



Microsoft

John L. Viescas

Microsoft Most Valuable Professional
(MVP) for Access

Building

Microsoft®

Access 应用大全

Applications

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Building Microsoft® Access Applications

John L. Viescas

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Very early in the project, I asked for feedback from my fellow Microsoft Access Most Valuable Professionals (MVPs) on my ideas for the design and user interface chapters. Several also volunteered to allow me to use their names as instructors in the Registration Management sample application. I apologize to any of you who don't like the courses you ended up teaching in the database—the courses were assigned using a random append query! The MVPs who contributed are:

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Many thanks to you all!

John Viescas
Austin, Texas
November, 2004

About the CD

The companion CD that ships with this book contains tools and resources to help you get the most out of *Building Microsoft Access Applications*.

What's on the CD

Your *Building Microsoft Access Applications* CD includes the following:

- **Sample Databases** This section contains the four databases described in the book: the Membership Tracking database, Inventory Management database, Customer Support database, and Registration Management database.
- **eBook** In this section you'll find the electronic version of *Building Microsoft Access Applications*.
- **Readme.txt** This file on the companion CD provides detailed information about the files on the CD. The files on the CD are designed to be accessed through Microsoft Internet Explorer (version 5.01 or later).



Note Please note that the links to third-party sites are not under the control of Microsoft Corporation, and Microsoft is therefore not responsible for their content, nor should their inclusion on this CD be construed as an endorsement of the product or the site.

Also, software provided on this CD is only in the English language and may be incompatible with non-English-language operating systems and software.

Sample Applications

Parts 2 through 5 of this book show you how to design and build four of the most common types of business applications. You can find the sample databases in the Sample Databases area of the CD.

- **Membership Tracking** (Membership.mdb and MembershipData.mdb). This application demonstrates how to maintain a member list for an organization, log membership renewal and dues payments, and track activities. This application also shows you how to contact members using automation with Microsoft Outlook.
- **Inventory Management** (Inventory.mdb, and InventoryData.mdb). Although some of the sample data in this application is based on the venerable Northwind example that has shipped with every version of Microsoft Access, the Inventory Management sample application goes far beyond the basic features of a typical "order entry" database. It not

only tracks customer orders but also allocates inventory from stock, generates vendor purchase orders for items not in stock, posts received purchase order items to inventory (and to any related customer order), and tracks customer payments. The application includes an example that dynamically creates a sales analysis chart in Microsoft Excel.

- **Customer Support** (Support.mdb and SupportData.mdb). This application is similar in some ways to Membership Tracking, but it tracks support issues and the resolution of issues rather than activities. This application demonstrates a technique for “pushing the envelope” to support 50 or more concurrent users, as discussed in Chapter 3, “Designing a Client/Server Application.” This application also shows you how to perform data analysis by linking to Microsoft Excel.
- **Registration Management** (Registration.mdb and RegistrationData.mdb). This application illustrates how to manage registrations for a school or a seminar. It limits the number of registrants for each session, verifies that a registrant has signed up to attend prerequisite sessions or courses, and manages wait lists. You can use this application as a template for any application that must manage limited resources that are available only for specific time periods (such as hotel rooms or airline flights and seats). This application includes sending registration notices using Microsoft Outlook.



Caution The sample applications were compiled and saved using Microsoft Access 2002 (XP). If you open any of the samples using Access 2000 or Access 2003, the startup code warns you that the Visual Basic project is no longer compiled. Before working in the sample, you should open any module in the Visual Basic Editor, choose Compile from the Debug menu, and save the result to obtain the best results.

The examples in this book assume you have installed Microsoft Office 2000, Microsoft Office XP (2002), or Microsoft Office 2003, not just Microsoft Access. Several examples also assume that you have installed all optional features of Access through the Microsoft Office Setup program. If you have not installed these additional features, you might not be able to run the samples from the companion CD. The dialog boxes illustrated in this book were captured with the Office Assistant turned off. If you have the Office Assistant turned on, some of your dialog boxes will appear differently.

All the sample databases are in Access 2000 file format, so you can open and run them using Access 2000, Access 2002 (XP), or Access 2003. You will not be able to open the samples using Access 97 or earlier. Although the code was developed and compiled using Access 2002, all the screen illustrations were created using Access 2003 with the **Use Windows Themed Controls on Forms** option enabled. If you run the sample application using Access 2000 or 2002, the forms will look slightly different on your system.



Note Please note that the person names, company names, e-mail addresses, and Web site addresses in these databases are fictitious. (The one exception is the instructor names in the Registration Management sample database—these are names of actual Microsoft Access MVPs, and their names are used with permission.) Although I preloaded all databases with sample data, some of the sample databases also include a special form (zfrmLoadData) that has code to load random data into the tables based on parameters that you supply.

