

The **Macro Recorder** can be used to create macros to automate your work, or to make a worksheet more user-friendly for colleagues.

Complex calculations can be recorded by an experienced Excel operator and then linked to objects on the worksheet to make them available to anyone.

In this session you will:

- ✓ learn how to prepare data for an application
- ✓ learn how to record a summation macro
- ✓ learn how to record consolidations
- ✓ learn how to record macros for specific divisions
- ✓ learn how to test macros
- ✓ learn how to create objects to run macros
- ✓ learn how to assign a macro to an object.

PREPARING DATA FOR AN APPLICATION

A series of macros can be put together in a workbook to perform related functions. This type of workbook is called an **application**. Before you start creating macros for an application, you need

to check that the data is suitable. For our example, a consolidation of the budget figures for four divisions, we need to ensure that the layout of each source worksheet is identical.

Try This Yourself:

Before starting this exercise you MUST ensure that Excel has started...

- 1 Click on the **File** tab of the **Ribbon** and select **Open**, then locate and double-click on **Expenses East.xlsx** to open the workbook
- 2 Repeat step 1 for the following workbooks:
Expenses North.xlsx
Expenses South.xlsx
Expenses West.xlsx
- 3 Spend a few moments examining the workbooks

Notice that the layout for each of the workbooks is the same – column and row headings are the same, totals exist in the same cells in each workbook, and the format applied to each total cell is the same...

*Leave the four **Expenses** workbooks open for the next exercise*

	A	B	C	D	E
1	Eastern Division				
2					
3		Jan	Feb	Mar	First Quarter
4					
5	<i>Administration</i>	12,766	12,776	11,988	37,530
6	<i>Sales</i>	23,116	23,666	23,765	70,547
7	<i>Production</i>	12,899	12,344	12,634	37,877
8	<i>Despatch</i>	1,876	1,977	2,554	6,407
9					
10	Total	50,657	50,763	50,941	152,361
11					

1

	A	B	C	D	E
1	Western Division				
2					
3		Jan	Feb	Mar	First Quarter
4					
5	<i>Administration</i>	5,332	5,288	5,776	16,396
6	<i>Sales</i>	12,876	12,399	12,000	37,275
7	<i>Production</i>	9,334	9,435	9,166	27,935
8	<i>Despatch</i>	199	266	178	643
9					
10	Total	27,741	27,388	27,120	82,249
11					

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For Your Reference...

To **prepare data** for an **application**:

1. Review the workbooks to be included, to be familiar with the data
2. If preparing for a consolidation, check that the layout of each source workbook is identical

Handy to Know...

- A **data consolidation** combines the figures from different worksheets/workbooks into a summary. For this reason we need the layout of each source workbook to be identical. We can write macros to consolidate the data in different ways such as a total, an average, or maximum and minimum figures.





RECORDING A SUMMATION MACRO

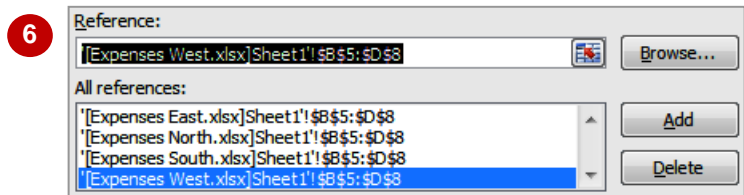
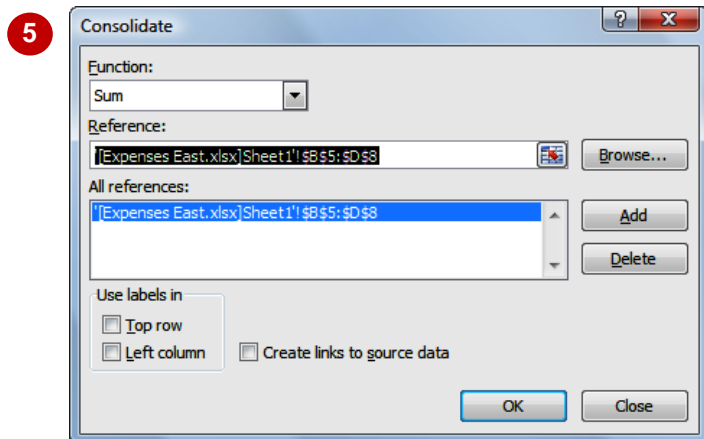
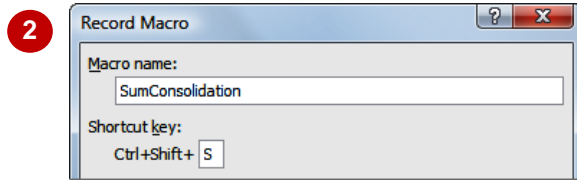
Any options available on Excel's **Ribbon** can be turned into macros to avoid the need for repetition. In this example, we will record a macro that uses the **Consolidate** option on the **Data** tab

of the Ribbon, to reference the figures in four worksheets and present the total in a fifth worksheet. By recording these steps, we can recreate the figures instantly in future.

