Using LOOKUP Functions, PivotTables, and Macros

n this lesson, you will learn about Excel features that can help you perform sophisticated data analyses. These features include the VLOOKUP and HLOOKUP functions, PivotTables, and PivotCharts. With the VLOOKUP and HLOOKUP functions, you use one piece of information to obtain another within a list. PivotTables let you summarize worksheet data dynamically so it can be viewed in various ways. PivotCharts provide this same power and flexibility within charts. Additionally, since many Excel workbooks are used on a recurring basis, with the same tasks being performed repeatedly, you will also create macros that can automate repetitive tasks.

LEARNING OBJECTIVES

After studying this lesson, you will be able to:

- Create a lookup formula to locate a value or text in a list
- Create PivotTables and change their fields
- Create PivotCharts from PivotTable and worksheet data
- Set macro security to protect workbook data
- Record and run macros to automate tasks

LESSON TIMING

- Concepts/Develop Your Skills: 2 hrs 00 min
- Concepts Review: 15 min
- Total: 2 hrs 15 min

CASE STUDY: ANALYZING DATA Efficiently

Green Clean, a janitorial product supplier and cleaning service contractor, works in conjunction with select charitable entities to raise funds for environmental causes. You would like to evaluate the overall performance of the company's fundraising team leaders. You would also like to examine the results of specific fundraising efforts that were overseen by these team leaders during the current year. You will use powerful data analysis tools—including the VLOOKUP function, PivotTables, and PivotCharts—to perform this analysis. You will also record macros to automate processes that will facilitate the analysis.

Introducing Lookup Functions

The lookup functions VLOOKUP (Vertical Lookup) and HLOOKUP (Horizontal Lookup) are used to retrieve a piece of data from a lookup table located within the same worksheet, a separate worksheet, or a different workbook.

	E	F]						
	Over								
	(Under)	Award							
15	Goal	Rate							
16	(\$100,000)	0%							
17	(\$5,000)	1%							
18	\$0	3%		A	В	С	D	E	F
19	\$5,000	5%	15	Over (Under) Goal	(\$100,000)	(\$5,000)	\$0	\$5,000	\$10,000
20	\$10,000	7%	16	Award Rate	0%	1%	3%	5%	7%

The same data arranged in a vertical lookup table (left) and a horizontal lookup table (right)

LOOKUP Function Syntax

The structure of the VLOOKUP and HLOOKUP functions is VLOOKUP *or* HLOOKUP(lookup value,table array,column (or row) index number,[range lookup]).

VLOOKUP FUNCTION ARGUMENTS									
Argument	Description								
Lookup value	The value in the worksheet to be looked up in the first column of the table array								
Table array	The cell range containing the lookup table, which may be expressed as absolute cell references or a defined name								
Column index number	The column number in the table array that contains the corresponding data to be retrieved								
Range lookup Optional; a logical value that specifies a search for an exact or approximate value the table array (TRUE, the default) or an exact match only (FALSE)									

How the VLOOKUP Function Works

In the formula =VLOOKUP(D5,Award_Table,2), cell D5 contains the lookup value, the defined name *Award_Table* indicates the table array in which the search takes place, and the number 2 (the column index number) indicates that the corresponding award rate will be retrieved from the second column of the lookup table. The search is conducted down the first column of the table array until the highest value not greater than the lookup value is located.



When a lookup formula will be copied to other cells, the cell range of the table array should be expressed in the formula as a defined name or absolute cell references.

Specifying the Range Lookup Argument

In our example, Excel uses the default range lookup argument TRUE so the search is conducted in the first column of the table array for either an exact match of \$6,810 or the closest value not greater than \$6,810. At times, you may want to search only for an exact match of the lookup value. The formula =VLOOKUP(D5,Award_Table,2,FALSE) includes the FALSE range lookup argument. This restricts the search to an exact match. Using our example, since the first column of the table array (\$E\$16:\$F\$20) does not contain the exact lookup value of \$6,810, Excel would display #N/A in the formula cell.

Sorting a Table Array

The rows in the table array must be sorted in lowest to highest (A to Z) order in the first column when the TRUE range lookup argument is used. This way, you can be assured that VLOOKUP will stop at the proper row and return the correct value. Sorting the table array is not required when the FALSE range lookup argument is used.

DEVELOP YOUR SKILLS EX01-D01 Use VLOOKUP

Before You Beegin: Navigate to the student resource center to download the student exercise files for this book.

- Open EX01-D01-Awards from the EX2013 Lesson 01 folder and save it as EX01-D01-Awards-[FirstInitialLastName].
- 2. Display the **December** worksheet. Complete the table array in the **range E15:G20** by entering the numbers and text shown.

	E	F	G
	Over		
	(Under)	Award	
15	Goal	Rate	Message
16	(\$100,000)	0%	Under Achiever
17	(\$5,000)	1%	Below Goal
18	\$0	3%	At Goal
19	\$5,000	5%	Above Goal
20	\$10,000	7%	Over Achiever

3. Follow these steps to create the range name:



- 4. Select cell E5 and enter the formula =VLOOKUP (D5, Award_Table, 2).
- 5. Use AutoFill to copy the formula from cell E5 down to the range E6:E12.
- 6. Select cell E7 and review the formula in the Formula Bar.
- 7. Type =C5*E5 in cell F5 and use AutoFill to copy the commission formula to the range F6:F12.

8. Select cell G5, enter the function =VLOOKUP (D5, Award_Table, 3), and use AutoFill to copy the quota message formula to the range G6:G12.

	A	В	С	D	E	F	G
				Over			
			Amount	(Under)	Award	Award	Achieved
4	Team Leader	Goal	Raised	Goal	Rate	Points	Goal?
5	Abbott	\$25,000	\$31,810	\$6,810	5%	1,591	Above Goal
6	Debowski	\$100,000	\$95,350	(\$4,650)	1%	954	Below Goal
7	Faber	\$60,000	\$52,500	(\$7,500)	0%	-	Under Achiever
8	Lemus	\$100,000	\$110,350	\$10,350	7%	7,725	Over Achiever
9	Martinez	\$70,000	\$66,000	(\$4,000)	1%	660	Below Goal
10	Nguyen	\$45,000	\$48,000	\$3,000	3%	1,440	At Goal
11	Park	\$30,000	\$31,680	\$1,680	3%	950	At Goal
12	Weinstein	\$70,000	\$67,000	(\$3,000)	1%	670	Below Goal
13							
14							
					Over		
					(Under)	Award	
15					Goal	Rate	Message
16					(\$100,000)	0%	Under Achiever
17					(\$5,000)	1%	Below Goal
18					\$0	3%	At Goal
19					\$5,000	5%	Above Goal
20					\$10,000	7%	Over Achiever

- **9.** Select **cell F16** and change the rate to **1%**.
- **10.** Click **Undo 5** to change the entry back to 0% in cell F16.
- **11.** Select **cell G16** and change the message to **Counsel**.
- **12.** Click **Undo (5)** to change the entry back to *Under Achiever*.
- **13.** Save and then close the file.

Creating PivotTables

PivotTables are powerful data analysis tools. They let you summarize data in various ways and instantly change the view you use. A PivotTable not only subtotals groups of related data; it also compares one group to another.

Arranging the Source Data

You create PivotTables from columns or from a table in an Excel worksheet. The data should contain no blank rows or columns. Converting a list to a table is recommended when records will be added after the PivotTable is created. The additional table data are included automatically within the PivotTable when it is refreshed or updated. Data in a list are not included automatically. The following examples explain two PivotTables based on the worksheet list partially shown here.

	A	В	C	D	E	F
3	Pledge Level	Team Leader	Sponsor Category	Sponsor Name	Year I	Year 2
4	Level 5	Abbott	Organization Contribution	Accountancy Association	0	15,000
5	Level 4	Faber	Corporate Sponsorship	Accurate Biomedical	10,000	10,000
6	Level I	Lemus	Federal Government Grant	Admin for Children & Fam	5,129,874	8,075,333
7	Level 3	Faber	Corporate Sponsorship	Alpha Supplies Corp.	125,000	50,000
8	Level 6	Nguyen	Individual Contribution	Andres Padilla	0	500

The worksheet data

PivotTable Example 1

You can sort the preceding table by pledge level or sponsor category, but you cannot easily compare totals for the various pledge levels in each sponsor category. A PivotTable can summarize some or all data in any number of ways, and it creates grand totals. Each column in a PivotTable is a field. Examine the PivotTable and notice that the Sponsor Category field from the table is used for the row labels, the Pledge Level field for the column labels, and the Year 2 field for the data area and grand totals. Each row displays the amount given by each sponsor group in the various pledge levels.

Sum of Year 2	Column Labels 💌						
Row Labels	▼ Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Grand Total
Corporate Grant		1,425,000		0			1,425,000
Corporate Sponsorship	20,300,000	250,000	350,000	22,500	28,750		20,951,250
Federal Government Grant	47 ,894 ,948						47 ,894 ,948
Individual Contribution					4,100	2,080	6,180
Individual Sponsorship	15,000,000	2,500,000	413,579	15,000	4,475	595	17,933,649
Local Business Contribution					2,634	992	3,626
Local Government Grant			243,500				243,500
Medical Center/Large Facility		90,250					90,250
Medical Ctr Contribution		596,432	122,340				718,772
Organization Contribution			50,000	28,000	39,050	3,160	120,210
Organized Labor/Union Contributior	ı	700,000					700,000
Physician Office Contribution			25,000	20,000	30,500		75,500
Private Grant		2,000,000	0				2,000,000
State Government Grant	35,077,677						35,077,677
Grand Total	118,272,625	7,561,682	1,204,419	85,500	109,509	6,827	127,240,562

This PivotTable summarizes contributions by sponsor category.

PivotTable Example 2

In this example, data is summarized first by pledge level and then by sponsor category. To create this type of view, the PivotTable layout shown in the following illustration contains the Pledge Level and then Sponsor Category fields for row labels, no column labels, and the Year 2 field for the data area and totals.

	А		В
3		Ŧ	Sum of Year 2
4	■Level 1		118,272,625
5	Corporate Sponsorship		20,300,000
6	Federal Government Grant		47 ,894 ,948
7	Individual Sponsorship		15,000,000
8	State Government Grant		35,077,677
9	■Level 2		7,561,682
10	Corporate Grant		1,425,000
11	Corporate Sponsorship		250,000
12	Individual Sponsorship		2,500,000
13	Medical Center/Large Facility		90,250
14	Medical Ctr Contribution		596,432
15	Organized Labor/Union Contributior	n	700,000
16	Private Grant		2,000,000
17	E Level 3		1,204,419
18	■Level 4		85,500
19	Evel 5		109,509
20	Evel 6		6,827
21	Grand Total		127,240,562

This PivotTable layout summarizes contributions first by pledge level and then by sponsor category.

How PivotTables Work

Each area of a PivotTable plays a role in data organization. The PivotTable Fields task pane displays after you define the worksheet range to be used. The areas of the task pane are explained in the following illustration, which displays the settings for PivotTable Example 1.

Here you choose columns that will appear in the PivotTable.	PivotTable Fields Choose fields to add to report: Pledge Level Team Leader Sponsor Category Sponsor Name Year 1 Year 2 MORE TABLES	▼ X	
You can filter fields you have chosen by dragging them here.	Drag fields between areas below T FILTERS III COLU Pledge L	MNS	Column labels are displayed here. This area displays
Row labels are displayed here.	E ROWS Σ VALU		the field on which a calculation is performed within the PivotTable.

Where you place fields within the PivotTable Fields task pane determines how the PivotTable summarizes the data. By choosing different fields or dragging and dropping a field, you can quickly compare data in various ways. You may choose from several functions—such as SUM, COUNT, and AVERAGE—to calculate fields containing values.

DEVELOP YOUR SKILLS EX01-D02 Create PivotTables

- 1. Open EX01-D02-Sponsors from the EX2013 Lesson 01 folder and save it as EX01-D02-Sponsors-[FirstInitialLastName].
- **2.** Select **cell B4** and choose **Insert**→**Tables**→**PivotTable**.
- **3.** Verify that the table/range agrees with the one displayed here, and then click **OK**.

Create PivotTable	?	×
Choose the data that you want to analyze		
Select a table or range		
Table/Range: (Sponsors Sheet'!\$A\$3:\$F\$101		國
O Use an external data source		
Choose Connection		
Connection name:		
Choose where you want the PivotTable report to be placed		
<u>N</u> ew Worksheet		

- 4. Rename Sheet1 to PivotTable by Sponsor Category, and then select cell A1.
- 5. Select cell A3 to restore the task pane.



