

1)

Develop a java program that prints all real solutions to quadratic equation $ax^2 + bx + c = 0$, read in a, b, c and use the quadratic formula. ~~to~~ if $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

Program :-

```
import java.util.Scanner;
class Quadratic
```

```
{
```

```
    int a, b, c;
```

```
    double r1, r2, d;
```

```
    void getd ()
```

```
{
```

```
        Scanner s = new Scanner (System.in);
```

```
        System.out.println ("Enter a, b, c");
```

```
        a = s.nextInt();
```

```
        b = s.nextInt();
```

```
        c = s.nextInt();
```

```
}
```

```
void compute ()
```

```
{
```

```
    while (a == 0)
```

```
{
```

```
        System
```

```
        System.out.println ("Not a quadratic Equation");
```

```
        System.out.println ("Enter non zero value");
```

```
        a = s.nextInt();
```

```
}
```

$d = b^2 - 4 * a * c;$

if (d == 0)

{

$r_1 = (-b / 2 * a);$

System.out.println("roots are real and equal");

System.out.println("Root 1 = Root 2 = " + r1);

}

else if (d > 0)

{

$r_1 = ((-b) + (\text{Math.sqrt}(d))) / (\text{double})(2 * a);$

$r_2 = ((-b) - (\text{Math.sqrt}(d))) / (\text{double})(2 * a);$

System.out.println("roots are real and distinct");

System.out.println("R1 = " + r1 + " and R2 = " + r2);

}

else if (d < 0)

{

~~System.out.println("roots are imaginary");~~

$r_1 = (-b) / (2 * a);$

$r_2 = \text{Math.sqrt}(-d) / (2 * a);$

System.out.println("R1 = " + r1 + " + i " + r2);

System.out.println("R2 = " + r1 + " + i " + r2);

}

}

}

class QuadraticMain

{

public static void main (String args [])

{

//_

```

quadratic q = new Quadratic ();
q.getd();
q.compute();
}

```

output

• Enter the conjugates of a, b, c

1

5

2

roots are real and distinct

$$\text{root 1} = -0.4384 \quad \text{root 2} = -4.5615$$

• Enter the conjugates of a, b, c

4

-4

1

* roots are real and equal

$$\text{root 1} = \text{root 2} = 1/2$$

• Enter the conjugates of a, b, c

1

1

1

The roots are imaginary

$$\text{root 1} = -0.5 + i 1.732$$

$$\text{root 2} = -0.5 - i 1.732$$

Shreyas Gouda M IBM22CS270

(10)

Jan

12/12/23