9 Advanced Tables

SKILL SUMMARY

Skills	Exam Objective	Objective Number
Creating a Custom Table	Create a table.	2.1.1
	Configure fields to auto-increment.	2.4.6
Summarizing Table Data	Add total rows.	2.2.2

CREATING A CUSTOM TABLE

When a table template doesn't suit your needs, you can create a custom table in Design view. In Design view, you can insert fields, set data types, and perform other advanced table design tasks.

Creating a Custom Table

Creating a table from scratch in Design view gives you maximum flexibility. You can do everything you need to do to create the table in Design view, including adding fields, setting data types, defining field properties, and defining a primary key. As you create a table, you can also easily insert and delete rows in your table design. In this exercise, you create a new blank table and then add fields for the new table in Design view.

Creating a new field for a table in Design view includes typing the name in the Field Name column; choosing a data type from the menu in the Data Type column; and typing a description, if you want, in the Description column. Additionally, you can modify field properties in the Field Properties section of the design grid.

After you have completed your table design, you'll need to save it. If you haven't already defined a primary key, Access will prompt you to do so when you save the table.
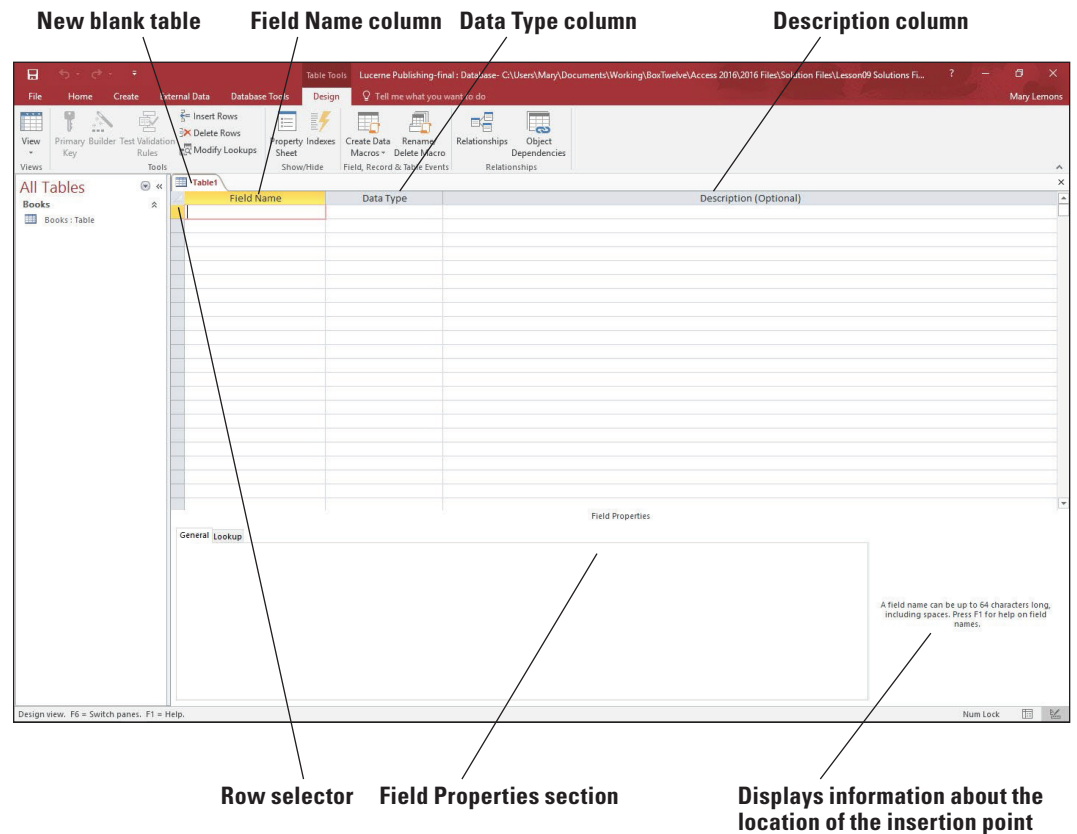
Create a Custom Table in Design View

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

1. **OPEN** *Lucerne Publishing* from the data files for this lesson and then **SAVE** the database as *Lucerne Publishing-final*.
2. On the Create tab, in the Tables group, click the **Table Design** button. A new blank table is created in Design view, as shown in Figure 9-1.

