Access 2010



DEPTH



Access[®] 2010

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MICROSOFT® ACCESS® 2010 IN DEPTH

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ABOUT THE AUTHOR

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Roger's books have more than 1.25 million English copies in print and have been translated into more than 20 languages. He is the author of Que's *Special Edition Using Microsoft Access* titles for Access versions 1.0, 1.1, 2.0, 95, 97 (first and second editions), 2000, 2002, and 2003, 2007, and *Platinum Edition Using Access 97*. He also wrote Que's *Special Edition Using Windows NT Server 4, Special Edition Using Windows 2000 Server, Unveiling Windows 95, Access Hot Tips,* and *Discover Windows 3.1 Multimedia.* For Pearson Education's Sams imprint, he has written two editions of *Access Developer's Guide* and three editions of *Database Developers Guide with Visual Basic.* Additionally, he was the series editor for the *Roger Jennings' Database Workshop* titles.

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Dedication

This book is dedicated to my wife, Alexandra.

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Steven Gray and Rick Lievano, authors of *Roger Jennings' Database Workshop: Microsoft Transaction Server 2.0*, created the original version of the CD-ROM's Oakmont.accdb Access and Oakmont.mdf SOL Server database.

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Introduction

Microsoft Office Access 2010 (version 14, called Access 2010 in this book) is a powerful, robust, and mature 32-bit and, finally, 64-bit relational database management system (RDBMS) for creating desktop and client/server database applications that run under Windows 7/Vista/XP/2000+. As a component of the Professional and higher editions of the 2010 Microsoft Office suite, Access 2010 has an updated user interface that's consistent with the Fluent user interface (UI) of other Office 2010 members.

Access has vanquished all desktop RDBMS rivals except FileMaker Pro and Microsoft's Visual FoxPro. However, in March 2007, Microsoft announced that Visual FoxPro (VFP) v9.0 would be the last version. In April 2007, Microsoft representative Yair Alan Griver announced that VFP v9.0 would be supported through 2015. Thus FileMaker Pro is the only likely long-term competition for Access.

The primary reasons for Access's success are its inclusion in the Microsoft Office productivity suite and its prowess as a rapid application development (RAD) environment for creating industrial-strength database applications. Another contributor to Access's market share is the capability to duplicate on the PC desktop the features of client/server relational database systems, also called *SQL databases*. Client/server RDBMSs have led the way in transferring database applications from costly mainframes and UNIX servers to modestly priced networked PCs and mobile devices. Despite Access's power—and the claims of its erstwhile competitors—this desktop RDBMS is easy for nonprogrammers to use.

🔍 note

Microsoft's Visual Studio Team introduced a beta version of Visual Studio LightSwitch (VSLS), a commercial product that shares similar rapid application development (RAD) features with Access, in August 2010. On its release, VSLS Silverlight applications will be able to connect to SQL Server, SQL Azure, Access, SharePoint, and several other popular data sources, and will be able to create new SQL Server databases by modeling them in the UI. VSLS offers form templates similar to those of Access 2010, built-in data validation, extensibility with VB.NET or C# code, and add-ins. VSLS applications can be deployed to desktops or the Web without changing code. For more information about VSLS and a trial edition, see http://bit.ly/bgTU8a, http://www.microsoft.com/visualstudio/en-us/lightswitch.

Microsoft's top priority for Access 2010 is to broaden the base of new users by focusing on typical tracking applications generated by a bevy of out-of-the box templates and more templates from Office Online that take maximum advantage of Access 2010's new navigation features and tabbed document presentation. Many potential Access customers view Access as difficult to master. The new Access templates enable information workers to create and begin using simple database applications in a few minutes.

The Access team devoted substantial resources to integrating Access 2010 with Microsoft SharePoint Foundation (SPF) 2010, formerly Windows SharePoint Services (WSS) 3.0, and Windows SharePoint Services (SPS) 2010, formerly Microsoft Office SharePoint Server (MOSS) 2007. WPF is a no-charge add-on to 64-bit Windows Server 2003 or 2008 [R2] that lets you share Access 2010 applications from document libraries and use Access to create or edit SharePoint lists. WPF ease of use lets workgroup members manage their own SharePoint website. SPS 2010 builds on WPF 2010 to create complete document management systems. SPS and SPF (collectively called SharePoint in this book) are Microsoft's primary workgroup and enterprise-level collaboration tools for knowledge workers. Access 2010 supports browser-based web databases published to Access Services running in SPS; Access web databases replace Data Access Pages (DAP), which Access 2007 discontinued.

Near the top of the feature list is support for Microsoft SQL Server 2005, 2008, and 2008 R2, and their freely distributable Express Editions (SQLX). SQLX Graphic table and query designers make creating and modifying SQL Server tables, views, functions, and stored procedures almost as easy as working with Access tables and queries. Extended properties add lookup fields, subdatasheets, input masks, and other Access accoutrements to SQL Server databases.

Microsoft's rallying cry for Windows 7/Vista/XP/2003+ Server and Office 2010 is total cost of ownership (TCO). Ease of use is one of the primary requisites for reducing TCO; Access 2010 includes many wizards and other aids designed for first-time database users. If you're still using Access 97 or 2000, Access 2010 and SQLX alone justify the cost of upgrading to Office 2010. If your team has a SharePoint site, make upgrading from Access 2000 or earlier to 2010 your first priority.

Who Should Read This Book

Microsoft Access 2010 In Depth takes an approach that's different from most books about database management applications. This book doesn't begin with the creation of a database for Widgets, Inc., nor does it require you to type a list of fictional customers for the company's new WidgetPlus

product line to learn the basics of Access. Instead, this book makes the following basic assumptions about your interest in Microsoft's relational database management system:

- You aren't starting from "ground zero." You now have or will have access via your computer, network, the Internet (or all three) to much of the data that you want to process with a Windows database manager. You've acquired Access and want to learn to use it more quickly and effectively. Or, you might be considering using Access as the database manager for yourself, your department or division, or your entire organization.
- Your existing data is in the form of databases, spreadsheets, mailing lists, web pages, or even plain-text files that you want to manipulate with a relational database management system. Access 2010 can process the most common varieties of these file types, as well as HTML tables, element-centric XML files, Outlook contact lists, SPF lists, and other tabular data sources.
- If you're planning to use Access 2010 as a front end to a client/server RDBMS, you'll use SQL Server 2005 Express Edition (SSX) or SQL Server 2005 or later as the back-end database. Access 2010 lets you replicate data between a local or workgroup copy of SSX and SQL Server 2005+ on a network server.
- If your data is on a mainframe computer, you're connected to that computer by a local area network and a database gateway, or through terminal-emulation software and an adapter card. Alternatively, you download text files from the mainframe to create Access or SQL Server tables.

If some or all of your data is in the form of ASCII/ANSI text files, or files from a spreadsheet application, you need to know how to create an Access database from the beginning and import the data into Access's new .accdb file structure. If your data is in the form of dBASE, FoxPro, or Paradox files, you can import it directly to Access tables. Access 2010 also lets you link Excel workbook and conventional text files, as well as Outlook and SharePoint lists to Access databases. The capability to link files in their native format lets you synchronize the contents of your database tables with the original source documents. All these subjects receive thorough coverage in this book.

Learning relational database design and management with Access 2010 as the training tool is the quickest and easiest way to upgrade your professional skills. If you're a web designer, the expertise in client/server database techniques that you gain by working with Access data projects, SQL Server, and Access Web databases greatly enhances your future employment prospects. Despite the prolonged downturn in the dot-com sector, there's no slack in the demand for unlocking islands of data stored in client/server databases and making the data available as usable business information on corporate intranets.

Access 2010 is a great first step in gaining XML, XML schema (XSD), and XSL transform (XSLT) skills. Most XML-related books and other training materials use trivial examples to illustrate XML and XSL(T) methodology. Access 2010 lets you dynamically generate real-world XML data and provides a standard transform to render data in HTML format. Working with the resulting .xsl files and their embedded VBScript is the fastest way to learn practical XSLT techniques for delivering XML data as fully formatted web pages.

How This Book Is Organized

In the spirit of conservation, *Microsoft Access 2010 In Depth* is a hybrid book. The print version consists of six printed parts totaling approximately 1,000 pages and four electronic book (ebook) sections of about 600 pages arranged in increasing levels of detail and complexity. Electronic versions of the book for Kindle (Mobi format); Sony Reader, iPad, iPhone, Android and other mobile devices (ePub format), and PDF readers contain this introduction, all chapters, and the appendixes.

Each division after Part I, "Getting Acquainted with Access 2010," follows the normal course of database application design, which involves the following initial steps:

- Create tables to hold the data and establish relationships between the tables—After you've defined the purpose of your database application and have found and organized the data it will process, you design a table for each *entity* (also called an *object* or *subject*). For example, contacts, tasks, orders, line items, and invoices are entities. In many cases, table data will be available in files that have another format. Part II, "Learning the Fundamentals of Access Databases," covers table design and importing or linking data to tables.
- Design queries to filter, format, sort, and display data contained in one or more tables—Relational databases use queries for turning raw data into useful information. Part III, "Transforming Data with Queries and PivotTables," shows you how to master Access's graphic query designer and generate PivotCharts and PivotTables.
- Prepare forms for data entry and visualization—Although you can enter data into tables directly, providing one or more forms simplifies data entry and minimizes the potential for entering bad data. Forms with graphs, PivotTables, and PivotCharts make data understandable to your supervisors and managers. Three of the chapters in Part IV, "Designing Forms and Reports," cover this topic.
- Lay out reports to summarize data—Access is famous for its report designer, which lets you quickly design fully formatted reports with group subtotals and grand totals, or generate mailing labels. Part IV's remaining two chapters show you how to take best advantage of Access reports.

