

# Introduction to Microsoft Access 2016



with examples and  
hands-on exercises

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**WEBUCATOR**

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## **Class Files**

Download the class files used in this manual at

<https://static.webucator.com/media/public/materials/classfiles/ACC2016.1-1.1.1.zip>.

## **Errata**

Corrections to errors in the manual can be found at

<https://www.webucator.com/books/errata/>.

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# LESSON 1

## Quick Overview of the Access User Interface

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### Topics Covered

- ☑ Organization of the Access ribbon.
- ☑ Context tabs in the ribbon.
- ☑ The **Quick Access Toolbar**.
- ☑ The **Navigation Pane**.
- ☑ Objects and the creation process.
- ☑ Access work surface.
- ☑ Creating a database with a wizard.

Evaluation  
Copy

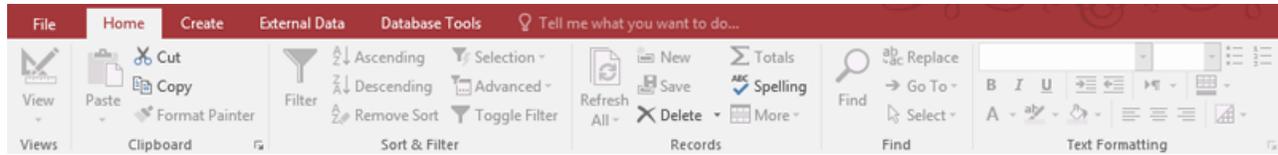
### Introduction

For this lesson, open the My Music Collection database located with your Webucator class files at `ClassFiles/OverviewoftheAccessUserInterface/Demos/Demo - My Music Collection.accdb`. If prompted concerning disabled content, click **Enable Content** in the yellow banner.



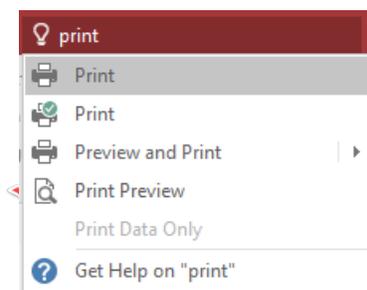
### 1.1. Access Ribbon

For this demo, we will open `../OverviewoftheAccessUserInterface/Demos/Demo - My Music Collection.accdb`. The tabbed area that spans the top of the Access window below the title bar is called the *ribbon*. The ribbon holds the commands that you can use to affect objects in Access. The commands available at any point in time depend on the type of object you have selected and the current view mode.



The ribbon has five standard tabs: **File**, **Home**, **Create**, **External Data**, and **Database Tools**.

A new feature is the **Tell me what you want to do...** (not available in the web app). This feature shows you options and takes you to an exact command, executing it along the way. It also provides an opportunity to get help for a topic. The screenshot below shows the results of a print search in the **Tell me what you want to do...**

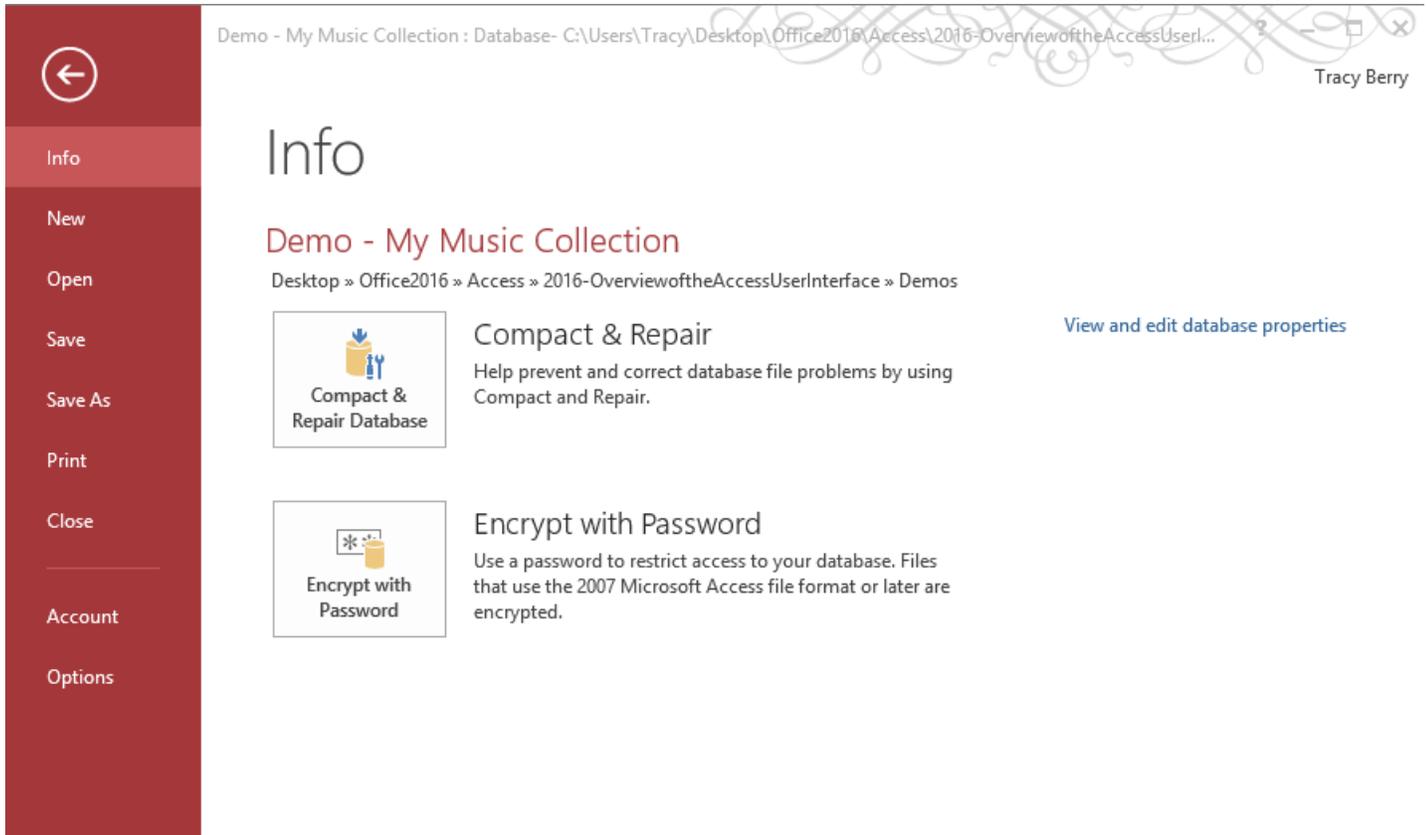


### ❖ 1.1.1. File

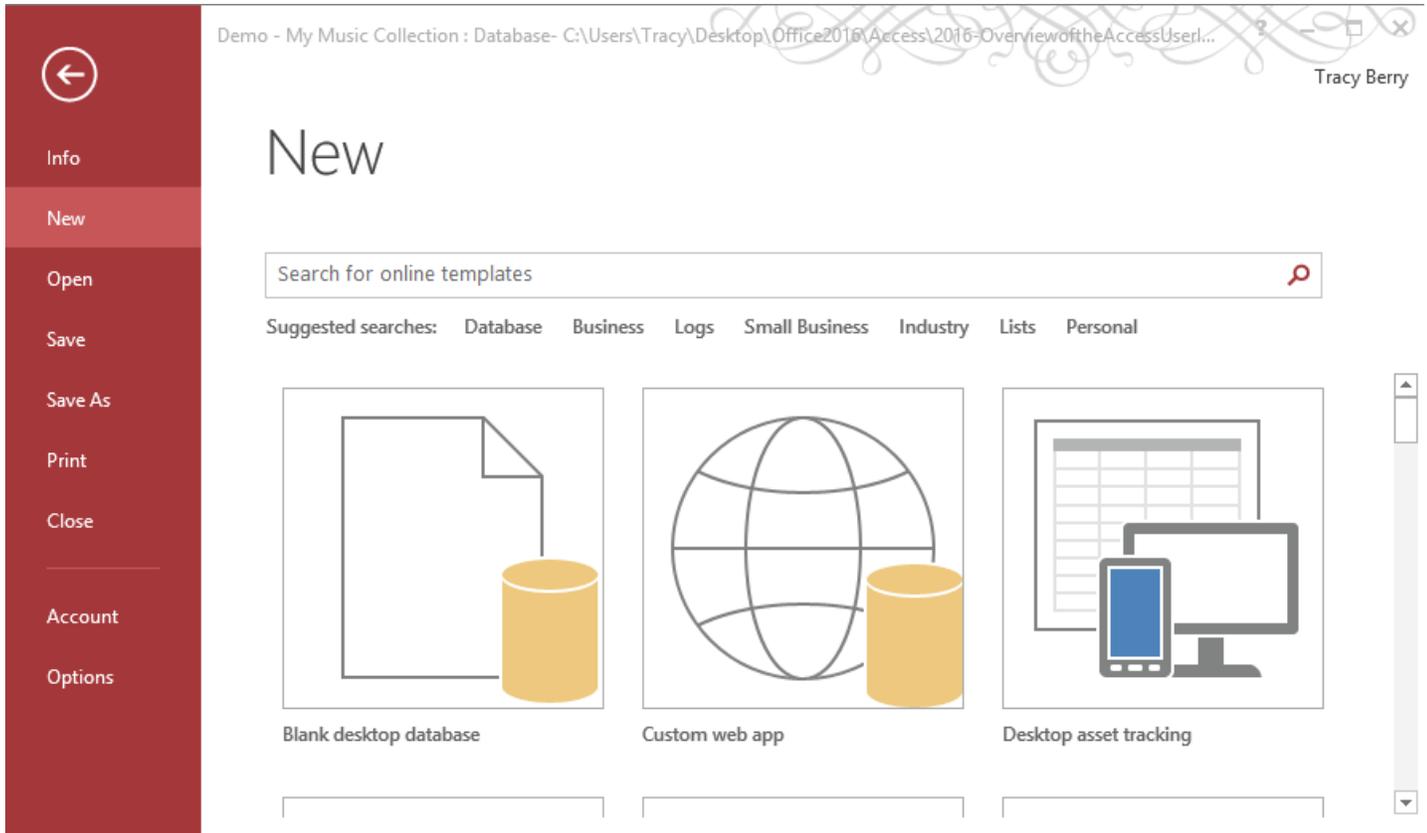
Selecting the **File** tab takes you to the **Backstage**, an area where file-level commands can be accessed.

To return to the main Access window from the **Backstage**, click .

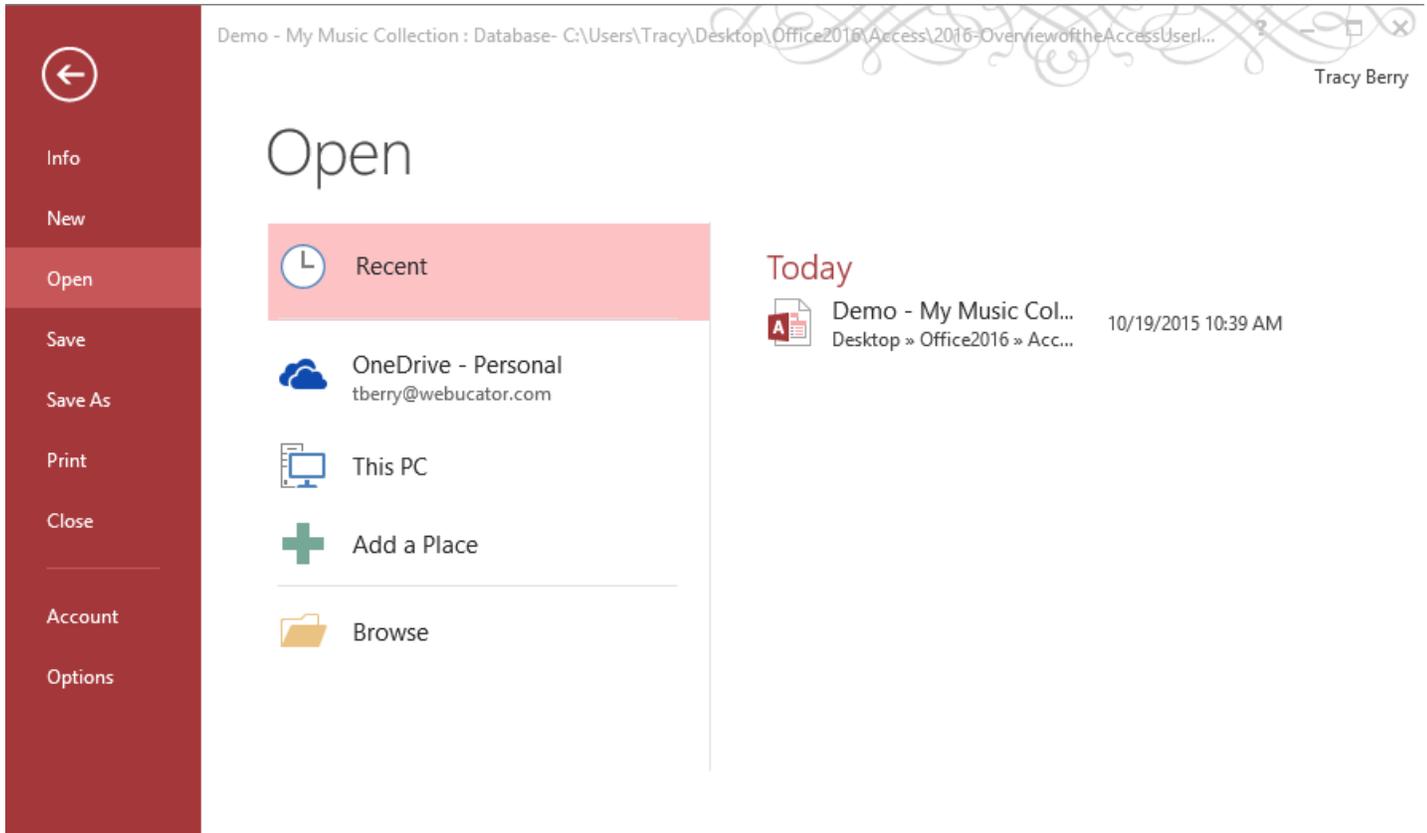
Selecting **Info** in the vertical menu on the left gives you access to the **Compact & Repair** and **Encrypt with Password** utilities.



**New** lets you create a new database by selecting from among numerous database templates. To start a desktop database from scratch (as we will later in this course), you would click the “Blank desktop database” template.



**Open** lets you locate an existing database and open it. Selecting the **Recent** option on the **Open** page shows you the database files you have used most recently. You can click a file name to open it. Notice when you hover over items in the file list that a horizontal push pin appears to the right of the file name. Clicking the push pin will pin the file name to the list so that it always appears in the list unless you subsequently unpin it. Selecting the **This PC** option on the **Open** page lets you open the current folder or recently used folders to search for database files. Alternatively, you can click **Browse** to navigate to a file.



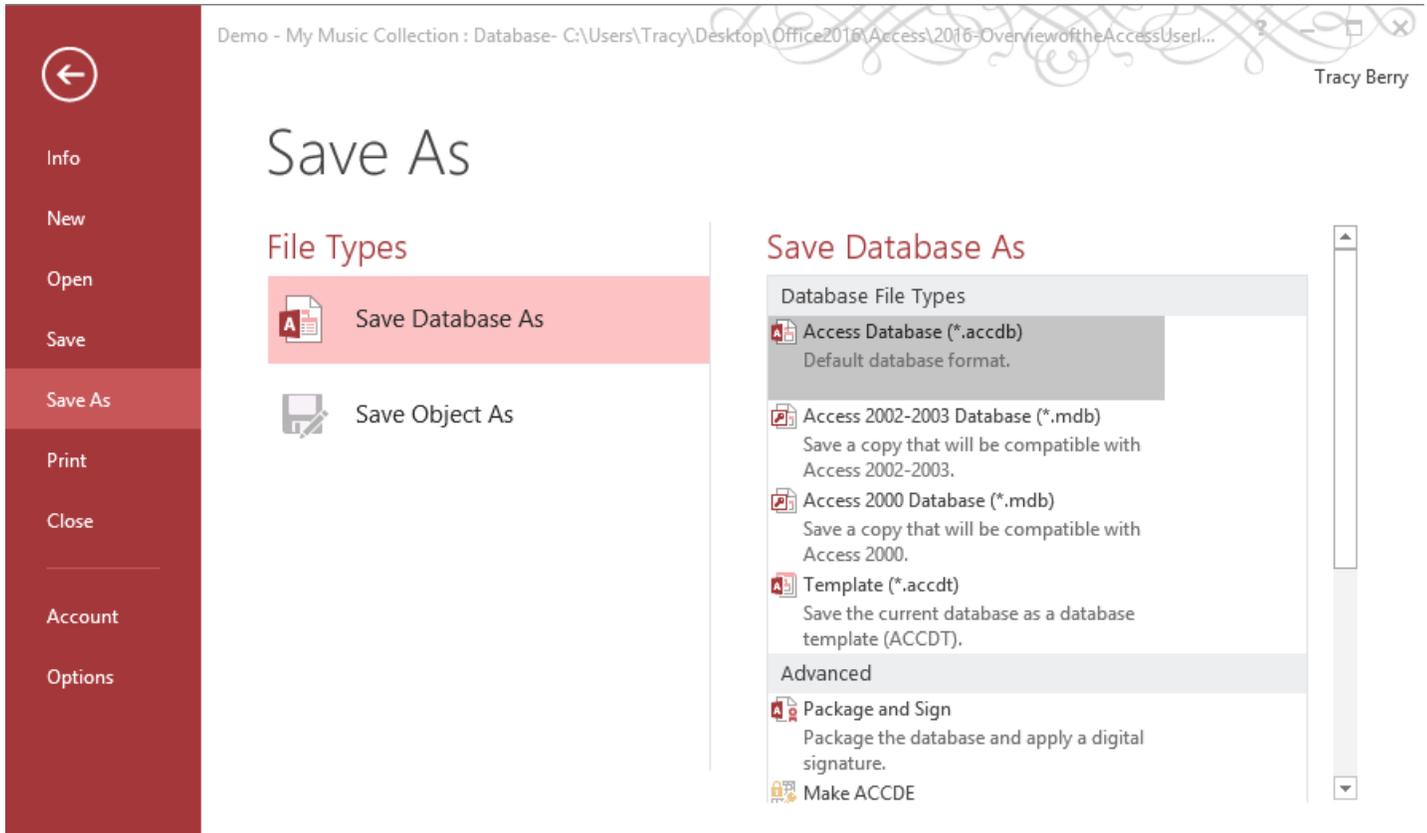
**Save** is available if you go to the **Backstage** when changes to database objects have not been saved. Clicking **Save** saves changes to database objects and returns you to the main window.

**Save As** lets you save the current database in a different file format or with a different name, or it lets you save a database object as a different file type (e.g., save an Access report as a PDF).

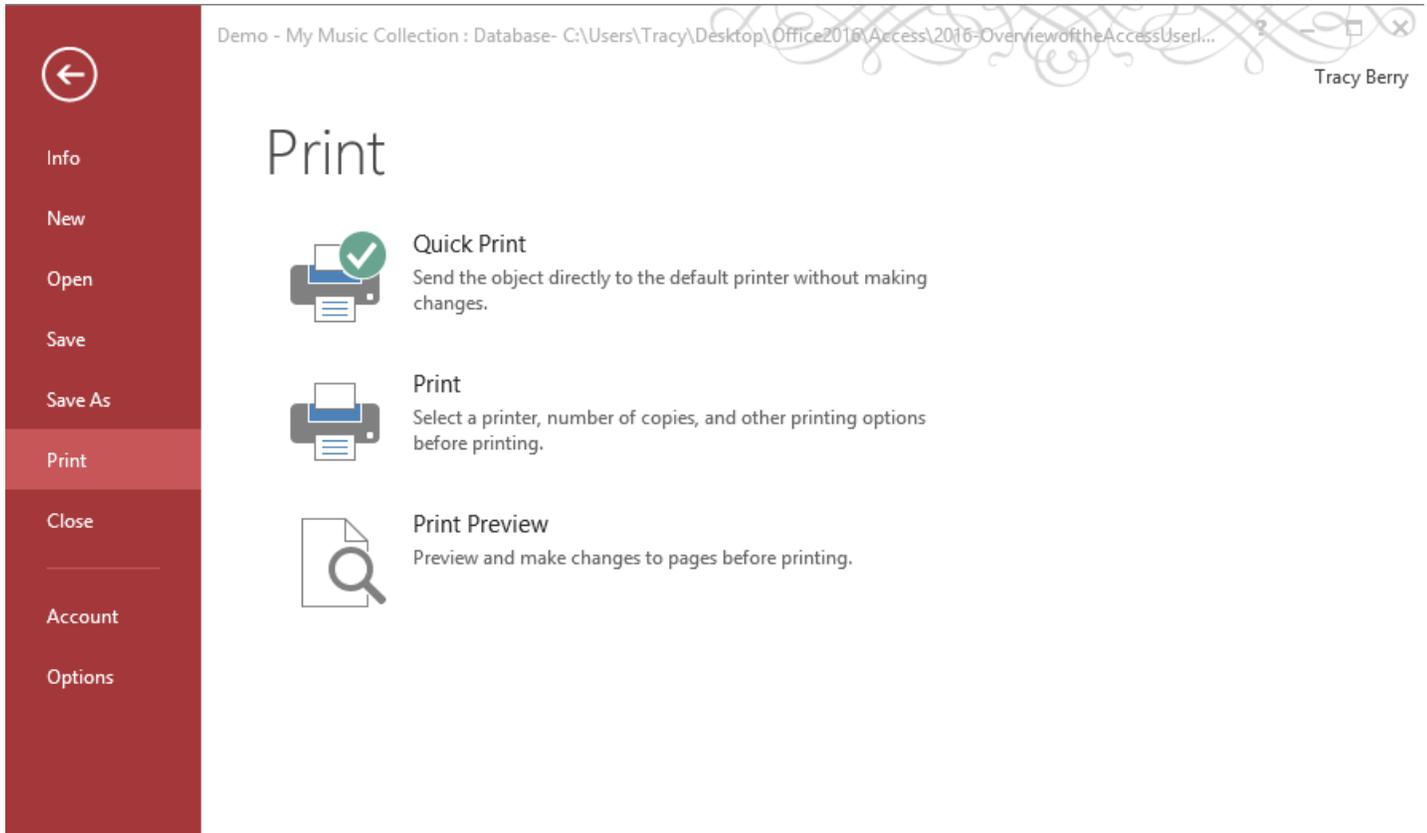
### Saving as Older Format

You may have the need to save a database as an older format in order to keep the format compliant with pre-existing environments.

By saving a database as a template, you will be able to easily replicate the functionality and structure of a database. This is helpful when you have several similar databases to create and roll out ensuring that once an end-user is used to the functionality of one database, they will easily take to the other new ones without any further training. You may also reuse query, report and forms assuming the table and field names remain the same.

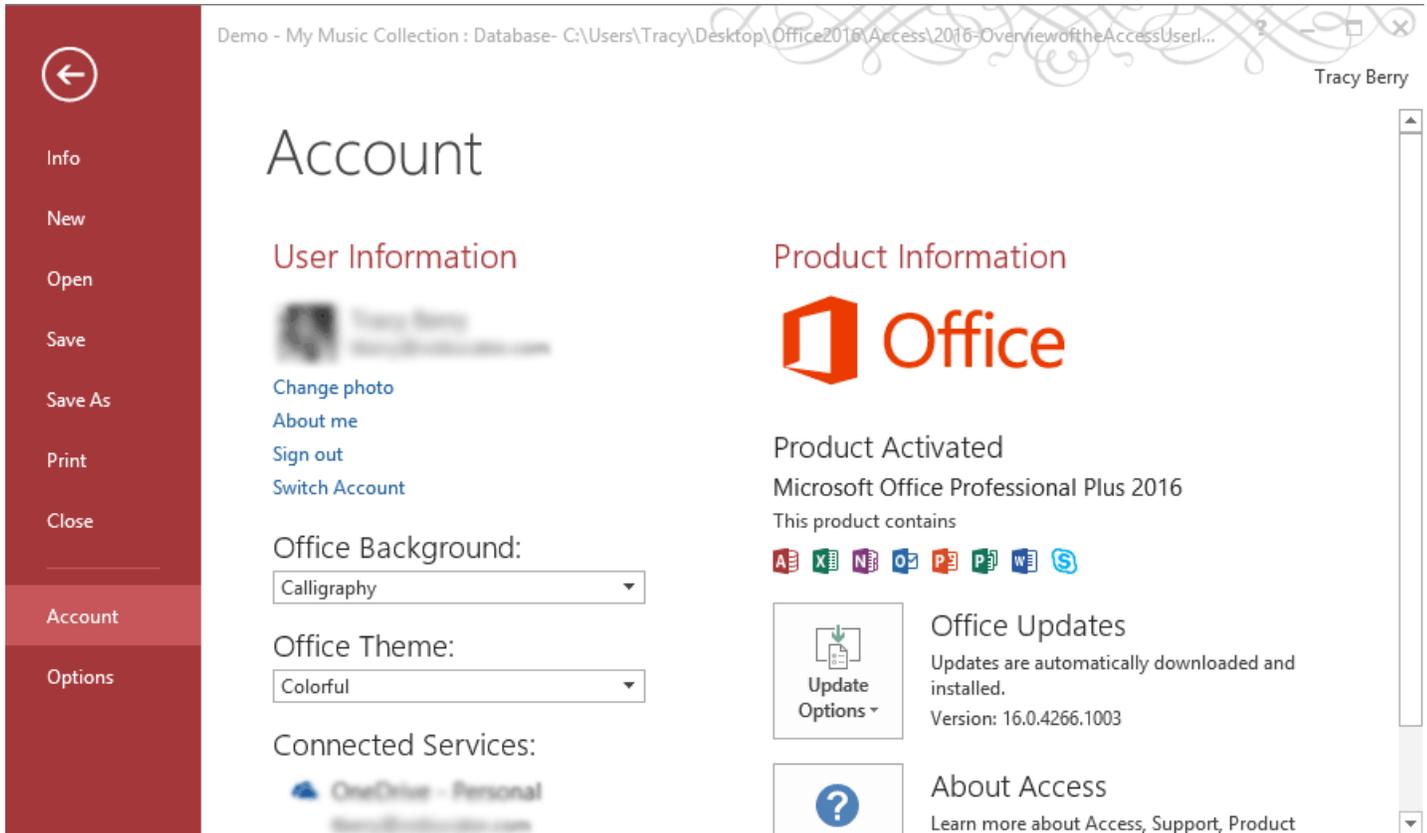


**Print** offers options for printing the currently selected database object.



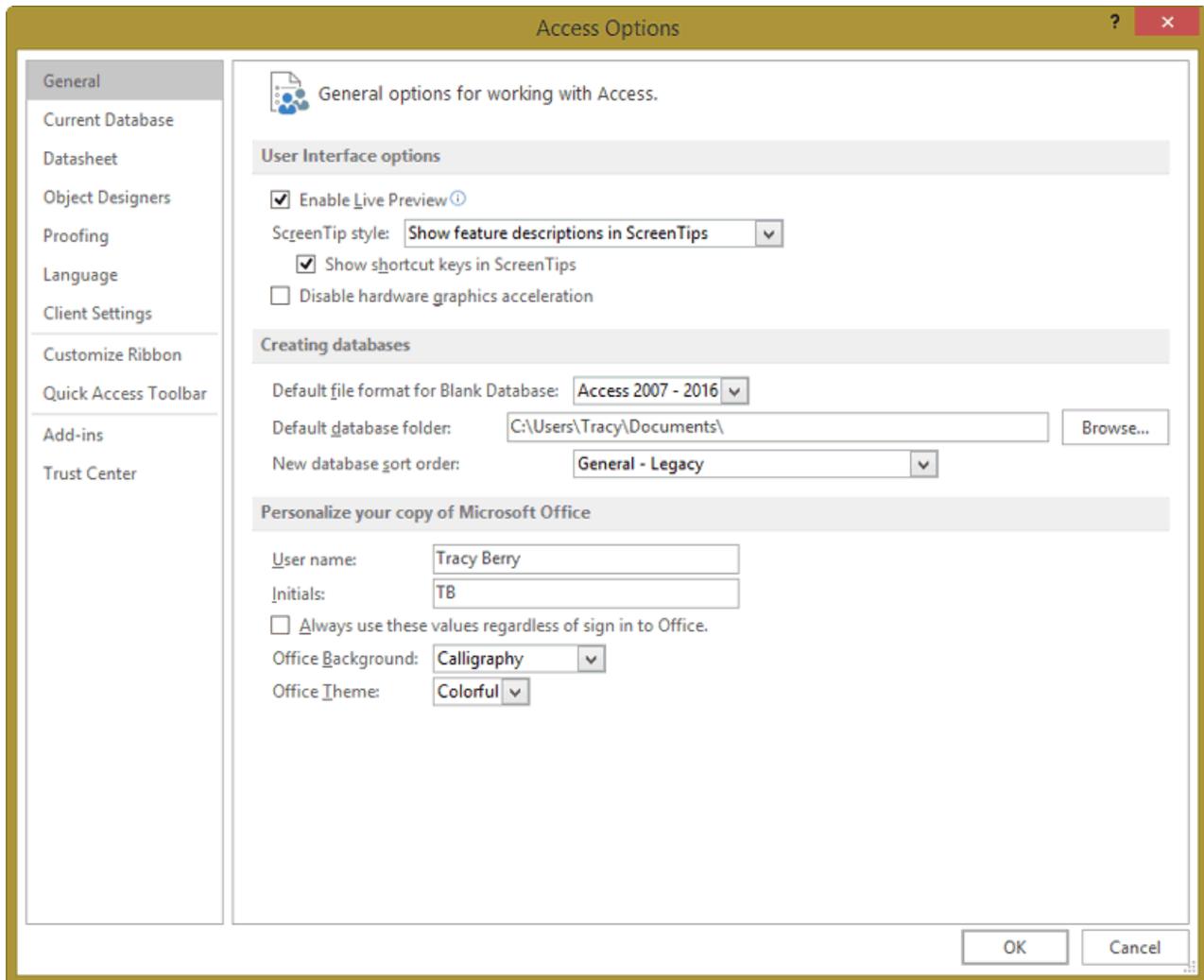
**Close** closes the current database file but leaves the Access program open.

**Account** shows information about your product installation.

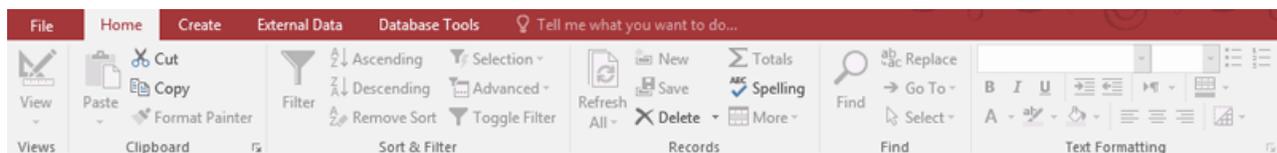


**Options** opens the **Access Options** dialog box where you can configure settings for Access and for the current database. The **Access Options** dialog box includes many settings to personalize your experience as you work with Access and to configure the current database according to your needs.

The left pane of the **Access Options** dialog box lists the categories of settings that you can control. Highlight a category to see the settings available for that category in the right pane. Make any changes needed in the right pane. When you are ready to apply the changes, click **OK** to save the changes and close the dialog box.



## ❖ 1.1.2. Home

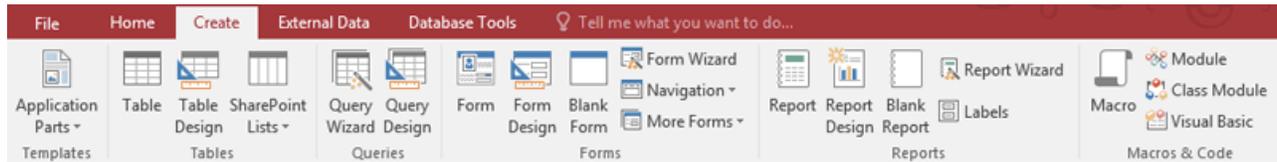


The commands on the **Home** tab are arranged in six groups:

- **Views** - Switch among the views available for the current object.
- **Clipboard** - Cut, copy, and paste data or objects. Apply formatting from one object on other objects.
- **Sort & Filter** - Sort data. Apply quick filters or filter by form.

- **Records** - Maintain records. Add a total row. Perform spell check.
- **Find** - Find records that match your criteria. Perform search and replace.
- **Text Formatting** - Change font styling, text justification, text color, bulleting.

### ❖ 1.1.3. Create

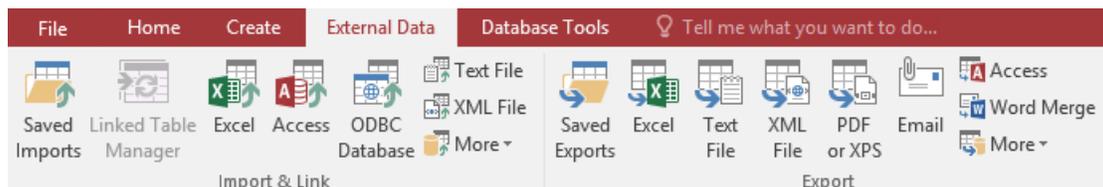


The commands on the **Create** tab are arranged in six groups:

- **Templates** - Create a database object from a template.
- **Tables** - Create a table in Datasheet view or Design view.
- **Queries** - Create a query using a wizard or in Design view.
- **Forms** - Create a form using a wizard or in Design view. Create specialized forms.
- **Reports** - Create a report using a wizard or in Design view. Create labels using a wizard.
- **Macros & Code** - Add and organize macros to automate tasks.

Wizards throughout Access will allow you to ease into the creation process as the Wizards lead you through the choices and options available. Most objects offer one, if not several, wizards to choose from.

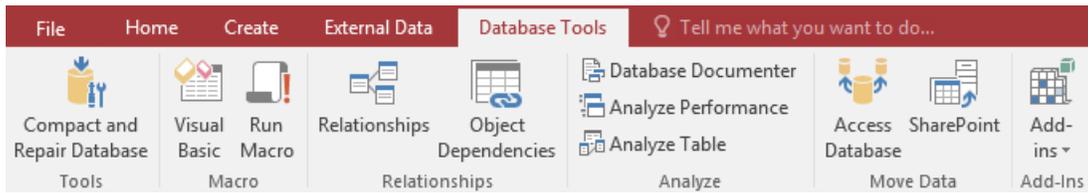
### ❖ 1.1.4. External Data



The commands on the **External Data** tab are arranged in two groups:

- **Import & Link** - Import data from a variety of data sources.
- **Export** - Export data from the database in a variety of formats.

## ❖ 1.1.5. Database Tools



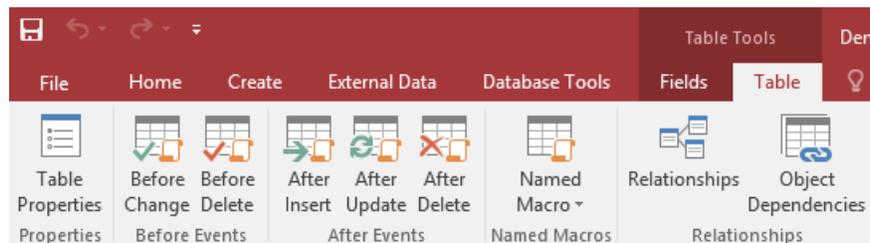
The commands on the **Database Tools** tab are arranged in six groups:

- **Tools** - Compact and repair the database.
- **Macro** - Access the Visual Basic for Applications editor. Run a macro.
- **Relationships** - Define relationships between tables in the database.
- **Analyze** - Analyze database objects for performance. Analyze tables for unnecessary data duplication.
- **Move Data** - Prepare the database for sharing with others.
- **Add-Ins** - Manage optional add-in features.

In this course and in the advanced course, we'll use commands from all the ribbons; however, our primary focus in this course will be on tools available in the **Home** and **Create** tabs.

## ❖ 1.1.6. Contextual Tabs

As you work with objects in Access, you may notice that additional tabs become available in the ribbon depending on the object you are working with and the view mode you are in. For example, when a table is open in Datasheet view, a **Table Tools** tab with two sub-tabs, **Fields** and **Table**, is visible.



Tabs like these are called *contextual* tabs. They provide specific additional tools for the object you are currently working with.



## 1.2. Quick Access Toolbar

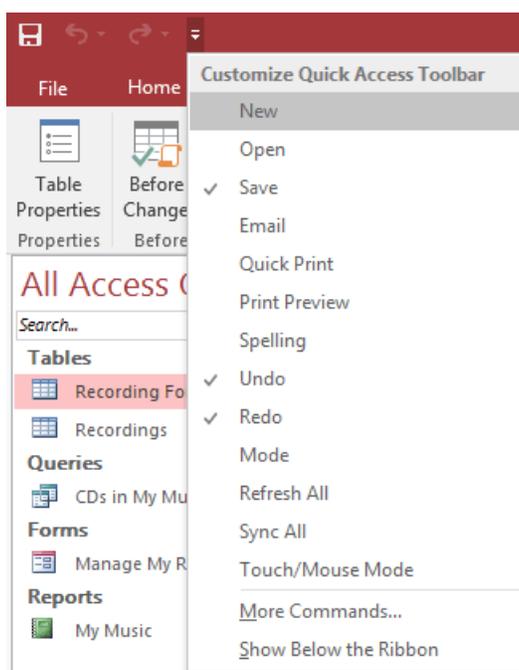
The **Quick Access Toolbar** is a customizable set of icons that typically displays above the ribbon to give you easy access to common commands such as **Save**, **Undo**, and **Redo**.



To use a command in the **Quick Access Toolbar**, simply click its icon. You can customize the toolbar to show whichever commands you prefer.

To add more common commands to the **Quick Access Toolbar**:

1. Click the drop-down arrow at the right end of the **Quick Access Toolbar** to open the **Customize Quick Access Toolbar** menu.



Note that commands already on the **Quick Access Toolbar** have a check mark to their left in the menu.

2. From the menu, select the command you want to add to the toolbar. Its icon is immediately added to the toolbar.

To remove a common command from the **Quick Access Toolbar**:

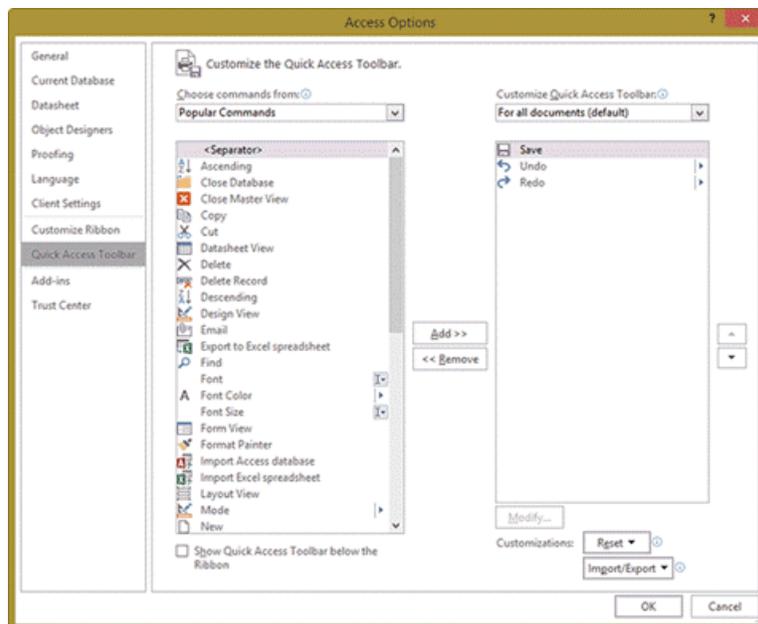
1. Click the **Quick Access Toolbar** drop-down arrow.

2. From the menu, select the check-marked command you want to remove from the toolbar. Its icon is immediately removed.

Any command that is available in Access can be added to the **Quick Access Toolbar**. To do so, you use the **Access Options** dialog box.

To customize the **Quick Access Toolbar** using the **Access Options** dialog box:

1. Click the **Quick Access Toolbar** drop-down arrow and select **More Commands...**. The **Access Options** dialog box opens with the **Quick Access Toolbar** category already selected.
2. In the left list box, locate and highlight the command to add to the **Quick Access Toolbar**.

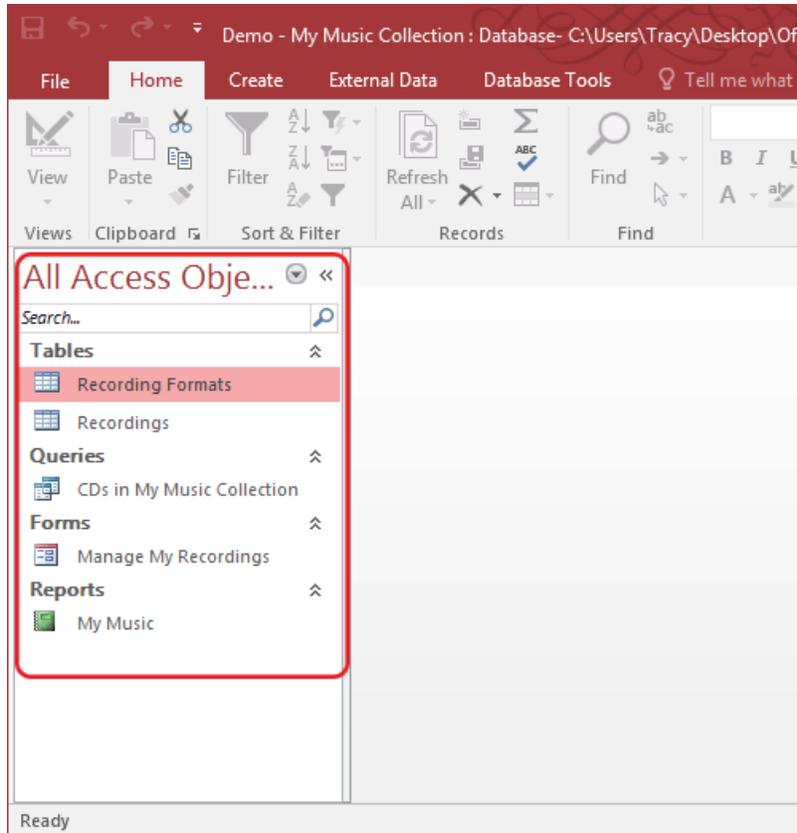


3. Click **Add**. The command moves to the right list box.
4. Click **OK**. The command is added to the **Quick Access Toolbar**.

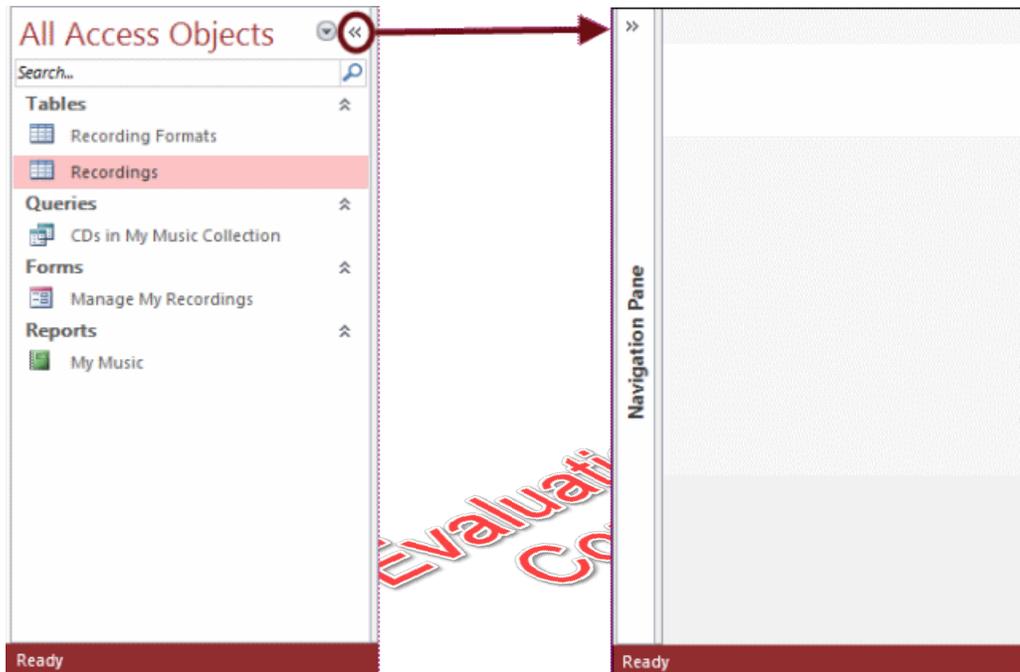


### 1.3. Object Navigation Pane

Along the left side of the main Access window is the **Navigation Pane**. The **Navigation Pane** shows the database objects that are part of your database application. Use the pane to open the database objects you want to work with.

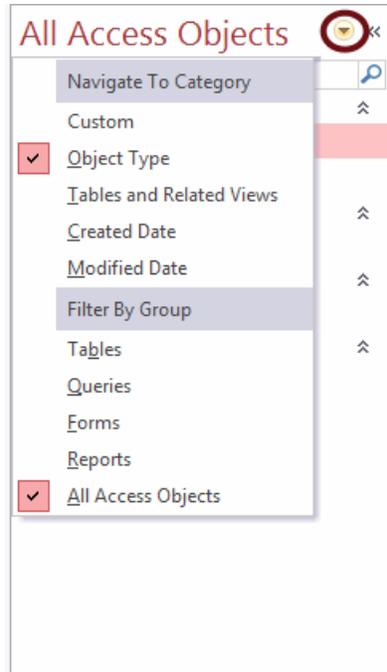


If you need additional work area, the **Navigation Pane** can be collapsed by clicking the shutter bar button in the upper right corner of the pane.

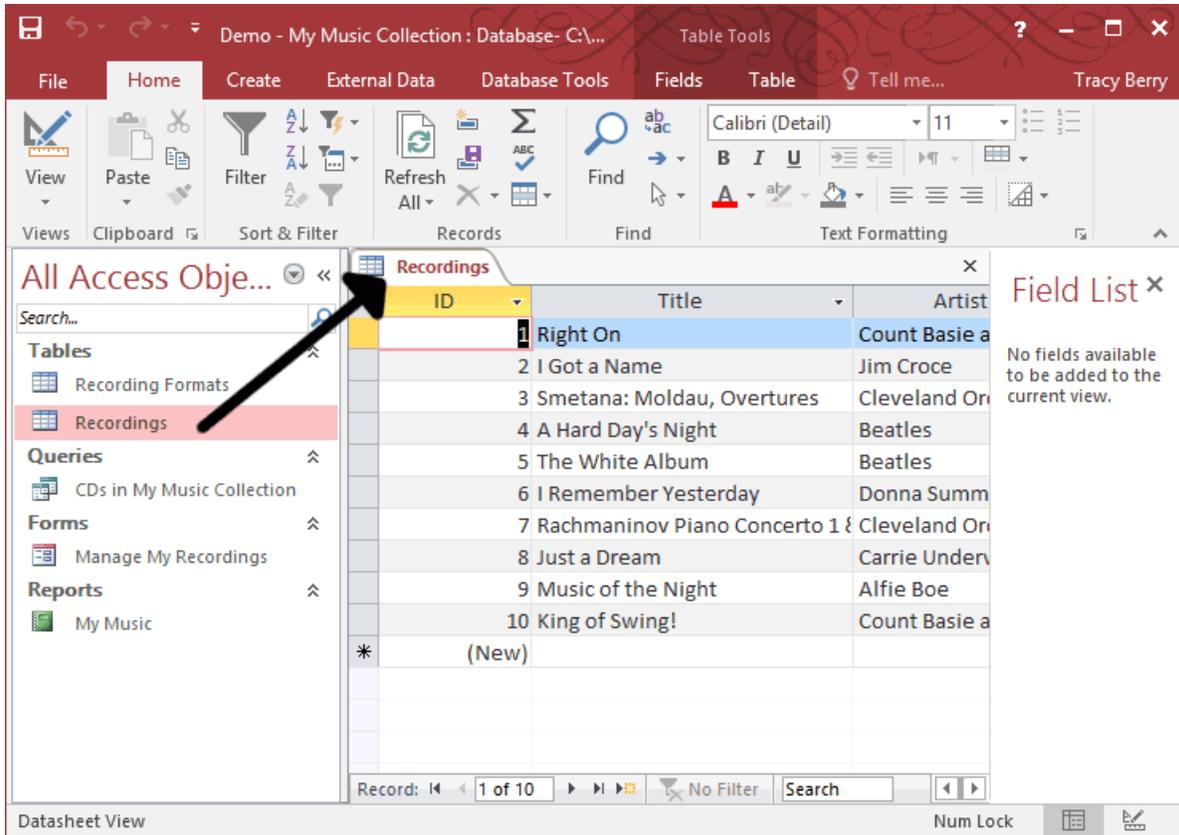


To restore the pane, click the shutter bar button on the collapsed pane.

