ARIZONA STATE UNIVERSITY

MCO 510
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Spring 2015

Tips for using Microsoft Excel

Many of the standard Microsoft shortcuts are valid in Excel, too. Here are some that can save time. These are the keystrokes for Macs. For PC users, use the Control key instead of Command.

Cmd+C	Copy	Cmd+I	Italics
Cmd+V	Paste	Cmd+U	Underline
Cmd+A	All	Cmd+N	New
Cmd+X	Cut	Cmd+Z	Undo
Cmd+S	Save	Cmd+M	Minimize
Cmd+P	Print	Cmd+F	Find
Cmd+O	Open file	Cmd+H	Find and replace
Cmd+B	Bold	Cmd+K	Add hyperlink

Cmd+Home	Go to Cell A1
Cmd+End	Go to bottom of spreadsheet contents
Cmd+Page Down	Next worksheet
Cmd+Page Up	Previous worksheet
Cmd+Spacebar	Selects entire column
Shift+Spacebar	Selects entire row
Right click on the mouse	This opens to a number of options
Double-clicking in a cell	Allows you to edit the contents of the cell (F2 on PCs)

Many of these actions also have on-screen icons, and you can access some of them by right-clicking at any time. This is an example of how there is often more than one way to do something in Excel, whether it involves calculations or preferences.

You can format the appearance and general character of your spreadsheet by adjusting settings from the options along the top of the screen, known as the ribbon. Among the most commonly used options are centering the contents of a cell (say for a header), or adding a color for clarity or contrast in a spreadsheet.

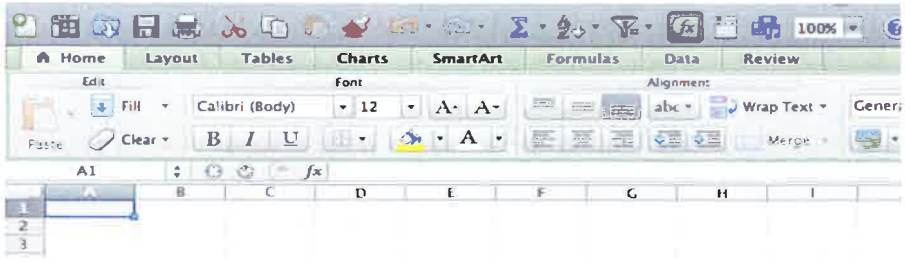
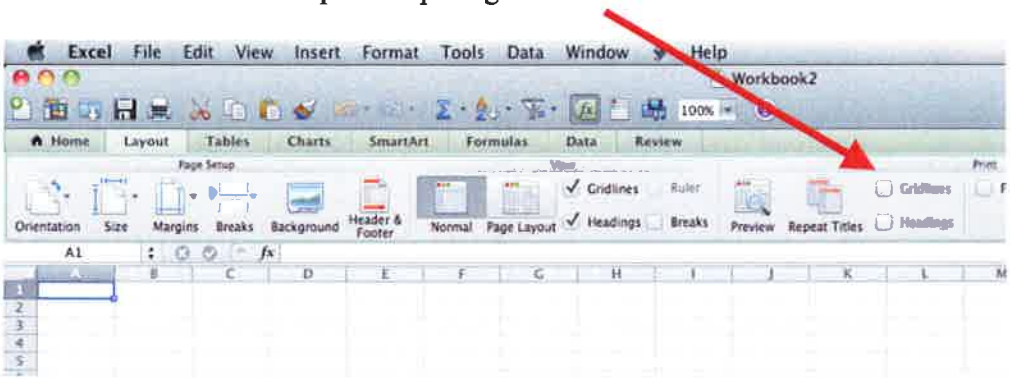


Figure 1Using the ribbon you can make aesthetic changes to improve clarity.

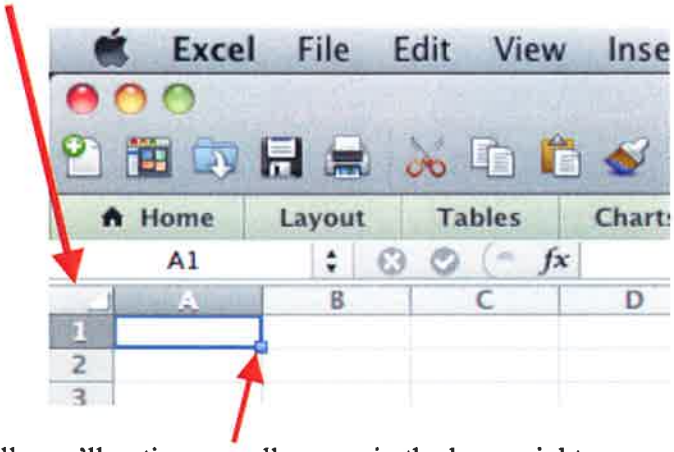
Maybe the most important advice for Excel: Always keep your original data. Create a copy of it and make changes to the copy. Maybe the second most important advice is to save often, but make sure not to save unwanted changes in your data.