Parts II, III, IV, V, and VI draw on the knowledge and experience that you've gained in the previous parts, so use of the book in a linear, front-to-back manner through Part IV, "Designing Forms and Reports," is recommended during the initial learning process. After you absorb the basics of working with Access databases, you progress through using Access macros to automate database operations, changing from single-user to multiuser database applications and linking access front ends to SSX, SQL Server 2005 or later tables, or SharePoint Foundation lists, as well as creating new Access web databases that depend on SharePoint Server's Access services.

The electronic-only chapters cover Access's HTML and XML features and show you how to upsize Access databases to Access Data Projects with SOLX, SOL Server, or SOL Azure back ends. Finally, you learn how to automate your applications with Visual Basic for Applications (VBA) code.

As you progress through the chapters in this book, you create a model of an Access application called Human Resources Actions. In Chapter 5, "Working with Access Databases and Tables," you create the HR Actions table. In the following chapters, you add new features to the HR Actions application. Be sure to perform the sample exercises for the HR Actions application each time

you encounter them because succeeding examples build on your previous work. The ten parts of *Microsoft Access 2010 In Depth* and the topics that they cover are described in the following sections for the printed and electronic-only sections.

Printed Parts and Chapters

The printed book includes this Introduction and Parts I through VI:

Part I: Getting Acquainted with Access 2010

The chapters in Part I introduce you to Access and many of the unique features that make Access 2010 the premier desktop database management system.

- Chapter 1, "Access 2010 for Access 2007 Users: What's New," provides a summary of the most important new features of Access 2010 and a detailed description of each addition and improvement. Chapter 1 includes detailed instructions for installing SQL Server 2008 R2 Express and SQL Server Management Studio 2008 R2.
- In Chapter 2, "Building Simple Tracking Applications," you create a database from an out-of-the-box database template included with Access 2010. You gain a basic understanding of the standard data-related objects of Access, including tables, queries, forms, reports, and macros. Chapter 2 also introduces you to automating Access operations with Access macros.

🔍 note

Appendix A, "What Was New in Access 2010 for Users of Access 2003 and Earlier" contains content that's of interest primarily to readers who now use Access 2000, 2002, or 2003 because there were major changes between these versions and Access 2007. Readers new to Access, however, benefit from the explanations of why many of these new features are significant in everyday Access 2010 use.

Chapter 3, "Navigating the Fluent User Interface," shows you how to take best advantage of Access 2010's "Fluent" ribbon user interface by explaining its command button, menu, and context menu choices and then showing how they relate to the structure of the Access object model. Chapter 3 also shows you how to use Access 2010's online help system.

Part II: Learning the Fundamentals of Access Databases

Part II is devoted to understanding the design principles of relational databases, creating new Access tables, adding and editing table data, and integrating Access tables with other sources of data. Most of the techniques that you learn in Part II also apply to SQL Server tables.

- Chapter 4, "Exploring Relational Database Theory and Practice," describes the process that you use to create relational database tables from real-world data—a technique called *normalizing the database structure*. The chapter also introduces you to the concepts of key fields, primary keys, data integrity, and views of tables that contain related data.
- Chapter 5, "Working with Access Databases and Tables," delves into the details of Access desktop database tables, shows you how to create tables, and explains how to choose the optimum

data types from the many new types that Access offers. Chapter 5 explains how to use subdatasheets and lookup tables to display and edit records in related tables. The chapter also explains how to use the Database Documentor tool included with Access 2010 to create a data dictionary that fully identifies each object in your database.

- Chapter 6, "Entering, Editing, and Validating Access Table Data," describes how to add new records to tables, enter data in the new records, and edit data in existing records. Using keyboard shortcuts instead of the mouse for editing speeds manual data entry. Adding input masks and data validation rules minimizes the chance for typographic errors when entering new data.
- Chapter 7, "Sorting, Finding, and Filtering Data," shows you how to arrange the data in tables to suit your needs and to limit the data displayed to only that information you want. You learn how to use Find and Replace to search for and alter multiple instances of data in the fields of tables. Chapter 7 further describes how to make best use of the Filter by Form and Filter by Selection features of Access 2010.
- Chapter 8, "Linking, Importing, and Exporting Data," explains how to import and export files of other database managers, spreadsheet applications, and text files downloaded from mainframe or UNIX database servers or the Internet. You also learn how use the Access Mail Merge Wizard to create form letters from data stored in Access tables.

Part III: Transforming Data with Queries and PivotTables

The chapters in Part III explain how to create Access queries to select the way that you view data contained in tables and how to take advantage of Access's relational database structure to link multiple tables with joins. Part III also covers Access 2010's PivotTable and PivotChart views of query resultsets.

- Chapter 9, "Designing Queries for Access Databases," starts with simple queries you create with Access's graphical Query Design window. You learn how to choose the fields of the tables included in your query and return query resultsets from these tables. Examples of Access SOL generated by the queries you design let you learn SOL "by osmosis." Chapter 9 shows you how to use the Simple Query Wizard to simplify the design process.
- Chapter 10, "Understanding Access Query Operators and Expressions," introduces you to the operators and expressions that you need to create queries that provide a meaningful

🔍 note

Chapter 28, "Upsizing Access Applications to Access Data Projects and SQL Azure," describes how to migrate Access database tables to SQL Azure tables deployed in Microsoft data centers. The chapter also explains how to link access front ends to SQL Azure databases.

result. Most Access operators and expressions are the same as those that you use in VBA programs. You use the Immediate window of the Office 2010 VBA editor to evaluate the expressions you write.

In Chapter 11, "Creating Multitable and Crosstab Queries," you create relations between tables, called *joins*, and learn how to add criteria to queries so that the query resultset includes only records that you want. Chapter 11 also takes you through the process of designing powerful

crosstab queries to summarize data and to present information in a format similar to that of worksheets.

- Chapter 12, "Working with PivotTable and PivotChart Views," shows you how to manipulate data from multitable queries in the OWC's PivotTable control and then display the results in PivotChart controls. The query design and PivotTable/PivotChart techniques that you learn here also apply to PivotTables and PivotCharts that you embed in Access forms.
- Chapter 13, "Creating and Updating Access Tables with Action Oueries," shows you how to develop action queries that update the tables underlying append, delete, update, and make-table queries. Chapter 13 also covers Access 2010's advanced referential integrity features, including cascading updates and cascading deletions.

Part IV: Designing Forms and Reports

The chapters in Part IV introduce you to the primary application objects of Access. (Tables and queries are considered database objects.) Forms make your Access applications come alive with the control objects that you add from the Form Tools, Design ribbon and the Report Tools, Design ribbon. Access's full-featured report generator lets you print fully formatted reports, export or mail reports as PDF or XPS (XML Paper Specification) files, and save reports to files that you can process in Excel 2010 or Word 2010 or earlier.

- Chapter 14, "Creating and Using Basic Access Forms," shows you how to use Access's Form Wizards to create simple forms and subforms that you can modify to suit your particular needs. Chapter 14 introduces you to the Subform Builder Wizard that uses drag-and-drop techniques to automatically create subforms for you.
- Chapter 15, "Designing Custom Multitable Forms," shows you how to design custom forms for viewing and entering your own data with Access's advanced form design tools.
- Chapter 16, "Working with Simple Reports and Mailing Labels," describes how to design and print basic reports with Access's Report Wizard, and how to print preformatted mailing labels by using the Mailing Label Wizard.
- Chapter 17, "Preparing Advanced Reports," describes how to use more sophisticated sorting and grouping techniques, as well as subreports, to obtain a result that exactly meets your detail and summary data-reporting requirements. Chapter 17 also covers the technology that lets you distribute Access reports as Outlook email attachments.
- In Chapter 18, "Adding Graphs, PivotCharts, and PivotTables," you first learn to use the OLEbased Chart Wizard to create data-bound graphs and charts based on Access crosstab queries. PivotCharts are destined to replace conventional Access Charts, so Chapter 18 builds on Chapter 12 by showing you how to add bound PivotTables and PivotCharts whose data is supplied by the form's data source.

Part V: Programming Databases with Macros

- Chapter 19, "Automating Access Applications with Macros," is an introduction to Access macros, which Microsoft resurrected from their previously deprecated status in Access 97 and later. You learn how to write simple standalone or embedded macros to run a query and open a form or report when you click a button on a form.
- Chapter 20, "Emulating Table Triggers with Access Data Macros," explains that data macros are a new feature of Access 2010 that lets you extend the range of containers for embedded macros from forms and reports only to include Access tables. Data macros respond to events generated by Data Manipulation Language (DML) instructions, such as Access SQL INSERT, DELETE, and UPDATE commands. In this respect, data macros are similar to SQL Server triggers, which are a special type of stored procedure.

