

Homework #1:

In this homework, you will write a complete program to do the following: Given a quadratic equation, solve it, or tell the user than no real solutions exist. Some background information for review:

A quadratic equation can be written as $ax^2 + bx + c = 0$, where $a \neq 0$ and a, b, c are real numbers. Based on Brahmagupta's quadratic formula, we can directly solve for x . We will have 2 solutions in the form:

$$x_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{and} \quad x_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

These roots are real if and only if $b^2 - 4ac \geq 0$. (Because the square root of a negative number is imaginary).

Here are the steps you will have to follow:

1. Write a comment at the top of the program telling me your name and describing in your own words what the program is supposed to do.
2. Print a message explaining to the user what this program does.
3. Ask the user for their first name and last name, and store it in a variable or variables. (It's up to you how you want to do this).
4. Print a message welcoming them to running your program.
5. Ask the user to enter 3 integers called a , b , and c . If $a=0$, then print out an error message to the user telling them that they need to input a value for a that is not 0, and then exit the program.
6. Your program should print out the 3 numbers together with an appropriate message.
7. The program should then compute $b^2 - 4ac$. If it is less than 0, print out an error message to the user telling them that their equation has no real solutions.
8. If $b^2 - 4ac = 0$, then tell the user that there is only one root.
9. Otherwise, tell the user that there are 2 real roots.
10. Compute the root(s) of the equation using the formula above. Recall that `Math.sqrt(x)` will compute the square root of x .

Please keep an eye out for what data types everything should be. Do not use double until you truly and positively need to. (Which step of the process is that?).

Run the program a few times on different inputs. Please run it for at least one example of no roots, one root, and two roots. Please print out and submit your code, your interactions as the user, and your output.