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OOJ LAB RECORD

## Program 1:

Develop a Java program that prints all real solutions to the quadratic equation  $ax^2 + bx + c = 0$ .

Read in  $a$ ,  $b$ ,  $c$  and use the quadratic formula. If the discriminant  $b^2 - 4ac$  is negative, display a message stating that there are no real solutions.

## Program 1

Q) Read in  $a, b, c$  use the quadratic formula to find the roots.

```
import java.util.*;  
class quadratic  
{  
    public static void main (String args)  
    {  
        Scanner sc = new Scanner (System.in)  
        int (a,b,c);  
        double d, r1, r2;  
        System.out.println ("Enter values of a, b, c");  
        a = sc.nextInt();  
        b = sc.nextInt();  
        c = sc.nextInt();  
        d = b*b - (4*a*c);  
        if (d<0)  
            System.out.println ("no real solution");  
        else  
        {  
            d= Math.sqrt(d);  
            r1 = (-b+d)/(2.0*a);  
            System.out.println ("roots are real");  
            System.out.println ("roots are: "+r1+" and "+r2);  
        }  
    }  
}
```

The screenshot shows the Geany IDE interface with two tabs open: `sgpa.java` and `1.java`. The `1.java` tab contains the following code:

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

The Command Prompt window shows the following output:

```
Microsoft Windows [Version 10.0.19041.685]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\Dr.sunil>cd desktop\oopj2mer\System.in;
C:\Users\Dr.sunil>int a,b,c;
C:\Users\Dr.sunil>1.java
1.java:24: error: reached end of file while parsing > and c in a quadratic equation"
      }
           ^
      ~~~~ nextInt();
      bsc.nextInt();
      csc.nextInt();
      ~~~~ nextInt();
      ~~~~ nextInt();

C:\Users\Dr.sunil>Desktop\oopj2>javac 1.java
      System.out.println("no real solution");
C:\Users\Dr.sunil>Desktop\oopj2>java quadratic
enter values of a b and c in a quadratic equation
1 -3 -10
d=Math.sqrt(d);
no real solution  r=(-b+d)/(2.0f);
C:\Users\Dr.sunil>Desktop\oopj2>1 -3 -10
"1" is not recognized as an internal or external command,
operable program or batch file.  roots of the equation are "+r1+" and "+r2+";

C:\Users\Dr.sunil>Desktop\oopj2>java quadratic
enter values of a b and c in a quadratic equation
1 -3 -10
roots are real
roots of the equation are 5.0 and -2.0 \Desktop\oPS)
```

The status bar at the bottom indicates: line: 25 / 26 col: 1 sel: 0 INS TAB mode: CRLF encoding: UTF-8 filetype:Java scope:quadratic.

## Program 2:

Develop a Java program to create a class Student with members usn, name, an array

credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

## Program 2:

Develop a Java program

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

```
class student
```

```
{
```

```
String usn, name;
```

```
static int credits[];
```

```
static double marks[];
```

```
void input (int n)
```

```
{
```

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

```
System.out.println ("Enter name and usn:");
```

```
usn = sc.nextLine();
```

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

```
System.out.println ("Enter marks along with credits");
```

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

```
{
```

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

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

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

```
}
```

```
}
```

```
double calculate (int n)
```

```
{
```

```
int c, cred = 0;
```

```
double tot, totall = 0.0; // total marks and total credits
```

```
(tot + totall) / (n * 100) * 100
```

```

for (int i=0; i<n; i++)
{
    (" name & marks[i] ") along with its pe
    int tot = marks[i];
    if (tot >= 90)
        c=10;
    else if (tot >= 80)
        c=9;
    else if (tot >= 70)
        c=8;
    else if (tot >= 60)
        c=7;
    else if (tot >= 50)
        c=6;
    else if (tot >= 40)
        c=5;
    else
        c=0;
    total = total + (c * credits[i]);
    cred = cred + credits[i];
}
total = total / cred;
return (total);
}

void display (int n, float total);
{
    System.out.println (" name of student: " + name);
}

