

INTERNAL S 1

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



OOJ LAB RECORD

Submitted by

SHREEHARI KULKARNI (1BM19CS153)

Under the Guidance of

Prof. PANIMOZHI K
Assistant Professor, BMSCE

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
Sep-2020 to Jan-2021

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 RECORD carried out by **SHREEHARI KULKARNI (1BM19CS153)** who is the bonafide students 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 Visveswaraiah Technological University, Belgaum during the year 2020-2021. The lab report has been approved as it satisfies the academic requirements in respect of **OOJ LAB RECORD (19CS3PCOOJ)** work prescribed for the said degree.

Signature of the Guide
Prof. Prof. PANIMOZHI K
Assistant Professor
CSE
BMSCE, Bengaluru

Signature of the HOD
Dr. Umadevi V
Associate Prof.& Head, Dept. of
BMSCE, Bengaluru

External Viva

Name of the Examiner

Signature with date

1. _____



WEEK 3

① Write a program to calculate roots of a quadratic equation ($ax^2 + bx + c = 0$)

STEP 1 INPUT a, b, c

STEP 2 $D = b * b - 4 * a * c$

STEP 3 If ($D > 0$)
 PRINT Real Roots
 Roots are $(-b + \sqrt{D}) / (2 * a)$
 Roots are $(-b - \sqrt{D}) / (2 * a)$

EISE IF ($D = 0$)

PRINT EQUAL Roots
 Roots is $(-b) / (2 * a)$

ELSE

PRINT IMAGINARY ROOTS

~~PRINT~~

Roots are $(-b + i\sqrt{-D}) / (2 * a)$

Roots are $(-b - i\sqrt{-D}) / (2 * a)$

STEP 4 STOP

Java code

```
import java.util.*;
import java.lang.*;

public class quadratic
{
    private static int double a;
    private static double b;
    private static double c;
    public static void read()
    {
        Scanner sc = new Scanner (System.in);
        System.out.println("Enter the Co-efficient a");
        a = sc.nextDouble();
        System.out.println("Enter the Co-efficient b");
        b = sc.nextDouble();
        System.out.println("Enter the Co-efficient c");
        c = sc.nextDouble();
    }
}
```

```
public static void calc()
```

```
    read();
    double d = b*b - 4*a*c;
    if (d>0)
    {
```

```
        System.out.println("ROOTS ARE  
REAL AND  
DISTINCT");
```

System.out.println("First root is " + (-b + Math.

$\sqrt{d})$
 $/(2*a))$;

System.out.println("Second root is " + (-b - Math.

$\sqrt{d})/(2*a))$;

}

else if (d == 0)

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

System.out.println("Roots are " + (-b) / (2*a));

);

}

else

{

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

System.out.println("Roots are " + (-b) / (2*a))

+ " + " + "i" +

(Math.sqrt(-d)) / (2*a))

);

System.out.println("Roots are " + (-b) / (2*a))

+ " - " + "i" + Math.

(Math.sqrt(-d)) / (2*a))

);

}

(else have while condition)

}

$a^2 - d^2 = b \sinh^2(b)$

(c/b)

public static void main (String [] args)

{

value();

}

ALGORITHM:

STEP 1 START

STEP 2 Read number of subjects, usn, name, credit P, mark[] from the user

STEP 3 fun() (grade.)
 if i = 0 to n
 if mark[i] >= 90 & & mark[i] <= 100
 Return 10 else if mark[i] >= 80 & & mark[i] < 90
 return 7 else if mark[i] >= 70 & & mark[i] < 60
 return 8 else if mark[i] >= 60 & & mark[i] < 50
 return 7 else if mark[i] >= 50 & & mark[i] <= 40
 return 6 else
 return "fail"

STEP 4. PTO (NextPage) . . .

Date: / /

STEP 4

```
for i=0 to n
```

```
c=grade(mark[i])
```

```
sum_credit+=credit[i];
```

```
sum+=c*credit[i]
```

```
sgpa = sum/sum - credit;
```

STEP 5

```
PRINT sgpa
```

Date _____

A program to calculate SGPA of student

import java.util.*;

public class Lab2

{

private static int n;

private static String usn;

private static String name;

private static int credit[];

private static double mark[];

public static void read()

{

Scanner sc = new Scanner(System.in);
System.out.println("Enter the number
of students");

n = sc.nextInt();

credit = new int[n];

mark = new double[n];

System.out.println("Enter the name of
student").

name = sc.next();

System.out.println("Enter the usn");

usn = sc.next();

System.out.println("Enter the credits
of subject");

Date / /

```
for (int i = 0; i < n; i++)
```

{

```
System.out.print("Enter credit in  
subject " + " " +  
(i+1));
```

```
credit[i] = sc.nextInt();
```

}

```
System.out.print("Enter the marks in subject  
" + ");
```

```
for (int i = 0; i < n; i++)
```

{

```
System.out.print("Enter marks in  
subject " + " " +  
(i+1));
```

```
mark[i] = sc.nextDouble();
```

}

}

```
public static int grade(double marks)
```

```
if (marks >= 90 & & marks <= 100)  
return 10
```

```
else if (marks >= 80 & & mark < 90)
```

```
{ return 9
```

{

Date _____ / _____ / _____

```
else if (marks >= 70 & & marks < 80 )  
{
```

```
    return 4.8;
```

```
}
```

```
else if (marks >= 60 & & marks < 50 )  
{
```

```
    return 3.7;
```

```
}
```

```
else if (marks >= 50 & & marks < 60 )  
{
```

```
    return 6;
```

```
}
```

```
else if (marks >= 40 & & marks < 50 )  
{
```

```
    return 5;
```

```
}
```

```
else
```

```
{
```

```
    System.out.println ("You have failed");  
    return 0;
```

```
}
```

```
}
```

public static double calculate()

```

    read()
    double sgpa;
    double sum_credits = 0;
    double sum = 0;
    int c;
    for (int i = 0; i < n; i++)
    {
        c = grade[mark[i]];
    }

```

sum_credits += credit[i];

sum = sum + c * credit[i];

}

sgpa = (double) (sum / sum_credits);

return sgpa;

}

public static void main (String [] args)

Scanner sc = new Scanner (System.in);

double sgpa = calculate();

System.out.println ("Name of Student"
+ name);

System.out.println ("Marks are ");

for (int i = 0; i < n; i++)

System.out.print ("Mark in Subject
" + " " + (i + 1)
+ " is " + "());

System.out.println (mark[i]);

}

Date _____

System out.println ("SGPA of Student is "+
sgpa);

LAB 3

Date _____

Saath

Algorithm

Step 1 Start

class book

Step 2 Take inputs for name, autho
r price and no of pages, using
constructor

Step 3 toString()

return "Name is :" + name + "Autho
is " +
author
+ "Price is " +
price

+ "Number of page
are " + no of
pages

End class book

class Test

STEP 4: book obj = new book()
for i = n

take input from user each
object and its instance
variable

Date _____ / _____ / _____

STEP 5 for i=0 to n

display obj[7]

STEP 6 End

Date: / /

→ Lab 3

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

```
public class Book_Lab3
```

```
{  
    public String name;  
    public String author;  
    public double price;  
    public double p no-of pages;
```

```
    public Lab_Programs(String n, String a,  
                        double p, int pages)
```

{

```
        name = n;
```

```
        author = a;
```

```
        price = p;
```

```
        no-of-pages = pages;
```

{

@Override

```
public String toString()
```

```
{ return "Name of book is: " + name +
```

```
           " Author of book is: "
```

```
+ author +
```

```
"Cost of the book is "
```

```
+ price +
```

```
"No of pages
```

```
is " + no-of-pages
```

Date

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

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

```
import java.lang.*;
```

```
public class ListBook3
```

```
{ public static String name;
```

```
public static String author;
```

```
public static double price;
```

```
public static int no_of_pages;
```

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

```
Scanner sc = new Scanner(System.in)
```

```
int n;
```

```
System.out.println("Enter the number of  
books");
```

```
n = sc.nextInt();
```

```
book3[] ob = new book3[n];
```

```
for(int i=0; i<n; i++)
```

```
{}
```

```
System.out.print("Enter the name  
of the book");
```

```
name = sc.next();
```

```
System.out.print("Enter the author  
of the book");
```

```
author = sc.next();
```

```
System.out.print("Enter the price of  
book");
```

Date / /

```
price = sc.nextIntDouble();  
System.out.println("Enter the number of  
pages of book")
```

```
no_of_pages = sc.nextInt();
```

```
ob[i] = new Book3(name, author, price,  
no_of_pages);
```

{

```
for(int i=0; i<n; i++)  
{
```

```
System.out.println("Displaying the  
details of book")
```

```
System.out.println(ob[i]);
```

{

OUTPUT:

1 Enter the number of books

2

Enter the name of book 1

b

enter the author of book 1

c

Date

Enter the price of book 1
500

Enter the number of pages of book 1
400

Enter the name of book 2
t

Enter the author of book 2
t

Enter the price of book 2
410

Enter the number of pages of book 2
500

Displaying Details of book 1

Name of book is : h Author of book is : t
cost of the book is : 500
No of pages in book : 400

Display Details of book 2

Name of the book is : r Author of book is : t
cost of the book is : ~~500~~ 410
No of pages in book is : 500

