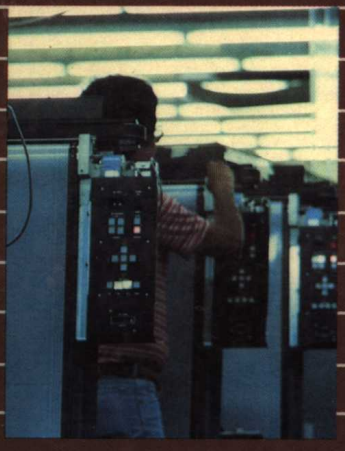
PRINCIPLES OF INFORMATION PROCESSING



THOMAS OWENS PERRY EDWARDS

0117635

Principles of Information Processing

Thomas Owens Perry Edwards

4990117635

993 2
097
311p .U 266

福州大学图书館藏书印

Macmillan Publishing Company
New York

Credits for the photographs appearing in this book are listed on page 311.

Copyright © 1987, Macmillan Publishing Company, a division of Macmillan, Inc.

Printed in the United States of America.

All rights reserved.

No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Macmillan Publishing Company
866 Third Avenue, New York, New York 10022

Collier Macmillan Canada, Inc.

Library of Congress Cataloging in Publication Data

Owens, Thomas
Principles of information processing.
1. Electronic data processing. I. Edwards, Perry.
II. Title.
QA76.0928 1986 004 86-998

Printing: 1 2 3 4 5 6 7 8 Year: 7 8 9 0 1 2 3 4

ISBN 0-02-390250-7

PREFACE

That the 1980s have been a half-decade of radical change in all aspects of our business and personal lives, including the onset and growth of the personal computer industry, is evidenced by the changes we have experienced as teachers of the "intro" course in information and business data processing. At the beginning of a term, we are accustomed to jotting down a list of ten to fifteen concepts we want our students to have learned by the end of the course. Over the last ten years, our lists of objectives have had a common core of hoping that our students would come to see how computers help people and businesses better manage their affairs. We emphasize that computers are bought for a purpose—to ensure that businesses and organizations run more productively, efficiently, and in the case of business, profitably. In the realm of personal use, we stress how computers can expand lives by offering more efficient means of communication and information handling, along with new forms of learning and entertainment. While our approach may be seen as one "trend" in this course, there is another trend demanded by instructors—flexibility.

Principles of Information Processing With Applications was written to provide for the increasing variety of the "intro" course and the flexibility in materials expected by instructors. While there is general agreement on the conceptual core students should take with them from the course, there is little agreement on the balance of concepts, programming, and applications software to which students should be exposed. This textbook provides a current and comprehensive approach to information processing concepts in an "essentials" form, and allows instructors to supplement the text with programming language and productivity software experiences and texts for their students. (This text is available in a version that includes a two-chapter BASIC programming section. Instructors should ask for *Principles of Information Processing with Applications and BASIC.*)

Our approach is, however, livelier and more contemporary than the typical "essentials" text. Rather than talk about computers in general terms, we use a timely and motivational case study to get down to specifics early. This case study focuses on a real business, View Video, an actual home entertainment videocassette rental firm and an example of one of the fastest growing small businesses in this country. View Video rents tapes and like most videotape rental stores

keeps its records on paper. The text traces this business as it falters from too much paper and not enough information about the store's operation. Throughout the conceptual core of the text, Chapters 1 through 11, students follow the owners as they review their need for computers and the hardware and software required to get the job done. In the applications module, Chapters 12 through 16, students see how the owners take control of their information with word processors, spreadsheets and graphics, database managers, and integrated software. We hope that students will see that disks, printers, memory, data security, and automation are very real problems to businesses today, and not solely academic topics. And we hope students will have the foundation for learning programming languages more easily by seeing their use in the development of a relevant business system.

As a realistic case, View Video works. It provides students with the practical knowledge necessary to understand the complex role of computers in our world. In the classroom, we've found it helpful as a launching point for discussing automation, careers, personal business computer selection, and a number of the important social issues of the 1980s—computer crime, privacy, and the changing nature of work in Chapters 17 through 20. The text stresses the productivity gains that computers can provide as well as the value of information in today's complex world. As students are increasingly exposed to productivity software tools, the text helps them grasp concepts with a real-world examples.

Productivity Software Applications

Today's students expect an opportunity to use the variety of software discussed in their text. As instructors, we've experienced the nightmares created by copyright restrictions and site licensing problems of commercial and "educational" software. In an effort to eliminate these problems for instructors and to provide the widest freedom of choice, the productivity software module, "Applications", Chapters 12 through 16, deals generically with word processing, spreadsheets and graphics, database managers, data communications, and integrated software. This enables instructors to use the text with a variety of software and be certain that students understand the fundamentals of popular software types.

