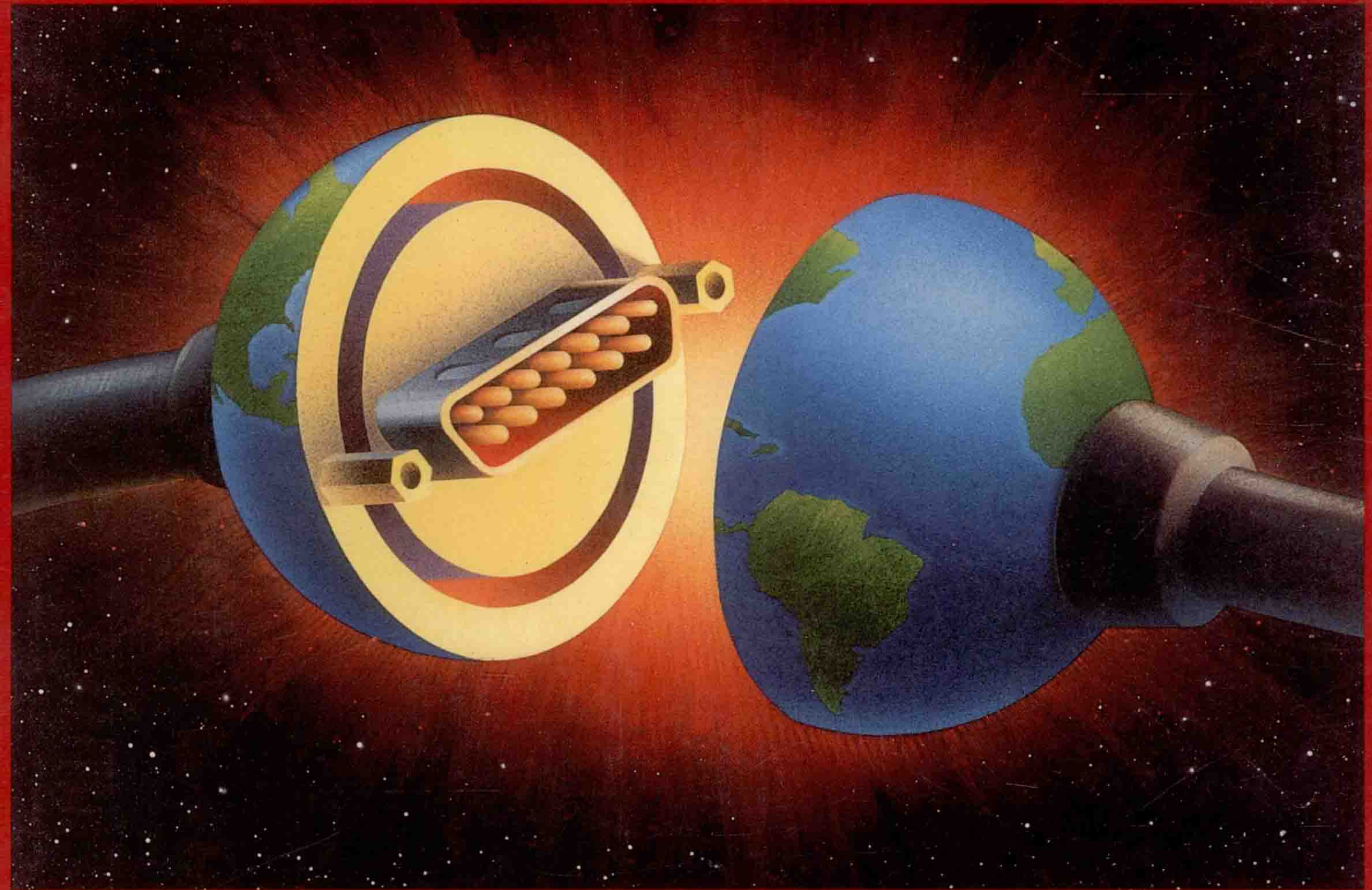# Using Information Technology

A Practical Introduction to Computers & Communications

Williams

Sawyer

Hutchinson

Third Edition

Using Information Technology

Technology Third Edition **3**

A Practical Introduction to Computers & Communications

Brian K. Williams

Stacey C. Sawyer

Sarah E. Hutchinson

This book is printed on acid-free paper.

