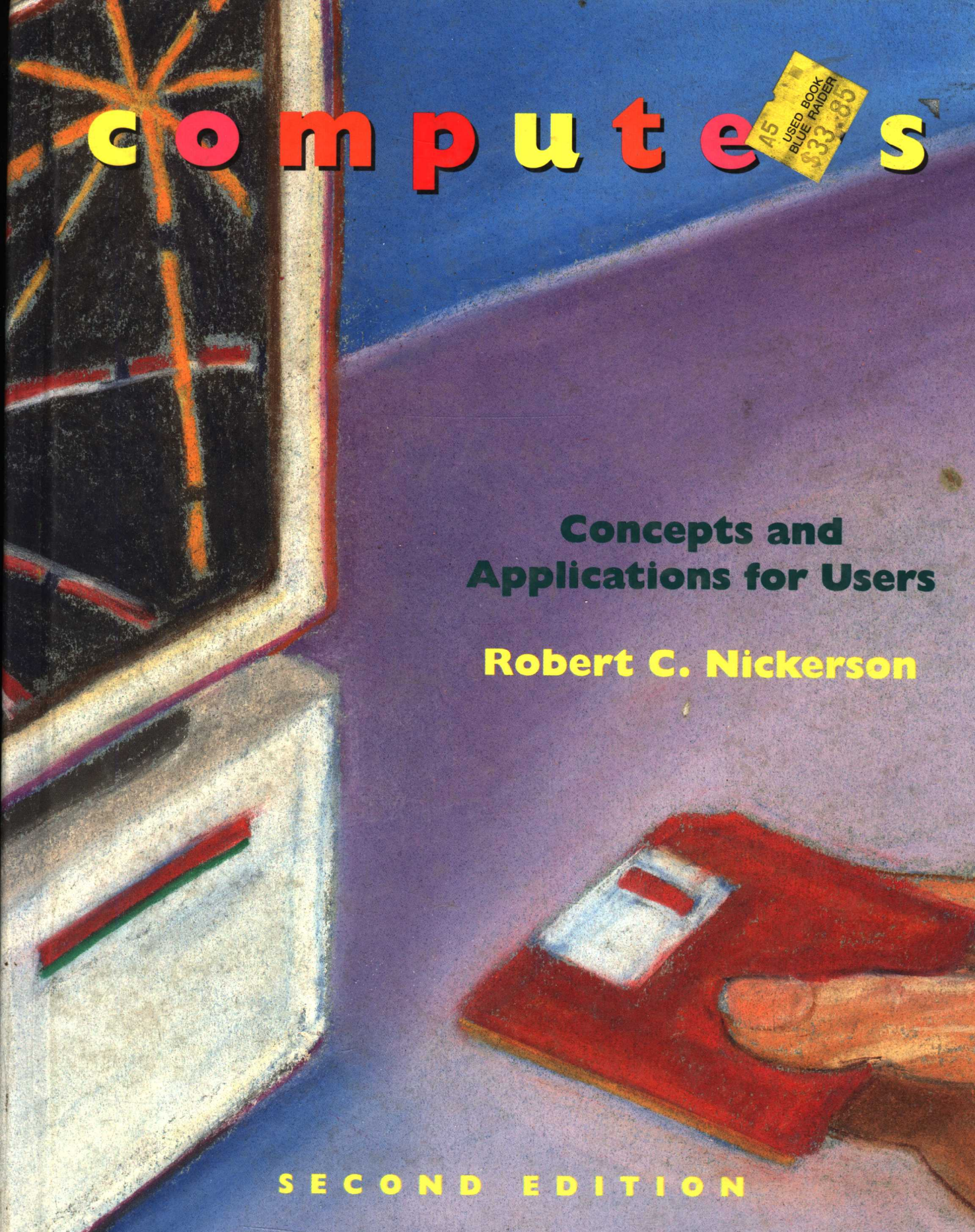
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Robert C. Nickerson
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PREFACE

Every year, the role of users in computer applications grows. Today, the user not only interacts with the computer but also develops his or her own applications. To do so, the user needs a solid foundation in computer concepts and a thorough understanding of computer applications. Students today know they will use computers more in the future and want to be prepared to get the most out of their computer usage. *COMPUTERS: Concepts and Applications for Users, Second Edition* provides students with the necessary preparation for a world in which computer use is continually expanding.

