

Recitation 4: Introduction to Microsoft Excel

When working as an urban planner (or one of its variants), you may need to analyze data from all sorts of sources. Excel can serve as a starting point for gathering data in order to format, sort, and analyze it.

Excel can readily view many different types of data and convert them into spreadsheet format. However, it does not establish a relationship between data records – that is, Excel does not think of one row of information as having any connection to another row. In order to create data relationships, you use a relational database program such as Microsoft Access (other popular examples are Lotus Notes, Sybase, and Oracle). These relational database management systems will be covered in Recitation 6.

Sample Data for Today's Recitation:

[File 1 \(tab delimited\)](#)

[File 2 \(comma delimited\)](#)

[File 3 \(fixed width\)](#)

File 4 (dbf)

File 5 (excel)

Download the files to your MyDocument folder (or on the desktop, or anywhere you can easily find).

Importing Data

Demographic data are often distributed in different format. (see the raw data using the notepad)

1. Tab-delimited (.txt)
2. Comma-delimited (.csv)
3. Fixed width (.txt or .prn)
4. Excel format
5. Access format
6. DBF (dBase file)

dBase is one of the oldest database software. Its format still survives although we don't use the software any more.

Choose "DBF 4 - dBase IV" when you are asked to choose among different versions.

The first row in Excel corresponds to the field name for each column.

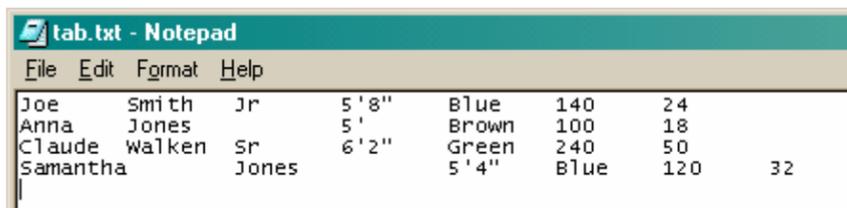
GIS software packages often require this format for importing data.

Using Excel, you can open/save in all of those formats. Beware, Excel will try to lure you into saving in the Excel format.

Several choices:

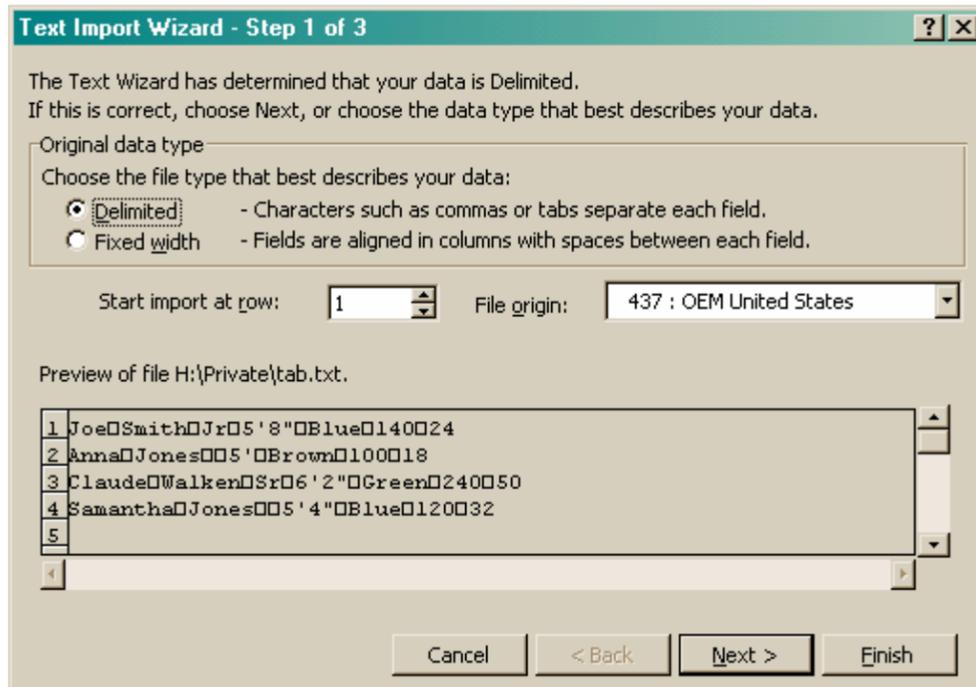
- **File | Open**
- **Data | Get External Data | New Database Query**
 - This is for more complicated imports, like from Access or Dbase files.
- **Data | Get External Data | Import Text File**

Tab Delimited Data

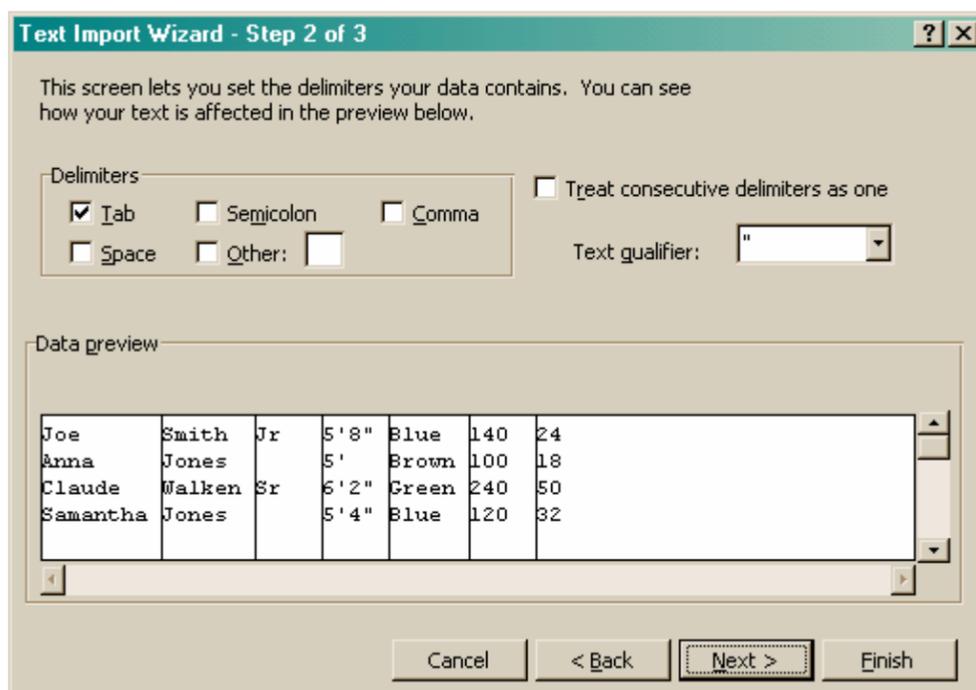


File	Edit	Format	Help			
Joe	Smith	Jr	5'8"	Blue	140	24
Anna	Jones		5'	Brown	100	18
Claude	Walken	Sr	6'2"	Green	240	50
Samantha	Jones		5'4"	Blue	120	32

