

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:

```
Q. 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.  
  
import java.util.Scanner;  
public class Quadratic  
{  
    public static void main (String[] args)  
    {  
        Scanner input = new Scanner (System.in);  
        System.out.print ("Enter the value of a:");  
        double a = input.nextDouble();  
        System.out.print ("Enter the value of b:");  
        double b = input.nextDouble();  
        System.out.print ("Enter the value of c:");  
        double c = input.nextDouble();  
        double d = b*b - 4.0 * a * c;  
        while (a == 0.0)  
        {  
            System.out.println ("Entered a value is  
            incorrect enter again");  
            a = input.nextDouble();  
        }  
        if (d > 0.0)  
        {  
            double x1 = (-b + Math.pow(d, 0.5)) / (2.0 * a);
```

```
            double x2 = (-b - Math.pow(d, 0.5)) / (2.0 * a);  
            System.out.println ("The roots are distinct and  
            the roots are "+x1+" and "+x2);  
        }  
        else if (d == 0.0)  
        {  
            double x1 = -b / (2.0 * a);  
            System.out.println ("The roots are real and  
            equal "+x1);  
        }  
        else  
        {  
            double x1 = -b / (2.0 * a);  
            double x2 = Math.sqrt(-d) / (2.0 * a);  
            System.out.println ("Roots are not real.");  
            System.out.println ("The roots are "+x1+" + i  
            "+x2+" and "+x1+" - i "+x2);  
        }  
    }  
}
```

Output:

```
Administrator: Command Prompt
operable program or batch file.
C:\Users\BMSCECSEIL74>cd C:\Users\BMSCECSEIL74\Desktop\1BM21CS002
C:\Users\BMSCECSEIL74\Desktop\1BM21CS002>javac Quadratic.java
C:\Users\BMSCECSEIL74\Desktop\1BM21CS002>java Quadratic
Enter the value of a: 0
Enter the value of b: 3
Enter the value of c: 4
Entered a value is incorrect enter again
4
The roots are 0.0 and -0.75
C:\Users\BMSCECSEIL74\Desktop\1BM21CS002>java Quadratic
Enter the value of a: 1
Enter the value of b: 2
Enter the value of c: 16
Roots are not real.
The Roots are -1.0 + i3.872983346207417 and -1.0 - i3.872983346207417
C:\Users\BMSCECSEIL74\Desktop\1BM21CS002>java Quadratic java Quadratic
Enter the value of a: 1
Enter the value of b: 5
Enter the value of c: 2
The roots are -0.4384471871911697 and -4.561552812808831
C:\Users\BMSCECSEIL74\Desktop\1BM21CS002>java Quadratic
Enter the value of a: 1
Enter the value of b: 2
Enter the value of c: 1
The root is -1.0
C:\Users\BMSCECSEIL74\Desktop\1BM21CS002>
```