When printing, you may want to include the gridlines in your spreadsheets to make the contents easier to follow. The easiest way to do this is by clicking on the Layout button of the ribbon. You'll notice an option to print gridlines.



Other tips for navigating Excel

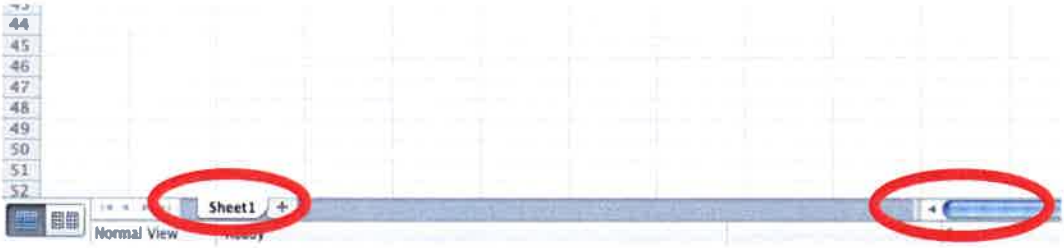
Clicking on the top left rectangle between column A and row 1 selects the entire worksheet. This is helpful if you want to copy everything in a worksheet.



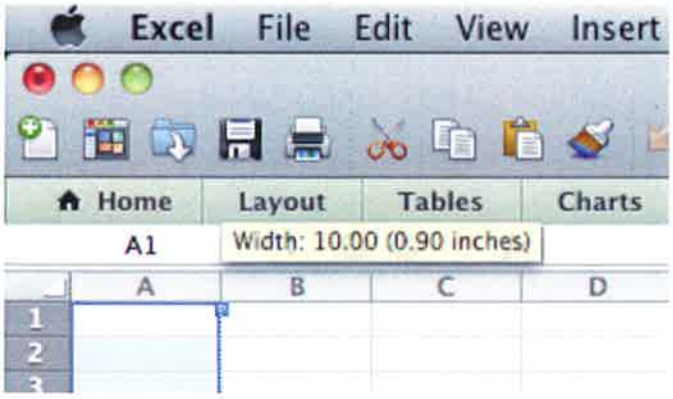
In the active cell, you'll notice a small square in the lower right corner. When you are over that with your mouse pointer, it will change from a white pointer to a black cross. Drag the auto-fill handle, as it is known, to copy the contents or formula. Double-click the auto-fill handle to fill an entire range vertically.

New spreadsheets begin with one worksheet labeled Sheet 1 in the bottom left portion of the screen. You can add, delete or rename sheets by right-clicking on the tab names or by double-clicking on them.

The bar in the bottom right is a quick way to slide from one side of the spreadsheet to another.



Columns and rows come in standard sizes, but they can change to fit their contents. If you want to change a cell's size, you can drag the line between the lettered columns or numbered rows to fit your needs. The pointer will change shapes when you are hovering over the border line, which is where you need to be. A quick way to make it fit is to double-click on the column header or over the row border.



Right-clicking is one of the most versatile tools you have in Excel. Much of whatever you want to do, from the appearance of your calculations to the cosmetics of the way it appears can be done with a right click. Here's what that typically looks like:

The right-click will reveal different menu options depending on what you're doing in the worksheet at the time.

In particular, you will often use Format Cells, which allows you to pick different ways to display something. For example, you can choose Percentage, Date or Currency for those types of figures.

Typically, you'll want currency with or without decimal points. But you have many options.

Working with numbers and data

This is one of the most basic strengths of using Excel. By using certain commands, you can have it add, subtract, multiply, divide, count and sort large amounts of data.

The SUM command is the workhorse of Excel. You will probably use this more than any other.

There are two basic uses. The first is to spell out each cell to add. The second uses a colon to note a cell range when dealing with many numbers at a time.

Here are two examples that do the same calculation in different ways:

=SUM(*cell address 1+cell address 2+cell address 3-cell address 4*)
=SUM(*cell address1:cell address 3*)*-cell address 4*

There's no "right" way to do calculations like this, but the second formula is shorter, especially when you have long lists of numbers.

Notice that you aren't limited to adding when using SUM. You can add (+), subtract (-), multiply (*) or divide (/) using the command.

Use parentheses to group calculations so they do what you want them to do and in the correct order. Here's an example:

(3+7)/5 is not the same as 3+(7/5). The answer to the first calculation is 2. The answer to the second one is 4.4. Where you put your parentheses makes a difference.

Copying formulas is easy, and Excel can do a pretty good job of adjusting calculations based on what it thinks you want to do. For example:

	Column A	**Column B**	**Column C**	**What appears in C**
Row 1	3	5	=SUM(A1*B1)	15
Row 2	2	6		
Row 3	4	7		

Entering the formula in cell C1 gives you an answer of 15. If you want to do the same calculation for the other rows, too, you can save time by copying the formula and pasting it to the other cells, or drag the auto-fill handle over the same range. (Or double-clicking the auto-fill handle is faster still.) Either way, this is what gets placed in the cells:

	Column A	**Column B**	**Column C**	**What appears in C**
Row 1	3	5	=SUM(A1*B1)	15
Row 2	2	6	=SUM(A2*B2)	12
Row 3	4	7	=SUM(A3*B3)	28

This is what you want and saves you from typing it out in each cell.

