CSCI 332, Fall 2025
Homework 8

Due Monday, November 3 Anywhere on Earth (6am Tuesday)

Submission Requirements

- Type or clearly hand-write your solutions into a PDF format so that they are legible and professional. Submit your PDF on Gradescope.
- Do not submit your first draft. Type or clearly re-write your solutions for your final submission. If your submission is not legible, we will ask you to resubmit.
- Use Gradescope to assign problems to the correct page(s) in your solution. If you do not do this correctly, we will ask you to resubmit.

Academic Integrity

Remember, you may access ***any*** resource in preparing your solution to the homework. However, you ***must***

- write your solutions in your own words, and
- credit every resource you use (for example: "Bob Smith helped me on this problem. He took this course at UM in Fall 2020"; "I found a solution to a problem similar to this one in the lecture notes for a different course, found at this link: www.profzeno.com/agreatclass/lecture10"; "I asked ChatGPT how to solve part (c)"; "I put my solution for part (c) into ChatGPT to check that it was correct and it caught a missing case.") If you use the provided LaTeX template, you can use the `sources` environment for this. Ask if you need help!

This written homework will extend on the PrairieLearn assignment's final problem:

You are given a sequence of digits $A[1..n]$ where each digit is between 1 and 9 (inclusive). You are asked to insert + signs in between the digits to partition them into terms which will be added together. The length of each term in the summation must be either 1 or 2 digits.

What is the maximum sum that can be achieved under these constraints?

For example, if $A = [1, 9, 1, 2]$, the maximum sum is $1 + 91 + 2 = 94$.

1. (0.5 point) The PrairieLearn assignment asked you to write a viable subproblem definition that can be used to solve this problem. Copy your subproblem definition here.

2. (0.5 point) Write a recursive definition for your subproblem. Make sure to include base case(s) as needed!

3. (0.5 point) Describe how you will memoize your recursive solution. What data structure will you use and in what order will you fill it?

4. (1.5 points) Write pseudocode for a dynamic programming algorithm that uses your subproblem definition to solve the problem.

5. (1.5 points) Implement your pseudocode in the programming language of your choice and use your implementation to verify that your algorithm is correct. This means that you should run your code on a few examples. Copy your code and the output on your examples here.

6. (0.5 point) What outside resources did you use to help with this assignment?