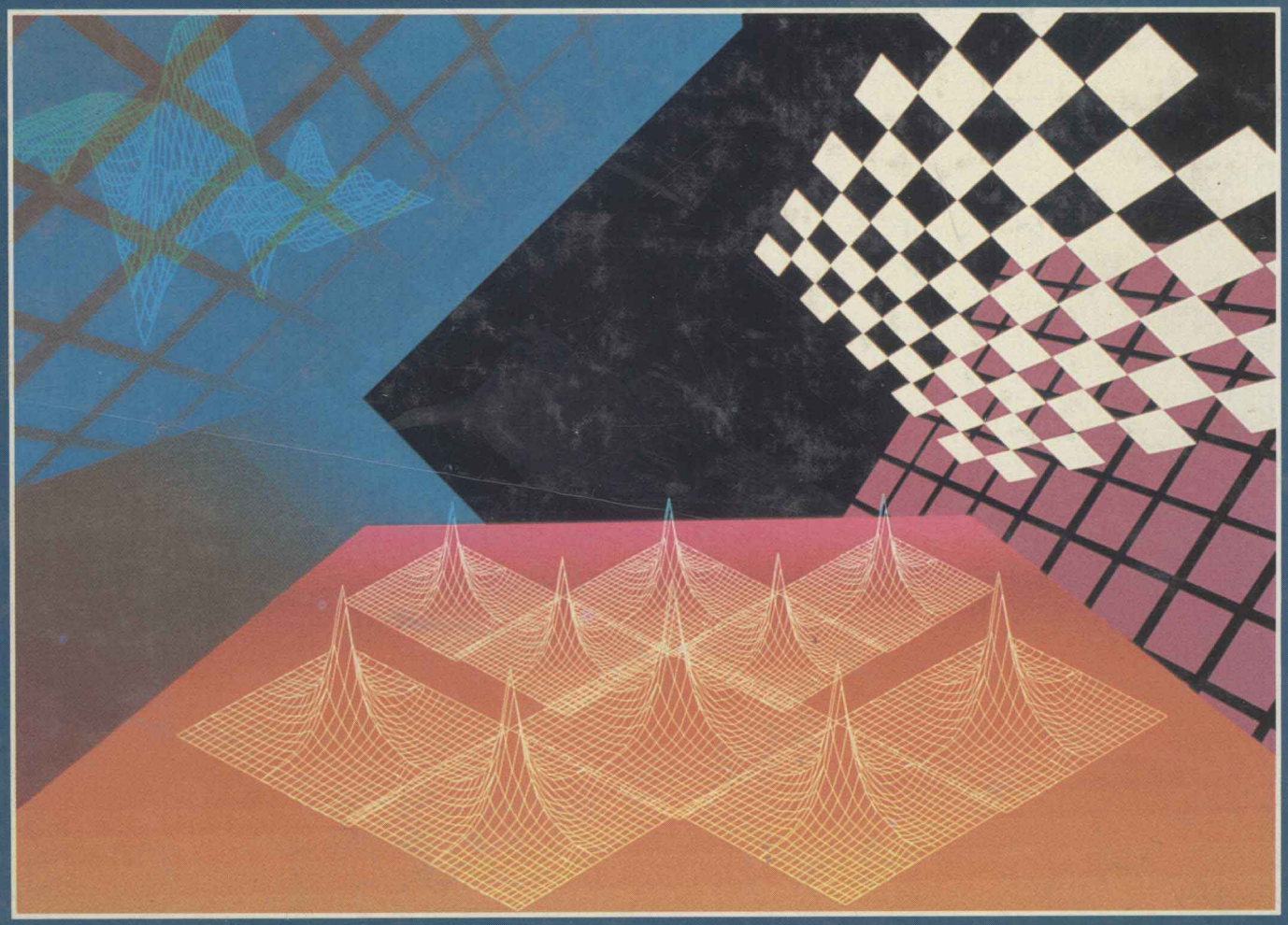
SECOND EDITION

COMPUTERS

Larry Long - Nancy Long



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Second Edition

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 communicate, do business, and learn. 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 be interesting, to present concepts in a logical and informative manner, and to provide a reference for the reinforcement of classroom lectures.

A good way to approach each chapter is to:

1. Look over the Student Learning Objectives in the chapter opener.
2. Turn to the end of the chapter and read the Summary and Important Terms.
3. Read over the major headings and subheadings and think of 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.)
6. Go over the Summary Outline and Important Terms again, paying particular attention to the boldface terms.
7. Take the Self-Test. Reread those sections that you do not fully understand.
8. Answer the questions in the Review Exercises.

Color is used throughout the book to add another dimension to the learning process. There are many instances where concepts can be reinforced and made easier to understand with the judicious use of color. We call this the *functional use of color.*

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 economist, a social worker, an attorney, a dancer, an accountant, a computer specialist, a sales manager, or virtually any other career from shop supervisor to politician, the knowledge you gain from this course ultimately will prove beneficial. Keep your course notes and this book, because they will provide valuable reference material in other courses and in your career. The chapter material addresses a broad range of computer concepts that occur frequently in other classes, at work, and even at home.

The use of computers for information processing 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 let you advance one step closer to an understanding of how computers are making the world a better place in which to live and work. You also will be gaining the knowledge necessary to become an active participant in what is the most exciting decade of technological innovation and change in recorded history.

Preface to the Instructor

Much has transpired since 1986 when students began using the first edition of *Computers*.

- The technology has taken yet another giant leap.
- Students are more aware of computers and information processing and of how they affect them personally, both now and in the future.
- College curriculums in all disciplines have been modified to recognize the growing importance of computers.

In this second edition of *Computers* we have retained the basic pedagogical philosophy that made the first edition a bestseller, while making revisions to reflect advances in the technology, greater student awareness, and the inevitable evolution of college curriculums.

In the late 1980s, computer knowledge has moved from the "nice-to-have" category to the "career-critical" category. What students learn (or do not learn) in the introductory computer course probably will have some bearing on how successful they are in their chosen careers. This places a tremendous responsibility on you, as instructors, and us, as authors. We were ever cognizant of this responsibility during the writing of the second edition. In that regard, we have been careful to cover from all angles the *what*, *why*, *when*, *where*, *how*, and *who*.

- *What*. All appropriate terms and concepts are discussed at a level of depth and in a manner in which they can be understood and applied to personal and business computing needs.
- *Why*. Hundreds of times throughout the book we explain why—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 sys-

tem 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).

Intended Audience

The target course for the second edition of *Computers* and its teaching/learning system consists of students who have a variety of skill levels, interests, and career orientations. The course covers a broad range of introductory computer and information processing concepts, applications, issues, concerns, and trends. The teaching/learning system includes hands-on laboratory materials for MS-DOS, WordPerfect, Lotus 1-2-3, dBASE III PLUS and dBASE IV, and BASIC programming. The student completing this course will use his or her newly acquired knowledge to become an effective end user of computers or as a stepping-stone to a computer-related career.

Features

All the features that made the first edition a success remain intact, and a few have been added.

- *Applications oriented.* Throughout the book, concepts are presented within the context of computer applications.
- *Presentation style. Computers* is written in a style that remains pedagogically sound while conveying the energy and excitement of computers to the student. Moreover, the material is written so that it can be understood by average learners, yet challenge the more advanced students.
- *Functional use of color.* Color is used functionally to relate ideas to one another and to illustrate the text. We pioneered this pedagogical innovation in the first edition.
- *Readability.* All elements (box items, photos, figures, memory bits, and so on) are integrated with the text to create a reading and study rhythm that complements and reinforces learning. The reading level was carefully monitored to avoid the problems associated with inappropriate levels of presentation.
- *Currency plus.* The material is more than current, it's "current plus"—anticipating the emergence and implementation of computer technology. *Computers* covers connectivity, magneto-optical (read-and-write) disks, expert systems, electronic data interchange, CASE, SQL, and all the other "hot topics."
- *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.

- *Chapter pedagogy*. Chapter organization and pedagogy is consistent throughout the text. The chapter is prefaced by *Student 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** print. Words and phrases to be emphasized appear in *italics*. Informative box items, photos, memory bits (outlines of key points), and cartoons are strategically positioned to complement the running text. Each chapter concludes with a *Summary Outline and Important Terms*, *Review Exercises* (concepts and discussion), and a *Self-Test*.

The Second Edition

It is our feeling that the second edition of any college text should reflect not only the pedagogical philosophy of its authors but its first-edition users as well. Fortunately, we had the opportunity to gather formal and informal feedback from many of the thousands of professors who used *Computers* in the classroom. The second edition of *Computers* is the result of our collective thinking. For those of you who are familiar with the first edition, the following summary of revisions may help you to better evaluate the book in relation to your college's educational needs.

