Access 2002 VBA Handbook

Susann Novalis and Dana Jones

Associate Publisher: Richard Mills

Acquisitions and Developmental Editor: Christine McGeever

Editor: Susan Berge

Production Editor: Patricia Oman, Publication Services, Inc.

Technical Editor: Matt Riggsby

Book Designer: Robin Kibby

Graphic Illustrator: Don Waller, Publication Services, Inc.

Electronic Publishing Specialists: David Eynon and T.C. Moore, Publication Services, Inc.

Proofreaders: Phil Hamer and Jennifer Putman, Publication Services, Inc.

Indexer: Ted Laux

CD Coordinator: Christine Harris

CD Technician: Kevin Ly

Cover Designer: Design Site

Cover Photographer: Pierre-Yves Goavec

Library of Congress Card Number: 2001093084

ISBN: 0-7821-4013-0

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

Software License Agreement: Terms and Conditions

The media and/or any online materials accompanying this book that are available now or in the future contain programs and/or text files (the "Software") to be used in connection with the book. SYBEX hereby grants to you a license to use the Software, subject to the terms that follow. Your purchase, acceptance, or use of the Software will constitute your acceptance of such terms.

The Software compilation is the property of SYBEX unless otherwise indicated and is protected by copyright to SYBEX or other copyright owner(s) as indicated in the media files (the "Owner(s)"). You are hereby granted a single-user license to use the Software for your personal, noncommercial use only. You may not reproduce, sell, distribute, publish, circulate, or commercially exploit the Software, or any portion thereof, without the written consent of SYBEX and the specific copyright owner(s) of any component software included on this media.

In the event that the Software or components include specific license requirements or end-user agreements, statements of condition, disclaimers, limitations, or warranties ("End-User License"), those End-User Licenses supersede the terms and conditions

herein as to that particular Software component. Your purchase, acceptance, or use of the Software will constitute your acceptance of such End-User Licenses.

By purchase, use, or acceptance of the Software you further agree to comply with all export laws and regulations of the United States as such laws and regulations may exist from time to time.

Reusable Code in This Book

The authors created reusable code in this publication expressly for reuse for readers. Sybex grants readers permission to reuse for any purpose the code found in this publication or its accompanying CD-ROM so long as all of the authors are attributed in any application containing the reusable code, and the code itself is never sold or commercially exploited as a stand-alone product.

Software Support

Components of the supplemental Software and any offers associated with them may be supported by the specific Owner(s) of that material, but they are not supported by SYBEX. Information regarding any available support may be obtained from the Owner(s) using the information provided in the appropriate read.me files or listed elsewhere on the media.

Should the manufacturer(s) or other Owner(s) cease to offer support or decline to honor any offer, SYBEX bears no responsibility. This notice concerning support for the Software is provided for your information only. SYBEX is not the agent or principal of the Owner(s), and SYBEX is in no way responsible for providing any support for the Software, nor is it liable or responsible for any support provided, or not provided, by the Owner(s).

Warranty

SYBEX warrants the enclosed media to be free of physical defects for a period of ninety (90) days after purchase. The Software is not available from SYBEX in any other form or media than that enclosed herein or posted to www.sybex.com. If you discover a defect in the media during this warranty period, you may obtain a replacement of identical format at no charge by sending the defective media, postage prepaid, with proof of purchase to:

SYBEX Inc.
Customer Service Department
1151 Marina Village Parkway
Alameda, CA 94501
(510) 523-8233
Fax: (510) 523-2373

e-mail: info@sybex.com
WEB: HTTP://www.sybex.com

After the 90-day period, you can obtain replacement media of identical format by sending us the defective disk, proof of purchase, and a check or money order for $10, payable to SYBEX.

Disclaimer

SYBEX makes no warranty or representation, either expressed or implied, with respect to the Software or its contents, quality, performance, merchantability, or fitness for a particular purpose. In no event will SYBEX, its distributors, or dealers be liable to you or any other party for direct, indirect, special, incidental, consequential, or other damages arising out of the use of or inability to use the Software or its contents even if advised of the possibility of such damage. In the event that the Software includes an online update feature, SYBEX further disclaims any obligation to provide this feature for any specific duration other than the initial posting.

The exclusion of implied warranties is not permitted by some states. Therefore, the above exclusion may not apply to you. This warranty provides you with specific legal rights; there may be other rights that you may have that vary from state to state. The pricing of the book with the Software by SYBEX reflects the allocation of risk and limitations on liability contained in this agreement of Terms and Conditions.

Shareware Distribution

This Software may contain various programs that are distributed as shareware. Copyright laws apply to both shareware and ordinary commercial software, and the copyright Owner(s) retains all rights. If you try a shareware program and continue using it, you are expected to register it. Individual programs differ on details of trial periods, registration, and payment. Please observe the requirements stated in appropriate files.

Copy Protection

The Software in whole or in part may or may not be copy-protected or encrypted. However, in all cases, reselling or redistributing these files without authorization is expressly forbidden except as specifically provided for by the Owner(s) therein.

To my readers-you make it all worthwhile.

-Susann Novalis

For Adam, who brought me out of myself.

