, 820–821

Video telephone call: Telephone call made using a PC video camera that allows both parties to see each other as they communicate over the Internet.

275–276

Viewable size: Diagonal measurement of the actual viewing area provided by the screen in a CRT monitor. 313

Virtual memory: A portion of a

storage medium, usually the hard disk, that the operating system allocates to function as additional RAM. 406–407, 432

Virtual private network (VPN):

Network that provides a mobile user with a secure connection to a company network server, as if the user has a private line. 575, 744, 761

Virtual Reality (VR): Computers used to simulate a real or imagined environment that appears as a three-dimensional (3-D) space. 96–97, 113

Virtualization: Practice of sharing or pooling computing resources, such as servers. 418, 745, 761

Virus: Potentially damaging computer program that affects, or infects, a computer negatively by altering the way the computer works without a user's knowledge or permission. 425, 433, 558, 559, 592 described, 103 mobile computer, device issues, 269 types and risks, 178

Virus author: Programmer who intentionally writes a virus program. 425

Virus definition: Known specific pattern of virus code. 560–561. *See also Virus signature*

Virus hoax: E-mail message that warns users of a nonexistent virus or other malware. 561, 594

Virus signature: Known specific pattern of virus code. 560–561. *See also Virus definition*

VisiCalc, 57, 179

Visio, 692

Visual Basic: Programming language that allows programmers easily to build complex task-oriented object-based programs. 18, 672, 700

Visual Basic for Applications (VBA):

Programming language that can work with Visual Studio Tools for Office or a similar language as their macro programming language. 676–677

Visual Basic Scripting Edition:

Subset of the Visual Basic language that allows programmers to add intelligence and interactivity to Web pages. 683

Visual C#: Programming language that combines programming elements of C++ with an easier, rapid development environment. 673, 700

Visual C++: Programming language based on C++. 673, 700

Visual programming environment (VPE): Graphical interface in a visual programming language that allows programmers to drag and drop objects to develop programs. 673, 700

Visual programming language:

Programming language that uses a visual or graphical interface for creating all source code. **673**

Visual Studio: Suite of program

development tools from Microsoft that assists programmers in building programs for Windows, Windows Mobile, or operating systems that support Microsoft's .NET framework. **66, 671, 700**

Visual Studio Tools for Office

(VSTO): A set of tools integrated in Visual Studio that enables developers to create programs that work with Microsoft's Office suite, including Word, Excel, PowerPoint, Outlook, and Project. **671**

Visual voice mail: Voice mail fea-

ture that allows users to view message details such as the length of calls and, in some cases, read message contents instead of listening to them. **467**

Vlog: Video blog. **68, 90****Vlogger:** Short for vlog author. **90****Vlogosphere:** Term used to refer to all vlogs worldwide. **90****Voice input:** Process of entering data by speaking into a microphone. **274****Voice mail:** Service that functions much like an answering machine, allowing a user to leave a voice message for one or more people. **467, 500****Voice mailbox:** Storage location on a hard disk in a voice mail system. **467****Voice output:** Audio output that occurs when a user hears a person's voice or when a computer talks to the user through the speakers on the computer. **325****Voice over IP:** Technology that allows users to speak to other users over the Internet using their desktop computer, mobile computer, or mobile device. **68, 106, 113.** See also **Internet telephony or VoIP****Voice recognition:** Computer's capability of distinguishing spoken words. **274, 291.** See also **Speech recognition****Voice verification system:**

Biometric device that compares a person's live speech with his or her stored voice pattern to determine if the person is a legitimate user. **283, 291**

VoIP: Technology that allows

users to speak to other users over the Internet using their desktop computer, mobile computer, or mobile device. **106, 113, 199, 325, 462.** See also **Internet telephony or Voice over IP**
application software, 174
split, 587
using, 768–769

VoIP specialist: Employee who evaluates, installs, and monitors data and/or voice communications equipment and software; maintains connections to the Internet and other WANs. **789.** See also **Data communications analyst****Volatile memory:** Type of memory that loses its contents when a computer's power is turned off. **223, 245**

von Ahn, Luis, 567
von Neumann, John, 54
voter databases, 530

VPN tunnel: Secure connection created over the Internet between the user's computer and the company's network. **744****vPro technology:** Technology used by Intel's dual-core and multi-core processors that provides the capability to track computer hardware and software, diagnose and resolve computer problems, and secure computers from outside threats. **217****VR world:** 3-D environment that contains infinite space and depth created with special VR software. **96–97****W****W3C:** Consortium of nearly 400 organizations from around the world that oversees research and sets standards and guidelines for many areas of the Internet. **76**

