# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

**"JnanaSangama", Belgaum -590014, Karnataka.**

**LAB REPORT**
**on**

# OBJECT ORIENTED JAVA PROGRAMMING

***Submitted by***

**ROHITH U (1BM21CS170)**

***in partial fulfillment for the award of the degree of***
**BACHELOR OF ENGINEERING**
***in***
**COMPUTER SCIENCE AND ENGINEERING**

**B.M.S. COLLEGE OF ENGINEERING**
**(Autonomous Institution under VTU)**
**BENGALURU-560019**
**Oct 2022-Feb 2023**
**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 **ROHITH U(1BM21CS170),** who is a 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- **(22CS3PCOOJ )**work prescribed for the said degree.


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# Index Sheet



## 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);
}
}
}
```

```
LP1- Quadratic Equation
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+"Root2:
                                "+r2);
  }
  else if(d==0)
  {
   r1 = (-b)/(2*a);
  System.out.println("Roots are Equal");
  system.out.println("Roots 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);
  }
  }
}
```

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))
```

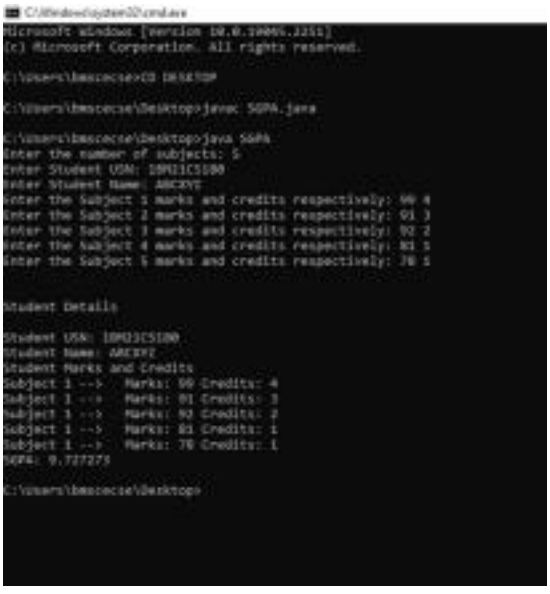
```
        return 8;
        else if ((marks>=60)&&(marks<70))
        return 7;
        else if ((marks>=50)&&(marks<60))
        return 6;
        else if ((marks>=40)&&(marks<50))
        return 5;
        return -1;
        }

        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);
	}
}
```

Sgpa

```
import java.util.Scanner;
class student{
    string name;
    string usN;
int marks[]=new int[3];
int credit[]=new int[3];
  int tcredits()
  {
    int t=0,i;
    for(i=0;i<3;i++)
    {
     t=t+credits[i];
    }
    return t;
  }
}
class Sgpa{
  public static void main(string
                          args[])
{
System.out.println("enter the student
   name, usN\n");
int i;
float sgpa=0,t;
Scanner sc=new Scanner(system.in);
student s1=new student();
   s1.name=sc.nextLine();
    s1.usn=sc.nextLine();
system.out.println("Marks and
   credit of each subject are\n");
```

```
for (i=0; i<3; i++)
{
  s1.marks[i] = sc.nextInt();
   if (s1.marks[i] == 100);
   s1.marks[i] = (s1.marks[i]/10);
  else
s1.marks[i] = (s1.marks[i]/10)+1;
  s1.credit[i] = sc.nextInt();
     sgpa = sgpa+s1.marks[i] * s1.
                          credit[i];

}
 t = s1.tcredits();
    sgpa = sgpa/(t);
 System.out.println(" sgpa of
" +s1.name+" is In " +sgpa);
}
}
```



## 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]);
}
}
}
```

BookDetails.

```
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 the Book");
    p = sc.nextDouble();
System.out.println("Enter the no. of pages of the Book");
    np = sc.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 Author \t Price \t Pages");
for(int i=0; i<n; i++){
System.out.println(b[i]);
}
}
}
```