If you want to keep a cell address constant in the formula, you can do so by adding a dollar sign ($) known as an absolute to it. Let's say we want to keep multiplying cell A1 (as opposed to A2 and A3 as well) by the various rows in column B. Here's what you would copy or auto-fill:

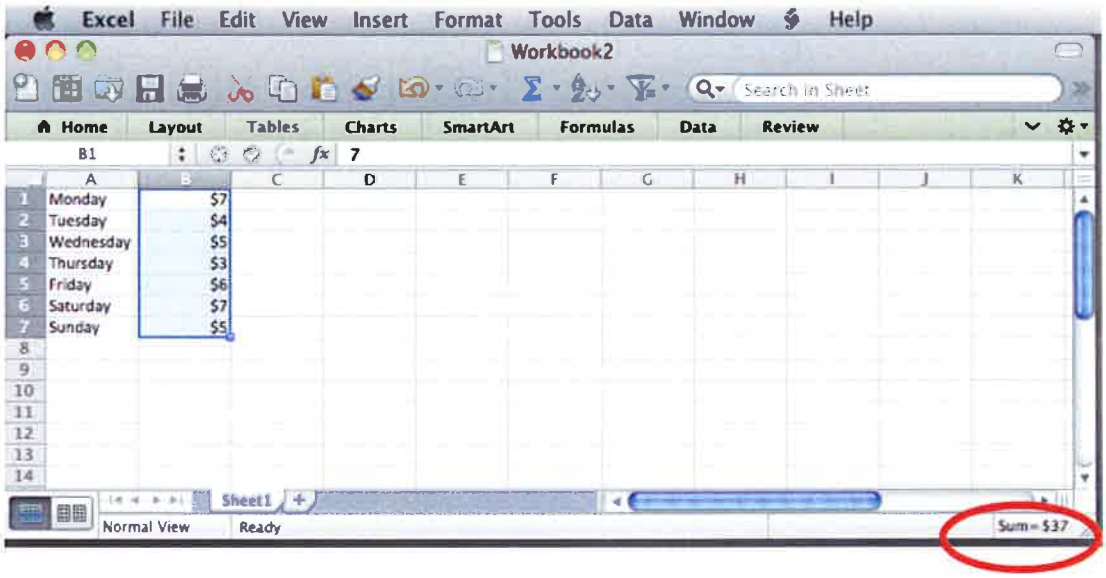
	Column A	**Column B**	**Column C**	**What appears in C**
Row 1	3	5	=SUM($A$1*B1)	15
Row 2	2	6		
Row 3	4	7		

Doing so results in this:

	Column A	**Column B**	**Column C**	**What appears in C**
Row 1	3	5	=SUM($A$1*B1)	15
Row 2	2	6	=SUM($A$1*B2)	18
Row 3	4	7	=SUM($A$1*B3)	21

As you can see, A1 remains the first number in the equation even as the second number changes as you move down the column. The absolute applies to either a column or a row. To have it apply to both, you need to insert it in front of both.

There's another way to add things in a series quickly. Highlight the numbers in a line, then look in the bottom right of the screen. Excel gives you a handy calculation.



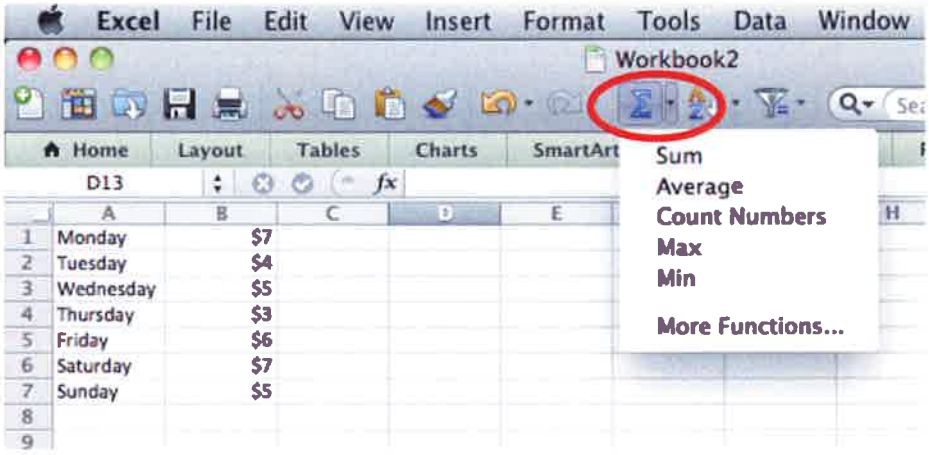
Calculating an average and median is easy in Excel.

=AVERAGE(*first cell range*:*last cell range*) will get you an average of the numbers.

=MEDIAN(*first cell range:last cell range*) will do the same for a median.

Note: Median is the middle number in a range, which is different than the average. Think of Steve Jobs walking into a roomful of reporters. The *average* income for everyone is in the millions because of him, but the *median* income would look like yours because of everyone else.

