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
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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 **Surya Krishna (1BF24CS307),** 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.

Dr. Seema Patil Associate Professor Department of CSE, BMSCE	Dr. Kavitha Sooda Professor & HOD Department of CSE, BMSCE

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Github Link:
https://github.com/suryakrishna24/1BF24CS307_OOJ-LAB_SURYA-KRISHNA.git

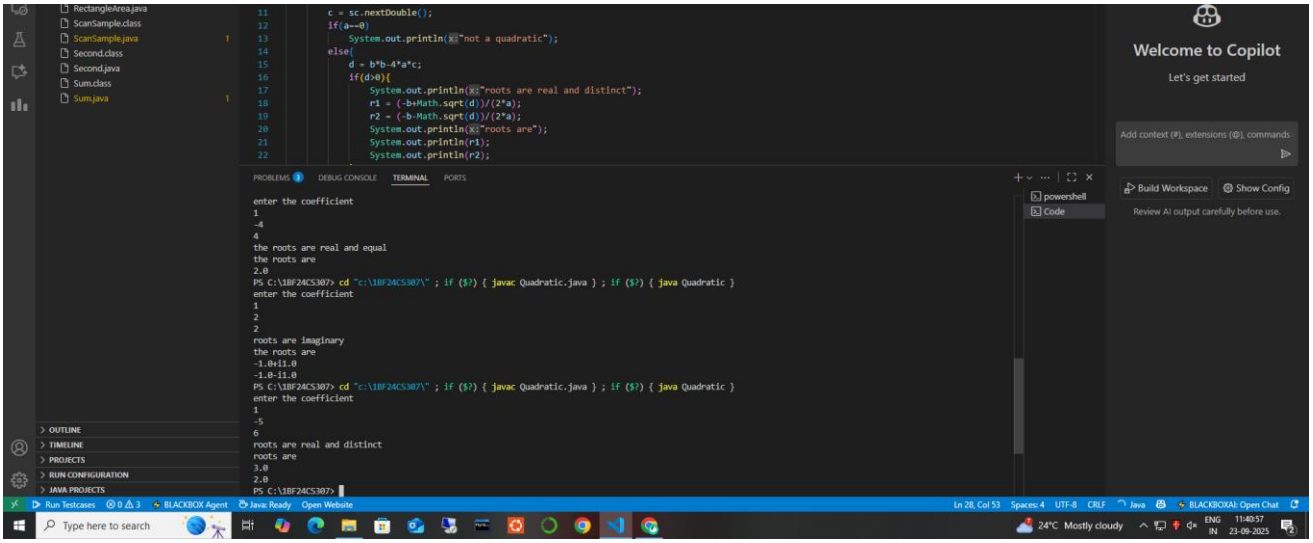
Program 1: QUADRATIC EQUATIONS

Code:

```
import java.util.*;

public class LabProgram1 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        double a,b,c,r1,r2,d;
        System.out.println("enter the coefficient");
        a = sc.nextDouble();
        b = sc.nextDouble();
        c = sc.nextDouble();
        if(a==0)
            System.out.println("not a quadratic");
        else{
            d = b*b-4*a*c;
            if(d>0){
                System.out.println("roots are real and distinct");
                r1 = (-b+Math.sqrt(d))/(2*a);
                r2 = (-b-Math.sqrt(d))/(2*a);
                System.out.println("roots are");
                System.out.println(r1);
                System.out.println(r2);
            }
            else if(d<0){
                System.out.println("roots are imaginary");
                r1 = -b/(2*a);
                r2 = Math.sqrt(Math.abs(d))/(2*a);
                System.out.println("the roots are");
                System.out.println(r1+"+i"+r2);
                System.out.println(r1+"-i"+r2);
            }
            else{
                System.out.println("the roots are real and equal");
                r1 = -b/(2*a);
                System.out.println("the roots are");
                System.out.println(r1);
```

```
        }
    }
  }
}
```

Output:


RectangleArea.java
ScanSample.class
ScanSample.java
Second.class
Second.java
Sum.class
Sum.java
c = sc.nextDouble();
if(a==0)
System.out.println("not a quadratic");
else{
d = b*b-4*a*c;
if(d>0){
System.out.println("roots are real and distinct");
r1 = (-b+Math.sqrt(d))/(2*a);
r2 = (-b-Math.sqrt(d))/(2*a);
System.out.println("roots are");
System.out.println(r1);
System.out.println(r2);
PROBLEMS
DEBUG CONSOLE
TERMINAL
PORTS
powershell
Code
enter the coefficient
1
-4
4
the roots are real and equal
the roots are
2.0
PS C:\1BF24CS307> cd "c:\1BF24CS307\" ; if ($?) { javac Quadratic.java } ; if ($?) { java Quadratic }
enter the coefficient
1
2
2
roots are imaginary
the roots are
-1.0+i1.0
-1.0-i1.0
PS C:\1BF24CS307> cd "c:\1BF24CS307\" ; if ($?) { javac Quadratic.java } ; if ($?) { java Quadratic }
enter the coefficient
1
-5
6
roots are real and distinct
roots are
3.0
2.0
PS C:\1BF24CS307>
OUTLINE
TIMELINE
PROJECTS
RUN CONFIGURATION
JAVA PROJECTS
Welcome to Copilot
Let's get started
Add context (#), extensions (@), commands
Build Workspace
Show Config
Review AI output carefully before use.
Run Testcases
BLACKBOX Agent
Java: Ready
Open Website
Ln 28, Col 53
Spaces: 4
UTF-8
CRLF
Java
BLACKBOXAI: Open Chat
Type here to search
24°C Mostly cloudy
ENG
IN
11:40:57
23-09-2025

