### VISVESVARAYA TECHNOLOGIVAL UNIVERSITY

"JNANASANGAMA", Belgaum- 590014, Karnataka



### LAB REPORT

ON

# **OBJECT ORIENTED JAVA PROGRAMMING**

(23CS3PCOOJ)

Submitted By

DISHA D S (1BM23CS094)

in partial fulfilment for the award of the degree of

**BACHELOR OF ENGINEERING** 

IN

### COMPUTER SCIENCE AND ENGINEERING



# **BMS COLLEGE OF ENGINEERING**

(Autonomous Institute under VTU)
Bengaluru- 560019

Sep- 2024 to Jan- 2025

# B.M.S. College of Engineering,Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

# **Department of Computer Science and Engineering**



This is to certify that the Lab work entitled "Object Oriented Java Programming (23CS3PCOOJ)" carried out by **DISHA D S (1BM23CS094)**, 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.

Assistant Professor Department of CSE, BMSCE	Dr. Kavita Sooda Professor & HOD Department of CSE, BMSCE	

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### PROGRAM 1

Develop a Java program that prints all real solutions to the quadratic equation ax2 +bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2 -4ac is negative, display a message stating that there are no real solutions.

3. To find the solution of a Quadratic Equation, Import Java. ulif. Scanner; ") alle de model sava. lang. Math;

public class Solu E public static void main (Sking [] ange) s double and a, b, c, d, 21, 22; Scanner S= new Scanner (Spotem .9n); System out paintin ("Entre the values of a, 64 C respectively"); a = S. nertInt();

sulem out reenter ("b:");

b = S. nertInt();

Syclem. out perntler ("c:");

C = S. nertInt(); box 0.1 - 200 stook 2.5 d= b\*b - 4\*a\*c; # Ed == 0) & x1 = x2 = - (6/12 + a); System. out. pernter (" The roote reve"+ x1+" and

```
elce if (d > 0) & math. (d))/3*a;
                                                                         x2 = - (6 - Math. sqxt(d)) / 2 * a;
                                                                    System. out. paroth ("The scoole was x1="+x1+"ond)

System. out. paroth ("The scoole was x1="+x1+"ond)

Site of the scool of the scool of the selection of of the school o
                                     Quelput:
                                      a;
                                                                                            b:
                                          2
                                         C!
import java.util.Scanner;
public class Solu{
         public static void main(String args[]){
                   double a,b,c,d,x1,x2;
                   Scanner s = new Scanner(System.in);
                   System.out.println("Enter the values of a ,b and c respectively ");
                   System.out.print("a: ");
                   a= s.nextInt();
                   System.out.print("b: ");
                   b=s.nextInt();
                   System.out.print("c: ");
```

```
c= s.nextInt();
    d = b*b-4*a*c;
    if(d==0)
       x1=x2=-(b/(2*a));
       System.out.println("The roots are"+x1+"and"+x2);
    }
    else if(d>0)
       x1=-(b+Math.sqrt(d))/2*a;
       x2=-(b-Math.sqrt(d))/2*a;
       System.out.println("The roots are"+x1+"and"+x2);
    }
    else {
       System.out.println("Roots are imaginary");
    }
  }
OUTPUT:
```

```
PS C:\Users\DISHA D S> cd "c:\Users\DISHA D S\OneDrive\Desktop\java\" Enter the values of a ,b and c respectively
a: 1
b: 2
c: 1
The roots are-1.0and-1.0
PS C:\Users\DISHA D S\OneDrive\Desktop\java> cd "c:\Users\DISHA D S\O Enter the values of a ,b and c respectively
a: 1
b: 3
c: 1
The roots are-2.618033988749895and-0.3819660112501051
```

```
PS C:\Users\DISHA D S\OneDrive\Desktop\java> cd "c:\Users\DISHA D S\O
Enter the values of a ,b and c respectively
a: 1
b: 1
c: 1
Roots are imaginary
```

### 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.

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Edward . Rod ED markes ; 1522
                                  Student (Int n) &
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                                                                                Applete of the sold about
                                    void take ( sames s) ( ) 5000 51 001 818 ) 29
                                                       System. out : print (" Enter Name; ");
name = S. nept Line ();
                                                          System out paintin ( enter voro: 1);
                                                            usn =: semepthing (); ) = 1 + jako
                                                           for (int i= 0; i < credity length sitt) &
                                                                           System. out. println (" Subject "+ (+1) + "Crobbe:")
                                                                                credice [i] = sinert Inter; page tos
                                                                           System.out. println ("Subject" + (i+1)+"marke: ");
                                                                                marke [i] (= S. new Indico;
                                                                                                        eles of (marker 5: 50)
                                                                                                         elu ( ( eventes )
```

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System. out printer (" USN: "+ USN);
System. out printer (" Name: "+ name);
                                            vord abotage, &
                                                                     for CPNP 1=0; ic credition length; 944) 5000
                                                                                  System out paintle ("Subject" + (2+1) + 1 Cody
                                                                                                                                                                 1 creditetij tri traste . "+ "au
                                                                                                                                                                                  Sen Vo) rehale
                                           Louble Sapper & by some a strong
                                                              double force = 0, totpt=0;
                                                            for (Int i=0; i< crediti-length; P++) s

total += crediti [i];
                                                            ind gp = getgp (marke Bil);
                                                              toopt + = credite [i] * grade; y
                                         nelwin tot pt / botere;
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and gelge (int marke) & il history & strong of the marke of the market of the marke
                                                                      elee { (marke > = 80)
                                                                                                     reluen 9;
                                                                      ela of (marks > = 70)
```

```
else if (mostle >= 60)

relian 3;

else if (mastle >= 50)

relian 6;

else if (mastle >= 40)

relian 5;

else

return 0;

public static rold main (string [] agg) if a significant significant of the state of the significant of the significant
```

