

COMPUTERS

UPDATED MONTHLY at: www.prenhall.com/long

BRIEF EDITION

SIXTH EDITION



LARRY LONG

NANCY LONG

Brief Edition

Computers

SIXTH EDITION

Larry Long
Nancy Long



Prentice Hall Upper Saddle River, New Jersey 07458

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To Our Children
Troy and Brady,
The motivation for all that we do.

PREFACE TO THE STUDENT

Welcome to the computer revolution. You've taken the first step toward computer competency, the bridge to an amazing realm of adventure and discovery. Once you have read and understood the material in this text and have acquired some hands-on experience with computers, you will be poised to play an active role in this revolution.

- You'll be an intelligent consumer of PCs and related products.
- You'll be better prepared to travel the rapidly expanding information superhighway and you'll know where to exit to get the information or services you need.
- You'll become a participant when conversations at work and school turn to computers and technology.
- You'll be better able to relate your computing and information processing needs to those who can help you.
- You'll know about a wide variety of software and services that can improve your productivity at work and at home, give you much needed information, expand your intellectual and cultural horizons, amaze you, your family, and your friends, and give you endless hours of enjoyment.

Achieving computer competency is the first step in a lifelong journey toward greater knowledge of and interaction with more and better applications of information technology (IT). Computer competency is your ticket to ride. Where you go, how fast you get there, and what you do when you arrive is up to you.

Learning Aids

Computers is supported by a comprehensive learning assistance package that includes these helpful learning aids:

The Long and Long INTERNET BRIDGE

The Long and Long INTERNET BRIDGE <http://www.prenhall.com/long> is a site on the Internet that is accessible from any PC with Internet access. The site, which is designed to help you make the transition between textbook learning and real-world understanding, has three main components:

- **Internet Exercises.** The INTERNET BRIDGE invites you to go online and explore the wonders of the Internet through a comprehensive set of Internet exercises. These entertaining exercises challenge you to learn more about the topics in this book and to do some "serendipitous surfing."
- **Online Interactive Study Guide (ISG).** The INTERNET BRIDGE's comprehensive online Interactive Study Guide gives you an opportunity to sharpen your problem-solving skills and to gauge your understanding of the material in the chapter. For each chapter, the ISG has multiple choice, true/false, and essay quizzes. The built-in grading feature gives you immediate feedback in the form of a report. The report also includes a question-by-question summary with an explanation or hint, your response, and the correct response (if needed).
- **Monthly Technology Update.** The printed book alone is no longer sufficient to keep you abreast of a rapidly advancing technology. The INTERNET BRIDGE's

Monthly Technology Update section helps you bridge this technology gap. Each month the authors post a chapter-by-chapter update to the INTERNET BRIDGE. The monthly update includes summaries of important technological events that occurred during the previous month.

The INTERNET BRIDGE icons in the margins throughout the book relate material in the book to applicable Internet exercises and online *Interactive Study Guide* chapters.

Edu.cis: Distance Learning with Computers

Edu.cis <http://www.prenhall.com/edu.cis> is the online course Internet site for this information technology concepts book and the software skills books by Robert Grauer and Maryann Barber. The site lets you take computer competency courses via distance learning or allows you to enhance your classroom experience. That is, you log on to the *edu.cis page* on the Internet to interact with instructors and classmates, go over chapter summaries, evaluate your understanding of course material, participate in on-line discussion groups, take quizzes and tests, gain access to class information (schedule, homework, and so on), make inquiries about your grades, and much more.

IT Works CD-ROM: Courseware for Information Technology

IT Works is a CD-ROM-based multimedia learning tool that interactively demonstrates many important computer concepts and applications. The IT Works icons in the margins throughout the book relate material in the book to applicable modules in *IT Works* (ISBN: 0-13-366766-9).

You, Computers, and the Future

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Whether you are pursuing a career as an economist, a social worker, a politician, an attorney, a dancer, an accountant, a computer specialist, a sales manager, or virtually any other career, the knowledge you gain from this course ultimately will prove beneficial. Keep your course notes and this book; they will prove to be valuable references in other courses and in your career.

Even though computers are all around us, we are seeing only the tip of the computer-applications iceberg. You are entering the computer era in its infancy. Each class you attend and each page you turn will present a learning experience to help you advance one step closer to an understanding of how computers are making the world a better place in which to live and work.

