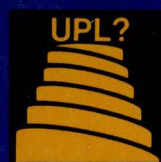
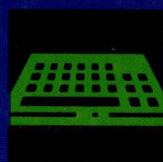


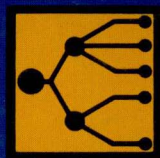
COMPUTERS



AND



DATA



PROCESSING



Harvey M. Deitel
Barbara Deitel



Computers and Data Processing

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Academic Press, Inc.
Orlando, Florida 32887

United Kingdom Edition Published by Academic Press, Inc.
(London) Ltd., 24/28 Oval Road, London NW1 7DX

ISBN: 0-12-209020-9
Library of Congress Catalog Card Number: 83-71919
Printed in the United States of America

COMPUTERS

DATA

AND PROCESSING

HARVEY M. DEITEL

Boston College

BARBARA DEITEL



ACADEMIC PRESS, INC.

(Harcourt Brace Jovanovich, Publishers)

Orlando San Diego San Francisco
New York London Toronto Montreal
Sydney Tokyo São Paulo

*Dedicated with love to
Julius and Miriam Zigman,
our children Paul and Abbey,
And in loving memory of Morris and Lena Deitel*

Preface

Computers and Data Processing is the product of one of the most ambitious research, writing, and production efforts ever undertaken in computer science publishing. Our goals were clear: make the book exciting, complete, up-to-the-minute, innovative, and visually smashing; deal with controversial issues head on, and include humor and anecdotal asides for the reader's enjoyment. The book contains one of the most dramatic and comprehensive graphics packages that has appeared in an introductory computer text.

The average person who will read this text is already well aware of the enormous impact computers are having on our personal lives and business enterprises. A familiarity with computers, how they work, and the kinds of applications they are used for is essential for living in today's increasingly complex world. This text is designed for use in a one-semester college course that introduces the basic principles of computers; it meets or exceeds the guidelines of the major professional organizations for computer literacy courses taught by departments of computer science, management, data processing, information sciences, and others.

We enjoyed writing the text; it gave us an opportunity to immerse ourselves in the most current information available in the computer field. We have read thousands of articles and communicated with hundreds of companies, organizations, and government agencies. We have met hundreds of interesting people at computer trade shows and professional conferences throughout the country, and we have had the opportunity to work with some of the leading professionals in the publishing industry. We sincerely hope you'll enjoy reading the text as well.

Features of the Text

We have loaded *Computers and Data Processing* with innovative materials in addition to presenting traditional basic computing concepts. We probe the reader's mind with challenging questions. We attack controversial issues directly.

The pictures in the text were acquired from hundreds of companies, publishers, and photographers who gave us their enthusiastic cooperation. These photographs and illustrations bring the reader right into the environments where computers are being used; the vast majority of these pictures are supplied as transparencies and color slides for projection in the classroom.

We have included a number of carefully chosen cartoons and anecdotes; our goal is not so much to get fast laughs, but rather to draw the reader's attention to important issues these pieces raise. Consider them carefully; there is much food for thought here.

We have included numerous enrichment pieces that are highlighted against color backdrops. They supplement the text, but we strongly recommend their inclusion in the required readings for the course. The material in these pieces is included in the exercises.

At this point, the reader should turn to the section titled "A Tour of the Text" on pages 8 through 17 for an overview of the book and a discussion of its unique features. This section is especially important to instructors considering the book for adoption.

For those courses that include a programming component, we have provided Chapter 8, "Structured Programming," and Appendix A, "BASIC Programming." Chapter 8 covers the general prin-

ciples of developing good programs; it is written in a language-independent manner and should be covered in all courses regardless of the particular programming language being used. For courses that use BASIC, Appendix A includes a substantial treatment of the language. The Appendix is carefully divided into four modules. Module 1 presents an introduction to the language. Module 2 introduces the elements of structured programming in BASIC with six case studies covering decision making, looping, counting, totaling, averaging, and finding the largest of a series of numbers; the case studies parallel Case Studies 1 through 6 of Chapter 8. Module 3 presents the more substantial topics of single-subscripted arrays, subroutines, and program development with stubs and drivers; its three case studies parallel Cases 7 through 9 of Chapter 8. Module 4 presents a series of advanced case studies that examine the important topics of fancy print formatting, sorting, double-subscripted arrays, and using randomness to develop simulation programs.

