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.

```
import java.util.Scanner;
class quadratic
{
  public static void main(String args[])
  {
    double a, b, c;
    double r1, r2;
    double determinant;
    Scanner input = new Scanner(System.in);
    System.out.println("Enter the values of a, b, c : ");
    a = input.nextDouble();
    b = input.nextDouble();
    c = input.nextDouble();
    determinant = (b*b)-(4*a*c);
    if(determinant > 0)
    {
      r1 = (-b + Math.sqrt(determinant))/(2*a);
      r2 = (-b - Math.sqrt(determinant))/(2*a);
      System.out.println("Real roots of the quadratic equation are : " + r1 + " and " + r2 );
    }
    else if(determinant == 0)
    {
      r1 = (-b + Math.sqrt(determinant))/(2*a);
      System.out.println("They have equal real roots : " + r1 + " and " + r1 );
```

```
    }
    else
    {
    System.out.println("There are no real solutions.");
    }
  }
}
```

Command Prompt

```
Microsoft Windows [Version 10.0.19041.508]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\SAKSHI>cd C:\Users\SAKSHI\JA

C:\Users\SAKSHI\JA>javac quadratic.java

C:\Users\SAKSHI\JA>java quadratic
Enter the values of a, b, c :
5
6
1
Real roots of the quadratic equation are : -0.2 and -1.0

C:\Users\SAKSHI\JA>java quadratic
Enter the values of a, b, c :
1
-4
6.25
There are no real solutions.

C:\Users\SAKSHI\JA>java quadratic
Enter the values of a, b, c :
2
-8
8
They have equal real roots : 2.0 and 2.0

C:\Users\SAKSHI\JA>
```

LAB PROGRAM 2 :

Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

```
import java.util.Scanner;
class Student
{
  String name;
  String usn;
  int marks[] = new int[5];
  int credits[] = new int[5];
  int i, n;
  int grade=0;
  double total=0;
  void get_data()
  {
    Scanner in = new Scanner(System.in);
    System.out.println("Enter Student Name : ");
    name = in.next();
    System.out.println("Enter Student USN : ");
    usn = in.next();
    System.out.println("Enter the number of subjects : ");
    n = in.nextInt();
    System.out.println("Enter subject credits and subject marks : ");
    for(i=0;i<n;i++)
    {
      System.out.println("Credits for subject " + (i+1) + " : ");
      credits[i] = in.nextInt();
      System.out.println("Marks in subject " + (i+1) + " : ");
```

```
    marks[i] = in.nextInt();
  }
}
void calculate_sgpa()
{
  for(i=0;i<n;i++)
  {
    if(marks[i] >= 90 && marks[i] <=100)
      grade=10;
    else if(marks[i] >= 80 && marks[i] < 90)
      grade=9;
    else if(marks[i] >= 70 && marks[i] < 80)
      grade=8;
    else if(marks[i] >= 60 && marks[i] < 70)
      grade=7;
    else if(marks[i] >= 50 && marks[i] < 60)
      grade=6;
    else if(marks[i] >= 40 && marks[i] < 50)
      grade=5;
    else if(marks[i] >= 0 && marks[i] < 40)
      grade=0;
    else
      System.out.println("Invalid marks entered");
    total = total + (grade*credits[i]);
  }
  total = total/20;
  System.out.println("SGPA = " + total);
}
```

```
  void stud_details()
  {
    System.out.println("Name : " +name);
    System.out.println("USN : " + usn);
    System.out.println("Marks and Credits of all subjects : ");
    for(i=0;i<n;i++)
    {
      System.out.println("Subject " + (i+1) + " : ");
      System.out.println("Marks : " + marks[i]);
      System.out.println("Credits : " + credits[i]);
    }
    calculate_sgpa();
  }
  public static void main(String args[])
  {
    Student obj = new Student();
    obj.get_data();
    obj.calculate_sgpa();
    obj.stud_details();
  }
}
```

Command Prompt

```
C:\Users\SAKSHI\JA>java Student
Enter Student Name :
Sakshi
Enter Student USN :
1BM19CS139
Enter the number of subjects :
5
Enter subject credits and subject marks :
Credits for subject 1 :
4
Marks in subject 1 :
97
Credits for subject 2 :
5
Marks in subject 2 :
76
Credits for subject 3 :
4
Marks in subject 3 :
89
Credits for subject 4 :
3
Marks in subject 4 :
85
Credits for subject 5 :
4
Marks in subject 5 :
73
SGPA = 8.75
Name : Sakshi
USN : 1BM19CS139
Marks and Credits of all subjects :
Subject 1 :
Marks : 97
Credits : 4
Subject 2 :
Marks : 76
Credits : 5
Subject 3 :
Marks : 89
Credits : 4
Subject 4 :
Marks : 85
Credits : 3
Subject 5 :
Marks : 73
Credits : 4
SGPA = 9.1875

C:\Users\SAKSHI\JA>
```