```
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bmscecse>cd desktop

C:\Users\bmscecse\Desktop>javac BookDetails.java

C:\Users\bmscecse\Desktop>java BookDetails
Enter the number of Books: 3

Enter the book name: Eldest
Enter the author name: Christopher_Paolini
Enter the book price: 250
Enter the number of pages: 350

Enter the book name: Brisingr
Enter the author name: Christopher_Paolini
Enter the book price: 400
Enter the number of pages: 440

Enter the book name: Inheritance
Enter the author name: Christopher_Paolini
Enter the book price: 450
Enter the number of pages: 499
Title    Author          Price   Pages

Eldest  Christopher_Paolini            250.0           350

Brisingr        Christopher_Paolini             400.0           440

Inheritance     Christopher_Paolini             450.0           499


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

## 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();
```

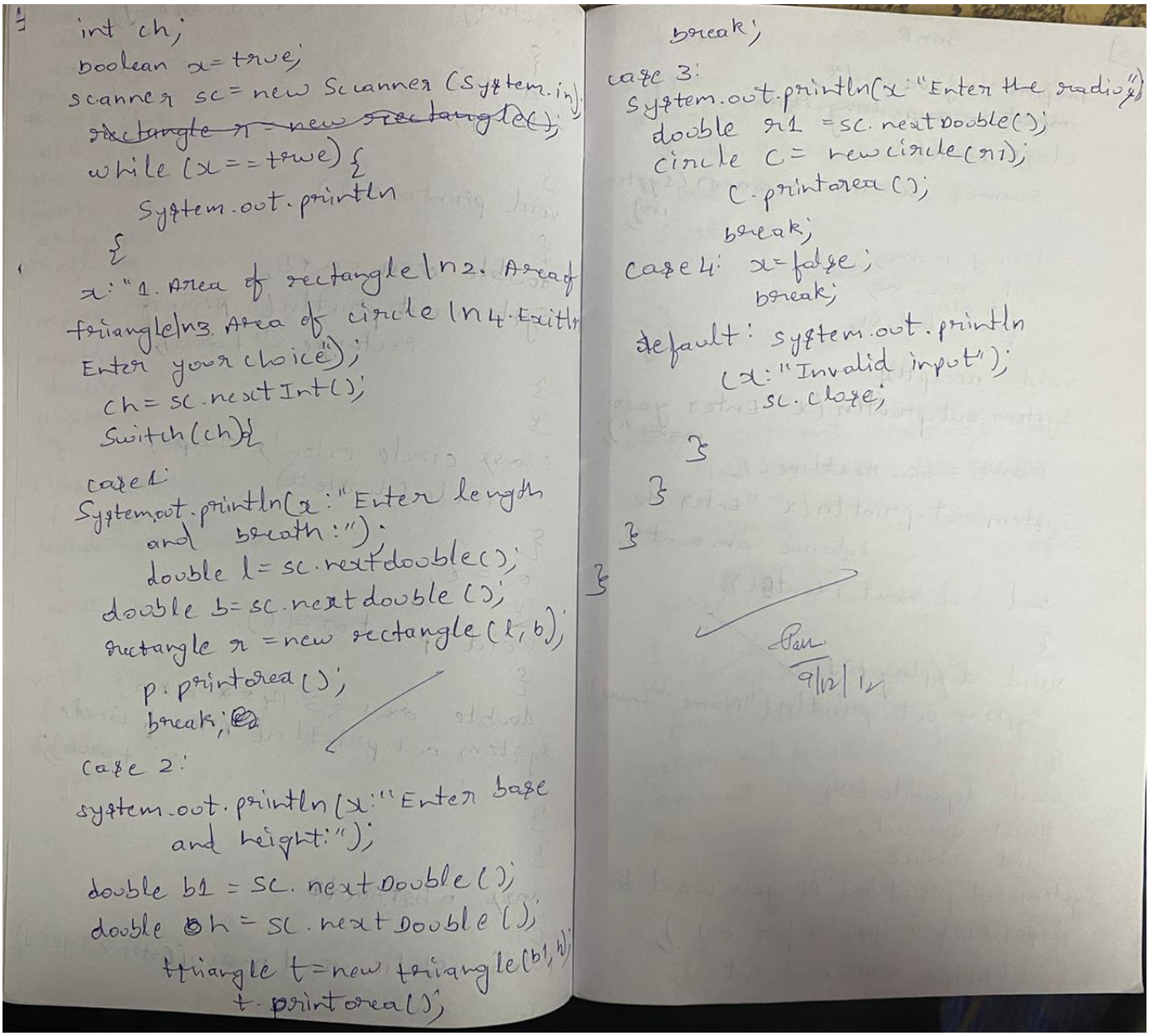
```
                break;
            case 3: Circle c = new Circle();
                c.printArea();
                break;
            case 4: System.out.println("Exiting the program!");
                System.exit(0);
                break;
            default: System.out.println("\nInvalid Choice!\n");
        }
        }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] 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 contains only the method printArea() that prints the area of the given shape.

```
import java.util.*;
abstract class shaped
