

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



LAB REPORT
on

Object Oriented Java Programming (23CS3PCOOJ)

Submitted by

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in partial fulfilment 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, Bengaluru 560019
(Affiliated To Visvesvaraya Technological University, Belgaum)
Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled “Object Oriented Java Programming (23CS3PCOOJ)” carried out by **Puneeth Giri B T (1BM23CS415)**, 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.

Syed Akram Assistant Professor Department of CSE, BMSCE	Dr.KavithaSooda Professor & HOD Department of CSE, BMSCE
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GitHub Link:

https://github.com/PUNEETHGIRIBT/OOJ_LAB

Program 1

Develop a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read a, b, c and use the quadratic formula. If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions.

Code:

```
import java.util.Scanner;
public class Quadratic
{
    public static void main(String[] args)
    {
        int a;
        int b;
        int c;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter 'a' value: ");
        a= sc.nextInt();
        System.out.print("Enter 'b' value: ");
        b=sc.nextInt();
        System.out.print("Enter 'c' value: ");
        c=sc.nextInt();
        float disc = ((b*b)-4*a*c);
        System.out.println(disc);
        if (a==0)
        {
            System.out.println("Not Quadratic");
        }
        else
        {
            if (disc<0)
            {
                System.out.println("No real roots ");
            }
            else if (disc>0)
            {
```

```

        double root1= (-b + Math.sqrt(disc))/(2*a);
        double root2= (-b - Math.sqrt(disc))/(2*a);
        System.out.println("Real roots ");
        System.out.println("Root-1: "+root1);
        System.out.println("Root-2: "+root2);
    }
    else
    {
        double root1=(-b)/(2*a);
        System.out.println("Real and equal");
        System.out.println("Root-1: "+root1);
        System.out.println("Root-2: "+root1);
    }
    System.out.println("Hemanth Kumar R");
    System.out.println("1BM23CS110");

}
}
}

```

```

Enter 'a' value: 3
Enter 'b' value: 8
Enter 'c' value: 5
4.0
Real roots
Root-1: -1.0
Root-2: -1.6666666666666667
Puneeth Giri B T
1BM23CS415
PS C:\Users\Punith BT\Desktop\3_SEM\JAVA\Programs> java Quadratic
Enter 'a' value: 0
Enter 'b' value: 1
Enter 'c' value: 2
1.0
Not Quadratic
PS C:\Users\Punith BT\Desktop\3_SEM\JAVA\Programs>

```

Program 2

SGPA Calculator

Code:

```
import java.util.Scanner;

class Student {
    private String name;
    private String usn;
    private double total_credit;
    private double[] marks;
    private Scanner sc = new Scanner(System.in);

    void getInfo() {
        System.out.print("Enter Name: ");
        name = sc.nextLine();

        System.out.print("Enter USN: ");
        usn = sc.nextLine();

        System.out.print("Enter Total Credits: ");
        total_credit = sc.nextDouble();
        sc.nextLine();
    }

    double grade(double mark) {
        if (mark <= 39) {
            return 0;
        } else if (mark >= 40 && mark <= 49) {
            return 4;
        } else if (mark >= 50 && mark <= 54) {
            return 5;
        } else if (mark >= 55 && mark <= 59) {
            return 6;
        } else if (mark >= 60 && mark <= 69) {
            return 7;
        } else if (mark >= 70 && mark <= 79) {
            return 8;
        }
    }
}
```

```

        } else if (mark >= 80 && mark <= 89) {
            return 9;
        } else {
            return 10;
        }
    }

    void getMarks() {
        marks = new double[8];
        for (int i = 0; i < 8; i++) {
            System.out.println("Enter the marks for subject " + (i + 1) + ": ");
            double mark = sc.nextDouble();

            System.out.println("Enter the credit for subject " + (i + 1) + ": ");
            double credit = sc.nextDouble();

            double grade = grade(mark);
            marks[i] = grade * credit;
        }
        sc.nextLine();
    }

    void calSgpa() {
        double totalMarks = 0;
        for (int i = 0; i < 8; i++) {
            totalMarks += marks[i];
        }
        System.out.println("Name: " + name);
        System.out.println("USN: " + usn);
        System.out.println("SGPA: " + (totalMarks / total_credit));
    }
}

public class Main {
    public static void main(String args[]) {
        boolean cond = true;
        Scanner sc = new Scanner(System.in);
        while (cond) {
            Student s1 = new Student();

