



University Information
Technology Services

Microsoft Office
Excel 2016 for Windows
Advanced Excel Tools

University Information Technology Services

Learning Technologies, Training & Audiovisual Outreach

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University Information Technology Services

Microsoft Office: Excel 2016 for Windows Advanced Excel Tools

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Introduction

This booklet is the companion document to the *Excel 2016: Advanced Excel Tools* workshop. The booklet will explain how to create a simple macro, how to use nested formulas, how to create templates, hide/unhide rows and columns, and protect/unprotect your spreadsheets and workbook.

Learning Objectives

After completing the instructions in this booklet, you will be able to:

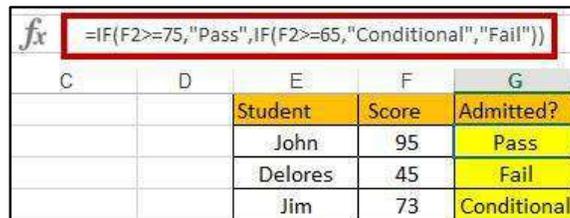
- Understand what Nested Functions are.
- Link data between sheets.
- Understand what Macros are.
- Create a simple Macro.
- Hide/unhide information in your spreadsheet.
- Protect your spreadsheet and workbook.
- Create templates out of workbooks.

Creating Nested Functions

Nested functions are functions within a function. By nesting an IF function within an existing IF function, you can test more than one conditions (e.g. Pass, Conditional, Fail). This can be helpful if you want to assign scores or grades based on certain conditions.

For example: `=IF(F2>=75,"Pass",IF(F2>=65,"Conditional","Fail"))`

This formula checks the cell for a value, and if it is greater than or equal to (\geq) a predetermined grade (e.g. 75), then the formula will return the phrase *Pass*. If the number in the cell is less than 75, *Excel* will move to the next part of the formula, and so on.



The screenshot shows an Excel spreadsheet with a formula bar at the top containing the nested IF formula: `=IF(F2>=75,"Pass",IF(F2>=65,"Conditional","Fail"))`. Below the formula bar is a table with columns labeled C, D, E, F, and G. The table data is as follows:

	C	D	E	F	G
			Student	Score	Admitted?
			John	95	Pass
			Delores	45	Fail
			Jim	73	Conditional

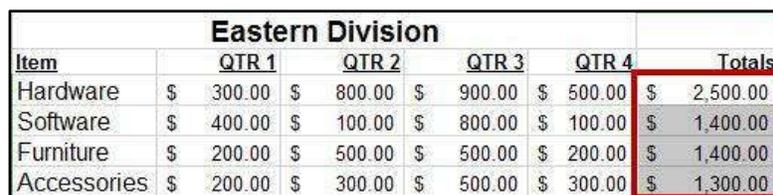
Figure 1 - Nestled IF Function

Note: Pass is in quotes to indicate to *Excel* that this is the value we want returned, and it is not another function.

Linking Data

Linking data between spreadsheets allows you to reference data contained elsewhere in your workbook without having to copy all of the information. For example, you could have a workbook that has multiple spreadsheets tracking regional sales and a separate spreadsheet to tally the totals across all regions. By linking to the regional data from the totals, you will only have to update your information in one location. The following example explains how to link data between the Eastern Division spreadsheet, and the Year End Total spreadsheet:

1. Open the spreadsheet that contains the source data and the target location (e.g. Eastern Division, Western Division, Totals, etc)
2. Select the cell(s) in the source spreadsheet that contain the data that you want to link to the target location (e.g. Total sales for Eastern Division).



The screenshot shows an Excel spreadsheet titled "Eastern Division" with the following data:

Item	QTR 1	QTR 2	QTR 3	QTR 4	Totals
Hardware	\$ 300.00	\$ 800.00	\$ 900.00	\$ 500.00	\$ 2,500.00
Software	\$ 400.00	\$ 100.00	\$ 800.00	\$ 100.00	\$ 1,400.00
Furniture	\$ 200.00	\$ 500.00	\$ 500.00	\$ 200.00	\$ 1,400.00
Accessories	\$ 200.00	\$ 300.00	\$ 500.00	\$ 300.00	\$ 1,300.00

Figure 2 - Selected Cells

3. Right-click on the **selected cells**.
4. A *context sensitive* menu will appear. Click **Copy**.

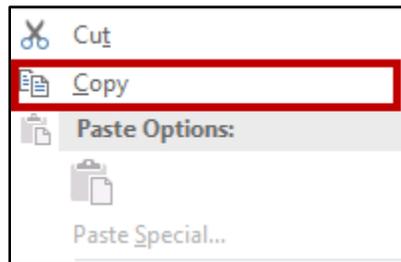


Figure 3 - Copy

5. Go to the target location (e.g. year-end totals sheet) and select the **cell(s)** where you want to link the source data.

Year End Totals					
Item	Eastern	Northern	Southern	Western	Total
Hardware					\$0
Software					\$0
Furniture					\$0
Accessories					\$0

Figure 4 - Paste Location

6. Right-click on the **selected cells**.
7. A *context sensitive* menu will appear. Click on the **Paste Link** icon.

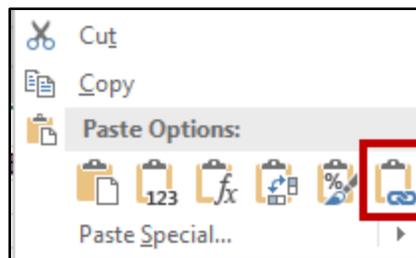


Figure 5 - Paste Link

8. The selected cells on the Year End spreadsheet are now linked with the cells on the Eastern Division spreadsheet. The data will now be updated whenever the source data is changed.

Macros

Macros are programs that run within *Excel* that can help to automate common repetitive tasks, thus saving time and boosting productivity with a simple click or command. For example, if you wanted to delete a row within your spreadsheet, you would need to select the row, click the *Home* tab, select delete, and then click delete rows. Instead, you can create a macro that completes the entire sequence with a single click or keystroke.

Enabling the Developer tab

Before you can record a macro, you will need access to the *Developer* tab in the *Ribbon*. The following steps explain how to add the *Developer* tab to the *Ribbon*:

1. Right-click in an **empty section** within the *Ribbon*.
2. A *dialog box* will appear. Select **Customize the Ribbon**.