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Enter name: D
                           E S. LALATADAS
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        differ radio : 1843 1 divor ratio
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      (Subject 2 19 Coditi 3 = 120 100)
 Entere fullyed 3 maker 1 hop to make
 Enly : Sulfell 3 credite: 4 0 to
              Student (n)
 NAME: D
                          Student. Foke (S);
               Shirt of your Maner us ;
 USN: 18m23
 Subject 1 marks: 80
                       creditle: 3
 Sulyet & marks : 90
                       argula: 3
 Subject 3 marks: 100
                       aedile: 4
 SGPA: 3.7
old Seen
```

```
Program:
import java.util.Scanner;
class Student {
  String usn;
  String name;
  int[] credits;
  int[] marks;
  Student(int n) {
     credits = new int[n];
    marks = new int[n];
  }
  void take(Scanner s) {
     System.out.println("ENTER NAME: ");
     name = s.nextLine();
     System.out.println();
     System.out.println("ENTER USN: ");
     usn = s.nextLine();
     for (int i = 0; i < credits.length; i++) {
       System.out.print("Subject " + (i + 1) + " Credits: ");
```

```
credits[i] = s.nextInt();
       System.out.print("Subject " + (i + 1) + " Marks: ");
       marks[i] = s.nextInt();
     }
  }
  void display() {
     System.out.println("USN: " + usn);
     System.out.println("Name: " + name);
     for (int i = 0; i < credits.length; i++) {
       System.out.println("Subject " + (i + 1) + ": Credits=" +
credits[i] + ", Marks=" + marks[i]);
     }
  }
  double SGPA() {
     double totcre = 0;
     double totpt = 0;
     for (int i = 0; i < credits.length; i++) {
       totcre += credits[i];
       int gp = getgp(marks[i]);
```

```
totpt+= credits[i] * gp;
  }
  return totpt / totcre;
}
int getgp(int marks) {
  if (marks \geq= 90) return 10;
  else if (marks \geq 80) return 9;
  else if (marks \geq 70) return 8;
  else if (marks \geq 60) return 7;
  else if (marks \geq 50) return 6;
  else if (marks \geq 40) return 5;
  else return 0;
}
public static void main(String[] args) {
  Scanner s = new Scanner(System.in);
  System.out.print("Enter no. of subjects: ");
  int n = s.nextInt();
  s.nextLine();
Student student = new Student(n);
  student.take(s);
  student.display();
```

```
System.out.println("SGPA: " + student.SGPA());
}
Output:
```

```
PS C:\Users\DISHA D S> cd "c:\Users\DISHA D S\OneDrive\Deskt
Enter no. of subjects: 3
ENTER NAME: d
ENTER USN: 1bm23
Subject 1 Credits: 3
Subject 1 Marks: 99
Subject 2 Credits: 3
Subject 2 Marks: 100
Subject 3 Credits: 3
Subject 3 Marks: 100
USN: 1bm23
Name: d
Subject 1: Credits=3, Marks=99
Subject 2: Credits=3, Marks=100
Subject 3: Credits=3, Marks=100
SGPA: 10.0
```

# 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.

Create a clave Book which contains four members name, author, price, num-pager. Include a conch set do set the value for the members. Include melhode to ket and get the detaile of the Include a dosking () method athat could decho dhe complete defate of the Gook. Develop vo fava program de create Propost gava utel Scanner; class Book & this name = name;

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paget = " I nopy;

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Scanner s = new Scanner (system.

System. out. partlin ("Enter number of ...

Pook [] books = new Book (")

for (Int = 01; of cn o; 7.1.1) &

System. out. partlin ("Enter name");

```
BOOK! NAME = CCC

AUTHOR = DDD

PRICE = SG.O

NOMBER OF PAGES = GT

TOTAL OF PAGES AND ADD

("ENDS IP") OF PAGES

("ENDS IP") OF PAGES

("ENDS IP") OF PAGES

("ENDS IP") OF PAGES
```

```
Program:
import java.util.Scanner;
class Book{
  private String name;
  private String author;
  private double price;
  private int numPages;
  public Book(String name, String author, double price, int
numPages) {
    this.name = name;
    this.author = author;
    this.price = price;
    this.numPages = numPages;
  }
  public void setName(String name) {
    this.name = name;
  }
  public void setAuthor(String author) {
```

```
this.author = author;
}
public void setPrice(double price) {
  this.price = price;
}
public void setNumPages(int numPages) {
  this.numPages = numPages;
}
public String getName() {
  return name;
}
public String getAuthor() {
  return author;
}
public double getPrice() {
  return price;
}
public int getNumPages() {
```

```
return numPages;
  }
  @Override
  public String toString() {
    return "Book Details:\n" +
         "Name: " + name + '\n' +
         "Author: " + author + '\n' +
         "Price: $" + price + '\n' +
         "Number of Pages: " + numPages;
  }
}
public class BookProgram{
  public static void main(String[] args) {
     Scanner scanner = new Scanner(System.in);
     System.out.print("Enter the number of books to create: ");
     int n = scanner.nextInt();
     scanner.nextLine();
     Book[] books = new Book[n];
```

