JAVA LAB ASSIGNMENT 1

Create a Student Record Management system that allows the user to input, display, and calculate grades for students. Implement a class-based structure using Object- Oriented Programming principles to manage student data such as roll number, name, course, marks, and grade. The program should also allow the display of student records and calculate the grade based on marks

Task 1: Student Class

- Variables: roll number, name, course, marks, grade.
- Methods:
  - inputStudent() → Takes input from user.
  - calculateGrade() → Calculates grade based on marks.
  - displayStudent() → Displays student details.

Task 2: StudentManagementSystem Class

- Stores **multiple students in a simple array**.
- Methods:
  - addStudent() → Adds a student record.
  - displayAllStudents() → Displays all students.

Task 3: Main Class

- Menu-driven program to interact with the system.

```
import java.util.Scanner;
// ======================
// Task 1: Student Class
// ======================
class Student {
   String rollNo;
   String name;
   String course;
   double marks;
   String grade;

   Scanner sc = new Scanner(System.in);

   // Method to input student details
   public void inputStudent() {
```

```
        System.out.print("Enter Roll Number: ");
        rollNo = sc.nextLine();

        System.out.print("Enter Name: ");
        name = sc.nextLine();

        System.out.print("Enter Course: ");
        course = sc.nextLine();

        System.out.print("Enter Marks: ");
        marks = sc.nextDouble();
        sc.nextLine(); // Consume newline

        calculateGrade(); // Calculate grade after marks are entered
    }

    // Method to calculate grade based on marks
    public void calculateGrade() {
        if (marks >= 90) grade = "A+";
        else if (marks >= 80) grade = "A";
        else if (marks >= 70) grade = "B";
        else if (marks >= 60) grade = "C";
        else if (marks >= 50) grade = "D";
        else grade = "F";
    }

    // Method to display student details
    public void displayStudent() {
        System.out.println("Roll No: " + rollNo);
        System.out.println("Name: " + name);
        System.out.println("Course: " + course);
        System.out.println("Marks: " + marks);
        System.out.println("Grade: " + grade);
        System.out.println("----------------------------------");
    }
}

// ========================================
```

```
// Task 2: Student Management System Class
// ======================================
class StudentManagementSystem {
    Student[] students;  // Simple array to store students
    int studentCount;
    Scanner sc = new Scanner(System.in);

    public void initializeSystem(int size) {
        students = new Student[size];
        studentCount = 0;
    }

    // Method to add new student
    public void addStudent() {
        if (studentCount >= students.length) {
            System.out.println("Cannot add more students. Array is full!");
            return;
        }
        Student s = new Student();
        s.inputStudent();
        students[studentCount] = s;
        studentCount++;
        System.out.println("Student added successfully!\n");
    }

    // Method to display all student records
    public void displayAllStudents() {
        if (studentCount == 0) {
            System.out.println("No student records available!\n");
            return;
        }
        System.out.println("======= Student Records =======");
        for (int i = 0; i < studentCount; i++) {
            students[i].displayStudent();
        }
    }
}
```

```
// ==========================
// Task 3: Main Driver Class
// ==========================
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        StudentManagementSystem sms = new StudentManagementSystem();

        System.out.print("Enter the maximum number of students: ");
        int size = sc.nextInt();
        sc.nextLine(); // Consume newline
        sms.initializeSystem(size);

        int choice;
        do {
            System.out.println("\n===== Student Record Management System =====");
            System.out.println("1. Add Student");
            System.out.println("2. Display All Students");
            System.out.println("3. Exit");
            System.out.print("Enter your choice: ");
            choice = sc.nextInt();
            sc.nextLine(); // Consume newline

            switch (choice) {
                case 1:
                    sms.addStudent();
                    break;
                case 2:
                    sms.displayAllStudents();
                    break;
                case 3:
                    System.out.println("Exiting the program. Goodbye!");
                    break;
                default:
                    System.out.println("Invalid choice! Please try again.");
            }
        } while (choice != 3);
```

```
        sc.close();
    }
}
```