Brief Contents

"Computer technology is the most powerful and the most flexible technology ever developed," says Terry Bynum, who chairs the American Philosophical Association's Committee on Philosophy and Computing. "Even though it's called a technical revolution, at heart it's a social and ethical revolution because it changes everything we value."

For evidence we need only look to the daily headlines: The boom in Web sites. The portal wars. Internet 2. Broader bandwidth connections. Falling PC prices. Greater microprocessor power. Intranets and extranets. Telephone and cable company mergers. GEO, MEO, and LEO satellite systems. And behind the headlines are the social and ethical changes: The mobile workplace. The blurring of work and leisure. The risk to privacy. The altering of photographs. Net gossip passing as truth. The technological distancing of the haves from the have-nots.

Information technology—the fusion of computing and communications— is creating far-reaching changes in the way we work, the way we live, and even in the way we think.

The Audience for & Promises of This Book

USING INFORMATION TECHNOLOGY: A Practical Introduction to Computers & Communications, THIRD EDITION, is intended for use as a concepts textbook to accompany a one-semester or one-quarter introductory course on computers or microcomputers. It is, we hope, a book that will make a difference in the lives of our readers.

The **key features** of *USING INFORMATION TECHNOLOGY*, THIRD EDITION, are as follows. We offer:

1. **Emphasis on unification of computer and communications systems.**
2. **Careful revision in response to extensive instructor and student feedback.**
3. **Commonsense illustration program.**
4. **Emphasis on practicality.**
5. **Emphasis throughout on ethics.**
6. **Use of techniques for reinforcing student learning.**
7. **Up-to-the-minute material—in the book and on our Web site.**

We elaborate on these features next.

Key Feature #1: Emphasis on Unification of Computers & Communications

The First Edition of this text broke new ground by emphasizing the technological merger of

used by computers. This is the relatively new phenomenon known as **technological convergence.**

Since the First Edition, other texts have also added coverage of the Internet and the World Wide Web. However, we agree with analysts who say the revolution is far broader than this, and we continue to stress the unification of entire industries and technologies and their effects. Thus, the THIRD EDITION continues to embrace the theme of convergence by giving it in-depth treatment in six chapters—the introduction, systems software, telecommunications, communications technology, databases, and promises and challenges (Chapters 1, 3, 7, 8, 9, 12). Convergence is also brought out in examples throughout other chapters.

This theme covers much of the technology currently found under such phrases as *the Information Superhighway, the Multimedia Revolution,* and *the Digital Age: mobile computing, the Internet, Web search tools, online services, workgroup computing, the virtual office, video compression, PC/TVs, "intelligent agents,"* and so on.

Key Feature #2: Careful Revision in Response to Extensive Instructor & Student Feedback

Our publisher has told us that the First Edition of *USING INFORMATION TECHNOLOGY* was apparently the most successful new text in the field at that time, with over 300 schools adopting both comprehensive and brief versions. We were delighted to learn that the Second Edition reached an even wider audience. An important reason for this success, we believe, was all the valuable contributions of our reviewers, both instructors and students.

Both the printed version of the Second Edition and the manuscript and proofs of the THIRD EDITION underwent a highly disciplined and wide-ranging reviewing process. This process of expert appraisal drew on instructors who were both users and nonusers, who were from a variety of educational institutions, and who expressed their ideas in both written form and in focus groups.

We also received input from a number of student users and nonusers of the Second Edition. Many indicated their appreciation for the Experience Boxes, as well as such pedagogical devices as section "Previews & Reviews," our unique end-of-chapter Summary, the practical emphasis of the book, and the people-oriented writing.

We have sometimes been overwhelmed with the amount of feedback, but we have tried to respond to all consensus criticisms and countless individual suggestions. Every page of the THIRD EDITION has been influenced by instructor feedback. The result, we think, is **a book addressing the needs of most instructors and students.**

New to this edition! In particular, we have addressed the following matters:

- **Communications material separated into two chapters:** Because of the overwhelming amount of new material, and following the direction of our reviewers, we split the old "Communications" chapter into two chapters. Chapter 7, "Telecommunications," covers online resources, the Internet, and the World Wide Web. Chapter 8, "Communications Technology," covers communications hardware, channels, and networks. (The chapters may be assigned in reverse order without loss of continuity.)

