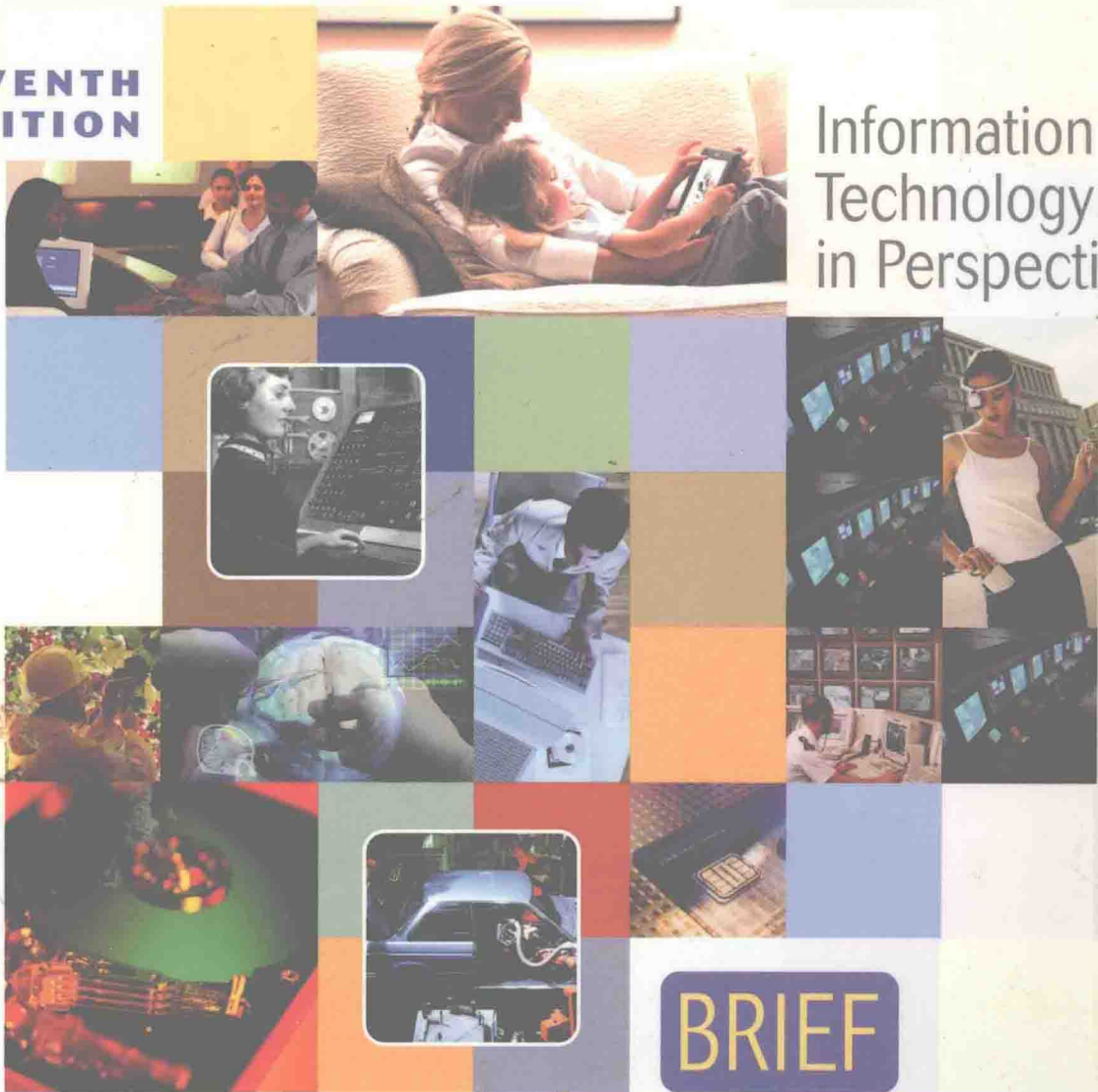


# COMPUTERS

**ELEVENTH  
EDITION**

# Information Technology in Perspective



# Larry Long - Nancy Long



**BRIEF EDITION**

# **COMPUTERS**

**INFORMATION TECHNOLOGY  
IN PERSPECTIVE**

**ELEVENTH EDITION**



**Larry Long  
and  
Nancy Long**



Upper Saddle River, New Jersey 07458

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BRIEF EDITION

# COMPUTERS

INFORMATION TECHNOLOGY  
IN PERSPECTIVE



*To our children,  
Troy and Brady,  
The motivation for all we do.*

## **COVER CREDITS**

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# PREFACE TO THE STUDENT

Welcome to the computer and information technology revolution. You've taken the first step toward information technology (IT) 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 Internet and take advantage of its wealth of resources and services.
- 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 IT competency is the first step in a lifelong journey toward greater knowledge and interaction with more and better applications of IT. IT competency is your ticket to ride. Where you go, how fast you get there, and what you do when you arrive are up to you.

## LEARNING AIDS

Each chapter contains several helpful learning aids that can help you understand and retain information technology concepts and terminology. The two-page chapter opening has two learning aids:

- *Learning Objectives.* The learning objectives give you a target for learning for each numbered section.
- *Why This Chapter Is Important to You.* This learning aid serves two purposes. First, it provides an overview of chapter content and, second, it offers compelling reasons why learning the material can help you achieve important life goals.

The body of the chapter has a learning aid at the beginning and end of each numbered section.

- *Why This Section Is Important to You.* Each section begins with a statement that answers the question, "Why do I need to know this?" There is a natural motivation to learn when you know the "Why?"
- *Section Self-Check.* These objective questions (multiple-choice and true-false) are designed to test and reinforce your knowledge of the section's content. Answers for these questions are provided at the back of the book.

The end-of-chapter material includes an extensive array of learning aids.

- *Chapter Summary.* Every boldface term is included in a section-by-section summary of the chapter.
- *Key Terms.* Key terms are listed in alphabetical order with cross-references to the pages where the terms are introduced.
