

CS3000: Algorithms & Data — Summer 2025 — Laney Strange

APP 6

Due: June 3rd @ 11:30am via [Gradescope](#)

Name:

- APPs will be assigned towards the end of roughly two lectures each week. You'll put together a solution to a short problem that we'll all use in the following lecture. We'll have time set aside to do these in class, or you can work on your own.
- You may handwrite your solutions, or typeset them in \LaTeX or another system.
- APPs will be graded on completeness. They must be submitted by 11:30am (just before lecture) on the due date. They will not be accepted late, but we drop 3 of them (out of 8 total).
- Collaboration is strongly encouraged for APPs!

Problem 1.

- (a) Given the follow alphabet and frequencies, use Huffman's algorithm to construct an optimal prefix-free code. Draw a resulting tree.

letter	a	g	h	i	l	m	o	r	t
frequency	12	6	10	17	7	13	24	2	9

Solution:

- (b) In total, there are 100 characters in the file, so if we used 8 bits (one byte) to represent each character, we'd end up needing 800 bits total. How many bits would we need using Huffman instead?

Solution: