

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.*;
import java.lang.*;
class box
{
    public static void main (String args[])
    {
        System.out.println("Enter the coefficients of quadrartic equation");
        Scanner sc= new Scanner(System.in);
        double a=sc.nextDouble();
        double b=sc.nextDouble();
        double c=sc.nextDouble();
        double d=(b*b)-(4*a*c);
        double r1;
        double r2;
        if(d>0)
        {
            r1=(-b+Math.sqrt(d))/(2*a);
            r2=(-b-Math.sqrt(d))/(2*a);
            System.out.println("Roots are real and distinct");
            System.out.println("The roots are r1="+r1+" and r2="+r2);
        }
        else if(d==0)
        {
```

```
    r1=r2=(-b)/(2*a);
    System.out.println("Roots are real and same");
    System.out.println("The roots are r1=r2="+r1);
}
else
{
    r1=(-b)/(2*a);
    r2=(Math.sqrt(-d))/(2*a);
    System.out.println("Roots are imaginary and distinct");
    System.out.println("The roots are r1="+r1+"+i"+r2);
    System.out.println("The roots are r2="+r1+"-i"+r2);
}
}
}
```

WRITTEN CODE:

18/11/22

Quadratic Equation

```
import java.util.*;
import java.lang.*;
class base {
    public static void main (String[] args) {
        System.out.println("Enter");

        Scanner sc = new Scanner(System.in);
        double a = sc.nextDouble();
        double b = sc.nextDouble();
        double c = sc.nextDouble();
        double d = (b*b) - (4*a*c);
        double r1;
        double r2;
        if (a != 0) {
            if (d > 0) {
                r1 = (-b + Math.sqrt(d)) / (2*a);
                r2 = (-b - Math.sqrt(d)) / (2*a);
                System.out.println("Roots are");
                System.out.println("The roots are");
            }
            else if (d == 0) {
                r1 = -b / (2*a);
                r2 = -b / (2*a);
                System.out.println("Roots are");
                System.out.println("The roots are");
            }
            else {
                System.out.println("Roots are");
                System.out.println("The roots are");
            }
        }
    }
}
```

```

        System.out.println("The
        System.out.println("The
    }
}
else {
    System.out.println("Enter
}
}
}

```

Output

1) Enter the coefficients of quadratic

Roots are real and equal

The roots are $x_1 = x_2 = 1$.

2) Enter the coefficients of quadratic

Roots are imaginary and distinct

The roots are $x_1 = 0.5 + i$

The roots are $x_2 = 0.5 - i$

OUTPUT (including test cases):

```
Command Prompt
23-01-2023 07:04 <DIR> COA
26-01-2023 00:30 <DIR> DATA STRUCTURES
27-11-2022 10:35 <DIR> DBMS
19-01-2023 23:15 <DIR> EVS
23-01-2023 20:58 <DIR> LOGIC DESIGN
18-01-2023 15:25 <DIR> MATHS
26-01-2023 00:55 <DIR> OBJECT JAVA PROGRAMMING
14-12-2022 21:57 <DIR> Syllabus
28-12-2022 00:44 <DIR> WEB APPLICATION
0 File(s) 0 bytes
12 Dir(s) 174,920,179,712 bytes free

C:\Users\Admin\Desktop\BMS\3RD SEM>cd OBJECT JAVA PROGRAMMING

C:\Users\Admin\Desktop\BMS\3RD SEM\OBJECT JAVA PROGRAMMING>cd Lab

C:\Users\Admin\Desktop\BMS\3RD SEM\OBJECT JAVA PROGRAMMING\Lab>set path="C:\Program Files\Java\jdk-19\bin"

C:\Users\Admin\Desktop\BMS\3RD SEM\OBJECT JAVA PROGRAMMING\Lab>javac Java1.java

C:\Users\Admin\Desktop\BMS\3RD SEM\OBJECT JAVA PROGRAMMING\Lab>java box
Enter the coefficients of quadratic equation
1 2 1
Roots are real and same
The roots are r1=r2=-1.0

C:\Users\Admin\Desktop\BMS\3RD SEM\OBJECT JAVA PROGRAMMING\Lab>java box
Enter the coefficients of quadratic equation
1 1 1
Roots are imaginary and distinct
The roots are r1=-0.5+i0.8660254037844386
The roots are r2=-0.5-i0.8660254037844386

C:\Users\Admin\Desktop\BMS\3RD SEM\OBJECT JAVA PROGRAMMING\Lab>java box
Enter the coefficients of quadratic equation
1 4 1
Roots are real and distinct
The roots are r1=-0.2679491924311228 and r2=-3.732050807568877

C:\Users\Admin\Desktop\BMS\3RD SEM\OBJECT JAVA PROGRAMMING\Lab>
```