Microsoft Official Academic Course
MICROSOFT ACCESS 2016

Includes coverage of the following Microsoft Office Specialist (MOS) exam:

MOS EXAM 77-73O: ACCESS 2016

WILEY

Preface

Welcome to the Microsoft Official Academic Course (MOAC) program for Microsoft Office 2016. MOAC represents the collaboration between Microsoft Learning and John Wiley & Sons, Inc. publishing company. Microsoft and Wiley teamed up to produce a series of textbooks that deliver compelling and innovative teaching solutions to instructors and superior learning experiences for students. Infused and informed by in-depth knowledge from the creators of Microsoft Office and Windows, and crafted by a publisher known worldwide for the pedagogical quality of its products, these textbooks maximize skills transfer in minimum time. Students are challenged to reach their potential by using their new technical skills as highly productive members of the workforce.

Because this knowledgebase comes directly from Microsoft, architect of the Office 2016 system and creator of the Microsoft Office Specialist (MOS) exams, you are sure to receive the topical coverage that is most relevant to students' personal and professional success. Microsoft's direct participation not only assures you that MOAC textbook content is accurate and current; it also means that students will receive the best instruction possible to enable their success on certification exams and in the workplace.

THE MICROSOFT OFFICIAL ACADEMIC COURSE PROGRAM

The Microsoft Official Academic Course series is a complete program for instructors and institutions to prepare and deliver great courses on Microsoft software technologies. With MOAC, we recognize that, because of the rapid pace of change in the technology and curriculum developed by Microsoft, there is an ongoing set of needs beyond classroom instruction tools for an instructor to be ready to teach the course. The MOAC program endeavors to provide solutions for all these needs in a systematic manner in order to ensure a successful and rewarding course experience for both instructor and student—technical and curriculum training for instructor readiness with new software releases; the software itself for student use at home for building hands-on skills, assessment, and validation of skill development; and a great set of tools for delivering instruction in the classroom and lab. All are important to the smooth delivery of an interesting course on Microsoft software, and all are provided with the MOAC program.

Book Tour

Pedagogical Features

The MOAC courseware for *Microsoft Office 2016 system* are designed to cover all the learning objectives for that MOS exam, which is referred to as its "objective domain." Many pedagogical features have been developed specifically for *Microsoft Official Academic Course* programs.

Presenting the extensive procedural information and technical concepts woven throughout the textbook raises challenges for the student and instructor alike. Following is a list of key features in each lesson designed to prepare students for success on the certification exams and in the workplace:

- Each lesson begins with a **Lesson Skill Matrix**. More than a standard list of learning objectives, the skill matrix correlates each software skill covered in the lesson to the specific MOS exam objective domain.
- Every lesson opens with a **Software Orientation**. This feature provides an overview of the software features students will be working with in the lesson. The orientation will detail the general properties of the software or specific features, such as a ribbon or dialog box; and it includes a large, labeled screen image.
- Concise and frequent **Step-by-Step** instructions teach students new features and provide an opportunity for hands-on practice. Numbered steps give detailed, step-by-step instructions to help students learn software skills. The steps also show results and screen images to match what students should see on their computer screens.
- **Illustrations:** Screen images provide visual feedback as students work through the exercises. The images reinforce key concepts, provide visual clues about the steps, and allow students to check their progress.
- **Knowledge Assessment:** Provides questions from a mix of True/False, Fill-in-the-Blank, and Multiple Choice, testing students on concepts learned in the lesson.
- **Projects:** Provide progressively more challenging lesson-ending activities.
- **Online files:** The student companion website contains the data files needed for each lesson.

Instructor Support Program

The *Microsoft Official Academic Course* programs are accompanied by a rich array of resources that incorporate the extensive textbook visuals to form a pedagogically cohesive package. These resources provide all the materials instructors need to deploy and deliver their courses. Resources available online for download include:

- The **Instructor's Guides** contain Solutions to all the textbook exercises as well as chapter summaries and lecture notes. The Instructor's Guides are available from the Instructor's Book Companion site.
- The **Solution Files** for all the projects in the book are available online from our Instructor's Book Companion site.
- A complete set of **PowerPoint presentations** is available on the Instructor's Book Companion site to enhance classroom presentations. Tailored to the text's topical coverage and Skills Matrix, these presentations are designed to convey key concepts addressed in the text.
- The **Student Data Files** are available online on both the Instructor's Book Companion site and for students on the Student Book Companion site.

Student Support Program

COPYING THE PRACTICE FILES

Your instructor might already have copied the practice files before you arrive in class. However, your instructor might ask you to copy the practice files on your own at the start of class. Also, if you want to work through any of the exercises in this book on your own at home or at your place of business after class, you may want to copy the practice files.

Author Credit

MARY LEMONS

Mary Lemons is an instructional writer, project manager, editor, manager, and producer. She has written books on HTML as well as online courses on various Microsoft Office products. She has managed the creative and production process for hundreds of online courses as well as numerous videos and interactive projects. She has also performed project, editorial, and author management along with publisher collaboration for more than 30 books.

Microsoft Office 2016 Software

This content was created using the Office 2016 Professional desktop version. If you have signed up for Office 365, some features may be added or updated.

Brief Contents

LESSON SKILL MATRIX

| Skills	Exam Objective	Objective Number
Working in the Access Interface	Display objects in the Navigation Pane. Change views.	1.3.4 1.3.5
Selecting Tools and Commands		
Defining Data Needs and Types	Change field data types.	2.4.5
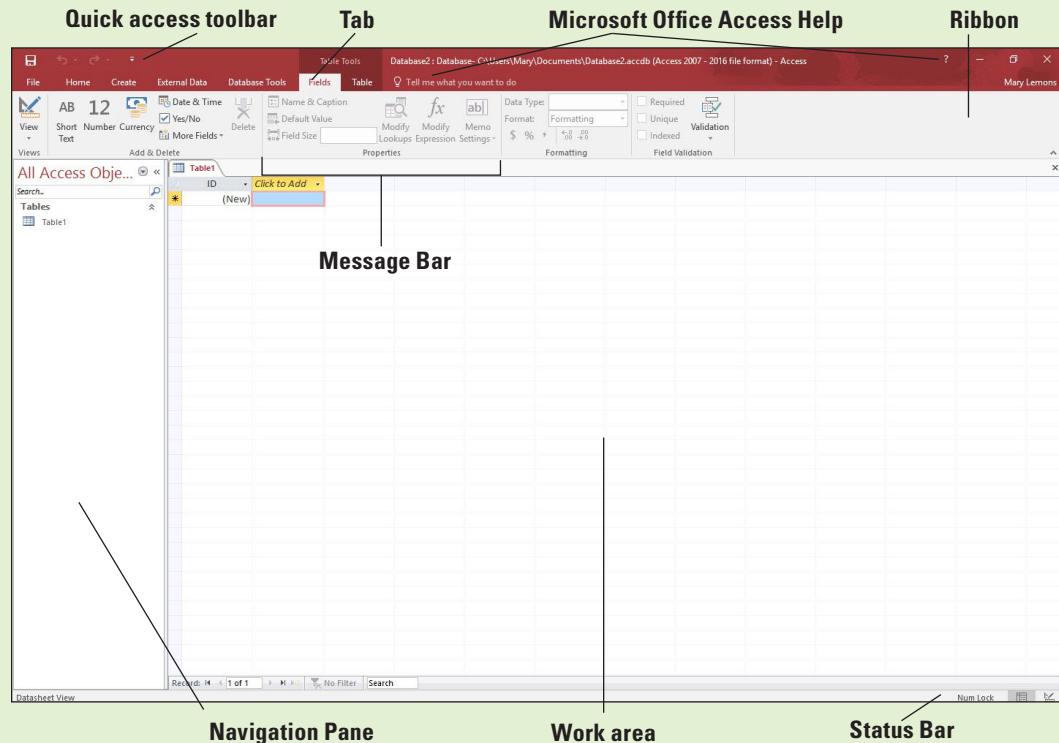
SOFTWARE ORIENTATION

The Access Opening Screen

Before you begin working in Microsoft Access 2016, you need to be familiar with the primary user interface. In the next section, you will be asked to open a new blank desktop database in Access. When you do so, a screen appears that is similar to the one shown in Figure 1-1.

Figure 1-1

Opening screen for new blank Access database

When you create a blank database in Access, the opening screen provides you with a workspace in which to build a database. Being familiar with the screen elements helps you understand important tools and information. The elements and features of your screen may vary if default settings have been changed or if other preferences have been set.

GETTING STARTED

A **database** is a tool for collecting and organizing information. For example, as a database, a phone book organizes a large amount of data—names, addresses, and phone numbers—so you can access it by name in alphabetic order. Even a grocery list is a simple type of database. A computerized **database management system (DBMS)**, such as Access, enables you to easily collect large volumes of data organized into categories of related information. This type of database allows you to store, organize, and manage your data, no matter how complex it is, and then retrieve and present it in various formats and reports. Using a DBMS to organize data gives you the power to manipulate, view, and report the data in ways that other applications like spreadsheets and word processing documents cannot. As with any program, however, the first tasks are the most basic. This section shows you how to start Access and open an existing database.

Starting Access

Access 2016 runs on the Windows 7 and later operating systems, and the steps to start Access differ depending on the version of Windows you have installed on your system.

When you start Access, a start screen with several options related to creating a database appears. The Access startup screen allows you to create a new, custom web app database, a blank desktop database, a database from a template, open a recent database (if you have already created one), or search online for templates.

Take Note   A web app database is a type of database that was introduced in Access 2013. It allows you to share the database with others as a Microsoft SharePoint app (an application on a network-based service that allows for collaboration) in a web browser or through Office 365 (a subscription-based version of Office provided on the web).

In Office 2016, you can sign into an Office application using your Microsoft or Organizational account. You can easily create a Microsoft account when you sign up for a Microsoft web service such as OneDrive, Xbox Live, Outlook.com, or other Microsoft service. An Organizational account is an account that your workplace or school would use to connect you to a Microsoft service. Once you sign in, your sign-in information will appear in the upper-right corner of each of the Office 2016 applications. This account information includes your name, email address, and user icon. You can use the Switch account command beside your user icon to sign in as a different user.

Microsoft enables you to sign into Office to make it easier for you to access and share your documents from virtually anywhere. You can open and save your documents using OneDrive, a free cloud-based file sharing service that can be accessed from any Internet-connected computer. Signing into Office also allows access to your personalized application settings and themes, and will even remind you where you left off in your document.

In this exercise, you learn to start Access from both Windows 10 and Windows 8 systems.
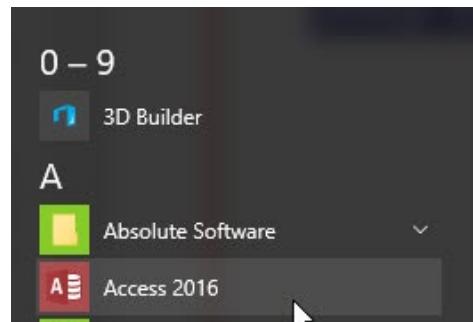
STEP BY STEP   **Start Access in Windows 10**

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary.
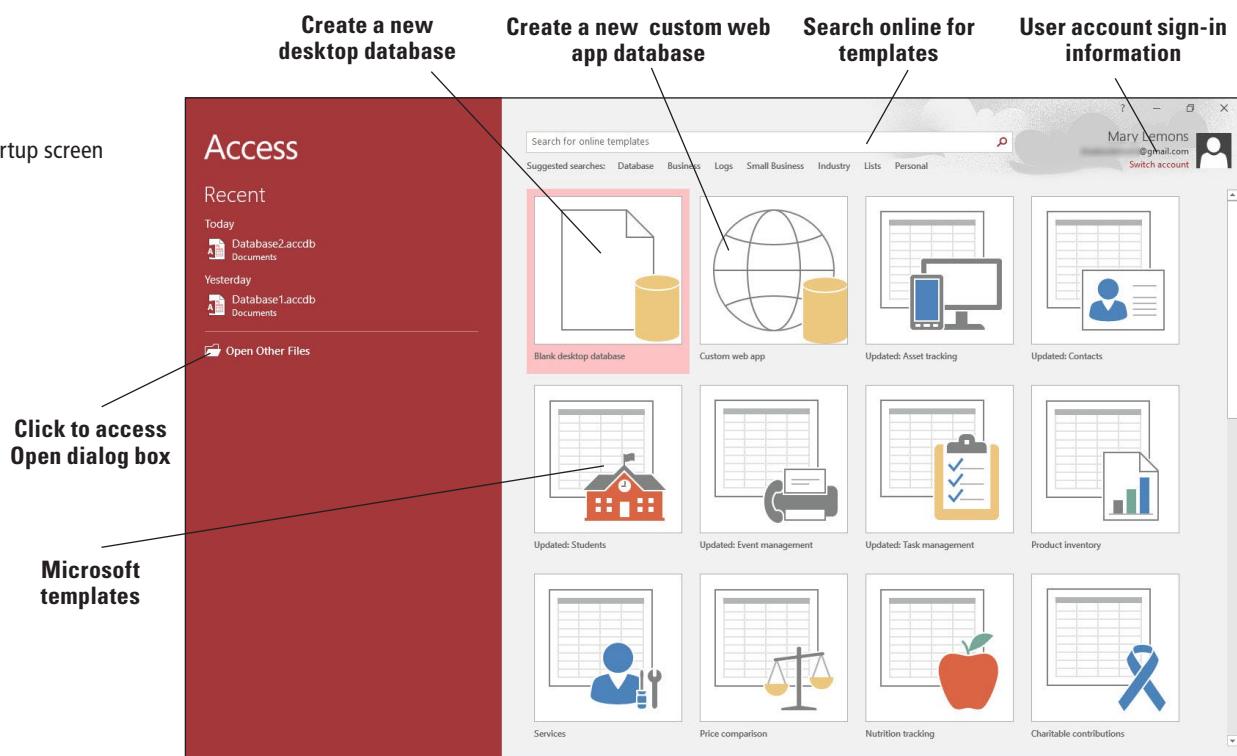
1. Press the **Windows** key on the keyboard to display the Start menu.
2. Click **All apps**, point to **Access 2016** (see Figure 1-2), and then click **Access 2016** to start Access and display its Start screen (see Figure 1-3).

Create a new desktop database   **Create a new custom web app database**   **Search online for templates**   **User account sign-in information**

Click to access Open dialog box

Microsoft templates

Clip art courtesy of Microsoft

Take Note   If you preferred the Windows start screen from Windows 8, you can configure it to appear on Windows 10. Click Start, Settings, Personalization, and Start. Turn the Use Start full screen option to On.

PAUSE. **LEAVE** Access open to use in the next exercise.

STEP BY STEP	Start Access in Windows 8

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary.

3. When starting Windows 8, if the Windows 8 Start screen doesn't appear, press the **Windows** key on the keyboard to display it.
4. If necessary, scroll to the Access 2016 tile.
5. Click the **Access 2016** tile. The Access startup screen opens.

PAUSE. LEAVE Access open to use in the next exercise.

Take Note   The Microsoft Office 2016 System, including Access 2016, is not compatible with Windows XP and earlier Microsoft Windows operating systems.

Opening an Existing Database

When you open an existing database, you access not only your previously entered and saved data, but also the elements you created to organize that data. In this exercise, you open a database that is in the beginning stages of development.

The Open Other Files command on the Access startup screen displays the Open screen. From there, you can choose to open a recent file, a file on your OneDrive location, This PC, or you can Add a Place or Browse for a file. The This PC command allows you to find files stored locally in a folder on your computer or on some type of removable media, or on a network drive. The Add a Place command allows you to set up network locations like OneDrive or an Office 365 SharePoint location. The Browse button opens the Open dialog box.

The left-hand pane of the Open dialog box lists the available locations for files, such as a folder, drive, or network/Internet location. Click the location, and the folders will be displayed in the folder list. From this list, you can double-click the folder you want to open. When you find the file you want, double-click the filename to open it or click it once to select it and then click the Open button.

STEP BY STEP	Open an Existing Database

GET READY. The Access startup screen should be on the screen from the previous exercise.

1. Click the **Open Other Files** command on the left side of the Access startup screen. The Open screen appears, as shown in Figure 1-4.
2. Click **Browse**, navigate to the data files for this lesson, and then select *StudentInformation.accdb*, as shown in Figure 1-5.
3. In the *Open* dialog box, click the **Open** button. The existing database opens.
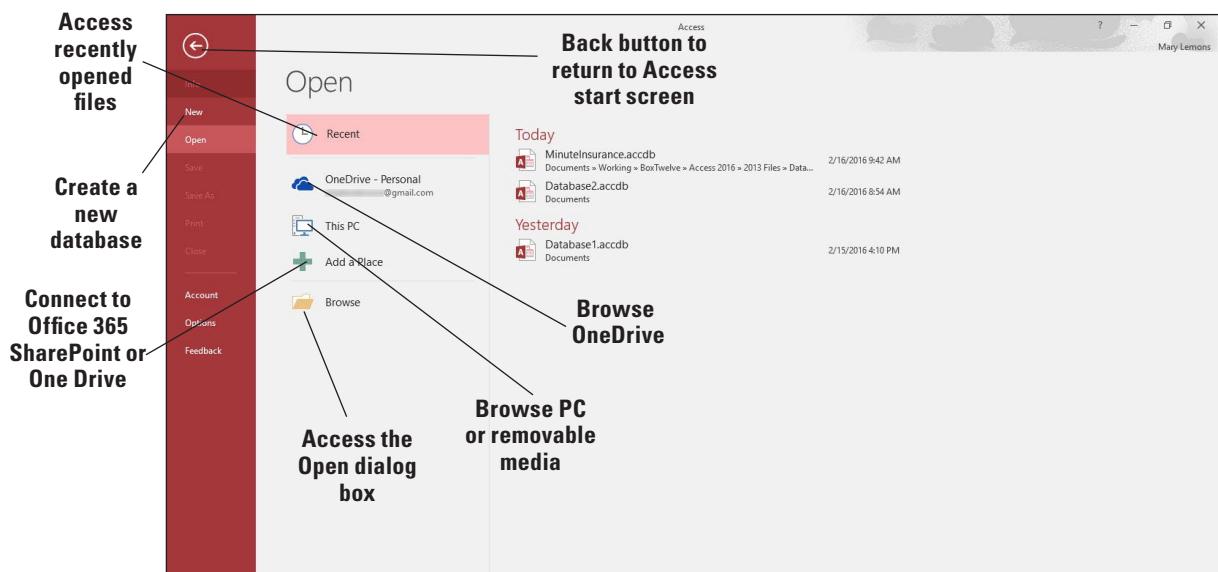
Take Note   Your figures might look slightly different depending upon which folder you have stored your files.

Take Note   As part of the Access 2016 security model, when you open a database outside of a trusted location or the database contains active content (content that can be misused by an unscrupulous person to cause harm to your computer), a Message Bar appears warning you that certain content has been disabled. If you know you can trust the database, click Enable Content. You can trust the databases downloaded from the book companion website, so click Enable Content on the Message Bar for all databases in this book.
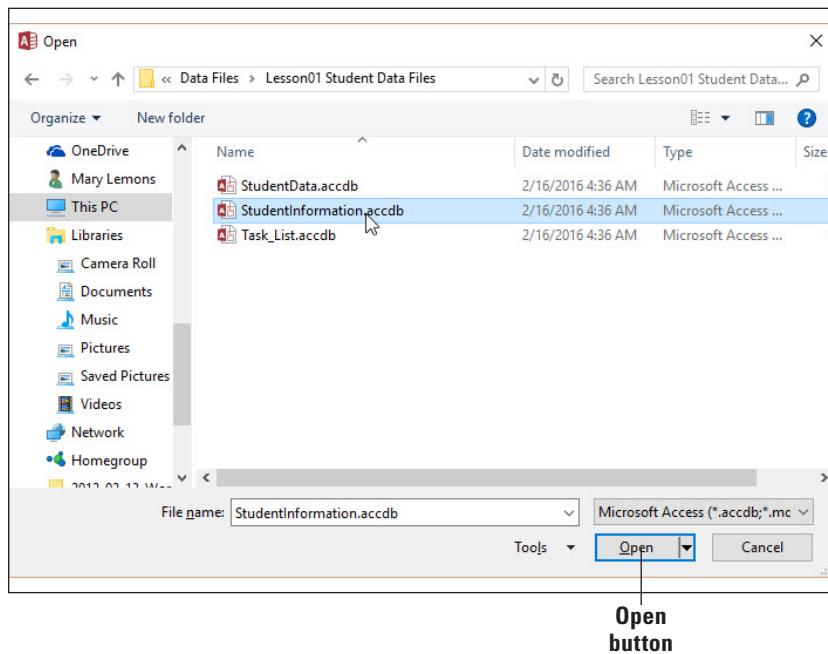
**PAUSE. LEAVE** the database open to use in the next exercise.

Figure 1-4

The Open screen

Figure 1-5

The Open dialog box

If you open a file in a multi-user environment such as a SharePoint drive, other users can read and write to the database as well; therefore, you may want to open the database with other options. Click the down arrow next to the Open button to view these options:

- **Open:** Opens with default access.
- **Open Read-Only:** Opens with only viewing ability and not editing ability. Others can still read and write.
- **Open Exclusive:** Opens so that the database is only available to you. Others will receive a message that the file is already in use.
- **Open Exclusive Read-Only:** Opens with only viewing ability and not editing ability. Others can only view and not edit the database.

Take Note Each time you start Access 2016, you open a new instance, or copy, of Access. You can only open one database at a time in a single instance of Access. In other words, you cannot start Access, open one database, and then open another database—not without first closing the first database. However, you can open multiple databases at the same time by double-clicking another database's icon. For example, to open two Access databases, start Access, open the first Access database, and then open a second Access database by double-clicking its database icon in File Explorer (referred to as Windows Explorer in previous versions of Windows).

WORKING IN THE ACCESS INTERFACE

The Access 2016 user interface was designed to help you find the commands you need quickly so that you can successfully perform your tasks. In this lesson, you will begin using the Navigation Pane, exploring the Ribbon and Backstage view.

SOFTWARE ORIENTATION

Navigation Pane

By default, the Navigation Pane, shown in Figure 1-6, appears on the left side of the Access screen each time you create or open a database.
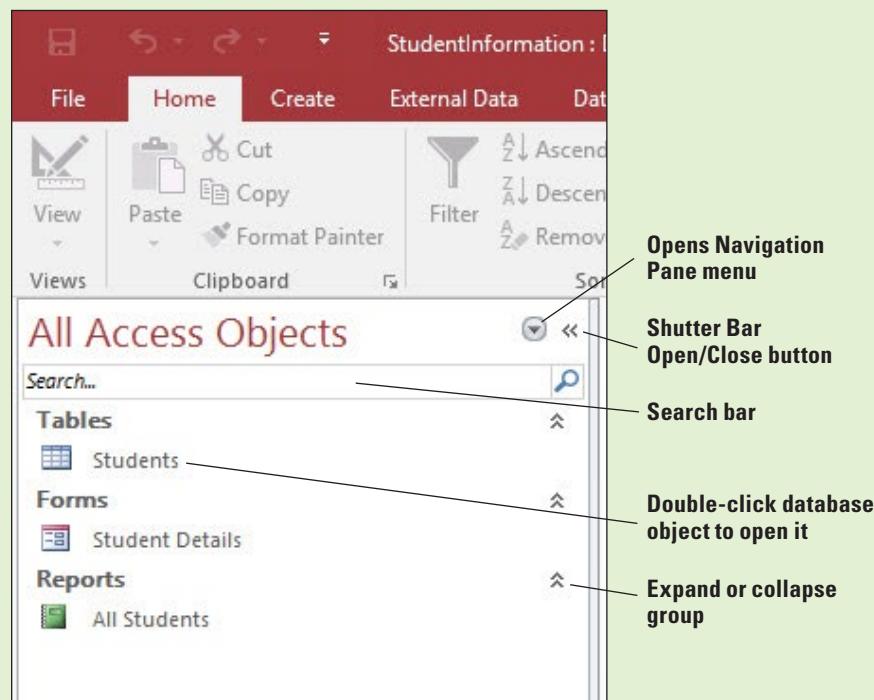

Figure 1-6

Navigation Pane

The Navigation Pane enables you to open, copy, and delete tables and other database **objects**. It also lists all the objects in your database, including: **tables** (the most basic database object that stores data in categories), **queries** (allow you to search and retrieve the data you have stored), **forms** (control data entry and data views and provide visual cues that make data easier to work with), and **reports** (present your information in ways that are most useful to you). You learn more about managing database objects (such as forms, queries, and reports) in later lessons of this book.

Using the Navigation Pane

Before you can create a database, you need to understand its most basic elements. This section introduces you to some of the elements in a database that help you organize data and navigate using the Navigation Pane, object tabs, and different views.
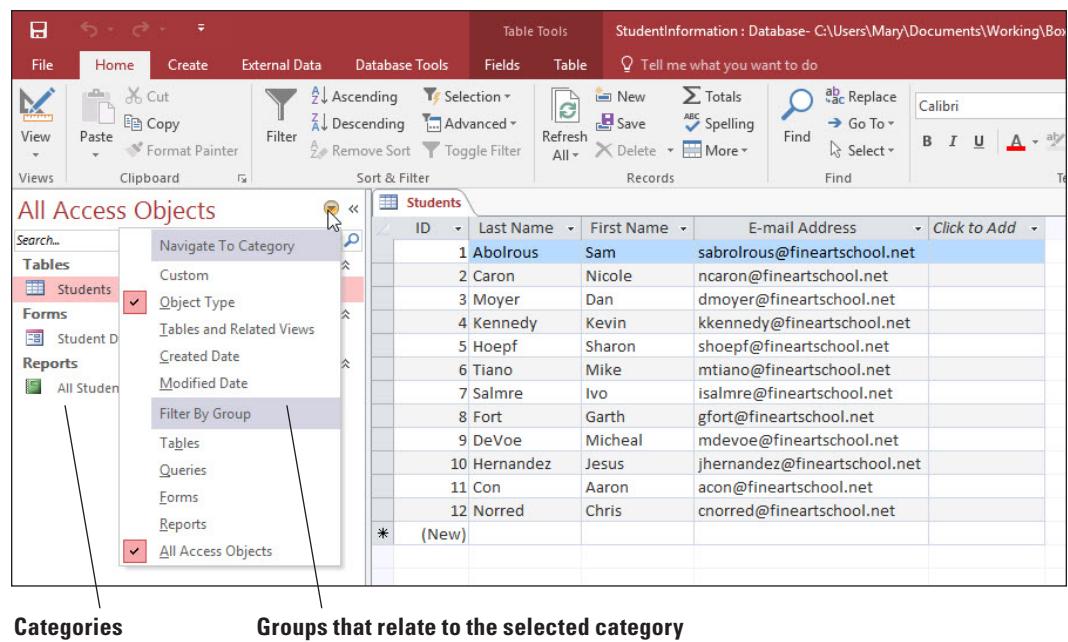
Use the Navigation Pane

GET READY. USE the *Student Information* database that is still open from the previous exercise.

1. In the Navigation Pane, double-click **Students** to display the table in the Access work area.

2. Click the **down arrow** next to All Access Objects at the top of the Navigation Pane to display the menu, as shown in Figure 1-7.

**Figure 1-7**

The Navigation Pane menu

Categories   Groups that relate to the selected category
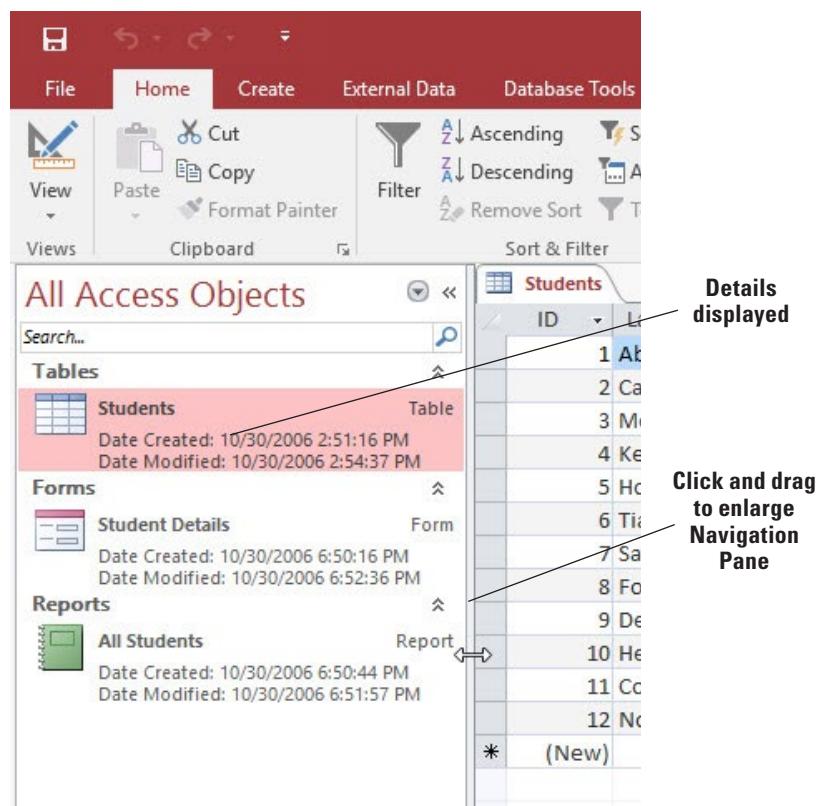
Take Note   The Navigation Pane divides your database objects into categories, and those categories contain groups. The default category is Object Type, which groups database objects by their type—tables, forms, reports, and so on. You can change the category to Tables and Related Views, which groups the objects in a database by the tables to which they are related. You can also change the category to one of several other views as shown in Figure 1-7.

3. Click **Tables and Related Views**. The default group in this category is All Tables, which appears in the menu at the top of the Navigation Pane. Notice the Students table and all other objects related to it are displayed under the Students object tab.

4. Click the **down arrow** next to All Tables at the top of the Navigation Pane to display the menu again and then click **Object Type** to return to the original view.

5. Right-click in the white area of the Navigation Pane to display a shortcut menu. Click **View By** and then click **Details**.

6. The database objects are displayed with details. Click the right side of the Navigation Pane and drag to make it wider so all the information can be read, as shown in Figure 1-8.
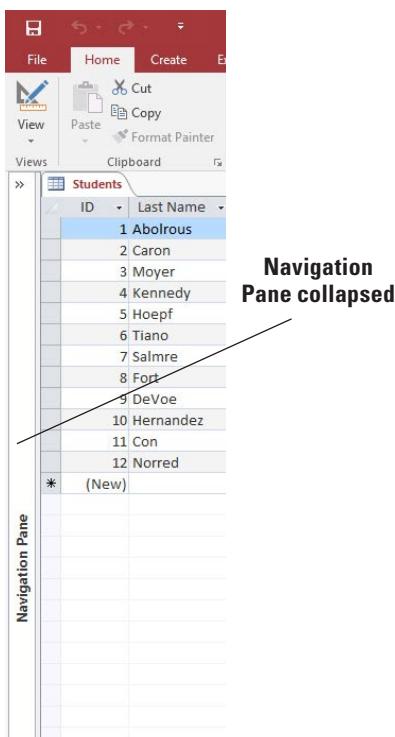
Widening the Navigation Pane

7. If the search bar does not appear at the top of the Navigation Pane, right-click the **All Access Objects** header of the Navigation Pane. On the shortcut menu, click **Search Bar**. A search bar is now displayed at the top of the Navigation Pane.

8. Right-click in the white area of the Navigation Pane, click **View By** and then click **List** in the shortcut menu to display the database objects in a list again.

9. Click the **Shutter Bar Open/Close** button to collapse the Navigation Pane. Notice it is not entirely hidden, as shown in Figure 1-9.

The Navigation Pane collapsed

10. Click the **Shutter Bar Open/Close** button to expand the Navigation Pane again.

PAUSE. LEAVE the database open to use in the next exercise.

Using Object Tabs

When you create a database in Access, all the objects in that database—including forms, tables, reports, queries—are displayed in a single window separated by tabs. Tabs help keep open objects visible and accessible. To move among the open objects, click a tab. To close a tab, click its Close button. You can also right-click a tab to display the shortcut menu, which you can use to save, close, close all, or change views. In this exercise, you practice opening and displaying object tabs.

STEP BY STEP   **Use Object Tabs**

GET READY. USE the *Student Information* database that is still open from the previous exercise.

1. In the Navigation Pane, double-click **Student Details**. A new object tab opens to display the form.

2. In the Navigation Pane, double-click **All Students**. A new object tab opens to display the All Students report tab along with the other two tabs, as shown in Figure 1-10.

3. Click the **Close** button on the report tab to close it.

Object tabs   Close button on the report tab
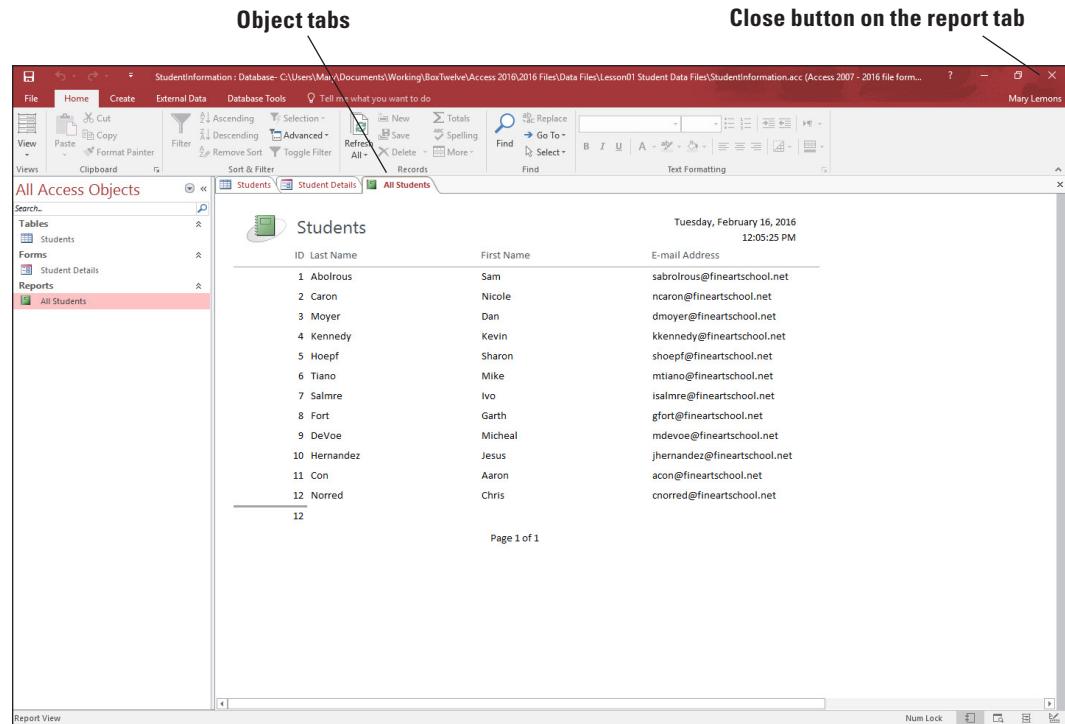
Figure 1-10

A tab showing a report along with the other two tabs

4. Right-click the **Student Details** tab to display the shortcut menu. This menu allows you to save the object, close the object, close all object tabs, or change the object view.

5. Click **Close** to close the form.

PAUSE. LEAVE the database open to use in the next exercise.

Changing Views

Each database object can be viewed several different ways. The main views for a table are Datasheet View and Design View. Datasheet View can be used to perform most table design tasks, so you will probably use it most often. A **datasheet** is the visual representation of the data contained in a table or of the results returned by a query. A query is simply a question you can ask a table or another query.

To change the view, on the Home tab, click the down arrow on the View button and then choose a view from the menu. When you change views, the commands available on the **Ribbon** change context to match the tasks you will be performing in that view.
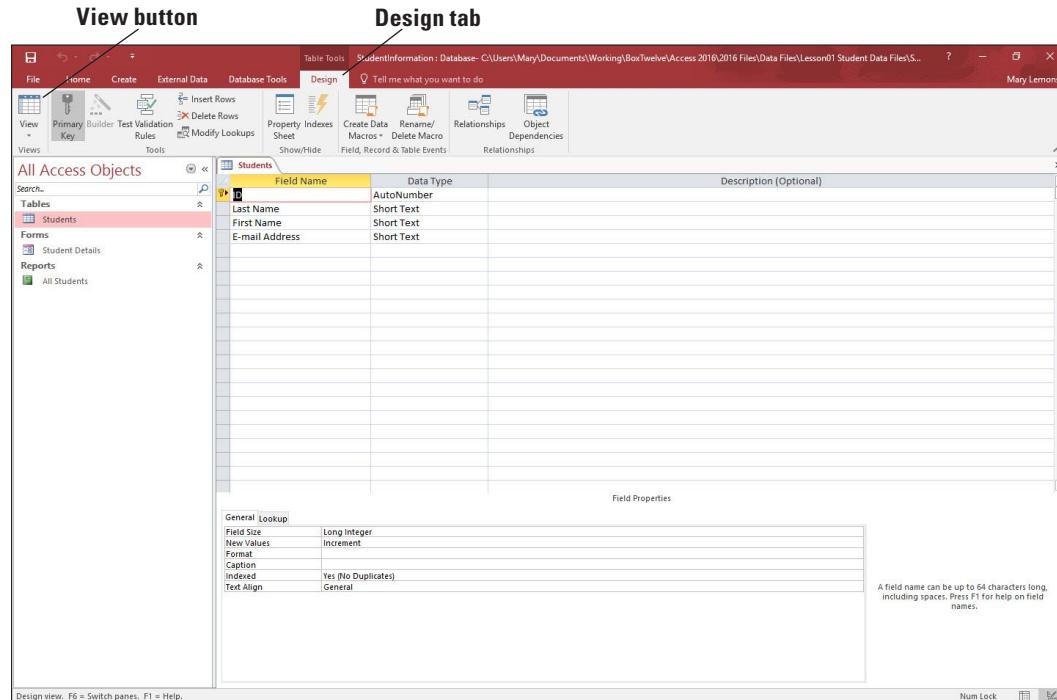
STEP BY STEP   **Change Views**

GET READY. USE the *Student Information* database you used in the previous exercise. The Students table should be displayed in the Access work area.

1. On the Home tab, in the Views group, click the **down arrow** on the View button.
2. Click **Design View**. The table is displayed in Design View, as shown in Figure 1-11. Notice that the Design tab is now displayed on the Ribbon.

Figure 1-11

The table shown in Design View

3. On the Design tab, in the Views group, click the **down arrow** on the View button and then click **Datasheet View**.
4. On the Ribbon, in the Table Tools group, click the **Fields** tab to display the contextual commands for that view.

PAUSE. LEAVE the database open to use in the next exercise.

SELECTING TOOLS AND COMMANDS

A **command** is a tool (such as an icon, a button, or a list) that tells Access to perform a specific task. Each tab provides commands that are relevant to the kind of task you are performing. Many of the tools and commands for working with Access are accessible through the Access Ribbon. In

addition to the Ribbon, Access also offers tools and commands on the File menu (also known as **Backstage view**), a Quick Access toolbar, and a status bar (refer to Figure 1-1). In this section, you explore the Ribbon, which displays **groups** of common commands arranged by tabs.

Using the Ribbon

The Ribbon is located across the top of the screen and contains tabs and groups of commands. It is divided into several tabs, which organize tasks according to similar commands you'd like to perform on a database. The Ribbon is contextual, which means it offers you commands related to the object that you are working on or the task that you are performing.

Some groups have a **dialog box launcher**, which is a small arrow in the lower-right corner of the group that you click to launch a dialog box or task pane that displays additional options or information. Some commands on the Ribbon have small arrows pointing down. These arrows indicate that a menu is available that lists more options from which you can choose.

In the next exercise, you will practice using the Ribbon.

STEP BY STEP   Use the Ribbon

GET READY. USE the *Student Information* database that is still open from the previous exercise.

1. Click the **Home** tab to make it active. As shown in Figure 1-12, the Ribbon is divided into groups of commands. Notice the dialog box launcher in the lower-right corner of the Clipboard group.
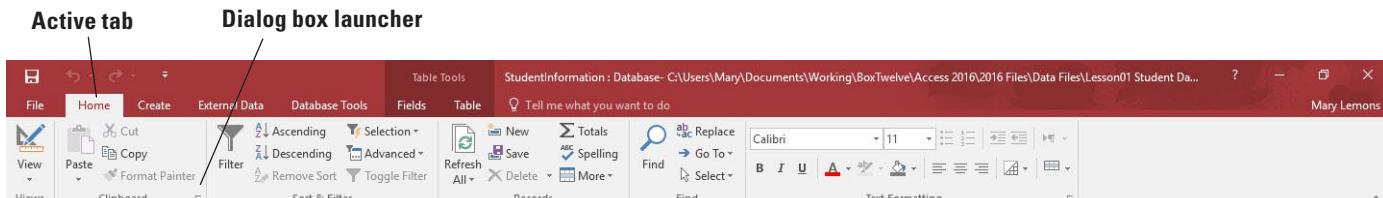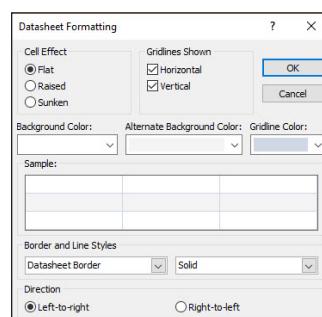

Figure 1-12

The Ribbon and dialog box launcher

2. Click the **Create** tab to make it the active tab. Notice that the groups of commands change.
3. Click **External Data** and then click **Database Tools** to see the commands available on those tabs.
4. Click the **Home** tab.
5. On the Students Object tab, click the **ID** column header in the table to select the ID column.
6. Click the **dialog box launcher** in the lower-right corner of the Text Formatting group. *The Datasheet Formatting* dialog box appears, as shown in Figure 1-13.

Figure 1-13

The Datasheet Formatting dialog box

7. Click **Cancel** to close the dialog box.

8. Double-click the **Home** tab. Notice the groups are hidden to give you more screen space to work with your database.

9. Double-click **Home** again to display the groups.

10. Click **File** and then click **Close** to close the database. Access appears with no database open.

Troubleshooting   If you click the Close button (the X in the upper-right corner), Access closes and you will have to reopen it for the next exercise.

PAUSE. LEAVE Access open to use in the next exercise.

Take Note   You can customize the Ribbon to have greater control over the commands that appear on it by turning off tabs and groups you rarely use, moving and/or duplicating groups from one tab to another, creating custom groups, and even creating custom tabs.

Using the Backstage View

Microsoft introduced Backstage view in Office 2010. The **Backstage view** (Figure 1-14) displays when you click the File tab from an open database and contains a menu of options and commands that allows you to access various screens to perform common tasks with your database files—such as creating a new database, opening, saving, printing, closing, and changing user account settings and options. You can click several options and commands to view related screens containing various options and commands used to create and manage your database. The Back button returns you to the Access database workspace.

Back button   Create new databases   View Save As commands

Figure 1-14

Backstage view

The following is an overview of the options in the Backstage view:

- **Info:** Default view. Use this option to view the current database file path and view and edit database properties. Compact and repair the database and encrypt the database with a password to restrict access.
- **New:** Use this option to create a new database from scratch or from available templates.
- **Open:** Use this option to open an existing database and view a list of recently accessed databases.
- **Save:** Use this option to return to the open database window where objects can be saved.
- **Save As:** Use this option to save the current database object (such as a table, query, form, or report) as a new object or save the database in another format that is compatible with earlier versions of Access. You can save the database to a document management server for sharing or you can package the database and apply a digital signature.
- **Print:** Use this option to quick-print to a printer, open a dialog box from which to choose print options, or preview your document before printing.
- **Close:** Use this option to close the open database but keep the Access application open.
- **Account:** Use this option to view and modify user account settings, change application background and theme, add a service, manage your Office 365 account, update office, and learn more about Access.
- **Options:** Use this option to customize language, display, proofing, and other settings.
- **Feedback:** Opens the Windows Feedback dialog box, which allows you to provide feedback to Microsoft and explore other users' feedback.

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STEP BY STEP   **Use the Backstage View**
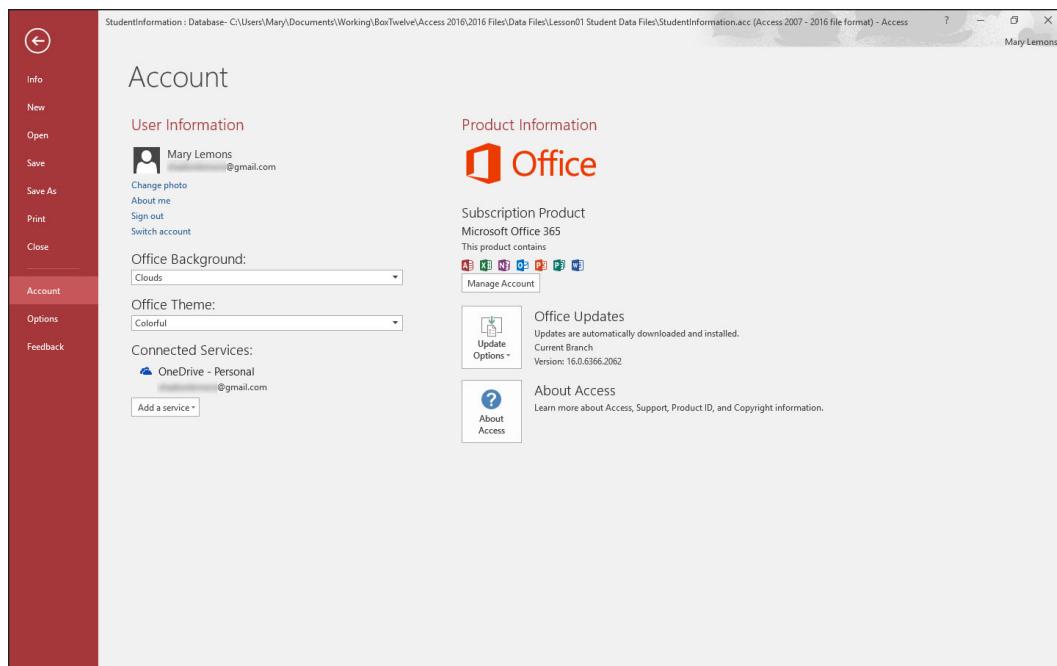
GET READY. START Access if it's not already running.

1. Click the **File** tab. Backstage view opens.
2. Click **Open** and then navigate to the *StudentData* database from the data files for this lesson.
3. Click **File** again. Backstage view now displays a menu of options down the left side of the window and information about the currently opened database.
4. Click the **New** option to view the options and commands available.
5. Click the **Save As** option to view more options and commands.
6. Select **Access Database (*.accdb)** if it's not already selected.
7. Click the **Save As** button in the right pane under the Save Database as area to save the Student Data file as **StudentData-final**. Click **Yes** in the dialog box that appears informing you that the objects will be closed.
8. Select the location to save the file and then click **Save**. The new database file opens automatically.
9. Select **File** again to re-open Backstage view.
10. Click the **Print** option to view more options and commands.
11. Click the **Account** option to view the options and commands shown in Figure 1-15.
12. Click the **Options** option to view more options and commands.
13. Click the **Cancel** button to close the *Access Options* dialog box and return to the Access workspace.

PAUSE. LEAVE the database open to use in the next exercise.

DEFINING DATA NEEDS AND TYPES

To create a database that achieves your goals and provides you with up-to-date, accurate information, you need to spend time planning and designing it.

When planning a database, the first step is to consider the purpose of your database. You need to design the database so that it accommodates all your data-processing and reporting needs. You should gather and organize all the information that you want to include, starting with any existing forms or lists, and think about the reports and mailings you might want to create using the data.

Once you have decided how the information will be used, the next step is to categorize the information by dividing it into subjects such as Products or Orders, which become the tables in your database. Each table should only contain information that relates to that subject. If you find yourself adding extra information, create a new table.

In a database table, data is stored in rows and columns—similar in appearance to a spreadsheet. Each row in a table is called a **record**. Each column in a table is called a **field**. For example, if a table is named "Student List," each record (row) contains information about a different student and each field (column) contains a different type of information about a student, such as last name or email address.

Once you have decided to create a Student List table, you need to determine what information you want to store in the table—such as age, birthdate, or tuition. Organize each piece of information into the smallest useful part—for example, use First Name and Last Name instead of just Name if you want to sort, search, calculate, or report using either a first name or a last name (or both). These pieces of information will eventually become your fields (columns), and each record (row) will then contain complete information about each student.

For each table, you will choose a primary key. A **primary key** is a column that uniquely identifies each row, such as Student ID Number. In the case of our Student List table, the primary key (Student ID Number) uniquely identifies each student.

Reviewing Database Fields

Reviewing preexisting database fields can give you an idea of the type of information that you can store in a database. In this exercise, you open a database that is further along in the process of being developed and view the fields in a form to see what a more advanced database looks like.
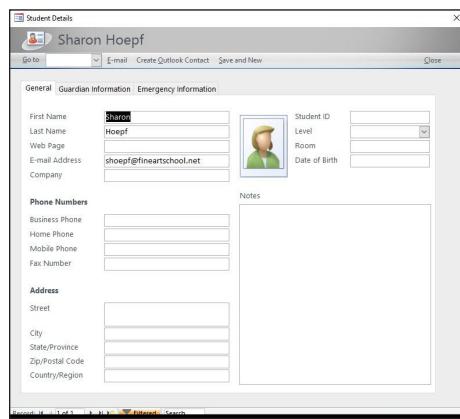
STEP BY STEP	Review Database Fields

GET READY. USE the ***StudentData-final*** database that is still open from the previous exercise.

1. On the Student List form, click the **ID** for record 5 to display the *Student Details* dialog box for Sharon Hoepf, as shown in Figure 1-16.

Figure 1-16

The Student Details dialog box

Clip art courtesy of Microsoft

2. Click the **Guardian Information** tab and then click the **Emergency Information** tab. Each field on each tab is an example of the type of information that could be contained in a database table.

3. Click **Close** to close the *Student Details* dialog box.

PAUSE. LEAVE the database open to use in the next exercise.

Defining and Modifying Data Types for Fields

When designing the database, you set a **data type** for each field (column) that you create to match the information it will store. A data type controls the type of data a field will contain—whether it is text, number, date/time, or some other type of data. When defining table fields, it is important to define them as specifically as possible. For example, if you are using a number, you should determine whether you need to use the Currency data type, the Calculated data type, or the Number data type. Or, if you need to store large amounts of text, you may need to use the Long Text data type (up to 64,000 characters) instead of the Short Text data type (255 characters). Sometimes you may also need to modify data types for preexisting fields.

Access provides 11 data types, each with its own purpose. Table 1-1 describes the types of data that each field can store.

Table 1-1

Types of data stored in fields

Data Type	Example	Description
Short Text	Last Name: D'Amato Street: 1234 Landau Ave.	The most common data type for fields. Can store up to 255 characters of text, and numbers (or a combination of both).
Long Text	Comments: Student will make monthly payments on the 15th of each month of $247.	Stores large amounts of text—up to 1 gigabyte (GB)—but only the first 64,000 characters of text, and numbers (or a combination of both) will be visible on the screen.
Number	Age: 19 Grade: 95.5	Stores numeric data that can be used in mathematical calculations.
Date/Time	Birthday: September 5, 1972	Stores date and/or time data.
Currency	Registration Fee: $50.00	Stores monetary data with precision to four decimal places. Use this data type to store financial data and when you don't want Access to round values.
AutoNumber	Student ID: 56	Unique values created by Access when you create a new record. Tables often contain an AutoNumber field used as the primary key.
Yes/No	Insurance: Yes	Stores Boolean (true or false) data. Access uses 1 for all Yes values and 0 for all No values.
OLE Object	Photo	Stores images, documents, graphs, and other objects from Office and Windows-based programs.
Hyperlink	Web addresses	Stores links to websites, sites or files on an intranet or Local Area Network (LAN), and sites or files on your computer.
Attachment	Any supported type of file	You can attach images, spreadsheet files, documents, charts, and other types of supported files (up to 2 GB per record) to the records in your database, much like you attach files to email messages.

Calculated	FullName: John Derenzo	Stores an expression based on two or more fields within the same table.
		Example using concatenation operator (&):
		    First: John
		    Last: Derenzo
		FullName stored as: [First]&'' ''&[Last]

Take Note   Some of the available data types in Access 2016 can only be chosen in table Design View and not from the Data Type drop-down menu on the Ribbon. You will learn more about table Design View in Lesson 9.

When you create a new field in a table and then enter data in it, Access 2016 automatically tries to detect the appropriate data type for the new column. For example, if you type a price, such as $10, Access recognizes the data as a price and sets the data type for the field to Currency. If Access doesn't have enough information from what you enter to detect the data type, the data type is set to Short Text. In this exercise, you practice reviewing and modifying data types.

Take Note   The Short Text data type and the Long Text data type each has unique properties and size limits, depending on whether you're using them in a desktop database or an Access web app.
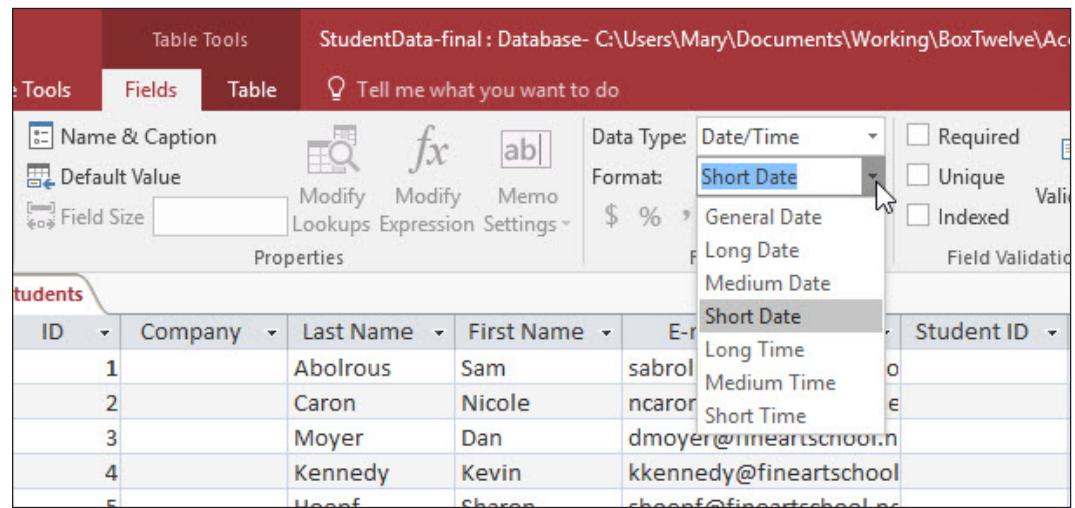
Review and Modify Data Types for Fields

GET READY. USE the ***StudentData-final*** database that is still open from the previous exercise.

1. **CLOSE** the Student List form.
2. In the Navigation Pane, in the Students group, double-click **Students: Table** to open it.
3. Click the **Date of Birth** field header.
4. On the Ribbon, click the **Fields** tab. Notice in the Formatting group that the Data Type is Date/Time.
5. In the Format box, click the **down arrow** to display the menu of formatting options for that type, as shown in Figure 1-17.

Figure 1-17

Format options for the Date/Time data type

6. Click the **Last Name** header. Notice that the Data Type is Short Text and that no formatting options are available for that data type.
7. Scroll to the right and then click the **Address** header.
8. In the Data Type box, click the **down arrow** and then click **Short Text** to change the data type.
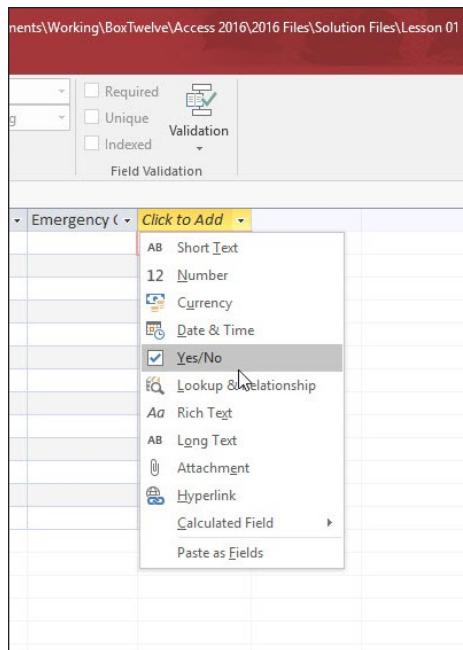
Take Note   Be aware that changing a data type might cut off some or all of the data in a field; in some cases, it might remove the data entirely.

9. Scroll to the far right and then click the **Click to Add** column header. In the Data Type drop-down list that appears, select **Yes/No** (see Figure 1-18). Once you click Yes/No, notice the name of the column header, Field1, is highlighted.

Figure 1-18
The Click to Add menu options

10. Rename the field by typing **Additional Contact Info on File?**. Press **Enter** and then click the **Additional Contact Info on File?** header.
11. On the Ribbon, in the Formatting group, click the **down arrow** in the Format box to display the menu of formatting options for the Yes/No data type.
12. Click outside the menu to close it.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   The Number data type should be used only if the numbers will be used in mathematical calculations. For numbers such as phone numbers, use the Short Text data type.

Defining Database Tables

Tables are the most basic organizational element of a database. Not only is it important to plan the tables so they will hold the type of data you need, it's important to plan how the tables and information will be connected. In this exercise, you view a visual representation of the relationship between two tables.

In a simple database, you might have only one table. Most databases, however, will have more than just one table. The tables you include in a database will be based on the data available. For example, a database of students might have a table for contact information, a table for grades, and a table for tuition and fees.

In database applications like Access, you can create a relational database. A **relational database** stores information in separate tables and these tables are connected or linked by a defined relationship that ties the data together.
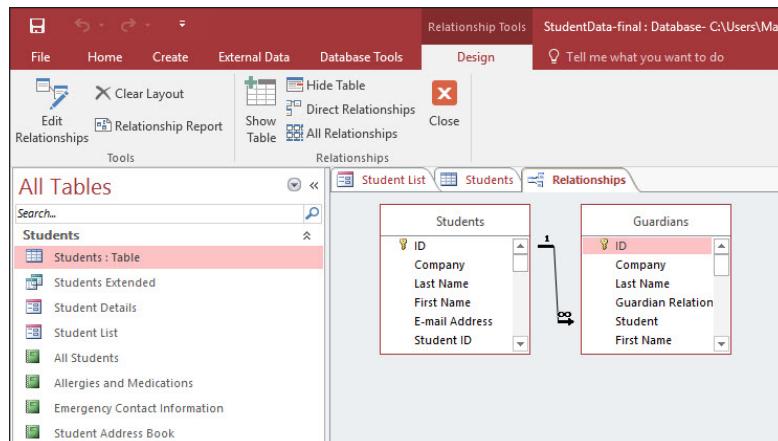
STEP BY STEP   **Define Database Tables**

GET READY. USE the *StudentData-final* database that is still open from the previous exercise.

1. On the Database Tools tab, in the Relationships group, click **Relationships** to display a visual representation of the relationship between the Students and Guardians tables, as shown in Figure 1-19.

A relationship between tables

2. **CLOSE** the Relationships tab.
3. **CLOSE** the Students tab.
4. **CLOSE** the Student List tab.

STOP. CLOSE the database and Access.

An important principle to consider when planning a database is to try to record each piece of information only once. Duplicate information, or **redundant data**, wastes space and increases the likelihood of errors. Relationships among database tables help ensure consistency and reduce repetitive data entry.

As you create each table, keep in mind how the data in the tables are related to each other. Enter test data and then add fields to tables or create new tables as necessary to refine the database. The last step is to apply data normalization rules to see if your tables are structured correctly and make adjustments as needed. **Normalization** is the process of applying rules to your database design to ensure that you have divided your information items into the appropriate tables.

Database design principles include standards and guidelines that can be used to determine if your database is structured correctly. These are referred to as **normal forms**. There are five normal forms, but typically only the first three are applied, because that is usually all that is required. The following is a summary of the first three normal forms:

- **First Normal Form (1NF):** This form divides each field according to its smallest meaningful value, removes repeating groups of data, and creates a separate table for each set of related data.
- **Second Normal Form (2NF):** With this form, each non-key column should be fully dependent on the entire primary key. Create new tables for data that applies to more than one record in a table and add a related field to the table.
- **Third Normal Form (3NF):** Use this form to remove fields that do not relate to, nor provide a fact about, the primary key.

Before normalizing a database and defining fields for the efficient storage of data in tables, it's important to know where your data will come from. Data can be brought into an Access database in a number of ways, including linking and importing. When defining tables, you have to decide whether data should be linked to or imported from external sources. When you import data, Access creates a copy of the data or objects in the destination database without altering the source. Linking lets you connect to data from another source without importing it, so that you can view and modify the latest data in both the source and destination databases without creating and maintaining two copies of the same data thereby reducing redundant data. Any changes you make to the data in the source are reflected in the linked table in the destination database, and vice versa. You find out more about normalizing tables in Lesson 9.

Knowledge Assessment

Matching

Match the term in Column 1 to its description in Column 2.

Column 1	Column 2
1. Record	**a.** Row in a database table
2. Field	**b.** Database object that asks a table a question
3. Query	**c.** Database object that simplifies the process of entering, editing, and displaying data
4. Form	**d.** Column in a database table
5. Data type	**e.** Kind of information a field contains

True/False

Circle T if the statement is true or F if the statement is false.

T F 1. Any list you make for a specific purpose—even a grocery list—can be considered a simple database.

T F 2. By default, the Navigation Pane appears on the right side of the Access screen each time you create or open a database.

T F 3. Forms, queries, and reports are examples of database objects.

T F 4. In a database table, data is stored in rows and columns—similar in appearance to a spreadsheet.

T F 5. An important principle to consider when planning a database is to try to record each piece of information as many times as possible for easy access.

Projects

Project 1-1: Using the Navigation Pane

As a busy editor at Lucerne Publishing, you use Access to organize and manage your task list. In this project, you will use the Navigation Pane to organize your task list.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Task List* from the data files for this lesson and then **SAVE** it as *Task List-final*.
2. To display the Navigation Pane, click the **Shutter Bar Open/Close** button.
3. Click the **Contacts** group header in the Navigation Pane to display those database objects.
4. Click the **Supporting Objects** group header to display those database objects.
5. In the Supporting Objects group, double-click **Tasks** to open that table.
6. In the Tasks group, double-click **Tasks by Assigned To** to open that report and view data taken from the Tasks table.
7. In the Navigation Pane, click the **Tasks Navigation** header to display the menu and then click **Object Type**. Notice that the Objects are now displayed by type, such as Tables, Queries, Forms, and Reports.
8. **SAVE** and then **CLOSE** the database.

PAUSE. LEAVE Access open for the next project.

Project 1-2: Creating a Database and Selecting Data Types

You are a volunteer for the Tech Terrace Neighborhood Association that holds an annual March Madness 5K Run. In the past, all data has been kept on paper, but you decide it would be more efficient to create a database. In this project, you will create a database and select data types.

GET READY. LAUNCH Access if it is not already running.

1. Click **File**, click **New**, and then double-click **Blank desktop database**.
2. In the Blank desktop database screen that appears in the center of the screen, type **Runners-final** in the File Name box. Click **Create**.
3. Click **Click to Add**, select **Short Text**, and then type **Runner Number**.
4. Click **Click to Add**, select **Short Text**, and then type **First Name**.
5. Click **Click to Add**, select **Short Text**, and then type **Last Name**.
6. Click **Click to Add**, select **Number**, and then type **Age**.
7. Click **Click to Add**, select **Short Text**, and then type **First Race?**.
8. Click **Click to Add**, select **Number**, and then type **Previous 5K Time**.
9. Click the **First Race** header and then change the Data Type to **Yes/No**.
10. **SAVE** and then **CLOSE** the object.
11. Rename Table 1 to **Runners**.
12. Click **OK**.

CLOSE the database and then **EXIT** Access.

2 Creating Database Tables

Skills	Exam Objective	Objective Number
Creating a Database	Create databases using templates. Create new databases. Create a database by using import objects or data from other sources.	1.1.2 1.1.1 1.1.3
Creating a Table	Create tables from templates and application parts. Create new tables.	2.1.5 2.1.1
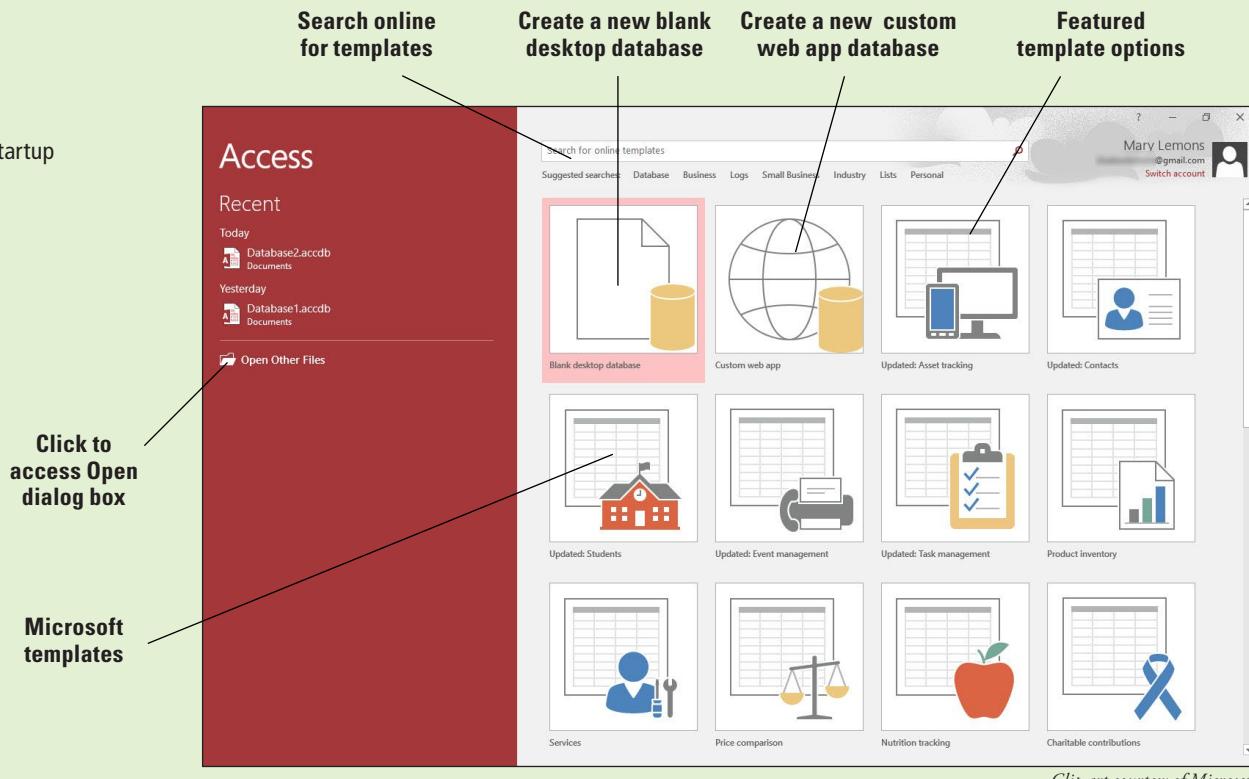
SOFTWARE ORIENTATION

Getting Started with Microsoft Access

The Access startup screen shown in Figure 2-1 provides options for opening an existing database, and creating a new blank database or a new database from a template. This is the default view after starting Access.

Figure 2-1

The Access startup screen

Clip art courtesy of Microsoft

CREATING A DATABASE

In Access 2016, the process of creating a new database is easier than ever. You can create a database using one of the many available **templates** (ready-to-use databases that contain all of the tables, queries, forms, and reports needed for performing specific tasks) or by creating a new blank database.

Using a Template to Create a Database

Access offers a variety of templates to help get you started. Some templates are immediately available for your use because they are built into Access whereas others can be easily downloaded from the Internet. There are built-in and online templates are available that you can use to track issues, manage contacts, and keep a record of expenses. Some templates contain a few sample records to help demonstrate their use. You can use templates as-is or you can customize them to better suit your needs. In this exercise, you use one of the many available templates to create a database.

STEP BY STEP   **Use a Template to Create a Database**
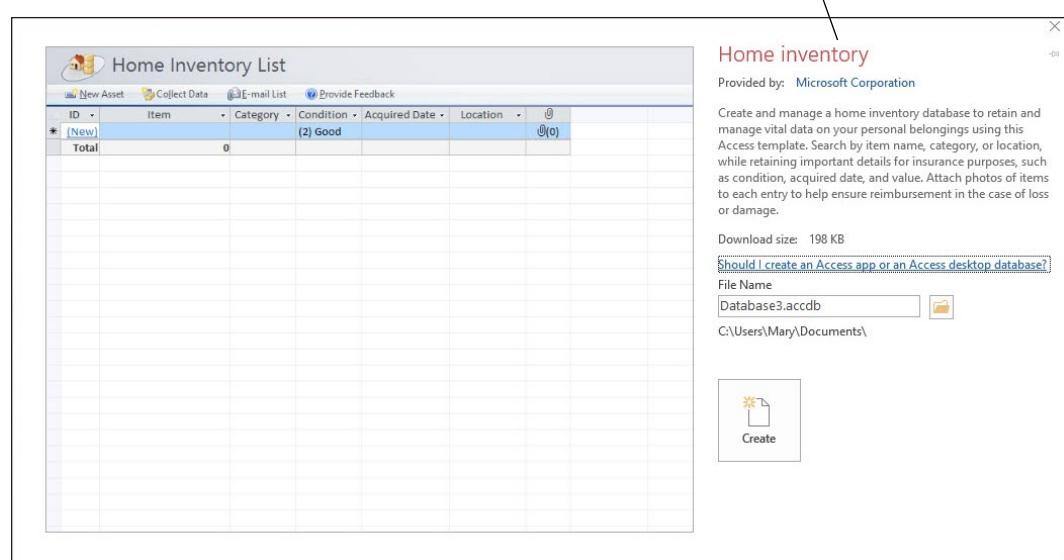
GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary. **LAUNCH** Access to display the startup screen.

1. On the top of the startup screen window, in the Search for online templates search box, type **personal**, and then press **Enter**.

2. In the list of Personal templates that appears in the middle of the startup screen results pane, click **Home inventory**. A preview screen of the selected template appears in the center of the startup screen, as shown in Figure 2-2. Close the Home inventory template preview screen.

Information about selected template displayed

Figure 2-2
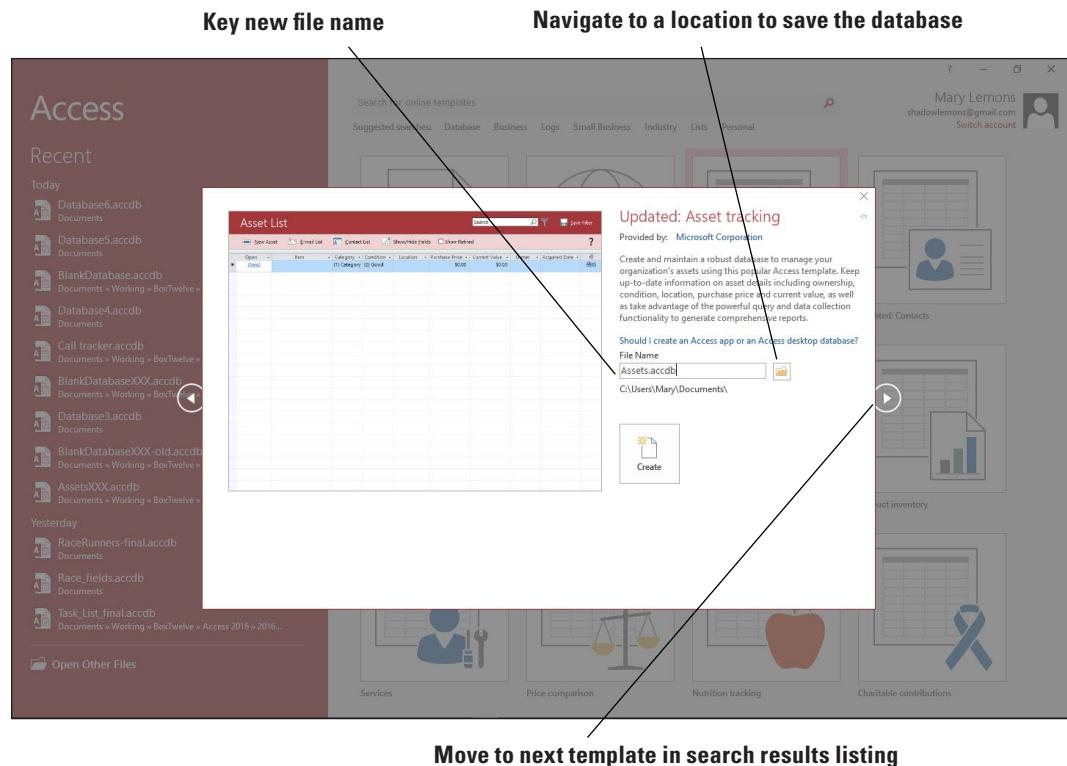
The Home inventory template preview screen

3. In the search box, type **assets** and then press **Enter**.

4. In the Assets template results list, click the **Updated: Asset tracking** database. The Updated: Asset tracking template preview screen appears.

5. In the Desktop asset tracking template preview screen, click in the **File Name** box and then replace the default file by typing **Assets**, as shown in Figure 2-3.

Key new file name   **Navigate to a location to save the database**

The File Name box and folder icon

Clip art courtesy of Microsoft

Move to next template in search results listing

Take Note   If you do not add an extension to your database file name, Access does it for you—for example, Access.accdb.

6. Click the folder icon to the right of the File Name box. The *File New Database* dialog box appears.

7. Navigate to the location where you want to save the file and then click **OK**.
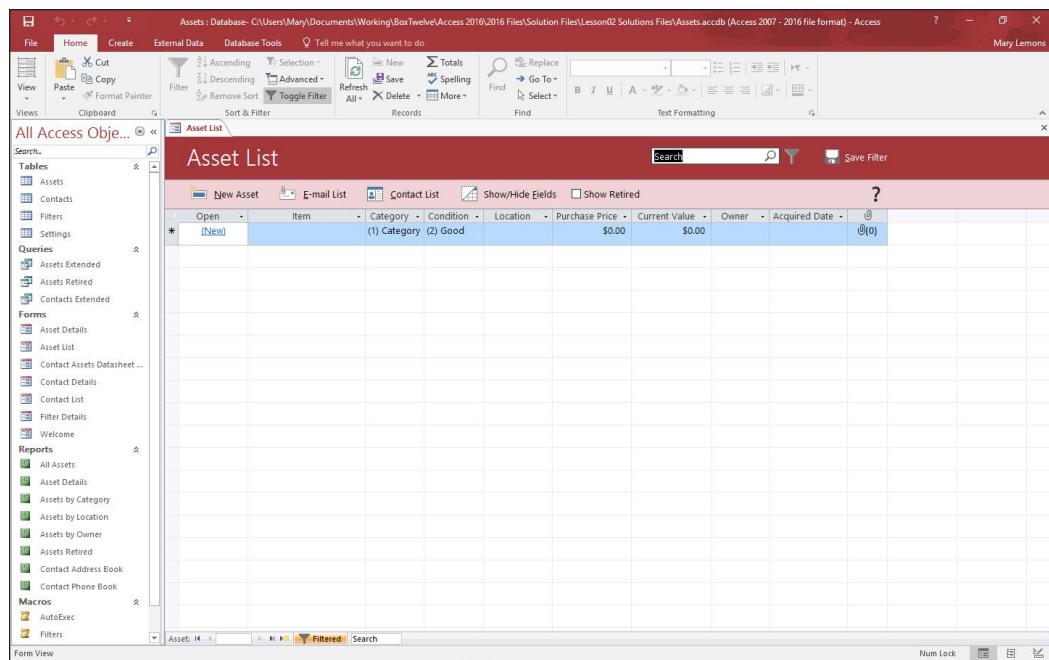
Take Note   You should save your files in a separate directory from where your data files are stored. This will ensure that you don't overwrite the original data files with your updated files.

Take Note   Unless you choose a different folder, Access uses the following default location in Windows Server 2008/2012, and Windows 7 and later to store your databases: c:\Users\<user name>\Documents

8. Click the **Create** button at the bottom of the preview pane. The preview pane indicates that the template is being downloaded. When the download is complete, the preview pane closes.

9. Access creates and then opens the Assets database, as shown in Figure 2-4. Because this database was downloaded from Office.com (a trusted source), click **Enable Content** on the Message Bar. Getting Started and Access Help windows may appear, which contain helpful videos and links about using the Asset tracking database. **CLOSE** these windows, if necessary, to return to the Assets database with the Asset List form active.

The Assets template database

10. Click to place the insertion point in the first cell of the Item field and then type **Canon EOS Rebel T3i**. Press **Enter**.

11. Click the **Shutter Bar Open/Close Button**, if necessary, to display the Navigation Pane to see all the objects in the database.

12. Click **File** and then click **Close** to close the database.

PAUSE. LEAVE Access open to use in the next exercise.

Creating a Blank Database

If you have existing data, you may decide that it is easier to create a blank database rather than using a template because it would require a lot of work to adapt your existing data to the template's defined data structure. When you create a new blank database, Access opens a database that contains a table where you can enter data, but it creates no other database objects. By default, Access creates a primary key field named "ID" for all new datasheets and sets the data type for the field to AutoNumber. In this exercise, you create a new blank database.

STEP BY STEP   **Create a Blank Database**

GET READY. START Access if it's not already running.

1. Click the **File** tab to open the New screen in Backstage view.
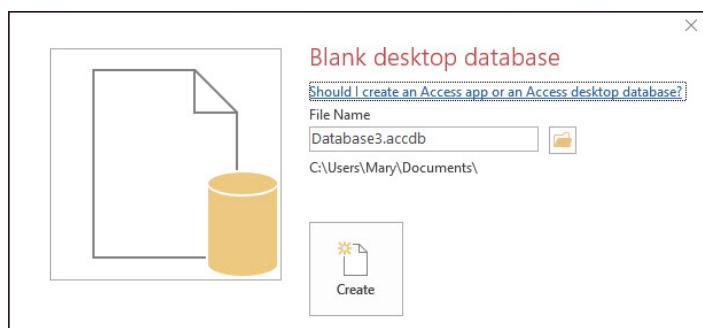
Take Note   The New screen appears in the Backstage view after you click on the File tab when no database is open. When a database is open, the File tab takes you to the Info screen in the Backstage view.

2. In the templates section of the New screen, click the **Blank desktop database** icon. A Blank desktop database screen appears in the center of the screen, as shown in Figure 2-5.

Figure 2-5

A Blank desktop database screen

3. In the File Name box, type **BlankDatabase**.

4. If you want to save the file in a location other than the one shown beneath the File Name box, click the folder icon to the right of the File Name box and browse to a different location.

5. Click **Create** button create the blank database. Access creates the database and then opens an empty table named Table1 in Datasheet view.

Take Note   At this point, you could import data from other sources, such as an Excel spreadsheet or another Access database, to populate this database. You simply create your new database as you just did, and then use the import commands on the External Data tab as discussed in Lesson 14.

PAUSE. LEAVE the database open to use in the next exercise.

With the insertion point placed in the first empty cell of your new, blank database, you can begin typing to add data. Entering data in Datasheet view is very similar to entering data into an Excel worksheet, except that data must be entered in related rows and columns, starting at the upper-left corner of the datasheet.

The table is structured through rows and columns, which become meaningful as you enter appropriate data. Any time you add a new column to the table, Access defines a new field for that column's data. You do not need to format your data by including blank rows or columns, as you might do in an Excel worksheet, because that just wastes space in your table. The table merely contains your data. All visual presentation of that data will be done in the forms and reports that you design later.

Take Note   A database has to be saved first before any objects like tables, queries, forms or reports can be added to it. For example, you cannot create a table first and then create the database to hold it.

CREATING A TABLE

It is easy to create a new table by using the Application Parts gallery and Quick Start. **Application Parts** were introduced in Access 2010 and consist of predefined templates that you can add to an existing database to help extend its functionality. Another way to create a table is to copy the structure of an existing table and then paste it into the database. You can copy a database object and paste it into the same database or into a different database that is open in another instance of Access.

Using the Application Parts Gallery and Quick Start

The Templates group on the Create tab contains the Application Parts gallery that you can use to insert predefined templates. Application parts vary from a single table to a collection of database objects like tables, forms, and reports. The Application Parts gallery consists of two categories:

Blank Forms and Quick Start. The Blank Forms category contains a collection of form parts that allows you to add predefined forms to a database. The **Quick Start** category of these templates contains a collection of predefined objects arranged by parts for tracking things such as comments, contacts, and issues. In this exercise, you will quickly create a table using the Application Parts gallery and Quick Start.
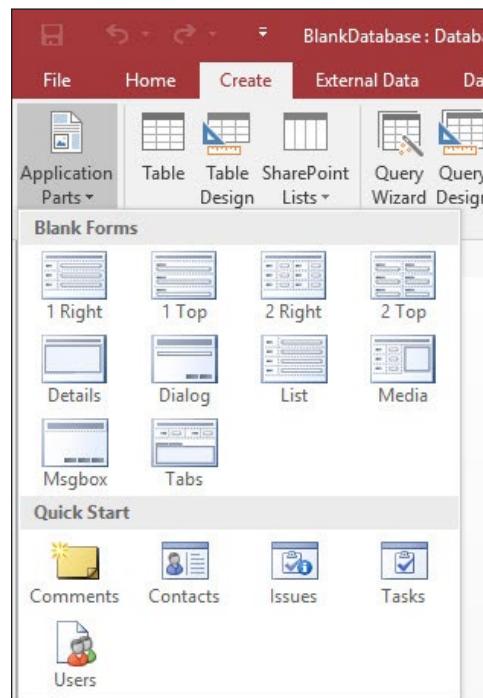
STEP BY STEP   **Create a Table Using the Application Parts Gallery and Quick Start**

GET READY. USE the *BlankDatabase* database that is still open from the previous exercise.

1. On the Create tab in the Templates group, click the **Application Parts** button to display the gallery shown in Figure 2-6.

Figure 2-6
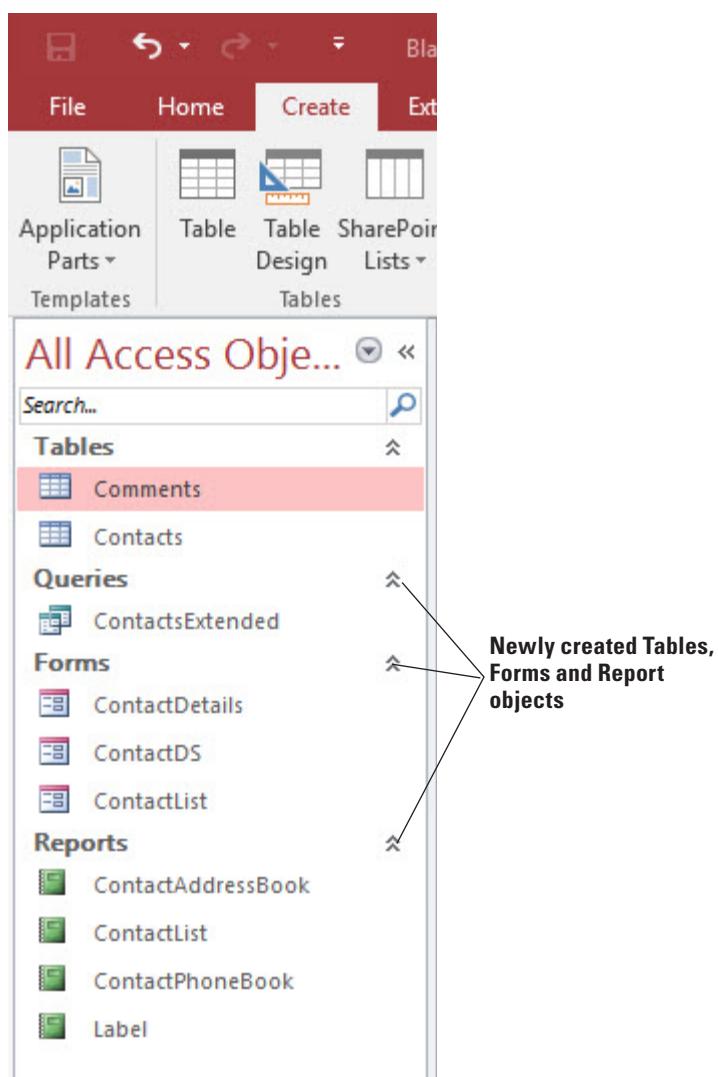
The Application Parts gallery

2. In the Quick Start section of the gallery, click **Comments**. If you are prompted to close all open objects before instantiating this application part, click **Yes** in the dialog box that appears. Notice the Comments table appears as a new object in the Navigation Pane.

3. Click the **Enable Content** button on the Message Bar to trust the database if necessary.

4. In the Navigation Pane, double-click **Comments** to display the newly created table with fields for comments. **CLOSE** the Comments table by clicking the Comments table Close button.

5. **OPEN** the Application Parts menu and then click **Contacts**.

6. In the *Create Relationship* dialog box that appears, select the **There is no relationship** option button and then click **Create**. A new table is created along with supporting forms and report objects, as shown in Figure 2-7.

PAUSE. LEAVE the database open to use in the next exercise.

Creating a Table from Another Table

Another way to create a table is to copy the structure of an existing table using the Copy and Paste commands. In this exercise, you copy the structure of an existing table to create a new table.
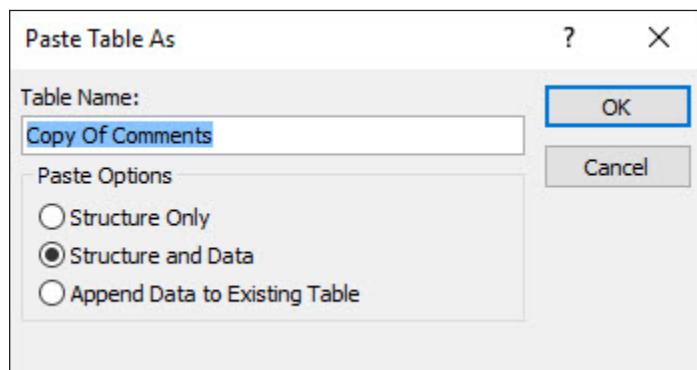
STEP BY STEP   **Create a Table from Another Table**

GET READY. USE the *BlankDatabase* database that is still open from the previous exercise.
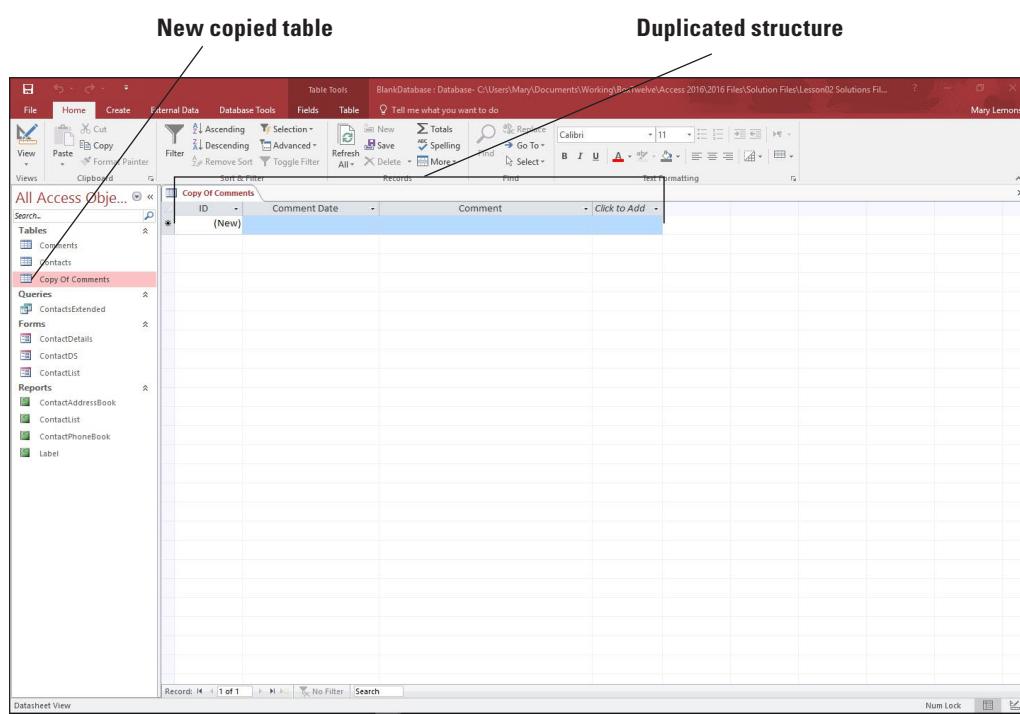
1. On the Navigation Pane, right-click the **Comments** table database object and then select **Copy** from the shortcut menu.
2. Right-click in a blank area of the Navigation Pane and select **Paste** from the shortcut menu. The *Paste Table As* dialog box appears, as shown in Figure 2-8. Notice the default name, Copy Of Comments, in the Table Name box.
3. In the Paste Options section, select the **Structure Only** option button to paste only the table's structure.
4. Click **OK**. The new table appears at the end of the list of database table objects in the Navigation Pane.

Figure 2-8

Paste Table As dialog box

5. Double-click **Copy Of Comments** to open the new table. Notice that the structure of the new table is the same as the table from which it was copied, as shown in Figure 2-9.

New copied table   Duplicated structure

Figure 2-9

New table copied from existing table

6. Click **File** and then click **Close** to close the database.

PAUSE. LEAVE Access open to use in the next exercise.

When you create a copy of a table by copying and pasting, you can re-create just the table's structure or both its structure and data. Access also provides you with a third option that appends data to an existing table. If this option is chosen, Access will attempt to append the table's records to another table you specify.

As you learned in Lesson 1, a relational database stores information in separate tables that are connected or linked by a defined relationship that ties the data together. When you add a new table to an existing database, that new table stands alone until you relate it to your existing tables. For example, say you need to track orders placed by a distributor. To do that, you add a table named Distributor Contacts to a sales database. To take advantage of the power that a relational database can provide—to search for the orders placed by a given contact, for example— you must create a relationship between the new table and any tables that contain the order data.

SAVING A DATABASE OBJECT

Access automatically saves data that you have entered any time you add an Application Part like a Quick Start template, move to a new record, close an object or database, or quit the application. But you will need to save the design of a table, or any other database object, after it is created. Additionally, you can use the Save Object As command in the Backstage view to create a duplicate of a database object (like a table, query, or report) by specifying an alternate name. You can even save objects in other formats such as the Adobe Portable Document Format (PDF) or XML Paper Specification (XPS), which helps you share data with others who may not have Access installed. Lastly, you can even save some objects as other compatible object types. For example, you can save a table as a new report which will, by default, include all table fields.

Saving a Table

When you save a new table for the first time, give it a name that describes the information it contains. You can use up to 64 characters (letters or numbers), including spaces. In this exercise, you save a database table, and then use the Save Object As command to create a duplicate of the same table.
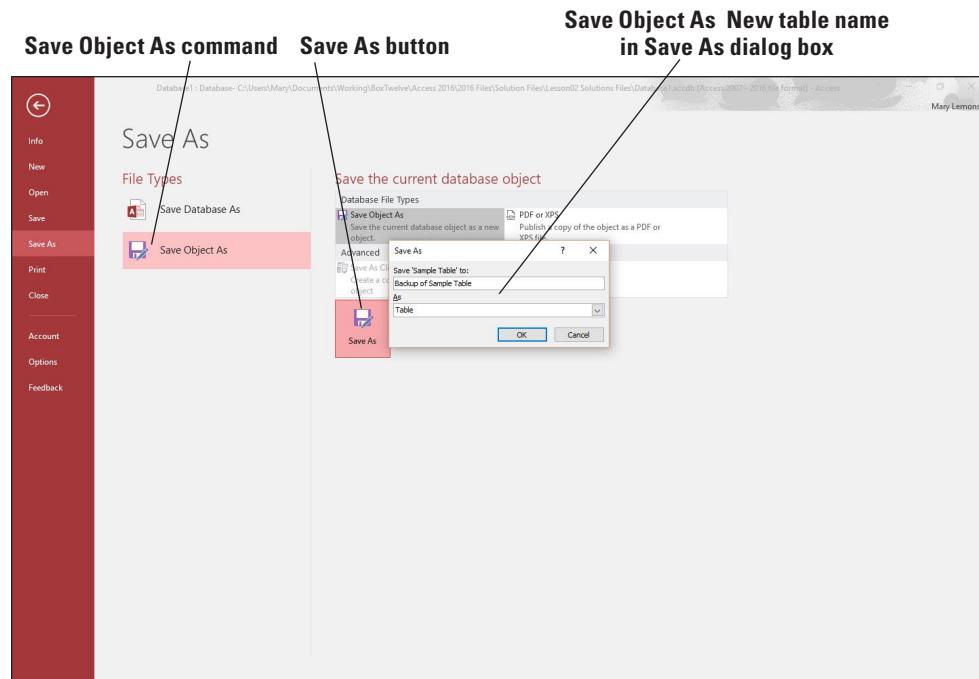
STEP BY STEP   **Save a Table**

GET READY. START Access if it's not already running.

1. From the File tab, click the **New** command and then click the **Blank desktop database** icon; a Blank desktop database screen appears in the center of the screen.
2. In the Blank desktop database screen's File Name box, the default name should be *Database1*. If not, replace the default name by typing **Database1**.
3. If you want to save the file in a location other than the one shown beneath the File Name box, click the folder icon and browse to a different location.
4. Click the **Create** button. A new blank database appears with the default table labeled Table1 displayed.
5. Click to place the insertion point in the cell under the Click to Add field and then type **Sample Data**.
6. Right-click on the **Table1** tab to display the shortcut menu and then click **Save**. The *Save As* dialog box appears.
7. In the Table Name box, type **Sample Table**.
8. Click **OK** to close the dialog box and return to the table, which now is labeled Sample Table.
9. Click the **File** tab to display the Backstage view.
10. Click **Save As** to display the Save As screen.
11. Under the File Types heading, click the **Save Object As** command.
12. Click the **Save As** button.
13. In the *Save As* dialog box that appears, type **Backup of Sample Table** in the area under "Save 'Sample Table' to:" as shown in Figure 2-10.

Figure 2-10

Save As dialog box on Save As screen

Save Object As command   Save As button   Save Object As New table name
in Save As dialog box

14. Click **OK**.

15. Notice the new table object named Backup of Sample Table in the Navigation Pane.

16. The Backup of Sample Table should now be open. Notice the table contains the same row you created in the Sample Table table.

17. **CLOSE** the Backup of Sample Table.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Fill in the Blank

Complete the following sentences by writing the correct word or words in the blanks provided.

1. Entering data in Datasheet view is very similar to entering data in a(n) _____.
2. The _____ contains predefined templates included in two categories: Blank Forms and Quick Start.
3. One way to create a table is to copy the _____ of an existing table and paste it into the database.
4. When you add a new table to an existing database, that new table stands alone until you _____ it to your existing tables.
5. The _____ category in the Application Parts gallery contains a collection of predefined database objects for tracking comments, contacts, and issues.

Multiple Choice

Select the best response for the following statements.

1. In Access, a template is which of the following?
   a. A database to manage contacts
   b. Where a database is stored
   c. Two tables linked together
   d. A ready-to-use database
2. When you create a new blank desktop database, Access opens a database that contains which of the following?
   a. One of each type of database object
   b. A table
   c. Sample data
   d. A template
3. The Templates group commands are located on which of the following tabs?
   a. Home
   b. Create
   c. Database Tools
   d. Datasheet
4. To copy a table, you must first select it in which of the following?
   a. The Clipboard
   b. Microsoft Office Online
   c. The Navigation Pane
   d. Datasheet view
5. When you paste a table, which of the following dialog boxes is displayed?
   a. Table Structure
   b. Copy Table
   c. Paste Data
   d. Paste Table As

Projects

Project 2-1: Creating a Database

In this project, you want to use Access to store, organize, and manage the contact information for the wholesale coffee suppliers used by Fourth Coffee, where you work as a buyer for the 15 stores in the northeast region. Use a template to create a database for the contacts.

GET READY. LAUNCH Access.

1. In the Search for online templates box, type **Call tracker** to find Call tracker database template and press **Enter**.
2. Select the **Call tracker** database template.
3. Type **Call tracker** in the File Name box.
4. If necessary, click the folder icon and choose a different location for the file.
5. Click **Create** to create and open the database. Click **Enable Content**, if necessary.
6. Click the **Shutter Bar Open/Close Button** to open the Navigation Pane.
7. Click the **Supporting Objects** header in the Navigation Pane to display the database objects in that group.
8. Right-click the **Customers** table under the Customers header to display the menu and click **Copy**.
9. Right-click in the white area of the Navigation Pane and click **Paste**.
10. In the *Paste Table As* dialog box, type **Customers Structure**.
11. Select the **Structure Only** option button (the table contains no record data so choosing Structure Only will have the same effect as choosing Structure and Data).
12. Click **OK**.
13. Select the **Customers Structure** object and drag it up to the Customers area to move it from Unassigned Objects to Customers.
14. Click **File** and then click **Close** to close the database. Changes are saved automatically.

PAUSE. LEAVE Access open for the next project.

Project 2-2: Adding Tables to a Database

In this project, you are a regional manager for a franchise restaurant chain and you want to keep track of restaurant locations and customer comments. You decide to create a database to store the necessary information as well as add some tables to the database.

GET READY. LAUNCH Access if it is not already running.

1. In Backstage view, on the New tab (or on the Startup screen, if Access is initially launched), click the **Blank desktop database** icon.
2. In the Blank desktop database screen that appears in the center of the screen, type **Restaurants** in the File Name box.
3. If necessary, click the folder icon and choose a different location for the file.
4. Click the **Create** button.
5. Right-click the **Table1** tab and click **Save**.
6. In the *Save As* dialog box, type **Locations**.
7. Click **OK**.
8. Click the **Create** tab, open the **Applications Parts gallery**, and then click **Comments**.
9. Click **Yes** to close all open Objects.
10. In the *Create Relationship* dialog box that appears, click the **Cancel** button.
11. Click **Enable Content**.
12. Rename the Comments table to **Uptown Comments**.
13. Copy the structure of the Uptown Comments table to create a new table.
14. Name the new table **Downtown Comments**. Changes are saved automatically.

EXIT Access.

Working with Tables and Database Records 3

LESSON SKILL MATRIX

Skills	Exam Objective	Objective Number
Navigating Among Records	Navigate specific records.	1.3.1
Entering, Editing, and Deleting Records	Add records. Update records. Delete records.	2.3.2 2.3.1 2.3.3
Working with Primary Keys	Set the primary key.	1.2.2
Finding and Replacing Data	Find and replace data.	2.3.5
Sorting and Filtering Data and Setting Field Viewing Options within a Table	Sort records. Filter records. Hide fields in tables.	2.3.6 2.3.7 2.2.1
Understanding Table Relationships	Enforce referential integrity. Set foreign keys. Create and modify relationships. View relationships.	1.2.3 1.2.4 1.2.1 1.2.5

NAVIGATING AMONG RECORDS

Database tables can be very large, and contain useful information that can be manipulated in different ways. When a table contains many records and fields, it is important to be able to navigate among them.

Navigating Using the Keyboard

Access users who prefer using the keyboard to navigate records can press keys and key combinations to move among records in Datasheet view. In Datasheet view, you can navigate among records using the up, down, left, and right arrow keys to move to the field you want. You can also use the Tab key to move from field to field in a record and from the last field in a record to the first field of the next record. If you prefer to use the mouse, you can move among records by clicking the navigation buttons, which you will do in a later exercise. However, in this exercise, you use the keyboard to navigate among records.

Table 3-1 lists keys and key combinations for moving among records.

