VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT

on

Object Oriented Java Programming

(23CS3PCOOJ)

Submitted by

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in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
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CERTIFICATE

This is to certify that the Lab work entitled "Artificial Intelligence (23CS5PCAIN)" carried out by **DHANUSH S (1BM23CS089),** who is bonafide student of **B.M.S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum. The Lab report has been approved as it satisfies the academic requirements in respect of an Artificial Intelligence (23CS5PCAIN) work prescribed for the said degree.

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Github Link:https://github.com/DhanushSGouda/OOJ-CS-LAB-1BM23CS089.git

Program 1

Implement Quadratic equation

Algorithm:

3. Develop Java program that print all real soluti to quad eqn $ax^2+bx+c=0$. If $b^2-4ac<0$ say real solutions doesn't exist

```
import java.util.scanner;
import java.lang.math;
Public class quadratic {
Public static void main (String[] args) {
int a, b, c, dis;
```

```
scanner input = new scanner (System.in);
a = input.nextint ();
b = input. nextInt ();
c = input. nextInt ();
d = discriminant (a, b, c);

if (d==0) {

  ans1 = -b/(2*a)
system.out.println ("roots are equal and ="+ ans1);

}
else if (d>0) {

e = Math. pow ( b*b - 4*a*c)^0.5;
ans1 = (-b+e)/(2*a);
ans2 = (-b-e)/(2*a);

system.out.println ("Roots = "+ ans1 "and" + ans2);

else {
System.out.println ("No real roots");
}
}
public static int discriminant ( int a, int b, int c)
{
  return (b*b)-(4*a*c);
}
}
```

Code:

```
import java.util.Scanner;
public class Quadratic

{
   public static void main(String[] args)
   {
      int a;
      int b;
      int c;
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter 'a' value: ");
      a= sc.nextInt();
      System.out.print("Enter 'b' value: ");
      b=sc.nextInt();
      System.out.print("Enter 'c' value: ");
      c=sc.nextInt();
      float disc = ((b*b)-4*a*c);
      System.out.println(disc);
      if (a==0)
      {
         System.out.println("Not Quadratic");
      }
      else
      {
         if (disc<0)
         {
         System.out.println("No real roots ");
         }
         else if (disc>0)
         {
         double root1= (-b + Math.sqrt(disc))/(2*a);
         double root2= (-b - Math.sqrt(disc))/(2*a);
         System.out.println("Real roots ");
         System.out.println("Root-1: "+root1);
         System.out.println("Root-2: "+root2);
         }
         else
         {
         double root1=(-b)/(2*a);
            System.out.println("Real and equal");
         System.out.println("Root-1: "+root1);
         System.out.println("Root-2: "+root1);
         }
         System.out.println("Dhanush S");
```

```
        System.out.println("1BM23CS089");

    }
  }
}
```

```
C:\Windows\System32\cmd.exe

C:\Users\dhanu\OneDrive\Documents\java>javac Quadratic.java

C:\Users\dhanu\OneDrive\Documents\java>java Quadratic
Enter 'a' value: 2
Enter 'b' value: 4
Enter 'c' value: 2
0.0
Real and equal
Root-1: -1.0
Root-2: -1.0
Dhanush S
1BM23CS089

C:\Users\dhanu\OneDrive\Documents\java>javac Quadratic.java

C:\Users\dhanu\OneDrive\Documents\java>java Quadratic
Enter 'a' value: 1
Enter 'b' value: 1
Enter 'c' value: 1
-3.0
No real roots
Dhanush S
1BM23CS089
```

Program 2
SGPA Calculator

Algorithm:

Date __/__/__
Page __

8/10/24 LAB Program - 2

```
import java.util.Scanner;
import java.util.Arrays;

class Student
{
  String USN;
  String name; int subjects;
  int[] credits;
  int[] marks;

public void accept_info()
  {
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter USN:");
      USN = sc.nextline();
    System.out.println("Enter name:");
      name = sc.nextline();
    System.out.println("Enter no of subjects:"
      subjects = sc.nextInt();
    credits = new int[subjects];
    marks = new int[subjects];
    System.out.println("Enter subjects and
     their credits:");
    for(int i=0; i<subjects; i++)
      {
        System.out.println("Subject"+(i+1));
        System.out.println("Enter credits:");
        credits[i] = sc.nextInt();
        System.out.println("Enter marks");
        marks[i] = sc.nextInt();
      }}
```