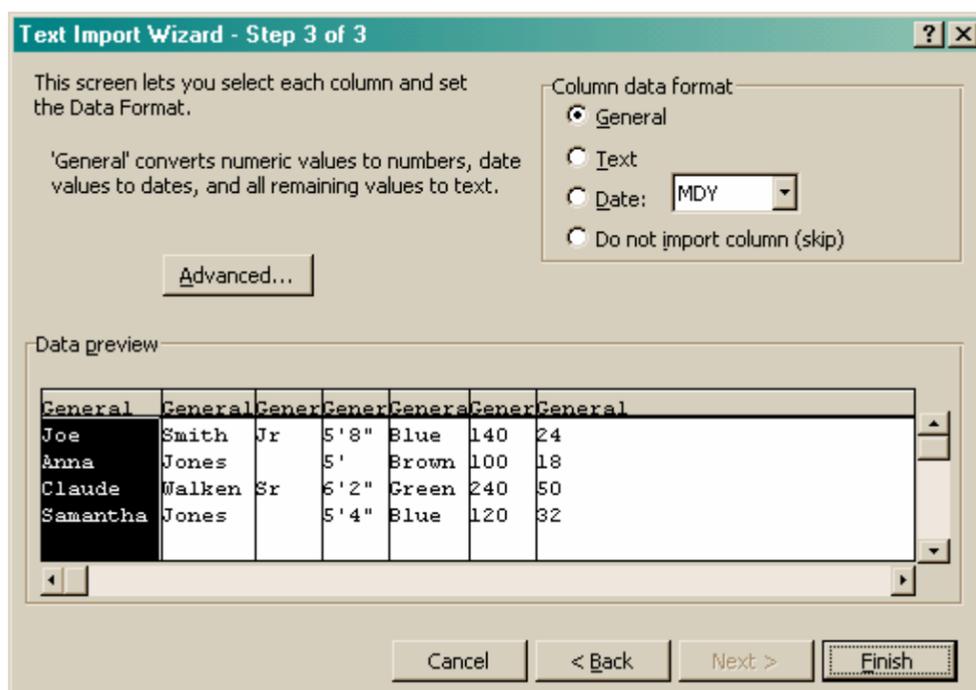
Select "Delimited" as the Original Data Type. When finished, click "Next."



Select "Tab" as the Delimiter. When finished, click "Next."



If you need to change the data format of the columns, do that here. You highlight each column and select the appropriate column data format. Then hit "Finish."



Screenshot of what the tab delimited data looks like in Excel.

	A	B	C	D	E	F	G
1	Joe	Smith	Jr	5'8"	Blue	140	24
2	Anna	Jones		5'	Brown	100	18
3	Claude	Walken	Sr	6'2"	Green	240	50
4	Samantha	Jones		5'4"	Blue	120	32
5							
6							
7							

Comma Delimited

```

Joe, Smith, Jr, 5'8", Blue, 140, 24
Anna, Jones, 5', Brown, 100, 18
Claude, Walken, Sr, 6'2", Green, 240, 50
Samantha, Jones, 5'4", Blue, 120, 32

```

Select "Delimited" as the Original Data Type. When finished, click "Next."

Text Import Wizard - Step 1 of 3

The Text Wizard has determined that your data is Delimited.
If this is correct, choose Next, or choose the data type that best describes your data.

Original data type

Choose the file type that best describes your data:

- Delimited - Characters such as commas or tabs separate each field.
- Fixed width - Fields are aligned in columns with spaces between each field.

Start import at row: File origin:

Preview of file H:\Private\comma.txt.

```

1 Joe, Smith, Jr, 5'8", Blue, 140, 24
2 Anna, Jones, 5', Brown, 100, 18
3 Claude, Walken, Sr, 6'2", Green, 240, 50
4 Samantha, Jones, 5'4", Blue, 120, 32
5

```

Buttons: Cancel, < Back, Next >, Finish

Select "Comma" as the Delimiter. When finished, click "Next."

Text Import Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

- Tab
- Semicolon
- Comma
- Space
- Other:

Treat consecutive delimiters as one

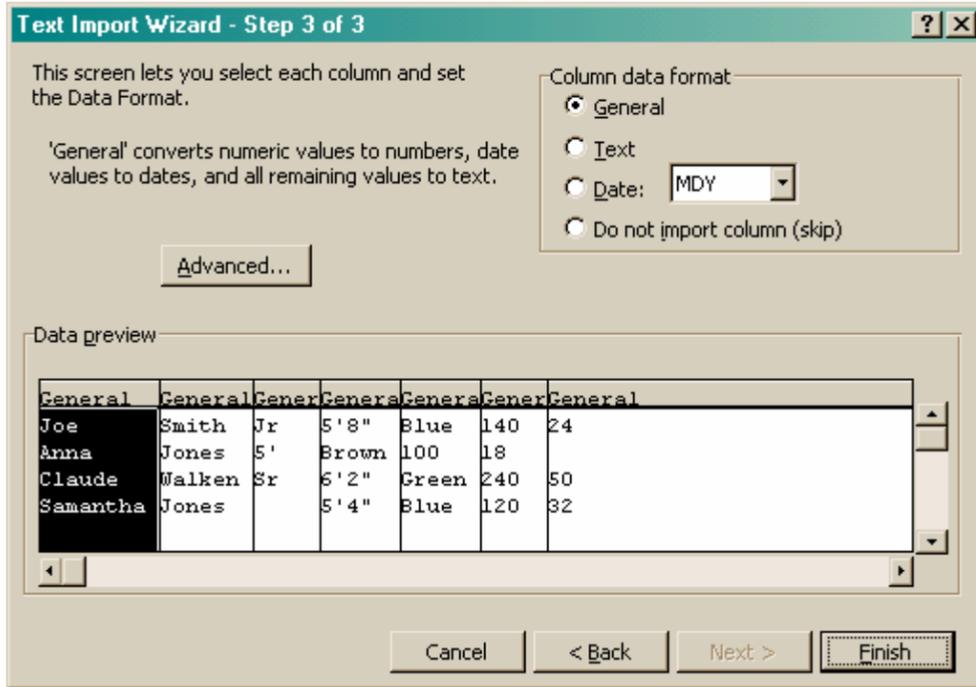
Text qualifier:

Data preview

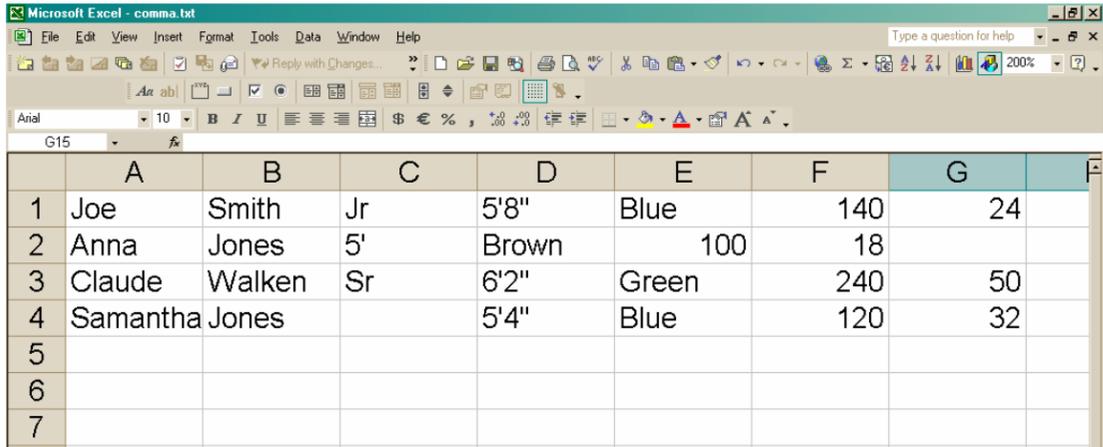
Joe	Smith	Jr	5'8"	Blue	140	24
Anna	Jones	5'	Brown	100	18	
Claude	Walken	Sr	6'2"	Green	240	50
Samantha	Jones		5'4"	Blue	120	32

Buttons: Cancel, < Back, Next >, Finish

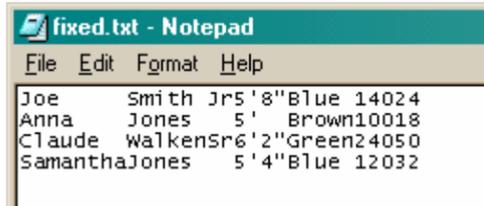
If you need to change the data format of the columns, do that here. You highlight each column and select the appropriate column data format. Then hit "Finish."



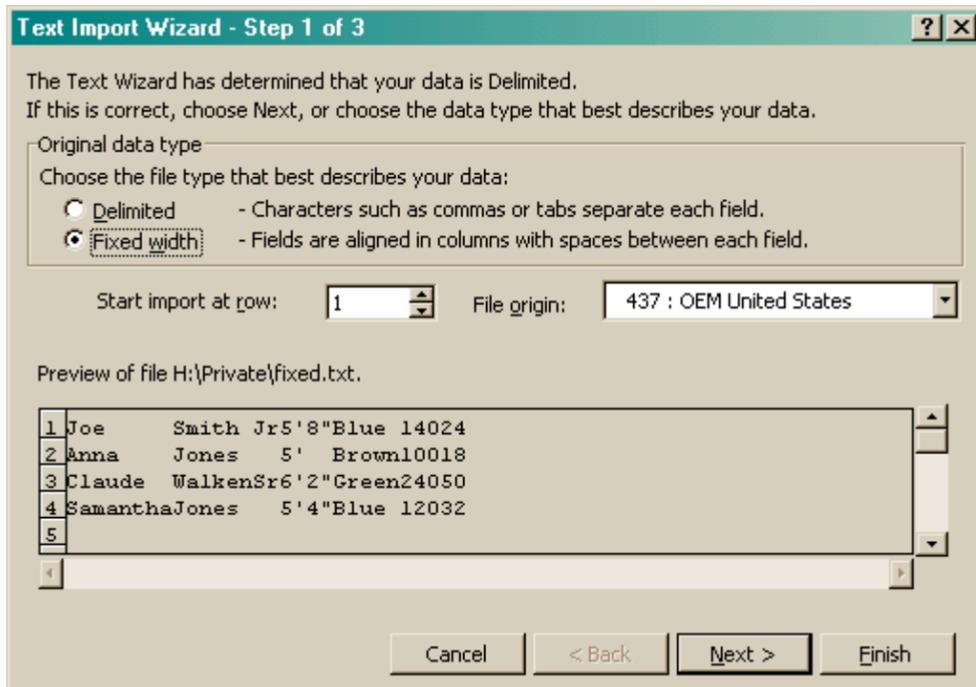
Screenshot of what the comma delimited data looks like in Excel. Notice that height of Anna Jones is in the wrong column. This occurs because the data was missing a comma between the suffix column (Column C) and the height column (Column D).