-Dana Jones

Acknowledgments

Thanks to James Kelley, Dean of San Francisco State University's College of Science and Engineering, and Marci Manderscheid, Executive Director, Downtown Center at San Francisco State University, for their continued support of my work with software applications.

Thanks to everyone at Sybex who worked on this book.

Special thanks to Dana Jones, whose global responsibility for the revision of this book included detailed attention to the new aspects of Access and a real insight into the needs of the readers.

And lastly, thanks to my parents, my sons, and especially Rich, for understanding my absence while the passion to create this book overtook me.

-Susann Novalis

Thanks to Christine McGeever for her support and encouragement, for listening to my suggestions and concerns, and for addressing them. I am grateful also to Matt Riggsby for his invaluable efforts as technical editor, again. Heartfelt thanks to Molly Redenbaugh for her encouragement and enthusiasm for getting this book done.

I have great luck with editors. Particular thanks to Susan Berge, editor, for reading this book almost as many times as I did. I appreciate her responsiveness, professionalism, and impeccable attention to detail. This book is much enhanced by her having worked on it.

Thanks to Ken Getz, Paul Litwin, and Mike Gunderloy, authors of *Access 2002 Desktop Developer's Handbook* (Sybex, 2001), for giving permission to include the Event Logger application on the book's CD-ROM.

Deepest thanks to Mike Gunderloy. He never fails to impress me with his technical knowledge and humility. I am grateful for the help he gave in the writing of this book, but I am more grateful for his unfailing belief that I could do it. To all our tomorrows.

Despite the impressive efforts of the many editors and colleagues who reviewed this book during its production, any errors that remain in the manuscript are my own.

-Dana Jones

Introduction

Microsoft Access is the leading relational database management system for creating database applications on the desktop. Why is Access number one? Two reasons are that Access is easy to learn and fun to use. Microsoft has achieved great success in providing a graphical interface environment that makes it as easy as possible for you to learn to use the enormous power available in Access.

If we think of using Access interactively as walking, then learning how to write the programs that automate Access is running, and learning how to put it all together into a custom application is flying. Several excellent introductory books exist to help you learn all about walking with Access. A particularly helpful book is *Mastering Access 2002 Premium Edition* by Alan Simpson and Celeste Robinson (Sybex, 2001). Far fewer flying manuals are available; one of the best is *Access 2002 Desktop Developer's Handbook* by Ken Getz, Paul Litwin, and Mike Gunderloy (Sybex, 2001). The book you are reading now is the running manual that bridges the gap.

About VBA in Access 2002

Microsoft provides Visual Basic for Applications (VBA) in Access 2002 as a powerful development tool for automating your database. Microsoft incorporated VBA in this product to make Access 2002 a versatile, powerful database management system for today's computer developers and users.

Developers need the additional power and the ability to deal with errors that VBA provides. VBA allows developers to control the user interface and manipulate events to create a database solution that is functional, effective, and user-friendly.

In this book, you'll learn the essentials of Access VBA programming. You'll learn how to create procedures for the three basic database operation categories: navigating through the application, maintaining data, and selecting groups of records for specific purposes.

Who Should Read This Book

This is an intermediate-level book about Microsoft Access. You should be familiar with the basic concepts and techniques of interactive Access, including creating a simple Access database complete with related tables, queries, forms, reports, and data access pages. This book builds on that knowledge and shows you how to automate database operations using Access VBA programming. You do not need any prior experience with programming. Although this book is an intermediate-level Access book, it is a beginning-level programming book.

How This Book Is Organized

This book consists of 15 chapters, a glossary, and a DAO appendix. As an introduction to the concepts involved in building automated applications, the first chapter explains how to use the Access wizards and helpers to automate a database. Chapters 2 and 3 cover fundamental elements of VBA programming—objects and events—and provide an introduction to the Access object model. Because forms play a key role in Access applications, Chapter 4 explores several advanced topics in form design.

Chapters 5 and 6 provide in-depth coverage of the object models used in VBA programming. Chapter 5 revisits the Access object model, focusing on the features available only in VBA. Chapter 6 describes the ActiveX Data Objects (ADO) model, which is used by the database engines.

The next three chapters cover the mechanics of writing procedures for VBA programming. Chapter 7 introduces the basics of writing procedures, Chapter 8 describes how to use variables, and Chapter 9 explains how to control the execution of program statements.

The remaining chapters deal with the techniques for using VBA programming to automate database tasks. In Chapter 10, you will learn how to deal with errors in VBA. Chapters 11, 12, and 13 cover the important tasks of database navigation, data maintenance, and manipulation of records. Chapter 14 describes how to create and modify database objects using VBA procedures. Finally, Chapter 15 introduces some advanced techniques for expanding the functionality of Access, including the use of dynamic-link libraries and ActiveX technologies.

The glossary at the back of the book provides an alphabetical list of the terms used in this book and their definitions.