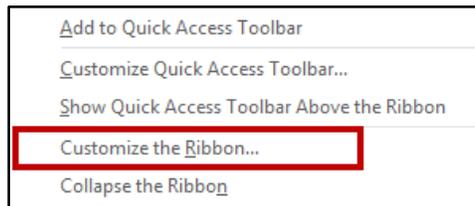


Figure 6 - Customize the Ribbon

3. The *Customize Ribbon* window will appear, with options to customize the ribbon on the right.

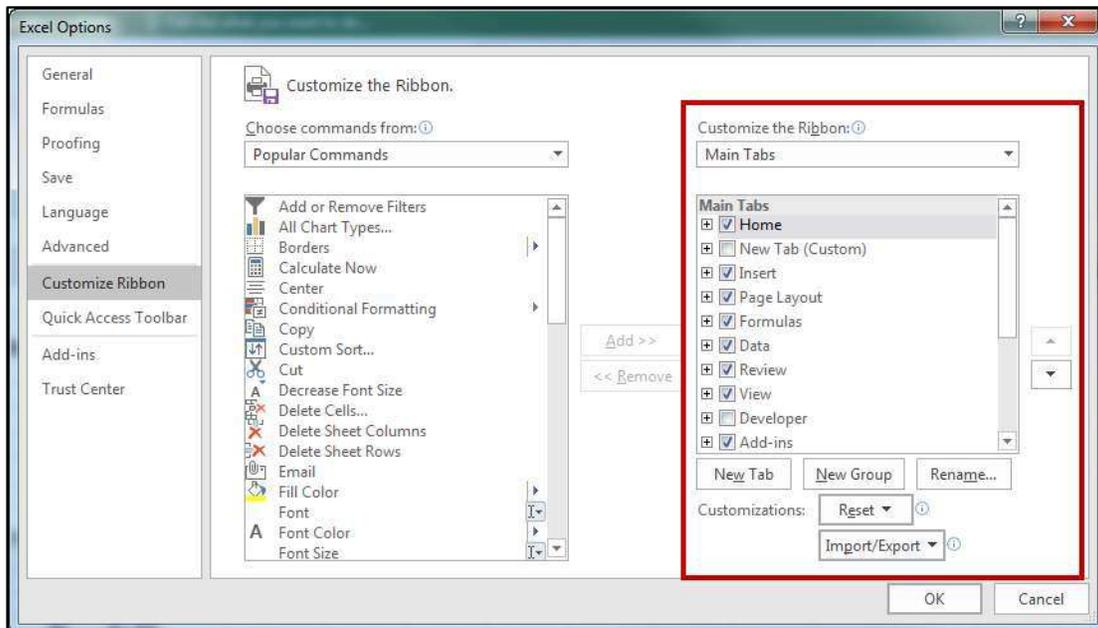


Figure 7 - Customize the Ribbon Options

4. Click the **checkbox** next to *Developer*.

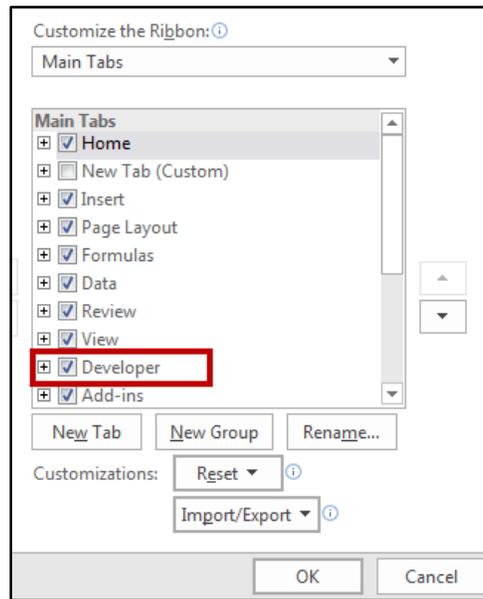


Figure 8 - Developer Checkbox

5. Click **OK**.
6. The *Developer* Tab will now be displayed in the *Ribbon*.

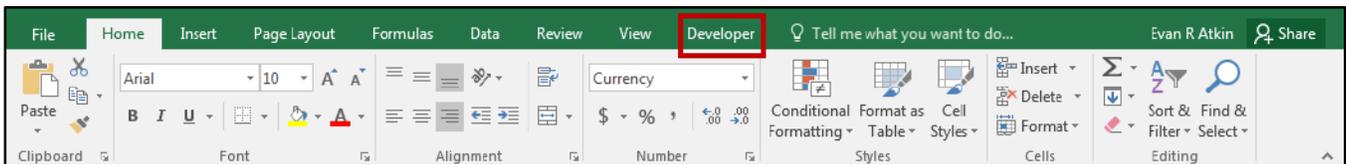


Figure 9 - Developer Tab

Recording a Macro

When recording your macro, *Excel* will register every mouse-click and keystroke as part of your macro until you stop recording. It is important to have the steps you wish *Excel* to record thought out beforehand. The following example describes how to create a simple macro that will delete an entire row:

Note: If the *Developer* tab is not available, see the section on *Enabling the Developer* tab.

1. In the *Ribbon*, click on the **Developer** tab.

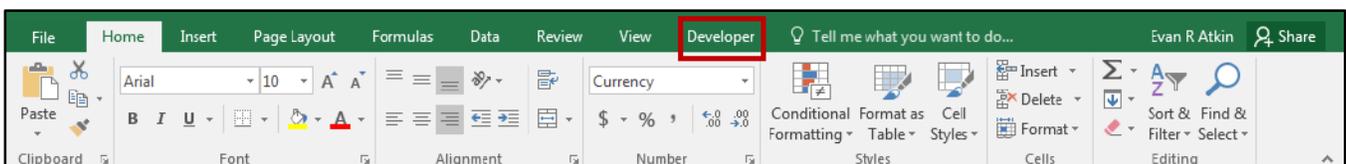


Figure 10 - Developer Tab

2. In the *Code* group, click on **Use Relative References**.



Figure 11 - Use Relative References

Note: With *Use Relative References* enabled, macros are recorded with actions relative to the initial selected cell.

3. In the *Code* group, click **Record Macro**.



Figure 12 - Record Macro

4. The *Record Macro* window appears. In the *Macro Name* field, type a **name**. Make sure the name has no spaces, and starts with a letter or underscore (See Figure 13).
5. In the *Shortcut key* field, enter a **shortcut** key. This will be the keyboard command you use to activate your *Macro* (See Figure 13).
6. In the *Store macro in:* field, click the **down arrow**, and select where you want the macro to be stored. If you plan to use a macro with more than one workbook, select the *Personal Macro Workbook* option (See Figure 13).
7. Enter a **description** of the macro in the *Description* field (See Figure 13).
8. You are ready to record the steps of the macro. Click **OK** to begin recording (See Figure 13).

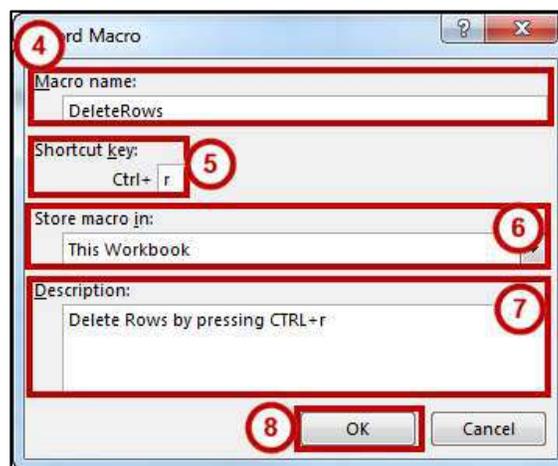


Figure 13 - Record Macro Window

Note: When recording your macro, *Excel* will register every mouse-click and keystroke as part of your macro until you stop recording.

