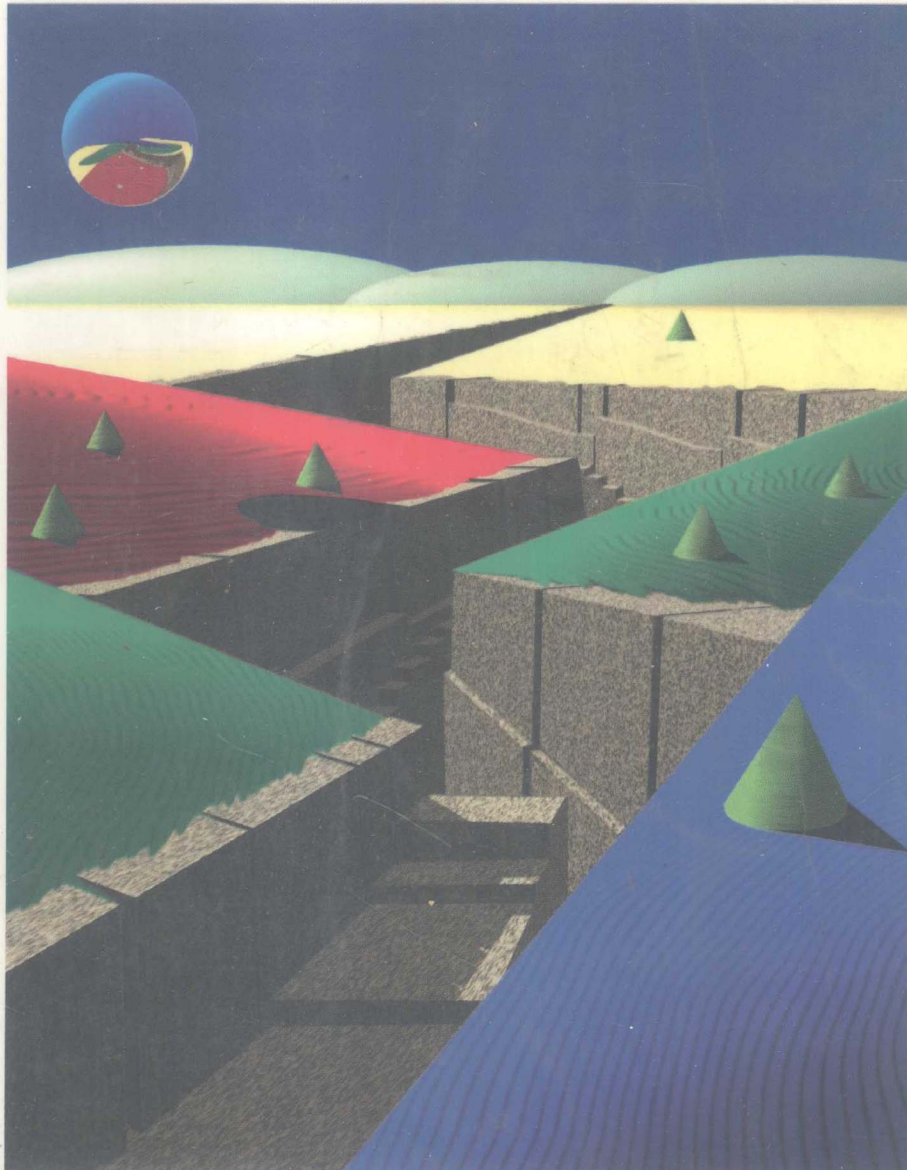


COMPUTERS & INFORMATION SYSTEMS

Tools for an Information Age



CAPRON
PERRON

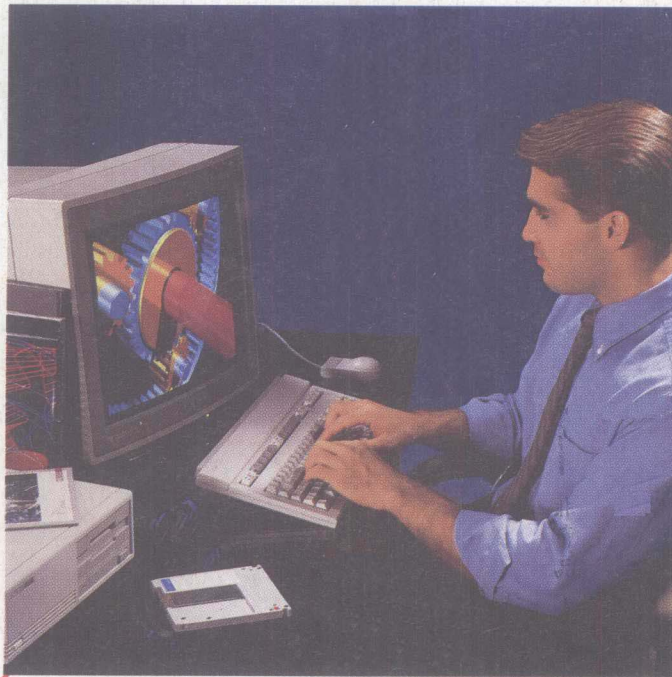
THIRD EDITION

COMPUTERS & INFORMATION SYSTEMS

Tools for an Information Age

THIRD EDITION

H. L. Capron and John D. Perron



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The Capron Collection

A Complete Supplements Package



- **Instructor's Edition with Annotations.** Written by B. Peacock with H. L. Capron and J. D. Perron, this special edition contains annotations for lecture preparation and includes supplementary material not found in the Instructor's Guide. The annotations include chapter outlines with key terms (for lecture preparation), lecture objectives, lecture activities, discussion questions, lecture hints, global perspectives, test bank references, transparency references, and answers to end-of-chapter true/false questions.
- **Instructor's Guide and Transparency Masters** by J. D. Perron (250 pages). Each chapter contains learning objectives, a chapter overview, a detailed lecture outline, and a list of key words. The Instructor's Guide also includes 50 transparency masters, and a reference guide to lecture support software screens.



H. L. Capron—

For the Morgans: Mary, Jack, Tim, and Joel



J. D. Perron—

For my wife, Jacqueline