```
for (int i = 0; i < n; i++) {
  System.out.println("\nEnter details for book " + (i + 1) + ":");
  System.out.print("Enter name: ");
  String name = scanner.nextLine();
  System.out.print("Enter author: ");
  String author = scanner.nextLine();
  System.out.print("Enter price: ");
  double price = scanner.nextDouble();
  System.out.print("Enter number of pages: ");
  int numPages = scanner.nextInt();
  scanner.nextLine();
  books[i] = new Book(name, author, price, numPages);
}
System.out.println("\nDetails of all books:");
for (int i = 0; i < n; i++) {
  System.out.println("\nBook" + (i + 1) + ":");
  System.out.println(books[i].toString());
}
```

```
scanner.close();
  }
}
 PS C:\Users\DISHA D S\OneDrive\Desktop\java> cd "c:\Users\DISHA
 ram }
 Enter the number of books to create: 2
 Enter details for book 1:
 Enter name: aaa
 Enter author: AAA
 Enter price: 599
 Enter number of pages: 60
 Enter details for book 2:
 Enter name: bbb
 Enter author: BBB
 Enter price: 699
 Enter number of pages: 40
 Details of all books:
 Book 1:
 Book Details:
 Name: aaa
 Author: AAA
 Price: $599.0
 Number of Pages: 60
 Book 2:
 Book Details:
 Name: bbb
 Author: BBB
 Price: $699.0
 Number of Pages: 40
```

## 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

import jewa with Sanner) abdeart about stape style restrict on all some styles Part I = worth grad of it coases bring browns elifewiong bayer C. Eym Konge ...) class vect entende elapse privare rect cine al 16) 15 this les; there 626;3 inder wind mad pand And Cant. 1, Ant by ba mother Syclem. oul. perollo ("Akea of sectangle &:"+ class létangle entende chaple é à literation mon é terrebe : thur h = h;}

vois print Assa (Lints b. wint th) é double a = 0.5 + 6 + 6; (0) Syllem-out perully (" see of leagle: " Class cacle enlande shape & pierre ou con 1 1 165. 12 73 Col wed fire and Cont or IT double a= 3.147 00 th Titleg. A System-out-partle ("see of ciacle: "+a); Claus Area & Sanne s = new Scanne (System. Pn); System. out pantly (" Shape: Rectargle ");

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        Syclemout panter (" Enter breakth ");
            ent 6 = 4, next Ind ( 2) para should be
        Sylem out pentin ( " Trape " Crocke ") 2 Poly
        system out penten ("Shape: Trayle in End
             and h= s.nextInd();
         Syclem- out panta ("Entre Gage"),
            Phy to = street Int ;
           double a = 0 = x & x & b
 in frequent one in the state of the contract ( 1.6);
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                 The = new on terappe (ba, h);
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       T. petrol mac)
     3) (Esser asid mais ( steen essers) (E
 : (" denotable . man of the same
```

```
import java.util.Scanner;
abstract class Shape {
  abstract void printArea();
}
class Rect extends Shape {
  private int length;
  private int breadth;
  public Rect(int length, int breadth) {
     this.length = length;
     this.breadth = breadth;
  }
  @Override
  void printArea() {
     int area = length * breadth;
     System.out.println("Area of the rectangle is " + area);
  }
}
class Tri extends Shape {
  private int base;
  private int height;
```

```
public Tri(int base, int height) {
     this.base = base;
     this.height = height;
  }
  @Override
  void printArea() {
     double area = 0.5 * base * height;
     System.out.println("Area of the triangle is " + area);
  }
}
class Circle extends Shape {
  private int radius;
  public Circle(int radius) {
     this.radius = radius;
  }
  @Override
  void printArea() {
     double area = 3.14 * radius * radius;
     System.out.println("Area of the circle is " + area);
  }
```

```
}
public class Area {
  public static void main(String[] args) {
     Scanner scanner = new Scanner(System.in);
     System.out.print("Shape: Rectangle\nEnter length: ");
     int length = scanner.nextInt();
     System.out.print("Enter breadth: ");
     int breadth = scanner.nextInt();
     System.out.print("Shape: Triangle\nEnter base: ");
     int base = scanner.nextInt();
     System.out.print("Enter height: ");
     int height = scanner.nextInt();
     System.out.print("Shape: Circle\nEnter radius: ");
     int radius = scanner.nextInt();
     Rect rectangle = new Rect(length, breadth);
     Tri triangle = new Tri(base, height);
     Circle circle = new Circle(radius);
     System.out.println();
     rectangle.printArea();
```

```
triangle.printArea();
    circle.printArea();
    scanner.close();
}
```

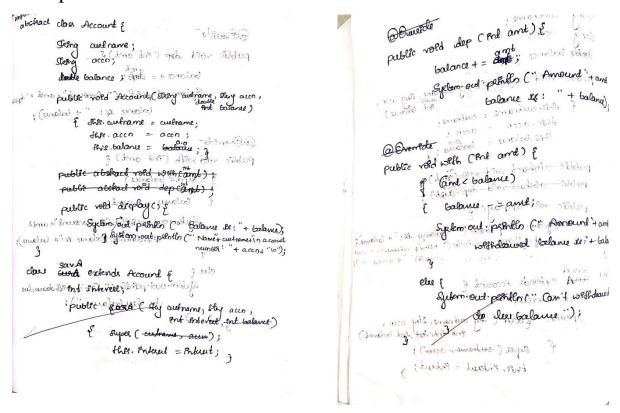
### **OUTPUT**:

٠

```
PS C:\Users\DISHA D S\OneDrive\Desktop\java> cd "c:\User
Shape: Rectangle
Enter length: 2
Enter breadth: 2
Shape: Triangle
Enter base: 2
Enter height: 1
Shape: Circle
Enter radius: 3
Area of the rectangle is 4
Area of the triangle is 1.0
Area of the circle is 28.259999999999998
PS C:\Users\DISHA D S\OneDrive\Desktop\java>
```

#### 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 Cur-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks: a) Accept deposit from customer and update the balance. b) Display the balance. c) Compute and deposit interest d) Permit withdrawal and update the balance Check for the minimum balance, impose penalty if necessary and update the balance.



```
public void compdepent ( ) &
       double r = balance + interest / 1000 day
             balance + = r;
             Sextem out printin (" Intered of is + " ix allow
 time! To brown more balance es per + balance);
moded " : Bunded housed 190 "
            Check in to ();
  3
class as a extende Associant & . ] sale
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        public Lead (Sking custraine, sly accomp
                , super ( customer, acco);
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wit mit mard z div, to may s
 Find Deregging on an alas mumina.
      public nord dep ( Rod and ) For
              balance += and;
              System out petfor "Amond" + and + "depointed balow it: " + balonce);
```

```
public mand worth ( and and) {
               of (and (balance); smolers
 were as a lo handbalaul F. Frant in 192
      : ( send od + Syden out pelle ( re Amount of to
                        " washdoowed Galance is " 62
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                      Public world dop ( Port and) (8
                         Galane 1 = and;
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          ic" 1 bolonies);
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public static roll maler (Sking aggs(3)) &
Scanner s: new Scanner (Strenge Accounts);
System out pinter ("Savinge Accounts);
          Sking Sn = s. next Line ();
           syclem out perillo (" entes ace no. 12)
                     an = s. nertane ():
           Syxtem out paintly ("Enter protessed"):
               int intr = S. rextant ();
                           (000,06)92
       · Sava sav = nev Savia (sn, an, intr);
           S. nept line (); / (C) poly to . en:
                             (020P) Allw. eu.
           Sydem.out. pernolen (" Cursend Account");
           Syclem. out perhlin (" Entre name: ");
              Son = s. hearing;
            Eyelern oud peter (" ender acc. no ");
              sking can = S. next (Suc),
            System out printin ("Enles Antered");
                int minb = s. next and ();
```

```
klem out paintin ("Proba whether your want to
1. Sawing deposed in Soverne withdraw
104. Cominge enteral
ins. Eurrent deposit ins. append withdraw
water Deploy )
    and ch = s. next and ();
      ( wrone ) delice.
Party CITE
 swetch (ch)
                (cologalismo sp. 12 ac
 3
    case 1: System-out pertin (" Ende amount
        to deposit ")
             Ant amt = s.next frt ();
             savidep (and); Grak;
    call 2: System out partle ("Erde withdrawal
              amount ");
              and want = s.new Int ();
               sav. with (wand); (seat;
    Care 3: Sav. dylay (1;
                         errolled minister 1111
    Case 4; sur compdep And ();
            beeat
```

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case simily termout petition (" Enter and to dipay

and simily termout petition (" Enter and for the case of causes," ( leak;

case of causes, ( Enter and for the causes, beat;

case 71 de cus display ();

case 71 de cus display ();

case 8? execo;

break;

case 11 de cus display ();

case 21 de cus display ();

case 31 de cus display ();

case 41 de cus display ();

case 5. next for ();

case 71 de cus display ();

case 71 de cus display ();

case 71 de cus display ();

case 8? execo;

display to make the cus display ();

case 1 de cus display ();

case 8. execord

case 1 de cus display ();

case 2 de cus display ();

case 3 de cus display ();

case 1 de cus display ();

case 2 de cus display ();

case 3 de cus display ();

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```
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     666
    Enter acc. no:
     23CS SOT 2266
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     Enter minimum balance:
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          too
          Enter service charge:
           50
                                                                                                                                                                                                                                             202020108: 50 Br
          Enter choice
  1. Sawinge deposit
2. Sawinge werthdeaus
3. Sawing Deplay
4. Sawing Friterit
5. Guerral deposit
     6. averal withdraw
     7. Current Deplay
8. Phil
     Amount to deposit: 2000
       Amount of 2000 deposited Balance: 2000
```

```
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3. Sanings Orphous
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           Combol Rollman ...
```

```
import java.util.Scanner;
class Account {
  String customerName;
  String accountNumber;
  String accountType;
  double balance;
  public Account(String customerName, String accountNumber,
String accountType, double initialDeposit) {
    this.customerName = customerName;
    this.accountNumber = accountNumber;
    this.accountType = accountType;
    this.balance = initialDeposit;
  }
  public void deposit(double amount) {
    if (amount > 0) {
       balance += amount;
       System.out.println("Deposit successful. Updated balance: " +
balance);
    } else {
       System.out.println("Invalid deposit amount.");
  }
```