The **Navigation Pane** can be filtered by category and by object type. To do so, click the drop-down arrow at the top of the pane and select the desired category from the **Navigate To Category** section of the drop-down menu. After you select a category, you can open the drop-down menu again and select the group to filter by in the lower section of the menu. The groups change depending on the category selected. The pane title changes to match the group you select.



The **Navigation Pane** provides easy access to your database objects. To open an object, double-click on its name in the **Navigation Pane**.



## 1.4. Access Work Surface

When you open an object from the **Navigation Pane**, the object appears in a tab on the Access work surface. The work surface is where you perform most of the tasks related to creating and maintaining a database. You can open multiple objects on the work surface at the same time. Each object appears in a separate tab.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
*	(New)			

Record: 1 of 10 No Filter Search

To make an object active so you can work with it, select its tab. To close an object, select it and then click the X at the far right end of the tab.

Title	Artist	Format
The White Album	Beatles	CD
Rachmaninov Piano Concerto	Cleveland Orchestra	CD
King of Swing!	Count Basie and His Orchestra	CD
*		

Record: 1 of 3 Unfiltered Search



## 1.5. Object Overview

### ❖ 1.5.1. Tables

Tables are the storage vessel for your data. Careful planning and arrangement of the fields that make up each table with consideration of the relationships between them make for a well rounded relational database design. If this foundation is prepared well, the rest of the objects that you create will be a smooth process.

### ❖ 1.5.2. Queries

Queries are designed to pull the relevant data from each table to create a recordset which can be used as the basis of your reports or to analyze the data in a meaningful way.

### ❖ 1.5.3. Forms

Forms present an opportunity to create a user interface for data entry that may be customized to fit your audience needs. Forms may be based off of Tables for data entry, or Queries for on screen reports and analysis.

### ❖ 1.5.4. Reports

Reports are used to create a Query or Table data that presents well in a print format. They may be customized and also saved out as a PDF file type for on screen viewing.

### ❖ 1.5.5. Macros and Modules

Macros and modules allow you to automate database functions and to provide additional functionality. Macros are built by selecting from a list of actions and combining actions to produce the effect you want. Modules are collections of functions and procedures written in the Visual Basic for Applications (VBA) language.

Macros and modules are beyond the scope of this course; however, the advanced course will demonstrate how to use basic macros to automate forms and reports.



## 1.6. Process Overview

The general process of building a database begins well before we approach Access to build the corresponding objects that make up the database. We need to step back and research the needs and resources available. Creation of a plan will help to keep you and your team on track as well as provide the visuals to explain the logic to others that will interact with your database. We will delve deeper in to the research and planning phases later in the course making sure you have a full understanding of the process start to finish regardless of your responsibilities in the project. The full understanding helps you better communicate with others on the team.

# Exercise 1: Getting Around the Access Environment

 15 to 25 minutes

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Using the “Exercise - My Music Collection” database located at Class Files/OverviewoftheAccessUserInterface/Exercises/Exercise - My Music Collection.accdb, perform the following tasks:

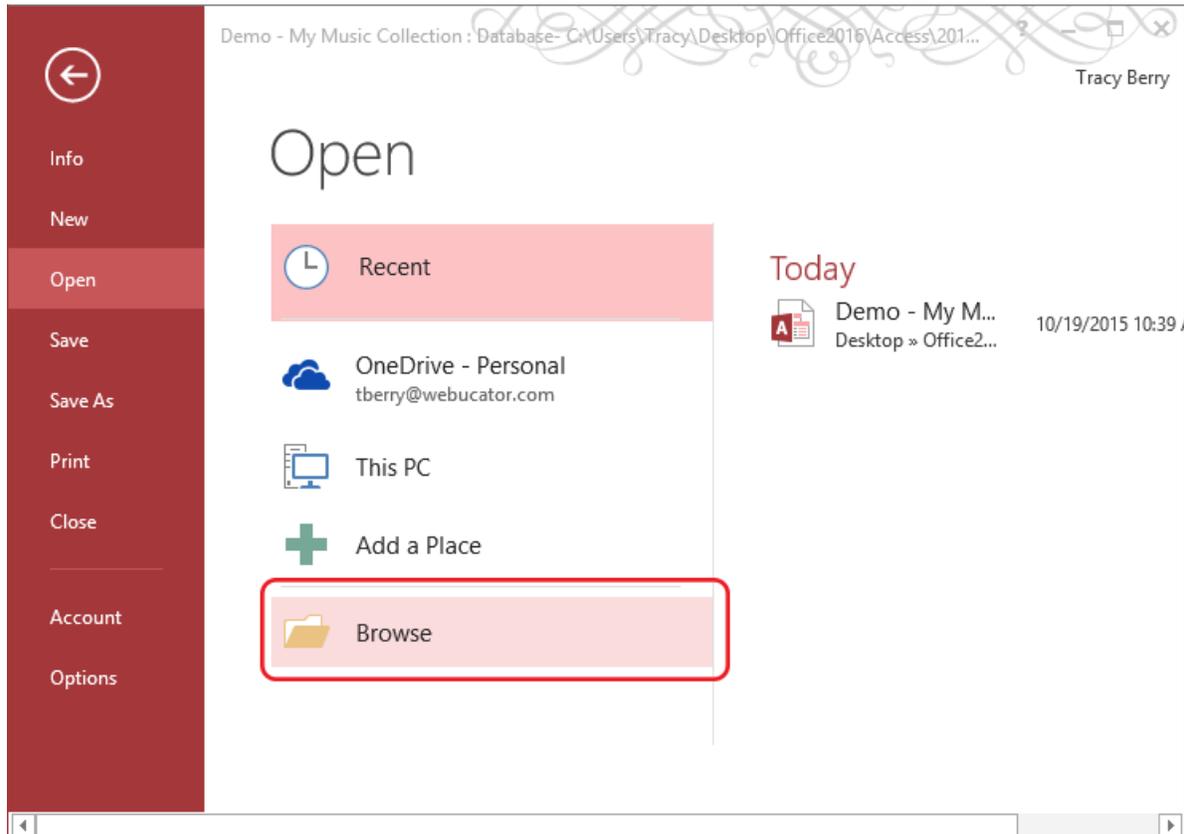
1. Pin the database file to the **Recent** files list.
2. Add the **Quick Print** icon to the **Quick Access Toolbar**.
3. Filter the **Navigation Pane** so that only tables appear in the list.

## Solution

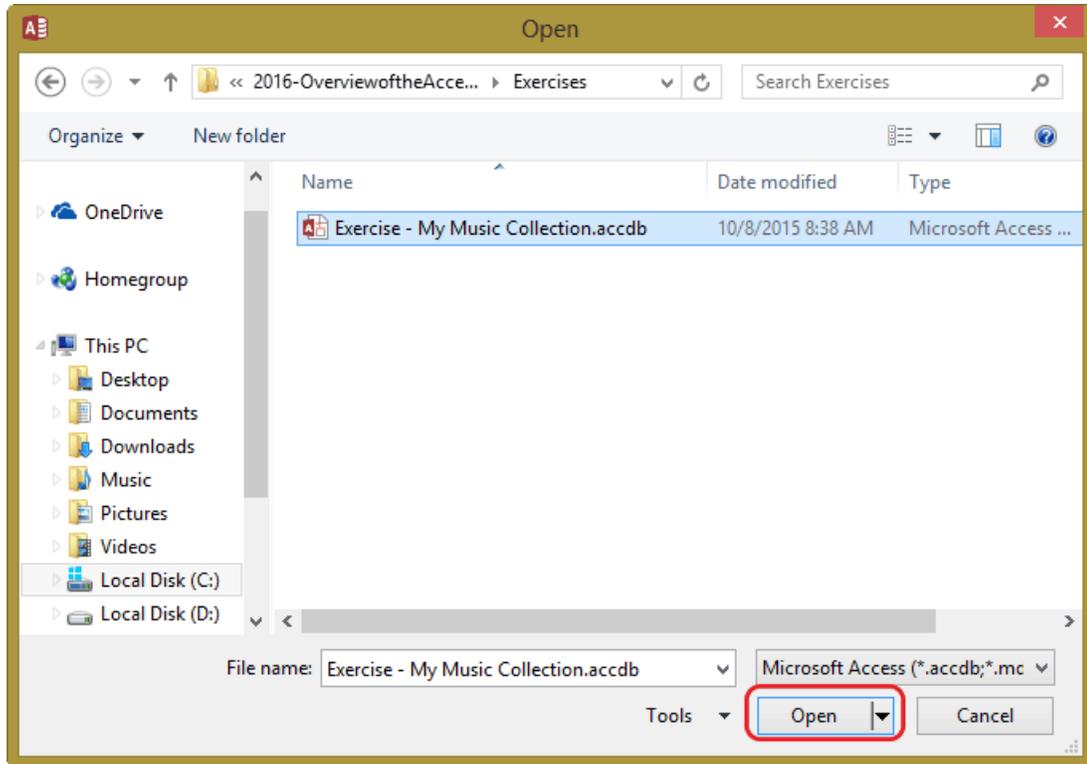
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To pin the database file to the **Recent** files list:

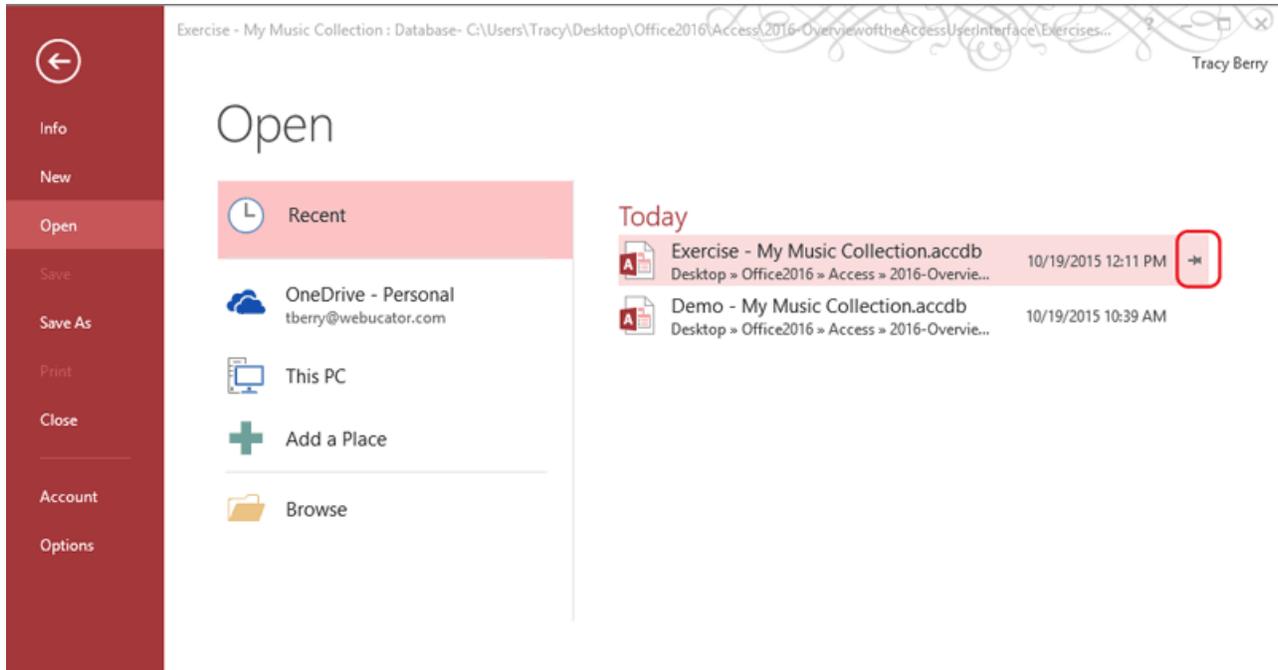
1. Select the **FILE** tab.
2. Select **Open** and **Browse**.



3. Locate `ClassFiles/OverviewoftheAccessUserInterface/Exercises/Exercise - My Music Collection.accdb` and click **Open**.

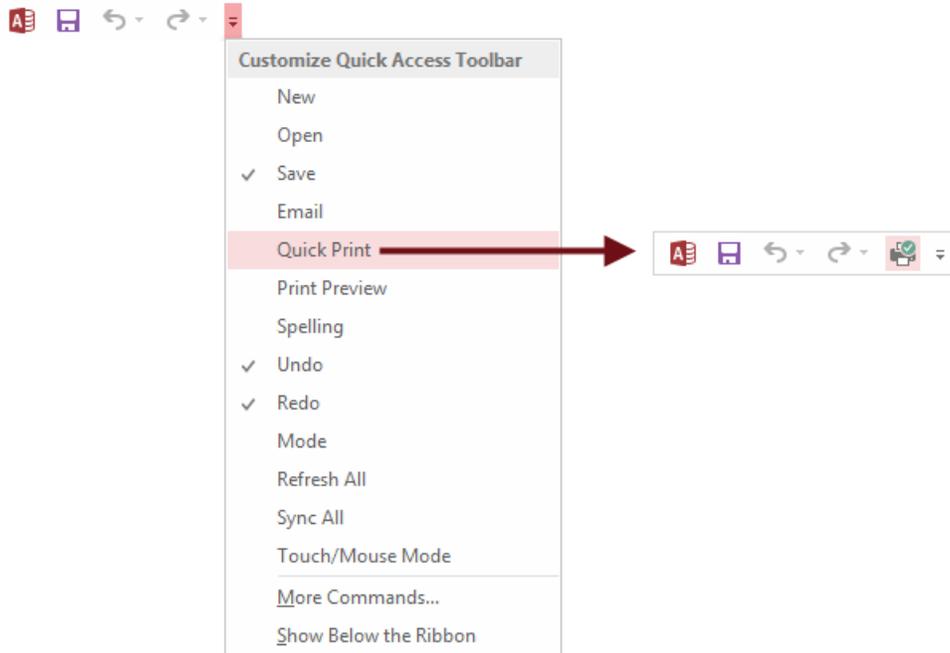


4. In the **Recent** files list, locate Exercise - My Music Collection.accdb and hover over the file name until you see the horizontal push pin. Click the push pin. The file moves above the list separator and is denoted with an upright push pin.



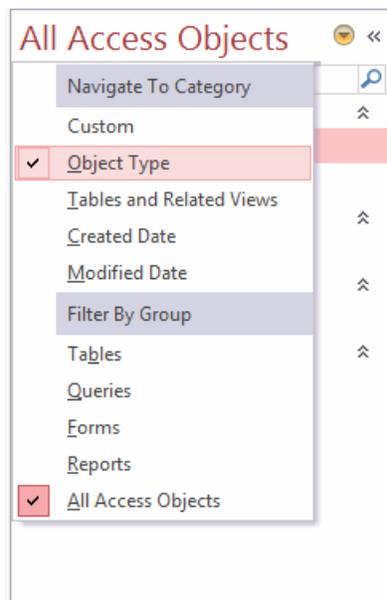
To add the **Quick Print** icon to the **Quick Access Toolbar**:

1. Return to the **Home** tab. If you're in the **Backstage**, click .
2. Click the **Quick Access Toolbar** drop-down arrow and select **Quick Print** from the drop-down menu. The icon is added to the toolbar.

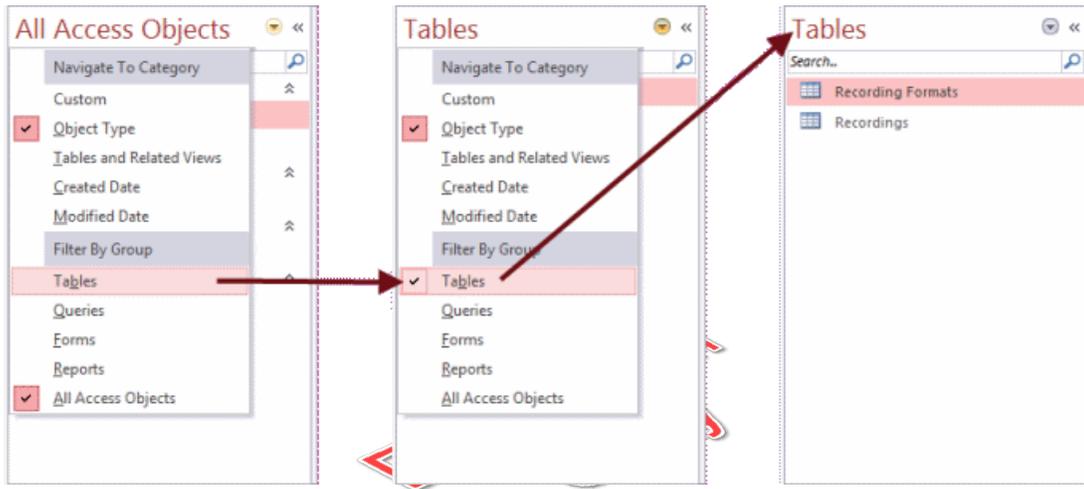


To filter the **Navigation Pane** so that only tables appear in the list of objects:

1. In the **Navigation Pane**, click the drop-down arrow in the pane title bar to open the drop-down menu. In the **Navigate To Category** section of the menu, ensure that **Object Type** is selected.



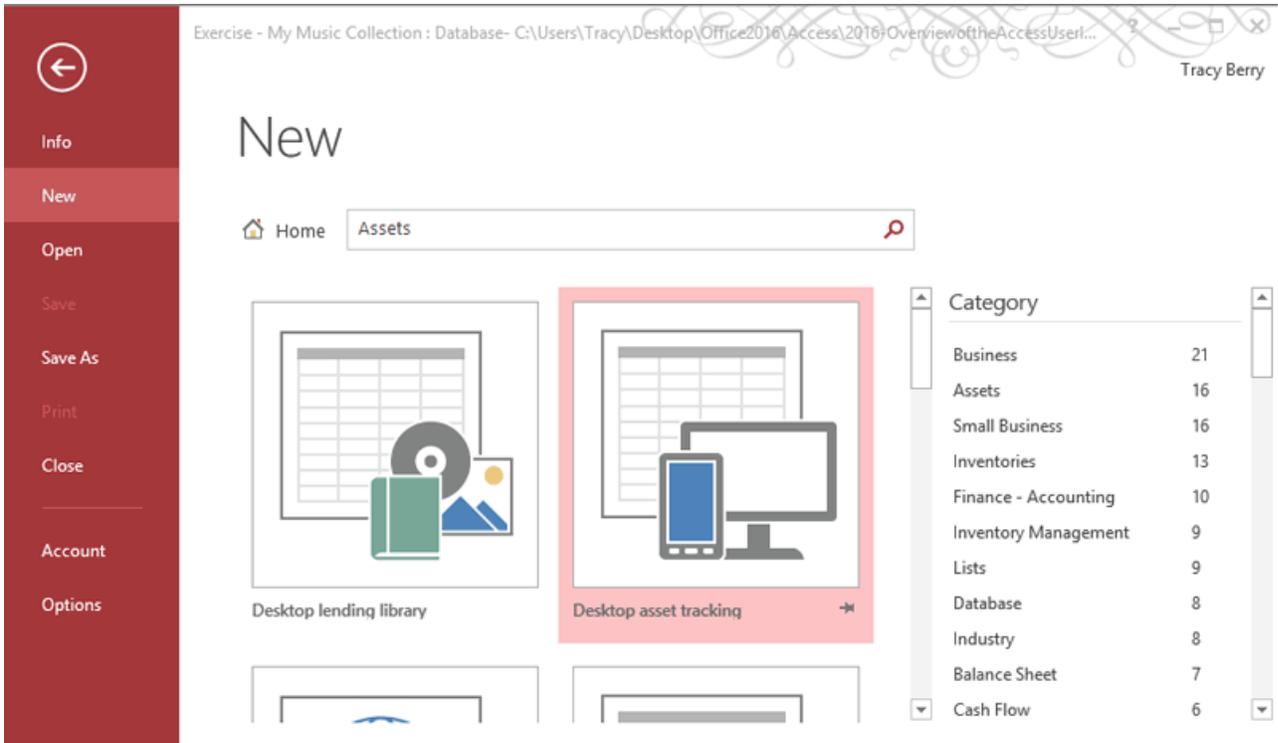
2. Click the drop-down arrow again and select **Tables** in the **Filter By Group** section of the menu.



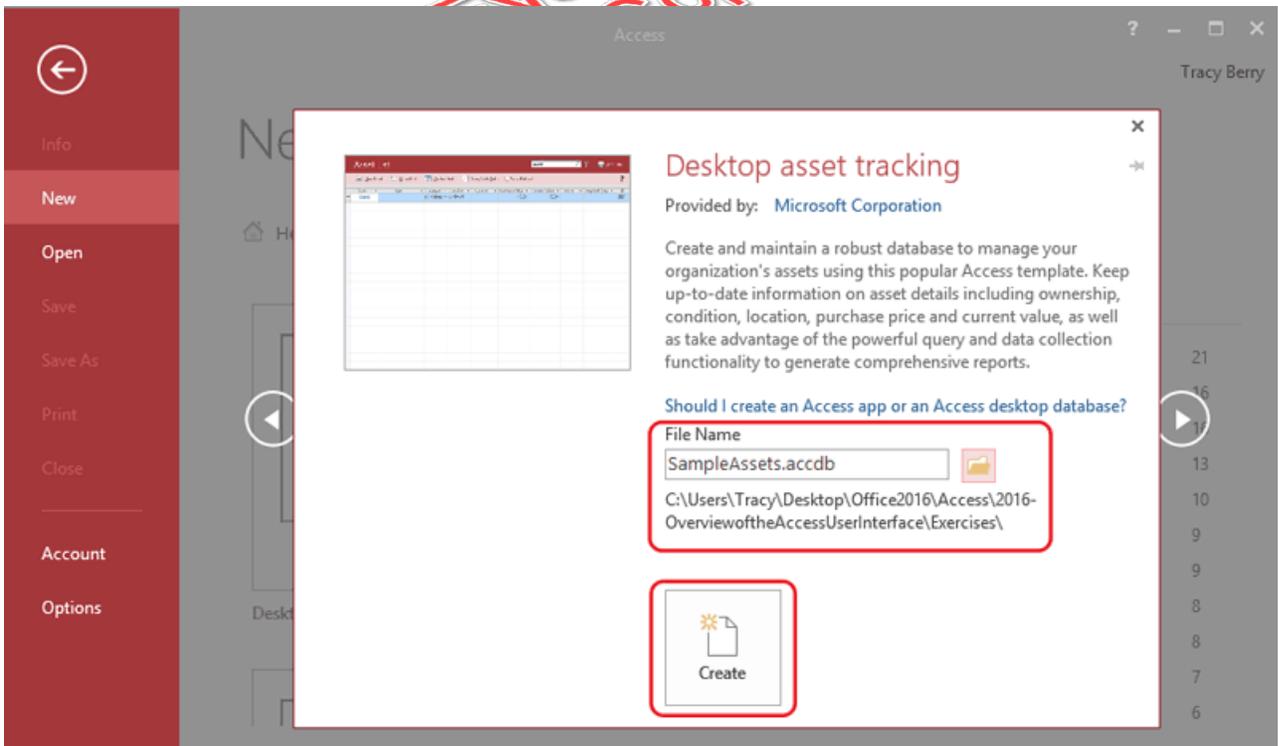
## 1.7. Create a Database Using a Wizard

When creating a new database, you have choices to use pre-made databases. These can be found on the internet, or many organizations may provide custom databases for their employees.

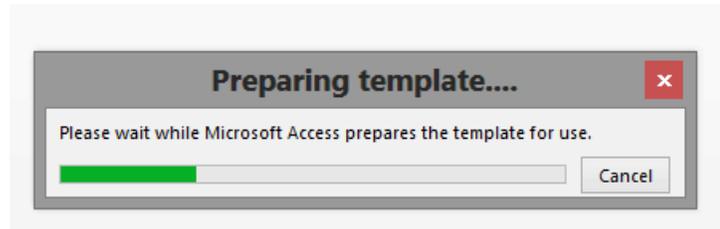
1. **File > New > Search** for the topic.



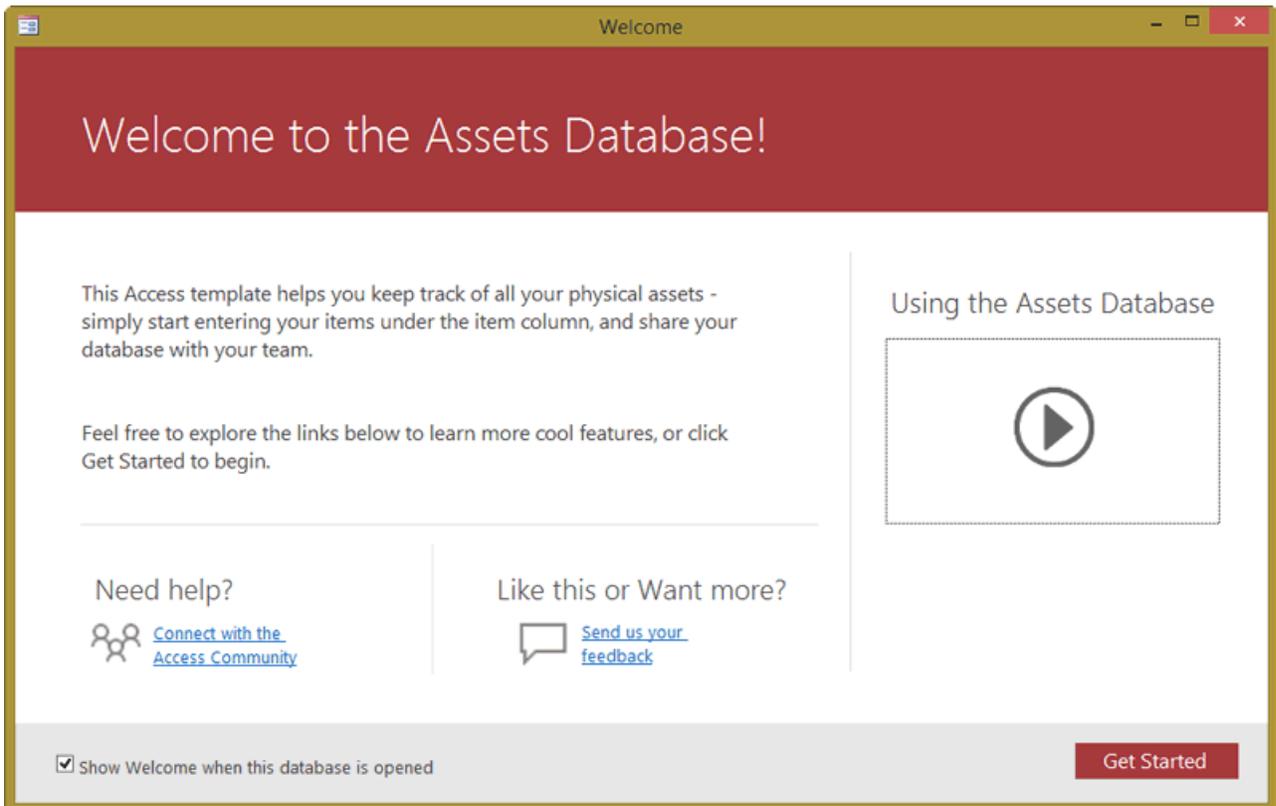
2. Single click upon the database of choice.



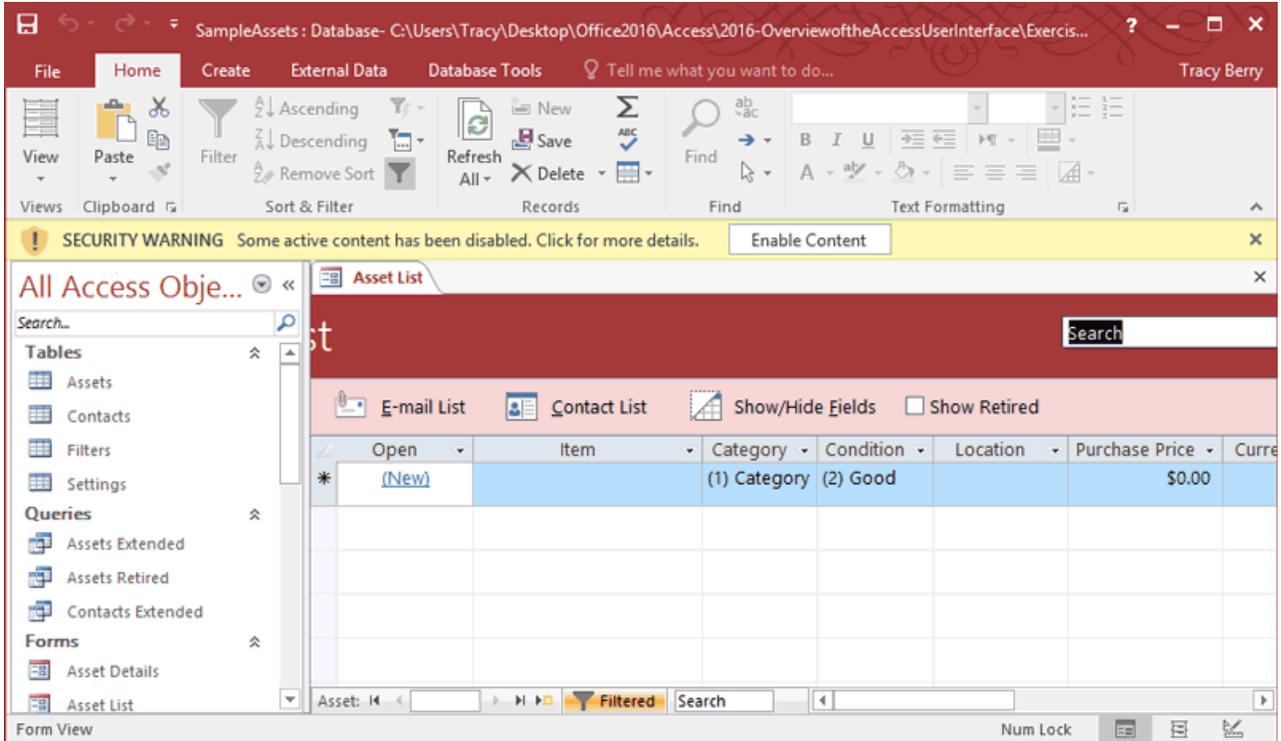
3. Choose a location and a name for the database. Click **Create**.



4. You may be presented with a Welcome screen depending on your template choice. Click **Get Started**.



5. The database is now ready for use.



The databases available may not always be exactly what you need, but they are a good start. Tables and other objects may be added or deleted as needed.

## Conclusion

In this lesson, you learned:

- To find your way around the Access environment.
- To customize elements such as the **Quick Access Toolbar** and **Navigation Pane** to suit your preferences.
- To open objects on the Access work surface so that you'll be ready to learn more about the creation process.



# LESSON 2

## Fundamentals

---

### Topics Covered

- ☑ Considerations before creating a database application.
- ☑ Common approaches to database design.
- ☑ Data mapping.
- ☑ Naming conventions.
- ☑ Normalization.
- ☑ Primary and foreign keys.
- ☑ Relationships among tables.

### Introduction

Now that you're acquainted with some of the tools Access puts at your disposal, let's get started. While it may be tempting to dive in and start creating tables right away, a little planning will go a long way to ensure that your database meets your users' needs and performs efficiently.



## 2.1. Questions to Ask Before You Start

The clearer your mental image of what you want your finished database application to look like, the easier it will be to achieve it. In this section, we'll consider some questions to help you visualize the finished result.

### ❖ 2.1.1. What is the purpose of the database?

It's important to clarify why you're creating the database application in the first place. What need will the database satisfy? Who needs it? Knowing your purpose and keeping it in mind as you work will keep you on track and ward off "feature creep" (the tendency to add

unnecessary features just because you can). As you plan and build your database application, continually ask yourself, “Does it serve my central purpose?”

### ❖ 2.1.2. Who will use the database?

Knowing who will use your database will help you make informed choices as you design and build it. Things to consider are your users’ skill level, job function, and information requirements. Also, recognize that you may have users who aren’t “hands on” users but who may be relying on the output from your database nonetheless.

### ❖ 2.1.3. What kind of output is needed from the database?

Will the database need to generate reports? Form letters? Invoices? Charts and graphs? What kind of questions do users need the database to provide answers to?

### ❖ 2.1.4. What process is the database replacing or improving?

Are you automating a task that’s been done manually thus far? Are you replacing a spreadsheet or another database? If so, why is it being replaced? How will your proposed database solution make the current process better?

# Exercise 2: Asking Questions

 15 to 25 minutes

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Reflecting on a database project you have in mind, answer the four questions posed in this section. If you don't have a project in mind, you can make one up.

1. What is the purpose of the database?
2. Who will use the database?
3. What kind of output is needed from the database?
4. What process is the database replacing or improving?



## 2.2. Approaches to Database Design

How you approach designing a database depends largely on what you know when you start. The most common approaches to database design are called *top-down* and *bottom-up*. Other design approaches are typically a variation on one of these methods or a mixture of the two.

### ❖ 2.2.1. Top-Down Database Design

If you are starting with a general concept and need to work down to the details, your project is a candidate for top-down design. In top-down design, you start with an abstract idea and gradually refine it until you arrive at the fundamental elements of the system. The top-down approach often involves interviewing prospective end users to learn their requirements for the system. The risk in top-down design is overlooking a critical need. The challenge in top-down design is to translate the end users' requirements into the simplest workable design.

### ❖ 2.2.2. Bottom-Up Database Design

As you may have guessed, bottom-up design starts with the details and works up to a unified concept. Bottom-up design typically starts with examining existing reports, forms, user interfaces, etc., to glean the information that needs to be incorporated in the system. With these details in hand, you work backward to design the structures that store the

information in an optimal way. A challenge in bottom-up design is weeding out information that is irrelevant.

### ❖ 2.2.3. Reality

In reality, the approach you take on most projects will probably resemble a mixture of the two methods rather than strictly one or the other. While you may be knowledgeable of some aspects of a project, you may also need to rely on others who have better first-hand knowledge of other aspects of the project.

In this course, we'll assume that we are experts on the subject of the database and adopt a mostly bottom-up approach to database design.



## 2.3. Gather Information

Our present goal is to identify the information that needs to be stored in the database and to organize it in a logical way. The following steps describe a strategy for doing this:

1. Collect data.
  - A. Gather any existing forms, reports, and other documents that are relevant to the purpose of the database. For the My Music Collection database, “documents” included record jackets, CD and cassette inserts, electronic data from MP3 files, and information from music-related websites. For an accounting system, you might collect invoices, purchase orders, receipts, reports required by the government and by other departments, etc.
  - B. Talk to users about the data they need the database to store and the information they need the database to return.
  - C. If your database is replacing a current system, look at the system’s interface and note the data that it collects and outputs. Discover the reasons the system is being replaced and take those into account as you build your project.
2. Categorize the data to determine the main objects the database needs to manage. These objects may range from people to transactions to inventory items to events to... These main objects typically become the basis for tables in your database.
  - As you categorize the data, try to weed out irrelevant data including data you don’t need and data that you can derive from other data that will be stored in the database. For example, suppose in an employee database

you will store first names, middle names, and last names. There is no need to include a full name column because the full name can be derived from the individual parts of a name. Storing the full name in addition to the parts wastes disk space and data input effort.

3. Write the main objects down and list the types of data you need to collect about each main object. For example, if a main object is “employee,” you might list name, social security number, address, phone number, birth date, job, etc. The information you store about a main object forms the columns in its table.
4. Determine how the main objects are related to one another. Often working through this step will help you identify additional objects that can be separated off and stored in their own tables. For example, we listed “job” as information you might collect for an employee. However, when we consider that several employees might have the same job and that we may want to store details that vary depending on the job (like supervisor and work location), we start to see why it could make sense to have a separate job table. Storing job-related data only on a job record reduces the possibility that two employees with the same job will show up on reports with different job titles (e.g., “entry clerk” and “data entry clerk”). In addition, when a new employee record is created, the user doesn’t need to enter a job and all the related details of the job; instead, the user simply assigns the appropriate job record to the employee record and the job details are automatically associated with the employee. We’ll discuss a systematic way to tease apart data like this in the “Normalization” section.

### The Right Design

There is not a definitive “right” design for a database. It *is* fair to say that some designs are better than others. In the discussions and exercises which follow, recognize that the solutions offered represent one way, but not the only way, to structure the database. The principles in this course are simply intended to help you design a database for optimal function and efficiency.

### ❖ 2.3.1. Data Mapping

Often it is helpful to represent the plan in a visual manner in order to make a clear road map for all to follow. Please look at the data map below that is representing the contact data for our clients. You may add to this and plan out the inventory and purchase history related to each client.

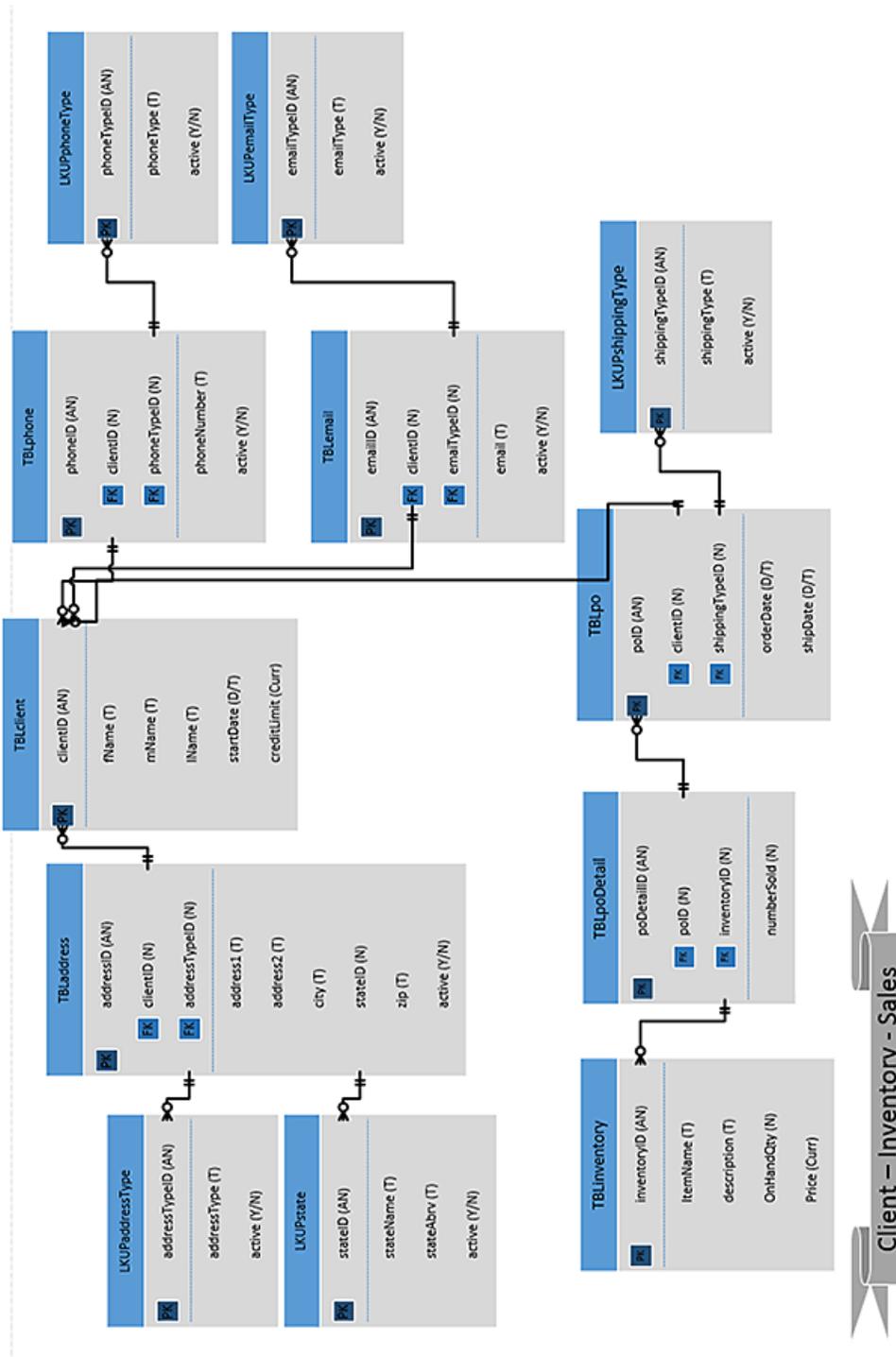
Notice the way each table has a unique ID field (primary key) and some have a reference to others (foreign key). This is the foundation of our relationships discussed later in this lesson. Also, each table has a single topic, that when presented with the chance of multiples, the item that may have multiples has generated a new table (this is the foundation of Normalization discussed later in this lesson). Each field has a notation of a data type that will be helpful when we actually build this table in Access.

In brief, each table in a database should have a single focus. When you notice that secondary items in the table are repeating, it's a signal to break the repeating topic into a table of its own and assign it its own primary key. This primary key becomes the source for a foreign key field in the original table. For the sake of good organization, though optional, the primary key and foreign key should share the same name and must be of similar data type.

There are three relationships possible between tables, to be covered in full later on.

- *One-to-many*. Table A has a one-to-many relationship with Table B if a record in Table A can match one or more records in Table B but each record in Table B must match only one record in Table A.
- *Many-to-many*. Table A has a many-to-many relationship with Table B if Table A can have one or more matches in Table B and Table B can have one or more matches in Table A.
- *One-to-one*. Table A has a one-to-one relationship with Table B if Table A can have no more than one matching record in Table B and Table B can have no more than one matching record in Table A.

## ❖ 2.3.2. Sample Data Map



Above we have planned out the tables of a Client - Sales - Inventory database. Think about the Client and Purchase Order portions of our database. Talk about the data you would need to collect to keep track of what we sell and when it was sold. How many tables would you need? What are they? What related information would each table store? How are the tables related to one another? Would you include any other tables other than the ones shown? There are no true right or wrong answers, however try to make your design as efficient as possible ensuring data is only entered once, and then referenced from then out in the future.

Evaluation  
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## 2.4. A Few Words about Naming Conventions

In this course and in the advanced course we will not impose a structure on the names of our database objects. This will make it more natural to refer to database objects in context. However, for larger or more complex databases you will want to consider using a naming convention to help you distinguish among objects. Using a naming convention is particularly helpful if other people may maintain your application.

A commonly used convention for Access databases is the Leszynski/Reddick naming convention. Briefly, this convention adds a tag in lower case letters before the object name and omits all spaces.

Object Type	Tag	Example
Table	tbl	tblRecordings
Table Lookup	tlkp	tlkpFormats
Query	qry	qryCDRecordings
Action Query	<ul style="list-style-type: none"> <li>• q a p p (append)</li> <li>• q x t b (crosstab)</li> <li>• q d e l (delete)</li> <li>• q m a k ( m a k e table)</li> <li>• qry or qsel (select)</li> <li>• q u p d (update)</li> </ul>	qappRecordings
Form	frm	frmRecordingEntry
Subform	sfrm	sfrmCompilations
Report	rpt	rptMusicList
Subreport	srpt	srptCompilations
Macro	mcr	mcrAddRecordings
Command	cmd	cmdOpenRecordingsForm

A variant of the Leszynski/Reddick convention includes an underscore between the tag name and the object name: tbl\_Recordings.

A similar naming convention has the advantage of making it easy to distinguish among object types like the Leszynski/Reddick convention does, but has the added benefit of

being easier to search. By this convention we append a tag in upper case letters to the end of the object name while omitting all spaces.

Object Type	Tag	Example
Table	TBL	RecordingsTBL
Table Lookup	LKUP	FormatsLKUP
Query	QRY	CDRecordingsQRY
Action Query	APPEND_ObjectNameQRY XTAB_ObjectNameQRY DELETE_ObjectNameQRY MAKE_ObjectNameQRY SELECT_ObjectNameQRY UPDATE_ObjectNameQRY	APPEND_RecordingsQRY
Form	FRM	RecordingEntryFRM
Subform	SFRM	CompilationsSFRM
Report	RPT	MusicListRPT
Subreport	SRPT	CompilationsSRPT
Macro	MCR	AddRecordingsMCR
Command	CMD	OpenRecordingsCMD

Whichever convention you choose, it is important to use it consistently across your application.







# Commonwealth National Bank

## Checking Statement

009900999999

Statement Period

04-15-13 through 05-14-13

TOM JEFFERSON  
931 JEFFERSON PKWY  
CHARLOTTESVILLE, VA 22902

### Account Summary

Opening Balance	3,215.46
Withdrawals	2,632.25
Deposits	2,079.83
Ending Balance on May 14, 2013	2,663.04

### Transaction Details

Date Posted	Details	Withdrawals	Deposits	Balance
04-15-13	Opening Balance			3,215.46
04-17-13	ATM	500.00		2,715.46
04-17-13	Check #4144	150.00		2,565.46
04-22-13	Direct deposit		1,025.43	3,590.89
04-29-13	Check #4140	119.74		3,471.15
05-01-13	Check #4142	1,250.00		2,221.15
05-06-13	Direct deposit		1,025.43	3,246.58
05-09-13	Direct debit	75.08		3,171.50
05-12-13	Transfer to savings	400.00		2,771.50
05-12-13	Draft payment – ChIElec	127.43		2,644.07
05-13-13	Counter deposit		28.97	2,673.04
05-14-13	Monthly Maintenance Fee	10.00		2,663.04
	<b>Closing Balance</b>			<b>2,663.04</b>

## Solution

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Solutions to this exercise will vary. A couple of possible solutions follow:

1. Tables: Debits, Credits
  - **Debits**
  - **Fields:** Transaction Number, Date, Payee, Amount, Memo, Status (Cleared, Not Cleared)
  - **Credits**
  - **Fields:** Transaction Code, Date, Description, Amount, Status (Cleared, Not Cleared)
2. Table: Transactions
  - **Transactions**
  - **Fields:** Transaction Code, Transaction Type (Debit, Credit), Date, Description, Amount, Memo, Status (Cleared, Not Cleared)

How did you do?

Think through your solution. Did you omit any data that would be needed? Did you include unnecessary data?



## 2.5. Normalization

*Normalization* is the process of organizing data in a way that promotes efficient data processing. Normalizing data entails breaking data into tables of related information and defining relationships among the tables.

If our definition sounds a bit subjective, it is. Normalization is a matter of degrees. In fact, the degree of normalization of a data set is referred to as its *normal form*. While there are several normal forms, we will concern ourselves with the first three normal forms, each form progressively more “normal” than the prior form.

The benefits of normalization include:

- **Data integrity.** Normalization eliminates redundant data and orphaned data.

- **Database efficiency.** Normalization improves the speed of queries.

To illustrate the normalization process, we'll start with the following unnormalized data set. (In some texts an unnormalized data set is referred to as being in *Zero Normal Form*).

Employee-Department-Skill

Employee	Department	Skill	Skill Description
Alpha Monroe	Accounting	Access	Database
Alpha Monroe	Accounting	Excel	Spreadsheet
Charlie Smith	Marketing	Publisher	Advertising, flyers, handouts
Charlie Smith	Marketing	Word	Document processing
Janet Doe	Purchasing	Excel	Spreadsheet
Janet Doe	Purchasing	Visio	Diagramming, workflow
Frank Fitz	Sales	Word	Document processing
Walter Armstrong	Purchasing	Excel	Spreadsheet
Ellis Walker	Accounting	Access	Database
Hope Harper	Marketing	Publisher	Advertising, flyers, handouts
Hope Harper	Marketing	SharePoint	Document management
Zachary Adams	Sales	PowerPoint	Slide presentation
Zachary Adams	Sales	Excel	Spreadsheet

## ❖ 2.5.1. First Normal Form

The goal of First Normal Form is to eliminate repeating groups. Examine the Employee-Department-Skill table and notice that some employees have multiple skills listed, resulting in some employees appearing in the table more than once.

There are two steps to achieving First Normal Form:

1. Create a separate table for each related set of data.
2. Assign a primary key field to each table.

For the Employee-Department-Skill table, this means first moving the employee and department information to its own table.

Employee-Department Table

Employee	Department
Alpha Monroe	Accounting
Charlie Smith	Marketing
Janet Doe	Purchasing
Frank Fitz	Sales
Walter Armstrong	Purchasing
Ellis Walker	Accounting
Hope Harper	Marketing
Zachary Adams	Sales

Next, we need to assign the new table a primary key. A *primary key* uniquely identifies a record in a table. A primary key field can be a field already in the table itself (e.g., social security numbers are often used as primary keys since they are unique to individuals) or a primary key field can be a field added to a table that generates unique identifiers as records are added to the table. This second type of primary key field has no intrinsic meaning; it simply serves as a means to ensure that records are unique.

### Composite Primary Keys

A primary key can also be defined on a group of fields which together uniquely identify a record. This is called a *composite primary key*.

You may have noticed that when we created tables in the “Table Objects and Their Views” lesson, Access automatically added a first column labeled “ID” to the tables. Whenever you create a table in Datasheet view, Access adds an ID column to serve as a primary key to ensure that records in the table are unique. As we will see in the next lesson, Design view allows you to determine the primary key field.