Wall, Larry, 682

War driving: Intrusion technique in which an individual attempts to detect wireless networks via their notebook computer while driving a vehicle through areas they suspect have a wireless network. **578, 595.** See also **Access point mapping****War flying:** Intrusion technique in which individuals use an airplane to detect unsecured wireless networks. **578, 595****Warm boot:** Process of using the

operating system to restart a computer. **400**

Warnock, John, 179

WBT: Web-based training; computer-based training that uses Internet technology and consists of application software on the Web. **176, 181**

weather
computers in meteorology, 381
Web sites, 134

Weather Channel, The, 134

Web: Worldwide collection of electronic documents called Web pages, the Web is one of the more popular services on the Internet. **13, 42, 74, 80, 462.** See also **World Wide Web or WWW**
addresses, 82–83
areas of interest, 124–139
browsing, 81–82
described, 12–13, 74
publishing resumes on, 121
searching the, 85
surfing the, 83**Web 2.0:** Term used to refer to

Web sites that provide a means for users to share personal information, allow users to modify Web site content, and have application software built into the site for visitors to use. **14, 67, 81, 172–173, 383, 462**

program development, 684–685, 712–715
program development toolkits, 716–717
social networking, and mashups, 714–715

Web 3.0, 81

Web address: Unique address for a Web page. **82–83, 112.** See also **URL and Uniform Resource Locator****Web administrator:** Employee who maintains an organization's Web site; creates or helps users create Web pages; oversees Web site performance. **789.** See also **Webmaster****Web app:** Web site that allows users to access and interact with software through a Web browser on any computer or device that is connected to the Internet. **91, 113, 172–173.** See also **Web application****Web application:** Web site that allows users to access and interact with software through a Web browser on any computer or device that is connected to the Internet. **14, 91, 113, 142, 172–173, 180.** See also **Web app**

overview of, 172–173

popular (fig.), 173

syndication, and, 714

tiers of, 713

Web browser: Application software that allows users to access and view Web pages. **81, 112.** See also **Browser**
and ActiveX control installation, 680
application software, 174**Web bug:** Type of spyware that is hidden on Web pages or in e-mail messages in the form of graphical images. **588****Web cam:** Digital video camera that enables a home or small business user to capture video and still images, send e-mail messages with video attachments, add live images to instant messages, broadcast live images over the Internet, and make live video telephone calls. **6–7, 28, 30, 259, 275–276**
installing, using, 298
purchasing considerations, 447
fun and entertainment, 125**Web conference:** Online meeting that takes place on the Web. **468**

personal and business perspective, 202–203

Web databases, 536–537

Web designer: Employee who develops graphical content using Photoshop, Flash, and other multimedia tools. **789****Web developers:** Designers of Web pages. **678, 700****Web farming:** Process of collecting data from the Internet as a source for a data warehouse. **741, 742****Web filtering software:**

Program that restricts access to certain material on the Web. **426, 433**

Web folders, 462

Web Interaction Response Time (WIRT), 648

Web page: Electronic document on the Web, which can contain text, graphics, animation, audio, and video and often has built-in connections to other documents, graphics, Web pages, or Web sites. **13, 80–81, 112**
development, 678–685
navigating, 83–84

Web Standards Project, 698

Web page authoring software:

Software used to create Web pages that include graphical images, video, audio, animation, and other special effects with

