Computing Today

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Technology Education

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Technology Education

COMPUTING TODAY

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Preface

INTRODUCTION

The 20th century not only brought us the dawn of the Information Age, but continued to bring us rapid changes in information technology. There is no indication that this rapid rate of change will be slowing—it may even be increasing. As we begin the 21st century, computer literacy will undoubtedly become prerequisite in whatever career a student chooses. The goal of *Computing Today* is to provide students with the basis for understanding the concepts necessary for success in the Information Age. *Computing Today* also endeavors to instill in students an appreciation for the effect of information technology on people and our environment and to give students a basis for building the necessary skill set to succeed in this new, 21st century.

ABOUT THE AUTHORS

Tim and Linda O'Leary live in the American Southwest and spend much of their time engaging instructors and students in conversation about learning. In fact, they have been talking about learning for over 25 years. Something in those early conversations convinced them to write a book, to bring their interest in the learning process to the printed page. Today, they are as concerned as ever about learning, about technology, and about the challenges of presenting material in new ways, both in terms of content and the method of delivery.

A powerful and creative team, Tim combines his years of classroom teaching experience with Linda's background as a consultant and corporate trainer. Tim has taught courses at Stark Technical College in Canton, Ohio, and at Rochester Institute of Technology in upstate New York, and is currently a professor at Arizona State University in Tempe, Arizona. Tim and Linda have talked to and taught students from 8 to 80, all of them with a desire to learn something about computers and the applications that make their lives easier, more interesting, and more productive.

Each new edition of an O'Leary text, supplement, or learning aid has benefited from these students and their instructors who daily stand in front of them (or over their shoulders). *Computing Today* is no exception.

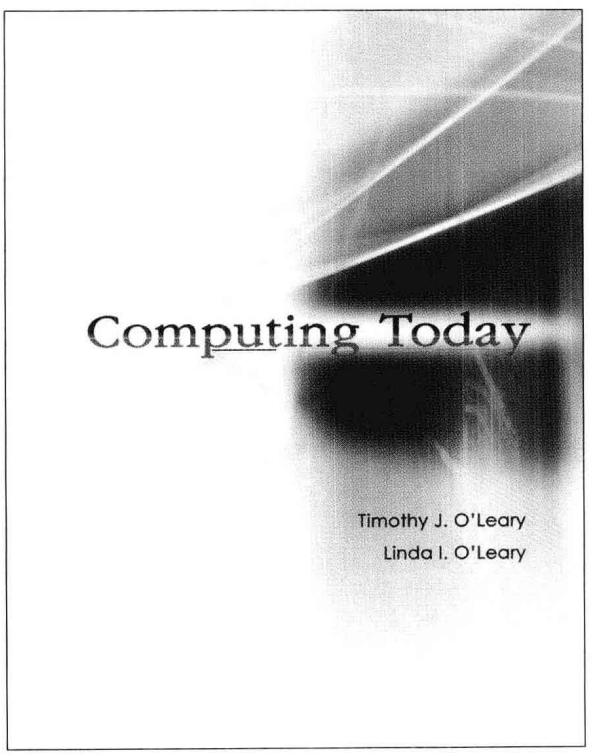
A WORD FROM THE AUTHORS

Times are changing, technology is changing, and this text is changing, too. Do you think the students of today are different from yesterday? Mine are and I'll wager that yours are as well. On the positive side, I am amazed how much effort students put toward things that interest them and things they are convinced are relevant to them. Their effort directed at learning application programs and exploring the Web seems at times limitless. On the other hand, it is difficult to engage them in other equally important topics such as personal privacy and technological advances.

I've changed the way I teach, and this book reflects that. I no longer lecture my students about how important certain concepts like microprocessors, input devices, and utility programs are. Rather, I begin by engaging their

interest by presenting practical tips related to the key concepts, by demonstrating interesting applications that are relevant to their lives, and by focusing on outputs rather than processes. Then, I discuss the concepts and processes.

Motivation and relevance are the keys. This text has several features specifically designed to engage students and to demonstrate the relevance of technology in their lives. These elements are combined with a thorough coverage of the concepts and sound pedagogical devices.



SELECTED FEATURES OF THIS BOOK

- **Visual Chapter Openers** Each chapter begins with a two-page Visual Chapter Opener with large graphics and brief text. The graphics present the structure and organization of the chapter. The text relates the graphics to topics that are covered in the chapter and discusses their importance. The objective of the visual chapter openers is to engage students and provide relevancy and motivation.
- **On the Web Explorations** Within many of the chapters, two or more On the Web Explorations are presented as marginal elements. These explorations encourage students to connect to carefully selected Web sites that provide additional information on key topics. The objective of the Web Explorations is to encourage students to expand their knowledge by using Web resources.

On the Web Explorations

Dragon Soft is a leader in developing continuous-speech systems. To learn more about the company, visit our Web site at

http://www.mhhe.com/oleary/CT05

and select On the Web Explorations from Tim's Toolbox.

- **Tips** Within many of the chapters, Tips are provided that offer advice on a variety of chapter-related issues such as how to efficiently locate information on the Web, how to speed up computer operations, and how to protect against computer viruses. One objective of the Tips is to provide students with assistance on common technology-related problems or issues. The other objective is to motivate students by showing the relevance of concepts presented in the chapter to their everyday lives.

TIPS **Have you ever bought anything online? If not, it's likely that in the future you will join the millions that have. Here are a few suggestions on how to shop online:**

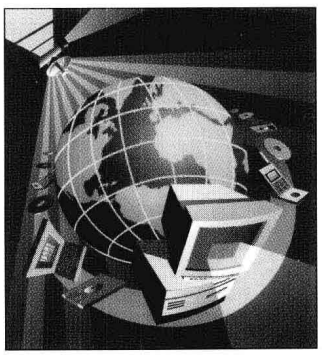
1. **Consult product review sites.** To get evaluations or opinions on products, visit one of the many review sites on the Web such as www.consumersearch.com and www.epinions.com.
2. **Use a shopping bot.** Once you have selected a specific product, enlist a shopping bot or automated shopping assistants to compare prices. Two well-known shopping bots are located at www.mysimon.com and www.shopping.yahoo.com.
3. **Consult vendor review sites.** Of course, price is not everything. Before placing an order with a vendor, check their reputation by visiting vendor review sites such as www.gomez.com and www.bizrate.com.
4. **Select payment option.** Once you have selected the product and the vendor, the final step is to order and pay. Security of your credit card number is critical. Consider payment options available from www.private.buy.com and www.americanexpress.com/privatepayments.

- **Concept Checks** Every chapter contains strategically placed Concept Check boxes. Each box contains questions related to the material just presented. The objective of these Concept Checks is to provide students the opportunity to test their retention of key chapter concepts.

