

**Syllabus for CSCI 4830**  
**History and Future of Computing**  
**Spring 2016**

**Lectures:** Tuesday and Thursday from 11:00am–12:15pm in LIBR M498

**Lecturer:** Aaron Clauset

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Course Web Page: <http://santafe.edu/~aaronc/courses/4830/>  
Office Hours: Tuesday and Thursday, 1:00–2:00pm, or by appointment

**Description:** In this course, we will survey and ponder the history and future of computing. This course will focus on the technical context and trajectory of fundamental innovations in the history of computing (e.g., Babbage’s Difference Engine, the telegraph and Morse code, early “networks,” information theory, numerical computation, the early Internet, etc.), and on computing’s likely future (Internet of Things, wearables and privacy, P vs. NP, ubiquitous artificial intelligence, self-driving cars, etc.). Students are expected to think critically about both the technical and the social aspects of computing in these contexts, and should be prepared to discuss the grand arc of computational progress, the specific technologies that have fueled it, and the problems, opportunities, and challenges computing poses for society.

**Prerequisites:** Algorithms (CSCI 3104), and students must be upper-division CSCI majors

**Required Texts:**

1. *The Information: A History, A Theory, A Flood*, by Gleick
2. *The Thrilling Adventures of Lovelace and Babbage*, by Padua
3. *Logicomix: An epic search for truth*, by Doxiadis and Papadimitriou

**Overview:**

- Meetings 2 times a week (T/Th)
- Intensive class discussions; student participation is mandatory
- Weekly reading assignments (50–100 pages per week)
- Weekly writing assignments (mini-essays)
- One mid-term exam and one final exam
- Expect that this will be a challenging course.

## Topic Schedule

Week 1	What is computation?
Week 2	Words & writing / the formalization of thought
Week 3	Lovelace & Babbage / the birth of the computer
Week 4	Telegraphs & addresses / the speed of information
Week 5	The logical foundations of computation
Week 6	A theory of information
Week 7	Computing is universal / computing is limited
Week 8	Into the modern era
Week 9	Sexism and computing
Week 10	Bias in the machine / fairness and accountability
Week 11	Spring break
Week 12	Autonomous vehicles / when robots live among us
Week 13	Ubiquitous computing / ubiquitous surveillance
Week 14	Artificial intelligence
Week 15	Artificial intelligence
Week 16	A singularity
Week 17	Final exam

## Examinations

Midterm exam	March 17 (Thursday)	in class
Final exam	May 4 (Wednesday)	1:30–4:00pm

## Grading

Grades will be assigned as the weighted sum of scores in four areas: class participation (0.25), written assignments (0.40), midterm exam (0.15) and final exam (0.20).

Letter grades will not be assigned until after all work for the semester has been submitted and graded. In the meantime, only numerical grades will be tracked.

## Weekly Reading Assignments

There will be weekly reading assignments. The purpose of these assignments is to help you prepare for the intensive class discussions and lectures on the weekly topic.

*All reading material for a given week should be completed prior to the Tuesday class of that week.* Reading assignments will be drawn from popular books and essays and multimedia sources on the history and future of computing (see below for the complete list). *The success of the class depends on each student coming to class prepared to discuss the assigned material.*

## Weekly Writing Assignments

There will be weekly writing assignments, starting in Week 2. The purpose of these assignments is to have you express and critically explore *your own ideas* about a given topic.

Each week you will compose and submit an original 2-page “mini-essay.” Essays must be typeset electronically (12 pt font, 1-inch margins, single spaced) and submitted as a PDF document via email to the instructor no later than 11:59pm on Thursday night, each week. If you cite references (and please to), they must follow the Chicago Manual of Style.

Files must be named like `Lastname-Firstname-MMDD-WeekX.pdf` where `X` is the number of the corresponding week of class and `MMDD` is the 2-digit month and 2-digit day of your birthday. For instance, `Clauset-Aaron-0701-Week2.pdf`. *Misnamed files will not be graded.*

These essays must be written independently. However, I strongly encourage you to discuss ideas with each other outside of class. Talk. Have debates. Argue. Discard bad ideas. Refine the good ones. *But do not copy or plagiarize from any source. Do not insult my or your own intelligence by submitting someone else’s writing as your own, in whole or in part.*

*Late or non-PDF submissions, and submissions longer than 2 or shorter than 1.5 pages will receive no credit.* There is no flexibility on these policies. To compensate for their unforgiving nature, the lowest 2 essay grades will be automatically dropped at the end of the semester.

Points will be deducted for sloppy writing, sloppy thinking, spelling mistakes, and poor grammar. I will not be unreasonable in my grading, but don’t make me read garbage. If I cannot understand what you are saying, you did not succeed in the assignment. The best way to get full credit is to write clearly and say interesting, thoughtful things. You will be graded on what you write, not what you meant to write. See the *Advice for the writing assignments* document on the class webpage for specific advice about how to get full credit on the essays.

**Suggestions:** Suggestions for improvement are welcome at any time. Any concern about the course should be brought first to my attention. Further recourse is available through the office of the Department Chair or the Graduate Program Advisor, both accessible on the 7th floor of the Engineering Center Office Tower.

**Honor Code:** As members of the CU academic community, we are all bound by the CU Honor Code. I take the Honor Code very seriously, and I expect that you will, too. Any significant violation will result in a failing grade for the course and will be reported. Here is the University's statement about the matter:

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council ([honor@colorado.edu](mailto:honor@colorado.edu); 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and at <http://www.colorado.edu/academics/honorcode/>

**Special Accommodations:** If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu).

If you have a temporary medical condition or injury, see Temporary Injuries under Quick Links at Disability Services website and discuss your needs with your professor.

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, I will make reasonable efforts to accommodate such needs if you notify me of their specific nature by the end of the 3rd week of class. See full details at [http://www.colorado.edu/policies/fac\\_relig.html](http://www.colorado.edu/policies/fac_relig.html)

**Classroom Behavior:** Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veterans status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities.

Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at <http://www.colorado.edu/policies/classbehavior.html> and at [http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\\_code](http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code)

**Discrimination and Harassment:** The University of Colorado at Boulder Discrimination and Harassment Policy and Procedures, the University of Colorado Sexual Harassment Policy and Procedures, and the University of Colorado Conflict of Interest in Cases of Amorous Relationships policy apply to all students, staff, and faculty. Any student, staff, or faculty member who believes s/he has been the subject of sexual harassment or discrimination or harassment based upon race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>