Exploring

MICROSOFT® ACCESS 2000

APPROVED COURSEWARE

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EXPLORING MICROSOFT® ACCESS 2000

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University of Miami

Prentice Hall, Upper Saddle River, New Jersey 07458

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Pearson Education
Upper Saddle River, New Jersey 07458

ISBN 0-13-020476-5

Prentice-Hall International (UK) Limited, London
Prentice-Hall of Australia Pty. Limited, Sydney
Prentice-Hall Canada Inc., Toronto
Prentice-Hall Hispanoamericana, S.A., Mexico
Prentice-Hall of India Private Limited, New Delhi
Prentice-Hall of Japan, Inc., Tokyo
Editora Prentice-Hall do Brasil, Ltda., Rio de Janeiro

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

To Marion—my wife, my lover, and my best friend
—Robert Grauer

To my Mother and Father—for all their love and support these many years
—Maryann Barber

PREFACE

We are proud to announce the fourth edition of the *Exploring Windows* series in conjunction with Microsoft® Office 2000. The series has expanded in two important ways—recognition by the ***Microsoft Office User Specialist (MOUS)*** program, and a significantly expanded Web site at ***www.prenhall.com/grauer***. The Web site provides password-protected solutions for instructors and online study guides (Companion Web sites) for students. Practice files and PowerPoint lectures are available for both student and instructor. The site also contains information about Microsoft Certification, CD-based tutorials for use with the series, and SkillCheck® assessment software.

The organization of the series is essentially unchanged. There are separate titles for each application—*Word 2000, Excel 2000, Access 2000,* and *PowerPoint 2000,* a book on *Windows® 98,* and eventually, *Windows® 2000.* There are also four combined texts—*Exploring Microsoft Office Professional, Volumes I* and *II, Exploring Microsoft Office Proficient Certification Edition,* and *Brief Office. Volume I* is a unique combination of applications and concepts for the introductory computer course. It covers all four Office applications and includes supporting material on Windows 95/98, Internet Explorer, and Essential Computing Concepts. The modules for Word and Excel satisfy the requirements for proficient certification. The *Proficient Certification Edition* extends the coverage of Access and PowerPoint from *Volume I* to meet the certification requirements, but (because of length) deletes the units on Internet Explorer and Essential Computing Concepts that are found in *Volume I. Volume II* includes the advanced features in all four applications and extends certification to the expert level. *Brief Office* is intended to get the reader "up and running," without concern for certification requirements.

The Internet and World Wide Web are integrated throughout the series. Students learn Office applications as before, and in addition are sent to the Web as appropriate for supplementary exercises. The sections on Object Linking and Embedding, for example, not only draw on resources within Microsoft Office, but on the Web as well. Students are directed to search the Web for information, and then download resources for inclusion in Office documents. The icon at the left of this paragraph appears throughout the text whenever there is a Web reference.

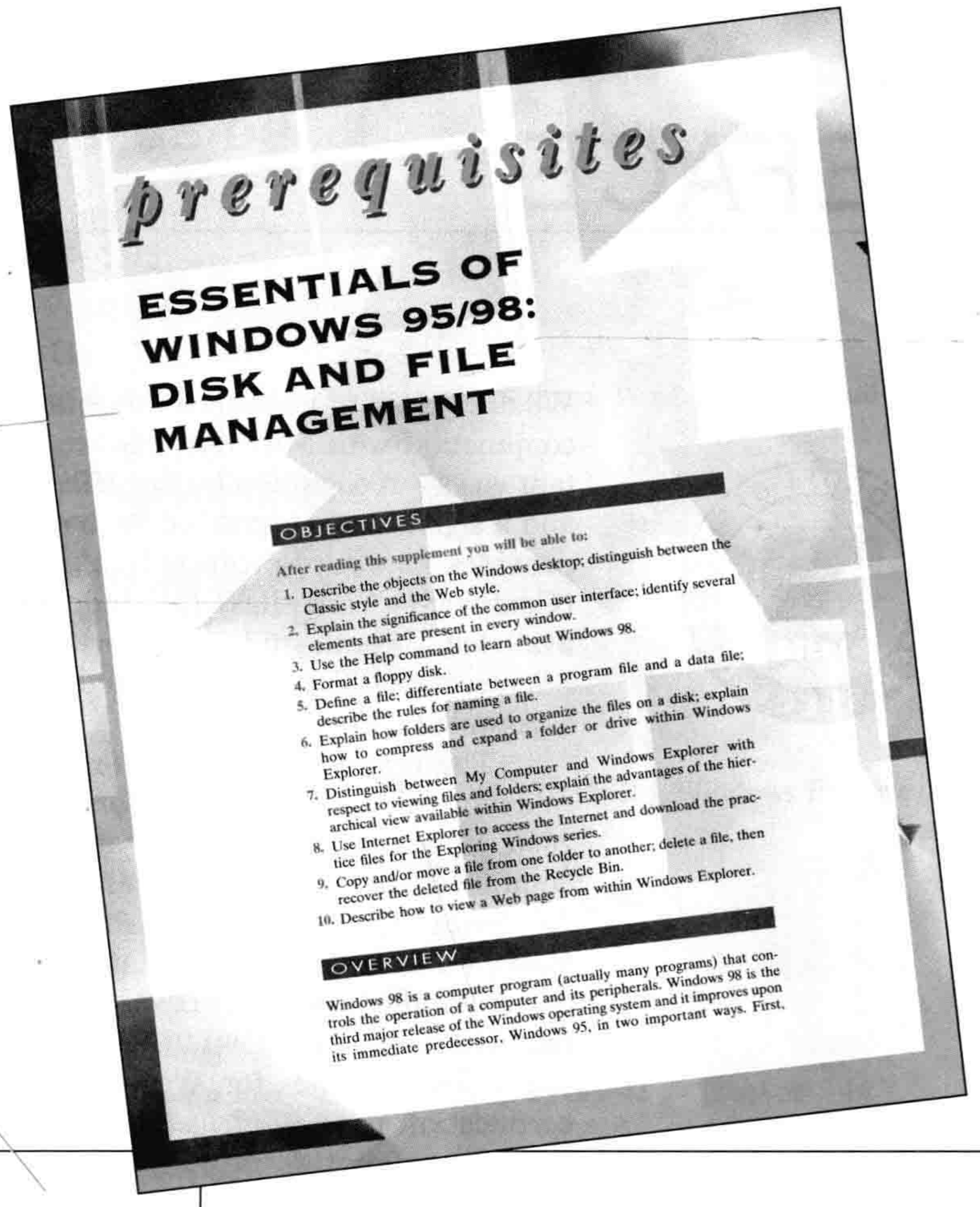
The *Exploring Windows* series is part of the Prentice Hall custom-binding (*Right PHit*) program, enabling instructors to create their own texts by selecting modules from *Volume I, Volume II,* the *Proficient Certification Edition,* and/or *Brief Office* to suit the needs of a specific course. An instructor could, for example, create a custom text consisting of the proficient modules in Word and Excel, coupled with the brief modules for Access and PowerPoint. Instructors can also take advantage of our *ValuePack program* to shrink-wrap multiple books together at a substantial saving for the student. A ValuePack is ideal in courses that require complete coverage of multiple applications.

