

# Project overview

*17 November 2023*

This document lays out the general structure of the final project, what you'll have to do, and how it will be graded.

## Research

A big part of what you're doing in this project is learning about a data structure or algorithm on your own. Many of the topics have at least partial coverage in the textbook, and they all have relevant Wikipedia pages, but you really need to look beyond those sources to help you understand how your data structure or algorithm works.

Note that it's not against the rules to look at code, even C++ code, as part of learning how your data structure/algorithm works, although see below under Implementation.

## Implementation

We'll talk on Tuesday about just what I expect you to implement for the project. Whatever we decide, you'll work on it together with your partner and document it together; both/all partners need to participate substantially in the implementation, but the work does not have to be a 50-50 split. One of you will submit it electronically as `proj` by the start of class on the 1st (the last day of class). Extensions to this are negotiable but *only if you speak to me in advance*, due to exam timing.

As you do your research, you'll find existing implementations, including some in C++, of your assigned data structure or algorithm. Any that you spend significant time reading (including those in other languages or in pseudocode) should probably be cited in a comment, although whether you cite your code as "inspired by" or "patterned after" or "adapted from" the other algorithm, or whether you use some other citation, will depend on just how you're using it.

## Presentation

Your presentation should be about 12 minutes (or 18 for a group of three), and will teach the rest of the class about the data structure or algorithm you were assigned, including

- Accurate example diagrams
- Pseudocode and tracing (using the example(s))
- Demonstration of either correctness or efficiency

You'll be able to use the whiteboard, the projector, or both.

## Scoring

The implementation is worth 15 points in the Lab grade (i.e. it counts as a lab and a half), which amounts to roughly 5.5% of the final course grade.

The presentation will be scored on a 30-point rubric and is worth 10% of the final course grade.

I will normally assign both/all partners the same grade, but I may make adjustments if circumstances warrant.

## Possible topics

You'll be working in a group of two or three. These are the possible topics that groups will be presenting.

Hashtable linear probing	AVL trees
Circular arrays (as queue/deque impl)	234 trees
Splay trees	Red-black trees
Heapsort	Treaps
Shellsort	Leftist heaps

**By Sunday night**, you should Slack me with any preferences you have about this: tell me if you want to work with someone in particular, if you *don't* want to work with someone, or if there's one of those topics that you do or don't want to be working on. I can't promise that I will meet all of your preferences, but I'll take them into account (and keep them confidential).