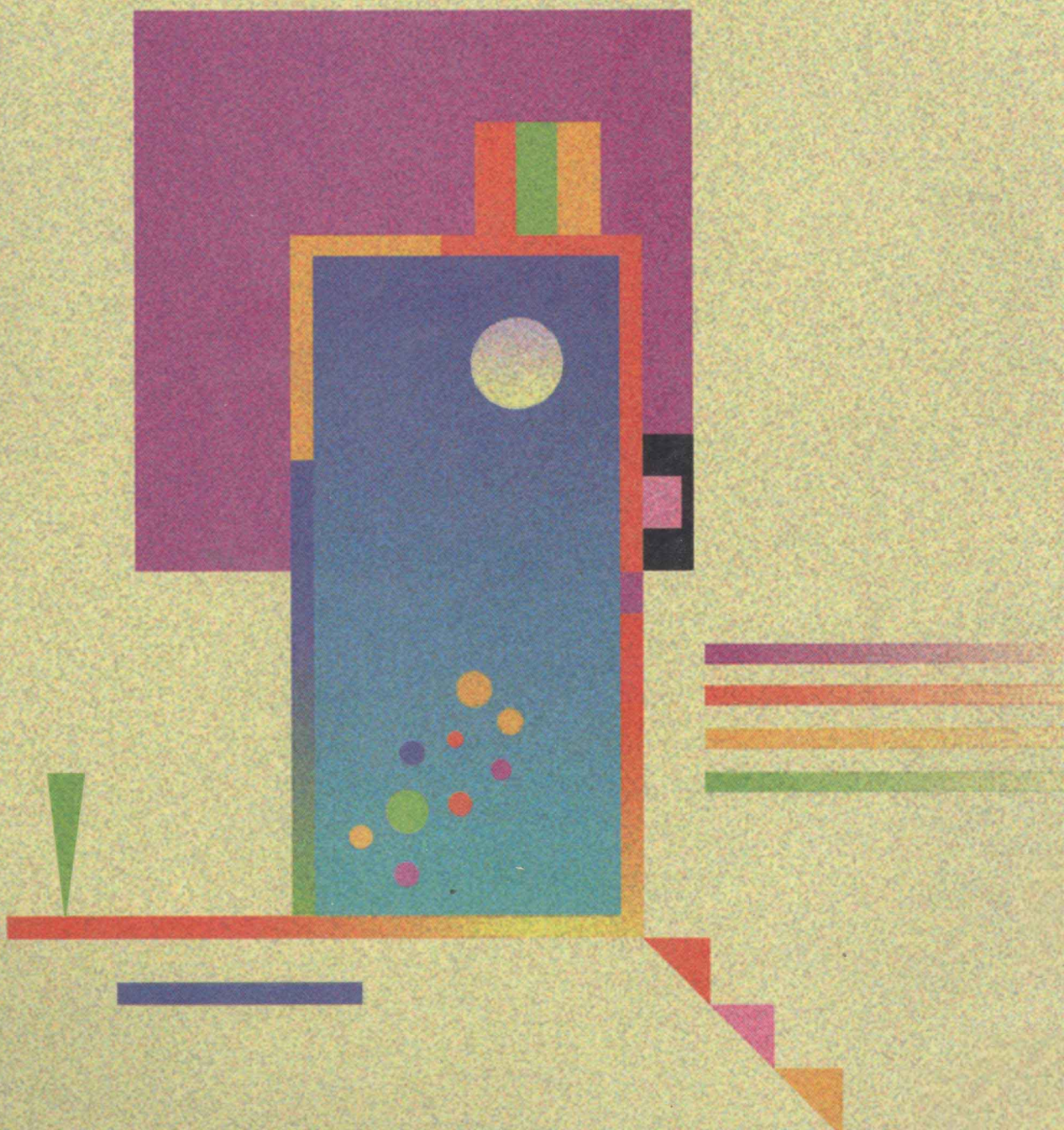
FOURTH EDITION

COMPUTERS AND INFORMATION SYSTEMS

WILLIAM M. FUORI ◆ LOUIS V. GIOIA



COMPUTERS AND INFORMATION SYSTEMS

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PREFACE

GENERAL PURPOSE

Today's educator must prepare each student to enter a world that has become heavily dependent on computers for its very survival. There can be little question that automation and the use of computers in every area of human endeavor is the driving force for change today. Educators at all levels, from grammar school through high school, to the community college to the university, have recognized the impact of the computer and have had the foresight not only to recommend but also, in many instances, to require that all students be instructed in the nature and uses of computers as an integral part of their formal education. To quote Dr. R. L. Bright when he was associate commissioner for research of the United States Department of Health, Education, and Welfare, ". . . [anyone who graduates from a college or university] without being instructed in the use of computers has been severely cheated."