Instructors will want to obtain the *Instructor's Resource CD* from their Prentice Hall representative. The CD contains the student data disks, solutions to all exercises in machine-readable format, PowerPoint lectures, and the Instructor Manuals themselves in Word format. The CD also has a Windows-based test generator. Please visit us on the Web at ***www.prenhall.com/grauer*** for additional information.

FEATURES AND BENEFITS

Exploring Microsoft® Access 2000 is written for the novice and assumes no previous knowledge of the operating system. A 64-page appendix covers the essentials of Windows 95/98/NT and emphasizes the file operations the reader will need.

Database design is stressed throughout the text, beginning in Chapter 1, where the reader is shown the power of a relational database. Full-color illustrations help clarify the relationships between tables and provide an intuitive understanding of select queries. Appendix B presents additional material on database design.



LOOKING AHEAD: A RELATIONAL DATABASE

The Bookstore and Employee databases are both examples of simple databases in that they each contained only a single table. The real power of Access, however, is derived from multiple tables and the relationships between those tables. This type of database is known as a ***relational database*** and is illustrated in Figure 1.9. This figure expands the original Employee database by adding two tables, for locations and titles, respectively.

The Employees table in Figure 1.9a is the same table we used at the beginning of the previous exercise, except for the substitution of a LocationID and TitleID for the location and title, respectively. The Locations table in turn has all of the fields that pertain to each location: LocationID, Location, Address, State, Zipcode, and Office Phone. One field, the LocationID, appears in both Employees and Locations tables and links the two tables to one another. In similar fashion, the Titles table has the information for each title: the TitleID, Title, Description, Education Required, and Minimum and Maximum Salary. The TitleID appears in both the Employees and Titles tables to link those tables to one another.

SSN	LastName	FirstName	LocationID	TitleID	Salary	Gender	Performance
000-01-0000	Milgrom	Pamela	L02	T02	$57,500	F	Average
000-02-2222	Adams	Jennifer	L01	T03	$19,500	F	Average
111-12-1111	Johnson	James	L03	T01	$47,500	M	Good
123-45-6789	Coulter	Tracey	L01	T02	$100,000	F	Good
222-23-2222	Marlin	Billy	L04	T02	$125,000	M	Good
222-52-5555	Smith	Mary	L03	T01	$42,500	F	Average
333-34-3333	Manin	Ann	L02	T01	$49,500	F	Average
333-43-4444	Smith	Frank	L01	T01	$65,000	M	Good
333-66-1234	Brown	Marietta	L01	T03	$18,500	F	Poor
444-45-4444	Frank	Vernon	L04	T01	$75,000	M	Good
555-22-3333	Rubin	Patricia	L02	T01	$45,000	F	Average
555-56-5555	Charles	Kenneth	L02	T01	$40,000	M	Poor
776-67-6666	Adamson	David	L03	T02	$52,000	M	Poor
777-78-7777	Marder	Kelly	L03	T01	$38,500	F	Average

(a) The Employees Table

LocationID	Location	Address	State	Zipcode	OfficePhone
L01	Atlanta	450 Peachtree Road	GA	30316	(404) 333-5555
L02	Boston	3 Commons Blvd	MA	02190	(617) 123-4444
L03	Chicago	500 Loop Highway	IL	60620	(312) 444-6666
L04	Miami	210 Biscayne Blvd	FL	33103	(305) 787-9999

(b) The Locations Table

TitleID	Title	Description	EducationRequired	MinimumSalary	MaximumSalary
T01	Account Rep	A marketing ...	Four year degree	$25,000	$75,000
T02	Manager	A supervisory ...	Four year degree	$50,000	$150,000
T03	Trainee	An entry-level ...	Two year degree	$18,000	$25,000

(c) The Titles Table

FIGURE 1.9 A Relational Database

It sounds complicated, but it is really quite simple and very elegant. More importantly, it enables you to obtain detailed information about any employee, location, or title. To show how it works, we will ask a series of questions that require you to look in one or more tables for the answer. Consider:

Query: At which location does Pamela Milgrom work? What is the phone number of her office?
Answer: Pamela works in the Boston office, at 3 Commons Blvd., Boston, MA, 02190. The phone number is (617) 123-4444.

Did you answer the question correctly? You had to search the Employees table for Pamela Milgrom to obtain the LocationID (L02 in this example) corresponding to her office. You then searched the Locations table for this LocationID to obtain the address and phone number for that location. The process required you to use both the Locations and Employees tables, which are linked to one another through a ***one-to-many relationship.*** One location can have many employees, but a specific employee can work at only one location. Let's try another question:

Query: Which employees are managers?
Answer: There are four managers: Pamela Milgrom, Tracey Coulter, Billy Marlin, and David Adamson

The answer to this question is based on the one-to-many relationship that exists between titles and employees. One title can have many employees, but a given employee has only one title. To answer the query, you search the Titles table for "manager" to determine its TitleID (T02). You then go to the Employees table and select those records that have this value in the TitleID field.

The design of a relational database enables us to extract information from multiple tables in a single query. Equally important, it simplifies the way data is changed in that modifications are made in only one place. Consider:

Query: Which employees work in the Boston office? What is their phone number? How many changes would be necessary if the Boston office were to get a new phone number?
Answer: There are four employees in Boston: Pamela Milgrom, Ann Manin, Patricia Rubin, and Kenneth Charles, each with the same number (617 123-4444). Only one change (in the Locations table) would be necessary if the phone number changed.

Once again, we draw on the one-to-many relationship between locations and employees. Thus, we begin in the Locations table where we search for "Boston" to determine its LocationID (L02) and phone number (617 123-4444). Then we go to the Employees table to select those records with this value in the LocationID field. Realize, however, that the phone number is stored in the Locations table. Thus, the new phone number is entered in the Boston record, where it is reflected automatically for each employee with a LocationID of L02 (corresponding to the Boston office).

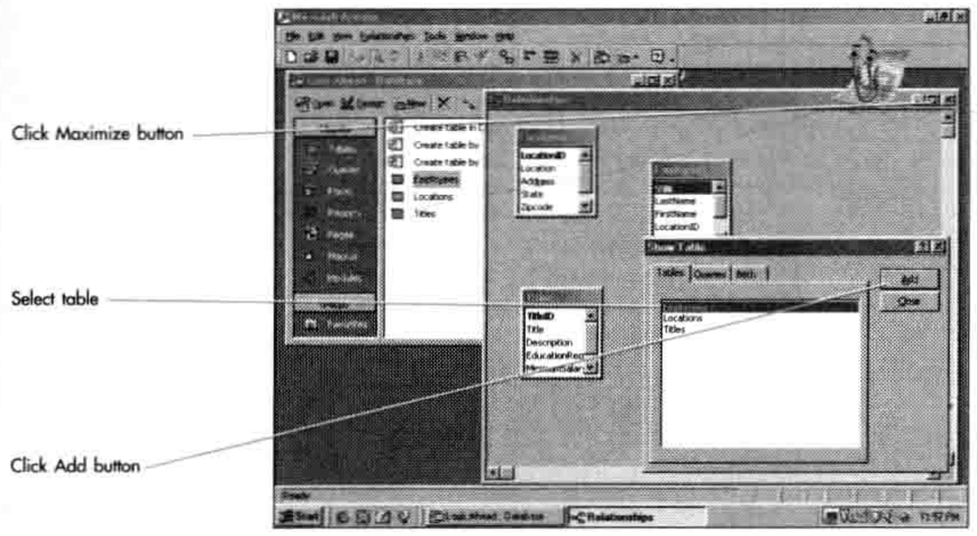
HANDS-ON EXERCISE 4

A Look Ahead

Objective: To open a database with multiple tables; to identify the one-to-many relationships within the database and to produce reports based on those relationships. Use Figure 1.10 as a guide in the exercise.

STEP 1: Open the Relationships Window

- Start Access, click the **More Files option button,** and click **OK.** If Access is already open, pull down the **File menu** and click the **Open command.** Open the **Look Ahead database** in the **Exploring Access folder.**
- The Tables button should be selected as in Figure 1.10a. The database contains the Employees, Locations, and Titles tables.
- Pull down the **Tools menu** and click the **Relationships command** to open the Relationships window as shown in Figure 1.10a. (The tables are not yet visible in this window.)
- Pull down the **Relationships menu** and click the **Show Table command** to display the Show Table dialog box. Click (select) the **Locations table** (within the Show Table dialog box) then click the **Add button** to add this table to the Relationships window.
- Double click the **Titles** and **Employees tables** to add these tables to the Relationships window.
- Close the Show Table dialog box.

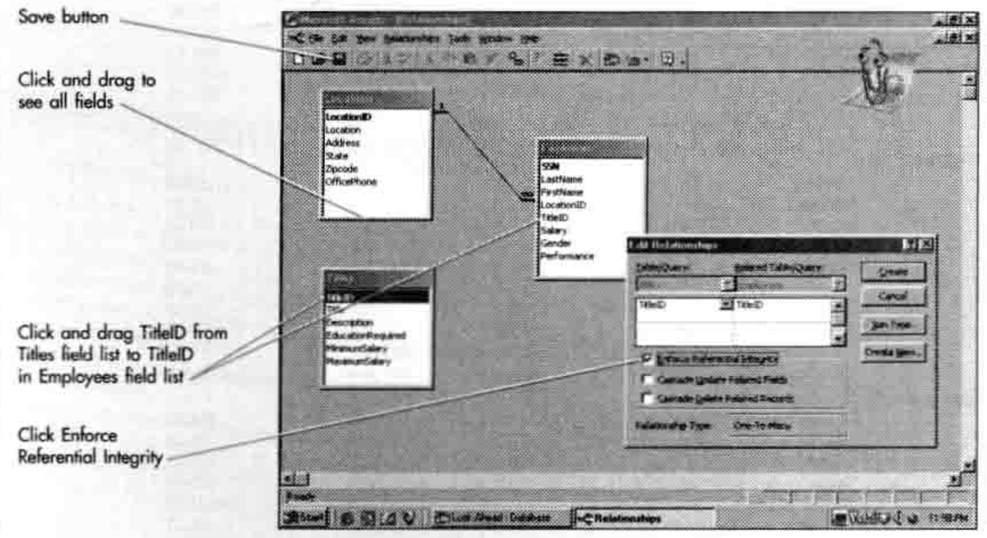


(a) Open the Relationships Window (step 1)

FIGURE 1.10 Hands-on Exercise 4

STEP 2: Create the Relationships

- Maximize the Relationships windows so that you have more room in which to work. Click and drag the title bar of each table so that the positions of the tables match those in Figure 1.10b. Click and drag the bottom (and/or right) border of each table so that you see all of the fields in each table.
- Click and drag the **LocationID field** in the Locations table field list to the **LocationID field** in the Employees field list. You will see the Edit Relationships dialog box. Check the box to **Enforce Referential Integrity.** Click the **Create button** to create the relationship.
- Click and drag the **TitleID field** in the Locations table field list to the **TitleID field** in the Employees field list. You will see the Edit Relationships dialog box. Check the box to **Enforce Referential Integrity** as shown in Figure 1.10b. Click the **Create button** to create the relationship.
- Click the **Save button** on the Relationship toolbar to save the Relationships window, then close the Relationships window.



(b) Create the Relationships (step 2)

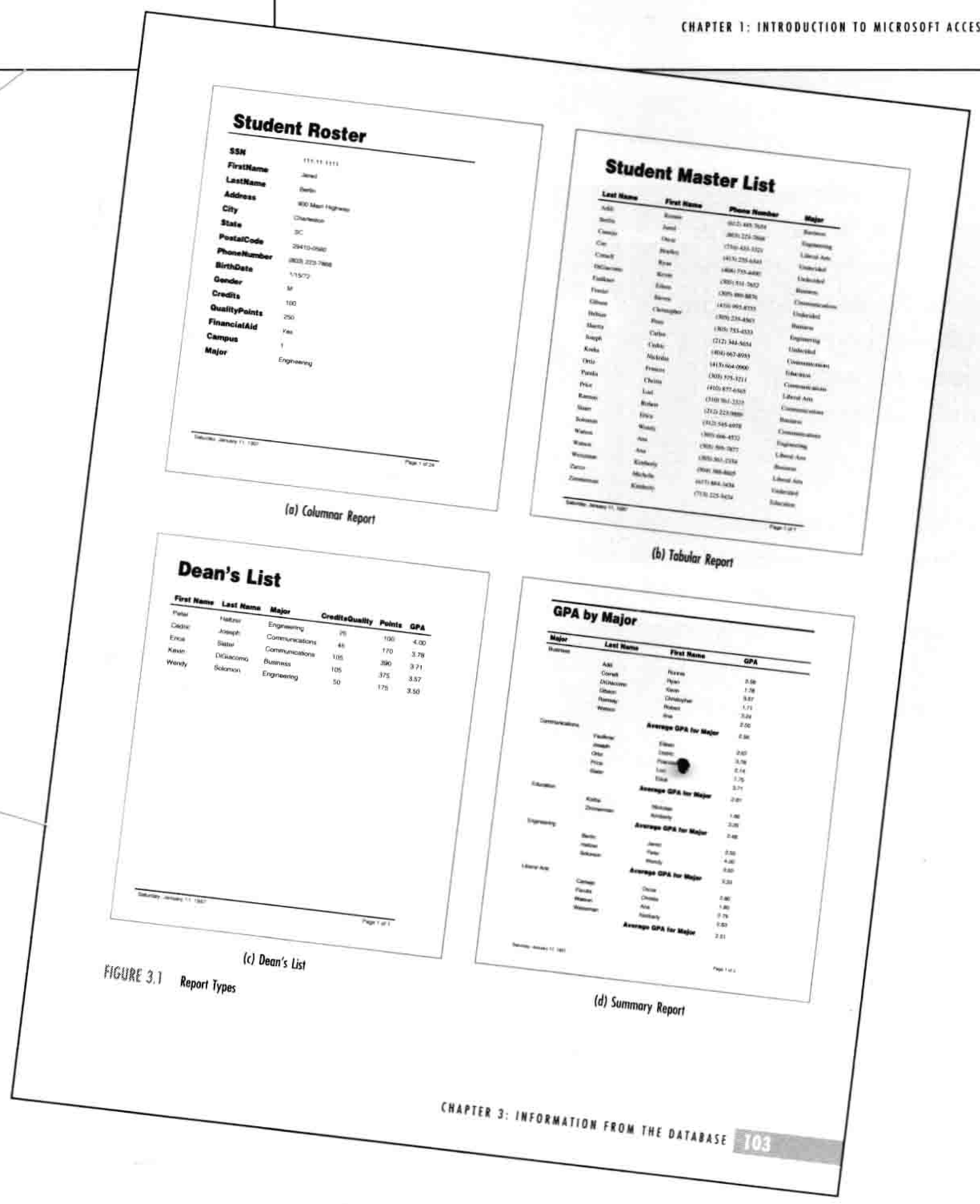
FIGURE 1.10 Hands-on Exercise 4 (continued)

THE RELATIONSHIPS ARE VISUAL

The tables in an Access database are created independently, then related to one another through the Relationships window. The number 1 and the infinity symbol (∞) appear at the ends of the line to indicate the nature of the relationship; e.g., a one-to-many relationship between the Locations and Employees tables.

A total of 30 in-depth tutorials provide hands-on instruction at the computer and guide the reader every step of the way. Each tutorial is illustrated with annotated screen captures and expanded through appropriate tips that further explain the task at hand.

All discussions are accompanied by multiple illustrations that explain the underlying conceptual material. This example describes the different types of reports that can be created from a database. The reader learns concepts as well as keystrokes, which in turn increases his or her proficiency in Access.



(a) Columnar Report

(b) Tabular Report

(c) Dean's List

(d) Summary Report

FIGURE 3.1 Report Types

United States by Region

Prepared by Gregg Kuehnel

Region	Name	Capital	Population	Area	Population Density
Middle Atlantic					
	Delaware	Dover	666,168	2,057	323.85
	Maryland	Annapolis	4,781,468	10,577	452.06
	New Jersey	Trenton	7,730,188	7,836	986.50
	New York	Albany	17,990,455	49,576	362.89
	Pennsylvania	Harrisburg	11,881,643	45,333	262.10
	Total for Region		**43,049,922**	**115,379**	
	Average for Region		**8,609,984**	**23,076**	**477.48**
Mountain					
	Arizona	Phoenix	3,665,228	113,909	32.18
	Colorado	Denver	3,294,394	104,247	31.60
	Idaho	Boise	1,006,749	83,557	12.05
	Montana	Helena	799,065	147,138	5.43
	Nevada	Carson City	1,201,833	110,540	10.87
	New Mexico	Santa Fe	1,515,069	121,666	12.45
	Utah	Salt Lake City	1,722,850	84,916	20.29
	Wyoming	Cheyenne	453,588	97,914	4.63
	Total for Region		**13,658,776**	**863,887**	
	Average for Region		**1,707,347**	**107,986**	**16.19**
New England					
	Connecticut	Hartford	3,287,116	5,009	656.24
	Maine	Augusta	1,227,928	33,215	36.97
	Massachusetts	Boston	6,016,425	8,257	728.65
	New	Concord	1,109,252	9,304	119.22
	Rhode Island	Providence	1,003,464	1,214	826.58
	Vermont	Montpelier	562,758	9,609	58.57
	Total for Region		**13,206,943**	**66,608**	
	Average for Region		**2,201,157**	**11,101**	**404.37**
North Central					
	Illinois	Springfield	11,430,602	56,400	202.67
	Indiana	Indianapolis	5,544,159	36,291	152.77
	Iowa	Des Moines	2,776,755	56,290	49.33
	Kansas	Topeka	2,477,574	82,264	30.12

