Green University of Bangladesh
Department of Computer Science and Engineering(CSE)

Faculty of Sciences and Engineering

Semester: (Spring, Year:2021), B.Sc. in CSE (Day)

Lab Report Portfolio

Course Title: Object Oriented Programming Lab

Course Code: CSE 202-CSE(181) Section:DB

Student Details

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Lab Date : 09/11/2022

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Course Teacher's Name : Dr. Muhammad Aminur Rahaman

[For Teachers use only: Don't Write Anything inside this box]

Lab Report Status

Marks: …… Signature:.....

Comments:..... Date:.....

Lab Report 01

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Problem 01 :

1. TITLE OF THE LAB EXPERIMENT :

Implement checking of odd and even number With Java programing language

2. OBJECTIVES/AIM :

My main Aim to Implement & checking of odd and even number With Java programing language

3. PROCEDURE / ANALYSIS / DESIGN :

Algorithm :

1. First we take packages like com.mycompany.lab 1 task 1.
2. Import java scanner file
3. Declare public classes
4. Then declare main function
5. Inside the main function we declare an integer variable and take a number from the user.
6. Then apply the if else condition to check if it is equal to the mod of 2 or not.
7. If yes then print an even number.
8. And if it was not equal then print ODD number .

4. IMPLEMENTATION :

```
package com.mycompany.lab1task1;
import java.util.Scanner;
public class Lab1task1 {
public static void main(String[] args) {
int num;
```

```
Scanner s = new Scanner(System.in);
System.out.print("Enter Any Number : ");
num = s.nextInt();

if(num % 2 == 0){
System.out.println(num + " " + " is an Even Number");
}else{
System.out.println(num + " " + " is an ODD Number");
}
}
}
```

5. TEST RESULT / OUTPUT :

This is the result :
Data 1 :
Enter Any Number : 5
5 is an ODD Number
Data 2 :
Enter Any Number : 4
4 is an Even Number

6. ANALYSIS AND DISCUSSION :

This kind of small project is really good to know about java programs as a beginner . I don't face
any kind of problem to complete this problem . I like this problem so much.

Problem 02:

1. TITLE OF THE LAB EXPERIMENT :

Implement summation of factorial odd number series With Java programing Language.

2. OBJECTIVES/AIM :

My main Aim to Implement summation of factorial odd number series With Java programing language

3. PROCEDURE :

Algorithm :

9. First we take packages like com.mycompany.lab 1 task 2.
10. Import java scanner file
11. Declare public classes
12. Then declare main function
13. Inside the main function we declare an integer variable and take a number from the user.
14. Then apply the if else condition to check if it is equal to the mod of 2 or not.
15. If yes then print an even number.
16. And if it was not equal then print ODD number .

4. IMPLEMENTATION :

```
package com.mycompany.lab 1 task 2;
import java.util.Scanner;
public class Lab1task2 {
public static void main(String args[]) {

int N, i, sum = 0;
```

```
Scanner in = new Scanner(System.in);
System.out.println("Enter a number");
N = in.nextInt();
for(i = 0; i <= N; i++){
if((i%2) == 1){
sum += i;
}
}
System.out.print("Sum of all odd numbers between 0 to "
+ N + " = " + sum);
}
}
```

5. Result :

Enter a number:
10
Sum of all odd numbers between 0 to 10 = 25

6. ANALYSIS AND DISCUSSION :

This kind of small project is really good to know about java programs as a beginner . I don't face
any kind of problem to complete this problem . I like this problem so much.now i know how to
add a sum of odd numbers.

