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
(Autonomous Institution under VTU)
BENGALURU-560019
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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 lab**" carried out by **Prajwal Dhage(1BM21CS133),** 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 Data structures Lab **- (21CS3PCOOJ)** work prescribed for the said degree.

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Index Sheet

Course Outcome

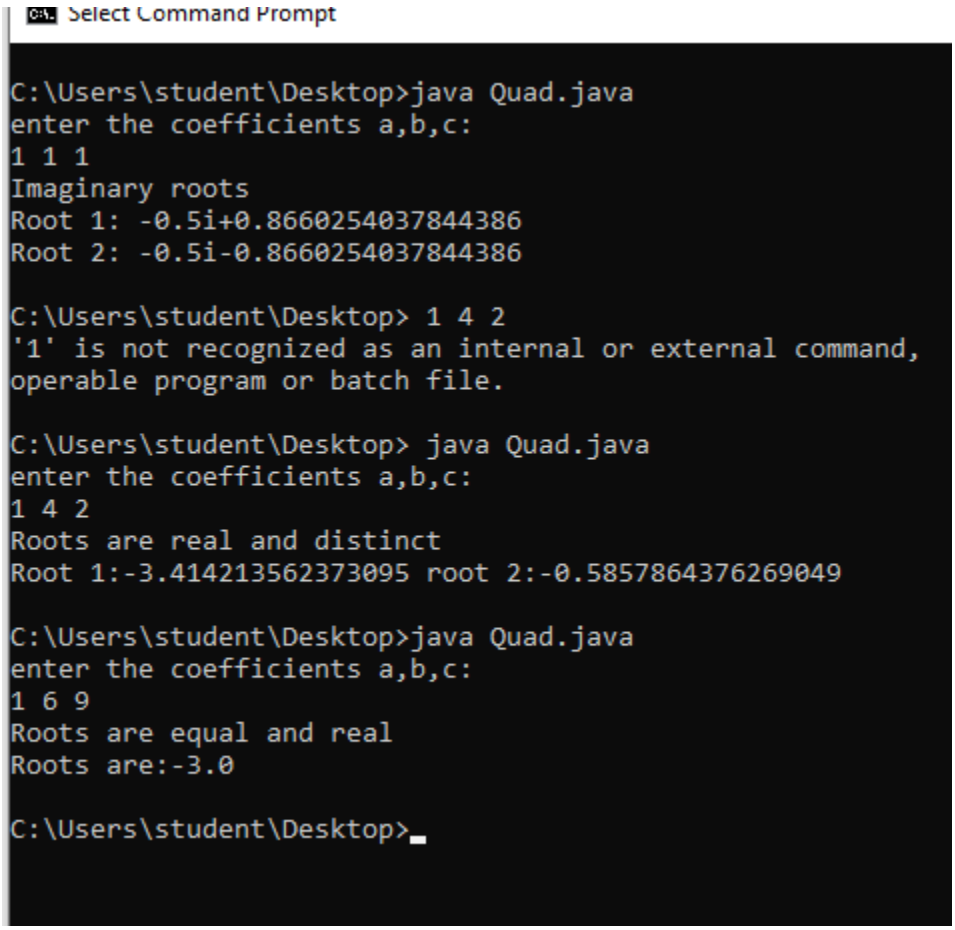
CO1	Apply the knowledge of Java concepts to find the solution for a given problem.
CO2	Analyze the given Java application for correctness/functionalities.
CO3	Develop Java programs / applications for a given requirement.
CO4	Conduct practical experiments for demonstrating features of Java.

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);
        }
    }
}
```



11. Program 1 : Quadratic eqn

```
import java.util.Scanner;

class main {
    public static void main (String[] args)
    {
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the value of a,b,c");
    float a = sc.nextfloat();
    float b = sc.nextfloat();
    float c = sc.nextfloat();
    float d = b*b - 4*a*c;
    double r1, r2;
    if (a==0)
    {
        System.out.println("not a quadratic eqn");
    }
    else if (d==0)
    {
        r1 = r2 = -b/(2*a);
        System.out.println(" r1 + " " + r2);
    }
    else if (d>0)
    {
    System.out.println("Roots are");
        r1 = (-b + Math.Sqrt(d))/(2*a);
        r2 = (-b - Math.Sqrt(d))/(2*a);
    System.out.println(r1 + " " + r2);
```