Part VI: Collaborating with Access Data

- Chapter 21, "Linking Access Front Ends to Access and Client/Server Tables," explains how to use the Upsizing Wizard to migrate from single-file or split (front-end/back-end) Access applications to SQL Server back-end databases. Retaining the front-end queries and application objects in an Access (.accdb) file, and using the SQL Server ODBC driver to connect to the server database, minimizes application changes required to take advantage of client/server technology. This chapter also explains how to secure Access databases with file system Access Control Lists (ACLs), because Access 2010 supports workgroup information (.mdw) files only for Access 2003 and earlier .mdb files.
- Chapter 22, "Collaborating with SharePoint Foundation 2010," introduces you to SPF 2010 and its data-related features. You learn to export Access or SQL Server tables to SPF lists, and how to link the lists to Access tables (and vice versa). You also learn to take linked SharePoint lists offline, modify them while disconnected, reconnect to SharePoint, and synchronize your and others' changes. Finally, the chapter shows you how to publish Access applications to SharePoint document libraries and share the published .accdb files with multiple collaborators.
- Chapter 23, "Sharing Web Databases with SharePointServer 2010" explains how to take advantage of SPS 2010's Access Services and the replacement for earlier versions of Access Data Pages (ADP). Like Access, SharePoint emphasizes self-service design of sharable objects by teams or groups within small businesses to large enterprises. Publishing Access business applications as web databases to a SharePoint website enables IT management to secure and audit them, as well ensure availability by backing them up on a regular schedule.

Online-Only Parts and Chapters

The online-only section contains Parts VII through X.

Part VII: Working with HTML and XML Documents

The chapters in Part VII explain how to take advantage of Access's HTML and XML export/import features:.

- Chapter 24, "Importing and Exporting Web Pages," shows you how to generate Access tables from HTML tables and lists in web pages, optimize HTML files to ensure proper importation, and export static or dynamic HTML pages. The chapter also explains how to gather data by email with Outlook 2010 HTML forms and automatically add the data acquired to the appropriate table.
- Chapter 25, "Integrating with XML and InfoPath 2010," explains the role of XML in database applications and how Access 2010's ReportML XML schema describes Access objects as an XML data document. The chapter shows you how to take advantage of the Report2HTML4.xsl XML transform to generate HTML pages from tables and queries with the Save As XML option. You learn how to modify Access's standard XSLT files to format the resulting tables and add images to the tables. Exporting conventional Access reports as fully formatted static and live web reports also receives detailed coverage. The chapter also explains the role of InfoPath 2010 as an alternative to Outlook 2010 HTML forms for gathering data.

Part VIII: Creating Access Front Ends to SQL Server Databases

From Access 2000 on, SQL Server [Express] has been the preferred back-end data source for secure, robust, and reliable Access multiuser applications. You can link SQL Server tables to a conventional Access .accdb front-end file, but a direct connection to an Access data project (.adp) front end is the better approach. This is especially true because Access 2010 no longer supports user-level (also called *workgroup*) security. If you're new to client/server RDBMSs, Access 2010 is the ideal learning tool for upgrading your database design and management skills to the requirements of today's job market.

- Chapter 26, "Exploring Access Data Projects and SQL Server 2008," introduces you to Access data projects and SSX. The chapter shows you how to use Access 2010's built-in project designer to create and modify SQL Server tables, views, functions, and stored procedures. Backing up, restoring, copying, and moving SQL Server databases is covered in detail. You also learn how to link other databases, including Access .accdb files, with OLE DB data providers and how to secure ADP front ends as .ade files.
- Chapter 27, "Moving from Access Queries to Transact-SQL," provides a formal introduction to ANSI-92 SQL and explains how the Access and Transact-SQL dialects differ. Special emphasis is given to queries that you can't create in the graphical project designer—such as UNION queries and subqueries—and enabling transactions in stored procedures that update two or more tables.
- Chapter 28, "Upsizing Access Applications to Access Data Projects and SOL Azure," explains how to use the Upsizing Wizard to convert existing Access applications directly to Access data project front ends and SOL Server tables, views, functions, and stored procedures. The wizard can't upsize Access crosstab queries, so the chapter explains how to write T-SOL PIVOT queries to emulate Access crosstab queries. When this book was written, Access 2010 was capable of
linking—but not upsizing—to SQL Azure "databases in the cloud;" ultimately, it's likely that the Access Upsizing Wizard will also accommodate SQL Azure back ends.

Part IX: Programming and Converting Access Applications

The chapters in Part IX assume that you have no programming experience in any language. These chapters explain the principles of writing Access macros and VBA programming code. They also show you how to apply these principles to automate Access applications and use VBA to work directly with ADO Recordset objects. Part VII also supplies tips for converting Access 97 and 200x applications to Access 2010.

- Chapter 29, "Learning Visual Basic for Applications," introduces you to the VBA language with emphasis on using VBA to automate your Access front ends. The chapter describes how to write VBA code to create user-defined functions stored in modules and to write simple procedures that you activate directly from events.
- Chapter 30, "Handling Events with Macros and Procedures," describes how to use embedded macros and VBA event-handling subprocedures in class modules. This chapter explains the events triggered by Access form, report, and control objects, and tells you how to use macro actions or methods of the DoCmd object to respond to events, such as loading or activating a form.
- Chapter 31, "Programming Combo and List Boxes," shows you how to take maximum advantage of Access 2010's unique databound combo and list boxes in decision-support applications. This chapter explains the VBA coding techniques for loading combo box lists and populating text and list boxes based on your combo box selections.
- Chapter 32, "Understanding Data Access Objects, OLE DB, and ADO," explains Microsoft's approach to Access and SQL Server data connectivity in Office applications, and describes how to program Data Access Objects (DAO) and ActiveX Data Objects (DAO), as well as tells how to decide on DAO or ADO for your new Access 2010 projects.
- Chapter 33, "Upgrading 2003 and Earlier Applications to Access 2010," tells you what changes you need to make when you convert your current 32-bit Access database applications and data access pages to 32-bit or 64-bit Access 2010.

Appendixes

The book's two appendixes are

- Appendix A, "What Was New in Access 2007 for Users of Access 2003 and Earlier," is intended to ease the transition of Access 2003 and earlier users to the Fluent user interface and the other dramatic changes to navigation with the Access UI. It is a verbatim copy of *Special Edition Using Microsoft Office Access 2007*'s Chapter 1, "Access 2007 for Access 200x Users: What's New."
- Appendix B, "Glossary," presents a descriptive list of the terms, abbreviations, and acronyms used in this book that you might not be familiar with and that can't be found in commonly used dictionaries.

The Downloadable Sample Files

The sample database files that you can download after registering at http://www.quepublishing.com/title/0789743078 contain sample databases for each chapter that deals with hands-on development. Extracting the individual files from the archive creates ...\ Access2010\Chaptr## folders (## is the chapter number) containing the *.accdb and other related files.

The sample database files contain tables, queries, forms, reports, HTML pages, VBA, and special files to complement design examples, and show you the expected result. An icon identifies sections that point to chapter files included in the downloadable samples.

A very large (20MB) database named Oakmont.accdb is included for optional use with some of the examples in this book. Oakmont University is a fictitious institution in Texas with 30,000 students and 2,300 employees. Databases with a large number of records in their tables are useful when designing applications to optimize performance, so the downloadable files also include a version of the Northwind.accdb database, NwindXL19.accdb, that has 21,096 records in the Orders table and about 193,280 Order Details records.

Installing the downloadable sample files to your \Access2010 folder requires about 200MB of free disk space.

How This Book Is Designed

The following special features are included in this book to assist readers.

If you've never used a database management application, you're provided with quick-start examples to gain confidence and experience while using Access with the Northwind Traders sample database. Like Access, this book uses the *tabula rasa* approach: Each major topic begins with the assumption that you have no prior experience with the subject. Therefore, when a command button on a ribbon, such as Design view, is used, its icon is displayed in the margin.

Access SQL

The book provides numerous examples of Access SQL statements for queries and Transact-SQL statements for views, functions, and stored procedures.

XML

Part VI of this book includes sample XML, XSL, and XML Schema documents (XSD) and examples of altering XSL Transforms (XSLT) to modify the presentation of HTML documents.

🛣 caution

Cautions are provided when an action can lead to an unexpected or unpredictable result, including loss of data; the text provides an explanation of how you can avoid such a result.

Tips describe shortcuts and alternative approaches to gaining an objective. These tips are based on the experience the author has gained during more than seven years of testing successive alpha and beta versions of Access and Microsoft Office Developer (MOD). Features that are new or that have been modified in Access 2010 are indicated by the 2010 icon in the margin, unless the change is only cosmetic. Where the changes are extensive and apply to an entire section of a chapter, the icon appears to the left or right of the section head.

Features that were new in Access 2007 are indicated by this marginal icon.

References to resources available on the Internet—such as World Wide Web Consortium (W3C) Recommendations—are identified by the Web icon.

Cross-references to specific sections in other chapters follow the material that they pertain to, as in the following sample reference:

For more information, see "A Section in Another Chapter," p. XXX.

