Logical Operations and Decision Branching Assignment

Problem 1

Given *v*=[4 -1 2 3 1 -2 5 0] and *u*=[5 -1 0 3 -3 2 1 5]. Evaluate the follwing expression without using MATLAB. Then, check the answers with MATLAB.

1. ~ ~u
2. v == ~u
3. u == abs(*v)*
4. *v* >= *u*+*v*

Problem 2

Write code to deteremine the real roots of a quadratic equation $ax^2 + bx + c = 0$. The user should define the values for *a, b,* and *c* at the top of the code. To calculate the root, the code should first calculate the discriminant *D*, given by:

$$D = b^2 - 4ac$$

- If *D>0* the program should use the `disp` function to print "The equation has two roots," and the roots should be displayed on the next line.
- If *D=0,* the program should display the message "The equation has one root," and the root should be displayed on the next line.
- If *D<0,* the program should display the message "The equation has no real roots."

Run the code on the following test cases:

1. $3x^2 + 6x + 3 = 0$
2. $-3x^2 + 4x - 6 = 0$
3. $-3x^2 + 7x + 5 = 0$

Optional Advanced Exercise:

Exercise 1: Make a unit conversion live script

Write a live script that converts pressure units. The user will be asked to give units in either Pa and psi, or atm and the program will give the equivalent value in another unit system specified by the user. The program should ask the user to input (1) the amount, (2) the current unit (compare string data using `strcomp`), and (3) the desired unit. If you want, you can use the live script's dropdown feature under Control in the Toolbar.

Use the program to:

(a) Convert 70 psi to Pa

(b) Convert 800 Pa to psi

(c) Convert 1 atm to psi