Commands	Results
Tab or Right Arrow	Moves cursor to the next field
End	Moves cursor to the last field in the current record
Shift+Tab or Left Arrow	Moves cursor to the previous field
Home	Moves cursor to the first field in the current record
Down Arrow	Moves cursor to the current field in the next record
Ctrl+Down Arrow	Moves cursor to the current field in the last record
Ctrl+End	Moves cursor to the last field in the last record
Up Arrow	Moves cursor to the current field in the previous record
Ctrl+Up Arrow	Moves cursor to the current field in the first record
Ctrl+Home	Moves cursor to the first field in the first record

STEP BY STEP   **Use the Keyboard to Navigate among Records**

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and **LAUNCH** Access.

1. **OPEN** *Fourth Coffee* from the data files for this lesson.
2. Click the **File** tab and then click the **Save As** option on the left side of the Backstage view.
3. Click the **Save As** command. The *Save As* dialog box appears. Type **Fourth Coffee-final** in the File name box. Find the location where you will save the solution files for this lesson and then click **Save**.
4. Click **Enable Content**.
5. In the Navigation Pane, double-click **Coffee Inventory: Table** to open the table.
6. Notice that the first cell of the first record is selected.
7. Press the **Down Arrow** key to move down to the next row. Notice that the first cell is selected.
8. Press the **Right Arrow** key to move to the Product Name field.
9. Press the **Tab** key to move to the next cell.
10. Press the **Tab** key to move to the next cell.
11. Press the **Tab** key to move to the next row.
12. Press **Ctrl+Down Arrow** to move to the first field of the last record.
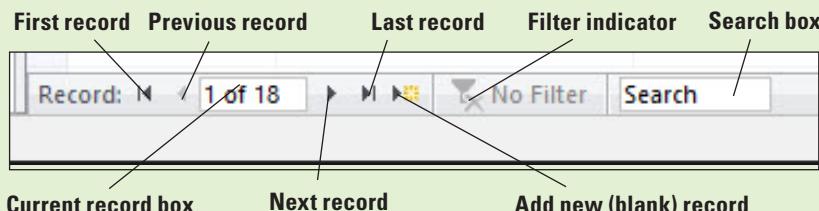
PAUSE. LEAVE the database open to use in the next exercise.

SOFTWARE ORIENTATION

Record Navigation Buttons

The record navigation buttons are displayed at the bottom of the screen in Datasheet view, as shown in Figure 3-1.

Figure 3-1

The Record Navigation buttons

First record Previous record   Last record   Filter indicator   Search box

Current record box   Next record   Add new (blank) record

Click the First record, Previous record, Next record, Last record, and New (blank) Record buttons to go to those records. (Your ability to click these may differ based on the number of records in the database you have open.) Type a record number into the Current Record box and then press Enter to go to that record. Type data into the Search box to find a match in the table. The Filter Indicator shows whether a filter has been applied to the table, which will be covered later in this lesson.

Using Navigation Buttons

Access users who prefer to use the mouse can use the navigation buttons at the bottom of Datasheet view to move among records. In this exercise, you use these buttons to navigate among records.

STEP BY STEP **Use Navigation Buttons**

GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise.

1. Click the **First record** button. The selection moves to the first record.
2. Click the **Next record** button. The selection moves to the next record.
3. Select and then delete the number **2** in the Current Record box. Type **5** and then press **Enter**. The selection moves to the fifth record.
4. Click the **Search** box to position the insertion point. Type **sunrise** into the Search box. Notice that the selection moves to the first occurrence of the word Sunrise.
5. Press **Enter**. The selection moves to the next occurrence of the word Sunrise.
6. Click the **New (blank) record** button. The insertion point moves to the first column and last row of the table.

PAUSE. LEAVE the database open to use in the next exercise.
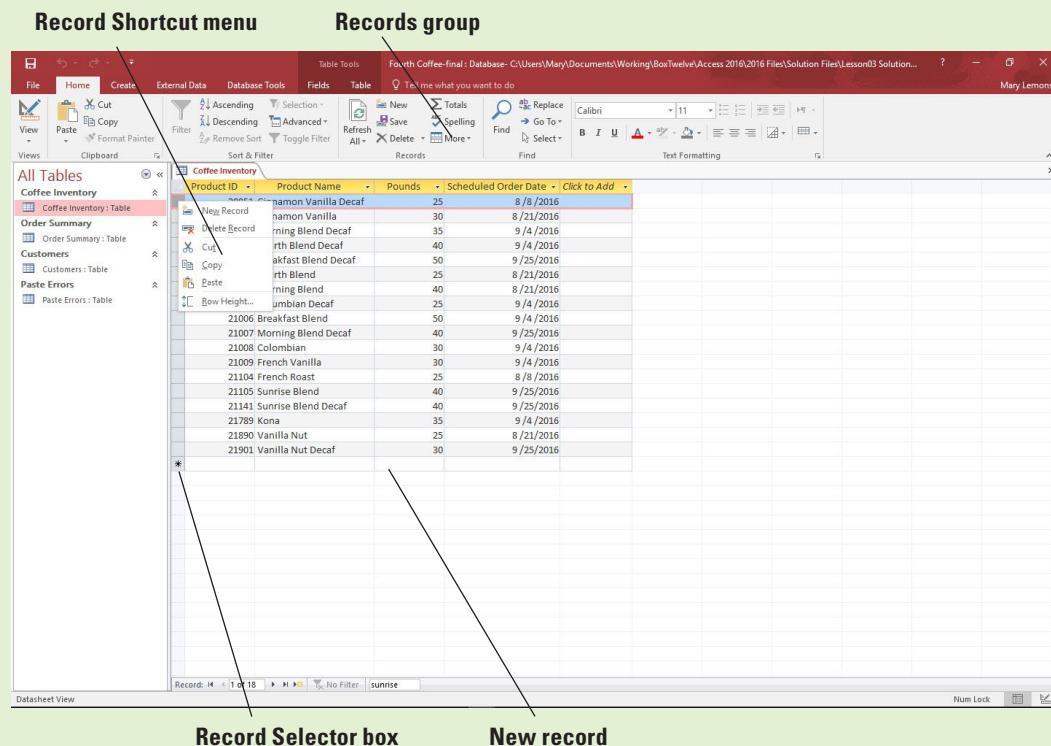
SOFTWARE ORIENTATION

Records Group, Record Selector Box, and Record Shortcut Menu

There are a few ways you can enter record data, delete data from individual fields of records, and insert and delete entire records, using the Records group, Record Selector box, and commands in the Record shortcut menu (accessed by right-clicking on the Record Selector box), shown in Figure 3-2.

Record Shortcut menu   **Records group**

Figure 3-2
Records Group, Record Selector Box, and Record Shortcut Menu

Record Selector box   **New record**

Use the commands in the Records group and the Record shortcut menu, as well as the Record Selector box (a blank square to the left of a record), to assist you in entering record data and inserting and deleting records.

ENTERING, EDITING, AND DELETING RECORDS

Keeping a database up-to-date and useful is an ongoing process. You can easily enter data by positioning the insertion point in the table cell where you want to add data and begin typing. To insert a new record, select any record in the table and then click the New button on the Home tab in the Records group. You can also click the Record Selector box, right-click the selected record, and then select New Record from the shortcut menu. A new record is added to the end of the table. Select existing data to edit or delete it.

Entering, Editing, and Deleting Records

After you enter data and move to a new field, Access automatically saves the data in the table. Each field in a table is formatted with a specific data type, so you must enter that kind of data in the field. If you do not, you will get an error message. To delete information from an individual field of a record, highlight the field data and then press the Delete key or click the Delete button on the Home tab in the Records group. If you change your mind after you delete information from a field, you can undo the action by clicking the Undo button on the Quick Access Toolbar. In this exercise, you enter a new record as well as edit and delete existing records.

You can delete an entire record or several records at once from a database. Just select the row or rows using the Record Selector box, and then press the Delete key or click the Delete button on the Home tab in the Records group. You can also right-click and select Delete Record from the shortcut menu. After you delete a record, you cannot undo it.
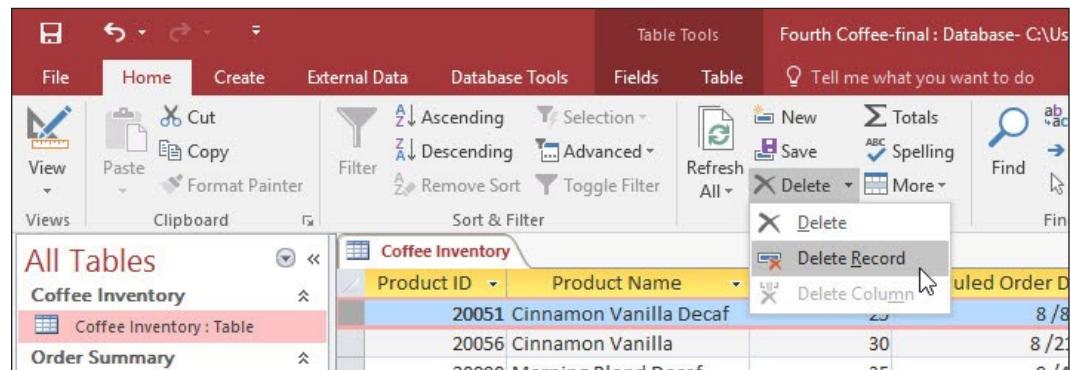
| STEP BY STEP | Enter, Edit, and Delete Records |

GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise.

1. The insertion point should be positioned in the first field of the new, blank row at the bottom of the datasheet. Notice the asterisk in the Record Selector box, which indicates that this is a new record, ready for data.
2. Type **21905** and then press **Tab**. Notice that the asterisk has changed to a pencil icon, indicating that the record is being edited.
3. Type **Hazelnut** and then press **Tab**.
4. Type **30** and then press **Tab**.
5. Type **09252016** and then press **Enter**.
6. Highlight **sunrise** in the Search box and then type **Kona** to locate the Kona record.
7. Click **Kona** in the record to position the blinking insertion point there. Delete **Kona**, type **Hawaiian**, and then press **Tab**.
8. Click the **Undo** button on the Quick Access Toolbar. Notice Hawaiian disappears and Kona reappears.
9. Press **Tab**. Type **08212016** and then press **Tab**.
10. Click the **Record Selector** box to the left of the Product ID field of the first record, 20051.
11. On the Home tab, in the Records group, click the **Delete** button drop-down arrow. Select **Delete Record** from the menu (see Figure 3-3). Click **Delete Record**.

Figure 3-3

Delete menu

12. A dialog box appears asking if you are sure you want to delete the record. Click **Yes**.
13. Notice that the Undo button on the Quick Access Toolbar is not available because you cannot undo a record deletion. **CLOSE** the table.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   You should be cautious when deleting record data. You cannot undo the deletion of a record.

WORKING WITH PRIMARY KEYS

As you learned in Lesson 1, a primary key is a column that uniquely identifies a record or row in a table. Customer IDs, serial numbers, or product IDs usually make good primary keys. Each table

should have a primary key, and some tables might have two or more. When you divide informa-tion into separate tables, the primary keys help Access bring the information back together again.

Defining a Primary Key

You can define a primary key for a field in Design view by selecting the row that contains the field for which you want to assign a primary key and then clicking the Primary Key button on the Design tab in the Tools group on the Ribbon. When you create a new database, Access creates a primary key field named "ID" by default and sets the data type for the field to AutoNumber. If you do not have a field in an existing database that you think will make a good primary key, you can use a field with the AutoNumber data type. It does not contain factual information (such as a telephone number) about a record, and it is not likely to change. In this exercise, you define a primary key.

Once a primary key is defined, you can use it in other tables to refer back to the table with the primary key. When a primary key from one table is used in another table, it is called the **foreign key**. The foreign key is used to reference the data from the primary key to help avoid redundancy.

You can modify a primary key by deleting it from one field and adding it to another field. To re-move a primary key in Design view, select the row and then click the Primary Key button on the Design tab in the Tools group on the Ribbon to remove it.

| STEP BY STEP | Define a Primary Key |

GET READY. USE the **Fourth Coffee-final** database that is still open from the previous exercise.

1. In the Navigation Pane, double-click **Order Summary: Table** to open the table.
2. On the Home tab, in the Views group, click the bottom half of the **View** button, and from the menu that appears, select **Design View**.
3. Click the **Row Selector** box beside the Order ID row to select the row.
4. On the Design tab, in the Tools group, click the **Primary Key** button. The Primary Key button is highlighted. A key icon appears on the Order ID row to designate the field as a primary key (see Figure 3-4).

Figure 3-4

Primary Key

Primary Key button

Indicates the field is the primary key

PAUSE. LEAVE the table open to use in the next exercise.

Defining and Modifying a Multifield Primary Key

In some cases, you may want to use two or more fields that, together, provide the primary key of a table. In Design view, select the rows you want to designate as primary keys and then click the Primary Key button. To remove multiple primary keys, select the rows, and then click the Primary Key button. In this exercise, you practice defining and modifying a multifield primary key.

Two or more primary keys in a table are called the **composite key**. Composite keys are useful in unique situations when a combination of data from two fields needs to provide a unique identifier in a table. For example, area code field data and phone number field data can be combined to create a unique combination of numbers that cannot be duplicated. Separate, neither the area code data nor the phone number data is unique and can be duplicated; however, together they form a unique set of numbers that cannot be duplicated. Likewise, a business can repeat both order identification number field data and customer identification number field data for multiple customers; however, these numbers become unique when combined resulting in a composite key for each customer.

STEP BY STEP	Define and Modify a Multifield Primary Key

GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise. Be sure you are still in Design View on the Order Summary table.

1. Press and hold the **Ctrl** key.
2. Click the **Row Selector** box beside the Paid row. Continue to hold down the **Ctrl** key and then click the **Order ID Row Selector** box. Both fields should be selected (see Figure 3-5). If not, continue to hold the **Ctrl** key and then click the **Paid Row Selector** box again.

Figure 3-5

Primary Key row and another row selected

Both fields are
selected

3. On the Design tab, in the Tools group, click the **Primary Key** button. A key icon should be displayed beside both of the two selected fields. The combination of data from these two fields *do not* make a sensible composite key, and this designation will be removed.

4. With the rows still selected, click the **Primary Key** button again to remove the primary key designation from both fields.

5. Click any field name to remove the selection.

6. Click the **Row Selector** box beside the Order ID row. Press and hold the **Ctrl** key and then click the **Row Selector** box beside the Customer ID row. Both fields should be selected.

7. On the Design tab, in the Tools group, click the **Primary Key** button. Both rows should have a key displayed beside them. The resulting composite key is more valid.

8. Click the **Save** button on the Quick Access Toolbar.

9. **CLOSE** the table.

PAUSE. LEAVE the database open to use in the next exercise.

FINDING AND REPLACING DATA

A big advantage of using a computer database rather than paper and pencil for recordkeeping is the ability to quickly search for and/or replace data. You can access these features from the Find and Replace dialog box. The Find and Replace commands in Access work very much like those in Word and other Office applications. You can use the Find command to search for specific text in a table or to move quickly to a particular word or number in the table. You can use the Replace command to automatically replace a word or number with something else.

In the Find and Replace dialog box, type the text or numbers that you want to search for into the Find What box and then click Find Next to locate the record containing the data. If you want to replace the data, type the new data into the Replace With box and then click Replace or Replace All.

Take Note   When replacing data, it is usually a good practice to click Replace instead of Replace All so that you can confirm each replacement to make sure that it is correct.

Finding and Replacing Data

The Find and Replace dialog box searches only one table at a time; it does not search the entire database. The Look In menu allows you to choose to search by field or to search the entire table. By default, Access searches the field that was selected when you opened the Find and Replace dialog box. If you want to search a different field, select the field while the dialog box is open; you do not have to close it first. In this exercise, you find and replace table data.

Remember these points when finding and replacing data in Access 2016:

• In the Match menu, you can specify where you want Access to look in a field. Select Any Part of Field for the broadest search.

• Sometimes, Access selects the Search Fields As Formatted check box. When it does, do not clear the check box, or your search probably will not return any results.

• Click the Match Case box to search for text with the same uppercase and/or lowercase capitalization of text.

• You can use **wildcard** characters such as a question mark or asterisk to find words or phrases that contain specific letters or combinations of letters. Type a question mark (?) to represent a single character—for example, typing b?t will find bat, bet, bit, and but. Type an asterisk (*) to represent a string of characters—for example, m*t will find mat, moment, or even medium format.

• If you type a wildcard character in the Replace With box, Access will insert that character just as you typed it.
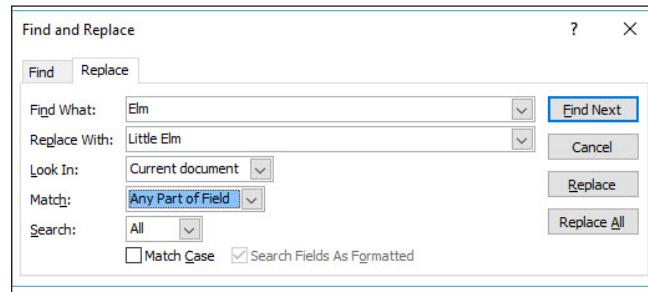
Find and Replace Data

**GET READY. USE** the *Fourth Coffee-final* database that is still open from the previous exercise.

1. **OPEN** the **Customers** table.
2. On the Home tab, in the Find group, click the **Find** button. The *Find and Replace* dialog box appears with the Find tab displayed.
3. Click the **Replace** tab in the *Find and Replace* dialog box.
4. Type **Elm** into the Find What box.
5. Type **Little Elm** into the Replace With box.
6. Click the **down arrow** beside the Look in menu, and then select **Current document** if it is not already selected.
7. Click the **down arrow** beside the Match menu and then select **Any Part of Field** if it already is not selected to broaden the search (see Figure 3-6).

Figure 3-6

Find and Replace dialog box

8. Click the **Find Next** button. Access searches the table, finds, and selects the word *Elm*.
9. Click the **Replace** button. Access replaces *Elm* with *Little Elm*.
10. Click the **Find Next** button. Access finds *Elm* in the new text that was just inserted.
11. Click **Find Next** again. Access displays a message saying that no more occurrences of the word have been found. Click **OK**.
12. Click **Cancel** to close the *Find and Replace* dialog box.
13. Press the **down arrow** to remove the selection and allow Access to save the change.
14. **CLOSE** the table.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   If you want to use the Find and Replace dialog box to search for characters that are used as wildcards, such as a question mark, you must enclose that character in brackets, for example [?]. Follow this rule when searching for all wildcard characters except exclamation points (!) and closing brackets (]) where you would simply search for these without any surrounding brackets.

ATTACHING AND DETACHING DOCUMENTS

Access 2016 allows you to attach documents, such as Word documents or photo files, to records in a database. For example, the human resources department of a large company could keep a photo, a resume, and employee evaluation documents with each employee record. These attached files can also be easily detached, if necessary. The Attachments dialog box allows you to manage the documents attached to records.

Take Note   You cannot attach files to databases created in versions of Access prior to Access 2007. You cannot share attachments with a database created in these prior versions of Access.

Attaching and Detaching Documents

Before you can start attaching documents, you must create a field in a table and format it with the Attachment data type. You can add the field in Datasheet view or in Design view. Access displays a paper clip icon in the header row and in every record in the field along with a number in parentheses indicating the number of attached files in the field. In this exercise, you create a new field and format it with the Attachment data type, and then remove the attachment from your database records.

Double-click the record in the Attachments field to display the Attachments dialog box where you can add, remove, open, or save multiple attachments, such as images, documents, and spreadsheets, for a single record. You can save attached files to your hard disk or network drive so that you can save changes to documents there before saving them to the database.

Take Note   You can attach a maximum total of 2 GB of data, but each individual file cannot exceed 256 MB in size.

If the program that was used to create the attached file is installed on your computer, you can open and edit the file using that program. For example, if you open a Word resume that is attached to a record, the Word program starts and you view the document in Word. If you do not have the program that was used to create a file, Access prompts you to choose a program you do have to view the file.
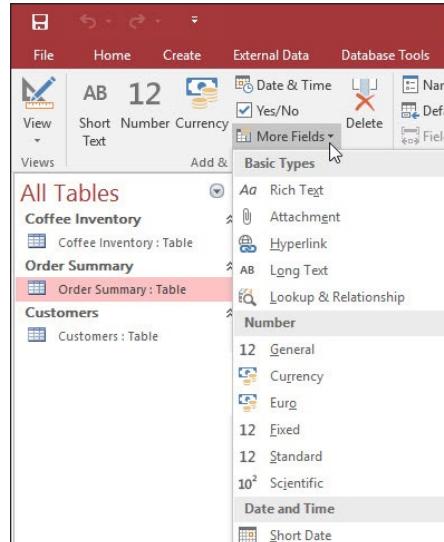
STEP BY STEP   **Attach and Detach Documents**

GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise.

1. **OPEN** the **Order Summary** table.
2. Click the header row of the Due Date field to select it.
3. In the Add & Delete group on the Table Tools Fields contextual tab, click the **More Fields** button. The More Fields menu appears (see Figure 3-7).

Figure 3-7

More Fields menu

4. Click **Attachment** under Basic Types. The Attachment field is inserted in the table.

5. Double-click the first row of the Attachments field. The *Attachments* dialog box appears.

6. Click the **Add** button. Navigate to the data files for this lesson and select *invoice100.docx*. Click **Open**. The document appears in the *Attachments* dialog box.

7. Click **OK**. The number of attachments in the first record changes to 1.

8. Double-click the attachment number in the Attachment field. The *Attachments* dialog box appears.

9. Click the **Open** button. The attachment, an invoice document, opens in Word.

10. Click the **Close** button to close the invoice document and return to Access.

11. Click the **Access** button on the taskbar, if necessary, to return to Access.

12. In the *Attachments* dialog box, click the **Remove** button and then click **OK**. The attachment is removed from the record.

13. **CLOSE** the Order Summary table.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   Once a field has been set to the Attachment data type, it cannot be converted to another data type.

SORTING AND FILTERING DATA AND SETTING FIELD VIEWING OPTIONS WITHIN A TABLE

It is often helpful to display data in order, display similar records, or hide and freeze certain fields without affecting the preexisting data. Sorting allows you to order records. For example, an office contact list that displays employees in alphabetical order by last name would help the user find information for a particular employee quickly. If you wanted to view only the records of employees in a particular department, you could create a filter to display only those records. You could also hide or freeze certain fields. For example, in a table that has several fields, you can hide or freeze fields to help you concentrate on certain data.

Sorting Data within a Table

To **sort** data means to arrange it alphabetically, numerically, or chronologically. Sorting within a table displays all the records in the table in the order that you select. You can easily sort by one or more fields to achieve the order that you want. Access can sort text, numbers, or dates in ascending or descending order. **Ascending** order sorts data from beginning to end, such as from A to Z, 1 to 10, and January to December. **Descending** order sorts data from the end to the beginning, such as from Z to A, 10 to 1, and December to January. In this exercise, you sort data using multiple fields, and then remove the sort.

To sort text, numbers, dates, or other data types in a column, you first need to select the column, and then click the Ascending or Descending button in the Sort & Filter group of the Home tab. You can also right-click a selected column and choose a Sort command from the shortcut menu. The available sort commands in the shortcut menu vary depending on the type of data in the column. For example, numbers are sorted largest to smallest or smallest to largest, text is sorted alphabetically A to Z or Z to A, Yes/No is sorted by cleared or selected, and dates are sorted newest to oldest or oldest to newest.

You can also sort records on multiple fields. When you are using multiple fields, determine in which order you want them to be sorted. The primary sort field is called the **outermost field**. A secondary sort field is called an **innermost field**. For example, if you want to sort a contact list so that each employee's last name is sorted primarily and first name is sorted secondarily, Last Name would be the outermost field and First Name would be the innermost field. In your completed sort, Smith, Lauren, would be listed before Smith, Mark, in an A to Z (ascending) sort. When designating the sort order, however, you select the innermost field first and choose the type of sort you want from the shortcut menu. Then select the outermost field and then select the type of sort that you want.

After you sort one or more columns, Access inserts sort arrows in the header row to show that the field is sorted. These sort commands remain with the table until you remove them. When you want to remove a sort order, click the Remove Sort button from the Sort & Filter group on the Home tab. This removes the sorting commands from all the fields in the table. In a table with more than one sorted field, you cannot remove just one sort.
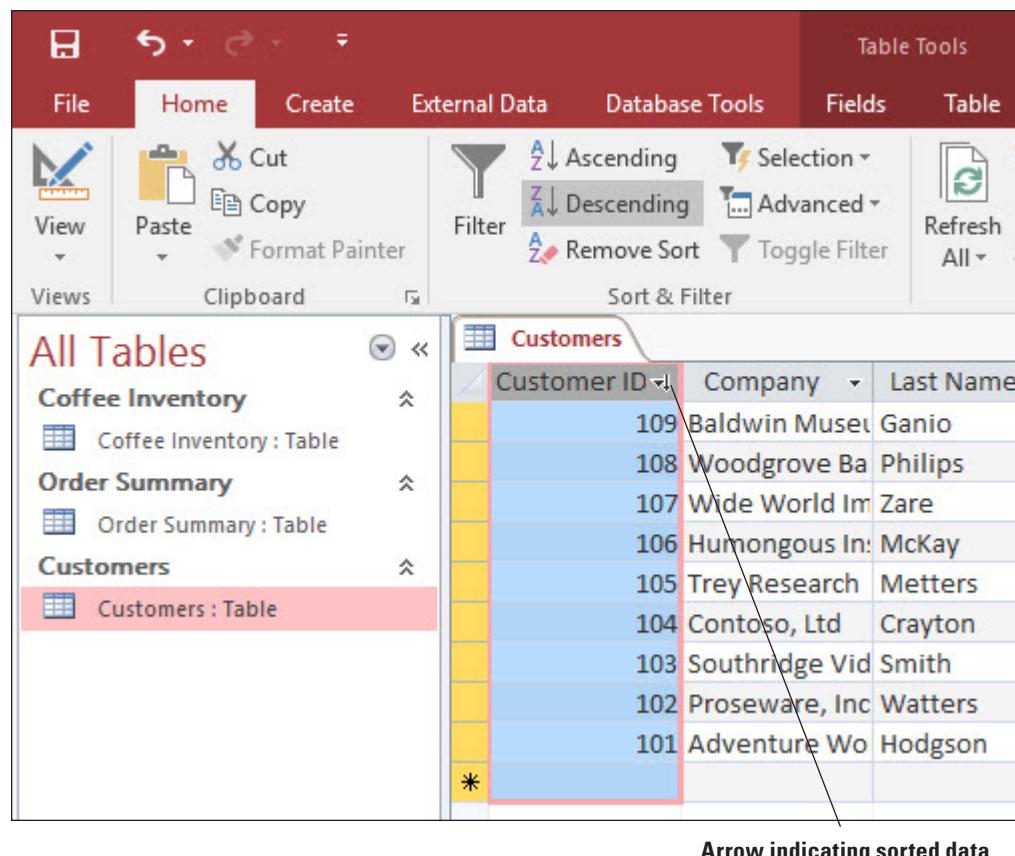
Sort Data within a Table

GET READY. USE the ***Fourth Coffee-final*** database that is still open from the previous exercise.

1. **OPEN** the Customers table.
2. Click the header row of the Customer ID field to select it.
3. On the Home tab, in the Sort & Filter group, click the **Descending** button. The data is sorted from largest to smallest, as shown in Figure 3-8. The data is sorted and an arrow is inserted in the header row indicating that the data is displayed in descending sort order.

Figure 3-8

Sort & Filter group and sorted data

Arrow indicating sorted data

Take Note   The arrow points up or down depending on whether the data is sorted in ascending or descending order.

4. On the Home tab, in the Sort & Filter group, click the **Remove Sort** button. The sort is removed from the Customer ID field.
5. Select the **First Name** field, right-click in the field to display the shortcut menu, and then click **Sort A to Z**. The data in the First Name field is sorted in ascending order.
6. Select the **Last Name** field. On the Home tab, in the Sort & Filter group, click the **Ascending** button. The data in the Last Name field is sorted in ascending order.

7. On the Home tab, in the Sort & Filter group, click the **Remove Sort** button. The sort is removed from both the First Name and Last Name fields.

8. **CLOSE** the table. If a dialog box appears asking if you want to save changes to the table, click **No**.

PAUSE. LEAVE the database open to use in the next exercise.

Filtering Data within a Table

A **filter** is a set of rules for determining which records will be displayed. When you apply a filter, Access displays only the records that meet your filter criteria; the other records are hidden from view. Once the filtered records are displayed, you can edit and navigate the records just as you would without a filter applied. Filters remain in effect until you close the object. You can toggle between views, and the filter settings will stay in effect. To make the filter available the next time you open the object, save the object before closing it. You can then reapply the filter the next time you open the object by clicking the Toggle Filter button in the Sort & Filter group on the Ribbon. In this exercise, you practice creating filters in several different ways.

STEP BY STEP   **Apply a Filter**

GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise.

1. **OPEN** the Coffee Inventory table.

2. Select the **Product Name** field.

3. On the Home tab, in the Sort & Filter group, click the **Filter** button. A menu appears.

4. Point to **Text Filters**. A second menu appears. Select **Contains** (see Figure 3-9). Click **Contains**.

Figure 3-9

Filter menu with Contains selected

5. The *Custom Filter* dialog box appears. Type **Decaf** and then click **OK**. Access filters the database to display only the records containing the word Decaf. A filter icon is displayed in the header row of the field.

6. Click the **Toggle Filter** button in the Sort & Filter group to display the records without the filter.

7. In the second record in the Product Name field, double-click the word **Decaf** to select it.

8. Right-click the word **Decaf** to display the shortcut menu and then select **Does Not Contain "Decaf"** (see Figure 3-10). Click **Does Not Contain "Decaf"**. Notice that the records are filtered to show only those that do not contain the word Decaf.

9. Click in the **Pounds** field of the first record.

10. On the Home tab, in the Sort & Filter group, click the **Filter** button.

11. Click the check boxes to remove the check marks beside **(Blanks)**, **30**, **35**, **40**, and **50**. Only the check mark beside 25 should remain.

Take Note   You can also uncheck Select All, and then check 25.

12. Click **OK**. Access filters the records to show only those containing the number 25 in the Pounds field.

13. Click the **Toggle Filter** button.

14. In the second row of the Scheduled Order Date field, highlight **9/4/2016** by clicking and dragging the mouse.

Take Note   Notice a '#' appears after the '9' and the '4' in the month and day parts of the selected date. This is a placeholder character that is part of the input mask field property for this field. This means that when data is entered in this field, it must follow a certain pattern. In this case, MM/DD/YYYY.

15. On the Home tab, in the Sort & Filter group, click the **Selection** button.

16. Select **On or After 9#/4#/2016**. The data is filtered to show only those records with content in the Scheduled Order Date field that matches the filter selection.

17. In the seventh row of the Pounds field, select **30**.

18. On the Home tab, in the Sort & Filter group, click the **Selection** button, and then select **Less Than or Equal to 30**. The records are filtered accordingly.

PAUSE. **LEAVE** the database open to use in the next exercise.

Take Note   Only one filter can be applied per column. When you apply a filter to a column that is already filtered, the previous filter is removed and the new filter is applied.

Take Note You cannot apply a case-specific filter. For example, filtering a table for "Decaf" will find all occurrences of the word "decaf" including "Decaf", "decaf", "deCaf", etc.

Removing a Filter

After applying a filter, you may need to return to records not displayed by the filter. The Toggle Filter button lets you toggle between viewing the filtered records and viewing the table without the filter. Note that the purpose of this button changes accordingly—when the records are filtered, the button is used to remove the filter, and when the filter is removed the button is used to apply the filter. When you are finished using the filter, you can permanently remove it. In this exercise, you permanently remove the filter you previously applied.

STEP BY STEP   **Remove a Filter**

GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise.

1. Select the **Pounds** field and then on the Home tab, in the Sort & Filter group, click the **Filter** button. A menu appears.
2. Select **Clear filter from Pounds**.
3. On the Home tab, in the Sort & Filter group, click the **Advanced** button, and then select **Clear All Filters** from the menu.
4. **SAVE** and **CLOSE** the table.

PAUSE. LEAVE the database open to use in the next exercise.

Freezing/Unfreezing and Hiding/Unhiding Fields

Sometimes you may need to change the view of a table's data to more efficiently find the information you are looking for. For example, it may be helpful to freeze First Name and Last Name fields so you can keep them fixed on the screen and then horizontally scroll and view other pertinent fields, like E-mail or Telephone Number, to get a better view of your data. You can also hide those fields that may distract you from getting a better view of the data. For example, if you are interested in viewing just a person's name and telephone number, you may decide to hide all fields except First Name, Last Name, and Phone Number. In this exercise, you practice freezing and unfreezing fields, as well as hiding and unhiding them.

STEP BY STEP   **Freeze/Unfreeze and Hide/Unhide Fields**

GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise.

1. **OPEN** the Customers table.
2. Select the **Last Name** field, and then on the Home tab, in the Records group, click the **More** button.
3. Select **Freeze Fields** from the menu that appears. Notice that the Last Name field moves to the first field position in the table.
4. Click the **Restore Down** button (see Figure 3-11) on the application window. The Restore Down button now becomes the Maximize button.

Figure 3-11

Restore Down button

5. Press the **Right Arrow** key to scroll the table's fields to the left, and stop when you reach the ZIP/Postal Code field. Notice that the Last Name field stays fixed as the other fields scroll.

6. Click the **More** button again and then select **Unfreeze All Fields**. Notice how the Last Name field remains in the table's first field position.

7. Press the **Right Arrow** key several times until the Last Name field scrolls off from view. Notice how the Last Name field moved with the other fields when the Right Arrow key was pressed several times.

Take Note   Fields can be rearranged in Datasheet view by clicking on the field name headers and dragging them to where you want to move them.

8. Click the **Maximize** button on the application window.

9. Select the **Customer ID** field. Click the **More** button and then select **Hide Fields**. Notice the Customer ID field is now hidden from view (see Figure 3-12).

Customer ID field is hidden

Figure 3-12

Hidden Customer ID field

Take Note   To select more than one field to freeze or hide, hold down the Shift key while selecting adjacent fields.

10. Click the **More** button and then select **Unhide Fields**. The *Unhide Columns* dialog box appears. Notice the check mark is missing from the Customer ID check box, signifying that it is hidden.

11. Deselect the check boxes next to all the other field representations except Last Name and Business Phone and then click the **Close** button in the *Unhide Columns* dialog box. Notice the only fields now displayed in Datasheet view are the Last Name and Business Phone fields.

12. **CLOSE** the Customers table without saving the changes to the layout.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   You can save your table so it retains your formatting the next time you open it.
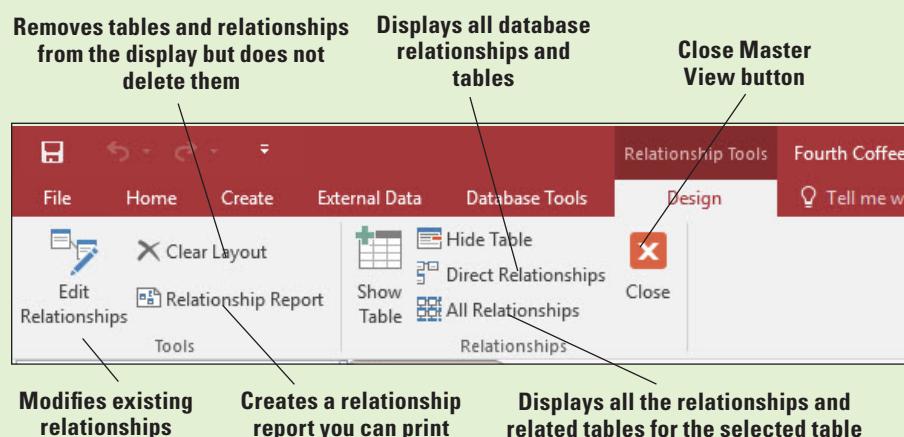
SOFTWARE ORIENTATION

Relationship Tools on the Ribbon

When you click the Relationships button on the Database Tools tab, the Relationships window appears and the Relationship Tools are displayed in the Ribbon (see Figure 3-13).

Removes tables and relationships from the display but does not delete them

Displays all database relationships and tables

Close Master View button

Figure 3-13

Use the Relationship Tools to define and modify table relationships

Modifies existing relationships

Creates a relationship report you can print

Displays all the relationships and related tables for the selected table

UNDERSTANDING TABLE RELATIONSHIPS

As you have already learned, most databases have more than one table. Creating relationships among these tables allows Access to bring that information back together again through objects such as reports and queries so that you can display information from several tables at once. It is much easier to create effective reports and queries when you start out with well-defined table relationships.

Defining Table Relationships

You define a table relationship in the Relationships window. To create that relationship, you place common fields in tables and define the relationships between the tables. Common fields used in different tables do not have to have the same names, but they usually do. They must have the same data type, though. In this exercise, you use a table that already has a primary key field to create a relationship with another table.

You can create three types of relationships in Access tables: one-to-one, one-to-many, and many-to-many.

In a one-to-one relationship, both tables have a common field with the same data. Each record in the first table can only have one matching record in the second table, and each record in the second table can have only one matching record in the first table. This type of relationship is not common, because information related in this way is usually stored in the same table.

A one-to-many relationship is more common, because each record in the first table can have many records in the second table. For example, in a Customers table and an Orders table, one customer could have many orders. The Customer ID would be the primary key in the Customers table (the one) and the foreign key in the Orders table (the many).

In a third type of relationship, called a many-to-many relationship, many records in the first table can have many records in the second table.
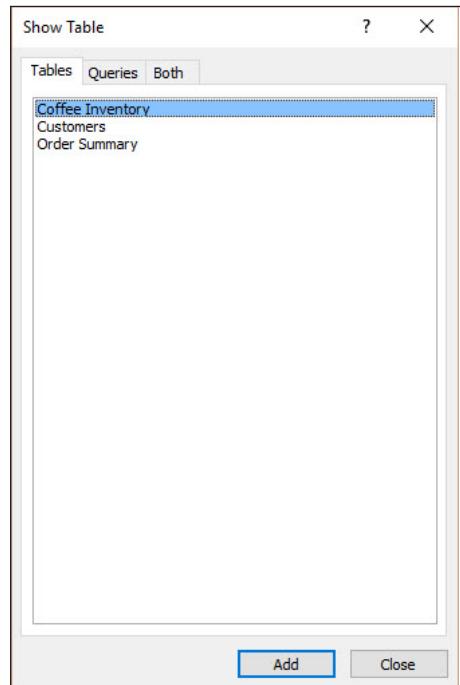
Define Table Relationships

GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise.

1. On the Database Tools tab in the Relationships group, click the **Relationships** button. The Relationships view appears with the Customers table represented.

2. Click the **Show Table** button in the Relationships group under the Relationship Tools Design tab. The *Show Table* dialog box appears (see Figure 3-14).

Figure 3-14
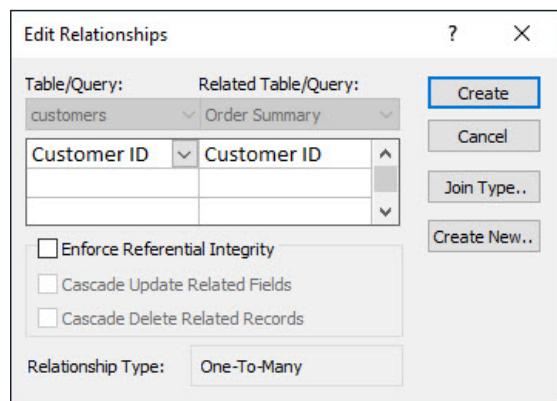
Show Table dialog box

3. Select **Order Summary** and then click **Add**.

4. Click **Close**. The Customer table and Order Summary table are represented in Relationships view.

5. Click the **Customer ID** primary key field in the Customers table, drag it to the Customer ID field of the **Order Summary** table, and then release the mouse button. The Customer ID field represents the common field between the two tables. The Customer ID field of the Order Summary table is now set as the foreign key. The *Edit Relationships* dialog box appears (see Figure 3-15).

Figure 3-15

Edit Relationships dialog box

6. Select the **Enforce Referential Integrity**, **Cascade Update Related Fields**, and **Cascade Delete Related Records** check boxes.

7. Click **Create**. A relationship line representing the one-to-many table relationship of the Customers and the Order Summary tables is displayed. You just created a one-to-many relationship between these tables using Customer ID, the common field. The one-to-many relationship type signifies that each customer record in the Customers table can have many order records in the Order Summary table.

PAUSE. LEAVE the database open to use in the next exercise.

Modifying Table Relationships

A table relationship is represented by the line that connects the tables in the Relationships window. To modify the relationship, you can double-click the line to display the Edit Relationships dialog box or delete the line to delete the relationship. The Edit Relationships dialog box allows you to change a table relationship. You can change the tables on either side of the relationship or the fields on either side. You can also perform actions like enforcing referential integrity and choosing cascade options. In this exercise, you delete the relationship you previously created, and then recreate and edit the relationship to enforce referential integrity.

Referential integrity is an option that you can select in the Edit Relationships dialog box to prevent orphan records. An orphan record is a record in one table that references records in another table that no longer exist. For example, when referential integrity is enforced, Access will not permit a Customer ID value as the foreign key in the Order Summary table that does not have a matching Customer ID value as the primary key in the Customers table. In this way, referential integrity ensures your tables contain logically related data. If an operation that violates referential integrity is performed once this option is selected, Access will display a dialog box with a message stating that referential integrity is being violated and will not permit the operation. You can also choose one or both types of cascade options—cascade update related fields or cascade delete related records—in the Edit Relationships dialog box once referential integrity has been selected. For example, if the cascade update related fields option is selected, Access will update the Customer ID value in the Order Summary table if the Customer ID value in the Customers table is updated. This ability to update related fields automatically ensures consistent Customer ID values in the related tables. Similarly, if the cascade delete related records option is selected, Access will delete all Customer ID records from the Order Summary table if the related Customer ID record is deleted from the Customers table; therefore, preventing orphaned records. When you enforce referential integrity between tables, the line connecting the tables becomes thicker. The number 1 is also displayed on the line on the one side of the relationship and an infinity symbol (∞) appears on the other side to represent the "many" field values that can be included in this side of the relationship.

To remove a table relationship, you must delete the relationship line. You can select the line by pointing to it and clicking it. When the relationship line is selected, it appears thicker. Press the Delete key to delete the line and remove the relationship or right-click the line to display the shortcut menu.
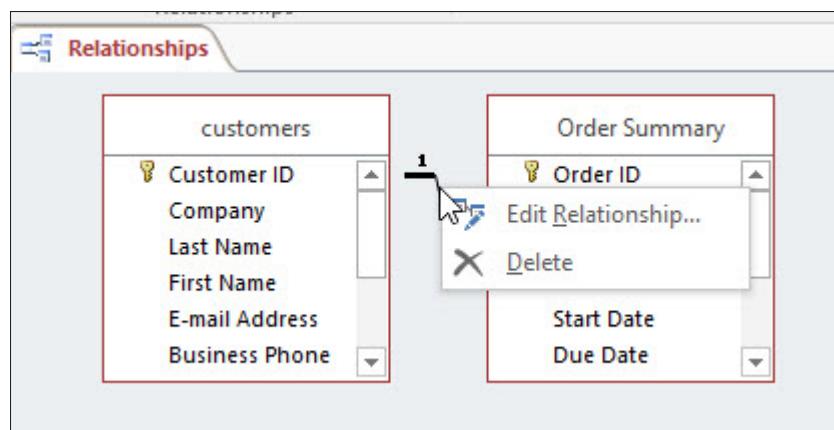
STEP BY STEP   **Modify Table Relationships**

GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise.

1. Right-click the center section of the relationship line connecting the two tables. A shortcut menu appears (see Figure 3-16).

Figure 3-16
Edit/Delete shortcut menu

Troubleshooting   If you click on the horizontal line near the 1 or the infinity symbol, you will get a different menu (Show Table, Show All, Save Layout), so be sure to click the center line to get the correct menu.

   2. Select **Delete**. A message appears asking if you are sure you want to delete the relationship. Click **Yes**. The line disappears.

   3. Select the **Customer ID** field in the first table. Drag the mouse to the Customer ID field in the second table and release the mouse button. The *Edit Relationships* dialog box appears.

   4. Click the **Create** button. A line appears, creating the relationship.

   5. Double-click the center section of the relationship line. The *Edit Relationships* dialog box appears again, listing the tables and the Customer ID fields on each side.

   6. Click the **Enforce Referential Integrity** box and then click **OK**. The line appears thicker, with the number 1 beside the first table and the infinity symbol (∞) beside the second.

PAUSE. LEAVE the database open to use in the next exercise.

Viewing and Printing Table Relationships

You may want to print a table relationship to save for your records or to discuss with a colleague. The Relationship Report command makes this easy. When you choose to print the relationship report, the Print Preview tab appears with options for viewing and printing the report. The Page Size group controls margins and page size; the Page Layout group controls page orientation and printing options; the Zoom group controls viewing options; and the Data group controls all aspects of data exporting. After you make any changes to the layout of the report, click the Print button to start printing. After printing the report, you can choose to save it. In this exercise, you view and print table relationships without saving the relationship report.

STEP BY STEP   **Print Table Relationships**
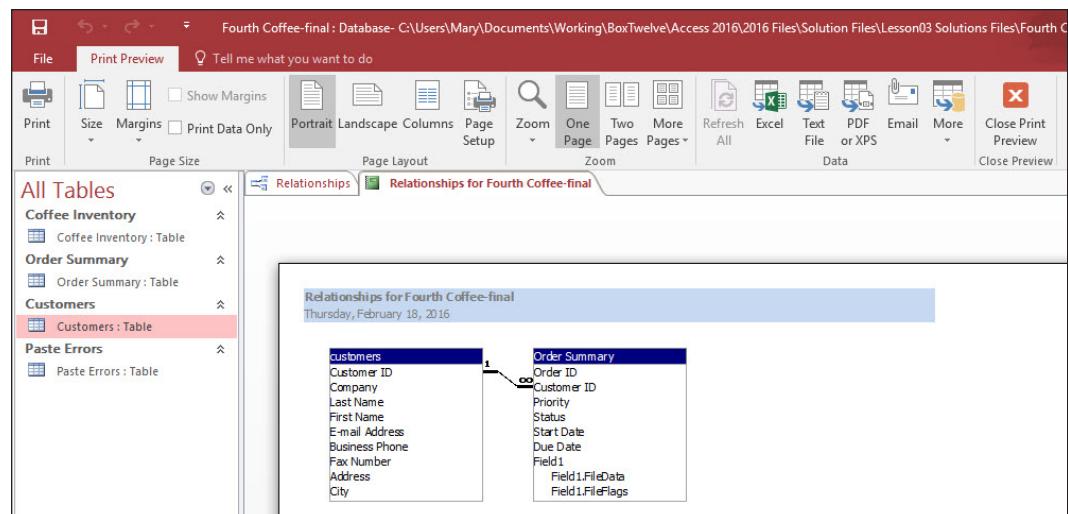
GET READY. USE the *Fourth Coffee-final* database that is still open from the previous exercise.

   1. In the Tools group of the Relationship Tools Design tab, click the **Relationship Report** button. The report is created and the Print Preview tab appears (see Figure 3-17).

2. Click the **Print** button. The *Print* dialog box appears, allowing you to select the printer you want to use.

3. Click **OK** to keep the default settings, and then print the report or click **Cancel** to not print the report.

4. Click the **Close** button to close the Relationships for Fourth Coffee-final tab. A message appears asking if you want to save changes to the report. Click **No**.

5. **CLOSE** the Relationships tab.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Matching

Match the term in Column 1 to its description in Column 2.

Column 1	Column 2
1. Foreign key	**a.** Prevents orphan records to ensure that records do not reference other records that no longer exist
2. Composite key	**b.** A primary key from one table that is used in another table
3. Referential integrity	**c.** A set of rules for determining which records will be displayed
4. Filter	**d.** The secondary sort field in a multifield sort
5. Innermost field	**e.** Two or more primary keys in a table

True/False

Circle T if the statement is true or F if the statement is false.

T   F   1.   You can use the Navigation buttons to search for data in a table.

T   F   2.   After you delete a record, you can click the Undo button to bring it back.

T   F   3.   The Find and Replace dialog box searches all the tables in a database at one time.

T   F   4.   The outermost field is the primary sort field in a multifield sort.

T   F   5.   In a one-to-many relationship, each record in the first table can have many records in the second table.

Projects

Project 3-1: Adding and Editing Records

In this project, you are working as an intern for Woodgrove Bank. Part of your job is helping your supervisor organize a charity event. Use an Access table to create a contacts list that your supervisor will use to make calls to local businesses requesting sponsorships and donations for the event.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *Charity Event* database from the data files for this lesson and then **SAVE** the database as *Charity Event-final*.
2. **OPEN** the Contacts table.
3. Enter the records shown in the following table: (Do not type the hyphens when entering the Business Phone data).

17	Company	Last Name	First Name	Business Phone
17	Trey Research	Tiano	Mike	469-555-0182
18	Fourth Coffee	Culp	Scott	469-555-0141
19	Wingtip Toys	Baker	Mary	972-555-0167
20	Margie's Travel	Nash	Mike	972-555-0189

4. Click the bottom half of the **View** button and then click **Design View**.
5. Select the **ID** row. On the Design tab, in the Tools group, click the **Primary Key** button.
6. Save the design of the table, and then return to **Datasheet** view.
7. On the Home tab, in the Find group, click the **Find** button. The *Find and Replace* dialog box appears. Type **0177** into the Find What box.
8. Select **Current document** from the Look In menu, and then select **Any Part of Field** in the Match menu.
9. Click the **Replace** tab and then type **0175** into the Replace With box.
10. Click **Find Next** and then click **Replace**.
11. Click **Cancel** to close the dialog box.
12. Select the **Lucerne Publishing** record.
13. On the Home tab, in the Records group, click the **Delete** button. Click **Yes** to delete the record.
14. **CLOSE** the database.

PAUSE. LEAVE Access open for the next project.

Project 3-2: Sorting and Creating Relationships

The four kindergarten classes at the School of Fine Art have adopted one boy and one girl "angel" from the community. Children from the classes may purchase holiday gifts for their angels. In this project, you are an office assistant at the school and you are working with the Angel Project staff to organize information about each angel.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Angels* from the data files for this lesson and then **SAVE** the database as *Angels-final*.
2. **OPEN** the List table.
3. Select the **Gender** field. On the Home tab, in the Sort & Filter group, click the **Ascending** button.
4. Select the **Age** field. On the Home tab, in the Sort & Filter group, click the **Descending** button.
5. On the Home tab, in the Sort & Filter group, click the **Remove Sort** button.
6. In the Gender field, select the **M** in the first record.
7. On the Home tab, in the Sort & Filter group, click the **Selection** button and then select **Equals "M"**.
8. On the Home tab, in the Sort & Filter group, click the **Toggle Filter** button.
9. Select the **Wants** field. On the Home tab, in the Sort & Filter group, click the **Filter** button.
10. Select **Text Filters** from the menu, select **Contains** from the next menu, type **Bike** in the Custom Filter dialog box, and then press **Enter**.
11. On the Home tab, in the Sort & Filter group, click the **Advanced** button, and then select **Clear All Filters** from the menu.
12. **SAVE** and **CLOSE** the List table.
13. Open the **Contact Information** table.
14. Type the following new records:

Last Name	First Name	Parent's Name	Address	City	State	Zip Code	Home Phone
Wright	Steven	Kevin	2309 Monroe St	Marietta	GA	34006	770-555-0142
Cook	Cathan	Patrick	1268 Oak Dr	Marietta	GA	34006	770-555-0128

15. Change to Design view. Remove the primary key from the Home Phone field and define the **ID field** as the primary key.
16. **SAVE** the design and return to Datasheet view.
17. Select the **ID** field and sort it in ascending order.
18. On the Database Tools tab, in the Relationships group, click the **Relationships** button.
19. Create a one-to-one relationship between the ID field of the List table and the ID field of the Contact Information table.
20. **SAVE** the Relationships view and then **CLOSE** it.

CLOSE the database and then **EXIT** Access.

4 Modifying Tables and Fields

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Modifying a Database Table	Add table descriptions.	2.2.3
	Rename tables.	2.2.4
	Delete database objects.	1.1.4
Creating Fields and Modifying Field Properties	Change field sizes.	2.4.4
	Using input masks.	2.4.8
	Set default values.	2.4.7
	Change field captions.	2.4.3
	Add validation rules to fields.	2.4.2
	Add fields to tables.	2.4.1
	Delete fields.	2.4.9

MODIFYING A DATABASE TABLE

After a table has been created, you may need to modify it. You can make many changes to a table—or other database object—using its property sheet. You can also rename or delete a table, but keep in mind that such a change could possibly break the functionality of the database, because in a relational database the various components work together.

Modifying Table Properties

You can set properties that control the appearance or behavior characteristics for an entire table in the table's property sheet. Sometimes it is necessary to describe the purpose of a table by modifying the table's Description property since others who view your table may require more information about its purpose. Other table properties are more advanced and used less often. In this exercise, you modify the description property for a table.

STEP BY STEP   **Modify Table Properties**

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and start Access.
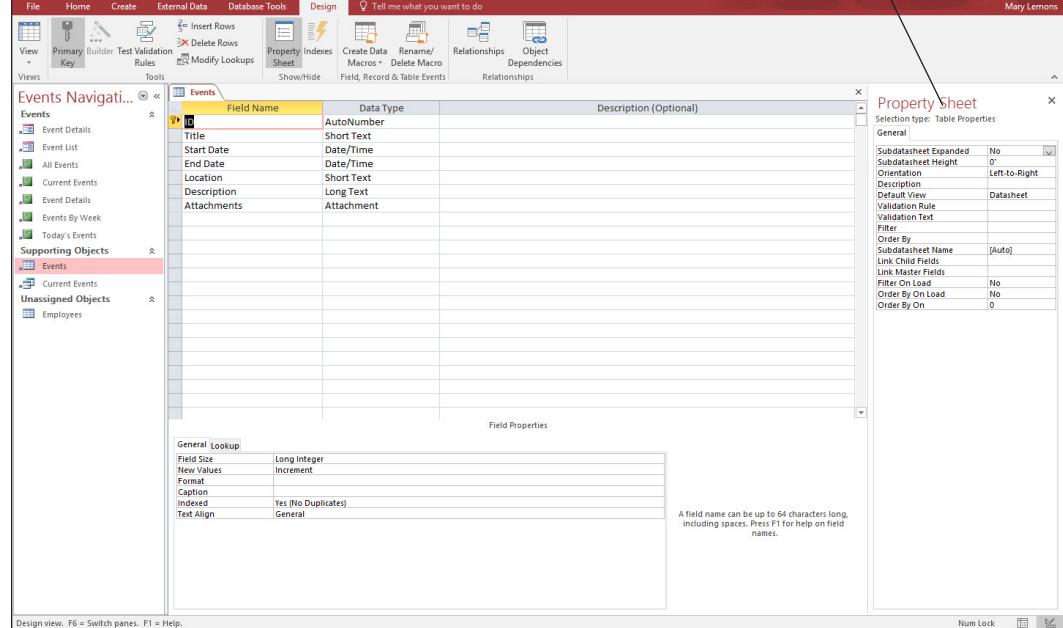
1. **OPEN** the *Events* database from the data files for this lesson and then **SAVE** the database as *Events-final*.

Take Note Don't forget to click Enable Content here. We stop indicating it as a separate step from this point on but always click Enable Content when prompted.

2. In the Navigation Pane, double-click **Events** to open that table.
3. On the Home tab, in the Views group, click the bottom half of the **View** button and then click **Design View** from the menu that appears.
4. On the Design tab, in the Show/Hide group, click **Property Sheet**. The Property Sheet pane appears on the right of the Access window (see Figure 4-1).

Property sheet pane

5. Place the insertion point in the property box for Description.
6. Press **Shift+F2** to open the *Zoom* dialog box to provide more space.
7. Type **Most popular events for 2016**.
8. Click **OK**.
9. Click the **Close** button on the Property Sheet pane to close it.
10. Click the **File** tab and then click **Save** to save the design changes you have made to the table.
11. Click the **Close** button to close the table.

PAUSE. **LEAVE** the database open to use in the next exercise.

Table 4-1 lists the available table properties on the Property Sheet and what they control.

Table Property	Use This Table Property To
Subdatasheet Expanded	Specify whether to expand all subdatasheets when you open the table.
Subdatasheet Height	Specify whether to expand to show all available subdatasheet rows (default) when opened or to set the height of the subdatasheet window to show when opened.
Orientation	Set the view orientation, according to whether your language is read left-to-right or right-to-left.
Description	Provide a description of the table.
Default View	Set Datasheet as the default view when you open the table.
Validation Rule	Supply an expression that must be true for you to add a record or change a record.
Validation Text	Enter text that appears when a record violates the Validation Rule expression.
Filter	Define criteria to display only matching rows in Datasheet view.
Order By	Select one or more fields to specify the default sort order of rows in Datasheet view.
Subdatasheet Name	Specify whether a subdatasheet should appear in Datasheet view, and, if so, which table or query should supply the rows in the subdatasheet.
Link Child Fields	List the fields in the table or query used for the subdatasheet that match this table's primary key field(s).
Link Master Fields	List the primary key field(s) in this table that match the child fields for the subdatasheet.
Filter On Load	Automatically apply the filter criteria in the Filter property (by setting to Yes) when the table is opened in Datasheet view.
Order By On Load	Automatically apply the sort criteria in the Order By property (by setting to Yes) when the table is opened in Datasheet view.
Order By On	Provide an alternate method to the Order By On Load property by automatically applying the sort criteria in the Order By property when set to -1 (Yes).

Renaming a Table

To rename a table or other database object, you must first close it. In the Navigation Pane, locate and right-click the object that you want to rename and then click Rename on the shortcut menu that appears. Or, select the table in the Navigation Pane, press F2, type a new name, and then press Enter. Think carefully before you rename a table. If existing database objects, such as queries or reports, use data from that table, the name modification might break the functionality of the database. In this exercise, you create a new table and then rename it using the shortcut menu.

STEP BY STEP   **Rename a Table**
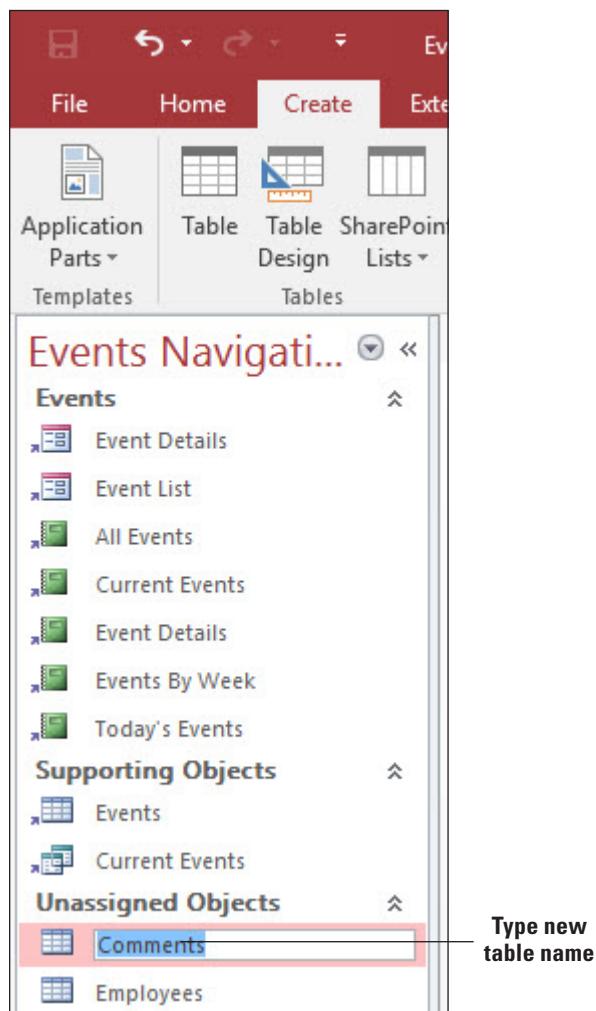
GET READY. USE the *Events-final* database that is still open from the previous exercise.

1. On the Create tab, in the Templates group, click the **Application Parts** button and then click **Comments** to create a new table.
2. In the *Create Relationship* dialog box that appears, select **There is no relationship** and then click **Create**.
3. **OPEN** the Comments table, right-click **Comments** in the Navigation Pane, and then select **Rename** from the shortcut menu. A dialog box appears that states that you can't rename the database object 'Comments' while it's open. Close the dialog box.

4. **CLOSE** the Comments table.

5. Right-click **Comments** in the Navigation Pane to display the shortcut menu.

6. Click **Rename**. The table name is now selected for renaming (see Figure 4-2).

Figure 4-2

Table name selected for renaming

Type new table name

7. Type **Event Comments** and then press **Enter**. The table has been renamed.

PAUSE. LEAVE the database open to use in the next exercise.

Deleting a Table

Deleting an entire table is not a complex process; however, remember that when you delete an entire table you might break the functionality of your database. Although you will be asked to confirm the deletion of a table, you can always undo the action. In this exercise, you delete a table.

To delete a table or other database object like a report, form, or query, right-click it in the Navigation Pane and click Remove or Delete. Or, select the table in the Navigation Pane and then press Delete.

Delete a Table

> **GET READY. USE** the ***Events-final*** database that is still open from the p revious exercise.
>
> **1.** Right-click the **Event Comments** table in the Navigation Pane and then click **Delete**.
> **2.** A confirmation message appears. Click **Yes** to delete the table.

Take Note   If the table was related to one or more additional tables, Access would ask if you wanted to delete those relationships before deleting the table.
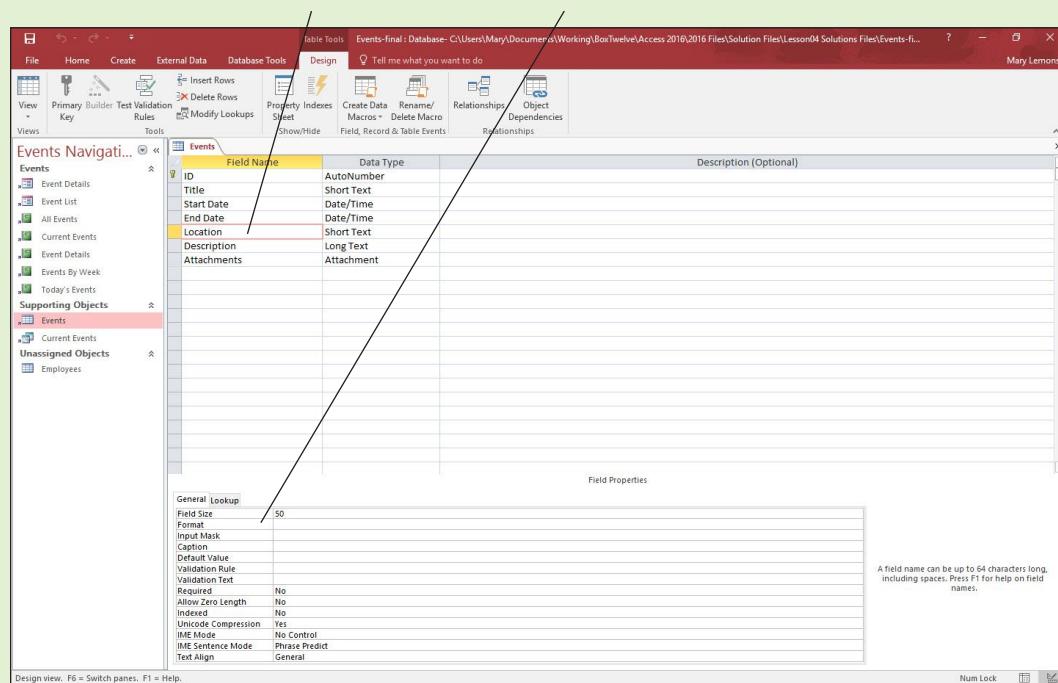
> **PAUSE. LEAVE** the database open to use in the next exercise.

SOFTWARE ORIENTATION

Field Properties

Some field properties are available in Datasheet view, but to access the complete list of field properties you must use Design view. An example of field properties for a table in Design view is shown in Figure 4-3.

Selected field   **Field properties for selected field**

Figure 4-3
Field properties

CREATING FIELDS AND MODIFYING FIELD PROPERTIES

A field has certain defining characteristics such as a name that uniquely identifies the field within a table, and a data type that is chosen to match the information to be stored. Every field also has an associated group of settings called properties that define the appearance or behavior of the field. In this section, you learn how to create fields and modify field properties.

Access uses the field property settings when you view and edit data. For example, the Format, Input Mask, and Caption properties affect how your information appears in table and query datasheets. In addition, any controls on new forms and reports that are based on the fields in the table inherit these same property settings by default.

Setting Field Properties

You can control the appearance of information, prevent incorrect entries, specify default values, speed up searching and sorting, and control other appearance or behavior characteristics by setting or modifying field properties. For example, you can format numbers to make them easier to read, or you can define a validation rule that must be satisfied for information to be entered in a field. In this exercise, you set the Required field property in Datasheet view and both the Default Value and Field Size field properties in Design view.

To set a field property in Datasheet view, open the table in Datasheet view. Click in the field for which you want to set the property. In the Field Validation group on the Table Tools Fields contextual tab, select the Unique check box to require the values in the field to be unique for all the records in the table. Or, select the Required check box to make this a required field, where all instances of this field must contain a value. In the Properties group, select the Field Size property box to define the text length for a field, which limits the number of characters allowed for input.

You can also select other field properties like Default Value, and Name & Caption. The Default Value property allows you to specify a value to automatically assign to a field when new records are added. This is useful if you have data that consistently repeats. The Name & Caption property allows you to specify a new field name and the associated caption for that field. The caption is what appears as column names in tables, and as labels in queries, forms, and reports. Keep in mind that Access will show field names as the column names and labels when no caption property value is specified. The field name is what Access uses to reference the field behind the scenes and when you view the field names in Design view.

You can set a few of the available field properties in Datasheet view, but to access all of the available field properties, you must open the table in Design view. For example, you can modify the Field Size property in both Datasheet and Design views, but you can only modify the Text Align property—which allows you to specify the default alignment of text within a field—in Design view.

To set field properties in Design view, open the table in Design view. In the upper portion of the table design grid, click the field for which you want to set properties. The properties for this field are displayed in the lower portion of the table design grid.

Click the box for the field property you want to set. Alternatively, you can press F6 and then move to the property using the arrow keys. Type a setting for the property or, if an arrow appears at the right side of the property box, click the arrow to choose from a list of settings for the property. Table 4-2 lists the available field properties and what they control. Remember that the properties available depend on the field's data type.

Field Property	Use This Field Property To
Field Size	Set the maximum size for data stored as a Short Text, Number, or AutoNumber data type.
Format	Customize the way the field appears when displayed or printed.
Decimal Places	Specify the number of decimal places to use when displaying numbers.
New Values	Set whether an AutoNumber field is incremented or assigned a random number.
Input Mask	Display editing characters to guide data entry.
Caption	Set the text displayed by default as the column name in tables and labels for forms, reports, and queries.
Default Value	Automatically assign a default value to a field when new records are added.
Validation Rule	Supply an expression that must be true whenever you add or change the value in this field.
Validation Text	Enter text that appears when a value violates the Validation Rule.
Required	Require that data be entered in a field.
Allow Zero Length	Allow entry (by setting to Yes) of a zero-length string ("") in a Short Text, Long Text, or Hyperlink field.
Indexed	Speed up access to data in this field by creating and using an index.
Unicode Compression	Compress text stored in this field when a large amount of text is stored.
IME Mode	Specify an Input Method Editor, a tool for using English versions of Windows.
IME Sentence Mode	Specify the type of data you can enter by using an Input Method Editor.
Append Only	Retain a history of all data changes (by setting to Yes) of a Long Text field.
Text Format	Choose Rich Text to store text as HTML and allow rich formatting. Choose Plain Text to store only text.
Text Align	Specify the default alignment of text within a field or control.
Precision	Specify the total number of digits allowed, including those both to the right and the left of the decimal point (when decimal Field Size property is set using Number data type).
Scale	Specify the maximum number of digits that can be stored to the right of the decimal separator (when decimal Field Size property is set using Number data type).
Expression	Specify the expression used for the Calculated data type to generate a value.
Result Type	Specify the data type to be used to store the value generated by the Expression field property for the Calculated data type.

STEP BY STEP   **Set a Field Property in Datasheet View and Design View**

GET READY. USE the *Events-final* database that is still open from the previous exercise.

1. Double-click the **Events** table in the Navigation Pane to open the table in Datasheet view, if it is not already open.
2. Click the **Location** column header to select that field.
3. Click the **Required** check box in the Field Validation group on the Table Tools Fields contextual tab. This setting determines that a value must be entered in the Location field for all records in the table.

4. On the Home tab, in the Views group, click the bottom half of the **View** button and then click **Design View**.

5. In the Field Name column in the middle portion of the table design grid, click in the **Location** cell.

6. In the Default Value row in the lower portion of the table design grid, click in the property box and then type **To Be Announced** to specify a value that will be automatically entered in this field for new records.

7. In the Field Name column in the upper portion of the table design grid, click in the **Title** cell.

8. In the Field Size row in the lower portion of the table design grid, select **150** in the property box and then type **175** to change the maximum number of characters you can enter in the Title field.

9. Press **Enter**.

PAUSE. LEAVE the database open to use in the next exercise.

Defining Input Masks

You use an **input mask** whenever you want users to enter data in a specific way. An input mask can require users to enter dates in a specific format, for example, DD-MM-YYYY, or telephone numbers that follow the conventions for a specific country or region. An input mask is helpful because it can prevent users from entering invalid data (such as a phone number in a date field). In addition, input masks can ensure that users enter data in a consistent way. In this exercise, you specify that the dates in the Start Date field be entered in Medium Date format, following the required pattern, 27-Sept-69.

You can add input masks to table fields by running the Input Mask Wizard or by manually entering masks in the Input Mask field property.
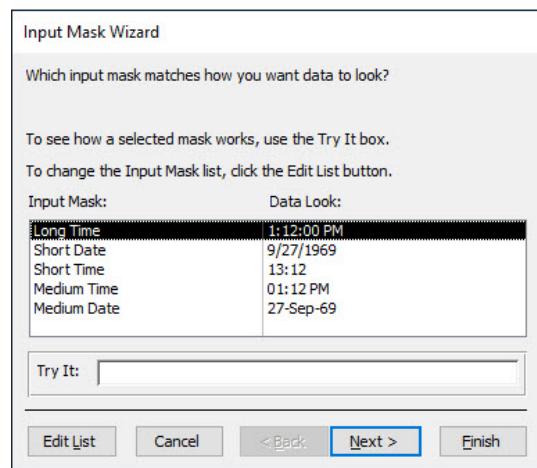
STEP BY STEP   **Define Input Masks for Fields**

GET READY. USE the *Events-final* database and Events table that is still open from the previous exercise.

1. In the Field Name column in the upper portion of the table design grid, click in the **Start Date** cell.

2. Click the **Input Mask** property box in the lower portion of the table design grid to display the Input Mask Wizard button (...) on the far right of the cell.

3. Click the **Input Mask Wizard** button. A message box appears asking if you want to save the table now.

4. Click **Yes** to close the message box and display the Input Mask Wizard (see Figure 4-4).

Figure 4-4

Input Mask Wizard

5. Click **Medium Date** to select the DD-MON-YR date format and then click **Next**. The next screen in the Input Mask Wizard appears. If you wanted to change the input mask, you would do so here. You can also test entering the values in the Try It text area.

6. Click **Next** to accept the default settings in this screen and display the final Input Mask Wizard screen.

7. Click **Finish**. The input mask appears in the Input Mask row (see Figure 4-5).

Figure 4-5

Input Mask row

Input mask for Start Date field in Input Mask row

PAUSE. LEAVE the database open to use in the next exercise.

Allowing Zero-Length Strings in a Field

When the Allow Zero Length field property is set to Yes, you can enter zero-length strings in a field. A **zero-length string** contains no characters; you use the string to indicate that you know no value exists for a particular field. This recognition of a nonexistent value actually represents a string. You enter a zero-length string by typing two double quotation marks with no space between them (""). In this exercise, you modify the Allow Zero Length property for the Description field.

Allow Zero Length

GET READY. USE the *Events-final* database and Events table that is still open from the previous exercise.

  1. In the Field Name column in the upper portion of the table design grid, click in the **Description** cell.
  2. Click the **Allow Zero Length** property box in the lower portion of the table design grid to display the down arrow on the far right of the cell.
  3. Click the **down arrow** to display the menu.
  4. Click **Yes.**

PAUSE. LEAVE the database open to use in the next exercise.

Setting Data Validation Rules

Validation rules help ensure that your database users enter the proper types or amounts of data. A **validation rule** is an expression that limits the values that can be entered in the field. The maximum length for the Validation Rule property is 2,048 characters. For example, if the field contains a date, you can require that the date entered in the field be later than June 4, 1977. **Validation text** specifies the text in the error message that appears when a user violates a validation rule. For example, the error message could say "Please enter a date that is later than June 4, 1977." The maximum length for the Validation Text property is 255 characters. In this exercise, you modify the Validation Rule and Validation Text properties for the End Date field.

Data can be validated in several ways, and you will often use multiple methods to define a validation rule. Each of the following can be used to ensure that your users enter data properly:

- **Data types:** When you design a database table, you define a data type for each field in the table, and that data type restricts what users can enter. For example, a Date/Time field accepts only dates and times, a Currency field accepts only monetary values, and so on.
- **Field sizes:** Field sizes provide another way to validate text. For example, if you create a field that stores first names, you can set it to accept a maximum of 15 characters. This can prevent a malicious user from pasting large amounts of text into the field. It could also prevent an inexperienced user from mistakenly entering a first, middle, and last name in a field designed only to hold a first name.
- **Table properties:** Table properties provide very specific types of validation. For example, you can use the Order By property to select one or more fields to specify the default sort order of rows in Datasheet view.
- **Field properties:** You can also use field properties, such as the Validation Rule property to require specific values, and the Validation Text property to alert your users to any mistakes. For example, entering a rule such as .1 and ,100 in the Validation Rule property forces users to enter values between 1 and 100. Entering text such as "Enter values between 1 and 100" in the Validation Text property tells users when they have made a mistake and how to fix the error.
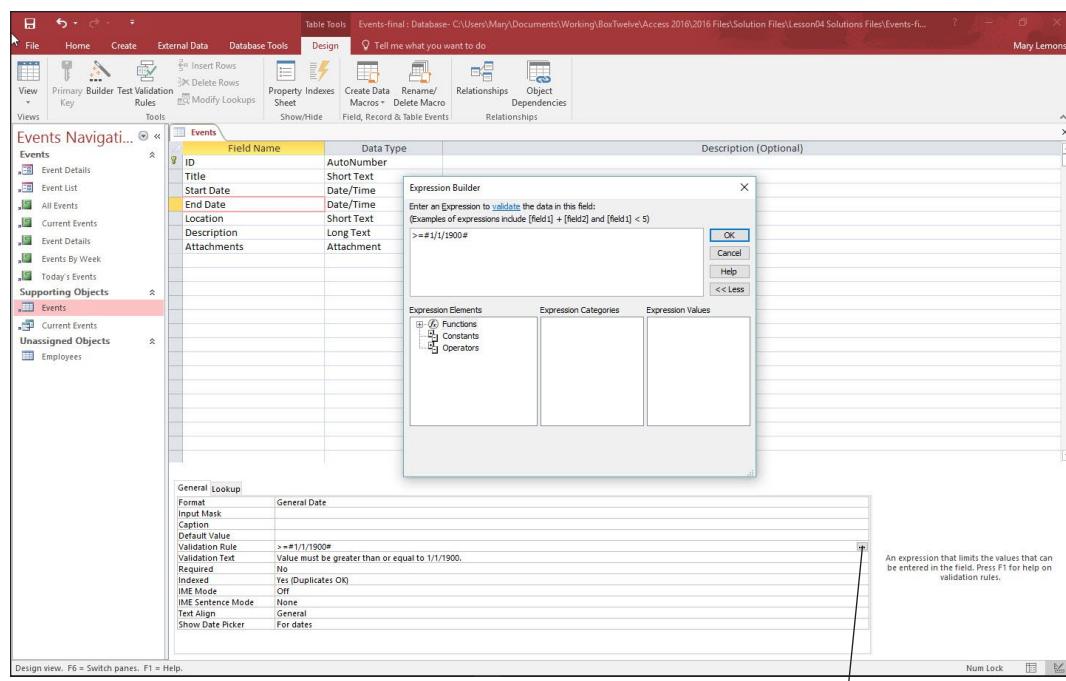
Set Data Validation Rules

GET READY. USE the *Events-final* database and Events table that is still open from the previous exercise.

  1. In the Field Name column in the upper portion of the table design grid, click the **End Date** cell.
  2. Click the **Validation Rule** property box in the lower portion of the table design grid to display the Expression Builder button (...) on the far right of the cell.
  3. Click the **Expression Builder** button to display the *Expression Builder* dialog box (see Figure 4-6).

Figure 4-6

Expression Builder button and
dialog box
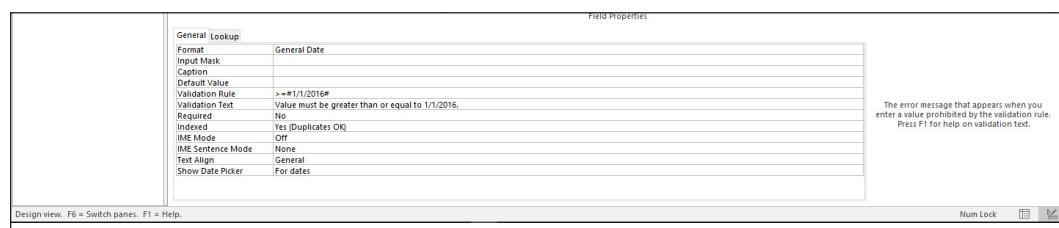
Click to open the Expression Builder

4. Select the number **1900** and replace it by typing **2016**.

5. Click **OK**.

6. Click the **Validation Text** property box in the lower portion of the table design grid.

7. Select the number **1900** and then replace it by typing **2016**. The property boxes should look like those shown in Figure 4-7.

Figure 4-7

Modified Validation field
properties

PAUSE. LEAVE the database open to use in the next exercise.

Entering Captions

The Caption property field specifies the text displayed by default as column names in tables and in labels for forms, reports, and queries. The maximum length for the Caption property is 255 characters. If you do not specify a caption to be displayed, the field name is used as the label. In this exercise, you set the Caption property for the Location field.

STEP BY STEP	Enter Captions

GET READY. USE the *Events-final* database and Events table that is still open from the previous exercise.

1. In the Field Name column in the upper portion of the table design grid, click the **Location** cell.

2. Click the **Caption** property box in the lower portion of the table design grid.

3. Type **Venue**. The caption property has now been set to Venue and will display as a column name in table Datasheet view, as well as labels for forms, reports, and queries.

Take Note   To change an existing caption, simply follow the same steps as you would for entering a caption. Overwrite the existing caption with the new caption.
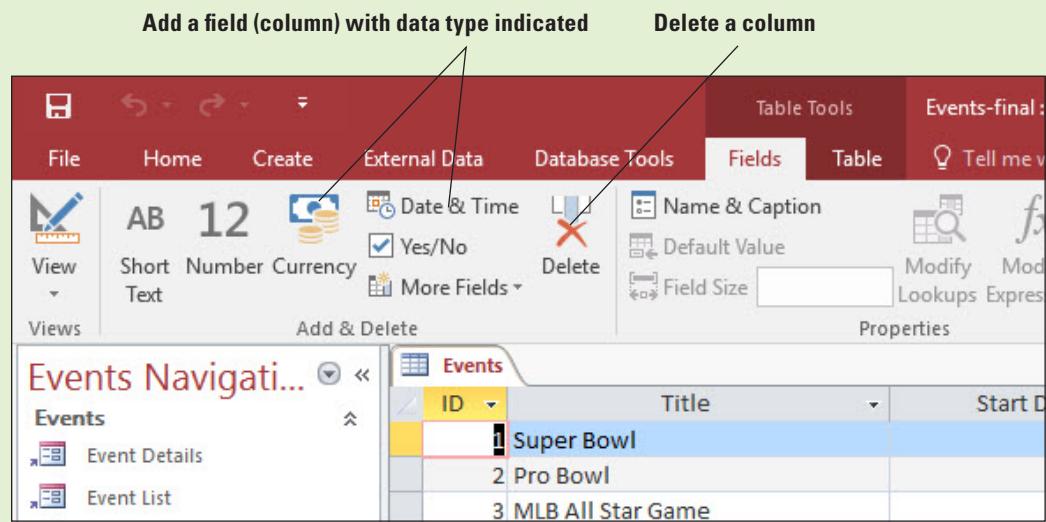
PAUSE. LEAVE the database open to use in the next exercise.

SOFTWARE ORIENTATION

Add & Delete Group

When creating fields in table Datasheet view, you use the Add & Delete group on the Table Tools Fields contextual tab, which is shown in Figure 4-8. You can use these commands to add fields with associated data types, add Quick Start fields, insert lookup columns, and delete columns.

Add a field (column) with data type indicated   **Delete a column**

Figure 4-8
Add & Delete group

Creating Fields

Fields can be created in different ways. You can add fields to a table in Design view, or add fields in Datasheet view using the Click to Add column or Add & Delete group. Sometimes it is easier to choose from a predefined list of fields than to manually create a field. Access includes a quick and easy way for you to add fields to a table using the Add & Delete group on the Table Tools Fields contextual tab, which includes a collection of fields with associated data types and built-in Quick Start fields that can save you considerable time. In this exercise, you add fields to a table using both the Click to Add column and the Add & Delete group.

The last column in a table in Datasheet view has a Click to Add column, which you can use to add a field simply by clicking on the Click to Add column header and choosing a data type from the menu that appears. Rename the field by right-clicking the column header, choosing Rename Field from the menu, and typing a new name. You can also type information directly in a column. Access will try to automatically determine the field data type by the data entered.

A **Quick Start field** is a predefined set of characteristics and properties that describes a field, including a field name, a data type, and a number of other field properties. Quick Start fields allow you to quickly add commonly used single fields or several related ones. For example, using Quick Start fields, you can choose from a variety of fields including "Status" to quickly add a field named Status with built-in options like Not Started, In Progress, and so on, or you can choose the "Address" Quick Start to quickly include related fields like City, State, and Zip Code.

To create a new field in table Datasheet view, you can simply choose from commonly used fields in the Add & Delete group, or click the More Fields button to access a menu with a greater variety of field types. To create a new field using Quick Start, click the More Fields button and then choose a Quick Start from the menu.

Create Fields

GET READY. USE the *Events-final* database and Events table that is still open from the previous exercise.

1. On the Home tab, in the Views group, click the bottom half of the **View** button and then click **Datasheet View**. Save the table, if required. If you get a message about data integrity, click **Yes**.
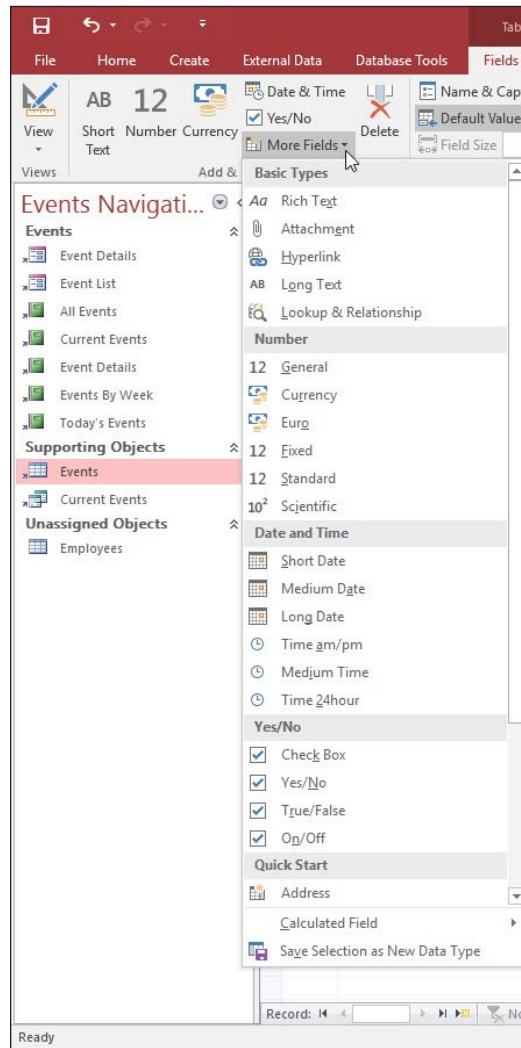
Take Note Whenever you add or modify field validation rules for fields that contain data, the data may violate these new rules. You can allow Access to test the data against the rules and inform you if there are any violations.

2. Scroll to the right of the Events table to display the last column and then click the **Click to Add** header. Click **Yes/No** from the menu of available data types that appear. You are going to add a new field with the Yes/No data type in which you can indicate whether events will have on-site staff. A new field named Field1 is added, and the Click to Add column becomes the last column in the table.

3. Right-click the **Field1** column header to display the shortcut menu and then click **Rename Field**.

4. Type **On-site staff?** as the column name.

5. Click the **More Fields** button in the Add & Delete group on the Table Tools Fields contextual tab. The More Fields menu appears (see Figure 4-9).

Figure 4-9
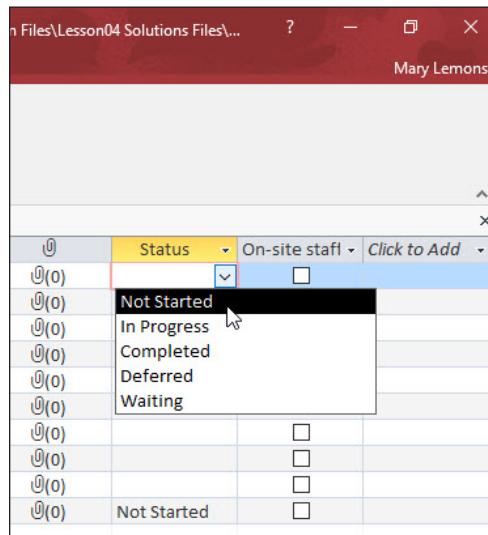
More Fields button and menu

6. In the Quick Start category, scroll down if necessary and click **Status**. A new Quick Start field named Status, in which you now have options to indicate the status of an event, appears to the left of the On-site staff? field.

7. Click the **Status** field drop-down box button to view the available options, and then select **Not Started** (see Figure 4-10). Click **Not Started**.

Figure 4-10

Status field drop-down box options

PAUSE. **LEAVE** the database open to use in the next exercise.

Deleting a Field

Before you delete a column from a datasheet, remember that doing so deletes all the data in the column and that the action cannot be undone. For that reason, you should back up the table before you delete the column. Before you can delete a primary key or a lookup field, you must first delete the relationships for those fields. In this exercise, you learn how to use the shortcut commands to delete two fields from an Access 2016 table.

To delete a field in Datasheet view, select the column, right-click, and then click Delete Field from the shortcut menu. Or, on the Table Tools Fields contextual tab in the Add & Delete group, click the Delete button. You will see a confirmation message asking if you are sure you want to delete the column and all the data. Sometimes you may see an additional confirmation message warning you about potential issues when deleting fields. You should always be cautious when deleting fields from a table.

STEP BY STEP   **Delete a Field**

GET READY. **USE** the *Events-final* database and Events tablet that is still open from the previous exercise.

1. Click the **column header** for the Attachment field, located between the *Description* field and the *Status* field.

2. Right-click the **column header** to display the shortcut menu and then click **Delete Field**. In the dialog box that appears, click **Yes**.

3. In the confirmation message that appears, click **Yes**. The field is deleted.

4. Click the **column header** for the Status field.

5. Right-click in the **column** to display the shortcut menu and then click **Delete Field**. In the message box that appears, click **Yes** to delete the Status field.

PAUSE. **LEAVE** the database open to use in the next exercise.

Creating Multivalued Lookup Fields

In Office Access 2016, you can create a **multivalued lookup field** that allows you to select more than one choice from a list—without having to create a more advanced database design. You can create a field that holds multiple values, such as a list of employees that you have assigned to a particular event. Use the Lookup Wizard to create multivalued fields. The Lookup Wizard guides you through the process of creating a field or lookup column that can "look up" data that exists in one or more tables to automate the complexity of manually relating tables. In this exercise, you create a multivalued lookup field using the Lookup Wizard in Datasheet view.

Use a multivalued lookup field when you want to store multiple selections from a list of choices that are relatively small. This is useful if you want to limit the choices a user can select to store in a table field to prevent erroneous data from being entered. For example, you can create a multivalued lookup field to assign only those employees who work in your department to a specific task. Limiting the choices a user can make to enter into a field helps protect the validity of your data.

Take Note   You can also create lookup columns that allow for a single selection of a value.
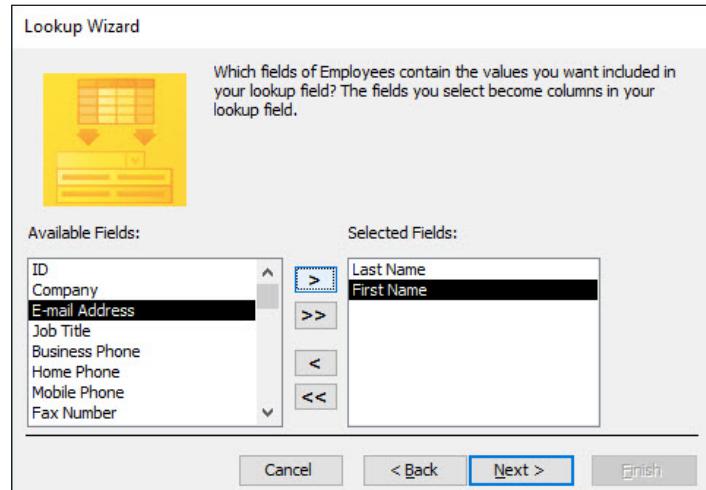
STEP BY STEP   **Create a Multivalued Lookup Field**

GET READY. USE the *Events-final* database and Events table that are still open from the previous exercise.

1. Place the insertion point in the first cell of the table. Click the **More Fields** button in the Add & Delete group on the Table Tools Fields contextual tab and then click the **Lookup & Relationship** button. The Lookup Wizard appears.

2. Click **Next** to accept the default setting (I want the lookup field to get the values from another table or query) and display the next screen in the Lookup Wizard. Notice you have a choice of two tables to provide the values for the lookup field you are creating. The first table, Employees, should already be selected for you.

3. Click **Next** to accept the default settings and display the next screen in the Lookup Wizard. The Available Fields scroll box contains all the fields of the Employees table, two of which you will select since they contain the values you want to eventually look up.

4. In the Available Fields list, select **Last Name** and then click the **>** button to move it to the Selected Fields box.

5. In the Available Fields list, select **First Name** and then click the **>** button to move it to the Selected Fields box. The results are shown in Figure 4-11.

Figure 4-11
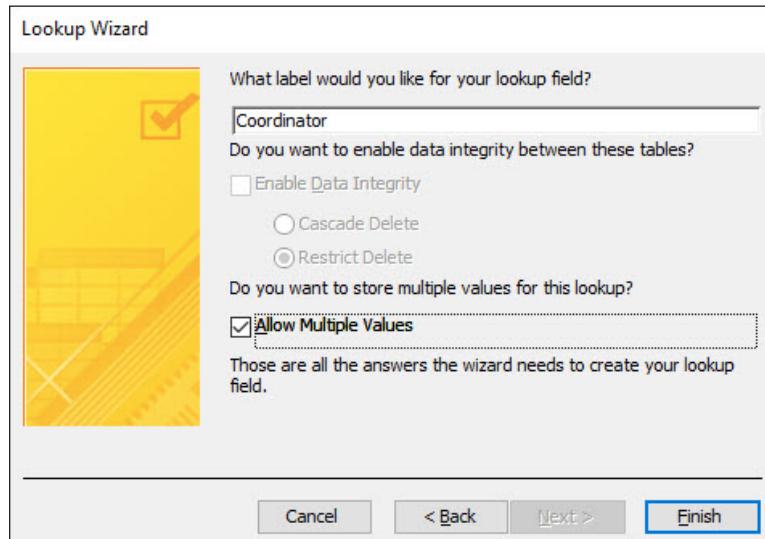
Lookup Wizard, third screen with options moved

6. Click **Next** to accept your settings and display the next screen in the Lookup Wizard.

7. Click the **down arrow** in the first box and then click **Last Name**. This will sort the Lookup column in alphabetical order by Last Name.

8. Click **Next** to accept your selection and to display the next screen in the Lookup Wizard.

9. Click **Next** to accept the default selection and to hide the primary key column to ensure only relevant and meaningful data displays in the lookup column later. The final screen of the Lookup Wizard displays.

10. In the What label would you like for your lookup field? box, type **Coordinator**. This will create a new label named Coordinator for your column.

11. Select the **Allow Multiple Values** check box to allow for the multiple selections of values. The completed dialog box is shown in Figure 4-12.

Figure 4-12

Lookup Wizard, final screen

12. Click the **Finish** button. A new column named Coordinator appears after the ID field. Click the **down arrow** in the first cell to display the list of names (see Figure 4-13).

Figure 4-13

Lookup column list

13. Click **Flood/Kathie** and **Mares/Gabe** on the list and then click **OK** to choose those multiple values for the field.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Fill in the Blank

Complete the following sentences by writing the correct word or words in the blanks provided.

1. _____ or _____ a table could possibly break the functionality of the database.

2. A(n) _____ contains no characters, and you use it to indicate that you know no value exists for a field.

3. _____ specifies the text in the error message that appears when users violate a validation rule.

4. A(n) _____ is a predefined set of characteristics and properties that describes a field.

5. You should always consider _____ a table before deleting a column.

Multiple Choice

Select the best response for the following statements or questions.

1. To rename a table or other database object, you do which of the following?
  a. Save it
  b. Close it
  c. Edit it
  d. Open it

2. Which of the following is *not* a field property?
  a. Column Template
  b. Field Size
  c. Caption
  d. Allow Zero Length

3. Which field property requires users to enter data in a specific format?
  a. Validation Text
  b. Default Value
  c. Required
  d. Input Mask

4. Which of the following is *not* a way to validate data?
  a. Data type
  b. Field sizes
  c. Filtering
  d. Field properties

5. Which type of field allows you to select more than one choice from a list?
  a. Attachment
  b. Multivalued
  c. Caption
  d. Validation

Projects

Project 4-1: Adding a Lookup Column and Modifying Field Properties

In this project, you are employed in the customer service department at City Power & Light. Each call that is received is recorded in an Access database. Because you know how to modify tables and fields, your supervisor asks you to add a lookup column to the Calls table to record the customer service representative who receives the call. Your supervisor also asks you to make some modifications to the field properties in the Calls table of the customer service database.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Customer service* from the data files for this lesson and then **SAVE** the database as *Customer service-final*.
2. In the Navigation Pane, double-click the **Calls** table to open it. Place the insertion point in the first cell of the table, if necessary.
3. On the Table Tools Fields contextual tab, in the Add & Delete group, click the **More Fields** button and then click the **Lookup & Relationship** button. The Lookup Wizard appears.
4. Click **Next** to display the next screen in the Lookup Wizard.
5. Select **Table: Employees** and then click **Next**.
6. In the Available Fields list, select **First Name** and then click the **>** button to move it to the Selected Fields box.
7. In the Available Fields list, select **Last Name** and then click the **>** button to move it to the Selected Fields box.
8. Click **Next** to display the next screen in the Lookup Wizard.
9. Click the **down arrow** in the first box and then click **Last Name**.
10. Click **Next** to display the next screen in the Lookup Wizard.
11. Click **Next** again to display the final screen in the Lookup Wizard.
12. In the What label would you like for your lookup field? box, type **Service Rep**.
13. Click the **Finish** button. A new column named Service Rep appears as the second column of the table.
14. Click the **down arrow** and then select **Clair/Hector** from the list.
15. Change to Design view.
16. Display the Lookup field properties for the **Service Rep** field.
17. Change the Allow Multiple Values property to **Yes** and then confirm the change.
18. Display the General field properties for the Call Time field.
19. Change the Validation Rule property so that the value must be **greater than 1/1/2000**.
20. Change the Validation Text property to say **Please enter a value that is later than 1/1/2000**.
21. Display the General field properties for the Caller field.
22. Change the Field Size property to **60**.
23. Display the General field properties for the Notes field.
24. Change the Allow Zero Length property to **Yes**.
25. Type **Comments** in the Default Value property.
26. **SAVE** the table. If a data integrity message appears, click **No**.
27. **CLOSE** the database.

PAUSE. LEAVE Access open for the next project.

Project 4-2: Changing List Items

In this project, you are the owner of Fourth Coffee, a growing company that is converting all of its data from spreadsheets to Access. You directed an intern to create a database with tables to be used to track inventory. You want to make some modifications to these database tables before you enter information in the database.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Fourth Coffee* from the data files for this lesson and then **SAVE** the database as *Fourth Coffee-final*.
2. Open the Coffee Beans table and create a new Lookup field as the last field in the table that uses the Country field in the Countries table. Specify an Ascending sort order for the records in this field.
3. Rename the field **Origin**.
4. In Datasheet view, change the name and caption of the Current Value field to **Market Value**.
5. In Datasheet view, change the name and caption of the Acquired Date field to **Acquisition Date**.
6. Create a Yes/No field as the last field in the table named Stocked with a caption named **In Stock?**.
7. In Design view, create an input mask for all fields that use the Date/Time data type. Choose **Medium Date** as the input mask and accept all default values.
8. **SAVE** the table.

STOP. CLOSE the database and **EXIT** Access.

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Creating Forms	Create a form.	4.1.1
	Save a form.	4.1.3
	Apply a theme.	4.3.4
Sorting and Filtering Data within a Form	Sort records by form field.	4.3.3
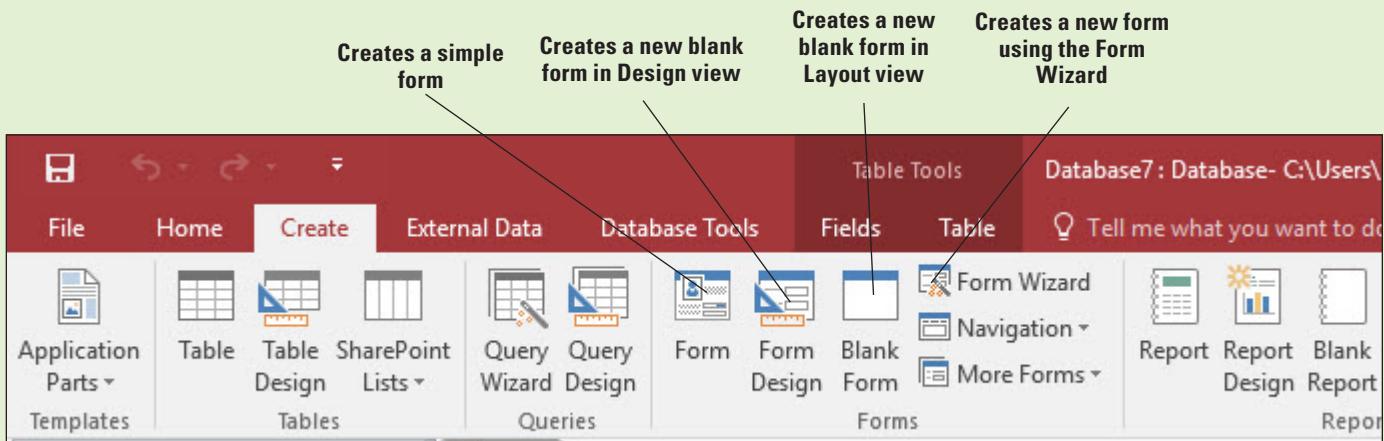
CREATING FORMS

A form is a database object that you can use to enter, edit, or display data from a table or query. You can use forms to control access to data by limiting which fields or rows of data are displayed to users. For example, certain users might need to see only certain fields in a table. Providing those users with a form that contains just those fields makes it easier for them to use the database. Think of forms as windows through which people see and reach your database in a more visually attractive and efficient way.