```

```

System.out.println ("Enter student ID: ");
String id = sc.nextLine();

System.out.println ("Enter marks for all subjects: ");
String marksStr = sc.nextLine();
String[] marksArr = marksStr.split(" ");

System.out.println ("Enter credit for each subject: ");
String creditsStr = sc.nextLine();
String[] creditsArr = creditsStr.split(" ");

int n = marksArr.length;
double[] marks = new double[n];
double[] credits = new double[n];

for (int i=0; i < n; i++) {
    marks[i] = Double.parseDouble(marksArr[i]);
    credits[i] = Double.parseDouble(creditsArr[i]);
}

double total = 0.0;
for (int i=0; i < n; i++) {
    total += marks[i] * credits[i];
}

System.out.println ("Total marks: " + total);
System.out.println ("Average marks: " + (total / n));
System.out.println ("Percentage: " + ((total / n) * 100));
System.out.println ("Grade: " + calculateGrade((total / n)));

```

```
sgpa.java 1.java 2.java
File Edit Search View Document Project Build Tools Help
New Open Save Save All Revert Close Back Forward Compile Build Execute Color Chooser Find Jump to Quit
Documents sgpa.java 1.java 2.java
~\Des_p\ojoj2
1.java
2.java
D:\DK\bin
sgpa.java
Command Prompt
48.1 void display(int n float totall)
C:\Users\Dr.sunil\Desktop\ojoj2>javac 2.java
student : "sunil"
System.out.println("marks of student along with credits of course");
C:\Users\Dr.sunil\Desktop\ojoj2>java student
enter no of course
4
System.out.println(marks[i]+" "+credits[i]);
enter usn and name
1bm18cs021 abhinav
System.out.println("sgpa of student : "+totall);
abhinav
enter marks along with credits
Status gcc -Wall "IL" "IL.c" (in directory: C:\Users\Dr.sunil\Desktop\DS)
Compiler Compilation: C:\Users\Dr.sunil\Desktop\ojoj2>
Messages
Scribble
Activate Windows
Go to Settings to activate Windows.
line: 73 / 73 col: 0 sel: 0 INS TAB mode:CRLF encoding:UTF-8 filetype:Java scope:unknown
11:30 PM 12/28/2020
```

## Program 3:

Create a class Book which contains four members: name, author, price, num\_pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a `toString()` method that could display the complete details of the book. Develop a Java program to create n book objects.

### Program 3

```
import java.util.*;  
class book  
{  
    String name, author;  
    int price, num, pages;  
    book (String name, String a, int p, int n, int pgs)  
    {  
        name = name;  
        author = a;  
        price = p;  
        num = n;  
        pages = pgs;  
    }  
    static String accept_name()  
    {  
        Scanner sc = new Scanner (System.in);  
        System.out.println ("Enter name of the book:");  
        return (sc.nextLine());  
    }  
    static String accept_author()  
    {  
        Scanner sc = new Scanner (System.in);  
        System.out.println ("Enter the name of author:");  
        return (sc.nextLine());  
    }  
    static int accept_pages()  
    {
```

