VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.



LAB REPORT on

Object Oriented Java Programming (23CS3PCOOJ)

Submitted by

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



B.M.S. COLLEGE OF ENGINEERING

(Autonomous Institution under VTU)
BENGALURU-560019
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



CERTIFICATE

This is to certify that the Lab work entitled "Object Oriented Java Programming (23CS3PCOOJ)" carried out by **Jayanth Gowda A(1BM23CS123)**, who is bonafide student of **B.M.S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum. 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.

| Lab faculty Incharge Name | Dr. Jyothi S Nayak |
|---------------------------|--------------------------|
| Assistant Professor | Professor & HOD |
| Department of CSE, BMSCE | Department of CSE, BMSCE |
| | |

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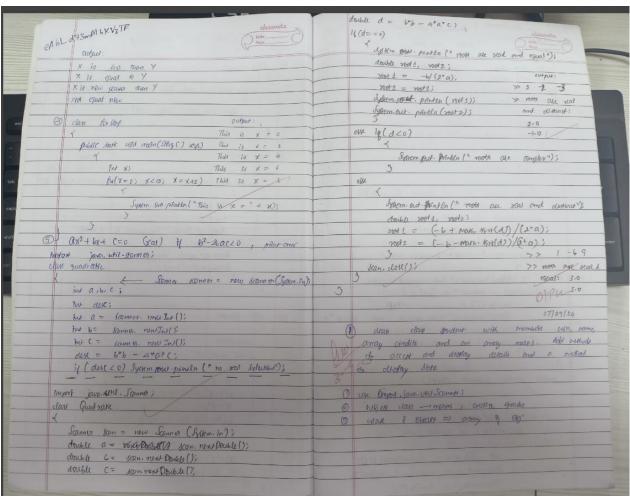
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Github Link:

 $\underline{https://github.com/Jayanth0927/java-lab-programs}$

Program 1
Implement Quadratic Equation



CODE:

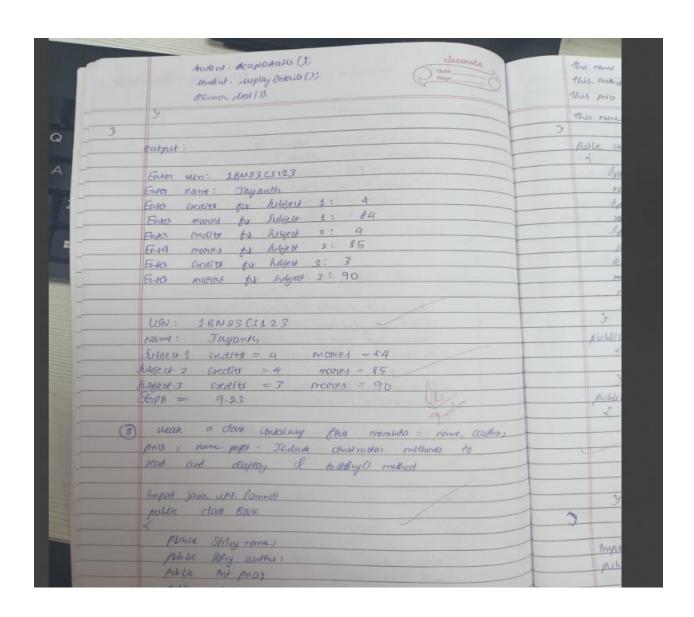
```
import java.util.Scanner;
```

```
public class QuadraticEquation {
  public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    System.out.print("Enter the coefficient a: ");
    double a = scanner.nextDouble();
    System.out.print("Enter the coefficient b: ");
    double b = scanner.nextDouble();
    System.out.print("Enter the coefficient c: ");
    double c = scanner.nextDouble();
    double discriminant = b * b - 4 * a * c;
```

```
if (discriminant > 0) {
    double root1 = (-b + Math.sqrt(discriminant)) / (2 * a);
    double root2 = (-b - Math.sqrt(discriminant)) / (2 * a);
    System.out.println("The roots are real and distinct.");
    System.out.println("Root 1: " + root1);
    System.out.println("Root 2: " + root2);
 } else if (discriminant == 0) {
    double root = -b / (2 * a);
    System.out.println("The roots are real and equal.");
    System.out.println("Root: " + root);
 } else {
    double realPart = -b/(2 * a);
    double imaginaryPart = Math.sqrt(-discriminant) / (2 * a);
    System.out.println("The roots are complex and distinct.");
    System.out.println("Root 1: " + realPart + " + " + imaginaryPart + "i");
    System.out.println("Root 2: " + realPart + " - " + imaginaryPart + "i");
 }
 scanner.close();
}
PS D:\1bm23cs123> java quadratic.java
1 -2 -3
roots are real and distinct:
3.0
 -1.0
 JAYANTH GOWDA A
1BM23CS123
 PS D:\1bm23cs123>
```

PROGRAM 2: CREATE SGPA:

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```
CODE:
import java.util.Scanner;

public class Student {
    String usn;
    String name;
    int[] credits;
    int[] marks;

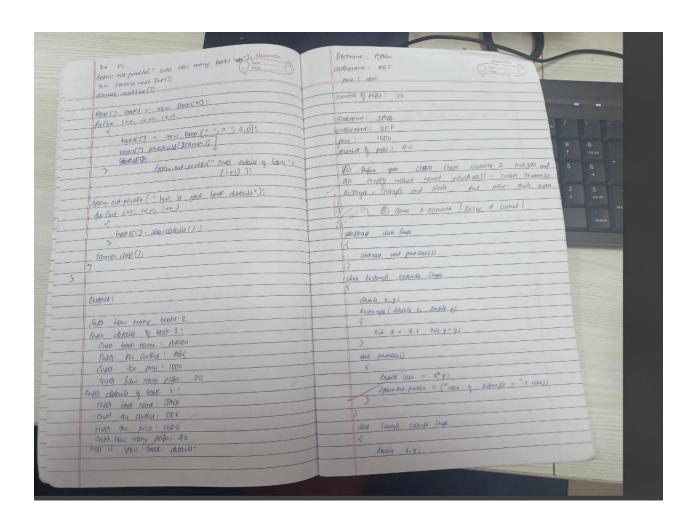
public void acceptDetails() {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter USN: ");
```

```
usn = scanner.nextLine();
  System.out.print("Enter name: ");
  name = scanner.nextLine();
  System.out.print("Enter number of subjects: ");
  int n = scanner.nextInt();
  credits = new int[n];
  marks = new int[n];
  for (int i = 0; i < n; i++) {
    System.out.print("Enter credits for subject " + (i + 1) + ": ");
    credits[i] = scanner.nextInt();
    System.out.print("Enter marks for subject " + (i + 1) + ": ");
    marks[i] = scanner.nextInt();
  }
}
public void displayDetails() {
  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]);
  }
}
public double calculateSGPA() {
  double totalCredits = 0;
  double weightedMarks = 0;
  for (int i = 0; i < credits.length; i++) {
    weightedMarks += credits[i] * marks[i];
    totalCredits += credits[i];
  }
  return weightedMarks / totalCredits;
}
public static void main(String[] args) {
  Student student = new Student();
  student.acceptDetails();
  student.displayDetails();
  double sgpa = student.calculateSGPA();
  System.out.println("SGPA: " + sgpa);
}
```

```
PS D:\1bm23cs123> javac Student.java
PS D:\1bm23cs123> java Student
Enter USN: 12
Enter name: jayanth
Enter number of subjects: 5
Enter credits for subject 1: 4
Enter marks for subject 1: 100
Enter credits for subject 2: 4
Enter marks for subject 2: 90
Enter credits for subject 3: 3
Enter marks for subject 3: 85
Enter credits for subject 4: 3
Enter marks for subject 4: 90
Enter credits for subject 5: 2
Enter marks for subject 5: 100
USN: 12
Name: jayanth
Subject 1 - Credits: 4, Marks: 100
Subject 2 - Credits: 4, Marks: 90
Subject 3 - Credits: 3, Marks: 85
Subject 4 - Credits: 3, Marks: 90
Subject 5 - Credits: 2, Marks: 100
SGPA: 92.8125
PS D:\1bm23cs123>
```

PROGRAM 3: CLASS BOOK

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| 4 | Scarver, source = new Scarrer (Justin, M); |



```
CODE: import java.util.Scanner;

public class Book

{

   public String name;

   public String author;

   public int price;

   public int num_pages;

   public Book(String name,String author,int price,int num_pages)

   {

     this.name = name;

     this.author = author;
```

```
this.price = price;
  this.num_pages = num_pages;
 }
 public void getdetails(Scanner scanner)
 {
   System.out.println("enter the book name: ");
   name = scanner.nextLine();
   System.out.println("enter the author: ");
   author = scanner.nextLine();
   System.out.println("enter the price: ");
   price = scanner.nextInt();
   scanner.nextLine();
   System.out.println("enter the number of pages: ");
   num_pages = scanner.nextInt();
   scanner.nextLine();
 }
 public void showdetails()
  System.out.println(this);
 }
 public String toString()
 {
   return
    "Book name: " + this.name + "\n" +
    "Author name: " + this.author + "\n" +
    "Price: " + this.price + "\n" +
    "Number of pages: " +this.num pages + "\n";
 }
}import java.util.Scanner;
```

```
public class Main
 public static void main(String[] args)
  Scanner scanner = new Scanner(System.in);
  int n;
  System.out.println("enter how many books");
  n = scanner.nextInt();
  scanner.nextLine();
  Book[] books = new Book[n];
  for(int i=0;i<n;i++)
  {
    books[i] = new Book(" "," ",0,0);
    System.out.println("enter the details for the book " + (i+1));
    books[i].getdetails(scanner);
  }
  System.out.println("here is your book details: ");
   for(int i=0;i<n;i++)
  {
   books[i].showdetails();
  }
   scanner.close();
 }
}
```