There's another way to quickly perform basic math functions, like adding, averaging and counting the number of items in a list. Use the sigma button at the top of the screen. Excel will guess at the range you want to select. You can change this as needed.



Sometimes you get lots of fields of data together but realize you need to rearrange them to make sense of them. There are several tools to help you do this.

First, you can do a general sort. Go to Data, then click Sort and click Column and make your choice. You can sort from A to Z or vice versa. (This also sorts numbers the same way.)

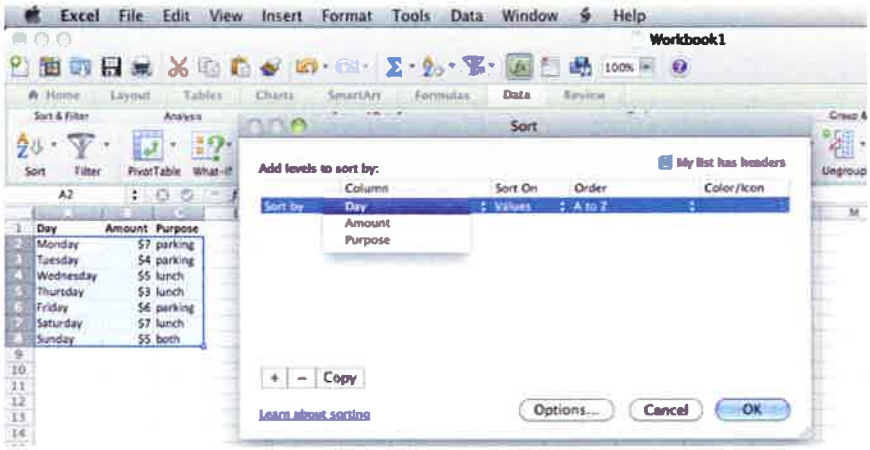
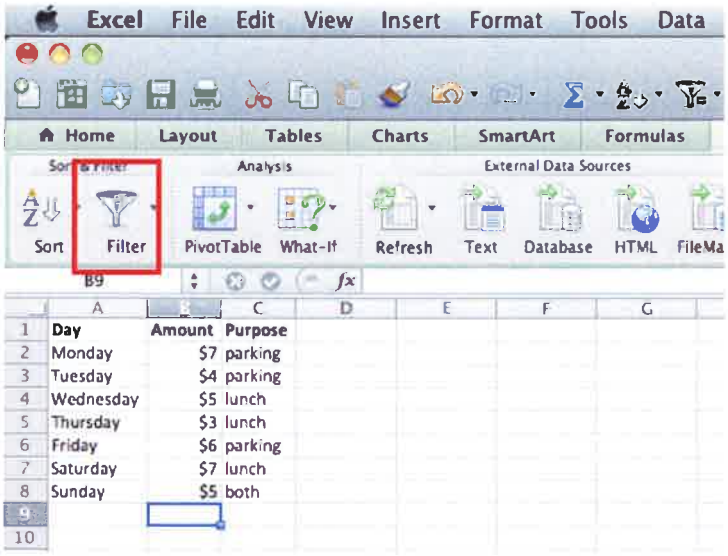


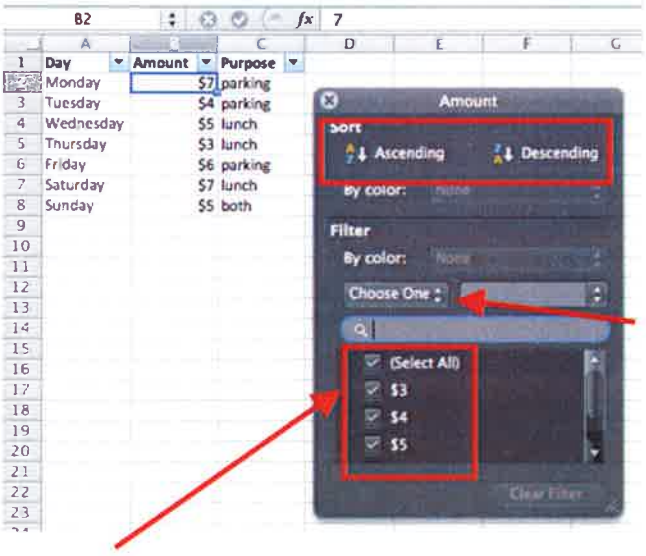
Figure 2 One way to sort is to click on Data along the top of the worksheet.



An easier way to do the same thing is to turn on the auto-filter. This is found within the Data tab on the ribbon. Once you click on that, you'll notice a funnel on the left. Click this and it toggles filter buttons where it thinks you want them in your spreadsheet.

You should see the header column with upside-down triangles. Now you can isolate the data you want to see.

Click on a triangle and you can sort the data for that column. In our example above, you could click the triangle next to the Amount header.



A dialog box opens giving you a number of useful options.

At the top, you could click on ascending or descending, which sorts text or numbers as you would expect.

In the middle, you can click the box labeled Choose One. This gives you the option of selecting, say, all the data greater than some number you pick or data within criteria you select.