Program 2: SGPA CALCULATOR

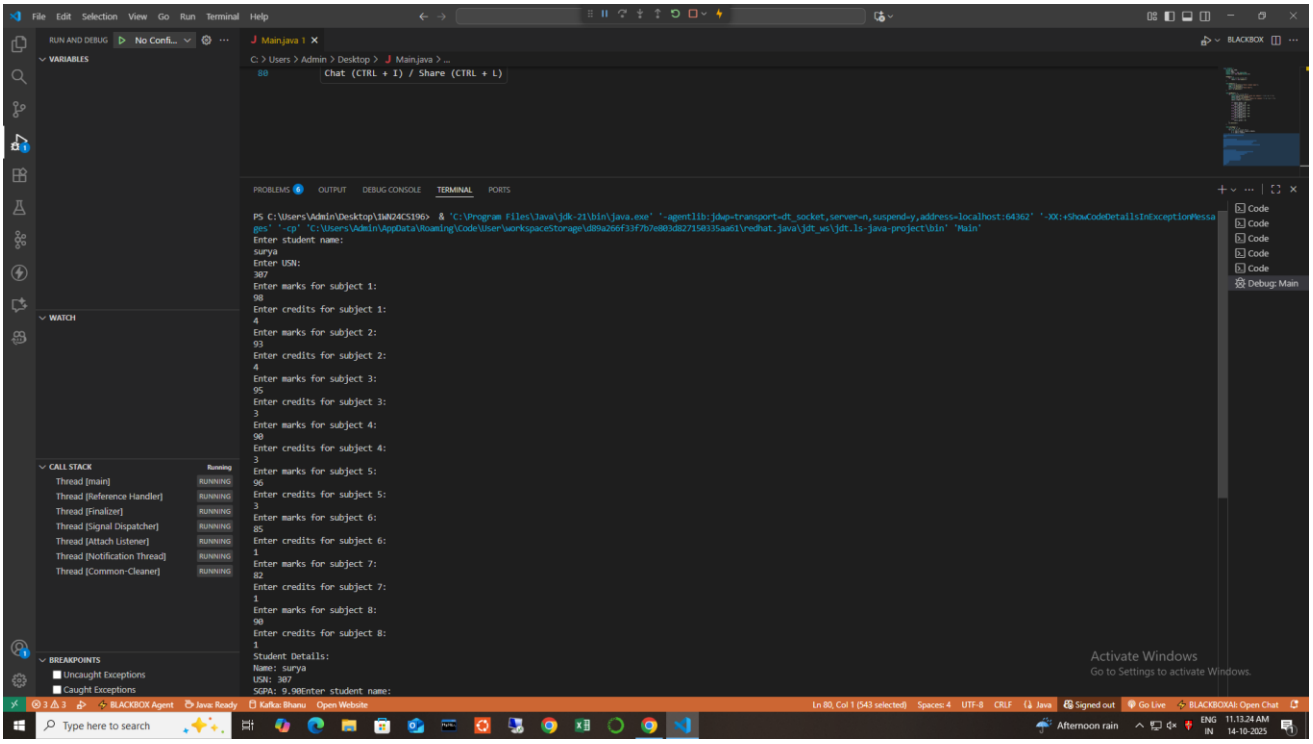
CODE:

```
import java.util.*;

class Subject {
   int marks, credits, grade;
}

class Student {
   String usn, name;
   double sgpa;
   Subject sub[] = new Subject[8];
   Scanner sc = new Scanner(System.in);

   Student() {
      for (int i = 0; i < 8; i++)
         sub[i] = new Subject();
   }

   void details() {
      System.out.println("Enter student name:");
      name = sc.nextLine();
      System.out.println("Enter USN:");
      usn = sc.nextLine();
   }

   void getMarks() {
      for (int i = 0; i < 8; i++) {
         System.out.println("Enter marks for subject " + (i + 1) + ":");
         sub[i].marks = sc.nextInt();
         System.out.println("Enter credits for subject " + (i + 1) + ":");
         sub[i].credits = sc.nextInt();

         if (sub[i].marks < 40)
            sub[i].grade = 0;
         else if (sub[i].marks < 50)
            sub[i].grade = 5;
         else if (sub[i].marks < 60)
```

```
            sub[i].grade = 6;
        else if (sub[i].marks < 70)
            sub[i].grade = 7;
        else if (sub[i].marks < 80)
            sub[i].grade = 8;
        else if (sub[i].marks < 90)
            sub[i].grade = 9;
        else
            sub[i].grade = 10;
      }
      sc.nextLine();
   }

   void calcSgpa() {
      int t = 0, n = 0;
      for (int i = 0; i < 8; i++) {
         n += sub[i].grade * sub[i].credits;
         t += sub[i].credits;
      }
      sgpa = (double) n / t;
   }

   void display() {
      System.out.println("Student Details:");
      System.out.println("Name: " + name);
      System.out.println("USN: " + usn);
      System.out.printf("SGPA: %.2f\n",sgpa);
   }
}

public class LabProgram2 {
   public static void main(String[] args) {
      Student st = new Student();
      for(int i = 0;i<7;i++){
         st.details();
         st.getMarks();
         st.calcSgpa();
         st.display();
      }
```

```
    }
}
```

Output:


Chat (CTRL + I) / Share (CTRL + L)
PS C:\Users\Admin\Desktop\1NM24CS196> & 'C:\Program Files\Java\jdk-21\bin\java.exe' '-agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:64362' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\Admin\AppData\Roaming\Code\User\workspaceStorage\d89a266f33f7b7e803d827150335aa61\redhat.java\jdt_ws\jdt.ls-java-project\bin' 'Main'
Enter student name:
surya
Enter USN:
307
Enter marks for subject 1:
98
Enter credits for subject 1:
4
Enter marks for subject 2:
93
Enter credits for subject 2:
4
Enter marks for subject 3:
95
Enter credits for subject 3:
3
Enter marks for subject 4:
90
Enter credits for subject 4:
3
Enter marks for subject 5:
96
Enter credits for subject 5:
3
Enter marks for subject 6:
85
Enter credits for subject 6:
1
Enter marks for subject 7:
82
Enter credits for subject 7:
1
Enter marks for subject 8:
90
Enter credits for subject 8:
1
Student Details:
Name: surya
USN: 307
SGPA: 9.90Enter student name:
Activate Windows
Go to Settings to activate Windows.

