School of Information and Library Science
University of North Carolina, Chapel Hill
INLS 465 â€“ Understanding Information Technology for Managing Digital Collections
[Last Updated: 2014-05-23]

Spring 2013
Meeting Time: 8:00-11:30
Location: Manning 014
Credits: 3
Instructor: Cal Lee
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Office Hours: 11:30-12:15 (after class), or by appointment
Course Web Site: http://sakai.unc.edu/

COURSE DESCRIPTION

The fundamental motivation for this course is that anyone responsible for digital collections will have to understand and be conversant in various aspects of the associated information technologies, in order to evaluate the work of developers, delegate tasks, write appropriate requests for proposals (RFPs), and establish reasonable management and preservation policies.

COURSE OBJECTIVES

Upon completion of this course, you should be able to:

- Assess many of the opportunities and challenges associated with digital information systems that you have not seen before and explain them to those who have less technical background than you
- Actively contribute to discussions about design, maintenance and changes to the information systems that support digital collections for which you are responsible
- Read and understand the information technology trade press, recognizing opportunities and strategic implications for the management of digital collections
- Contribute substantive recommendations for policies related to the management of digital collections

COURSE EXPECTATIONS

- Try to familiarize yourself with the Focal Readings for each class session. Complete a closer reading of materials related to the paper assignments you've selected.
    - For tips on reading strategically: How to Read a Book - http://pne.people.si.umich.edu/PDF/howtoread.pdf
- Written work should be of high quality. If you have concerns about writing, address them early and often.
    - UNC Writing Center in on the lower level of the Student and Academic Services Building North (SASB), with a satellite office in Greenlaw Hall, Room 221. - http://www.unc.edu/depts/wcweb/
    - Most importantly, your peers.
- Come to class on time.
- Participate in discussions – counts as 20% of your total grade for the course.
- Practice "respectful and informed ignorance." Will Rogers said, "Everybody is ignorant, only on different subjects." This class will be most effective if everyone feels comfortable asking questions, so respect the questions of others. Bring to class your own **informed** questions about the week's materials (i.e. be able to convey how you've tried to understand the issues and what still remains unclear to you).

Special Needs: If you feel that you may need an accommodation for a disability or have any other special need, please

make an appointment to discuss this with me. I will best be able to address special circumstances if I know about them early in the semester. My office hours and contact information are listed at the beginning of this syllabus.

Diversity Statement
"In support of the Universityâ€™s diversity goals and the mission of the School of Information and Library Science, SILS embraces diversity as an ethical and societal value. We broadly define diversity to include race, gender, national origin, ethnicity, religion, social class, age, sexual orientation and physical and learning ability. As an academic community committed to preparing our graduates to be leaders in an increasingly multicultural and global society we strive to:

- Ensure inclusive leadership, policies and practices;
- Integrate diversity into the curriculum and research;
- Foster a mutually respectful intellectual environment in which diverse opinions are valued;
- Recruit traditionally underrepresented groups of students, faculty and staff; and
- Participate in outreach to underserved groups in the State.Â

The statement represents a commitment of resources to the development and maintenance of an academic environment that is open, representative, reflective and committed to the concepts of equity and fairness."

~The faculty of the School of Information and Library Science (http://sils.unc.edu/about/diversity)

COURSE REQUIREMENTS

1. Complete required readings and participate in class discussions (most in person but some online).

2. Submit 10 of the 12 Paper Assignments (skip two of them) to the Sakai Assignments area. You can submit them at any time, but all 10 papers should be uploaded by **5pm on Wednesday, June 11**.

3. Final Exam - **June 16-17 (you choose 3-hour block on one of these days)**.

IMPORTANT NOTE ON PLAGIARISM

It is very important that you both attribute your sources and avoid excessive use of quotes (see separate document called "In Your Own Words"). Be aware of the University of North Carolina policy on plagiarism. Your written work must be original. Ask if you have any doubts about what this means.

All cases of plagiarism (unattributed quotation or paraphrasing) of anyone else's work, whether from someone else's answers to homework or from published materials, will be officially reported and dealt with according to UNC policies (Instrument of Student Judicial Governance, Section II.B.1. and III.D.2, http://instrument.unc.edu).

EVALUATION

Participation in class discussions and exercises: 20%

Weekly Assignments: 50% (5% x 10 assignments)

Course Exam: 30%

The most important measures of your performance in this and all other classes at SILS will be your ability to engage in challenging materials with your fellow students; your reputation for insights and professionalism among your peers and with your instructor; your integration of course material with the other things you are learning both inside and outside the classroom; and your ability to apply what you've learned in your future career. However, the conventions of academia dictate that I also assign labels (called grades) to your work on assignments and for the course as a whole.

