Data Structures and Algorithms Lab

Lab 01 **Marks 10**

Instructions

- Work in this lab individually.
- You can use your books, notes, handouts etc. but you are not allowed to borrow anything from your peer student.
- Make sure to follow the best coding practices.
- Include comments to explain the logic where necessary.
- Test your program thoroughly with various inputs to ensure proper functionality and error handling.
- Show your work to the instructor before leaving the lab to get some or full credit.

Task 01

Write a program that:

1. Creates a file named **student.txt**. If the file creation fails, display an error message.
2. Prompts the user to enter student records containing the following information:
    - Roll number (stop when user enters **-999**)
    - First name
    - Last name
    - Marks (should be within a valid range, e.g., 0-100)
3. The data should be stored in the file **student.txt**, with each record on a new line, and fields separated by a space.
4. After entering **-999** as the roll number, the program should display a message indicating the process is complete.

Task 02

Write a program that:

1. **Opens the file** created in Task 01 (**student.txt**).
2. **Reads all the student records** from the file.
3. **Displays the records** in the following format:

Roll No.	Name	Marks
1	Ali Imran	75
2	Asif Ali	87
3	Naveed Aslam	56
4	Shahid Farid	100
5	Hassan Khan	98

- Ensure the **name** consists of both the **first** and **last names** of the student.

Task 03

Write a program that:

1. **Reads the input** from a file named **input.txt** (provided in the lab folder).
2. **Input Format**: Each line in the file contains:
    - A student's roll number.
    - Ten quiz scores (whole numbers), separated by a single space.
3. **Output**: For each student, the program will:
    - Display the roll number and the ten quiz scores as they appear in the file.
    - Append an additional number at the end of the line, which is the **range** of the scores (the difference between the highest and the lowest scores).
4. **Output Display**: The result is printed to the console, showing both the original data and the **range** of the quiz scores.

Sample Input	Sample Output
101 2 1 4 5 3 0 6 4 7 9	**101** 2 1 4 5 3 0 6 4 7 9 **9**
104 4 3 2 8 7 3 6 7 4 10	**104** 4 3 2 8 7 3 6 7 4 10 **8**
103 9 8 6 5 9 5 8 7 4 6	**103** 9 8 6 5 9 5 8 7 4 6 **5**