When we add a primary key field to the Employee-Department table, our result looks like this:

**Employee-Department Table**

Employee ID	Employee	Department
1	Alpha Monroe	Accounting
2	Charlie Smith	Marketing
3	Janet Doe	Purchasing
4	Frank Fitz	Sales
5	Walter Armstrong	Purchasing
6	Ellis Walker	Accounting
7	Hope Harper	Marketing
8	Zachary Adams	Sales

So the original Employee-Department-Skill table is equivalent to this table:

**Employee-Skill Table:**

Employee ID	Skill	Skill Description
1	Access	Database
1	Excel	Spreadsheet
2	Publisher	Advertising, flyers, handouts
2	Word	Document processing
3	Excel	Spreadsheet
3	Visio	Diagramming, workflow
4	Word	Document processing
5	Excel	Spreadsheet
6	Access	Database
7	Publisher	Advertising, flyers, handouts
7	SharePoint	Document management
8	PowerPoint	Slide presentation
8	Excel	Spreadsheet

Finally, we need to assign the Employee-Skill table its own primary key field.

**Employee-Skill Table**

Employee-Skill ID	Employee ID	Skill	Skill Description
1	1	Access	Database
2	1	Excel	Spreadsheet
3	2	Publisher	Advertising, flyers, handouts
4	2	Word	Document processing
5	3	Excel	Spreadsheet
6	3	Visio	Diagramming, workflow
7	4	Word	Document processing
8	5	Excel	Spreadsheet
9	6	Access	Database
10	7	Publisher	Advertising, flyers, handouts
11	7	SharePoint	Document management
12	8	PowerPoint	Slide presentation
13	8	Excel	Spreadsheet

Notice that in the resulting tables, employees appear only once in the Employee-Department table, but they may be referenced multiple times in the Employee-Skill table. This is known as a *one-to-many relationship*.

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**Employee-Department Table**

Employee ID	Employee	Department
1	Alpha Monroe	Accounting
2	Charlie Smith	Marketing
3	Janet Doe	Purchasing
4	Frank Fitz	Sales
5	Walter Armstrong	Purchasing
6	Ellis Walker	Accounting
7	Hope Harper	Marketing
8	Zachary Adams	Sales

**Employee-Skill Table:**

Employee ID	Skill	Skill Description
1	Access	Database
1	Excel	Spreadsheet
2	Publisher	Advertising, flyers, handouts
2	Word	Document processing
3	Excel	Spreadsheet
3	Visio	Diagramming, workflow
4	Word	Document processing
5	Excel	Spreadsheet
6	Access	Database
7	Publisher	Advertising, flyers, handouts
7	SharePoint	Document management
8	PowerPoint	Slide presentation
8	Excel	Spreadsheet



## ❖ 2.5.2. Second Normal Form

The goal of Second Normal Form is to eliminate redundant data.

There are two steps to achieving Second Normal Form:

1. Satisfy the requirements of First Normal Form.
2. Identify data that is redundant and separate it into another table.

Notice that some skills and their descriptions in the Employee-Skill table are redundant.

**Employee-Skill Table**

Employee-Skill ID	Employee ID	Skill	Skill Description
1	1	Access	Database
2	1	Excel	Spreadsheet
3	2	Publisher	Advertising, flyers, handouts
4	2	Word	Document processing
5	3	Excel	Spreadsheet
6	3	Visio	Diagramming, workflow
7	4	Word	Document processing
8	5	Excel	Spreadsheet
9	6	Access	Database
10	7	Publisher	Advertising, flyers, handouts
11	7	SharePoint	Document management
12	8	PowerPoint	Slide presentation
13	8	Excel	Spreadsheet

This redundancy suggests that we should create a separate table for skills:

**Skill Table**

Skill ID	Skill	Skill Description
1	Access	Database
2	Excel	Spreadsheet
3	Publisher	Advertising, flyers, handouts
4	Word	Document processing
5	Visio	Diagramming, workflow
6	SharePoint	Document management
7	PowerPoint	Slide presentation

This reduces the Employee-Skill table to:

Employee-Skill Table

Employee-Skill ID	Employee ID	Skill ID
1	1	1
2	1	2
3	2	3
4	2	4
5	3	2
6	3	5
7	4	4
8	5	2
9	6	1
10	7	3
11	7	6
12	8	7
13	8	2

Because the Employee ID and Skill ID together determine the same information provided by the Employee-Skill ID, we can eliminate the Employee-Skill ID column altogether and use the Employee ID and Skill ID together as a composite primary key. This results in the following Employee-Skill table:

Employee-Skill Table

Employee ID	Skill ID
1	1
1	2
2	3
2	4
3	2
3	5
4	4
5	2
6	1
7	3
7	6
8	7
8	2

Notice that in the resulting tables there is only one instance of each skill in the Skill table but multiple employees may be assigned the same skill in the Employee-Skill table, another one-to-many relationship.

Skill ID	Skill	Skill Description
1	Access	Database
2	Excel	Spreadsheet
3	Publisher	Advertising, flyers, handouts
4	Word	Document processing
5	Visio	Diagramming, workflow
6	SharePoint	Document management
7	PowerPoint	Slide presentation

Employee ID	Skill ID
1	1
1	2
2	3
2	4
3	2
3	5
4	4
5	2
6	1
7	3
7	6
8	7
8	2

Evaluating Copy

### ❖ 2.5.3. Third Normal Form

Third Normal Form has two requirements:

1. Satisfy the requirements of Second Normal Form.
2. Remove columns in a table that do not directly depend on the table's primary key.

Let's return to the Employee-Department table.

**Employee-Department Table**

Employee ID	Employee	Department
1	Alpha Monroe	Accounting
2	Charlie Smith	Marketing
3	Janet Doe	Purchasing
4	Frank Fitz	Sales
5	Walter Armstrong	Purchasing
6	Ellis Walker	Accounting
7	Hope Harper	Marketing
8	Zachary Adams	Sales

In the Employee-Department table, the Department column depends on the Employee (if I know the employee, I know the department) and the Employee column depends on the Employee ID (if I know the Employee ID, I know the employee), but the Department does not depend on the Employee ID directly (if I know the employee ID I cannot be sure of the department). Because the Department column does not directly depend on the Employee ID, departments need to be moved to a separate table.

After we create a separate Department table and replace the Department field in the Employee-Department table with the Department ID field, the result is two tables:

**Department Table**

Department ID	Department
1	Accounting
2	Marketing
3	Purchasing
4	Sales

**Employee Table**

Employee ID	Employee	Department ID
1	Alpha Monroe	1
2	Charlie Smith	2
3	Janet Doe	3
4	Frank Fitz	4
5	Walter Armstrong	3
6	Ellis Walker	1
7	Hope Harper	2
8	Zachary Adams	4

The Department ID field in the Employee table is an example of a foreign key. A *foreign key* is a field in a relational database table that matches the primary key of another table. Foreign keys establish a relationship between tables and are vital to maintaining data integrity.

To recap, to achieve Third Normal Form in your tables:

1. Eliminate repeating groups.
2. Eliminate redundant data.
3. Remove columns which do not directly depend on the primary key.



## 2.6. Table Relationships

In the process of our work to normalize the tables in the example, we defined relationships among the tables.

The Department table has a one-to-many relationship with the Employee table.

Department Table		Employee Table		
Department ID	Department	Employee ID	Employee	Department ID
1	Accounting	1	Alpha Monroe	1
2	Marketing	2	Charlie Smith	2
3	Purchasing	3	Janet Doe	3
4	Sales	4	Frank Fitz	4
		5	Walter Armstrong	3
		6	Ellis Walker	1
		7	Hope Harper	2
		8	Zachary Adams	4

The Employee table has a one-to-many relationship with the Employee-Skill table and the Skill table likewise has a one-to-many relationship with the Employee-Skill table.

Employee Table

Employee ID	Employee	Department ID
1	Alpha Monroe	1
2	Charlie Smith	2
3	Janet Doe	3
4	Frank Fitz	4
5	Walter Armstrong	3
6	Ellis Walker	1
7	Hope Harper	2
8	Zachary Adams	4

Employee-Skill Table

Employee ID	Skill ID
1	1
1	2
2	3
2	4
3	2
3	5
4	4
5	2
6	1
7	3
7	6
8	7
8	2

Skill Table

Skill ID	Skill	Skill Description
1	Access	Database
2	Excel	Spreadsheet
3	Publisher	Advertising, flyers, handouts
4	Word	Document processing
5	Visio	Diagramming, workflow
6	SharePoint	Document management
7	PowerPoint	Slide presentation

## ❖ 2.6.1. Relationship Types

There are three types of relationships among tables. For table A and table B:

- Table A has a *one-to-many relationship* with Table B if a record in Table A can match one or more records in Table B but each record in Table B must match only one record in Table A. In our example, we arrived at three one-to-many relationships: the Department table to the Employee table, the Employee table to the Employee-Skill table, and the Skill table to the Employee-Skill table. One-to-many relationships are the most common type of table relationship.
- Table A has a *many-to-many relationship* with Table B if Table A can have one or more matches in Table B and Table B can have one or more matches in Table A. This sort of relationship occurs when a third table, called a *junction table*, is defined which consists of a foreign key from Table A and a foreign key from Table B. The Employee table and the Skill table in this lesson's example have a many-to-many relationship with the Employee-Skill table acting as the junction table.
- Table A has a *one-to-one relationship* with Table B if a record in Table A can have no more than one matching record in Table B and Table B can have no more than one matching record in Table A. This type of relationship is less common because most data with this sort of relationship could be stored in the same table. At times, however, such a relationship is useful.

## Exercise 4: Normalizing Data

 30 to 45 minutes

Consider the following Transactions table. Use normalization techniques to achieve tables which satisfy Third Normal Form.

**Transactions**

Code	Type	Date	Description	Amount	Memo	Status
AD	Credit	4/1/2013	Payroll deposit	1,095.62		Cleared
DC	Debit	4/2/2013	Main Street Market	117.34	Groceries	Cleared
7214	Debit	4/7/2013	Charlottesville MUD	74.19	Water bill	Uncleared
FT	Debit	4/10/2013	Transfer to savings	500.00		Cleared
ATM	Debit	4/10/2013	Cash withdrawal	120.00		Cleared
AD	Credit	4/14/2013	US Dept of Treasury	372.96	Tax refund	Uncleared

## Solution

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### First Normal Form

The Transactions table has no repeating data. To establish First Normal Form, we only need to assign a primary key field to the table.

**Transactions**

Trans ID	Code	Type	Date	Description	Amount	Memo	Status
1	AD	Credit	4/1/2013	Payroll deposit	1,095.62		Cleared
2	DC	Debit	4/2/2013	Main Street Market	117.34	Groceries	Cleared
3	7214	Debit	4/7/2013	Charlottesville MUD	74.19	Water bill	Uncleared
4	FT	Debit	4/10/2013	Transfer to savings	500.00		Cleared
5	ATM	Debit	4/10/2013	Cash withdrawal	120.00		Cleared
6	AD	Credit	4/14/2013	US Dept of Treasury	372.96	Tax refund	Uncleared

### Second Normal Form

Notice that the Type and Status columns contain redundant data. We need to remove these columns to their own tables and assign primary keys.

**Transaction Types**

Type ID	Type
1	Debit
2	Credit

**Statuses**

Status ID	Status
1	Cleared
2	Not Cleared

When we replace the Type and Status columns as foreign keys, the Transactions table looks like this:

### Transactions

Trans ID	Code	Type ID	Date	Description	Amount	Memo	Status ID
1	AD	2	4/1/2013	Payroll deposit	1,095.62		1
2	DC	1	4/2/2013	Main Street Market	117.34	Groceries	1
3	7214	1	4/7/2013	Charlottesville MUD	74.19	Water bill	2
4	FT	1	4/10/2013	Transfer to savings	500.00		1
5	ATM	1	4/10/2013	Cash withdrawal	120.00		1
6	AD	2	4/14/2013	US Dept of Treasury	372.96	Tax refund	2

### *Third Normal Form*

All columns in the Transactions, Transaction Types, and Statuses tables depend on their respective primary keys. There is nothing further to do to achieve Third Normal Form.

Evaluation  
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## Conclusion

In this lesson, you learned:

- How to get started designing a database application.
- About naming conventions for tables and other objects.
- What normalization is and how to normalize tables to conform to Third Normal Form.
- About primary keys and assigning a primary key to a table.
- About foreign keys and using them to establish relationships among tables.



# LESSON 3

## Tables and Their Views

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### Topics Covered

- Tables and table views.
- Tables in Datasheet view.
- Data records in Datasheet view.
- The purpose of Design view.

### Introduction

Access provides five types of database objects: tables, queries, forms, reports, and macros and modules. This lesson focuses on tables, the essential database objects. The next lesson looks at the remaining database objects. These add the functionality that enhance data access for your end users.

For this lesson, open the My Music Collection database located with your Webucator class files at ... \ClassFiles\TablesTheirViews\Demos\Demo - My Music Collection.accdb. If prompted concerning disabled content, click **Enable Content** in the yellow banner.



### 3.1. Definition and Purpose

Tables are the core structure of a database. They store related data in a logical framework of rows and columns that makes it easy for an RDBMS to sort, filter, and retrieve information.

**A field**

ID	Title	Artist	Format
1	Right On	Count Basie and His Orchestra	78
2	I Got a Name	Jim Croce	8-tr
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33
4	A Hard Day's Night	Beatles	33
5	The White Album	Beatles	CD
6	I Remember Yesterday	Donna Summer	Cass
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD
8	Just a Dream	Carrie Underwood	MP3
9	Music of the Night	Alfie Boe	MP3
10	King of Swing!	Count Basie and His Orchestra	CD
* (New)			

The first row of a database table contains column headings. The column headings are the *names* of the *fields* in the table.

Each column in a table represents a *field*. Each entry in a field is a *field value*.

Each row in the table represents a *record*. A record consists of a value for each field in the table. (For this definition, we're including "blank" as a field value if the database rules allow a blank field value.)



## 3.2. Datasheet View

Access provides two ways to work with tables: Datasheet view and Design view.

Datasheet view shows a table in typical column and row layout.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

### Datasheet view

Datasheet view provides a number of features for working with a table and its data.

#### ❖ 3.2.1. Selection Tools

##### Select a Table

If you need to make a change that affects all the data in a table, you first need to select everything in the table.

To select a table, click the table selector in the upper left corner of the table.

<input type="checkbox"/>	ID	Title
	1	Right On
	2	I Got a Name
	3	Smetana: Moldau, Overtures
	4	A Hard Day's Night

The entire table is highlighted.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

## Select a Column

If you need to make a change that affects a column, you first need to select the column.

To select a column:

1. Hover the mouse pointer over the column you need to select until it changes to a downward arrow.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

2. Click. The column is highlighted.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

To select multiple adjacent columns, select the first column you need, then press **Shift** and select the last column you need.

### Select a Row

If you need to make a change that affects a row, you first need to select the row.

To select a row:

Evaluation Copy

1. Hover over the record selector to the left of the row you need to select. The mouse pointer changes to a right arrow.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

2. Click. The row is highlighted.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

To select multiple adjacent rows, select the first row you need, then press **Shift** and select the last row.

### ❖ 3.2.2. Table Layout Tools

#### Reorder Columns

Evaluation Copy

To move a column to a different location in the table:

1. Select the column.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto 1 & 3	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

2. Click in the heading of the selected column.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto 1 & 3	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

- Drag the column to a new location. Notice that a bold separator indicates the positions where you can place the column.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto 1 & 3	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

- When you arrive at the desired position, release the mouse button to finish the move.

ID	Title	Format	Artist	Click to Add
1	Right On	78	Count Basie and His Orchestra	
2	I Got a Name	8-tr	Jim Croce	
3	Smetana: Moldau, Overtures	33	Cleveland Orchestra	
4	A Hard Day's Night	33	Beatles	
5	The White Album	CD	Beatles	
6	I Remember Yesterday	Cass	Donna Summer	
7	Rachmaninov Piano Concerto 1 & 3	CD	Cleveland Orchestra	
8	Just a Dream	MP3	Carrie Underwood	
9	Music of the Night	MP3	Alfie Boe	
10	King of Swing!	CD	Count Basie and His Orchestra	
* (New)				

## Resize a Column

You can make columns wider or narrower to suit your needs.

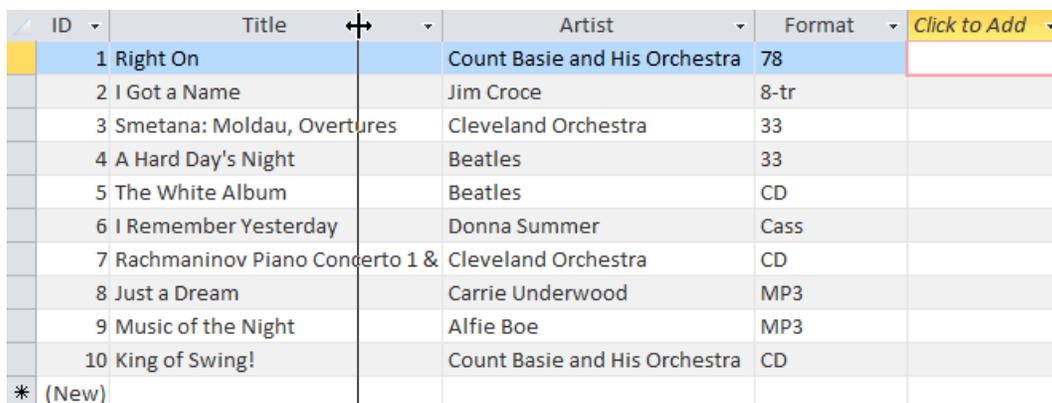
To change the width of a column:

1. On the right end of the column heading, hover over the column separator until the cursor changes to .



ID	Title	Artist	Format
1	Right On	Count Basie and His Orchestra	78
2	I Got a Name	Jim Croce	8-tr
3	Smetana: Moldau, Overture	Cleveland Orchestra	33
4	A Hard Day's Night	Beatles	33
5	The White Album	Beatles	CD
6	I Remember Yesterday	Donna Summer	Cass
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD
8	Just a Dream	Carrie Underwood	MP3
9	Music of the Night	Alfie Boe	MP3
10	King of Swing!	Count Basie and His Orchestra	CD
* (New)			

2. Click and drag to the left to make the column narrower; drag to the right to make it wider.



ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto 1 &	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

3. When you achieve the desired width, release the mouse button.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overt	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Conc	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

You can quickly resize a column to fit the width of the longest displayed record value in the column. To do so, double-click the column separator.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtu	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Conc	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

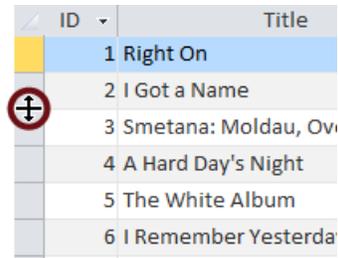
ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto 1 & 3	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

## Resize Rows

Where as resizing columns affects only the selected column, resizing rows affects all rows in the table.

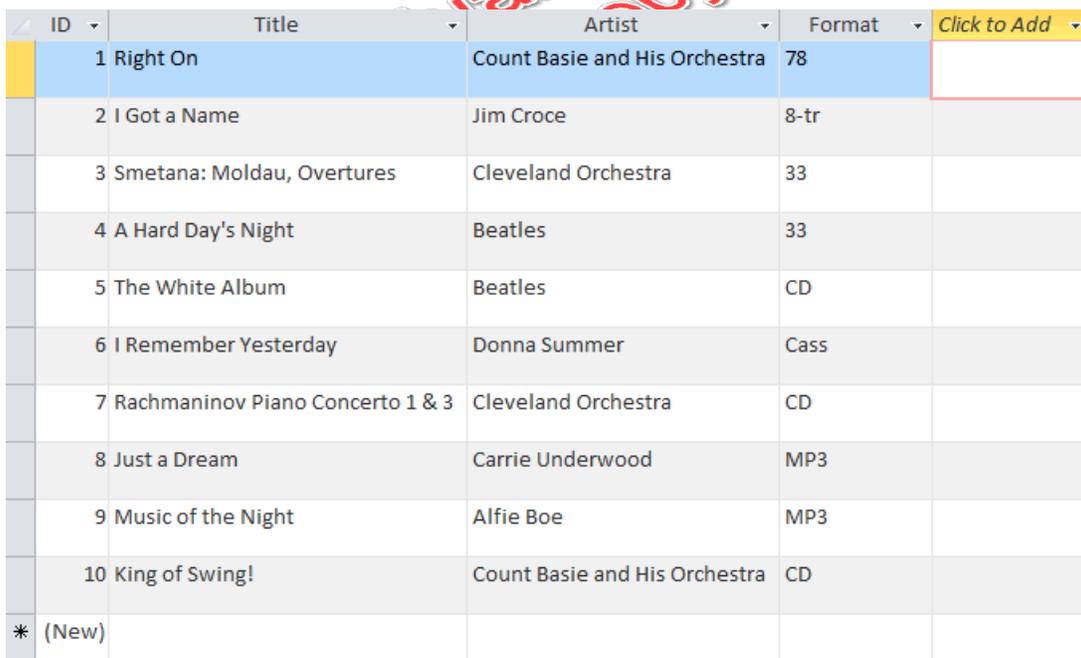
To resize the rows in a table:

1. Hover over the divider between two record selectors until the cursor changes to .



ID	Title
1	Right On
2	I Got a Name
3	Smetana: Moldau, Ovr
4	A Hard Day's Night
5	The White Album
6	I Remember Yesterda

2. Click and drag down to make the rows taller; drag up to make the rows shorter.
3. When you reach the desired row height, release the mouse button.



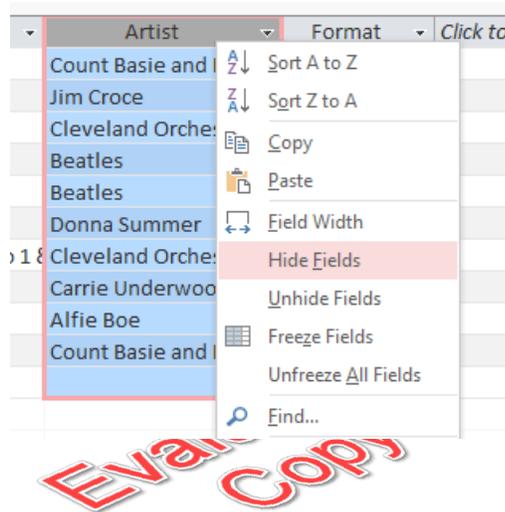
ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto 1 & 3	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
*	(New)			

## Hide a Field

Hiding a field will affect the view of the table without harming the data.

To a field in a table:

1. **Right-Click** on the field you wish to hide. Choose **Hide Fields**.

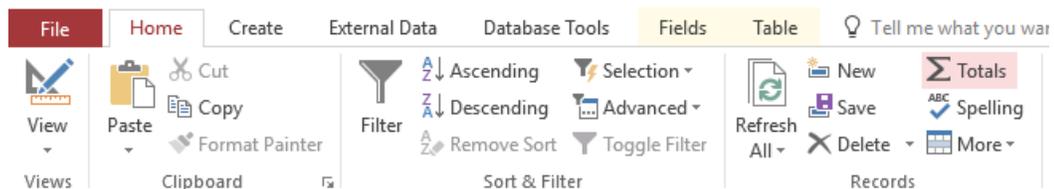


## Display the Totals Row

When you need a quick summation from a table, we may use the Totals Row feature. Depending on the type of data in the column, your choices as to how the calculation will be generated will differ.

Totals Row in a Table:

1. **Home > Records > Totals**.



2. In the column that needs a summation, click and choose a function.

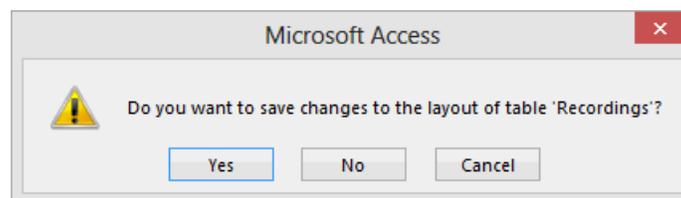
ID	Title	Artist	Format
1	Right On	Count Basie and His Orc	78
2	I Got a Name	Jim Croce	8-tr
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33
4	A Hard Day's Night	Beatles	33
5	The White Album	Beatles	CD
6	I Remember Yesterday	Donna Summer	Cass
7	Rachmaninov Piano Concerto 1 &	Cleveland Orchestra	CD
8	Just a Dream	Carrie Underwood	MP3
9	Music of the Night	Alfie Boe	MP3
10	King of Swing!	Count Basie and His Orc	CD
*	(New)		
<b>Total</b>			<input type="text"/> None Count

3. The calculation is processed.

ID	Title	Artist	Format
1	Right On	Count Basie and His Orc	78
2	I Got a Name	Jim Croce	8-tr
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33
4	A Hard Day's Night	Beatles	33
5	The White Album	Beatles	CD
6	I Remember Yesterday	Donna Summer	Cass
7	Rachmaninov Piano Concerto 1 &	Cleveland Orchestra	CD
8	Just a Dream	Carrie Underwood	MP3
9	Music of the Night	Alfie Boe	MP3
10	King of Swing!	Count Basie and His Orc	CD
*	(New)		
<b>Total</b>			<b>10</b>

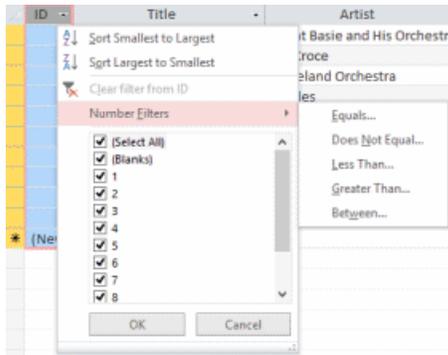
## Save Layout Changes

To keep changes to the layout of a database table, you must save the table. If you do not save beforehand, Access will prompt you when you try to close the table.

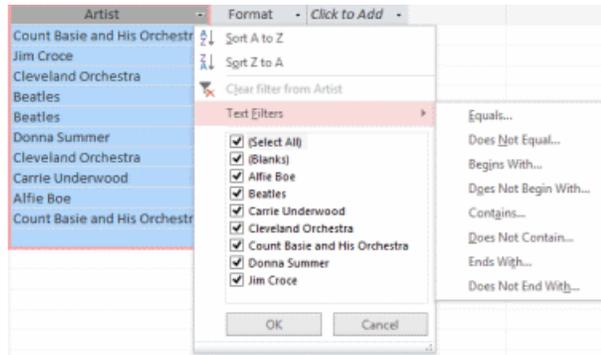


### ❖ 3.2.3. Sorting and Filtering Tools

Data can be sorted and filtered by using the commands available in drop-down menus on the column headings. The options available vary depending on the type of data a column stores; however, the basic methods are similar regardless of data type.



Options available on a number field

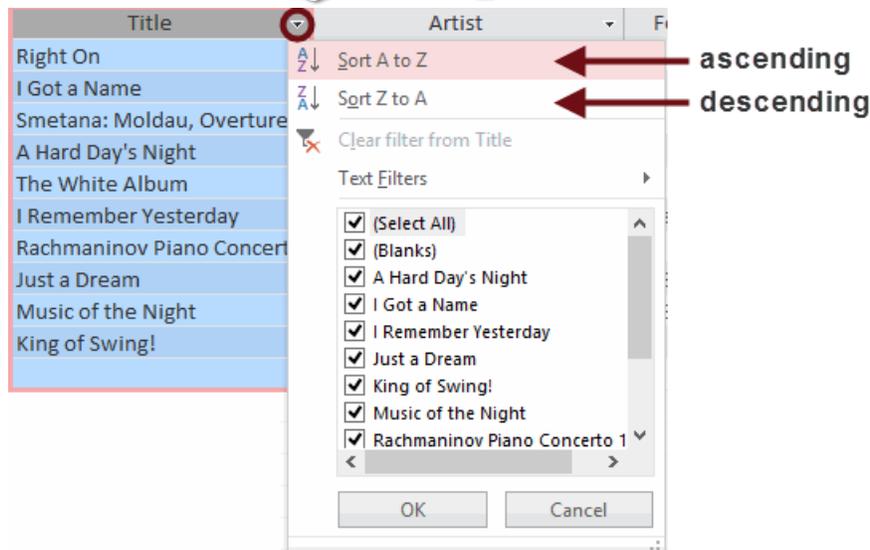


Options available on a text field

### Sort Data

To sort data by the values in a particular column,

1. Click the down arrow to the right of the column name to open the drop-down menu.

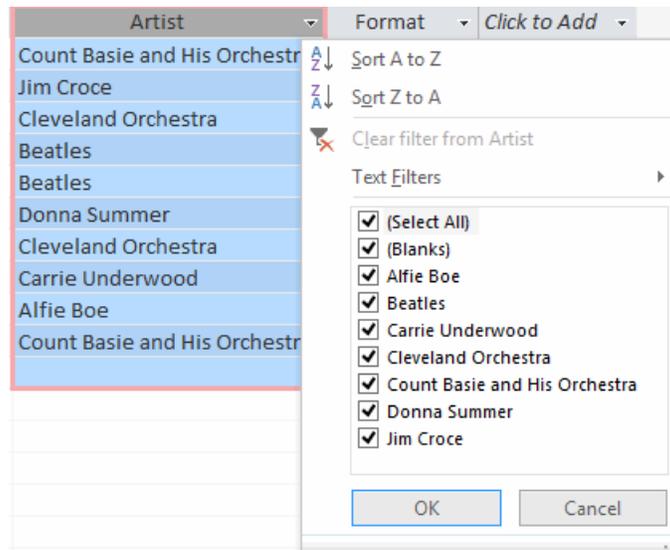


2. From the menu, select the option next to the  icon to sort in ascending order or select the option next to the  icon to sort in descending order.

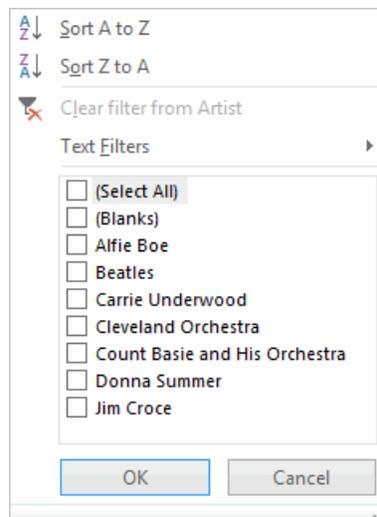
## Filter Data by Value

To filter data by specific value(s) in a column:

1. Click the down arrow to the right of the column name to open the drop-down menu.



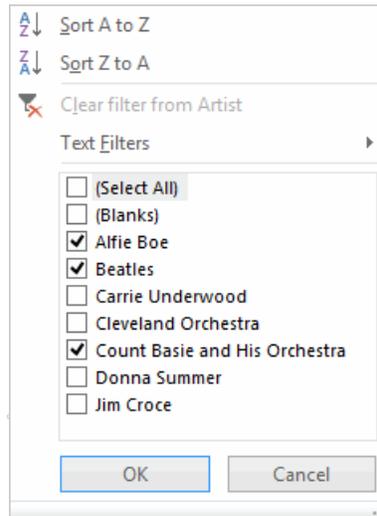
2. In the list box, clear the **(Select All)** check box. This clears all the check boxes in the list box.



3. Mark the check box for each value you want to include in the filtered results.

## The (Blanks) Option

The **(Blanks)** option lets you see the records which don't have a value specified in the column.

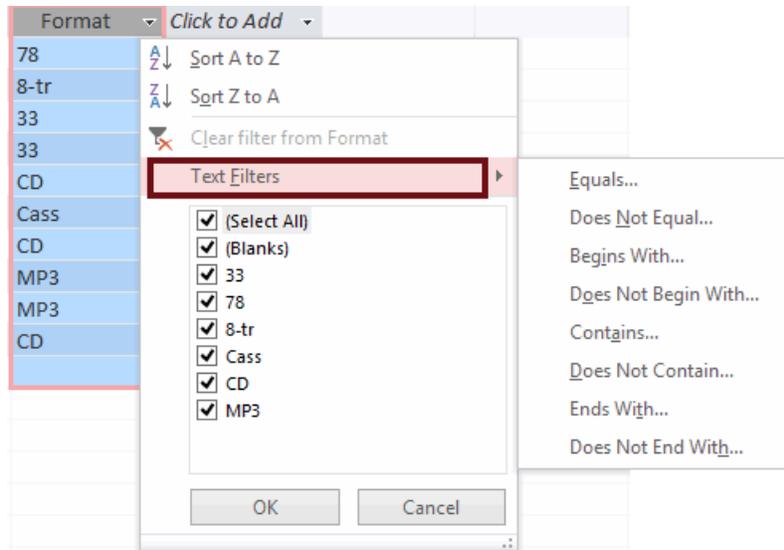


4. Click **OK**. Only the records which match your selections show in the datasheet.

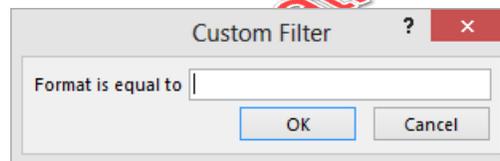
ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

After you apply a filter, an indicator appears in the record navigation bar at the bottom of the tab to indicate that the dataset is filtered.

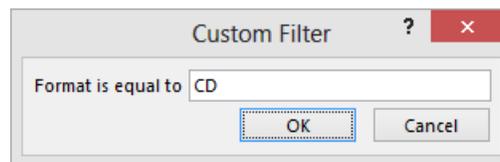




- From the submenu, select how you want to compare values to determine if a record belongs in the filtered dataset. You are prompted for a value.



- Type the value that you need to satisfy the statement.



- Click **OK**. Only the records which satisfy your criteria show in the table.

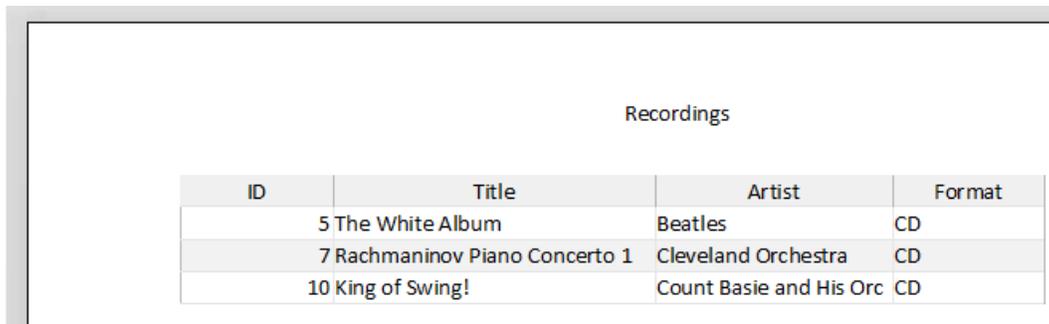
ID	Title	Artist	Format	Click to Add
5	The White Album	Beatles	CD	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

### ❖ 3.2.4. Print Records

Once you have the perfect recordset, you may wish to print, save as a PDF, or export the recordset out to another format.

Print a Recordset:

1. Choose **File > Print > Print Preview**.
2. View and print as desired.



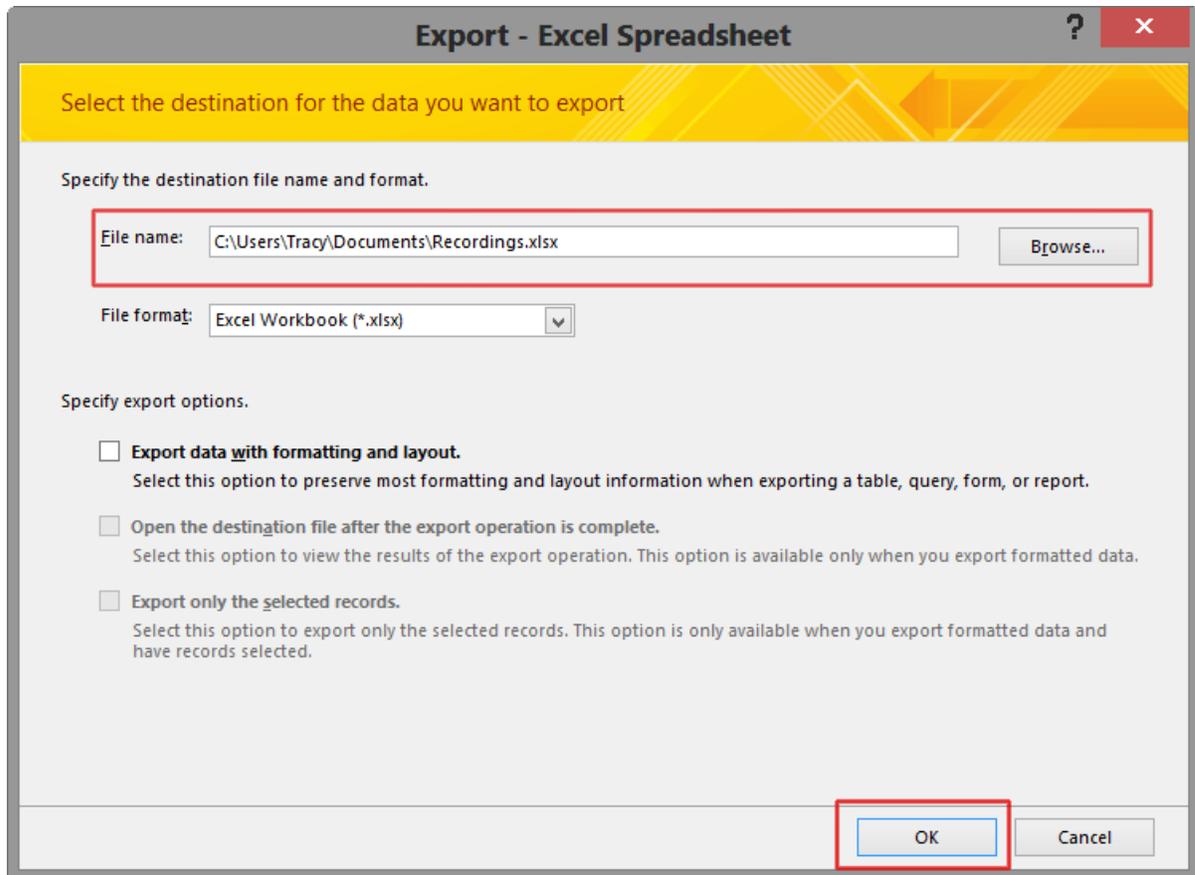
ID	Title	Artist	Format
5	The White Album	Beatles	CD
7	Rachmaninov Piano Concerto 1	Cleveland Orchestra	CD
10	King of Swing!	Count Basie and His Orc	CD

Export a Recordset to Excel:

1. Choose **External Data > Export > Excel** to open the export wizard.



2. Choose a location and then click **OK**.



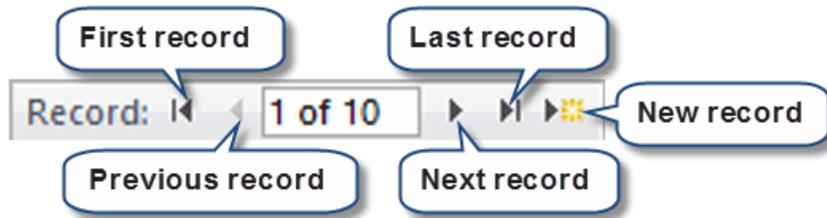
3. Your recordset data has now been saved as an Excel spreadsheet.

### ❖ 3.2.5. Record Navigation

At the bottom of a table's tab is the record navigation bar.



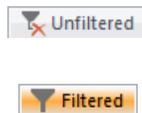
The first section of the bar is the record navigator. The buttons of the record navigator allow you to move quickly to the first record , the previous record , the next record , and the last record  in the table. The last button  in the record navigator adds a new blank record to the table.



In the middle of the record navigator is the current record indicator which shows the record currently selected in the table and the total number of records in the table. You can select the text in the current record box, type a record number, and press **Enter** to move quickly to that record in the table.



To the right of the record navigator is a button that indicates whether the table is filtered or unfiltered. Clicking **Unfiltered** applies the last saved filter on the table. As noted earlier, clicking **Filtered** removes filtering.



The last item on the record navigator is a search box.



As you type in the search box, the cursor moves to the first value in the table that matches what you've typed. After you find your search term, you can press **Enter** again to find the next instance of the search term in the table.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

Record: 1 of 10 Unfiltered C

...finds this match.

Typing "C" here...

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

Record: 5 of 10 Unfiltered CD

...finds this match.

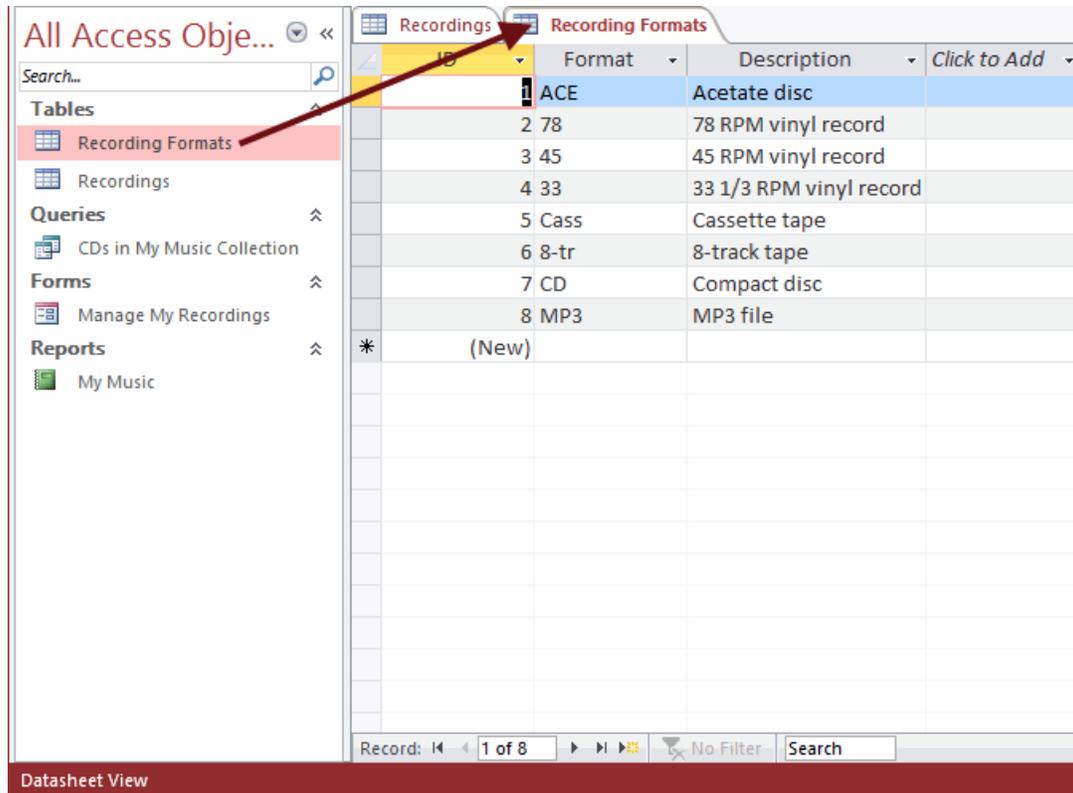
Typing "CD" here...

## ❖ 3.2.6. Working in Datasheet View

### Open a Table

To open an existing table in Datasheet view:

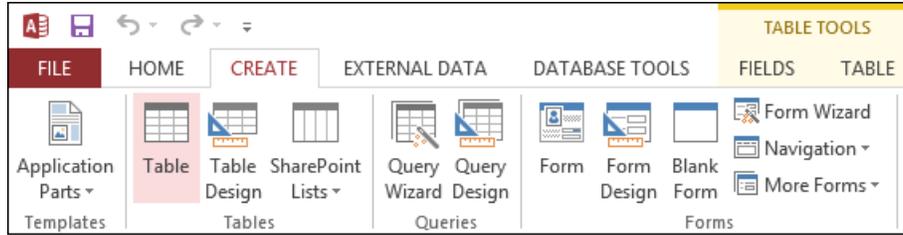
1. Locate the table in the **Navigation Pane**.
2. Double-click the table name.



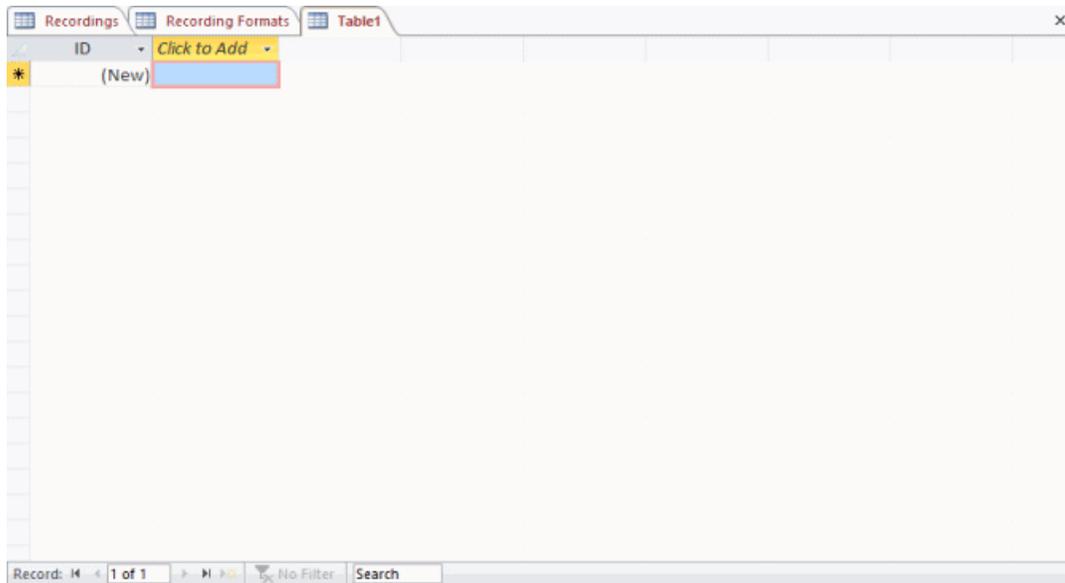
### Create a New Table

To create a new table in Datasheet view:

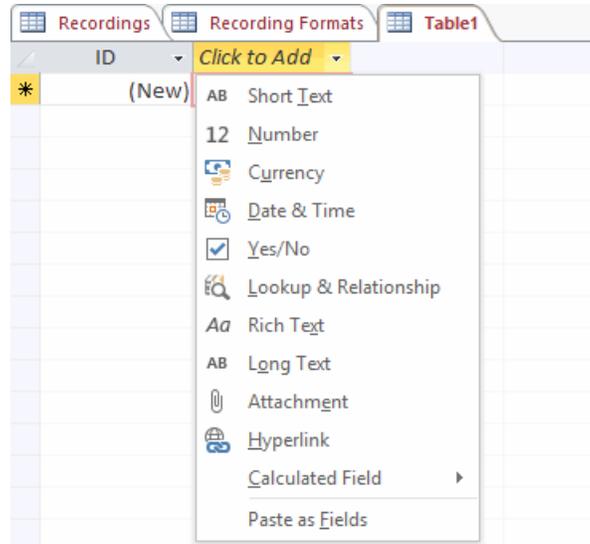
1. Select the **Create** tab.



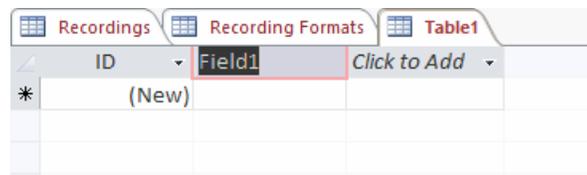
2. In the **Tables** group, click **Table**. A new table with a default name of “Table1” is added to the work surface.



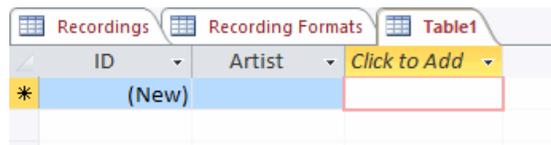
3. Add fields to the table as needed. To do so, click **Click to Add** in the first available column.



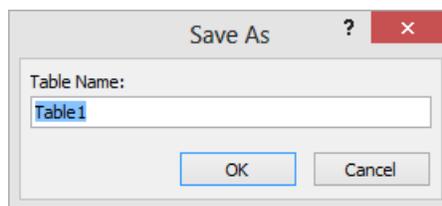
- From the drop-down menu, select an appropriate data type. The new field is added using a default name. Notice that the default name is highlighted and editable.



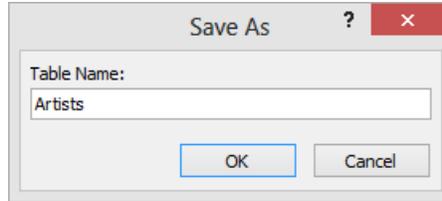
- Type a meaningful name for the field.