```
public void displayBalance() {
    System.out.println("Balance: " + balance);
  }
}
class SavAcct extends Account {
  private static final double INTEREST_RATE = 0.04;
  public SavAcct(String customerName, String accountNumber,
double initialDeposit) {
    super(customerName, accountNumber, "Savings",
initialDeposit);
  }
  public void computeAndDepositInterest() {
    double interest = balance * INTEREST RATE;
    balance += interest;
    System.out.println("Interest of " + interest + " deposited.
Updated balance: " + balance);
  }
  public void withdraw(double amount) {
    if (amount > balance) {
       System.out.println("Insufficient balance for withdrawal.");
     } else {
```

```
balance -= amount;
       System.out.println("Withdrawal successful. Updated balance:
" + balance);
     }
}
class CurAcct extends Account {
  private static final double MINIMUM BALANCE = 1000.0;
  private static final double PENALTY = 100.0;
  public CurAcct(String customerName, String accountNumber,
double initialDeposit) {
    super(customerName, accountNumber, "Current",
initialDeposit);
  }
  public void withdraw(double amount) {
    if (amount > balance) {
       System.out.println("Insufficient balance for withdrawal.");
    } else {
       balance -= amount;
       System.out.println("Withdrawal successful. Updated balance:
" + balance);
       if (balance < MINIMUM BALANCE) {
         imposePenalty();
```

```
}
  }
  private void imposePenalty() {
    balance -= PENALTY;
    System.out.println("Balance fell below minimum. Penalty of " +
PENALTY + " imposed. Updated balance: " + balance);
  }
}
public class Bank {
  public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    System.out.print("Enter customer name for Savings Account: ");
    String savName = scanner.nextLine();
    System.out.print("Enter account number: ");
    String savAccNum = scanner.nextLine();
    System.out.print("Enter initial deposit: ");
    double savDeposit = scanner.nextDouble();
    SavAcct savings = new SavAcct(savName, savAccNum,
savDeposit);
```

```
scanner.nextLine();
    System.out.print("\nEnter customer name for Current Account:
");
    String curName = scanner.nextLine();
    System.out.print("Enter account number: ");
    String curAccNum = scanner.nextLine();
    System.out.print("Enter initial deposit: ");
    double curDeposit = scanner.nextDouble();
    CurAcct current = new CurAcct(curName, curAccNum,
curDeposit);
    while (true) {
       System.out.println("\n--- Bank Menu ---");
       System.out.println("1. Deposit to Savings Account");
       System.out.println("2. Withdraw from Savings Account");
       System.out.println("3. Display Savings Account Balance");
       System.out.println("4. Compute and Deposit Interest to
Savings Account");
       System.out.println("5. Deposit to Current Account");
       System.out.println("6. Withdraw from Current Account");
       System.out.println("7. Display Current Account Balance");
       System.out.println("8. Exit");
       System.out.print("Enter your choice: ");
       int choice = scanner.nextInt();
```

```
switch (choice) {
         case 1:
            System.out.print("Enter amount to deposit to Savings
Account: ");
            double savDepositAmt = scanner.nextDouble();
            savings.deposit(savDepositAmt);
            break;
         case 2:
            System.out.print("Enter amount to withdraw from
Savings Account: ");
            double savWithdrawAmt = scanner.nextDouble();
            savings.withdraw(savWithdrawAmt);
            break;
         case 3:
            System.out.println("Savings Account Balance: ");
            savings.displayBalance();
            break;
         case 4:
            savings.computeAndDepositInterest();
            break;
         case 5:
            System.out.print("Enter amount to deposit to Current
Account: ");
            double curDepositAmt = scanner.nextDouble();
            current.deposit(curDepositAmt);
```

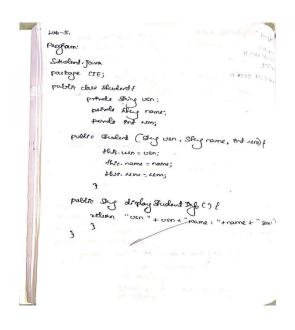
```
break;
         case 6:
            System.out.print("Enter amount to withdraw from
Current Account: ");
            double curWithdrawAmt = scanner.nextDouble();
            current.withdraw(curWithdrawAmt);
            break;
         case 7:
            System.out.println("Current Account Balance: ");
            current.displayBalance();
            break;
         case 8:
            System.out.println("Exiting program. Thank you!");
            scanner.close();
            return;
         default:
            System.out.println("Invalid choice. Please try again.");
       }
  }
}
```

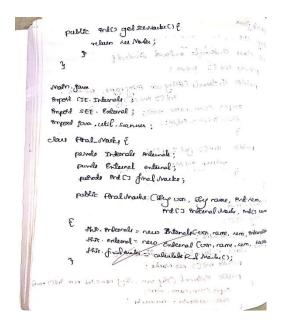
```
Enter customer name for Savings Account: AAA
Enter account number: 123
Enter initial deposit: 1000
Enter customer name for Current Account: BBB
Enter account number: 12365
Enter initial deposit: 5000
--- Bank Menu -
1. Deposit to Savings Account
2. Withdraw from Savings Account
3. Display Savings Account Balance
4. Compute and Deposit Interest to Savings Account
5. Deposit to Current Account
6. Withdraw from Current Account
7. Display Current Account Balance
8. Exit
Enter your choice: 2
Enter amount to withdraw from Savings Account: 600
Withdrawal successful. Updated balance: 400.0
   Bank Menu
1. Deposit to Savings Account
2. Withdraw from Savings Account
3. Display Savings Account Balance
4. Compute and Deposit Interest to Savings Account
5. Deposit to Current Account
6. Withdraw from Current Account
7. Display Current Account Balance
8. Exit
Enter your choice: 6
Enter amount to withdraw from Current Account: 45000 Insufficient balance for withdrawal.
--- Bank Menu -
1. Deposit to Savings Account
2. Withdraw from Savings Account
3. Display Savings Account Balance
4. Compute and Deposit Interest to Savings Account
5. Deposit to Current Account
```