For the Student

We have included several features to help the student master the material. Each chapter begins with an attention-getting illustration, a statement of learning objectives, a chapter outline, and one or more thought-provoking quotations. Each chapter ends with a summary and an alphabetized list of important terms. Twenty self-review exercises—10 matching and 10 fill-in-the-blanks—are included; answers for these are provided to help the student evaluate his or her progress. Ten discussion questions are included to create material for homework and class discussions. Each chapter also includes one or more suggested projects. Many of these encourage the students to perform work outside the classroom—to investigate and experience the applications and implications of computers in the society around them.

A comprehensive **Glossary** includes definitions of the 570 terms that are highlighted in the **Important Terms** sections throughout the text. An

especially thorough **Index** includes page references for the approximately 1200 terms that are highlighted in boldface type in the chapters.

The student *Study Guide* is the ideal supplement for the student who wishes to reinforce his or her knowledge of the material and prepare for course examinations. For each chapter of the text the study guide states the learning objectives, includes a section titled “Taking Notes” that provides a detailed outline of the text material, and includes 60 short answer questions with answers—15 true/false, 15 multiple choice, 15 matching, and 15 fill-in-the-blanks. The student who reads the text, reads the notes, does the 20 self-review exercises in the text, and does the 60 self-review exercises in the *Study Guide* should certainly master the material.

Appendix C provides a wealth of information for people considering careers in the computer field or in closely related fields. It discusses many of the popular positions held by computing professionals, describes available educational programs, and lists the key professional organizations and certification programs. Perhaps the most valuable feature of the appendix is its presentation on how to go about searching for a job; the appendix describes how to prepare a résumé and cover letter and provides the names and addresses of more than 100 of the leading employers in the computer industry throughout the United States. College seniors should write to the personnel directors of these and other companies in the fall; many of them will send literature about careers they offer, their salary scales and benefits, and how to apply for jobs they offer.

For the Instructor

We have worked very hard to provide the instructor with valuable teaching materials to help make the classes interesting and enjoyable. We believe strongly in the value of graphics and illustrations, so we have assembled the largest support package of slides and transparencies ever used with an introductory computer science text. We have selected 100 illustrations from the text for the *Transparencies Package*, and we have chosen 270 pictures from the text for inclusion in the *Color*

Slides Package. Thus, most of the art from the text is available for projection in the classroom.

We have prepared a *Test Bank* containing examination questions and answers for each of the nineteen chapters of the text. A *Computerized Testing Service* and *Test Generation Software* are available from the publisher. The *Instructor's Manual* contains numerous teaching hints and provides answers to each of the discussion questions from the main text.

Acknowledgments

One of the pleasures of authorship is acknowledging the many people whose names may not appear on the cover but without whose efforts, cooperation, and encouragement a work of this scope could never have been completed.

We are fortunate to have been able to work with the extraordinary team of publishing professionals at Academic Press. These people had to work under the strain of tight deadlines and demanding authors to make this project happen; they did it with vigor, determination, and dedication.

Steve Dowling, President of Academic Press College Publishers, committed substantial resources to the development and production of the text and bent the rules to ensure that we received the publishing effort we wanted. Karen Bierstedt managed every phase of a complex production effort; her extraordinary management and diplomacy skills are very much responsible for making this text a reality. Lenn Holland handled the myriad of details of interfacing with the compositor, the color separator, the printer, and the binder. Janet Lowenstein skillfully edited the manuscript. Chris Martin painstakingly cleared publication permissions on the book's huge art package. Frank Soley designed the entire text, developed the art styles, and resolved the complex array of technical problems associated with producing a full-color textbook. Sandy Pouliot dummied the book; she fit the pieces of the text and illustrations puzzle together to create a visually pleasing and pedagogically sound presentation. We are grateful to John Parker, Academic Press's ever present representative in the Boston area, for

making the contact that initiated this publishing effort.

