Shri Dharmasthala Manjunatheshwara College of Engineering, Dharwad
Department of Computer Science & Engineering

OOP Activities Submission Report

[Submitted as part of CTA Activity No-1]

Course:	Object-Oriented Programming	Course Code:	21UCSC401
Semester & Division:	IV & A	Academic Year:	2022-23

Report submitted by:

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1. Problem Definition:

You are hired as an Associate Software Engineer in a reputed Multinational Company (MNC).Your company has received a software requirement from Shri Dharmasthala Manjunatheshwara College of Engineering and Technology, Dharwad, a software that computes and publishes the examination results.
You are assigned to work on Students' Grading System project. As part of this project, you are asked by your team lead to write a GUI based Java program to compute the grade obtained by a student in a single course.
Sample GUI design template for your assigned task is given below:

The project must provide the following features:
1) Provide GUI components to read IA–1, IA–2, IA–3, CTA & SEE marks scored by a student in a
single course.

2) Proper error messages should be displayed if marks entered is invalid. i.e., IA marks should be between 0 – 20, CTA between 0 – 10 and SEE between 0 – 100. Incase of absentees, marks should
be entered as 0.

3) CIE marks is the sum of best 2 marks of IA–1, IA–2 and IA–3 + CTA.

4) If CIE < 20, then the program should display a message "Student is detained from taking SEE"
and the program should not display the grade.

5) If SEE marks is 38 or 39, then it should be upgraded to 40.

6) If SEE marks is < 38, then the message F Grade should be printed.

7) Total marks is to be calculated using the formula:
Total marks = CIE + SEE/2
is to be rounded-off to the next number if the fraction is ≥ 0.5, otherwise, it should be truncated.

8) Grade is to be computed and displayed using the following table:
Total marks Grade
100 – 90 S
89 – 80 A
79 – 70 B
69 – 60 C
59 – 50 D
49 – 40 E
39 – 0 F

As a beginner in Java programming, you are required to incorporate the following in your program:

- Use of object-oriented style of programming
- Use of inheritance and interfaces
- Exception handling mechanism
- Use of dynamic method dispatch feature

2. Java Program:

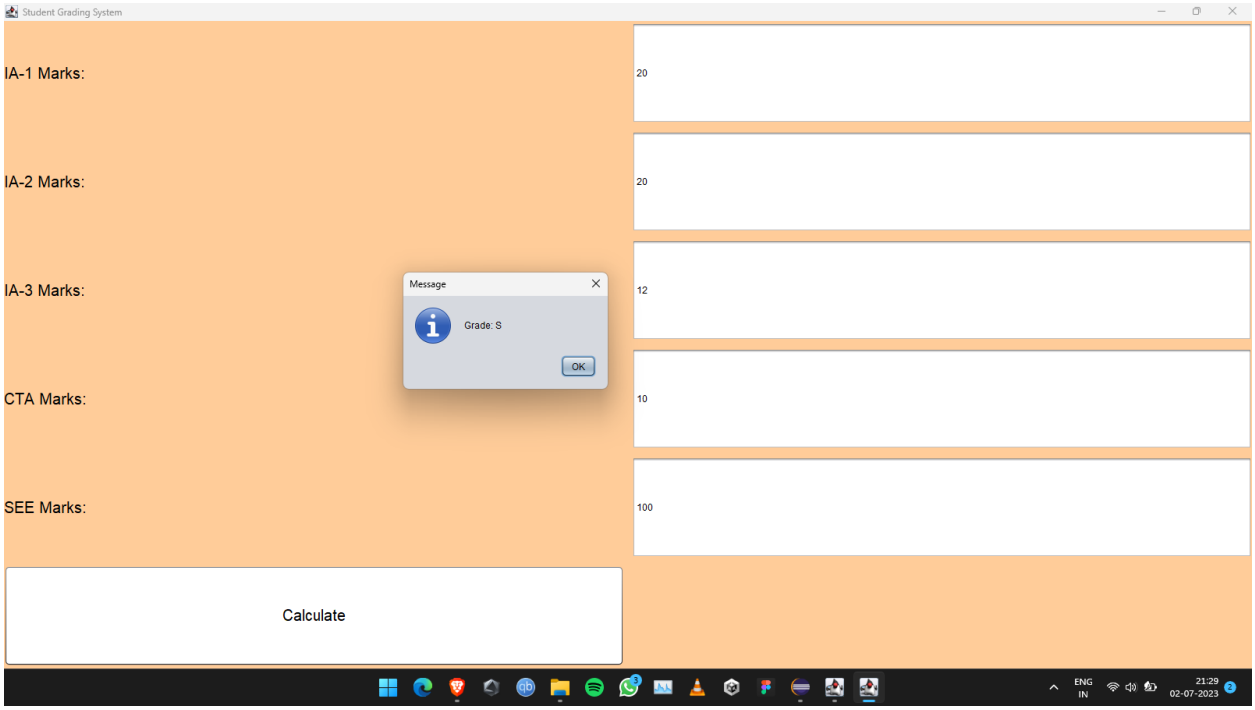
```
package GUI;
import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

public class cons extends JFrame {
    private JTextField ia1TextField;
    private JTextField ia2TextField;
    private JTextField ia3TextField;
    private JTextField ctaTextField;
    private JTextField seeTextField;
    private JButton calculateButton;

    public cons() {
        try {
            UIManager.setLookAndFeel("javax.swing.plaf.nimbus.NimbusLookAndFeel");
        } catch (Exception ex) {
            ex.printStackTrace();
        }

        setTitle("Student Grading System");
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setSize(400, 300);
        setLocationRelativeTo(null);
        setLayout(new GridLayout(6, 2, 10, 10));
        getContentPane().setBackground(new Color(255, 204, 153)); // Set background color

        Font labelFont = new Font("Montserrat", Font.PLAIN, 20); // Create a Font object
        Font buttonFont = new Font("Arial", Font.PLAIN, 20); // Create a Font object for

        add(createLabel("IA-1 Marks:", labelFont));
        ia1TextField = new JTextField();
        add(ia1TextField);

        add(createLabel("IA-2 Marks:", labelFont));
        ia2TextField = new JTextField();
        add(ia2TextField);
```