```
5. Deposit to Current Account
6. Withdraw from Current Account
7. Display Current Account Balance
8. Exit
Enter your choice: 6
Enter amount to withdraw from Current Account: 4500
Withdrawal successful. Updated balance: 500.0
Balance fell below minimum. Penalty of 100.0 imposed. Updated balance: 400.0
--- Bank Menu ---
1. Deposit to Savings Account
2. Withdraw from Savings Account
3. Display Savings Account Balance
4. Compute and Deposit Interest to Savings Account
5. Deposit to Current Account
6. Withdraw from Current Account
7. Display Current Account Balance
8. Exit
Enter your choice: 8
Exiting program. Thank you!
```

#### 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.





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          proveds and CJ and m;
           public Enclavels (sterng usn, sterng rame, and sem, and com, and com, and com, sem);
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             buppy sufficient of the desire of the desired
                           releven Enternal or family three
                                                   party love or fively waster;
  Bland for mon pill one got shouldness silling mentaling when the solution is a solution of the parties of the parties of the solution of the parties of the 
  package SEE;
  Amport CIE. Skillart, Public Class Enteral sakada Skulent E
                     periode and [] see Marke;
                    public External Coly von , sty name, Ind name, tol anough
                   super (usn, ram, eem);
     petrale Ant [] calculate Fral Nacke Cotivo. mas midura
                 Prof () fral Marks = new ant (5);
                  And [] Artanal Mais = Enlearale, golizhend Medices;
md [] Lee Nacle = enlearal getree Machecs;
for (ml 1=0; 85; 7+4) f
                             final waves [i] = indeenal would it is +
         ( Ca) when and a shalow (Fee Marker [1]/2);
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                                         "(" no who of full from the
    public road deplay final markers & ...
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               for (Prot most: fred Marke) frag the maly
                              Eyelern out peurel (mark + ");
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                                           for continuity of
                    to the cold about the City = s. next (150)
```

```
public clau Mari &
   public static rold order ( skat f 13 age) p
     Same s= new Same Caylen Pn);
      Sylom out part ("Enter no. of eludents);
       and n = s. next Ind ();
       countingly, lender = my dear, land
     · And Marke (7) pladerlo = new final Moder (1).
       for (mt 0=0, 8 cn; 8+4) p. Jong miles
         Systemous pout (" Enle UM");
         sty on = & next crack payab how the
 : (O and Grend ( render name: ");
         sty came = 5 new ( same ( ); may be orange
         Syclem-out pend ( Enter Ken. ");
          sug view = 2 view put () if no more
          And () Enternal Marks = new End (5);
          ender = new And (50);
          Rylen out penter (" Entre onbeind market 5
                       courses " "
          for (Ant 1=0; 105; 144) p
             Internal Marker (1) = 5. nex-(Ind();
```

```
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 Enter Sec.
           : CO And Jack 12 - C Without Long Shin
  100
  100
  100
  100
a Enter OSMA 16M. OSTSOO What Was Flower = [1] & who
  Ende Mame: AAA
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  Enter andered marke for 5 courses:
  45. (" Andries Jo chan lond or") Alary hua mig
        - Gladul : habit said of
 Erdu SEE made FER & couque
  99
  99
 Foral Marke of Stredards:
 USN:189205094, Nam: Belo Ds. Sem. 3
Finel Marks: 53 94 89 83 77
              : Ena to wife in Law. I would of
```

```
systemout pointes (" Entre SEE marke for scauce : ");
     for (and j=0); (5) J++) p
          ordered Noelicia = c. septent ();
     studente [i] = new Arahvouke (ven, name, Lem, Alenal Marke
                              see Marks );
     s. nexteneco;
                    the Antony made yet s course:
    g
   system. out. perhala (" in Anal Marke of steedards; ");
   for (Fral Marke student: studente) f
       student deplay Frak Marky (2);
 3
Output:
Enter mumber of chuderle: 2 and out on the same of the
Enter USIN: 18m23CSOQ4
 Ste Nam: DISHATOS GARAGONIA
             LL ES OL DO ES COMPTENS
 Enler sem: 3
 Erles Internal Marks for o courses;
```

```
package CIE;
public class Student{
  protected String usn;
  protected String name;
  protected int sem;
  public Student(String usn, String name, int sem) {
     this.usn = usn;
     this.name = name;
    this.sem = sem;
  }
  public String displayStudentInfo() {
    return "USN: " + usn + ", Name: " + name + ", Semester: " +
sem;
  }
}
package CIE;
public class Internals extends Student {
  private int[] internalMarks; // Array to store internal marks for 5
courses
```

```
public Internals(String usn, String name, int sem, int[]
internalMarks) {
     super(usn, name, sem);
    this.internalMarks = internalMarks;
  }
  public int[] getInternalMarks() {
     return internalMarks;
  }
}
package SEE;
import CIE.Student;
public class External extends Student {
  private int[] seeMarks; // Array to store SEE marks for 5 courses
  public External(String usn, String name, int sem, int[] seeMarks) {
     super(usn, name, sem);
    this.seeMarks = seeMarks;
  }
  public int[] getSeeMarks() {
    return seeMarks;
```

```
}
}
import CIE.Internals;
import SEE.External;
import java.util.Scanner;
class FinalMarks {
  private Internals internals;
  private External external;
  private int[] finalMarks;
  public FinalMarks(String usn, String name, int sem, int[]
internalMarks, int[] seeMarks) {
     this.internals = new Internals(usn, name, sem, internalMarks);
     this.external = new External(usn, name, sem, seeMarks);
     this.finalMarks = calculateFinalMarks();
  }
  private int[] calculateFinalMarks() {
     int[] finalMarks = new int[5];
     int[] internalMarks = internals.getInternalMarks();
     int[] seeMarks = external.getSeeMarks();
     for (int i = 0; i < 5; i++) {
```

```
// Assuming final mark is (internal mark) + (SEE mark scaled
to 50%)
       finalMarks[i] = internalMarks[i] + (seeMarks[i] / 2);
     }
    return finalMarks;
  }
  public void displayFinalMarks() {
     System.out.println(internals.displayStudentInfo());
     System.out.print("Final Marks: ");
     for (int mark : finalMarks) {
       System.out.print(mark + " ");
     }
     System.out.println();
}
public class Main1 {
  public static void main(String[] args) {
     Scanner s = new Scanner(System.in);
     System.out.print("Enter number of students: ");
     int n = s.nextInt();
     s.nextLine();
```

```
FinalMarks[] students = new FinalMarks[n];
for (int i = 0; i < n; i++) {
  System.out.print("Enter USN: ");
  String usn = s.nextLine();
  System.out.print("Enter Name: ");
  String name = s.nextLine();
  System.out.print("Enter Semester: ");
  int sem = s.nextInt();
  int[] internalMarks = new int[5];
  int[] seeMarks = new int[5];
  System.out.println("Enter Internal marks for 5 courses:");
  for (int j = 0; j < 5; j++) {
     internalMarks[j] = s.nextInt();
  }
  System.out.println("Enter SEE marks for 5 courses:");
  for (int j = 0; j < 5; j++) {
     seeMarks[j] = s.nextInt();
  }
  students[i] = new FinalMarks(usn, name, sem, internalMarks,
```

