VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

OBJECT ORIENTED JAVA PROGRAMMING

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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B. M. S. College of Engineering,

Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "**OBJECT ORIENTED JAVA PROGRAMMING**" carried out by **ROHAN SATISH KUMAR(1BM21CS168),** 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 during the year 2022-23. The Lab report has been approved as it satisfies the academic requirements in respect of Object Oriented Java Programming Lab- **(21CS3PCOOJ)**work prescribed for the said degree.

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Course Outcome

CO1	Apply the knowledge of Java concepts to find the solution for a given problem.
CO2	Analyze the given Java application for correctness/functionalities.
CO3	Develop Java programs / applications for a given requirement.
CO4	Conduct practical experiments for demonstrating features of Java.

LAB PROGRAM 1: QUADRATIC EQUATIONS

CODE:

```
import java.util.Scanner;
import java.lang.Math;
public class Trial
{
    public static void main(String[] args)
        {
            Scanner s = new Scanner(System.in);
            System.out.println("Enter the coefficients: ");
            float a = s.nextFloat();
            float b = s.nextFloat();
            float c = s.nextFloat();
            double r1,r2;
            float d = (b*b)-(4.0f*a*c);
            if(d>0)
            {
                r1=(-b+Math.sqrt(d))/(2*a);
                r2=(-b-Math.sqrt(d))/(2*a);
                System.out.println("Roots are Real");
                System.out.println("Root 1: "+r1+" Root 2: "+r2);
            }
             else if(d==0)
            {
                r1=(-b)/(2*a);
                System.out.println("Roots are Equal");
                System.out.println("Root is: "+r1);
            }


        else
```

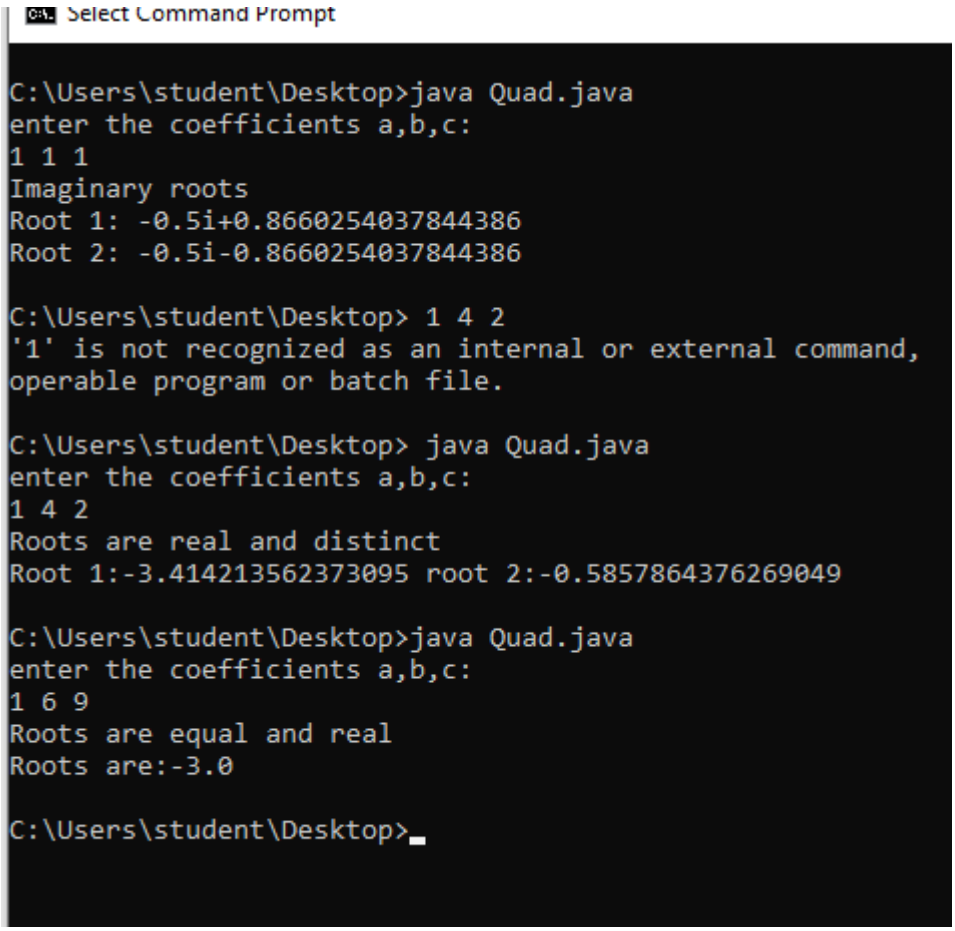
```
            {
                double e =(-b)/(2.0f*a);
                double f =(Math.sqrt(-d))/(2*a);
                System.out.println("Roots are imaginary");
                System.out.println("Root 1: "+e+"i+"+f);
                System.out.println("Root 2: "+e+"i-"+f);
            }
        }
}
```

