CS 214: Introduction to computing systems
Winter Term, 2026

Homework 5

Due: Tuesday 2/10 at 11:59pm

Complete the following problems. Submit the first either on euclid using handin (as assignment hwk5) or Google Classroom. Submit the second using Google Classroom as a text file, PDF, or Google Doc, with the file name(s) based on your name or username.

1. (12 points) Complete Lab 5 to that the program is able to run your submission for HW 3 (recursively computing Catalan numbers). You don't need to implement other features (like the system calls for things other than integers or instructions that you don't use in HW 3). The simulator should include 2 different options for caching. Both are direct mapped. One should support 64 lines with one word per line and the other should support 32 lines with 2 words per line. (Same total size of cache.) It's ok if switching between these requires changes to the code, but include directions for how to do so. (Changing a variable, commenting out one version of a function and replacing it with the other, etc.) Both versions should print the total number of memory operations (loads and stores), along with the number that resulted in cache hits.

2. (a) (4 points) Describe how you created the code; which AI did you use, what changes were needed in the code (type and general description rather than an exhaustive list), and did you collaborate with anyone other than your chosen AI system? (Be sure to include a collaboration statement even if you didn't work with anyone else.)

   (b) (4 points) Run your simulator on your HW 3 submission to compute C_4 with each cache configuration. Report the cache statistics for both versions and discuss them. (How does the performance of the two configurations differ? How do you explain the differences?)

   (c) (4 points) What lessons (if any) did you learn for working with the AI?