Along the bottom is a nice custom filter where you can toggle between all the data (labeled as Select All) and each of the individual data entries. So you can uncheck Select All and check the entry for $5 in the Amount column. This tells Excel to display only the rows where the amount is $5. All the data still exists, but you can't see it until you take the filter off.

In the bottom of the spreadsheet it also tallies the records shown.

If Excel doesn't place the filters in the right place for you, it's probably because you are trying to put them in a place that doesn't seem like the top of a range. In other words, you may have an extra row above your data range. Separate that from the rows you want to filter and the auto-filter should work.

You can filter multiple columns at once.

There's an easy way to clean your data of **extraneous spaces** using the TRIM command.

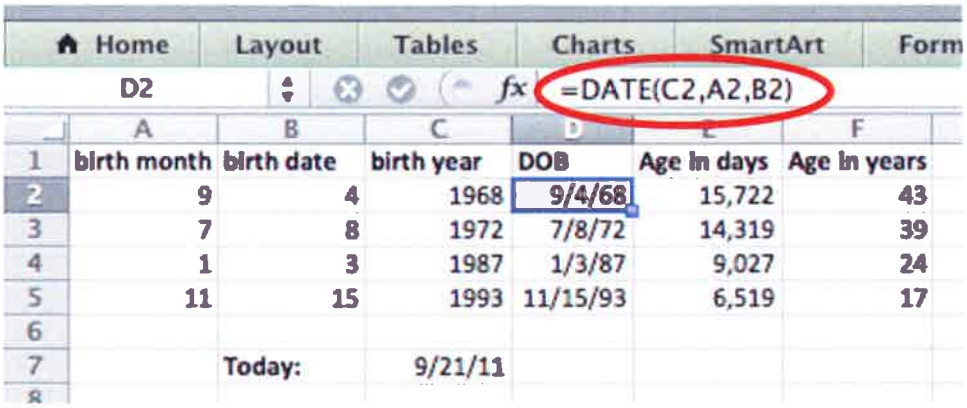
=TRIM(*cell address*)

Advanced editing functions

You can do a lot with dates and age. Here are some examples.

To merge different fields for a date, use the DATE command. Notice that the order of the formula is different than the display in the worksheet.

Use =DATE(*year cell*, *month cell*, *date cell*).



	A	B	C	D	E	F
1	birth month	birth date	birth year	DOB	Age in days	Age in years
2	9	4	1968	9/4/68	15,722	43
3	7	8	1972	7/8/72	14,319	39
4	1	3	1987	1/3/87	9,027	24
5	11	15	1993	11/15/93	6,519	17
6						
7		Today:	9/21/11			

You can calculate the **difference between two dates** by using a couple tools. The easiest way to count days is simply to subtract one cell from another. Make sure the answer is formatted as a general number, not a date.

First cell	Second cell	Formula	Answer
9/4/1968	9/21/2011	=(*second cell – first cell*)	15,722

To **calculate age in years**, use the DATEDIF command.

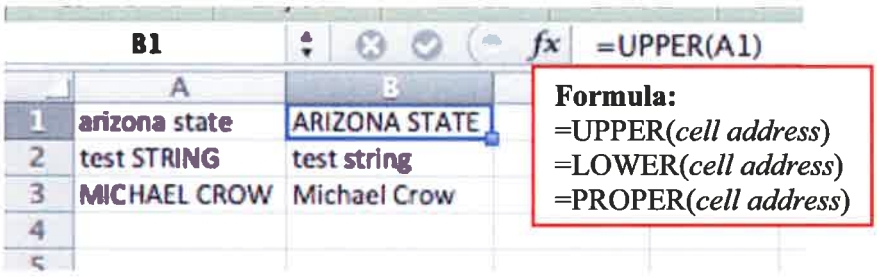
First date	Second date	Formula	Answer
7/8/1972	9/21/2011	=DATEDIF(*start date*,*end date*,"y")	39

Note that there are no spaces between the cell addresses and the interval. The interval can also be "m" for months or "d" for days.

To display only a portion of a date, use the **MONTH or YEAR** command. Say you have a date like 12/20/1969 and you want to display a portion, here's how to do it:

Formula	**Result**
=YEAR(*cell address*)	1969
=MONTH(*cell address*)	12

To **change case** of text in cells, use the UPPER, LOWER or PROPER commands.



To **merge contents** from different cells, use the ampersand command.

First cell:	**Second cell:**	**Formula:**
Super	duper	=(*first cell address&second address*)

Result:
Superduper

To **separate contents**, as with a name, use quote marks with a blank space between them.