18/11/22

① Quadratic Equation

```
import java.util.*;
import java.lang.Math;
class quadratic
{
public static void main (String[] args)
{
 Scanner sc= new Scanner (System.in);
 double r1;
 double r2;
System.out.println("enter values of a, b, c");
int a= sc.nextInt();
System.out.println("a is" + a);
int b= sc.nextInt();
System.out.println("b is" +b);
int c= sc.nextInt();
System.out.println("c is" +c);
int d= (b*b) - (4*a*c);
System.out.println("d is" +d);
if(d>0)
{
System.out.println("roots are real and distinct");
```

```
r1 = (-b + Math.sqrt(d)) / (2*a);
r2 = (-b - Math.sqrt(d)) / (2*a);
System.out.println("The roots are" + r1 + " and " + r2);
}
else if (d == 0)
{
System.out.println("roots are real and equal");
r1 = r2 = (-b) / (2*a);
System.out.println("The roots are" + r1 + " and " + r2);
}
else
{
System.out.println("roots are imaginary");
r1 = -b / (2*a);
r2 = (Math.sqrt(Math.abs(d))) / (2*a);
System.out.println("r1 = " + r1 + "i" + r2);
System.out.println("r2 = " + r1 + "-i" + r2);
}
}
}
```


Select Command Prompt
C:\Users\student\Desktop>java Quad.java
enter the coefficients a,b,c:
1 1 1
Imaginary roots
Root 1: -0.5i+0.8660254037844386
Root 2: -0.5i-0.8660254037844386
C:\Users\student\Desktop> 1 4 2
'1' is not recognized as an internal or external command,
operable program or batch file.
C:\Users\student\Desktop> java Quad.java
enter the coefficients a,b,c:
1 4 2
Roots are real and distinct
Root 1:-3.414213562373095 root 2:-0.5857864376269049
C:\Users\student\Desktop>java Quad.java
enter the coefficients a,b,c:
1 6 9
Roots are equal and real
Roots are:-3.0
C:\Users\student\Desktop>

LAB PROGRAM 2: SGPA CALCULATION

CODE

```
import java.util.Scanner;
class Student
{
        String   USN;
        String name;
        int[] credits = new int[20];
        int[] marks = new int[20];
        void input(int n)
        {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter Student USN: ");
        USN = s.nextLine();
        System.out.print("Enter Student Name: ");
        name = s.nextLine();
        for(int i=0;i<n;i++)
        {
        System.out.print("Enter the Subject "+(i+1)+" marks and credits
respectively: ");
```

```
        marks[i] = s.nextInt();
        credits[i] = s.nextInt();
        }
        }
        float calculate(int n)
        {
        int sum_of_credits = 0;
        float result=0.0f;
        for(int i=0;i<n;i++)
        {
        sum_of_credits+=credits[i];
          if(calculate_grade_point(marks[i])==-1)
                return -1.0f;
        else
        {
                result = result +(float)
(calculate_grade_point(marks[i])*credits[i]);
        }
        }
        return (result/sum_of_credits);
        }
```

```
int calculate_grade_point(int marks)
{
if(marks>=90)
return 10;
else if ((marks>=80)&&(marks<90))
return 9;
else if ((marks>=70)&&(marks<80))
return 8;
else if ((marks>=60)&&(marks<70))
return 7;
else if ((marks>=50)&&(marks<60))
return 6;
else if ((marks>=40)&&(marks<50))
return 5;
return -1;
}

void display(int n,float result)
{
System.out.println("\n");
System.out.println("Student Details");
```

```
        System.out.println();
        System.out.println("Student USN: "+USN);
        System.out.println("Student Name: "+name);
        System.out.println("Student Marks and Credits");
        for(int i=0;i<n;i++)
        {
        System.out.println("Subject 1 -->\tMarks: "+marks[i]+" Credits:
"+credits[i]);
        }
        System.out.println("SGPA: "+result);
        }
}
public class Lab_02_SGPA
{
        public static void main(String[] args)
        {
        Scanner s = new Scanner(System.in);
        Student s1 = new Student();
        System.out.print("Enter the number of subjects: ");
        int n = s.nextInt();
        s1.input(n);
        float result = s1.calculate(n);
```

```
        if(result == -1.0f)
        {
        System.out.println();
        System.out.println("The Student has failed in a subject. SGPA cannot be calculated!");
        System.exit(0);
        }
        s1.display(n,result);
        }
}
```

Week-2

② Book details :-

```
import java.io.*;
import java.util.*;
class Book
{
String title, author;
double price;
int numPages;
Book()
{
title = "Default";
author = "Default";
price = 0.0;
NumPages = 0;
}
void setTitle (String t)
{
 title = t;
}
void setAuthor (String a)
{
 author a;
}
void setPrice (double p)
{
 price p;
```

```
void setPages(int np)
  {
    numPages = np;
 }
public String toString()
 {
  return title + "\t" + author + "\t" + price + "\t" + numPages + "\n";
 }
}
class BookDetails {
public static void main(String args[])
 {
  String t, a;
  double p;
  int np, n;
 Scanner sc = new Scanner(System.in);
 System.out.println("Enter the number of Books");
 n = sc.nextInt();
 Book b[] = new Book [n];
 for (int i = 0; i < n; i++)
 {
System.out.println("Enter the title of the Book");
t = sc.next();
System.out.println("Enter the Author of the Book");
a = sc.next();
```

```
System.out.println("Enter the Price of Books");
P = sc.nextDouble();
System.out.println("Enter the number of pages of the Book");
p = sc.nextInt();
b[i] = new Book();
b[i].setTitle(t);
b[i].setAuthor(a);
b[i].setPrice(p);
b[i].setPages(p);
}
System.out.println("Title \t Author \t Price \t Pages \n");
for(int i=0; i<n; i++)
{ System.out.println(b[i]);
}
```