Most chapters include "Troubleshooting" sections. The elements of these sections help you solve specific problems—common and uncommon—that you might run into when creating applications that use specific Access features or techniques.

Typographic Conventions Used in This Book

This book uses various typesetting styles to distinguish between explanatory and instructional text, text that you enter in dialogs (set in **bold**), and text that you enter in code-editing windows (set in monospace type).

Key Combinations, Menu Choices, and Filenames

Key combinations that you use to perform Windows operations are indicated by joining the keys with a plus sign: Alt+F4, for example. In cases when you must press and release a key and then press another key, such as Alt, to activate KeyTips, the keys are separated by a comma without an intervening space: Alt, H. Conventional shortcut key combinations appear as Ctrl+Key.

Sequences of individual menu items are separated by a comma: Edit, Cut.

Most file and folder names are initial-letter-capitalized in the text



Notes offer advice to help you use Access, describe differences between various versions of Access, and explain the few remaining anomalies that you find in Access 2010.

and headings of this book to conform with 32-bit Windows filenaming conventions and the appearance of filenames in Windows Explorer.

SQL Statements and Keywords in Other Languages

SQL statements and code examples are set in a special monospace font. Keywords of SQL statements, such as SELECT, are set in all uppercase. Ellipses (...) indicate intervening programming code that isn't shown in the text or examples.

Square brackets in monospace type ([]) that appear within Access SOL statements don't indicate optional items, as they do in syntax descriptions. In this case, the square brackets are used instead of quotation marks to frame a literal string or to allow use of a table and field names, such as

[Order Details], that include embedded spaces or special punctuation, or field names that are identical to reserved words in VBA.

Typographic Conventions Used for VBA

This book uses a special set of typographic conventions for references to Visual Basic for Applications keywords in the presentation of VBA examples:

Monospace type is used for all examples of VBA code, as in the following statement:

```
Dim NewArray ( ) As Long
```

ReDim NewArray (9, 9, 9)

- Monospace type also is used when referring to names of properties of Access database objects, such as FormName.Width. The captions for text boxes and drop-down lists in which you enter values of properties, such as Source Connect String, are set in this book's regular textual font.
- Bold monospace type is used for all VBA reserved words and type-declaration symbols, as shown in the preceding example. Standard function names in VBA also are set in **bold mono-space** type so that reserved words, standard function names, and reserved symbols stand out from variable and function names and values that you assign to variables.
- Italic monospace type indicates a replaceable item, as in

Dim DataItem As String

Bold italic monospace type indicates a replaceable reserved word, such as a data type, as in

Dim **DataItem** As DataType

DataItem is replaced by a keyword corresponding to the desired VBA data type, such as **String** or **Variant**.

An ellipsis (...) substitutes for code not shown in syntax and code examples, as in

If... Then... Else... End If

Braces ({}) enclosing two or more identifiers separated by the pipe symbol (|) indicate that you must choose one of these identifiers, as in

Do {While¦Until}... Loop

In this case, you must use the **While** or **Until** reserved word in your statement, but not the braces or the pipe character.

Three-letter prefixes to variable names indicate the VBA data type of the variable, such as bln for Boolean, str for String, and lng for Long (integer).

Square brackets ([]) enclosing an identifier indicate that the identifier is optional, as in

```
Set tblName = dbName.OpenTable(strTableName[, blnExclusive])
```

Here, the blnExclusive flag, if set to **True**, opens the table specified by str*TableName* for exclusive use. blnExclusive is an optional argument. Don't include the brackets in any code that you type.

Typographic Conventions Used for VBScript

The few Visual Basic Scripting Edition (VBScript) examples in this book use lowercase monospace type for reserved words, a practice that originated in ECMAScript (JavaScript or Microsoft JScript). Variables are in mixed case with a data type prefix, despite the lack of VBScript support for data types other than **Variant**. Object, property, and method names included in the World Wide Web Consortium (W3C) Document Object Model (DOM) standard also are in lowercase. Most non-DOM objects, such as MSODSC.RecordsetDefs(), use mixed case.

System Requirements for Access 2010

Access 2010 is a very resource-intensive application, as are all other Office 2010 members, including InfoPath 2010. You'll find execution of Access applications on Pentium PCs slower than 1GHz running Windows XP SP2 to be impaired, at best. The Windows Vista Capable PC minimum—"A modern processor (at least 800MHz)"—isn't likely to provide generally accepted performance standards.

Microsoft's somewhat optimistic minimum RAM recommendations for Microsoft Office Professional 2010 running under Windows 7 or XP (SP2) is 256MB. However, the Windows Vista Capable PC minimum is 512MB.

The preceding recommendations don't take into account the RAM required to run SOL Server 2005 [Express] or later. Double the realistic RAM recommendations to 1GB to achieve acceptable performance with SSX. All the examples of this book were created and tested under virtual 64-bit Windows 7 or Windows Server 2008 R2 guest operating systems running on a 64-bit 2.83GHz Core2 Quad CPU with 8GB RAM. 3GB of RAM was assigned to each of the two guest OSes.

The Microsoft Access team recommends that you install 64-bit Access 2010 only if you need more than 2GB of RAM to cache very large databases in memory. The 32-bit version incurs no performance hit from running under 64-bit Windows 7's or Vista's WOW64 (Windows-on-Windows64) feature.

Standard installation of Microsoft Office Professional 2010—without SQL Server 2005 Express or later, SQL Server Management Studio, or SQL Server Books Online—requires about 1GB of free disk space. Add another 100MB for SQL Server and 50MB each for InfoPath and Windows SharePoint Services. From a practical standpoint, you need 1.5GB or more of free disk space to use Office 2010 effectively. Add another 200MB for the downloadable sample files.

Other Sources of Information for Access

Relational database design and SOL, discussed in Chapters 4 and 27, are the subject of myriad guides and texts covering one or both of these topics. Articles in database-related periodicals in print form or on the Internet provide up-to-date assistance in using Access 2010. The following sections provide a bibliography of database-related books and periodicals, as well as a brief description of websites and newsgroups of interest to Access users.

Books

The following books complement the content of this book by providing detailed coverage of database design techniques, Structured Query Language, VBA database programming, SQL Server 2000, XML, and HTML:

- Database Design for Mere Mortals, Second Edition, by Michael J. Hernandez (Addison-Wesley, ISBN 0-201-75284-0), is a comprehensive guide to sound relational database design techniques for developing productive desktop and client/server databases. The book is platform agnostic, but the methods that you learn are especially effective for Access and SOL Server database design.
- Understanding the New SQL: A Complete Guide, by Jim Melton and Alan R. Simpson (Morgan Kaufmann Publishers, ISBN 1-55860-245-3), describes the history and implementation of the American National Standards Institute's X3.135.1-1992 standard for Structured Query Language, SQL-92, on which Access SQL is based. Melton was the editor of the ANSI SQL-92 standard, which consists of more than 500 pages of fine print.



SQL: 1999 — Understanding Relational Language Components, by Jim Melton and Alan R. Simpson (Morgan Kaufmann Publishers, ISBN 1-55860-456-1, 2001), is a newer book that covers SQL-99. However, neither Access nor SQLX supports the elements added to SQL-92 by SQL-99.

- SQL Queries for Mere Mortals, by Michael J. Hernandez and John L. Viescas (Addison-Wesley, ISBN 0-201-43336-2), is your best source for learning to write effective SELECT queries in any SQL dialect. The book includes detailed coverage of JOIN, UNION, GROUP BY, HAVING, and subquery syntax.
- Special Edition Using XML, Second Edition, by David Gulbrandsen, et al. (Que, ISBN 0-7897-2748-X), describes the technologies and standards that make up XML. It includes chapters that cover modeling with XML Schema, managing namespaces, using XSL transformations, and applying styles with XSL Formatting Objects and Cascading Style Sheets.
- Special Edition Using HTML and XHTML, by Molly E. Holzschlag (Que, ISBN 0-7897-2713-5), is an indispensable tutorial and reference for learning the basics of HTML and gaining a full understanding of Dynamic HTML (DHTML), Cascading Style Sheets (CSS), and XHTML.

Internet

Microsoft's Office Online and Access Developer Portal websites now are the primary source of new and updated information for Access users and developers. Following are the primary websites and newsgroups for Access 2007 users and developers:

- Microsoft's Access page, http://office.microsoft.com/en-us/access/default.aspx, is the jumping-off point for U.S. Access users. It includes links to all related Access 2007 and earlier pages on the Microsoft website.
- Microsoft's Access Developer Portal page, http://msdn2.microsoft.com/en-us/office/aa905400. aspx, provides links to information of particular interest to the Access developer community.
- The Access Team blog (http://blogs.msdn.com/b/access/), subtitled "The official blog of the Microsoft Access product development group," is a running source of information on the new features in Access 2010.
- Microsoft's online support page for Office 2007 and 2010, http://support.microsoft.com/gp/gp_off_ main#tab0, provides links to Microsoft Knowledge Base pages for all its products. For other support options, go to www.microsoft.com/support/.
- The Access for Developers forum at http://social.msdn.microsoft.com/Forums/en-US/accessdev/ threads is "for developer discussions and questions."