```

```
s1.getInfo();
s1.getMarks();
s1.calSgpa();

System.out.println("Do you want to calculate SGPA for another student?
(yes/no): ");
String check = sc.nextLine();
if (check.equalsIgnoreCase("yes")) {
    continue;
} else {
    cond = false;
}
}
System.out.println("Hemanth Kumar R");
System.out.println("1BM23CS110");
sc.close();
}
}
```



```
PS C:\Users\Punith BT\Desktop\3_SEM\JAVA\Programs\WEEK_3> java StudentSGPA
Enter Name: Puneeth Giri B T
Enter USN: 1BM23CS415
Enter Total Credits: 20
Enter the marks for subject 1:
85
Enter the credit for subject 1:
4
Enter the marks for subject 2:
70
Enter the credit for subject 2:
3
Enter the marks for subject 3:
85
Enter the credit for subject 3:
3
Enter the marks for subject 4:
60
Enter the credit for subject 4:
2
Enter the marks for subject 5:
81
Enter the credit for subject 5:
3
Enter the marks for subject 6:
63
Enter the credit for subject 6:
2
Enter the marks for subject 7:
80
Enter the credit for subject 7:
2
Enter the marks for subject 8:
65
```

```
Enter the credit for subject 8:
1
Name: Puneeth Giri B T
USN: 1BM23CS415
SGPA: 8.35
```

Program 3

Method overriding

Code:

```
import java.util.Scanner;

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

    Book(String book_name, String author_name, int price, int num_pages) {
        this.book_name = book_name;
        this.author_name = author_name;
        this.price = price;
        this.num_pages = num_pages;
    }

    @Override
    public String toString() {
        String name, author, price, numPages;
        name = "Book Name: " + this.book_name + "\n";
        author = "Author Name: " + this.author_name + "\n";
        price = "Price: " + this.price + "\n";
        numPages = "Number of Pages: " + this.num_pages + "\n";
        return name + author + price + numPages;
    }
}

public class ride {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Number of books: ");
        int count = sc.nextInt();
        sc.nextLine();
    }
}
```

```

Book[] arr = new Book[count];
for (int i = 0; i < count; i++) {
    System.out.print("Enter book " + (i + 1) + " name: ");
    String name = sc.nextLine();
    System.out.print("Enter author " + (i + 1) + " name: ");
    String author = sc.nextLine();
    System.out.print("Enter book " + (i + 1) + " price: ");
    int price = sc.nextInt();
    System.out.print("Enter book " + (i + 1) + " pages: ");
    int pages = sc.nextInt();
    sc.nextLine();

    arr[i] = new Book(name, author, price, pages);
    System.out.println(arr[i]);
}

sc.close();
}
}

```

```

C:\Users\heman\OneDrive\Desktop\1BM23CS110>java Ride
Number of books: 2
Enter book 1 name: kdsm
Enter author 1 name: dsad
Enter book 1 price: 200
Enter book 1 pages: 250
Book Name: kdsm
Author Name: dsad
Price: 200
Number of Pages: 250

Enter book 2 name: skfmks
Enter author 2 name: gkdfmgk
Enter book 2 price: 400
Enter book 2 pages: 340
Book Name: skfmks
Author Name: gkdfmgk
Price: 400
Number of Pages: 340

```

Program 4

Abstract Classes

Code:

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

```
abstract class Shape {  
    double dim1;  
    double dim2;  
  
    abstract void printarea();  
}
```

```
class Rectangle extends Shape {  
    Rectangle(double d1, double d2) {  
        this.dim1 = d1;  
        this.dim2 = d2;  
    }  
  
    @Override  
    void printarea() {  
        double area = dim1 * dim2;  
        System.out.println("Area of Rectangle: " + area);  
    }  
}
```

```
class Triangle extends Shape {  
    Triangle(double base, double height) {  
        this.dim1 = base;  
        this.dim2 = height;  
    }  
  
    @Override  
    void printarea() {  
        double area = 0.5 * dim1 * dim2;  
        System.out.println("Area of Triangle: " + area);  
    }  
}
```

```

class Circle extends Shape {
    Circle(double radius) {
        this.dim1 = radius;
    }

    @Override
    void printarea() {
        double area = 3.14 * dim1 * dim1;
        System.out.println("Area of Circle: " + area);
    }
}

public class area {
    public static void main(String[] args) {
        try (Scanner sc = new Scanner(System.in)) {
            System.out.println("Enter length and breadth of Rectangle:");
            double rl = sc.nextDouble();
            double rb = sc.nextDouble();
            Rectangle r1 = new Rectangle(rl, rb);
            r1.printarea();

            System.out.println("Enter base and height of Triangle:");
            double base = sc.nextDouble();
            double height = sc.nextDouble();
            Triangle t1 = new Triangle(base, height);
            t1.printarea();

            System.out.println("Enter the Radius:");
            double radius = sc.nextDouble();
            Circle c1 = new Circle(radius);
            c1.printarea();
        }
    }
}

