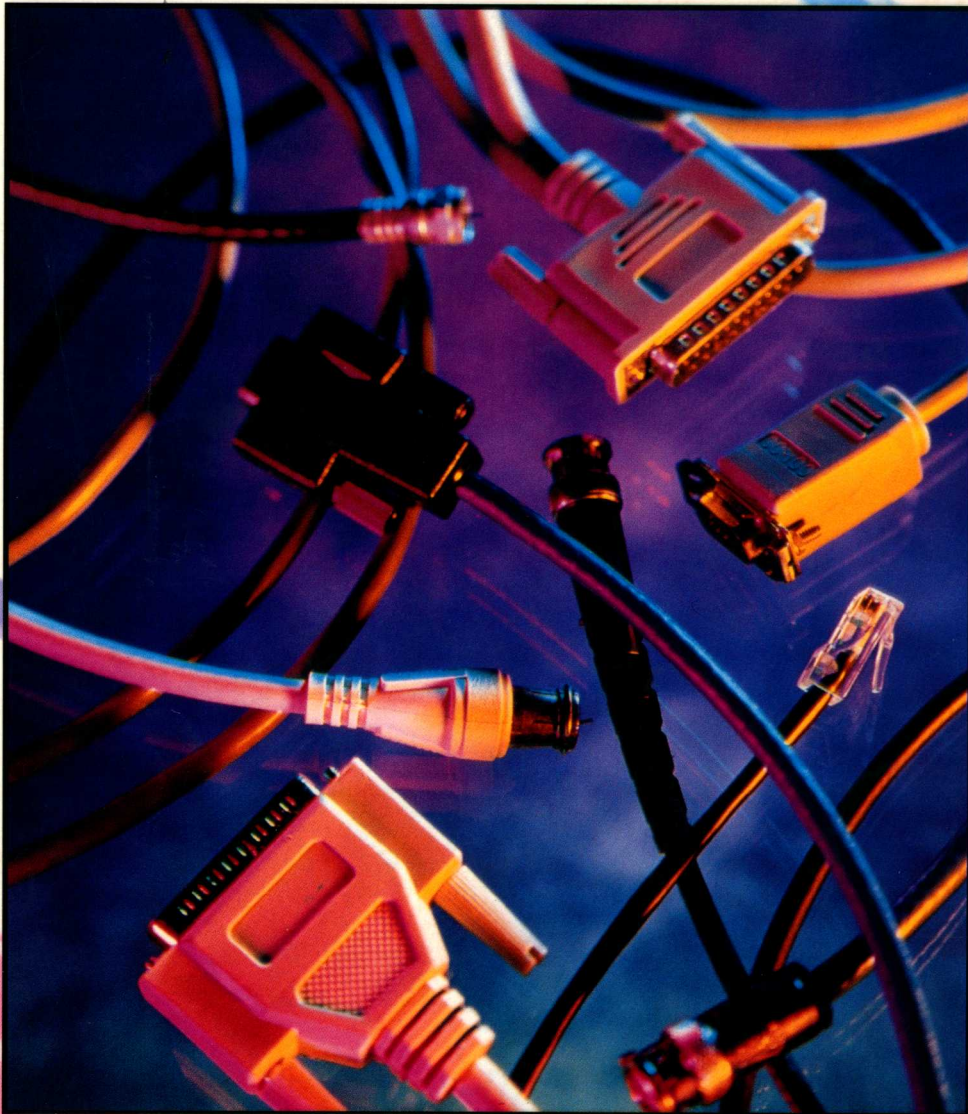


# Modern Microcomputers

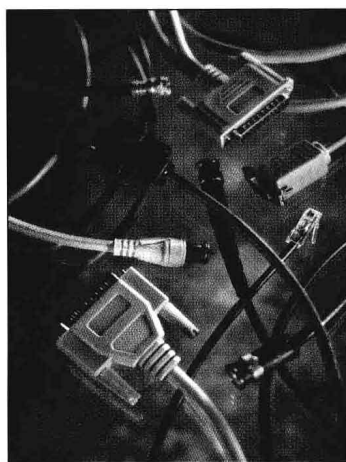
## SECOND EDITION



**FRITZ J. ERICKSON / JOHN A. VONK**

# Modern Microcomputers

## SECOND EDITION



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**IRWIN**

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*Hi Mom*

# Preface

## COMPUTERS AS TOOLS

Not so long ago, the use of a computer to solve a problem was big news. Today, however, computers affect so many aspects of our daily activities that we sometimes hardly notice their benefits. This is not to say that the world of computing is no longer interesting; hardly! The pace of innovation and potential applications make the study of computers more exciting than ever. The goal of this text is to share that excitement with students by showing them the far-reaching effects of computers and technology, and the applications that computers have to their own lives.

## THE TOOLS FOR UNDERSTANDING CONCEPTS

Students are motivated by success. By introducing ideas in manageable doses, this text allows students to succeed with each topic, building confidence to move to the next. In addition, we have created the following learning system to help students effectively comprehend computer concepts.

