

THIRD EDITION

COMPUTERS



Larry Long • Nancy Long



COMPUTERS

T H I R D E D I T I O N



▶ LARRY LONG

▶ NANCY LONG



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PREFACE TO THE STUDENT

We are in the midst of a technological revolution that is changing our way of life. The cornerstone of this revolution, the computer, is transforming the way we learn, communicate, and do business. This text provides an overview of computers—what they are, what they are doing, and what they can do. Once you have read and understood its content, you will be poised to play an active role in this revolution.

Getting the Most from This Text

The layout and organization of the text and its content are designed to present concepts in a logical, interesting, and informative manner and to reinforce classroom lectures. A good way to approach each chapter is to:

1. Look over the Student Learning Objectives on the chapter opener.
2. Turn to the end of the chapter and read the Important Terms and Summary Outline.
3. Read over the major headings and subheadings and think about how they are related.
4. Read the chapter and note the important terms that are in **boldface** type and in *italic* type.
5. Relate photos and photo captions to the text. (“A picture is worth a thousand words.”) *Note:* The chapter openers throughout the book provide a gallery for a new form of art created with computers.
6. Go over the Important Terms and Summary Outline again, paying particular attention to the boldface terms.
7. Take the Self-Test. Reread those sections you do not fully understand.
8. Answer the *concepts* and *discussion* questions in the Review Exercises.
9. Complete the *problem solving* Review Exercises as directed by your instructor.

Computers is supported by a comprehensive learning assistance package. The package is detailed in the “Preface to the Instructor.” Ask your instructor about the availability of these learning supplements.

You, Computers, and the Future

Whether you are pursuing a career as an actuary, a social worker, an attorney, a dancer, an accountant, a computer specialist, a sales manager, or virtually any other job from shop supervisor to politician, the knowledge you gain from this course will prove beneficial. For most of you, this knowledge will be a fundamental prerequisite to performing your job. The chapter material addresses a broad range of computer concepts that occur frequently in other classes, at work, and even at home. Keep your course notes and this book, because they will be a valuable reference in these courses and in your career.

Computers are all around us, yet the application of computers is in its infancy. By taking this course, you are getting in “on the ground floor.” Each class you attend and each page you turn will present a learning experience that will advance you one step further in your understanding of how computers are making the world a better place in which to live and work.

PREFACE TO THE INSTRUCTOR

This is the year of the computer. So was last year. And so it will be next year. Indeed, every year seems to be the year of the computer. A never-ending string of innovative applications of computer and information technology continues to affect virtually everything we do. We wrote this third edition of *Computers* to reflect the excitement associated with ongoing technological change. To achieve this, we included discussions of hundreds of stimulating computer-based applications throughout the book. We feel that both the learning and teaching experiences are enriched when concepts are related to practice.

Intended Audience

The target course for the third edition of *Computers* and its teaching/learning system:

- Provides comprehensive coverage of a broad range of introductory computer and information processing concepts, applications, issues, concerns, and trends.
- Consists of students who have a variety of skill levels, interests, and career orientations.
- May or may not include a laboratory component. (The teaching/learning system includes an extensive array of optional hands-on laboratory materials that can be packaged with the text to meet the needs of most lab environments.)

The student completing this course will use his or her newly acquired knowledge to become an effective end user of computers or as a steppingstone to a computer-related career.

The Third Edition

What's Retained in the Third Edition? The third edition of *Computers* retains the basic pedagogical philosophy that prompted thousands of your colleagues in the United States and around the world to adopt its earlier editions. The third edition continues to cover all the angles: *what*, *why*, *when*, *where*, *how*, and *who*.

- *What?* All terms and concepts are discussed in the depth and in a manner in which they can be understood and applied to personal and business computing needs.
- *Why?* We explain why hundreds of times throughout the book—why use this DBMS, why use this printer, why use this programming language, or why use computers.
- *When?* As needed, we describe when or under what circumstances a concept or tool is applied or implemented (prototyping or proprietary software, for example).
- *Where?* We feel that students should know where concepts are applied (for example, in which industry or at which level in a company).
- *How?* We address the “How?” aspect of pedagogy many times in every chapter—how a compiler works; how an information system is developed; or how data are stored on a magnetic disk. (The supplements package includes “how to” books on micro applications software and BASIC programming.)
- *Who?* *Computers* identifies who is responsible for accomplishing particular tasks (functional specifications, maintenance of operating systems) or who employs a particular aspect of automation (CASE tools or decision support systems).

Traditional *Computers* features remain intact.

- *Applications-oriented.* Throughout the book, intangible concepts spring to life through dynamic, real-world applications.
- *Presentation style.* *Computers* is written in a style that conveys the energy and excitement of computers to the student.
- *Readability.* All elements (boxed features, photos, figures, Memory Bits, and so on) are integrated with the text to create a reading and study rhythm that complements and reinforces learning.
- *Currency-plus.* The material is more than current, it’s “current-plus”—anticipating the emergence and implementation of computer technology such as virtual reality and wearable PCs.
- *Flexibility.* The text and its teaching/learning system are organized to permit maximum flexibility in course design and in the selection, assignment, and presentation of material.

