GG250 Lab 4
Introduction to Programming with Matlab

This lab will provide you with your first opportunity to write a Matlab program nearly from scratch.

Exercise 4_1 (function file)

Prepare one function that solves for the roots of the following equation:

$$y = ax^2 + bx + c$$

and that plots the curve and the roots. The function should accept values for a, b, and c, and it should return roots and the number of roots. Three possibilities exist for the roots:

1 Two real roots;
2 One real roots;
3 No real roots (a null or empty set).

A pseudo code for the problem is on the lab web site
pseudo_code_gg250_lab_04_1.m

a) **Make sure you clearly understand the problem.**

b) **Work the following problems "by hand"** (you can use Matlab as a calculator):
(a, b, c) = (3,2,4)
(a, b, c) = (3,2,1)
(a, b, c) = (3,2,-2)
(a, b, c) = (1,2,1)
(a, b, c) = (0,1,0)

c) **Prepare a flow chart** in Word, and attach that in the e-mail with the code you eventually prepare. You almost certainly will have to modify the flow chart in the process of writing the function, so don't expect to get it perfect the first time.

d) **Develop the code**

1) Create a file called "function gg250_lab_04_1_yourname".
2) Title the function on the first line of the file as " function gg250_lab_04_1_yourname".
function [roots,n] = gg250_lab_04_1_your name(a,b,c)
The input list of arguments should be the three parameters a, b, and c. The output list of arguments should be the roots of the equation, an array called root.

Before each "active command" in the script (or before a small set of associated commands, insert comments saying what the line (or set of lines) does.

3) Include a general description of what the file does in documentation at the start of the function. Make sure you include your name in the documentation.

Examples of documentation are found in the files “line_intersect.x” on my website. Include the following list of examples:

% Examples:
% [roots,n] = gg250_lab_04_1_key(3,2,4)
% [roots,n] = gg250_lab_04_1_key(3,2,1)
% [roots,n] = gg250_lab_04_1_key(3,2,-2)
% [roots,n] = gg250_lab_04_1_key(1,2,1)
% [roots,n] = gg250_lab_04_1_key(0,1,0)

Make sure you include your name in the documentation at the start of the code.

4) Have the title of your plot read 'Parabola $y = ax^2 + bx + c$", where you use num2str to give the actual values of a, b, and c

d) **Test the five examples given**

e) **Attach to e-mail to**
gg250-lab@hawaii.edu
the following items
* your Matlab function
* your WORD file with the flowchart

* In the **body** of the e-mail, give the results for the roots you obtained by hand