LAB PROGRAM: 1

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 menage stating that are no real solutions.

→
```
import java.util.Scanner
class Quadratic {

public static void main (String [] args)
 Scanner s = new Scanner (System.in);
System.out.println ("Enter the value of a\n");
   double root 1, root 2;
double a = s.nextDouble ();
System.out.println ("Enter the value of b\n");
double b = s.nextDouble ();
system.out.println ("Enter the value of c\n");
double c = s.nextDouble ();
double dis = (b*b) - (4*a*c);
if (dis > 0)
{
 root 1 = (-b + Math.sqrt (dis) / (2*a));
 root 2 = (-b - Math.sqrt (dis) / (2*a));
System.out.println ("Two distinct real roots exists:
      root 1 = " + root 1 + " root 2 = " + root 2);
}
else if (dis == 0)
{
root 1 = root 2 = (-b/(2*a));
System.out.println ("\n two equal & real roots exists:
      root 1 = " + root 1 + " root 2 = " + root 2);
```

```
}
else {
system.out.println("\n No real solution exists");
}
}
}
```

ALGORITHM

Steps

(1). Input the value of a, b, c

(2). calculate $d = b*b - 4*a*c$

(3). If $(d < 0)$

Display that there are no real solutions

else if $(d = 0)$

Display that roots are equal

Calculate $r1 = r2 = (-b/2*a)$

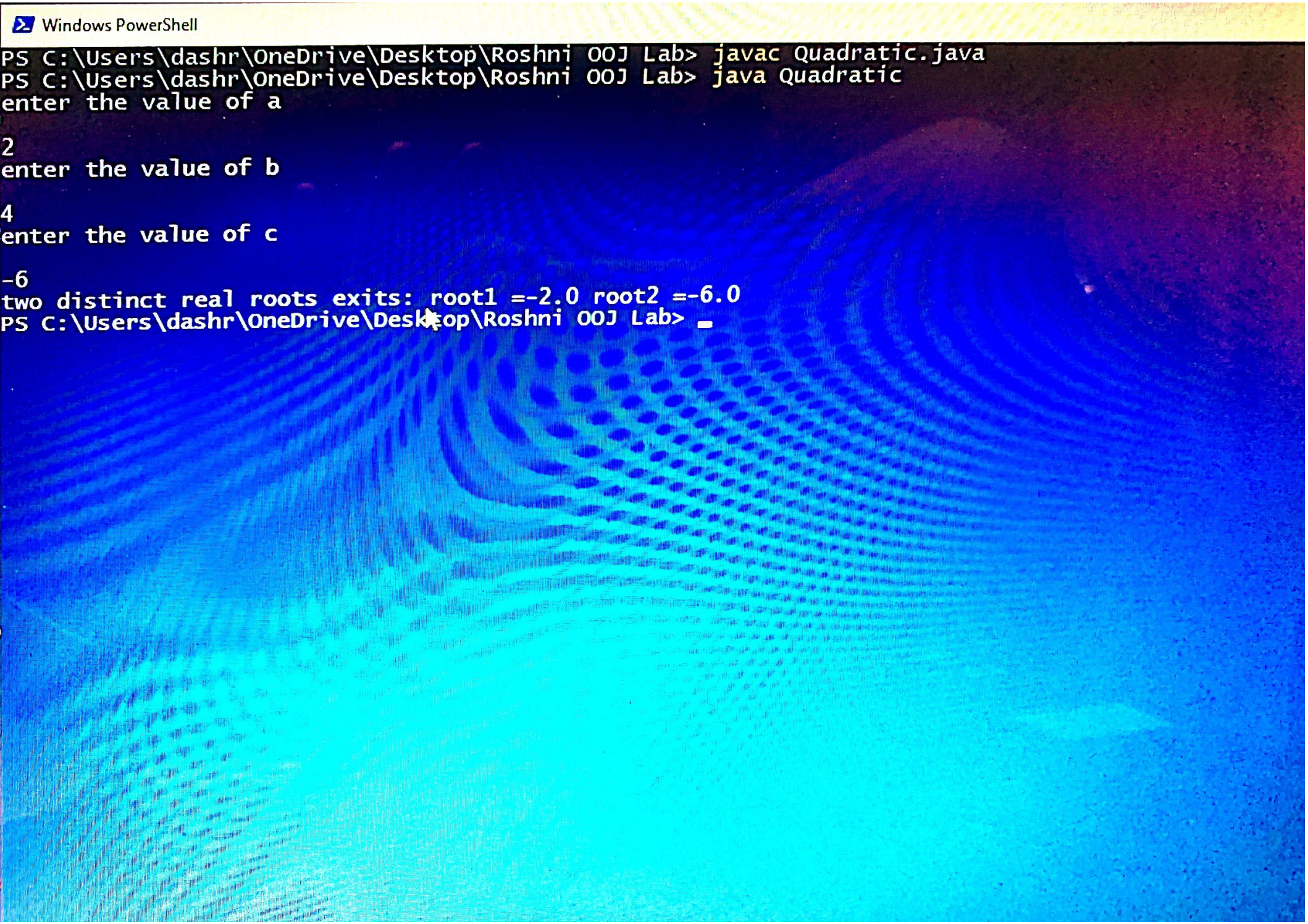
else

Display roots are real & calculate

$r1 = -b+d/2*a$ and $r_2 = -b-d/2*a$

(4). Print r_1 & r_2

(5). End program algorithm.



