LAB # 2

Good practices of programming

OBJECTIVE

Implementing good code practices and code optimization techniques.

Lab Task:

1. Create a design for the mark sheet by taking runtime value of student name, total marks, obtained marks and calculate its percentage, grade and GPA. Use good practices of programming that we have studied and ensure that the outcomes should be presented in a proper Viewable approach.

*MarkSheet.java *Rectangle.java

```
import java.util.Scanner;
public class MarkSheet {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Student Name: ");
        String name = sc.nextLine();
        System.out.print("Total Marks: ");
        double total = sc.nextDouble();
        System.out.print("Obtained Marks: ");
        double obtained = sc.nextDouble();
        double percentage = (obtained / total) * 100;
        String grade;
        double gpa;
        if (percentage >= 90) { grade = "A+"; gpa = 4.0; }
        else if (percentage >= 80) { grade = "A"; gpa = 3.7; }
        else if (percentage >= 70) { grade = "B"; gpa = 3.0; }
        else if (percentage >= 60) { grade = "C"; gpa = 2.0; }
        else if (percentage >= 50) { grade = "D"; gpa = 1.0; }
        else { grade = "F"; gpa = 0.0; }
        System.out.println("\n--- Marksheet ---");
        System.out.println("Name: " + name);
        System.out.println(percentage);
        System.out.println("Grade: " + grade);
        System.out.println(gpa);
        sc.close();
    }}
```

Problems Javadoc Declaration Console

```
<terminated> MarkSheet [Java Application] C:\eclipse(with jre and jdk)\jre\bin\javaw.exe (22-Oct-2025 3:4
Student Name: Suhaib Ahmed
Total Marks: 800
Obtained Marks: 650

--- Marksheet ---
Name: Suhaib Ahmed
81.25
Grade: A
3.7
```

2. Create a class Rectangle with attributes length and width, each of which defaults to 1. Provide methods that calculate the rectangle's perimeter and area. It has set and get methods for both length and width. The set methods should verify that length and width are each floating-point numbers larger than 0.0 and less than 20.0. Write a program to test class Rectangle.

Main.java

```
    }

    public void setWidth(double width) {
        if (width > 0 && width < 20)
            this.width = width;
        else
            System.out.println("Width must be >0 and <20");
    }

    public double getPerimeter() {
        return 2 * (length + width);
    }

    public double getArea() {
        return length * width;
    }
}

public class Main {
    public static void main(String[] args) {
        Rectangle r = new Rectangle();
        r.setLength(13);
        r.setWidth(9);
        System.out.println("Perimeter: " + r.getPerimeter());
        System.out.println("Area: " + r.getArea());
    }
}
```

Problems Javadoc Declaration Console

```
<terminated> Main [Java Application] C:\eclipse(with jre and jdk)\jre\bin\javaw.exe (22-Oct-2025 3:51:1
Perimeter: 44.0
Area: 117.0
```