Organizing Your Work

Access 2002 VBA Handbook is both a reference and a hands-on tutorial. In most chapters, you'll either create a new database from scratch or create a copy of the Northwind sample database. To organize your work,

1. Create a new folder named VBAHandbook in which to store your example databases.
2. Locate the Samples folder. In a default installation of Microsoft Office 2002, the path is C:\Program Files\Microsoft Office\Office10\Samples.
3. Drag copies of all the files in the Samples folder to your VBAHandbook folder. Many of the files you copy from the Samples folder are image and other files that the Northwind database uses. These related files must be in the same folder as your working copies of the Northwind database. The files you'll need in the chapters are now readily available in your work folder.

What's on the CD-ROM

The book's CD-ROM contains sample databases for the book's chapters, an application called Event Logger, and tables of additional reference material. To use the CD-ROM, you must have Windows 95, Windows 98, or Windows NT Workstation 4 or later and Microsoft Access 2002 installed on your computer.

The folder named Solutions contains the answer databases for the book's chapters. You can run the answer databases directly from the CD-ROM, or you can copy them to your VBAHandbook folder. The solutions folder contains the following databases:

Expenses.mdb	A semi-automated database that the Database Wizard creates and that we modify using the other built-in Access tools in Chapter 1. Chapters 2, 3, and 4 also refer to this database.
Northwind_Ch4.mdb	A copy of the Northwind database used in Chapter 4.
Northwind_Ch5,6.mdb	A copy of the Northwind database used in Chapters 5 and 6.
Ch7_Examples.mdb	A solutions file you create from scratch in Chapter 7.
Northwind_Ch8.mdb	A copy of the Northwind database used in Chapter 8.
Northwind_Ch9.mdb	A copy of the Northwind database used in Chapter 9.
Northwind_Ch11.mdb	A copy of the Northwind database used in Chapter 11.
NorthwindCS_Ch11.adp	A copy of the Northwind project used in Chapter 11.
Northwind_Ch12.mdb	A copy of the Northwind database used in Chapter 12.
Northwind_Ch13.mdb	A copy of the Northwind database used in Chapter 13.
Northwind_Ch14.mdb	A copy of the Northwind database used in Chapter 14.
Northwind_Ch15.mdb	A copy of the Northwind database used in Chapter 15.

The Tables folder contains several comprehensive reference tables. You can view the tables using the Adobe Acrobat Reader, which is also included on the CD-ROM.

The Event Logger folder contains the file Eventlogger.mdb. This is the Event Logger database application used in Chapter 2 for hands-on experience with events. This application was created by the authors of *Access 2002 Desktop Developer's Handbook*, who have kindly given permission to include this excellent tutorial database in this book.

New Access 2002 Features

Access 2002 provides several features that were not included in Access 2000. The new features, many of which are covered in this book, include features to make information

easy to find and use, Web-enabled features for sharing information, analysis tools for managing information, and additional programming enhancements.

Information Features

The following features have been added or embellished in Access 2002 to make information easier to find and use:

Access taskpane A new toolbar that appears at startup makes it easier to launch saved databases or create new ones. This type of feature has been extended throughout the Office suite.

XML support Enhanced integration with XML (Extensible Markup Language) makes interapplication data sharing easier.

Improved SQL Server integration Extended support for SQL database properties means that Access is more fully functional with existing SQL Server databases than ever before.

Multiple-version file sharing You can open and modify Access 2000 databases in Access 2002 without altering the file type. If you have several people accessing the same database, this is a real benefit.

Multiple Undo and Redo When working with objects in Design view, you can now Undo and Redo multiple actions.

Web-Enabled Features

Offline data access pages have been embellished in Access 2002 to allow a greater degree of information sharing. When working with an Access project, you can alter the project's data access pages and have your changes automatically uploaded to the SQL Server data source the next time you reconnect.

Analysis Tools

The following features have been added or enhanced in Access 2002 to provide better analysis capabilities:

PivotChart and PivotTable views You can view PivotCharts and PivotTables based on your forms, stored procedures, views, queries, tables, and functions, and can save these views as data access pages.

Conversion error logging Access 2002 will create a table of any errors that occur when you convert a database from Access 95, 97, or 2000 to Access 2002.

Password changes in projects If you're using a SQL Server 6.5 or later data source, you can change your logon password from within Access's interface.

Linked table wizard New wizard lets you link to a SQL Server database from within an Access project.

Conventions Used in This Book

This book uses the following conventions:

- Key combinations that you press are indicated by joining the keys with a plus sign. For example, Shift+F2 indicates that you hold down the Shift key while you press the F2 function key.
- Sequences of menu commands are indicated by the symbol □. For example, File □ Close indicates the Close command on the File menu.
- Words, phrases, and names that you must type or enter are shown in bold type.
- Monospace type is used for examples of programming code. Keywords of SQL statements are shown in uppercase (for example, DISTINCTROW).

You'll find the following types of special notes throughout the book.

Note Notes give you additional information about the topic.
Tip Tips usually point out a more efficient way to accomplish a task.
Warning Warnings alert you to problems you may encounter.

Sidebars

These boxed sections provide explanations of special topics that are related to the surrounding discussion. For example, Chapter 5, on VBA basics, includes a sidebar about encapsulation; and Chapter 15, on expanding Access, includes a sidebar about obtaining ActiveX controls.