Quadratic - Notepad

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```
import java.util.Scanner;
class Quadratic{
    public static void main(String[]args){
        Scanner s = new Scanner (System.in);
        System.out.println("enter the value of a\n");
        double root1, root2;
        double a = s.nextDouble();
        System.out.println("enter the value of b\n");
        double b = s.nextDouble();
        System.out.println("enter the value of c\n");
        double c = s.nextDouble();
        double dis = (b*b)-(4*a*c);
        if (dis>0)
        { root1 = (-b + Math.sqrt(dis)/(2*a));
            root2 = (-b - Math.sqrt(dis)/(2*a));
            System.out.println("two distinct real roots exits: root1 ="+ root1 +" root2 =" +root2);
        }
        else if (dis==0)
        { root1 = root2 =(-b/(2*a));
            System.out.println("\n two real and equal roots exits: root1 ="+ root1 +" root2 =" +root2);
        }
        else{ System.out.println("\n no real solution exits");
        }
    }
}
```

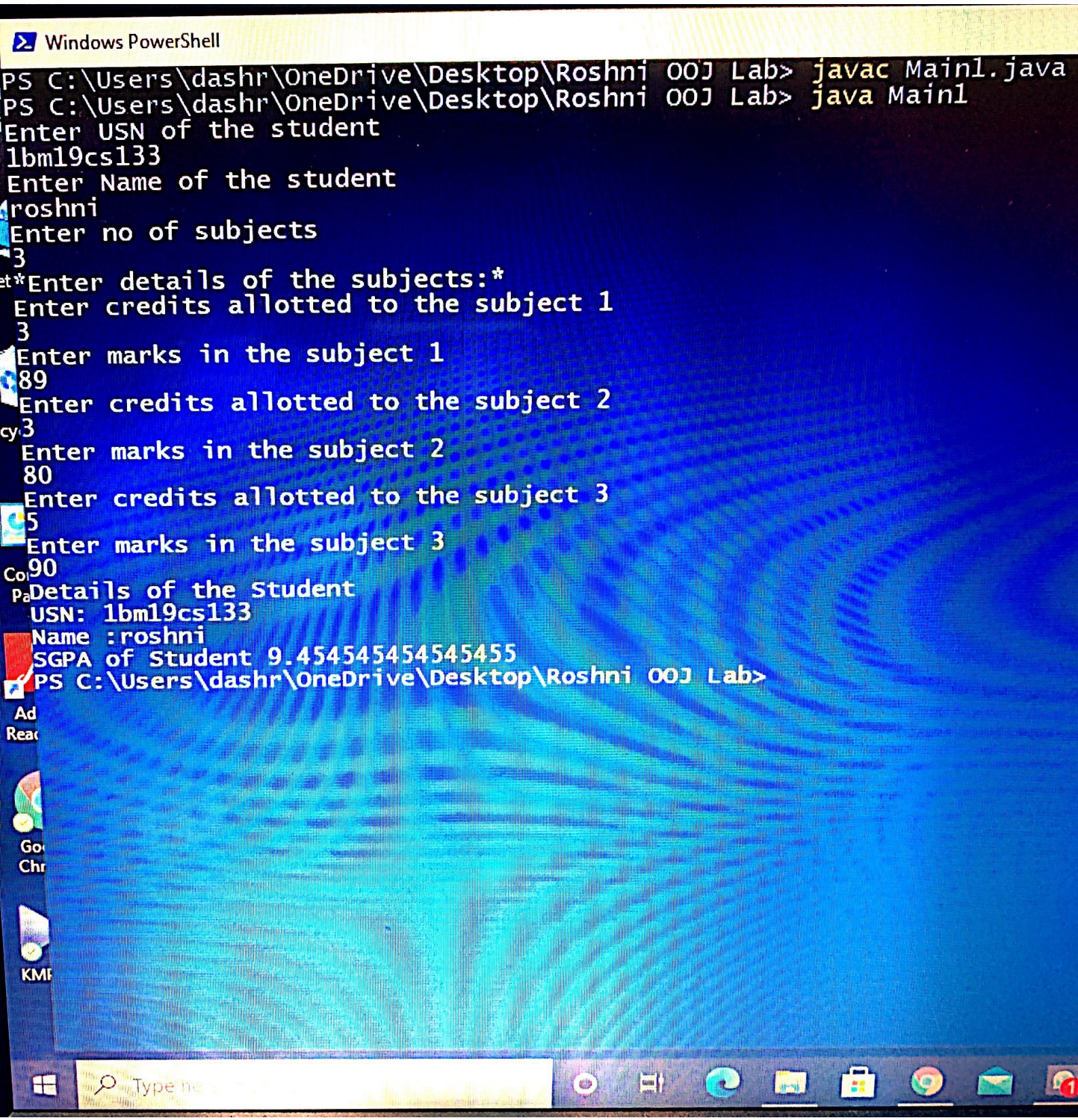
LAB PROGRAM : 2

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 & a method to calculate SGPA of a student.

→
```
import java.util.Scanner;
class Student
{
  private String USN;
  private String name;
  private int n;
  private double SGPA = 0;
  private int total credits = 0;
private int credits [];
private double marks [];
  Scanner ss = new Scanner (System.in);
  void details ()
{
System.out.println ("Enter USN of the student");
USN = ss.nextline ();
System.out.println ("Enter Name of the student");
name = ss.nextline ();
System.out.println ("Enter no. of objects");
n = ss.nextInt ();
credits = new int [n];
marks = new double [n];
System.out.println ("* Enter details of the subjects :*");
for (int i = 0; i < n; i++)
{
System.out.println ("Enter credits allotted to the subject "+(i+1));
```

