CMPE1300 – Exercise 13 ref and out

You will write a program that will calculate the roots of a quadratic equation using methods. A quadratic equation has the form shown below:

$$f(x) = ax^2 + bx + c$$

The two roots of a quadratic equation can be calculated as shown below:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Using methods, your program will input values for the coefficients a, b, and c as double values. The program will then attempt to calculate the two roots of the equation using a method. If the roots could be calculated, they will be displayed. If the roots could not be calculated, an error message will be displayed.

Your program will include the methods defined below:

GetDouble()

Method GetDouble() will receive the prompt to be displayed as a parameter. GetDouble() will display the prompt, and input a single double value. If the double value is not a valid number, an error message will be displayed, and the user will be trapped in a loop until a valid number has been entered. This version of GetDouble() **will not check** the range of the value. Once the double value has been accepted, it will be returned to the main program using an **out** parameter.
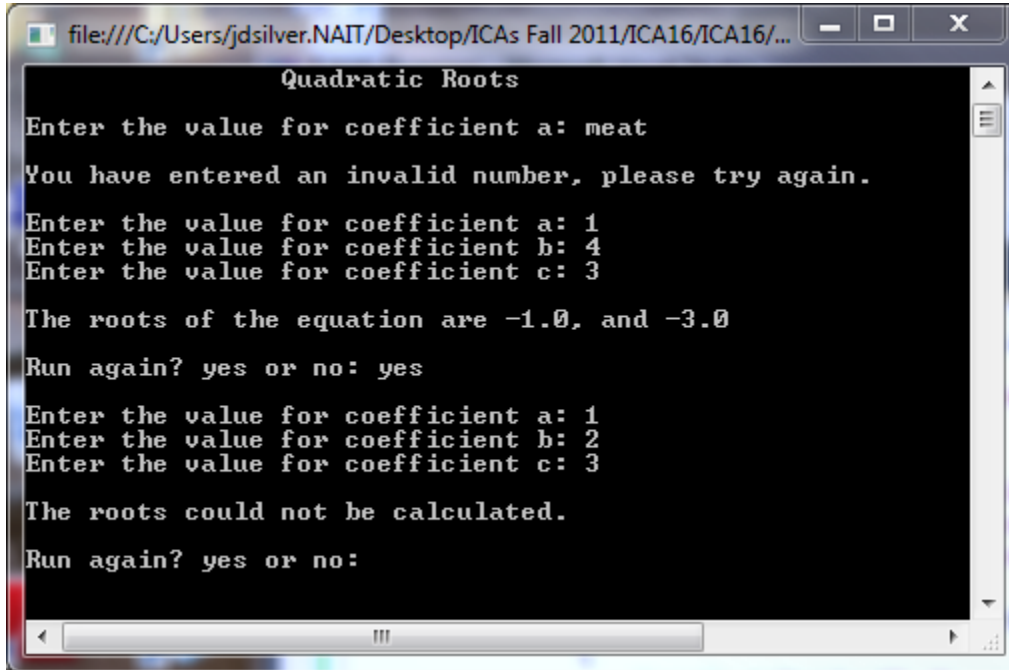
Roots()

Method Roots() will calculate the roots of a quadratic equation. It will be passed as parameters the values of the coefficients a, b, and c. It will return the calculated roots (2 values) as doubles using references. In addition, the return statement will return a Boolean value to the main program. The Boolean value will be true if the roots could be calculated, or false if the calculation of the roots failed (due to negative contents of the square root). This method will display **nothing** to the screen.

Main()

The main program will use GetDouble (3 times) to input the values of the coefficients of the quadratic equation as double values. Main() will then use Roots() to attempt to calculate the roots of the quadratic equation. If the roots could not be calculated, an error message will be displayed. If the roots could be calculated, then they will be displayed as shown below.

Main() will ask the user if they wish to run the program again. If the user responds with "yes", uppercase or lower case in any combination, the program will run again. If the user does not answer "yes", then the program will exit.

You may **not** use global variables in your program. Ensure that your arguments and parameters use different variable names.