1/2/23

LAB PROGRAM - 01

Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminate $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

```
import java.util.Scanner;
class quadratic
{
    int a, b, c;
    double r1, r2, d;
    void getd()
    {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the coefficients of a, b, c");
        a = s.nextInt();
        b = s.nextInt();
        c = s.nextInt();
    }
    void compute()
    {
        while (a == 0)
        {
            System.out.println("Not a quadratic equation");
            System.out.println("Enter a non zero value for a: ");
            Scanner s = new Scanner(System.in);
            a = s.nextInt();
        }
        d = b*b - 4*a*c;
        if (d == 0)
        {
            r1 = (-b)/(2*a);
            System.out.println("Roots are real and equal");
            System.out.println("Root1 = Root2 = "+r1);
        }
```

```
else if (d > 0)
{
    r1 = ((-b) + (Math.sqrt(d))) / (double)(2*a);
    r2 = ((-b) - (Math.sqrt(d))) / (double)(2*a);
    System.out.println("Roots are real and distinct");
    System.out.println("Root 1 = " + r1 + "Root 2 = " + r2);
}
else if (d < 0)
{
    System.out.println("Roots are imaginary");
    r3 = (-b) / (2*a);
    r4 = Math.sqrt(-d) / (2*a);
    System.out.println("Root 1 = " + r1 + " + i" + r2);
    System.out.println("Root 1 = " + r1 + " - i" + r2);
}
}
}

class QuadraticMain
{
    public static void main(String args[])
    {
        Quadratic q = new Quadratic();
        q.getd();
        q.compute();
    }
}
```

OUTPUTS

① Enter the coefficients of a, b, c

3 2 1

Roots are imaginary

Root 1 = 0.0 + i0.471404520799

Root 2 = 0.0 - i0.471404520799

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② Enter the coefficients of a, b, c

1 2 1

Roots are real and equal

Root 1 = Root 2 = -1.0

③ Enter the coefficients of a, b, c

1 4 1

Roots are real and distinct

Root 1 = -3.732050807568877

Root 2 = 0.0

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