Excel Formulas

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Introduction

In this class we're going to discuss formulas, from starting out and beginning to put together your first formula, to elaborate, conditional controls that will analyze the information entered into your table and adapt to it.

Formulas

Here are some basic properties of formulas:

-All formulas begin with an equal sign (=).

-Formulas can use cell references and/or real numbers in their calculations.

-The mathematical operators Excel recognizes are: + (addition), - (subtraction), * (multiplication), / (division), ^ (exponentiation), and % (percentage).

-You can add parenthesis to override the order of operations

-After a formula is entered, you'll see the formula in both the Formula bar and the cell where you entered it, and you can edit the formula in either location.

-If you want to see all the formulas on your worksheet at once, instead of their results, you can switch the worksheet display. Press Ctrl + ` to toggle between formulas and results, or click Tools, Options, and on the View tab, check the Formulas check box to show formulas, clear the box to show results.

Error Values

Sometimes something prevents a formula from properly calculating. In these situations Excel will display a value to let you know what the situation is. Below is a listing of those values:

This Error	What it Means	Solution
#####	The column isn't wide enough to display the value	Widen the Column
#VALUE!	Wrong type of argument or operand(for Example, calculating a cell with the value #N/A	Check operands and arguments; be sure references are valid
#DIV/0!	Formula is attempting to divide by zero	Check the cell values
#NAME?	Formula is referencing an invalid or nonexistent name	Check names and spelling
#N/A	Most commonly means no value is available or wrong arguments used	In a lookup formula check table is sorted correctly
#REF!	Excel can't locate the referenced cells.	Click Undo immediately to restore references then change

		formula references
#NUM!	Incorrect use of a number(such as SQRT(-1)) or formula result is a number too large or small to be displayed	Be sure that the arguments are correct, and that the result is between $-1*10^{307}$ and $1*10^{307}$
#NULL	Reference to intersection of two areas that do not intersect.	Check typing/reference errors
Circular	A formula refers to itself, either directly or indirectly.	Click OK then remove self-reference or rework formula so it's not required.

Referencing Values in Other Worksheets and Workbooks

If, when writing your formulas, you decide you want to work with a value, or values, from another worksheet; it's not a problem at all.

To reference data from another worksheet in your formula just follow these steps:

1. Begin building the formula.

2. When you are ready to insert the reference from another worksheet, click the tab for that worksheet.

3. Locate the cell that you want to reference, and click it. If you're referencing a range, drag across the range to select it. The sheet name and cell reference appear in the Formula bar.

4. Continue building your formula by typing the remaining operators. If your formula requires cells from other worksheets(or from the original worksheet), repeat steps 2 and 3 to add them.

5. When the formula is complete, press Enter.

If you want to enter the reference in by simply typing it follow this format:

SheetName!*CellReference*

If the sheet name includes spaces enclose it in single quotes.

Referencing Other Workbooks

If you need to reference data that is not only from another worksheet, but an entirely different file(a.k.a. Workbook), you need to make some slight changes to the reference format. To reference a cell from another workbook you would identify it in your formula like this:

[*WorkbookName*]*WorksheetName*!*CellReference*

Using Functions
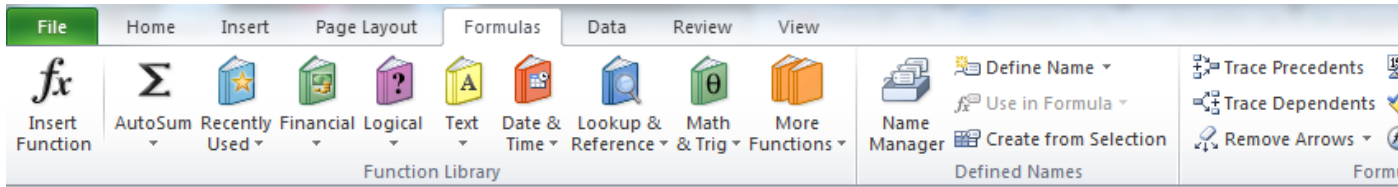
Excel provides a number of pre-built functions (you can make your own using VBA) that can be included in your formulas. To do so simply type the function (e.g. "sum()" with the appropriate information inside the parenthesis) where you would normally type a cell name, a number, or a word. To find a list of functions available follow these steps:

1. Left-click the Insert menu

2. Left-click "functions"

3. From this screen → select the category of function you want and scroll through the list

4. If you want further details about the function left-click "Help on this function"
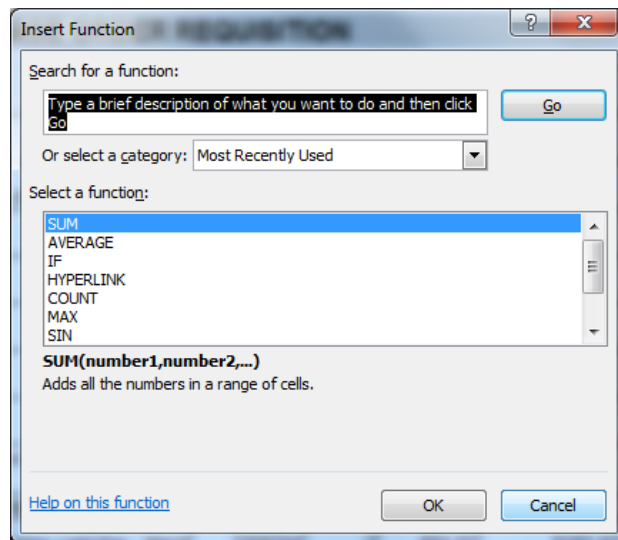
Defining Range Names

Sometimes you'll have a number of cells that you want associated with each other, other times you just find it easier to refer to cells and blocks of cells by name rather than cell address. To name cells on older versions of Excel follow these steps:

1. Select the cell(s)

2. Choose Insert→Name→Define

3. In the Names in Workbook text box, type a name for the selected cell(s)

4. Click OK

On newer versions you simply need to use the Name Box
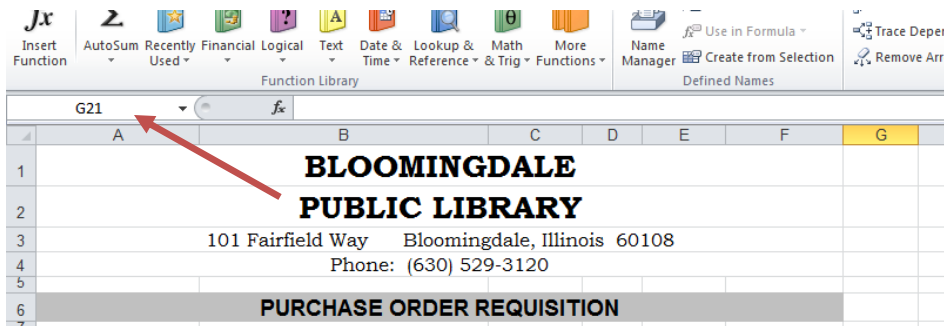
You can now refer to those cells by name on any worksheet in your file.

Logical Functions

For most of us, learning to use formulas in Excel begins with necessity – maybe you need to add some things together, balance a budget, find the average attendance at your meetings. Whatever the reason, you have some task you want to achieve and you direct your efforts towards that. For this reason most people

learn functions like "sum" or "count" long before they encounter functions like "if" or "and". However, the conditional, or logical, functions give our spreadsheets a great deal of flexibility. Today we're going to examine the If function and the things we can do with it.

If (logical_test,[value if true], [value if false])

What does this mean? Lets take it step by step.

1. Logical test: this is a statement that is either true or false. For example "C4>D4" If cell c4 has a numeric value that's higher than that of cell d4 then that's a true statement, if not the statement is false. Here's another example "E1='Kissinger'", in this case, if the word "Kissinger" is typed into cell e1 then it will be true, anything else and it will be false

2. [value if true]: This is what will appear in the cell if the logical test returns "true"

3. [value if false]: This is what will appear in the cell if the logical test returns "false"

We'll go over detailed example of how you can use this to your advantage in class.

Data Validation

Data validation allows you to control the content entered into a spreadsheet. This guarantees that your formulas won't be thrown into errors by strange entries or typos. The steps to performing data validation are as follows:

1. Highlight the area you wish to control

2. Left Click the Data tab of the ribbon

3. Select the Data Validation button

4. Use this screen (shown below) to control what type of data you can enter, what instructions (input messages) should appear when entering data, and what the error messages should say if invalid data is entered
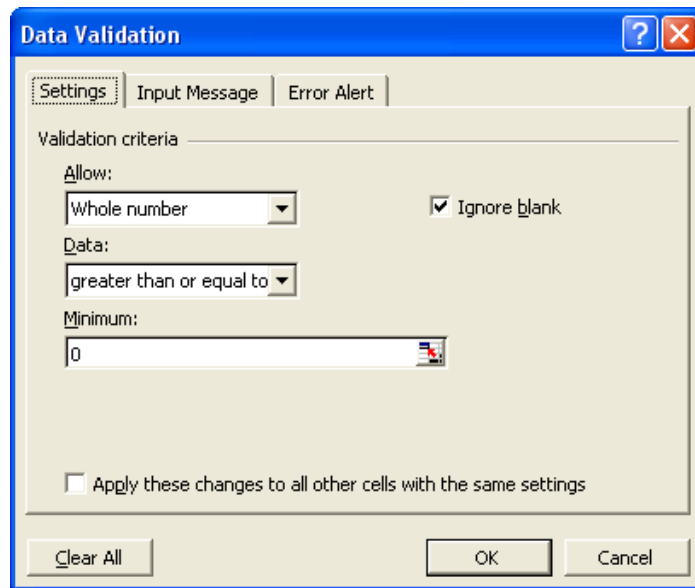

Conditional Formatting

Conditional formatting gives spreadsheet designers the ability to change the appearance of a cell based on the information that appears in it. This is very useful when setting up formulas to deal with a lot of different data entered in. You can control appearances based on a large number of different factors. The steps to adding conditional formatting are as follows:

1. Select the cells who's formatting you want to control

2. Select the Home tab on the ribbon

3. Left click "Conditional Formatting" in the center of the ribbon

4. Select "New Rule"
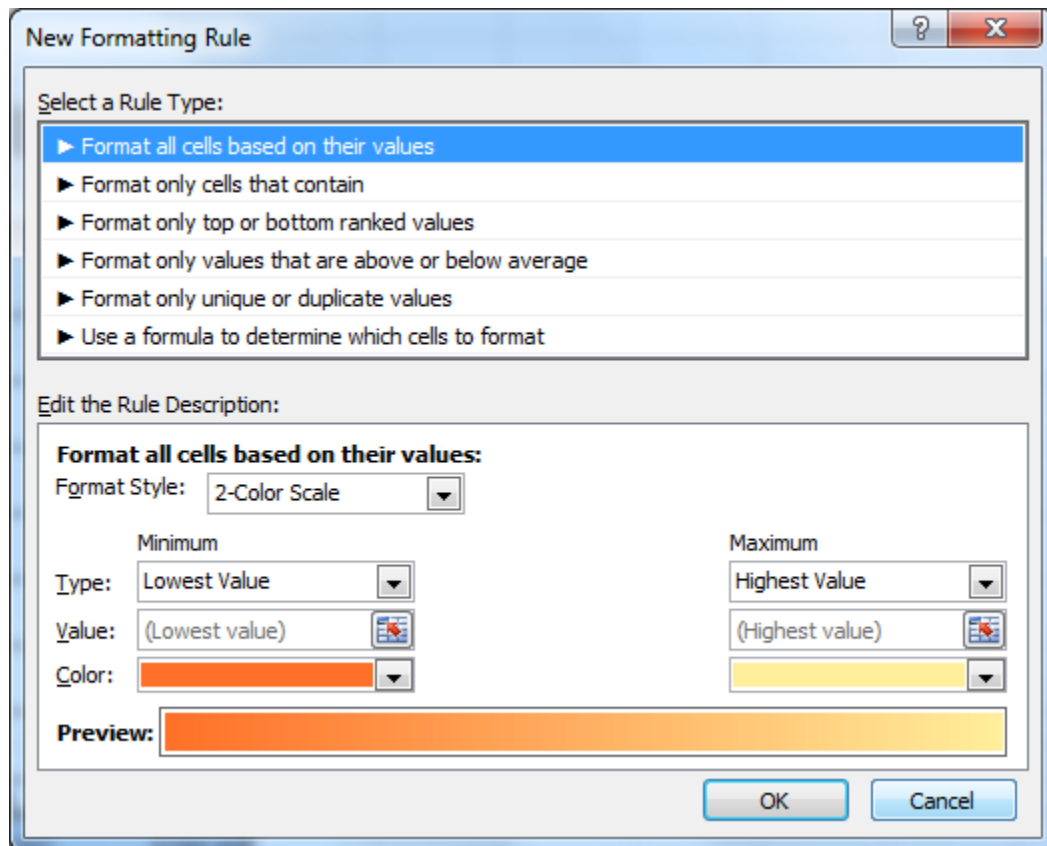
5.

Class Evaluation Sheet

Class attended:

Date:

General suggestions or complaints:

Is there anything I covered too much?

Is there anything I didn't cover enough?

Was there enough time for questions?

Did I answer your questions to your satisfaction?

Are there any classes you'd like to see us offer?

Did I move too quickly? Too slowly?