Computing and Its Consequences

HPSS*S689, Wintersession 2008 – Tuesdays and Thursdays, 9:30 a.m. - 12:30 p.m.
The Rhode Island School of Design, Providence RI
MKT 203 -- Roger B. Blumberg

Syllabus: http://www.cs.brown.edu/~rbb/risd/compcon.2008.html
Last Update : 2/11/08

Weekly Descriptions | Books & Bibliography

Briefly: Computer science is barely a half-century old and yet its impact has been extraordinary. This course is about the developments in mathematics and machinery that gave rise to modern computing, and the consequences of these developments for the way we think about ourselves and others, about the societies we live in, and about what we can expect in the present and the future. Beginning with a discussion of the work of John von Neumann, Claude Shannon, Alan Turing, and Norbert Weiner, the course traces the connection between technical innovations in computing (from the 1940's to the present), and the social and political questions and formulations they generated in each decade. The course concludes with an examination of the state of computing in the first decade of the 21st century, and the questions the most recent developments raise about our humanity and our future.

Requirements: The foundation of our work in this course will be our discussions of the assigned readings, and the weekly writing assignments and/or presentations designed to capture your reactions and reflections. Students are expected to read critically and contribute regularly to class discussions. As the Wintersession is only six weeks long, students are expected to do a significant amount of reading and writing outside of class, and to make sure their written assignments and comments in class reflect this work. Each student is responsible for an essay discussing the books by Chorost and Ullman (along with any others you may be reading), and there will be a final exam.

Books & Bibliography

Required Reading:

- Bush, Vannevar. "As We May Think," *The Atlantic Monthly*, July 1945
- Chorost, Michael. *REBUILT: How Becoming Part Computer Made Me More Human* (Houghton Mifflin, 2005).
- Engelbart, Douglas C. "Augmenting Human Intellect: A Conceptual Framework" Summary Report AFOSR-3223 (1962)
- Mahoney, Michael S. "The histories of computing(s)," *Interdisciplinary Science Reviews*, Vol.30, number 2, 2005
- Shannon, Claude E. "A Mathematical Theory of Communication," *Bell System Technical Journal*, vol. 27, pp. 379-423 and 623-656, July and October, 1948.
- Sunstein, Cass. *Republic.com* (Princeton University Press, 1999)
- Turing, Alan. "Computing Machinery and Intelligence," *Mind*, 59, pp. 433-460. 1950.
- Ullman, Ellen. *Close to the Machine: Technophilia and Its Discontents* (City Lights, 1997)
- Webster, Frank (ed). *The Information Society Reader* (Routledge, 2003).

Recommended Texts:

- Abbate, Janet. *Inventing the Internet* (MIT, 1999)

- Beniger, James R. *The Control Revolution: Technological and Economic Origins of the Information Society* (Harvard University Press, 1986)
- Borgmann, Albert. *Technology and the Character of Contemporary Life* (University of Chicago Press, 1984).
- Cowan, Ruth Schwartz. *A Social History of American Technology* (Oxford University Press, 1997)
- Ellul, Jacques. *The Technological Society* (Random House, 1964)
- Feenberg, Andrew. *Transforming Technology* (Oxford University Press, 2002).
- Gray, Chris Hables. *Cyborg Citizen: Politics in the Posthuman Age* (Routledge, 2002)
- Grier, David. *When Computers Were Human* (Princeton University Press, 2005)
- Harel, David. *Computers Ltd.* (Oxford University Press, 2000)
- Hayles, N. Katherine. *How We Became Post-Human* (University of Chicago Press, 1999)
- Heidegger, Martin. "The Question Concerning Technology," in *Basic Writings* (Harper and Row, 1977)
- Kaplan, David. *Readings in the Philosophy of Technology* (Rowan and Littlefield, 2004)
- Licklider, J. C. R. "Man-Computer Symbiosis," *IRE Transactions on Human Factors in Electronics*, March 1960.
- Lyotard, Jean-Francois. *The Postmodern Condition* (University of Minnesota Press, 1984/1979).
- Metropolis, N., J. Howlett & G-C. Rota (eds). *A history of computing in the Twentieth Century* (Academic Press, 1980).
- Mitcham, Carl and Robert Mackey. *Philosophy and Technology: Readings in the Philosophical Problems of Technology* (Free Press, 1983)
- Weiner, Norbert. *Cybernetics: or Control and Communication in the Animal and the Machine* (John Wiley, 1948).