- *Matching.* Here you match a word or a phrase to 15 terms or concepts from the chapter. Answers to this matching exercise are provided at the back of the book.
- *Chapter Self-Check.* The Chapter Self-Check, which is organized by numbered section, is an extension of the Section Self-Check; that is, it contains more of the same types of questions to assess your understanding of the material. Answers to these exercises are provided at the back of the book.

- *IT Ethics and Issues.* Several scenarios introduce important information technology ethical considerations and issues. Each scenario has discussion questions that encourage critical thinking and/or promote a lively in-class debate.
- *Discussion and Problem Solving.* These questions invite group discussion or individual/group problem solving related to concepts presented in the chapter.
- *Focus on Personal Computing.* Each chapter has exercises designed to expand your personal computing horizons, all within the context of chapter content.
- *Online Exercises.* The Long and Long Companion Website invites you to go online and explore the wonders of the Internet through a comprehensive set of Internet exercises. These entertaining exercises invite you to learn more about the topics in this book and to do some serendipitous (just-for-fun) surfing.

*Computers* is supported by a comprehensive mixed-media learning assistance package. The Long and Long Companion Website at [www.prenhall.com/long](http://www.prenhall.com/long) includes *Online Exercises*, *Web Projects*, *Internet Links*, an *Interactive Study Guide*, and much more—all designed to help you learn about computers and information technology. Other online learning tools are described in the Preface to the Instructor.

## **YOU, COMPUTERS, AND THE FUTURE**

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 your 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 information technology iceberg. You are entering the IT era in its infancy. Each class you attend and each page you turn offers a learning experience that takes you one step closer to an understanding of how computers and IT are making the world a better place in which to live and work.



# PREFACE TO THE INSTRUCTOR

Everything seems to be changing—at home, at work, during leisure, and in education. The forces behind this change, computers and information technology (IT), are the reason we now live in an interconnected society. *Computers*, 11th edition, captures this paradigm shift in societal trends in a way that instills in students an urgent desire to learn and to play an active role in this technology revolution.

