VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.



LAB REPORT on

Object Oriented Java Programming (23CS3PCOOJ)

Submitted by

Chirag S (1BM23CS079)

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



B.M.S. COLLEGE OF ENGINEERING

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B.M.S. College of Engineering,

Bull Temple Road, Bengaluru 560019
(Affiliated To Visvesvaraya Technological University, Belgaum)
Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled "Object Oriented Java Programming (23CS3PCOOJ)" carried out by **Chirag S (1BM23CS079)**, who is bonafide student of **B.M.S. College of Engineering.** It is in partial fulfilment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum. The Lab report has been approved as it satisfies the academic requirements in respect of an Object Oriented Java Programming (23CS3PCOOJ) work prescribed for the said degree.

Ambuja Assistant Professor Department of CSE, BMSCE Dr. Jyothi S Nayak Professor & HOD Department of CSE, BMSCE

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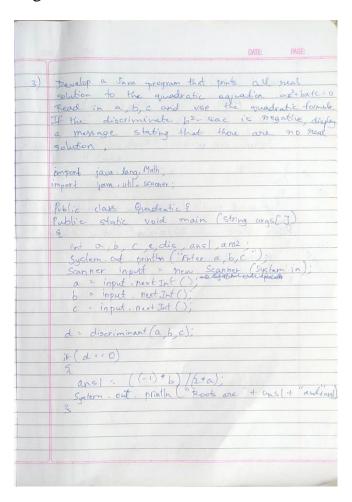
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GitHub Link:

https://github.com/ChiragS-Git/OOJ_LAB_079.git

Program 1

Implement Quadratic Equation



```
import java.util.Scanner;
public class Quadratic

{
    public static void main(String[] args)
    {
        int a;
        int b;
        int c;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter 'a' value: ");
        a= sc.nextInt();
}
```

```
System.out.print("Enter 'b' value: ");
b=sc.nextInt();
System.out.print("Enter 'c' value: ");
c=sc.nextInt();
float disc = ((b*b)-4*a*c);
System.out.println(disc);
if (a==0)
  System.out.println("Not Quadratic");
else
  if (disc<0)
  System.out.println("No real roots ");
  else if (disc>0)
  double root1= (-b + Math.sqrt(disc))/(2*a);
  double root2= (-b - Math.sqrt(disc))/(2*a);
  System.out.println("Real roots ");
  System.out.println("Root-1: "+root1);
  System.out.println("Root-2: "+root2);
  else
  double root1=(-b)/(2*a);
    System.out.println("Real and equal");
  System.out.println("Root-1: "+root1);
  System.out.println("Root-2: "+root1);
 System.out.println("Chirag S");
 System.out.println("1BM23CS079");
```

```
C:\Users\Chirag\Desktop\college\jlab>javac Quadratic.java
C:\Users\Chirag\Desktop\college\jlab>java Quadratic
Enter 'a' value: 3
Enter 'b' value: 8
Enter 'c' value: 1
52.0
Real roots
Root-1: -0.13148290817867028
Root-2: -2.5351837584879964
Chirag S
1BM23CS079
C:\Users\Chirag\Desktop\college\jlab>java Quadratic
Enter 'a' value: 4
Enter 'b' value: 4
Enter 'c' value: 1
0.0
Real and equal
Root-1: 0.0
Root-2: 0.0
Chirag S
1BM23CS079
C:\Users\Chirag\Desktop\college\jlab>java Quadratic
Enter 'a' value: 0
Enter 'b' value: 1
Enter 'c' value: 2
1.0
Not Quadratic
C:\Users\Chirag\Desktop\college\jlab>java Quadratic
Enter 'a' value: 1
Enter 'b' value: 1
Enter 'c' value: 1
-3.0
No real roots
Chirag S
1BM23CS079
```

SGPA Calculator

	DATE: PAGE:
4.	
	with Members van name, an away credit and
	an array marks Include methods to accept and
	display details and a method to calculate son
	of a student
	import java util Scanner;
	class Student 2
	postial whatier usid mais last
	private string usn;
	private string name: private string credits;
	private de credits;
March 1	private int [] marks;
	Public stud (int sum-of subjects) ?
	THE STATE OF THE S
	credits: new int (num of alligned);
	marks = new int (hum_of-subjects);
	3
	public void accept 02
	Scanner input : new Scanner (System.in)
	System. out. println ("Enter USN: a");
	Ofectora von = input nextline();
	OSystem out printh ("Enter name:");
	name = input (hextlinel),
	for (i=0; i < num of sub; (++) {
	System.out, println (" Enter credits for subject credits is + (i+1) + ":
	creatistis + (i+1) + :);
	sin put (pext Int ()
	System out println ("Enter marks for subjectifit) + ":"):
	marks(i): input next Int();
	9