- **Input and output material made one chapter:** The two chapters "Input" and "Output" are combined into a single chapter, which

allows us to continue to offer a book of just 12 chapters, which instructors (particularly in quarter-system schools) have indicated they prefer.

- **New Experience Boxes—on digital photography, Web use for term papers, and identity theft:** Recent developments suggested a need for **new end-of-chapter Experience Boxes.** The arrival of digital photography has led us to create *"Photo Opportunities: Working with Digitized Photographs"* (Chapter 6). Also, in keeping with our ethics theme, the newly popular use of the Web by students for term-paper research—and for online plagiarism and other abuses—has resulted in *"Web Research, Term Papers, & Plagiarism"* (Chapter 7). The escalation of theft-of-identity crime has resulted in *"Preventing Your Identity from Getting Stolen"* (Chapter 9). Other Experience Boxes have been thoroughly updated to reflect the latest advances.

- **New README Boxes throughout:** The well-received README boxes that appear in every chapter are almost **completely new** but they still retain their practical orientation. Examples are "Batteries for Laptops," "Getting Real About Credit Cards," "Comparing Mobile Phones," "How Long Will Digitized Data Last?" and "Programmers Wanted—*Really* Wanted." See the list on the inside front cover.

In addition to these major structural and substantive changes, we have made hundreds of line-by-line and word-by-word adjustments to refine coverage and to conform with instructor's requests.

Key Feature #3: Commonsense Illustration Program

In an era of overillustrated introductory texts, more and more instructors have become concerned about texts that now seem to favor illustrations—and especially glitzy photos—over information. The THIRD EDITION of *USING INFORMATION TECHNOLOGY* addresses this concern in several ways. Artwork in the book is designed principally to be **didactic.** There are no unnecessary, space-filling photo "galleries," for instance. To support learning concepts, photographs are often coupled with additional information—an elaboration of the discussion in the text, some how-to advice, an interesting quotation, or a piece of line art. In general, then, we do not think the practical and pedagogical should be diminished in favor of glamorous artwork and photography.

Key Feature #4: Emphasis on Practicality

As with past editions, we are trying to make this book a "keeper" for students. Thus, we not only cover fundamental concepts but also offer a great deal of **practical advice.** This advice, of the sort found in computer magazines and general-interest computer books, is expressed principally in two kinds of boxes—Experience Boxes and README boxes:

- **The Experience Box:** Appearing at the end of each chapter, the Experience Box is **optional** material that may be assigned at the instructor's discretion. However, students will find the subjects covered are of immediate value.

  Some examples: "Becoming a Mobile Computer User"; "How to Buy Software"; "Preventing Your Identity from Getting Stolen." Five of the Experience Boxes show students how to benefit from going

online. They include "Online Résumés & Other Career Strategies for the Digital Age" and "Job Searching on the Internet & World Wide Web."

- **README boxes:** README boxes consist of optional material of two types—Practical Matters, and Case Studies:

  Practical Matters offer practical advice—such as tips for managing your e-mail or staying focused to avoid information overload.

  Case Studies offer behind-the-scenes looks at information technology—such as how many years digitized data in secondary storage will last or how virtual teams in business transcend the usual organizational hierarchy.

Key Feature #5: Emphasis Throughout on Ethics

Ethics

Many texts discuss ethics in isolation, usually in one of the final chapters. We believe this topic is too important to be treated last or lightly. Thus, **we cover ethical matters in 19 places** throughout the book, as indicated by the special logo shown here in the margin. For example, the all-important question of what kind of software can be legally copied is discussed in Chapter 2 ("Applications Software"), an appropriate place for students just starting software labs. Other ethical matters discussed are the manipulation of truth through digitizing of photographs, intellectual property rights, netiquette, censorship, privacy, and computer crime.

A list of pages with ethics coverage appears on the inside front cover. Instructors wishing to teach all ethical matters as a single unit may refer to this list.

