Lab Program 1:

Develop a Java program that prints all real solutions to the quadratic equation ax2+bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative, display a message stating that there are no real solutions.

SOURCE CODE:

```
import java.util.Scanner;
import java.lang.Math;
public class QuadEq {
        public static void main (String ss[]) {
        Scanner x = new Scanner(System.in);
        System.out.print("Enter the value of a: ");
        double a;
                System.out.println("make sure it is not 0");
                a=x.nextDouble();
        }while(a==0);
        System.out.print("Enter the value of b: ");
        double b=x.nextDouble();
        System.out.print("Enter the value of c: ");
        double c=x.nextDouble();
        double d=b*b-(4*a*c);
        double r1,r2;
        if(d>0) {
                r1=(-b + Math.sqrt(d))/(2*a);
                r2=(-b - Math.sqrt(d))/(2*a);
                System.out.println("Roots are real and distinct");
                System.out.println("Roots are: "+r1+" and "+r2);
        else if(d==0) {
                r1=r2=-b/(2*a);
                System.out.println("Root is real and unique");
                System.out.println("Root is: "+r1);
        else {
                r1=-b/(2*a);
                r2=Math.sqrt(Math.abs(d)/(2*a));
                System.out.println("There are no real solutions");
                System.out.println("Roots are imaginary and distinct");
System.out.println("Root 1 is: "+r1+" + i"+r2);
System.out.println("Root 2 is: "+r1+" - i"+r2);
```

WRITTEN CODE:

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                         Quadratic Equation
   Import jana. utill. Scannere;
   import java long. Math,
  public clars quad Eq 2
      public static nois main (string ss []) 2
          Scenner n = new Scenner (System.in)
          System. out. println ("Enter value of a: ");
          double a;
          Lo & (1) ManhoMI mor Mich
       System out. prividen ("make sure it is not o");
              a = n. cooper souble ();
         ) while (a = = 0);
      System ent probable ("Enter the value of b: ");
         double b = x. near spelble();
          System. our prhithel " Entere the value of c: ");
          Vouble c = n near Double ();
        double d = b * b - (4 * a * c);
         double 81,82;
   if (d>0) {
         T1 = (-b+ Marth.sqrt(d))/(2*a);
         32 = (-b - Math. sgrt (d))/(2*a);
        Syrum out. pointly ("Roots are Real and Distinct");
        Syrum. out. printly ("Roots are: "+81+" and #52);
```

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Syrhem. out. printly ("Rools are: "+ τ 1+" and "+ τ 2);

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T₁ = -b/(2*a);

T₂ = Math. sqrt (Marth.abs (d)/(2*a));

System our printled "there are no real solutions");

System our printled "koots are imaginary of Latterer");

System out printled ("hoots is: "+ol+"+i"+o2);

System out. printled ("hoots is: "+ol+"+i"+o2);

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Pest cases:

0 1, -2, 1

21, 5, 3 (M)

3, 1, 2, (())

OUTPUT (including test cases):

```
PS C:\Users\anosh\OneDrive\Desktop\java practice> javac QuadEq.java
PS C:\Users\anosh\OneDrive\Desktop\java practice> java QuadEq
Enter the value of a: make sure it is not 0
make sure it is not 0
Enter the value of b: -2
Enter the value of c: 1
Root is real and unique
Root is: 1.0
PS C:\Users\anosh\OneDrive\Desktop\java practice> java QuadEq
Enter the value of a: make sure it is not 0
Enter the value of b: 5
Enter the value of c: 3
Roots are real and distinct
Roots are: -0.6972243622680054 and -4.302775637731995
PS C:\Users\anosh\OneDrive\Desktop\java practice> java QuadEq
Enter the value of a: make sure it is not 0
Enter the value of b: 1
Enter the value of c: 4
There are no real solutions
Roots are imaginary and distinct
PS C:\Users\anosh\OneDrive\Desktop\java practice>
```