	DATE:
	DAIE
	public void display()?
	System.out-println ("USN: + USM);
	System out printh ("Name: "+ name);
is lar	Septem oute printer
	for (i=0; i < num of sub, i++) }
	System out println ("Marks:" + credits ! System out println ("Marks:" + marks ["
" Army"	System. out printing "Marks " + morks !"
1/4	£3
	public void sgpa () {
1	int total credits = 0;
08	int total grade = 0;
hit	for (i= o; ic num of sub; i+t)
	total credits + = credits [i]
	total grade = (marts(i)/10) + gredits (
	reduce (total and the land of)
	return (total grade (total credits),
	public static void main() }
	Scanper input: new Scanner (System in
	System. Out , println ("Enter total number of
	Subject)
Na	num of sub = input . next Int ().
01	Student SI = new Student/mon of-su
	Ct 1 + C2 - Ct 1 + Cm of Cu
	Student S2 = new Student (num of sub SI accept ();
The Paris	
	51, display ()
	2
	Salar da
	No. of the second secon
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

import java.util.Scanner;

class Student {
 private String name;
 private String usn;
 private double total_credit;

```
private double[] marks;
private Scanner sc = new Scanner(System.in);
void getInfo() {
  System.out.print("Enter Name: ");
  name = sc.nextLine();
  System.out.print("Enter USN: ");
  usn = sc.nextLine();
  System.out.print("Enter Total Credits: ");
  total_credit = sc.nextDouble();
  sc.nextLine();
}
double grade(double mark) {
  if (mark <= 39) {
    return 0:
  } else if (mark >= 40 && mark <= 49) {
    return 4;
  } else if (mark >= 50 && mark <= 54) {
    return 5;
  } else if (mark >= 55 && mark <= 59) {
    return 6;
  \} else if (mark >= 60 && mark <= 69) {
    return 7;
  } else if (mark >= 70 && mark <= 79) {
    return 8;
  else if (mark >= 80 \&\& mark <= 89) 
    return 9;
  } else {
    return 10;
}
void getMarks() {
  marks = new double[8];
  for (int i = 0; i < 8; i++) {
    System.out.println("Enter the marks for subject " + (i + 1) + ": ");
    double mark = sc.nextDouble();
```

```
System.out.println("Enter the credit for subject " + (i + 1) + ": ");
       double credit = sc.nextDouble();
       double grade = grade(mark);
       marks[i] = grade * credit;
     sc.nextLine();
  }
  void calSgpa() {
     double totalMarks = 0;
     for (int i = 0; i < 8; i++) {
       totalMarks += marks[i];
     System.out.println("Name: " + name);
     System.out.println("USN: " + usn);
     System.out.println("SGPA: " + (totalMarks / total_credit));
}
public class Main {
  public static void main(String args[]) {
     boolean cond = true;
     Scanner sc = new Scanner(System.in);
     while (cond) {
       Student s1 = new Student();
       s1.getInfo();
       s1.getMarks();
       s1.calSgpa();
       System.out.println("Do you want to calculate SGPA for another student?
(yes/no): ");
       String check = sc.nextLine();
       if (check.equalsIgnoreCase("yes")) {
          continue;
       } else {
          cond = false;
```

```
}
    System.out.println("Chirag S");
    System.out.println("1BM23CS079");
    sc.close();
}
```

```
C:\Users\Chirag\Desktop\college\jlab>java Main
Enter Name: Chirag
Enter USN: 079
Enter Total Credits: 20
Enter the marks for subject 1:
Enter the credit for subject 1:
Enter the marks for subject 2:
Enter the credit for subject 2:
Enter the marks for subject 3:
Enter the credit for subject 3:
Enter the marks for subject 4:
Enter the credit for subject 4:
Enter the marks for subject 5:
Enter the credit for subject 5:
Enter the marks for subject 6:
Enter the credit for subject 6:
Enter the marks for subject 7:
Enter the credit for subject 7:
Enter the marks for subject 8:
Enter the credit for subject 8:
Name: Chirag
USN: 079
SGPA: 8.8
Do you want to calculate SGPA for another student? (yes/no):
no
Chirag S
1BM23CS079
```

Method overriding

	DATE: PAGE:
5.	Create a class Book which contains four members: no
	author, price, num pages. Include a constructor to set the
	values for the members. Include methods to set and go
	the details of the objects. Include a tostring () method
	that could display the complete details of the book.
	Develop a Java program to create a book objects,
	import -
	Java . Util . Scanner;
	class Book &
	private String name;
	private string author;
	private double price;
	private int sum-pages;
	String
	public Book (string author, double sprice, int nump
	this hame = name 1
	this author; author;
	this price = price;
	this numpeges = num pages;
	2
	public void set Name (String name) &
	this name = name;
	3 Profession and Manager and American
	public void set Arthor (String andhor) S
	this author = author ;
	3 Comment of Marine Description
	public void set Price (double price) &
	this price = price;
	8

		DATE: PAGE
		DATE: PAGE
		1
public vo	d set Num pages (int.	num.pages) {
	this . num-pages = nu	m-pages;
And And Andreas	3	The Carl Strawards
public	thing get Name() §	A A Calledon
	return name	Controlle Nova The
No. No. No.	ξ	- 100 B 100 B
public S	ring get Author () &	
	return author;	A STATE OF THE PARTY OF THE PAR
public de	whole get Arce OE	213955 2400
	return price;	Caral Stadio
3	- D C	C. William St. College
	get Num-pages Of	of the standard
	return num-pages	a de deved
Compassion Compassion	public String	W. 148
	salang to String () E	In + Nome : In I name
	return Book details:	t author + "Price: In +
		Number of Pages : It't num page
	price +	Number of Tages in + 110m, mas
3	5	
	Books	
	mblic static void mai	in (Arine FT ares) &
	C	and alcohola hali
	System out - printly (" En	ter number of books:
	int on : in, next	inate);
	for (i=0; iah; it)	Her Name:).
	name : in nextline);
	System. out. printha (")	Enter Author "
	author: in nextline	

```
DATE:
Enter number of pages 2:8
```

import java.util.Scanner;

```
class Book {
   public String book_name;
   public String author_name;
   public int price;
   public int num_pages;
```

```
Book(String book_name, String author_name, int price, int num_pages) {
    this.book name = book name;
    this.author_name = author_name;
    this.price = price;
    this.num_pages = num_pages;
  }
  @Override
  public String toString() {
     String name, author, price, numPages;
    name = "Book Name: " + this.book_name + "\n";
    author = "Author Name: " + this.author_name + "\n";
    price = "Price: " + this.price + "\n";
    numPages = "Number of Pages: " + this.num_pages + "\n";
    return name + author + price + numPages;
  }
}
public class ride {
  public static void main(String[] args) {
     Scanner sc = new Scanner(System.in);
    System.out.print("Number of books: ");
    int count = sc.nextInt();
    sc.nextLine();
    Book[] arr = new Book[count];
    for (int i = 0; i < count; i++) {
       System.out.print("Enter book " + (i + 1) + " name: ");
       String name = sc.nextLine();
       System.out.print("Enter author" + (i + 1) + " name: ");
       String author = sc.nextLine();
       System.out.print("Enter book " + (i + 1) + " price: ");
       int price = sc.nextInt();
       System.out.print("Enter book " + (i + 1) + " pages: ");
       int pages = sc.nextInt();
       sc.nextLine();
       arr[i] = new Book(name, author, price, pages);
       System.out.println(arr[i]);
```

```
}
sc.close();
System.out.println("Chirag S");
System.out.println("1BM23CS079");
}
```

```
C:\Users\Chirag\Desktop\college\jlab>java ride
Number of books: 2
Enter book 1 name: ncos
Enter author 1 name: jsdc
Enter book 1 price: 250
Enter book 1 pages: 200
Book Name: ncos
Author Name: jsdc
Price: 250
Number of Pages: 200
Enter book 2 name: sdfse
Enter author 2 name: sdcfsv
Enter book 2 price: 300
Enter book 2 pages: 250
Book Name: sdfse
Author Name: sdcfsv
Price: 300
Number of Pages: 250
Chirag S
1BM23CS079
```

Abstract Classes

to create an Java Shape that contains abstract class named true integers and an empty method three classes print Area (). Provid Rectargle Triangle and Circle such that each one of the classes extends the class Shape. Each one of the contain only the method print Area () import java util # '
import java util sederac' abstract class shape & public abstract void find Areal); class rectangle extends shape 3 int length; int weak int breadth; · Rectargle (int length int breadth this length = length; this breadth : breadth; public Vo fied Area () & area - longth + breadh System out println ("Asea exectangle is I am Triangle extends shape? Class base. int height; double area.

	DATE: PAGE:
	Tringle (int bose int height) { this height: height;
	this height height;
	this, base : base;
	all the cis
	Public void Find Area () {
	System out, println ("Area of triangle is" +0
	3 sten out, finally that of triangle 3 to
	8
	class circle extends shape ?
	int radius '
	double area;
	circle (int radius) 3
	this fractive: gradius
	3
	pulic void find drea () 5
	Grea = 3.14 * gradix * gradius; System out println ("Aska of Cirole is it as
	System out printly (Aska of Cirole 15 + as
	e
	Public Class Area &
	public static poid main (String [] orgs) 2
	Rectargle # new Rectargle (6,8);
	Circle & s new Chale (5):
	Triangle t = new Triangle (4,5);
	to the Area ()
	C. tind Asea)
reas	this Ason I.
	- 2,
	4

import java.util.Scanner;

```
abstract class Shape {
  double dim1;
  double dim2;
  abstract void printarea();
class Rectangle extends Shape {
  Rectangle(double d1, double d2) {
    this.dim1 = d1;
    this.dim2 = d2;
  }
  @Override
  void printarea() {
     double area = \dim 1 * \dim 2;
     System.out.println("Area of Rectangle: " + area);
  }
}
class Triangle extends Shape {
  Triangle(double base, double height) {
    this.dim1 = base;
    this.dim2 = height;
  }
  @Override
  void printarea() {
     double area = 0.5 * dim1 * dim2;
     System.out.println("Area of Triangle: " + area);
}
class Circle extends Shape {
  Circle(double radius) {
     this.dim1 = radius;
  @Override
```

```
void printarea() {
     double area = 3.14 * dim1 * dim1;
     System.out.println("Area of Circle: " + area);
  }
}
public class area {
  public static void main(String[] args) {
     try (Scanner sc = new Scanner(System.in)) {
       System.out.println("Enter length and breadth of Rectangle:");
       double rl = sc.nextDouble();
       double rb = sc.nextDouble();
       Rectangle r1 = new Rectangle(rl, rb);
       r1.printarea();
       System.out.println("Enter base and height of Triangle:");
       double base = sc.nextDouble();
       double height = sc.nextDouble();
       Triangle t1 = new Triangle(base, height);
       t1.printarea();
       System.out.println("Enter the Radius:");
       double radius = sc.nextDouble();
       Circle c1 = new Circle(radius);
       c1.printarea();
     System.out.println("Chirag S");
     System.out.println("1BM23CS079");
}
```

