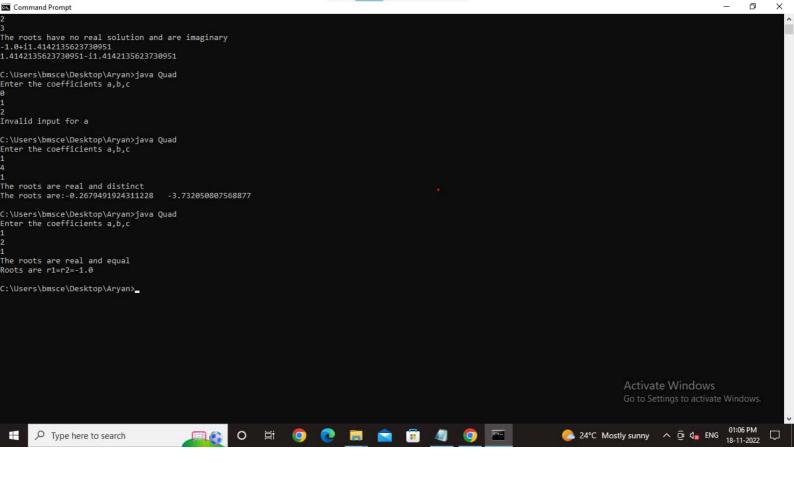# Quadratic Equation

```java
import java.math.*;
import java.util.Scanner;

class Quad
{
    public static void main (String arr[])
    {
        Scanner s = new Scanner (System.in);
        System.out.println ("Enter the coefficients a, b, c:");
        double a = s.nextDouble();
        double b = s.nextDouble();
        double c = s.nextDouble();
        double d, res1, res2;
        d = b*b - 4*a*c;
        if(a==0) { System.out.println('Invalid input for a');} else{
        { if (d>0)
            {
                System.out.println ("The roots are real and
                                            distinct :);
                res1 = -b + (Math.sqrt (d)) / (2*a);
                res2 = -b - (Math.sqrt(d)) / (2*a);
                System.out.println ("The roots are: "+ res1+" " +res2);
            }
        else if (d==0)
            {
                System.out.println ("Roots are real and equal");
                res1 = res2 = -b /(2*a);
                System.out.println ("Roots are r1=r2= "+ res1);
            }
        else { r1= -b/(2*a); r2= (math.sqrt (math.abs (d)))/(2*a);
            System.out.println (" No Real Solutions "); }
                System.out.println (r1+ "+i"+ r2 +"\n"+ r2 +(-i"+r1);
        }
    }
}
```

Output

1) Enter the coefficients a, b, c

0

2

3

Invalid Input for a

2) Enter the coefficients a, b, c

1

2

1

The roots are real and equal

Roots are r1 = r2 = 1·0

3) Enter the coefficients a, b, c

1

5

1

The roots are real and distinct

The roots are: - 0.2087121

-4.7912878474

4) Enter the coefficients a, b, c

1

2

3

The roots have no real solution and are imaginary

-1·0 + i 1.4142135623730951

1.4142135623730951 + i 1·4·42135623730951

```
2
3
The roots have no real solution and are imaginary
-1.0+i1.4142135623730951
1.4142135623730951-i1.4142135623730951

C:\Users\bmsce\Desktop\Aryan>java Quad
Enter the coefficients a,b,c
0
1
2
Invalid input for a

C:\Users\bmsce\Desktop\Aryan>java Quad
Enter the coefficients a,b,c
1
4
1
The roots are real and distinct
The roots are:-0.2679491924311228    -3.732050807568877

C:\Users\bmsce\Desktop\Aryan>java Quad
Enter the coefficients a,b,c
1
2
1
The roots are real and equal
Roots are r1=r2=-1.0

C:\Users\bmsce\Desktop\Aryan>
```