Concept Check

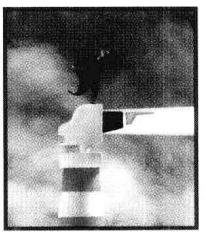
- What is an information system?
- What is required of a competent end user?

- **Making IT Work for You** Based on student surveys, 11 special interest topics have been identified. These topics include downloading music from the Internet, creating personal Web sites, and using the Internet to place free long-distance telephone calls. Each of these 11 special interest topics is presented in a two-page Making IT Work for You section within the relevant chapter. The objective is to engage students by presenting high-interest topics and to motivate them to learn about related concepts in the chapter.



- **Making IT Work Video Series** Based on student interest and chapter content, several Making IT Work for You special interest topics have been selected for special attention. Seven short videos bring these selected topics to life. These videos are available on CD for classroom viewing and on the Web for direct student viewing. One objective of this feature is to motivate students by animating and extending the printed two-page Making IT Work for You presentation in the textbook. The other objective is to provide instructors with a presentation tool for classroom demonstrations that are integrated and further supported by the textbook.
- **Using IT at DVD Direct** Many students find information systems concepts to be very challenging. A series of four cases focused on DVD Direct, a factious Web-based movie rental company have been created. The cases appear at the end of Chapters 12, 13, 14, and 15. They have been written to allow instructors to skip all or some of the cases without losing continuity. The objective of the cases is to engage students in an interesting current application of technology and to demonstrate the relevance and importance of information systems, databases, systems analysis and design, and programming.

- **Careers in IT** Each chapter includes a job description for a different career in IT. These descriptions include job titles, responsibilities, educational requirements, and salary ranges, providing students with real-world examples within the IT field.



- **A Look to the Future** Each chapter concludes with a brief discussion of a specific recent technological advance related to material presented in the chapter. The objective of this feature is to remind students that technology is always changing and to reinforce the importance of staying informed of recent changes.

- **Visual Chapter Summaries** Each chapter ends with a multipage visual chapter summary. Like the chapter openers, the summaries use graphics to present the structure of the chapter and text to provide specifics. Using a columnar arrangement, major concepts are represented by graphics followed by detailed text summaries. The objective of the visual chapter summaries is to provide a detailed summary of key concepts and terms in an engaging and meaningful way.

- **Using Technology** Every chapter has Web-related end-of-chapter exercises that direct students to explore current popular uses of technology. In most cases, the first question requires the student to view one of the Making IT Work for You Web-delivered demonstrations and to respond to a series of related questions. Other questions require Web research. One objective of the Using Technology feature is to provide support for instructors who would prefer their students to view the Making IT Work for You videos on the Web rather than in class. The other objective is to provide a powerful tool to engage and motivate students by providing assignments related to technology that directly relates to them.

- **Expanding Your Knowledge** Every chapter has Web-related end-of-chapter exercises directing students to enhance their depth of knowledge on specific technologies introduced in the chapter. In most cases, one question requires the students to use either their free SimNet Concepts CD-ROM or their Computing Today CD and to respond to a series of related questions. Other questions require Web research into carefully selected topics. One objective of the Expanding Your Knowledge feature is to provide support for instructors who want their students to effectively use the free Interactive CD-ROM. The other objective is to support instructors who want their students to obtain greater in-depth understanding of key technologies.

- **Building Your Portfolio** Every chapter has Web-related end-of-chapter exercises directing students to prepare and to write a one- or two-page paper on critical technology-related issues. Some questions require students to summarize and analyze select emerging technologies addressed in the chapter. Other questions focus on a critical chapter-related privacy, security, and/or ethical issue. Students are required to consider, evaluate, and formulate a position. One objective of the Building Your Portfolio feature is to support instructors who want their students to develop critical thinking and writing skills. Another objective is to provide support for instructors who want their students to create written document(s) recording their technology knowledge. A third objective is to provide support for instructors who want their students to recognize, understand, and analyze key privacy, security, and ethical issues relating to technology.

- **Engaging Students** Having all these features is one thing. Making the students aware of them is another. Like in almost all textbooks, Chapter 1 of this textbook provides an overview and framework for the following chapters. Unlike other textbooks, our Chapter 1 also provides a discussion and overview of each of the above engaging features. One objective of this approach is to support instructors who want to focus their students' attention on any one or on a combination of features. The other objective is to motivate students by highlighting features that are visually interesting and relevant to their lives.
- **Tim's Toolbox** Throughout the pages of the text you will see references to Tim's Toolbox. This is a set of resources for students on the student CD-ROM and on the text's Web site, www.mhhe.com/oleary/CT05. The features inside Tim's Toolbox have been determined by the features on the pages of the text. Tim's Toolbox organizes these features on the CD and the Web site for easy access and reference. Features found in Tim's Toolbox include *Tips, On the Web Explorations, Making IT Work for You, Careers in IT,* practice tests, and more.

Instructor's Guide

RESOURCES FOR INSTRUCTORS

We understand that in today's teaching environment offering a textbook alone is not sufficient to meet the needs of the many different instructors who use our books. To teach effectively, instructors must have a full complement of supplemental resources to assist them in every facet of teaching from preparing for class, to presenting lectures, to assessing students' comprehension. *Computing Today* offers a complete, fully integrated supplements package, as described below.

Instructor's Resource Kit

The Instructor's Resource Kit contains an updated CD-ROM containing the Instructor's Manual in both MS Word and PDF formats, PowerPoint slides, and Brownstone's Diploma test generation software with accompanying test item files for each chapter. The distinctive features of each component of the Instructor's Resource Kit are described below.

- **Instructor's Manual** The Instructor's Manual contains a schedule showing how much time is required to cover the material in the chapter; a list of the chapter competencies; tips for covering difficult material; and answers to the Concept Checks. Also included are references to corresponding topics on the Interactive Companion CD-ROM, answers to all the exercises in the Chapter Review section, and answers to the On the Web Exercises. The manual also includes a helpful introduction that explains the features, benefits, and suggested uses of the IM and an index of concepts and corresponding competencies.
- **PowerPoint Presentation** The PowerPoint presentation is designed to provide instructors with a comprehensive resource for use during lecture. It includes a review of key terms and definitions, figures from the text, along with several new illustrations, anticipated student questions with answers, and additional resources that can be accessed in Internet-enabled classrooms. Also included with the presentation are comprehensive speaker's notes.
- **Testbank** The *Computing Today* edition testbank contains over 3,000 questions categorized by level of learning (definition, concept, and application). This is the same learning scheme that is introduced in the text to provide a valuable testing and reinforcement tool. The test questions are identified by text page number to assist you in planning your exams, and rationales for each answer are also included. Additional test questions, which can be used as pretests and posttests in class, can be found on the Online Learning Center, accessible through our Information Technology Supersite (www.mhhe.com/it).

