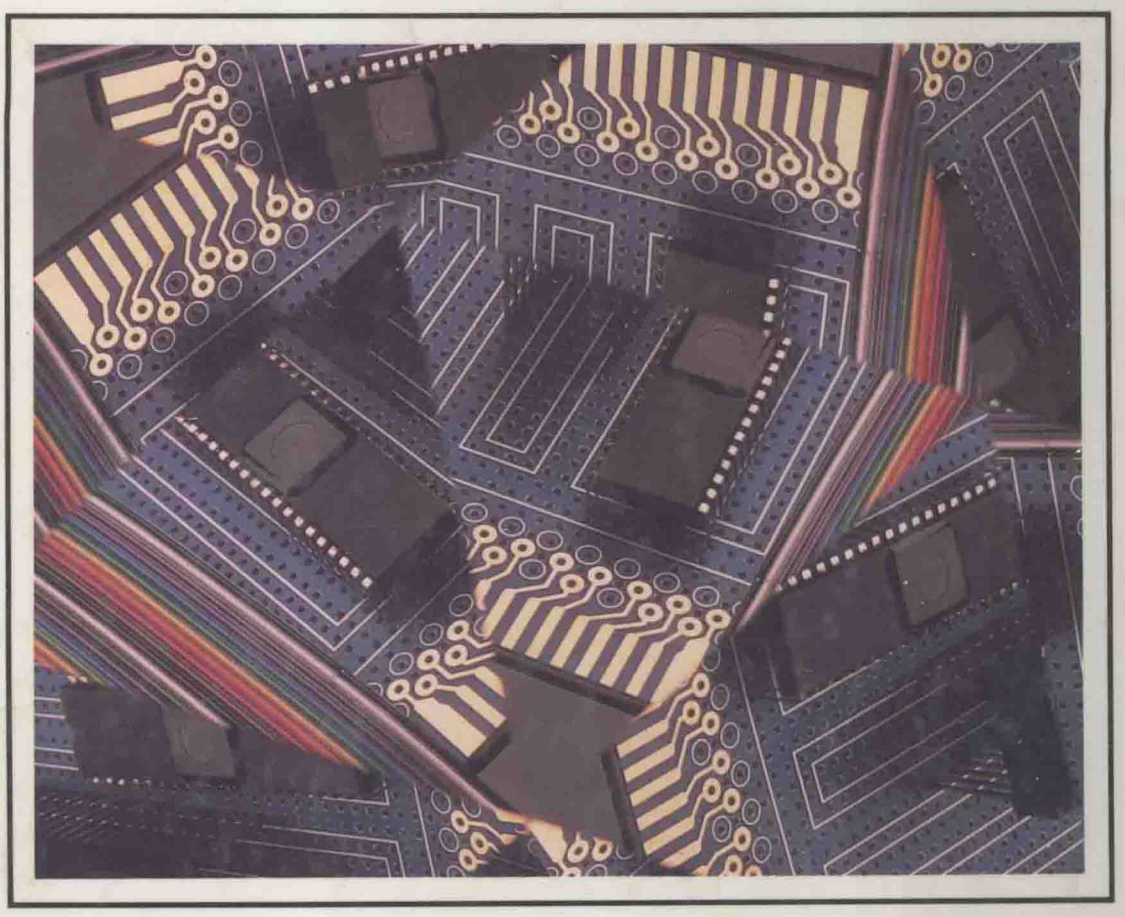
AN INTRODUCTION TO COMPUTERS AND INFORMATION SYSTEMS

RADEMACHER • GIBSON



AN INTRODUCTION TO COMPUTERS AND INFORMATION SYSTEMS

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PREFACE

Instructors in introductory computer courses face a changing technology, large classes, and students with varied interests and abilities. This comprehensive, introductory textbook is appropriate for persons affected by, or intending to enter, the computer field. Topics have been selected on the basis of currency and relevancy, and the text is written at a non-technical level to effect widespread applicability. Our guess is that the study of computers and information systems will probably join mathematics and English as graduation requirements within the next decade. Even today, some institutions require students to buy personal computers to promote their computer literacy.