 double a,b;
 abstract void printarea();
 }
class triangle extends shape
 {
 void triangle (double x, double y)
 {
 a=x; b=y;
 }
void printarea()
{
double area=0.5*a*b;
System.out.println ("Area of triangle
                    =" +area);
 }
 }
class rectangle extends shape
 {
 rectangle (double x, double y)
 {
 a=x;
 b=y;
 }
void printarea()
{
double area =a*b;
System.out.println (" Area of
          rectangle =" +area);
 }
 }
class circle extends shape{
   circle (double x)
{
 a=x;
 }
 void printarea()
 {
 double area =3.142*a*a;
System.out.println("Area of circle
                    =" +area);
 }
 }
class abstract
{
public static void main(String args[]);
 {
```



```
int ch;
boolean x=true;
scanner sc= new Scanner (System.in);
~~rectangle r = new rectangle();~~
while (x==true){
    System.out.println
{
x:"1. Area of rectangle\n2. Area of
triangle\n3. Area of circle \n4. Exit\n
Enter your choice");
ch= sc.nextInt();
Switch(ch){

case 1:
System.out.println(x:"Enter length
    and breath:");
    double l= sc.nextdouble();
double b= sc.nextdouble();
rectangle r =new rectangle(l,b);
    p.printarea();
    break;

case 2:
system.out.println(x:"Enter base
    and height:");
double b1 = SC. nextDouble();
double h = SC. nextDouble();
    triangle t=new triangle(b1,h);
        t.printarea();
break;
case 3:
System.out.println(x:"Enter the radius");
double r1 =sc.nextDouble();
circle C= new circle(r1);
    C.printarea();
    break;
case 4: x=false;
    break;
default: system.out.println
    (x:"Invalid input");
    sc.close;
}
}
}
}
```