Tech TV—New Video Series from McGraw-Hill Technology Education

McGraw-Hill Technology Education is pleased to announce a new relationship with Tech TV. Through this partnership, we are able to offer instructors and students new video content directly related to computing that enhances the classroom or lab experience with technology programming from business and society. Video selections from Tech TV programs such as "Cybercrime," "The Screen Savers" and "TechLive" are sometimes edgy and always informative. Use of these videos will help students understand how computing interacts with and contributes to business and society—and will also offer an advance look at emerging technology and devices. These new videos have been developed with the guidance of Professor Donald L. Amoroso of San Diego State

University. Professor Amoroso is an active teacher of large sections and has selected video segments from Tech TV that he knows will work in the classroom. He has prepared written guidance on how to best use these videos to facilitate learning. This new series gives instructors and students more power for teaching and learning in the computing classroom!

Making IT Work Video Series

Available on CD or the Web site, these videos provide cutting-edge context to help students learn the concepts presented in the text. This series of brief video presentations features the author and corresponds to specific Making IT Work for You topics from the text, making it a flexible tool for in-class and Web-delivered demonstrations while engaging students by presenting high-interest topics directly related to the concepts presented in the text. The series includes videos on:

- CD-R Drivers and Music from the Internet
- Creating a Personal Web Site
- Creating an Active Desktop
- Instant Messaging
- Locating Jobs Online
- Using TV Tuner Cards and Video Clips
- Virus Protection

SimNet CD

SimNet is a new interactive computer-based program for student learning and assessment on 77 key computer concepts. SimNet includes a learning or tutorial presentation of each of these 77 concepts, and includes exam questions (both practice questions and assessment questions) for each one.

Computing Today CD

The Computing Today CD contains animations of key concepts, videos relating to select Making IT Work for You applications, and in-depth coverage of select topics. Computing Today CD icons are located in the margins throughout the book to alert students that expanded coverage of the material in the text can be found on their Computing Today CD.

Digital Solutions to Help You Manage Your Course

PageOut—PageOut is our Course Web Site Development Center that offers a syllabus page, URL, McGraw-Hill Online Learning Center content, online exercises and quizzes, gradebook, discussion board, and an area for student Web pages. For more information, visit the PageOut Web site (www.pageout.net).

Online Learning Centers—The Online Learning Center that accompanies *Computing Today* is accessible through our Information Technology Supersite (www.mhhe.com/it). This site provides additional learning and instructional tools developed using the same three-level approach found in the text and supplements. This offers a consistent method for students to enhance their comprehension of the concepts presented in the text.

Online Courses Available—OLCs are your perfect solutions for Internet-based content. Simply put, these Centers are "digital cartridges" that contain a book's pedagogy and supplements. As students read the book, they can go online and take self-grading quizzes or work through interactive exercises. These also provide students appropriate access to lecture materials and other key supplements.

Blackboard.com

WebCT (a product of Universal Learning Technology)

O'Leary Series Applications Lab Manuals

The O'Leary Series computer applications lab manuals for Microsoft Office are available separately, or packaged with *Computing Today*. The O'Leary Series offers a step-by-step approach to developing computer applications skills and is available in both brief and intro-

ductory levels. The introductory level manuals are MOUS Certified and prepare students for the Microsoft Office User Certification Exam.

Skills Assessment

SimNet XPert (Simulated Network Assessment Product) provides a way for you to test students' software skills in a simulated environment. SimNet is available for Microsoft Office 97, Microsoft Office 2000, and Microsoft Office XP. SimNet provides flexibility for you in your course by offering:

- Pretesting options
- Posttesting options
- Course placement testing
- Diagnostic capabilities to reinforce skills
- Proficiency testing to measure skills
- Web or LAN delivery of tests
- Computer-based training tutorials (new for Office XP)
- MOUS preparation exams
- Learning verification reports
- Spanish version

For more information on skills assessment software, please contact your local sales representative, or visit us at www.mhhe.com/it.

Student's Guide

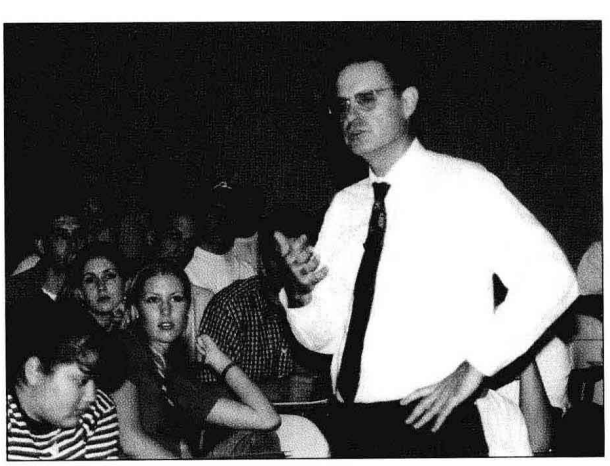
STUDENT'S GUIDE TO THE O'LEARY LEARNING SYSTEM

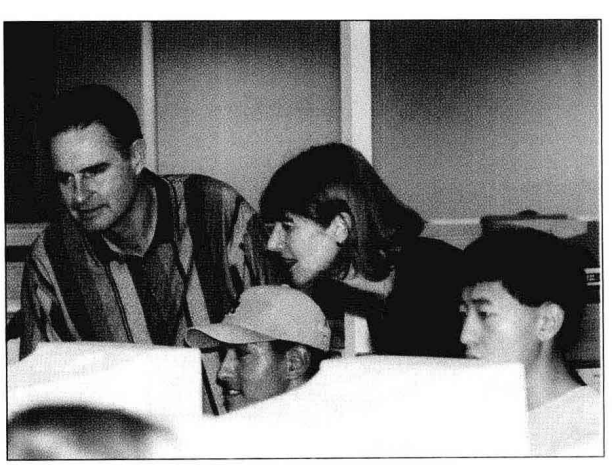
Recently, at the end of the semester, some of my students stopped by my office to say they enjoyed the class and that they "learned something that they could actually use." High praise indeed for a professor! Actually, I had mixed feelings. Of course, it felt good to learn that my students had enjoyed the course. However, it hurt a bit that they were surprised that they learned something useful.

Here's my promise to you:
In the following pages you will find things that you can actually use now as well as that provide a foundation for understanding future technological advances.

As you read the text, notice the "Tips" scattered throughout the book. These tips offer suggestions on a variety of topics from the basics of cleaning a monitor to how to make your computer run faster and smoother. Also, notice the "Making IT Work for You" sections that demonstrate some specific computer applications you might find interesting. For example, one demonstrates how to capture and use television video clips for electronic presentations and another shows how to capture, save, and play music from the Internet.

Many learning aids are built into the text to ensure your success with the material and to make the process of learning rewarding. In the pages that follow, we call your attention to the key features in the text. We also show you supplemental materials, such as the student Online Learning Center, that you should take advantage of to ensure your success in this course.