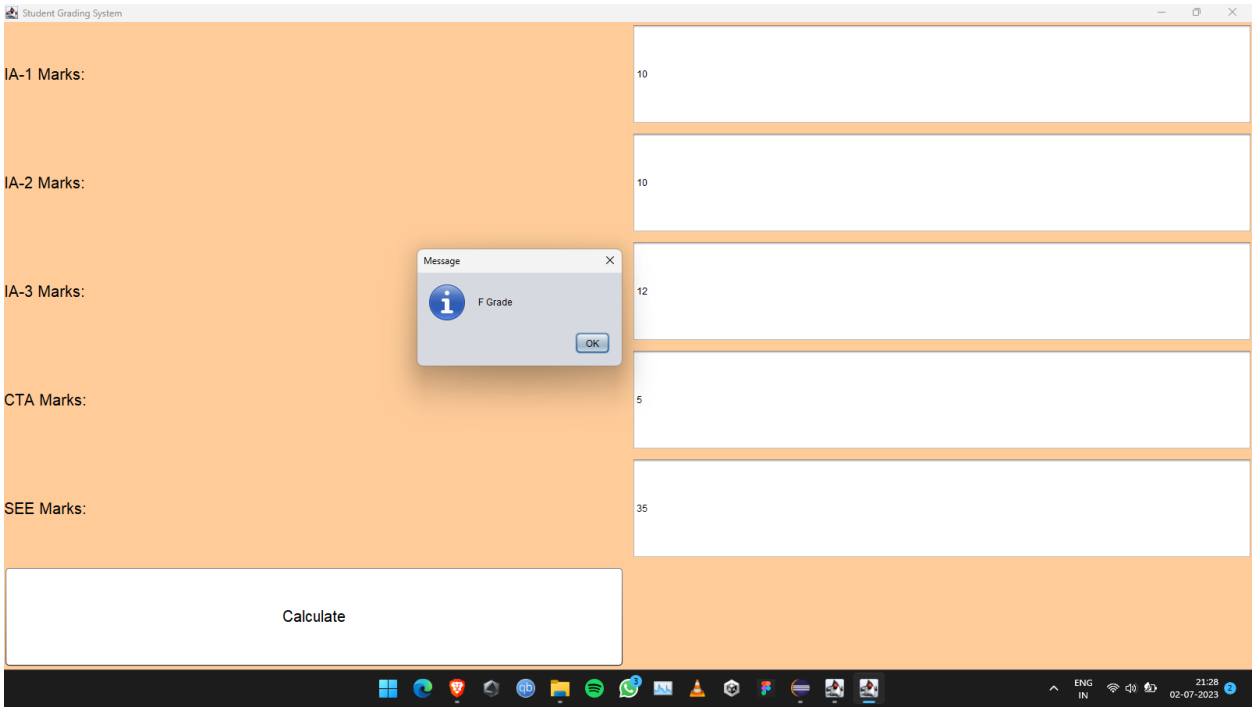
```
        add(createLabel("IA-3 Marks:", labelFont));
        ia3TextField = new JTextField();
        add(ia3TextField);

        add(createLabel("CTA Marks:", labelFont));
        ctaTextField = new JTextField();
        add(ctaTextField);

        add(createLabel("SEE Marks:", labelFont));
        seeTextField = new JTextField();
        add(seeTextField);

        calculateButton = new JButton("Calculate");
        calculateButton.setBackground(Color.WHITE); // Set button color to white
        calculateButton.setFont(buttonFont); // Set the font for the button text
        add(calculateButton);

        calculateButton.addActionListener(new ActionListener() {
            @Override
            public void actionPerformed(ActionEvent e) {
                try {
                    calculateGrade();
                } catch (NumberFormatException ex) {
                    JOptionPane.showMessageDialog(cons.this, "Invalid input. Please enter valid
numeric values.");
                }
            }
        });

        setVisible(true);
    }

    private JLabel createLabel(String text, Font font) {
        JLabel label = new JLabel(text);
        label.setFont(font);
        return label;
    }

    private void calculateGrade() {
        int ia1Marks, ia2Marks, ia3Marks, ctaMarks, seeMarks;
```