Dale Brown, our computer science editor, provided many valuable suggestions that helped shape the final product, and he recruited and supervised a demanding and insightful team of reviewers. These people scrutinized every word, every illustration, and every aspect of the pedagogy of the text. They provided innumerable suggestions that helped refine the manuscript in ways we could never have achieved on our own. We are very pleased to acknowledge their efforts:

Darrell Abney, Nashville Technical Institute
 Julian Andersen, Shoreline Community College
 Russell Blankenfeld, Rochester Community College
 Kolman Brand, Nassau Community College
 Michael Capsuto, Cypress College
 John Carroll, San Diego State University
 Laura Cooper, College of Mainland
 Van Cunningham, American Technical University
 Wil Dershimer, Seminole Community College
 Joe Evans, Southwest Missouri State College
 Judie Gammage, El Centro College
 Homer Gerber, University of Central Florida
 Gilbert Ghez, Roosevelt University
 Carla Hall, Florissant Valley Community College
 Don Henderson, Western Kentucky University
 Robert Lacey, Valencia Community College
 Joseph McMenamin, Grossmont Community College
 Stephen Mansfield, McHenry Community College
 J. Hayden Mathews, Murray State College
 Amanda Meredith, Florida Junior College
 Cathie Norris, North Texas State University
 Curtis Rawson, Kirkwood Community College
 Paul Ross, Millersville State University
 Alan Schwartz, University of Missouri-St. Louis
 Earl Talbert, Central Piedmont Community College
 E. M. Teagarden, Dakota State College
 James R. Walters, Pikes Peak Community College
 Judith Wilson, University of Cincinnati
 David Whitney, San Francisco State University

We would also like to thank Fr. J. Donald Monan, S. J., President of Boston College;

Fr. Joseph Fahey, S. J., Academic Vice President; Dean John Neuhauser of the School of Management; and Professors Peter Kugel, James Gips, Peter Olivieri, and Richard Maffei for their friendship and encouragement, and for creating an environment in which this writing effort could thrive.

We hope you'll enjoy reading our text. We

would greatly appreciate your comments and criticisms addressed to:

Harvey and Barbara Deitel
c/o Computer Science Editor
Academic Press, Inc.
Orlando, FL 32887

We will respond to all correspondence immediately.

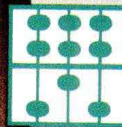
Computers and Data Processing



Chapter 1. The Information Revolution



Chapter 2. The Evolution of Computers



Brief Contents

Preface xxi

Part One Introduction 1



1. The Information Revolution 3
2. The Evolution of Computers 21

Part Two Hardware 45



3. The Processor 47
4. Input: Gateway to the Computer 73
5. Output: Getting Results from Computers 101
6. Secondary Storage 133
7. Data Communications 155

Part Three Software 183



8. Structured Programming 185
9. Programming Languages 219
10. Structured Systems Analysis and Design; Systems Acquisition 245
11. Database Management Systems, Management Information Systems, Decision Support Systems 273
12. Operating Systems 307

Part Four Computers in Business 331



13. Personal Computing 333
14. Office Automation 369
15. Electronic Funds Transfer Systems, Security, Privacy, and Computer Crime 397

Part Five Computers in Society 421



16. Robotics and Artificial Intelligence 423
17. Computers and Medicine 449
18. Computers and the Handicapped 465
19. Computers and Transportation 489

Appendices



- A Basic Programming 509
- B Number Systems 569
- C The Computing Profession 583

Glossary 605

Illustration Credits 623

Index 629

Detailed Contents

Preface xxi

Part One Introduction 1

1 The Information Revolution 3

Introducing the Computer 4
The Benefits 6
The Dangers 6
Looking to the Future 7
A Tour of the Text 8
Summary 17