COMPUTERS is a carefully written introduction to computer concepts and applications for present and future computer users. Its language communicates complex and difficult ideas in a simple, straightforward style supported by well-planned illustrations. During the development of the book, the author, editors, and reviewers continually questioned whether a user truly needed to have a working knowledge of a given topic. The subject matter was included only if it was of direct relevance to computer users or if it provided a foundation to understand important concepts. The ultimate goal of this text is to provide the student with just the right background and balance of knowledge to be an *effective computer user.*

CHANGES IN THE SECOND EDITION

The second edition of *COMPUTERS* is the result of a thorough review of the previous edition. The complete text has been reviewed to improve clarity in the writing and the illustrations. All technical topics have been checked for currency and updated if appropriate. More than half of the "Computer Close-ups" have been replaced, but those that the reviewers of the previous edition especially preferred have been retained. New end-of-chapter questions have been added, and answers to half of the review questions are now provided at the back of the book.

Some topics have been shifted for improved organization. Basic computer concepts have been moved from Chapter 2, "Computer System Basics," to Chapter 1, "Using Computers Every Day," to provide a better basis for understanding the applications discussed there; data organization has been moved from Chapter 2 to Chapter 5, "Secondary Storage," where it ties in with secondary storage; and microcomputer communications software has been moved from Chapter 11, "Graphics and Other Application Software," to Chapter 6, "Data Communications," so that all data communications topics are together. Chapter 7, "Operating Systems," has been substantially reorganized to put more emphasis on operating systems from a user's perspective. Chapter 11 has been modified to more greatly emphasize graphic and related software because of the increased use of this type of software.

A number of new, current topics have been added. These include notebook and pocket computers in Chapter 2; trackballs and page scanners in Chapter 4, "Input and Output Devices," database servers in Chapter 6; graphical use interfaces in Chapter 7; cooperative processing and executive support systems in Chapter 15, "Types of Information Systems"; object-oriented databases in Chapter 16, "Database Processing." Coverage of numerous topics has been expanded because of increased interest in them. For example, more information is now covered on optical disks in Chapter 5; on desktop publishing in Chapter 8, "Word Processing Software"; on spreadsheet software functions in Chapter 9, "Spreadsheet Software"; on presentation graphics and computer-aided design software in Chapter 11; and on viruses and computer ethics in Chapter 18,"The Computer's Impact on Society."

The BASIC appendix, available in one version of the book, has been completely rewritten to eliminate reliance on GOTO statements. Decisions are now implemented using IF-THEN or IF-THEN-ELSE statements, and loops are implemented using WHILE/WEND and FOR/NEXT statements, thus bringing the material into line with modern programming practice. Other changes include the shifting of certain topics for better organization. For example, the coverage of strings has been shifted into Section 2, "Essential Elements of BASIC," and the coverage of subroutines, modular programming, and built-in functions has been moved into Section 5, "Subroutines and Modular Programming." This latter section has been written so that any of its topics can be covered after completing Section 2, thus providing flexibility for the instructor. Complete sample programs developed using the five-step structured programming process are now found in all sections (except the introductory first section). Coverage of pseudocode has been added in parallel to that of flowcharts; the instructor can choose to emphasize one or the other of these tools. Material on program testing and test data design has been added to Section 3, and coverage of program debugging techniques has been added to Section 4. Review questions have been updated, and answers to half of the review questions are now provided at the end of the appendix.

KEY EMPHASES AND FEATURES

Every feature of *COMPUTERS* is designed to be especially useful. Currency, however, is a key strength. Every effort has been made to incorporate the most up-to-date topics in the field. For example, pocket computers are discussed in Chapter 2, "Computer Systems Basics"; erasable optical disks are covered in Chapter 5, "Secondary Storage"; graphical user interfaces are described in Chapter 7, "Operating Systems"; object-oriented programming is covered in Chapter 13, "Computer Programming Languages"; and expert systems are presented in Chapter 15, "Types of Information Systems."

Microcomputer hardware and software are emphasized throughout the book, but not at the exclusion of larger computers. Hardware and software for both IBM PC compatible computers and Apple Macintoshes are

mentioned at appropriate points. Minicomputer, mainframe computer, and supercomputer hardware and software coverage is integrated with the discussions of microcomputers.

Extended examples are used in several parts of the book to tie together related material within groups of chapters. An example in Chapters 8 through 11 shows how a sales manager uses microcomputer software for a variety of purposes. Chapters 14 through 17 use an extended example involving a bicycle business to illustrate important concepts about information systems.

The chapters are constructed upon important pedagogical features. Each chapter begins with an outline and a list of objectives. Throughout each chapter, full-color diagrams and photographs illuminate ideas as well as applications and processes. Illustrations are carefully coordinated with the text discussion. Each chapter has a summary of important concepts and a list of all boldfaced terms presented in the chapter. Every term in this list is defined in a chapter-referenced glossary at the end of the book. Finally, each chapter concludes with two types of review questions—fill-in and short-answers, and some experiential projects designed to push the student into new areas. Answers to one-half of the review questions are provided at the back of the book.