```
enter the details for the book 1
enter the book name:
book1
enter the author:
javanth
enter the price:
enter the number of pages :
enter the details for the book 2
enter the book name:
book2
enter the author:
gowda
enter the price:
600
enter the number of pages :
20
here is your book details:
Book name: book1
Author name: jayanth
Price: 500
Number of pages: 30
Book name: book2
Author name: gowda
Price: 600
Number of pages: 20
PS D:\1bm23cs123>
```

PROGRAM 4: ABSTRACT CLASS

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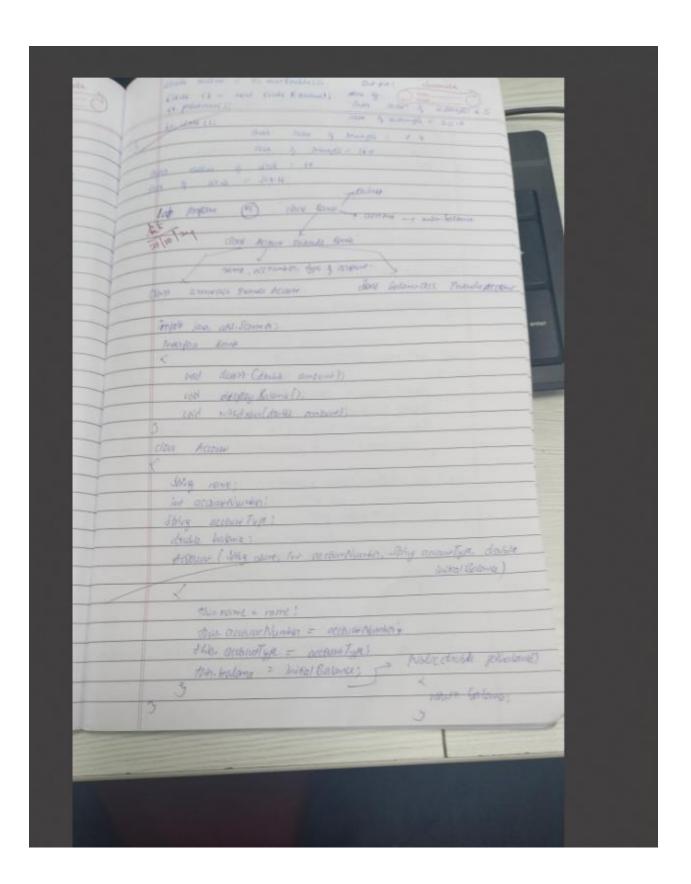
```
CODE:
abstract class Shape
{
   double x,y;
   abstract void printarea();
}
class Rectangle extends Shape
{
   Rectangle(double a,double b)
```

```
{
  this.x = a;
 this.y = b;
 }
void printarea()
{
 double area = x*y;
 System.out.println("area of rectangle = " + area);
 }
}
class Triangle extends Shape
Triangle(double a,double b)
  this.x = a;
 this.y = b;
void printarea()
 {
 double area = (x*y)/2;
 System.out.println("area of triangle = " + area);
 }
}
class Circle extends Shape
Circle(double radius)
  this.x = radius;
 }
```

```
void printarea()
  double area = 3.1416*x*x;
  System.out.println("area of circle = " + area);
 }
}
import java.util.Scanner;
class Main
 public static void main(String[] args)
 {
  Scanner in = new Scanner(System.in);
  System.out.println("enter the sides of rectangle: ");
  double x = in.nextDouble();
  double y = in.nextDouble();
  Rectangle r1 = new Rectangle(x,y);
  r1.printarea();
  System.out.println("enter the sides of triangle: ");
  double a = in.nextDouble();
  double b = in.nextDouble();
  Triangle t1 = new Triangle(a,b);
  t1.printarea();
  System.out.println("enter the radius of circle: ");
  double radius = in.nextDouble();
  Circle c1 = new Circle(radius);
  c1.printarea();
  System.out.println("END OF PROGRAM");
  in.close();
 }
```

```
PS D:\lbm23cs123> javac Shape.java Main.java
PS D:\lbm23cs123> java Main
enter the sides of rectangle:
4 5
area of rectangle = 20.0
enter the sides of triangle:
8 4
area of triangle = 16.0
enter the radius of circle :
10
area of circle = 314.16
END OF PROGRAM
PS D:\lbm23cs123> |
```

PROGRAM 5: BANK ACCOUNT



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| | | | |

CODE: import java.util.Scanner;

```
interface Bank
{
    void deposit(double amount);
    void displayBalance();
    void withdraw(double amount);
}
class Account
{
    String name;
    int accountNumber;
```