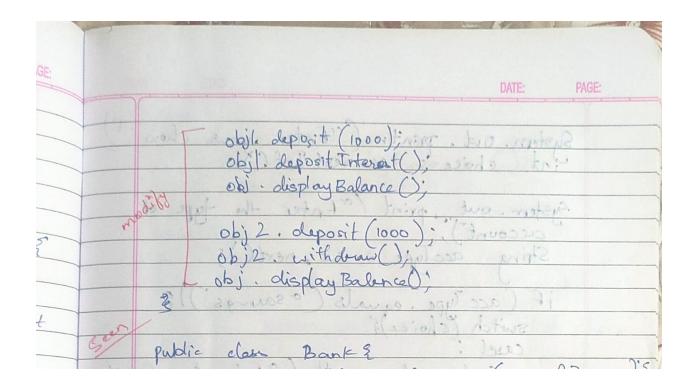
```
C:\Users\Chirag\Desktop\college\jlab>java area
Enter length and breadth of Rectangle:
4
5
Area of Rectangle: 20.0
Enter base and height of Triangle:
5
4
Area of Triangle: 10.0
Enter the Radius:
5
Area of Circle: 78.5
Chirag S
1BM23CS079
```

Bank Account

			DATE:
N	No. 13	class account ?	
		case desort 12 m. many	10 00
	1	later has been of account for	Market St.
	bruggard	protected string charme;	The state of the s
M	10000	protected int acc no;	39311
H	1	protected double balance;	ars Janely;
		to deal person don't don't	, per la constant
H	was a	public account (String charme	, accura
1		With the last of the state of	Section of the
3		besenction 1960	3143/ 21/4
+		this . chame = chame;	
4	1 200	this ace no accho!	steer.
+		flis balance = balance:	5000 TO
1	1 3	on 11.3 have inverse upon all	3570.00
1-	1	public void deposit (double amount)	D.W.
4	ACCORDED TO	if (amount > 0) &	ber vin
		et (amount > 0) is	Red to 1
1		balance + = amount;	
1	43	System out grintly ("Depo	sited: + N
Ш		3 erse 1	
1	1	System out println ("In	valid diposi
		amount.);	2200
	and o	the state of the s	7
		Most interior impact Books	Story .
		public void display Balance () {	Coeganin
		System. out. println ("Account	of Number
		acc-nol:	
		System.out. println (" Custon	per Name
		System.out. println (" Custon chame);	
		Sustem. out printly (Bolon	co : 4 /
1		3	
H			

	DATE: PAGE:
7	
	public void withdraw (double amount) End
	System out print in ("Withdrawal not permit
	From this account is, long the strong
	3
*	class saviace extends Account & informativate
	private static final double both = 0.0
	Francisco - Drivoled
4	published saw acc string chame, intacen
	i transmodenble balance) E
	(or read (marrie) acc ha balance
	3 Super (chame, ace no balance
4.01	Sastem met - senth / I nout for a
	public void deposit Interest) ?
	double interest := balance + interest_rate;
	30 balance + = interest; davis
	System out print In ("Interact added: "+ in
	3 Nover = Dreded
	Setim out prints ("Polar a bel
	public void withdraw (double amount)?
	if (amount 4 = balance)?
	palance -= amount;
	System. out. println ("Withdrawn: "+ amount
7	3 else ? mad euro sideo
37	gotemout grintln ("Inoufficient balance"
2001	12 / 50 Car Car Car Car Off 1 1
	3 (003 10)
24	18") 100 mod + 5 100 sor - 440
	(0000) (0)

	DATE:
Lake	· class curace extende account ?
	the termination of the transferred
	fival double min balance = C
	private final double penalty: 50:
.1	
30	public soid withdow (double arrow
140	14. Carnount 2: balance /2
01 51	balance -= amount;
	System out printly ("Withdown amount);
Lund	about it I
203	Lelie {
	System. out. printly ("Insufficien
	S treaty treat
(0)	the design of the sept of the sept of
	TOTAL STATE OF THE
Charata F.	if (balance < minbalance) ?
	bolance -= penalty;
	Suptem a distance a
	minimum of enalty: + senal
	2 140/40 = 1/94 00000 1
	June of the state
1 1010 1011	public class Bank &
. / "	public static void main (string)
	Sav-acc objl = new sav-acc
	101 5000);
	cur- ace obje: new cur-acc
	(or, 10000);



import java.util.Scanner; class Account{ Scanner sc=new Scanner(System.in); String name="Chirag"; int money; String type; int accno; Account(String acctype,int accno){ this.type=acctype; this.money=0; this.accno=accno; } void accdetail(){

System.out.println("Account Holder Name: "+name);

System.out.println("Account No: "+accno); System.out.println("Balance: "+money);

Code:

```
System.out.println(this.type);
void deposit(){
 int mon;
 System.out.println(accno);
 System.out.println(type);
 System.out.println("Enter the Amount: ");
 mon=sc.nextInt();
 money+=mon;
 System.out.println("Balance: "+money);
void withdraw(){
 System.out.println(this.accno);
 System.out.println(type);
 int mon;
 System.out.println("Enter the Amount: ");
 mon=sc.nextInt();
 money-=mon;
 System.out.println("Balance: "+money);
 if((money<=100) && this.type=="current_account")
  System.out.println("Minimum balance is 100");
  System.out.println("Deposite money now and pay the fine of 50");
void cal_intrest(){
 if(this.type=="saving_account")
 {
  System.out.println(this.type);
  double temp=this.money;
  double intrest=((temp)*0.5)+temp;
  System.out.println("The intrest: "+intrest);
 else
```

```
System.out.println("Not a saving account");
public class Sys {
  public static void main(String[] args) {
   Account c1=new Account("saving_account",1);
   Account c2=new Account("current_account",2);
   while(true)
     Scanner sc=new Scanner(System.in);
     int choice;
     System.out.println("Enter the choice:\n1.Deposite\n2.Withdraw\n3.Compute
intrest\n4.Display acc details\n5.Exit");
     choice=sc.nextInt();
     if (choice==1)
      c1.deposit();
      c2.deposit();
    if(choice==2){
      c1.withdraw();
      c2.withdraw();
    if(choice==3){
      c1.cal_intrest();
      c2.cal_intrest();
    }
    if(choice==4){
    c1.accdetail();
    c2.accdetail();
```

```
if(choice==5){
  break;
  }
}

System.out.println("Chirag S");
System.out.println("1BM23CS079");
}
```

```
C:\Users\Chirag\Desktop\college\jlab>javac Sys.java
C:\Users\Chirag\Desktop\college\jlab>java Sys
Enter the choice:
1.Deposit
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
1
1
saving_account
Enter the Amount:
350
Balance: 350
current_account
Enter the Amount:
400
Balance: 400
Enter the choice:
1.Deposit
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
4
Account Holder Name: Chirag
Account No: 1
Balance: 350
saving_account
Account Holder Name: Chirag
Account No: 2
Balance: 400
current_account
Enter the choice:
1.Deposit
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
5
Chirag S
1BM23CS079
```

