Chris Gregg
CS 208E

Handout #1
September 26, 2017

CS 208E — Course Information

Lecturer: Chris Gregg

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Office hours: Tuesday 9:30–11:00; Thursday 9:30–11:00 (just for this seminar)

Course description

CS 208E. Great Ideas in Computer Science—This is a course designed by Eric Roberts, the founder of the MS CS Education program. The seminar covers the intellectual tradition of computer science emphasizing ideas that reflect the most important milestones in the history of the discipline. Topics include programming and problem solving; implementing computation in hardware; algorithmic efficiency; the theoretical limits of computation; cryptography and security; computer networks; machine learning; and the philosophy behind artificial intelligence. Readings will include classic papers along with additional explanatory material. Enrollment limited to students in the Master's program in Computer Science Education.

Class meetings

This seminar is scheduled for Tuesdays and Thursdays from 1:30 to 2:50 in 160-319. As in any small seminar, regular attendance is essential.

Readings

Most of the reading for this class consists of chapters from Eric Roberts's book for people interested in the intellectual foundations of computer science. The bookstore has copies of the reader, which contains 12 chapters from the current draft along with the wonderful E. M. Forster short story "The Machine Stops" and essays by Vannevar Bush and Alan Turing.

Course requirements

The required work for this course consists of the following:

Class participation — Most of what you learn in the seminar will take place during the seminar meeting, so it is critical that you take an active role. You are expected to complete the assigned reading and to think about the issues raised by those readings so that you can participate fully.

Weekly assignments — In most weeks, I will give out a short assignment on Thursday, which is due the following Thursday. The goal of these assignments is to make sure that you are actively engaged in the topics and not simply reading about them. Concepts that you think you understand from the reading don't really sink in until you've had a chance to put them into practice.

Class presentation — In every week except this first one, I will assign one of you the task of preparing a 30-minute presentation on a specific topic relating to that week's material, to be presented in the Thursday class.

Final project The single most important component of the course is the final project, in which you—as part of a team of two 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 45-minute presentation, which we will schedule during the 12:15 to 3:15P.M. final exam slot on Monday, December 12. 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:

20% Class participation
30% Weekly assignments
10% Class presentation
40% Final project

Week-by-week schedule (may be modified)

Week 1	Introductions; course overview; Babbage machines; Ada Lovelace Readings: Chapter 3
Week 2	Karel the Robot; beginning JavaScript; algorithms Readings: Chapters 1 and 2
Week 3	Binary arithmetic; digital logic Readings: Chapters 4 and 5
Week 4	Stored-program machines; the Toddler machine Readings: Chapter 6
Week 5	Turing machines; the Busy Beaver problem; undecidability Readings: Chapters 8 and 9
Week 6	Computational complexity; the P = NP question Readings: Chapters 7 and 10
Week 7	Cryptography; public-key cryptography; digital signatures Readings: Chapters 11 and 12
Week 8	Networking; networking algorithms; the Google page-rank algorithm Readings: Vannevar Bush, "As We May Think"
Week 9	Artificial intelligence; machine learning; big data Readings: Alan Turing, "Computing Machinery and Intelligence"
Week 10	Computers and ethics; promise and peril of the digital age Readings: E. M. Forster, "The Machine Stops"