First cell:	**Second cell:**	**Formula:**
Jan	Brewer	=(*first cell address&" "&second cell address*)

Result:
Jan Brewer

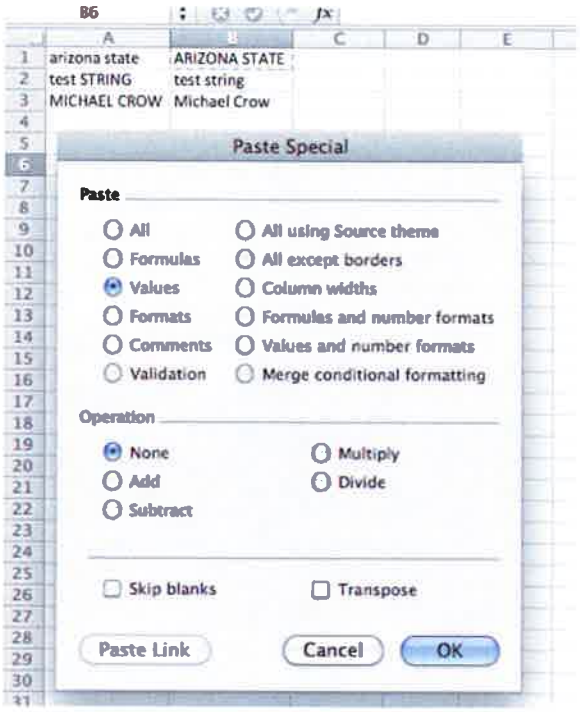
You can **add other characters** the same way. Here's how to list alphabetic by last name:

First cell:	**Second cell:**	**Formula:**
Jan	Brewer	=(*second cell address&", "&first cell address*)

Result:
Brewer, Jan

Note the space between the comma and closed quote mark.

In the examples above, the resulting data looks like a name, but it's actually a formula. If you want to copy it somewhere else – or just change it so that it actually is the name it seems – there's an easy way to do it.



First, copy the data and select the cell you want to place it in, then right-click and select **Paste Special**.

In the dialog box that opens, choose Values.

The cells should appear the same, but inside them the contents are no longer a calculation. Instead, they are the words you actually see. This works with numbers, too. It's a good way to change a calculation to the base data you now want to use.

For example, a cell may contain the formula 2*2, which displays as 4. You can change this to actually be the number 4 by copying and selecting paste special as a value. Don't forget you can paste over the cells the formulas appear in, too.

Paste special has another commonly used function: It transposes data. Suppose you have data displayed horizontally and you prefer it in a column. Copy the data range and select paste special, then click on transpose in the lower right corner. This changes the layout in a way that can make it easier to use. Here's what it looks like:

Original layout:

ABCD
1234

After copy, paste special and transpose:

A1
B2
C3
D4

This works to reorient material from vertical to horizontal, too. Be careful when doing any of this because formulas that reference other cells can accidentally be thrown off by transposing them.

To locate or clean up data, use the Find and **Find and Replace** functions.

Ctrl+F will locate the characters you enter in the search field. Be as brief or nonspecific as you need to be.

For example, to find an instance of Phoenix in a spreadsheet, hit Ctrl+F, then type "pho" or "phoen" in the window. You can spell out "phoenix" but remember that it limits your search only to those instances where it is spelled correctly. It won't find any misspelled instances, if there are any.

Tip: Using the auto-filter and checking all the data types in a field where you expect to see Phoenix could help you see if there are rows where it appears incorrectly (The typo Pheonix, for example, would not be located with a regular search. By looking through the data types, you can see that this entry is there and you can correct it, too.

Find and replace is a time-saving tool to clean up numerous instances of something you want to change. Say your data says "CASE RESOLVED, NO ACTION TAKEN" and you want to change this to "case closed".

Use the Ctrl+F or Ctrl+H shortcuts, and follow the on-screen instructions. The important thing to remember is that it can help a search by using partial terms like "phoe" instead of "phoenix." But when you do a find and replace, you need to spell out exactly what you want replaced and spell out exactly what you want it replaced with. There are options to make case matter. If you make a mistake, remember you can undo the changes *until you save them*. Be careful because you can sometimes change more than you want! Keep originals and inspect your changes.

To extract portions of a cell, use the **LEFT**, **RIGHT** and **MID** functions.

Say you have a string of data that includes a country code, state code and ZIP plus four code sandwiched around the ZIP code that you really want. It looks like this:

1104850044378

You know that the first four digits aren't important and the last four aren't, either. Your formula would tell Excel to start by displaying the fifth character and continue for five characters, the length of a ZIP code. It would look like this:

=MID(*cell address*,5,5)

Starting number string	**Selected string**
1104850044378	85004

In our example above, the formula would isolate the 85004, which we know is the ZIP code we're trying to identify.

It's the same for LEFT and RIGHT functions.

Cell:	**Formula**:	**Result**:
3/7/2005	=RIGHT(*cell address*, 4)	2005

Note: Dates are actually the number of days since the beginning of 1900, but they are formatted to appear like something meaningful to you. If you are working with dates and see some large number that doesn't seem to correspond to what you were trying to do, it may be a formatting issue that you can fix with a right click, format cells command.

To **split contents** of a cell, you can also use a Data tool.