You can create forms in several different ways, depending on how much control you want over the form's design. You can quickly create forms that include all fields in a table through a single mouse click using the Form tool, or you can control the number of fields you'd like to include on the form as well as the layout of the form using the Form Wizard. You have the most flexibility with

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the amount and placement of fields on the form when you use Layout or Design view, with Design view giving you the greatest control over field placement and properties. You can quickly apply a chosen theme to the form to modify its color and font scheme using the Themes command. Finally, you can delete any form by simply using the Delete command. In this section, you practice creating forms using a variety of these skills. You also delete a pre-existing form.

Creating a Simple Form and Deleting a Form

You can use the **Form tool** to create a form with a single mouse-click. When you use this tool, all the fields from the underlying data source are placed on the form. Access creates the form and displays it in Layout view. You can begin using the new form immediately, or you can modify it in Layout view or Design view to better suit your needs. You can also delete a form to remove it permanently from the database. In this exercise, you use the Form tool to create a simple form and use the Delete command to delete a form.

To use the Form tool to create a simple form, first click in the Navigation Pane on the table that contains the data you want to see on the form. On the Create tab, in the Forms group, click Form.

To save a form design, click the File tab and then click Save. Type a name in the Form Name box and then click OK. After you save your form design, you can run the form as often as you want. The design stays the same, but you see current data every time you view the form. If your needs change, you can modify the form design or create a new form that is based on the original. You can also permanently delete the form or any preexisting forms from the database by using the Delete command in the Records group of the Home tab. You can delete a form if you erroneously created it or simply want to unclutter the database.
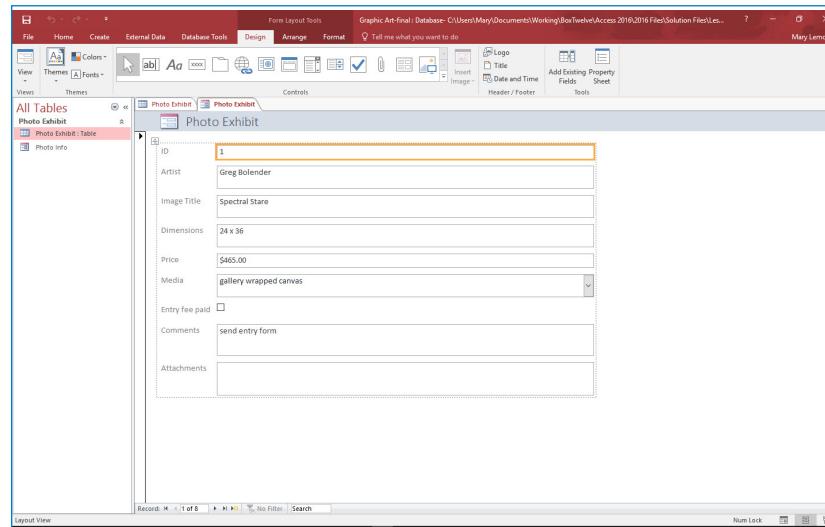
STEP BY STEP   **Create a Simple Form and Delete a Form**

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and start Access.

1. **OPEN** the *Graphic Art* database from the data files for this lesson and then **SAVE** the database as *Graphic Art-final*.
2. In the Navigation Pane, click the **Photo Exhibit** table. This is the table for which you will create a form.
3. On the Create tab, in the Forms group, click the **Form** button. Access creates the form and displays it in Layout view (see Figure 5-2). Your form may be slightly different.

Figure 5-2

Simple form

4. Click the **File** tab and then click **Save**. The *Save As* dialog box appears.

Take Note   You can use the record navigation buttons at the bottom of a form to navigate among the form's records, just as you used them to navigate among records in a table in Lesson 3.

5. Click **OK** to accept the Photo Exhibit form name suggested by Access. The form name appears in the Navigation Pane.

6. Click the **Close** button on the Photo Exhibit form to close it.

7. In the Navigation Pane, click the **Photo Info** form. This is a form that you no longer need.

8. In the Records group, click the **Delete** button arrow and then click the **Delete** command on the menu that appears.

9. Click **Yes** on the dialog box asking you if you want to permanently delete the Photo Info form. The form is now permanently deleted from the database.

Troubleshooting   In step 7, don't double click the form. If you do, the form opens and you can't delete the form when it is open.

PAUSE. LEAVE the database open to use in the next exercise.

Creating a Form in Design View

When you click the **Form Design button**, a new blank form is created in Design view. Design view gives you a more detailed view of the structure of your form than Layout view. The form is not actually running when it is shown in Design view, so you cannot see the underlying data while you are making design changes. In this exercise, you create a new blank form in Design view and manually add fields to it.

You can fine-tune your form's design by working in Design view. To change to Design view, right-click the form name in the Navigation Pane and then click Design view. You can also use the View button on the Home tab of the Ribbon. You can add new controls—used to enter, edit, and find information—and fields to the form by adding them to the design grid. Plus, the property sheet gives you access to a large number of properties that you can set to customize your form.
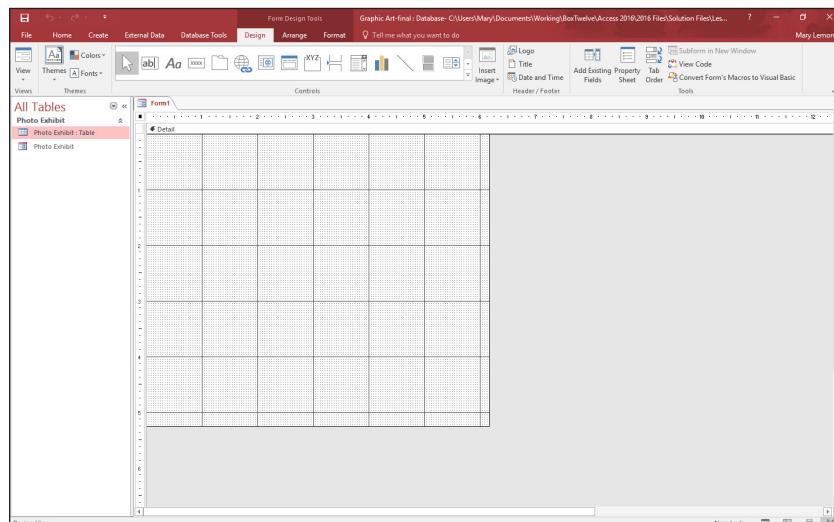
STEP BY STEP   **Create a Form in Design View**

GET READY. USE the *Graphic Art-final* database that is open from the previous exercise.
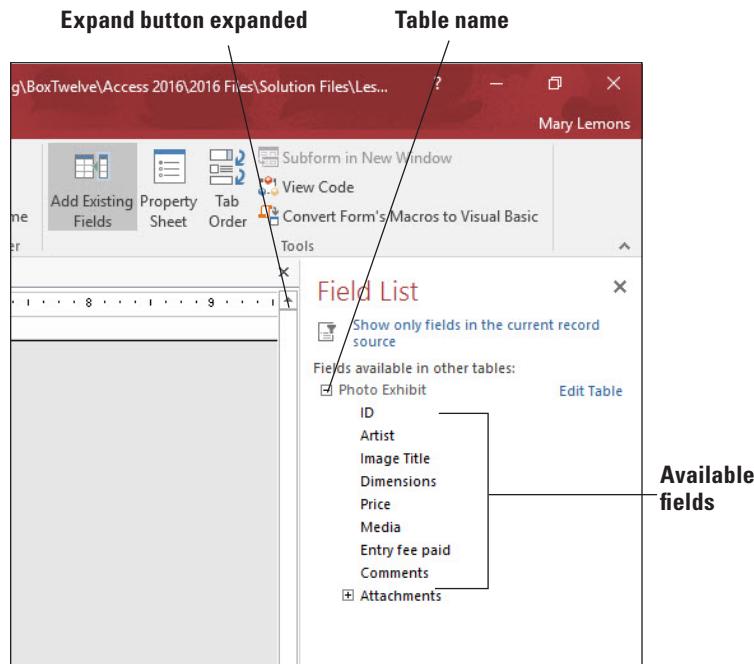
1. On the Create tab, in the Forms group, click the **Form Design** button. A new blank form is created in Design view (see Figure 5-3).

Figure 5-3

New blank form in Design view

2. On the Form Design Tools Design contextual tab, in the Tools group, click the **Add Existing Fields** button. The Field List pane appears.

3. Click the **Show all tables** link, and then the **expand** button to the left of the table name. The available fields display from the Photo Exhibit table (see Figure 5-4).

Expand button expanded   **Table name**
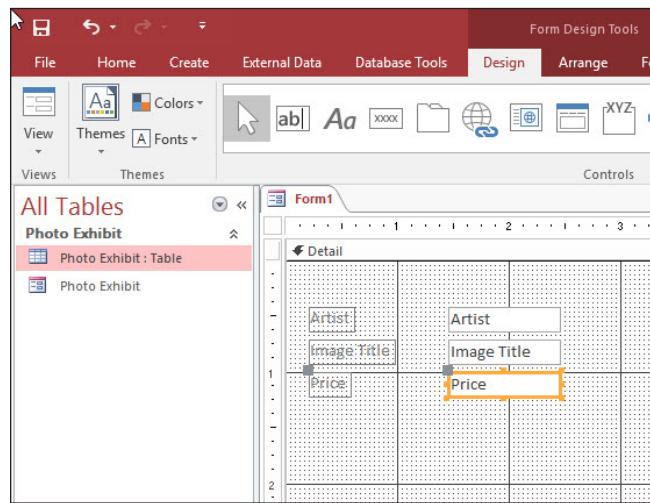
Figure 5-4

Field List pane with expand button and available fields

Available fields

4. In the list of fields, double-click **Artist** to add it to the form.

5. Double-click **Image Title** to add it to the form.

6. Double-click **Price** to add it to the form. Your form should look similar to Figure 5-5.

Figure 5-5
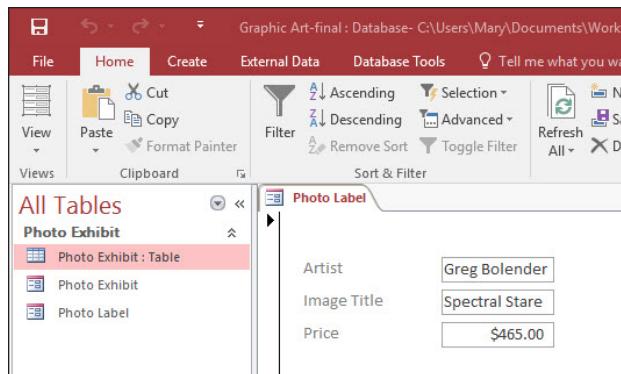
Fields inserted in Design view

7. Click the **File** tab and then click **Save**.

8. In the *Save As* dialog box, type **Photo Label** and then click **OK**.

9. On the Design menu, in the Views group, click the lower half of the **View** button and then click **Form View** to display the form in Form view (see Figure 5-6).

Figure 5-6

Form view

10. Click the **Close** button on Photo Label to close the form.

PAUSE. LEAVE the database open to use in the next exercise.

Creating a Form in Layout View

If other form-building tools do not fit your needs, you can use the Blank Form tool to create a form. The **Blank Form tool** creates a new form in Layout view. This can be a very quick way to build a form, especially if you plan to put only a few fields on your form. Click the Blank Form button to quickly create a new blank form in Layout view. This allows you to make design changes to the form while viewing the underlying data. In this exercise, you use the Blank Form tool to create a form in Layout view.

On the Create tab, in the Forms group, click the Blank Form button. Access opens a blank form in Layout view and displays the Field List pane. To add a field to the form, double-click it or drag it onto the form. In Layout view, you can make design changes to the form while it is displaying data.

STEP BY STEP   **Create a Form in Layout View**

GET READY. USE the *Graphic Art-final* database that is open from the previous exercise.

1. On the Create tab, in the Forms group, click the **Blank Form** button. A new blank form is created in Layout view.
2. Click the **Show all tables** link in the Field List pane to show the Photo Exhibit table name, if necessary.
3. If necessary, click the **expand** button next to the Photo Exhibit table name to show a list of fields related to the table, and then double-click **Image Title** to add it to the form.
4. Double-click **Dimensions** to add it to the form.
5. Double-click **Media** to add it to the form. Your form should look similar to Figure 5-7.
6. Click the **File** tab and then click **Save**.
7. In the *Save As* dialog box, type **Image Info** and then click **OK**.
8. Click the **Close** button to close the Field List.
9. Click the **Close** button on Image Info to close the form.
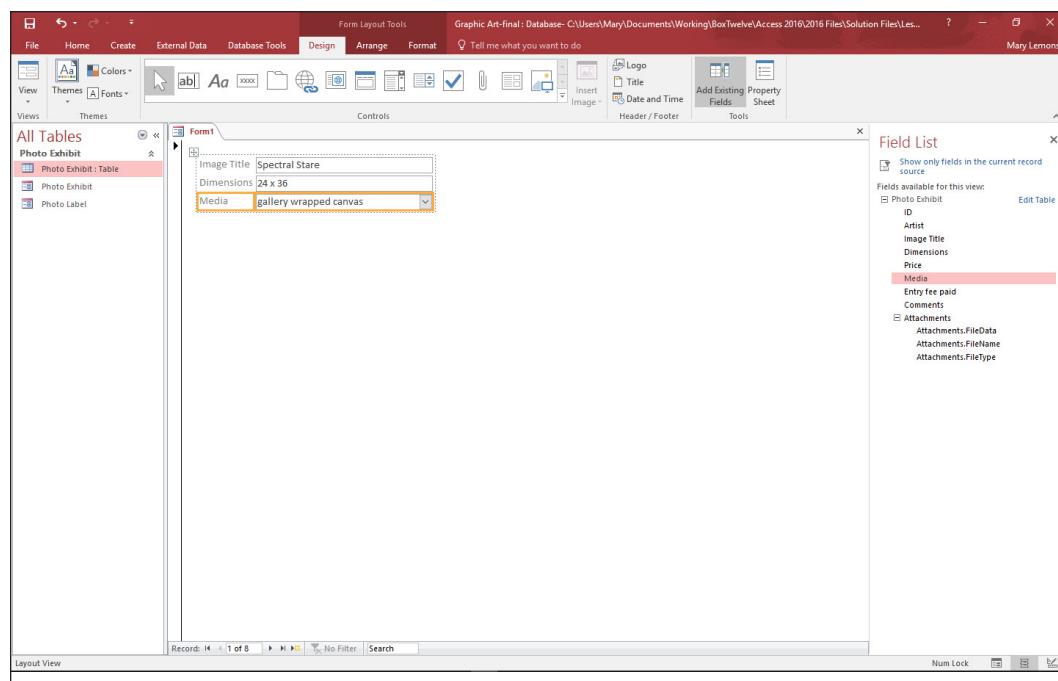
PAUSE. LEAVE the database open to use in the next exercise.

Take Note   To add more than one field at a time after adding at least one other field, press Ctrl and click several fields, and then drag them all onto the form at once.

Using the Form Wizard

Another method of building a form is to use the **Form Wizard** tool. The Form Wizard allows you to select the fields that will appear on the form, choose the form layout (which determines the positioning of controls, objects, and data on a form), and also choose a predefined style, if desired. In this exercise, you use the Form Wizard to create a datasheet form. A datasheet form looks very similar to the table upon which it is based and provides a way to enter data using columns and rows.
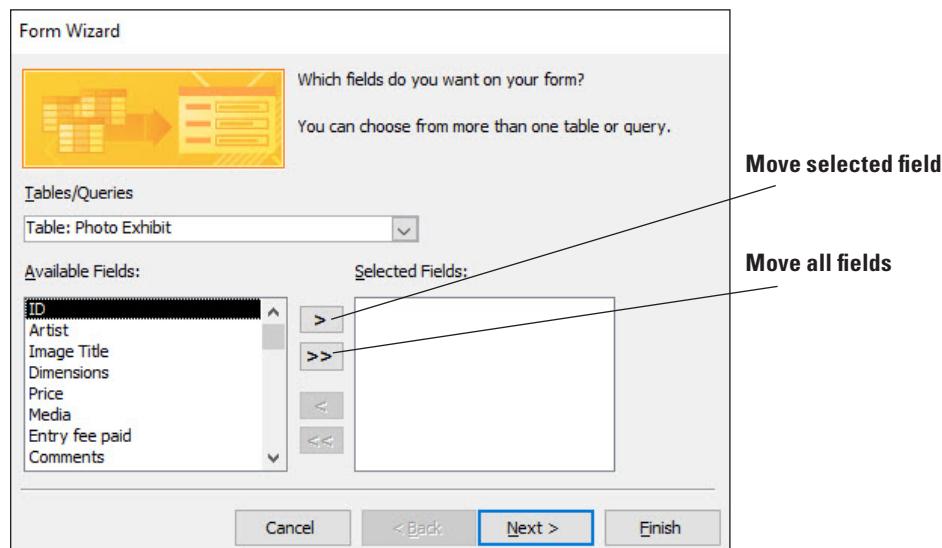
STEP BY STEP   **Use the Form Wizard**

GET READY. USE the *Graphic Art-final* database that is open from the previous exercise.

1. On the Create tab, in the Forms group, click the **Form Wizard** button. The Form Wizard appears (see Figure 5-8).

2. Click the **>>** button to move all the fields from the Available Fields box to the Selected Fields box.

3. Click the **Next** button to move to the next page in the Form Wizard

4. Click **Datasheet** as the layout for the form. Form layouts help determine the positioning of controls, objects, and data on a form.

5. Click the **Next** button to move to the final page in the Form Wizard.

6. Type **Photo Details** as the title of the form.

7. Click the **Finish** button. A datasheet form appears (see Figure 5-9).

Figure 5-9

Datasheet form

8. Click the **Close** button on Photo Details to close the form.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note To include fields from more than one table on your form, do not click Next or Finish after you select the fields from the first table on the first page of the Form Wizard. Instead, repeat the steps to select another table and then click any additional fields that you want to include on the form before continuing.

Applying a Theme

The **Themes** command applies a predefined color and font scheme to a form or report. A theme modifies a form by controlling the color and fonts of its text. In this exercise, you apply a Theme to a form.

To apply a theme, first change to Layout view. On the Form Layout Tools Design contextual tab, in the Themes group, click the Themes button to view a gallery of theme styles from which to choose. You can point to each option to see the name of that format and a live preview before it is applied to the form.
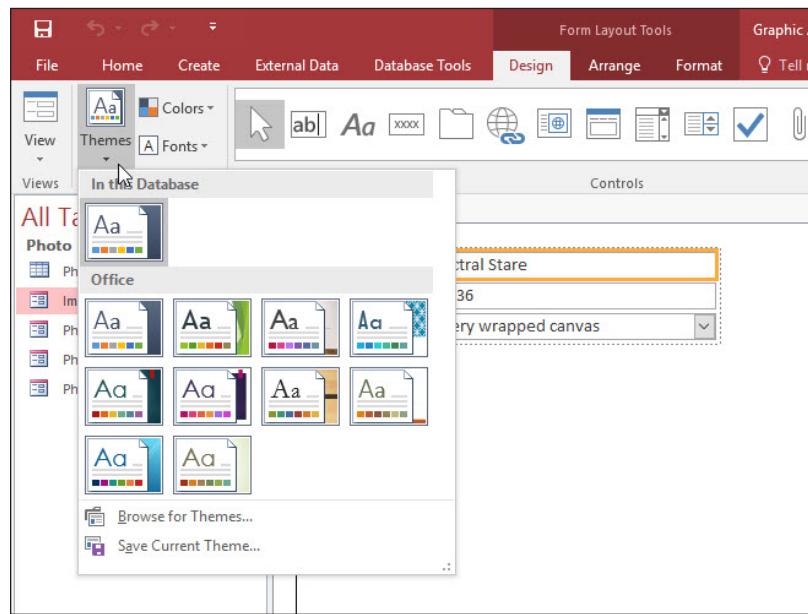
Apply a Theme

GET READY. USE the *Graphic Art-final* database that is open from the previous exercise.

1. Double-click the **Image Info** form in the Navigation Pane to open it.

2. On the Home tab, in the Views group, click the lower half of the **View** button and then click **Layout View** on the View menu.

3. On the Form Layout Tools Design contextual tab, in the Themes group, click the **Themes** button. A gallery of themes appears (see Figure 5-10).

Figure 5-10
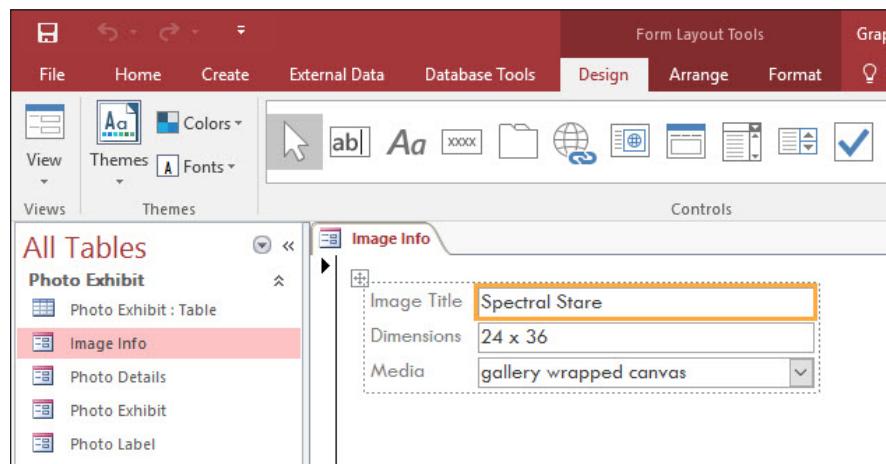
Themes gallery

4. Click the **Integral theme** (fourth item in the first row) to apply it to the form. Notice how the form's text has changed (see Figure 5-11).

Figure 5-11

Form in Layout view with Integral theme applied

5. Click the **Close** button on Image Info to close the form.

PAUSE. LEAVE the database open to use in the next exercise.

SORTING AND FILTERING DATA WITHIN A FORM

Sorting data in a form can help make it much more effective and easy to use. Sorting helps users review and locate the records they want without having to browse the data. To find one or more specific records in a form, you can use a filter. A **filter** limits a view of data to specific records without requiring you to alter the design of the form. You also can use a tool called filter by form to filter on several fields in a form or to find a specific record.

Sorting Data within a Form

You can sort data in the Form view of a form. The order that is chosen when a form is designed becomes that object's default sort order. But when viewing the form, users can sort the records in whatever way is most useful for them. You can sort the records in a form on one or more fields. In this exercise, you sort data in a form in ascending order.

STEP BY STEP   **Sort Data within a Form**

GET READY. USE the *Graphic Art-final* database that is open from the previous exercise.

1. Double-click the **Photo Label** form in the Navigation Pane to open it in Form view.
2. Right-click the **Price** field to display the shortcut menu.
3. Click **Sort Smallest to Largest**. The form is sorted by price from smallest to largest. The record with the smallest price is displayed first.
4. Click the **Next record** button on the record navigator at the bottom of the form. Continue clicking through all the records to see the records in order according to price.
5. On the Home tab, in the Sort & Filter group, click the **Remove Sort** button. The records have resorted back to their original order.
6. Click the **Close** button on Photo Label to close the form.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   You cannot sort on a field that contains attachments. Also, when sorting on a field with the Yes/No data type, a value of "Yes" is considered "Selected," and when sorted in ascending order, appears at the top of the list. A value of "No" is considered "Cleared," and when sorted in ascending order, appears at the bottom of the list.

You must identify the fields on which you want to sort. To sort on two or more fields, identify the fields that will act as the innermost and outermost sort fields. Right-click anywhere in the column corresponding to the innermost field and then click one of the sort commands. The commands vary based on the type of data that is in the selected field. Repeat the process for each sort field, ending with the outermost sort field. The records are rearranged to match the sort order.

The last-applied sort order is automatically saved with the form. If you want it automatically applied the next time you open the form, set the Order By On Load property of the form to Yes. Remember that you cannot remove a sort order from just a single field. To remove sorting from all sort fields, click Remove Sort on the Home tab in the Sort & Filter group.

Filtering Data within a Form

Common filters are built into every view that displays data. The filters available depend on the type and values of the field. When you apply the filter, only records that contain the values that you are interested in are included in the view. The rest are hidden until you remove the filter. In this exercise, you filter form data using common filters.

Filters are easy to apply and remove. Filter settings remain in effect until you close the form—even if you change to another view. If you save the form while the filter is applied, it will be available

the next time you open the form. To permanently remove a filter, on the Home tab, in the Sort & Filter group, click the Advanced button and then click Clear All Filters.
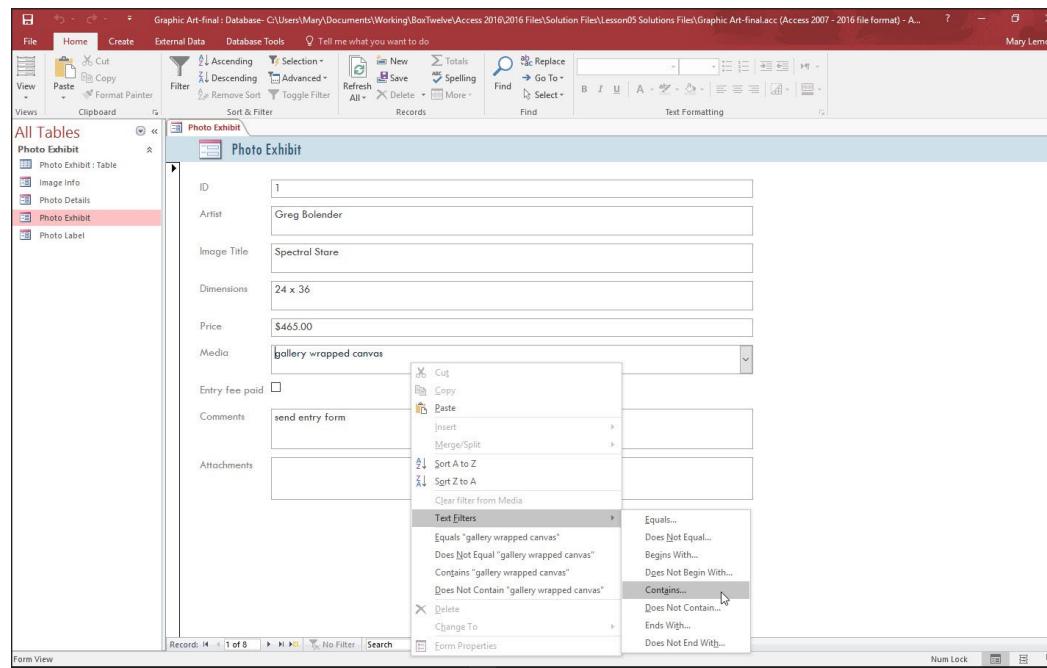
Filter Data with Common Filters

GET READY. USE the *Graphic Art-final* database that is open from the previous exercise.

1. Double-click the **Photo Exhibit** form in the Navigation Pane to open it in Form view.
2. Right-click the **Media** field to display the shortcut menu, click **Text Filters**, and then select **Contains**, as shown in Figure 5-12. Click **Contains** to display the *Custom Filter* dialog box.

Figure 5-12

Media field text filters

3. In the Media contains box, type **print** and then click **OK**.
4. Click the **Next record** button on the record navigator at the bottom of the form. Continue clicking to see the five records that contain the word "print" in the Media field.
5. Right-click the **Price** field to display the shortcut menu and then click **Number Filters**.
6. Click **Less Than** to display the *Custom Filter* dialog box.
7. In the Price is less than or equal to box, type **500** and then click **OK**.
8. Click the **Next record** button on the record navigator at the bottom of the form. Continue clicking to see the three photos that use print media and are less than $500.
9. On the Home tab, in the Sort & Filter group, click the **Advanced Filter Options** button and then click **Clear All Filters**.

PAUSE. LEAVE the database open to use in the next exercise.

Using Filter by Form

Although only a single filter can be in effect for any one field at any one time, you can specify a different filter for each field that is present in the view. In addition to the ready-to-use filters for each data type, you can also filter a form by completing an action called filter by form. **Filter by form** is useful when you want to filter several fields in a form or if you are trying to find a specific record. Access creates a blank form that is similar to the original form; you then complete as many of the

fields as you want. When you are finished, Access finds the records that contain the specified values. In this exercise, you filter by form.

To use filter by form, open the form in Form view and make sure the view is not already filtered by verifying that either the Unfiltered icon or the dimmed No Filter icon is present on the record selector bar. On the Home tab, in the Sort & Filter group, click Advanced and then click Filter By Form. Click the down arrow in a field to display the available values.

Enter the first set of values on the Look for tab at the bottom of the page and then click the Or tab and enter the next set of values. Each time you click the Or tab, Access creates another Or tab; so you can continue to add additional filter values. Click the Toggle Filter button to apply the filter. The filter returns any record that contains all of the values specified on the Look for tab, or all of the values specified on the first Or tab, or all of the values specified on the second Or tab, and so on.
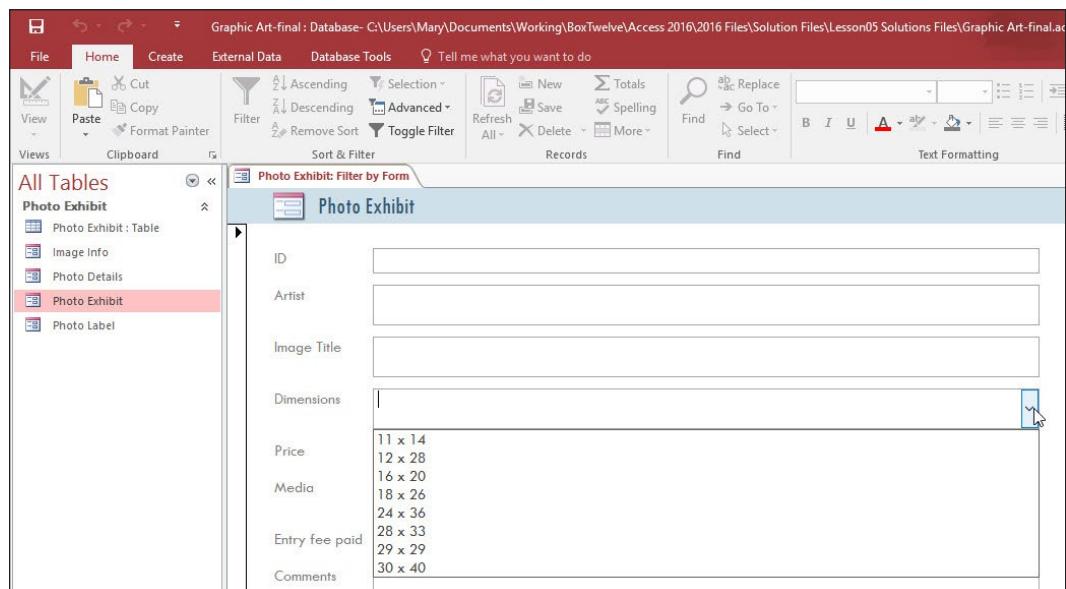
STEP BY STEP   **Use Filter by Form**

GET READY. USE the *Graphic Art-final* database that is open from the previous exercise.

1. On the Home tab, in the Sort & Filter group, click the **Advanced Filter Options** button and then click **Filter By Form**. A form filter appears.
2. Place the insertion point in the Dimensions box and then click the **down arrow** on the right to display the list of options shown in Figure 5-13.

Figure 5-13
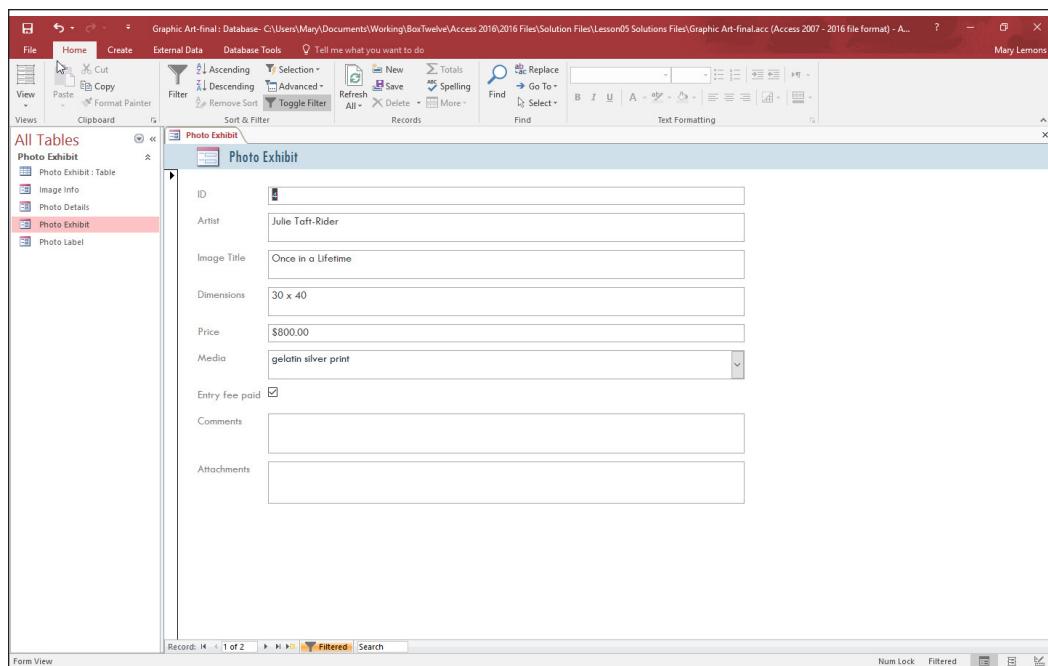
Form filter field options

3. Click **30 X 40**.
4. Click the **Or** tab at the bottom of the form.
5. Place the insertion point in the Dimensions box, click the **down arrow** and then click **12 X 28**.
6. On the Home tab, in the Sort & Filter group, click the **Toggle Filter** button to apply the filter. The records containing either the dimensions **30 X 40** or **12 X 28** are displayed (see Figure 5-14).

7. Click the **Next record** button on the record navigator at the bottom of the form to see the second record in the form filter results.

8. On the Home tab, in the Sort & Filter group, click the **Toggle Filter** button again to remove the filter, click the **Advanced** button and then click **Clear All Filters**.

9. Click the **File** tab and then click **Close**.

STOP. CLOSE the database and then **EXIT** Access.

Take Note   If you want a field value to operate as a filter that is independent of other field values, you must enter that value on the Look for tab and each Or tab. In other words, the Look for tab and each Or tab represents an alternate set of filter values.

Knowledge Assessment

Matching

Match the term in Column 1 to its description in Column 2.

Column 1	Column 2
1. Form Design button	**a.** Useful when you want to filter on several fields in a form or if you are trying to find a specific record
2. Blank Form button	**b.** Creates a simple form with a single mouse-click
3. Filter by form	**c.** Quickly creates a new blank form in Layout view
4. Form tool	**d.** Quickly creates a new blank form in Design view
5. Common filters	**e.** Built into every view that displays data

True/False

Circle T if the statement is true or F if the statement is false.

T F 1. Forms can be used to control access to data, such as which fields or rows of data are displayed.

T F 2. To access the Theme options, first change to Form view.

T F 3. You cannot remove a sort order from just a single field.

T F 4. The filters available depend on the field's data type and values.

T F 5. When using the Form Wizard, you can only include fields from one table.

Projects

Project 5-1: Creating, Sorting, and Filtering Forms

In this project, you are the manager at Southridge Video. To expand the store, you have recently started taking used games in trade. You store information about each title in an Access database. You decide to create some forms to help you use the database more efficiently. Next, when a customer comes in and asks about game publishers and the availability of a particular game, you sort and filter data in the forms you created to get the information that you need.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Games inventory* from the data files for this lesson and then **SAVE** the database as *Games inventory-final*.
2. In the Navigation Pane, double-click **Games: Table** to open the table.
3. On the Create tab, in the Forms group, click the **Form** button to create a simple form and display it in Layout view.
4. Click the **File** tab and then click **Save**.
5. In the *Save As* dialog box, click **OK** to accept the Games form name suggested by Access.
6. Click the **Close** button for Games to close the form.
7. On the Create tab, in the Forms group, click the **Form Design** button to create a new blank form in Design view.
8. On the Form Design Tools Design contextual tab, in the Tools group, click the **Add Existing Fields** button to display the Field List pane.
9. Click the **Show all tables link** in the Field List pane, if necessary.
10. Click the **expand** button next to Games to list the available fields, if necessary.

11. Double-click **Title** to add it to the form.

12. Double-click **Rating** to add it to the form.

13. Double-click **Platform** to add it to the form.

14. Click the **File** tab and then click **Save**.

15. In the *Save As* dialog box, type **Game Rating** and then click **OK**.

16. Click the **Close** button to close the Field List.

17. On the Design contextual tab, in the Views group, click the lower half of the **View** button and then click **Form View** to display the form in Form view.

18. Click the **Close** button for Game Rating to close the form.

19. In the Navigation Pane, double-click the **Games** form to open it.

20. Right-click the **Publisher** field to display the shortcut menu.

21. Click **Sort A to Z** to sort the form by publisher name in alphabetic order.

22. Navigate to record 3, titled Marvel: Ultimate Alliance.

23. Right-click the **Title** field and then click **Contains "Marvel: Ultimate Alliance"**.

24. Click the **Next record** button on the record navigator at the bottom of the form to see all the versions of the game with that name.

25. On the Home tab, in the Sort & Filter group, click the **Remove Sort** button, click the **Advanced** down arrow and then click **Clear All Filters**.

26. **CLOSE** the database.

PAUSE. **LEAVE** Access open for the next project.

Project 5-2: Applying a Theme

In this project, your brother owns Wingtip Toys and recently started keeping a list of the store inventory in an Access database. He wants to add a form to the database and asks for your help. Add a simple form with a theme, and then show him how to sort and apply filters.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Toy inventory* from the data files for this lesson and then **SAVE** the database as *Toy inventory-final*.

2. In the Navigation Pane, double-click **Inventory: Table** to open the table.

3. Use the Form tool to create a simple form.

4. Format the form using the **Organic** theme option.

5. **SAVE** the form as **Inventory**.

6. Sort the form's In Stock field from **Largest to Smallest**.

7. Sort the Description field from **A to Z**.

8. Run a filter that finds all the records where the Price field is **between $50 and $100**.

9. Clear all sorts and filters.

10. Create a filter by form to find all the records that have two items in stock.

CLOSE the form, **CLOSE** the database, and then **EXIT** Access.

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Creating Reports	Create a report based on the query or table. Create a report by using a wizard. Create reports in Design view.	5.1.1 5.1.3 5.1.2
Applying a Theme	Apply a theme.	5.3.8
Working with Reports	Group and sort fields.	5.2.1

SOFTWARE ORIENTATION

Reports Group

The Reports group is located on the Create tab in the Ribbon, as shown in Figure 6-1.

Creates a simple report   **Creates a blank report in Layout view**   **Starts the Report Wizard**
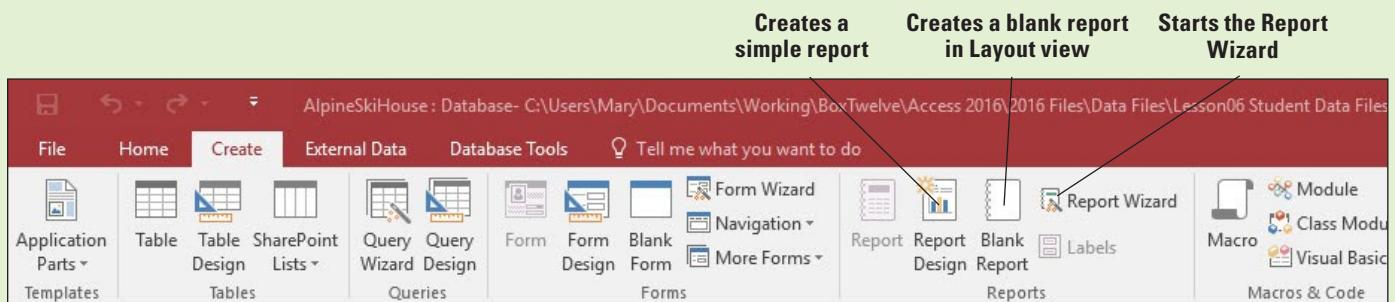
Figure 6-1
Reports group

Use the Reports group of commands to create reports.

CREATING REPORTS

A **report** is a database object that is used to organize and display data pulled from tables and queries. You can create a report using the Report button, Report Wizard button, Report Design button, and Blank Report button, depending on the amount of customization desired. You can also create labels using the Labels button. After creating a report, you can instantly apply a Theme to create a professional look. You can also sort and filter data in a report to display the records to suit your needs.

Creating a Simple Report and Deleting a Report

You can use Access 2016 to create simple or complex reports. When creating a complex report, you might spend quite a bit of time choosing which fields you want to include from various tables or queries. That is fine when you need such a report, but when you need a simple display of all the fields in a table or query, use the Report button to create a simple report. You can also delete a report to remove it permanently from the database. In this exercise, you use the Report button to create a simple report and delete a report using the Delete command.

Reports are commonly used as formatted hard copies of table or query data. You can modify a report's design, but you cannot add or edit data in a report. The purpose of a report is to allow users to view data, not edit it. For example, a supervisor might ask you to create a sales report that is filtered to show only one region's sales. The supervisor does not need to edit the data, just view it.

A report's **record source** is the table or query that provides the data used to generate a report. Before you can create a report, you need to define the record source by clicking in the Navigation Pane on the table or query on which you want to base the report. Then, click the Report button and a report is automatically generated based on the table or query you selected.

You can modify a report's design, print, or save and close a report. You should save a report's design if you are likely to use it again. To save a report, click the Save button on the File tab or in the Quick Access Toolbar. If you click the Close button without saving, Access will display a dialog box asking if you want to save it. Once it is saved, the report is listed in the Navigation Pane. You can open it and modify it in the future or create a new report based on the original. The next time you run the report, the design will be the same, but the data will be different if the data in the table or query has been updated.

You use the Delete command in the Records group on the Home tab to permanently delete a report from the database. You can delete a report if you erroneously created it or if you want to unclutter the database by removing reports that you no longer use.

STEP BY STEP   **Create and Delete a Report**

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and start Access.

1. **OPEN** *AlpineSkiHouse* from the data files for this lesson and then **SAVE** the database as *AlpineSkiHouse-final*.
2. In the Navigation Pane, click the **Rooms** table to select it. This is your record source.
3. On the Create tab, in the Reports group, click the **Report** button. The report appears in Layout view, as shown in Figure 6-2. Notice the Report Layout tools that appear in the Ribbon.

Figure 6-2

Simple report

4. Click the **Room ID** header to select it. Position the pointer over the right border until you see a double-sided arrow.

5. Click and drag, resizing the column to remove excess white space. Your screen should look similar to Figure 6-3.

Figure 6-3

Report with resized columns

6. Click the **Save** button on the Quick Access Toolbar. The *Save As* dialog box appears with Rooms in the Report Name box. Click **OK**. Notice that the Rooms report is listed in the Navigation Pane.

7. Click the **Close** button to close the Rooms report.

8. In the Navigation Pane, click the **Reservations** report to select it.

9. On the Home tab, in the Records group, click the **Delete** button arrow and then click the **Delete** command on the menu that appears.

   10. Click **Yes** on the dialog box asking you if you want to permanently delete the Reservations report. The report is now permanently deleted from the database.

PAUSE. LEAVE the database open to use in the next exercise.

Using the Report Wizard

You are probably already familiar with the way a "wizard" works. The Report Wizard displays a series of questions about the report you want, and then it creates the report for you based on your answers. The Report Wizard knows what makes a good report, so the questions are designed to help you create a professional report with little effort. The Report Wizard is usually the easiest way to create a report when you want to choose which fields to include. It guides you through a series of questions and then generates a report based on your answers. If you want to skip steps such as Sorting or Grouping in the Report Wizard, click the Next button to go to the next screen. You can click the Finish button anytime it is available to create the report with the choices you have specified. In this exercise, you use the Report Wizard to create a report based on the Rooms table.

The Report Wizard allows you to include fields from more than one table or query. You can click the double right arrow button (>>) to include all the fields in the report or click the single right arrow button (>) to move them one at a time. Likewise, you can click the double left arrow button (<<) to move all the fields out of the report or the single left arrow button (<) to move them one at a time.

You can specify group levels, such as grouping all of the first-floor rooms together and all of the second-floor rooms together if creating a room report. You can also choose up to four fields on which to sort data in ascending or descending order. On the layout screen, you can choose from various layouts, such as stepped, block, or outline, all of which indent fields and records in different ways to make the report clearer to read. You can also choose to display the report in portrait or landscape orientation. Access provides a wide variety of design styles from which to choose. On the last screen of the Report Wizard, you can type a name for the report and choose to preview or modify the report.
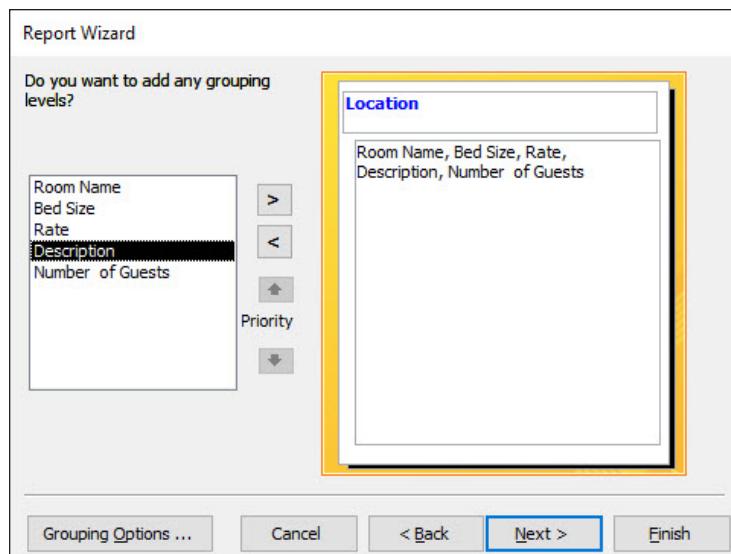
STEP BY STEP   **Use the Report Wizard**

GET READY. USE the ***AlpineSkiHouse-final*** database that is open from the previous exercise.

   1. On the Create tab, in the Reports group, click the **Report Wizard** button. The first screen of the Report Wizard appears.
   2. Select the **Rooms table** in the Tables/Queries menu.
   3. Click the **>>** button to move all the fields into the Selected Fields list.
   4. Click the **Room ID** field to select it and then click the **<** button to move it back to the Available Fields list. Click the **Next** button.
   5. Click the **Location** field to select it and then click the **>** button to add it as a grouping level, as shown in Figure 6-4.

Figure 6-4
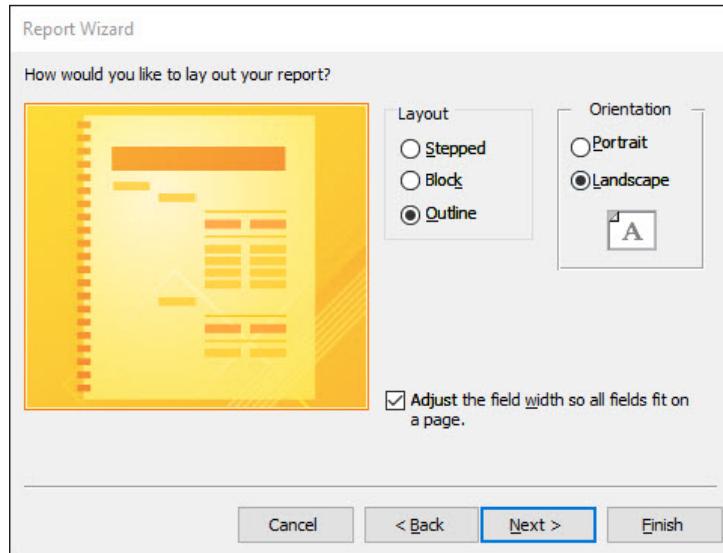
The Report Wizard Grouping screen

6. Click the **Next** button.
7. Select **Room Name** from the fields menu to sort in ascending order and then click the **Next** button.
8. In the Layout section, click the **Outline** button. In the Orientation section, click the **Landscape** button as shown in Figure 6-5. Click **Next**.

Figure 6-5

The Report Wizard Layout screen
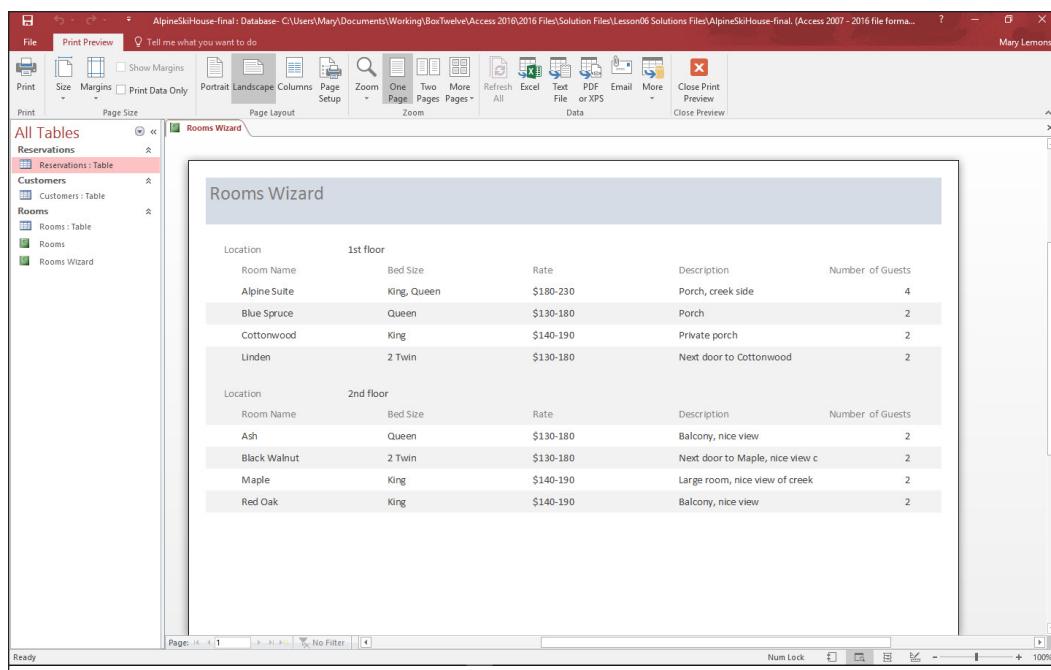
9. Type **Rooms Wizard** as the title of the report.
10. Click **Finish**. The Rooms Wizard report appears on the screen, as shown in Figure 6-6.
11. **CLOSE** the report. Notice that the new report is listed in the Navigation Pane.

PAUSE. LEAVE the database open to use in the next exercise.

Creating a Report in Design View

When you want a customized report, you can create it in Design view, which offers you many options for creating the report exactly the way you want it. Design view gives you the most options for creating a report, because it shows you the underlying structure of the report. It also provides you with more design tools and capabilities. In this exercise, you create a report in Design view by adding and moving fields.

In Design view, a report is displayed on a design grid with sections. Table 6-1 lists the sections.

Table 6-1

Design view sections

Section Name	Description
Report header	This section is printed once at the beginning of every report. This is a good place to include a logo, a date, or information that might normally appear on a cover page.
Page header	This section is printed at the top of every page of a report, so it is a good place to include the report title.
<Group> header	This section is printed at the beginning of a group. (The name of the grouping field replaces <Group>.) It is a good place to include the group name.
Detail	This section includes the body of the report. It is printed once for every row in a record source.
<Group> footer	This section is only printed at the end of a group that contains summary information for the group. (The name of the grouping field replaces <Group>.)
Page footer	This section is printed at the bottom of every page of a report, so it is a good place to include information such as a page number.
Report footer	This section is printed once at the end of every report. It is a good place for report totals.

To add fields to the report design, you can display the Field List pane (if it is not already displayed) by clicking the Add Existing Fields button. Double-click a field in the Field List to add it to the design grid or drag the field to a location on the grid. If you need to move a field on the grid, click the field to select it, position the pointer on the border until you see a four-sided arrow, and then

drag it to the new location. To change the size of a field, position the pointer on the border until it turns into a two-sided arrow, and then drag to resize the field.

The field name and field data are in two separate boxes. Most of the time you will move both boxes together; however, to move one box separately from the other, position the pointer on the box border's selection handle, and then drag the box to the new location.

To see what your report will look like, click the bottom half of the View button in the Views group and then select Report View from the menu.

STEP BY STEP   **Create a Report in Design View**

GET READY. USE the *AlpineSkiHouse-final* database that is open from the previous exercise.

1. If necessary, click the **Rooms** table in the Navigation Pane to select it.
2. On the Create tab, in the Reports group, click the **Report Design** button. A new blank report is displayed in Design view, as shown in Figure 6-7.
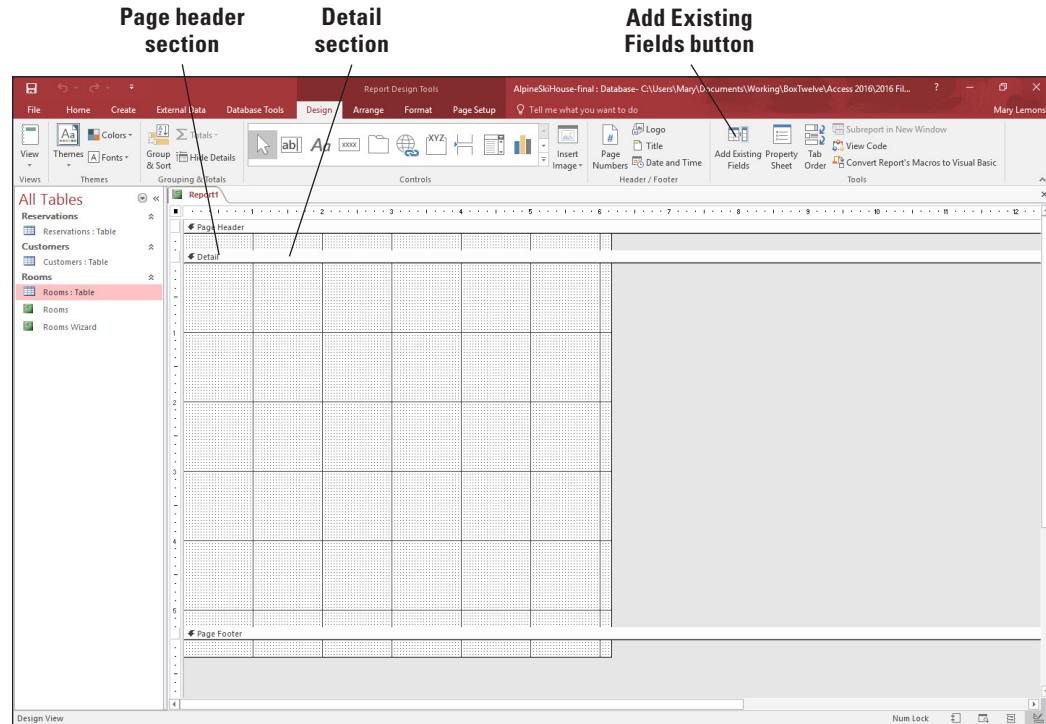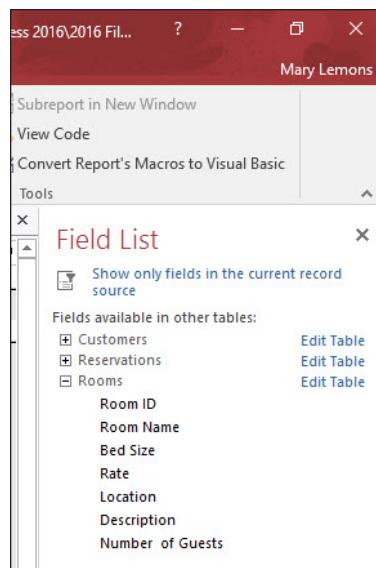
Figure 6-7

New blank report in Design view

3. If the Field List pane is not already displayed, click the **Add Existing Fields** button on the Design tab in the Tools group. The Show All Tables link appears.
4. Click the **Show all tables link** and then the **plus (+)** box beside Rooms to display the fields in the table, as shown in Figure 6-8.
5. Double-click **Room ID**. The field is inserted onto the design grid.
6. Double-click **Room Name**, **Bed Size**, and **Rate** to add them to the design grid.
7. Click the **Close** button on the Field List pane.
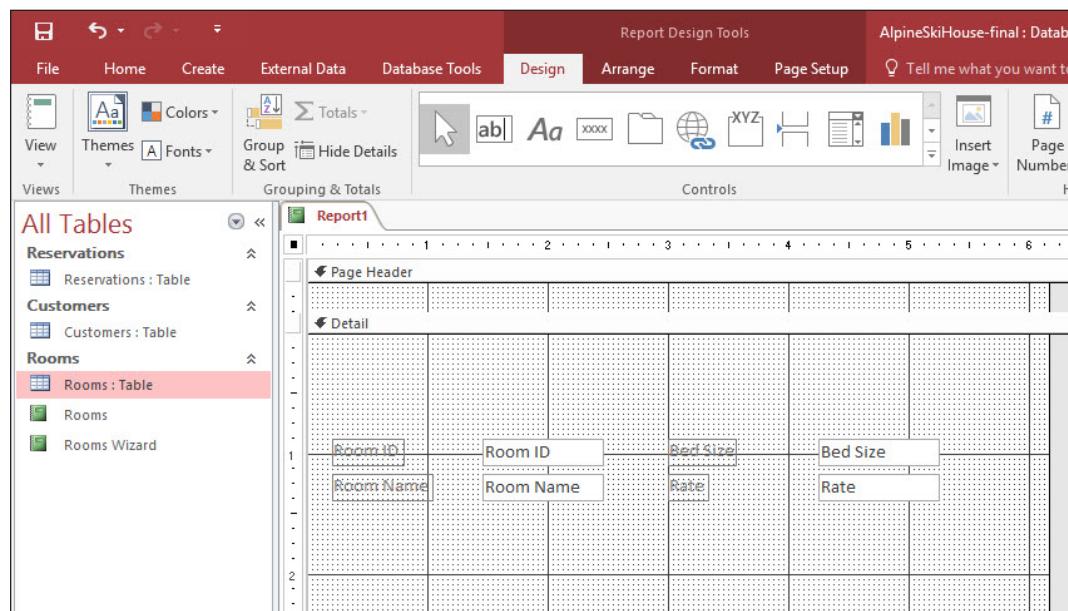
8. Click the **Bed Size** label. The border around the label changes to orange, indicating that it is selected. Position the insertion point over the top of the border until the pointer changes to a four-sided arrow.

9. Click and drag the label to position it about one-half inch to the right of the Room ID field and release the mouse button. The field is moved along with the label.

10. In the same manner, move the **Rate** label and field to position it below the Bed Size field. Your screen should resemble Figure 6-9.

11. Click the **Room ID** field to select it. Position the mouse pointer on the square handle in the middle of the right-side border. Click and drag the field to the left to decrease the size by about one-quarter inch.

12. On the Ribbon, in the Views group, click the bottom half of the **View** button and then select **Report View** from the menu. The report is shown in Report view. Scroll down to see all the records.

13. Click the **Save** button on the Quick Access Toolbar.

14. Type **Report Design** in the Report Name box and then click **OK**.

15. **CLOSE** the report.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note You can add more than one field to a report design at once only after at least one other field has been added. Hold down the Ctrl key and click the fields you want and then drag the selected fields onto the report.

APPLYING A THEME

A theme applies a set of predefined fonts, colors, and design to a report. You can apply a theme to any report in Layout view or Design view. The Themes gallery displays a variety of designs. After you click the design you want, it is applied to the report. This instant formatting can quickly give your report the professional look you want.

Applying a Theme

To apply a theme, on the Report Layout Tools Design contextual tab, in the Themes group, click the Themes button to display the Themes gallery. You can select a design from the list displayed or browse for saved themes. You can also customize and then save a theme based on the current report. You can click the Colors button and choose a color scheme from the menu to update the currently applied theme's colors and even create new theme colors. You can also click the Fonts button and choose a font scheme to update the currently applied theme's fonts and create new theme fonts. In this exercise, you apply a theme to the Rooms report and modify the fonts.
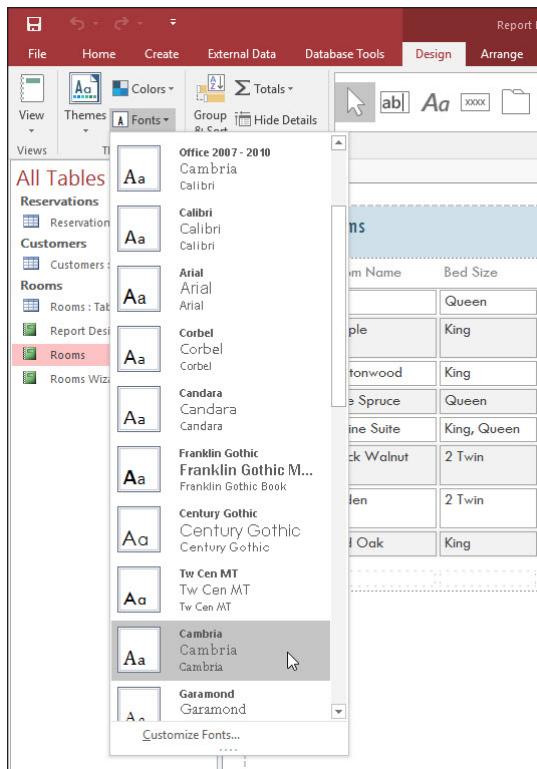
Apply a Theme

GET READY. USE the *AlpineSkiHouse-final* database that is open from the previous exercise.

1. Double-click the **Rooms** report in the Navigation Pane to open it.

2. On the Ribbon, in the Views group, click the bottom half of the **View** button and then select **Layout View** from the menu.

3. On the Report Layout Tools Design contextual tab, in the Themes group, click the **Themes** button. The Themes gallery of predefined report themes appears.

4. In the Office section, click the **Integral** design. The format is applied to the report.

5. In the Themes group, click the **Fonts** button. Select **Cambria** from the menu, as shown in Figure 6-10. Click the font and the new Font theme is applied. (Be sure to select the Cambria font and not the Office 2007-2010 Cambria font.)

6. **SAVE** the report.

PAUSE. LEAVE the report open to use in the next exercise.

WORKING WITH REPORTS

Reports help group and summarize data in different ways. However, after a report is created, you can use Layout view as well as Report view to help locate data. For example, you can use Layout view to easily sort field data one at a time, or perform more complex sorts using the Group, Sort, and Total pane. You can also use Layout view to filter data and view only those records based on the criteria you specify, and use Report view or Layout view to find data based on any term you specify.

Grouping and Sorting Data within a Report

Sorting organizes data into a particular sequence, such as alphabetic order or from smallest to largest numbers. For example, you can sort a customer list in alphabetic order by last name or by customer ID number. You can sort data by clicking the buttons on the Ribbon, right-clicking and choosing commands from the shortcut menu, or by using the Group, Sort, and Total pane. In this exercise, you sort data in a report using the Ribbon, the shortcut menu, and the Group, Sort, and Total pane.

Sorting data in a report is similar to sorting in a table. In Layout view, select the field you want to sort and then click the Ascending or Descending button on the Home tab in the Sort & Filter group. Click the Remove Sort button to remove the sort order. You can sort as many fields as you like one at a time.

You can also easily sort data by right-clicking in a field and choosing the type of sort you want from the shortcut menu. The sort commands in the shortcut menu vary depending on the type of data in the field. For text, you will choose Sort A to Z or Sort Z to A; for numbers, you will choose Sort Smallest to Largest or Sort Largest to Smallest; and for dates, you will choose Sort Oldest to Newest or Sort Newest to Oldest.

The Group, Sort, and Total pane gives you more sorting options. You can use the pane to specify the sort order or to view the results of sorting using the shortcut menu. To specify a sort, click the Add a Sort button and then select a field from the pop-up menu. Click the drop-down menu to specify the type of sort you want. Click the More Options button to display additional commands for creating detailed sorts. Click the Less Options button to return to the basic sorting options.

To delete a sort in the Group, Sort, and Total pane, click Delete at the end of the sort line.
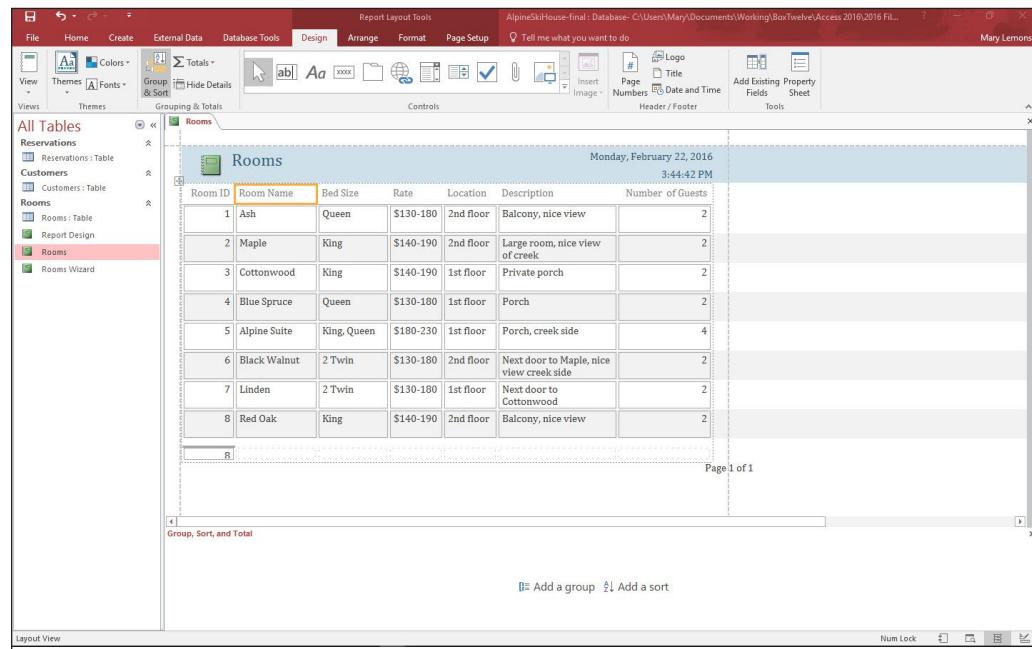
<table>
<tr><td>**STEP BY STEP**</td><td>**Group and Sort Data within a Report**</td></tr>
</table>

GET READY. USE the ***AlpineSkiHouse-final*** database that is open from the previous exercise.

1. On the Home tab in the Views group, click the bottom half of the **View** button. Select **Layout View** from the menu.
2. Click the **Room Name** header.
3. On the Home tab, in the Sort & Filter group, click the **Ascending** button. The column is sorted in ascending alphabetic order.
4. On the Home tab, in the Sort & Filter group, click the **Remove Sort** button. The Sort is removed.
5. Right-click the **Room Name** header. The shortcut menu appears.
6. Select **Sort Z to A**. The column is sorted.
7. On the Home tab, in the Sort & Filter group, click the **Remove Sort** button. The Sort is cleared.
8. On the Report Layout Tools Design contextual tab, in the Grouping & Totals group, click the **Group & Sort** button. The Group, Sort, and Total pane appears at the bottom of the screen, as shown in Figure 6-11.

Figure 6-11

Group, Sort, and Total pane

9. Click the **Add a sort** button in the Group, Sort, and Total pane.
10. Select **Room Name** from the select field list. Notice that the field was sorted in ascending order by default and a line was added describing the sort.
11. Click the **down arrow** beside *with A on top* and then select **with Z on top** from the menu. The field is sorted in descending order.

12. Click the **More Options** button in the Sort line. Notice the options available for customizing a sort (see Figure 6-12).

13. Click the **Delete** button. The sort is cleared.
14. In the Grouping & Totals group on the Ribbon, click the **Group & Sort** button. The Group, Total, and Sort pane is removed.
15. **SAVE** the report.

PAUSE. LEAVE the database open to use in the next exercise.

Filtering Data within a Report

A filter displays only data that meets the criteria you have specified and hides the rest. It does not modify the table data or the design of the report. After you remove a filter, all the records are displayed again. Filtering data in Layout view of a report is very similar to filtering data in a table. You can apply common filters using the commands in the Sort & Filter group or by right-clicking a field and choosing a filter from the shortcut menu. The filters available on the shortcut menu vary depending on the type of data in the field. Only one filter can be applied to a field at a time. However, you can specify a different filter for each field. In this exercise, you filter a report using a custom filter, and filter by selection.

You can toggle between filtered and unfiltered views using the Toggle Filter button. To remove a filter from a field, right-click in the field and then select the Clear filter from field name command. To remove all filters permanently, select the Clear All Filters command on the Advanced menu in the Sort & Filter group.

Take Note   If you save a report (or other object) while a filter is applied, it will be available the next time that you open the report. If you want to open the report and see the filter already applied, set the Filter On Load property setting to Yes.

You can also filter by selection in a report. If you want to view only the reservations for 12/13/16, select that date in the Check-in field and then click the Selection button. That date will appear in the menu, so that you can choose Equals 12/13/16, Does Not Equal 12/13/16, and so on. You can also access these commands on the shortcut menu by right-clicking the value.

Take Note   If you need to apply a filter that is not in the common filters list, you can write an advanced filter using the Advanced Filter/Sort command on the Advanced menu. You need to be familiar with writing expressions, which are similar to formulas, and be familiar with the criteria that you specify when designing a query.

Filter Data within a Report
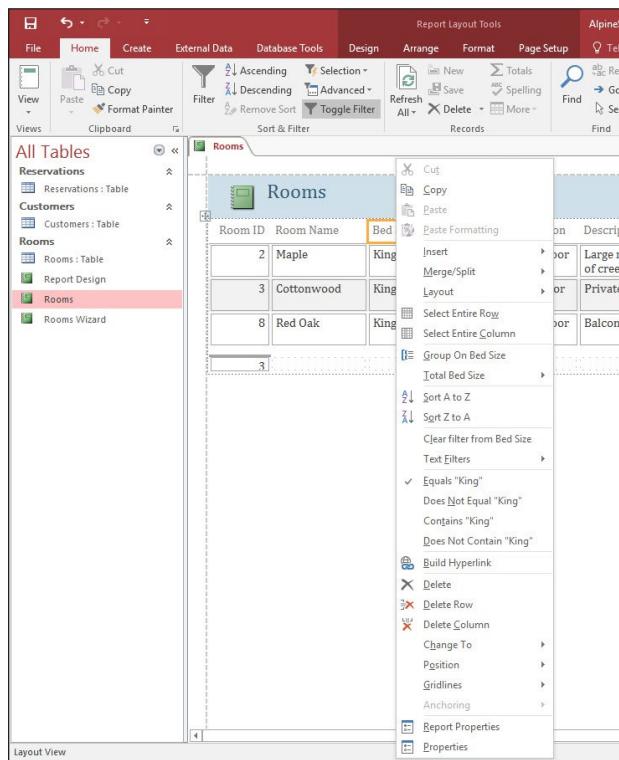
GET READY. USE the *AlpineSkiHouse-final* database that is open from the previous exercise.

1. Click the **Location** header to select it.
2. On the Home tab, in the Sort & Filter group, click the **Filter** button. A menu appears.
3. Select **Text Filters** and then click **Begins With**. The *Custom Filter* dialog box appears.

4. Type **1** into the *Custom Filter* dialog box and then click **OK**. The data is filtered to show only the rooms on the first floor.

5. Click the **Toggle Filter** button on the Ribbon. The report returns to its unfiltered state.

6. In the Bed Size field, click **King** in the second row.

7. On the Home tab, in the Sort & Filter group, click the **Selection** button, and then select **Equals "King"** from the menu. The data is filtered to show only the rooms with King-sized beds.

8. Right-click the **Bed Size** header. A shortcut menu appears. Notice that the Equals "King" filter and the other filters from the Selection menu are also available in the shortcut menu (see Figure 6-13).

9. Select **Clear filter from Bed Size** from the menu. The filter is cleared.

10. **CLOSE** and **SAVE** the report.

PAUSE. **LEAVE** the database open to use in the next exercise.

Finding Data within a Report

When you want to quickly locate records in a report, you can use the Find command, which searches all the records of the report for any term you specify. Sometimes, you may need to quickly find records within a report while in Report view or Report Layout view. To accomplish this, you can use the Find command in the Find group on the Home tab. In this exercise, you locate data in Report view by using the Find command.

The Find command was overviewed for tables in Lesson 3. Like the Find command in table datasheet view, once clicked, the Find dialog box appears where you can enter search criteria, set options for where you would like Access to look for the data, and set data matching and other search options. You can quickly locate records that match your search term and view multiple occurrences; however, remember that you cannot modify record data from within a report, so you cannot replace the record data that is found.

Take Note You cannot use the Find command when you are in Report Design view; however, you can use it in tables, forms, and queries.
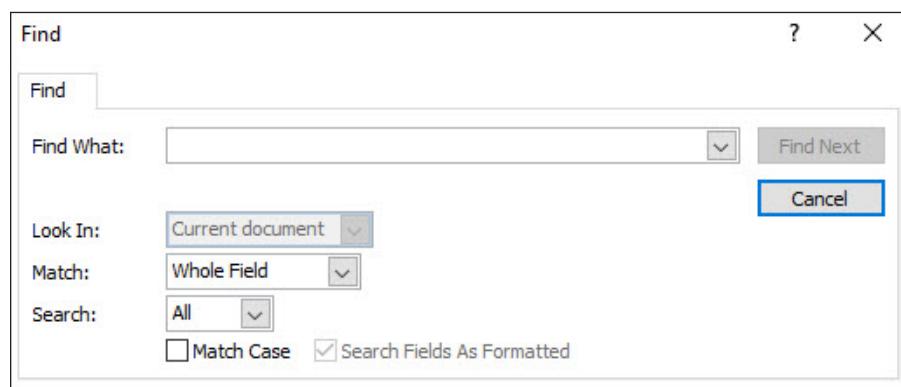
Find Data within a Report

GET READY. USE the *AlpineSkiHouse-final* database that is open from the previous exercise.

1. Double-click the Rooms report in the Navigation Pane to open it.
2. On the Home tab, in the Find group, click the **Find** button. The *Find* dialog box appears (see Figure 6-14).

Figure 6-14

Find dialog box

3. Type **King** in the Find What drop-down box.
4. Click the **Find Next** button. Access highlights the first occurrence of 'King' in the report. Continue clicking the **Find Next** button until Access reports that it has finished searching the records.
5. Click **OK** and then click **Cancel** to close the *Find* dialog box.
6. **CLOSE** the report and the database.

STOP. EXIT Access.

Knowledge Assessment

Matching

Match the term in Column 1 to its description in Column 2.

Column 1	Column 2
1. Report	**a.** A list of available fields for adding to a report
2. Field List pane	**b.** A database object that is used to organize and display data from tables and queries
3. Detail	**c.** The way a report is displayed in Design view
4. Theme	**d.** The section of a report that includes the body of the report
5. Design grid	**e.** A predefined format that you can apply to any report in Layout view

True/False

Circle T if the statement is true or F if the statement is false.

T F 1. A simple report contains all the records in a table or query.

T F 2. You can edit the data in a report.

T F 3. Layout view gives you the most options for creating a report, because it shows you the underlying structure of the report.

T F 4. You can save a filter with a report.

T F 5. The Toggle Filter button removes a filter permanently.

Projects

Project 6-1: Creating a Report and Applying a Theme

In your job at Fourth Coffee, you are responsible for maintaining the coffee inventory. In this project, you will create a report to view the inventory and prepare for the next order, and then you will apply a theme to the report.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Coffee* from the data files for this lesson and then **SAVE** the database as *Coffee-final*.
2. Click the **Coffee Inventory Table** in the Navigation Pane to select it.
3. On the Create tab, in the Reports group, click the **Report Wizard** button. The first Report Wizard screen appears.
4. Click **>>** to move all the fields to the Selected Fields list and then click **Next**.
5. On the grouping screen, click the **Scheduled Order Date** field, click the **>**, and then click **Next**.
6. On the sorting screen, click the active **down arrow** on the menu, select **Pounds**, and then click **Next**.
7. Keep the defaults as is on the layout screen, and then click **Next**.
8. Click **Finish**. The report is created.
9. **CLOSE** the report.
10. In the Navigation Pane, double-click the **Coffee Inventory** report you just created to open it.
11. On the Home tab, click **View**, select **Layout View**, and then resize the label columns and field boxes so all text and data appear completely in them.
12. On the Report Layout Tools Design contextual tab, in the Themes group, click the **Themes** button.
13. In the Office category, select the format named **Retrospect**.
14. **SAVE** and then **CLOSE** the report.
15. **CLOSE** the database.

PAUSE. LEAVE Access open for the next project.

Project 6-2: Creating a Report in Design View and Filtering a Report
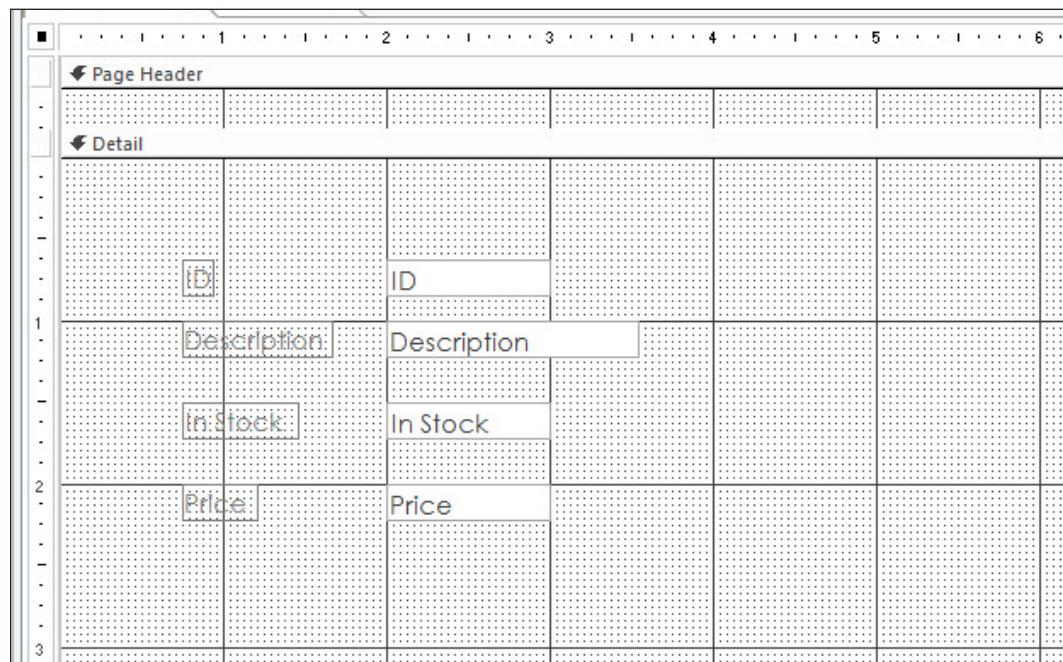
The manufacturing department at Wingtip Toys needs summary information about each toy in inventory. In this project, you will create a report in Design view that will display the requested information, and then filter the report.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *WingtipToys* and then **SAVE** it as *WingtipToys-final*.
2. Click the **Inventory** table in the Navigation Pane to select it.
3. On the Create tab, in the Reports group, click the **Report Design** button.
4. On the Design tab, in the Tools group, click the **Add Existing Fields** button, if necessary, to display the Field List pane.
5. Add and position the fields from the Inventory table onto the design grid as shown in Figure 6-15. Adjust the Description field width as shown.

6. Apply the **Ion Boardroom** theme to the new report.
7. Change to Layout view.
8. Sort the report in ascending order by the Description field.
9. Click the first row of the **In Stock** field, which contains the number 10.
10. Filter by selection to display the toys with 10 or fewer items in stock.
11. Click the **In Stock** field header and sort the field in ascending order.
12. Clear all sorts.
13. Clear all filters.
14. Find and cycle through all occurrences of the word, Car.
15. Clear the filter.
16. **SAVE** the report as **Toy Summary** and then **CLOSE** the report.

CLOSE the database and then **EXIT** Access.

Creating and Modifying Queries 7

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Creating a query	Run a query. Save a query. Rename a query. Create a multi-table query.	3.1.1 3.1.6 3.2.1 3.1.5
Modifying a query	Hide fields. Create a parameter query.	3.2.4 3.1.3
Sorting and filtering data within a query	Sort data within queries.	3.2.5

CREATING A QUERY

A query is a set of instructions used for working with data. Creating a query is similar to asking the database a question. Running a query performs these instructions and provides the answers. You can sort, group, or filter the results that a query returns. There are several different types of queries. Basic queries can be used to extract useful information from one or more tables in the database, while more advanced queries can be used to manipulate data in tables (for example, create, copy, modify, delete, or find duplicate or unmatched table data).

A **select query** is the most basic type of Access query. It creates subsets of data that you can use to answer specific questions or to supply data to other database objects such as forms and reports. The data is displayed in Datasheet view without being changed. A query is a powerful and versatile database tool. Queries differ from sort or filter commands because they can be saved for future use and can utilize data from multiple tables or other queries.

Creating a Query from a Table

A query can get its data from one or more tables, from existing queries, or from a combination of the two. The tables or queries from which a query gets its data are referred to as its **record source**. When one table provides the information that you need, you can create a simple select query using the Query Wizard. You can also use a query to find records with duplicate field values in a single table. You can delete a query to remove it permanently from the database and rename a query if you want to modify the previous name. In this exercise, you create a simple select query that searches the data in a single table and rename the query. You also delete a pre-existing query using the Delete command.

The Queries group on the Create tab contains the commands used to create queries. The Query Wizard button launches the Query Wizard, which helps you create a simple query, a crosstab query, a find duplicates query, or a find unmatched query. The Query Design button creates a new, blank query in Design view.

To create a simple select query, click the Query Wizard button in the Queries group on the Create tab. Click Simple Query Wizard and then click OK. Specify the table you want to use as the record source and the fields that you want to show. Name the query and then click Finish. When you close the query, it is automatically saved. You can also save a query as a PDF, XPS, or as a

Query, Form, or Report using the Save As Object option. You find out more about Saving Objects as other file types in Lesson 13.

To run a query after it has been created, simply double-click it in the Navigation Pane to open it in Datasheet view and see the results.

You can also permanently delete a query from the database by using the Delete command in the Records group on the Home tab. You can delete a query if you erroneously created it or simply want to unclutter the database by removing preexisting queries you no longer use.

Finally, you can rename a query by right-clicking on it in the Navigation Pane, choosing the Rename command from the shortcut menu that appears, and typing in the new name.
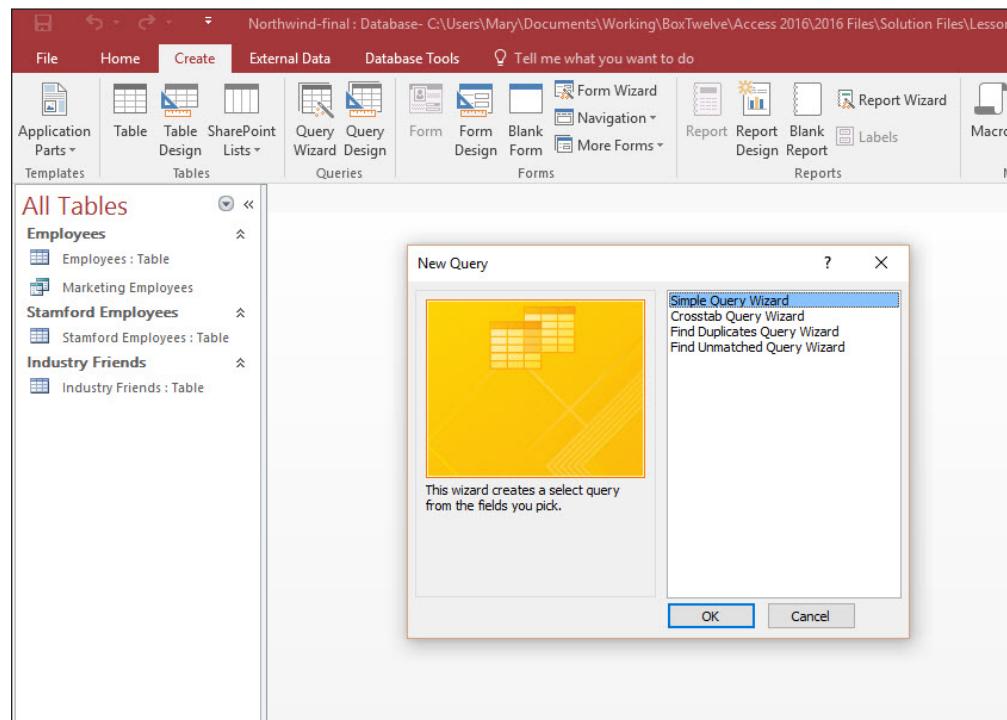
STEP BY STEP   **Create a Simple Query**

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and start Access.

1. **OPEN** the *Northwind* file from the data files for this lesson and then **SAVE** the database as *Northwind-final*.
2. On the Create tab, in the Queries group, click the **Query Wizard** button. The *New Query* dialog box appears, as shown in Figure 7-1.

Figure 7-1
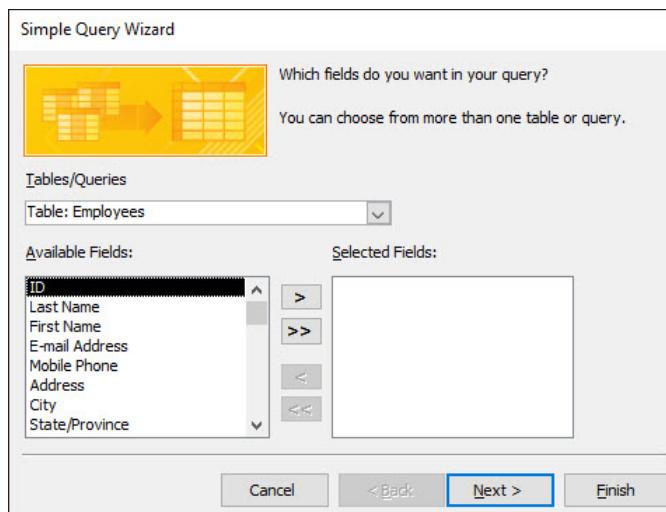
New Query dialog box and Query buttons

3. Click **Simple Query Wizard** and then click **OK**. The Simple Query Wizard appears, as shown in Figure 7-2.

Figure 7-2

Simple Query Wizard

4. In the Tables/Queries drop-down list, *Table: Employees* should be selected by default. If it is not, select it.

5. Under Available Fields, double-click **Last Name**, **First Name**, **E-mail Address**, **Mobile Phone**, and **Position** to move them to the Selected Fields box.

Take Note   To remove a field from the Selected Fields box, double-click the field. This moves it back to the Available Fields box.

6. Click the **Next** button. The second screen in the Simple Query Wizard appears.

7. Name the query **Employees Contact Query** and then select **Open the query to view information** if it is not already selected.

8. Click the **Finish** button to accept the default selection and complete the query. The Employees Contact Query is displayed, as shown in Figure 7-3. The results show all of the records, but show only the five fields that you specified in the Query Wizard.

Figure 7-3

Simple select query

9. Click the **Close** button on the Employees Contact Query window to close the query.

10. In the Navigation Pane, double-click the **Employees Contact Query** to run it. The query results are displayed in Datasheet view.

11. Click the **Close** button on the Employees Contact Query window to close the query.

12. In the Navigation Pane, right-click the **Employees Contact Query** to select it.

13. On the shortcut menu that appears, click the **Rename** command.

14. In the query name box, type **Employees Contact Info Query** to rename it and then click **Enter**. The query has been renamed.

15. In the Navigation Pane, click the **Marketing Employees** query to select it.

16. On the Home tab, in the Records group, click the **Delete** button arrow and then click the **Delete** command on the menu that appears.

17. Click **Yes** on the dialog box asking you if you want to permanently delete the Marketing Employees query. The query is now permanently deleted from the database.

PAUSE. LEAVE Access open to use in the next exercise.

Creating a Find Duplicates Query

As a general rule, duplicate data should be eliminated from a database whenever possible to minimize redundancy and increase accuracy. The first step in this process is finding duplicate data. Two or more records are considered duplicates only when all the fields in your query results contain the same values. If the values in even a single field differ, each record is unique. In this exercise, you use the Find Duplicates Query Wizard to find duplicate records.

You can also use the Find Duplicates Query Wizard to find records that contain *some* matching field values. You should include the field or fields that identify each record uniquely, typically the primary key. The query returns matching records where the values in the specified fields match character for character.
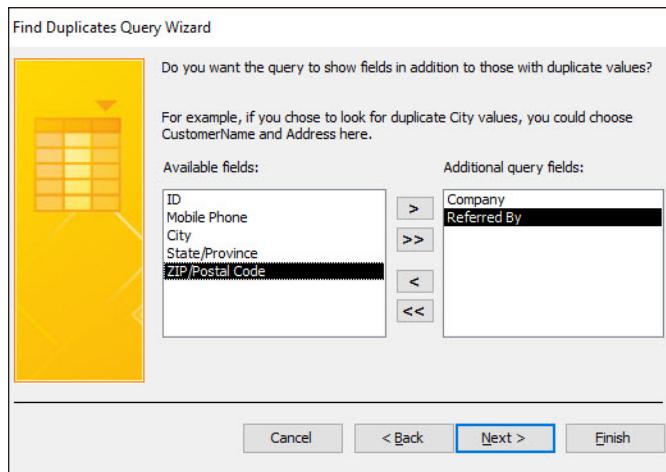
STEP BY STEP   **Create a Find Duplicates Query**

GET READY. USE the *Northwind-final* database that is open from the previous exercise.
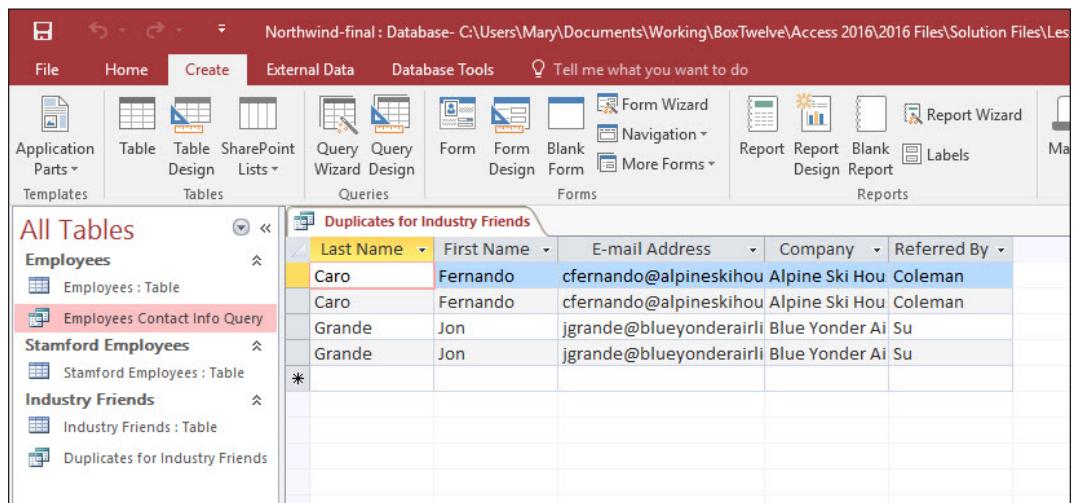
1. On the Create tab, in the Queries group, click the **Query Wizard** button. The *New Query* dialog box appears.

2. Click **Find Duplicates Query Wizard** and then click **OK**. The Find Duplicates Query Wizard appears.

3. Click **Table: Industry Friends** and then click **Next**. The next screen in the Find Duplicates Query Wizard appears.

4. Double-click **Last Name**, **First Name**, and **E-mail Address** to move them to the Duplicate-value fields box. These are the fields that you think may include duplicate information.

5. Click **Next** to display the next screen in the Find Duplicates Query Wizard. This screen asks if you want to show other fields of the duplicate record besides just the ones with the duplicate data.

6. Double-click **Company** and **Referred By** to move them to the Additional query fields box, as shown in Figure 7-4.

Figure 7-4

Find Duplicates Query Wizard,
Additional query fields

7. Click **Next** to display the final screen in the Find Duplicates Query Wizard.

8. Name the query **Duplicates for Industry Friends** and then click **Finish**. The query showing duplicate records in the table is displayed, as shown in Figure 7-5.

Figure 7-5

Duplicates for Industry Friends query

9. Click the **Close** button on the Duplicates for Industry Friends tab to close the query.

PAUSE. LEAVE Access open to use in the next exercise.

Creating a Query from Multiple Tables

If the data you need is spread out in more than one table, you can build a query that combines information from multiple sources. You can also create a query that finds records in one table that have no related records in another table. When you need to include multiple tables in your query, you can use the Simple Query Wizard to build a query from a primary table and a related table. The process is similar to creating a query from a single table, except that you include fields from additional tables. In this exercise, you create a simple query to display related data from two tables.

Sometimes using data from a related table helps make the query results clearer and more useful. For example, in this activity, you could pull the name of the industry friends and the employee who referred them from one table. But to get additional information about the referring employees, you need to pull data from the related Employees table.

Before creating a query from multiple tables, you must first ensure that the tables have a defined relationship in the Relationships window. A relationship appears as a line connecting the two tables on a common field. You can double-click a relationship line to see which fields in the tables are connected by the relationship.
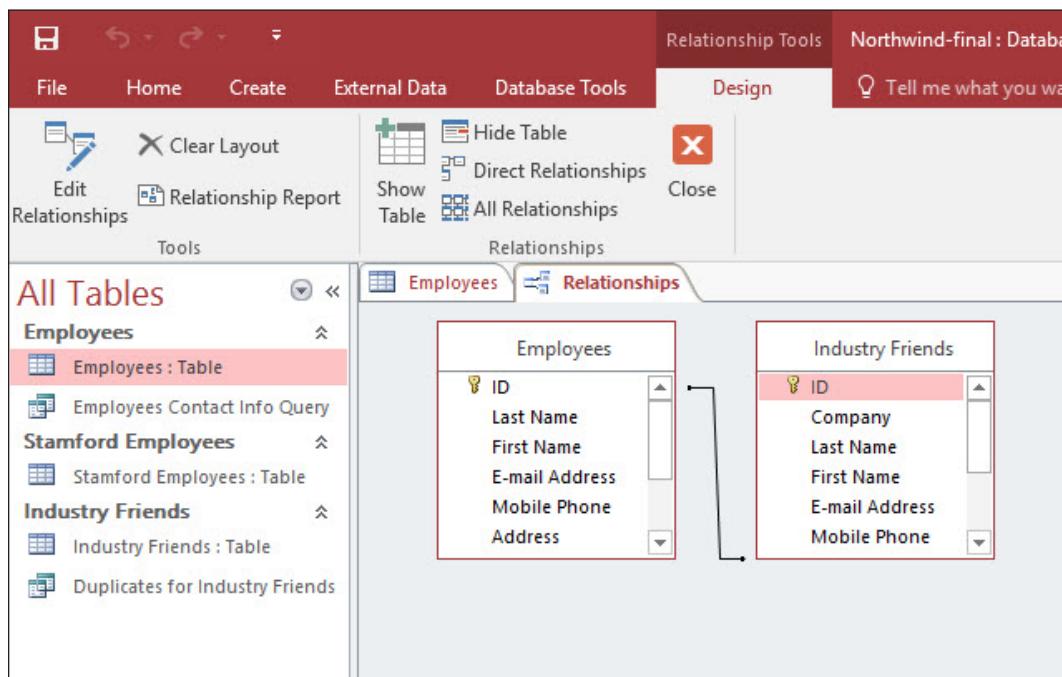
Create a Query from Multiple Tables

GET READY. USE the *Northwind-final* database that is open from the previous exercise.

1. In the Navigation Pane, double-click **Employees: Table** to open the table.
2. On the Database Tools tab, in the Relationships group, click the **Relationships** button to display the table relationship, as shown in Figure 7-6. The Employees table has a defined relationship with the Industry Friends table as indicated by the relationship line connecting the two tables.

Figure 7-6

Relationships for Employees table

3. Click the **Close** button in the Relationships group on the Ribbon to close the Relationships window, and then click the **Close** button on the Employees tab to close the Employees table.
4. On the Create tab, in the Queries group, click the **Query Wizard** button to display the *New Query* dialog box.
5. Click **Simple Query Wizard** and then click **OK** to display the Simple Query Wizard.
6. In the Tables/Queries drop-down list, click **Table: Industry Friends**.
7. Under Available Fields, double-click **Last Name**, **First Name**, and **Referred By** to move them to the Selected Fields box.
8. In the Tables/Queries drop-down list, click **Table: Employees**.
9. Under Available Fields, double-click **Position** and **E-mail Address** to move them to the Selected Fields box.
10. Click the **Next** button to display the next screen. The Detail option should be selected by default.

11. Click the **Next** button to display the final screen, and then click the **Finish** button to accept the default settings in this screen and display the query, shown in Figure 7-7. This query shows the name, position, and email address of the employee who referred each industry friend.

Figure 7-7

Industry Friends query

12. Click the **Close** button on the Industry Friends Query tab to close the query and then **SAVE** the query if prompted.

PAUSE. LEAVE the database open to use in the next exercise.

Finding Unmatched Records

To view only the records in one table that do not have a matching record in another table, you can create a Find Unmatched query. On the Create tab, in the Queries group, click Query Wizard, and then click Find Unmatched Query Wizard to start the wizard. In this exercise, you run a Find Unmatched query to display the employees who do not live in Stamford.
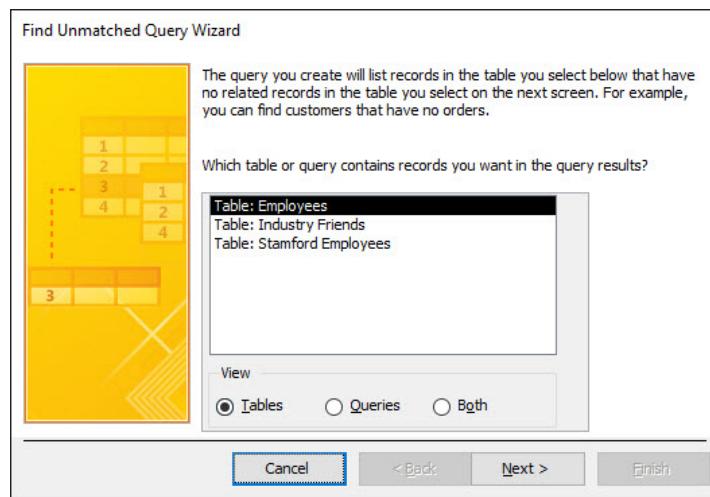
STEP BY STEP   **Find Unmatched Records**

GET READY. USE the *Northwind-final* database that is open from the previous exercise.
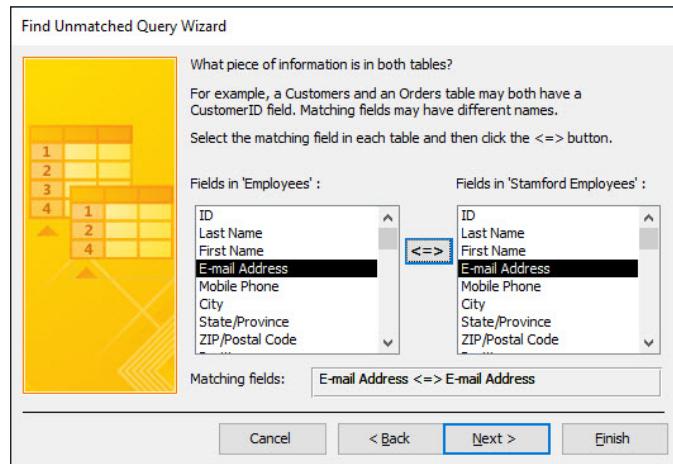
1. On the Create tab, in the Queries group, click the **Query Wizard** button. The *New Query* dialog box appears.

2. Click **Find Unmatched Query Wizard** and then click **OK**. The Find Unmatched Query Wizard appears, as shown in Figure 7-8.