LAB - 6

Shapes program.

```

import java.io.*;
import java.lang.*;
import java.util.*;
abstract class Shape {
    int len, wid;
    Shape (int l, int w)
    {
        len = l;
        wid = w;
    }
    abstract void printArea();
}
class rectangle extends Shape {
    rectangle (int a, int b)
    {
        super (a, b);
    }
    void printArea()
    {
        System.out.println ("Area of Rectangle is " +
            (len * wid));
    }
}
class triangle extends Shape {
    triangle (int a, int b)
    {
        super (a, b);
    }
    void printArea()
    {
        System.out.println ("Area of the triangle");
    }
}

```

Date _____

```
is "+(len+wid)/2));
```

{

Class circle extends Shape

{

```
circle (int r1, int r2)
```

{

```
super (r1, r2);
```

{

```
void printArea()
```

{

```
System.out.println ("Area of the circle is "+  
(3.142 * len*len));
```

{

class test

{

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

{

```
int l, b, rad;
```

```
Scanner sc = new Scanner (System.in);
```

```
System.out.println ("Enter the length/base of  
the rectangle/triangle respectively");
```

```
l = sc.nextInt();
```

```
System.out.println ("Enter the breadth/height  
of the rectangle/triangle respectively");
```

```
b = sc.nextInt();
```

```
System.out.println ("Enter the radius of  
the circle");
```

```
rad = sc.nextInt();
```

```
Shape s;
```

```
rectangle r = new rectangle (l, b);
```

```
triangle t = new triangle (l, b);
```

```
circle c = new circle (rad, rad);
```

Date / /

$$S = 8;$$

S. print Area(); // Prints the area of the rectangle.

$$S = 4;$$

S. print Area(); // Prints the area of the triangle.

$$S = C;$$

S. print Area(); // Prints the area of the circle.

{ }

OUTPUT

Enter the length/base of the rectangle/Tri
angle respectively.

4

Enter the breadth/height of the rectangle/
Triangle respectively.

4

Enter the radius of the circle.

4

Area of Rectangle is 16

Area of the Triangle is 8

Area of the circle is 50.272.

Date _____ / _____ / _____

Bank Programm

```
import java.io.*;  
import java.lang.*;  
import java.util.*;  
abstract class account
```

```
{  
    String name;  
    String acc_no;  
    String type;  
    double balance;  
    account (String n, String a, String t, double b)  
{
```

```
        name = n;  
        acc_no = a;  
        type = t;  
        balance = b;
```

```
}  
    abstract void deposit();  
    abstract void display();  
    abstract void withdraw();  
    abstract void fine();  
    abstract void inter();
```

```
class curr_acc extends account
```

```
{  
    curr_acc (String n, String a, String t,  
              double b)  
{  
    super (n, a, t, b);
```

```
}  
    void fine()  
{
```

```
    if (balance < 1000)
```

```
}  
    System.out.println ("you will be fined")
```

Date: / /

500 Rs Because minimum balance in your account must be 1000");
balance = balance - 500;

display ();
}

else

{
System.out.println("you will not be charged
Any fine Thank you");
display();
}

void display()
{
System.out.println("Name of the Account Holder is" + name);
System.out.println("Account Number of the Account Holder is" + acc_no);
System.out.println("Balance In your Account is" + balance);
}
void deposit()
{
double sum;
Scanner sc = new Scanner(System.in);
System.out.println("Enter the amount you want to withdraw");
sum = sc.nextDouble();
balance = balance - sum;
if (balance > 1000)
display();
else

Date / /

```
System.out.println("you cannot withdraw  
This much Amount");  
line()
```

```
void inter()
```

```
System.out.println("your Account Type is  
not Eligible For Any Interest");
```

```
class sav_acc extends account
```

```
sav_acc (String n, String a, String t,  
double b)
```

```
super (n, a, t, b);
```

```
void display ()
```

```
System.out.println("name of the Account  
Holder is "+ name);
```

```
System.out.println("Account Number of  
the Account Holder is "+ acc_no);
```

```
System.out.println("Type of the Account  
of the Account Holder is "+ type);
```

```
System.out.println("Balance in your  
Account is "+ balance);
```

```
void withdraw()
```

```
double sum;
```

```
Scanner sc = new scanner (System.in);
```

```
System.out.println ("Enter the amount you
```

Date

```
want to withdraw");
System.out.println();
Sum = sc.nextDouble();
balance = balance - Sum;
display();
```

Void deposit()

```
int Sum;
Scanner sc = new Scanner(System.in);
System.out.println("Enter the principal amount you want to submit");
Sum = sc.nextInt();
```

Void inter()

```
double n, t;
double cpy = balance;
double interest;
Scanner sc = new Scanner(System.in);
System.out.println("Enter the Rate of interest");
n = sc.nextInt();
System.out.println("Enter the year of time Account has to be elapsed");
t = sc.nextInt();
System.out.println("Enter the period per year, when interest has to be calculated");
n = sc.nextInt();
balance = (balance) * (Math.pow((1 + (interest / 100)), t));
Interest = balance - cpy;
System.out.println("Interest Accumulated");
```

Date

In your Account is "t interest);
display();
System.out.println();

4 void fine ()

{
System.out.println("you have no Restriction on your minimum Balance Thankyou");
System.out.println();

5

class test

{ public static void main (String args)

{

account a;
Scanner sc = new Scanner (System.in);
String name, acc_num, typ;
int option;
double bal;
System.out.println ("Enter the name of the account holder");
name = sc.next();

System.out.println ("Enter the account number");
acc_num = sc.next();

typ = "current Account";
System.out.println ("Enter the minimum Balance in the account");
bal = sc.nextDouble();

System.out.println ("1: current Account");
System.out.println ("2: Savings Account");
System.out.println ("3: Exit");

```

System.out.println ("Enter your choice");
option = sc.nextInt();
switch (option)
{
}

```

Case 1;

```

curr_acc c = new curr_ac (name, acc
                           typ, bal);

```

a = c;

int counter;

do

```

System.out.println ("1 : Check For Fine");
System.out.println ("2 : Deposit");
System.out.println ("3 : withdraw");
System.out.println ("4 : Exit");
System.out.println ("Enter your choice");
counter = sc.nextInt();
switch (counter)
{
}

```

Case 1;

a. fine();

break;

case 2;

a. deposit();

break;

case 3;

a. withdraw ();

break;

case 4;

System.exit (0);

break;

4

```

while (counter != 4);
break;

```

Date _____

case 2;

Sav-Acc s = new Sav-Acc(name, acc-num,
type, bal);

a = s;

int cnr;

do

{

System.out.println("1; Deposit with
Interest");

System.out.println("2; withdraw");

System.out.println("3; Exit");

System.out.println("Enter your choice");

cnr = sc.nextInt();

switch(cnr)

{

case 1;

a.deposit();

break;

case 2;

a.withdraw();

break;

case 3;

System.exit(0);

break;

{

while(cnr != 3);

break;

case 3;

System.exit(0);

break;

g

y

Date / /

Saath

OUTPUT

Enter the name of the Account holder

Hari

Enter the Account Number

1bm19cs153

Enter the minimum balance in the account

2000

1 : current Account

2 : Saving Account

3 : Exit

Enter your choice

3

Enter the rate of

1 : Deposit

2 : withdraw

3 : Interest

4 : Exit

Enter your choice

1

Enter ~~your~~ the principle amount of you want to submit

500

Name of the Account Holder is Hari

Account Number of the Account holder

Current Account

Balance in your Account is 2500.

1 : Deposit

2 : withdraw

3 : Interest

4 : Exit

Enter your choice

3

Date _____ / _____ / _____

Enter the rate of the interest

5

Enter the year of the time Account has to be
clapped.

4

~~615153~~

Interest Accumulated In your Account is
538.7656.

Name of the Account holder is Hari
Account Number of the Account Holder
is 1bm19cs153

Type of the Account of the Account Holder
is current Account

Balance In your Account is 3038.7656

WRITE A PROGRAM TO SOLVE THE QUADRATIC EQUATION

```
import java.io.*;
import java.util.*;
import java.lang.*;
public class quadratic
{
    private static double a;
    private static double b;
    private static double c;
    public static void read()
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the Co-Effcient a");
        a=sc.nextDouble();
        System.out.println("Enter the Co-Effcient b");
        b=sc.nextDouble();
        System.out.println("Enter the Co-Effcient c");
        c=sc.nextDouble();
        System.out.println("THANK YOU FOR ENTERRING THE CO-EFFICIENTS");
    }
    public static void calc()
    {
        read();
        double d=b*b-4*a*c;
        if(d>0)
        {
            System.out.println("ROOTS ARE REAL AND DISTINCT");
            System.out.println("FIRST ROOT IS " + (-b+Math.sqrt(d))/(2*a));
            System.out.println("SECOND ROOT IS " + (-b-Math.sqrt(d))/(2*a));
        }
    }
}
```

```
        }

    else if(d==0)
    {
        System.out.println("Roots are equal");
        System.out.println("ROOTS ARE " + (-b)/(2*a));
    }
    else
    {
        System.out.println("ROOTS ARE IMAGINARY");
        System.out.println("ROOTS ARE " + -b/(2*a) + "+" +"i" + (Math.sqrt(-d))/(2*a));
        System.out.println("ROOTS ARE " + -b/(2*a) + "-" +"i" + (Math.sqrt(-d))/(2*a));
    }
}

public static void main(String[] args)
{
    calc();
}
}
```

OUTPUT:

OUTPUT IS SHARED IN THE NEXT PAGE

```
C:\Users\Shreehari Kulkarni\Desktop\JAVALABPROGRAMS>javac quadratic.java
C:\Users\Shreehari Kulkarni\Desktop\JAVALABPROGRAMS>java quadratic
Enter the Co-Efficient a
1
Enter the Co-Efficient b
-4
Enter the Co-Efficient c
4
THANK YOU FOR ENTERRING THE CO-EFFICIENTS
Roots are equal
ROOTS ARE 2.0

C:\Users\Shreehari Kulkarni\Desktop\JAVALABPROGRAMS>javac quadratic.java
C:\Users\Shreehari Kulkarni\Desktop\JAVALABPROGRAMS>java quadratic
Enter the Co-Efficient a
4
Enter the Co-Efficient b
5
Enter the Co-Efficient c
1
THANK YOU FOR ENTERRING THE CO-EFFICIENTS
ROOTS ARE IMAGINARY
ROOTS ARE -0.625+10.78862474979798
ROOTS ARE -0.625-10.78862474979798

C:\Users\Shreehari Kulkarni\Desktop\JAVALABPROGRAMS>javac quadratic.java
C:\Users\Shreehari Kulkarni\Desktop\JAVALABPROGRAMS>java quadratic
Enter the Co-Efficient a
4
Enter the Co-Efficient b
5
Enter the Co-Efficient c
1
THANK YOU FOR ENTERRING THE CO-EFFICIENTS
ROOTS ARE READ AND DISTINCT
FIRST ROOT IS -0.25
SECOND ROOT IS -1.0

C:\Users\Shreehari Kulkarni\Desktop\JAVALABPROGRAMS>
```

WRITE A PROGRAM TO CALCULATE SGPA OF THE STUDENT

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

public class lab2
{
    private static int n;
    private static String usn;
    private static String name;
    private static int credit[];
    private static double mark[];

    public static void read()
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the Number Of Subjects");
        n=sc.nextInt();
        credit=new int[n];
        mark=new double[n];
        System.out.println("Enter the name of the Student");
        name=sc.next();

        System.out.println("Enter the USN of The Student");
        usn=sc.next();

        System.out.println("Enter the Credits Of The Subject");
        for(int i=0;i<n;i++)
        {
            credit[i]=sc.nextInt();
        }
        System.out.println("Enter the Marks Of The Student In Corresponding Subjects");
```

```
for(int i=0;i<n;i++)
{
    mark[i]=sc.nextDouble();
}

public static int grade(double marks)
{
    if(marks>=90&&marks<=100)
    {
        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;
    }
}
```

```
}

else

{

    System.out.println("You Have Failed In This Subject");

    return 0;

}

}

public static double calculate()

{

    read();

    double sgpa;

    double sum_credits=0;

    double sum=0;

    int c;

    for(int i=0;i<n;i++)

    {

        c=grade(mark[i]);

        sum_credits+=credit[i];

        sum=sum+c*credit[i];

    }

    sgpa=(double)(sum/sum_credits);

    return sgpa;

}

public static void main(String[] args)

{

    Scanner sc=new Scanner(System.in);

    double sgpa=calculate();

    System.out.println("Name Of The Student is " + name);
```

```
System.out.println("SGPA OF THE STUDENT IS " + sgpa);  
}  
}
```

OUTPUT:

The screenshot shows a Microsoft Windows Command Prompt window titled "Command Prompt". The window displays the following text:

```
Microsoft Windows [Version 10.0.18362.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\Shreehari Kulkarni>set path=C:\Program Files\Java\jdk-14.0.2\bin

C:\Users\Shreehari Kulkarni>cd JAVA LAB PROGRAMS

C:\Users\Shreehari Kulkarni\Desktop>javac lab2.java

C:\Users\Shreehari Kulkarni\Desktop>java lab2
Enter the USN of The Student
153
Enter the Number Of Subjects
4
Enter the name of the Student
Hari
Enter the Credits Of The Subject
4
4
4
4
Enter the Marks Of The Student In Corresponding Subjects
95
99
99
85
Name Of The Student is Hari
SGPA OF THE STUDENT IS 9.45

C:\Users\Shreehari Kulkarni\Desktop>JAVA LAB PROGRAMS>
```

The window includes the standard Windows taskbar at the bottom with various icons and system status information.

LAB PROGRAM

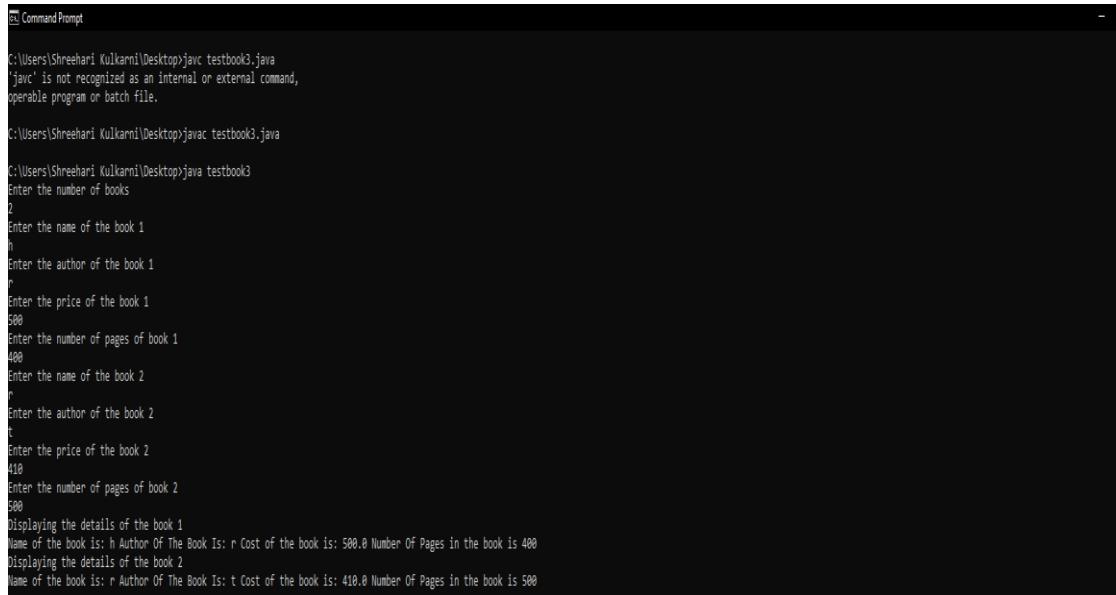
```
import java.io.*;
import java.lang.*;
import java.util.*;
public class book3
{
    public String name;
    public String author;
    public double price;
    public int no_of_pages;
    public book3(String n,String a,double pri,int pages)
    {
        name=n;
        author=a;
        price=pri;
        no_of_pages=pages;
    }
    @Override
    public String toString()
    {
        return "Name of the book is: " + name + " Author Of The Book Is: " + author + " Cost of the book
is: " + price + " Number Of Pages in the book is " + no_of_pages;
    }
}

import java.io.*;
import java.util.*;
import java.lang.*;
public class testbook3
{
```

```
public static String name;
public static String author;
public static double price;
public static int no_of_page;
public static void main(String[] args)
{
    Scanner sc=new Scanner(System.in);
    int n;
    System.out.println("Enter the number of books");
    n=sc.nextInt();
    book3[] ob=new book3[n];
    for(int i=0;i<n;i++)
    {
        System.out.println("Enter the name of the book " + (i+1));
        name=sc.next();
        System.out.println("Enter the author of the book " + (i+1));
        author=sc.next();
        System.out.println("Enter the price of the book " + (i+1));
        price=sc.nextDouble();
        System.out.println("Enter the number of pages of book " + (i+1));
        no_of_page=sc.nextInt();
        ob[i]= new book3(name,author,price,no_of_page);
        //ob[i]=new lab_program3(name,author,price,)
    }
    for(int i=0;i<n;i++)
    {
        System.out.println("Displaying the details of the book " + (i+1));
        //System.out.println();
        System.out.println(ob[i]);
    }
}
```

```
}
```

OUTPUT



```
C:\Users\Shreehari Kulkarni\Desktop>javac testbook3.java
'javac' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\Shreehari Kulkarni\Desktop>java testbook3
Enter the number of books
2
Enter the name of the book 1
h
Enter the author of the book 1
r
Enter the price of the book 1
500
Enter the number of pages of book 1
400
Enter the name of the book 2
t
Enter the author of the book 2
e
Enter the price of the book 2
410
Enter the number of pages of book 2
500
Displaying the details of the book 1
Name of the book is: h Author Of The Book Is: r Cost of the book is: 500.0 Number Of Pages in the book is 400
Displaying the details of the book 2
Name of the book is: t Author Of The Book Is: e Cost of the book is: 410.0 Number Of Pages in the book is 500
```

EXTRA PROGRAM1:

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

public class extra7
{
    public static String empid;
    public static String empname;
    public static double emphrs;
    public static double empbas;
    public static double emphra;
    public static double empda;
    public static double empit;
    public static double empgross;
    public static void read()
```

```
{  
Scanner sc=new Scanner(System.in);  
System.out.println("Enter the id of the employee");  
empid=sc.nextInt();  
System.out.println("Enter the name of the employee");  
empname=sc.next();  
System.out.println("Enter the number of hours an employee works in minutes");  
emphrs=sc.nextDouble();  
System.out.println("Enter the basic salary of the employee");  
empbas=sc.nextDouble();  
System.out.println("Enter thehra of the employee in percent");  
emphra=sc.nextDouble();  
System.out.println("Enter the da of the employee in percent");  
empda=sc.nextDouble();  
System.out.println("Enter the it of the employee");  
empit=sc.nextDouble();  
}  
  
public static double calc()  
{  
    read();  
    double time=0;  
    double i_d=0;  
    empgross=empbas+(empbas*emphra)/(100);  
    if(emphrs>200)  
    {  
        time=emphrs-200;  
        time=time/60;  
        System.out.println("Employee is eligible for Additional Payment");  
        i_d=time*100;  
        System.out.println("ADDITIONAL SALARY IS: " + i_d);  
        empgross=empgross+i_d;  
    }  
}
```

```

    }
else
{
    time=200-emphrs;
    time=time/60;
    System.out.println("Your Salary Will Be Cut If You Don't Perform Atleast 200 Minutes of
work");
    i_d=time*100;
    System.out.println("DECREASED SALARY IS: " + i_d);
    empgross=empgross-i_d;
}
return empgross;
}

public static void main(String[] args)
{
    double salary=calc();
    System.out.println("Name of the employee is " + empname);
    System.out.println("Id of the employee is " + empid);
    System.out.println("Basic Salary of the employee is " + empbas);
    System.out.println("Final Salary of the employee is " + salary);
}
}

