

**INTRODUCTION TO  
ELECTRONIC DATA  
PROCESSING**

**REVISED EDITION**

**ANDREW VAZSONYI**

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*To my wife Laura,  
a constant helpmate in  
this more mundane adventure*

## Preface

**T**his revised edition of *Introduction to Electronic Data Processing* consists of three parts: (1) the *main text*, Chapters 1 to 11, which covers data processing and is independent of any programming language; (2) Appendix One, the *Language Supplement* (Chapters A to D), which presents simplified versions of FORTRAN, COBOL, and BASIC; and (3) Appendix Two, the *Data Processing Applications and Flowcharting Supplement* (Chapter E), which presents a set of data processing case studies. Because the main text does not rely on the supplements the instructor has complete flexibility as to when to introduce programming and how much time to allocate to programming and flowcharting.

The main text stresses the social impact of computer systems, the basic concepts of data processing, the fundamental principles of computer-based information systems, the role of the data processing professional, what data processing is, and what computers do. A broad conceptual framework is developed, relying heavily on illustrations and case studies. Many concepts are presented as flowcharts to build a bridge between data processing and programming.

The programming approach in the supplements is based on *translating* flowcharts into computer programs. The material is presented so that a typical student can write successful computer programs within the first two weeks of the course. Enough complete programs, flowcharts, case studies, and exercises are included to give

the student the immediate reward of a series of successful computer runs.

A typical course allocates two thirds of classroom time to the main text and one third to programming, using the supplements. The text is flexible and fits a wide variety of curricula. The instructor may choose to: (1) use the language supplement as a survey of computer programming; (2) stress programming and take full advantage of the variety of simple case studies presented in the Data Processing Applications and Flowcharting Supplement; or (3) use and stress this supplement as a survey of simple data processing case studies.

The detailed Table of Contents gives the outline of the text. Here only the highlights and organization of the Revised Edition are discussed. This Revised Edition represents a major change from the First Edition. It stresses modern concepts of data processing which can prepare the student for the use of computer systems. To keep the size of the book unchanged, material of lesser importance has been condensed or deleted.

The changes in this Revised Edition are based on the comments and advice of a group of consultants and reviewers as well as on a most rigorous classroom testing and verification process. Chapters 1 to 4 are the foundation of the text, and are substantially new. Chapter 1, which is entirely new, makes a case from the societal point of view for data processing and the data processing professional. Chapter 2 is substantially new and develops a simple but precise approach to data processing.

Chapter 3, which has been updated, illustrates the principal concepts of information processing systems and Chapter 4 now includes coverage of minicomputers, interrupt systems, distributed computing, and other recent developments. Chapter 5 stresses principles and methodology of programming including structured programming. Chapter 6 covers data representation in an abbreviated form. Chapter 7 has been updated to describe new types of input/output devices and other developments. Chapter 8 has been simplified, and stresses remote processing, distributed systems, and structured processes.

Chapter 9 starts with procedure-oriented languages, proceeds with a discussion of structured programming, and ends with optional sections on assembler language programming and input/output control systems. Chapter 10 is a new, optional chapter on data base management systems. Chapter 11 starts with a new statement of a general principle of computer systems development, but remains otherwise unchanged.

The supplements now include a man-machine dialog to teach BASIC programming in a time-sharing mode.

An extensive Study Guide with vocabulary drills, self-tests (true-false, matching, and multiple choice), and essay-type questions is available. A comprehensive Instructor's Manual is available with: (1) statement of objectives; (2) suggested approach; (3) objective test questions; (4) answers to tests in the Study Guide; (5) transparency masters of the most important illustrations; and (6) a chapter on PL/I Programming.

#### ACKNOWLEDGMENTS

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*December 1976*

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Revised edition

# Introduction to **Electronic data processing**

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**Opportunity and dilemma**

**Reactions to the computer**

The enthusiastic view

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**The power of the computer**

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**Protecting personal privacy**

**The users of computer systems**

**The manager and the computer**

**Resolution of the dilemma: The  
knowledge worker**

**The world of the data processing  
professional**

Computer operators

Application programmers

Systems analysts

Systems programmers

Data base administrators

Directors of data processing

Skills required

**The joys of data processing**

**The challenge: Toward a positive  
future**

## Why study data processing? The social implications

**D**uring the past quarter century there has developed a new resource of great importance, described by words like **computer, data, information, processing, and system**<sup>1</sup> combined into expressions like information systems, data processing, and computer and information technology. This resource is bringing about significant changes in society, as it will continue to do in the future. If we are to appreciate the significance of the societal changes brought about by computer systems we cannot think of the computer merely as a calculating machine. It must be considered an entirely new resource, potentially capable of bettering our lot (**Figure 1.1a and b**).

