COMPUTER CONCEPTS AND APPLICATIONS

Third Edition

with an Introduction to Software and BASIC

James A. O'Brien

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with an Introduction to Software and BASIC

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PREFACE

INTRODUCTION

The only constant in computing is change. Dynamic developments in computer and information systems technology, theory, and applications have become a fact of life in this field. Thus, this edition represents a major revision of the second edition material. The new title of this edition emphasizes the extent of the major changes made in its content and organization. However, this text continues to fulfill the requirements of providing a basic understanding of computers and information systems recommended in model curriculums, including those contained in Course CIS-1: Introduction to Computer Information Systems, of the Data Processing Management Association. It should be noted that this text differs from my other introductory text, the fifth edition of *Information Systems in Business Management*, in that it is designed for introductory courses that do not need an extensive introduction to topics in business information systems and management of information system resources. However, this text continues to embody the following characteristics:

- An introduction to computer concepts and applications.
- A emphasis on real-world applications, information systems concepts, and hands-on user computing.
- A personal style, user's viewpoint, straightforward organization, and up-to-date content.

OBJECTIVES OF THE TEXT

This edition of the text has two fundamental objectives that underlie its organization and content, and are reflected in its change of title.

Computer Concepts Objectives

This text helps students become computer literate through the introduction of concepts and terminology encountered in computer information systems. Students should be able to provide examples from the "real world" that demonstrate a true understanding of fundamental concepts and terms in the areas of:

- ☐ Computer hardware and software.
- ☐ Information processing technology.
- ☐ Information systems applications.
- ☐ The computer's impact on society.

Computer Applications Objectives

This text and its software and workbook supplements help students become knowledgeable users of computers and software packages and introduce them to software development using BASIC. Students should learn to accomplish the following tasks:

- ☐ How to load and use simple application packages on a microcomputer.
- ☐ How to create, edit, store, and print a document using word processing functions.
- ☐ How to build, modify, store, print, graph, and use an electronic spreadsheet.
- ☐ How to create and use a database and retrieve, display, and report information.
- ☐ How to develop and execute a few simple programs in BASIC.

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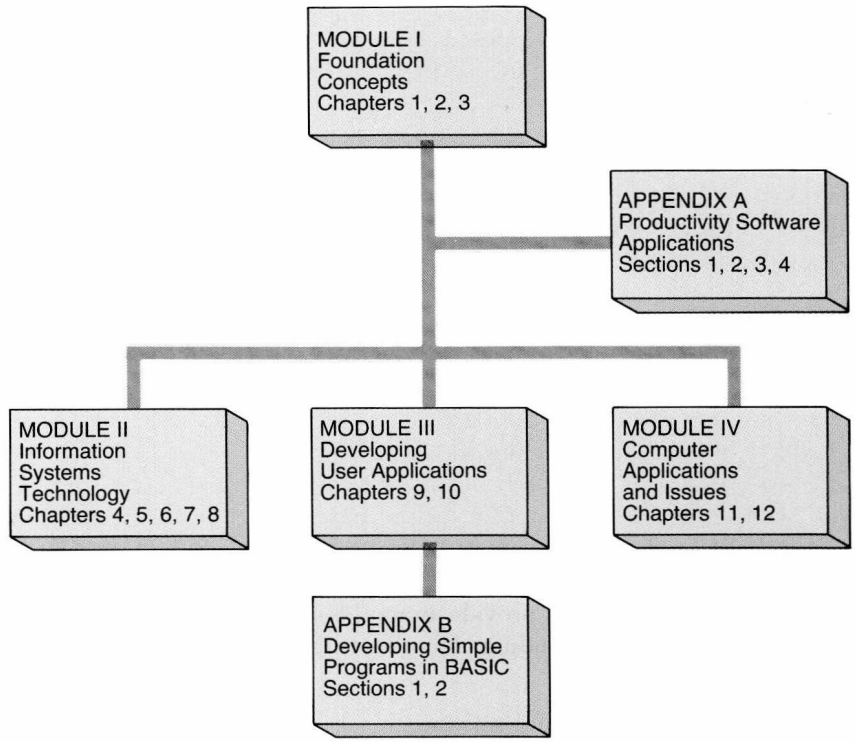

Figure 1 The modular organization of the text.

