CSC 323 Algorithm Design and Analysis, Fall 2018
Instructor: Dr. Natarajan Meghanathan

Project 6: Dynamic Programming-based Solution for the Longest Common Subsequence Problem

Due: November 1, 2018: by 11.30 AM (in Canvas)

In this project, you will implement the dynamic programming-based solution to find the longest common subsequence (LCS) of two sequences.

Your inputs will be the two sequences (as Strings) and the outputs are the longest common subsequence (printed as a String) and the final matrix (printed as a two-dimensional array) depicting the length of the longest common subsequences (as shown in the slides) for all possible subsequences of the two input sequences.

The two input sequences to be used by each student are shown below. The LCS expected for the two sequences is also shown.

Student Name	Row Sequence	Column Sequence	LCS
Clark, Lavaskie	TCGCCTT	GGGGTAACT	TCT
Epps, Justin	TAAAATCTAG	CTTGGATC	TATC
Harris, James	GTGTGGAAAC	GCTTCTTTCT	GTTC
Hester, Larriel	AGGACGGTGAA	AATTTTTA	AATA
Hopson, Shanice	CGGCCAGGCGAT	CGAGGTAAGTAG	CGAGGGA
Jackson, Martice	GCTATTAT	ATAGAAATC	GAAT
Jones, Demarius	TTCTGATGTT	TCGGGAT	TCGAT
Kang, Ning	CAGATGTATCTG	GAGACAGGAT	CAGGAT
Kirk, Damon	CTCAGGT	GTGAGGGGGA	TAGG
Manuel, Jackie	GATTGCACTA	GTAGCAGT	GAGCAT
McIntosh, Blair	GCTAAGC	AGTGCCG	GTGC
Sheffey, Varlin	ATCACC	GCTCGATCTGCA	TCACC
Simmons, Jetnya	TTTTAATCCAGC	TGCAGAGAACTA	TAATA
Thomas, Eriana	GAGTAAG	GCGACG	GGAG
Walker, Brandon	CCCCTATAGT	CTGACG	CTAG
Wynn, Marcus	AGAGGC	CAATCGCAACGC	AGAGC
Zimmerman, Taba	TATCAA	TGGACTCCGCAC	TATCA

A sample output is shown below.

```
Row Sequence: ATTAGTGTCGA
Column Sequence: ATGCGGGG
0 0 0 0 0 0 0 0 0 0
0 1 1 1 1 1 1 1 1 1
0 1 2 2 2 2 2 2 2 2
0 1 2 2 2 2 2 2 2 2
0 1 2 2 2 2 2 2 2 2
0 1 2 3 3 3 3 3 3 3
0 1 2 3 3 3 3 3 3 3
0 1 2 3 3 4 4 4 4 4
0 1 2 3 3 4 4 4 4 4
0 1 2 3 4 4 4 4 4 5
0 1 2 3 4 5 5 5 5 5
0 1 2 3 4 5 5 5 5 5
LCS: ATGGC
```

Submission (through Canvas):

A word document containing the following:
(i) entire code
(ii) the outputs showing the final dynamic programming table (of the lengths of the longest common subsequences of all possible subsequences of the two input strings) and the longest common subsequence
(iii) the final alignment (determined manually by working out the alignment based on the table printed in ii, and typed in the word document) of the two input strings and the gaps (-) that need to be introduced in order to facilitate an alignment that matches with the LCS obtained.