Using the CD

To use the companion CD, insert it into your CD-ROM or DVD drive. Accept the license agreement that is presented to access the Start menu. If AutoRun is not enabled on your system, run StartCD.exe located in the root of the CD or refer to the Readme.txt file. The menu provides you with links to the resources available on the CD and also to the Microsoft Learning Support Web site.



Caution The electronic version of the book included on this CD is provided in Portable Document Format (PDF). To view this file, you will need Adobe Acrobat or Adobe Reader. For more information about these products or to download the free Adobe Reader, visit the Adobe Web site at <http://www.adobe.com>.

System Requirements

The following minimum system requirements are necessary to run the CD:

- Microsoft Windows XP or later or Windows 2000 Professional with Service Pack 3 or later
- Pentium 233-MHz personal computer; Pentium III or faster processor recommended
- At least 128 megabytes (MB) of RAM for Microsoft Access 2003; other Access versions might vary
- At least 75 MB of hard disk space for copying the sample applications from the CD to your computer's hard drive
- CD-ROM or DVD drive
- Super VGA (800 × 600) or higher-resolution monitor; XGA (1024 × 768) recommended for the sample applications
- Microsoft Internet Explorer 5.01 or later
- Microsoft Mouse or compatible pointing device



Note An Internet connection is necessary to access the Web sites cited in this book. The Internet functionality of Access also requires that you have dial-up or broadband Internet access; dial-up and other charges might apply to your Internet access.

Support Information

Every effort has been made to ensure the accuracy of the book and the contents of the companion CD. For feedback on the book content or the companion CD, fill out the Online Survey referenced on the CD.

Microsoft Press provides corrections for books through the World Wide Web at <http://www.microsoft.com/learning/support/>. To connect directly to the Microsoft Press Knowledge Base and enter a query regarding a question or issue that you might have, go to <http://www.microsoft.com/learning/support/search.asp>.

For support information regarding Microsoft Access, you can connect to Microsoft Technical Support on the Web at <http://support.microsoft.com/>.

Introduction

With all five versions of my *Running Microsoft Access* books and my latest *Microsoft Office Access 2003 Inside Out* title, I included one or more complete sample applications to help illustrate the concepts that I describe in the books. However, there has never been enough space in the 1,000 or more pages of these book to fully explore how the applications work while also documenting the many features of Access itself. Adventurous readers can explore the samples in detail to learn more, but the reader must try to discern how it all fits together by studying the table designs and relationships and by reading the comments that I always include in the code.

I can't tell you how many times I've seen developers struggling to implement some of the more complex features in various common applications. These struggles often end in frustration after long threads in Internet newsgroups or in one of the many available Web-based forums (such as Yahoo Groups). So, I decided to create complete samples of four of the most common applications and explore the toughest issues in depth in a separate book. You are holding the result in your hand.

You might be asking, "How did you decide which applications to build?" First, I drew on my more than 10 years' experience as a Microsoft Most Valuable Professional (MVP) answering questions in the public newsgroups and forums. (Disclaimer: I am not now and never have been an employee of Microsoft.) I also consulted my fellow MVPs and members of the Access development and support staffs. Finally, I decided to provide solutions for the most common business problems, so you won't find a sample database in this book to help you keep track of your personal book or record collection.

For those of you who think Microsoft Access is just a development tool for casual users, I think the complexity of the four sample applications will convince you otherwise. I built all four applications in less than eight months. Although my long experience with Access certainly contributed to my productivity, I can't imagine building a set of four complex applications in less time with any other development tool.

Who Can Use This Book

This book is not for the rank beginner. I assume the reader of this book has been working with Access for a while and has worked through at least one of the "big" books on Microsoft Access—such as my *Running Microsoft Access 2000* or *Microsoft Office Access 2003 Inside Out*. So, this book will not teach you the fundamentals of query, form, or report design or coding in Visual Basic. Although this book covers common table design problems and recommended design techniques in Chapter 1, "Designing Your Tables," you should have also studied accepted relational database design techniques in depth elsewhere. (You can find a list of suggested reading in Appendix A, "Recommended Reading.")

You will find this book useful if you are tasked with creating an Access application that is similar to any of the four discussed in this book. You might even find that you can use one of the sample applications as a starting template for your application. Even if the application you need to build isn't similar to one of the four in this book, you most likely will find in one of the samples the solution for some complex tasks you need to perform. For example, if you need to allocate a resource, you can see ways to solve variations of this problem in both the Registration Management and Inventory Management applications. If you need examples of automating tasks with Microsoft Excel or Microsoft Outlook, you can find examples in all four sample applications.