Output:

Enter number of Books 1

Enter the Title of Book RAM

Enter Author RAMV

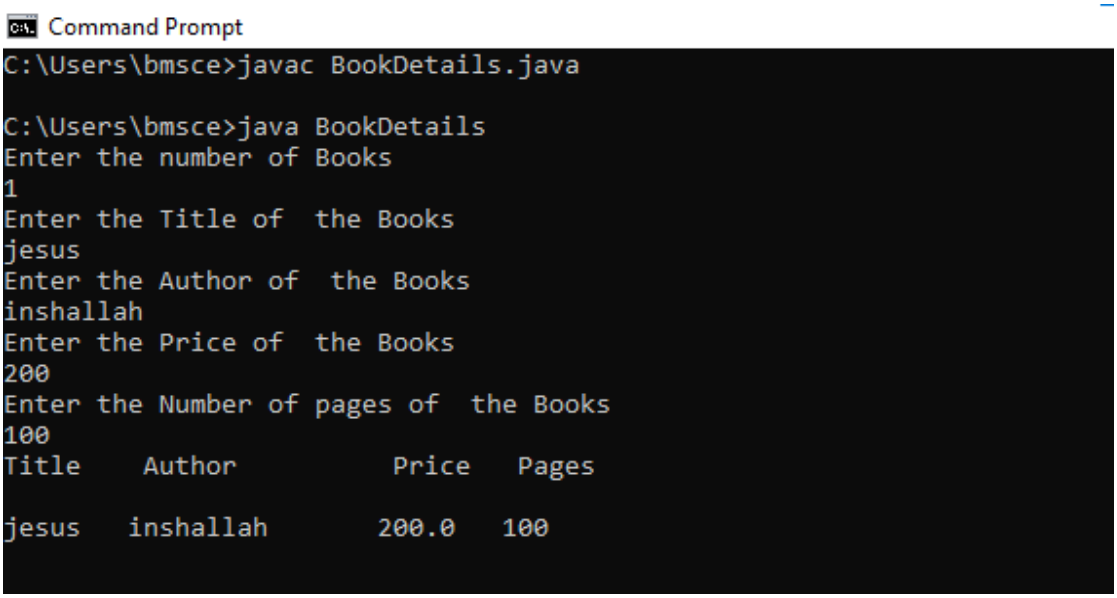
Enter Price 1000

Enter number of pages 100

Title	Author	Price	Pages
RAM	RAMV	1000.0	100

3) PA1

```
import java.io.
import java.util
class student {
  String name;
  String USN;
  int no of Courses
  int Credits[] =
  int marks[] =
  Scanner s = new
  Student()
  {
   no of Courses
  }
  void setName
    {
      name = s
    }
  void setUSN
    {
      USN = s;
    }
  void set Cour
    {
      no of Course
    }
```


Command Prompt
C:\Users\bmsce>javac BookDetails.java
C:\Users\bmsce>java BookDetails
Enter the number of Books
1
Enter the Title of the Books
jesus
Enter the Author of the Books
inshallah
Enter the Price of the Books
200
Enter the Number of pages of the Books
100
Title Author Price Pages
jesus inshallah 200.0 100

LAB PROGRAM 3: IMPLEMENTING ARRAY OF OBJECTS

CODE

```
import java.util.*;
import java.io.*;

class Book
{
String title,author;
float price;
int num_pages;

Book()
{
title = "Default Value";
author = "Default Value";
price = 0.0f;
num_pages = 0;
}

void setTitle(String title)
```

```
{
this.title=title;
}

void setAuthor(String author)
{
this.author=author;
}

void setPrice(float price)
{
this.price=price;
}

void setPages(int num_pages)
{
this.num_pages = num_pages;
}


public String toString()
{
```

```
return title+"\t\t"+author+"\t\t"+price+"\t\t"+num_pages+"\n";
}



}

public class BookDetails

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

String t, a;
float p;
int np,n;
Scanner s = new Scanner(System.in);
System.out.print("Enter the number of Books: ");
n = s.nextInt();
Book[] b = new Book[n];
for(int i=0;i<n;i++)
{
System.out.println();
```

```
System.out.print("Enter the book name: ");
t = s.next();
System.out.print("Enter the author name: ");
a = s.next();
System.out.print("Enter the book price: ");
p = s.nextFloat();
System.out.print("Enter the number of pages: ");
np = s.nextInt();

b[i] = new Book();
b[i].setTitle(t);
b[i].setAuthor(a);
b[i].setPrice(p);
b[i].setPages(np);
}
System.out.println("Title \t\t Author \t\t Price \t\t Pages\n");
for(int i=0; i<n;i++)
{
System.out.println(b[i]);
}
}
}
```

