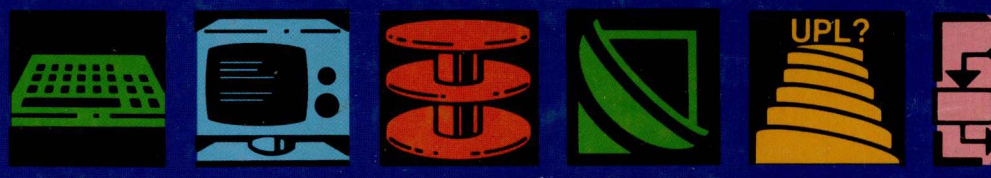
COMPUTERS AND DATA PROCESSING



Harvey M. Deitel
Barbara Deitel

Computers and Data Processing

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COMPUTERS

DATA

AND PROCESSING

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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:

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We hope you'll enjoy reading our text. We would greatly appreciate your comments and criticisms addressed to:

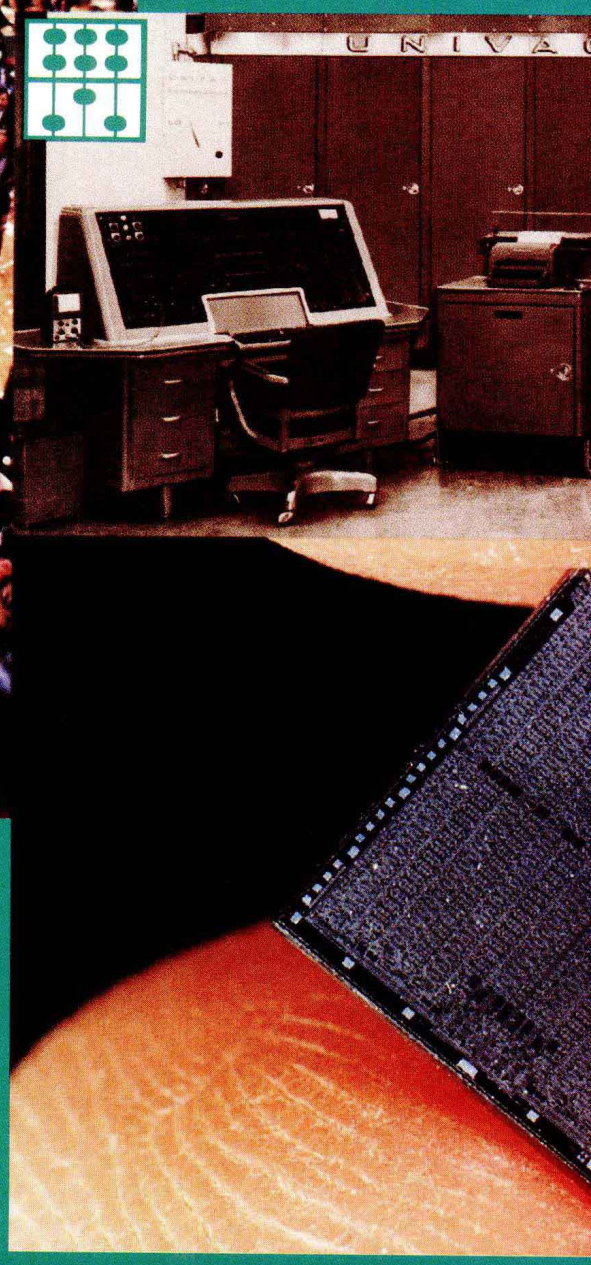
Harvey and Barbara Deitel
c/o Computer Science Editor
Academic Press, Inc.
Orlando, FL 32887

We will respond to all correspondence immediately.

Computers and Data Processing

Chapter 1. The Information Revolution

Chapter 2. The Evolution of Computers



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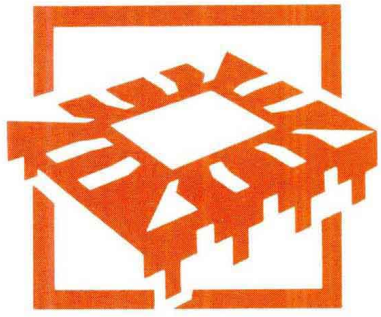

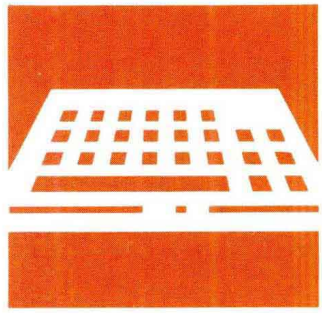

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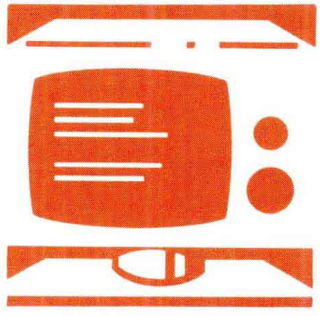

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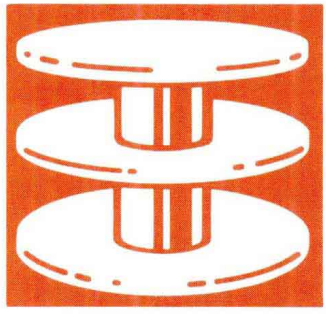

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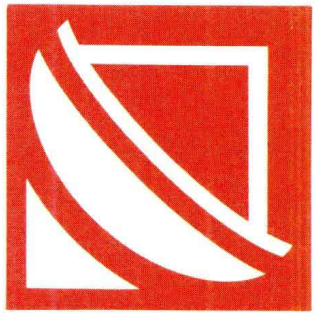

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