Figure 7-8

Find Unmatched Query Wizard

3. Table: Employees is the default selection in this screen. This table will contain the records you'll want to display. Click the **Next** button to display the next screen in the Find Unmatched Query Wizard.

4. Select **Table: Stamford Employees** to select the table that is related to the Employees table and contains the records you *don't* want to display. Click the **Next** button to display the next screen in the Find Unmatched Query Wizard.

5. Click **E-mail Address** in the Fields in "Employees" list. Click **E-mail Address** in the Fields in "Stamford Employees" list. Click the **<=>** button to display them in the Matching fields box, as shown in Figure 7-9. These fields contain data that is in both tables.

Figure 7-9

Find Unmatched Query Wizard, Matching fields

6. Click the **Next** button to display the next screen in the Find Unmatched Query Wizard.

7. In the Available fields box, double-click **Last Name**, **First Name**, **Position**, and **City** to move them to the Selected fields box.

8. Click the **Next** button to display the final screen in the Find Unmatched Query Wizard.

9. Click in the text box at the top of this screen, type **Non-Stamford Employees** to name your query, and then click the **Finish** button. The query is displayed, as shown in Figure 7-10.

Figure 7-10

Non-Stamford Employees query

10. Click the **Close** button on the Non-Stamford Employees tab to close the query.

PAUSE. LEAVE the database open to use in the next exercise.

SOFTWARE ORIENTATION

Query Tools Design Tab

By changing to Design view, you can access all the tools needed to modify your query on the Query Tools Design tab, shown in Figure 7-11.

Figure 7-11

Query Tools Design tab

MODIFYING A QUERY

A query can be modified in Design view, regardless of how it was created. You can add or remove a table, add or remove fields, or add criteria to refine query results.

Adding a Table to a Query

To add a table to a query, you must be in Design view. Run the query and then click Design View on the lower half of the View button. On the Query Tools Design tab, in the Query Setup group, click the Show Table button to display the Show Table dialog box. There is a tab that contains the tables in the database, a tab with the queries, and a tab that displays both. Select the object you

want to add to the query and then click the Add button. If you add a second copy of a table to the query, it is indicated by a "1" in the title. In this exercise, you add additional tables to a query using the Show Table dialog box.
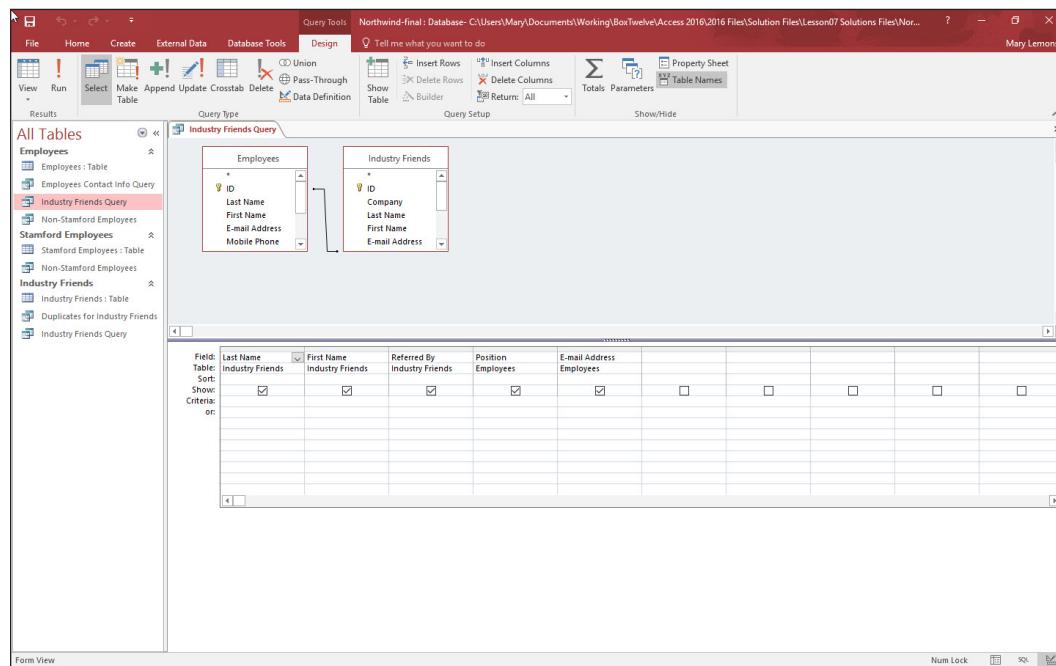
Add a Table to a Query

GET READY. USE the ***Northwind-final*** database that is open from the previous exercise.

1. Double-click the **Industry Friends Query** in the Navigation Pane to open it.
2. On the Home tab, in the Views group, click the lower half of the **View** button and then click **Design View**. The query appears in Design view, as shown in Figure 7-12.

Figure 7-12
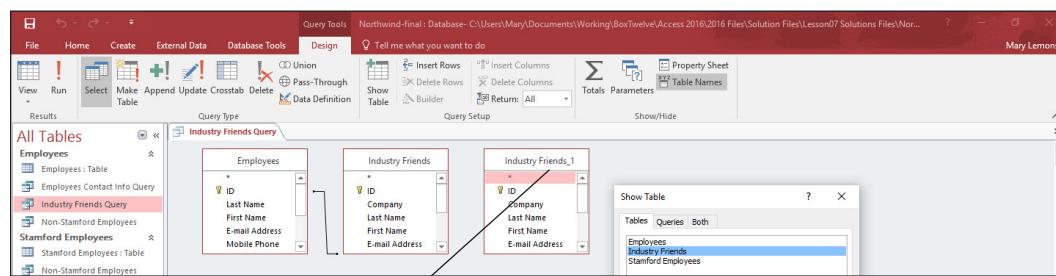
Query in Design view

3. On the Query Tools Design tab, in the Query Setup group, click the **Show Table** button to display the *Show Table* dialog box.
4. Click **Industry Friends** and then click the **Add** button. A second copy of the Industry Friends table is added to the query, as indicated by the "1" in the title, as shown in Figure 7-13.

Figure 7-13

Second copy of table in a query

The 1 indicates a second copy of the table has been added to the query

5. Click **Stamford Employees** and then click the **Add** button. The table is added to the query.
6. Click the **Close** button in the *Show Table* dialog box.
7. Click anywhere in the **Industry Friends_1** field list.

8. Press the **Delete** key to remove the table.

9. Click anywhere in the **Stamford Employees** field list.

10. Press the **Delete** key to remove the table.

11. Click the **Close** button on the Industry Friends Query tab to close the query. If a message asks you if you want to save the changes, click **Yes**.

PAUSE. LEAVE the database open to use in the next exercise.

Adding Criteria to a Query

Not all queries must include criteria, but if you are not interested in seeing all the records that are stored in the underlying record source, you can add criteria to a query when designing it. A **query criterion** is a rule that identifies the records you want to include in the query result. A criterion is similar to a formula. Some criteria are simple and use basic operators and constants. Others are complex and use functions, special operators, and include field references. Criteria can look very different from each other, depending on the data type of the field to which they apply and your specific requirements. You can also run a **parameter query**, in which the user interactively specifies one or more criteria values. This is not a separate query; it extends the flexibility of another type of query, such as a select query, by prompting the user for a parameter value when it is run. In this exercise, you add criteria to queries to display certain records, use the Show check box, and create and run a parameter query that will prompt the user for a city name and display matching records.

To specify one or more criteria to restrict the records returned in the query results, open the query in Design view. Select the field and then type the condition that you want to specify in the Criteria row. To see the results, change to Datasheet view. The results will show each field, including the one where the criterion was specified.

Sometimes, you may want to show only certain fields (while hiding others) from the records that match the criterion to get a more concise view of the resulting data. In this case, deselect the Show row check box above the Criteria row for those fields you don't want to display in the results. The fields that you choose not to show, except the field with the criterion, will be hidden from the results after you change to Datasheet view.

Table 7-1 shows some sample criteria and explains how they work. Table 7-2 shows the query results that are returned when a specific criterion is used.

Table 7-1

Criteria examples

Criteria	Description
>25 and <50	This criterion applies to a Number field, such as Inventory. It includes only those records where the Inventory field contains a value greater than 25 and less than 50.
DateDiff ("yyyy", [BirthDate], Date()) > 21	This criterion applies to a Date/Time field, such as BirthDate. Only records where the number of years between a person's birth date and today's date is greater than 21 are included in the query result.
Is Null	This criterion can be applied to any type of field to show records where the field value is null. (A **null value** is a marker that a value does not exist for a field and is differentiated from a value that has been missed being entered by a user.)

Table 7-2

Query result examples

To Include Records That…	Use This Criterion	Query Result
Exactly match a value, such as Manager	"Manager"	Returns records where the given field is set to Manager.
Do not match a value, such as Chicago	Not "Chicago"	Returns records where the given field is set to a value other than Chicago.
Begin with the specified string, such as B	Like B*	Returns records for the given field where the value starts with "B," such as Boston, Bakersfield, and so on.
Do not begin with the specified string, such as B	Not Like B*	Returns records for the given field where the value starts with a character other than "B."
Contain the specified string, such as Sales	Like "*Sales*"	Returns records for the given field that contain the string "Sales."
Do not contain the specified string, such as Sales	Not Like "*Sales*"	Returns records for the given field that do not contain the string "Sales."
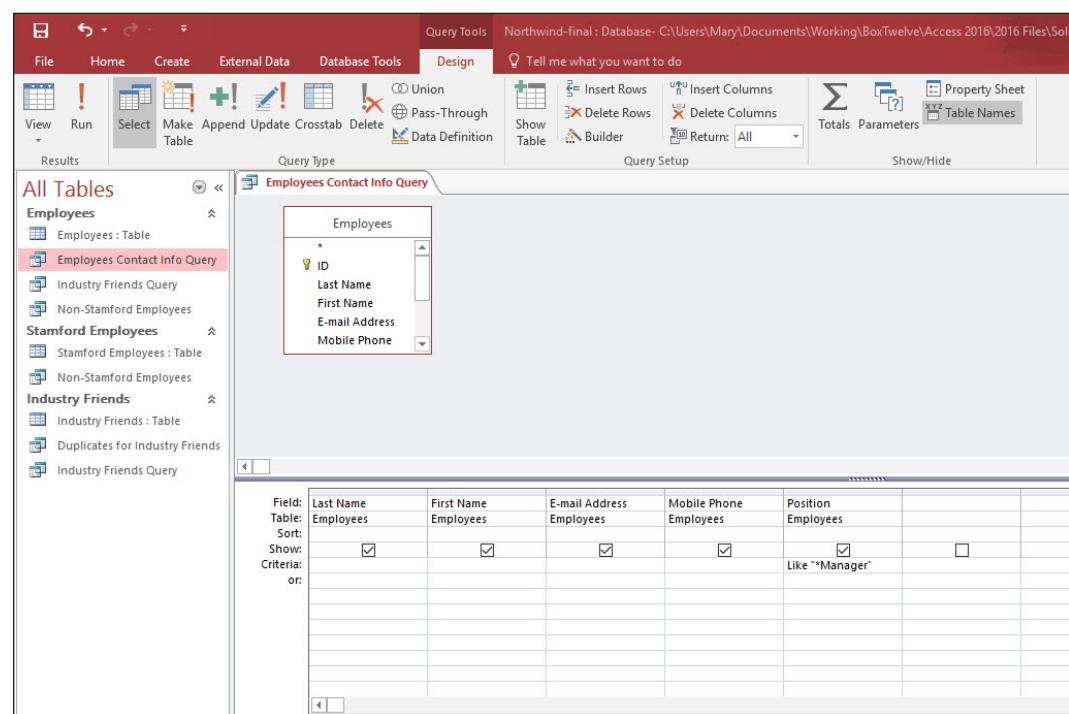
STEP BY STEP   Add Criteria to a Query

GET READY. USE the **Northwind-final** database that is open from the previous exercise.

1. In the Navigation Pane, double-click the **Employees Contact Info Query** to open it.

2. On the Home tab, in the Views group, click the lower half of the **View** button and then click **Design View**.

3. In the Criteria row of the Position field, type **Like "*Manager"**, as shown in Figure 7-14, to display all records that end with the string "Manager" in the Position field (for example, Assistant Manager, Sales Manager, Product Manager, and so on.).

Figure 7-14

Query criterion

4. On the Query Tools Design tab, in the Results group, click the lower half of the **View** button and then click **Datasheet View**. The query results display all records that end with the string "Manager" in the Position field. (You may have to increase the width of the Position field to completely view the data within it.)

5. On the Home tab, in the Views group, click the lower half of the **View** button and then click **Design View**.

6. In the Show row, under the First Name field, click the **Show** check box to deselect it. The First Name field data will not appear in the query results.

7. On the Home tab, in the Views group, click the lower half of the **View** button and then click **Datasheet View**. Notice that the First Name field doesn't appear.

8. Click the **Close** button on the Employees Contact Info Query tab to close the query. When prompted to save, click **Yes**.

9. In the Navigation Pane, double-click the **Non-Stamford Employees Query** under the Employees section to open it.

10. On the Home tab, in the Views group, click the lower half of the **View** button and then click **Design View**.

11. In the Criteria row of the City field, type **[City?]**. This will create the parameter and require you to enter a city name when the query is run.

12. On the Home tab, in the Views group, click the lower half of the **View** button and then click **Datasheet View**. The prompt appears in the *Enter Parameter Value* dialog box.

13. Type **Darien** in the City? box.

14. Click **OK**. The records for non-Stamford employees who live in Darien are displayed in the results, as shown in Figure 7-15.

Figure 7-15

Parameter query result

15. Click the **Close** button on the Non-Stamford Employees tab to close the query. When prompted to save, click **Yes**.

PAUSE. LEAVE the database open to use in the next exercise.

SORTING AND FILTERING DATA WITHIN A QUERY

Sorting and filtering data within a query allows you to display only the records you want and/or display records in a particular order.

Sorting Data within a Query

Sorting data in a query can help organize data efficiently and make it easier for users to review and locate the records they want without having to browse the data. Data can be sorted in the Datasheet view of a query. Right-click the field on which you want to sort and then click the sort order you want—ascending or descending—from the shortcut menu. The records are rearranged to match the sort order. In this exercise, you sort data using the Datasheet view of a query.

To sort by more than one field, on the Home tab, in the Sort & Filter group, click the Advanced button, and then click Advanced Filter/Sort to open a tab where you can specify more than one field by which to sort and the sort order.
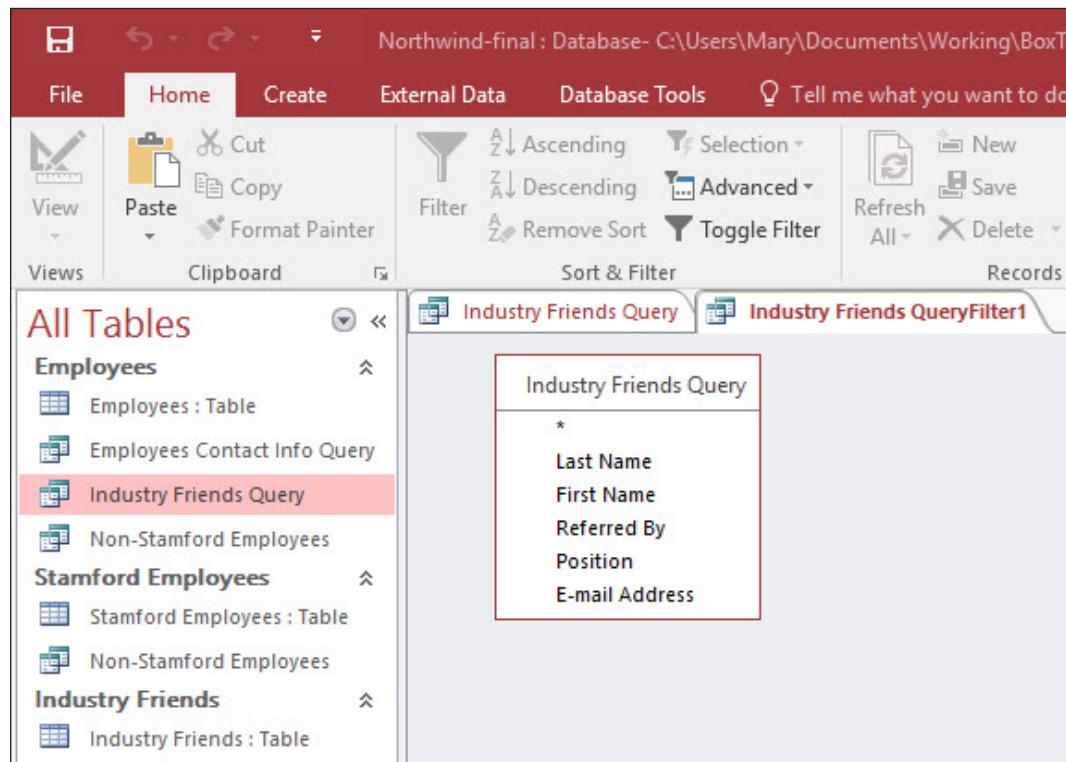
Sort Data within a Query

GET READY. USE the *Northwind-final* database that is open from the previous exercise.

1. In the Navigation Pane, double-click the **Industry Friends Query** to open it.
2. Right-click the **Referred By** field and then select **Sort A to Z** from the shortcut menu that is displayed. The field is sorted in alphabetical order from A to Z.
3. On the Home tab, in the Sort & Filter group, click the **Remove Sort** button. The sort order is removed from the Referred By field.
4. On the Home tab, in the Sort & Filter group, click the **Advanced** button, and then select **Advanced Filter/Sort** from the menu. An Industry Friends QueryFilter1 tab appears, as shown in Figure 7-16.

Figure 7-16
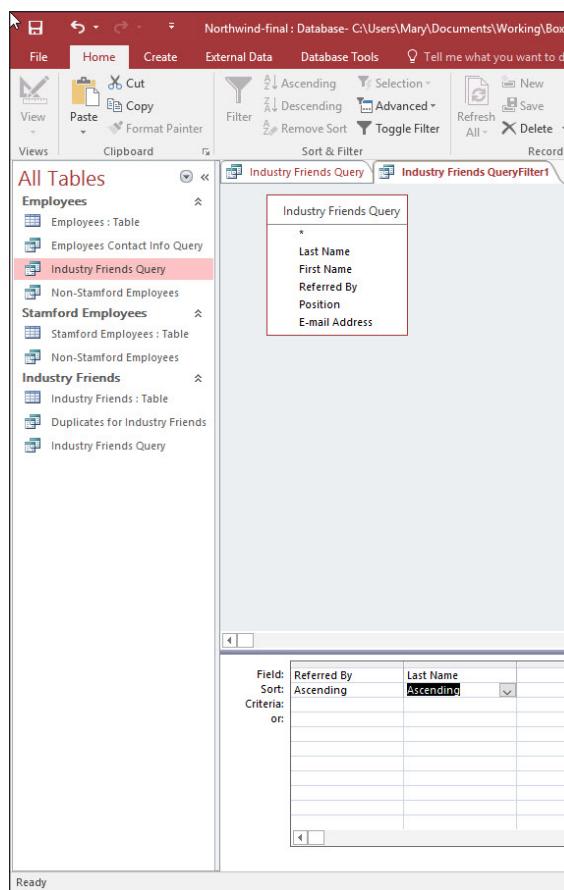
Industry Friends QueryFilter1 tab

5. Click the **Field cell** in the first column, click the **down arrow** and then click **Referred By** on the drop-down menu.
6. Click the **Sort cell** in the first column, click the **down arrow** and then click **Ascending** on the drop-down menu.
7. Click the **Field cell** in the second column, click the **down arrow** and then click **Last Name** on the drop-down menu.
8. Click the **Sort cell** in the second column, click the **down arrow** and then click **Ascending** on the drop-down menu. Your screen should look similar to Figure 7-17.

Figure 7-17

Advanced sort criteria

9. On the Home tab, in the Sort & Filter group, click the **Advanced** button and then click **Apply Filter/Sort**. The query is sorted by the Referred By field in ascending order and then by the Last Name field in ascending order.

10. On the Home tab, in the Sort & Filter group, click the **Remove Sort** button.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   The same tab is used to perform an advanced filter for the query.

Filtering Data within a Query

A filter limits a view of data to specific records without requiring you to alter the design of the underlying query. If the criteria are temporary or change often, you can filter the query results instead of frequently modifying the query criteria. A filter is a temporary criterion that changes the query result without altering the design of the query. In this exercise, you filter data within a query.

To filter data within a query, click the field you want to filter. On the Home tab, in the Sort & Filter group, click the Filter button. The filters available depend on the type and values of the field. When you apply the filter, only records that contain the values in which you are interested are included in the view. The rest are hidden until you remove the filter by clicking the Toggle Filter button.

Filter Data within a Query

GET READY. USE the *Northwind-final* database that is open from the previous exercise. The Industry Friends Query should be open.

1. Click the **Position header** to select the field.
2. On the Home tab, in the Sort & Filter group, click the **Filter** button. A menu appears on the field, as shown in Figure 7-18.

Figure 7-18

Filter menu

3. On the menu, click **Text Filters** and then click **Contains** on the submenu. A *Custom Filter* dialog box appears.
4. In the Position contains box, type **Marketing** and then click **OK**. The records are filtered to show only those results containing the word "Marketing" in the Position field. Adjust the fields to display the entire position name if necessary.
5. On the Home tab, in the Sort & Filter group, click the **Toggle Filter** button to remove the filter.
6. Click the **Close** button on the Industry Friends Query tab to close the query and then click **Yes** to save changes when prompted.
7. Click the **Close** button on the Industry Friends QueryFilter1 tab to close the query.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Fill in the Blank

Complete the following sentences by writing the correct word or words in the blanks provided.

1. A(n) _____ is the most basic type of Access query.

2. The tables or queries from which a query gets its data are referred to as its_____.

3. Two or more records are considered _____ only when all the fields in your query results contain the same values.

4. To view only the records in one table that don't have a matching record in another table, you can create a _____ query.

5. A(n) _____ is a window that lists all the fields in the underlying record source or database object.

Multiple Choice

Select the best response for the following statements or questions.

1. Which of the following queries cannot be created using the Query Wizard?
  a. Parameter query
  b. Simple query
  c. Find duplicates query
  d. Find unmatched query

2. Which of the following statements best describes why queries are different from sort or filter commands?
  a. You can apply them to multiple fields.
  b. You can save them.
  c. You can modify them
  d. You can use them on forms.

3. To find records that contain matching field values, you can create a query using which of the following wizards?
  a. Find Matching
  b. Matching Fields
  c. Duplicate Records
  d. Find Duplicates

4. Before creating a query from multiple tables, you must first ensure that the tables have which of the following?
  a. Unmatched records
  b. A defined relationship
  c. A filter applied
  d. No related records

5. To add a table to a query, you must be in which of the following views?
  a. SQL
  b. Datasheet
  c. Normal
  d. Design

Projects

Project 7-1: Creating Queries

As the manager at Southridge Video, you have stored information in an Access database about each used game that the store has taken in trade. Now that you know how to create queries, you decide to create a select query to list the title, rating, and category, which are the fields that you most often need to view. Then you create a Find Duplicates query to determine if there are duplicates.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Games* from the data files for this lesson and then **SAVE** the database as *Games-final*.
2. On the Create tab, in the Queries group, click the **Query Wizard** button to display the *New Query* dialog box.
3. Click **Simple Query Wizard** and then click **OK**. In the Tables/Queries drop-down list, Table: Games should be selected.
4. Under Available Fields, double-click **Title**, **Rating**, and **Category** to move them to the Selected Fields box.
5. Click the **Next** button. The second screen in the Simple Query Wizard appears.
6. Accept the default name **Games Query**, and then make sure *Open the query to view information* is selected.
7. Click the **Finish** button.
8. Click the **Close** button on the Games Query tab to close the query.
9. On the Create tab, in the Queries group, click the **Query Wizard** button.
10. In the *New Query* dialog box, click **Find Duplicates Query Wizard** and then click **OK**.
11. Click **Table: Games** and then click **Next**.
12. Double-click **Title**, **Platform**, and **Publisher** to move them to the Duplicate-value fields box.
13. Click **Next** to display the next screen.
14. Double-click **Category** to move it to the Additional query fields box.
15. Click **Next** to display the final screen in the Find Duplicates Query Wizard.
16. Name the query **Duplicates for Games** and then click **Finish** to display the query showing duplicate records in the table.
17. Click the **Close** button on the Duplicates for Games tab to close the query.
18. **CLOSE** the database.

PAUSE. LEAVE Access open for the next project.

Project 7-2: Creating Multiple Table, Unmatched, and Parameter Queries

Information about each selection for the Fourth Coffee monthly coffee club is stored in an Access database. Information about regular coffee and decaf coffee is stored in separate tables. In your position as customer service rep, it would be useful to be able to query information from both tables. Next, you want to determine if there are any records in the decaf coffee table that don't have a matching record in the regular coffee table; you decide to create a Find Unmatched query.

GET READY. LAUNCH Access if it is not already running.

1. **OPE N** *Fourth Coffee Club* from the data files for this lesson and then **SAVE** the database as *Fourth Coffee Club-final*.
2. **OPEN** the Regular Coffee: Table.
3. Open the **Relationships** window to ensure there is a relationship between the regular coffee and decaf coffee tables. Close the Relationships window.
4. Start the Query Wizard and then select **Simple Query Wizard** and then click **OK**.
5. In the Tables/Queries drop-down list, click **Table: Regular Coffee**.
6. Move the **Name**, **Country**, **Month**, and **Type** fields to the Selected Fields box.
7. In the Tables/Queries drop-down list, click **Table: Decaf Coffee**.
8. Move the **Name**, **Country**, **Month**, and **Type** fields to the Selected Fields box.
9. Click the **Next** button and name the query **Coffee Query**.
10. Click the **Finish** button.
11. Review the information in the query and then **CLOSE** it.
12. Start the **Query Wizard**, choose **Find Unmatched Query Wizard**, and then click **OK**.
13. Table: Decaf Coffee should be selected. Click **Next**.
14. Table: Regular Coffee should be selected. Click **Next**.
15. Click **ID** in the Fields in 'Decaf Coffee' list. Click **ID** in the Fields in 'Regular Coffee' list. Click the **<=>** button to display them in the Matching fields box, if they're not already displayed.
16. Click the **Next** button.
17. Move the **Name**, **Month**, and **Type** fields to the Selected fields box.
18. Click the **Next** button.
19. Name the query **Unmatched Month** and then click the **Finish** button to display the query results.
20. Start the **Query Wizard** and create a simple query that contains all the fields in the Regular Coffee table. Click **Next**.
21. Click **Next** again.
22. Name the query **Regular Coffee Pounds Query** and then click **Finish**.
23. **SAVE** and then **CLOSE** the query.

CLOSE any open objects, **CLOSE** the database, and then **EXIT** Access.

8 Using Controls in Reports and Forms

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Adding controls	Add report controls.	5.2.3
	Add form controls.	4.2.2
	Insert headers and footers.	4.3.7
	Insert header and footer information.	5.3.6
	Insert images. (Forms)	4.3.8
	Insert images. (Reports)	5.3.7
	Modify data sources. (Forms)	4.2.3
	Modify data sources. (Reports)	5.2.2
	Manage labels. (Forms)	4.2.6
	Add and modify labels. (Reports)	5.2.4
	Move form controls.	4.2.1
	Set form control properties.	4.2.5
Defining control tab order	Modify tab order.	4.3.1
Formatting controls	Format report elements.	5.3.4
	Insert backgrounds.	4.3.6
	Control report positioning.	5.3.3
	Format a report into multiple columns.	5.3.1
	Move form controls.	
	Add form controls.	4.2.1
	Remove form controls.	4.2.2
	Control form positioning.	4.2.4
		4.3.5
Arranging control alignment, size, and position	Control form positioning.	4.3.5
Adjusting page margins and changing page orientation for forms and reports	Configure print settings.	4.3.2
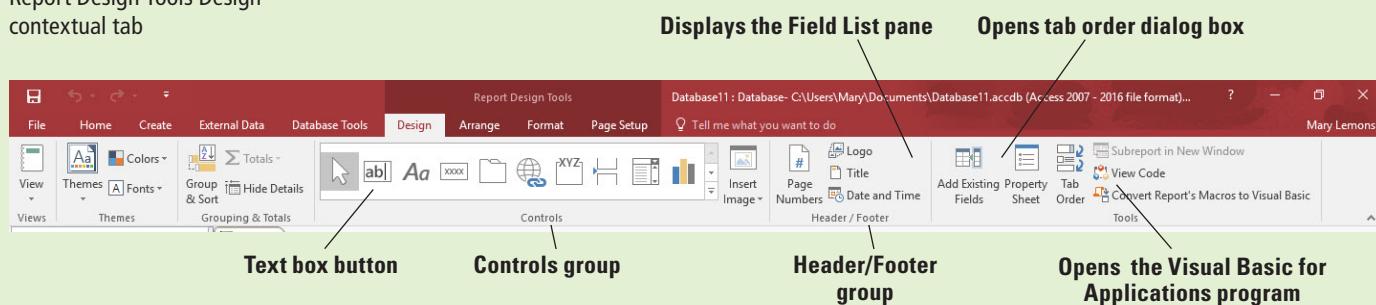
SOFTWARE ORIENTATION

Design and Layout Tools for Reports and Forms

When you view a report in Design view, the Report Design Tools are displayed on the Ribbon. Similarly, when you view a report in Layout view, the Report Layout Tools are displayed on the Ribbon. Both the Report Design Tools and the Report Layout Tools contain a Design contextual tab with groups of tools that are nearly identical, except there are four additional commands on the Report Design Tools Design contextual tab: Tab Order, Subreport in New Window, View Code, and Convert Report's Macros to Visual Basic. You can add controls to a report in both Design view and Layout view. The commands in the Controls, Header/Footer and Tools groups on the Report Design Tools Design contextual tab are shown in Figure 8-1. When you position the mouse pointer over a tool, Access displays the tool's name as a ScreenTip.

Figure 8-1
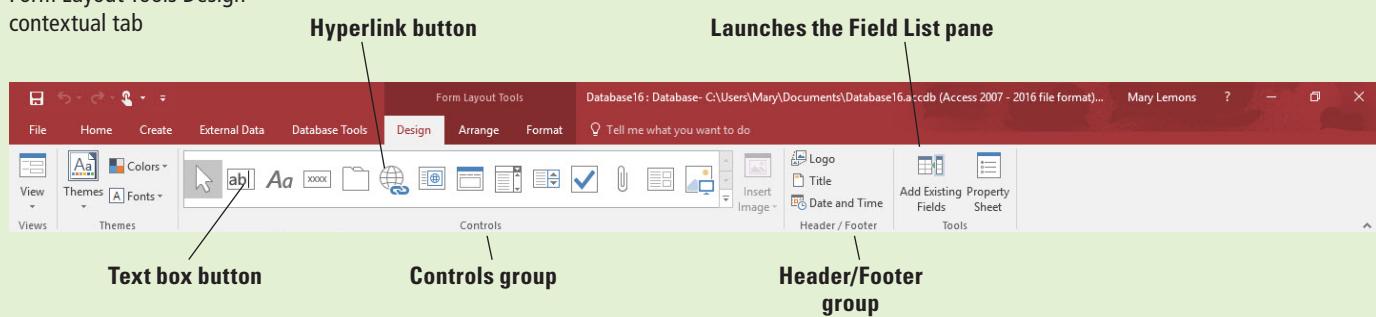
Report Design Tools Design contextual tab

When you view a form in Design view, the Form Design Tools are displayed on the Ribbon. Similarly, and like reports, when you view a form in Layout view, the Form Layout Tools are displayed on the Ribbon. Both the Form Design Tools menu and the Form Layout Tools menu contain a Design contextual tab with nearly identical tools, except there are four additional commands on the Form Design Tools Design contextual tab: Tab Order, Subform in New Window, View Code, and Convert Form's Macros to Visual Basic. Like reports, you can also add controls in form Layout view. The commands in the Controls, Header/Footer and Tools groups on the Form Layout Tools Design contextual tab are shown in Figure 8-2. The procedures for adding controls to a form and a report are similar as well, which is why we cover them together in this lesson.

Figure 8-2

Form Layout Tools Design contextual tab

Take Note   Although you'll be using the tools on the Report and Form Design Tools Design contextual tabs in this lesson, remember that the Report and Form Layout Tools Design contextual tabs have almost identical tools that can be used in Layout view. The majority of the instructions in this lesson apply to both form and report controls.

ADDING CONTROLS

A **control** is an object that displays data, performs actions, and lets you improve the look and usability of a form or report. Access uses three different types of controls: bound, unbound, and calculated.

Controls add functionality to a report or form. For example, you can add a logo control to a report to enhance the look of the report or a list box control to allow users to choose from a list of items. You can insert bound, unbound, and calculated controls using the tools in the Controls and Header/Footer groups. The Use Control Wizards option, located in the Controls group, is helpful when creating some of the more complicated controls.

Adding Unbound Controls

An **unbound control** does not have a data source; it displays information such as lines, shapes, or pictures. Unbound controls are not connected to a field, but they display information that is important for reports and forms, some of which will appear in report and form header and footer sections, such as titles, dates, and page numbers. You can use the tools in the Controls group to add both bound and unbound controls, or you can use the Header/Footer group to add unbound controls to the header and footer sections of reports and forms. In this exercise, you will use the tools in the Header/Footer group to add unbound controls to the Report Header section.

Take Note   The process for adding a control to a form and a report using the Header/Footer group is the same. Once shown how to add a control using the Header/Footer group to a report, you can add a similar control to a form in the same manner.
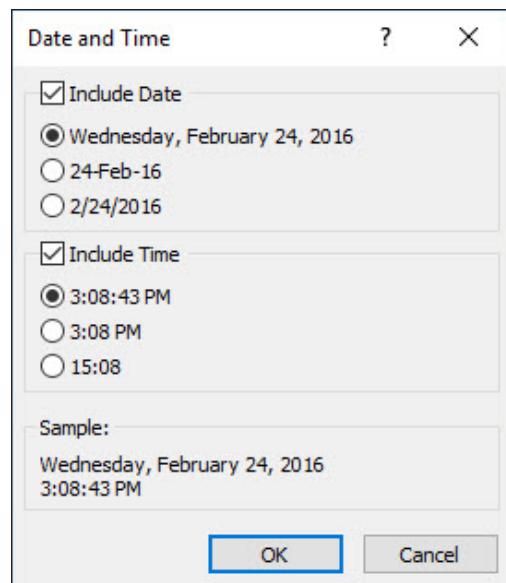
STEP BY STEP   **Add Unbound Controls**

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and start Access.

1. **OPEN** *Wingtip Inventory* from the data files for this lesson and then **SAVE** the database as *Wingtip Inventory-final*.
2. Double-click the *Toy Summary* report in the Navigation Pane.
3. On the Home tab, in the Views group, click the lower half of the **View** button, and then select **Design View**.
4. On the Design tab, in the Header/Footer group, click the **Logo** button. The *Insert Picture* dialog box appears.
5. Navigate to the data files for this lesson and select *Toys.jpg*. Click **OK**. The picture is inserted in the Report Header section.
6. On the Design tab, in the Header/Footer group, click the **Title** button. The title control with the title Toy Summary is inserted in the Report Header section. The text in the title is selected.
7. Type **Inventory Summary by Toy** and then press the **Enter** key.
8. On the Design contextual tab, in the Header/Footer group, click the **Date and Time** button. The *Date and Time* dialog box appears, as shown in Figure 8-3.

Figure 8-3
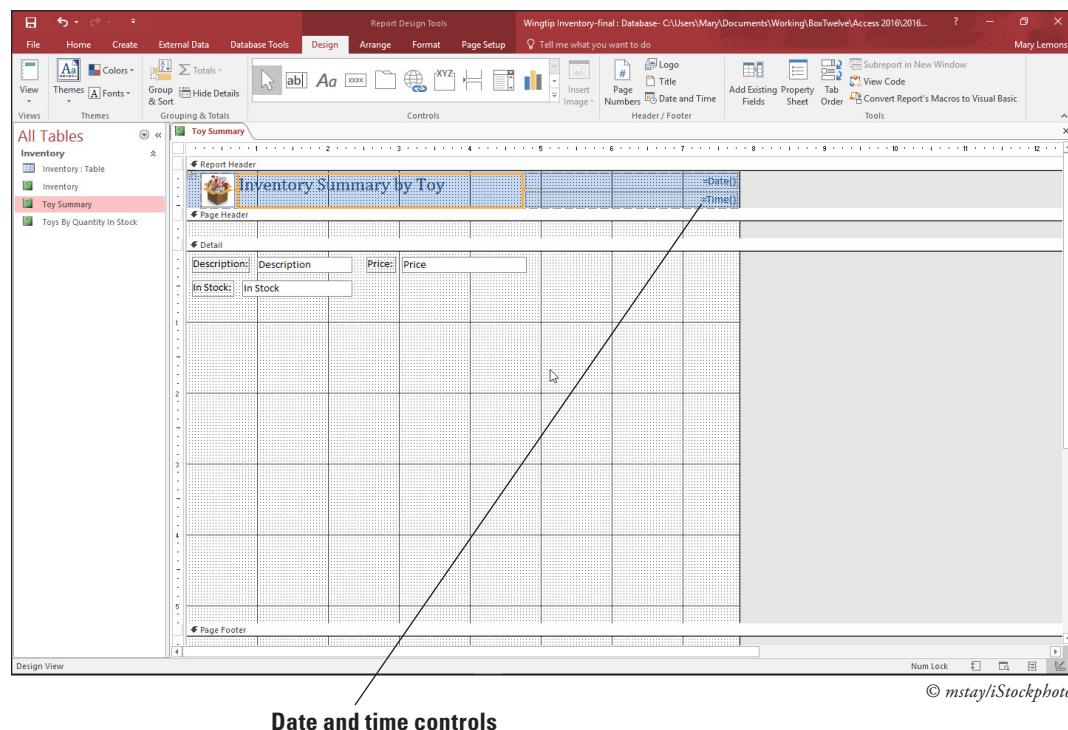
Date and Time dialog box

9. Click **OK** to accept the default date and time formats. The Date and Time controls are inserted in the Report Header section of the report, as shown in Figure 8-4.

Figure 8-4

Report Header shown in Design view

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Date and time controls

10. On the Design contextual tab, in the Header/Footer group, click the **Page Numbers** button. The *Page Numbers* dialog box appears.

11. In the Position section of the *Page Numbers* dialog box, select the **Bottom of Page [Footer]** option and then click **OK**. If necessary, scroll to the bottom of the report window. The Page number control is inserted in the Page Footer section near the bottom of the report.

12. Click the **Save** button on the Quick Access Toolbar.

PAUSE. **LEAVE** the report open to use in the next exercise.

Adding Bound Controls
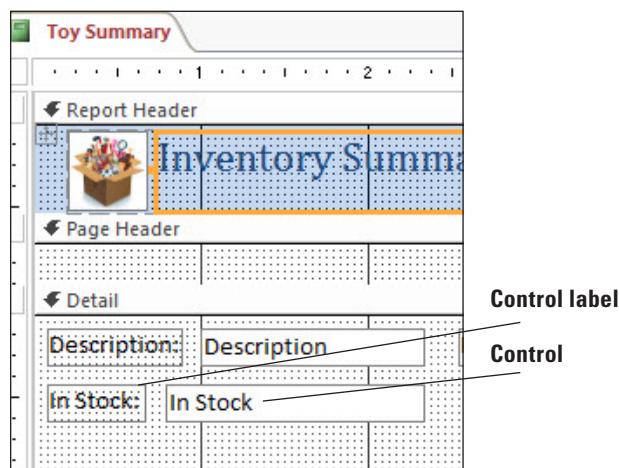
A **bound control** uses a field in a table or query as the data source. Bound controls, such as text boxes, display information such as text, dates, numbers, pictures, or graphs from a field in a table or query.

You can bind a control to a field by moving it from the Field List pane or by using the Property Sheet. In this exercise, you will practice adding a bound control to a report by using the Field List pane, and adding an unbound control and then binding it by using the Controls group and Property Sheet, respectively.

When you bind a control to a field, you connect it to that field. The easiest way to create a bound control is to double-click or drag a field from the Field List pane to the report. Access creates the appropriate control, binds the control to the field, and then creates a label for the control. The control's label appears on the left, and the control appears on the right, as shown in Figure 8-5.

Figure 8-5

Control label and control

You can display the Field List pane by clicking the Add Existing Fields button in the Tools group on the Design contextual tab.

Another way to bind a control to a field is to first add an unbound text box to a report or form using the Controls group. Then, open its Property Sheet either by right-clicking and choosing Properties from the shortcut menu or by clicking the Property Sheet button in the Tools group on the Design contextual tab. On the Property Sheet, in the Data tab, click the down arrow beside the Control Source property and then select the field you want to display in the control. You can then change the default text in the control's label to text that corresponds to the field to which the control is bound simply by clicking on the label and typing the new name.

Take Note   The process for changing a control's default label name for a report or a form is the same. Once shown how to change a label name for a report control, you can change a label name for a form control in the same manner.

Take Note   The process for adding or removing a control to and from a form and a report is the same. Once shown how to add/remove a control to/from a report, you can add/remove a similar control to a form in the same manner.

When you click any button in the Controls group (except the Hyperlink and Insert Image buttons) the pointer changes to the move pointer with a plus sign (+). On the design grid, click where you want the upper-left portion of the control to start. Remember that a label will also be inserted, so leave enough space for the label. Click once to create a default-sized control, or click and drag the move pointer to create the size you want.

When you click the Hyperlink and Insert Image buttons in the Controls group, a dialog box appears requesting additional information before these unbound controls are created. For example, the Insert Hyperlink dialog box asks to which file or location you would like to link and the corresponding hyperlink text to display on the form or report. Similarly, the Insert Image button displays a submenu with two selections: one that allows you to browse your computer for images to add to the report or form and one that allows you to view a gallery of images you have already included on your report or form so you can easily add them again.

You can use the Controls group to add other unbound controls like lines and page breaks to forms and reports. For example, you may want to use the line control to visually separate controls on a form to help it look more aesthetically pleasing or use the Insert Page Break control to create a report's title page by separating controls in the Report Header from the rest of the report.

To move a control and its label simultaneously, select the control, position the mouse pointer over the orange selection border until you see a four-sided arrow, and then drag it to the new position.

To delete a control from the grid, select it, right-click the control to display the shortcut menu, and then choose Delete.
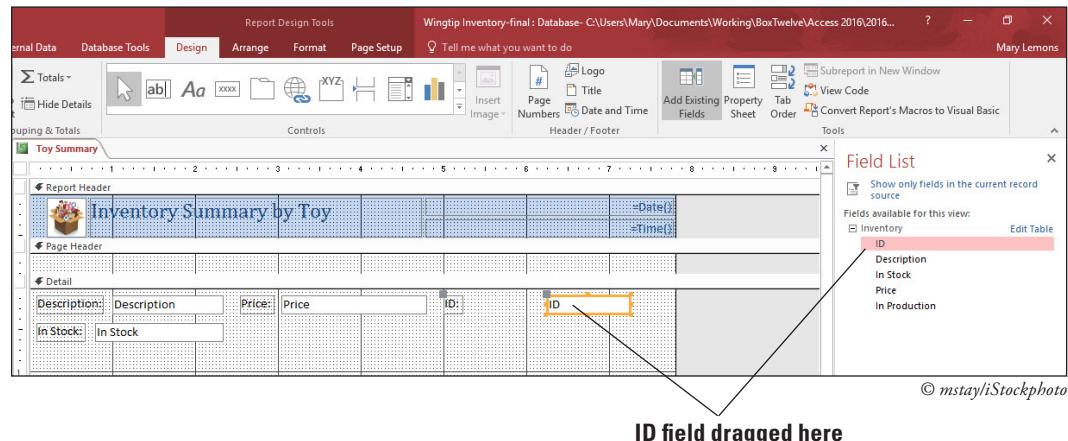
STEP BY STEP   **Add a Bound Control to a Report**

GET READY. USE the *Wingtip Inventory-final* database and *Toy Summary* report that are open from the previous exercise.

1. On the Design contextual tab, in the Tools group, click the **Add Existing Fields** button. The Field List pane appears. Click the **Show all tables** link. The fields for the Inventory table appear.
2. Click the **ID** field and drag it to the right of the Price control, as shown in Figure 8-6.

Figure 8-6

Bound control dragged from the Field List pane

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ID field dragged here
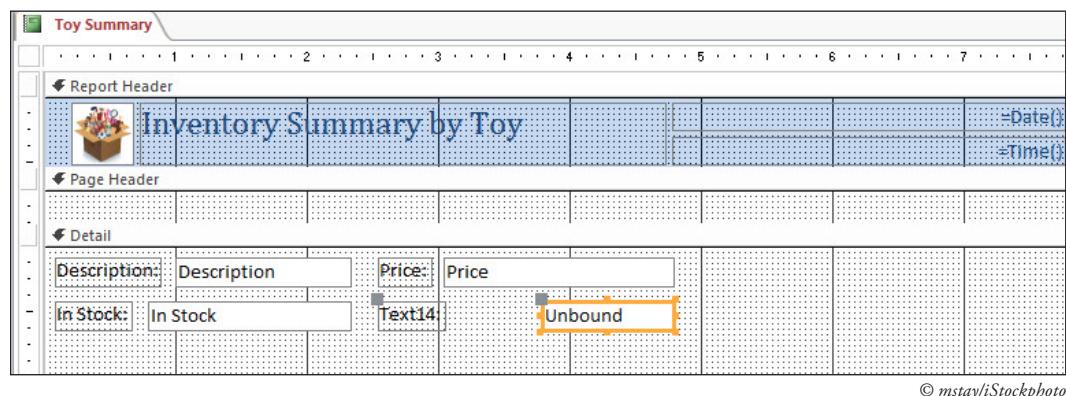
3. Drag the **In Production** field to the design grid below the ID control.
4. Click **Close** on the Field List pane.
5. Click the **ID field control** until you see the orange border with selection handles on the borders and corners.
6. Right-click in the control and select **Delete** from the menu. The control and label are removed from the design grid.
7. Select the **In Production** control, right-click and then select **Delete** from the menu.
8. On the Design contextual tab, in the Controls group, click the **Text Box** button. The mouse pointer changes to the move pointer with a plus sign (+) when you place it over the report.
9. Position the pointer under the Price control and then click to create the text box control

as shown in Figure 8-7. If you need to move the control, select it and move the mouse pointer over the selection border until it appears as a four-sided pointer, and then click and drag it to the appropriate location. Notice that the word Unbound is shown in the control and the word Text and a number (depending on the number of controls you have created in this session) appear in the label.

Figure 8-7

Unbound control

© *mstay/iStockphoto*
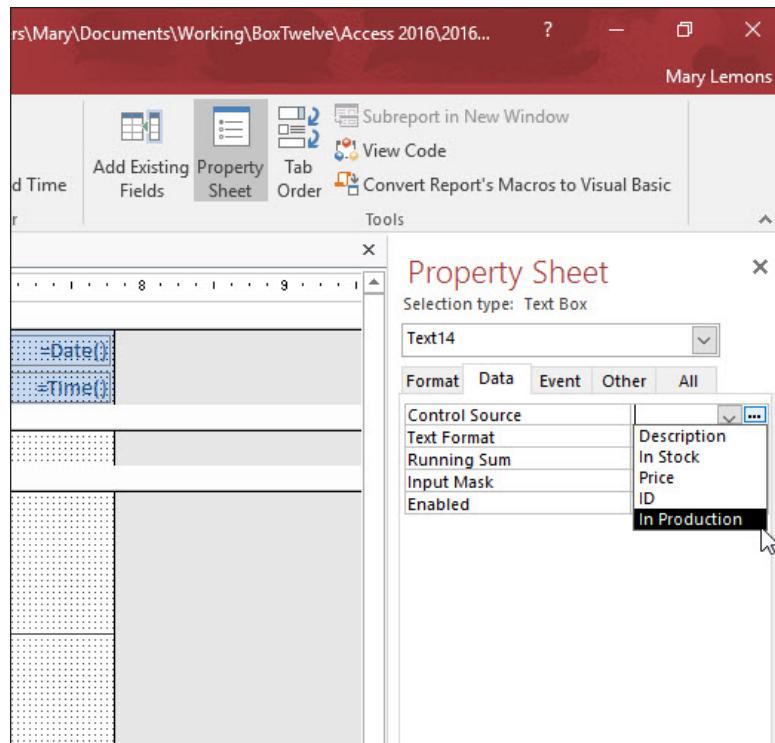
10. Select the text box control if it isn't already selected.
11. On the Design contextual tab, in the Tools group, click the **Property Sheet** button. The Property Sheet appears.
12. In the Data tab, click the down arrow on the **Control Source** row and then select the **In Production** field, as shown in Figure 8-8. Click **In Production**. Notice the control now displays the field name In Production, which means that it is now bound to the control.

Figure 8-8
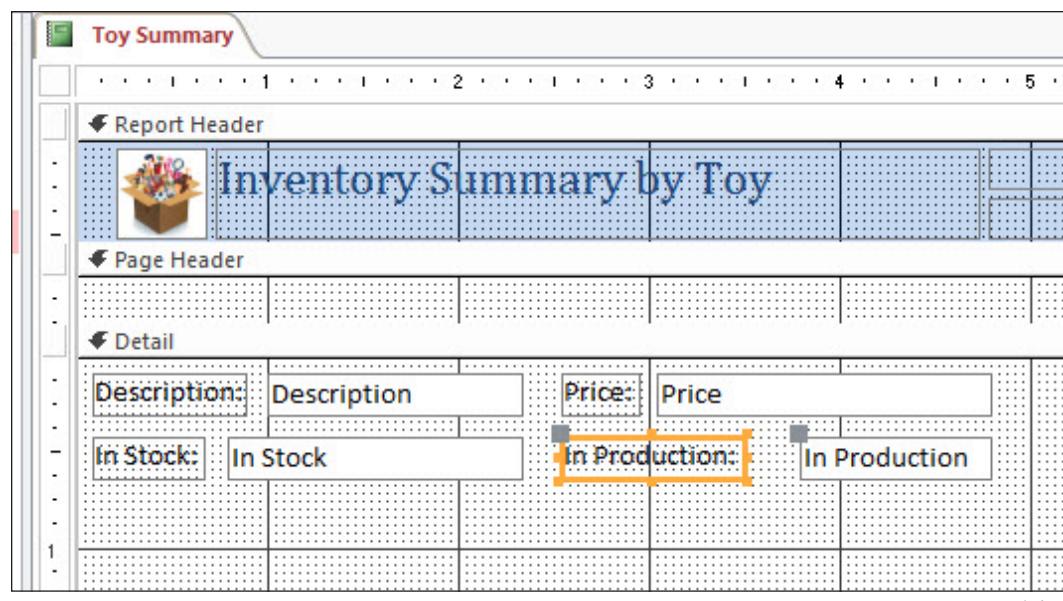
Property Sheet pane

13. Click **Close** on the Property Sheet.
14. Click the **In Production** control label (that says Text and a number) and then select the text in the label.
15. Type **In Production:** and then press **Enter**. Your screen should look similar to Figure 8-9.

Figure 8-9

Bound control

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16. Go to Report view to view your changes. When finished, change back to Design view.

17. Click the **Save** button on the Quick Access Toolbar.

PAUSE. LEAVE the report open to use in the next exercise.

Take Note   The process for setting report control properties is the same for a form. Once shown how to set a report control property, you can set a form control property in the same manner.

Adding Calculated Controls

A **calculated control** is a control that displays the result of a calculation or expression. Calculated controls can display calculations that are vital to the usefulness of a report or form. For example, when your company needs to know the amount of sales dollars generated by each toy in a product line, you can multiply the number of toys sold by the price and display the value in a report or form. Text boxes are the most popular choice for a calculated control because they can display so many different types of data. However, any control that has a Control Source property can be used as a calculated control. In this exercise, you will use the Expression Builder to add a calculated control to a report.

An expression in Access is like a formula in Excel. An expression consists of the following elements that are used alone or in combination:

- **Identifiers:** The names or properties of fields or controls
- **Operators:** Such as + (addition), - (subtraction), or * (multiplication)
- **Functions:** Such as SUM or AVG
- **Constants:** Values that do not change, such as numbers that are not calculated

To create a calculated control, you can either type an expression in the Control Source property box or use the **Expression Builder**, which is a feature that provides names of the fields and controls in a database, lists the operators available, and has built-in functions to help you create an expression. The intuitive Expression Builder includes IntelliSense, which presents you with a drop-down box of potential values as you're typing an identifier or function name to create your expression.
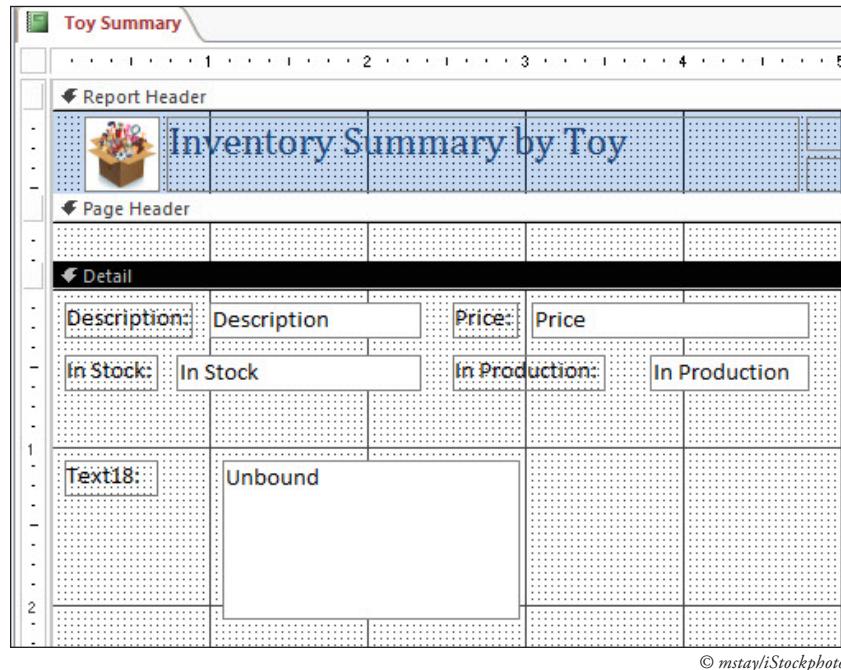
Add a Calculated Control

GET READY. USE the *Wingtip Inventory-final* database and the *Toy Summary* report that are open from the previous exercise.

1. On the Design tab, in the Controls group, click the **Text Box** button.
2. Position the mouse pointer on the design grid and drag down and to the right to create and position a control the size of the one shown in Figure 8-10. Reposition as necessary to get it to match the figure.

Figure 8-10

Text box control
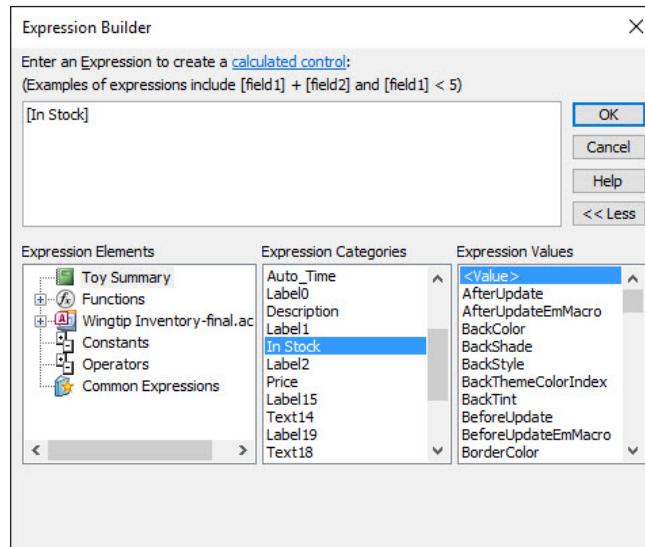
© *mstay/iStockphoto*

3. Select the text in the label and then type **Investment:**.
4. Select the control, right-click and then select **Properties** from the menu to display the Property Sheet if it isn't already displayed.
5. On the Data tab, in the Control Source row, click the **Build** button (looks like three periods, …). The *Expression Builder* dialog box appears.
6. In the Expression Categories list, scroll down and double-click **In Stock**. The In Stock field is inserted in the expression box, as shown in Figure 8-11.

Figure 8-11

Expression Builder dialog box
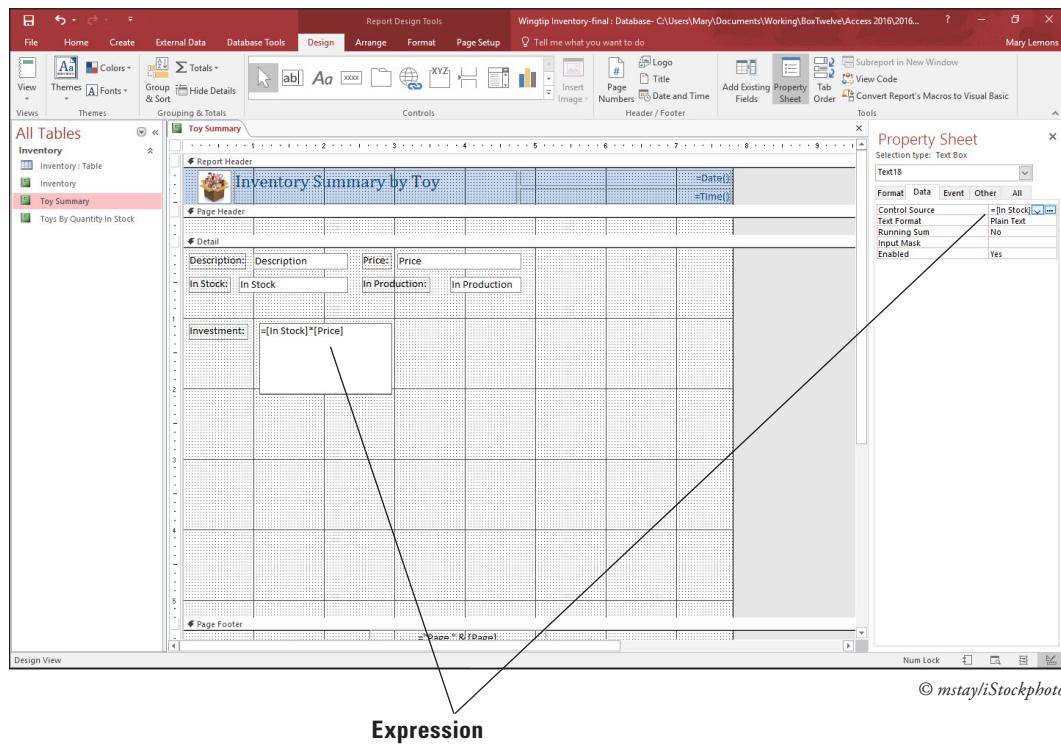
Take Note   All the list items in the Expression Categories on your screen may not match exactly to the figure shown.

7. In the Expression Elements section, click the **Operators** element, and then double-click the ***** (asterisk) value in the Expression Values section to select the multiplication operator.

8. In the Expression Elements section, click the **Toy Summary** element, and then find and double-click the **Price** field in the Expression Categories section.

9. Click **OK**. The expression appears in the Control Source row of the Property Sheet as well as in the control box in the Detail section of the report, as shown in Figure 8-12.

Figure 8-12

Expression in Control Source row

Expression

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10. Click **Close** on the Property Sheet.

11. Change to Report view and scroll through the report records to view the calculated totals.

12. Click the **Save** button on the Quick Access Toolbar.

13. **CLOSE** the report.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   It is often easiest to add and arrange all the bound controls first, and then add the unbound and calculated controls to complete the design of the report.

Adding Controls Using a Wizard

It could take quite a bit of time to figure out how to set all the properties necessary to create option groups and combo and list boxes for a report or form. To speed up this task, Access 2016 includes wizards that help you create some of the more complicated controls. A **Control Wizard** can help you create controls such as command buttons, list boxes, combo boxes, and option groups. Some of these types of controls can modify underlying table data sources. For example, after you add a combo box to a form, you can use it to select a value to be stored in an underlying table field. In this exercise, you add a combo box to a form using the Control Wizard.

Like other wizards you have used, a Control Wizard asks you questions about how you want the control to look and operate, and then it creates the control based on your answers. The Control Wizard's button is a toggle button that you can click to activate and deactivate wizards on controls that use them.
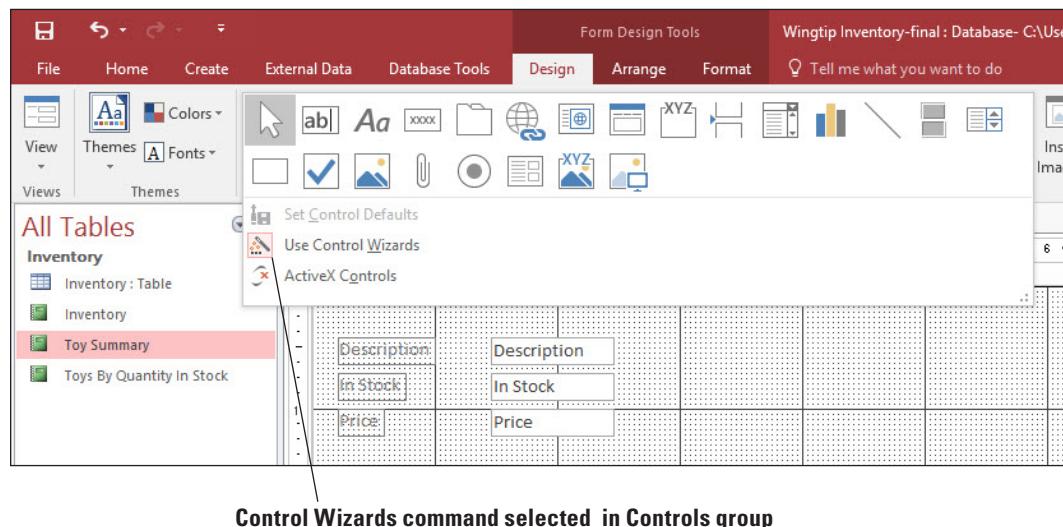
Use the Control Wizard

GET READY. USE the *Wingtip Inventory-final* database that is open from the previous exercise.

1. On the Create tab, in the Forms group, click the **Form Design** button. A new, blank form is created, and the Field List pane is displayed. (If it isn't, click the **Add Existing Fields** button in the Tools group on the Ribbon.)

2. If necessary, click **Show all tables** link in the Field List pane and then click the **expand** button next to Inventory to display the fields of the Inventory table.

3. Double-click the **Description** field to add it to the form.

4. Double-click the **In Stock** field to add it to the form.

5. Double-click the **Price** field to add it to the form.

6. Double-click the **In Production** field to add it to the form.

7. Select the **In Production** control that you just added, right-click it and then select **Delete** from the shortcut menu.

8. On the Design tab, click the **More** arrow in the Controls group, and then locate the **Use Control Wizards** command and make sure it is turned on, as shown in Figure 8-13. The image to the left of the command should be highlighted.

Figure 8-13

Control Wizards command
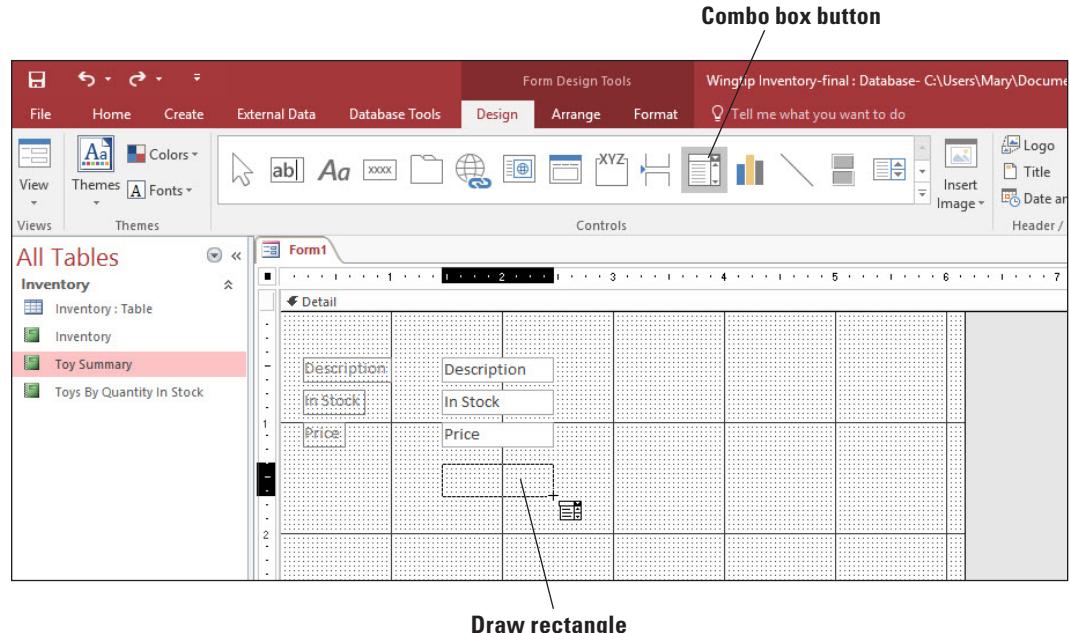
Control Wizards command selected in Controls group

9. On the Design tab, in the Controls group, locate and then click the **Combo Box** button. (Hover your mouse pointer over each control button to view its ScreenTip until you find the Combo Box button.)

10. Position the mouse pointer and drag to draw a rectangle, as shown in Figure 8-14.

Combo box button

Figure 8-14

Drag to draw a custom control

Draw rectangle
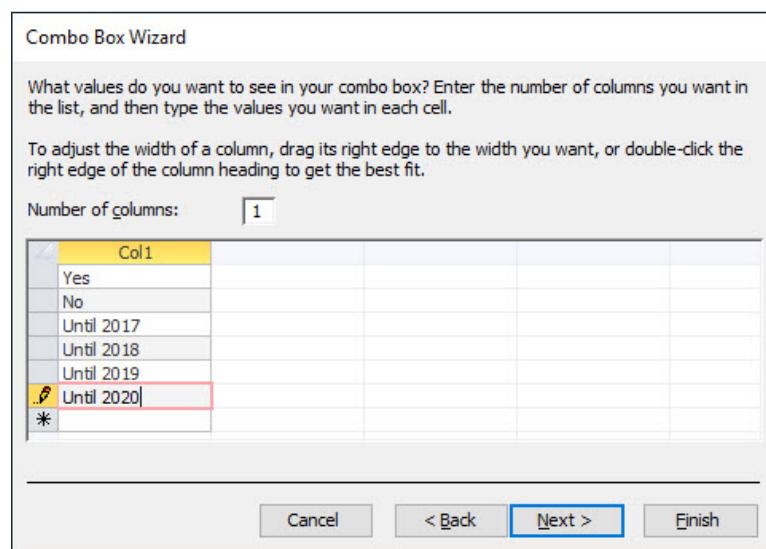
11. When you release the mouse button, the Combo Box Wizard appears. Click the button beside *I will type in the values that I want* and then click **Next**.

12. In the empty cell below the Col1 header, type **Yes**. Continue typing values in the column as shown in Figure 8-15 using the down arrow key to move to the next row. (If you press Enter, the wizard advances to the next screen so be sure to use the down arrow key.)

Figure 8-15

Combo Box Wizard

13. Click **Next**.

14. Click the button beside *Store that value in this field*, click the down arrow to display the menu, and then select **In Production**.
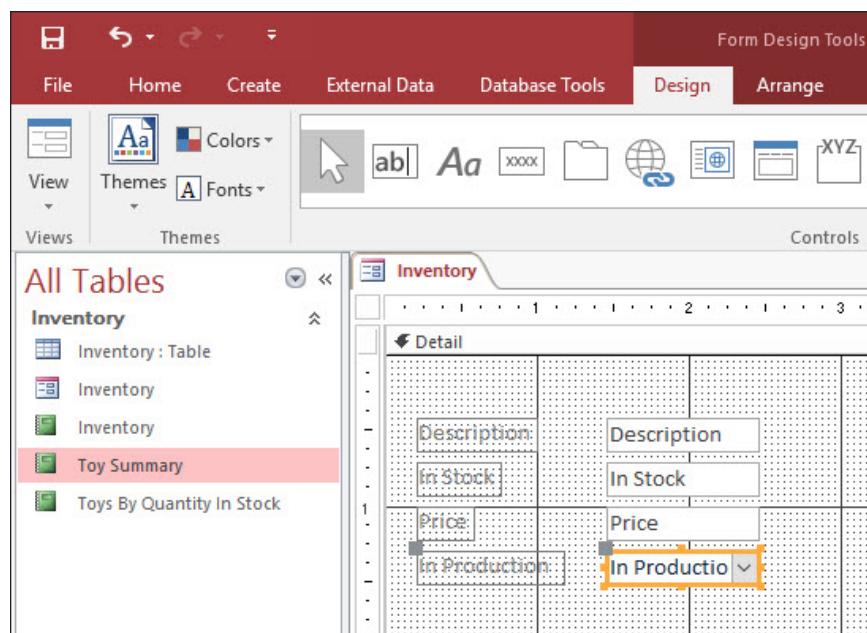
15. Click **Next**.

16. Type **In Production** in the text box and reposition the control to fix spacing if necessary.

17. Click **Finish**. Your screen should look similar to Figure 8-16.

Figure 8-16

Form with combo box control

Take Note   A combo box is also known as a drop-down control, because it is a combination of a text box with a list box that is hidden until you select the arrow next to the text box and it *drops down*.

18. Change to Form view, scroll through the records, and modify the In Production field by selecting an item in the combo box for one or more records.

19. SAVE the form as **Inventory**.

PAUSE. LEAVE the form open to use in the next exercise.

Adding Button Controls Using the Wizard

You can also use Control Wizards to add Button controls to forms. You create Button controls using the Command Button Wizard and assign the controls certain tasks that are created by macros. Macros are useful since they add additional functionality to a database by automating a series of tasks to create an action. For example, Button controls can be created on a form to perform many different actions, including moving to the next or previous record, displaying the Print dialog box, or closing the form. The code that enables this functionality is automatically created as a macro by the Command Button Wizard. In this exercise, you will create a Button control using the Command Button Wizard and use the View Code button to open the Visual Basic for Applications program.

You can further customize the function of database controls and even objects by viewing and modifying their code using a programming language called Visual Basic for Applications (VBA). You can click the View Code button in the Tools group of the Design tab to open the VBA program. The VBA program is built into Access and provides you with an interface to write and modify code associated with database controls and objects. You can really harness the power of Access 2016 by directly interacting with controls and objects via VBA.
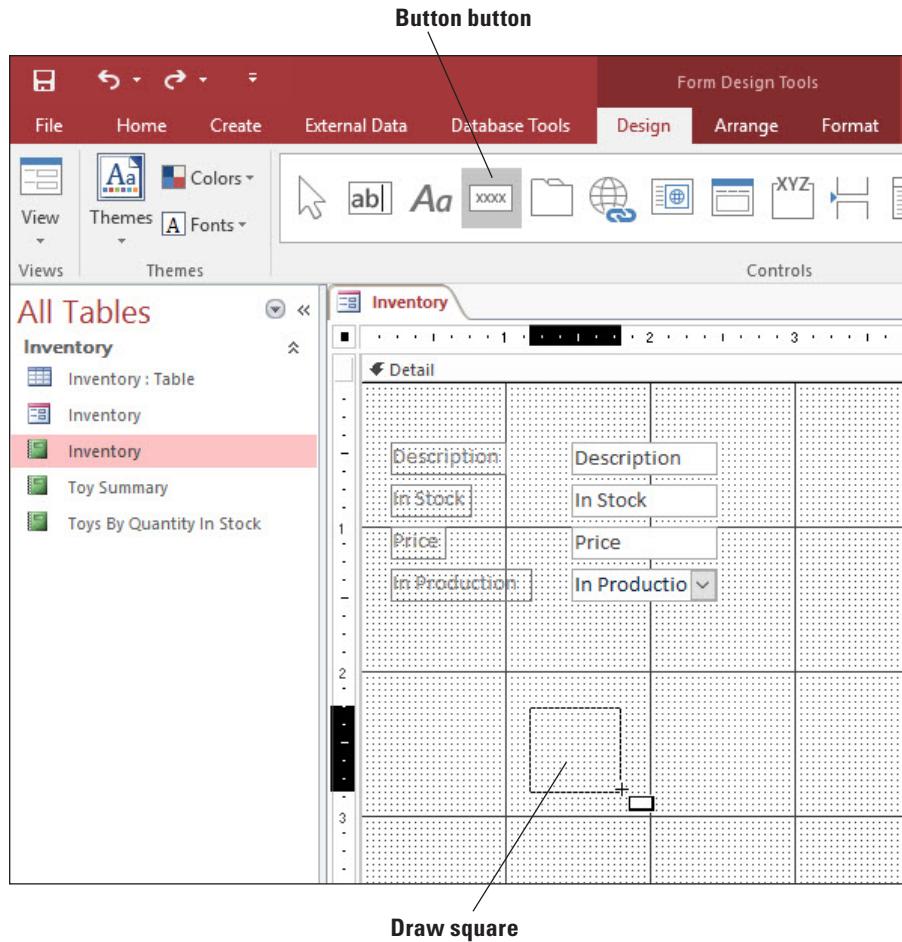
STEP BY STEP   **Use the Control Wizard to Add Button Controls**

GET READY. USE the *Wingtip Inventory-final* database and the *Inventory* form that are open from the previous exercise.

1. Change to Design view, if necessary.

2. On the Design tab, in the Controls group, click the **Button** button (a rectangle with xxx in it).
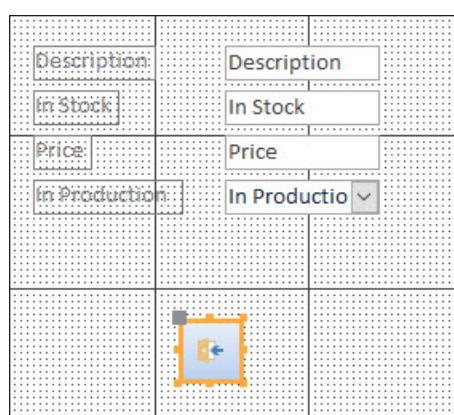
3. Position the mouse pointer on the design grid and drag down and to the right to create a control the size of the one shown in Figure 8-17.

Button button

Figure 8-17

Button control

Draw square

4. When you release the mouse button, the Command Button Wizard appears. In the Categories: section, click **Form Operations**, and in the Actions section, click **Close Form**.

5. Click **Next**.

6. On the next screen, keep the default settings to have the button contain the Exit Doorway picture displayed in the dialog box. Click **Next**.

7. On the final screen, type **Exit_Inventory_Form** as the default button name and then click **Finish**. (The default button name indicated on your screen may differ depending on how many controls you have previously attempted to include.) Notice that the image on the Button control on the form has changed to the Exit Doorway picture, as shown in Figure 8-18.
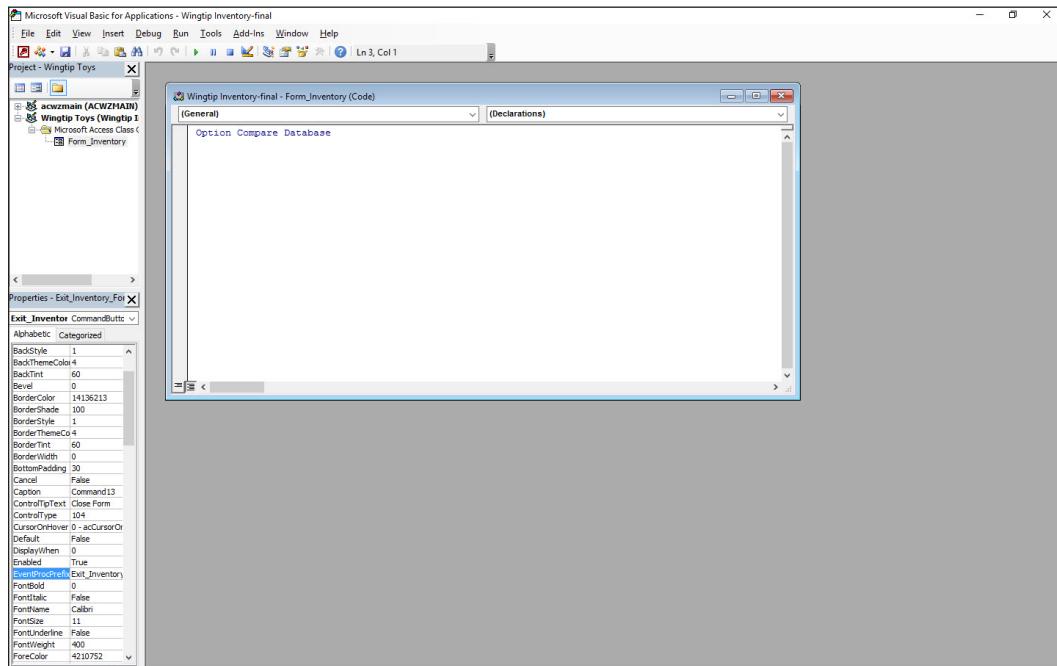
Figure 8-18

Inventory Form in Design view

8. Click the **Save** button on the Quick Access Toolbar.

9. Click the **Button** control on the form. On the Design tab, in the Tools group, click the **View Code** button. The Microsoft Visual Basic for Applications window appears, as shown in Figure 8-19. If you're fluent in VBA, you can use this window to add VBA code to customize the function of this control.

Figure 8-19

Microsoft Visual Basic for Applications window

10. Click the **Close** button on the Visual Basic for Applications window to return to Access.

11. Change to Form view and then click the newly created **Close Form** button to close the form. If a dialog box appears asking you if you want to save the changes to the form, click **Yes**.

PAUSE. **LEAVE** the database open to use in the next exercise.

DEFINING CONTROL TAB ORDER

When you are in Form or Report view, pressing the Tab key moves the selection, or focus, to the next field. **Control tab order** refers to the order in which the selection, or focus, moves from field to field in a form or report. When entering data in a form, it is helpful to set the control tab order to a sequence that matches the order of the data you are entering. It's also helpful to set the tab order of a report to a logical field sequence when reviewing report records. This allows you to efficiently concentrate on meaningful data as you use the change of focus as a guide. In this exercise, you will define form control tab order.

You change the tab order using the Tab Order dialog box, which is located in the Tools group of both the Report Design Tools and Form Design Tools Design tabs. The Tab Order dialog box lists each section of the report or form and the tab order of the fields in each section. Click the selection button to the left of each row in the Custom Order list to select the row. You can drag the rows into the tab order you want, from top to bottom. The Auto Order button places the fields in the order that they appear on the form or report—from top to bottom and left to right.
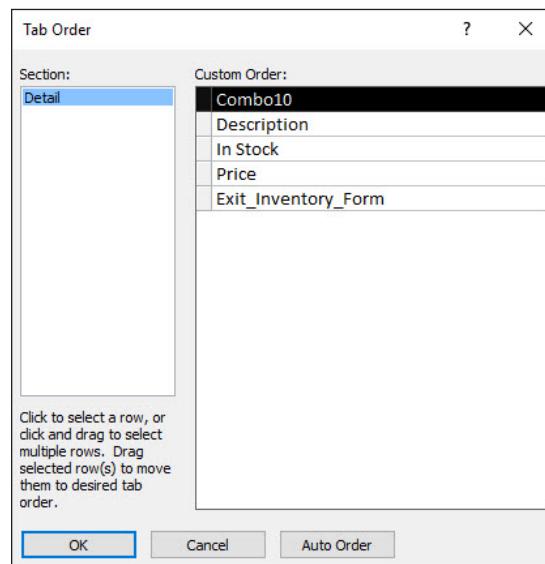
Define Control Tab Order

GET READY. USE the ***Wingtip Inventory-final*** database that is open from the previous exercise.

1. Double-click the **Inventory** form in the Navigation pane to open it in Form view.

2. Press the **Tab** key several times to see the order in which the controls are selected each time you press it. Notice that the tab order begins with the Description field, moves to the In Stock field, the Price field, the In Production field, and then the Close Form button. The tab order then continues to the next record in sequence and through the same fields as before.

3. Change to Design view.

4. On the Design tab, in the Tools group, click the **Tab Order** button. The *Tab Order* dialog box appears, displaying the tab order in the Custom Order list. Notice that the In Production combo box field is referred to as Combo10 since Access stores this name to use as a coding reference in Visual Basic for Applications. (You may have a different number, depending on how many controls you have had and removed previously on the form.)

5. Click the row selector to the left of the Combo10 field to select it.

6. Click and hold the row selector. The mouse pointer changes to a move pointer with an empty rectangle. Drag up a row and notice the black horizontal line moves with you. Drag up until the black horizontal line is in place at the top of the Description field; release the mouse button. The Combo10 field should be the first item in the list, as shown in Figure 8-20.

Figure 8-20

New order in the Tab Order dialog box

7. Click the **Auto Order** button. The order of the fields automatically resets based on the order that they appear on the form or report.

8. Click the row selector to the left of the Combo10 field to select it. Click and hold the row selector and drag it up until the black horizontal line is in place above the In Stock field; release the mouse button. The Combo10 field should now be the second item in the list.

9. Click **OK**.

10. **SAVE** the form design.

11. Change to Form view.

12. Press the **Tab** key several times to see the new tab order.

13. **CLOSE** the form.

PAUSE. LEAVE the database open to use in the next exercise.
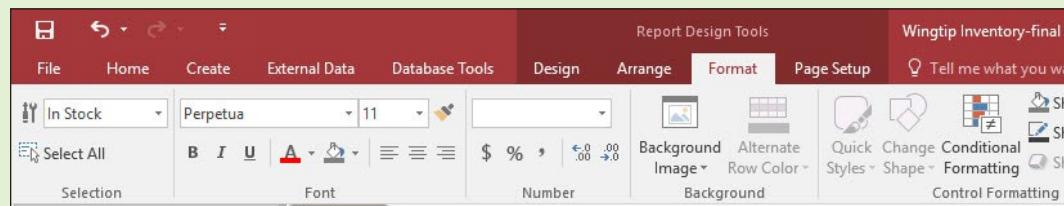
SOFTWARE ORIENTATION

Report Design Tools Format Tab

When you are working with reports, the Format tab is located in the Report Design Tools. It contains groups of commands used to format reports, as shown in Figure 8-21.

Figure 8-21
Format tab in Report Design Tools

When you are working with forms, the Format tab contains the same groups of commands and is available in the Form Layout Tools. Use these common formatting commands to change the display of controls and their labels in forms and reports.

FORMATTING CONTROLS

Formatting professional-looking reports and forms not only projects a high-quality image, but it also improves the form or report's readability. Display formatting allows you to refine the look of your reports and forms. You can change the font, font size, font color, alignment, and other attributes of text and numbers in controls and their associated labels. You can also change the background images of your reports and forms as well as change the shapes of certain controls. You can even apply Quick Styles to controls to quickly change their appearance or use conditional formatting to change the look of data when certain conditions are met.

Formatting Controls

You use many of the formatting tools that you have probably used before to format text, numbers, and objects in other Office programs, such as Word or Excel, to format the display of a control. In this exercise, you will format the display of controls on a report.

You can resize controls and their labels by clicking the resize handles, which are tiny squares located on the borders and corners of a selected control or label. Click the label or field control you want to resize, position the mouse pointer over a vertical border handle to get a two-sided arrow, and then click and drag horizontally to increase or decrease its width. Similarly, position the mouse pointer over a corner of the label or field control's border until you get a diagonal arrow, and then click and drag diagonally to increase or decrease its height and width. To move a control and its label simultaneously, select the control, position the mouse pointer over the orange selection border until you see a four-sided arrow, and then drag to the new position.

Controls on forms and reports display the format applied to the source table. However, you can change the display formatting for each control and label on a form or report. Your changes will only affect each control and the way the data appears. It does not change how users enter data or how data is stored.

Take Note   You cannot apply visual formats to controls bound to Attachment and OLE Object fields. However, you can change the format of the label associated with the control.

You can format a control in Design view or Layout view using the commands in the Font group. You can change the font as well as the size, color, alignment, and background color of text. You can also add bold, underline, and italics. The Format Painter button copies formats so that you can easily apply the same formatting to another control.

The Background group allows you to insert a background image into your form or report or alternate row colors to help make the form or report more visually appealing.

You can change the format of a number control using the Number group. You can format a number to include dollar signs, increase or decrease decimal places, add commas and percentages, or choose from a list of standard number formats by using the drop-down box in the group.

Lastly, you can also format controls using the commands in the Control Formatting group. You can apply Quick Styles, change the shape of a control, apply shape effects to quickly change the appearance of certain controls like button controls, and change the fill and outline color of controls. You can even use conditional formatting to change the look of the data that appears in a control when certain conditions are met.

Troubleshooting   By default, text does not automatically wrap when it reaches the edge of a control box. It remains on a single line and extends beyond the edges of the control. To enable text wrapping in a form or report, set the height to a non-default size and then change the CanGrow and CanShrink properties for the control to Yes. By default, a control's label box will expand to include the entire label.
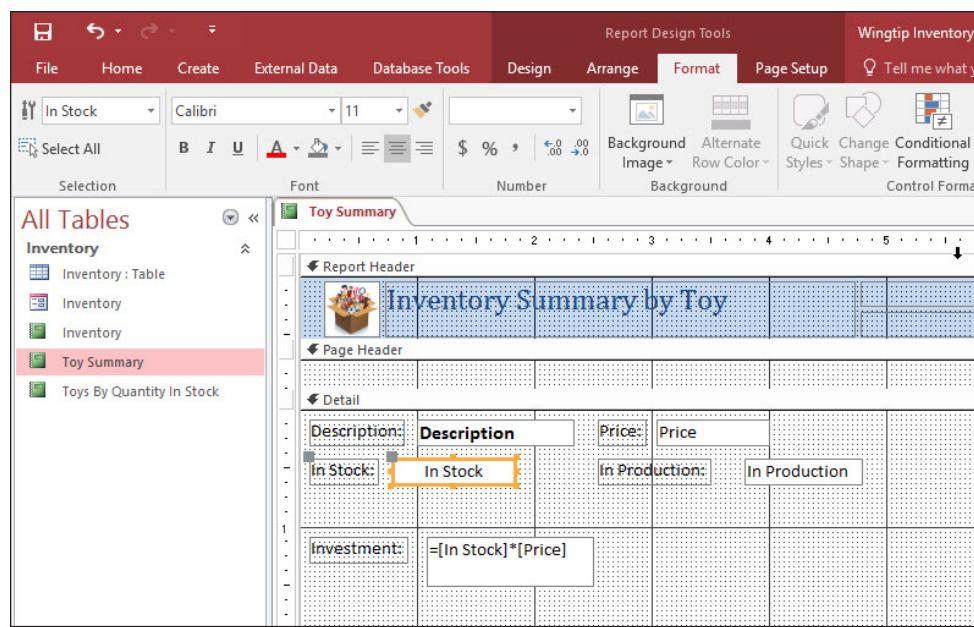
STEP BY STEP   **Format Controls on a Report**

GET READY. USE the *Wingtip Inventory-final* database that is open from the previous exercise.

1. Double-click the **Toy Summary** report in the Navigation pane to open it and then change to Design view.
2. Click the **In Stock** control. Position the mouse pointer over the resize handle on the right border. The mouse pointer changes to a double-sided arrow. Using the horizontal ruler at the top of the report as a guide, drag to the left to resize the control until its right side is at the 1 3/4" mark.
3. In the same manner, reduce the width of the Price control until its right side is at the horizontal ruler's 4" mark.
4. In the same manner, reduce the size of the Investment control until its right side is at the horizontal ruler's 2 1/2" mark and its bottom is at the vertical ruler's 1 1/2" mark.
5. Click the **Description** control to select it.
6. On the Format tab, in the Font group, click the **Bold** button. The Description control is bolded.
7. Click the arrow on the Font Size menu and select **12** from the menu. The font size becomes 12.
8. Click the **In Stock** control to select it.
9. On the Format tab, in the Font group, click the **Center** button. The In Stock text is centered in the control box. Your report should look similar to Figure 8-22.
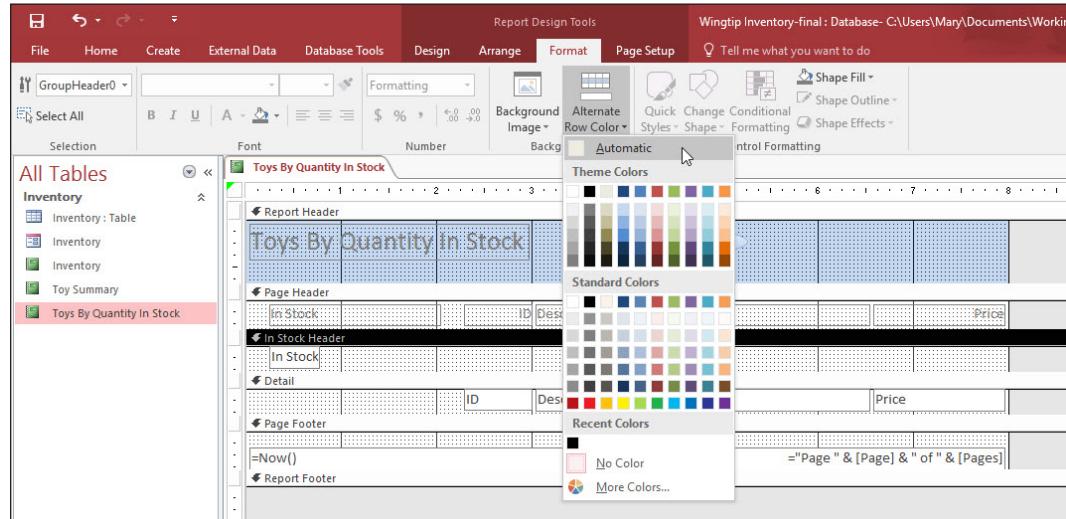
© mstay/iStockphoto

10. Click the **Investment** control that contains the formula you entered in an earlier exercise.

11. On the Format tab, in the Number group, click the **Apply Currency Format** command.

12. Click the **Price** control.

13. On the Format tab, in the Number group, click the **Apply Currency Format** command.

14. **SAVE** the report.

15. Change to Report view to see the changes you've made. Notice the text formatting changes as well as the currency formats for the Investment and Price fields.

16. **CLOSE** the report.

17. Double-click the **Toys By Quantity In Stock** report in the Navigation pane and change to Design view.

18. In the Report Header section, click the **Print Report** Button control to select it.

19. On the Format tab, in the Control Formatting group, click the **Change Shape** button to display the menu. Click the **Oval** option. The Button control's shape changes to an oval.

20. Click the **In Stock Header**.

21. Click the **Alternate Row Color** menu and select **Automatic**, as shown in Figure 8-23. Click **Automatic** to apply it.

22. Click the **Detail** row. Click the **Alternate Row Color** menu and then select **Automatic**.

23. Change to Report View and see that the button has been changed and the rows are now separated by alternate colors.

24. **SAVE** and then **CLOSE** the report.

PAUSE. LEAVE the database open to use in the next exercise.

Formatting Controls on a Form

In this exercise, you will learn how to format the display of controls on a form and include a background image.
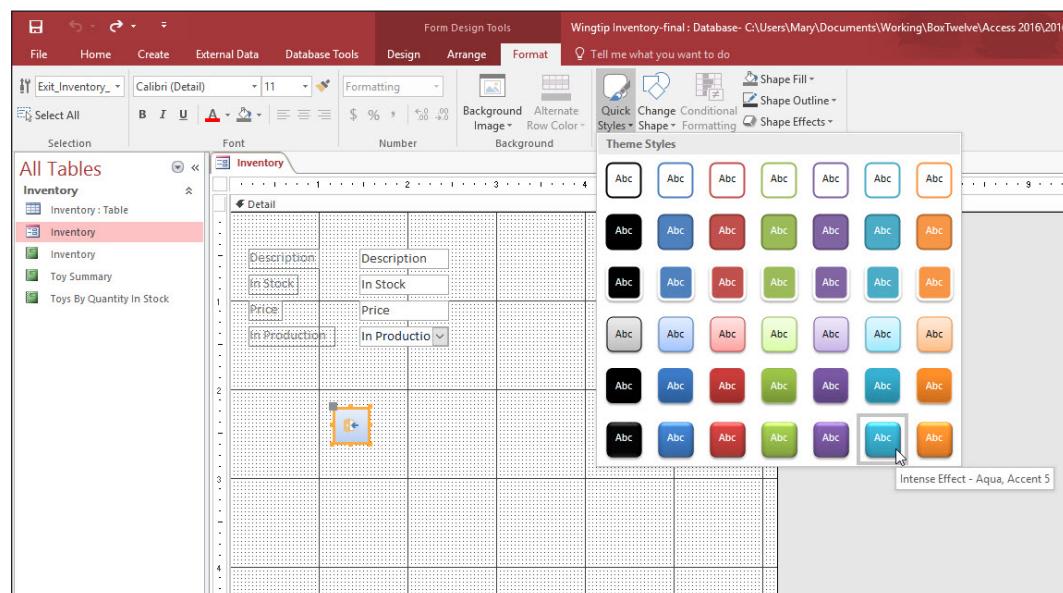
STEP BY STEP   **Format Controls on a Form**

GET READY. USE the *Wingtip Inventory-final* database that is open from the previous exercise.

1. Double-click the **Inventory** form in the Navigation pane to open it if it's not open already and then change to Design view.

2. Click the **Button** control on the form. On the Format tab, in the Control Formatting group, click the **Quick Styles** button and then select **Intense Effect – Aqua, Accent 5** from the Theme Styles, as shown in Figure 8-24. Click the style to apply it; the Button control's style changes to the chosen Quick Style.

Figure 8-24
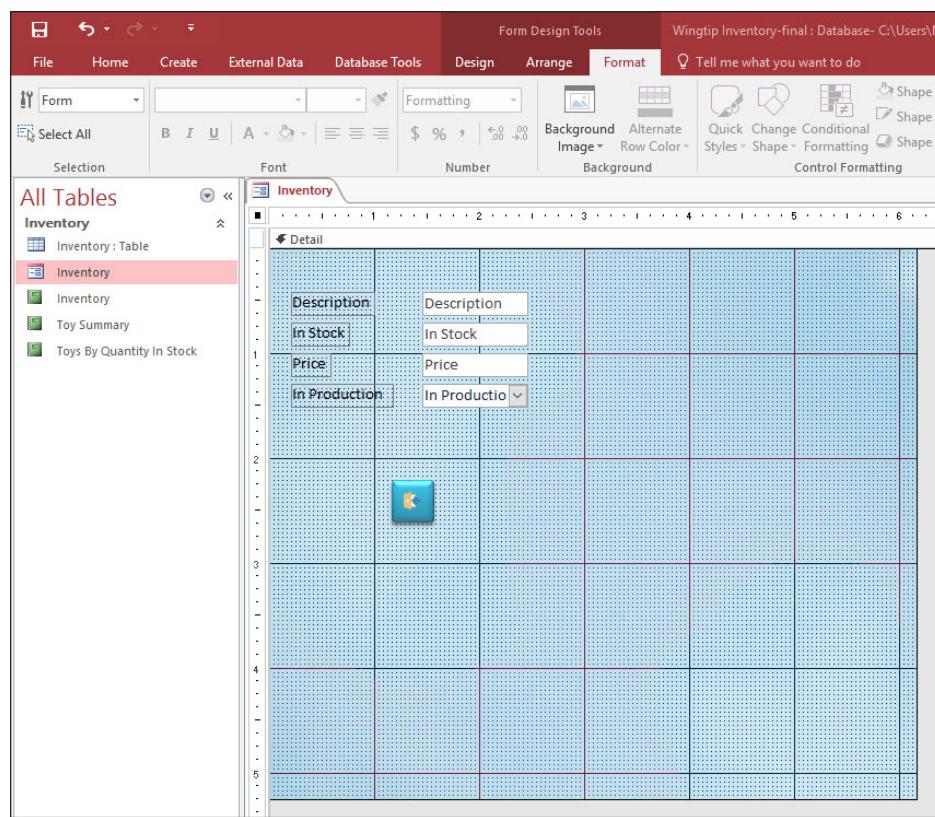
Quick Style gallery

3. Click the **Description** label to select it.

4. On the Format tab, in the Font group, click the **Font Color** button and then select **Black** from the Theme Colors menu. The Description label displays in black. Change the font color to black for the In Stock, Price, and In Production labels.

5. On the Format tab, in the Background group, click the **Background Image** button, click the **Browse** command to locate the *Winter Theme Background.jpg* image file, and then click **OK**. Notice the form's background image is now that of the image, as shown in Figure 8-25.

Figure 8-25

Form with background image

6. Change to Form view to see the changes you made.

7. **SAVE** and then **CLOSE** the form.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   The process for adding a background image to a form or a report is the same. Once shown how to add a background image to a form, you can add a background image to a report in the same manner.

Creating Conditional Formatting on Controls

Sometimes employees need a little help recognizing when inventory is low or when sales are high. Conditional formatting in forms and reports helps alert users to text or numbers that need attention so that important data is not overlooked. **Conditional formatting** changes the appearance of a control or the value in a control when certain conditions are met. You can change the color of text or numbers in the control or the background color. In this exercise, you will create conditional formatting for a report field.

You can create conditional formatting based on a value or expression. For example, when the number of products in an inventory falls below 10 for a single product, you can set the conditional formatting so that Access will display the number in red or with a red background so that you and others will notice the low inventory number.

The easiest way to add or delete conditional formatting from a form or report is to use the Conditional Formatting Rules Manager dialog box, which displays a list of the existing formatting rules, if any.
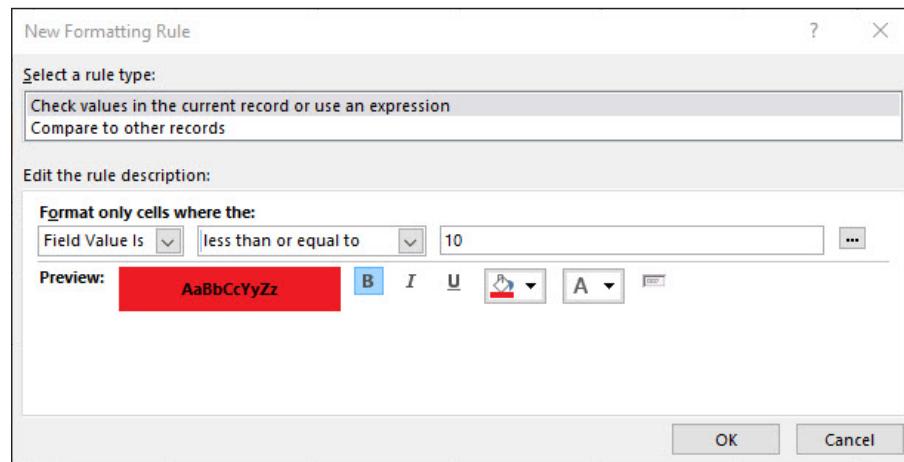
Create Conditional Formatting

GET READY. USE the *Wingtip Inventory-final* database that is open from the previous exercise.

1. Double-click the **Toy Summary** report in the Navigation pane to open it, if necessary, and then change to Design view.

2. Click the **In Stock** control to select it.

3. On the Format tab, in the Control Formatting group, click the **Conditional Formatting** button. The *Conditional Formatting Rules Manager* dialog box appears.

4. Click the **New Rule** button. The *New Formatting Rule* dialog box appears. You will create a new rule based on criteria you will enter.

5. In the Edit the rule description section, keep Field Value Is in the first menu. Click the drop-down arrow to the right of *between* and scroll to the bottom of the list to select **less than or equal to**. Click in the empty text box and then type **10**. Click the **Bold** button in the Preview section.

6. Click the down arrow on the **Background Color** button and select **Red** from the menu that appears. The dialog box should look similar to Figure 8-26.

Figure 8-26

New Formatting Rule
dialog box

7. Click the **OK** button. A formatting rule for the In Stock field is added to the dialog box. Now, when the report is viewed in Report view, the value for the In Stock field will appear bold and the control background color will appear red if the formatting rule applies.