Date __/__/__
Page ____

```
public void display_info ()
{
    System.out.println("Details :");
    System.out.println(" USN :" + USN);
    System.out.println("Name :" + name);
    for (int i = 0; i < subjects ; i++)
    {
      System.out.println ["Subject :" + (i+1)+
                        ", Marks :" + marks [i]);
}}

public double sgpa()
{
int t_credit = 0
    double _ rec = 0.0 ;
    for( int i = 0 ; i < subjects ; i++ )
      {
        t_credits += credit [i] ;
        rec + = credits [i] * points (marks[i]);
      }
    return rec / t_credits ;
}

public int points (int j )
{
    if ( j >= 90)
        return 10;
    else if (j >= 80)
        return 9;
    else if (j >= 70)
        return 8;
    else if (j >= 60)
        return 7;
```

Date __/__/__
Page _____

```
else if (j >= 50)
    return 6;
else
    return 0;
}}
class sgpa {
  public static void main (String args[])
  {
    Student student = new Student();
    student.accept_info();
    Student.display_info()
    System.out.println("SGPA:" + student
                                .sgpa());
  }}
```

O/P

Enter USN NAM
1BM23CS089
Enter name
~~Hemanth~~ DHANUSH S
Enter no of subjects
2
Enter subjects and their credits
Subject : 1
Enter credits : 4
Enter marks : 85
Subject : 2
Enter credits : 4
Enter marks : 95

08.10

code:

```
import java.util.Scanner;

class Student {
    private String name;
    private String usn;
    private double total_credit;
    private double[] marks;
    private Scanner sc = new Scanner(System.in);

    void getInfo() {
        System.out.print("Enter Name: ");
        name = sc.nextLine();

        System.out.print("Enter USN: ");
        usn = sc.nextLine();

        System.out.print("Enter Total Credits: ");
        total_credit = sc.nextDouble();
        sc.nextLine();
    }

    double grade(double mark) {
        if (mark <= 39) {
            return 0;
        } else if (mark >= 40 && mark <= 49) {
            return 4;
        } else if (mark >= 50 && mark <= 54) {
            return 5;
        } else if (mark >= 55 && mark <= 59) {
            return 6;
        } else if (mark >= 60 && mark <= 69) {
            return 7;
        } else if (mark >= 70 && mark <= 79) {
            return 8;
        } else if (mark >= 80 && mark <= 89) {
            return 9;
        } else {
            return 10;
        }
    }

    void getMarks() {
        marks = new double[8];
        for (int i = 0; i < 8; i++) {
            System.out.println("Enter the marks for subject " + (i + 1) + ": ");
            double mark = sc.nextDouble();
```

```
            System.out.println("Enter the credit for subject " + (i + 1) + ": ");
            double credit = sc.nextDouble();

            double grade = grade(mark);
            marks[i] = grade * credit;
        }
        sc.nextLine();
    }

    void calSgpa() {
        double totalMarks = 0;
        for (int i = 0; i < 8; i++) {
            totalMarks += marks[i];
        }
        System.out.println("Name: " + name);
        System.out.println("USN: " + usn);
        System.out.println("SGPA: " + (totalMarks / total_credit));
    }
}

public class Main {
    public static void main(String args[]) {
        boolean cond = true;
        Scanner sc = new Scanner(System.in);
        while (cond) {
            Student s1 = new Student();


            s1.getInfo();
            s1.getMarks();
            s1.calSgpa();

            System.out.println("Do you want to calculate SGPA for another student? (yes/no): ");
            String check = sc.nextLine();
            if (check.equalsIgnoreCase("yes")) {
                continue;
            } else {
                cond = false;
            }
                System.out.println("Dhanush S");
                System.out.println("1BM23CS089");
        }
        sc.close();
    }
}
```

```
C:\Windows\System32\cmd.exe

C:\Users\dhanu\OneDrive\Documents\java>javac Main.java

C:\Users\dhanu\OneDrive\Documents\java>java Main
Enter Name: dhanush
Enter USN: 89
Enter Total Credits: 22
Enter the marks for subject 1:
90
Enter the credit for subject 1:
4
Enter the marks for subject 2:
80
Enter the credit for subject 2:
4
Enter the marks for subject 3:
80
Enter the credit for subject 3:
4
Enter the marks for subject 4:
90
Enter the credit for subject 4:
3
Enter the marks for subject 5:
90
Enter the credit for subject 5:
2
Enter the marks for subject 6:
90
Enter the credit for subject 6:
2
Enter the marks for subject 7:
80
Enter the credit for subject 7:
1
Enter the marks for subject 8:
90
Enter the credit for subject 8:
2
Name: dhanush
USN: 89
SGPA: 9.590909090909092
Do you want to calculate SGPA for another student? (yes/no):
no
Dhanush S
1BM23CS089

C:\Users\dhanu\OneDrive\Documents\java>
```

Program 3

Method Overriding

Algorithm:

Date __/__/__
Page _____

```
LAB - 3
import java.util.Scanner;
class Book {
    private String name;
    private String author;
    private double price;
    private int no_of_pages;

    public Book (String name, String author
        , double price, int no_of_pages) {
        this.name = name;
        this.author = author;
        this.price = price;
        this.no_of_pages = no_of_pages;

    public String getname() {
        return name;
    }
    public void setname (String name) {
        this.name = name;
    }
    public String getauthor () {
        return author;
    }
    public void setauthor (String author)
        this.author = author;
    }
    public String double getprice () {
        return price;
    }
    public void setprice (double price) {
        this.price = price;
    }
```

Date __/__/__
Page ____

```
public int ~~get~~_no_of_pages() {
        return no_of_pages;
    }
public void setno_of_pages() {
        this.no_of_pages = no_of_pages;
    }

public String toString() {
                                    "\n"+
    return "Name : " + name + " Author:
        + author + "\n" + " Price: $" + price +
        "\n" + "no_of_pages" + no_of_pages
        + "\n"
    }
}

~~public class main()~~
    public static void main(String[] args)
    Scanner sc = new Scanner(System.in);

System.out.println(" Enter no of pages");
        int n = sc.nextInt();
        sc.nextline();

        Book[] books = new Book[n]
System.out.println(" Enter Book details");
    for (int i=0 ; i<n ; i++) {
System.out.println("Enter ~~details~~ Book" + (i+1));
        System.out.println(" Enter Bookname")
            String name = sc.nextline();

System.out.println(" Enter author name);
        String author = sc.nextline();
```

Date ___/___/___
Page _____

```
System.out.println("Enter price:");
    double price = sc.nextdouble();

System.out.println("Enter no.of.pages");
    int no.of.page = sc.nextInt();
    sc.nextline();
    new
Book[i] = Book(~~String~~ name, author,
        price, no-of-pages)

}
for(int i=0; i<n; i++) {
System.out.println("Book"+(i+1)" + "\n" +
        Book[i].toString())
}
}
```

Output

15/10
Proceed

```
Enter no of books : 2
DHANVSH S
1BM23CS084
Enter Detail of Book 1
Enter book name : Harry Potter
Enter book author : J.K Rowling
Enter book price : 20
Enter no of page : 300

Enter details of Book 2
Enter book name : Rome
Enter book author : William
Enter book price : 30
Enter book no.of pages : 400
```

code:

```
import java.util.Scanner;

class Book {
   public String book_name;
   public String author_name;
   public int price;
   public int num_pages;

   Book(String book_name, String author_name, int price, int num_pages) {
      this.book_name = book_name;
      this.author_name = author_name;
      this.price = price;
      this.num_pages = num_pages;
   }

   @Override
   public String toString() {
      String name, author, price, numPages;
      name = "Book Name: " + this.book_name + "\n";
      author = "Author Name: " + this.author_name + "\n";
      price = "Price: " + this.price + "\n";
      numPages = "Number of Pages: " + this.num_pages + "\n";
      return name + author + price + numPages;
   }
}

public class Oride {
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);
      System.out.print("Number of books: ");
      int count = sc.nextInt();
      sc.nextLine();

      Book[] arr = new Book[count];
      for (int i = 0; i < count; i++) {
         System.out.print("Enter book " + (i + 1) + " name: ");
         String name = sc.nextLine();
         System.out.print("Enter author " + (i + 1) + " name: ");
         String author = sc.nextLine();
         System.out.print("Enter book " + (i + 1) + " price: ");
         int price = sc.nextInt();
         System.out.print("Enter book " + (i + 1) + " pages: ");
         int pages = sc.nextInt();
         sc.nextLine();

         arr[i] = new Book(name, author, price, pages);
```

```
            System.out.println(arr[i]);
        }

        sc.close();

        System.out.println("USN: 1BM23CS089");
        System.out.println("Name: Dhanush S");
    }
}
```

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19045.5131]
(c) Microsoft Corporation. All rights reserved.

C:\Users\dhanu\OneDrive\Documents\java>javac Oride.java

C:\Users\dhanu\OneDrive\Documents\java>java Oride
Number of books: 2
Enter book 1 name: harry potter
Enter author 1 name: J.K rowling
Enter book 1 price: 20
Enter book 1 pages: 300
Book Name: harry potter
Author Name: J.K rowling
Price: 20
Number of Pages: 300

Enter book 2 name: ROmeo
Enter author 2 name: william
Enter book 2 price: 30
Enter book 2 pages: 400
Book Name: ROmeo
Author Name: william
Price: 30
Number of Pages: 400

USN: 1BM23CS089
Name: Dhanush S

C:\Users\dhanu\OneDrive\Documents\java>
```

Program 4

Abstract class

Algorithm:

```
Lab-4 ?
        abstract
public class Shape {

    int dim1, dim2;
    Shape ( int d1, int d2) {
        dim1 = d1;
        dim2 = d2;
    }

    abstract void printArea();
}

class Rectangle extends Shape {
    Rectangle ( int l, int b) {
        super (l, b)
    }

    void printArea() {
        int Area = dim1 * dim2;
        System.out.println("Area of Rectangle is"
        + area);
    }
}

class Triangle extends Shape {
    Triangle (int b, int h) {
        super(b, h)
    }
    void print Area() {
        int area = 0.5 * dim1 * dim2;
    System.out.println("Area of Triangle is"
        + area);
    }
}
```

```
class Circle extends Shape {
        Circle( int radius, int unused) {
                super(radius, 0);
        }
    void printArea() {
        double area = Math.PI * dim1 * dim2;
    System.out.println("Area of circle:" + area
        }
    }

public class MainClass {
        public static void main(String[] a
            Rectange rectangle = new Rectangle(
            Triangle triangle = new triangle(
            Circle circle = new Circle(5

            rectangle.printArea();
            triangle.printArea();
            circle.printArea();

        }
    }
```

Output

Area of rectangle = 25

Area of triangle = 6

Area of circle = 78.5

code:

```
import java.util.Scanner;

abstract class Shape {
   double dim1;
   double dim2;

   abstract void printarea();
}

class Rectangle extends Shape {
   Rectangle(double d1, double d2) {
      this.dim1 = d1;
      this.dim2 = d2;
   }


   void printarea() {
      double area = dim1 * dim2;
      System.out.println("Area of Rectangle: " + area);
   }
}

class Triangle extends Shape {
   Triangle(double base, double height) {
      this.dim1 = base;
      this.dim2 = height;
   }


   void printarea() {
      double area = 0.5 * dim1 * dim2;
      System.out.println("Area of Triangle: " + area);
   }
}

class Circle extends Shape {
   Circle(double radius) {
      this.dim1 = radius;
   }


   void printarea() {
      double area = 3.14 * dim1 * dim1;
      System.out.println("Area of Circle: " + area);
   }
}
```

```
public class area {
   public static void main(String[] args) {
      try (Scanner sc = new Scanner(System.in)) {
         System.out.println("Enter length and breadth of Rectangle:");
         double rl = sc.nextDouble();
         double rb = sc.nextDouble();
         Rectangle r1 = new Rectangle(rl, rb);
         r1.printarea();

         System.out.println("Enter base and height of Triangle:");
         double base = sc.nextDouble();
         double height = sc.nextDouble();
         Triangle t1 = new Triangle(base, height);
         t1.printarea();

         System.out.println("Enter the Radius:");
         double radius = sc.nextDouble();
         Circle c1 = new Circle(radius);
         c1.printarea();
      }

      System.out.println("USN: 1BM23CS089");
      System.out.println("Name: Dhanush S");
   }
}
```

```
C:\Windows\System32\cmd.exe

C:\Users\dhanu\OneDrive\Documents\java>javac area.java

C:\Users\dhanu\OneDrive\Documents\java>java area
Enter length and breadth of Rectangle:
10
20
Area of Rectangle: 200.0
Enter base and height of Triangle:
10
20
Area of Triangle: 100.0
Enter the Radius:
5
Area of Circle: 78.5
USN: 1BM23CS089
Name: Dhanush S

C:\Users\dhanu\OneDrive\Documents\java>
```

Program 5

Bank Account

Algorithm

LAB-5

Date __/__/__
Page _____

Create a class Bank account which has two child classes SavAcc and curr_Acc, Sav acc provides interest and curr Acc checks if it has min balance and imposes service charges.

```
import java.util.Scanner;

Class Account {
        String Customername;
        Int ~~Cur~~ Accountnum;
        String Accounttype;
        Double Balance;

        public ~~class~~ Account ( String Customername
        , Int Accountnum, String Accounttype;
        Double Balance ) {

            this. Customername = Customername;
            this. Accountnum = Accountnum;
            this. Accounttype = Accountype
            this. Balance = Balance;
        }

        public void deposit (double amount) {
            if (amount > 0) {
                Balance += amount;
            }
            else {
                System.out.println(" Invalid amount")
            }
        }
```

```
public void display () {
        System.out.println (" Balance = " +
            Balance ) ;
    }
}

Class Saw_acct Extends Account {
    public double InterestRate ;
        double Year ;
    public Saw_acct ( String Customername,
        Int accountype , Double Balance
        Double Interestrate Double year ) {