9. In your spreadsheet, select a **row** you wish to delete.

10. In the *Ribbon*, click on the **Home** tab.

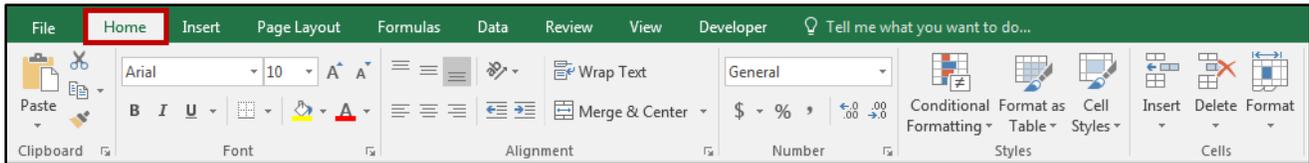


Figure 14 - Home Tab

11. Under the *Cells* grouping, click on the **arrow below Delete**.

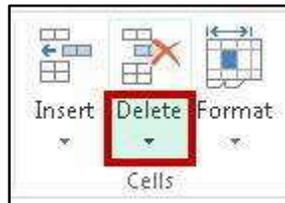


Figure 15 – Delete

12. From the drop-down, click **Delete Sheet Rows**.

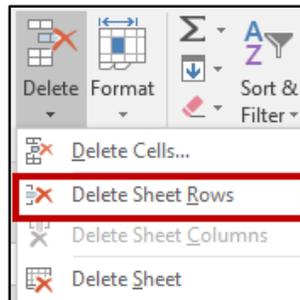


Figure 16 - Delete Sheet Rows

13. The selected row will be deleted.

14. Click on the **Developer** tab.

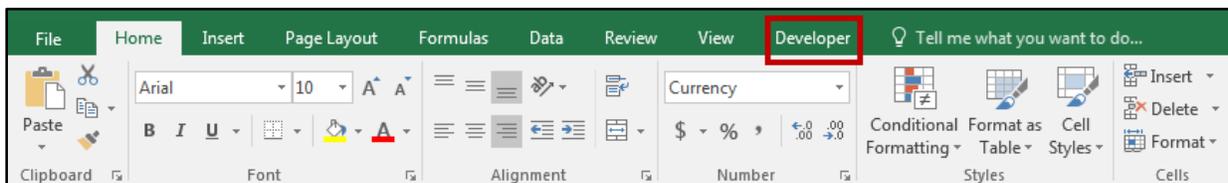


Figure 17 - Developer Tab

15. In the *Code* grouping, click **Stop Recording**.



Figure 18 - Stop Recording

16. If done correctly, your macro will have been captured. To run your *DeleteRows* macro, select the **row** to delete and press **CTRL+r**.

Note: If your macro is not running as intended. It is easier to delete the macro and record again. See the *Managing your Macros* section for more information.

Managing your Macros

Once you have created a macro, you can run it without using the keyboard shortcut, delete it, edit it, or change the keyboard options for it.

1. In the *Ribbon*, click the **Developer** tab.

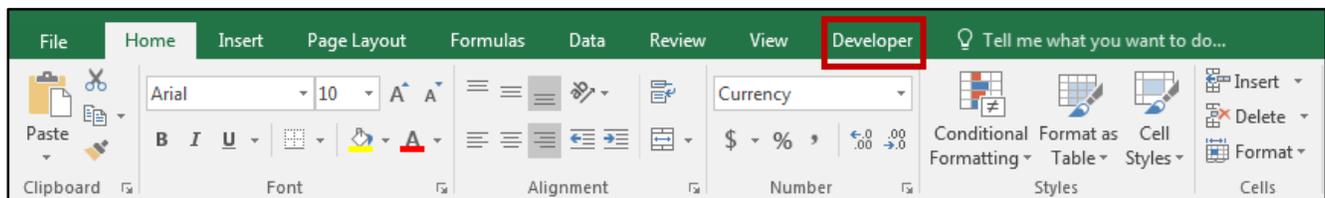


Figure 19 - Developer Tab

2. In the *Code* group, click **Macros**.



Figure 20 – Macros

3. The *Macro* window will open. A list of your created macros will be displayed.
 - a. To run a macro, select it from the list, and click **Run** (See Figure 21).
 - b. To edit a macro in Visual Basic, select it from the list, and click on **Edit** (See Figure 21).
 - c. To delete a macro, select it from the list, and click on **Delete** (See Figure 21).
 - d. To change the shortcut key or description for the macro, select it from the list, and click on **Options...** (See Figure 21).
 - e. Click **Cancel** when finished (See Figure 21).

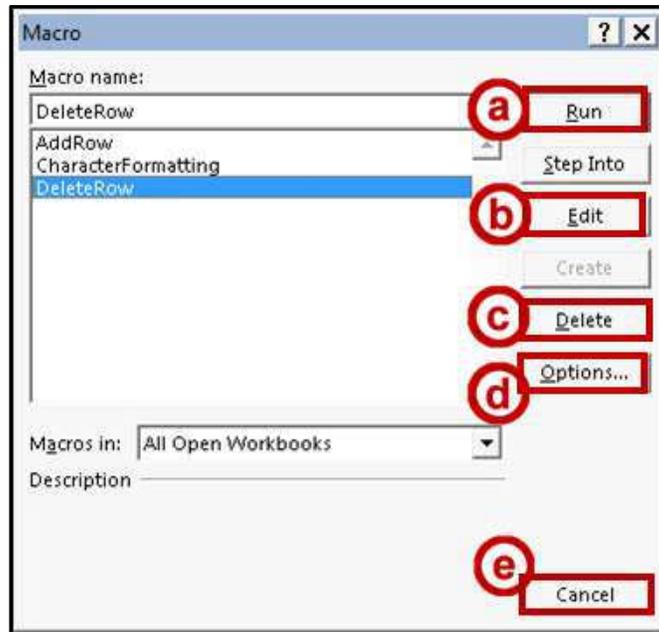


Figure 21 - Macro Window

Note: You will need to understand *Visual Basic* in order to edit a macro. If you need to make a correction and are not familiar with *Visual Basic*, it would be easier to delete the macro and re-record.

Moving Spreadsheets

You can easily rearrange the spreadsheet tabs in your workbook to keep them in order. The following explains how to move spreadsheets:

1. Left-click and hold the **spreadsheet tab** at the bottom of your spreadsheet.

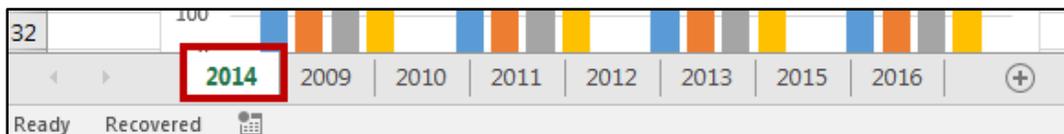


Figure 22 - Spreadsheet Tab

2. Drag the **spreadsheet tab** in-between any existing spreadsheet. Your cursor will change to show you are moving a spreadsheet.



Figure 23 - Dragging Spreadsheet

3. Release the **left-mouse button** to finish moving your spreadsheet.

Note: You can also move a spreadsheet using the *Move or Copy* tool:

1. Right-click on the **spreadsheet tab** you wish to move.
2. A *context sensitive menu* will appear. Click **Move or Copy**.



Figure 24 - Move or Copy...

3. The *Move or Copy* window will appear. Under *Before sheet*, select where you want the currently selected spreadsheet to be moved.

