Moving you from Meek to Geek in a Nanosecond (or two©!

Excelling @ Excel - Advanced - Level 3

Prepared especially for You!

Presented and Written by:

Greg Creech

Techedutainment Services Inc.

Technology ✬ Education ✬ Entertainment

Hey! It's Chic 2B Geek© Series!

Excel for Excellent Business Management

An Excellent Table of Contents

Oops! and Legal Stuff

While I have made every effort to ensure the accuracy of this document, including grammar and instructions, I make mistakes. *(Surprise!)* If you find an error or want to provide constructive feedback, please contact me. Thank you! *Enjoy Excelling at Excel and this document.*

Greg Creech

Techedutainment Services, Inc.

P. O. Box 1431

Pine Lake, GA 30072

www.gregcreech.com

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Introducing Greg Creech

Shop Talk from The Atlanta Journal-Constitution
Sunday, Oct. 29, 2000 R3 - JOBS

Why I Love my Job – Greg Creech

What I Do: I teach technology courses and make presentations to beginner and expert computer users and professionals. I use humor and the piano. I train all levels from first-time computer users to systems technicians acquiring A+ certification. As an A+ certified trainer, MOUS expert, and technical trainer, my certifications and knowledge give me a career in the technology. My humor, the piano, and people keep me in the technology training field. I sing to my students sometimes and perform stand-up comedy about computers.

Technology speaker and trainer Plus, he's a pianist and comedian.

How I got started: I won Best Actor in a Supporting Role at Southside Theatre Guild for *"A Funny Thing Happened on the Way to the Forum"* and studied comedy under Jerry Farber. I have played the piano since 8 years of age and had the first personal computer with a 1 MB of memory. In order to learn the PC, I associated the PC with the piano -- both use a language to translate, both have keyboards, and now - both provide music and information. I must admit I miss the days when I only played the piano and programmed the PC. Now, I play the PC and have to program my piano. In 1998 after seventeen years of technology business experience in the corporate market, I decided to take a leap of faith on my own. I call my presentations "Showminars," a combination of a show and a seminar.

The Best Part: Hearing the laughter and the comments: "You have saved me so much time," and "I remember complicated macros because of the way you taught them." I have a passion for teaching creative people to be more technical and technical people to be more creative – Mozart would be proud!

The Challenging Part: Explaining why I want my piano in a PC classroom. "Mainframers" who refuse to acknowledge the existence of the PC and the Web. People who attend training classes because they have to, not because they want to. Technical people who are not client- focused.

My Favorite Quotes: "To err is human, to really mess things up you need a computer." "Forty-two percent of all households have a computer; only eight percent of those know how to use it."

What Keeps me Going: I enjoy combining my love of people, the piano, processors, and humor into a unique speaking and learning experience.

Greg Creech sings to his students, and often he performs stand-up comedy about computers.

My Favorite Excel Shortcuts

Keyboard Shortcut	What it Does
CTRL + Home	Takes you to the top of your worksheet, usually cell A1.
CTRL + End	Take you to the end of your worksheet.
PgUp (Page Up) and PgDn (Page Down)	Takes you down or up several rows (screen pages) at each press of the key.
CTRL + PgUp (Page Up) and CTRL+PgDn (Page Down)	Scrolls through your worksheets or tabs. CTRL+PgUp Scrolls to the Left for you and CTRL+PgDn scrolls to the Right.
CTRL + Shift + Down/Up Arrow	Selects an entire column of data/information based on the cell that is selected.
CTL + Shift + Left/Right Arrow	Selects an entire row of data/information based on the cell that is selected.
CTL + Shift + Home	Selects from your active/selected cell to the top of your worksheet.
CTL + Shift + End	Selects from your active/selected cell to the bottom of your worksheet.

♫ *Write your notes here:*_____

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Forming our Formulas

Excel is Excel because of the powerful Formulas and *Functions* that the application uses or that you may produce. Excel is "Excel-lent" at providing very complex and very simple built-in functions for you to use or you may create your own formulas. Now, we need to learn how to "form" our own formulas.

In the beginning is the *cell*. As introduced at the start of this course, a *cell* is the intersection of a column and row, for example cell A1 is the intersection of Column A and Row 1. Generally, A1 is your "home" cell. If you are in another section of Excel and wish to return to the beginning of the worksheet press *the CTRL key and the Home key* simultaneously. We have entered text and numbers in cells and have formatted them. Now, we will insert formulas in cells and use the cells in calculations.

Formulas and *functions* in *cells* begin with the *equal (=) sign*. A formula in a cell maybe **=2+2** or **=(8*2)+10**. *However, in Excel rarely will you use a specific number in a formula. You will use various cell references for your formula to get the numeric value.*

Formulas in Excel follow the order of algebraic standards and the order of operations:

- ✓ *Items in parentheses are calculated first and work left to right,*

- ✓ *Exponents are calculated next,*

- ✓ *Multiplication and Division numbers/cells are then calculated,*

- ✓ *Finally, Addition and subtraction items are calculated.*

Excel uses common Mathematical operators. The mathematical operators are:

Mathematical Operators

Addition	+
Subtraction	-
Multiplication	*
Division	/
Exponents	^

Symbols in Formulas and Functions

Below is a table of symbols and what they mean in formulas and functions. This will help explain and use the syntax that Excel needs in order to work properly for your formulas and functions.

Symbol	What it means
: (A Colon, such as A5:G5) **=Sum(A5:G5)**	Think the word "Through" or a range of contiguous cells, so the sample at left would be "A5 Through G5".
, (A Comma, such as A5, C10, D12) **=Average(A5, C10, D12)**	Think the word "And" or specific cells that are not contiguous, so at left would be "A5 and C10 and D12".
() Parenthesis – Cells used in the function or you may see a function without cells but have the () which is needed for the function to work, such as =TODAY() – which will put the date on the computer in your work sheet and update the date automatically for you.	Specifies the cells or range of cells needed for the Function or to separate items that need to be calculated in a specific order for your formula. All functions must have parentheses, even with no cell reference.
! (An Exclamation Point, **=SUM(January:December!B5)** **This is a 3D reference.**	Think the word Join, The Exclamation points joins or connects different workbooks, worksheets, and cells in Functions and Formulas.
= Equal Sign, =A5 + A6+B10 **=Count(A5:G5)**	Think "Excel I'm, giving you a formula or function." All Formulas and Functions must begin with an equal sign =.
$ (A Dollar Sign, such as $B$5) **Absolute and Mixed referencing.** **=$B5*$I$5.**	Think the word "Only". Only use this cell in a calculation even if the cell's formula is copied to other cells, the cell reference will not change. This is the Absolute Reference symbol.

Cell Referencing and Addressing

Aside from entering numbers for calculations, the primary power of Excel is Cell addressing and references: *Cells* have various types of *addresses and references*. I explain them below and demonstrate them in the coming pages. We will use these types of cell references throughout the course. As we build various types of formulas, we will refer back to this section.

Relative Address

Relative Address: A relative address changes the address of the cell relative to its location. If you enter a formula calculating cell B3 as follows **=B1+B2** then copy the cell to C3 the formula changes based upon the relative address **to =C1+C2.** You may quickly and easily copy formulas; we discussed this in our previous section *Excel F2 – Fills and will use this in the upcoming exercises.*

Absolute Address

Absolute Address: An absolute address of a cell does not change. The absolute address symbol is the dollar sign **($)**. If you enter a formula in B3 as **=$B$1+B2** and then copy the formula to C3 the formula becomes **=$B$1+C2**. The absolute address allows you to specify your calculation using a specific cell for all calculations. As an example, if you want your expense items to increase by 3%, you would place 3% in a cell and reference this cell in your expense calculations using the **$** symbol. When you see a $ in a formula, function, or cell reference think the word "only", such as if you see *$A$1* think *"only use Cell A1 – do not change this reference even if I copy it." We will use this for our forecast, VLOOKUP, and other functions/formulas later*

Mixed Address

Mixed Address: This uses both relative and absolute addresses. If you want the reference in a particular column or row *not to change* and another reference in a particular column or row *to change*, you would use **=$A1+B1** in cell C1 (Column A would be used however the row would change). If you copy this cell to C2, the formula becomes **=$A2+B2**.

3-D References

3-D References: This uses cells in other worksheets. The *exclamation point (!)* separates the worksheet name and actual cell. If you want to add January rent and February rent for a total in

March, you would enter a formula in the March worksheet as follows**:**

=**January!B5**+**February!B5** (Note that your formula bar will guide you through the calculation and illustrate your position in accomplishing the formula or function.) We will use this for our summary worksheet later.

Summary Worksheets

A worksheet that summarizes data across multiple worksheets is a real time saver. We will create an annual worksheet based upon our monthly worksheets. However, you could create quarterly worksheets and then base an annual worksheet on the quarterly sheets. There are many applications and efficiencies for using Summary worksheets.

Through our Annual worksheet we will use different kind of formulas and functions. First, the formulas and the Sum functions we utilized in our monthly worksheets are *relative reference* cells. Now, we will examine the *3-D reference* and finally in our next worksheet we will use *Absolute references and Mixed references*. Our next worksheet will be a forecast worksheet for future budgets and expenses based upon a percentage of the current budget and expenses; an *absolute reference* provides the ease of changing a percentage and associated figures.

Here are the steps for creating our Annual Worksheet:

1. **First, let's copy the December worksheet and rename it to Annual in our Budget.xslx, click the December worksheet,**

2. **With the December worksheet selected, press your CTRL (Control) key and keep it pressed,**

3. **Click the December worksheet (your cursor changes with a sheet of paper and a plus (+) sign) and drag the December worksheet over next to Sheet 2 or at the end of your worksheets. An arrow will display where your worksheet will be inserted.**

4. **When your worksheet is in position between December and Sheet 2, release your mouse button,**

5. **Release your CTRL key.**

6. **You have a new worksheet named December (2),**

7. **Double click it to change the name to Annual.**

8. **After renaming your worksheet to Annual, Click cell A2 and change the heading to *Annual Budget and Expenses.***

Your Annual worksheet is only a copy of December; time to change that! Using this Annual worksheet, we will create a function that adds all of the worksheets together using the SUM function and 3-D reference.

1. **In the Annual worksheet, Click in cell B5,**

2. **Click the AutoSum button.**

3. **The Sum function appears in your formula bar as: =SUM(). (Since there are no numbers above this cell or to the left, Excel did not assume a range of cells.)**

4. **Click the January sheet.**

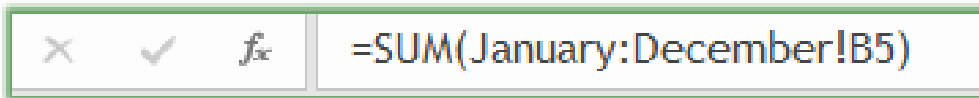5. **PRESS YOUR SHIFT KEY AND KEEP IT PRESSED (This can be the tricky part).**

6. **Using the Navigation Buttons, scroll until you see December (If the December worksheet is in your view just click it with your shift button pressed.).**

7. **Click the December sheet.**

8. **RELEASE YOUR SHIFT KEY. This selects your sheets contiguously.**

9. **Click Cell B5.**

10. **Press your Enter Key.**

11. **Your completed formula bar for cell B5 appears here.**

Like a math wizard Excel calculates the 12 months of your Lease budget! This type of calculation is termed a 3-D reference and calculation since we use other worksheets to compile the equation. The exclamation point or bang symbol (!) is our separator. You can link entirely different Excel files on another computer or server using the exclamation point as a file, worksheet, etc separator.

Do we have to repeat these steps for every cell? Nope! Remember our buddy Fill Handle? Time to use Dr. Fill.

1. **In your Annual Worksheet,**

2. **Click Cell B5 (with our calculation =SUM(January:December!B5)),**

3. **Position your cursor over the lower right corner and when you see the plus sign (+ - Fill Handle), click and drag horizontally to Cell D5. Your formula copies to these cells.**

4. **With Cells B5 through D5 selected for you, position your cursor over Cell D5's tiny, black box in the right lower corner of its border and with the Fill Handle, Double Click the fill handle and Dr. Fill completes your formula through row 15.**

5. **You may need to use the Fill Option box and choose Fill Without Formatting in case Fill creates or deletes your borders or other formats that you wish to keep. This is displayed for you here.**

Wow! Fill has done the job of copying all of the formulas for you!!

We have our annual budget, expenses, totals, and differences.

For practice, go into any of your worksheets and change a number. For example, in April change your Lease Budget and Expense to $0. Notice that your April worksheet reflects the change. Click the Annual tab and notice the change in figures for the Lease cells. Changing the amounts is easy and will calculate correctly. Change the position of the cells or inserting rows will spell disaster for you! Avoid inserting cells and rows. As I related, the worksheets must be exact. The numbers don't have to be the same, but the position of cells, rows and columns is very important because we are using relative referencing to accomplish our annual summation. We will add a row to all of our worksheets and a function on all of them at once using the Group feature, again.

Global Worksheet Change

After you complete the Greatest Worksheet and Workbook in the World, someone will say: *"That's nice, BUT you forgot to add an item."* Initially you will want to shoot the person, but it's not worth being arrested and Excel provides a way to update all worksheets at once through using the *Grouping* feature we have previously employed in our other exercises.

If you want to add, delete, or change all of your worksheets at one time, you may make this type of global change by selecting them all and making your change. With thirteen worksheets available we will use our *navigation buttons* to assist in selecting all of the sheets. As we have previously learned and used, pictured below are the *Navigation buttons* to use to select or to move to your various worksheets; *these buttons are located in lower left section of your screen adjacent to your worksheet tabs*. *Note: These buttons do not function until you have so many sheets that you are no longer able to click to select or open a worksheet.*

Navigation Buttons:

The navigation buttons at the lower left of your status bar allow you to scroll through your worksheets to the left or right. Right Clicking the navigation buttons retrieves a menu of all of your worksheet names for you to click to move to that worksheet or tab.

♫ *Write your notes here:*_____

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Let's add a new line item by inserting a row and update the sheets and calculations; we will also add a function to the sheets. Here are the steps to add a row to all worksheets:

1. **First, have January worksheet visible,**

2. **Click the January worksheet,**

3. **Scroll until you see the Annual Worksheet,**

4. **Press your shift key and keep it pressed,**

5. **Click the Annual worksheet; January through Annual worksheets will turn gradient and are selected or grouped for you,**

6. **Right Click on Row 11 (Click the number 11 for the row otherwise known as the Row Header).**

☹ **An Important Gotcha! Please ensure that you are in the range of your cells when inserting columns and rows – avoid inserting rows or columns at the beginning or the end of your information. Excel may not update calculations for you to include the new rows or columns. We want our Total, Average, and Count functions to update automatically and change the range for us that is why we inserted the row within our list. ☹**

1. **After right clicking row header 11, the shortcut menu appears,**

2. **Click Insert,**

3. **A new row inserts for you,**

4. **In Cell A11 type the word Travel,**

5. **In Cell B11 type 250 for the Budget,**

6. **In Cell C11 type 250 for the Expense,**

7. **Copy the Formula in Cell D10 to D11 using your Fill Handle.**

♫ *Write your notes here:* _____
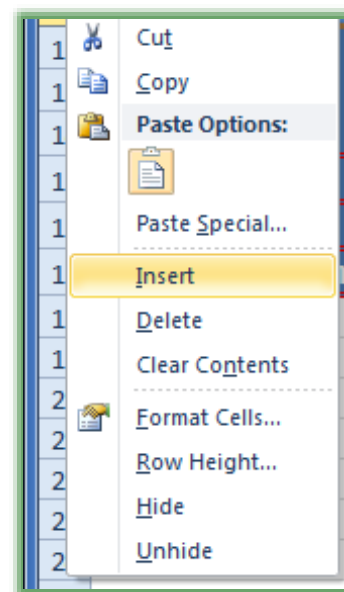
Here are the steps to globally add a date on all of the worksheets.

1. **With your sheets selected,**

2. **Click Cell A1 in any worksheet and type =TODAY(),**

3. **=TODAY() is a function that will display the current system date on your computer and is used in calculations as well. We will use this later to perform age and service calculations.**

4. **After inserting the Today function, select the cell and using your Number Format box and the cascading menu change your format to Long Date and format the date as you like, such as bold, font, color, etc.**

5. **Right click a worksheet tab and click Ungroup Sheets,**

6. **Click a worksheet tab to see the date. Click several worksheet tabs to view the date change of your worksheets.**

All looks great, except go to the Annual Worksheet. Oops! The Travel item doesn't have the calculations for all of the worksheets; the cell contains the number 250 that we typed in. Let's change this. The only assumption Excel will make in changing all of worksheets is your formatting. Generally, Excel doesn't assume the function or formulas when you add rows or columns.

1. **In your Annual worksheet,**

2. **Select Cells B10 through D10,**

3. **Using your Fill handle, click and drag to row 11**

4. **After releasing your mouse button the figures should reflect $3000 for Budget and Expense with a difference of $0.**

I use this ability to update all of my worksheets at once a lot and hope you'll find this to be a real time saver.

♫ *Write your notes here:* _____

Forecast Worksheet and Absolute Reference

Now that we have our annual budget and expenses, let's forecast our Budget and Expenses. First we will copy our Annual *worksheet* and then add *Absolute Reference* calculations to automatically increase our budget and expense by a certain percentage. We could accomplish this task without Absolute reference; however, we would have to continue to change our formulas and copy them throughout our worksheet. With *Absolute Reference* we need only make one change in one cell to impact figures throughout the worksheet. Using *Absolute Reference* prevents errors, is more efficient, and easier to manage. *We use Absolute Reference to provide a constant number in our formulas and functions and using a cell reference for a consistent number is easier than editing a formula or function and changing the number.*

Here are the steps for creating a forecast worksheet that will include our current year, too.

1. **Copy the Annual worksheet using our right click, shortcut menu, and the Move or Copy function OR use the CTRL and Click and Drag method.**

2. **With your Annual worksheet copied, rename the *Annual (2)* worksheet to *Forecast*.**

3. **Change the title of your worksheet (Cell A2) to: Forecast Budget and Expenses.**

4. **Next, let's Merge and Center a new area that will encompass new columns of data for our forecast.**

5. **Select cells A2 through G2,**

6. **Click the Merge and Center command button once to turn off the Merge and Center,**

7. **Click the Merge and Center command button again to turn on the Merge and Center formatting on the new area (A2 through G2).**
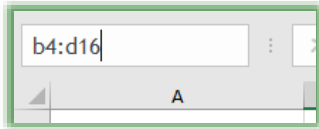
♫ *Write your notes here:* _____

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We want to keep the information in tact; however, we need to make a copy of the area of our budget, expenses, differences, and totals.

*Let's learn a new way to select an area of your worksheet.*

b4:d16

1. **Click in your Name Box and type B4:D16. The Name box is located to the left of your Formula Bar and directly above Row 1 and Column A. My Name Box is pictured here.**

2. **After typing B4:D16 in your Name Box, Press Enter (You must press enter in order for Excel to execute your selection.)**

Your cells select for you without clicking and dragging. Excellent keyboardists prefer this method; while excellent Mouse users like the click and drag. People who are excellent at both, the Keyboard and Mouse, like the Shift and Click method of selecting areas of your worksheet.

3. **Right click in the selected area and from the shortcut menu Click** *Copy* **or you may press CTRL + C or use the Copy command button on the Home tab. A Scrolling Marquee (some call it "marching ants" or "squikkly thingies") appears around the selected cells.**

4. **Right Click in Cell E4 and from the shortcut menu click Paste or you may press CTRL + V or use the Paste command button on the Home tab. We will learn more about Copy and Paste in the next section of this manual.**

5. **Press the Esc key on your keyboard and the scrolling marquee stops. So we have a duplicate area.**

Our area is copied and 0's or dashes appear below the headers. Since the cells we copied were relative reference, our copied area needs to change.

=SUM(January:December!E5)
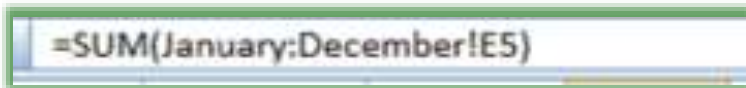
**Click in Cell E5. The formula bar displays,
=SUM(January:December!E5).**

We have a duplicate of our information using the wrong cell reference.

Now, let's forecast our budget and expenses by using *Mixed and Absolute References.*

An *Absolute Reference* is a reference that will use only a specific cell, specific row, or specific column in its calculation or reference; this is pictured in *the formula bar* here as **$I$1** which signifies **ONLY USE this Cell,** even when the cell is copied to other cells – do not change this cell reference. A *dollar sign ($)* signifies to Excel to use only a certain cell, row, or column. A *Mixed Reference* uses both a relative reference (a row or column can change relative to position) and an absolute reference (a specific row or column cannot change in relation to position of the calculation) Pictured above is the Mixed cell reference of **$B5** which will not change the column (since I always want Column B to be budget); however, the row will change. I will want the row reference to change to other items.

We will change our Budget, Expenses, and Difference calculations to reflect a Mixed Reference. Here's how we will change the formula. We will first designate two cells to be our percentage increase (or decrease) for the Budget Increase and our Expense Increase.

1. **In cell H1 type Budget Increase.**
2. **In Cell I1 type 1.05 and press enter.**
3. **Click to select H1 again and click the format percent (%) Command Button on the Home Tab,**
4. **Next, in cell H2 type Expense Increase.**
5. **In Cell I2 type 1.03 and press enter.**
6. **Then, click to re-select I2 and click the % icon.**

We have our two cells: I1 for Budget Increase and I2 for Expense increase. Format your cells as you wish.

Time to use these cells in our Absolute Formula.

1. **Click in Cell E5,**

2. **Highlight the entire =SUM formula on the Formula Bar, and type =$B5*I1. You may click the cells and Excel will provide the cell reference in your formula, but you'll have to add the $ before the B.**

3. **Press enter.**

4. **Using your Fill Handle copy the formula down to E10.**

What Happened?! What's Wrong with the calculation? You may receive Value errors, 0's, and incorrect figures or calculations. Why?

Click Cell E6 and notice that the Cell referenced is cell =$B6*I2. Cell I2 is not what we want. Click cells E7, E8, etc. notice that they are not using cell I1 as we need. This is still using relative reference. Time for our absolute reference!

Absolute reference will signify to Excel to ONLY use Cell H1 in the calculation.

1. **Click in Cell E5.**

2. **Click in I1 on the Formula (VERY IMPORTANT, make sure you have clicked in I1 on the Formula bar, so Excel will know which cell to apply the mixed/absolute reference).**

> ☛ **Hot Tip! Using the FN4 – Function 4 key to toggle through your references. While you may type the $ for Absolute and Mixed references, using the FN4 key on your keyboard will toggle through all of your references for you. Click the cell reference using the formula bar or the cell with your reference, then continue to press your F4 key to toggle through all of your references, such $B5 or $I$1. ☛**

3. **On your keyboard Press the FN4 key(s), some keyboards require you to press an FN key and the F4 key together. In Excel when you are clicked in a cell reference, the FN4 (Function 4) key is a shortcut to use for cell referencing. Your**

formula will change to $I$1 continue to press FN4 to notice how it will change the cell reference formula. Stop pressing FN4 when your formula reads - $I$1.

4. **=$B5*$I$1 is our completed formula. Press Enter to have Excel accept the Formula.**

The above formula tells Excel Only to Use Column B and then to only multiply the figure by cell I1.

1. **Using the Fill Handle copy the formula to Cell E16.**

2. **After you Fill down, click on the drop-down arrow for your *Auto Fill Options* icon and click Fill without Formatting.**

*Now, our calculations and data are correct! Let's test this out.*

Click in Cell I1 and type 1.02 and press enter.

Notice that Excel automatically changes your Budget figures to accept this new figure. Changing one cell impacts many other cells; this is the time savings of using Absolute Reference. We can play all sort of "what if" games with our figures without any trouble of having to copy and paste our updated percentages.

Enter 1.05 in Cell I1.

We need to build a forecast for our Expenses.

1. **In Cell F5, Edit the Formula on the Formula bar to read $C5*$I$2 – remember you may type in the formula or use your click and F4 methods of having Excel enter the dollar signs ($) for you.**
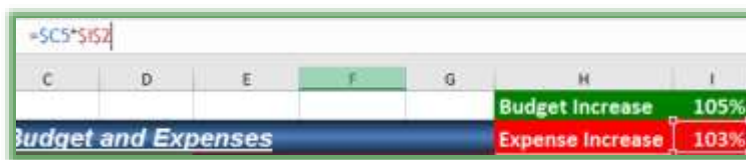
2. **Once your cell reflects the updated expense forecast, use the Fill Handle to copy the formula to Cell F16.**

Now for Formatting practice, on your own accomplish the following using previous sections of this manual to help you:

3. **Create a heading in Cells B3 through D3 for the Current Year and E3 through G3 for the Next Year,**
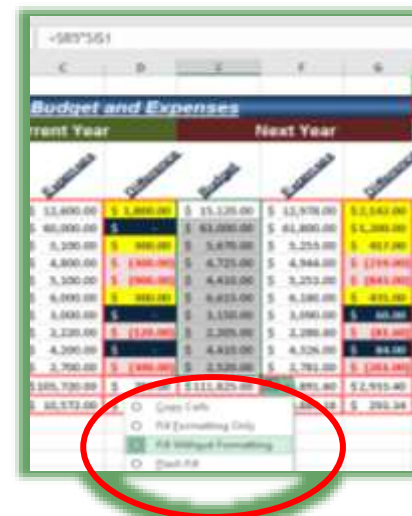
4. **Use your Merge and Center command button, and Use Fills and Borders around the areas to accentuate these different budget and expense years,**

5. **Change your font and create interesting formats for these areas,**

6. **Next, you may need to change your Difference formula in Cell G5,**

7. **Change Cell G5 to read =E5-F5,**

8. **Fill this formula down to G16,**

9. **Using the Auto Fill Option Icon, Fill Without Formatting.**

We have our Annual Budget and Expenses and a Forecast for Next year complete! Now let's learn some of Excel's other neat features, such as *Conditional Formatting*, *Paste Special, and Paste Preview.*

♫ *Write your notes here:*_____
_____
_____

Worksheet and Workbook Linkage

We created a 3-D reference that linked our worksheets using the SUM function. Excel allows you to retrieve data from any worksheet or workbook that you have access. If you can open the workbook from which you want your data, creating linkages are easy. As with formulas and functions, linking begins with an equal sign. After the equal sign, simply click the worksheet and the cell you wish to link. Excel creates the linkage and includes the exclamation point for you.

fx =Jan!B5
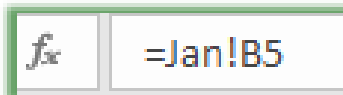
Let's create a worksheet linkage first and then we will link to a workbook.