Important Terms 18 • Self-Review Exercises 18
• Discussion Questions 19 • Projects 19



2 The Evolution of Computers 21

Early Computing Devices 22

The Abacus 22 • Napier's Bones 22 • Pascal's Arithmetic Machine 24 • Leibniz and the Stepped Reckoner 24 • Jacquard's Loom 25 • Babbage's Analytical Engine 26 • Lady Lovelace: The World's First Computer Programmer 27 • Boolean Logic 28 • Hollerith's Punched-Card Tabulating Machines 28 • Powers and the Simultaneous Punching Machine 30

The Dawn of the Modern Computer Age 30

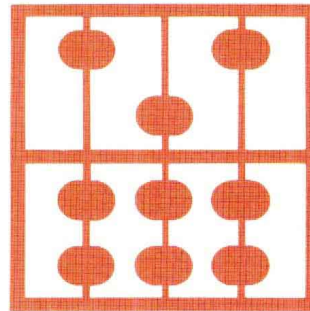
Aiken and the Harvard Mark I 30 • Atanasoff and the ABC 31 • Mauchly, Eckert, and the ENIAC 31 • Von Neumann and the Stored Program Concept 32 • Wilkes and the EDSAC 32 • UNIVAC: The First Commercial Computer 32 • IBM: The Giant Awakens 34

Generations of Computers 35

The First Generation: 1951–1959 35 • The Second Generation: 1959–1964 35 • The Third Generation: 1964–1970 37 • The Fourth Generation: 1970–Present 38 • The Fifth Generation: 1990? 39

Summary 41

Important Terms 42 • Self-Review Exercises 42
• Discussion Questions 43 • Project 43



Enrichment Pieces

Largest Bookkeeping Job 30
The Mark I 31
The ENIAC 33
Supercomputers: A Special Breed 40

Part Two Hardware 45

3 The Processor 47

The Basic Computer Processing Cycle 48
The Central Processing Unit 49

Arithmetic and Logic Unit 51 • Main Storage 51

The Binary Number System 58
Data Organization 58

Main Storage Size and Addressing 61 • Editing 62
• Destructive Read-In and Nondestructive Read-Out 62

Machine Language Instructions 62

The Instruction Execution Cycle 63 • Variable
World-Length and Fixed World-Length Machines
64 • Machine Language Programming 64 •
Looping: The Real Power of the Computer 65

The Josephson Junction: The “Computer on
Ice” 67

Consequences of Technology 67

Biochips (Fleshware?) 68

Summary 69

Important Terms 70 • Self-Review Exercises 70
• Discussion Questions 71 • Project 71

4 Input: Gateway to the Computer 73

Punched Cards 75

The Key punch Machine 76 • Card Verification 77
• Eliminating Verification 77 • Reading Cards into
the Computer 77 • An Assessment 77

Key-to-Tape and Key-to-Disk Systems 78

Terminal-Oriented Systems 78

Touch Sensing 79

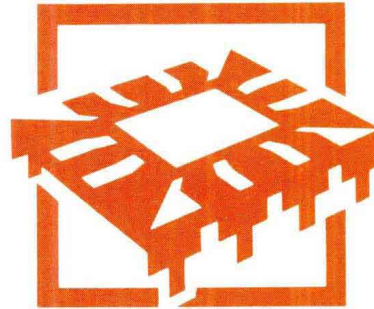
Other Input Devices 83

Source Data Automation 84

Magnetic Ink Character Recognition 85 • Optical
Character Recognition 86

How OCR Works 88 ○ OCR Applications 88

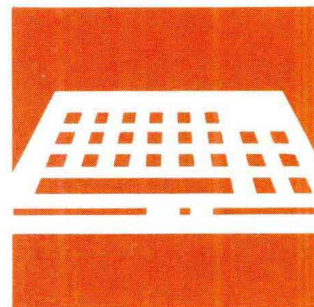
Optical Mark Recognition 90 • Bar Code Reading
91 • Universal Product Code 94