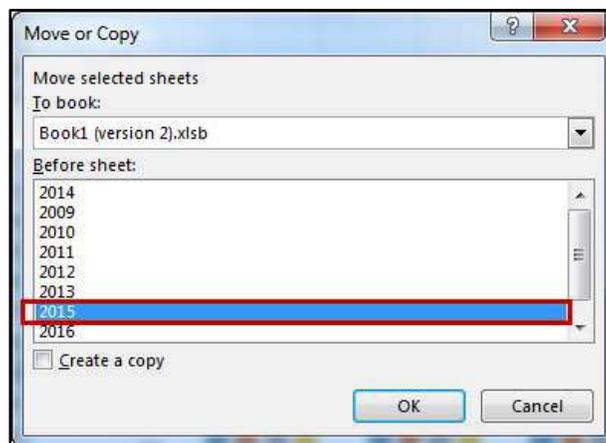


Figure 25 - Move or Copy Window

4. Click **OK**. The spreadsheet will be moved before the selected location.

Copying Spreadsheets

Duplicating a spreadsheet can be done with the *Move or Copy* tool. The following explains how to copy spreadsheets:

1. Right-click on the **spreadsheet tab** you wish to copy.
2. A *context sensitive menu* will appear. Click on **Move or Copy**.

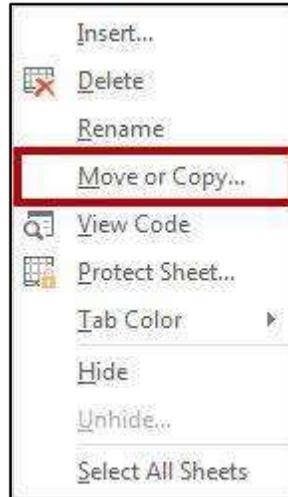


Figure 26 - Move or Copy...

3. The *Move or Copy* window will appear. Under *Before sheet*, select where you want the **copy** of the currently selected spreadsheet to be moved (See Figure 27).
4. Next to *Create a Copy*, click the **checkbox** (See Figure 27).
5. Click **OK**. A copy of the spreadsheet will be made before the selected location (See Figure 27).

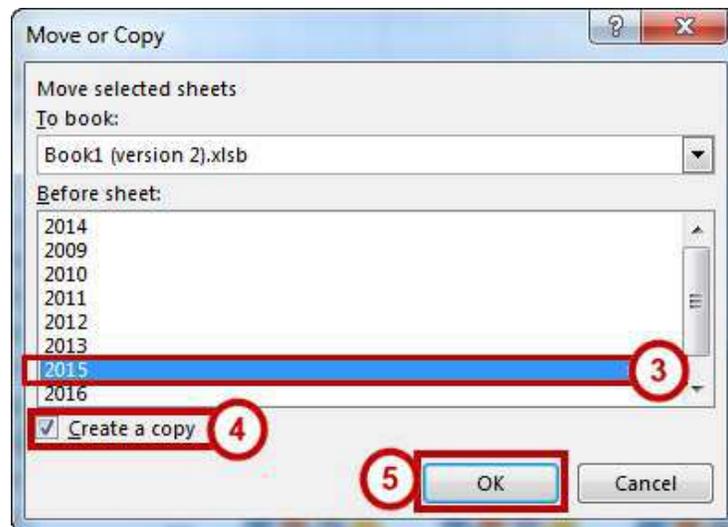
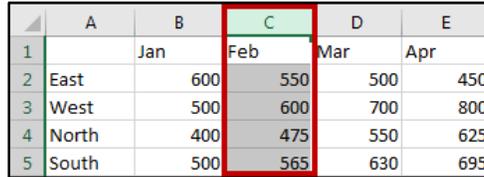


Figure 27 - Move or Copy Window

Hiding Rows and Columns

Hiding rows and/or columns in your spreadsheet will hide them from view so you can focus on other parts of your table. To hide a row or column:

1. Select the **row/column** in your spreadsheet.



A screenshot of a spreadsheet with columns A through E and rows 1 through 5. Column C is highlighted in green, and a red border is drawn around it. The data in the spreadsheet is as follows:

	A	B	C	D	E
1		Jan	Feb	Mar	Apr
2	East	600	550	500	450
3	West	500	600	700	800
4	North	400	475	550	625
5	South	500	565	630	695

Figure 28 - Selected Column

2. Right-click on the selected **row/column**.
3. A *context sensitive* menu will appear. Click **Hide**.

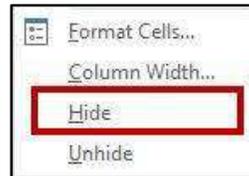
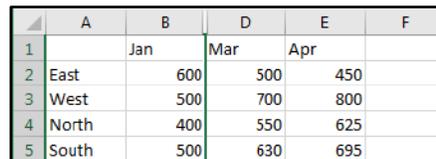


Figure 29 - Hide

4. The selected row/column will be hidden.



A screenshot of a spreadsheet where column C has been hidden. The visible columns are A, B, D, E, and F. The data in the spreadsheet is as follows:

	A	B	D	E	F
1		Jan	Mar	Apr	
2	East	600	500	450	
3	West	500	700	800	
4	North	400	550	625	
5	South	500	630	695	

Figure 30 - Selected Column Hidden

Hiding Spreadsheets

You can also hide whole spreadsheets if needed. To hide a spreadsheet:

1. Right-click on the **spreadsheet tab**.
2. A *context sensitive* menu will appear. Click on **Hide**.



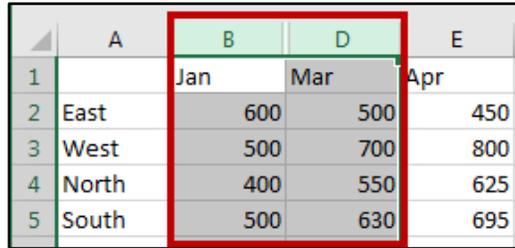
Figure 31 - Hide Spreadsheet

3. The selected spreadsheet will be hidden.

Unhiding Rows and Columns

To identify hidden rows/columns in your spreadsheet, pay attention to the numbering (rows) or lettering (columns). If they appear to skip within their sequence, then rows/columns are hidden. To unhide rows and columns:

1. Select the **rows/columns** surrounding the hidden rows/columns.



	A	B	D	E
1		Jan	Mar	Apr
2	East	600	500	450
3	West	500	700	800
4	North	400	550	625
5	South	500	630	695

Figure 32 - Select Hidden Rows/Columns

2. Right-click on the selected **row/column**.
3. A *context sensitive* menu will appear. Click **Unhide**.

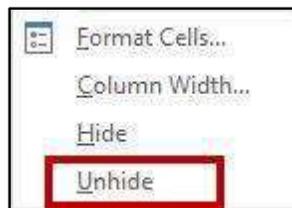
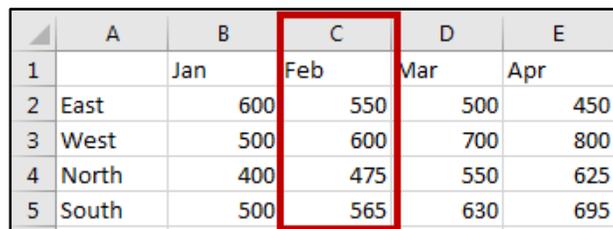


Figure 33 – Unhide

4. The hidden rows/columns will now be visible.



	A	B	C	D	E
1		Jan	Feb	Mar	Apr
2	East	600	550	500	450
3	West	500	600	700	800
4	North	400	475	550	625
5	South	500	565	630	695

Figure 34 - Unhidden Column

Unhide Spreadsheets

The following shows how to unhide spreadsheets:

1. Right-click on a **spreadsheet tab**.
2. A *context sensitive* menu will appear. If *Unhide* is not greyed out, there are hidden spreadsheets within your workbook. Click on **Unhide**.