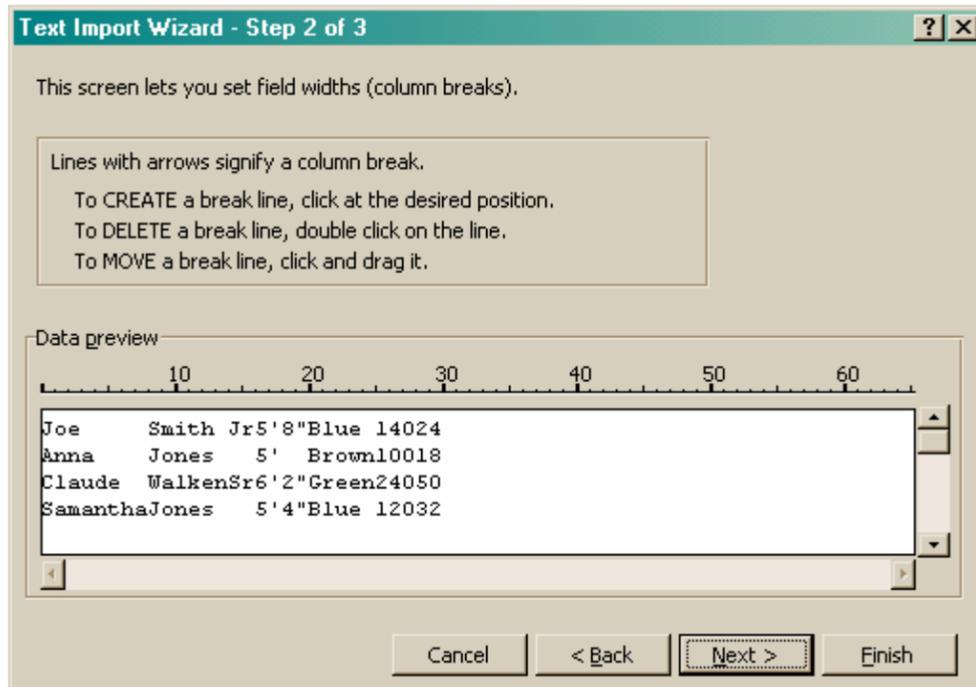
Fixed-Width



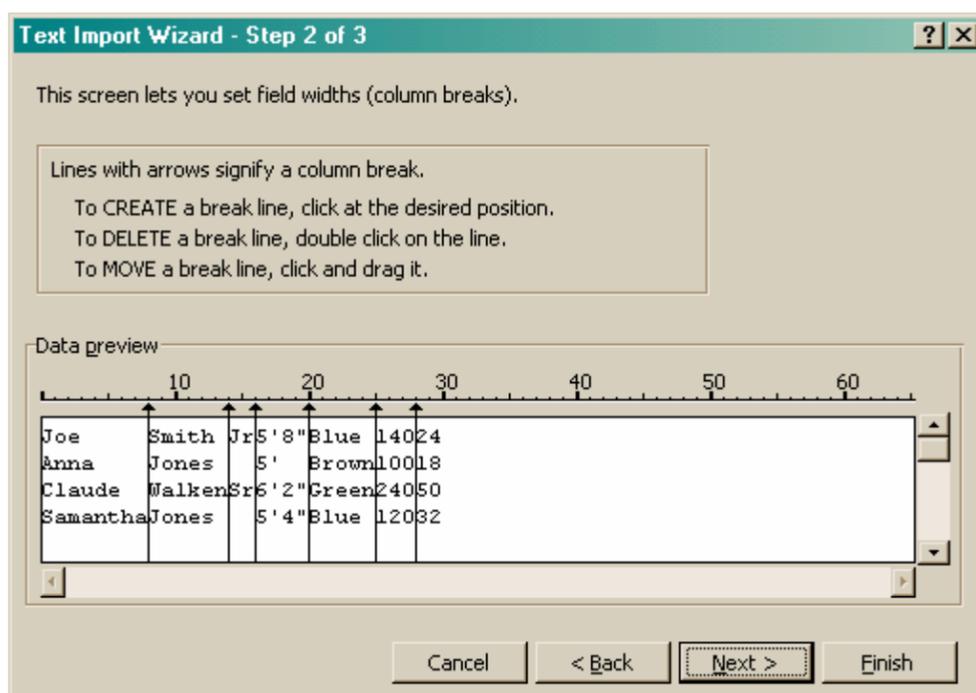
Select "Fixed width " as the Original Data Type. When finished, click "Next."



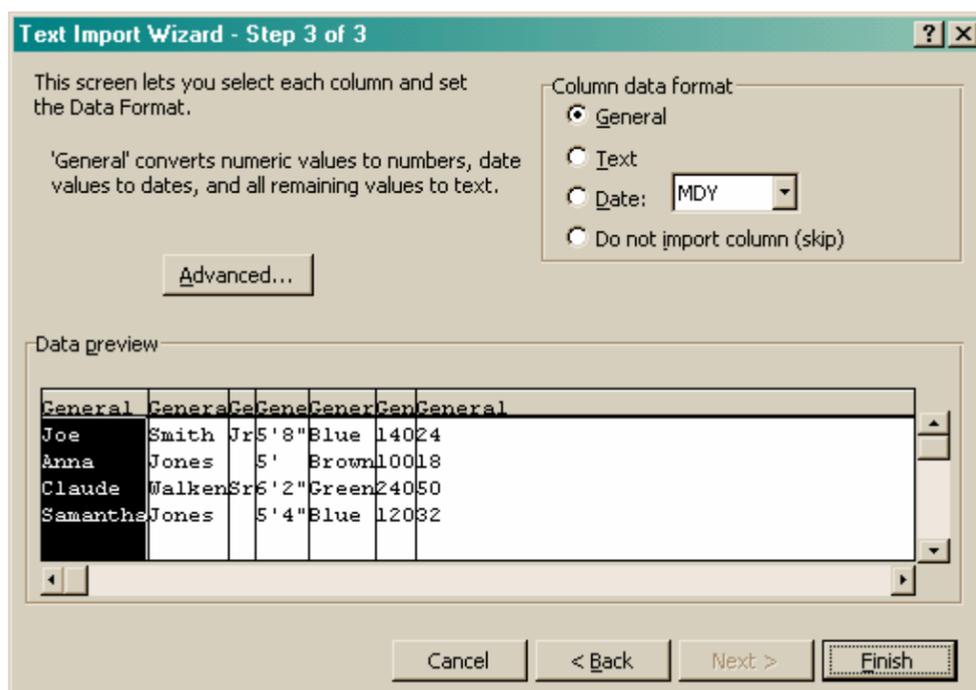
Now we need to tell Excel how to split up the data into columns. In this case, we need to put a column break after the longest field. So Samantha; Walken; Jr or Sr (since they are the same length); the double quotes ("); and 0. This translates into a length of 7 for Column 1, 6 for Column 2, 2 for Column 3, 5 for Column 4, 3 for Column 5, and 2 for Column 6.



Create a column break by clicking on the appropriate place in the window. The break can be moved by clicking and dragging it to the desired location. Double-click on a line to delete it.



If you need to change the data format of the columns, do that here. You highlight each column and select the appropriate column data format. Then hit "Finish."



Screenshot of what the fixed width data looks like in Excel. It matches the results of the tab delimited data.