We have written from the premise that each student is a potential user of computers and will benefit from an understanding of computers and their use in society. Students soon come to realize that with a little knowledge and understanding, the mystery and awe with which they might have viewed the computer will disappear and the computer can begin to serve them as the useful and essential tool that it was intended to be. Accordingly, the first three editions of this text were a huge success. They were adopted by universities, two-year colleges, and vocational schools nationally and internationally. We feel the attraction comes in large part from the balance of general computer concepts and real world computer experience the text provides.

However, in the decade of the '90s, our readers come to us more computer literate than ever before. Thus, they expect more from us. Therefore, in this fourth edition of the text, we have provided, in a clear and concise format, a basic understanding of what a computer system is, what it can do, where and how it is currently being used, and the ethical aspects of computers in society. Perhaps more important, this book can help the student learn how to use a computer.

Through the use of tutorials and other computer exercises, students become excited and encouraged as they learn the magic and power of a computer firsthand. Therefore, we enhanced the hands-on aspect of our package by providing increased tutorial coverage in the companion applications book. This companion book, entitled *Applications for Computers and Information Systems*, fourth edition, contains four tutorials that guide a student, step by step, through the popular microcomputer operating system DOS and applications software such as WordPerfect, Lotus 1–2–3, and dBASE.

This text is recommended for use in a one-semester survey course or in an introductory computer course for general education, or for the business, computer science, or information processing student. Once the student has completed this one-semester course, he or she will be prepared to function effectively in our computerized world or pursue more advanced studies in the field of computers.

ATTRIBUTES OF THE TEXT

In addition to a thorough, comprehensive, and concise treatment of the subject matter, you will find the text contains the following attributes.

Hands-On Approach

Recognizing the importance of knowing how to use a computer, we have included four tutorials on the most recent version of DOS, WordPerfect, Lotus 1–2–3, and dBASE IV. Hands-on computer activities are provided at the end of each tutorial.

Currency

With new developments taking place daily in information systems, it is essential that the material presented in a textbook represent the state of the art. Current topics that are given extensive treatment in this edition are operating systems, artificial intelligence, expert systems, networking, wide area distributed data processing networks, local area networks, communications systems, the automated office, the integration of micros with mini- or mainframe computers in business and industry, laptop microcomputers to mainframe supercomputers, fourth-generation languages, fifth-generation computers, and robotics! In addition, the fourth edition features new coverage of multimedia computers, object-oriented programming, computer ethics, micrographics, operating environments, optical disk drive technology, workstations, computer-assisted software engineering (CASE), desktop publishing, computer viruses, RISC computers, and the latest developments in microcomputer technology.

Readability

From the outset, we have tried to keep the student's needs and interests in mind. Realizing that this material can sometimes seem dry and irrelevant to some, we have written in a lively and engaging manner. We want this edition of the text to be as meaningful and enjoyable to its readers as was the previous edition. However, it was our goal to achieve this by being concise and to the point in our presentations. Concepts, no matter how technical or complex, are explained in a simple, down-to-earth style, with references to real-life situations. When students see how computers can relate to their world, whether it's on the job or at home, they become interested; often, they get downright excited.

Flexibility

A top-down structured approach was used throughout that provides the instructor the flexibility to alter the order of presentation of topics or modules within a chapter or unit, or to skip a particular topic or module altogether without affecting the continuity and effectiveness of the overall presentation. This was accomplished by introducing concepts when needed to support a particular topic or module and not in a predetermined or set order. Terms are defined when they are introduced into a discussion. In the rare event that a term or a concept may be used in a module that has

not been adequately defined or explained in a previous topic or module, or covered in the instructor's presentation, an unprecedented glossary (more than 500 terms) and index (in excess of 2,000 entries) is at the student's disposal and should provide the needed assistance.

Integration of Microcomputers Throughout

The personal or microcomputer is no longer an interesting plaything for the computer hobbyist. It has become a familiar sight in homes and offices across the land. Many small businesses rely exclusively on microcomputers for their processing needs, and a number of larger companies continue to employ mini- or mainframe computers exclusively. The trend today is to network computers. Microcomputers are being hooked up to terminals and other micros in various networking schemes. Personal computers are being integrated into mini- and mainframe configurations to form more useful and powerful systems. Consequently, we have emphasized both the microcomputer system, and micro-to-micro and micro-to-mainframe connections throughout.

One of the most-asked questions today is, "What's the best microcomputer to buy?" The answer naturally depends on your needs. Realizing the need for help in this area, we have presented material concerning microcomputers in such a way that by the time the reader completes the book, he or she will be well prepared to go out and make a wise selection.