Lab Report 02

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Problem 01

1. TITLE OF THE LAB EXPERIMENT :

Take three constructor where first constructor will calculate the area of triangle, second constructor will calculate the area of rectangle and third constructor will calculate the area of circle using overloading constructor

2. OBJECTIVES/AIM :

My main Aim to Take three constructor where first constructor will calculate the area of triangle, second constructor will calculate the area of rectangle and third constructor will calculate the area of circle using overloading constructor

4. IMPLEMENTATION :

```
import java.util.Scanner;
class NumberValue {
int length;
int height;
String areaname;
double area;
public NumberValue(int l,int h,String type) {
length=l;
height=h;
areaname=type;
area=0.5*length*height;
}
public NumberValue(String type,int h,int l) {
length=l;
height=h;
areaname=type;
```

```
area=length*height;
}
public NumberValue(String type,int r) {
length=r;
areaname=type;
area=3.14*(r*r);
}
public void display() {
System.out.println("total area of "+ areaname +" "+ area);
}
}
public class Area {
public static void main(String[] args) {
Scanner scan=new Scanner(System.in);
System.out.print("1 for tri \n 2 for rec \n for circle\n");
int select=scan.nextInt();

switch (select) {
case 1 -> {
System.out.print("Please input the length and height\n");

int length=scan.nextInt();

int height=scan.nextInt();
NumberValue tri = new NumberValue(length,height,"tri");
tri.display();
}
case 2 -> {
System.out.print("Please input the length and height\n");
int lengths=scan.nextInt();
int heights=scan.nextInt();

NumberValue rec = new

NumberValue("rec",heights,lengths);

rec.display();
}
case 3 -> {
System.out.print("Please input circle area\n");
```

```
int circles=scan.nextInt();
NumberValue circle = new NumberValue("circle",circles);
circle.display();
}
default -> throw new AssertionError();
}
}
}
```

5. TEST RESULT / OUTPUT :

```
-------------------------< com.mycompany:Login
Building Login 1.0-SNAPSHOT
---------------------------------[ jar ]---------

--- exec-maven-plugin:3.0.0:exec (default-cli
1 for triangle
2 for rectangle
3for circle
3
Please input circle radius
25
total area of circle 1962.5
------------------------------------------------
BUILD SUCCESS
------------------------------------------------
```

6. ANALYSIS AND DISCUSSION :

This kind of small project is really good to know about java programs as a beginner . I don't face
any kind of problem to complete this problem . I like this problem so much.

Lab report 03

==========

1. TITLE OF THE LAB EXPERIMENT :

“2 files contains 2 matrix , read from them and provide the matrix multiplication in the 3rd file;”

2. OBJECTIVES/AIM :

My main Aim is to Take 2 files that contain 2 matrices , then read from them and provide the matrix multiplication in the 3rd file.

4. IMPLEMENTATION :

```
package com.mycompany.lab3;

import java.io.File;
import java.util.Scanner;
import java.io.*;


public class Lab3 {

    public static void main(String[] args) throws IOException {
      int[] [] arr1 = new int [3][3];
      int [] [] arr2 = new int [3][3];
      Scanner input = new Scanner(System.in);
       System.out.println("Enter the elements of First mat : "
```

```
);
      for(int i = 0 ; i < 3 ; i++){
          for(int j = 0 ; j < 3 ; j++){
              arr1[i][j] = input.nextInt();
          }
      }
      System.out.println("Enter the elements of second mat : "
);
       for(int i = 0 ; i < 3 ; i++){
          for(int j = 0 ; j < 3 ; j++){
              arr1[i][j] = input.nextInt();
          }
      }

       int [] [] multi = new int[3][3];
       for( int i = 0  ; i < 3; i++){
           for(int j = 0; j < 3 ; j++ ){
               multi [i] [j] = 0 ;
               for(int k = 0 ;  k < 3 ; k++){
                   multi [i] [j ] += arr1[i] [k] * arr2[k][j];
               }
           }
       }

       File file1 = new File("marix1.txt");
      File file2 = new File("marix2.txt");
      File file3 = new File("marix3.txt");

       file1.createNewFile();
       file2.createNewFile();
       file3.createNewFile();

       String filename1 = file1.getName();
        String filename2 = file2.getName();
         String filename3 = file3.getName();
```

```
        Write wobj = new Write();
        wobj.writeMatrix(filename1,arr1);
        wobj.writeMatrix(filename2,arr2);
        wobj.writeMatrix(filename3,multi);

        System.out.print(file1.getAbsolutePath());
    }
}

class Write{
    static void writeMatrix(String filename,int[][] matrix){
        try{
            BufferedWriter bw = new BufferedWriter(new
FileWriter(filename));

            for(int i = 0 ; i < matrix.length; i++){
            for(int j = 0 ; j < matrix[i].length;j++){
                bw.write(matrix[i][j] + ",");
            }
             bw.newLine();
        }
            bw.flush();
        }catch(IOException e){

        }
    }
}
```