	A	B	C	D	E	F	G
1	Joe	Smith	Jr	5'8"	Blue	140	24
2	Anna	Jones		5'	Brown	100	18
3	Claude	Walken	Sr	6'2"	Green	240	50
4	Samantha	Jones		5'4"	Blue	120	32
5							
6							
7							

Excel file format (*.xls) v. dBase file format (*.dbf)

- dbf File removes any text formatting

Excel File -- note the **bold** row headings and the *italicized* data.

	FirstName	LastName	Suffix	Height	EyeColor	Weight	Age
2	<i>Joe</i>	<i>Smith</i>	<i>Jr</i>	<i>5'8"</i>	<i>Blue</i>	<i>140</i>	<i>24</i>
3	<i>Anna</i>	<i>Jones</i>		<i>5'</i>	<i>Brown</i>	<i>100</i>	<i>18</i>
4	<i>Claude</i>	<i>Walken</i>	<i>Sr</i>	<i>6'2"</i>	<i>Green</i>	<i>240</i>	<i>50</i>
5	<i>Samantha</i>	<i>Jones</i>		<i>5'4"</i>	<i>Blue</i>	<i>120</i>	<i>32</i>
6							
7							

dBase File -- Note the loss of text formatting (**bold**, *italics*) and ALL CAPS row headings.

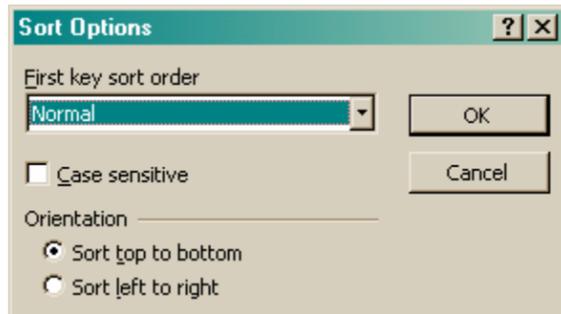
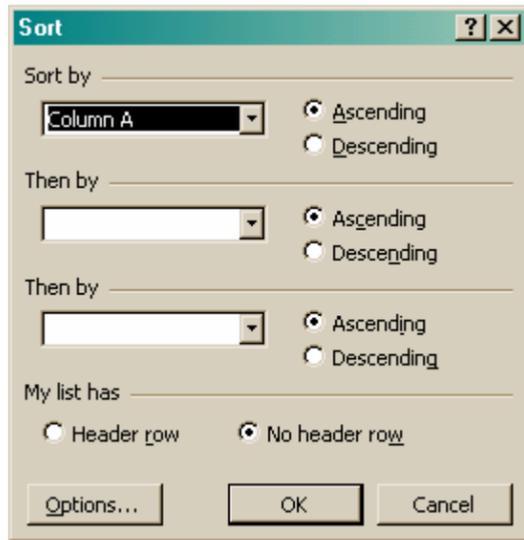
	FIRSTNAME	LASTNAME	SUFFIX	HEIGHT	EYECOLOR	WEIGHT	AGE
2	Joe	Smith	Jr	5'8"	Blue	140	24
3	Anna	Jones		5'	Brown	100	18
4	Claude	Walken	Sr	6'2"	Green	240	50
5	Samantha	Jones		5'4"	Blue	120	32
6							
7							

Data Display

Sort

You can sort ascending or descending...

- A single column
- All columns via a single sort
- All columns via a hierarchy of sorting



Tips:

- Be sure to sort all columns – don't misalign your data!
- Remember to check off header row if you have one.

Filtering

Data | Filter | AutoFilter

Focuses in on a subset of data

- Select a single value, or make your own.
- You can filter more than one column at a time.

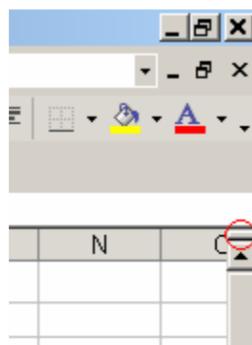
Be careful! The row numbers do not reflect the number of items. Look at the bottom right to see the number of records found.

Split or Freeze Panes

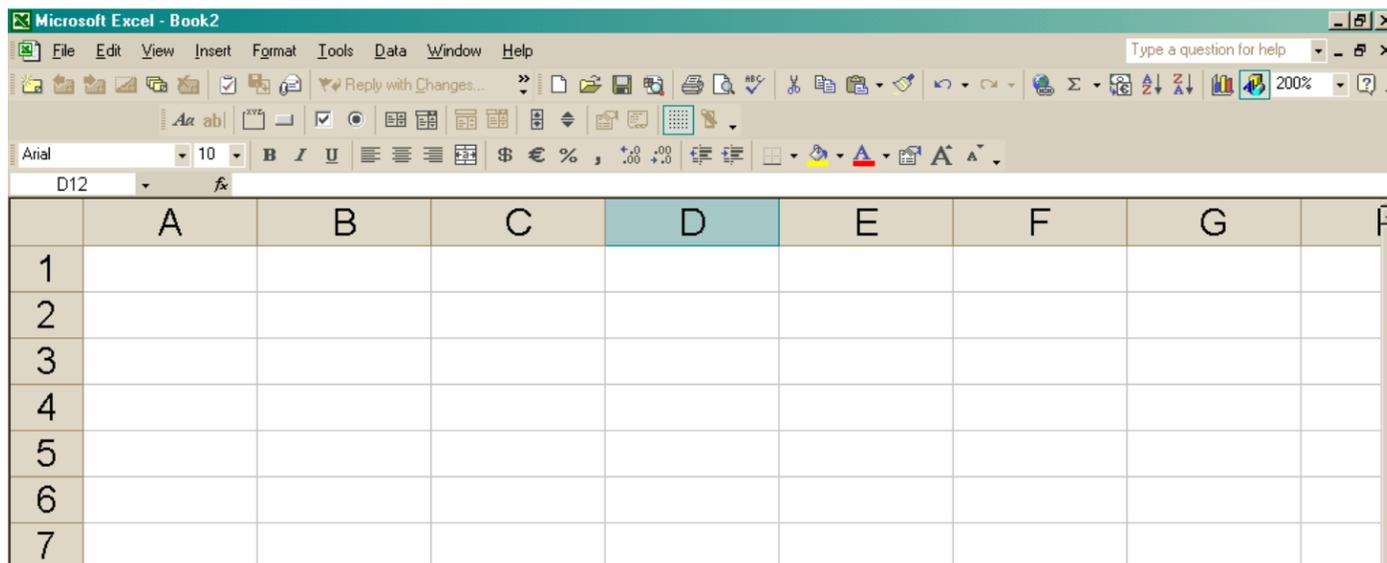
This allows you to keep important rows or columns visible while you scroll.