FEATURES OF THE TEXT

Tutorials

Recognizing the importance of prewritten or packaged commercial software like operating systems, word processing, electronic spreadsheets, and database management systems, we treat this all-important topic in three chapters in the text and four complete tutorials (DOS, WordPerfect, Lotus 1–2–3, and dBASE IV). Judging from our own experiences as well as from research and comments received from instructors, business professionals, and students from all over the country, knowing how to use the computer as a tool has become at least as important as knowing about computers. This text is a response to that need.

We have spent much time and effort researching the topic and feel that our treatment and presentation of prewritten software tutorials are the most thorough of any introductory computer book yet published. We have taken extra care to present this material in a clear, natural, easy-to-follow manner. Our writing assumes that the reader has little or no prior knowledge of the subject matter. Teacher and student alike will find this timely information to be particularly interesting and of great practical value.

If a computer or software package is not available, each tutorial can still be used profitably and effectively. Because the illustrations shown in each tutorial are the computer screens produced by the actual software package, reproduced in exact detail, reading the step-by-step, keystroke-by-keystroke tutorial will be like looking over a friend's shoulder and directing him or her as to the steps to take—only the excitement of using the computer and the sensation of actually depressing the keys will be missing.

Boxed Features

To a degree, most books of this type are obsolete the day they are published. Therefore, virtually every chapter contains boxed features composed of current material from a recent article or book. These materials were carefully selected to keep the reader informed about the latest computer-related topics and issues. Written in a motivational and entertaining manner, information of this type enriches the text material and relates the book's contents to the student's real world.

Student Annotations

Most students enjoy reading about computer lore, culture, and fancy. We have included a number of tantalizing tidbits to both inform, and enliven and amuse. Readers will learn about the robots in the operating room, a virtual chicken, and more.

To-the-Point Discussion Summaries

To-the-Point discussions are sometimes used in place of lengthy discussions. They can be used by the student to get a capsulized view of the material.

UNIQUENESS

In several ways, this book is different from others that appeal to students in the data processing, computer science, information processing, and related areas.

1. Simplicity is our strategy. The book avoids repetition of facts and discussions, and the material is homogeneously grouped, thus more logically presented. Key information will be summarized in brief To-the-Point discussion summaries.
2. A new and unique table of contents has been developed for the text. The instructor will find the order easy to teach from, and the student will have no trouble seeing the relationships that exist from discussion to discussion.

   Chapters 8, 9, and 10 will provide a broad overview of word processing, desktop publishing, electronic spreadsheets, database management, computer graphics and communications software, and more. The tutorials presented in the applications book are designed to be used with a computer and corresponding software package. They will guide you step by step through the major functions of the software package in a simple and easy-to-follow manner. As we pointed out earlier, if a computer or the needed software is not available, you will still reap most of the benefits of the tutorial, but only as an observer and not as a player.
3. Understandably, instructors enjoy having the freedom to skip certain topics and to teach others out of order while maintaining continuity and cohesiveness in their overall presentation. This text affords instructors this capability to the greatest extent possible by virtue of its modular construction. Concepts are presented only as needed to support a particular topic or module and not in any arbitrary order.
4. The material presented in this text has been successfully field-tested at Nassau Community College. The enthusiastic response has convinced the authors that the material is interesting, informative, and easy to understand.

5. The text includes a substantial number of true/false and multiple-choice exercises at the end of each chapter. The answers to all questions are included.
6. *Problems That Carry the Student Beyond the Pages of This Book* are included at the end of each chapter. These thought-provoking questions are based on the discussions within the various chapters. They should entice the student to research the topics to which they relate.
7. The text includes amazing but true facts concerning the people and events surrounding the fascinating world of computers—a believe-it-or-not of computer trivia.

STRUCTURE OF THE TEXT

This text is organized to facilitate the student's comprehension of the relevance of information systems in business, science, and industry. To accomplish this end, we have divided the text into units as follows.

Unit I

In this unit, the impact of computers on business, science, industry, and our everyday lives is presented. This will help clarify why this study is being undertaken. Additional materials presented in this unit will prepare the student to begin a study of programming or to work with available software packages. Upon completion of this unit, the instructor may freely choose if, when, and in what depth these topics will be presented.

Unit II

This unit describes the hardware that makes up an information processing system. A thorough and complete integration of microcomputer and mainframe systems is provided. Particular attention is paid to the numerous conceptual and architectural similarities between the micro- and the mainframe computer systems. In addition, this unit will focus on data entry, input/output, the processor, and data communications.

Unit III

Unit III is devoted to an in-depth discussion of software. We begin with a discussion of operating systems, from those used with the smallest microcomputers to those used with the largest supercomputers. We discuss word processing, desktop publishing, spreadsheet analysis, data structures, database design and implementation, computer graphics, and integrated software packages. Finally, the problem-solving process is presented. The student will learn how to prepare an application for programming, to logically analyze the problem to determine the sequence of operations that will efficiently solve it by computer, to represent this solution graphically utilizing a program flowchart or pseudocode, and finally to use the flowchart or pseudocode to prepare a computer program. To accomplish this, learning about program preparation, structured programming and other top-down programming techniques, and computer languages will be necessary.