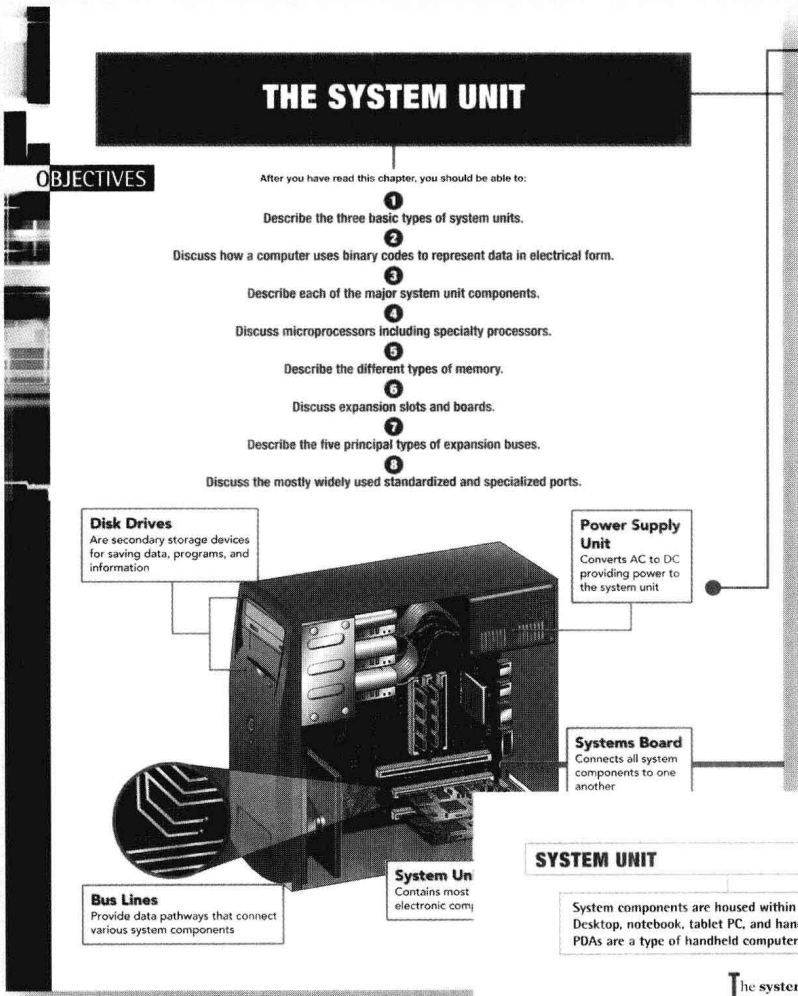




What makes Computing Today such a powerful tool?

Visual Chapter Openers

Each chapter begins with a two-page opening spread that provides the Chapter Competencies and a brief introduction to the chapter. Graphics present the structure and organization of the chapter visually, while text discusses the topics that will be covered and their importance.



Key Terms

Throughout the text, the most important terms are presented in bold type and are defined within the text. You will also find a list of key terms at the end of each chapter and in the glossary at the end of the book.

SYSTEM UNIT

System components are housed within the system unit or system cabinet. Desktop, notebook, tablet PC, and handheld are four types of system units. PDAs are a type of handheld computer.

The **system unit**, also known as the **system cabinet** or **chassis**, is a container that houses most of the electronic components that make up a computer system. All computer systems have a system unit. For microcomputers, there are four basic types (see Figure 6-1):

- **Desktop system units** typically contain the system's electronic components and selected secondary storage devices. Input and output devices, such as a mouse, keyboard, and monitor, are located outside the system unit. This type of system unit is design to be placed either horizontally or vertically. Vertical units are often called **tower models.**
- **Notebook system units** are portable and much smaller. These system units contain the electronic components, selected secondary storage devices, and input devices (keyboard and pointing device). Located outside the system unit, the monitor is attached by hinges. Notebook system units are often called **laptops.**

Figure 6-1 Basic types of system units

How does Computing Today use the Web and provide practical real world tips?

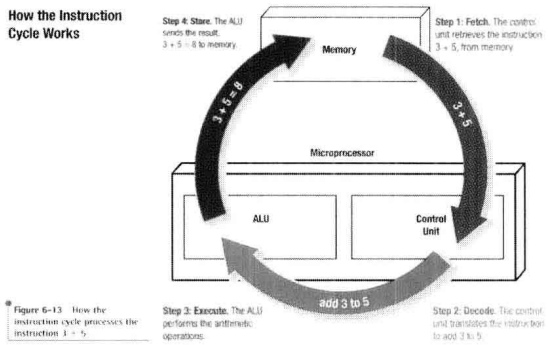


Figure 6-13 How the instruction cycle processes the instruction 3 + 5.

Unit	Speed
Microsecond	Millionth of a second
Nanosecond	Billionth of a second
Picosecond	Trillionth of a second

Figure 6-14 Processing speeds.

There are two types of microprocessor chips.

- **CISC chips:** The most common type of microprocessor is the **complex instruction set computer (CISC) chip.** This design was popularized by Intel and is the basis for their line of microprocessors. It is the most widely used chip design with thousands of programs written specifically for it. Intel's Pentium microprocessors are CISC chips. While Intel is the leading manufacturer of microprocessors, other manufacturers produce microprocessors using a nearly identical design. These chips, referred to as **Intel-compatible** processors, are able to process programs originally written specifically for Intel chips. For example, AMD Corporation produces Intel-compatible chips known as Athlon and Hammer.
- **RISC chips: Reduced instruction set computer (RISC) chips** use fewer instructions. This design is simpler and less costly than CISC chips. The PowerPC is a RISC chip produced by Motorola. SPARC is a RISC chip produced by Sun. These chips are used in many of today's most powerful microcomputers known as **workstations.**

See Figure 6-15 for a table of popular microprocessors.

On the Web Explorations

Motorola is a leader in RISC research and development. To learn more about the company, visit our Web site at http://www.mhhe.com/oleary/CT05 and select On the Web Explorations from Tim's Toolbox.

SPECIALTY PROCESSORS

In addition to microprocessor chips, a variety of more specialized processing chips have been developed. One of the most common is coprocessors. **Co-processors** are specialty chips designed to improve specific computing opera-

On the Web Explorations

Two or more On the Web Explorations appear within nearly every chapter and are presented as marginal elements. These explorations ask you to connect to carefully selected Web sites that provide additional information on key topics, encouraging you to expand your knowledge by using Web resources.

Tips

Tips appear within nearly every chapter and are provided to offer advice on a variety of chapter-related issues, such as how to efficiently locate information on the Web, how to speed up computer operations, and how to protect against computer viruses. Tips assist you with common technology-related problems or issues, and motivate you by showing the relevance of concepts presented in the chapter to everyday life.

