Using Electronic Spreadsheets, with particular reference to Excel

1.   What Spreadsheets Do:

Modern electronic spreadsheets provide an exciting environment for manipulating data, including the ability to plot data in a rich variety of beautiful graphs, to evaluate complicated statistical functions, and to solve maximization problems. The results of calculations can be COPY/PASTED into other programs, such as Word and Eviews.

The basic layout of spreadsheets has not changed much since Dan Bricklin and Bob Frankston, two amazingly clever Harvard Business School students, created the first electronic spreadsheet in 1978. They introduced VisiCalc for the Apple II in 1979.

Consider the spreadsheet generated with Excel 97 displayed on the next page. (You can download this spreadsheet (file ClassDat.xls) from the E280 homepage.

The heart of the electronic spreadsheet is a rectangular array of *cells* laid out in a grid or matrix. Rows are numbered on the left side of the array: 1, 2, 3, … ; columns are identified by letters: A, B, C, D ... along the top.

- Each cell in the matrix can be identified by specifying its column and row; e.g. B3 is the third cell down in the second column.
- Each cell may contain text, such as Heights or user entered data, such as 5.3.
- Entering an appropriately formatted equation into a cell causes Excel to display the result of the requested calculations in that the cell. For example, entering =AVERAGE(F4:F40) into cell F41 leads Excel to display in cell F41 the average of the numbers in cells F4 through F40.
- Spreadsheets automatically recalculate. For example, if the user changes the number in cell F29, the average reported in cell F41 will be recalculated to reflect this revision of the data.

2.   The Excel Environment:

The next page displays the standard screen that appears when the program opens. Many of the features are familiar to users of Microsoft Word. The title bar at the top displays the name of the program and the file. The second bar down, the Menu Bar, contains a number of Pull Down menus. For example, click on File and you will be given the opportunity to save as your worksheet, Print it, Exit the program, etc. There are many old Word friends in the Icon Row: reading from left to right we have icons for a new page (spreadsheet), opening an existing file, saving the file, printing the spreadsheet, previewing the spreadsheet, spell check; cut, copy paste; and undo. And just as in Word, you just click on the HELP icon or tap F1 when you need information and assistance. And even more so than in Word, right clicking can bring up helpful context sensitive menus.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Questionnaire Data, E270					ClassDat.xls	, February 19, 1999					
2		Case	Computer	EyeColor			Heights					
3			Skill	Yourself	Mother	Father	Yourself	Mother	Farther	Gender		
4	1	7	1	1	1	80	72	75	0			
5	2	6	0	0	0	65	64	70	1			
6	3	6	0	0	0	73	70	66	0			
7	4	5	0	1	0	69	64	70	0			
8	5	3	1	0	1	71	62	72	0			
9	6	3	0	0	0	65	66	68	1			
10	7	4	0	1	0	60	65	73	0			
11	8	8.5	1	1	1	75	68	71	0			
12	9	8	1	1	1	68	66	66	0			
13	10		1	1	1	70	68	66	0			
14	11	5	1	0	1	69	65	68	0			
15	12	2	1	1	1	71	53	74	0			
16	13	8	1	1	0	73	68	71	0			
17	14	3	1	1	1	66	66	70	1			
18	15	5	0	1	1	76	68	72	0			
19	16	5	0	0	0	65	68	70	1			
20	17	5	1	1	1	65	64	69	1			
21	18	4	0	0	0	75	64	72	0			
22	19	6	1	1	1	68	65	73	0			
23	20	6	0	0	0	69	61	63	0			

3. Cell Entry:

Excel needs to know whether the information you are entering into a cell is text, a number, or an equation.

- If you enter =3+4 in cell C3, Excel assumes you want it to display the sum of 3+4 or 7 in that cell.
- If you enter Heights in cell F2, Excel assumes you wish to have that word displayed in cell F2.
- Entering =A3 in cell C23 displays in cell C23 whatever is currently on display in cell A3. If the entry in cell A3 changes so will its image in cell C23.
- If you enter =Max(F4:F40 in cell F42, the program assumes you want the maximum of the numbers in cells F4 to and including F40 displayed in cell F42.
- If you wish the program to display as text the expression =3+4 rather than the sum you should enter '3+4; the single quote tells the program that what follows is text rather than numbers or an eqauation.
- To edit an entry, first select the cell with the cursor. The contents will display on the edit box at the top of the spreadsheet, just above the C. Edit the entry so that it appears the way you want it and then press return.
- A small red triangle in the upper right-hand corner of a cell indicates that it contains a comment that will be displayed if you place your cursor on the cell.

4. Blocking, dragging, cutting, copying, and pasting:

These operations are very similar to Word counterparts. Cells are selected by highlighting them with the mouse. An entire column is selected by clicking on the identifying letter at the top; an

entire row is selected by clicking on the identifying number in the left margin.

- After blocking a section of the worksheet, you might decide to cut the section out or copy the section. To cut out the section you can use the scissors icon; to copy a section you can use the icon that has two identical pieces of paper on it. To unblock a section (decide to leave the section), just click the mouse somewhere else on the page.
- If you have selected several cells (a row, a column or a rectangle) that you wish to copy to a new location, your first step is to click on the Copy icon. Next highlight the cell that is to contain the upper left-hand corner of the block. Now Paste and the entire block will be copied. If you wish to move rather than copy, you should use the cut icon in the first step. [This operation can also be accomplished by dragging the blocked cells while holding down the Ctrl key or by using the Copy and Paste options in the Edit pull down menu.]