1. **In your Track workbook, insert a new worksheet, and rename it Linkage.**
2. **In cell A1, type January Revenue,**
3. **In cell A2, type February Revenue,**
4. **In cell A3, type March Revenue,**
5. **In cell B1, type an equal sign,**
6. **Next, click the Jan worksheet and then click cell B5, press enter.**
7. **Excel inserts the January revenue figure.**
8. **Next, repeat this step for cells B2 and B3 using Feb and Mar worksheets. My linkage formulas appear here with my total using the SUM function.**

	A	B
1	January Revenue	=Jan!B5
2	February Revenue	=Feb!B5
3	March Revenue	=Mar!B5
4		
5	Total	=SUM(B1:B4)

9. **Finally, in the Jan worksheet add numbers to a customer to increase the revenue. When you navigate to your Linkage worksheet notice your cell B1 updates for you.**

> ☛ **A Hot Tip! Linking ensures that when you change your information in one worksheet, the linked worksheet automatically updates for you.** ☛

Workbook linkages work the same as a worksheet linkage, except you navigate to an open workbook and then click the worksheet and cell(s) that you wish. In this exercise, we will link an area of a worksheet, not just one cell.

1. **Create a new blank workbook and have your Budget file open.**
2. **In your new workbook, click in cell A1 enter an equal sign (=),**
3. **Navigate to your open Budget file and click cell A4.**

• •

4. Now, Excel's formula bar displays =[Budget.xlsx]January!$A$4. Notice Excel uses Absolute Reference for these cells with the $ signs. We want to link an area of this worksheet from A4 to D17 without Absolute Reference; therefore, we will need to turn the cell reference to a Relative Reference without the $ signs.

1. **In your formula bar, click in the cell $A$4 and press the Function 4 key until the reference is A4 or delete the $ signs from the cell reference. Press enter. Excel returns to your blank workbook with Items in cell A1.**

2. **In the blank workbook, your formula bar should display =[Budget.xlsx]January!A4.**

3. **Now, using AutoFill, Fill to D1. Excel inserts the column headers Budget, Expense, and Difference from the January worksheet.**

4. **Finally, select the cells A1 through D1. Again, using your AutoFill handle fill down to row 14.**

5. **Viola! Excel links these cells from the January worksheet.**

Now, when you make a change to these cells in the January worksheet, Excel updates your cells for you. Try it, in your Budget's January worksheet change cell A5 from $1200 to $1100. Next, navigate to your Linkages workbook and notice cell B5 updates automatically.

6. **Save your workbook as Linkages.**
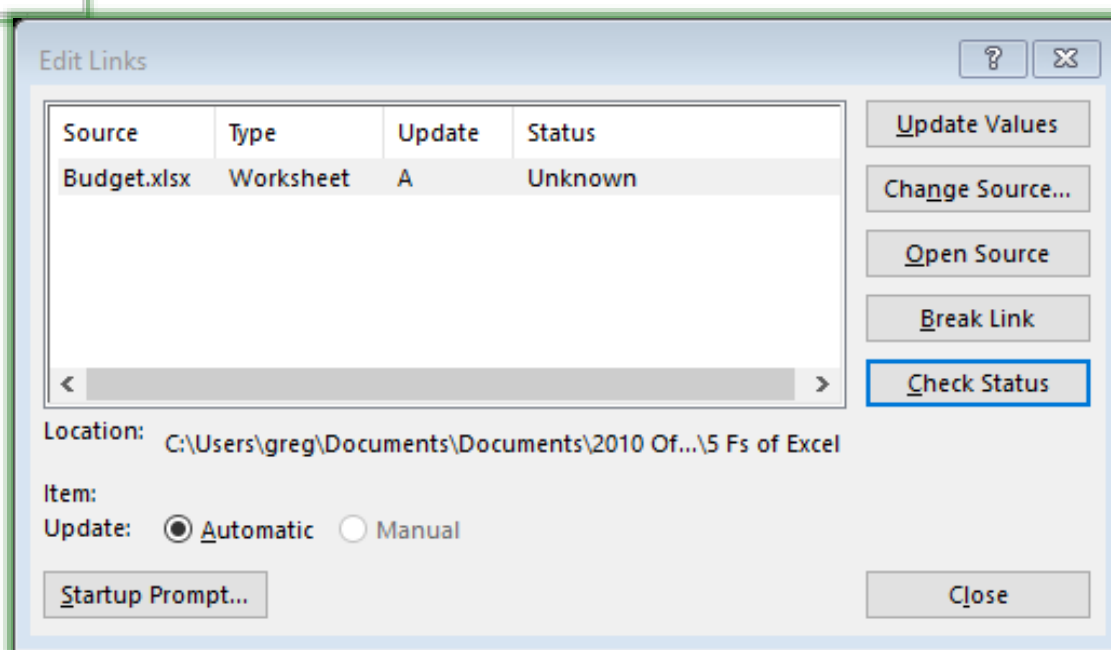
A few important notes about linking:
- ✓ *Excel does not link the formatting, only the data.*
- ✓ *Do not move or delete the linked workbook, Excel can't update and the linkages no longer works.*
- ✓ *To remove a linkage, simply delete the contents of the cell containing the links.*
- ✓ *Your formula bar may display the path to your file. This path to your linked file can be quite complicated and lengthy depending upon where you store the file, such as remote servers, including the cloud. My linked path for cell B5 displays here.*

```
='C:\Users\greg\Documents\Documents\2010 Office\2010 Excelling @ Excel\5 Fs of Excel\[Budget.xlsx]January'!B5
```
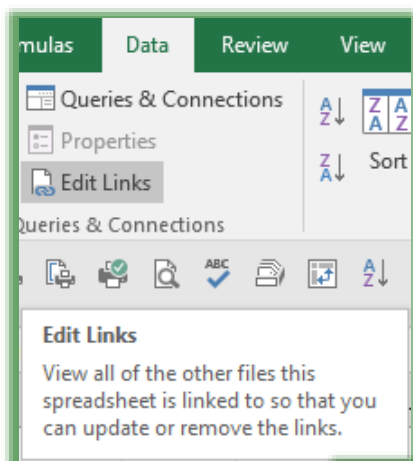
With linked data, the *Data Tab* has an important command for you to use to edit, remove, and perform other actions with your linkages. The *Edit Links* command button displays here and opens the dialogue box below for you to manage your linkages. I usually have my *Update* set to *Automatic,* which is the default; **UNLESS**, the data linkage covers multiple workbooks from several sources, and links large areas. As it updates, Excel may slow to a crawl; you may want to use the *Manual* option. With *Manual* selected, you will want to use the *Update Values* button to refresh your workbook with the latest information.

Edit Links

View all of the other files this spreadsheet is linked to so that you can update or remove the links.

When you open a file that has linkages, Excel may prompt you if you want to update the linkages or not. Your *Startup Prompt* button allows you the options displayed at left. With the default (*Let users choose to display the alert or not*), Excel provides the prompt dialogue box below.

,
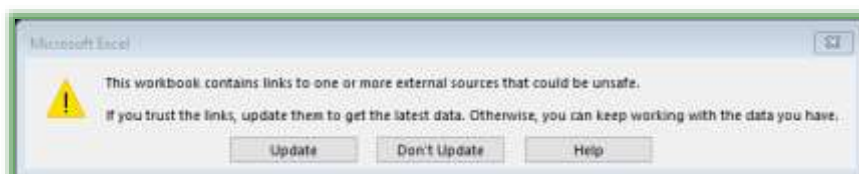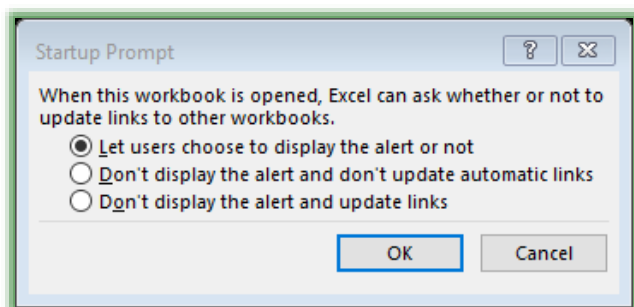
Conditional Formatting

Excel has a feature that allows you to have cells formatted in a particular manner when a value or range of values is present. This feature is aptly called *Conditional Formatting*. I have used *Conditional Formatting* to color code cells based on a value for several companies. Here are a few example of how I have used *Conditional Formatting* to help my clients.

- ✓ Color Code cells based on ZIP codes for an Insurance company that needed to have high accident ZIP codes in one color, medium accident zone ZIP Codes in another color and finally low accident zones ZIP codes in another color.
- ✓ A telecommunications company used color coding for date ranges to alert them when orders were due and overdue.
- ✓ As a Human Resources Manager, I used Conditional Formatting for attainment percentages and to color code highly, medium, and lowly ranked sales people.

You will want the skill and knowledge for creating and managing your own rules, so we will do that first. For our example, we will want to color code our difference Columns in order to take money from one category that is under budget and give money to other items that are over budget. We will color code our Difference columns so at a glance we will know which items we can take money from and those that we need to leave as is. Then, we'll use some of *Conditional Formatting's* built in functionality for percentages and number values.
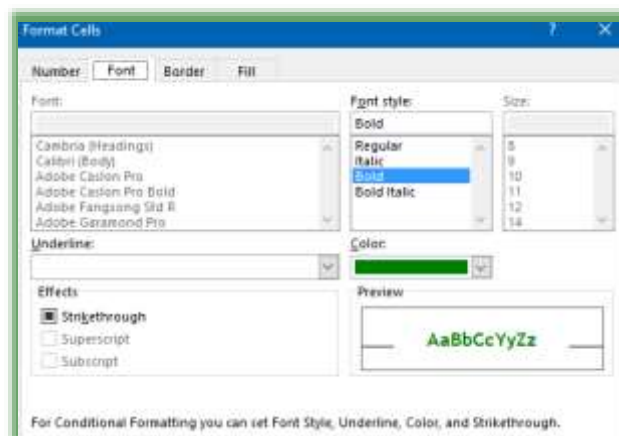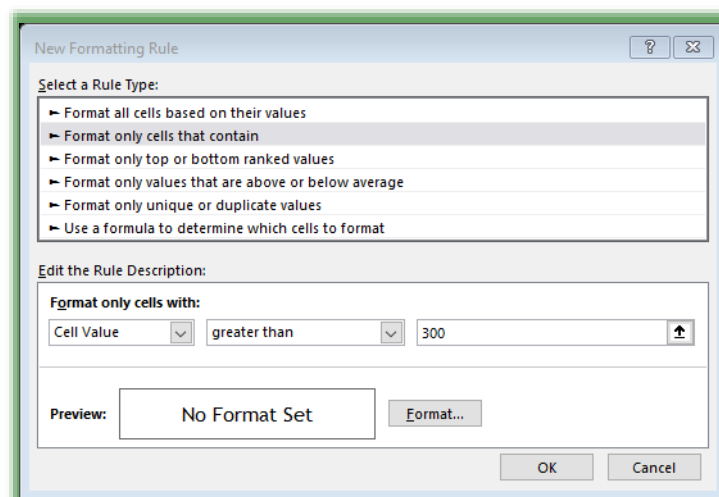
Custom Conditional Formatting

Here are the steps to have our numbers in the Differences columns formatted based upon a value in the cell.

1. **Have your Budget Workbook open,**
2. **Click on the Forecast tab,**
3. **Select Cell D5 through D14 through click and drag.**
4. **Press your CTRL key and Keep it pressed,**
5. **Click and drag Cell G5 through G14,**
6. **Release your mouse button and release the CTRL key.**

7. **Our two areas are selected that we want to use Conditional Formatting.**

8. **On the Home Tab, click the Conditional Formatting command button,**

9. **From the cascading menu, click New Rule . . .**

10. **In the Select a Rule Type, I am choosing only cells that contain.**

11. **Using the Format only cells with boxes, I keep *Cell Value* and change the middle box to *greater than* and then type *300* (I want to give the dollar amount above three hundred special formatting).**

12. **Next, click the Format button, and the familiar Format Cells dialogue box opens; however, not all items are available but you may change your Font Style and Color as well as provide a border and fill color and pattern.**

13. **As pictured at right, we will change our dialogue box to reflect the values and range of values with specific colors.**

14. **Change your font to bold and change the font color for values that are greater than 300.**

15. **Click the Fill tab and give your cell a fill color – I chose light green.**

16. **Click OK. Click OK, again, at the Greater Than box.**

17. **Your formatting changes for cells greater than 300.**

Let's add another rule and learn to edit and add new rules.

1. **With your area D5 through D14 and G5 through G14 still selected in the Budget workbook and Forecast Tab,**

2. **Click the Conditional Formatting Command Button, Click the Manage Rules item at the bottom of the menu.**

You may create, edit, and delete rules from this location and also change the area you want to set rules for using the *Show Formatting rules for:* area.

1. **Click the New Rule. . . button.**

2. **At the New Formatting Rule Pane, choose the *Format only cells that contain* item.**

3. **In the *Edit the Rule Description:* area change your Cell Value to between with 0 and 300 (we want our numbers 0 through 300 with a special formatting).**

4. **Click the Format button,**

5. **In the Format Cells dialogue box, choose Bold and a color and on the Fill tab choose a fill color, if you like.**

6. **Click OK.**

7. **At the New Formatting Rule pane, Click OK.**

8. **At the Manage Rules pane, click the Apply button and Excel displays your formatting for numbers between 0 and 300.**
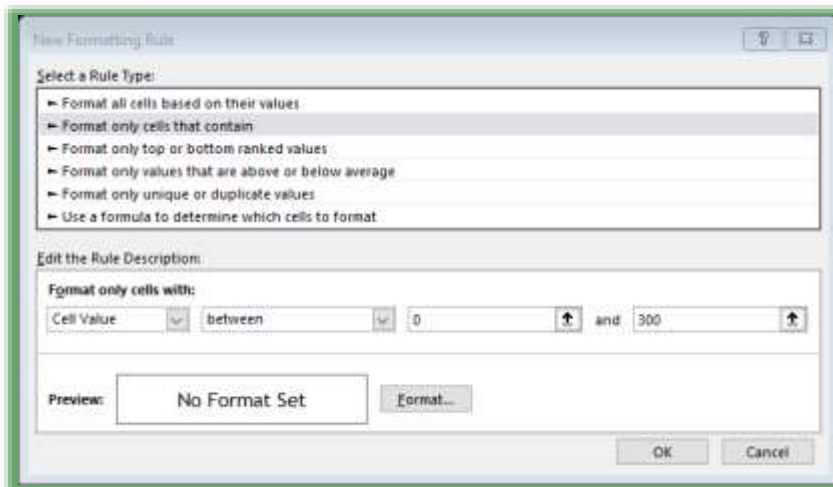
1. **Using your Manage Rules pane, Click New rule,**

2. **Now, using these steps as a guide create your own rule and formatting for values less than 0 (negative numbers) for cells D5 through D14 and G5 through G14.**

3. **My completed Conditional Formatting Rules Manager pane appears below with the rules and formatting applied to the selected areas of my worksheet.**
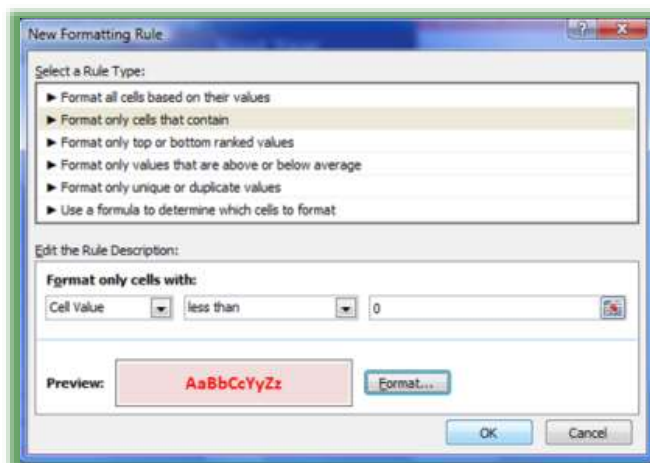
> ☛ **Hot Tip: You will want to create a legend or insert comments about the formatted cells. The reasons for the colors may not be obvious and the user may not know to use the Conditional Formatting Rules Manager.** ☛
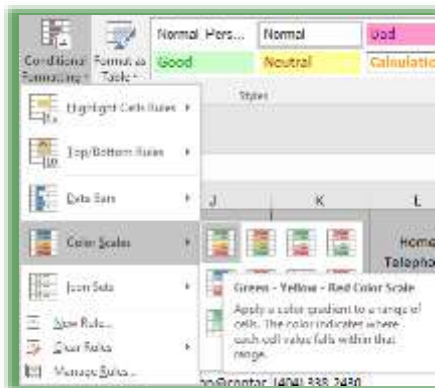
Automatic Conditional Formatting

Excel has many terrific built in *Conditional Formats* that provides magic for your numbers and percentages as well as text and dates. Excel can rank your values in neat and easy ways. We'll look at these ways of using Excel's *Automatic Conditional Formatting*.

1. **First, open a file entitled Database Functionality, Click the Conditional Format Personnel tab,**

2. **Select the Percent column Cells M2 through M48 or select the entire Percent column by clicking the Column Header M,**

3. **Click the Conditional Formatting button and from the menu look at the various styles. I am choosing one of the Color Scales.**

> ☛ **A Hot Tip! You can apply more than one of the built in formatting rules to your cells.** ☛

4. **Next, with my Column M (Percent) still selected, I use Conditional Formatting to add Icon sets to my numbers.**

5. **For practice select the Bonus cells of N2 through N48 (or Click column header N to select the entire column) and using the Conditional Formatting button and menu select a format for your bonus ranges. Save your workbook.**

On your own, use Conditional Formatting for the Age column.

If you want to know the rules for the formatting that the built-in conditional formatting employs, you will need to use the Manage Rules Pane and the Edit rules item. I am displaying the rules for my color scales here.

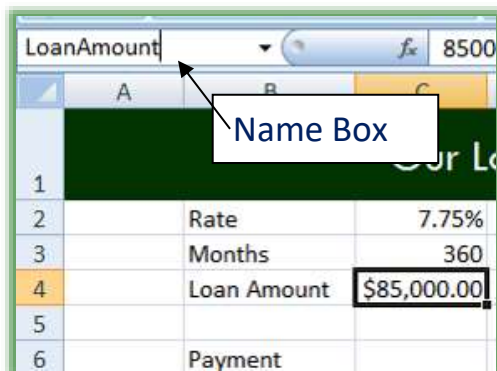*Conditional Formatting* can format your information based on the top or bottom items and above or below averages and other types of numerical data for you. Practice using difference rules for your numbers, text, and dates. *You may use your Quick Analysis Menu to add Conditional Formatting, too.*
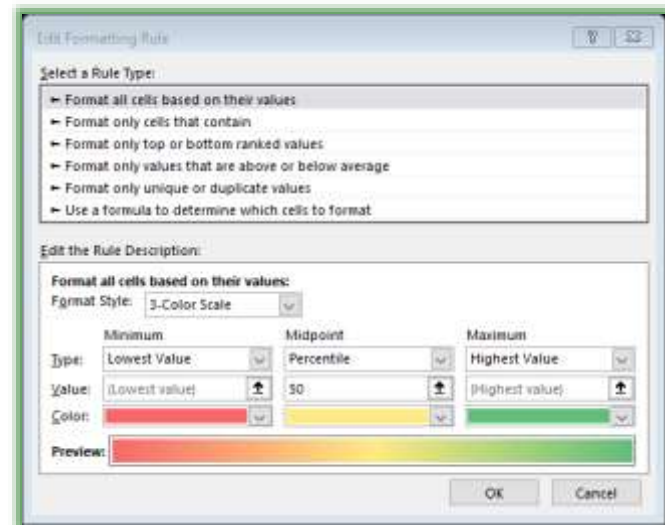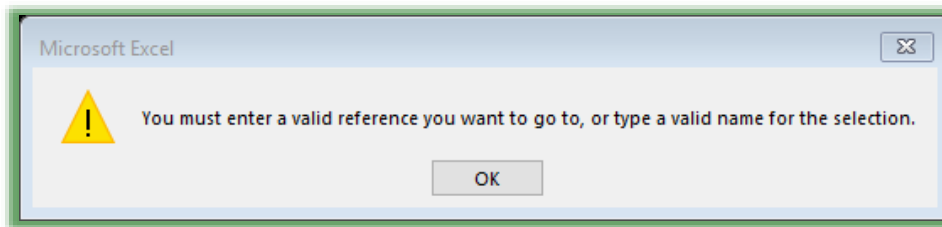
♫ *Write your notes here:* _____
_____
_____

Name Box and Name Manager

The *Name Box*, located to the Left of the *Formula Bar*, is a way to give a cell or a range of cells an English name. This will allow you to use the English Name in calculations or to quickly go to this cell using the *Name Box's drop-down* arrow. We will use the *Name Box* to name cells, an area of our worksheet, and to use in calculations.

☹ **An Important Gotcha! You cannot use spaces in Names you enter in the Name Box; Excel gives you an error**

message, if you put a space in a Name. Also, press the Enter Key after you type in a name; otherwise, the Name Box will not save your text. So, no spaces in Names and press the Enter Key after you type a Name. You may use an Underscore character for a space if you like. ☹

👉**A Hot Tip! Here five reasons we will learn to love the Name Box and Name Manager:**
1. Makes a cell reference absolute (you can use a name rather than the dollar signs - $A$1),
2. Navigation,
3. Selection,
4. Used in formulas and functions,
5. Store Values. 👉

Let's use the Name box to "name" our 7.75%, 360, and $-85,000

Here are the steps for adding a Name to a Cell.

1. **Click cell C2 with our Percentage,**
2. **Click in the Name Box, and type *Rate* and press enter,**
3. **Click cell C3 with our figure of 360,**
4. **Click in the Name Box, and type *Months* and press enter,**

5. **Click cell C4 with our figure $(85,000.00),**

6. **Click in the Name Box, and type *LoanAmount* and press enter,**

7. **Click cell C6 which will contain our Payment Function,**

8. **Click in the Name Box, and type *Payment* and press enter,**

9. **Click and drag to select cells B2 through C6,**

10. **Click in the Name Box, and type *LoanInfo*, and press enter.**

Now, let's use the Name box for navigation and selection.

Go to another worksheet, and click the down arrow on the Name Box and click a name to quickly go to that worksheet and cell.
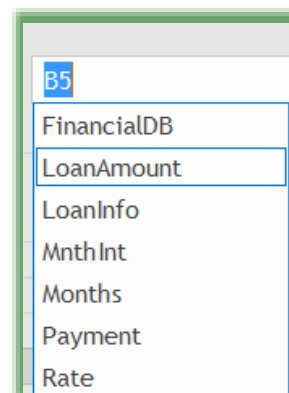
> ☛ **Hot Tip! The Name box helps in maneuvering and in navigating to different areas of your workbook quick and easy. I once had all of the total of a worksheet on row 57,569 I named that row *TheBottomLine* and any time I needed to quickly go there I could using the Name Box no matter what other worksheet I was. ☚**

1. **In an empty cell type =LoanAmountt+5000.**

2. **The result will be –80000 (Remember our loan is a negative number!)**

3. **Clear the cell.**
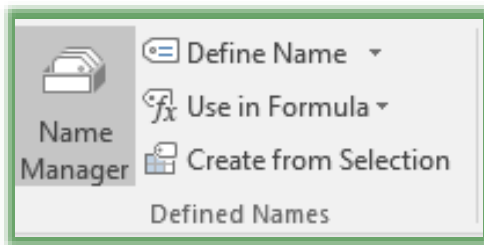
The Names take on the value of the cells and update as you change the figures in the cells.
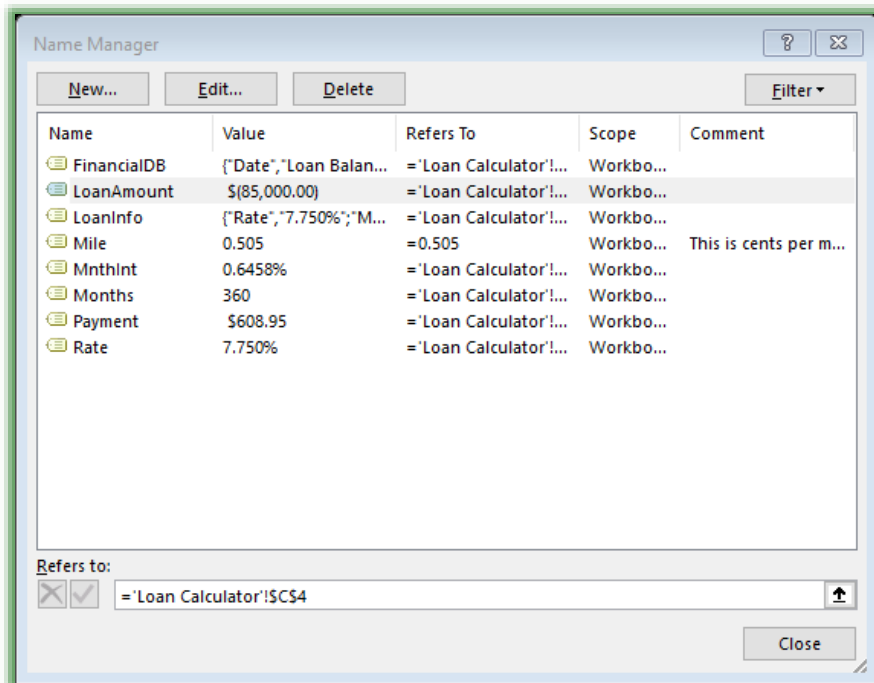
♫ *Write your notes here:* _____

_____

Name Manager

Excel has a great feature to help you with *Names* – The *Name Manager*. This will allow you to edit your names, create new names, delete names, and change the cell reference or value. *The Name Manager* is pictured here and is part of *the Formulas Tab* and the *Defined Names Group*.