PREFACE TO THE INSTRUCTOR

The Paradigm Shift

The rules are changing. The criteria by which we make decisions, the way we do things, and even what we do is changing, dramatically. The explosion of the Internet, a rapidly expanding worldwide network of computers, coupled with increased interest in personal computing has resulted in an acceleration in the pace of change. We are now members of an interconnected society where we can shop at online Wal-Mart Supercenters, research our family tree, take virtual tours of thousands of sites from the White House to the pyramids, take courses for college credit, and much, much more, all from a linked PC.

This paradigm shift is causing radical changes in all facets of society, including the way we teach and learn. We are entering a new era of education in which technology plays an increasingly significant role. This is especially true of introductory computer courses in which the integration of the technology is a natural extension of the learning process. After all, the best place to learn about computers is at the computer.

Computers, 6th Edition: A Technology Update

This sixth edition of *Computers* is a *technology update* intended to bring *Computers* abreast with a rampaging technology. About six Internet years pass in one real-time year—the elapsed time between the fifth and sixth editions. For the past 15 years, your peers have told us that we consistently publish the most up-to-date computer concept textbooks. We take great pride in your confidence in us and are committed to offering you and your students a timely IT concepts textbook.

The sixth edition retains the same familiar look and feel as the fifth edition (and also that of *Introduction to Computers and Information Systems*, 5th ed., by Long and Long). The sixth edition reflects hundreds of changes in information technology over the past year, but its organization is the same as that of the fifth edition. This consistency in organization should enable a smooth, seamless transition for those colleges moving from the fifth to the sixth edition. The sixth edition includes:

- Over 100 new or updated images to reflect the latest releases and innovations in software.
- Many new photos showing new hardware and applications (for example, an in-dash automobile PC).
- Scores of updated Internet and America Online examples.
- A new Windows appendix, reflecting both Windows 95 and 98 concepts.
- 1999–2000 capacities and speeds for modems, disks, RAM, processors, printers, and so on.
- Major changes in PC architecture, such as the Pentium II, AGP video technology, and SDRAM.
- Coverage of new issues, such as *spamming*.

A Mixed-Media Learning Tool

This textbook is one component of a *mixed-media learning tool*. Although it can be used as a stand-alone resource, its effectiveness is enhanced when used in conjunction with

the Long and Long INTERNET BRIDGE and edu.cis, its companion Internet sites, IT Works, its multimedia CD-ROM-based courseware, and other media-based ancillaries. The mixed-media orientation of this edition of *Computers* gives students a power boost up the learning curve and instructors an innovative vehicle for delivery of course content. The margin icons throughout the book direct students to applicable INTERNET BRIDGE and IT Works activities.

We've designed the *Computers*, 6th ed., mixed-media resource to give you maximum flexibility in course design and instruction. Use this resource to offer computer competency education in whatever formats meet your student and curriculum needs, from traditional classroom/lab instruction to courses offered completely online via distance learning.

Throughout all aspects of this mixed-media approach to learning, we play to the student's sense of exhilaration by projecting the excitement of the age of information. We have attempted to include something on every printed page, every Internet page, and every CD-ROM-based exploration that will tickle their senses and inspire them to learn more. Eventually anxieties and fears fade away as students recognize the dawning of a new era in their life, an era bursting with opportunity.

The Intro Course

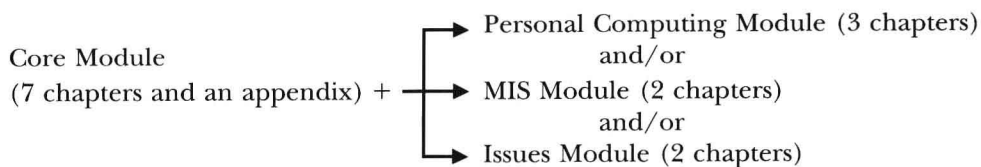
The introductory computer course poses tremendous teaching challenges. To be effective, we must continually change our lecture style and even the vehicle by which we convey content and interact with students. Throughout the term we are continually changing hats. Sometimes we are historians. Much of the time we are scientists presenting technical material. On occasion we are sociologists commenting on social issues. In the same course we now toggle between lecture and lab. Moreover, we are teaching an ever-increasing amount of material to students with a wide range of career objectives and technical abilities. Prentice Hall and we have done everything we can to help you meet this challenge.