New blank table | **Field Name column** | **Data Type column** | **Description column**

Row selector | **Field Properties section** | **Displays information about the location of the insertion point**

3. Type **ID** in the Field Name column.
4. Press the **Tab** key to move to the Data Type column.
5. Click the **down arrow** in the Data Type column and then select **AutoNumber** from the menu. The AutoNumber data type will automatically number your records starting at 1.
6. Press the **Tab** key to move to the Description field.
7. Type **Record Number** and then press **Tab** again to move to the next blank field row.
8. Type **Gross Sales** and then press the **Tab** key.
9. Click the **down arrow** on the Data Type column and then select **Currency** from the menu.
10. Click in the **Decimal Places** row in the Field Properties section. Click the **down arrow** and then select **0** from the menu.
11. Enter the remaining fields, as shown in Figure 9-2, formatting each with the **Currency** data type and **0** decimal places.

Custom Table in Design view
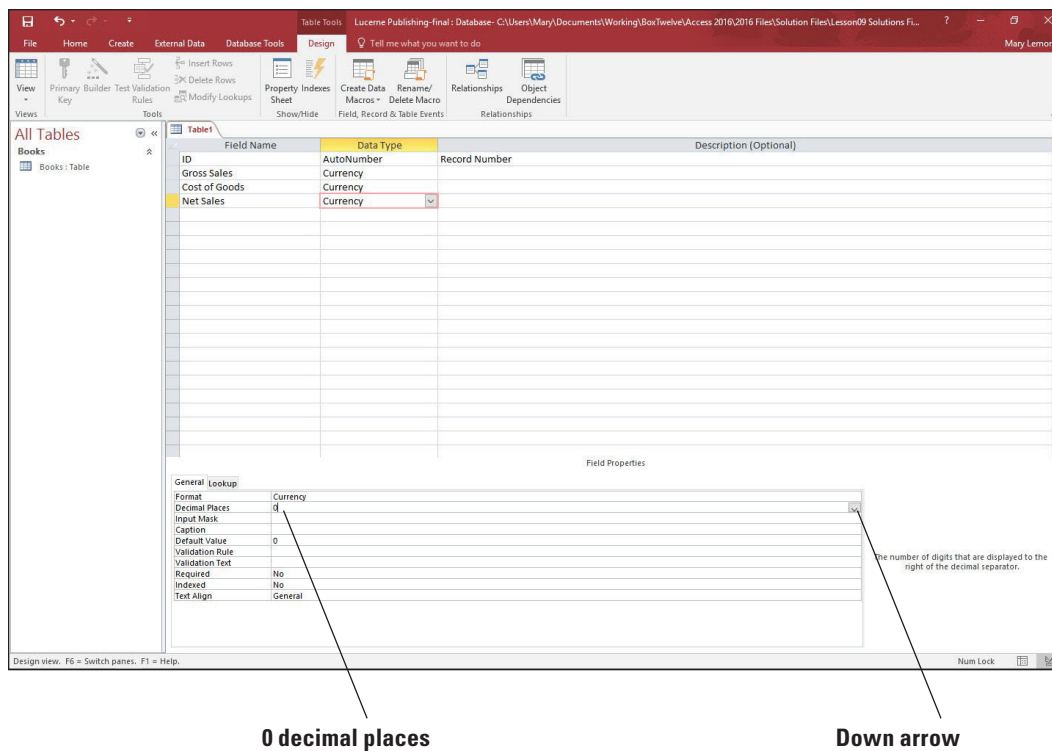
0 decimal places   **Down arrow**

12. Click the row selector to the left of the ID field to select the row.

13. On the Design tab, in the Tools group, click the **Primary Key** button.

14. Click the **Save** button on the Quick Access Toolbar. The *Save As* dialog box appears.

15. Type **Sales** and then click **OK**.

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

Inserting and Deleting Rows

When creating a custom table in Design view, you can insert and delete rows as needed using the Insert Rows and Delete Rows commands in the Tools group on the Table Tools Design contextual tab. When you click the Insert Rows button, a new row is inserted above the selected row. The field order from top to bottom in Design view will be displayed from left to right in Datasheet view. In this exercise, you insert and delete rows using the new table you created in the previous exercise.

