B.M.S COLLEGE OF ENGINEERING BENGALURU

Autonomous Institute, Affiliated to VTU

LAB REPORT

23CS3PCOOJ

Submitted in partial fulfillment of the requirements for

Lab Bachelor of Engineering

in

Computer Science and Engineering

Submitted by:

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LAB - Program-

Q Develop a Java program that prints all real solution to the quadratic equation $ax^2 + bx + c = 0$ Read a, b, c and use the quadratic formula, if the discriminate $b^2 - 4ac$ is negative display a message stating that there are no real solutions.

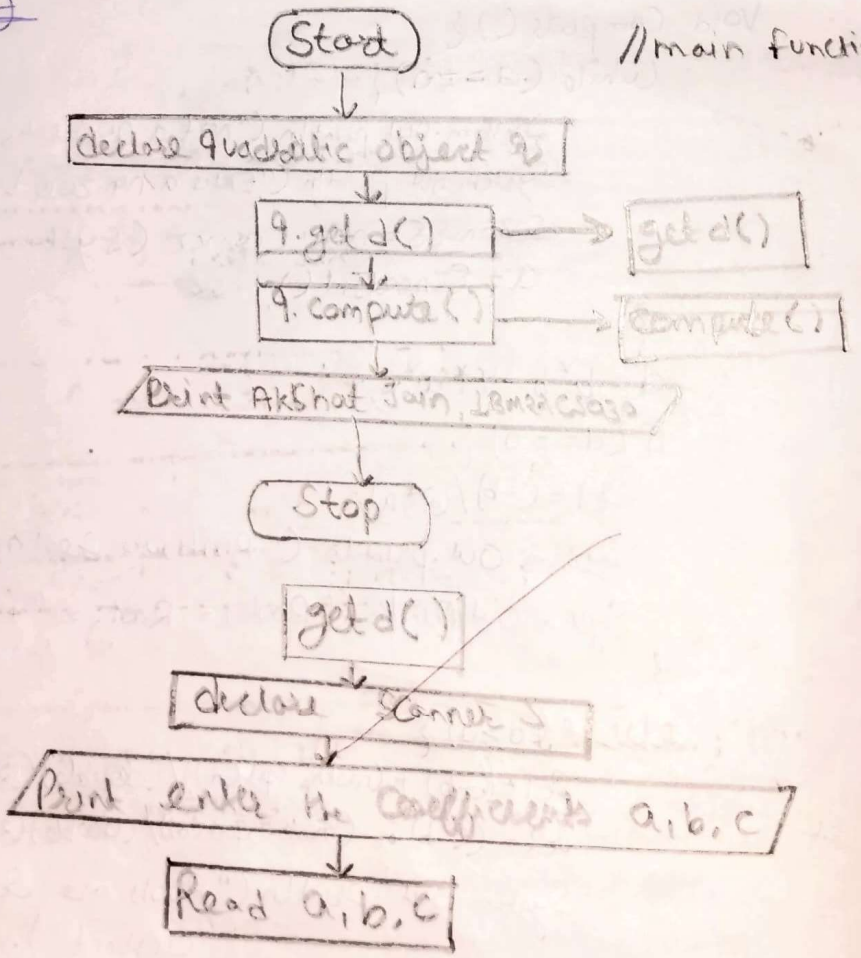
Sol-

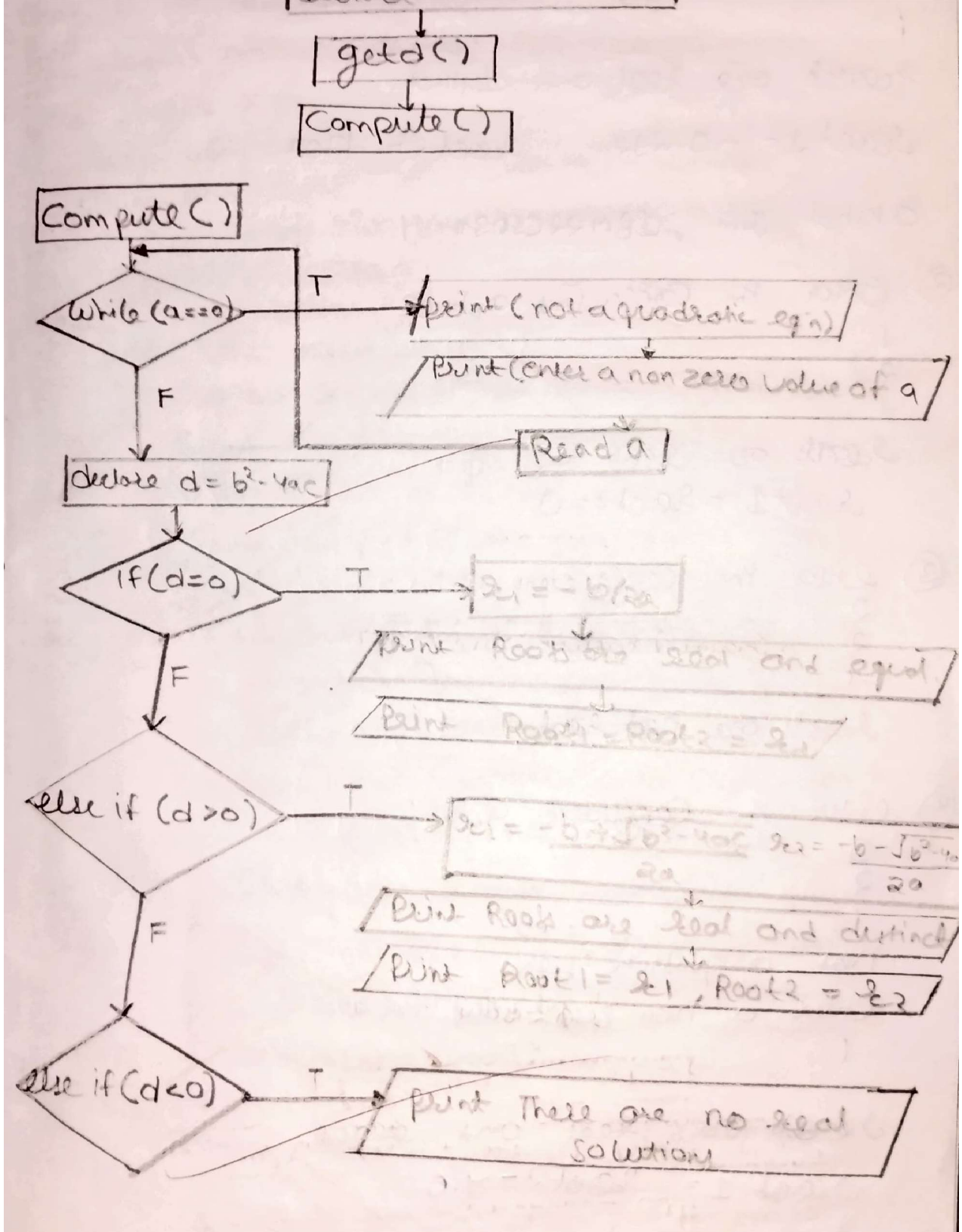
```
import java.util.*;
Class quadratic {
    int a,b,c;
    double r1, r2, d;
    void getd() {
        Scanner S = new Scanner(System.in);
        System.out.println("Enter the Coefficients of a,b,c");
        a = S.nextInt();
        b = S.nextInt();
        c = S.nextInt();
    }
    void Compute() {
        while (a==0) {
            System.out.println("not a quadratic eqn");
            System.out.println("Enter a non zero value for a:");
            Scanner S = new Scanner (System.in);
            a = S.nextInt();
        }
        d = b*b - 4*a*c;
        if (d==0) {
            r1 = (-b)/(2*a);
            System.out.println("Roots are real and equal");
            System.out.println("Root 1 = Root 2 = " + r1);
        }
        else if (d>0) {
            r1 = ((-b) + (math.sqrt(d))/(double)(2*a);
            r2 = ((-b) - (math.sqrt(d))/(double)(2*a);
            System.out.println("Roots are real and
                distinct");