```
else
{
    System.out.println("Imaginary Roots");
}
}
}
```

Output

1. Enter the coefficients a, b, c
   1 6 9
   $r_1 = r_2 = -3$

2. Enter the coefficients a, b, c
   1 6 5
   $r_1 = -4.0$
   $r_2 = -6.0$

3. Enter the coefficient a, b, c
   1 6 10
   Imaginary roots.

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);
        }
}
```

To calculate SGPA

```
import java.util.Scanner;

class Student {
Scanner sc = new Scanner(System.in);
int marks[] = new int[50];
int credits[] = new int[50];
int mSum = 0;
int cSum = 0;

void enterMarks(int x){
for(int i=1 ; i<=x ; i++) {
    marks[i] = sc.nextInt();
System.out.println("Enter Subject" + i + "marks");
    marks[i] = sc.nextInt();
System.out.println("Enter Subject" + i + "Credit");
    credits[i] = sc.nextInt();
cSum += credits[i];

if (marks[i] >= 90)
    marks[i] = 10;
else if (marks[i] >= 80 && marks[i] <= 90)
    marks[i] = 9;
else if (marks[i] >= 70 && marks[i] <= 80)
    marks[i] = 8;
else if (marks[i] >= 60 && marks[i] <= 70)
    marks[i] = 7;
else if (marks[i] >= 50 && marks[i] < 60)
    marks[i] = 6;
else if (marks[i] >= 40 && marks[i] < 50)
    marks[i] = 5
```

```
        else
            mark[i]=0;
        }
    }
    double calc(int z)
    {
        for(int f=0; f<z; f++)
            sum2 += marks[f] * credits[f];
    }
    return (sum2/sum1);
    }
}

public class SGPA{
    public static void main(String[] args)
    {
    Student stud = new Student();
    Scanner sc= new Scanner();
    int n = sc.nextInt();
    stud.markenter(n);
    System.out.println("SGPA is "+ stud.calc(n)
    }
}
```

Output.

Enter the no of subjects.

5.

Enter the marks, credits of ~~the~~ subject 1 respectively

89 3.

Enter marks and credits of Subject ~~two~~ 2

89 3.

Enter marks & credits in subject ~~three~~ 3

90 2

LAB PROGRAM 3: IMPLEMENTING ARRAY OF OBJECTS

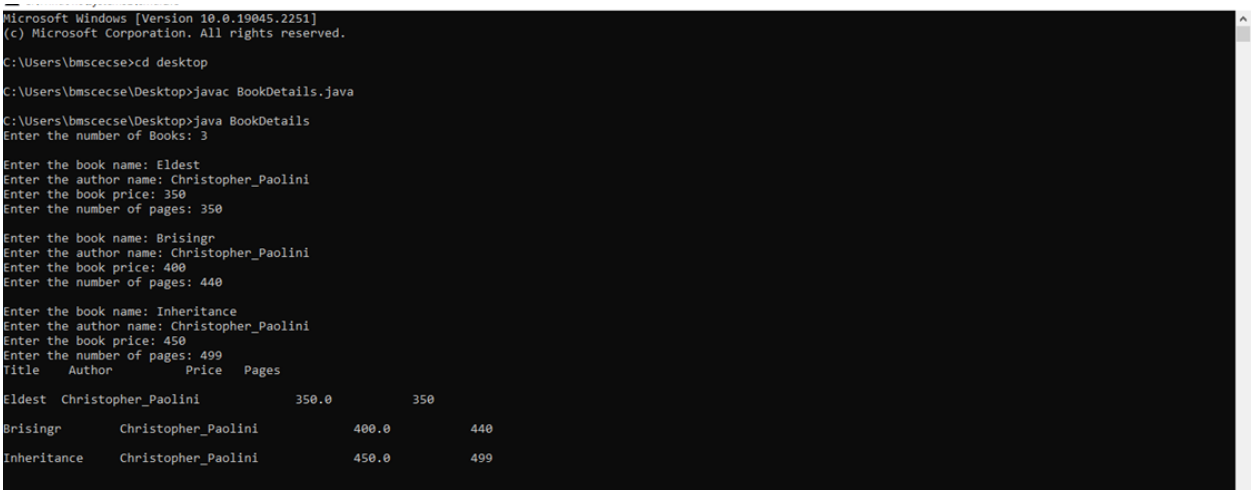
CODE

```
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]);
}
}
}
```