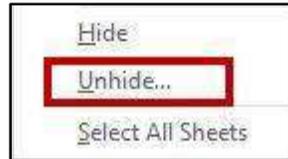


Figure 35 - Unhide Spreadsheet

3. The *Unhide* window will appear. Select a **spreadsheet** to unhide from the list.

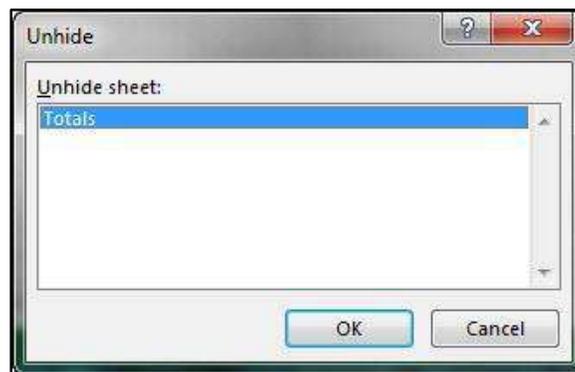


Figure 36 - Unhide Window

4. Click **OK**.
5. The spreadsheet will now be visible.

Protecting your Spreadsheets

Protecting your spreadsheet can limit what cells other users can select, and even what types of edits are allowed. This feature is helpful if you have created a spreadsheet with complex formulas that you do not want to be deleted, or if you just want to limit where users can enter information (e.g. an inventory spreadsheet which asks users to fill in specific sections). You can choose to protect/unprotect specific cells in your spreadsheet, or lock an entire spreadsheet.

By default, *Excel* assumes that you will want to lock all cells in your spreadsheet. If you wish users to be able to edit specific cells, you will first need to prepare the cells so they can be edited by *unlocking* them while the rest of the cells in your spreadsheet remain locked.

Preparing your Cells

Before locking your spreadsheet, you will need to unlock the cells that you want users to be able to edit. For example, you have a quarterly sales spreadsheet with formulas in the totals column. You want users to enter values for their quarter, but let *Excel* calculate the totals. You can unlock the quarter columns so it is the only part of the spreadsheet users will be able to access.

The following explains how to unlock cells within your spreadsheet:

1. Select the **cells** that you want to enable users to edit.

Western Division					
Item	QTR 1	QTR 2	QTR 3	QTR 4	Totals
Hardware	\$ 100.00	\$ 500.00	\$ 700.00	\$ 400.00	\$ 1,700.00
Software	\$ 200.00	\$ 600.00	\$ 200.00	\$ 300.00	\$ 1,300.00
Furniture	\$ 200.00	\$ 500.00	\$ 500.00	\$ 300.00	\$ 1,500.00
Accessories	\$ 300.00	\$ 300.00	\$ 200.00	\$ 100.00	\$ 900.00

Figure 37 - Selected Cells to Unlock

2. Right-click the selected **cells**.
3. A *context sensitive* menu will appear. Click **Format Cells...**

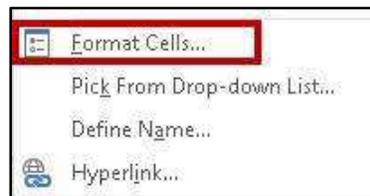


Figure 38 - Format Cells...

4. The *Format Cells* window will appear. Click the **Protection** tab.

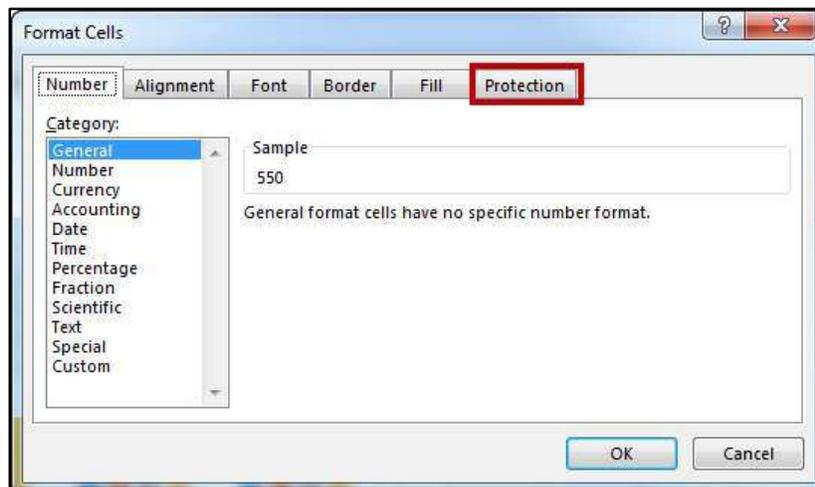


Figure 39 - Protection Tab

5. Uncheck the **checkbox** next to *Locked*. This will allow users to make changes to the selected cells.

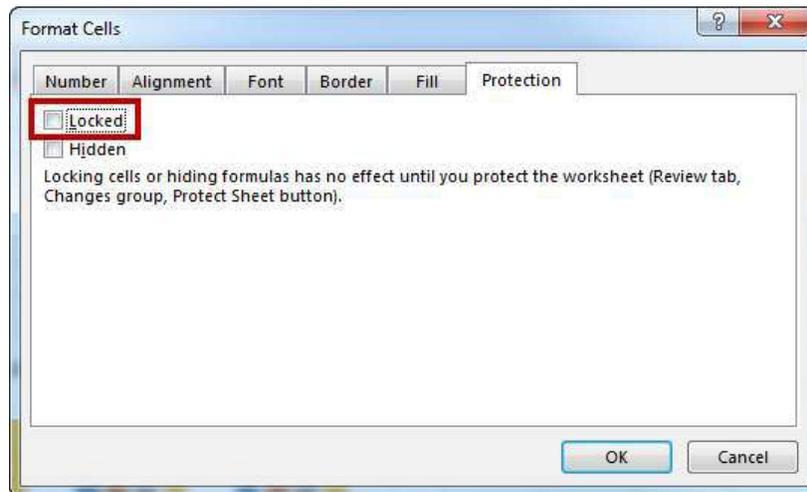


Figure 40 - Unlock Selected Cells

6. Click **OK**.
7. The selected cells are now set to unlocked. You will need to lock your spreadsheet to enable protection (See *Locking your Spreadsheet* for more information).

Locking your Spreadsheet

Once you have designated which cells are to remain unlocked (See *Preparing your Cells*), you can protect the spreadsheet to lock the rest of your cells (e.g. cells that contain necessary formulas or instructions for users).