ACCESS 2010 FOR ACCESS 2007 USERS: WHAT'S NEW

Access 1.0, 1.1, and 2.0 were very successful standalone desktop database platforms. The first Access team consisted of highly skilled development, marketing, and management personnel who were devoted entirely to making Access the premier desktop relational database management system (RDBMS) for Windows. Access, which reports say cost \$60 million to develop, sold for US\$99 and, according to Jim Gray of Microsoft Research, was generating revenue of about US\$300 million per year by February 1994 or earlier.

Microsoft created Office 95 Professional by adding Access to Office 95 Standard's Word, Excel, PowerPoint, and Schedule+ applications and adding US\$100 to the retail price. Access gained a few new features with each subsequent release, but generally suffered from not-so-benign neglect by Office management. Access 2003, for example, delivered only minor, incremental improvements over Access 2002.

Access 2007 represented a sea change to the traditional incremental improve-

🔍 note

Access 2007 ceased supporting many less widely used Access features, such as Data Access Pages (DAP) and userlevel security for the new .accdb and .accde file formats. Access 2010 introduces Access Services and web databases to replace DAP for browser-based database front ends.

ments in version upgrades. The Office team grafted what became known as the Fluent user interface (UI) to Access 2007, which caused consternation among access veterans. According to Erik Rucker, then Group Program Manager for Access, the development team for Access 2007 was

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about seven times as large as that for Access 2003. The overwhelming changes to its UI represented only a fraction of the new and mostly improved features of Access 2007.



To learn more about elements of earlier versions that Access 2007 dropped, see "Features Missing from Access 2007," p. 1464.

What's New in Microsoft Office Access 2010: An **Overview**

²⁰¹⁰ Microsoft's primary goals for Access 2010 are to improve usability for new users and increase productivity for experienced users and developers. Following are brief descriptions of the most important new features of Access 2010:

File tab and Backstage View—Access 2010 replaces Access 2007's Office button with a File tab that opens what the Access team calls the Backstage View. The Backstage View contains command buttons that execute operations on entire databases, such as Open, which displays a list of recently used databases, or New, which opens a collection of templates on which to base new databases. (See Figure 1.1.) Chapter 3, "Navigating the Fluent Access User Interface," covers the Fluent UI and Backstage View in detail.



- Calculated table fields—Earlier Access versions required using Access queries to create computed columns. Access 2010 enables defining fields whose values are derived from other fields in the same table. Chapter 5, "Working with Access Databases and Tables," shows you how to define calculated fields.
- A Office Themes for forms and reports—Office Themes enable applying a standardized set of colors and fonts to all custom Office applications; they replace the Autoformat feature of earlier Access versions (see Figure 1.2).

Figure 1.2

Office Themes let you apply preset complementary colors and font families to all Access and Office 2010 applications.



- Conditional formatting with data bars—Data bars convey the relative value of numeric cells with a color gradient, which emulates similar Excel 2010 formatting styles (see Figure 1.3). Chapter 15, "Designing Custom Multitable Forms," describes applying conditional formatting to databound text boxes to let users quickly spot data trends.
- **Navigation control**—A specialized hierarchical Navigation tab control, which Chapter 15 describes, enables point-and-click navigation between forms. Dragging a form from the Navigation pane to an [Add New] drop zone creates a tab named for the form. This new control is intended to replace earlier Access versions' Switchboard form (see Figure 1.4).

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[Add New]

Navigation Form

[Add New]

Access 2010 Data Bars let you emulate Excel formatting styles

for numeric values.

Category Sales for 2005		×
Category Sales	for 2005	
Category Name	Category Sales	
Beverages	\$46,338.00	
Condiments	\$17,754.78	
Confections	\$27,257.49	
Dairy Products	\$36,711.37	
Grains/Cereals	\$9,219.92	
Meat/Poultry	\$24,617.86	
Produce	\$12.651.16	
Select a rule type: Check values in the current rec Compare to other records Edit the rule description: Data Bar format settings: Show Bar only Shortest Bar Type: Value: Value: (covest value) Bar golor	Longest bar W Highest value Preview:	OK Cancel
Record: H → 1 of 8 → H → 🖄 🔆 No	Filter Search	

Figure 1.3

Figure 1.4 × 4

🛅 Navigation 🔻 <u>H</u>orizontal Tabs I Vertical Tabs, Left Vertical Tabs, Right Horizontal Tabs, 2 Levels Horizontal Tabs and Vertical Tabs, Left

Horizontal Tabs and Vertical Tabs, Right

Drag a form icon from the Navigation pane to a horizontal or vertical drop zone tab of the Navigation control to create a new tab.

- Web Browser control—Access 2010's new Web Browser control lets you create web mashups and display web content in your Access applications.
- Access Macro Builder—Microsoft deprecated Access macros in favor of VBA programming code beginning with Access 97. Macros enable limited application automation without requiring the .accdb file to be placed in a trusted location or having a signed .accde file from a package. The new Macro Builder offers IntelliSense and aids understanding of multiple macro actions (see Figure 1.5), which is likely to increase use of macros. You must use Access macros to automate web databases because Access Services don't support VBA. Chapter 19, "Automating Access Applications with Macros," shows you how to respond to events with macros.

igure 1.5	Image: Second control Macron Cools Northwind Traders File Home Design Image: Second control Image: Second contro Image: Second contro I	x 5
iew drag-and- drop Macro	Image: Step	
Builder with	Tools Collapse/cepana Show/mide Close ImproductsMacro Collapse/cepana Show/mide Close	×
ntelliSense	ShowAllRecords	
authoring	If [cboCategory]=1 Then	± ⇒ ×
nacros.	ApplyTilter Filter Name Where Condition = [Category[D]=1	E
	Control Name	Add Else Add Else If
Madication Pares	If [cboCategory]=2 Then /* Condiments I ApplyFilter Filter Name Where Condition = [CategoryID]=2	″ ≙ ⇒ X
	Control Name End If □ If [cboCategory]=3 Then /* Confections ApplyFilter	*7
	Filter Name Where Condition = [CategoryID]=3 Control Name	
Re	ady	

Data Macros—Access 2007 and earlier macros handle events triggered by forms and reports, as well as their controls. Access 2010 introduces Data Macros that handle table-generated events, such as Before Update, Before Delete, After Update, After Insert or After Delete of a row. Access 2010 Data Macros correspond to SQL Server's triggers. Chapter 20, "Emulating Table Triggers with Access Data Macros," teaches you how to take advantage of Data Macros.

- Collaboration with SharePoint—Microsoft downplays Access 2010/SQL Server projects for client/server applications in favor of linking Access tables from SharePoint lists and sharing .accdb files from SharePoint Document Libraries. Manipulating relational data in Sharepoint's nonrelational, web-based environment probably will interest only organizations that have a substantial commitment to an SPF 3.0 or SPS 2010 infrastructure. Chapter 22, "Collaborating with SharePoint Foundation 2010," introduces you to linking or moving tables to SPF or SPS.
 - Web databases—Data Access Pages authored in Access 2003 were suited to private intranets but not the public Internet. Access 2010's new web databases and SPS's Access Services enable publishing browser-based applications to intranets and the Internet. Web databases substitute SharePoint lists for Access tables. Chapter 23, "Sharing Web Databases with SharePoint Server 2010," shows you how to publish a standard Access front end to an interactive web application.

The sections that follow expand on the brief descriptions in the preceding list and provide cross-references to detailed coverage of new features in later chapters.

🐠 tip

The remainder of this chapter assumes familiarity with Access 2007. If you're migrating from Access 2003 or earlier, Appendix A, "What Was New in Access 2007 for Users of Access 2003 and Earlier," introduces the many new features added—and a few removed—by Access 2007.

If you haven't used an earlier Access version, you might want to skip to the "SQL Server 2008 R2 Express Edition Setup" section near the end of this chapter. The succeeding chapters of this book cover in detail all the material presented in this chapter, with the exception of initial SQL Server 2008 R2 Express Edition installation.

Changes to the Office 2007 Ribbon User Interface

Other than replacing the Office button with the File tab and its Backstage View, Access 2010 made mostly cosmetic changes to Access 2007 Fluent UI. Access 2010 adds an improved UI in the Options dialog for creating new and customizing what Microsoft calls command tabs and groups. Optionally, click the New Tab to create a new command tab. With a new or existing ribbon selected in the right list, click the New Group button to add a new group, select a command icon in the left list, and, with the new group selected, click the Add button to add the new command icon.

Access 2007's Main Ribbons

Access 2010 has five main command tabs and ribbons. Press Alt to display the shortcut keys (called *KeyTips*) for each main ribbon, the Office button, and Quick Access Toolbar (1...n), as shown in Figure 1.7 (top). Press Alt+*Key* to display the second-level shortcut keys (see Figure 1.7 center and bottom). Many Access 2010 KeyTips differ from those of Access 2007, and group names and their members have changed.

Following are brief descriptions of the primary purposes of each main ribbon, which are largely unchanged:



Figure 1.7

The top Home half-ribbon shows shortcut-key combinations to activate one of the five main ribbons (File, Home, Create, External Data, and Database Tools) or the Quick Access Toolbar (QAT).