TIPS Does your computer seem to be getting slower and slower? Perhaps it's so slow you are thinking about buying a new one. Before doing that, consider the following suggestions that might add a little zip to your current system.

1. **Uninstall programs you no longer need.** Explore the contents of your hard disk and identify programs that you no longer need. If you have Windows XP, use Start/Control Panel/Add/Remove Programs (for Windows 2000 use Start/Settings/Control Panel/Add/Remove Programs) to access the Uninstall feature.
2. **Remove unneeded fonts.** If you have Windows XP use Start/Control Panel/ Fonts in the classic view (for Windows 2000 use Start/Settings/Control Panel/Fonts) to determine the different font types stored on your system. To see a sample of any font type, double-click it. Review the fonts and delete those you will not need.
3. **Empty the Recycle Bin.** If you have either Windows 2000 or Windows XP, files are not removed from your hard disk when you delete them. Rather, they are moved to the Recycle Bin. To empty or remove files from the Recycle Bin, open the Recycle Bin and use File/Empty Recycle Bin.

Concept Check

- What is a system clock? How is it like a bass drum?
- What is a superscalar microprocessor?
- What is clock speed? What how is it measured?

EXPANSION SLOTS AND CARDS

Expansion slots provide an open architecture. Expansion cards provide connections for video, sound, network, TV tuner cards, and more. PC cards are for notebook and handheld computers.

Computers are known for having different kinds of "architectures." Machines that have **closed architecture** are manufactured in such a way that users cannot easily add new devices. Most microcomputers have **open architecture.** They allow users to expand their systems by providing **slots** on the system board. Users can insert optional devices known as **expansion cards** into these slots. (See Figure 6-24.)

Expansion cards are also called **plug-in boards, controller cards, adapter cards,** and **interface cards.** They plug into slots located on the system board. Ports on the cards allow cables to be connected from the expansion cards to devices outside the system unit. (See Figure 6-25.) There are a wide range of different types of expansion cards. Some of the most commonly used expansion cards are:

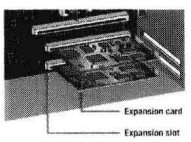


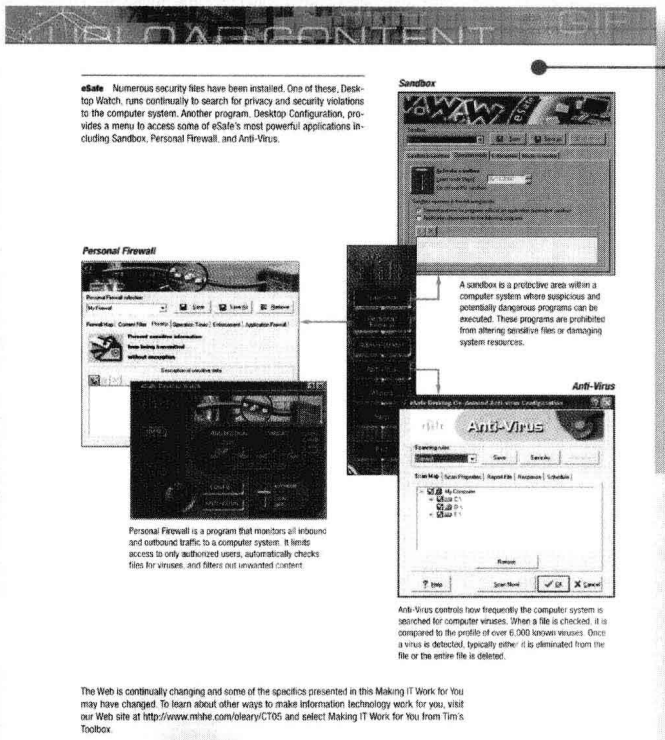
Figure 6-24 Expansion cards fit into slots on the system board.

- **Video cards:** Also known as **graphics cards,** these cards connect the system board to the computer's monitor. The cards convert the internal electronic signals to video signals so they can be displayed on the monitor.
- **Sound cards:** These cards accept audio input from a microphone and convert it into a form that can be processed by the computer. Also, these cards convert internal electronic signals to audio signals so they can be heard from external speakers.

Computing Today Web site

Throughout the text, the Computing Today Web site at http://www.mhhe.com/oleary/CT05 is referenced. The text directs you to this Web site for additional material, Web links, and exercises to boost interest and enhance your comprehension of the material.

How does Computing Today get you involved in current technologies?



The Web is continually changing and some of the specifics presented in this Making IT Work for You may have changed. To learn about other ways to make information technology work for you, visit our Web site at http://www.mhhe.com/oleary/CT05 and select Making IT Work for You from Tim's Toolbox.

Making IT Work for You

Special interest topics are presented in a two-page Making IT Work for You section within the chapter relating to that topic. These topics include protecting against computer viruses, downloading music from the Internet, and using the Internet to place free long-distance telephone calls.

Making IT Work Video Series

Seven of the Making IT Work for You features have been expanded into video presentations available on the Web and from the Computing Today CD. These videos expand and animate the material in the book.

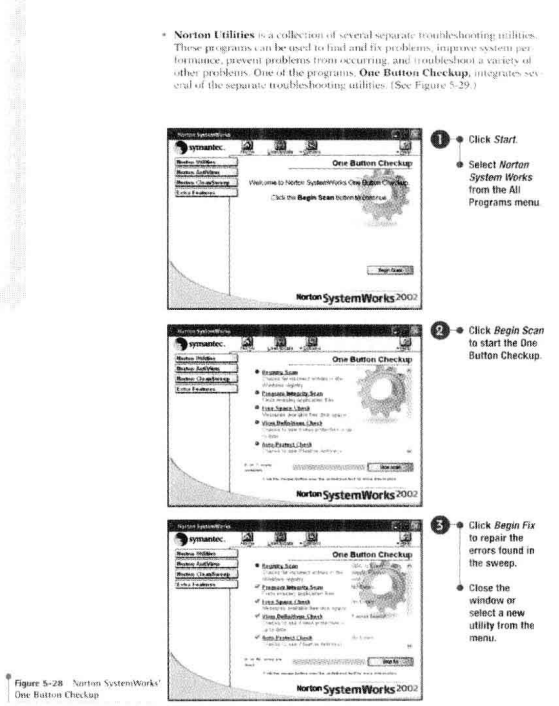
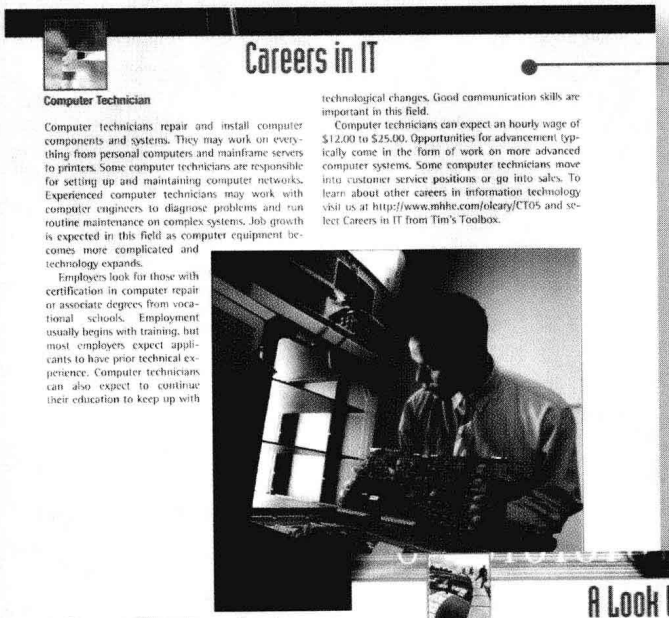