  Excel facilitates multiple as well as single cell pasting: If you paste a blocked column, say cells F41:F42 onto a blocked row, say A41:I41, you will have a rectangle consisting of a row of 10 columns with 5 cells in each column. Or if you paste a blocked row of 5 cells onto a blocked column of ten cells you will have a rectangle consisting of 5 columns with 9 cells in each row. The upper left-hand corner of the rectangle will be in cell A41.
- Excel has a cleaver way of automatically updating the cell addresses of the functions in cells when they are moved. Suppose that =AVERAGE(C3:C10) has been entered into cell C11 of an Excel spreadsheet. If this function is copy/pasted into cell D11, the cells identified in the argument of the function will be changed to reference column D; i.e., =AVERAGE(D3:D10). Thus the average of the D column will be recorded at the bottom of that column.
- It is sometimes useful to *freeze* the cell references by using dollar signs. For example, if the entry in cell C11 had been =AVERAGE($C3:$C10) the C reference would have been frozen when the function was moved to D11. However, the row references are not frozen (no dollar signs in front of the numbers in the cell reference) so if it were moved to cell D21 the entry would read been =AVERAGE($C13:$C20)

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5.   Spreadsheet Functions:

Modern spreadsheets contain an amazing collection of functions. One can look up a desired function in Help, but it is easier to use Excel's function wizard, which is accessed by clicking on the icon with the symbol f_n. After selecting with the cursor the spot where you want the answer to appear, clicking on this symbol yields a number of categories of functions, such as Math and Trig and Statistical. Click on the desired category and then search for the particular function you want. Once you select the function you can use Help to find its full specification and instructions on how to enter the necessary data or cell references.

EXCEL's Statistics/FREQUENCY Function is tricky to use because the results go in an array rather than in a single cell – It is an "Array Formula." Before you try to activate it you must block a column array that is one cell longer than the Bin Array. After you have specified the Data and Bin Array, DON't click done. Instead you must hit Ctrl-Shift-Return because it is an Array Formula!

6.   Graphs and Charts

The Chart Wizard icon is located just a few spots to the right of the Function Wizard. You can specify the data by selecting a block of data before starting the Chart Wizard. Later you can change the data by using the Series option. You work through successive steps of the Chart Wizard by tapping next. You will be confronted with the opportunity to select the type of graph from an amazing variety, including pie charts, graphs for time series, scatter-plots etc. The best way to proceed is to experiment bravely.

After a preliminary chart has been constructed, right clicking on it in various items on the

graph will bring up a number of menus giving you a range of options for making all manner of changes. For example, when you pretty up a bar graph you may want to have the units of measure (e.g., height in inches) indicated under each bar. You can do this by clicking on the Series Tab of the Source Data Menu. Put in the location of the labels at the bottom in the box called Category (X) labels:"

Experiment! Once the graph has been constructed you can resize it. If you like, you can copy/paste it into a Word document.

7. Excel's Special Formatting Options:

1. When you print out a page, the grid lines and the numbers and letters identifying rows and columns usually are not printed. If you want them to show, go to the File/Page Setup/ Sheet menu and click on the Grid Lines and the Row and Column Headings options.
2. You can format your numbers easily with the $, % and .0 .00 icons: e.g., $1.50, or 150% or 15.0 or .150. For more flexibility, go to Format/Cells/Number.
3. You can insert helpful comments into your spreadsheet cells. They will not print out, but they will help the user of your spreadsheet. For examples, check out the ClassDat.xls and the Actuary.xls spreadsheets off the E280 home page. To insert a comment into your spreadsheet, just click on Insert/Comment.

8. Excel Output to the Printer:

- Save Trees: Always click on print preview icon before printing a spreadsheet in order to make sure that it is laid out appropriately.
- Print preview may reveal that your spreadsheet will take many more pages than you anticipate. If a document is just a bit wider and longer than a page it may cover four sheets! One way to remedy this problem is to go to File/Page Setup/ Page menu and invoke the "Adjust to % normal size option to reduce to 75%, say. Or use the Fit To Pages option.
- You can restrict the rows and columns covered by the printer by selecting with your cursor the rows and column block you want to print, clicking on the File pull down menu in Excel, and then choosing the Print Area option.

9. Downloading Data from the Internet for processing

You may get a mess if you try to copy/paste a table from the Net, but here is a trick. When a table of data is displayed in Netscape Communicator, Click on File/Save as an *.HTML file and save it on your hard disk (Open the HTML file you have created in EXCEL and it will automatically load it into a table. Clean up the data and, if desired, copy/paste into EViews.

10. Highly Recommended Online information about Excel

(The URL addresses for these files are also in the Net Site HTML file):
From E280, Fall 1998-99 (Prof. Isgut):
Working with Excel ~ http://www.wesleyan.edu/~aisgut/econ280/fall98/excel.html
Wonderfully useful two page Help Sheets about, Excel from San Francisco State University
Excel Basics: userwww.sfsu.edu/~training/excel%20basics.pdf
Excel Intermediate: http://userwww.sfsu.edu/~training/intermediate%20excel.pdf
Excel Charts and Graphs: http://userwww.sfsu.edu/~training/excel%20charts.pdf
Excel Data Analysis: (includes Analysis tools pack, Single variable data, Categorical data,
Histogram, Trend lines):
http://userwww.sfsu.edu/~training/adv%20excel%20data%20analysis.pdf