- Home—Lets you select Datasheet, Form, Report, Layout, or Design view; perform Clipboard operations; specify font properties; format memo fields with HTML; and refresh, add, delete, save, sort, filter, find, and spell check records (refer to Figure 1.7).
- Create—Lets you create a new empty table or a table from a template in Datasheet view, or an empty table in Design view; create a SharePoint list and a table that links to the list; create a form or report bound to a table or query that's selected in the Navigation pane; and create a new query, macro, module, or class module (see Figure 1.8).

A 🛃 🔯 File	li ^g) → (^t i → ↓ Home Create External Data Database Tool	Table Tools Is Design	Figure 1.8 The Create ribbon's buttons and drop-
Application Parts *	Table SharePoint Query Query Form	Form Blank Form Blank FDE FBL FFM	down galleries enable adding new Access objects to your database.
Temphates	RZ Report Wizard		
	Report Report Blank Ma Dacian Report RN RD Report RN RD Reports	A Cliass Module Cro Visual Basic Macros & Code	

- External Data—Lets you import, link, or export external data in a variety of formats; collect or update data via emailed HTML forms; save import or export specifications; work with SharePoint lists while offline; and move select objects or the entire database to a SharePoint site (see Figure 1.9).
- Database Tools—Lets you open the VBA editor for a module or Class Module; run a macro, create a shortcut menu from a macro, or convert a macro to VBA; open the Relationships window to create or edit table relationships; show or hide the Object Dependencies pane, property sheet for an object, or message bar; run the Database Documenter, Performance Analyzer, or Table Analyzer Wizard; move tables to a back-end Access database or upsize tables and queries to SOL Server 2005 or later [Express]; run the Linked Table Manager for linked Access tables; create or edit a switchboard with the Switchboard Manager; encrypt the database and set a database password; manage Access add-ins; and make an execute-only database by stripping out VBA source code (see Figure 1.10).

Contextual Ribbons for Access Databases and Projects

Access 2010 has 16 different contextual ribbons, which contain buttons for commands that are appropriate to specific Access object contexts. With the exception of the Print Preview ribbon, all contextual ribbon tabs appear to the right of the Database Tools tab. Most of the contextual ribbons have minor changes to group names and command icon placements. Chapter 3 provides detailed descriptions of these ribbons and illustrates galleries, when applicable.



Figure 1.10

The Database Tools ribbon's buttons perform their actions without the need for gallery choices.



The Quick Access Toolbar

The Ouick Access Toolbar (OAT) lets you create custom shortcuts to frequently used commands. By default, the OAT has three command buttons: Save, Undo, and Redo. The Undo and Redo buttons usually are disabled and sport Can't Undo and Can't Redo ToolTips.

Clicking the drop-down button to the right of the Can't Redo button opens a gallery of popular command buttons that you can add to the QAT (see Figure 1.11).



Figure 1.11

You can add popular command buttons to the QAT and specify its location—above or below the ribbon—from its drop-down gallery. The Sync All command is new in Access 2010.

The File Tab's Backstage View

There's no conventional File or Tools menu, so the Backstage view that opens when you click the File tab handles many of those two menu's former tasks. If you've opened a database or project file, the gallery opens with an Info[rmation] pane. Click the View and Edit Database Properties list to open the *Filename* Properties dialog (see Figure 1.12).

Here's what happens when you click one of the gallery's following eight links and command buttons with an .accdb file open:

- **2010** Info—Opens the Information About *DatabaseFile* pane (refer to Figure 1.12).
- **2010 Recent**—Opens a Recent Databases (MRU) list.



- New—Opens the Getting Started with Microsoft Office Access dialog, which lets you create a database from a local or downloaded template, open an empty database, or open a new ADP (refer to Figure 1.3).
- **Print**—Opens the Print pane that offers Quick Print, Print, and Print Preview buttons.
- Save & Publish—Opens a pane with options to save the current database or object as a new database or object; publish to as a web database to Access Services, save the database file in Access 2007, 2002–3, or 2000 format or as an Access Template (*.accdt file); package and distribute the database, package and digitally sign the database, make an execute-only database (*.accde file) with design mode disabled; back up the database; or save it to a SharePoint Document Library (see Figure 1.13).
- Help—Opens a pane to access Microsoft Office Help, Getting Started help topics, links to Office Support pages, the Options dialog, and online Updates (see Figure 1.14).



Figure 1.13

The Save & Publish pane offers a variety of options for saving the database in various formats or publishing it as a web database with Access Services.



Figure 1.14

The Help page contains links to obtain answers to users' auestions. You can also open the Options dialog and check for updated Access 2010 files.

• **Options**—Opens the Access Options dialog, which lets you specify settings for Access 2010 and the current database (see Figure 1.15).

Figure 1.15 The Options dialog's General page lets you specify optional set- tings for all Access data- bases you open.	Access Options General Current Database Datasheet Object Designers Proofing Language Client Settings Customize Ribbon Quick Access Toolbar Add-ins Trust Center	General options for working with Access. User Interface options Image: Sequence options Image: Always use ClearType ScreenTip style: Show feature descriptions in ScreenTips Image: Show shortcut keys in ScreenTips Image: Short keys shortcut keys in ScreenTips Imag
		OK Cancel

Security, Trusted Locations, Packages, and Certificates

Access 2010's approach to system and database security is very similar to that of Access 2007. System security attempts to prevent—or at least dissuade—users from opening database or project files that might contain *harmful code* in macros or VBA modules. The term *harmful code* generally means code that can access local computer or network resources and (potentially) install malware, bots, or viruses.

When you open any database from a location that you haven't designated as trusted or that hasn't been signed with a digital signature from a publisher you trust, Access opens with a Security Warning bar. Clicking the bar's Click for More Details link (look ahead to Figure 1.17), opens the Info pane with a Security Warning button added. Opening the button's gallery gives you two choices for enabling potentially dangerous content (see Figure 1.16).

Selecting Advanced Options closes the Info pane and opens a Security Alert dialog that's identical to the Access 2007 version (see Figure 1.17).



Figure 1.16

You can enable all content or open the Security Alert dialog to select the content to trust in the Security Warning gallery.



Figure 1.17

Access 2010's Security Warning message differs slightly from Access 2007's. Select the Enable the Content option if you trust the database's source.

Specifying Trusted Locations

You can prevent the Security Warning bar from appearing by storing the .accdb or .adp file in a *trusted location* (folder). You specify trusted location(s) in the Trusted Locations dialog of the Access Options dialog's Trust Center page.

 For an example of creating a trusted location, see
 "Designating the Default Database Folder as a Trusted Location," p. 53.

Packaging and Code-Signing Databases

An alternative to requiring users of your Access application to create a trusted location for the database is to create a Microsoft Office Access Signed Package (.accdc file) from the .accdb file. Creating a Signed Package code-signs all objects in the database and compresses the file by a factor of about five to reduce download time.

To sign a package, you must have a code-signing (Class 3) certificate from a commercial certificate authority (CA), such as Comodo, Thawte, or VeriSign, or create a self-signed certificate with Office 2007's Digital Certificate for VBA Projects application (SelfCert. exe). Code-signing certificates from a commercial CA cost from \$99 to \$199 per year.

Self-signed certificates usually are limited to personal or small workgroup use. By default, self-signed certificates work only for packages you extract on the same machine that created and signed them. Use trusted locations to avoid security warnings unless you have a compelling reason to do otherwise.

Enabling Non-trusted Application Automation with Macros

Access 2010 users in organizations with highly secure computer operations might be prevented from enabling "potentially harmful content" by a group policy setting. In this case, you can take advantage of the default "safe" subset of Access macro actions that will run without enabling VBA code by trusting the database. To enable unsafe macro actions, you must click the Macro Tools, Design ribbon's Show All Actions button, which toggles between displaying a list of all and safe-only actions.



For more information on Access macros, **see** "Access Macros Redux," **p. 33**.

🔍 note

The primary difference between the Access 2010 and 2007 security warning is the detour to the Info pane. With the example shown here, the Info Pane's Enable All Content button and the Security Alert dialog's Enable the Content option accomplish the same thing.

When you create a new empty (blank) database in the Getting Started with Microsoft Office Access dialog, the Security Warning bar doesn't appear until you reopen the database.

🔍 note

Access 2010 doesn't support GEOMETRY, GEOGRAPHY, or HIERARCHYID data types, nor will it open SQL Server 2008 [R2] database diagrams.

🔍 note

SharePoint Foundation and Share-Point Server 2010 are designed to run on the 64-bit version of Windows Server 2008 [R2] and require a 64-bit CPU/motherboard. They will install and run under 64-bit Windows 7 also, but only for test and development purposes.

🔍 note

Microsoft touts the capability of macro actions to execute in nontrusted applications as one of the reasons for the resurrection of Access macros as a recommended programming technology.

Access Web Databases and SharePoint Lists

Access 2010's changes to Access 2007 tables and database engine are relatively minor, unless you publish Access databases to SharePoint Server 2010 to enable browser-based intranet or Internet access with web databases. Web databases, which store tables as SharePoint Server 2010 lists and don't support VBA, serve as the replacement for Data Access Pages, which Access 2007 dropped. Chapter 23 is devoted to Web Databases.

The Access and SharePoint teams devoted substantial development and testing resources to improving the performance of tables linked to SharePoint lists by optimizing client-side and server-side caching. Chapter 22 explains how to link or move tables to SharePoint Foundation 2010, which is available to licensees of 64-bit Windows Server 2008 or 2008 R2 at no charge.