```
String accountType;
  double balance;
 Account(String name, int accountNumber, String accountType, double initialBalance)
  {
    this.name = name;
    this.accountNumber = accountNumber;
    this.accountType = accountType;
    this.balance = initialBalance;
  }
 // Method to get the balance
  public double getBalance()
    return balance;
 }
class SavAcct extends Account implements Bank
{
  double interestRate;
 SavAcct(String name, int accountNumber, double initialBalance, double interestRate)
  {
    super(name, accountNumber, "Savings", initialBalance);
    this.interestRate = interestRate;
  }
  public void deposit(double amount)
```

```
balance += amount;
  System.out.println("Deposited: " + amount);
}
public void displayBalance()
{
  System.out.println("Current balance: " + getBalance());
}
public void computeAndDepositInterest()
  double interest = getBalance() * interestRate;
  balance += interest;
  System.out.println("Interest of " + interest + " added. New balance: " + getBalance());
}
public void withdraw(double amount)
{
  if (amount > getBalance())
  {
    System.out.println("Insufficient funds.");
  }
  else
  {
    balance -= amount;
    System.out.println("Withdrew: " + amount + ". New balance: " + getBalance());
  }
}
```

```
}
class CurAcct extends Account implements Bank
  double minBalance = 500.0;
  double serviceCharge = 50.0;
  CurAcct(String name, int accountNumber, double initialBalance)
  {
    super(name, accountNumber, "Current", initialBalance);
  }
  public void deposit(double amount)
    balance += amount;
    System.out.println("Deposited: " + amount);
  }
  public void displayBalance()
  {
    System.out.println("Current balance: " + getBalance());
  }
  public void withdraw(double amount)
    if (amount > getBalance())
    {
      System.out.println("Insufficient funds.");
    }
```

```
else
      balance -= amount;
      System.out.println("Withdrew: " + amount + ". New balance: " + getBalance());
    }
    checkMinimumBalance();
  }
 void checkMinimumBalance()
  {
    if (getBalance() < minBalance)</pre>
    {
      balance -= serviceCharge;
      System.out.println("Service charge imposed. New balance: " + getBalance());
    }
  }
}
public class BankAccount
{
  public static void main(String[] args)
  {
    Scanner scanner = new Scanner(System.in);
    System.out.println("Enter customer name: ");
    String name = scanner.nextLine();
    System.out.println("Enter account number: ");
    int accountNumber = scanner.nextInt();
```

```
System.out.println("Choose account type (1 for Savings, 2 for Current): ");
int accountType = scanner.nextInt();
Bank account;
if (accountType == 1)
{
  System.out.println("Enter initial balance: ");
  double initialBalance = scanner.nextDouble();
  System.out.println("Enter interest rate (as a decimal): ");
  double interestRate = scanner.nextDouble();
  account = new SavAcct(name, accountNumber, initialBalance, interestRate);
}
else
{
  System.out.println("Enter initial balance: ");
  double initialBalance = scanner.nextDouble();
  account = new CurAcct(name, accountNumber, initialBalance);
}
account.displayBalance();
// Immediate interest calculation for savings account
if (account instanceof SavAcct)
{
  ((SavAcct) account).computeAndDepositInterest();
}
System.out.println("Enter deposit amount: ");
```

```
double depositAmount = scanner.nextDouble();
    account.deposit(depositAmount);
    account.displayBalance();

    System.out.println("Enter withdrawal amount: ");
    double withdrawalAmount = scanner.nextDouble();
    account.withdraw(withdrawalAmount);
    account.displayBalance();

    scanner.close();
}
```

```
PS D:\1bm23cs123\lab program 5 code+output> javac BankAccount.java
PS D:\1bm23cs123\lab program 5 code+output> java BankAccount
Enter customer name:
jayanth
Enter account number:
123
Choose account type (1 for Savings, 2 for Current):
Enter initial balance:
1000
Enter interest rate (as a decimal):
0.05
Current balance: 1000.0
Interest of 50.0 added. New balance: 1050.0
Enter deposit amount:
2000
Deposited: 2000.0
Current balance: 3050.0
Enter withdrawal amount:
Withdrew: 500.0. New balance: 2550.0
Current balance: 2550.0
PS D:\1bm23cs123\lab program 5 code+output> java BankAccount
Enter customer name:
Enter account number:
Choose account type (1 for Savings, 2 for Current):
Enter initial balance:
1000
Current balance: 1000.0
Enter deposit amount:
2000
Deposited: 2000.0
Current balance: 3000.0
Enter withdrawal amount:
500
Withdrew: 500.0. New balance: 2500.0
Current balance: 2500.0
PS D:\1bm23cs123\lab program 5 code+output>
```

PROGRAM 6: PACKAGES

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```
CODE: package CIE;
package CIE;
public class Internals extends Student {
  private int[] internalMarks;
  // Constructor to initialize internal marks and student details
  public Internals(String usn, String name, int sem, int[] internalMarks) {
    super(usn, name, sem); // Calling the parent constructor
    this.internalMarks = internalMarks;
  }
  // Method to calculate the total internal marks
  public int calculateInternalTotal() {
    int total = 0;
    for (int i = 0; i < internalMarks.length; i++) {
      total += internalMarks[i];
    }
    return total;
  }
  // Get the internal marks array
  public int[] getInternalMarks() {
    return internalMarks;
  }
package CIE;
public class Student {
```

```
private String usn;
  private String name;
  private int sem;
 // Constructor
  public Student(String usn, String name, int sem) {
    this.usn = usn;
    this.name = name;
    this.sem = sem;
  }
 // Getters
  public String getUsn() {
    return usn;
  }
  public String getName() {
    return name;
  }
  public int getSem() {
    return sem;
  }
package SEE;
import CIE.Student;
public class External extends Student {
```