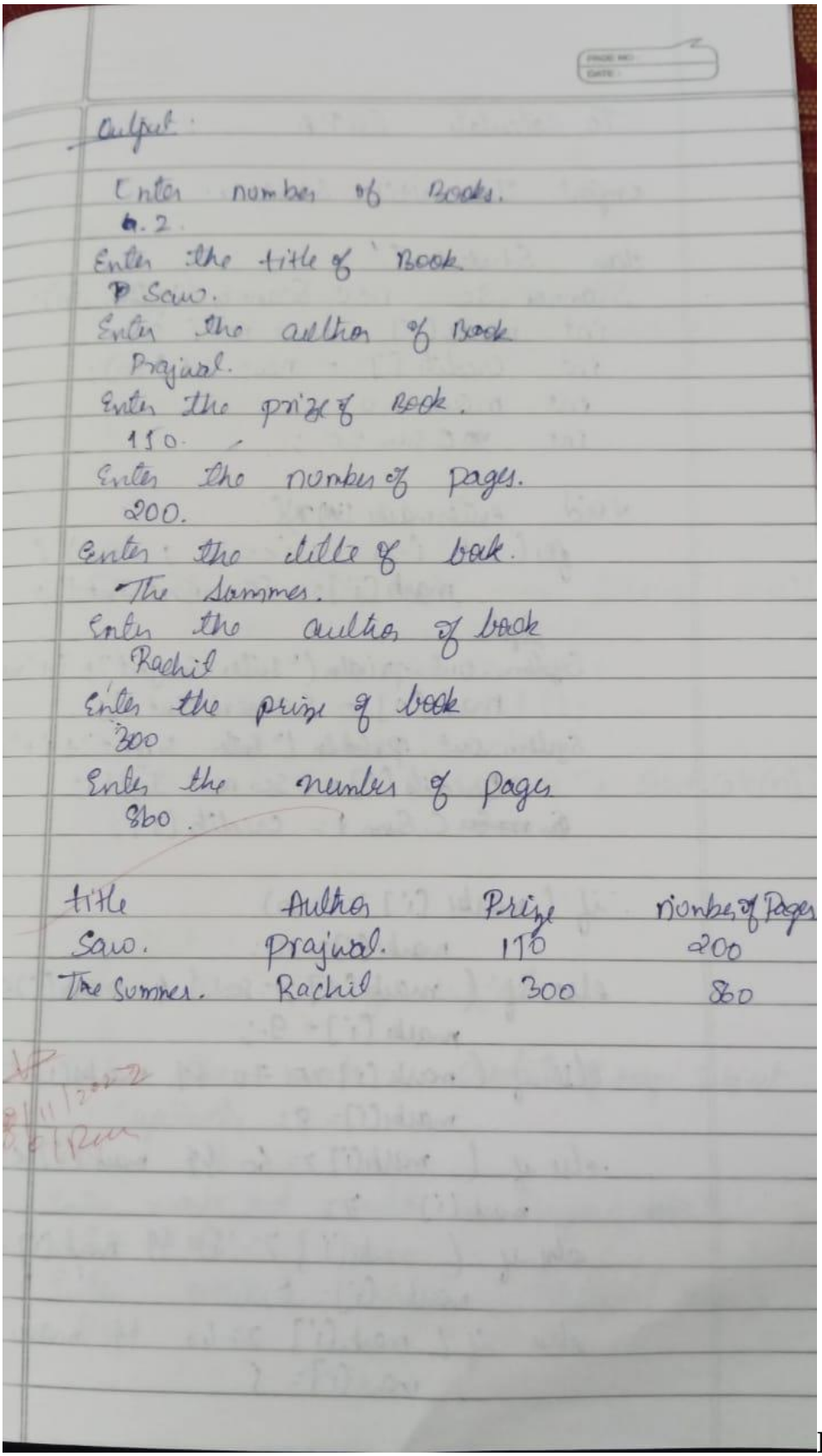

Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.
C:\Users\bmscecse>cd desktop
C:\Users\bmscecse\Desktop>javac BookDetails.java
C:\Users\bmscecse\Desktop>java BookDetails
Enter the number of Books: 3
Enter the book name: Eldest
Enter the author name: Christopher_Paolini
Enter the book price: 350
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 350.0 350
Brisingr Christopher_Paolini 400.0 440
Inheritance Christopher_Paolini 450.0 499

