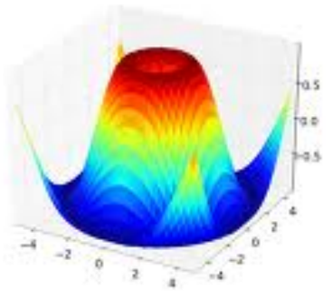
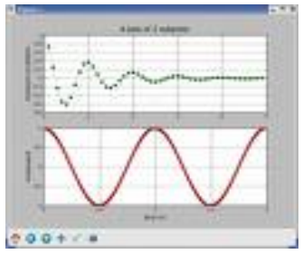
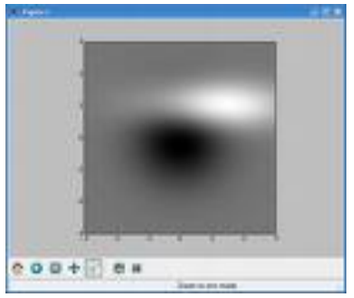
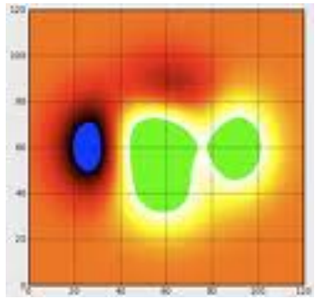
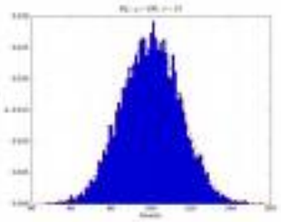
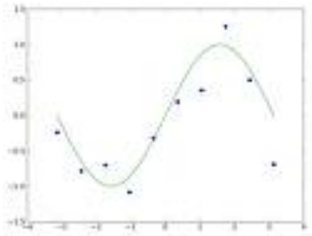


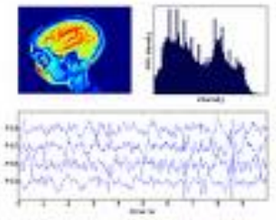


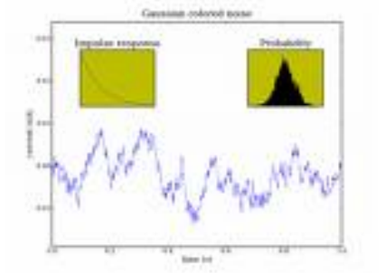


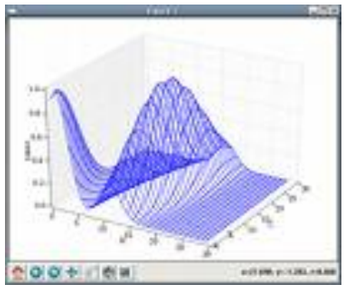


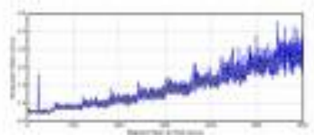










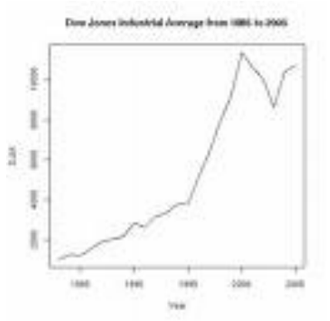


Plotting Data

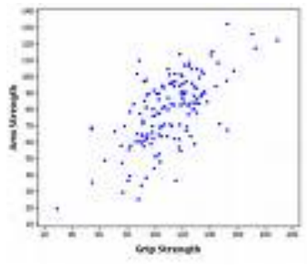
COMP 364 - Lecture 14
March 5, 2010
Derek Ruths

Why plot data programmatically?

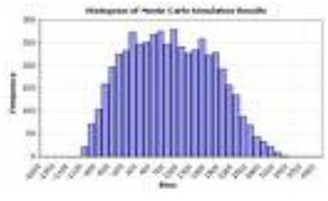
Different kinds of plots...