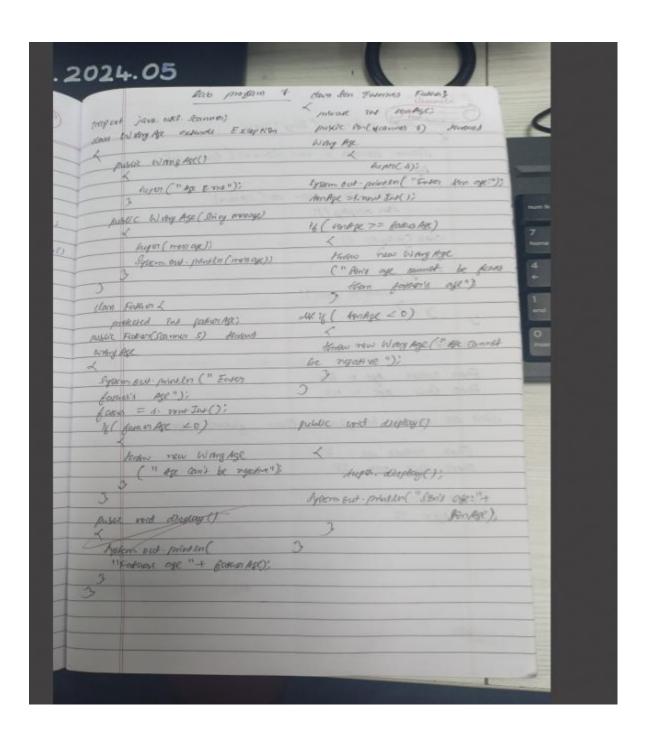
```
private int[] externalMarks;
  // Constructor to initialize external marks and student details
  public External(String usn, String name, int sem, int[] externalMarks) {
    super(usn, name, sem); // Calling the parent constructor
    this.externalMarks = externalMarks;
  }
  // Method to calculate the total external marks
  public int calculateExternalTotal() {
    int total = 0;
    for (int i = 0; i < externalMarks.length; i++) {
      total += externalMarks[i];
    }
    return total;
  }
  // Get the external marks array
  public int[] getExternalMarks() {
    return externalMarks;
  }
import CIE.Internals;
import SEE.External;
public class FinalMarks {
  public static void main(String[] args) {
    int[] internalMarks1 = {20, 30, 40, 35, 25};
    int[] externalMarks1 = {60, 70, 75, 80, 65};
```

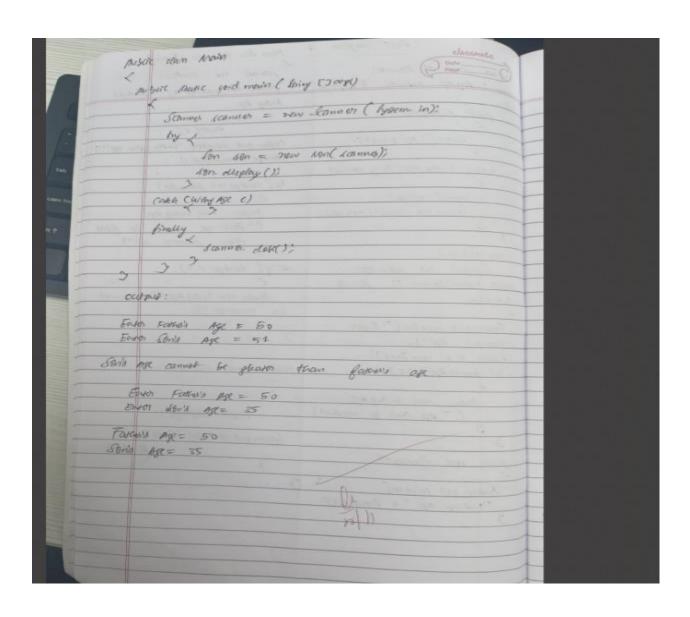
```
int[] internalMarks2 = {22, 33, 45, 50, 40};
 int[] externalMarks2 = {65, 68, 78, 72, 85};
  int[] internalMarks3 = {19, 25, 38, 33, 28};
  int[] externalMarks3 = {58, 65, 70, 80, 60};
  Internals[] internalsStudents = new Internals[3];
  External[] externalStudents = new External[3];
  internalsStudents[0] = new Internals("1BM23CS001", "JD", 5, internalMarks1);
  externalStudents[0] = new External("1BM23CS001", "JD", 5, externalMarks1);
  internalsStudents[1] = new Internals("1BM23CS002", "JS", 5, internalMarks2);
  externalStudents[1] = new External("1BM23CS002", "JS", 5, externalMarks2);
  internalsStudents[2] = new Internals("1BM23CS003", "AM", 5, internalMarks3);
  externalStudents[2] = new External("1BM23CS003", "AM", 5, externalMarks3);
  for (int i = 0; i < 3; i++) {
    displayFinalMarks(internalsStudents[i], externalStudents[i]);
 }
public static void displayFinalMarks(Internals internals, External external) {
  int internalTotal = internals.calculateInternalTotal();
  int externalTotal = external.calculateExternalTotal();
 int finalTotal = internalTotal + externalTotal;
```

```
System.out.println("Student: " + internals.getName());
System.out.println("USN: " + internals.getUsn());
System.out.println("Semester: " + internals.getSem());
System.out.println("Internal Marks Total: " + internalTotal);
System.out.println("External Marks Total: " + externalTotal);
System.out.println("Final Marks (Internal + External): " + finalTotal);
System.out.println();
}
```

```
D:\>cd 1bm23cs123
D:\1bm23cs123> javac CIE/*.java SEE/*.java FinalMarks.java
D:\1bm23cs123> java FinalMarks
Student: JD
USN: 1BM23CS001
Semester: 5
Internal Marks Total: 150
External Marks Total: 350
Final Marks (Internal + External): 500
Student: JS
USN: 1BM23CS002
Semester: 5
Internal Marks Total: 190
External Marks Total: 368
Final Marks (Internal + External): 558
Student: AM
USN: 1BM23CS003
Semester: 5
Internal Marks Total: 143
External Marks Total: 333
Final Marks (Internal + External): 476
D:\1bm23cs123>
```

