University of Lincoln
School of Computer Science
CMP9133M – Advanced Programming
Workshop 3

Task (assessed):
This task will help you practice working with arrays, variables, built-in data types, and control structures in C++. Moreover, it assesses the definition of a class, object instantiation, and how to manage data using objects.

Problem Statement

You are tasked with writing a C++ program to analyse the scores of a class of students. Your program should define a `Student` class to store individual student scores and then calculate and display various statistics based on the provided scores.

Instructions

1. Define a class named `Student` with the following attributes:
    - An integer variable named `score` to store the student's score.
    - A constructor that takes an integer parameter and initializes the `score` attribute.
2. In the `main()` function:
    - Declare an array of `Student` objects named `students` with a size of 10.
    - Use a loop to input scores from the user for each student and create `Student` objects using the provided scores.
3. Calculate and display the following statistics:
    - The total number of students in the class.
    - The average score of the students.
    - The highest score achieved by a student.
    - The lowest score achieved by a student.
    - The number of students who scored above the average.
    - The number of students who scored below the average.
4. Display the calculated information in the following format:

```
Total students: [total_students]
Average score: [average_score]
Highest score: [highest_score]
Lowest score: [lowest_score]
Students above average: [students_above_average]
Students below average: [students_below_average]
```

Note: You should use appropriate control structures (loops, conditionals) and class methods to implement the required functionality.

Test case:
Input:

```
Enter scores of 10 students:
Enter score for student 1: 85
Enter score for student 2: 90
Enter score for student 3: 78
Enter score for student 4: 92
Enter score for student 5: 88
Enter score for student 6: 72
Enter score for student 7: 95
Enter score for student 8: 80
Enter score for student 9: 87
Enter score for student 10: 91
```

Output:

```
Total students: 10
Average score: 85.8
Highest score: 95
Lowest score: 72
Students above average: 6
Students below average: 4
```