            System.out.println("Root 1 = " + r1 + "Root 2
                = " + r2);
        }
```

```
        else if (d<0) {
            System.out.println (" There are no real
                                 Solutions");
        }
    }
}
Class quadraticmain{
    Public Static Void main (String args[]) {
        Quadratic q = new quadratic;
        q.getd();
        q.computa();
        System.out.println (" AKSHAT JAIN, 1BM22CS030");
    }
}
```

~~Algorithm~~ Flowchart -

~~Step 1~~




getd()
Compute()
Compute()
while (a==0)
T
Print (not a quadratic eqn)
Print (enter a non zero value of a
Read a
F
declare d = b²-4ac
if (d=0)
T
x1 = -b/2a
Print Roots are real and equal
Print Root1 = Root2 = x1
F
else if (d>0)
T
x1 = -b+√b²-4ac / 2a
x2 = -b-√b²-4ac / 2a
Print Roots are real and distinct
Print Root1 = x1, Root2 = x2
F
else if (d<0)
T
Print There are no real solutions

Output -

① Enter the coefficients a, b, c:
2
4
1
roots are real and distinct.
root 1 = -0.292 root 2 = -1.707

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② Enter the coefficients a, b, c:
1
2
1
roots are real and equal
root 1 = root 2 = 0

③ Enter the coefficient a, b, c:
2
2
1
roots are not real

④ Enter the coefficient a, b, c:
0
2
1
not a quadratic eqn
Enter a non zero value for a:
1

roots are real and equal
root 1 = root 2 = -1.0

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```
C:\Users\AKSHAT\Documents\akshat 3aooj>javac Quadratic2.java

C:\Users\AKSHAT\Documents\akshat 3aooj>java Quadratic2
Enter a coefficient a: 1
Enter a coefficient b: 2
Enter a coefficient c: 1
Both roots are equal:-1.0
Name:Akshat jain.
USN:1BM22CS030.