        Super.        ( Customername , Accountnum
        " Saving" , Balance) ;
            this . Interestrate = InterestRate ;
            this . year = year
        }

    public void Interest ( double InterestRate ,
        double year ) {

        double Interest = (Balance * year * Interest
        - Rate ) / 100 ;
        deposit ( Interest ) ;
        System.Out.println (" Interest added")

    public void withdrawal (double amount ) {
        if ( amount > Balance ) {
            System.out.println (" Insufficient
            Balance ")
        else {
            Balance - = amount ;
        System.out.println ( amount + " Withdrawn"
        }
```

Date __/__/__
Page _____

```
class Cur_acct Extends Account {
        double minBalance;
        double servicecharge;
    public Cur_acct( String Customername,
      Int accountnum, Double Balance
      Double minBalance, Double servicecharge)
        {
      super( Customername, accountnum,
        "Current", Balance);
          this.MinBalance = minBalance;
          this.Servicecharge = servicecharge;
        }

public void withdrawal ( double amount) {
    if ( balance - amount < minBalance) {
      { System.out.println (" Your Balance is
        less than min balance");
          balance - = Servicecharge;
    System.out.println (" Service charge has
        been imposed");
        display(); }
    else {
          balance - = amount;
      System.out.println(" Withdrawal successful")
        display ();
    }
}

public class BankAccount {
    public static void main (String [] Args) {
    Sav_acct sav_acct = new Savacct (
    "Jagan", "10", 10000, 10, 2);
    Cur_acct cur_acct = new Cur_acct (
```

```
"Jagan", 10, 10000, 500, 100);
Cur_Acct.deposit(2000);
Cur_Acct.display();
Cur_Acct.withdrawal(1000);

Sav_acct sav_acct = new Sav_acct("Jagan",
    10, 10000, 10, 2);
    Sav_acct.deposit(1000);
    Sav_acct.display();
    Sav_acct.Interest(12.0, 2.0)
    Sav_acct.display();
    Sav_acct.withdrawal(2000);
    Sav_acct.display();
}
}
```

Proceed

Output:

```
Enter customer name for Current Account: jagan
Enter account number: 10
Enter initial balance = 1000
Enter service charge: 100
Enter customer name for Saving Account: jagan
Enter account number: 2000
Enter initial balance: 300
Enter interest rate: 5
Enter number of years: 4

1. Deposite to Current Account
2. Withdraw from current Account
3. Display Current Account Balance
4. Deposit to Saving account
5. Withdraw from Saving Account
6. Add Interest to Saving Account
7. Display Saving Account Balance

1. Enter amount to deposit: 1000
Deposited: 1000.0
3. Balance: 2000
```

```
import java.util.Scanner;

class Account{
  Scanner sc=new Scanner(System.in);

  String name="Dhanush S";
  int money;
  String type;
  int accno;
  Account(String acctype,int accno){
    this.type=acctype;
    this.money=0;
    this.accno=accno;

  }
```

```
void accdetail(){
  System.out.println("Account Holder Name: "+name);
  System.out.println("Account No: "+accno);
  System.out.println("Balance: "+money);
  System.out.println(this.type);
}

void deposit(){
  int mon;
  System.out.println(accno);
  System.out.println(type);
  System.out.println("Enter the Amount: ");
  mon=sc.nextInt();
  money+=mon;
  System.out.println("Balance: "+money);
}

void withdraw(){
  System.out.println(this.accno);
  System.out.println(type);
  int mon;
  System.out.println("Enter the Amount: ");
  mon=sc.nextInt();
  money-=mon;
  System.out.println("Balance: "+money);
  if((money<=100) && this.type=="current_account")
  {
    System.out.println("Minimum balance is 100");
    System.out.println("Deposite money now and pay the fine of 50");
  }
}
void cal_intrest(){
  if(this.type=="saving_account")
  {

    System.out.println(this.type);
    double temp=this.money;

    double intrest=((temp)*0.5)+temp;
    System.out.println("The intrest: "+intrest);
  }

  else
  {
    System.out.println("Not a saving account");
  }
```

```
  }
}

public class bank{
   public static void main(String[] args) {
     Account c1=new Account("saving_account",1);
     Account c2=new Account("current_account",2);

     while(true)
     {
       Scanner sc=new Scanner(System.in);

       int choice;
       System.out.println("Enter the choice:\n1.Deposite\n2.Withdraw\n3.Compute intrest\n4.Display
acc details\n5.Exit");
       choice=sc.nextInt();
       if (choice==1)
       {
         c1.deposit();
         c2.deposit();
       }

       if(choice==2){
          c1.withdraw();
          c2.withdraw();
       }

       if(choice==3){
         c1.cal_intrest();
         c2.cal_intrest();
      }

      if(choice==4){
       c1.accdetail();
       c2.accdetail();
    }

    if(choice==5){
     break;
     }
   }

   System.out.println("USN: 1BM23CS089");
   System.out.println("Name: Dhanush S");
  }
}
```