Output :

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ lab3 ---
Enter the elements of First mat :
1 2 3
11 22 33
33 44 55
Enter the elements of second mat :
3 2 1
6 5 4
9 8 7
C:\Users\User\OneDrive\Documents\NetBeansProjects\lab3\marix1.txt
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  27.619 s
Finished at: 2022-12-27T05:14:41+06:00
------------------------------------------------------------------------
```

6. ANALYSIS AND DISCUSSION :

This kind of project is very helpful to understand file handling and files in the Java programming language . This kind of small project is really good to know about java programs as a beginner . I don't face
any kind of problem to complete this problem . I like this problem so much.

Lab Report 04

==========

1. TITLE OF THE LAB EXPERIMENT :

“Create a scientific calculator using the Java programming language.”

2. OBJECTIVES/AIM :

My main Aim is to Create a scientific calculator using the Java programming language.

3. IMPLEMENTATION :

```
package com.mycompany.calculatorlab4;

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


public class Calculatorlab4 implements ActionListener {

        double num1 = 0 , num2 = 0 , result = 0 ;
        int calculation;


        JFrame frame = new JFrame("Calculator") ;
```

```
        JLabel label = new JLabel();
        JTextField textField = new JTextField();
        JRadioButton onradiobutton = new JRadioButton();
        JRadioButton offradiobutton = new JRadioButton();
        JButton buttonzeor = new JButton("0");
        JButton buttonone = new JButton("1");
        JButton buttontwo = new JButton("2");
        JButton buttonthree = new JButton("3");
        JButton buttonfour = new JButton("4");
        JButton buttonfive = new JButton("5");
        JButton buttonsix = new JButton("6");
        JButton buttonseven = new JButton("7");
        JButton buttoneight = new JButton("8");
        JButton buttonnine = new JButton("9");
        JButton buttondot = new JButton(".");
        JButton buttonclear = new JButton("C");
        JButton buttondelete = new JButton("DEL");
        JButton buttonegual = new JButton("=");
        JButton buttonmul = new JButton("X");
        JButton buttondiv = new JButton("/");
        JButton buttonplus = new JButton("+");
        JButton buttonminus = new JButton("-");
        JButton buttonsquare = new JButton("x\u00B2");
        JButton buttonreciprocal = new JButton("1/x");
        JButton buttonsqrt = new JButton("\u221A");

        Calculatorlab4(){
            preparegui();
            addcomponents();
            addActionEvent();
        };

        public void addcomponents(){
            label.setBounds(250,0,50,50);
            label.setForeground(Color.white);
            frame.add(label);
```

```
            textField.setBounds(10,40,270,40);
            textField.setFont(new Font("Arial",Font.BOLD,20));
            textField.setEditable(false);

textField.setHorizontalAlignment(SwingConstants.RIGHT);
            frame.add(textField);

            onradiobutton.setBounds(10, 95, 60, 40);
            onradiobutton.setSelected(true);
            onradiobutton.setBackground(Color.black);
            onradiobutton.setForeground(Color.white);
            onradiobutton.setFocusable(false);
            onradiobutton.setFont(new
Font("Arial",Font.BOLD,14));
            frame.add(onradiobutton);

            offradiobutton.setBounds(10, 120, 60, 40);
            offradiobutton.setSelected(false);
            offradiobutton.setBackground(Color.black);
            offradiobutton.setForeground(Color.white);
            offradiobutton.setFocusable(false);
            offradiobutton.setFont(new
Font("Arial",Font.BOLD,14));
            frame.add(offradiobutton);


            ButtonGroup buttongroup = new ButtonGroup();
            buttongroup.add(onradiobutton);
            buttongroup.add(offradiobutton);

            buttonseven.setBounds(10,230 , 60, 40);
            buttonseven.setFont(new Font("Arial",Font.BOLD,20));
            buttonseven.setFocusable(false);
            frame.add(buttonseven);
```

