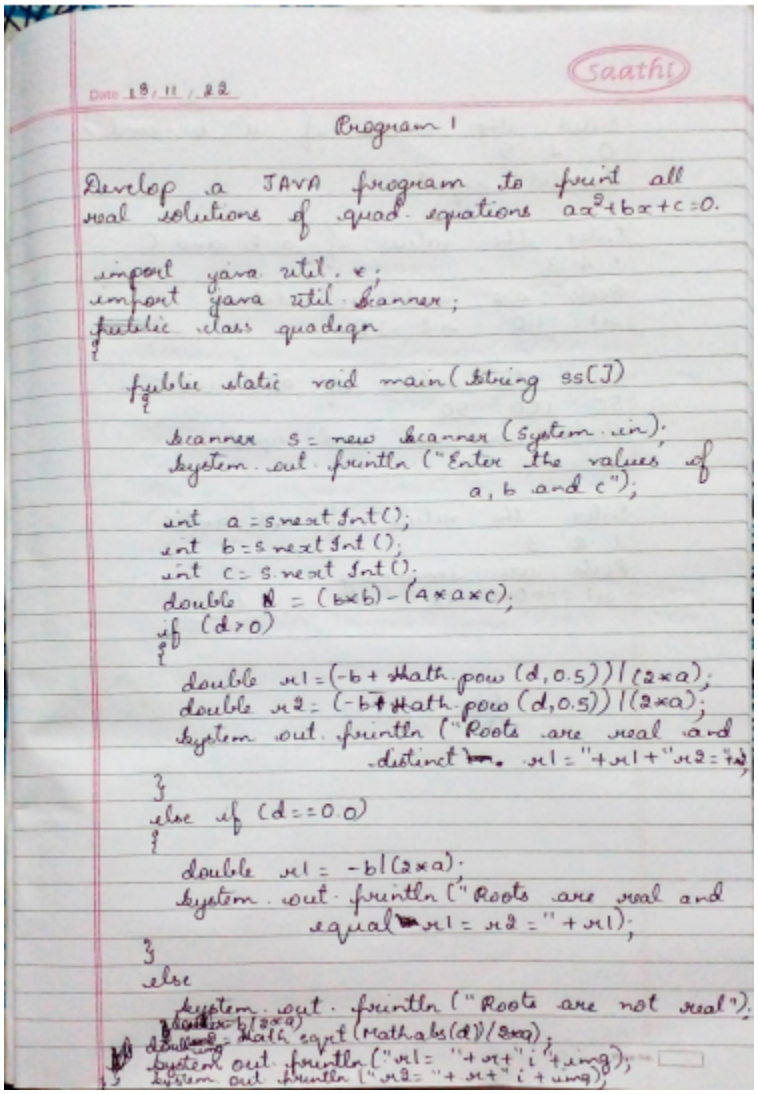
Week-1

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.*;
import
java.util.Scanner;
class quadeqn

 { public static void
   main(String ss[])

 {

    double
    d; int
    a,b,c;

    Scanner s = new Scanner(System.in);

    System.out.println("Enter the values
     of a, b and c"); a=s.nextInt();
     b=s.nextInt(); c=s.nextInt();
    d=
    (b*b)-(4*a*c);
    if (a==0)

   {
```

```
 System.out.println("Invalid input");

}

else if(d>0)

{

   double
   r1=(-b+Math.pow(d,0.5))/(2*a);
   double
   r2=(-b-Math.pow(d,0.5))/(2*a);

   System.out.println("Roots are real and distinct");

   System.out.println("r1 = "+r1 +" " + "r2= "+r2);

} else
if(d==0.0)
   { double r1 =
      -b/(2*a);

   System.out.println("Roots are real and equal");

   System.out.println("r1 = r2 = "+r1);

 } else
  if(d<0)

 {

   System.out.println("Roots are imaginary ");

                double real = -b/2*a;
     double img = (Math.sqrt(Math.abs(d)))/(2*a);

   System.out.println("r1= " +real+"+i"+img);
```

```
        System.out.println("r2= " +real+"+i"+img);

    }

  }

}
```



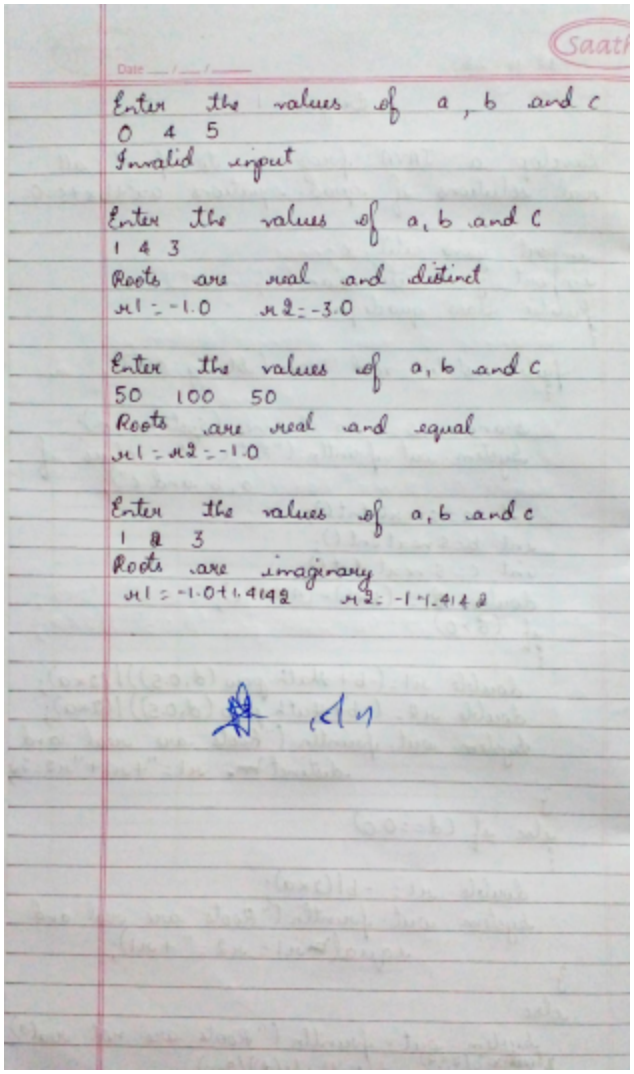
Date 18/11/22

Saathi

Program 1

Develop a JAVA program to print all real solutions of quad. equations $ax^2+bx+c=0$.