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

```

BookMain.java - C:\Users\Dr.sunil\Desktop\ooj2 - Geany
File Edit Search View Document Project Build Tools Help
New Open Save Save All Revert Close Back Forward Compile Build Execute Color Chooser Find Jump to Quit
Documents sgpa.java 1.java 2.java BookMain.java toStringlibrary.java 4.java 5.java 6.java 7.java 8.java 9.java 10.java integerdivide.java
~\Des_p0oj2 1.java 2.java 4.java 5.java 6.java 7.java 8.java 9.java 10.java BookMain.java toStringlibrary.java 4.java 5.java 6.java 7.java 8.java 9.java 10.java integerdivide.java
Command Prompt
1 import java.util.Scanner;
Enter Book name:
jon snow
Enter Author name:
Enter Book price:
230
Enter number of pages:
200
public class BookMain {
    public static void main(String[] args) {
        Scanner si = new Scanner(System.in);
        System.out.println("Enter Book name:");
        Book : 1
        System.out.println("Enter Author name:");
        Author: snow
        System.out.println("Enter Book price:");
        Price: 230
        System.out.println("Enter number of pages:");
        Number of pages:200
    }
}
-----[REDACTED]-----
Scanner si=new Scanner(System.in);
System.out.println("Enter Book name:");
Details of all books:
Book : 1
System.out.println("Enter Author name:");
Book: jon
Author: xyz
Price: 230
System.out.println("Enter Book price:");
Number of pages:200
Book : 2
System.out.println("Enter number of pages:");
Book: jon
Author: jan
Price: 230
System.out.println("Enter Book name:");
Book : 3
System.out.println("Enter Author name:");
Author: xyz
Price: 230
System.out.println("Enter Book price:");
Number of pages:400
-----[REDACTED]-----
Status javac "8.java"
Compiler Compilation completed successfully.
Messages
Scribble
Activate Windows
Go to Settings to activate Windows.

```

line: 58 / 59 col: 1 sel: 0 INS TAB mode: CRLF encoding: UTF-8 filetype: Java scope: BookMain

Windows 10 Taskbar: 12:03 AM 12/29/2020

## Program 4:

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea( ) that prints the area of the given shape.

```
/*Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea( ) that prints the area of the given shape.
```

#### Program 4

```
import java.util.*;
abstract class shape
{
    int a, b;
    abstract void printArea();
}
class rectangle extends shape
{
    float areaRec;
    void printArea()
    {
        areaRec = a * b;
        System.out.println ("area of rectangle = " + areaRec);
    }
}
class triangle extends shape
{
    float areaTri;
    void printArea()
    {
        areaTri = 0.5 * a * b;
        System.out.println ("area of triangle = " + areaTri);
    }
}
```

```

class circle extends shape
{
    float area-cir;
    void printArea()
    {
        area-cir = 3.14 f * a * a;
        System.out.println ("area of circle = " + area-cir);
    }
}

class area-shape
{
    public static void main (String args[])
    {
        Scanner sc = new Scanner (System.in);
        rectangle a1 = new rectangle ();
        System.out.println ("Enter length and breadth : ");
        a1.a = sc.nextInt();
        a1.b = sc.nextInt();
        a1.printArea();
        triangle a2 = new triangle ();
        System.out.println ("Enter base and height : ");
        a2.a = sc.nextInt();
        a2.b = sc.nextInt();
        a2.printArea();
        circle a3 = new circle ();
        System.out.println ("Enter radius : ");
        a3.a = sc.nextInt();
        a3.printArea();
    }
}

```

```

4.java - C:\Users\Dr.sunil\Desktop\oop2 - Geany
File Edit Search View Document Project Build Tools Help
New Open Save Save All Revert Close Back Forward Compile Build Execute Color Chooser Find Jump to Quit
Documents sgpa.java 1.java 2.java 3.java toStringlibrary.java 4.java
~\Des...p\oop2
1.java
2.java
3.java
4.java
D:\JDK\bin
sgpa.java
toStr...java
Command Prompt
at java.util.Scanner.nextDouble(Unknown Source)
at java.util.Scanner.nextDouble(Unknown Source)
at LibraryV.getDetails(toStringLibrary.java:23)
at Bookmain.main(toStringLibrary.java:44)
public static void main(String[] args){
D:\JDK\bin>c:
        Scanner sc=new Scanner(System.in);
C:\Users>cd desktop\oop2 <new rectangle>
The system cannot find the path specified.gbh and breath of rectangle");
C:\Users>cd Dr.sunil\Desktop\oop2>javac 4.java
C:\Users>cd Dr.sunil\Desktop\oop2>java area_shapes
enter base and height of triangle";
enter length and breath of rectangle
3 9
area of rectangle = 27.0
enter base and height of triangle";
3 8
area of triangle = 12.0
system.out.println("enter radius of circle");
3 8
area of triangle = 12.0
enter radius of circle:rem();
5
area of circle = 113.04
Status gcc -Wall -o "LL" "LL.c" (in directory: C:\Users\Dr.sunil\Desktop\DS)
Compiler Compilation finished successfully.
Messages
Scribble
Activate Windows
Go to Settings to activate Windows.

line: 55 / 55 col: 0 sel: 0 INS TAB mode: CRLF encoding: UTF-8 filetype:Java scope:unknown