Opportunity, challenge, and competition are forcing all of us to become computer competent and to prepare ourselves for a more interconnected world. *Computers*, 6th ed., its mixed-media components, and its ancillary materials provide a launch pad toward these objectives. The target course for this text and its teaching/learning system:

- *Provides overview coverage of computing concepts and applications for a wide variety of introductory courses.* The Right PHit custom-binding solution allows you to select only those modules required to meet your course's educational objectives.
- *Accommodates students from a broad spectrum of disciplines and interests.*
- *May or may not include a laboratory component.* The Right PHit offers an extensive array of optional hands-on laboratory materials.

The Right PHit: Prentice Hall's Custom Binding Solution

Prentice Hall's custom binding program offers the Right PHit for everyone. The Right PHit program allows you to create the book that is right for your course, curriculum, and college. *Computers* is organized into four modules. The Core Module, the foundation of the Right PHit program, can be combined and bound with any or all of the other three conceptual modules.



Core The seven core chapters introduce students to the world of computing, concepts relating to interaction with computers, and fundamental hardware, software, communications concepts, and going online (the Internet, online information services). This module includes Focus on ITs (photo essays) on the making of integrated circuits and on computer history, plus an appendix on the Windows environment.

Personal Computing The three personal computing chapters introduce students to the most popular personal computing applications (word processing, desktop publishing, presentation, spreadsheet, database, browser, graphics, and multimedia). This module includes a buyer's guide Focus on IT.

MIS This two-chapter module introduces students to the various types of information systems (MIS, DSS, expert systems, software agents, and so on) and includes an overview of the latest approaches to systems development.

Issues The two issue-oriented chapters discuss computing in context with society, addressing the many issues raised by the coming of the Information Age. Also, in these chapters students travel the information superhighway, making frequent stops to discuss current and future applications.

The Right PHit program offers a complete solution for introductory computer courses, from concepts to applications. Any component of the Grauer/Barber *Exploring Windows 95* or *Exploring Windows 98* series can be bound with *Computers*, 6th ed., via Prentice Hall's Right PHit program. A complete array of Office 95 and Office 97 titles is available in this custom binding program, as are modules on Visual Basic, Netscape, and Internet Explorer. The *Exploring Windows* series is part of the most extensive array of hands-on laboratory materials offered by any textbook publisher. These hands-on manuals can be bound together with *Computers*, 6th ed., or, if you prefer, bound separately and shrinkwrapped as a package so students can carry them to the lab one at a time. Your Prentice Hall representative will be happy to work with you to identify that combination of student support materials and packaging that best meets the needs of your lab environment.

Popular Features Retained in the 6th Edition

- *Applications-oriented.* The continuing theme throughout the text is applications. Hundreds of applications are presented from on-line universities to telemedicine to robotics.
- *Readability.* All elements (photos, figures, sidebars, and so on) are integrated with the textual material to complement and reinforce learning.
- *Presentation style.* The text and all supplements are written in a style that remains pedagogically sound while communicating the energy and excitement of computers and computing to the student.
- *Currency-plus.* The material actually anticipates the emergence and implementation of computer technology. Included is coverage of digital convergence, Win-

dows 98, ADSL, DVD (digital videodisk), webcasting, hypermedia, audio mail, NCs, online documents (HTML and PDF formats), e-money, data warehousing, intelligent agents, SDRAM, rapid application development using CASE, the Pentium II, AGP video boards, compact disk-rewritable (CD-RW), Zip and SuperDisk drives, morphing, firewalls, flaming, Internet-based videophone links, hot plugging, IrDA ports, workplace ergonomics, and applets.

- *Flexibility.* The text and its mixed-media teaching/learning system are organized to permit maximum flexibility in course design and in the selection, assignment, and presentation of material.
- *Extensive coverage of Internet applications and concepts.* Students are given an opportunity to take an extended trip on the information superhighway. Internet and general online capabilities and concepts are covered in detail.
- *Analogies.* Analogies are used throughout the book to relate information technology concepts they are learning to concepts they already understand, such as airplanes (computer systems), audio CDs (random processing), and cars/parking lots (files/disks).
- *Colorful new Focus on ITs.* Focus on ITs combine dynamic photos with in-depth discussions of topics that are of interest to students: how chips are made, the history of computers, and how to buy a PC.
- *Walkthrough illustrations.* Every attempt has been made to minimize conceptual navigation between the running text and figures. This was done by including relevant information within the figures in easy-to-follow numbered walkthroughs.
- *Mixed-media margin icons.* The INTERNET BRIDGE and IT Works icons in the margin point students to interactive multimedia learning resources on the Internet and the IT Works CD-ROM. The INTERNET BRIDGE icons invite students to check out the Monthly Technology Update, do applicable Internet exercises, and use the Interactive Study Guide to assess their grasp of the material. The IT Works icons identify applicable explorations and challenges. These resources are designed by the authors to complement this book.
- *Chapter pedagogy.* Chapter organization and pedagogy are consistent throughout the text. Each chapter is prefaced by “Let’s Talk” (an introduction to terms in the chapter) and Learning Objectives. In the body of the chapter, all major headings are numbered (1-1, 1-2, and so on) to facilitate selective assignment and to provide an easy cross-reference to all related material in the supplements. Important terms and phrases are highlighted in **boldface** type. Words and phrases to be emphasized appear in *italics*. Informative boxed features, photos, and “Memory Bits” (outlines of key points) are positioned strategically to complement the running text. Each chapter concludes with a Summary Outline and Important Terms, Review Exercises (Concepts; Discussion and Problem Solving), and a Self-test. Margin icons direct students to applicable INTERNET BRIDGE and IT Works activities.