```
buttoneight.setBounds(80,230 , 60, 40);
buttoneight.setFont(new Font("Arial",Font.BOLD,20));
frame.add(buttoneight);
buttoneight.setFocusable(false);

buttonnine.setBounds(150,230 , 60, 40);
buttonnine.setFont(new Font("Arial",Font.BOLD,20));
frame.add(buttonnine);
buttonnine.setFocusable(false);

buttonfour.setBounds(10,290 , 60, 40);
buttonfour.setFont(new Font("Arial",Font.BOLD,20));
frame.add(buttonfour);
buttonfour.setFocusable(false);

buttonfive.setBounds(80,290 , 60, 40);
buttonfive.setFont(new Font("Arial",Font.BOLD,20));
frame.add(buttonfive);
buttonfive.setFocusable(false);

buttonsix.setBounds(150,290 , 60, 40);
buttonsix.setFont(new Font("Arial",Font.BOLD,20));
frame.add(buttonsix);
buttonsix.setFocusable(false);

buttonone.setBounds(10,350 , 60, 40);
buttonone.setFont(new Font("Arial",Font.BOLD,20));
frame.add(buttonone);
buttonone.setFocusable(false);

 buttontwo.setBounds(80,350 , 60, 40);
buttontwo.setFont(new Font("Arial",Font.BOLD,20));
frame.add(buttontwo);
 buttontwo.setFocusable(false);
```

```
            buttonthree.setBounds(150,350 , 60, 40);
            buttonthree.setFont(new Font("Arial",Font.BOLD,20));
            frame.add(buttonthree);
             buttonthree.setFocusable(false);

            buttondot.setBounds(150,410 , 60, 40);
            buttondot.setFont(new Font("Arial",Font.BOLD,20));
            frame.add(buttondot);
             buttondot.setFocusable(false);

            buttonzeor.setBounds(10,410 , 130, 40);
            buttonzeor.setFont(new Font("Arial",Font.BOLD,20));
            frame.add(buttonzeor);
            buttonzeor.setFocusable(false);


            buttonegual.setBounds(220,350 , 60, 100);
            buttonegual.setFont(new Font("Arial",Font.BOLD,20));
            buttonegual.setBackground(new Color(239,188,2));
            frame.add(buttonegual);
            buttonegual.setFocusable(false);

            buttondiv.setBounds(220,110 , 60, 40);
            buttondiv.setFont(new Font("Arial",Font.BOLD,20));
            buttondiv.setBackground(new Color(239,188,2));
            frame.add(buttondiv);
             buttondiv.setFocusable(false);

            buttonsquare.setBounds(10,170 , 60, 40);
            buttonsquare.setFont(new
Font("Arial",Font.BOLD,20));
            buttonsquare.setBackground(new Color(239,188,2));
            frame.add(buttonsquare);
             buttonsquare.setFocusable(false);

            buttonmul.setBounds(220,230 , 60, 40);
```

```
            buttonmul.setFont(new Font("Arial",Font.BOLD,20));
            buttonmul.setBackground(new Color(239,188,2));
            frame.add(buttonmul);
            buttonmul.setFocusable(false);


            buttonminus.setBounds(220,170 , 60, 40);
            buttonminus.setFont(new Font("Arial",Font.BOLD,20));
            buttonminus.setBackground(new Color(239,188,2));
            frame.add(buttonminus);
             buttonminus.setFocusable(false);

            buttonplus.setBounds(220,290 , 60, 40);
            buttonplus.setFont(new Font("Arial",Font.BOLD,20));
            buttonplus.setBackground(new Color(239,188,2));
            frame.add(buttonplus);
            buttonplus.setFocusable(false);

            buttonreciprocal.setBounds(75,170 , 70, 40);
            buttonreciprocal.setFont(new
Font("Arial",Font.BOLD,20));
            buttonreciprocal.setBackground(new
Color(239,188,2));
            frame.add(buttonreciprocal);
             buttonreciprocal.setFocusable(false);

            buttonsqrt.setBounds(150,170 , 60, 40);
            buttonsqrt.setFont(new Font("Arial",Font.BOLD,20));
            buttonsqrt.setBackground(new Color(239,188,2));
            frame.add(buttonsqrt);
            buttonsqrt.setFocusable(false);

            buttondelete.setBounds(70,110 , 70, 40);
            buttondelete.setFont(new
Font("Arial",Font.BOLD,18));
            buttondelete.setBackground(new Color(239,188,2));
```