Try This Yourself:

Open File Before starting this exercise you **MUST** open the file *E846 Recorder Workshop_1.xlsm...*



- 1 On the **Developer** tab of the **Ribbon**, click on **Record Macro**  in the **Code** group
- 2 Complete the macro details as shown, then click on **[OK]**
- 3 Click on **B5**, then click on the **Data** tab of the **Ribbon** and click on **Consolidate**  to display the **Consolidate** dialog box
- 4 Click on the **View** tab of the **Ribbon**, click on **Switch Windows**  and click on **Expenses East.xlsx**
- 5 Select range **B5:D8**, then click on **[Add]**
- 6 Repeat steps 4 and 5 for **Expenses North.xlsx**, **Expenses South.xlsx** and **Expenses West.xlsx**
- 7 Click on **[OK]** to consolidate the figures
- 8 Click on **A1**, type **Sum of All Divisions** then press **Enter** and click on **Stop Recording** 




	A	B	C	D	E	F
1	Sum of All Divisions					
2						
3		<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>First Quarter</i>	
4						
5	<i>Administration</i>	28,630	29,391	28,210	86,231	
6	<i>Sales</i>	136,767	134,785	136,542	408,094	
7	<i>Production</i>	98,299	99,210	107,000	304,509	
8	<i>Despatch</i>	21,274	17,910	20,941	60,125	
9						
10	Total	284,970	281,296	292,693	858,959	
11						

For Your Reference...

To **record** a **summation macro**:

1. Click on **Record Macro** 
2. Click on the first cell of the target range and perform the consolidation steps
3. Click on **Stop Recording** 

Handy to Know...

- Rather than having to type the cell references in the **Consolidate** dialog box, you can click on **Collapse Dialog**  to give you access to the worksheet, enabling you to select the appropriate range with the mouse.

RECORDING CONSOLIDATIONS





Once a **consolidation** has been recorded, it can be reused to consolidate the figures in different ways. Some of the other options for summarising the data are to show average, maximum,

minimum, count, product (multiplied) and standard deviation. For our case study in this workshop we will build additional macros that perform the first three of these functions on the same set of data.

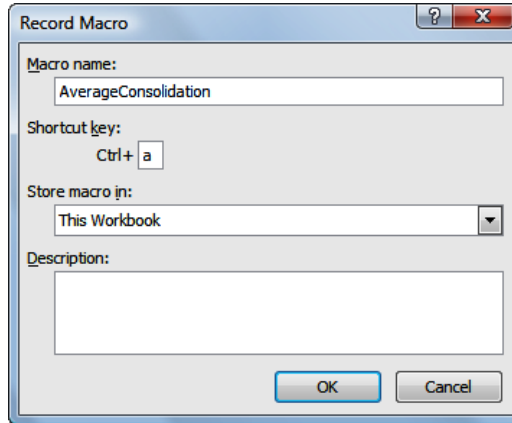
Try This Yourself:

Same File

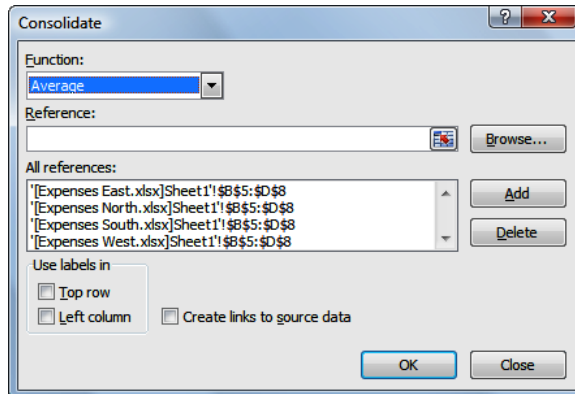
Continue using the previous file with this exercise, or open the file *E846 Recorder Workshop_2.xlsm...*