Program 3: BOOK DETAILS

CODE:

```
import java.util.Scanner;

class Book{
   String name,author;
   int price,pages;

   Book(String name,String author,int price,int pages){
      this.name = name;
      this.author = author;
      this.price = price;
      this.pages = pages;
   }

   public String toString(){
      String name,author,price,pages;
      name = "Book name: "+this.name+"\n";
      author = "Author name: "+this.author+"\n";
      price = "Price: "+this.price+"\n";
      pages = "Pages: "+this.pages+"\n";
      return name+author+price+pages;
   }
}

public class Lp3 {
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);
      int n, price,pages;
      String name,author;
      System.out.println("enter no of books");
      n = sc.nextInt();
      sc.nextLine();
```

```
        Book b[] = new Book[n];
        for(int i = 0 ;i<n;i++){
            System.out.println("enter name");
            name = sc.nextLine();
            System.out.println("enter author");
            author = sc.nextLine();
            System.out.println("enter price");
            price = sc.nextInt();
            System.out.println("enter pages");
            pages = sc.nextInt();
            b[i] = new Book(name,author,price,pages);
            sc.nextLine();
        }
        for(int i = 0;i<n;i++)
            System.out.println(b[i]);
    }
}
```

Output:

```
Enter number of books:
2
Enter the name:
WATER
Author of the book:
SWAMI
Enter the price of the book:
899
ENTER THE NUMBER OF PAGES:
788
Enter the name:
FIRE
Author of the book:
RAMAN
Enter the price of the book:
877
ENTER THE NUMBER OF PAGES:
999
Book name: WATER
Author name: SWAMI
Price: 899
Number of pages: 788

Book name: FIRE
Author name: RAMAN
Price: 877
Number of pages: 999
```

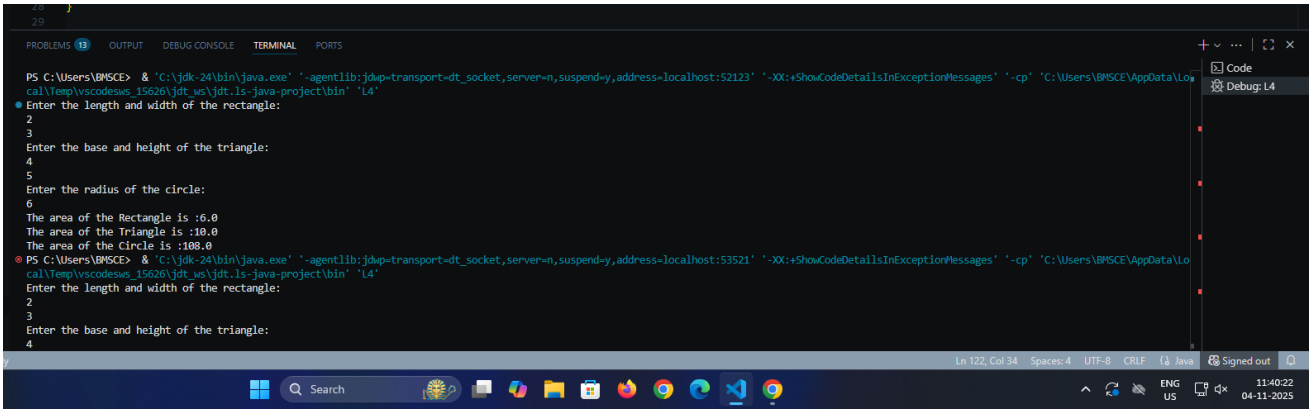
Program 4: CALCULATE AREA OF SHAPES

CODE:

```
import java.util.Scanner;
abstract class Shape{
   double a;double b;
   Shape(double w,double f){
      a=w;b=f;
   }
   abstract void area();
}
class Rectangle extends Shape{
   Rectangle(double l,double w){
      super(l,w);
   }
   void area() {
      System.out.println("The area of the Rectangle is :");
      System.out.println(a*b);
   }
}
class Triangle extends Shape{
   Triangle(double h,double b){
      super(h,b);
   }
   void area() {
      System.out.println("The area of the Triangle is :");
      System.out.println(a*b*0.5);
   }
}
class Circle extends Shape{
   Circle(double r){
      super(r,0);
   }
   void area() {
      System.out.println("The area of the Circle is :");
      System.out.println(a*a*(22/7));
   }
}
public class L4 {
```

```
    public static void main(String[] args) {
        double length,width,base,height,radius;
        Scanner s=new Scanner(System.in);
        System.out.println("Enter the length and width of the rectangle: ");
        length=s.nextDouble();
        width=s.nextDouble();
        System.out.println("Enter the base and height of the triangle: ");
        base=s.nextDouble();
        height=s.nextDouble();
        System.out.println("Enter the radius of the circle: ");
        radius=s.nextDouble();
        Rectangle r=new Rectangle(length,width);
        Triangle t=new Triangle(height,base);
        Circle d=new Circle(radius);
        r.area();
        t.area();
        d.area();
    }
}
```

