CS194: Senior Project Class

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Welcome to CS194—Senior Project Class. In this class, you will get an opportunity to build a large software project. In addition if you take this class as CS194W it fulfills the Writing in the Major requirement.

Course Staff & Office Hours

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The Project

The project, of course, is the main focus of the class. So let's start of by discussing how to choose a project:

- Pick a topic that you find interesting. You will be spending a tremendous amount of time on your project. Ideally, you should be passionate about your project. Pick something that you always wanted to build. You might also consider building something related to your hobbies.

- Remember you will be presenting your project at the Stanford Software Fair at the end of the quarter. Pick something you'll be excited to display. If you have an amazing idea for a startup, but you want to keep it secret, don't do it for your project.

- You will have only limited amounts of time to study new material. You may want to pick a project that builds on your strengths. Don't plan on building a 3D game, for example, unless you are familiar with creating 3D graphics. Similarly, don't build a website requiring a database, unless at least one member of your team has at least passing familiarity with databases. Don't try building an iOS app unless your team already has iOS expertise. We will not be taking any time required to learn new technologies into account during grading. If you build an iOS app, the criteria at the end of the quarter will be does this app reflect the quality we would expect from a team of Stanford CS majors with pre-existing iOS experience working for a full quarter.

- Along a similar vein, keep in mind that you only have ten weeks, so you won't be able to do something huge like reproducing Windows 10 as your project. If you've got something really large you want to build, see if you can break off a ten-week chunk for class. Just remember, you need a real working project that you can show off at the end of the quarter.

- Finally, remember you may <u>not</u> receive Stanford units for doing anything for which you are also paid. This rules out projects done for your part-time job. On the other hand, I would be very happy to have students provide free work for non-profits.

You'll need to choose your project very quickly. You have only ten weeks total to get the project up and running, so you can't afford to spend much time choosing a project. The first assignment is due next Friday (April 14th). Ideally, you should have your project chosen by this Friday.

Your project idea must be approved by either myself or a TA. I will be available to meet with teams this Friday from 2-5pm.

Project topics vary widely. Here are some projects from past quarters:

- A website replacement for the `su.market` newsgroup.

- A 3D sword fighting game complete with a custom-built 3D sword control device.

- An application to manage large collections of photographs. This project studied different techniques for displaying large collections of objects.

- A distance learning tool which allowed instructors to present material simultaneously to users across the Internet and to give exams online.

- An operating system for a tablet-based computer.

Teams

You should form a team of between 3-5 students. If you don't know anyone in class, don't worry. We have certainly had successful projects completed by teams where the team members didn't meet until the first day of CS194 (in fact, some of these teams have earned A+s in the class).

If you don't know your team members well and are uncertain of their reliability, I would very strongly encourage you to get on a larger team. A three person team with one team member who badly underperforms can be disastrous. A four or five person team with one underperforming team member is more likely to still meet their overall objectives.

While I would prefer that you all choose your own teams, in order to make sure everyone ends up on a team, some students may be randomly added to existing teams.

As in real life, your project (and your grade) will be determined by how smoothly your team works. Programming in teams has both a technical aspect and a managerial aspect. I urge you to communicate with your fellow team members frequently and to address any problems immediately.

Resources

You are largely on your own for finding material and equipment to build your project. You will, of course, have access to all the standard resources generally available to Stanford

students. Beyond that, you're on your own. If you find any on-campus resources that are available, but require an instructor's signature, I will be most happy to sign. In addition, if you find resources off campus that require a letter from me verifying that you are indeed a Stanford student working on a class project, I will be happy to write a letter for you.

Lectures and Weekly Meetings

CS194 will only meet for lecture for the first three weeks of the quarter. For the first two weeks, we will have lectures on basic software engineering principles. During the third week, teams will present overviews of their projects to the other students.

Each project team will be assigned a teaching assistant to act as your project supervisor. Teams will also be assigned an alumni mentor at after their project overview presentation (3rd week of the quarter).

After the third week, we will no longer meet for lecture. Instead, after this point each individual project team will meet weekly alternating between meetings with their alumni mentor and their supervising TA.