STEP BY STEP   **Insert and Delete Rows in Design View**

GET READY. USE the *Lucerne Publishing-final* database and the *Sales* table that are open from the previous exercise.

1. Click the row selector to the left of the Gross Sales field to select the entire row.

2. In the Tools group on the Table Tools Design contextual tab, click the **Delete Rows** button. The field row is deleted from the table.

3. Click the **Undo** button on the Quick Access Toolbar. The field row reappears.

4. In the Tools group on the Table Tools Design contextual tab, click the **Insert Rows** button. A blank row is inserted above the Gross Sales field.

5. In the Field Name column, type **Area** and then press the **Tab** key.

6. Press the **Tab** key again to accept the **Short Text** data type.

7. Leave the Description field blank and then press **Tab** again to move to the next field.

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

9. Change to Datasheet view and enter the records shown in Figure 9-3 in the table. The ID field will be automatically generated, so just press **Tab** to get past it.

10. SAVE and **CLOSE** the table.

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

USING THE TABLE ANALYZER

The **Table Analyzer** is a wizard that performs the normalization process for you by examining a table design and suggesting a way to divide the table for maximum efficiency. The Table Analyzer helps you design efficient tables. The Table Analyzer will suggest primary keys for the new tables or will allow you to determine the primary keys. You can also have the wizard insert a unique identifier field. If it determines that a table has duplicate information, it can split a table into two more efficient tables for you, or you can choose to do it yourself.

Using the Table Analyzer

The Table Analyzer is a wizard that examines a table and asks you a series of questions about the table to determine whether it should be divided into two or more tables. In this exercise, you use the Table Analyzer Wizard to analyze a table in the database.

Well-designed databases do not store the same data in more than one place. Redundant data storage takes more disk space and increases the likelihood for data entry errors. In Lesson 1, you were introduced to the concept of normalization, which is the process of applying rules to a database design to ensure that you have divided your data into the appropriate tables.

In the Books table, contact information for authors has to be entered for each book the author wrote. The Table Analyzer Wizard will determine that a more efficient database would split the table into two tables: one with author contact information and one with book sales data.

In addition to analyzing the table, the Table Analyzer Wizard will also analyze the redundant data in a table and suggest corrections for records that should match. It will also give you the choice of whether to create a query, which is similar to the original table. Creating the query allows forms and reports that were created with the original table to continue to function properly. The original table may be renamed, but it will not be removed or altered.

⚠ Troubleshooting   If you run the Table Analyzer before entering records in the table, you may get a message stating that you need to enter at least two records in the table to get a meaningful analysis.
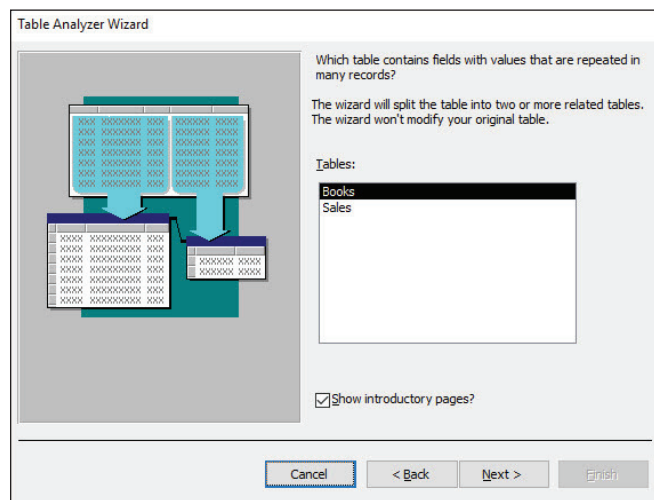
Use the Table Analyzer

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

1. Double-click the **Books** table in the Navigation Pane to open it.
2. Scroll through the table to become familiar with the fields in the table.
3. On the Database Tools tab, in the Analyze group, click the **Analyze Table** button. The *Table Analyzer Wizard* dialog box, screen 1, appears. This first dialog box provides more information about the types of problems the wizard will find. Click the two **Show me an example** buttons to read more about how duplicating information can lead to problems.
4. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 2, appears. This dialog box provides more information about what the wizard will do. Click the two **Show me an example** buttons to read more about how splitting the table is helpful.
5. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 3, appears, as shown in Figure 9-4.

