Lecture 2 – Functions, Data I/O, plotting in Excel

0. Class Business

* How did HW submission go?
* Opening prayer
* Spiritual Thought
* Unit of the day.

1 meter = 3.28084 feet

1m = 3.28 ft

I. Functions.

* A function is a map between inputs and outputs.

examples: $f(x) = x^2$ $f(3) = 9$

sort(string) $f(\text{'cba'}) = \text{'abc'}$

* A formula (like x^2) can be a function, but not all functions can be written in a formula.

* In Excel, functions are written in a cell with the following syntax

= Function(Arg1, Arg2, ...)

* Excel has many functions
  - mathematics functions (e.g. abs, cos, log10)
  - statistical functions (e.g. max, average)
  - logical functions (e.g. if)
  - date & time functions (e.g. today)
  - many more

* On the references page on the course website, there is a useful list of functions by category

Activity

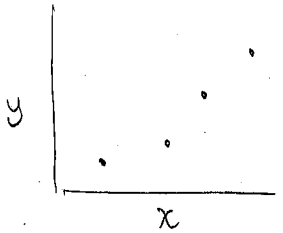
* Using the provided excel sheet:
  (1) Read through the list of basic functions
  (2) Use these basic functions to fill in the yellow boxes on the worksheet for "activity 1."

II. Plotting

* Plotting allows us to visualize data. This enables better communication about data. Plots are all about using data to tell a story.

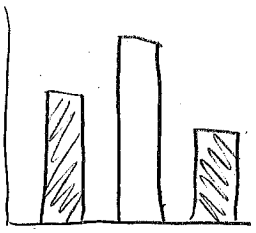
* Excel has three types of plots that we are going to focus on.

(1) Scatter Plots



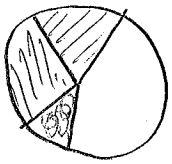
- plots pairs of (x, y) points
- By far the most used

(2) Bar charts



- plots values for different categories
- can use to visualize data in a table.

(3) Pie charts



- plots values for different categories & shows fractions of a whole

* There are four steps to make a plot in excel.
  - (i) Define or import your data
  - (ii) Select data in columns
  - (iii) Insert plot / chart
  - (iv) Format plot / chart.

Example

* show how to make a scatter plot
* show how to make Pie / Bar charts

* one more thing: How do we import data?
  - we can import data by opening the data file with excel.

- Importing depends on how the data is structured. Is it delimited by spaces, tabs, or commas?
- spaces | tabs = usually .txt
- commas = usually .csv

Activity

* Using the provided data:

  - import pipe_data.txt
  - make a plot of the average u versus x.
  - Format the plot to range from -1 to 1.