STRUCTURE OF THE TEXT

One of the primary objectives of the third edition was to simplify, shorten, and restructure the second edition text material. A significant effort was made to remove redundant material and excess wordage, and to simplify the sentence structure and language used in the text. The text was reorganized into four modules and two appendixes. Each chapter was also organized into two or three distinct **sections.** This was done to avoid proliferation of chapters, as well as to provide better conceptual organization of the text and each chapter. It also helps instructors spotlight material they wish to emphasize, make optional, or delete. Additionally, it dramatically reduces the number of chapters from 16 to 12, and structures the text into levels of modules, as shown in Figure 1.

The practice of starting each chapter with an outline and learning objectives has been maintained. Real World Applications have been moved to the end of each chapter section. All Real World Applications have been replaced with more current and more section-specific examples. Each chapter ends with Key Terms and Concepts, a new Review and Application Quiz tied directly to the Key Terms and Concepts, and Application Problems (which have been increased to eight or more problems in each chapter). The text also contains an extensive glossary of information systems terms.

CORE MODULE

The first module of the text (Chapters 1, 2, and 3) is a true **core module.** It includes the foundation concepts of information systems, computer hardware, and software. This was done for two reasons. First, it allows instructors

to assign *any other module or appendix* after completing the core module. Second, many instructors are now beginning classroom demonstrations of computer hardware and software and making application software lab assignments in the first few weeks of a course. They need a text that gives students an immediate, yet fairly complete introductory coverage of the foundation concepts of information systems, computer hardware, and software. They don't need a text that makes them wait until the middle of the book for a software chapter, or that has a skimpy introduction to such topics in an opening chapter, and then has to repeat itself in later chapters.

Note that historical and future material is in a third section of the first chapter where it can be de-emphasized or deleted if necessary. However, such introductory material is important to give students a feel for *trends* in computing—where we came from and where we are going. Also note that the survey of programming languages material has been reduced and included as a third section of the introductory chapter on software (Chapter 3). This allows instructors to talk about programming languages when they talk about software. However, instructors can also de-emphasize or delete this section if they wish.

THE TECHNOLOGY MODULE

Gathered together in a *technology* module (Chapters 4, 5, 6, 7, and 8) is a more detailed treatment of how computer hardware and software support the information system activities of processing, input/output, and storage. This includes concepts and applications in file and database processing and data communications. Once the core module and this module are covered, coverage of the technology of information systems is completed. This feature will thus support a range of instructor preferences and course objectives concerning the depth of coverage of CIS technology topics. For example, I prefer covering such chapters early in the course while also covering hands-on application software material, and before assigning students business applications and societal impact chapters. However, because of the modular approach, instructors with different preferences can accommodate a different order of coverage.

MICROCOMPUTER COVERAGE

Microcomputer concepts, considerations, and applications are integrated throughout the book, instead of being concentrated in one chapter. A single chapter on microcomputers is a simplistic, redundant, and unrealistic solution to the problem of including microcomputer content in a course. For example, in some schools, students may start using microcomputers in the first week of a course and continue to use them throughout the semester. In this text, microcomputer coverage is in the foundation chapters on information systems, computer hardware, and software; in the technology chapters on processing, input/output, and storage methods, and database and data communication systems; in the chapters of the module on computer applications and issues; and in the software appendix!

THE INFORMATION SYSTEMS MODEL

The information systems model used throughout this text is a modified version of the one used in the second edition. It has been renamed and

redefined to emphasize its importance in providing a conceptual framework that helps students understand and integrate the many facts and concepts that are part of information systems technology and applications. This simple yet comprehensive model makes it easier for students to learn how to analyze, evaluate, and manage computer-based information systems. This model stresses that:

Information systems use the resources of hardware (machines and media), software (programs and procedures), and people (specialists and users) to perform input, processing, output, storage, and control activities that transform data resources into information products.