The "Computer Close-Up" is another key feature integrated into every chapter. These special readings—two per chapter—focus on real-world applications and go beyond the topics in the chapter, presenting interesting new examples and ideas. Some "close-ups" are taken from popular and professional computer publications, and others are custom-tailored to the book.

CONTENT AND ORGANIZATION

COMPUTERS is organized into five parts. Part 1 provides a basic foundation and helps the reader see how he or she is already an active computer user. Chapter 1 introduces basic computer concepts and motivates the student by providing numerous examples of computer applications. Chapter 2 explains the fundamental technology of computer systems, including the essential concepts of hardware and software. After completing Part 1, the class may follow alternative paths through the other parts of the book.

Part 2 covers computer system hardware and some closely related software and data concepts. Chapter 3 describes the central processing unit and primary storage, explaining the characteristics of these components that affect the user the most. The emphasis is on the CPU and the primary storage characteristics of microcomputers, but minicomputer, mainframe computer, and supercomputer components are also examined. Chapter 4 covers input and output devices, again stressing microcomputer devices without bypassing input/output devices for larger computers. Chapter 5 describes secondary storage devices, including magnetic disk, magnetic tape, and optical disk, and covers data organization and file concepts. Data communication hardware and software are described in Chapter 6.

The chapter emphasizes topics that are relevant to the user, such as micro-to-mainframe communications and local area network communications.

The third part of the book examines computer software, including both packaged software and custom software. The part begins with a discussion of operating systems and software interfaces in Chapter 7. The chapter describes user-relevant operating system concepts, including the general characteristics of common operating systems such as PC DOS, OS/2, the Apple Macintosh operating system, and UNIX. It also introduces menus, icons, windows, and graphical user interfaces, among other topics. The next four chapters cover the generic features of the main microcomputer software packages that users will commonly encounter. Chapter 8 describes word processing software, Chapter 9 examines spreadsheet software, Chapter 10 explains file and database management software, and Chapter 11 introduces graphics and integrated software. These chapters also discuss related software—including desktop publishing software, presentation graphics software, computer-aided design software, personal information management software, and hypertext software. Part 3 concludes with two chapters that deal with software development. Chapter 12 explains the software development process, emphasizing the points at which the user may be involved. Chapter 13 describes common programming languages, including fourth-generation languages and object-oriented languages.

Part 4 covers the essentials of information systems from a user's perspective. Chapter 14 presents information system concepts and common applications. Chapter 15 lays out the range of different types of information systems—management information systems, decision support systems, expert systems, office automation systems, and executive support systems. Database processing and its use in information systems is outlined in Chapter 16. The chapter emphasizes relational databases and discusses SQL. Finally, Chapter 17 explains how information systems are developed, emphasizing the user's role in the development process.

The last part of *COMPUTERS* reviews the place of computers in our society. Chapter 18 provides a look at the present and possible future impact of computers. Finally, for interested students, Chapter 19 examines careers in the computer field. It functions as a practical guide to getting started in a computer career, but it also reminds students that computer usage is part of many job situations.

The book has three appendices that may be studied at any time in the course. Appendix A demystifies the process of selecting a personal computer. Appendix B discusses the history of computers. The material is both complete and illustrated, but it is placed at the back of the book to provide an option for the instructor. Number systems are discussed in Appendix C.

A fourth appendix covering structured programming in BASIC is available in one version of the book. This appendix provides a solid introduction to structured computer programming in the BASIC language. The emphasis is on the process of developing well-structured programs in BASIC to solve a variety of problems. This appendix is divided into sections with review questions and programming problems at the end of each section. A separate glossary and index augments the BASIC appendix.

SUPPLEMENTS PROGRAM

Great care has been taken to provide a comprehensive set of supplementary materials to accompany the text.

Instructor's Manual

The instructor's manual contains for each chapter an overview and summary, lecture outlines, lecture tips, answers to in-text discussion questions, class projects, and additional review questions.

Test Bank

A manual of over 2500 true/false, multiple-choice, and completion questions is available for the instructor. The questions have been thoroughly class-tested and are also available in computerize format, with the HarperCollins TestMaster program.

Color Transparencies

More than 100 four-color transparency acetates of illustrations from within and from outside the text are available.

Study Guide

A comprehensive study guide helps students to retain terms and concepts and to do better on exams. A computerized version of the study guide, SuperShell II, allows the student to study while sitting at the PC keyboard.

Software Tutorials

A new, inexpensively priced modular series of software tutorials covers the fundamentals of microcomputer systems, DOS, and popular releases of WordPerfect, Lotus 1-2-3, dBASE III+ and dBASE IV. The applications software modules come in beginner and intermediate versions.