2nd Dec 2021

Book - Details

```
import java.util.Scanner;

class Book {
    String title, author;
    double prize;
    int numpages;

Book(){title = "Default";
    author = "Default";
    prize = 0.0
    numpages = 0.0;
}

void setTitle(String t) {
    title = t
}

void setauthor(String a) {
    author = a;
}

void setPrize(double p) {
    prize = p;
}
void setNumpages(int n) {
    numpages = n;
}
public String toString() {
    return title + "\t" + author + "\t" + prize +
        "\t" + numpages + "\n";
}
}
```

```
public 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 no of books ");
        n = sc.nextInt();
        Book b[] = new Book[n];
    for(int i=0 ; i<n ; i++){
        System.out.println("Enter the title ");
            t = sc.next();
        System.out.println("Enter Author ");
            a = sc.next();
        System.out.println("Enter prize");
            p = sc.nextDouble();
        System.out.println("enter no of pages")
            np = sc.nextInt();
        b[i] = new Book();
            b[i].setTitle(t);
            b[i].set author(a);
            b[i].setPrize(p);
            b[i].setPages(np);
    }
System.out.println("Title \t Author \t Prize \t
                    Pages \n");
for(i=0; i<n ; i++){
    System.out.println(b[i]);
}
}
```



Output:

Enter number of Books.
2.
Enter the title of Book
Savo.
Enter the author of Book
Prajwal.
Enter the prize of Book.
110.
Enter the number of pages.
200.
Enter the title of book.
The Summer.
Enter the author of book
Rachil
Enter the prize of book
300
Enter the number of pages
860.

title	Author	Prize	Number of Pages
Savo.	Prajwal.	110	200
The Summer.	Rachil	300	860

LAB

PROGRAM 4: CALCULATING AREA OF SHAPES (ABSTRACT CLASS)

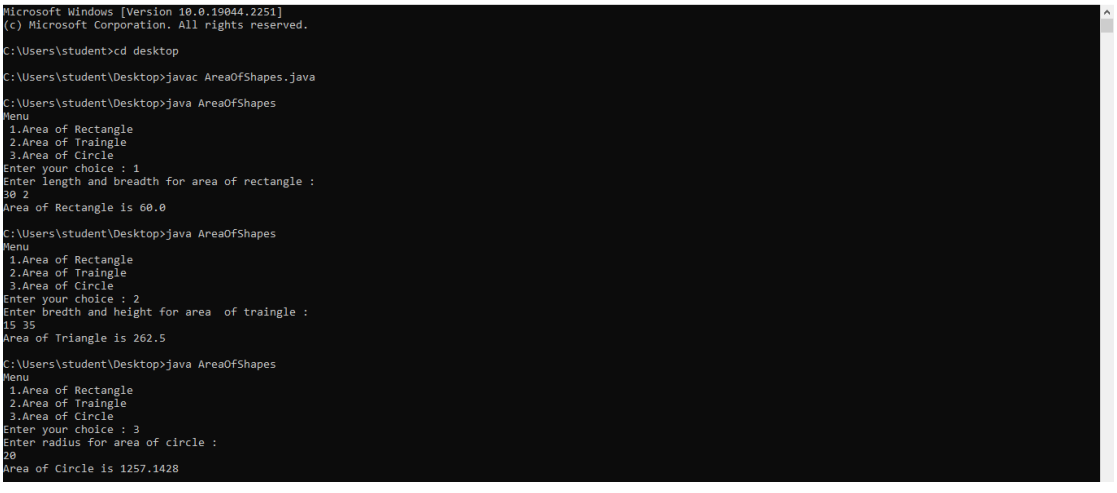
CODE

```
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");
        }
}
```



Abstract class.

```
import java.util.Scanner;

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 {
    tri (double i, double j) {
        super (i,j);
    }
    double area () {
        return 0.5 * x*y;
    }
}

class cir extends a {
    cir (double i, double j) {
        super(i,j);
```

```
double area() {
    return 3.14 * x * y;
}
}
```

1.

```
class Area {
    public static void main (String[] args) {
        Scanner Sc = new Scanner(System.in);

        System.out.println("Enter Length & Breadth");
        double L = sc.nextInt();
        double B = sc.nextInt();

        System.out.println("Enter height & base of triangle");
        double h = sc.nextInt();
        double ba = sc.nextInt();

        System.out.println("Enter radius of circle");
        double r = sc.nextInt();
        ~~double~~
        rect r = new rect(L, B);
        ~~rect t~~
        tri t = new tri(h, ba);
        cir c = new cir(r);

        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" + r.area());
    }
}
```

PAGE NO :
DATE :

Enter the length & breadth of rectangle
5
4.
Enter the height and base of triangle
5
4
Enter the radius of circle
6.
Area of rectangle is 20
Area of triangle is 10
Area of circle is 133.03999999999999.