SOFTWARE APPENDIX

Appendix A, "Productivity Software Applications," has been thoroughly revised. First, a section on the use of the PC and DOS has been added. Second, it contains sections on using word processing, electronic spreadsheet, and database management software that are not tied to any particular package. This provides students with an overview of the major generic activities performed with such productivity software packages. Students can thus gain an understanding of the major purposes of such packages as well as the basic activities involved in their use. Students are then ready for hands-on computing using specific brands of productivity software packages and the manuals or workbooks that support their use.

APPLICATIONS DEVELOPMENT AND BASIC

Introductory CIS courses are still being taught either with or without coverage of applications development and a programming language. To accommodate these two approaches, the text contains a module on application systems and software development, as well as an appendix containing introductory coverage of BASIC. Thus, instructors can better choose whether or not they want to cover such material. Dr. Jim Morgan, a colleague who teaches courses in BASIC, COBOL, and database, revised the BASIC appendix for this edition. Coverage of Pascal will still be available as a supplement in the Student Study Guide and has been revised by Professor Craig VanLengen to support the use of Turbo Pascal.

THE COLOR INSERT

In an effort to reduce costs and keep textbook prices to students from increasing out of sight, the third edition is printed in two colors, with a full-color photo insert included as the first section of their first chapter. This 24-page insert contains *47 full color photographs* organized into the four major topic areas of (1) Computers in the Real World, (2) Microcomputers and Other Computer Systems, (3) Input, Output, and Storage Methods, and (4) Software Packages in Action. All figures have several sentences of descriptive material as captions, and are referred to in subsequent chapters. This single color insert avoids arbitrary interruption of text material, emphasizes the presence of a color photo section, and makes it a real working section, not just a visual treat, as is the case in the multiple color inserts found in other texts.

SUPPORT MATERIALS

The **Student Study Guide** that supplements the text has been improved for this edition. It contains detailed chapter outlines, chapter learning objectives, chapter overviews, definitions of key terms and concepts, chapter test-yourself questions (true-false, multiple choice, fill-in the blanks, matching), answers to test-yourself questions, and short chapter assignments. It also contains an introductory programming appendix on Pascal. The study guide should thus be a valuable supplement to the main text.

An **Instructor's Guide** is available to instructors upon adoption of the text. It contains instructional aids and suggestions, answers to chapter questions and problems, solutions to the software appendix assignments, and answers and solutions to the questions and programming assignments in the BASIC Appendix and Student Study Guide. Color transparencies and overhead transparency masters of important figures in the text are also provided.

The **Test Bank** was extensively revised and improved and contains over 1,500 true-false and multiple choice questions. The Test Bank is available as a separate test manual and in computerized form on tape or floppy disk for use with the Irwin Test Generator Program.

Microcomputer **software packages,** including fully functional word processing (PC-Write), spreadsheet (PC-Calc+), database management (PC-File+), and other productivity software packages are available from the publisher. A tutorial software supplement (*PC Software Workbook,* second edition) is also available, as are other software-specific texts published by Irwin.

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A special acknowledgment is owed to Jim Morgan of Northern Arizona University, who coauthored the Student Study Guide and revised the BASIC appendix, Instructor's Guide, and the Test Bank. Craig VanLengen, also of Northern Arizona University, revised the Pascal appendix in the Student Study Guide. My thanks also to Toni Ohrn and Maureen McAuliffe, whose word processing skills allowed me to complete the manuscript on time. The contributions of computer manufacturers and others who provided photographs and illustrations used in the text are gratefully acknowledged. Finally, but most importantly, I wish to thank the many instructors who have used my texts for their comments and suggestions that have helped me improve each edition of this book.

A Special Acknowledgment

A special acknowledgment is also due the many business firms and other computer-using organizations that are the subjects of most of the **Real World Applications** in each chapter. In order of appearance in the text, the Real World Applications are as follows:

Chapter 1: Computers in the Real World, ABC Department Stores, and Toward the Fifth Generation.

Chapter 2: Computers in Small Business, The Travelers Corporation, and Tenneco, Inc.

Chapter 3: San Diego Gas and Electric Company, Popular Software Packages, and COBOL and the 4GLs.