🎬 Access 2010 also supports linking tables to Data Services, which can be conventional SOAP Web services with Web Service Definition Language (WSDL) files or SharePoint Business Connectivity Services (BCS) entities with Application Definition XML files that contain External Content Type metadata. Linking to Data Services is beyond the scope of this book.

Application Development by Templates

Access 2010 includes 12 built-in templates: seven for conventional Access databases (Events, Faculty, Marketing Projects, Northwind, Sales Pipeline, Students, and Tasks) and five for web databases (Assets, Charitable Contributions, Contacts, Issues, and Projects). In Backstage view, click New and Sample Templates to open the Available Templates gallery (see Figure 1.18).

The Access 2007 team commissioned a complete makeover of the original 25 Access 2003 templates available from Office Online. These templates were popular; for example, the Access 2003 Contact Management template had close to 600,000 downloads before it was converted to Access 2007. This template has four related tables and manages detailed contact information and call history. A benefit of Access 2003 and earlier templates is that most have a few rows of sample data.

The new templates page at http://office.microsoft.com/en-us/templates/CT010214400.aspx has Access 2010, Access 2007, and Previous Versions categories.

To learn how to create an Access 2010 application from earlier versions of templates, see "Creating a Database from Any Access Template on Microsoft Office Online," p. 55.





Access Macros Redux

Access 2010 treats macros as full-fledged objects, and the Access team encourages their use by new users and seasoned developers alike. As of Office 97, which replaced Access Basic with VBA, macros were deprecated. VBA was designated the strategic programming language for automating Access applications, and Office 97 included a macro-to-VBA converter to ease the upgrade effort. (The Database Tools ribbon's Macro group includes a Convert Form's Macros to Visual Basic button.)

Original Access macros had two basic defects: no error-handling capability and the lack of an equivalent to form and report Class Modules (also called *code behind forms*, or CBF). Access 2007 overcame the first limitation with the new On Error macro action, which lets you specify how errors are handled with one of the following values of the Go To argument:

- Next disregards the error, and execution proceeds to the next macro action.
- MacroName stops executing the current macro and jumps to the named macro.
- **Fail** stops execution and displays an error message.

Embedded macros handle the missing CBF equivalent. Each form or report event has a builder button that opens a Choose Builder dialog that lets you select a Macro Builder, Expression Builder, or Code Builder.

As an example, an embedded macro in the \Access2010\Chaptr01\NavPane.accdb database's Form1 (Customers List) hides the prebuilt Object Type, Tables and Related Views, Modified Date, and Created Date categories and locks the NavPane when you open the form (see Figure 1.19). Ordinarily, the AutoExec macro would execute these actions.



A similar macro that enables the prebuilt categories and unlocks the NavPane executes when you open Form2 (Orders List).

Chapter 19, "Automating Access Applications with Macros," and Chapter 30, "Handling Events with Macros and Procedures," show you how to write Access macros to handle simple tasks. VBA is better used for complex application automation chores, but web databases don't support VBA. Therefore, the Access team added Data Macros to handle events associated with adding, deleting and updating rows of Access tables.

1

SQL Server 2008 [R2] Express Edition Setup

SQL Server 2005 Express replaced Access 2000's Microsoft Data Engine (MSDE) 1.0 (based on SQL Server 7.0) and Access 2002 and 2003's Microsoft SQL Server Desktop Engine (MSDE) 2000 (based on SQL Server 2000). SQL Server 2005 Express was a major upgrade to MSDE 2000 and took Microsoft almost five years to finish. SQL Server 2005 Express was the first free SQL Server version to include a management tool—SQL Server Management Studio Express (SSMS). SQL Server 2005 Express removed MSDE's performance throttle, which limited query execution to five simultaneously running queries.

Microsoft released SQL Server 2008 [Express] on August 6, 2008. SQL Server 2008 added spatial (GEOMETRY and GEOGRAPHY), HIERARCHYID and specialized date/time data types, as well as Transparent Data Encryption (TDE) and improved data compression features. SQL Server 2008 R2 (called *SSX* in this book) released to manufacturing on April 21, 2010, six days after Office 2010 RTMed. The R2 upgrade added new features, including PowerPivot for Excel and SharePoint, Master Data Services, StreamInsight, ReportBuilder 3.0, and Reporting Services Add-in for SharePoint.

Office 2000–2003 included installation code for MSDE 1.0 and 2000; the Office 2010 CD-ROM images don't include SQL Server 2008 R2 Express Edition and Management Tools, which is the recommended version for Access users who don't have a network connection to SQL Server 2005 Workgroup Edition or later.

Downloading and Installing SSX

🔍 note

Access 2010 doesn't support GEOMETRY, GEOGRAPHY, or HIERARCHYID data types, nor will it open SQL Server 2008 [R2] database diagrams.

🐠 tip

If you're creating multiuser database applications for an organization or team and loss or corruption of data would have serious economic or social consequences, consider substituting Access data projects and SSX for .accdb databases. SSX is a much more robust, secure, and reliable data engine than Access's. The only downside of moving to SSX is loss of new SharePointspecific features, such as the Attachment field data type, MVLFs, and append-only Memo fields.

If you intend to develop or just explore Access 2010 data projects (ADP) or Access front-ends linked to SQL Server 2008 R2 or SQL Azure tables, do the following to install SSX on your client PC or a network server:

1. Download and save the SQL Server 2008 R2 Express Edition and Management Tools installer (SQLEXPRWT_x86.exe, 32-bit: 235MB or SQLEXPRWT_x64.exe, 64-bit: 247MB) from http://www.microsoft.com/express/database/ to a temporary folder, usually \Users\UserName\Downloads.

🔍 note

32-bit or 64-bit SSX (R2) is recommended because it has a maximum database size of 10 GB, while SQL Server 2008 Express is limited to 4 GB. SQL Server 2008 R2 Management Studio Express, which is included in the Management Tools, is required to connect to SQL Azure cloud databases, which are one of the topics of Chapter 28. SQL Azure is a customized version of SQL Server 2008. The Management Tools also include SQL Server 2008 Reporting Services and Full-Text Search.

- 1
- 2. Run SOLEXPRWT_x??.exe with an administrative account, accept the End User License Agreement, click Next, and then click Install to extract the setup files and open the SOL Server Installation Center dialog (see Figure 1.20).



- 3. Click the New Installation or Add Features to an Existing Installation link to open the License Terms dialog.
- 4. Mark the I Accept the License terms check box, optionally mark the Send Feature Usage Data to Microsoft check box, and click Next to open the Setup Support Files dialog.
- 5. After the Setup Support Files install and the system configuration check completes, the Feature Selection dialog opens (see Figure 1.21).
- 6. Accept the default features and click Next to perform another System Configuration Check, and click Next to open the Instance Configuration dialog.

able features Setup Support Rules selected by default. Feature Selection Installation Rules Installation Rules Instance Configuration Disk Space Requirements Disk Space Requirements Server Configuration Database Engine Configuration Shared Features Database Engine Configuration Solution Rules Installation Progress Complete Complete Select <u>All</u> Unselect All Select <u>All</u>	Figure 1.21 The Feature Selection dialog opens with all avail- able features selected by default.	C SQL Server 2008 R2 Setup Feature Selection Select the Express with Advanced	d Services features to install.		
		Setup Support Rules Feature Selection Installation Rules Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting Installation Configuration Rules Installation Progress Complete	Eeatures: ♥ Database Engine Services ♥ SQL Server Replicatio Shared Features ♥ Management Tools - Bas ♥ SQL Client Connectivity S Redistributable Features Select All Shared feature directory:	ic DK C:\Program Files\Microsoft S	QL Server\
Shared feature directory (<u>x</u> 86): C:\Program Files (x86)\Microsoft SQL Server\			Shared feature directory (<u>x</u> 86):	C:\Program Files (x86)\Micro	soft SQL Server\

7. Accept the default Named Instance option and, optionally, change the Instance ID value from SOLExpress to SOLEXPRESS (see Figure 1.22).

SQL Server instance names aren't case sensitive.

8. Click Next to open the Instance Configuration dialog (see Figure 1.23).

SQL Server 2008 R2 Setup Instance Configuration Specify the name and instance I	ID for the instance of SQL	. Server. Instance II) becomes part of the ins	tallation path.	×	Figure 1 The defa instance for SQL
Setup Support Rules Feature Selection Installation Rules	 <u>D</u>efault instance N<u>a</u>med instance: 	SQLEXPRESS				Express is SQLE Other SO
Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting Installation Configuration Rules Installation Progress	Instance ID: Instance toot directo SQL Server directory Installed instances:	SQLEXPRESS ory: C:\Program F : C:\Program F	illes\Microsoft SQL Server	NMSSQL10_50.SQ	LEXPRESS	instance example Server 2 Express named S appear i
	Instance Name	Instance ID	Features	Edition	Version	list
	SQLXSP3	MSSQL.1	SQLEngine, SQLEn	Express	9.3.4053	ust.
			< Back Next	> Cance	Help	

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ult name erver latabases PRESS. L Server s, for an SQL 005 SP3 nstance QLXSP3, the Instances

Server Configuration					
Specify the service accounts and	collation configuration.				
etup Support Rules Feature Selection Installation Rules	Service Accounts Collation	ou use a separate account for each SQL	. Server sen	vice.	
Instance Configuration	Service	Account Name	Passw	Startup Type	e
Disk Space Requirements	SQL Server Database Engine	NT AUTHORITY\NETWORK SERVICE		Automatic	-
Server Configuration	SQL Server Browser	NT AUTHORITY\LOCALSERVICE		Automatic	-
Installation Progress					
Installation Progress Complete					
Installation Progress Complete					

gure 1.23

ne Instance onfiguration diag lets you specify Account Name nd Password for e SQL Server atabase Engine nd SQL Server owser. The efault values nown here usually e satisfactory.