6. Follow these steps to define the PivotTable in the task pane:

	A	В		С	D	E	F	G	Н
3	Sum of Year 2	Column L	abels 🔻						
4	Row Labels 🔻	Level 1		Level 2	Level 3	Level 4	Level 5	Level 6	Grand Total
5	Corporate Grant			1425000		0			1425000
6	Corporate Sponsorship	2	20300000	250000	350000	22500	28750		20951250
7	Federal Government Grant	1	47894948						47894948
8	Individual Contribution						4100	2080	6180
9	Individual Sponsorship	1	15000000	2500000	413579	15000	4475	595	17933649
10	Local Business Contribution						2634	992	3626
11	Local Government Grant				243500				243500
12	Medical Center/Large Facility			90250					90250
13	Medical Ctr Contribution			596432	122340				718772
14	Organization Contribution				50000	28000	39050	3160	120210
15	Organized Labor/Union Contribution			700000					700000
16	Physician Office Contribution				25000	20000	30500		75500
17	Private Grant			2000000	0				2000000
18	State Government Grant	3	35077677						35077677
19	Grand Total	11	18272625	7561682	1204419	85500	109509	6827	127240562

- 7. Choose PivotTable Tools→Analyze→PivotTable→Options.
- 8. Type BySponsorCategory in the PivotTable name text box and tap Enter.
- 9. Display the **Sponsors Table** worksheet.
- **10.** With any table cell selected, choose **Insert**→**Tables**→**PivotTable**, verify that the suggested range is the **Sponsors_Table**, and click **OK**.
- **11.** Rename the new sheet **PivotTable by Pledge Level**. In the PivotTable Fields task pane, place a checkmark next to field names in this order: **Pledge Level, Sponsor Category, Year 2**.

▼ FILTERS	COLUMNS		A		В
		3	Row Labels	-	Sum of Year 2
		4	⊟Level 1		118,272,625
		5	Corporate Sponsorship		20,300,000
		6	Federal Government Grant		47,894,948
		7	Individual Sponsorship		15,000,000
■ ROWS	Σ VALUES	8	State Government Grant		35,077,677
Diadata Laural 📼	Sum of Year 2 🔻	9	⊟Level 2		7,561,682
Pledge Level 🔻		10	Corporate Grant		1,425,000
Sponsor Cate 🔻		11	Corporate Sponsorship		250,000

- **12.** Choose **PivotTable Tools** → **Analyze** → **PivotTable** → **Options**.
- **13.** Type **ByPledgeLevel** in the PivotTable name text box and tap **Enter**.
- **14.** Save the file and leave it open; you will modify it throughout this lesson.

Formatting a PivotTable

Values and subtotals in a PivotTable do not automatically display the formatting from the original worksheet cells. You may select and format one or more specific cells in the PivotTable using standard Ribbon commands. Alternatively, the PivotTable Tools Design contextual tab contains a large selection of PivotTable styles that can be used to quickly apply color, shading, and gridlines. The report layout displays in Compact Form by default, but you may choose from two other layouts. The subtotals may be displayed at the top or bottom of each group, or can be hidden.

		_			_	
	A	В		i A	В	C
3	Row Labels 🛛 💌	Sum of Year 2	3	Pledge Level	Sponsor Category	Sum of Year 2
4	⊡Level 1	118272625	4	⊡Level 1	Corporate Sponsorship	20300000
5	Corporate Sponsorship	20300000	5		Federal Government Grant	47894948
6	Federal Government Grant	47894948	6		Individual Sponsorship	1500000
7	Individual Sponsorship	15000000	7		State Government Grant	35077677
8	State Government Grant	35077677	8	Level 1 Total		118272625
9	⊟Level 2	7561682	9	⊡Level 2	Corporate Grant	1425000
10	Corporate Grant	1425000	10		Corporate Sponsorship	250000
Com	pact form		Tab	ular form		

DEVELOP YOUR SKILLS EX01-D03 Format a PivotTable

- 1. Save your file as EX01-D03-Sponsors-[FirstInitialLastName].
- **2.** Display the **PivotTable by Sponsor Category** worksheet, select the **range B4:H4**, and right-align the labels.
- **3.** Choose **PivotTable Tools**→**Design**→**Layout**→**Grand Totals**. Experiment by choosing each option and observing its result, and then choose **On for Rows and Columns**.
- **4.** Select any cell in the PivotTable.
- **5.** Follow these steps to format the Year 2 contribution numbers:



- 6. Display the **PivotTable by Pledge Level** worksheet.
- **7.** Click in the PivotTable, choose **PivotTable Tools**→**Design**→**PivotTable Styles**→**More** ▼, and choose **Pivot Style Medium 9**.

- **8.** Choose **PivotTable Tools**→**Design**→**Layout**→**Report Layout**→**Show in Outline Form**.
- **9.** Choose **PivotTable Tools**→**Design**→**Layout**→**Report Layout**→**Show in Tabular Form**.
- **10.** Choose **PivotTable Tools**→**Design**→**Layout**→**Report Layout**→**Show in Compact Form** to return to the original layout.
- **11.** Save the file and leave it open.

Changing PivotTable Fields

You may add or remove fields on a PivotTable simply by adding or removing the checkmark next to the field name in the PivotTable Fields task pane. The PivotTable will automatically reconfigure to display the new data. You may also change the order of fields within the row and column areas. One of the most powerful ways of manipulating data is to move a field from the row area to the column area or vice versa. This is called *pivoting the field* (hence the name PivotTable). The display of the data field rotates to give you an entirely different view of your data, as illustrated in the two PivotTables you created in the previous exercise. There, you positioned the Pledge Level field to display as columns in the first PivotTable and as rows in the second.

