

Hands-On Exercises



1 Table Design, Creation, and Modification

Assisting the bank auditor at Commonwealth Federal Bank as he investigates the mishandled funds will be a great opportunity for you to showcase your Access skills. Be sure to check your work each step of the way, because your work will come under substantial scrutiny. Do a good job with this Access project and more opportunities might come your way.

Skills covered: Create a Table in Datasheet View • Delete a Field and Set a Table's Primary Key • Work with Field Properties • Create a New Field in Design View • Modify the Table in Datasheet View

STEP 1 » CREATE A TABLE IN DATASHEET VIEW

You create a new desktop database to store information about the mishandled funds database. You enter the data for the first record (BranchID, Manager, and Location). Refer to Figure 2.7 as you complete Step 1.

Step h: Type the data directly into the datasheet

Step i: Save the table as Branch

FIGURE 2.7 Enter Data into the Branch Table in Datasheet View

ID	BranchID	Manager	Location
1	B10	Krebs	Uptown
2	B20	Esposito	Eastern
3	B30	Amosko	Western
4	B40	Singh	Southern
5	B50	YourLastName	Campus

- Start Microsoft Office Access 2013 and click **Blank desktop database**.
- Type **a02h1Bank_LastFirst** into the **File Name** box.
- Click **Browse** to find the folder location designated by your instructor and click **OK**. Click **Create** to create the new database.
Access will create the new database named **a02h1Bank_LastFirst** and a new table will automatically open in Datasheet view.
- Click **Click to Add** and select **Short Text** as the Data type.
Click to Add changes to *Field1*. *Field1* is selected to make it easier to change the field name.
- Type **BranchID** and press **Tab**.
A list of Data types for the third column opens so that you can select the data type for the third column.
- Select **Short Text**, type **Manager**, and then press **Tab**.
- Select **Short Text**, type **Location**, and then click in the first column next to the New Record asterisk.
- Enter the data for the new table as shown in Figure 2.7, letting Access assign the ID field for each new record. Replace *YourLastName* with your own last name.
Entering data in Datasheet view provides an easy way to create the table initially. You can now modify the table in Design view as described in the next several steps.
- Click **Save** on the Quick Access Toolbar. Type **Branch** in the **Save As** dialog box and click **OK**.

STEP 2 » DELETE A FIELD AND SET A TABLE'S PRIMARY KEY

It is possible to modify tables even after data have been entered; however, pay attention to the messages from Access after you make a design change. In this step, you will be modifying the Branch table. You examine the design of the table and realize that the BranchID field is a unique identifier, making the ID field redundant. You delete the ID field and make the BranchID field the primary key field. Refer to Figure 2.8 as you complete Step 2.

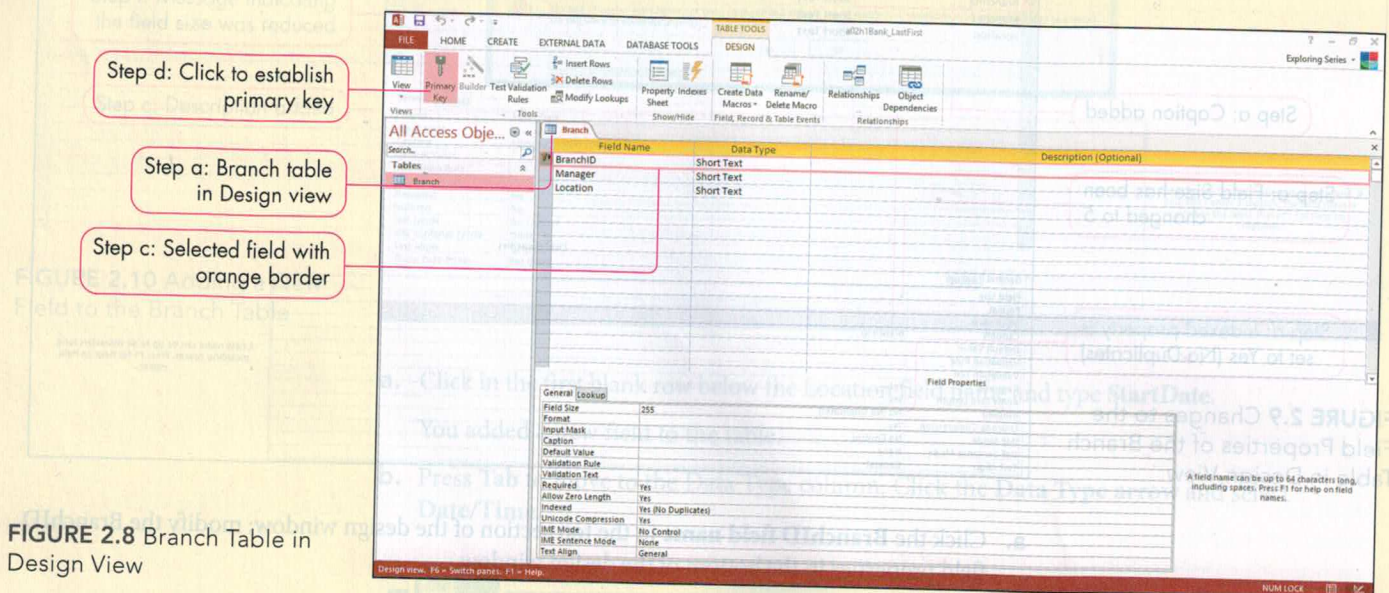


FIGURE 2.8 Branch Table in Design View

- Click **View** in the Views group to switch to the Design view of the Branch table. The Field Name for each of the four fields displays along with the Data Type.
- Click the **ID** field to select it, if necessary. Click **Delete Rows** in the Tools group. Click **Yes** to both warning messages. Access responds with a warning that you are about to permanently delete a field and a second warning that the field is the primary key. You delete the field because you will set the BranchID field as the primary key.
- Click the **BranchID** field, if necessary. The cell field name now has an orange border, as shown in Figure 2.8.
- Click **Primary Key** in the Tools group on the DESIGN tab. You set the BranchID as the primary key. The Indexed property in the *Field Properties* section at the bottom of the design window displays *Yes (No Duplicates)*.
- Click **Save** on the Quick Access Toolbar to save the table.



Shortcut Menu

You can right-click a row selector to display a shortcut menu to copy a field, set the primary key, insert or delete rows, or to access field properties. Use the shortcut menu to make these specific changes to the design of a table.

STEP 3 » WORK WITH FIELD PROPERTIES

You need to modify the table design further to comply with the bank auditor's specifications. Be aware of messages from Access that indicate you may lose data. Refer to Figure 2.9 as you complete Step 3.