We will rely on the World Wide Web for some of the assigned texts, and for recent publications. All links to the electronic required readings will be part of the electronic version of the syllabus.

Additional Bibliography

Baudrillard, Jean. *Simulations*, trans. Paul Foss, Paul Patton and Philip Beitchman (Semiotexte, 1983)

Benjamin, Walter. *Illuminations*, edited by Hannah Arendt, trans. Harry Zohn (Schocken, 1968/1936) pp. 217-252.

Berry, Wendell. "Why I Am Not Going To Buy A Computer," from *What Are People For?* (North Point Press, 1990).

Borgmann, Albert. *Holding on to Reality: The Nature of Information at the Turn of the Millennium.* (University of Chicago Press, 1999).

Brin, David. *The Transparent Society: Will Technology Force Us to Choose Between Privacy and Freedom?* (Addison-Wesley, 1998).

Brook, James, and Boal, Iain. *Resisting the Virtual Life: The Culture and Politics of Information* (City Lights, 1995)

Castells, Manual. *The Information Age: Economy, Society and Culture*, 3v. (Blackwell, 1996).

Dreyfus, Hubert L., and Spinosa, Charles. "Highway Bridges and Feasts: Heidegger and Borgmann on How to Affirm Technology." from *Hubert Dreyfus' Selected Papers*, (University of California Berkeley, 2002) Electronic version at: http://ist-socrates.berkeley.edu/~hdreyfus/html/paper_highway.html).

Ess, Charles. *Philosophical Perspectives on Computer-Mediated Communication* (SUNY Press, 1996).

Feenberg, Andrew. *Critical Theory of Technology* Oxford University Press, 1991)

Fukuyama, Francis. *Our Posthuman Future: Consequences of the Biotechnology Revolution* (FSG, 2002).

Gray, Chris Hables (ed). *The Cyborg Handbook* (Routledge, 1996)

Hickman, Larry A. *Philosophical Tools for Technological Culture: Putting Pragmatism to Work* (Indiana University Press, 2001).

Kargon, Robert H. and Molella, Arthur P. "Culture, Technology and Constructed Memory in Disney's New Town: Techno-nostalgia in Historical Perspective," in *Cultures of Control*, edited by Miram R. Levin (Harwood Academic Publishers, 2000), pp. 135-150.

Kranzberg, Melvin. "The Information Age: Evolution or Revolution?", in Bruce R. Guile (ed.), *Information Technologies and Social Transformation* (National Academy Press, 1985).

Lagarias, Jeffrey C. "The *3x+1* Problem and its Generalization," (AT&T Bell Laboratories, 1993). Electronic version at: http://www.cecm.sfu.ca/organics/papers/lagarias/index.html. This is an update of Lagarias 1985, which appeared in the *American Mathematical Monthly*, vol. 92, pp. 3-23.

Marx, Karl. "The Meaning of Human Requirements," in *Economic and Philosophical Manuscripts of 1844*, edited by Dirk J. Struik, trans. by Martin Milligan (International Publishers, 1964), pp. 147-164.

Moser, Mary Anne, with Douglas McLeod. *Immersed in Technology: Art and Virtual Environments* (MIT, 1995)

Mumford, Lewis. *Art and Technics* (Columbia University Press, 2000/1952)

Neumann, Peter G. (moderator). *The Risks Digest: Forum On Risks To The Public In Computers And Related Systems* (ACM Committee on Computers and Public Policy: http://catless.ncl.ac.uk/Risks, 2003).