Figure 9-4

Table Analyzer Wizard, screen 3

6. The **Books** table should be selected in the list; if it is not, select it. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 4, appears.
7. The **Yes, let the wizard decide** button should be selected; if it is not, select it. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 5, appears.
8. Scroll through each table. Notice that the Table2 box contains the Year, which should be in Table1 with the sales information. Click the **Year** field to select it.
9. Drag the selected field to the Table1 box, positioning the horizontal black line below the Book Title field, as shown in Figure 9-5, and releasing the mouse button to place the Year field in its new location.

Table names   **Rename Table button**   **Tips button**
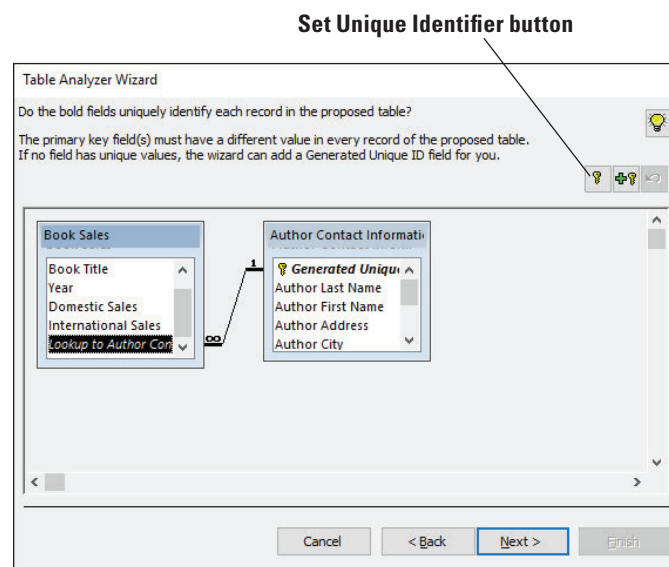
Table Analyzer Wizard, screen 5

New location
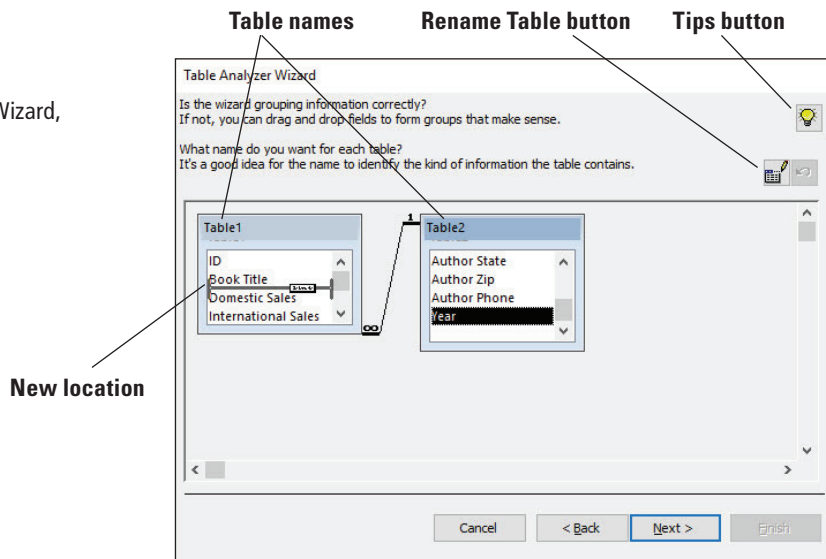
10. Click the **Table1** name to select it. Click the **Rename Table** button. If you receive a message stating that an expression you entered is the wrong data type for one of the arguments, click **OK**. The *Table Analyzer Wizard* dialog box appears.

Take Note   You can also double click on the table name to rename it.

11. Type **Book Sales** and then click **OK**.

12. Click the **Table2** name and then click the **Rename Table** button. If you receive a message stating that an expression you entered is the wrong data type for one of the arguments, click **OK**. The *Table Analyzer Wizard* dialog box appears.