8. Click **OK**.

9. **SAVE** the report.

10. Change to Report view and scroll through the records to see the conditional formatting at work.

11. **CLOSE** the report.

PAUSE. LEAVE the database open to use in the next exercise.
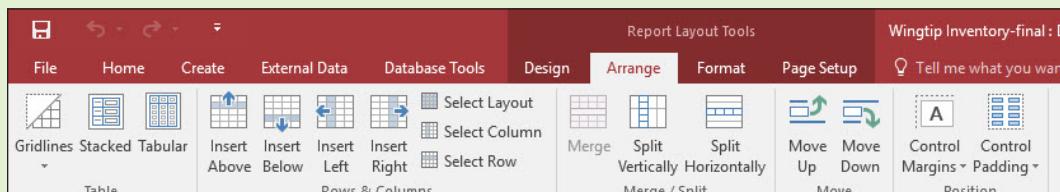
SOFTWARE ORIENTATION

Arrange Tab

The Arrange tab, shown in Figure 8-27, is located in the Report Layout Tools as well as the Report Design Tools area of the Ribbon. It contains groups of commands for arranging the layout, alignment, size, and position of controls on a report. Use the commands on the Arrange tab to arrange controls on a report.

Figure 8-27
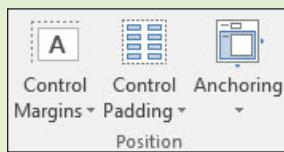
Arrange tab in the Report Layout Tools Ribbon

Similar to a report, the Arrange tab is displayed in both the Form Layout Tools and Form Design Tools area of the Ribbon. The buttons and commands on the Arrange tab are the same as the Arrange tab for reports, except for the Anchoring button located in the Position group. The Position group, shown in Figure 8-28, contains an Anchoring button that helps position controls on a form when the containing window is resized. Use the commands on the Arrange tab to arrange controls on a form.

Figure 8-28

Position group on Arrange tab in the Form Design Tools Ribbon

Arranging Control Layout

After you have created a form or report, you can arrange the controls on it to fit the data or to best display the data. Access provides commands for arranging the layout, alignment, position, and size of controls. **Control layouts** align your controls horizontally and vertically to give your report or form a uniform appearance. The two types of control layouts are tabular and stacked. Controls are arranged vertically in a **stacked layout**, with a label on the left and the control on the right. Stacked layouts are contained in one report or form section. In a **tabular layout**, the controls are arranged in rows and columns like a spreadsheet, with labels across the top. Tabular layouts use two sections of a report or form. The labels are displayed in one section and the fields are arranged in the section below. In this exercise, you will arrange controls on a report using control layouts.

You can have more than one layout on a report. For example, you could have a tabular layout to create a row of data for each record, and then a stacked layout underneath with more information about the same record.

Access automatically creates tabular control layouts when you create a new report using the Report button or the Blank Report button on the Create tab. When you create a new form using the Form button or the Blank Form button, Access creates stacked control layouts.

On an existing blank report, you can create a new control layout by holding down the Shift key and then selecting the fields you want to include in the form or report from the Field List pane. On the Arrange tab, in the Table group, click the Stacked button or the Tabular button.

You can change the entire layout of a report or form to the other layout by selecting all of the cells in the layout and then clicking the layout button you want—either Stacked or Tabular.

You can also split a control layout into two different layouts. Hold down the Shift key, select the controls you want to move to the new control layout and then click the Tabular or Stacked button.

STEP BY STEP   **Arrange Control Layout**

GET READY. USE the ***Wingtip Inventory-final*** database that is open from the previous exercise.

1. Click the **Inventory** table in the Navigation Pane to select it.
2. On the Create tab, in the Reports group, click the **Blank Report** button. A new, blank report is created and the Field List pane is displayed. (If it isn't, click the **Add Existing Fields** button in the Tools group on the Design tab.)
3. Double-click the **ID** field to add it to the report.
4. Double-click the **Description** field to add it to the report.
5. Double-click the **In Stock** field to add it to the report.
6. Double-click the **Price** field to add it to the report.
7. Press and hold the **Shift** key and then click each of the four controls to select them all. Be sure you select the controls and not the labels, as shown in Figure 8-29.

Figure 8-29

Selected report controls

Selected controls

8. On the Arrange tab, in the Table group, click the **Stacked** button. The controls and labels are arranged in a 2-column stacked layout.
9. On the Arrange tab, in the Table group, click the **Tabular** button. The controls and labels are arranged back in a tabular layout. The tabular format indents the position of the columns by default.
10. On the Arrange tab, in the Table group, click the **Stacked** button to change it back to a stacked layout, as shown in Figure 8-30.

11. **SAVE** the report as *Stacked Report* and leave it open for use in the next exercise.

PAUSE. LEAVE the database open to use in the next exercise.

By using the tools in the various groups on the Arrange tab, Access 2016 gives you even greater flexibility over arranging and controlling the cells in control layouts.

You can add new rows and columns of cells above and below existing cell rows and to the left and right of existing cell columns using the tools in the Rows & Columns group. You can merge two cells into one, as well as split them vertically and horizontally using the tools in the Merge/Split group. The tools in the Move group can be used to reorganize cells by moving them up or down.

You can adjust the location of information displayed in a control in relation to the control's border with the Control Margins button in the Position group. You can choose the None, Narrow, Medium, or Wide setting in the Control Margins menu.

The Control Padding button adjusts the amount of space between a label and its field control. The Control Padding menu contains choices for None, Narrow, Medium, or Wide padding.

The Position group also contains the Anchoring button and menu. The Anchoring button only appears in the Form Layout Tools and Form Design Tools Arrange tab in the Position group since the anchoring option is only available for forms and not reports. Anchoring can be used so that control sizes automatically increase or decrease when the Access window size is increased or de-

creased. You may never have to anchor a control because you will most likely keep the Access window a consistent size. Anchoring is helpful when you want to control the position of the controls on a form when the Access window is increased. If anchoring is not applied, controls that contain more text than visible within the default size will remain the default size even when the Access window is made larger. When you anchor a field control in a layout, the newly anchored field and all the others grow when the Access window size is increased to display more field data, if applicable. Anchoring is best used on fields that contain a large amount of text like those with the Long Text data type. For example, you can anchor a Notes field control to stretch down and to the right as you increase the size of the Access window. This allows you to see more text within the field control in the larger Access window, including text you'd normally not see if you didn't anchor it. Field controls that are not anchored will remain the default size even if you increased the Access window size, hiding the excess text. Once a control is anchored, all other controls in the layout will behave the same way. You can only have one anchored control in a Stacked or Tabular layout, but many anchored controls with different anchoring options if they're not in a specific layout.

Add, Move, and Remove a Control

When you want to add a new field from the Field List to an existing control layout, just drag the field from the Field List pane to the grid. To add it to the layout, select all the controls in the layout and the new control, and then click the Stacked or Tabular button to integrate the new field into the control layout. Removing a control from a control layout allows you to place it anywhere on the report or form without affecting the positioning of any other controls. Click the control you want to remove and then click the Remove Layout button in the Table group. The Remove Layout button is only available in the Table group in report or form Design view. In this exercise, you will add and move controls within a layout and remove a control from a layout.
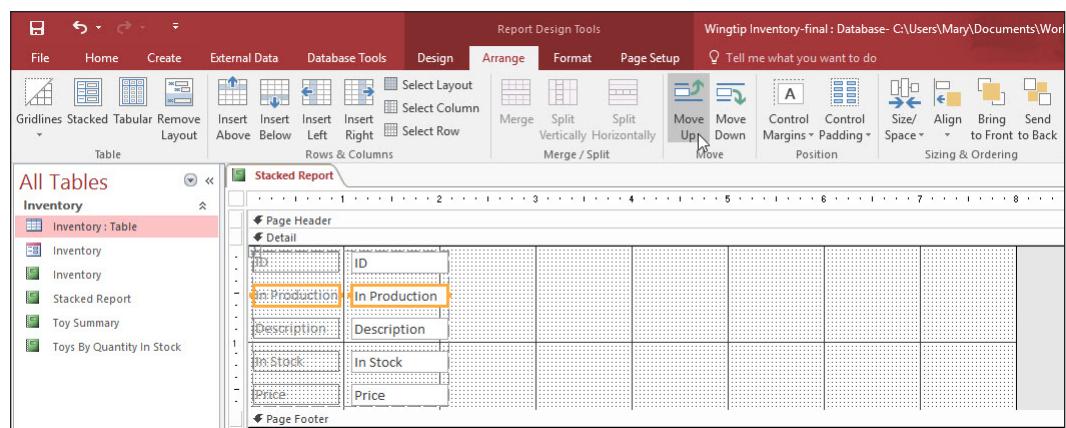
STEP BY STEP	Add, Move, and Remove a Control from a Layout

GET READY. USE the *Wingtip Inventory-final* database and *Stacked Report* report that are open from the previous exercise.

1. Change to Report Design view, if necessary.
2. Click the **Show all tables** link in the Field List pane, if necessary, to view all the available fields in the Inventory table.
3. Click the **In Production** field in the Field List pane. Drag it to the grid and place it in any location on the design grid to the right of the four controls.
4. Press and hold the **Shift** key and then select the **ID** field control. Still holding the **Shift** key, select the **Description**, **In Stock**, and **Price** field controls so that all five (In Production, ID, Description, In Stock, and Price) are selected.
5. On the Arrange tab, in the Table group, click the **Stacked** button. The In Production control is added to the bottom of the stacked layout.
6. With all five controls still selected, click the **Control Margins** button on the Arrange tab in the Position group and then select **Narrow** from the menu. The text within the field controls and labels is formatted by the Narrow option.
7. On the Arrange tab, in the Position group, click the **Control Padding** button and select **Medium** from the menu.
8. Click anywhere on a blank area of the design grid to deselect the field controls, select the **In Production** field control and then click **Select Row** in the Rows & Columns group. Notice the In Production label and field control are both outlined in orange. In the Move group on the Ribbon, click the **Move Up** button three times to move it under the ID label and field control, as shown in Figure 8-31.
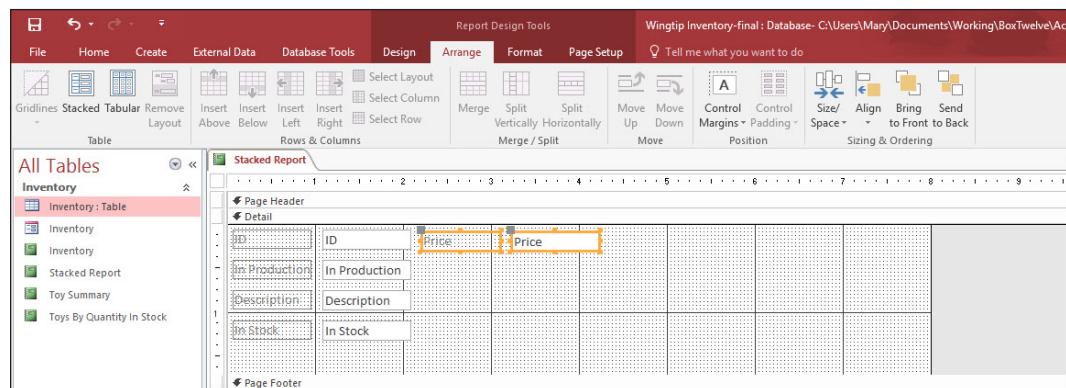
9. Click and drag the **ID** control out of the layout. It will not move out of the layout.

10. Click anywhere on a blank area of the design grid to deselect the field controls. Press and hold the **Shift** key and then select the **Price** label and control.

11. In the Table group on the Ribbon, click the **Remove Layout** button.

12. Click and drag the **Price** field control to the right of the ID field control, as shown in Figure 8-32.

13. **SAVE** the report and then change to Report view to view your changes.

⚠️ **Troubleshooting**   If the In Production text within the label is partially hidden, change to Design view and select the In Production control and label. On the Arrange tab, in the Position group, click the Control Margins button, select None from the menu, and then Save the report.

---

14. **CLOSE** the report.

PAUSE. LEAVE the database open to use in the next exercise.

Arranging and Anchoring Controls

In this exercise you practice arranging controls within a layout using a variety of arrangement tools.
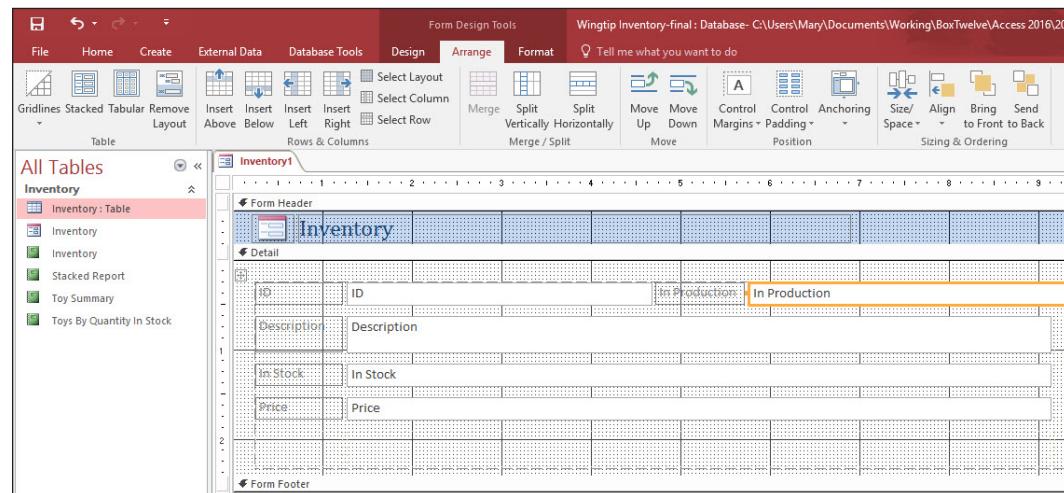
Arrange and Anchor Controls within a Layout

GET READY. USE the *Wingtip Inventory-final* database that is open from the previous exercise.

1. Click the **Inventory** table in the Navigation Pane to select it.

2. On the Create tab, in the Forms group, click the **Form** button. A new form containing all the fields from the Inventory table is created in Layout view. Notice the stacked control layout is the default.

3. Change to Design view.

4. Click the **ID** control to select it.

5. On the Arrange tab, in the Merge/Split group, click the **Split Horizontally** button. Click to the right of the ID field control and notice the orange border of the new column created after the split.

6. Click the **In Production** field control and drag it to the right of the ID field control to place it next to it. The In Production label and field control is now in the column. Your screen should resemble Figure 8-33. Notice the new additional space automatically created to the right of the other field controls.

Figure 8-33

In Production control next to ID control
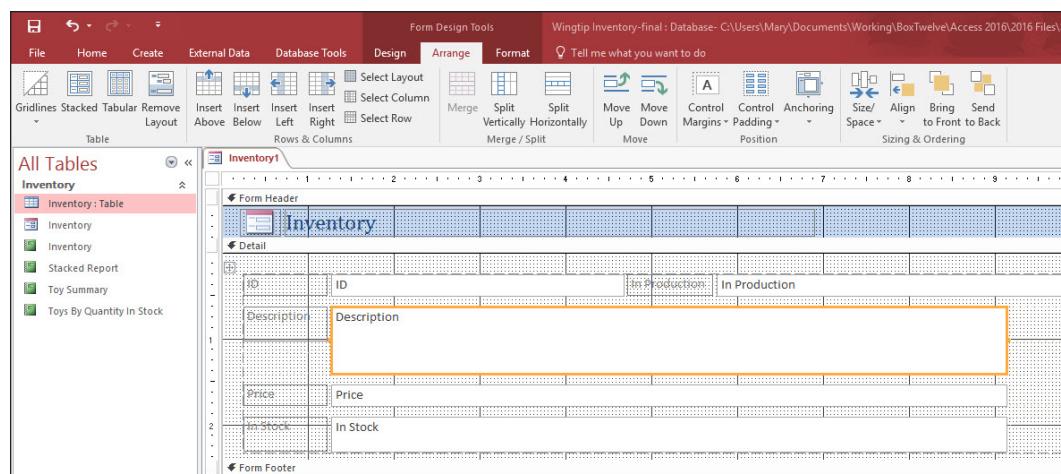
Take Note Access automatically creates a new column of placeholders in a layout when a field control is horizontally split and another field control is dragged into the placeholder created next to the horizontally split field control.

7. Click the **In Stock** field control to select it. Press and hold the **Shift** key and then select the **In Stock** control label.

8. On the Arrange tab, in the Move group, click the **Move Down** button once. The In Stock field control and label move to the bottom of the layout.

9. Click the **Description** field control to select it. Press and hold the **Shift** key and then click the empty space below the Description field control to select the cell. Both the Description field control and cell below should be outlined in orange.

10. On the Arrange tab, in the Merge/Split group, click the **Merge** button. The Description field control and cell have now merged into one, as shown in Figure 8-34.

11. Click the **In Stock** field control to select it. On the Arrange tab, in the Rows & Columns group, click the **Insert Below** button twice. Two empty cells are added under the In Stock control. The In Stock field control should still be selected.

12. On the Arrange tab in the Rows & Columns group, click the **Select Row** button. Both the In Stock label and field control should be selected as well as an empty column created when we dragged the In Production field control to the right of the ID field control.

13. On the Arrange tab, in the Move group, click **Move Down** twice to move the In Stock control to the last cell row at the bottom of the layout.

Take Note   In Layout view, you can also use the tools on the Arrange tab to arrange controls within a layout for both forms and reports.

14. Click the **Description** field control to select it. On the Arrange tab in the Position group, click the **Anchoring** button and then select **Stretch Down and Across** from the Anchoring menu that appears. The Description field control as well as all the others will now automatically resize to display all their contained text, if necessary, when the Access window is made larger.

15. Click the **In Stock** field control and increase its height by positioning the pointer over the top-right corner of the control until a diagonal two-sided arrow appears, and then clicking and dragging upward until the text is no longer obstructed.

16. Change to Form view to display the new arrangement of the controls and resize the Access application window (not the form window) to see the controls stretch and shrink in conjunction with the window size.

17. **SAVE** the form as *Modified Inventory Form* and then **CLOSE** it.

PAUSE. **LEAVE** the database open to use in the next exercise.

ARRANGING CONTROL ALIGNMENT, SIZE, AND POSITION

You can change the alignment, size, or position of controls and associated labels. Aligning, sizing, and positioning commands using the Arrange tab gives you more options for improving the look of controls and labels in forms and reports. The Sizing & Ordering group, which is available only on the Arrange tab in report or form Design view, has commands for aligning labels and controls to the grid (the intersecting horizontal and vertical lines and points that appear in Design view) to allow for precise position. For example, you can precisely align a group of controls and related labels using the Align To Grid command to ensure all the labels' upper-left corners align to their nearest grid points. This helps you ensure the organization of your controls is consistent through-out. In this exercise, you arrange the alignment, size, and position of controls and labels.

You can align multiple controls and labels at one time so their left, right, top, and bottom borders are perfectly aligned to each other using the align left, right, top, and bottom commands.

Also in the Sizing & Ordering group, you can use the commands to adjust the size of controls and labels to Size to Fit, Size to Grid, Size to Tallest, Size to Widest, Size to Shortest, or Size to Narrowest.

Additionally, you can use the Bring to Front and Send to Back commands to move objects in front of or behind other objects. Also in the Sizing & Ordering group, you can use the commands to increase or decrease horizontal or vertical spacing using the Equal Horizontal, Equal Vertical, Increase Horizontal, Decrease Horizontal, Increase Vertical, and Decrease Vertical commands.

Finally, the Sizing & Ordering group contains toggle commands for showing or hiding the Grid and the Ruler and enabling or disabling Snap to Grid. This allows you to precisely arrange a label when you move the associated control by enabling Access to automatically align the upper-left corner of a label to its closest grid point. There are also Group and Ungroup commands that allow you to group several controls together so you can move or modify them all at once.

Take Note The process for arranging the control alignment, size, and position on a report is the same as for a form. Once shown how to arrange these for a form, you can arrange them for a report in the same manner.
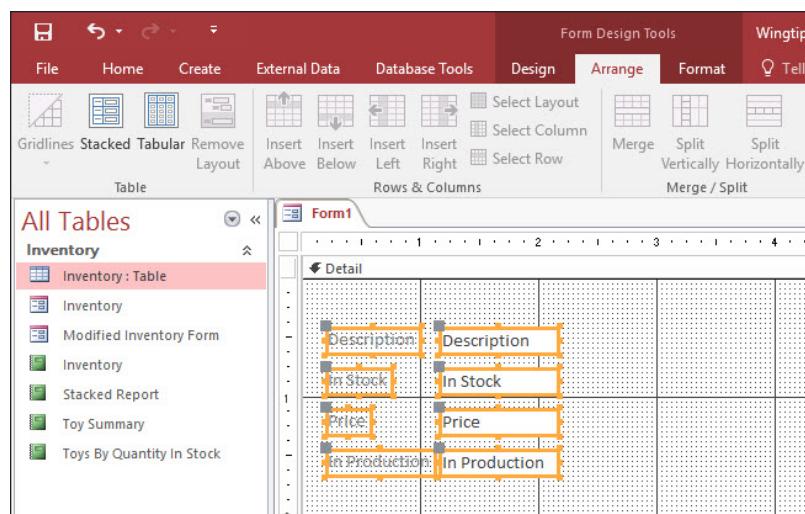
STEP BY STEP | **Arrange Control Alignment, Size, and Position**

GET READY. USE the *Wingtip Inventory-final* database that is open from the previous exercise.

1. Click the **Inventory** table in the Navigation Pane to select it.
2. On the Create tab, in the Forms group, click the **Form Design** button. A new, blank form is created, and the Field List pane is displayed. (If it isn't displayed, click the **Add Existing Fields** button in the Tools group on the Design tab.)
3. Double-click the **Description** field to add it to the form.
4. Double-click the **In Stock** field to add it to the form.
5. Double-click the **Price** field to add it to the form.
6. Double-click the **In Production** field to add it to the form.
7. Press and hold the **Shift** key and then click the **Description**, **In Stock**, and **Price** field controls to select them. The In Production field control should already be selected.
8. On the Arrange tab, in the Table group, click the **Stacked** button. The controls and labels are arranged in a stacked layout.
9. Click on a blank space on the design grid, and then select the **In Production** field control and label.
10. On the Arrange tab, in the Sizing & Ordering group, click the **Size/Space** button. In the Size category on the menu that appears, click **To Fit**. Notice all the field controls and labels are slightly resized in the layout based on the best fit of the text within the In Production field control and label since the layout forces all fields to conform to this action.
11. Select all the controls in the stacked layout (the labels and controls for the Description, In Stock, Price, and In Production controls).
12. On the Arrange tab, in the Table group, click the **Remove Layout** button.
13. All the controls and labels should still be selected. On the Arrange tab, in the Sizing & Ordering group, click the **Size/Space** button and then select **To Fit** from the menu that appears. Notice that all the field controls independently change their width to best fit their text since they are no longer part of a layout. Your screen should look similar to Figure 8-35.
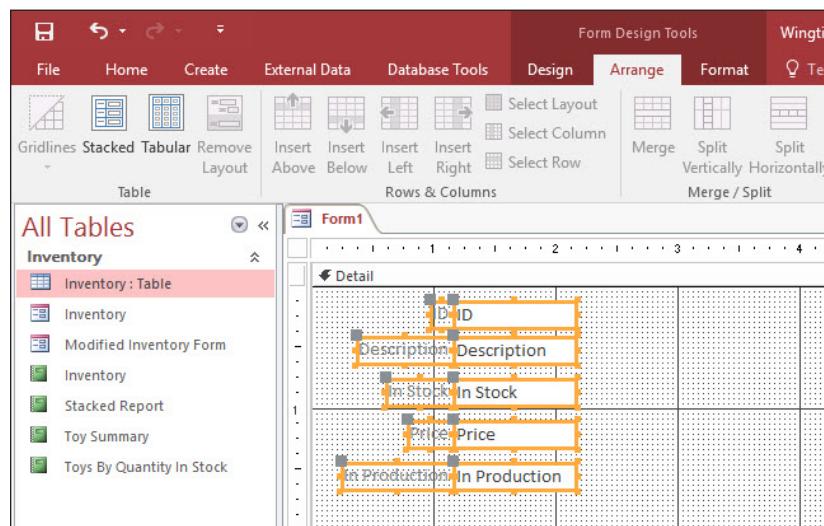
14. With the controls and labels still selected, on the Arrange tab, in the Sizing & Ordering
    group, click the **Align** button and then select **Right** from the menu that appears. The
    labels are right-aligned to the controls.

15. Click and drag the **ID** field from the Field List pane to any blank spot on the design grid
    above the Description field.

16. Select the **ID** label and control and in the Sizing & Ordering group, click the **Align**
    button, and then select **Right** from the menu that appears.

17. Press and hold the **Shift** key and then click both the labels and controls for all the
    controls. In the Sizing & Ordering group, click the **Align** button, and then select **Left**
    from the menu that appears. All the controls are left-aligned as a group.

18. In the Sizing & Ordering group, click the **Align** button and then select **Right** from the
    menu that appears. All the controls are now right-aligned as a group. Your screen
    should look similar to Figure 8-36.

19. Select all the labels and controls, if necessary.

20. On the Arrange tab, in the Sizing & Ordering group, click the **Size/Space** button and
    then select **Equal Vertical** from the Spacing category on the menu that appears. Notice
    that the vertical space between the controls is now equal.

21. Click any blank space on the design grid.

22. On the Arrange tab, in the Sizing & Ordering group, click the **Size/Space** button and
    then select **Grid** from the Grid category on the menu that appears. The design grid
    disappears.

23. Click **Size/Space** and then select **Grid** again. The design grid appears.

24. Click any blank space on the design grid and drag to draw a box around the labels and controls so they are all selected, or press and hold the **Shift** key and then select each label and control.

25. On the Arrange tab, in the Sizing & Ordering group, click the **Align** button. In the menu that appears, click the **To Grid** button. Notice the control and labels slightly move. The upper-left corners of all the labels are now aligned to their nearest grid points.

26. On the Arrange tab, in the Sizing & Ordering group, click the **Size/Space** button. In the Grid category on the menu that appears, click the **Ruler** button. The rulers disappear.

27. Click **Size/Space** and then select **Ruler** again. The rulers reappear.

28. **SAVE** the form as *Arranged Inventory Form*.

29. **CLOSE** the Field List and the form.

PAUSE. LEAVE the database open to use in the next exercise.
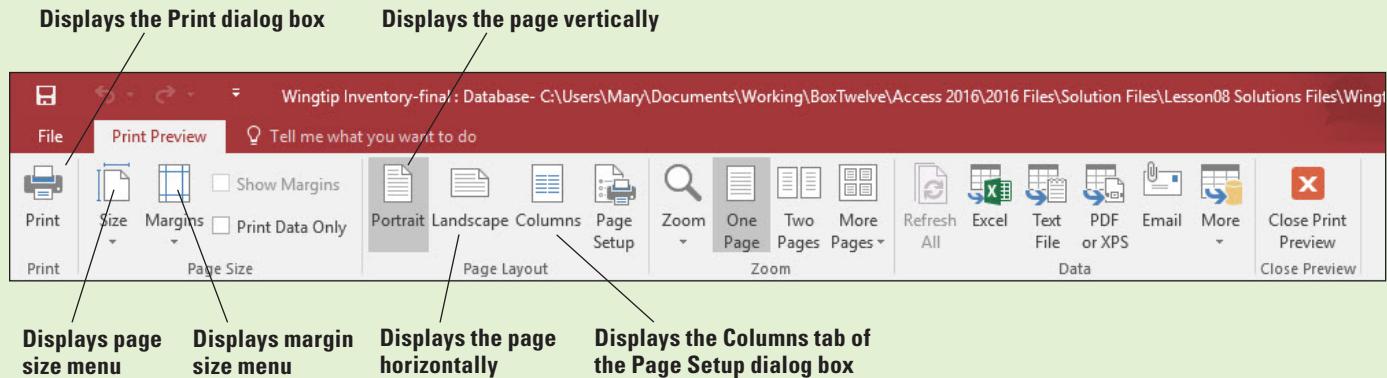
SOFTWARE ORIENTATION

Print Preview Tab

The Print Preview tab, as shown in Figure 8-37, has commands for viewing tables, queries, forms, and reports in a variety of ways so you can adjust their layout and view your changes before you print them. You can display the Print Preview tab by choosing an object you want to print from the Navigation Pane, and then selecting the Print Preview option on the File tab's Print menu. A report already has a Print Preview option on its View menu, so you can simply select that option to take you to the Print Preview tab. Use the Print Preview tab to view and adjust data that appears on printed pages to create an effective print layout. For example, you can adjust margins and change the page orientation before printing to ensure data appears appropriately.

Figure 8-37
Print Preview tab

Displays the Print dialog box   Displays the page vertically

Displays page size menu   Displays margin size menu   Displays the page horizontally   Displays the Columns tab of the Page Setup dialog box

ADJUSTING PAGE MARGINS AND CHANGING PAGE ORIENTATION FOR FORMS AND REPORTS

Forms and reports—and all other Access objects—can be printed to easily communicate data to others in a hardcopy format. The Print Preview tab provides options that allow you to adjust page margins and/or change orientation to ensure data fits appropriately on a page. When you are satisfied with the page layout, you can click the Print button to send the page to the printer.

It may be easy to understand why you would want to print a report to share data with your colleagues, but Access also gives you the option of printing all other database objects. For example, you may want to print a table to view data in a datasheet format to which you're more accustomed or print a form to share with a graphic design team so it can be aesthetically evaluated and redesigned.

The Page Size group on the Print Preview tab contains commands for controlling page size and mar-

gins. The Print Data Only checkbox gives you the option of printing only object data without the corresponding structure (like gridlines and borders). The Show Margins checkbox allows you to view an object's margins on the preview of the object to help you better adjust them.

The Page Layout group allows you to change the page orientation of an object, either by choosing the Portrait (vertical) or Landscape (horizontal) options. You can also change the layout of data by converting it into any number of columns by choosing the Columns option. Lastly, the Page Setup option, when clicked, displays a dialog box with many of the same options that appear in the Page Size and Page Layout groups. In this exercise, you use Print Preview to adjust the page margins and change page orientation for forms and reports.

Changes to an object's print layout using Print Preview are automatically retained when you close Print Preview.
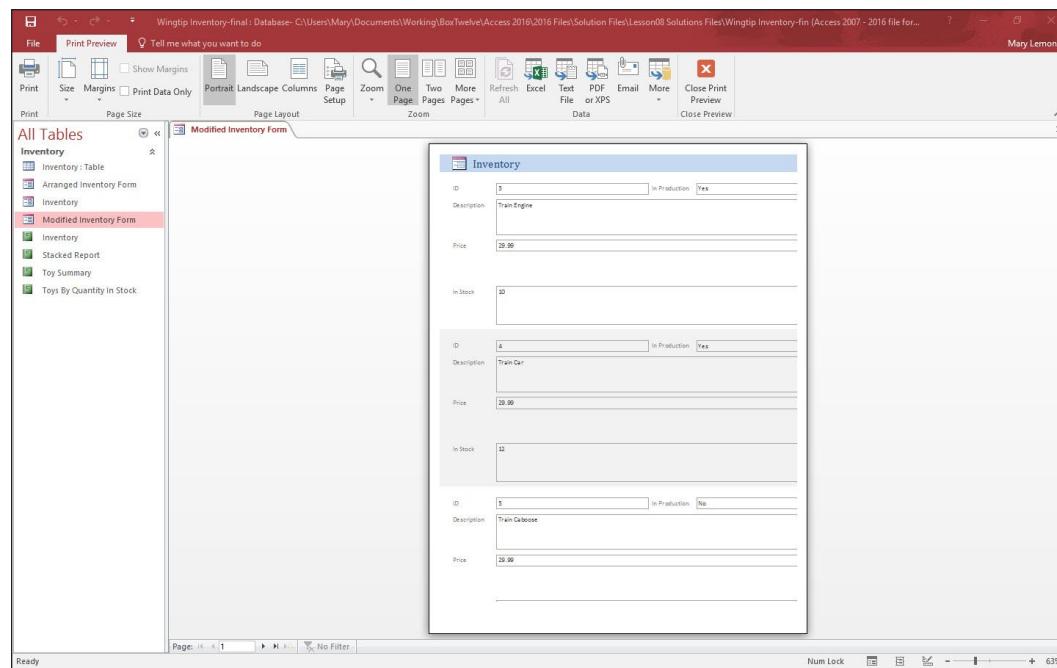
<table>
<tr><td>**STEP BY STEP**</td><td>**Adjust Page Margins and Change Page Orientation for Forms and Reports**</td></tr>
</table>

GET READY. USE the *Wingtip Inventory-final* database that is open from the previous exercise.

1. Click the **Modified Inventory Form** in the Navigation Pane and then click the **File** tab.
2. On the File tab, click the **Print** button to display the Print menu, with the options Quick Print, Print, and Print Preview.
3. Click the **Print Preview** command. The Print Preview screen appears with a preview of the form, as shown in Figure 8-38. Notice the form's field borders exceed the width of the right margin.

Figure 8-38

Form in Print Preview

4. In the Page Layout group, click the **Landscape** button to display the form in landscape view. Notice some of the form's field borders still exceed the width of the right margin.
5. In the Page Size group, click the **Margins** button. On the Margins menu that appears, click the **Narrow** option. The form's field borders have been adjusted and should now be within the right margin. The print layout now appears complete. Your screen should resemble the form shown in Figure 8-39.
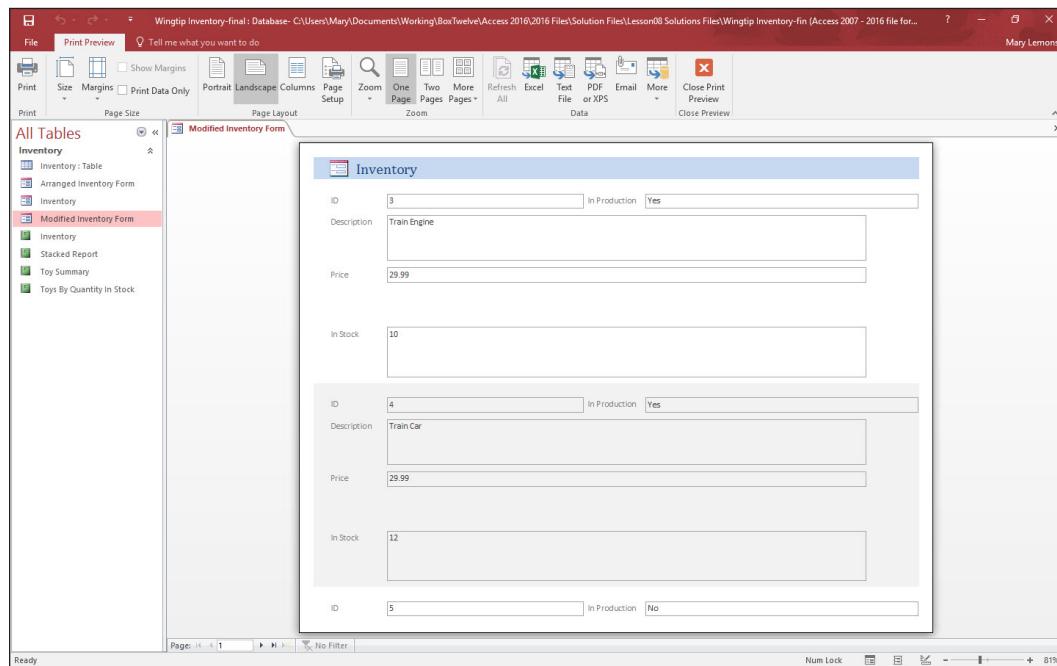
| Troubleshooting | If the borders are not within the right margin, change to Design view and resize the column to the right of the In Production field so it is at the 10½-inch mark. Save the form and return to Print Layout view. |

6. In the Close Preview group, click the **Close Print Preview** button to return to the Access database screen.

7. Double-click the **Toys By Quantity In Stock** report to open it.

8. On the Home tab, in the Views group, click the lower half of the **View** button and then select **Print Preview** from the menu. The report is displayed in Print Preview. The Price field header and data in the last column exceed the width of the right margin.

9. On the Print Preview tab, in the Page Size group, click the **Margins** button and then select **Narrow** from the menu that appears. The Price field header and data are now completely visible.

10. On the Print Preview tab, click the **Close Print Preview** button to return to Report view.

11. **CLOSE** the reports.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Matching

Match the term in Column 1 to its description in Column 2.

Column 1	Column 2
1. Bound control	**a.** A control that displays the result of a calculation or expression
2. Calculated control	**b.** Help you create controls such as command buttons, list boxes, combo boxes, and option groups
3. Control Wizards	**c.** Controls that are arranged vertically with a label on the left and the control on the right
4. Conditional formatting	**d.** A control that uses a field in a table or query as the data source
5. Stacked layout	**e.** Used to change the appearance of a control or the value in a control when certain conditions are met

True/False

Circle T if the statement is true or F if the statement is false.

T F   1. The easiest way to create a bound control is to double-click or drag a field from the Property Sheet to the report.

T F   2. Display formatting can be applied to controls and labels in a form or report.

T F   3. You can change an entire control layout of a report or form from one type to the other.

T F   4. The Remove Layout command in the Table group removes a control from a form or report.

T F   5. You can use Print Preview to set the margins for a form or report.

Projects

Project 8-1: Refining a Report, and Creating and Refining a Form

In this project, you have learned a great deal about reports and forms while working as an administrative assistant at the Alpine Ski House and you want to refine the basic report you created previously so you can display it proudly at the front desk. In addition, you want to create a form for reservation data and format it to your needs.
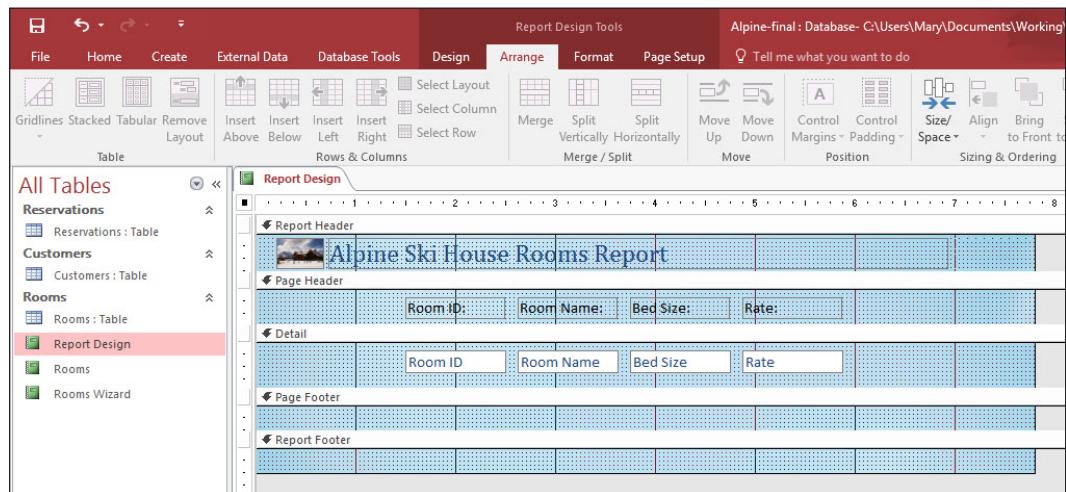
GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *Alpine* database and then **SAVE** it as *Alpine-final*.
2. Double-click the **Report Design** report to open it and then change to Design view.
3. Select all four controls in the report.
4. On the Arrange tab, in the Table group, click the **Tabular** button.
5. On the Arrange tab, in the Position group, click the **Control Margins** button and then select **Narrow** from the menu.
6. On the Arrange tab, in the Position group, click the **Control Padding** button and then select **Medium** from the menu.
7. On the Design tab, in the Header/Footer group, click the **Title** button. A title is inserted in the report header.
8. Type **Alpine Ski House Rooms Report** as the title and then press **Enter**.

9. On the Design tab, in the Header/Footer group, click the **Logo** button. Navigate to the data files for this lesson and select ***Ski Lodge.jpg***. Click **OK**.

10. On the Format tab, in the Background group, click the **Background Image** button. Navigate to the data files for this lesson and select ***Winter Theme Background.jpg***. Click **OK**.

11. Press and hold the **Shift** key and then select all four controls (not control labels).

12. On the Format tab in the Font group, click the **Font Color** menu button. Select the dark blue color called **Dark Blue, Text 2** in the first row and fourth column of the Theme Colors section.

13. Make sure all the controls are still selected. On the Arrange tab, in the Table group, click **Remove Layout**.

14. With the controls still selected, click and drag them up together and position them just below the Detail section bar. Alternatively, you can use the up arrow on your keyboard to move them up.

15. Scroll down and position the mouse pointer over the top of the Page Footer section bar. Drag the section bar up to position just below the controls. Your screen should look similar to Figure 8-40.

Figure 8-40

Report design
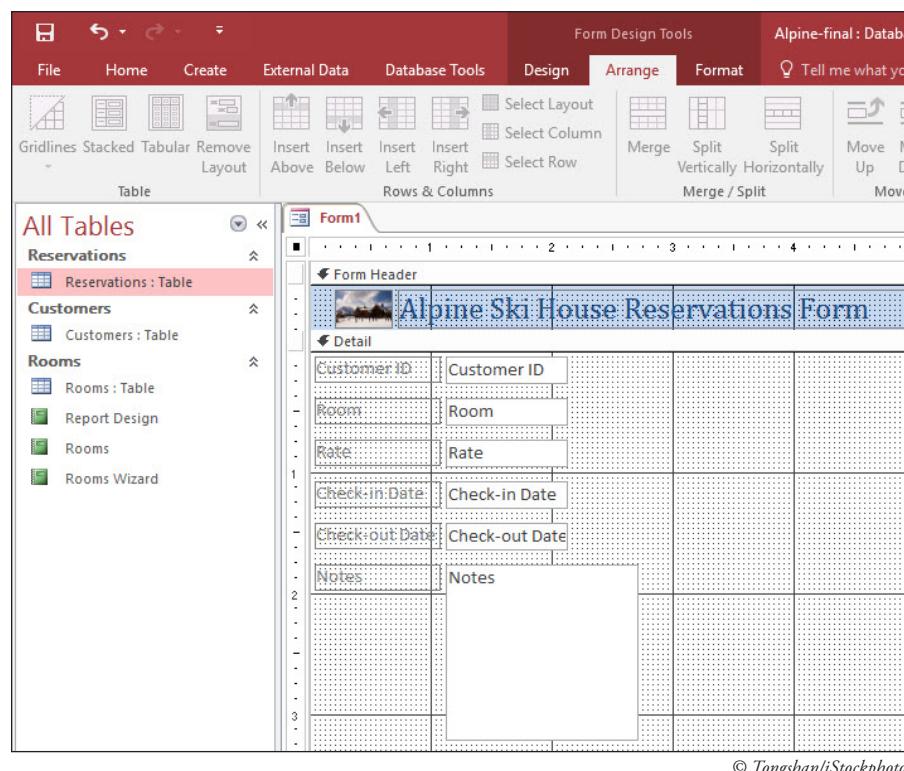
© Tongshan/iStockphoto

16. **SAVE** the report and then change to Print Preview.

17. Click the **Landscape** button in the Page Layout group on the Print Preview tab.

18. Click the **Reservations: Table** in the Navigation Pane to select it.

19. **CREATE** a new form using Design view.

20. Insert a title control. Change the title to **Alpine Ski House Reservations Form**.

21. Insert a logo control by navigating to the data files for this lesson and selecting ***Ski Lodge.jpg***.

22. Add the following bound controls to the design grid: **Customer ID**, **Room**, **Rate**, **Check-In Date**, **Check-Out Date**, and **Notes**.

23. Select all the controls and then apply the **Stacked** control layout.

24. Position the controls in the upper-left corner of the Detail section, remove the stacked layout and resize the Notes control, as shown in Figure 8-41.
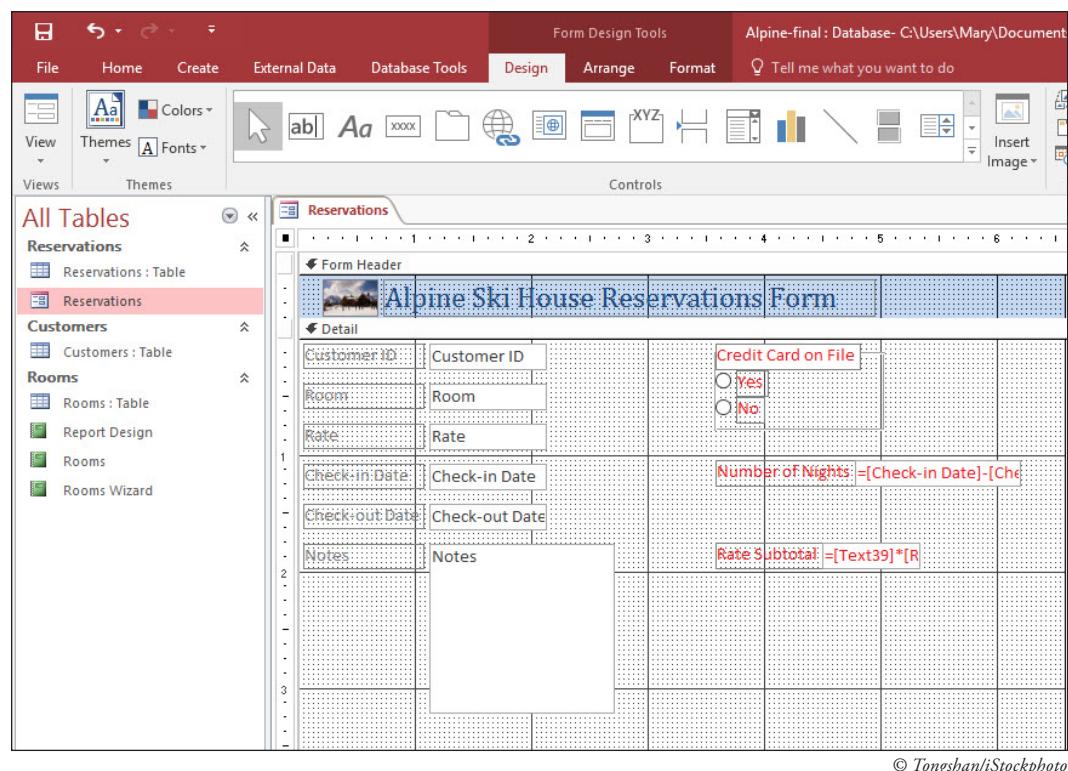
© *Tongshan/iStockphoto*

25. SAVE the form as *Reservations Form*.

26. Add an Option group control on the right side of the form. Use the Control Wizard to create the option box for the Credit Card on File field.

27. Using the Option Group Wizard, add two Labels: one for Yes and the other for No. Set the value for Yes to **-1** and the value for No to **0**. Use option buttons, and label the control **Credit Card on File**.

28. Add an unbound text box control below the Credit Card on File field.

29. Click the **Property Sheet** button on the Design tab and then click the **Build** button in the Control Source property.

30. Create an expression to subtract the Check-in Date from the Check-out Date.

31. Type **Number of Nights** as the label. (Note the default label number, such as Text##.)

32. Add an unbound text box control beside the Notes control.

33. Double-click the **Property Sheet** button on the Design tab and then click the **Build** button in the Control Source property.

34. Create an expression to multiply the Number of Nights (or Text##) by the Rate.

35. Type **Rate Subtotal** as the label.

36. Format the Rate Subtotal field control for Currency.

37. Align the new fields to the left, space to fit, and then change the controls and labels to a red font. Your screen should look similar to Figure 8-42.

38. SAVE the form as *Reservations* and then change to Form view to view your changes.

39. CLOSE the database.

PAUSE. LEAVE Access open for the next project.

Figure 8-42

Revised Reservations form

© *Tongshan/iStockphoto*

Project 8-2: Formatting a Report

Because you have increased your Access skills while working as an assistant coach for a youth soccer team, you decide to improve the soccer roster you created at the beginning of the season. There have been a few changes anyway, so in this project, you will format an updated version.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *SoccerData* from the data files for this lesson and then **SAVE** it as *SoccerData-final*.
2. Double-click the **Roster** report in the Navigation Pane to open it and then change to Design view.
3. Press and hold the **Shift** key and then click all the **labels** in the Page Header section to select them.
4. On the Format tab, in the Font group, click the **Bold** button.
5. Select the title (Roster) and then type **Soccer Roster**.
6. On the Format tab, in the Font group, click the drop-down arrow to the right of the **Font** box and select **Arial Black**.
7. On the Format tab, in the Font group, click the **Font Size** menu and then select or type **22**.
8. On the Arrange tab, on the Size/Space menu in the Sizing & Ordering group, click the **To Fit** button.
9. Press and hold the **Shift** key and then click all of the controls in the Detail section. On the Arrange tab in the Sizing & Ordering group, select **To Grid** from the Align menu.
10. Delete the report image.
11. On the Design tab, in the Header/Footer group, click the **Logo** button.
12. Navigate to the data files for this lesson and insert the *Soccer.jpg* file. Click the newly created **logo** control and drag the sizing border handles to increase the logo size until the soccer ball image can be seen clearly in the header.
13. **SAVE** the report and view it in Report view.

CLOSE the database and then **EXIT** Access.

9 Advanced Tables

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Creating a Custom Table	Create a table. Configure fields to auto-increment.	2.1.1 2.4.6
Summarizing Table Data	Add total rows.	2.2.2

CREATING A CUSTOM TABLE

When a table template doesn't suit your needs, you can create a custom table in Design view. In Design view, you can insert fields, set data types, and perform other advanced table design tasks.

Creating a Custom Table

Creating a table from scratch in Design view gives you maximum flexibility. You can do everything you need to do to create the table in Design view, including adding fields, setting data types, defining field properties, and defining a primary key. As you create a table, you can also easily insert and delete rows in your table design. In this exercise, you create a new blank table and then add fields for the new table in Design view.

Creating a new field for a table in Design view includes typing the name in the Field Name column; choosing a data type from the menu in the Data Type column; and typing a description, if you want, in the Description column. Additionally, you can modify field properties in the Field Properties section of the design grid.

After you have completed your table design, you'll need to save it. If you haven't already defined a primary key, Access will prompt you to do so when you save the table.
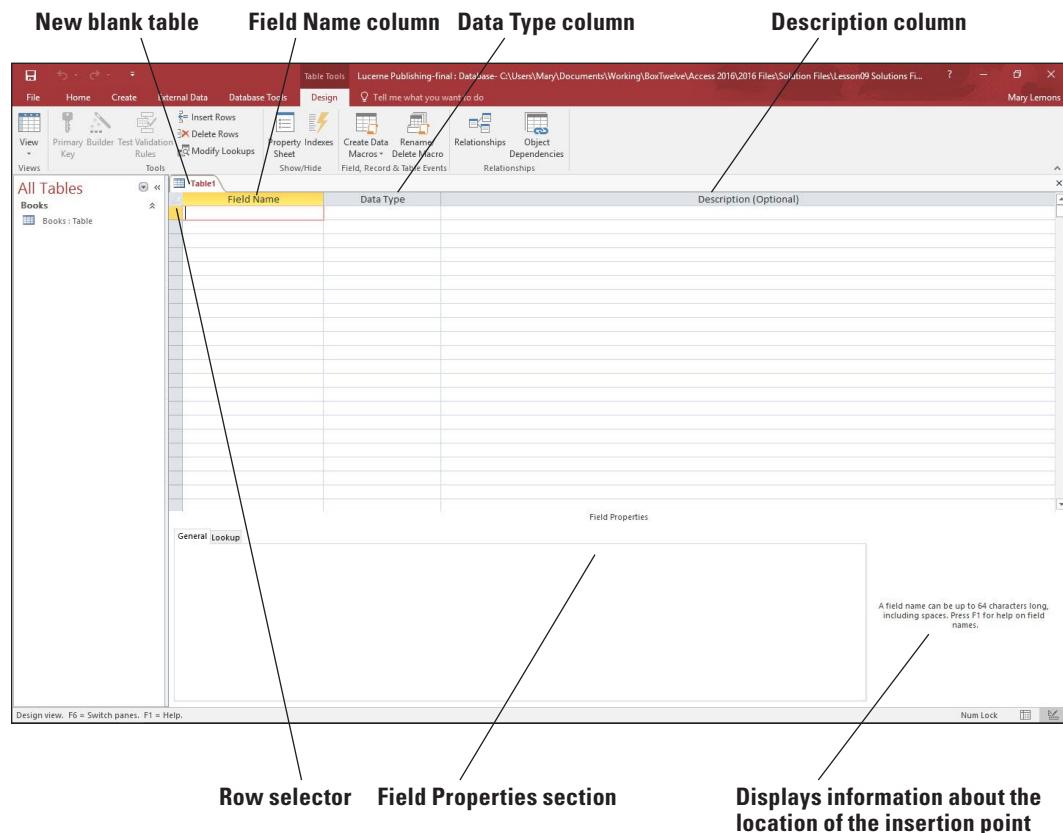
Create a Custom Table in Design View

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and start Access.

1. **OPEN** *Lucerne Publishing* from the data files for this lesson and then **SAVE** the database as *Lucerne Publishing-final*.
2. On the Create tab, in the Tables group, click the **Table Design** button. A new blank table is created in Design view, as shown in Figure 9-1.

New blank table   **Field Name column**   **Data Type column**   **Description column**

Row selector   **Field Properties section**   **Displays information about the location of the insertion point**
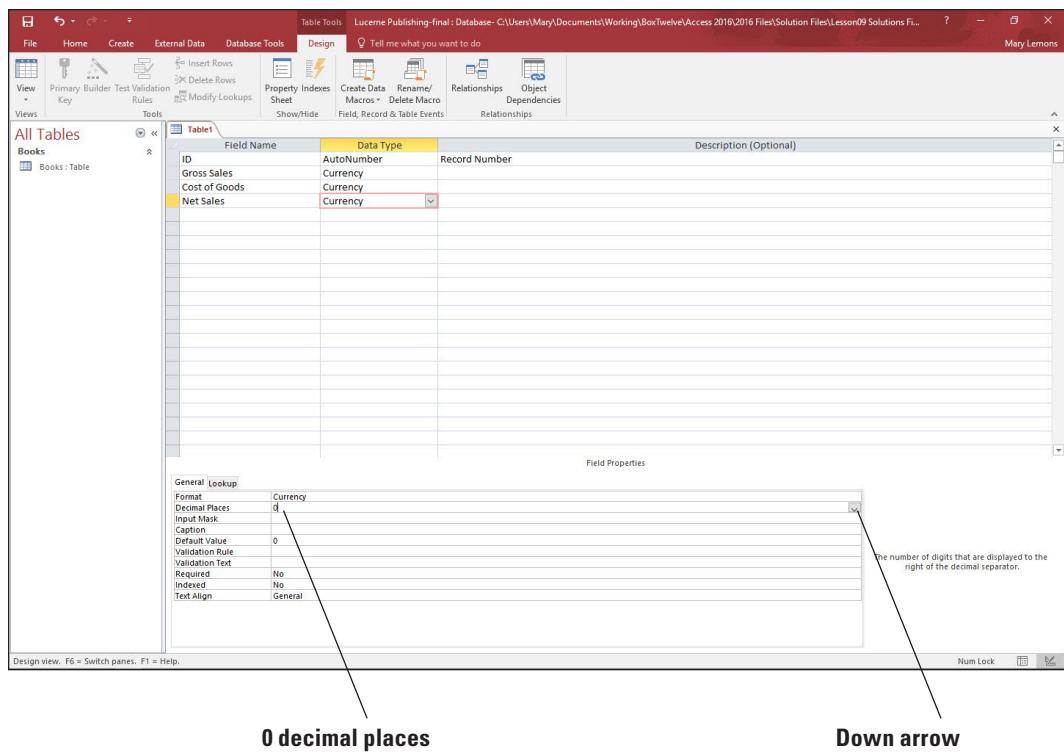
3. Type **ID** in the Field Name column.

4. Press the **Tab** key to move to the Data Type column.

5. Click the **down arrow** in the Data Type column and then select **AutoNumber** from the menu. The AutoNumber data type will automatically number your records starting at 1.

6. Press the **Tab** key to move to the Description field.

7. Type **Record Number** and then press **Tab** again to move to the next blank field row.

8. Type **Gross Sales** and then press the **Tab** key.

9. Click the **down arrow** on the Data Type column and then select **Currency** from the menu.

10. Click in the **Decimal Places** row in the Field Properties section. Click the **down arrow** and then select **0** from the menu.

11. Enter the remaining fields, as shown in Figure 9-2, formatting each with the **Currency** data type and **0** decimal places.

0 decimal places   **Down arrow**

12. Click the row selector to the left of the ID field to select the row.
13. On the Design tab, in the Tools group, click the **Primary Key** button.
14. Click the **Save** button on the Quick Access Toolbar. The *Save As* dialog box appears.
15. Type **Sales** and then click **OK**.

PAUSE. LEAVE the database and Sales table open to use in the next exercise.

Inserting and Deleting Rows

When creating a custom table in Design view, you can insert and delete rows as needed using the Insert Rows and Delete Rows commands in the Tools group on the Table Tools Design contextual tab. When you click the Insert Rows button, a new row is inserted above the selected row. The field order from top to bottom in Design view will be displayed from left to right in Datasheet view. In this exercise, you insert and delete rows using the new table you created in the previous exercise.

STEP BY STEP   **Insert and Delete Rows in Design View**

GET READY. USE the *Lucerne Publishing-final* database and the *Sales* table that are open from the previous exercise.

1. Click the row selector to the left of the Gross Sales field to select the entire row.
2. In the Tools group on the Table Tools Design contextual tab, click the **Delete Rows** button. The field row is deleted from the table.
3. Click the **Undo** button on the Quick Access Toolbar. The field row reappears.
4. In the Tools group on the Table Tools Design contextual tab, click the **Insert Rows** button. A blank row is inserted above the Gross Sales field.
5. In the Field Name column, type **Area** and then press the **Tab** key.
6. Press the **Tab** key again to accept the **Short Text** data type.
7. Leave the Description field blank and then press **Tab** again to move to the next field.
8. Click the **Save** button on the Quick Access Toolbar.

9. Change to Datasheet view and enter the records shown in Figure 9-3 in the table. The ID field will be automatically generated, so just press **Tab** to get past it.

10. **SAVE** and **CLOSE** the table.

PAUSE. LEAVE the database open to use in the next exercise.

USING THE TABLE ANALYZER

The **Table Analyzer** is a wizard that performs the normalization process for you by examining a table design and suggesting a way to divide the table for maximum efficiency. The Table Analyzer helps you design efficient tables. The Table Analyzer will suggest primary keys for the new tables or will allow you to determine the primary keys. You can also have the wizard insert a unique identifier field. If it determines that a table has duplicate information, it can split a table into two more efficient tables for you, or you can choose to do it yourself.

Using the Table Analyzer

The Table Analyzer is a wizard that examines a table and asks you a series of questions about the table to determine whether it should be divided into two or more tables. In this exercise, you use the Table Analyzer Wizard to analyze a table in the database.

Well-designed databases do not store the same data in more than one place. Redundant data storage takes more disk space and increases the likelihood for data entry errors. In Lesson 1, you were introduced to the concept of normalization, which is the process of applying rules to a database design to ensure that you have divided your data into the appropriate tables.

In the Books table, contact information for authors has to be entered for each book the author wrote. The Table Analyzer Wizard will determine that a more efficient database would split the table into two tables: one with author contact information and one with book sales data.

In addition to analyzing the table, the Table Analyzer Wizard will also analyze the redundant data in a table and suggest corrections for records that should match. It will also give you the choice of whether to create a query, which is similar to the original table. Creating the query allows forms and reports that were created with the original table to continue to function properly. The original table may be renamed, but it will not be removed or altered.

Troubleshooting If you run the Table Analyzer before entering records in the table, you may get a message stating that you need to enter at least two records in the table to get a meaningful analysis.
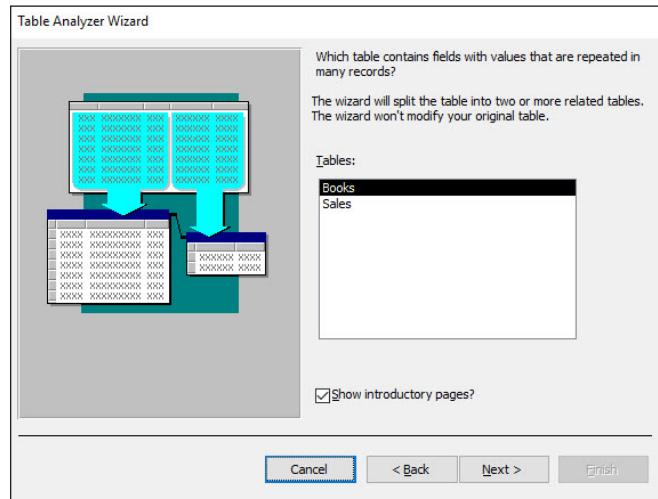
Use the Table Analyzer

GET READY. USE the *Lucerne Publishing-final* database that is open from the previous exercise.

1. Double-click the **Books** table in the Navigation Pane to open it.
2. Scroll through the table to become familiar with the fields in the table.
3. On the Database Tools tab, in the Analyze group, click the **Analyze Table** button. The *Table Analyzer Wizard* dialog box, screen 1, appears. This first dialog box provides more information about the types of problems the wizard will find. Click the two **Show me an example** buttons to read more about how duplicating information can lead to problems.
4. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 2, appears. This dialog box provides more information about what the wizard will do. Click the two **Show me an example** buttons to read more about how splitting the table is helpful.
5. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 3, appears, as shown in Figure 9-4.

Figure 9-4
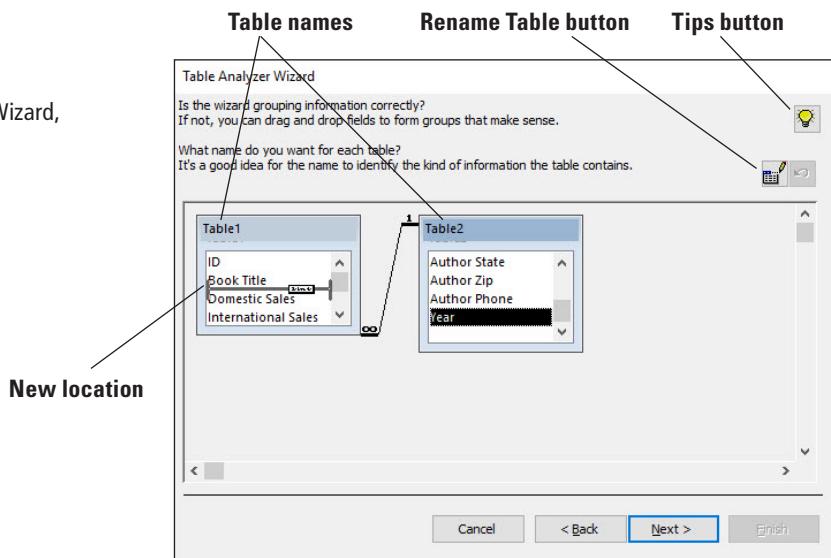
Table Analyzer Wizard, screen 3

6. The **Books** table should be selected in the list; if it is not, select it. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 4, appears.
7. The **Yes, let the wizard decide** button should be selected; if it is not, select it. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 5, appears.
8. Scroll through each table. Notice that the Table2 box contains the Year, which should be in Table1 with the sales information. Click the **Year** field to select it.
9. Drag the selected field to the Table1 box, positioning the horizontal black line below the Book Title field, as shown in Figure 9-5, and releasing the mouse button to place the Year field in its new location.

Table names   **Rename Table button**   **Tips button**

Figure 9-5

Table Analyzer Wizard,
screen 5

New location

10. Click the **Table1** name to select it. Click the **Rename Table** button. If you receive a message stating that an expression you entered is the wrong data type for one of the arguments, click **OK**. The *Table Analyzer Wizard* dialog box appears.
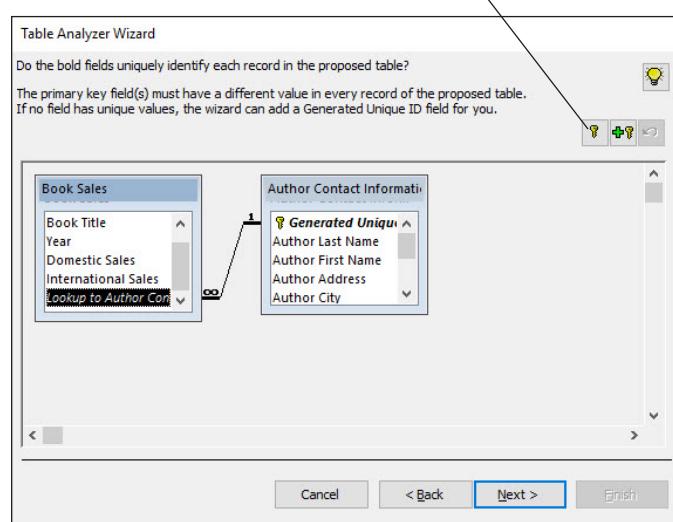
Take Note   You can also double click on the table name to rename it.

11. Type **Book Sales** and then click **OK**.

12. Click the **Table2** name and then click the **Rename Table** button. If you receive a message stating that an expression you entered is the wrong data type for one of the arguments, click **OK**. The *Table Analyzer Wizard* dialog box appears.

13. Type **Author Contact Information** and then click **OK**.

14. Scroll down to the bottom of the Book Sales table. Notice that the Lookup to Author Contact Information field was added.

15. Scroll through the Author Contact Information table. Notice that the Generated Unique ID field was added as a primary key. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 6, appears, as shown in Figure 9-6.

Set Unique Identifier button

Figure 9-6

Table Analyzer Wizard,
screen 6
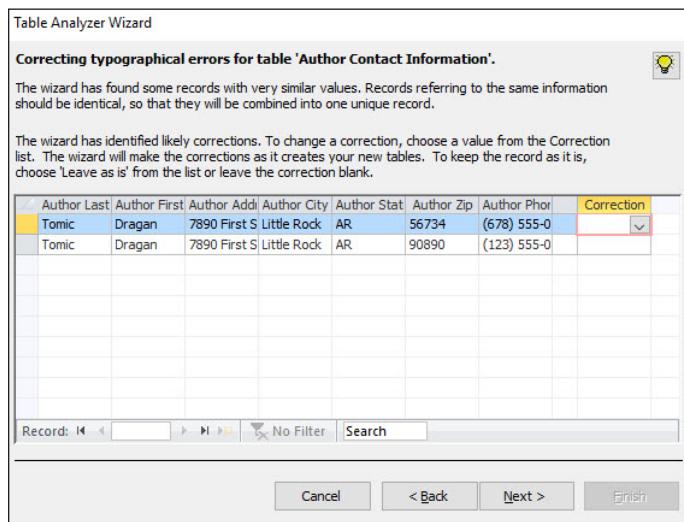
16. Click the **ID** field in the Book Sales table to select it. Click the **Set Unique Identifier** button. A primary key is inserted.

17. Click **Next**. The *Table Analyzer Wizard* dialog box, screen 7, appears, as shown in Figure 9-7.

Figure 9-7
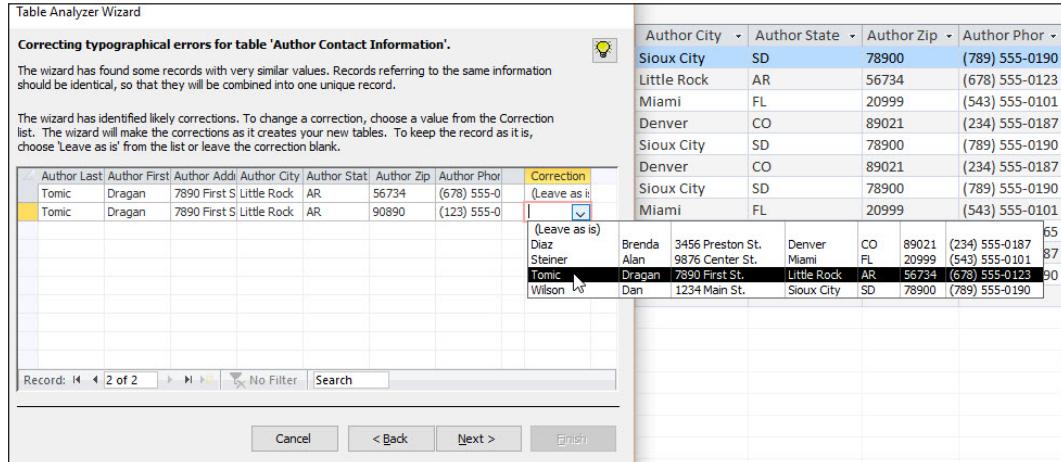
Table Analyzer Wizard, screen 7

18. Notice that the Table Analyzer Wizard has detected two similar records, one with an incorrect zip code and phone number. Click the **down arrow** in the first row of the Correction field and then select **Leave as is**. This is the correct record.

19. Click the **down arrow** on the second row of the Correction field and then select the **Tomic** correction from the menu, as shown in Figure 9-8, to replace the incorrect record. Click to select it.

Figure 9-8

Corrections to the new tables

20. Click **Next**. The final *Table Analyzer Wizard* dialog box appears.

21. The **Yes, create the query** option button should be selected. Click the **Finish** button.

22. A message saying that the wizard couldn't rename your table because it's open and the new query will be saved as Books_NEW appears. Click **OK**.

23. If Access Help appears on your screen, close it. Your screen should look similar to Figure 9-9.

24. **SAVE** and **CLOSE** all tables and queries.

PAUSE. **LEAVE** the database open to use in the next exercise.

SUMMARIZING TABLE DATA

It is often necessary to count or summarize data in a table, column by column. Tables that contain columns of sales figures or other numbers need to be summed, averaged, or counted to be more useful. The Total row makes these tasks easy.

Summarizing Table Data

Much like the bottom row of a spreadsheet, the Total row is a feature in Access 2016 that makes it easy to sum, average, or count the values in a datasheet column. You can also find maximum or minimum values and use statistical functions such as standard deviation and variance. In this exercise, you summarize table data by inserting a Total row.

Aggregate functions are functions that calculate values across a range of data, such as in a column. You can use these functions in queries or in Visual Basic for Applications (VBA) code. Although you can still use those methods, the Total row saves you time by allowing you to choose one of these functions from a menu, applying it instantly. The **Total row** is a row inserted at the bottom of a table that provides a menu of functions for each column in the row.

Take Note You can also add a Total row to queries open in Datasheet view and to a split form open in Form view. You cannot add a Total row to a report, but you can use aggregate functions in reports using other methods.

Table 9-1 describes the aggregate functions available in the Total row and the data types that they work with.

Table 9-1

Aggregate functions in the Total row

Aggregate Function	Description	Data Types
Average	Calculates the average value for a column	Number, Decimal, Currency, Date/Time
Count	Counts the number of items in a column	All (except multivalued list)
Maximum	Returns the item with the highest value	Number, Decimal, Currency, Date/Time
Minimum	Returns the item with the lowest value	Number, Decimal, Currency, Date/Time
Standard Deviation	Measures how widely values are dispersed from an average value	Number, Decimal, Currency
Sum	Adds items in a column	Number, Decimal, Currency
Variance	Measures the statistical variance of all values in the column	Number, Decimal, Currency

As shown in the table, some functions only work with certain data types. For example, you cannot sum a column of text, so that function would not be available for a column with the Short Text or Long Text data type.

STEP BY STEP   **Insert a Total Row**

GET READY. USE the *Lucerne Publishing-final* database that is open from the previous exercise.

1. Double-click the **Book Sales** table in the Navigation Pane to open it.
2. On the Home tab, in the Records group, click the **Totals** button. The Total row appears below the row with the asterisk (*) in the record selector box.
3. Click the **down arrow** in the Book Title column of the Total row. Select **Count** from the menu. The number of records in the column is counted, and the number 11 is displayed.
4. Click the **down arrow** in the Domestic Sales column of the Total row and then select **Sum** from the menu, as shown in Figure 9-10. Click **Sum** to apply it.
5. Click the **down arrow** in the International Sales column of the Total row and then select **Sum** from the menu.
6. **SAVE** the table.
7. On the Home tab, in the Records group, click the **Totals** button. The Total row is hidden.
8. On the Home tab, in the Records group, click the **Totals** button again. The Total row reappears.

Figure 9-10

Total row

Total row   **Available functions for column**

9. **SAVE** and **CLOSE** the table.

 STOP. CLOSE the database and then **EXIT** Access.

Take Note   If you want to sort or filter data, Access will exclude the Total row by default.

Knowledge Assessment

Matching

Match the term in Column 1 to its description in Column 2.

Column 1	Column 2
1. Aggregate function	**a.** The process of applying rules to a database design to ensure that you have divided your information into the appropriate tables
2. Table Analyzer	**b.** An optional part of Design view where you can enter a field description
3. Normalization	**c.** An aggregate function that counts the records in a column
4. Count	**d.** A wizard that performs the normalization process by examining a table design and suggesting a way to divide the table for maximum efficiency
5. Description	**e.** Function that calculates values across a range of data

True/False

Circle T if the statement is true or F if the statement is false.

T   F   1. If you haven't already defined a primary key, Access will prompt you to do so when you save the table in Design view.

T   F   2. The row selector is located at the bottom of the table.

T   F   3. The Table Analyzer does not remove the original table.

T   F   4. The Table Analyzer gives you the choice of whether to create a query.

T   F   5. You cannot delete a Total row, but you can hide it.

Projects

Project 9-1: Creating and Analyzing Tables

In this project, sales data for Fourth Coffee has just come in for the first quarter. The manager asks you to create a table that displays the sales for each of the five stores in your division. Note that each store is known by a three-digit number, such as 656. You also decide to use the Table Analyzer to check a table you created previously to make sure it is efficient.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *FourthCoffeeInventory* from the data files for this lesson, and then **SAVE** the database as *FourthCoffeeInventory-final*.
2. **CREATE** a new table in Design view using the Table Design button on the Create tab.
3. Type **ID** as the first field name and then press the **Tab** key. Set the data type to **AutoNumber**.
4. Type **Sales Month** as the second field name and then press the **Tab** key. Keep the default data type.
5. Enter the remaining field names and data types, as shown in Figure 9-11. Set the primary key as shown.

6. **SAVE** the table as **Monthly Sales by Store**.

7. Change to Datasheet view.

8. Enter the data as shown in the following table.

ID	Sales Month	Store	Sales
1	January	651	$88,432.00
2	February	651	$97,798.00
3	March	651	$67,890.00
4	April	651	$59,098.00
5	January	656	$105,890.00
6	February	656	$96,789.00
7	March	656	$96,789.00
8	April	656	$87,890.00
9	January	660	$106,098.00
10	February	660	$77,998.00
11	March	660	$94,927.00
12	April	660	$84,123.00
13	January	662	$90,890.00
14	February	662	$67,223.00
15	March	662	$87,010.00
16	April	662	$74,280.00

9. Insert a **Total** row.

10. Count the Sales Month field and sum the Sales field.

11. **SAVE** and **CLOSE** the table.

12. Double-click the **Customers** table in the Navigation Pane to analyze it.

13. On the Database Tools tab, in the Analyze group, click the **Analyze Table** button. The *Table Analyzer Wizard* dialog box appears.

14. Click **Next** to display the next *Table Analyzer Wizard* dialog box.

15. Click **Next** to display the next *Table Analyzer Wizard* dialog box.

16. The Customers table should be selected. Click **Next**.

17. The **Yes, let the Wizard decide** option button should be selected. Click **Next**.

18. A message is displayed that says the wizard does not recommend dividing the table. Click **OK**.

19. Click **Cancel** to close the Table Analyzer Wizard.

20. **CLOSE** the table and the database.

PAUSE. LEAVE Access open for use in the next project.

Project 9-2: Creating and Designing a Table

The owner of Wingtip Toys has given you yearly sales data for each of the company's sales channels. In this project, you will create and design a table in which to store and total the data.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *WingtipToysInventory* from the data files for this lesson, and then **SAVE** the database as *WingtipToysInventory-final*.
2. **CREATE** a new table in Design view using the Table Design button on the Create tab.
3. **CREATE** the table as shown in Figure 9-12.

Figure 9-12

Yearly Sales table in Design view

4. **SAVE** the table as **Yearly Sales** and then change to Datasheet view to review the table you just created.
5. Change back to Design view.
6. Insert a blank row above the Catalog Sales field.
7. Type **Yr** as a new field with the Short Text data type.
8. Select the **Yr** field and then click the **Primary Key** button to designate the Year field as the new primary key.
9. Delete the **ID** field.
10. **SAVE** the table and then change to Datasheet view.
11. Enter data as shown in the following table.

Yr	Catalog Sales	Internet Sales	Store Sales	Other Sales
2014	$87,987.00	$109,897.00	$208,767.00	$23,987.00
2015	$57,984.00	$98,789.00	$197,098.00	$10,761.00
2016	$61,089.00	$78,907.00	$168,234.00	$9,125.00

12. **SAVE** the table.
13. Insert a **Total** row.
14. Sum the Catalog Sales, Internet Sales, Store Sales, and Other Sales columns.
15. **SAVE** and **CLOSE** the table.

CLOSE the database and then **EXIT** Access.

Skills	Exam Objective	Objective Number
Creating Advanced Forms	Create a form. Add sub-forms.	4.1.1 4.2.7
Using Application Parts to Create Blank Forms	Create a form from a template with application parts.	4.1.2
Creating and Modifying a Navigation Form	Create and modify a navigation form.	1.3.2

SOFTWARE ORIENTATION

The Templates Group and the Forms Group

The Application Parts button in the Templates group and the Navigation and More Forms buttons in the Forms group, all located on the Create tab, contain menus with commands for creating all types of forms—some of which you have already learned about in Lesson 5. Figures 10-1, 10-2, and 10-3 show the menus and commands you use to create advanced forms.
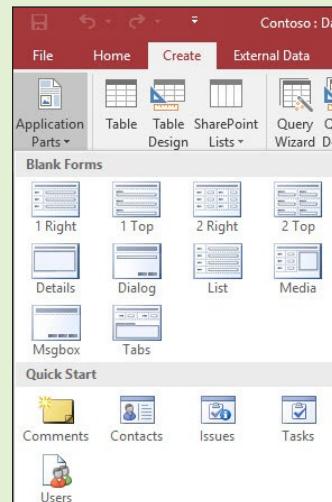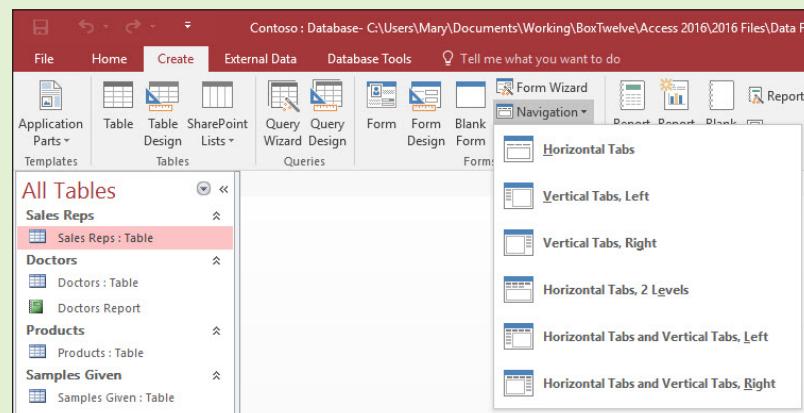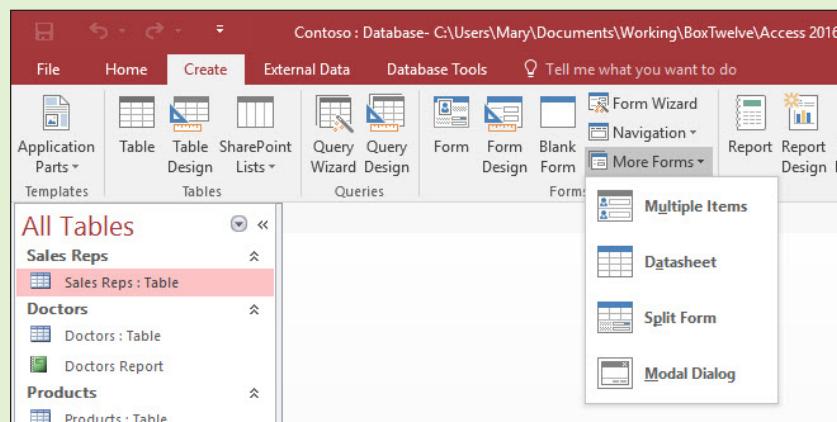
CREATING ADVANCED FORMS

Access provides tools to help you create forms quickly, including advanced forms with features that can improve the usability of your database. The **Multiple Items tool** creates a customizable form that displays multiple records. A **split form** gives you two views of your data at the same time—in both Form view and Datasheet view. A **subform** is a form that is inserted into another form.

Creating a Multi-Item Form

When you create a simple form using the Form tool, Access creates a form that displays a single record at a time. To create a form that displays multiple records but that is more customizable than a datasheet, you can use the Multiple Items tool. In this exercise, you create a multi-item form using the Multiple Items tool.

When you use the Multiple Items tool, the form that Access creates resembles a datasheet. The data is arranged in rows and columns, and you see more than one record at a time. However, a Multiple Items form gives you more customization options than a datasheet, such as the ability to add graphical elements, buttons, and other controls.

STEP BY STEP | **Create a Multi-Item Form**

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and start Access.

1. **OPEN** the *Contoso* database from the data files for this lesson and then **SAVE** it as *Contoso-final*.
2. In the Navigation Pane, double-click the **Doctors** table to open it.
3. On the Create tab, in the Forms group, click the **More Forms** button. On the menu that appears, click the **Multiple Items** button. Access creates the form and displays it in Layout view, as shown in Figure 10-4.

4. Scroll down to view the multiple records on the form.
5. Click the **File** tab and then click **Save**.
6. In the *Save As* dialog box, type **Doctors Multiple** and then click **OK**.
7. **CLOSE** the Doctors Multiple form and the Doctors table.

PAUSE. LEAVE the database open to use in the next exercise.

Creating a Split Form

Creating a split form allows you to see two views of your data at the same time—in Form view and in Datasheet view. The two views are connected to the same data source and are completely synchronized with each other. In this exercise, you create a split form.

Working with split forms gives you the benefits of both types of forms in a single form. Selecting a field in the Datasheet view of the form selects the same field in the Form view part of the form. When you add, edit, or delete data in the Datasheet view, the change is reflected in the Form view.

Table 10-1 lists some of the properties related to split forms that you can set on the Property Sheet to fine-tune your form. To change form properties, change to Design view, press F4 to display the Property Sheet, select Form from the drop-down list at the top of the Property Sheet, and then click the Format tab.

Property	View(s) in which you can set the property	Description
Split Form Orientation	Design view	Allows you to define whether the datasheet appears above, below, to the left, or to the right of the form.
Split Form Datasheet	Design view or Layout view	If set to Allow Edits (and the form's record source is updateable), Access allows edits to be made on the datasheet. If set to Read Only, Access prevents edits from being made on the datasheet.
Split Form Splitter Bar	Design view	If set to Yes, Access allows you to resize the form and datasheet by moving the splitter bar that separates the two parts. If set to No, the splitter bar is hidden, and the form and datasheet cannot be resized.
Save Splitter Bar Position	Design view	If set to Yes, the form opens with the splitter bar in the same position in which you last left it. If set to No, the form and datasheet cannot be resized, and the splitter bar is hidden.
Split Form Size	Design view or Layout view	Allows you to specify an exact height or width (depending on whether the form is split vertically or horizontally) for the Form view of the split form. For example, type 1'' to set the form to a height or width of 1 inch. Type Auto to set the dimension by other means, such as dragging the splitter bar in Layout view.
Split Form Printing	Design view or Layout view	Allows you to define which portion of the form is printed when you print the form. If set to Form Only, only the form portion is printed. If set to Datasheet Only, only the datasheet portion is printed.
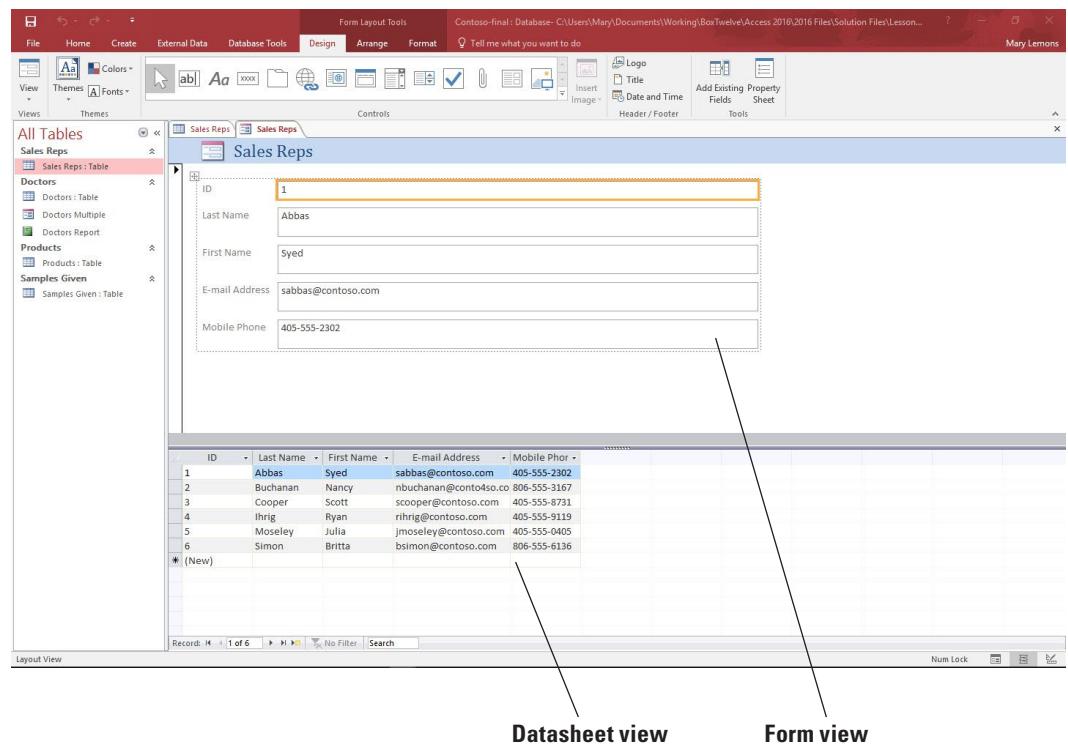
STEP BY STEP   **Create a Split Form**

GET READY. USE the *Contoso-final* database that is open from the previous exercise.

1. In the Navigation Pane, double-click the **Sales Reps** table to open it.
2. On the Create tab, in the Forms group, click the **More Forms** button. On the menu that appears, select **Split Form**. Access creates the form and displays it in Form view and Datasheet view at the same time, as shown in Figure 10-5.

Figure 10-5

Split form
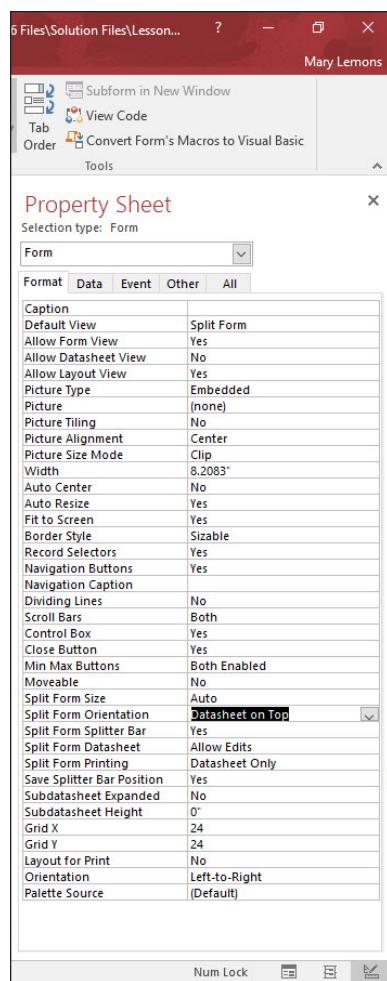
Datasheet view   Form view

3. Click the **Next Record** navigation button to display the next record in Form view.

4. In the Datasheet view on the bottom, place the insertion point in the **Mobile Phone** field for Nancy Buchanan. Notice that the same field is selected in the Form view at the top.

5. Change the number for Nancy Buchanan in the Mobile Phone field to **806-555-4489**.

6. Click anywhere on the Form view above the datasheet and notice that the mobile phone number has been changed there as well.

7. On the Home tab, in the Views group, click the lower half of the **View** button and then select **Design View**.

8. Press **F4** to display the Property Sheet.

9. Click **Form** in the drop-down list at the top of the Property Sheet, if necessary, and then click the **Format tab**.

10. Scroll down to the Split Form Orientation property, click the **down arrow** and then select **Datasheet on Top** (see Figure 10-6).

Figure 10-6

Changing a property
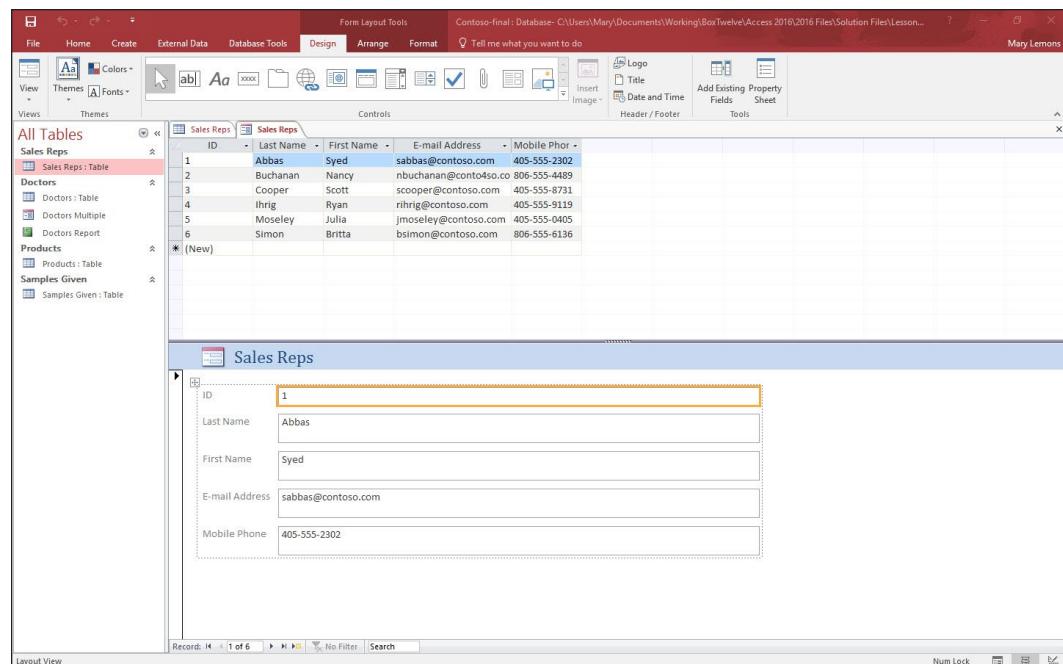
⚠️ **Troubleshooting**   If all text for the properties is not visible, click the left border of the Property Sheet and drag to widen it.

11. Click the **Close** button to close the Property Sheet.
12. On the Home tab, in the Views group, click the lower half of the **View** button and then select **Layout View**. The split form is displayed with the datasheet on top, as shown in Figure 10-7.

Figure 10-7

Split form with datasheet on top

13. Click the **File** tab and then click **Save**.

14. In the *Save As* dialog box, type **Sales Reps Split** and then click **OK**.

15. **CLOSE** the Sales Reps Split form and the Sales Reps table.

PAUSE. **LEAVE** the database open to use in the next exercise.

Creating a Subform

A subform is a convenient tool that allows you to view data from more than one table or query on the same form. A subform is a form that is inserted into another form. The primary form is called the **main form**, and the form within the form is called the subform. A form/subform combination is sometimes referred to as a **hierarchical form**, a master/detail form, or a parent/child form. You can use the Form Wizard to help you create subforms quickly. For best results, all relationships should be established first. This enables Access to automatically create the links between subforms and main forms. In this exercise, you create a subform.

When working with a relational database, you often need to view data from more than one table or query on the same form. For example, you want to see customer data, as well as information about the customer's orders at the same time. Subforms are a convenient tool for doing this.

Subforms are especially effective when you want to show data from tables or queries that have a one-to-many relationship—the main form shows data from the "one" side of the relationship and the subform shows the data from the "many" side of the relationship.
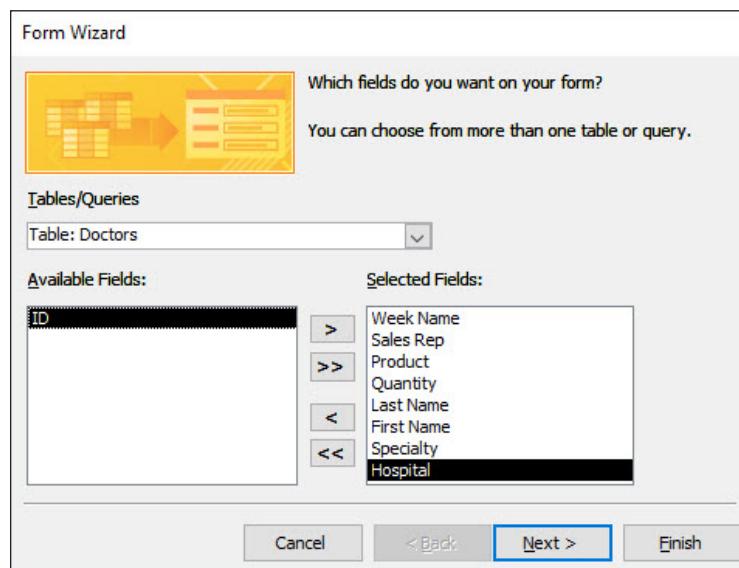
STEP BY STEP	Create a Subform

GET READY. USE the ***Contoso-final*** database that is open from the previous exercise.

1. On the Create tab, in the Forms group, click **Form Wizard**.
2. In the first screen on the Form Wizard, click the **down arrow** in the Tables/Queries box and then click **Table: Samples Given**.
3. In the Available Fields box, double-click the **Week Name**, **Sales Rep**, **Product**, and **Quantity** fields to move them to the Selected Fields box.
4. Click the **down arrow** in the Tables/Queries box and then click **Table: Doctors**.
5. In the Available Fields box, double-click the **Last Name**, **First Name**, **Specialty**, and **Hospital** fields to move them to the Selected Fields box. The screen should look like Figure 10-8.

Figure 10-8

Form Wizard, screen 1
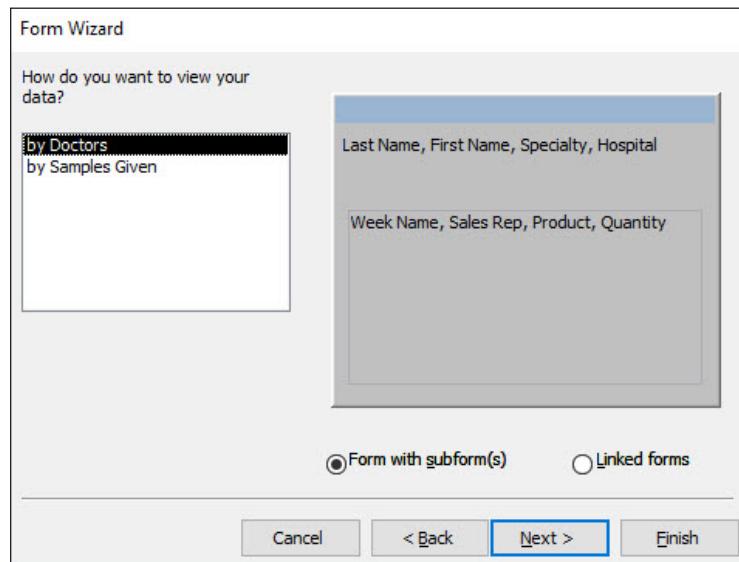
6. Click the **Next** button.
7. In the How do you want to view your data? box, click **by Doctors**. The Form with subform(s) option button should be selected, and the Form Wizard should look like Figure 10-9.

Figure 10-9
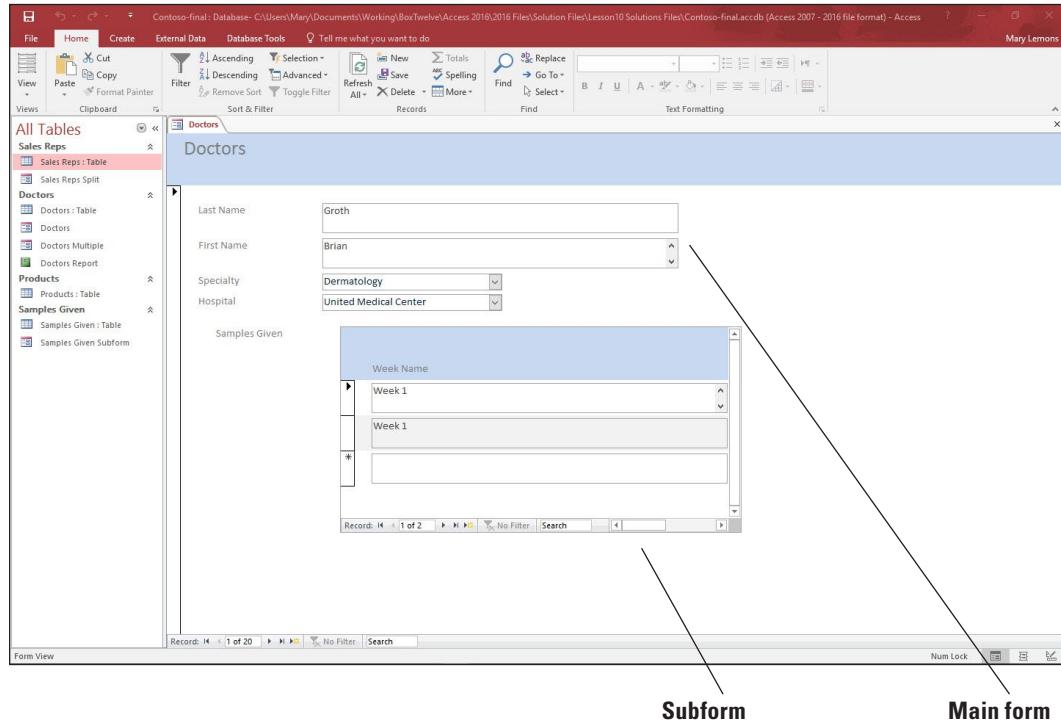
Form Wizard, screen 2

8. Click the **Next** button.

9. Click the **Tabular** option button to select that as the layout for your subform.

10. Click the **Next** button. Access has suggested titles for the forms (Doctors and Samples Given Subform). Keep the default selection to open the form.

11. Click the **Finish** button to create the forms. The Doctors form appears with the Samples Given subform, as shown in Figure 10-10.

Figure 10-10

Doctors form with subform

Subform   Main form

12. In the Navigation Pane, double-click the **Samples Given Subform** to open it.

13. Scroll down and to the right, if necessary, to see the data contained in the records.

14. **CLOSE** the Samples Given Subform and the Doctors form.

PAUSE. LEAVE the database open to use in the next exercise.

USING APPLICATION PARTS TO CREATE BLANK FORMS

As you learned in Lesson 2, the Application Parts gallery consists of two categories, **Blank Forms** and Quick Start. The Blank Forms category contains a collection of 10 form parts that allow you to add predefined forms to a database. In this exercise, you create an Application Parts Blank Form and populate the form with bound controls using the Field List.

Application Parts Blank Forms are created as unbound forms and provide a prearranged control layout. They can also provide unbound command button controls, depending on what type of Blank Form you choose. These forms can also be easily populated with bound controls by using the Field List.