```

```
C:\Users\heman\OneDrive\Desktop\1BM23CS110>java Area
Enter length and breadth of Rectangle:
3
4
Area of Rectangle: 12.0
Enter base and height of Triangle:
4
5
Area of Triangle: 10.0
Enter the Radius:
5
Area of Circle: 78.5
```

Program 5

Bank Account

Code:

```
import java.util.Scanner;

class Account{
    Scanner sc=new Scanner(System.in);

    String name="HK";
    int money;
    String type;
    int accno;
    Account(String acctype,int accno){
        this.type=acctype;
        this.money=0;
        this.accno=accno;
    }
    void accdetail(){
        System.out.println("Account Holder Name: "+name);
        System.out.println("Account No: "+accno);
        System.out.println("Balance: "+money);
        System.out.println(this.type);
    }

    void deposit(){
        int mon;
        System.out.println(accno);
        System.out.println(type);
        System.out.println("Enter the Amount: ");
        mon=sc.nextInt();
        money+=mon;
        System.out.println("Balance: "+money);
    }

    void withdraw(){
        System.out.println(this.accno);
```

```

System.out.println(type);
int mon;
System.out.println("Enter the Amount: ");
mon=sc.nextInt();
money-=mon;
System.out.println("Balance: "+money);
if((money<=100) && this.type=="current_account")
{
    System.out.println("Minimum balance is 100");
    System.out.println("Deposit money now and pay the fine of 50");
}
}
void cal_intrest(){
    if(this.type=="saving_account")
    {

        System.out.println(this.type);
        double temp=this.money;

        double intrest=((temp)*0.5)+temp;
        System.out.println("The intrest: "+intrest);
    }

    else
    {
        System.out.println("Not a saving account");
    }

}
}

public class Sys {
    public static void main(String[] args) {
        Account c1=new Account("saving_account",1);
        Account c2=new Account("current_account",2);

        while(true)
        {
            Scanner sc=new Scanner(System.in);

```



```

    int choice;
    System.out.println("Enter the choice:\n1.Deposite\n2.Withdraw\n3.Compute
intrest\n4.Display acc details\n5.Exit");
    choice=sc.nextInt();
    if (choice==1)
    {
        c1.deposit();
        c2.deposit();
    }

    if(choice==2){
        c1.withdraw();
        c2.withdraw();
    }

    if(choice==3){
        c1.cal_intrest();
        c2.cal_intrest();
    }

    if(choice==4){
        c1.accdetail();
        c2.accdetail();
    }

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

```

```
C:\Users\heman\OneDrive\Desktop\18M23CS110>java sys
Enter the choice:
1.Deposite
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
1
1
saving_account
Enter the Amount:
300
Balance: 300
2
current_account
Enter the Amount:
400
Balance: 400
Enter the choice:
1.Deposite
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
4
Account Holder Name: HK
Account No: 1
Balance: 300
saving_account
Account Holder Name: HK
Account No: 2
Balance: 400
current_account
Enter the choice:
1.Deposite
2.Withdraw
3.Compute intrest
4.Display acc details
5.Exit
5
```