```
import java.util.*;
import java.util.Scanner;
public class quadeqn
{
  public static void main(String ss[])
  {
    Scanner s = new Scanner(System.in);
    System.out.println("Enter the values of
                        a, b and c");
    int a = s.nextInt();
    int b = s.nextInt();
    int c = s.nextInt();
    double d = (b*b) - (4*a*c);
    if (d>0)
    {
      double r1 = (-b + Math.pow(d,0.5)) / (2*a);
      double r2 = (-b - Math.pow(d,0.5)) / (2*a);
      System.out.println("Roots are real and
                          distinct. r1 = "+r1+" r2 = "+r2);
    }
    else if (d==0.0)
    {
      double r1 = -b/(2*a);
      System.out.println("Roots are real and
                          equal r1 = r2 = "+r1);
    }
    else
      System.out.println("Roots are not real");
      double r = Math.sqrt(Math.abs(d))/(2*a);
      System.out.println("r1 = "+r+" i "+img);
      System.out.println("r2 = "+r+" i "+img);
```



Enter the values of a, b and c
0 4 5
Invalid input

Enter the values of a, b and c
1 4 3
Roots are real and distinct
r1 = -1.0 r2 = -3.0

Enter the values of a, b and c
50 100 50
Roots are real and equal
r1 = r2 = -1.0

Enter the values of a, b and c
1 2 3
Roots are imaginary
r1 = -1.0+1.4142 r2 = -1-1.414 2

```
Command Prompt
               2 Dir(s)  311,668,727,808 bytes free

:\Users\DELL\OneDrive\Desktop\1BM21CS050> javac quadeqn.java

:\Users\DELL\OneDrive\Desktop\1BM21CS050> java quadeqn.java
nter the values of a, b and c
 4 5
nvalid input

:\Users\DELL\OneDrive\Desktop\1BM21CS050>
:\Users\DELL\OneDrive\Desktop\1BM21CS050> java quadeqn.java
nter the values of a, b and c
 4 3
oots are real and distinct
1 = -1.0 r2= -3.0

:\Users\DELL\OneDrive\Desktop\1BM21CS050> java quadeqn.java
nter the values of a, b and c
0 100 50
oots are real and equal
1 = r2 = -1.0

:\Users\DELL\OneDrive\Desktop\1BM21CS050> java quadeqn.java
nter the values of a, b and c
 2 3
oots are imaginary
1= -1.0+i1.4142135623730951
2= -1.0+i1.4142135623730951

:\Users\DELL\OneDrive\Desktop\1BM21CS050>
```

WEEK-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
{
    student(){}
    String name;
    String usn;
    double result=0;

    int credits[];
    int marks[];
    int total=0;


    void accept()
   {
    Scanner s=new Scanner(System.in);
    System.out.println("Enter number of subjects ");
    n=s.nextInt();

   System.out.println("Enter your Name ");
   name=s.nextLine();
   System.out.println("Enter USN ");
   usn=s.nextLine();
```

```
   System.out.println("Enter credits and marks of each subject
respectively ");
   for(int i=0;i<n;i++)
    {
      credits[i]=s.nextInt();
      marks[i]=s.nextInt();
     }
   }
   void calculate()
   {
     for(int i=0;i<n;i++)
     {
       if(marks[i]>=90 && marks[i]<=100)
          result+=credits[i]*10;
      else if(marks[i]>=80 && marks[i]<90)
          result+=credits[i]*9;
      else if(marks[i]>=70 && marks[i]<80)
          result+=credits[i]*8;
      else if(marks[i]>=60 && marks[i]<70)
          result+=credits[i]*7;
      else if(marks[i]>=50 && marks[i]<60)
           result+=credits[i]*6;
      else if(marks[i]>=40 && marks[i]<50)
          result+=credits[i]*5;
      else
         result+=0*credits[i];
     }
      for(int i=0;i<n;i++)
        total+=credits[i];
      result=result/total;
   }
   void display()
```

```
  {
     System.out.println("Name:"+name+"  USN:"+usn);
     System.out.println("credits  Marks");
     for(int i=0;i<n;i++)
    System.out.println(credits[i]+"         "+marks[i]);
    System.out.println("Total credits="+total);
    System.out.println("SGPA="+result);
  }
}


class demo
{
  public static void main(String[] args)

 {
   student s1=new student();
   s1.accept();
  s1.calculate();
  s1.display();
 }
}
```

Date __/__/____

Saathi

Program-2

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

```
import java.util.Scanner;
class Student
{
  Student() { }
  String name;
  String USN;
  int marks[] = new int[5];
  int credits[] = new int[5];
  int total = 0;
  double result = 0;
  void accept()
  {
    Scanner s = new Scanner(System.in);
    System.out.println("Enter name and USN");
    name = s.nextLine();
    USN = s.nextLine();
    System.out.println("Enter credits and marks");
    for(int i=0; i<5; i++)
    {
      credits[i] = s.nextInt();
      marks[i] = s.nextInt();
    }
  }
  void calculate()
  {
```

```
        for(int i=0; i<5; i++)
        {
            if(marks>=90 && marks<=100)
                result+=credits[i]*10;
            else if(marks>=80 && marks<90)
                result+=credits[i]*9;
            else if(marks>=70 && marks<80)
                result+=credits[i]*8;
            else if(marks>=60 && marks<70)
                result+=credits[i]*7;
            else if(marks>=50 && marks<60)
                result+=credits[i]*6;
            else if(marks>=40 && marks<50)
                result+=credits[i]*5;
            else
                result+=credits[i]*0;
        }
        for(int i=0; i<5; i++)
            total=total+credits[i];
        sgpa=result/total;
    }
    void display()
    {
        System.out.println("Name:"+name);
        System.out.println("USN:"+USN);
        System.out.println("SGPA:"+sgpa);
    }
}
class student1
{
    public static void main(String ss[])
    {
        Student s1=new student();
```

```
        s1.accept();
        s1.calculate();
        s1.display();
    }
}
```