```

## Program 5

Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:

- Accept deposit from customer and update the balance.
- Display the balance.
- Compute and deposit interest
- Permit withdrawal and update the balance
- Check for the minimum balance, impose penalty if necessary and update the balance

## Program 5 :

4. Write Java program to

```
import java.util.*;  
  
class account  
{  
    String cust-name;  
    long acc-no;  
    double balance;  
    int type-acc;  
  
    void input()  
    {  
        Scanner sc = new Scanner (System.in)  
        System.out.println("Enter account details");  
        System.out.println("Enter customer name");  
        cust-name = sc.nextLine();  
        System.out.println("Enter customer account number");  
        acc-no = sc.nextLong();  
        System.out.println("Enter customer account type 1.savings 2.current");  
        type-acc = sc.nextInt();  
        System.out.println("Enter balance");  
        balance = sc.nextDouble();  
    }  
  
    void display()  
    {  
        System.out.println("---- customer account details ----");  
        System.out.println("customer name : " + cust-name);  
        System.out.println("customer account number : " + acc-no);  
        System.out.println("customer account type : " + acc-type);  
    }  
}
```

```
System.out.println ("Customer balance is " + balance);
```

```
}
```

```
void deposit();
```

```
{
```

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

```
double amount;
```

```
System.out.println ("Enter amount to be deposited");
```

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

```
balance = balance + amount;
```

```
System.out.println ("Customer balance in account is " + balance);
```

```
System.out.println ("Customer balance in account is " + balance);
```

```
}
```

```
}
```

```
class SavAcc extends Account
```

```
{
```

```
double interest;
```

```
void computeInterest();
```

```
{
```

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

```
int rate, time;
```

```
System.out.println ("Enter rate and time period");
```

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

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

```
interest = balance * Math.pow ((1 + rate / 100.0), time) - balance;
```

```
System.out.println ("Compound interest is " + interest);
```

```
balance = balance + interest;
```

```
System.out.println ("Customer balance amount in account is " + balance);
```

```
}.
```

```

    {
        // Method for withdrawal amount
        void withdraw()
        {
            Scanner sc = new Scanner(System.in);
            double with;
            System.out.println("Enter amount to be withdrawn");
            with = sc.nextDouble();
            if (with > balance)
                System.out.println("Enter Amount to be withdrawn");
            else
                balance = balance - with;
            System.out.println("customers balance in account " + balance);
        }
    }

    void check()
    {
        double penalty();
        if (balance < 2000.0)
        {
            penalty = 200.0;
            balance = balance - penalty;
            System.out.println("balance less than minimum balance");
            System.out.println("penalty of RS. 200");
            System.out.println("customers balance " + balance);
        }
    }
}

```

```

        System.out.println("no penalty");
    }
}
}

class bank {
    public static void main (String args[])
    {
        Savings s1 = new Savings();
        Current c2 = new Current();
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter account type 1.savings 2.current");
        int ch = sc.nextInt();
        int n=0;
        if (ch==1)
        {
            s1.input();
            s1.display();
            while (n!=3)
            {
                System.out.println("Enter 1.deposit 2.withdrawl 3.exit");
                n= sc.nextInt();
                if (n==1)
                    s1.deposit();
                if (n==2)
                    s1.withdrawl();
                else
                    s1.compute_interest();
                s1.check();
            }
        }
        else
            System.out.println(" no penalty");
    }
}

```

```
        }  
    else if (ch == 2)
```

```
    {  
        O2.input();  
        O2.display();  
        while (n != 3)
```

```
    {  
        System.out.println("Enter 1.deposit 2.withdraw 3.exit");
```