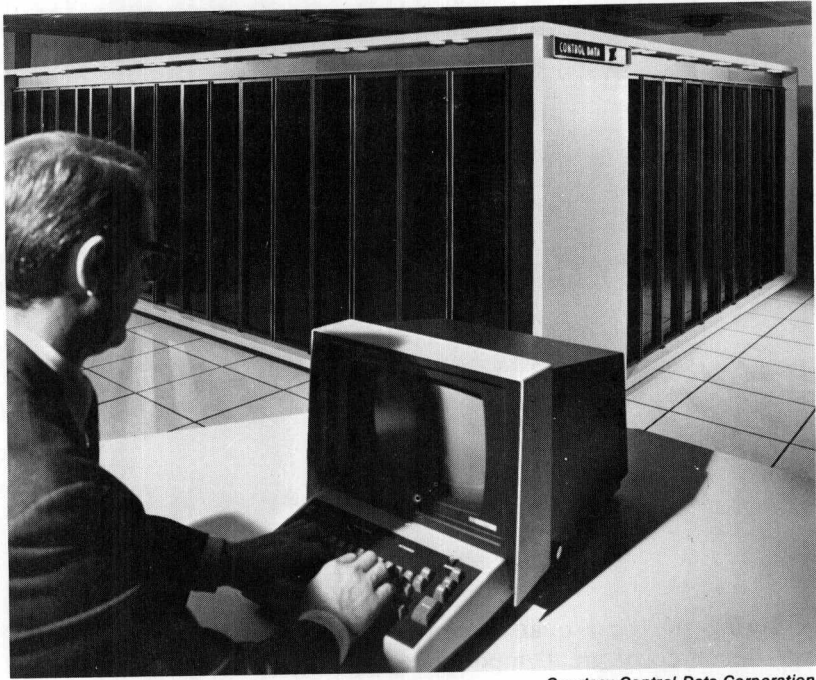
### OPPORTUNITY AND DILEMMA

We usually think in terms of supplying and supporting our needs by material resources, but we have begun to realize that the material resources of the earth are limited. Our material resources are harnessed by energy, and we have learned that the energy resources of the earth are also limited. Thus it appears that our horizons have been foreshortened by the limitations of available resources. If information is compared with energy, however, it can be considered a new resource. *The instrument of this new type of energy—mental energy* is the computer. In the sense that our material and energy resources alike are controlled by information, this third resource may be the most important one (**Figure 1.2**). Information is also a

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<sup>1</sup> Terms printed in color are defined at the end of the chapter.

FIGURE 1.1a  
Modern large-  
scale computer  
system.



Courtesy Control Data Corporation.

virtually unlimited resource, and we have only begun to explore it.

While material and energy resources have contributed to our welfare, our use of them can bring about destructive social consequences and raise serious doubts and inspire fears. Information, the new resource, can be harnessed to benefit us or misapplied to deter us from our goals. *Our challenge is to harness the power of this new invention to the benefit of the human race.* The computer can become an agent of social progress, but it can also create social, political, cultural, and economic problems. However optimistic we may be about the possible accomplishments of the computer, we cannot reap its full benefits unless we recognize both its potentialities and its pitfalls. While to an extent this awareness can be gained only through experience, an educational foundation is essential to a balanced knowledge of the subject.

In the past, most members of our society were involved in producing material goods and services. Today society is rapidly turning from concern only with the production of physical goods to an equal concern with the production of information and knowledge. The purpose of this book is to provide introductory knowledge about computers and data processing. Mastery of this subject will start

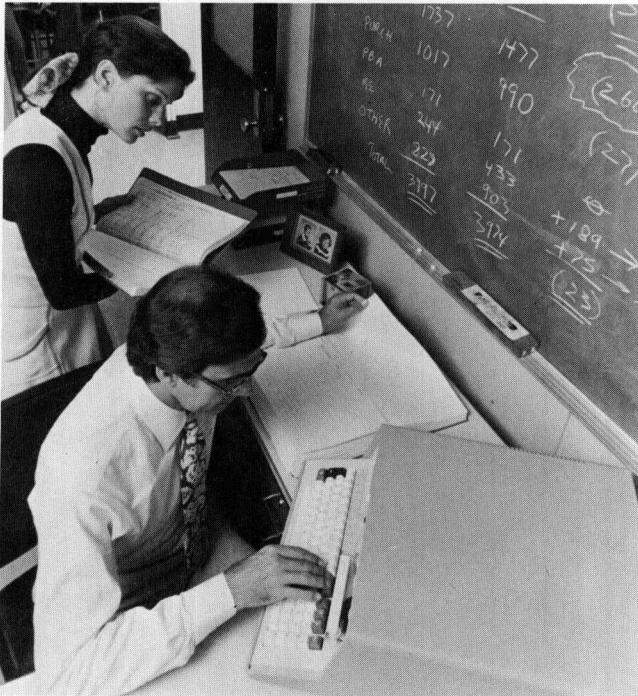


FIGURE 1.1b  
Modern portable  
computer.

Courtesy IBM.

you on the road to becoming a data processing professional or a manager knowledgeable in the use of computers.

In summary, there are four reasons you should study data processing:

1. To fulfill your responsibilities as a citizen in helping assure that the new technology will be beneficial and not harmful to society.
2. To enable you to cope with the expanding use of computers, which is necessary if you are to be an effective, productive member of modern society.
3. To enable you, as a manager, to use the computer as an instrument in decision making.
4. To start you on the road to becoming a data processing professional.

In the first chapter of this book we stress the societal impact of this new resource and the role the data processing professional plays in its development and application. Technical discussion of data processing and computers is reserved for subsequent chapters.