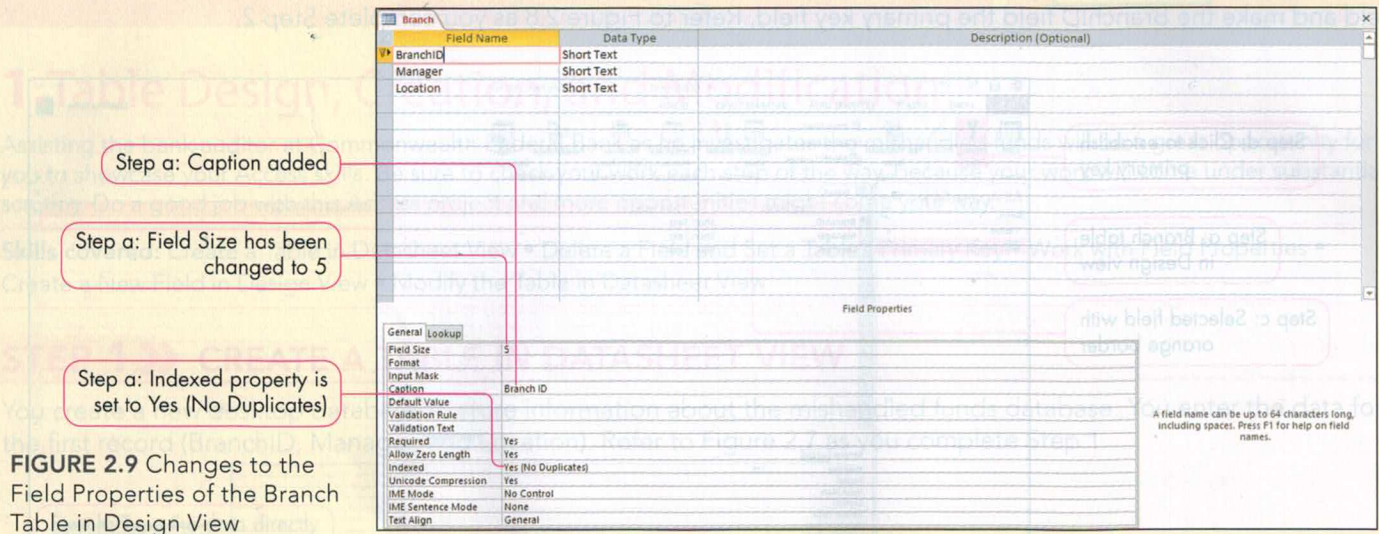
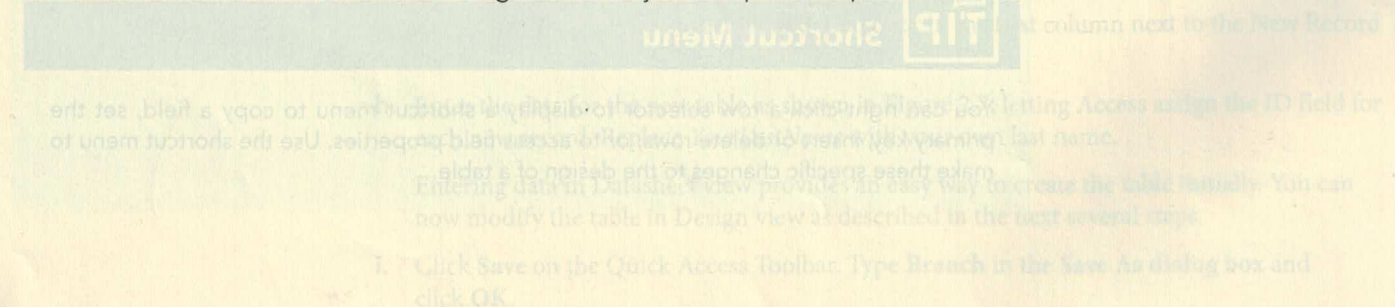


FIGURE 2.9 Changes to the Field Properties of the Branch Table in Design View

- a. Click the **BranchID** field name in the top section of the design window; modify the BranchID field properties in the bottom of the design window.
 - Click in the **Field Size** property and change 255 to 5.
 - Click in the **Caption** property and type **Branch ID**. Make sure *Branch* and *ID* have a space between them. A caption provides a more descriptive field name. It will appear as the column heading in Datasheet view.
 - Check the **Indexed** property; confirm it is *Yes (No Duplicates)*.
- b. Click the **Manager** field name at the top of the window; modify the following field properties:
 - Click in the **Field Size** property and change 255 to 30.
 - Click in the **Caption** property and type **Manager's Name**.
- c. Click the **Location** field name and modify the following field properties:
 - Click in the **Field Size** property and change 255 to 30.
 - Click in the **Caption** property and type **Branch Location**.

STEP 4 » CREATE A NEW FIELD IN DESIGN VIEW

You notify the auditor that a date field is missing in your new table. Modify the table to add the new field. The data can be entered at a later time. Refer to Figure 2.10 as you complete Step 4.



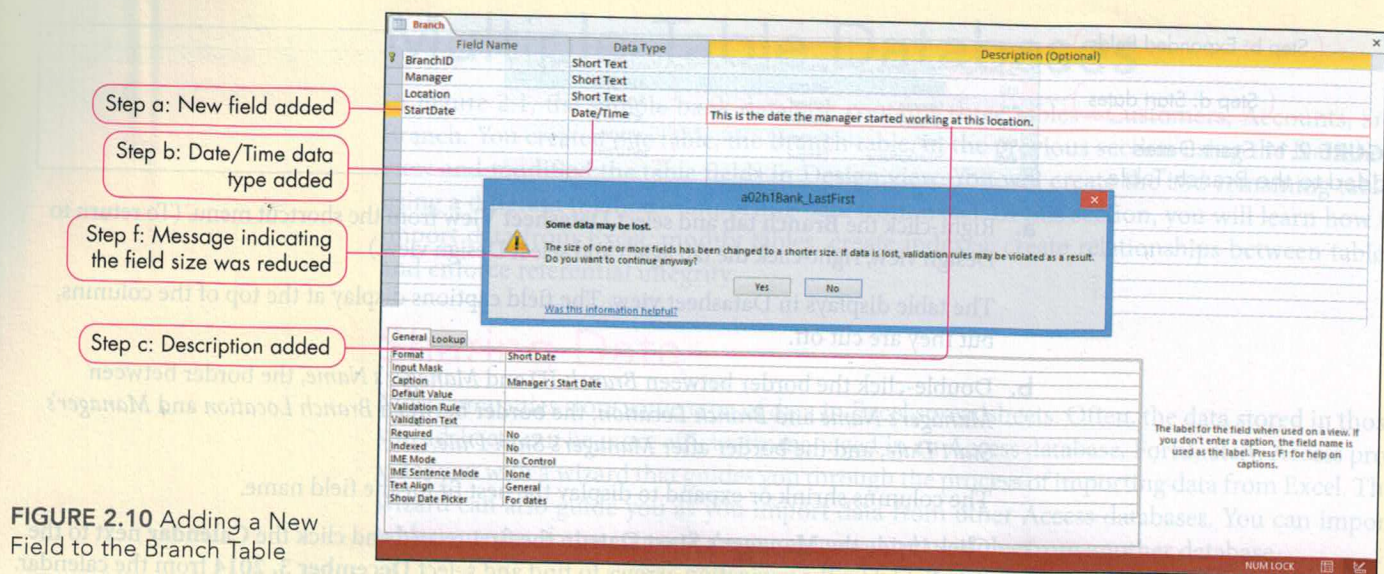


FIGURE 2.10 Adding a New Field to the Branch Table

- Click in the first blank row below the Location field name and type **StartDate**.
You added a new field to the table.
- Press **Tab** to move to the Data Type column. Click the **Data Type** arrow and select **Date/Time**.



Keyboard Shortcut for Data Types

You also can type the first letter of the data type, such as **d** for Date/Time, **s** for Short Text, or **n** for Number. To use the keyboard shortcut, click on the field name and press **Tab** to advance to the Data Type column. Next, type the first letter of the data type.

- Press **Tab** to move to the Description column and type **This is the date the manager started working at this location.**
- Click the **Format** property, click the arrow, and then select **Short Date** from the list of date formats.
- Click in the **Caption** property and type **Manager's Start Date**.
- Click **Save** on the Quick Access Toolbar.

A warning dialog box opens to indicate that "Some data may be lost" because the size of the BranchID, Manager, and Location field properties were shortened. It asks if you want to continue anyway. Always read the Access warning! In this case, you can click **Yes** to continue because you know that the existing data are no longer than the new field sizes.

- Click **Yes** in the warning box.

STEP 5 MODIFY THE TABLE IN DATASHEET VIEW

As you work with the auditor, you will modify tables in the bank database from time to time. To modify the table, you will need to switch between Design view and Datasheet view. Refer to Figure 2.11 as you complete Step 5.

Step b: Expanded fields

Step d: Start dates

FIGURE 2.11 Start Dates Added to the Branch Table

Branch ID	Manager's Name	Branch Location	Manager's Start Date	Click to Add
B10	Krebs	Uptown	12/3/2014	
B20	Esposito	Eastern	6/18/2013	
B30	Amosko	Western	3/13/2011	
B40	Singh	Southern	9/15/2014	
B50	YourLastName	Campus	10/11/2016	

- Right-click the **Branch** tab and select **Datasheet View** from the shortcut menu. (To return to Design view, right-click the tab again and select Design view.)
The table displays in Datasheet view. The field captions display at the top of the columns, but they are cut off.
- Double-click the border between *Branch ID* and *Manager's Name*, the border between *Manager's Name* and *Branch Location*, the border between *Branch Location* and *Manager's Start Date*, and the border after *Manager's Start Date*.
The columns shrink or expand to display the best fit for the field name.
- Click inside the **Manager's Start Date** in the first record and click the **Calendar** next to the date field. Use the navigation arrows to find and select **December 3, 2014** from the calendar.
You can also enter the dates by typing them directly into the StartDate field.
- Type the start date directly in each field for the rest of the managers, as shown in Figure 2.11.
- Click the **Close (X) button** at the top-right corner of the datasheet, below the Ribbon.