1. In the *Ribbon*, click the **Review** tab.

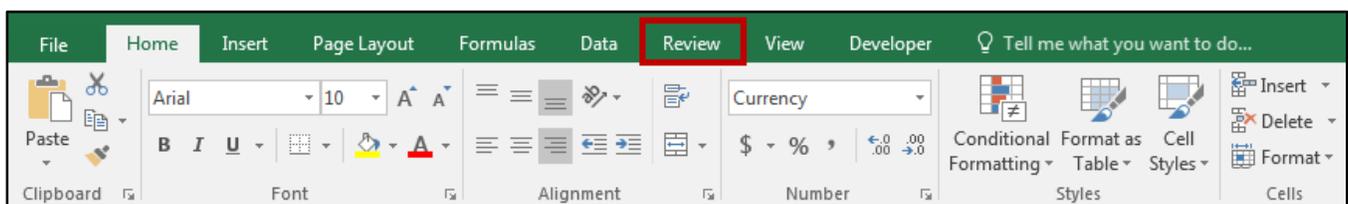


Figure 41 - Review Tab

2. In the *Changes* grouping, click **Protect Sheet**.

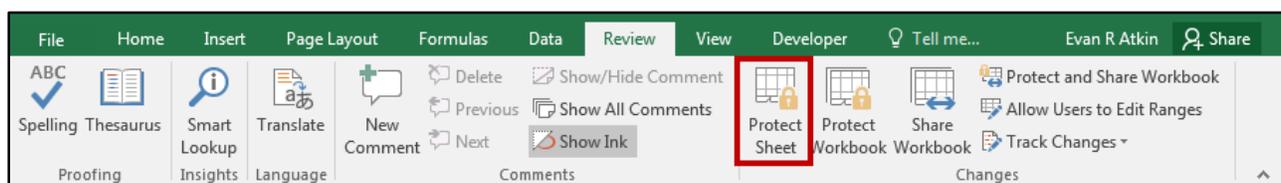


Figure 42 - Protect Sheet

3. The *Protect Sheet* window will appear. Click the **checkbox** next to *Protect worksheet and contents of locked cell* (See Figure 43).
4. Enter a **password** if desired. You will be asked to confirm your password if you create one (See Figure 43).
5. Next to *Select locked cells*, uncheck the **checkbox** (See Figure 43).
6. Make sure the checkbox next to *Select unlocked cells* is checked. This will enable users to access and make changes to unlocked cells (See Figure 43).
7. Click **OK** (See Figure 43)

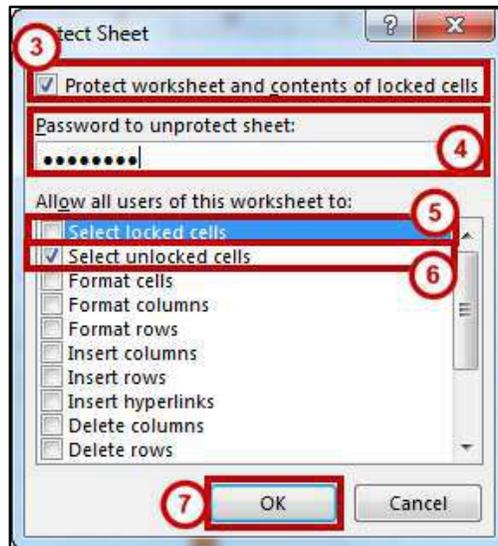


Figure 43 - Protect Sheet Window

Note: Without a password, anyone can easily unprotect the sheet. If you forget your password, it cannot be retrieved, so make sure to write it down and keep it in a safe place.

8. Your spreadsheet will be protected. Only the unlocked cells will be selectable.

Unprotect Worksheets

The following explains how to unprotect a worksheet that has been locked for editing:

1. In the *Ribbon*, click the **File** tab.

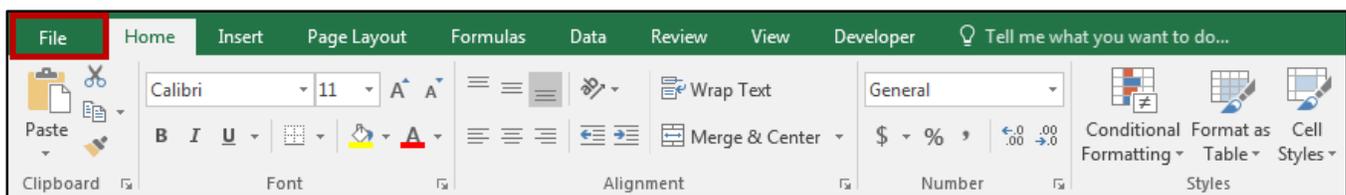


Figure 44 - File Tab

2. The *Backstage View* will appear, and the *protect workbook* information will display any spreadsheets that are currently locked.
3. Click **Unprotect** next to the *spreadsheet* you want to unprotect.

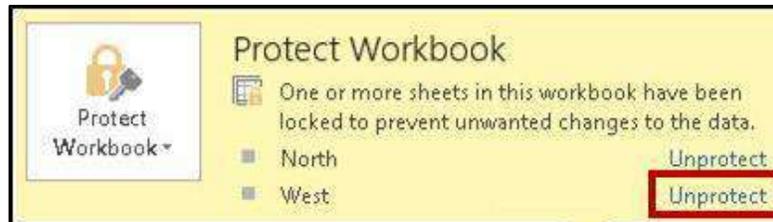


Figure 45 - Unprotect Spreadsheet

4. If the spreadsheet is password protected, you will be prompted to enter the password. Once entered, click **OK**.
5. The selected spreadsheet has been unlocked and is ready to be edited.

Protecting Workbooks

You can protect an entire workbook to prevent unwanted changes such as moving, deleting, or adding sheets. To protect a workbook:

1. In the *Ribbon*, click the **Review** tab.

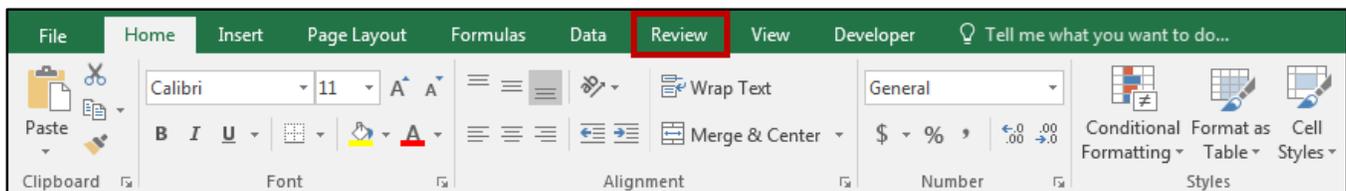


Figure 46 - Review Tab

2. In the *Changes* grouping, click on **Protect Workbook**.

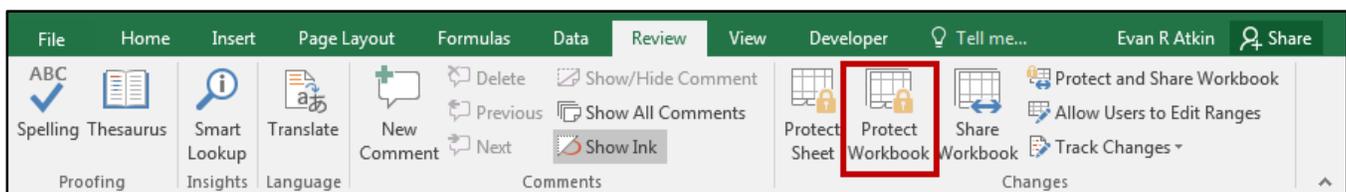


Figure 47 - Protect Workbook

3. The *Protect Structure and Windows* window will appear. Make sure that the checkbox next to *Structure* is checked (See Figure 48).
4. Enter a password if desired. You will be asked to confirm your password if you create one (See Figure 48).
5. Click **OK**. Your workbook will be protected (See Figure 48).

