

- 1) Develop a java program that prints all real solutions to quadratic equation $ax^2+bx+c=0$. And show all the cases

```
import java.util.*;

class quadratic
{
    public static void main(String args[])
    {
        double a,b,c;
        double firstRoot,secondRoot;

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the value of a ::");
        a = sc.nextDouble();

        System.out.println("Enter the value of b ::");
        b = sc.nextDouble();

        System.out.println("Enter the value of c ::");
        c = sc.nextDouble();

        double determinant = (b*b)-(4*a*c);
        double s = Math.sqrt(determinant);

        if(determinant>0)
        {
            firstRoot = (-b + s)/(2*a);
            secondRoot = (-b - s)/(2*a);
            System.out.println("Roots are real and distinct");
            System.out.println("Roots are :: "+ firstRoot +" and "+secondRoot);
        }
        else if(determinant == 0)
```

```
{  
    System.out.println("Roots are equal");  
    System.out.println("Root is :: "+(-b)/(2*a));  
}  
else  
{  
    firstRoot = (-b/(2*a));  
    System.out.println("Roots are imaginary");  
    System.out.println(firstRoot+"+i "+(Math.sqrt(Math.abs(determinant)))/(2*a));  
    System.out.println(firstRoot+"-i "+(Math.sqrt(Math.abs(determinant)))/(2*a));  
}  
  
}  
}
```

```
C:\Users\Admin\Desktop>java quadratic
Enter the value of a ::
1
Enter the value of b ::
2
Enter the value of c ::
3
Roots are imaginary
-1.0+i 1.4142135623730951
-1.0-i 1.4142135623730951
```

```
C:\Users\Admin\Desktop>java quadratic
Enter the value of a ::
1
Enter the value of b ::
2
Enter the value of c ::
1
Roots are equal
Root is :: -1.0
```

```
C:\Users\Admin\Desktop>java quadratic
Enter the value of a ::
1
Enter the value of b ::
3
Enter the value of c ::
1
Roots are real and distinct
Roots are :: -0.3819660112501051 and -2.618033988749895
```

```
C:\Users\Admin\Desktop>
```