```

OUTPUT

IS SHARED IN THE NEXT PAGE:

```

C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0-19041.572]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\Shreeshari_Kulkarni>set path="C:\Program Files\Java\jdk-14.0.2\bin"
C:\Users\Shreeshari_Kulkarni>cd JAVA\LABPROGRAMS
C:\Users\Shreeshari_Kulkarni\Desktop>javac extra7.java
C:\Users\Shreeshari_Kulkarni\Desktop\JAVA\LABPROGRAMS>java extra7
Enter the id of the employee
1BM9CS153
Enter the name of the employee
KULKARNI
Enter the number of hours an employee works in minutes
180
Enter the basic salary of the employee
40000
Enter thehra of the employee in percent
5
Enter the da of the employee in percent
5
Enter the it of the employee
5
Employee is eligible For Additional Payment
ADDITIONAL SALARY IS: 333.3333333333337
Name of the employee is KULKARNI
Id of the employee is 1BM9CS153
Basic Salary of the employee is 40000.0
Final Salary of the employee is 42333.33333333336

C:\Users\Shreeshari_Kulkarni\Desktop\JAVA\LABPROGRAMS>javac extra8.java
C:\Users\Shreeshari_Kulkarni\Desktop\JAVA\LABPROGRAMS>java extra8
Enter the id of the employee
1BM9CS153
Enter the name of the employee
KULKARNI
Enter the number of hours an employee works in minutes
180
Enter the basic salary of the employee
40000
Enter thehra of the employee in percent
5
Enter the da of the employee in percent
5
Enter the it of the employee
5
Your Salary Will Be Cut If You Don't Perform Atleast 200 Minutes of work
DECREASED SALARY IS: 33.33333333333333
Name of the employee is KULKARNI
Id of the employee is 1BM9CS153
Basic Salary of the employee is 40000.0
Final Salary of the employee is 41966.666666666664

C:\Users\Shreeshari_Kulkarni\Desktop\JAVA\LABPROGRAMS>

```

EXTRA 2:

```

import java.util.*;
import java.io.*;
import java.lang.*;
public class extra8
{
    public int years;
    public int months;
    public String name;
}
class age
{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        extra8[] ob=new extra8[2];
    }
}

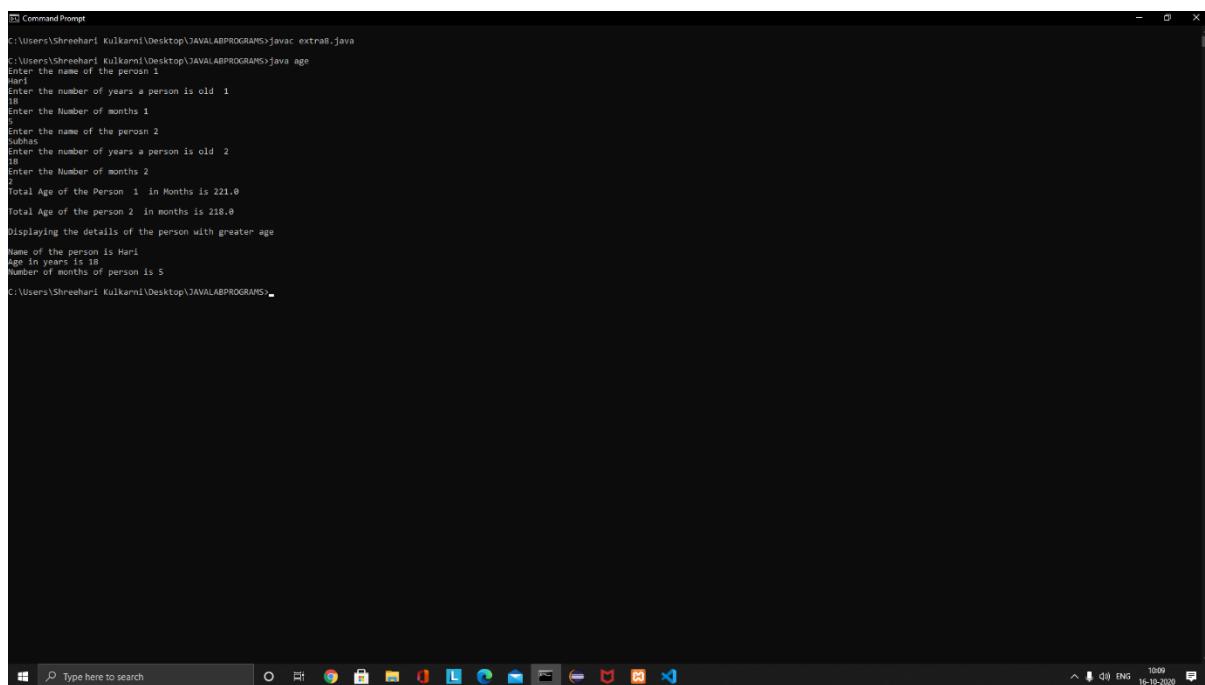
```

```
ob[0]=new extra8();
ob[1]=new extra8();
for(int i=0;i<2;i++)
{
    System.out.println("Enter the name of the person " + (i+1));
    ob[i].name=sc.next();
    System.out.println("Enter the number of years a person is old " + (i+1));
    ob[i].years=sc.nextInt();
    ob[i].years=ob[i].years*12;
    System.out.println("Enter the Number of months " + (i+1));
    ob[i].months=sc.nextInt();
}
double sum1=ob[0].years+ob[0].months;
System.out.println("Total Age of the Person " + " 1 " + " in Months is " + sum1);
System.out.println();
double sum2=ob[1].years+ob[1].months;
System.out.println("Total Age of the person 2 " + " in months is " + sum2);
System.out.println();
System.out.println("Displaying the details of the person with greater age ");
System.out.println();
if(sum1>sum2)
{
    display(ob[0]);
}
else
{
    display(ob[1]);
}
}

public static void display(extra8 ob)
```

```
{  
    System.out.println("Name of the person is " + ob.name);  
    System.out.println("Age in years is " + ob.years/12);  
    System.out.println("Number of months of person is " + ob.months);  
}  
}
```

OUTPUT:



The screenshot shows a Windows Command Prompt window titled 'Command Prompt'. The command 'javac extra8.java' is run from the directory 'C:\Users\Shreeshari Kulkarni\Desktop\JAVALABPROGRAMS'. The program 'java age' is then run, prompting for the name of two persons. The user inputs 'Harsh' for the first person and 'Subhas' for the second. Both are 18 years old and have 5 months. The total age in months for both is calculated as 221.0. Finally, the details of the person with greater age (Subhas) are displayed.

```
C:\Command Prompt  
C:\Users\Shreeshari Kulkarni\Desktop\JAVALABPROGRAMS>javac extra8.java  
C:\Users\Shreeshari Kulkarni\Desktop\JAVALABPROGRAMS>java age  
Enter the name of the person 1  
Harsh  
Enter the number of years a person is old 1  
18  
Enter the Number of months 1  
1  
Enter the name of the person 2  
Subhas  
Enter the number of years a person is old 2  
18  
Enter the Number of months 2  
2  
Total Age of the Person 1 in Months is 221.0  
Total Age of the person 2 in months is 218.0  
Displaying the details of the person with greater age  
Name of the person is Subhas  
Age in years is 18  
Number of months of person is 2  
C:\Users\Shreeshari Kulkarni\Desktop\JAVALABPROGRAMS>
```

Program to Calculate Area of triangle ,Rectangle,circle using abstract class

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

abstract class shape{
    int len,wid;

    shape(int l,int w)
    {
        len=l;
        wid=w;
    }

    abstract void printArea();
}
```

```
class rectangle extends shape
```

```
{
    rectangle(int a,int b)
    {
        super(a,b);
    }

    void printArea()
    {
        System.out.println("Area Of Rectangle is " + (len*wid));
    }
}
```

```
class triangle extends shape
{
    triangle(int a,int b)
    {
        super(a,b);
    }

    void printArea()
    {
        System.out.println("Area Of The Traingle Is " + ((len*wid)/2));
    }
}