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FIGURE 3.13 The United States Database (Exercise 3)

University of Miami Book Store

Prepared by Gregg Kuehnel

Publisher	ISBN	Author	Title	ListPrice
Macmillan Publishing				
	1-56686-127-6	Rosch	The Hardware Bible	$35.00
			Number of Books:	1
			Average List Price:	$35.00
McGraw Hill				
	0-07-029387-2	Hofstetter	Internet Literacy	$45.00
	0-07-041127-1	Martinez	Getting Ahead by Getting	$39.95
	0-07-054048-9	Rothstein	Ace the Technical Interview	$24.95
	0-07-070318-3	Willard	The Cybernetics Reader	$15.75
			Number of Books:	4
			Average List Price:	$31.41
Prentice Hall				
	013-011100-7	Grauer/Barber	Exploring Microsoft Office 2000	$45.00
	0-13-011108-2	Grauer/Barber	Exploring Excel 2000	$28.95
	0-13-011190-0	Grauer/Barber	Exploring Microsoft Office 2000	$45.00
	0-13-011816-8	Grauer/Barber	Exploring PowerPoint 2000	$28.95
	0-13-020476-5	Grauer/Barber	Exploring Access 2000	$28.95
	0-13-020489-7	Grauer/Barber	Exploring Word 2000	$28.95
	0-13-065541-4	Grauer/Barber	Exploring Windows 3.1	$24.95
	0-13-504077-9	Grauer/Barber	Exploring Windows 95	$28.95
	0-13-754193-7	Grauer/Barber	Exploring Windows 98	$28.95
	0-13-754201-1	Grauer/Barber	Exploring Word 97	$30.95
	0-13-754219-1	Grauer/Barber	Exploring Excel 97	$30.95
	0-13-754227-5	Grauer/Barber	Exploring Access 97	$30.95
	0-13-754235-6	Grauer/Barber	Exploring PowerPoint 97	$30.95
	0-13-790817-2	Grauer/ Villar	COBOL: From Micro to Mainframe	$52.95
			Number of Books:	14
			Average List Price:	$33.24

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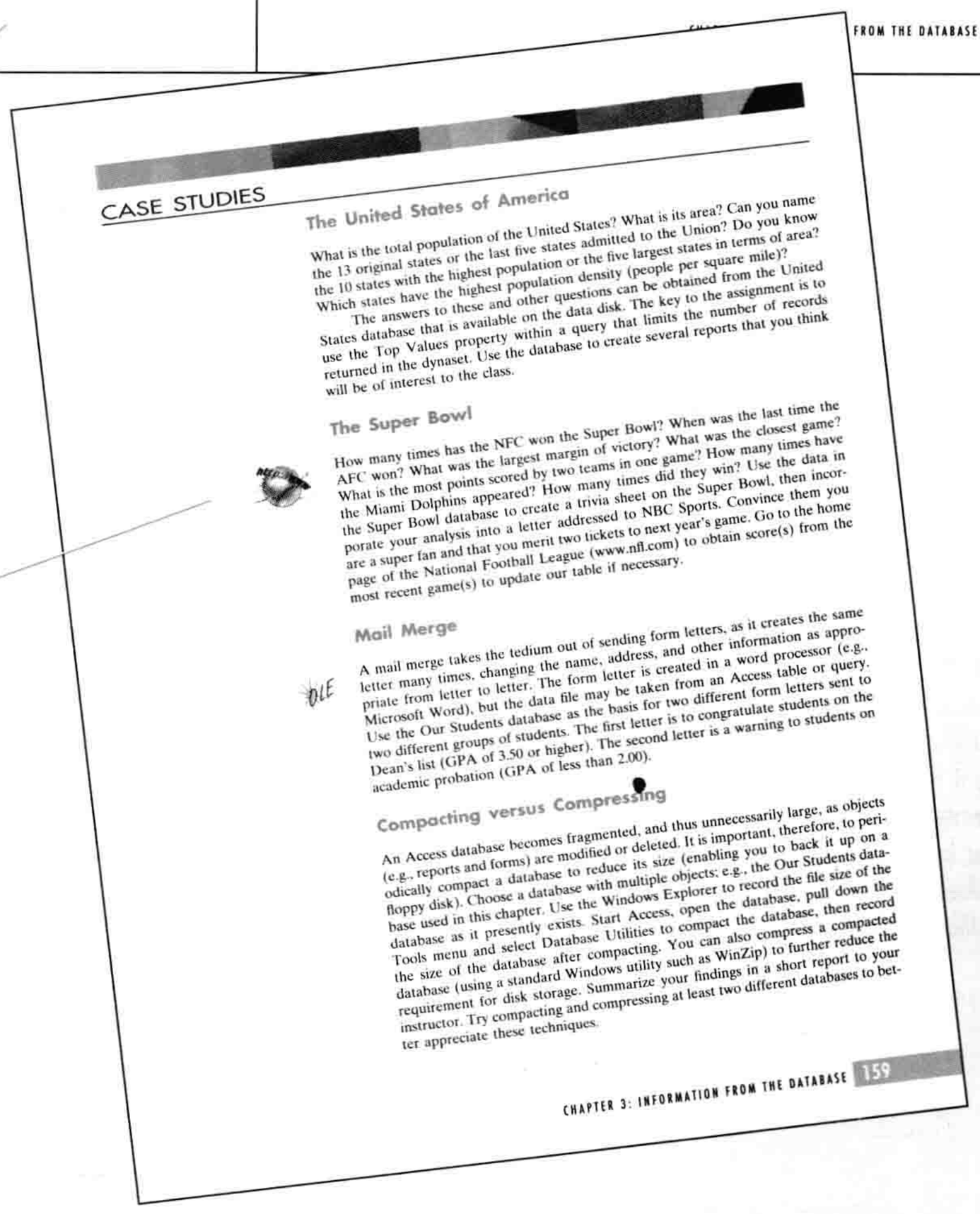
FIGURE 3.14 The Bookstore Database (Exercise 4)

Every chapter ends with multiple practice exercises to reinforce the material and avoid repetition from one semester to the next. There are objective multiple-choice questions, guided computer exercises, and less structured case studies.