Enrichment Pieces

How Microchips Are Made 52–57

How a Computer Really Works 59



Enrichment Pieces

Garbage-In-Garbage-Out 75

Touch Tour 79

The Kurzweil OCR Reader 89

Combining OCR and OMR 91

Bar Code Applications 92–93

Benefits of UPC Scanning 96 ○ *Controversial Issues in UPC Scanning* 96 ○ *Directions in UPC Scanning* 96

Summary 97

Important Terms 98 • Self-Review Exercises 98
• Discussion Questions 99 • Projects 99

5 Output: Getting Results from Computers 101

Printed Reports 102

Types of Printers 102

Impact Printers 102 • Nonimpact Printers 110

Terminal-Oriented Systems 111

Cathode Ray Tube Terminals 112

Features of CRT Terminals 112

Portable Terminals 116

Other Types of Computer Output 124

Computer Output Microfilm 124 • Speech Synthesis 124

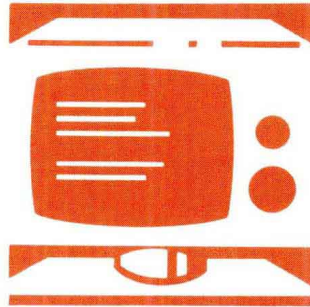
Speech Synthesis Techniques 126

Three-Dimensional Computer Output 126

Applications for the Future 129

Summary 129

Important Terms 130 • Self-Review Exercises 130
• Discussion Questions 131 • Projects 131



Enrichment Pieces

How a Laser Printer Works 112–113

Ergonomics 115

The World of Computer Graphics 117–123

The Shroud of Turin: An Ancient Mystery 128

6 Secondary Storage 133

Magnetic Tape Storage 134

Transfer Rate 136 • Organizing Records on Tape 137

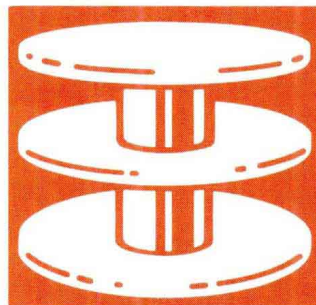
Disk Storage 139

Floppy Disks 140 • Winchester Disks 143 • How Data Is Stored on Disk 144

Mass Storage Devices 145

Bubble Memory 147

Optical Disks 148



File Organization Methods 149

Sequential Files 149 • Direct Files 150 • Indexed
Sequential Files 150

Applications for the Future 151

Summary 151

Important Terms 152 • Self-Review Exercises 152
• Discussion Questions 153 • Projects 153

7 Data Communications 155

History 156

How Data Communications Systems Work 157

Asynchronous and Synchronous

Transmission 158

Data Transmission Codes 160

Simplex, Half-Duplex, and Full-Duplex

Transmission 160

Line Speed 160

Transmission Media 161

Twisted Pairs 161 • Cables 161 • Coaxial Cables
161 • Microwave Transmission 162 • Satellite
Transmission 162 • Fiber Optics 164

Line Configuration 166

Point-to-Point and Multidrop Lines 166 • Leased
and Switched Lines 167

Polling with Multidrop Lines 168

Data Communications Networks 169

Star Networks 169 • Bus Networks 170 • Ring
Networks 170 • Local Networks 171 • Case Study
7-1: The Ethernet Local Network 171

Multiplexors 174

Statistical Multiplexors 176

Concentrators 176

Common Carriers 177

Expectations for the Future 178

Summary 179

Important Terms 179 • Self-Review Exercises 180
• Discussion Questions 181 • Projects 181

Enrichment Pieces

Library of Congress 148

The Laser Card 149



Enrichment Pieces

Lincoln's Logic 158

Laser Talk 164

The Purest Glass 166

A Popular Multiplexor 175