Computer Applications: Using Intro-Software

Special applications software accompanies the text. Intro-Software offers free, unrestricted, copyable software to teachers. Intro-Software offers students a hands-on experience with the concepts and operation of the central productivity tools of a spreadsheet (Intro-Calc), a database management system (Intro-File), and word processing (Intro-Word). They learn basic operations and applications

此为试读,需要完整PDF请访问: www.ertongbook.com

through self-paced and carefully guided workbook assignments that reinforce concepts. Available for the IBM PC and compatibles as well as the Apple II series, each application contains an easy-to-use menu and operating instructions and can be used either in a networked or standalone computing environment.

Intro-Software was created by Fred Beisse of the University of Oregon. He wrote the programs and the workbook which can be conveniently used with the text. In designing Intro-Software, Fred took into consideration the pressures on instructors to balance the presentation of concepts, programming, and applications in one term. To maximize value to the student and instructor, Intro-Software uses a few simple commands that demonstrate typical capabilities and features contained in major commercial programs, and assumes that this is the emphasis given to applications software by instructors at the introductory level. In our course we ask our students to whet their appetities on the software, work out any phobias about using productivity tools, and master one or more specific products on their own.

Chapter Learning Aids

Principles of Information Processing not only covers the most current topics, but includes proven pedagogical devices that make the text easy to teach and learn from. Inclusion of these pedagogical aids in a principles text is unusual.

Chapter Outline A concise outline guides the reader to the most important elements of each chapter.

Previews Specially constructed previews and goals clarify expectations.

Key Terms Important terms are listed at the beginning of each module to emphasize terminology to be mastered.

Italics Italicized key terms are defined in context and listed when introduced in the margin of each page.

Diagrams and Photographs Diagrams have been constructed and photographs selected to both instruct and stimulate further thought. The use of color has been carefully planned to reinforce the text material and concepts, and is more extensive than in any similar text.

Chapter Summaries Student-oriented summaries have been constructed to review key terms and important concepts learned.

Review Questions End-of-chapter review questions have been ranked by three levels of difficulty from information queries about the text to thought-provoking inquiries about concepts.

References Selected references have been listed for further reading to invite students to explore areas of special interest.

Glossary Items Cross-referenced indicating where terms are first introduced in the text.

Comprehensive Index The text has a single index including concepts and terminology.

Teaching and Learning Supplements

Principles of Information Processing is surrounded by a complete teacher-student support package. These materials include an Instructor's Manual, Transparency Masters, printed Test Bank, computerized Test Bank, and software encompassing the View Video data bank and Intro-Software.

Instructor's Manual

In many cases, writing the Instructor's Manual to accompany a text is either left until last or placed in the hands of others. Knowing the importance of this support element for *Principles of Information Processing*, we wrote the Instructor's Manual in parallel with the text. Our teaching experience and the teaching experience of others, both on our own campus and across the country, was utilized in its preparation. Realizing that there is often a direct relationship between the success of a teaching situation and the resources available to the teacher, the Instructor's Manual includes many helpful features.

instructor-oriented summary of central concepts

teaching suggestions and lecture tips

answers to review questions

additional exercise suggestions to give variety to the classroom experience

a listing of suggested project assignments

an expanded annotated bibliography

commentary on using the View Video case and database

references to the package of Transparency Masters

Transparency Master and Acetates

A full set of Transparency Masters from the text, sized for effective and convenient use, is available along with additional material and instructional commentary on the use of the package. The Transparency Master package is also available in acetate form.

Printed and Computerized Test Bank

The Test Bank is available in two versions with over 2500 multiple choice, true/false, fill-in, and matching questions of graded diffi-

culty to help verify student mastery of terms and concepts and to ease the chores of test preparation and grading. Version One is in printed form and Version Two is part of the Burgess computerized testing system, TEST ONE, for the IBM PC/compatibles and the Apple IIe.