Packages

DATE:
1) Execute a package CIF which has two tellars.
- Student and Internals. The class fearonal has
members like Ish, have sen The class in
the internal marks groved in five counter
of Student which is a derived dark
2) Greater two packages to display Stilent and
Mars and into import parkages in third
the program.
his family into import parkages in third
tockers are in the service of the se
tackage or
Bubba see al 1 1 6
int usn
String name.
int sem;
Student (int ush, String hame, int sem);
this ush > ush;
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0 7/	30, 40,50)
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proble class B? proble class B? proble void fam Info()? System out pintle ("father's Name: Section In Mother's Name: Shubble); import info(.A: import info 2.B; public class printInfo? public class printInfo? public static void main (String[] args)? A a: now A(): B b: new B(): a my Info();		public void myInfo() {
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import infol. A: I'mport info 2. B; public class printInfo? public static void main (String[] args)? A a: how A(): B b: new B(): a my Info () = bo Domy Info ():	-	32
Import info 2. B; public class printInfo? public static void main (String[] args)? A a - how A(): 1 B b : New B(): a my Info () & bo		
public class printInto? public static void main (String[] args)? A a how A(): B b New B(): a my Into () = bo Domy Into ():		import intol. A:
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		· Cale 1 Voltage
		The same of the sa

```
Code:
package CIE;
import java.util.Scanner;
public class Internals extends Student {
  int[] cieMarks = new int[5];
  public void inputCIEMarks() {
     Scanner s = new Scanner(System.in);
     System.out.println("Enter CIE marks for 5 subjects:");
     for (int i = 0; i < 5; i++) {
       System.out.print("Subject " + (i + 1) + ": ");
       cieMarks[i] = s.nextInt();
     }
  public int[] getCieMarks() {
    return cieMarks;
package CIE;
import java.util.Scanner;
public class Student {
  protected String usn;
  protected String name;
  protected int sem;
  public void inputStudentDetails() {
     Scanner s = new Scanner(System.in);
     System.out.print("Enter USN: ");
     usn = s.nextLine();
     System.out.print("Enter Name: ");
     name = s.nextLine();
```

```
System.out.print("Enter Semester: ");
    sem = s.nextInt();
  }
  public void displayStudentDetails() {
     System.out.println("USN: " + usn);
     System.out.println("Name: " + name);
     System.out.println("Semester: " + sem);
}
package SEE;
import CIE.Student;
import java.util.Scanner;
public class External extends Student {
  int[] seeMarks = new int[5];
  public void inputSEEMarks() {
     Scanner s = new Scanner(System.in);
     System.out.println("Enter SEE marks for 5 subjects:");
     for (int i = 0; i < 5; i++) {
       System.out.print("Subject " + (i + 1) + ": ");
       seeMarks[i] = s.nextInt();
     }
  }
  public int[] getSeeMarks() {
     return seeMarks;
}
import CIE.Internals;
import SEE.External;
import java.util.Scanner;
public class Main {
  public static void main(String[] args) {
```

```
Scanner sc = new Scanner(System.in);
System.out.print("Enter the number of students: ");
int numStudents = sc.nextInt();
sc.nextLine();
Internals[] cieStudents = new Internals[numStudents];
External[] seeStudents = new External[numStudents];
for (int i = 0; i < numStudents; i++) {
  System.out.println("\nEnter details for student " + (i + 1) + ":");
  cieStudents[i] = new Internals();
  cieStudents[i].inputStudentDetails();
  cieStudents[i].inputCIEMarks();
  seeStudents[i] = new External();
  seeStudents[i].inputSEEMarks();
}
System.out.println("\nFinal marks for each student:");
for (int i = 0; i < numStudents; i++) {
  System.out.println("\nDetails for student " + (i + 1) + ":");
  cieStudents[i].displayStudentDetails();
  int[] cieMarks = cieStudents[i].getCieMarks();
  int[] seeMarks = seeStudents[i].getSeeMarks();
  int[] finalMarks = new int[5];
  System.out.println("Final marks in each subject:");
  for (int j = 0; j < 5; j++) {
     finalMarks[i] = cieMarks[i] + seeMarks[i];
     System.out.println("Subject " + (i + 1) + ": " + finalMarks[i]);
  }
}
sc.close();
System.out.println("Chirag S");
System.out.println("1BM23CS079");
```