PROGRAM 7: HANDLING OF EXCEPTION IN INHERITANCE TREE





CODE:

import java.util.Scanner;

class WrongAge extends Exception {

```
public WrongAge() {
  super("Age Error");
```

```
}
  public WrongAge(String message) {
    super(message);
    System.out.println(message);
 }
}
class Father {
  protected int fatherAge;
  public Father(Scanner s) throws WrongAge {
    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);
 }
}
```

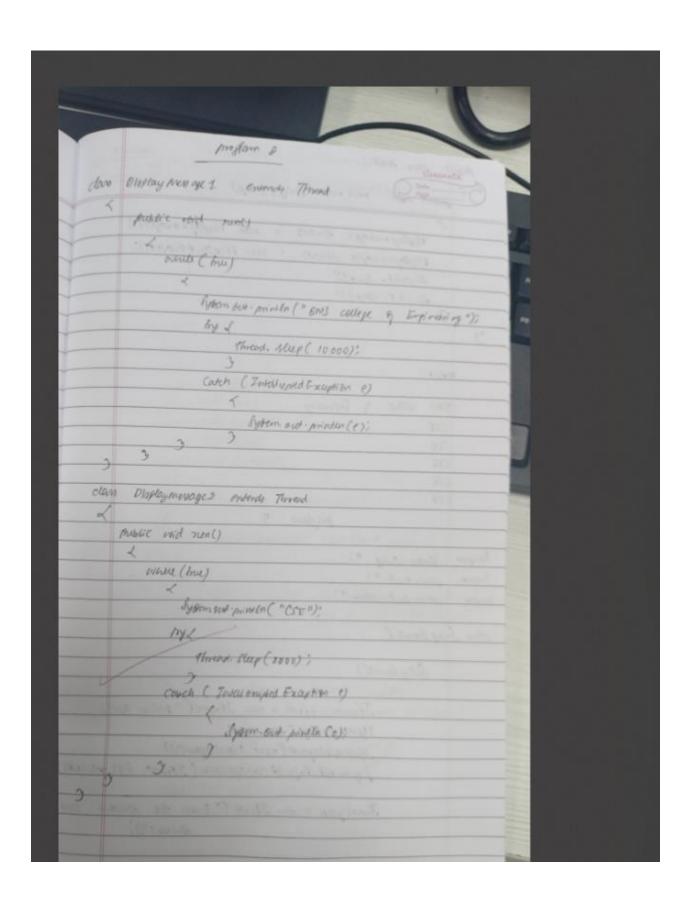
```
class Son extends Father {
  private int sonAge;
  public Son(Scanner s) throws WrongAge {
    super(s);
    System.out.print("Enter Son's age: ");
    sonAge = s.nextInt();
    if (sonAge >= fatherAge) {
      throw new WrongAge("Son's age cannot be greater than or equal to Father's age.");
   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

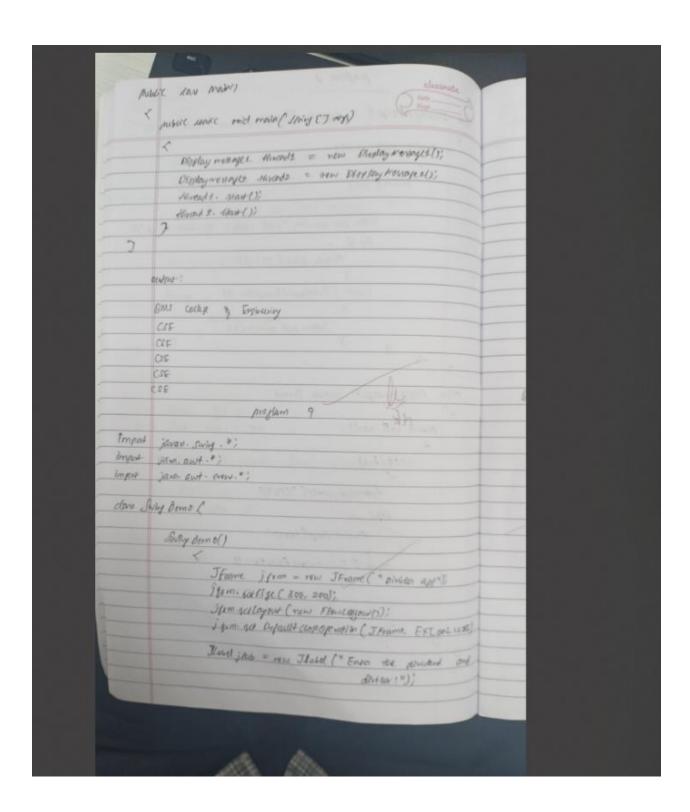
```
Son son = new Son(scanner);
son.display();
} catch (WrongAge e) {