Chapter 4: John Johnston—Louisiana Geological Survey and Mobil Oil Corporation.

Chapter 5: Federated Investors, Inc. and West Point Pepperell.

Chapter 6: Microsoft Corporation and Richard T. Rodgers, Attorney-at-Law.

Chapter 7: Simmonds Precision Company and Citicorp, Inc.

Chapter 8: Canadian Imperial Bank of Commerce; Clairol, Inc.; and TRW International Distribution Services.

Chapter 9: Pacific Northwest Bell and GTE Midwestern Telephone Operations.

Chapter 10: Romano Bros. Beverage Co. and IDS/American Express.

Chapter 11: E. I. du Pont de Nemours & Co., Inc. and Dominick's Finer Foods, Inc.

Chapter 12: Pillsbury Company and Computer Crime Incorporated.

The real-life situations faced by these individuals and firms provide a valuable demonstration of the benefits and limitations of using computer-based information systems in modern organizations.

ABOUT THE AUTHOR

James A. O'Brien is a professor and former Coordinator of the Computer Information Systems area in the College of Business Administration at Northern Arizona University. He did his undergraduate work at the University of Hawaii and Gonzaga University, and received his M.S. and Ph.D. in Business Administration from the University of Oregon. He was formerly Professor of Finance and Management Information Systems and Chairman of the Department of Management at Eastern Washington University, and has been a visiting professor at the University of Alberta and the University of Hawaii.

Dr. O'Brien's business experience includes the Marketing Management Program of the IBM Corporation, as well as serving as a financial analyst for the General Electric Company. He is a graduate of General Electric's Financial Management Program. He has also served as an information systems consultant to several banks and computer services firms.

Dr. O'Brien has contributed to the field of computers and information processing in business through the publication of several books and numerous articles, as well as through his active participation in academic and industry associations in the field of information systems.

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A NOTE TO STUDENTS

AN IMPORTANT QUESTION

Do you really have to know about computer concepts and applications? That's the same as asking: Do I really have to know about computers, their use in information processing, and how I can personally use them? The answer is no if you don't really care whether or not you are a success in the world of today or tomorrow. The answer is yes if you want to be a successful professional, executive, or entrepreneur in a society where computers are vital but commonplace tools. So whether you want to rise to the top of your profession, be a manager in a large organization, or just be your own boss, you will need to know about computers and how they can be used to help you get the information you will need to be successful.

COMPUTER CONCEPTS

So what exactly do you need to know? First, you need to know something about computers and information systems and how they provide information required by people in business firms and other organizations. That's what we call **computer concepts.** Some people feel that you don't really need to know this, but they are wrong. Their argument is that you just need to know a few basic ways to use a computer or how it can help you perform a few specific jobs you need to accomplish. The problem with this argument is that while it may allow you to survive in society, it does not really help you succeed! I've long since stopped counting the number of people who told me that they know how to use computers in their work, and therefore don't need to know anymore about them. However, what I usually discover upon further questioning is that most of them are just blindly feeding a computer data, or

blindly accepting the output that it produces. They do not have the foggiest idea of how computers can be used and are being used by successful people in other organizations to help them become more efficient, effective, and productive. So having a basic conceptual knowledge of computers and their use in information processing is an important and vital achievement. Without it, "you can't see the forest for the trees."

COMPUTER APPLICATIONS

The second thing you need to know is how to actually use a computer yourself. You really need to have a "hands-on" knowledge of **computer applications** using a microcomputer or other computer system. The days of having information systems professionals do all of your information processing chores for you are over. Most organizations can't keep up with the information demands of their users. So more and more people must learn to use microcomputers as personal computers in order to get the information they need to accomplish their jobs successfully. So a conceptual knowledge of computers and their uses is important, but not good enough. You also need to have first-hand experience in using computers to help you get things done more easily, efficiently, and effectively. For example, you should learn how to use word processing to prepare professional correspondence, electronic spreadsheeets to analyze alternative proposals, database management to organize data and extract information, and computer graphics to present results effectively. This will give you the ability to effectively use computers as productivity tools to help you achieve your career goals.

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