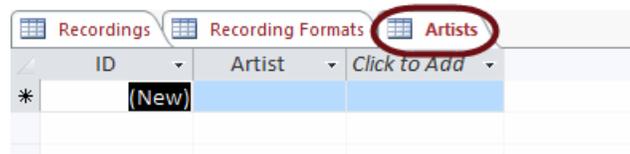
- Continue adding more fields as needed.
- When you finish, click **Save**. You are prompted for a table name.



- In the **Table Name** field, type a descriptive name for the table.



9. Click **OK**.



## Add and Edit Data

Data records can be added and edited directly in Datasheet view.

The last row in a data table is ready for new data entry. The asterisk on the record selector indicates the new record. The **ID** field indicates “(New)”. After you start typing in the first empty field, Access will replace “(New)” with a unique value and add another new row to the table.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
* (New)				

To add a new record:

1. In the last row of the table, start typing values for the fields in the new record. Press **Tab** to move from field to field.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto 1	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
11	Pirates of Penzance	D'oyly Carte Opera Company	33	
*	(New)			

2. Press **Tab** after you fill in the last field to move to the next row.

### Automatic Saving

New records and changes to records are immediately saved to the database. You do not need to click **Save** to save data. The **Save** command applies to database objects only.

To change a value in an existing record:

1. Locate the record you need to change.
2. Place your cursor in the field you need to change, highlighting all or part of the entry as necessary.
3. Correct the value.

### Delete a Record

When a record has served its purpose, deletion is an option available. Once the record has been deleted, there is no recovery.

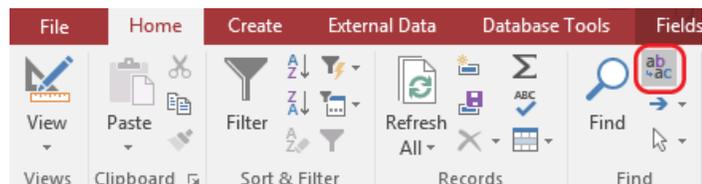
ID	Title	Artist	Format
1	Right On	Count Basie and His Orc	78
2	I Got a Name	Jim Croce	8-tr
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33
4	A Hard Day's Night	Beatles	33
5	The White Album	Beatles	CD
6	I Remember Yesterday	Donna Summer	Cass
7	Rachmaninov Piano Concerto 1	Cleveland Orchestra	CD
8	Just a Dream	Carrie Underwood	MP3
	...ic of the Night	Alfie Boe	MP3
	...g of Swing!	Count Basie and His Orc	CD

1. Right-click the record in question.
2. Choose Delete Record.

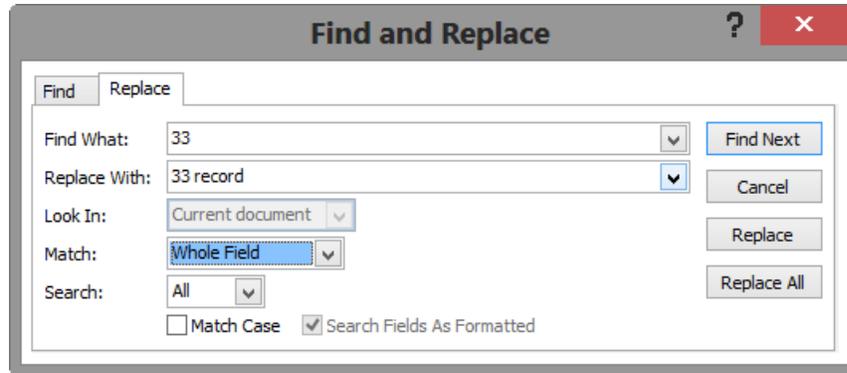
## Find and Replace Data

When mass changes need to be made, Find and Replace is available.

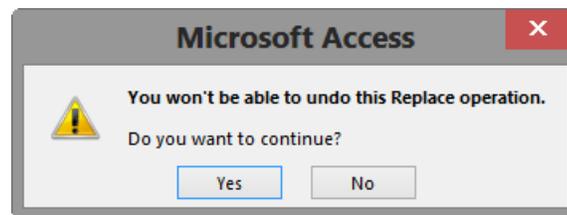
1. Click Home > Find > Replace.



2. The **Find and Replace** dialog box appears. Choose your settings.



3. Once a match is found, click **Replace**. Click **Yes**.



## Close a Table

To close a table:

1. Click the X at the top right corner of the table tab. If you've made changes to the table, you are prompted to save your changes.
2. If you want to save the changes, click **Yes**.

## Delete a Table

To delete a table:

1. If the table is open, close it.
2. Highlight the table name in the **Navigation Pane**.
3. Right-click and select **Delete** from the shortcut menu. You are prompted to confirm your action.
4. Click **Yes**.

## Caution!

Exercise caution when deleting tables. Deleting a table that other tables or other database objects depend on can introduce errors, data inconsistency, and functional anomalies.

Evaluation  
Copy

# Exercise 5: Working with Tables in Datasheet View

 15 to 25 minutes

In this exercise, you will add records to a table, create a new table, sort the data in a table, and apply a filter to the data in a table.

Open the Exercise - My Music Collection database located in your class files at ...\\ClassFiles\\TablesTheirViews\\Exercises\\Exercise - My Music Collection.accdb and then do the following:

1. Add the following data records to the Recordings table:

Title	Artist	Format
Pirates of Penzance	D'Oyly Carte Opera Company	33
Skyfall	Adele	MP3

2. Create a new table named "Artists" with a field named "Artist". Add a record for each distinct artist found in the Recordings table. In other words, if an artist appears more than once in the Recordings table, only add it once to the Artists table.
3. Resize the Artist column in the Artists table so that the full name of every artist in the table is visible.
4. Sort the Artists table in alphabetical order.
5. Filter the Artists table to show only artists with the word "Orchestra" in their names.



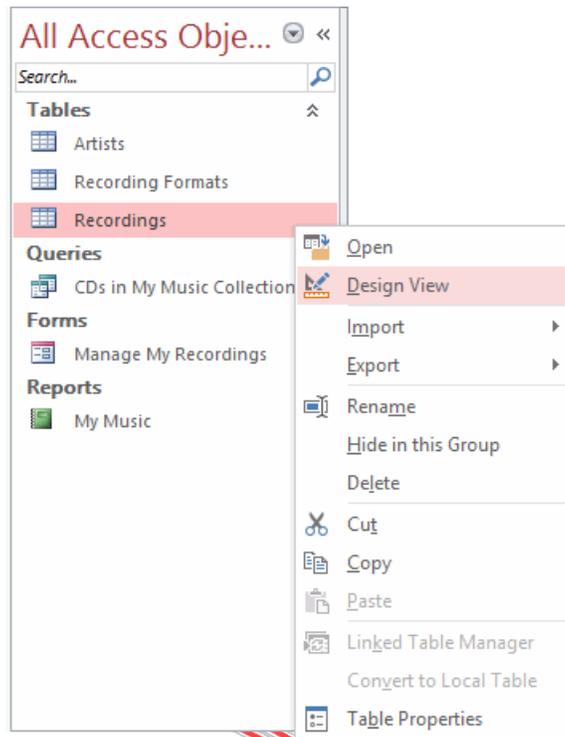
## 3.3. Design View

While Datasheet view lets you work directly with the data in tables, Design view takes you behind the scenes to work with the table structure. In Design view you have much finer control over how the fields in your data are defined and validated.

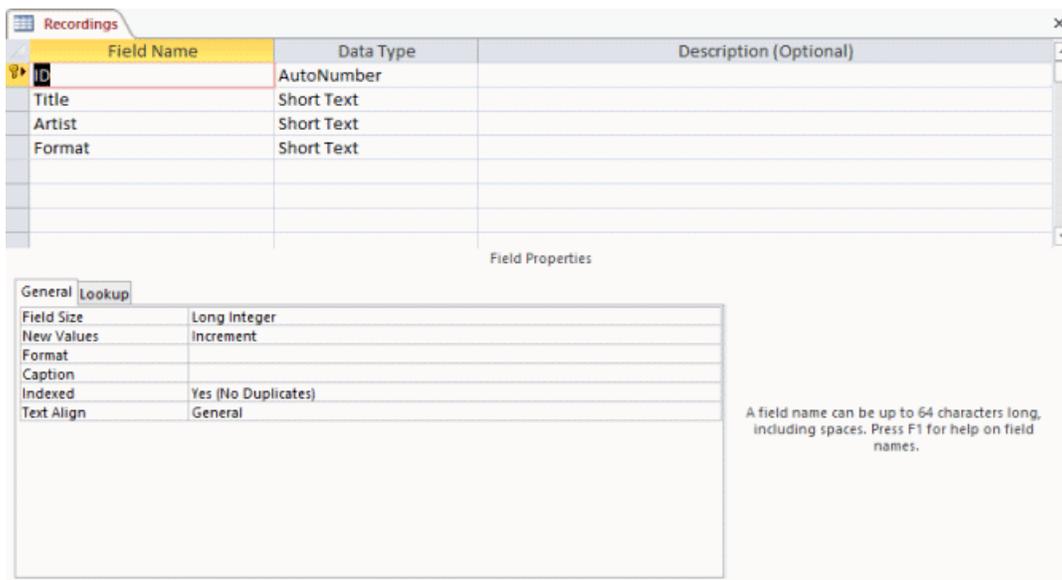
### ❖ 3.3.1. Open a Table in Design View

To open a closed table in Design view:

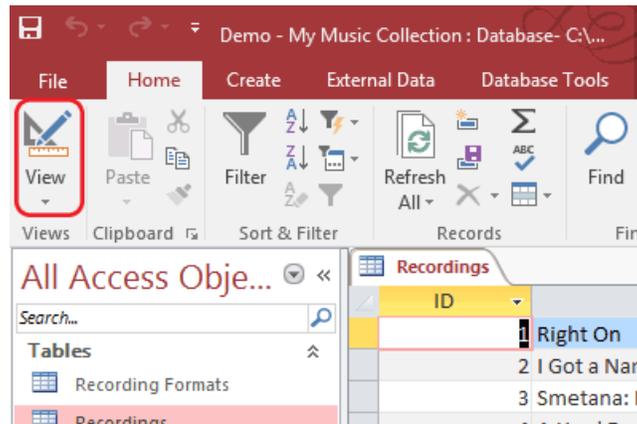
1. Locate the table in the **Navigation Pane** and right-click it.



2. From the shortcut menu, select **Design View**. The table object opens as a tab on the work surface.



If a table is already open in Datasheet view, you can switch to Design view by clicking the **View** icon in the toolbar.



### ❖ 3.3.2. Design View Layout

The Design view for a table is divided into three main sections: the field definition area, the field properties tabs, and the user assistance text.

The field definition area spans the top of the tab. Here you can add fields, specify their data types, and provide descriptions that users can see when they enter the field while using your application.

Field Name	Data Type	Description (Optional)
ID	AutoNumber	
Title	Short Text	
Artist	Short Text	
Format	Short Text	

Field Properties

General		Lookup
Field Size	Long Integer	
New Values	Increment	
Format		
Caption		
Indexed	Yes (No Duplicates)	
Text Align	General	

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

The field properties area is located at the bottom left of the tab. The items on the **Field Properties** tabs represent the properties of the field that is currently selected in the field definition area.

Field Name	Data Type	Description (Optional)
ID	AutoNumber	
Title	Short Text	
Artist	Short Text	
Format	Short Text	

Field Properties

General    Lookup

Field Size	Long Integer
New Values	Increment
Format	
Caption	
Indexed	Yes (No Duplicates)
Text Align	General

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

The user assistance text is located at the bottom right. The text provides guidance for the object where your cursor is currently placed.

Field Name	Data Type	Description (Optional)
ID	AutoNumber	
Title	Short Text	
Artist	Short Text	
Format	Short Text	

Field Properties

General    Lookup

Field Size	Long Integer
New Values	Increment
Format	
Caption	
Indexed	Yes (No Duplicates)
Text Align	General

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

We'll look in more depth at Design view for tables in a future lesson.

## Conclusion

In this lesson, you learned:

- About the table object in Access.

- About the views available for working with tables: Datasheet view and Design view.
- About working with tables in Datasheet view.

Evaluation  
Copy

# LESSON 4

## Tables

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### Topics Covered

- Creating an Access database.
- Creating a table in Design view.
- Data types.
- Assigning a key field.
- Input masks.
- Defining validation rules.

Evaluation  
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### Introduction

For this lesson, open the My Music Collection database located with your Webucator class files at `.ClassFiles/Tables/Demos/Demo - Contacts.accdb`. If prompted concerning disabled content, click **Enable Content** in the yellow banner.

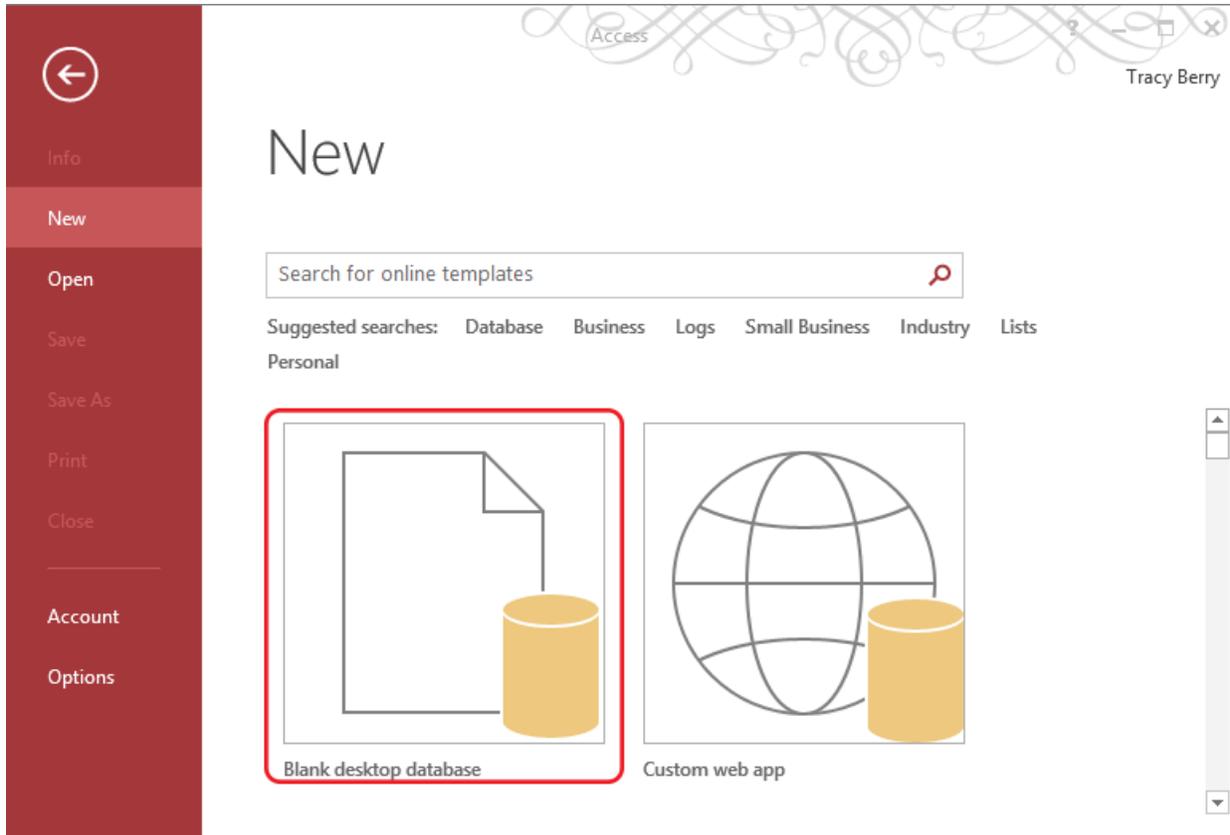


## 4.1. Creating an Access Database

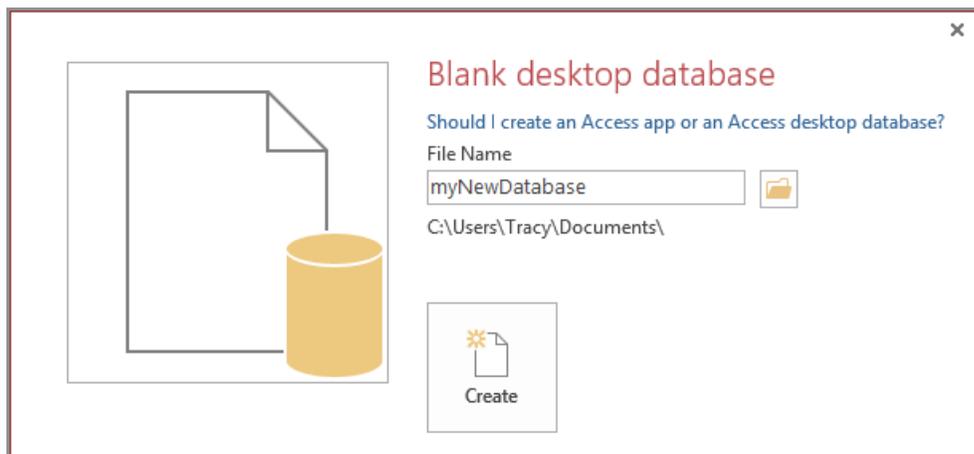
So far we've worked with existing databases. Now it's time to create our own database and start developing our first application.

To create a blank Access database:

1. Start Access.

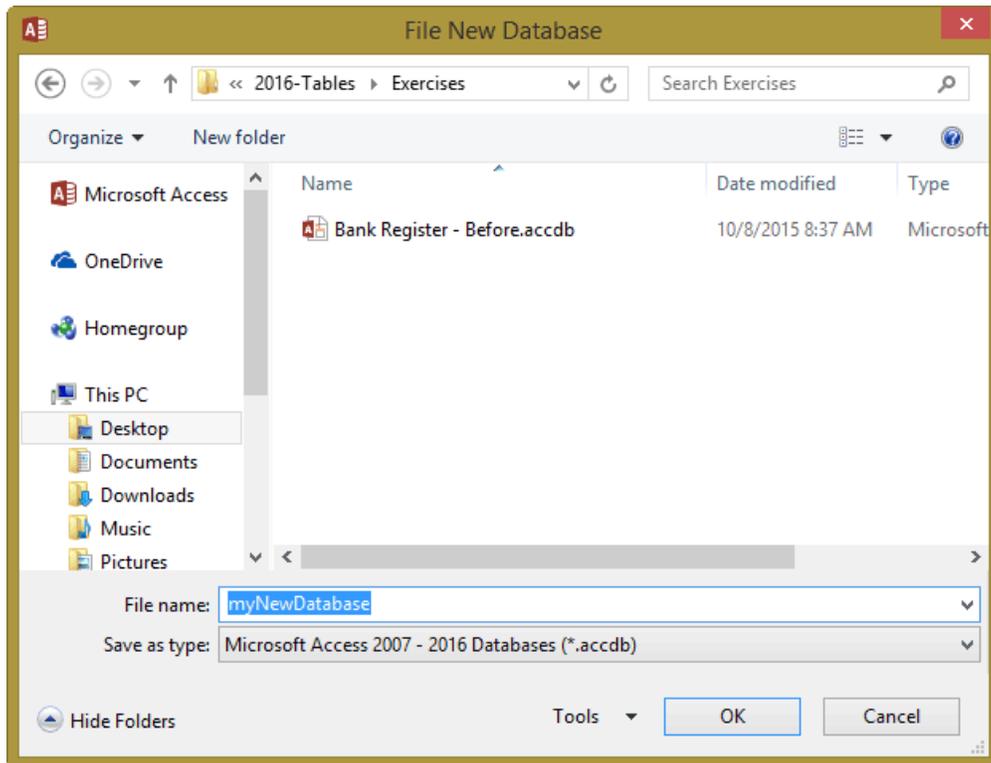


2. Click **Blank desktop database**.

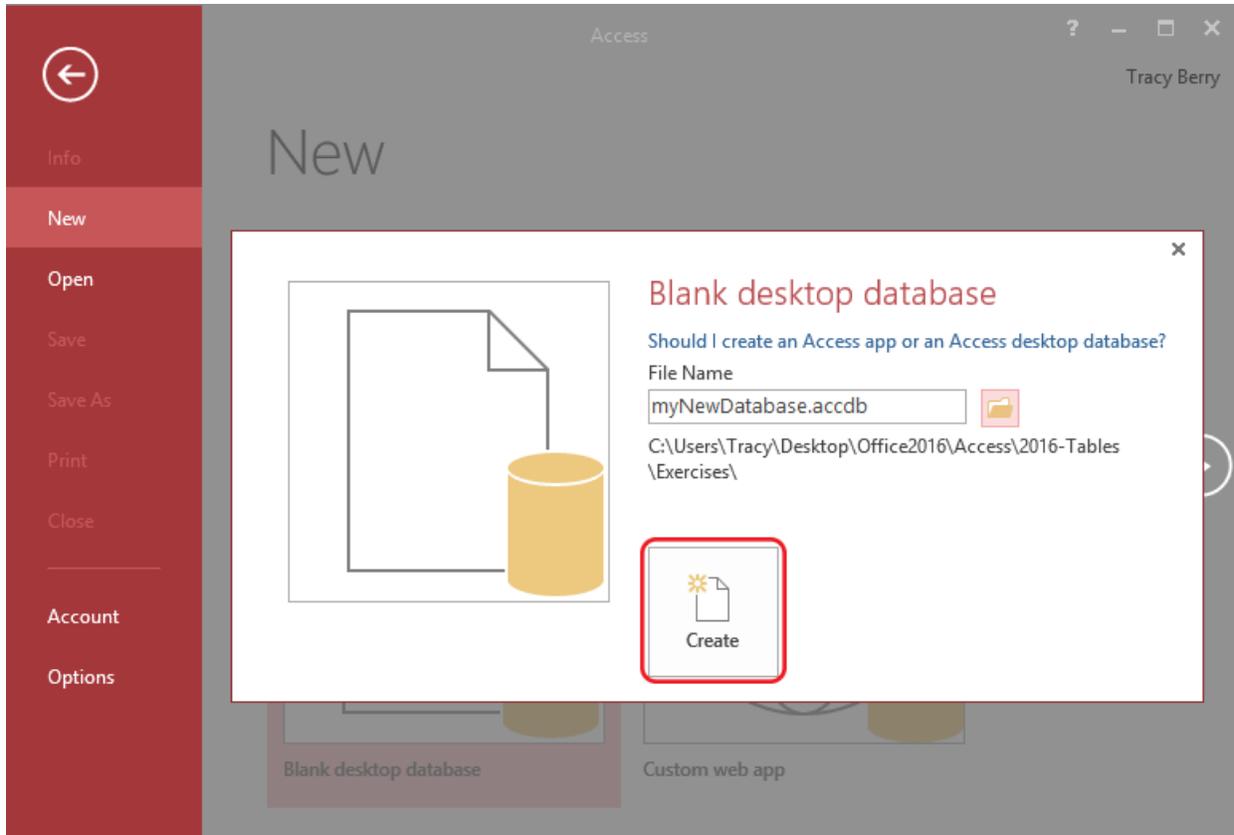


3. In the **File Name** field, type a name for the new database.
4. To save to a different location than the default saving location, click the folder icon. The **File New Database** dialog opens.

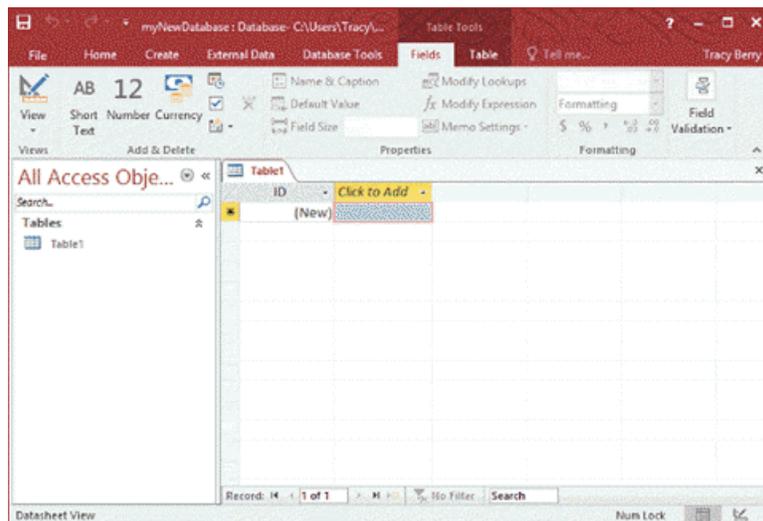
5. Navigate to and select the folder where you want to save the database file.



6. Click **OK**.



7. Click **Create**. Access opens the new database file and creates a blank table for you.



## Exercise 6: Creating a New Database

 15 to 25 minutes

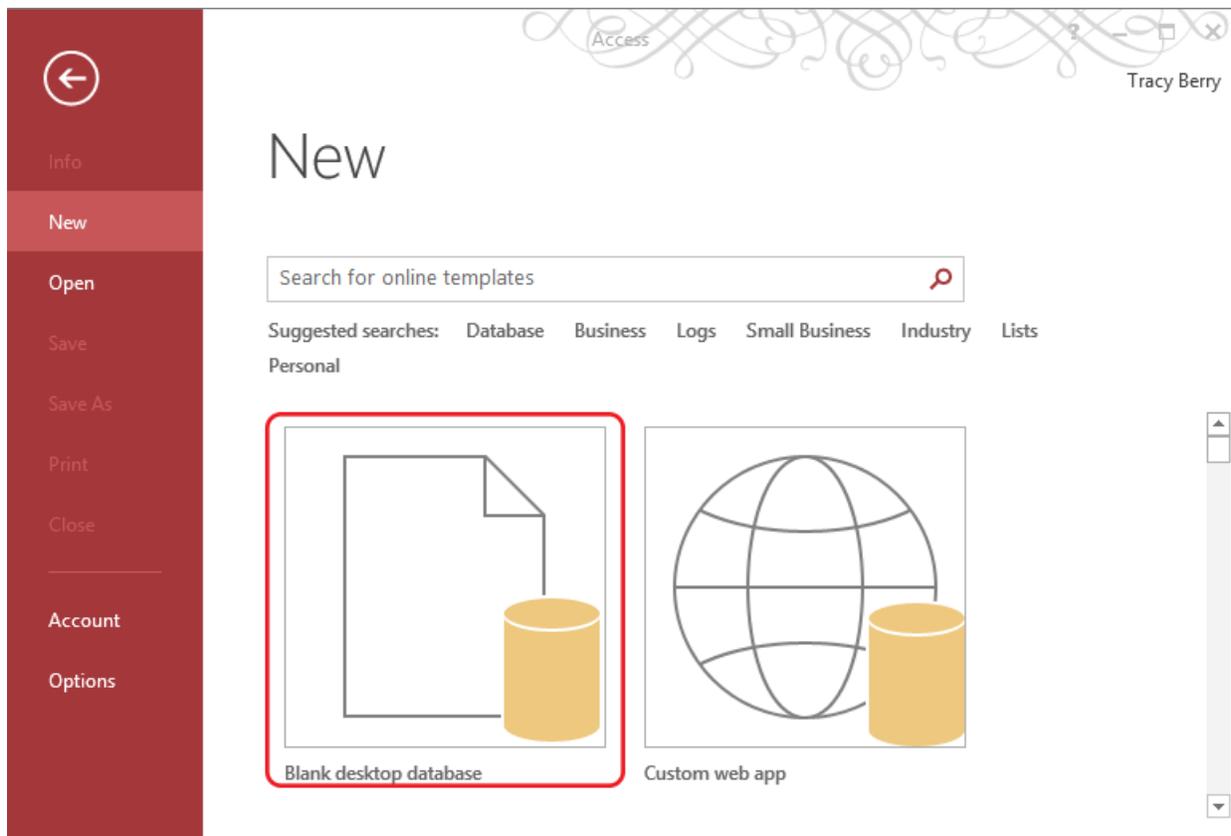
---

In this exercise, you will create a database using the blank database template. Save the database in your `.../ClassFiles/Tables/Exercises` folder and name it “Bank Register.accdb”.

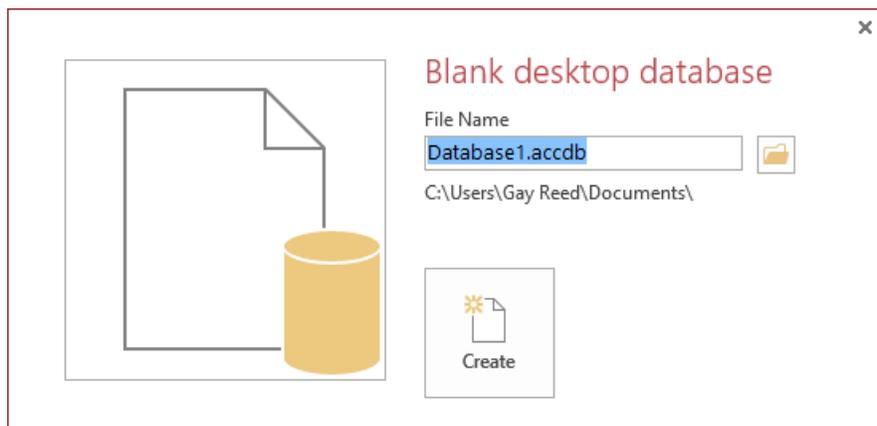
## Solution

To create the database:

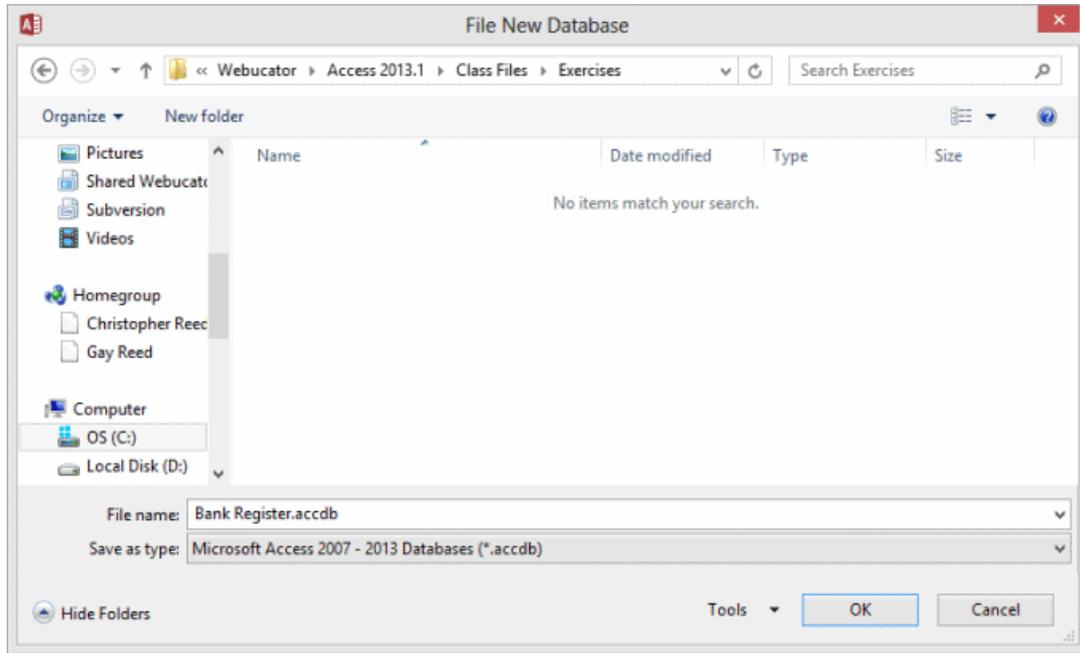
1. Start Access.



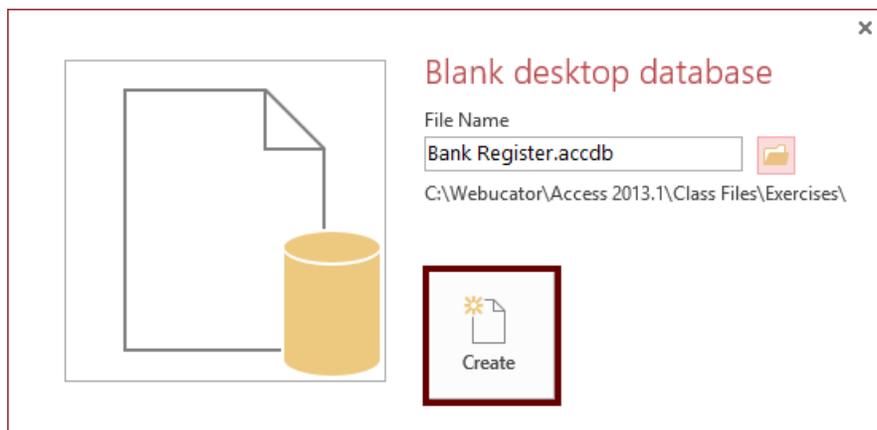
2. Click **Blank desktop database**.



3. In the **File Name** field, type “Bank Register.accdb”.
4. Click the folder icon and navigate to and select the folder where you want to save the database file.



5. Click **OK**.



6. Click **Create**. Your new database opens.



## 4.2. Data Types

When we create tables, Access allows us to specify the kind of data that will be stored in each column. This lets us take advantage of robust features like data validation and built-in functions that enhance the reliability of data entry and output. The following table summarizes the data types available.

<b>Data Type</b>	<b>Description</b>
Short text	Alphanumeric text (letters and/or numbers) up to 255 characters.
Long text	Alphanumeric text that can exceed 255 characters.
Number	Numbers
Date/Time	Dates and times
Currency	Monetary amounts
AutoNumber	Unique numbers generated by Access to identify new records.
Yes/No	For data that is either true or false. Access stores false values as the number 0 and true values as -1.
OLE object	Objects from other Windows applications.
Hyperlink	A link to a file or location on the Internet, on a network, or on the user's computer.
Attachment	A file such as a document, spreadsheet, or image. While the number of attachments per record is theoretically unlimited, the total size of attachments is limited by the maximum database size.
Calculated	An expression that brings together data from one or more fields.

# Exercise 7: Determining Data Types

 5 to 15 minutes

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In this exercise, you will assign data types to the columns in a table.

Open `.../ClassFiles/Tables/Exercises/Exercise - Contacts Table.pdf`. Which data type would you assign to each column in the Contacts table? Explain your choices for the Zip and Cell columns.

## Solution

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Suggested data types:

Column	Data Type
Contact ID	AutoNumber
Last Name	Short text
First Name	Short text
MI	Short text
Address	Short text
City	Short text
State	Short text
Zip	Short text
Cell	Short text
Birthdate	Date/Time
Relative?	Yes/No

Evaluation  
Copy

While the Zip and Cell columns store numbers, the numbers cannot be used in any meaningful computations; therefore, storing them as text is sufficient.



### 4.3. Create a Table in Design View

We'll use the Contacts table from the last exercise to demonstrate how to create a table in Design view. It is often helpful to add a Table **Description** of the general purpose and topic for each table in **Design View** using the **Properties Sheet**.

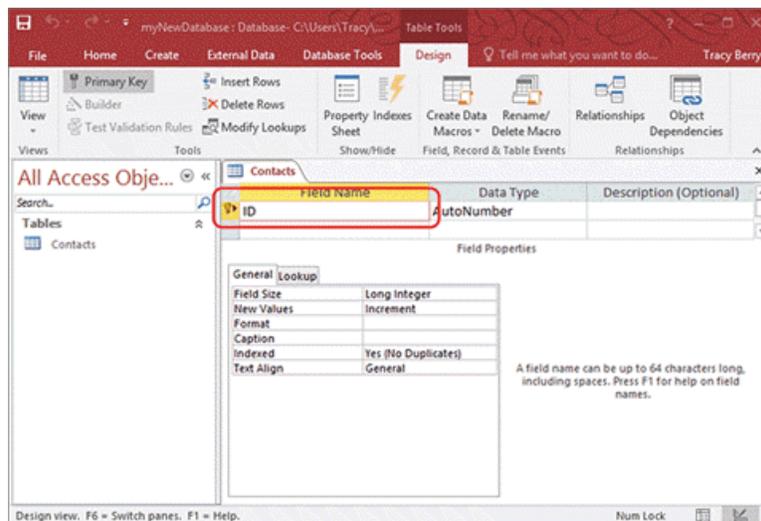
### Property Sheet

Selection type: Table Properties

General	
Read Only When Disconnect	No
Subdatasheet Expanded	No
Subdatasheet Height	0"
Orientation	Left-to-Right
Description	List of Music
Default View	Datasheet
Validation Rule	
Validation Text	
Filter	{([Recordings].[Format]=
Order By	
Subdatasheet Name	[Auto]
Link Child Fields	
Link Master Fields	
Filter On Load	No
Order By On Load	Yes

To create the table in Design view:

1. Open the database. (For this demonstration, we'll use "My New Database.accdb".)
2. Create a new table by clicking **Create > Tables > Table**.
3. In the **Navigation Pane**, Table1 should be open on the work surface.
4. On the **Home** tab, in the **Views** group, click . Name the table **Contacts**, click **OK**. Notice that the ID field that Access automatically created is carried over for you. We'll keep the field but rename it.

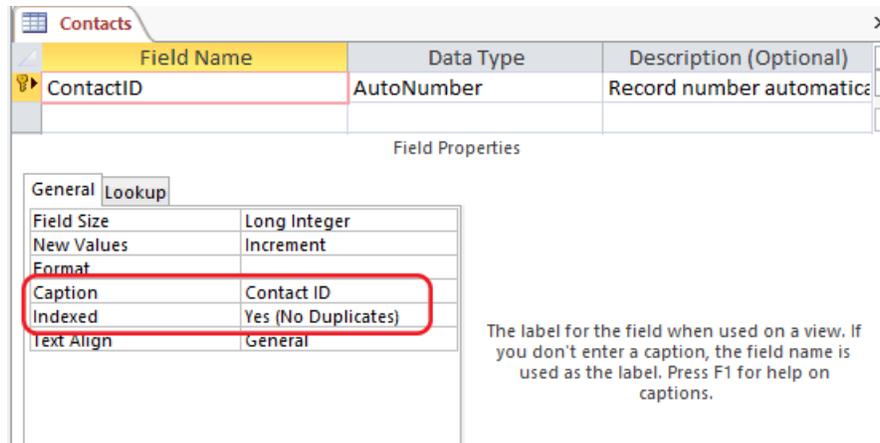


5. In the **Field Name** column in the first row, rename the field "ContactID".

## Note

When naming the columns of a table, it is good practice to leave out any spaces in the name. Typically, an application developer will ignore the spaces or replace them with underscores (\_). While spaces are allowed, field names with spaces must be enclosed in quotation marks when referenced in SQL statements or VBA code.

6. In the **Data Type** column, accept the default of “AutoNumber”. The ContactID field will serve as our record ID, so we will allow Access to automatically generate it for us.
7. The **Description** field is optional. However, since the description will display in the status bar for our users, it is good practice to give them a hint about the field. For the ContactID field, type “Record number automatically assigned by Access.”
  - Notice the key  to the left of the row. It denotes that the ContactID field is the primary key for the Contacts table. Since we started with a table that Access automatically created, the primary key is set for us by default; however, it can be changed if necessary.
  - To set a primary key, place your cursor in the row of the field you want to make the primary key and click **Primary Key** in the ribbon. The key  appears to the left of the primary key row.
  - We created the ContactID field for the purpose of serving as a unique key, so we will leave it as is.
8. In the **Field Properties** area, on the **General** tab, we will accept the defaults that Access recommends. However, we will provide our own caption. Earlier we recommended that you remove spaces from the field name. The caption is our opportunity to provide the label we want the users to see when this field appears on a form or report. In the **Caption** field, type “Contact ID”:



## The Indexed Property

Before we move on, a few words about the **Indexed** property are in order. An *index* holds the locations of records in the database using the fields which are indexed as points of reference. Access can create indexes on fields to speed up searching and sorting. While indexing improves searching and sorting performance, the tradeoff comes in slower performance when updating the database. For this reason, you should be selective in choosing the fields you want Access to index, giving preference to fields that users are most likely to need to perform searches on. Primary key fields should always be indexed.

There are three options for the **Indexed** property:

- No - An index will not be created for the field.
- Yes (Duplicates OK) - An index will be created. Duplicate values are allowed in the field.
- Yes (No Duplicates) - An index will be created. Values in the field must be unique.

Because key fields must be unique, the **Indexed** property should be set to “Yes (No Duplicates)”.

9. In the second row of the field definition area, enter the following information for the Last Name field:
  - **Field Name:** LastName





Field Name	Data Type	Description (Optional)
ContactID	AutoNumber	Record number automatically assigned by Access.
LastName	Short Text	Enter the contact's last name.
FirstName	Short Text	Enter the contact's first name.
MI	Short Text	Enter the contact's middle initial.

Field Properties

General		Lookup
Field Size	1	
Format		
Input Mask		
Caption	MI	
Default Value		
Validation Rule		
Validation Text		
Required	No	
Allow Zero Length	Yes	
Indexed	No	
Unicode Compression	Yes	
IME Mode	No Control	
IME Sentence Mode	None	
Text Align	General	

Alignment of text in control

- In the next row of the field definition area, enter the following information for the Address field:
  - Field Name:** Address
  - Data Type:** Short Text
  - Description:** Enter the street number and street name of the contact's address.
- In the **Field Properties** area, on the **General** tab, make the following entries:
  - Field Size:** 30
  - Caption:** Address

Field Name	Data Type	Description (Optional)
ContactID	AutoNumber	Record number automatically assigned by Access.
LastName	Short Text	Enter the contact's last name.
FirstName	Short Text	Enter the contact's first name.
MI	Short Text	Enter the contact's middle initial.
Address	Short Text	Enter the contact's street number and street name.

Field Properties

General		Lookup
Field Size	30	←
Format		
Input Mask		
Caption	Address	←
Default Value		
Validation Rule		
Validation Text		
Required	No	
Allow Zero Length	Yes	
Indexed	No	
Unicode Compression	Yes	
IME Mode	No Control	
IME Sentence Mode	None	
Text Align	General	

Alignment of text in control

17. In the next row of the field definition area, enter the following information for the City field:

- **Field Name:** City
- **Data Type:** Short Text
- **Description:** Enter the city of the contact's address.

18. In the **Field Properties** area, on the **General** tab, make the following entries:

- **Field Size:** 25
- **Caption:** City

Field Name	Data Type	Description (Optional)
ContactID	AutoNumber	Record number automatically assigned by Access.
LastName	Short Text	Enter the contact's last name.
FirstName	Short Text	Enter the contact's first name.
MI	Short Text	Enter the contact's middle initial.
Address	Short Text	Enter the contact's street number and street name.
City	Short Text	Enter the city of the contact's address.

Field Properties

General	Lookup
Field Size	25
Format	
Input Mask	
Caption	City
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes
Indexed	No
Unicode Compression	Yes
IME Mode	No Control
IME Sentence Mode	None
Text Align	General

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

19. In the next row of the field definition area, enter the following information for the State field:
  - **Field Name:** State
  - **Data Type:** Short Text
  - **Description:** Enter the two-character state abbreviation of the contact's address.
  
20. In the **Field Properties** area, on the **General** tab, make the following entries:
  - **Field Size:** 2
  - **Caption:** State

Field Name	Data Type	Description (Optional)
ContactID	AutoNumber	Record number automatically assigned by Access.
LastName	Short Text	Enter the contact's last name.
FirstName	Short Text	Enter the contact's first name.
MI	Short Text	Enter the contact's middle initial.
Address	Short Text	Enter the contact's street number and street name.
City	Short Text	Enter the city of the contact's address.
State	Short Text	Enter the two-character state abbreviation of the contact.

Field Properties

General	Lookup
Field Size	2
Format	
Input Mask	
Caption	State
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes
Indexed	No
Unicode Compression	Yes
IME Mode	No Control
IME Sentence Mode	None
Text Align	General

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

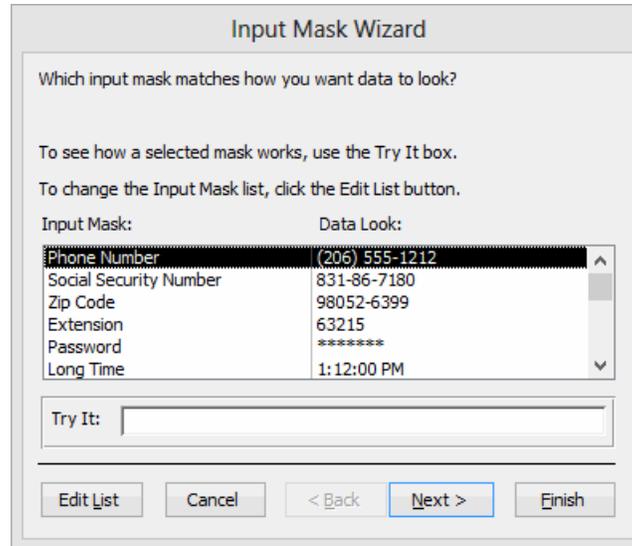


21. In the next row of the field definition area, enter the following information for the Zip field:

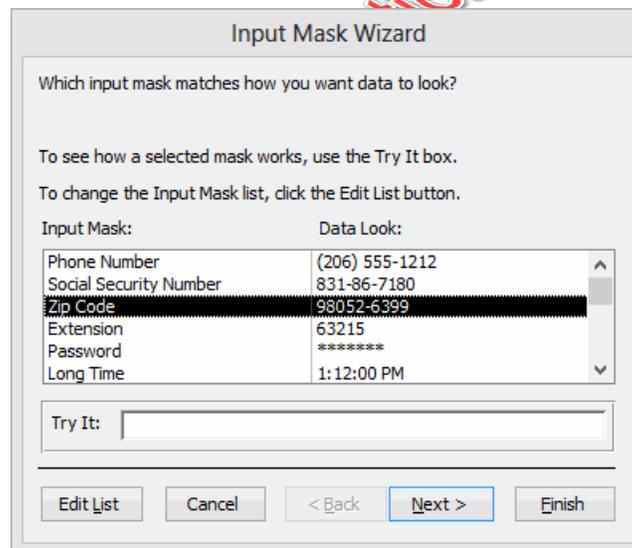
- **Field Name:** Zip
- **Data Type:** Short Text
- **Description:** Enter the contact's zip code.

22. In the **Field Properties** area, on the **General** tab, make the following entries:

- **Field Size:** 9
- **Input Mask:** 00000/-9999;:\_
  - An *input mask* assists users with data input by applying formatting as they type.
  - To define an input mask for a zip code field:
    1. Click the  ellipsis button in the **Input Mask** field.
    2. When prompted to save the table, click **Yes**. The **Input Mask Wizard** starts.



3. In the list box, highlight the Zip Code mask.



**Tip:** To verify that the mask is the one you need, you can type a value in the **Try It** field to simulate the behavior of the mask.

4. Click **Next >**.

Input Mask Wizard

Do you want to change the input mask?

Input Mask Name: Zip Code

Input Mask: 00000-9999

What placeholder character do you want the field to display?  
Placeholders are replaced as you enter data into the field.

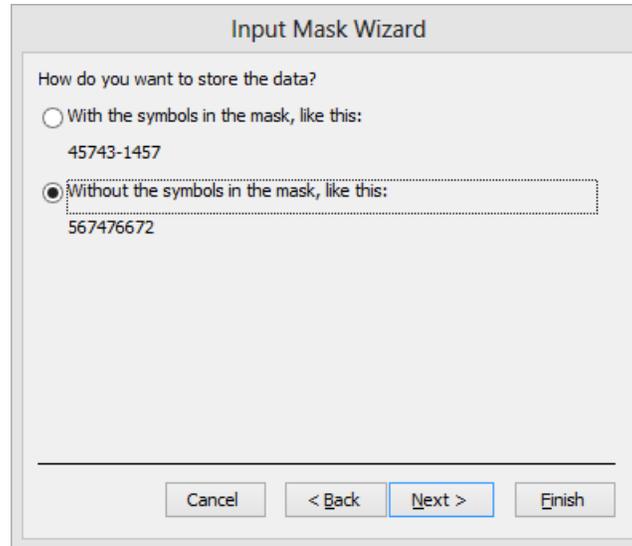
Placeholder character: -

Try It:

Cancel < Back Next > Finish

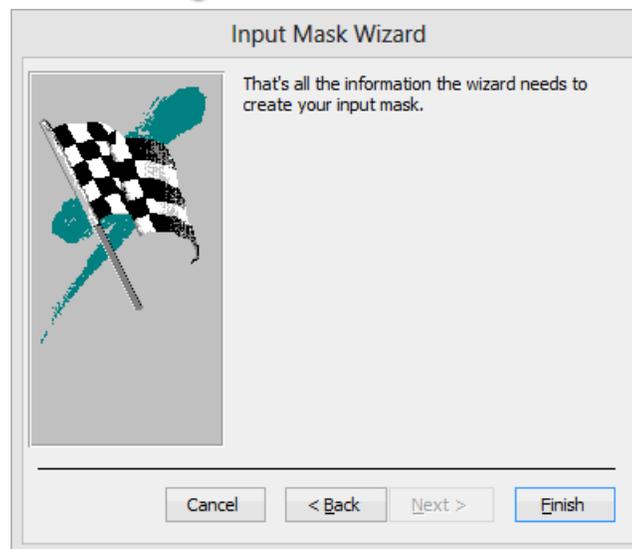


- The **Input Mask** field gives you the opportunity to make changes to the layout of the mask. For the Zip Code mask, 0s represent required entries and 9s represent optional entries. For example, if we don't need to allow Zip+4 zip codes, we could change the mask to "00000".
  - The **Placeholder character** field allows you to select the character which displays as users input values in the field. If you want to change the placeholder, select a different placeholder from the drop-down list.
5. After you make the changes you want, click **Next >**.



