

Lab Program - 1

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:

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 the coefficients of a, b, c");
        a = s.nextInt();
        b = s.nextInt();
        c = s.nextInt();
    }
    void compute()
    {
        while (a == 0)
        {
            System.out.println("Not a quadratic equation");
            System.out.println("Enter a non zero value of a:");
            Scanner s = new Scanner(System.in);
            a = s.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 ("Root1 = Root2 = " + r1);
}

```
else if (d > 0)
```

```
{
```

$$r1 = ((-b) + (\text{Math.sqrt}(d))) / (\text{double})(2 * a);$$

$$r2 = ((-b) - (\text{Math.sqrt}(d))) / (\text{double})(2 * a);$$

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

System.out.println ("Root1 = " + r1 + " Root2 = " + r2);
}

```
else if (d < 0)
```

```
{
```

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

$$r1 = (-b) / (2 * a);$$

$$r2 = \text{Math.sqrt}(-d) / (2 * a);$$

System.out.println ("Root1 = " + r1 + " + i " + r2);
}

System.out.println ("Root2 = " + r1 + " - i " + r2);
}

```
}
```

Class Quadratic Main

```
{
```

```
public static void main (String args [])
```

```
{
```

```
Quadratic q = new Quadratic();
```

```
q.getd();
```

```
q.compute();
```

```
}
```

Output :

Enter the coefficients of a, b, c

2.3 4 5.6

Roots are Imaginary

$$\text{Root 1} = -0.87 + 1.30i$$

$$\text{Root 2} = -0.87 - 1.30i$$

Shuvam Rajbanshi

1BM22CS275

Enter the coefficients of a, b, c

1 3 2

Roots are real and distinct

$$\text{Root 1} = -1.0 \quad \text{Root 2} = -2.0$$

Enter the coefficients of a, b, c

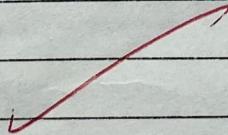
1 2 1

Roots are real and equal

$$\text{Root} = \text{Root} = -10$$

Shuvam Rajbanshi

1BM22CS275



Additional programs:

Q. To write a program in Java to find the area of a rectangle and verify same with various inputs (length/breadth).

class Rectangle Area

```
public static void main (String args [ ]) {  
    int length, breath;  
    length = Integer.parseInt (args [ 0 ]);  
    breath = Integer.parseInt (args [ 1 ]);  
    int area = length * breath;  
    System.out.println ("length of rectangle = " + length);  
    System.out.println ("breadth of rectangle = " + breath);  
    System.out.println ("area of rectangle = " + area);  
}
```

Output :

10 8

length of rectangle = 10

breadth of rectangle = 8

area of rectangle = 80

d. ~~Scanner~~ Scanner Class

```
import java.util.Scanner;  
class HelloWorld {  
    public static void main (String args[]) {  
        int a; float b; String s;  
        Scanner in = new Scanner (System.in);  
        System.out.println ("Enter a string");  
        s = in.nextLine();  
        System.out.println ("You entered string " + s);  
        System.out.println ("Enter an integer");  
        a = in.nextInt();  
        System.out.println ("You entered integer " + a);  
        System.out.println ("Enter a float");  
        b = in.nextFloat();  
        System.out.println ("You entered a float " + b);  
    }  
}
```

Output:

Enter a string

java

You entered string java

Enter an integer

67

You entered integer 67

Enter a float

7.6

You entered float 7.6

③

Java
12/12/23