Notice I have LoanAmount selected, so my buttons at top are all active. You can *Edit and Delete Names* and *Cell References* here and create new names for specific cell(s). You can used the *Refers to:* section to type your cell references or you can use the *Collapse* button to click your cell references. As I related earlier *Names* by nature are *Absolute Reference* and the *Refers to Section* with the *='Loan Calculator'!$C$4* pictured at right demonstrates.

Let's add a new name to represent a constant value. We'll use .54 as if this were a percent or maybe mileage at cents per mile.
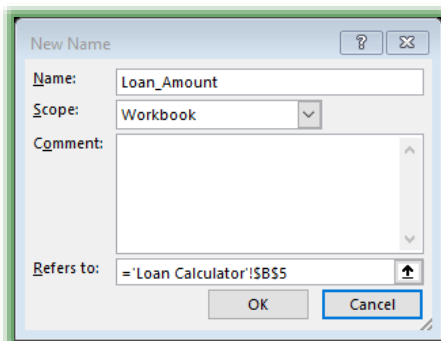
1. **In your Loan Calculator worksheet, click the Formulas Tab and click the Name Manager command button,**

2. **Click the New Button in your Name Manager,**

3. **For the Name enter: *Mile*,**

4. **Keep the Scope at Workbook, although you can store names in specific worksheets,**

5. **Provide an appropriate comment,**

6. **In the Refers to section enter =.542 (our constant value),**

7. **Click OK,**

8. **Click the Close button in the Name Manager window,**

9. **Click in Sheet 2 and click in any cell and enter the formula =100*Mile. Notice as you type Mile that Excel provides the AutoComplete feature for you to double click the Mile label to insert the name into your formula.**

10. **Press enter – Excels provides the calculation.**
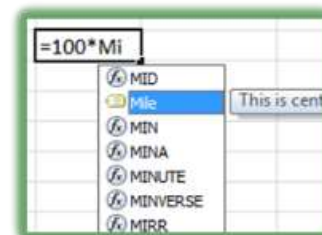
In reality, our constant numbers are not so constant and values, like mileage, change. Let's edit our name for a new value.

1. **Click your Name Manager button and select or highlight Mile,**

2. **Click the Edit Button . . .**

3. **Your Edit Name pane appears, in the refers to section change the value to =0.6,**

4. **Click OK,**

5. **Click close at the Name Manager pane.**

6. **Your value for your name changes in the formula's result.**

The Other command buttons on the Defined Names Group are good for creating and using names without the Name Manager. The Define Name button allows you to create new names by opening the New Name page for you and to apply names. The Use in Formula button lists your names for you to use in a formula, if you click a name Excel begins your formula in the formula with an equal sign and your name.
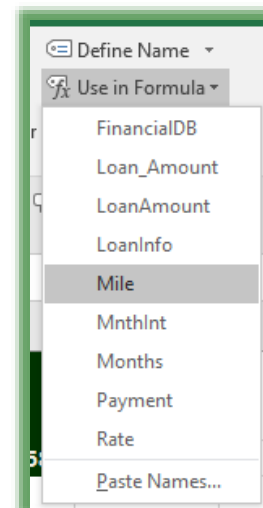
We could have used the Create Names From Selection command button, too. This allows you to select a Range for example B2: C6 in our Loan Calculator worksheet and name the cells base on adjacent cells. For example, this would automatically name cell C2 Rate based on cell B2.

# Is it Valid? Data Validation
Data Validation Overview

Excel has a fantastic method for checking your data and restricting your input. This feature entitled *Data Validation* ensures accuracy, ease of input, and flexibility in entering data. I used this especially when I share *workbooks* in order to collect data from other people. These people may not know how to use *Excel* or are uncomfortable in using the application; data validation makes input and using *Excel* easier for the novice *Excel* person. Under the *Data Tab*, you will find *Data Validation*. This has a three tab dialogue box for configuring the data types and ranges allowed, an input message tab, and an error alert tab.

We will use a worksheet and add validation to it. First, let's examine a worksheet that already contains validation rules to understand what we will be doing.

Data Validation Sample

1. **Open the Data Validation workbook,**

2. **Click the Jan Data Validation Sample tab ♪ This is similar to the worksheet we have previously used. We will add data validation to certain areas of it. ♪**

Let's look at a Date Validation first.
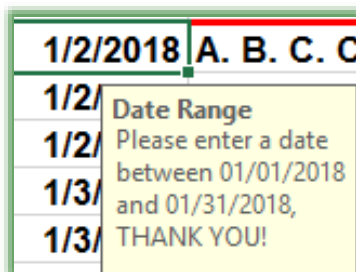
1. **Click cell B8. Notice the Input message displayed alerting you to enter a date between 01/01/2018 and 01/31/2018,**

2. **Enter 02/01/2018 or any date outside of the correct range,**

3. **An error message activates – Notice how polite my message is!**
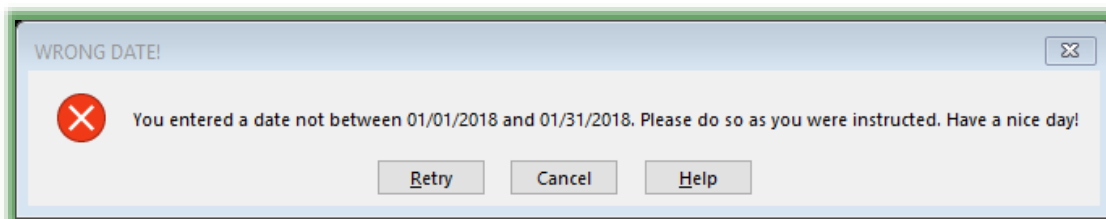
4. **Click retry and correct your entry to 01/14/2018.**

Now, let's look at a popular item in Excel and that is using a lookup list
or drop-down menu to select information.

1. **Click cell C8,**

2. **Notice the input message for the clients,**

3. **Click the drop-down list and select a client from the list,**

4. **Now, type your name in cell C8,**

5. **Notice the Error message that displays; you may continue by clicking OK or pressing enter,**

6. **Click OK.**

Excel allows you to continue unlike the previous error message and data validation rule.
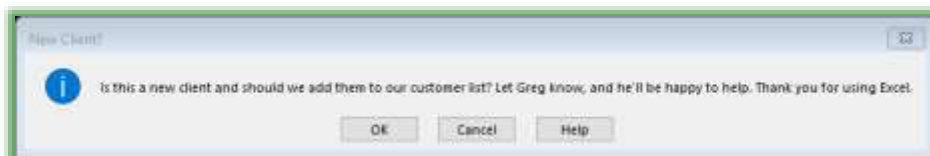
Excel's Data Validation lets you create your own type of error message which we will accomplish in a moment.

Finally, let's look at a number validation example.

1. **In cell D8 type 12. Notice that we have an input message box telling us to input our time; however, an error message box asking us to verify our input activates if we enter a number greater than 10.**

2. **Click Yes to continue.**

That's it! Excel has guided us to correct input using data validation.

Time for us to create our own Data Validation.

♫ *Write your notes here:*_____

_____

Data Validation: You got the Power!

We will add the data validation in the previous section to a file entitled DataValidation.xlsx.

Date Validation and Required Information

Here are the steps and screens for adding data validation for required information with a date range.

1. **Open the Data Validation workbook,**

2. **Click the Jan tab,**

3. **Select Column B; this is the column or cells we wish to place a condition on the input,**

4. **On the Data Tab, click the Data Validation Button in the drop-down menu click Data Validation as displayed here.**
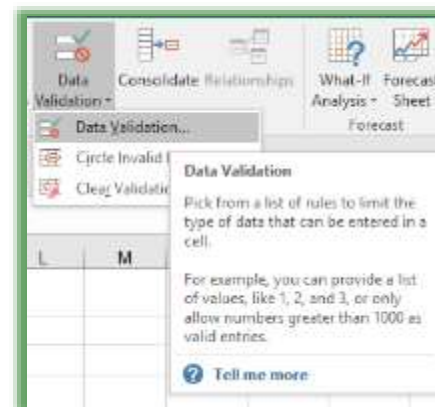
The Data Validation Dialogue box contains three tabs:

✓ **Settings:** **The actual data validation rules and guidelines,**

✓ **Input Message: A message displayed in the cell with the rule to guide a user's input,**

✓ **Error Alert: An error message will appear if the user inputs incorrect data. The three types of Error Alerts are:**

   o **Information – Allows you to continue and you may enter incorrect information,**

   o **Warning – You must click Yes, No, or Cancel to accept the input,**

   o **Stop – Will allow a user to only input the required data.**
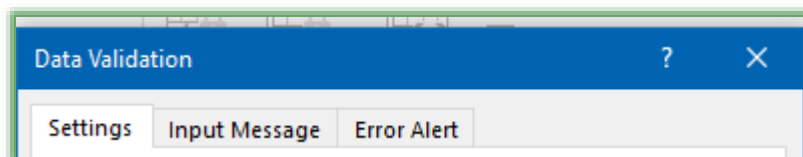
1. **In the Settings tab, click the Allow drop-down box. Notice all of the types of data that can have requirements.**

2. **Using the screenshot, enter Date in the Allow box,**

3. **Between in the Data box,**

4. **And 01/01/2018 in the Start Date,**

5. **And 01/31/2018 in the End Date.**

We only want January, 2018 orders input in this worksheet and cells.

1. **Click the Input Message tab:**

2. **Ensure the *Show Input message when cell is selected* check box is checked,**

3. **In the *Title* area, type Correct Date,**

4. **In the *Input message* type the Input message as displayed here,**

5. **This is to instruct and help the user in the required input.**

Now, if the person does not enter the correct information, we need a nice way to alert them. Time to create our Error Alert Message Box.

1. **Click the Error Alert tab,**

2. **In the Style box drop-down list choose Stop,**

3. **Type the Title of the Error Message WRONG DATE!,**

4. **Finally, give an appropriate Error Message,**

5. **Click OK.**

Let's try out your rule.

1. **Click an empty cell in your specified range. Notice the Input Message box,**

2. **Type 12/31/18,**

3. **The Stop Error Alert Message Box activates. Click Retry and Enter 01/01/2018.**

There is our first rule!

Next, we will provide a List from which a user may choose a client name rather than typing in a client name. The next data validation will provide a list of our popular clients which we can choose and if not a Warning Error Alert activates.

♫ You may type in the list as you create the rule or you may use an existing list. If you create a List rule and use an area of your worksheet (or another worksheet as we are accomplishing) as your list (which is a good idea), the data is easier than updating the Validation Rule dialogue box and panes. You may type in the worksheet and the area that contains your list rather than use a list in your Source box. I always hide my list whether my list is a worksheet (I hide the worksheet) or an area of my worksheet with the validation rule (hide column). We will use a list that exists on the worksheet Client List. The Client List tab appears at right. I have sorted my client list and named this area ClientList using my Name box. ♫

	A
1	ABC Co.
2	Bates Motel
3	Big Bad Computer
4	Bowling for Dollars
5	Computer Tech
6	Cooper, Lars
7	Dean Don
8	Dr. Data
9	Fay Fryer
10	Foxx 91
11	Georgy Porgy
12	Hard Hat
13	InfoMania
14	James Jones
15	John John
16	Jones James
17	Lili Lulu
18	Lucy Goosey
19	Madam Salon
20	Moma Mia
21	Pumpkin, Peter
22	Shoot Pool
23	Smith, Bob
24	Thomas Tuner
25	USA Inc

1. **In the JAN Worksheet,**

2. **Select column C.**

3. **On the Data Tab, click Data Validation and from the menu click Data Validation.**

4. **The Data Validation Dialogue box opens.**

5. **In the Settings Tab, choose List for the Allow area,**

6. **Next, in the Source area, click the Client List worksheet tab and your dialogue box changes as displayed above. Click and drag your cells A1 through A25 – the client list of names. I named this area ClientList.**
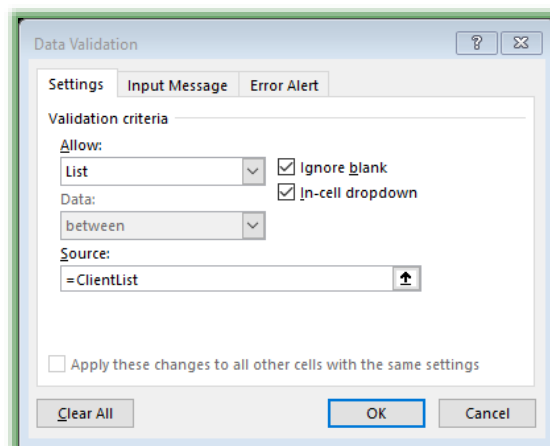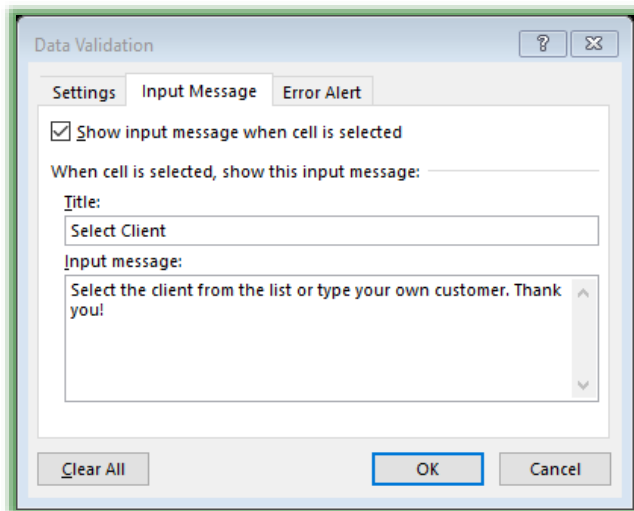
7. Next, click the Input Message tab and enter a title and the Input Message,
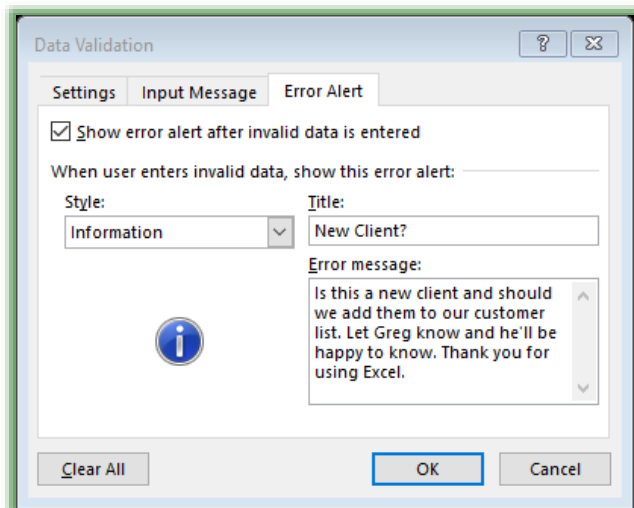
8. Finally, click the Error Alert tab, and use an information style alert and type the Error Alert information as you wish,

9. Click OK.

Time to try out our new rule.

1. In your worksheet, click an empty client cell and notice the drop-down box. Click the drop-down box to view the customer names.

2. Type your name,

3. An error message box activates,

4. Click OK. Excel allows your name in the cell.

♫ **Note: You can add, change, or delete items on your list by editing your Client List.** ♫

I want to add a new client, Geeks R Us, to my list AND hide my worksheet, here's how.

1. **Click in the Client List tab and right click on Georgy Porgy,**

2. **Click Insert from the shortcut menu,**

3. **The Insert screen appears as displayed at right, ensure Shift cells down is selected,**

4. **Excel inserts a blank cell for you— I want my list to remain alphabetical and remember to always add information within a range not at the beginning or at the end of your list,**

5. **Type Geeks R Us in cell A11 and press enter,**

6. **Right click on the Client List worksheet and from the shortcut menu click hide; Excel hides your Client List.**

7. **Back at your Jan tab, click the client list and notice that Geeks R Us displays in your list.**
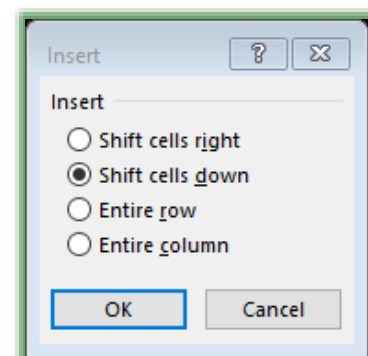
♫ *To add another client or edit your list you would unhide the worksheet using the worksheet shortcut menu and delete or insert cells as necessary for your list.* ♫
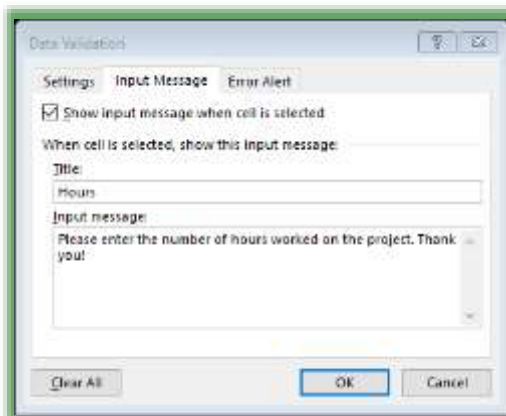
Our final validation rule is a range of numbers to ensure the accuracy of our input.

1. **In the Jan worksheet, select columns D through F,**
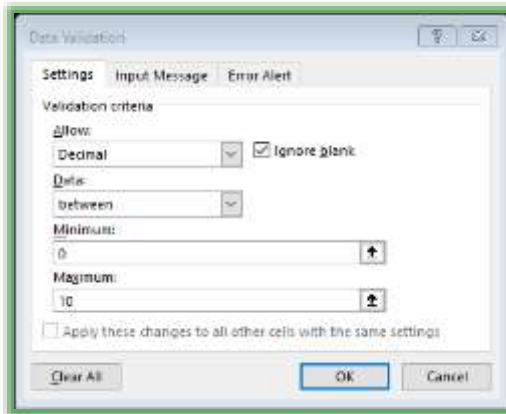
2. **On the Data tab, click Data Validation and from the menu click Data Validation and the Dialogue box opens,**

3. **In the Settings Tab choose Decimal in the Allow area,**

4. **Choose Between for the Data,**

5. **Provide 0 for minimum and 10 for maximum.**

6. **Next, click the Input Message tab and enter a Title and Input Message,**
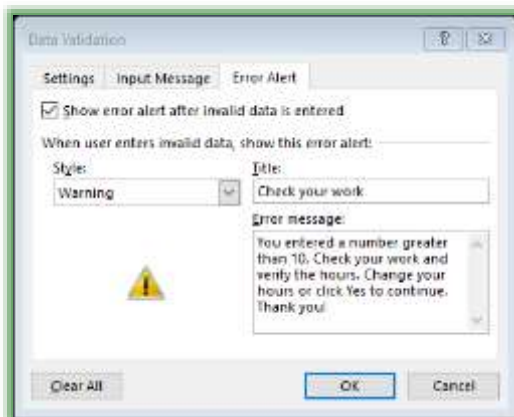
7. **Next, click the Error Alert tab,**

8. **Use a Warning Style,**

9. **Enter the Error Message and click OK.**

In your Jan worksheet, type 12 in a Word cell. Notice the Error Alert message, click Yes to accept the number

Data Validation is a great way to protect your data from incorrect entries or typographical mistakes. As you can see, data validation helps users on input and is not difficult to establish once you understand the process we have just accomplished. Next, we will use *Data Validation* for our function criteria. ***Congratulations! You and your data are valid.***

Macros
Macro Overview

Macros are programmed shortcuts. All of the *Command buttons* on *the Ribbon* are *macros*; the buttons represent pictures that execute code for *Excel* to accomplish. *Macros* save time and keystrokes by recording your keystrokes as you perform them. This is the basic *Macro*. Unless you want to become a *Visual Basic* programmer, this is how we use *Macros* to create time saving features and prevent repetitive steps and input. *Macros* are not bad and are very helpful; however, macro viruses that evil programmers and others code that can hide in files and applications create bad macro viruses. That is why we must create *Macro Enable workbooks* with a different extension of *.xlsm*.

You should write down your macro steps and review the process prior to recording a *macro*, especially a multiple step macro. Also, you may *delete* and *edit* (if you are comfortable with *Visual Basic) macros*. You can view all of your macros and delete or alter them by *Choosing Macros in the Developer tab*.. We will create three macros and assign them to buttons on our *Quick Access Toolbar* and run them through keyboard shortcuts, too.

Before we can create and work with macros you need to ensure that your Developer tab is active.

1. **Click the File tab and tlick the Excel Options button,**

2. **At the Customize Ribbon item, ensure the Developer tab item is checked,**

3. **Click OK, and the Developer Tab appears on your Ribbon.**
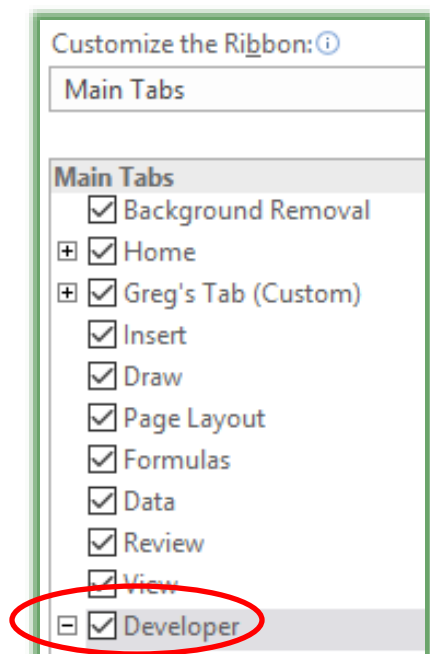
Here are the overall steps we will use to create a macro.

1. **On the Developer tab, click the Record Macro button,**

2. **The Record Macro dialogue box opens for you to name your macro, assign a shortcut key character, and to save in the workbook. You enter a description of your Macro here, too. Click OK.**

3. **Excel will begin recording EVERY keystroke, click, menu selection, and character typing you perform.**

4. **When finished, you stop the recording by clicking the Stop Recording button on your status bar or in your Developer Tab.**

5. **Next, try it out using the keyboard shortcut you entered.**
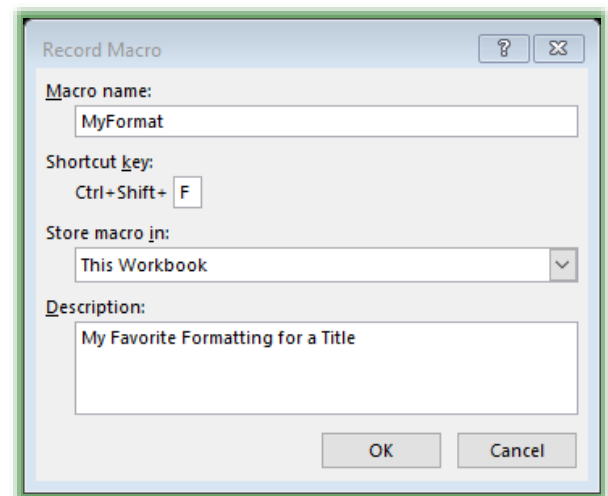
I use macros to automate spreadsheet printing, font styles, sorting/filtering data, and other events that require repeated keystrokes that I consistently perform.

First, we will create a simple macro that will type our name and company and provide the formatting we select. Macros record our clicks, typing, selections, etc. Macros do not record the time it takes, so be careful, slow, and sure.

☹ **Very Important Gotchas!**

1. **Undo does not work on macros. If you run a macro and don't like the results, OOPS! Undo won't undo.**

2. **If you use a keyboard shortcut for your macro, the macro overwrites existing shortcuts. For example, I used CTRL+S to run a sorting macro. Guess what that workbook never did again using CTRL+S? SAVE! The workbook sorted nicely with CTRL+S but did not save anymore.** ☹

Formatting Macro

Macros may require a lot of computing power. Depending upon your computer, the process may be slow or cause "freeze-ups", especially if you have several applications and files open and active.

I created a workbook, Macro.xlsm, for us to use. When you open this you may need to enable the macro content.

♫ *If you want the macro to always go to a specific cell for the entry, start your macro first and then click the cells where you want the items placed. This is what we will do. If you do not what the macro to begin at specific location, don't click a cell or column after the macros begins. Also, the Developer Tab offers you to use Relative Reference.* ♫

1. **Open the Macro.xlsm file, and click the Format Macro worksheet,**
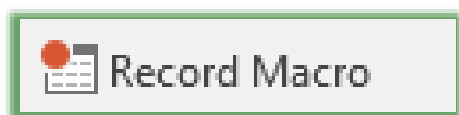
2. **On the Developer Tab, click the Record Macro Button,**
☹ **An Important Gotcha! Macro names cannot contain a space or special characters!** ☹

1. **Type *MyFormat* as the Macro name.**
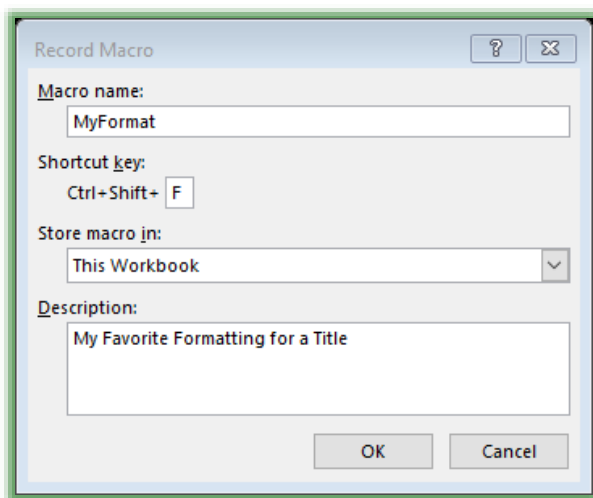
2. **In the Shortcut key section press Shift and the letter f. Excel keeps the CTRL key for you, only press Shift and the letter F. We need to be careful in assigning these shortcut keys because most of the Ctrl + a letter keys are assigned already. For example, *CTRL + n* activates a New Workbook and *CTRL + f* activates the Find Dialogue box. Macros will allow you to overwrite existing shortcut keys. I don't use this shortcut CTRL + SHIFT + F; I'm not sure what it does, if anything.**

3. **Save the macro to the Personal Macro Workbook using the drop-down arrow's pick list; you can reuse this macro in other workbooks**

and worksheets. You could save the macro only in this workbook or in new workbooks.

