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papergrid

Date: / /

- ① Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display they are not real.

```
import java.util.Scanner;
```

```
class Quadratic
```

```
{
```

```
    int a, b, c;
```

```
    double x1, x2, x3, d;
```

```
    void getd()
```

```
    {
```

```
        Scanner u = new Scanner(System.in);
```

```
        System.out.println("Enter coefficients");
```

```
        a = u.nextInt();
```

```
        b = u.nextInt();
```

```
        c = u.nextInt();
```

```
    }
```

```
    void compute()
```

```
    {
```

```
        while (a == 0)
```

```
        {
```

```
            System.out.println("Not a quadratic eq");
```

```
            System.out.println("Enter nonzero value");
```

```
            Scanner u = new Scanner(System.in);
```

```
            a = u.nextInt();
```

```
        }
```

```
        d = b*b - 4*a*c;
```



```
if (d == 0)
{
```

```
    r1 = (-b) / (2 * a);
```

```
    System.out.println("Roots are  
equal");
```

```
    System.out.println("r1 = r2 = " + r1);
```

```
}
```

```
else if (d > 0)
```

```
{
```

(double)

```
    r1 = ((-b) + (Math.sqrt(d))) / (2 * a);
```

```
    r2 = ((-b) - (Math.sqrt(d))) / (2 * a);
```

```
    System.out.println("Roots are  
real and distinct");
```

```
    System.out.println("r1 = " + r1 + " r2 = " + r2);
```

```
}
```

```
else if (d < 0)
```

```
{
```

```
    System.out.println("Roots are  
imaginary");
```

```
    r1 = (-b) / (2 * a);
```

```
    r2 = Math.sqrt(-d) / (2 * a);
```

```
    System.out.println("r1 = " + r1 + "i" + r2);
```

```
    System.out.println("r2 = " + r2 + "i" + r1);
```

```
}
```

```
}
```

```
}
```

```
class QuadraticMain
```

```
{
```

```
    public static void main(String args[])
```

```
    {
        Quadratic q = new Quadratic();
```

```
        q.setd(1);
```

```
        q.compute();
```

```
}
```


Output:

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Enter the coefficients

1

5

6

The roots are real and distinct

$$r_1 = -2.0$$

$$r_2 = -3.0$$

② Enter the coefficients

3

4

5

The roots are imaginary.

$$r_1 = 0.0 + i 1.1055415967851332$$

$$r_2 = 0.0 - i 1.1055415967851332$$

③ Enter the coefficients

1

2

1

The roots are real and equal.

$$r_1 = r_2 = -1.0$$

Over
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