

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

SOURCE CODE :

```
import java.util.Scanner;
import java.lang.Math;

public class QuadEq {
    public static void main (String ss[]) {
        Scanner x = new Scanner(System.in);
        System.out.print("Enter the value of a: ");
        double a=x.nextDouble();
        System.out.print("Enter the value of b: ");
        double b=x.nextDouble();
        System.out.print("Enter the value of c: ");
        double c=x.nextDouble();

        double d=b*b-(4*a*c);
        double r1,r2;

        if(a==0) {
            System.out.println("INVALID INPUT");
        }

        else {

            if(d>0) {
                r1=(-b + Math.sqrt(d))/(2*a);
                r2=(-b - Math.sqrt(d))/(2*a);
                System.out.println("Roots are: "+r1+" and "+r2);
            }

            else if(d==0) {
                r1=r2=-b/(2*a);
                System.out.println("Root is: "+r1);
            }
            else {
                r1=-b/(2*a);
                r2=Math.sqrt(Math.abs(d))/(2*a);
                System.out.println("There are no real solutions");
                System.out.println("Root 1 is: "+r1+" + i"+r2);
                System.out.println("Root 2 is: "+r1+" - i"+r2);
            }
        }
    }
}
```

OUTPUT :

```
PS C:\Users\Admin\Documents\1BM21CS024> javac QuadEq.java
PS C:\Users\Admin\Documents\1BM21CS024> java QuadEq
Enter the value of a: 0
Enter the value of b: 1
Enter the value of c: 2
INVALID INPUT
PS C:\Users\Admin\Documents\1BM21CS024> java QuadEq
Enter the value of a: 1
Enter the value of b: -2
Enter the value of c: 1
Root is: 1.0
PS C:\Users\Admin\Documents\1BM21CS024> java QuadEq
Enter the value of a: 3
Enter the value of b: 8
Enter the value of c: 2
Roots are: -0.2792407799438735 and -2.3874258867227933
PS C:\Users\Admin\Documents\1BM21CS024> java QuadEq
Enter the value of a: 2
Enter the value of b: 4
Enter the value of c: 7
There are no real solutions
Root 1 is: -1.0 + i3.1622776601683795
Root 2 is: -1.0 - i3.1622776601683795
PS C:\Users\Admin\Documents\1BM21CS024>
```