- interactive content. **163**, **181**, **685**, **701**
- Web program development tools** (fig.), **714**
- Web publishing:** Development and maintenance of Web pages. **97–98**, **113**
- Web server:** Computer that delivers requested Web pages to a computer. **81**, **474**
- Web services:** Set of software technologies that allows businesses to create products and B2B (business-to-business) interactions over the Internet. **469**, **500**, **742–743**, **761**
- Web site:** Document on the Web that contains text, graphics, animation, audio, and video. **13**, **81**
accessibility levels, responsibility for, **328**
blogs, **127**
career, job-hunting, **138**
computer-related, **799**
cookie, **585–587**
education, learning, **136**
environment, **130**
evaluating, **92**
finance, **131**
fun and entertainment, **125**
government, **132**
health, **137**
literature and art, **139**
and malicious software, **559**
most popular U.S., **14**
online social network, **128**
research, **126**
science, **136**
shopping and auctions, **133**
travel, **129**
types of, **88–92**
weather, sports, news, **134**
Web publishing, **97–98**
- Web site management programs:** Software that collects data designed to help organizations make informed decisions regarding their Web presence. **732**, **760**
- Web software developer:** Employee who analyzes, designs, implements, and supports Web applications; works with HTML, Ajax, JavaScript, and multimedia. **788**
- Web-based Help:** Help located on Web sites that provides updates and comprehensive resources to respond to technical issues about software. **175**, **181**
- Web-based training (WBT):** Computer-based training that uses Internet technology and consists of application software on the Web. **176**, **181**, **685**
- Weblog:** Informal Web site consisting of time-stamped articles, or posts, in a diary or journal format, usually listed in reverse chronological order. **90**, **113**, **552**. *See also Blog*
- Webmaster:** Employee who maintains an organization's Web site; creates or helps users create Web pages; oversees Web site performance. **789**. *See also Web administrator*
- WebSlices:** Internet Explorer feature that enables content aggregators to mark sections of their Web page as feeds to which user can subscribe. **92**
- What-if analysis:** Spreadsheet software feature that allows a user to change certain values in a spreadsheet to reveal the effects of those changes. **152**
- Wheel:** Steering-wheel-type input device that is used to simulate driving a vehicle. **270**, **290**
purchasing considerations, **446**
- Whiteboard:** Video conference feature in which another window on the screen displays notes and drawings simultaneously on all participants' screens. **276**
- Wide area network (WAN):** Network that covers a large geographic area (such as a city, country, or the world) using a communications channel that combines many types of media such as telephone lines, cables, and radio waves. **473**, **500**
- Widescreen:** Term used to refer to LCD monitors that are wider than they are tall. **307**
- Widget:** Mini-program with limited functionality that connects to another program or provides information. **414**, **713**. *See also Gadget*
- Wi-Fi:** Short for wireless fidelity. Type of broadband Internet connection that uses radio signals to provide high-speed Internet connections to compatible or properly equipped wireless computers and devices. **76**, **112**, **479**, **501**
access, **77**
setting up home network, **490**, **508–509**
and wireless networks, **464**
- Wi-Fi mesh network:** Network in which each mesh node routes its data to the next available node until the data reaches its destination – usually an Internet connection. **480**
- Wi-Fi Protected Access (WPA):** Security standard that improves on older security standards by authenticating network users and providing more advanced encryption techniques. **578**, **595**
- Wii (Nintendo),** **24**, **40**, **829**
- Wii Remote:** Nintendo's motion-sensing input device that uses Bluetooth wireless technology to communicate with the Wii game console. **271**, **291**
- Wiki:** Collaborative Web site that allows users to create, add to, modify, or delete the Web site content via their Web browser. **90**, **113**, **193**, **462**
described, **200**
enterprise use of, **742**
personal and business perspective, **200–201**
- Wikipedia,** **63**
- Wikipedia Foundation,** **649**
- WiMAX:** Worldwide Interoperability for Microwave Access. Newer network standard developed by IEEE that specifies how wireless devices communicate over the air in a wide area. **69**, **464**, **482**, **501**, **780**, **781**. *See also 802.16*
- Win32.Hatred virus,** **178**
- Window:** Rectangular area of a computer screen that displays data or information. **144**, **180**
- Windows (Microsoft)**
described, **15**
development and Visual Studio, **671**
keeping up-to-date, **440–441**
Magnifier feature, **328**
starting, interacting with program from, **145**
- Windows 7:** Microsoft's fastest, most efficient operating system to date, offering quicker program start up, built-in diagnostics, automatic recovery, improved security, enhanced searching and organizing capabilities, and an easy-to-use interface. **413–415**
- Windows 7 Help and Support,** **736**
- Windows 7 Home Premium:** Windows 7 edition that includes all the capabilities of Windows 7 Starter and also includes Windows Aero with its Aero Flip 3D feature. **414**
- Windows 7 Professional:** Windows 7 edition that allows users in all sizes of businesses are provided a secure operating environment that uses Windows Aero where they easily can search for files, protect their computers from unauthorized intruders and unwanted programs, use improved backup technologies, securely connect to Wi-Fi networks, quickly view messages on a powered-off, specially equipped notebook computer, easily share documents and collaborate with other users, and watch and record live television. **414**
- Windows 7 Starter:** Windows 7 edition designed for netbooks and other small notebook computers that allows users to search for files, connect to printers and devices, browse the Internet, join home networks, and connect to wireless networks. **414**
- Windows 7 Ultimate:** Windows 7 edition that includes all features of Windows 7 Home Premium and provides additional features designed to keep your files secure and support for 35 languages. **414**
- Windows Aero:** Interface for computers with more than 1 GB of RAM that provides an enhanced visual look, additional navigation options, and animation. **402–403**
- Windows Calendar:** Windows feature that allows you to coordinate your schedule with others' schedules. **415**
- Windows Defender:** Windows security feature that protects your computer from spyware. **415**
- Windows DVD Maker:** Windows 7 feature that allows users to create DVDs from digital videos. **414**
- Windows Embedded CE:** Scaled-down Windows operating system designed for use on communications, entertainment, and computing devices with limited functionality. **419**, **433**
- Windows Firewall:** Windows 7's built-in personal firewall that protects computers or a network from hackers. **414**, **425**
- Windows Internet Explorer (IE),** **82**
- Windows Live Essentials:** Windows 7 feature that includes programs for instant messaging, photo editing and sharing, e-mail, blogging, and video editing and sharing. **415**
- Windows Live Mail:** Windows 7 e-mail feature. **415**