4. **Type in appropriate comments in the Description section, and click OK.**

5. **The macro is recording and may signify this on your status bar.**

When we are finished recording our macro, we will click Stop Recording on our Developer tab.

1. **Click cell E1, carefully type your name as you want it to appear, then type your company's name as you want it to appear and press enter.**

2. **Click and drag to select Cells C1 through J1 – we want to give ourselves plenty of space for formatting.**

3. **Click the Merge and Center button,**

4. **On the formatting toolbar change your font,**

5. **Change your font size,**

6. **Click the Bold and Italic buttons, if like,**

7. **Change the Font color and the Fill color,**

8. **Make other formatting changes as you like.**

☹ An Important Gotcha! Even if a tab or item is selected, you must reselect it so the macro records your item. For example, if Times New Roman is your default and you want Times New Roman font in your macro, you must select it or click it again; otherwise, whatever default font is present when you run the macro will appear. ☹

9. **Click cell A4 – this is where your cursor is after the macro runs,**
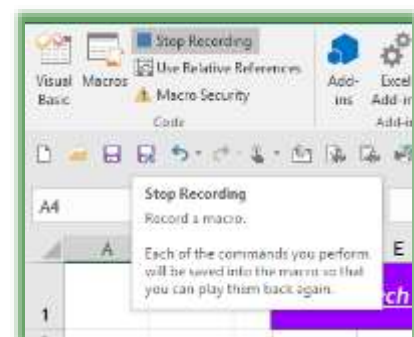
10. **Click the Stop Recording button on your Developer Tab.**

11. **Go to another worksheet,**

12. **Click a cell,**

13. **Press the CTRL key and the Shift key and the letter "*f*" key all at the same time.**

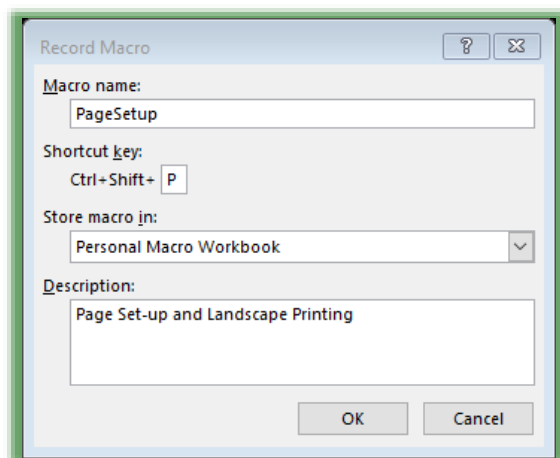14. **Your macro executes for you. Notice your most valuable Undo button – grayed out ☹.**

Wow! A time saver for you.

☺*Note if you accomplished this correctly the first time you are a genius and Excel expert. I create all kinds for formatting macros to type information in certain fonts, shading, borders, and so on. ☺*

A Page Set-up Macro

Let's create a page set-up macro that will print our worksheet in landscape and format columns as numbers, dates, and text.. You can start and stop your macros using the Status bar or the Developer tab command buttons.

1. **Open the Macro.xlsm workbook, and click the Page Set-up sheet. We will record a printing and page set-up macro for this workbook.**

2. **On your Developer tab, click the Record Macro button,**

3. **Name the Macro – PageSetup (Remember no spaces),**

4. **Assign the Shift +P key to the Shortcut key so our macro will be run with CTRL+SHIFT+P (The CTRL+SHIFT+P shortcut opens the Format Cells at the Font tab; I never use that shortcut, so the macro can overwrite it),**

5. **Ensure that we will store this macro in the Personal Macro Workbook, so we may use this macro in all Excel files.**

6. **Type in a description,**

7. **Click OK and the Macro begins recording.**

This is a popular type of macro, because after downloading information into Excel you will probably need to do much formatting for the type of values in the columns and then set your worksheet for printing.

1. **Format Column A (Order) as a Number with no decimal places,**

2. **Format Column B (Date) as a Date,**

3. **Format Column C (Customer) as Text,**

4. **Format Columns D-H as Numbers,**

5. **Format Column I as Currency with no decimal places,**

6. **Format Column J as Text,**

7. **Format Column K as a Percentage,**

8. **Click the Page Layout tab,**

9. **Click the Orientation button and click Landscape,**

10. **Change your margins,**

11. **Perform other page set-up items.**

12. **Click Stop Recording on your Developer tab.**

13. **Click the Page Set-up Practice Macro worksheet,**

14. **Press your shortcut keys CTRL+SHIFT+P and the columns format for you and prints in landscape.**

A Sorting Macro

We will use a macro for a specific workbook to perform sorting for us and our worksheets.

1. **Open the Macro.xlsm workbook,**

2. **Click the Sort Macro worksheet,**

3. **Click the Record Macro button on your Developer Tab,**

4. **At the Record Macro Dialogue box name your macro MultiSort.**

5. **Give a keyboard shortcut of Ctrl+Shift+S by pressing the Shift + S key in the Shortcut key box.**

6. **Store the macro in This Workbook.**

7. **Give a description of your macros,**

8. **Click OK and your macro begins recording.**

9. **Click in the data table and then click the Custom Sort button on the Data Tab,**
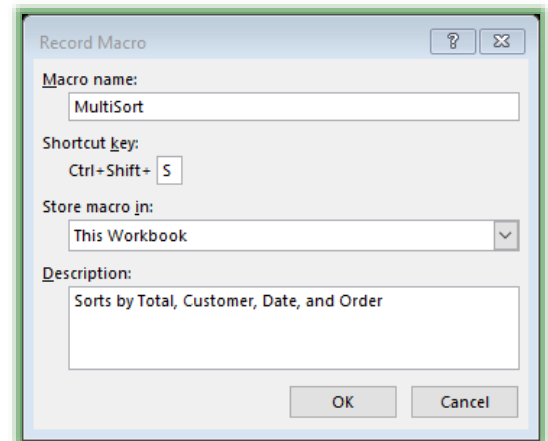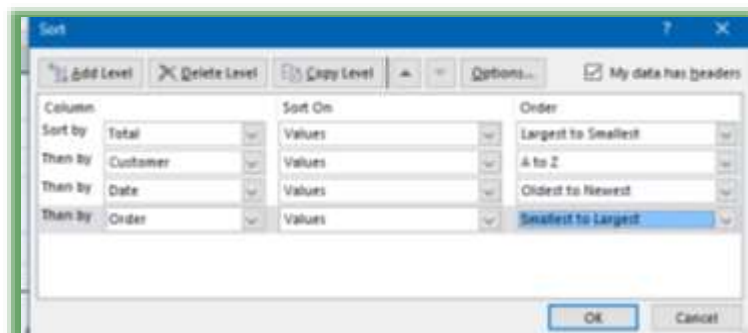
10. **Add levels and change your sorts as displayed here,**

11. **Click OK, and Excel sorts your worksheet,**

12. **Stop your recording by pressing the Stop Recording button your Developer Tab.**

13. **Sort your worksheet by Order number.**

14. **Press your Ctrl + Shift + S keys and watch as Excel magically sorts your worksheet.**

15. **Sort by customer and then run your macro again.**

Macro Security

As I wrote at the introduction of macros, macros pose a security risk with malicious code that someone may have put in your Excel file. Therefore, Microsoft Office offers security measures for you in the *Developer tab* and the *Macro Security button*. The *Macro Security button* opens your *Trust Center* for how you want to handle macros. If you have an IT department, they may have stronger protection that won't allow workbooks with macros on your computer.
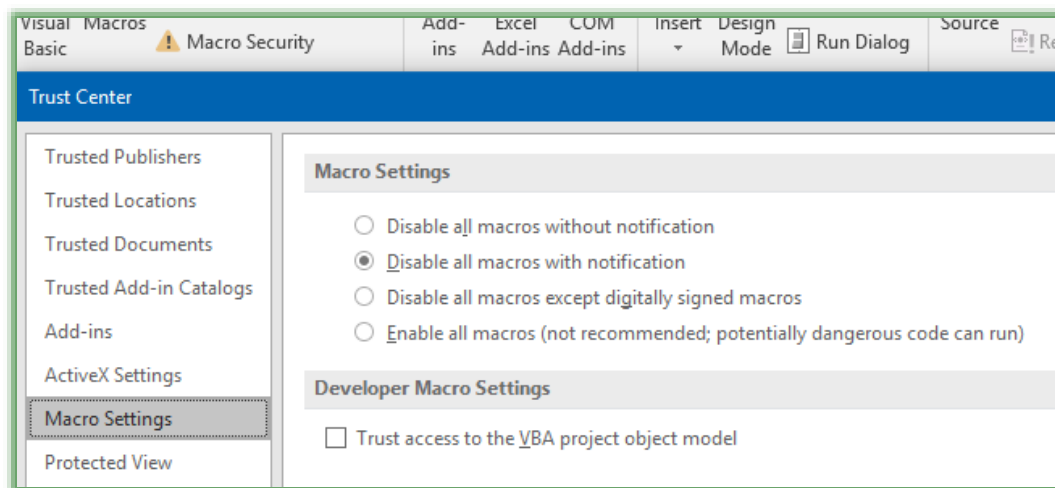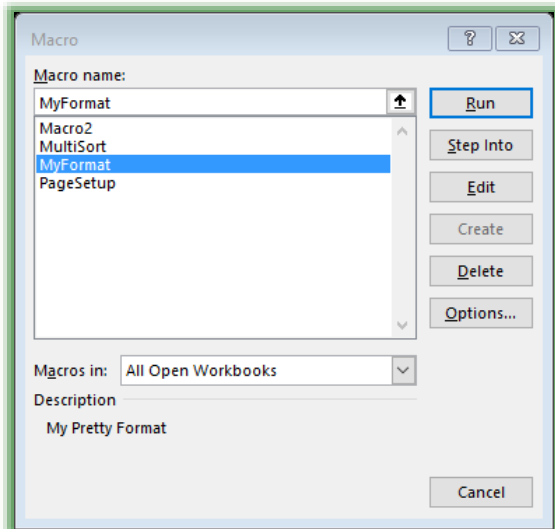

☛ **Hot Tip! Pay attention to the enable content button when you receive an Excel file with a macro, if you don't know or trust the person, don't open the workbook or enable the macro content.** ☛

Editing a Macro

You may want to edit or delete your macros.

1. **First, be in the workbook that contains your macro to edit or delete your macro.**

2. **Click the Developer tab and click the Macros button, the Macro dialogue box appears.**

3. **I am in the Macro.xlsm workbook. Select the Macro you wish to run, edit or delete and click the appropriate button for editing, running, or deleting.**

Note that the PERSONAL.XLSB macros are stored in the Personal Macro Workbook and can only be deleted or edited if you unhide the

PERSONAL.XLSB workbook. A Message box appears when you try to delete or edit a macro in the PERSONAL.XLSB file.
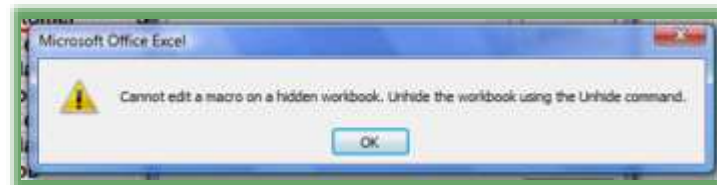
If you are ready for VBA programming then you may edit your macros, as displayed here. This is the scary place for me, so I quickly exit.

Let's Unhide the PERSONAL.XLSB file and look at the macros.

1. **In your Macro.xlsm file, click the View Tab and click the Unhide button.**

2. **We have used the Hide and Unhide features for columns and worksheets, but not workbooks. If we have nothing selected, Excel will assume we want to hide the entire workbook.**
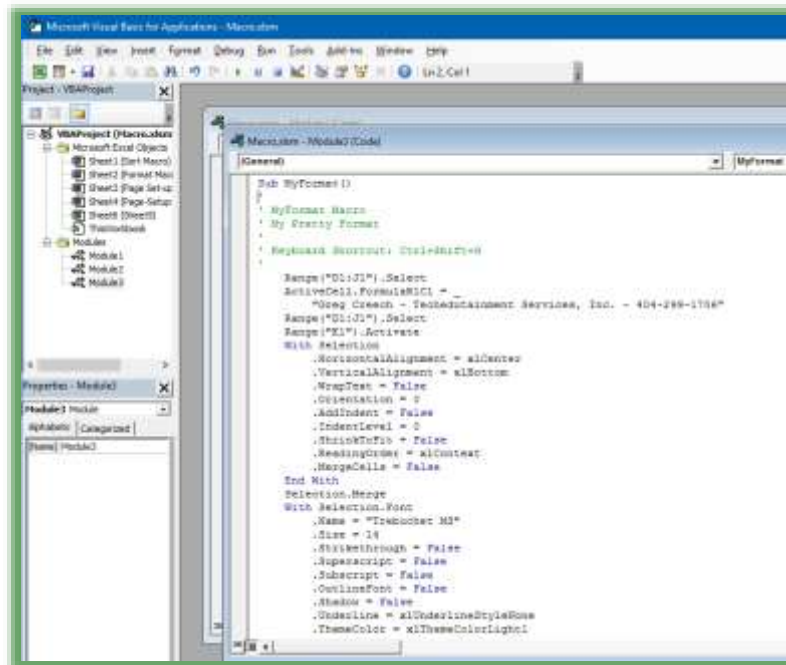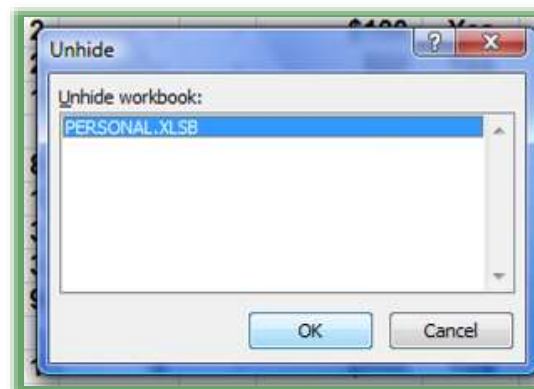
3. **After clicking the Unhide button, the Unhide pane appears for you to select, if it isn't already, the PERSONAL.XLSB file and click OK.**

4. **The PERSONAL.XLSB file opens for you.**

5. **Click the Developer tab and click the Macros button.**

6. **Now, you can edit and delete these macros.**

7. **After viewing your macros, click OK.**

8. **On the View Tab, click the Hide button to hide your PERSONAL.XLSB file.**

If you were to edit a macro, Excel takes you to Visual Basic as displayed at right. Now you are ready to be a programmer!
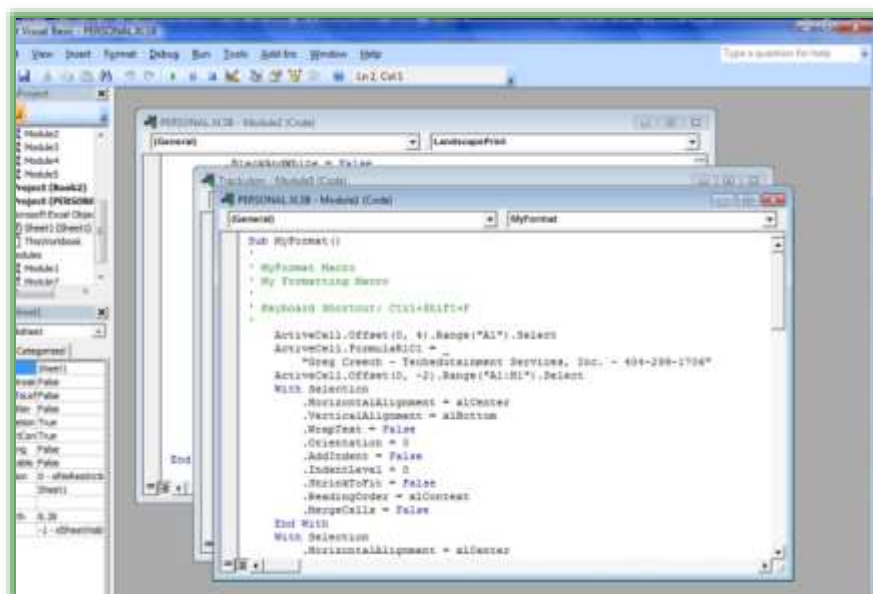
I use macros for all sort of printing items, too. You can select multiple worksheets to print and assign headers and footers to grouped sheets. There are many, many uses for macros and hopefully you'll find this section helpful as you build your own shortcuts using macros.

While this is nice, I'll never remember these shortcut keys. Let's go add command buttons to our *Quick Access Toolbar* that will run our macros when clicked.

Macros Assignment

We have keyboard shortcuts for our *Macros*; however, we also want a button to press to run the macro. For a refresher on *the Quick Access Toolbar* and *command buttons* please refer to the earlier section of this book or my *Excelling @ Excel: The FUNdamentals* book for how to change and add commands to our *Quick Access Toolbar*.

1. **Right click on a command button on the Ribbon,**

2. **From the shortcut menu, click Customize Quick Access Toolbar, and the Customize pane opens,**

3. **In the Choose command from section, scroll down and locate Macros.**

4. **Select each macro and click the Add button to add the macro to your Quick Access Toolbar. I'm adding my MultiSort, MyFormat, and PageSetup at the end of my Quick Access Toolbar.**
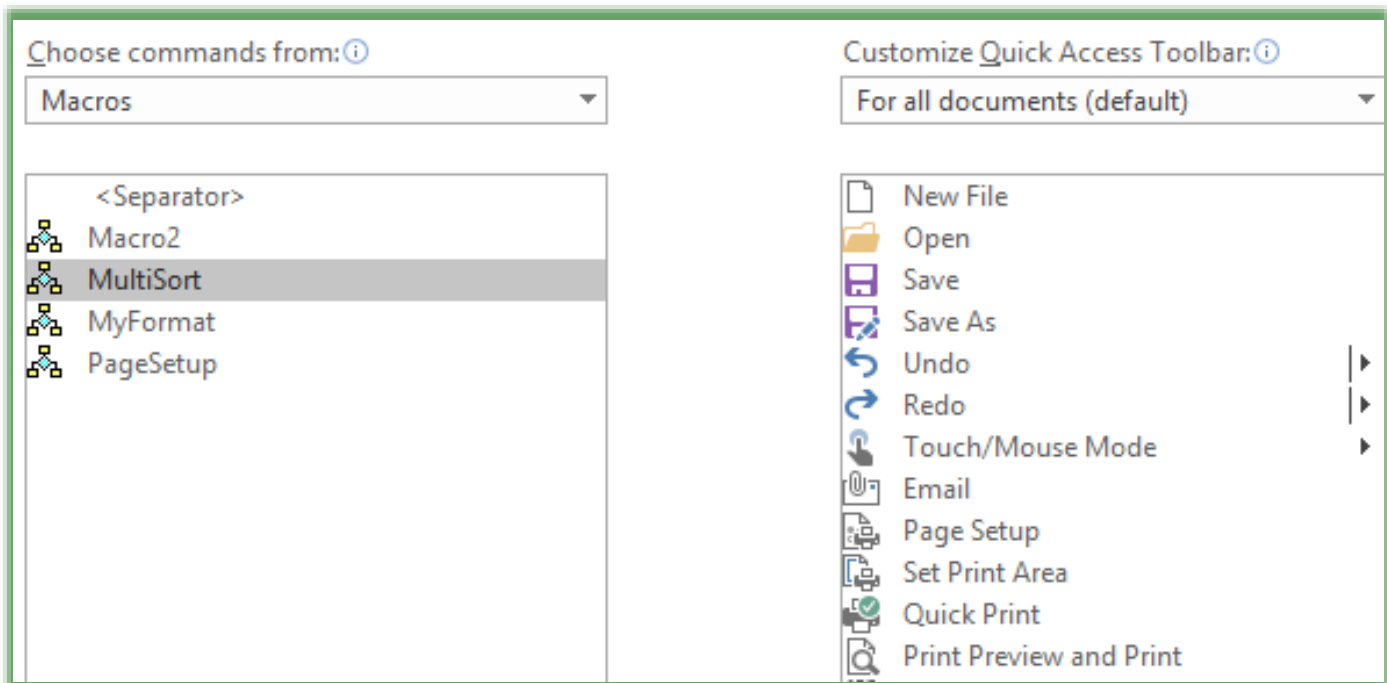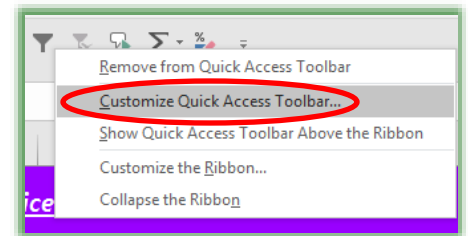
5. Next, change your button symbol or image by selecting the Macro and clicking the Modify button at the bottom of your customize box.

6. The Modify Button pane appears for you to choose your button and rename your button. I have chosen a button and named the macro's button *Sorts by Total, Customer, Date, and Order*.

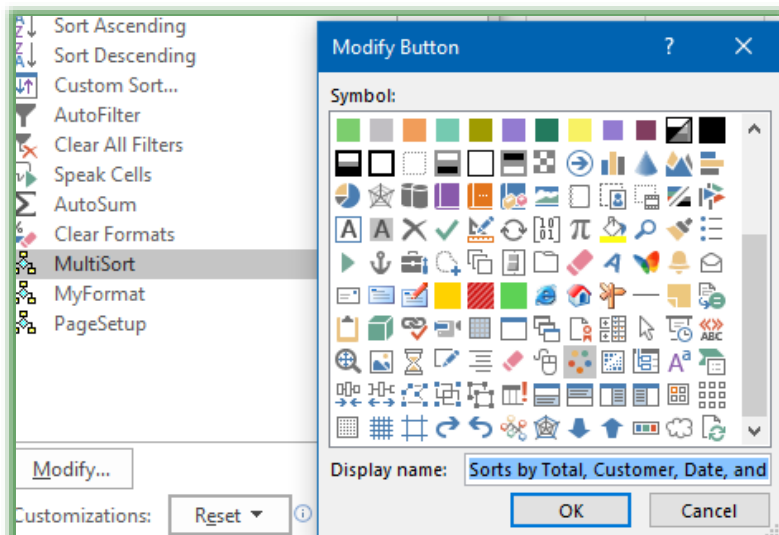7. Change the button and the button's name for your other macros by selecting the macro in your button pane and clicking the Modify button. Next, choose your new image and change your Display name box.
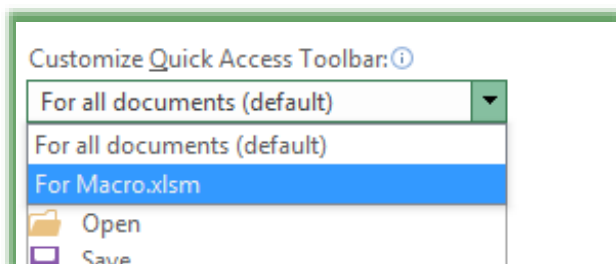
☛ **Hot Tip! Excel allows you to customize the Quick Access Toolbar for all files or for a specific Excel files. If you have a macro designed for only one workbook, then you may add that button to the file that the macro applies. You must have the workbook open with the macro to add it to your toolbar.** ☛
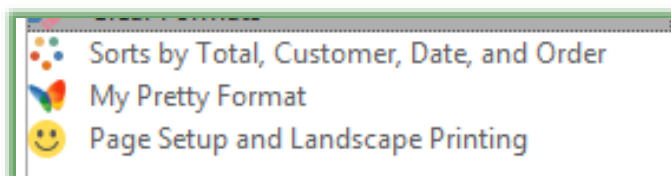
My images and names appear here.

Click OK. Open a new workbook and try out your format button.

Congratulations on creating your own macros and buttons. Now that wasn't SOOOOOOO bad.

More Functionality with Functions
Text Functions

Text functions are easy and powerful. We'll bring columns together using *Concat* and learn how to change case in Excel, and other ways of working with and displaying text data.

Hey Mate! Let's CONCATENATE!

Excel 2013/2016 – Function name change Concatenate to Concat.

In 2013/2016 Excel the function is Concat; in previous versions the function was Concatenate. This great and easy function still brings separate columns together to act as one.

Concatenate is a fancy word for bring together or consolidate. The *Concat* function in Excel consolidates two or more columns into one column. For example, you may want your First Name and Last Name columns   in one column entitled Name or maybe you want your City, State, and Zip Code columns as one.

> ☛**Hot Tip! Concatenating columns makes mail merge from Word easier and less cumbersome with working with one column rather than 2 or 3. Concat aids in sorting and in PivotTables.** ☛

We'll use the *concat* function on our *Database Functionality* file and *Concat* worksheet to consolidate the Last Name and First Name Columns.

1. **Open the Excel Workbook entitled Database Functionality and select the Concat worksheet/tab,**

2. **We'll insert two columns for our concatenated columns. One Column for Name and one column for City, State, and Zip.**

3. **Right click the column E Header or the Home Street Line 1 column and from the shortcut list, click Insert. A new, blank column inserts for you.**

4. **Right click the column header J and from the shortcut menu, choose Insert. A new, blank column inserts for you.**
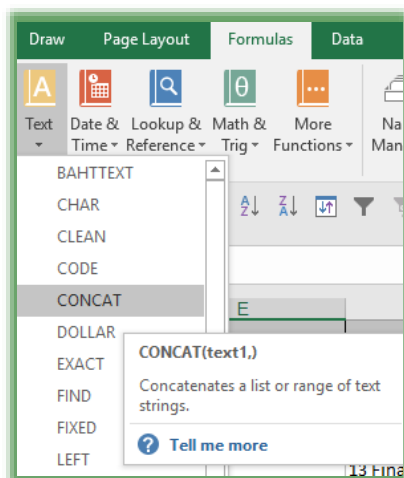
5. **Click cell E1 and type Name. You will want to widen your column for the names to fit.**

6. **Click in cell J1 and type – City, ST, ZIP. You will want to widen your column for City, ST, and ZIP to fit.**

7. **Click the Formulas Tab and the Text Command button and choose Concat from the list.**

8. **In the Function Arguments Dialogue box for Concat enter C2 (by typing the cell reference C2 or clicking the cell C2) in the Text 1 box,**

9. **In the Text2 box enter D2 (by clicking the cell D2 or typing D2),**

10. **Excel displays that the function is working for you.**

11. **Click OK.**

This is fine, except we want a space between the First Name and the Last Name, so we will need to edit the function.