3 Sum of Year 2 Column Labels Level 1 Level 2 Level 3 Level 4 Level 5 Level 6 Grand Tota 5 Corporate Grant 1,425,000 0 1,425,000 0 1,425,000 20,951,25 20,951,25 20,951,25 20,951,25 7 Federal Government Grant 47,894,948 4100 2,080 6,18 9 Individual Contribution 15,000,000 2,500,000 413,579 15,000 4,475 595 17,933,64 10 Local Business Contribution 590,250 243,500 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>									
4 Row Labels Level 1 Level 2 Level 3 Level 4 Level 6 Grand Total 5 Corporate Grant 1,425,000 0 1,425,000 20,300,000 250,000 350,000 22,500 28,750 20,951,25 7 7 Federal Government Grant 47,894,948 47,894,948 47,894,948 47,894,948 47,894,948 47,894,948 47,894,948 47,894,948 4,100 2,080 6,18 9 Individual Contribution 4,100 2,080 6,18 92 3,62 10 Local Business Contribution 243,500 243,500 4,475 595 17,933,64 11 Local Government Grant 243,500 243,500 90,250 243,500 90,250 90,250 90,250 90,250 122,340 718,77 14 Organization Contribution 50,000 28,000 39,050 3,160 120,211 15 Organized Labor/Union Contribution 700,000 75,50 75,50 17,00,000 75,50 75,50		A	В	C	D	E	F	G	Н
5 Corporate Grant 1,425,000 0 1,425,000 6 Corporate Sponsorship 20,300,000 250,000 350,000 22,500 28,750 20,951,25 7 Federal Government Grant 47,894,948 47,894,94 41,00 2,080 6,18 9 Individual Contribution 4,100 2,080 6,18 92 3,62 10 Local Business Contribution 243,500 243,500 243,500 243,500 243,500 243,500 12,32,34 992 3,62 11 Local Government Grant 243,500 243,500 243,500 90,250 90,250 90,250 90,250 12,34,00 718,77 14 Organization Contribution 596,432 122,340 718,77 14 Organized Labor/Union Contribution 700,000 700,000 700,000 700,000 75,50 17 Private Grant 2,000,000 0 2,000,000 2,000,000 2,000,000 75,50 18 State Government Grant 35,077,677 35,077,677 <th>3</th> <th>Sum of Year 2 Co</th> <th>lumn Labels 💌</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	3	Sum of Year 2 Co	lumn Labels 💌						
6 Corporate Sponsorship 20,300,000 250,000 350,000 22,500 28,750 20,951,25 7 Federal Government Grant 47,894,948 47,894,948 47,894,948 47,894,94 8 Individual Contribution 4,100 2,080 6,18 9 Individual Sponsorship 15,000,000 2,500,000 413,579 15,000 4,475 595 17,933,64 10 Local Business Contribution 243,500 243,500 243,500 243,500 243,500 243,500 12,349,902,550 12,2340 718,77 90,255 13,677 90,250 120,000,000 250,000 28,000 39,050 3,160 120,211 15 Organization Contribution 50,000 28,000 39,050 3,160 120,211 15 Organized Labor/Union Contribution 700,000 700,000 700,000 700,000 75,50 17,90,000 12,000,000 12,000,000 12,000,000 12,000,000 12,000,000 12,000,000 12,000,000 12,000,000 12,000,000 12,000,000 <td< th=""><th>4</th><th>Row Labels 🔹</th><th>Level 1</th><th>Level 2</th><th>Level 3</th><th>Level 4</th><th>Level 5</th><th>Level 6</th><th>Grand Total</th></td<>	4	Row Labels 🔹	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Grand Total
7 Federal Government Grant 47,894,948 47,894,948 47,894,94 8 Individual Contribution 4,100 2,080 6,18 9 Individual Sponsorship 15,000,000 2,500,000 413,579 15,000 4,475 595 17,933,64 10 Local Business Contribution 2,634 992 3,62 243,500 243,500 243,500 11 Local Government Grant 243,500 243,500 90,250 90,250 12 Medical Center/Large Facility 90,250 90,250 90,250 90,250 120,211 14 Organization Contribution 596,432 122,340 718,77 140,000 120,211 15 Organized Labor/Union Contribution 700,000 700,000 700,000 700,000 75,500 16 Physician Office Contribution 2,000,000 0 2,000,000 2,000,000 2,000,000 2,000,000 12,000,000 35,077,677 35,077,677 35,077,677 35,077,677 35,077,677 35,077,677 35,077,677 <td>5</td> <td>Corporate Grant</td> <td></td> <td>1,425,000</td> <td></td> <td>0</td> <td></td> <td></td> <td>1,425,000</td>	5	Corporate Grant		1,425,000		0			1,425,000
8 Individual Contribution 4,100 2,080 6,18 9 Individual Sponsorship 15,000,000 2,500,000 413,579 15,000 4,475 595 17,933,64 10 Local Business Contribution 2,634 992 3,62 11 Local Government Grant 243,500 243,500 243,50 12 Medical Center/Large Facility 90,250 90,250 90,250 13 Medical Ctr Contribution 596,432 122,340 718,77 14 Organization Contribution 700,000 26,000 39,050 3,160 120,21 15 Organized Labor/Union Contribution 700,000 700,000 700,000 700,000 16 Physician Office Contribution 2,000,000 0 2,000,000 75,50 17 Private Grant 2,000,000 0 2,000,000 2,000,000 2,000,000 18 State Government Grant 35,077,677 35,077,677 35,077,677 35,077,67	6	Corporate Sponsorship	20,300,000	250,000	350,000	22,500	28,750		20,951,250
9 Individual Sponsorship 15,000,000 2,500,000 413,579 15,000 4,475 595 17,933,64 10 Local Business Contribution 2,634 992 3,62 11 Local Government Grant 243,500 243,500 243,500 12 Medical Center/Large Facility 90,250 90,250 90,250 13 Medical Ctr Contribution 596,432 122,340 718,77 14 Organization Contribution 700,000 700,000 700,000 15 Organized Labor/Union Contribution 700,000 75,50 75,50 17 Private Grant 2,000,000 0 2,000,000 2,000,000 18 State Government Grant 35,077,677 35,077,677 35,077,677 35,077,677	7	Federal Government Grant	47 ,894 ,948						47 ,894 ,948
10 Local Business Contribution 2,634 992 3,62 11 Local Government Grant 243,500 243,500 12 Medical Center/Large Facility 90,250 90,250 13 Medical Ctr Contribution 596,432 122,340 718,77 14 Organization Contribution 50,000 28,000 39,050 3,160 120,21 15 Organized Labor/Union Contribution 700,000 700,000 700,000 700,000 75,50 17 Private Grant 2,000,000 0 2,000,000 2,000,000 2,000,000 75,50 17 Private Grant 35,077,677 35,077,677 35,077,67 35,077,677	8	Individual Contribution					4,100	2,080	6,180
11 Local Government Grant 243,500 243,500 12 Medical Center/Large Facility 90,250 90,250 13 Medical Ctr Contribution 596,432 122,340 718,77 14 Organization Contribution 50,000 28,000 39,050 3,160 120,21 15 Organized Labor/Union Contribution 700,000 700,000 700,000 700,000 16 Physician Office Contribution 22,000,000 0 22,000,000 75,50 17 Private Grant 2,000,000 0 2,000,000 2,000,000 18 State Government Grant 35,077,677 35,077,677 35,077,677	9	Individual Sponsorship	15,000,000	2,500,000	413,579	15,000	4,475	595	17,933,649
12 Medical Center/Large Facility 90,250 90,251 13 Medical Ctr Contribution 596,432 122,340 718,77 14 Organization Contribution 50,000 28,000 39,050 3,160 120,21 15 Organized Labor/Union Contribution 700,000 700,000 700,000 705,500 16 Physician Office Contribution 25,000 20,000 30,500 75,50 17 Private Grant 2,000,000 0 2,000,000 2,000,000 18 State Government Grant 35,077,677 35,077,677 35,077,677	10	Local Business Contribution					2,634	992	3,626
13 Medical Ctr Contribution 596,432 122,340 718,77 14 Organization Contribution 50,000 28,000 39,050 3,160 120,21 15 Organized Labor/Union Contribution 700,000 700,000 700,000 700,000 16 Physician Office Contribution 25,000 20,000 30,500 75,50 17 Private Grant 2,000,000 0 2,000,000 2,000,000 18 State Government Grant 35,077,677 35,077,677 35,077,677	11	Local Government Grant	· · · · · · · · · · · · · · · · · · ·		243,500				243,500
14 Organization Contribution 50,000 28,000 39,050 3,160 120,21 15 Organized Labor/Union Contribution 700,000 700,000 700,000 16 Physician Office Contribution 25,000 20,000 30,500 75,50 17 Private Grant 2,000,000 0 2,000,00 2,000,00 18 State Government Grant 35,077,677 35,077,677 35,077,677	12	Medical Center/Large Facility		90,250					90,250
15 Organized Labor/Union Contribution 700,000 700,000 16 Physician Office Contribution 25,000 20,000 30,500 75,50 17 Private Grant 2,000,000 0 2,000,00 2,000,00 18 State Government Grant 35,077,677 35,077,67 35,077,67	13	Medical Ctr Contribution		596,432	122,340				718,772
16 Physician Office Contribution 25,000 20,000 30,500 75,50 17 Private Grant 2,000,000 0 2,000,00 2,000,00 18 State Government Grant 35,077,677 35,077,67 35,077,67	14	Organization Contribution			50,000	28,000	39,050	3,160	120,210
17 Private Grant 2,000,000 0 2,000,00 18 State Government Grant 35,077,677 35,077,67 35,077,67	15	Organized Labor/Union Contribution		700,000					700,000
18 State Government Grant 35,077,677 35,077,67	16	Physician Office Contribution			25,000	20,000	30,500		75,500
	17	Private Grant		2,000,000	0				2,000,000
19 Grand Total 118,272,625 7,561,682 1,204,419 85,500 109,509 6,827 127,240,56	18	State Government Grant	35,077,677						35,077,677
	19	Grand Total	118,272,625	7,561,682	1,204,419	85,500	109,509	6,827	127,240,562