The case studies challenge the reader by extending the material in the chapter. The Web icon appears whenever the reader is directed to the World Wide Web as a source of additional material. Object Linking and Embedding (OLE) is also highlighted.



CASE STUDIES

The United States of America

What is the total population of the United States? What is its area? Can you name the 13 original states or the last five states admitted to the Union? Do you know the 10 states with the highest population or the five largest states in terms of area? Which states have the highest population density (people per square mile)?

The answers to these and other questions can be obtained from the United States database that is available on the data disk. The key to the assignment is to use the Top Values property within a query that limits the number of records returned in the dynaset. Use the database to create several reports that you think will be of interest to the class.

The Super Bowl

How many times has the NFC won the Super Bowl? When was the last time the AFC won? What was the largest margin of victory? What was the closest game? What is the most points scored by two teams in one game? How many times have the Miami Dolphins appeared? How many times did they win? Use the data in the Super Bowl database to create a trivia sheet on the Super Bowl, then incorporate your analysis into a letter addressed to NBC Sports. Convince them you are a super fan and that you merit two tickets to next year's game. Go to the home page of the National Football League (www.nfl.com) to obtain score(s) from the most recent game(s) to update our table if necessary.

Mail Merge

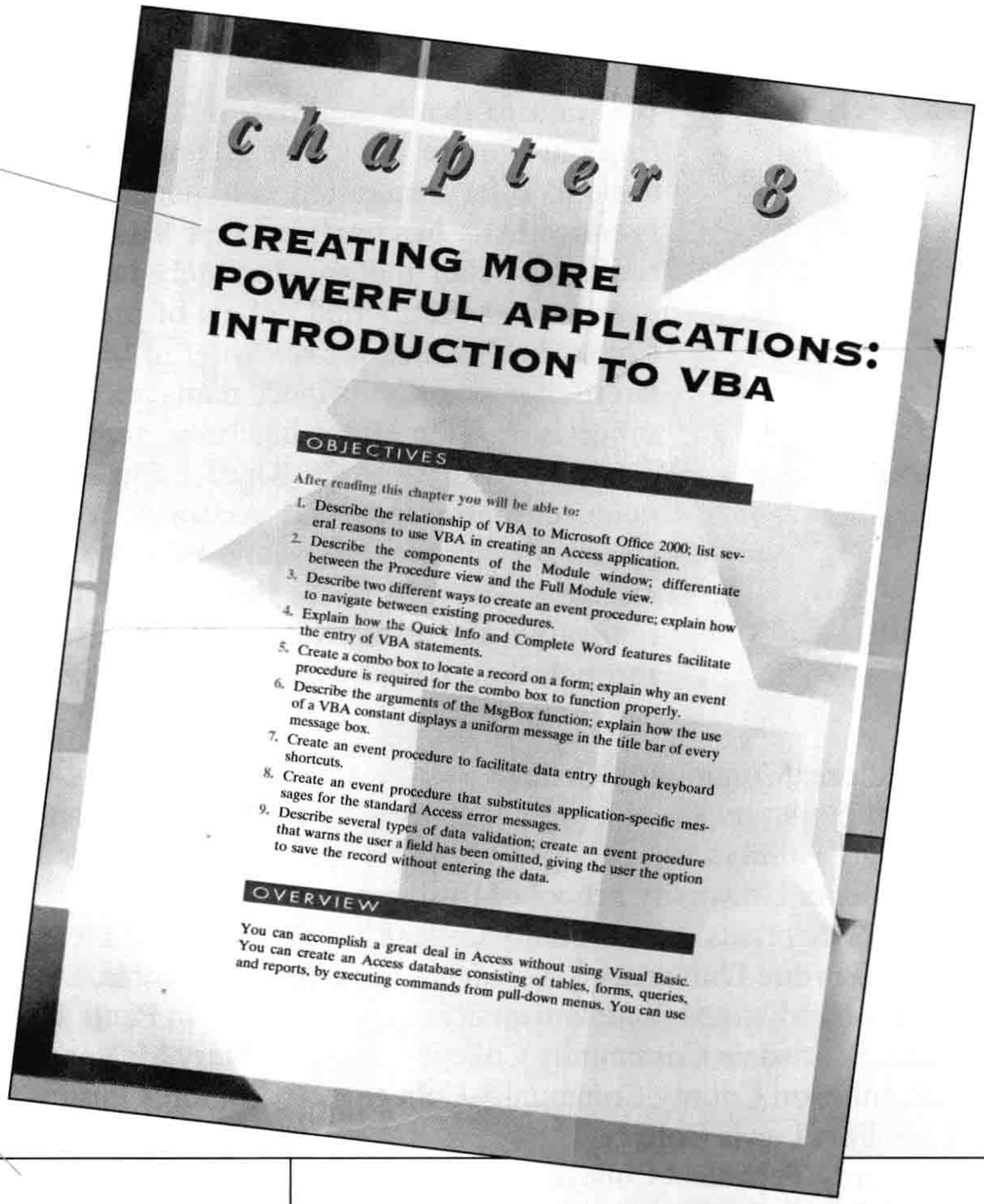
OLE

A mail merge takes the tedium out of sending form letters, as it creates the same letter many times, changing the name, address, and other information as appropriate from letter to letter. The form letter is created in a word processor (e.g., Microsoft Word), but the data file may be taken from an Access table or query. Use the Our Students database as the basis for two different form letters sent to two different groups of students. The first letter is to congratulate students on the Dean's list (GPA of 3.50 or higher). The second letter is a warning to students on academic probation (GPA of less than 2.00).

Compacting versus Compressing

An Access database becomes fragmented, and thus unnecessarily large, as objects (e.g., reports and forms) are modified or deleted. It is important, therefore, to periodically compact a database to reduce its size (enabling you to back it up on a floppy disk). Choose a database with multiple objects; e.g., the Our Students database used in this chapter. Use the Windows Explorer to record the file size of the database as it presently exists. Start Access, open the database, pull down the Tools menu and select Database Utilities to compact the database, then record the size of the database after compacting. You can also compress a compacted database (using a standard Windows utility such as WinZip) to further reduce the requirement for disk storage. Summarize your findings in a short report to your instructor. Try compacting and compressing at least two different databases to better appreciate these techniques.