Output

```
Enter your name
Deepini
Enter USN
1BM21CS050
Enter credits and marks of each subject
3   90
5   95
4   90
Total credits = 12
SGPA = 10.0
Name : Deepini S
USN : 1BM21CS050
Credits     Marks
  3          90
  5          95
  4          90
Total credits = 12
SGPA = 10.0
```

```
C:\Users\bmscecse\Desktop\1BM21CS050> javac student.java

C:\Users\bmscecse\Desktop\1BM21CS050> java student
Enter your Name
DEEPINI S
Enter USN
 1bm21cs050
Enter credits and marks of each subject respectively
3 90
5 95
4 90
Name:DEEPINI S  USN: 1bm21cs050
credits  Marks
3         90
5         95
4         90
Total credits=12
SGPA=10.0

C:\Users\bmscecse\Desktop\1BM21CS050>
C:\Users\bmscecse\Desktop\1BM21CS050> java student
Enter your Name
DEEPINI
Enter USN
1BM21CS050
Enter credits and marks of each subject respectively
3 80
5 70
4 60
Name:DEEPINI  USN:1BM21CS050
credits  Marks
3         80
5         70
4         60
Total credits=12
SGPA=7.916666666666667

C:\Users\bmscecse\Desktop\1BM21CS050>
```

WEEK 3

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.

```
import java.util.Scanner;
class Book{
int num_pages;
double price;
String name;
 String author;
Book()
{
}
void set_data()
{
System.out.println(“Enter book name”);
name=s.next;
System.out.println(“Enter author’s name”);
author=s.next;
System.out.println(“Enter book price”);
price=s.nextDouble;;
System.out.println(“Enter the number of pages in the book”);
pages=s.nextInt();

 public String toString()
{ return
```

```
("Book details\nname: "+name+"\nauthor: "+author+"\nnmber of
pages: "+num_pages+"\nprice: "+price+"\n
);
 }
 }
class book1 {
public static void main(String[] args)
{
Scanner s=new Scanner(System.in);
Int n;
System.out,println(“Enter the no of books”);
n=s.nextInt();
Book1 b[]=new book1();
for(int i=0; i<n; i++);
{
b1[i]=new book1();
b1[i].set();
System.out.println(b1[i]);
}
```

Date ___/___/_____ Saathi

Program 3

Develop a class Book which contains four members: name, author, price, num pgs. Include a constructor to set values for members. Include methods to set and get the details of objects. Include a toString() method that could display complete details of the book. Develop a JAVA program to create n book objects.

```
import java.util.Scanner;
class book
{
    String name, author;
    double price;
    int pages;
    book() { }
    Scanner s = new Scanner (System.in);
    void set()
    {
        System.out.println("Enter Book name");
        name = s.nextLine();
        System.out.println("Enter author's name");
        author = s.nextLine();
        System.out.println("Enter book price");
        price = s.nextDouble();
        System.out.println("Enter the number of pages in the book");
        pages = s.nextInt();
    }
    public String toString()
    {
        return ("Name: "+name+"\n Author: "+author
                +"\nPrice: "+price+"\n Pages: "+pages);
    }
```

Date __/__/____

Saathi

```
class book1
{
   public static void main (String[] xx)
   {
      Scanner ss= new Scanner(System.in);
      int n;
      System.out.println("Enter the number of
                                    books");
      n = ss.nextInt();
      book b[] = new book[n];
      for (int i=0; i<n; i++)
      {
         b[i] = new book();
         b[i].set();
         System.out.println(b[i]);
      }
   }
}
```

Output:

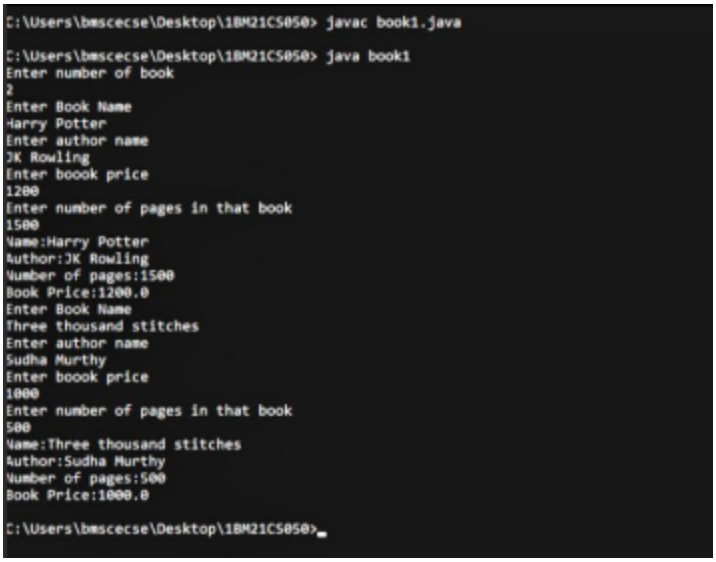
```
Enter the number of books
2
Enter book name
Harry Potter
Enter author name
JK Rowling
Enter book price
1200
Enter number of pages in the book
1500
Name: Harry Potter
Author: JK Rowling
Book Price: 1200
Pages: 1500
```

Page No.

Saathi

Date __/__/____

Enter book name
Three Thousand Stitches
Enter author name
Sudha Murthy
Enter book price
1000
Enter number of pages in the book
500
Name: Three Thousand Stitches
Author: Sudha Murthy
Price: 1000
Pages: 500


C:\Users\bmscecse\Desktop\1BM21CS050> javac book1.java
C:\Users\bmscecse\Desktop\1BM21CS050> java book1
Enter number of book
2
Enter Book Name
Harry Potter
Enter author name
JK Rowling
Enter boook price
1200
Enter number of pages in that book
1500
Name:Harry Potter
Author:JK Rowling
Number of pages:1500
Book Price:1200.0
Enter Book Name
Three thousand stitches
Enter author name
Sudha Murthy
Enter boook price
1000
Enter number of pages in that book
500
Name:Three thousand stitches
Author:Sudha Murthy
Number of pages:500
Book Price:1000.0
C:\Users\bmscecse\Desktop\1BM21CS050>