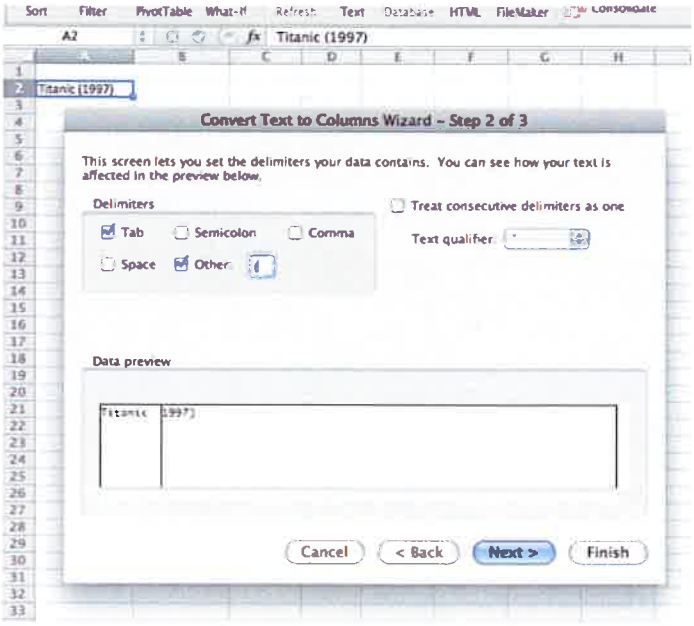
Suppose we have a cell with two pieces of information that we would rather have in one:

Titanic (1997)

We want to separate the name of the movie, Titanic, and the year of its release, 1997.

First, highlight the area we want to change, then click on Data and go to Text to Columns. A new dialog box should appear and give you a choice of whether the data is delimited or fixed width.

Fixed width is, as the name suggests, a certain number of characters or spaces wide. Choose this if all your data is the same width. Define the width in the next screen and you should have a clean dataset. If the data isn't all the same width, choose delimited.



Delimited data is data that is separated by certain characteristics, say, a comma, a pipe (|), an underscore (_) or a parenthesis. Click on the appropriate box (comma, for example) or enter the appropriate character in the box labeled Other. In our example, it's the opening parenthesis.

Click Finish and it splits the contents so that Titanic is in one cell and 1997) is in the one next to it. You'll want to

get rid of the closing parenthesis. You could edit that one cell (by hitting the F2 key). If you have plenty of rows, you'll want to do a Find and Replace and use a backspace stroke as the replacement for the parenthesis.

Using pivot tables

Pivot tables sound scary and, truth be told, aren't especially intuitive at first. But don't be intimidated. They are one of the most powerful tools in Excel, and once you figure out how they work, you won't want to do things any other way.

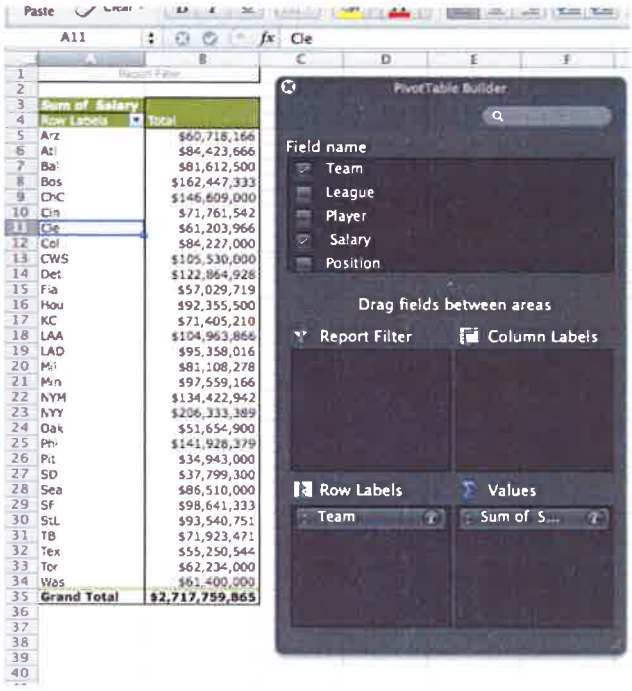
Essentially pivot tables provide an instant database overview based on criteria that you choose. Let's use an example.

Say we have a database of baseball teams, player names, position and salaries for each man. We want to know what the payroll of each team is.

Without a pivot table, we would have to isolate the data for each team and add the salary data. This can be done using an auto-filter, but it's tedious.

Here's how the pivot table makes short work of it:

Click on any part of the database, then go to Data and select Pivot Table. You'll also find an icon for it in the Data tab on the ribbon. Excel guesses at the data range you're trying to examine. As long as every column and row are a compact table with a header, it will probably guess correctly. Putting something extra alongside any part of the database will confuse Excel.



Excel opens a new worksheet with the data arranged in a table that may seem confusing. There's a black dialog box that will help you shape the data as you would like.

Drag the field name of a category into the row labels in the lower left corner of the box and Excel sorts the data to show it.

In our example, drag Team into Row Labels and drop it there. You should see every team listed alphabetically on the left. Drag another field name, like Salary, into the Values box in the lower right corner. You should see all the teams and their total payroll.

In this case, we're totaling dollars, but they first appear as numbers without the dollar sign.

You can change that by right-clicking and selecting Format Cells. This opens a dialog box. Select currency as you normally would. Doing so, formats all the totals properly.