1. **Click in your formula bar (or use the Function Arguments box displayed here) and edit the formula. We accomplish this by typing a quotation mark, pressing our spacebar, typing another quotation mark, and typing a comma.**

2. **The function now reads =CONCAT(C2," ",D2) and the name has a space in it.**
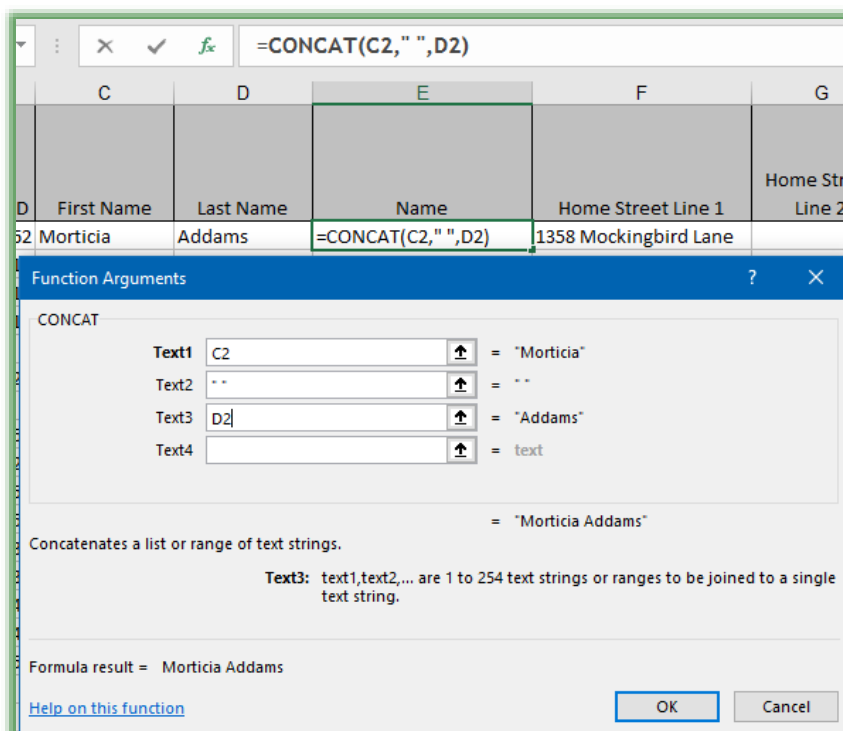
3. **Finally, double click your fill handle in cell E2 to copy this function through your list.**

Now, let's edit the function so our names will be by Last Name and then First Name with a comma separating them.

1. **Click in cell E2 and in the formula bar edit the function as follows:**

2. **Change C to D in the first cell reference (so cell D2 is the first cell reference),**

3. **Type a comma after the quotation mark and before the space,**

   f_x **=CONCAT(D2,", ",C2)**
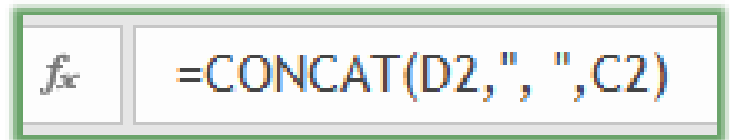
4. **Change D to C in the second cell reference (so cell C2 is the second cell reference),**

5. **Press enter and double click your fill handle in cell E2 to copy this function through your list.**

6. **Finally, click the Sort Ascending button to automatically sort your list by Last Name and then by First Name. Using Concat with these columns allows me to sort by Last Name and First Name without using the Custom Sort box.**

   So, our Concat function aids in formatting, functionality, and in sorting.

Now, let's practice concatenation with our City, State, and ZIP code columns in the inserted K2 cell.

1. **Click in cell J2,**

2. **Activate your Insert Function Dialogue box and from the Categories insure Text appears and select the Concat Function from your list.**

Function Arguments

CONCAT

Text1	G2	↑	=	"Decatur"
Text2	", "	↑	=	", "
Text3	H2	↑	=	"GA"
Text4	" "	↑	=	" "
Text5	I2	↑	=	"30123- "

= "Decatur, GA 30123-   "

Concatenates a list or range of text strings.

Text5: text1,text2,... are 1 to 254 text strings or ranges to be joined to a single text string.

Formula result = Decatur, GA 30123-

3. **The Function Arguments dialogues box appears and in the Text1 box type or click cell G2,**

4. **In the Text2 box type ", " (quotation mark, comma, space, quotation mark),**

5. **In Text3 box type or click cell H2,**

6. **In Text4 box type " ", (quotation mark, space, quotation mark),**

7. **And finally, in the Text5 box type or click cell I2, as pictured above for you. The function should read: =CONCAT(G2,", ",H2," ",I2),**

8. **Click OK.**

9. **Finally, double click your fill handle in cell K2 to fill this down through your list. You may need to widen your columns to see your concatenated information.**

Your city, state, and ZIP Code have appropriate spacing now for a mail merge or other use.
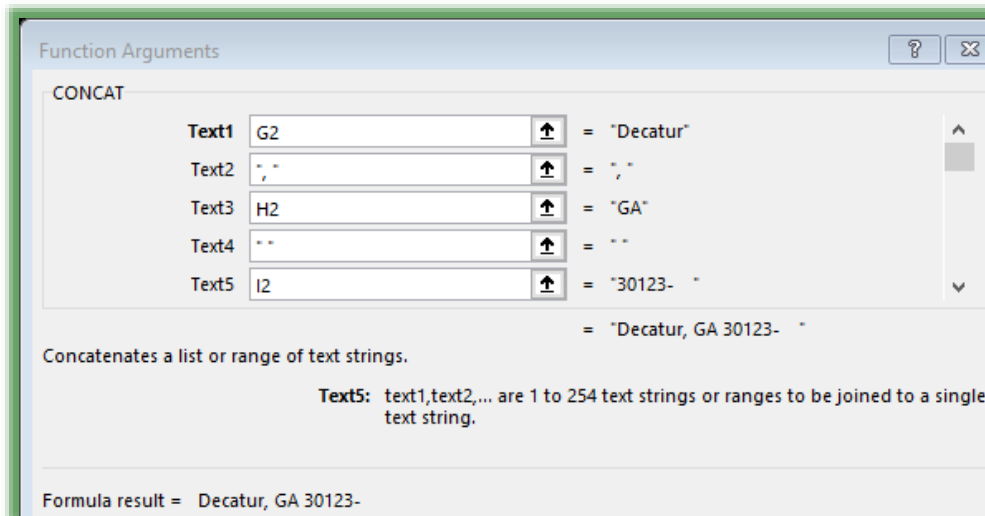
There is another function similar to Concat that includes a delimiter for you. Here's a screenshot of the JOINTEXT function for Last Name and First Name separated by a comma and a space.

The difference between CONCAT and TEXTJOIN is I enter the delimiter of a comma and space in the Delimiter box using the TEXTJOIN function instead of using a Text box for my delimiter. The City, State, and ZIP

concatenated column wouldn't work with TEXTJOIN, since I used different delimiters.
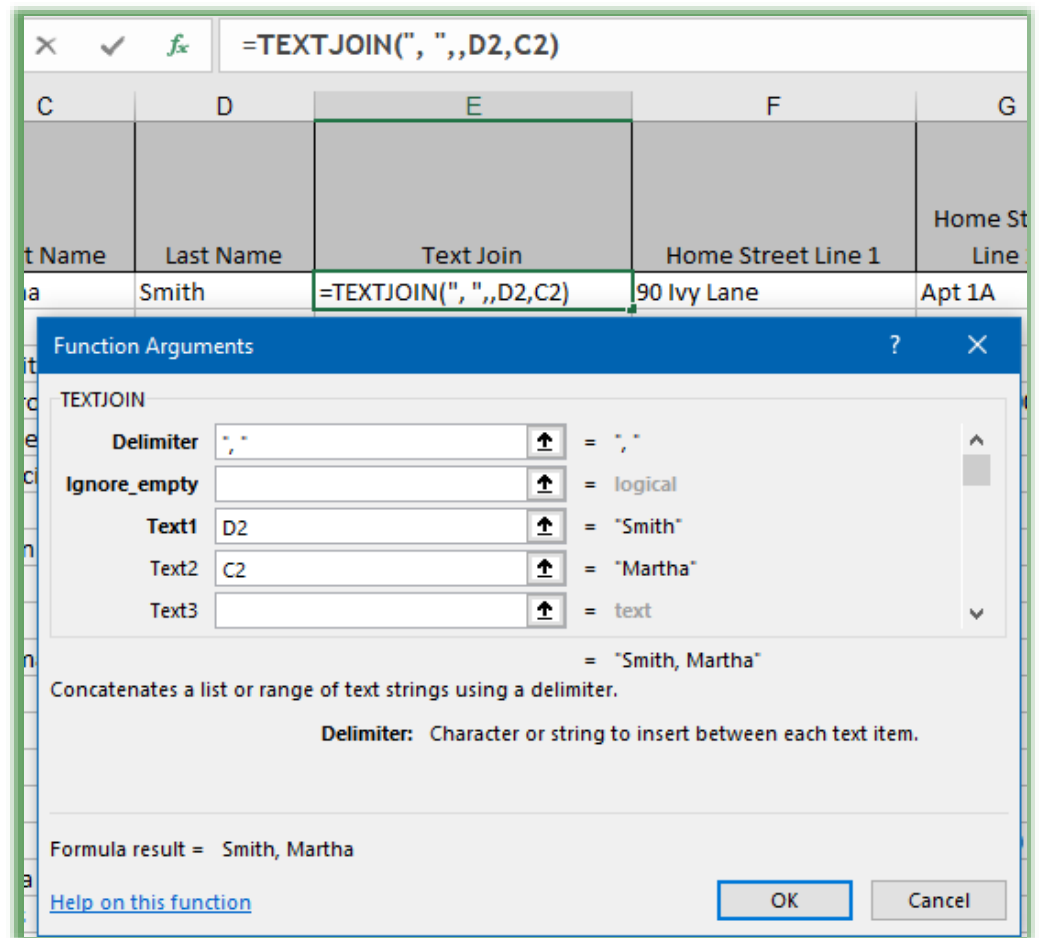
Upper, Lower, and Proper

Clients have asked where are the case buttons for text (uppercase, lowercase, and proper), and this being Excel, I reply these are functions in Excel. These functions are easy because you simply use the function and reference the cell you wish the change the case. So, here is the syntax for these functions:

Lowercase: =LOWER(B2)
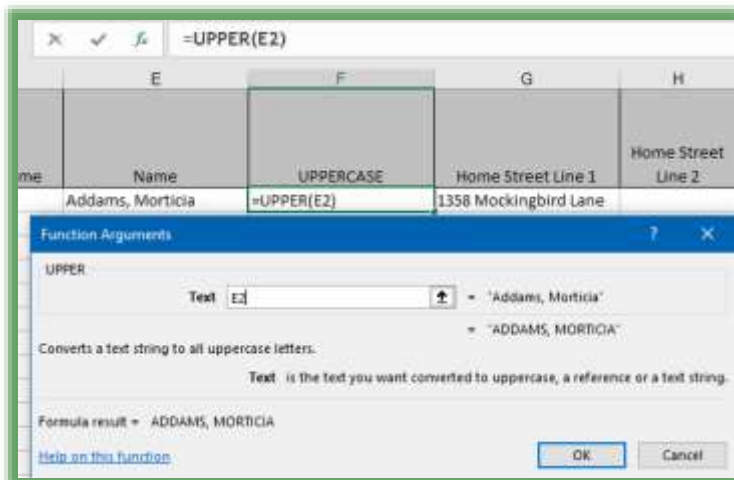
Uppercase: =UPPER(C2)

Proper: =PROPER(V2)

☹ **Important Gotcha! Be careful with proper, it capitalizes the first characters, so names like LaTonya and McCants won't have subsequent characters with the capitals.** ☹

Practice inserting columns in the Concat worksheet and using these case functions.

Left, Right, and Mid

Often, we want to use only certain characters of a text string, for example the last four digits of an account number or Social Security Number. The *LEFT, RIGHT, and MID* functions accomplish this for you.

1. **Using the Concat worksheet insert a column at column H. We want the last four digits of the SSN and the columns do not have to be adjacent.**

2. **In cell H1 type 4 Digits,**

3. **In cell H2, using your Text function list choose RIGHT, which displays the number of characters from the end of a text string,**

4. **The Text is cell A2 that has our SSN,**

5. **The Number of characters is 4,**

6. **Click OK and the last four digist of the SSN displays.**
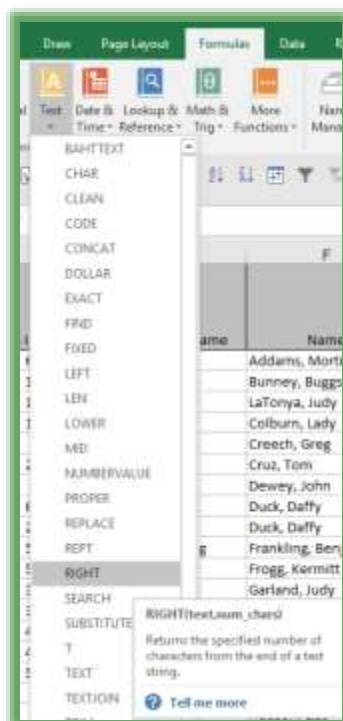
☹ **Important Gotcha! You may need to format your column as text to see the leading zeros.** ☹

The Left function measures from the beginning of a text string and the Mid function measures from the middle of your text.
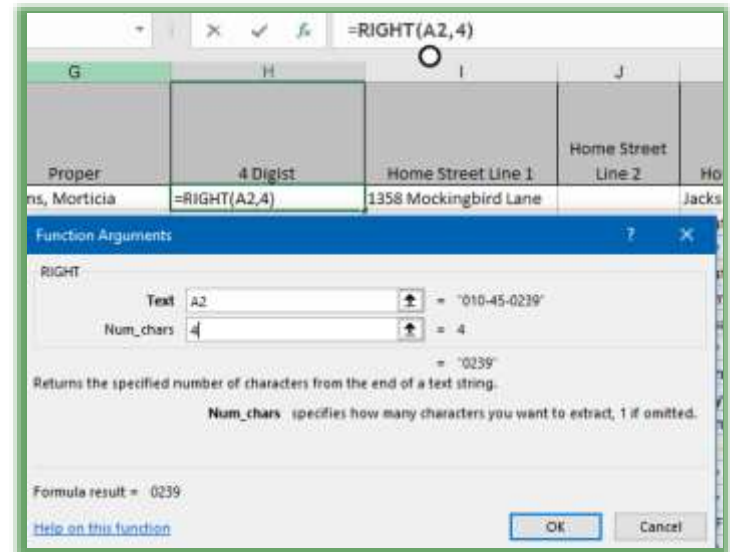
Value, NumberValue and DateValue

When you download data from a database or website, Excel may not provide the correct value, since it uses the *General* formatting. Even when you turn a column into an Excel format like *Date*, the data will not work as a number or date only text, so sorting won't work. Similar to the *UPPER* and *LOWER* functions, you reference a cell to change the value. This is the case for the Database Functionality workbook and worksheets; I downloaded this from an Access database and the dates did not convert well.

1. **In your Database Functionality file and in the Personnel worksheet, click in the Birth Date column and sort it. OOPS! The Birth Date column sorts as Text not a Date. The column is formatted as a Date and still won't work.**

2. **Insert a column after your Birth Date column,**

3. **Type a title for your column, such as New Birth Date,**

4. **In the cell beneath, insert the DATEVALUE function. You only need to reference**
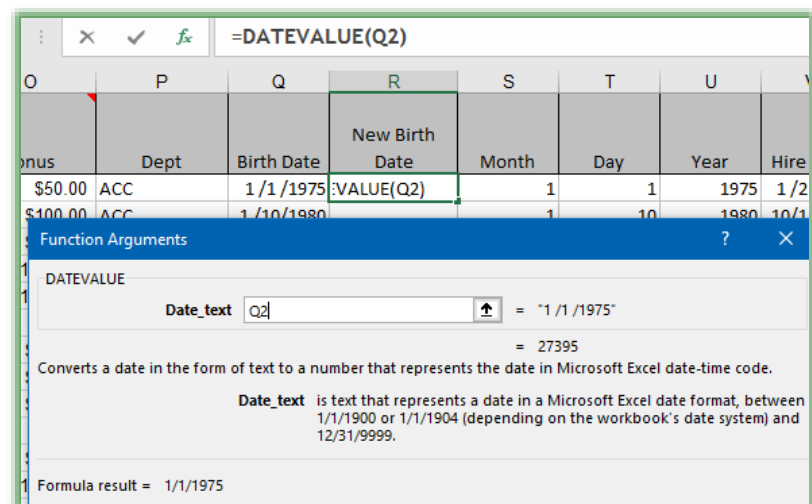
the cell you want to change the value: **=DATEVALUE(Q2). Press enter or click OK.**

5. **Fill your DateValue formula down the column and then sort your data that works great now and sorts chronologically.**

The Value and NumberValue functions work the same way and takes text and converts it to a number. There are plenty of other text functions to help including REPLACE, SUBSTITUE, and REPT.

♫ *Write your notes here:* _____

_____

Date Calculations

Since Excel is so great with formulas and functions using cell referencing and numbers, it is terrific at *Date Calculations,* too, such as age and service anniversaries calculations. You do not want to manually enter an age, unless you want to constantly update your worksheet with the correct age and we grow older by the day. We will look at several different age calculations. Let's first examine how you can calculate age and service anniversaries that are based on a Date of Birth and Hire Date and using the *TODAY()* function.

♫ *Please ensure that you format your dates as date, such as Short date, using your format cells dialogue box. Also, Excel stores your dates as numbers. Every day since 01/01/1900 is a serial number, for example 01/01/1900 is stored as 1 and 01/01/2008 is 39448. That's how Excel can compute time intervals.* ♫

1. **Open a new blank workbook and in cell A1 enter your date of birth. (You don't have to use the correct year, if you don't want to; I have no shame so I am entering my actual birthdate of 04/02/1958. Yes, Excel can count that high!)**

2. **Enter this Formula in cell B1: =Today()-A1. Press enter.**

OOPS! You may need to format column B as a number if you have date format in cell B1. I changed my B1 cell from a Date to a Number format with no decimal places.

3. **Wow, this measures our age in days. The TODAY() function is the current date on your computer and measures your dates in days. I am typing this on 07/12/2017, so 21651 is the number of days I have lived as of 07/12/2017.**

4. **Fill this formula down a few cells, and in cell A2 type a more current date. This is popular to know for time intervals for shipping, ordering, billing, and other important business information dates. I used this for knowing when an account's Account Receivables went above 30, 60, or 90 days.**

Now, let's change our age to years.

....

1. **Now, let's use years – change your formula to read:
   =(TODAY()-A1)/365.25. Your information is expressed in years, but Excel rounds, because I formatted as a number with no decimals!**

   ♩ **Notes on the Formula: If you do not put in the 365.25 division, this will calculate the number of days. The .25 in the 365.25 figure is for leap years. Excel started tracking days on 01/01/1900. Also, notice I had to put in my parentheses before TODAY and after A1; otherwise, Excel would do my division first and then my subtraction following our order of operations. I would really not like that number!** ♪

B1	▼ :	✕ ✓ fx	=(TODAY()-A1)/365.25

	A	B	C	D	E	F
1	4/2/1958	59				

2. **Here's how to use the ROUNDDOWN function to prevent rounding our age up. I changed my birth month, so Excel rounded my age to 60!**

B1	▼ :	✕ ✓ fx	=ROUNDDOWN(((TODAY()-A1)/365.25),0)

	A	B	C	D	E	F	G	H
1	1/1/1958	59						

3. **Click in Cell B1 and edit the formula to read:
   =ROUNDDOWN(((TODAY()-A1)/365.25),0)**

4. **This will accomplish exactly what you want. The number of parentheses can be tricky and the 0 is the number of decimal places that you want.**

5. *Save your workbook as Date Calculations.*

   ♩ *Write your notes here:* _____

   _____

Now, let's calculate the Age at which the associate was hired. With this formula we won't use the TODAY() function but we will compare two dates and use the YEAR Function. For us the dates will be the Birth Date and the Hire date.

1. **Open the Database Functionality file,**

2. **With your Personnel File Workbook open, click in cell W2,**

3. **Notice the formula =YEAR(U2)-YEAR(Q2). This provides how old these people were when we hired them and the time interval in years.**

   `=YEAR(U2)-YEAR(Q2)`

4. **You may delete the contents of these cells and recreate the formula.**

Next, with Length of Service, let's have the ability to show partial years. As a Human Resources Manager, I needed to know parts of years rather than whole years.

`=(TODAY()-U2)/365.25`

W	X	Y
Hire Age	Service	Produ
50	17.49	Widget

1. **In Cell X2, notice the Formula =(TODAY()-U2)/365.25**

2. **You may need to decrease or increase your decimal places as you like.**

3. **This is similar to our age calculation, but using our hire date.**

♫ *As related previously, if you want to compare an Order date verses a Ship Date or Purchase date verses an Warranty Expiration date you may want to use days or months.* ♫

If you like, you may use the ROUNDDOWN function has described above. Also, when you change a Birth Date or Hire Date your calculations change too.

There are other functions to check out, too. You may use the *NETWORKDAYS* **to measure Workdays rather than including Weekends. You may want to use the** *MONTH* **function to calculate based on months. Check this out on Excel's help with functions.**

Lookout for LookUps

Using Excel as a List or Database tracking system allows the program to populate information from another area of a worksheet or from an entirely different worksheet. This can eliminate

duplicate input and can quickly locate specific information for you based upon criteria. While there is a Lookup function that will lookup one row or one column of data the ***VLOOKUP*** and ***HLOOKUP*** functions are more powerful and popular because they can use multiple columns and rows.

If your worksheet is a vertical type of worksheet, that is where the data is in columns use the ***VLOOKUP (Vertical Lookup)*** Function. If your worksheet is a horizontal type of worksheet, that is where the data is in rows use the ***HLOOKUP (Horizontal Lookup)*** function. The Vertical Lookup function will lookup information in columns; the Horizontal Lookup function will lookup information in rows. We will use the Vertical Lookup ***(VLOOKUP Function).***

The ***ExcelVLlookup*** workbook contains a vertical lookup for us to examine.

1. **Open the ExcelVlookup file. Click on the Product Sales sheet, notice the figures in the Date column – these numbers are retrieved from the individual sheets. Navigate to the August 1 tab and change a number for a Product – click back on the Product Sales sheet and notice the number updates automatically. VLookup automatically updates a cell from another worksheet.**

2. **Where you see a blank or #N/A the product code doesn't exist on the other worksheets. Great for comparing worksheets and the missing data – this is popular for audits and reconciliation activities and a host of other needs when comparing the differences between worksheets or to populate and update a worksheet based on another worksheet.**

The ***Product Sales worksheet*** retrieves its information from the other worksheets. Each day a worksheet downloads from a server illustrating the Product Code sales for each day. As a day is added as a worksheet, the Product Sales worksheet needs to have a column added and the vertical lookup function modified to reflect the additional daily sales. Of course, in the "real world" you would copy the VLOOKUP function and edit it; however, for our exercise we will develop a new Vertical Lookup function. The Product Sales worksheet "looks" at the other

worksheets and compares the Product Code and based upon the Product Code the value in Column B is returned.

> ☛ **Hot Tip! This is another area in which using a Named data range is very helpful; otherwise, you may need to use Absolute Reference using the $ signs. I encourage you to name your area to reduce frustration and mistakes. I will use the name Aug2Sales for our exercises here.** ☛

Here are the steps and our exercise for using Vertical Lookup to retrieve information based upon Product Code from another worksheet (August 2).

1. **Open the ExcelVloopup workbook and Click the August 2 tab and select Columns A & B (this is the area from which we retrieve the data). In the Name box type Aug2Sales and press enter to name this area.**

2. **Click back in the Product Sales worksheet and click in Cell E3 – this is where we will construct our VLOOKUP function.**

3. **Click the Formulas Tab and in the Function Library Group click the Lookup & Reference item and from the menu select VLOOKUP. The VLOOKUP function dialogue box activates.**
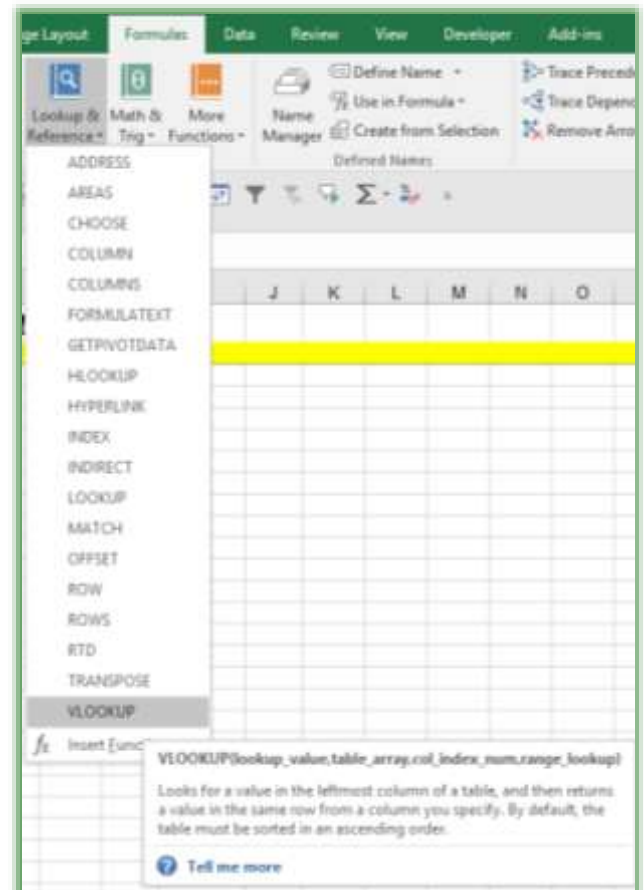
4. **If your Function Arguments box covers your data, click at the top of the dialogue box and move it.**

5. **Lookup_value is the column or cell(s) that contain the item you wish to have Excel to compare in order to find the data for that item. In our case, the Product Code information is retrieved and this information is in Column A.**

6. **Click the Column A column header in the Product Sales worksheet,**

7. **The Dialogue box displays A:A,**

8. **Next, Excel needs the area containing the data. This is signified by the Table_array box. The Table_array can be a range of cells, columns, rows, etc. We named our area Aug2Sales.**

9. **Click and drag Column A and B in the August 2 worksheet or type Aug2Sales – Excel places this name in the Table_array box for you.**

10. **Excel needs the column number from our table array or data area. We will use Column B from our area and Column B happens to be the second column in our array. Type 2 for the Col_index_num. Press Tab.**

11. In our worksheet we need an EXACT or precise match for the data since we have specific product codes; therefore, type FALSE in our last row.