The Computers Teaching/Learning System

Computers, 6th ed., continues the Long and Long tradition of having the most comprehensive, innovative, and effective support package on the market. The teaching/learning system includes the following components.

Long and Long INTERNET BRIDGE

<<http://www.prenhall.com/long>>

The Long and Long INTERNET BRIDGE is designed to help students studying Long and Long resources make the transition between textbook learning and real-world understanding. To use this resource, the student connects to the Internet, navigates to the INTERNET BRIDGE, and clicks on the *Computers*, 6th ed., image. The site offers a variety of activities and services, including these main components:

INTERNET EXERCISES

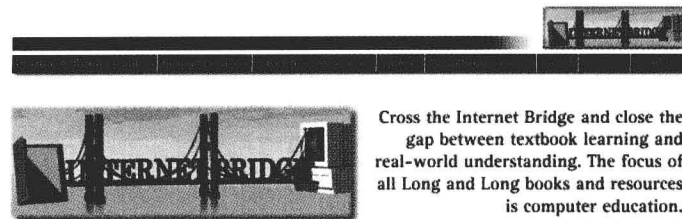
The Internet exercises encourage students to more fully explore computer competency topics while familiarizing themselves with the Internet. The student selects a specific chapter to begin an online adventure that will take him or her around and into the exciting world of computing. The student's journey will include many stops that can increase his or her understanding and appreciation of the technologies that change and embellish our lives.

Each chapter has from one to seven topics (for example, Printers, Telecommuting, Multimedia, and/or Artificial Intelligence), at least one of which is Serendipitous Surfing (for example, movies, sports, or popular culture). Each topic has from three to seven Internet Exercises. For each exercise, the student: 1) reads the exercise; 2) navigates to the applicable Internet site(s); 3) notes the source(s) title(s) and URL(s); 4) finds the requested information; and 5) returns to the topic page and enters the requested information in the response box. When all Internet exercises are completed for a given topic, the student clicks the "Submit Answers" button to e-mail the responses to his or her instructor/grader.