C:\Users\AKSHAT\Documents\akshat 3aooj>javac Quadratic2.java

C:\Users\AKSHAT\Documents\akshat 3aooj>java Quadratic2
Enter a coefficient a: 4
Enter a coefficient b: 5
Enter a coefficient c: 3
Roots are not equal
Name:Akshat jain.
USN:1BM22CS030.

C:\Users\AKSHAT\Documents\akshat 3aooj>javac Quadratic2.java

C:\Users\AKSHAT\Documents\akshat 3aooj>java Quadratic2
Enter a coefficient a: 1
Enter a coefficient b: 5
Enter a coefficient c: 2
Two real solutions: -2.9384471871911697 and -7.061552812808831
Name:Akshat jain.
USN:1BM22CS030.
```

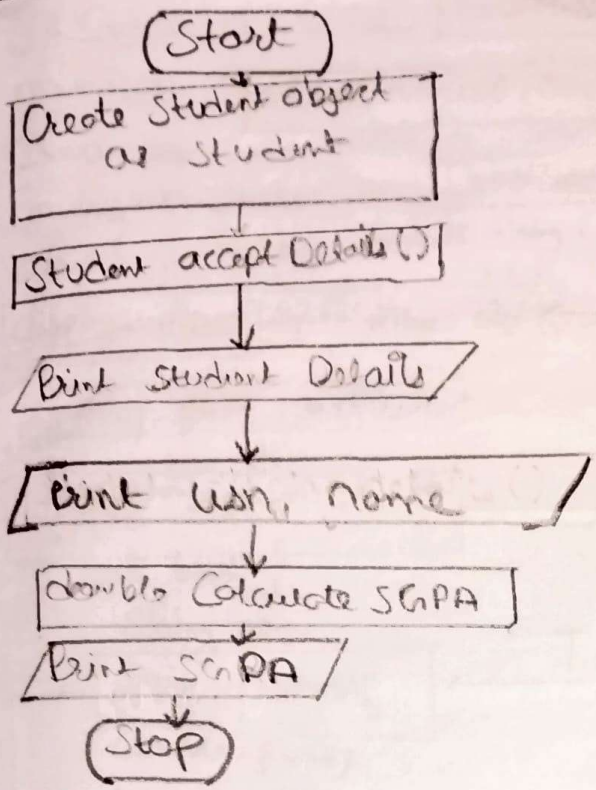
LAB Program-3

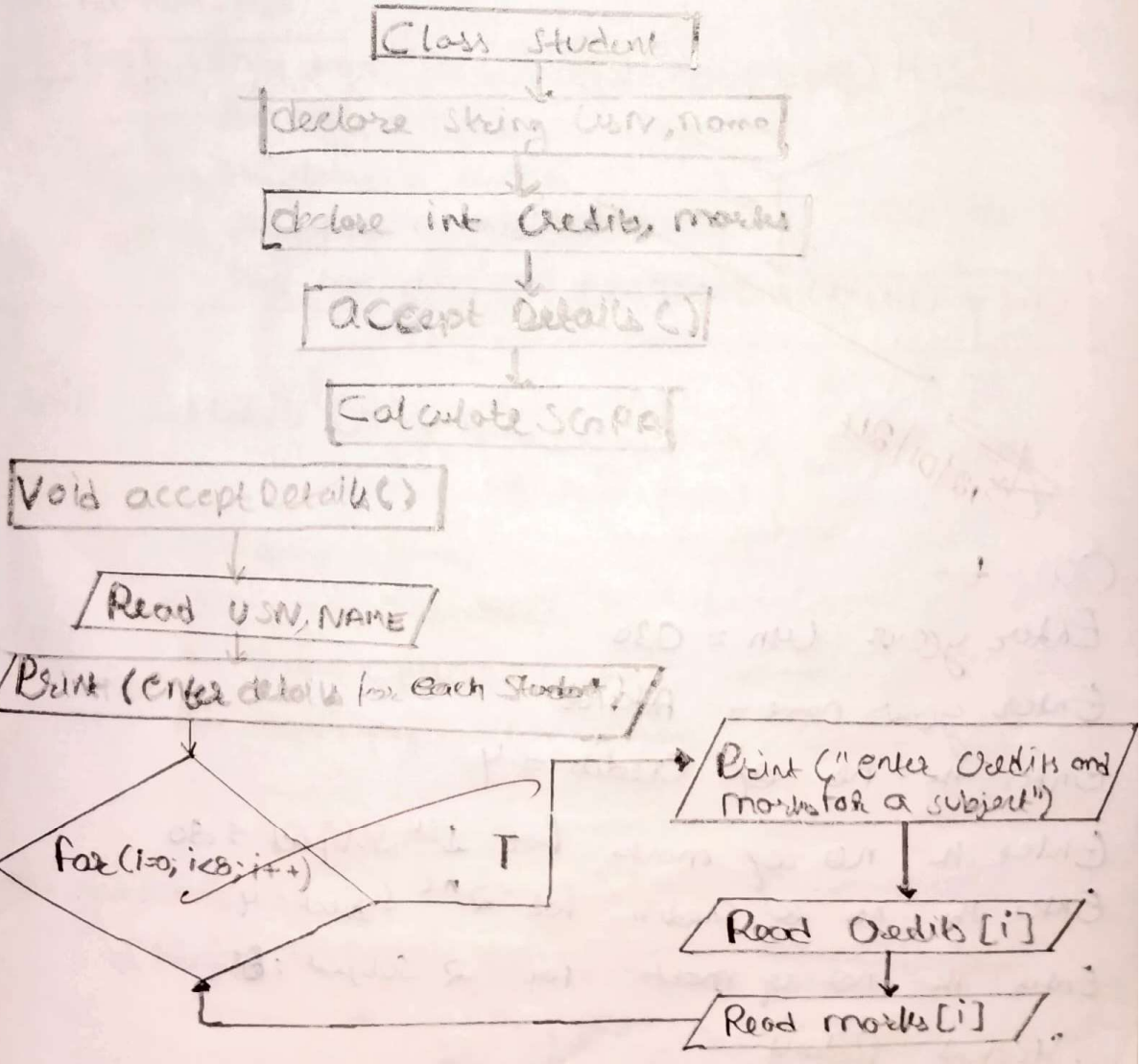
Q Develop a Java program to create a class student with members usn, name, an array credits and an array marks. Include methods to accepts and a method to calculate SGPA of a student.

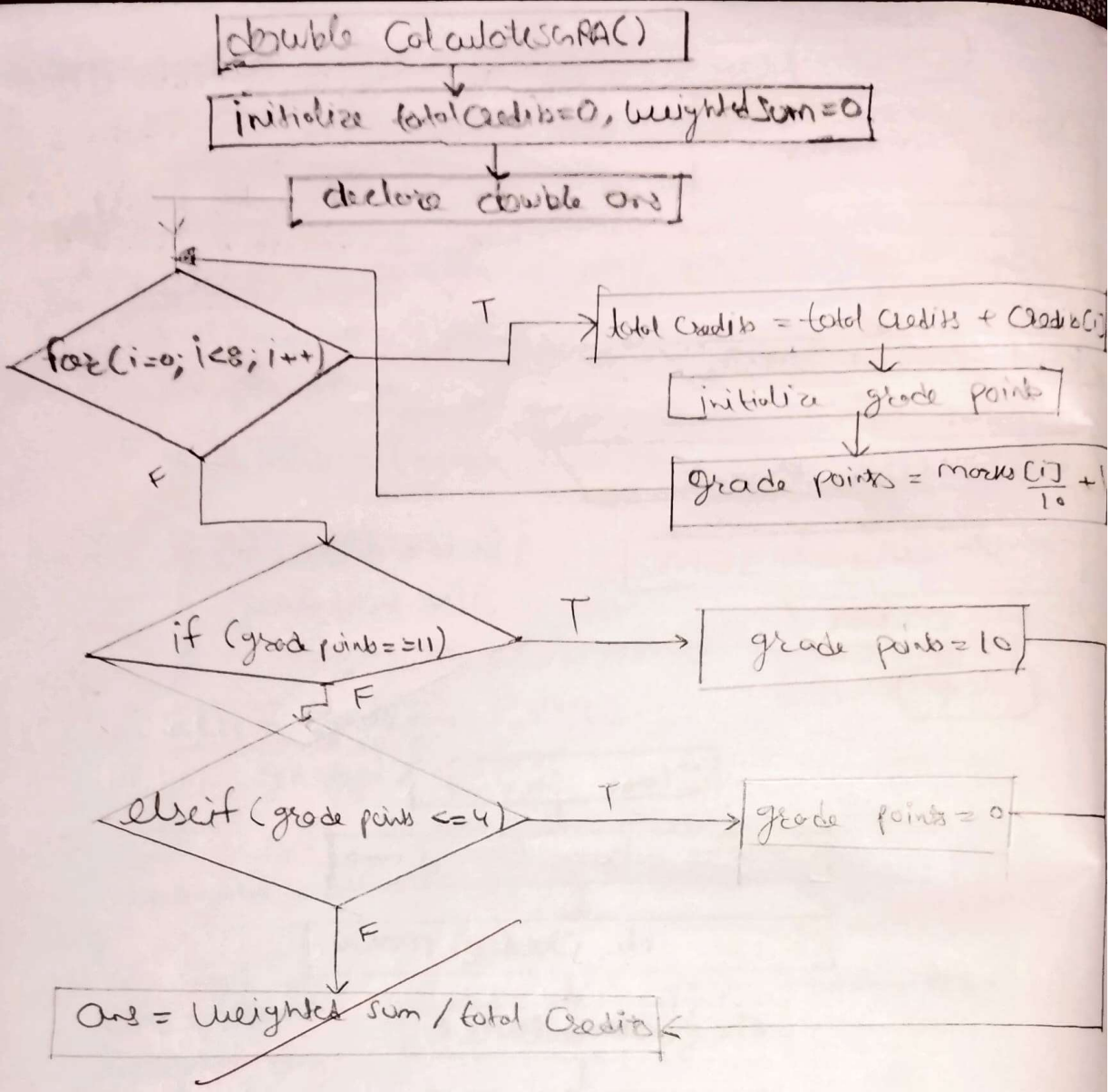
Sol-