Application Parts Blank Forms differ from adding a form using the Blank Forms tool because you can add forms that automatically include command buttons that provide additional functionality, such as saving a record or closing a form. Using Application Parts Blank Forms, you can also easily add forms that do more than just display data from a record source. You can create unbound forms that display messages to a user or provide dialog boxes that prompt the user for an action. These unbound forms can be referenced through code using Visual Basic for Applications (VBA) to help provide a more functional database.
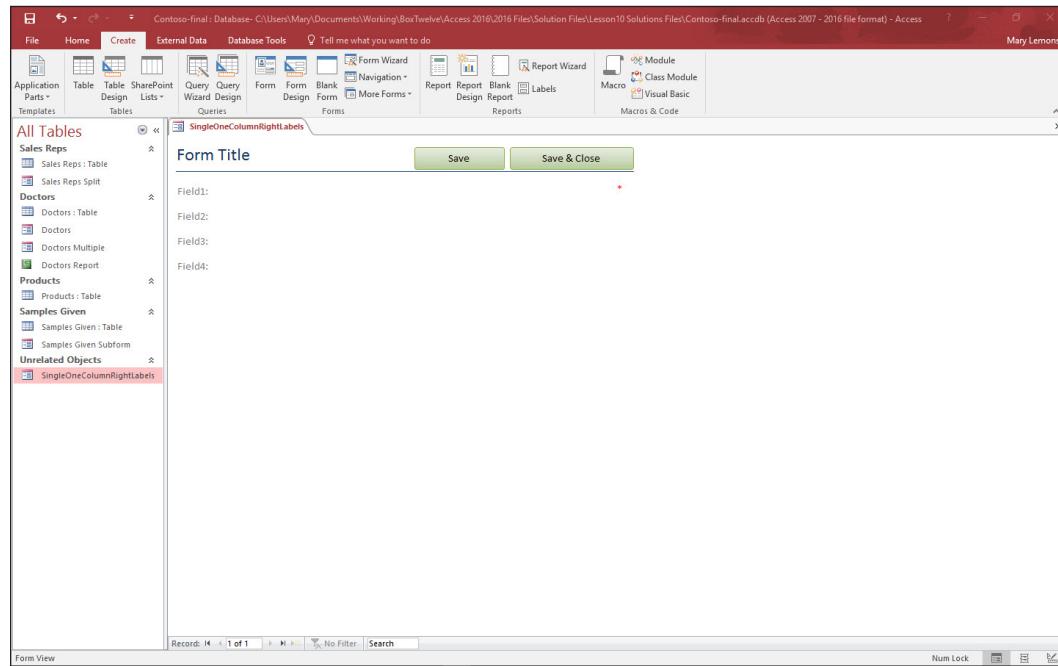
Use Application Parts to Create Blank Forms

GET READY. USE the *Contoso-final* database that is open from the previous exercise.

1. On the Create tab, in the Templates group, click the **Application Parts** button and then select **1 Right**. A new form object named SingleOneColumnRightLabels appears in the Navigation Pane in the Unrelated Objects category.

2. Double-click the **SingleOneColumnRightLabels** form to open it. The form is displayed in Form view, as shown in Figure 10-11.

Figure 10-11
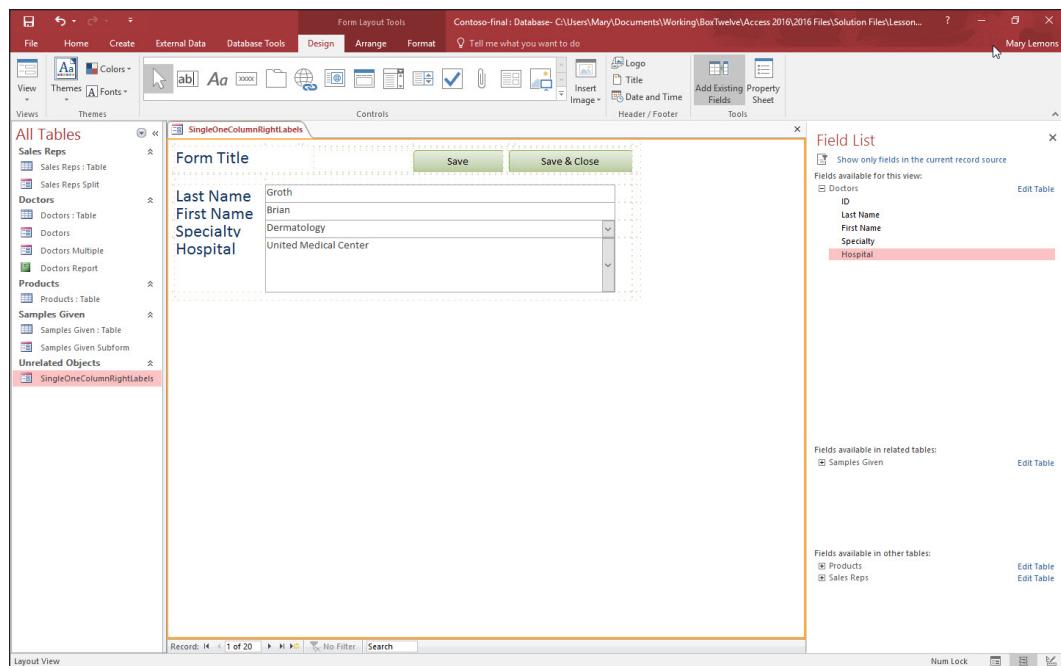
Blank Form in Form view

3. Change to Layout view and then press **Shift** while clicking on the label control placeholders titled **Field1**, **Field2**, **Field3**, and **Field4** to select them all. Press the **Delete** key on the keyboard to delete the label controls. Also delete the label control placeholder that contains the red asterisk, which could be used to denote an important field, like a key field.

4. Click the **Add Existing Fields** button in the Tools group. The Field List pane appears. If necessary, click the **Show all tables** link.

5. In the Field List pane, expand the Doctors table.

6. In the Field List pane, click and drag each **Last Name**, **First Name**, **Specialty**, and **Hospital** field to the form and to the right placeholder of the original locations of the Field1, Field2, Field3, and Field4 label controls that you just deleted.

7. Resize the label and field controls that you just added until your screen resembles Figure 10-12.

Figure 10-12

Form with re-sized label and field control

8. Click the **Form Title** label, delete Form Title and then type **Doctors**.

9. Change to Form view and cycle through the records. Click the **Save & Close** button on the form to close the form.

10. Click **Yes** in the dialog box prompting you to save design changes to the form.

11. Rename the SingleOneColumnRightLabels form to **Doctors Blank Form**.

PAUSE. LEAVE the database open to use in the next exercise.

CREATING AND MODIFYING A NAVIGATION FORM

The ability to create **Navigation forms** was introduced in Access 2010. A Navigation form includes a set of navigation tabs that you can click to display forms and reports. In this exercise, you create and modify a Navigation form.

As you learned in Lesson 2, you can create databases based on templates. When a database is created using a web database template, a Navigation form is used as the main interface within the database since the Navigation Pane cannot be viewed from within a web browser. However, Navigation forms can also be used from within the Access application window to simplify your interaction with database objects. For example, you can easily click a tab on a Navigation form to view a form to add, view, or edit data. Similarly, you can simply click a button on the Navigation form to work with reports.

You create navigation forms by clicking the Navigation button in the Forms group on the Create tab. There are six Navigation form layouts from which to choose. Each layout includes a specific arrangement of tabs that can then be modified in Layout or Design view to access forms and reports. In Layout view, you can click and drag form and report objects from the Navigation Pane to tabs to quickly add functionality to the Navigation form. You can also type a form or report's name as the tab's label and Access will automatically bind the associated form or report to that label. You can also work with Navigation forms using Design view to have the most control over design options, but you lose the ability to quickly add form and report objects by just clicking and dragging them to the tabs or modifying the labels.

Take Note   You can also add fields from multiple tables to your Navigation form using the Field List pane in both Design and Layout views to allow for even greater customization.
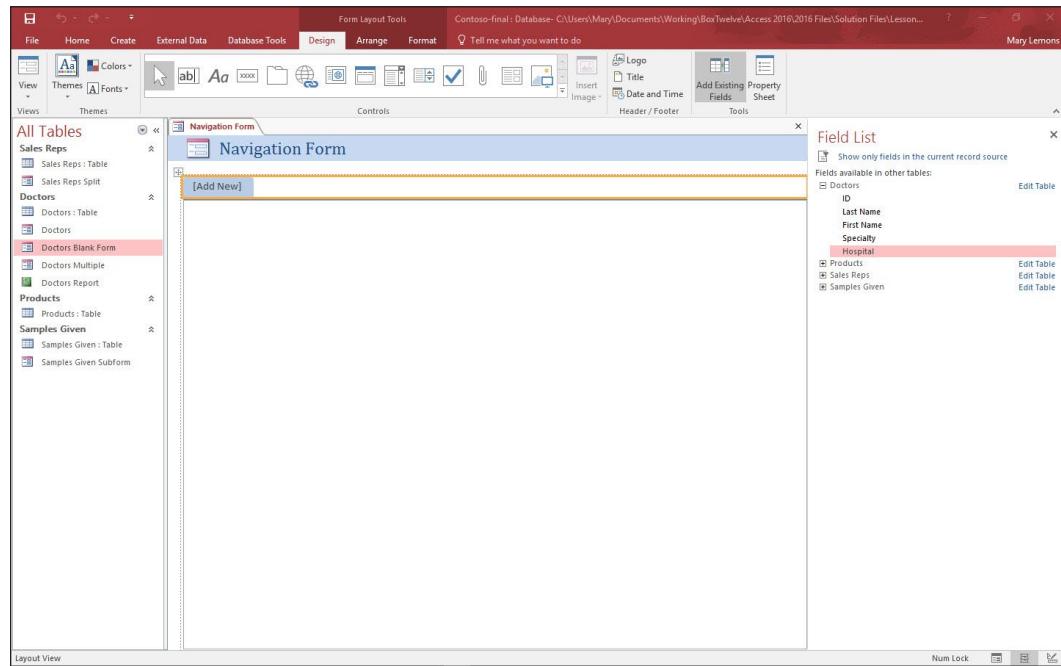
STEP BY STEP   Create a Navigation Form

GET READY. USE the *Contoso-final* database that is open from the previous exercise.

1. On the Create tab, in the Forms group, click the **Navigation** button and then click **Horizontal Tabs**. A new Navigation form appears in Layout view, as shown in Figure 10-13.

Figure 10-13

Navigation form in Layout view

2. Click and drag the **Doctors** form object from the Navigation Pane to the Add New tab near the top of the form. The form tab is renamed Doctors and all the Doctors form's controls appear. A new [Add New] tab appears next to the Doctors tab.

Take Note   You cannot drag table objects from the Navigation Pane to the [Add New] tab.

3. Click and drag the **Doctors Report** object from the Navigation Pane to the [Add New] tab near the top of the form. The form tab has been renamed **Doctors Report** and all the Doctors report controls appear. A new [Add New] tab appears next to the Doctors Report tab. Your screen should resemble Figure 10-14.

Figure 10-14

Navigation form displaying Doctors report

4. Double-click the **Doctors** tab and then type **Doctors Form** to rename the tab.

5. Click the **File** tab and then click **Save**.

6. In the Save As dialog box, type **Doctors Navigation Form** and then click **OK**.

7. Change to Design View, and on the Doctors Form Tab Layout View, resize the columns in the Samples Given section so they all fit mostly in the window, as shown in Figure 10-15.

8. Change back to Form View and view the changes. Your screen should look similar to Figure 10-16.

Figure 10-15
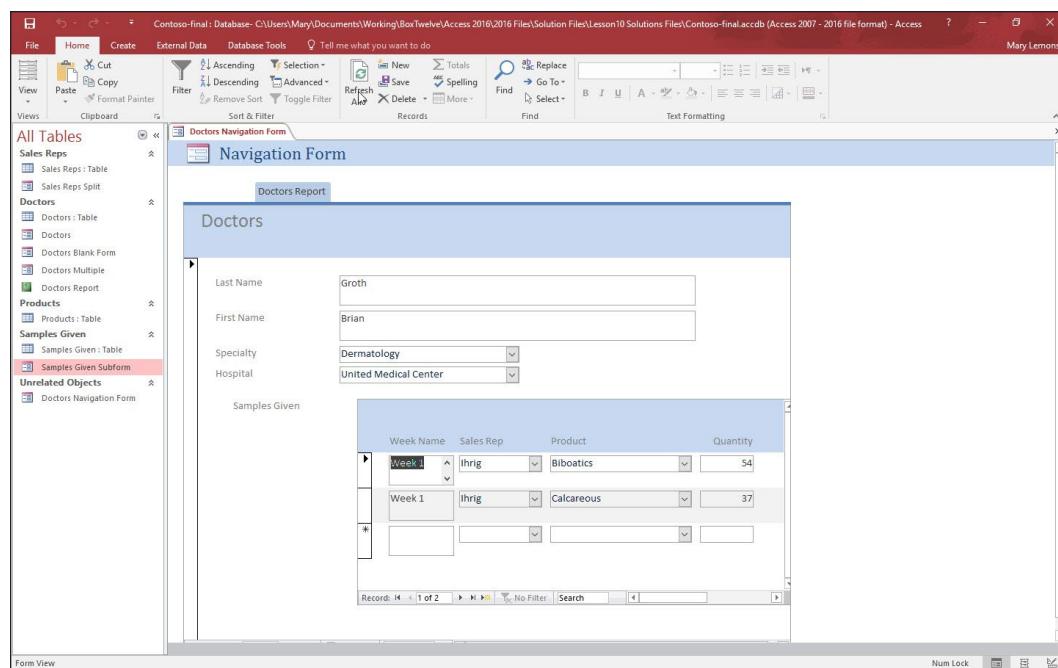
The Samples Given section resized in Design View

Take Note   Simply click the control label and/or the control to view an orange box around them to resize accordingly. Shift+click the Control label and the control to select all of them to move them.

Figure 10-16

Samples Given in Form View

9. **SAVE** and **CLOSE** the Doctors Navigation Form.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Fill in the Blank

Complete the following sentences by writing the correct word or words in the blanks provided.

1. Creating a(n) _____ form allows you to see two views of your data at the same time.
2. For best results, all _____ should be established before creating a subform.
3. When creating a subform, the primary form is called the _____ form.
4. A(n) _____ form resembles a datasheet, but it gives you more customization options.
5. The views in a split form are connected to the same data _____ and are completely synchronized with each other.

Multiple Choice

Select the best response for the following statements or questions.

1. Which of the following tools creates a customizable form that displays multiple records?
   a. Query
   b. Subform
   c. Report
   d. Multiple Items

2. Which type of form allows you to view data from more than one table or query on the same form?
   a. Multi-item form
   b. Split form
   c. Subform
   d. Navigation form

3. A form/subform combination is sometimes referred to as which of the following?
   a. Hierarchical form
   b. Master/detail form
   c. Parent/child form
   d. All of the above

4. Which type of form already has a predefined layout and can automatically contain command buttons?
   a. Multi-item form
   b. Split form
   c. Subform
   d. Application Parts Blank form

5. Which type of form can be added to a database to simplify your interaction with objects preventing the need to use the Navigation Pane?
   a. Subform
   b. Blank form
   c. Split form
   d. Navigation form

Projects

Project 10-1: Creating Forms and Subforms

Information about each selection for the Fourth Coffee monthly coffee club is stored in an Access database. As purchasing manager, you use the database frequently and need to have several types of forms available to work with the data. In this project, you will create a multi-item form, a split form, and a subform that show this data.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN *Fourth Coffee Club*** from the data files for this lesson and then **SAVE** the database as ***Fourth Coffee Club-final***.
2. **CREATE** a multi-item form for the Regular Coffee table.
3. Name the form **Regular Coffee Multi** and close it.
4. **CREATE** a multi-item form for the Decaf Coffee table.
5. Name the form **Decaf Coffee Multi** and close it.
6. **CREATE** a split form for the Regular Coffee table.
7. Name the form **Regular Coffee Split** and close it.
8. **CREATE** a split form for the Decaf Coffee table.
9. Name the form **Decaf Coffee Split** and close it.
10. On the Create tab, in the Forms group, click **Form Wizard**.
11. In the first screen on the Form Wizard, select **Table: Regular Coffee** in the Tables/Queries box.
12. Move the Name field to the Selected Fields box.
13. Select **Table: Orders** in the Tables/Queries box.
14. Move the Order Date, Distributor, and Pounds Ordered fields to the Selected Fields box.
15. In the second screen of the Form Wizard, choose to view your data **by Regular Coffee**.
16. In the third screen of the Form Wizard, choose to view your data in **tabular** layout.
17. In the final screen of the Form Wizard, accept the default form names and then click **Finish**.
18. Navigate to the fourth record to see information about the orders placed to the distributors for River Road coffee.
19. **CLOSE** the form.

PAUSE. LEAVE the database open for the next project.

Project 10-2: Using Application Parts to Create Forms and Creating Navigation Forms

As purchasing manager for Fourth Coffee, you need to keep track of the Distributors you use for your coffee. In this project, you will create a form to add distributors and a navigation form that allows you to view both the distributors and the orders by distributors.

GET READY. USE the *Fourth Coffee Club-final* database that is open from the previous project.

1. On the Create tab, in the Templates group, click the **Application Parts** button and then select **1 Right**.
2. Double-click the new form named **SingleOneColumnRightLabels** in the Navigation Pane to open it.
3. In Layout view, delete the placeholders **Field1**, **Field2**, **Field3**, and **Field4** as well as the label control placeholder that contains the red asterisk.
4. Delete the very last row of the table.
5. Click the **Add Existing Fields** button in the Tools group, and expand the Distributors table.
6. Click and drag the **Company**, **Business Phone**, and **Web Page** fields to the form.
7. Resize the label and field controls as necessary.
8. Click the **Form Title** label, delete Form Title and then type **Distributors**.
9. Change to Form view and cycle through the records. Click the **Save & Close** button on the form to close the form.
10. Click **Yes** in the dialog box prompting you to save design changes to the form.
11. Rename the SingleOneColumnRightLabels form to **Distributors Form**.
12. On the Create tab, in the Forms group, click the **Navigation** button and then click **Horizontal Tabs**.
13. Click and drag the **Distributors** form object from the Navigation Pane to the Add New tab near the top of the form.
14. Click and drag the **Orders Subform** object from the Navigation Pane to the [Add New] tab near the top of the form.
15. Click **Save** and name the form **Distributors and Orders Form**.

STOP. CLOSE the form, **CLOSE** the database, and then **EXIT** Access.

Advanced Reports 11

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Defining Groups	Group and sort fields.	5.2.1
Creating a Subform on a Report	Add subforms.	4.2.7
Creating the Print Layout	Print reports. Print records. Change report orientation.	1.5.1 1.5.2 5.3.5

DEFINING GROUPS

A **group** is a collection of records separated visually with any introductory or summary information displayed with it. Reports can be grouped on fields or expressions. A **grouping field** is a field by which data is grouped. **Grouping levels** are the nested arrangement of the groups in a report. Access creates indented levels to show the groups from highest to lowest priority. You can change a group's level in the Report Wizard by using the priority up and down arrows. Access allows you to specify as many as 10 grouping levels in a report. Groups can be nested so you can easily see the group structure.

When data is arranged in groups, it is often easier to comprehend and it becomes more meaningful. For example, if you want to see the sales performance for each region, it is easier to review this data if each region's sales are grouped together. You can go a step further and specify another group level, such as salesperson. This allows you to group a report by region and by salesperson within each region.

You can specify grouping intervals by using the Grouping Options button. **Grouping intervals** establish the way that records are grouped together. They can be very useful in arranging a large number of records in a group. You can group on the first character of a text field so that all of the records are visually separated alphabetically. You can specify a group interval of a day, week, month, or quarter on a date field. This is useful if you want to view the sales for each week in a report. You can also specify a custom interval.

Using the Report Wizard

You can easily specify groups with the Report Wizard when creating a new report. This is an easy and fast way to create a report with groups. The Report Wizard lets you specify how you would like data to be grouped as you create the report. You can also add grouping to an existing report using the Group, Sort, and Total pane. Grouping options let you further specify how you want the groups to appear in your report. In this exercise, you use the Report Wizard to specify grouping levels and create a report.
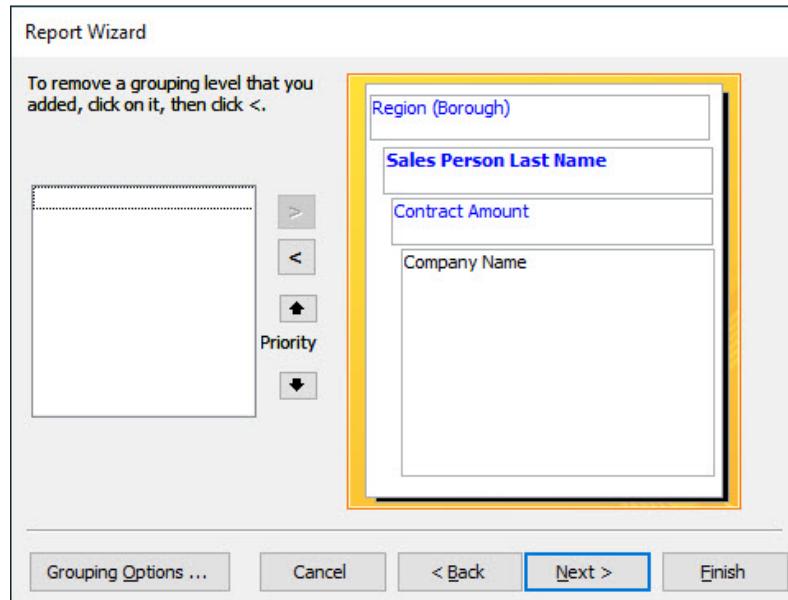
Use the Report Wizard

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and start Access.

1. **OPEN** *Messenger* database from the data files for this lesson and then **SAVE** it as *Messenger-final*.
2. In the Navigation Pane, double-click the **Corporate Sales** table to open it.
3. On the Create tab, in the Reports group, click the **Report Wizard** button. The first *Report Wizard* dialog box appears.
4. Click the **>** button or double-click each item to move the **Region (Borough)**, **Sales Person Last Name**, **Company Name**, and **Contract Amount** fields from the Available Fields list to the Selected Fields list.
5. Click the **Next** button. The second *Report Wizard* dialog box appears.
6. Select the **Region (Borough)** field and then click the **>** button to move it to the grouping levels box.
7. Select the **Contract Amount** field and then click the **>** button to move it to the grouping levels box.
8. Select the **Sales Person Last Name** field and then click the **>** button to move it to the grouping levels box.
9. Notice that the Sales Person Last Name field is the active field in bold type. Click the **Priority** up arrow to move the Sales Person Last Name field to the second level of grouping. Your screen should look similar to Figure 11-1.

Figure 11-1
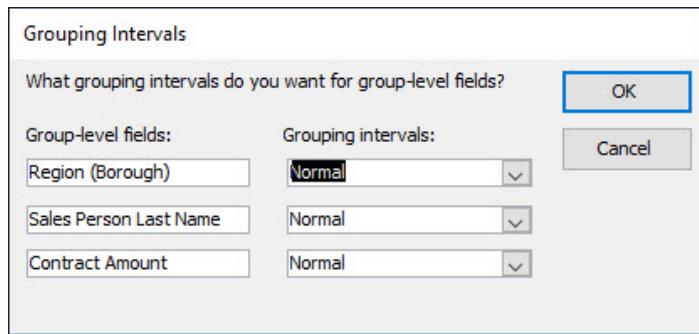
Second Report Wizard dialog box

10. Click the **Grouping Options** button at the bottom of the dialog box. The *Grouping Intervals* dialog box appears, as shown in Figure 11-2.
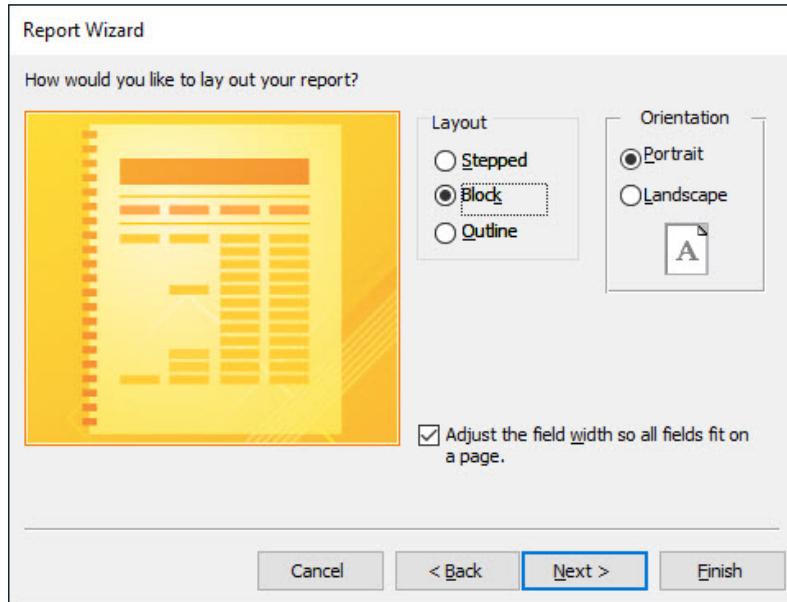
Grouping Intervals dialog box

11. Click the down arrow on the first Grouping intervals menu to see the choices available. Select **Normal** from the menu and then click **OK**.

12. Click the **Next** button. The third *Report Wizard* dialog box appears. You can sort in either ascending or descending order and by up to four fields.

13. Click the down arrow on the Sort menu and then select **Company Name** to sort in ascending order by Company Name.

14. Click the **Next** button. The fourth *Report Wizard* dialog box appears. You can choose from three different layouts for your report as well as two different orientations.

15. In the Layout section, click the **Block** option button, as shown in Figure 11-3. Keep the default orientation as **Portrait** and keep the selection so all fields fit on one page.

Figure 11-3

Report Wizard dialog box, layout and orientation

16. Click the **Next** button. The fifth *Report Wizard* dialog box appears.

17. Type **Corporate Sales by Region/Salesperson** as the title of your Report, replacing the default title of Corporate Sales1.

18. Click the **Finish** button to accept the settings. The Report Wizard creates the report, shown in Figure 11-4, with the groups you specified.

Figure 11-4

Corporate Sales by Region/
Salesperson report

19. CLOSE the report and the table.

PAUSE. LEAVE the database open to use in the next exercise.

Adding Group Headers and Footers

You can add group headers and footers to a report using the Group, Sort, and Total pane. When you select a field from the Group On menu, the group header is added to the report. In this exercise, you add group headers using the Group, Sort, and Total pane.

As you may remember from Lesson 6, a report is organized into sections. You can view sections of a report in Design view. The **group header** is the section of a report where the name of a grouped field is displayed and printed. Group headers take on the name of the group, so instead of seeing a group header named *Group Header* you will see [Fieldname] Header.

A **group footer** is the section of the report where the data in the group is summarized. It is optional. If you do not have any summary data, such as a total, you don't need a group footer.

Use the Group, Sort, and Total Pane

GET READY. USE the *Messenger-final* database that is open from the previous exercise.

1. In the Navigation Pane, double-click the **Corporate Sales** report to open it. Notice that the report is not arranged by groups.

2. Change to Layout view and close the Field List pane if it opens.

3. On the Design tab, in the Grouping & Totals group, click the **Group & Sort** button. The Group, Sort, and Total pane appears at the bottom of the screen, as shown in Figure 11-5.

4. Click the **Add a group** button. Select **Region (Borough)** from the Group On menu. The report is now grouped on the Region (Borough) field.

Figure 11-5

Group, Sort, and Total pane

Group, Sort, and Total pane

5. Click the **Add a group** button again and then select **Sales Person Last Name** from the Group On menu. The report is now also grouped on the Sales Person Last Name field.

6. Change to Design view. Your screen should look similar to Figure 11-6. Notice that there is a Region (Borough) Header for that group and a Sales Person Last Name header for that group. The Company Name and Contract Amount fields are arranged in the Detail section.

7. **SAVE** the report.

PAUSE. **LEAVE** the database and the report open to use in the next exercise.

Group headers

Figure 11-6

Group headers in Design view

Group On rows   Detail section

Changing Grouping Options

After grouping data, Access gives you options for displaying grouped data. To display the grouping options in the Group, Sort, and Total pane, click More on the group level that you want to change. If you want to hide the grouping options, click Less. In this exercise, you use the Group, Sort, and Total Pane to change group options.

Grouping options include:

- **Sort order:** Choose ascending or descending
- **Group interval:** Change the way records are grouped together
- **Totals:** Add totals to fields
- **Title:** Change the label of a column heading or summary field
- **With/without header:** Add or remove the header section
- **With/without footer:** Add or remove footer section
- **Do not keep group together on one page:** Groups can be broken up by page breaks
- **Keep whole group together on one page:** Minimizes the number of page breaks in a group on one page
- **Keep header and first record together on one page:** Ensures a group header is not printed by itself at the bottom of a page

You can also click the Move up and Move down arrows at the end of the Group On row to change the priority of grouping levels. To delete a grouping level, click the Delete button at the end of its Group On row and Access will move the data to the Detail section of the report. However, if other controls are in the header, Access will warn you that these could be deleted.

The Hide Details command is a toggle button in the Grouping & Totals group on the Ribbon that hides data in the Detail section of the report. Click it again to display the data.

STEP BY STEP   **Change Grouping Options**

GET READY. USE the *Messenger-final* database and *Corporate Sales* report that are open from the previous exercise.

1. Change to Layout view.
2. Click the **Group On Sales Person Last Name** row in the Group, Sort, and Total pane, and then click the **More** button to view the available grouping options.
3. Click the **down arrow** beside with a header section and then select **without a header section** from the drop-down menu, as shown in Figure 11-7.
4. Change to Design view. Notice that the Sales Person Last Name Header has been deleted from the grouping area.
5. Change back to Layout view.

Group on Sales Person Last Name row   Move up   Delete

Drop-down menu   Move down
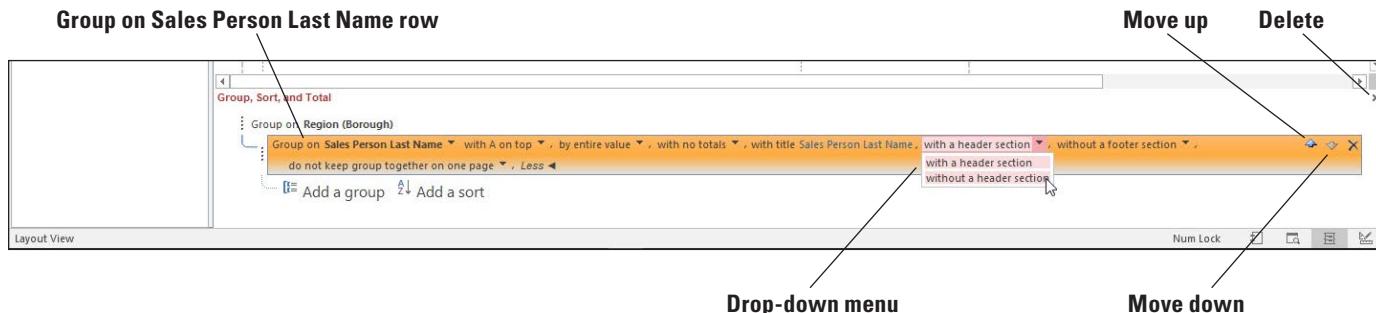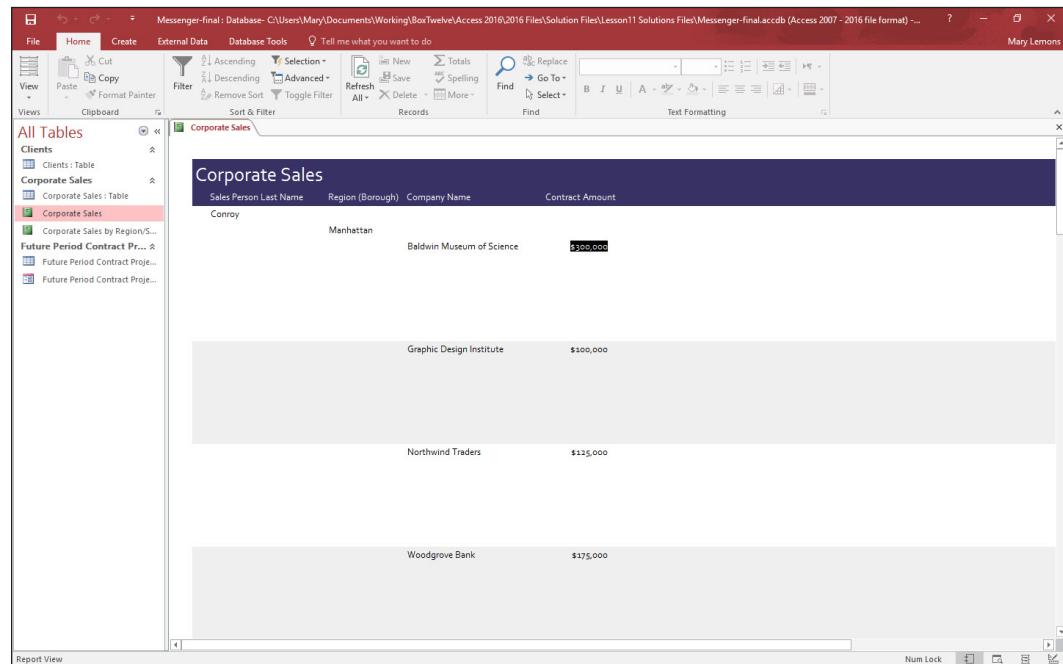
Figure 11-7

Group on Sales Person
Last Name row

6. Click the **down arrow** beside the without a header section (if the without a header section option doesn't appear, click the **More** button) and then select **with a header section** from the drop-down menu.

7. Click the **Move up** arrow at the end of the Group On Sales Person Last Name row. Notice that the Sales Person Last Name group is now the top level group in the report.

8. Click the **Add a group** button and then select **Company Name** from the menu. A new group level is added to the report.

9. On the Design tab, in the Grouping & Totals group, click the **Hide Details** button. The data in the Contract Amount field is hidden.

10. On the Design tab, in the Grouping & Totals group, click the **Hide Details** button. The data in the Contract Amount field is displayed.

11. Click the **More** button next to Group On Company Name in the Group, Sort, and Total pane.

12. Click the **with A on top** down arrow on the Group On Company Name row in the Group, Sort, and Total Pane and then select **with Z on top** from the drop-down menu. The sort order is changed from ascending to descending order.

13. Click the **with Z on top** down arrow and then select **with A on top**.

14. Click the **Delete** button on the right side of the Group On Company Name row in the Group, Sort, and Total pane. The row is deleted, as is the Company Name header section.

15. Change to Report view to see the report. Your screen should resemble Figure 11-8.

Figure 11-8

Corporate Sales report

16. **SAVE** the report.

PAUSE. LEAVE the database and the report open to use in the next exercise.

CREATING AGGREGATE FIELDS

Report data often contains numbers, such as sales figures, that need to be totaled. A report that lists sales for each month in a quarter but does not total all the sales for the quarter is incomplete. **Aggregate fields** use functions to provide summary information of such data. You can create an aggregate field by using aggregate functions to calculate data in a field. The aggregate functions you can use are Sum, Average, Count Records, Count Values, Maximum, Minimum, Standard Deviation, or Variance.

Access 2016 provides a Totals command that lets you create an aggregate field that provides not only grand totals, but totals for groups in a report as well. You can also use the Group, Sort, and Total pane to add aggregate functions to fields.

The Totals command is located on the Design tab, in the Grouping & Totals group, but you can also access it on the shortcut menu. In Layout view, just right-click the field you want to total and then select Total, which will be followed by the field name, from the shortcut menu. The Totals command adds a calculated control in the report footer where it displays the grand total. If you don't already have group footers in your report, the Totals command adds group footers and calculated controls to calculate the totals for each group.

Creating Aggregate Fields

You have a few more options when using the Group, Sort, and Total pane to create an aggregate field in a report. The Totals menu gives you options for choosing the field and type of function as well as options on how you want to display totals. You can display a grand total or group subtotals as a percentage of the grand total. You can also choose to show the subtotals in the group header or footer. In this exercise, you use the Group, Sort, and Total pane to create aggregate fields.

STEP BY STEP	Create Aggregate Fields

GET READY. USE the *Messenger-final* database and *Corporate Sales* report that are open from the previous exercise.

1. Change to Layout view.
2. Click the **Group On Sales Person Last Name** row in the Group, Sort, and Total pane, and then click **More**.
3. Click the **with no totals** down arrow. The Totals menu appears.
4. Click the **Total On** menu down arrow and then select **Contract Amount**.
5. Click the **Type** menu down arrow and then select **Sum** if it isn't selected already.
6. Point to the **Show Grand Total** box, as shown in Figure 11-9. Click the **Show Grand Total** check box. The menu disappears and the grand total appears in the Contract Amount column at the bottom of the report.
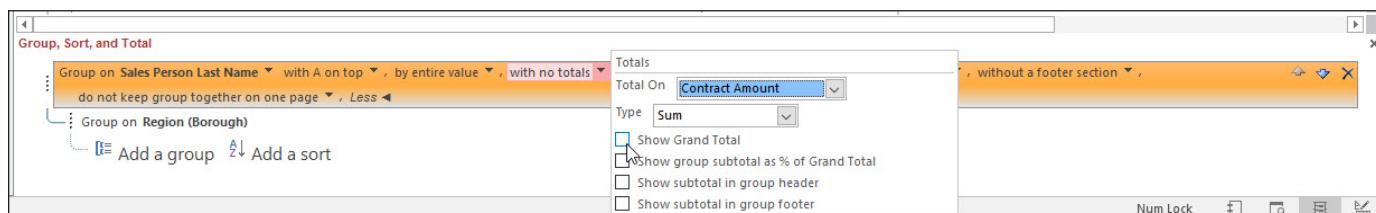
Figure 11-9

Totals menu

7. Click the **Group On Sales Person Last Name** row again, click **More**, and then click the **with Contract Amount totaled** down arrow.
8. Click the **Total On** menu down arrow, select **Contract Amount**, and then click the **Show subtotal in group footer** box. The settings are applied, and the subtotals are now shown in each group's footer.
9. Select the **Sales Person Last Name** field header on the report.
10. On the Design tab, in the Grouping & Totals group, click the **Totals** button and then select **Count Records** from the menu.
11. Change to Report view. The total number of records appears at the bottom of the report.
12. **SAVE** the report.

PAUSE. LEAVE the database and report open to use in the next exercise.

CREATING A SUBFORM ON A REPORT

As you learned in Lesson 10, a subform is a convenient tool that allows you to view data from more than one table or query on the same form. Similarly, a subform can be inserted into a report and used in the same way to view data on a report. The primary report is called the main report, and the form within the report is called the subform. In this exercise, you create a subform on a report by dragging a preexisting form from the Navigation Pane to a report in Design view.

When working with a relational database, it is sometimes helpful to view data from more than one table or query on the same report. Subforms can be effectively used on reports to show data from tables or queries that have a one-to-many relationship—the main report shows data from the "one" side of the relationship and the subform shows the data from the "many" side of the relationship. For example, you can view the current contract data salespeople have with their clients (one side), while also viewing related estimated future contract amounts (many side) on the same report.

You can also filter the records that appear in a subform in the same way you would filter a form.

You can use the Subreport Wizard located in the Controls group on the Design tab to create a new subform to add to a report and include which fields you want to appear. The Wizard can also be used to include the fields from a preexisting form to use as a subform in a report or to establish a relationship between a report and a subform.

If you already have a preexisting form in your database, you can simply drag the form object from the Navigation Pane to an appropriate section of the main report in Design view. For best results, all relationships should be established first. This enables Access to automatically create the links between subforms and main reports to effectively show related data.

Take Note A subreport can also be added to a report in a similar way and serves a similar function as a subform. The determination to add a subform or subreport to a report depends mainly on what form or report objects you already have in your database and what additional data you want to communicate.
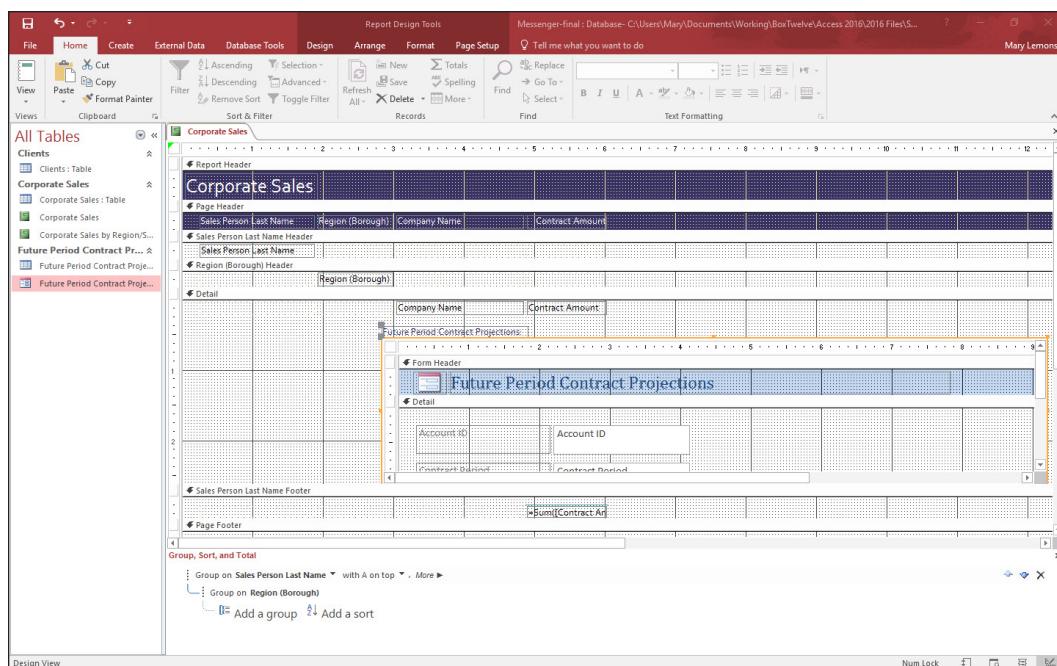
STEP BY STEP   **Create a Subform on a Report**

GET READY. USE the *Messenger-final* database and *Corporate Sales* report that are open from the previous exercise.

1. Change to Design view.
2. Click and drag the **Future Period Contract Projections** form object from the Navigation Pane to the Report Detail section under the Company Name and Contract Amount controls. Your screen should look similar to Figure 11-10.

Figure 11-10

Report and subform

3. Change to Report View to view the Report and related subform, and cycle through the two records in the top subform using the record navigation buttons on the subform.

4. **SAVE** and **CLOSE** the report.

PAUSE. **LEAVE** the database open to use in the next exercise.

CREATING THE PRINT LAYOUT

Reports are often created so records can be appropriately arranged, formatted, and shared with colleagues either by being displayed onscreen or printed. You can print a report from any view: Report, Layout, Design, or Print Preview. **Print Preview** displays a report as it will look when printed. You can display the Print Preview tab by choosing the Print Preview option on the File tab's Print menu. It is helpful to preview a report before printing it. This allows you to make adjustments to the layout before clicking the Print button so you can make sure the report prints the way you want. The settings that you choose will be saved with the report, so you won't have to select the same settings each time you print.

When you are confident your report will print correctly, you can click the Print button. The Print dialog box lets you select the printer, choose the number of copies you want to print, and specify which pages you want to print. If you don't need to preview a report, you can skip Print Preview and then select Print or Quick Print on the File tab's Print menu. The Print command displays the Print dialog box, but the Quick Print command sends the report directly to the printer. The report's records are printed once you send the report to the printer.

Using Print Preview to Create a Print Layout

The Print Preview tab has commands for printing, changing the page size and layout, zooming in or out to view the pages, and exporting report data to a variety of formats like Excel and Word. When you are finished previewing a report, you can click the Close Print Preview button to leave the view. In this exercise, you use Print Preview to create the print layout of a report.
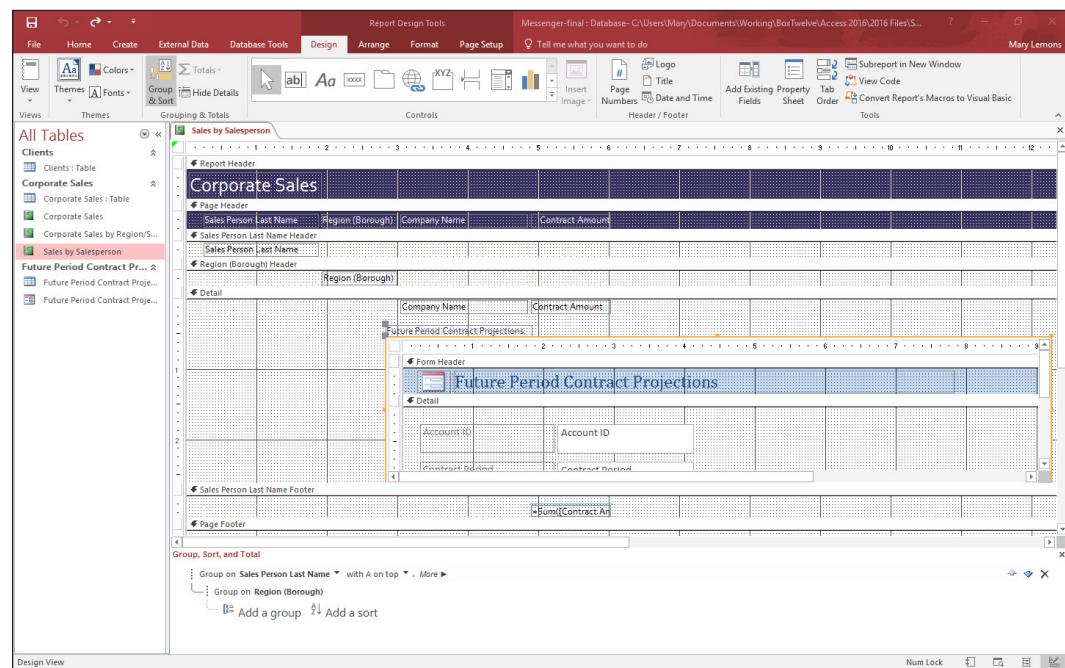
Create the Print Layout

GET READY. USE the *Messenger-final* database that is open from the previous exercise.

1. Right-click the **Corporate Sales** report in the Navigation Pane and then select **Copy** from the shortcut menu that appears.

2. Right-click in a blank area in the Navigation Pane and then select **Paste** from the menu. The *Paste As* dialog box appears.

3. In the *Paste As* dialog box, replace the name of the report in the Report Name field with **Sales by Salesperson** and then click **OK**.

4. Double-click the **Sales by Salesperson** report in the Navigation pane and then change to Design view. You want to remove the subform from the report and keep only the sales related to each salesperson.

5. In the Detail section, click the **Future Period Contract Projections** subform, as shown in Figure 11-11, and then press **Delete** on the keyboard to delete the subform.

Figure 11-11
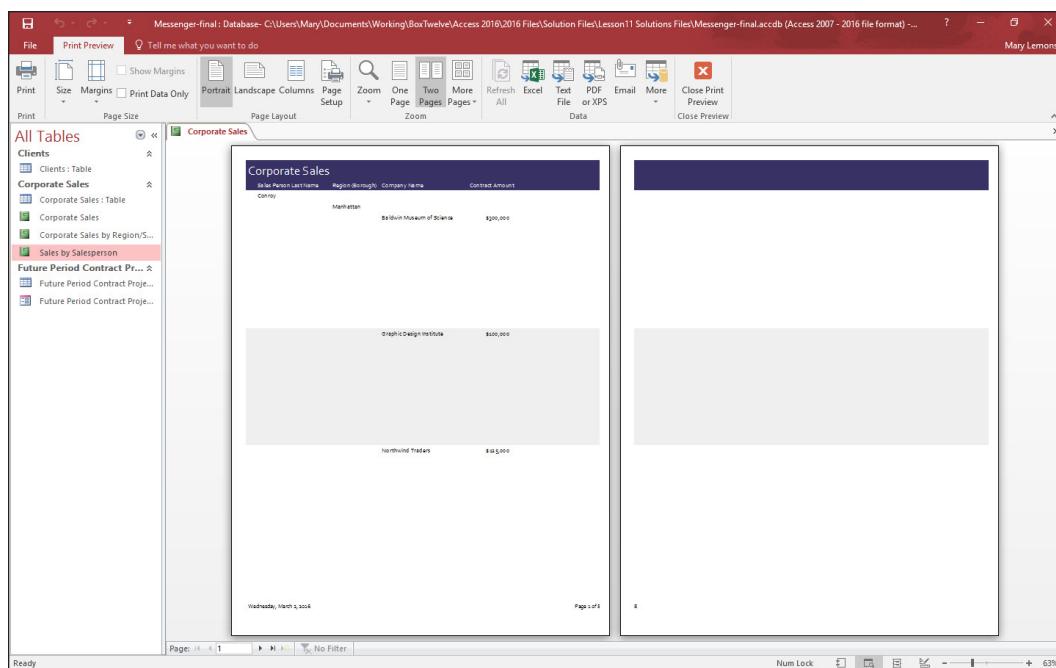
Future Period Contract Projections subform

6. On the Home tab, in the Views group, click the lower half of the **View** button and then select **Print Preview** from the menu. The report is displayed in Print Preview. Notice the large area of blank space between company names in the detail section.

7. On the Print Preview tab, in the Zoom group, click the **Two Pages** button. The first two pages of the report are displayed on the screen, as shown in Figure 11-12. Notice the second page has no report data on it. You need to correct these issues in Report Design view to ensure the report print layout is appropriate before printing.

Figure 11-12
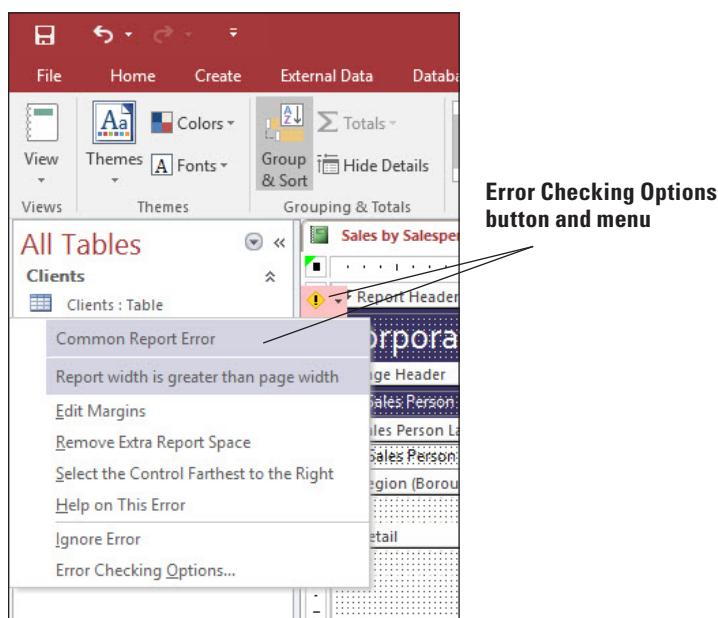
Print Preview of Two Pages

8. On the Print Preview tab, click the **Close Print Preview** button to return to Report Design view.

9. Click the **Error Checking Options** button next to the Report Header section title to view the Error Checking Options menu, as shown in Figure 11-13. Notice the menu text that states *Report width is greater than page width*. Click the **Remove Extra Report Space** menu option. The report's width is automatically adjusted; however, the issue is not entirely corrected and the Error Checking Option button still appears.

Figure 11-13
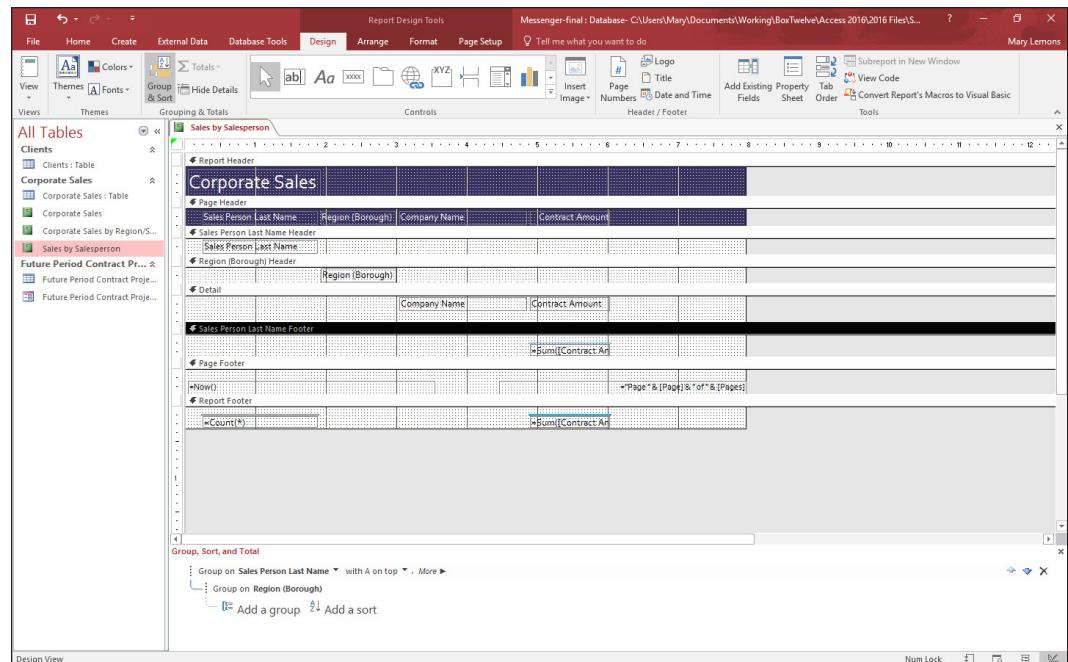
Error Checking Options button and menu

10. Scroll to the bottom of the report, if necessary, and place the pointer over the top of the **Sales Person Last Name** footer until it turns into a two-headed vertical pointer. Click and drag the Sales Person Last Name Footer and place it below the Company Name and Contract Amount controls, as shown in Figure 11-14. This removes the excess blank space between company names in the Detail section.

Figure 11-14
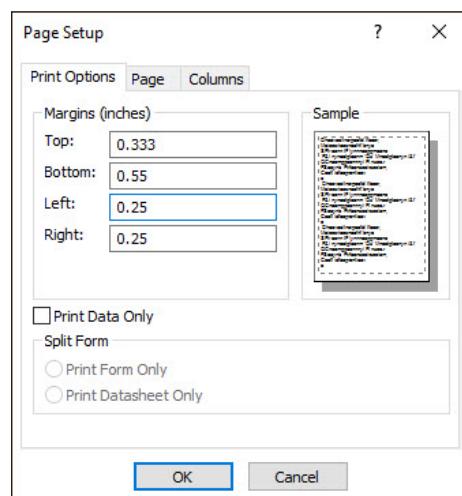
Sales Person Last Name Footer

11. Change to Print Preview view. Notice the report layout still appears on two pages. The Remove Extra Report Space didn't entirely fix the issue. The page number control is exceeding the width of the page in Design view as evident by the page numbering text appearing in the footer section of the second page. On the Print Preview tab, in the Page Layout group, click the **Landscape** button. The report is displayed in landscape orientation and the formatting appears correctly.

12. On the Print Preview tab, in the Page Layout group, click the **Portrait** button. The report is displayed in portrait orientation again.

13. On the Print Preview tab, in the Page Layout group, click the **Page Setup** button. The *Page Setup* dialog box appears. Notice it contains many of the same options that are available in the Page Layout group but also includes additional options and details that can be modified.

14. On the Print Options tab, change the Left margin from 0.333 to 0.25 (see Figure 11-15).

Figure 11-15

Page Setup dialog box

15. Click **OK**. Notice that all the report data now fits and will print on two pages.

16. On the Print Preview tab, in the Zoom group, click the **Zoom** button arrow and then select **50%** from the menu.

17. Click the **Close Print Preview** button. You are back in Design view.

18. **SAVE** the report design and go back to Print Preview.

19. On the Print Preview tab, click the **Print** button. The *Print* dialog box appears. Click **OK** to print or click **Cancel** to close the dialog box. (Notice that you can access the *Setup* dialog box from here as well.)

20. **CLOSE** Print Preview and the report.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   You can add the Print Preview and/or the Quick Print command to the Quick Access Toolbar by clicking the Customize Quick Access Toolbar down arrow at the end of the toolbar and then selecting Print Preview or Quick Print from the menu.

USING THE LABEL WIZARD

You can create labels for mailing, or other purposes, using the data in your Access databases. The **Label Wizard** helps you create a label-sized report that you can use to print labels. The Label Wizard asks you a series of questions about the labels you want and then creates the labels based on your answers. You can choose from a wide variety of sizes, including sizes to fit label sheets that you purchase at the office supply store or custom-created labels.

Creating Labels Using the Label Wizard

You can create mailing labels or other types of labels from an Access table or query. Access allows you to choose the font name, font size, font weight, and text color for your labels. You can also choose to underline or italicize text in the label. The Sample box displays the choices you make. In this exercise, you use the Label Wizard to create labels.

You can select predefined label sizes that match popular manufacturer's label sheets. These are listed by Product Number in the first Label Wizard screen. If you don't know the manufacturer of your label sheets, you can choose a sheet with similar dimensions and with the correct number of labels across the sheet. If you don't see the size you need, you can customize the size and create a new label using the Customize button.

As you add fields to the Prototype label, remember to use the Spacebar to add a space between fields and then press Enter to move to the next line. You can also type text directly in the Prototype label that you want to appear on each label.

You can sort the labels by one or more fields, such as zip code for bulk mailings. On the last Label Wizard screen, if you choose to see the labels as they will look when printed, they will be displayed in Print Preview. Choose Modify the label design to view the label report in Design view.
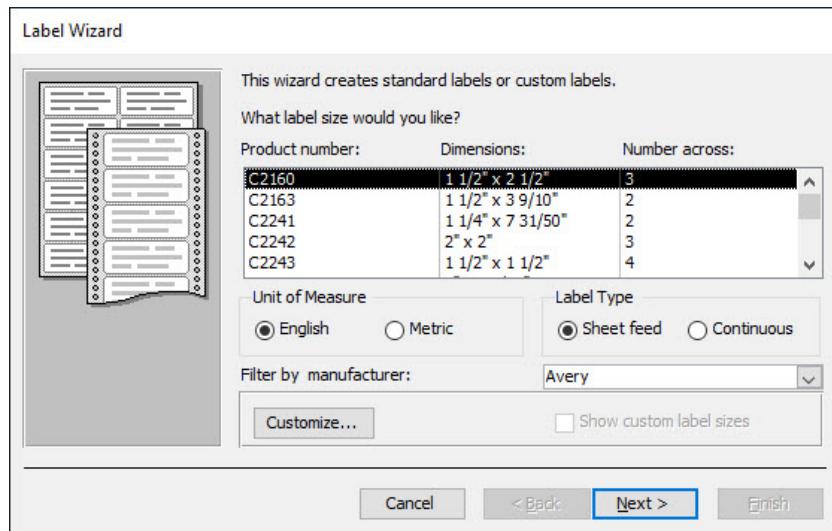
STEP BY STEP   **Use the Label Wizard**

GET READY. USE the *Messenger-final* database that is open from the previous exercise.

1. Select the **Clients** table in the Navigation Pane.

2. On the Create tab, in the Reports group, click the **Labels** button. The first *Label Wizard* dialog box appears, as shown in Figure 11-16.

3. Scroll down in the Product Number box, select **Avery USA 5160** and then click the **Next** button. The second *Label Wizard* dialog box appears.

4. Click the **Font name:** down arrow and scroll down to select **Times New Roman**. Notice the preview sample displays the new font.

Figure 11-16

First Label Wizard dialog box
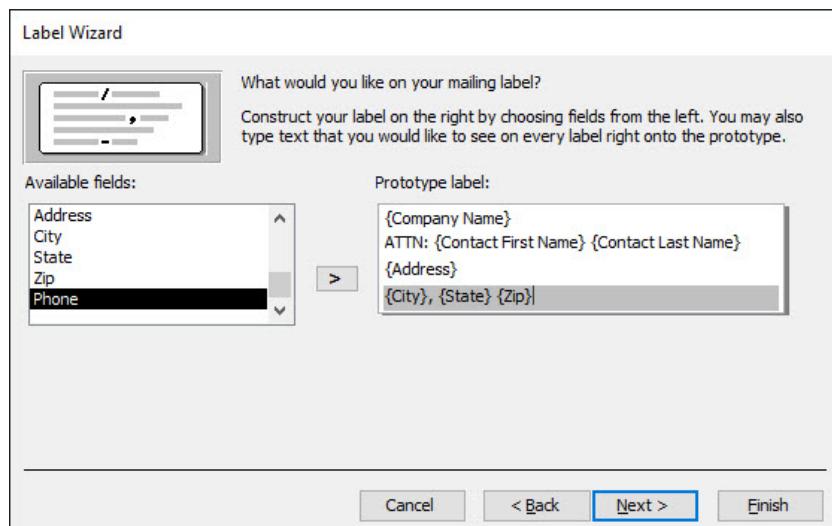
5. Click the **Font size:** down arrow and then select **9**.

6. Click the **Font weight:** down arrow and then select **Normal**.

7. In the *Text color* section, click the **Ellipses** button to display the *Color* dialog box. Notice the options available, then click **Cancel** to close it.

8. Click the **Next** button. The third *Label Wizard* dialog box appears.

9. Select the **Company Name** field in the Available Fields list and then click the **>** button to place it on the Prototype label. Press **Enter**.

10. Type **ATTN:** and then press the **Spacebar**.

11. Select the **Contact First Name** field and then click the **>** button.

12. Press the **Spacebar** to insert a blank space between fields.

13. Select the **Contact Last Name** field and then click the **>** button. Press **Enter**.

Take Note   Remember that you can also double-click the field to add it to the Prototype label section.

14. Select the **Address** field and then click the **>** button. Press **Enter**.

15. Select the **City** field and then click the **>** button. Type **,** (a comma) and then press the **Spacebar**.

16. Select the **State** field and then click the **>** button. Press the **Spacebar**.

17. Select the **Zip** field and then click the **>** button. Your screen should look similar to Figure 11-17.

Figure 11-17
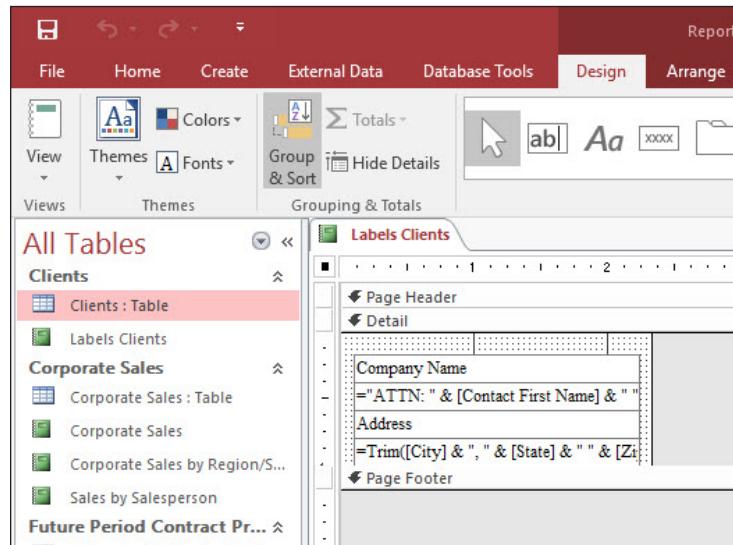
Completed Prototype label

18. Click **Next**. The fourth *Label Wizard* dialog box appears. It provides you with Sort by options.

19. Select the **Zip** field and then click the **>** button.

20. Click **Next**. The fifth *Label Wizard* dialog box appears.

21. Leave the default name, click the **Modify the label design** option button, and then click **Finish**. Your screen should look similar to Figure 11-18.

Figure 11-18
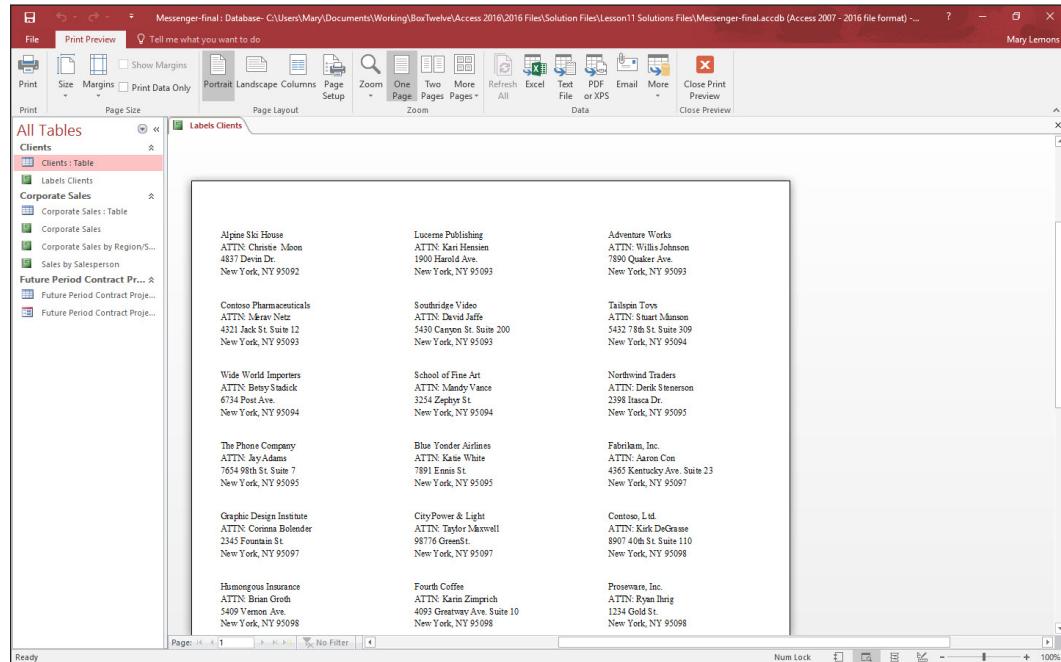
Label report

22. On the Home tab, in the Views group, click the lower half of the **View** button and then select **Print Preview** from the menu. Your screen should look similar to Figure 11-19.

Figure 11-19

Label report in Print Preview

23. Click the **Print** button. The *Print* dialog box appears. Click **OK** to print or click **Cancel** to close the dialog box.

24. **CLOSE** Print Preview and then **CLOSE** the report.

STOP. CLOSE the database and then **EXIT** Access.

Troubleshooting   If Access displays a message warning you that some of your data may not be displayed, this means the controls on the label are too wide for the allotted space. If this happens, try reducing the size of the controls in Design view so that they fit in the space available for a single label or try reducing the page margins using Page Setup.

Take Note   As an alternative to printing labels, you can print addresses directly onto envelopes. To do this, you will need to create a custom label instead of a predefined label and set the Label Type setting to Sheet Feed.

Knowledge Assessment

Matching

Match the term in Column 1 to its description in Column 2.

Column 1	Column 2
1. Group header	**a.** A field that contains an aggregate function to calculate data
2. Group footer	**b.** A field by which data is grouped
3. Grouping field	**c.** The nested arrangement of groups in a report
4. Aggregate field	**d.** The section of a report where the name of a grouped field is displayed and printed
5. Grouping levels	**e.** The section of a report where the data in a group is summarized

True/False

Circle T if the statement is true or F if the statement is false.

T F 1. Group headers take on the name of the group.

T F 2. The arrows at the end of a Group On row determine sort order.

T F 3. Average is an aggregate function.

T F 4. You must preview a report before you can print.

T F 5. Labels can be printed using reports.

Projects

Project 11-1: Creating Address Labels, and Totaling and Printing Reports

In this project, you need to send out confidential contract information to the authors in the Business Books division. Create labels for the authors using the Author Contact Information table. You also need to finish the Book Sales report to show totals for Domestic and International Sales and make adjustments in Print Preview before printing.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *Lucerne* database and then **SAVE** it as *Lucerne-final*.
2. Select the **Author Contact Information** table in the Navigation Pane.
3. On the Create tab, in the Reports group, click the **Labels** button.
4. Select the **C2242** label in the *Product number* box and then click **Next**.
5. Select **Arial** from the *Font name* menu and then select **9** from the *Font size* menu.
6. Click the **Italic** button and then click **Next**.
7. Type **CONFIDENTIAL** in all caps and then press **Enter**.
8. Type **For Addressee Only** and then press **Enter**.
9. Select the **Author First Name** field and then click the **>** button. Press the **Spacebar**.
10. Select the **Author Last Name** field and then click the **>** button. Press **Enter**.
11. Select the **Author Address** field and then click the **>** button. Press **Enter**.
12. Select the **Author City** field and then click the **>** button. Type **,** (a comma) and then press the **Spacebar**.
13. Select the **Author State** field and then click the **>** button. Press the **Spacebar**.
14. Select the **Author Zip** field and then click the **>** button.
15. Click **Finish**.
16. **CLOSE** the report.
17. Double-click the **Book Sales** report in the Navigation Pane to open it.
18. In Layout view, select the **Domestic Sales** field header.
19. On the Design tab, in the Grouping & Totals group, click the **Totals** button and then select **Sum** from the menu.
20. Select the **International Sales** field header.
21. On the Design tab, in the Grouping & Totals group, click the **Totals** button and then select **Sum** from the menu.
22. Select the **Book Title** field header.
23. On the Design tab, in the Grouping & Totals group, click the **Totals** button and then select **Count Records** from the menu.
24. On the Design tab, in the Views group, click the **View** menu and then select **Print Preview** from the menu.
25. On the Print Preview tab, change between Portrait and Landscape layout. Portrait looks better so click **Portrait**.
26. In the Page Size group, click the **Margins** button and then select **Wide** from the menu.
27. On the Print Preview tab, in the Zoom group, click the **Zoom** button arrow and then select **Fit to Window**.
28. **SAVE** the report.
29. On the Print Preview tab, in the Print group, click the **Print** button or click **Cancel** to close the dialog box.
30. **CLOSE** the report and then **CLOSE** the database.

PAUSE. LEAVE Access open for the next project.

Project 11-2: Creating and Printing a Grouped Report

In this project, your supervisor at Fourth Coffee asks you to create and print a report using the Monthly Sales by Store table. View the report in Print Preview to make sure the report is centered on the page before printing.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Fourth Coffee* from the data files for this lesson and then **SAVE** the database as *Fourth Coffee-final*.
2. Select the **Monthly Sales by Store** table.
3. Use the Report Wizard to create a report that includes the **Month**, **Store**, and **Sales** fields.
4. Group **by Store** and create a **Stepped** layout.
5. Change to Design view to decrease the width of the Month and Sales columns and move the Sales column closer to the month.
6. Click the **Group & Sort** button to open the Group, Sort, and Total pane.
7. Click the **Add a sort** button and then select **Sales** from the menu. Sort from smallest to largest.
8. Change to Layout view.
9. Select the **Sales** column.
10. Click the **Totals** button and then select **Sum** from the menu.
11. **SAVE** the report.
12. Change to Print Preview.
13. Click the **Zoom** button arrow and then select **Fit to Window**.
14. Click the **Margins** button and then select **Wide** from the menu.
15. Click the **Landscape** button.
16. Click the **Page Setup** button.
17. Click the **Print Options** tab. In the Margins section, type **1** in the Top box, **1** in the Bottom box, **1.5** in the Left box, and **1.5** in the Right box.
18. Click **OK**.
19. Click the **Print** button and then click **OK** to print the report or click **Cancel** to close the dialog box.
20. **SAVE** and **CLOSE** the report.

STOP. CLOSE the database and then **EXIT** Access.

12 Advanced Queries

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Creating crosstab queries	Create a crosstab query.	3.1.2
Creating a subquery	Add fields. Remove fields. Group data by using comparison operators.	3.2.2 3.2.3 3.3.4
Saving a filter as a query	Set filtering criteria.	3.3.2
Creating action queries	Create an action query.	3.1.4
Understanding advanced query modification	Group data by using comparison operators. Create a multi-table query. Add calculated fields. Add calculated fields. Format fields within queries. Group data by using arithmetic and logical operators. Group and summarize data.	3.3.4 3.1.5 3.3.1 5.3.2 3.2.6 3.3.5 3.3.3

CREATING CROSSTAB QUERIES

Queries are powerful tools that you use to retrieve exactly the data you need from your database, showing only the relevant records. Depending on the information you want to display, these advanced queries can help refine the results of your search or perform the actions you want. A crosstab query calculates a sum, average, count, or other type of total on records, and then groups the results by two types of information: one down the left side of the datasheet and the other across the top. When you summarize data using a crosstab query, you select values from specified fields or expressions as column headings so you can view data in a more compact format than with a select query.

Creating Crosstab Queries

A crosstab query is a special type of query that displays its results in a grid similar to an Excel worksheet. Crosstab queries summarize your values and then group them by two sets of facts: a set of row headers down the side and a set of column headers across the top. A crosstab query typically includes data from more than one table and always includes three types of data: the data used as row headings, the data used as column headings, and the values that you want to sum or otherwise compute. A crosstab query does not always populate all the fields in the result set because the tables that you use in the query do not always contain values for every possible data point. In this exercise, you create a crosstab query.

The easiest way to create a crosstab query is to use the Crosstab Query Wizard. To run a crosstab query, double-click it in the Navigation Pane or click it and then press Enter. When you run a crosstab query, the results are displayed in Datasheet view.
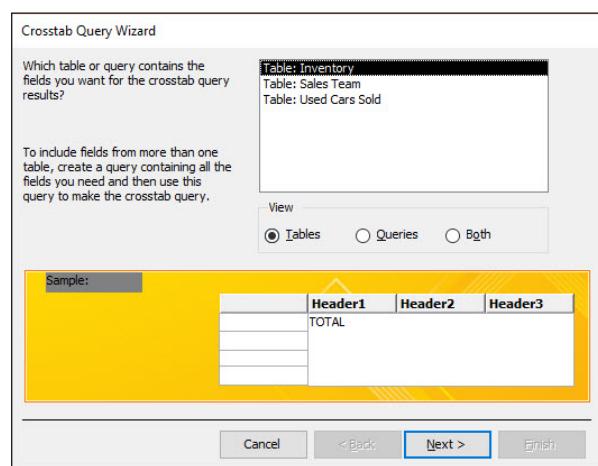
Create Crosstab Queries

GET READY. Before you begin these steps, make sure that your computer is on. Sign on, if necessary, and start Access.

1. **OPEN** the *Importers* database from the data files for this lesson and then **SAVE** it as *Importers-final*.
2. On the Create tab, in the Queries group, click the **Query Wizard** button to display the *New Query* dialog box.
3. Click **Crosstab Query Wizard** and then click **OK** to display the Crosstab Query Wizard, shown in Figure 12-1.

Figure 12-1
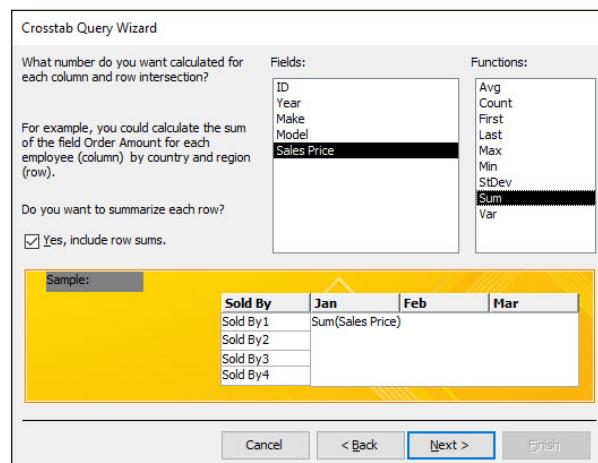
Crosstab Query Wizard, first screen

4. Click **Table: Used Cars Sold** and then click **Next** to display the Select Fields screen.
5. In the Available Fields box, double-click **Sold By** to move it to the Selected Fields box and then click **Next**. The next screen appears, asking which values you want to use as column headings.
6. Click **Date Sold** and then click **Next**. The next screen appears, asking how you want to group your Date/Time column information.
7. Click **Month** and then click **Next** The next screen appears, asking you what number you want calculated for each column and row intersection.
8. In the Fields box, click **Sales Price**, and in the Functions box, click **Sum**, as shown in Figure 12-2.

Figure 12-2

Crosstab Query Wizard, fifth screen

9. Click **Next** to display the final screen. Keep the default name (Used Cars Sold_Crosstab) and selection (View the query).

10. Click **Finish** to display the results of the crosstab query, as shown in Figure 12-3.

Take Note   A crosstab query does not always populate all the fields in the result set because the tables used do not always contain values for every possible data point.

11. **CLOSE** the Used Cars Sold_Crosstab query.

PAUSE. LEAVE the database open to use in the next exercise.

CREATING A SUBQUERY

You can use a subquery to limit the amount of data returned by a query. A **subquery** is a SELECT statement that is inside another select or action query. A **SELECT statement** is a Structured Query Language (SQL) command that instructs the Microsoft Access database engine to return information from the database as a set of records. This type of statement invokes conditional logic using expressions that evaluate to true or false; if true, Access returns a result that meets the condition that you have specified; if false, Access can return a different result depending on what you've specified. For example, you can use a conditional expression to create a new field that displays an adjusted salary with a 3% bonus for all employees who had annual sales revenue of $50,000 or more and display a message like "Not Bonus Eligible" for everyone else. The data that appears after the expression can be communicated on reports to provide useful information to employees who make decisions in your organization.

At a minimum, the syntax for a SELECT statement is:

SELECT fields FROM table

You can use an asterisk (*) to select all the fields in a table. The following example selects all the fields in the Inventory table:

SELECT * FROM Inventory

You can use clauses such as WHERE and ORDER BY in a SELECT statement to restrict and organize your returned data. Table 12-1 shows some SELECT statements and the results that are returned.

SELECT statement	Result
SELECT [FirstName], [LastName] FROM [Employees] WHERE [LastName] = "Cooper";	Displays the values in the FirstName and LastName fields for employees whose last name is Cooper.
SELECT [ProductID], [ProductName] FROM [Products] WHERE [CategoryID] = Forms.[New Products].[CategoryID];	Displays the values for ProductID and ProductName in the Products table for records in which the CategoryID value matches the CategoryID value specified in an open New Products form. Note: "Forms.[New Products].[Category ID]" references the New Products form and the Category-ID field on the form in case a New Products table and field also exist. The "." character is used to substantiate these form and field relationships.
SELECT Avg([ExtendedPrice]) AS [Average Extended Price] FROM [Order Details Extended] WHERE [ExtendedPrice] > 1000;	Displays the average extended price of orders for which the value in ExtendedPrice field is more than 1,000 in a field named Average Extended Price.
SELECT [CategoryID], Count([ProductID]) AS [CountOfProductID] FROM [Products] GROUP BY [CategoryID] HAVING Count([ProductID]) > 10;	Displays the total number of products for categories with more than 10 products in a field named CountOfProductID.

You can enter a SELECT statement in a field or criteria cell in Design view. If you need more space in which to enter the SELECT statement in a field or criteria cell, press Shift+F2 and enter the statement in the Zoom box. You can see the entire SQL statement by changing to SQL view.

In a subquery, you use a SELECT statement to provide a set of one or more specific values to evaluate in the WHERE or HAVING clause expression. A subquery has three parts:

- **Comparison:** An expression and a comparison operator that compares the expression with the results of the subquery
- **Expression:** An expression for which the result set of the subquery is searched
- **Sqlstatement:** A SELECT statement, following the same format and rules as any other SELECT statement. It must be enclosed in parentheses.

Creating a Subquery

In this exercise, you create a subquery that returns only the records from the Inventory table whose asking price is equal to or greater than the average asking price. You also add, remove, and reposition fields while working within the query design grid.

Subqueries are created in Design view. Using the Show Table dialog box, you first need to select the table that contains the desired information. This will add the table window, which contains the table's field list, to Design view. You can then easily add fields from the table window to the design grid at the bottom of the screen by either double-clicking the field name or by clicking and dragging the field to the query design grid. You can remove fields from the query design grid by moving the mouse pointer above the field name you want to remove until the pointer changes to a bold down arrow, clicking, and then pressing Delete on the keyboard, or by clicking the Delete Columns button in the Query Setup group on the Design tab. You can rearrange fields on the grid by moving the mouse pointer above the field you want to move until the pointer changes to a bold down arrow, and then clicking and dragging the field to any position on the grid using the vertical placeholder bar that appears as a guide.
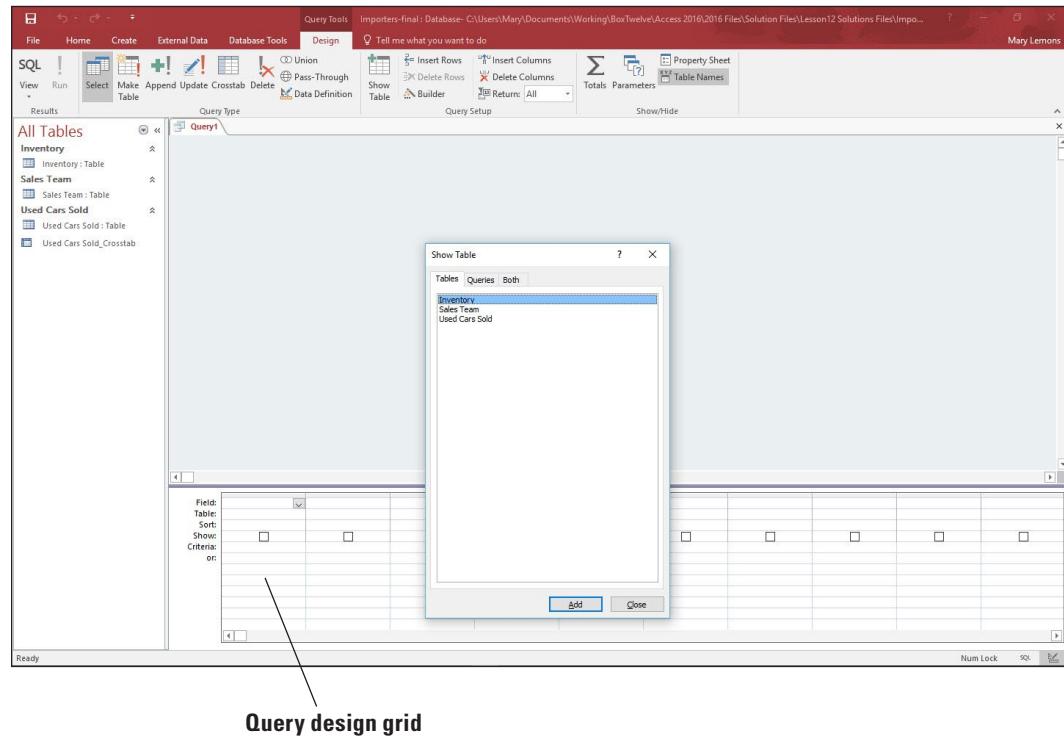
Create a Subquery

GET READY. USE the *Importers-final* database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click **Query Design**. The query design grid opens, and the *Show Table* dialog box appears, as shown in Figure 12-4.

Figure 12-4

The query design grid and Show Table dialog box
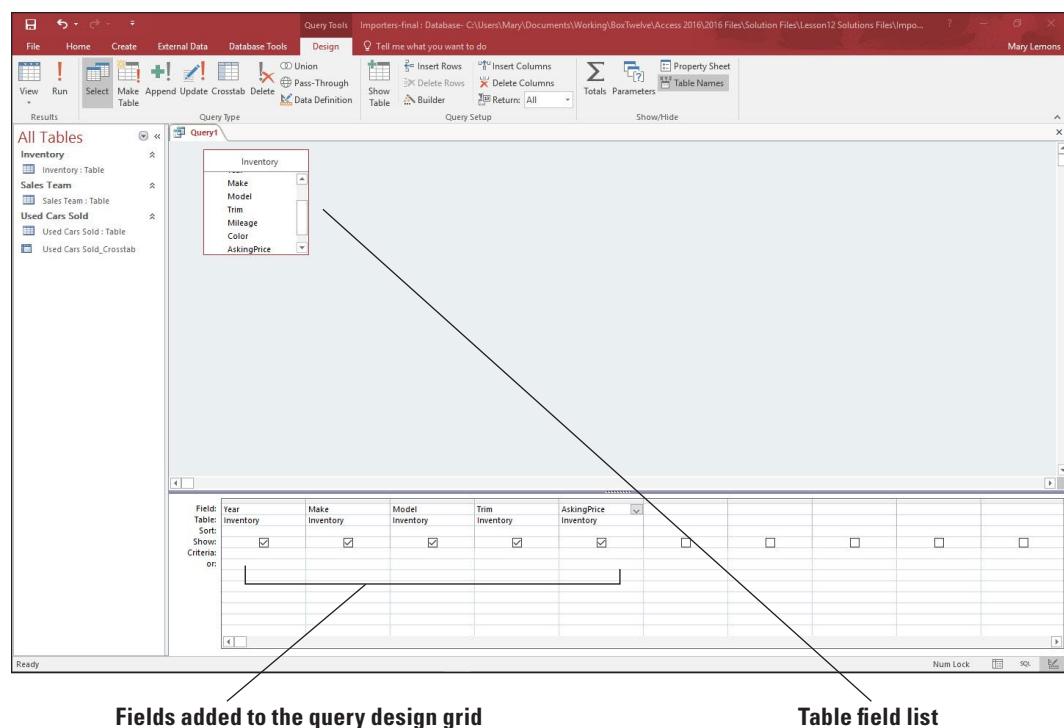
Query design grid

2. On the Tables tab, click **Inventory**, click **Add**, and then click **Close**. The table field list appears as a window in the upper section of the query design grid.
3. In the list of table fields, double-click **Year**, **Make**, **Model**, **Trim**, and **AskingPrice** to add those fields to the design grid at the bottom of the page, as shown in Figure 12-5.

Figure 12-5

Fields added to design grid

Fields added to the query design grid   Table field list

4. Move the insertion point above the Trim field on the design grid until it turns into a bold down arrow. Click to select and highlight the **Trim** column.

5. Press the **Delete** key on the keyboard and the Trim column is deleted. The AskingPrice field moves to the left to replace the Trim column.

6. Move the insertion point above the **Model** field on the design grid until it turns into a bold down arrow. Click to select and highlight the **Model** column.

7. On the Design tab, in the Query Setup group, click the **Delete Columns** button. The Model column is deleted.

8. In the table field list in the Inventory table window, double-click the **Model** field to add it back to the query design grid as the last column.

9. Move the insertion point above the Model field on the design grid until it turns into a bold down arrow. Click to select and highlight the **Model** column. Click and hold the mouse button down and drag the Model field to the left until the black vertical placeholder bar is positioned between the Make and AskingPrice fields and then release the mouse button. Your screen should resemble Figure 12-6.

Figure 12-6

Query design grid

10. Place the insertion point in the Criteria row of the AskingPrice field and then press **Shift+F2** to display the *Zoom* dialog box.
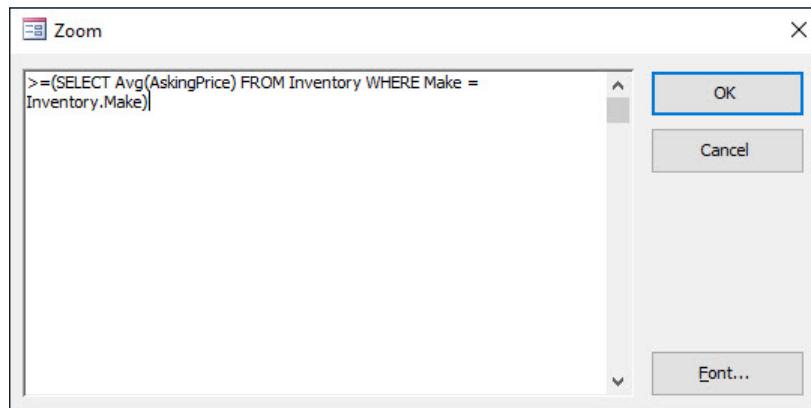
Take Note   The Zoom dialog box is used to create a larger workspace to help you focus on expressions and limit typing errors.

11. Type the following expression in the *Zoom* dialog box, as shown in Figure 12-7, to have the query eventually return all car makes that have an asking price greater or equal to the average asking price for all car makes:

    >=(SELECT Avg(AskingPrice) FROM Inventory WHERE Make = Inventory.Make)

Figure 12-7

Zoom dialog box with expression
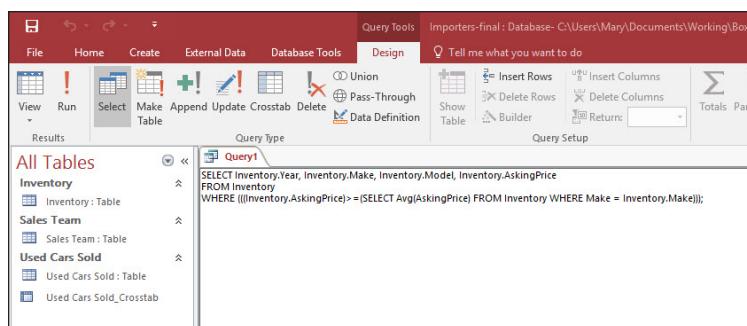
Take Note   Because you are already working inside the Inventory table, the reference in the expression to the Inventory table preceding the Make field can be omitted and the expression can also be constructed as follows: >=(SELECT Avg(AskingPrice) FROM Inventory WHERE Make = Make)

12. Click **OK** to insert the expression in the Criteria row of the **AskingPrice** field.

13. On the Design tab, in the Results group, click the lower half of the **View** button and then click **SQL View** to see the entire expression, as shown in Figure 12-8.

Figure 12-8

Subquery WHERE clause in
SQL View

14. On the Design tab, in the Results group, click **Run**. The query results are displayed, as shown in Figure 12-9.

Figure 12-9

Subquery results

15. Click the **File** tab and then click **Save**.

16. In the *Save As* dialog box, type **Subquery** as the query name and then click **OK**.

17. **CLOSE** the Subquery query.

PAUSE. LEAVE the database open to use in the next exercise.

SAVING A FILTER AS A QUERY

A filter can be saved as a query so it can be run again anytime you want. If you often work with certain filters, you might want to save these filters so you don't waste time defining them each time. You cannot save more than one filter for each table, query, or form; but you can save a filter as a query and then apply the query as a filter when and where you want.

Saving a Filter as a Query
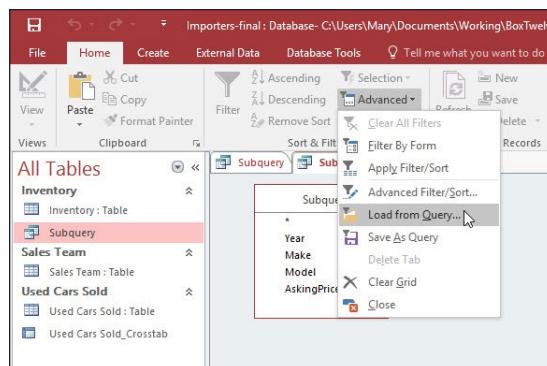
In this exercise, you create a simple select query, filter it, and then save it.

When you want to save a filter as a query, you first use the Query Wizard to create a new query using all the fields from a table or another query. You then use the Filter by Form command to choose the data by which to filter the newly created query and then apply the filter. Next, on the Home tab, in the Sort & Filter group, you click the Advanced button and then click Advanced Filter/Sort. The new query design grid appears. It automatically includes all of the fields you've previously chosen to filter. On the Home tab, in the Sort & Filter group, click the Advanced button and then click Save As Query. Type a name for the query and then click OK.

To apply the query as a filter, click the Advanced button, select Load from Query (see Figure 12-10), and then click it to display the Applicable Filter dialog box.

Figure 12-10

Load from Query on the Advanced menu

Only queries that are based on the same table or query as the form or datasheet will appear in the dialog box. Select the filter, click OK, and then apply the filter.
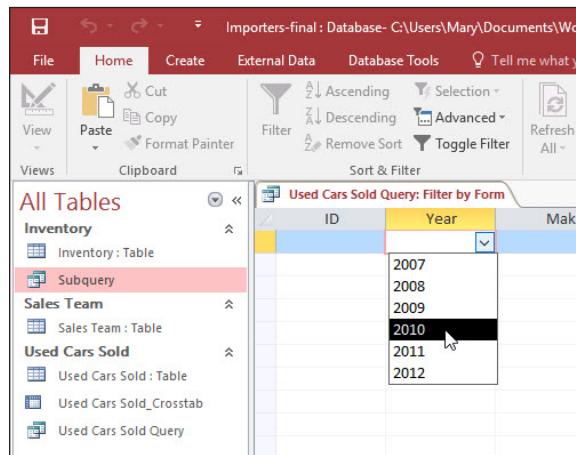
STEP BY STEP   **Save a Filter as a Query**

GET READY. USE the ***Importers-final*** database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click the **Query Wizard** button.
2. In the *New Query* dialog box, click **Simple Query Wizard** and then click **OK**.
3. In the Tables/Queries drop-down list, click **Table: Used Cars Sold**.
4. Click the **>>** button to move all the fields from the Available Fields box to the Selected Fields box and then click **Next**.
5. Click **Next** again to accept the default Detail and then click **Finish** to display a simple select query.
6. On the Home tab, in the Sort & Filter group, click the **Advanced** button and then click **Filter by Form**.
7. In Filter by Form view, click the **Year** field down arrow and then select **2010**, as shown in Figure 12-11. Click **2010**.

Figure 12-11
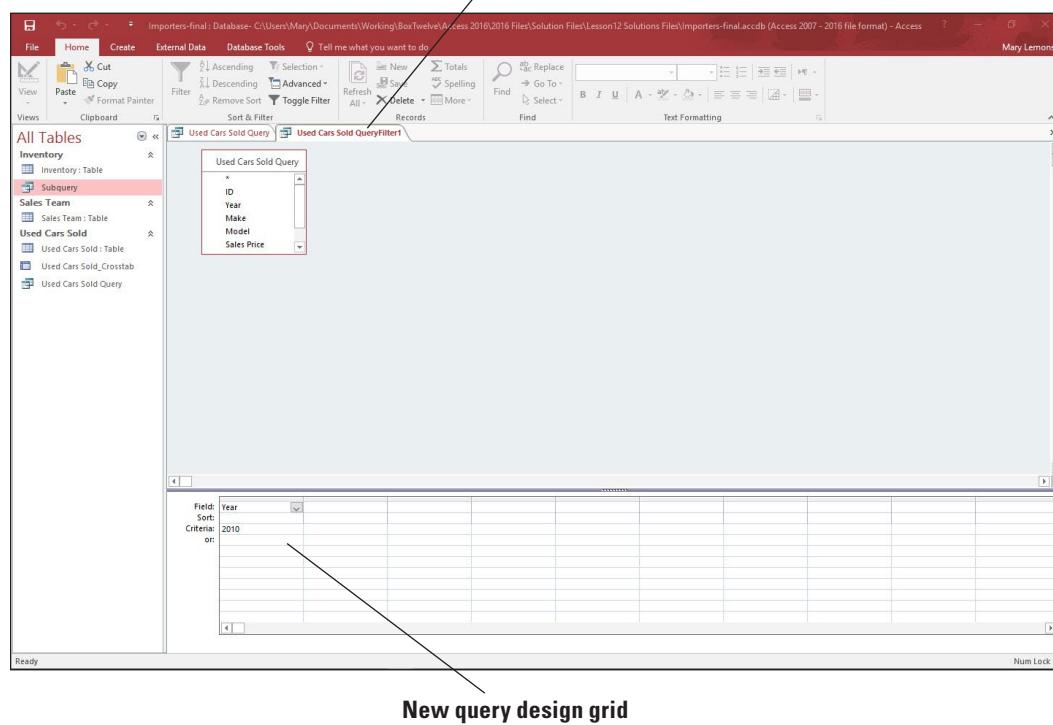
Filter by Form

8. On the Home tab, in the Sort & Filter group, click the **Toggle Filter** button to apply the filter. Only 2010 vehicles are shown in the results.
9. On the Home tab, in the Sort & Filter group, click the **Advanced** button and then click **Advanced Filter/Sort** to display the new query filter design grid and tab, as shown in Figure 12-12.

New query filter tab

New query design grid

10. On the Home tab, in the Sort & Filter group, click the **Advanced** button and then click **Save As Query**. The *Save As Query* dialog box appears.
11. Type **Filter Query** in the Query Name box and then click **OK**.
12. Click the **Close** button to close the Used Cars Sold QueryFilter1 query.
13. On the Home tab, in the Sort & Filter group, click the **Toggle Filter** button to remove the filter.
14. Click the **Close** button to close the Used Cars Sold Query and save the changes when prompted. If another dialog box appears informing you that another user may have changed the data, click **Yes**.

PAUSE. LEAVE the database open to use in the next exercise.

CREATING ACTION QUERIES

An **action query** changes the data in its datasource or creates a new table. There are four types of action queries—append, delete, update, and make table—and except for the make table query, action queries make changes to the data in the tables on which they are based.

As their name suggests, action queries make changes to the data in the tables they are based on (except for make table queries, which create new tables). There are four types of action queries:

- **Append query:** Adds the records in the query's result set to the end of an existing table
- **Delete query:** Removes rows matching the criteria that you specify from one or more tables
- **Update query:** Changes a set of records according to criteria that you specify
- **Make table query:** Creates a new table and then creates records in it by copying records from an existing table

Changes made by action queries cannot be easily undone, so if you later decide you didn't want to make those changes, usually you will have to restore the data from a backup copy. For this reason, you should always make sure you have a current backup of the underlying data before running an action query.

To minimize the risk involved in running an action query, you can first preview the data that will be acted upon by viewing the action query in Datasheet view before running it. When you are ready to run an action query, double-click it in the Navigation Pane or click it and then press Enter. Or, on the Design tab, in the Results group, click Run.

Creating an Append Query

An **append query** adds a set of records from one or more source tables (or queries) to one or more destination tables. Typically, the source and destination tables reside in the same database, but they don't have to. For example, suppose you acquire some new customers and a database that contains a table of information about those customers. To avoid entering that new data manually, you can append it to the appropriate table in your database. In this exercise, you practice creating an append query to append inventory data to the Used Cars Sold.

You can also use append queries to append fields that are based on criteria. For example, you might want to append only the names and addresses of customers who have outstanding orders. Or you can use append queries to append records when some of the fields in one table don't exist in the other table. For example, suppose that your Customers table has 10 fields, and the fields in the Clients table in another database match 8 of your 10 fields. You can use an append query to add only the data in the matching fields and ignore the others.

You cannot use append queries to change the data in individual fields in existing records. To do that type of task, you use an update query. You can only use append queries to add rows of data.

STEP BY STEP | **Create an Append Query**

GET READY. USE the *Importers-final* database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click the **Query Design** button.
2. In the *Show Table* dialog box, double-click **Inventory** to add it to the upper section of the query design grid.
3. Click **Close** to close the *Show Table* dialog box.
4. In the list of table fields, double-click **Year**, **Make**, **Model**, and **Asking Price** to add those fields to the design grid.
5. On the Design tab, in the Results group, click **Run**. Verify that the query returned the records that you want to append, as shown in Figure 12-13.

Figure 12-13

Records to be appended

Take Note   If you need to add or remove fields from the query, go to Design view and double-click to add fields or select the fields that you don't want and then press Delete to remove them from the query.

6. Right-click the document tab (titled **Query1**) for the open query and then choose **Design View** on the shortcut menu.

7. On the Design tab, in the Query Type group, click **Append**. The *Append* dialog box appears, as shown in Figure 12-14.