}

```
C:\Users\Chirag\Desktop\college\java\Main>javac CIE/Internals.java CIE/Student.java SEE/External.java Main.java
C:\Users\Chirag\Desktop\college\java\Main>java Main
Enter the number of students: 1

Enter details for student 1:
Enter USN: 079
Enter Name: Chirag
Enter Semester: 3
Enter CIE marks for 5 subjects:
Subject 1: 67
Subject 2: 89
Subject 4: 98
Subject 5: 87
Enter SEE marks for 5 subjects:
Subject 1: 87
Subject 2: 66
Subject 3: 78
Subject 2: 66
Subject 3: 78
Subject 4: 97
Subject 5: 56

Final marks for each student:

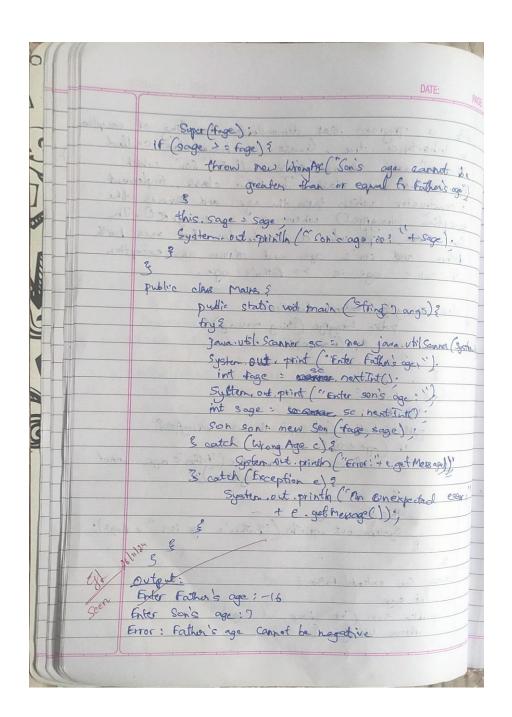
Details for student 1:
USN: 079
Name: Chirag
Semester: 3
Final marks in each subject:
Subject 1: 154
Subject 2: 155
Subject 2: 155
Subject 3: 143
Subject 4: 195
Subject 4: 195
Subject 5: 143
Chirag S
```

Program 7

Exception handling

Algorithm:

Write a program that demonstrates thereby of ex In inhoritance tree, (reate a base date 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 (NoongAge) when the input age & O. Th Son class implement a constructor that uses be father and son's age and throws as exception if son's age is >= father's age. class (MrongAge extends Exception? Public (MrongAge (String message)? Super (mousage) Int fage: public father (int age) throws (MrongAge? If (age 40)? Throw new (MongAge (Mother's age annotation) this stage age: System, out agenith ("Father's age is;" + fage) alone son extends father? int sage public son (int targe, int sage)	7	DATE: PAGE:
in more tance the verset a base day 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 broughge! when the input age CO. The Son class implement a constructor that uses be taken and con's age and throws an exception if son's age is > = father's age. class broughge extends exception? Super (morange); 3 class father? Int fage: public father (int age) throws be broughge? If (age < 0)? Throw new Mong Age (Father's age corner be negative); 3 System, out . println (Father's age is: " + fage) of the sage: public Son extends father?		With a street of the street of
"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 broughted when the input age & O. The Son class implement a constructor had uses be father and con's age and throws an exception if son's age is >= father's age. class broughts extends Exception? Putric Wrongte (string message)? Super (message) 3 class Father (int age) throws broughte? It (age < 0)? throw new broughte ("Father's age connot be negative); 3 this tage age: public Son extends fallor? int sage: public Son (int tone int sage)		in inheritance tree, Create a base days called
extends the base clark. In father clark implement a constructor which takes the age and throws the exception Wrong Age O. The Son Clare implement a constructor hat uses be fother and con's age and throws an exception if son's age is >= father's age, clare wrong Age extends Exception? Public Wrong Age (string message)? Super (morage) Recognition of the control		"Father" and derived class called "Son" which
a constructor which takes the age and throws the exception bloogtye() when the input age (0. The Son class, implement a constructor hat uses be father and con's age and throws an exception if son's age is >= father's age, class bloogty (string message)? Super (message); Int fage; If (age < 0)? Throw new bloogs Age ("Tother's age narrow he meg appro); System, out println ("Father's age is; "+ fage) of the sage; public son (int tonce int sage)		extends the base class. In father class implement
Son claw implement a constructor that uses be father and con's age and throws an exception if son's age is >= father's age; class wrong the extends faception? Public Wrong the Esting message)? Super (message); lint fage: public Father (int age) throws Wrong the father's age annot throw new (Mong the ("Father's age annot be megative"); This tage: System, out println ("Father's age is; "+ fage and is and is and is a public son extends father?		a constructor which takes the age and throws the
Son claus implement a constructor hat vses be tother and son's age and throws an exception if son's age is >= fathor's age. claus wrong the extende faception? Public Wrong the Esting message)? Super (message); But fage: public Father (int age) throws Wrong the Father's age cannot be negative); this tage: age: System, out . println ("Father's age is: "+ fage") claus Son extends father? Int sage: public Son (int tage int sage)		exception Wrong Agel) when the input age RO. Th
tather and son's age and throws an exception if son's age is > = father's age, class wrong the extends Exception ? Public Wrong the Extends Exception? Super (moxage) ; Class Father? Int fage; Public Father (ixt age) throws Wrong the? If (age < 0)? Throw new Wrong the ("Father's age cannot be negative"); System, out . println ("Father's age is;" + fage int sage; Int sage; Dublic Son extends father?		Son claus implement a constructor that uses ho
class Wrong Page extends Exception ? Public Wrong Page (String memage)? Super (mexcego); Super (mexcego); Int fage: Public Father (int age) throws Wrong Page? If (age < 0)? Throw new Wrong Page ("Father's age cannot be negative"); System, out . grintln ("Father's age is;" + fage! System, out . grintln ("Father's age is;" + fage! Int sage: Dublic San (int torse int sage)		
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class Wrong Age extends Exception ? Public Wrong Age (String message)? Super (message); Read of the factor (int age) through Mesong Age? If (age < 0)? Throw new Wrong Age ("Father's age cannot be megative"); This stage age: System, out grintly ("Father's age is; " + fage) and son extends father? Int sage: public Son (int torge int sage)		entary again bilding
public bloog Age (string message)? Super (message); Super (message); Class Father ? Int fage; public Falker (int age) throws Wrong Age? Throw new Wrong Age ("Father's age carrow her megarture"); this fage age; System, out . println ("Father's age is; " + fage) and son extends father? Int sage: public San (int face int sage)		
Super (mexage); 3 Class Father ? Int fage; Public Father (int age) throws WrongAge? If (age < 0)? Throw new Wrong Age ("Father's age connormal be megathro"); System, out println ("Father's age is;" + fage) Class Son extends father? Int sage: public Son (int tong int sage)		
dows father ? Int fage: public Father (int age) throws WrongAge? If (age < 0)? throw new Wrong Age ("Father's age control be negative"); System, out println ("Father's age is;" + fage) and some extends father? Int sage: public son (int tonge int sage)	1990	Super (mexcage)
class father ? Int fage: public Father (int age) throws Wrong Age ("Father's age cornor her megapore"); this tage: System, out . grintln ("Father's age is;" + fage) and son extends father? Int sage: public son (int torse int sage)		3 the state two was
class father ? Int fage; public Father (it age) throus Wrong Age? Throw new Wrong Age ("Father's age carnot be negative"); this tage: System, out . griniln ("Father's age is;" + fage) and sage: public son (int torse int sage)		& . Withou gospessos : 5,00% has
Int fage: public Father (it age) throws WrongAge? If (age < 0)? throw new Wrong Age ("Father's age carrow he megakra"); this tage: age: System, out . println ("Father's age is;" + fage) and son extends father? Int sage: public son (int torse int sage)		
public Father (irt age) throws Wrong Age ("Father's age cannot this stage age; this stage age; System, out println ("Father's age is; " + fage) aloue Son extends father? int sage; public Son (int tonge int Sage)		
this tage age: System, out println ("Father's age is;" + fage) and son extends father 2 int sage: public son (int tong int sage)		
throw new (Mong Age ("Fother's age carrow be negative"); this tage age: System, out grintly ("Father's age is;" + fage! Close Son extends Father & int sage: public Son (int tonce int Sage)		IF (age 40) 2 and angel later
this tage in age: System, out . grintln ("Father's age is;" + fage! alous Son extends father? int sage: public Son (int tonge int Sage)		throw new Wing Age ("Father's age carnot
this tage age: System, out println ("Father's age is;" + fage) alous Son extends father? int sage: public Son (int torse int sage)		he heartise)
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System, out grintly ("Father's age is; " + fage) glass Son extends father ? int sage: public Son (int tonge int Sage)		Il to fine in any
alous Son extends fathor ? int sage: public Son (int tonge int sage)		System, out grintly ("Father's age is; " + fage)
class Son extends fathor ? int sage: public Son (int touse int sage)		3
and sage int sage int sage		3
and sage int sage int sage		class Son extends Fathers
public son (int tonge int sage)		
through Wrongage 3		throus Wrongage & home of the state of the s



Code:

import java.util.Scanner;

```
class WrongAge extends Exception {
  public WrongAge() {
    super("Age Error");
  public WrongAge(String message) {
    super(message);
  }
}
class Father {
  protected int fatherAge;
  public Father() throws WrongAge {
     Scanner s = new Scanner(System.in);
    System.out.print("Enter Father's Age: ");
    fatherAge = s.nextInt();
    if (fatherAge < 0) {
       throw new WrongAge("Age cannot be negative");
     }
  }
  public void display() {
    System.out.println("Father's Age: " + fatherAge);
  }
}
class Son extends Father {
  private int sonAge;
  public Son() throws WrongAge {
    super();
    Scanner s = new Scanner(System.in);
    System.out.print("Enter Son's Age: ");
    sonAge = s.nextInt();
    if (sonAge < 0) {
       throw new WrongAge("Age cannot be negative");
    } else if (sonAge >= fatherAge) {
       throw new WrongAge("Son's age cannot be greater than or equal to Father's
```

```
age");
  @Override
  public void display() {
    super.display();
    System.out.println("Son's Age: " + sonAge);
  }
}
public class Main7 {
  public static void main(String[] args) {
    try {
      Son son = new Son();
      son.display();
    } catch (WrongAge e) {
      System.out.println("Exception Caught: " + e.getMessage());
    System.out.println("Chirag S");
    System.out.println("1BM23CS079");
  }
}
C:\Users\Chirag\Desktop\college\jlab>javac Main7.java
C:\Users\Chirag\Desktop\college\jlab>java Main7
Enter Father's Age: 50
Enter Son's Age: 20
Father's Age: 50
Son's Age: 20
Chirag S
1BM23CS079
```

Program 8

Threads Algorithm:

```
Threads
        this interval:
  public voil sun () &
            while (true) 5
           3 coutch (Interrupted
              System.out. printer (e. getAlexage ())
         class Main &
      Thread thread 2. new Message Thread /
```