## MEETING THE CHALLENGES OF TEACHING INTRODUCTORY IT COURSES

The introductory IT course has its teaching challenges. Throughout the term we are historians, scientists, and, on occasion, sociologists. In the same course we now toggle between lecture, lab, and, for some, distance learning via the Internet. If that's not enough, we teach an ever-increasing amount of material to students with a wide range of career objectives and technical abilities. *Computers* and its extensive teaching/learning system are written and designed to give you what you want and need to meet these challenges.

## OBJECTIVES FOR THE ELEVENTH EDITION OF COMPUTERS

We had these primary objectives as we began writing this eleventh edition of *Computers*.

- *Make content relevant to the student.* Throughout the book, we make learning about IT a very personal experience. Each chapter begins with “Why This Chapter Is Important to You” and each major section begins with “Why This Section Is Important to You.”
- *Motivate the student to learn.* The text and all supplements are written in a style that remains pedagogically sound while communicating the energy and excitement of IT to the student. We want the information in this book to be absorbed, retained, and enjoyed.
- *Present the right content at the right level for IT competency.* We cover only that material which is appropriate for *modern* IT competency. We feel an obligation to present topics at depths consistent with introductory learning. Our focus is on information that will have an impact on the student's ability to cope with the IT revolution.
- *Create content that reflects the state-of-the-art of the technology.* We are committed to maintaining our position as the most current IT concepts book available.
- *Streamline the presentation of material.* We have streamlined the presentation, eliminating those boxed items that may be interesting, but are not critical to chapter concepts or IT competency. This streamlining effort is in response to faculty and students who tell us they want a book that presents important material in a straightforward manner without extraneous clutter. The result is a cleaner, more easily absorbed presentation.
- *Present IT ethics in more depth.* An appreciation for IT ethics has emerged as a core topic for college graduates. A chapter is devoted to IT ethics. Each chapter has several *IT Ethics and Issues* scenarios with probing discussion questions designed to spur lively in-class discussions. Also, the *Discussion and Problem Solving* section has numerous engaging discussion questions on IT issues.
- *Cover the Internet in a way that reflects its true impact on society.* Chapters 3 and 9 are devoted to the Internet, and the Net is mentioned or discussed hundreds of times throughout the book. We are an interconnected society and it is our obligation to present the breadth of Internet applications, examine timely Internet issues, and gaze into the future of the Net.
- *Give professors plenty of 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.

- *Emphasize personal computing.* Students enjoy personal computing, so we take every opportunity to relate terms and concepts to their personal computing experiences.
- *Make this edition transition friendly.* *Computers*, 11th edition, was written to enable a smooth, seamless transition for those colleges moving from previous editions of *Computers*.

## COMPUTERS IS AN ANNUAL EDITION

*Computers* is updated annually, and each year we make thousands of changes to bring *Computers* abreast with a rampaging technology. Just look at what has happened in one year since the last edition.

- Instant messaging emerged as a major communications tool in the corporate world.
- Open source software development is going mainstream.
- Broadband has reached critical mass in many geographic areas enabling the widespread implementation Net-based applications such as video-on-demand, grid computing, and videoconferencing.
- Chip technology has gone from microns to nanometers.
- De facto standards have emerged for rewritable DVD and short-range wireless communications.
- Home networking has become commonplace.
- Internet gaming has exploded.
- New IT ethics issues, such as the use of facial recognition systems, have emerged.
- People routinely check their e-mail and chat via cell phones.
- Hard disk storage capacities have doubled.
- The Internet is the conduit for most international calls.

## CHANGES IN THE ELEVENTH EDITION

One reason that *Computers* has remained the choice of thousands of your colleagues through ten editions is because we try very hard to evolve with your needs and give you the features you need to teach successful courses. In that regard, this edition has several very visible changes.

