

15-453 COURSE PROJECT

The primary goal of this project is to give you an idea of what it feels like to do research in theoretical computer science. You are expected to obtain an in-depth understanding of a specific topic, and be able to hold educated conversations with experts in the field. You are free to choose your topic (although it must be approved by the course instructors). The project will count for 15% of your final grade in this class.

What you need to do

The first step is to choose a topic. This is not an easy thing to do, so we recommend spending time interacting with the instructors as well as researching what topic to choose. At the bottom of this handout, we present suggestions for places to look for project ideas. You can take any of our suggestions or work on a project of your own design (this is recommended if and only if you have had research experience with a specific problem that has a theoretical computer science component to it). You cannot choose a topic that somebody else has already chosen (this will be decided on a first-come first-serve basis when you talk to the instructors about your topic). After choosing a topic, you are expected to learn as much as you can regarding your topic, and are encouraged (although not required nor expected) to make original research contributions. You will hand in two write-ups of what you have accomplished so far (see below for specific deadlines). The first write-up will consist mostly of the statement of the problem that you will investigate, and subsequent write-ups should get longer as the semester progresses. The final write-up should be a maximum of 10 pages long, and should be a coherent explanation of the problem and everything you understand about it. At the end of the semester, you will be required to give a 10-minute talk about your project in class to an audience consisting of other students in the class, the instructors and hungry graduate students in theoretical computer science who will be bribed to attend the class with a free lunch. Throughout the semester, you are also expected to schedule a meeting with an instructor at least once a month to talk about your project freely. You should be ready to answer any questions the instructor might have on the topic.

What you need to do (bulleted list)

- Choose a (unique) topic
- Learn as much as you can about your topic
- Schedule meetings with an instructor once a month (once in September, once in October, etc.)
- Write progress reports
- Prepare a final 10-minute in-class presentation

Important dates

- September 20. First progress report due (this should essentially be an explanation of the problem you will investigate throughout the semester).
- November 15. Second progress report due.
- December 1 and 6. In-class presentations.
- December 8. Final project report due.

Suggested places to look for project topics

- Any paper that has appeared in the proceedings of FOCS or STOC in the last 10 years (starting with FOCS'95 and STOC'95). FOCS (Foundations of Computer Science) and STOC (Symposium on the Theory of Computing) are the two major conferences of general computer science theory. The proceedings of both conferences are available at the E&S library or electronically.