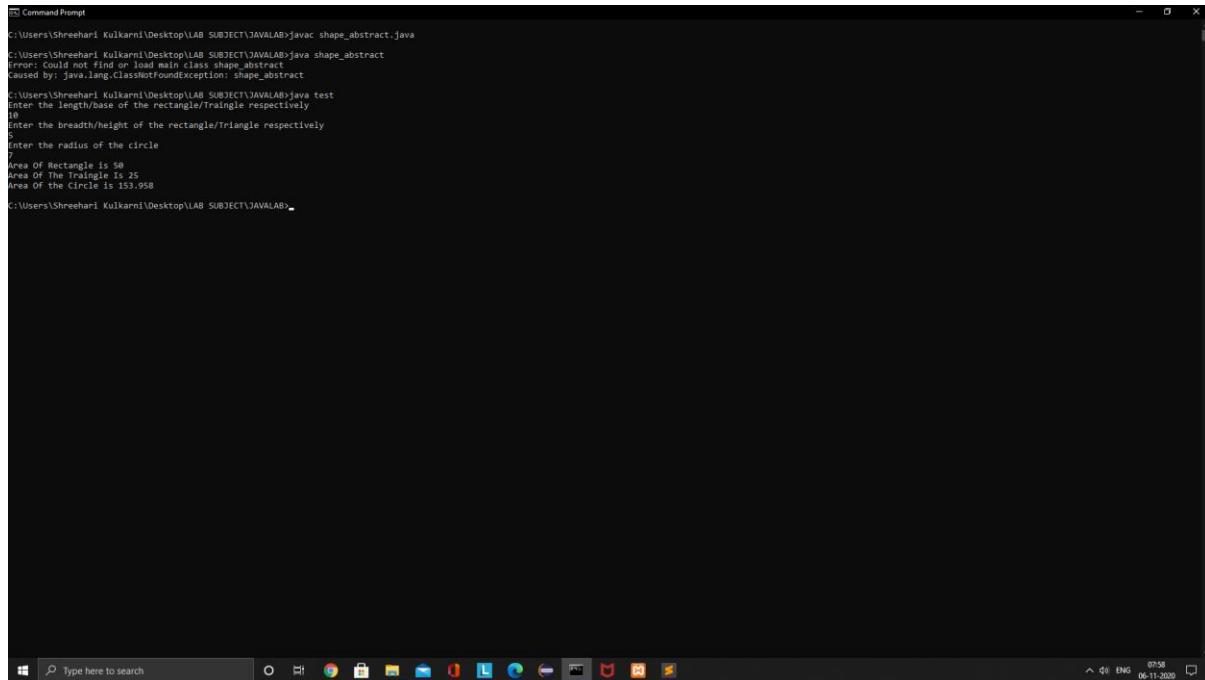
class circle extends shape
{
    circle(int r1,int r2)
    {
        super(r1,r2);
    }

    void printArea()
    {
        System.out.println("Area Of the Circle is " + (3.142*len*len));
    }
}

class test
{
    public static void main(String[] args)
    {
        int l,b,rad;
```

```
Scanner sc=new Scanner(System.in);
System.out.println("Enter the length/base of the rectangle/Triangle respectively ");
l=sc.nextInt();
System.out.println("Enter the breadth/height of the rectangle/Triangle respectively ");
");
b=sc.nextInt();
System.out.println("Enter the radius of the circle ");
rad=sc.nextInt();
shape s;
rectangle r=new rectangle(l,b);
triangle t=new triangle(l,b);
circle c=new circle(rad,rad);
s=r;
s.printArea(); //prints the area of the rectangle
s=t;
s.printArea(); //prints the area of the triangle
s=c;
s.printArea(); //prints the area of the circle
}
}
```

Output



The screenshot shows a Windows Command Prompt window titled "Command Prompt". The command `javac shape_abstract.java` is run, followed by `java shape_abstract`, which results in a `java.lang.ClassNotFoundException`. Then, `java test` is run, prompting for rectangle/triangle dimensions. Finally, the areas of a rectangle (50), triangle (25), and circle (153.958) are displayed.

```
C:\Users\Shreehari Kulkarni\Desktop\LAB SUBJECT\JAVA\LAB>javac shape_abstract.java
C:\Users\Shreehari Kulkarni\Desktop\LAB SUBJECT\JAVA\LAB>java shape_abstract
java: Could not find or load main class shape_abstract
Caused by: java.lang.ClassNotFoundException: shape_abstract
C:\Users\Shreehari Kulkarni\Desktop\LAB SUBJECT\JAVA\LAB>java test
Enter the length/base of the rectangle/triangle respectively
10
Enter the breadth/height of the rectangle/triangle respectively
5
Enter the radius of the circle
7
Area Of Rectangle is 50
Area Of The Triangle Is 25
Area Of The Circle Is 153.958
C:\Users\Shreehari Kulkarni\Desktop\LAB SUBJECT\JAVA\LAB>
```

Bank Program

```
import java.io.*;
import java.lang.*;
import java.util.*;
abstract class account
{
    String name;
    String acc_no;
    String type;
    double balance;

    account(String n,String a,String t,double b)
    {
        name=n;
        acc_no=a;
```

```

        type=t;
        balance=b;
    }

    abstract void deposit();
    abstract void display();
    abstract void withdraw();
    abstract void fine();
    abstract void inter();
}

class curr_acc extends account
{
    curr_acc(String n,String a,String t,double b)
    {
        super(n,a,t,b);
    }

    void fine()
    {
        if(balance<1000)
        {
            System.out.println("You Will Be Fined 500Rs Because Minimum balance In Your
Account Must be 1000 ");
            balance=balance-500;
            display();
        }
        else
        {
            System.out.println("You Will Not Be Charged Any Fine Thank You ");
            display();
        }
    }
}

```

```
}

void display()
{
    System.out.println("Name Of the Account Holder is " + name);
    System.out.println("Account Number of the Account Holder is " + acc_no);
    System.out.println("Type Of the Account od the Account Holder is " + type);
    System.out.println("Balance In Your Account is " + balance);
}

void deposit()
{
    double sum;
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter the Amount You Want To Deposit ");
    sum=sc.nextDouble();
    balance=balance+sum;
    display();
}

void withdraw()
{
    double sum;
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter the amount You Want To Withdraw ");
    sum=sc.nextDouble();
    balance=balance-sum;
    if(balance>1000)
    {
        display();
    }
}
```

```
        else
        {
            System.out.println("You Cannot Withdraw This Much Amount ");
            fine();
        }
    }

    void inter()
    {
        System.out.println("Your Account Type Is Not Eligible For Any Interest ");
    }
}

class sav_acc extends account
{
    sav_acc(String n,String a,String t,double b)
    {
        super(n,a,t,b);
    }

    void display()
    {
        System.out.println("Name Of the Account Holder is " + name);
        System.out.println();
        System.out.println("Account Number of the Account Holder is " + acc_no);
        System.out.println();
        System.out.println("Type Of the Account of the Account Holder is " + type);
        System.out.println();
        System.out.println("Balance In Your Account is " + balance);
        System.out.println();
    }
}
```

```
void withdraw()
{
    double sum;
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter the amount You Want To Withdraw ");
    System.out.println();
    sum=sc.nextDouble();
    balance=balance-sum;
    display();
}
```

```
void deposit()
{
    int sum;
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter the principal amount you want to submit ");
    sum=sc.nextInt();
    balance+=sum;
    display();
}
```

```
void inter()
{
    double r,t;
    double interest;
    double amount;
    double power;
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter the Rate of interest ");
```

```

r=sc.nextDouble();

System.out.println("Enter the Year of time Account has to be elapsed ");

t=sc.nextDouble();

power=Math.pow((1+((r)/(100))),t);

System.out.println(power);

amount=balance*power;

System.out.println(amount);

interest=amount-balance;

System.out.println("Interest Accumalted In Your Account is " + interest);

display();

System.out.println();

}

void fine()

{

System.out.println("You Have No Restriction On Your Minimum Balance Thank You!");

};

System.out.println();

}

class test

{

public static void main(String[] args)

{

account a;

Scanner sc=new Scanner(System.in);

String name,acc_num,typ;

```

```
int option;
double bal;

System.out.println("Enter the name of the account holder ");
name=sc.next();

System.out.println("Enter the Account Number ");
acc_num=sc.next();

typ="Current Account";

System.out.println("Enter the Minimum Balance in the account ");
bal=sc.nextDouble();

System.out.println();

System.out.println("1: Current Account ");
System.out.println("2: Savings Account ");
System.out.println("3: Exit");

System.out.println();

System.out.println("Enter your choice ");
option=sc.nextInt();

switch(option)
{
    case 1:
        curr_acc c=new curr_acc(name,acc_num,typ,bal);
        a=c;
        int counter;
        do
        {
            System.out.println("1: Check For Fine ");
            System.out.println("2: Deposit ");
            System.out.println("3: Withdraw ");
            System.out.println("4: Exit");
            System.out.println();
            System.out.println("Enter Your Choice ");

```

```
        counter=sc.nextInt();
        switch(counter)
        {
            case 1:
                a.fine();
                break;

            case 2:
                a.deposit();
                break;

            case 3:
                a.withdraw();
                break;

            case 4:
                System.exit(0);
                break;
        }
    }while(counter!=4);

    break;

    case 2:
        sav_acc s=new sav_acc(name,acc_num,typ,bal);
        a=s;
        int cnr;
        do
        {
```

```
System.out.println("1: Deposit ");

System.out.println("2: Withdraw ");

System.out.println("3: Interest");

System.out.println("4: Exit");

System.out.println();

System.out.println("Enter Your Choice ");

cnr=sc.nextInt();

switch(cnr)

{

    case 1:

        a.deposit();

        break;

    case 2:

        a.withdraw();

        break;

    case 3:

        a.inter();

    case 4:

        System.exit(0);

        break;

}

}while(cnr!=5);

break;

case 3:
```

```
        System.exit(0);

    break;