What’s New in the Third Edition? The following summary of revisions may help you to better evaluate *Computers* in relation to your college’s educational needs.

- *Exciting new boxed features.* Emerging Technology boxes address virtual reality, multimedia, smart houses, and other innovative applications of technology. PCs and You boxes explore telecommuting, shareware, add-ins, notebooks, EISA versus MCA, and many more areas of interest to PC users. Brief margin notes, called *Sidelights*, feature the human side of automation (for example, computer campaigning and personalized greeting cards).

- *Colorful Image Banks.* The Image Banks combine dynamic photos with in-depth discussions of topics that are of interest to students: computer graphics, how chips are made, how to buy a PC, the history of computers, and computers at the movies.
- *Emphasis on information systems.* Information systems move to the front and center: Coverage of systems development is expanded; management information systems, decision support systems, and expert systems are discussed and illustrated in detail; many application examples are added; and a comprehensive MIS case study is included as an appendix.
- *Continuous coverage of personal computing.* The growing importance of personal computing is underscored throughout the book.
- *More on communications and networking.* Communications topics now encompass two chapters: “Connectivity and Data Communications” (hardware) and “Networks and Networking” (software and applications).
- *Improved chapter pedagogy.* The basic elements of the familiar Long chapter format remain intact (*Student Learning Objectives*, *Memory Bits* summaries of key points, *numbered section heads*, *Summary Outline*, *Review Exercises* [Concepts and Discussion], and *Self-Test*). Three new elements help students learn: a *Chapter Outline*, an alphabetical list of *Important Terms*, and *Problem-Solving* exercises to encourage critical thinking.
- *Reorganized for better flow.* The chapters and appendices have been reorganized for better flow and to reflect changes in the technology, in student awareness, and in curriculums. Every page of the third edition has been revised but the following changes are major: an introduction to all computer systems in a single chapter; a new chapter on networking; consolidation of all software categories, including PC applications software, in “Part III: Software”; integration of programming concepts from an appendix into the body of the text; reduced coverage of design techniques; and the addition of an MIS case study as an appendix.

The Computers Teaching/Learning System

The third edition of *Computers* is the cornerstone of a comprehensive teaching/learning system. The other components of the system are described here.

Computers Annotated Instructor's Edition We introduced the first Annotated Instructor's Edition (AIE) for introductory computer education with the second edition of *Computers*. The well-received AIE is continued with the third edition. It is a four-color instructor's version of *Computers* that includes lecture notes, teaching tips, interesting supplemental material, in-class discussion questions and exercises, supplemental examples, warnings, quotes, cross-references to other components of the teaching/learning system, and much more—all in the margin of the text! When you open your book, you not only see what the student sees, you see what you need to deliver an interesting and informative lecture on the accompanying material.

CAPS (Computer-Assisted Presentation System)—Electronic Transparencies CAPS, a breakthrough in teaching technology, provides instructors with an integrated set of dynamic graphics, sometimes called *electronic transparencies*. Graphic displays are used in conjunction with a personal computer and a screen-image projector to enhance and facilitate classroom lectures. These computer-based “transparencies” enable the dynamic presentation of graphics, text, and animation. The transparencies contain key lecture points and appropriate graphics; they can be recalled from a menu and displayed as needed.

The Instructor’s Resource Manual (IRM) The IRM contains detailed teaching hints, chapter outlines with key terms and concepts, solutions to exercises, and instruction on the use of all of the teaching and learning materials, and the hard copy of the *Test Item File*. Other sections contain information to help you prepare, develop, and teach the course.

The New York Times Dodger The *New York Times* and Prentice Hall are sponsoring A CONTEMPORARY VIEW: a program designed to enhance student access to current information of relevance in the classroom.

Through this program, the core subject matter provided in the text is supplemented by a collection of time-sensitive articles from one of the world’s most distinguished newspapers, *The New York Times*. These articles demonstrate the vital, ongoing connection between what is learned in the classroom and what is happening in the world around us.

To enjoy the wealth of information of *The New York Times* daily, a reduced subscription rate is available. For information, call toll-free: 1-800-631-1222.

Prentice Hall and *The New York Times* are proud to cosponsor A CONTEMPORARY VIEW. We hope it will make the reading of both textbooks and newspapers a more dynamic, involving process.



ABC News/Prentice Hall Video Library Prentice Hall and ABC News 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 computer technology.

Study Guide The *Study Guide* is a supplementary book designed to support the student learning objectives in the text. It contains self-tests and hand-in exercises.

Test Item File The *Test Item File* contains over 3000 multiple-choice, true/false, essay, and matching questions. The questions are listed by numbered section head in the IRM. The *Test Item File* diskettes are distributed for use with *ParSystem Testing*, Prentice Hall’s test preparation and classroom management software.