Figure 12-14
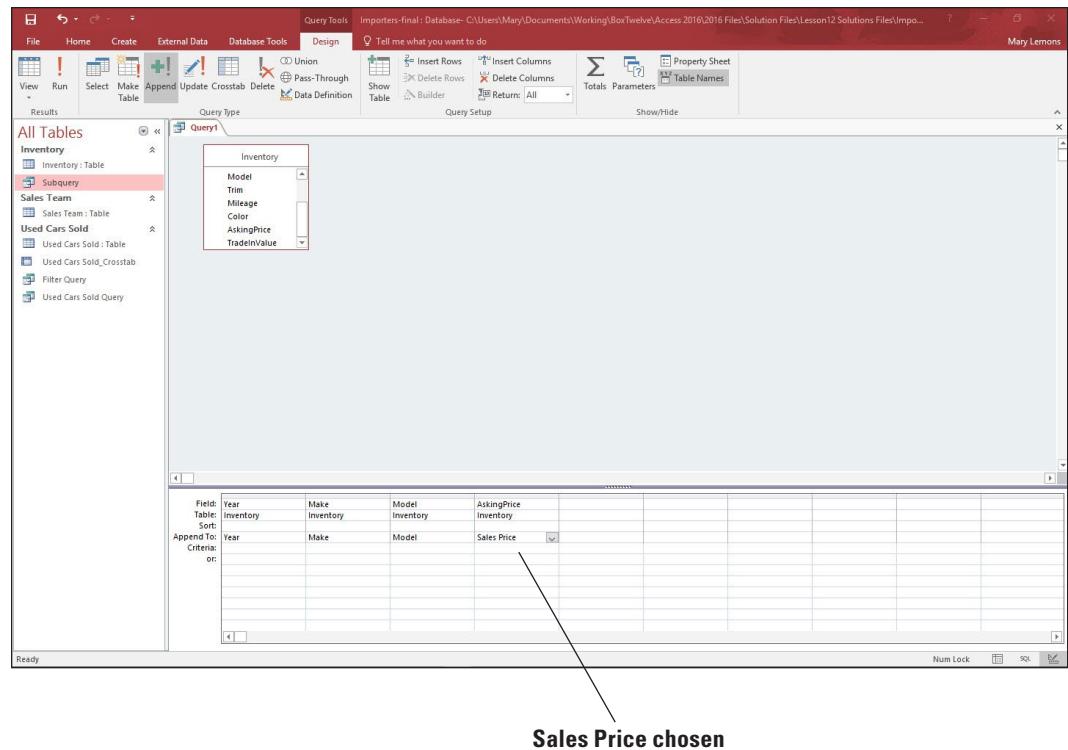
Append dialog box

8. In the Table Name box, click the down arrow and then click **Used Cars Sold**. This is the table you want to append to. The **Current Database** option button should be selected.

9. Click **OK**. Access automatically adds the names of the destination fields that match the source field names to the Append To row in the design grid. Because the Asking Price field doesn't have a match, Access leaves that field blank.

10. Click the blank field in the Append To row under the AskingPrice cell and then select **Sales Price** as the destination field, as shown in Figure 12-15.

Figure 12-15

Source and destination fields matched

Sales Price chosen

11. Right-click the document tab for the query and then choose **Datasheet View** to preview your changes.

12. Right-click the document tab for the query and then choose **Design View**.

13. On the Design tab, in the Results group, click **Run**. An alert message appears asking if you are sure you want to append the selected rows.

14. Click **Yes**.

15. Double-click the **Used Cars Sold** table in the Navigation Pane to open it and scroll down to see that the records from the Inventory table have been appended to the end, as shown in Figure 12-16.

Original records

Figure 12-16

Results of append query

Appended records

16. **CLOSE** the Used Cars Sold table.
17. **SAVE** the query as *Append Query*.
18. **CLOSE** the Append Query query.

PAUSE. LEAVE the database open to use in the next exercise.

Creating a Make Table Query

A **make table query** is an action query that creates a new table and then creates records in it by copying records from an existing table. You use a make table query when you want to create a new table based on query criterion or criteria from an existing table. For example, you may work for a telecommunications provider and be provided with a table with thousands of cellphone service customers who live in various states. You may find it easier to work with a subset of customers from New York, New Jersey, and Connecticut who have had cellphone service for less than one year, since you need to contact and produce reports on only those individuals. A make table query can be advantageous in this example, especially if you want to ensure the data is stored in a separate table (for example, you want to export the data as a table to a new database). If you run a make table query with no criterion or criteria, Access will make a duplicate of the table titled after the name you provide. This is helpful when you need to copy the data in a table or to archive data, especially before you run an append, update, or delete query in case it amends the table data in a way that you don't want. In this exercise, you practice creating a make table query to create a backup of a table.
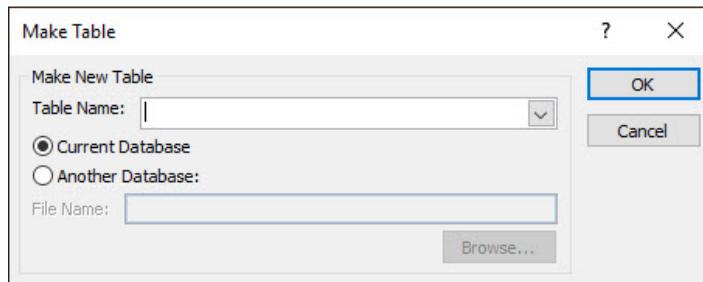
STEP BY STEP | **Create a Make Table Query**

GET READY. USE the *Importers-final* database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click the **Query Wizard** button.
2. In the *New Query* dialog box, click **Simple Query Wizard** and then click **OK**.
3. In the Tables/Queries drop-down list, click **Table: Sales Team**.
4. Click the **>>** button to move all the fields from the Available Fields to the Selected Fields box and then click **Next**.
5. Click **Finish** to display a simple select query.
6. Right-click the **Sales Team Query** document tab and then choose **Design View** to display the query in Design view.
7. On the Design tab, in the Query Type group, click **Make Table**. The *Make Table* dialog box appears, as shown in Figure 12-17.

Figure 12-17

Make Table dialog box

8. In the Table Name box, type **Sales Team Backup**. If it isn't already selected, click **Current Database** and then click **OK**.
9. On the Design tab, in the Results group, click **Run**. An alert message appears asking if you are sure you want to create a new table with the selected records.
10. Click **Yes**. A new table named Sales Team Backup appears in the Navigation Pane.
11. Double-click **Sales Team Backup: Table** in the Navigation Pane to open the new table, as shown in Figure 12-18.

New table

12. **CLOSE** the Sales Team Backup table and the Sales Team query. **SAVE** the changes when prompted.

PAUSE. LEAVE the database open to use in the next exercise.

Creating an Update Query

An **update query** is an action query that changes a set of records according to specified criteria. Use an update query when you need to add, change, or delete the data in one or more existing records. You can think of update queries as a powerful form of the Find and Replace dialog box. In this exercise, you practice making an Update Query.

When making an update query, you enter a select criterion and an update criterion. Unlike the Find and Replace dialog box, update queries can accept multiple criteria. You can use them to update a large number of records in one pass and to change records in more than one table at one time. You can also update the data in one table with data from another—as long as the data types for the source and destination fields match or are compatible.

To create an update query, first create or open a select query. On the Design tab, in the Query Type group, click Update. Access adds the Update To row in the query design grid. Locate the field that contains the data you want to change and then type your change criteria in the Update To row for that field.

You can use any valid expression in the Update To row. Table 12-2 shows some common valid expressions and explains how they change data.

Expression	Result
"Chicago"	In a Text field, sets a text value to Chicago.
#9/25/15#	In a Date/Time field, changes a date value to 25-Sept-15.
Yes	In a Yes/No field, changes a No value to Yes.
"PN" & [PartNumber]	In the PartNumber field, adds "PN" to the beginning of each specified part number.
[UnitPrice] * [Quantity]	Sets a Total field to the result of multiplying values in fields named UnitPrice and Quantity.
[Shipping] * 1.5	In the Shipping field, increases values by 50 percent.
DSum("[Quantity] * [UnitPrice]", "Order Details", "[ProductID] ="& [ProductID])	Where the ProductID values in the current table match the ProductID values in a table named Order Details, this expression updates sales totals when specified in the SalesTotal field by multiplying the values in a field named Quantity by the values in a field named UnitPrice. The expression uses the DSum function because it can operate against more than one table and table field.
Left([PostalCode],5)	In the PostalCode field, removes the rightmost characters in a text or numeric string and leaves the 5 leftmost characters.
IIf(IsNull([SalesPrice]), 0, [SalesPrice])	In the SalesPrice field, changes a null (unknown or undefined) value to a zero (0) value.
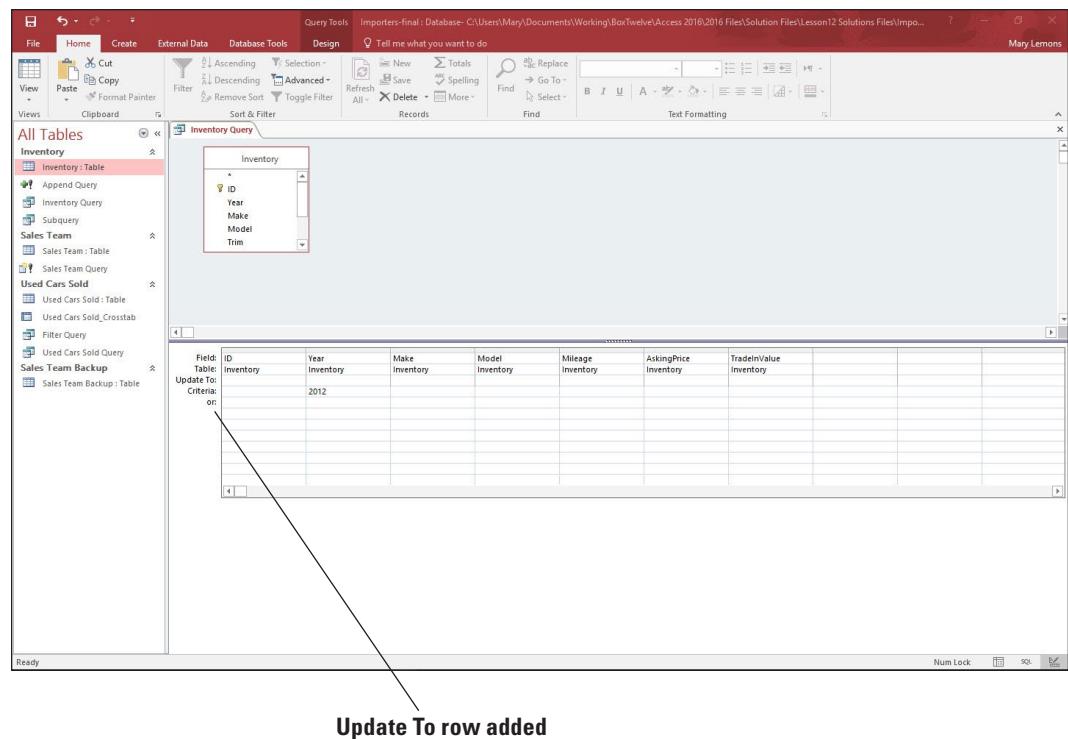
**STEP BY STEP**   **Create an Update Query**

GET READY. USE the *Importers-final* database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click the **Query Wizard** button.
2. In the *New Query* dialog box, click **Simple Query Wizard** and then click **OK**.
3. In the Tables/Queries drop-down list, click **Table: Inventory**.
4. Click the **>>** button to move all the fields from the Available Fields to the Selected Fields box.
5. Click **Trim** and then the **<** button to move it back to the Available Fields box. Click **Color** and then the **<** button to move it back to the Available Fields box. Click **Next**.
6. Click **Next** again and then click **Finish** to display a simple select query in Datasheet view.
7. Right-click the **Inventory Query** document tab and then choose **Design View** to display the query in Design view.
8. Type **2012** in the Criteria row of the Year field.
9. On the Design tab, in the Query Type group, click **Update**. Access adds the Update To row in the query design grid, as shown in Figure 12-19.

Figure 12-19
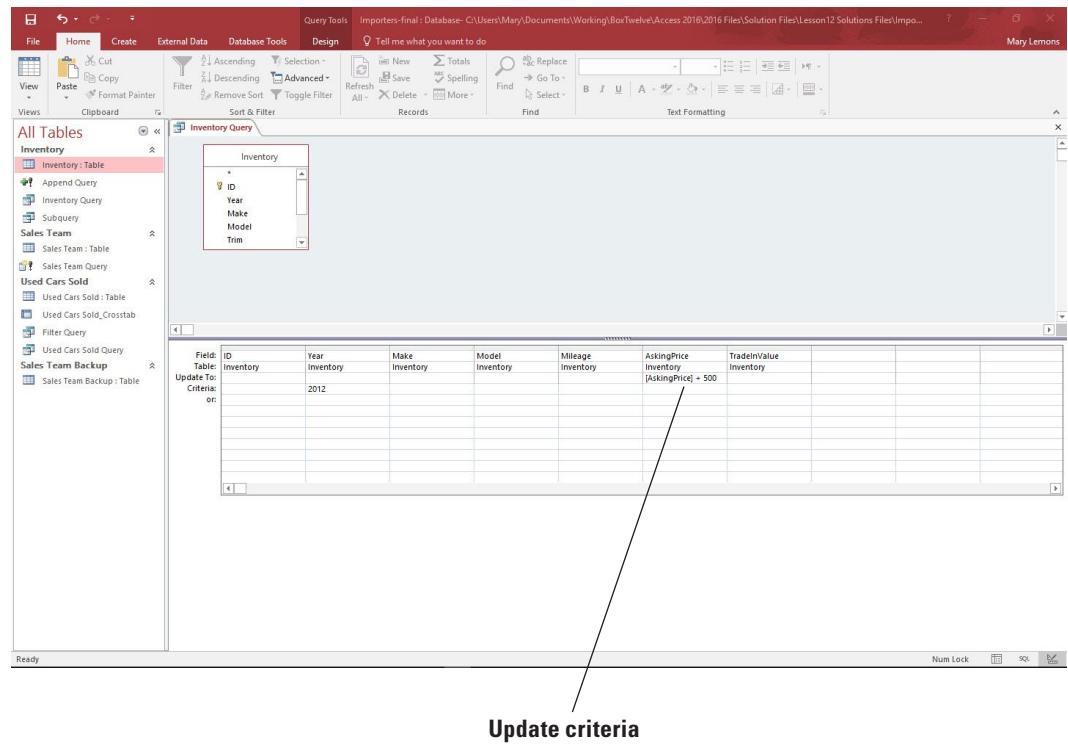
Select query in Design view

Update To row added

10. In the Update To row of the AskingPrice field, type **[AskingPrice] + 500**. The design grid should look similar to Figure 12-20.

Figure 12-20
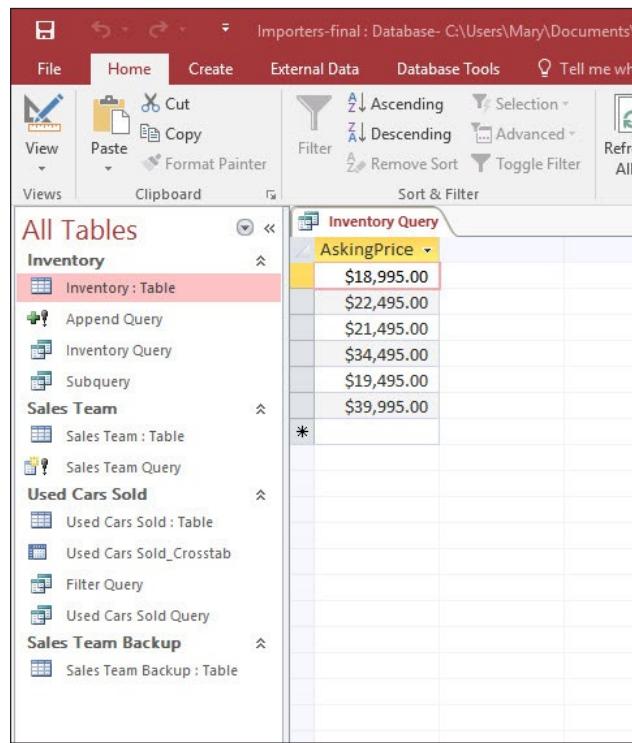
Select and update criterion

Update criteria

11. On the Design tab, in the Results group, click **Run**. An alert message appears asking if you are sure you want to update the records.

12. Click **Yes**.

13. Right-click the **Inventory Query** document tab and then choose **Datasheet View** to display the update query results, as shown in Figure 12-21. The query contains fields that you don't update, so Access does not display those fields in the results.

14. **CLOSE** the Inventory query and then **SAVE** the changes when prompted.

15. Double-click **Inventory: Table** in the Navigation Pane to open it. Notice that the asking price for all 2012 cars has been increased by $500.

16. **CLOSE** the Inventory table.

PAUSE. LEAVE the database open to use in the next exercise.

Creating a Delete Query

A **delete query** is an action query that removes rows matching the criteria that you specify from one or more tables. A delete query is used to delete entire records from a table, along with the key value that makes a record unique. Typically, delete queries are used only when you need to change or remove large amounts of data quickly. To remove a small number of records, open the table in Datasheet view, select the fields or rows that you want to delete, and then press Delete.

To create a delete query, first create or open a select query and add criteria to return the records you want to delete. On the Design tab, in the Query Type group, click Delete. Access changes the select query to a delete query, hides the Show row in the lower section of the design grid, and adds the Delete row. The word Where appears in the Delete row for all fields of the query.

When you click Run, Access prompts you to confirm the deletion. Click Yes to delete the data and then open the table to see that the records have been deleted.

STEP BY STEP   **Create a Delete Query**

GET READY. USE the *Importers-final* database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click **Query Wizard**.
2. In the *New Query* dialog box, click **Simple Query Wizard** and then click **OK**.
3. In the Tables/Queries drop-down list, click **Table: Used Cars Sold**.
4. Click the **>>** button to move all the fields from the Available Fields to the Selected Fields box and then click **Next**.
5. Click **Next** again.
6. Type **Delete Query** as the title and then click **Finish** to display the results of the simple select query.
7. Right-click the **Delete Query** document tab and then choose **Design View** to display the query in Design view.
8. Type **<#3/31/2016#** in the Criteria row of the Date Sold field, as shown in Figure 12-22.

Figure 12-22

Date Sold criteria

9. On the Design tab, in the Results group, click **Run** to display the records to be deleted, as shown in Figure 12-23.

Figure 12-23

Records to be deleted

10. Right-click the **Delete Query** document tab and then choose **Design View** to display the query in Design view.
11. On the Design tab, in the Query Type group, click **Delete**. Access hides the Show row in the lower section of the design grid and adds the Delete row, as shown in Figure 12-24.

Figure 12-24

Delete row in design grid

Delete row added

12. On the Design tab, in the Results group, click **Run**. An alert message appears, asking if you are sure you want to delete the selected records.

13. Click **Yes**.

14. Double-click **Used Cars Sold: Table** in the Navigation Pane to open it. Notice that all the records for cars sold before March 31, 2016, have been deleted, as shown in Figure 12-25.

Figure 12-25

Table with records deleted

15. **CLOSE** the Used Cars Sold table and Delete Query. **SAVE** the changes when prompted.

PAUSE. LEAVE the database open to use in the next exercise.

UNDERSTANDING ADVANCED QUERY MODIFICATION

After a query has been created, you can modify it in various ways to suit your purposes—by creating a join, creating calculated fields, or using aggregated functions.

Creating a Join

Relational databases consist of tables that have logical relationships to each other. You use relationships to connect tables based on fields they have in common. A relationship between identical fields in different tables is represented by a **join** in Design view. When you include multiple tables in a query, you use joins to help you get the results you want. A join helps a query return only the records from each table you want to see based on how those tables are related to other tables in the query. When you add tables to a query, Access creates joins that are based on relationships that

have been defined between the tables. You can manually create joins known as ad hoc relationships in queries, even if they do not represent relationships that have already been defined. In this exercise, you create a join between tables.

Take Note   If the relationship is one-to-many, Access displays a "1" above the join line to show which table is on the "one" side and an infinity symbol (∞) to show which table is on the "many" side.

The four basic types of joins are inner joins, outer joins, cross joins, and unequal joins. An **inner join** includes rows in the query only when the joined field matches records in both tables. Inner joins are the most common type of join. Most of the time, you don't need to do anything to use an inner join. Access automatically creates inner joins if you add two tables to a query and those tables each have a field with the same name and the same or compatible data type and one of the join fields is a primary key.

An **outer join** includes all of the rows from one table in the query results and only those rows from the other table that match the join field in the first table. You create outer joins by modifying inner joins. To create an outer join, double-click the line joining the tables to display the Join Properties dialog box. In the Join Properties dialog box, Option 1 represents an inner join. Option 2 is a **left outer join**, where the query includes all of the rows from the table on the left and only those records from the table on the right that match the join field in the left table. Option 3 is a **right outer join**, where the query includes all of the rows from the table on the right and only those rows from the table on the left that match the join field in the right table.

Because some of the rows on one side of an outer join will not have corresponding rows from the other table, some of the fields returned in the query results from the other table will be empty when the rows do not correspond.

Take Note   To tell which table is the left table or the right table in a given join, double-click the join to view the Join Properties dialog box.

In a **cross join**, each row from one table is combined with each row from another table. Any time you run a query that has tables that are not explicitly joined, a cross join is produced. Cross joins are usually unintentional, but there are cases where they can be useful. A cross join can be used if you want to examine every possible combination of rows between two tables or queries.

If you want to combine the rows of two sources of data based on field values that are not equal, you use an unequal join. Typically, unequal joins are based on either the greater than (>), less than (<), greater than or equal to (>=), or less than or equal to (<=) comparison operators. Unequal joins are not supported in Design view. If you wish to use them, you must do so in SQL view.

⚠️ **Troubleshooting**   If you create a join by mistake, for example, a join between two fields that have dissimilar data types, you can delete it. In the query design grid, click the join you want to remove and then press Delete.
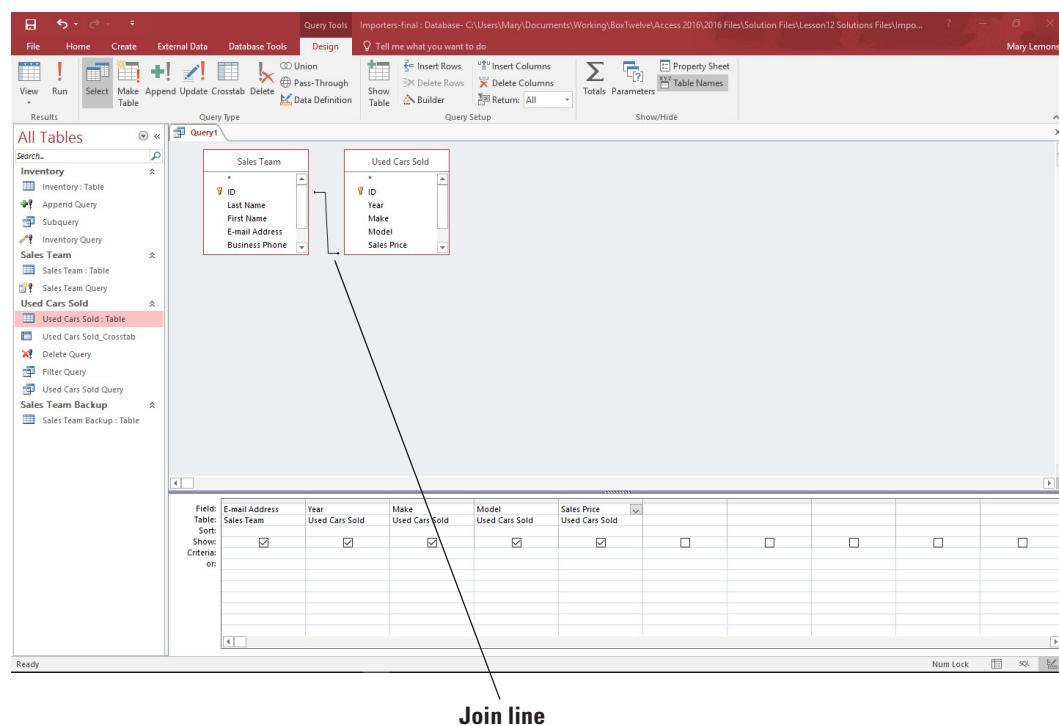
STEP BY STEP   **Create a Join**

GET READY. USE the *Importers-final* database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click **Query Design**.
2. In the *Show Table* dialog box, double-click **Sales Team** and **Used Cars Sold** to add them to the design grid.
3. Click **Close**.
4. In the Sales Team field list, double-click **E-mail Address**.
5. In the Used Cars Sold field list, double-click **Year**, **Make**, **Model**, and **Sales Price**. Your screen should look similar to Figure 12-26.
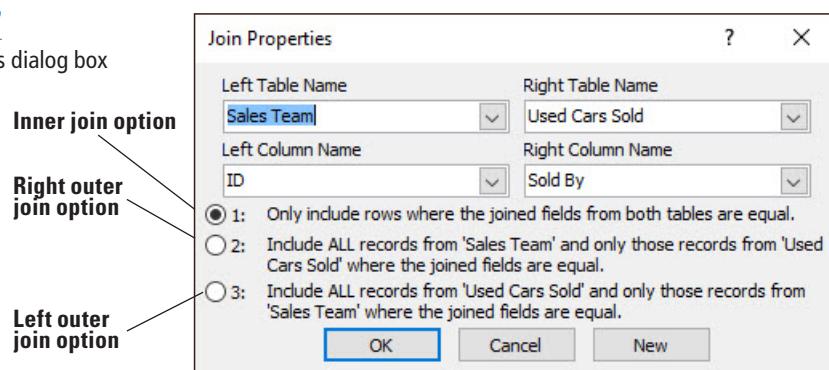
Join line

6. Double-click the join line between the tables, indicating which fields are joined. The *Join Properties* dialog box opens, as shown in Figure 12-27.

Inner join option

Right outer join option
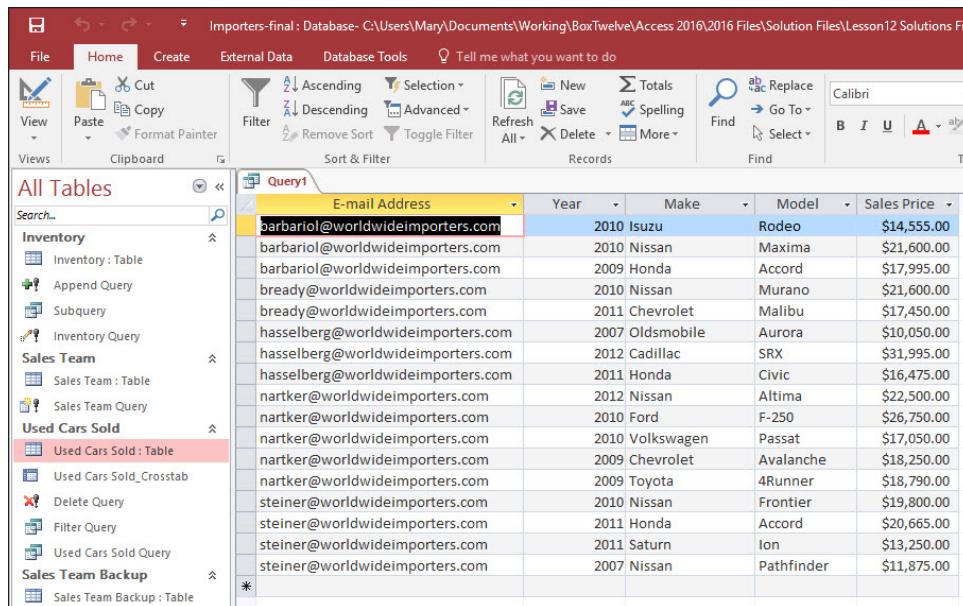
Left outer join option

7. Click the option button for option **2:** and then click **OK** to create a left outer join.

8. On the Design tab, in the Results group, click **Run**.

9. The results of the query are displayed, as shown in Figure 12-28. Results include all of the rows from the first table and only those records from the second table that match the join field in the first table.

Figure 12-28

Left outer join

10. **SAVE** the query as *Join Query* and then **CLOSE** the query.

PAUSE. LEAVE the database open to use in the next exercise.

Creating a Calculated Query Field

You can create a new field that displays the results of a calculation you define with an expression or that manipulates field values. A **calculated field** is a column in a query that results from an expression. For example, you can calculate a value; combine text values, such as first and last names; or format a portion of a date. You can also format the calculated field value by choosing an appropriate format in the Property Sheet pane. In this exercise, you use the Expression Builder to create a calculated query by subtracting two fields to determine a markup price in both U.S. dollars and Euros.

You can use expressions that perform arithmetic operations in calculated fields using basic operators (+,-,*,/) to add, subtract, multiply, and divide the values in two or more fields. You can also perform arithmetic operations on dates or use expressions that manipulate text. Table 12-3 shows examples of expressions and basic operators that you can use in calculated fields. The results can then be formatted by selecting the calculated field and then selecting a format in the Format box of the Property Sheet pane. For example, a number can be formatted in several different ways, including as Currency or Scientific values. The Property Sheet button in the Show/Hide group on the Design tab displays the Property Sheet pane.

Table 12-3

Expressions that can be used in calculated fields

Expression	Description
PrimeShip: [Ship] * 1.1	Creates a field called PrimeShip, and then displays shipping charges plus 10 percent in the field.
OrderAmount: [Quantity] * [Price]	Creates a field called OrderAmount, and then displays the product of the values in the Quantity and Price fields.
LeadTime: [RequiredDate] - [ShippedDate]	Creates a field called LeadTime, and then displays the difference (in number of days) between the values in the RequiredDate and ShippedDate fields.
TotalInventory: [UnitsInStock] + [UnitsOnOrder]	Creates a field called TotalInventory, and then displays the sum of the values in the UnitsInStock and UnitsOnOrder fields.
FullName: [FirstName] & " " & [LastName]	Creates a field called FullName that displays the values in the FirstName and LastName fields, separated by a space. ("&" is called the concatenation operator and is used to put strings together.)
Address2: [City] & " " & [Region] & " " & [PostalCode]	Creates a field called Address2 that displays the values in the City, Region, and PostalCode fields, separated by spaces. ("&" is called the concatenation operator and is used to put strings together.)

A well-designed database does not store simple calculated values in tables. For example, a table might store an employee's hire date, but not how long she has worked for the company. If you know both today's date and the employee's date of hire, you can always calculate her employment length, so there is no need to store that in the table. Instead, you create a query that calculates and displays the pertinent value. The calculations are made every time you run the query, so if the underlying data changes, so do your calculated results.

To create a calculated field, first open or create a query and then change to Design view. In the Field row of the first blank column in the design grid, type the expression. You can use the Zoom box to access a larger screen area to help you enter the expression or, as you learned in Lesson 8, you can use the Expression Builder to easily select the elements of the expression (fields, operators, and built-in functions) from menus. To name the field, type a name followed by a colon before the expression. If you do not supply a name, Access uses a generic name for the field, for example, EXPR1. The string following the colon is the expression that supplies the values for each record. To see the SQL code, you can change to SQL View.

STEP BY STEP   **Create a Calculated Query Field**
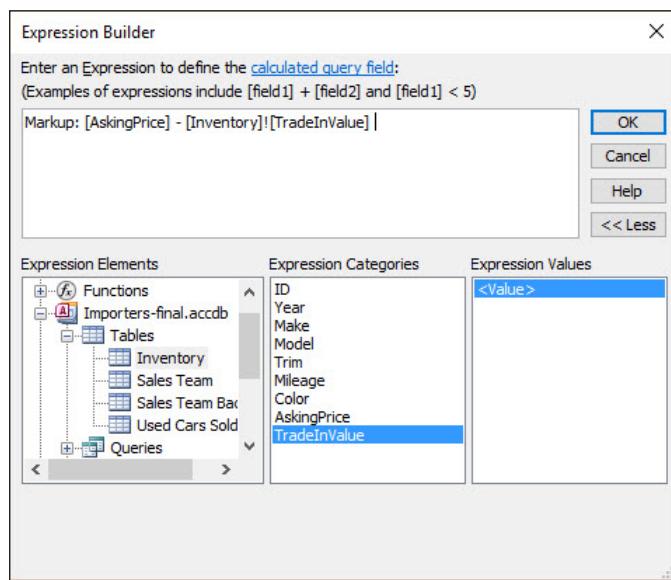
GET READY. USE the *Importers-final* database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click **Query Design**.
2. In the *Show Table* dialog box, double-click **Inventory** to add the table to the design grid.
3. Click **Close**.
4. In the Inventory field list, double-click **Year**, **Make**, **Model**, **AskingPrice**, and **TradeInValue**.
5. Click the **Field** cell in the first blank column (to the right of the TradeInValue field) and then click the **Builder** button in the Query Setup group to open the *Expression Builder* dialog box.
6. In the blank area of the dialog box, type the following:
   Markup: [AskingPrice]
7. In the Expression Elements category, click **Operators**.

8. In the Expression Values category, double-click the **minus sign (-)**. The minus sign should appear in the expression and next to the AskingPrice field.

9. In the Expression Elements category, click the **expand** button next to Importers-final. accdb. Tables, Queries, Forms, and Reports should appear under Importers-final.accdb.

10. In the Expression Elements category, click the **expand** button next to Tables to expand it. The available table names appear. Click **Inventory**. The available fields from the Inventory table should appear in the Expression Categories box.

11. In the Expression Categories box, double-click **TradeInValue**; [Inventory]! [TradeInValue] should appear in the expression and next to the minus sign (-). Your screen should resemble Figure 12-29.

Figure 12-29

Expression Builder with Expression Elements expanded and expression complete
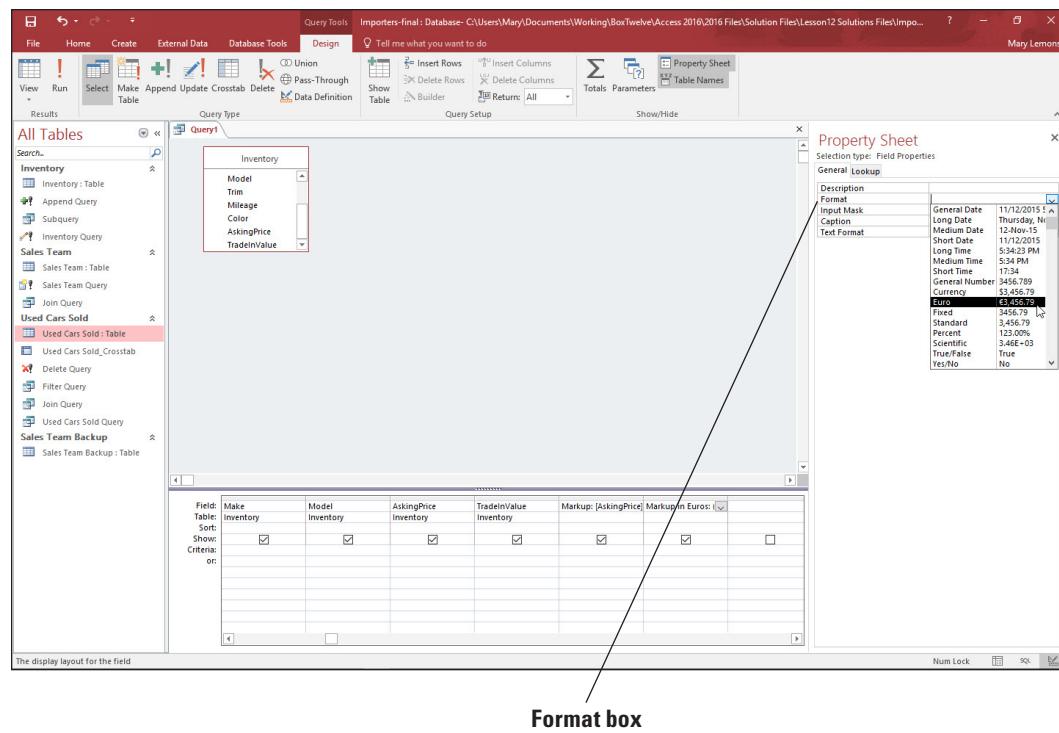
Take Note The part of the expression that reads [Inventory]![TradeInValue] specifies that the TradeInValue field originates from the Inventory table; however, even though Access automatically formats it this way, this expression format is not required since you're already referencing the Inventory table in the Table row of the design grid.

12. Click **OK**.

13. Click the **Field** cell in the first blank column (to the right of the newly created calculated field) and then click the **Builder** button in the Query Setup group to open the Expression Builder dialog box.

14. In the blank area of the dialog box, type the following:
    Markup in Euros: ([AskingPrice] - [TradeInValue]) * .92

15. Click **OK**. Make sure your cursor is still in the Markup in Euros cell.

16. On the Design tab, in the Show/Hide group, click the **Property Sheet** button. The Property Sheet pane for the Markup in Euros expression is displayed.

17. Click the empty cell next to the Format box, and then click the down arrow to display the Format menu, as shown in Figure 12-30. Select **Euro** from the options that appear to format the expression result as Euro.

Figure 12-30

Format menu

Format box

18. On the Design tab, in the Results group, click **Run**. The query with the new calculated Markup and Markup in Euros fields is displayed, as shown in Figure 12-31.

New field

Figure 12-31

Calculated field query results

19. SAVE the query as *Calculated Query* and then **CLOSE** the query.

20. Select the Calculated Query in the Navigation Pane.

21. On the Create tab, in the Reports group, click **Report**.

22. Select **File**, **Print**, and then click **Print Preview**. Change the layout to **Landscape**.

23. Click **OK** on the dialog box about report width.

24. SAVE the report as *Calculated Query* and then **CLOSE** the report.

PAUSE. LEAVE the database open to use in the next exercise.

Creating Aggregated Queries

An **aggregate function** performs a calculation on a set of values and then returns a single value, so it "groups" data. You can add, count, or calculate other aggregate values and display them in a special row, called the Total row, which appears below the asterisk (*) row in Datasheet view. You can use a different aggregate function for each column and you can also choose not to summarize a column. You can use aggregated functions to count the data returned by a query, calculate average values, and find the smallest, largest, earliest, and latest values using a feature called the Total row, which doesn't alter the design of your query. You can work with the Total row in both query Design and query Datasheet views. In this exercise, you create an aggregated query using the Total row in both query Design and query Datasheet views. You will use both arithmetic and logical operators to group data.

Take Note The arithmetic operators were mentioned earlier. The logical operators are And, Eqv (equivalent), Not, Or, and Xor (exclusive or).

You can also apply aggregated functions in Design view where you have the ability to use the Group By function in the Total row on the design grid. The Group By function can be used in combination with other fields and aggregated functions. For example, if you're managing a human resource database, you can group by employees' gender and display the average salary per group.

The following aggregated functions are available in both Datasheet view and Design view:

- **Count:** Counts the number of items in a column
- **Sum:** Sums a column of numbers
- **Average:** Averages a column of numbers
- **Maximum:** Finds the highest value in a column
- **Minimum:** Finds the lowest value in a column
- **Standard Deviation:** Measures how widely values are dispersed from an average value (a mean) in a column
- **Variance:** Measures the statistical variance of all values in a column

The following additional aggregated functions are available in Design view:

- **First:** Finds the first value in a field
- **Last:** Finds the last value in a field
- **Expression:** Groups data based on an expression you can specify
- **Where:** Groups data based on criteria you can specify

Take Note Many of the aggregated functions work only on data fields set to specific data types. For example, if you are in a column that only displays text values, some functions—such as Sum or Average—are not relevant, and are therefore not available.

STEP BY STEP   **Create an Aggregated Query**

GET READY. USE the *Importers-final* database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click **Query Design**.

2. In the *Show Table* dialog box, double-click **Inventory** to add the table's field list window to the design grid.

3. Click **Close**.

4. In the Inventory field list, double-click **Year**, **Make**, **Model**, **Mileage**, **AskingPrice**, and **TradeInValue** to add them to the design grid.

5. On the Design tab, in the Results group, click **Run**.

6. On the Home tab, in the Records group, click the **Totals** button. Scroll down, if necessary, to see the Total row at the bottom of the result set.

7. In the Total cell of the **Year** field, click the down arrow to display the menu and then click **Count**. Notice the cell displays 26, denoting 26 values (years) in the Year column.

8. Click the down arrow in the **Total** cell of the Mileage field and then click **Average**.

9. Click the down arrow in the **Total** cell of the AskingPrice field and then click **Maximum**.

10. Click the down arrow in the **Total** cell of the TradeInValue field and then click **Sum**. Your Total row should appear similar to Figure 12-32.

Figure 12-32

Aggregate function results

Count   Average   Maximum   Sum

Take Note   You can't see the formulas in the fields but you are using arithmetic operators to group this data.

11. Change to Design view and remove the **Model**, **Mileage**, **AskingPrice**, and **TradeInValue** fields from the design grid. The Year and Make fields should be the only ones remaining on the grid.

12. On the Design tab, in the Show/Hide group, click the **Totals** button. A new Totals row should appear below the Table row on the design grid.

13. Click the Group By cell below the Make field cell and then click the **down arrow** to display the aggregate function menu.

14. Select the **Count** aggregate function from the menu, as shown in Figure 12-33. Click **Count**.

Aggregate function menu in Total row

Figure 12-33

Aggregate function menu in Design view

15. Change to Datasheet view. Your screen should resemble Figure 12-34. Notice the records in the Make field are grouped by Year and counted with the results appearing in a new column named CountOfMake. Also notice the Year field is grouped and each year remains counted as applied from the aggregate function we created previously in Datasheet view.

Figure 12-34

Aggregate function results

16. **SAVE** the query as *Aggregated Query* and then **CLOSE** the query.

PAUSE. LEAVE the database open for the next exercise.

STEP BY STEP   **Use Arithmetic and Logical Operators to Group Data**
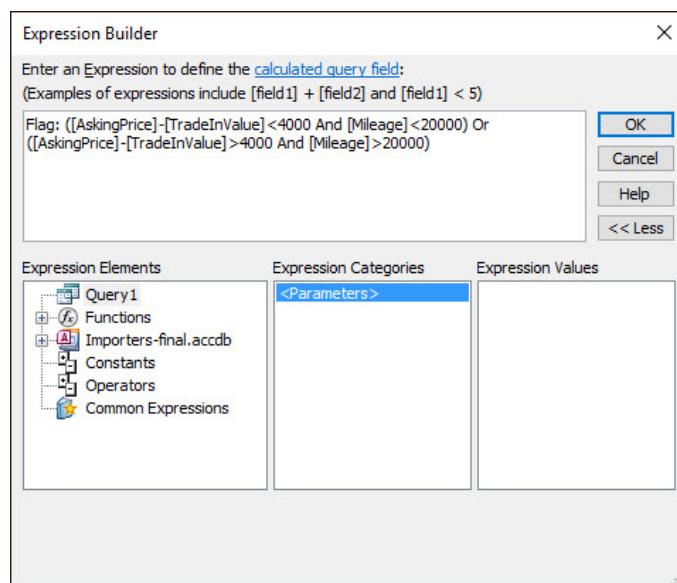
GET READY. USE the *Importers-final* database that is open from the previous exercise.

1. On the Create tab, in the Queries group, click **Query Design**.
2. In the *Show Table* dialog box, double-click **Inventory** to add the table's field list window to the design grid.
3. Click **Close**.
4. In the Inventory field list, double-click **Year**, **Make**, **Model**, **Mileage**, **AskingPrice**, and **TradeInValue** to add them to the design grid.
5. Click the **Field** cell in the first blank column (to the right of the TradeInValue field) and then click the **Builder** button in the Query Setup group to open the *Expression Builder* dialog box.
6. In the blank area of the dialog box, type the following or use the Expression Elements to create the following formula, as shown in Figure 12-35:

   Flag: ([AskingPrice]-[TradeInValue] <4000 And [Mileage] <20000) Or ([AskingPrice]-[TradeInValue] >4000 And [Mileage] >20000)

Figure 12-35

Logical and arithmetic operators in an expression

Take Note In the expression, you will notice a combination of operators. The And and Or operators are logical operators, whereas the – is an arithmetic operator, and the < and > signs are comparison operators.

7. This expression flags the cars that cost more than $4000 ([AskingPrice] - [TradeInValue]) and have a mileage of more than 20,000 miles ([Mileage]), and the cars that cost less than $4,000 and have less than 20,000 miles. Click **OK**.

8. On the Design tab, in the Show/Hide group, click the **Totals** button. A new Totals row should appear below the Table row on the design grid.

9. Select **Sum** from the Group By menu in the Total row of the Flag field.

10. Click the **Field** cell in the Total column of the new Flag field.

11. On the Design tab, in the Results group, click **Run**.

12. If the total row does not appear, click **Totals** on the Records tab of the Home tab, and then select **Sum** from the Flag fields Total drop down. The Flag expression field has a 0 where the expression is false and a -1 where the expression is true. At the bottom of the Flag column, you see that there are 11 cars that fulfill the expression, as shown in Figure 12-36.

Figure 12-36

Cars that fulfill the expression

13. To make it easier to see which cars are selected, select the **Flag** column, click **Selection** in the Sort & Filter group, and then select **Does Not Equal 0**. Now you can see all high-mileage cars that may be overpriced (since there are no low mileage cars that are underpriced).

14. **SAVE** the query as *Mileage Query* and then **CLOSE** the query.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Fill in the Blank

Complete the following sentences by writing the correct word or words in the blanks provided.

1. A(n) _____ removes rows matching the criteria you specify from one or more tables.

2. To minimize the risk of running an action query, you can first preview the data that will be acted upon by viewing the action query in _____ view before running it.

3. You can use the Group By function in the _____ row on the design grid in query Design view.

4. A(n) _____ query always includes three types of data: the data used as row headings, the data used as column headings, and the values that you want to sum or otherwise compute.

5. To be able to apply a filter when and where you want, save the filter as a(n) _____ .

Multiple Choice

Select the best response for the following statements or questions.

1. Which type of query displays its results in a grid similar to an Excel worksheet?
   a. Crosstab
   b. Append
   c. Aggregated
   d. Subquery

2. Which of the following is not a type of join?
   a. Inner join
   b. Exterior join
   c. Cross join
   d. Unequal join

3. Which of the following is not an aggregated function?
   a. Lowest
   b. Sum
   c. Average
   d. Count

4. Which of the following is pressed to open the Zoom box, which provides you with more space in which to enter the SELECT statement in a field or criteria cell?
   a. Shift+F2
   b. Ctrl+2
   c. Shift+Enter
   d. Ctrl+Spacebar

5. To display the pane used to format a calculated value in query Design view, click the _____ button in the Show/Hide group on the Design tab of the Ribbon.
   a. Undo
   b. Property Sheet
   c. Datasheet View
   d. Totals

Projects

Project 12-1: Creating a Calculated Query Field

In your job as a travel agent at Margie's Travel, you are frequently asked the length of various trips. So that you don't have to calculate it mentally, you will create a calculated field that will give you this information.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *M Travel* database from the data files for this lesson and then **SAVE** the database as *M Travel-final*.
2. On the Create tab, in the Queries group, click **Query Design**.
3. In the *Show Table* dialog box, double-click **Events** to add the table to the design grid.
4. Click **Close**.
5. In the Inventory field list, double-click **Event**, **StartDate**, and **EndDate** to add the fields to the design grid.
6. Click the **Field** cell in the first blank column after EndDate and then press **Shift+F2** to open the *Zoom* dialog box.
7. In the *Zoom* dialog box, type the following expression:
   TripLength: [EndDate] - [StartDate]
8. Click **OK**.
9. On the Design tab, in the Results group, click **Run**. The query is displayed, with a new **TripLength** field calculating the number of days for each trip.
10. **SAVE** the query as *Calculated Query* and then **CLOSE** the query.
11. **CLOSE** the database.

PAUSE. LEAVE Access running for the next project.

Project 12-2: Saving a Filter as a Query and Creating a Subquery

As sales manager for Fourth Coffee, you frequently run the same filters on the database. Now that you have learned to save a filter as a query, you can save yourself some time. You are also interested in extracting specific information about monthly sales for all Fourth Coffee stores from the database. Create a subquery to determine which months and corresponding stores have sales that are above average.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** *Fourth Coffee* from the data files for this lesson and then **SAVE** the database as *Fourth Coffee-final*.
2. On the Create tab, in the Queries group, click the **Query Wizard** button.
3. In the *New Query* dialog box, click **Simple Query Wizard** and then click **OK**.
4. In the Tables/Queries drop-down list, click **Table: Order Summary**.
5. Click the **>>** button to move all the fields from the Available Fields to the Selected Fields box and then click **Next**.
6. Click **Next** again and then click **Finish** to display a simple select query.
7. On the Home tab, in the Sort & Filter group, click the **Advanced** button and then click **Filter by Form**.
8. In the Filter by Form, click the down arrow in the **Status** field and then click **Completed**.
9. On the Home tab, in the Sort & Filter group, click the **Toggle Filter** button to apply the filter. The results are displayed.
10. On the Home tab, in the Sort & Filter group, click the **Advanced** button and then click **Advanced Filter/Sort** to display the new query design grid.

11. On the Home tab, in the Sort & Filter group, click the **Advanced** button and then click **Save As Query**. The *Save As Query* dialog box appears.

12. Type **Filter Query** in the Query Name box and then click **OK**.

13. **CLOSE** the Order Summary QueryFilter1 query.

14. On the Home tab, in the Sort & Filter group, click the **Toggle Filter** button to remove the filter.

15. **CLOSE** the Order Summary Query and **SAVE** the changes when prompted. If presented with a message box stating the query has been changed, click **Yes**.

16. On the Create tab, in the Queries group, click **Query Design**.

17. Use the *Show Table* dialog box to add the **Monthly Sales by Store** table to the upper section of the query design grid and then close the *Show Table* dialog box.

18. Add the **Month**, **Store**, and **Sales** fields to the design grid.

19. Place the insertion point in the Criteria row of the Sales field and display the Expression Builder.

20. Type the following expression in the Expression Builder, using the available categories and menus:

    > (SELECT AVG([Sales]) FROM [Monthly Sales by Store])

21. Click **OK**.

22. Use the Property Sheet pane to change the calculated field format to Euro.

23. On the Design tab, in the Results group, click **Run** to display the query results.

24. **SAVE** the query as *Subquery* and then **CLOSE** the query.

STOP. CLOSE the database and then **EXIT** Access.

13 Displaying and Sharing Data

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Creating a Chart Using the Chart Wizard	Add report controls.	5.2.3
Formatting a Chart	Modify data sources.	5.2.2
Saving a Database Object as Another File Type	Save a query.	3.1.6
Printing a Database Object	Print reports.	1.5.1

CREATING A CHART USING THE CHART WIZARD

Charts are often used in the business world to give a visual representation of numeric data. Because a picture is worth a thousand words, charts play an important role in reports and presentations. In Access 2016, you can insert a chart into a new or existing form or report using the Chart control.

Creating a Chart Using the Chart Wizard

The Chart control lets you insert a chart into a new or existing report or form using a table or query as your data source. This allows you to insert a pictorial view of the data along with the numbers. Once a chart has been inserted, the Chart Wizard asks you questions about the chart you want and then creates the chart based on your answers. In this exercise, you will insert a chart into the Page Footer section of a report because it is a one-page report and it is helpful to show the data at the bottom of the page after the columnar data.

Take Note   Charts and graphs are terms used synonymously in Microsoft Access. For example, the Chart control inserts a chart into reports or forms; however, a chart is referred to as a graph in Visual Basic for Applications (VBA) code.

A **chart** is a graphical representation of data. Although charts can contain various components used to help make data more meaningful, most are made up of two basic parts; the body and the legend. The **chart body** is the main area that displays the chart. The **legend** displays a list of the colors, shapes, or patterns used as categories in a chart.

Once a chart has been inserted into a report or form using the Chart control, the **Chart Wizard** asks you questions to quickly create a customized chart. Once you insert a chart, you may need to resize it later; you can do so by clicking and dragging the selection handles to increase or decrease the height or width.

You can also place the chart in the Detail section of the report and set the chart to change with each record by enabling this option within the Chart Wizard. This allows you to have a report that displays the record data and a chart for each record.

You can create 20 different charts using the Chart Wizard, including column, bar, area, line, XY scatter, pie, bubble, and doughnut charts.

Access makes it easy to delete a chart as well. Simply, right-click it in Design view and then choose Delete from the shortcut menu.
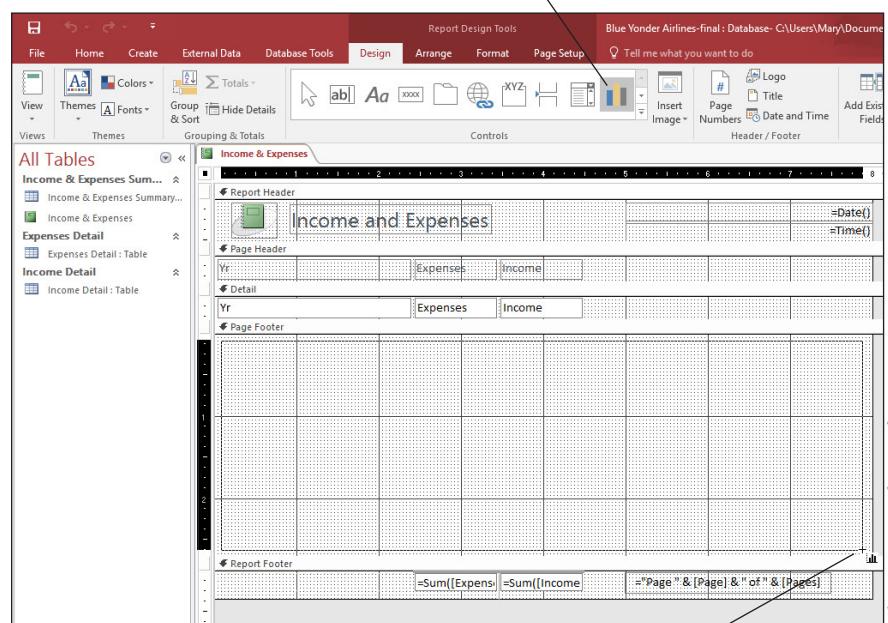
Create a Chart

GET READY. Before you begin these steps, be sure to turn on and/or sign on to your computer and start Access.

1. **OPEN** *Blue Yonder Airlines* from the data files for this lesson and then **SAVE** the database as *Blue Yonder Airlines-final*.

2. Double-click the **Income & Expenses** report in the Navigation Pane to open it.

3. Change to Design view.

4. Expand the Page Footer section. On the Report Design Tools Design tab, in the Controls group, click the **Chart** button. The pointer changes to a plus sign with a chart icon.

5. Click in the upper-left corner of the Page Footer section, hold the mouse button, and drag to the lower-right corner to create a rectangular placeholder where the chart will be inserted, as shown in Figure 13-1.

Chart button

Figure 13-1

Report in Design view

Clip art courtesy of Microsoft

Draw a rectangle for the chart
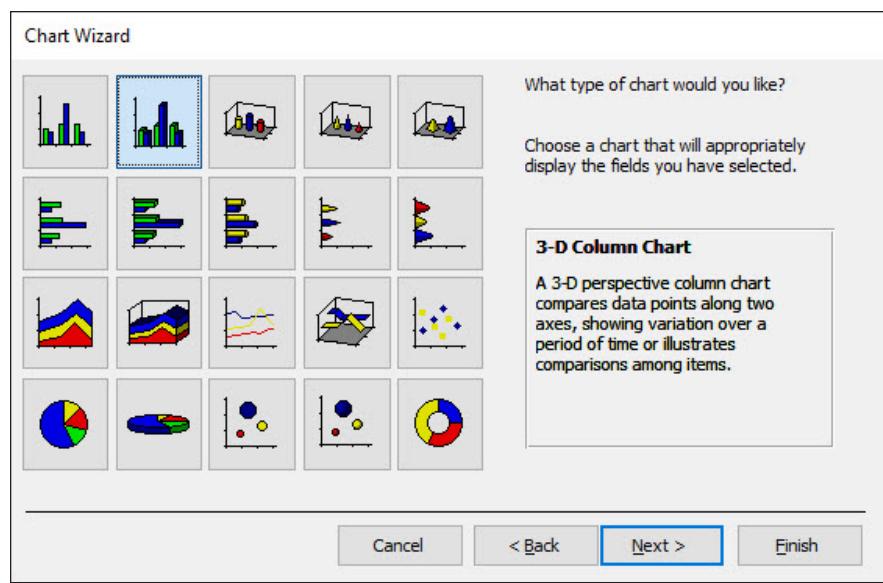
6. Release the mouse button. The first *Chart Wizard* dialog box appears asking you which table or query you would like to use to create your chart.

7. Select the **Income & Expenses Summary** table as your data source and then click the **Next** button. The second *Chart Wizard* dialog box appears.

8. Click the **>>** button to move all the fields to the Fields for Chart box and then click the **Next** button. The third *Chart Wizard* dialog box appears, which shows you the chart type options.

9. Click the **3D Column Chart** button—the second icon in the first row. Notice that the description of the chart type is displayed on the right, as shown in Figure 13-2.
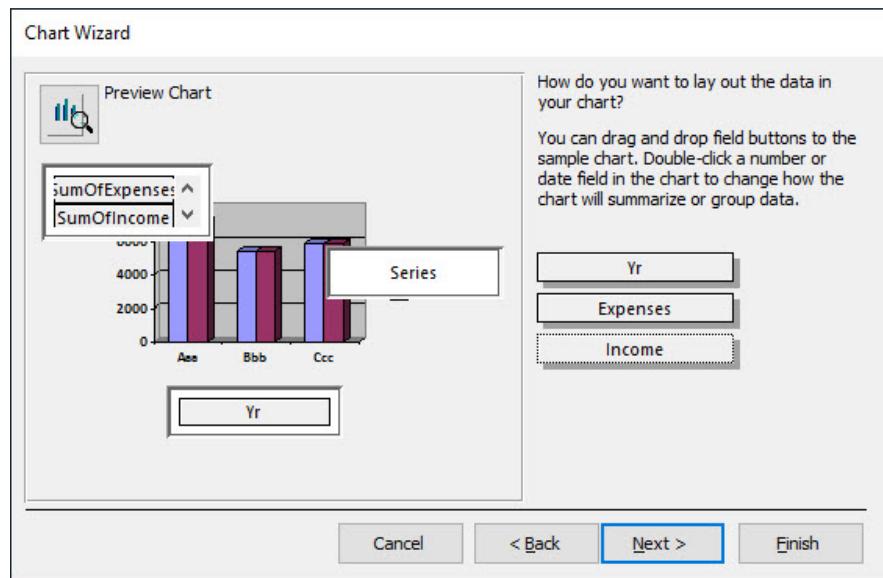
Clip art courtesy of Microsoft

10. Click the **Next** button. The fourth *Chart Wizard* dialog box appears.

11. Click and drag the **Income** field button to the upper left of the chart and drop on the
SumofExpenses data list. Both the SumofExpenses and SumofIncome fields should be
listed, as shown in Figure 13-3.

Clip art courtesy of Microsoft

12. Click the **Preview Chart** button. The *Sample Preview* dialog box appears, displaying a
sample of your chart.

13. Click the **Close** button. The *Sample Preview* dialog box closes.

14. Click the **Next** button. The fifth *Chart Wizard* dialog box appears.

15. Click the **down arrow** in the Report Fields menu and then select **<No Field>** since you
don't want to display a chart for each record in the data source.

16. Click the **down arrow** in the Chart Fields menu and then select **<No Field>** again, since
you don't want to display a chart for each record in the data source.

17. Click the **Next** button. The sixth *Chart Wizard* dialog box appears

18. Type **2008-2017 Income and Expenses** in the Title box.

19. Yes, display a legend should be selected. If not, select it and then click the **Finish** button. Access inserts your chart. Notice that Design view displays sample data and not the actual data from your chart.

20. Click the chart to select it.

21. On the Report Design Tools Design tab, in the Tools group, click the **Property Sheet** button, if necessary.

22. Click the **Data** tab of the Property Sheet. Click the **down arrow** at the end of the Enabled cell and then select **Yes**. This enables the chart to accurately display the associated table data.

23. **CLOSE** the Property Sheet.

24. Change to Report view.
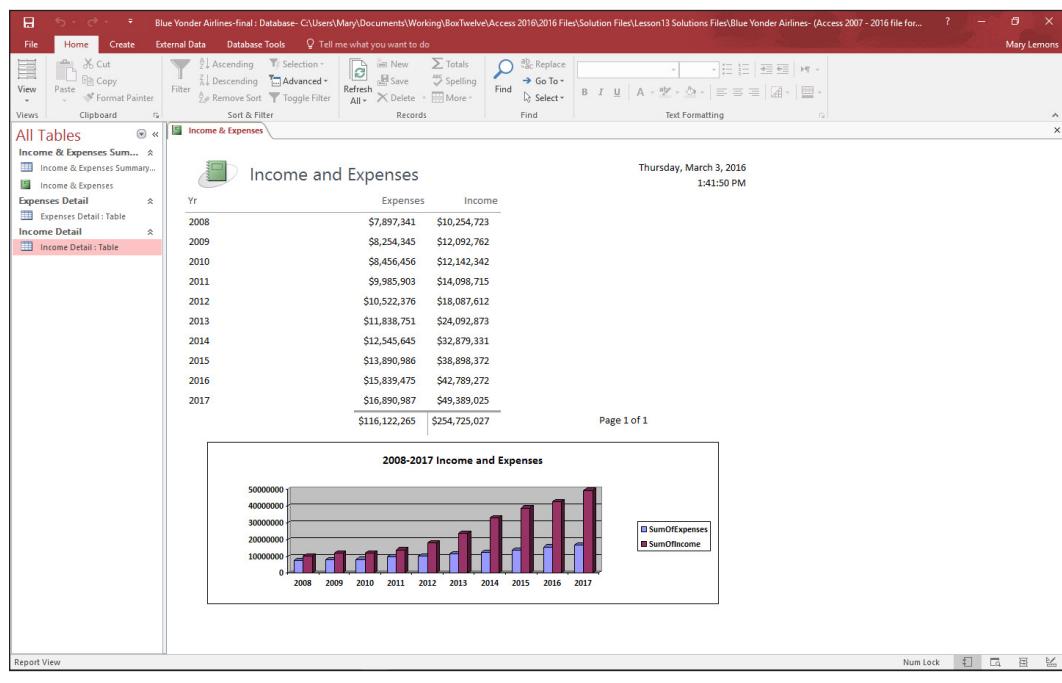
Troubleshooting If your chart is not displaying correctly (for example, the text looks stretched), you need to increase or decrease the width and/or height of the placeholder. In Design view, click the resize handles in the center of the vertical borders and drag to increase or decrease the size until the text looks right. Drag the resize handles on the horizontal borders to change the height. Then, change back to Report view to see the results.

25. On the Home tab, in the Records group, click the **Refresh All** button to ensure the chart displays the latest table data.

26. Scroll to the bottom of the report to view your chart, which should look similar to Figure 13-4.

Figure 13-4

Report with 3D bar chart

Clip art courtesy of Microsoft

27. SAVE the report.

Take Note When you try to save the report, you may see a dialog box that says, "The object is locked. Any changes you make will be discarded when the form is closed." Click OK whenever you see this dialog box throughout this lesson.

PAUSE. LEAVE the report open to use in the next exercise.

FORMATTING A CHART

You can use Microsoft Graph to change the formatting of charts created with the Chart Wizard. You can change chart options such as how the title and labels are displayed and where you want the legend located. You can also change formatting options such as the color of the chart's background and the color and size of the data blocks in the chart.

After you create a chart using the Chart Wizard, you can edit it using Microsoft Graph, which is a component of Office 2016. To launch Microsoft Graph, double-click a chart in Design view. Microsoft Graph displays the chart and datasheet. You can choose commands from the menu bar or the toolbar.

After you make changes to the chart, it is important to save the changes using the Save command on the File menu. After you save a chart, Microsoft Graph closes and changes you back to Design view.

Changing Chart Options

The Chart Options dialog box has six tabs with options for changing the look and layout of a chart. You can access the Chart Options dialog box from the Chart menu or by right-clicking the white Chart Area and then choosing Chart Options from the shortcut menu. In this exercise, you will change chart options using Microsoft Graph.

STEP BY STEP   **Change Chart Options**

GET READY. USE the *Blue Yonder Airlines-final* database and *Income & Expenses* report that are open from the previous exercise.

1. Change to Design view.
2. Double-click the chart. The Microsoft Graph software launches, displaying the chart in a view similar to Design view, as shown in Figure 13-5.

Figure 13-5

Chart displayed in Microsoft Graph

Chart Objects menu   Menu bar   Chart title   Walls   Toolbar

Datasheet   Data series   Chart area

Clip art courtesy of Microsoft

3. Click **Chart** on the menu bar and then select **Chart Options** from the menu that appears. The *Chart Options* dialog box appears, as shown in Figure 13-6.

Figure 13-6

Titles tab on the Chart Options dialog box
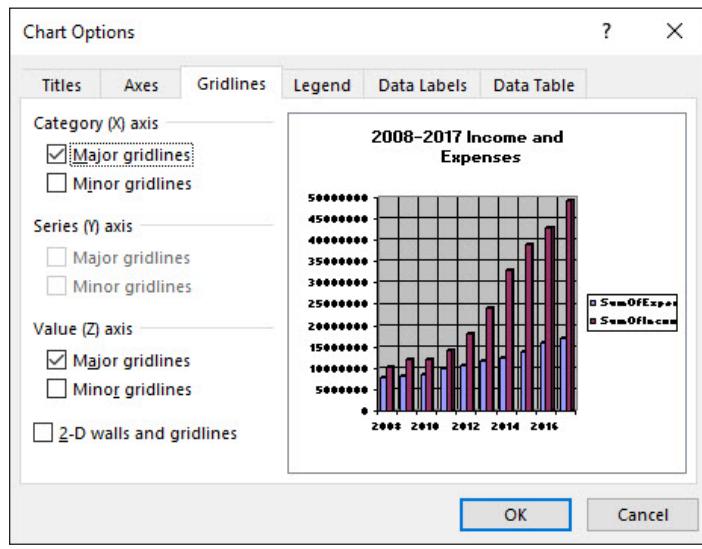
Clip art courtesy of Microsoft

4. Click the **Axes** tab to display the options on the tab.
5. Click the **Value (Z) axis** check box to remove the check mark. Notice that the values on the Z axis are removed.
6. Click the **Value (Z) axis** check box again to insert the check mark.
7. Click the **Gridlines** tab to display the options on the tab.
8. Select the **Major gridlines** check box in the Category (X) axis section. Notice that gridlines are added to the preview, as shown in Figure 13-7.

Figure 13-7

Gridlines tab of the Chart Options dialog box

Clip art courtesy of Microsoft

9. Click the **Legend** tab to display the options on the tab.
10. Click the **Show legend** check box to remove the check mark. Notice that the legend is removed from the chart.
11. Click the **Show legend** check box again to insert the check mark. The legend is displayed in the preview.
12. Click the **Bottom** option button to move the legend to the bottom of the chart.
13. Click the **Data Labels** tab to display the options on the tab.

14. Click the **Value** check box to insert a check mark. Notice that values are added to the columns in the chart.

15. Click the **Value** check box again to remove the check mark.

16. Click the **Data Table** tab to display the options on the tab

17. Click the **Show data table** check box to insert a check mark. Notice that the datasheet is added to the bottom of the chart.

18. Click the **Show data table** check box again to remove the check mark.

19. Click **OK**.

20. Click the **File** menu and then select **Save**. The Microsoft Graph software closes and the report is changed back to Design view.

PAUSE. LEAVE the report open to use in the next exercise.

Take Note   Microsoft Graph has its own Help system. To access it, double-click a chart to launch Microsoft Graph and choose Microsoft Graph Help from the Help menu or press F1.

Changing Format Options

Microsoft Graph makes it easy to format a chart. Each part of the chart is an independent object, so you can simply right-click the chart object that you want to change and choose Format [Chart Object] from the shortcut menu. A dialog box appears with the formatting choices available for that object. In this exercise, you will format the chart you have been creating.

If you prefer to use the menus, you can click on the chart object to select it or choose it from the Chart Objects list box on the toolbar. Once you have specified the object you want to change, click the Format menu and choose Selected [Chart Object] from the menu to launch the dialog box of available options.
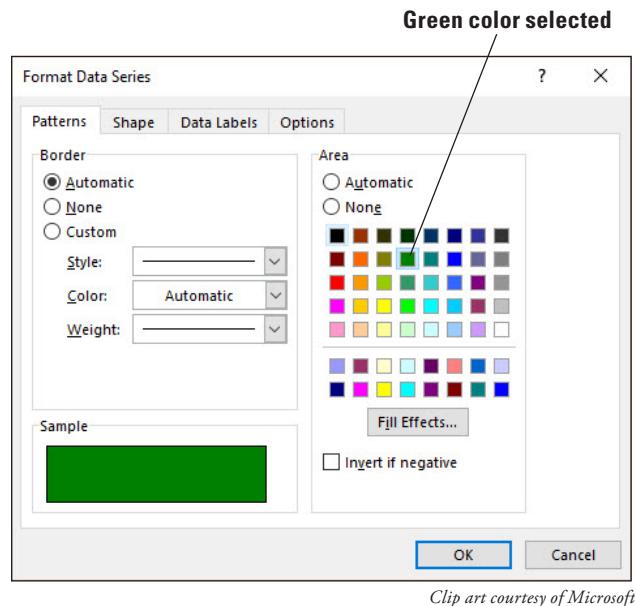
STEP BY STEP   **Change Format Options**

GET READY. USE the *Blue Yonder Airlines-final* database and *Income & Expenses* report that are open from the previous exercise.

1. In Design view, double-click the chart to open Microsoft Graph.

2. Click the Chart Area, the white background of the chart, to select it. The Chart Area should be displayed in the Chart Objects list box in the upper-left corner of the toolbar.

3. Click the **Format** menu and then click **Selected Chart Area**. The *Format Chart Area* dialog box appears.

4. Click the **Fill Effects** button. The *Fill Effects* dialog box appears.

5. Click the **Horizontal** option button in the Shading styles section and then click **OK**.

6. Click **OK** in the *Format Chart Area* dialog box. Notice the shading style of the chart background changes to your selection.

7. Right-click any of the purple Data Series columns in the chart to display the shortcut menu. Notice that Series "SumOfIncome" is displayed in the Chart Objects list box.

8. Choose **Format Data Series** from the shortcut menu. The *Format Data Series* dialog box appears.

9. Select the **Green** color (second row, fourth from the left) as shown in Figure 13-8.

Green color selected
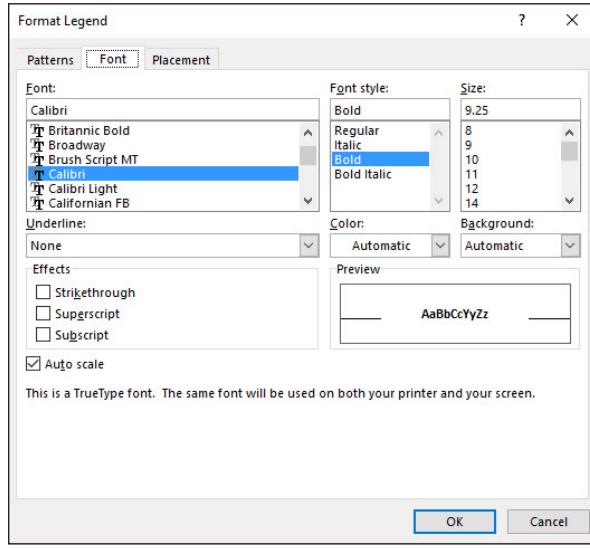
Clip art courtesy of Microsoft

10. Click **OK** in the *Format Data Series* dialog box.

11. Right-click the gray grid background of the chart, called the Walls, and choose **Format Walls** from the shortcut menu.

12. Click the **Fill Effects** button.

13. Click the **From center** button in the Shading styles section and then click **OK**.

14. Click **OK** in the *Format Walls* dialog box.

15. Right-click the Legend and choose **Format Legend** from the shortcut menu. The *Format Legend* dialog box appears. Select the **Font** tab if it is not already displayed. The Font tab of the dialog box appears, as shown in Figure 13-9.

Clip art courtesy of Microsoft

16. Select **12** in the Size: menu and then click **OK**. Notice the font size of the legend text has increased.

17. Right-click on the left axis that shows the number of dollars and choose **Format Axis**.

18. Click the **Number** tab, select **Currency** from the Category section, and then click **OK**.

19. Click the **File** menu and then click **Save**. Change to Report view to view your changes.

20. **SAVE** the report.

PAUSE. LEAVE the report open to use in the next exercise.

Refreshing Data in a Chart

The Refresh All button can be a useful tool when working with charts. When you make a change to the data source of a chart, be sure to save the new data in the table or query. When you change back to the form or report containing your chart, click Refresh All to update the data in the chart with the modified data. In this exercise, you will make a change to a table record and then refresh the data in a chart to view the change.

STEP BY STEP   **Refresh Data in a Chart**

GET READY. USE the *Blue Yonder Airlines-final* database and *Income & Expenses* report that are open from the previous exercise.

1. Double-click the **Income & Expenses Summary** table in the Navigation Pane to open it.
2. In the first row, in the Income column, select the data, type **9004523**, and then press **Enter**].
3. **SAVE** and **CLOSE** the table.
4. Click the **Income & Expenses** report tab. Notice that the numbers in the report data and the numbers in the chart have not changed.
5. On the Home tab, in the Records group, click the **Refresh All** button. The data in the report and in the chart are updated.
6. **SAVE** the report.

PAUSE. LEAVE the report open to use in the next exercise.

CHANGING CHART TYPES

Access provides many different chart types and variations of those chart types for you to choose from in the Chart Type dialog box. Access makes it easy to experiment with different configurations before you decide on the chart that best displays the data you want to emphasize. In this exercise, you will change the type of chart with which you have been working.

Changing Chart Types

The key is to choose a chart that displays your data in a meaningful way. Often, you have a specific chart in mind that you want to use, but sometimes it requires experimentation, choosing and changing chart types until you get the results you want.
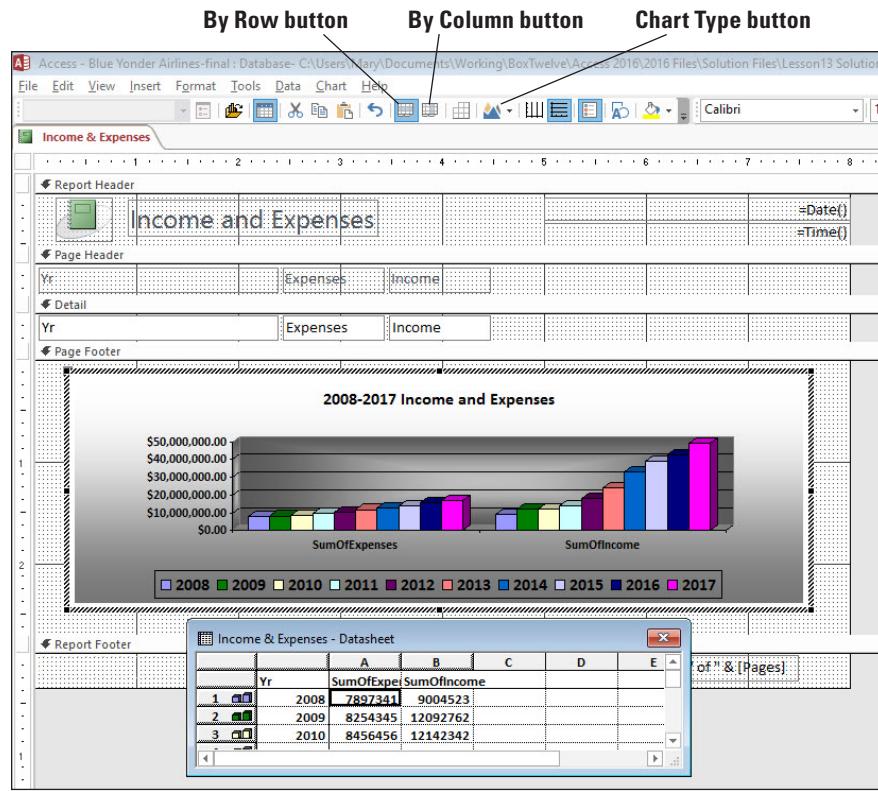
STEP BY STEP   **Change Chart Types**

GET READY. USE the *Blue Yonder Airlines-final* database and *Income & Expenses* report that are open from the previous exercise.

1. Change to Design view.
2. Double-click the chart. Microsoft Graph opens.
3. Click the **By Row** button on the toolbar. The chart is changed to show all the expenses together and all the income together, as shown in Figure 13-10.

By Row button   **By Column button**   **Chart Type button**

Microsoft Graph toolbar
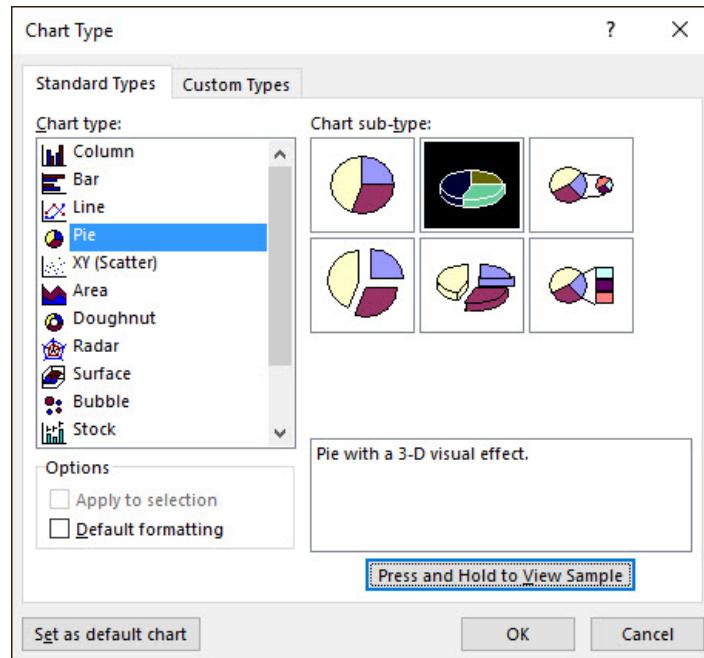
Clip art courtesy of Microsoft

4. Click the **By Column** button on the toolbar to change it back to the original chart.

5. Click the **Chart Type** drop-down arrow in the toolbar and then select **3D Area Chart** from the menu. The chart changes to an area chart.

6. Click the **Chart** menu and then click **Chart Type**. The *Chart Type* dialog box appears.

7. On the Standard Types tab, click **Pie** in the Chart type list. In the Chart sub-type section, click **Pie with a 3D visual effect**, the second icon on the first row, as shown in Figure 13-11.

Figure 13-11

Select the Pie with a 3D visual effect pie chart
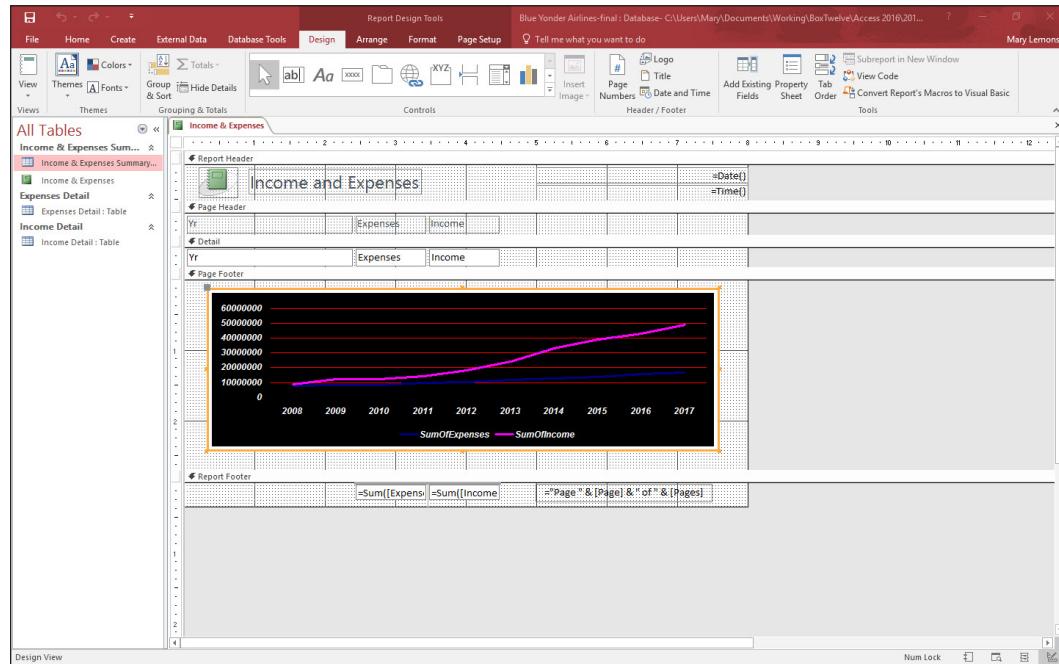
Clip art courtesy of Microsoft

8. Click and hold the **Press and Hold to View Sample** button to see a preview of the chart.

9. Click the **Custom Types** tab.

10. Click **Colored Lines** in the Chart type: list and then click **OK**.

11. Click the **File** menu and then click **Save**. Your screen should resemble Figure 13-12.

Figure 13-12

Line chart in Report Design view

12. Change to Report view to view your changes.

13. **SAVE** and **CLOSE** the report.

PAUSE. LEAVE the database open to use in the next exercise.

SAVING A DATABASE OBJECT AS ANOTHER FILE TYPE

Microsoft Access 2016 allows you to save database objects, such as tables, forms, and queries, as other types of objects using the Save Object As command. For example, you can save a table as a report. Although you can save tables, forms, and queries as at least one other type of database object, Access doesn't allow you to save reports as other object types; however, you can save all database objects as Portable Document Format (PDF) or XML Paper Specification (XPS) file formats. You might already be familiar with PDF files from documents you view on the Internet or share via emails. The **PDF** file format maintains the exact layout of the original file and can easily be shared. An alternative to PDF, the **XPS** file format preserves document formatting; can be easily shared, printed, and archived; and is more secure. The Save Object As command also gives you the option of saving a database object as a client object. Saving an object as a client object is used when you want to save a web-based Access object as one that can be accessed and modified in the Access application installed on your computer.

Saving a database object as another file type allows you to share data with other users or repurpose the data in other ways. Since you can create Access objects to be used on the web, you can also save all web-based database objects as the same object of a different type called a client object. For example, you can save a web-based table object as a client table object type, but you cannot directly save the web-based table object as a form object until after it's saved as a client table object. A **client object** is an object that can be accessed and modified in the Access application installed on your computer.

You can access the Save As menu by selecting the Save As command on the File tab. In this exercise, you save a table object as a new query object.
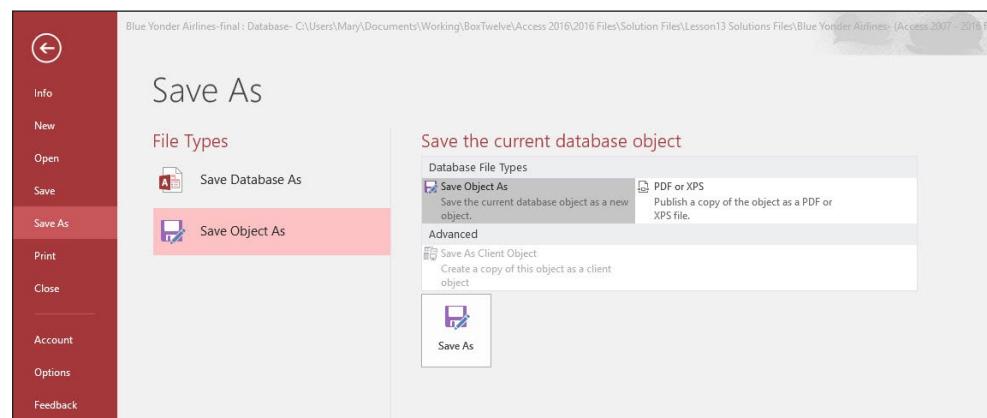
Save a Database Object as Another File Type

GET READY. USE the *Blue Yonder Airlines-final* database that is open from the previous exercise.

1. Double-click the **Income & Expenses Summary** table in the Navigation Pane to open it.

2. Click the **File** tab and then click the **Save As** tab to display the Save As menu. Click the **Save Object As** command in the File Types category, as shown in Figure 13-13.

Figure 13-13
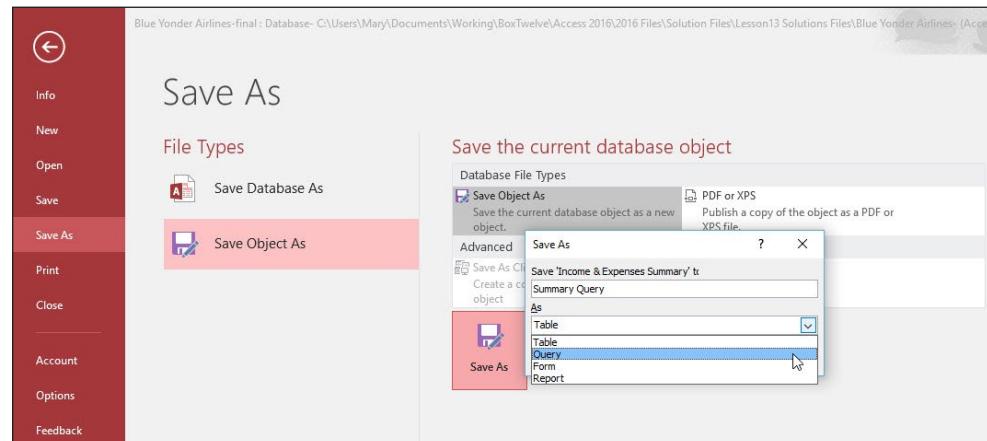
Save Object As command

3. Notice the Save Object As option is already highlighted in the Save the current database object category. Click the **Save As** button. The *Save As* dialog box appears.

4. Type **Summary Query** in the Save box.

5. Click the **down arrow** on the As menu and then select **Query**, as shown in Figure 13-14. Notice that you can also save this table as a duplicate table (for example, to back up a table), a Form, or a Report.

Figure 13-14

Save As dialog box

6. Click **OK**. The table object is saved as a query object and the new Summary Query appears in Datasheet view.

7. **CLOSE** the Summary Query.

8. Click the **File** tab and then click the **Save As**.

9. Click the **Save Object As** command in the File Types category and then click **Save As**.

10. Type **Summary Report** in the Save box.

11. Click the **down arrow** on the As menu, select **Report**, and then click **OK**.

12. The report opens. **SAVE** the report.

PAUSE. LEAVE the report open to use in the next exercise.

PRINTING A DATABASE OBJECT

You are probably already familiar with printing various kinds of documents from your computer. Printing a database object uses the same print options and settings you use with other types of documents.

You can choose various printing options before sending your document to the printer, such as the number of copies, size of the paper, or the range of pages to print. In this exercise, you will learn about some of the options available in the Print dialog box when you print a database object.

You can print reports just by right-clicking the object in the Navigation Pane and choosing Print from the shortcut menu. An alternate way to print reports, and to print other objects like tables, queries, forms, or macros, is to use the Print tab on the File tab. The Print tab displays available print options that you can modify before you print an object. To print charts, you must open either the form or report that contains the chart or the table that is its record source. Changes that you make in the Print dialog box will only be applied to that particular document.

Take Note   When printing lengthy reports, you can choose other options, such as printing a range of pages, collating the pages, or printing multiple pages per sheet.
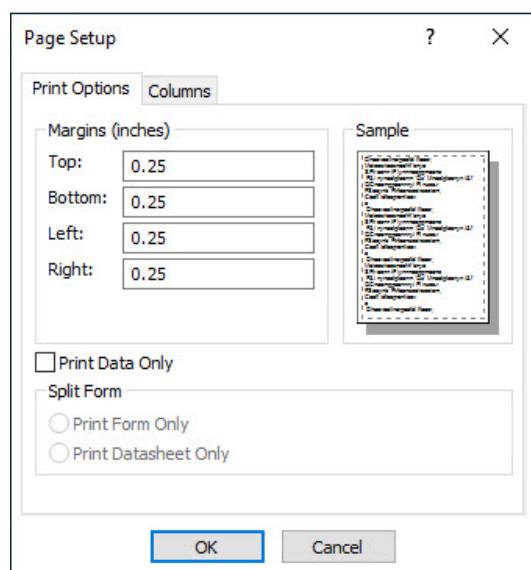
STEP BY STEP   **Print a Database Object**

GET READY. USE the *Blue Yonder Airlines-final* database and *Summary Report* report that are open from the previous exercise.

1. Click the **File** tab and then click the **Print** tab on the menu. The Print tab displays available options.
2. Click the **Print** button. The *Print* dialog box appears.
3. Click the **Properties** button. The *Properties* dialog box appears. The *Properties* dialog box differs depending on the type of printer you have. You can change the quality, paper, printing, and orientation options available for your printer in this dialog box. Click the **Cancel** button.
4. Click the **Setup** button. The *Page Setup* dialog box appears, as shown in Figure 13-15. Click the **Cancel** button.

Figure 13-15

Page Setup dialog box

5. In the Copies section of the *Print* dialog box, click the **up arrow** in the Number of Copies menu to change the number of copies to **2**.

6. Click **OK** to print two copies of the report, or click **Cancel** (if you choose not to Print).

7. CLOSE the report and table.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Matching

Match the term in Column 1 to its description in Column 2.

Column 1	Column 2
1. Legend	**a.** Contains six tabs with options for changing the look and layout of a chart
2. Chart Options dialog box	**b.** A component of Access 2016 used to make changes to a chart created by the Chart Wizard
3. Refresh All button	**c.** Displays a list of the colors, shapes, or patterns used as categories in a chart
4. Microsoft Graph	**d.** Allows you to save objects as other file formats like PDF and XPS and as other database objects
5. Save Object As command	**e.** Updates the data in a chart

True/False

Circle T if the statement is true or F if the statement is false.

T F 1. The Chart Wizard is a control.

T F 2. A legend can be displayed only on the right side of a chart.

T F 3. The Refresh All button updates data in a chart with data modified in the underlying data source.

T F 4. You can save a table as a report.

T F 5. An Axis is a type of chart.

Projects

Project 13-1: Creating a Chart and Changing the Chart Type

The City Power & Light human resources department is reviewing the salary budgets for the office. In this project, your supervisor asks you to create a pie chart within a report to show the distribution of funds for each employee. Then, you decide to create a variation of the pie chart that will more clearly show the salary amounts in relationship to each other.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *City Power & Light* database and then **SAVE** the database as *City Power & Light-final*.
2. Double-click the **Salary** report in the Navigation Pane to open it and then change to Design view.
3. Click the **Chart** button and draw a large rectangle in the space provided in the Page Footer section. The *Chart Wizard* dialog box appears.
4. Click the **Next** button.
5. Move the Employee ID and Salary fields to the Fields for Chart list and then click **Next**.
6. Click the **Pie** chart button and then click **Next**.
7. Drag and drop the **Salary** field button to the data box that says SumofEmployee ID box. SumofEmployee ID is replaced with SumOfSalary
8. Drag and drop the **Employee ID** field button to the Series box. Series is replaced with Employee ID.
9. Click the **Preview Chart** button.
10. Click **Close**.
11. Click **Finish**. Resize the chart if necessary if the text is too large.
12. Click the **Data** tab of the Property Sheet and set the Enabled property to **Yes**.
13. Change to Report view.
14. Click the **Refresh All** button.
15. **SAVE** the Report.
16. Double-click the **Salary** report in the Navigation Pane to open it in Report view if it's not already open.
17. Click the **File** tab and then click **Save As**.
18. Click the **Save Object As** button.
19. Click the **Save As** button.
20. Type **Salary Line Chart** in the "Save 'Salary' to:" box and then click **OK**.
21. Change to Design view.
22. Double-click the chart to launch Microsoft Graph.
23. Click the **Chart** menu and then click **Chart Type** from the menu.
24. Click **Line** in the Standard types list.
25. In the Chart subtype list, if not already selected, click the **Line with markers displayed at each data value** button.
26. Click **OK**.
27. Click the **Chart** menu and then click **Chart Options** from the menu.
28. Click the **Legend** tab and then click the **Bottom** option button.
29. Click **OK**.
30. **SAVE** the chart and then view the chart in Report view.
31. **CLOSE** the database.

PAUSE. LEAVE Access open for the next project.

Displaying and Sharing Data ## Project 13-2: Creating and Formatting an Expenses Chart

You created a chart representing the Income & Expenses Summary table for Blue Yonder Airlines earlier. Now you need to create a chart solely for the expenses.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN *Blue Yonder Airlines-final*** that you saved in an earlier exercise.
2. Double-click the **Expenses Detail** table in the Navigation Pane to open it.
3. Click the **File** tab and then click **Save As**.
4. Click the **Save Object As** button.
5. Click the **Save As** button.
6. Type **Expenses Detail** in the "Save 'Expenses Detail' to:" box, select **Report** from the As menu, and then click **OK**.
7. Double-click the **Expenses Detail** report in the Navigation Pane to open it and then change to Design view.
8. Expand the Page Footer section by moving the Report Footer section down.
9. Create a chart in the Page Footer section using the Expenses Detail table as the data source.
10. Move the Amount and Yr fields to the Fields for Chart list and then click **Next**.
11. Click the **Doughnut** chart type button and then click **Next**.
12. Drag and drop the **Yr** field button to the Axis box (where it says Series) and then click **Next**.
13. Select **<No Field>** in the Report Fields and Chart Fields drop-down boxes and then click **Next**.
14. Click **Finish**.
15. Click the **Property Sheet** button.
16. Click the **Data** tab of the Property Sheet and then change the Enabled cell to **Yes**.
17. View the chart in Report view.
18. Change to Design view and double-click the chart to launch Microsoft Graph.
19. Click the **Chart** menu and then select **Chart Options** from the menu.
20. Click the **Data Labels** tab and then select the **Percentage** check box.
21. Click **OK**.
22. **SAVE** the chart.
23. View the chart changes in Report view.
24. **CLOSE** the report.

STOP. CLOSE the database and then **EXIT** Access.

14 Importing and Exporting Data

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Importing Data	Import data into tables.	2.1.2
	Append records from external data.	2.3.4
	Import tables from other databases.	2.1.4
	Create a database by using import objects or data from other sources.	1.1.3
	Create linked tables from external sources.	2.1.3
Exporting Data	Export to alternate formats.	1.5.4

SOFTWARE ORIENTATION

External Data Tab

The External Data tab shown in Figure 14-1 contains commands that you will use to import and export data in various formats. When you import or export data, you can save that data and access it later using the Saved Imports and Saved Exports commands, respectively.
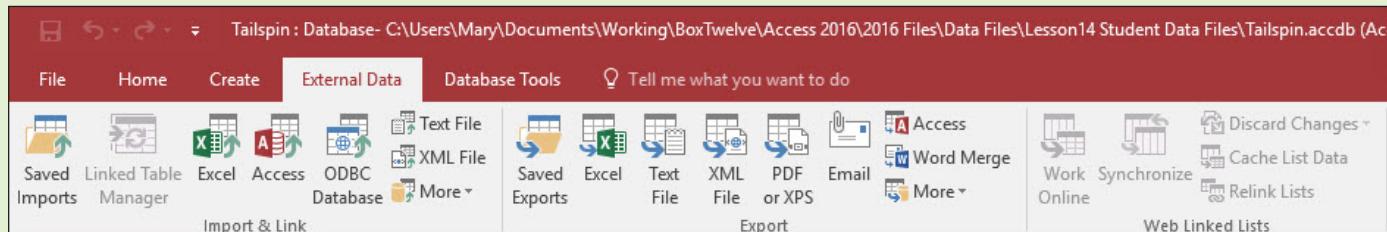
Figure 14-1
External Data tab

IMPORTING DATA

To store data from an external source in Access, you can import the data into a new or existing database. After you run an import operation, you can save the import settings for reuse. You can also link to data from an external source without actually maintaining a copy of the data in the database.

Importing Data from a Specific Source

You can import data from a variety of sources into an Access database—either an existing database or a new database. When you import data into a new database, a new table is created in that blank database.

When you import data into an existing database, Access creates a copy of the data in a new or existing table without altering the source file. Before you start the import operation, decide whether you want to store the data in a new or existing table. If you choose to store the data in a new table,

Access creates a table and adds the imported data to this table. If a table with the specified name already exists, Access overwrites the contents of the table with the imported data. If you choose to add the data to an existing table, the imported data is appended to the specified Access table. In this exercise, you will import data from an Excel worksheet into a new Access table. You then import a table from another Access database into the current Access database as a new table.

You can also import data from other specific sources besides Excel, such as a SharePoint list, a Word file, another Access database, or a text file. The same general process is used for importing data, regardless of the source. On the External Data tab, in the Import & Link group, click the More button to see additional formats that you can import from or link to.

Take Note   You can import only one Excel worksheet at a time during an import operation. To import data from multiple worksheets, repeat the import operation for each worksheet.

Before you import, you should always review the source data and make any necessary modifications, as described in Table 14-1.

Table 14-1

Source data elements

Element	Description
Number of columns	You cannot import more than 255 source columns, because Access does not support more than 255 fields in a table.
Skipping columns and rows	It is good practice to include only the rows and columns that you want to import in the source worksheet or named range. Note that you cannot filter or skip rows during the import operation. If you choose to add the data to an existing table, you cannot skip columns during the import operation either.
Tabular format	Ensure that the cells are in tabular format. If the worksheet or named range includes merged cells, the contents of the cell are placed in the field that corresponds to the leftmost column, and the other fields are left blank.
Blank columns, rows, and cells	Delete all unnecessary blank columns and blank rows in the worksheet or range. If the worksheet or range contains blank cells, try to add the missing data. If you are planning to append the records to an existing table, ensure that the corresponding field in the table accepts null (missing or unknown) values. A field will accept null values if its Required field property is set to No and its Validation Rule property setting does not prevent null values.
Error values	If one or more cells in the worksheet or range contains error values, such as #NUM and #DIV, correct them before you start the import operation. If a source worksheet or range contains error values, Access places a null value in the corresponding fields in the table.
Data type	Ensure that each source column contains the same type of data in every row. It is good practice to format each source column in Excel and assign a specific data format to each column before you start the import operation—especially if a column includes values of different data types.
First row	If the first row in the worksheet or named range contains the names of the columns, you can specify that Access treat the data in the first row as field names during the import operation. If your source worksheet or range does not include the names, it is a good idea to add them to the source before you start the import operation.

Take Note   If you plan to append the data to an existing table, ensure that the name of each column exactly matches the name of the corresponding field. If the name of a column is different from the name of the corresponding field in the table, the import operation will fail. To see the names of the fields, open the table in Design view in Access.

Troubleshooting Always close the file you want to import before beginning the import operation. Keeping the source file open can result in data conversion errors. After an import operation, you should review the contents and structure of the table to ensure that everything looks correct before you start using the table. If you see the message "An error occurred trying to import file," the import operation failed. If the data imports and you find just a few missing values, you can add them directly to the table. However, if you find that entire columns or a large number of values are either missing or were not imported properly, use Access Help to troubleshoot the results and correct the problem in the source file. After you have corrected all known problems, repeat the import operation.
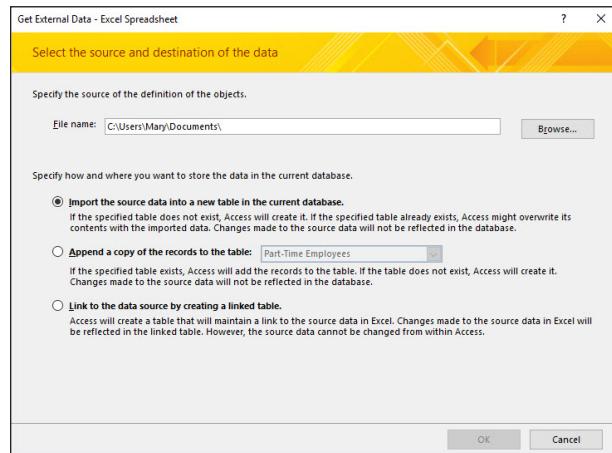
STEP BY STEP   **Import Data from Excel**

GET READY. Before you begin these steps, be sure to turn on and/or sign on to your computer and **LAUNCH** Access.

1. **OPEN** the *Tailspin* database from the data files for this lesson and then **SAVE** the database as *Tailspin-final*.