```
import java.util.Scanner;

class student {
    String usn;
    String name;
    int credits = new int [8];
    int marks = new int[8];

    Public void acceptDetails() {
        Scanner scanner = new scanner (System.in);
        System.out.print("Enter USN");
        USN = Scanner.nextLine();
        System.out.print ("Enter name");
        name = scanner.nextLine();
        System.out.println (" Enter details for each
            subject: \n");
        for (int i=0; i<credits.length; i++) {
            System.out.print ("\n enter Credits for a
                subject" +(i+1) + ":" );
            Credits[i] = Scanner.nextInt ();
            System.out.print ("\n enter Marks for a
                subject" + (i+1)+":");
            marks[i] = scanner.nextInt ();
        }
        Scanner.close();
    }
```

```
Public double CalculateSGPA () {
    int totalCredits = 0;
    int weightedSum = 0;
    double ans;
    for (int i=0; i < credits.length; i++) {
        totalCredits += credits[i];
        int gradePoints;

        gradePoints = (marks[i] /10)+1;

        if (gradePoints == 11) {
            gradePoint = 10;
        }
        else if (gradepoints <=4) {
            gradepoints =0;
        }
        weightedSum += gradepoints * credits[i];
    }
    ans = (double) weightedSum / (double) totalCredits;
    return ans;
  }
}
Public Class SGPA {
    Public static void main (String[] args) {
        Scanner scanner = new Scanner (System.in);
        Student student = new student ();
        student.acceptDetails ();
        System.out.println ("\n Student Details");
        System.out.println ("USN:" + student.usn);
        System.out.println ("Name" + student.name);
        double SgPA = student.CalculateSGPA ();
        System.out.println ("\n SGPA :" + SgPA);
        scanner.close ();
    }
}
```


Start
Create Student object as student
Student accept Details()
Print Student Details
Print USN, Name
double Calculate SGPA
Print SGPA
Stop


Class Student
declare String USN, Name
declare int Credits, marks
accept Details()
Calculate SGPA
Void acceptDetails()
Read USN, NAME
Print (Enter details for each Student)
for(i=0; i<8; i++)
T
Print ("enter Credits and marks for a subject")
Read Credits[i]
Read marks[i]



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Output -

Enter your Usn = 030

Enter your name = Akshat

Enter the no of Credits = 4

Enter the no of marks for 1st Subject : 80

Enter the no of Credits for 2nd Subject : 4

Enter the no of marks for 2 Subject : 85

Student Details

Enter USN : 1BM22CS030

Enter name : Akshat

SGPA : 9