9. Accept the default Service Accounts and Collation and click Next to open the Database Engine Configuration dialog. Mark the Mixed Mode check box to enable logon with SQL Server's System Administrator (sa) account. Type and confirm a complex (upper- and lower-case letters, numeral(s) and symbol) password, and click Add Current User if you aren't logged in as the local machine administrator (see Figure 1.24).

The Account Provisioning dialog lets you add an sa login with SQL Server security in addition to the required integrated Windows security login for the local machine Administrator account.	C SQL Server 2008 R2 Setup Database Engine Configu- Specify Database Engine authention Setup Support Rules Feature Selection Installation Rules Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting Installation Configuration Rules Installation Progress Complete	uration cation security mode, administrators and data directories. Account Provisioning Data Directories FILESTREAM Specify the authentication mode and administrators for the Database Engine. Authentication Mode Mindows authentication mode Mixed Mode (SQL Server authentication and Windows authentication) Specify the password for the SQL Server system administrator (sa) account. Enter password: Confirm password: Specify SQL Server administrators OAKLEAF\Administrator (Administrator) SqL adm	Server inistrators have stricted access to
		Add <u>Current User</u> <u>A</u> dd <u>R</u> emove < <u>Back</u> <u>Next</u> > <u>Cance</u>	Inistrators have stricted access to latabase Engine.

- **10.** Review the Data Directories and FILESTREAM pages, and click Next to open the Error Reporting dialog.
- 11. If you want to share error information with the SQL Server team, mark the Send Windows and SQL Server Error Reports to Microsoft check box. Click Next to open the Installation Progress dialog and start installation.

🔍 note

The FILESTREAM feature, which isn't enabled by default, gives SQL Server access to the local file system for storage of large objects, such as graphic images.

- 12. After a few minutes, the Complete dialog opens with a message that the installation completed successfully and added details in the Supplemental Information text box (see Figure 1.25).
- **13.** After you've read the Supplemental Information, click Close to close the Complete dialog.



SQL Server 2008 R2 Setup Complete Your SQL Server 2008 R2 install	ation completed successfully.	Figure 1.25 The Complete dialog's supplemental information
Setup Support Rules License Terms Feature Selection Installation Rules Instance Configuration Disk Space Requirements Server Configuration Database Engine Configuration Error Reporting Installation Configuration Rules	Summary log file has been saved to the following location: <u>C:\Program Files\Microsoft SQL Server\100\Setup Bootstrap\Log\20101013 155857\Summary OL-</u> <u>WIN7ENTRTM23 20101013 155857.txt</u> Information about the Setup operation or possible next steps: Your SQL Server 2008 R2 installation completed successfully.	text box con- tains details for downloading the SQL Server 2008 R2 Books Online (help) file and sample databases.
Complete	Supplemental Information: The following notes apply to this release of SQL Server only. Microsoft Update For information about how to use Microsoft Update to identify updates for SQL Server 2008 R2, see the Microsoft Update Web site at http://go.microsoft.com/fwlink/?Linkld=108409 . Samples Close Help	

Setup installs a Programs, Microsoft SQL Server 2008 R2 submenu with Import and Export Data (32bit), Import, Export Data (64-bit), and SQL Server Management Studio choices, plus Configuration Tools and Integration Services folders. Installing Books Online adds its choice to the Documentation and Tutorials submenu.

To learn more about SQL Server Management Studio Express (SSMSX), see "Adding SQL Server User Logins with SQL," p. 900 and "Moving from MSDE to the SQL Server 2005 or Later Express Edition," p. 1415.

Managing SSX

If you run SSX on the same machine as your Access front end, you don't need to do anything after installation. SSX will start as a service automatically when you boot your computer. If you want to make the instance of SSX you install accessible to remote networked users, you must perform some minimal management tasks. You must set the SQL Server Browser Service to start automatically and enable at least the TCP/IP protocol for SSX. The Browser Service enables clients to locate SQL Server 2005

🔍 note

The Configuration Tools folder contains Reporting Services Configuration, SQL Server Configuration Manager, SQL Server Error and Usage Reporting, and SQL Server Installation Center (##-bit) choices. The default configuration is for local (shared memory) access of SQL Server 2008 R2. instances on remote computers. If you're running the Windows Firewall and Install doesn't establish exceptions for SQL Server and SQL Server Browser, you must create an exception for SQL Server and Browser connections also.

Making SSX Accessible to Remote Users

To make a local SSX instance accessible to other networked computers, do the following:

- Choose Programs, Microsoft SQL Server 2008 R2, Configuration Tools, SQL Server Configuration Manager to open the dialog of the same name.
- 2. Double-click the SQL Server Configuration Manager (Local) node to display the nodes SQL Server 2008 Services, SQL Server 2008 Network Configuration, and SQL Native Client Configuration.
- **3.** Double-click the SQL Server 2008 Services node to display the SQL Server Browser and SQL Server (SQLEXPRESS) service items in the right pane (see Figure 1.26). If you installed other services, they will appear also.

Figure 1.26 Installing the SSX database engine installs	Sql Server Configuration Manager File Action View Help Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager File Action View Help Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuration Manager Image: Server Configuratio						
	SQL Server Configuration Manager (Local)	Name	State	Start Mode			
	SQL Server Services	SQL Server (SQLXSP3)	Running	Automatic			
start the SQL	SQL Server Network Configuration (32bit)	🔊 SQL Server Browser	Running	Automatic			
Server Browser	Scient Protocols	SQL Server (SQLEXPRESS)	Running	Automatic			
service auto-	📮 Aliases	Eiii) SQL Server Agent (SQLEXPRESS)	Stopped	Other (Boot, Syste			
matically.	▶ . J. SQL Server Network Configuration ▲ . SQL Native Client 10.0 Configuration 육 Client Protocols 육 Aliases	4		Þ			

4. Right-click the SQL Server Browser item and choose Properties to open the SQL Server Browser Properties dialog. Click the Service tab, open the Start Mode list box, and choose Automatic (see Figure 1.27). Click OK to close the Properties dialog.

General					
Binary F	ath	"c:\Program Files (x86)\Microsoft S			
Error Co	ntrol	1			
Exit Coo	le	0			
Host Na	me	WIN7PROVM1-RTM			
Name		SQL Server Browser			
Process	ID	2576			
SQL Ser	vice Type	SQL Browser			
Start M	ode	Automatic 👻			
State		Automatic			
		Disabled			
		Manual			
Start Mode The start mode of this service.					

Figure 1.27

Change the SQL Server Browser's Start Mode setting to Automatic, if it's currently Disabled or Manual.

- **5.** If you changed the setting to Automatic, right-click the SOL Server Browser item and choose Start to start the service for the first time.
- 6. Double-click to expand the SQL Server 2008 Network Configuration item, select the Protocols for SQL Express node, right-click the TCP/IP item in the right pane's Protocol Name list, and choose Enabled (see Figure 1.28). Acknowledge the message that states you must stop and restart SSX for the change to become effective.
- **7.** Repeat step 6 for the SQL Server Network Configuration (32-bit) node, if you installed the 64-bit version.
- **8.** If you want to communicate with remote SSX or SQL Server instances, expand the SQL Native Client 10.0 Configuration node, select Client Protocols, and enable the TCP/IP protocol.
- **9.** Repeat step 8 for the SQL Server Native Client Configuration (32-bit) node, if you installed the 64-bit version.
- Select SQL Services, right-click SQL Server (SQLEXPRESS), choose Stop, wait for the service to stop, and then choose Start.
- 11. Close SQL Server Configuration Manager.

Alternatively, you can access SQL Server Configuration manager from the Computer Management dialog's Services and Applications node.

Figure 1.28 Enable the TCP/IP protocol for SSX to com- municate with remote clients.	Sql Server Configuration Manager File Action View Help					
	[™] SQL Server Configuration Manager (Local) [™] SQL Server Services [™] SQL Server Network Configuration (32bit) [™] SQL Native Client 10.0 Configuration (32bit) [™] SQL Native Client 10.0 Configuration (32bit) [™] All liaces	bit) Prot S S S N S T S V	ocol Name hared Memory lamed Pipes CP/IP IA	Status Enabled Disabled Enabled Disabled		
	▲ 및 SQL Server Network Configuration ← Protocols for SQLEXPRESS SQL Native Client 10.0 Configuration 曼 Client Protocols Aliases	Warning				×
		0	Any changes may the service is stop	de will be saved; however oped and restarted.	, they will not take effect unt	1
					OK	

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