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 deliminated)

File 2 (comma deliminated)

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

dBase is one of the oldest database softwaare. 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

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

Text Import Wizard - Step 1 of 3	? ×
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Fixed width - Fields are alighed in columns with spaces between each field.	
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Select "Tab" as the Delimiter. When finished, click "Next."

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

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."

'General' converts numeric values to numbers, date values to dates, and all remaining values to text. ○ <u>I</u> ext ○ <u>D</u> ate: MDY ○ Do not import column (skip)	'General' converts numeric values to numbers, date values to dates, and all remaining values to text. C Iext C Date: MDY Advanced C Do not import column (skip)	'General' converts numeric values to numbers, date values to dates, and all remaining values to text. ○ Iext ○ Date: MDY Advanced ○ Do not import column (skip) Data preview Ceneral CeneraCeneraCeneraCeneral Ceneral Ceneral CeneraCeneraCeneral 24	This screen le the Data For	ets you selec mat.	ct each colum	n and set	Column data format	
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Screenshot of what the tab delimited data looks like in Excel.

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Comma Delimited



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

Text Import Wizard - Step 1 of 3	<u>? ×</u>
The Text Wizard has determined that your data is Delimited. If this is correct, choose Next, or choose the data type that be	st describes your data.
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C Fixed width - Fields are aligned in columns with space	es between each field.
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4 Samantha, Jones, ,5'4", Blue, 120, 32	
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Select "Comma" as the Delimiter. When finished, click "Next."

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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."

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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).

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3	Claude	Walken	Sr	6'2"	Green	240	50	
4	Samantha	Jones		5'4"	Blue	120	32	
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Fixed-Width

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



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4 SamanthaJones 5'4"Blue 12032 5	
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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.

Text Import Wizard - Step 2 of 3	? ×
This screen lets you set field widths (column breaks).	
Lines with arrows signify a column break.	
To CREATE a break line, click at the desired position. To DELETE a break line, double click on the line. To MOVE a break line, click and drag it.	
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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.

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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."

Text Import Wizard - Step 3 of 3	<u>?×</u>
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SementheJones 5'4"Blue 12032	-
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Screenshot of what the fixed width data looks like in Excel. It matches the results of the tab delimited data.

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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.

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4	Claude	Walken	Sr	6'2"	Green	240	50				
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dBase File -- Note the loss of text formatting (**bold**, *italics*) and ALL CAPS row headings.

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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

Sort		?×
Sort by		
Column A	-	• Ascending
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		C Descending
Then by		<u> </u>
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Options		OK Cancel

Sort Options	<u>?</u> ×
First key sort order	
Orientation	
Sort to bottom	
C Sort left to right	

Tips:

- □ Be sure to sort <u>all</u> 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 <u>small</u> rectangle just above the up arrow.



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

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

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Freeze panes...

- \Box The top horizontal pane Select the row below where you want the split to appear.
- **D** The left vertical pane Select the column to the right of where you want the split to appear.
- **D** 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
- **D** To remove or reset, choose **Window** | **Unfreeze Panes**

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

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Cell formatting

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

- □ Number settings include currency, percentages, dates, and decimal places.
- **Given Set 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:

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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:

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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.)

SUM							
Number 1	L	🗾 = number					
Number2	2	💽 = number					
= Adds all the numbers in a range of cells.							
Number1: number1, number2, are 1 to 30 numbers to sum. Logical values and text are ignored in cells, included if typed as arguments.							
🕄 Formu	ula result =	OK Cancel					

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 <u>dynamic</u> 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)'

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

- **D** 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'

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Paste	
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C Eormulas	C Validatio <u>n</u>
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Paste Link	OK Cancel

Functions You Should Know

- Two ways of inserting a function
 - \circ 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 equasion
- Copy by dragging +.
- Fill Option -- Down, Right, Up, Left (Under Edit Menu).

Formula Examples:

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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)										

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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 Stati	stics on WEI	<u>GHT</u>								
8	Total (SUM)	600									
9		600									
10											
11	Maximum (MAX)	240									
12											
13	Minimum (MIN)	100									
14											
15	Mean (AVERAGE	150									
16											
17	Median (MEDIAN)	130									
18											
19	Standard Deviation	62									
20											
21	Variance (VAR)	3867									
22											

CONCATENATE Examples

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1	NAME	FIRSTNAME	LASTNAME	SUFFIX	HEIGHT	EYECOLOR	WEIGHT	AGE			
2	=B2&" "&C2	Joe	Smith	Jr	5'8"	Blue	140	24			
3	=B3&" "&C3	Anna	Jones		5'	Brown	100	18			
4	=B4&" "&C4	Claude	Walken	Sr	6'2"	Green	240	50			
5	=B5&" "&C5	Samantha	Jones		5'4"	Blue	120	32			
6											
7	=CONCATENATE(B2,C2)										
8	=CONCATENATE(B3,C3)										
9	=CONCATENATE(B4,C4)										
10	=CONCATENATE(B5,C5)										
11											

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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										
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IF Examples

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1	FIRSTNAME	LASTNAME	SUFFIX	HEIGHT	EYECOLOR	WEIGHT	AGE				
2	Anna	Jones		5'	Brown	100	18	=IF(G2<20,"Teenager",IF(G2<3(
3	Joe	Smith	Jr	5'8"	Blue	140	24	=IF(G3<20,"Teenager",IF(G3<3(
4	Samantha	Jones		5'4"	Blue	120	32	=IF(G4<20,"Teenager",IF(G4<3(
5	Claude	Walken	Sr	6'2"	Green	240	50	=IF(G5<20,"Teenager",IF(G5<3(
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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											
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Charts

- Choosing among chart types
- Changing the data set/Copy-paste trick
- Formatting
 - o 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

- $\hfill\square$ 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 ¹/₂ by 11 (this is the standard...similar to A4 size used abroad)
 - □ Legal: 8 ¹/₂ by 14
 - **D** 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...
 - **Given Set 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 Jr5'8"Blue 14024 Anna Jones 5' Brown10018 Claude WalkenSr6'2"Green24050 SamanthaJones 5'4"Blue 12032