- **Extensive examples.** Throughout every chapter, each example is designed to encourage student interest and motivation and support topics presented in the text. These examples have been chosen for their relevance and interest to freshman or sophomore students.
- **Emphasis on microcomputers.** With more efficient microprocessors available each year, the microcomputer is the dominant tool of the end-user. To reflect this shift away from mainframes, we have focused exclusively on microcomputers (PCs and Macs) and their relevance to the college student and professional.
- **A brief history.** History adds flavor and personality to most disciplines. Computing is no exception. Unfortunately, few instructors can devote significant class time specifically to the history of computers. That is why we have included a special appendix highlighting the most interesting aspects of computing history. Students will learn about the evolution of computing and the people behind the changes.
- **Easy-to-understand language.** We made a considerable effort to make technical information comprehensible to the student. We made no assumptions about jargon, technical terms, or industry names. As a result, students will be less intimidated and will understand more.



special keys often perform specialized input tasks. Other input devices include a mouse, which manipulates a pointer on the computer screen for giving commands and entering data; a scanner, which reads graphic images and pages of text and sends them to the computer; and a modem, which receives data over phone lines.

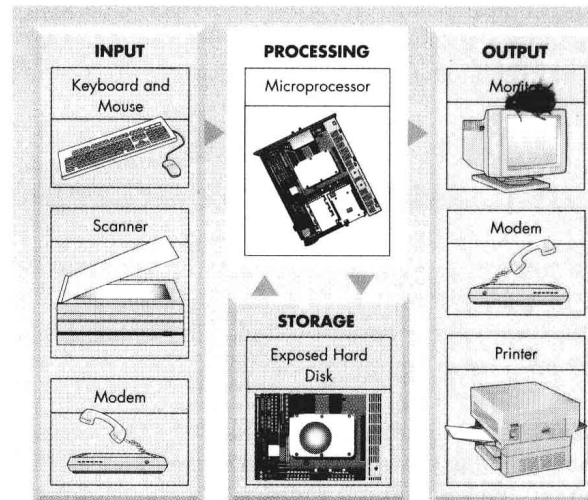
Once data is in a microcomputer, it is **processed** by the microprocessor and its associated integrated circuits. Microprocessors perform all calculations and manipulations necessary to transform data into meaningful information. Associated with the processor is the computer's memory, which is used for storing data and programs while they're being used by the processor.

Getting processed data out of the computer is the job of **output devices**. Most often computers display data on a monitor. There are several types including color or monochrome, flat panel or picture tube, desktop or portable. You can also send data to a printer or plotter to make a paper copy, use the modem to send the data over a phone line to another computer, or use any number of specialized output devices.

What do you do if you want to keep the data in a permanent form? Use a **storage device**. Storage devices hold data for later retrieval. Microcomputers typically store data magnetically on disks or tape. Each type of disk is used by its corresponding disk drive to read and write information. Floppy disks are used for easy, portable

## COMPUTERS AND NATURAL DISASTERS

Scientists at Livermore Labs in California used computerized wind and weather data to guide Air Force pilots through volcanic ash clouds as they evacuated people from the vicinity of erupting Mount Pinatubo in the Philippines. Over 20,000 people were evacuated. Every 12 hours scientists sent their predictions—which later were confirmed by satellite photos—to Air Force pilots. Earlier, the scientists had computed the path of clouds of radiation released by the explosion of the Soviet nuclear reactor at Chernobyl, which sent plumes of radiation up to 50,000 feet into the atmosphere. More recently, the same team of scientists provided forecasts of the dense clouds made by oil wells set on fire by the Iraqi army as it began fleeing Kuwait during the Gulf War.



**Figure 1-6**  
The computing cycle. The microprocessor (CPU) receives data from input devices, processes it, and sends the data to output devices for display, printing, or communication. Along the way, the CPU stores data temporarily in memory or permanently on a storage medium such as magnetic disk, tape, or optical disk.

## EXTENSIVE END-OF-CHAPTER RESOURCES MAKE THE TEXT A TRUE LEARNING TOOL

Another application for which businesses have found great use is presentation graphics. Whether you are selling an idea or product to your boss or to a potential customer, presentation graphics software can help get your point across. These programs give you a great deal of power to create and format charts, graphs, and accompanying text.

### SUMMARY

- Computers can be broadly classified as special purpose or general purpose.
- Special-purpose computers, such as an ATM at the bank, accept only certain types of input and present a narrow range of outputs.
- This book focuses on a type of general-purpose computer, the microcomputer.
- The computing cycle includes four kinds of hardware devices: input, pro-

Recaps critical concepts

### KEY TERMS

application  
application software  
computer  
computing cycle  
desktop publishing (DTP)  
E-mail  
general-purpose computers  
hardware

input  
mainframe computers  
microcomputers  
minicomputers  
modem  
operating systems  
output devices  
processed

Provides a list of important topics for student review

### REVIEW QUESTIONS

1. Is a calculator a general-purpose or special-purpose computer? Why? Explain your reasoning.
2. How might you use a word processor, spreadsheet program, and database program in your classes?
3. Even if minicomputers and mainframe computers were inexpensive, why is it unlikely that a person would buy one for home use?
4. What is a scanner? a mouse? a modem? What functions does each serve?
5. If you wanted to create a professional-looking brochure to advertise your carpentry business, what kind of application software would you use?
6. How could you use database software to help write a term paper?
7. Describe the individual processes of the computing cycle.
8. What are the major types of application software?

