COMS 3101 - Fall 2013
Homework 2 (Extra)

- This part is optional.
- Due by start of class (Monday 4pm).
- See submission instructions.

1. Recall the game from HW#1, Extra:
   Choose any positive integer (1,2,…), call it X.
   If X is an even integer you divide X by 2.
   If X is an odd integer you multiply X by 3 and add 1.
   You continue this procedure until at some point you get 1 as your next integer. At that point you stop.

   a) Read the MATLAB documentation for the 'plot' function (help plot).
   b) Write a function named "ehw2b.m" which has 2 input arguments (and no output arguments): {N, S}.
      Your function should do the following: for every integer <= N, your function should compute the number of steps it takes to get from N to 1 according to the game, and then plot each pair {N, #steps for N} on a figure. For each pair you plot a red point with a marker size set to S.

      For example, if X = 5, # of steps for X is 5 (i.e. 5->16->8->4->2->1).
      And you should plot the point (5,5).
      Note: your x axis should run from 1 to N. Your y axis from 0 to the 'maximum # of steps for any integer <=N' + 1.
      Note: you should adjust your axes using actual command(s) not your GUI.

   c) Write a function named "ehw2c.m" which has 2 input arguments {N, S} and one output argument M:
      Your function should do the following: for a given integer N, your function should compute the sequence generated from N to get to 1.

It should then plot each pair {Step # + 1, sequence value} on a figure. For each pair you plot a red point with a marker size set to S. On the same figure, plot a dotted curve in blue color that connects your plotted points (in order). You should set M to the maximum value that you reach in your sequence.

For example, if X = 5, the sequence is {5,16,8,4,2,1}.
You should plot the points (1,5), (2,16)….(6,1).
M should be set to 16.
The red points should be connected in blue: 1st to 2nd, 2nd to 3rd and etc.

Note: your x axis should run from 1 to '# of steps in the sequence' + 2. Your y axis from 0 to the 'maximum value at any step' + 10.
Note: you should adjust your axes using actual command(s) not your GUI.

d) Experiment with your functions a bit by trying different input values. Do you notice anything peculiar about your results? (Hint: try large values of N for part (b))