You can store zip codes with or without the dash. Saving without the dash represents a savings in disk space. However, if you find it more meaningful to view the data in the table in formatted form, you may want to save the data with the dash. If you store the dash, ensure that the field size is large enough to accommodate it.

6. Click **Next >**.



7. Click **Finish**.

- **Caption:** Zip

Field Name	Data Type	Description (Optional)
ContactID	AutoNumber	Record number automatically assigned by Access.
LastName	Short Text	Enter the contact's last name.
FirstName	Short Text	Enter the contact's first name.
MI	Short Text	Enter the contact's middle initial.
Address	Short Text	Enter the contact's street number and street name.
City	Short Text	Enter the city of the contact's address.
State	Short Text	Enter the two-character state abbreviation of the contact.
Zip	Short Text	Enter the contact's zip code.

Field Properties

General	Lookup
Field Size	9
Format	
Input Mask	00000\;9999;_
Caption	Zip
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes
Indexed	No
Unicode Compression	Yes
IME Mode	No Control
IME Sentence Mode	None
Text Align	General

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

23. In the next row of the field definition area, enter the following information for the Cell field:

- **Field Name:** Cell
- **Data Type:** Short Text
- **Description:** Enter the contact's cell phone number.

24. In the **Field Properties** area, on the **General** tab, make the following entries:

- **Field Size:** 10
- **Input Mask:** !/(999“) "000/-0000;\_
  - To define a mask for the cell phone number:
    1. Click the  ellipsis button in the **Input Mask** field.
    2. At the prompt to save the table, click **Yes**. The **Input Mask Entry** wizard starts.
    3. Highlight the Phone Number mask and click **Next >**.

**Input Mask Wizard**

Do you want to change the input mask?

Input Mask Name: Phone Number

Input Mask: !(999) 000-0000

What placeholder character do you want the field to display?  
Placeholders are replaced as you enter data into the field.

Placeholder character: \_

Try It:

Notice that the phone number mask is preceded by an exclamation mark (!). This indicates that the mask should fill from left to right instead of right to left.

**Data fills from right to left**

Amount

**Data fills from left to right**

Cell

The area code portion of the phone number is set to “999”. If you want to require an area code in every cell phone number, you can change this part of the mask to “000”.

4. Click **Next >**.
5. Select how to store cell phone numbers in the database, then click **Next >**.
6. Click **Finish**.

- **Caption: Cell**

Field Name	Data Type	Description (Optional)
ContactID	AutoNumber	Record number automatically assigned by Access.
LastName	Short Text	Enter the contact's last name.
FirstName	Short Text	Enter the contact's first name.
MI	Short Text	Enter the contact's middle initial.
Address	Short Text	Enter the contact's street number and street name.
City	Short Text	Enter the city of the contact's address.
State	Short Text	Enter the two-character state abbreviation of the contact.
Zip	Short Text	Enter the contact's zip code.
Cell	Short Text	Enter the contact's cell phone number.

Field Properties

General	Lookup
Field Size	10
Format	
Input Mask	!(999) 000\0000;_
Caption	Cell
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes
Indexed	No
Unicode Compression	Yes
IME Mode	No Control
IME Sentence Mode	None
Text Align	General

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

25. In the next row of the field definition area, enter the following information for the Birthdate field:

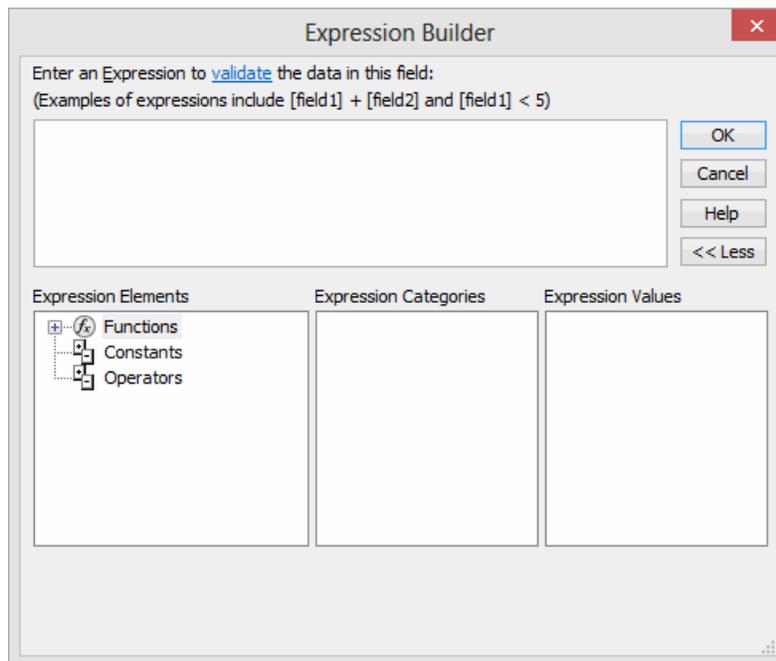
- **Field Name:** Birthdate
- **Data Type:** Date/Time
- **Description:** Enter the contact's date of birth.

26. In the **Field Properties** area, on the **General** tab, make the following entries:

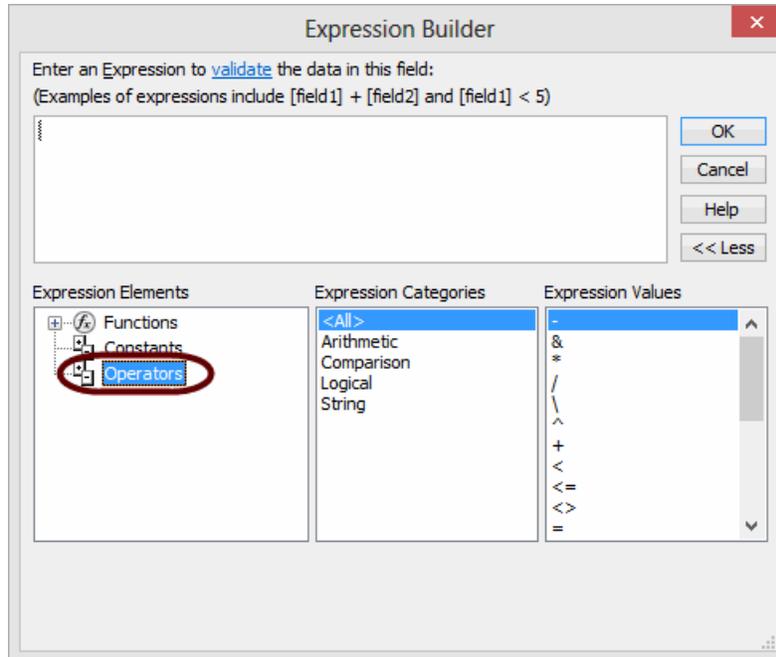
- **Format:** Short Date. Select the date format from the drop-down list.

Format	General Date	11/12/2015 5:34:23 PM
Input Mask	Long Date	Thursday, November 12, 2015
Caption	Medium Date	12-Nov-15
Default Value	Short Date	11/12/2015
Validation Rule	Long Time	5:34:23 PM
Validation Text	Medium Time	5:34 PM
Required	Short Time	17:34
Indexed		
IME Mode	No Control	
IME Sentence Mode	None	
Text Align	General	
Show Date Picker	For dates	

- **Caption:** Birthdate
- **Validation Rule:**  $\geq \text{Now}()$  We can ensure that a user doesn't accidentally enter a future date in this date field. To do this, we'll use the **Expression Builder** to define a rule that the database will check against to decide if an entry is valid. We will create an expression that checks that the date entered is less than or equal to the current date and time.
  - To create the validation rule:
    1. Click the  ellipsis button in the **Validation Rule** field. The **Expression Builder** opens.

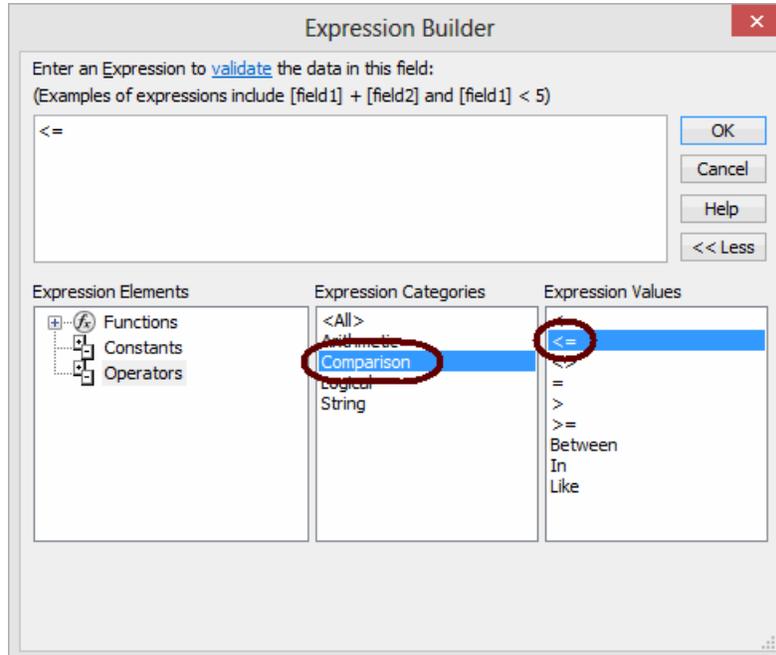


2. In the **Expression Elements** list box, highlight **Operators**.

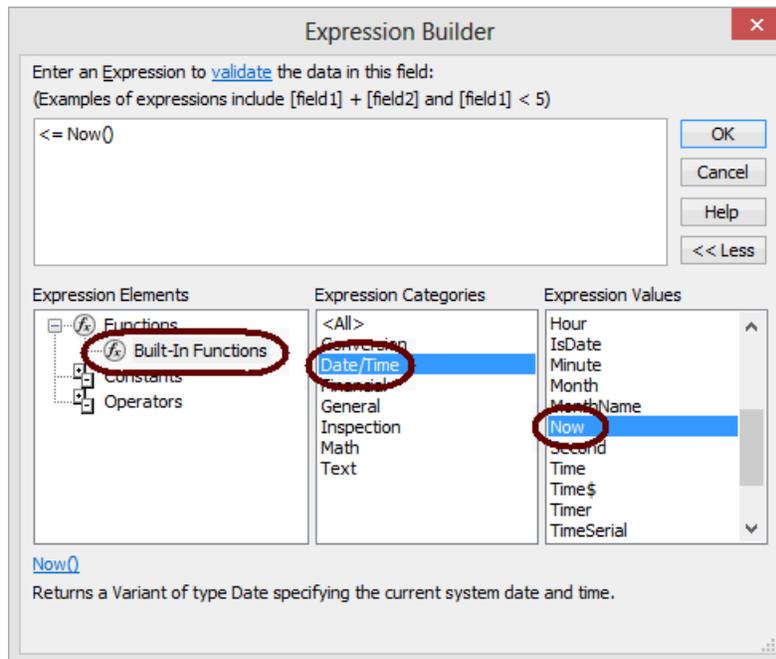


3. In the **Expression Categories** list box, highlight **Comparison**.

4. In the **Expression Values** list box, double-click **>=**.



5. Next, in the **Expression Elements** list box, expand the **Functions** branch and highlight **Built-In Functions**.
6. In the **Expression Categories** list box, highlight **Date/Time**.
7. In the **Expression Values** list box, double-click **Now**.



8. Click **OK**. The expression loads in the **Validation Rule** field.
- **Validation Text:** The date must be prior to the current date. This is the text of the message that displays to the user if an invalid date is entered.
  - **Show Date Picker:** Select “For dates” if you want the field to include a calendar control that users can use to select a date. Otherwise, select “Never”.

Field Name	Data Type	Description (Optional)
ContactID	AutoNumber	Record number automatically assigned by Access.
LastName	Short Text	Enter the contact's last name.
FirstName	Short Text	Enter the contact's first name.
MI	Short Text	Enter the contact's middle initial.
Address	Short Text	Enter the contact's street number and street name.
City	Short Text	Enter the city of the contact's address.
State	Short Text	Enter the two-character state abbreviation of the contact.
Zip	Short Text	Enter the contact's zip code.
Cell	Short Text	Enter the contact's cell phone number.
Birthdate	Date/Time	Enter the contact's date of birth.

Field Properties

General		Lookup
Format	Short Date	←
Input Mask		
Caption	Birthdate	←
Default Value		
Validation Rule	<=Now()	←
Validation Text	The date must be prior to the current date.	←
Required	No	
Indexed	No	
IME Mode	No Control	
IME Sentence Mode	None	
Text Align	General	
Show Date Picker	For dates	←

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

27. In the next row of the field definition area, enter the following information for the Relative field:
  - **Field Name:** Relative
  - **Data Type:** Yes/No
  - **Description:** Mark the check box if the contact is a relative.
  
28. In the **Field Properties** area, on the **General** tab, make the following entries:
  - **Format:** Yes/No
  - **Caption:** Relative
  - **Default Value:** No. Generally speaking, you should set the **Default Value** property to the more likely value. In this case, we're assuming that more contacts will be non-relatives than relatives.

Field Name	Data Type	Description (Optional)
ContactID	AutoNumber	Record number automatically assigned by Access.
LastName	Short Text	Enter the contact's last name.
FirstName	Short Text	Enter the contact's first name.
MI	Short Text	Enter the contact's middle initial.
Address	Short Text	Enter the contact's street number and street name.
City	Short Text	Enter the city of the contact's address.
State	Short Text	Enter the two-character state abbreviation of the contact.
Zip	Short Text	Enter the contact's zip code.
Cell	Short Text	Enter the contact's cell phone number.
Birthdate	Date/Time	Enter the contact's date of birth.
Relative	Yes/No	Mark the checkbox if the contact is your relative.

Field Properties

General	Lookup
Format	Yes/No
Caption	Relative
Default Value	No
Validation Rule	
Validation Text	
Indexed	No
Text Align	General

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

EVALUATION COPY

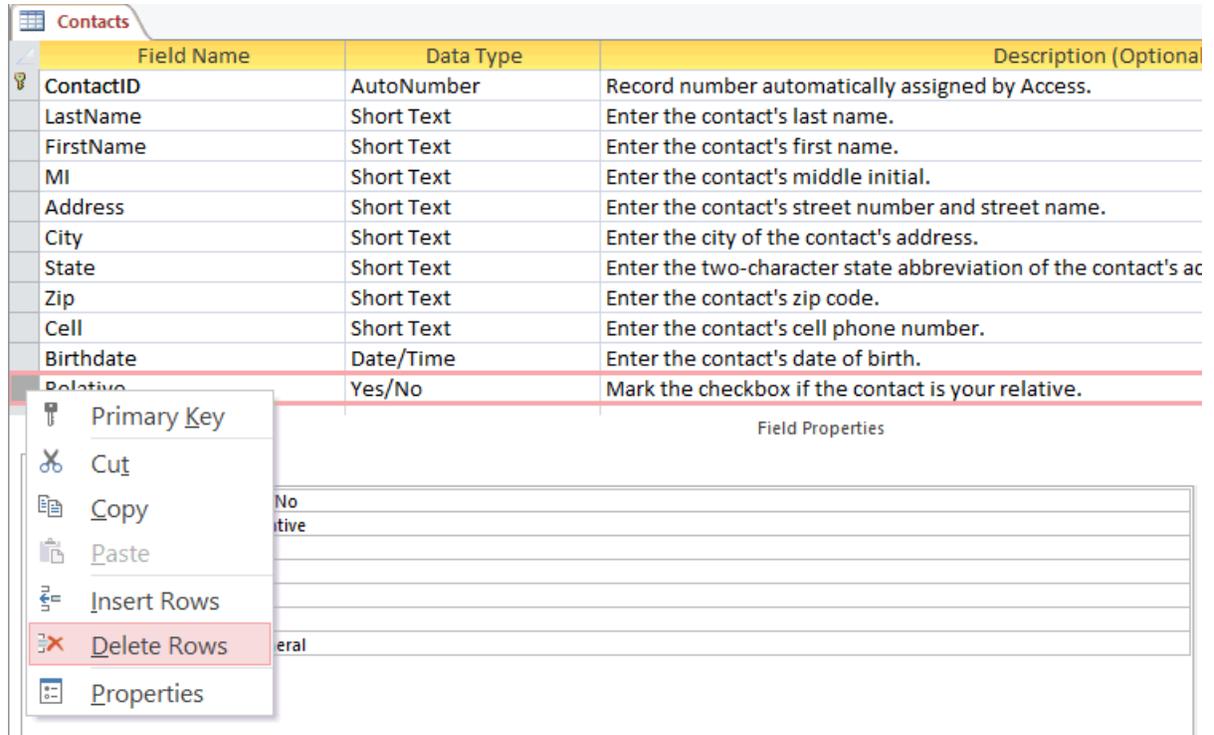
29. Select the **Lookup** tab.
30. In the **Display Control** field, select the type of control to use for the Relative field. Your options are:
  - Check Box - Users will mark or clear a check box.
  - Text Box - Users will type a value in a text field.
  - Combo Box - Users will select a value from a drop-down list.

General	Lookup
Display Control	Check Box

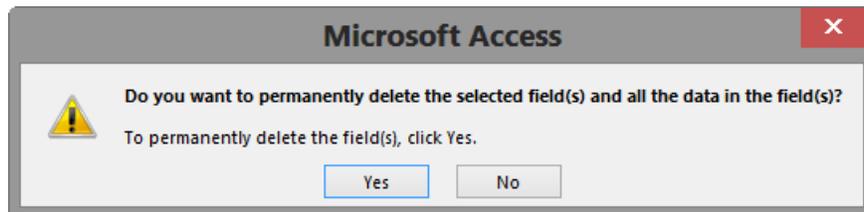
31. Save your changes.
32. Close the table.
33. Rename the table to "Contacts".

### ❖ 4.3.1. Delete a Field

When a field is deleted, the data will be removed, and there is no way to recover the data.

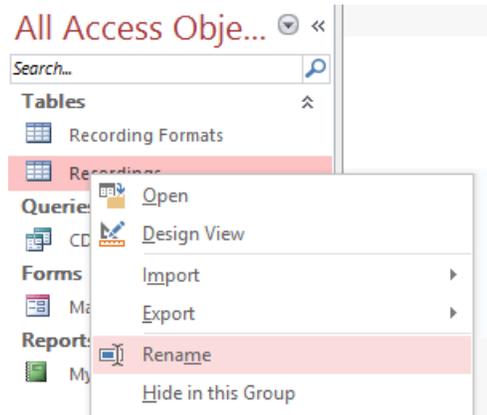


If there are records, then you will be warned about the permanent deletion.



## ❖ 4.3.2. Rename a Table

There will be times when you must rename a table. Before you do, please be aware that any objects that are dependent on the Table will need to be updated as well. Access does not rename references for you as other technologies do.



1. Right-click the table that you wish to rename.
2. Choose **Rename**.
3. Type the new name and hit the **Enter** key to confirm the name.

### Undo

Note that you will have a chance to **CTRL+Z** to undo right away.

## Exercise 8: Creating a Table in Design View

### View

 15 to 45 minutes

---

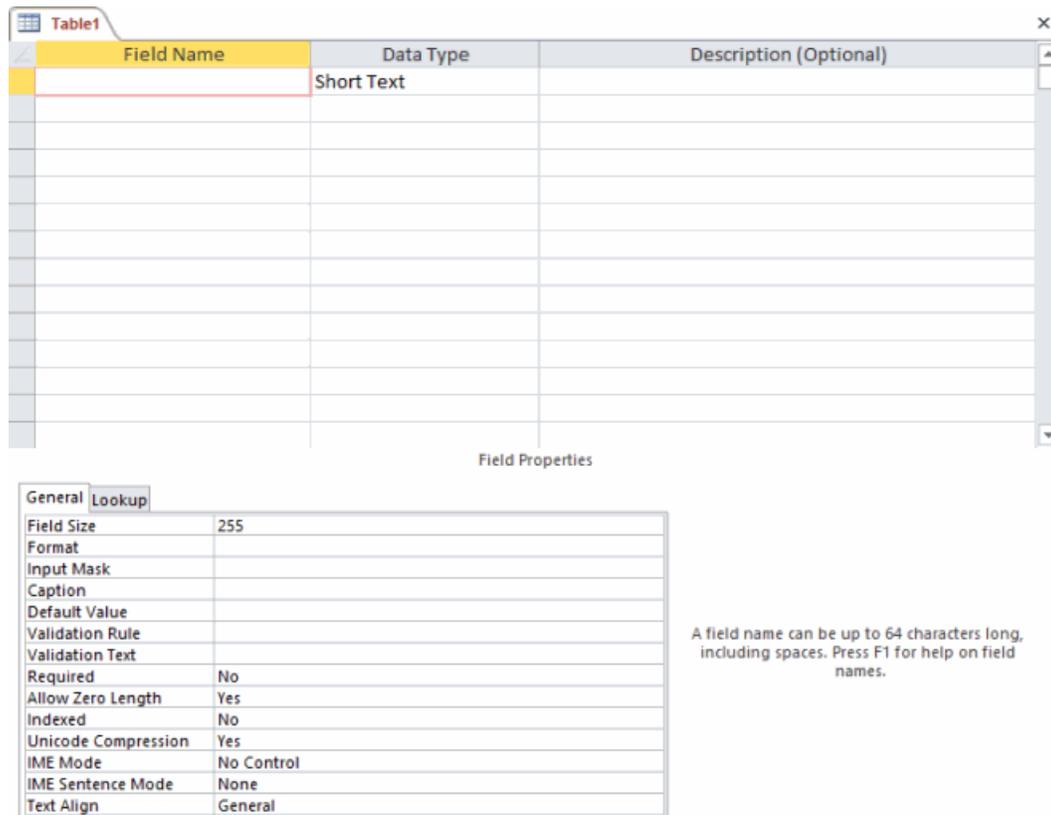
Create a Transactions table in the Bank Register - Before.accdb database located in your .../ClassFiles/Tables/Exercises/Bank Register - Before.accdb folder. Refer to the sample Transactions table in the Exercise - Transactions.pdf file located in the same folder. Make the Trans ID field the primary key.

## Solution

---

To create the Transactions table:

1. Open the database.
2. On the **Create** tab, click **Table Design**. Table1 opens in Design view.



3. In the first row of the field definition area, enter the following information for the Trans ID field:
  - **Field Name:** TransID
  - **Data Type:** AutoNumber
  - **Description:** Record number automatically assigned by Access.
4. To make the TransID field the primary key, ensure your cursor is in the TransID row and click **Primary Key** in the ribbon. Notice that the  key appears to the left of the row.
5. In the **Field Properties** area, on the **General** tab, make the following entry:
  - **Caption:** Trans ID





Field Name	Data Type	Description (Optional)
TransID	AutoNumber	Record number automatically assigned by Access.
Code	Short Text	Enter a transaction code or check number.
Credit	Yes/No	Mark this checkbox if this is a credit transaction.

Field Properties

General	Lookup
Format	Yes/No
Caption	Credit
Default Value	No
Validation Rule	
Validation Text	
Indexed	No
Text Align	General

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

10. In the next row of the field definition area, enter the following information for the Date field:
  - **Field Name:** TransDate (We are using TransDate instead of “Date” because Access considers “Date” a reserved word.)
  - **Data Type:** Date/Time
  - **Description:** Enter the transaction date.
  
11. In the **Field Properties** area, on the **General** tab, make the following entries:
  - **Format:** Short Date
  - **Caption:** Date
  - **Required:** Yes

Field Name	Data Type	Description (Optional)
TransID	AutoNumber	Record number automatically assigned by Access.
Code	Short Text	Enter a transaction code or check number.
Credit	Yes/No	Mark this checkbox if this is a credit transaction.
TransDate	Date/Time	Enter the transaction date.

Field Properties

General	Lookup
Format	Short Date ←
Input Mask	
Caption	Date ←
Default Value	
Validation Rule	
Validation Text	
Required	Yes ←
Indexed	No
IME Mode	No Control
IME Sentence Mode	None
Text Align	General
Show Date Picker	For dates

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

- In the next row of the field definition area, enter the following information for the Description field:
  - Field Name:** Description
  - Data Type:** Short Text
  - Description:** Enter the payee or a description of the transaction.
- In the **Field Properties** area, on the **General** tab, make the following entries:
  - Field Size:** 50
  - Caption:** Description
  - Required:** Yes

Field Name	Data Type	Description (Optional)
TransID	AutoNumber	Record number automatically assigned by Access.
Code	Short Text	Enter a transaction code or check number.
Credit	Yes/No	Mark this checkbox if this is a credit transaction.
TransDate	Date/Time	Enter the transaction date.
Description	Short Text	Enter the payee or a description of the transaction.

Field Properties

General		Lookup
Field Size	50	←
Format		
Input Mask		
Caption	Description	←
Default Value		
Validation Rule		
Validation Text		
Required	Yes	←
Allow Zero Length	Yes	
Indexed	No	
Unicode Compression	Yes	
IME Mode	No Control	
IME Sentence Mode	None	
Text Align	General	

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

- In the next row of the field definition area, enter the following information for the Amount field:
  - Field Name:** Amount
  - Data Type:** Currency
  - Description:** Enter the amount of the transaction.
- In the **Field Properties** area, on the **General** tab, make the following entries:
  - Caption:** Amount
  - Required:** Yes

Field Name	Data Type	Description (Optional)
TransID	AutoNumber	Record number automatically assigned by Access.
Code	Short Text	Enter a transaction code or check number.
Credit	Yes/No	Mark this checkbox if this is a credit transaction.
TransDate	Date/Time	Enter the transaction date.
Description	Short Text	Enter the payee or a description of the transaction.
Amount	Currency	Enter the amount of the transaction.

Field Properties

General	Lookup
Format	Currency
Decimal Places	Auto
Input Mask	
Caption	Amount 
Default Value	0
Validation Rule	
Validation Text	
Required	Yes 
Indexed	No
Text Align	General

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

- In the next row of the field definition area, enter the following information for the Memo field:
  - Field Name:** Memo
  - Data Type:** Short Text
  - Description:** Enter a memo about the transaction (optional).
- In the **Field Properties** area, on the **General** tab, make the following entries:
  - Field Size:** 40
  - Caption:** Memo

Field Name	Data Type	Description (Optional)
TransID	AutoNumber	Record number automatically assigned by Access.
Code	Short Text	Enter a transaction code or check number.
Credit	Yes/No	Mark this checkbox if this is a credit transaction.
TransDate	Date/Time	Enter the transaction date.
Description	Short Text	Enter the payee or a description of the transaction.
Amount	Currency	Enter the amount of the transaction.
Memo	Short Text	Enter a memo about the transaction (optional).

Field Properties

General		Lookup
Field Size	40	←
Format		
Input Mask		
Caption	Memo	←
Default Value		
Validation Rule		
Validation Text		
Required	No	
Allow Zero Length	Yes	
Indexed	No	
Unicode Compression	Yes	
IME Mode	No Control	
IME Sentence Mode	None	
Text Align	General	

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.

18. In the next row of the field definition area, enter the following information for the Cleared field:
  - **Field Name:** Cleared
  - **Data Type:** Yes/No
  - **Description:** Mark the check box if the transaction has cleared the bank.
  
19. In the **Field Properties** area, on the **General** tab, make the following entry:
  - **Caption:** Cleared

Field Name	Data Type	Description (Optional)
TransID	AutoNumber	Record number automatically assigned by Access.
Code	Short Text	Enter a transaction code or check number.
Credit	Yes/No	Mark this checkbox if this is a credit transaction.
TransDate	Date/Time	Enter the transaction date.
Description	Short Text	Enter the payee or a description of the transaction.
Amount	Currency	Enter the amount of the transaction.
Memo	Short Text	Enter a memo about the transaction (optional).
Cleared	Yes/No	Mark this checkbox if the transaction has cleared the ba

Field Properties

General		Lookup
Format	Yes/No	
Caption	Cleared	←
Default Value	No	
Validation Rule		
Validation Text		
Indexed	No	
Text Align	General	

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.



20. Save the table.
21. Close the table.
22. Rename the table "Transactions".

## Conclusion

In this lesson, you learned:

- To create a blank database.
- To create a table in Design view.
- About the data types supported by Access.
- To set a primary key.
- To use the **Input Mask Wizard**.
- To use the **Expression Builder** to define validation rules.

# LESSON 5

## Queries

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### Topics Covered

- Queries and query views.
- Creating a simple query.

### Introduction

In this lesson, we'll focus on the database objects you can use to retrieve data from tables (queries).

For this lesson, open files located with your Webucator class files at `ClassFiles/Intro_Queries/Demos/`. If prompted concerning disabled content, click **Enable Content** in the yellow banner.

Evaluation  
\*  
Copy

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## 5.1. Queries

### ❖ 5.1.1. Definition and Purpose

A query is a way for you to describe what data you want to see and then have Access fetch that data and either return it to you or perform some action on that data. Queries are especially powerful because they can pull together data from multiple related tables and other queries. Queries are frequently used as the basis for data entry forms and for reports.

### ❖ 5.1.2. Types

The two main types of queries supported by Access are *select* queries and *action* queries.

#### Select Queries

A select query retrieves data from your database. Select queries can be used to perform calculations.

## Action Queries

An action query can add, change, or delete records in your database. An important caveat about action queries is that they cannot be reversed. You may want to consider backing up your data before performing an action query.

The types of action queries available in Access include:

**Make table** - Creates a new table using data from other tables in the database.

**Append** - Adds records to a table.

**Update** - Makes changes to records.

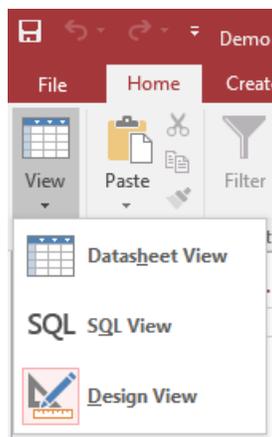
**Delete** - Removes records from a table.

### ❖ 5.1.3. Views

Similar to tables, queries have a Datasheet view and a Design view. In addition, queries have a SQL view that allows you to view the query statements that Access interprets to make the queries work. In fact, if you know SQL (Structured Query Language) you can write your own query statements directly in the SQL editor.

Open ClassFiles/Intro\_Queries/Demos/Demo - My Music Collection - Simple Select from Multiple Tables.accdb.

To switch among views for a query, select the **Home** tab, click the drop-down arrow below the **View** icon, and select the view you want from the drop-down menu.



## Datasheet View

The Datasheet view for queries resembles the Datasheet view for tables in most respects.

Title	Artist	Description
Right On	Count Basie and His Orchestra	78 RPM vinyl record
I Got a Name	Jim Croce	8-track tape
Smetana: Moldau, Overtures	Cleveland Orchestra	33 1/3 RPM vinyl record
A Hard Day's Night	Beatles	33 1/3 RPM vinyl record
The White Album	Beatles	Compact disc
I Remember Yesterday	Donna Summer	Cassette tape
Rachmaninov Piano Concerto 1 & 3	Cleveland Orchestra	Compact disc
Just a Dream	Carrie Underwood	MP3 file
Music of the Night	Alfie Boe	MP3 file
King of Swing!	Count Basie and His Orchestra	Compact disc
Pirates of Penzance	D'Oyly Carte Opera Company	33 1/3 RPM vinyl record
Skyfall	Adele	MP3 file

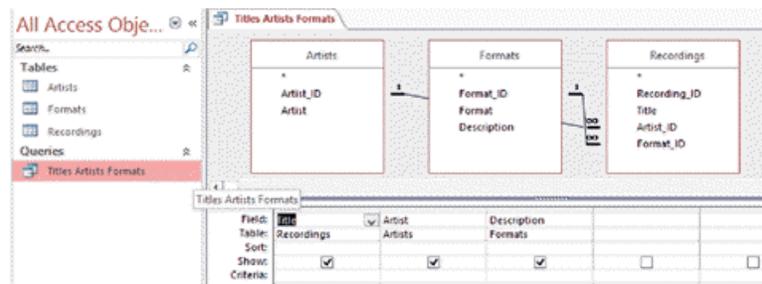
In fact, the procedures for selecting data, filtering, sorting, navigating, searching, adding new records, and editing records are the same.

To run a select query, you can simply open it in Datasheet view.

## Design View

The work of putting your data request into terms that Access can understand occurs in query Design view.

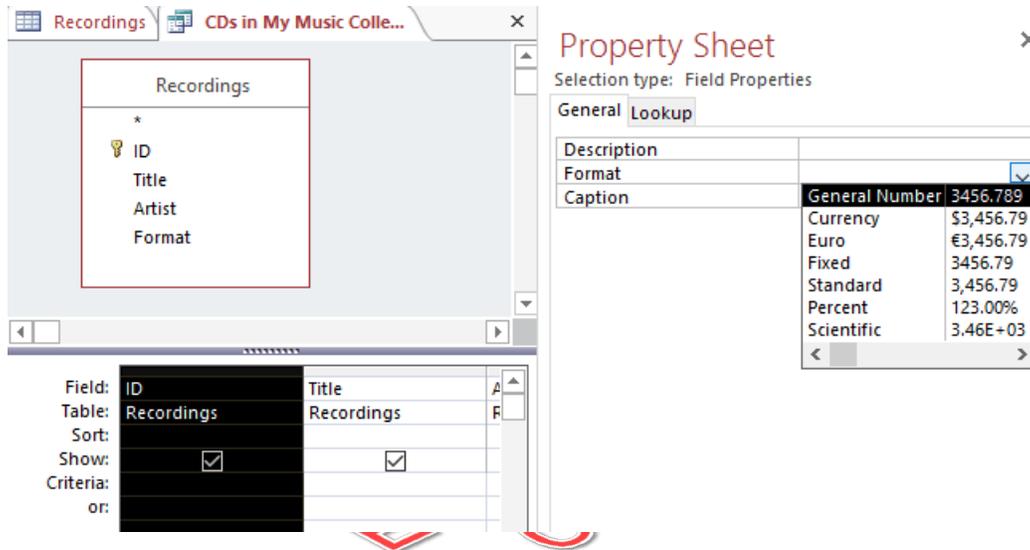
The query tab in Design view consists of two sections. The top section holds representations of the tables and queries you want to extract data from.



The bottom section is where you specify the data you want the query to return, how you want it sorted, and criteria for filtering the data.

Field:	Title	Artist	Description
Table:	Recordings	Artists	Formats
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:			
or:			

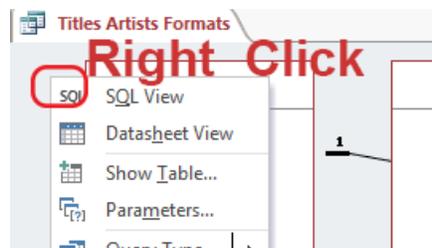
The Property Sheet allows you to set unique attributes for each item.



We will explore Design view in more depth in the advanced course.

## SQL View

As you set up a query in Design view, Access builds the equivalent SQL statements. You can see what those statements look like in SQL view by right-clicking and choosing **SQL View**.



Working with SQL statements is beyond the scope of this course; however, viewing the SQL code and familiarizing yourself with the syntax will deepen your understanding of how queries work.

```
Titles Artists Formats
SELECT Recordings.Title, Artists.Artist, Formats.Description
FROM Formats INNER JOIN (Artists INNER JOIN Recordings ON Artists.Artist_ID = Recordings.Artist_ID) ON Formats.Format_ID =
Recordings.Format_ID;
```



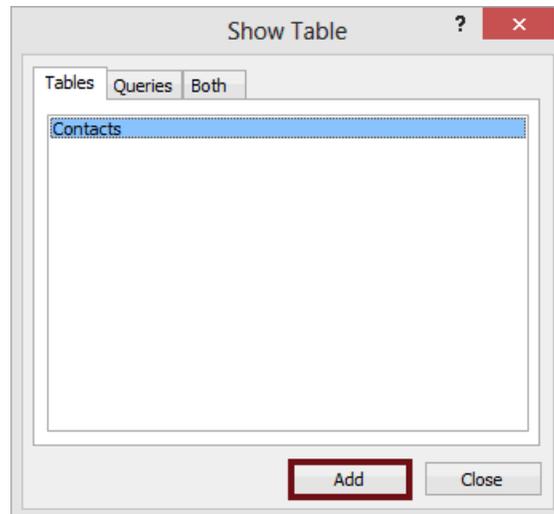
## 5.2. Select Queries

At the heart of every kind of query is a select query.

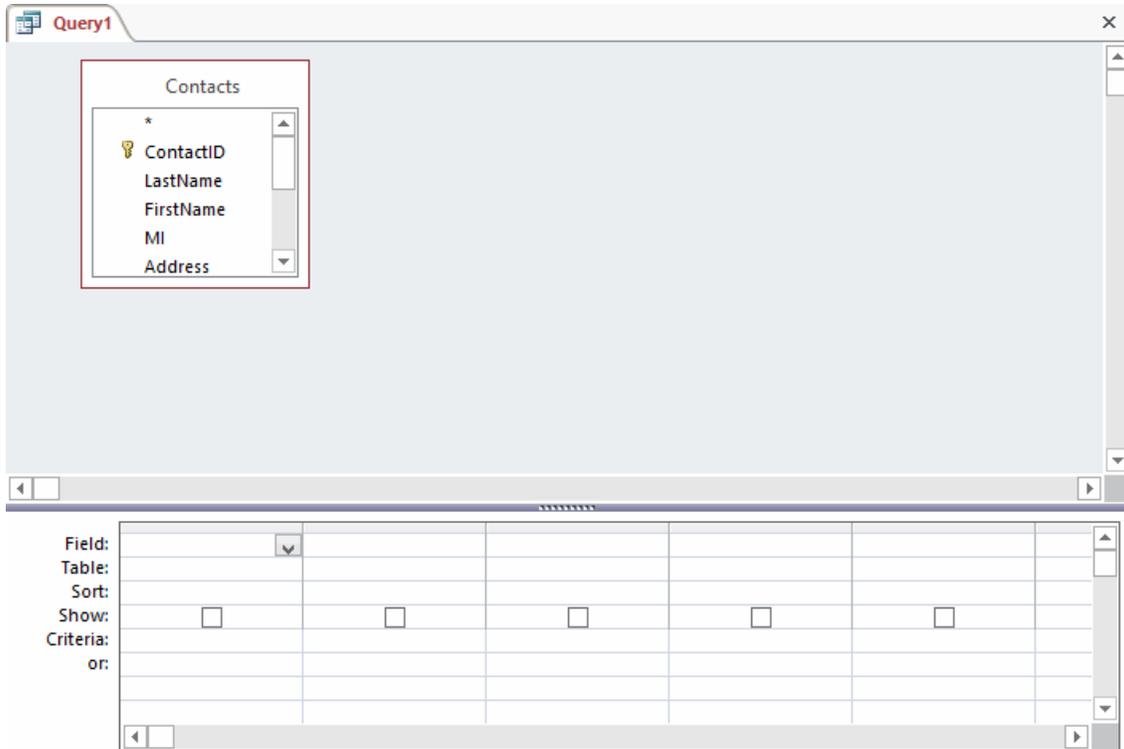
Select queries can return a subset of fields from a single table or can aggregate data from multiple tables.

To create a simple select query showing data from a single table: Open ClassFiles/Intro\_Queries/Demos/My New Database - Simple Select.accdb.

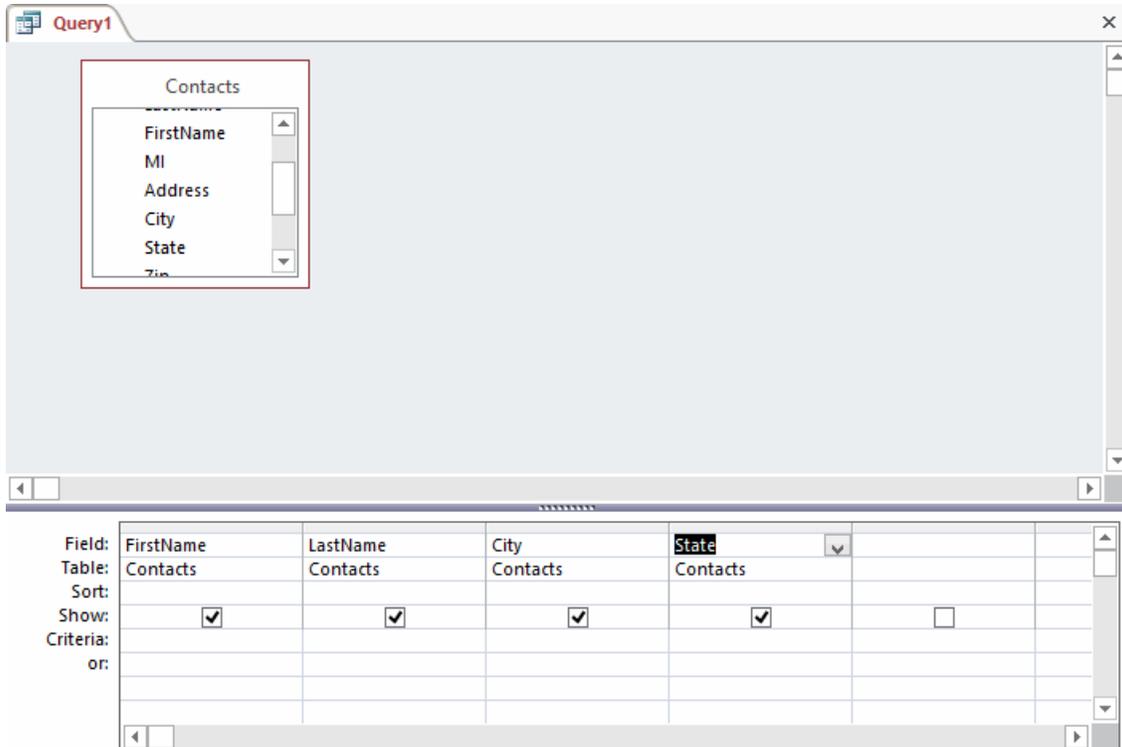
1. Open the database.
2. On the **Create** tab in the **Queries** group, click **Query Design**. The **Show Table** dialog box opens.
3. Highlight the table to perform the query on and click **Add**.



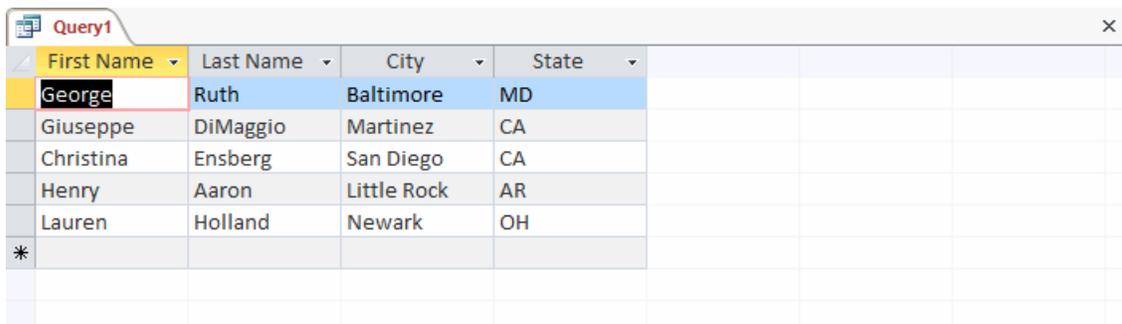
4. Click **Close**.



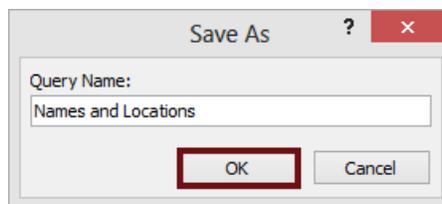
5. In the table, double-click the field names you want to add to the query grid.



6. On the **Query Tools: Design** tab in the **Results** group, click **Datasheets view**. The results display in a datasheet.

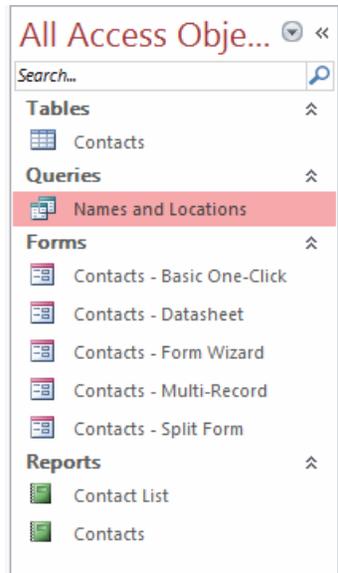


7. Click **Save**.
8. In the **Save As** dialog box, type a name for the query and click **OK**.



To run a query after you've saved it:

1. Locate the name of the query in the **Navigation** pane.

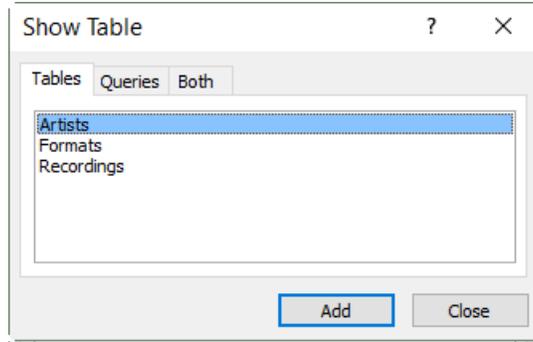


2. Double-click the query name.

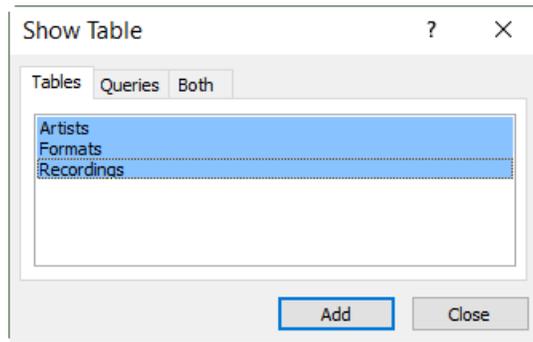
First Name	Last Name	City	State
George	Ruth	Baltimore	MD
Giuseppe	DiMaggio	Martinez	CA
Christina	Ensberg	San Diego	CA
Henry	Aaron	Little Rock	AR
Lauren	Holland	Newark	OH
*			

To write a select query to pull together data from multiple tables: Open ClassFiles/Intro\_Queries/Demos/Demo - My Music Collection - Simple Select from Multiple Tables.accdb.

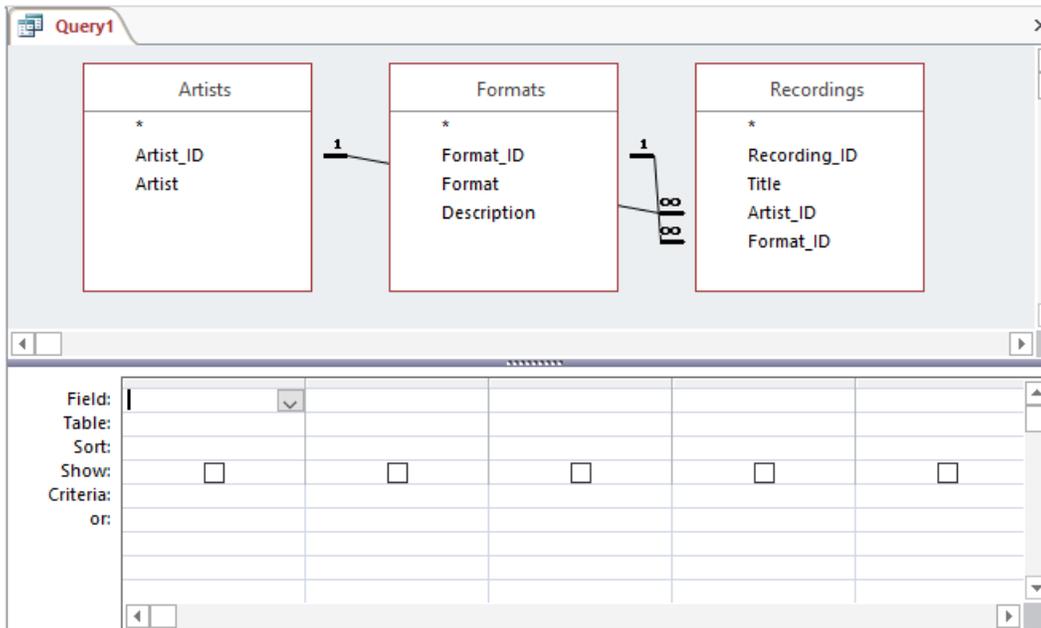
1. Open the database.
2. On the **Create** tab in the **Queries** group, click **Query Design**. The **Show Table** dialog box opens.