Windows Live Messenger:

Windows 7 instant messaging feature. **415**

Windows Live Movie Maker:

Windows 7 video editing and sharing feature. **415, 820–821**

Windows Live Photo Gallery:

Windows 7 photo editing and sharing feature. **415**

Windows Live Writer: Windows 7 blogging feature. **415****Windows Media Player:**

Windows program that allows users to listen to Internet radio stations, play MP3 and other music formats, copy music and data to CDs, and watch movies. **414**

Windows Phone 7: Embedded operating system that includes functionality, programs, and a user interface designed for specific types of smart phones. **419, 433****Windows Photo Viewer:**

Windows image viewer that allows you to print and e-mail photos. **415**

Windows ReadyBoost: Windows feature that can allocate available storage space on removable flash memory devices as additional cache. **227, 406–407****Windows Server 2008:** Server operating system designed by Microsoft that is an upgrade to Windows Server 2003, including Web server management, enhanced server security, network access protection, and protection against malware features. **69, 417–418, 433****Windows Server 2008**

Datacenter: Server operating system designed for use by businesses with huge volumes of transactions and large-scale databases. **417**

Windows Server 2008

Enterprise: Server operating system designed for use by medium- to large-sized businesses, including those with e-commerce operations. **417**

Windows Server 2008 Family:

Collection of server operating system products, including Windows Server 2008 for Itanium-Based Systems; Windows Server 2008, Standard Edition; Windows Server 2008, Enterprise Edition; Windows Server 2008, Datacenter; and Windows Web Server 2008. **417–418**

Windows Server 2008 for Itanium-Based Systems:

Server operating system designed for use by computers with 64-bit processors that function as a Web server. **418**

Windows Server 2008 Standard:

Server operating system designed for use by typical small- to medium-sized business networks. **417**

Windows Task Manager, **405**

Windows Touch: Windows 7 support for computers with multi-touch technology. **415**

Windows Update, **409**

Windows Vista, **68**

Windows Web Server 2008:

Server operating system designed for Web server and Web hosting businesses. **418**

Winer, Dave, **552**

wiping utility, **355**

WIPS (Web interactions per second), **648**

wireframe, **330**

wireless

broadband connections' impact on print media, **465**

devices, using multiple, **235**

home network, **490**

instant messaging (IM), **464**

messaging services, **462–464**

security, **577–579**

transmission media, **494–496**

Wireless access point: Central communications device that allows computers and devices to transfer data wirelessly among themselves or to transfer data wirelessly to a wired network. **487, 501, 578, 595**

Wireless Application Protocol (WAP): Network standard, specifically a protocol, that specifies how some wireless mobile devices such as smart phones can display the content of Internet services such as the Web, e-mail, and chat rooms. **482, 501, 578, 610**

Wireless fidelity: Term for any network based on the 802.11 series of standards. **479**

Wireless Internet access point: Location where people can connect wirelessly to the Internet using notebook computers, smart phones, handheld game consoles, or other devices. **464, 500**

Wireless Internet service provider: Company that provides wireless Internet access to desktop and notebook computers and mobile devices, such as smart phones and

portable media players, with built-in wireless capability (such as Wi-Fi) or to computers using wireless modems or wireless access devices. **78, 112**

Wireless keyboard: Battery-powered keyboard that transmits data using wireless technology, such as radio waves or infrared light waves. **262.** See also *Cordless keyboard*

wireless LAN access points, purchasing considerations, **447**

Wireless LAN (WLAN): Local area network that uses no physical wires. **472**

Wireless modem: Modem that uses the cell phone network to connect to the Internet wirelessly from a notebook computer, a smart phone, or other mobile device. **487, 501**

Wireless mouse: Battery-powered device that transmits data using wireless technology, such as radio waves or infrared light waves. **264, 290.** See also *Cordless mouse*

wireless network, security issues, **269**

Wireless network administrator:

Employee who installs, configures, and maintains LANs, WANs, wireless networks, intranets, and Internet systems; identifies and resolves connectivity issues. **788.** See also *Network administrator*

Wireless network card: Network card, often with an antenna, that provides wireless data transmission. **487**

Wireless portal: Portal designed for Internet-enabled mobile devices. **89**

Wireless transmission media:

Type of media that send communications signals through the air or space using radio, microwave, and infrared signals. **492, 501**

WML: Wireless markup language; subset of XML that allows Web developers to design pages specifically for microbrowsers. **679, 700**

Word (Microsoft), saving ASCII files, **694**

Word processing software: One of the more widely used types of application software; allows a user to create and manipulate documents containing mostly text and sometimes graphics. **56, 147–150, 180.** See also *Word processor*

developing documents, **149–150**

features (fig.), **148**

overview of, **147–148**

popular (fig.), **146**
and student laziness, **150**

Word processor: One of the more widely used types of application software; allows a user to create and manipulate documents containing mostly text and sometimes graphics. **147, 180.** See also *Word processing software*

Word size: Number of bits a computer can interpret and execute at a given time. **237**

Wordwrap: Feature of word processing software that allows users to type words in a paragraph continually without pressing the ENTER key at the end of each line. **147**

Workflow: Defined process that identifies the specific set of steps involved in completing a particular project or business process. **744**

Workflow application: Program that assists in the management and tracking of all the activities in a business process from start to finish. **744, 761**

Workgroup computing: Concept in which network hardware and software enable group members to communicate, manage projects, schedule meetings, and make group decisions. **467**

workplace design, and ergonomics, **580**

Worksheet: Rows and columns used to organize data in a spreadsheet. **150**

World Wide Web: Worldwide collection of electronic documents. **42, 59, 80, 111.** See also *Web or WWW*

described, **12–13, 74**

uses of, **80–98**

World Wide Web Consortium (W3C), **76, 328**

Worm: Malicious-logic program that copies itself repeatedly, using up system resources and possibly shutting down the system. **178, 426, 558, 594**

WQXGA: Wide Quad XGA; video standard with a resolution of 2560×1600 . **311**

Wozniak, Stephen, **41, 57, 331, 431**

write-protection device, **611**

Writing: Process of transferring data, instructions, and information from memory to a storage medium. **354, 384**

data to RAM, **242**

WSXGA: Wide Super XGA; video standard with a resolution of 1680×1050 . **311**

WUXGA: Wide Ultra XGA; video standard with a resolution of 1920×1200 . **311**

WWW: Worldwide collection of electronic documents. **80**. *See also Web or World Wide Web*

WXGA: Wide XGA; video standard with a resolution of 1280×1024 or 1366×768 . **311**

X

Xbox 360 (Microsoft), 24, 66, 829

xD Picture Card: Memory card capable of storing between 256 MB and 2 GB of data. **364, 365, 384**

Xeon: Intel processor used by workstations and low-end servers. **216, 244**

Xerox, 331

Xerox reusable paper, 314

XGA: Extended Graphics Array; video standard with a resolution of 1024×768 . **311**

XHTML: Extensible HTML; markup language that enables Web sites to be displayed more easily on microbrowsers in smart phones and other mobile devices, as well as on desktop and notebook computers. **678, 685, 700**

XML: Extensible Markup Language; format for sharing data that allows Web developers to create customized tags, as well as use predefined tags, used for developing a single Web site whose content can be formatted to display appropriately on various devices. **469, 471, 679, 700**

XSL: Extensible Stylesheet Language; language for creating

a style sheet that describes how to present the data described in an XML document on a Web page. **679**

XSLT: Extensible Stylesheet

Language Transformation; extension of XSL that creates styles sheets that describe how to transform XML documents into other types of documents.

679

Y

Yahoo!, 60, 88, 811

Yahoo! Maps, 129

Yang, Jerry, 811

yottabyte (YB), 354

Young, Neil, 699

Your Life, Calculated, 668

Yourdon, Ed, 649

YouTube, 66, 68, 96, 111, 128, 368, 495, 759, 828

making video and uploading to, 340

Z

Zappacosta, Pierluigi, 289

Z-Buffer, 330

zettabyte (ZB), 354

Zipped files: Type of compressed files that usually have a .zip extension. **189, 427**

Zombie: A compromised computer whose owner is unaware the computer is being controlled remotely by an outsider. **562**

Zombie army: Group of compromised computers connected to a network such as the Internet that are used as part of a network that attacks other networks, usually for nefarious purposes. **562**. *See also Botnet*

Zuckerberg, Mark, 111

CENGAGE  brain.com

Credits

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