seeMarks);

```
s.nextLine(); // Consume newline
}

System.out.println("\nFinal Marks of Students:");
for (FinalMarks student : students) {
    student.displayFinalMarks();
}
}
```

#### **OUTPUT**

```
PS C:\Users\DISHA D S\OneDrive\Desktop\java> cd "c:\Users\DISHA D S\
Enter number of students: 2
Enter USN: 1
Enter Name: AAA
Enter Semester: 3
Enter Internal marks for 5 courses:
50
50
50
50
Enter SEE marks for 5 courses:
 100
 100
100
 100
Enter USN: 2
Enter Name: BBB
Enter Semester: 3
Enter Internal marks for 5 courses:
50
50
50
50
Enter SEE marks for 5 courses:
100
20
100
99
Final Marks of Students:
USN: 1, Name: AAA, Semester: 3
Final Marks: 100 100 100 100 100
USN: 2, Name: BBB, Semester: 3
Final Marks: 149 60 100 99 60
```

#### PROGRAM 7

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 WrongAge() when the input age=father's age.

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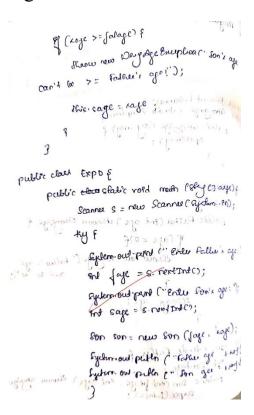
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```



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olp

shu Father 's age: 0

shu Son's age: 0

shupton: Son's age: amnof be greated than or equal

to father is age.

```
import java.util.Scanner;
     class WrongAgeException extends Exception {
       public WrongAgeException(String message) {
          super(message);
       }
     class Father {
       protected int age;
       public Father(int age) throws WrongAgeException {
          if (age < 0) {
            throw new WrongAgeException("Father's age cannot be
negative.");
          this.age = age;
     class Son extends Father {
       private int sonAge;
       public Son(int fatherAge, int sonAge) throws
WrongAgeException {
```

```
super(fatherAge);
          if (sonAge < 0) {
            throw new WrongAgeException("Son's age cannot be
negative.");
          if (sonAge >= fatherAge) {
            throw new WrongAgeException("Son's age cannot be
greater than or equal to father's age.");
          this.sonAge = sonAge;
        }
       public void displayAges() {
          System.out.println("Father's Age: " + age);
          System.out.println("Son's Age: " + sonAge);
     public class FamilyAgeTest {
       public static void main(String[] args) {
          Scanner scanner = new Scanner(System.in);
          try {
            System.out.print("Enter father's age: ");
            int fatherAge = scanner.nextInt();
```

```
System.out.print("Enter son's age: ");
int sonAge = scanner.nextInt();

Son son = new Son(fatherAge, sonAge);
son.displayAges();
} catch (WrongAgeException e) {
System.out.println("Error: " + e.getMessage());
} catch (Exception e) {
System.out.println("Invalid input. Please enter valid ages.");
}
```