12. Click OK.

13. Finally, using the ever popular Fill Handle, click the in cell E3 and double click the AutoFill Handle to fill the remaining cells.

14. Click on the August 2 tab and at the bottom of the product list add 10102 and in the second column type a number. Click back on your Product Sales worksheet - your information automatically populates.

🎵 *Note: If Excel does not find a match it populates the worksheet with N/A.*

Let's practice another Vertical Lookup. This time we will enter a product code in one cell and the sales for that product code will display in another cell.

1. Click the August 1 worksheet.

2. Notice cells D1 through E2,

3. In cell E1 type 10400,

4. Cell E2 displays 12,

5. Scroll down your worksheet to the Product code of 10400 and notice that Excel is displaying the correct number. Change the cell from 12 to 15.

6. Scroll back to the top of your worksheet, notice E2 displays 15.

Let's add this "function"ality to our August 2 worksheet.

1. Click the August 2 worksheet,

2. Click cell E1 and enter 10101,

3. Click cell E2,

4. Click Formulas Tab and click the Recently Used button and from the menu choose VLOOKUP.

5. The lookup value is cell E1 – either type E1 or using the collapse icon, click cell E1.

6. In the Table_array box type Aug2Sales or click and drag Columns A and B (The name of our range of cells containing our lookup data),
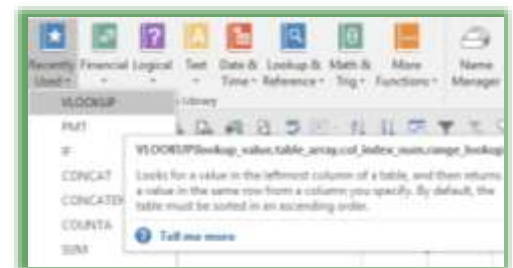
7. **The Col_index_num is 2,**

8. **The Range_lookup is False,**

9. **Click OK,**

10. **In cell E1 enter another Product Code and notice the changes in Cell E2.**
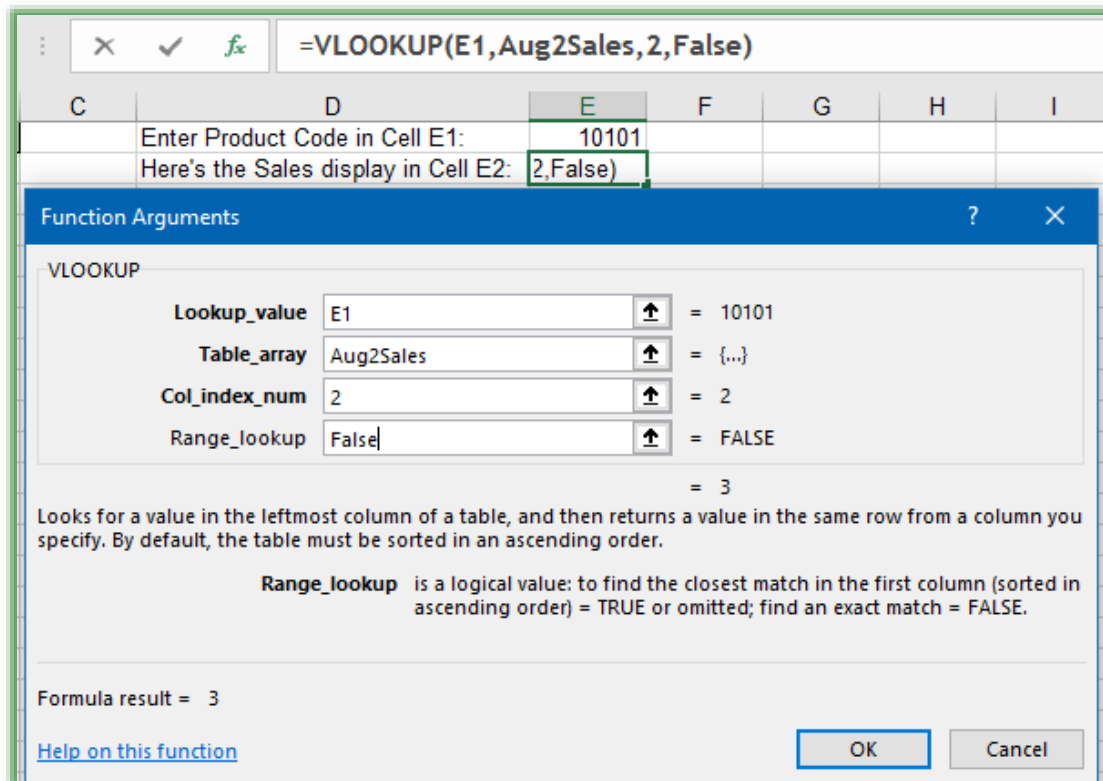
This is popular in using a huge worksheet to display specific information and is much quicker than using the Find feature and using the Filter items. We will use the VLOOKUP function in the same manner in our next section, but we will have more columns.

♫ *Write your notes here:* _____

_____

IfError Function

Excel will put #N/A if a value is not found in the Lookup. You may not want Excel to display this and display nothing or other text. Excel's new **IFERROR** Function allows you to specify the error display.

Here's how to use the **IFERROR function**.

1. **In your VLookup workbook and the Product Sales worksheet, Click cell E3 with your VLookup Function. Edit the function and add the IFERROR Function like this:**

=IFERROR(VLOOKUP(A:A,Aug2Sales,2,FALSE),"").

=IFERROR(VLOOKUP(A:A,Aug2Sales,2,FALSE),"")

2. **Fill down your edited function by double clicking your Fill Handle for this cell or clicking and dragging down to the end of your list. Excel replaces the #N/A with a blank because we used double quotation marks in our IFERROR function.**

   You can put words or other characters between the quotation marks to further customize your error message as displayed below after editing my VLOOKUP on the August 2 tab.

=IFERROR(VLOOKUP(E1,Aug2Sales,2,FALSE),"Sorry, Item not found.")

While you may use the Function Arguments box to accomplish the IFERROR function I have found that the Function Arguments become the Function Cursing box for me as I find it easier to edit using the formula bar than the dialogue box.

♫ *Write your notes here:* _____

_____

More VLOOKUP

As you have seen VLOOKUP makes retrieving data on huge worksheets easy and accurate. We will use VLOOKUP on a demographic and Human Resources type of workbook, now.

1. **Open the Database Functionality workbook,**

2. **Click the Vlookup Complete tab and at the top of the worksheet notice the Sales ID box. When you enter a Sales ID in cell A2, VLOOKUP retrieves key information about that person.**

3. **We will create these VLOOKUP functions on the next tab.**

4. **Click the VLookup Practice worksheet and in cell A2 enter a Sales ID of 18. I have named this cell LkpSalesID and I have named the database/table PersonnelDB.**

5. **Click in cell B2, click the Formulas Tab and in the Function Gallery choose Lookup & Reference and from the menu click VLOOKUP.**

6. **The VLOOKUP Function Arguments pane appears.**

7. **The Lookup_Value is the Sales ID box or cell A2 – LkpSalesID. You may type LkpSalesID or click cell A2.**

Function Arguments		?	☒
VLOOKUP			
Lookup_value	LkpSalesID	↑	= 18
Table_array	PersonnelDB	↑	= {"Sales ID","SSN","First Name","Last Na
Col_index_num	4	↑	= 4
Range_lookup	False	↑	= FALSE
			= "Bunney"

Looks for a value in the leftmost column of a table, and then returns a value in the same row from a column you specify. By default, the table must be sorted in an ascending order.

Range_lookup is a logical value: to find the closest match in the first column (sorted in ascending order) = TRUE or omitted; find an exact match = FALSE.

Formula result = Bunney

Help on this function   OK   Cancel

···

8. The Table_array is PersonnelDB – you may find it easier to type this than to select the database area,

9. The Last Name is in Column 4 of our database/table so the Col_index_num is 4. This is the fourth column in our table that happens to be Column D.

10. We want an exact match so FALSE is in the Range_lookup area,

11. Click OK. Bunney should appear in Last Name.

12. Copy and Paste or use AutoFill to copy this function from Cell B2 to C2 and change the column number from 4 to 3 (The First Name column in our table/array and notice Buggs appears in this cell).

13. Practice copying and pasting this function in the other cells and changing the column that it references for Bonus, Percentage, etc.

> ☛ **A Hot Tip! Know column or row numbers, you can click and drag across column or row headers and Excel displays the Column and Row number for you. You don't have to start the numbering at Column A or Row 1; Excel magically displays the row and column number for you as you click and drag across your column or row headers. Percent is in column 13 for my VLookup function. So, VLOOKUP is easy once you get it right. Simply copy/paste or Autfill the function to another cell and change the column number. ☛**

This is where using the Name Box for Absolute Reference is helpful; otherwise, Excel would change our Sales ID (LkpSalesID) cell from A2 to B2 after we copied the function from cell B2 to C2 plus it would change our lookup table-array reference, if we used regular (relative) cell references.

On Your Own! There is a worksheet entitled VLookup On Your Own – here's the assignment using Column A – SalesID Look up the information in the column headings such as Last Name, First Name, etc. and beginning in B2 create your VLookup to retrieve data from PersonnelDB in the VLookup Complete worksheet for these columns. Remember to use the Name box and

name column A SalesID. My VLOOKUP for Last Name appears here. After I complete this VLOOKUP I use AutFill to copy the function down my Column B. Next, I use AutoFill to copy my VLOOKUP function from B2 to C2 and then edit the VLOOKUP function from Column 4 (Last Name) to Column 3 (First Name).

Now, repeat these steps for Dept, Bonus, and Age; remember you will need to know the Column number for these lookups.

🎵 *Write your notes here:* _____

_____

H L O O K U P F u n c t i o n

Now, let's use the HLOOKUP function for our horizontal lookup and having our information in rows.

1. **Open the ExcelHlookup workbook.**

2. **The HLOOKUP Complete worksheet uses cities with percentages (cells I1:Q2) as its Table_array, which I have named COLA. The HLOOKUP function is in cell B5. Based on the city, Excel retrieves the Cost Of Living Adjustment percentage and the New Salary updates. Also, notice**

    how I am using Data Validation to select a city from the list. We learned how to do this earlier and you can click this cell and enable data validation to see my settings for this list.

3. **Now, using the HLOOKUP Practice worksheet and cell B5, create a HLOOKUP. Here's screenshot of my completed HLOOKUP Function Arguments box.**
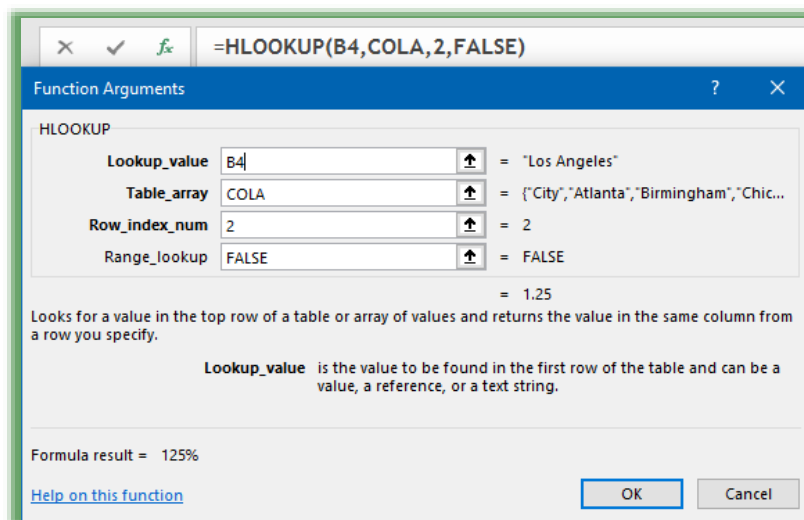
If, Then, OR Else!

Excel has several *If, Then, Else* functions available. We will examine the *If, Then, Else* using one condition and then we will use this for several conditions. The first example is *an Immediate If Then function* and the second example is *a nested If Then Else* function. Using more than one function together or various levels of calculations is called *nesting*. We will use the *If, Then, Else functions* for text and for numbers.

In our first example, if someone stays within or under budget they will receive the words good or bad in the If function cell. Then we will have various levels of being within budget, so the more money they have in a budget the words will change. Finally, we will award bonuses based upon a percentage; this will be a nested *If, Then*.

☹ **Watch out for the parenthesis with the IF function! This can get tricky with the number of parenthesis and is a common mistake to miss a parenthesis or put too many parentheses in the function, as you will see. Also, use these examples to help you in forming your own IF, THEN functions – copy and paste one of these and change your reference cells and words/numbers. ☹**

Let's get started with a basic If Then first.
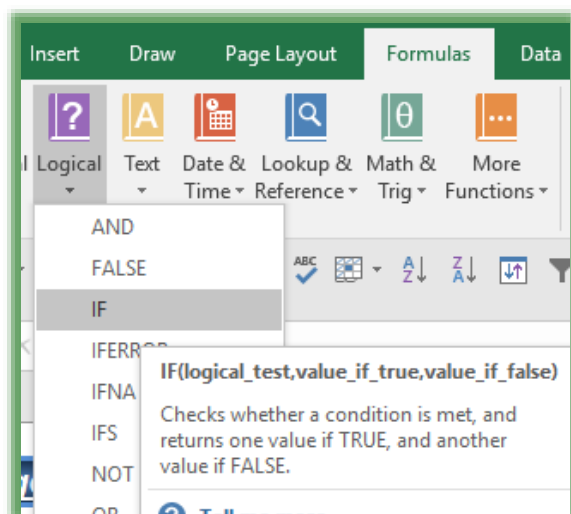
1. **Open your Budget Excel workbook,**

2. **In cell E4, type Good or Bad and press Enter,**

3. **In cell E5 and Formulas tab, click Logical and from the menu choose IF,**

IF(logical_test,value_if_true,value_if_false)

Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE.

4. **At the Function Argument box, the Logical_test is D5>=0 (if they have**


```
=IF(D5>=0,"Good!","Bad!")
```

Function Arguments

IF

Logical_test   D5>=0   = TRUE
Value_if_true "Good!"   = "Good!"
Value_if_false "Bad!"   = "Bad!"

                                  = "Good!"

Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE.

        Value_if_false is the value that is returned if Logical_test is FALSE. If omitted, FALSE
                            is returned.

Formula result = Good!

Help on this function   OK   Cancel

any money leftover they are good),

5. **The Value_if_true is Good! – Excel will put in the necessary quotation marks.**

6. **The Value_if_false is Bad! – Excel will put in the necessary quotation marks; so if they go overbudget, they are bad.**

7. **Click OK.**

This formula is saying: "If the cell D5 is greater than equal to 0, then provide Good in this cell, else Bad if the amount is less than 0."

8. **Next, fill down your function.**

This type of IF function is also called an Immediate IF statement, since there are no other conditions.

♫ *This is another good use for the Name box. In our next exercises, I will use a range Name of Difference and Percent for the IF function.* ♫

Now, let's use more than one condition. We will have Excel provide different words based on the amount of money left in the budget, for example, if we have more than 100, the word Excellent will appear, if we have more than 75 and up to 100, the word Good will appear, if we have more than 50 up to 75, the word Fair will appear, if we have more than 0 up to 50, the word OK will appear, or if we are over budget with less than 0 in our category the word Fired! will appear – let's be good corporate citizens and not go over budget OR ELSE!

1. **With the Budget workbook open, click cell F4 and type Multiple If,**

2. **Click Cell F5, Enter the IF Function as shown below. You should use the formula bar to create and edit this nested function.**
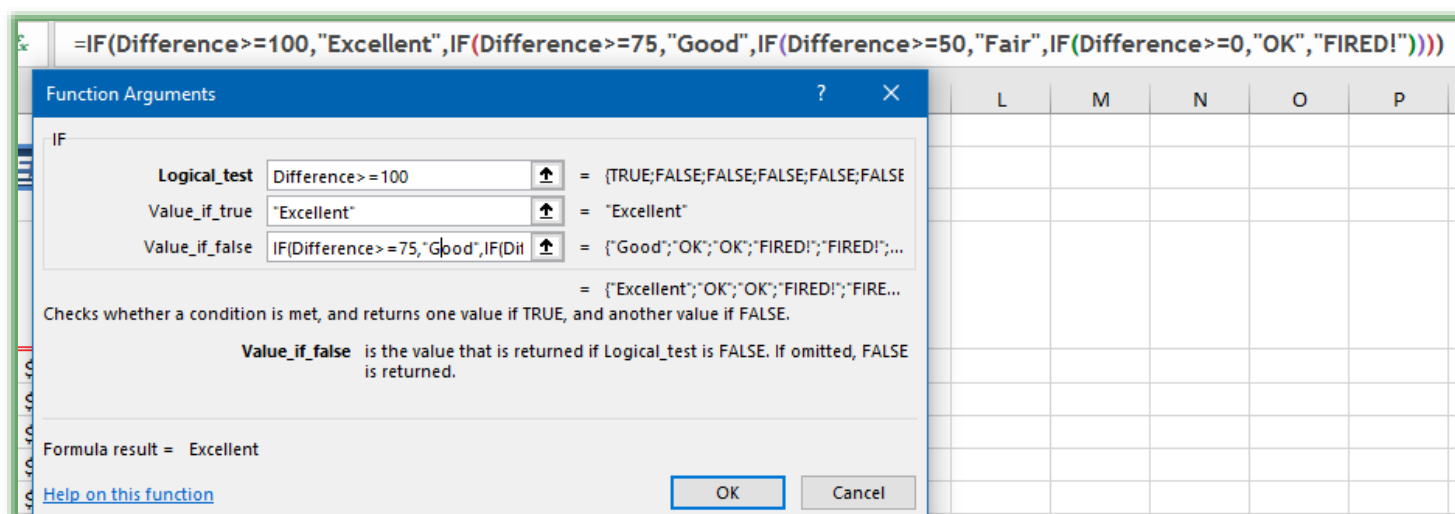
This is where the parentheses get tricky; thankfully, Excel gives color coded parentheses, so when you see the black parenthesis at the end of your closing parentheses, you are done. I have named cells D5 through D16 Difference. Also, you must type the quotation marks for the text values.

Once this is correct in your cell F5, fill down through row 16.

Why didn't I use the *Function Arguments* dialogue box? I find this function easier if I type in the information. The screenshot above of the *Function Argument Dialogue box* shows you the function arguments of Value if false, which is too small for me to enter the function.

Now, let's create a function that will provide a value or number rather than text. In the next example, we will provide a bonus amount based upon a percentage. If the percentage is greater than equal to 100, the bonus will be $1000; if the percentage is greater than equal to 95 up to 100, the bonus will be $750; if the percentage 90 or more, the bonus will be $500; and so on until the percentage falls below 70, then the bonus will be 0.

1. **With your Database Functionality file open, click on the Personnel tab and click cell O2. For this function, I have named the cell range in column N Percent. Notice the function and delete the function from O2 – O46. Now, don't click Undo! We will recreate the function.**

2. **In Cell O2 type the Function as it appears below or use the Function Argument Dialogue box if you prefer for the IF Function.**

`=IF(Percent>=100%,1000,IF(Percent>=95%,750,IF(Percent>=90%,500,IF(Percent>=85%,400,IF(Percent>=80%, 250,IF(Percent>=75%,100,IF(Percent>=70%,50,0))))))`

K	L	M	N	O	P	Q	R	S	T	U	V	W	X
	Business Telephone Number	Home Telephone Number	Percent	Bonus	Dept	Birth Date	Month	Day	Year	Hire Date	Age	Hire Age	Serv
ail Address	(904) 123-4123	(904) 123-4004	105%	=IF(Percent>=10	ENG	10/31/1950	10	31	1950	1/15/2000	66	50	1

3. **Again, be careful as it is easy to mistype or get something out of place. Also, if you do not want to use the percent you can use the number as a decimal, such as 100% becomes 1, 95% becomes .95, etc. whichever is best for you.**

4. **Once complete and the function is working double click the fill handle in cell N2 to fill to the end of your percentages or click and drag down to the final percent row.**

The Excel Help provides additional information about this function with examples similar to ones I have used here. You may have Excel perform calculations and functions for you based upon values in a cell, too.

♫ *Write your notes here:* _____

_____

While providing Values and Text are popular with If Then Else, using If Then Else to perform calculations is popular, too. We will use a quantity cell and populate a revenue cell using constructs for the product.

1. **Open the Database Functionality workbook and click in the Personnel Worksheet cell AB2. Notice the If Then Else Function; this is pictured for you below.**

`=IF(Z2="Plan 1",AA2*50,IF(Z2="Plan 2",AA2*75,IF(Z2="Plan 3",AA2*100,IF(Z2="Plan 4",AA2*125,IF(Z2="Plan 5",AA2*150,0)))))`

	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
	Bonus	Dept	Birth Dat	Month	Day	Year	Hire Dat	Age	Hire Ag	Servic	Produ	Service	Service Qty	Total Revenue
6	$250.00	ENG	1/29/1960	1	29	1960	1/8/2005	51	45	6.47	Widget 1	Plan 1	33	!*150,0))))
6	$100.00	ACC	1/10/1980	1	10	1980	10/1/2002	31	22	8.74	Widget 1	Plan 2	52	$3,900.00
6	$50.00	ACC	1/1/1975	1	1	1975	1/2/2001	36	26	10.48	Widget 2	Plan 3	2	$200.00
6	$50.00	ADM	2/14/1990	2	14	1990	1/5/2001	21	11	10.48	Widget 2	Plan 4	24	$3,000.00

2. **This takes the value in Column Z and multiplies the value by a number based on the type of Plan in Column Z. We multiply the Value in Column Z by the Quantity in column AA using the IF THEN ELSE to determine which value to use in the calculation based on the Plan. The Else is 0.**

3. **As I related previously, this is quite detailed and the commas, literal text, and parenthesis order matters.**

4. **Delete the IF THEN FUNCTION in the column AB, let's recreate the function using this screenshot as a guide. As I previously wrote, I find**

`=IF(Z2="Plan 1",AA2*50,IF(Z2="Plan 2",AA2*75,IF(Z2="Plan 3",AA2*100,IF(Z2="Plan 4",AA2*125,IF(Z2="Plan 5",AA2*150,0)))))`

   using the Formula bar to enter the information more helpful than the Function Arguments box.

5. **Once you complete this function is cell AB2, fill it down through the remainder of the rows, using your double click trick with Dr. Fill.**

   ♫ *Write your notes here:*_____

   _____

More If Wonders – SumIFS, AverageIFs

Speaking of If, Excel has Functions that can use the Sum, Average, and Count Functions based on criteria. Excel has had a function that would calculate data based on a single criteria (SUMIF, COUNTIF, AVERAGEIF), but with Excel 2007-2016, the function expands to include more than one criteria and criteria range. We will perform sums based on account/client and payment. We will accomplish multiple and singe criteria for our functions.

♫ Important Note: Using the Name box and Name manager for your Sum or Average Range and your Criteria ranges are far easier than selecting large areas for these ranges. This also helps in knowing the correct area by using names that describe your function and criteria ranges. For example, using the name Total is better than a range of I11:I99 to represent the area I want to use the SUMIFS or AVERAGEIFS functions. Also, using the name Customer for our criteria range is better than cells C11:C99. ♫

Let's create several functions based on criteria.

SumIFS

1. **With the IfThenSheet workbook open, click the Ifs Complete worksheet and notice Cells D4, D5, and D6 with the calculations for Sum, Count, and Average based on criteria. Click these cells and notice the formula bar and the construction of these functions. I am using names for the range and the criteria range and the information in quotation marks are the criteria for these items. For example, if you click on Cell D4 and in the formula bar change the "Yes" to a "No" and press enter, the cell will display orders that Computer Tech has NOT paid (BOO! HISS!).**

2. **Now, click the Ifs Practice worksheet and click cell D4. Using the Insert Function menu, type SUMIFS and the function will appear.**

3. **Select SUMIFS and press OK.**
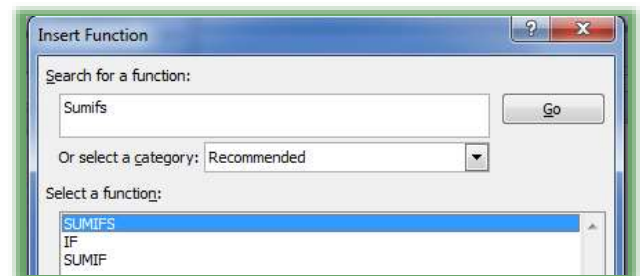
4. **At the Function Arguments Pane enter Total for Sum_range or use the range of cells you wish to provide the Sum function.**

5. **Next, in the Crieria_range1 enter Customer or the range of cells you wish for your criteria.**

6. **At the Criteria1 box enter the text Computer Tech or other criteria for the Sum function to use. Excel inserts the quotation marks for you.**

7. **Excel provides the Criteria_range2 box after you enter your Criteria1 information, enter the name Paid or use your range of cells for the second criteria.**


```
✓  fx   =SUMIFS(Total,Customer,"Computer Tech",Paid,"Yes")
```

Function Arguments   ?   ×

SUMIFS

Sum_range	Total ↑	= {"Total";5500;200;300;300;50;2200;150;
Criteria_range1	Customer ↑	= {"Customer";"A. B. C. Co";"Adam, Allan
Criteria1	"Computer Tech" ↑	= "Computer Tech"
Criteria_range2	Paid ↑	= {"Paid?";"Yes";"Yes";"No";"Yes";"Yes";"No
Criteria2	"Yes" ↑	= "Yes"

                                                = 4350

Adds the cells specified by a given set of conditions or criteria.

