

02/10/24

- Q) 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.

Source Code

```

import java.util.*;

public class Quad {
    Scanner sc = new Scanner (System.in);
    int a, b, c, d;
    double r1, r2, d-sq;

    void input() {
        System.out.println("Enter coefficients a, b, c: ");
        a = sc.nextInt();
        b = sc.nextInt();
        c = sc.nextInt();
    }

    void calc() {
        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 = " + r1 + " and Root 2 = " + r1);
        }
        else if (d > 0) {
            d-sq = Math.sqrt(d);
            r1 = (-b + d-sq) / (2*a);
            r2 = (-b - d-sq) / (2*a);
            System.out.println("Roots are real and distinct");
            System.out.println("Root 1 = " + r1 + " and Root 2 = " + r2);
        }
    }
}

```



else {

d\_sq = Math.sqrt(-d);

r1 = -b / (2.0 \* a);

r2 = d\_sq / (2.0 \* a);

System.out.println("Roots are imaginary");

System.out.println("Root 1 = " + r1 + " + " + r2 + "i" + "\nRoot 2 = " + r1 + " - " + r2 + "i");

}

}

}

class Quadratic {

public static void main (String[] args) {

Quad quad = new Quad();

quad.input();

quad.calc();

}

}

Output

Enter coefficients a, b, c:

1

5

6

Roots are real and distinct

Root 1 = 2.0

Root 2 = 2.0



Enter coefficients a, b, c:

1  
1  
1

Roots are imaginary

$$\text{Root 1} = -0.5 + 0.8660254037844386i$$

$$\text{Root 2} = -0.5 - 0.8660254037844386i$$

Enter coefficients a, b, c:

4  
12  
9

Roots are real and equal

$$\text{Root 1} = -1.5$$

$$\text{Root 2} = -1.5$$

o/p seen

GK  
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