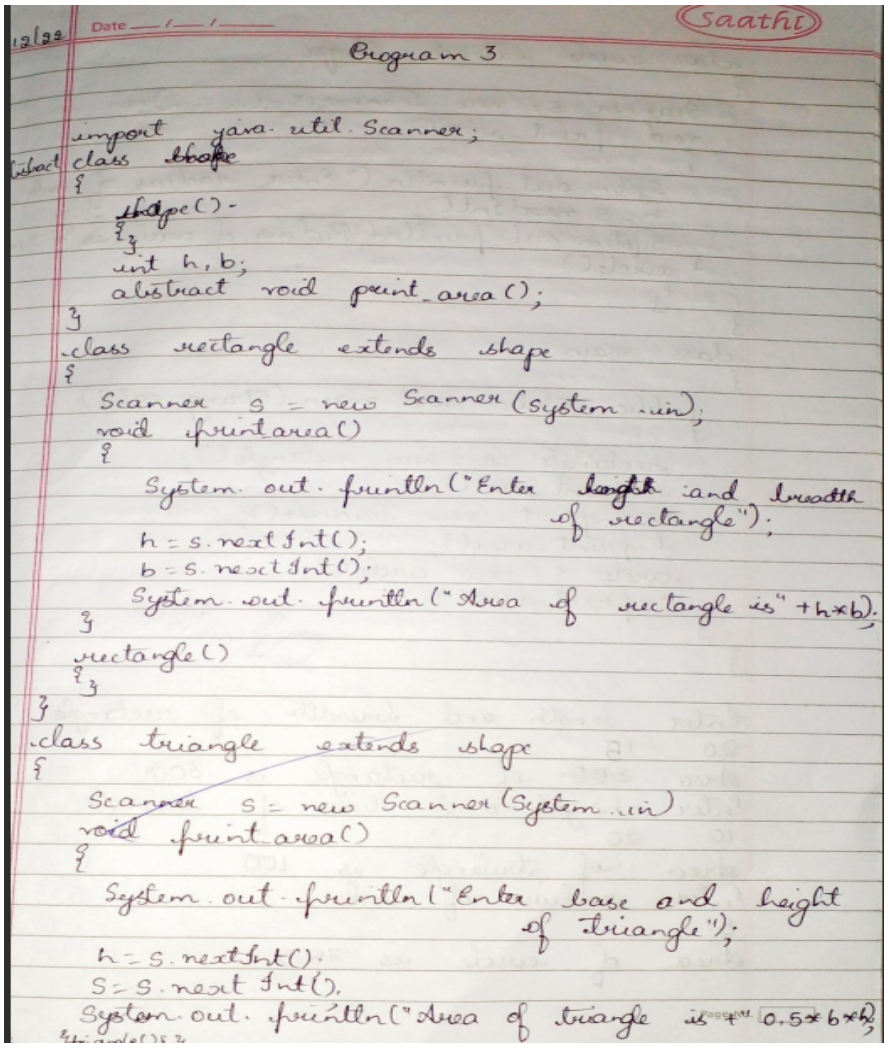
WEEK 4

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea( ) that prints the area of the given shape.

```
import java.util.Scanner;
abstract class shape
{
	shape(){}
	int h,b;
	abstract void printArea();
	}
class rectangle extends shape
{
	Scanner s=new Scanner(System.in);
	void printArea()
		{
			System.out.println("Enter height and width of
rectangle");
			h=s.nextInt();
			b=s.nextInt();
			System.out.println("Area of Rectangle is "+b*h);
			}
	rectangle(){}
}
```

```
class triangle extends shape
{
	Scanner s=new Scanner(System.in);
	void printArea()
		{
			System.out.println("Enter height and base of
rectangle");
			h=s.nextInt();
			b=s.nextInt();
			System.out.println("Area of Trianle is "+0.5*b*h);
			}
		triangle(){}
}

class circle extends shape
{
	Scanner s=new Scanner(System.in);
	void printArea()
		{
			System.out.println("Enter radius of Circle");
			h=s.nextInt();
			System.out.println("Area of Circle is "+3.14*h*h);
			}
		circle(){}
}


class main
{
public static void main(String xx[])
{
```

```
        rectangle r=new rectangle();
        r.printArea();
        triangle t=new triangle();
        t.printArea();
        circle c=new circle();
        c.printArea();
}
}
```



12/22 Date __/__/____ Saathi

Program 3

```
import java.util.Scanner;
abstract class shape
{
    shape()
    {
    }
    int h, b;
    abstract void print_area();
}
class rectangle extends shape
{
    Scanner s = new Scanner(System.in);
    void printarea()
    {
        System.out.println("Enter length and breadth
                                of rectangle");
        h = s.nextInt();
        b = s.nextInt();
        System.out.println("Area of rectangle is" +h*b);
    }
    rectangle()
    {
    }
}
class triangle extends shape
{
    Scanner s = new Scanner(System.in)
    void print_area()
    {
        System.out.println("Enter base and height
                                of Triangle");
        h = s.nextInt();
        S = s.next Int();
        System.out.println("Area of triangle is" 0.5*b*h);
```

```
class circle extends shape
{
    Scanner s= new Scanner(System.in);
    void print_area()
    {
        System.out.println("Enter radius of circle");
        r= s.nextInt();
        System.out.println("Radius of circle is "+ 3.14*r
    circle()
    }
}
class main
{
    public static void main(String ss[])
    {
        rectangle r = new rectangle();
        r.print_area();
        triangle t = new triangle();
        t.print_area();
        circle c = new circle();
        c.print_area();
    }
}
```

Enter length and breadth of rectangle
20 15
Area ~~300~~ of rectangle is 300
Enter height and base of triangle
10 20
Area of triangle is 100
Enter radius of circle
5
Area of circle is 78.5

```
Enter height and width of rectangle
20 15
Area of Rectangle is 300
Enter height and base of Triangle
10 20
Area of Triangle is 100.0
Enter radius of Circle
5
Area of Circle is 78.5
```

