MATLAB 101
Homework #1, August 2013

1. Download and unzip course materials from my github (github.com/sriveravi)

2. Open MATLAB and adjust the interface to your liking. Move around and resize components.
   Try docking or undocking items. Look through the menu and buttons to see what they do. Go
   in preferences and adjust the fonts and/or colors. Navigate working directory to the path of the
   downloaded materials.

3. Go through the scripts t1.m – t4.m, making toy example scripts or working in command window
   as you go. Practice opening multiple scripts and switching between them. Try moving the list
   of open scripts from the right to the bottom, and back.

4. In a new 'Homework' directory, create a script file to accomplish the following tasks. Use
   comments to label the parts of code (ie: %4a, %4f_ii). In the submitted version, suppress all
   output except what is asked for.
   a. Store vector of odd numbers in [1,10] in a variable. Show it. Do not do x = [1 3 5 …]
   b. Like part (a), but even numbers
   c. Create a variable with a (2x5) matrix of zeros using zeros function, and show it.
   d. Create a variable with (2x5) matrix of all 5, and show. (hint: what does 2.*[1 2 3] do?)
   e. Create (5x7) matrix of zeros. Show it. Set all even columns to 1, using:
       i.   A for loop
       ii.   A while loop
       iii. Vector indexing, and show (hint: x = [1:10;11:20], what does x(1,[2:2:6]) do?
   f. Set all odd rows of matrix from (e) to 3, using vector indexing
   g. Create this matrix: x =| 1 4 7 10 |, first manually, then by generating x = [1:12], then
                              | 2 5 8 11 | using reshape and/or '. Show both versions. Show
                              | 3 6 9 12 | the third row. Show third column. (hint: x(:,1))
   h. Create 100 points in [0,1], store in x. Plot y = x^2. For bonus, label the axes nicely.
       (Hint: doc plot; doc linspace)

5. In another script file, use tic/toc to time the procedures from e(i-iii). Note which is fastest.
   Why is that the case? What happens to the discrepancy in time if you instead create a (5x1000)
   matrix. Why? Plot the time for procedures e(i-iii) on the same figure as a function of the
   number of columns in the matrix. You may want to use loops, and create a vector/matrix to
   store the time of each loop as you increase the size. You might want to make a simple function
   to return the time value of each method (i-iii) as a function of matrix size (hint: hold on; legend)

   Clear the matrix, and generate the matrix of alternating 1 and 0 columns above by adding one
   column at a time. (hint: x = [0]; x = [x, 1]; x = [x, 0];). Note speed changes and MATLAB
   warning. Show the time of this along with the previous time plots.