2. On the External Data tab, in the Import & Link group, click **Excel**. The *Get External Data – Excel Spreadsheet* dialog box appears, as shown in Figure 14-2.

Figure 14-2
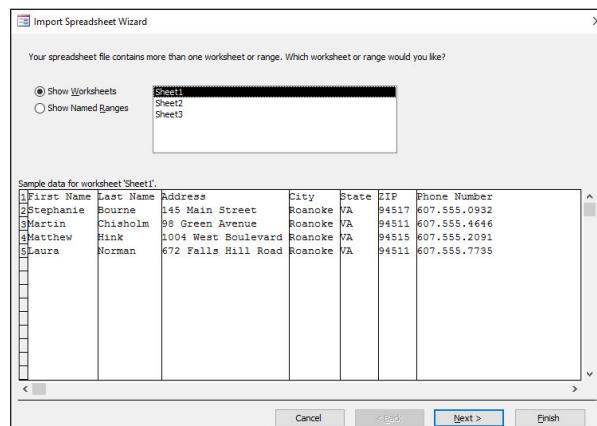
Get External Data – Excel Spreadsheet dialog box

3. Click **Browse** to open the *File Open* dialog box to locate the source file.

4. Use the *File Open* dialog box to locate the *New_Employees* spreadsheet file and then click **Open**.

5. Notice the three options you have when importing data. Select the option button for **Import the source data into a new table in the current database** and then click **OK**. The Import Spreadsheet Wizard appears, as shown in Figure 14-3.

Figure 14-3

Import Spreadsheet Wizard, first screen
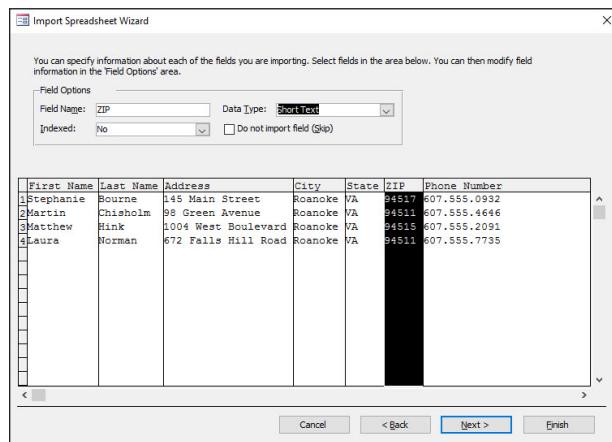
Take Note   To create a new database using external data, you would follow these same steps but in Step 1, you would simply create a new blank database, save it with your desired filename, and then follow steps 2-5 to import the data into the new database.

Take Note   In the Get External Data – Excel Spreadsheet dialog box, Access also allows you to append a copy of the records to an existing table in the database. You can choose Append a copy of the records to the table and then select an available table from the drop-down list.

6. Click **Next** to display the next screen and then select the **First Row Contains Column Headings** check box. Access uses these column headings to name the fields in the table.

7. Click **Next** to display the next screen where the wizard prompts you to review the field properties.

8. Click the **ZIP** column header to display the corresponding field properties.

9. Click the **Data Type** down arrow and then click **Short Text**, as shown in Figure 14-4.

Figure 14-4

Change field properties
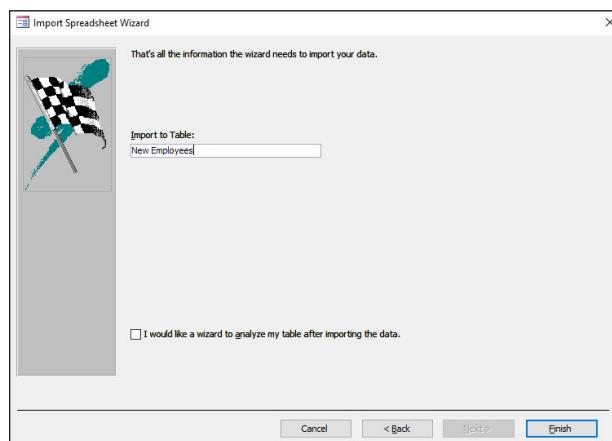
Take Note   Access reviews the first eight rows in each column to suggest the data type for the corresponding field. If the column contains different types of values, the wizard suggests a data type that is compatible with all of the values in the column—usually the Short Text data type. Although you can choose a different data type, values that are not compatible with the chosen data type will be ignored or converted incorrectly during the import process.

10. Click **Next** to display the next screen, which is where you choose the primary key. Keep the default selection, which lets Access add the primary key.

11. Click **Next**. The final screen appears, which is where you decide where to import the table. In the Import to Table box, type **New Employees**, as shown in Figure 14-5.

Figure 14-5

Import Spreadsheet Wizard, final screen

12. Click **Finish** and when the Save Import Steps prompt appears, click **Close**.

13. In the Navigation Pane, double-click the **New Employees: Table** to open the new table with imported data, as shown in Figure 14-6.

14. **CLOSE** the New Employees table.

PAUSE. LEAVE the database open to use in the next exercise.
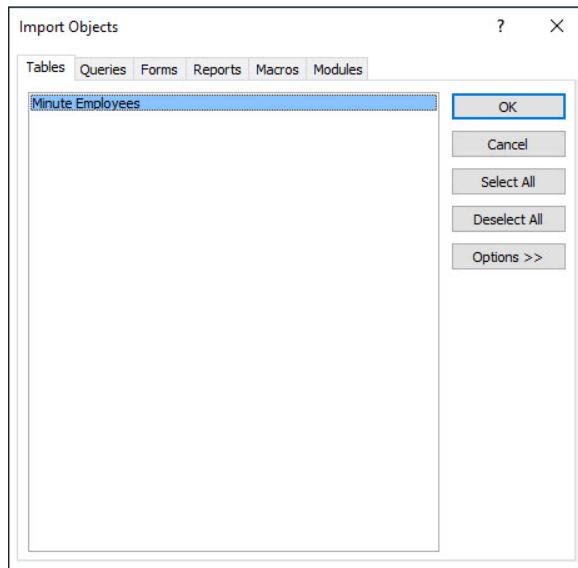
Import Table Data from Another Access Database

GET READY. USE the *Tailspin-final* database that is open from the previous exercise.

1. On the External Data tab, in the Import & Link group, click **Access**. The *Get External Data – Access Database* dialog box appears.

2. Click **Browse** to open the *File Open* dialog box.

3. Use the *File Open* dialog box to locate the *Minute Insurance* Access database file and then click **Open**.

4. In the *Get External Data – Access Database* dialog box, click **OK**. The *Import Objects* dialog box appears. Notice the Tables object tab is selected by default.

5. In the *Import Objects* dialog box, click **Minute Employees**, as shown in Figure 14-7, to select the table you wish to import.

Take Note   You can import a variety of Access database objects into another Access database. Use the objects tabs (Tables, Queries, Forms, Reports, Macros, and Modules) at the top of the Import Objects dialog box.

6. Click **OK** to return to the *Get External Data – Access Database* dialog box and then click **Close**. Notice the newly imported Minute Employees table appears in the Navigation Pane.

7. In the Navigation Pane, double-click the **Minute Employees: Table** to open the new table with imported data.

8. **CLOSE** the Minute Employees table.

PAUSE. LEAVE the database open to use in the next exercise.

Linking to an External Data Source

By linking an Access database to data in another program, you can use the querying and reporting tools that Access provides without having to maintain a copy of the external data in your database. You can also link to other external data sources, such as linking tables in another Access database (although you cannot link to queries, forms, or reports), HTML documents, or text files. In this exercise, you will link to an Excel spreadsheet.

When you link to an Excel worksheet, Access creates a new table that is linked to the source cells, called a **linked table**. The table shows the data in the source worksheet, but it does not actually store the data in the database. Any changes you make to the source cells in Excel appear in the linked table. However, you cannot edit the contents or structure of the corresponding table in Access. If you want to add, edit, or delete data, you must make the changes in the source file.

Take Note   If you don't want to link to the entire worksheet, define a range in Excel that includes only the cells to which you want to link. To create a named range, select the cells, and then right-click and choose Define Name. In the New Name dialog box, type a name for the range and then click OK.

After linking, you should open the linked table and review the fields and data to ensure that you see the correct data in all the fields. If you see error values or incorrect data, use Access Help to troubleshoot the source data and then try linking again.

STEP BY STEP   **Link to an External Data Source**

GET READY. USE the *Tailspin-final* database that is open from the previous exercise.

1. On the External Data tab, in the Import & Link group, click **Excel** to open the *Get External Data – Excel Spreadsheet* dialog box.

2. Click **Browse** to open the *File Open* dialog box.

3. Use the *File Open* dialog box to locate the *Benefit_Providers* spreadsheet file and then click **Open**.

4. Click **Link to the data source by creating a linked table** and then click **OK**. The Link Spreadsheet Wizard appears (which looks similar to Figure 14-3 shown earlier).

5. Click **Next** to display the next screen.

6. Select the **First Row Contains Column Headings** check box to use the first row of data as field names in the table.

7. Click **Next** to display the next screen.

8. In the Linked Table Name box, type **Benefit_Providers**.

9. Click **Finish**. A Link Spreadsheet Wizard message appears informing you that Access finished linking.

10. Click **OK**.

⚠ Troubleshooting   If the table with the name you specified already exists, you are asked if you want to overwrite the existing file. Click Yes if you want to overwrite the file; click No to specify a different file-name.

11. In the Navigation Pane, notice the linked Excel icon next to Benefit_Providers. Double-click **Benefit_Providers** to open the new linked table, shown in Figure 14-8. Notice that there is not an Add New Field column because of the structure of a linked table.

Excel icon

12. Click the **Close** button on the Benefit_Providers tab to close the table.

⚠ **Troubleshooting**   If you don't close this table, you will not be able to edit the data in the spreadsheet. You will get a "data is locked for editing" error message.

13. **LAUNCH** Excel and then **OPEN** the **Benefit_Providers** spreadsheet.

14. Type the following data in a new row, as shown in Figure 14-9.

Company: **Litware, Inc.**

Address: **866 Hickory Road**

City: **Wichita**

State: **KS**

ZIP: **66013**

Phone: **302-555-9897**

Website: **www.litwareinc.com**

Figure 14-9
New Excel data

New data

15. **SAVE** and **CLOSE** the spreadsheet.

16. **CLOSE** Excel.

17. In the Navigation Pane of Access, double-click **Benefit_Providers** to open the linked table. Notice that the new row of data has been added, as shown in Figure 14-10.

New data

18. **CLOSE** the Benefit_Providers table.

PAUSE. LEAVE the database open to use in the next exercise.

SAVING AND RUNNING IMPORT SPECIFICATIONS

Saving the details of an import operation as a specification allows you to repeat the operation at any time. A **specification** contains all the information Access needs to repeat an import or export operation without user input. When you run an import wizard, you can save the settings you used as a specification so that you can repeat the operation at any time without having to provide any additional input.

A specification is flexible. For example, you can change the name of the source file or the destination file before you run the specification again. This way, you can use a single specification with several different source or destination files.

Take Note If you regularly repeat this saved operation, you can create an Outlook task that reminds you when it is time to perform this operation by clicking the Create Outlook Task check box in the import wizard.

To use a text file as a source file for importing, the contents of the file must be organized in such a way that the Import Wizard can divide the contents into a set of records (rows) and each record into a collection of fields (columns). Two types of text files that are organized for importing are delimited files and fixed-width files.

In a **delimited file**, each record appears on a separate line and the fields are separated by a single character, called the delimiter. The **delimiter** can be any character that does not appear in the field values, such as a tab, semicolon, comma, space, and so on. The following is an example of a comma-delimited file:

ID, Company Name, Employee Name, Position

1, Fourth Coffee, Lauren Halian, Sales Manager

2, Woodgrove Bank, Michael Damato, Vice President

3, Wingtip Toys, Karl Vogelmann, Owner

In a **fixed-width file**, each record appears on a separate line and the width of each field remains consistent across records. For example, the first field of every record is always 9 characters long, the second field of every record is always 14 characters long, and so on. If the actual length of a field's value varies from record to record, the values that fall short of the required width must be padded with trailing space characters. The following is an example of a fixed-width text file where the first field is said to be 3 characters, the second field is said to be 15 characters, the third field is said to be 13 characters, the fourth field is said to be 12 characters, the fifth field is said to be 11 characters, and the sixth field is said to be 11 characters:

ID	CompanyName	EmpFirstName	EmpLastName	PositionF1	PositionF2
1	Fourth Coffee	Lauren	Halian	Sales	Manager
2	Woodgrove Bank	Michael	Damato	Vice	President
3	Wingtip Toys	Karl	Vogelmann	Owner	

Saving Specifications

You can save an import or export operation involving any of the file formats supported in Access, but you cannot save the details of a linking operation or an operation where you export only a portion of a datasheet. In this exercise, you will import a text file and then save the import specifications.
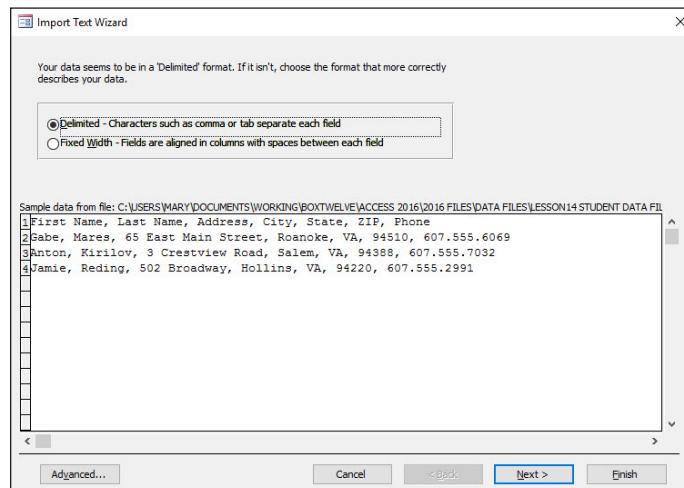
STEP BY STEP   **Save Import Specifications**

GET READY. USE the *Tailspin-final* database that is open from the previous exercise.

1. On the External Data tab, in the Import & Link group, click **Text File** to open the *Get External Data – Text File* dialog box.
2. Click **Browse** to open the *File Open* dialog box.
3. Use the *File Open* dialog box to locate the *applicants* text file and then click **Open**.
4. Click **Import the source data into a new table in the current database** and then click **OK**. The Import Text Wizard appears, as shown in Figure 14-11. Notice the Delimited option button is selected and the data preview of the file contains fields separated by commas. In this case, you will keep the delimited selection.

Figure 14-11
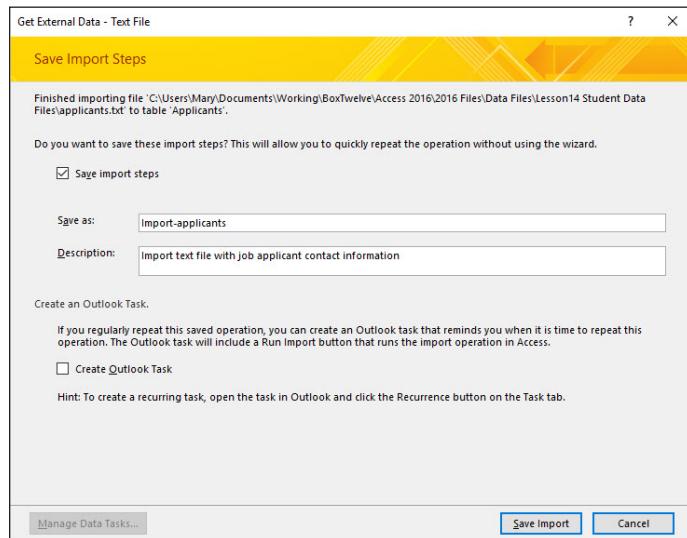
Import Text Wizard, first screen

5. Click **Next** to display the next screen. Comma should be selected as the delimiter.

6. Select the **First Row Contains Field Names** check box to use the first row of data as field names in the table.

7. Click **Next** to display the next screen where you can specify field information.

8. Click **Next** to accept the default settings and display the next screen where you can define a primary key. Leave the default selection that lets Access add the primary key.

9. Click **Next** to display the final screen.

10. Click **Finish** to accept the default table name. A Save Import Steps screen appears.

11. Select the **Save import steps** check box to display the specification details.

12. In the Description box, type **Import text file with job applicant contact information**, as shown in Figure 14-12.

Figure 14-12

Save Import Steps screen

13. Click **Save Import**.

14. In the Navigation Pane, double-click the **Applicants: Table** to open the new table with imported data.

15. **CLOSE** the Applicants table.

PAUSE. LEAVE the database open to use in the next exercise.

Running Import Specifications

To run a saved specification, on the External Data tab, in the Import & Link group, click Saved Imports. In the Manage Data Tasks dialog box, on the Saved Imports tab, click the specification that you want to run. In this exercise, you will run import specifications.

If you want to change the source file, click the path of the file to edit it. The new file you specify must satisfy all the requirements essential for successfully completing the operation.

Before you click Run, make sure that the source and destination files exist, that the source data is ready for importing, and that the operation will not accidentally overwrite any data in your destination file. Do everything that you would do to ensure the success of a wizard-driven operation before running any saved specification and then click Run.

If you no longer need to perform a specific operation, you can delete the specification by selecting it and then clicking Delete.
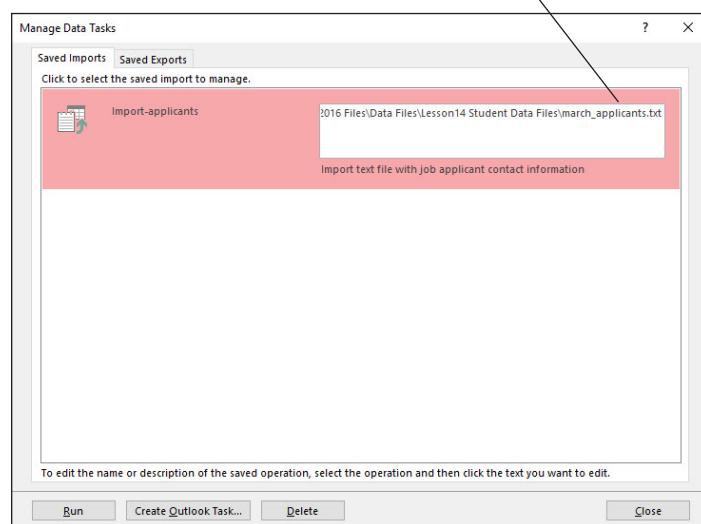
STEP BY STEP	Run Import Specifications

GET READY. USE the *Tailspin-final* database that is open from the previous exercise.

1. On the External Data tab, in the Import & Link group, click **Saved Imports** to open the *Manage Data Tasks* dialog box.
2. Click the file path and edit it by changing the source file name to march_applicants.txt, as shown in Figure 14-13.

Figure 14-13

Changing the source file name

3. Click **Run**. A message appears asking if you want to overwrite the existing table.
4. Click **Yes**. A message appears confirming that all objects were successfully imported.
5. Click **OK**.
6. Click **Close** to close the *Manage Data Tasks* dialog box.
7. In the Navigation Pane, double-click the **Applicants: Table** to open the table. The existing data has been replaced with new imported data, as shown in Figure 14-14.

Figure 14-14

Table with new imported data

8. **CLOSE** the Applicants table.

PAUSE. LEAVE the database open to use in the next exercise.

EXPORTING DATA

To use Access data in another program, you can use the various commands in the Export group of the External Data tab to export the selected object in the format you want.

Exporting from a Table to Excel and Other Formats

When you export data from a table to Excel, Access creates a copy of the data and then stores the copy in an Excel worksheet. In this exercise, you will export data from an Access table to an Excel worksheet.

Besides exporting to Excel, you can also export data to other destinations, such as a SharePoint list, a Rich Text Format file, another Access database, a text file, an XML or HTML file, PDF or XPS files, or Email. The process for exporting data is similar, regardless of the destination. The Export group contains all the formats Access can export to. The More button on the Export group has even more exportable formats from which you can choose.

If the source object is a table or a query, decide whether you want to export the data with or without its formatting. By default, Access exports table and query objects without formatting; all fields and records in the underlying object are exported and the Format property settings are ignored during the operation. You can also choose to export a table or query object with formatting; only the fields and records displayed in the current view are exported and the Format property settings are maintained.

If the source object is a form or report, you don't have the option to export the data without its formatting since a form or report object contains, by definition, a formatted layout of fields.

Table 14-2 summarizes the options for creating or overwriting an Excel workbook.

Table 14-2

Destination workbook options

Destination Workbook	Source Object	Data Exported	Result
Does not exist	Table, query, form, or report	With (for tables, queries, forms, or reports) or without (for tables or queries) formatting	Workbook is created during the export operation.
Already exists	Table or query (Forms and reports cannot be exported without their formatting)	Without formatting	The workbook is not overwritten. A new worksheet is added to the workbook and is given the name of the object from which the data is being exported. If a worksheet having that name already exists in the workbook, Access prompts you to either replace the contents of the corresponding worksheet or specify another name for the new sheet.
Already exists	Table, query, form, or report	With formatting	The workbook is overwritten by the exported data. All existing worksheets are removed, and a new worksheet having the same name as the exported object is created. The data in the Excel worksheet inherits the format settings of the source object.

You can export a table, query, form, or report to Excel. You can only export one database object in a single export operation. However, you can merge the data in multiple worksheets in Excel after completing the individual export operations. The data is always added in a new worksheet. You cannot append the data to an existing worksheet.
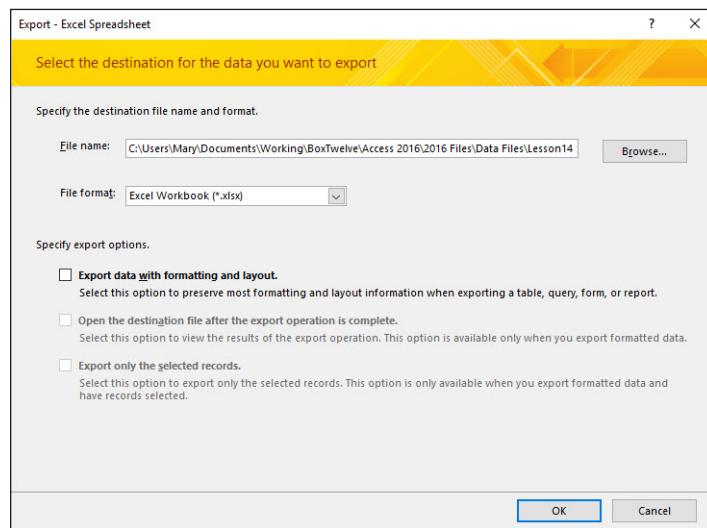
STEP BY STEP   **Export from a Table to Excel and Other Formats**

GET READY. USE the ***Tailspin-final*** database that is open from the previous exercise.

1. In the Navigation Pane, select the **Part-Time Employees: Table**.
2. On the External Data tab, in the Export group, click **Excel**. The *Export - Excel Spreadsheet* dialog box appears, as shown in Figure 14-15.

Figure 14-15

Export - Excel Spreadsheet dialog box

3. If you want to specify a different destination, click **Browse** to open the *File Save* dialog box. Choose a folder and then click **Save**.
4. Select the **Export data with formatting and layout** check box and then select the **Open the destination file after the export operation is complete** check box.
5. Click **OK**. Excel opens and the new worksheet with exported data is displayed, as shown in Figure 14-16.

Figure 14-16

Excel worksheet with exported data

6. **CLOSE** the worksheet and then **CLOSE** Excel.

7. Go back to Access.

8. On the Save Export Steps screen, click **Close**.

9. In the Navigation Pane, select the **Part-Time Employees: Table** if it is not already selected.

10. Click **PDF or XPS** on the External Data tab. The *Publish as PDF or XPS* dialog box appears.

11. Select a location for the file and then click **Publish**. (Leave the default name Part-Time Employees.pdf.)

12. The table opens as a PDF or XPS. **CLOSE** the file and return to Access.

PAUSE. LEAVE the database open to use in the next exercise.

Exporting from a Query to Word

You can export data from an Access query to a variety of formats, just as you can export data from an Access table. In this exercise, you will export a query to Word.

You can export a table, query, form, or report to Word. When you export an object to Word, Access creates a copy of the object's data in a Microsoft Word Rich Text Format file (*.rtf), and the visible fields and records appear as a table, with the field names in the first row.

Take Note   Pictures or attachments that are part of the source data are not exported to Word. Expressions are not exported either, but the results are.

When you export from Access to a Word document, the Export Wizard always exports formatted data and the data is always exported into a new Word file. You cannot append data to an existing Word document.
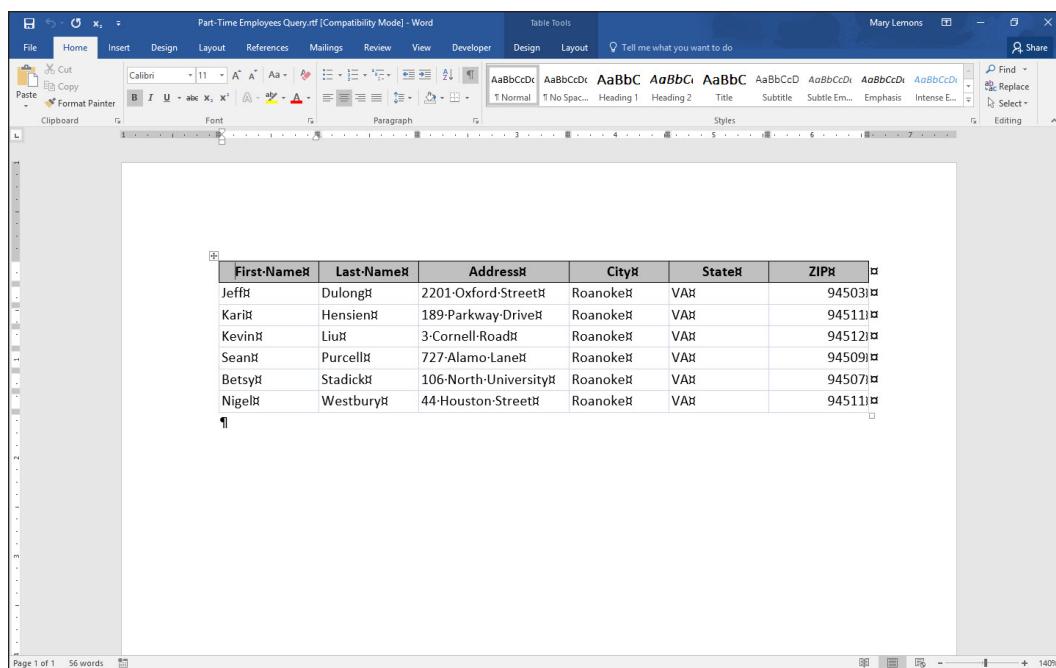
STEP BY STEP   **Export from a Query to Word**

GET READY. USE the *Tailspin-final* database that is open from the previous exercise.

1. In the Navigation Pane, select the **Part-Time Employees Query**.

2. On the External Data tab, in the Export group, click the **More** button. On the menu that appears, click **Word**. The *Export - RTF File* dialog box appears.

3. If you want to specify a different destination, click **Browse** to open the *File Save* dialog box. Choose a folder and then click **Save**.

4. Select the **Open the destination file after the export operation is complete** check box.

5. Click **OK**. Word opens and the new document with exported data is displayed, as shown in Figure 14-17.

Figure 14-17

Word document with exported data

6. **CLOSE** the document and then **CLOSE** Word.

7. Go back to Access.

8. On the Save Export Steps screen, click **Close**.

PAUSE. **LEAVE** the database open to use in the next exercise.

SAVING AND RUNNING EXPORT SPECIFICATIONS

In the Export Wizard Save as box, type a name for the export specification. Optionally, type a description in the Description box. If you want to perform the operation at fixed intervals, such as weekly or monthly, select the Create Outlook Task check box. Doing this creates an Outlook task that lets you run the specification by clicking a button.

Once these details are saved, you can use the Saved Exports command in the Export group on the External Data tab on the Ribbon to repeat the operation. Once clicked, the Manage Data Tasks dialog box appears.

In the Manage Data Tasks dialog box, you can change the name of the specification, its description, and the path and file name of the destination file by clicking and making changes in the text box and then pressing Enter. Repeat an operation by clicking the specification and then clicking Run. If you are exporting data with formatting and layout, you are asked to choose the encoding to be used for saving the file. When the operation is complete, you will see a message that communicates the status of the operation.

Although you can export Access data in various formats, sometimes you might need to export data to a program that uses a file format that Access does not support. In that case, if the destination program can use text (*.txt) files, you can export your data as a text file and open the resulting file with the second program. When you export the contents of a table or query to a text file with formatting and layout, hyphens (-) and pipe characters (|) are used to organize the content in a grid in the text file. The records appear as rows, fields appear as columns, and field names appear in the first row.

When exporting without formatting or layout, the Export Wizard gives you the option of creating a delimited file or a fixed-width file.

The choice you make usually depends on the system that works with the exported files. If users need to look at the data, a fixed-width file can be much easier to read than a delimited file.

Saving Export Specifications

After you have performed an export operation, you are given the opportunity to save it for future use. Saving the details helps you repeat the same export operation in the future without having to step through the wizard each time. In this exercise, you will export data from Access to a text file and then save the export specification.
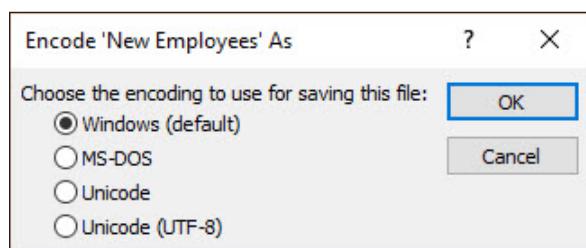
STEP BY STEP	Save Export Specifications

GET READY. USE the *Tailspin-final* database that is open from the previous exercise.

1. In the Navigation Pane, select the **New Employees: Table**.
2. On the External Data tab, in the Export group, click **Text File**. *The Export - Text File* dialog box appears
3. If you want to specify a different destination, click **Browse** to open the *File Save* dialog box. Choose a folder and then click **Save**.
4. Select the **Export data with formatting and layout** check box and then select the **Open the destination file after the export operation is complete** check box.
5. Click **OK**. The *Encode 'New Employees' As* dialog box is displayed, as shown in Figure 14-18.

Figure 14-18

Encode 'New Employees' As dialog box

6. Windows (default) should be selected. Click **OK**. Notepad opens and the new file with exported data is displayed, as shown in Figure 14-19.

Figure 14-19

Notepad with exported data

7. **CLOSE** Notepad.
8. Go back to Access.
9. On the Save Export Steps screen, select the **Save export steps** check box to display the specification details.
10. In the Description box, type **Export new employee information to a text file**.
11. Click **Save Export**.

PAUSE. LEAVE the database open to use in the next exercise.

Running Export Specifications

When you run the Export Wizard, you can save the operation as a specification for future use. In this exercise, you will run the export specifications you just saved.

Run Export Specifications
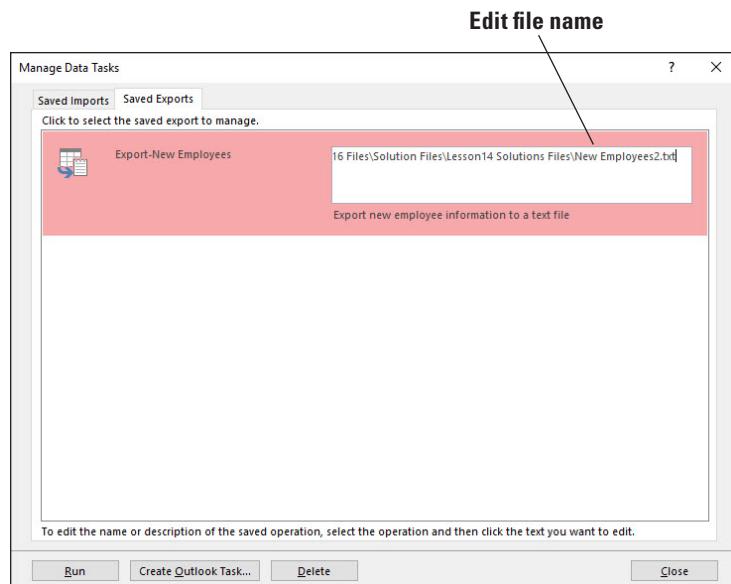
GET READY. USE the *Tailspin-final* database that is open from the previous exercise.

1. In the Navigation Pane, double-click the **New Employees: Table** to open it, if necessary.
2. Add another record with the following information:

   First Name: **Rachel**

   Last Name: **Valdez**

   Address: **39 Vista Drive**

   City: **Roanoke**

   State: **VA**

   ZIP: **94510**

   Phone Number: **607.555.1218**
3. **CLOSE** the table.
4. On the External Data tab, in the Export group, click **Saved Exports** to open the *Manage Data Tasks* dialog box.
5. Click the file path and edit it by changing the destination file name to **New Employees2. txt**, as shown in Figure 14-20.

Edit file name

Figure 14-20

Edit destination file

6. Click **Run**. Notepad opens and the new file with exported data is displayed.
7. Go back to Access. A message confirms that the export operation was successful.
8. Click **OK** and then click **Close** to close the *Manage Data Tasks* dialog box.
9. **CLOSE** Notepad.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Fill in the Blank

Complete the following sentences by writing the correct word or words in the blanks provided.

1. When you link to an Excel worksheet, Access creates a new table, called a(n) _____, that is linked to the source cells.

2. In a(n) _____ file, each record appears on a separate line and the fields are separated by a single character.

3. In a(n) _____ file, each record appears on a separate line and the width of each field remains consistent across records.

4. When you export the content of a table or query to a text file with _____ and _____, hyphens (-) and pipe characters (|) are used to organize the content in a grid.

5. When exporting to Excel, the data is always added in a new _____.

Multiple Choice

Select the best response for the following statements or questions.

1. If you want to add, edit, or delete data in a linked table, you must make the changes in which of the following?
   a. First row of data
   b. Access object
   c. Field headers
   d. Source file

2. You can save an import or export operation involving any of the file formats supported in Access, but you cannot save the details of which of the following?
   a. Linking operation
   b. Text file import operation
   c. Query export operation
   d. Fixed-width file

3. When you export an object to Word, Access creates which type of file?
   a. MS-DOS text
   b. Rich Text Format
   c. HTML
   d. Linked

4. Which of the following does Access do if you choose to store imported data in a new table?
   a. It links the new table to an existing table.
   b. It overwrites the data in the existing table.
   c. It creates a table and adds the imported data to this table.
   d. It gives you an error message.

5. Which of the following is an advantage of linking an Access database to data in another program?
   a. Maintaining a copy of the external data in Access
   b. Being able to use Access querying and reporting tools
   c. Being able to edit the linked table in Access
   d. Easily being able to change the structure of the Access table

Projects

Project 14-1: Importing and Exporting Data

In this project, you are the purchasing manager for Fourth Coffee and an associate has provided some information about exotic coffees that are being considered for the monthly coffee club. The data is in an Excel worksheet and will need to be imported into the database. Your supervisor also wants a list of customer information in a Word file. So you use the Customers table in the Access database to export the data to a Rich Text Format file.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *Fourth Coffee* database from the data files for this lesson and then **SAVE** the database as *Fourth Coffee-final*.
2. On the External Data tab, in the Import & Link group, click **Excel** to display the *Get External Data – Excel Spreadsheet* dialog box.
3. Click **Browse** to open the *File Open* dialog box.
4. Use the *File Open* dialog box to locate the *Coffee_Exotic* spreadsheet file and then click **Open.**
5. Click **Import the source data into a new table in the current database** and then click **OK**. The Import Spreadsheet Wizard appears.
6. Click **Next** to display the next screen.
7. Select the **First Row Contains Column Headings** check box if it is not already selected.
8. Click **Next** to display the next screen where the wizard prompts you to review the field properties.
9. Click the column headings to display the corresponding field properties.
10. Click **Next** to display the next screen.
11. Click **Next** to let Access add the primary key. The final screen appears.
12. In the Import to Table box, type **Coffee_Exotic** and then click **Finish**. When the Save Import Steps screen appears, click **Close**.
13. In the Navigation Pane, double-click the **Coffee_Exotic: Table** to open the new table with imported data.
14. **CLOSE** the Coffee_Exotic table.
15. In the Navigation Pane, select the **Customers: Table**.
16. On the External Data tab, in the Export group, click the **More** button. On the menu that appears, click **Word** to display the *Export - RTF File* dialog box.
17. If you want to specify a different destination, click **Browse** to open the *File Save* dialog box. Choose a folder and then click **Save**.
18. Select the **Open the destination file after the export operation is complete** check box.
19. Click **OK**. Word opens and the new file with exported data is displayed. (You may need to adjust the margins and columns and then change the orientation to layout to get the content to actually fit if you want to print the report.)
20. **CLOSE** the file and then **CLOSE** Word.
21. Go back to Access.
22. On the Save Export Steps screen, click **Close**.
23. **CLOSE** the database.

PAUSE. **LEAVE** Access open for the next project.

Project 14-2: Exporting Data to a New Database

In this project, you are the manager at Southridge Video. You have created a new database to store information about new video games. You want to export the Games table to the new database. You have exported an Access table to other destinations, but not to another Access database. Use Access Help if you need more information.

GET READY. LAUNCH Access if it is not already running.

1. Create a new database called *New Games-final*.
2. **CLOSE** the New Games-final database.
3. **OPEN** *Sale Games* from the data files for this lesson and then **SAVE** the database as *Sale Games-final*.
4. On the External Data tab, in the Export group, click the **Access** button. The *Export – Access Database* dialog box appears.
5. Click **Browse** and navigate to the location where you saved the New Games-final database. Select it and then click **Save**.
6. Click **OK**. The *Export* dialog box appears.
7. Leave the default settings and then click **OK**.
8. Click **Close** in the *Export -Access Database* dialog box.
9. **CLOSE** the Sales Games-final database.
10. **OPEN** the *New Games-final* database, double-click the Games table to open it, and then verify that the data was successfully exported.
11. **CLOSE** the Games table.
12. On the External Data tab, in the Import & Link group, click **Excel**. The *Get External Data – Excel Spreadsheet* dialog box appears.
13. Click **Browse** and then open the *Games to Add.xlsx* spreadsheet in the data files for this lesson.
14. Select the **Append a copy of the records to the table Games** radio button and then click **OK**.
15. Click **Next**, click **Finish**, and then click **Close**.
16. Double-click the **Games** table in the Navigation Pane to open it. Notice there are now more items in the table (two new NBA Live games and one new College Hoops game).
17. **CLOSE** the Games table. Click **Yes** if you're asked to save it.

STOP. CLOSE the database and then **EXIT** Access.

15 Database Tools

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Maintaining a Database	Back up a database. Recover data from backup. Compact a database. Repair a database.	1.4.3 1.4.6 1.4.1 1.4.2
Saving a Database as a Template	Save a database as a template.	1.5.3
Encrypting a Database	Encrypt a database with a password.	1.4.5
Configuring Database Options	Set a form as the startup option.	1.3.3
Using Database Tools	Split a database.	1.4.4

MAINTAINING A DATABASE

You can perform some important database maintenance tasks by using the commands on the Info menu and Save As menu on the File tab. Although the commands available on these menus might not seem as important as the actual data in your database, these commands allow you to provide protection for all the data in the file, and that is important. You can use the options on the Info menu to compact and repair your database, set database properties, and protect your database using encryption. The options on the Save As menu let you save your database in other file formats and back up your database.

Backing Up a Database

After all the work you have put into a database, you start to depend on being able to access and update the data and the information in it on a regular basis. It is a good idea to create backup files of all your databases and back them up regularly to protect your work. A **backup** is a copy of a file. When you back up your database, you are essentially making another copy of the database that you can store on your computer, on a network drive, or in another safe location to prevent the loss of your data. In this exercise, you back up a database.

You can store a backup copy in the same place as your original file, such as on your computer. However, if something happened to your computer, both files would be affected. A better solution is to save a backup copy to a network drive or removable media that is stored in a different physical location. For example, some companies that maintain sensitive client data have elaborate processes in place to store backup copies on computers or other media in another part of the city or in another part of the country. If an entire office building is destroyed by fire or a city is involved in a natural disaster, the backup files containing client data are safe in another location. It is a good idea to consider the appropriate precautions needed for even a small company's data.

When backing up a database, Access automatically adds the date to the filename. You can keep this filename as an identifier for the backup file or change the filename to something else. Just keep in mind that you need a new name or location so that you don't overwrite your original file. In the Save In box, choose the location where you want to save the file.
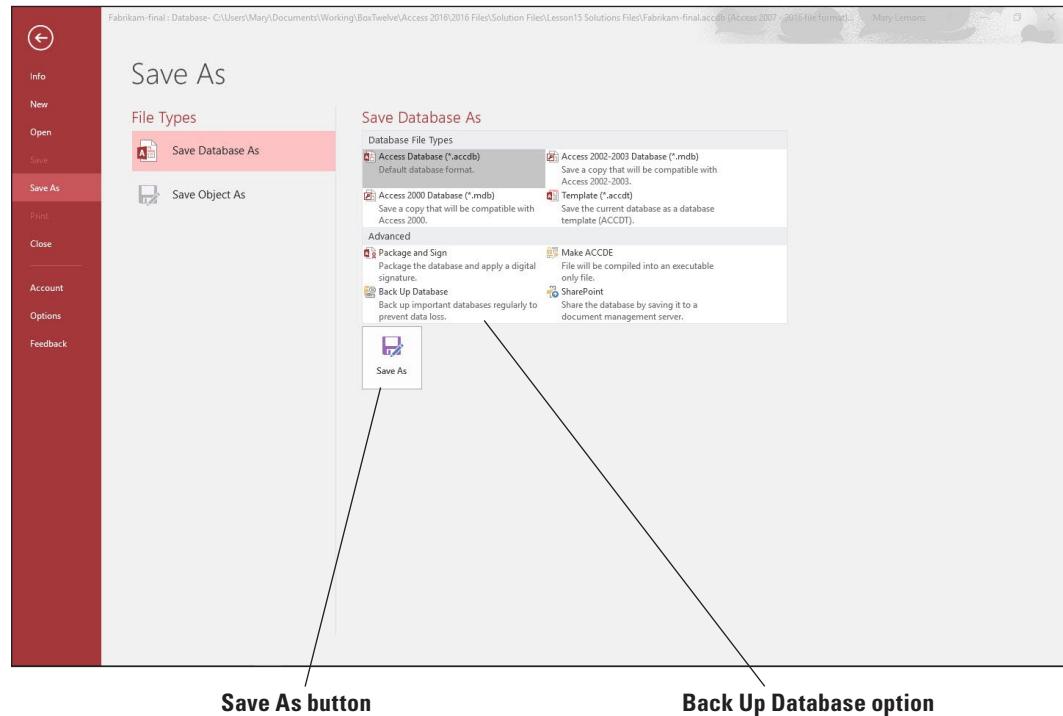
Back Up a Database

GET READY. Before you begin these steps, be sure to turn on and/or sign on to your computer and then start Access.

1. **OPEN** *Fabrikam* from the data files for this lesson and then **SAVE** the database as *Fabrikam-final*.
2. Click the **File** tab and then click **Save As**. The Save As menu appears, as shown in Figure 15-1.

Figure 15-1

Save As menu

Save As button   Back Up Database option
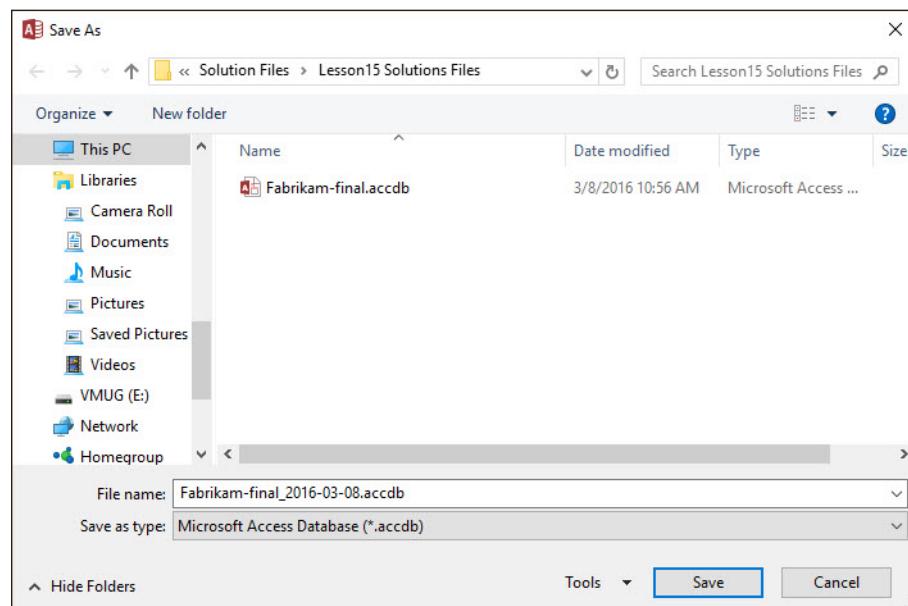
3. In the Advanced category, click **Back Up Database** and then click the **Save As** button. The *Save As* dialog box appears, as shown in Figure 15-2. Notice that Access automatically adds the current date to the end of the filename.

Figure 15-2

Save As dialog box

4. Click the **Save** button to accept the generated filename and save location. You could also navigate to an external drive to save the database to an external location to increase its physical security. You can recover the data by simply opening the database backup file you just created.

PAUSE. LEAVE the database open to use in the next exercise.

Saving as a Previous Version

Access 2016 allows you to save a database in a previous Access file format so that those using earlier versions of the software can use the database. When you save a database file—or any computer file—in an earlier file format, you're maintaining backward compatibility. However, some features of Access 2016 cannot be converted into a file format prior to Access 2007. Access will alert you when this is the case, and you can always remove that feature in order to save the database as a previous version. Before you can save a database in a previous file format, you should open the database and make sure all objects are closed. In this exercise, you save an Access 2016 database as a previous version so a user who has an earlier version of Access can open your document without any difficulty.

When you save a new, blank database in Microsoft Access 2016, you are prompted to give it a filename. Although you may have created the database in Access 2016, it is saved in the Access 2007–2016 Default database file format by default, which gives it the .accdb extension. The Access 2007–2016 format is not readable by earlier versions of Access. If you need to share a database with others using earlier versions of the software, the Save As command allows you to save the database in the Access 2000 format or the Access 2002–2003 format, both of which have the extension .mdb. When you use the Save As command to save a database in an earlier format, it preserves the original database file in its native format and creates a copy in the format you choose.

STEP BY STEP   **Save as a Previous Version**

GET READY. USE the *Fabrikam-final* database that is open from the previous exercise.

1. Click the **File** tab and then click **Save As**. The Save As menu appears.
2. In the Database File Types category, click **Access 2002–2003 Database** and then click the **Save As** button. The *Save As* dialog box appears. Notice that Microsoft Access Database (2002–2003) is displayed in the Save as type: box.
3. Type **Fabrikam2002-2003** in the file name box.
4. Click the **Save** button. Notice the filename and format change is displayed in the title bar, as shown in Figure 15-3.

File format displayed in the title bar
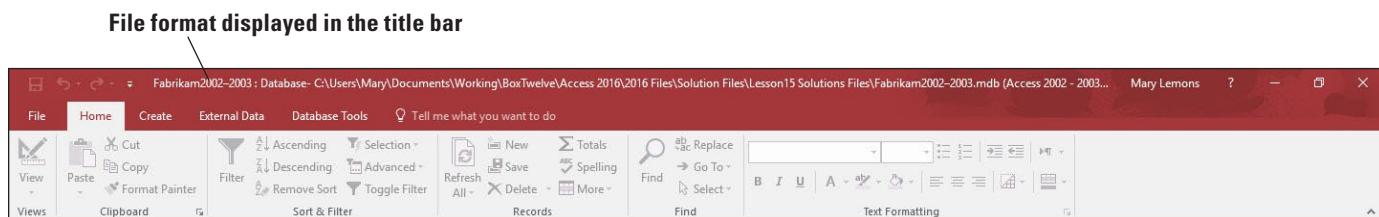
Figure 15-3

Database saved in Access 2002–2003 format

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   If an Access 2016 database file contains complex data, offline data, or attachments created in Access 2013, you will not be able to save it in a format earlier than Access 2007.

Compacting and Repairing a Database

The Compact and Repair command on the Info menu on the File tab optimizes files and fixes minor problems in the file structure that may result from normal, everyday use of a database file. In this exercise, you compact and repair a database.

As records or objects in a database are deleted, the empty space within the file might not be replaced right away, leaving the file fragmented or with large empty spaces within the file structure. In databases with many records and objects, these issues can affect the database's performance over time. In the same way, minor errors can occur in any file, especially when it is shared by many different users on a network drive. Using the Compact and Repair command on a regular basis will help optimize the file and repair minor problems before they become major ones.

Take Note   Before you use this command on a shared file, make sure no one else has the file open.
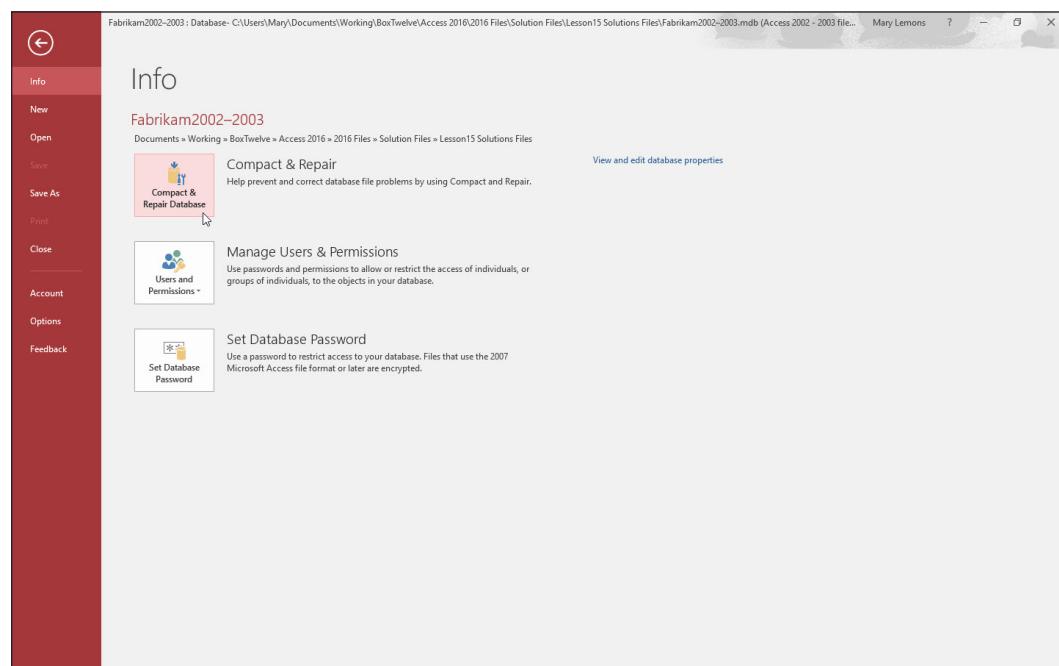
STEP BY STEP   **Compact and Repair a Database**

GET READY. USE the *Fabrikam2002-2003* database that is open from the previous exercise.

1. Click the **File** tab and then click **Info** (if the Info menu doesn't already appear). Select **Compact & Repair Database** on the Info menu that appears, as shown in Figure 15-4. Click **Compact & Repair Database**. Access compacts and repairs the database.

Figure 15-4

Info menu

2. CLOSE the database.

PAUSE. LEAVE Access open to use in the next exercise.

SAVING A DATABASE AS A TEMPLATE

You may find it useful to reuse a database you or others have spent a lot of time creating. For example, you may have created the structure of a database, including relevant tables, queries, forms, and reports—with or without sample data—and may want to save this underlying structure to reuse or to share with others. In this exercise, you create a database as a template.

Access allows you to create a **database template**, a file (extension type *. accdt) that can be used to create a new, prefabricated database. You can even share database templates with the Access community or with your colleagues—simply provide them with the file Access creates after you save the template. Besides saving databases as templates, you can also save and reuse predesigned applications parts and pre-constructed tables, forms, and other objects. These predesigned objects can then be directly inserted into a pre-existing database. You can also create data type templates, which are elements you can use to create new fields or field combinations. You can also share application parts and data type templates with others.

You can save a database as a database template or create a new application part by using the commands on the Save As menu. You can access the Save As menu by selecting Save As on the File tab. The Database File Types category includes the option to save the database as a template. Once this option is chosen and you click the Save As button, the Create New Template from This Database dialog box appears with the options described in Table 15-1.

Table 15-1

Create New Template from
This Database options

Option	Description
Name	Required text that identifies the template or application part being saved.
Description	Text that describes the contents or purpose of the template or application part.
Category	Used for application parts. Defaults to the User Templates category which has the application part show up under User Templates on the Ribbon.
Icon	Optional. The icon displayed on the appropriate Access menu for the template or application part.
Preview	Optional. The preview image that shows when you click on the database template on the Access menu.
Primary Table	Used for application parts. The table used by default to relate the application part to other tables in a database to which the part is added. A wizard is started when the application part is first used, and this table is the first that is presented to the user to relate to other objects in the database.
Instantiation Form	Form that opens as a startup form when databases made by this template are first opened.
Application Part	Used to select database as an application part. When not selected, database is used as a template.
Include Data in Template	Used to include sample data in the database as part of the template to share with users who create new databases from this template.

Take Note   Data type templates can be created when a table is open by using the Save Selection as New Data Type command located on the More Fields menu in the Add & Delete group on the Table Tools Fields tab. You first need to select a field or combination of fields from the open table to execute this command.

Take Note   Database templates, applications parts, and data type template files that you create are saved to the following folder in both Windows 8 and Windows 10: C:\Users\<username>\AppData\Roaming\Microsoft\Templates\Access\. Others can share these files with you and you can put them in this folder to use them from within Access. Similarly, you can share your template files with others by providing them with copies from this folder.

Take Note   To use a newly created database template from within Access, click the Personal link on the New menu after clicking New on the File tab. The newly created application part can be accessed on the Application Parts menu in the Templates group on the Create tab on the Ribbon. The data type template can be accessed by opening the table in which you want to create the field and then clicking the newly created data type template on the More Fields menu in the Add & Delete group on the Table Tools Fields tab on the Ribbon.
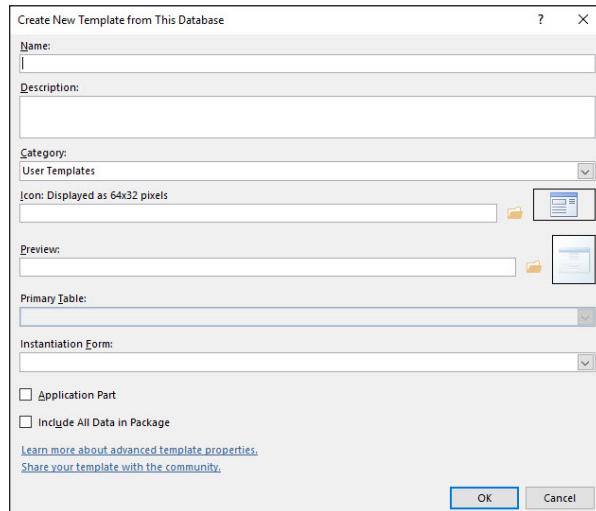
Save a Database as a Template

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *Graphic Art* database from the data files for this lesson.
2. Click the **File** tab.
3. Click **Save As** to display the Save As menu. Click the **Template** option in the Database File Types category.
4. Click the **Save As** button. The *Create New Template from This Database* dialog box appears, as shown in Figure 15-5.

Figure 15-5
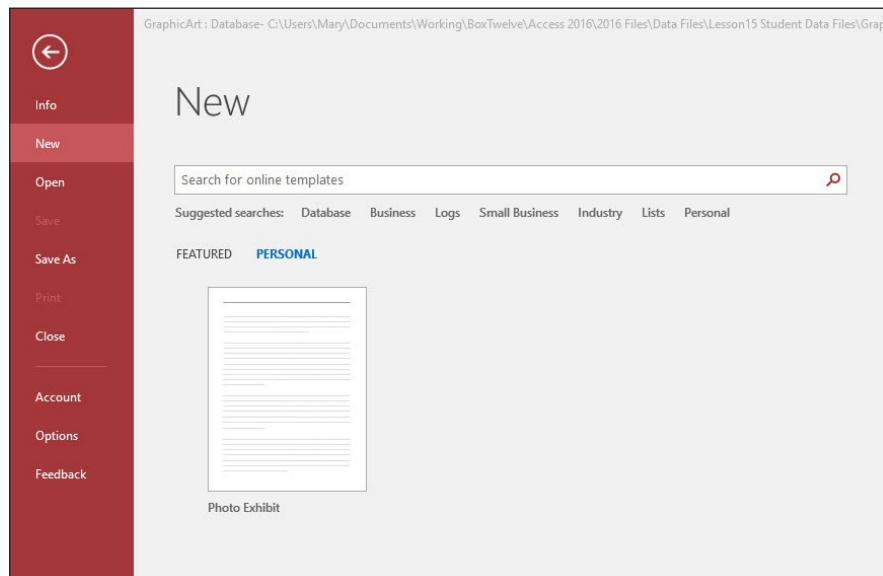
Create New Template from This Database dialog box

5. Type **Photo Exhibit** in the Name box.
6. Type **This template contains a standard photo exhibit table with standardized fields and a related form** in the Description box. Review the other boxes and options in the *Create New Template from This Database* dialog box.
7. Click **OK**. Notice the file path and name of the saved template in the message box that appears. Click **OK** to close the message box.
8. Click the **File** tab and then click **New** to display the New menu. Click the **PERSONAL** link to the right of the FEATURED link. The newly created Photo Exhibit database template appears, as shown in Figure 15-6.

Figure 15-6

Photo Exhibit database template

9. **CLOSE** the database.

PAUSE. LEAVE Access open to use in the next exercise.

MERGING DATABASES

Sometimes you will have a situation where you need to merge the data from several databases into one. In this case, you will need to import several Access database objects—or an entire database—into another database. In this exercise, you import several objects from one Access database in to another.

You may experience a situation in business where each department maintains their own employee records in separate databases stored in separate tables using separate queries, forms, and reports. Using the Access button in the Import & Link group on the External Data tab on the Ribbon, you can import tables, queries, forms, and reports into the current database. The Import Objects dialog box, which appears before the import process, allows you to choose all or some of the objects you'd like to import. You can also choose to import object relationships, table definitions and actual data (or just table definitions), and other tools.
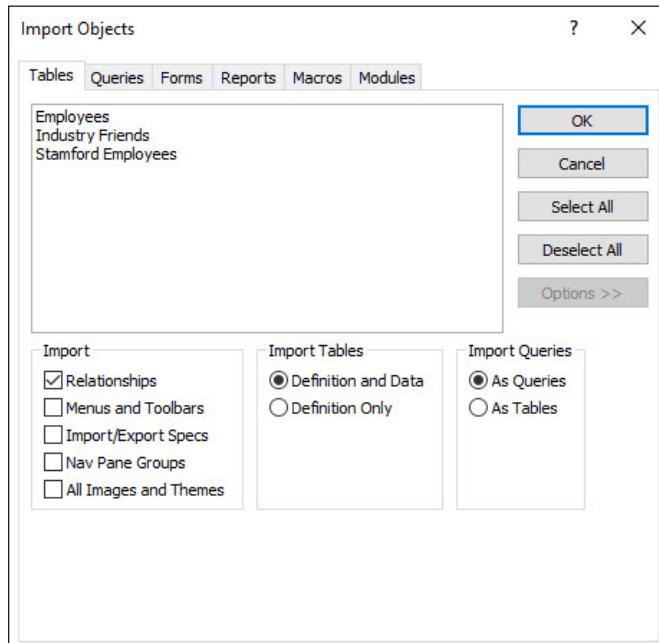
STEP BY STEP	**Merge Databases**

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *Alpine* database from the data files for this lesson, and then **SAVE** the database as *Alpine-final*.
2. On the External Data tab, in the Import & Link group, click the **Access** button. The *Get External Data – Access Database* dialog box appears.
3. Click **Browse** to open the *File Open* dialog box.
4. Use the *File Open* dialog box to locate the *Northwind* database file and then click **Open**. The *File Open* dialog box closes.
5. Notice the two options you have when importing data. Click **Import tables, queries, forms, reports, macros, and modules into the current database** and then click **OK**. The *Import Objects* dialog box appears. Click the **Options** button to display additional import options, as shown in Figure 15-7. Review the available options but keep the default options.

Figure 15-7

Import Objects dialog box

6. Click the **Select All** button on the Tables tab.

7. Click the additional object tab for queries, forms, and reports, and then click the **Select All** button as the contents for each tab are displayed to select all the objects in the Northwind database.

8. Click **OK**.

9. When the Save Import Steps screen appears, click **Close**.

10. Notice the Navigation Pane now includes objects imported from the Northwind database, as shown in Figure 15-8. The databases have been merged.

Figure 15-8

Navigation Pane with imported Northwind database objects

11. **CLOSE** the database.

PAUSE. LEAVE Access open to use in the next exercise.

SETTING DATABASE PROPERTIES

Database properties are details about a file that describe or identify it. Using database properties makes it easier to organize and identify databases later. Some properties can be specified by you and some are automatically updated by Access. You can search to find files that contain certain properties, such as keywords, file size, or creation date. Standard properties are those such as author, title, and subject that are associated with a document by default. In this exercise, you set database properties that will help you identify and organize it later.

Table 15-2 describes each Standard property on the Summary tab of the Properties dialog box. These properties can all be changed by the user; however, some properties on the General, Statistics, and Contents tabs—such as the file size and date the document was created or updated—are automatically updated by Access and cannot be changed. On the Custom tab, you can define Custom properties by assigning text, time, numeric, or yes/no values to custom properties.

Table 15-2

Standard Database Properties

Property Name	Description
Title	Title of the database
Subject	Topic of the contents in the database
Author	Name of the individual who has authored the database
Manager	Name of the manager who is responsible for the database
Company	Name of the company that owns the database
Category	Category in which the database can be classified
Keywords	A word or set of words that describes the database
Comments	Summary or abstract of the contents of the database
Hyperlink base	Path to the destination of the file; the path may point to a location on your hard drive, a network drive, or the Internet
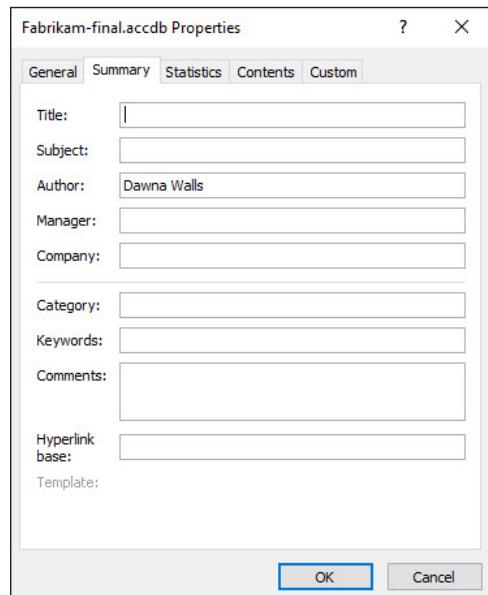
STEP BY STEP   **Set Database Properties**

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *Fabrikam-final* database that you saved in an earlier exercise.
2. Click the **File** tab and then click **Info**, if necessary. On the Info menu that appears, click the **View and edit database properties** link. The *Fabrikam-final.accdb Properties* dialog box appears, as shown in Figure 15-9.

Figure 15-9

Summary Tab of the Fabrikam-final.accdb Properties dialog box

3. Type **Fall Collection** in the Title box.
4. Type **preview** in the Subject box.
5. Select the text in the Author box and then type [**Your Name**] (where Your Name is your name).
6. Type **Britta Simon** in the Manager box.
7. Type **Fabrikam, Inc**. in the Company box
8. Click the **General** tab. Notice that this tab displays the file type, location, and size as well as the dates the file was created, modified, and accessed.
9. Click the **Contents** tab to view a list of the types of objects within the database file.

10. Click **OK**.

PAUSE. LEAVE the database open to use in the next exercise.

ENCRYPTING A DATABASE

==Encrypting== a database means to scramble the data in a way that can only be reconverted by an authorized user who has the password. When you use a database password to encrypt a database, you make all data unreadable by other tools and you force users to enter a password to use the database. Encrypting a database can provide security for sensitive data. You can use the Decrypt Database command to change the password on a regular basis or to remove it.

Take Note   Use strong passwords that combine uppercase and lowercase letters, numbers, and symbols. Weak passwords do not mix these elements. Strong password: W5!dk8@R. Weak password: CAR381. Passwords should be 8 or more characters in length. A pass phrase that uses 14 or more characters is better.

When you open an encrypted database, the Password Required dialog box appears where you type the password. Passwords are case sensitive, meaning you can use uppercase and lowercase letters as well as numbers and symbols, but you must enter them exactly as they were entered when the password was set in order for there to be a match. It is very important for you to remember your password, because if you forget it Microsoft cannot retrieve it for you. Write down the password and store it in a safe location or use a password manager.

Encrypting and Decrypting a Database

To encrypt a database, you first need to open it in Exclusive mode. ==Decrypting== a database is removing the password from a file that has been encrypted. In this exercise, you help secure a database by encrypting it and then unsecure it by decrypting it.

If you want to remove a password, open the database in Exclusive mode, click the Decrypt Database button from the Database Tools group, and then type the password in the Unset Database Password dialog box exactly as it was entered to encrypt the database.
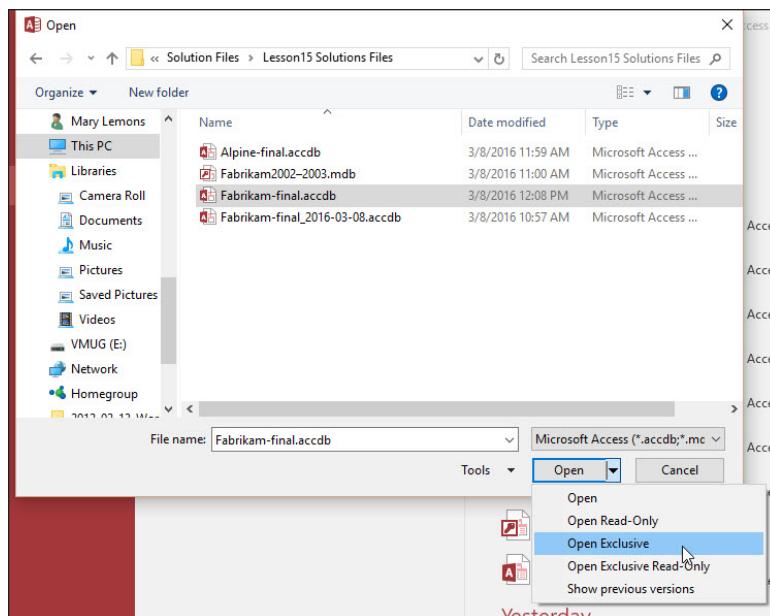
STEP BY STEP   **Encrypt and Decrypt a Database**

GET READY. USE the *Fabrikam-final* database that is open from the previous exercise.

1. Click the **File** tab and then click **Info**, if necessary. On the Info menu that appears, click the **Encrypt with Password** button. A Microsoft Office Access message box appears saying you must open the database in Exclusive mode.

2. Click **OK**.

3. **CLOSE** the database but don't close Access.

4. Click **Open** on the File tab. The Open menu appears.

5. Navigate to the data files for this lesson and then select *Fabrikam-final*.

6. Click the **down arrow** on the Open button and then select **Open Exclusive** from the menu, as shown in Figure 15-10. Click **Open Exclusive**. The Fabrikam-final database file opens in exclusive mode.

Figure 15-10
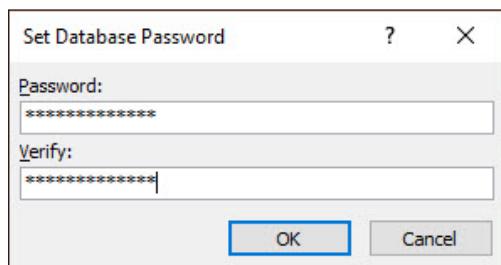
Open menu

7. On the File tab, on the Info menu, click the **Encrypt with Password** button. The *Set Database Password* dialog box appears.
8. Type **$Fabrikam09fc** in the Password box.
9. Type **$Fabrikam09fc** in the Verify box, as shown in Figure 15-11.

Figure 15-11

Set Database Password dialog box

⚠️ **Troubleshooting**   Type the passwords exactly as printed throughout this exercise to avoid error messages.

10. Click **OK**. If you get another message box informing you that an option will be ignored, click **OK**. The database is now encrypted with a password.
11. **CLOSE** the database.
12. **OPEN** the database in Exclusive mode again. The *Password Required* dialog box appears.

Take Note   You only need to open the database in Exclusive mode if you are going to set or unset a password. The database will be protected with the password in any mode.

13. Type **$Fabrikam09fc** and then click **OK**. The database opens.
14. On the File tab, on the Info menu, click the **Decrypt Database** button. (If you hadn't opened the database in Exclusive mode, you would get a message prompting you to do so.) The *Unset Database Password* dialog box appears.
15. Type **$Fabrikam09fc** and then click **OK**. The database is now decrypted.
16. **CLOSE** the database.

17. OPEN the database in regular mode. Notice that a password is no longer required to open the file.

18. CLOSE the database.

PAUSE. LEAVE Access open to use in the next exercise.

CONFIGURING DATABASE OPTIONS

The Access Options dialog box provides many ways to customize your copy of Access by allowing you to change popular options to other unique options. Through the Access Options dialog box, you can enable error checking, show/hide the Navigation Pane, and select a startup display form.

If you want a form to be displayed automatically when you open a database, the Display Form menu lets you choose from available forms in the database. You can choose none if you do not wish to display a form.

The Display Navigation Pane option is turned on by default, but if you don't want the Navigation Pane to be displayed when you open your database, click the Display Navigation Pane check box to remove the check mark. You must close and reopen the current database for these settings to take effect.

Enable Error Checking, located in the Object Designers options, is another feature you can change. Error checking is on by default, but you can clear the check box to disable all types of error checking in forms and reports. For example, Access places error indicators in controls that encounter one or more types of errors. The indicators appear as triangles in the upper-left or upper-right corner of the control, depending on text direction. The default indicator color is green, but you can change that to another color if you choose.

Configuring Database Options

The Access Options dialog box lets you customize certain aspects of Access and your databases. The Access Options dialog box has 11 sections of customizable options, including General, Current Database, Datasheet, Object Designers, Proofing, and Language. In this exercise, you use the Access Options dialog box to set a form as the startup option and hide the Navigation Pane.
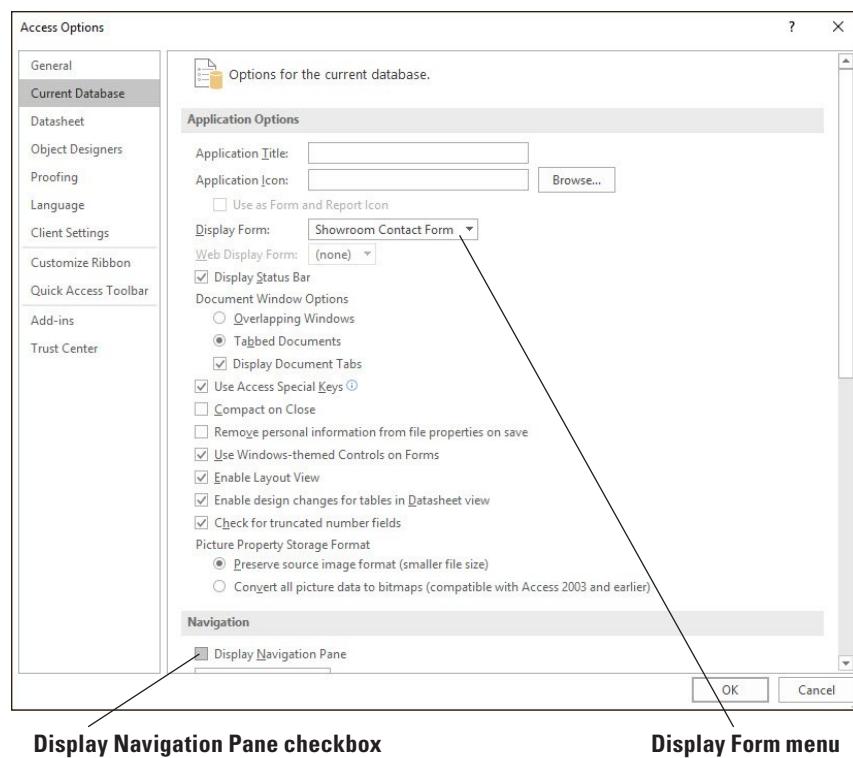
STEP BY STEP   **Configure Database Options**

GET READY. LAUNCH Access if it is not already running.

1. OPEN *Fabrikam Inc* from the data files for this lesson and then **SAVE** the database as *Fabrikam Inc-final*.

2. Click the **File** tab and then click **Options**. The *Access Options* dialog box appears.

3. Click the **Current Database** button on the left to display the Current Database menu of the A*ccess Options* dialog box.

4. In the Application Options section, click the **Display Form** down arrow and then select **Showroom Contact Form** from the menu to display the form at startup.

5. In the Navigation section, notice that the **Display Navigation Pane** is turned on by default.

6. Click the **Display Navigation Pane** check box to remove the check mark, as shown in Figure 15-12, and then click **OK**. A Microsoft Access message box appears saying you need to close and reopen the database for the changes to take effect.

Figure 15-12

Access Options dialog box,
Current Database menu

Display Navigation Pane checkbox   **Display Form menu**
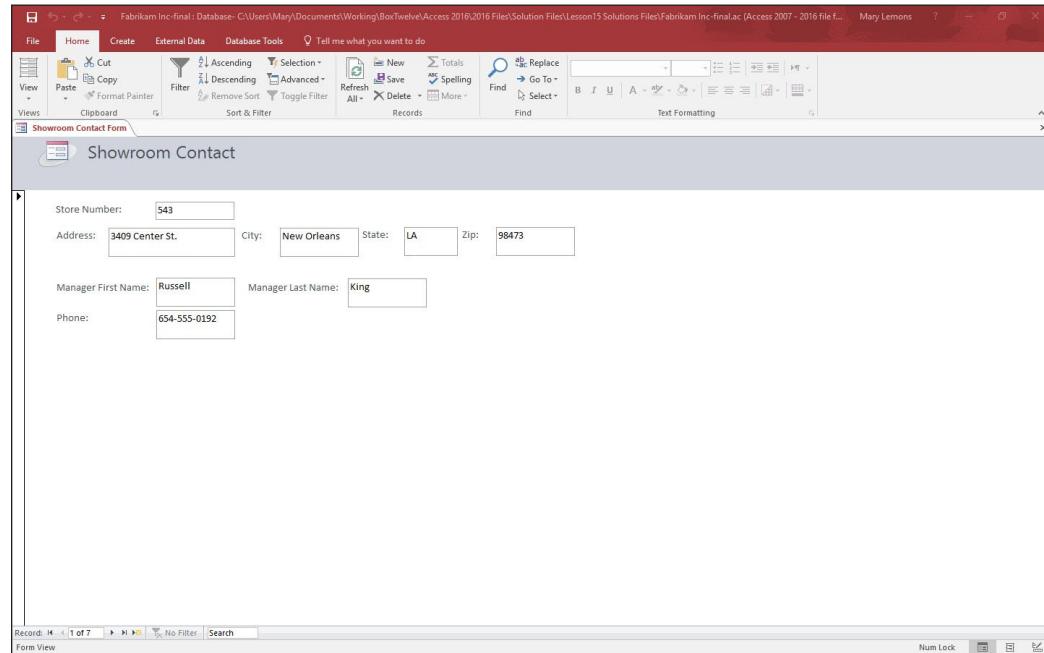
7. Click **OK**.

8. **CLOSE** the database.

9. **OPEN** the *Fabrikam Inc-final* database. Notice that the Navigation Pane is not visible and the Showroom Contact Form is displayed at startup, as shown in Figure 15-13.

Figure 15-13

Showroom Contact form

10. Click the **File** tab and then click **Options**.
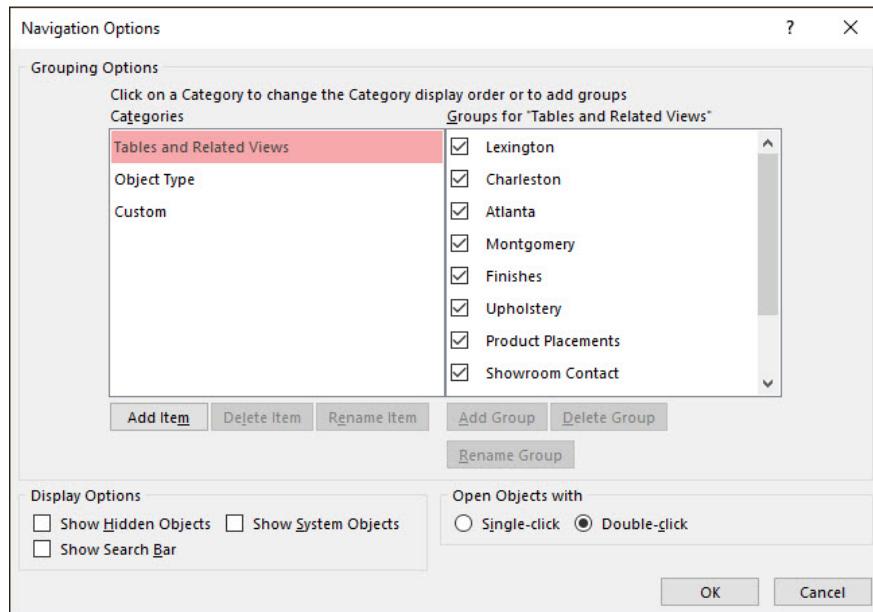
11. Click the **Current Database** button on the left, if it's not already selected.

12. In the Application Options section, click the **Display Form** down arrow and then select **(none)** from the menu.

13. In the Navigation section, click the **Display Navigation Pane** check box to insert a check mark.

14. In the Navigation section, click the **Navigation Options** button. The *Navigation Options* dialog box appears, as shown in Figure 15-14. Notice the grouping and display options that are available and then click **Cancel**.

15. Click the **Object Designers** button on the left.

16. Scroll to the bottom of the window to see the Error checking section. The Enable Error Checking options are turned on by default.

17. Click **OK**. The *Microsoft Access* dialog box appears again.

18. Click **OK**.

19. **CLOSE** the database.

20. **OPEN** the *Fabrikam Inc-final* database. Notice the Navigation Pane is displayed and the form is not.

PAUSE. **LEAVE** the database open to use in the next exercise.

USING DATABASE TOOLS

The Database Tools tab has advanced commands for maintaining databases. Using this tab, you can do such things as identify object dependencies, create object reports with the Database Documenter, and split a database.

Identifying Object Dependencies

Object dependencies describe how objects in a database rely on other components to function properly. The Object Dependencies task pane helps you manage a database by displaying how all of its components interact. This can be helpful if you want to delete a table or form. It allows you to see which objects you may need to change so they will function without the deleted table. In this exercise, you identify object dependencies.

The Object Dependencies task pane displays how database objects, such as tables or forms, use other objects. This process helps keep databases running smoothly by preventing errors that could result when changes or deletions are made to objects in a database. The Object Dependencies task pane works only for tables, forms, queries, and reports in an Access database.
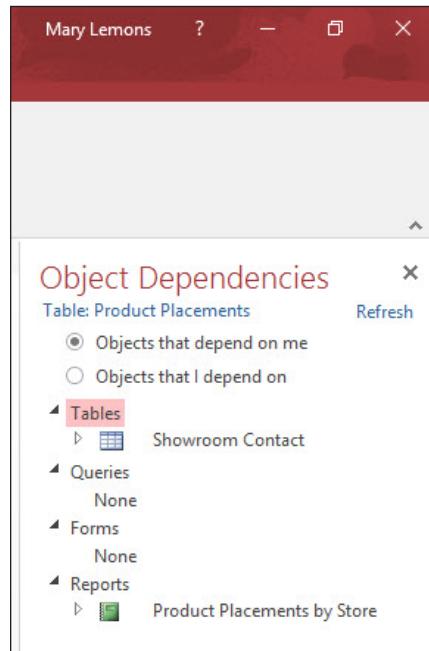
Identify Object Dependencies

GET READY. USE the *Fabrikam Inc-final* database that is open from the previous exercise.

1. Click the **Product Placements: Table** in the Navigation Pane to select it.
2. On the Database Tools tab, in the Relationships group, click the **Object Dependencies** button. The **Object Dependencies task pane** displays dependency information for the selected table, as shown in Figure 15-15. Widen the pane if necessary. Notice that the *Objects that depend on me* option button is selected.

Figure 15-15

Object Dependencies task pane

3. Click the **Objects that I depend on** option button. Notice the changes in the Reports section.
4. Click the **Objects that depend on me** option button. Click the **right-pointing triangle** beside the Showroom Contact table to see the tables and forms that depend on the Showroom Contact table.
5. Click the **Showroom Contact** link to display it in Design view where you could make any necessary changes
6. **CLOSE** the Showroom Contact table.
7. **CLOSE** the Object Dependencies task pane.

PAUSE. LEAVE the database open to use in the next exercise.

Using the Database Documenter

The **Database Documenter** provides detailed information about a database and presents it as a report that can be printed. Use the Database Documenter when you need to have a printed record of this information, such as for record-keeping purposes or as insurance in case you have to re-create the database or object. In this exercise, you use the Database Documenter to create a report about the objects included in the database.

The Database Documenter creates a report that shows details, or definitions, about a selected object and opens it in Print Preview. You can view the properties for a form as well as properties for each section of the form and each label, button, or control on the form. The Documenter dialog box contains tabs for each type of object as well as a tab that displays all objects. Select the object whose definitions you want to view or print. The Options button lets you further specify the features of the object for which you want to view the definitions.
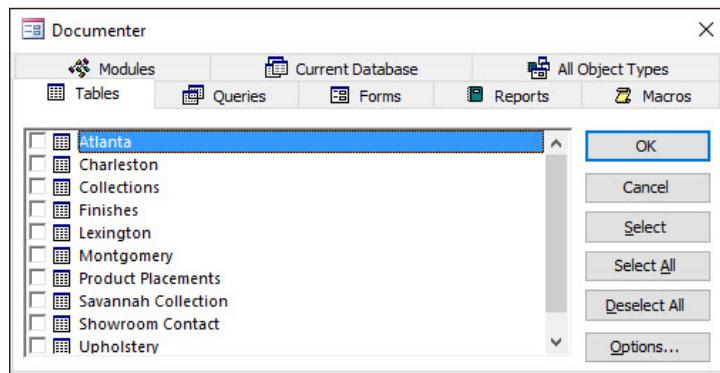
Use the Database Documenter

GET READY. USE the *Fabrikam Inc-final* database that is open from the previous exercise.

1. On the Database Tools tab, in the Analyze group, click the **Database Documenter** button. The *Documenter* dialog box appears, as shown in Figure 15-16.

Figure 15-16
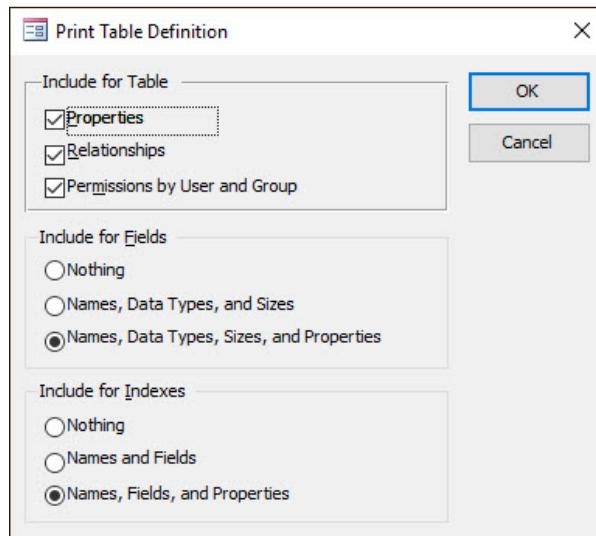
Documenter dialog box

2. Click the **All Object Types** tab.
3. Click the **Tables** tab.
4. Select the **Showroom Contact** check box in the Tables list.
5. Click the **Options** button. The *Print Table Definition* dialog box appears, as shown in Figure 15-17.

Figure 15-17
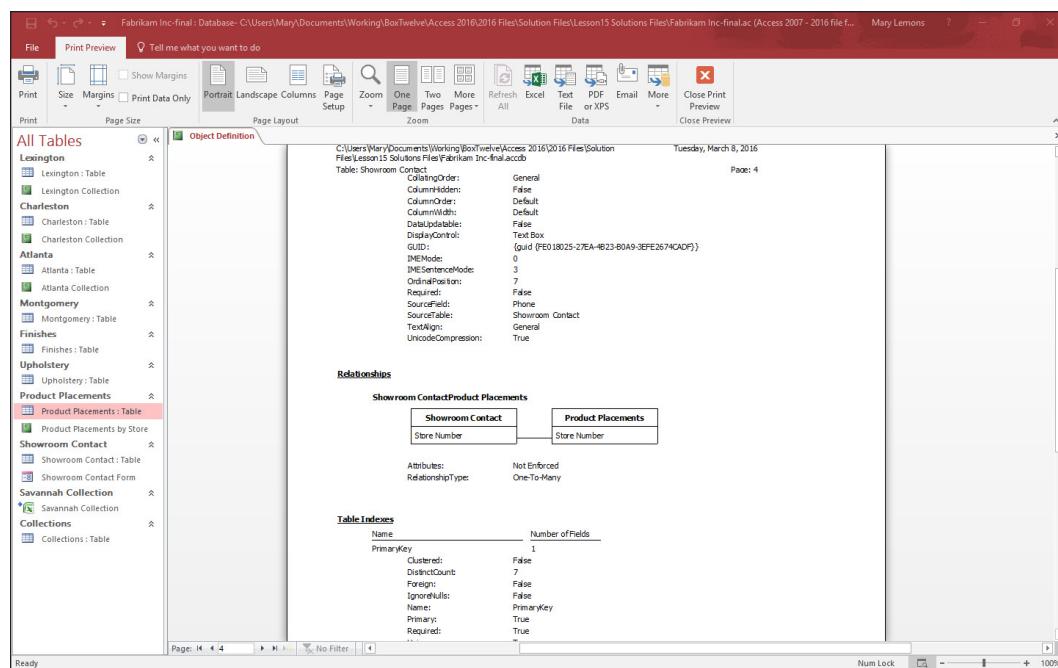
Print Table Definition dialog box

6. Click **OK** to close the *Print Table Definition* dialog box.
7. Click **OK** to close the *Documenter* dialog box. The Object Definition report appears in Print Preview.
8. Click the **Zoom** button in the Zoom group to view the report. At this point, you could print the report or make any changes to the layout and then print it.
9. Click the **Next Page** button on the page navigation bar until you reach page 4. Notice the relationship diagram included in the report, as shown in Figure 15-18.

10. Click the **Close Print Preview** button.

PAUSE. LEAVE the database open to use in the next exercise.

Take Note   Some object definitions can be several pages long, so it is a good idea to check the length of the report before printing.

Splitting a Database

It can be difficult for many people to use the data in a database at the same time. Synchronizing data can be difficult and time consuming. To avoid slowing down the network because of constant changes being made to a database, the **Database Splitter** wizard can split the database into two files: one that contains the tables, called the **back-end file**; and one that contains the queries, forms, reports, and other objects created from the tables, called the **front-end file.** Users who need to access the data can customize their own forms, reports, pages, and other objects while maintaining a single source of data on the network. Essentially, the back-end database tables are dynamically linked to the front-end database tables, so a change of record data in one table will automatically change the same data in the corresponding table in the other database. It is a good idea to back up the database before splitting it. In this exercise, you use the Database Splitter wizard to split a database.
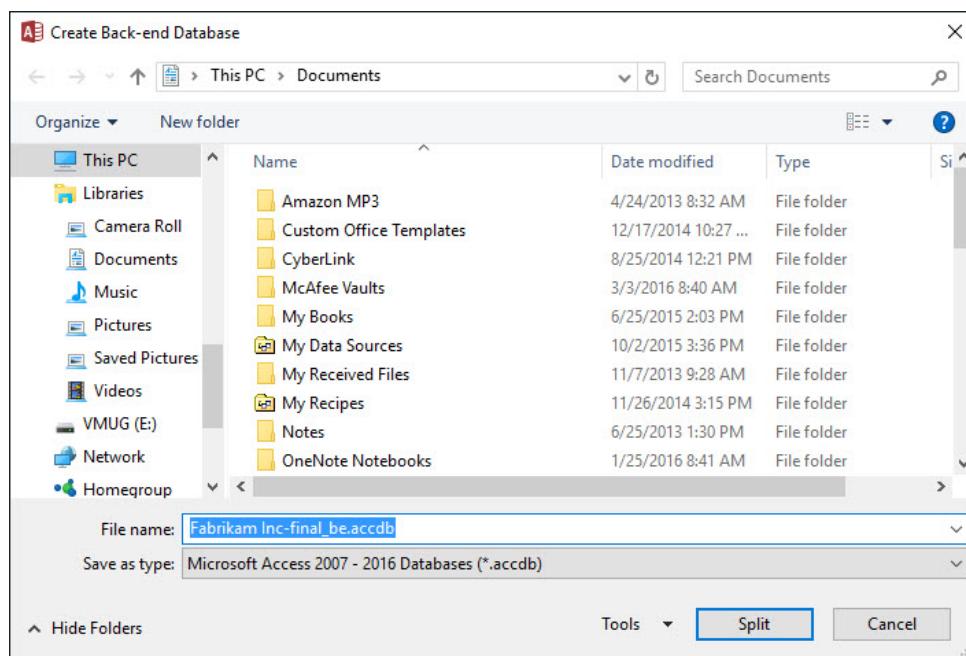
STEP BY STEP   **Split a Database**

GET READY. USE the *Fabrikam Inc-final* database that is open from the previous exercise.

1. On the Database Tools tab, in the Move Data group, click the **Access Database** button. The Database Splitter Wizard appears.

2. Click the **Split Database** button. The *Create Back-end Database* dialog box appears, as shown in Figure 15-19. Notice that is has already given the file a file name.

Figure 15-19

Create Back-end Database
dialog box

3. Navigate to the location where you want to save the back-end file and then click **Split**. After a few moments, the Database Splitter message box appears stating that the database was successfully split.

4. Click **OK**.

5. **CLOSE** the database.

6. **OPEN** *Fabrikam Inc-final_be*. Notice that it contains only the tables for the database.

STOP. CLOSE the database and then **EXIT** Access.

Knowledge Assessment

Matching

Match the term in Column 1 to its description in Column 2.

Column 1	Column 2
1. Back-end file	**a.** In a split database, the file that contains the queries, forms, reports, and other objects created from the tables
2. Front-end file	**b.** Optimizes files and fixes minor problems in the file structure of a database
3. Compact and Repair command	**c.** To scramble data in a way that can only be reconverted by an authorized user who has the correct password
4. Encrypting	**d.** Creates a report that shows details, or definitions, about a selected object database and opens it in Print Preview
5. Database Documenter	**e.** The file that contains the tables in a split database

True/False

Circle T if the statement is true or F if the statement is false.

T   F   1. Backing up files on a regular basis is really not necessary.

T   F   2. Compacting and repairing a database leaves the file fragmented.

T   F   3. The .accdb extension is for the Access 2002–2003 file format.

T   F   4. If you forget a password for a database, Microsoft can retrieve it for you.

T   F   5. It is a good idea to back up a database before splitting it.

Competency Assessment

Project 15-1: Setting Database Properties, and Encrypting and Decrypting a Database

As an investor relations specialist for Blue Yonder Airlines, you need to maintain and safeguard the databases that you use. In this project, you will set the database properties and compact and repair the Income and Expenses database. Then, set the Income chart to open on startup and create a password to protect the data in the Income and Expenses database. Once the protection is no longer needed, remove the encryption from the Blue Yonder Income and Expenses database.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *Blue Yonder* database from the data files for this lesson and then **SAVE** the database as *Blue Yonder-final*.
2. Click the **File** tab, click **Info** (if necessary), and then select the **View and edit database properties** link.
3. Type **Income and Expenses** in the Subject box.
4. Type [**Your Name**] in the Author box.
5. Type **Andrew Lan** in the Manager box.
6. Type **BlueYonder Airlines** in the Company box.
7. Click **OK**.
8. Click **File** and then select **Compact & Repair Database**.
9. Click **File** and then click **Options**.
10. Click the **Current Database** link on the left.
11. Select **Income Chart** from the Display Form menu.
12. Click **OK** and then click **OK** again.
13. **CLOSE** the database.
14. **OPEN** the *Blue Yonder-final* database in Exclusive mode.
15. Click the **File** tab, and on the Info menu click the **Encrypt with Password** button.
16. Type **#1BlueYonder$87** in the Password box.
17. Type **#1BlueYonder$87** in the Verify box.
18. Click **OK**. Click **OK** if you receive a warning dialog box.
19. **CLOSE** the database.
20. **OPEN** the database.
21. Type **#1BlueYonder$87** in the Enter database password box and then click **OK**.
22. Open the **Database Documenter**.
23. Select the **Income & Expenses Summary** table and then click **OK** to view the report.
24. Print the report or close Print Preview.
25. **CLOSE** the database and then reopen it in Exclusive mode.
26. Type **#1BlueYonder$87** in the Enter database password box and then click **OK**.
27. Click **File** and then click **Decrypt Database**.

28. Type **#1BlueYonder$87** and then click **OK**.

29. Click **File** and then **Save As**.

30. Click **Back Up Database**.

31. Use the generated file name, and **SAVE** it in the same location as the original version.

32. **CLOSE** the database.

PAUSE. LEAVE Access open to use in the next project.

Project 15-2: Merging, Backing Up, and Splitting the WingTip Database

As part of your maintenance of database files at WingTip Toys, you decide to merge a database with another database with similar data to consolidate the two databases. In this project, you will also create a backup of a database and split it so that others in the company can create their own forms and reports using the data in the tables.

GET READY. LAUNCH Access if it is not already running.

1. **OPEN** the *Wingtip* database from the data files for this lesson and then **SAVE** the database as *Wingtip-final*.

2. On the External Data tab, in the Import & Link group, click the **Access** button.

3. Click **Browse** to open the *File Open* dialog box.

4. Locate the *Toys* database file and then click **Open**.

5. The Import tables, queries, forms, reports, macros, and modules into the current database option should be selected. Click **OK**.

6. Click the **Select All** button on each tab in the *Import Object* dialog box to import all objects into the current database. Click **OK**.

7. When the Save Import Steps screen appears, click **Close**.

8. Click the **File** tab, click **Save As**, and then select **Back Up Database**.

9. Click the **Save As** button and then, using the generated file name with the date, click **Save**. (Change the destination location if you want.)

10. On the Database Tools tab, in the Move Data group, click the **Access Database** button.

11. Click the **Split Database** button.

12. Accept the **Wingtip-final_be file** name and then click **Split**.

13. Click **OK**.

STOP. CLOSE the database and then **EXIT** Access.

Appendix A

EXAM 77-730: ACCESS 2016

Objective Number	Matrix skill	Lesson Number
Create and Manage a Database		
1.1	Create and Modify Databases	
1.1.1	Create a blank desktop database	2
1.1.2	Create a database from a template	2
1.1.3	Create a database by using import objects or data from other sources	2, 14
1.1.4	Delete database objects	4
1.2	Manage Relationships and Keys	
1.2.1	Create and modify relationships	3
1.2.2	Set the primary key	3
1.2.3	Enforce referential integrity	3
1.2.4	Set foreign keys	3
1.2.5	View relationships	3
1.3	Navigate through a Database	
1.3.1	Navigate specific records	3
1.3.2	Create and modify a navigation form	10
1.3.3	Set a form as the startup option	15
1.3.4	Display objects in the Navigation Pane	1
1.3.5	Change views of objects	1
1.4	Protect and Maintain Databases	
1.4.1	Compact a database	15
1.4.2	Repair a database	15
1.4.3	Back up a database	15
1.4.4	Split a database	15
1.4.5	Encrypt a database with a password	15
1.4.6	Recover data from backup	15
1.5	Print and Export Data	

Objective Number	Matrix skill	Lesson Number
1.5.1	Print reports	11, 13
1.5.2	Print records	11
1.5.3	Save a database as a template	15
1.5.4	Export objects to alternative formats	14
Build Tables		
2.1	Create Tables	
2.1.1	Create a table	2, 9
2.1.2	Import data into tables	14
2.1.3	Create linked tables from external sources	14
2.1.4	Import tables from other databases	14
2.1.5	Create a table from a template with application parts	2
2.2	Manage Tables	
2.2.1	Hide fields in tables	3
2.2.2	Add total rows	9
2.2.3	Add table descriptions	4
2.2.4	Rename tables	4
2.3	Manage Records in Tables	
2.3.1	Update records	3
2.3.2	Add records	3
2.3.3	Delete records	3
2.3.4	Append records from external data	14
2.3.5	Find and replace data	3
2.3.6	Sort records	3
2.3.7	Filter records	3
2.4	Create and Modify Fields	
2.4.1	Add fields to tables	4
2.4.2	Add validation rules to fields	4
2.4.3	Change field captions	4
2.4.4	Change field sizes	4
2.4.5	Change field data types	1
2.4.6	Configure fields to auto-increment	9
2.4.7	Set default values	4

Objective Number	Matrix skill	Lesson Number
2.4.8	Using input masks	4
2.4.9	Delete fields	4
Create Queries		
3.1	Create a Query	
3.1.1	Run a query	7
3.1.2	Create a crosstab query	12
3.1.3	Create a parameter query	7
3.1.4	Create an action query	12
3.1.5	Create a multi-table query	7, 12
3.1.6	Save a query	7, 13
3.2	Modify a Query	
3.2.1	Rename a query	7
3.2.2	Add fields	12
3.2.3	Remove fields	12
3.2.4	Hide fields	7
3.2.5	Sort data within queries	7
3.2.6	Format fields within queries	12
3.3	Create Calculated Fields and Grouping within Queries	
3.3.1	Add calculated fields	12
3.3.2	Set filtering criteria	12
3.3.3	Group and summarize data	12
3.3.4	Group data by using comparison operators	12
3.3.5	Group data by using arithmetic and logical operators	12
Create Forms		
4.1	Create a Form	
4.1.1	Create a form	5, 10
4.1.2	Create a form from a template with application parts	10
4.1.3	Save a form	5
4.2	Configure Form Controls	
4.2.1	Move form controls	8
4.2.2	Add form controls	8
4.2.3	Modify data sources	8

Objective Number	Matrix skill	Lesson Number
4.2.4	Remove form controls	8
4.2.5	Set form control properties	8
4.2.6	Manage labels	8
4.2.7	Add sub-forms	10, 11
4.3	Format a Form	
4.3.1	Modify tab order	8
4.3.2	Configure print settings	8
4.3.3	Sort records by form field	5
4.3.4	Apply a theme	5
4.3.5	Control form positioning	8
4.3.6	Insert backgrounds	8
4.3.7	Insert headers and footers	8
4.3.8	Insert images	8
Create Reports		
5.1	Create a Report	
5.1.1	Create a report based on the query or table	6
5.1.2	Create a report in Design view	6
5.1.3	Create a report by using a wizard	6
5.2	Configure Report Controls	
5.2.1	Group and sort fields	6, 11
5.2.2	Modify data sources	8, 13
5.2.3	Add report controls	8, 13
5.2.4	Add and modify labels	8
5.3	Format a Report	
5.3.1	Format a report into multiple columns	8
5.3.2	Add calculated fields	12
5.3.3	Control report positioning	8
5.3.4	Format report elements	8
5.3.5	Change report orientation	11
5.3.6	Insert header and footer information	8
5.3.7	Insert images	8
5.3.8	Apply a theme	6