Split panes...

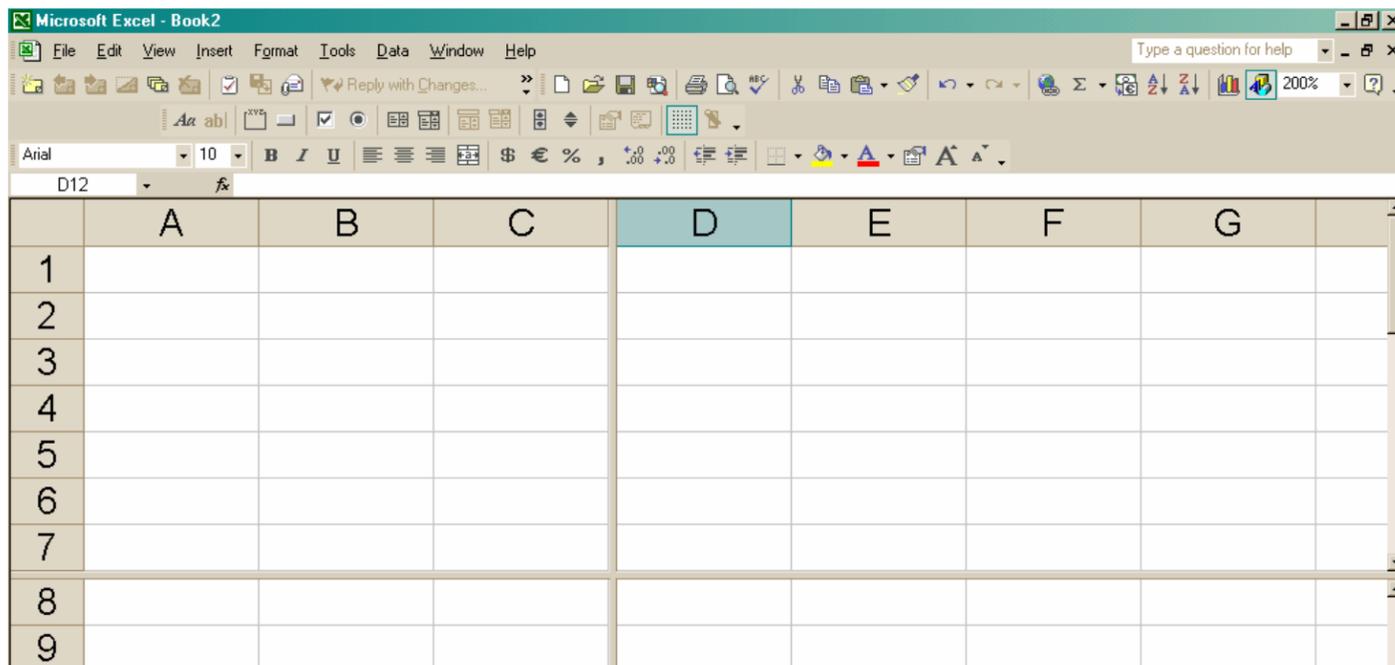
1. At the top of the vertical scroll bar or at the right end of the horizontal scroll bar, point to the split box...this is the small rectangle just above the up arrow.



- When the pointer changes to a split pointer, drag the split box down or to the left to the position you want.



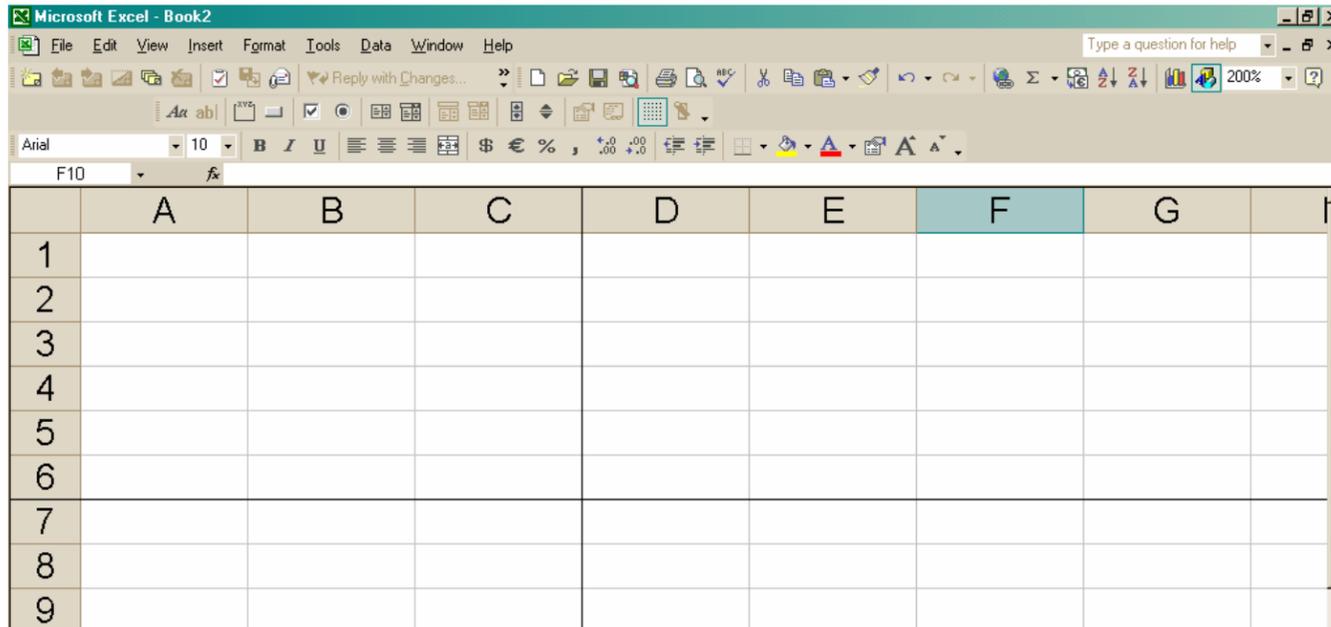
Both a vertical and a horizontal split are shown below in gray.