```
C:\Windows\System32\cmd.exe - java bank

C:\Users\dhanu\OneDrive\Documents\java>javac bank.java

C:\Users\dhanu\OneDrive\Documents\java>java bank
Enter the choice:
1.Deposite
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
1
1
saving_account
Enter the Amount:
2000
Balance: 2000
2
current_account
Enter the Amount:
1000
Balance: 1000
Enter the choice:
1.Deposite
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
2
1
saving_account
Enter the Amount:
1000
Balance: 1000
2
current_account
Enter the Amount:
2000
Balance: -1000
Minimum balance is 100
Deposite money now and pay the fine of 50
Enter the choice:
1.Deposite
2.Withdraw
```

```
C:\Windows\System32\cmd.exe
Enter the Amount:
1000
Balance: 1000
2
current_account
Enter the Amount:
2000
Balance: -1000
Minimum balance is 100
Deposite money now and pay the fine of 50
Enter the choice:
1.Deposite
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
4
Account Holder Name: Dhanush S
Account No: 1
Balance: 1000
saving_account
Account Holder Name: Dhanush S
Account No: 2
Balance: -1000
current_account
Enter the choice:
1.Deposite
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
5
USN: 1BM23CS089
Name: Dhanush S

C:\Users\dhanu\OneDrive\Documents\java>SS
```

Program 6

Packages

Algorithm:

Packages

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Create a package CIE, which has two classes Student and internal. Class Personal has details like USN, name, details. Implement the program using package appropriately

```
package CIE
public class Personal (String USN, name, int sem)

package CIE

public class Internals extends personal (int[]
  internalMarks = new int[5];)

package SEE;
import CIE.Internals;
public class External extends Internals{ int[]
external Marks = new Int[5];}

import CIE.*;
import SEE.*;
import java.util.Scanner;

public class FinalMarks {
  public static void main (String args[]) {
    Scanner sc = new Scanner (System.in);
    System.out.println ("Enter number of students");
    int n = sc.nextInt ()
    External [] students = new External[n];
    for (int i=0; i<n; i++) {
      Student [i] = new External ();
```

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```
System.out.println("USN");
  Students[i].USN = sc.next();
System.out.println("Name");
  Students[i].name = sc.nextline();
System.out.println("semester:");
  Students[i].semester = sc.nextInt();
System.out.println("Enter 5 Internal
marks;
for (int j=0; j<5; j++) Students[i]
InternalMarks[j] = sc.nextInt();
  System.out.println("Enter 5 SEE marks");
for (int j=0; j<5; j++) students[i].external
Marks[j] = sc.nextInt();
}

for (int i=0; i<n; i++) {
    System.out ("\n student" + (i+1) + ":" + students
  [i].usn + "," + students[i].name);
  for (int j=0; j<5; j++)
    System.out ("subject" + (j+1) + "Final marks" +
      (students[i].internalmarks[j] + student
        [i].externalMarks[j]));
  }
  sc.close();
}
```

Output

```
Enter the number of students: 2
USN: 1
Name: Ram
Sem: 3
Enter marks of 5 subjects internal
```

80, 70 60 50 40
Enter marks of 5 External marks
80, 70 60 50 40

USN: 2
Name: Dhi
Sem: 3
Enter marks of 5 external marks
80 70 60 40 50
Enter marks of 5 external marks
50 40 60 70 80

Final marks
Name: Dha
USN: 1
Marks internal 80 70 60 50 40
Name: Dhi
USN: 2
Marks internal 40 50 60 70 80

