2nd edition

Introduction to COMPUTERS

Alton R. Kindred

INTRODUCTION TO COMPUTERS

2nd edition

Alton R. Kindred
Manatee Junior College
Bradenton, Florida

Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632

Library of Congress Cataloging in Publication Data
Kindred, Alton R.
Introduction to computers.
Includes index.
1. Electronic data processing. 2. Electronic digital computers–Programming. I. Title
QA76.K476 1982 001.64 81-15415
ISBN 0-13-480079-6 AACR2

Editorial/production supervision and interior design by *Barbara Grasso*
Cover design by *Jayne Conte*
Manufacturing buyer: *Edward O'Dougherty*

Printed in the United States of America

10 9 8 7 6 5 4 3

ISBN 0-13-480079-6

Prentice-Hall International, Inc., *London*
Prentice-Hall of Australia Pty. Limited, *Sydney*
Prentice-Hall of Canada, Ltd., *Toronto*
Prentice-Hall of India Private Limited, *New Delhi*
Prentice-Hall of Japan, Inc., *Tokyo*
Prentice-Hall of Southeast Asia Pte. Ltd., *Singapore*
Whitehall Books Limited, *Wellington, New Zealand*

PREFACE

In barely thirty years the electronic computer has made an enormous impact upon business, industry, science, education, and our society in general. Almost all occupations and academic disciplines have been profoundly affected by the versatility, speed, accuracy, and tireless capacity of work of the modern computer system.

We have reached the point where every literate person needs to understand something about the way a computer works, its power and limitations, its uses and abuses, its capacity for service and for mischief. Nearly every college now offers a course introducing students to the concepts of the computer, usually providing in addition some elementary programming language and some fundamentals of data processing techniques and practices. There is growing support for making such a course a required part of each student's general education.

Some colleges offer several introductory computer courses designed for differing publics. One may be for data processing or computer science majors, another for the casual student. One may stress mathematical and scientific usage, another business applications. I believe that there are far more common needs than differences among students who wish to learn about the computer. This book is intended to serve all of the groups mentioned. It has three principal objectives:

1. To make the reader literate with regard to the parts and functions of the computer and applications in which it is employed.

2. To serve as a foundation for further study for those intending to pursue a computer-related career.

3. To combat and eliminate the misinformation, fear, and mystery that have grown up around the computer.

This second edition of *Introduction to Computers* retains many of the features that were successfully employed in the first edition, while adding much new content and rearranging certain topics for better continuity and understanding. In revising this book, I have followed certain convictions based on more than twenty-five years as a data processing user, teacher, programmer, and analyst:

1. A properly written text can adequately serve both computer majors and non-majors and both business and scientific users.

2. The text should always move from what the students already know to what they have yet to learn. In this respect, it may appear to be written in almost reverse sequence from that followed in many other books.

3. An introductory text should be broad rather than deep. The vocabulary of the computer should be introduced and general principals and practices explained. But to try to treat each topic in detail can drown, rather than quench, the thirst for knowledge.

4. Some programming, as early in the course as possible, is essential for an adequate understanding and appreciation of the computer. BASIC is introduced as the language most likely to be readily available on time-sharing systems, small business computers, and home computers. A comparison with other languages is provided.

5. An effective book can be self-contained, requiring no additional outlays for workbooks, study guides, or supplemental references. Every chapter contains a statement of objectives, frequent headings and subheadings, numerous illustrations, applications and social concerns, a summary, terms for review, and problems and exercises. Two appendices, a complete glossary, and a detailed index complete the book.

6. Although I strongly recommend that the text be followed as written, some chapters or sections can be omitted without seriously affecting the following material.

7. It is important to know what a book covers and what it does not. This one is about computers. It is not about mathematics, engineering, business administration, or management, although it describes many applications of computers to those areas. It does not waste valuable space with cartoons, crossword puzzles, gimmicks, and literary quotations.

Numerous additions and changes, and a few deletions, are to be found in this second edition of the text. Instead of having a full chapter on philosophical and social concerns, a section on applications and social concerns appears as a part of each chapter.

BASIC has been selected as the principal programming language because of its growing usage with microcomputers in education, in small business, and in the home. A new chapter applies BASIC to fundamental programming principles so that some programming may be used in later chapters to compute file capacities, processing speeds, and other measures of performance.

The first edition presented separate chapters on input and output devices, file organization, and file processing. Material from these three chapters has been combined and reorganized to produce five coordinated chapters on the major functions of data entry equipment and methods, the central processing unit, mass storage and data base systems, information retrieval and output, and data communications.

Two new chapters of the book describe careers with computers and management of computer installations. These chapters emphasize the actual uses of computers as contrasted with the purely technical performance stressed in many texts.

I am greatly indebted to suggestions received from numerous teachers and students who used the first edition of *Introduction to Computers* for nearly six years. The additions and changes in this edition reflect my attempt to honor and benefit from those suggestions.

I express deep appreciation to my colleagues Robert D. Onley, Dianne C. Saunders, F. Ronald McCord, Jack Riggsbee, and Robert Campbell who have used this book with thousands of students and who reviewed in whole or in part the manuscript for the second edition.

Ron Ledwith, Doug Thompson, Barbara Grasso, and Gert Glassen of the Prentice-Hall editorial and production staffs gave their usual splendid guidance and support.

Finally, I wish to thank my lovely wife Joy for her inspiration and unflagging support during the long hours of writing, editing, and proofreading the book.

Alton R. Kindred

CONTENTS

II

PROBLEM DEFINITION AND PROGRAMMING

(How Do We Control Computers?)

V

THE COMPUTER HERITAGE

(Where Have We Been and What's Ahead?)