Endnotes

Thank you for selecting this book to help you learn about Access VBA programming. Writing this book has been a wonderful opportunity for us to learn more about programming and to share our insights with you. We hope you enjoy learning from this book. Please send your comments, suggestions, and corrections to Dana Jones at dana@larkfarm.com.

Chapter 1: Automating a Database without Programming

Overview

A *database* is a collection of records and files. To create a database, you need a system that will help you to store, retrieve, and sort your data, as well as analyze and convert it into useful information. If the database is large or complex, you'll probably want to use a commercial computer database application such as Microsoft Access.

Access has a terrific set of tools and wizards to help you create a database, including *tables* to store data, *database diagrams* to manipulate tables and create associations between fields in those tables, *queries* to retrieve and manipulate data, *forms* to enter and view data, *data access pages* to view and work with data from the Internet or an intranet, and *reports* to print information. But if you stop at this point, you'll have taken advantage of only a fraction of the power that Access offers, having left *macros* and *modules* untouched.

Without macros and modules, a database is *interactive*. In an interactive database, the user initiates each individual action the computer carries out by choosing a menu command or by clicking a toolbar button. The user is the one who supplies the connections between the forms and reports in the database. To perform tasks, the user needs to know which menu commands to use and which sequence to use them in, as well as how the forms and reports are related. In an interactive database, the user has complete control. A knowledgeable user has the power to use the interactive database in productive ways. A less sophisticated user has the power to corrupt the data and damage the database by selecting the wrong command at the wrong time.

In this book, you'll learn how to transform your interactive database into an *automated database application*. A well-designed, fully automated database application can be used by any user. The user doesn't need to know the sequence of steps for a task or the Access commands. The user needs only to click a single button to execute a complicated task.

When you create a fully automated application, you create a custom user interface. The *user interface* is what users see on the screen and how they use the keyboard and mouse to communicate with the computer. In the custom application's user interface, the user clicks command buttons to move between tasks, perform data-entry operations, find records, and print reports. The custom user interface is where the user lives in your database application. From the user's perspective, the custom user interface *is* your database application.

When creating the new interface, you should supply the tools to open forms, perform data entry, locate specific records or groups of records, import data, archive old records,

and print reports. You should also provide a choice of paths for navigating through your database, making sure that users always know where they are and how to backtrack along the path.

Access provides a set of wizards and helpers to assist you with some of the automation. This chapter introduces you to the Database Wizard for creating the first draft of a complete application, the Command Button Wizard and Combo Box Wizard for creating automated command buttons and combo boxes, the Microsoft Exchange/Outlook Wizard for importing data from Outlook, the Link Spreadsheet and Link Text Wizards for importing data from other programs, and the Switchboard Manager for creating road maps to the forms and reports in the application.

This chapter also shows you how to use hyperlink techniques from Internet technology to navigate between database objects. You'll learn how to use hyperlinks to navigate directly from a form in your application to any document in your computer's file system or in any other computer that is connected to the Internet.

At each stage of user interface construction, your goals are to build in ease of use, intuitive understanding, and protection of the application. This chapter shows you how to create custom menus and toolbars so your application provides only the tools and commands that a user needs. You'll learn how to protect your application with a password and how to set startup conditions so a user who survives the password test is greeted by your application's startup form and its custom menus and toolbars. This chapter ends with a preview of VBA (Visual Basic for Applications), the powerful programming language used in Access, and gives you a glimpse of the additional power you'll have when you learn to use it.

Using the Task Pane

With Access 2002, Microsoft has instituted a new toolbar to make it easier to open existing files and create new ones. It duplicates many of the options in the File menu and uses hyperlink technology to execute commands (see Figure 1.1).

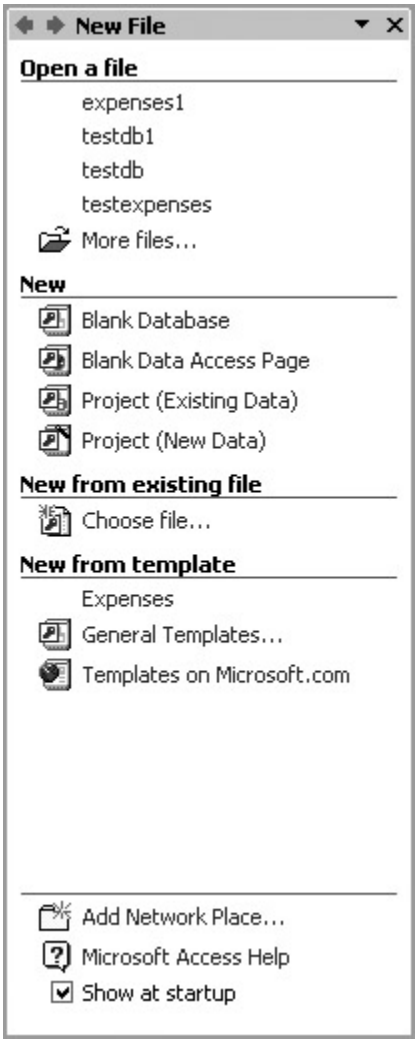

Figure 1.1: The Access Task Pane

Most of the functions of this window are fairly straightforward, but some merit further discussion. If you have never opened an Access database or project before, the Open section will have only the "More Files…" option, which opens a Browse window that you can use to open existing databases. Otherwise, you can see recently opened databases and projects here as well. Under New you have four options: Blank Database, Blank Data Access Page, Project (Existing Data), and Project (New Data). Blank Database and Project (New Data) are the same as choosing to create a new database or a new project in Access 2000's startup window. Blank Data Access Page allows you to connect to an existing data source and create a data access page based on that data (data access pages exist separately from a database or project). Project (Existing Data) allows you to create a project based on data that already resides on a SQL server once you connect to that server.