Class and Final Conflicts

One question that sometimes comes up is can a student take a class whose meeting time conflicts with CS194. The answer is *maybe*. As I have noted above, CS194 only meets for lecture for three weeks. However, attendance at the Stanford Software Fair, which occurs during CS194's final slot **is mandatory and is non-negotiable**. If the instructor for your conflicting class will let you attend the Stanford Software Fair, handling their own final outside of the regular time slot, then yes, you may take a class which meets at the same time.

However, if your instructor will not agree to an alternate exam time and you do not attend the Software Fair, you will not pass the class. Attendance at the Project Fair is a School of Engineering requirement for all engineering capstone projects, including CS194.

Please note that **a class meeting Monday, Wednesday, or Friday at 4:30pm will also have a conflicting final time**, and therefore may not be taken unless the other class's instructor will allow an alternate exam time.

Piazza

We will be using the Piazza discussion system. Please signup at:

http://piazza.com/stanford/spring2017/cs194/

CS194W

Students taking CS194W will receive writing in the major credit. While students taking CS194W will write the same papers as students taking regular CS194, those taking CS194 will need to go through an additional revision process and meet with writing tutors.

Grades

Your grade will be based almost entirely on your project at the end of the quarter. However, here are some caveats.

- Teams who do not take the project proposal seriously can expect to get docked a half-grade. Students who are taking CS194W and do poorly on the project proposal can expect to get docked a full grade.

- Teams who do not take the project presentation seriously can expect to get docked a half-point.

- Students who do not take the team responsibilities assignment seriously can expect to get docked a half-grade. Students who are taking CS194W and do poorly on the team responsibilities assignment can expect to get docked a full grade.

In addition, your grade will be moved up or down based on the following items:

- You are required to attend all weekly team meetings. If you can't make a meeting, please let your project supervisor know why. Poor attendance at either weekly team meetings or missing meetings with the WIM writing tutors will lower your grade.

- Your project supervisor and team members will evaluate you on your performance within the group. While most team members end up receiving the same grade, your grade may be raised or lowered based on the amount of effort you put in relative to your fellow team members.

  Exceptionally poor performance by individual team members may result in a lower grade for those team members and in extreme cases **may result in a student not passing CS194**. Please note that if you receive poor reviews from your fellow team members, you can expect to be heavily penalized regardless of whether or not you actually performed the work – that is to say if you are sure you performed 25% of the work on your four-person team but all three of your fellow team members tell me you performed 1-2% of the work, you will be very heavily penalized even if you provide me with Git logs showing your work.

  Getting along with your team members is critical in the real world. So consider this as a good opportunity to build your inter-team skills. Failure to get along with your team members is likely to result in 1) getting fired by your manager if you are in a traditional company, or 2) getting kicked out of your startup by your fellow founders if you are in a startup. Remember these types of decisions aren't just made on the basis of one's technical ability. If you don't work well with your team members or you badly disrupt team dynamics, you can and will get fired from a job even if your work is technically competent.

  Pay attention to both how you are contributing to the team *and* how your contributions are perceived by your teammates. In real life this can make a considerable difference in hiring, firing and pay raises. Work together with your teammates—do not work at cross-purposes with them. Make sure your work is coordinated with them.

Schedule

Here is the tentative schedule for CS194:

Week of April 3rd
> Lectures on Software Engineering
> Approval of Project Idea by Friday, April 7th

Week of April 10th
Lectures on Software Engineering
Project Proposal due Friday, April 14th at 5pm

Week of April 17th
Project Overview Presentations

Week of April 24th
Personal Responsibilities Assignment due by Friday 28th at 5pm

Weeks from Aril 24th through June 5th
Teams meet with Project Supervisors

Software Fair on Wednesday, June 14th from 3:30-6:30pm

Software Fair

At the end of the quarter, we will hold the Stanford Software Fair. This fair is attended by Stanford students and faculty, as well as other members of the Silicon Valley community. You will be presenting your project at the fair. The fair will be held Wednesday, June 8th from 3:30-6:30pm. <u>Attendance at the fair is mandatory for all CS194 students.</u> Please plan accordingly.

Final Hints

Here are some final hints for a successful CS194 project:

- Make sure you communicate with your fellow team members. Few things are more depressing than getting together to integrate code, only to discover that you and your fellow team members have been programming to different specifications.

- Address all team problems immediately, don't let problems fester.

- Get cracking as soon as possible. Ten weeks isn't much time to develop a software product.

- Have fun! This is a wonderful opportunity to go out and build something exciting and fun.