Code:

```
import java.util.Scanner;
class WrongAge extends Exception {
   public WrongAge() {
      super("Age Error");
   }
```

```
public WrongAge(String message) {
     super(message);
}
class Father {
  protected int fatherAge;
  public Father() throws WrongAge {
     Scanner s = new Scanner(System.in);
     System.out.print("Enter Father's Age: ");
     fatherAge = s.nextInt();
    if (fatherAge < 0) {
       throw new WrongAge("Age cannot be negative");
     }
  }
  public void display() {
     System.out.println("Father's Age: " + fatherAge);
}
class Son extends Father {
  private int sonAge;
  public Son() throws WrongAge {
     super();
     Scanner s = new Scanner(System.in);
     System.out.print("Enter Son's Age: ");
     sonAge = s.nextInt();
    if (sonAge < 0) {
       throw new WrongAge("Age cannot be negative");
     } else if (sonAge >= fatherAge) {
       throw new WrongAge("Son's age cannot be greater than or equal to Father's
age");
  @Override
  public void display() {
```

```
super.display();
    System.out.println("Son's Age: " + sonAge);
}

public class Main8 {
    public static void main(String[] args) {
        try {
            Son son = new Son();
            son.display();
        } catch (WrongAge e) {
                System.out.println("Exception Caught: " + e.getMessage());
        }

            System.out.println("Chirag S");
            System.out.println("1BM23CS079");
        }
}
```

```
C:\Users\Chirag\Desktop\college\jlab>javac Main8.java

C:\Users\Chirag\Desktop\college\jlab>java Main8
Chirag S
1BM23CS079
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
```

Program 9

Calculator

Algorithm:

	DATE: PAGE:
	2 mt
	WAP to create war interface to perform
. /-	integer divisiones user propos two numbries in ter
	fields NUMI, NUM 2 - Division of this is displaned
	Fields Num1 Num2 - Division of this is displayed in Result Field.
5135	to receive the property the property of the sea by
	import jouax, swary. I would some
	import java aut sor; I have a House to
	import java art event . Action Event;
	import java authorent Actionlistmen;
	public class Divisions
. 108	public static void main (string args)
	Frame frame onew Joranne Mi Integer Division Calculator ")
-	Division (alculator')
Bash	Frame set Perault Close Operation (I Frame.
	EXIT ON-CLOSE)
	Frame, setsize (400, 200); (82)
	Frame, Set layout (new Gridlagout (4, 2);
	Tabel label Num! = new Itabel ("Num!!
	Textfield text Num onew Tlakt Field
	Tabel label Result - new Habel ("Pesul
	TTextfield textResult: new Treatfield ();
	text Result, set Editable (false);
	JButton divide Button: new Button (Di.
	Jours state (force)
	divide Button, add Action Listner & new Action Listerer ()
	a Overricle
	a Overricle public void action featured (Action Event e) ?

```
DATE:
   int num! = Integer passe Int (text Num! get text
int num! = Integer passe Int (text Num! get lext
   if ( num 2 := 0)
                              for numt num2
   JOHIOFORE: ERROR, MESSAGE)
& catch prithmeti Exception ex);
  ToptionPole . ShowMersage Dialog (Frame ex setMers
       " Earlor", Joption Pane, ERROR MESSAGE)
 333);
frame, add ( label Norm!
frame add test Num!
frome add Tabil Nom2
               test Num2
     ne add ( text Result).
France, add (divide Button);
frame. set Visible frue
```

Code:

import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

```
class SwingDemo {
  SwingDemo() {
    JFrame jfrm = new JFrame("Divider App");
    jfrm.setSize(275, 150);
    ifrm.setLayout(new FlowLayout());
    jfrm.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    JLabel jlab = new JLabel("Enter the divisor and dividend:");
    JLabel jlab1 = new JLabel("USN:1BM23CS079 Name: Chirag S");
    JTextField aitf = new JTextField(8);
    JTextField bitf = new JTextField(8);
    JButton button = new JButton("Calculate");
    JLabel err = new JLabel();
    JLabel alab = new JLabel();
    JLabel blab = new JLabel();
    JLabel anslab = new JLabel();
    ifrm.add(err);
    ifrm.add(jlab);
    ifrm.add(jlab1);
    ifrm.add(aitf);
    ifrm.add(bjtf);
    ifrm.add(button);
    ifrm.add(alab);
    jfrm.add(blab);
    jfrm.add(anslab);
    ActionListener 1 = new ActionListener() {
       public void actionPerformed(ActionEvent evt) {
         System.out.println("Action event from a text field");
    };
    ajtf.addActionListener(1);
    bitf.addActionListener(1);
    button.addActionListener(new ActionListener() {
       public void actionPerformed(ActionEvent evt) {
         try {
            int a = Integer.parseInt(ajtf.getText());
```

```
int b = Integer.parseInt(bjtf.getText());
          int ans = a / b;
          alab.setText("A = " + a);
          blab.setText("B = " + b);
          anslab.setText("Ans = " + ans);
          err.setText("");
        } catch (NumberFormatException e) {
          alab.setText("");
          blab.setText("");
          anslab.setText("");
          err.setText("Enter Only Integers!");
        } catch (ArithmeticException e) {
          alab.setText("");
          blab.setText("");
          anslab.setText("");
          err.setText("B should be NON zero!");
  });
  jfrm.setVisible(true);
public static void main(String args[]) {
  SwingUtilities.invokeLater(new Runnable() {
     public void run() {
       new SwingDemo();
  });
}
```