(3) Sig PA

```
import java.io.*;
import java.util.Scanner;
class student {
  String name;
  String USN;
  int no of Courses;
  int credits [] = new int [10];
int marks [] = new int [10];
Scanner s = new Scanner (System.in);
Student ()
{
 no of Courses = 0;
}

void setName (String s)
  {
    name = s;
  }

void setUSN (String s)
  {
    USN = s;
  }

void set Courses (int s)
 {
  no of Courses = s;
 }
```

```
void input(){
  for(int i=0;i<no of course;i++){
System.out.println("Enter credit of course "+(i+1));
Credits[i]=s.nextInt();
System.out.println("Enter marks of course "+(i+1));
marks[i]=s.nextInt();
}}
double returnSGPA(){
double d=0, s=0;
for(int i=0; i<no of course;i++){
  d+=credits[i]*marks[i];
  s+=credits[i];
}return d/(s*10);
}
public class sgpa {
public static void main(String[]args){
Student s = new Student();
Scanner sc = new Scanner(System.in);
System.out.println("Enter ur name");
String st=sc.nextLine();
s.setName(st);
System.out.println("enter USN");
String sq=sc.next line(); s.setUSN(sq);
System.out.println("Enter no of Course"); int n=sc.nextInt();
s.setCourses(n); s.input(); double d=s.returnSGPA();
System.out.println("sgpa of student is"+d); sc.close();}}
```

⑦ Shape

```
import java.util.
abstract class a {
  double x,y;
  a(double i,do
  {
    x=i;
    y=j;
  }
abstract double
}
class rect extend
{
  rect(double
  {
    super(i,j);
  }
  double area
  {
    return x*y
  }
}
class tri extends
```

```
C:\Users\bmscecse\Desktop>java SGPA
Enter the number of subjects: 5
Enter Student USN: 1BM21CS180
Enter Student Name: ABCXYZ
Enter the Subject 1 marks and credits respectively: 99 4
Enter the Subject 2 marks and credits respectively: 91 3
Enter the Subject 3 marks and credits respectively: 92 2
Enter the Subject 4 marks and credits respectively: 81 1
Enter the Subject 5 marks and credits respectively: 78 1


Student Details

Student USN: 1BM21CS180
Student Name: ABCXYZ
Student Marks and Credits
Subject 1 -->   Marks: 99 Credits: 4
Subject 1 -->   Marks: 91 Credits: 3
Subject 1 -->   Marks: 92 Credits: 2
Subject 1 -->   Marks: 81 Credits: 1
Subject 1 -->   Marks: 78 Credits: 1
SGPA: 9.727273
```

LAB PROGRAM 4: CALCULATING AREA OF SHAPES (ABSTRACT CLASS)

CODE

```
import java.util.Scanner;
public class Shape1
{
	public static void main(String args[])
	{
	int choice;
	Scanner s = new Scanner(System.in);
	do
	{
	System.out.println("1. Calculate Area of Rectangle\n2. Calculate Area of Triangle\n3. Calculate Area of " +
		"Circle\n4. Exit the Program\n\nEnter the choice: ");
	choice = s.nextInt();
	switch(choice)
	{
		case 1: Rectangle r = new Rectangle();
			r.printArea();
			break;
```

```
                case 2: Triangle t = new Triangle();
                        t.printArea();
                        break;
                case 3: Circle c = new Circle();
                        c.printArea();
                        break;
                case 4: System.out.println("Exiting the program!");
                        System.exit(0);
                        break;
                default: System.out.println("\nInvalid Choice!\n");
        }
        }while(true);
        }
}

abstract class Shape
{
        int a,b;
        abstract void printArea();
}

class Rectangle extends Shape
```

```
{
        void printArea()
        {
        int area;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the length and breadth of rectangle: ");
        a = s.nextInt();
        b = s.nextInt();
        area = a*b;
        System.out.println("\nArea of Rectangle: "+area+"\n");
        }
}

class Triangle extends Shape
{
        void printArea()
        {
        float area;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the base and height of triangle: ");
        a = s.nextInt();
        b = s.nextInt();
```

```
        area = 0.5f*a*b;
        System.out.println("\nArea of triangle: "+area+"\n");
        }
}

class Circle extends Shape
{
        void printArea()
        {
        double area;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the radius of circle: ");
        a = s.nextInt();
        area = Math.PI*a;
        System.out.println("Area of Circle: "+area+"\n");
        }
}
```

④ Shape — week 4 — 9/12/22

```
import java.util.*;
abstract class a {
 double x,y;
 a(double i,double j)
 {
  x=i;
  y=j;
 }
abstract double area();
}
class rect extends a
{
 rect(double i,double j)
  {
   super(i,j);
  }
  double area()
  {
   return x*y;
  }
}

class tri extends a
```

```
{
  return 0.5*x*y;
  }
}
class cir extends a
  {
   cir(double i)
   {
    super(i,i);
   }
     double area()
      {
        return 3.14*x*y;
      }
  }
class week 4 {
public static void main(String args[])
   {
     Scanner sc = new Scanner (System.in);
     System.out.println("enter the length and breadth of
          a rectangle :");
      double l= sc.nextInt();
      double b= sc.nextInt();
```

```
System.out.println("Enter the length and base of a triangle:");
double h = sc.nextInt();
double ba = sc.nextInt();
System.out.println("Enter the radius of circle:");
double ra = sc.nextInt();

Rect r1 = new Rect(l, b);
Tri t = new Tri(h, ba);
Cir c = new Cir(ra);
System.out.println("Area of rectangle is " + r.area());
System.out.println("Area of triangle is " + t.area());
System.out.println("Area of Circle is " + c.area());
}
}
```