1. The coverage of microcomputer productivity software is now integrated into the chapter material (from an appendix).
2. Coverage of BASIC has been rewritten and moved from the main text to a special BASIC supplement.
3. The chapters have been reorganized for better flow and to reflect changes in the technology, student awareness, and curriculums.
   - The two "Computers in Society" chapters (2 and 17) have been trimmed to one (Chapter 17).
   - The mainframe chapter now precedes the micro chapter.
   - The I/O chapter now precedes the data storage chapter.
   - Chapter 10, "The MIS and Decision Support Systems," has been added.
   - The two chapters on information system applications (12 and 13) have been combined into Chapter 11, "Applications of Information Technology."
   - Those areas in which coverage varies markedly between curriculums have been moved to appendices. These include the history of computers, numbering systems, design techniques, and programming concepts.
4. Changes have been made on virtually every page of the second edition, but the following changes from the first edition would be considered major:

- The information in the micros chapter (3) is expanded to help prepare students for the actual use and operations of micros.
- The data communications chapter (7) now includes a segment on connectivity.
- The data management chapter (9) is expanded to include coverage of all three major types of database management system software.
- Coverage of management information systems, decision support systems, and expert systems is expanded (Chapter 10).
- Coverage of prototyping is expanded, and coverage of automated applications development is added (Chapter 12).
- The material in Chapters 14 and 15 on micro productivity software has been written to reflect common business applications.

The *Computers* Teaching/Learning System

The second edition of *Computers* is the cornerstone of a comprehensive teaching/learning system. The other components of the system are:

***Computers* Annotated Instructor's Edition** The *Computers* Annotated Instructor's Edition (AIE) is an innovation in introductory computer education. The AIE 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, but you see what you need to deliver an interesting and informative lecture on the accompanying material. The AIE also contains an Instructor's Resource Manual that has teaching hints, chapter outlines with key terms and concepts, solutions to exercises, instructions on the use of all of the teaching and learning materials, and teaching notes to accompany the BASIC supplement to this text.

Instructor's Resource Manual on a Disk Most of the Lecture Notes portion of the IRM is available on disk in a generic ASCII format. Use your word processing package to customize this IRM lecture material to meet your teaching style and educational objectives.

Study Guide The student *Study Guide* is designed to support the student learning objectives. Section I, the first of four sections, contains Student Learning Objectives, Important Terms, and a Self-Test for each chapter or appendix in the main text and for each learning module in the BASIC supplement. Section II contains the Checkups for material in the text and in the BASIC supplement, which can be assigned as hand-in exercises. Section III contains the answers to the Self-Tests in Section I. Section IV is the "Guide to *The New Literacy* Videotape Series." This section provides material that enables stu-

dents to make the most effective use of the 26-part videotape series *The New Literacy: An Introduction to Computers.*

***CAPS* (Computer-Assisted Presentation System)—Electronic Transparencies** *CAPS*, a breakthrough in instructional 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, and can be recalled from a menu and displayed as needed.

Microcomputer Software: Step by Step Many introductory computer courses have a microcomputer lab component. *Microcomputer Software: Step by Step* by Ted Kalmon, Larry Long, and Nancy Long (Prentice Hall, 1990) is written to support laboratory courses teaching word processing, electronic spreadsheet, or database software in the IBM PC environment. Specifically, this lab book contains conceptual overviews, step-by-step hands-on tutorials, exercises, and quick reference guides for MS-DOS (3.3 and 4.01), WordPerfect (5.0), Lotus 1-2-3 (releases 2.01 and 3.0), and dBASE III PLUS and IV. The step-by-step tutorials are organized in topical sessions. *Microcomputer Software: Step by Step* is written to be consistent with the pedagogy and examples in *Computers*; however, it can also be used as a stand-alone text.

BASIC for Introductory Computing *Computers* is available with or without BASIC. In the BASIC version, the booklet *BASIC for Introductory Computing* by Larry Long (1990, Prentice Hall) is packaged with the main text. The increase in cost is nominal. The BASIC supplement is a concise treatment of the BASIC programming language and is designed especially to complement introductory computer courses. The booklet, which is less than 100 pages long, is divided into five learning modules so that the student can systematically progress through increasingly sophisticated levels of understanding. If you wish only to expose the student to BASIC and assign a few simple programs, then Modules I, II, and III will suffice. Modules IV and V take the student to an intermediate skill level.

