

CSCI 230 -- PA 8

Tries and Dynamic Programming

Feel free to discuss and help each other out but does not imply that you can give away your code or your answers! Make sure to read all instructions before attempting this lab.

You can work with a lab partner and each one must submit the same PDF file (include both names in the submission file). Each person must include a brief statement about your contribution to this assignment.

You must use an appropriate provided template from Canvas and output "Author: Your Name(s)" for all your programs. If you are modifying an existing program, use "Modified by: Your Name(s)".

Exercise 1: Implement the MCP algorithm and print out resulting table as well as the minimum number of operations. Try $B \times C \times D$ with B a 2×10 matrix, C a 10×50 matrix, and D a 50×20 matrix. Try another test case with 10×5 (A), 5×2 (B), 2×20 (C), 20×12 (D), 12×4 (E), and 4×60 (F).

Exercise 2: Implement a standard trie for a set of ASCII strings including a terminating character $\$$ for each word. You might want to look at the trie in zyBook. Create a class that has a constructor that accepts the name of an input file as a parameter (a string), and the class should have an operation that test whether a given string is stored in the trie. The driver should allow user to specify the input data file, output number of words in the trie, and then use a y/n loop to check for a few words (try the following words: honor, honour, government, computer). Output yes or no for each search word. Use the text file *usdeclarPC.txt* as an input file and you should format the words to lowercase and remove extra characters like comma, periods, etc.

Question 1: Explain the main difference between standard tries and compressed tries. How much space is saved from standard tries to compressed tries?

Question 2: Trace the LCS algorithm in the book and construct the L table for $X = \text{"GTCCTA"}$ and $Y = \text{"CGATA"}$. What is the longest common sub-sequence of the two strings?

Extra Credit: Modify exercise 1 to include parentheses to indicate the order of evaluation. For example, it would print either $(A * (B * C))$ or $((A * B) * C)$ for the first test case.

Fill out and turn in the PA submission file for this assignment (save as PDF format).