Figure 5-28 Norton SystemWorks' One Button Checkup

How does Computing Today teach you about careers and the future in information technology?



Careers in IT

Computer Technician

Computer technicians repair and install computer components and systems. They may work on everything from personal computers and mainframe servers to printers. Some computer technicians are responsible for setting up and maintaining computer networks. Experienced computer technicians may work with computer engineers to diagnose problems and run routine maintenance on complex systems. Job growth is expected in this field as computer equipment becomes more complicated and technology expands.

Employers look for those with certification in computer repair or associate degrees from vocational schools. Employment usually begins with training, but most employers expect applicants to have prior technical experience. Computer technicians can also expect to continue their education to keep up with technological changes. Good communication skills are important in this field.

Computer technicians can expect an hourly wage of $12.00 to $25.00. Opportunities for advancement typically come in the form of work on more advanced computer systems. Some computer technicians move into customer service positions or go into sales. To learn about other careers in information technology visit us at http://www.mhhe.com/oleary/CT05 and select Careers in IT from Tim's Toolbox.

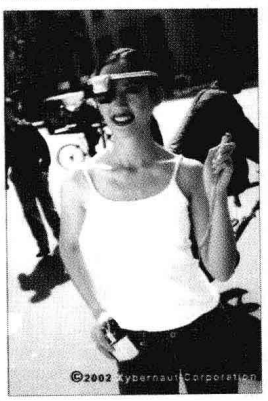
A Look to the Future

Xybernaut Corporation Makes Wearable Computers a Reality

Wouldn't it be nice if you could conveniently access the Internet wirelessly at any time during the day? What if you could send and receive e-mail from your waist-mounted computer? What if you could maintain your personal schedule book, making new appointments with others on the fly? What if you could play interactive games, and surf the Web from anywhere?

Of course you can do all this and more using wireless technology and PDAs. Many people currently use this technology when they are away from their home or office. What if these users could accomplish these tasks with an even smaller, more portable and less intrusive system? Will people be wearing computers rather than carrying them? What if your computer featured a head-mounted display?

Xybernaut Corporation is currently marketing a personal wearable computer called POMA®. The device is described as a personal multimedia appliance. It is composed of a processor that runs Windows CE, a wireless pointing device, and a head-mounted display. The display allows you to see the equivalent of a desktop monitor via a small screen that is worn in front of one eye. This screen is only one inch square and weighs a mere 3 ounces. The device includes an MP3 player that plays songs and displays videos, and abridged versions of Windows Office programs.



Devices made by Xybernaut® are currently evaluated for use in airports by security personal. These devices are currently being used by the U.S. Department of Defense for military applications and by the Toronto Blue Jays to end long lines at ticket windows. When coupled with face recognition technology Xybernaut's Mobile Assistant® V allows security personnel the advantage of portability and instant communication with the command center. Police and security officers may someday use this technology to check IDs and verify your identity. Experts say that wearable computers will be used by surgeons in operating rooms to "view" their patients.

Will we be wearing computers soon? Some of us already are. And some experts predict the majority of us will employ a wearable computer before the end of the decade. Many computer manufacturers are currently working on wearable computers, and there is even a wearable computer fashion show that showcases the latest designs. Many people are already "wearing" their computers, and making use of this mobile technology to read e-mail while waiting in lines or even studying their notes for the next exam. What do you think? Will Americans someday grab their keys and their computers before they leave the house? Will your computer one day be housed in your jacket?

Careers in IT

Some of the fastest growing career opportunities are in information technology. Every chapter includes a job description for a different career in IT. These descriptions include job titles, responsibilities, educational requirements, and salary ranges. Among the careers covered are webmaster, software engineer, and database administrator. You will learn how the material they are studying relates directly to a potential career path.

A Look to the Future

Each chapter concludes with a brief discussion of a recent technological advance related to chapter material, reinforcing the importance of staying informed.

How does Computing Today reinforce key concepts

Visual Chapter Summaries

These summaries appear in at least two pages at the end of each chapter. Using a columnar arrangement, major concepts are presented by graphics followed by detailed text summaries, providing a summary of key concepts and terms in an engaging and meaningful way.

VISUAL SUMMARY

THE SYSTEM UNIT

SYSTEM UNIT

SYSTEM BOARD

System unit (system cabinet or **chassis)** contains electronic components. Four basic types are: **desktop (tower models** positioned vertically), **notebook, tablet PC (convertible and slate),** and handheld. **PDA (personal digital assistant)** most widely used handheld computer.

Electronic Representation

Our voices create continuous **analog** signals. A conversion to **digital** signals is necessary before processing. Data and instructions can be represented electronically with a **two-state** or **binary system** of numbers (0 and 1). Each 0 or 1 is called a **bit.** A **byte** consists of eight bits and represents one character.

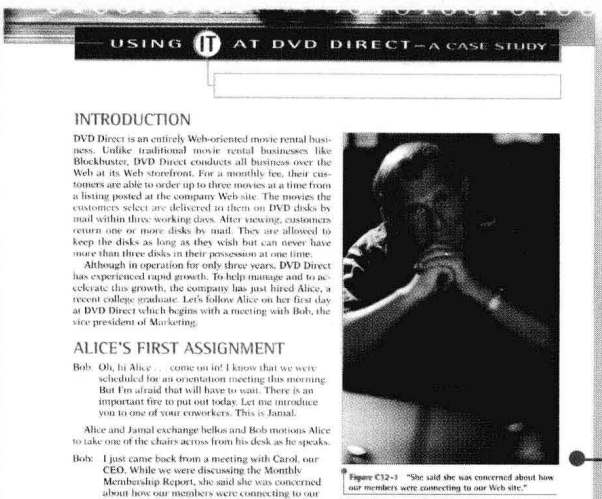
Binary Coding Schemes

Binary coding schemes convert binary data into characters. Three such schemes are:

- **ASCII**—the most widely used for microcomputers.
- **EBCDIC**—developed by IBM; used primarily by large computers.
- **Unicode**—16-bit code; designed to support international languages like Chinese and Japanese.

