

---

## Final Project

Due Date/Time	Deliverable
Apr. 11 6pm	Project Proposal
Apr. 20 6pm	Implementation Demo
Apr. 23-27	Class Presentation
Apr. 30 6pm	Complete Submission

Solutions should be submitted in PDF form using L<sup>A</sup>T<sub>E</sub>X.

---

In your CS271 Final Project, you will, in teams of 2 or 3, perform a detailed investigation of a data structure and/or algorithmic technique of your choosing. As in our hash table assignment, I want to really encourage you and your team to engage and to think creatively. Understanding and mastering a data structure or algorithmic technique generally takes equal parts of conceptual understanding and the practical understanding that comes from an implementation. That is why, for this project, you are expected to learn about the data structure, implement the data structure, evaluate and assess the data structure in some application context, and to teach your fellow students about the data structure.

### Deliverables

1. **Proposal:** You should perform a preliminary investigation of possible project topics and then generate a two page document offering a proposal of your topic. The proposal should include a very high level description of the topic area as well as give concrete plans for an implementation, a way to put the data structure in a context and evaluate its performance, what other data structures or C++ or implementation techniques will be needed to carry out your investigation. Be sure and include testing strategies and performance metrics you will be measuring.
2. **Implementation Demo:** After building an implementation of your data structure and after supplying sufficient infrastructure to drive that implementation (either a test harness or some application-specific input data to drive the implementation through its paces), you will demonstrate your implementation to the instructor and to others in the class. This need not be at the point of gathering performance evaluation results, but must demonstrate a bug free implementation of the data structure itself.
3. **Class Presentation:** Your team will present the data structure to class, conveying both a conceptual understanding of the data structure as well as some level of practical understanding via simplified example. You may also choose to present performance results and/or analysis of the complexity of the data structure. Each team will, at presentation time, give me at least three possible test questions that the rest of the class should be able to answer regarding your data structure.

4. **Submission:** Your team will present a report documenting your investigation and giving both qualitative and quantitative results.

### Possible Topics

- Fibonacci Heaps
- B-trees
- van Emde Boas Trees
- Bloom Filters
- Huffman Trees/Huffman Coding/Adaptive Huffman Coding
- Quadtree/Octtree
- Disjoint Sets
- Ternary Trees
- Splay Trees
- Tries
- Alternative Graph Structures (beyond adjacency lists from 275)