Output:



Program 5: BANK ACCOUNT

CODE:

```
import java.util.Scanner;


class Account {
   String customerName;
   int accountNumber;
   String accountType;
   double balance;

   void getAccountDetails() {
      Scanner s = new Scanner(System.in);
      System.out.print("Enter customer name: ");
      customerName = s.next();
      System.out.print("Enter account Number: ");
      accountNumber = s.nextInt();
      System.out.print("Enter type of account (saving/current): ");
      accountType = s.next();
      balance = 0;
   }

   void display() {
      System.out.println("Customer name: " + customerName);
      System.out.println("Account number: " + accountNumber);
      System.out.println("Type of Account: " + accountType);
      System.out.println("Balance = " + balance);
   }
}


class Sav_acct extends Account {
   void deposit() {
      Scanner s = new Scanner(System.in);
      System.out.print("Enter the deposit amount: ");
      double amount = s.nextDouble();
      balance += amount;
   }
```

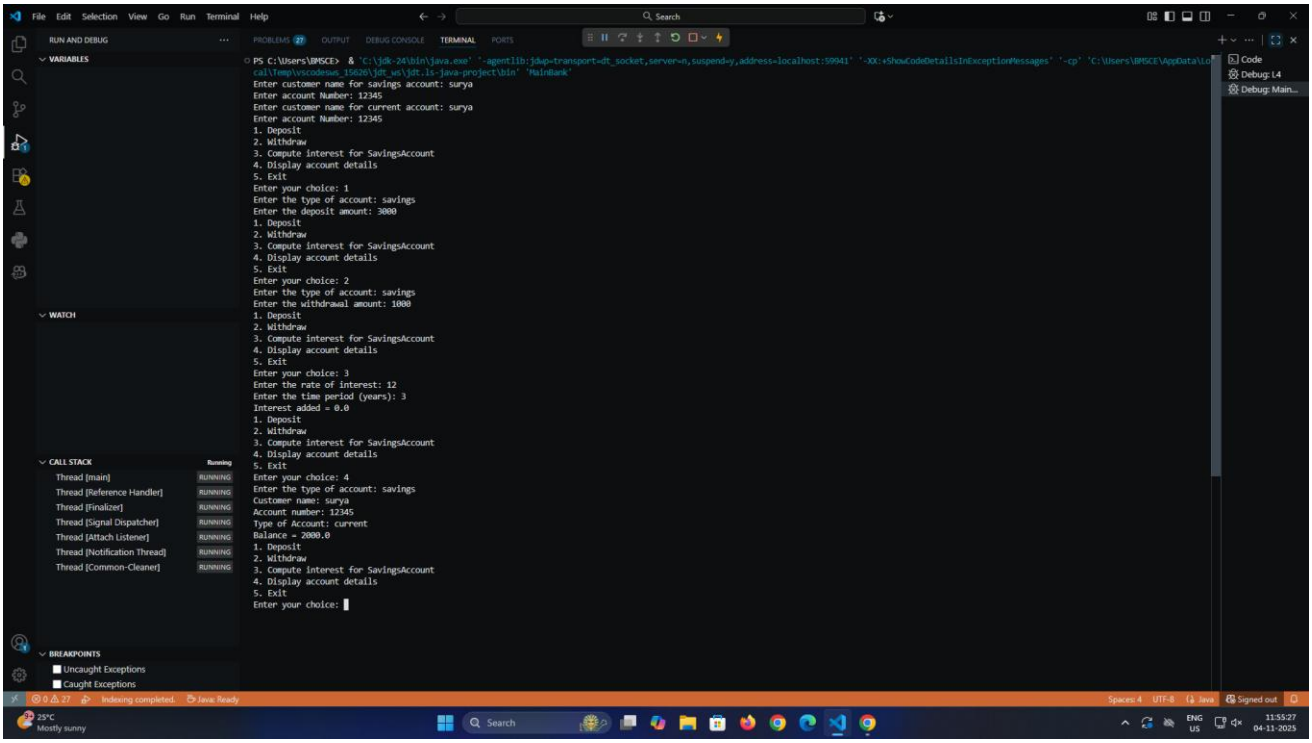
```
    void withdraw() {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter the withdrawal amount: ");
        double amount = s.nextDouble();
        if (amount > balance) {
            System.out.println("Insufficient balance!");
        } else {
            balance -= amount;
        }
    }

    void computeInterest() {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter the rate of interest: ");
        double rate = s.nextDouble();
        System.out.print("Enter the time period (years): ");
        int time = s.nextInt();

        double interest = balance * Math.pow((1 + rate / 100), time) - balance;
        balance += interest;
        System.out.println("Interest added = " + interest);
    }
}


class Cur_acct extends Account {
    final double minBalance = 500;
    final double serviceCharge = 100;

    void deposit() {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter the deposit amount: ");
        double amount = s.nextDouble();
        balance += amount;
    }

    void withdraw() {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter the withdrawal amount: ");
        double amount = s.nextDouble();
```

```
        if (amount > balance) {
            System.out.println("Insufficient balance!");
        } else {
            balance -= amount;
            checkMinBalance();
        }
    }