Key Feature #6: Reinforcement for Learning

Having individually or together written nearly two dozen textbooks and scores of labs, the authors are vitally concerned with reinforcing students in acquiring knowledge and developing critical thinking. Accordingly, we offer the following to provide learning reinforcement:

- **Interesting writing:** Studies have found that textbooks **written in an imaginative style** significantly improve students' ability to retain information. Thus, the authors have employed a number of journalistic devices—such as the short biographical sketch, the colorful fact, the apt direct quote—to make the material as interesting as possible. We also use real anecdotes and examples rather than fictionalized ones.

- **Key terms and definitions in boldface: Each key term AND its definition is printed in boldface** within the text, in order to help readers avoid any confusion about which terms are important and what they actually mean.

- **"Preview & Review" presents abstracts of each section for learning reinforcement:** Each main section heading throughout the book is followed by **an abstract or précis entitled Preview & Review.** This enables the student to get a preview of the material before reading it and then to review it afterward, for maximum learning reinforcement.

- **Innovative chapter Summaries for learning reinforcement:** The end-of-chapter Summary is especially innovative—and especially helpful to students. In fact, research through student focus groups has shown

that this format was clearly first among five different choices of summary formats. Each concept is discussed under **two columns, headed "What It Is/What It Does" and "Why It's Important."**

Each concept or term is also given a cross-reference page number that refers the reader to the main discussion within the chapter.

In addition, as we discuss next, the term or concept is also given a Key Question number (such as *KQ 2.1, KQ 2.2,* and so on) corresponding to the appropriate Key Question (learning objective) at the beginning of the chapter.

- **Key Questions to help students read with purpose:** *New to this edition!* Lists of learning objectives at the start of chapters are common in textbooks—and most students simply skip them. Because we believe learning objectives are excellent instruments for reinforcement, we have crafted ours to make them more helpful to students. We do this in two ways:

  (1) By **phrasing the learning objectives as Key Questions.** These Key Questions appear on the chapter-opening page and again at the start of each chapter section. By phrasing learning objectives as Key Questions we give students a tool to help them read with purpose.

  (2) By **tying terms and concepts in the end-of-chapter Summary to the Key Questions.** That is, in the Summary we have given "KQ" numbers to the terms and concepts that relate to the particular Key Question numbers in the text.

  For example, in Chapter 2, *Key Questions 2.11* ask "When is copying a violation of copyright laws, what is a software license agreement, and what types of agreements are there?" Terms and concepts appearing in the end-of-chapter Summary that relate to these questions—such as "copyright," "freeware," and "intellectual property"—are identified with the notation *KQ 2.11* and the page number in the chapter where they are discussed.

- **Cross-referencing system for key terms and concepts:** Wherever important key terms and concepts appear throughout the text that students might need to remind themselves about, we have added **"check the cross reference"** information, to indicate the first definition or usage of a key term or concept, as in: "use of machine language (✔ p. 111)." In student focus groups, this cross-reference device was found to rank *first* out of 20-plus study/learning aids.

- **Material in "bite-size" portions:** Major ideas are presented in **bite-size form,** with generous use of advance organizers, bulleted lists, and new paragraphing when a new idea is introduced.

- **Short sentences:** Most sentences have been kept short, the majority not exceeding **22–25 words** in length.

- **End-of-chapter exercises:** For practice purposes, students will benefit from several exercises at the end of each chapter: **fill-in-the-blank questions, short-answer questions, multiple-choice questions,** and **true-false questions.** Answers to selected exercises appear upside down at the end of the Exercises section.

  In addition, we present several "Knowledge in Action," end-of-chapter **projects/critical-thinking questions,** generally of a practical nature, to help students absorb the material. In a typical example, students are asked to identify the security threats to which their home computers are vulnerable.

Key Feature #7: Up-to-the-Minute Material—in the Text & on the Irwin/McGraw-Hill Web Site

Writing a text like this is a constant steeplechase of trying to keep up with changing technological developments. Every day seems to bring reports of something new and important. As we write this, our September 1998 publication date is only three months away. However, because our publisher has allowed us to do several steps concurrently (writing, reviewing, editing, production), our text includes coverage of the following material:

ActiveX. The bandwidth economy. Brain-wave input. Cable modems. Cyberspace job hunting. Data mining. Digital cameras. Digital TV. Divx. DSL. DVD. EPIC architecture. Extranets. GEO, MEO, and LEO satellite systems. Gigabit Ethernet. High-capacity bar codes. Identity theft. Internet 2. Map software. The Merced chip. Net addiction. NGI. Online secondary storage. Photonics. Plagiarism and online term papers. Portal sites. Presentation technology. R/3 software. Radio-frequency identification devices. Set-top boxes. Silicon germanium chips. Telephony. 3-D displays. Virtual teams. VRML. Web authoring tools. WebTV. Windows 98. XML. The Y2K problem . . . And more.

Still, we recognize that a Gutenberg-era lag exists between our last-minute scribbling and the book's publication date. And of course we also realize that fast-moving events will unquestionably overtake some of the facts in this book by the time it is in the student's hands. Accordingly, after publication we are periodically offering instructors updated material and other interaction on the Irwin/McGraw-Hill UIT Web Site: **http://www.mhhe.com/cit/ concepts/uit**.

Complete Course Solutions: Supplements That Work—Four Distinctive Offerings

It's less important how many supplements a textbook has than whether they are truly useful, accurate, and of high quality. Irwin/McGraw-Hill presents **four distinctive kinds of supplement offerings** to complement the text:

1. **Application-software tutorials—four types**
2. **McGraw-Hill Learning Architecture Web-based software**
3. **Classroom presentation software**
4. **Instructor support materials**

We elaborate on these below.

Supplement Offering #1: Application-Software Tutorials—Four Types

Our publisher, Irwin/McGraw-Hill, offers four different series of tutorials, which present four different hands-on approaches to learning various types of application software. An Irwin/McGraw-Hill sales representative can explain the specific software covered by each series.

- **Advantage Series tutorials:** Written by *Sarah E. Hutchinson* and *Glen J. Coulthard,* manuals in the **Advantage Series for Computer Education** average just over 200 pages each and cover a large number of popular software packages, including the latest versions of Microsoft Office. Each tutorial leads students through step-by-step instructions

not only for the most common methods of executing commands but also for alternative methods.

Each session begins with a case scenario and concludes with case problems showing real-world application of the software. "Quick Reference" guides summarizing important functions and shortcuts appear throughout. Boxes introduce unusual functions that will enhance the user's productivity. Hands-on exercises and short-answer questions allow students to practice their skills.

- **Advantage Interactive CD-ROM tutorials:** Offered by Irwin/McGraw-Hill in partnership with *MindQ Publishing*, the **Advantage Interactive** CD-ROM tutorials are based on the printed *Advantage Series* texts described above. The CD-ROMs combine sight, sound, and motion into a truly interactive learning experience. Video clips, simulations, hands-on exercises, and quizzes reinforce every important concept. *Advantage Interactive* tutorials are available for latest versions of Microsoft Office and may be used independently or with corresponding manuals in the *Advantage Series.*

- **O'Leary Series print tutorials:** Written by *Linda* and *Timothy O'Leary*, the **O'Leary Series** manuals are designed for application-specific short courses. Each manual offers a project-based approach that gives students a sense of the real-world capabilities of software applications. Extensive screen captures provide easy-to-follow visual examples for each major textual step, while visual summaries reinforce the concepts, building on students' knowledge. Manuals are available for a wide variety of software applications, including latest versions of Microsoft Office.

- **Interactive Computing Skills CD-ROM tutorials:** Created by *Ken Laudon* and *Azimuth Multimedia*, the **Interactive Computing Skills** CD-ROM tutorials offer complete introductory coverage of software applications, including Microsoft Office 4.3 and 97. Each narrated and highly interactive lesson takes 45–60 minutes to complete. "SmartQuizzes" at the end of the lessons actively test software skills within a simulated software environment. With up to four lessons per disk, *Interactive Computing Skills* is a valuable addition to an instructor's courseware package or an excellent self-study tool for students.

Supplement Offering #2: McGraw-Hill Learning Architecture

New to this edition! The future of interactive, networked education is here today! This exciting Web-based software provides complete course administration, including content customization, authoring, and delivery. With the **McGraw-Hill Learning Architecture (MHLA)** and a standard Web browser, students can take online quizzes and tests, and their scores are automatically graded and recorded. *MHLA* also includes useful features such as e-mail, message boards, and chat rooms, and it easily links to other Internet resources. Your Irwin/McGraw-Hill sales representative can explain *MHLA* in detail.