- **Lecture Support Software** by J. Huhtala and G. Novotny. This eight-disk package for the IBM PC, PS/2, or compatible machine provides 280 color screens containing animation and text that summarize the key concepts in each section of the book. The accompanying student workbook (300 pages) supports the software by offering additional text, learning objectives, key terms, review questions, and completion questions. The software and workbook can be used in lecture or lab. A reference guide for the support software is included in the Instructor's Guide.
- **Test Bank** by S. Langman. The test bank contains approximately 2000 items. There are five types of questions: multiple choice, true/false, matching, fill-in-the-blank, and situational essay. Each question is referenced to the text by page number and the answers are provided. The test bank is available both as hard copy and in a computerized format for the IBM PC (and any compatible machine), IBM PS/2, and Macintosh computers.
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- **Mastering Microcomputers** by William Davis, et al. Covers basic hardware and software concepts as well as DOS 5.0, WordPerfect 5.1, Lotus 1-2-3, Release 2.3, and dBASE IV 1.5.
- **The Computing Fundamentals Series.** This series consists of brief tutorials. The titles include: *Concepts, 3rd ed.*, *WordPerfect 5.0/5.1*, *dBASE III PLUS*, *dBASE IV*, *Lotus 1-2-3, Release 2.01/2.2*, *Lotus 1-2-3, Release 2.3*, *PC-DOS and MS-DOS*, *DOS 5.0*, *PageMaker for the Macintosh*, *PageMaker for the IBM PC*, and *Microsoft Word 5.0*.