- *Reorganized to meet emerging IT educational needs.* A number of changes have been made to the overall organization of the book. To provide a better fit for the semester format, the full book now has a Getting Started section and 12 chapters, one less than the 10th edition. “Going Online” is moved from Chapter 7 to Chapter 3. The Brief edition, which was previously the Getting Started plus 10 chapters, is now the Getting Started plus eight chapters.
- *Expanded “Getting Started” section.* Unique to introductory IT books, the very visual Getting Started section is expanded, to help jumpstart the student’s personal computing experience and enable leveling of IT understanding. This popular section introduces the essential information students need to get them up and running—hardware basics, GUI/operating system concepts, file management, networking and Internet access concepts, and an introduction to using word processing, e-mail, Internet browser, and instant messaging software.
- *Expanded end-of-chapter material.* The chapter review materials are significantly enhanced from previous editions. The *Chapter Summary* and *Discussion and Problem Solving* elements are continued and several new aids are added, including *Key Terms* (with page references), *Matching*, *Chapter Self-Check* (a supplement to *Section Self-Checks*), *IT Ethics and Issues* (scenarios and discussion), *Focus on Personal Computing* (hands-on PC exercises), and *Online Exercises* (references to the companion Web site).
- *New margin elements: The Crystal Ball and Personal Computing.* These short, to-the-point sidebars give students some solid advice on how to prepare for the future and get the absolute most of their personal computing experience. Both are written in first person by author Larry Long. *The Crystal Ball* offers author predictions on information technology from 3 to 10 years into the future. The Crystal Ball looks to the future on many topics, such as health care and personal communications. *Personal Computing* contains tips, hints, and recommendations that can enhance the student’s personal computing experience.



THE CRYSTAL BALL

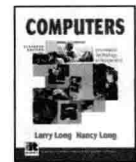
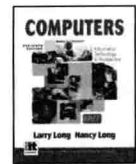


PERSONAL COMPUTING

# A COMPUTERS EDITION FOR EVERY COURSE

*Computers* comes in two editions.

- *The Brief Edition.* Eight core chapters, plus a *Getting Started* section at the beginning of the book, introduce students to the world of information technology: concepts relating to interaction with computers; fundamental hardware, software, and communications concepts; going online (the Internet and its applications); and IT ethics and issues. The brief book includes three colorful *IT Illustrated* modules: computer history, the making of integrated circuits, and a PC buyer's guide.
- *The Full Edition.* The full edition has four additional chapters. The student is introduced to the cyberworld, from e-commerce to Web site development. A *two-chapter* sequence introduces students to the various types of information systems and includes an overview of the latest approaches to system development. The focus of the last chapter is the future: IT careers, robotics, and future IT applications.



## THE COMPUTERS TEACHING/LEARNING SYSTEM

*Computers*, 11th edition, continues the Long and Long tradition of having the most comprehensive, innovative, and effective support package on the market. The book is but one component of a comprehensive *mixed-media teaching/learning system* that is designed to give you maximum flexibility in course design and instruction. Use these resources to offer IT competency education in whatever formats meet your student and curriculum needs.

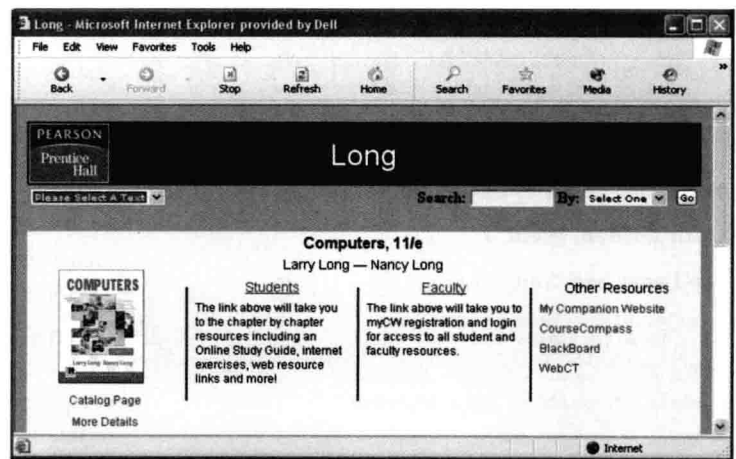
## TOOLS FOR ONLINE LEARNING

A wealth of online learning tools are available to facilitate the teaching/learning process.