            Criteria2:   is the condition or criteria in the form of a number, expression, or text
                         that defines which cells will be added.

Formula result = $4,350

Help on this function   OK   Cancel

8. **In the Criteria2 box enter the text Yes.**

9. **Click OK and Excel returns the Sum of $4,350.**

10. **Now, edit your formula bar so that the "Yes" is a "No" and notice how the criteria and result changes for you.   Next, change Computer Tech to Bates Motel in the formula bar. If you prefer using the Function Argument box to modify your Criteria you may do so. Play around with different customer names.**

☹ **Important Gotcha! Using the Formula Bar or Function Arguments box to change our criteria is tricky; the criteria must be exact plus a novice Excel user may not know how to change the criteria easily for you. Data Validation ensures accuracy and makes our functions more "user-friendly". We will use cells with our criteria in a list to select the criteria for our functions.** ☹

Data Validation for Criteria

With the HLOOKUP function, I created a list from which to choose a city for HLOOKUP to lookup. With functions like SUMIFS, AVERAGEIFS, and COUNTIFS using a drop-down list to select criteria is easier and more accurate than editing the formula bar or using the Function Arguments box for your criteria. We'll learn how to create a list from which people may choose their criteria.

With your IfThenSheet.xlsx workbook open, click the Ifs Complete Data Validation worksheet, notice cell D3 with a drop-down list, select a client from the list and your SUMIF function updates based on the customer in cell D3. Also, notice cell F4 that has Yes or No from which to choose. For example, change cell D3 to Bates Motel and cell F4 to No and see how much Norman owes me. Since we covered Data Validation in detail earlier, I'll display my Data Validation screens below for you to create your own list.

1. **Open the IfThenSheets workbook and click cell D3 in the IFS Practice Data Validation worksheet. This is where we will insert our customer list using Data Validation.**

2. **Also, Column N contains our Client List that I named Customers. This is our list we will use for our criteria. After using this list in my function, I hide Column N.**

3. **Using Data Validation for cell D3, the Settings Tab allows a List and the source is our Customers list. We don't need an input message, but if someone tries to type a name or use a name not on our list, we want to provide a nice error message as displayed here in my Error Alert screenshot. Click ok and now you may choose your criteria from your list.**
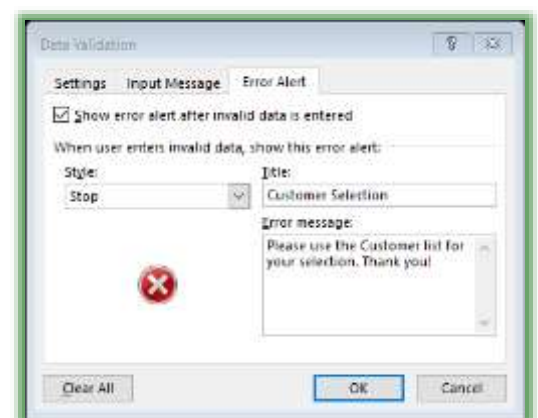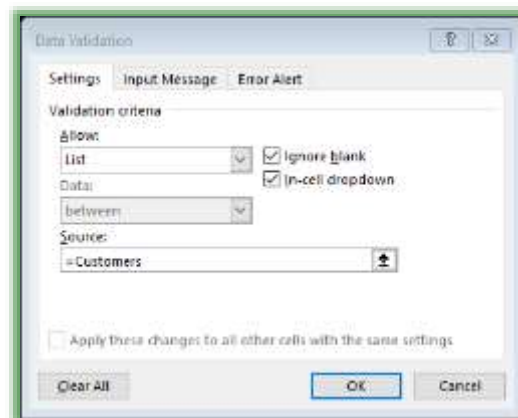
Now, let's use cell F4 for our Paid criteria Yes or No.
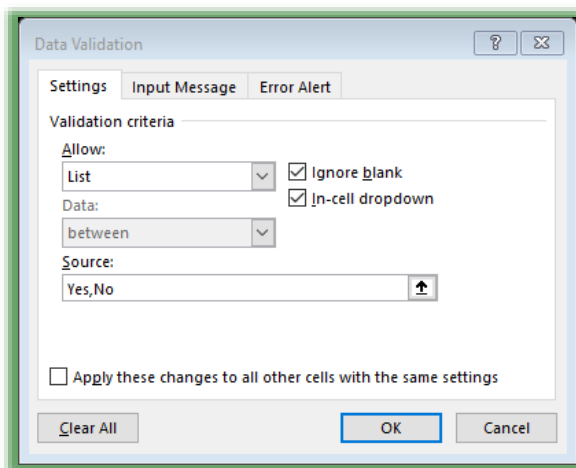
1. **Using our Data Validation for cell F4, the allow is a List and you may enter your list separated by commas. Our list is easy with only Yes, No, as displayed here.**

2. **We don't need an Input Message or Error Alert. Click OK and now you may choose Yes or No in cell F4.**

Now, time for our SUMIFS in cell D4.

1. **In cell D4, insert a SUMIFS function. At the Function Arguments box, enter the**
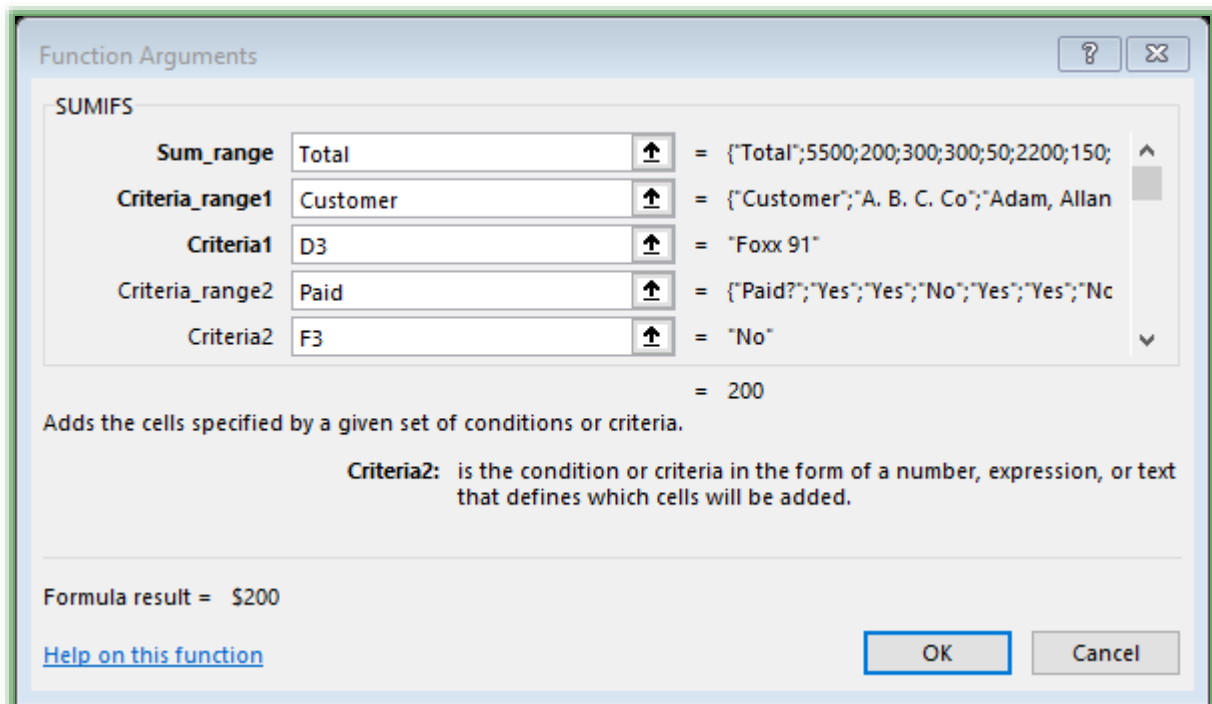
information based on this screenshot.

2. I'm still using Names for my Sum and Criteria ranges, but I'm not typing the criteria. I reference cells that have the criteria with my Data Validation.

3. Click OK. Now, change customers in cell D3 and change paid in cell F4 and notice your cell D4 how it sums based on your selections.

I guess by now, you know how much I love Naming. Here is my SUMIFS on the Ifs Complete Data Validation worksheet, where I named my cells D3 and F3.

Function Arguments

SUMIFS

Sum_range	Total	⬆	= {"Total";5500;200;300;300;50;2200;15...
Criteria_range1	Customer	⬆	= {"Customer";"A. B. C. Co";"Adam, All...
Criteria1	Client	⬆	= "Bates Motel"
Criteria_range2	Paid	⬆	= {"Paid?";"Yes";"Yes";"No";"Yes";"Yes";"...
Criteria2	YesNo	⬆	= "No"

= 5950

Adds the cells specified by a given set of conditions or criteria.

      Sum_range: are the actual cells to sum.

Formula result = $5,950

Help on this function   OK   Cancel

♫ While you may use the Ifs Practice worksheet to do the following CountIfs and AverageIf, you will have to edit the formula bar or Function Arguments box to change your criteria. We'll use our lists and Data Validation for our criteria and the IFS Practice Data Validation Worksheet. ♫

Let's use the COUNTIFS function next.

1. **Now in cell D5, activate your Function Arguments box for the COUNTIFS function. We will provide the same criteria as our SUMIFS.**
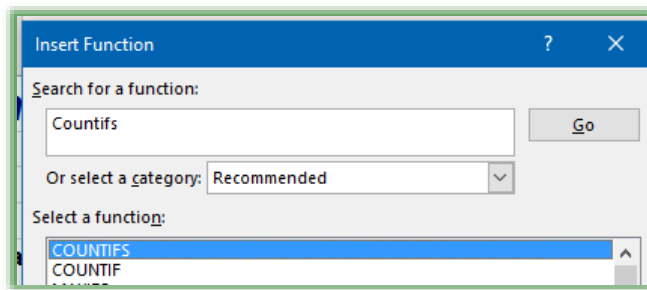
2. **I use my Insert Function box and search for Countifs.**

3. **In my Function Arguments box for CountIfs, and in the Criteria_range1 box enter the range name of Customer,**

4. **In the Criteria1 box, enter or click cell D3,**

=COUNTIFS(Customer,ClientSelect,Paid,PaidSelect)

Techedutainment Services Inc.

January

Select Client: **Bates Motel** **Paid:** **No**

Function Arguments

COUNTIFS

Criteria_range1	Customer	= {"Customer";"A. B. C. Co";"Adam, Allan
Criteria1	ClientSelect	= "Bates Motel"
Criteria_range2	Paid	= {"Paid?";"Yes";"Yes";"No";"Yes";"Yes";"Nc
Criteria2	PaidSelect	= "No"
Criteria_range3		= reference

= 1

Counts the number of cells specified by a given set of conditions or criteria.

♫ **I have named my criteria cell D3 to ClientSelect and my cell F3 to PaidSelect.** ♫

5. **In Criteria_range 2, enter Paid,**

6. **In Criteria2, type or click cell F3,**

7. **Click OK.**

8. **Now, when you select customers in cell D3 and Yes or No in cell F3, we get the sum and the count function.**

Finally, let's use the AverageIF function. We'll use one Criteria and use a Product for our Average.

1. **Now, in cell D6, activate your Function Arguments box for the AVERAGEIF function. We will provide a single criterion for the Average of products by a customer.**

♫ **I have named each of the products Word, Excel, PowerPoint, Outook, and Access appropriate names for their column of data.** ♫

2. **In the Range box enter Customer,**

3. **In the Criteria box enter the cell D3 or use a name (I've used ClientSelect to represent cell D3),**

4. **In the Average range box enter Excel, which will provide an average of the client's purchases of the Excel product,**

5. **Click OK.**

6. **Excel provides the Average of Excel products for the client in cell D3.**

7. **Next, change the Product from Excel to Word using your Formula Bar or your Function Arguments box. So, you may change your Average function to other products by changing the Average Range name,**
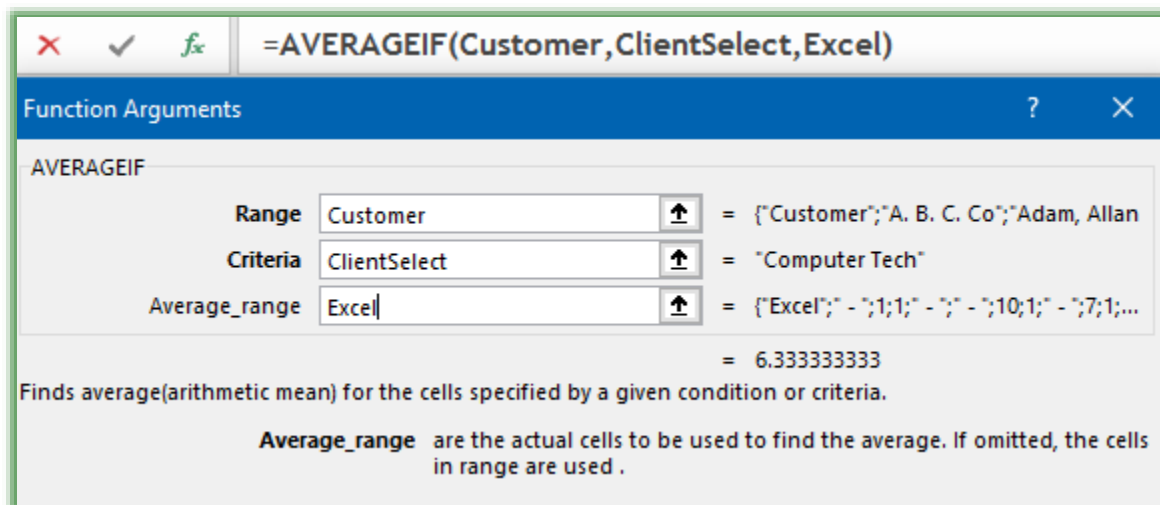
such as Outlook, Access, or Word.

☹ **You cannot use Data Validation or a list for your Average product selection. Darn it! You must edit your Formula Bar or Function**

Arguments box. However, using a name is much easier than entering and editing a cell range, like C11 -C99 for your Average range. ☹

Now, click the Ifs Galore! Tab and notice cells B1, B2, B3, D1, D2, and D3 with the SUMIFS, AVERAGEIFS, and COUNTIFS functions based on criteria and cell ranges. See how awkward changing our criteria and function ranges are without a Data Validation list or using Names. On your own, recreate these functions and provide names and drop-down lists using the Ifs Galore! Practice worksheet.

♫ *Write your notes here:*_____

_____

_____

_____

Security and Worksheet Protection
Calling Security

Excel has great security options to prevent your workbook file from being edited inappropriately, opened or modified by other individuals. You set these options through your *File Tab and the Info pane, shortcut menus, or the Review Tab and the Changes Group.* There are many ways to protect your Excel files and share them. We are going to concentrate on a couple of options in Excel's protection that prevents editing but is easy to enable editing, require a password to open your file and allowing users to edit only parts of a worksheet; otherwise, they will need a password to change anything else on the worksheet. You should play with these different options; HOWEVER, always have backup copies of your workbook and worksheets without a password – just in case. We will learn a quick and easy way for you to protect your worksheet from inappropriate editing, including you. Then, we will look at more extensive password protection.

Mark as Final

The Office Suite offers a quick and easy way for you to prevent editing and then a quick and easy way for you to enable editing; the feature is *Mark as Final*. We will use your Budget worksheet for these exercises.

1. With your Budget workbook open, click the File tab and at the Info pane, click Protect Workbook from the cascading menu choose Mark as Final,

2. The message at right appears, click OK,

3. Next, Excel alerts that the workbook is marked as final.

---
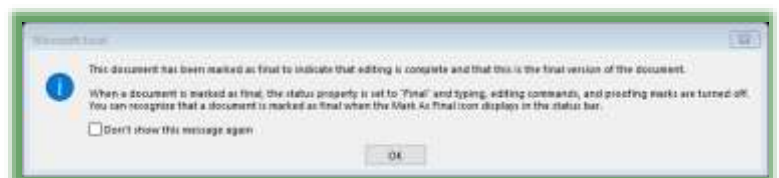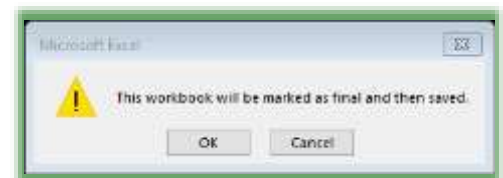
4. **Excel informs you of the Mark as Final status in information box underneath the ribbon.**

> ⓘ MARKED AS FINAL   An author has marked this workbook as final to discourage editing. | Edit Anyway |
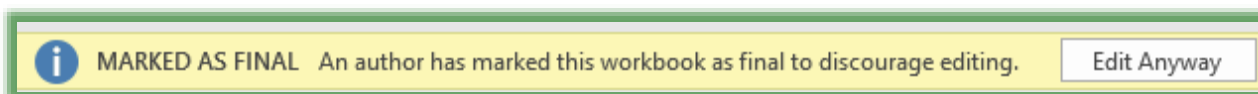
Notice the box above says discourage, not stop. To me, the reason for Mark as Final is so when you or someone else opens the files you don't accidentally start typing over the data and functions.

5. **To enable editing, simply click the Edit Anyway button on your information box or return to the File Tab and the Info Pane and click the Mark as Final item again to enable editing.**

Password Protecting the Workbook - Encryption

You can use the *Encrypt* document item as displayed below to assign a password to open your workbook. This is the strongest form of protection. Here are the steps to activate your *Security* and to set passwords.

☹ **Important Gotcha! When you set a workbook password, Excel warns you to remember the password or store the password in a secure place; you cannot recover your password if you lose or forget it. As I suggested before, I make a back-up copy of the file without a password in a secure folder or other drive and then enter a password for the workbook I want to share.** ☹

1. **Open your Budget workbook,**

2. **Click the File tab and trace to the Info item,**
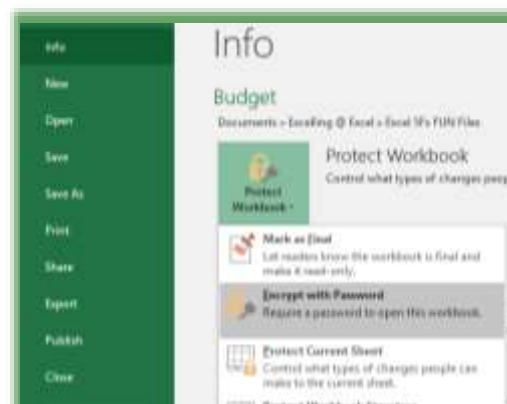
3. **Click Protect Workbook, and from the cascading menu, click the Encrypt with Password item as displayed above,**

4. **At the Encrypt the contents of this file and the password section type** *excel123*,

5. **Click OK,**

6. **Confirm your password by typing** *excel123*,

7. **Save and close your Budget workbook,**

8. **Open it and at the password screen enter** *excel123* **and press enter or click OK.**
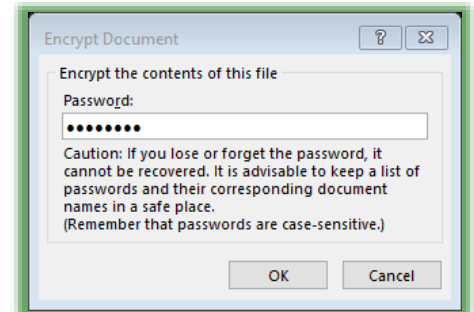
To remove a password, open the Password dialogue box through the Protect Workbook and the Encrypt with Password item, select and delete the password. Click OK. Deleting the password removes the protection.

Excel has workbook security in the Review Tab, let's examine that.

1. **Open your Budget workbook,**

2. **On the Ribbon, click the Review tab,**

3. **In the Changes group, click the Protect Workbook button.**

4. **Notice the areas to protect the Structure and Windows. These prevent copying, deleting, or moving worksheets but not the information within the worksheets – that's what we will accomplish.**

5. **Enter** *excel123* **as your password and then re-enter your password to confirm it. Click OK. This provides security for the Excel Workbook or File, not the worksheet.**
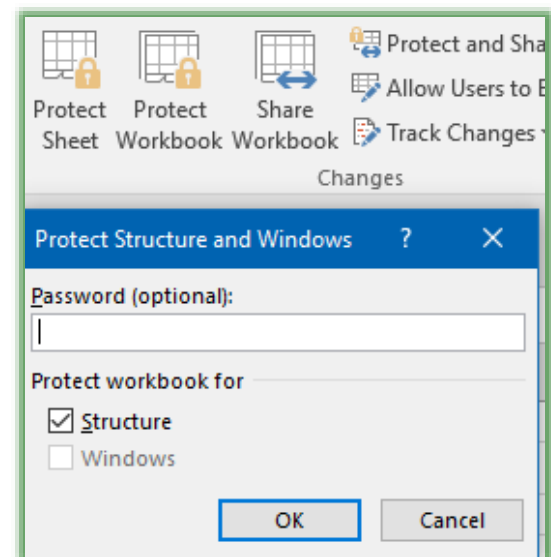
☹ **An Important Gotcha! As I wrote, before, when you set a password, Excel will do its best to alert you not to forget the password and will ask you to verify the password after initially typing your password. When Excel says don't forget the password,**

Excel means it – unless you want to hire a professional hacker to retrieve your password and this is neither cheap nor quick! ☹

Worksheet Protection and Cell Locking

Excel provides a way to only modify certain cells and worksheets, too. By default Excel has all cells *locked*; in that case, if you protect a worksheet or workbook none of the cells may be changed or edited without a password – which is optional. You may want certain cells or a range of cells to be unlocked for you and others so that you can change the contents.
Here is how you UNLOCK a cell or range of cells.

1. **First select the cell(s) you want people to edit and change,**

2. **On the Home Tab click the Dialogue box launcher for Number,**

3. **Click the Protection tab and click Locked – so that Locked is NOT Checked.**

    ☹ **An Important Gotcha! You should unlock all the cells you need to and then Protect your worksheet or workbook.** ☹

Aside protecting certain cells, you can protect your worksheets, too.

1. **Worksheet Protection is in the Review Tab and the Protect Sheet button. Also, you may right click a worksheet or tab and from the shortcut menu choose Protect sheet**

2. **You receive a dialog box for the items you want to protect and an optional password box.**

3. **The items to protect and options will change depending on what you are protecting worksheets (individual tabs in your workbook) or the workbook (the Excel File). Use care and caution in setting these items. The Excel protection and security features work great; in fact, too great if you are not careful or forget a password.**

Although there are several important "gotchas" associated with protection and security, I use these a lot to prevent unwanted intrusion and changes in my workbooks, worksheets, and cells. For example, I will provide my clients with a pricing sheet of my services. The clients can change the hours and other aspects of the project, but NOT my hourly fee or contracted amount of money! As an Operations Manager, when I set a budget for my groups I would allow them to input their expenses but nothing else on the worksheet like we are accomplishing.
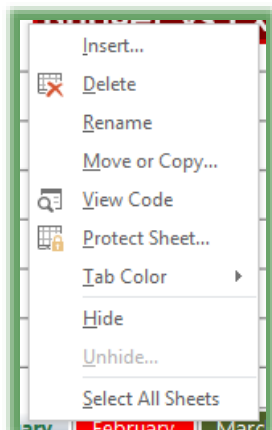
We will accomplish unprotecting certain cells in our worksheet in this exercise. Let's Protect our January Worksheet except for the Expense items which we will allow changes.

1. **In our Budget workbook,**

2. **Click the January tab,**

3. **Highlight/Select cells C5 through C14 – these are the cells we will permit people to change.**

4. **Click the Home Tab and click the Dialogue Box launcher arrow in the Number Group or right click the selected cells and from the Shortcut menu choose Format Cells.**

5. **From the Format Cells Dialogue Box, click the Protection tab,**

6. **Click to *uncheck* the Locked check box,**

7. **As pictured here, notice the message of locking our cells and then protecting our worksheet. This will be our next step.**

8. **Click OK.**
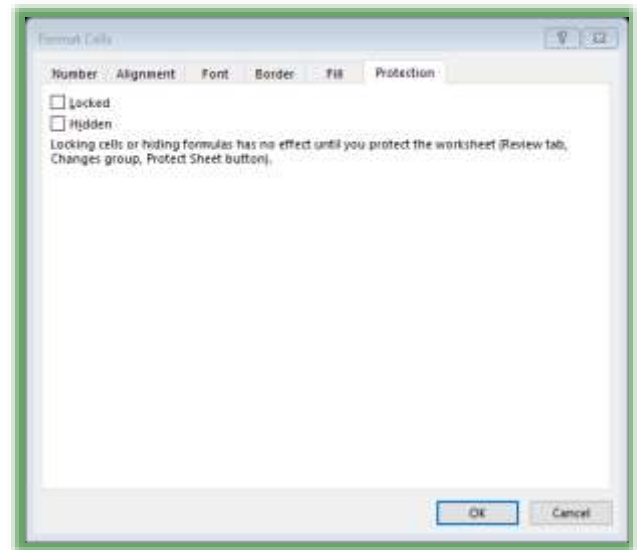
As Excel informed us, nothing has changed about our worksheet yet. Time to change that – we are going to set a password for this sheet and allow only changes to C5 through C14, now.

