COMS 3101 - Fall 2013
Homework 3

- Due by start of class (Monday 4pm).
- See submission instructions.

1.

a) Write a function named 'hw3a' which has input parameters {file_dir, N, delim, sub_M}. Your function should do the following:
b) Suppose you have a directory whose name is stored in 'file_dir' (input parameter) which contains 100 files all named 'data_#.txt'. Each file has strictly numeric data separated by the delimiter 'delim' (input parameter). You can assume that there are no errors in the data or the input parameters {file_dir, delim}.
c) Your function should open each file (from 1 to N), read the data into some variable, where the range of the data is specified in 'sub_M' (an input parameter), and compute the cumulative sum over all N files.
   For example, say N = 2, and you read data into D1 (for N=1), and D2 (for N=2). Then the cumulative sum should be D = D1+D2;
d) You should check that the 'sub_M' input parameter is set to a legal value. Output an error statement of your choice otherwise.
e) Finally save the "cumulative sum" variable to a new file named 'ndata_#.mat', (hint: notice file extension) in the same directory.

2.

a) Write a function named 'hw3b' which has 3 input parameters {M, N, C} Your function should do the following:
b) Suppose M is a matrix with 3 columns. Columns {1,2} of M are the {x,y} coordinates of points in the plane. Column 3 is the class to which the point belongs. The values of column 3 are one of N unknown integers. C is a vector of size 2 that contains two integers (classes).
c) Your function should choose only the points (rows) of M whose class (column 3) is specified in the input parameter C.

d) You should check that C is of the right size, and that there is at least one point in M from each class specified in C.
e) Your function should plot the selected points (from part c). Points in one class (doesn't matter which one) should be dots in red, points in the 2nd class should be squares in green.
f) Adjust your axes properly so that the furthest points are not on the edge.
   Note: you don't necessarily need a for-loop here since there are only two classes to plot.
   Note: you can test your function by generating some random data (using 'rand' for example) and classes.

3.

a) Write a function named 'hw3c' which has two input parameters {M, N}. We shall assume that each element of M should be an integer in the range [0,N] and that M is a square matrix.
b) Each element M(i,j) represents the cost of travelling from location i to location j. For each pair {i,j}, if M(i,j) is nonzero, plot the point(i,j) as a dot in any color. The marker size of the dot should be the value of the element.
c) Adjust both axes to go from 0 to N+1.
d) Set the ticks on both axes strictly to integers (0…N+1).
   Note: you don't have to do error checking