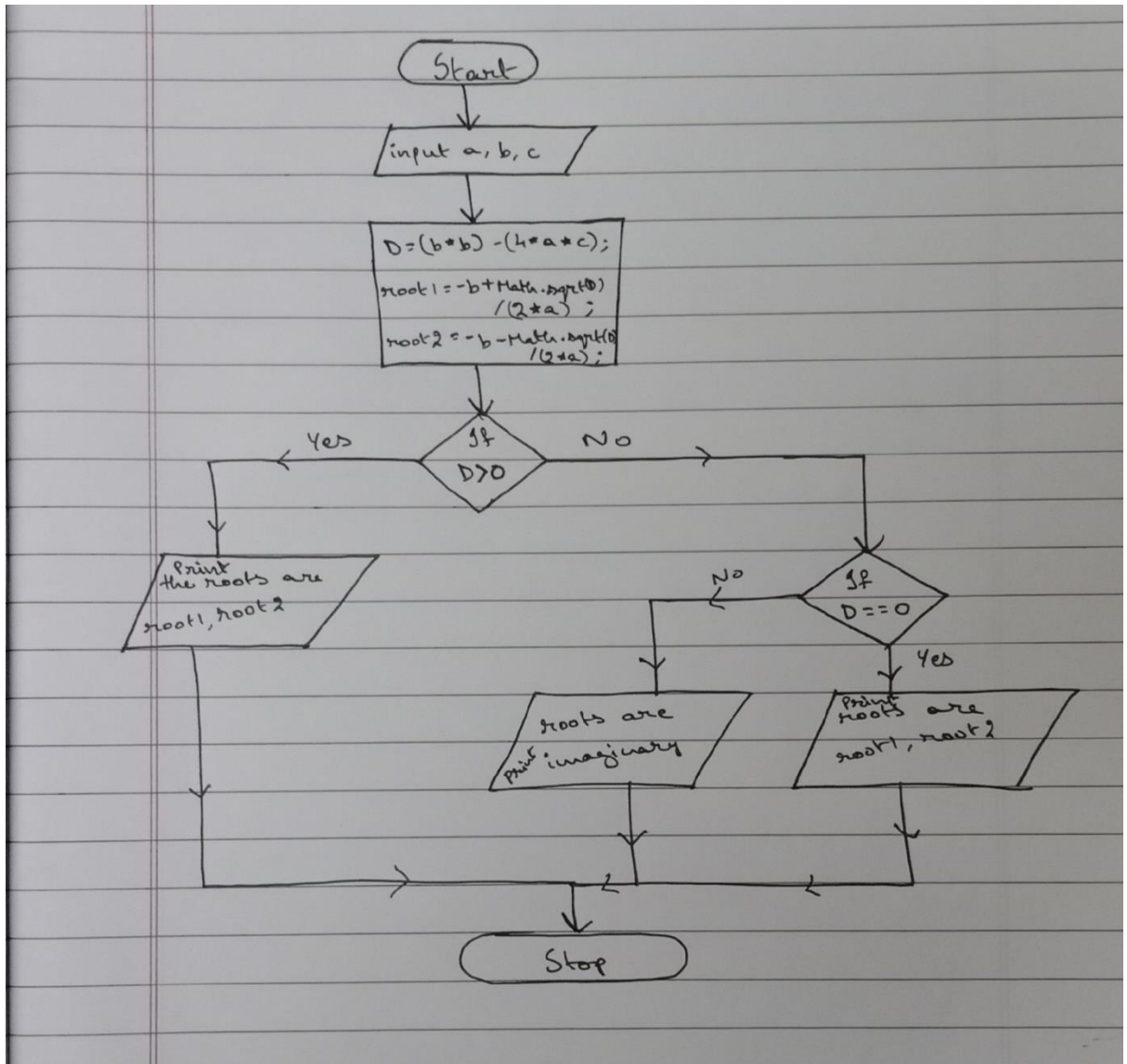# LAB-1

PROGRAM TO FIND THE ROOTS OF A QUADRATIC EQUATION

- FLOWCHART

- HANDWRITTEN PROGRAM

```java
import java.util.Scanner;
class quadratic
{
    public static void main (String args[])
    {
        double a, b, c, D, root1, root2;
        Scanner in = new Scanner (System.in);
        System.out.print ("Enter the coefficient of x squared: ");
        a = in.nextDouble ();
        System.out.print ("Enter the coefficient of x: ");
        b = in.nextDouble ();
        System.out.print ("Enter the constant: ");
        c = in.nextDouble ();
        D = (b*b) - (4 * a * c);
        root1 = -b + Math.sqrt (D) / (2 * a);
        root2 = - b - Math.sqrt (D) / (2 * a);
        if (D>0)
        {
            System.out.println (" the roots are - " + root1 + "   " + root2);
            System.out.println (" they are real & distinct");
        }
        else if (D==0)
        {
            System.out.println (" the roots are - " + root1 + "  " + root2);
            System.out.println (" they are real & equal");
        }
        else
        {
            System.out.println (" the roots are imaginary");
        }
    }
}
```

- PROGRAM

```java
import java.util.Scanner;
class quadratic
{
  public static void main(String args[])
        {
            double a,b,c,D,root1,root2;
            Scanner in=new Scanner(System.in);
            System.out.print("Enter the coefficient of x squared: ");
            a=in.nextDouble();
            System.out.print("Enter the coefficient of x: ");
            b=in.nextDouble();
            System.out.print("Enter the constant: ");
            c=in.nextDouble();
            D=(b*b)-(4*a*c);
            root1=-b+Math.sqrt(D)/(2*a);
            root2=-b-Math.sqrt(D)/(2*a);
            if(D>0)
            {
                System.out.println("the roots are -"+root1+"  "+root2);
                System.out.println("they are real and distinct");
            }
            else if(D==0)
            {
                System.out.println("the roots are -"+root1+"  "+root2);
                System.out.println("they are real and equal");
            }
            else
            {
                System.out.println("the roots are imaginary");
            }
        }
}
```

- OUTPUT
    1. WHEN ROOTS ARE REAL AND DISTINCT

```
C:\bms\sem3\labs\java>java quadratic
Enter the coefficient of x squared: 1
Enter the coefficient of x: 4
Enter the constant: -8
the roots are --0.5358983848622456   -7.464101615137754
they are real and distinct
```

    2. WHEN ROOTS ARE REAL AND EQUAL

```
C:\bms\sem3\labs\java>java quadratic
Enter the coefficient of x squared: 1
Enter the coefficient of x: -18
Enter the constant: 81
the roots are -18.0  18.0
they are real and equal
```

    3. WHEN ROOTS ARE IMAGINARY

```
C:\bms\sem3\labs\java>java quadratic
Enter the coefficient of x squared: 1
Enter the coefficient of x: 4
Enter the constant: 8
the roots are imaginary
```