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LAB 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 discriminate b^2-4ac is negative, display a message stating that there are no real solutions.

A.

```
import java.util.Scanner;

class QuadraticEquations
{
    public static void main (String args[])
    {
        double a,b,c,D;
        double r1, r2;
        double imaginary_part, real_part;

        Scanner in = new Scanner (System.in);

        System.out.println("Enter the constants a,b and c in the
            quadratic equation a(x)^2 +b(x)+c=0: ");
        a = in.nextDouble();
        b = in.nextDouble();
        c = in.nextDouble();
        System.out.println("\n Input Quadratic Equation: "+a+"
            (x)^2+"+b+"(x) + "+c+" =0");

        D =(b*b) -(4*a*c);
```

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```
if(D>0)
{
    System.out.println("\n Roots are real and unequal since
                                    Discriminant=" +D);
    r1 = (-b + Math.sqrt(D)) / (2*a);
    r2 = (-b - Math.sqrt(D)) / (2*a);
    System.out.println("\n Roots of the Quadratic Equation are:
        \n Root 1 =" +r1 + "\n Root 2 = " +r2);
}
else if (D==0)
{
    System.out.println("\n Roots are real and equal since
                                    Discriminant = " +D);
    r1 = r2 = (-b) / (2*a);
    System.out.println("\n Roots of the Quadratic Equation are:
        \n Root 1 = Root 2 = " +r1);
}
else
{
    System.out.println("\n Roots are unreal since Discriminant=" +D)
    real_part = (-b) / (2*a);
    imaginary_part = (Math.sqrt(-D)) / (2*a);
    System.out.println("\n Roots of the Quadratic
Equation are: \n Root 1 =" +real_part + " +" +imaginary_
part + "(i) \n Root 2 = " +real_part + " -" +imaginary_part+
"(i)");
}
}
}
```

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OUTPUT:

Enter the constants a,b and c of the quadratic equation
a(x)^2 + b(x) + c = 0;
1
-6
9

Input Quadratic Equation : 1.0(x)^2 - 6.0(x) + 9.0 = 0

Roots are real and equal since Discriminant = 0.0

Roots of Quadratic Equation are:
Root 1 = Root 2 = 3.0