### Long and Long Companion Website: [www.prenhall.com/long](http://www.prenhall.com/long)

The Companion Website is customizable with real-time news, headlines, and current events and it offers a variety of activities and services, including downloadable supplements. These resources complement student learning.

- *Internet Exercises.* The Internet exercises encourage students to explore more fully IT competency topics while familiarizing themselves with the Internet. Each chapter has an Internet exercise for each of the special interest sidebars as well as an additional 2-4 exercises focusing on chapter specific topics and real-world issues.
- *Interactive Study Guide.* The Interactive Study Guide helps the student learn and retain concepts presented in the text. The student can choose from four skills quizzes: multiple choice, true or false, matching, or essay. A summary report is returned to the student within seconds. After completing a quiz, the student has the option of routing the answers to his or her e-mail address and/or to that of the instructor.
- *Online End-of-Chapter Materials.*
- *Web Resources.* Additional web resources include Careers in IT, Technology Updates, Technology Buying Guide, crossword puzzles, a Web Guide and much, much more.
- *Instructor Downloads.* The Companion Website includes many helpful password-protected faculty resources. These resources are dynamic, ever changing, and include supplementary exercises, the image library, videos, animations, the instructor's manual and Test Bank in Word and PDF format, and PowerPoint presentations.



Long and Long Companion Website

The instructor's resources are also available on the instructor's one-stop CD-ROM called Present IT. The new IRCD/Present IT is a comprehensive, user-friendly, Instructor's Tool that is all you need to prepare and present powerful lectures to your students. You can easily customize your own lecture presentation selecting from dynamic PowerPoints, images, videos, animations, and more.

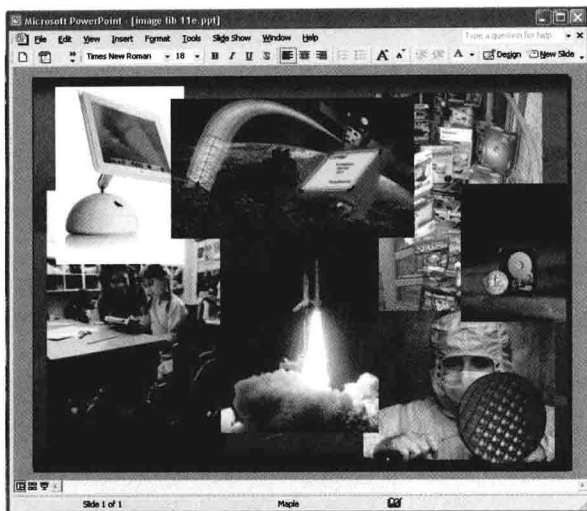
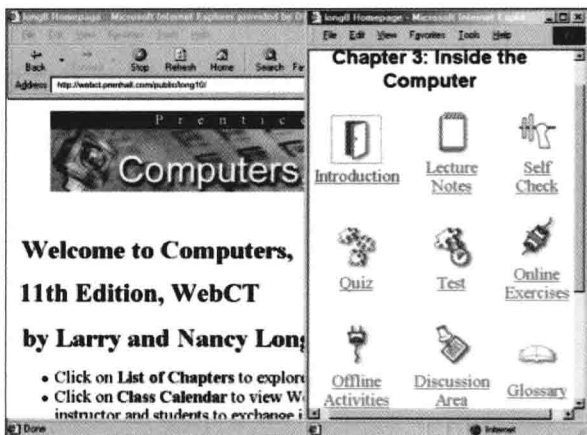