TROUBLESHOOTING: If you accidentally click the Close (X) button on top of the Ribbon, you will exit Access completely. To start again, launch Access and click the first file in the Recent list.

- Double-click the **Branch** table in the Navigation Pane to open the table. Check the start dates.
The start dates are still there even though you did not save your work in the previous step. Access saves the data to your storage location as soon as you move off the current record or close an object.
- Click the **FILE** tab, click **Print**, and then click **Print Preview**.
Occasionally, users will print an Access table. However, database developers usually create reports to print table data.
- Click **Close Print Preview** and close the Branch table.
- Keep the database open if you plan to continue with Hands-On Exercise 2. If not, close the database and exit Access.

Multiple-Table Databases

In Figure 2.1, the sample bank database contains three tables—Customers, Accounts, and Branch. You created one table, the Branch table, in the previous section using the Datasheet view and modified the table fields in Design view. You will create the two remaining tables using a different method—importing data from Excel. In this section, you will learn how to import data from Excel, modify tables, create indexes, create relationships between tables, and enforce referential integrity.

Sharing Data

Most companies store some type of data in Excel spreadsheets. Often, the data stored in those spreadsheets can be more efficiently managed in an Access database. Fortunately, Access provides you with a wizard that guides you through the process of importing data from Excel. The wizard can also guide you as you import data from other Access databases. You can import tables, queries, forms, reports, pages, macros, and modules from another database.

Import an Excel Spreadsheet

STEP 1 >>

STEP 2 >>

Figures 2.12 through 2.17 show the steps of the Get External Data – Excel Spreadsheet feature. Launch the feature by clicking the External Data tab and clicking Excel in the Import & Link group. Figure 2.12 shows the first screen of the Get External Data – Excel Spreadsheet feature. In this step, you specify the source of the data. Locate the Excel file you want to import by clicking Browse. Then choose between three options for the incoming data: *Import the source data into a new table in the current database*; *Append a copy of the records to the table*, which adds the data to an existing table; or *Link to the data source by creating a linked table*, which creates a link to the Excel source. Importing or appending data stores a copy of the data in Access, whereas linking the data keeps the data in the original file and Access retrieves the data each time the database is opened.

Click Browse to find a spreadsheet

Decide what you want to do with the data

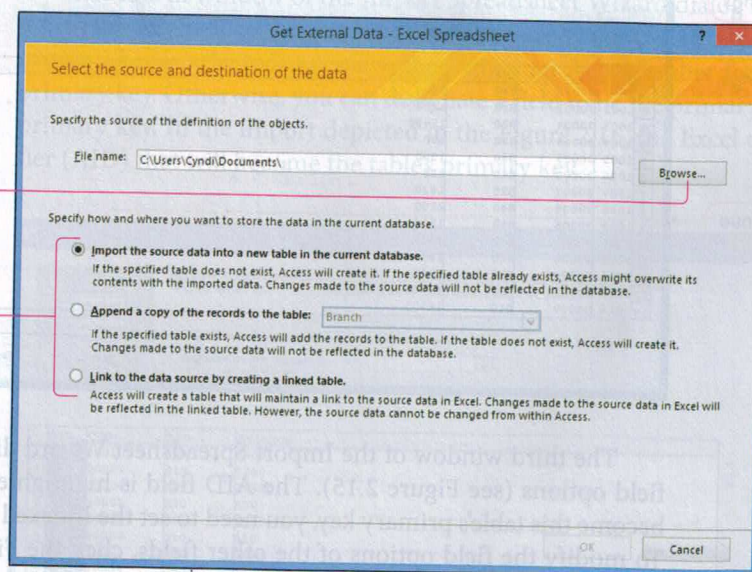


FIGURE 2.12 Import Excel Data

After you locate and select an Excel workbook, accept the default option (*Import the source data into a new table in the current database*) and click OK. The Import Spreadsheet Wizard dialog box launches and displays a list of the worksheets in the specified workbook. Select the worksheet you want to import and click Next. Figure 2.13 shows the Accounts worksheet selected. The bottom of the Import Spreadsheet Wizard dialog box displays a preview of the data stored in the specified worksheet.

Hands-On Exercises



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2 Multiple-Table Databases

You created a new Bank database, and you created a new Branch table. Now you are ready to import additional tables—one from an Excel spreadsheet and one from an Access database. Assume that the data are formatted correctly and are structured properly so that you can begin the import process.

Skills covered: Import Excel Data • Import Data from an Access Database • Modify an Imported Table's Design and Add Data • Add Data to an Imported Table • Establish Table Relationships • Test Referential Integrity

STEP 1 » IMPORT EXCEL DATA

You and the auditor have discovered several of Commonwealth's files that contain customer data. These files need to be analyzed, so you decide to import the data into Access. In this exercise, you import an Excel spreadsheet into the Bank database. Refer to Figure 2.22 as you complete Step 1.

Step c: Click Excel to import data

Step e: Imported column headings

CID	FirstName	LastName	Street	City	State	ZIP	Phone
30001	Allison	Millward	2732 Baker Blvd.	Greensboro	NC	27492	5553345678
30002	Bernett	Fox	12 Orchestra Terrace	High Point	NC	27494	5553585554
30003	Clay	Hayes	P.O. Box 555	Greensboro	NC	27492	5559984457
30004	Cordlie	Collins	2743 Bering St.	Winston-Salem	NC	27492	5554472283
30005	Eaton	Wagner	2743 Bering St.	Greensboro	NC	27492	5559883346
30006	Kwasi	Williams	89 Jefferson Way	High Point	NC	27494	5554475565
30007	Natasha	Simpson	187 Suffolk Ln.	Greensboro	NC	27493	5557753389
30008	Joy	Jones	305 - 14th Ave. S.	Winston-Salem	NC	27493	5552587655
30009	John	Nunn	89 Chiaroscuro Rd.	Greensboro	NC	27494	5559985557
30010	Laura	Peterson	120 Hanover Sq.	Winston-Salem	NC	27492	5553346654

FIGURE 2.22 Imported Customers Table

- Open *a02h1Bank_LastFirst* if you closed it at the end of Hands-On Exercise 1. Click the **FILE** tab, click **Save As**, and then click **Save As** in the *Save Database As* section. Type *a02h2Bank_LastFirst*, changing *h1* to *h2*. Click **Save**.
- If necessary, click **Enable Content** below the Ribbon to indicate you trust the contents of the database

TROUBLESHOOTING: If you make any major mistakes in this exercise, you can close the file, open *a02h1Bank_LastFirst* again, and then start this exercise over.

- Click the **EXTERNAL DATA** tab and click **Excel** in the **Import & Link** group to launch the **Get External Data – Excel Spreadsheet** feature. Select the **Import the source data into a new table in the current database** option, if necessary.
- Click **Browse** and go to the student data folder. Select the *a02h2Customers* workbook. Click **Open** and click **OK** to open the **Import Spreadsheet Wizard**.
- Ensure that the **First Row Contains Column Headings** check box is checked to tell Access that column headings exist in the Excel file.

The field names *CID*, *FirstName*, *LastName*, *Street*, *City*, *State*, *ZIP*, and *Phone* will import from Excel along with the data stored in the rows in the worksheet. The field names will be modified later in Access.

f. Click **Next**.

g. Ensure that **CID** is displayed in the Field Name box in Field Options. Click the **Indexed arrow** and select **Yes (No Duplicates)**. Click **Next**.