Output :-

```
Enter the length and breadth of rectangle
12 34
Enter the height and base of triangle
34 21
Enter the radius of Circle
34
```

```
Area of rectangle is 408.0
Area of triangle is 357.0
Area of Circle is 3629.84
```

```
C:\Users\student\Desktop>java AreaOfShapes
Menu
 1.Area of Rectangle
 2.Area of Traingle
 3.Area of Circle
Enter your choice : 1
Enter length and breadth for area of rectangle :
30 2
Area of Rectangle is 60.0

C:\Users\student\Desktop>java AreaOfShapes
Menu
 1.Area of Rectangle
 2.Area of Traingle
 3.Area of Circle
Enter your choice : 2
Enter bredth and height for area  of traingle :
15 35
Area of Triangle is 262.5

C:\Users\student\Desktop>java AreaOfShapes
Menu
 1.Area of Rectangle
 2.Area of Traingle
 3.Area of Circle
Enter your choice : 3
Enter radius for area of circle :
20
Area of Circle is 1257.1428
```

LAB PROGRAM 5: BANK PROGRAM

CODE

```
import java.util.Scanner;
class Account
{
    String customer_name;
    long acc_no;
    float bal;
    Scanner s = new Scanner(System.in);
    public void input()
    {
        System.out.print("\nEnter the Customer Name: ");
        customer_name = s.nextLine();
        System.out.print("\nEnter the Account Number: ");
        acc_no = s.nextLong();
        System.out.print("\nEnter the Starting Amount (Minimum Amount =
5000): ");
        bal = s.nextFloat();
        if(bal<5000f)
        {
            System.out.println("\nAccount Balance cannot be less than 5000.0
\n");
            System.exit(0);
        }
```

```
    }
    public void display()
    {
        System.out.println("\nCustomer Name: "+customer_name);
        System.out.println("Account Number: "+acc_no);
        System.out.println("Amount: "+bal);
    }
}

class Savings extends Account
{
    Scanner s = new Scanner(System.in);
    float deposit,withdraw,interest;
    public void deposit()
    {
        System.out.print("\nEnter the amount to be deposited: ");
        deposit = s.nextFloat();
        bal+=deposit;
        System.out.println("\nBalance: "+bal);
    }
    public void withdraw()
    {
        System.out.print("\nEnter the amount to be withdrawn: ");
        withdraw = s.nextFloat();
        if(bal<5000)
        {
```

```
            System.out.println("\nInsufficient Balance");
        }
        else
        {
            bal-=withdraw;
            System.out.println("\nAmount Withdrawn: "+withdraw+"\nBalance:
"+bal);
        }

    }
    public void check_Bal()
    {
        if(bal<5000)
        {
            System.out.println("\nInsufficient Balance!!\nBalance: "+bal);
        }
        else
        {
            System.out.println("\nBalance: "+bal);
        }
    }
    public void interest()
    {
        interest=(bal*6)/100;
        bal+=interest;
        System.out.println("\nInterest Credited: "+interest+"\nBalance :"+bal) ;
    }
```

```
}

class Current extends Account
{
    float deposit, withdraw, penalty;

    public void deposit()
    {
        System.out.print("\nEnter Amount to be deposited: ");
        deposit = s.nextFloat();
        bal += deposit;
        System.out.println("Balance: " + bal);
    }

    public void check_Bal()
    {
        if (bal < 5000)
        {
            penalty = (0.1f * bal);
            System.out.println("\nInitial Account Balance: "+bal);
            bal = bal-penalty;
            System.out.println("\nLow balance!\nPenalty Amount: " + penalty +
"\nAccount balance: " + bal);
        }
        else
        {
```

```
            System.out.println("\n Balance: " + bal);
        }
    }

    public boolean check_Bal_part_2()
    {
        if (bal < 5000)
        {
            penalty = (0.1f * bal);
            System.out.println("\nInitial Account Balance: "+bal);
            bal = bal-penalty;
            System.out.println("\nLow Balance!\nPenalty Amount: " + penalty +
"\nAccount balance: " + bal);
            return false;
        }
        return true;
    }

    public void withdraw()
    {
        System.out.print("\nEnter Amount to withdraw: ");
        withdraw = s.nextFloat();
        if(check_Bal_part_2())
        {
            bal-=withdraw;
```

```
            System.out.println("\nAmount Withdrawn: "+withdraw+"\nBalance:
"+bal);
        }
    }

    public void chequebook()
    {
        System.out.println("\nCheque Book has been Issued!");
    }
}

public class Bank
{
    public static void main(String[] args)
    {
        Scanner s = new Scanner(System.in);
        String ch;
        int n;
        Current c = new Current();
        Savings sa = new Savings();
        System.out.print("\nEnter the Account Type (S for Savings , C for
Current) : ");
        ch = s.next();

        switch(ch.toLowerCase())
        {
```

```
        case "s" :  sa.input();
                    do
                    {
                        System.out.print("\n1. Deposit \n2. Withdrawal \n3. Check
Balance \n4. Check Interest"
                                +"\n5. Show Account Details \n6. Exit
Transaction\n\nEnter your choice: ");
                        n = s.nextInt();
                        switch(n)
                        {
                            case 1 : sa.deposit();
                                     break;
                            case 2 : sa.withdraw();
                                     break;
                            case 3 : sa.check_Bal();
                                     break;
                            case 4 : sa.interest();
                                     break;
                            case 5 : sa.display();
                                     break;
                            case 6 : System.out.println("\nExiting Transaction!");
                                     System.exit(0);
                                     break;
                            default : System.out.println("\nInvalid Operation");
                        }
                    }while(true);
```

```
        case "c" : c.input();
                do {
                    System.out.print("\n1. Deposit \n2. Withdrawal \n3. Check
Balance \n4. Issue Cheque Book"
                        + "\n5. Show Account Details \n6. Exit
Transaction\n\nEnter your choice: ");
                    n = s.nextInt();
                    switch (n) {
                        case 1:
                            c.deposit();
                            break;
                        case 2:
                            c.withdraw();
                            break;
                        case 3:
                            c.check_Bal();
                            break;
                        case 4:
                            c.chequebook();
                            break;
                        case 5:
                            c.display();
                            break;
                        case 6:
                            System.out.println("\nExiting Transaction!");
                            System.exit(0);
```

```
                    break;
                default:
                    System.out.println("\nInvalid Operation");
                }
            }while(true);
        default : System.out.println("\nInvalid Choice");
            break;
        }
    }
}
```