### Output:

```
PS C:\Users\DISHA D S\OneDrive\Desktop\java> cd "c:\Use
Enter father's age: 30
Enter son's age: 30
Error: Son's age cannot be greater than or equal to fat
PS C:\Users\DISHA D S\OneDrive\Desktop\java> cd "c:\Use
Enter father's age: -30
Enter son's age: 30
Error: Father's age cannot be negative.
```

#### PROGRAM 8

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.

```
1. 19 the a phogram which ready live linear
                                                                               one throat Examines diplaying CSE once every
ten seconds & another diplaying CSE once every
     Tay ( while (min my) sycken out prints ("CSE");
             Thread. Leep (2000);
                                                                               two seconds
     catch & totompled Enception e) 5
                                                                             -> Amport gara. ulil. *;
                   Syctem out people (e); 3 3
    public rold stop Theod. C) & 2000 ) goldo
                                                                              clau B extends Itorad f
pand robbite boolean runng = terre;
@Gunide
                   suppring= false;
                                                                                   publik word sunci &
           3
                                                                             public with (manning)
public class Inain &
    public clabit rold main ( (Ring () ask) & public smit
                                                                                          Thread-Aleep (10000);
                                                                                         3
           B fl = new B();
                                                                                     catch (Interupted_Exception e) {
           c +2 = new c();
                                                                                            Syclem. out. parthy (e);
           El. Afaetc);
           to. Abado:
                                                                                     pulle not elop Thread() &
           try &
                                                                                            running = false;
                Thread. Lleep (30000);
            catch (Interrupted Exception e) &
                                                                            class centeral Thread &
                                                                                 provide volatile Godlean sunning = True;
                  byclem out perth (e);
                                                                                   @Queesde
       ti. AppThread();
to. AppThread(); 3 3
```

```
class B extends Thread {
  private volatile boolean running = true;
  @Override
  public void run() {
    try {
       while (running) {
          System.out.println("BMS College of Engineering");
          Thread.sleep(10000);
       }
     } catch (InterruptedException e) {
       System.out.println(e);
     }
  }
  public void stopThread() {
    running = false;
  }
}
class C extends Thread {
  private volatile boolean running = true;
  @Override
  public void run() {
```

```
try {
        while (running) {
          System.out.println("CSE");
          Thread.sleep(2000);
        }
     } catch (InterruptedException e) {
        System.out.println(e);
     }
  }
  public void stopThread() {
     running = false;
  }
}
public class ThreadE {
  public static void main(String[] args) {
     B thread 1 = \text{new B}();
     C \text{ thread2} = \text{new } C();
     thread1.start();
     thread2.start();
     try {
        Thread.sleep(30000);
```

```
} catch (InterruptedException e) {
         System.out.println(e);
}

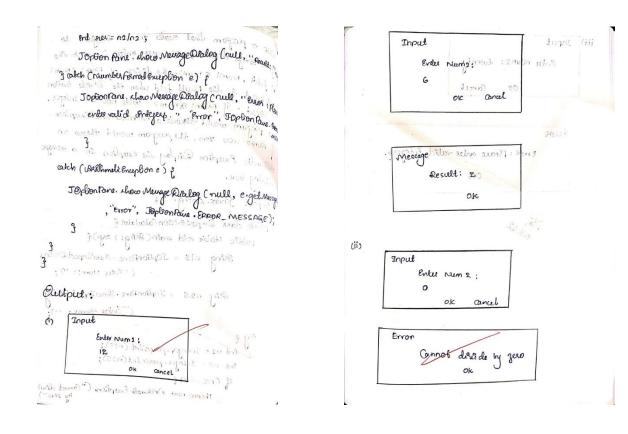
thread1.stopThread();
thread2.stopThread();
}
```

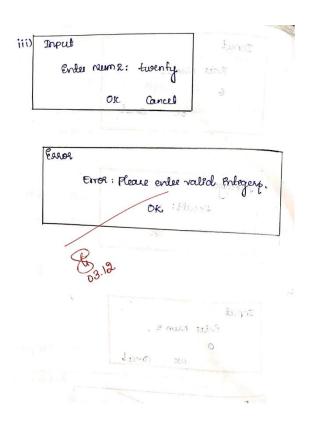
## Output

```
PS C:\Users\DISHA D S\OneDrive\Desktop\java> cd "c:\Use
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
```

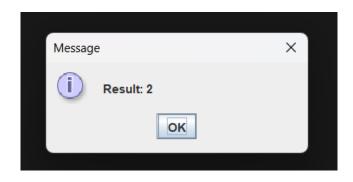
## Program 9

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.





```
import javax.swing.*;
     public class SimpleDivisionCalculator {
       public static void main(String[] args) {
          String num1Str = JOptionPane.showInputDialog("Enter
Num1:");
          String num2Str = JOptionPane.showInputDialog("Enter
Num2:");
          try {
            int num1 = Integer.parseInt(num1Str);
            int num2 = Integer.parseInt(num2Str);
            if (num2 == 0) {
               throw new ArithmeticException("Cannot divide by
zero.");
             }
            int result = num1 / num2;
            JOptionPane.showMessageDialog(null, "Result: " +
result);
```







# Github link:

https://github.com/DishaDS094/DISHADS\_JAVA\_094