```
C:\Users\AKSHAT\Documents\akshat 3aooj>javac Main1.java

C:\Users\AKSHAT\Documents\akshat 3aooj>java Main1
Enter  usn : 1BM22CS030
Enter name : Akshat
Enter marks for subject 1 : 55
Enter marks for subject 2 : 65
Enter marks for subject 3 : 70
Enter marks for subject 4 : 45
Enter marks for subject 5 : 52
Enter marks for subject 6 : 85
Enter marks for subject 7 : 96
Enter marks for subject 8 : 68
usn is : 1BM22CS030
 name is : Akshat
 marks for subject 1 is : 65
 marks for subject 2 is : 70
 marks for subject 3 is : 45
 marks for subject 4 is : 52
 marks for subject 5 is : 85
 marks for subject 6 is : 96
 marks for subject 7 is : 68
Your sgpa is : 6.75
```

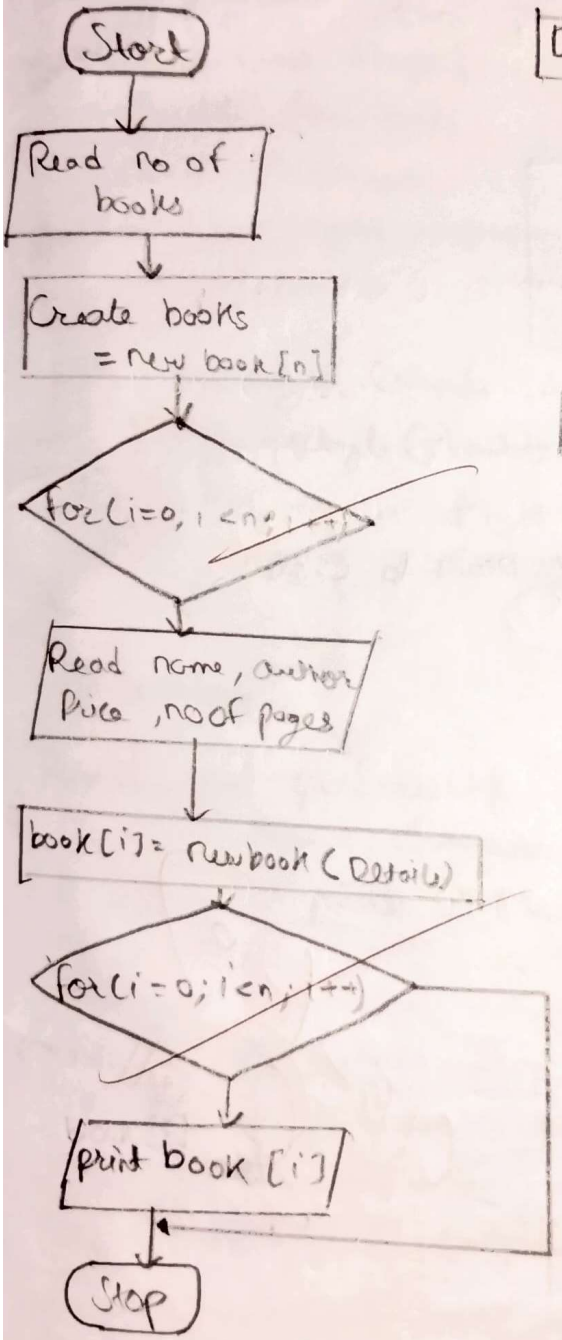
Q3 Create a Class Book which Contains Four members name, author, price, num-pages include a Constructor to set the values for the members include methods to set and get the details of the objects. Include a toString() method that could display the complete details of the book. Develop a Java program to create n book objects.

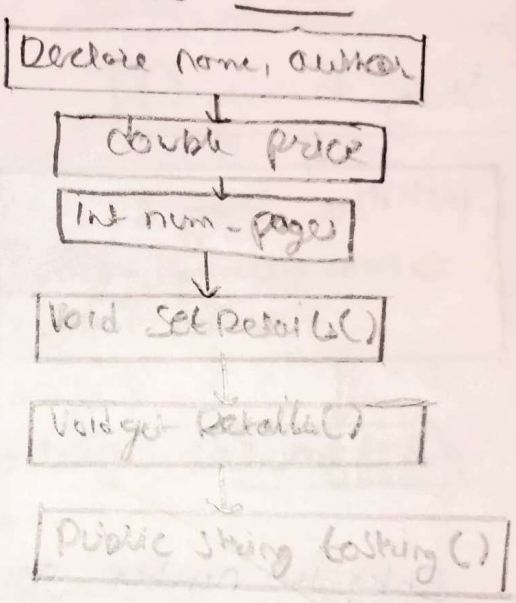
Sol-

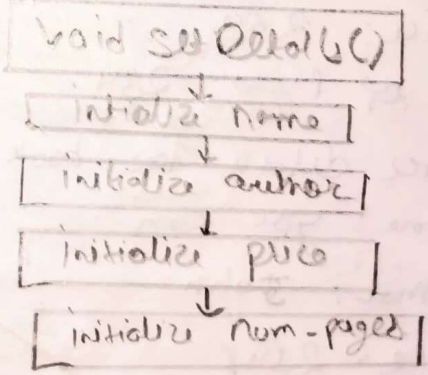
```
import java.util.*;
Class book {
    String name;
    String author;
    double price;
    int num-page;
    Book (String name, String author, double price, int num-pages){
        this.name = name;
        this.author = author;
        this.price = price;
        this.num-pages = num-pages;
}
Void SetDetails (String name, String author, double price,
                 int num-pages) {
    this.name = name;
    this.author = author;
    this.price = price;
    this.num-pages = num-pages;
}
Void getDetails (){
    String S = "Book:" + name + " by author" + author
        + "with pages:" + num-pages + " is of
            price:" + price;
```

```
System.Out.println(s);
}
Public String
toString(){
    String s = "Book" + Name + "by author:" + author
        + "with pages" + num_pages + "is of price:"
                + price;
    return s;
}
}

Public Class main{
    Public Static Void main (String [] args){
    Scanner scanner = new scanner (System.in);

    System.out.println("Enter the number of books
                to Create:");
    int n= scanner.nextInt();
    Book[]. books = new book[n];
    for (int i=0; i<n; i++){
        Scanner.nextLine();
    System.out.print("Name:");
    String .Name = Scanner.nextLine();
    System.out.print("author");
    String .author = Scanner.nextLine();
    System.out.println("price");
    double.price = Scanner.nextDouble();

    System.Out.print("no of Pages");
    double noofpages = scanner.nextdouble();
    book [i] = new book (name, author, price, noofpg
```

```
System.out.println(" Details of the books");
for (int i = 0 ; i<n; i = i+1) {
    System.out.println (" book" +(i+1) + " book[i]);
}
    Scanner.close();
}
```







```
C:\Users\AKSHAT\Documents\akshat 3aooj>javac Lab3.java

C:\Users\AKSHAT\Documents\akshat 3aooj>java Lab3
Enter the number of books to create: 2

