CS 54N — Course Information

Professor: Eric Roberts

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Drop-in hours: Tue 9:30–11:00; Wed 4:00–5:00 (just for this seminar)

Course assistant: Kelsey Schroeder

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Course description

Stanford Introductory Seminar. Preference to freshmen. Covers the intellectual tradition of computer science emphasizing ideas that reflect the most important milestones in the history of the discipline. No prior experience with programming is assumed. Topics include programming and problem solving; implementing computation in hardware; algorithmic efficiency; the theoretical limits of computation; cryptography and security; and the philosophy behind artificial intelligence.

Class meetings

This seminar is scheduled for Mondays and Wednesdays from 7:00 to 8:15 in 160-317. In a small seminar, regular attendance is essential. Anyone missing more than two class meetings during the quarter is subject to being dropped from the course.

Topic outline

I very much want this class to be driven by your collective interests and enthusiasm for the individual topics. For that to be true, it doesn't really work to start off with a rigid syllabus. What we'll do instead is start with a tentative outline of the topics I think it will be fun to cover, as follows:

Week 1 Introductions; course overview; short reports on early computing
Week 2 Charles Babbage's machines; Ada Lovelace and the birth of programming
Week 3 Binary arithmetic; logic gates; the von Neumann architecture
Week 4 Turing machines; uncomputable functions
Week 5 computational complexity; **P** *vs.* **NP**
Week 6 Basic cryptography; public-key cryptography
Week 7 Networking; social networks; Google's page rank algorithm
Week 8 Artificial intelligence; machine learning; robotics
Week 9 The future of computing

If there are other topics that seem more exciting, we can adjust the schedule to make room for them. Each Wednesday, I will distribute a more detailed calendar outlining the topics, readings, assignments, and special events (tours of Stanford labs, a field trip to the Computer History Museum, a performance of Tom Stoppard's *The Hard Problem* at the American Conservatory Theater in San Francisco, movies, games nights, and so on).

Readings

Most of the reading for this class consists of chapters from the book I'm writing for people interested in the intellectual foundations of computer science. A reader containing 12 chapters from the textbook along with three historically important articles and stories is available from the Stanford bookstore.

Course requirements

The required work for this course consists of the following:

Class participation The most important aspect of the course is the seminar itself. As I noted earlier, regular attendance is essential. I have a long waiting list, and it is unfair for someone to take up a space in the class without intending to participate fully. Seminar participation, however, involves considerably more than simple attendance. You are expected to complete the assigned reading and to think about the issues raised by those readings.

Short report This Wednesday's class will consist of short (on the order of 10 minutes) reports presented in groups of three or four. I'll provide details when I assign the topics.

Weekly assignments In most weeks, there will be a short assignment given out on Wednesday and due the following Wednesday. The goal of these assignments is to make sure that you are actively engaged in the topics and not simply reading about them. As many of you know from your prior experience in programming, many concepts don't really sink in until you've had to put them into practice.

Final project The single most important component of the course is the final project, in which you—as part of a team of three students—investigate in detail some aspect of computer science that seems to qualify as a "great idea." The deliverables include a web site that describes your topic in detail and a 25-minute presentation, which we will schedule during the 7:00 to 10:00 P.M. final exam slot on Thursday, December 15. I will describe the project assignment and offer several possible topic ideas in a separate handout distributed at the beginning of the fourth week of class.

Grading

Final grades for the course will be determined using the following weights:

25%	Class participation
5%	Short report
30%	Weekly assignments
40%	Final project