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

```
        if (n == 1)
```

```
            O2.deposit();
```

```
        if (n == 2)
```

```
            O2.withdraw();
```

```
    }  
    O2.check();
```

```
else
```

```
    System.out.println("Invalid choice");
```

```
}
```

```
}
```

5.java - C:\Users\Dr.sunil\Desktop\oop2 - Geany

File Edit Search View Document Project Build Tools Help

New Open Save Save All Revert Close Back Forward Compile Build Execute Color Chooser Find Jump to Quit

Documents sgpa.java 1.java 2.java 3.java toStringlibrary.java 4.java 5.java

133 11.withdrawal();

Command Prompt - java bank

```
C:\Users\Dr.sunil\Desktop\oop2>java bank
enter customer's account type 1.savings account 2.current account
1
-----enter account details-----
enter customer name abhinav
enter customer account number
1234567
enter customer's account type 1.savings account 2.current account exit();
1
-----enter customer's balance amount in account
8000
0000 02.deposit()
-----customer's account details-----
customer name abhinav
customer account number 1234567
customer's account type 1
customer's balance amount in account 8000.0
enter 1.deposit 2.withdrawal 3.exit
1
enter amount to be deposited invalid choice"
2000
customer's balance amount in account 10000.0
enter 1.deposit 2.withdrawal 3.exit
2
-----enter amount to be withdrawn
3000 "LLC" (in directory: C:\Users\Dr.sunil\Desktop\DS)
customer's balance amount in account 7000.0
enter 1.deposit 2.withdrawal 3.exit
```

Status gcc -Wall

Compiler Compilation

Messages

Scribble

Activate Windows  
Go to Settings to activate Windows.

line: 158 / 158 col: 0 sel: 0 INS TAB mode:CRLF encoding:UTF-8 filetype:Java scope:unknown

Windows taskbar: 11:40 PM 12/28/2020

File Home Share View Manage Screenshots

Quick access Desktop Downloads Documents Pictures Parapet Sample1 Sample2 Screenshots OneDrive This PC 3D Objects Desktop Documents Downloads Music Pictures Videos Local Disk (C:) Local Disk (D:) Local Disk (E:) Network

Activate Windows  
Go to Settings to activate Windows.

6 items

Windows taskbar: 11:42 PM 12/28/2020

# Program 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.

## Program 6

```
import java.util.*;  
  
public class student.  
{  
    public String usn, name;  
    public int sem;  
    public void input()  
    {  
        Scanner sc = new Scanner(System.in)  
        System.out.println("Enter student details");  
        System.out.print("name:");  
        name = sc.nextLine();  
        System.out.print("usn:");  
        usn = sc.nextLine();  
        System.out.print("sem:");  
        sem = sc.nextInt();  
    }  
    public void display()  
    {  
        System.out.println("----- student details -----");  
        System.out.println("name: " + name);  
        System.out.println("usn: " + usn);  
        System.out.println("sem: " + sem);  
    }  
}
```

package SFE;

```

import CIE.*;
import java.util.*;

public class extends CIE student
{
    public int see_marks[] = new int[5];
    public void input()
    {
        Scanner sc = new Scanner (System.in);
        System.out.println (" Enter see in 5 courses");
        for (int i=0; i<5; i++)
            see_marks[i] = sc.nextInt();
    }
    public void display()
    {
        System.out.println ("see Marks:");
        for (int i=0, i<5, i++)
            System.out.print (see_marks[i] + " ");
        System.out.println ();
    }
}

package CIE;
import java.util.*;
public class Internals
{
}