    void checkMinBalance() {
        if (balance < minBalance) {
            balance -= serviceCharge;
            System.out.println("Balance below minimum! Service charge of Rs." +
serviceCharge + " imposed.");
        }
    }
}


public class MainBank {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);
        Sav_acct sav = new Sav_acct();
        Cur_acct cur = new Cur_acct();

        System.out.print("Enter customer name for savings account: ");
        sav.customerName = s.next();
        System.out.print("Enter account Number: ");
        sav.accountNumber = s.nextInt();
        sav.accountType = "saving";

        System.out.print("Enter customer name for current account: ");
        cur.customerName = s.next();
        System.out.print("Enter account Number: ");
        cur.accountNumber = s.nextInt();
        cur.accountType = "current";

        int choice;
        do {
            System.out.println("1. Deposit");
            System.out.println("2. Withdraw");
```

```
System.out.println("3. Compute interest for SavingsAccount");
System.out.println("4. Display account details");
System.out.println("5. Exit");
System.out.print("Enter your choice: ");
choice = s.nextInt();

switch (choice) {
   case 1:
      System.out.print("Enter the type of account: ");
      String type = s.next();
      if (type.equalsIgnoreCase("saving"))
         sav.deposit();
      else
         cur.deposit();
      break;

   case 2:
      System.out.print("Enter the type of account: ");
      type = s.next();
      if (type.equalsIgnoreCase("saving"))
         sav.withdraw();
      else
         cur.withdraw();
      break;

   case 3:
      sav.computeInterest();
      break;

   case 4:
      System.out.print("Enter the type of account: ");
      type = s.next();
      if (type.equalsIgnoreCase("saving"))
         sav.display();
      else
         cur.display();
      break;

   case 5:
      System.out.println("Exiting...");
```

```
                break;

            default:
                System.out.println("Invalid choice!");
        }
    } while (choice != 5);
  }
}
```

OUTPUT:



Program 6: FINAL SEE AND CIE MARKS

CODE:

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

public class Internals extends Student {
   protected int marks[] = 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("CIE Mark " + (i+1) + ": ");
         marks[i] = s.nextInt();
      }
   }
}
```