WEEK 5

Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is Imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Cur-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:
a) Accept deposit from customer and update the balance.
b) Display the balance.
c) Compute and deposit interest
d) Permit withdrawal and update the balance
Check for the minimum balance, impose penalty if necessary and update the balance.

```
class account {
 String name=new String();
 int accno; double bal;
 Scanner s=new Scanner(System.in);
void set() {
System.out.println("Enter customer name");
 name=s.nextLine();
System.out.println("Enter "+name+"'s account number");
accno=s.nextInt();
System.out.println("Enter balance amount ");
```

```
bal=s.nextDouble(); }
void display() {
System.out.println("Customer Name:"+name);
System.out.println("Your account number:"+accno);
System.out.println("Your Account Balance:"+bal); }
account()
{
}
}
class savacct extends account {
Scanner s=new Scanner(System.in);
savacct()
{ System.out.println("Cheque Facility not available "); }
void deposit()
{
int ch;
double amt;
System.out.println("Press 1 to deposit ");
ch=s.nextInt();
if(ch==1)
{ System.out.println("Enter amount to be deposited ");
amt=s.nextDouble();
bal=bal+amt;
 }
else
System.out.println("Invalid Input");
}
void in()
 {
System.out.println("Enter rate of interest ");
double r=s.nextDouble();
```

```
System.out.println("Enter number of times interest applied per time
period");
int n=s.nextInt();
System.out.println("Enter number of time periods");
int t=s.nextInt();
double x=(1+(r/n));
double ci=bal*Math.pow(x,n*t);
System.out.println("Interest amount="+ci+" \nBalance amount without
interest is"+bal);
bal=bal+ci;
System.out.println("Available balance after updating is"+bal);
}
void wd()
 {
System.out.println("Press 1 to withdraw ammount");
int ch=s.nextInt();
if(ch==1)
{
System.out.println("Enter the amount to be withdrawn ");
double wdraw=s.nextDouble();
bal=bal-wdraw;
System.out.println("Available Balance:"+bal);}
else
System.out.println("Invalid input"); } }
class curacct extends account
 { Scanner s=new Scanner(System.in); curacct()
System.out.println("Cheque Facility available ");
} void deposit() {
int ch; double amt;
System.out.println("Press 1 to deposit ");
ch=s.nextInt();
if(ch==1)
```

```
 {
System.out.println("Enter amount to be deposited ");
amt=s.nextDouble();
bal=bal+amt;
}
else
System.out.println("Invalid Input");
}
void wd() {
 System.out.println("Press 1 to withdraw ammount");
int ch=s.nextInt();
 if(ch==1) {
 System.out.println("Enter the amount to be withdrawn ");
double wdraw=s.nextDouble();
bal=bal-wdraw;
System.out.println("Available Balance:"+bal);}
 else
System.out.println("Invalid input");
if(bal<1000) {
System.out.println("You are running out of minimum balance \n
Penalty Amount of rs 50 has been credited as service charge for
having low balance");
bal=bal-50;
System.out.println("Your Available Balance:"+bal);
}
}
}

public class Lab5 {
public static void main(String xx[]) {
```

```
Scanner s=new Scanner(System.in); int ch;
System.out.println("\n\nPress\n1. if your account is savings account
\n2. if your account is current account");
ch=s.nextInt();
switch(ch)
{
case 1: savacct s1=new savacct();
s1.set();
s1.display();
s1.deposit();
s1.in();
s1.wd();
break;
case 2:
curacct c1=new curacct();
c1.set();
c1.display();
c1.deposit();
c1.wd();
break;
default : System.exit(0);
}
 }
}
```

Saath

Date __/__/____

Program 5

Develop a JAVA program to create a class Bank that maintains two kinds of accounts called saving account & current account.

```
import java.util.Scanner;
import java.lang.math;
class account
{
   String name = new String();
   int accno;
   double bal;
   Scanner s = new Scanner(system.in);
   void set()
   {
      System.out.println("Enter customer details
                  (name, account no, balance).
      name = s.next();
      accno = s.nextInt();
      bal = s.nextDouble();
   }
   void display()
   {
      System.out.println("Name = "+name+
                  "\n Account no = "+acc
                  +"\n Balance = "+bal);
   }
   account()
   {
   }
}
```

Date __/__/____

Saathi

```
class sav_acc extends account
{
  Scanner s = new Scanner (System.in);
  sav_acc()
  {
    System.out.println("Cheque facility not
  }                                  available");
  void deposit()
  {
    int ch;
    double amt;
    System.out.println("1 for deposit");
    ch=s.nextInt();
    if(ch==1)
    {
      System.out.println("Enter amount to
                          be deposited");
      amt=s.nextDouble();
      bal = bal+amt;
    }
    else
      System.out.println("Invalid input");
  }
  void input()
  {
    System.out.println("Enter rate of interest,
                        no of times interest applied
                        number of time periods");
    double r = s.nextDouble();
    int n=s.nextInt();
    int t = s.nextInt();
    double x = bal * (1+r/n);
    double ci = bal * Math.pow(x, n*t);
    bal = bal+ci;
    System.out.println("Balance = "+bal);
  }
```

Page No.

```
    void wdl()
    {
      System.out.println("1 to withdraw amount");
      int ch=s.nextInt();
      if(ch==1)
      {
        System.out.println("Enter amount to b wit
        double withdraw=s.nextDouble();
        bal=bal-withdraw;
        System.out.println("Balance="+bal);
      }
      else
      {
        System.out.println("Invalid input");
      }
}
class curacc extends account
{
  Scanner s=new Scanner(System.in);
  cur_acc()
  {
    System.out.println("Cheque faculty available");
  }
  void deposit()
  {
    int ch;
    double amt;
    System.out.println("1 for deposit");
    ch=s.nextInt();
    if(ch==1)
    {
      System.out.println("Enter amount to be dep
      amt=s.nextDouble();
      bal=bal+amt;
    }
```

```
        else
            System.out.println("Invalid input");
    }
    void wd2()
    {
        System.out.println("1 for withdrawal");
reason");
        int ch = s.nextInt()
        if (ch==1)
        {
            System.out.println("Enter amount to be
                                withdrawn");
            double withdraw = s.nextDouble();
            bal = bal - withdraw;
            System.out.println("Balance = "+bal);
        }
        else
            System.out.println("Invalid input");
    }
    if(bal<1000)
    {
        System.out.println("Running out of min.
                            balance\n Amount of ₹30
                            deducted");
        bal = bal - ₹30;
        System.out.println("Balance "+bal);
    }
  }
}
public class bank
{
  public static void main(String[] args)
ited");
  {
    Scanner s = new Scanner(System.in);
    int ch;
```

```
System.out.println("Press 1 for savi
                    and 2 for current
ch=Character.readChar();
switch(ch)
{
    case 1: sav_acc s1=new sav_acc();
            s1.set(); s1.display();
            s1.deposit();
            s1.input();
            s1.withdraw();
            break;
    case 2: cur_acc a1=new cur_ac();
            c1.set();
            c1.display();
            c1.deposit();
            c1.input();
            c1.withdraw();
            break;
    default: exit(0);
  }
 }
}
```

Output

```
Press
1. Savings account
2. Current account

1
Cheque facility not available
Enter customer name
Avinash
Enter account number
2468
```

Date __/__/____

Saathi

Enter balance amount
40000
Customer name: Avinash
Account no: 2468
Account balance: 40000

Press 1 for deposit
1
Enter amount to be deposited
10000
Enter rate of interest
0.05
Enter number of times interest applied
2
Enter number of time periods
2
~~Balance amount = 55190.6445~~
Available balance after updating = 105190.64
Press 1 to withdraw amount
1
Enter amount to be withdrawn
40000
Available balance: 65190.644

Press
1. Savings account
2. Current account

2
Cheque facility available
Enter customer name
Dinesh
Enter account number
2468

Date ___/___/_____

Enter balance amount
1000
Customer name: Dinesh
Account number: 1468
Account balance: 1000
Press 1 to deposit
1
Enter amount to be deposited
2000
Press 1 to withdraw amount
1
Enter amount to be ~~dep~~ withdrawn
3500
Available balance = -500.0
You are running out of minimum balance
Amount of 50 to be deducted
Balance = -550

07/12/2021

```
Press
1. Savings account
2. Current account
2
Cheque Facility available
Enter customer name
DINESH
Enter account number
2468
Enter balance amount
1000
Customer Name:DINESH
Your account number:2468
Your Account Balance:1000.0
Press 1 to deposit
1
Enter amount to be deposited
2000
Press 1 to withdraw ammount
1
Enter the amount to be withdrawn
3500
Available Balance:-500.0
You are running out of minimum balance
Amount of rs 50 has been credited
Your Available Balance:-550.0

C:\Users\BMSCECSEIL74\Desktop\1bm21csss050>
```

```
Press
1. Savings account
2. Current account
 1
Cheque Facility not available
Enter customer name
AVINASH
Enter account number
2468
Enter balance amount
40000
Customer Name:AVINASH
Your account number:2468
Your Account Balance:40000.0
Press 1 to deposit
1
Enter amount to be deposited
10000
Enter rate of interest
0.05
Enter number of times interest applied per time period
2
Enter number of time periods
2
Interest amount=55190.64453124998
Balance amount without interest is50000.0
Available balance after updating is105190.64453124997
Press 1 to withdraw ammount
1
Enter the amount to be withdrawn
40000
Available Balance:65190.64453124997
```

WEEK 6

Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called “Father” and derived class called “Son” which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge( ) when the input age<0. In Son class, implement a constructor that cases both father and son’s age and throws an exception if son’s age is >=father’s age.

```
class worngAgeException extends Exception{
	public String toString(){
		return ("Age cannot be negetive");
	}
}

class AgeException extends Excepetipon{
	public String toString()
	{
		return("Age of son cannot be greater than Father's age");
	}
}

class Father{
	int father_age;
	Father(int x) throws WrongAgeException
	{
		father_age=x;
		if(father_age<0)
			{
			throw new WrongAgeException();
	}
```

```
    }
}

class Son extends Father{
        int son_age;
        Son(int x,int y) throws AgeException, WrongAgeException{
                super(x);
                son_age=y;
                if(son_age<0)
                                {
                        throw new WrongAgeException();
                }
                if(son_age>=father_age)
                                {
                        throw new AgeException();
        }
    }
}


class age1{
        public static void main(String[] args) {
                try {
                        Scanner s=new Scanner(System.in);
                        System.out.println("Enter father's  age  :  ");
                        int x=s.nextInt();
                        System.out.prinltln("Enter son's age  :  ");
                        int y=s.nextInt();
                        Son so=new Son(x,y);
                        System.out.println("Father is " + so.father_age +
"years old and son is "+ so.son_age + " years old");
        }
```

```
            catch (WrongAgeException wa)
                {
                    System.out.println(wa);
            }
            catch (AgeException a)
                    {
                System.out.println(a);
            }
            catch (Exception e)
                    {
                System.out.println("Enter valid values of age");
        }
    }
}
```

Program 6

Develop a program to demonstrate handling of exceptions in inheritance tree. Create a base class called "Father" & derived class called 'Son' which extends base class. In Father's class, implement a constructor which takes age & throws WrongAge() when input age < 0. In Son class, implement constructor which cases both father's and son's age and throws an exception if son's age >= father's age

```
import java.util.Scanner;
class WrongAgeException extends Exception
{
  public String toString()
  {
    return ("Wrong Age"+"\n Age cannot be negative");
  }
}
class AgeException extends Exception
{
  public String toString()
  {
    return("Impossible"+"\n Son's age greater
          cannot be greater than father's age");
  }
}
class Father
{
  int father_age;
  Father(int x) throws WrongAgeException
  {
```