Ram
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```
Command Prompt
Microsoft Windows [Version 10.0.19044.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\student>cd desktop

C:\Users\student\Desktop>javac AreaOfShapes.java

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

C:\Users\student\Desktop>
```

## 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);
```

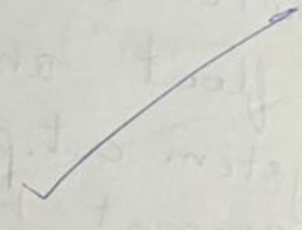
```
                        break;
                    default:
                        System.out.println("\nInvalid Operation");
                }
            }while(true);
        default : System.out.println("\nInvalid Choice");
            break;
        }
    }
}
```

5]

Bank

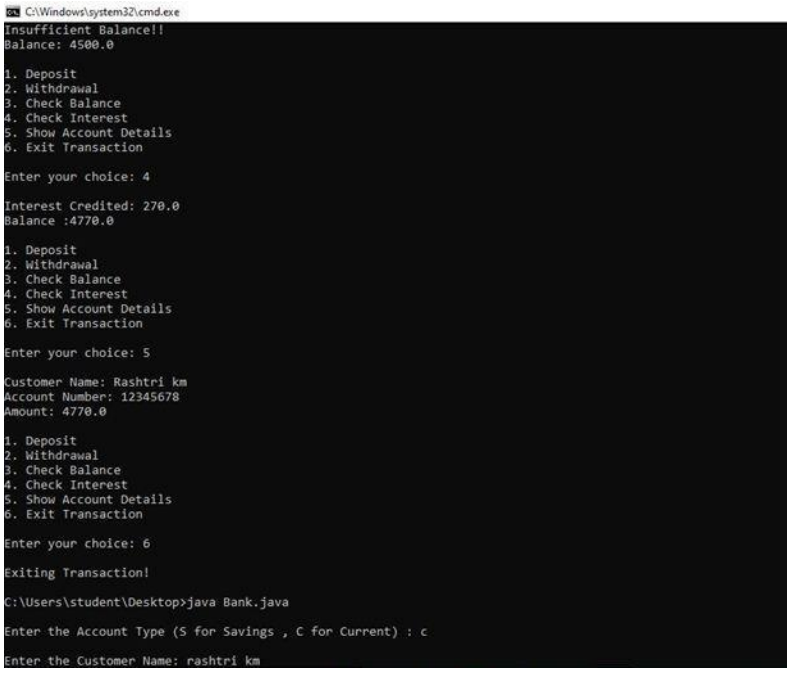
```
import java.util.*;
import java.lang.Math
class bank{
    Scanner sc=new Scanner(System.in);

    String name;
    int acc_no;
    double bal,si;

void accept(){
System.out.println("Enter your name");
    name = sc.nextline();
System.out.println("Enter the balance amount");
    bal =sc.nextFloat();
}
void display(){
    System.out.println("Name:"+name);
}
void deposite(){
    float amount;
    int choice;
System.out.println("Do you want to deposit(1for yes, 2 for no)");
    Choice =sc.nextInt();
if (choice==1){
System.out.println("Enter the amount to be deposited");
    amount =sc.nextFloat();
    bal = bal +amount;
System.out.println("current balance :" + bal);

}
}
class current extends bank{
    int service_fee =50;
    void cheque(){
    System.out.println("cheque service available");
}
void withdrawal(){
    float amt;
System.out.println("Enter the amount to be withdrawn");
amt = sc.nextFloat();
    if (amt> bal)
    System.out.println("Balance insufficient");
    else{
```

```
bal = bal - amt;
    if (bal < 1000) {
bal = bal - service - fee;
System.out.println("so rs is
  taken as service fee");
    }
System.out.println("withdrawn
                    : " + amt);
System.out.println("current
   balance: " + bal);
}
}
}
class savings extends bank{
   void cheque(){
System.out
```