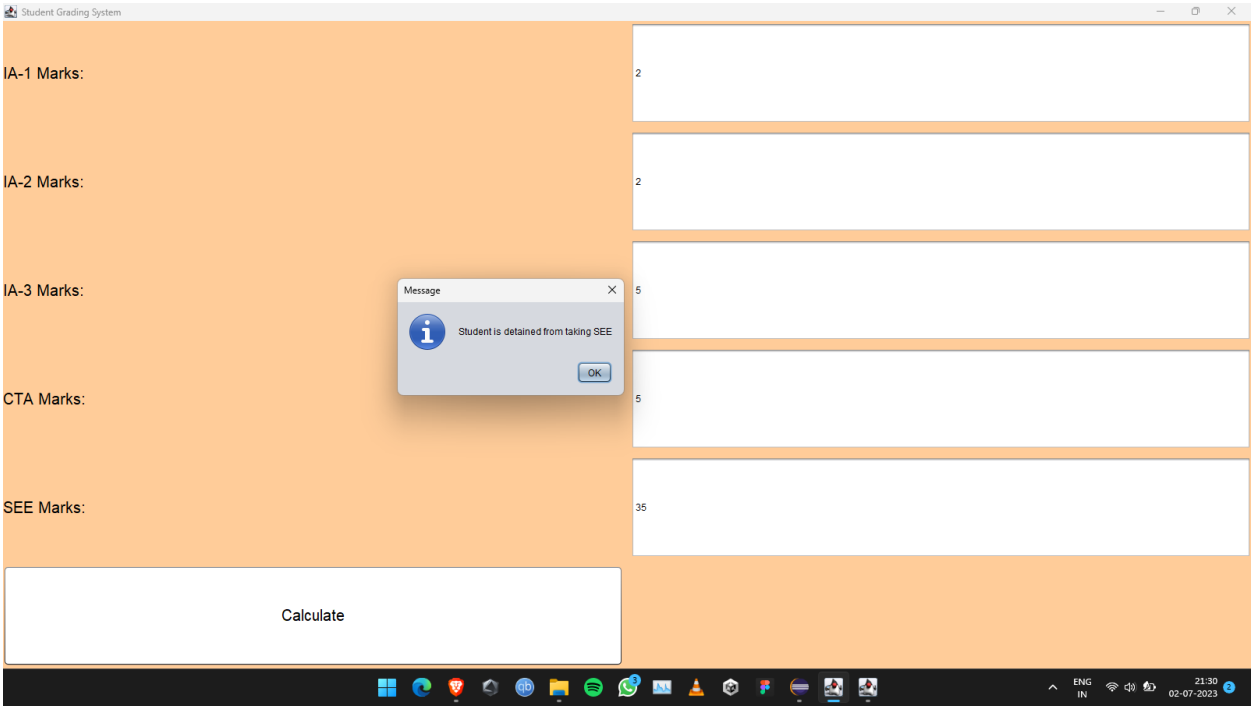
```
try {
    ia1Marks = Integer.parseInt(ia1TextField.getText());
    ia2Marks = Integer.parseInt(ia2TextField.getText());
    ia3Marks = Integer.parseInt(ia3TextField.getText());
    ctaMarks = Integer.parseInt(ctaTextField.getText());
    seeMarks = Integer.parseInt(seeTextField.getText());
} catch (NumberFormatException e) {
    throw new NumberFormatException();
}

int cie = ia1Marks + ia2Marks + ia3Marks + ctaMarks;
int see = seeMarks;

if (cie < 20) {
    JOptionPane.showMessageDialog(this, "Student is detained from taking SEE");
    return;
}

if (seeMarks == 38 || seeMarks == 39) {
    see = 40;
} else if (seeMarks < 38) {
    JOptionPane.showMessageDialog(this, "F Grade");
    return;
}

double totalMarks = (cie + see) / 2.0;
int roundedMarks = (int) Math.round(totalMarks);

String grade;
if (roundedMarks >= 90) {
    grade = "S";
} else if (roundedMarks >= 80) {
    grade = "A";
} else if (roundedMarks >= 70) {
    grade = "B";
} else if (roundedMarks >= 60) {
    grade = "C";
} else if (roundedMarks >= 50) {
    grade = "D";
} else if (roundedMarks >= 40) {
```