1. **Click the Review tab and click the Protect sheet button OR right click on the January worksheet tab and click the Protect Sheet item in the shortcut menu.**

2. **The Protect sheet screen appears. In the *Allow all users of this worksheet to:* section only have the first two items checked; these are the default. Scroll and look at the other options that you may allow other uses to change, such as formatting and inserting/deleting. I don't want others changing and destroying my important and beautiful work.**
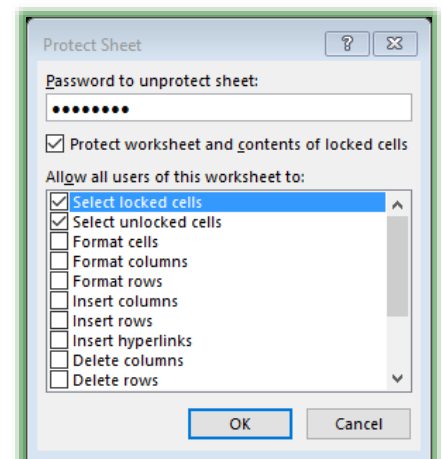
3. **Let's give an optional Password of *excel123* (Case matters! I'm using lowercase),**

4. **Click OK,**

5. **A Dialogue box appears asking you to confirm the password retype *excel123* and read the Caution message.**

6. **Click OK, and Excel returns to your worksheet. Try to change numbers in the budget column or anywhere other than cells C5 through C14. You'll receive the error message displayed here.**
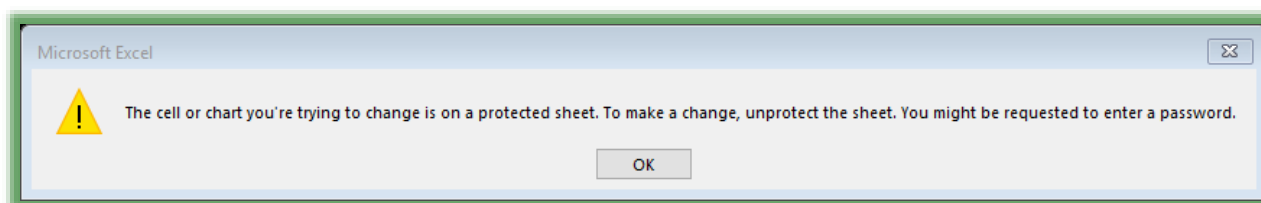
Try to format your heading with a different font, size, or color. Excel acts like it will change these for you, but alas it won't.

Click in cell C5 and change the number. You are allowed to do this because we unlocked our cells before we protected our sheet. You can change and edit any of the items in C5 through C14 but nowhere else.

Let's remove the protection.

1. **In the Review Tab,**

2. **Click the Unprotect Sheet button,**

3. **In the Password dialogue box, type *excel123*. Our worksheet is unprotected and we are free to make any changes, again.**

☹ **An Important Gotcha! If we had wanted to protect these cells on all of our worksheets we would need to have accomplished this and then copy the worksheets. As our workbook is now, we would have to go through each tab and set the protection on each one. Grouping your sheets and trying to set passwords on specific cells won't work. If you have several worksheets selected or grouped when you unlock your cells**

and protect your workbook, the worksheets are not protected from input ONLY THE STRUCTURE OF THE WORKSHEETS ARE PROTECTED; therefore, no one can delete, copy, or otherwise change the structure or layout of your workbook. You would need to unlock the cells first, then protect your worksheet, and finally, copy it as we learned earlier in this course. ☹

♫ *Write your notes here:*_____

_____

_____

_____

Charts: As Easy As Pie
Chart Art

No *Excel* course ise complete without a look at charts. *Charts are graphical, visual representation of our data.* *Charts* turn our number crunching into a work of art. We will build a *Pie Chart* and a *Column Chart* in the next sections. We'll look at some of the new charts in Excel 2016. We'll learn the *Chart contextual tabs* and other panes to create dynamic and appealing charts.

> ☞**A Hot Tip! Always select the area of the worksheet that you want to base your chart upon. If you don't select your area, Excel assumes your table and may include totals and other data you do not want.**
> **Two Quick Chart Shortcuts:**
>
> 1. **The Function 11 (F11) key quickly produces a column chart for you in a new worksheet,**
> 2. **After selecting your area, you may use the Quick Analysis menu to add a chart. To use the Quick Analysis menu your chart areas must be continuous, so we can't use the Quick Analysis in our exercise below, since we are selecting two different areas of the worksheet. ☞**

1. **Open the Budget workbook,**

2. **Click the January Tab. We want to select two different areas – our items and our expenses. Here's how:**

3. **Select cells A4 through A14,**

4. **Press your CTRL key and click and drag cells C4 through C14 to select them. We want a pie chart to display where our money goes by item.**

5. **Click the Insert Tab,**

6. **Click the Pie Chart button and from the cascading menu choose the 3-D Pie Chart. Notice Excel provides a nice preview of your chart.**

7. **Excel inserts a Pie Chart in your worksheet and opens your Chart Tools at the Design Tab.**

8. **Scroll through the Chart Styles and choose one.**

I am choosing Style 3 with a Legend and Percentages.

Let's put this chart in its own worksheet and change some elements.

1. **On the Design Tab at the end of the row of command buttons, click the Move Chart button and in the Move Chart Dialogue Box, click the New Sheet item and give the new worksheet a name, such as January Expenses,**

2. **Click OK.**

3. **Excel moves your chart to a new worksheet named January Expenses.**
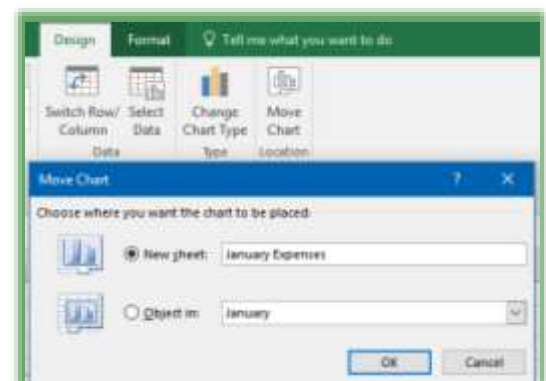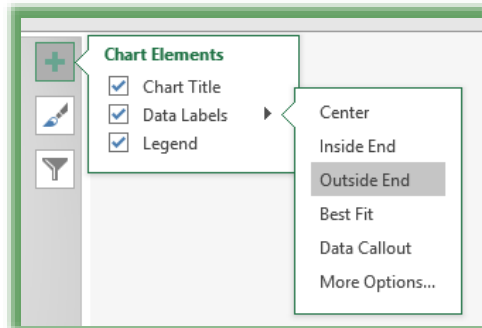
The new vesions of Excel 2013/2016 use fly-out menus instead of the Layout Tab in previous versions of Excel to accomplish customizing your chart.

1. With your January Expenses pie chart displayed, move your cursor to the upper right area and three items appear. The top item is the plus sign (+) for you to change your Chart Elements. I am moving my Data Labels to the Outside End.

2. Next, I move my Legend to the Top of my Chart Area.

3. Click in the chart title Expenses and change the title to January Expenses. You may select your text and the Mini Toolbar appears with many of your formatting options.
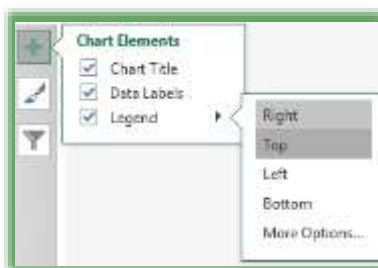
Let's look at some of the color schemes for our charts and customize the color for a chart item.

You may use your Chart Tools' Design Tab and the Color button to change your color scheme. You may change your layout, too, using the Quick Layout button and menu.

I am using the format item on the chart — the paint brush and middle item. There are many ways to format and customize your chart elements, including the Format Tab for Charts.
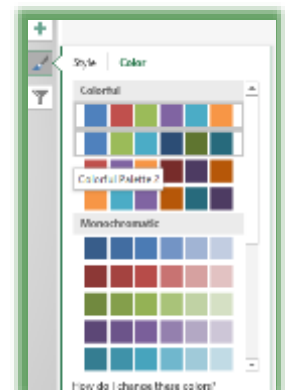
1. Click the Format Tab — this tab displays below.
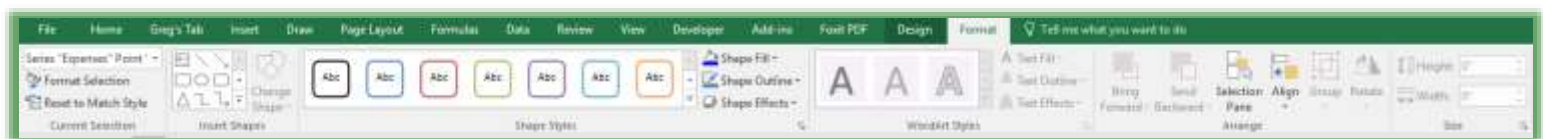
2. **Click your Chart – notice how Excel puts little circles around each piece of your Pie – this indicates that these areas are selected for you and any formatting change you make to one affects all of the pieces.**

☹ *An Important Gotcha: If you change your chart's color with all of the pieces selected the chart will be the same color and more difficult to see your categories. The Current Selection group at the beginning of your Layout Tab Row will display what you have selected and what other areas you may quickly select. The Format Selection button activates your Formatting Options task pane. ☹*
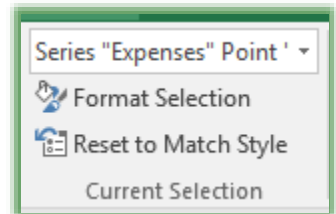
3. **Click one of your pieces of your pie again and notice how Excel now only puts little circles around that piece of your pie, so any changes you make only affects that piece of your pie.**

4. **Click this piece of your pie and drag it out. Excel moves this piece out and reshapes your pie.**

5. **Using your Shape Styles group change the Fill Color of this piece of your pie.**

6. **Notice from the Shape Fill cascading menus all of the options available for you – you may even use a picture as a background or fill color for pieces of your Pie chart. Look at difference options and play around.**

7. **Save your workbook.**

Additional Formatting changes.

As displayed at right I have made additional formatting changes and I have used my Mini Toolbar and Shortcut menu to help me make changes. On your own, make these changes:
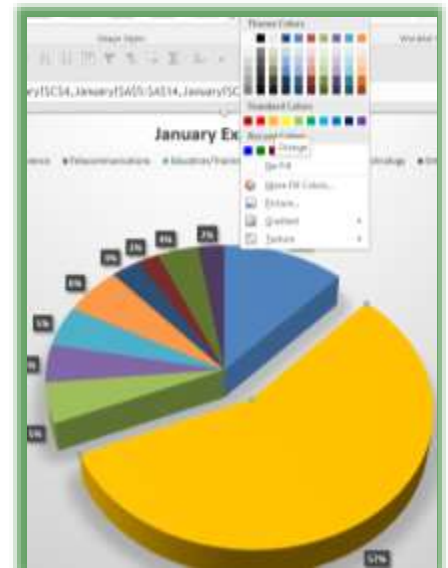
✓ **Bold all of your labels – Click one label or percentage and Excel selects all of them. Next, use your mini toolbar or Home tab to bold your percentages.**

✓ **Move only certain labels (You'll have to click a label and Excel selects all of the labels for you, then click a specific label and Excel will select the label by putting circles around that label and no other label).**

✓ **Change your Legend's font, font size, and make your Legend larger.**

✓ **Don't forget, if you right click on a chart element, a nifty shortcut menu displays offering you many of these options.**

✓ **Play and use your creativity.**
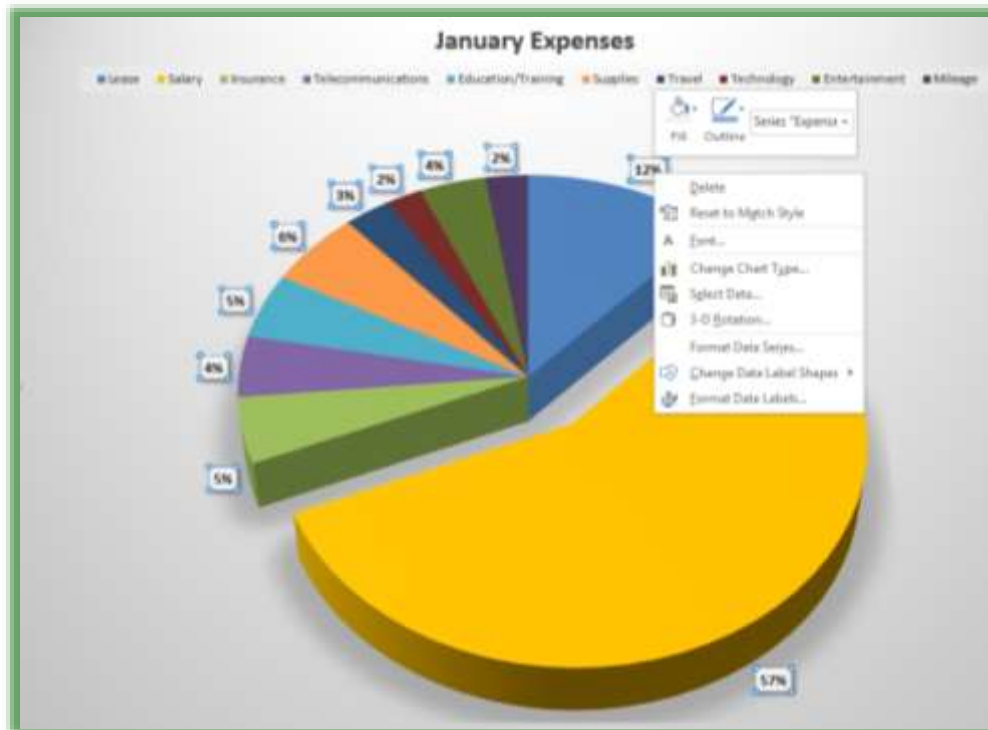
Another nice thing about charts is, as you make changes to your January worksheet, the chart automatically updates.

1. **Click on your January worksheet tab,**

2. **Change Lease expense cell C5 to $2,000, press the Enter key.**

3. **Click the January Chart tab. The Lease Data Point reflects the change.**

4. **Change your Lease expense back to $1050.00 and the chart changes, too.**

Charting another Chart

Let's create another chart, one more time and learn other options with formatting and enhancing our charts. We want to compare our Budget and Expenses by Category using a Column Chart and then we will copy this and use other types of charts and options.

Have your Budget workbook open.

1. **Go to your January worksheet,**

2. **Click and drag to select A4 through C14,**

3. **Click your Quick Analysis button and from the menu choose charts and then Clustered Column Chart. Excel provides a preview of your chart.**

4. **Excel inserts a Column chart illustrating your Budget and Expenses.**

Not sure if that is the chart you want? Click the Change Chart Type button and a menu appears with two tabs. The Recommended Charts Tab displays charts that match your selection, and All Charts displays more chart types than you could think. Click different types of charts and Excel gives you a preview of the chart.

5. **Move your chart by click on the border of your chart and dragging it to a new location – I have put my chart under my data area,**

6. **Make your chart larger by placing your cursor over one of the corners and with the double headed arrow clicking and dragging out,**

7. **With your Design Tab active in the Chart Tools' contextual tab, change your layout using the Quick Layout button and menu. I have**
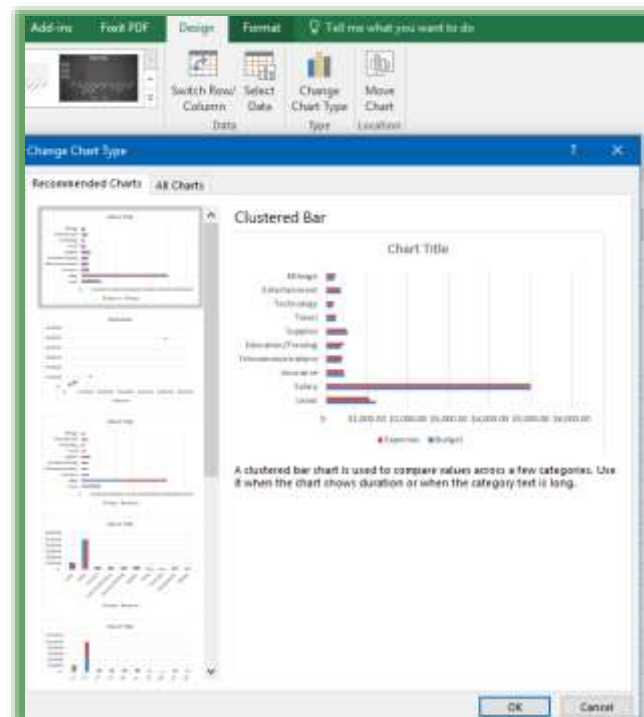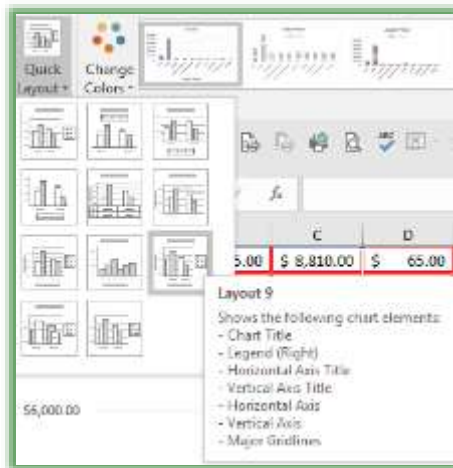
chosen Layout 9 with Chart Title, Legend at right, with Axis and Titles, and Major Gridlines.

8.   Next, change your Chart Style using the Chart Style Gallery of colors and formats,

9.   Click in the Chart Title area and type Budget vs Expenses,

10. Select your Chart Title text and right click in your Chart Title and from the Mini Toolbar change your Chart Title Formatting. I have changed my font, font color, fill color a border around my title.

As with the Pie chart, let's change and format our chart items and objects.
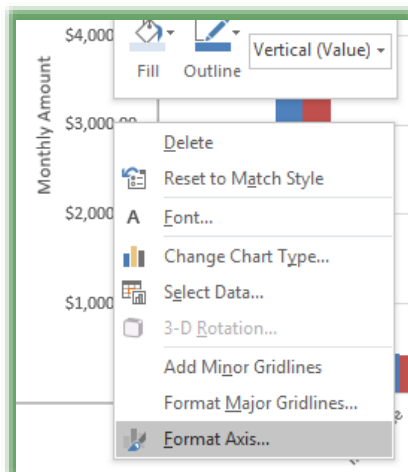
1.   Since I have Axis titles, I have changed the Value axis title to Monthly Amount and the Category axis to Categories of Expenses.

2.   Right click your Value Axis and from the shortcut menu click Format Axis …

3.   The Format Axis Task Pane opens at the right of your screen. Click the Number item and expand your options, change your number's decimal place to 0.

4.   Next, in Units for Major I have changed mine to 500. You have many options using this task pane, and besides the Axis Option tab, you have the Text Options that you may use.

The Format Axis Task Pane makes it easy to navigate to other chart elements to customize. When you click the Axis Options arrow, you receive a list of other Chart elements. I am
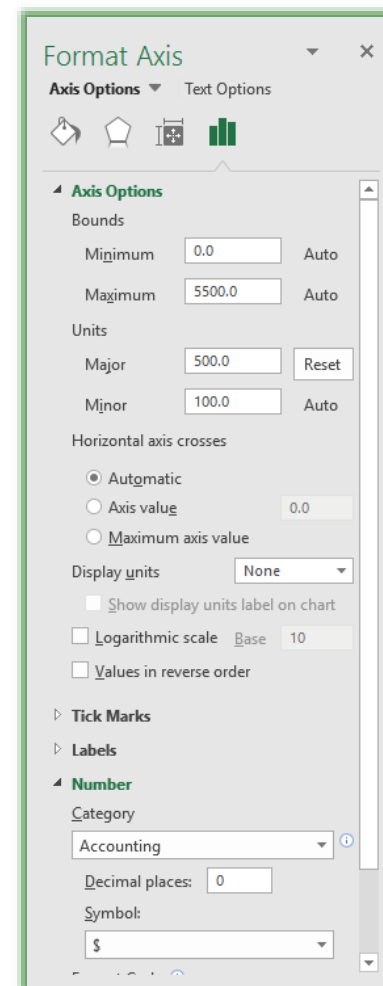
navigating to my Legend to put it at the bottom of my chart.

5. **You may close your Format Options Task Pane by clicking the X at the top right of the pane. Notice, you don't have to click OK or save to change your chart elements. As you use the Task Panes, your chart changes automatically for you.**

Let's change your column colors.

1. **Click one of your columns, and Excel selects all of your columns by placing little circles around each column,**

2. **Right Click one of the Columns and from the shortcut menu choose Format Data Series. The Format Data Series Task pane opens.**

3. **Like other Format Task Panes, this one is loaded with options. I am changing my Fill color. You may use the other Series Effects and Series Options buttons at the top of the pane, too.**

4. **Click your other column to select those columns and format that data series. Using my Format Tab in Chart Tools and the Format Data Series panes, I have changed fill color, and other items – change your column as you wish.**

5. **Right click in your Category Axis and from the shortcut menu add Major Gridlines.**

6. **Click and drag your chart title to move it to new location.**

Let's look at our Chart Element button and make a couple of changes there.

We have used the Format tab to make many of our changes and the Format Options Task Pane. We can use shortcut menus or the Chart Element buttons on the chart.
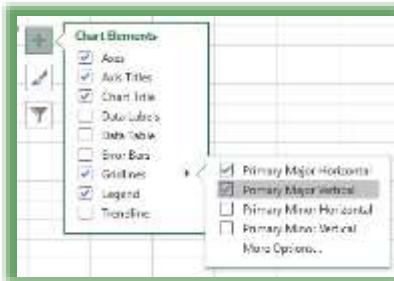
1. **Click the Chart Elements (+) button on the upper right area of your chart. I navigate to Gridlines and turn on my Primary Major Vertical gridlines.**

2. **Click the Data Labels and view your labels – I turned mine off, because it made my chart too busy.**

3. **Next, using your Chart elements pane, add a Trendline.**

Let's look at other types of charts.

We want to keep this chart but examine some of Excel's other great charts. First, let's copy this chart to a new worksheet and then look at other charts, like Area, Bar, and Line Charts.
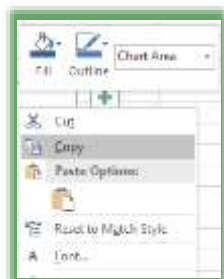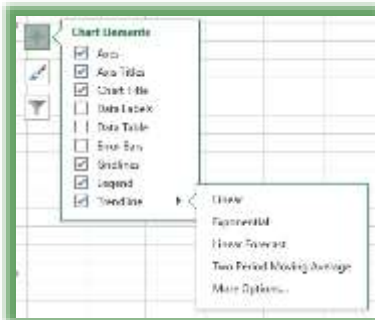
1. **Right click in your Chart Area and from the shortcut menu choose copy. Next, paste the chart in another area of your worksheet or in a new workbook.**

2. **Click your Design Tab of your Chart Tools,**

3. **Click the Change Chart Type button,**

4. **The Change Chart Type Gallery pane opens for you to click a type of chart and then a style for that chart,**

5. **I am using the All Charts tab and select the new Waterfall chart. You should go through and look at all of the interesting ways of displaying your data.**

6. **Select a new chart type and click OK.**

7. **Excel changes your chart and keeps many of your formatting changes.**
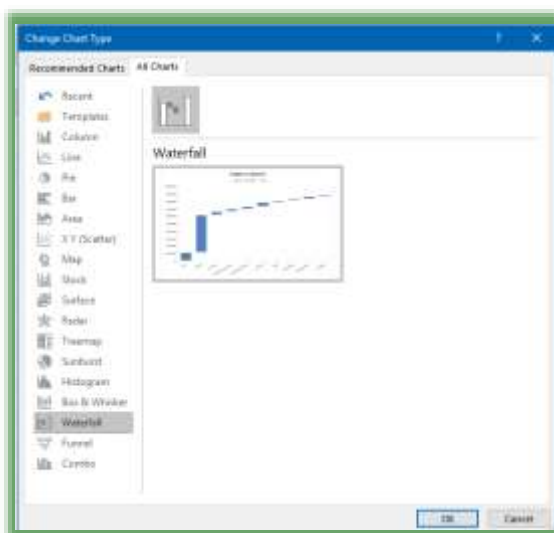
Chart Filters and Data Options

Charts have a *Filter* button that works just like our previous filtering. The *Filter* button is in upper right corner of your chart with the *Chart Elements* and *Chart Styles* button as displayed here.

You may use the *Select Data* button on your *Design Tab* and the dialogue box below displays, where you may use filters. Using this pane you may change the chart's data area and switch rows/columns and perform other helpful actions.
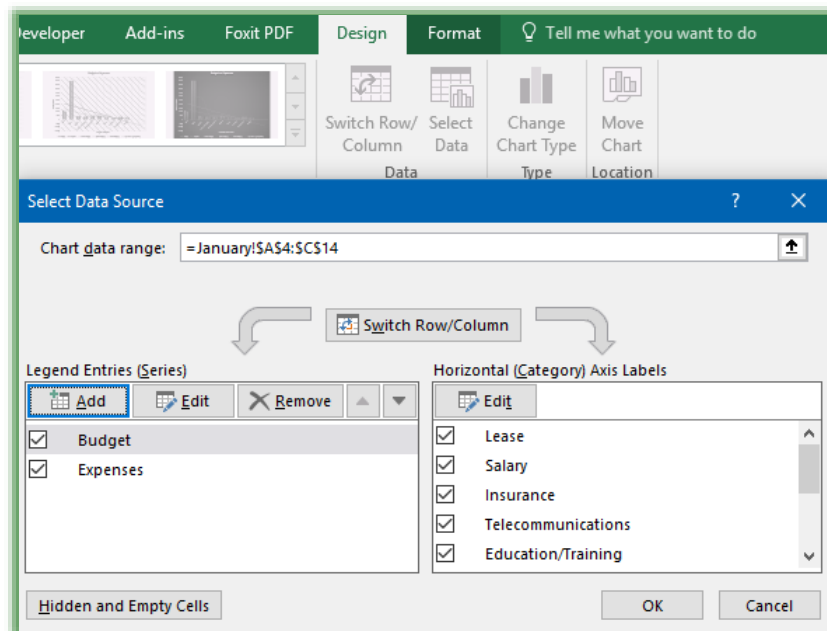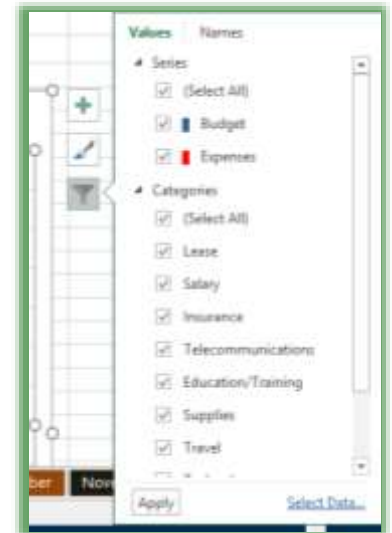
♫ *Write your notes here:*_____

An Excellent Excel Index