

## LAB # 02

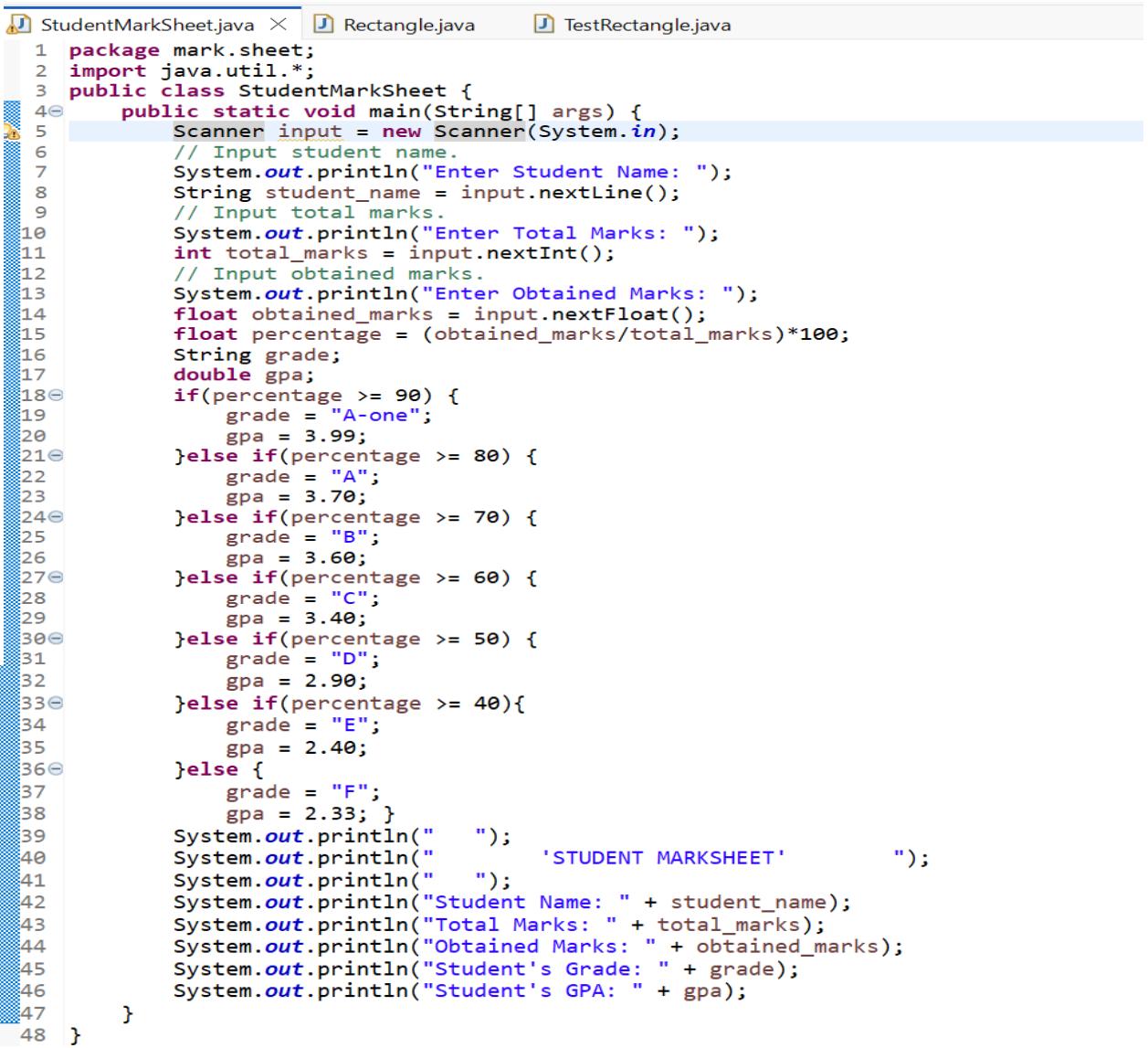
### GOOD PRACTICES OF PROGRAMMING

**OBJECT:**

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.