Acknowledgements

Writing this text and preparing the student and instructor support package took a tremendous effort on the part of many people. In manuscript form, our book was reviewed by instructors from a variety of colleges and universities. We wish to offer a special "thank you" to these selected reviewers:

Shepperd Gold, University of Houston

Sallyann Hanson, Mercer County Community College

Hattie Russell Jones, Chowan College

Ben Matley, Ventura College

George Miller, North Seattle Community College

Emmett Ritter, University of Northern Colorado

Peter Simis, California State University, Fresno

Joseph Waters, Santa Rosa Junior College

We wish to thank all of our colleagues at Sierra College, Rocklin, California, especially Bruce Broadwell, Cliff Burns, and Douglas Aimes. Whether they know it or not, they were constant reviewers of our work! Also, special thanks are due to Brete Harrison, Philip Cecchettini, Larry Lazopoulos, Barbara Pickard, and Jenny Forbes.

Thomas Owens
Perry Edwards
Rocklin, California
September 1986

Brief Contents

Preface xiii

MODULE 1 Introduction 1

1 Computers 3
2 Processing 10

MODULE 2 Hardware 25

3 Input 27
4 Output 38
5 CPU and Memory 51
6 Storage 65

MODULE 3 Software 79

7 System Analysis Design and Development 81
8 Structured Methodology 97
9 Programming Languages 109
10 Operating Systems 128
11 Processing Techniques 140

MODULE 4 Applications 151

12 Word Processing 153
13 Spreadsheets 167
14 Database Management 183
15 Data Communication 204
16 Integrated Software 223

1353/67/8

MODULE 5 Computers in Our World 239

17 Automation, Artificial Intelligence, and Robotics 241
18 Careers Involving Computers 250
19 Choosing a Personal Computer 256
20 Social Issues 273

Glossary 287
Index 303

Table of Contents

Preface xiii

MODULE 1

Introduction 1

1 Computers 3
Preview 3
People using computers 3
Defining a computer 4
Businesses using computers 5
Taking apart the computer hardware 6
Summary 8
Questions for review and discussion 8
References 9

2 Processing 10
Preview 10
View Video: The Movie People 10
Examining the need for computers 13
Benefits of computerization 16
Costs of computerization 16
Types of activities computers perform 17
Using information 19
Application software 20
Summary 23
Questions for review and discussion 24
References 24

MODULE 2

Hardware 25

3 Input 27
Preview 27
What is data collection? 27
Data collection methods 29
Data accuracy tests 30

此为试读，需要完整PDF请访问：www.ertongbook.com

Input devices 30
Summary 36
Questions for review and discussion 36
References 37

4 Output 38
Preview 38
The need for reporting 38
Monitors 40
Printers 43
Plotters 46
Microfilm and microfiche output 47
Voice synthesis devices 48
Summary 49
Questions for review and discussion 50
References 50

5 CPU and Memory 51
Preview 51
Chips—the integrated circuit 51
The central processing unit 52
Memory—primary storage 54
Representing data 55
ACSII and EBCDIC 57
Processing capacities: from micros to mainframes 59
Summary 62
Questions for review and discussion 63
References 63

6 Storage 65
Preview 65
The need for storage 65
Magnetic tape 66
Floppy disks 70
Hard disks 72
Optical laser disks 75
Summary 76
Questions for review and discussion 77
References 77

MODULE 3 Software 79

7 System Analysis Design and Development 81
Preview 81
The systems process 82
The accounts receivable system of Flowers by Foote 83

Systems analysis 84
Systems design 88
Systems development 92
Summary 95
Questions for review and discussion 95
References 96

8 Structured Methodology 97
Preview 97
The toolbox 98
Tools to assist the systems designer 99
Tools to assist the programmer 102
Tools to assist management 104
Summary 106
Questions for review and discussion 107
References 108

9 Programming Languages 109
Preview 109
Categories of languages 110
Low-level languages 112
Assembly languages 113
High-level languages: compiling and interpreting 115
BASIC 115
FORTRAN 117
COBOL 118
Pascal 120
Other languages: C, Ada, and RPG 122
Query and natural languages 124
Which language is best? 125
Summary 126
Questions for review and discussion 127
References 127

10 Operating Systems 128
Preview 128
What is an operating system? 129
Operating system functions 130
System software 132
Operating systems 134
Summary 138
Questions for review and discussion 139
References 139

11 Processing Techniques 140
Preview 140
Processing modes 140
Multiprogramming 144
Virtual storage 145

Time-sharing 146
Multiprocessing 147
Summary 148
Questions for review and discussion 149
References 150

MODULE 4

Applications 151

12 Word Processing 153
Preview 153
What is word processing? 154
Typing versus word processing 154
Entering text 155
Fixing errors 156
Adding new text 158
Rearranging text 158
Printing text 160
Storing text 160
Checking spelling 162
Other functions 163
A survey of popular word processors 164
Summary 164
Questions for review and discussion 165
References 166

