

Java - Date - 12/12/23

1) Develop a Java Program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read a, b, c .

```
import java.util.*;

public class Quadratic {

    public static void main (String args[]) {
        Scanner SC = new Scanner (System.in);
        int a, b, c;
        double r1, r2, d;
        void getd()
        {
            System.out.println ("Enter coefficients of a, b, c");
            a = SC.nextInt();
            b = SC.nextInt();
            c = SC.nextInt();
        }

        void compute()
        {
            while (a == 0)
            {
                System.out.println ("Not a quadratic equation");
                System.out.println ("Enter a non zero value for a");
                a = SC.nextInt();
            }

            d = (b*b) - (4*a*c);
            if (d == 0)
            {
                r1 = (-b) / (2*a);
                System.out.println ("Roots are real and equal");
                System.out.println ("Root 1 = Root 2 = " + r1);
            }
            else if (d > 0)
            {
                r1 = (-b + (Math.sqrt(d))) / (double) (2*a);
                r2 = (-b - (Math.sqrt(d))) / (double) (2*a);
                System.out.println ("Roots are real and unequal");
                System.out.println ("Root 1 = " + r1 + " and Root 2 = " + r2);
            }
            else if (d < 0)
            {
                System.out.println ("Roots are imaginary");
                double realPart = (-b) / (2*a);
                double imaginaryPart = (Math.sqrt(-d)) / (2*a);
                System.out.println ("Root 1 = " + realPart + " + i " + imaginaryPart);
                System.out.println ("Root 2 = " + realPart + " - i " + imaginaryPart);
            }
        }
    }
}
```



```

x2 = ((-b) - (Math.sqrt(d))) / (2*a);
System.out.println("Roots are real and distinct");
System.out.println("Root 1 = " + x1 + " Root 2 = " + x2);
}
else if (d < 0)
{
    System.out.println("Roots are imaginary");
    x1 = (-b) / (2*a);
    x2 = Math.sqrt(-d) / (2*a);
    System.out.println("Root 1 = " + x1 + " + i " + x2 + " Root 2 = " + x1 + " - i " + x2);
}
}
}

```

Output -

Enter coefficients of a, b, c

4 5 6

Roots are imaginary

Root 1 = 0.0 + i 1.053

Root 2 = 0.0 - i 1.053

Enter coefficients of a, b, c

1 -2 1

Roots are real and equal

Root 1 = Root 2 = 1.0

Enter coefficients of a, b, c

1 -3 2

Roots are real and distinct

Root 1 = 2.0

Root 2 = 1.0