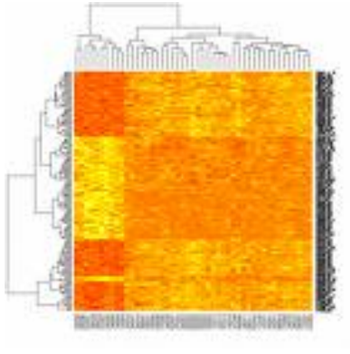
Line plot



Scatter plot



Histogram



Heatmap

Line and scatter plots

Major considerations for line/scatter plotting

- Data consists of numbers
- Each data point has an X and a Y value
    - Data is specified as two lists (X values and Y values)
- *Key issue: we read our data in as strings, but need it to be two lists of numbers.*

Manipulating lists

- x.append(y) - add the object y into list x
- x.remove(y) - remove the first occurrence of y in list x

Exercise: Consider a file containing x-y datapoints - each line has two numbers, separated by a space. Read these points from the file into two lists.

Line plots

- matplotlib (pylab) is a 3rd party python library that provides MANY plotting functions (http://matplotlib.sourceforge.net)

- *pylab.figure()* - creates a new blank figure

- *pylab.plot(X,Y)* - draws a line plot using data points X,Y on the current figure

- *pylab.show()* - displays the current figure on the screen

Exercise: extend our previous code to plot the data points in a line graph.

Stylizing our plot

- *pylab.plot(X,Y,fmt)* - fmt is a string that tells pylab how our points should be drawn and connected.
  - plot(X,Y,'r') - draw in red
  - plot(X,Y,'b') - draw in blue
  - plot(X,Y,'--b') - draw a dashed blue line
  - plot(X,Y,'g.') - draw a scatterplot with green points
- *pylab.hold(True)* - tells pylab to combine future plots onto the current plot (rather than replacing it)

Exercise: modify our previous script to draw a scatter plot. It also should take a threshold. All data points with a y-value > threshold should be drawn in green, otherwise blue.

Annotating a plot

- pylab.title(s) - set the title of the current plot to s
- pylab.xlabel(s) - set the label of the x axis to s
- pylab.ylabel(s) - set the label of the y axis to s
- pylab.legend([c1,c2,...]) - draw a legend on the figure labeling each curve

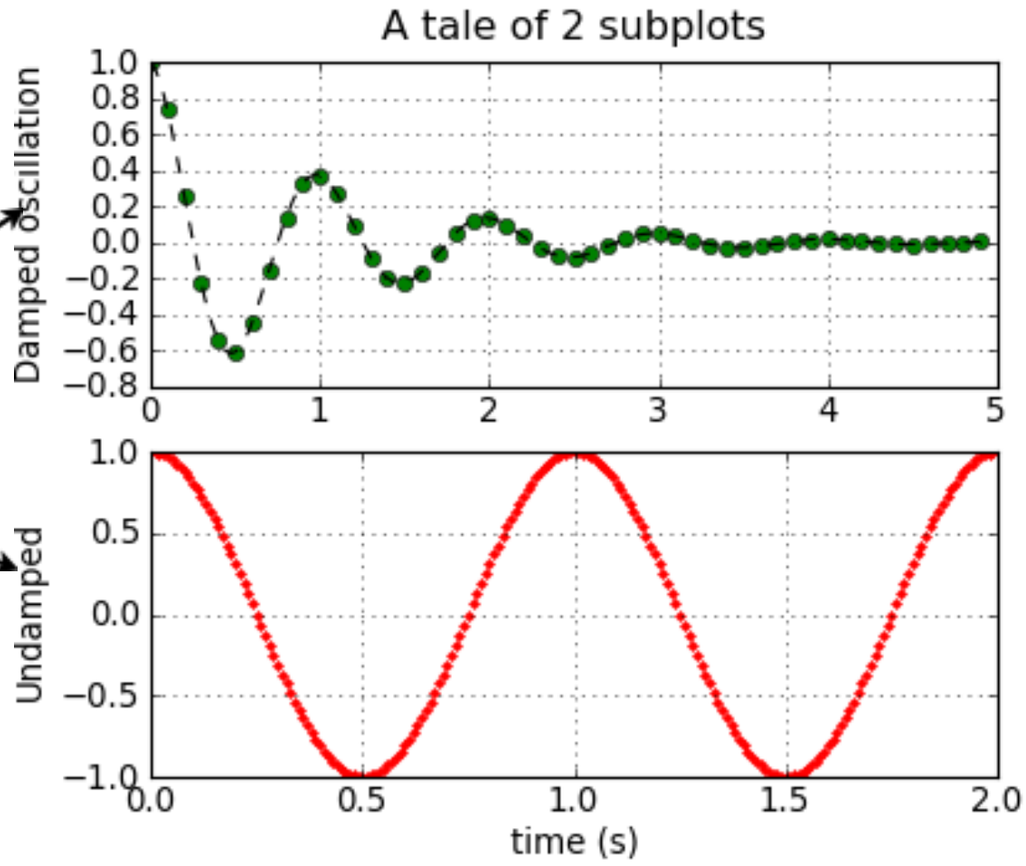
Exercise: make the title of our plot the name of the data file, make a legend for the two colors.