Program 6

Packages

Code:

```
package CIE;

import java.util.Scanner;

public class Internals extends Student {

    int[] cieMarks = new int[5];

    public void inputCIEMarks() {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter CIE marks for 5 subjects:");
        for (int i = 0; i < 5; i++) {
            System.out.print("Subject " + (i + 1) + ": ");
            cieMarks[i] = s.nextInt();
        }
    }

    public int[] getCieMarks() {
        return cieMarks;
    }
}

package CIE;

import java.util.Scanner;

public class Student {
    protected String usn;
    protected String name;
    protected int sem;

    public void inputStudentDetails() {
        Scanner s = new Scanner(System.in);
```

```

        System.out.print("Enter USN: ");
        usn = s.nextLine();
        System.out.print("Enter Name: ");
        name = s.nextLine();
        System.out.print("Enter Semester: ");
        sem = s.nextInt();
    }

    public void displayStudentDetails() {
        System.out.println("USN: " + usn);
        System.out.println("Name: " + name);
        System.out.println("Semester: " + sem);
    }
}

package SEE;

import CIE.Student;
import java.util.Scanner;

public class External extends Student {
    int[] seeMarks = new int[5];

    public void inputSEEMarks() {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter SEE marks for 5 subjects:");
        for (int i = 0; i < 5; i++) {
            System.out.print("Subject " + (i + 1) + ": ");
            seeMarks[i] = s.nextInt();
        }
    }

    public int[] getSeeMarks() {
        return seeMarks;
    }
}

import CIE.Internals;
import SEE.External;

```

```

import java.util.Scanner;

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

        System.out.print("Enter the number of students: ");
        int numStudents = sc.nextInt();
        sc.nextLine();

        Internal[] cieStudents = new Internal[numStudents];
        External[] seeStudents = new External[numStudents];

        for (int i = 0; i < numStudents; i++) {
            System.out.println("\nEnter details for student " + (i + 1) + ":");

            cieStudents[i] = new Internal();
            cieStudents[i].inputStudentDetails();
            cieStudents[i].inputCIEMarks();

            seeStudents[i] = new External();
            seeStudents[i].inputSEEMarks();
        }

        System.out.println("\nFinal marks for each student:");
        for (int i = 0; i < numStudents; i++) {
            System.out.println("\nDetails for student " + (i + 1) + ":");
            cieStudents[i].displayStudentDetails();

            int[] cieMarks = cieStudents[i].getCieMarks();
            int[] seeMarks = seeStudents[i].getSeeMarks();
            int[] finalMarks = new int[5];

            System.out.println("Final marks in each subject:");
            for (int j = 0; j < 5; j++) {
                finalMarks[j] = cieMarks[j] + seeMarks[j];
                System.out.println("Subject " + (j + 1) + ": " + finalMarks[j]);
            }
        }
    }
}

```

```
        sc.close();  
    }  
}
```

```
C:\Users\heman\OneDrive\Desktop\1BM23CS110>javac Main.java
```

```
C:\Users\heman\OneDrive\Desktop\1BM23CS110>java Main
```

```
Enter the number of students: 1
```

```
Enter details for student 1:
```

```
Enter USN: 343ewd
```

```
Enter Name: dsdsd
```

```
Enter Semester: 12
```

```
Enter CIE marks for 5 subjects:
```

```
Subject 1: 23
```

```
Subject 2: 34
```

```
Subject 3: 45
```

```
Subject 4: 56
```

```
Subject 5: 67
```

```
Enter SEE marks for 5 subjects:
```

```
Subject 1: 76
```

```
Subject 2: 65
```

```
Subject 3: 54
```

```
Subject 4: 43
```

```
Subject 5: 32
```

```
Final marks for each student:
```

```
Details for student 1:
```

```
USN: 343ewd
```

```
Name: dsdsd
```

```
Semester: 12
```

```
Final marks in each subject:
```

```
Subject 1: 99
```

```
Subject 2: 99
```

```
Subject 3: 99
```

```
Subject 4: 99
```

```
Subject 5: 99
```

Program 7

Exception handling

Code:

```
import java.util.Scanner;

class WrongAge extends Exception {

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

    public WrongAge(String message) {
        super(message);
    }
}

class Father {
    protected int fatherAge;

    public Father() throws WrongAge {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter Father's Age: ");
        fatherAge = s.nextInt();
        if (fatherAge < 0) {
            throw new WrongAge("Age cannot be negative");
        }
    }

    public void display() {
        System.out.println("Father's Age: " + fatherAge);
    }
}

class Son extends Father {
    private int sonAge;

    public Son() throws WrongAge {
```

```

    super();
    Scanner s = new Scanner(System.in);
    System.out.print("Enter Son's Age: ");
    sonAge = s.nextInt();
    if (sonAge < 0) {
        throw new WrongAge("Age cannot be negative");
    } else if (sonAge >= fatherAge) {
        throw new WrongAge("Son's age cannot be greater than or equal to Father's
age");
    }
}

@Override
public void display() {
    super.display();
    System.out.println("Son's Age: " + sonAge);
}

}

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

        System.out.println("Puneeth Giri B T");
        System.out.println("1BM23CS415");
    }
}