Image Library

- **Instructor's Manual (IM).** The *Instructor's Manual* is available in Microsoft Word and PDF format and is available in hard copy, as well. The *Instructor's Manual* contains teaching hints, references to other resources, selected images, lecture notes, key terms with definitions, solutions to review exercises, and much more.
- **PowerPoint Slides.** Several hundred colorful and illustrative PowerPoint slides are available for use with Microsoft PowerPoint. The chapter-by-chapter PowerPoint slides can be customized easily to meet lecture needs.
- **Windows PH Test Gen and Test Item File.** Windows PH Test Gen 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 online practice testing for students. The accompanying *Test Item File* contains thousands of multiple-choice, true/false, matching, and essay questions.

Additional media resources include an image library, animations, and brand new TECH TV videos, giving motion and additional meaning to the student's learning experience.



Online Learning: WebCT and Blackboard

## Online Course Development and Management

Prentice Hall provides the content and support you need to create and manage your own online course in *WebCT*, *Blackboard*, or Prentice Hall's own *CourseCompass™*. These online course development tools, along with embedded Long and Long content, offer 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 these tools can help you create, implement, and deliver a high-quality online course or course component with relative ease. If you already offer an online course, then these tools can assist you in formalizing your course.

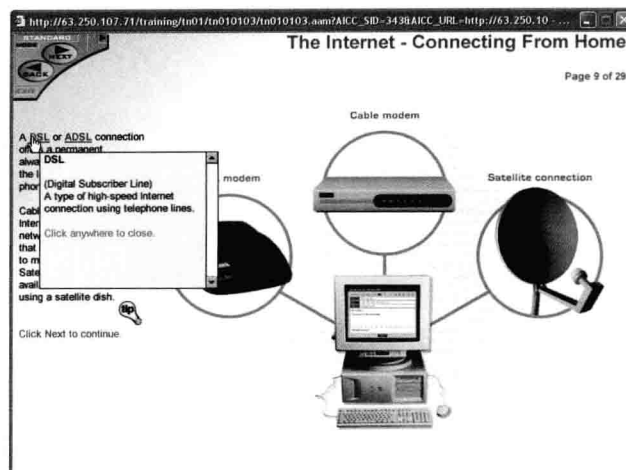
These Web-course tools give you the flexibility to customize your online course by integrating your custom material with content from *Computers*, 11th edition. Content includes lecture material, exercises, individual student projects, team projects, homework assignments, additional testing questions and all resources found on the Companion Website. Whether you are off and running or this is your first online course, these ready-to-go online course resources can save you countless hours of preparation and course administration time.



- **CourseCompass™ at [www.coursecompass.com](http://www.coursecompass.com).** CourseCompass™ is a dynamic, interactive online course management tool powered by Blackboard. Best of all, Prentice Hall handles the hosting, the technical support, and the training so you can focus on your course by creating the best teaching and learning environment for both you and your students.
- **Blackboard at [www.prenhall.com/blackboard](http://www.prenhall.com/blackboard).** Prentice Hall's abundant online content, combined with Blackboard's popular tools and interface, results in robust Web-based courses that are easy to implement, manage, and use—taking your courses to new heights in student interaction and learning.
- **WebCT at [www.prenhall.com/webct](http://www.prenhall.com/webct).** Course-management tools within WebCT include page tracking, progress tracking, class and student management, gradebook, communication, calendar, reporting tools, and more.

## Train and Assess IT

With Prentice Hall's *Train and Assess IT* software program, you can experience the more challenging computer topics anywhere you have access to a computer and/or the Internet. Delivered over the Web or on CD-ROM, the labs present an interactive, multimedia look into the world of computer concepts. The training component offers computer-based training that a student can use to preview, learn, and review computer concepts (Inside the Box, The Internet—Connecting from Home, PC Troubleshooting Basics, Working with Graphics, Security and Privacy, and many more), Windows concepts, and Microsoft Office applications (Word, Excel, PowerPoint, Access, and Outlook). Each lab takes about 20 minutes to complete. Built-in prescriptive testing suggests a study path based on student test results. The assessment component provides performance-based assessment to evaluate the students understanding of specific computer/IT skills.



