Program 2
CSCI 111 – Fall 2022

The two roots of a quadratic equation $ax^2 + bx + c = 0$ can be obtained using the following formula:

$r_1 = \frac{-b+\sqrt{b^2-4ac}}{2a}$ and $r_2 = \frac{-b-\sqrt{b^2-4ac}}{2a}$

$\boldsymbol{b^2 - 4ac}$ is called the ***discriminant*** of the quadratic equation, and its value determines the number of roots as follows:

- $b^2 - 4ac > 0$, two real roots: r1 and r2
- $b^2 - 4ac = 0$, one real root: r
- $b^2 - 4ac < 0$, no real roots

Write a program that prompts the user for coefficients a, b, and c. Based on the discriminant, determine and output the number of real roots and their values, if there are any (you must use an if-statement for this determination).

Sample Output (3 examples)

```
Enter the A coefficient: 1
Enter the B coefficient: 3
Enter the C coefficient: 1
1, 3, and 1 coefficients have two real roots:
        r1 = -0.38
        r2 = -2.62
>>
Enter the A coefficient: 1
Enter the B coefficient: 2
Enter the C coefficient: 1
1, 2, and 1 coefficients have one real root:
        r = -1.00
>>
Enter the A coefficient: 5
Enter the B coefficient: 5
Enter the C coefficient: 5
5, 5, and 5 coefficients have no real roots
>>
```

Name your program **RootsYourLastName.java**. Include header comments formatted exactly as shown below (i.e., these comments should be the FIRST LINES in your program). Your electronic submission of the program file will represent your endorsement of the Honor Code Statement.

Before each significant step, provide a comment explaining the step (do not comment every line of code).

```
/* Course: CSCI 111, Section 1
   Student Name: Jane Doe
   Student ID: 12345678
   Program 2
   Due Date:

   In keeping with the Honor Code of UM, I have neither given nor received
   inappropriate assistance from anyone other than the TA or the instructor.

   Program Description:
*/
```