Week5 BankAccount:

```
import java.lang.Math;
import java.util.*;
class account
{
String name:new String();
int acno;
double bal;
Scanner s=new Scanner(System.in);
void set()
{
System.out.println("Enter customers name");
name=s.nextline();
System.out.println("Enter"+name+"'s account number");
acno =s.nextInt();
System.out.println("Enter balance amount");
bal=s.nextDouble();
}
void display()
{
System.out.println("Customers Name:"+name);
System.out.println("Your account number:"+acno);
System.out.println("Your account balance:"+bal);
}
```

```
account (){}
}
class savacct extends account
{
  Scanner s=new Scanner(System.in);
Save acct ()
  {
 System.out.println ("Cheque Facility not available ");
}
void deposit ()
 {
 int ch ;
 double amt ;
System.out.println ("Enter amount to be deposited ");
 amt =s.nextDouble ();
 bal = bal + amt;
}
else
System.out.println ("Invalid input ");
}
void int ()
 {
  System.out.println ("Enter rate of interest ");
  double r=s.nextDouble();
```

```
- principal period));
int n=s.nextInt();
System.out.println ("Enter number of time periods ");
int t= sc.nextInt();
double x =(1 +(r/100));
double ci =bal * Math.pow (x,n);
System.out.println (" Interest amount ="+ ci +"\n Balance amount
  without interest is" +bal);
System.out.println ("Availble balance after updation is"+ci);
}
void wd()
{
System.out.println ("Press 1 to withdraw amount");
int ch= s.nextInt();
if (ch == 1)
{
System.out.println ("Enter the amount to be withdrawn ");
double wdraw =s.nextDouble();
if(wdraw >bal)
{
System.out.println (" Balance is lesser than withdrawal
                                    amount ");
return;
}
else
```

```
System.out.println("Available Balance" + bal);}
else
System.out.println("Invalid Input");
}}
class current extends account
{
Scanner s= new Scanner(System.in);
current()
{
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("The 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 amount");
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("Balance below minimum amount .\n
                    A penalty of 50Rs has been credited");
bal=bal-50;
System.out.println("Your Available Balance :"+bal);
}}}
public class account 1
{
  public static void main(String [])
```

```
{
Scanner s = new Scanner(System.in);
int ch ;
System.out.println("\n\n Enter your account type:
                    \n 1 : Savings account
                    \n 2 : 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); }}
```

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```
Exiting Transaction!

C:\Users\student\Desktop>java Bank.java

Enter the Account Type (S for Savings , C for Current) : c

Enter the Customer Name: rashtri km

Enter the Account Number: 123456789

Enter the Starting Amount (Minimum Amount = 5000): 6000

1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction

Enter your choice: 1

Enter Amount to be deposited: 6000
Balance: 12000.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction

Enter your choice: 2

Enter Amount to withdraw: 5000

Amount Withdrawn: 5000.0
Balance: 7000.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
```

```
Insufficient Balance!!
Balance: 4500.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 4

Interest Credited: 270.0
Balance :4770.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 5

Customer Name: Rashtri km
Account Number: 12345678
Amount: 4770.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 6

Exiting Transaction!

C:\Users\student\Desktop>java Bank.java

Enter the Account Type (S for Savings , C for Current) : c

Enter the Customer Name: rashtri km
```

```
Enter the amount to be deposited: 1000

Balance: 6500.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 2000

Invalid Operation

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 2

Enter the amount to be withdrawn: 2000

Amount Withdrawn: 2000.0
Balance: 4500.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 3

Insufficient Balance!!
Balance: 4500.0

1. Deposit
2. Withdrawal
```

```
C:\Users\student\Desktop>java Bank.java

Enter the Account Type (S for Savings , C for Current) : s

Enter the Customer Name: Rashtri km

Enter the Account Number: 12345678

Enter the Starting Amount (Minimum Amount = 5000): 5500

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 1000

Invalid Operation

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 1

Enter the amount to be deposited: 1000

Balance: 6500.0

1. Deposit
2. Withdrawal
```

LAB PROGRAM 6: AGE EVALUATION - EXCEPTION HANDLING

CODE

```
import java.util.Scanner;

public class Age
{
	public static void main(String[] args) throws WrongAge,InvalidAge
	{
	new Son();
	}
}

class WrongAge extends Exception
{
	public String getMessage()
	{
	return "Age Cannot Be Negative";
	}
}
```