Pledge Level fields displayed as columns

	⊟Level 1 Corporate Sponsorship Federal Government Grant	Sum of Year 2 118272625 20300000
5 6	Corporate Sponsorship Federal Government Grant	20300000
6	Federal Government Grant	
7		47894948
	Individual Sponsorship	15000000
8	State Government Grant	35077677
9	⊟Level 2	7561682
10	Corporate Grant	1425000
11	Corporate Sponsorship	250000
12	Individual Sponsorship	2500000
13	Medical Center/Large Facility	90250
14	Medical Ctr Contribution	596432
15	Organized Labor/Union Contribution	700000
16	Private Grant	200000
	⊡Level 3	1204419
18	Corporate Sponsorship	350000
19	Individual Sponsorship	413579
20	Local Government Grant	243500
21	Medical Ctr Contribution	122340
22	Organization Contribution	50000
23	Physician Office Contribution	25000
24	Private Grant	0
	⊟Level 4	85500
26	Corporate Grant	0
27	Corporate Sponsorship	22500
28	Individual Sponsorship	15000
29	Organization Contribution	28000
30	Physician Office Contribution	20000

Pledge Level fields displayed as rows

DEVELOP YOUR SKILLS EX01-D04 Change PivotTable Fields

- 1. Save your file as EX01-D04-Sponsors-[FirstInitialLastName].
- 2. Display the **PivotTable by Pledge Level** worksheet.
- 3. Place a checkmark next to Year 1 in the task pane to add this field to the PivotTable.
- **4.** Right-click any cell in the **Sum of Year 1** column of the PivotTable and choose **Number Format**.
- **5.** In the Format Cells dialog box, choose the **Number** category, set **0** decimal places, check the **Use 1000 Separator (,)** option, and click **OK**.
- 6. Repeat steps 4–5 to format the Sum of Year 2 column.
- 7. Drag Sum of Year 2 below Sum of Year 1 in the Values area.

	A	В	С
3	Row Labels	Sum of Year 1	Sum of Year 2
4	⊡Level 1	117,267,482	118,272,625
5	Corporate Sponsorship	17,460,000	20,300,000
6	Federal Government Grant	49,899,591	47,894,948
7	Individual Sponsorship	12,500,000	15,000,000
8	State Government Grant	37 ,407 ,891	35,077,677
9	⊡Level 2	6,254,063	7,561,682
10	Corporate Grant	1,250,000	1,425,000
11	Corporate Sponsorship	250,000	250,000
	4 5 6 7 8 9	4 ■ Level 1 5 Corporate Sponsorship 6 Federal Government Grant 7 Individual Sponsorship 8 State Government Grant 9 ■ Level 2 10 Corporate Grant	3 Row Labels Sum of Year 1 4 ■Level 1 117,267,482 5 Corporate Sponsorship 17,460,000 6 Federal Government Grant 49,899,591 7 Individual Sponsorship 12,500,000 8 State Government Grant 37,407,891 9 ■Level 2 6,254,063 10 Corporate Grant 1,250,000

8. Place a checkmark by the **Sponsor Name** field in the top section of the PivotTable Fields task pane.

		A	В	С
	3	Row Labels	Sum of Year 1	Sum of Year 2
	4	⊟Level 1	117,267,482	118,272,625
	5	■Corporate Sponsorship	17,460,000	20,300,000
■ ROWS	6	Jensen Pharmaceutical	7 ,500 ,000	10,000,000
Pledge Level 🔻	7	Medical Solutions Corp.	5,460,000	4,300,000
	8	Open Systems	4,500,000	6,000,000
Sponsor Cate 🔻	9	Federal Government Grant	49,899,591	47,894,948
Sponsor Name 🔻	10	Admin for Children & Fam	5,129,874	8,075,333

- **9.** Remove the checkmark by the **Sponsor Category** and **Sponsor Name** fields in the PivotTable Fields task pane; add a checkmark next to **Team Leader**.
- **10.** Drag the **Team Leader** field from the Rows area to the **Columns** area below the Values field.

▼ FILTERS	Σ Values	
■ ROWS Pledge Level Team Leader	Σ VALUES Sum of Year 1 ▼ Sum of Year 2 ▼	

	A	В	С	D	Е	F	G	Н		J
3		Column Labels 🔽								
4	_	Sum of Year 1								Sum of Year 2
5	Row Labels 💌	Abbott	Debowski	Faber	Lemus	Martinez	Nguyen	Park	Weinstein	Abbott
6	Level 1			17,460,000	87,307,482				12,500,000	
7	Level 2		750,000	250,000	2,000,000	754,063			2,500,000	
8	Level 3	50,000)	412,000	350,000	207,250			298,333	50,000
9	Level 4	30,000)	42,500	50,000	65,000			14,600	28,000
10	Level 5	14,000)	20,000		12,500	5,200	2,262	4,325	39,050
11	Level 6	10,648	6				2,595	1,410	535	3,160
12	Grand Total	104,646	5 750,000	18,184,500	89,707,482	1,038,813	7,795	3,672	15,317,793	120,210

- **11. Undo 5** the pivot.
- **12.** Save the file and leave it open.