} finally {
    scanner.close();
}
```

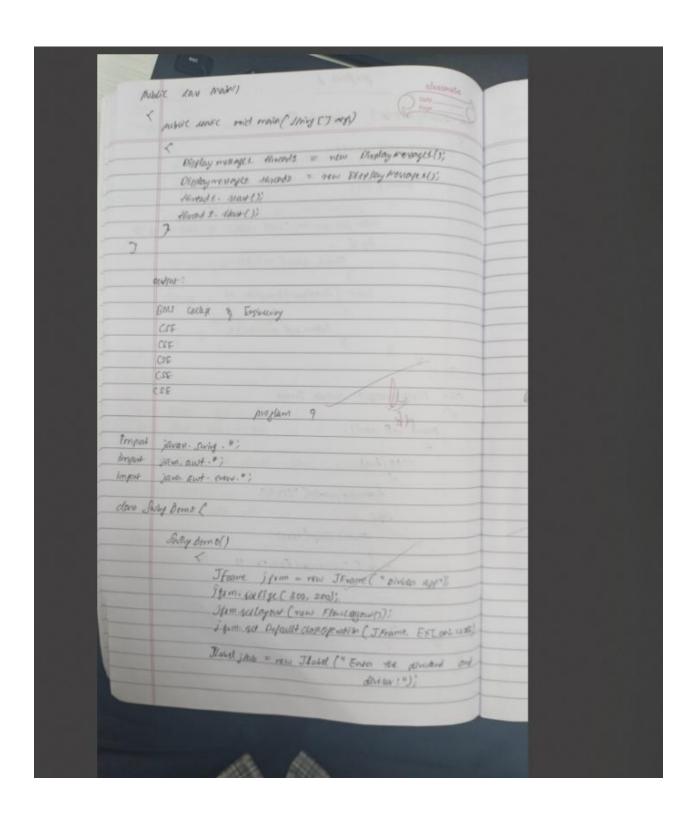
```
Ib\bin' 'Main'
Enter Father's age: 50
Enter Son's age: 51
Son's age cannot be greater than or equal to Father's age.
PS D:\java> java Maij
Error: Could not find or load main class Maij
Caused by: java.lang.ClassNotFoundException: Maij
PS D:\java> java Main
Enter Father's age: 50
Enter Son's age: 34
Father's age: 50
Son's age: 34
PS D:\java> |
```

PROGRAM 8: PRINT BMSCE AND CSE (USING SLEEP).





PROGRAM 9: UI TO PERORM INTEGER DIVISION



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```

```
CODE:
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
class SwingDemo {
```

SwingDemo() {

```
// Create JFrame container
JFrame jfrm = new JFrame("Divider App");
jfrm.setSize(300, 200);
jfrm.setLayout(new FlowLayout());
// Terminate program on close
jfrm.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
// Create components
JLabel jlab = new JLabel("Enter the dividend and divisor:");
JTextField ajtf = new JTextField(8);
JTextField bjtf = new JTextField(8);
JButton button = new JButton("Calculate");
JLabel err = new JLabel(); // Error label
JLabel alab = new JLabel(); // A value label
JLabel blab = new JLabel(); // B value label
JLabel anslab = new JLabel(); // Result label
// Add components to the frame
jfrm.add(jlab);
jfrm.add(ajtf);
jfrm.add(bjtf);
jfrm.add(button);
jfrm.add(err);
jfrm.add(alab);
jfrm.add(blab);
jfrm.add(anslab);
```