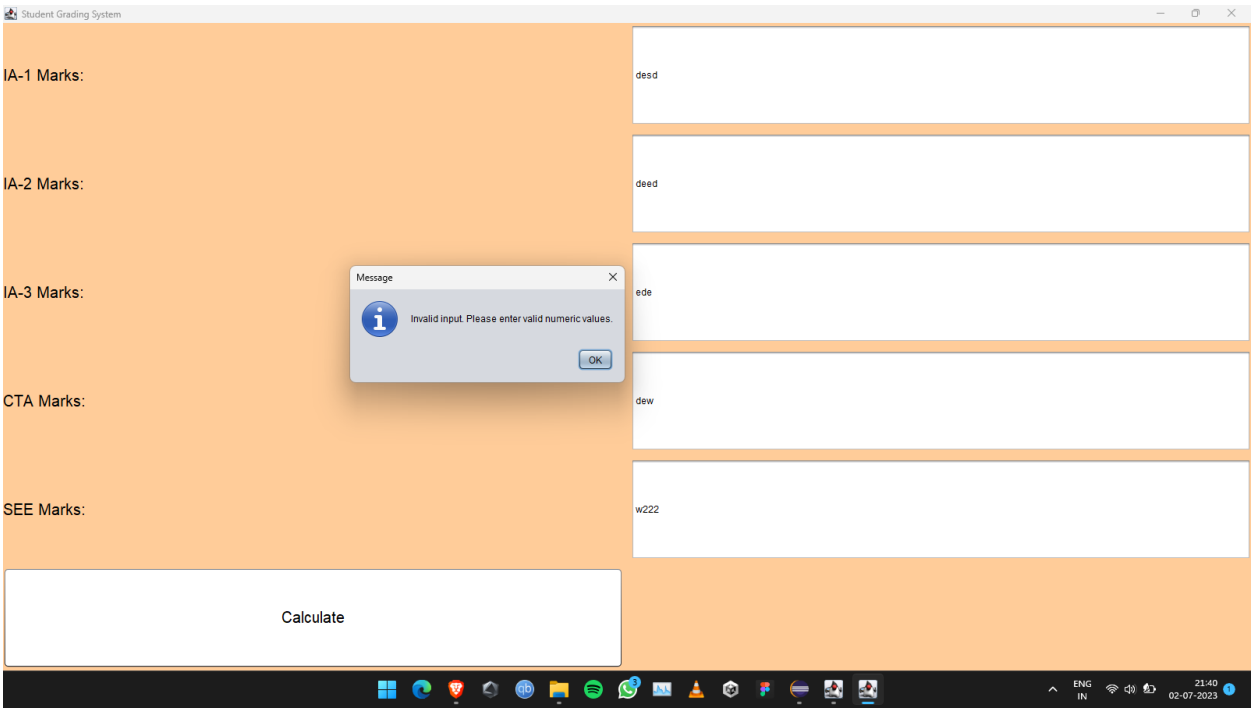
```
            grade = "E";
        } else {
            grade = "F";
        }

        JOptionPane.showMessageDialog(this, "Grade: " + grade);
    }

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

3. Screenshots of the program execution:






Student Grading System
IA-1 Marks:
2
IA-2 Marks:
2
IA-3 Marks:
5
CTA Marks:
5
SEE Marks:
35
Calculate
Message
Student is detained from taking SEE
OK
ENG
IN
21:30
02-07-2023


Student Grading System
IA-1 Marks:
desd
IA-2 Marks:
deed
IA-3 Marks:
ede
CTA Marks:
dew
SEE Marks:
w222
Calculate
Message
Invalid input. Please enter valid numeric values.
OK
ENG
IN
21:40
02-07-2023