13. Type **Author Contact Information** and then click **OK**.

14. Scroll down to the bottom of the Book Sales table. Notice that the Lookup to Author Contact Information field was added.

15. Scroll through the Author Contact Information table. Notice that the Generated Unique ID field was added as a primary key. Click the **Next** button. The *Table Analyzer Wizard* dialog box, screen 6, appears, as shown in Figure 9-6.

Set Unique Identifier button

Figure 9-6
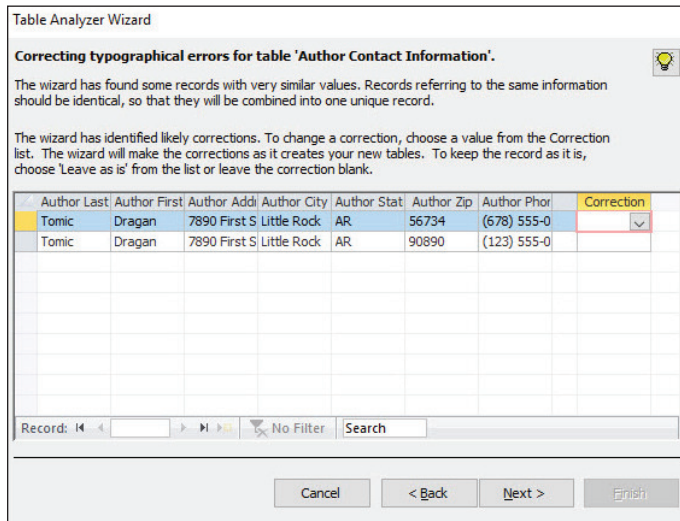
Table Analyzer Wizard, screen 6

16. Click the **ID** field in the Book Sales table to select it. Click the **Set Unique Identifier** button. A primary key is inserted.

17. Click **Next**. The *Table Analyzer Wizard* dialog box, screen 7, appears, as shown in Figure 9-7.

Figure 9-7

Table Analyzer Wizard, screen 7

18. Notice that the Table Analyzer Wizard has detected two similar records, one with an incorrect zip code and phone number. Click the **down arrow** in the first row of the Correction field and then select **Leave as is**. This is the correct record.

19. Click the **down arrow** on the second row of the Correction field and then select the **Tomic** correction from the menu, as shown in Figure 9-8, to replace the incorrect record. Click to select it.

Figure 9-8

Corrections to the new tables
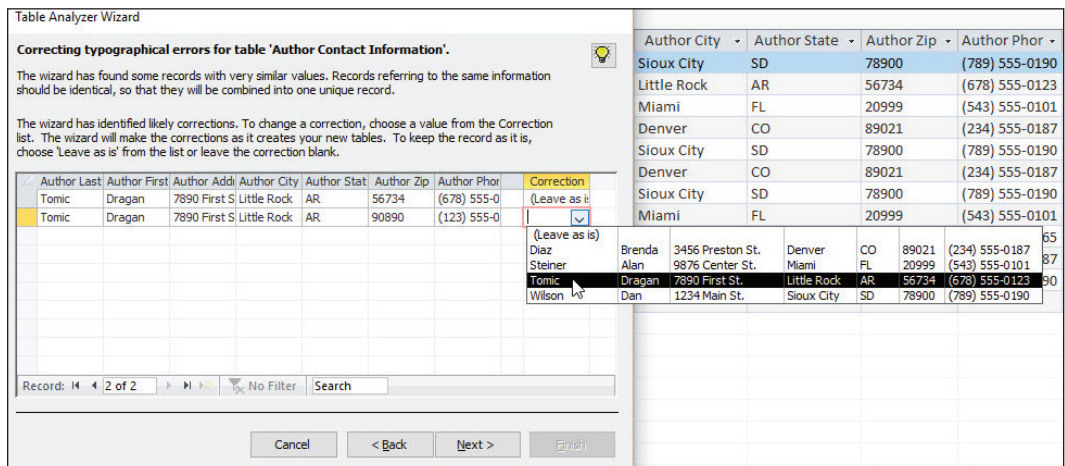
20. Click **Next**. The final *Table Analyzer Wizard* dialog box appears.