Train and Access IT

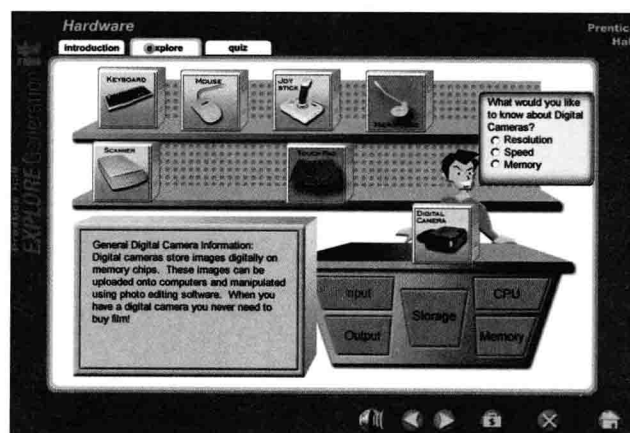
## EXPLORE IT at [www.prenhall.com/phit](http://www.prenhall.com/phit)

A Web and CD-ROM-based training program for computer competency, *EXPLORE IT*, includes a variety of interactive multimedia training modules, including Troubleshooting, Programming Logic, Mouse and Keyboard Basics, Databases, Building a Web Page, Hardware, Software, Operating Systems, Building a Network, and more.

Finally, there is the author link. If you have questions regarding the book, resources, package, or course planning, contact us directly (Prentice Hall representatives can provide contact information).

LARRY LONG, PH.D.

NANCY LONG, PH.D.



EXPLORE Generation IT Lab

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Any introductory book, especially this 11th edition of *Computers* and its many mixed-media ancillaries, is a major undertaking involving many talented people. Each year, my friends and colleagues at Prentice Hall do a magnificent job of articulating the focus of the book, supporting us during the writing process, and, ultimately, blending over a thousand separate elements of text and imagery into a beautiful and effective college textbook. These professionals should be very proud of *Computers*, for it is their book, too. Jodi McPherson, Natalie E. Anderson, Melissa Edwards, and Jasmine Slowik comprise a magnificent editorial team. The quality of the production is evident and for that we thank Kristine Lombardi Frankel, Gail Steier de Acevedo, Tim Tate, Vinnie Scelta, and their colleagues. Cathi Profitko, Karen Goldsmith, Christy Mahon, and their colleagues do wonders with our Web and mixed-media supplements. The art and design is beautiful, thanks to Pat Smythe, Maria Lange, Kenneth Batelman, Ray Cruz, and John Romer. Our book is made all the better with continuous feedback from Emily Knight and Daneille Torio in marketing. In addition, we would like to thank Joyce Nielsen, Sandy Reinhard, and Caryl Wenzel for their diligence in the development and production process.

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The feedback from numerous college professors, both invited and voluntary, has proven invaluable in refining this new edition to better serve their course needs. We would like to extend our heartfelt gratitude to these professors for their insight on this and previous editions of *Computers*.

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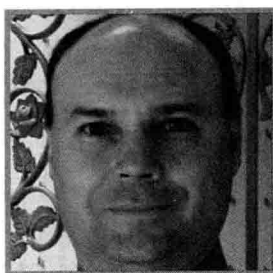
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## ABOUT THE AUTHORS



**Dr. Larry Long** and **Dr. Nancy Long** have written more than 30 books, which have been used in hundreds of colleges throughout the world. Larry is a lecturer, author, consultant, and educator in the information technology fields. He has served as a strategic-level consultant to most major types of industries and has over 25 years of classroom experience at IBM, the University of Oklahoma, Lehigh University, and the University of Arkansas. Nancy, a reading specialist, has teaching and administrative experience at all levels of education.