New From Existing File makes a copy of a database that already exists and allows you to manipulate the copy. New From Template has two options-General Templates and Templates On Microsoft.com. General Templates are those you install on your

computer when you install Microsoft Access. Choosing to create a new database from a General Template will launch the Database Wizard. The second option allows you to use additional templates you can get from Microsoft's Web site on the Internet. If you click this option, you must already have an active connection to the Internet. You will see that the templates listed on the Web site are not all for Access-there are templates for all of the products in the Microsoft Office Suite. As new templates are created and published to this site, they increase the usefulness of the Access program.

Once you've opened a database or project, the Task Pane disappears. You can reopen it by clicking View □ Toolbars □ Task Pane.

Using the Database Wizard

The Database Wizard can help you create database applications for several different business and personal scenarios. Some of these are as follows:

Asset Tracking	Ledger
Contact Management	Order Entry
Event Management	Resource Scheduling
Expenses	Service Call Management
Inventory Control	Time and Billing

Once you identify the scenario that is closest to the application you want to create, the wizard displays a series of screens telling you about the application and soliciting your input. After collecting your choices, the wizard uses the template you selected to create and customize the necessary tables, queries, forms, reports, database diagrams, data access pages, and modules.

The Database Wizard can create both simple and complex databases. Depending on the scenario you choose, the wizard may create several groups of tables. The wizard creates simple data-entry forms for each table and may even create a form/subform combination to display a one-to-many relationship. The wizard creates summary reports appropriate to the scenario you choose.

Creating Navigation Paths with Switchboards

After creating the individual data-entry forms and summary reports, the wizard automatically creates forms called *switchboards,* which provide navigation paths between groups of forms and reports. The wizard creates a Main Switchboard to serve as the control center for the application. The Main Switchboard has command buttons for each of the basic database tasks. Clicking a button on the Main Switchboard takes you to a form that you use to perform a database task, such as entering data into one of the tables. Clicking a button on the Main Switchboard may also take you to another switchboard with buttons that take you to other forms, reports, or other switchboards. Figure 1.2 illustrates switchboard navigation paths.

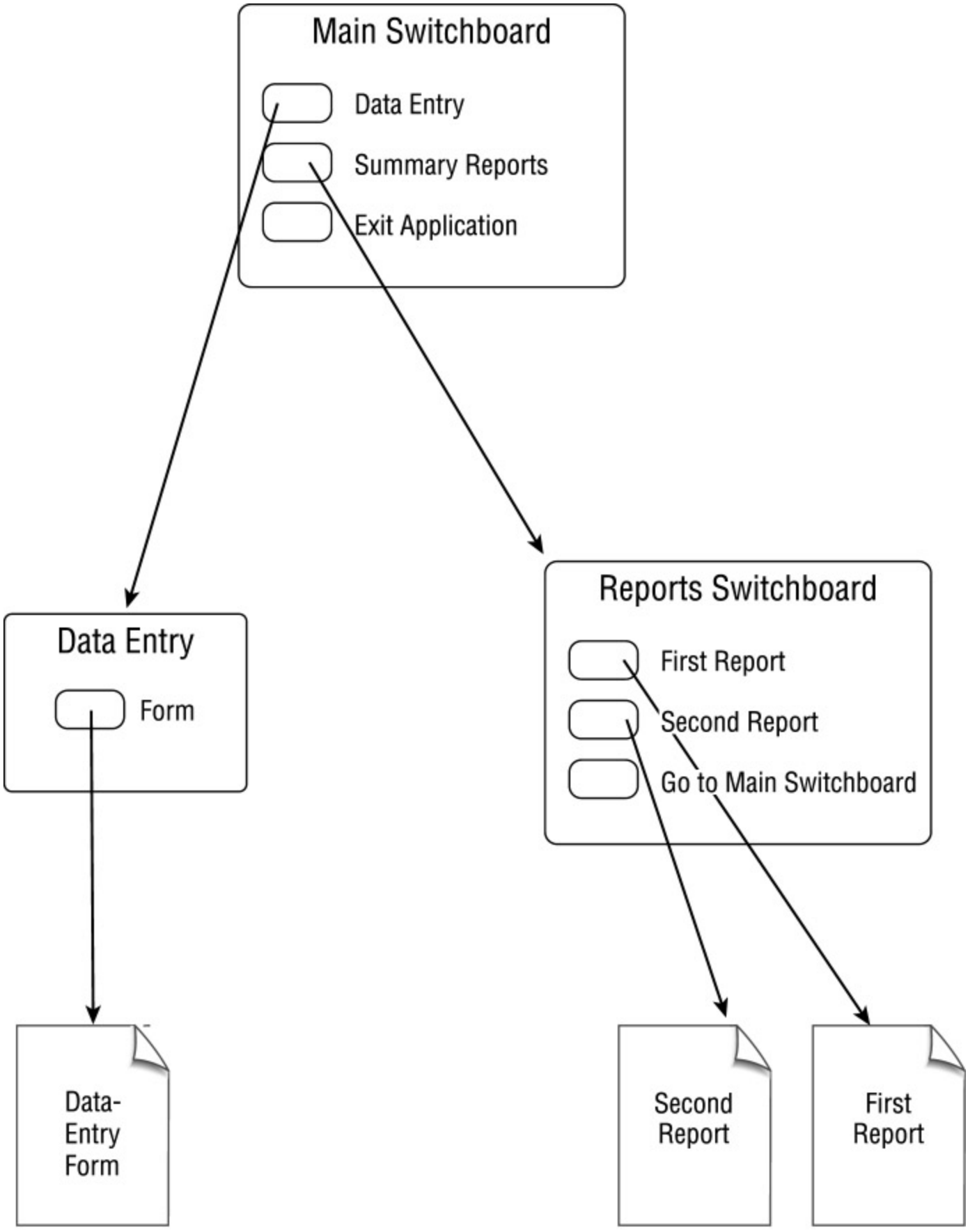
Main Switchboard
Data Entry
Summary Reports
Exit Application
Data Entry
Form
Reports Switchboard
First Report
Second Report
Go to Main Switchboard
Data-
Entry
Form
Second
Report
First
Report