```
            frame.add(buttondelete);
            buttondelete.setFocusable(false);

            buttonclear.setBounds(150,110 , 60, 40);
            buttonclear.setFont(new Font("Arial",Font.BOLD,18));
            buttonclear.setBackground(new Color(239,188,2));
            frame.add(buttonclear);
            buttonclear.setFocusable(false);
        }

        public void preparegui(){
            frame.setSize(305,510);
            frame.getContentPane().setLayout(null);
            frame.getContentPane().setBackground(Color.black);
            frame.setLocationRelativeTo(null);
            frame.setVisible(true);

frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        }


    public void addActionEvent(){
        onradiobutton.addActionListener(this);
        offradiobutton.addActionListener(this);
        buttonzeor.addActionListener(this);
        buttonone.addActionListener(this);
        buttontwo.addActionListener(this);
        buttonthree.addActionListener(this);
        buttonfour.addActionListener(this);
        buttonfive.addActionListener(this);
        buttonsix.addActionListener(this);
        buttonseven.addActionListener(this);
        buttoneight.addActionListener(this);
        buttonnine.addActionListener(this);
        buttondot.addActionListener(this);
        buttonclear.addActionListener(this);
```

```
        buttondelete.addActionListener(this);
        buttonegual.addActionListener(this);
        buttonmul.addActionListener(this);
        buttondiv.addActionListener(this);
        buttonplus.addActionListener(this);
        buttonminus.addActionListener(this);
        buttonsquare.addActionListener(this);
          buttonreciprocal.addActionListener(this);
        buttonsqrt.addActionListener(this);


    }

    public static void main(String[] args) {

        Calculatorlab4 calculator = new Calculatorlab4();
    }

    @Override
    public void actionPerformed(ActionEvent e) {
       Object object = e.getSource();

       if(source == onradiobutton){
           enable();
       }
    }

    public void enable(){
        onradiobutton.setEnabled(false);
        offradiobutton.setEnabled(true);

        buttonzeor.setEnabled(true);
        buttonone.setEnabled(true);
        buttontwo.setEnabled(true);
        buttonthree.setEnabled(true);
        buttonfour.setEnabled(true);
```

```
        buttonfive.setEnabled(true);
        buttonsix.setEnabled(true);
        buttonseven.setEnabled(true);
        buttoneight.setEnabled(true);
        buttonnine.setEnabled(true);
        buttondot.setEnabled(true);
        buttonclear.setEnabled(true);
        buttondelete.setEnabled(true);
        buttonegual.setEnabled(true);
        buttonmul.setEnabled(true);
        buttondiv.setEnabled(true);
        buttonplus.setEnabled(true);
        buttonminus.setEnabled(true);
        buttonsquare.setEnabled(true);
        buttonreciprocal.setEnabled(true);
        buttonsqrt.setEnabled(true);
        textField.setEnabled(true);
        label.setEnabled(true);

    }
}
```

OutPut :

5. ANALYSIS AND DISCUSSION :

This kind of project is very helpful to Swing and the interface in the Java programming language . This kind of small project is really good to know about java programs as a beginner . I don't face any kind of problem to complete this problem . I like this problem so much.

Lab Report 05

==========

1. TITLE OF THE LAB EXPERIMENT :

• Implement Multiple inheritance. 3 Classes A,B,C. Class C inherits both A and B. • Try various combinations of public, private, protected

2. OBJECTIVES/AIM :

The main Objective of this project is to learn interface and multiple inheritance

3. PROCEDURE / ANALYSIS / DESIGN :

Inheritance is the process of creating a new Class, called the Derived Class, from the existing class, called the Base Class. Inheritance has many advantages, the most important of them being the reusability of code. Rather than developing new Objects from scratch, new code can be based on the work of other developers, adding only the new features that are needed. The reuse of existing classes saves time and effort.

Single Inheritance
Multi-Level Inheritance
Hierarchical Inheritance
Hybrid Inheritance
Multipath inheritance
Multiple Inheritance

Most important inheritance is multiple inheritance. Two problems are related to inheritance and interface

4. IMPLEMENTATION :

(1ST PROBLEMS)