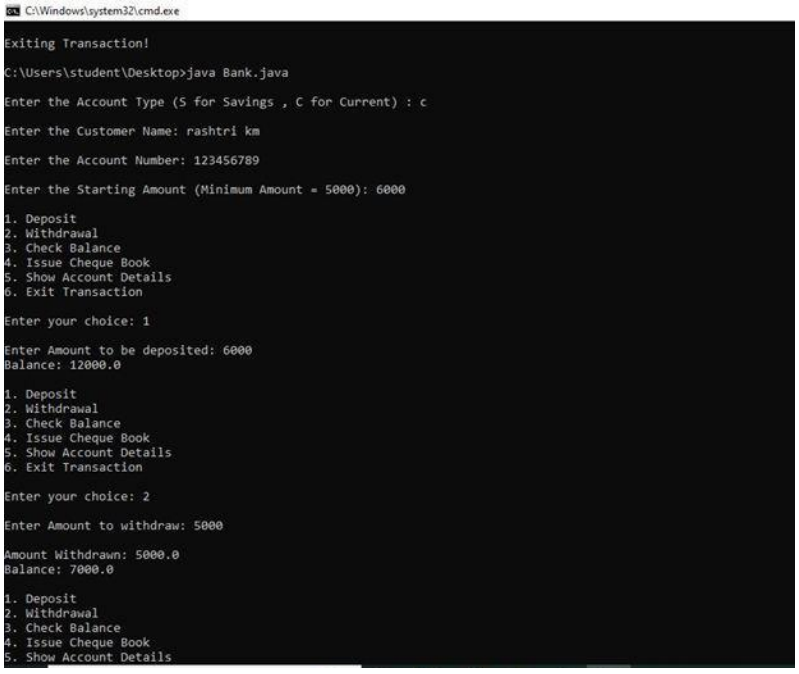


```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.19044.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\student>cd desktop

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

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
3. Check Balance
```

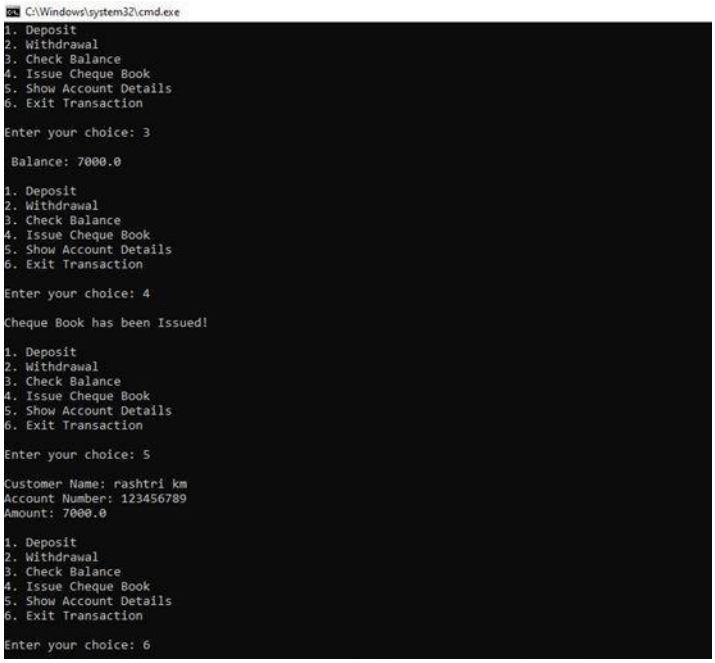
```
C:\Windows\system32\cmd.exe

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:\Windows\system32\cmd.exe
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
```



```
C:\Windows\system32\cmd.exe

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
```


C:\Windows\system32\cmd.exe
1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction
Enter your choice: 3
Balance: 7000.0
1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction
Enter your choice: 4
Cheque Book has been Issued!
1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction
Enter your choice: 5
Customer Name: rashtri km
Account Number: 123456789
Amount: 7000.0
1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction
Enter your choice: 6

## LAB PROGRAM 6: INTERFACE PROGRAM

Code

```
import java.util.InputMismatchException;
import java.util.Scanner;

interface Z
{
    public int calc(int a,int b);
}

class Y implements Z
{
    public int calc(int a, int b)
    {
        int c = a/b;
        return c;
    }
}

public class Divintf
{
    public static void main(String[] args)
    {
        Scanner s = new Scanner(System.in);
        Y o = new Y();
        int num1,num2;
        try
        {
            System.out.println("Enter the two numbers: ");
            num1 = s.nextInt();
            num2 = s.nextInt();
            int c = o.calc(num1,num2);
            System.out.println("Quotient: "+c);
        }
        catch(ArithmeticException | InputMismatchException e1)
        {
            System.out.println("Exception: "+e1);
        }
    }
}
```