Filtering a PivotTable with AutoFilter

You may set the PivotTable to filter, or include, specific items in the data summaries. The totals and subtotals are recalculated for the selected items. The Row Labels and Column Labels headings have an AutoFilter button that displays the same sorting and filtering options that are available on the columns of worksheet lists and tables.

	3	Row Labels	Υ.	
The field to be	Sel	ect field:		
filtered	Ple	dge Level	~	— The AutoFilter
	₽↓	Sort A to Z		button
	Z↓	Sort Z to A		
		More Sort Options		
	$\overline{\mathbf{x}}$	<u>C</u> lear Filter From "Pledge Level"		
		<u>L</u> abel Filters)	Additional filtering
		<u>V</u> alue Filters		commands, such as Begins With and Greater
		Search	P	Than, are available here.
		🔳 (Select All)		
Select specific				
pledge levels here.		Level 2		

Filtering PivotTables with Slicers

Slicers are menu frames displayed on worksheets that contain all filtering choices in one field. Selected items are highlighted in slicers, making it easy to identify currently applied criteria. Slicer frames may be resized, moved, and formatted with styles for a consistent appearance. Slicers may also be shared in other worksheets of the same workbook for use with multiple PivotTables based on the same data set. Changing the filtering selections in a shared slicer causes all connected PivotTables to update automatically.

		_									7
	A	В	С	D	E	F	G		Н		The Clear Filter button
2											- The Clear Filter button
3	Row Labels ┹	Sum of Year 1	Sum of Year 2	Pledge	Level		x	Ļ	Sponsor Catego	rv 📡	
4	⊟Level 1	29,960,000	35,300,000					1.			
5	Faber	17,460,000	20,300,000	Level					Corporate Spon	sorship 🔨	
6	Weinstein	12,500,000	15,000,000	Level)			Ī	Federal Governi	mony	
7	Grand Total	29,960,000	35,300,000	Levers	-			Ц	r ederal Governi		Highlighted items are
8				Level	}			11	Individual Spons	sorship	included in the current filter.
9							<u> — П</u>	Ľ			
10				Level				11	State Governme	ent G	
11				Level (5			11	Corporate Grant		Dimmed items are not available in
12							= П	15			the current filter (Pledge Level 1
13				Level 6	ì			11	Individual Contri	bution	contains no corporate grants).
_								-			

DEVELOP YOUR SKILLS EX01-D05 Filter a PivotTable with Slicers

- 1. Save your file as EX01-D05-Sponsors-[FirstInitialLastName].
- 2. Display the **PivotTable with Slicers** worksheet.

- **3.** Select any cell in the PivotTable and choose **PivotTable Tools**→**Analyze**→**Filter**→**Insert Slicer**.
- 4. Place a checkmark next to Pledge Level, Team Leader, and Sponsor Category; click OK.
- 5. Select cell A1 to hide the PivotTable Fields task pane, if still displayed.
- **6.** Follow these steps to move and resize the Sponsor Category slicer:



7. Drag the Pledge Level and Team Leader slicers to row 19.

	A		В	С	D	E
18	Grand Total		125,114,701	127,240,562	Iviedical Ctr	Contribution
19 20	Pledge Level 🕺 🕺	Ηľ	Team Leader	x	Organization	Contribution
21	Level 1		Abbott	^	Organized L	abor/Union C

- **8.** Click the **Pledge Level** title to display the slicer's frame, and then hold down Shift and click the **Team Leader** title.
- **9.** Choose **Slicer Tools**→**Options**→**Buttons**→**Columns** → and change the number of columns to **2**.
- **10.** Click the **Sponsor Category** title in the slicer at the right of the PivotTable, choose **Slicer Tools**→**Options**→**Slicer Styles**→**More**, and choose any style.
- **11.** Apply the styles of your choice to the **Pledge Level** and **Team Leader** slicers.
- **12.** Choose **Level 2** in the Pledge Level slicer.

Pledge Level		₹~	Team Leader	×
Level 1	Level 2		Debowski	Faber
Level 3	Level 4		Lemus	Martinez
Level 5	Level 6		Weinstein	Abbott
			Nguyen	Park

- **13.** Click the **Clear Filter** 🔀 button on the Pledge Level slicer.
- **14.** Select **Corporate Sponsorship** in the Sponsor Category slicer, hold down [Ctrl], and select **Individual Sponsorship**.
- **15.** Save the file and leave it open.

Editing PivotTable Calculations

You are not limited to summing values in a PivotTable, and you may create formulas within PivotTables when necessary.

Changing the Function for a Values Area Item

By default, the subtotals and grand totals in a PivotTable sum the values in a field. You may change the SUM function to a different function, such as AVERAGE, MAX, or COUNT.

If the Values area of the PivotTable Fields task pane contains only one entry, all SUM columns will change to the function you selected. If multiple entries exist in the Values area, you may change the function for one entry at a time.

Creating a Calculated Field

Some functions are not available on the Summarize Values By tab of the Value Field Settings dialog box. These functions may be typed in the Insert Calculated Field dialog box. A calculated field contains a formula using values from one or more existing fields. For example, the formula could subtract the value in one field from another to find the difference.

	Insert Calcul	lated Field	? ×		
<u>N</u> ame: For <u>m</u> ula:	Goal 110% Year 2 = 'Year 2'*110%		<u>A</u> dd Delete		Here, you create a formula for a calculated field.
Sponsor Year 1	der Category			L	
Year 2	Insert Fi <u>e</u> ld				Field names may be selected from this list fo insertion in the formula.
		ОК	Close		

Converting Column Data to a Calculation

The Show Values As tab of the Value Field Settings dialog box can be used to create formulas employing preset options. For example, you can calculate percentages of a total, the difference between values in two columns, a running total, or a ranked order. If you want to display the original column data along with the converted data, simply drag and drop the field name from the field list to the Values area to create a duplicate field.

Refreshing PivotTable Data

PivotTables are often created with data from sources external to the Excel workbook containing the PivotTables. After you change the source data even if in a worksheet range or table within the same workbook—you must refresh the PivotTables manually. You may refresh just the active PivotTable or all PivotTables in the workbook. You may also set a PivotTable option to refresh data from external sources when the workbook is opened.