Integrated Software

The *new Version 3.1* of *PFS: First Choice* is available at a substantial educational discount with the textbook. This powerful, integrated software package provides new and experienced computer users with word processing, spreadsheet, database, presentation graphics, and electronic communications capabilities.

ACKNOWLEDGMENTS

Many of the ideas for this edition of the book came from reviews by users of the first edition. I greatly appreciate their efforts. The manuscript reviewers did a thorough job, and their comments were especially useful. My colleagues at San Francisco State University provided much useful advice and encouragement. Professors Sultan Bhimjee, David Chao, Sam Gill, Gary Hammerstrom, Ron Henley, Hugo Moortgat, and Richard Wiersba were particularly helpful, but many other colleagues contributed in some way.

Finally, I would like to thank my family for their support and help during the writing of this book.

REVIEWERS

The following professors and instructors have provided valuable input in the development of the second edition of *COMPUTERS* either as book users or as reviewers of the revised text. They gave practical input on content, depth of coverage, organization, and accessibility to the student.

William Burkardt	*Carl Sandburg College*
John Cary	*George Washington University*
Jason Chen	*Gonzaga University*
Sandra Cunningham	*Ranger Junior College*
Douglas Goings	*University of Southern Louisiana*
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Linda Lindeman	*Black Hawk College*
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Brenda Parker	*Middle Tennessee State University*
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Pauline Pike	*County College of Morris*
Tom Rosengarth	*Westminster College*
Maria Rynn	*Northern Virginia Community College*
Steve Silva	*DeVry Institute*
Richard Stearns	*Parkland College*

The following professors and instructors reviewed the previous edition of *COMPUTERS: Concepts and Applications for Users.*

Virginia Bender	*Harper College*
Al Campbell	*Golden West College*
Paul Cheney	*Texas Tech University*
D. Epperhart	*Weatherford College*
Richard Fleming	*North Texas State University*
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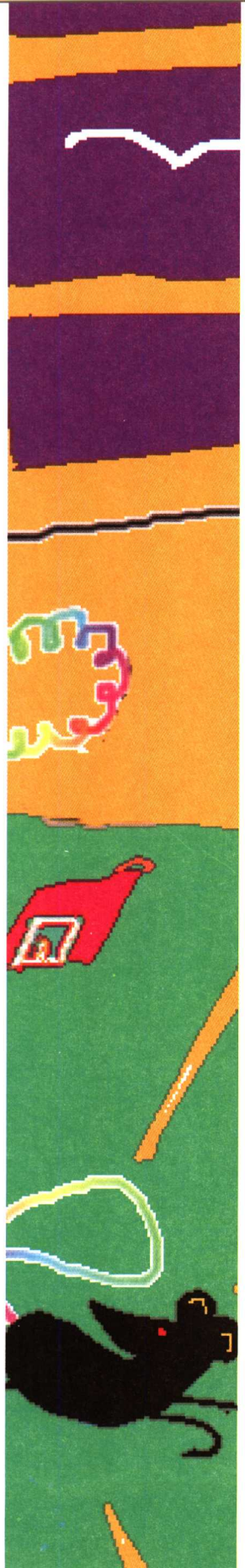
Sandra Stalker	*North Shore Community College*

Robert C. Nickerson



BRIEF CONTENTS

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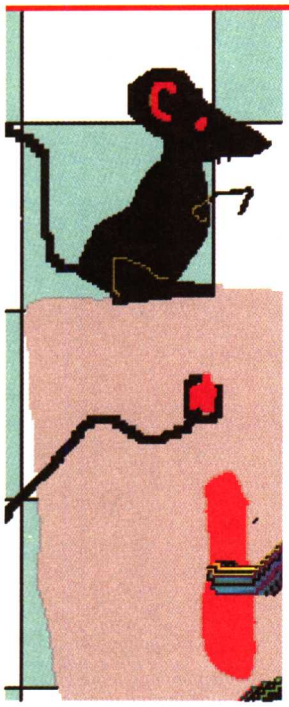
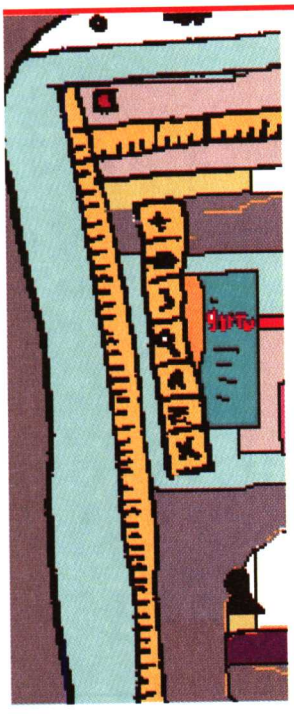


PART 2/HARDWARE



PART 3/SOFTWARE