Sub plots

pylab.subplot(# rows, # cols, plot #)

pylab.subplot(2,1,1)

pylab.subplot(2,1,2)

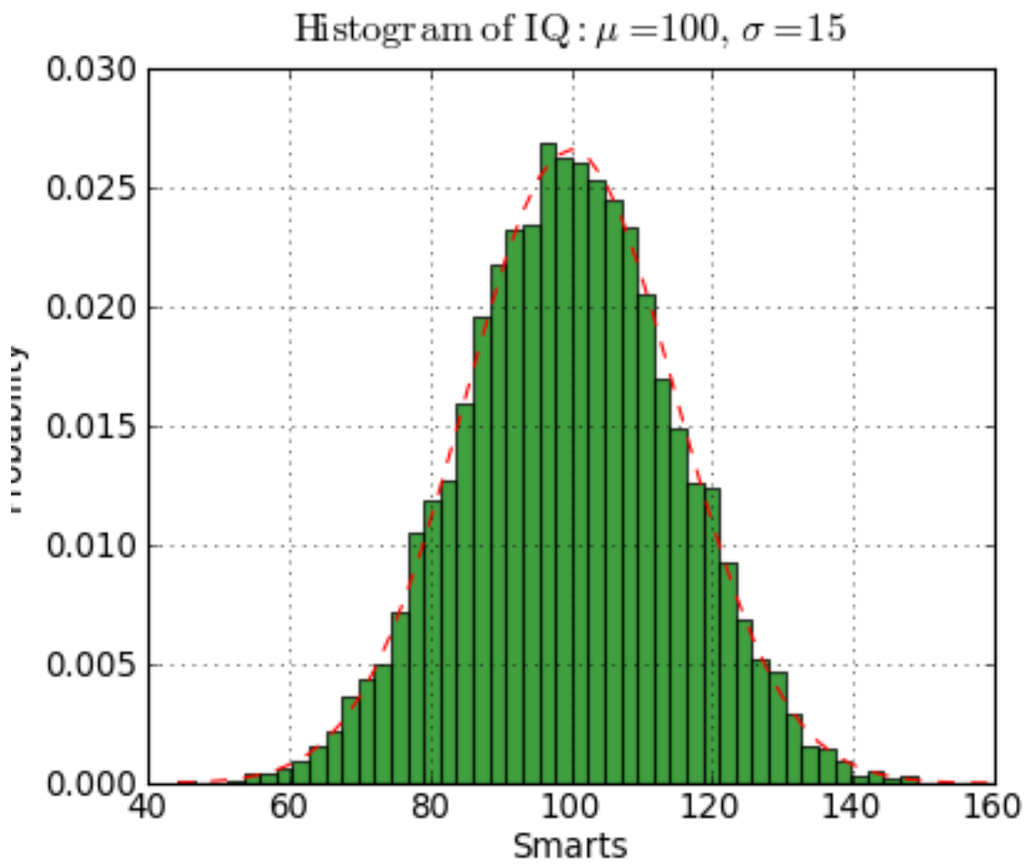


Exercise: write a script that makes a figure with 2 subplots: one for sin, one for cos. (plot for x = [0,6])

Histograms

hist(...)

hist(x,bins=10)



Exercise: plot the distribution of gene lengths in a genome file

Exercise: use subplot to plot (1) the distribution of gene lengths in a genome file and (2) the length of genes along the genome (in order)