}

}

}

}
```

Output

```
Command Prompt - java test
C:\Users\Shreehari Kulkarni\Desktop\LAB SUBJECT\JAVA LAB>javac bank.java
C:\Users\Shreehari Kulkarni\Desktop\LAB SUBJECT\JAVA LAB>java test
Enter the name of the account holder
Harl
Enter the Account Number
IBM19CS153
Enter the Minimum Balance in the account
2000
1: Current Account
2: Savings Account
3: Exit
Enter your choice
1
1: Deposit
2: Withdraw
3: Interest
4: Exit
Enter Your Choice
1
Enter the principal amount you want to submit
500
Name Of the Account Holder is Harl
Account Number of the Account Holder is IBM19CS153
Type of the Account of the Account Holder is Current Account
Balance In Your Account is 2500.0
1: Deposit
2: Withdraw
3: Interest
4: Exit
Enter Your Choice
```

INTERNALS 2

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



OOJ LAB RECORD

Submitted by

SHREEHARI KULKARNI (1BM19CS153)

Under the Guidance of

Prof. PANIMOZHI K
Assistant Professor, BMSCE

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
Sep-2020 to Jan-2021

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 RECORD carried out by **SHREEHARI KULKARNI (1BM19CS153)** who is the bonafide students 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 Visveswaraiah Technological University, Belgaum during the year 2020-2021. The lab report has been approved as it satisfies the academic requirements in respect of **OOJ LAB RECORD (19CS3PCOOJ)** work prescribed for the said degree.

Signature of the Guide
Prof. Prof. PANIMozhi K
Assistant Professor
CSE
BMSCE, Bengaluru

Signature of the HOD
Dr. Umadevi V
Associate Prof.& Head, Dept. of
BMSCE, Bengaluru

External Viva

Name of the Examiner

Signature with date

6:Create a package CIE which has two classes- Student and Internals.
The class Personal has

members like usn, name, sem. The class internals has an array that stores the internal marks

scored in five courses of the current semester of the student. Create another package SEE

which has the class External which is a derived class of Student. This class has an array that

stores the SEE marks scored in five courses of the current semester of the student. Import the

two packages in a file that declares the final marks of n students in all five courses.

```
package cie;  
  
import java.util.*;  
  
  
public class internals extends student  
{  
    public int[] a=new int[5];  
  
    public void read()  
    {  
        super.read();  
        Scanner sc=new Scanner(System.in);  
        System.out.println("Enter the CIE marks of 5 courses ");  
        for(int i=0;i<5;i++)  
        {  
            System.out.println("Enter marks of the course " + (i+1));  
            a[i]=sc.nextInt();  
        }  
    }  
}
```

```
    }
}

public void display()
{
    System.out.println("USN of the student is " + usn);
    System.out.println("Name of the student is " + name);
    System.out.println("Semester of the student is " + sem);
}

}

package cie;
import java.util.*;
public class student
{
    public String usn;
    public String name;
    public int sem;

    public void read()
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the usn of the student ");
        usn=sc.next();
        System.out.println("Enter the name of the student ");
        name=sc.next();
        System.out.println("Enter the semester of the student ");
        sem=sc.nextInt();
    }
}

package see;
```

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

public class external extends cie.student
{
    public int[] b=new int[5];
    public int[] mar;
    public void read()
    {
        Scanner sc=new Scanner(System.in);
        for(int i=0;i<5;i++)
        {
            System.out.println("Enter the SEE marks of the course " + (i+1));
            b[i]=sc.nextInt();
        }
    }
}
```

```
import java.util.*;
import java.io.*;
import java.lang.*;
import cie.*;
import see.*;

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

```

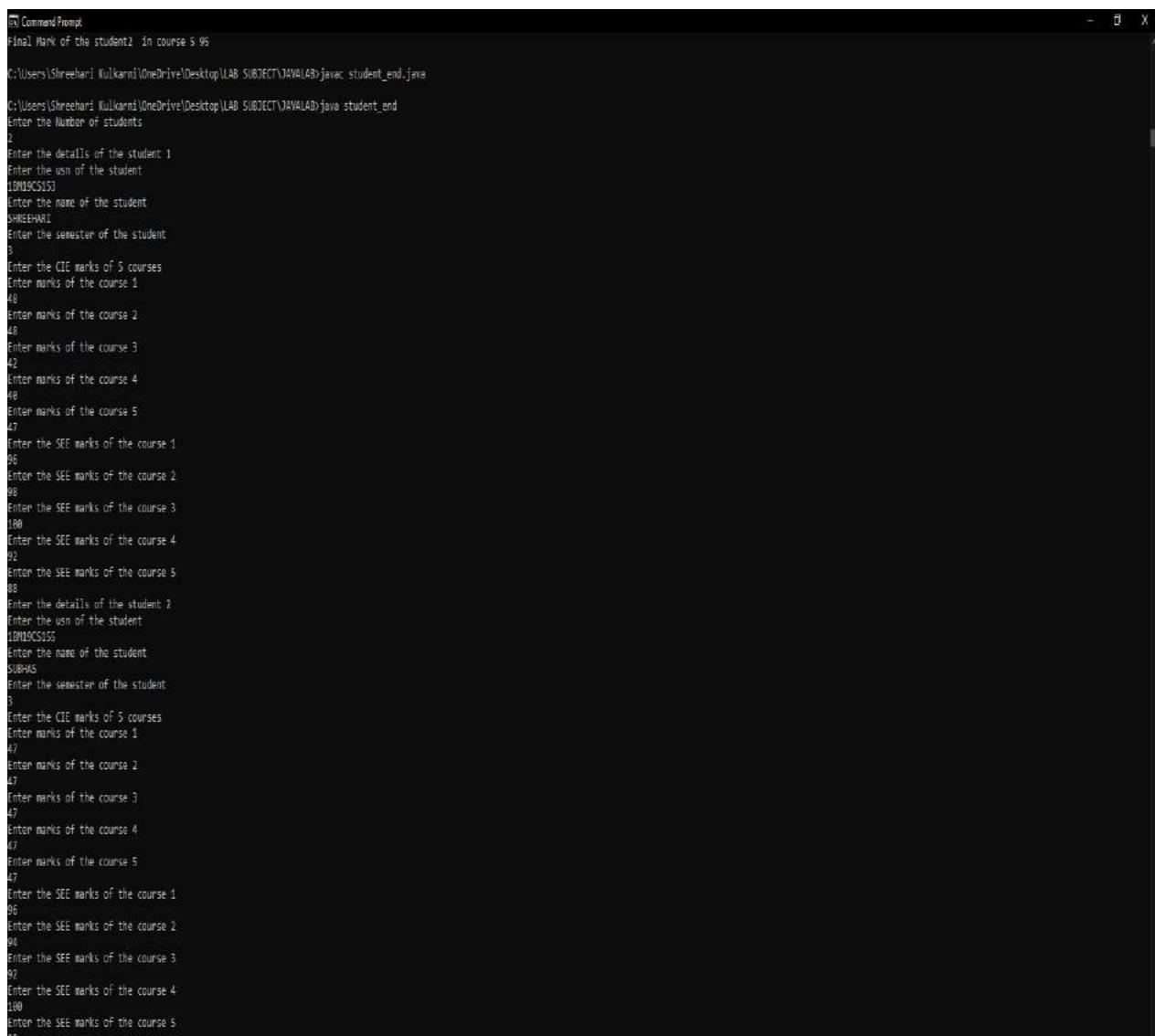
int n;
Scanner sc=new Scanner(System.in);
int final_mark;
System.out.println("Enter the Number of students ");
n=sc.nextInt();
internals[] in=new internals[n];
external[] ex=new external[n];
internals ob1=new internals();
external ob2=new external();
ob2.mar=new int[n];

for(int i=0;i<n;i++)
{
    System.out.println("Enter the details of the student " + (i+1));
    in[i]=new internals();
    in[i].read();
    ex[i]=new external();
    ex[i].read();
}
System.out.println();
for(int i=0;i<n;i++)
{
    System.out.println("*****Details Of The
Student***** " + (i+1));
    System.out.println("USN of the student is " + in[i].usn);
    System.out.println("Name of the stuednt is " + in[i].name);
    System.out.println("Semester of the student is " + in[i].sem);
    for(int j=0;j<5;j++)
    {
        final_mark=in[i].a[j]+((ex[i].b[j])/2);
        System.out.println("Final Mark of the student " + (i+1) + " " + " in course "
+ (j+1) + " " + final_mark);
    }
}

```

```
        }  
        System.out.println();  
    }  
  
}  
  
}
```

OUTPUT:



```
Command Prompt  
Final Mark of the student2 in course 5 95  
C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVA\LAB>javac student_end.java  
C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVA\LAB>java student_end  
Enter the Number of students  
2  
Enter the details of the student 1  
Enter the usn of the student  
10M19CS153  
Enter the name of the student  
SHREEHARI  
Enter the semester of the student  
3  
Enter the CIE marks of 5 courses  
Enter marks of the course 1  
48  
Enter marks of the course 2  
48  
Enter marks of the course 3  
42  
Enter marks of the course 4  
48  
Enter marks of the course 5  
47  
Enter the SEE marks of the course 1  
96  
Enter the SEE marks of the course 2  
98  
Enter the SEE marks of the course 3  
100  
Enter the SEE marks of the course 4  
92  
Enter the SEE marks of the course 5  
88  
Enter the details of the student 2  
Enter the usn of the student  
10M19CS155  
Enter the name of the student  
SUBHAM  
Enter the semester of the student  
3  
Enter the CIE marks of 5 courses  
Enter marks of the course 1  
47  
Enter marks of the course 2  
47  
Enter marks of the course 3  
47  
Enter marks of the course 4  
47  
Enter marks of the course 5  
47  
Enter the SEE marks of the course 1  
96  
Enter the SEE marks of the course 2  
98  
Enter the SEE marks of the course 3  
92  
Enter the SEE marks of the course 4  
100  
Enter the SEE marks of the course 5  
98
```