FROM THE RIBBON

PivotTable Tools \rightarrow Analyze \rightarrow Data \rightarrow Refresh $\bigtriangledown \rightarrow$ Refresh or Refresh All

FROM THE KEYBOARD

Ctrl + Alt + F5 to refresh all data sources

DEVELOP YOUR SKILLS EX01-D06 Change PivotTable Calculations

- 1. Save your file as EX01-D06-Sponsors-[FirstInitialLastName].
- 2. Display the **PivotTable by Pledge Level** worksheet.
- **3.** Select a number cell in **column B** of the PivotTable, and then choose **PivotTable Tools→Analyze→Active Field→Field Settings**.
- 4. Select Average on the Summarize Values By tab and click OK.
- 5. Choose PivotTable Tools→Analyze→Calculations→Fields, Items, & Sets→ Calculated Field.
- **6.** Follow these steps to create a calculated field:

Insert Calculated Field A Type Goal 110% Year 2 in the Name box. Add D Click Add. Goal 110% Year 2 v Formula: = 'Year 2'*110% Delete **B** Type an equals sign to begin the formula. Field Pledge Level **O** Double-click **Year 2** Team Leader Sponsor Category and type ***110%**. Sponsor Name Year 1 Year 2 Insert Fi<u>e</u>ld G Click OK. Close

	A	В	С	D
3	Row Labels 💌	Average of Year 1	Sum of Year 2	Sum of Goal 110% Year 2
4	⊟Level 1	13,029,720	118,272,625	130,099,888
5	Faber	5,820,000	20,300,000	22,330,000
6	Lemus	17,461,496	82,972,625	91,269,888
7	Weinstein	12,500,000	15,000,000	16,500,000

- 7. Display the **Sponsors Table** worksheet.
- **8.** In **cell F98** change 250,000 to **200000**, and then display the **PivotTable by Pledge Level** worksheet.
- 9. Choose PivotTable Tools→Analyze→Data→Refresh menu ▼→Refresh All.
- **10.** Save the file and leave it open.

Creating PivotCharts

A PivotChart presents data from a PivotTable. There are two ways to create a PivotChart.

- **1.** Chart an existing PivotTable by choosing a chart type from the Insert tab, as you would do for a normal Excel chart.
- **2.** Use the PivotChart command to create a PivotTable and PivotChart from the source data at the same time. The chart builds as you choose fields in the PivotTable Fields task pane.

The fields in the values area of the PivotTable are displayed as data series in the chart. The row labels in the PivotTable are used as the axis labels in the chart; the column labels are the data series in the chart legend.

Filtering PivotCharts

The PivotChart may be filtered using the AutoFilter buttons on the chart, AutoFilter buttons on the PivotTable, or slicers added to the worksheet. The filtering is applied to the related PivotTable as well.



Formatting and Printing PivotCharts

You format PivotCharts using the same Ribbon commands as you do for normal Excel charts. Some chart formatting, such as data labels, is not preserved after a PivotChart is refreshed.

DEVELOP YOUR SKILLS EX01-D07 Create a PivotChart

- 1. Save your file as EX01-D07-Sponsors-[FirstInitialLastName].
- 2. Display the PivotChart worksheet.
- **3.** Select any cell within the PivotTable, and then choose **Insert**→**Charts**→**Insert Column Chart**→**2-D Column**→**Clustered Column**.
- **4.** Point at the chart frame and drag the chart just below the PivotTable.
- **5.** Place a checkmark next to **Year 2** in the PivotChart Fields list.
- 6. To filter the PivotChart, choose the **Pledge Level AutoFilter** button at the lower-left corner of the PivotChart, remove the checkmark next to **Level 4**, and click **OK**.
- В Δ 275573 Grand Total 5 6 7 Sum of Year 1 8 То 9 10 250000 11 12 200000 13
- 7. Select the chart, choose **PivotChart Tools**→**Design**→**Type**→**Change Chart Type**→**Column**→**3-D Clustered Column**, and click **OK**.
- **8.** Save and close the file.

Changing Macro Security

A macro is a recorded set of mouse and keyboard actions that can be played back at any time. Macros are useful for automating routine tasks, especially if those tasks are lengthy. Macros can contain viruses, so be cautious about opening workbooks containing macros that you receive from others.

Security Levels

You change macro security in the Trust Center section within Excel Options. Your setting there is in effect for all Excel workbooks that you open on your computer. The setting is not embedded in any workbooks that you save and share with others. You may choose among four different levels of security in Excel that control whether macros in an opened workbook are available or disabled. FROM THE RIBBON

File→Options→Trust Center→Trust Center Settings→Macro Settings

- Enable all macros: You are not protected from potentially unsafe macros. This option is not recommended for general use.
- **Disable all macros except digitally signed macros:** This option automatically disables unsigned macros and enables macros from publishers previously added to the trusted publishers list in the Trust Center.

- **Disable all macros with notification:** This is the default option that displays a message allowing you to enable macros in the specified workbook or use the workbook without enabling macros.
- Disable all macros without notification: Only macros in workbooks that you placed in a trusted location of the Trust Center will run. All other digitally signed and unsigned macros are disabled.

If you have antivirus software installed, the file will be scanned for viruses before it is opened regardless of the security level set. Also, note that your network system administrator may set macro security and prevent users from changing it.

DEVELOP YOUR SKILLS EX01-D08 Verify Macro Security

- **1.** Choose **File**→**Options**→**Trust Center**.
- 2. Click the **Trust Center Settings** button, choose the **Macro Settings** category, and choose **Disable All Macros with Notification** (if necessary).
- **3.** Choose the **Message Bar** category from the left side of the window. Verify that the **Show the Message Bar...** option is selected.
- 4. Click OK twice to close both dialog boxes.
- 5. Open EX01-D08-MacroTest from the EX2013 Lesson 01 folder.
- 6. Click Enable Editing below the Ribbon if necessary. Save the file as EX01-D08-MacroTest-[FirstInitialLastName].
- 7. Click the Enable Content button, if necessary.
- 8. Click the Sort by Leader button.
- **9.** Close the file without saving changes.

Recording Macros

Excel's macro recording feature is similar to a video camera. You turn it on, press a button to start recording, and press a button to stop recording when finished. You may replay the recording as many times as you want, during which macros play back recorded keystrokes and mouse actions.

After the Record Macro button is clicked in the Status Bar, the Stop Recording button appears.

Naming a Macro

You can name your macros, or use Excel's default names (Macro1, Macro2, etc.). Macro names may not contain spaces but may include capital letters and underscores.

Recording Macro Steps

Most actions you perform are recorded in a macro. These include mouse actions, choosing Ribbon commands, selecting options in dialog boxes, using arrow keys to navigate the worksheet, and typing text. Any mistakes and corrections you make during recording are also saved in the macro. If the final result is correct, you can choose to include mistakes and corrections and not bother to rerecord the macro, as there would be no benefit to doing so.

Storing Macros

Macros are available only in the workbook in which you create them unless you assign them to the Personal Macro Workbook. Some macros are useful only in a particular workbook. For these macros, you would choose the This Workbook storage option. Other macros can benefit multiple workbooks. So that they will be available for all workbooks, these macros are assigned to a Personal Macro Workbook, which is a hidden file used to make macros available to all open workbooks.

Saving a Workbook Containing Macros

If you attempt to save a workbook containing macros using the normal Excel Workbook file format, Excel displays the message "The following features cannot be saved in macro-free workbooks: VB Project."

