

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");
                System.out.println(" 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
            {
                r1=-b/(2*a);
            }
        }
    }
}
```

```

        r2=(Math.sqrt(Math.abs(d)))/(2*a);
        System.out.println("Roots are imaginary and values are" + r1+ "+i" +Math.abs(r2)+ "and"
+ r1+ "-i"+Math.abs(r2));
    }
}
}

```

Screenshot of writeup code:

```

quadraticquation - Notepad
File Edit Format View Help
import java.util.Scanner;
class quadraticquation
{
    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");
                System.out.println(" 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
            {
                r1=-b/(2*a);
                r2=(Math.sqrt(Math.abs(d)))/(2*a);
                System.out.println("Roots are imaginary and values are" + r1+ "+i" +Math.abs(r2)+ "and" +r1+ "-i"+Math.abs(r2));
            }
        }
    }
}

```

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Output:

```
Command Prompt
C:\Users\bmce\Desktop\BM21CS064>javac quadraticquation.java
C:\Users\bmce\Desktop\BM21CS064>java quadraticquation
enter the values of a, b and c
0
Invalid input
C:\Users\bmce\Desktop\BM21CS064>java quadraticquation
enter the values of a, b and c
1 5 6
Roots are real and distinct
The values are -2.0and-3.0
C:\Users\bmce\Desktop\BM21CS064>java quadraticquation
enter the values of a, b and c
2 4 2
Roots are equal and the values are-1.0
C:\Users\bmce\Desktop\BM21CS064>java quadraticquation
enter the values of a, b and c
1 2 3
Roots are imaginary and values are-1.0+11.4142135623730951and-1.0-11.4142135623730951
C:\Users\bmce\Desktop\BM21CS064>
```