

//Lab Program 1:

```
/*Q) 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);
```

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

Command Prompt

Microsoft Windows [Version 10.0.22621.755]
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C:\Users\Aisha Taffazul>cd C:\Users\Aisha Taffazul\Desktop\notes\3rd sem\java programs

C:\Users\Aisha Taffazul\Desktop\notes\3rd sem\java programs>

C:\Users\Aisha Taffazul\Desktop\notes\3rd sem\java programs>javac quadratic.java

C:\Users\Aisha Taffazul\Desktop\notes\3rd sem\java programs>java QuadraticEq

Enter the coefficients of a,b,c

1 4 4

Roots are real and equal

Root1 = Root2 = -2.0

C:\Users\Aisha Taffazul\Desktop\notes\3rd sem\java programs>java QuadraticEq

Enter the coefficients of a,b,c

1 9 20

Roots are real and distinct

Root1 = -4.0 Root2 = -5.0

C:\Users\Aisha Taffazul\Desktop\notes\3rd sem\java programs>java QuadraticEq

Enter the coefficients of a,b,c

1 2 30

Roots are imaginary

Root1 = -1.0 + i5.385164807134504

Root1 = -1.0 - i5.385164807134504

C:\Users\Aisha Taffazul\Desktop\notes\3rd sem\java programs>java QuadraticEq

Enter the coefficients of a,b,c

0 0 0

Not a quadratic equation

Enter a non zero value for a:

2 3 4

Roots are real and equal

Root1 = Root2 = 0.0

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