The CID (CustomerID) will become the primary key in this table. It needs to be a unique identifier, so we must change the properties to no duplicates.

h. Click the **Choose my own primary key option**. Make sure that the CID field is selected. Click **Next**.

The final screen of the Import Spreadsheet Wizard asks you to name your table. The name of the Excel worksheet was Customers, and Access defaults to the worksheet name. It is an acceptable name.

i. Click **Finish** to accept the Customers table name.

A dialog box opens asking if you wish to save the steps of this import to use again. If this were sales data that was collected in Excel and updated to the database on a weekly basis, saving the import steps would save time. You do not need to save this example.

j. Click the **Close (X)** button.

The new table displays in the Navigation Pane and resides in the Bank database.

k. Open the imported Customers table in Datasheet view and double-click the border between each of the field names to adjust the columns to Best fit. Compare your table to Figure 2.22.

l. Close the table.

STEP 2 » IMPORT DATA FROM AN ACCESS DATABASE

The Customers spreadsheet that you imported contains customer information. The auditor asks you to import an Access database table that contains account information related to the mishandled funds. You use the Import Wizard to import the database table. Refer to Figure 2.23 as you complete Step 2.

Step a: External Data tab

Step a: Click Access

Step e: Imported Accounts table

AID	CID	BID	Balance	OpenDate
1001	30010	850	5600	4/28/2012
1002	30001	810	1200	4/13/2010
1003	30004	820	15490	5/28/2009
1004	30001	830	630	9/21/2008
1005	30009	850	1300	7/22/2010
1006	30003	810	350	7/3/2008
1007	30007	820	1620	6/7/2011
1008	30004	840	2100	9/30/2012
1009	30005	850	1500	2/7/2011
1010	30001	800	3000	3/18/2015
1011	30005	810	290	10/16/2016
1012	30002	830	1900	3/14/2012
1013	30001	820	10000	5/15/2014
1014	30009	810	16700	9/17/2012
1015	30004	830	460	4/4/2008
1016	30001	830	18700	3/13/2008
1017	30010	830	980	9/3/2009
1018	30005	840	7800	5/6/2008
1019	30004	830	14250	1/4/2016
1020	30001	850	1200	4/13/2010
1021	30011	850	23004	7/2/2009
1022	30001	850	4000	4/13/2016
1023	30011	850	1090	1/4/2016

FIGURE 2.23 Imported Accounts Table

a. Click the **EXTERNAL DATA** tab and click **Access** in the Import & Link group to launch the Get External Data – Access Database feature. Select the **Import tables, queries, forms, reports, macros, and modules into the current database option**, if necessary.

b. Click **Browse** and go to the student data folder. Select the **a02h2Accounts** database. Click **Open** and click **OK** to open the Import Objects dialog box.

The Accounts table is active; you will import this table.

c. Ensure that the Accounts table is selected and click **OK**.

- d. Click **Close** on the Save Import Steps dialog box.

The Navigation Pane contains three tables: Accounts, Branch, and Customers.

- e. Open the imported Accounts table in Datasheet view and compare it to Figure 2.23.

STEP 3 >> MODIFY AN IMPORTED TABLE'S DESIGN AND ADD DATA

When importing tables from either Excel or Access, the fields may have different data types and property settings than required to create table relationships. You need to modify the tables so that each field has the correct data type and field size. Refer to Figure 2.24 as you complete Step 3.

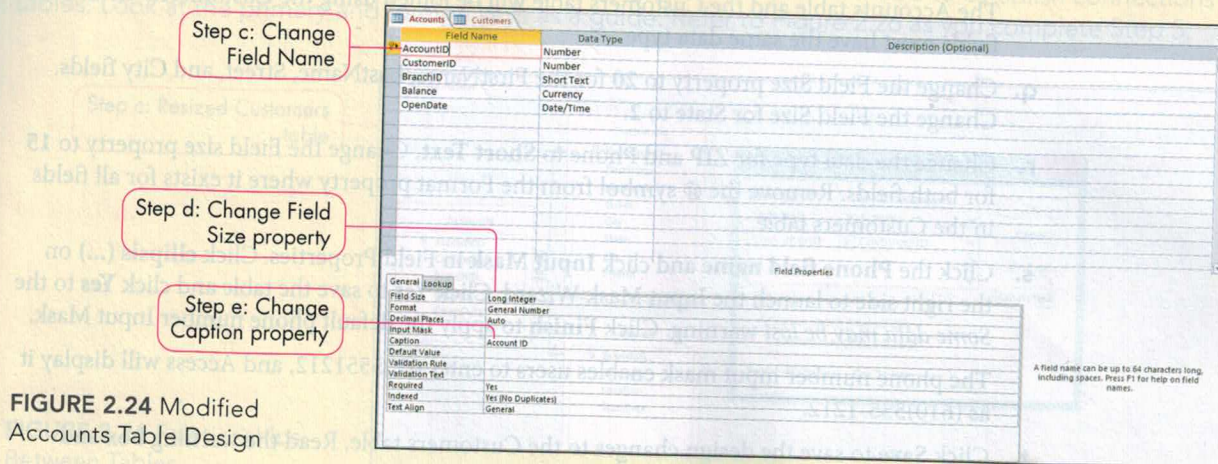


FIGURE 2.24 Modified Accounts Table Design

- a. Right-click the **Accounts** table in the Navigation Pane.
- b. Click **Design View** to open the table in Design view.
The Accounts table displays with the primary key AID selected.
- c. Change the AID field name to **AccountID**.
- d. Change the Field Size property to **Long Integer** in the Field Properties at the bottom of the Design window.
Long Integer ensures that there will be enough numbers as the number of customers grows over time and may exceed 32,768 (the upper limit for Integer values).
- e. Type **Account ID** in the **Caption** property box for the AccountID field. The caption contains a space between *Account* and *ID*.
- f. Change the CID field name to **CustomerID**.
- g. Change the Field Size property to **Long Integer** in the Field Properties at the bottom of the Design window.
You can select the Field Size option using the arrow, or you can type the first letter of the option you want. For example, type *l* for Long Integer or *s* for Single. Make sure the current option is completely selected before you type the letter.
- h. Type **Customer ID** in the **Caption** property box for the CustomerID field. The caption contains a space between *Customer* and *ID*.
- i. Click the **BID** field. Change the BID field name to **BranchID**.
- j. Type **5** in the **Field Size** property box in the Field Properties.
- k. Type **Branch ID** in the **Caption** property box for the Branch ID field.
- l. Change the Data Type of the Balance field to **Currency**.
The Currency data type is used for fields that contain monetary values.
- m. Change the Data Type of the OpenDate field to **Date/Time** and add **Short Date** in the Format field property. Type **Open Date** in the **Caption** property box.
The OpenDate field stores the date that each account was opened.

- n. Click **View** in the Views group to switch to Datasheet view. Read the messages and click **Yes** twice.

In this case, it is OK to click Yes because the shortened fields will not cut off any data. Leave the table open.

- o. Right-click the **Customers** table in the Navigation Pane and select **Design View** from the shortcut menu.
- p. Change the CID field name to **CustomerID**. Change the Field Size property of the CustomerID field to **Long Integer** and add a caption, **Customer ID**. Take note of the intentional space between *Customer* and *ID*.

The Accounts table and the Customers table will be joined using the CustomerID field. Both fields must have the same data type.

- q. Change the Field Size property to **20** for the FirstName, LastName, Street, and City fields. Change the Field Size for State to **2**.
- r. Change the data type for ZIP and Phone to **Short Text**. Change the Field size property to **15** for both fields. Remove the @ symbol from the Format property where it exists for all fields in the Customers table.

- s. Click the **Phone field name** and click **Input Mask** in Field Properties. Click **ellipsis (...)** on the right side to launch the Input Mask Wizard. Click **Yes** to save the table and click **Yes** to the *Some data may be lost* warning. Click **Finish** to apply the default phone number Input Mask.

The phone number input mask enables users to enter 6105551212, and Access will display it as (610)555-1212.

- t. Click **Save** to save the design changes to the Customers table. Read the warning box and click **Yes**.