**CODE:**


```

1 package mark.sheet;
2 import java.util.*;
3 public class StudentMarkSheet {
4     public static void main(String[] args) {
5         Scanner input = new Scanner(System.in);
6         // Input student name.
7         System.out.println("Enter Student Name: ");
8         String student_name = input.nextLine();
9         // Input total marks.
10        System.out.println("Enter Total Marks: ");
11        int total_marks = input.nextInt();
12        // Input obtained marks.
13        System.out.println("Enter Obtained Marks: ");
14        float obtained_marks = input.nextFloat();
15        float percentage = (obtained_marks/total_marks)*100;
16        String grade;
17        double gpa;
18        if(percentage >= 90) {
19            grade = "A-one";
20            gpa = 3.99;
21        } else if(percentage >= 80) {
22            grade = "A";
23            gpa = 3.70;
24        } else if(percentage >= 70) {
25            grade = "B";
26            gpa = 3.60;
27        } else if(percentage >= 60) {
28            grade = "C";
29            gpa = 3.40;
30        } else if(percentage >= 50) {
31            grade = "D";
32            gpa = 2.90;
33        } else if(percentage >= 40){
34            grade = "E";
35            gpa = 2.40;
36        } else {
37            grade = "F";
38            gpa = 2.33; }
39        System.out.println("      ");
40        System.out.println("      'STUDENT MARKSHEET'      ");
41        System.out.println("      ");
42        System.out.println("Student Name: " + student_name);
43        System.out.println("Total Marks: " + total_marks);
44        System.out.println("Obtained Marks: " + obtained_marks);
45        System.out.println("Student's Grade: " + grade);
46        System.out.println("Student's GPA: " + gpa);
47    }
48 }

```

**OUTPUT:**

```

Problems @ Javadoc Declaration Console X Install
<terminated> StudentMarkSheet [Java Application] C:\Users\DELL.p2\poc
Enter Student Name:
Aruba Hassan
Enter Total Marks:
1000
Enter Obtained Marks:
870
|
'STUDENT MARKSHEET'

Student Name: Aruba Hassan
Total Marks: 1000
Obtained Marks: 870.0
Student's Grade: A
Student's GPA: 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.

**CODE:**Rectangle class:

```

StudentMarkSheet.java Rectangle.java TestRectangle.java
1 package rectangle.area.perimeter;
2 public class Rectangle {
3     double length;
4     double width;
5     // Default value of length and width.
6     public Rectangle() {
7         this.length = 1;
8         this.width = 1;}
9     // Parameterized Constructor.
10    public Rectangle(double length , double width) {
11        this.length = length;
12        this.width = width;}
13    // Method for perimeter of rectangle.
14    public double getPerimeter() {
15        return 2 *(length + width);}
16    // Method for area of rectangle.
17    public double getArea() {
18        return length * width;}
19    // getLength method.
20    public double getLength() {
21        return length;}
22    // getArea method.
23    public double getWidth() {
24        return width; }
25    // set length of rectangle between 0.0 to 20.0.
26    public void setLength(double length) {
27        if(length > 0.0 && length < 20.0) {
28            this.length = length;
29        }else {
30            System.out.println("Length must be greater than 0.0 and less than 20.0.");}
31    // set area of rectangle between 0.0 to 20.0.
32    public void setWidth(double width) {
33        if(width > 0.0 && width < 20.0) {
34            this.width = width;
35        }else {
36            System.out.println("Width must be greater than 0.0 and less than 20.0. ");}
37    }
38 }
39

```

TestRectangle class:

```
1 package rectangle.area.perimeter;
2 public class TestRectangle {
3     public static void main(String[] args) {
4         // object of Rectangle.
5         Rectangle rectangle = new Rectangle();
6         // Details of default rectangle.
7         System.out.println("Default Rectangle: ");
8         System.out.println("Length : " + rectangle.getLength());
9         System.out.println("Width : " + rectangle.getWidth());
10        System.out.println("Area Of Rectangle : " + rectangle.getArea());
11        System.out.println("Perimeter Of Rectangle : " + rectangle.getPerimeter());
12        System.out.println(" ");
13        // set values of length and width and update rectangle.
14        rectangle.setLength(16.9);
15        rectangle.setWidth(12.9);
16        // Details of updated rectangle.
17        System.out.println("Updated Rectangle: ");
18        System.out.println("Length : " + rectangle.getLength());
19        System.out.println("Width : " + rectangle.getWidth());
20        System.out.println("Area Of Rectangle : " + rectangle.getArea());
21        System.out.println("Perimeter Of Rectangle : " + rectangle.getPerimeter());
22    }
23 }
```

OUTPUT:

```
Problems @ Javadoc Declaration Console × ⓘ Install Java 25 Support
<terminated> TestRectangle [Java Application] C:\Users\DELL\p2\pool\plugins\org.eclipse.ju
Default Rectangle:
Length : 1.0
Width : 1.0
Area Of Rectangle : 1.0
Perimeter Of Rectangle : 4.0

Updated Rectangle:
Length : 16.9
Width : 12.9
Area Of Rectangle : 218.01
Perimeter Of Rectangle : 59.599999999999994
```