21. The **Yes, create the query** option button should be selected. Click the **Finish** button.

22. A message saying that the wizard couldn't rename your table because it's open and the new query will be saved as Books_NEW appears. Click **OK**.

23. If Access Help appears on your screen, close it. Your screen should look similar to Figure 9-9.

24. **SAVE** and **CLOSE** all tables and queries.

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

Figure 9-9

New tables and queries
created by the Table Analyzer
Wizard

SUMMARIZING TABLE DATA

It is often necessary to count or summarize data in a table, column by column. Tables that contain columns of sales figures or other numbers need to be summed, averaged, or counted to be more useful. The Total row makes these tasks easy.

Summarizing Table Data

Much like the bottom row of a spreadsheet, the Total row is a feature in Access 2016 that makes it easy to sum, average, or count the values in a datasheet column. You can also find maximum or minimum values and use statistical functions such as standard deviation and variance. In this exercise, you summarize table data by inserting a Total row.

Aggregate functions are functions that calculate values across a range of data, such as in a column. You can use these functions in queries or in Visual Basic for Applications (VBA) code. Although you can still use those methods, the Total row saves you time by allowing you to choose one of these functions from a menu, applying it instantly. The **Total row** is a row inserted at the bottom of a table that provides a menu of functions for each column in the row.

Take Note   You can also add a Total row to queries open in Datasheet view and to a split form open in Form view. You cannot add a Total row to a report, but you can use aggregate functions in reports using other methods.

Table 9-1 describes the aggregate functions available in the Total row and the data types that they work with.

Aggregate Function	Description	Data Types
Average	Calculates the average value for a column	Number, Decimal, Currency, Date/Time
Count	Counts the number of items in a column	All (except multivalued list)
Maximum	Returns the item with the highest value	Number, Decimal, Currency, Date/Time
Minimum	Returns the item with the lowest value	Number, Decimal, Currency, Date/Time
Standard Deviation	Measures how widely values are dispersed from an average value	Number, Decimal, Currency
Sum	Adds items in a column	Number, Decimal, Currency
Variance	Measures the statistical variance of all values in the column	Number, Decimal, Currency

As shown in the table, some functions only work with certain data types. For example, you cannot sum a column of text, so that function would not be available for a column with the Short Text or Long Text data type.

STEP BY STEP   **Insert a Total Row**

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

1. Double-click the **Book Sales** table in the Navigation Pane to open it.
2. On the Home tab, in the Records group, click the **Totals** button. The Total row appears below the row with the asterisk (*) in the record selector box.
3. Click the **down arrow** in the Book Title column of the Total row. Select **Count** from the menu. The number of records in the column is counted, and the number 11 is displayed.
4. Click the **down arrow** in the Domestic Sales column of the Total row and then select **Sum** from the menu, as shown in Figure 9-10. Click **Sum** to apply it.
5. Click the **down arrow** in the International Sales column of the Total row and then select **Sum** from the menu.
6. **SAVE** the table.
7. On the Home tab, in the Records group, click the **Totals** button. The Total row is hidden.
8. On the Home tab, in the Records group, click the **Totals** button again. The Total row reappears.

Figure 9-10

Total row

ID		Book Title		Year		Domestic Sa		Internationa		Lookup to A		Click to Add	
	1	Inside Contoso		2016		12365		9236		Wilson, Dan, 1:			
	2	Seeking Adven		2016		12321		6712		Tomic, Dragan,			
	3	The Coho Fami		2016		13734		5432		Steiner, Alan, S			
	4	Fourth Coffee:		2016		15098		4575		Diaz, Brenda, 3			
	5	Litware vs. Pro		2016		14994		9087		Wilson, Dan, 1:			
	6	Flying with Blu		2016		20890		8912		Diaz, Brenda, 3			
	7	Outside Conto:		2016		21846		10987		Wilson, Dan, 1:			
	8	Researching Tr		2016		14534		10172		Steiner, Alan, S			
	9	Buying and Sel		2016		17983		2987		Tomic, Dragan,			
	10	Traveling with		2016		23423		9091		Diaz, Brenda, 3			
	11	The Birth of Co		2016		16347		1098		Wilson, Dan, 1:			
*	(New)												
	Total		11			[dropdown]							

None
Sum
Average
Count
Maximum
Minimum
Standard Deviation
Variance

Total row   **Available functions for column**

9. SAVE and **CLOSE** the table.

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

Take Note   If you want to sort or filter data, Access will exclude the Total row by default.