Freeze panes...

- The top horizontal pane – Select the row below where you want the split to appear.
- The left vertical pane – Select the column to the right of where you want the split to appear.
- Both the upper and left panes – Click the cell below and to the right of where you want the split to appear.
- Then choose **Window | Freeze Panes**
- To remove or reset, choose **Window | Unfreeze Panes**

The frozen pane below is A6:C6 and outlined in black.



Cell formatting

You can set number appearance, alignment, font, border type, and background colors.

- Number settings include currency, percentages, dates, and decimal places.
- **Format | Cells**

Cell content

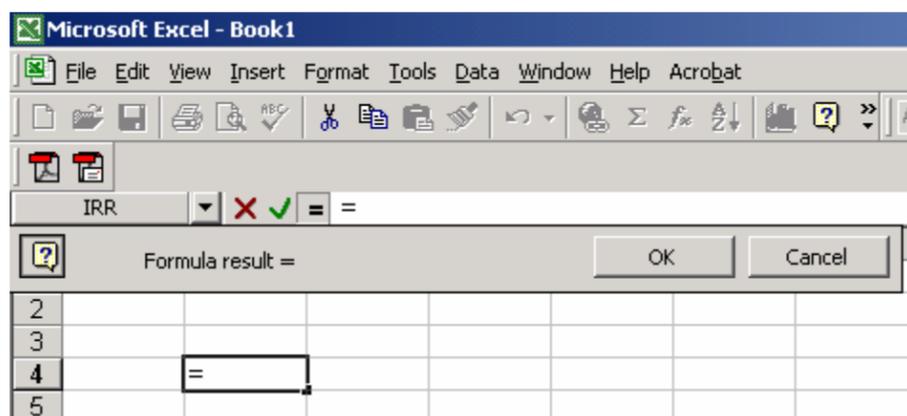
Just type in the value you want to display.

TIP: Place an apostrophe in front of a number to make it behave like text.

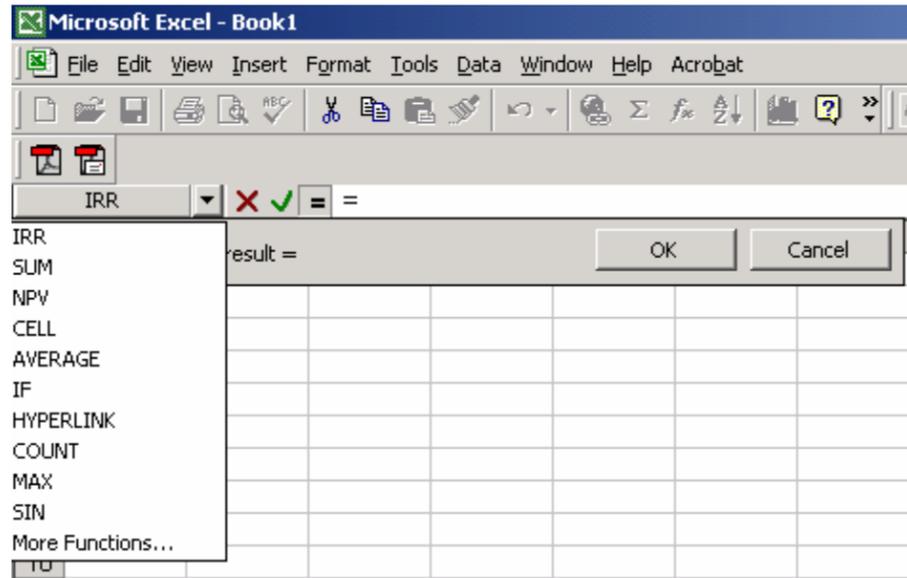
Formulas

Excel allows you to execute basic arithmetic (sums, division, etc.), as well as standard financial and statistical operations (average, net present value, internal rate of return, etc.).

To pull up the formula options, click the **=** sign next to the text entry window:

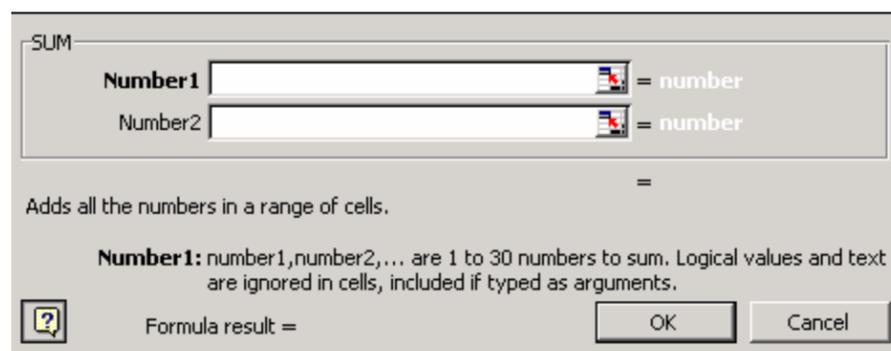


Then use the drop-down box at the far left of that row to select the operation you wish to use. The default is probably whichever you last used, and the most recent will show up in a list:



To select any formula, or make your own, choose “More functions...”

Once you select a formula, a box with entry fields and instructions will appear. Either type in the cell numbers to be used in the formula, or click on the selection button to manually choose them with the mouse. (I find the latter option to be easier.)



A range of cells is denoted with the starting and ending cell location, separated by a colon. Ranges must be contiguous.

Cell reference

To show the content of another cell, type in a **+** sign before the target cell’s coordinates. To show content from another worksheet, use an exclamation point to separate the sheet name and cell label. For example:

- ❑ +A2
- ❑ +SheetName!B4

IMPORTANT:

- ❑ Keep in mind this content display is a dynamic connection – when the original cell’s content changes, the other cell’s display changes.
- ❑ References will not work across worksheets unless sheet name is explicit in the cell value.

Relative reference: If you copy a cell whose value is based on a formula, and paste it into a new cell, then:

1. The formula – not the displayed value – copies over, AND
2. The formula will update to reflect the shift in location.

For example, if cell A6 has the value ‘SUM(A3:A5)’ and is copied into...