- 1 Click on **Record Macro**  and complete the **Record Macro** dialog box as shown, then click on **[OK]**
- 2 Click on **B5**, then click on the **Data** tab of the Ribbon and click on **Consolidate**  to display the **Consolidate** dialog box
- 3 Click on the drop arrow  for **Function** and select **Average**
As the References are already in place from the previous macro, we can simply accept the rest of the settings...
- 4 Click on **[OK]**, then click on **A1**, type **Average of All Divisions** and press **Enter**
- 5 Click on **Stop Recording** 
- 6 Repeat steps 1 to 5 for the other macros, as shown in the table

1





3



6

Macro Name:	MaximumConsolidation
Macro Shortcut:	Ctrl + X (lowercase x)
Consolidation Function:	Max
Text in cell A1:	Maximum of All Divisions
Macro Name:	MinimumConsolidation
Macro Shortcut:	Ctrl + I (lowercase i)
Consolidation Function:	Min
Text in cell A1:	Minimum of All Divisions

For Your Reference...

- To **apply** different **consolidation functions**:
1. Click where you want the data to appear
 2. On the **Data** tab, click on **Consolidate** 
 3. Click on the drop arrow  for **Function** and select the function required
 4. Click on **[OK]**

Handy to Know...

- After performing a consolidation, you have no way of knowing how the figures have been combined without referring to the **Consolidate** dialog box. By placing a heading in **A1** we ensure that at any time we know which function was the most recently applied.

RECORDING DIVISIONAL MACROS

We have used the data consolidation process to combine the data from four source workbooks. If you wanted to examine these individually, you would need to open them one by one.

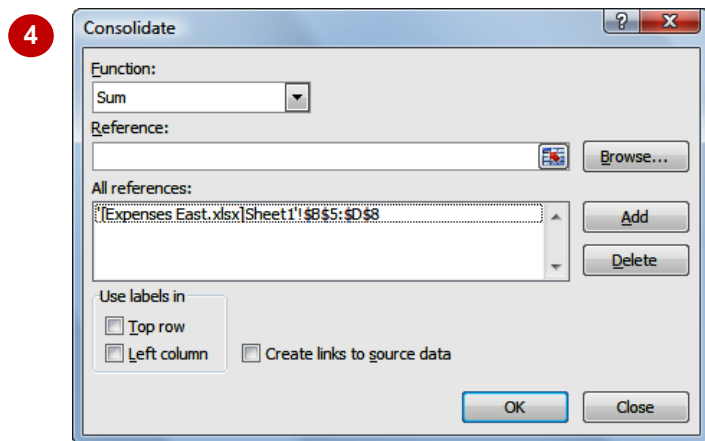
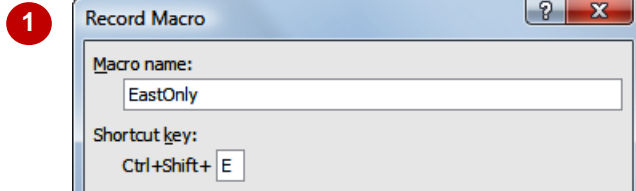
Alternatively, you can write macros that transfer the **data from one division only** into the consolidated worksheet. Add a heading at the same time and you've created one viewing point for all workbooks.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file *E846 Recorder Workshop_3.xlsm...*

- 1 Click on **Record Macro** and complete the **Record Macro** dialog box as shown, then click on [OK]
- 2 Click on **B5**, then click on the **Data** tab of the **Ribbon** and click on **Consolidate**
- 3 Click on the drop arrow for **Function** and click on **Sum**
- 4 Click on the entry below **Expenses East.xlsx** in **All references** and click on [Delete], then repeat until only this reference is left
- 5 Click on [OK] then click on **A1**, type **Eastern Division Only** and press **Enter**
- 6 Click on **Stop Recording**
- 7 Repeat steps 1 to 6 for the macros as shown in the table – to change the reference at step 5, click on it in **All references**, modify it in the **Reference** field and click on [Add]. Click on the previous reference and click on [Delete] to remove it



7	Macro Name:	WestOnly
	Macro Shortcut:	Ctrl + Shift + W (uppercase W)
	Reference:	Expenses West.xlsx
	Text in cell A1:	Western Division Only
	Macro Name:	NorthOnly
	Macro Shortcut:	Ctrl + Shift + N (uppercase N)
	Reference:	Expenses North.xlsx
	Text in cell A1:	Northern Division Only
	Macro Name:	SouthOnly
	Macro Shortcut:	Ctrl + Shift + O (uppercase O)
	Reference:	Expenses South.xlsx
	Text in cell A1:	Southern Division Only

For Your Reference...