We discuss all of those topics generally in Chapters 7–11. Tutorials on the most popular prepackaged software (DOS, WordPerfect, Lotus 1–2–3, and dBASE) are provided in the applications book.

Unit IV

In this unit, we explore the more sophisticated topics of systems analysis and design, and information systems. Application areas discussed include electronic mail, teleconferencing, voice mail, videotext, telecommuting, and public utility services.

Unit V

In Unit V, we answer many of the questions asked by students in an introductory computer course. We answer such questions as, What careers are open to me if I pursue my studies in information processing? Where is this field headed? What lies ahead? What is artificial intelligence? Can computers think and learn? Will I be able to carry on a conversation or speak to a computer in normal everyday English in the next decade or two? We summarize what the experts see in their crystal balls for our futures.

Appendixes

The Appendixes include a discussion of computer number system and data representations, a brief but spectacular look at the evolution of computers, and flowcharting and decision tables.

Glossary

An extensive glossary of computer-related terms is included.

Tutorials

The DOS, WordPerfect, Lotus 1–2–3, and dBASE tutorials contained in the applications book can be used by the instructor to give the student hands-on experience with the software packages most commonly used in business today. How better can one understand the use of prepackaged software than by studying the biggest sellers in each respective area?

INSTRUCTOR'S RESOURCE PACKAGE

Instructor's Resource Manual

To aid the instructor in structuring the course to fit the interests and backgrounds of his or her students, a teacher's resource manual is available. This manual is divided into three units.

UNIT I — Includes for each chapter a detailed guide to be used as a lecture outline.

UNIT II Provides suggestions and outlines for presenting DOS, word processing, electronic spreadsheets, and database software.

UNIT III Consists of suggestions for presenting BASIC.

Test Bank

A computerized test bank containing more than 3,000 questions that can be used by the instructor in the preparation of examinations is available. *Questions are organized and presented by section and are graduated in level of difficulty.* Each section contains a number of objective questions that are drawn from the corresponding section in the text. In each section, the questions presented first test a student's factual recall of basic terms and concepts, followed by questions that test for a more detailed knowledge of the text material, and concluding with questions that test the student's ability to reason the answer based on a knowledge and an understanding of the text material. The instructor is free to choose questions that are consistent in depth and level with the presentation of this material in class. A phone call to Prentice Hall indicating the questions desired is all that is needed, and you'll receive back by return mail a typed exam, which you can then copy for your students.

Study Guide

To assist the student in understanding and learning the material presented in the text, and to make the learning experience more enjoyable, a study guide can be used and is available. The study guide is subdivided into three units.

Unit I provides the following for each chapter:

A summary that emphasizes the main points of each chapter.

A vocabulary drill.

Short-answer exercises with answers.

Projects to be completed outside of class. These can be specifically assigned by the instructor or used as voluntary extra-credit assignments for the more enterprising students.

Unit II contains information and exercises that assist the student in learning software packages of the type presented in the tutorials. Each exercise is designed to reduce anxiety, increase motivation, and provide a useful and meaningful experience for the student on a self-paced independent-learning basis.

BASIC Supplement

This supplement deals exclusively with the BASIC language. The BASIC instruction set presented is universal and is available in virtually every version of BASIC. This material is provided in seven distinct lessons. The instructor can choose the most appropriate point(s) in the course to present the lessons.

Turbo Pascal Supplement

This supplement deals exclusively with the Pascal language. The Turbo Pascal instruction set is presented.

Expert Systems Supplement

A tutorial that can be used to prepare your own expert system is available.

Acetates and Transparency Masters

Full-color acetates are provided to visually and dramatically enhance the instructor's classroom presentation. These represent the illustrations most often selected and used by instructors during the field testing of the text.

Other Supplements

To further aid the instructor in structuring the course to fit the needs of his or her students, *Computers and Information Systems* includes the *New York Times Contemporary View Program*, *The Machine that Changed the World Series*, the *Video Professor Software Tutorial Series*, and the *ABC News/Prentice-Hall Video Library*.

Laser Disk

A laser disk that contains information relative to the topics presented within the text is available free upon adoption of the book.

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It is with great pleasure and gratitude that we acknowledge the many people whose expertise and encouragement contributed immensely to the creation of this book. A project of this magnitude could not have been completed without the help of many talented and committed people.

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you can see, the drawings and line art are simply beautiful. We were fortunate to have their services.

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To those of you who will be reading and learning the many facts and concepts in our book, we hope you find the material exciting and challenging. Suggestions for improving the text or any of the supplemental materials will always be welcomed. Send them to:

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We will respond to all correspondence.

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