```
21 Command Prompt
100
Enter the SEE marks of the course 5
98

USN of the student is 18M10CS153
Name of the student is SHREEHARTI
Semester of the student is 3
Final Mark of the student1 in course 1 96
Final Mark of the student1 in course 2 97
Final Mark of the student1 in course 3 92
Final Mark of the student1 in course 4 86
Final Mark of the student1 in course 5 91

USN of the student is 18M10CS155
Name of the student is SUBHAS
Semester of the student is 3
Final Mark of the student2 in course 1 95
Final Mark of the student2 in course 2 94
Final Mark of the student2 in course 3 93
Final Mark of the student2 in course 4 97
Final Mark of the student2 in course 5 96

C:\Users\Shreeharti\kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVA LAB>
```

7: Write a program to demonstrate generics with multiple object parameters.

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

class gen<T>
{
    T ob;
    gen(T o)
    {
        ob=o;
    }
    T getob()
    {
        return ob;
    }
    void showtype()
    {
        System.out.println("Type of T is " + ob.getClass().getName());
    }
}

class generic
{
    public static void main(String[] args)
    {
        String n;
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the Integer Number to Be Displayed Using the generic style");
    }
}
```

```
n=sc.nextInt();

gen<Integer> ob1=new gen<Integer>(Integer.parseInt(n));

ob1.showtype();

int val=ob1.getob();

System.out.println("Value is: " + val);

System.out.println();

System.out.println("Enter the String to Be Displayed Using the generic style");

n=sc.nextInt();

gen<String> ob2=new gen<String>(n);

ob2.showtype();

String x=ob2.getob();

System.out.println("Value : " + x);

System.out.println();

System.out.println("Enter the Double Number to Be Displayed Using the generic style");

n=sc.nextInt();

gen<Double> ob3=new gen<Double>(Double.parseDouble(n));

ob3.showtype();

double ans=ob3.getob();

System.out.println("Value : " + ans);

}

}
```

OUTPUT:

```
C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVA\LAB>javac generic.java
C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVA\LAB>java generic
Enter the Integer Number to Be Displayed Using the generic style
25
Type of T is java.lang.Integer
Value is: 25

Enter the String to Be Displayed Using the generic style
Hari
Type of T is java.lang.String
Value : Hari

Enter the Double Number to Be Displayed Using the generic style
550.55
Type of T is java.lang.Double
Value : 550.55

C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVA\LAB>
```

8: Write a program that demonstrates handling of exceptions in inheritance tree. Create a base

class called “Father” and derived class called “Son” which extends the base class. In Father

class, implement a constructor which takes the age and throws the exception Wrong Age()

when the input age<0. In Son class, implement a constructor that cases both father and son’s

age and throws an exception if son’s age is >=father’s age.

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

class Wrongage extends Exception
{
    public int a;
    Wrongage(int x)
    {
        a=x;
    }

    public String toString()
    {
        return "Wrongage[" + a + "]";
    }
}

class father
{
    public int age;
```

```
father(int a)
{
    age=a;
}

public void check() throws Wrongage
{
    System.out.println("Checking the age of the father ");
    System.out.println();
    if(age<0)
        throw new Wrongage(age);
    System.out.println("Correct Age");
}
```

```
class son extends father
{
    public int son_age;
    son(int fa_age,int i)
    {
        super(fa_age);
        son_age=i;
    }
    public void check() throws Wrongage
    {
        super.check();
        System.out.println();
        System.out.println("Checking the age of the Son ");
        System.out.println();
        if(son_age<0||son_age>age)
            throw new Wrongage(son_age);
        System.out.println("Correct Age");
```

```
    }

}

public class errortest

{

    public static void main(String[] args)

    {

        int so_age,father_age;

        Scanner sc=new Scanner(System.in);

        System.out.println("Enter the Age Of The Father ");

        father_age=sc.nextInt();

        System.out.println("Enter the age of the son ");

        so_age=sc.nextInt();

        son s=new son(father_age,so_age);

        try

        {

            s.check();

        }catch(Wrongage w)

        {

            System.out.println("Exception: " + w);

        }

    }

}
```

OUTPUT:

```
C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVALAB>javac errortest.java
C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVALAB>java errortest
Enter the Age Of The Father
22
Enter the age of the son
00
Checking the age of the father

Correct Age
Checking the age of the son

Exception: Wrongage[00]
C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVALAB>
```

9: Write a program which creates two threads, one thread displaying “BMS College of

Engineering” once every ten seconds and another displaying “CSE” once every two seconds.

```
import java.util.*;
import java.io.*;
import java.lang.*;
class newthread implements Runnable
{
    Thread t;
    newthread()
    {
        t=new Thread(this,"CSE");
        System.out.println("CHILD THREAD: " + t);
    }
    public void run()
    {
        try{
            for(;;)
            {
                System.out.println("CSE");
                Thread.sleep(2000);
            }
        }catch(InterruptedException e){
            System.out.println("CSE Thread interrupted ");
        }
        System.out.println("Exiting The CSE Thread");
    }
}
```

```
class thread
{
    public static void main(String[] args)
    {
        newthread nt=new newthread();
        nt.t.start();
        try{
            for(;;)
            {
                System.out.println("BMS COLLEGE OF ENGINEERING");
                Thread.sleep(10000);
            }
        }catch(InterruptedException e){
            System.out.println("Main Thread Interrupted: ");
        }
        System.out.println("Exiting out of the main thread ");
    }
}
```

OUTPUT:

```
Command Prompt - java thread
Microsoft Windows [Version 10.0.19041.630]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\Shreehari Kulkarni>set path="C:\Program Files\Java\jdk-14.0.2\bin"

C:\Users\Shreehari Kulkarni>cd onedrive

C:\Users\Shreehari Kulkarni\OneDrive>cd desktop

C:\Users\Shreehari Kulkarni\OneDrive\Desktop>cd lab subject

C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT>cd javalab

C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVALAB>javac thread.java

C:\Users\Shreehari Kulkarni\OneDrive\Desktop\LAB SUBJECT\JAVALAB>java thread
CHILD THREAD: Thread[CSE_5,main]
BMS COLLEGE OF ENGINEERING
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING
CSE
```

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

```
import java.awt.*;
import java.awt.event.*;
import java.util.*;
import java.io.*;
import java.lang.*;

public class divgui extends WindowAdapter implements ActionListener
{
    Button div;
    Dialog d;
    Dialog d1;
    TextField num1;
    TextField num2;
    TextField ans;
    Label l1;
    Frame f;
    String n1,n2;
    //MyWindowAdapter mwa;

    public divgui()
    {
        Scanner sc=new Scanner(System.in);
        f=new Frame("INTEGER DIVISION");
        div=new Button("DIVIDE");
        div.addActionListener(this);
        l1=new Label("CLICK ON BUTTON TO DIVIDE");
        num1=new TextField("NUMBER 1");
        num2=new TextField("NUMBER 2");
    }
}
```

```

ans=new TextField("ANSWER");

f.add(l1);

f.add(num1);

f.add(num2);

f.add(ans);

f.add(div);

f.setSize(800,800);

f.setVisible(true);

f.setLocationRelativeTo(f);

f.setLocation(new Point(400,200));

f.setLayout(new FlowLayout());

f.addWindowListener(new MyWindowAdapter());

}

public void actionPerformed(ActionEvent ae)

{

if(ae.getActionCommand().equals("DIVIDE"))

{

try

{



int a=Integer.parseInt(num1.getText());

int b=Integer.parseInt(num2.getText());

int c=a/b;

ans.setText(Integer.toString(c));

}catch(ArithmaticException e){

d=new Dialog(f,"ERROR",true);

Label l2=new Label("You Divided By Zero Please Enter the correct

value");

d.add(l2);

d.addWindowListener(this);

d.pack();

d.setLocationRelativeTo(f);

d.setLocation(new Point(100,100));

```

```
        d.setSize(500,500);

        d.setVisible(true);

    }catch(NumberFormatException e){

        d=new Dialog(f,"ERROR",true);

        Label l2=new Label("You Have Entered The Wrong Format Of
Number , Please Enter Correctly");

        d.add(l2);

        d.addWindowListener(this);

        d.pack();

        d.setLocationRelativeTo(f);

        d.setLocation(new Point(100,100));

        d.setSize(500,500);

        d.setVisible(true);

    }

}

public void windowClosing(WindowEvent we)

{

    d.setVisible(false);

//f.setVisible(false);

}

public static void main(String[] args)

{

    divgui obj=new divgui();

}

class MyWindowAdapter extends WindowAdapter{

    public void windowClosing(WindowEvent we){

        System.exit(0);

