

## Lab Program 1:

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 discriminant  $b^2-4ac$  is negative, display a message stating that there are no real solutions.

### Code:

```
import java.util.Scanner;
class quadraticEquation
{
    public static void main(String args[])
    {
        Scanner S = new Scanner(System.in);
        System.out.println("Enter the values of a b and c");
        double a,b,c,d,r1,r2;
        a=S.nextFloat();
        if(a==0)
        {
            System.out.println("invalid input");
        }
        else
        {
            b=S.nextFloat();
            c=S.nextFloat();
            d=(b*b)-(4*a*c);

            if(d>0)
            {
                r1=(-b+Math.pow(d,0.5))/(2*a);
                r2=(-b-Math.pow(d,0.5))/(2*a);

                System.out.println(" Roots are Real and Distinct and The values are: " + r1 + "and" +
r2);
            }
            else if(d==0)
            {
                r1=-b/(2*a);
                System.out.println("Roots are Equal and the values are " + r1);
            }
            else
            {
                System.out.println("No real solutions");
            }
        }
    }
}
```

**Screenshot of code:**

Ln 11, Col 8 100% Windows (CRLF) UTF-8 07:18:39 16-11-2022

## Output:

```
Command Prompt
Microsoft Windows [Version 10.0.19044.1700]
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C:\Users\bmsce>cd C:\Users\bmsce\Desktop\1BM21CS065

C:\Users\bmsce\Desktop\1BM21CS065>set path="C:\Program Files\Java\jdk1.8.0_201\bin"

C:\Users\bmsce\Desktop\1BM21CS065>javac quadraticquation.java

C:\Users\bmsce\Desktop\1BM21CS065>java quadraticquation
Enter the values of a b and c
0
Invalid Input

C:\Users\bmsce\Desktop\1BM21CS065>java quadraticquation
Enter the values of a b and c
1 5 6
Roots are Real and Distinct and The values are: -2.0and-3.0

C:\Users\bmsce\Desktop\1BM21CS065>java quadraticquation
Enter the values of a b and c
2 4 2
Roots are Equal and the values are -1.0

C:\Users\bmsce\Desktop\1BM21CS065>java quadraticquation
Enter the values of a b and c
1 2 3
Roots are not real and the values are -1.0+11.4142135623730951and-1.0-11.4142135623730951

C:\Users\bmsce\Desktop\1BM21CS065>
```

## Observation:

## PROGRAM - 1

18/11/22

### QUADRATIC EQUATIONS

```
import java.util.Scanner;
import java.util.Scanner;
class QuadraticEquation
{
    public static void main (String args[])
    {
        Scanner S = new Scanner (System.in);
        System.out.println ("Enter the values a b and c");
        double
        float a, b, c, d, r1, r2;
        a = S.nextFloat();
        if (a == 0) { System.out.println ("invalid input"); }
        else { b = S.nextFloat();
            c = S.nextFloat();
            d = (b*b) - (4*a*c);
            if (d > 0)
            {
                r1 = (-b + sqrt(d)) / (2*a);
                r2 = (-b - sqrt(d)) / (2*a);
                System.out.println ("Roots are " + r1 + " and " + r2);
            }
            else if (d == 0)
            {
                r1 = -b / (2*a);
                System.out.println ("Roots are " + r1 + " and " + r1);
            }
            else
            {
                System.out.println ("Roots are complex");
            }
        }
    }
}
```



```
system.out.println ("Roots are equal and value  
is " + r1);
```

```
} else {
```

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

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

```
System.out.println ("Roots are not real and the  
values are " + r1 + " + i " + Maths.abs(r2) + " and " + r1  
"- i " + Maths.abs(r2)); } } }
```

output:-

Enter the values of a b and c

2 4 9

Roots are Equal and the values are -1

Enter the values of a b and c

1 5 6

Roots are Real and Distinct and the values are  
-2 and -3.

Enter the values of a b and c

1 2 3

Roots are not Real

*Machine*  
18/11/2022