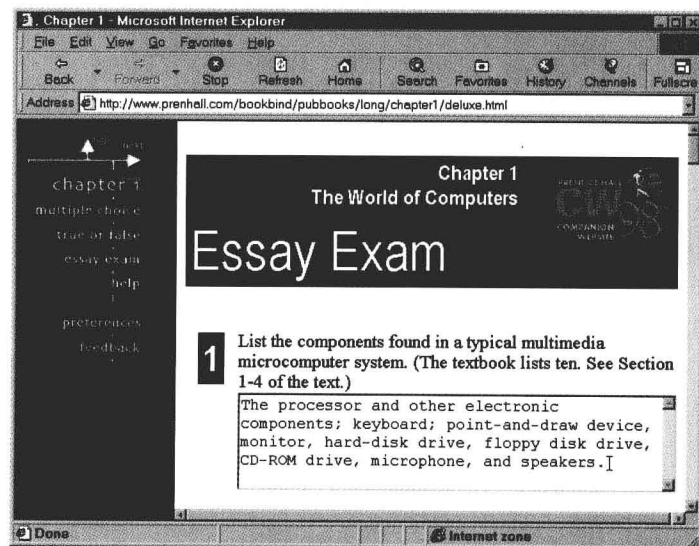
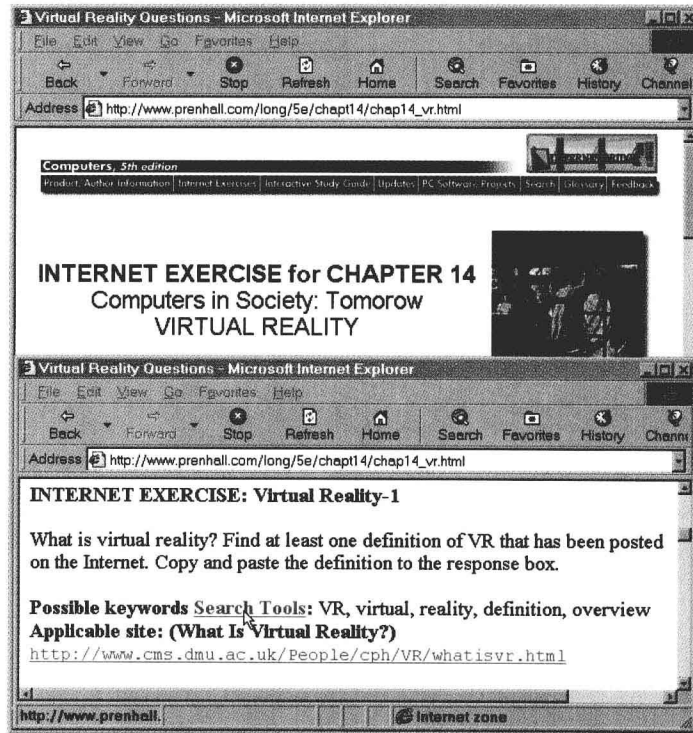
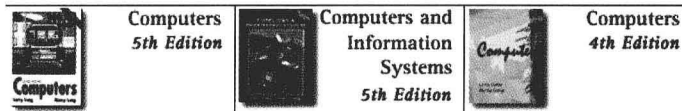
ONLINE INTERACTIVE STUDY GUIDE

The Internet-based Interactive Study Guide (ISG) helps the student learn and retain concepts presented in the text. A drop-down box on the ISG page lets the student navigate directly to the desired chapter. The student can view the chapter learning objectives, then choose from three skills quizzes: multiple choice, true/false, or essay. These quizzes are designed to give students the opportunity to sharpen their problem-solving skills and assess their grasp of concepts.

- **Multiple Choice.** When taking the multiple-choice quiz the student simply clicks the radio button for the correct response for each question. After answering all of the questions, the student submits the answers for automatic grading. A summary report is returned to the student within seconds. The summary report includes the percentage cor-



Welcome to the Long and Long INTERNET BRIDGE



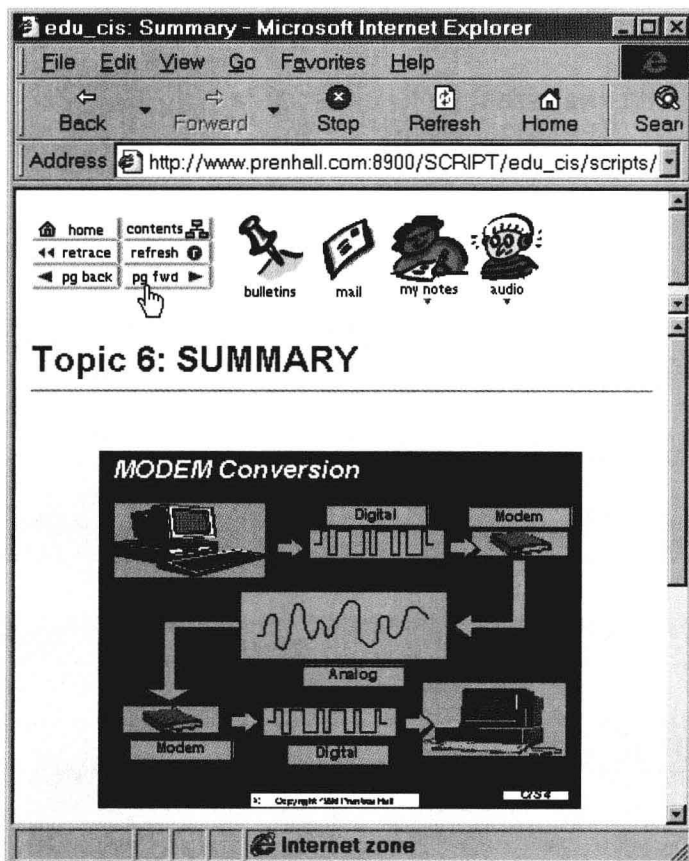
rect, the number of incorrect answers, and the number of unanswered questions. The report also includes a question-by-question summary with an explanation, the student's response, and the correct response (if needed).