    }

}
```

}

OUTPUT:

A screenshot of a digital calculator interface titled "INTEGER DIVISION". The title bar includes standard window controls (minimize, maximize, close). Below the title, there is a text input field containing the instruction "CLICK ON BUTTON TO DIVIDE". Below this, there are three input fields for numbers: the first contains "15", the second contains "4", and the third contains "3". To the right of these input fields is a button labeled "DIVIDE".

WRITEUP DOCUMENTS

6:Create a package CIE which has two classes- Student and Internals. The class Personal has

members like usn, name, sem. The class internals has an array that stores the internal marks

scored in five courses of the current semester of the student. Create another package SEE

which has the class External which is a derived class of Student. This class has an array that

stores the SEE marks scored in five courses of the current semester of the student.
Import the

two packages in a file that declares the final marks of n students in all five courses.

Date _____ / _____ / _____

Package programm
package cie;

import java.util.*;

public class Student

{

 public String usn;

 public String name;

 public int sem;

 public void read()

{

 Scanner sc = new Scanner(System.in);
 System.out.println("Enter the usn of the student");

 usn = sc.next();

 System.out.println("Enter the name of the student");
 name = sc.next();

 System.out.println("Enter the semester of the student");

 Sem = sc.nextInt();

{

package cie;

import java.util.*;

public class Internals extends Student

{

 public int[] a = new int[5];

 public void main read()

{

 super.read();

```

Scanner sc=new Scanner (System.in);
System.out.println ("Enter the CIE marks of 5
courses");
for(int i=0; i<5; i++)
{
    System.out.println ("Enter marks of the course"
+ (i+1));
    a[i]=sc.nextInt();
}
public void display ()
{
    System.out.println ("USN of the Student is "+usn);
    System.out.println ("Name of the Student is "+name);
    System.out.println ("Semester of the Student is "+sem);
}

```

Package Sce;

```

import java.util.*;
import java.io.*;
import java.lang.*;

```

Public class external extends cie.Student

```

{
    Public int [] b=new int [5];
    Public int [] mark;
    Public Void read ()
}

```

```

Scanner sc=new Scanner (System.in);
for (int i=0; i<5; i++)

```

Date / /

```

    {
        System.out.println("Enter the SEE  

                           of the cause "+(i+1));
        b[i]=sc.nextInt();
    }
}

```

```

import java.util.*;
import java.io.*;
import java.lang.*;
import cie;
import See.*;

```

Public class Student_end

```

{
    Public static void main (String [] args)
    {
        int n;
        Scanner sc=new Scanner (System.in);
        int final mark;
        System.out.println ("Enter the Number of");
        n=sc.nextInt();
        internals [] in=new internals [n];
        externals [] ex=new externals [n];
        internals ob1=new internals ();
        externals ob2=new externals ();
        ob2.mark=new int [n];
        for (int i=0; i<n; i++)
        {
            in[i]=ob1;
            ex[i]=ob2;
        }
    }
}

```

System.out.println("Enter the details of
the Student" + (i+1));

int[i] = new internal();

int[i].read();

ex[i] = new external();

ex[i].read();

}

System.out.println();

for (int i=0; i<n; i++)

{

System.out.println("***** Details student
*****" + (i+1));

System.out.println("USN of the Student is" +
in[i].usn);

System.out.println("Name of the Student is" +
in[i].name);

System.out.println("Semester of the Student
is" + in[i].sem);

for (int i=0; i<5; i++)

{

final_mark = in[i].a[i] + (ex[i].b[i]/2);

System.out.println("Final mark of the Student
" + (i+1) + " in course" + (i+1) + " " +
final_mark);

}

System.out.println();

{}

}

7:Write a program to demonstrate generics with multiple object parameters.

8: Write a program that demonstrates handling of exceptions in inheritance tree. Create a base

class called “Father” and derived class called “Son” which extends the base class. In Father

class, implement a constructor which takes the age and throws the exception Wrong Age()

when the input age<0. In Son class, implement a constructor that cases both father and son’s

age and throws an exception if son’s age is >=father’s age.

Generic Programs:

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

```
class gen<T>
```

```
{
```

```
    T ob
```

```
    gen<T>()
```

```
        ob = 0;
```

```
}
```

```
    T getob()
```

```
{
```

```
    return ob
```

```
}
```

```
void Showtype
```

```
{
```

```
    System.out.println("Type of T is: " +
```

```
        ob.getClass()
```

```
.getClassName());
```

```
}
```

```
}
```

```
class generic
```

```
{  
    public static void main(String args)
```

```
        String n;
```

```
        Scanner sc = new Scanner(System.in);  
        System.out.println("Enter the integer  
        Number to  
        be displayed")
```

```
"");
```

```
n = sc.nextInt();
```

```
gen<Integer> ob1 = new gen<Integer>
```

```
(Integer.parseInt  
(n));
```

```
ob1.showType();
```

```
int val = ob1.getob();
```

```
System.out.println("Value is: "+val);
```

```
System.out.println("Enter the string");
```

```
n = sc.nextInt();
```

```
gen<String> ob2 = new gen<String>(n);
```

```
ob2.showType();
```

```
String x = ob2.getob();
```

```
System.out.println("Value: "+x);
```

Date

System.out.println ("Enter the Double Number")

n = sc.nextInt();

gen<Double> ob3 = new gen<Double>

Double para

Double

11

15

ob3.showtype();

doublesans = ob3.getob();

System.out.println ("Value: " + ans);

}

}

Exception program

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

```
class Wrongage extends Exception
```

```
{ public int a
```

```
Wrongage (int x)
```

```
{ a = x;
```

```
} public String toString()
```

```
{ return "Wrongage[" + a + "]"; }
```

```
}
```

```
class father
```

```
{ public int age;
```

```
father (int a)
```

```
{ age = a;
```

```
} public void check () throws Wrongage
```

```
System.out.println ("Checking age of  
father");
```

```
System.out.println();
```

```
if (age < 0)
```

```
    throw new Wrongage (age);
```

```
System.out.println ("Correct age");
```

```
}
```

Date / /

class son extends father

{
public int son-age;
son/int fa-age, int;}

super(fa-age);
son-age = 11;

{

public void check() throws WrongAge

{super.check();

System.out.println();

System.out.println("Checking age of son");

System.out.println();

if (son.age < 0 || son-age > age)
throw new WrongAge("son")

System.out.println("Correct age");

}

}

public class erector

public static void main (String [] args)

int so-age, father-age;
 Scanner sc = new Scanner (System.in);
 System.out.print ("Enter the age of
 father ");

father-age = sc.nextInt();

System.out.print ("Enter the age
 of son ");

so-age = sc.nextInt();

Son s = new Son (father-age,
 so-age);

try

s.check();
 catch (WrongAge w)

System.out.println ("Exception :-
 " + w);

}

{

{

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

```
import java.util.*;  
import java.io.*;  
class newthread implements Runnable
```

```
{  
    Thread t;  
    newthread()  
{
```

```
    t = new Thread(this, "CSE");  
    System.out.println(t);
```

```
    public void run()  
{
```

```
        try {  
            for(;;)
```

```
                System.out.println("CSE");  
                Thread.sleep(2000);
```

```
        } catch(InterruptedException e)  
{
```

```
            System.out.println("child interrupted")
```

```
        System.out.println("Exit")  
    }
```

class thread

{

public static void main (String [] args)

newthread nt = newthread () ;

nt . t . start () ;

try { for (;;) {

System.out.println ("BMS COLLEGE
OF ENGI
NEERING")

Thread.sleep (1000) ;

} catch (InterruptedException e) {

System.out.println ("Program
Interrupted") ;

System.out.println ("Exit") ;

}

}

10:Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

AWT Program:

Date / /

Saathi

```
import java.awt.*;
import java.awt.event.*;
import java.util.*;
```

```
public class extends WindowAdapter implements
ActionListener
```

{

```
Button div;
Dialog d, d1;
TextField num1, num2;
TextField ans;
Label l1;
Frame f;
String n1, n2;
public void()
{
```

```
Scanner sc = new Scanner(System.in);
f = new Frame("INTEGER DIVISION");
div = new Button("DIVIDE");
div.addActionListener(this);
l1 = new Label("CLICK ON BUTTON TO
DIVIDE");
```

```
num1 = new TextField("NUMBER 1");
num2 = new TextField("NUMBER 2");
ans = new TextField("ANSWER");
f.add(l1);
f.add(num1);
f.add(num2);
f.add(ans);
f.add(div);
```

Date _____ / _____ / _____

- f. setSize(800, 800);
- f. setVisible(true);
- f. setLocationRelativeTo(f);
- f. setLocation(new Point(400, 200))
- f. setLayout(new FlowLayout());

}

public void actionPerformed(ActionEvent ae)

} if (ae.getActionCommand().equals("DIVIDE"))

try

int a = Integer.parseInt(num1.getText());
 int b = Integer.parseInt(num2.getText());
 int c = a/b

ans. setText(" " + (Integer.toString(c)))

} catch (ArithmaticException e) {

d = new Dialog(f, "ERROR", true)

Label l2 = new Label("You divided
By zero");

d.add(l2);

d.addWindowListener(this);

d.pack();

d.setLocationRelativeTo(f);

d.setLocation(new Point(100, 100));

d.setSize(500, 500);

d.setVisible(true);

} catch (NumberFormatException e) {

d = new Dialog(f, "ERROR", true);
 Label l2 = new Label("You have Entered wrong
format");

d.add(l2);

d.addWindowListener(lis);

d.pack();

d.setLocationRelativeTo(f);

d.setLocation(new Point(100, 100));

d.setSize(500, 500);

d.setVisible(true);

}

}

}

public void windowClosing(WindowEvent)

d.setVisible(false);

7

public static void main(String[] args)

Dirgui obj = new Dirgui();

7

class MyWindowAdapter extends Window

Adapter {

public void windowClosing(WindowEvent)

System.out.println("Window closing");