To **display** a **single workbook** using consolidate:

1. Click where you want the data to appear
2. On the **Data** tab, click on **Consolidate**
3. Ensure that **Sum** is selected in **Function**
4. Remove all references except the one you require, then click on [OK]

Handy to Know...

- You can also consolidate data by **category**. This uses the **labels** to the left or above the values to determine the category. In this situation, you can have a list of labels that varies, such as expense categories. Values with identical labels are consolidated and the others are reported individually.

TESTING MACROS

We have developed eight macros for our case study. Four of them provide a summary of the data as a total, average, maximum or minimum. The other four macros display the source data,

enabling you to drill down a level and review the original data, should you want to examine it more thoroughly. It is important to **test each macro** before you pass the workbook on to other users.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file *E846 Recorder Workshop_4.xlsm...*

- 1 Press **Ctrl** + **Shift** + **S** to see the **Sum** consolidation
- 2 Press **Ctrl** + **A** to see the **Average** consolidation
- 3 Press **Ctrl** + **I** to see the **Minimum** consolidation
- 4 Press **Ctrl** + **X** to see the **Maximum** consolidation
- 5 Press **Ctrl** + **Shift** + **E** to see the **Eastern Division** data
- 6 Press **Ctrl** + **Shift** + **W** to see the **Western Division** data
- 7 Press **Ctrl** + **Shift** + **N** to see the **Northern Division** data
- 8 Press **Ctrl** + **Shift** + **O** to see the **Southern Division** data

1

	A	B	C	D	E
1	Sum of All Divisions				
2					
3		<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>First Quarter</i>
4					
5	<i>Administration</i>	28,630	29,391	28,210	86,231
6	<i>Sales</i>	136,767	134,785	136,542	408,094
7	<i>Production</i>	98,299	99,210	107,000	304,509
8	<i>Despatch</i>	21,274	17,910	20,941	60,125
9					
10	Total	284,970	281,296	292,693	858,959
11					

4


	A	B	C	D	E
1	Maximum of All Divisions				
2					
3		<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>First Quarter</i>
4					
5	<i>Administration</i>	12,766	12,776	11,988	37,530
6	<i>Sales</i>	65,886	63,499	61,222	190,607
7	<i>Production</i>	43,288	43,887	54,112	141,287
8	<i>Despatch</i>	9,633	9,123	9,443	28,199
9					
10	Total	131,573	129,285	136,765	397,623
11					

8

	A	B	C	D	E
1	Southern Division Only				
2					
3		<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>First Quarter</i>
4					
5	<i>Administration</i>	8,221	8,332	7,334	23,887
6	<i>Sales</i>	34,889	35,221	39,555	109,665
7	<i>Production</i>	32,778	33,544	31,088	97,410
8	<i>Despatch</i>	9,566	9,123	9,443	28,132
9					
10	Total	85,454	86,220	87,420	259,094
11					

For Your Reference...

To **test** a **macro**:

1. Press the corresponding shortcut key
- OR
1. Click on **Macros**  on the **Developer** tab
2. Select the macro
3. Click on **[Run]**

Handy to Know...

- Ideally, you should manually calculate a sample of the figures to ensure that the consolidations are working correctly. Open each workbook and compare the figures. You'd be surprised at the proportion of spreadsheets that have errors – automated and all!

CREATING OBJECTS TO RUN MACROS



Macros make using workbooks easier – as long as you know that they exist! You could show someone how to use the shortcut keys or ribbon to run macros, but a more user-friendly approach

is to **create an object** and link the macro to that object. An object can be anything that you can place on a workbook, such as a drawn circle, a box, a line or even an inserted picture.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file *E846 Recorder Workshop_5.xlsm...*

- 1 Click on the **Insert** tab then click on **Shapes**  in the **Illustrations** group to display the autoshapes menu
 - 2 Click on the **Bevel**  shape in **Basic Shapes** to select it – the mouse pointer changes to a cross-hair
 - 3 Starting at the top left of cell **G2**, use the mouse to draw a bevelled rectangle, then type **Sum Divisions**
 - 4 Repeat steps 2 & 3 to create the objects shown in the table
- The Bevel tool now appears on the Drawing Tools > Format tab...*
- 5 Hold down **Shift** and click on each object to select them
 - 6 Click on the **Drawing Tools: Format** tab, then click on **Align** and select **Align Left**
 - 7 On the **Drawing Tools: Format** tab, click on **Align** and select **Distribute Vertically**
 - 8 Press **Esc** to deselect the objects