Figure 1.2: The switchboard connection

The buttons react when you click them because the wizard has created an individual set of instructions for each button. The wizard writes instructions and stores them in one of two places:

- In *standard modules* that are listed as separate objects in the Modules pane of the Database window
- In *form modules* and *report modules* that are built into the forms and reports (as part of the form or report definition), stored as part of the form listed in the Forms pane or the report listed in the Reports pane of the Database window

To observe the Database Wizard at work, we'll create an application for tracking employees' expenses.

1. Start Access and click General Templates. Click the Databases tab in the New dialog and choose Expenses as the template to use to create your new database (see Figure 1.3).

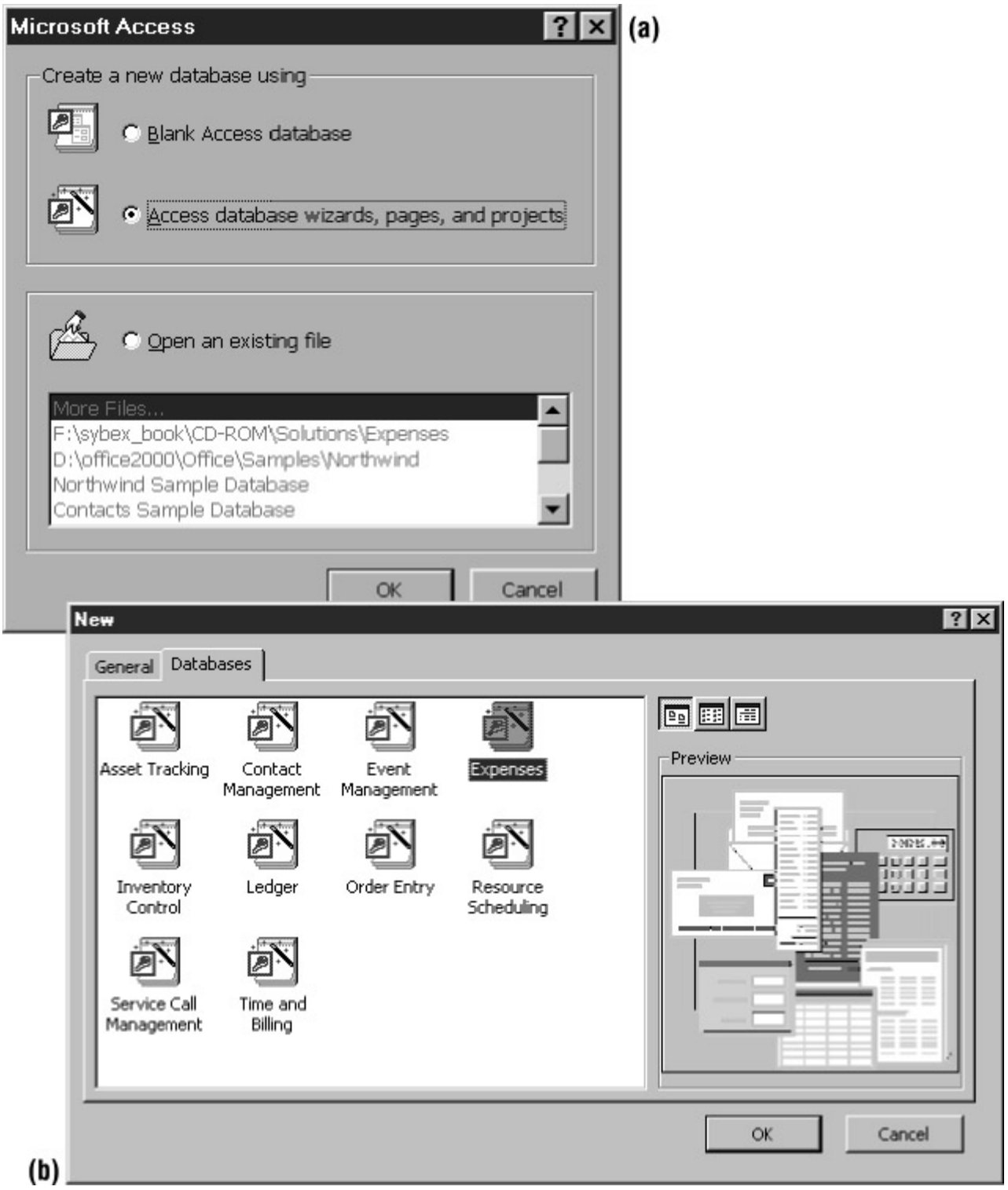

Figure 1.3: Select a template for the new database.

2. In the next dialog, enter **Expenses** as the name and save the database to the VBAHandbook folder (see Figure 1.4). (If you haven't created this folder, see this book's introduction for instructions on setting it up.) Click the Create button to

start the Database Wizard. The wizard's first screen explains the kinds of information the database will manage (see Figure 1.5).

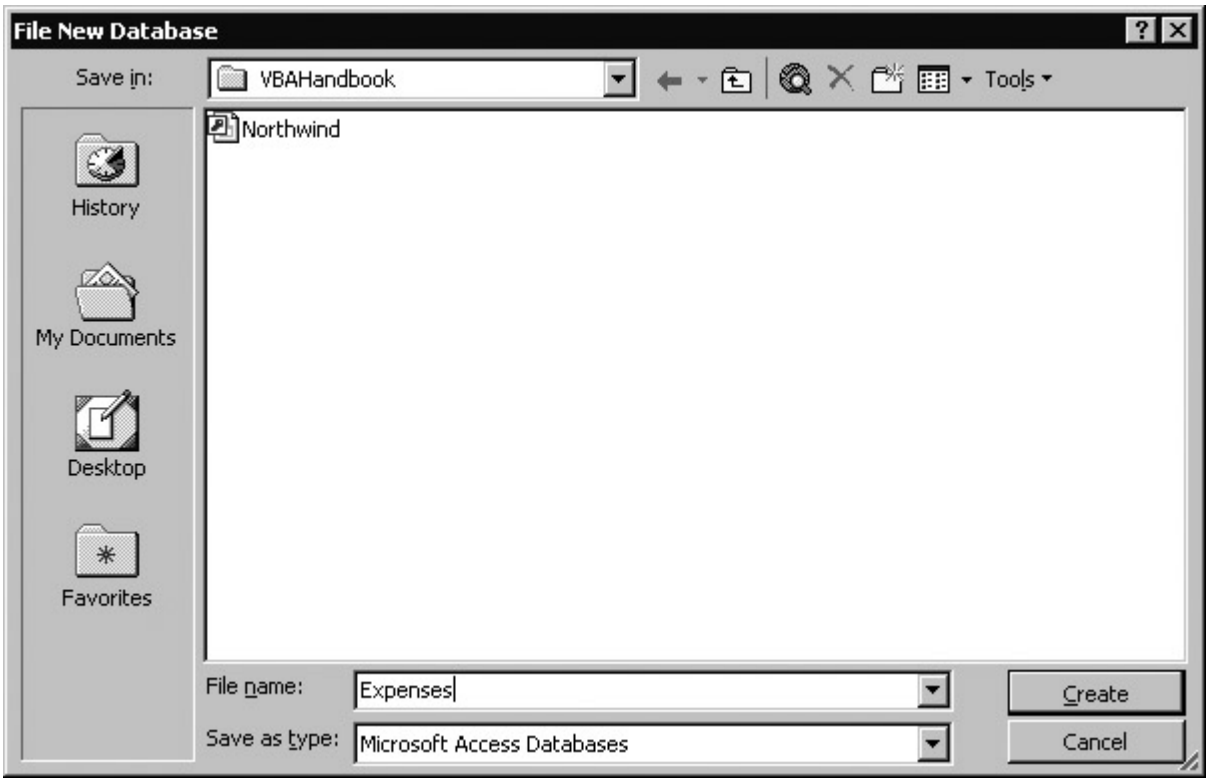

Figure 1.4: Name and save your database.

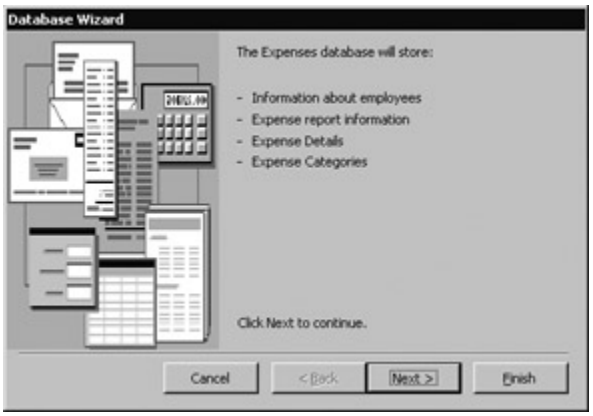

Figure 1.5: The Database Wizard explains the kinds of information the database will manage.