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
```

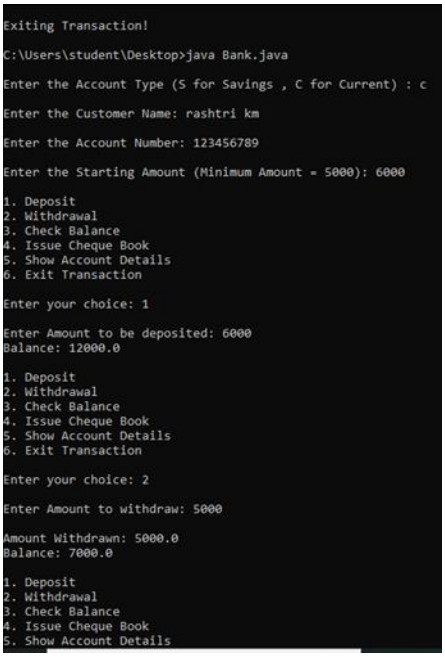
```
        {
            System.out.println("\n Balance: " + bal);
        }
    }

    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;
```

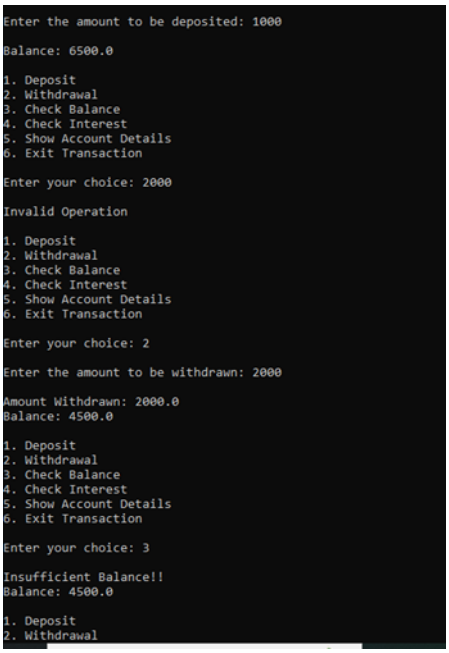
```
            System.out.println("\nAmount Withdrawn: "+withdraw+"\nBalance:
"+bal);
        }
    }

    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;
        }
    }
}
```





```
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
```

```
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
```

```
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
```

```
import java.util.Scanner;

class Account
{
    String Customer_name;
    long acc_no;
    float bal;
    Scanner sc = new Scanner (System.in);

public void input ()
{
    System.out.println("\n Enter the Customer name:");
    Customer_name = S.nextLine ();
System.out.print ("\n Enter the acc no ");
    acc_no = S.nextLong();
    System.out.print("\n Enter the starting amt");
    bal = S.nextFloat ();
  if (bal < 5000.0f)
    {
      System.out.println("\n Account Balance cannot
        be less than 5000.0 \n");
      System.exit(0);
    }
}
public void display ()
{
    System.out.println("\nCustomer name" + Customer_name);
System.out.println("\nAccount_no : " + acc_no);
System.out.println("\n Amount : " + bal);
```

```
class savings extends Account {
  Scanner sc = new Scanner (System.in);
  float deposit, withdraw, unbal;

  public void deposit ()
  {
     System.out.println("Enter the Amount");
     deposit = S.nextfloat ();
     bal += deposit.

  }.
  public void withdraw ()
  {
     System.out.println("Enter the amount");
     withdraw = S.nextfloat ();
    if (bal < 3000)
     {
        System.out.print("Insufficient Balance");
     }
    else {
        bal -= withdraw;
       System.out.println("Amount withdrawn" +
       withdraw + "Balance" + Bal);
     }.
  }.

  public void check_bal ()
  {
     if (bal < 5000) {
        System.out.println("Insufficient Balance");
     }
  else {
        System.out.println("Balance" + Bal);
  }.
}.
```

```
public void inInst ()
{
    inInst = (bal * 6) /100;
    bal += inInst;
    System.out.println ("Inlist added " +
    inInst + " Balance " + bal);
}
}