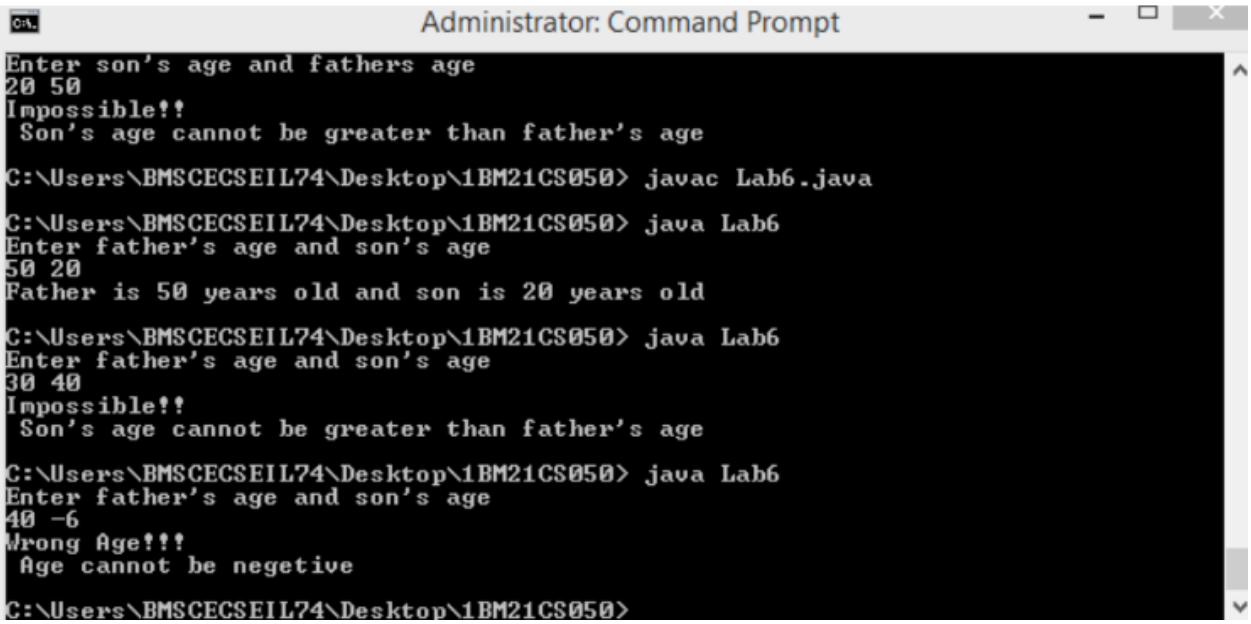
```
            father_age = x;
            if (father_age < 0)
            {
                throw new WrongAgeException();
            }
        }
    }
class son extends father
{
    int son_age;
    son(int x, int y) throws AgeException, WrongAgeExc
    {
        super(x);
        son_age = y;
        if (son_age < 0)
        {
            Throw new WrongAgeException();
        }
        if( son_age >= father_age)
        {
            throw new AgeException();
        }
    }
}
class Lab6
{
    public static void main(String xx[])
    {
        try
        {
            Scanner S = new Scanner (System.in);
            System.out.println(" Enter father's age and
                                son's age");
            int x = S.nextInt();
```

```
            Son so = new Son(x,y);
            System.out.println("Father is " + so.father_age +
                               " years old and son is
                               " + so.son_age + " years old");
        }
        catch (WrongAgeException wa)
        {
            System.out.println(wa);
        }
        catch (AgeException a)
        {
            System.out.println(a);
        }
        catch (Exception e)
        {
            System.out.println("Enter valid age");
        }
    }
}
```

Output

```
Enter father's son's age and son's father's age
20 50
Impossible !!
Son's age cannot be greater than father's age.

Enter father's age and son's age
50 20
Father is 50 years old and son is 20 years old

Enter father's age and son's age
40 -6
Wrong age !!
Age cannot be negative.
```

Page No.


Administrator: Command Prompt
Enter son's age and fathers age
20 50
Impossible!!
Son's age cannot be greater than father's age
C:\Users\BMSCECSEIL74\Desktop\1BM21CS050> javac Lab6.java
C:\Users\BMSCECSEIL74\Desktop\1BM21CS050> java Lab6
Enter father's age and son's age
50 20
Father is 50 years old and son is 20 years old
C:\Users\BMSCECSEIL74\Desktop\1BM21CS050> java Lab6
Enter father's age and son's age
30 40
Impossible!!
Son's age cannot be greater than father's age
C:\Users\BMSCECSEIL74\Desktop\1BM21CS050> java Lab6
Enter father's age and son's age
40 -6
Wrong Age!!!
Age cannot be negetive
C:\Users\BMSCECSEIL74\Desktop\1BM21CS050>

WEEK 7

Write a program which creates two threads, one thread displaying “BMS College of Engineering” once every ten seconds and another displaying “CSE” once every two seconds.

```
{
        String a;
        int x,time;
        Thread t;
        Call(String t1,int ti,int x1)
        {
                a=t1;
                x=x1;
                time=ti;
                t=new Thread(this,a);
                t.start();
        }
        public void run()
        {
                try{
                        for(int i=0;i<x ;i++)
                        {
```

```
                        System.out.println(a);
                        Thread.sleep(time);
                    }
                    }
                catch(InterruptedException ie)
                {
                    System.out.println("Interrupted ");
                }
        }
}

class threads1
{
public static void main(String xx[])
{
        new Call("BMS College of Engineering",10000,3);
        new Call("CSE",2000,10);
}
}
```

6/1/23

Program 7

Write a program which creates 2 threads one displaying "BMS College of Engineering" every ten seconds and another displaying "CSE" once every two seconds.

```
class call implements Runnable
{
  String a;
  int x, time;
  Thread t;
  Call (String t1, int ti, int x1)
  {
    a = t1;
    x = x1;
    t = new Thread (this, a);
    t.start();
  }
  public void run()
  {
    try
    {
      for(int i=0; i<x; i++)
      {
        System.out.println (a);
        Thread.sleep(time);
      }
    }
    catch (InterruptedException ie)
    {
      System.out.println ("Interrupted");
    }
  }
```

Date ___/___/_____

Saathi

```
class threads1
{
   public static void main(String ss[])
   {
      new Call ("BMS College of Engineering", 100
      new Call ("CSE", 2008, 10);
   }
}
```

Output

```
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
```

06/01/2023


C:\Users\BMSCECSEIL74\Desktop\1BM21CS050>javac threads1.java
C:\Users\BMSCECSEIL74\Desktop\1BM21CS050>java threads1
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
C:\Users\BMSCECSEIL74\Desktop\1BM21CS050>