```
class InvalidAge extends Exception
{
	public String getMessage()
	{
	return "Son's Age cannot be greater than Father's!";
	}
}
class Father
{
	Scanner s = new Scanner(System.in);
	int f;
	Father() throws WrongAge
	{
	System.out.print("Enter the Father's Age: ");
	f = s.nextInt();
	try
	{
	if(f<0)
	throw new WrongAge();
	}
	catch(WrongAge e1)
	{
```

```
            System.out.println(e1.getMessage());
        System.exit(0);
        }
        }
}

class Son extends Father
{
        int son;
        Son() throws WrongAge,InvalidAge
        {
        super();
        System.out.print("Enter the Son's Age: ");
        son = s.nextInt();
        try
        {
        if(son<0)
        throw new WrongAge();
        }
        catch(WrongAge e2)
        {
            System.out.println(e2.getMessage());
```

```
            System.exit(0);
        }
        try
        {
        if(son>f)
        throw new InvalidAge();
        }
        catch(InvalidAge e3)
        {
           System.out.println(e3.getMessage());
            System.exit(0);
        }
        System.out.println("Ages are appropriate");
        }
}
```

Week7 :- Father-Son

```
class Father extends exception
{
 int fage ;
 Father (int a)
  {
  fage=a ;
 }
 public String toString ()
  {
   return "Wrong age" ;
  }}

class Son extends Father
 {int sage ;
 Son (int a, int b)
  {
   super (a) ;
   sage=b ;
 }
 public String toString ()
 {
  return "Son's age is greaterthan or equal to Father's age" ;
 }}
class Ag
{ static int a,b ;
 static void Father age(int a) throws Father
{
 static int a,b ;
 static void Father age(int a) throws Father
  {
   System.out.println("Called Father age ("+a+")");
  if(a<0)
  throw new Father (a);
 System.out.println("Normal exit :Father's age"+a);
}
static void Son age (int a, int b) throws Son
  {
   System.out.println("Called SonAge ("+b+")");
   if( b>=a)
   throw new Son (a,b);
  System.out.println("Normal exit :Son's age :"+b);
 } public static void main (String args[])
 {
 Scanner age = new Scanner (System.in);
 System.out.println("Enter Father's age:");
```

```
b=age.nextInt();
try {
Father age(a);
}
catch (Father e)
 {
  System.out.println(e);
  }

 try
 {son age(a,b);
  }
 catch (Son e)
  {
    System.out.println(e);
  }}}
```

Output:-

Enter Father's age :
24
Enter Son's age :
10
Called Father age (24)
Normal exit : Father's age : 24
Called Son age (10)
Normal exit : Son's age : 10.

```
C:\Users\bmscecse\Desktop>javac Age.java

C:\Users\bmscecse\Desktop>java Age.java
Enter the Father's Age: 40
Enter the Son's Age: 20
Ages are appropriate

C:\Users\bmscecse\Desktop>java Age.java
Enter the Father's Age: 30
Enter the Son's Age: 50
Son's Age cannot be greater than Father's!

C:\Users\bmscecse\Desktop>java Age.java
Enter the Father's Age: -1
Age Cannot Be Negative

C:\Users\bmscecse\Desktop>java Age.java
Enter the Father's Age: 50
Enter the Son's Age: -1
Age Cannot Be Negative
```

LAB PROGRAM 7: MULTI-THREADING

CODE

```
class MyThread extends Thread
{
	long time;
	private volatile boolean running = true;
	MyThread(){
	System.out.println("Default");
}
MyThread(String name, long time)
{
	super(name);
	this.time = time;
}
public void pause()
{
	running = false;
}
public void run()
{
	try
	{
		while(running)
```

```
                {
                        System.out.println(this.getName());
                        Thread.sleep(time*1000);
                }
        }
         catch(InterruptedException ie)
        {
                System.out.println("Exception caught in method");
        }

}
}

class ThreadRunner
{
        public static void main(String [] args)
        {
                MyThread mt1 = new MyThread("BMS", 10);
                MyThread mt2 = new MyThread("CSE", 2);
                mt1.start();
                mt2.start();
                Try
                {
                        Thread.sleep(20*1000);
                        mt1.pause();
                        mt2.pause();
```

```
            }
            catch(InterruptedException ie)
            {
                System.out.println("Exception caught in main");
            }
        }
}
```

Week 8 :- Threadem

```
class NewThread implements Runnable
{
 String name;
  int x;
 long time 1;
Thread t;
NewThread (String threadname, long time, int x1)
 {
  name = threadname;
   x=x1;
 time 1 = time;
t = new Thread (this, name);
 t.start();
}
public void run()
{
 try {
 for (int i = x ;i >0 ;i--)
  {
    System.out.println(name);
   Thread.sleep (time 1))
```

```
catch (InterruptedException e)
  {
   System.out.println(name + "Interrupted");
  }}}
class Threading
 {
  public static void main (String args[])
    {
     new NewThread("BMS College of engineering",10000);
     new NewThread ("CSE",20000);
    }}
```

Output :-