STEP 4 » ADD DATA TO AN IMPORTED TABLE

Now that you have created the Access tables, you add records. You may also need to update and delete records if you and the auditor decide the information is no longer needed. Refer to Figure 2.25 as you complete Step 4.

Step b: Enter yourself as a new customer

FIGURE 2.25 Customers Table Displaying Your Information

Cust	FirstName	LastName	Street	City	State	Zip	Phone	Click to Add
30001	Allison	Millward	2732 Baker Blvd.	Greensboro	NC	27492	(555) 334-5678	
30002	Bernett	Fox	12 Orchestra Terrace	High Point	NC	27494	(555) 358-5554	
30003	Clay	Hayes	P.O. Box 555	Greensboro	NC	27492	(555) 998-4457	
30004	Cordle	Collins	2743 Bering St.	Winston-Salem	NC	27492	(555) 447-2283	
30005	Eaton	Wagner	2743 Bering St.	Greensboro	NC	27492	(555) 988-3346	
30006	Kwasi	Williams	89 Jefferson Way	High Point	NC	27494	(555) 447-5565	
30007	Natasha	Simpson	187 Suffolk Ln.	Greensboro	NC	27493	(555) 775-3389	
30008	Joy	Jones	305 - 14th Ave. S.	Winston-Salem	NC	27493	(555) 258-7655	
30009	John	Nunn	89 Chiaroscuro Rd.	Greensboro	NC	27494	(555) 998-5557	
30010	Laura	Peterson	120 Hanover Sq.	Winston-Salem	NC	27492	(555) 334-6854	
30011	YourName	YourName	800 University Ave.	High Point	NC	27494	(555) 447-1235	*

- a. Click **View** in the Views group to display the Customers table in Datasheet view.
The asterisk at the bottom of the table data in the row selector area is the indicator of a place to enter a new record.
- b. Click the **Customer ID** field in the record after 30010. Type **30011**. Fill in the rest of the data using your information as the customer. You may use a fictitious address and phone number.
Note the phone number format. The input mask you set formats the phone number.
- c. Close the Customers table. The Accounts table tab is open.

TROUBLESHOOTING: If the Accounts table is not open, double-click Accounts in the Navigation Pane.

- d. Locate the new record indicator—the * in the row selector—and click in the **Account ID** column. Type **1024**. Type **30011** as the Customer ID and **B50** as the Branch ID. Type **14005** for the Balance field value. Type **8/7/2015** for the OpenDate.

- e. Add the following records to the Accounts table:

Account ID	Customer ID	Branch ID	Balance	Open Date
1025	30006	B40	\$11,010	3/13/2013
1026	30007	B20	\$7,400	5/1/2014

- f. Close the Accounts table; keep the database open.

STEP 5 » ESTABLISH TABLE RELATIONSHIPS

The tables for the bank investigation have been designed. Now you will need to establish connections between the tables. Look at the primary and foreign keys as a guide. Refer to Figure 2.26 as you complete Step 5.

Step c: Resized Customers table

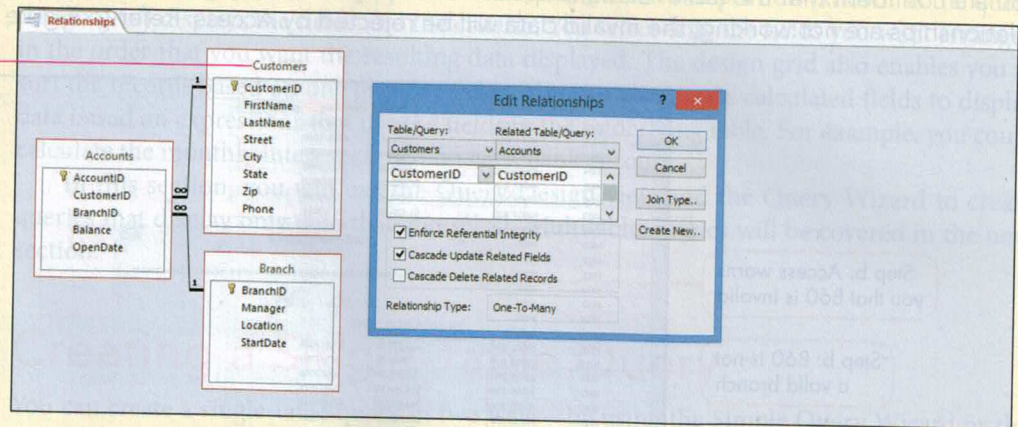


FIGURE 2.26 Relationships Between Tables

- a. Click the **DATABASE TOOLS** tab and click **Relationships** in the Relationships group.

The Relationships window opens and the Show Table dialog box appears.

TROUBLESHOOTING: If the Show Table dialog box does not open, click Show Table in the Relationships group on the Relationships Tools Design tab.

- b. Double-click each of the three tables displayed in the Show Table dialog box to add them to the Relationships window. (Alternatively, click a table and click **Add**.) Click **Close** in the Show Table dialog box.

TROUBLESHOOTING: If you have a duplicate table, click the title bar of the duplicated table and press Delete.

- c. Resize the Customers table box so all of the fields are visible. Arrange the tables as shown in Figure 2.26.
- d. Drag the **BranchID** field in the Branch table onto the BranchID field in the Accounts table. The Edit Relationships dialog box opens. Click the **Enforce Referential Integrity** and **Cascade Update Related Fields** check boxes. Click **Create**.

A black line displays, joining the two tables. It has a 1 at the end near the Branch table and an infinity symbol on the end next to the Accounts table. You have established a one-to-many relationship between the Branch and Accounts tables.

- e. Drag the **CustomerID** field in the Customers table onto the CustomerID field in the Accounts table. The Edit Relationships dialog box opens. Click the **Enforce Referential Integrity** and **Cascade Update Related Fields** check boxes. Click **Create**.

You have established a one-to-many relationship between the Customers and Accounts tables. A customer will have only a single CustomerID number. The same customer may have many different accounts: Savings, Checking, CDs, and so forth.

TROUBLESHOOTING: If you get an error message when you click Create, verify that the data types of the joined fields are the same. To check the data types from the Relationships window, right-click the title bar of a table and select Table Design from the shortcut menu. Modify the data type and field size of the join fields if necessary.

Save on the Quick Access Toolbar to save the changes to the relationships. Close the Relationships window.

REFERENTIAL INTEGRITY

STEP 6 TEST RE

The design of the Bank you are confident the relationships are must be 100% correct; otherwise, data entry may be compromised. Even though the relationships are correct, you decide to test them by entering some invalid data. If the invalid data will be rejected by Access. Refer to Figure 2.27 as you complete Step 6.

Access warns that B60 is invalid

Step b: B60 is not a valid branch

Account ID	Customer ID	Branch ID	Balance	OpenDate	Click to Add
1001	30010	B50	\$5,600.00	4/28/2012	
1002	30001	B10	\$1,200.00	4/13/2010	
1003	30004	B20	\$15,490.00	5/28/2009	
1004	30003	B30	\$630.00	9/21/2008	
1005	30009	B50	\$1,300.00	7/22/2010	
1006	30003	B10	\$550.00	7/3/2008	
1007	30007	B20	\$1,620.00	6/7/2011	
1008	30004	B40	\$7,100.00	6/16/2012	
1009	30001				
1010	30001				
1011	30001				
1012	30001				
1013	30001				
1014	30001				
1015	30001	B30	\$18,700.00	3/13/2008	
1016	30001	B30	\$980.00	9/5/2009	
1017	30010	B30	\$7,800.00	5/6/2008	
1018	30005	B40	\$14,250.00	1/4/2016	
1019	30004	B30	\$12,000.00	4/13/2010	
1020	30001	B50	\$21,004.00	7/2/2009	
1021	30011	B50	\$4,000.00	4/13/2016	
1022	30003	B50	\$1,000.00	1/4/2016	
1023	30011	B50	\$14,005.00	4/9/2015	
1024	30011	B50	\$11,000.00	3/13/2013	
1025	30006	B40	\$7,400.00	5/1/2014	
1026	30007	B20	\$4,000.00	4/13/2016	
1027	30003	B60			

FIGURE 2.27 Referential Integrity Works to Protect Data

- Double-click the **Accounts** table to open it in Datasheet view.
- Add a new record, pressing **Tab** after each field: Account ID: **1027**, Customer ID: **30003**, Branch: **B60**, Balance: **4000**, OpenDate: **4/13/2016**.