WEEK 8

Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.

```
package CIE;
import java.util.*;
public class student{
    Scanner sc=new Scanner(System.in);
    public String usn,name;
    public int sem;

    public void accept(){
        System.out.println("Enter USN, Name and Current semester: ");
        usn=sc.nextLine();
        name=sc.nextLine();
        sem=sc.nextInt();
    }
    public void display(){
        System.out.println("\nStudent Details");
        System.out.println("Name: "+name);
        System.out.println("USN: "+usn);
        System.out.println("Semester: "+sem);
    }
}
```

```
package CIE;
import java.util.*;
public class internals extends CIE.student {
    Scanner sc=new Scanner(System.in);
    public int ciem[]=new int[5];

    public void accept(){
        int i;
        for(i=0;i<5;i++)
        {
          System.out.println("Enter CIE marks of subject "+(i+1));
          ciem[i]=sc.nextInt();
        }
    }
}

package SEE;
import CIE.*;
import java.util.*;
public class externals extends CIE.student{
    Scanner sc=new Scanner(System.in);
    public int seem[]=new int[5];

    public void accept(){
        for(int i=0;i<5;i++)
        {
            System.out.println("Enter SEE marks of subject "+(i+1));
            seem[i]=sc.nextInt();
        }
```

```
    }
}



import CIE.*;
import SEE.*;
import java.util.*;
class total{
    public static void main(String args[]) {
        int i,j,n;
        Scanner sc=new Scanner(System.in);
        int total[]=new int[5];
        System.out.println("Enter number of students: ");
        n=sc.nextInt();
        CIE.student s[]=new CIE.student[n];
        CIE.internals ci[]=new CIE.internals[n];
        SEE.externals se[]=new SEE.externals[n];
        for(i=0;i<n;i++)
        {
            System.out.println("\nEnter student "+(i+1)+" details");
            s[i]=new CIE.student();
            s[i].accept();
            ci[i]=new CIE.internals();
            ci[i].accept();
            se[i]=new SEE.externals();
            se[i].accept();
        }
        for(i=0;i<n;i++)
        {
            System.out.println("\nDetails of student "+(i+1));
            s[i].display();
```

```
            for(j=0;j<5;j++)
            {
                total[j]=ci[i].ciem[j]+se[i].seem[j];
                System.out.println("Total marks in subject "+(j+1)+":
"+total[j]);
            }
            System.out.println();
        }
    }
}
```

Date ___/___/_____

Saathi

Program 8

Create a ~~class~~ package CIE which has 2 classes - Student and Internals - a subclass of Student. Student has members like USN, name, sem. Class internals stores internal marks scored in five courses.
Create another package SEE which has class External derived from Internals. It has an array which stores SEE marks scored in five subjects.
Import 2 ~~class~~ packages that declares final marks of n students in all five courses.

```
package CIE;
import java.util.*;
public class Student
{
    Scanner sc = new Scanner (System.in);
    public String USN, name;
    public int sem;
    public void accept()
    {
        System.out.println("Enter USN, name, current semester");
        USN = sc.nextLine();
        name = sc.nextLine();
        sem = sc.nextInt();
    }
    public void display()
    {
        System.out.println("Student Details");
        System.out.println("Name: "+name);
        System.out.println("USN: "+USN);
        System.out.println("Semester: "+sem);
```

```
package CIE;
import java.util.*;
public class internals extends CIE.Student
{
  Scanner sc = new Scanner(System.in);
  public int siem[] = new int[5];
  public void accept()
  {
    int i;
    for(i=0; i<5; i++)
    {
      System.out.println("Enter CIE marks of"+(i+1));
      siem[i] = sc.nextInt();
    }
  }
}
```

```
package SEE;
import CIE.*;
import java.util.Scanner;
public class externals extends CIE.Student
{
  Scanner sc = new Scanner(System.in);
  public int ssem[] = new int[5];
  public void accept()
  {
    for(int i=0; i<5; i++)
    {
      System.out.println("Enter SEE marks of
                          subject"+(i+1));
      ssem[i] = sc.nextInt();
    }
  }
}
```

```
import CIE.*;
import SEE.*;
import java.util.*;
class total
{
  public static void main(String args[])
  {
    int i, j, n;
    Scanner sc = new Scanner(System.in);
    int total[] = new int[6];
    System.out.println("Enter no. of students");
    n = sc.nextInt();
    CIE.student s[] = new CIE.student[n];
    SEE.externals se[] = new SEE.externals[n];
    for(int i=0; i<n; i++)
    {
      s[i] = new CIE.student();
      s[i].accept();
      ci[i] = new CIE.internals();
      ci[i].accept();
      se[i] = new SEE.externals();
      se[i].accept();
    }
    for(i=0; i<n; i++)
    {
      System.out.println("Details of student "+(i+1));
      s[i].display();
      for(j=0; j<5; j++)
      {
        total[j] = ci[i].cie[j] + se[i].see[j];
        System.out.println("Total marks in
                            subject "+(j+1)+" : "+total[j]);
      }
      System.out.println();
    }
```

```
C:\Users\bmsce\Desktop\1BM21CS050> java total
Enter number of students:
2

Enter student 1 details
Enter USN, Name and Current semester:
1BM21CS001
AVINASH
2
Enter CIE marks of subject 1
40
Enter CIE marks of subject 2
38
Enter CIE marks of subject 3
36
Enter CIE marks of subject 4
37
Enter CIE marks of subject 5
35
Enter SEE marks of subject 1
100
Enter SEE marks of subject 2
98
Enter SEE marks of subject 3
96
Enter SEE marks of subject 4
94
Enter SEE marks of subject 5
95

Enter student 2 details
Enter USN, Name and Current semester:
1BM21CS002
BALAJI
3
Enter CIE marks of subject 1
35
Enter CIE marks of subject 2
36
Enter CIE marks of subject 3
38
Enter CIE marks of subject 4
39
```

```
Enter CIE marks of subject 4
39
Enter CIE marks of subject 5
39
Enter SEE marks of subject 1
100
Enter SEE marks of subject 2
100
Enter SEE marks of subject 3
98
Enter SEE marks of subject 4
83
Enter SEE marks of subject 5
92

Details of student 1

Student Details
Name: AVINASH
USN: 1BM21CS001
Semester: 2
Total marks in subject 1: 140
Total marks in subject 2: 136
Total marks in subject 3: 132
Total marks in subject 4: 131
Total marks in subject 5: 130


Details of student 2

Student Details
Name: BALAJI
USN: 1BM21CS002
Semester: 3
Total marks in subject 1: 135
Total marks in subject 2: 136
Total marks in subject 3: 136
Total marks in subject 4: 122
Total marks in subject 5: 131


C:\Users\bmsce\Desktop\1BM21CS050>
```