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LAB PROGRAM - 1

Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read 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.

→ `import java.util.Scanner;`

```
public class quadratic {
    public static void main (String[] args) {
        Scanner scanner = new Scanner (System.in);
```

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

```
        System.out.print ("Enter a: ");
```

```
        double a = scanner.nextDouble();
```

```
        System.out.print ("Enter b: ");
```

```
        double b = scanner.nextDouble();
```

```
        System.out.print ("Enter c: ");
```

```
        double c = scanner.nextDouble();
```

```
        if (a == 0)
```

```
        {
            System.out.print ("Not a quadratic equation") }
    }
```



```
else {
```

```
double d = (b*b) - (4*a*c);
```

```
if (d > 0) {
```

```
double root1 = (-b + Math.sqrt(d)) / (2*a);
```

```
double root2 = (-b - Math.sqrt(d)) / (2*a);
```

```
System.out.println("The roots are real and  
different");
```

```
System.out.println("Root 1: " + root1);
```

```
System.out.println("Root 2: " + root2);
```

```
}
```

```
else if (d == 0) {
```

```
double root = -b / (2*a);
```

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

```
System.out.println("Root: " + root);
```

```
}
```

```
else {
```

```
double realPart = -b / (2*a);
```

```
double imagPart = Math.sqrt(d) / (2*a);
```

```
System.out.println("Roots are complex and  
different");
```

```
System.out.println("Root 1: " + realPart +  
" + " + imagPart + "i");
```

```
System.out.println("Root 2: " + realPart + "- "  
" + imagPart + "i");
```

```
}
```



```
System.out.print("no real roots");
```

```
}
```

```
}
```

```
Scanner.close();
```

```
}
```

```
}
```

o/p: Enter coefficients of a, b, c:

Enter a: 0

Enter b: 4

Enter c: 6

Not a quadratic equation

Enter coefficients of a, b, c:

Enter a: 5

Enter b: 7

Enter c: 9

No real roots

Enter coefficients of a, b, c:

Enter a: 2

Enter b: 4

Enter c: 2

The roots are real and equal

Root: -1.0

Enter coefficients a, b, c:

Enter a: 2

Enter b: 8

Enter c: 2

The roots are real and different

Root 1: -0.2679491

Root 2: -3.7320508

o/p seen

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