You attempted to enter a nonexistent BranchID and were not allowed to make that error. A warning message is telling you that a related record in the Branch table is required because the Accounts table and the Branch table are connected by a relationship with Enforce Referential Integrity checked.

- Click **OK**. Double-click the **Branch** table in the Navigation Pane and examine the data in the BranchID field. Notice the Branch table has no B60 record. Close the Branch table.
- Replace **B60** with **B50** in the new Accounts record and press **Tab** three times. As soon as the focus moves to the next record, the pencil symbol disappears and your data are saved.

You successfully identified a BranchID that Access recognizes. Because referential integrity between the Accounts and Branch tables has been enforced, Access looks at each data entry item in a foreign key and matches it to a corresponding value in the table where it is the primary key. In step b, you attempted to enter a nonexistent BranchID and were not allowed to make that error. In step d, you entered a valid BranchID. Access examined the index for the BranchID in the Branch table and found a corresponding value for B50.

- Close the Accounts table. Reopen the Accounts table; you will find that the record you just entered for 1027 has been saved. Close the table.

You have established a one-to-many relationship between the Customers and Accounts tables. A customer will have only a single CustomerID number. The same customer may have many different accounts: Savings, Checking, CDs, and so forth.

- Close all open tables, if necessary.
- Keep the database open if you plan to continue with Hands-On Exercise 3. If not, close the database and exit Access.

Hands-On Exercises



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3 Single-Table Queries

The tables and table relationships have been created, and some data have been entered. Now, you need to begin the process of analyzing the bank data for the auditor. You will do so using queries. You decide to begin with the Accounts table.

Skills covered: Create a Query Using a Wizard • Specify Query Criteria and Query Sort Order • Change Query Data

STEP 1 » CREATE A QUERY USING A WIZARD

You decide to start with the Query Wizard, knowing you can always alter the design of the query later in Query Design view. You will show the results to the auditor using Datasheet view. Refer to Figure 2.39 as you complete Step 1.

Step b: Click Query Wizard

Step 3: Selected fields

Account ID	Customer ID	Branch ID	Balance
1001	30010	850	\$5,600.00
1002	30001	810	\$1,200.00
1003	30004	820	\$15,490.00
1004	30008	830	\$610.00
1005	30009	850	\$330.00
1006	30003	810	\$1,620.00
1007	30007	820	\$1,620.00
1008	30004	840	\$2,100.00
1009	30005	850	\$1,500.00
1010	30001	820	\$3,000.00
1011	30005	810	\$290.00
1012	30002	830	\$1,900.00
1013	30001	820	\$10,000.00
1014	30009	810	\$16,700.00
1015	30004	830	\$460.00
1016	30001	830	\$18,700.00
1017	30010	830	\$980.00
1018	30005	840	\$7,800.00
1019	30004	830	\$14,250.00
1020	30001	850	\$12,000.00
1021	30011	850	\$21,004.00
1022	30003	850	\$4,000.00
1023	30011	850	\$1,000.00
1024	30011	850	\$14,005.00
1025	30006	840	\$11,010.00
1026	30007	820	\$7,400.00
1027	30003	850	\$4,000.00

FIGURE 2.39 Query Results Before Criteria Are Applied

- Open *a02h2Bank_LastFirst* if you closed it at the end of Hands-On Exercise 2. Save the database as *a02h3Bank_LastFirst*, changing *h2* to *h3*.
- Click the **CREATE** tab and click **Query Wizard** in the Queries group to launch the New Query wizard.
The New Query Wizard dialog box opens. Simple Query Wizard is selected by default.
- Click **OK**.
- Verify that *Table: Accounts* is selected in the Tables/Query box.
- Select **AccountID** from the **Available Fields** list and click >. Repeat the process with **CustomerID**, **BranchID**, and **Balance**.
The four fields should now display in the Selected Fields list box.
- Click **Next**.
- Confirm *Detail* is selected and click **Next**.
- Name the query **Accounts from Campus Branch**. Click **Finish**.

This query name describes the data in the query results. Your query should have four fields: **AccountID**, **CustomerID**, **BranchID**, and **Balance**. The Navigation bar indicates 27 records meet the query criteria.

STEP 2 >> SPECIFY QUERY CRITERIA AND QUERY SORT ORDER

The auditor indicated that the problem seems to be confined to the Campus branch. You use this knowledge to revise the query to display only Campus accounts. Refer to Figure 2.40 as you complete Step 2.

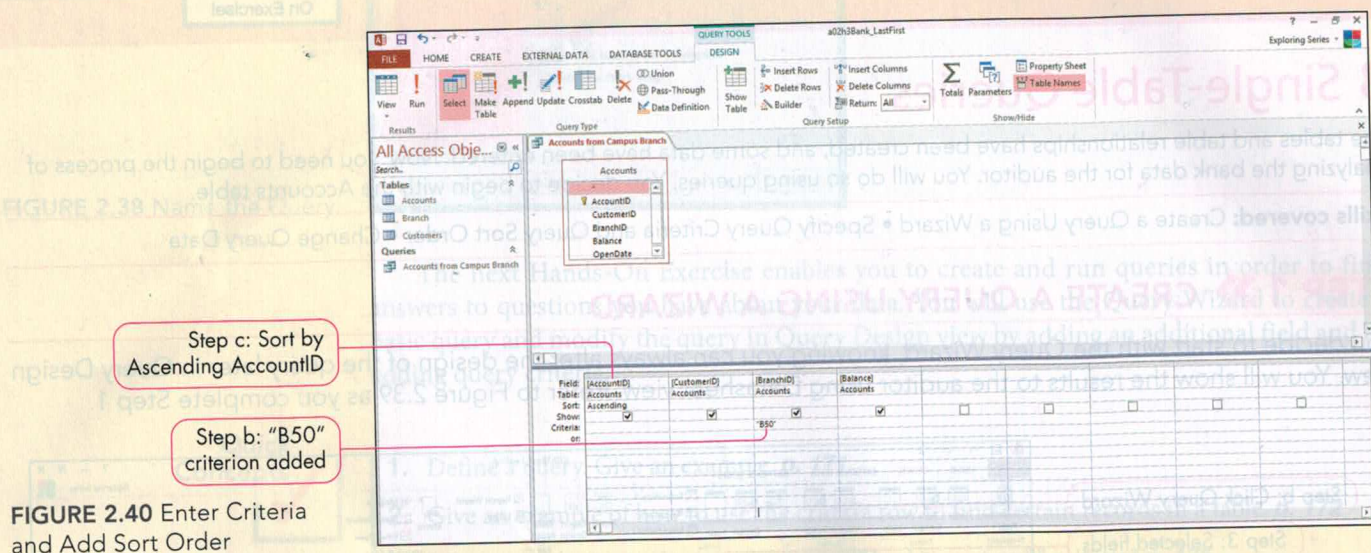


FIGURE 2.40 Enter Criteria and Add Sort Order

- Click the **HOME** tab and click **View** in the Views group to view the Accounts from Campus Branch query in Design view.
You have created the Campus Branch Customers query to view only those accounts at the Campus branch. However, other branches' accounts also display. You need to limit the query results to only the records of interest.
- Click in the **Criteria row** (fifth row) in the BranchID column and type **B50**.
B50 is the BranchID for the Campus branch. Access queries are not case sensitive; therefore, b50 and B50 will produce the same results. Access adds quotation marks around text criteria.
- Click in the **Sort row** (third row) in the AccountID column and select **Ascending**.
- Click **Run** in the Results group.

You should see nine records, all from Branch B50, in the query results.

STEP 3 >> CHANGE QUERY DATA

When the query results are on the screen, the auditor notices that some of the data are incorrect, and one of the accounts is missing. From your experience with Access, you explain to the auditor that the data can be changed directly in a query rather than switching back to the table. Refer to Figure 2.41 as you complete Step 3.