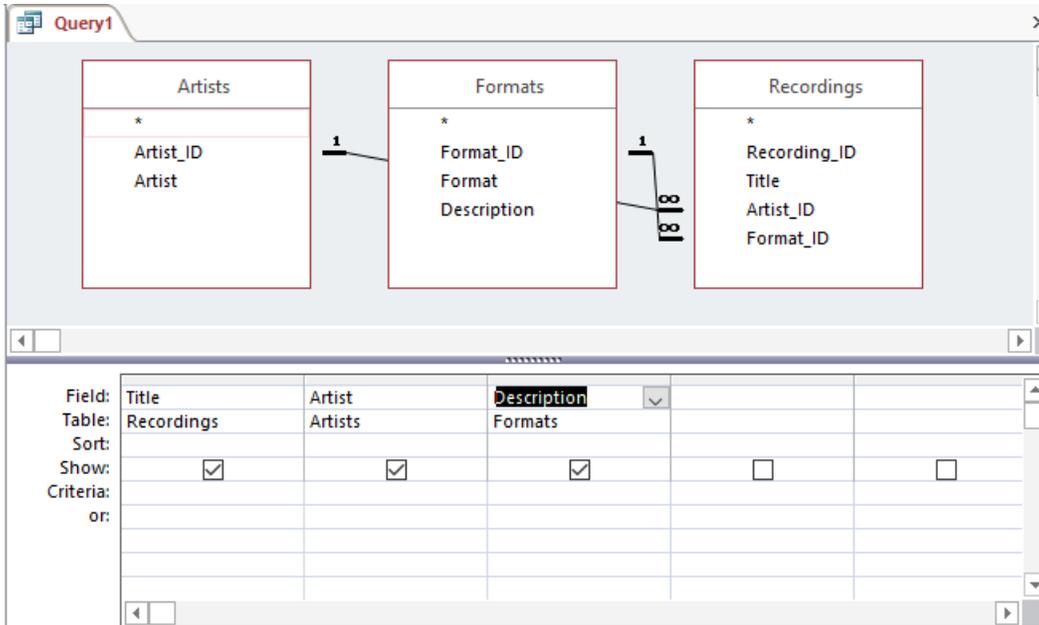
3. Highlight the tables to add to the query and click **Add**.



4. Click **Close**.



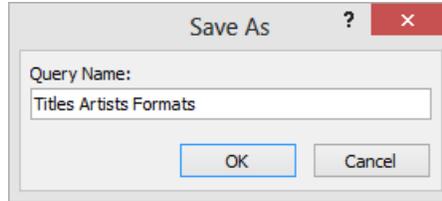
5. In the tables, double-click the field names you want to add to the query grid.



- On the **Query Tools: Design** tab in the **Results** group, click **Datasheet view**. The results display in a datasheet.

Title	Artist	Description
Skyfall	Adele	MP3 file
Right On	Count Basie and His Orchestra	78 RPM vinyl record
I Got a Name	Jim Croce	8-track tape
Smetana: Moldau, Overtures	Cleveland Orchestra	33 1/3 RPM vinyl record
A Hard Day's Night	Beatles	33 1/3 RPM vinyl record
The White Album	Beatles	Compact disc
I Remember Yesterday	Donna Summer	Cassette tape
Rachmaninov Piano Concerto 1 & 3	Count Basie and His Orchestra	Compact disc
Just a Dream	Carrie Underwood	MP3 file
Music of the Night	Alfie Boe	MP3 file
King of Swing!	Count Basie and His Orchestra	Compact disc
Pirates of Penzance	D'Oyly Carte Opera Company	33 1/3 RPM vinyl record
*		

- Click **Save**.
- In the **Save As** dialog box, type a name for the query and click **OK**.

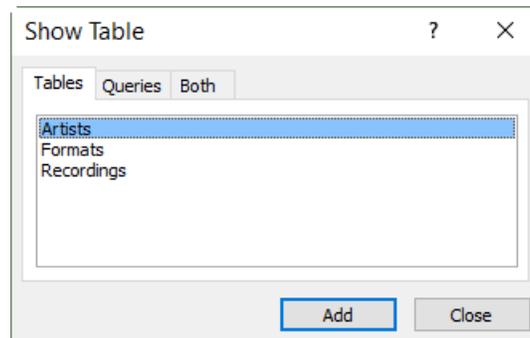


### 5.3. Select Queries with Criteria

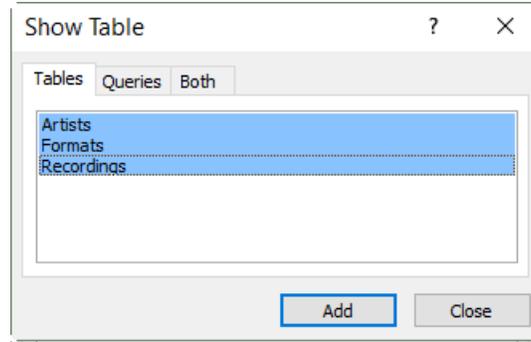
You can select very precise result sets by applying selection criteria to a select query. Selection criteria let you include or exclude data based on the requirements you specify.

To create a select query with selection criteria: Open `ClassFiles/Intro_Queries/Demos/Demo - My Music Collection - Select Query with Criteria.accdb`.

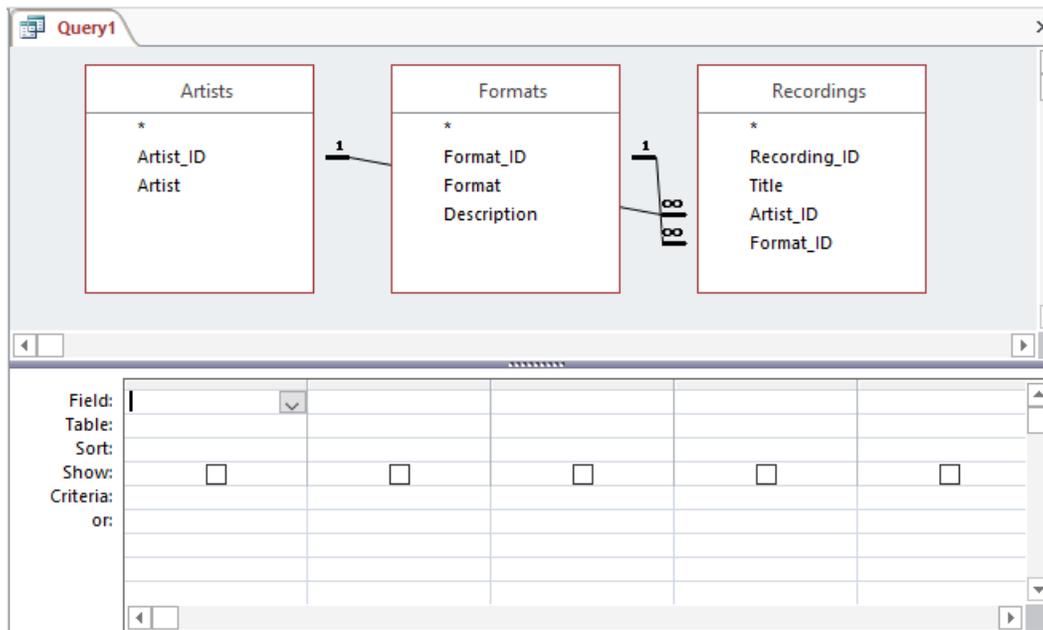
1. Open the database.
2. On the **Create** tab in the **Queries** group, click **Query Design**. The **Show Table** dialog box opens.



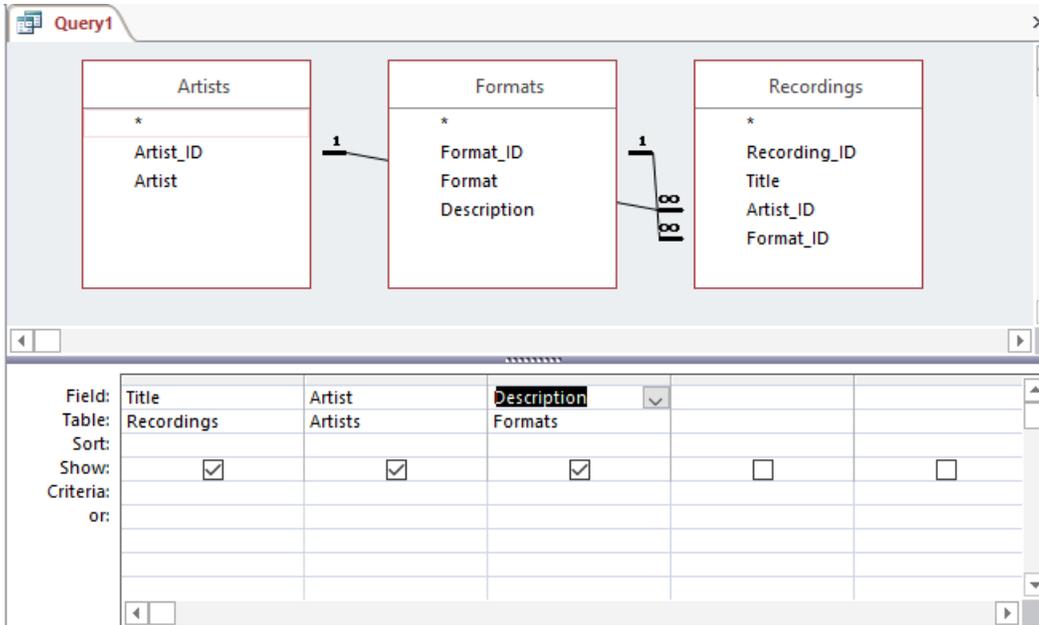
3. Highlight the tables to add to the query and click **Add**.



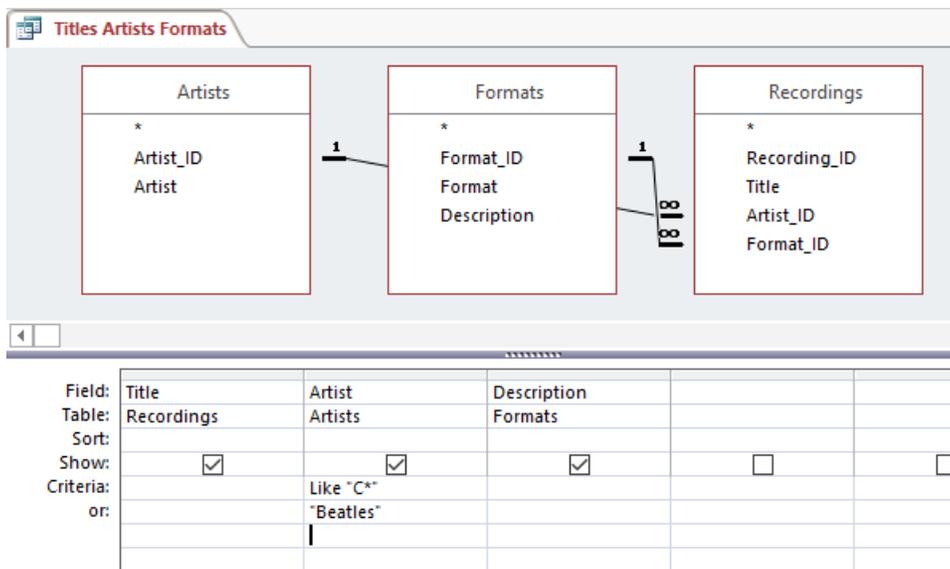
4. Click **Close**.



5. In the tables, double-click the field names you want to add to the query design grid.



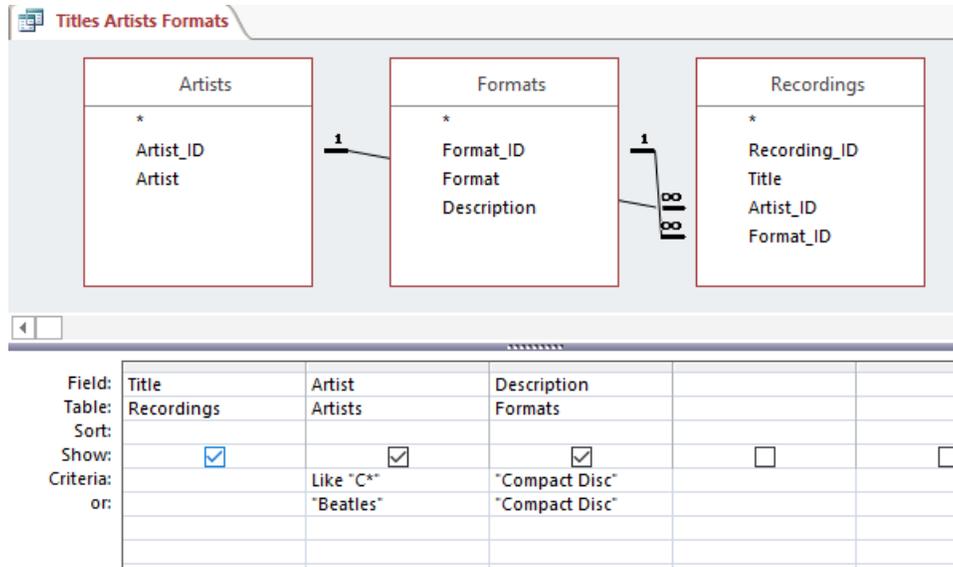
- In a column for a field you want to limit results by, enter a value or expression in the **Criteria** row. To enter more criteria for a single field, use the **or** rows below the **Criteria** row. For examples of acceptable criteria, search Access help for “examples of query criteria” and see the section on logical operators that follows this section.



## Note

The result set will include records that satisfy at least one of the criteria specified for a field. In our example, the result set will include records where the artist name starts with “C” OR where the artist name is “Beatles”.

7. Enter criteria for other fields as desired.



Field:	Title	Artist	Description		
Table:	Recordings	Artists	Formats		
Sort:					
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria:		Like "C*"	"Compact Disc"		
or:		"Beatles"	"Compact Disc"		

## Note

The result set will include only the records that satisfy all the columns. In our example, the result set will include records where the artist name starts with “C” AND the format is “Compact disc” OR records where the artist name is “Beatles” AND the format is “Compact disc”.

8. On the **Query Tools: Design** tab in the **Results** group, click **Datasheet view**. The results display in a datasheet.

	Title	Artist	Description
	The White Album	Beatles	Compact disc
	Rachmaninov Piano Concerto 1 & 3	Cleveland Orchestra	Compact disc
	King of Swing!	Count Basie and His Orchestra	Compact disc
*			

9. Click **Save**.
10. In the **Save As** dialog box, type a name for the query and click **OK**.



## 5.4. Logical Operators

When specifying selection criteria, it's not always convenient (or possible) to list all the acceptable criteria values. Usually it's better to write logical expressions to describe the criteria. This is where logical operators come in. Logical operators describe how we want our criteria evaluated. In conjunction with operators, we can use wildcard characters, symbols such as asterisk (\*) that substitute for other characters or strings of characters.

The following table lists common logical operators with examples and explains their use.

Operator	Example	Returns
Like	Like C*	Items that start with "C".
	Like *C	Items that end with "C".
	Like *C*	Items that contain "C".
Not Like	Not Like C*	All items except those that start with "C".
	Not Like *C	All items except those that end with "C".
	Not Like *C*	All items except those that contain "C".
Is Null	Is Null	Items that are blank.
Is Not Null	Is Not Null	All items that are not blank.
In	In (Arizona, New Mexico, Texas, Oklahoma)	Items that match one of the values in the list.
Not In	Not In (Arizona, New Mexico, Texas, Oklahoma)	Items that don't match one of the values in the list.
Between and	Between 200 and 400	Items that fall between 200 and 400.
Not Between and	Not Between 200 and 400	All items that don't fall between 200 and 400.
<	< 200	Items that are less than 200.
<=	<= 200	Items that are less than or equal to 200.
>	> 400	Items that are greater than 400.
>=	>= 400	Items that are greater than or equal to 400.

You can create very specific selection criteria by combining logical expressions.

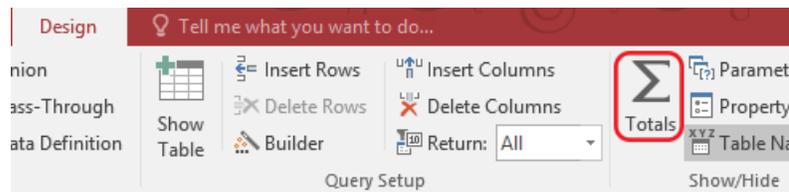


## 5.5. Group and Total with Queries

In a query, you will often need to summarize data. The totals row uses Group By to better structure your data, then choose from options such as SUM to create subtotals. (sample below uses tables from . . /ExtraDatabase/Samp1eCompany .accdb)

### ❖ 5.5.1. Totals Row with Group By

1. Click **Design > Show/Hide > Totals**.



2. Make sure you have your fields arranged left to right in importance. Then choose **Group By** to start the process.

Field:	Name: [fName] & " " & [lName]	itemName	numberSold	Price
Table:		TBLInventory	TBLpoDetail	TBLInventory
Total:	Group By	Group By	Group By	Group By
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:				
or:				

3. Choose **SUM** for the numerical data.

Field:	Name: [fName] & " " & [lName]	itemName	numberSold	Price
Table:		TBLInventory	TBLpoDetail	TBLInventory
Total:	Group By	Group By	Sum	Group By
Sort:				Group By
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:				
or:				

4. The results return the Names, then itemName with a sum of each item number and price.

Name	itemName	SumOfnumt	SumOfPrice
Abby Furr	Gloves	128	\$68.94
Abby Furr	Hammer	85	\$53.94
Abby Furr	Pliers	90	\$50.94
Abby Furr	Rake	89	\$77.88
Abby Furr	Screwdriver	20	\$29.94
Abby Furr	Shovel	886	\$131.28
Abby Furr	Sledgehammer	825	\$347.88
Abby Furr	Wrench	35	\$41.94
Chelce Snyder	Gloves	199	\$68.94
Chelce Snyder	Hammer	134	\$53.94
Chelce Snyder	Pliers	758	\$50.94
Chelce Snyder	Rake	257	\$77.88
Chelce Snyder	Screwdriver	59	\$14.97
Chelce Snyder	Shovel	221	\$131.28
Chelce Snyder	Sledgehammer	93	\$260.91
Chelce Snyder	Wrench	41	\$20.97
Pat Baarlow	Gloves	774	\$68.94
Pat Baarlow	Hammer	93	\$53.94
Pat Baarlow	Pliers	105	\$50.94
Pat Baarlow	Rake	220	\$77.88
Pat Baarlow	Screwdriver	198	\$54.89
Pat Baarlow	Shovel	137	\$131.28

- Remember, order matters as when we remove the Name field, the results will now focus on the unique itemNames.

Field:	itemName	numberSold	Price
Table:	TBLInventory	TBLpoDetail	TBLInventory
Total:	Group By	Sum	Sum
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:			
or:			

- See the results below, a summary of each item with the Sum of number and price.

itemName	SumOfnumt	SumOfPrice
Gloves	1515	\$390.66
Hammer	593	\$305.66
Pliers	1998	\$288.66
Rake	984	\$441.32
Screwdriver	1876	\$169.66
Shovel	1507	\$743.92
Sledgehammer	2766	\$1,971.32
Wrench	584	\$237.66

## Exercise 9: Creating Select Queries

 15 to 25 minutes

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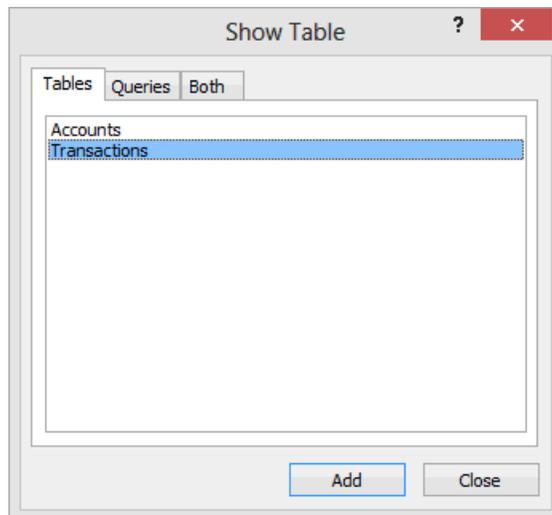
In this exercise, you will create a query recordset of uncleared transactions for the Bank Register database from the `ClassFiles/Intro_Queries/Exercises/Bank Register.accdb`.

## Solution

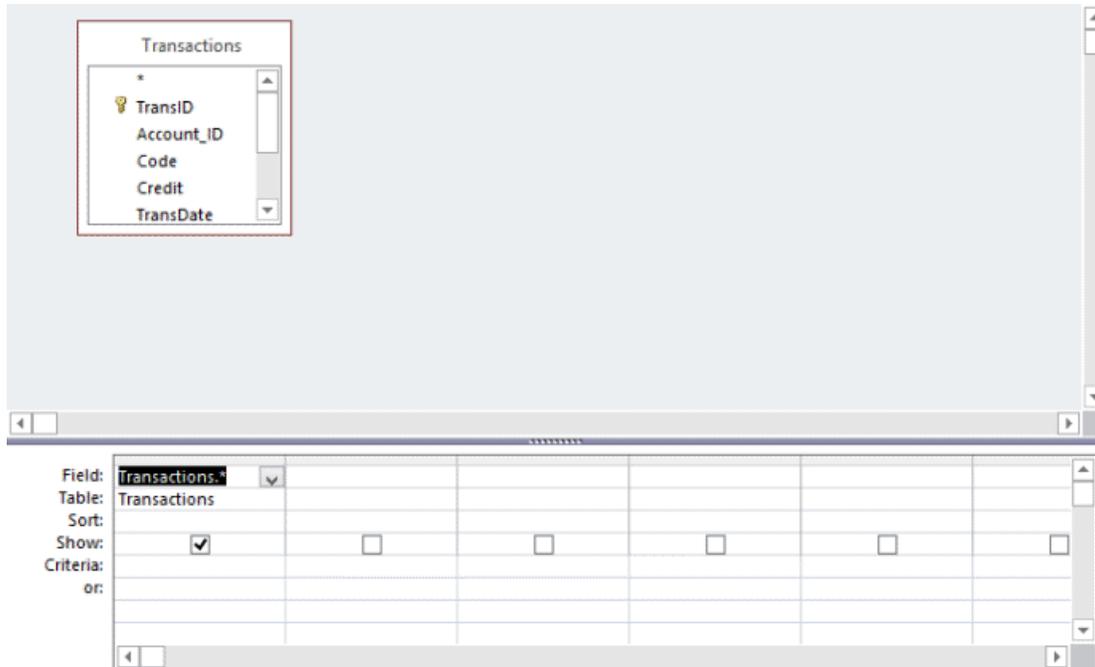
---

First, we will create a select query to select the uncleared transactions and then we'll change it to a make table query.

1. Open the database.
2. On the **Create** tab in the **Queries** group, click **Query Design**.
3. In the **Show Table** dialog box, highlight "Transactions".



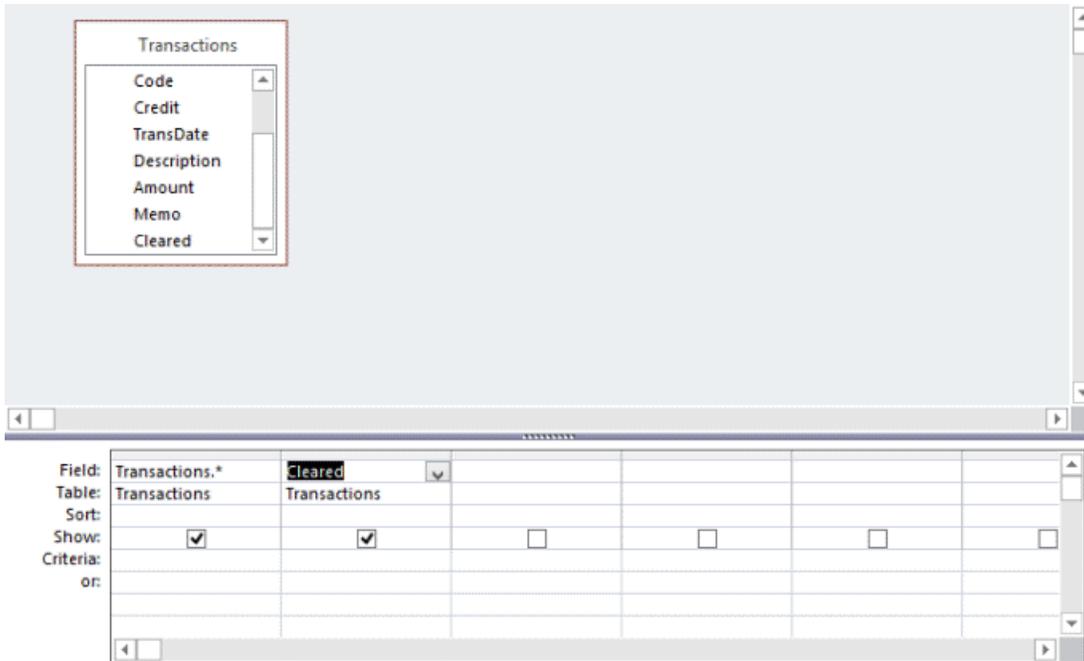
4. Click **Add**.
5. Click **Close**.
6. In the table, double-click \* to add all fields in the table to the query.



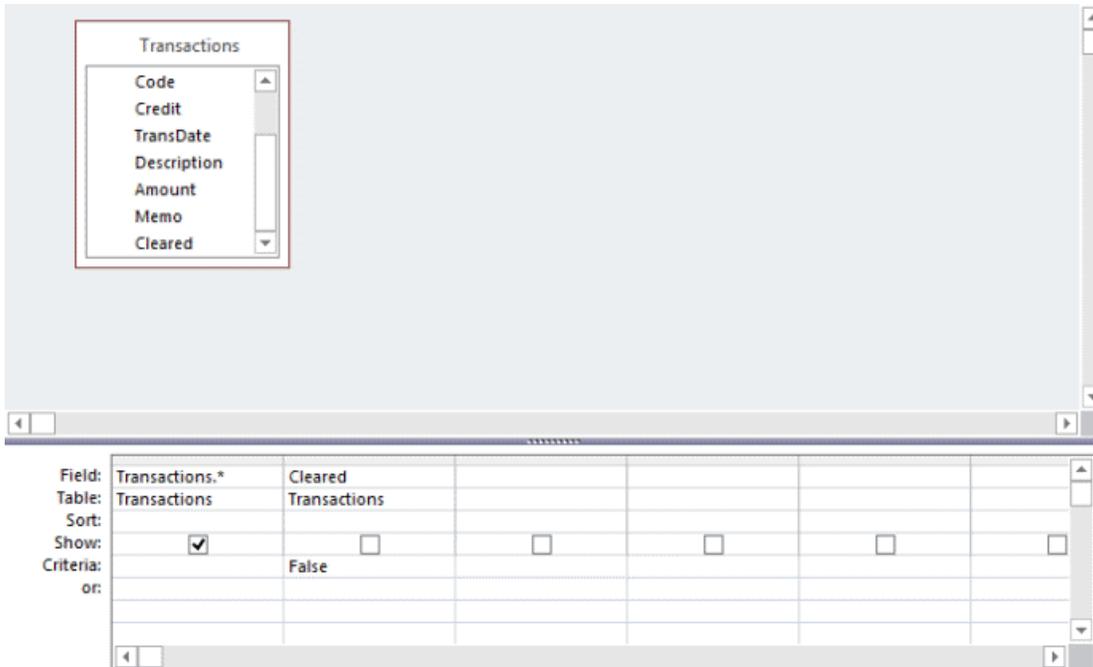
### Hint

Double-clicking \* is a quick way to add all the fields in a table to your query. You can still add a field from the table to use as selection criteria, just make sure to clear the field's **Show** check box so that the field doesn't appear twice in your results.

7. In the table, locate and double-click the Cleared field to add it to the query design grid.



8. Clear the check box in the **Show** row for the Cleared field. (We don't want the Cleared field to appear twice in our table.)
9. In the **Criteria** row for the Cleared field, type "False". (We want the table to show only transactions that are not cleared.)



10. On the **Query Tools: Design** tab in the **Results** group, click **Datasheet view**.
11. View your results.

Evaluation Copy

Trans ID	Account ID	Code	Credit	Date	Description	Amount	Memo	Cleared
	1	7214	<input type="checkbox"/>	4/7/2013	Charlottesville MUD	\$74.19	Water bill	<input type="checkbox"/>
6	1	AD	<input checked="" type="checkbox"/>	4/14/2013	US Dept of Treasury	\$372.96	Tax refund	<input type="checkbox"/>
*	(New)		<input type="checkbox"/>			\$0.00		<input type="checkbox"/>

12. Switch back to Design view and click **Save**.
13. In the **Save As** dialog box, type a name for the query and click **OK**.

## Conclusion

In this lesson, you learned:

- About the Access queries.
- About the views available for working with queries.
- About select queries with criteria.



# LESSON 6

## Forms

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### Topics Covered

- Form types.
- Adding records using a form.
- One-click forms.
- The Form Wizard.

### Introduction

Access lets you decide how much effort to put into creating data entry forms. In this lesson, we'll learn how to create forms with a single-click and with the Form Wizard and enter data into forms. In the advanced course, you will delve deeper into using Design view to create customized forms. No matter how your form originates, once it's created you can use Layout view and/or Design view to improve it.

For this lesson, open files located with your Webucator class files at `ClassFiles/Forms/Demos/`. If prompted concerning disabled content, click **Enable Content** in the yellow banner.



## 6.1. Forms

### ❖ 6.1.1. Definition and Purpose

Forms are how you make data accessible to users for viewing, adding, and editing. While forms are not a technical requirement for a database, they help users make sense of the data without having to know the intricacies of how the database is structured. Well-designed forms can help ensure that users always enter valid data and that data is not inadvertently duplicated.

## ❖ 6.1.2. Views

Form objects can be viewed in three ways: Form view, Layout view, and Design view.

### Form View

Form view displays a form as it would look to your users. Form view allows access to the data from the tables and queries on which the form is based so that users can view data, add records, and edit record values.

The screenshot shows a Microsoft Access form titled "Contacts - Form Wizard". The form contains the following fields and values:

Field	Value
Contact ID	
Last Name	Ruth
First Name	George
MI	H
Address	1895 26th Ave
City	Baltimore
State	MD
Zip	21212-

At the bottom of the form, there is a record navigator bar with the following elements:

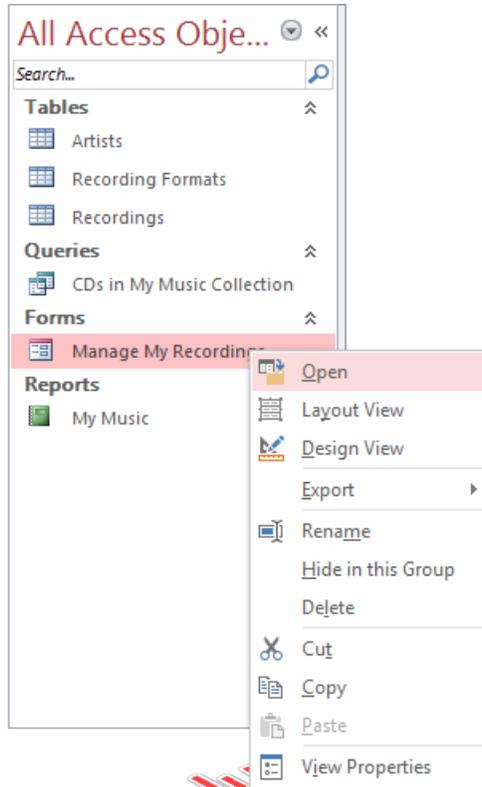
- Record: 1 of 5
- No Filter
- Search

Notice that Form view has a record navigator bar like tables have in Datasheet view. The navigation, filtering, and search tools serve the same purposes in forms as they do in tables. Unlike the strict column and row layout of tables, however, forms can be laid out logically and can provide aesthetic appeal to your users.

### Open a Form in Form View

To open a form: Open Forms/Demos/My Music Collection.accdb.

1. Locate the form in the **Navigation Pane** and right-click it.



2. From the drop-down menu, select **Open**. The form opens in a tab on the Access work surface.

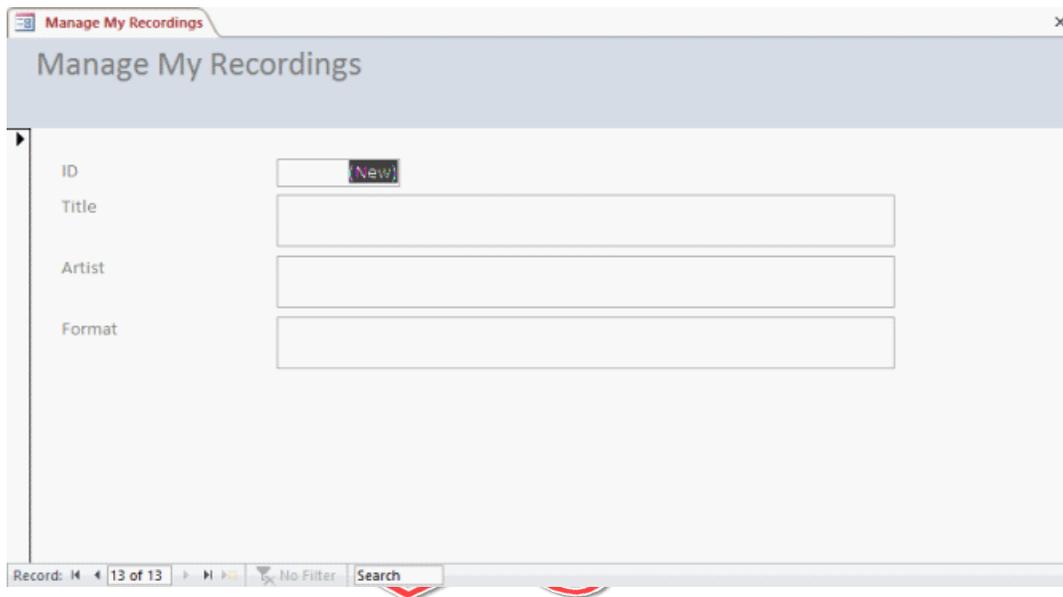
ID	Title	Artist	Format
	Right On	Count Basie and His Orchestra	78

Record: 1 of 12 | No Filter | Search

## Enter Data in Form View

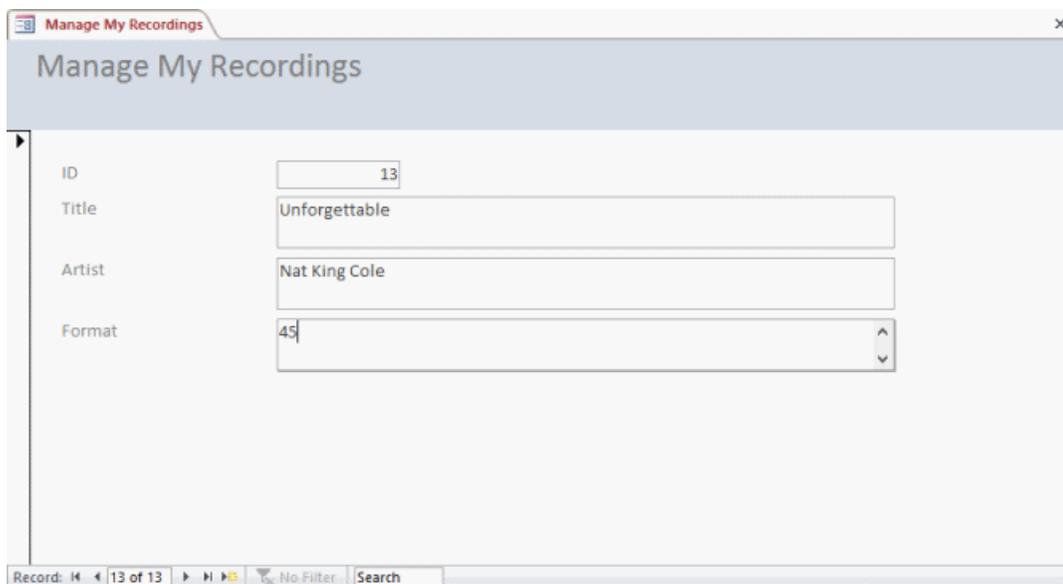
To add a record in Form view:

1. Open the form.
2. Click the **New Record** button in the record navigator bar. A blank record loads in the form.



The screenshot shows a web application window titled "Manage My Recordings". The form contains four input fields: "ID" (with a "New" button), "Title", "Artist", and "Format". The "Record" bar at the bottom shows "Record: 13 of 13" and "No Filter".

3. Press **Tab** in the ID field to generate a record number and then respond to the remaining fields with appropriate information.



The screenshot shows the same "Manage My Recordings" form, but now with data entered: "ID" is 13, "Title" is "Unforgettable", "Artist" is "Nat King Cole", and "Format" is 45. The "Record" bar at the bottom shows "Record: 13 of 13" and "No Filter".

If you were to open the table(s) the form is based on, you would see that the record is added there too.

ID	Title	Artist	Format	Click to Add
1	Right On	Count Basie and His Orchestra	78	
2	I Got a Name	Jim Croce	8-tr	
3	Smetana: Moldau, Overtures	Cleveland Orchestra	33	
4	A Hard Day's Night	Beatles	33	
5	The White Album	Beatles	CD	
6	I Remember Yesterday	Donna Summer	Cass	
7	Rachmaninov Piano Concerto	Cleveland Orchestra	CD	
8	Just a Dream	Carrie Underwood	MP3	
9	Music of the Night	Alfie Boe	MP3	
10	King of Swing!	Count Basie and His Orchestra	CD	
11	Pirates of Penzance	D'Oyly Carte Opera Company	33	
12	Skyfall	Adele	MP3	
13	Unforgettable	Nat King Cole	45	
*	(New)			

### Sort Records in Form View

To sort records in Form view:

1. Open the form.

The screenshot shows a window titled "Manage My Recordings" with a close button (X) in the top right corner. The form contains the following fields:

- ID:
- Title:
- Artist:
- Format:

At the bottom of the window, there is a navigation bar with the following elements:

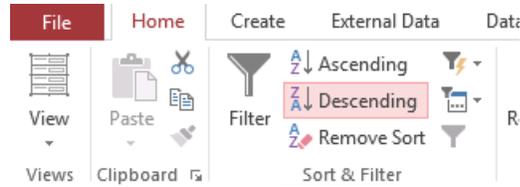
- Record:  of 10
- Navigation icons: back, forward, search, refresh
- Filter: No Filter
- Search:

2. Select the form field you wish to sort by.

Title

A Hard Day's Night

3. **Home > Sort & Filter > Ascending or Descending.**



4. Results are now updated.

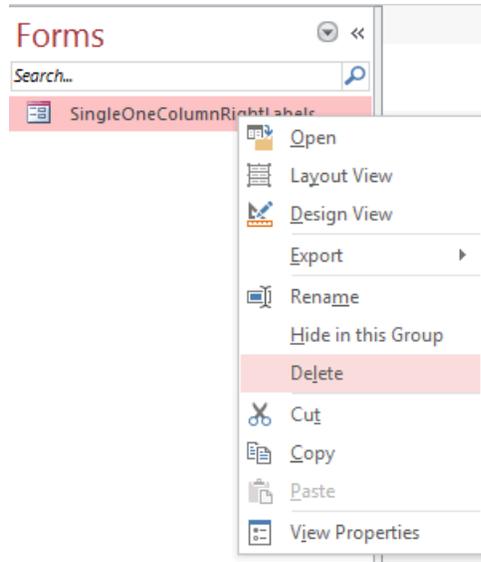
A screenshot of a web application interface titled 'Manage My Recordings'. It shows a form with several fields: 'ID' (containing the number 5), 'Title' (containing 'The White Album'), 'Artist' (containing 'Beatles'), and 'Format' (containing 'CD'). The 'Title' field is highlighted with a red rectangular box. The form is presented in a light blue and white color scheme.

## 6.2. Alter a Form

Forms may be altered in a variety of ways that can help you to customize any process.

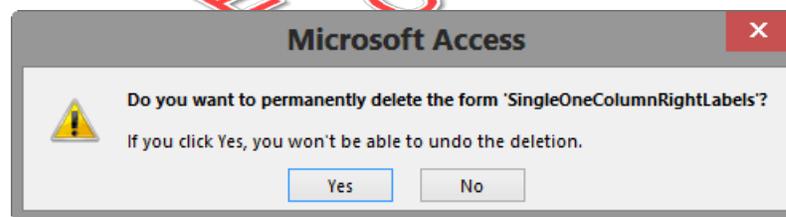
### ❖ 6.2.1. Delete Forms

Once a form has served its purpose, you will want to delete it in order to keep your database efficient.



1.

Right-click the form you want to delete; be aware that if the form is being used by other objects, the deletion process may cause issues.



2.

Confirm the action.

## ❖ 6.2.2. Remove Form Controls

Controls may need to be removed from the various sections of the form. When doing this, the data will not be affected, and the control may be added back at any time. Open Forms/Demos/My Music Collection - Add Fields.accdb

Music Collection

1 2 3 4 5

Form Header

 My Music Collection

Detail

Title Title

Artist Artist

Format Format

Form Footer

1.

Select the control to remove. Press the **Delete** key.

Music Collection

1 2 3 4 5

Form Header

 My Music Collection

Detail

Title Title

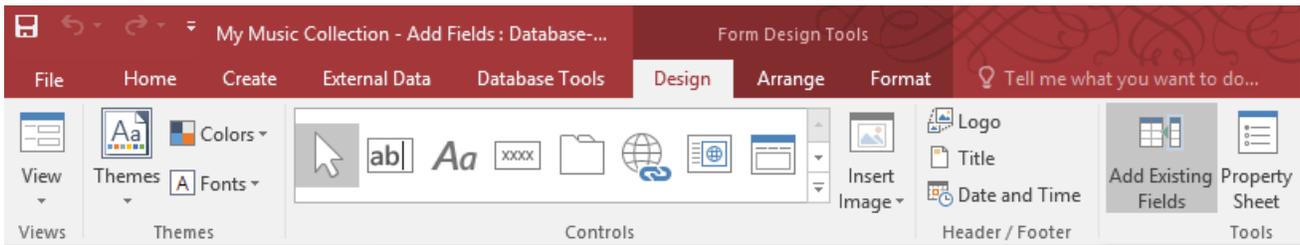
Artist Artist

Form Footer

2.

The control is removed.

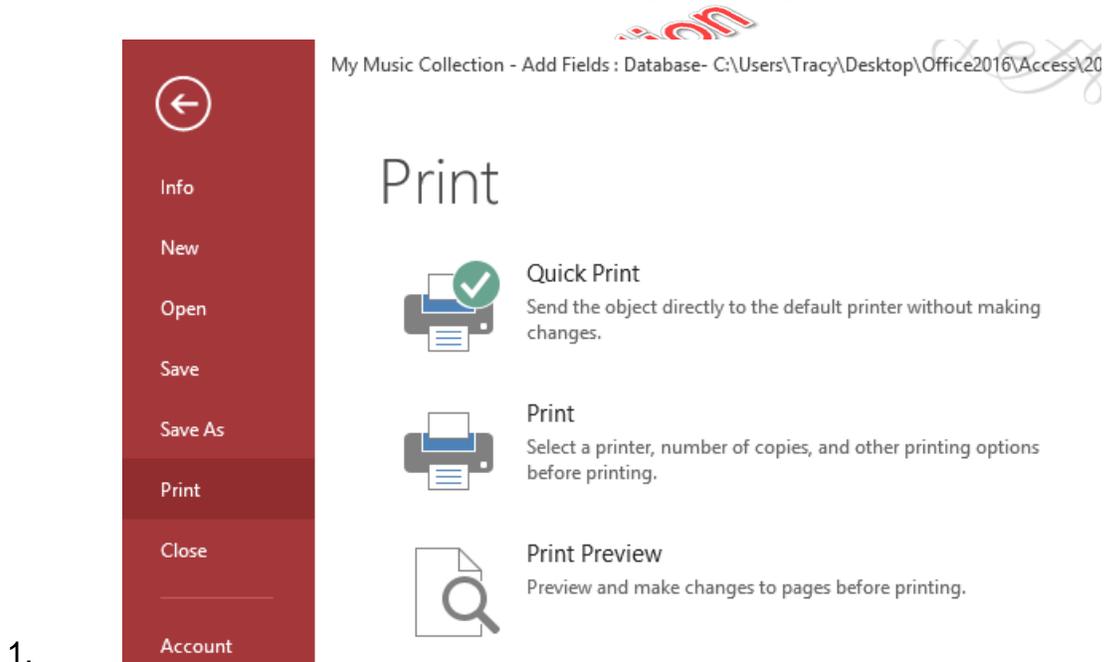
## ❖ 6.2.3. Format a Form



There are many options available on the three tabs.

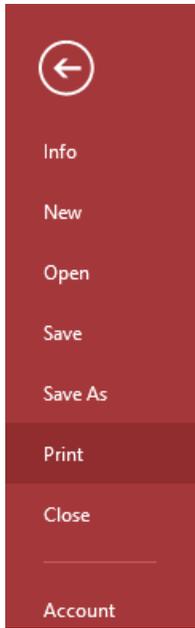
### Format Print Layouts

Forms may be printed at anytime. To view and adjust the layout, choose File > Print.



1.

File > Print.



# Print



## Quick Print

Send the object directly to the default printer without making changes.



## Print

Select a printer, number of copies, and other printing options before printing.

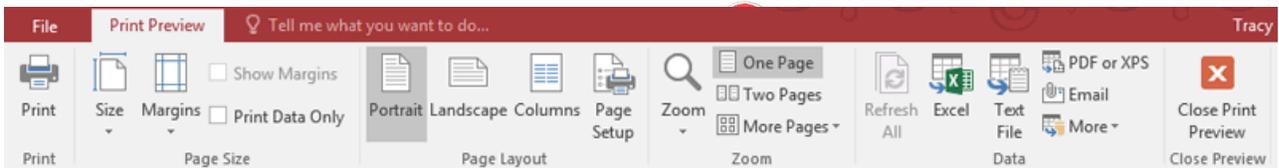


## Print Preview

Preview and make changes to pages before printing.

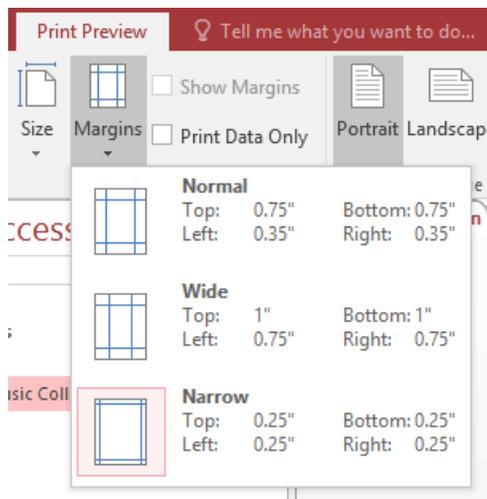
2.

## Print Preview.



The Print Preview Ribbon provides many choices in how the form will be printed.

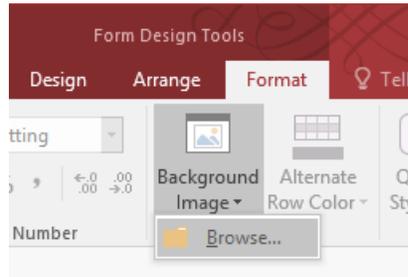
## Change Margins



Margins can affect how much of the form will fit on a single page.

