

CSC 323 Algorithm Design and Analysis
Fall 2017
Instructor: Dr. Natarajan Meghanathan

Project 7: Dynamic Programming-based Solution for the Longest Common Subsequence Problem

Due: Nov. 14, 2017: 11.30 AM

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
Armon Clark	TCGCCTT	GGGGTAACT	TCT
Daniel Epps	TAAAATCTAG	CTTGGATC	TATC
Allee Gammons	GTGTGGAAAC	GCTTCTTTCT	GTTC
Menlik Getachew	AGGACGGTGAA	AATTTTTA	AATA
Taylor Hasty	CGGCCAGGCGAT	CGAGGTAAGTAG	CGAGGGA
Derrick Jackson	GCTATTAT	ATAGAAATC	GAAT
Devario Lewis	TTCTGATGTT	TCGGGAT	TCGAT
Jai-Michael McMillian	CAGATGTATCTG	GAGACAGGAT	CAGGAT
Nahu Merawi	CTCAGGT	GTGAGGGGGA	TAGG
Taj Nelson	GATTGCACTA	GTAGCAGT	GAGCAT
Patricia Perry	GCTAAGC	AGTGCCG	GTGC
Daniel Powell	ATCACC	GCTCGATCTGCA	TCACC
Aiyanna Price	TTTTAATCCAGC	TGCAGAGAACTA	TAATA
Allaysia Roberts	GAGTAAG	GCGACG	GGAG
Dreshon Sanders	CCCCTATAGT	CTGACG	CTAG
Miracle Williams	AGAGGC	CAATCGCAACGC	AGAGC
Michael Wilson	TATCAA	TGGACTCCGCAC	TATCA

A sample output is shown below.

```

Row Sequence: ATTAGTGTGCA
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)
- (iii) the final alignment (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.