- *True/False.* The true/false interface and summary report is like that of a multiple-choice quiz.
- *Essay Exam.* The essay exam includes a text response box for each question into which the student inserts the answer.

Most questions have hints or they provide a reference to the applicable section in the text. After completing a quiz, students have the option of routing the answers to their e-mail addresses and/or to that of their instructor. The summary report is sent for multiple-choice and true/false quizzes, and the questions and answers are sent for the essay exams.

MONTHLY TECHNOLOGY UPDATE

Each month we compile a summary of important changes and happenings in the world of computing. These summaries, which are keyed to chapters, are intended to help keep the student's learning experience current with a rampaging technology.



Edu.cis: The Online Course Page

Edu.cis <http://www.prenhall.com/edu.cis> is Prentice Hall's Internet site supporting online computer competency courses. The site supports this book and its companion lab book, *Office Professional 97* by Grauer and Barber. Edu.cis offers you and your colleagues all the advantages of a custom-built program, but without the hassle. If you are considering offering all or part of your course via distance learning, then edu.cis can help you create and implement a high-quality course with relative ease. If you already offer an online course, then edu.cis can assist you in formalizing your course. Edu.cis gives you the flexibility to integrate your custom material with the continuously updated Long and Long content. The edu.cis is packaged within the WebCT course authoring tool so that you can customize the content to meet the most demanding curriculum requirements. Whether you are off and running or this is your first online course, edu.cis can save you countless hours of preparation and course administration time.

Edu.cis includes these and many other features in each of its 28 learning modules: an introduction, objectives, summaries of key concepts, online activities that use the Internet and Office 97, offline activities that integrate the texts with Web content, self-check exercises, online quizzes (auto-scored and recorded), test item database and test preparation tools (auto-

scored and recorded), e-mail accounts for students and instructors, and a bulletin board primed with interesting discussion topics. A wizard program guides you through

the initial stages of course development, including the creation of a password-protected course home page. The *Course Management* feature automatically grades online tests and records scores in your electronic grade book. The *Progress Tracking* feature lets you monitor individual and overall student progress. The *Content Tracking* feature tells you how often and for how long each and every student visits an *edu.cis* page. The WebCT shell also lets you integrate files without using HTML.

IT Works CD-ROM: Courseware for Information Technology

- *IT Works CD-ROM: Courseware for Information Technology*. Accompanying *Computers*, 6th ed., is the most comprehensive and exciting multimedia courseware ever produced for introductory computing education (0-13-366766-9).

Prentice Hall has made a significant commitment and contribution to introductory computer education with the release of the IT Works CD-ROM. The IT (Information Technology) Works CD-ROM represents a new generation in college-level courseware. IT Works is an innovative multimedia educational tool that can work one-on-one with students to demonstrate interactively many important computer concepts and applications. This extremely visual and interactive courseware employs sound, motion video, colorful high-resolution graphics, and animation. Plan on students spending many informative and fun-filled hours with IT Works.

The initial version sports three modules, each of which contains the following main menu options: *Exploration* (teaches important concepts and applications); *Challenge* (tests the student's knowledge of the subject); *Review* (multiple-choice and true/false questions); *Video* (video vignettes); and *Glossary*. Cross-references to the multimedia Explorations and Challenges are included in the margins throughout the book.

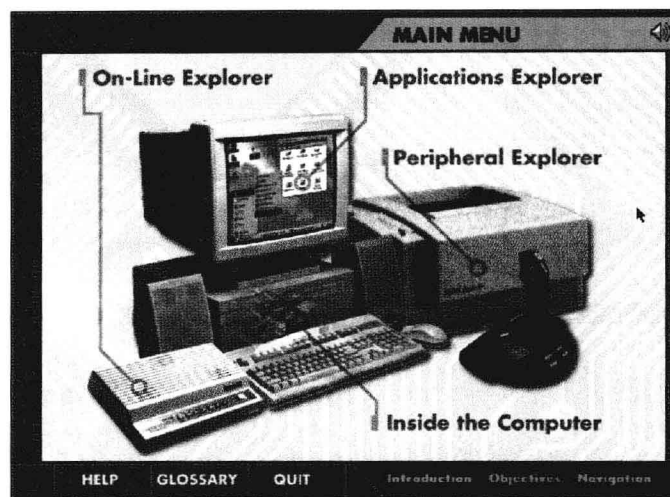
Computer Explorer. This explorer exams the system unit, inside and out (front and rear). The student simply clicks on a component to learn more about it.