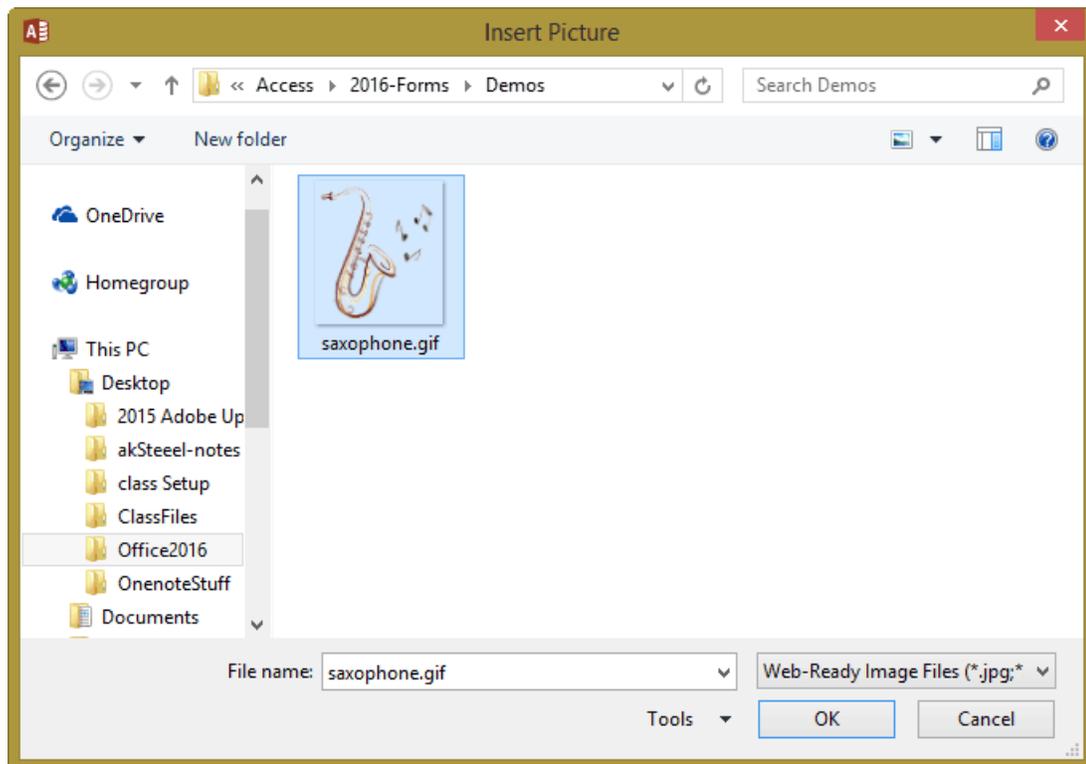
## Insert Backgrounds and Images

Images may help convey a message. By branding a set of forms with a logo or image will help to categorize and maintain a uniform look.



1.

**Format > Background Image > Browse...**



2.

Choose the proper image. Click **OK**.

Music Collection

## My Music Collection



Title

Artist

Format



3.

The image is now placed in the center of the form.

# Exercise 10: Adding Data Records in Form View

 15 to 25 minutes

In this exercise, you will add two records to the Recordings table using the Manage My Recordings form. Use the `ClassFiles/Forms/Exercises/Exercise - My Music Collection.accdb` database.

Add the following records:

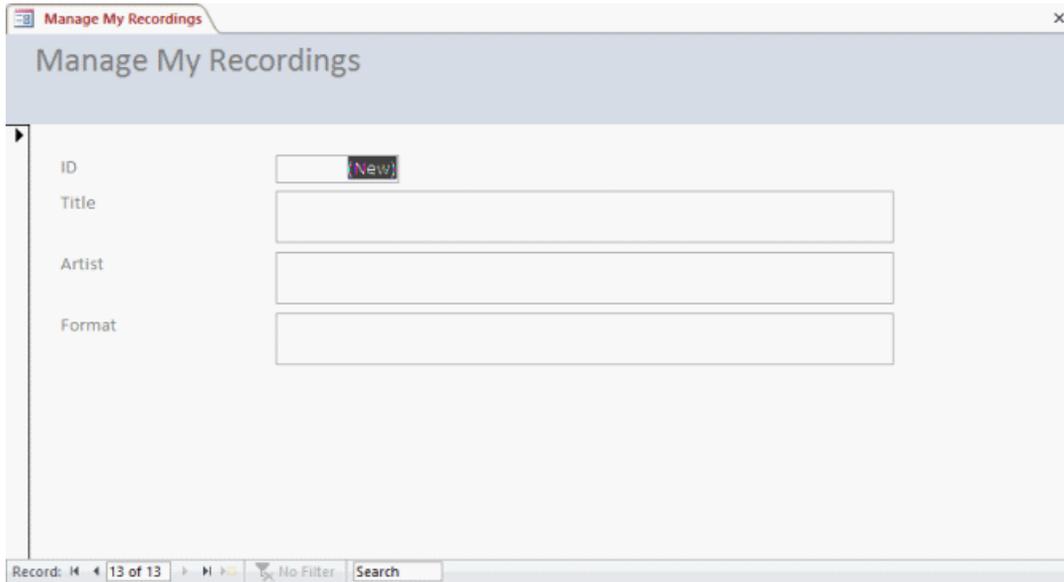
Title	Artist	Format
Unforgettable	Nat King Cole	45
Unforgettable	Natalie Cole	MP3

## Solution

---

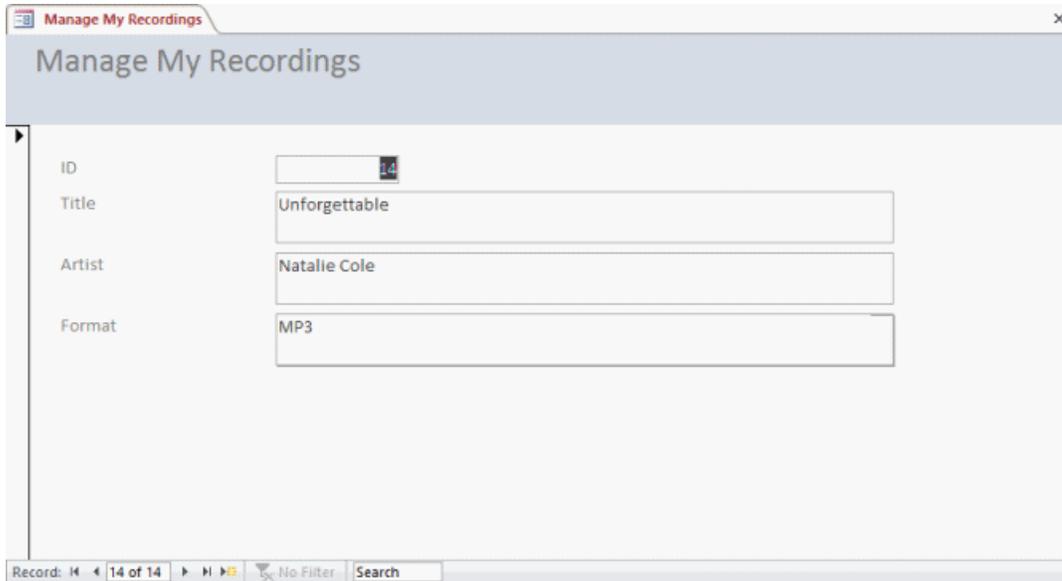
To add the recordings:

1. Open the Manage My Recordings form.
2. In the record navigator bar, click .



The screenshot shows a web application window titled "Manage My Recordings". The window contains a form with four input fields: "ID", "Title", "Artist", and "Format". The "ID" field has a small "[New]" button next to it. Below the form is a record navigator bar with the text "Record: 13 of 13", navigation arrows, "No Filter", and a "Search" field.

3. Press **Tab** in the ID field to generate a record number.
4. In the Title field, type "Unforgettable".
5. In the Artist field, type "Nat King Cole".
6. In the Format field, type "45". When you tab out of this field, a new record is automatically loaded for you.
7. In the Title field, type "Unforgettable".
8. In the Artist field, type "Natalie Cole".
9. In the Format field, type "MP3".

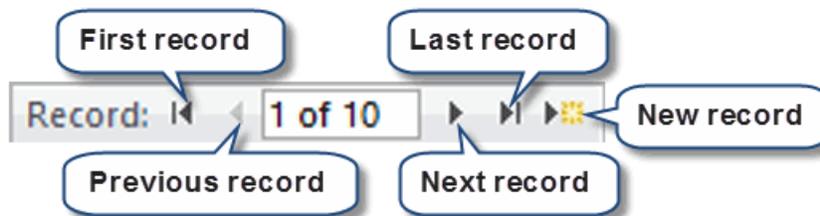


### 6.3. Form Record Navigation

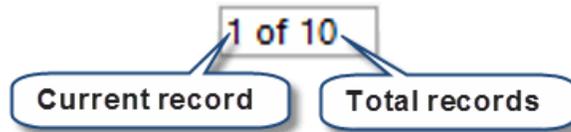
At the bottom of a form's tab is the record navigation bar.



The first section of the bar is the record navigator. The buttons of the record navigator allow you to move quickly to the first record , the previous record , the next record , and the last record  in the table. The last button  in the record navigator adds a new blank record to the table.



In the middle of the record navigator is the current record indicator which shows the record currently selected in the form and the total number of records in the table. You can select the text in the current record box, type a record number, and press **Enter** to move quickly to that record in the table.



To the right of the record navigator is a button that indicates whether the table is filtered or unfiltered. Clicking **Unfiltered** applies the last saved filter on the table. As noted earlier, clicking **Filtered** removes filtering.



The last item on the record navigator is a search box.

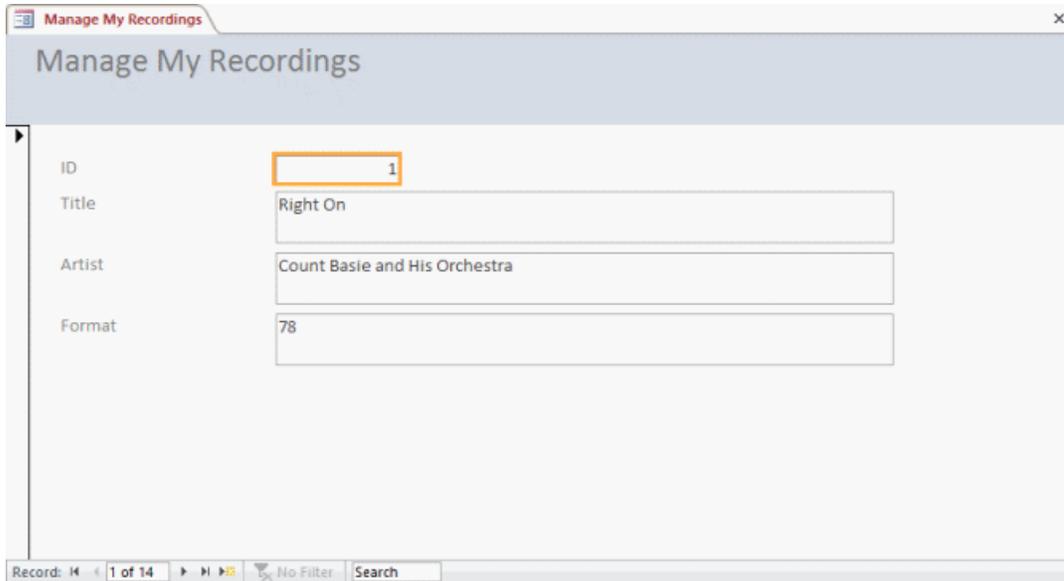


As you type in the search box, the cursor moves to the first value in the table that matches what you've typed. After you find your search term, you can press **Enter** again to find the next instance of the search term in the table.

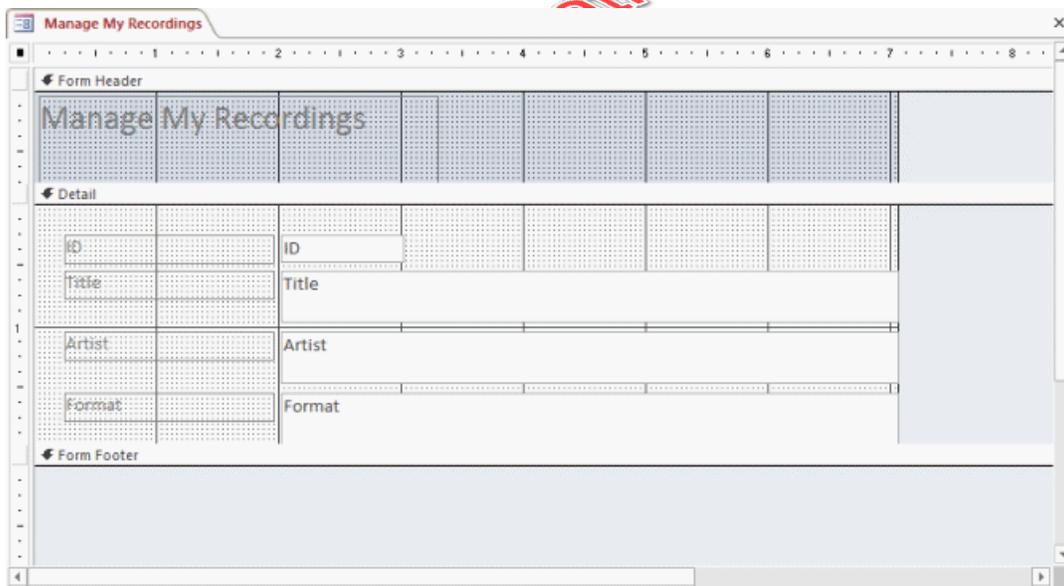


## 6.4. Layout View and Design View

Layout view looks very similar to Form view; however, its purpose is similar to that of the form Design view. Both allow you to work with the design of the form. Layout view lets you work with the form in a visual format (sometimes called WYSIWYG or “what you see is what you get”) while Design view allows you to work with the design from a structural point of view. Many design changes can be made from either view; however, some changes can only be accomplished in Design view. Use the `ClassFiles/Forms/Exercises/Exercise - My Music Collection.accdb` database.



Layout view



Design view



## 6.5. One-Click Forms

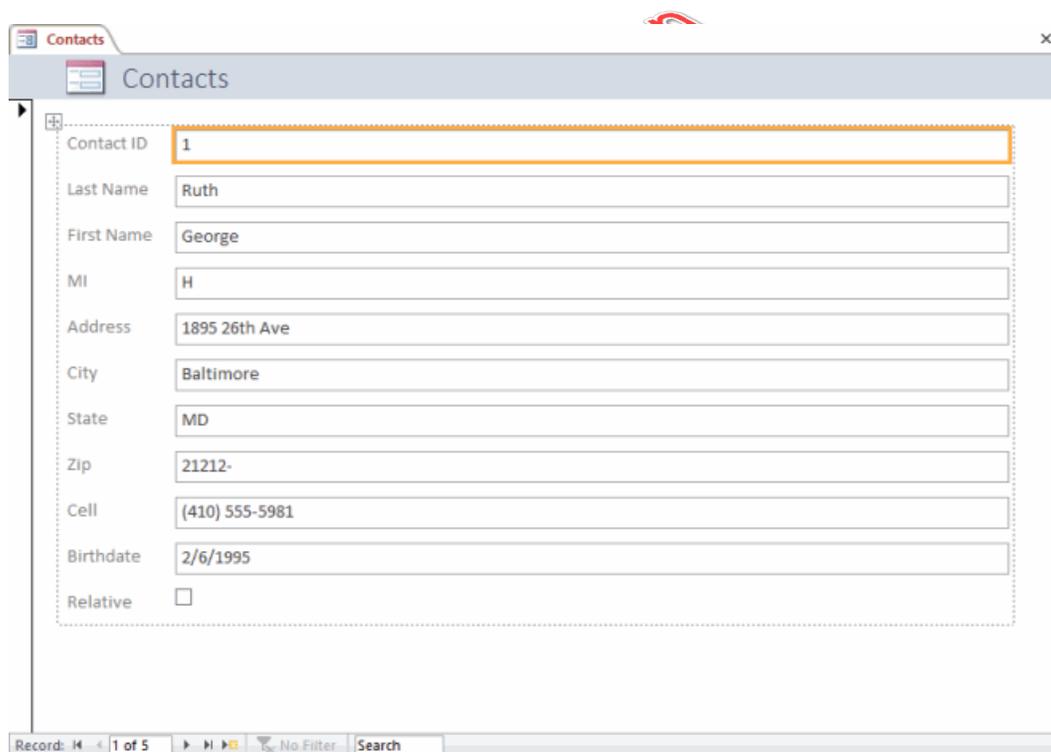
Access provides some basic forms which you can create simply by highlighting the table or query you want to base the form on and then clicking an icon or selecting a form type from a menu.

In this section, we'll demonstrate four of the one-click forms.

### ❖ 6.5.1. Basic Data Entry Form

To create a data entry form which displays one record at a time: Use the Class Files/Forms/Demos/My New Database - Before.accdb database.

1. In the **Navigation Pane**, highlight the table to base the form on.
2. On the **Create** tab in the **Forms** group, click **Form**. The new form loads on the work surface.

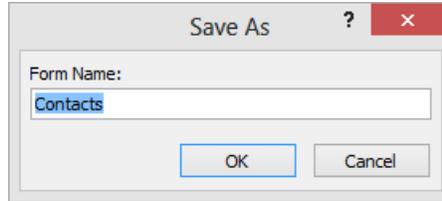


The screenshot shows a Microsoft Access window titled "Contacts" with a close button (x) in the top right corner. The window displays a data entry form for a contact record. The form fields are as follows:

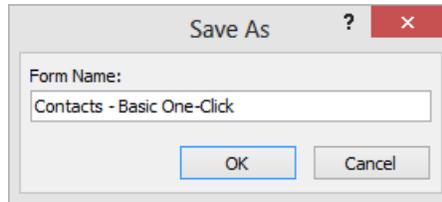
Contact ID	1
Last Name	Ruth
First Name	George
MI	H
Address	1895 26th Ave
City	Baltimore
State	MD
Zip	21212-
Cell	(410) 555-5981
Birthdate	2/6/1995
Relative	<input type="checkbox"/>

At the bottom of the window, there is a status bar with the text "Record: 1 of 5", navigation arrows, "No Filter", and a "Search" button.

3. Click **Save**. You are prompted to name the form.



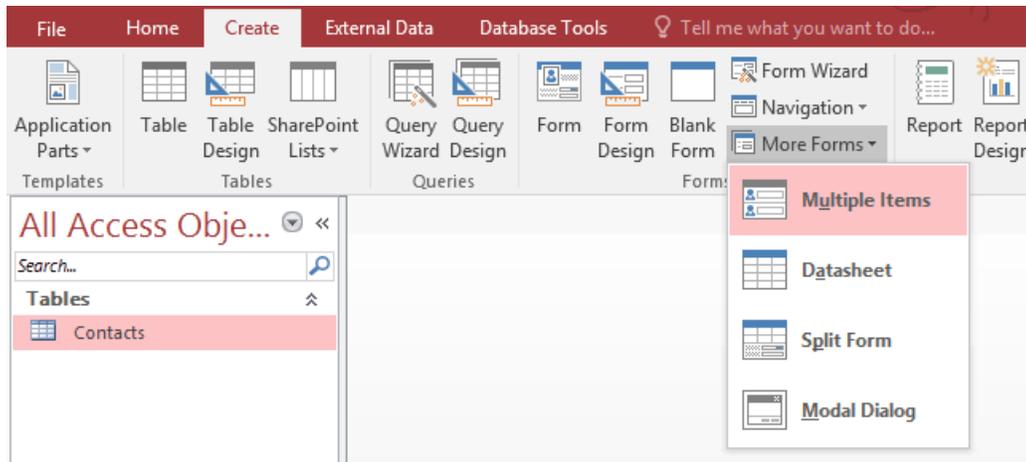
4. Enter a name for the form and click **OK**.



## ❖ 6.5.2. Basic Multi-Record Form

To create a form that shows multiple records at a time:

1. In the **Navigation Pane**, highlight the table to base the form on.
2. On the **Create** tab in the **Forms** group, click **More Forms** and select **Multiple Items** from the drop-down menu.



The form loads on the work surface.

Contact ID	Last Name	First Name	MI	Address
1	Ruth	George	H	189
2	DiMaggio	Giuseppe	P	191
3	Ensberg	Christina	A	141
4	Aaron	Henry	L	441
5	Holland	Lauren	R	454

3. Name and save the form.

### ❖ 6.5.3. Datasheet Form

A datasheet form resembles the Datasheet view of a table.

To create a datasheet form:

1. In the **Navigation Pane**, highlight the table to base the form on.
2. On the **Create** tab in the **Forms** group, click **More Forms** and select **Datasheet** from the drop-down menu. The form loads on the work surface.



Contact ID	Last Name	First Name	MI	Address	City	State	Zip
1	Ruth	George	H	1895 26th Ave	Baltimore	MD	21212
2	DiMaggio	Giuseppe	P	1914 Clipper St	Martinez	CA	94553
3	Ensberg	Christina	A	14 Houston Pk	San Diego	CA	92067
4	Aaron	Henry	L	44 Hammer Ln	Little Rock	AR	72207

- Name and save the form.

*Evaluation Copy*  
\*

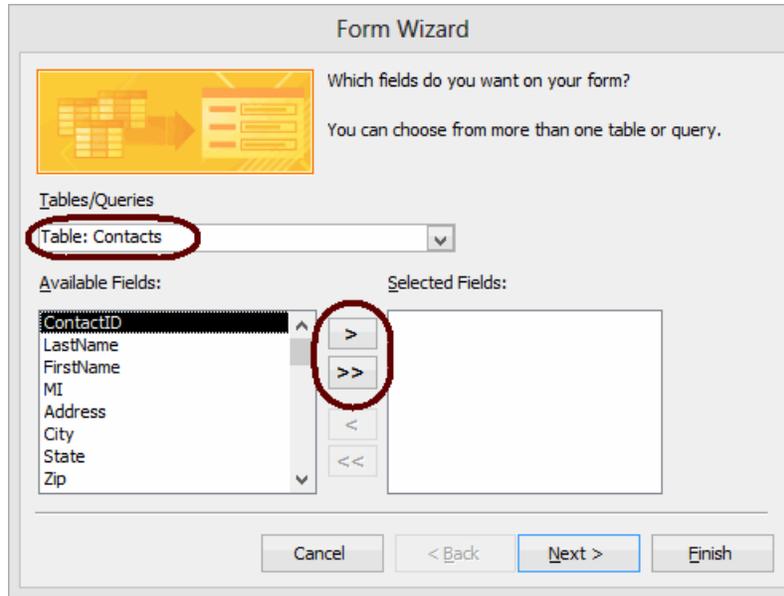
## 6.6. Form Wizard

The Form Wizard gives you more control over your results than one-click forms do. The wizard lets you make decisions about certain aspects of a form's design and produces a form based on your instructions.

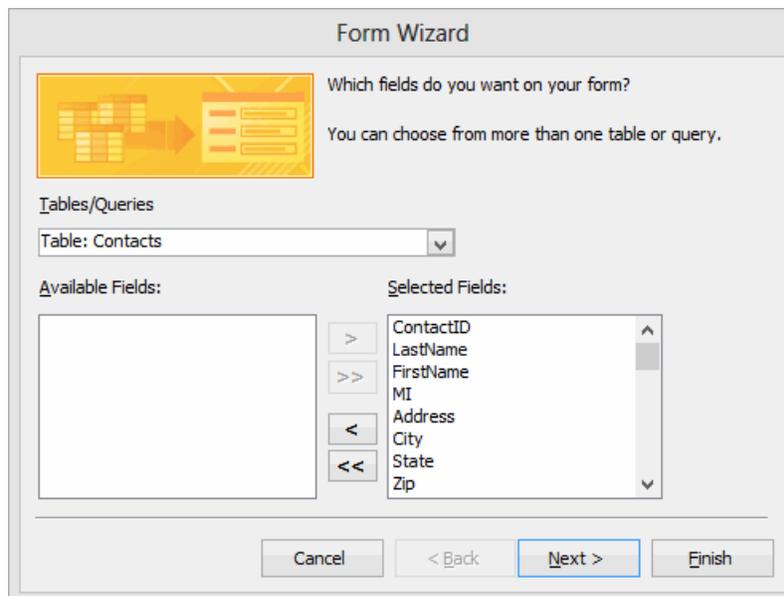
### ❖ 6.6.1. Create a Form with the Form Wizard

To create a form based on a single table using the Form Wizard:

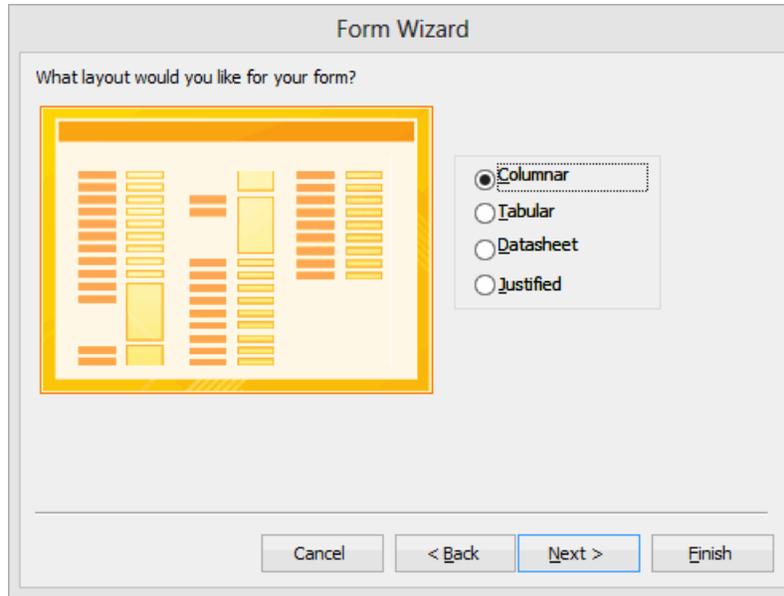
- On the **Create** tab in the **Forms** group, click **Form Wizard**. The wizard starts.



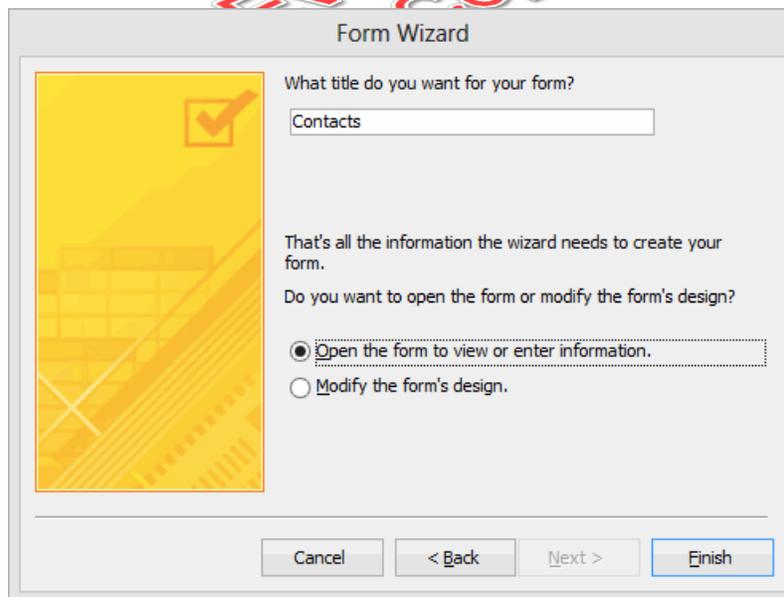
2. From the **Tables/Queries** drop-down list, select the table (or query) to base the form on. The fields for the selected table load in the **Available Fields** list box.
3. Move the fields to include on the form from the **Available Fields** list box to the **Selected Fields** list box. To do so, double-click a field name to move it or highlight the field name and click **>**. To move all fields at once, click **>>**.



4. Click **Next >**.



5. Select the layout for the form. Your options are “Columnar”, “Tabular”, “Datasheet”, and “Justified”. **Tip:** Select each of the options to see a preview of the form layout before you make a final selection.
6. Click **Next >**.



7. Enter a title for the form.
8. Select an option for the view you want to open the form in. Your options are:

- **Open the form to view or enter information** - Opens in Form view.
- **Modify the form's design** - Opens in Design view.

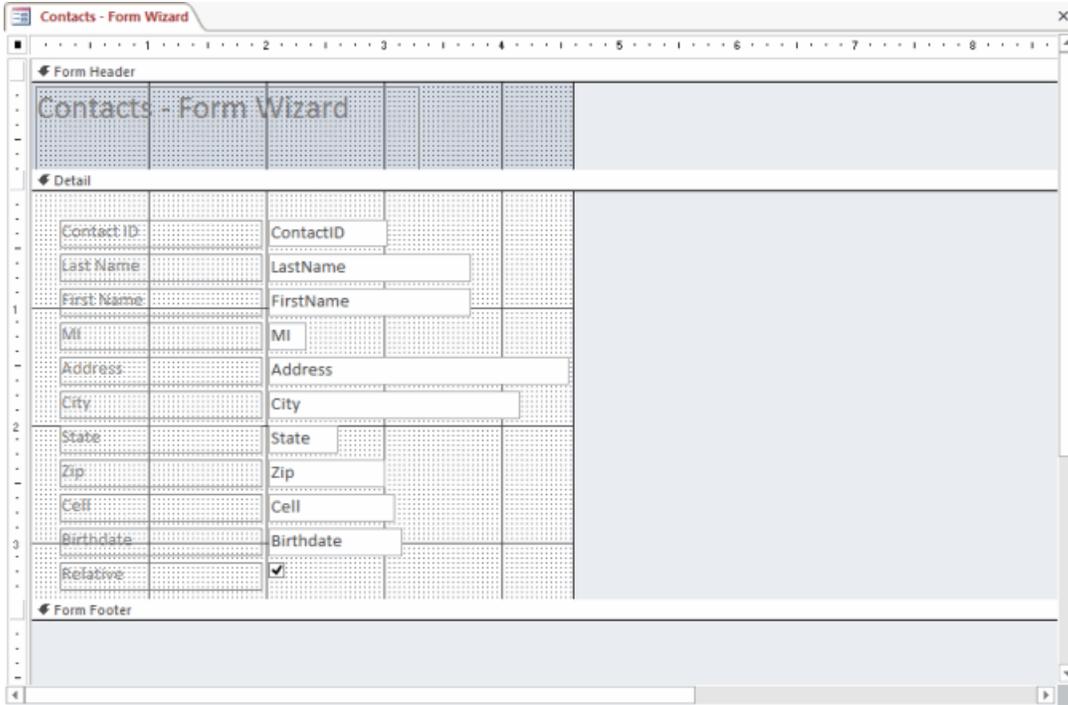
9. Click **Finish**. The form loads in the view you selected.

The screenshot shows a window titled "Contacts - Form Wizard" with a close button (X) in the top right corner. The main area contains a form with the following fields and values:

Contact ID	<input type="text"/>
Last Name	Ruth
First Name	George
MI	H
Address	1895 26th Ave
City	Baltimore
State	MD
Zip	21212-
Cell	(410) 555-5981
Birthdate	2/6/1995
Relative	<input type="checkbox"/>

At the bottom of the window, there is a status bar with the text "Record: 1 of 5", navigation arrows, "No Filter", and a "Search" field.

**Form view**



**Design view**

# Exercise 11: Creating a Form with the Form Wizard

 15 to 35 minutes

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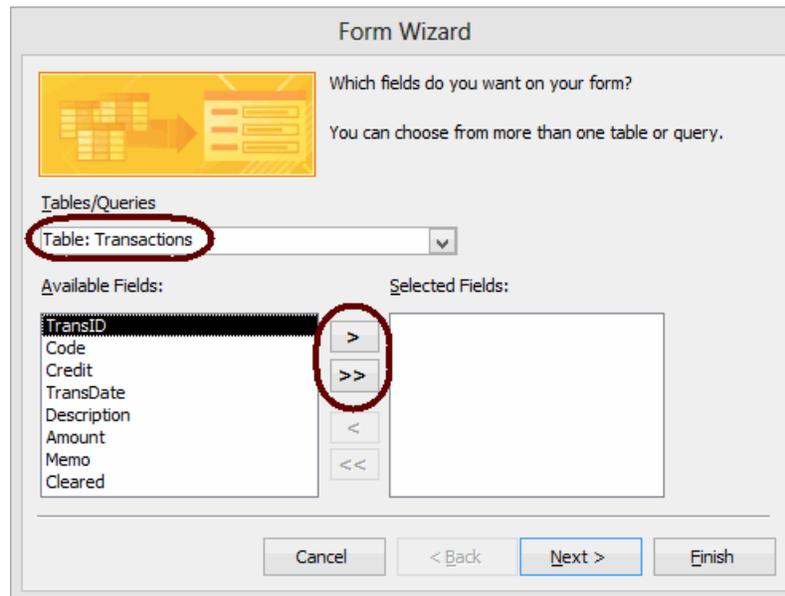
Use the Form Wizard to create a columnar form based on the Transactions table in the Bank Register database in the ClassFiles/Forms/Exercises folder. Include all fields except the TransID field. (Record numbers will be generated whether or not the key field is included on the form.) Name the form “Transaction Entry”.

## Solution

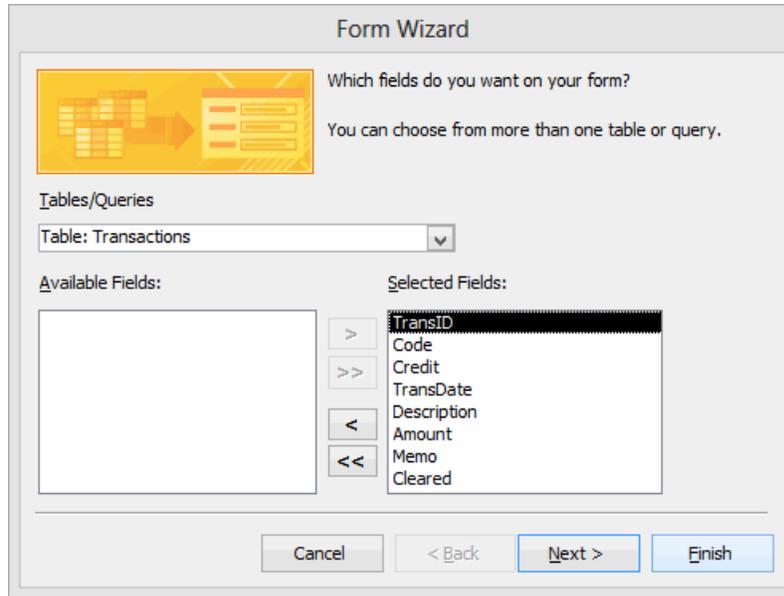
---

To create the form:

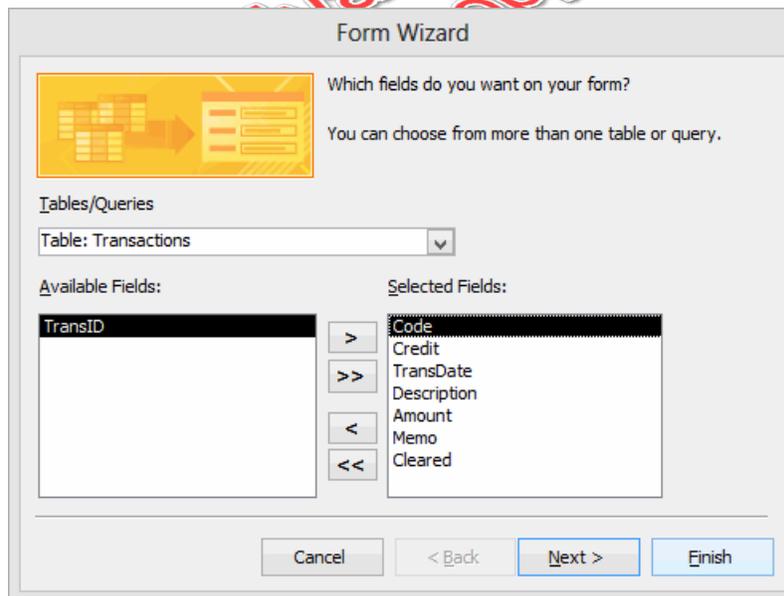
1. Open the database.
2. On the **Create** tab in the **Forms** group, click **Form Wizard**.



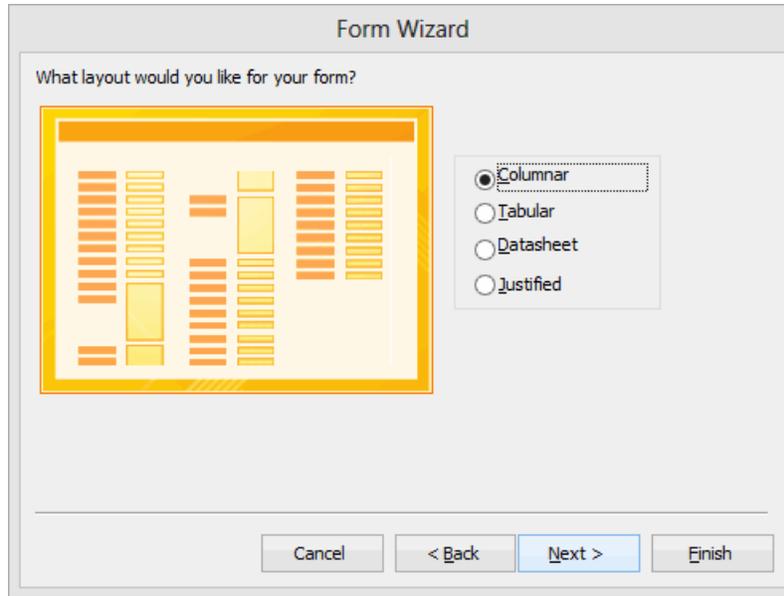
3. In the **Tables/Queries** field, ensure that the Transactions table is selected.
4. Click **>>** to move all fields from the **Available Fields** list box to the **Selected Fields** list box.



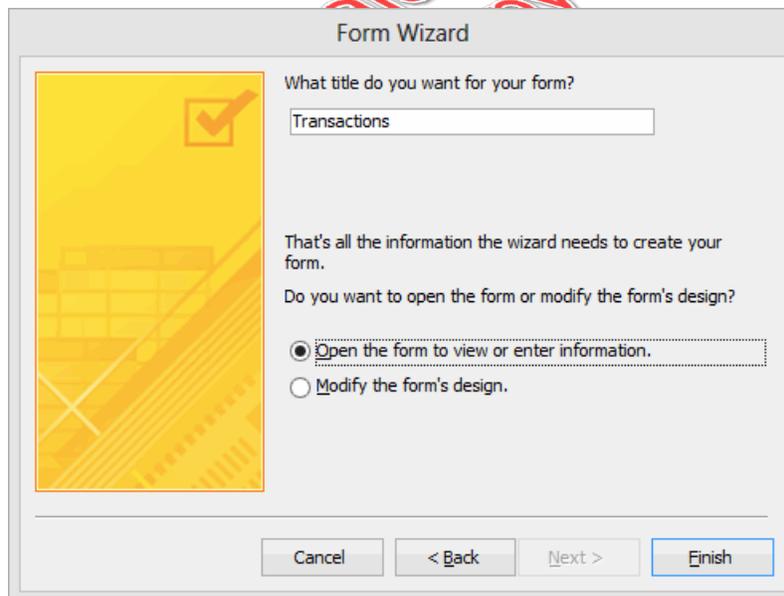
5. In the **Selected Fields** list box, double-click TransID to move it back to the **Available Fields** list box.



6. Click **Next >**.



7. Accept the “Columnar” option. Click **Next >**.



8. In the **What title do you want for your form?** field, type “Transaction Entry”.

**Form Wizard**



What title do you want for your form?

That's all the information the wizard needs to create your form.

Do you want to open the form or modify the form's design?

Open the form to view or enter information.

Modify the form's design.

9. Click **Finish**.

Transaction Entry
x

Code	<input type="text" value="AD"/>
Credit	<input checked="" type="checkbox"/>
Date	<input type="text" value="4/1/2013"/>
Description	<input type="text" value="Payroll deposit"/>
Amount	<input type="text" value="\$1,095.62"/>
Memo	<input type="text"/>
Cleared	<input checked="" type="checkbox"/>

Record: 14
1 of 6
No Filter

## Conclusion

In this lesson, you learned:

- To about types of forms.
- To add records using a form.
- To create simple forms using Access's built-in one-click forms.
- To create forms using the Form Wizard.

# LESSON 7

## Reports

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### Topics Covered

- Reports.
- The one-click report.
- The Report Wizard.

### Introduction

For this lesson, open the My Music Collection database located with your Webucator class files at `ClassFiles/Reports/Demos/My Music Collection.accdb`. If prompted concerning disabled content, click **Enable Content** in the yellow banner.



## 7.1. Reports

### ❖ 7.1.1. Definition and Purpose

Reports are a practical way to share data with others. Reports can be printed, saved as PDF, emailed to others, or exported to an Excel file. Reports are typically based on one or more tables or queries.

### ❖ 7.1.2. Views

Reports offer four views: Report view, Layout view, Design view, and Print Preview.

#### Report View

Report view is analogous to Form view for forms. Report view renders the report as the user will experience it.

To open a report object in Report view, highlight the report name in the **Navigation Pane** and double-click.

My Music

Artist	Title	Format
Adele	Skyfall	MP3
Alfie Boe	Music of the Night	MP3
Beatles	A Hard Day's Night	33
	The White Album	CD
Carrie Underwood	Just a Dream	MP3
Cleveland Orchestra	Rachmaninov Piano Concerto 1 & 3	CD
	Smetana: Moldau, Overtures	33
Count Basie and His Orch	King of Swing!	CD
	Right On	78
Donna Summer	I Remember Yesterday	Cass
D'Oyly Carte Opera Comp	Pirates of Penzance	33
Jim Croce	I Got a Name	8-tr
Nat King Cole	Unforgettable	45
Natalie Cole	Unforgettable	MP3

Tuesday, March 26, 2013 Page 1 of 1

## Layout View and Design View

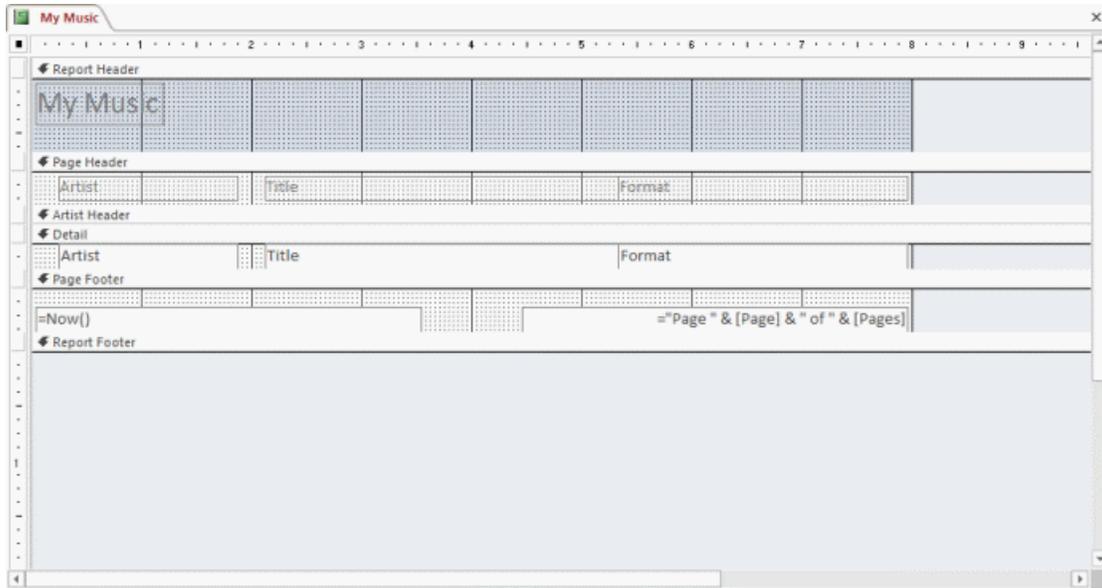
Layout view and Design view are also similar to their forms namesakes. Both allow you to work with the design of a report: Layout view from a visual perspective and Design view from a structural perspective.

My Music

Artist	Title	Format
Adele	Skyfall	MP3
Alfie Boe	Music of the Night	MP3
Beatles	A Hard Day's Night	33
	The White Album	CD
Carrie Underwood	Just a Dream	MP3
Cleveland Orchestra	Rachmaninov Piano Concerto 1 & 3	CD
	Smetana: Moldau, Overtures	33
Count Basie and His Orch	King of Swing!	CD
	Right On	78
Donna Summer	I Remember Yesterday	Cass
D'Oyly Carte Opera Comp	Pirates of Penzance	33
Jim Croce	I Got a Name	8-tr
Nat King Cole	Unforgettable	45
Natalie Cole	Unforgettable	MP3

Tuesday, March 26, 2013 Page 1 of 1

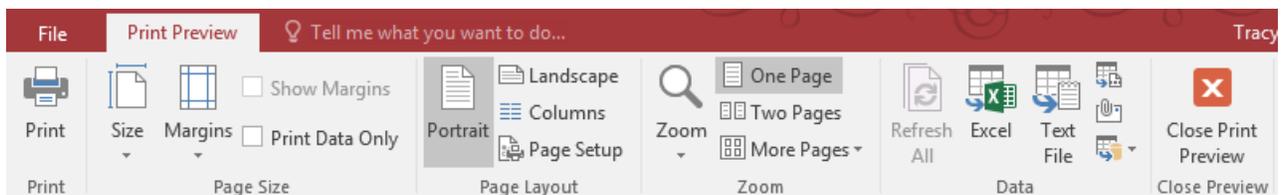
**Layout view**



**Design view**

## Print Preview

Print Preview is a special view for reports that allows you to tweak page settings before you print a report. Print Preview also offers different output methods including email, PDF, and Excel spreadsheet.



Artist	Title	Format
Adele	Skyfall	MP3
Alfie Boe	Music of the Night	MP3
Beatles	A Hard Day's Night	33
	The White Album	CD
Carrie Underwood	Just a Dream	MP3
Cleveland Orchestra	Rachmaninov Piano Concerto 1 & 3	CD
	Smetana: Moldau, Overtures	33
Count Basie and His Orch	King of Swing!	CD
	Right On	78
Donna Summer	I Remember Yesterday	Cass
D'Oyly Carte Opera Comp	Pirates of Penzance	33
Jim Croce	I Got a Name	8-tr
Nat King Cole	Unforgettable	45
Natalie Cole	Unforgettable	MP3

### ❖ 7.1.3. One-Click Report

Access offers a single one-click report.

To create a one-click report: Open `ClassFiles/Reports/Demos/My New Database - Before.accdb`.

1. In the **Navigation Pane**, highlight the table to base the report on.
2. On the **Create** tab in the **Reports** group, click **Report**. The report loads on the work surface.

Contact ID	Last Name	First Name	MI	Address
1	Ruth	George	H	1895 26th Ave
2	DIMaggio	Giuseppe	P	1914 Clipper St
3	Ensberg	Christina	A	14 Houston Pkwy
4	Aaron	Henry	L	44 Hammer Ln
5	Holland	Lauren	R	4545 Kaline Blvd

- Click **Save**. You are prompted to name the report.

- Type a name for the report and click **OK**.

### Note

The dashed lines on the report indicate page boundaries. This attempt at a contacts report would require further tweaking in Layout view or Design view to be usable.



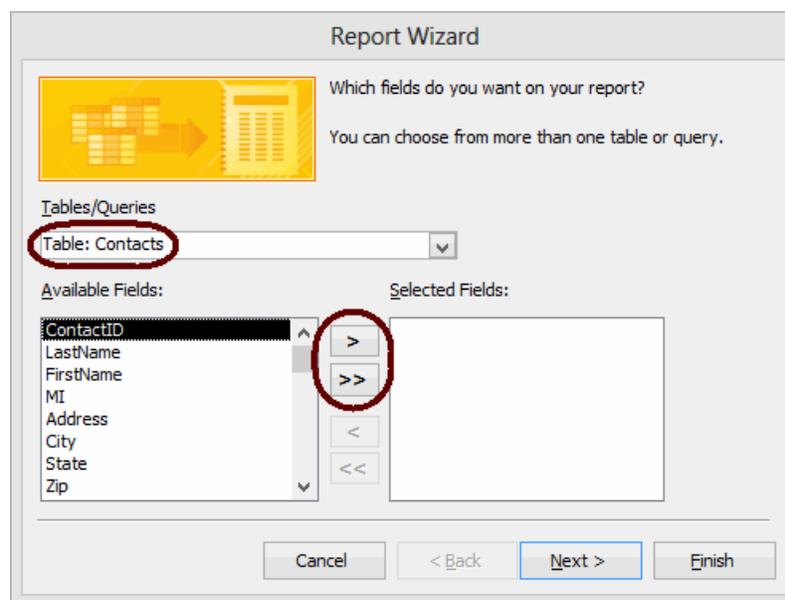
## 7.2. Report Wizard

Similar to the Form Wizard, the Report Wizard steps us through a series of decisions in order to build a report.