```
package interfaces;
interface A{

void methodA();
}
interface B {
void methodB();
}
class c implements A, B {
// final int a=10;
public void methodA() {
System.out.println("Method A");
}
public void methodB() {
System.out.println("Method B");
}
}
public class multipleInheritance { public static void main(String[]
args) {
c obj=new c();
obj.methodA();
obj.methodB();
}
}
```

2ND PROBLEMS

```
package interfaces;
interface A{
protected void methodA();
```

```
}
interface B {
private void methodB();

public void methodD();
}
class c implements A, B {
public void methodA() {
System.out.println("Method A");
}
public void methodB() {
System.out.println("Method B");
}
public void methodD() {
System.out.println("Method D");
}
}
public class access {
public static void main(String[] args) {
c obj=new c();
obj.methodA();
obj.methodB();
}
}
```

5. TEST RESULT / OUTPUT :

1st problem output :

```
a\jdt_ws\Java_72da403b\bin' 'int
erfaces.multipleInheritance'
Method A
Method B
PS D:\Java>
```

2nd problem :

```
?) { java access }
access.java:4: error: modifier protec
ed not allowed here
  protected void methodA();
                 ^
access.java:8: error: missing method
ody, or declare abstract
   private void methodB();
                ^
2 errors
PS D:\Java\interfaces>
```

6. ANALYSIS AND DISCUSSION :

These two problems are related to inheritance and interface. I learn a lot to solve these two problems. Though I faced some problems and difficulties to solve these problems. But I love these problems.

Lab Report 6 & 7

==========

1. TITLE OF THE LAB EXPERIMENT :

One analytical problem related to java inheritance and interface

2. OBJECTIVES :

The project's main objective is to learn Java the interface and multiple inheritance

3. PROCEDURE / ANALYSIS / DESIGN:

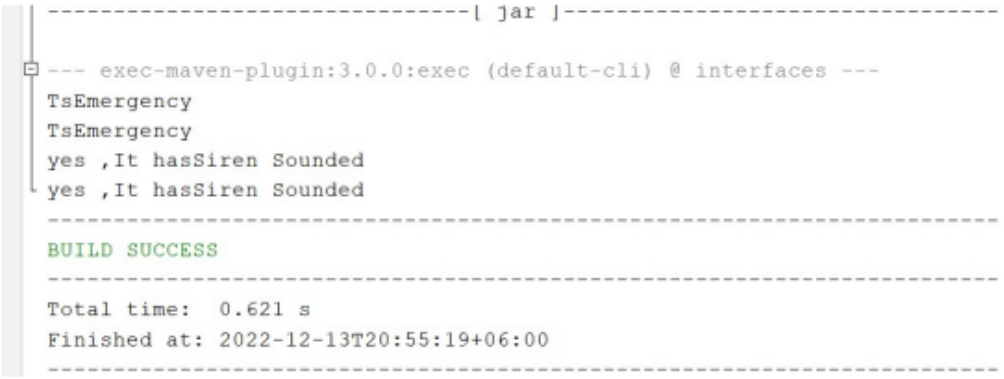
In this problem some criteria were given to solve the problem. First of all, we had to
Create an interface isEmergency with only one method - soundSiren which takes no
arguments and returns no value.Then need another class FireEmergency that implements
the IsEmergency interface. The soundSiren method should
print "Siren Sounded". Also, we need to Write a class SmokeAlarm that does not implement any interface. The class has an empty body. After that instruction was to create an array of Object class, myArray in the main method, and construct 2 SmokeAlarm objects and add it to the array myArray in the main method. And construct
2 FireEmergency objects and add them to the array myArray in the main method. Finally In the main method, write a for loop, and then check which array elements are
instances of classes that implement

4. IMPLEMENTATION :

```
package labreportSeven;

interface isEmergency {
public void soundSiren();
}
class FireEmergency implements isEmergency {
public void soundSiren() {
System.out.println("Siren Sounded");