code:

```
package CIE;

import java.util.Scanner;
import CIE.Student;
public class Internals extends Student {
   protected int[] cieMarks = new int[5];

   public void inputCIEMarks() {
      Scanner s = new Scanner(System.in);
      System.out.println("Enter CIE marks for 5 subjects:");
      for (int i = 0; i < 5; i++) {
         System.out.print("Subject " + (i + 1) + ": ");
         cieMarks[i] = s.nextInt();
      }
   }

   public int[] getCieMarks() {
      return cieMarks;
   }
}
package CIE;

import java.util.Scanner;

public class Student {
   protected String usn;
   protected String name;
   protected int sem;

   public void inputStudentDetails() {
      Scanner s = new Scanner(System.in);
      System.out.print("Enter USN: ");
      usn = s.nextLine();
      System.out.print("Enter Name: ");
      name = s.nextLine();
      System.out.print("Enter Semester: ");
      sem = s.nextInt();
   }

   public void displayStudentDetails() {
      System.out.println("USN: " + usn);
      System.out.println("Name: " + name);
      System.out.println("Semester: " + sem);
   }
}
```

```java
package SEE;

import CIE.Student;
import java.util.Scanner;

public class External extends Student {
    protected int[] seeMarks = new int[5];

    public void inputSEEMarks() {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter SEE marks for 5 subjects:");
        for (int i = 0; i < 5; i++) {
            System.out.print("Subject " + (i + 1) + ": ");
            seeMarks[i] = s.nextInt();
        }
    }

    public int[] getSeeMarks() {
        return seeMarks;
    }
}
```

```java
package Main;

import CIE.Internals;
import SEE.External;
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter the number of students: ");
        int numStudents = sc.nextInt();
        sc.nextLine();

        Internals[] cieStudents = new Internals[numStudents];
        External[] seeStudents = new External[numStudents];

        for (int i = 0; i < numStudents; i++) {
            System.out.println("\nEnter details for student " + (i + 1) + ":");

            cieStudents[i] = new Internals();
            cieStudents[i].inputStudentDetails();
            cieStudents[i].inputCIEMarks();
```

```
            seeStudents[i] = new External();
            seeStudents[i].inputSEEMarks();
        }

        System.out.println("\nFinal marks for each student:");
        for (int i = 0; i < numStudents; i++) {
            System.out.println("\nDetails for student " + (i + 1) + ":");
            cieStudents[i].displayStudentDetails();

            int[] cieMarks = cieStudents[i].getCieMarks();
            int[] seeMarks = seeStudents[i].getSeeMarks();
            int[] finalMarks = new int[5];

            System.out.println("Final marks in each subject:");
            for (int j = 0; j < 5; j++) {
                finalMarks[j] = cieMarks[j] + seeMarks[j];
                System.out.println("Subject " + (j + 1) + ": " + finalMarks[j]);
            }
        }

        sc.close();

        System.out.println("USN: 1BM23CS089");
        System.out.println("Name: Dhanush S");
    }
}
```

```
C:\Windows\System32\cmd.exe - java  -cp . Main.Main
C:\Users\dhanu\OneDrive\Documents\java>javac -cp . CIE\Internals.java

C:\Users\dhanu\OneDrive\Documents\java>javac -cp . SEE\External.java

C:\Users\dhanu\OneDrive\Documents\java>javac -cp . Main\Main.java

C:\Users\dhanu\OneDrive\Documents\java>java -cp . Main\Main
Error: Could not find or load main class Main\Main
Caused by: java.lang.NoClassDefFoundError: Main\Main (wrong name: Main/Main)

C:\Users\dhanu\OneDrive\Documents\java>java -cp . Main.Main
Enter the number of students: 1

Enter details for student 1:
Enter USN: 1BM23CS089
Enter Name: DHANUSH S
Enter Semester: 3
Enter CIE marks for 5 subjects:
Subject 1: 90
Subject 2: 80
Subject 3: 70
Subject 4: 90
Subject 5: 90
Enter SEE marks for 5 subjects:
Subject 1: 90
Subject 2: 80
Subject 3: 90
Subject 4: 80
Subject 5: 90

Final marks for each student:

Details for student 1:
USN: 1BM23CS089
Name: DHANUSH S
Semester: 3
Final marks in each subject:
Subject 1: 180
Subject 2: 160
Subject 3: 160
Subject 4: 170
Subject 5: 180
USN: 1BM23CS089
Name: Dhanush S
```

Program 7
Exception Handling

Algorithm:

26/11/24 Lab 5

```
class WrongAgeException extends Exception {
    public WrongAgeException(String message) {
        super(message);
    }
}

class Father {
    int age;
    public Father(int age) throws
    WrongAgeException {
        if (age <0) throw new
    WrongAgeException ("Father's age
            cannot be negative");
        this.age = age;
    }
}

class Son extends Father {
    int sonAge;

    public Son(int fatherage, int sonAge)
        throws WrongAgeException {
            super(fatherAge);
            if (sonAge <0 || sonAge > fathers
                Age) {
                throw new WrongAgeException(
    "Invalid son's age:" + sonAge +".
    It must be non-negative and less
    than the father's age (" + fatherAge + ")");
```

```
}
    this.sonAge = sonAge;
  }
}

public class Main {
    public static void main (String[] args) {
      try {
          Father father = new Father(40);
          Son son = new Son(40, 200);
          System.out.println("Father's age:"
          + father.age);
        System.out.println("Son's age:"
          + son.sonAge);
      }
      catch (WrongAgeException e) {
          System.out.println("Exception:" +
          e.getMessage());
        }
    }
}
```

Output

```
Father age: 40
Son's age: 200
Son's age cannot be more than father
Father's age:-1
Son's age: 20
Father's age cannot be negative
```