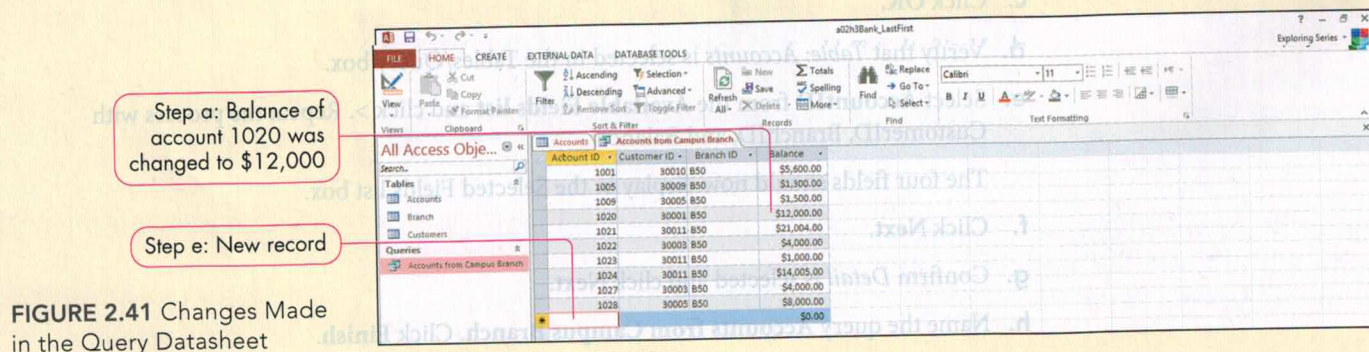


FIGURE 2.41 Changes Made in the Query Datasheet

- a. Click on the **Balance** field in the record for account 1020. Change \$1,200 to **\$12,000**. Press **Enter**. Save and close the query.

You are modifying the record directly in the query results.

- b. Double-click the **Accounts** table in the Navigation Pane to open it.

Only one account shows a \$12,000 balance. The Account ID is 1020 and the Customer ID is 30001. The change you made in the Accounts table from the Campus Branch query datasheet automatically changed the data stored in the underlying table.

- c. Open the Customers table. Find the name of the customer whose CustomerID is 30001. Note that the account belongs to Allison Millward. Close the Customers table.

- d. Add a new record to the Accounts table with the following data: **1028** (Account ID), **30005** (Customer ID), **B50** (Branch ID), **8/4/2016** (Open Date), and **\$8,000** (Balance). Press **Tab**.

TROUBLESHOOTING: If the Accounts table is not open, double-click Accounts in the Navigation Pane.

The new record is added to the Accounts table.

- e. Double-click the **Accounts from Campus Branch query** in the Navigation Pane.

Customer 30005 now shows two accounts: one with a balance of \$1,500 and one with a balance of \$8,000.

- f. Close the Accounts from Campus Branch query and close the Accounts table.

- g. Keep the database open if you plan to continue with Hands-On Exercise 4. If not, close the database and exit Access.

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Hands-On Exercises



4 Multitable Queries

Based on the auditor's request, you will need to evaluate the data further. This requires creating queries that are based on multiple tables rather than on a single table. You decide to open an existing query, add additional tables, and then save the query with a new name.

Skills covered: Add Additional Tables to a Query • Create a Multitable Query • Modify a Multitable Query • Get Answers Using a Multitable Query

STEP 1 » ADD ADDITIONAL TABLES TO A QUERY

The previous query was based on the Accounts table, but now you need to add information to the query that is in the Branch and Customers tables. You will need to add the Branch and Customers tables to the query. Refer to Figure 2.47 as you complete Step 1.

Steps c and l: Customers and Branch tables added

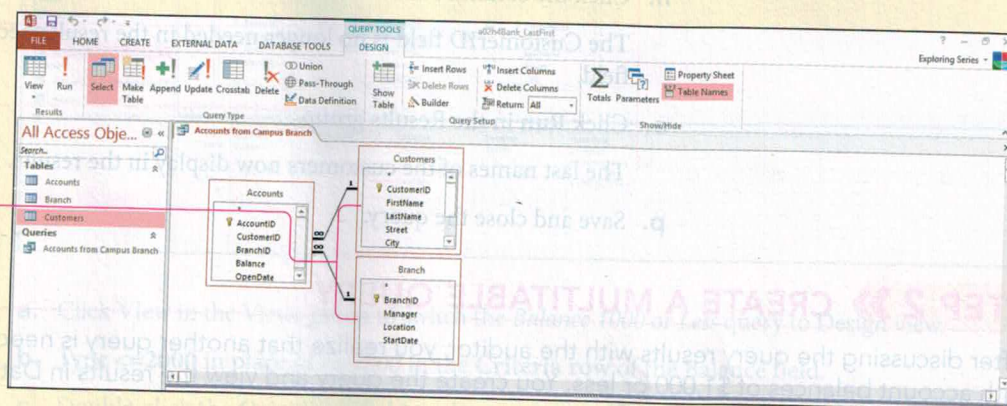


FIGURE 2.47 Add Tables to Query Design View

- Open *a02h3Bank_LastFirst* if you closed it at the end of Hands-On Exercise 3. Save the database as *a02h4Bank_LastFirst*, changing *h3* to *h4*.
- Right-click the **Accounts from Campus Branch** query in the Navigation Pane and select **Design View** from the shortcut menu.
- Drag the **Branch** table from the Navigation Pane to the top pane of the query design grid next to the Accounts table.

A join line connects the Branch table to the Accounts table. The query inherits the join lines from the relationships created in the Relationships window.

- Drag the **Location** field from the Branch table to the first empty column in the design grid. The Location field should be positioned to the right of the Balance column.
- Click the **Show check box** under the BranchID field to clear the check box and hide this field in the results.

The BranchID field is no longer needed because the Location field provides the same information. Because you unchecked the BranchID show check box, the BranchID field will not display the next time the query is opened.

- Delete the B50 criterion in the BranchID field.
- Type **Campus** as a criterion in the Location field and press **Enter**.

Access adds quotation marks around *Campus* for you; quotes are required for text criteria. You are substituting the Location criterion (*Campus*) in place of the BranchID criterion (B50).

- h. Remove Ascending from the AccountID sort row. Click in the **Sort row** of the Balance field. Click the arrow and select **Descending**.
- i. Click **Run** in the Results group.
The BranchID field does not display in the Datasheet view because you hid the field in step e. Only Campus accounts should display in the datasheet (10 records). Next, you will add the Customer LastName and delete the CustomerID from the query.
- j. Save the changes to the query design.
- k. Click **View** in the Views group to return to the Design view.
The BranchID field no longer displays on the field as it has been hidden.
- l. Drag the **Customers** table from the Navigation Pane to the top section of the query design grid and reposition the tables so that the join lines are not blocked (see Figure 2.47).
The one-to-many relationship lines automatically connect the Customers table to the Accounts table (similar to step c on the previous page).
- m. Drag the **LastName** field in the Customers table to the second column in the design grid.
The LastName field should be positioned to the right of the AccountID field.
- n. Click the column selector in the CustomerID field to select it. Press **Delete**.
The CustomerID field is no longer needed in the results because we added the LastName field.
- o. Click **Run** in the Results group.
The last names of the customers now display in the results.
- p. Save and close the query.

STEP 2 » CREATE A MULTITABLE QUERY

After discussing the query results with the auditor, you realize that another query is needed to show those customers with account balances of \$1,000 or less. You create the query and view the results in Datasheet view. Refer to Figure 2.48 as you complete Step 2.