Promotes discussion and critical thinking

Allows students to practice for tests or exams

### SELF-QUIZ

- Computers can remember information on a short, temporary basis by using
  - magnetic tapes.
  - magnetic disks.
  - hard disks.
  - memory circuits.
- Early microcomputers (about 1975) were largely used by
  - accounting firms.
  - hobbyists.
  - large industry.
  - scientists.
- Hardware consists of
  - application programs.
  - operating systems.
  - virtual devices.
  - physical devices.
- Because their meanings are very similar, the terms software and \_\_\_\_\_ are often used interchangeably.
  - hardware
  - operating system
  - input device
  - program
- The six most common types of application software are word processing, graphics, spreadsheet, database, desktop publishing, and \_\_\_\_\_ software.
  - communications
  - games
  - utility
  - drawing

Encourages students to question and explore the world of microcomputers

### SIMULATIONS

So you think you know something about computers. Maybe. Maybe not. Answer the following questions as truthfully as possible. Do not look anything up. Do not ask a friend. If you do not know an answer then write "I don't know." Honesty is always the best policy.

- Right now could you write a 10-page term paper on a word processor that contained headers and footers?
- Describe one use of Internet.
- What is a font, a style, and point size?
- What is the difference between a formula and a function?
- What is the difference between bit-mapped and object-oriented graphics?
- Have you ever taken a computer class before? If so, what did you do and what did you learn?
- What are two types of networks?
- What is the difference between RAM and ROM?
- What is Internet?
- What are the three components that make up any computer system? Can you provide an example of each?

Expands student interest with practical assignments

### HANDS-ON COMPUTING

- How can computers make your life easier? In this chapter we examined how computers were used to help create this book. Think of the tasks that you do on a somewhat regular basis. Can computers make completing those tasks easier? Create a list of computing possibilities.
- Of course computers are everywhere. They are at banks, in the grocery store, at the registrar's office. Keep a list of every place where you have had contact with a computer for one week. Don't limit yourself to just microcomputers but think about the special computing devices that affect your everyday life.
- What do you like to do? Are you a train buff? Are you a bike rider? Do you play an instrument? Do you like baseball cards? Computers are most often useful for hobbies and interests. For example, if you are a baseball fan, there are computer programs that help you track, organize, and evaluate baseball cards. There are train programs that help you set up a model-train layout. What can you find? Take a trip to the local software store and see what type of software is available for your particular interest or hobby.
- Computers are very much part of the popular media. In fact, many movies feature computers in a major role. Create a list of movies where computers play a central character. Here are a few to get you started—*2001: A Space Odyssey*, *The Lawn Mower Man*, *War Games*.
- Become a futurist. Ten years ago, it was difficult to imagine the impact



- **Active learning.** Computing is a hands-on experience. At the end of each chapter are sections called Simulations and Hands-On Computing. Simulations provides you with real-life examples of computer uses. Hands-On gives you the opportunity to use computers to learn about computers.
- **Pedagogy.** Each chapter contains an Introduction, Vignettes, Learning Objectives/Outlines, Chapter Summaries, List of Key Terms, Discussion Questions, Self-Quiz, and Study/Review Questions.
- **Marginal notes.** Throughout the text, interesting marginal notes include tips on avoiding microcomputer problems, stories about historical figures in computing, and real-life applications of the chapter subject.

## ANCILLARY MATERIALS

Knowing that modern microcomputers is just one component of the course, we have developed several instructional tools with utility and value in mind.

- *PowerPoint Presentation Software:* Consists of PowerPoint slides and animated graphics that enhance the classroom presentation of computer concepts.
- *Instructor's Manual with resource disk:* Available to instructors only, this manual contains lecture outlines, solutions to end-of-chapter questions and exercises, teaching tips, and additional test questions. The disk is in ASCII format, so it's easy to modify, add additional material, or print sections as needed.
- *Test bank:* This test bank contains many different questions, including true/false, multiple choice, fill-in, and short essay questions. Also included are a sample mid-term and a final exam, along with answers to all questions.
- *Computest:* Irwin's popular, user-friendly computerized testing software contains test bank questions and allows instructors to customize test sheets, entering their own questions and generating review sheets and answer keys.
- *Videos:* 21 videos from the acclaimed PBS series, *Computer Chronicles*, are available that cover topics ranging from computer speech to the Internet.
- *Instructor's data disks:* For instructors using the lab tutorials for software education, these diskettes contain files used in the DOS- and Windows™-based software labs.
- *Phone and fax instructor support service:* Irwin's College New Media Department offers telephone-linked support services to instructors using Irwin software.

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