3. The next screen gives you the opportunity to make minor changes in the database (see Figure 1.6). The list box on the left displays the tables to be created. When you click a table, the list box on the right changes to display the fields for the selected table. You can't add new tables or delete tables from the

list, but you can add the fields shown in italics, or remove those that are selected. For each table, check the fields you want to include.

Figure 1.6: You can choose whether to include fields in a table using the Database Wizard.

4. Specify styles for the forms (see Figure 1.7a) and reports (see Figure 1.7b) in the next two screens.

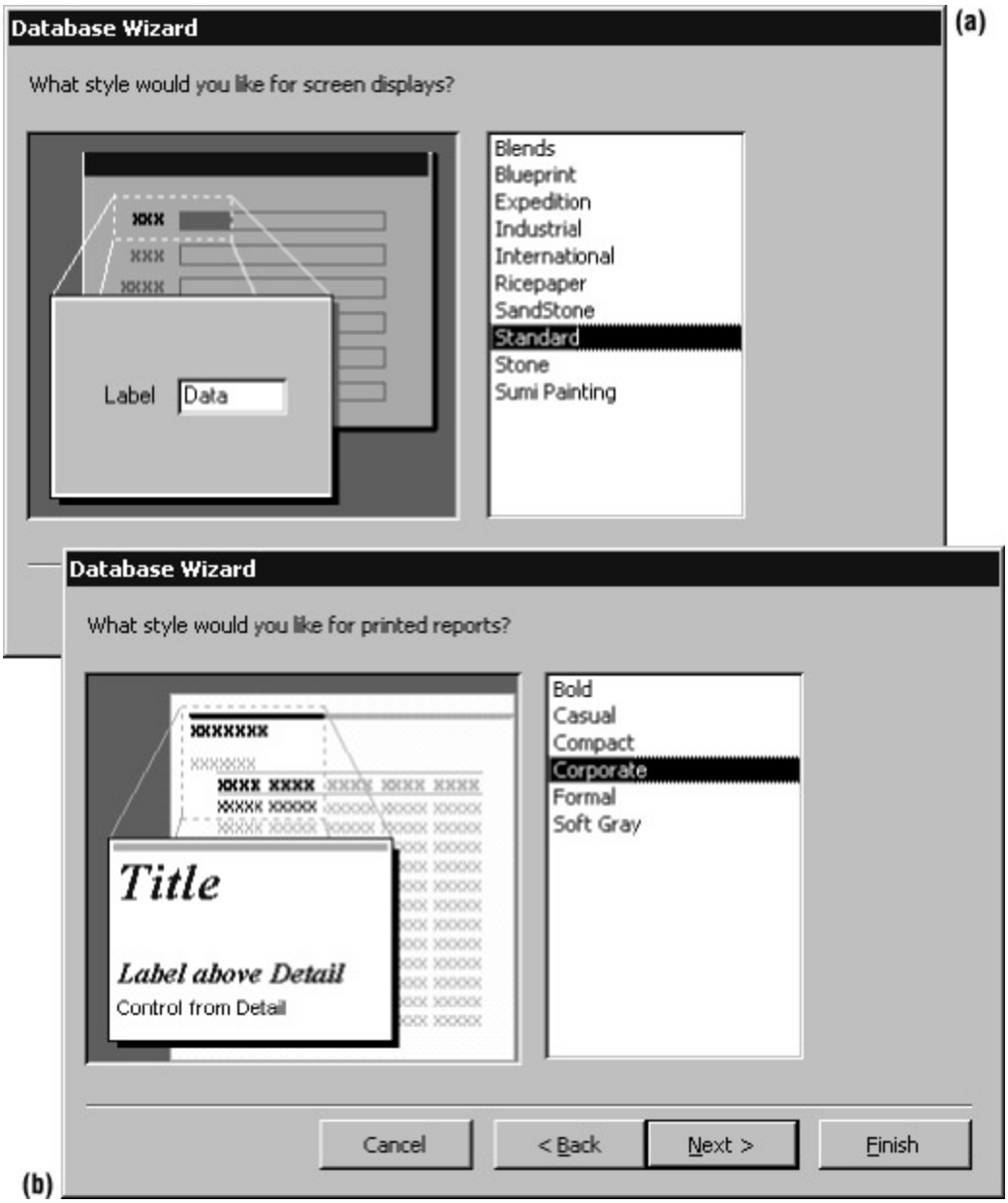

Figure 1.7: You can specify styles for forms (a) and reports (b).

5. You can use the next screen to enter a title for the database and include a bitmap picture (see Figure 1.8a). If you add a picture, it will appear on reports that the wizard creates. In the final screen (see Figure 1.8b), you can select to start the database immediately after it is created and to display help. Clicking the Finish button puts the wizard to work. While the wizard toils, a dialog displays one progress meter showing the overall progress and another progress meter showing the progress in creating a specific object.