Exploring Microsoft® Access 2000 goes beyond the Expert level in the MOUS (Microsoft Office User Specialist) program to include a capstone chapter on VBA. This material enables the reader to take Access to the next level as he or she learns how to put VBA code behind Access objects.


chapter 8

CREATING MORE POWERFUL APPLICATIONS: INTRODUCTION TO VBA

OBJECTIVES

After reading this chapter you will be able to:

1. Describe the relationship of VBA to Microsoft Office 2000; list several reasons to use VBA in creating an Access application.
2. Describe the components of the Module window; differentiate between the Procedure view and the Full Module view.
3. Describe two different ways to create an event procedure; explain how to navigate between existing procedures.
4. Explain how the Quick Info and Complete Word features facilitate the entry of VBA statements.
5. Create a combo box to locate a record on a form; explain why an event procedure is required for the combo box to function properly.
6. Describe the arguments of the MsgBox function; explain how the use of a VBA constant displays a uniform message in the title bar of every message box.
7. Create an event procedure to facilitate data entry through keyboard shortcuts.
8. Create an event procedure that substitutes application-specific messages for the standard Access error messages.
9. Describe several types of data validation; create an event procedure that warns the user a field has been omitted, giving the user the option to save the record without entering the data.

OVERVIEW

You can accomplish a great deal in Access without using Visual Basic. You can create an Access database consisting of tables, forms, queries, and reports, by executing commands from pull-down menus. You can use

Students are exposed to a wide variety of practical applications with which they can identify. The case study on a sports league appears in Chapter 7 and includes material on multilevel switchboards and macros.

database into two files—one containing the tables and the other containing the remaining objects (the forms, reports, queries, and macros). The tables are then linked to the other objects through the Link Tables command. It sounds complicated but this approach has several advantages, as you will see.

The chapter also covers macros and prototyping, two techniques that are used by developers in creating applications. A macro automates common command sequences and further simplifies the system for the end user. Prototyping is used in conjunction with developing the various switchboards to demonstrate the "look and feel" of an application, even before the application is complete. Three hands-on exercises are included in the chapter to progressively build the application as you develop your skills in Access.

CASE STUDY: A RECREATIONAL SPORTS LEAGUE

You have probably played in a sports league at one time or another, whether in Little League as a child or in an intramural league at school or work. Whatever the league, it had teams, players, and coaches. The typical league registers the players and coaches individually then holds a draft among the coaches to divide the players into teams according to ability. The league may have been organized informally, with manual procedures for registering the participants and creating the teams. Now we automate the process.

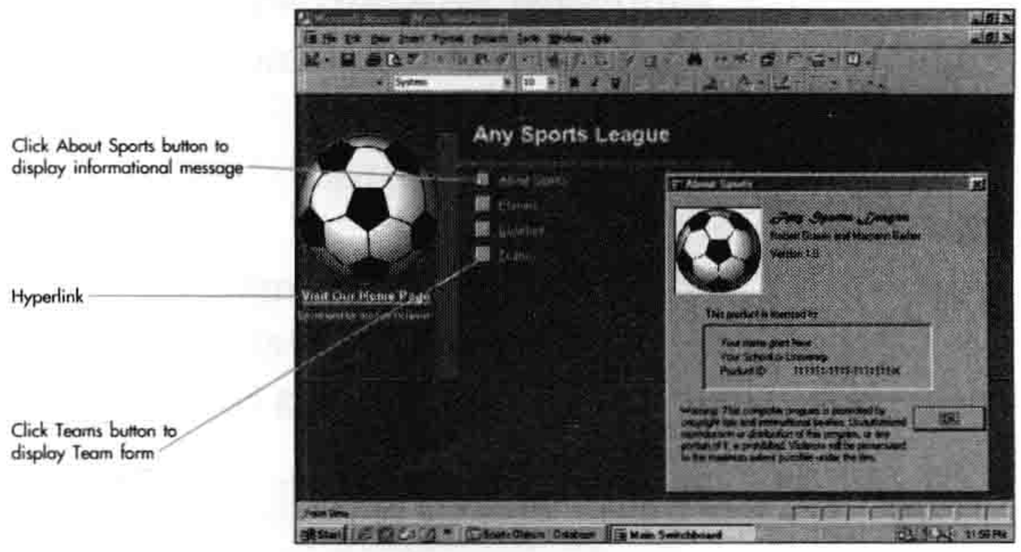
Let's think for a moment about the tables and associated relationships that will be necessary to create the database. There are three tables, one each for players, coaches, and teams. There is a one-to-many relationship between teams and players (one team has many players, but a player is assigned to only one team). There is also a one-to-many relationship between teams and coaches (one team has many coaches, but a coach is assigned to only one team).

In addition to the tables, the database will contain multiple forms, queries, and reports based on these tables. A Players form is necessary in order to add a new player, or edit or delete the record of an existing player. A similar form should exist for Coaches. There might also be a sophisticated main and subform combination for the Teams table that displays the players and coaches on each team, and through which data for any table (Team, Player, or Coach) can be added, edited, or deleted. And, of course, there will be a variety of reports and queries.

