

**Due Date:** Nov 26, 2022

For this assignment, you will implement

- a) Longest Common Subsequence Dynamic Programming approach with b and c arrays (LCS\_DP\_CB(X,Y)) (Page 394 from textbook)

Detailed requirements:

- Write a program for the LCS algorithm in **LCS\_DP\_CB.py** (or another extension if the code is in a language other than python). **Code may be implemented in any programming language.**
- LCS\_DP\_CB.py** does the following:
  - Reads a file **LCS1.txt** with two strings in each line and uses them as X and Y input variables for a function **LCS\_DP\_CB(X,Y)**. **You should not hard code the input strings in the program because the TAs will test for different strings by replacing the contents of your LCS1.txt.**
  - LCS\_DP\_CB(X,Y)** function
    - implements the dynamic programming version of LCS-LENGTH(X,Y) include on page 394 in your text book (with some additional print statements)
    - populates arrays b and c
    - stores  $\backslash$ ,  $\wedge$ ,  $<$  in array c instead of diagonal up arrow, up arrow, and left arrow.
    - and produces output with corresponding b[i][j] c[i][j] **side by side** as shown below for all pairs of strings in **LCS1.txt**
      - X = "Diagonal" Y = "Dragon"

			1	2	3	4	5	6
		Y	D	r	a	g	o	n
X		0	0	0	0	0	0	0
1 D		0	\	1	<	1	<	1
2 i		0	^	1	^	1	^	1
3 a		0	^	1	^	1	\	2
4 g		0	^	1	^	1	^	2
5 o		0	^	1	^	1	^	2
6 n		0	^	1	^	1	^	2
7 a		0	^	1	^	1	\	2
8 l		0	^	1	^	1	^	2

Length of the Longest Common Subsequence is: 5

The Longest Common Subsequence of "Diagonal" and "Dragon" is "Dagon"

- X = "NOAH" Y = "BOAT"

			1	2	3	4
		Y	B	O	A	T
X		0	0	0	0	0
1 N		0	^	0	^	0
2 O		0	^	0	\	1
3 A		0	^	0	^	1
4 H		0	^	0	^	1

Length of the Longest Common Subsequence is: 2

The Longest Common Subsequence of "NOAH" and "BOAT" is "OA"

- X = "FARAH" Y = "FaaaRAH"

		1	2	3	4	5	6	7
	Y	F	a	a	a	R	A	h
X\		0	0	0	0	0	0	0
1 F\		0 \ 1 < 1 < 1 < 1 < 1 < 1 < 1						
2 A\		0 ^ 1 ^ 1 ^ 1 ^ 1 ^ 1 ^ 1 \ 2 < 2						
3 R\		0 ^ 1 ^ 1 ^ 1 ^ 1 ^ 1 \ 2 ^ 2 ^ 2						
4 A\		0 ^ 1 ^ 1 ^ 1 ^ 1 ^ 1 ^ 2 \ 3 < 3						
5 H\		0 ^ 1 ^ 1 ^ 1 ^ 1 ^ 1 ^ 2 ^ 3 ^ 3						

Length of the Longest Common Subsequence is: 3

- The Longest Common Subsequence of "FARAH" and "FaaaRAh" is "FRA"

- X="PARAMETER" Y="MeTeR"

		1	2	3	4	5
	Y	M	e	T	e	R
X\		0	0	0	0	0
1 P\		0 ^ 0 ^ 0 ^ 0 ^ 0 ^ 0 ^ 0				
2 A\		0 ^ 0 ^ 0 ^ 0 ^ 0 ^ 0 ^ 0				
3 R\		0 ^ 0 ^ 0 ^ 0 ^ 0 ^ 0 \ 1				
4 A\		0 ^ 0 ^ 0 ^ 0 ^ 0 ^ 0 ^ 1				
5 M\		0 \ 1 < 1 < 1 < 1 < 1 ^ 1				
6 E\		0 ^ 1 ^ 1 ^ 1 ^ 1 ^ 1 ^ 1				
7 T\		0 ^ 1 ^ 1 \ 2 < 2 < 2				
8 E\		0 ^ 1 ^ 1 ^ 2 ^ 2 ^ 2				
9 R\		0 ^ 1 ^ 1 ^ 2 ^ 2 \ 3				

Length of the Longest Common Subsequence is: 3

- The Longest Common Subsequence of "PARAMETER" and "MeTeR" is "MTR"

- Ensure that your code is readable (indented/commented).
- Ensure that the output looks exactly as shown here. If the output (including all dashes "---" or bars "|" don't match, you will get a zero)
- All incidents will result in a zero and student (students) found cheating will be reported to the department. The department may choose to remove the student(s) from their current program at UTA
- Submit a README file that explains how to run the code including any environment dependency (language versions), Make Sure TA can run your code. TAs may ask you to demo your project. **The student who is not present for the demo will receive a zero.**
- **Project will be completed by and submitted by groups of two students.** Only 1 student will submit the assignment, but both will be present for the demo.
- All files need to be zipped in a zip file before submission that is named as follows:
  - CSE5311-Sectionno-P2- **LANG**-1000XXXXX-1000YYYYY
  - LANG is replaced by Python, Java, C, etc based on the programming language used
    - for e.g., CSE5311-02-P2-**Python**-1000XXXXX-1000YYYYY
  - If **Section no is 1 or 2 or 8** and the Student ids of the two students are 1000XXXXX and 1000YYYYY, the zip file will be named as shown here:
    - CSE5311-01-P2-LANG-1000XXXXX-1000YYYYY
    - CSE5311-02-P2- LANG-1000XXXXX-1000YYYYY
    - CSE5311-08-P2- LANG-1000XXXXX-1000YYYYY
- Zip file CSE5311-Sectionno-P2- LANG-1000XXXXX-1000YYYYY will contain the following:
  - 1 file for the code
  - 1 Read me file
  - 1 Report
- Your **report documents** the following:
  - List any sites/sources referred
  - Time complexity of the algorithm
  - List the results of executing **LCS\_DP\_CB.py** with strings in **LCS1.txt** used as X and Y parameters in the format shown above.
  - Report of 1-2 pages should be enough.

- Honor code (stated in red in this document)
- Implement your code yourself without copying from anywhere
- **The code will be tested for plagiarism. Any plagiarism will result in zero for all students involved.**

**Some rules to follow:**

1. The project is to be completed in a group of two students from the same section.
2. Include both names and IDs in your document along with a description of **what each member did**.
3. **Handwrite, sign, and date (with date of submission)** a copy of the Honor Code (shown below) and share the image as part of your project; a handwritten, signed, and dated (with the date of submission) copy of the Honor Code must be included with every project and exam submission. **(Failing to include will cost 20 points)**
4. Students are required to NOT share their solutions to the project even after the semester is over or even after graduation. However, they can show their projects during their interviews. They are also required to not discuss the solution with others or use anyone else's solution. Any violation of the policy will result in a 0 for this project for all students concerned.

**HONOR CODE**

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or that I contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code

I will not participate in any form of cheating/sharing the questions/solutions.

**Contents of LCS1.txt:**

Diagonal,Dragon  
NOAH,BOAT  
FARAH,FaaaRAh  
PARAMETER,MeTeR