***Test Item File* Diskettes and Booklet** The *Test Item File*, which covers material in both *Computers* and *BASIC for Introductory Computing*, comes in both diskette and booklet forms. The *Test Item File* contains over 3842 multiple-choice, true/false, and essay questions for the main text and 385 questions for the BASIC supplement. The *Test Item File* diskettes are distributed for use with *DataManager*, Prentice Hall's test preparation and classroom management software.

***Prentice Hall DataManager* (Computer-Based Testing and Classroom Management)** The *Prentice Hall DataManager* is an integrated IBM-PC–compatible software package that provides a complete classroom

management system. Broad in its scope, the package allows instructors to design and create tests, to maintain student records, and to provide practice testing for students.

The *PH DataManager* has three modules: the Test Manager, the Grade Manager, and the Study Manager. The Test Manager module allows you to interact with the *Computers Test Item File* to construct and print exams. Use this module 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. When printed, the exam is ready for duplication. Student answer sheets and the answer key are also produced. The Grade Manager module is a record-keeping system that keeps track of student performance and calculates grades. The Study Manager module is used in conjunction with a computer-based file of the questions in the *Study Guide*.

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 One hundred color transparency acetates, which support material in the text and the *Computers* Annotated Instructor's Edition, are provided to facilitate in-class explanation. Fifty percent of the acetates are taken from the text; the remainder are supplemental.

Full Function Word Processing Software Prentice Hall has made a special arrangement with its parent company, Simon & Schuster, Inc., that will enable students using *Computers* to purchase the full function versions of Webster's NewWorld Writer and its 100,000-plus word Spelling Checker for about the cost of the diskettes! These Simon & Schuster products sell for more than $100 at computer stores. Webster's NewWorld Writer has redefined the meaning of "user-friendly" in word processing software. Its easy-to-use, menu-driven user interface is designed to display instructional prompts in windows if the user hesitates in selecting an option from a menu. A student can actually learn Webster's NewWorld Writer while using it—without a manual.

Microcomputer Software and Micro Software 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 (WordPerfect, The TWiN [emulates Lotus 1-2-3], dBASE III PLUS, and Excel, for example). We recognize that your laboratory environment may have special needs. In that regard, your Prentice Hall rep-

resentative will be happy to discuss the many options you have in the selection of lab manuals and support software.

Videotape Series—*The New Literacy: An Introduction to Computers* A 13-tape, 26-segment video series, entitled *The New Literacy: An Introduction to Computers*, sets the material in the text into motion. Each video addresses a particular facet of the use and application of computers. The videotape series is made available free of charge to qualified adopters of *Computers* and to others at discount prices. *The New Literacy*, which is produced by the Southern California Consortium, was released in 1984 and revised in 1988. The *Study Guide* contains assignments, videotape overviews, and review exercises that relate to *The New Literacy* videotapes.

Video Software Tutorials—The *Video Professor* A series of video tutorials are available to qualified adopters. For the IBM-PC–compatible environment, the series includes instructional tapes for MS-DOS, WordPerfect 4.2 and 5.0, Lotus 1-2-3, dBASE III PLUS, dBASE IV, WordStar Professional, Microsoft Word, Ventura, MultiMate Advantage II, Excel, and Microsoft Works WordProcessing. The *Video Professor* series also includes instructional tapes for the Apple II, IIe, IIc, and IIgs environment and the Macintosh environment.

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. It contains 50-plus hours of hands-on lab activity for the IBM PC version (25-plus hours for the Apple version) and is designed to instruct, intrigue, and motivate. SuperSoftware provides many dynamic electronic transparencies. When used in conjunction with a screen-image projector, SuperSoftware can demonstrate dozens of important computer (configuring a micro), information processing (airline reservations), software (mail merge with word processing), and programming (sorting) concepts.

Author "Hotline" Professors and administrators of colleges adopting *Computers*, Second Edition, are encouraged to call Larry or Nancy Long (the hotline number is in the "Preface to the Annotated Instructor's Edition") to discuss specific questions relating to the use of the text and its support package or to discuss more general questions relating to course organization or curriculum planning.

Acknowledgments

Computers, Second Edition, is the continuation of a long and fruitful friendship that we have enjoyed with the people at Prentice Hall. Many of these dedicated professionals have made significant contri-

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Thousands of professors selected the first edition for use in their classrooms. We thank them, for without their confidence and encouragement, there would be no second edition. Continuing the tradition, the second edition is also a product of collective thinking. In that regard, we are deeply indebted to our colleagues:

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Nancy Long, Ph.D. *Larry Long, Ph.D.*

Overview

APPENDICES

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