The **system board (main board** or **motherboard)** connects all system components and allows input and output devices to communicate with the system unit. It is a flat circuit board covered with electronic components.

- **Sockets** provide connection points for **chips (silicon chips, semiconductors, integrated circuits).** Chips mounted on **carrier packages.**
- **Slots** provide connection points for specialized cards or circuit boards.
- **Connecting lines (bus lines)** provide pathways to support communication.



USING IT AT DVD DIRECT—A CASE STUDY

INTRODUCTION

DVD Direct is an entirely Web-oriented movie rental business. Unlike traditional movie rental businesses like Blockbuster, DVD Direct conducts all business over the Web at its Web storefront. For a monthly fee, their customers are able to order up to three movies at a time from a listing posted at the company Web site. The movies the customers select are delivered to them on DVD disks by mail within three working days. After viewing, customers return one or more disks by mail. They are allowed to keep the disks as long as they wish but can never have more than three disks in their possession at one time.

Although in operation for only three years, DVD Direct has experienced rapid growth. To help manage and to accelerate this growth, the company has just hired Alice, a recent college graduate. Let's follow Alice on her first day at DVD Direct which begins with a meeting with Bob, the vice president of Marketing.

ALICE'S FIRST ASSIGNMENT

Bob: Oh, hi Alice . . . come on in! I know that we were scheduled for an orientation meeting this morning. But I'm afraid that will have to wait. There is an important fire to put out today. Let me introduce you to one of your coworkers. This is Jamal.

Alice and Jamal exchange hellos and Bob motions Alice to take one of the chairs across from his desk as he speaks.

Bob: I just came back from a meeting with Carol, our CEO. While we were discussing the Monthly Membership Report, she said she was concerned about how our members were connecting to our Web site. [See Figure C12-1.] This really caught me off guard! Our membership growth has exceeded projections and I had assumed that our meeting was to discuss how to handle all the new members. She requested that her Morning Report be modified to include the percentage of our customers who use high bandwidth, and she wants us to analyze the changes in low bandwidth customers versus high bandwidth customers over the past year.

Bob: Jamal, here is the Monthly Membership Report. I'd like you to review it and then create two profiles. One profile will describe our members who use low bandwidth. The other profile will be for our members who use high bandwidth. I'm interested in any differences or unique characteristics you can uncover.

Bob removes the cover page, hands the rest of the report to Jamal, and hands the cover page to Alice.

Bob: Alice, I want you to focus on these three values. [See Figure C12-2.] Start by locating their source. Then obtain data for low and high bandwidth members for the past twelve months and prepare a graph comparing the two. Start by talking with Dennis. He is the southwest marketing manager and his team developed the Monthly Membership Report.

Figure C12-1 "She said she was concerned about how our members were connecting to our Web site."

Using IT at DVD Direct—A Case Study

Beginning in Chapter 12 and continuing through Chapter 15, Using IT at DVD-Direct—A Case Study is an up-close look at what you might expect to find on the job in the real world. You will follow Alice, a recent college graduate hired as a marketing analyst, as she navigates her way through Accounting, Marketing, Production, Human Resources and Research, gathering and processing data to help manage and accelerate the growth of the three year-old company. This case study is supported with end of chapter exercises and the Computing Today CD.

For a summary of the different types of expansion buses, see Figure 6-31.

Concept Check
What is a bus and what is its function?
Name and describe the two categories of buses.
What are the five principle bus lines? How are they different from one another?

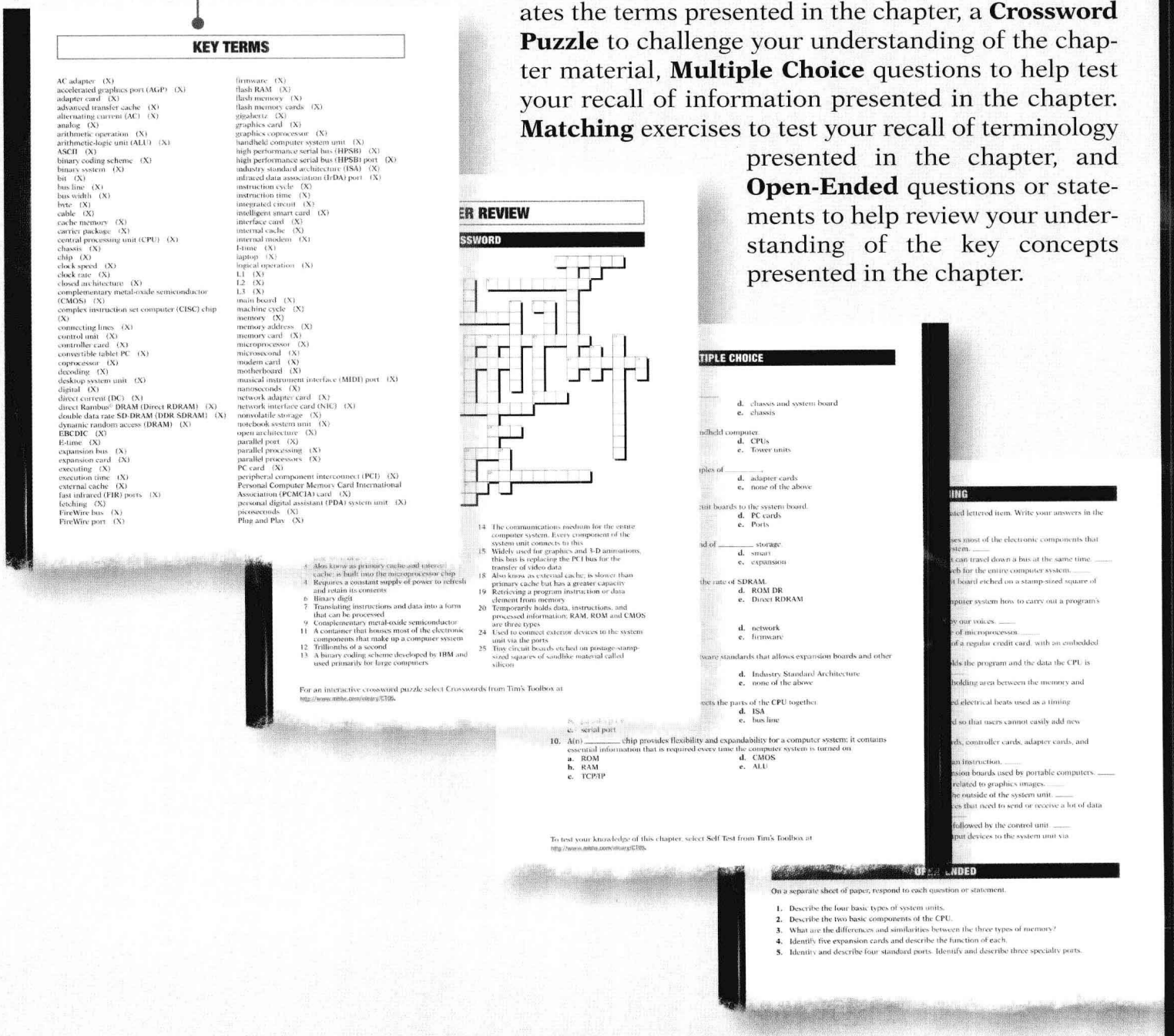
Concept Check

Located at points throughout each chapter, the Concept Check cues you to note which topics have been covered and to self-test your understanding of the material

How does Computing Today help you to evaluate your knowledge of the material in each chapter?