```

```

SOP ("Enter no. of students");
int n = sc.nextInt();
CIE.Student[] o1 = new CIE.Student[n];
CIE.Internals[] o2 = new CIE.Internals[n];
SEE.Externals[] o3 = new SEE.Externals[n];
main[ob] = new main[n];
for (int i=0; i<n; i++)
{
    o1[i] = new CIE.Student();
    o2[i] = new CIE.Internals();
    o3[i] = new SEE.Externals();
    obj[i] = new main();
    o1[i].input();
    o2[i].input();
    o3[i].input();
    for (int j=0; j<5; j++)
        obj[i].final_marks[j] = o1[i].cier_marks[j] + o2[i].see_marks[j]/2;
}
for (int i=0; i<n; i++)
{
    o1[i].display();
    o2[i].display();
    o3[i].display();
    SOP ("final marks ");
    for (int j=0; j<5; j++)
        SOP (obj[i].final_marks[j] + " ");
    SOP ();
}

```

## Program 7:

## Program 7

("Inheritance part 2nd") 702

```

class Gren < T1, T2 {
    T1 ob1;
    T2 ob2;
    Gren (T1 o1, T2 o2) {
        ob1 = o1;
        ob2 = o2;
    }
    void showTypes() {
        SOP (" Type of T1 is " + ob1.getClass().getName());
        SOP (" Type of T2 is " + ob2.getClass().getName());
    }
    T1 getOb1() {
        return ob1;
    }
    T2 getOb2() {
        return ob2;
    }
}
class demb {
    (" Inheritance part 2nd " ) 702
    (" Inheritance part 2nd " ) 702
}

```

```

    {
        public int cie-marks[] = new int[5];
        public void input() {
            Scanner sc = new Scanner(System.in);
            SOP("Enter cie marks in 5 courses:");
            for (int i=0; i<5; i++) {
                cie-marks[i] = sc.nextInt();
            }
        }
        public void display() {
            SOP("cie marks");
            for (int i=0; i<5; i++) {
                SOP(cie-marks[i] + " ");
            }
            SOP();
        }
    }
    import CIE.*;
    import SEE.*;
    import java.util.*;
    class main {
        {
            int final-marks[] = new int[5];
            public static void main(String args[]) {
                Scanner sc = new Scanner(System.in);
            }
        }
    }

```

The screenshot shows the Geany IDE interface. The title bar reads "7.java - C:\Users\Dr.sunil\Desktop\oop2 - Geany". The menu bar includes File, Edit, Search, View, Document, Project, Build, Tools, Help. The toolbar has icons for New, Open, Save, Save All, Revert, Close, Back, Forward, Compile, Build, Execute, Color Chooser, Find, Jump to, and Quit. The left sidebar shows project files: 1.java, 2.java, 3.java, 4.java, 5.java, 6.java, 7.java, and D:\JDK\bin\sgpa.java, toStr...java. The main editor window contains Java code for a class named demo. The code includes imports for java.util.\* and java.lang.\*. It defines a main method that creates an object of type Gen<Integer, String> and prints its type and value. The output window shows the command prompt: "C:\Users\Dr.sunil\Desktop\oop2> javac 7.java" followed by the program's output: "Type of T1 is java.lang.Integer", "Type of T2 is java.lang.String", "T1 value: 100", and "T2 value: hello!". The status bar at the bottom shows "line: 35 / 35 col: 0 sel: 0 INS TAB mode: CRLF encoding: UTF-8 filetype:Java scope:unknown". The bottom right corner shows "Activate Windows Go to Settings to activate Windows." and the date/time "11:45 PM 12/28/2020".

## Program 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=father’s age.

## Program 8

```
import java.util.*;  
class F_Ex extends Exception  
{  
    public String toString()  
{  
        return (" Father's age is less than 0");  
    }  
}  
class S_Ex extends Exception.  
{  
    int w;  
    S_Ex (int aage)  
    {  
        w = aage;  
    }  
    public String toString()  
    {  
        if (w < 0)  
            return (" son's age is less than 0");  
        else  
            return (" son's age is more than father's age");  
    }  
}  
class father.  
{  
    public int age=1;  
    father (int a)  
    {  
        age = a;  
    }  
}
```

```

{
    age f=0;
}
void ex1() throws f-ex
{
    if (age-f < 0)
        throw new F-Ex();
}

class son extends father
{
    public int age-s;
    son (int a, int b) {
        super(a);
        age s=b;
    }
    void ex2() throws s-ex
    {
        if (age-s<0 || age s>age-f)
            throw new s-Ex (age-s);
    }
}

class fatherson
{
    public static void main (String args[])
}