This new book is designed specifically to meet the text requirements of the basic computing course for two-year and four-year colleges. Our central theme is the application of computers and information systems to business functions. To the greatest extent possible, each of the five parts is independent of the others. Thus the major topics can be taught in any desired order to meet the needs of a variety of classes. The textbook is designed to support a one-term course with or without language instruction.

Parts 1 and 2 trace the development of computer technology and its impact on organizations. The computer industry is probably the most dynamic of all disciplines and fields. It has directly changed the production, marketing, and financial aspects of business as well as the art and science of management. While computers have done much to improve the quality of life, people still represent the most important component in the creation, transmission, and management of information. Part 3 explores this human interface and the increasingly important role of software.

Part 4 discusses the application of the systems development cycle to business-oriented, computer-based systems. Because we are aware of the increasing importance of information systems topics in business and applied computer science departments, our treatment of these topics is more comprehensive than that found in most introductory textbooks. Part 5 concludes with a discussion of the most current technology affecting today's "information industries."

Why publish another introductory computer textbook? Because too many basic texts gather dust on the student's bookshelf. Most introductory texts are "loaded" with facts — generally adequate and up to date, but often too technical and unexciting. *An Introduction to Computers and Information Systems* is written in a way that involves the student personally in the learning process. We agree with Confucius when he said, "I hear and I forget; I see and I remember; I do and I understand."

Our comprehensive teaching package involves and enlightens the student in the latest topics relating to computers and information systems. Chapter instructional material includes

— objectives listed prior to each chapter,
— end-of-chapter summaries,
— lists of key terms,
— supporting newspaper/magazine articles,
— real-world applications, and
— relevant pictures and illustrative material.

The teacher's manual provides

— teaching suggestions,
— answers to end-of-chapter questions,
— transparency masters of key illustrations, and
— a comprehensive test bank.

A student study guide reinforces conceptual development using

— completion items and crossword puzzles for terminology review,
— true-false, multiple-choice, and matching questions,
— exercises and problems with varied levels of cognition, and
— an answer key for selected material.

In the future, computer literacy will be a requirement for all citizens. A knowledge of the components and criteria for developing information systems

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will also be required of all business employees. In the development of this textbook we have blended modern computer technology, current applications, and state-of-the-art systems topics with effective instructional pedagogy. We are confident that instructors and students will find these materials a useful and effective aid in studying computers and information systems.