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

    public void deposit () {
    System.out.println (Enter Amount to be
        deposited : ");
    deposit = Scanner float ();
    bal = bal + deposit;
    System.out.print (" Balance " + bal);
}

public void check_Bal ()
    if (bal < 5000)
    {
        penalty = (0.15 * bal)
        System.out.print (Initial Amount " Bal);
        bal = bal - penalty;
    System.out.println (" Low Balance penalty
    amount " + penalty + " Balance " + Bal);
    }
else {
    System.out.println (" Balance " + Bal);
}
}
```

```
public boolean check_bal_part_2()
{
  if (bal < 5000)
  {   penalty = (0.15 * bal);
      System.out.println("Initial Balance " + bal);
      bal = Bal - penalty;
      system.out.println("Balance" Bal + "penalty");
      return false; }
  return true;
}

public void withdraw()
{
  System.out.print("Enter the amount ");
    withdraw = so.nextFloat();
  if (check_Bal_part_2())
    {
       bal -= withdraw;
    System.out.println("Amount withdrawn Bal" bal);
  }
},
  public void checque Book() {
    System.out.println("Cheque Book issued in");
  }
},

public class Bank
{
    public static void main(String[] args
    {
      Scanner sc = new Scanner(System.in);
      String ch;
      int n;
```

```
int n;
Current c = new Current();
Saving sa = new Saving();
System.out.print(" Enter the account type S for Saving
        C for Current ");
ch = sc.next();

Switch( ch.toLowerCase())
{
    Case "s" :  sa.input();
    do {
System.out.print(1. Deposit \n 2. Withdraw 3. Check
4. Balance \n 5. Account Details 6. exit.");
n = sc.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 :  exit(0);
                Break;
}
} while(1)
Case 'c' : c.input();
do {
    System.out.print(Deposit \n 2. Withdraw \n 3. Check
```

```
c. System.out.println("6 Exit");
n = sc.nextInt();
switch (n) {
case 1:
    c.deposit();
    break;
case 2:  c.withdraw();
    break;
case 3:  c.checkBal();
    break;
case 4:  c.chequeBook();
    break;
case 5:  c.display();
    break;
case 6: System.exit(0);
    break;
} while (true)
default: System.out.println("InvalidChoice");
    break;
}
}
```

Output:

Enter the account type S for Savings C for Cu
1. Deposit.
2. withdrawal.
3. check Balance.
4. check Interest.
5. Show Account detail
6. End Transaction.

Enter your choice 2:

Enter the Amount to withdraw: 300

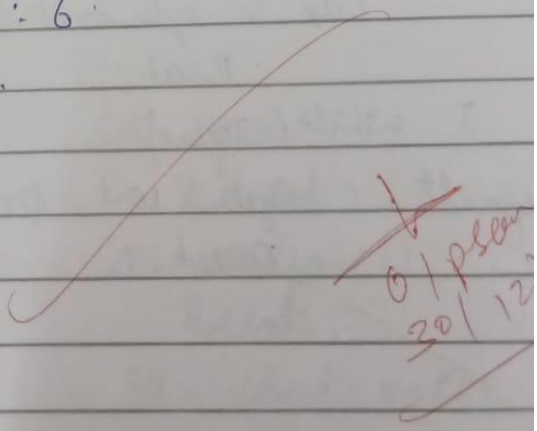
Amount withdrawn: 300.0
Balance: 5700.0

Enter your choice: 1.

Enter Amount to deposit: 300
Balance 6000.

Enter your choice: 4.
Interest credited: 360.0
Balance 6360.0

Enter your choice: 6.
Exiting the code.

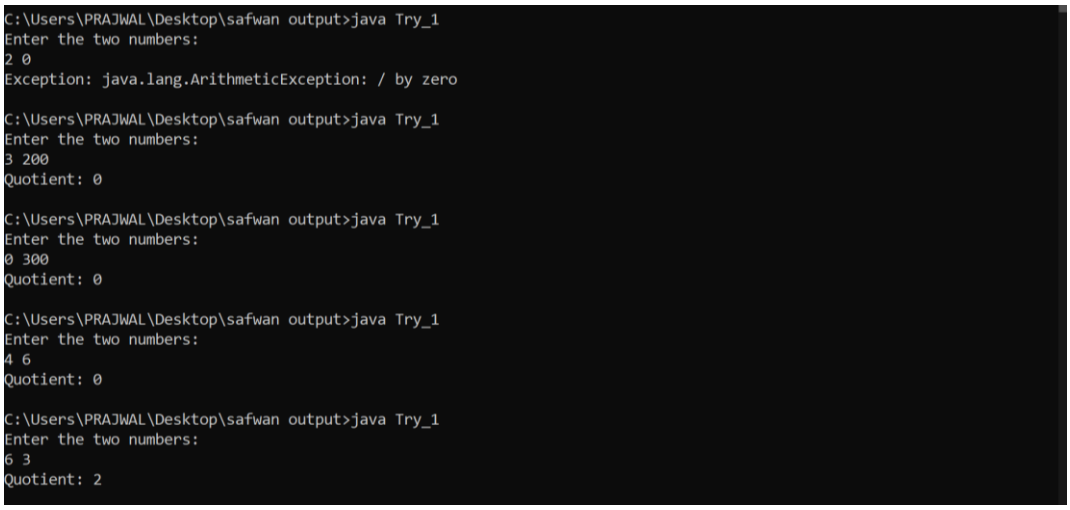


LAB PROGRAM 6: NUMBER OPERATIONS - EXCEPTION HANDLING

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 Try_1
{
   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);
        }
    }
}
```