Pacey, Arnold. *Meaning in Technology* (MIT, 1999)

Scheffler, Israel. "Computers at School?" in *In Praise of the Cognitive Emotions and Other Essays in the Philosophy of Education* (Routledge, 1991), pp. 80-96.

Searle, John R. "Minds, Brains, and Programs," *The Behavioral and Brain Sciences*, vol. 3, pp. 417-457, 1980..

Techné: Journal of the Society for Philosophy and Technology. Electronic version available at the Digital Library Archives of Virginia Tech: http://scholar.lib.vt.edu/ejournals/.

Tenner, Edward. *Why Things Bite Back: Technology and the Revenge of Unintended Consequences* (Knopf, 1996)

Weizenbaum, Joseph. *Computer Power and Human Reason* (W.H. Freeman, 1976)

Winner, Langdon. *The Whale and the Reactor* (University of Chicago Press, 1986).

Weekly Schedule

Week #1 (January 3): Why a/this course on the consequences of computing? : We'll discuss the motivations for and outline of the course, and then turn to the different ways a history of computing might be

narrated. In the coming weeks we'll be interested in the theoretical foundations of modern (electronic) computing, the applications of electronic computing, and the contrasts between the digital and the industrial age(s)..

> **Required Reading:** Michael S. Mahoney, "The histories of computing(s)," *Interdisciplinary Science Reviews*, Vol.30, number 2, 2005 (Electronic version at: http://www.princeton.edu/%7Emike/articles/histories/ISR119.pdf.
> **Recommended Reading :** STS.035 The History of Computing (both at MIT's OpenCourseWare Project); the latest issue of RISKS Digest.

- ENIAC 1946 (at The History of Computing Project, www.thocp.net)
- "ENIAC: The Army-Sponsored Revolution," by William T. Moye (at the US Army Research Lib).
- John von Neumann's "First Draft of a Report on the Edvac" (1945), edited with an introduction by Michael D. Godfrey: http://qss.stanford.edu/%7Egodfrey/vonNeumann/vnedvac.pdf
- "Issues in the History of Computing," by Michael S. Mahoney from the Forum on History of Computing at the ACM/SIGPLAN Second History of Programming Languages Conference, Cambridge, MA, 20-23, April 1993.

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Week #2 (January 8 and 10): The Rise of Information : One of the most striking aspects of the history of computing is the way it urged a redefinition of the significance of fundamental aspects of our humanity (e.g. our bodies, and our intelligence). We'll read Turning's famous "Turing Test" paper from 1950, and an excerpt from Shannon's 1948 paper that gave us Information Theory and the contemporary notion of "disembodied" information.

> **Required Reading:** Alan Turing's "Computing machinery and intelligence" *Mind*, 59, 433-460 (1950), and Claude E. Shannon's "A Mathematical Theory of Communication" (1948) (at computerhistory.org)
> **Recommended Reading:** The Turning Test Page (at ucsd.edu); Alan Turing Scrapbook (at Andrew Hodges' turing.org.uk); An introduction to information theory and entropy," by Tom Carter (at csustan.edu).

- "Computers, postmodernism and the culture of the artificial," by Colin Beardon, *AI & Society*, number 8, pps. 1-16, 1994.
- "Is the Brain a Digital Computer?" by John R. Searle (1990)
- *The Postmodern Condition*, by Jean-Francois Lyotard (1979)

   Blumberg's Notes

Week #3 (January 15 and 17): Information, Control, and the Posthuman Condition: One way to understand the success of modern computing is to see its connnection to large social and economic transformations that placed new emphasis on the value of rapid, efficient control and communication. The concept of a "programmable" machine inspired new ideas about human-machine interactions and automatiion; suddenly, it seemed reasonable to speculate not only about machine intelligence but about a kind of artifical "mind". We'll discuss Beniger's *The Control Revolution*, and Weiner's classic *Cybernetics*, and discuss the significance of computers in the context of social and economic transformations in the late 20th century.