ROBERT A. RADEMACHER
HARRY L. GIBSON

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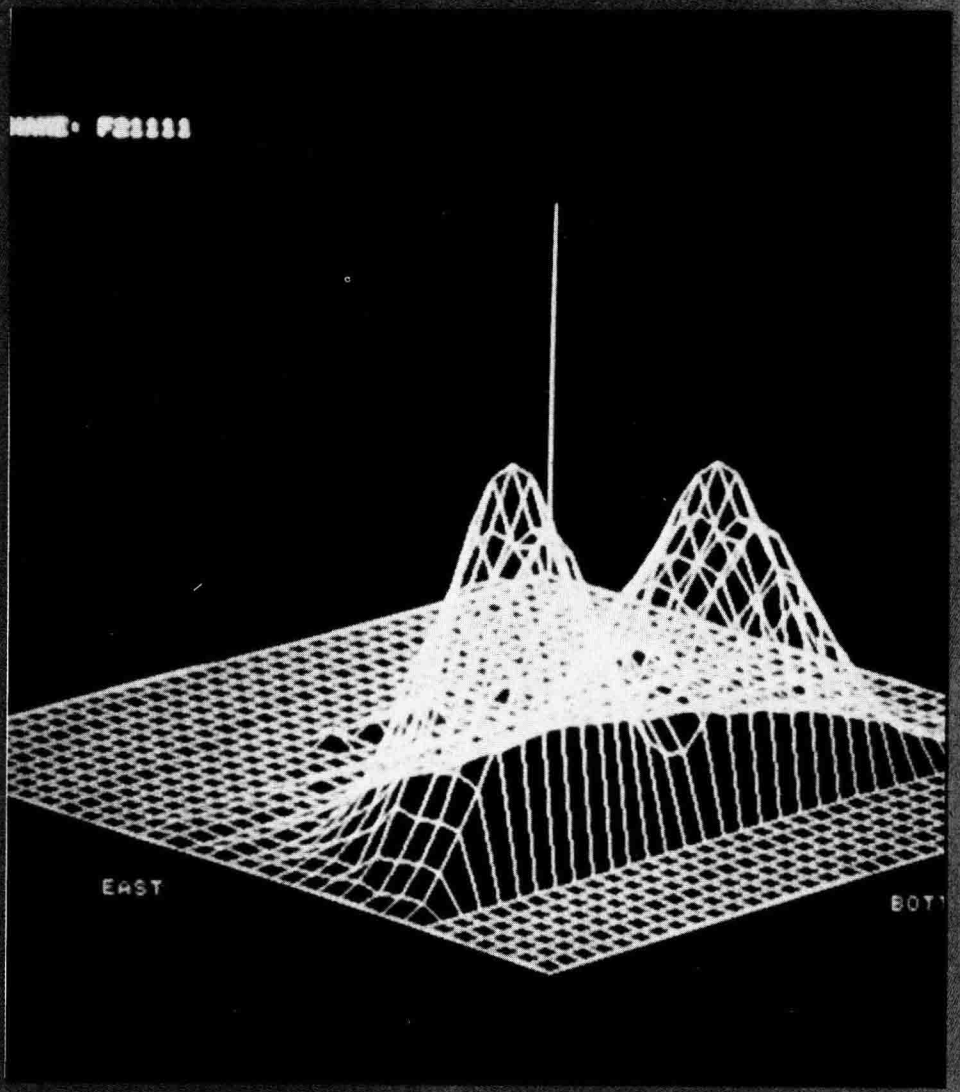
AN INTRODUCTION TO COMPUTERS AND INFORMATION SYSTEMS

PART 1 INTRODUCTION TO ELECTRONIC DATA PROCESSING



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This section provides a foundation for studying the role of computers and information systems in organizations. You are presently a participant in the computer explosion; in this section you will study how computer use developed and the present state-of-the-art.

Chapter 1 - introduces EDP terminology.

Chapter 2 - traces the impact of the computer revolution.

CHAPTER 1

ORIENTATION TO COMPUTERS AND SYSTEMS IN BUSINESS

CHAPTER OBJECTIVES

In this chapter you will learn:

1. The new relationship which is emerging between people and computers.
2. Key definitions, as a first step toward becoming computer literate.
3. The impact and capabilities of computers.
4. The benefits of computers to the business user.
5. The classes of business applications.
6. The definition of a system and how systems relate to business.
7. The systems life cycle and its various elements.

> Computers are just systems with a great amount of unconsciousness: everything held in immediate memory and subject to programs which the operator initiates. The operator therefore is the consciousness of the computer.
>
> —Author Unknown

The above quote illustrates an important consideration which is essential for you to think about and understand before beginning your study of computers. You should appreciate the notion that a computer is a machine or, if you will, a tool. While that tool has enormous potential, the real power of the computer comes from people. That is, people are the means by which the computer's potential is developed to its fullest.

It is also important to understand that the computer is perhaps the most important and powerful tool ever put to use in the world of business. In that world, where every competitive edge may spell the difference between profits and losses, success and failure, the use of computers by the modern organization has become essential.

Today's manager must be well versed in the computer, what it can do, and how best to make use of its capabilities. The impact of the computer on our lives and on the modern business organization will be discussed throughout this book. Note this increasing impact of business computers in the academic community as reflected in current headlines (Figure 1-1).

The U.S. Labor Department estimates that nearly two out of three workers today depend on the computer. The International Data Corporation estimates that by 1985 users will spend over $100 billion annually on computer operations. Is it possible that computers will take over the office and robots will replace factory workers? No, computer development hasn't reached this stage yet, but with the seemingly limitless potential of computer technology, it's almost possible to imagine this scenario one day becoming fact. One thing of which we can be certain, however, is that our interaction with computers *is* constantly increasing, as is the impact computers have on our lives. A new relationship between humans and machines is being forged—a relationship whose boundaries are as yet unknown.