Knowledge Assessment

Matching

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

Column 1	Column 2
1. Aggregate function	**a.** The process of applying rules to a database design to ensure that you have divided your information into the appropriate tables
2. Table Analyzer	**b.** An optional part of Design view where you can enter a field description
3. Normalization	**c.** An aggregate function that counts the records in a column
4. Count	**d.** A wizard that performs the normalization process by examining a table design and suggesting a way to divide the table for maximum efficiency
5. Description	**e.** Function that calculates values across a range of data

True/False

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

T   F   1. If you haven't already defined a primary key, Access will prompt you to do so when you save the table in Design view.

T   F   2. The row selector is located at the bottom of the table.

T   F   3. The Table Analyzer does not remove the original table.

T   F   4. The Table Analyzer gives you the choice of whether to create a query.

T   F   5. You cannot delete a Total row, but you can hide it.

# Projects

Project 9-1: Creating and Analyzing Tables

In this project, sales data for Fourth Coffee has just come in for the first quarter. The manager asks you to create a table that displays the sales for each of the five stores in your division. Note that each store is known by a three-digit number, such as 656. You also decide to use the Table Analyzer to check a table you created previously to make sure it is efficient.

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

1. **OPEN** *FourthCoffeeInventory* from the data files for this lesson, and then **SAVE** the database as *FourthCoffeeInventory-final*.
2. **CREATE** a new table in Design view using the Table Design button on the Create tab.
3. Type **ID** as the first field name and then press the **Tab** key. Set the data type to **AutoNumber**.
4. Type **Sales Month** as the second field name and then press the **Tab** key. Keep the default data type.
5. Enter the remaining field names and data types, as shown in Figure 9-11. Set the primary key as shown.

Figure 9-11

Monthly Sales by Store in Design view
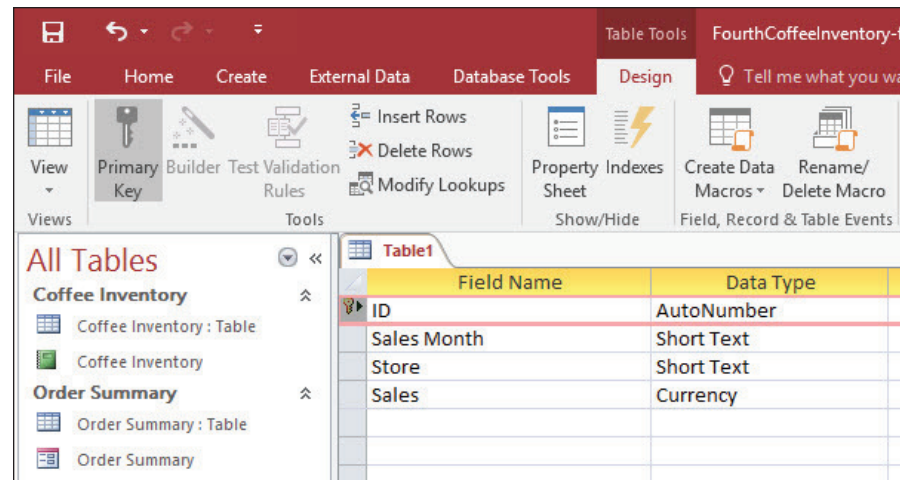
6. **SAVE** the table as **Monthly Sales by Store**.

7. Change to Datasheet view.

8. Enter the data as shown in the following table.

ID	Sales Month	Store	Sales
1	January	651	$88,432.00
2	February	651	$97,798.00
3	March	651	$67,890.00
4	April	651	$59,098.00
5	January	656	$105,890.00
6	February	656	$96,789.00
7	March	656	$96,789.00
8	April	656	$87,890.00
9	January	660	$106,098.00
10	February	660	$77,998.00
11	March	660	$94,927.00
12	April	660	$84,123.00
13	January	662	$90,890.00
14	February	662	$67,223.00
15	March	662	$87,010.00
16	April	662	$74,280.00

9. Insert a **Total** row.

10. Count the Sales Month field and sum the Sales field.

11. **SAVE** and **CLOSE** the table.

