Java Program: Student Grades Management

Problem Description:

- Build a Java program to input and manage student grades.
- Calculate average, highest, and lowest scores.
- Use arrays or ArrayLists to store and manage data.
- Display a summary report of all students.
- Make the interface console-based or GUI-based as desired.

Java Code:

```
import java.util.ArrayList;
import java.util.Scanner;

class Student {
    String name;
    double grade;

    Student(String name, double grade) {
        this.name = name;
        this.grade = grade;
    }
}

public class StudentGradeManager {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        ArrayList<Student> students = new ArrayList<>();

        System.out.println("Enter number of students:");
        int n = scanner.nextInt();
        scanner.nextLine();  // consume leftover newline

        for (int i = 0; i < n; i++) {
            System.out.printf("Enter name of student %d: ", i + 1);
            String name = scanner.nextLine();

            System.out.printf("Enter grade of %s: ", name);
            double grade = scanner.nextDouble();
            scanner.nextLine(); // consume leftover newline

            students.add(new Student(name, grade));
        }

        if (students.isEmpty()) {
            System.out.println("No student data entered.");
            scanner.close();
            return;
```

```
        }

        double sum = 0, highest = students.get(0).grade, lowest = students.get(0).grade;
        String highestStudent = students.get(0).name;
        String lowestStudent = students.get(0).name;

        for (Student s : students) {
            sum += s.grade;
            if (s.grade > highest) {
                highest = s.grade;
                highestStudent = s.name;
            }
            if (s.grade < lowest) {
                lowest = s.grade;
                lowestStudent = s.name;
            }
        }

        double average = sum / students.size();

        System.out.println("\n--- Student Grades Summary Report ---");
        for (Student s : students) {
            System.out.printf("%s: %.2f%n", s.name, s.grade);
        }
        System.out.printf("Average grade: %.2f%n", average);
        System.out.printf("Highest grade: %.2f (by %s)%n", highest, highestStudent);
        System.out.printf("Lowest grade: %.2f (by %s)%n", lowest, lowestStudent);

        scanner.close();
    }
}
```

Sample Output:

```
Enter number of students:
3
Enter name of student 1: Alice
Enter grade of Alice: 85
Enter name of student 2: Bob
Enter grade of Bob: 92
Enter name of student 3: Charlie
Enter grade of Charlie: 78

--- Student Grades Summary Report ---
Alice: 85.00
Bob: 92.00
Charlie: 78.00
Average grade: 85.00
Highest grade: 92.00 (by Bob)
Lowest grade: 78.00 (by Charlie)
```