In his book *The Third Wave,* Alvin Toffler considers this growing relationship with computers. Toffler suggests that the key to today's "intelligent environment" is the computer, and he contends that, in the future, "we will begin to use computers with a grace and naturalness that is hard for us to

Figure 1-1

'Computer Literacy' Gaining Place in Undergraduate Curriculum

By JACK MAGARRELL

Computers rapidly are becoming an essential part of the general college curriculum. At several institutions, "computer literacy" is now required for graduation. At many others, computers are being used heavily by students and faculty members in every field of study.

The idea that all students "should be acquainted with the computer in some reasonably respectable fashion is surely no more radical a thought than the proposition that they should be able to read a... "write," says Stephen Whit... special projects f... Found...

bers, including a requirement that any student receiving a degree, regardless of field of study, must demonstrate "fundamen... computer literacy." To help i... the policy, R.I.T. plans to ... new computing e... Comput... requ...

Market for Pocket Computers Is Expected to Take Off Soon

Adapting to Computer Age Sends Executives to School

By WILLIAM M. BULKELEY

Staff Reporter of The Wall Street Journa...

It's galling to an executive wh... the computer wizards who work ... him rattle off their jargon—"inpu... "byte," "software" and so on—... the faintest no...

Business, Not Scientific DPers Needed

SAN FRANCISCO—While the shortage of trained data processing professionals multiplies, universities continue to ... give students the wrong kind ...

Jobs Abound For DP Grads

By Bob Johnson
CW New York Bureau

NEW YORK—Metropolitan area computer science majors in the graduating class of 1982 will not be adversely affected by the depressed economy. In fact, major corporations are as eager as ever to hire students with computer savvy.

That was the general consensus of college placement ...ffices contacted by *Computerworld* in a recent telephone survey to gauge what the job ...arket has in store for the ...ring crop of would-be DPers. Yvette Negron, a recruitment coordinator at Pace Data-

(Continued on Page 6)

Use of Computers Predicted to Improve Life

By Phil Hirsch
CW Washington Bureau

DALLAS — Increasing computer us... a significan... in the qualit... Charles P. Li... also reduce the need for travel, he added. "And if the need for travel is greatly re... ...ener...

SYSTEMS ANALYSTS

We need highly motivated individuals, preferably with a BS degree and with a minimum 2 years experience in the business community. If you communicate well, have DBMS education and have on-line or distributive processing experience, you may be the person
ence in any of the following

imagine today."[1] Toffler and other prognosticators also predict that a substantial amount of white-collar work will be done in the "electronic cottage"—in other words, on home computer terminals, eliminating the time and cost of commuting for employees trained to handle such tasks as computer programming. Since the impact of computers is expected to continue to increase, it is important that we increase our knowledge of the computer as well. The more knowledge we have about the impact of computers and their applications, the greater our understanding of this new relationship will be, particularly as it relates to modern business organizations and their management.

Cheaper computers and communications breakthroughs now allow data processing to be widely dispersed throughout organizations. Newly automated offices are increasing white-collar productivity while robots are invading the factory. This new technology (Figure 1-2) requires new techniques, new management expertise, and new systems organization. In today's computer environment, business students who graduate without computer knowledge are obsolete before they have their first job interview.

KEY DEFINITIONS

As shown in Figure 1-3, computer terms are fast becoming part of our vocabulary at an early age. In order to get the most out of this and succeeding chapters, there are several terms we must define now.

Let us begin with the *computer.* A computer is best described as a general-purpose, electronic, stored-program device. It is designed to handle program instructions as well as the data to be processed by the instructions.

Computers can be either *digital* or *analog.* A digital computer board is shown in Figure 1-4. While analog and digital boards cost about the same, their functions are very different. Digital computers operate by counting, while analog computers operate by measuring. Analog data include physical variables such as voltage, resistance, and rotation. Digital data are represented by means of coded characters such as numbers, letters, and symbols. Our study will be confined to the digital computer.

[1]Alvin Toffler, *The Third Wave* (New York: William Morrow and Co., 1980), p. 189.

Figure 1-2

Computer technology affects the way organizations handle information.

Photo bottom right, National Semiconductor Corporation

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