12. Double-click the **Customers** table in the Navigation Pane to analyze it.

13. On the Database Tools tab, in the Analyze group, click the **Analyze Table** button. The *Table Analyzer Wizard* dialog box appears.

14. Click **Next** to display the next *Table Analyzer Wizard* dialog box.

15. Click **Next** to display the next *Table Analyzer Wizard* dialog box.

16. The Customers table should be selected. Click **Next**.

17. The **Yes, let the Wizard decide** option button should be selected. Click **Next**.

18. A message is displayed that says the wizard does not recommend dividing the table. Click **OK**.

19. Click **Cancel** to close the Table Analyzer Wizard.

20. **CLOSE** the table and the database.

PAUSE. LEAVE Access open for use in the next project.

Project 9-2: Creating and Designing a Table

The owner of Wingtip Toys has given you yearly sales data for each of the company's sales channels. In this project, you will create and design a table in which to store and total the data.

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

1. **OPEN** *WingtipToysInventory* from the data files for this lesson, and then **SAVE** the database as *WingtipToysInventory-final*.
2. **CREATE** a new table in Design view using the Table Design button on the Create tab.
3. **CREATE** the table as shown in Figure 9-12.

Figure 9-12

Yearly Sales table in Design view
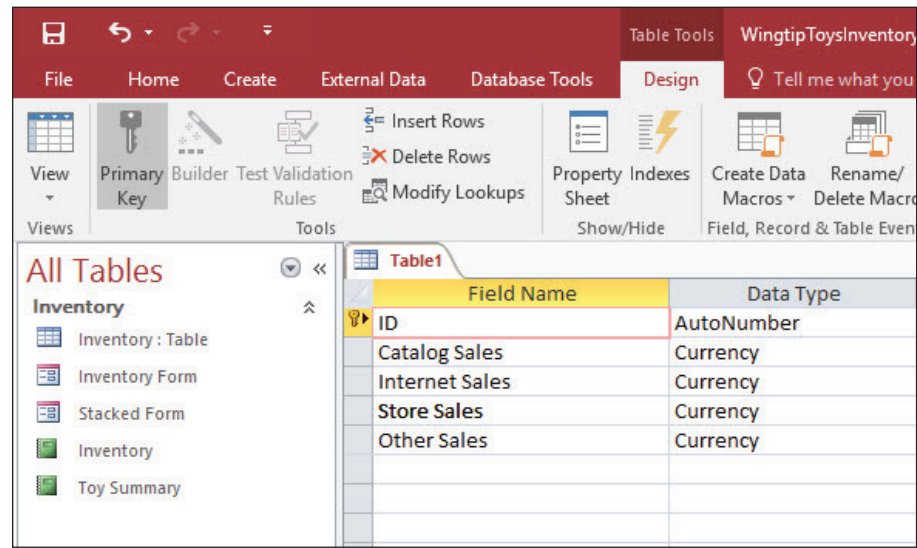
4. **SAVE** the table as **Yearly Sales** and then change to Datasheet view to review the table you just created.
5. Change back to Design view.
6. Insert a blank row above the Catalog Sales field.
7. Type **Yr** as a new field with the Short Text data type.
8. Select the **Yr** field and then click the **Primary Key** button to designate the Year field as the new primary key.
9. Delete the **ID** field.
10. **SAVE** the table and then change to Datasheet view.
11. Enter data as shown in the following table.

Yr	Catalog Sales	Internet Sales	Store Sales	Other Sales
2014	$87,987.00	$109,897.00	$208,767.00	$23,987.00
2015	$57,984.00	$98,789.00	$197,098.00	$10,761.00
2016	$61,089.00	$78,907.00	$168,234.00	$9,125.00

12. **SAVE** the table.
13. Insert a **Total** row.
14. Sum the Catalog Sales, Internet Sales, Store Sales, and Other Sales columns.
15. **SAVE** and **CLOSE** the table.

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