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");
        }
}
```

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Exception

```
import java.util.Scanner;

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";
    }
}

class Father
{
    Scanner sc = new Scanner(System.in);
    int f;
    Father() throws WrongAge
    {
        System.out.println("Enter Father's Age");
        f = sc.nextInt();
        try {
            if (f < 0)
                throw new WrongAge();
        }
```

```
Catch (Wrong Age e1)
{
  System.out.println(e1.getMessage());
  System.exit(0);
}
}
class Son extends Father
{
  Son() throws WrongAge, InvalidAge
  {
    super();
    System.out.println("Enter Son's age");
    Son = S.nextInt();
    try {
      if (Son < 0)
        throw new WrongAge();
    }
    catch (WrongAge e2)
    {
      System.out.println(e2.getMessage());
    }
  try {
    if (Son > 5)
      throw new InvalidAge();
    }
  Catch (InvalidAge e3)
    {
      System.out.println(e3.getMessage());
    }
}
}
```

```
public class Try-1
{
    public static void main(String args[])
      throws WrongAge, InvalidAge
    {
        new Son();
    }
}
```

3.

Output :

Enter Fathers Age : 20.
Enter Sons Age : 23.
Sons Age Cannot be greater than Fathers

Enter Fathers Age : 67
Enter Sons Age : -90
Age Cannot be -Negative

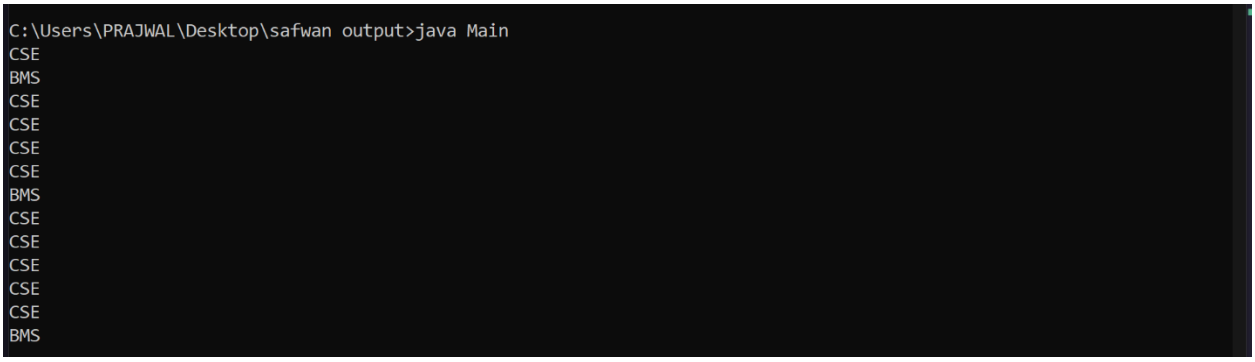
LAB PROGRAM 8: MULTI-THREADING

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)
                {
```