Although I created the samples using Access 2002 (version 10), all the sample databases are in Access 2000 format. You should be able to open and run the samples and view the design of objects using Access 2000 (version 9) or later.



Note I compiled and saved the sample code using Access 2002. The sample databases avoid using version-dependent elements such as ActiveX controls or the Visual Basic libraries for Microsoft Office or other Microsoft Office products. If you want to run the samples using a different version of Access, you should first open any module in the Visual Basic Editor, verify that the library references are correct by choosing References from the Tools menu, and then compile and save the project.

What's in This Book

Building Microsoft Access Applications is divided into five major parts:

- Part 1 discusses overall table design, user interface design, and client/server issues.
 - Chapter 1 focuses on common table design problems and recommended design techniques for designing tables for an Access application. You should already be familiar with the basic concepts of relational table design before reading this chapter.
 - Chapter 2 describes recommended techniques for building the user interface for your application.
 - Chapter 3 explains the considerations for building an efficient client/server application that can support multiple users. This chapter also describes advanced techniques you can use to support 50 or more simultaneous users.
- Part 2 shows you how to build a membership application.
 - Chapter 4 describes the Membership Tracking application and explains the table design.
 - Chapter 5 shows you how to detect, and warn users about, potentially duplicate names and how to ensure that names are stored in proper case.

- ❑ Chapter 6 discusses how to track membership activities, including meeting and committee meeting attendance.
- ❑ Chapter 7 explains how to track membership expiration, collect dues, and report dues status.
- ❑ Chapter 8 shows you how to print meeting and dues expiration notices and send the notices using Microsoft Outlook.
- Part 3 discusses how to design and build a sales and inventory management application (think Northwind on steroids).
 - ❑ Chapter 9 describes the Inventory Management application, including business rule assumptions and the supporting table design.
 - ❑ Chapter 10 shows you how to allocate an ordered item to an order from available inventory.
 - ❑ Chapter 11 describes how to generate purchase orders to bring product stock up to minimum levels. It also shows you how to generate purchase orders linked to open customer orders when there is insufficient stock to fill an order.
 - ❑ Chapter 12 explains how to log the vendor invoice for a purchase order, mark the items received, and post them to inventory. When a purchase order has a related customer order, you'll learn a technique for simultaneously marking the customer order as allocated.
 - ❑ Chapter 13 shows you how to create customer invoices and mark the allocated products sold in inventory.
 - ❑ Chapter 14 describes how to produce packing lists, invoices, and inventory reports and explores ways to analyze and chart sales using automation features of Microsoft Excel.
- Part 4 explains the intricacies of a customer support application, including techniques for supporting 50 or more simultaneous users.
 - ❑ Chapter 15 describes the Customer Support application and shows you how to build both shared and local tables.
 - ❑ Chapters 16 explores how to organize customer information, including tracking the products owned and warranty expiration.
 - ❑ Chapter 17 describes how to capture support cases, assign them for resolution, and log support events.
 - ❑ Chapter 18 shows you how to create reminders for a support case, track outstanding reminders, and mark reminders complete.
 - ❑ Chapter 19 describes ways to report and analyze support cases, including using automation features of Microsoft Excel.

- Part 5 explores how to manage a technical school or seminar with a registration management application.
 - Chapter 20 describes a technology school registration management business model and shows you how to design the supporting tables.
 - Chapter 21 explores how to leverage the power of Visual Basic to automatically schedule courses and course sections.
 - Chapter 22 shows how to validate and confirm a registration request while managing section attendance limits and verifying prerequisites.
 - Chapter 23 describes how to print or e-mail registration confirmations and the class schedule for instructors.
 - Chapter 24 discusses how to generate and send out student invoices.

This book also includes five appendixes that contain important reference information:

- Appendix A lists additional books that are recommended as part of any Access application developer's complete library.
- Appendix B describes the schemas (table layouts) of the four sample applications.
- Appendix C lists the Visual Basic functions most commonly used in Access applications.
- Appendix D is a complete reference to SQL as implemented in desktop databases. It also contains notes about differences between SQL supported natively by Access and SQL implemented in SQL Server.
- Appendix E describes generic features that you might want to use in any Access application.

Conventions Used in This Book and the Sample Databases

As you work through the book, you'll encounter various conventions to describe the syntax you should use. In the sample databases, you'll find that I have used standard naming conventions for object and variable names. This section describes those conventions.

SQL Syntax Conventions

The following conventions are used in the descriptions of SQL statement syntax in Appendix D, "Understanding SQL." These conventions do not apply to code examples listed within the text; all code examples appear exactly as you'll find them in the sample databases. Except as noted below, you must enter all symbols, such as parentheses and colons, exactly as they appear in the syntax line.