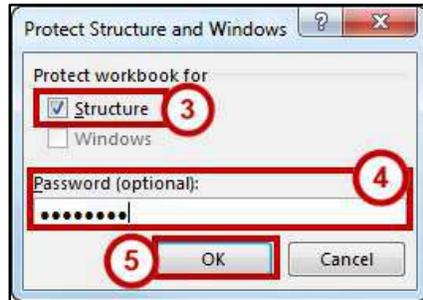


Figure 48 - Protect Structure and Windows

Note: Without a password, anyone can easily unprotect the workbook. If you forget your password, it cannot be retrieved, so make sure to write it down and keep it in a safe place.

Unprotect Workbooks

The following explains how to unprotect a protected workbook:

1. In the *Ribbon*, click the **Review** tab.

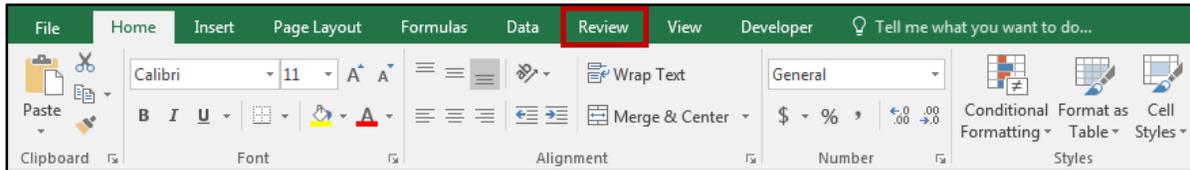


Figure 49 - Review Tab

2. In the *Changes* grouping, click **Protect Workbook**.

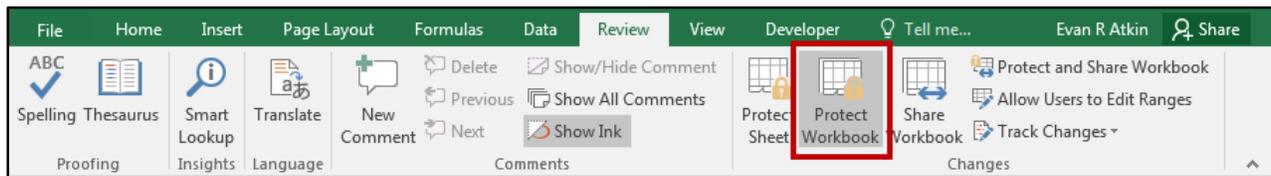


Figure 50 - Unprotecting Workbook

Note: If the workbook is currently protected, the *protect workbook* icon will be shaded grey.

3. If the spreadsheet is password protected, you will be prompted to enter the password, then click **OK**.
4. The protection on the workbook has been removed.

Creating Templates

Templates help you to create documents with special formatting for your desired task (e.g. calendar template, inventory template, schedule template, etc). You can create your own templates based off of an existing spreadsheet.

The sample below shows a template for calculating first quarter sales for a company. This template was created by modifying an existing spreadsheet and saving it as a template file. The template could also have been created from a new spreadsheet, with the formulas for totals saved in the proper cells.

Company 1st Quarter Sales				
Region	January	February	March	Totals
Eastern Region	\$110.00	\$175.00	\$140.00	\$425.00
Western Region	\$200.00	\$210.00	\$240.00	\$650.00
Southern Region	\$300.00	\$180.00	\$295.00	\$775.00
Northern Region	\$220.00	\$205.00	\$195.00	\$620.00
Total	\$830.00	\$770.00	\$870.00	\$2,470.00
Average	\$207.50	\$192.50	\$217.50	\$617.50

Figure 51 - Template Example

To prepare your spreadsheet as a template:

1. Create your spreadsheet as normal (e.g. formatting, headers, formulas for totals, etc.)
2. In the *Ribbon*, click the **File** tab.

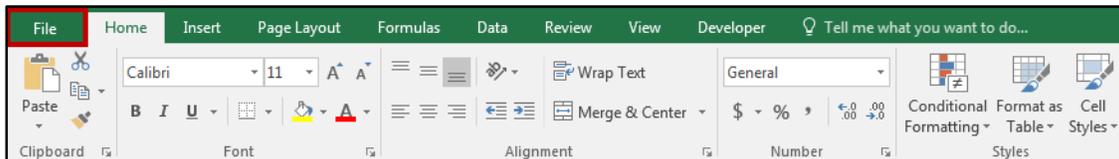


Figure 52 - File Tab

3. The *Backstage View* will appear. Click **Save As**.

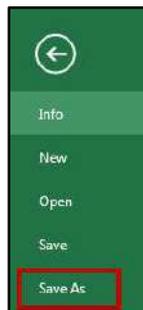


Figure 53 - Save As

4. The *Save As* options will display. Click **Browse**.



Figure 54 - Click Browse

5. The *Save As* window will open. In the *File name:* field, enter a **name** for the template (See Figure 55).
6. In the *Save as type* field, select **Excel Macro-Enabled Template** (See Figure 55).
7. Click **Save** (See Figure 55).

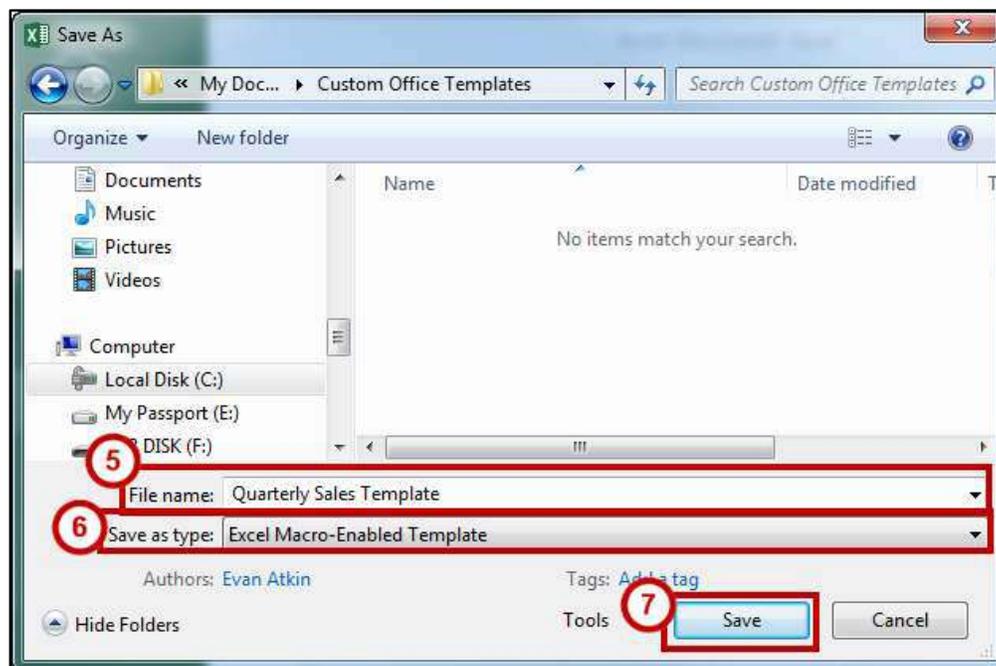


Figure 55 - Excel Macro-Enabled Template

8. Your template will be saved in the *My Documents/Custom Office Templates* folder.

Using a Template

The following explains how to access the custom-made template created in the *Creating Templates* section.