ParSystem Testing *ParSystem Testing* is a comprehensive, user-friendly testing package. *ParSystem* software allows you to interact with the *Computers Test Item File* to construct and print exams. Use this system to create your own customized exam, or request that the exams be generated randomly. You can also edit *Test Item File* questions and add questions

of your own. You can even include graphic images in the printed exams, and a test can be generated and printed in multiple versions. When printed, the exam is ready for duplication. Student answer sheets and the answer key are also produced. *ParSystem* software interfaces with SCANTRON optical readers. *ParSystem* generates a wide variety of test reports and rosters including test item analysis, roster printout, score distribution, grade distributions, error logs, and many more.

ParSystem Testing gives you the option to test students on-line. The system also provides student feedback reports with correct answers and textbook references.

Computerized Testing Service The Computerized Testing Service is available free of charge to all instructors who adopt *Computers*. This service eliminates the tasks associated with test preparation by providing a customized exam based on the questions in the *Test Item File*. To take advantage of this service, simply call in your test order to Prentice Hall.

Color Transparency Acetates Over 70 color transparency acetates, which support material in the text and the *Computers* Annotated Instructor's Edition, are provided to facilitate in-class explanation.

Source 1: The Prentice Hall Custom Lab Program Skills modules are available for MS-DOS, Windows, and a variety of popular word processing, spreadsheet, and database packages. Each skills module includes an *application description*, *step-by-step keystroke tutorials*, and *hands-on exercises*. You select the ones you need. Through custom publishing, Prentice Hall binds the applications software skills modules you selected. (Your Prentice Hall representative can provide details on publication deadlines.)

Laboratory Software and Support Materials Prentice Hall is the largest and most prolific publisher of computer textbooks in the world. In many instances, full-function and educational versions of commercial software are distributed with these books (Microsoft Works, Quattro 1.01, and dBASE III PLUS, for example). Prentice Hall also publishes a variety of programming texts.

SuperSoftware The dual-purpose *SuperSoftware* is equally effective as a stand-alone educational software package or as a vehicle for in-class demonstration of a myriad of computer-related concepts. When used as a hands-on educational package, *SuperSoftware* actively involves students through interactive communication with the computer. *SuperSoftware*, which contains 60 hands-on lab activities, is designed to instruct, intrigue, and motivate.

Author Hotline If you have questions about the text, its package, or course planning, call us on the hotline. The telephone number appears in the *IRM*.

Acknowledgments

Computers imply change—lots of it. In that regard, the *Computers* text mirrors its namesake. As authors, we feel obligated to write a textbook

that reflects changes in computer technology and in the evolution of curriculums and teaching methods. However, to do so effectively we needed help—and we got lots of it. We would like to extend our deep appreciation to our colleagues in academe for their help and insight.

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More than 100 organizations have made contributions to this book and its teaching/learning system. A grateful academic community appreciates their pledge to quality education.

The publication of *Computers*, third edition, marks the fifteenth anniversary of our association with Prentice Hall. We are proud of this association and of the dedicated professionals at PH with whom we work. We are honored to acknowledge their contributions. P. J. McCue brought vision and focus, Nancy DeWolfe added structure and achievement, and Ray Mullaney furnished wisdom and harmony. Managers Garret White, Joe Heider, Valerie Ashton, Joyce Turner, Patti Arneson, and Janet Schmid provided encouragement, timely support, and a commitment to excellence. A focus group of field sales representatives Beth Casey, Bill Hendee, Bruce Collin, Charlotte Morrissey, Clarissa Seager, Elizabeth Wood, Kate Moore, and Pamela Lancaster used their collective experiences to tell us what professors want in a text and a support package. Lisamarie Brassini, Delores Kenny, Nancy Savio-Marcello, Teri Stratford, Linda Muterspaugh, Virginia Feury-Gagnon, and Jerry Votta left a little of themselves in the project. We thank them all, for *Computers* is their book too. Finally, we would like to thank you, our customer, for your confidence and encouragement.

NANCY LONG, Ph.D. LARRY LONG, Ph.D.

ABOUT THE AUTHORS



Dr. Larry Long is a lecturer, author, consultant, and educator in the computer and information services fields. He has written over 25 books on a broad spectrum of computer/MIS-related topics from introductory computing, to programming, to MIS strategic planning. Dr. Long has addressed a breadth of management, computer, and MIS issues in his executive seminars.

Dr. Long has served as a consultant to all levels of management in virtually every major type of industry. He has over 25 years of classroom experience at IBM, the University of Oklahoma, Lehigh University, and the University of Arkansas, where he continues to be an active lecturer. He received his Ph.D., M.S., and B.S. degrees in Industrial Engineering at the University of Oklahoma and holds certification as a C.D.P. and a Professional Engineer.

Dr. Nancy Long has coauthored a number of books with her husband. She has a decade of teaching and administrative experience at all levels of education: elementary, secondary, college, and continuing education. Dr. Long received a Ph.D in Reading Education and Educational Psychology, an M.S. in Personnel Services, and a B.S. in Elementary Education at the University of Oklahoma. Her wealth of knowledge in the areas of pedagogy and reading education is evident throughout the text and the supplements.

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