Clicking No in the message box displays the Save As



dialog box, where you should choose the Excel Macro-Enabled Workbook file format. The file is saved with the extension .xlsm to indicate that it contains a macro.

DEVELOP YOUR SKILLS EX01-D09

Record a Macro

- 1. Open EX01-D09-Contributions from the EX2013 Lesson 01 folder and save it as EX01-D09-Contributions-[FirstInitialLastName].
- **2.** Click the **Record Macro** button on the Status Bar at the bottom-left corner of the window.

3. Follow these steps to name the macro and begin the recording process:



- **4.** Select **cell B4** in the table, and then choose **Data**→**Sort & Filter**→**Sort**.
- **5.** Follow these steps to set the sort parameters and initiate the sort:



- 6. Click **Stop Recording** on the Status Bar.
- 7. Click **Save**. Click **No** in the dialog box, and then choose **Computer**→**Browse** if necessary.
- 8. Edit the filename to EX01-D09-ContsWithMacros-[FirstInitialLastName], choose Excel Macro-Enabled Workbook from the Save as Type list, and click Save. Keep the file open.

FROM THE RIBBON View→Macros→View

FROM THE KEYBOARD

Alt + F8 to view

Macros

macros

Running Macros

You may run a macro from within the Macro dialog box. However, macros are more accessible if you assign them to shortcut keys, custom buttons or graphics on a worksheet, or buttons on the Quick Access toolbar. You then run a macro by issuing the shortcut key or clicking the object to which it is assigned.

DEVELOP YOUR SKILLS EX01-D10 Run an Unassigned Macro

- 1. Save your file as EX01-D10-ContsWithMacros-[FirstInitialLastName].
- **2.** Select cell D4 and choose Data \rightarrow Sort & Filter \rightarrow Sort A to Z
- Choose View→Macros→View Macros , choose the Sort_by_Leader macro, and click Run.
- **4.** Save the file and leave it open.

Assigning Macros

Macros can be assigned to shortcut keys, or to either custom buttons or graphics within a worksheet.

Assigning Macros to Shortcut Keys

Excel lets you assign a macro to a shortcut key as you name the macro. You must use Ctrl or Ctrl+Shift as part of the shortcut key combination. Any shortcut you assign will override an existing Excel command shortcut. For example, if you assign Ctrl+B to a macro, that combination would no longer apply bold formatting.

DEVELOP YOUR SKILLS EX01-D11 Assign a Macro to a Shortcut Key

- 1. Save your file as EX01-D11-ContsWithMacros-[FirstInitialLastName].
- 2. Click **Record Macro** an the Status Bar.

Assigning Macros 23

3. Follow these steps to name a new macro:

Record Macro ? ×	Type Insert_Sponsor in the Macro Name box.
Macro name:	
Insert_Sponsor	B Hold down Shift and tap
Shortcut <u>k</u> ey:	T to set the shortcut as
Ctrl+Shift+	$\boxed{\text{Ctrl}} + \boxed{\text{Shift}} + \boxed{1}.$
Store macro <u>i</u> n:	C Verify that the macro will be
This Workbook	stored in This Workbook .
Description:	
	D Click OK.

- **4.** Select **cell A4**, and then choose **Home**→**Cells**→**Insert**.
- 5. Select the **range A5:G5**, choose **Home**→**Clipboard**→**Format Painter**, and select **cell A4** to apply the cell formatting from row 5 to the blank row 4.
- 6. Select cell A4 again to position the pointer for data entry.
- 7. Click Stop Recording .
- **8.** Delete the blank **row 4** that you inserted while creating the macro, then use **Ctrl**+**Shift**+**I** to run the Insert_Sponsor macro.
- **9.** Add this sponsor to the table. Tap Tab after entering the Year 2 value to have the To Date value calculate automatically.

3	Pledge Team Leader	Sponsor Category	Sponsor Name	Year I	Year 2	To Date
4	Level 6 Weinstein	Individual Contribution	Raul T. Garcia	0	500	500

10. Run the **Insert_Sponsor** macro again and add this sponsor to the table.

3	Pledge	Team Leader	Sponsor Category	Sponsor Name	Year I	Year 2	To Date
4	Level 6	Weinstein	Individual Contribution	Wayne Zobe	0	300	300

- **11.** Choose **View** \rightarrow **Macros** \rightarrow **View Macros**
- 12. Choose the Sort_by_Leader macro, and then click Options.
- **13.** In the Shortcut Key text box, press Shift, and tap L to set the shortcut key to Ctrl + Shift + L; click OK.
- **14.** Click **Cancel** to exit the Macro dialog box, then use Ctrl + Shift + L to run the macro.
- **15.** Save the file and leave it open.

Assigning Macros to Custom Buttons

A macro assigned to a custom button is run whenever the button is clicked. The easiest way to create a custom button is to add a shape to the worksheet. You then assign a macro to the button. A custom button may also contain a descriptive label to help identify its function or the macro that is assigned to it.

You create custom buttons using the Insert Controls tool on the Developer tab. To display this tab, choose File \rightarrow Options, click Customize Ribbon, place a checkmark next to Developer in the Main Tabs list at the right, and click OK.

DEVELOP YOUR SKILLS EX01-D12 Assign Macros to Shapes

- 1. Save your file as EX01-D12-ContsWithMacros-[FirstInitialLastName].
- **2.** Choose Insert \rightarrow Illustrations \rightarrow Shapes \rightarrow Rectangles \rightarrow Rectangle \square .
- **3.** Drag the mouse to draw a rectangle on **cell D1**. Copy and paste the button to **cell E1**.
- **4.** Select the first rectangle and type **Insert Sponsor** (don't tap **Enter**), select the second rectangle, and type **Sort by Leader**.
- 5. Click outside the rectangle to deselect it. Then, use
 Shift to select both rectangles and choose Drawing
 Tools→Format→Arrange→Align Objects→
 Align Middle.

D	E	F
Insert Sponsor	Sort by L	eader

- **6.** Deselect the two rectangles.
- **7.** Right-click the **Insert Sponsor** rectangle, choose **Assign Macro**, choose **Insert_Sponsor**, and click **OK**.
- **8.** Assign the **Sort_by_Leader** macro to its rectangle.
- **9.** Deselect the rectangle.
- **10.** Click the **Insert Sponsor** rectangle to run the Insert_Sponsor macro.
- **11.** Add this sponsor to the new row:

3	Pledge Team Leader	Sponsor Category	Sponsor Name	Year I	Year 2	To Date
4	Level 3 Abbott	Organization Contribution	Kelsey Foundation	0	50,000	50,000

12. Click the **Sort by Leader** rectangle to run the Sort_by_Leader macro.

13. Save and then close the file.

Concepts Review

To check your knowledge of the key concepts introduced in this lesson, complete the Concepts Review quiz on the student resource center.