13 Spreadsheets 167
Preview 167
What is a spreadsheet? 168
Looking in the window: the parts of a spreadsheet 169
Constructing the spreadsheet 172
Working the spreadsheet 178
Summary 181
Questions for review and discussion 182
References 182

14 Database Management 183
Preview 183
What is database management? 184
Types of database management systems 187
Basic features of a database management system 191
Applying database management 194
Summary 202
Questions for review and discussion 202
References 203

15 Data Communication 204
Preview 204
What is data communication? 204
Basic hardware components 206
Standards and variations of data transmission 213
Networks 215
Summary 220
Questions for review and discussion 221
References 221

16 Integrated Software 223
Preview 223
Approaches to integrated software 224
Applying integrated software 227
Summary 237
Questions for review and discussion 237
References 238

MODULE 5

Computers in Our World 239

17 Automation, Artificial Intelligence, and Robotics 241
Preview 241
Industrial robots 242
Mechanization and automation 242
Effects on employment 243
Coping with automation 244
Rehabilitative robots 245
Personal robots 246
Artificial intelligence 246
Summary 247
Questions for review and discussion 248
References 248

18 Careers Involving Computers 250
Preview 250
Role of the computer in a business 250
Data processing professionals 251
Distribution and maintenance personnel 253
End users or knowledge workers 253
Summary 254
Questions for review and discussion 254
References 255

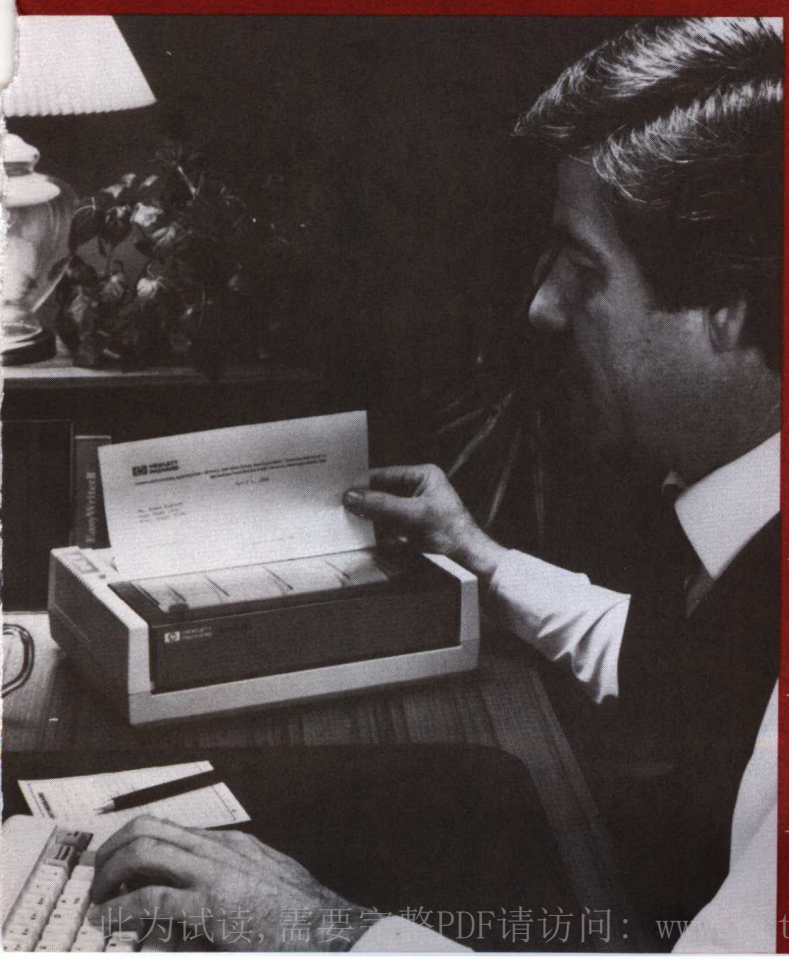
19 Choosing a Personal Computer 256
Preview 256
Types of personal business computers 257
Doing a needs assessment 258
Getting more information 259
Choosing a system 262
Aids to decision making 266
Summary 270
Questions for review and discussion 272
References 272

20 Social Issues 273
Preview 273
Computer crime: use a computer, go to jail? 273
Examples of computer crimes and how to avoid them 276
Privacy: big computer is watching you 278
The electronic cottage 283
Summary 284
Questions for review and discussion 285
References 285

Glossary 287
Index 303

MODULE 1

Introduction



此为试读，需要完整PDF请访问：www.ertongbook.com