Convention	Meaning
Bold	Bold type indicates keywords and reserved words that you must enter exactly as shown. Microsoft Visual Basic understands keywords entered in uppercase, lowercase, and mixed case type. Access stores SQL keywords in queries in all uppercase, but you can enter the keywords in any case.
<i>Italic</i>	Italicized words represent variables that you supply.
Angle brackets < >	Angle brackets enclose syntactic elements that you must supply. The words inside the angle brackets describe the element but do not show the actual syntax of the element. Do not enter the angle brackets.
Brackets []	Brackets enclose optional items. If more than one item is listed, the items are separated by a pipe character (). Choose one or none of the elements. Do not enter the brackets or the pipe; they're not part of the element. Note that Visual Basic and SQL in many cases require that you enclose names in brackets. When brackets are required as part of the syntax of variables that you must supply in these examples, the brackets are italicized, as in <i>[MyTable].[MyField]</i> .
Braces { }	Braces enclose one or more options. If more than one option is listed, the items are separated by a pipe character (). Choose one item from the list. Do not enter the braces or the pipe.
Ellipsis ...	Ellipses indicate that you can repeat an item one or more times. When a comma is shown with an ellipsis (...), enter a comma between items.
Underscore _	You can use a blank space followed by an underscore to continue a line of Visual Basic code to the next line for readability. You cannot place an underscore in the middle of a string literal. You do not need an underscore for continued lines in SQL, but you cannot break a literal across lines.

Object and Variable Naming Conventions

In any application, it's a good idea to prefix the names of objects and variables so that when the names appear in queries or code, the intended use of the object is clear. For example, when constructing queries, a FROM clause that includes Customers or Products doesn't tell you whether those names refer to a table or a query. Names like tblCustomers or qryProducts are more meaningful. Likewise, a variable named Q isn't very informative, but a variable named intQ tells you the data type of the variable is Integer. Following are the naming prefixes used in the sample applications and their meanings.

Naming Conventions Used for Access Objects

Object Type	Object Prefix	Meaning
Table	tbl	A table object.
	tlkp	A table containing lookup values for the foreign key in another table.
	twv	A table containing a local view of data from the shared data file.
	ztbl, zttbl, or zztbl	A working or system table for the application.
Query	qry	A standard select query, usually a record source for a form.
	qlkp	A query on a lookup table, usually the row source for a combo box or list box.
	qupd	An update query.
	qapp	An append (insert) query.
	qdel	A delete query.
	qmak	A make table query.
	qtot	A totals query.
	qxtb	A crosstab query.
	zqry, zqupd, zqapp, zqdel	Queries used by application code.
	qxmpl or qryXmpl	Sample queries referenced in the book but not used by the application.
Form	frm	A form to edit data.
	fpop	A form that opens in pop-up mode.
	fdlg	A form that opens in Dialog mode.
	fsub	A form used as a subform.
	frmXmpl, fsubXmpl	Sample forms referenced in the book but not used by the application.
	zfrm, zfdlg	Sample or system forms not normally displayed to the user.

Object Type	Object Prefix	Meaning
Report	rpt	A report to display data.
	rsub	A report used as a subreport.
	rptXmpl, rsubXmpl	Sample reports referenced in the book but not used by the application.
Module	mod	A standard module. (Class modules have no prefix.)
	zmod	A module containing sample code not used by the application.



Note Within the sample databases, you'll find that I always use prefixes but don't always strictly follow the suggested linkage between prefix and meaning. For example, you'll probably find some totals queries that have a *qry* prefix instead of a *qtot* prefix.

Naming Conventions for Access Form and Control Names

Prefix	Meaning
btn or opt	An option button.
bx	A rectangle.
chk	A check box.
cmb	A combo box.
cmd	A command button.
fsb	A subform and subform control.
img	An image control.
lbl	A label.
ln	A line.
lst	A list box.
og	An option group.
ole	A bound or unbound object frame.
pag	A page on a tab control.
pbk	A page break.
tab	A tab control.
tgl	A toggle button.
txt	A text box.

Naming Conventions for Variables

Variable Type	Prefix	Meaning
Data	byt	Byte data type.
	bln	Boolean data type.
	int	Integer data type.
	lng	Long data type.
	sng	Single data type.
	dbl	Double data type.
	cur	Currency data type.
	dec	Decimal data type.
	dat	Date data type.
	str	String data type.
	var	Variant data type.
Objects	obj	A generic object.
	db	A Database object.
	rst	A Recordset object.
	tdf	A TableDef object.
	qdf	A QueryDef object.
	frm	A Form object.
	rpt	A Report object.

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