> **Required Reading** Vannevar Bush's "As We May Think", *The Atlantic Monthly*, July 1945; Doug Engelbart's "Augmenting Human Intellect: A Conceptual Framework", October 1962; "Virtual Bodies and Flickering Signifiers," by N. Katherine Hayles (at Hayles' site at ucla.edu).and Michael S.

Mahoney, "Cybernetics and Information Technology", in R.C. Olby et al. (eds.), *Companion to the History of Modern Science* (London/New York: Routledge, Chapman & Hall, 1989), Chap. 34.
Recommended Reading : W. Ross Ashby's book "Introduction to Cybernetics" (1956), J. C. R. Licklider, "Man-Computer Symbiosis" (1960), 21A.350J / SP.484J / STS.086J The Anthropology of Computing (at ocw.mit.edu); N. Katherine Hayles' *How We Became Posthuman* (1999)

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Week #4 (January 22 and 24): Computing and "Being Digital": Apples, PCs and the Rise of "Information Society": With the mass marketing of "personal computers" in the 1980s, the possibilities of computing began to be felt in the home as well as the workplace, and nearly every profession/discipline began to debate whether/how to integrate computers into professional practice. With the expansion of the Internet and the invention of the World Wide Web in 1989, the significance of "information society" and "globalization" was felt by most major institutions and in a growing number of households, and the personal consequences of personal computing began to be discussed and studied.

Required Reading: Michael Chorost's *REBUILT* and Ellen Ullman's *Close to the Machine*; and The Robopet Exercise (from CS9 at Brown)
Recommended Reading: Chorost's blog, Nicholas Negroponte's *Being Digital* (1995), Martin Heidegger's "Question Concerning Technology" and H.L. Dreyfus "Heidegger on Gaining a Free Relation to Technology" in Kaplan (2004), *The Information Age: An Anthology on Its Impact and Consequences*, edited by David S. Alberts and Daniel S. Papp (NDU Press, 2002).
Assignment: Your Chorost/Ullman essay is due by noon on Friday, the 25th.

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Week #5 (January 29 and 31): The Consequences of Computing I: In the final two weeks of the course, we'll discuss the consequences of computing under a variety of (social science) headings (e.g. Information Society, Post-Industrial Society, The Network Society, Digital Inequalities, Surveillance, Virtuality and Democracy), and consider whether/how the topics, selections and analyses in the Webster anthology might be revised to suit our world and our concerns nearly a decade later.

Required Reading: *The Information Society Reader*, Introduction and Part One.
Recommended Reading: "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," by Donna Haraway, from *Simians, Cyborgs and Women: The Reinvention of Nature* (New York; Routledge, 1991), pp.149-181; "Why The Future Doesn't Need Us," by Bill Joy (from *Wired* 8.04 (April 2000).

O'Malley's Notes to Chapter 20
Min's Notes to Chapter 21
Altavena's Notes to Chapter 22
Blumberg's Notes

Week #6 (February 5 and 7): The Consequences of Computing II: We'll continue presenting and discussing the readings in *The Information Society Reader*, as well as Cass Sunstein's *republic.com.* (also published in 1999).

Required Reading: *The Information Society Reader* (selections); *republic.com*, by Cass Sunstein (Princeton UP, 1999).
Recommended Reading: "Computers and Organisms", History 598 at Princeton University, by Angela N.H. Creager and Michael S. Mahoney (2004);

February 12th: [The Final Exam](#): This year, the final exam will be a culmination of the discussions of the last three weeks, and each students will be responsible for writing about a particular section of the Webster anthology as well as the Sunstein book. The second part of [last year's final exam](#) hints at the sort of questions about which you'll be asked to write..

Contact Information

I am most easily reached by e-mail (rblumber@risd.edu or rbb@cs.brown.edu) and am happy to schedule regular weekly office hours if requested.