3

	D	E	F	G	H	I	J
				Sum Divisions			
Mar	First Quarter						
	7,334	23,887					
	39,555	109,665					
	31,088	97,410					
	9,443	28,132					
	87,420	259,094					

4


Cell G4:	Average Divisions
Cell G6:	Minimum Expenses
Cell G8:	Maximum Expenses
Cell G10:	Eastern Division
Cell G12:	Western Division
Cell G14:	Northern Division
Cell G16:	Southern Division

8



	D	E	F	G	H	I	J
				Sum Divisions			
Mar	First Quarter			Average Divisions			
	7,334	23,887		Minimum Expenses			
	39,555	109,665		Maximum Expenses			
	31,088	97,410		Eastern Division			
	9,443	28,132		Western Division			
	87,420	259,094		Northern Division			
				Southern Division			

For Your Reference...

To **create** an **object**:

1. Click on the **Insert** tab, then click on **Shapes** 
2. Select a shape from the menu
3. Draw a shape on the worksheet
4. Type a name in the shape

Handy to Know...

- Click on **Shape Fill**  to change the fill colour of a shape.
- Click on **Shape Outline**  to change the outline of a shape.

ASSIGNING A MACRO TO AN OBJECT

Once you have created your macros and the objects that you want to link them to, all you need to do is assign the macros to the objects. This is done via a shortcut menu. When you **assign a**

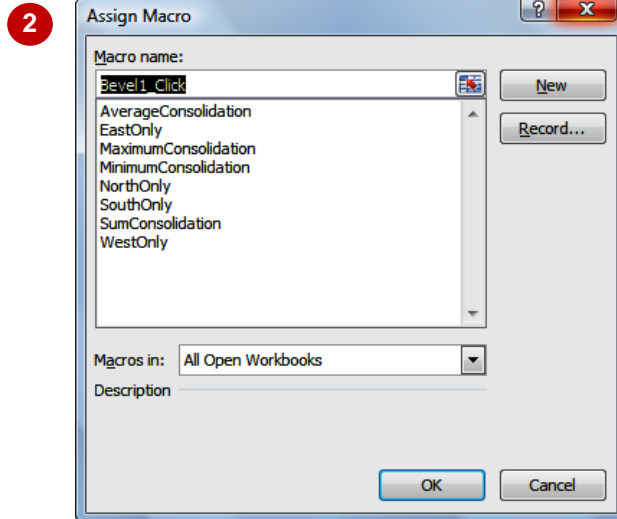
macro to an object, the object becomes 'live'. You'll notice that the mouse pointer will change to a hand as you hover over the object. This is to clearly indicate that clicking the object will start an action.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file *E846 Recorder Workshop_6.xlsm...*

- 1 Click on the **Sum Divisions** shape to select it
- 2 Right-click on the shape to display the shortcut menu and select **Assign Macro**
The Assign Macro dialog box will be displayed...
- 3 Click on **SumConsolidation** and click on **[OK]**
- 4 Press **[Esc]** to deselect the shape then hover over the **Sum Divisions** shape to display the mouse pointer
- 5 Click on the shape to run the macro
- 6 Repeat steps 1 to 5 to assign the macros as shown in the table
- 7 Test each of the macro objects



4

	D	E	F	G	H	I	J
				Sum Divisions			
				Average Divisions			
Mar	First Quarter			Minimum Expenses			
	7,334	23,887		Maximum Expenses			
	39,555	109,665					
	31,088	97,410					
	9,443	28,132					

6



Shape	Macro
Average Divisions:	AverageConsolidation
Minimum Expenses:	MinimumConsolidation
Maximum Expenses:	MaximumConsolidation
Eastern Division:	EastOnly
Western Division:	WestOnly
Northern Division:	NorthOnly
Southern Division:	SouthOnly

For Your Reference...

To **assign a macro** to an **object**:

1. Click on the object to select it
2. Right-click on the object and select **Assign Macro**
3. Click on the macro name
4. Click on **[OK]**

Handy to Know...

- You can also assign macros to the **Quick Access Toolbar**. Click on the drop arrow  for the QAT and select **More Commands**. Click on the drop arrow  for **Choose commands from** and select **Macros**. Click on the macro and click on **[Add]**.