Step d: Add the balance criterion

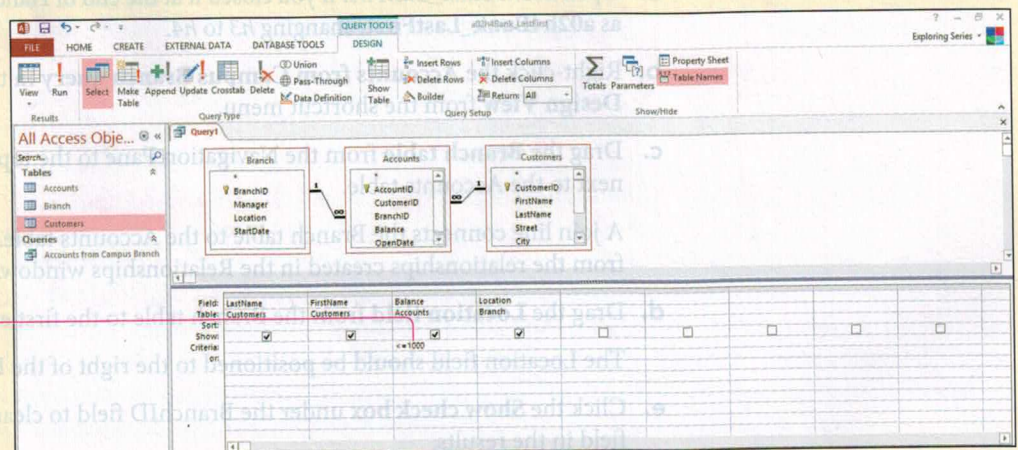


FIGURE 2.48 Create a Multitable Query

- a. Click the **CREATE** tab and click **Query Design** in the Queries group.
- b. Double-click the **Branch** table name in the Show Table dialog box and double-click **Accounts** and **Customers** to add all three to the Query Design view. Click **Close** in the Show Table dialog box.
Three tables were added to the query.

- c. Double-click the following fields to add them to the design grid: **LastName**, **FirstName**, **Balance**, and **Location**.
- d. Type **<=1000** in the **Criteria row** of the Balance column.
- e. Click **Run** in the Results group to see the query results.
Six records that have a balance of \$1,000 or less display.
- f. Click **Save** on the Quick Access Toolbar and type **Balance 1000 or Less** as the Query Name in the **Save As** dialog box. Click **OK**.

STEP 3 >> MODIFY A MULTITABLE QUERY

The auditor requests additional changes to the Balance 1000 or Less query you just created. You will modify the criteria to display the accounts that were opened after January 1, 2011, with balances of \$2,000 or less. Refer to Figure 2.49 as you complete Step 3.

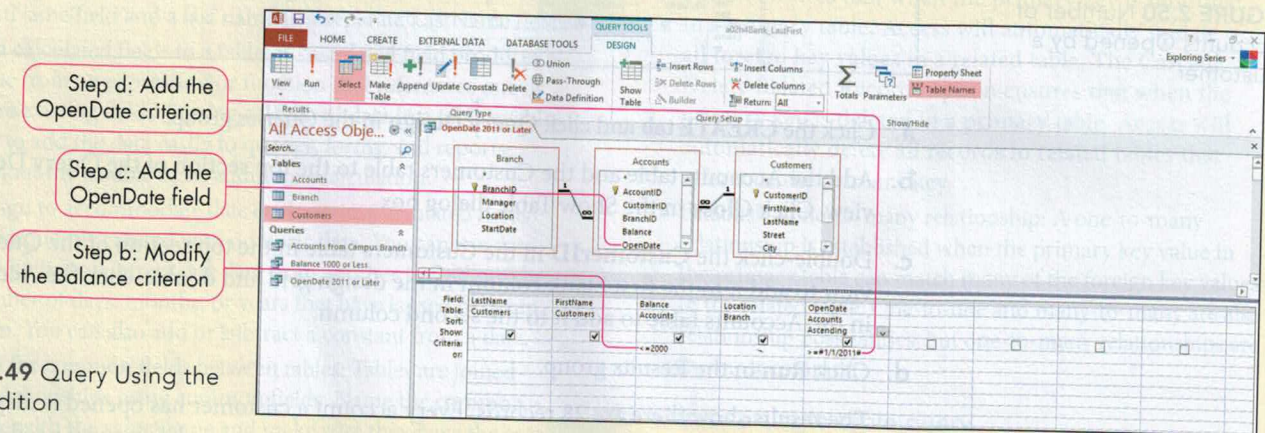


FIGURE 2.49 Query Using the AND Condition

- a. Click **View** in the Views group to switch the *Balance 1000 or Less* query to Design view.
- b. Type **<=2000** in place of **<=1000** in the **Criteria row** of the Balance field.
- c. Double-click the **OpenDate** field in the Accounts table in the top section of the Query Design view to add it to the first blank column in the design grid.
- d. Type **>=1/1/2011** in the **Criteria row** of the OpenDate field to extract only accounts that have been opened since January 2011.

After you type the expression and then move to a different column, Access will add the # symbols around the date automatically.

- e. Click **Run** in the Results group to display the results of the query.
Five records display in the query results.
- f. Click the **FILE** tab, click **Save As**, click **Save Object As**, and then click **Save As**. Type **OpenDate 2011 or Later** as the query name. Click **OK**.
- g. Click **View** in the Views group to return to the Design view of the query.
- h. Click in the **Sort row** of the OpenDate field and select **Ascending**.
- i. Click **Run** in the Results group.

The records are sorted from the earliest open date after January 1, 2011, to the most recent open date.

- j. Save and close the query.

STEP 4 » GET ANSWERS USING A MULTITABLE QUERY

The auditor wants to know the number of accounts each customer has opened. You create a query using a Totals row to obtain these data. Refer to Figure 2.50 as you complete Step 4.

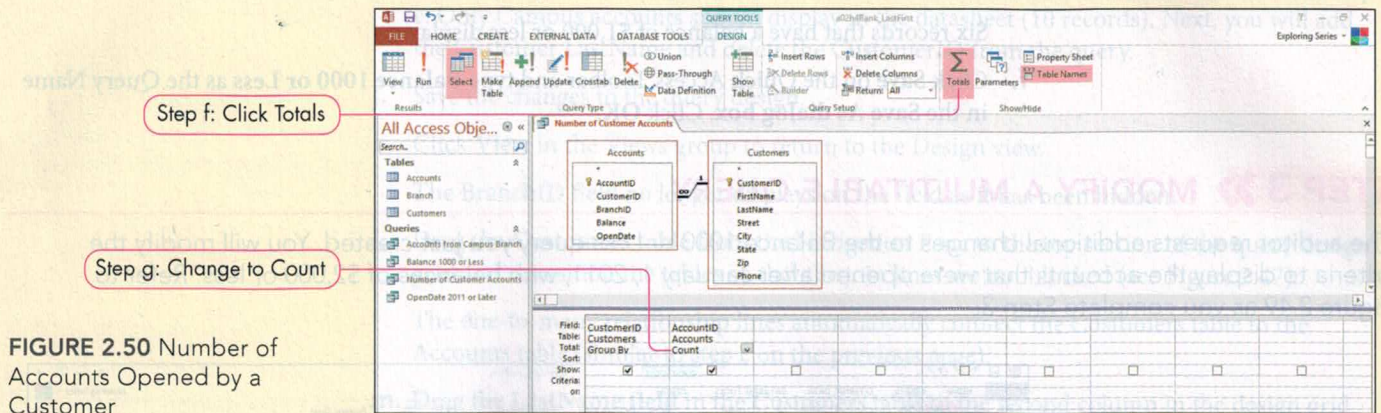


FIGURE 2.50 Number of Accounts Opened by a Customer

- Click the **CREATE** tab and click **Query Design** in the Queries group.
- Add the Accounts table and the Customers table to the top section of the Query Design view. Click **Close** in the Show Table dialog box.
- Double-click the **CustomerID** in the Customers table in the top section of the Query Design view to add it to the first blank column in the design grid and double-click the **AccountID** in the Accounts table to add it to the second column.
- Click **Run** in the Results group.

The results show there are 28 records. Every account a customer has opened is displayed. The auditor only wants the total number of accounts a customer has, so you need to modify the query.

- Click **View** in the Views group to return to the Design view of the query.
- Click **Totals** in the Show/Hide group.
- Click **Group By** in the Total row of the AccountID field and select **Count**.
- Click **Run** in the Results group.

The results show one row for each customer and the number of accounts each customer has opened since the database was created.

- Click **Save** on the Quick Access Toolbar and type **Number of Customer Accounts** as the query name. Close the query.
- Submit based on your instructor's directions and close Access.