

## **LAB #2**

### **Good Practices Of Programming**

#### *Lab Tasks:*

1. Create a program that takes runtime input of a student's name, total marks, and obtained marks, then calculates and displays the percentage, grade, and GPA in a proper formatted output using good programming practices.

**Code :**

```

1. import java.util.Scanner;
2. import java.text.DecimalFormat;
3.
4. public class scdlab {
5.     public static void main(String[] args) {
6.         Scanner sc = new Scanner(System.in);
7.         DecimalFormat df = new DecimalFormat("0.00");
8.
9.         System.out.print("Student Name: ");
10.        String name = sc.nextLine();
11.
12.        System.out.print("Total Marks: ");
13.        double total = sc.nextDouble();
14.
15.        System.out.print("Obtained Marks: ");
16.        double obtained = sc.nextDouble();
17.
18.        double percentage = (obtained / total) * 100;
19.        String grade;
20.        double gpa;
21.
22.        if (percentage >= 90) { grade = "A+"; gpa = 4.0; }
23.        else if (percentage >= 80) { grade = "A"; gpa = 3.7; }
24.        else if (percentage >= 70) { grade = "B"; gpa = 3.0; }
25.        else if (percentage >= 60) { grade = "C"; gpa = 2.0; }
26.        else if (percentage >= 50) { grade = "D"; gpa = 1.0; }
27.        else { grade = "F"; gpa = 0.0; }
28.
29.        System.out.println("\n--- Marksheets ---");
30.        System.out.println("Name: " + name);
31.        System.out.println("Percentage: " + df.format(percentage) + "%");
32.        System.out.println("Grade: " + grade);
33.        System.out.println("GPA: " + df.format(gpa));
34.
35.        sc.close();
36.    }

```

**Output :**

```

Output
Student Name: Sohaib
Total Marks: 800
Obtained Marks: 660

--- Marksheets ---
Name: Sohaib
Percentage: 82.50%
Grade: A
GPA: 3.70

== Code Execution Successful ==

```

2. Create a class Rectangle having attributes length and width (default 1), with methods to calculate area and perimeter, including proper getter and setter methods that validate values between 0.0 and 20.0, and write a program to test this class.

**Code :**

```

1. class Rectangle {
2     private double length = 1;
3     private double width = 1;
4
5     public void setLength(double length) {
6         if (length > 0 && length < 20)
7             this.length = length;
8         else
9             System.out.println("Length must be >0 and <20");
10    }
11
12    public void setWidth(double width) {
13        if (width > 0 && width < 20)
14            this.width = width;
15        else
16            System.out.println("Width must be >0 and <20");
17    }
18
19    public double getPerimeter() {
20        return 2 * (length + width);
21    }
22
23    public double getArea() {
24        return length * width;
25    }
26 }
27
28 public class Main {
29     public static void main(String[] args) {
30         Rectangle r = new Rectangle();
31         r.setLength(11);
32         r.setWidth(3);
33         System.out.println("Perimeter: " + r.getPerimeter());
34         System.out.println("Area: " + r.getArea());
35     }
36 }

```

**Output:**

Output

Perimeter: 28.0

Area: 33.0

== Code Execution Successful ==

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