

CS32 Final Project

Introduction

For the final project, we're giving you the ultimate freedom in a CS course: the choice of what problem you want to solve. In groups of three to five (four is highly preferred), you will specify, design, code, test, and demo a project that is completely your own.

You will be assigned a mentor TA to guide you throughout the semester. Think of your group as a software design team, and your mentor TA as the team's boss. You will be graded on the punctuality with which you meet deadlines, the professionalism of your presentations to your TA, and the extent to which you meet your goals. Communicate well with your team, and always come prepared to your meetings.

Sometimes you will meet with a TA other than your mentor TA. Think of this new TA like your boss's boss; they are not forgiving to road-bumps you have met throughout the semester and just want to see progress. It is important that every member of the team has results to present at these meetings.

Keep in mind, the final project is not about showing off your skills to your classmates. We prefer a well designed, well thought out, well implemented project to a flashy but ill-conceived one.

Project Ideas

When choosing your final project, make sure to pick something you and your partners are excited to work on. Your project should either be a completely new product that does not already exist, or be a significantly better product if something similar already exists.

- Desktop Application: You are probably most comfortable building a desktop application, and it is a great choice for your final project.
- Open Source Project: You may contribute to an existing open source project as your final project. We expect you to make a significant contribution to the project of your choosing.

We explicitly disallow mobile and web application because they require too great an investment of time learning and configuring frameworks. If your group feels strongly about creating a mobile or web application, contact the head TAs and we will discuss your options on a case-by-case basis.

Timeline

Project Idea (February 3)

Submit a final project idea to the class spreadsheet, [here](#), and peruse your peers' ideas. Try to be specific, and sell your idea to your peers! This is to help you find a group to work on your project with.

Group Formation (February 10)

Forming groups should be based both on who you want to work with and what you want to work on. Groups can have between 3 and 5 members, but we strongly suggest that you have a group

of 4. This deadline will be strongly enforced — if you miss the deadline, we will assign you to a group. We highly encourage “heterogeneous” teams, meaning that groups with students from multiple intro sequence classes (CS15/16, CS17/18, and CS19) will get to pick final project presentation times before those teams which are homogeneous.

Project Requirements and Survey (February 17)

The first step in developing a project is to understand what problem you are attempting to solve and to develop a requirements document that describes those problems and how your program solves them.

Detail your project from the user’s perspective. Organize and document your requirements. Then, get input from potential users (outside of your own group) on the project. We expect you to develop a survey, interview, or other method, in order to understand what your users want. Each feature in your requirements should be backed up by a short explanation of why it is important from the user’s perspective.

Present your requirements document to your mentor TA by **February 17**. As your project progresses and morphs, so too will your requirements change; you are expected to keep this document current throughout the semester.

Project Specifications/Mock-up (March 2)

Specifications detail exactly how your program will meet requirements and what it should do in every possible situation. You should have details of exactly how a user will interact with the program and what will happen for all inputs. Specifications should also include basic diagrams that show what the user will see. Use PowerPoint or a drawing diagram to create annotated faux-screenshots. The more detailed your specifications document, the better.

The specifications that you develop and get approved by your Mentor TA will provide the basis on which your project will be graded. Present your specifications document to your mentor TA by **March 2**. As your project progresses and morphs, so too will your specifications change; you are expected to keep this document current throughout the semester.

Project Design (March 16)

Your design presentation will detail how you plan to implement your project.

Your design document should cleanly break the project into independent components that can be tackled by individual team members. You would be wise to divide-and-conquer your design by having individuals design the components for which they are responsible. We suggest presenting your design to the rest of your group when everyone has done their part.

Design documents should minimally contain diagrams and/or code contracts for each package, specifications for interfaces between packages, descriptions of major methods and data structures, and a sample run of the project (including a discussion of flow of control).

As with all of your other projects, we expect a comprehensive testing plan. This is a sequence of tests that will exercise every aspect of your project. If you've thoroughly tested your code before you try to integrate it, everyone's life will be much easier. We require automated unit testing.

You should arrange a meeting with your mentor TA to present your design. Come to this meeting with a complete draft of your design and a short series of slides to present to your TA. The slides might take this form:

- Project name, group structure, division of labor, and a project description
- A fairly detailed timeline of individual schedule, in more detail than deadlines, including internal integration deadlines
- A design snapshot; summarize overall design
- Testing plan
- A list of expected problems/issues

Although your design might change in the course of writing the project, you will save a lot of headaches if you put a great deal of thought into this design and stick to it as closely as possible. You should present your final design to your Mentor TA at this meeting by **March 16**.

Coding Milestones (March 23, April 26)

Your March 23 demo will be to an adversary TA (your boss's boss). At this point, each member of the team is still likely working on separate parts of the assignment, and little to no integration work has been completed. You should prepare a concise presentation, where you describe your project and what each member has done. It is unacceptable for some member of the team to have completed no work by the time of the first presentation. Meet with your mentor TA before doing this demo to get advice and feedback.

By the time of your April 20 demonstration (also to an adversary TA), you should have the majority of your integration work done, and your project should be in nearly working condition. Remember, the TA to whom you are presenting is focused on results, and wants to know that each member of the team has contributed significantly to the project.

This leaves plenty of time to bang out the kinks before final demo day.

Demo Day (May 7-8)

Demo Day is your opportunity to show what you've been working on. It's not about one-upping your classmates or producing the biggest 3D explosions, but giving us an idea of the challenges you encountered along the way and why things turned out the way they did. We want to know why your design turned out to be good or bad, what you had to change, and what you've learned from the experience.

Some topics you should cover in your presentation include:

- Division of labor: Each member describes their section

- Goals of the project: Were they met? If so, how? If something wasn't, what happened?
- Difficulties: What did you learn from this experience?
- Visuals: Find something to show us, if applicable
- Guided tour/demo of the program

Final Demo (by May 9)

Have a meeting with your mentor TA to demo your project and talk through your semester's work. The majority of your grade will come from the demo you did on Demo Day, and this demo to just your mentor TA. Come to your final demo with final drafts of your requirements, specifications and design, as well as end-user documentation, and a rehearsed presentation of your project. This demo will be highly interactive, to get greater detail on the state of your project.

Parting Words

Start early and work consistently. Good luck!