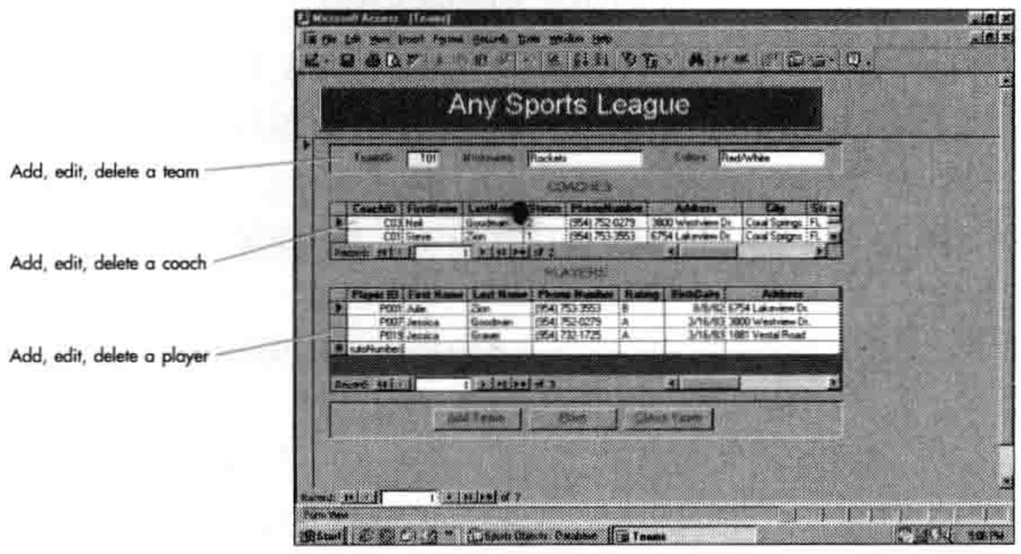
Let's assume that this database has been created. It would not be difficult for a person knowledgeable in Access to open the database and select the various objects as the need arose. He or she would know how to display the Database window and how to select the various buttons in order to open the appropriate object. But what if the system is to be used by someone who does not know Access, which is typically the case? You can see that the user interface becomes the most important part of the system, at least from the viewpoint of the end user. An interface that is intuitive and easy to use will be successful. Conversely, a system that is difficult to use or visually unappealing is sure to fail.

Figure 7.1a displays the switchboard that will be created for this application. We have added a soccer ball as a logo, but the application applies to any type of recreational sports league. The interface is intuitive and easy to use. Click the About Sports button, the first button on our menu, and the system displays the informational screen we like to include in all of our applications. Click any other button, and you display the indicated form. Click the Teams button, for example, and you see the form in Figure 7.1b where you can add a new team, view, edit, or print the data for any existing team, then click the Close Form button to return to the main menu.

The switchboard in Figure 7.1a exists as a form within the database. Look closely, however, and you will see it is subtly different from the forms you have developed in previous chapters. The record selector and navigation buttons, for example, have been suppressed because they are not needed. In other words, this



(a) The Main Menu



(b) The Teams Form

FIGURE 7.1 Building a User Interface

Acknowledgments

We want to thank the many individuals who have helped to bring this project to fruition. We are especially grateful to Nancy Evans and PJ Boardman, who continue to offer inspiration and guidance. Alex von Rosenberg, executive editor at Prentice Hall, has provided new leadership in extending the series to Office 2000. Nancy Welcher did an absolutely incredible job on our Web site. Susan Rifkin coordinated the myriad details of production and the certification process. Greg Christofferson was instrumental in the acquisition of supporting software. Lynne Breitfeller was the project manager. Paul Smolenski was senior manufacturing supervisor. Greg Hubit has been masterful as the external production editor for every book in the series. Cecil Yarbrough did an outstanding job in checking the manuscript for technical accuracy. Jennifer Surich was the editorial assistant. Leanne Nieglos was the supplements editor. Cindy Stevens, Karen Vignare, and Michael Olmstead wrote the Instructor Manuals. Patricia Smythe developed the innovative and attractive design. We also want to acknowledge our reviewers who, through their comments and constructive criticism, greatly improved the series.

Lynne Band, Middlesex Community College
Don Belle, Central Piedmont Community College
Stuart P. Brian, Holy Family College
Carl M. Briggs, Indiana University School of Business
Kimberly Chambers, Scottsdale Community College
Alok Charturvedi, Purdue University
Jerry Chin, Southwest Missouri State University
Dean Combellick, Scottsdale Community College
Cody Copeland, Johnson County Community College
Larry S. Corman, Fort Lewis College
Janis Cox, Tri-County Technical College
Martin Crossland, Southwest Missouri State University
Paul E. Daurelle, Western Piedmont Community College
David Douglas, University of Arkansas
Carlotta Eaton, Radford University
Judith M. Fitspatrick, Gulf Coast Community College
Raymond Frost, Central Connecticut State University
Midge Gerber, Southwestern Oklahoma State University
James Gips, Boston College
Vernon Griffin, Austin Community College
Michael Hassett, Fort Hays State University
Wanda D. Heller, Seminole Community College
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Alan Moltz, Naugatuck Valley Technical Community College
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Judith Rice, Santa Fe Community College
David Rinehard, Lansing Community College
Marilyn Salas, Scottsdale Community College
John Shepherd, Duquesne University
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Margaret Thomas, Ohio University
Mike Thomas, Indiana University School of Business
Suzanne Tomlinson, Iowa State University
Karen Tracey, Central Connecticut State University
Sally Visci, Lorain County Community College
David Weiner, University of San Francisco
Connie Wells, Georgia State University
Wallace John Whistance-Smith, Ryerson Polytechnic University
Jack Zeller, Kirkwood Community College

A final word of thanks to the unnamed students at the University of Miami, who make it all worthwhile. Most of all, thanks to you, our readers, for choosing this book. Please feel free to contact us with any comments and suggestions.

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chapter 1

INTRODUCTION TO MICROSOFT ACCESS: WHAT IS A DATABASE?

OBJECTIVES

After reading this chapter you will be able to:

1. Define the terms field, record, table, and database.
2. Start Microsoft Access; describe the Database window and the objects in an Access database.
3. Add, edit, and delete records within a table; use the Find command to locate a specific record.
4. Describe the record selector; explain when changes are saved to a table.
5. Explain the importance of data validation in table maintenance.
6. Apply a filter (by form or by selection) to a table; sort a table on one or more fields.
7. Describe a relational database; identify the one-to-many relationships that exist within a database.

OVERVIEW

All businesses and organizations maintain data of one kind or another. Companies store data about their employees. Schools and universities store data about their students and faculties. Magazines and newspapers store data about their subscribers. The list goes on and on, and while each of these examples refers to different types of data, they all operate under the same basic principles of database management.

The chapter introduces you to Microsoft Access, the application in the Microsoft Office suite that performs database management. We describe the objects in an Access database and show you how to add, edit, and delete records to a table. We explain how to obtain information from the database by running reports and queries that have been previously created. We discuss how to display selected records through a filter and how to display those records in different sequences. And finally, we provide a look ahead, by showing how the real power of Access is derived from a relational database that contains multiple tables.