Enter details for Book 1:
Name: you can
Author: shiv
Price: 299
Number of Pages: 243

Enter details for Book 2:
Name: you will
Author: adi
Price: 499
Number of Pages: 567

Details of the Books:

Book 1:
Book : you can by author : shiv with pages : 243 is of price : 299.0

Book 2:
Book : you will by author : adi with pages : 567 is of price : 499.0
Akshat jain
1BM22CS030
```

Q4

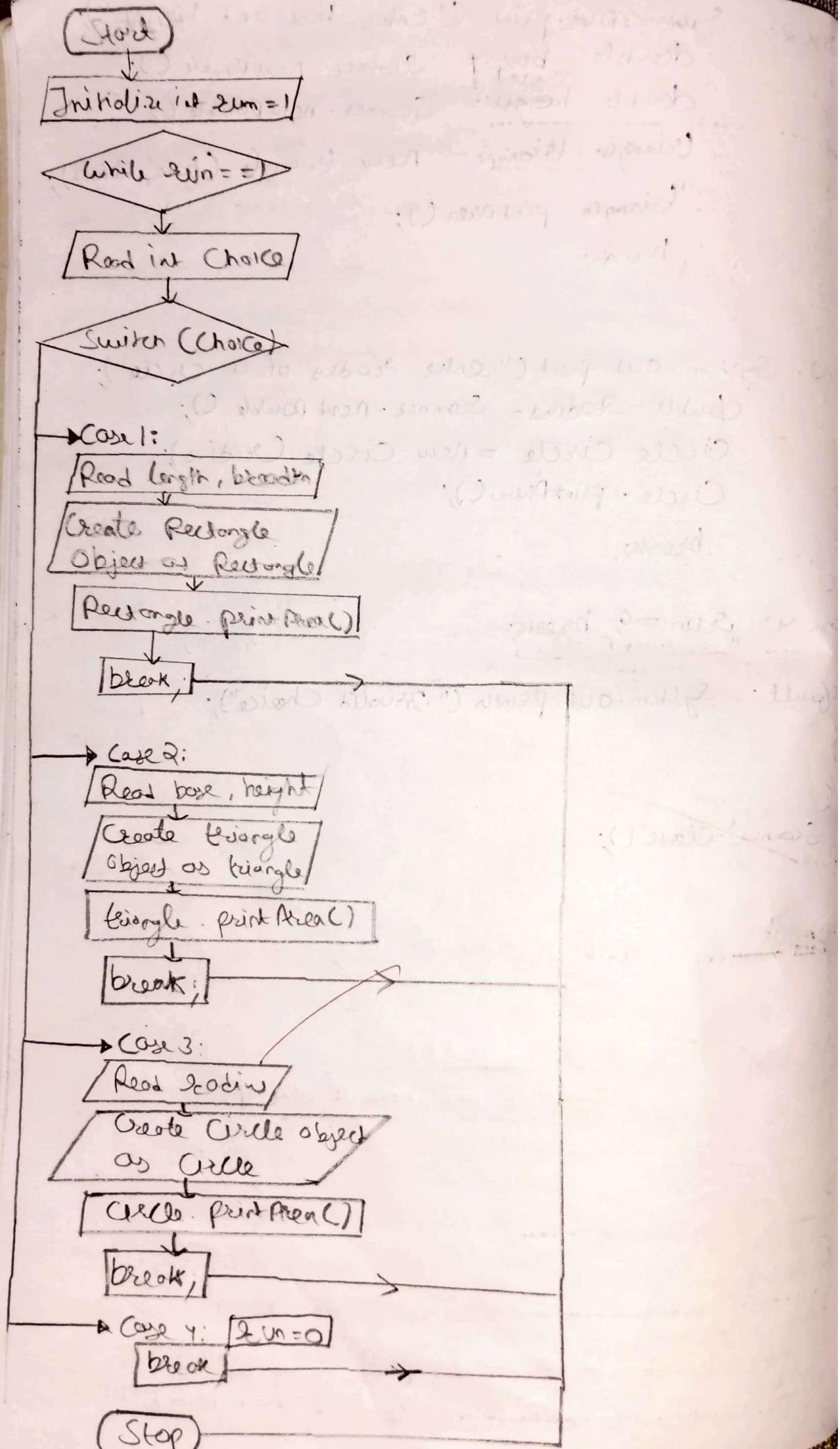
Code:

```
import java.util.*{
abstract class Shape{
    double dimension1;
    double dimension2;
public abstract void printarea;
}
class Rectangle extends Shape{
    Public Rectangle (double length, double width);
  this.dimension1 = length;
  this.dimension2 = width;
}
@override
Public void printArea(){
    double Area = dimension1 * dimension2;
    System.out.println(" Area of Rectangle = ", Area);
}
class Triangle extends Shape (){
  Public Triangle (double base, double Height);
    this.dimension1 = base;
    this.dimension2 = height;
}
@ override
Public void printArea(){
    double Area = 0.5 * dimension1 * dimension2;
    System.out.println(" Area of triangle ", Area);
}
```

