★LAB - 1 :↓

★ 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 "No real roots".

Soln:

```
import java.util.*;
class Main {
    public static void main (String args[]) {

    Scanner input = new Scanner (System.in);

    System.out.println ("Enter the coefficients
                         a, b and c");

    int x1, x2;
    int a = input.nextInt();
    int b = input.nextInt();
    int c = input.nextInt();

    if ((b)(b) - 4*a*c) < 0) {

        System.out.println ("No Real roots
                             available");

    else if ((b)(b) - 4*a*c == 0) {

        System.out.println ("The Roots are equal");

    x1 = -b/(2*a);

    System.out.println ("Root value is ", +x1);
```

```
else if ((b)*b - 4*a*c >0){
    r1 = (-b + sqrt (b*b - 4*a*c)) /2*a;
    r2 = (-b - sqrt (b*b - 4*a*c)) /(2*a);
    System.out.println(" It has two real and
                        different roots \n
                        the roots are "
                        + r1 + " and " + r2 );
}
}
```

* Algorithm :

→ step 1 : start

→ step 2 : input a, b, and c [coefficients]

→ step 3 : calculate discriminant, $b^2 - 4ac$.

→ step 4 : check if $b^2-4ac < 0$, then print No real roots.

→ step 5 : if $b^2-4ac = 0$, then print both roots are equal and real.

→ step 6 : if $b^2-4ac > 0$, then print roots are different and real, and print the roots.

→ step 7 : END

* Output:

* Enter the co-efficients a, b, c:
  - 4
  - 8
  - 4

→ The roots are equal and the value is = -1.0.

* Enter the coefficients a, b, c:
  - -1
  - 1
  - 2

→ The roots are Imaginary.

* Enter the coefficients a, b, c:
  - 1
  - -5
  - 6

→ The roots are distinct and real and the value of roots are 3.0 and 2.0