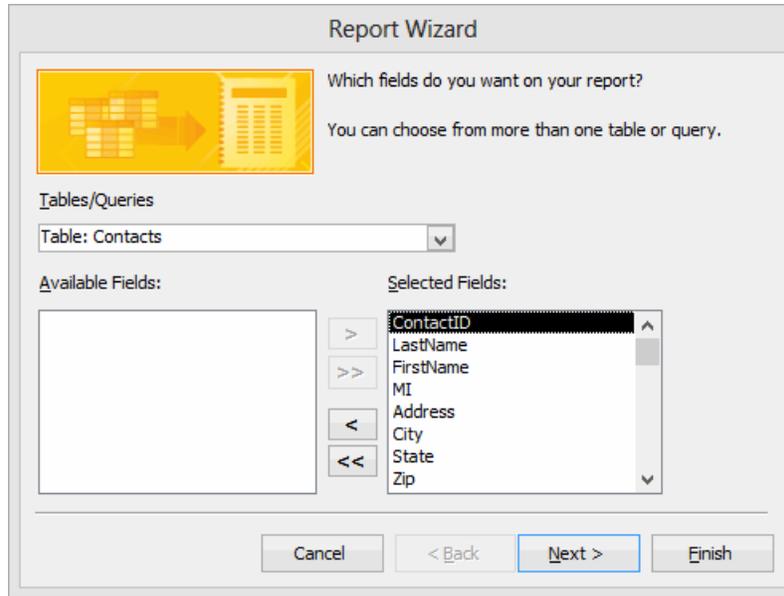
### ❖ 7.2.1. Create a Report Using the Report Wizard

To create a report using the Report Wizard: Open `ClassFiles/Reports/Demos/My New Database - Before.accdb`.

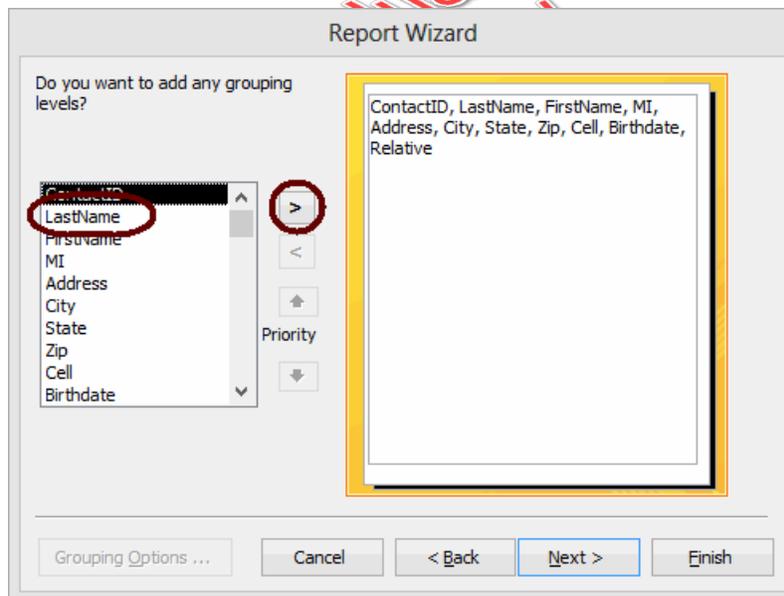
1. On the **Create** tab in the **Reports** group, click **Report Wizard**. The wizard starts.



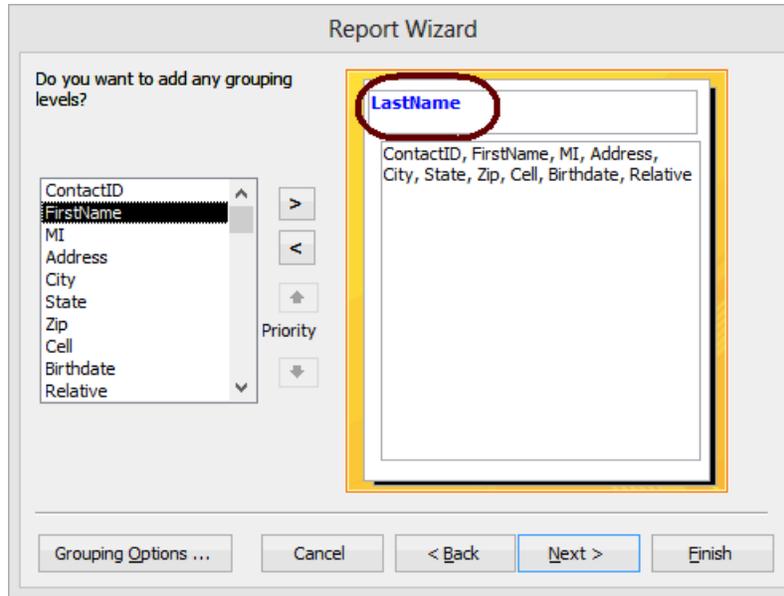
2. From the **Tables/Queries** drop-down list, select the table (or query) to base the report on. The fields for the selected table load in the **Available Fields** list box.
3. Move the fields to include on the report from the **Available Fields** list box to the **Selected Fields** list box. To do so, double-click a field name to move it or highlight the field name and click **>**. To move all fields at once, click **>>**.



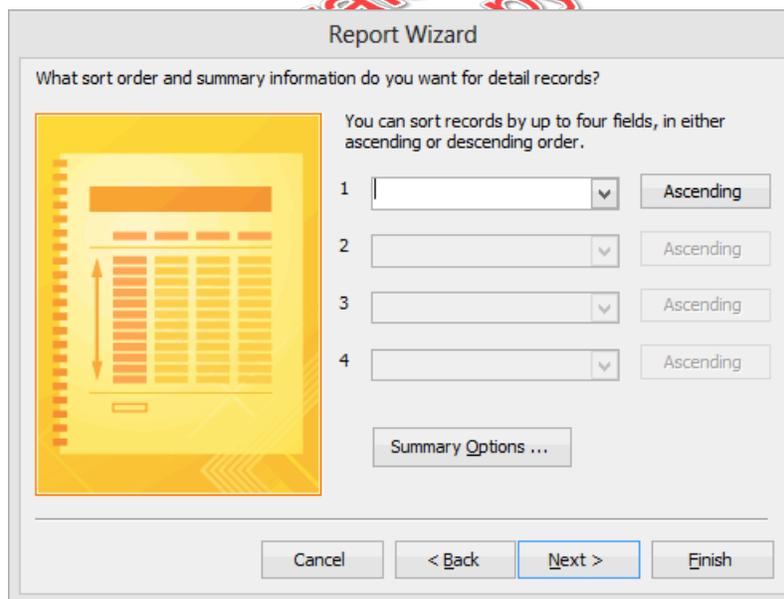
4. Click **Next >**.



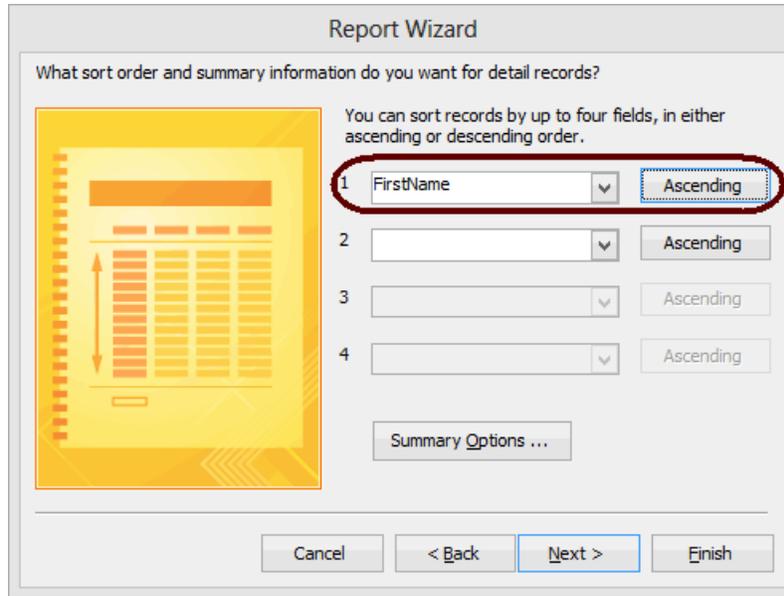
5. To group records on the report by a particular field, highlight the field in the list box and click **>**.



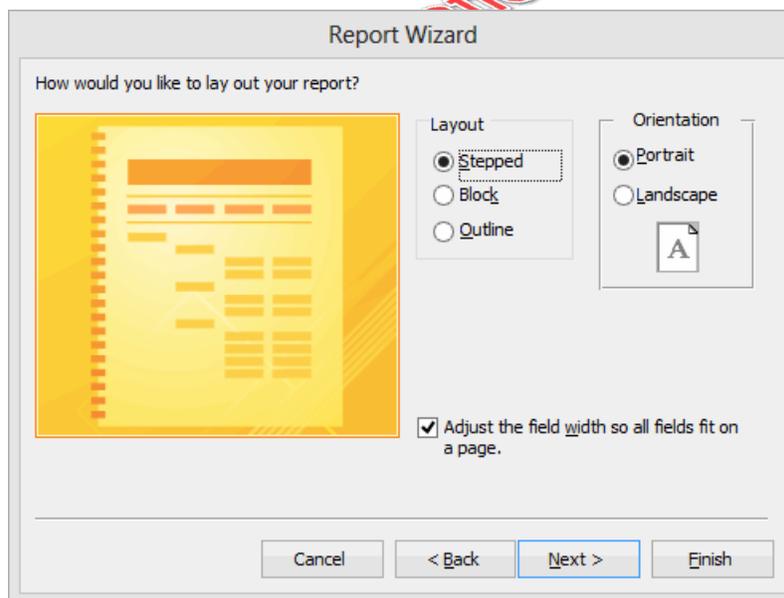
6. Add more grouping levels if desired. You can use the arrows to change the order of the grouping levels if needed.
7. When you finish defining how you want records grouped, click **Next >**.



8. In the first drop-down list, select the field to sort records by. By default, records will be sorted in ascending order by the field you select. If you want to sort in descending order, click the **Ascending** button to change its label to "Descending".

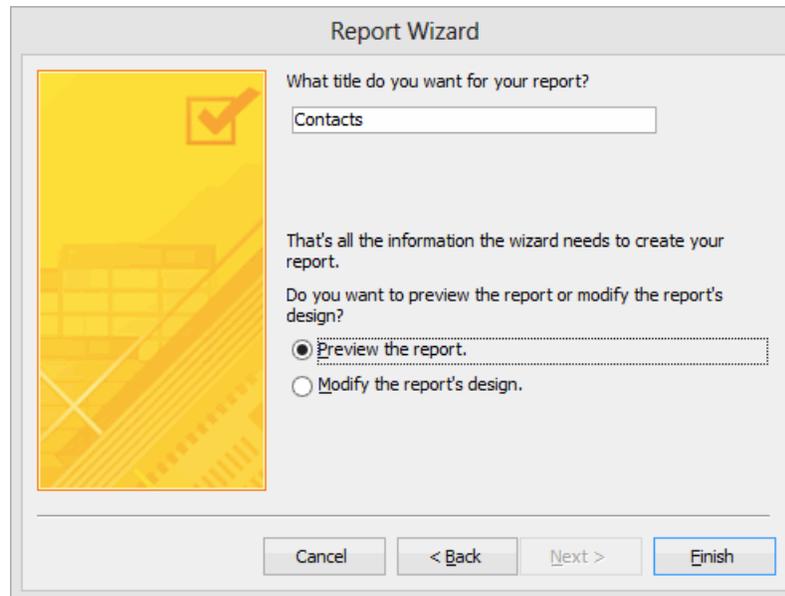


9. You can specify up to four levels of sorting. When you finish specifying sorting options, click **Next >**.



10. In the **Layout** field, select the format of the report. Your options are “Stepped”, “Block”, and “Outline”. (Try the options to see a preview of the report layouts.)
11. In the **Orientation** field, select whether to lay out the report in portrait or landscape mode.

12. If you want all fields to fit on a single page, ensure the **Adjust the field width so all fields fit on a page** check box is marked.
13. Click **Next >**.



Report Wizard

What title do you want for your report?

Contacts

That's all the information the wizard needs to create your report.

Do you want to preview the report or modify the report's design?

Preview the report.

Modify the report's design.

Cancel < Back Next > Finish

14. Enter a title for the report.
15. Select an option for the view you want to open the report in. Your options are:
  - **Preview the report** - Opens in Print Preview mode.
  - **Modify the report's design** - Opens in Design view.
16. Click **Finish**. The report loads in the view you selected.

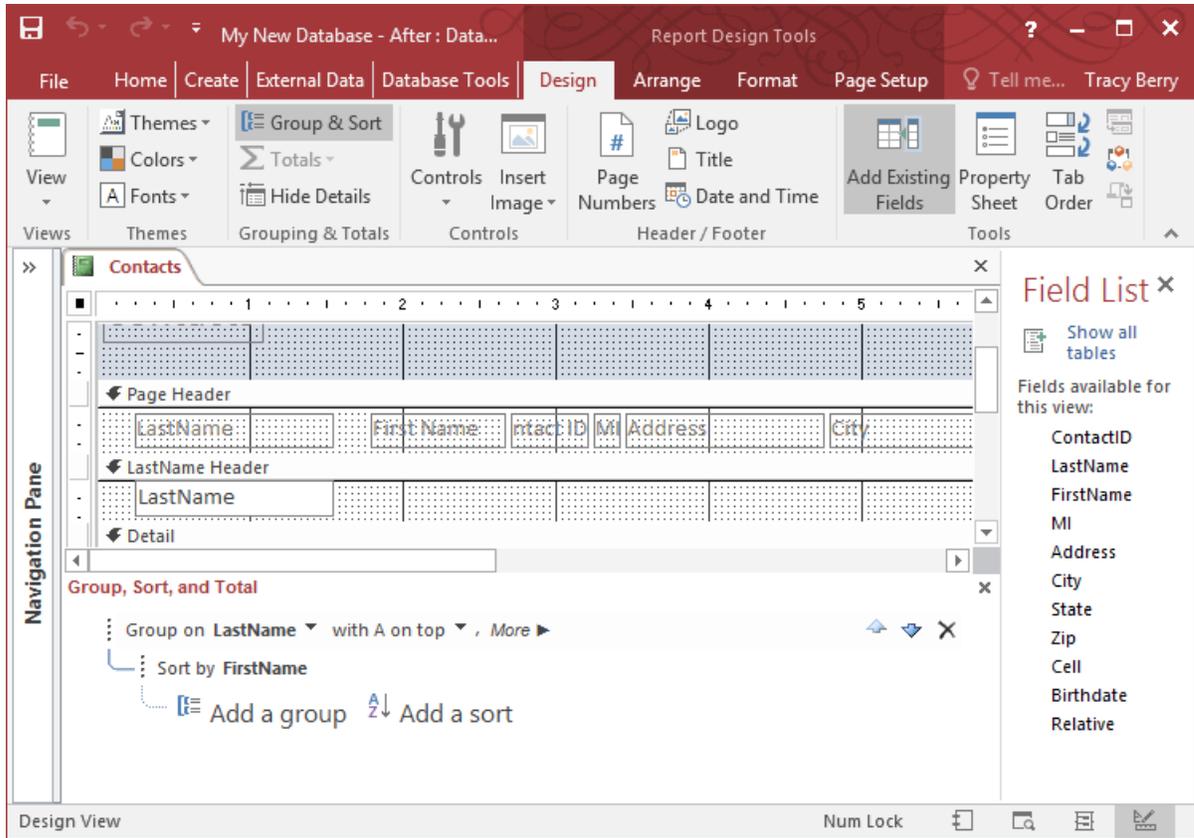
LastName	First Name	ntact ID	M	Address	City	Stat	Zip	Cell	Birthdate
Aaron	Henry	4	L	44 Hammer Ln	Little Rock	AR	72207-	(501) 55	#####
DiMaggio	Giuseppe	2	P	1914 Clipper St	Martinez	CA	94553-	(925) 55	#####
Ensberg	Christina	3	A	14 Houston Pkwy	San Diego	CA	92067-	(619) 55	#####
Holland	Lauren	5	R	4545 Kaline Blvd	Newark	OH	43058-	(740) 55	#####
Ruth	George	1	H	1895 26th Ave	Baltimore	MD	21212-	(410) 55	#####

### Print Preview

Report Header									
Contacts									
Page Header									
LastName	First Name	ntact ID	M	Address	City	Stat	Zip	Cell	Birthdate
LastName Header									
LastName									
Detail									
	FirstName	Contact	M	Address	City	Stat	Zip	Cell	Birthdate
Page Footer									
=Now()						="Page " & [Page] & " of " & [Pages]			
Report Footer									

### Design view

Once the wizard has done its job, then future changes to the Sorting and Grouping are made in the **Group, Sort, and Total area: Design > Group & Sort**. You may change the order, remove, or edit any existing items. You may also add a group and a sort as well.



## Exercise 12: Creating a Report with the Report Wizard

 15 to 35 minutes

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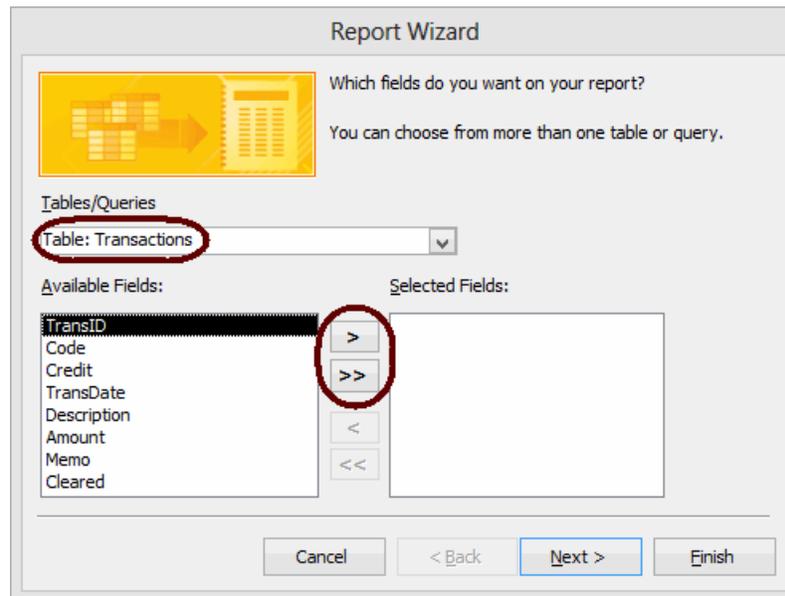
Use the Report Wizard to create a report based on the Transactions table in the Bank Register database in the `ClassFiles/Reports/Exercises` folder. Include all fields except the TransID field. Group by TransDate and sort in ascending order by Code. Use block layout and portrait orientation. Name the report "Transaction Listing". View the report in Print Preview mode.

## Solution

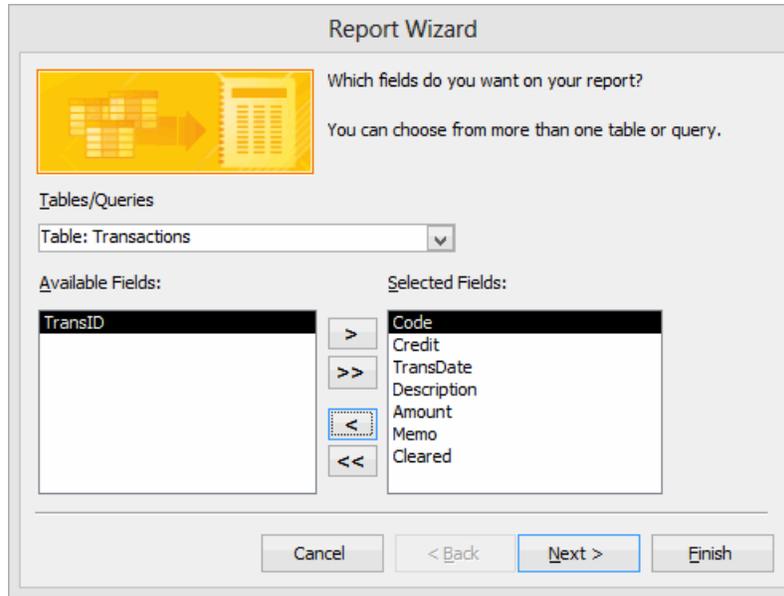
---

To create the report:

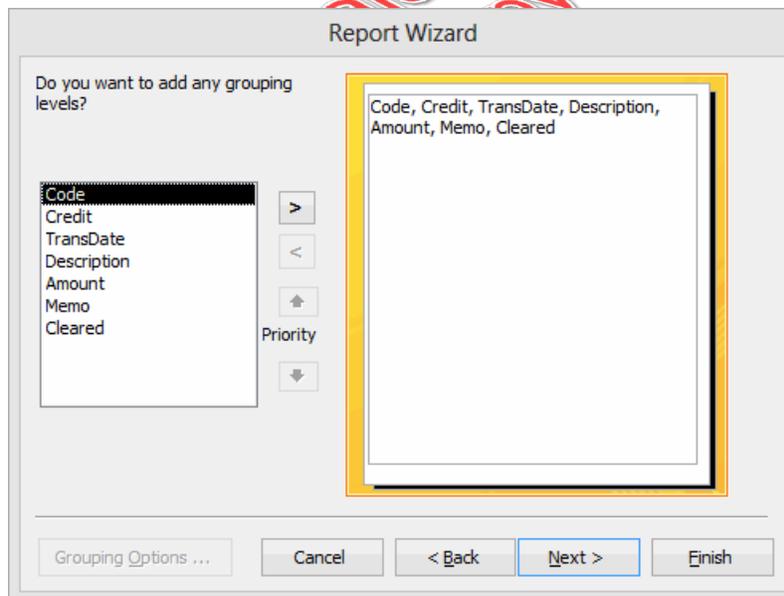
1. Open the database.
2. On the **Create** tab in the **Reports** group, click **Report Wizard**.



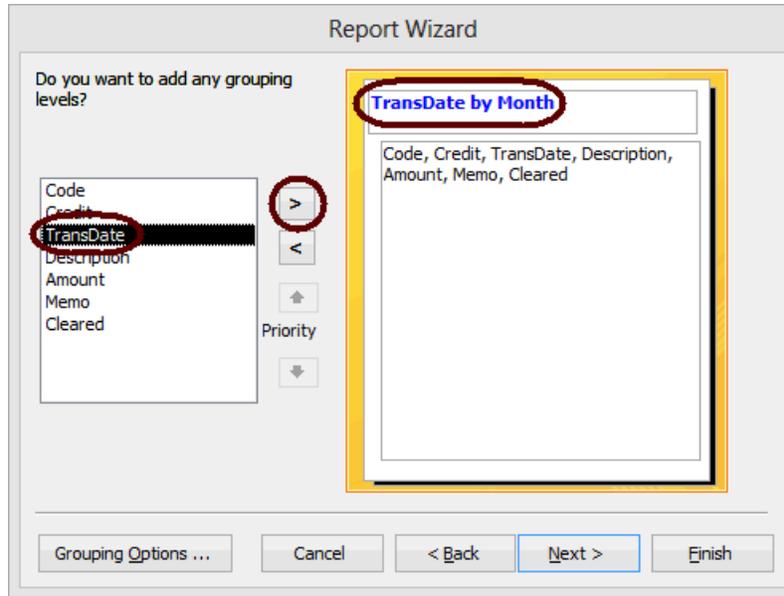
3. In the **Tables/Queries** field, ensure that the Transactions table is selected.
4. Move all fields except the TransID field from the **Available Fields** list box to the **Selected Fields** list box.



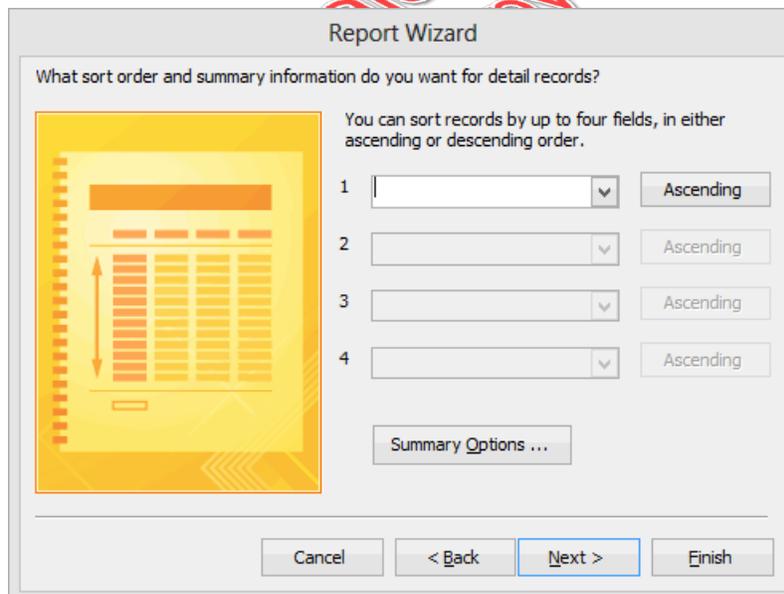
5. Click **Next >**.



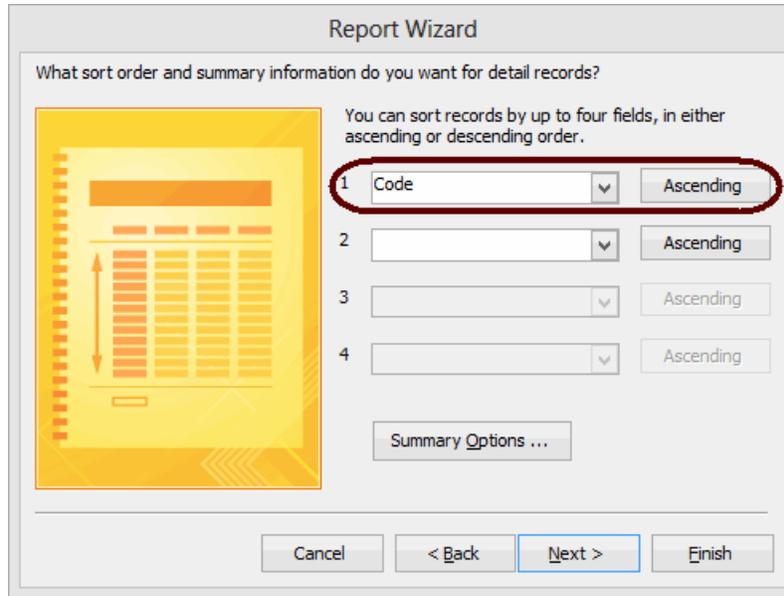
6. In the list box, highlight "TransDate", then click **>**.



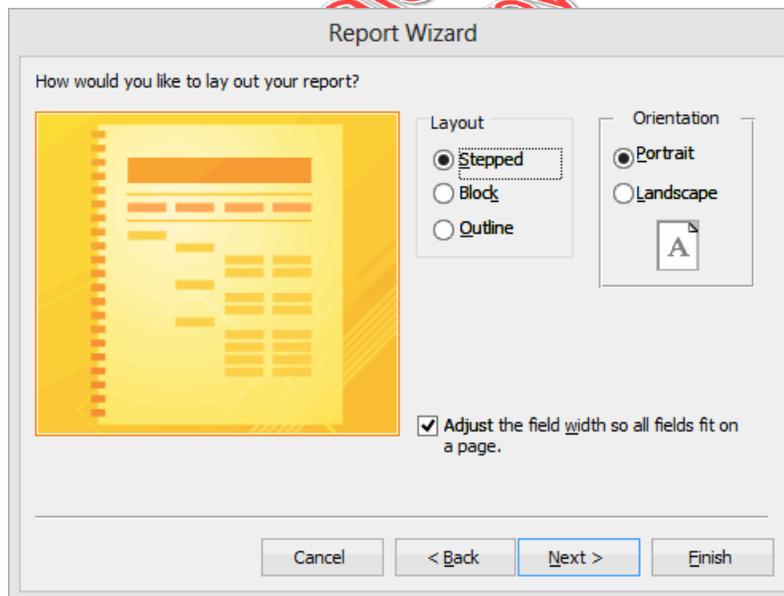
7. Click **Next >**.



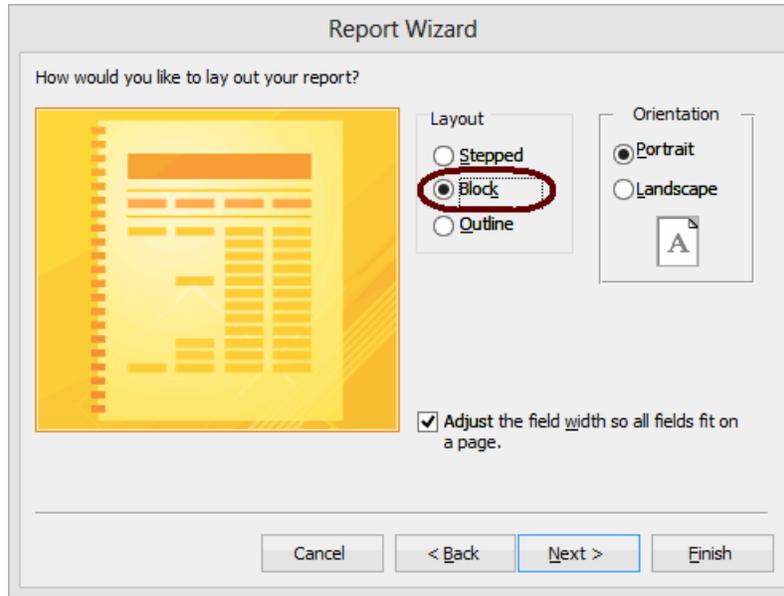
8. From the first drop-down list, select "Code".



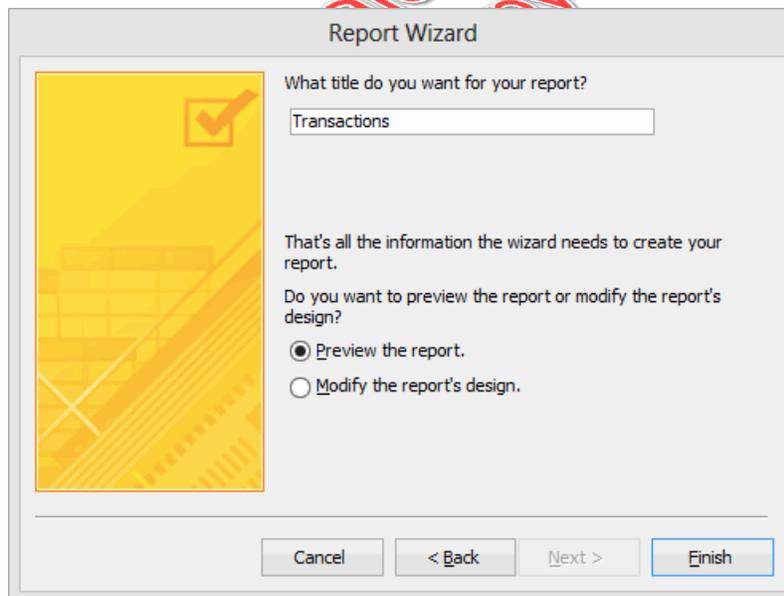
9. Click **Next >**.



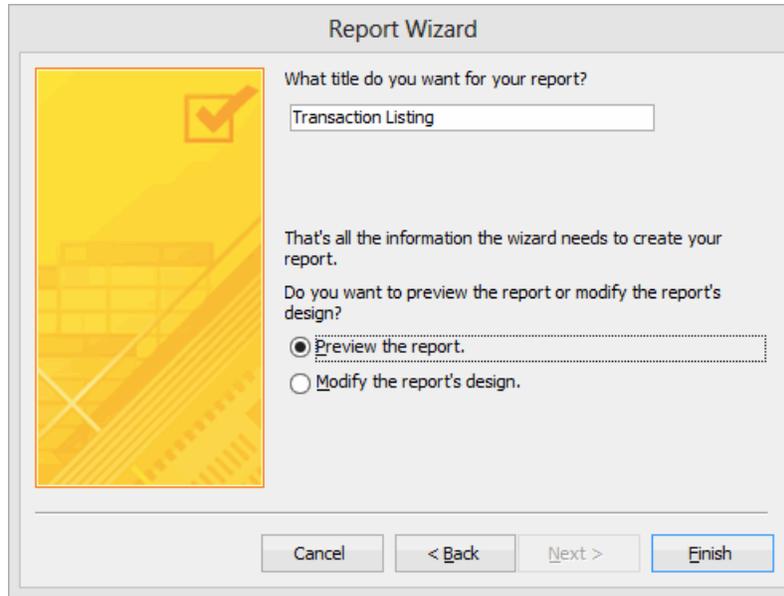
10. In the **Layout** field, select “Block”.



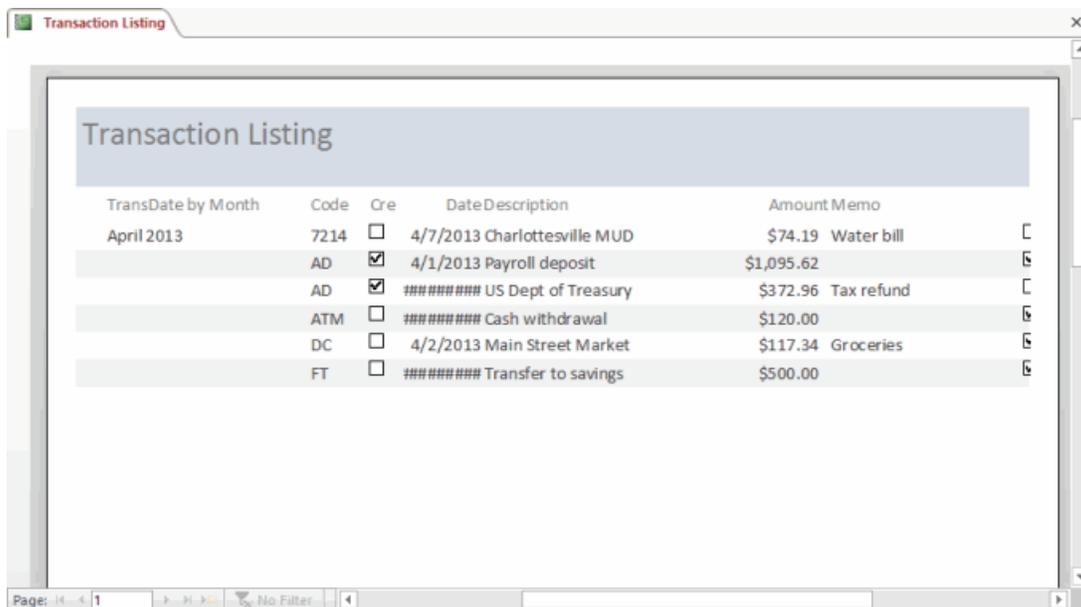
11. Click **Next >**.



12. In the **What title do you want for your report?** field, type "Transaction Listing".



13. Click **Finish**.



## Conclusion

In this lesson, you learned:

- To understand reports.

- To create a one-click report.
- To create a report using the Report Wizard

EVALUATION COPY

# LESSON 8

## Optional: Databases and Access Terms

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### Topics Covered

- What is a database?
- Database vs. spreadsheet.
- Where Excel excels.
- Relational databases.
- What is an RDBMS?
- What is Microsoft Access?
- Benefits and limitations of Access.

### Introduction

In this lesson, you will learn what a database is, how a database is different from a spreadsheet, where Excel excels and where it doesn't, how to choose whether to use a spreadsheet or a database for your purpose, what a relational database is, what a relational database management system (RDBMS) is, what Microsoft Access is, and some benefits and some limitations of Access.



### 8.1. "Database" Defined

A *database* is a collection of related information organized so that the information can be searched, retrieved, and manipulated. The information collected is commonly called *data*.

This basic definition reveals some essential characteristics of a database. Namely, a database:

- Stores data.
- Ideally only stores data relevant to its purpose.
- Has a meaningful structure.

- Is searchable.
- Returns the data its users need in a form that is useful to them.

The purpose of this course is to teach you about the tools that Microsoft Access provides to help you create applications that collect data, store it, find it, and output it.



## 8.2. Databases vs. Spreadsheets

Users often turn to databases when they feel they've reached the limits of what they can manage with spreadsheets. In this section, we'll explore how to know if you're choosing the right tool for the job.

Databases and spreadsheets share some common characteristics. Both provide a means for collecting data. Data in both can be filtered, sorted, and searched. Both spreadsheets and databases rely on a table structure.

Despite some similarities, spreadsheets and databases have certain strengths and weaknesses that make them suited to different tasks. The table below provides a comparison of the two.

<b>Database</b>	<b>Spreadsheet</b>
Labor-intensive setup	Simple to create
Somewhat steep learning curve	Easier for novices to get started
Relational structure: multiple tables	Flat structure: one table
Only displays the data the user needs	Displays all data
Can handle large amounts of data	Size is limited by computer resources
Multiple simultaneous users	The first user with access locks other users out. Other users can “read” data, but cannot change it.
Easy to update	Easy to introduce errors when updating
Data formats (e.g., text, date, currency) are enforced <i>plus</i> field size constraints, required fields, default values, and data validation.	Data formats are enforced
Limited graphing and charting capability	Powerful graphing, charting, and analysis tools
Limited calculations outside of reports	Extensive mathematical and financial calculations; what-if scenarios; cost-benefit analysis
Safeguards against duplicate data and data corruption	Prone to redundant and unreliable data
Once established, low maintenance	Low maintenance
Well-suited to long-term storage and data use	Best-suited to time-bounded data collection and analysis projects
Robust querying ability	Limited querying tools
No need to create copies of the database (except for backup)	Frequent copying of a spreadsheet can result in numerous “out-of-sync” versions of the spreadsheet

In summary, if you need a tool that is relatively easy to learn and use, that is flexible with enhanced financial, mathematical, and analytical capabilities, a spreadsheet may be the better solution. On the other hand, if capacity, efficiency, data integrity, and multi-user capability are important, you should consider using a database.

## ❖ 8.2.1. Questions to Ask When Deciding Whether to Use a Spreadsheet or a Database

- Does the data require multiple tables or is a single table sufficient?
- Is the data mostly text or mostly numbers?
- Is there a lot of repeated data?
- Do I need to track actions or events?
- Is ease of use or efficiency a greater priority?
- How much data do I need to store?
- Do I need to store and access the data on an ongoing basis or are my needs short-term?
- Is data reliability important?
- Is data corruption a concern? In other words, if I lost the data, would it be difficult to reproduce?
- How many users need access to the data?
- Do I need to produce complex reports from the data?
- Will other users need help with data entry?

Evaluation  
Copy

## 8.3. Access vs. Excel

Microsoft offers both a spreadsheet application, Excel, and a database application, Access. The general comparisons of databases and spreadsheets discussed above apply to Access and Excel as well. In particular...

The strengths of Excel include:

- Mathematical and financial calculations
- Data analysis
- Pivot tables
- Charting and graphing
- User familiarity

The strengths of Access include:

- Accuracy

- Efficiency
- Capacity
- Multiple tables
- Data entry
- Reporting
- Multiple simultaneous users

In addition, choosing Access doesn't mean you have to give up the features of Excel. In fact, Access includes an export feature that allows you to send data from your database to an Excel spreadsheet where you can take advantage of Excel's calculation, analysis, and data visualization tools. We'll talk about that feature in the advanced course.

### ❖ 8.3.1. Discussion Questions

For the examples below, decide whether the data described is better suited to a spreadsheet or a database. Why?

- An employee list with one name, address, phone number, and birth date for each employee.
- Product sales data including product, manufacturer, manufacturer's contact information, quantity sold, unit cost, and sales price.
- Student data including names, addresses, birth dates, and exam grades.



## 8.4. "Relational Database" Defined

A *relational database* is a collection of data sets organized in multiple tables. Each table in a relational database has well-defined relationships with one or more other tables in the database. These relationships make it easy for the tables to share data and, as we will see in later lessons, to search, retrieve, and report on the data.

Consider the following tables. The first table contains a list of recordings and the second is a list of recording formats.

## Recordings

Title	Artist	Format
Right On	Count Basie and His Orchestra	78
I Got a Name	Jim Croce	8-tr
Smetana: Moldau, Overtures	Cleveland Orchestra	33
A Hard Day's Night	Beatles	33
The White Album	Beatles	CD
I Remember Yesterday	Donna Summer	Cass
Rachmaninov Piano Concerto 1 & 3	Cleveland Orchestra	CD
Just a Dream	Carrie Underwood	MP3
Music of the Night	Alfie Boe	MP3
King of Swing!	Count Basie and His Orchestra	CD

## Recording Formats

Format	Description
ACE	Acetate disc
78	78 RPM vinyl record
45	45 RPM vinyl record
33	33 1/3 RPM vinyl record
Cass	Cassette tape
8-tr	8-track tape
CD	Compact disc
MP3	MP3 file

Evaluation  
Copy

What do the tables have in common?

Notice that both tables store recording formats. Notice also that the formats occur exactly once in the Formats, but occur 0, 1, or more times in the Recordings table. We can define a relationship between the Formats and the Recordings table based on this common information. We call this sort of relationship a *one-to-many relationship* since there is only one of each value in the Formats but these values can correspond to multiple values in the Format column of the Recordings table.

### ❖ 8.4.1. Terminology

Data tables are organized into *columns* and *rows*. The label at the top of each column is commonly called a *field* name. The values in a column are the values that the field takes on in data records. Each row in a data table represents a *record* in the table. The Recordings table above has three *fields* and ten *records*. The Formats has two fields and seven records. To add another record to a table, we simply add a new row and fill in data for each of the fields.

Evaluation  
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### ❖ 8.4.2. Observations

In our example above, we have multiple tables (2) and we can define a relationship between the tables based on the format data they have in common. These tables, with a defined relationship, satisfy our definition of relational database.

# Exercise 13: Understanding Relational Databases

 5 to 15 minutes

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Often, the existence of repeating values in a field signals an opportunity to create additional tables and relationships to streamline the database. Looking back at the Recordings and Formats in this lesson, define a third table and describe its relationship to the other tables. Sketch out the table on paper, showing field(s) and data value(s).



## Solution

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The Artist field in the Recordings table has repeated values. We can create an Artists table to hold those values.

### Artists

Name
Count Basie and His Orchestra
Jim Croce
Cleveland Orchestra
Beatles
Donna Summer
Carrie Underwood
Alfie Boe

The Artists table has a one-to-many relationship to the Recordings table. It has no apparent relationship to the Formats.

Evaluation  
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## 8.5. “Relational Database Management System” (RDBMS) Defined

A *relational database management system* (RDBMS) is software that stores relational data and provides the mechanisms to work with it. Tools in an RDBMS help you add and manipulate the data, retrieve specific subsets of data, generate reports, and share data.

Specific features of an RDBMS include:

- Table structure
- Enforcement of relationships and data integrity
- Multiple user capability
- Ability to prevent unauthorized users from accessing data
- Query language support (i.e., a means to tell the system what information you want to retrieve)
- Utilities for maintaining and backing up the database

- Support for access to the database across a network



## 8.6. Access is an RDBMS

Microsoft Access *is* a relational database management system. First, Access supports relational databases: data is stored in tables and Access provides a way to define relationships among those tables. Furthermore, Access includes a number of tools for working with data, including:

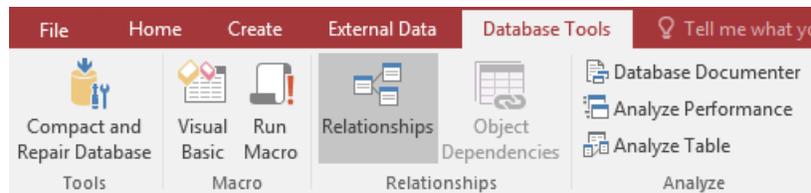
- Querying, sorting, and filtering tools for data retrieval
- Form building for data entry
- Report building for data presentation
- A macro language for task automation
- Supporting functions such as data import and export, data backup, and password protection



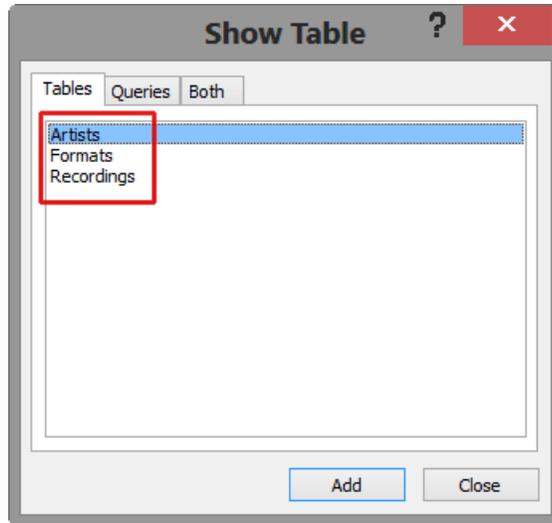
## 8.7. Creating a Relationship

In Access, you must establish the relationships using the Relationships window.

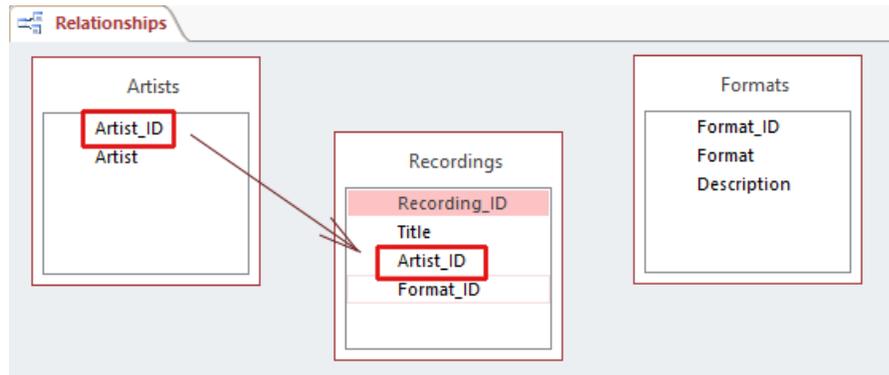
1. Choose Database Tools > Relationships > Relationships.



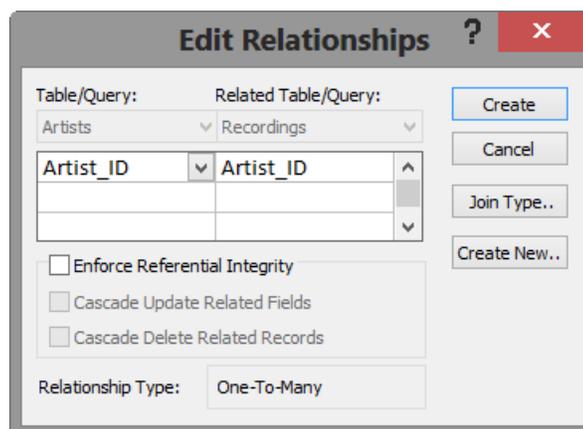
2. You must choose the tables to include.



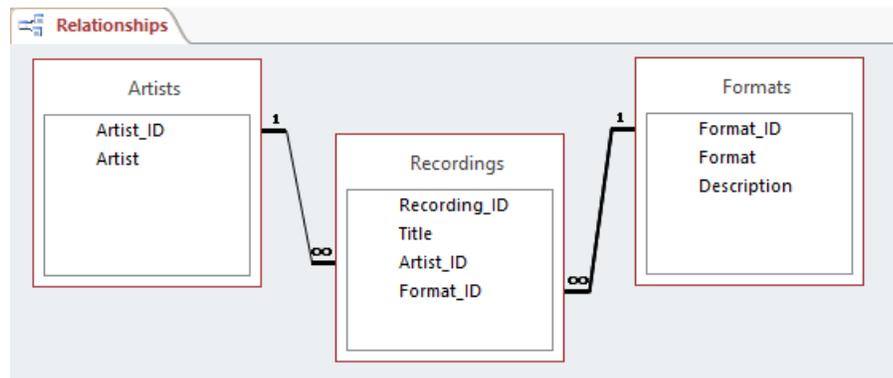
3. Drag the Primary Key from the Parent Table to the Foreign Key of the Child Table.



4. Choose the options for the relationship.



5. Repeat as needed and your Relationship window should be complete.



## 8.8. Benefits and Limitations of Access

Aside from the features just listed, Microsoft Access is a valuable tool for other reasons. As part of the Microsoft Office Suite, Access integrates seamlessly with other Office applications, particularly Excel and Word. This is handy if you need to export data from Access for analysis in Excel or if you need to use contact data stored in Access as the data source for a mail merge in Word.

Access appeals to a variety of skill levels. Access provides database templates which produce fully functioning databases, so novice users can create a database in mere minutes. Forms created in Access simplify data entry for users of any skill level. For users who need a custom database, Access provides wizards to simplify the processes of creating tables, forms, queries, and reports. For advanced users, Access provides a VBA (Visual Basic for Applications) editor so users with programming skills can work in the code behind the database objects.

The main potential drawbacks of using Access as a database solution are database size and performance limitations. The maximum size for an Access database file is 2GB. This is adequate for most personal database users and small businesses, but if your data storage needs are large, you should take this limitation into consideration. Also, while Access applications can be distributed for use among multiple users, the performance of an Access application will degrade as the number of *concurrent* users (users using the application at the same time) increases.

## ❖ 8.8.1. Discussion Questions

Thinking back to the example of the Recordings and Formats, suppose you need to store the year that each of the recordings was released. How could you include that information in the database? Would an additional table be needed? Why or why not?

## Conclusion

In this lesson, you learned:

- What a database, relational database, and relational database management system are.
- Guidelines for choosing whether to use a database or spreadsheet; in particular, whether to use Access or Excel.
- That Microsoft Access is an RDBMS suitable for users with a variety of skill levels where data storage needs are modest and where there are relatively few concurrent users.