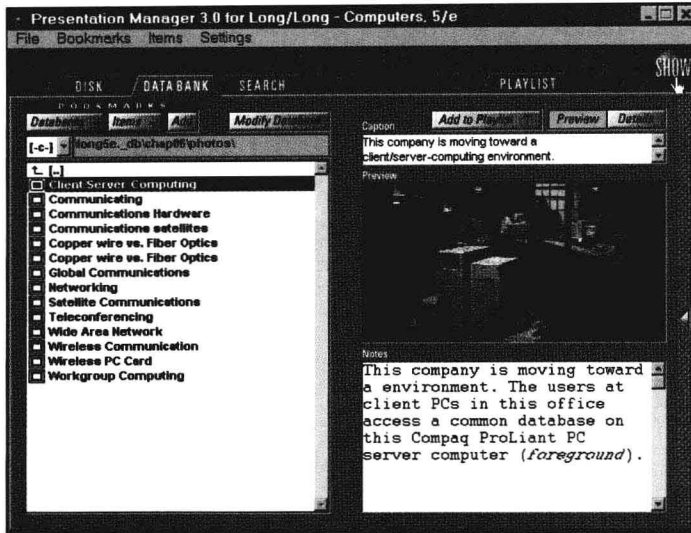
Peripherals Explorer. This Peripherals Explorer activity introduces you to common input/output devices, storage devices, and storage media you might configure with a PC.

Online Explorer. This explorer simulates going on-line. The student can "log on" and learn to navigate the Internet, America Online, and a BBS.

Applications Explorer. The Applications Explorer gives the student a better view of what software is available. They can explore various applications in four software categories: productivity, multiuser applications, home/personal, and system software.

IT Works, like the technology, is dynamic—ever changing and growing. As your needs change, so will *IT Works*.





Computers Presentation Manager CD-ROM

The Presentation Manager is a truly user-friendly PC-compatible presentation program that enables you to integrate Prentice Hall-supplied resources with your own for vibrant multimedia lectures. The *Computers Presentation Manager* CD-ROM contains hundreds of images and many videos that can be organized to meet your presentation needs. The CD-ROM contains all of the figures in the text and over one hundred photo images from the book and elsewhere, plus a variety of video vignettes. All of these resources are organized by chapter for your convenience. When putting together the resources for a particular lecture, simply use the key word search and preview feature to find exactly what you need. You can also integrate images of your own; and the software enables you to include (or modify) notes for each image or video (0-13-081910-7).

PH Custom Test

PH Custom Test is an integrated PC-compatible test-generation and classroom-management software package. The package permits instructors to design and create tests, to maintain student records, and to provide on-line practice testing for students (0-13-081918-2).

Test Item File

The *Test Item File* contains thousands of multiple-choice, true/false, essay, and matching questions. The questions are listed by numbered section head. The *Test Item File* diskettes are distributed for use with PH Custom Test software (0-13-081914-X).

Instructor's Resource Manual (IRM)

The *IRM* contains teaching hints, references to other resources, PowerPoint and acetate images, lecture notes, key terms with definitions, solutions to review exercises, and much more (0-13-081913-1). Also available on the Long and Long INTERNET BRIDGE.

Color Transparency Acetates

Approximately one-hundred color transparency acetates, which support material in the text, are provided to facilitate in-class explanation (0-13-081915-8). Also available on the Long and Long INTERNET BRIDGE.

PowerPoint Slides

Several hundred colorful and illustrative PowerPoint slides are available for use with Microsoft PowerPoint. The PowerPoint slides are distributed as individual files so they can be integrated into your multimedia presentations. Available on the Presentation Manager CD-ROM and on the Long and Long INTERNET BRIDGE.

Computer Chronicles Video Library

Prentice Hall and Computer Chronicles have joined forces to provide you with a video library that offers a variety of documentary and feature-style stories on computers and applications of information technology (0-13-848060-5).

Author Link

If you have questions about the text, its package, or course planning, call us (see the *IRM* for number) or contact us via the INTERNET BRIDGE authors' page (click on the "Feedback" option).

Acknowledgments

A major mixed-media learning tool like *Computers*, 6th ed., and all its ancillaries is not simply written by its authors. That's the easy part. Literally hundreds of people and almost one hundred companies participated in the creation of *Computers* and its many supporting elements.