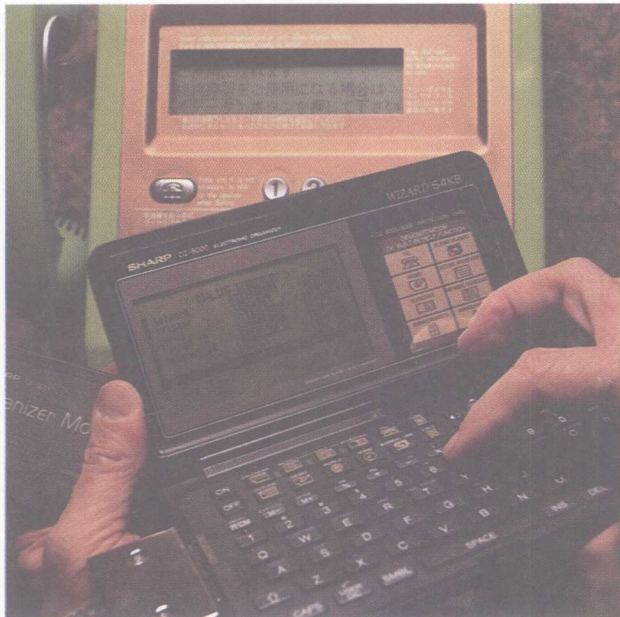
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- **LotusWorks 3.0.** This two-disk integrated package available in PC or PS/2 formats offers a spreadsheet, database, word processing and communications service. The package also includes a tutorial booklet and a reference book with a quick-reference guide.
- **Student Editions.** *The Student Edition of Lotus 1-2-3* (509 pages); *The Student Edition of dBASE IV* (704 pages); *The Student Edition of Framework II* (372 pages).
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GALLERY 2

COMPUTERS AROUND US (follows page 224)

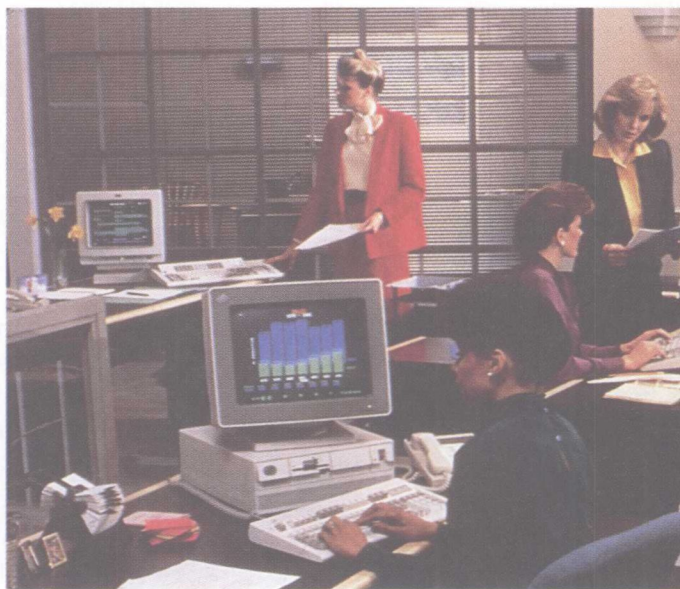
This gallery showcases some of the interesting uses for computers in our everyday lives. We examine how computers are being used in science, health and medicine, sports and games, entertainment, music, the service industry, art, and photography.



GALLERY 3

COMPUTERS AT WORK (follows page 448)

The computer has become an essential tool in the world of business and manufacturing. In this gallery, we explore how computers are being used to design, engineer, and manufacture products; to control robots on the job; and to support workers in a variety of fields, from graphic design to finance.



BUYER'S GUIDE: HOW TO BUY YOUR OWN PERSONAL COMPUTER (follows page 320)

This special eight-page section presents issues and questions to consider before buying a personal computer and software. If you are thinking about buying a personal computer now or in the future, read this section carefully.



Preface

In the fast-changing world of computers and information systems technology, giving students an up-to-date introduction to computing can be a challenge. To help instructors meet that challenge, this new edition of *Computers & Information Systems: Tools for an Information Age* has been revised and updated throughout. The third edition retains, however, the appealing reading style that has made this text a best-seller. In addition, the accompanying support package provides all the elements instructors need to teach an introductory computer course.

New to this Edition

- **WordPerfect 5.1, Lotus 1-2-3 version 2.3, and dBASE IV**, the most popular software packages, are covered in our revised software applications chapters (Chapters 9-11). We use these packages to demonstrate the basic concepts of word processing, spreadsheets, business graphics, and database management systems. In addition, desktop publishing is now covered along with word processing, reflecting the growing trend toward incorporating desktop publishing features in word processing software.
- **“Computer Graphics: From Art to Animation and Beyond”** (Chapter 12) is a new chapter that provides an overview of computer graphics terminology and describes in basic terms how graphics are created.
- **“Modern Trends: Artificial Intelligence, Expert Systems, and Robotics”** (Chapter 16), new to this edition, focuses on the advances being made on the cutting edge of computing. The chapter introduces students to the concepts of neural networks, natural languages, and fuzzy logic and shows how expert systems and robotics are changing the way businesses operate.
- **Programming concepts** are the focus of a new appendix (Appendix A), which is for those who want to cover structured programming in greater depth.

