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 discriminant b2-4ac is negative, display a message stating that there are no real solutions.

```
import java.util.Scanner;
class QuadraticEquation
{
public static void main(String XX[])
{
double a;
double b;
double c;
double root1,root2;
Scanner SS=new Scanner(System.in);
System.out.print("Enter the values of a,b,c");
a=SS.nextDouble();
b=SS.nextDouble();
c=SS.nextDouble();
double determinant=b*b-4*a*c;
{
if(a==0)
System.out.print("It is not a quadratic equation");
elsea
{
```

```
if(determinant>0)
{
root1=((-b+Math.sqrt(determinant))/2*a);
root2=((-b-Math.sqrt(determinant))/2*a);
System.out.print("The roots are distinct and real:"+root1+"and "+root2);
}
if(determinant==0)
{
root1=root2=-b/2*a;
System.out.print("The roots are equal:"+root1);
}
if(determinant<0)
{
root1=((-b+Math.abs(Math.sqrt(determinant)))/2*a);
root2=((-b-Math.abs(Math.sqrt(determinant)))/2*a);
System.out.print("the roots are imaginary:"+"i"+root1+" "+"i"+root2);
}
}
}
}
}
```

Program - 1

```
import java.util.Scanner;
class Quadratic Equation
{
 public static void main (String xx[])
  {
  double a;
  double b;
  double c;
double root1, root2;
Scanner SS = new Scanner (System.in);
System.out.print ("Enter the value of a,b,c");
 a = SS.nextDouble();
  b = SS.nextDouble();
  c = SS.nextDouble();
double determine = b*b-4*a*c;
  {
  if (a==0)
System.out.println ("It is not a quadratic equation");
 else
    {
      if (determinant >0)
      {
   root1 = ((-b+Math.sqrt(determinant))/2*a);
   root2 = ((-b Math.sqrt(determinant))/2*a);
 System.out.println ("The roots are distinct and real:"+root1+
       "and"+root2);
  }
 if (determinant == 0)
    {
    root1 = root2 = -b/2*a;
    System.out.print ("The roots are equal :"+root1);
  }
  if (determinant <0)
  {
    root1 = ((-b + Math.sqrt(determinant)))/2*a);
     root2 = ((-b -Math.abs (Math.sqrt(determinant)))/2*a)
    System.out.println ("the roots are imaginary:"+"+root1
    " + " "+i" root2);
  }
 }
}
```

Output:

Enter the value of a:
4
Enter the value of b:
-4
Enter the value of c:
1
The roots are real and equal and are 0.5 and 0.5
Enter the value of a:
1
Enter the value of b:
4
Enter the value of c:
3
The roots are real and distinct and are -1.0 and -3.0

```
C:\Users\ACER\Documents>javac QuadraticEquation.java

C:\Users\ACER\Documents>java QuadraticEquation
Enter the values of a,b,c22
18
10
the roots are imaginary:iNaN iNaN
C:\Users\ACER\Documents>java QuadraticEquation
Enter the values of a,b,c0
55
6
It is not a quadratic equation
C:\Users\ACER\Documents>-22
'-22' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\ACER\Documents>java QuadraticEquation
Enter the values of a,b,c2
4
6
the roots are imaginary:iNaN iNaN
C:\Users\ACER\Documents>
```