```
BMS College of engineering.
   CSE
   CSE
   CSE
   CSE
BMS College of engineering
   CSE
   CSE
   CSE
   CSE
```

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```
C:\Users\bmscecse\Desktop>javac Age.java

C:\Users\bmscecse\Desktop>java Age.java
Enter the Father's Age: 40
Enter the Son's Age: 20
Ages are appropriate

C:\Users\bmscecse\Desktop>java Age.java
Enter the Father's Age: 30
Enter the Son's Age: 50
Son's Age cannot be greater than Father's!

C:\Users\bmscecse\Desktop>java Age.java
Enter the Father's Age: -1
Age Cannot Be Negative

C:\Users\bmscecse\Desktop>java Age.java
Enter the Father's Age: 50
Enter the Son's Age: -1
Age Cannot Be Negative
```

LAB PROGRAM 8: INTERFACE PROGRAM

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

public class Anchor
{
	public static void main(String[] args)
	{
		Scanner s = new Scanner(System.in);
		int choice;
		System.out.print("\n1. UnderGraduate Student\n2. 
GraduateStudent\nEnter your choice: ");
		choice = s.nextInt();
		switch(choice)
		{
			case 1:
				{
					System.out.print("\nEnter the student name: 
");
					UnderGraduate u = new 
UnderGraduate(s.next());
					System.out.println("Enter the subject number 
and marks of 4 subjects");
					for(int i=0;i<4;i++)
					{

						u.setTestScore(s.nextInt(),s.nextInt());
```

```
                    }
                    u.setTestResult();
                    u.display();
                }
                break;
            case 2:
                {
                    System.out.print("\nEnter the student name:
");
                    Graduate g = new Graduate(s.next());
                    System.out.println("Enter the subject number
and marks of 4 subjects");
                    for(int i=0;i<4;i++)
                    {
                        g.setTestScore(s.nextInt(),s.nextInt());
                    }
                    g.setTestResult();
                    g.display();
                }
                break;
            default: System.out.println("Invalid Choice!");
        }
    }
}

interface A
```

```
{
        public String getName();
        public void setTestScore(int no,int marks);
        public int[] getTestScore();
        public void setTestResult();
        public int getTestResult();
        public void display();
}

abstract class Student implements A
{
        String name;
        int[] test = new int[4];
        int sum;
        abstract public void generateResult();
        Student()
        {}
        Student(String name)
        {
                this.name = name;
        }
        public String getName()
        {
                return this.name;
        }
        public void setTestScore(int no,int marks)
```

```
	{
		test[no-1] = marks;
	}
	public int[] getTestScore()
	{
		return test;
	}
	public void setTestResult()
	{
		for(int i=0;i<4;i++)
		{
			sum=sum+test[i];
		}
		sum/=4;
	}
	public int getTestResult()
	{
		return sum;
	}
	public void display()
	{
		System.out.println("\nStudent Name : "+getName());
		System.out.println("Student Marks :
"+Arrays.toString(getTestScore()));
		System.out.print("Result : ");
		generateResult();
```

```
        }
}
class UnderGraduate extends Student
{
        UnderGraduate()
        {}
        UnderGraduate(String name)
        {
                this.name = name;
        }
        public void generateResult()
        {
                if(getTestResult()>=60)
                        System.out.print("Pass");
                else
                        System.out.print("Fail");
        }
}

class Graduate extends Student
{
        Graduate()
        {}
        Graduate(String name)
        {
                this.name = name;
        }
```

```
	public void generateResult()
	{
		if(getTestResult()>=70)
			System.out.print("Pass");
		else
			System.out.print("Fail");
	}
}
```

Week-6 Interface :-

```
import java.util.*;
interface result
{
 void generate_result();
}
class Student
{
 String s_name;
 int t_score;
 String t_result;
 int marr[] = new int[4];
 double avg = 0;
 int flag = 1;
 Student() {}
 Student(String s) { s_name = s; }
 void set_test_score(int t_no, int t_score)
 { marr[t_no] = t_score; }
 void set_studname(String s) { s_name = s; }
  void set_result()
  {
   for(int j = 0; j < 4; j++)
    {
     avg += marr[j];
```

```
    avg=avg/4;
}
double get_tscore()
    {
      set_tresult();
     return avg;
 }
String get_tresult()
 {
  String p="pass",f="fail";
  if (flag==1)
  {
    return p;
  }
else
   return f)
}
String get_stdname() {return s_name;}
}class Ug extends Student implements resultt
 {  Ug(){}
     Ug(String s) {s_name = s;}
public
     void generate_result()
      {
        double q=get_tscore();
         if(q<60)
           {
            flag=0; }
System.out.println("name"+"    "+get_stdname());
System.out.println("result"+"  "+get_tresult());
 } }
class Tester
{
public static void main(String args[])
     {
      Scanner sc=new Scanner(System.in);
      Ug od=new Ug();
      Pg03=new Pg();
      System.out.println("Entering student name");
      String nu=sc.next();
      od.set.stdname(nu);
     }
  }
```

```
C:\Users\bmscecse\Desktop>java Anchor.java

1. UnderGraduate Student
2. GraduateStudent
Enter your choice: 1

Enter the student name: Philip
Enter the subject number and marks of 4 subjects
1 70
2 69
3 71
4 55

Student Name : Philip
Student Marks : [70, 69, 71, 55]
Result : Pass
C:\Users\bmscecse\Desktop>java Anchor.java

1. UnderGraduate Student
2. GraduateStudent
Enter your choice: 2

Enter the student name: Jerry
Enter the subject number and marks of 4 subjects
1 70
2 69
3 71
4 55

Student Name : Jerry
Student Marks : [70, 69, 71, 55]
Result : Fail
```