- **The SELECT System.** With Benjamin/Cummings Publishing Company's SELECT System, you can tailor this text to the needs of your course. The SELECT Edition of *Computers & Information Systems* is custom-bound with your choice of applications modules into one convenient text. Other SELECT options: Applications modules are available as individual books or bound together without *Computers & Information Systems*.

Updated in This Edition

- **Extensive personal computer coverage.** Although we discuss all types of computers, we emphasize personal computers, reflecting their continuing prominence in business and education. Because of the trend toward greater integration of personal computers into schools and work places, we no longer cover PCs in a separate chapter. Instead, we have incorporated a wide variety of new personal computer examples throughout the text.
- **Personal Computers in Action.** Each chapter includes a feature about personal computers that demonstrates the range of tasks personal computers perform. Most of these sections are new to this edition; they include topics such as the use of personal computers on campus, in entertainment, and in business.
- **Buyer's Guide.** Students and their families make important economic decisions when they purchase computers to meet their educational needs. This concise eight-page guide offers the up-to-date information students need to evaluate hardware and software, and a checklist to help them make purchasing decisions.
- **Coverage of mainframes in business.** Although personal computers have become increasingly important in business, large computer systems—supercomputers, mainframes, minicomputers, and the newest superminis—are a critical part of the computer industry. In the third edition we continue to cover large computer systems, and we show how they are affected by personal computers.
- **Management Information Systems.** Reflecting the growing importance of computing systems in the management of information in business, we have expanded and updated coverage of MIS and decision support systems (chapter 14). New topics include the executive support system (ESS), the group decision support system (GDSS), and groupware.
- **Special-topic galleries.** Three revised full-color photo essays vividly illustrate the world of computers. One walks the reader through the manufacture of silicon chips, another marvels at the many uses of computers, and the third shows how computers are used in the business world.
- **Margin notes.** To further engage student attention, margin notes are carefully placed throughout the chapters. The margin notes extend

the text by providing additional information and examples of interesting computer applications.

- **Extensive student learning aids.** The third edition features the following pedagogical support: key terms boldfaced in the text; extensive summaries with boldfaced key terms; review questions, discussion questions, and true/false questions; an extensive glossary; and an index.
- **The friendly writing style.** When students enjoy what they read, they remember it. The trademark of this book continues to be the friendly writing style that encourages the reluctant reader and increases the student's comprehension and confidence. For example, stories about computer users engage interest immediately and illustrate key points from the chapter.

Organization of the Text

The text is divided into four parts:

- Part 1 offers an overview of computer systems and explores computer hardware. Hardware topics include updated coverage of the central processing unit and memory, input/output devices, storage mechanisms, and communications technology.
- Part 2 focuses on programming and languages, operating systems, and systems analysis and design. Information about programming and programming languages now appear in a single chapter, and an extended discussion of structured programming concepts has been included in Appendix A. The operating systems chapter includes new information about Microsoft Windows and other graphical user interfaces.
- Part 3 includes three chapters about applications packages: word processing (WordPerfect 5.1) and desktop publishing, spreadsheets and business graphics (Lotus 1-2-3 Release 2.3), and database management systems (dBASE IV PLUS), plus a new chapter on computer graphics.
- Part 4 looks at computers in the workplace; security, privacy, and ethics; and artificial intelligence, expert systems, and robotics.
- Appendix A covers structured programming concepts. Appendix B describes the history of computing. Appendix C offers a review of number systems. These appendices provide material for those who wish to include these topics in their course.

The Capron Collection: A Complete Supplements Package

- **Instructor's Edition with Annotations.** Written by B. Peacock (North Carolina State University) with H. L. Capron and J. D. Perron, this special edition contains lecture outlines with key terms, learning objectives, lecture hints, discussion questions, lecture activities, global per-

spective, test bank references, transparency references, and student projects.