Program using Interface

```
import java.util.Scanner
interface Students
{
Scanner S= new Scanner(System.in);
  void getResult();
  void setTestscores();
   void setStudentName();
   String getStudentName();
     int  getTestScores();
  }
class undergraduateStudent implements
   Students {
   int [] testScores=new int[4];
      String testResult;
      string studentName;
    public void generateResults (){
        string st;
    if (getTestScores()/4>=60) {
          st = "pass";
        }
         else
        {
        st = "fail";
        }
testResult ="Student name:" + student
Name + "In test result:" +st;
      System.out.println(testResult);
  }
```

```
}
publicint getTestScores() {
        int sum = 0;
    for (int i : testScores) {
            sum += i;
        }
        return sum;
    }
    public void setTestScores() {
        for (int i=0; i<4; i++) {
System.out.println("Enter test score"+
                                (i+1));
    testScores [i] = s.nextInt();
        }
    }
    public void setstudent Name(){
      Student Name = s.nextLine();
    }
    public string getStudent Name(){
        return studentName;
    }
}
Class graduate student implements
                                Students {
    int [] testScores = new int[4];
        String testResult;
        String student Name;
```

```
public void generateResults() {
        String st;
  if (getTestScores()/4 >= 70) {
        st = "pass";
        }
        else
        {
        st = "fail";
        }
testResult = "student name :" + Student
Name +"in test result :" + st;
    system.out.println (testResult);
}
public int getTestScores () {
        int sum =0;
    for (int i : testScores) {
            sum += i;
        }
        return sum;
    }
    public void setTestScores () {
        for (int i =0; i<4; i++){
System.out.println ("Enter test score
                        + (i+1));
    testScores [i] = s.nextInt();
    }
}
public void setstudentName () {
    StudentName = s.nextLine();
```

```
}
public string getstudentName(){
    return studentName;
}
}
public class anchor1 {
public static void main (String[] args){
System.out.println(x: "enter 1 for
  undergraduate student or 2 for
graduatestudent");
Scanner st = new ~~student~~ scanner (System.in);
    int i = st.nextInt();
    if (i==1){
undergraduate student u= new
                undergraduatestudent();
    System.out.println(x: "enter ur
                your name");
        u.setStudentName();
        u.SetTestScores();
        u.generateResults();
    }
```

```
Microsoft Windows [Version 10.0.22621.1105]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Acer\Desktop\Notes (2nd Year)\java practice programs>javac Integer_Division.java


C:\Users\Acer\Desktop\Notes (2nd Year)\java practice programs>java Divide
Enter the two numbers:
18
9
Division Result: 2

C:\Users\Acer\Desktop\Notes (2nd Year)\java practice programs>java Divide
Enter the two numbers:
18
0
Exception: java.lang.ArithmeticException: / by zero

C:\Users\Acer\Desktop\Notes (2nd Year)\java practice programs>java Divide
Enter the two numbers:
0.15
Exception in thread "main" java.util.InputMismatchException
        at java.base/java.util.Scanner.throwFor(Scanner.java:939)
        at java.base/java.util.Scanner.next(Scanner.java:1594)
        at java.base/java.util.Scanner.nextInt(Scanner.java:2258)
        at java.base/java.util.Scanner.nextInt(Scanner.java:2212)
        at Divide.main(Integer_Division.java:33)
```

## LAB PROGRAM 7: 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");
        }
}
```

Week 7

```
import java.util.Scanner;
class fatherAgeException extends Exception{
public string toString(){
return ("Father's age is less than 0");
}
}
class sonAgeException extends Exception{
   int a;
 sonAgeException(int age){
     a=age;
  }
public string toString(){
      if (a<0)
      return ("son's age is less
          than 0");
     else
return ("son's age is more than
   Father's age");
   }
  }
  class Father{
     int age;
  Scanner in = new Scanner(System.in);
  Father(){
System.out.println("Enter the father's age:");
```

o/p Seen 6/1