- ❑ cell B6, the formula will change to ‘SUM(B3:B5)’
- ❑ cell A12, the formula will change to ‘SUM(A9:A11)’

Absolute reference: If a dollar sign precedes the letter and/or number, such as \$A\$1, the column and/or row reference is absolute.

- ❑ The formula will remain the same no matter where it is pasted.
- ❑ If you wish to maintain only the row or column – but not both – then place a single \$ in front of the appropriate value.

To copy the cell value, rather than the formula, use **Edit | Paste Special**, and select ‘Values’



Functions You Should Know

- Two ways of inserting a function
 - Hit "=" on the toolbar, then find a function; or
 - Type "=", type a function name, type "(", choose an area, type ")", then hit Enter.

- 1. **SUM**: sum
- 2. **MAX**: find the maximum value
- 3. **MIN**: find the minimum value
- 4. **AVERAGE**: calculate the average/mean
- 5. **MEDIAN**: find the median
- 6. **STDEV**: calculate the standard deviation
- 7. **VAR**: calculate the variance
- 8. **CONCATENATE**: concatenate text data (or use &)
- 9. **IF**: yield values by testing a given equation

- Copy by dragging +.

- Fill Option -- Down, Right, Up, Left (Under Edit Menu).

Formula Examples:

	A	B	C	D	E	F	G	
1	FIRSTNAME	LASTNAME	SUFFIX	HEIGHT	EYECOLOR	WEIGHT	AGE	
2	Joe	Smith	Jr	5'8"	Blue	140	24	
3	Anna	Jones		5'	Brown	100	18	
4	Claude	Walken	Sr	6'2"	Green	240	50	
5	Samantha	Jones		5'4"	Blue	120	32	
6								
7	Descriptive Statistics on WEIGHT							
8	Total (SUM)	=SUM(F2:F5)						
9		=F2+F3+F4+F5						
10								
11	Maximum (MAX)	=MAX(F2:F5)						
12								
13	Minimum (MIN)	=MIN(F2:F5)						
14								
15	Mean (AVERAGE)	=AVERAGE(F2:F5)						
16								
17	Median (MEDIAN)	=MEDIAN(F2:F5)						
18								
19	Standard Deviation (STDEV)	=STDEV(F2:F5)						
20								
21	Variance (VAR)	=VAR(F2:F5)						
22								

	A	B	C	D	E	F	G	H	I
1	NAME	FIRSTNAME	LASTNAME	SUFFIX	HEIGHT	EYECOLOR	WEIGHT	AGE	
2	Joe Smith	Joe	Smith	Jr	5'8"	Blue	140	24	
3	Anna Jones	Anna	Jones		5'	Brown	100	18	
4	Claude Walken	Claude	Walken	Sr	6'2"	Green	240	50	
5	Samantha Jones	Samantha	Jones		5'4"	Blue	120	32	
6									
7	JoeSmith								
8	AnnaJones								
9	ClaudeWalken								
10	SamanthaJones								
11									

IF Examples

	A	B	C	D	E	F	G	H
1	FIRSTNAME	LASTNAME	SUFFIX	HEIGHT	EYECOLOR	WEIGHT	AGE	
2	Anna	Jones		5'	Brown	100	18	=IF(G2<20,"Teenager",IF(G2<30,"Twenty-Something Old",IF(G2<40,"Thirty-Something",IF(G2<60,"Almost a Senior"))))
3	Joe	Smith	Jr	5'8"	Blue	140	24	=IF(G3<20,"Teenager",IF(G3<30,"Twenty-Something Old",IF(G3<40,"Thirty-Something",IF(G3<60,"Almost a Senior"))))
4	Samantha	Jones		5'4"	Blue	120	32	=IF(G4<20,"Teenager",IF(G4<30,"Twenty-Something Old",IF(G4<40,"Thirty-Something",IF(G4<60,"Almost a Senior"))))
5	Claude	Walken	Sr	6'2"	Green	240	50	=IF(G5<20,"Teenager",IF(G5<30,"Twenty-Something Old",IF(G5<40,"Thirty-Something",IF(G5<60,"Almost a Senior"))))
6								
7								

	B	C	D	E	F	G	H
1	LASTNAME	SUFFIX	HEIGHT	EYECOLOR	WEIGHT	AGE	
2	Jones		5'	Brown	100	18	Teenager
3	Smith	Jr	5'8"	Blue	140	24	Young Adult
4	Jones		5'4"	Blue	120	32	Thirty-Something
5	Walken	Sr	6'2"	Green	240	50	Almost a Senior
6							
7							

Charts

- Choosing among chart types
- Changing the data set/Copy-paste trick
- Formatting
 - Text
 - Width
- Embedding in Microsoft Word
- Embedding in Web Pages

Insert | Chart

- There are many graphic options...
- Choose the entire data set with the selector – this may take several tries to get it to display as you want it.
- I often find it easier to 'tidy up' the chart to my liking after finishing with the Wizard.

After creating a chart, when you select it with the mouse, the Chart menu appears at the top of the screen.

Statistical options are available in the Add Trendline window

- Line equation
- R-squared

Remember – charts are dynamic. If you like your results, maybe you should copy and paste it into another file.

Printing

A. Set Page Properties

- Page setup: May want to choose Landscape. If appropriate, change the paper size:
 - Letter: 8 ½ by 11 (this is the standard...similar to A4 size used abroad)
 - Legal: 8 ½ by 14
 - Tabloid: 11 by 17 (colormaps has this size)

B. Set Printable Area

- Set the Print Area to select which portion of your spreadsheet(s) to print
 - First, select the area you want to print out, then...
 - File | Print Area | Set Print Area**
-

Created by Shannon McKay, October 2004 with assistance from Chris Hodges and Masa Matsuura.

Joe	Smith Jr	5'8"	Blue	140	24
Anna	Jones	5'	Brown	100	18
Claude	Walken Sr	6'2"	Green	240	50
Samantha	Jones	5'4"	Blue	120	32

Joe,Smith,Jr,5'8",Blue,140,24

Anna,Jones,5',Brown,100,18

Claude,Walken,Sr,6'2",Green,240,50

Samantha,Jones,,5'4",Blue,120,32

Joe Smith Jr 5'8" Blue 14024
Anna Jones 5' Brown 10018
Claude Walken Sr 6'2" Green 24050
Samantha Jones 5'4" Blue 12032