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- **Student Study Guide.** Written by H. L. Capron, this study guide contains learning objectives; an overview of each chapter; a chapter outline; a list of key words with space for a student-supplied definition; study hints; self-tests (multiple choice, true/false, matching, fill-in-the-blank, and identification exercises requiring students to label figures from the text); answers to self-tests; additional margin notes; and sections called Close to Home, which provide motivational examples of computer use in everyday life.
- **Test Bank.** The test bank, containing approximately 2000 questions, has been prepared by Shelly Langman. There are four types of questions: multiple choice, true/false, matching, fill-in-the-blank, and situational essay. For your convenience, each question is referenced to the text by page number and answers are provided. The test bank is available both as hard copy and in a computerized format for the IBM PC (and compatible machine), the PS/2, and the Macintosh.
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lease 2.3, Fox/Metzelaar; *MS Works 2.0 for PCs*, Scharpf; *LotusWorks 3.0*, Fox/Metzelaar; *DOS 5.0*, Fox/Metzelaar; *DOS and Windows 3.0*, Fox/Metzelaar/Scharpf; *dBASE IV*, Fox/Metzelaar; *dBASE III PLUS*, Fox/Metzelaar; *BASIC*, Appelt/Whittenhall/Kittner; *QBASIC*, Fenton; *WordPerfect 5.1*, Fox/Metzelaar; *Excel 3.0 for PCs*, Scharpf; *Paradox 3.5*, Fox/Metzelaar; *Quattro Pro 4.0*, Webster.

- **Mastering Microcomputers** by William Davis, Paul Schreiner, Donald Byrkett, and Craig Wood. Covers basic hardware and software concepts, as well as DOS 5.0, WordPerfect 5.1, Lotus 1-2-3, Release 2.3, and dBASE IV 1.5. Students learn problem-solving through the *Solve It Yourself* feature.
- **The Computing Fundamentals Series.** This series consists of brief tutorials that introduce beginners to specific software packages, operating systems, and programming languages. The books cover the fundamental functions necessary to start using a particular application successfully. The titles include: *Concepts, 3rd ed.*, Davis; *WordPerfect 5.0/5.1*, Davis; *dBASE III PLUS*, Davis/Schreiner; *dBASE IV*, Davis/Schreiner; *Lotus 1-2-3, Release 2.01/2.2*, Byrkett; *Lotus 1-2-3, Release 2.3*, Byrkett; *PC-DOS AND MS-DOS*, Wood; *DOS 5.0*, Wood; *PageMaker for the Macintosh*, Davies; *PageMaker for the IBM PC*, Davies; *Microsoft Word 5.0*, Gorman/Haggard.
- **The Hands-On Series** by Larry Metzelaar and Marianne Fox. An ideal introduction to four major software applications for the IBM PC, these books cover the most recent releases: *Hands-On Plus: MS-DOS, dBASE IV, WordPerfect 5.1, Lotus 1-2-3*; *Hands-On, 2nd ed.: MS-DOS, dBASE III PLUS, WordPerfect 5.0, Lotus 1-2-3*; *Hands-On WordPerfect 5.1*; and *Hands-On dBASE IV*.

Software for the Instructor

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Of Related Interest

The Student Edition of Lotus 1-2-3 (509 pages); *The Student Edition of dBASE IV* (704 pages); *The Student Edition of Framework II* (372 pages).

Special Note to the Student

We welcome your reactions to this book. It is written to open up the world of computing for you. Expanding your knowledge will increase your confidence and prepare you for a life that will be influenced by computers. Your comments and questions are important to us. Write to the author in care of Computer Information Systems Editor, Benjamin/Cummings Publishing Company, 390 Bridge Parkway, Redwood City, California 94065. All letters with a return address will be answered by the author.

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The success of any project as extensive as this one involves the contributions and support of many people. The authors are indebted to all of them, especially the contributors whose expertise inspires many sections of this work: Banks Peacock of North Carolina State University, Mary Allyn Webster of the University of Florida, Melanie Wolf-Greenberg of California State University at Fullerton, and Shelly Langman of Bellevue Community College. We would also like to extend a special thanks to those who helped lift this project out of traditional publishing and into the new electronic world of desktop publishing.

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Reviewers and consultants from both industry and academia have provided many invaluable contributions that continue to improve the quality of this work. Their names follow in a list, and to the reviewers we express our sincere gratitude for helping us provide students with new insights into the ever-changing information age.

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