

LAB PROGRAM

Develop a lab program that prints all real solutions to the quadratic $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ 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("Root1 = " + r1 + " Root2 = " + r2);
}
else if (d < 0)
{
    System.out.println("Roots are imaginary");
    r1 = (-b) / (2 * a);
    r2 = Math.sqrt(-d) / (2 * a);
    System.out.println("Root1 = " + r1 + " + i" + r2);
    System.out.println("Root1 = " + r1 + " - i" + r2);
}
}
}
class QuadraticMain
{
    public static void main(String args[])
    {
        Quadratic q = new Quadratic();
        q.getD();
        q.compute();
    }
}

```


Output:

Enter the coefficients of a, b, c

1

2

3

Roots are imaginary

$$\text{Root1} = -1.0 + i1.4142135623730951$$

$$\text{Root1} = -1.0 - i1.4142135623730951$$

Enter the coefficients of a, b, c

1

2

1

Roots are real and equal

$$\text{Root1} = \text{Root2} = -1.0$$

Enter the coefficients a, b, c

1

4

1

Roots are real and distinct

Root 1 = 3.732050804568877 Root 2 = 0.6

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