26.11

code:

```
import java.util.Scanner;

class WrongAge extends Exception {

    public WrongAge() {
        super("Age Error");
    }

    public WrongAge(String message) {
        super(message);
    }
}

class Father {
    protected int fatherAge;

    public Father() throws WrongAge {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter Father's Age: ");
        fatherAge = s.nextInt();
        if (fatherAge < 0) {
            throw new WrongAge("Age cannot be negative");
        }
    }

    public void display() {
        System.out.println("Father's Age: " + fatherAge);
    }
}

class Son extends Father {
    private int sonAge;

    public Son() throws WrongAge {
        super();
        Scanner s = new Scanner(System.in);
        System.out.print("Enter Son's Age: ");
        sonAge = s.nextInt();
        if (sonAge < 0) {
            throw new WrongAge("Age cannot be negative");
        } else if (sonAge >= fatherAge) {
            throw new WrongAge("Son's age cannot be greater than or equal to Father's age");
        }
    }

    @Override
```

```
    public void display() {
        super.display();
        System.out.println("Son's Age: " + sonAge);
    }
}

public class Main1 {
    public static void main(String[] args) {
        try {
            Son son = new Son();
            son.display();
        } catch (WrongAge e) {
            System.out.println("Exception Caught: " + e.getMessage());
        }

        System.out.println("USN: 1BM23CS089");
        System.out.println("Name: Dhanush S");
    }
}
```

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19045.5131]
(c) Microsoft Corporation. All rights reserved.

C:\Users\dhanu\OneDrive\Documents\java>javac Main1.java

C:\Users\dhanu\OneDrive\Documents\java>java Main1
Enter Father's Age: 40
Enter Son's Age: 10
Father's Age: 40
Son's Age: 10
USN: 1BM23CS089
Name: Dhanush S

C:\Users\dhanu\OneDrive\Documents\java>java Main1
Enter Father's Age: 10
Enter Son's Age: 20
Exception Caught: Son's age cannot be greater than or equal to Father's age
USN: 1BM23CS089
Name: Dhanush S

C:\Users\dhanu\OneDrive\Documents\java>java Main1
Enter Father's Age: -20
Exception Caught: Age cannot be negative
USN: 1BM23CS089
Name: Dhanush S

C:\Users\dhanu\OneDrive\Documents\java>java Main1
Enter Father's Age: 20
Enter Son's Age: -10
Exception Caught: Age cannot be negative
USN: 1BM23CS089
Name: Dhanush S

C:\Users\dhanu\OneDrive\Documents\java>
```

Program 8
Threads

Algorithm:

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Threads

Write a program that contain two threads One displaying BMS college of Engineering every 10 sec and other displaying CSE every two seconds

```
class BMSCollegeThread extends Thread {
    public void run() {
        while (true) {
            try {
                thread.sleep (10000);
                System.out.println (" BMS college of
                Engineering");
            }
            catch ( Interrupted Exception e) {
                System.out.println (e);
            }
        }
    }
}

class CseThread extends Thread {
    public void run() {
        while (true) {
            try {
                thread.sleep (2000);
                System.out.println (" CSE");
            }
            Catch ( Interrupted exception e) {
                System.out.println (e);
            }
        }
    }
}
```

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

        BmsCollegeThread BMST = new BmsCollg
            Thread;
        CseThread CSET = new CseThread;

        BMST.start();
        CSET.start();
    }
}
```

Output:

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

```
code:class CollegeThread extends Thread {
   @Override
   public void run() {
      try {
         for (int i = 0; i < 5; i++) {
            System.out.println("BMS College of Engineering");
            Thread.sleep(10000);
         }
      } catch (InterruptedException e) {
         System.out.println("CollegeThread interrupted");
      }
   }
}

class CSEThread extends Thread {
   @Override
   public void run() {
      try {
         for (int i = 0; i < 5; i++) {
            System.out.println("CSE");
            Thread.sleep(2000);
         }
      } catch (InterruptedException e) {
         System.out.println("CSEThread interrupted");
      }
   }
}

public class Main2 {
   public static void main(String[] args) {
      CollegeThread collegeThread = new CollegeThread();
      CSEThread cseThread = new CSEThread();

      collegeThread.start();
      cseThread.start();

      System.out.println("USN: 1BM23CS089");
      System.out.println("Name: Dhanush S");
   }
}
```

```
C:\Windows\System32\cmd.exe

C:\Users\dhanu\OneDrive\Documents\java>javac Main2.java

C:\Users\dhanu\OneDrive\Documents\java>java Main2
USN: 1BM23CS089
Name: Dhanush S
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering

C:\Users\dhanu\OneDrive\Documents\java>
```