Supplement Offering #3: Classroom Presentation Software

To help instructors enhance their lecture presentations, Irwin/McGraw-Hill makes available the **CIT Classroom Presentation Tool,** a graphics-intensive set of electronic slides. This CD-ROM-based software helps to clarify topics

that may otherwise be difficult to present. Topics are organized to correspond with the text chapters. The *Presentation Tool* also includes electronic files for all of the graphics in the text, allowing instructors to customize their presentations.

Minimum system requirements: IBM PC or compatible with a Pentium processor, 4X CD-ROM drive, and at least 16 MB of RAM, running Windows 95 or later. An LCD panel is needed if the images are to be shown to a large audience.

Supplement Offering #4: Instructor Support Materials

We offer the instructor the following other kinds of supplements and support to complement the text:

- **Instructor's Resource Guide:** This complete guide supports instruction in any course environment. For each chapter, the **Instructor's Resource Guide** provides an overview, chapter outline, lecture notes, notes regarding the boxes (README boxes) from the text, solutions, and suggestions, and additional information to enhance the project and critical thinking sections.

- **Test bank:** The test bank contains over 1200 different questions, which are directly referenced to the text. Specifically, it contains *true/false, multiple-choice,* and *fill-in questions,* categorized by difficulty and by type; *short-essay questions; sample midterm exam; sample final exam;* and *answers to all questions.*

- **Diploma 97—computerized testing software:** Created by *Brownstone Research Group,* **Diploma 97** has been consistently ranked number one in evaluations over similar testing products. *Diploma 97* gives instructors simple ways to write sophisticated tests that can be administered on paper or posted over a campus local area network, an intranet, or the Internet.

  Test results can be merged into *Diploma 97's* gradebook program, which automates grading, curving, and reporting functions. Indeed, thousands of students and hundreds of assignments can be put into the same gradebook file. In addition, teaching programs can be attached to questions to create interactive study guides.

  System requirements: (a) IBM PC or compatible with at least 2 MB of RAM running Windows 3.1 or (b) Macintosh with at least 2 MB of RAM running System 6.01 or later; CD-ROM drive or 3.5-inch floppy-disk drives.

- **Videos:** A selection of 10 video segments of the acclaimed PBS television series, *Computer Chronicles,* is available to qualified adopters. Each video is approximately 30 minutes long. The videos cover topics ranging from computers and politics, to online financial services, to the latest developments in PC technologies.

- **Technical support services:** Irwin/McGraw-Hill's Technical Support is available to instructors on any of our software products, such as the McGraw-Hill Learning Architecture or the CIT Classroom Presentation Tool. Instructors can access the Online Helpdesk at **www.mhhe.com/helpdesk** or by calling toll free 1-800-331-5094.

- **UIT Web site:** It's appropriate that a text with a strong communications focus also find a way to employ the communications technology available. Accordingly, a text-specific Irwin/McGraw-Hill UIT Web is available, located at **http://www.mhhe.com/cit/concepts/uit.**

This Web site was developed as a place to go for periodic updates of text material, relevant links, downloads of supplements, an instructor's forum for sharing information with colleagues, and other value-added features.

Instructor Scenarios for Using the Text

USING INFORMATION TECHNOLOGY, Third Edition, was carefully designed based on marketplace feedback. We have tried to write the kind of book that instructors asked for, and the materials are designed to serve a consensus kind of course.

Thus, to serve the new generation of students we are presenting a book that, we hope, reads like a magazine, offers interesting illustrations, and helps the reader learn through many extra pedagogical features—README boxes, Experience Boxes, Key Questions, section Preview & Reviews, innovative end-of-chapter Summaries ("What It is/What It Does," and "Why It's Important"), and end-of-chapter exercises. *Actual material on which the student is to be tested—the general text—constitutes only slightly more than half of each chapter*, as determined from representative chapters. In Chapter 3, for instance, general text constitutes about 24 of the 41 pages. (The rest consists of chapter opening, illustrations, boxes, section Previews & Reviews, end-of-chapter Summaries, and end-of-chapter exercises.)

Many instructors have told us that having the material presented in **just 12 chapters,** rather than the customary 14 or 15 or more, better suits their teaching approach. With 12 chapters, readings may be assigned at the rate of slightly over a chapter a week in a quarter system, less than a chapter a week in a semester system. Chapters are organized according to the topic outline of traditional introductory computer texts. Thus, most instructors can continue to follow their present course outlines.

Note: The text allows for **a good deal of instructor flexibility.** After Chapter 1, the remaining 11 chapters may be taught in any sequence, or selectively omitted, at the instructor's discretion. As mentioned, to make this possible, we offer **"check the cross-reference"** information to indicate the first definition or usage of a key term or concept, as in "(✔ p. 111)." For instructors whose courses are less than 3 units or who must teach students software labs in addition to computer concepts, there are other options. Any one or combination of the following scenarios will allow instructors to teach selectively from this book without loss of continuity:

Ethics

- Scenario 1—Teach all "ethics" segments as one component: Rather than discuss ethical matters just in one place, we have spread this topic around through the book, as indicated by the special sign shown here. All the pages of ethics coverage are indicated on the inside front cover. Instructors wishing to teach all ethical matters as a single component (as toward the end of the semester or quarter) may direct students to read the ethics material in the order shown on that list.

- Scenario 2—Skip the Experience Boxes: Some instructors may wish to assign all 12 chapters but not the end-of-chapter essays we call Experiences Boxes. All Experience Boxes are considered optional (not testable) material, but some instructors may wish to pick and choose which they assign, and some instructors may wish not to assign any.

- Scenario 3—Skip chapters on systems and software development: Some instructors may choose to forego Chapter 10, "Information Systems: Management & Development," and Chapter 11, "Software Development: Programming & Languages."

- **Scenario 4—Skip the last chapter:** Chapter 12, "Society & the Digital Age: Promises & Challenges," could be skipped. Instead, for a discussion of security and ergonomic issues, the instructor may choose to assign the Chapter 5 Experience Box: "Good Habits: Protecting Your Computer System, Your Data, & Your Health."

- **Scenario 5—skip chapters on applications and systems software:** Instructors whose courses include software labs may feel their students are already getting enough knowledge about applications and systems software that they do not need to read Chapters 2 and 3. (Chapter 2 is "Applications Software: Tools for Thinking & Working." Chapter 3 is "Systems Software: The Power Behind the Power.")

With these kinds of options, we feel sure that most instructors will be able to tailor the text to their particular course.

Finally, we should mention that a brief version of this text is also available: *USING INFORMATION TECHNOLOGY, BRIEF VERSION,* by Stacey C. Sawyer, Brian K. Williams, and Sarah E. Hutchinson. This book offers 10 rather than 12 chapters and four rather than 12 Experience Boxes, and in general the coverage has been selectively reduced.

Acknowledgments

Acknowledgment of Focus Group Participants, Survey Respondents, & Reviewers

We are grateful to the following people for their participation in focus groups, response to surveys, or reviews on manuscript drafts or page proofs of all or part of the book. We cannot overstate their importance and contributions in helping us to make this the most market-driven book possible.