```

```

Scanner sc = new Scanner(System.in);
SOP(" Enter father's age:");
int a = sc.nextInt();
SOP(" Enter son's age:");
int b = sc.nextInt();
son s = new son(a,b);

try
{
    s.ex1();
}
catch(F-Ex e)
{
    SOP(e);
}

try
{
    s.ex2();
}
catch(S-Ex e)
{
    SOP(e);
}
}

```

The screenshot shows the Geany IDE interface with the following details:

- Title Bar:** 8.java - C:\Users\Dr.sunil\Desktop\oop2 - Geany
- Menu Bar:** File, Edit, Search, Document, Project, Build, Tools, Help
- Toolbar:** New, Open, Save, Save All, Revert, Close, Back, Forward, Compile, Build, Execute, Color Chooser, Find, Jump to, Quit
- File Tree:** Documents (~\Des...p\oop2) contains files 1.java, 2.java, 3.java, 4.java, 5.java, 6.java, 7.java, 8.java; D:\DK\bin contains sgpa.java, toStr...java.
- Code Editor:** Displays Java code for Main class:

```
class Main {    public static void main(String Args[]) {        System.out.println("Please enter the son's age:");        try {            Son s1 = new Son(new Scanner(System.in).nextInt());        } catch (WrongAge e) {            System.out.println(e);        }    }}
```
- Terminal:** Command Prompt window showing the output of running the Main class:

```
C:\Users\Dr.sunil\Desktop\oop2>java main
Error: Could not find or load main class main
Exception in thread "main" java.lang.NoClassDefFoundError: main
Caused by: java.lang.ClassNotFoundException: main
        at java.net.URLClassLoader.findClass(URLClassLoader.java:382)
        at java.net.URLClassLoader.access$100(URLClassLoader.java:96)
        at java.net.URLClassLoader$1.run(URLClassLoader.java:345)
        at java.net.URLClassLoader$1.run(URLClassLoader.java:343)
        at java.security.AccessController.doPrivileged(Native Method)
        at java.net.URLClassLoader.findClass(URLClassLoader.java:342)
        at java.lang.ClassLoader.loadClass(ClassLoader.java:585)
        at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:349)
        at java.lang.ClassLoader.loadClass(ClassLoader.java:545)
Exception in thread "main" java.lang.NoClassDefFoundError: main
Caused by: java.lang.ClassNotFoundException: main
        at java.net.URLClassLoader.findClass(URLClassLoader.java:382)
        at java.net.URLClassLoader.access$100(URLClassLoader.java:96)
        at java.net.URLClassLoader$1.run(URLClassLoader.java:345)
        at java.net.URLClassLoader$1.run(URLClassLoader.java:343)
        at java.security.AccessController.doPrivileged(Native Method)
        at java.net.URLClassLoader.findClass(URLClassLoader.java:342)
        at java.lang.ClassLoader.loadClass(ClassLoader.java:585)
        at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:349)
        at java.lang.ClassLoader.loadClass(ClassLoader.java:545)
Exception in thread "main" java.lang.NoClassDefFoundError: main
Caused by: java.lang.ClassNotFoundException: main
        at java.net.URLClassLoader.findClass(URLClassLoader.java:382)
        at java.net.URLClassLoader.access$100(URLClassLoader.java:96)
        at java.net.URLClassLoader$1.run(URLClassLoader.java:345)
        at java.net.URLClassLoader$1.run(URLClassLoader.java:343)
        at java.security.AccessController.doPrivileged(Native Method)
        at java.net.URLClassLoader.findClass(URLClassLoader.java:342)
        at java.lang.ClassLoader.loadClass(ClassLoader.java:585)
        at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:349)
        at java.lang.ClassLoader.loadClass(ClassLoader.java:545)
```
- Status Bar:** Status: javac "8.java" (in directory: C:\Users\Dr.sunil\Desktop\oop2), Compiler: Compilation finished successfully.
- Messages:** None
- Scribble:** None
- System Tray:** Shows icons for Windows, Task View, File Explorer, Edge, Taskbar, and a clock showing 11:51 PM on 12/28/2020.