```



```
PS C:\Users\Punith BT\Desktop\3_SEM\JAVA\Java> java Main
Enter Father's Age: 35
Enter Son's Age: 16
Father's Age: 35
Son's Age: 16
Puneeth Giri B T
1BM23CS415
PS C:\Users\Punith BT\Desktop\3_SEM\JAVA\Java> java Main
Enter Father's Age: 30
Enter Son's Age: 31
Exception Caught: Son's age cannot be greater than or equal to Father's age
Puneeth Giri B T
1BM23CS415
```

Program 8

Threads

Code:

```
import java.util.Scanner;

class WrongAge extends Exception {

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

    public WrongAge(String message) {
        super(message);
    }
}

class Father {
    protected int fatherAge;

    public Father() throws WrongAge {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter Father's Age: ");
        fatherAge = s.nextInt();
        if (fatherAge < 0) {
            throw new WrongAge("Age cannot be negative");
        }
    }

    public void display() {
        System.out.println("Father's Age: " + fatherAge);
    }
}

class Son extends Father {
    private int sonAge;

    public Son() throws WrongAge {
```

```

    super();
    Scanner s = new Scanner(System.in);
    System.out.print("Enter Son's Age: ");
    sonAge = s.nextInt();
    if (sonAge < 0) {
        throw new WrongAge("Age cannot be negative");
    } else if (sonAge >= fatherAge) {
        throw new WrongAge("Son's age cannot be greater than or equal to Father's
age");
    }
}

@Override
public void display() {
    super.display();
    System.out.println("Son's Age: " + sonAge);
}

}

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

        System.out.println("Puneeth Giri B T")
        System.out.println("1BM23CS415");
    }
}

```

```
PS C:\Users\Punith BT\Desktop\3_SEM\JAVA\Java> java Main
Enter Father's Age: 35
Enter Son's Age: 16
Father's Age: 35
Son's Age: 16
Puneeth Giri B T
1BM23CS415
PS C:\Users\Punith BT\Desktop\3_SEM\JAVA\Java> java Main
Enter Father's Age: 30
Enter Son's Age: 31
Exception Caught: Son's age cannot be greater than or equal to Father's age
Puneeth Giri B T
1BM23CS415
```

Program 9

Calculator

Code:

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

class SwingDemo {
    SwingDemo() {
        JFrame jfrm = new JFrame("Divider App");
        jfrm.setSize(275, 150);
        jfrm.setLayout(new FlowLayout());
        jfrm.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

        JLabel jlab = new JLabel("Enter the divisor and dividend:");
        JLabel jlab1 = new JLabel("USN:1BM23CS415 Name:Puneeth Giri B T");
        JTextField ajtf = new JTextField(8);
        JTextField bjtf = new JTextField(8);
        JButton button = new JButton("Calculate");
        JLabel err = new JLabel();
        JLabel alab = new JLabel();
        JLabel blab = new JLabel();
        JLabel anslab = new JLabel();

        jfrm.add(err);
        jfrm.add(jlab);
        jfrm.add(jlab1);
        jfrm.add(ajtf);
        jfrm.add(bjtf);
        jfrm.add(button);
        jfrm.add(alab);
        jfrm.add(blab);
        jfrm.add(anslab);

        ActionListener l = new ActionListener() {
            public void actionPerformed(ActionEvent evt) {
                System.out.println("Action event from a text field");
            }
        }
    }
}
```

```

    }
};

ajtf.addActionListener(l);
bjtf.addActionListener(l);

button.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent evt) {
        try {
            int a = Integer.parseInt(ajtf.getText());
            int b = Integer.parseInt(bjtf.getText());
            int ans = a / b;

            alab.setText("A = " + a);
            blab.setText("B = " + b);
            anslab.setText("Ans = " + ans);
            err.setText("");
        } catch (NumberFormatException e) {
            alab.setText("");
            blab.setText("");
            anslab.setText("");
            err.setText("Enter Only Integers!");
        } catch (ArithmeticException e) {
            alab.setText("");
            blab.setText("");
            anslab.setText("");
            err.setText("B should be NON zero!");
        }
    }
});

jfrm.setVisible(true);
}

public static void main(String args[]) {
    SwingUtilities.invokeLater(new Runnable() {
        public void run() {
            new SwingDemo();
        }
    });
};

```

```
}  
}
```