```
package SEE;
import CIE.Internals;
import java.util.Scanner;

public class Externals extends Internals {
    protected int seeMarks[];
    protected int finalMarks[];

    public Externals() {
        seeMarks = new int[5];
        finalMarks = 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("SEE Mark " + (i + 1) + ": ");
            seeMarks[i] = s.nextInt();
        }
    }

    public void calculateFinalMarks() {
        for (int i = 0; i < 5; i++) {
            finalMarks[i] = (marks[i]) + (seeMarks[i] / 2);
        }
    }

    public void displayFinalMarks() {
        displayStudentDetails();
        System.out.println("Final Marks (CIE + SEE/2): ");
        for (int i = 0; i < 5; i++) {
            System.out.println("Subject " + (i+1) + ": " + finalMarks[i]);
        }
    }
}



import SEE.Externals;

class Main {
    public static void main(String args[]) {
        java.util.Scanner s = new java.util.Scanner(System.in);

        System.out.print("Enter number of students: ");
```

```
        int n = s.nextInt();

        Externals[] st = new Externals[n];

        for (int i = 0; i < n; i++) {
            System.out.println("\n--- Student " + (i+1) + " ---");
            st[i] = new Externals();
            st[i].inputStudentDetails();
            st[i].inputCIEmarks();
            st[i].inputSEEmarks();
            st[i].calculateFinalMarks();
        }

        System.out.println("\n===== FINAL MARKS REPORT =====");
        for (int i = 0; i < n; i++) {
            st[i].displayFinalMarks();
        }
    }
}
```

OUTPUT:

```
Enter the name:
ravi kumar
Enter the usn:
BF24CS397
Enter the sem:
3
Enter the subject 1 CIE marks:
47
Enter the subject 2 CIE marks:
48
Enter the subject 3 CIE marks:
49
Enter the subject 4 CIE marks:
50
Enter the subject 5 CIE marks:
43
Enter the subject 1 SEE marks:
48
Enter the subject 2 SEE marks:
49
Enter the subject 3 SEE marks:
50
Enter the subject 4 SEE marks:
43
Enter the subject 5 SEE marks:
47
Name of the student is: ravi kumar
USN is: BF24CS397
SEM is: 3
The final marks in all 5 courses are:
Course 1 is: 95
Course 2 is: 97
Course 3 is: 99
Course 4 is: 93
Course 5 is: 90
```

PROGRAM 7: WRONG AGE

CODE:

```
import java.util.*;
class wrongAgeException extends Exception {
   wrongAgeException(String message) {
      super(message);
   }
}
class wrongSonAgeException extends Exception {
   wrongSonAgeException(String message) {
      super(message);
}
}
 class Father {
   int fAge;
   Father(int fAge) {

      try {
      if(fAge<0) {
         throw new wrongAgeException("father's age cannot be less than 0");
      }
      this.fAge=fAge;
   }
   catch (wrongAgeException e) {
      System.out.println("Error:"+e);
   }

   }
}
 class Son extends Father {
   int sAge;
   Son(int fAge,int sAge) {
      super( fAge );

   try {
      if (sAge>=fAge) {
         throw new wrongSonAgeException("Son's age cannot be more than Father's
age");
```

```
        }
         this.sAge=sAge;
    }
    catch (wrongSonAgeException e) {
        System.out.println("Error:"+e);
    }
    }

    }


public class exceptions {
    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.println("enter the father and son age");
        int fatherAge=sc.nextInt();
        int sonAge=sc.nextInt();
        Son s1=new Son(fatherAge,sonAge);
    }
}
```

OUTPUT:

PROGRAM 8: MULTITHREADING

CODE:

```
class MessageThread extends Thread {
   private String message;
   private int interval;  // in milliseconds

   public MessageThread(String message, int interval) {
      this.message = message;
      this.interval = interval;
   }

   @Override
   public void run() {
      while (true) {
         System.out.println(message);
         try {
            Thread.sleep(interval);
         } catch (InterruptedException e) {
            System.out.println("Thread interrupted: " + e.getMessage());
         }
      }
   }
}

public class TwoThreadDemo {
   public static void main(String[] args) {
      // Thread 1: prints every 10 seconds
      MessageThread t1 = new MessageThread("BMS College of Engineering",
10000);

      // Thread 2: prints every 2 seconds
      MessageThread t2 = new MessageThread("CSE", 2000);

      t1.start();
      t2.start();
   }
}
```

OUTPUT:

```
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
```