INSTRUCTOR FOCUS GROUP PARTICIPANTS

Russell Breslauer
Chabot College

Patrick Callan
Concordia University

Joe Chambers
Triton College

Hiram Crawford
Olive Harvey College

Edouard Desautels
University of Wisconsin—Madison

William Dorin
Indiana University—Northwest

Bonita Ellis
Wright City College

Pat Fenton
West Valley College

Bob Fulkerth
Golden Gate University

Charles Geigner
Illinois State University

Julie Giles
DeVry Institute of Technology

Dwight Graham
Prairie State College

Don Hoggan
Solano Community College

Stan Honacki
Moraine Valley Community College

Tom Hrubec
Waubonsee Community College

Alan Iliff
North Park College

Julie Jordahl
Rock Valley College

John Longstreet
Harold Washington College

Paul Lou
Diablo Valley College

Ed Mannion
California State University—Chico

Jim Potter
California State University—Hayward

Pattie Riden
Western Illinois University

Behrooz Saghafi
Chicago State University

Naj Shaik
Heartland Community College

Charlotte Thunen
Foothill College

James Van Tassel
Mission College

STUDENT FOCUS GROUP PARTICIPANTS

Virginia Amarna
Laney College

Roger Lyle
College of Marin

Kerry Bassett
California State University—Chico

Susan Malibiran
San Francisco City College

Jeff Ferreira
Chabot College

Karey Mathews
Chabot College

Jocelyn Lander
Chabot College

Teresa Taganat
San Francisco City College

Alfred Lepori
Mission College

Robin Torbet
College of Marin

SURVEY RESPONDENTS

Nancy Alderdice
Murray State University

Norman Muller
Greenfield Community College

Margaret Allison
University of Texas—Pan American

Paul Murphy
Massachusetts Bay Community College

Angela Amin
Great Lakes Junior College

Sonia Nayle
Los Angeles City College

Connie Aragon
Seattle Central Community College

Janet Olpert
Cameron University

Gigi Beaton
Tyler Junior College

Pat Ormond
Utah Valley State College

William C. Brough
University of Texas—Pan American

Marie Planchard
Massachusetts Bay Community College

Jeff Butterfield
University of Idaho

Helen Corrigan-McFadyen
Massachusetts Bay Community College

Fernando Rivera
University of Puerto Rico—Mayaguez Campus

James Frost
Idaho State University

Naj Shaik
Heartland Community College

Candace Gerrod
Red Rocks Community College

Jack Shorter
Texas A&M University

Julie Heine
Southern Oregon State College

Randy Stolze
Marist College

Jerry Humphrey
Tulsa Junior College

Ron Wallace
Blue Mountain Community College

Jan Karasz
Cameron University

Steve Wedwick
Heartland Community College

Alan Maples
Cedar Valley College

REVIEWERS

Nancy Alderdice
Murray State University

Bonnie Bailey
Morehead State University

Margaret Allison
University of Texas—Pan American

David Brent Bandy
University of Wisconsin—Oshkosh

Sharon Anderson
Western Iowa Tech Community College

Robert Barrett
Indiana University, Purdue University at Fort Wayne

Anthony Baxter
University of Kentucky

Virginia Bender
William Rainey Harper College

Warren Boe
University of Iowa

Randall Bower
Iowa State University

Phyllis Broughton
Pitt Community College

J. Wesley Cain
City University, Bellevue

Judy Cameron
Spokane Community College

Kris Chandler
Pikes Peak Community College

William Chandler
University of Southern Colorado

John Chenoweth
East Tennessee State University

Ashraful Chowdhury
Dekalb College

Erline Cocke
*Northwest Mississippi Community
    College*

Robert Coleman
Pima County Community College

Glen Coulthard
Okanagan University

Robert Crandall
Denver Business School

Thad Crews
Western Kentucky University

Jim Dartt
San Diego Mesa College

Patti Dreven
*Community College of Southern
    Nevada*

John Durham
Fort Hays State University

John Enomoto
East Los Angeles College

Ray Fanselau
American River College

Eleanor Flanigan
Montclair State University

Ken Frizane
Oakton Community College

James Frost
Idaho State University

JoAnn Garver
University of Akron

Jill Gebelt
Salt Lake Community College

Charles Geigner
Illinois State University

Frank Gillespie
University of Georgia

Myron Goldberg
Pace University

Sallyann Hanson
Mercer County Community College

Albert Harris
Appalachian State University

Jan Harris
Lewis & Clark Community College

Michael Hasset
Fort Hays State University

Martin Hochhauser
Dutchess Community College

James D. Holland
*Okaloosa-Waltoon Community
    College*

Wayne Horn
Pensacola Junior College

Christopher Hundhausen
University of Oregon

Jim Johnson
Valencia Community College

Jorene Kirkland
Amarillo College

Victor Lafrenz
Mohawk Valley Community College

Sheila Lancaster
Gadsden State Community College

Stephen Leach
Florida State University

Paul Leidig
Grand Valley State University

Chang-Yang Lin
Eastern Kentucky University

Paul Lou
Diablo Valley College

Deborah Ludford
Glendale Community College

Peter MacGregor
*Estrella Mountain Community
    College*

Donna Madsen
Kirkwood Community College