```
// Add action listener for the button
button.addActionListener(new ActionListener() {
  public void actionPerformed(ActionEvent evt) {
    try {
      int a = Integer.parseInt(ajtf.getText());
      int b = Integer.parseInt(bjtf.getText());
      // Check for division by zero
      if (b == 0) {
         throw new ArithmeticException("Divisor cannot be zero.");
      }
      int ans = a/b;
      err.setText(""); // Clear error messages
      alab.setText("A = " + a);
      blab.setText("B = " + b);
      anslab.setText("Ans = " + ans);
    } catch (NumberFormatException e) {
      err.setText("Enter valid integers!");
      alab.setText("");
      blab.setText("");
      anslab.setText("");
    } catch (ArithmeticException e) {
      err.setText("Divisor cannot be zero!");
      alab.setText("");
      blab.setText("");
      anslab.setText("");
    }
  }
```

```
});

// Display the frame
jfrm.setVisible(true);
}

public static void main(String[] args) {
    // Create frame on Event Dispatch Thread
    SwingUtilities.invokeLater(new Runnable() {
        public void run() {
            new SwingDemo();
        }
    });
}
```

}

| Enter the dividend and divisor: 34 17 Calculate Ans = 2 | 17 Calculate A = 34 B = 17 | 17 Calculate A = 34 B = 17 |
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PROGRAM 10 A: PRODUCER AND CONSUMER

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```
class Q {
  int n;
  boolean valueSet = false; // Flag to check if value is set

synchronized int get() {
    // Wait until a value is set by the producer
    while (!valueSet) {
       try {
            wait(); // Wait until a value is put
            } catch (InterruptedException e) {
```

```
System.out.println(e);
      }
    }
    System.out.println("Got: " + n);
    valueSet = false; // Reset the flag
    notify(); // Notify the producer that value is consumed
    return n;
  }
  synchronized void put(int n) {
    // Wait until the consumer has consumed the previous value
    while (valueSet) {
      try {
        wait(); // Wait until consumer gets the value
      } catch (InterruptedException e) {
         System.out.println(e);
      }
    }
    this.n = n;
    System.out.println("Put: " + n);
    valueSet = true; // Set the flag indicating value is set
    notify(); // Notify the consumer that a new value is available
  }
class Producer implements Runnable {
  Qq;
  Producer(Q q) {
```

}

```
this.q = q;
    new Thread(this, "Producer").start();
  }
  public void run() {
    int i = 0;
    while (i < 15) {
      q.put(i++);
    }
  }
}
class Consumer implements Runnable {
  Qq;
  Consumer(Q q) {
    this.q = q;
    new Thread(this, "Consumer").start();
  }
  public void run() {
    int i = 0;
    while (i < 15) {
      q.get(); // Call get() without storing the result
      i++;
    }
  }
}
```

```
class PC {
  public static void main(String args[]) {
    Q q = new Q();
    new Producer(q);
    new Consumer(q);
    System.out.println("Press Control-C to stop.");
  }
}
```

```
Press Control-C to st
Put: 0
Got: 0
Put: 1
Got: 1
Put: 2
Got: 2
Put: 3
Got: 3
Put: 4
Got: 4
Put: 5
Got: 5
Put: 6
Got: 6
Put: 7
Got: 7
Put: 8
Got: 8
Put: 9
Got: 9
```

PROGRAM 10B: DEADLOCK

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```
CODE : class A {
    synchronized void foo(B b) {
        String name = Thread.currentThread().getName();
        System.out.println(name + " entered A.foo");
```

```
try {
      Thread.sleep(1000);
    } catch(Exception e) {
      System.out.println("A Interrupted");
    }
    System.out.println(name + " trying to call B.last()");
    b.last();
  }
  synchronized void last() {
    System.out.println("Inside A.last");
 }
}
class B {
  synchronized void bar(A a) {
    String name = Thread.currentThread().getName();
    System.out.println(name + " entered B.bar");
    try {
      Thread.sleep(1000);
    } catch(Exception e) {
      System.out.println("B Interrupted");
    }
```

```
System.out.println(name + " trying to call A.last()");
    a.last();
  }
  synchronized void last() {
    System.out.println("Inside B.last");
  }
}
class Deadlock implements Runnable {
  A = new A();
  Bb = new B();
  Deadlock() {
    Thread.currentThread().setName("MainThread");
    Thread t = new Thread(this, "RacingThread");
    t.start();
    a.foo(b); // get lock on a in this thread.
    System.out.println("Back in main thread");
  }
  public void run() {
    b.bar(a); // get lock on b in other thread.
    System.out.println("Back in other thread");
```

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

```
PS D:\program10B> cd "d:\program10B\" ; if ($?) { javac Dea dlock.java } ; if ($?) { java Deadlock }
MainThread entered A.foo
RacingThread entered B.bar
RacingThread trying to call A.last()
MainThread trying to call B.last()
```