```
        age = in.nextInt();
    }
void ex1() throws FatherAgeException{
    if (age < 0)
    throw new FatherAgeException();
  }
}
class Son extends Father {
    int age;
  Son() {
System.out.println("Enter the Son's
                        age:");
    age = in.nextInt();
   }
void ex2() throws SonAgeException{
   if (age < 0 || age > super.age) {
  throw new SonAgeException(age);
  }
 }
}
public class Excepth{
public static void main (String[]
                        args){
     Son s = new Son();
    try {
       s.ex1();
catch (FatherAgeException e) {
     System.out.println(e);
  }
  try{
   s.ex2();
  }
catch (SonAgeException e) {
     System.out.println(e);
   }
 }
}
```

```
C:\Windows\system32\cmd.exe

C:\Users\bmscecse>javac Age.java
error: file not found: Age.java
Usage: javac <options> <source files>
use --help for a list of possible options

C:\Users\bmscecse>cd Desktop

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

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

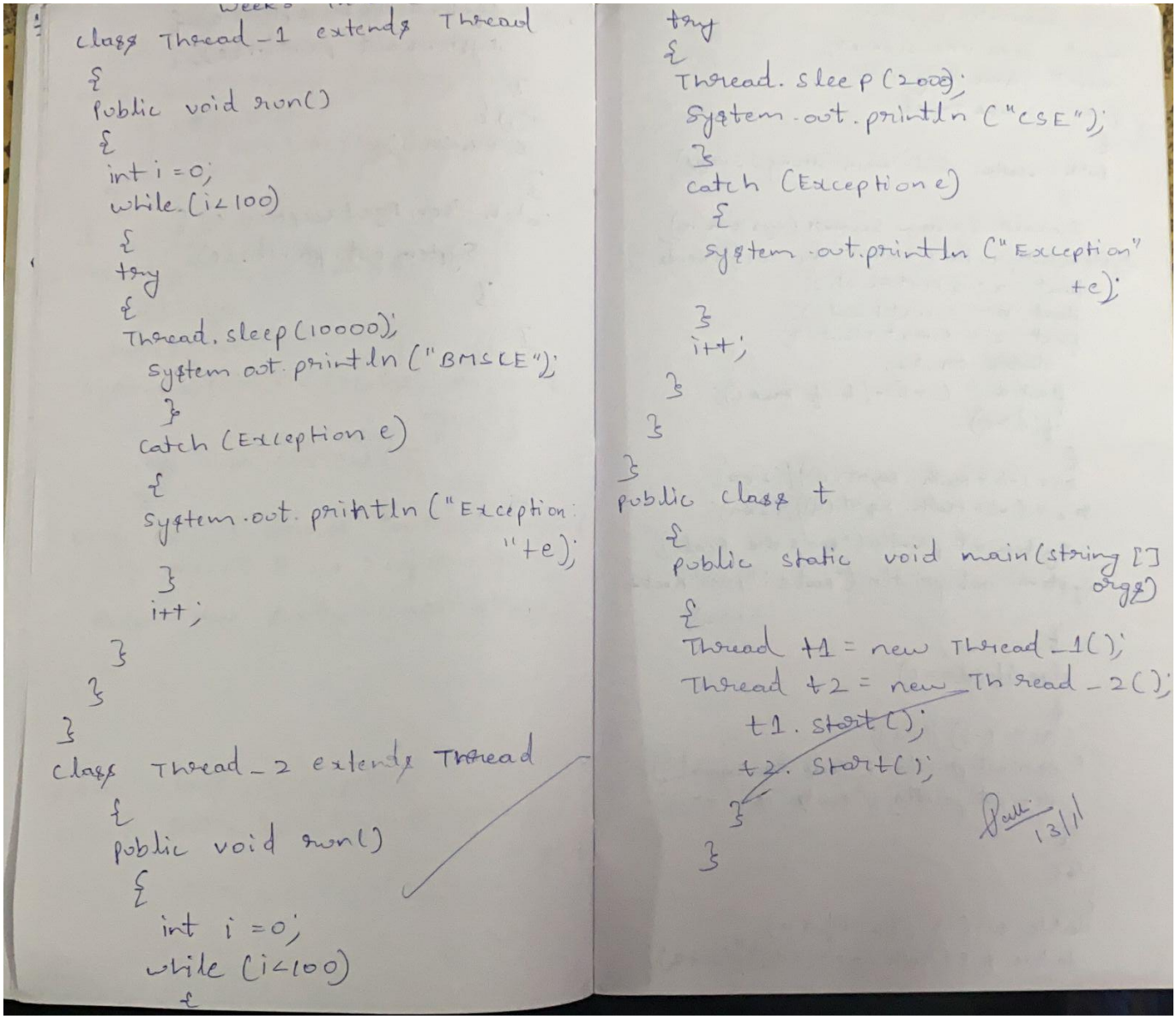
## LAB PROGRAM 8: MULTI-THREADING

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);