}
}
class SmokeAlarm {
}
class interfaces {
public static void main(String[] args) {

Object[] myArray = new Object[4];

myArray[0] = new SmokeAlarm();
myArray[1] = new SmokeAlarm();
myArray[2] = new FireEmergency();
myArray[3] = new FireEmergency();
for (int i = 0; i < 4; i++) {
if (myArray[i] instanceof isEmergency) {

//

System.out.printf("The element at index

implmergency\n", i);

((isEmergency) myArray[i]).soundSiren();
} else {
System.out.printf("TsEmergency\n", i);
}
}
```

```
}
}
```

5. TEST RESULT:



6. ANALYSIS AND DISCUSSION :

These two problems are related to inheritance and interface. When we want to use private and protected methods. it shows an error because the interface method doesn’t support it. Interface method only supports abstract and public methods.

Lab Report 08

==========

1. TITLE OF THE LAB EXPERIMENT :

“Exception and Exception Handling in Java programming language .”

2. OBJECTIVES/AIM :

The main Objective of this project is to learn Exception and Exception Handling in the Java programming language .

3. PROCEDURE / ANALYSIS / DESIGN :

Step 01 : Start
step 02 : take the value of age and GPA from the user .
step 03 : Run an if else statement .
step 04 : if the age is less than 25 and gpa is greater than 2.5 . print "you are accepted".
step 05 : Otherwise Go through try and catch.we will build this exception now.
step 06 : create agecalculator function and throws user create exception.
step 07 : check if age is greater than 25 or not. if yes then throw a new AgeOutOfRangeException .
step 08 : end if statement.
step 09 : again throw LowGpaException exception and check the gpa if the gpa is lower than 2.5 or not.
step 10 : if yes. then throw a new LowGpaException exception.
step 11 : Create AgeOutOfRangeException class that is built-in in java.
step 12 : In this class we print the message that " you are older than our requested age (25 yesr) . you are + age".

step 13 : Create a LowGpaException class that extends exceptions that are built in exceptions.
step 14 : And Print Your gpa is not sufficient to apply.

4. IMPLEMENTATION :

```
package com.mycompany.lab8;


import java.util.Scanner;

class AgeOutOfRangeException extends Exception{
    AgeOutOfRangeException(int age){
        System.out.println("You are older than our  requested
age (25 Years)"+".you are "+age);
    }
}


class LowGpaException extends Exception{
    LowGpaException(double gpa){
        System.out.println("Your GPA is not sufficient to apply
for our job(2.5)");
    }
}

public class Lab8 {

public static void main(String[] args) {
    Scanner scan =new Scanner(System.in);
    System.out.println("your Age :");
    int age=scan.nextInt();
    System.out.println("your GPA : ");
    double gpa=scan.nextDouble();
    if (age<25 && gpa>2.5){
```

```
        System.out.println("You are accepted for this job");
    }
    else{
        try {
            ageCalculator(age);
        } catch (Exception e) {
            System.out.println(e);
        }
        try {
            gpaCalculator(gpa);
        } catch (Exception e) {
            System.out.println(e);
        }
   }
}

static void ageCalculator(int ag) throws AgeOutOfRangeException{
    if(ag>25){
        throw new AgeOutOfRangeException(ag);
    }
}
 static void gpaCalculator(double gp) throws LowGpaException{
      if(gp<2.5){
           throw new LowGpaException(gp);
      }
     }
}
```

5. TEST RESULT / OUTPUT :

```
-------------------------< com.mycompany:lab8 >-------------------------
Building lab8 1.0-SNAPSHOT
--------------------------------[ jar ]---------------------------------

--- exec-maven-plugin:3.0.0:exec (default-cli) @ lab8 ---
your Age :
23
your GPA :
3.81
You are accepted for this job
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  10.437 s
Finished at: 2022-12-27T03:46:16+06:00
------------------------------------------------------------------------
```

6. ANALYSIS AND DISCUSSION :

These two problems are related to inheritance and interface. I learn a lot to solve these two problems. Though I faced some problems and difficulties to solve these problems. But I love these problems.