## Program 9:

## Program 9:

```
class Threads implements Runnable {  
    String Text;  
    Thread t;  
    int time;  
    Threads (String threadname, int tm) {  
        text = threadname;  
        time = tm;  
        t = new Thread(this, Text);  
        System.out.println("thread " + t);  
        t.start();  
    }  
    public void run() {  
        try {  
            for (int i = 5; i > 0; i--) {  
                System.out.println(text)  
                Thread.sleep(time)  
            }  
        } catch (InterruptedException e) {  
            System.out.println(text + ".Interrupted");  
        }  
        System.out.println(text + ". exiting");  
    }  
}
```

public static void main (String args[])

Threads t1 = new Threads ("BMSCE", 10000);

Threads t2 = new Threads ("CSE", 2000);

}

}.

The screenshot shows the Geany IDE interface. The terminal window displays the output of a Java program named '9.java'. The program prints 'BMS COLLEGE OF ENGINEERING' five times and then exits. The status bar at the bottom indicates the command was 'javac "8.java"' and compilation was successful.

```
C:\Users\Dr.sunil\Desktop\oop2>javac 9.java
C:\Users\Dr.sunil\Desktop\oop2>java Main
thread:Thread[BMS COLLEGE OF ENGINEERING,5,main]
thread:Thread[CSE_5.main] (---)
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING exiting
C:\Users\Dr.sunil\Desktop\oop2>
```

## Program 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

## Program 10

```
import java.awt.*; // import all classes present under AWT
import java.awt.event.*;
import javax.swing.*; // import all classes present under swing

public class IntegerDivision extends JFrame implements ActionListener
{
    JTextField n1, n2, res;
    JLabel n1, n2, lres;
    JButton b;

    public IntegerDivision()
    {
        setLayout(new FlowLayout());
        n1 = new JTextField("Number 1", Label.RIGHT);
        n2 = new JTextField("Number 2", Label.RIGHT);
        lres = new JLabel("Result", Label.RIGHT);
        b = new JButton("DIVISION");
        add(n1);
        add(n1);
        add(n2);
        add(n2);
        add(b);
        add(lres);
        add(lres);
    }

    void calculate()
    {
        int a = Integer.parseInt(n1.getText());
        int b = Integer.parseInt(n2.getText());
        int c = a / b;
        lres.setText("Result = " + c);
    }

    public void actionPerformed(ActionEvent e)
    {
        calculate();
    }
}
```

```

        b. add ActionListener (this);
        add WindowListener (new WindowAdapter () {
            public void windowOpened (WindowEvent e) {
                if (e.getSource () == b)
                    try {
                        int num1 = Integer.parseInt (n1.getText ());
                        int num2 = Integer.parseInt (n2.getText ());
                        int num3 = num1 / num2;
                        res.setText ("string, valueof (num3))");
                    } catch (NumberFormatException e) {
                    }
                    JOptionPane.showMessageDialog (this, e, "ERROR", JOptionPane.ERROR_MESSAGE);
                }
            catch (ArithmeticException) {
                JOptionPane.showMessageDialog (this, "DIVISION BY ZERO ERROR");
                JOptionPane.showMessageDialog (this, "Error Message");
            }
        }
    )
}

```

```
public static void main (String args[]){  
      
    IntegerDivision = new IntegerDivision (1);  
    i.set size (new Dimension (400, 400));  
    i.setTitle ("Integer division of 2 numbers");  
    i.setVisible (true);  
      
}  
class WindowAdapter1 extends WindowAdapter {  
    public void windowClosing (WindowEvent we)  
    {  
        System.exit (0);  
    }  
}
```



