CS619 Advanced Data Structures and Algorithms Laboratory
Autumn 2024
Assignment 8
Maximum marks: 10

Objective

The objective of this assignment is to implement the dynamic programming algorithm we learned for finding longest common subsequence.

Input

Your program should accept a command-line argument which is an input file path. The input file contains just one line which is a string composed of the characters ‘a’, ‘b’, ‘c’, ‘d’.

Tasks

Let the string in the input file be S.

1. Write string S to the output file “output.txt” (as the first line) **(0.5 marks)**
2. Reverse the string S to get the string R. Write R to output.txt (as the second line) **(0.5 marks)**
3. Implement the dynamic programming algorithm that we learned in the class to find the length of a longest common subsequence of S and R. Write the value to the file output.txt (as the third line). Let this length be p. **(4 marks)**
4. Find how many different common subsequences (of S and R) are there with length p. Write this value to output.txt (as fourth line). **(1.5 marks)**
5. Find all distinct longest common subsequences of S and R. Write all of them into output.txt, one per line (from fifth line onward). **(2.5 marks)**
6. Create a file <Roll-no>.txt which contains the following details. Replace <Roll-no> with your roll number. (**1 mark**)
    a. Commands to compile and run your code.
    b. List of tasks that you completed.
    c. List of tasks that are partially completed - clearly explain in which cases your code will work and in which cases your code will not work.
    d. Any other comments that you have for the evaluators.

Some sample inputs and outputs are given.

Evaluation

The maximum marks for this assignment is 10. There will be a 5% penalty if you are not accepting input file as command-line argument. There will be 5% penalty if the output file format is not proper. A plagiarism test will be conducted after the deadline and if found guilty a “-10” mark will be awarded to the corresponding students and may be forwarded to the disciplinary action committee in grave cases.

Submission:

Your program must be submitted through moodle. The deadline is 6.00 pm on 12th November.