You can modify your pivot table endlessly. Dragging the Player word below Team in the Row Labels allows you to see all the players within each team.

There are times when you need Excel to evaluate data and do something if certain conditions exist. This requires the use of **IF statements**. Here's an example: Suppose we have a list of quiz scores and want to determine whether someone passed based on a score greater than 10. Our formula would look something like this:

=IF(*cell address*>=10,"Pass","Fail")

Score	**Result**
12	Pass
9	Fail
10	Pass

Notice that we define the criteria, then give instructions. In this case, if a quiz score is greater than or equal to 10, note that the student passed. If not, they failed.

You can have more than one condition with the IF statement. This is known as nesting. The rules are the same, but these multiple conditions, called arguments, are all set off with their own IF statement and are within the first one. Structurally, it looks like this:

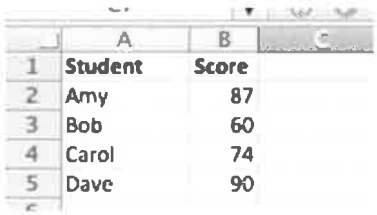
=IF(1st argument,IF(2nd argument,IF(3rd argument)))

Notice how the arguments are placed within the parentheses for the argument preceding it. Be careful in closing each argument with parentheses in the right spots. It's easy to get lost in the maze of a long IF statement.

Lookup tables

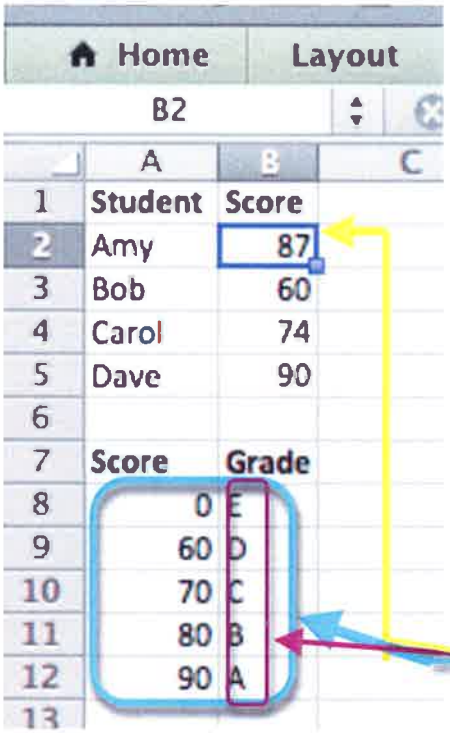
Closely related to the IF statement is the **lookup table**. This is a handy tool to calculate where data falls within a defined range.

Think of assigning grades to student scores. Here's an example:



	A	B
1	**Student**	**Score**
2	Amy	87
3	Bob	60
4	Carol	74
5	Dave	90

We want a lookup table that outlines how to assign grades to those scores. Always put the table in alphabetic or numerical order, depending on what type of data you're using.



We've put a Score column (in numerical order) that runs through the breakpoints for different grades. Next to it, we add a Grade column that corresponds to those numbers. (90 or more is an A.) The table is correctly sorted in ascending numerical order based on the score (rather than by letter grade) because that's how the grades are assigned.

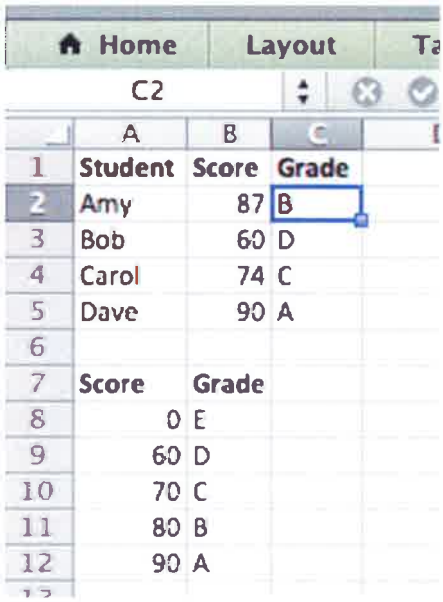
Now we write a formula to tell Excel to look at this table and assign grades based on the individual scores.

Lookup tables use either a VLOOKUP command or HLOOKUP depending on whether the data is oriented vertically (V) or horizontally (H). In this case, the data is arranged vertically, so we'll use the VLOOKUP formula. It is structured this way:

=VLOOKUP(B2,$A$8:$B$12,2)

=VLOOKUP(*cell address of the value to assess,lookup table range,column number to display the answer*)

Because you'll probably want to refer multiple cells, you'll need to use absolutes ($) to define the lookup table (the middle part of the formula) and copy the formula to your entire range.



What's happening is Excel looks at cell B2 and finds where that score (87) falls within the lookup table range. The table range is from A8 down to B12.

Excel skips 0, 60 and 70. It determines that 87 is greater than 80 but less than 90, so that is the proper score range. The last part of the formula tells Excel to display the second column for that particular range. In this case, that means an 87 equals a B grade.

Now copy the formula to the other cells.