Note: The following instructions show how to access templates saved to the default *My Documents/Custom Office Templates* location on your computer.

1. In the *Ribbon*, click on the **File** tab.

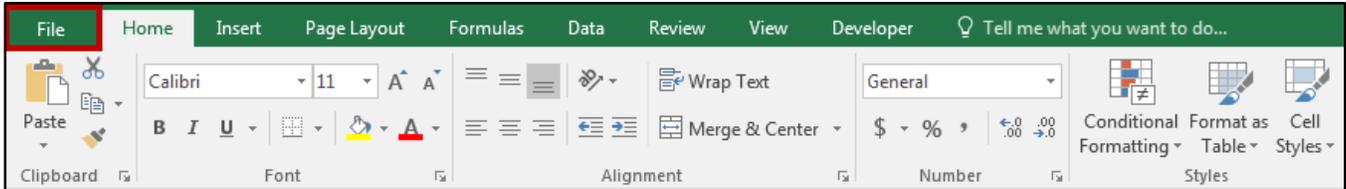


Figure 56- File Tab

2. The *Backstage View* will appear. Click **New**.

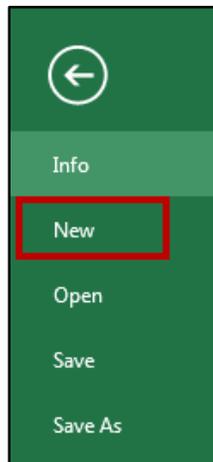


Figure 57 - New

3. The *New* options will display. Click **Personal** to access your custom templates.

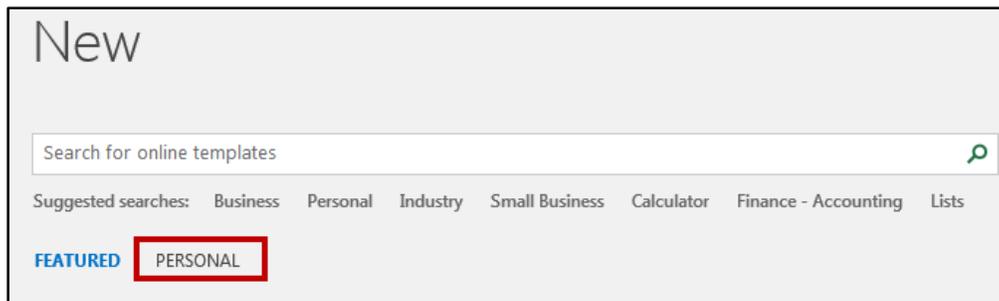


Figure 58 - Custom Templates

4. Your created templates will be displayed. Click on your desired **template**.

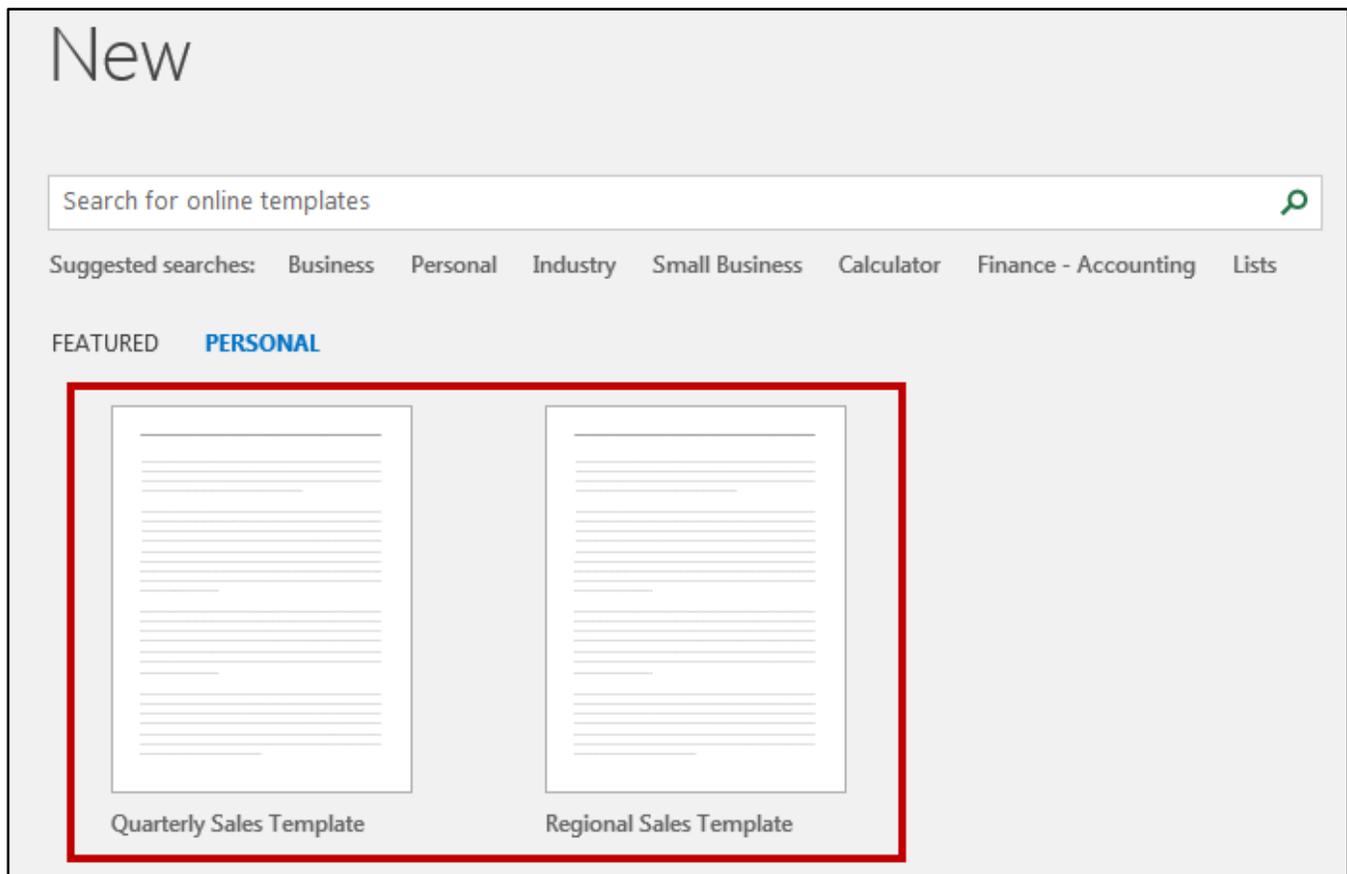


Figure 59 – Created Templates

Additional Help

For additional support, please contact the KSU Service Desk:

KSU Service Desk for Faculty & Staff

- Phone: 470-578-6999
- Email: service@kennesaw.edu
- Website: <http://uits.kennesaw.edu>

KSU Student Helpdesk

- Phone: 470-578-3555
- Email: studenthelpdesk@kennesaw.edu
- Website: <http://uits.kennesaw.edu>