```
Public Circle extends Shape(){
    Public Circle (double radius);
      this.dimension1 = radius
}
@override
Public void printArea(){
    double Area = Math.pi * dimension1 * dimension1;
    System.out.println("Area of circle:", Circle);
}

Public class main(){
  Scanner scanner = new scanner (System.in);
  System.out.println(" Enter your Choice");
  System.out.println(" 1. Rectangle \n 2. Circle \n
                     3. triangle \n 4. Exit");
  int n = Scanner.nextInt();
  int run = 1;

  while (run == 1) {
  System.out.println(" enter Choice");
  int Choice = Scanner.nextInt();
  Switch (Choice){
Case 1: System.out.println("Enter length and breadth");
        double length = Scanner.nextDouble();
        double breadth = Scanner.nextDouble();
        Rectangle rectangle = new Rectangle (length,
                                             breadth);
        Rectangle.printArea();
        break;
```

```
case 2: System.out.print("Enter base and height");
        double base = Scanner.nextDouble();
        double height = Scanner.nextDouble();
        Triangle triangle = new Triangle(base, height);
        triangle.printArea();
        break;

case 3: System.out.print("enter radius of a circle");
        double radius = Scanner.nextDouble();
        Circle circle = new Circle(radius);
        Circle.printArea();
        break;

case 4: run = 0; break;

default: System.out.println("Invalid Choice");
}
}
Scanner.close();
}
```

Output


Start
Initialize int run = 1
While run == 1
Read int Choice
Switch (Choice)
Case 1:
Read length, breadth
Create Rectangle Object as Rectangle
Rectangle.printArea()
break;
Case 2:
Read base, height
Create Triangle Object as triangle
triangle.printArea()
break;
Case 3:
Read radius
Create Circle object as Circle
Circle.printArea()
break;
Case 4: run = 0
break
Stop

abstract class Shape

Initialize double dimension1

Initialize double dimension2

↓ extends

Class triangle
Class Rectangle
Class circle

Class Rectangle

Rectangle (length, width)

dimension1 = length
dimension2 = width

Public void printArea()

double Area = dimension1 * dimension2

Print Area

Class triangle

triangle (base, height)

dimension1 = base
dimension2 = height

Public void printArea()

double Area = dimension1 * dimension2 * 0.5;

Print Area;

Class Circle

Circle (radius)
dimension1 = radius

Public void circle()

double Area = mathpi * dimension1 * dimension2;

Print Area;

Output -

Choose a Shape to Calculate Area:
1 Rectangle
2 Triangle
3 Circle
4 Exit
Enter Choice: 2
Enter base of triangle : 1
Enter height of triangle: 2
Area of triangle : 1.0

Enter Choice: 1
Enter length of Rectangle : 25
Enter width of Rectangle: 14
Area of Rectangle: 350.0
Enter Choice: 3
Enter radius of a circle : 2
Area of circle: 12.567

Enter Choice: 5
Invalid Choice

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olbSeer

```
C:\Users\AKSHAT\Documents\akshat 3aooj>javac Lab4.java

C:\Users\AKSHAT\Documents\akshat 3aooj>java Lab4
Enter length and breadth:
10
20
Area of the rectangle is:200.0
Enter base and height:
5
12
Area of the Triangle is:60.0
Enter Radius:
23
Area of the Circle is:1661.0600000000002
Akshat jain
1BM22CS030
```

⑤ Develop a Java program to create a Class Bank that maintains two kinds of account for its customer, one called savings account and other current account. The saving account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holder also maintain a min'm balance and if the balance falls below this level a service charge is imposed.

Sol

```
Class Account {
    String CustomerName;
    long accountNumber;
    String accountType;
    double balance;

    Public Account (String CustomerName, long accountNumber,
        String accountType, double balance) {
        this.CustomerName = CustomerName;
        this.accountNumber = accountNumber;
        this.accountType = accountType;
        this.balance = balance;
    }

    Public void deposit (double amount) {
        balance = balance + amount;
        System.out.println ("\n Deposit of Rs " + amount + "
            Successful =>> Updates balance : Rs." + balance);
    }

    Public void displayBalance () {
    System.out.println ("\n Account Balance for " +
        accountType + " Account (Account Number:" +
        accountNumber + ") =>>" + balance );

}
```

```
Public void depositInterest (double Rate) {
 if (accountType == "Savings") {
   double interest = balance * (Rate /100);
   System.out.println ("\n Interest Deposit");
    deposit (interest);
 }
else {
   System.out.println (" Interest is not applicable for
       Current ACcount");
    }
}

Public void withdraw (double amount) {
if (balance >= amount) {
       balance = balance - amount;
  System.out.println ("\n Withdrawal of Rs " + amount +
   " Successful => Updated balance Rs " + balance);
}
else {
  System.out.println ("\n Insufficient funds withdrawal
        not allowed");
     }
}
}

Class CurAcct extends ACcount {
   Private double minBalance;
   Private double serviceCharge;
```