We would like to single out a few of the many people at Prentice Hall who made major contributions to this project. Acquisitions Editor David Alexander spearheaded the effort with zeal and vision. Production Manager Bruce Kaplan and copy editor Anne Graydon added just the right mix of patience and creativity. The end-product is proof that these and the following Prentice Hall professionals are committed to excellence: Lori Cardillo, P. J. Boardman, Carolyn Henderson, and Keith Kryszczun in Editorial; Nancy Evans, Kris King, Audra Silverie, and Greg Christofferson in Marketing; Joanne Jay, Paul Smolenski, Lorraine Patsco, Dave Salierno, Veronica Schwartz, Christy Mahon, and Richard Bretan in Production and Manufacturing; Ted Tolles, David Nusspickel, Phyllis Bregman, and Heidi Lobecker in New Media. Our good friend Henry Rowe provided valuable feedback and co-authored several of the supplements.

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6TH EDITION:

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For previous editions, reviewers include:

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Stephanie Chenault, The College of Charleston; Eli Cohen, Wichita State University; William Cornette, Southwest Missouri State University; Timothy Gottlebeir, North Lake College; Vernon Griffin, Austin Community College; Sandra Brown, Finger Lakes Community College; Mike Michaelson, Palomar College; Domingo Molina, Texas Southmost College; Joseph Morrell, Metropolitan State College of Denver; Patricia Nettnin, Finger Lakes Community College; Anthony Nowakowski, State University of New York College at Buffalo; Michael Padbury, Arapahoe Community College; Carl Ubelacker, Cincinnati State Technical and Community College.

3RD EDITION:

Ray Fanselau, American River College; Fred Homeyer, Angelo State University; Robert Keim, Arizona State University; Carl Clavadetscher, California Polytechnic State University, Pomona; Barry Floyd, California Polytechnic State University, San Luis Obispo; Dr. Diane Visor, University of Central Oklahoma; Dr. Diane Fischer, Dowling College; Dr. Adolph Katz, Fairfield University; Constance Knapp, Pace University; Dr. John Sanford, Philadelphia College of Textiles and Science; Peter Irwin, Richland College; Al Schroeder, Richland College; Amir Afzal, Strayer College; James Johnson, Valencia Community College.

2ND EDITION:

Michael J. Belgard, Bryant and Stratton College; Roy Bunch, Chemeketa Community College; Marvin Daugherty, Indiana Vocational Technical College; Joyce Derocher, Bay de Noc Community College; Kirk L. Gibson, City College of San Francisco; Randy Goldberg, Marist College; Don Hall, Manatee Community College; Seth Hock, Columbus State Community College; Dr. M. B. Kahn, California State University at Long Beach; Michael A. Kelly, City College of San Francisco; Constance K. Knapp, CSP, Pace University; Sandra Lehmann, Moraine Park Technical College; William McTammany, Florida Community College at Jacksonville; Margaret J. Moore, Coastal Carolina Community College; Thomas H. Miller, University of Idaho; Anne L. Olsen, Wingate College; Verale Phillips, Cincinnati Technical College; Mark Seagroves, Wingate College; Bari Siddique, Texas Southmost College; Dr. Joseph Williams, University of Texas at Austin; Larry B. Wintermeyer, Chemeketa Community College; Floyd Jay Winters, Manatee Community College.

1ST EDITION:

Sally Anthony, San Diego State University; Harvey Blessing, Essex Community College; Wayne Bowen, Black Hawk Community College; Michael Brown, DeVry Institute of Technology, Chicago; J. Patrick Fenton, West Valley College; Ken Griffin, University of Central Arkansas; Nancy Harrington, Trident Technical College; Grace C. Hertlein, California State University; Shirley Hill, California State University; Cynthia Kachik, Santa Fe Community College; Sandra Lehmann, Moraine Park Technical Institute; Michael Lichtenstein, DeVry Institute of Technology, Chicago; Dennis Martin, Kennebec Valley Vocational Technical Institute; William McDaniel, Jr., Northern Virginia Community College at Alexandria; Edward Nock, DeVry Institute of Technology, Columbus; Lewis Noe, Ivy Technical Institute; Frank O'Brien, Milwaukee Technical College; Alvin Ollenburger, University of Minnesota; Beverly Oswalt, University of Central Arkansas; James Phillips, Lexington Community College; Nancy Roberts, Lesley College; Richardson Siebert, Morton College; Bob Spear, Prince George's Community College; Thomas Voight, Franklin University.

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LARRY LONG, Ph.D.

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