```

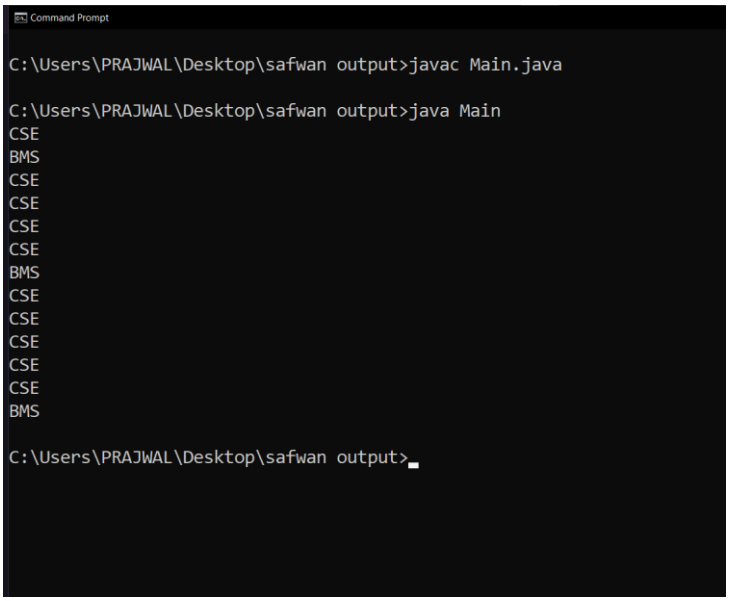
```
            }
        }
         catch(InterruptedException ie)
        {
            System.out.println("Exception caught in method");
        }

}
}

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");
        }
    }
```

}



```
class Thread_1 extends Thread
{
public void run()
{
int i = 0;
while (i<100)
{
try
{
Thread.sleep(10000);
System.out.println("BMSCE");
}
catch (Exception e)
{
System.out.println("Exception:
"+e);
}
i++;
}
}
}
class Thread_2 extends Thread
{
public void run()
{
int i = 0;
while (i<100)
{
try
{
Thread.sleep(2000);
System.out.println("CSE");
}
catch (Exception e)
{
System.out.println("Exception"
+e);
}
i++;
}
}
}
public class t
{
public static void main(String []
args)
{
Thread t1 = new Thread_1();
Thread t2 = new Thread_2();
t1.start();
t2.start();
}
}
```

Patil 13/1


Command Prompt
C:\Users\PRAJWAL\Desktop\safwan output>javac Main.java
C:\Users\PRAJWAL\Desktop\safwan output>java Main
CSE
BMS
CSE
CSE
CSE
CSE
BMS
CSE
CSE
CSE
CSE
CSE
BMS
C:\Users\PRAJWAL\Desktop\safwan output>