Chapter Review

Following the Visual Summary, the chapter Review includes material designed to review and reinforce chapter content. It includes a **Key Terms List** that reiterates the terms presented in the chapter, a **Crossword Puzzle** to challenge your understanding of the chapter material, **Multiple Choice** questions to help test your recall of information presented in the chapter. **Matching** exercises to test your recall of terminology presented in the chapter, and **Open-Ended** questions or statements to help review your understanding of the key concepts presented in the chapter.



KEY TERMS

AC adapter (X)
accelerated graphics port (AGP) (X)
adapter card (X)
advanced transfer cache (X)
alternating current (AC) (X)
analog (X)
arithmetic operation (X)
arithmetic-logic unit (ALU) (X)
ASCII (X)
binary coding scheme (X)
binary system (X)
bit (X)
bus line (X)
bus width (X)
byte (X)
cable (X)
cache memory (X)
carrier package (X)
central processing unit (CPU) (X)
chassis (X)
chip (X)
clock speed (X)
clock rate (X)
closed architecture (X)
complementary metal-oxide semiconductor (CMOS) (X)
complex instruction set computer (CISC) chip (X)
connecting lines (X)
control unit (X)
controller card (X)
convertible tablet PC (X)
coprocessor (X)
decoding (X)
desktop system unit (X)
digital (X)
direct current (DC) (X)
direct Rambus® DRAM (Direct RDRAM) (X)
double data rate SD-DRAM (DDR SDRAM) (X)
dynamic random access (DRAM) (X)
EBCDIC (X)
E-time (X)
expansion bus (X)
expansion card (X)
executing (X)
execution time (X)
external cache (X)
fast infrared (FIR) ports (X)
fetching (X)
FireWire bus (X)
FireWire port (X)
firmware (X)
flash RAM (X)
flash memory (X)
flash memory cards (X)
gigahertz (X)
graphics card (X)
graphics coprocessor (X)
handheld computer system unit (X)
high performance serial bus (HPSB) (X)
high performance serial bus (HPSB) port (X)
industry standard architecture (ISA) (X)
infrared data association (IrDA) port (X)
instruction cycle (X)
instruction time (X)
integrated circuit (X)
intelligent smart card (X)
interface card (X)
internal cache (X)
internal modem (X)
I-time (X)
laptop (X)
logical operation (X)
L1 (X)
L2 (X)
L3 (X)
main board (X)
machine cycle (X)
memory (X)
memory address (X)
memory card (X)
microprocessor (X)
microsecond (X)
modem card (X)
motherboard (X)
musical instrument interface (MIDI) port (X)
nanoseconds (X)
network adapter card (X)
network interface card (NIC) (X)
nonvolatile storage (X)
notebook system unit (X)
open architecture (X)
parallel port (X)
parallel processing (X)
parallel processors (X)
PC card (X)
peripheral component interconnect (PCI) (X)
Personal Computer Memory Card International Association (PCMCIA) card (X)
personal digital assistant (PDA) system unit (X)
picoseconds (X)
Plug and Play (X)

ER REVIEW

SSWORD

14 The communications medium for the entire computer system. Every component of the system unit connects to this.
15 Widely used for graphics and 3-D animations, this bus is replacing the PCI bus for the transfer of video data.
18 Also know as external cache; is slower than primary cache but has a greater capacity.
19 Retrieving a program instruction or data element from memory.
20 Temporarily holds data, instructions, and processed information; RAM, ROM and CMOS are three types.
24 Used to connect exterior devices to the system unit via the ports.
25 Tiny circuit boards etched on postage-stamp-sized squares of sandlike material called silicon.

5 Also know as primary cache and internal cache; is built into the microprocessor chip.
6 Requires a constant supply of power to refresh and retain its contents.
6 Binary digit.
7 Translating instructions and data into a form that can be processed.
9 Complementary metal-oxide semiconductor.
11 A container that houses most of the electronic components that make up a computer system.
12 Trillionths of a second.
13 A binary coding scheme developed by IBM and used primarily for large computers.

For an interactive crossword puzzle select Crosswords from Tim's Toolbox at http://www.mhhe.com/oleary/CT06.

TIPLE CHOICE

d. chassis and system board
e. chassis

ndheld computer.
d. CPUs
e. Tower units

ples of _____.
d. adapter cards
e. none of the above

tall boards to the system board.
d. PC cards
e. Ports

d of _____ storage.
d. smart
e. expansion

the rate of SDRAM.
d. ROM DR
e. Direct RDRAM

d. network
e. firmware

ware standards that allows expansion boards and other

d. Industry Standard Architecture
e. none of the above

ects the parts of the CPU together.
d. ISA
e. bus line

c. serial port

10. A(n) _____ chip provides flexibility and expandability for a computer system; it contains essential information that is required every time the computer system is turned on.
a. ROM
b. RAM
c. TCP/IP
d. CMOS
e. ALU

To test your knowledge of this chapter, select Self Test from Tim's Toolbox at http://www.mhhe.com/oleary/CT06.

ING

ated lettered item. Write your answers in the

ses most of the electronic components that stem.
t can travel down a bus at the same time.
eb for the entire computer system.
t board etched on a stamp-sized square of

puter system how to carry out a program's

by our voices.
of microprocessor.
of a regular credit card, with an embedded

lds the program and the data the CPU is

holding area between the memory and

ed electrical beats used as a timing

d so that users cannot easily add new

rds, controller cards, adapter cards, and

an instruction.
sion boards used by portable computers.
related to graphics images.
he outside of the system unit.
es that need to send or receive a lot of data

followed by the control unit.
put devices to the system unit via

ENDED

On a separate sheet of paper, respond to each question or statement.

1. Describe the four basic types of system units.
2. Describe the two basic components of the CPU.
3. What are the differences and similarities between the three types of memory?
4. Identify five expansion cards and describe the function of each.
5. Identify and describe four standard ports. Identify and describe three specialty ports.