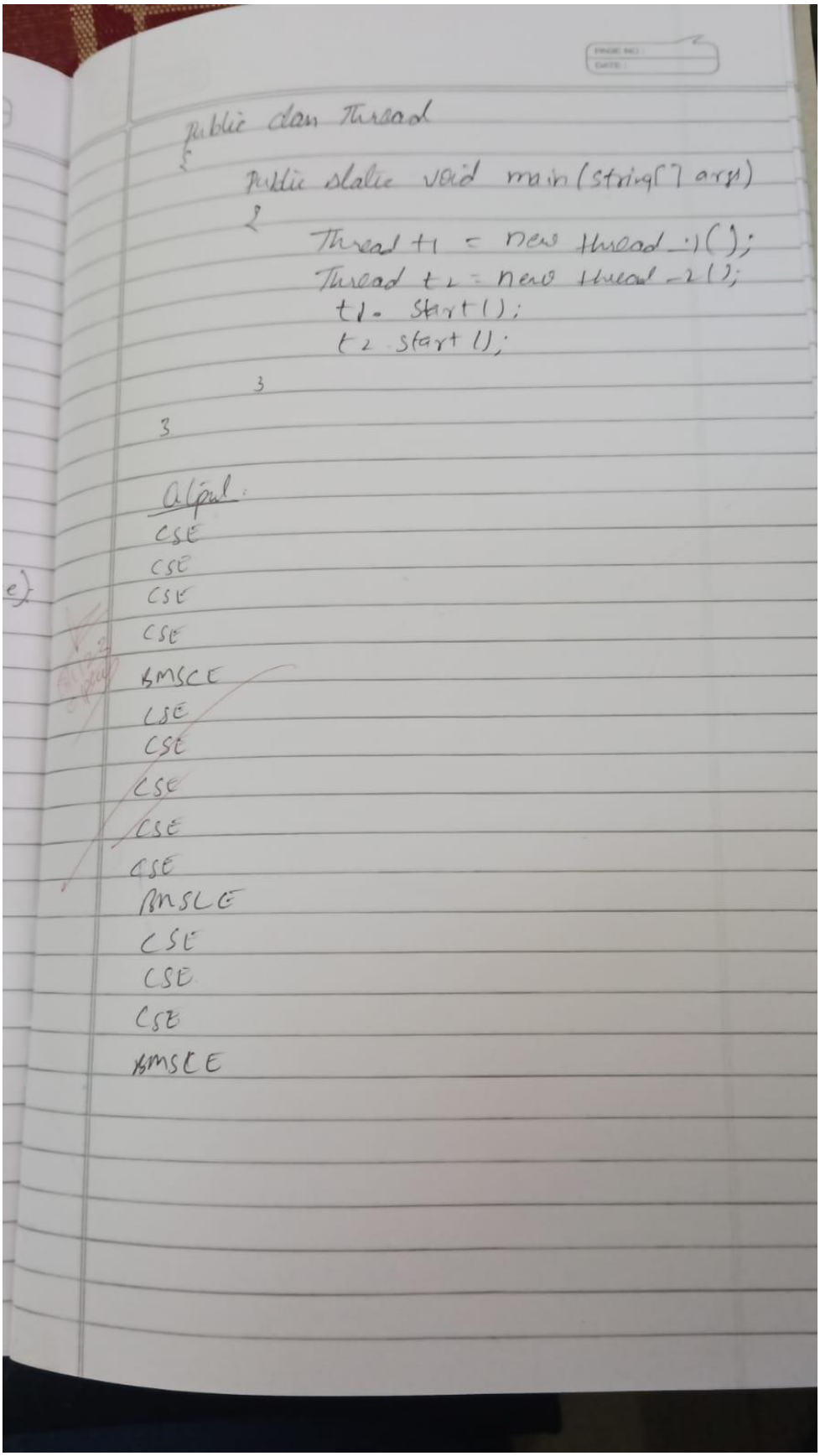
```
                System.out.println(this.getName());
                Thread.sleep(time*1000);
            }
        }
        catch(InterruptedException ie)
        {
            System.out.println("Exception caught in method");
        }

}
}

class Main
{
    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");
            }
        }
    }
```



13/1/2023

```
class Thread_1 extends Thread
{
  public void run()
  {
    int i=0;
    while(i<10)
    {
      try {
        Thread.sleep(1000);
        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<10){
      try{
        Thread.sleep(10000);
        System.out.println("BMSCE");
      }
      catch(Exception e){
        System.out.println("Exception"+e)
      }
      i++
    }
}
```



```
Public class Thread
{
    Public static void main(String[] args)
    {
        Thread t1 = new Thread_1();
        Thread t2 = new Thread_2();
        t1.start();
        t2.start();
    }
}
```

Output:

CSE
CSE
CSE
CSE
BMSCE
CSE
CSE
CSE
CSE
CSE
BMSCE
CSE
CSE
CSE
BMSCE