```
credits [i] = ss.nextInt();
System.out.println("Enter marks in the subject "+(i+1));
marks [i]= ss.nextInt();
Calculate (credits [i], marks [i], i);
}
}
void calculate (int credit, double mark, int j)
{
 totalCredits = totalCredits + credit;
if (mark >=90 && mark <=100)
        SGPA = SGPA+ (10* credit);
else if (marks >=80 && mark <=89)
        SGPA = SGPA + (9* credit);
else if (mark >=70 && mark <=79)
        SGPA= SGPA + (8* credit);
else if (mark >=60 && mark <=69)
        SGPA=SGPA+ (7* credit);
else if (mark >=50 && mark <=59)
        SGPA=SGPA + (6* credit);
else if (mark >=40 && mark <=49)
        SGPA=SGPA + (5 *credit);
else
   System.out.println("Failed in subject "+(j+1));
}
void display()
{
 System.out.println("Details of the student");
System.out.println("USN: "+USN);
System.out.println("Name :"+name);
 System.out.println("SGPA of student "+(SGPA/totalCredits));
 }
}
```

```
class Main1
{
 public static void main(String args [])
{
    Student S1 = new Student ();
    S1. Details ();
    S1. Display ();
}
}
```



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```
import java.util.Scanner;
class Student
{
        private String USN;
        private String name;
        private int n;
        private double SGPA = 0;
        private int totalCredits = 0;
  private int credits[];
  private double marks[];
        Scanner ss = new Scanner(System.in);

        void Details()
        {
        System.out.println("Enter USN of the student");
        USN = ss.nextLine();
        System.out.println("Enter Name of the student");
        name = ss.nextLine();
        System.out.println("Enter no of subjects");
        n = ss.nextInt();
        credits = new int[n];
        marks = new double[n];
        System.out.println("*Enter details of the subjects:*");
        for(int i=0;i<n;i++)
        {
                System.out.println("Enter credits allotted to the subject "+(i+1));
                credits[i] = ss.nextInt();
                System.out.println("Enter marks in the subject "+(i+1));
                marks[i] = ss.nextInt();
                Calculate(credits[i],marks[i],i);

        }
    }
    void Calculate(int credit,double mark,int j)
    {
                totalCredits = totalCredits + credit;
                if(mark>=90&&mark<=100)
```

Main1 - Notepad

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```
    void Calculate(int credit,double mark,int j)
    {
                totalCredits = totalCredits + credit;
                if(mark>=90&&mark<=100)
                        SGPA = SGPA + (10*credit);
                else if(mark>=80 && mark<=89)
                        SGPA = SGPA + (9*credit);
                else if(mark>=70&&mark<=79)
                        SGPA = SGPA + (8*credit);
                else if(mark>=60&&mark<=69)
                        SGPA = SGPA + (7*credit);
                else if(mark>=50 && mark<=59)
                        SGPA = SGPA + (6*credit);
                else if(mark>=40&&mark<=49)
                        SGPA = SGPA + (5*credit);
                else
                        System.out.println("Failed in Subject "+(j+1));
        }
        void Display()
        {
                System.out.println("Details of the Student");
    System.out.println("USN: "+USN);
    System.out.println("Name :"+name);
                System.out.println("SGPA of Student "+(SGPA/totalCredits));
        }
}
class Main1
{
        public static void main(String args[])
        {
                Student s1 = new Student();
                s1.Details();
                s1.Display();
        }
```