Based on UNC Registrar Policy for graduate-level courses (http://regweb.unc.edu/resources/rpm24.php), both assignment and semester grades will be H, P, L or F. Few students will obtain an "H," which signifies an exceptionally high level of performance (higher than an "A" in an A-F systems). The following is a more detailed breakdown:

- H Superior work: complete command of subject, unusual depth, great creativity or originality
- P+ Above average performance: solid work somewhat beyond what was required and good command of the material
- P Satisfactory performance that meets course requirements (expected to be the median grade of all students in the course)
- P- Acceptable work in need of improvement
- L Unacceptable graduate performance: substandard in significant ways
- F Performance that is seriously deficient and unworthy of graduate credit

According to UNC Registrar Policy, undergraduate grades are based on the following definitions:

- A Mastery of course content at the highest level of attainment that can reasonably be expected of students at a given stage of development. The A grade states clearly that the students have shown such outstanding promise in the aspect of the discipline under study that he/she may be strongly encouraged to continue.
- B Strong performance demonstrating a high level of attainment for a student at a given stage of development. The B grade states that the student has shown solid promise in the aspect of the discipline under study.
- C A totally acceptable performance demonstrating an adequate level of attainment for a student at a given stage of development. The C grade states that, while not yet showing unusual promise, the student may continue to study in the discipline with reasonable hope of intellectual development.
- D A marginal performance in the required exercises demonstrating a minimal passing level of attainment. A student has given no evidence of prospective growth in the discipline; an accumulation of D grades should be taken to mean that the student would be well advised not to continue in the academic field.
- F For whatever reason, an unacceptable performance. The F grade indicates that the student's performance in the required exercises has revealed almost no understanding of the course content. A grade of F should warrant an advisor's questioning whether the student may suitably register for further study in the discipline before remedial work is undertaken.
- AB Absent from final examination, but could have passed if exam taken. This is a temporary grade that converts to an F* after the last day of class for the next regular semester unless the student makes up the exam.
- FA Failed and absent from exam. The FA grade is given when the undergraduate student did not attend the exam, and could not pass the course regardless of performance on the exam. This would be appropriate for a student that never attended the course or has excessive absences in the course, as well as missing the exam.
- IN Work incomplete. This is a temporary grade that converts to F* at the end of eight weeks into the next semester unless the student makes up the incomplete work.
- W Withdrew passing. Entered when a student drops after the six-week drop period.

COURSE READINGS

The text for the course is available for purchase from the UNC Student Stores in the Daniels Building (two buildings south of Manning).

Required Text:

- White, Ron and Timothy Edward Downs. *How Computers Work*. 9th Edition. How It Works Series. Indianapolis, IN: Que, 2008.

SILS Reserves: Copies of the following books are available from the SILS Library on the first floor of Manning Hall

(behind the SILS Library help desk):

- Axelrod, Robert, and Michael D. Cohen. *Harnessing Complexity: Organizational Implications of a Scientific Frontier*. New York: The Free Press, 1999.
- Bantin, Philip C. *Understanding Data and Information Systems for Recordkeeping*. New York, NY: Neal-Schuman, 2008.
- Brodie, Michael L., and Michael Stonebraker. *Migrating Legacy Systems: Gateways, Interfaces & the Incremental Approach*. San Francisco, CA: Morgan Kaufmann, 1995.
- Campbell-Kelly, Martin, and William Aspray. *Computer: A History of the Information Machine*. Second ed. Boulder, CO: Westview, 2004.
- Carrier, Brian. *File System Forensic Analysis*. Boston, MA: Addison-Wesley, 2005.
- Farmer, Dan, and Wietse Venema. *Forensic Discovery*. Upper Saddle River, NJ: Addison-Wesley, 2005.
- Garrido, JosÃ© M., and Richard Schlesinger. *Principles of Modern Operating Systems*. Sudbury, MA: Jones and Bartlett Publishers, 2008.
- Hillis, W. Daniel. *The Pattern on the Stone: The Simple Ideas That Make Computers Work*. New York, NY: Basic Books, 1998.
- Jones, Keith J., Richard Bejtlich, and Curtis W. Rose. *Real Digital Forensics: Computer Security and Incident Response*. Upper Saddle River, NJ: Addison-Wesley, 2006.
- Kernighan, Brian W. *D Is for Digital: What a Well-Informed Person Should Know About Computers and Communications.* DisforDigital.net, 2012.
- Lessig, Lawrence. *Code: Version 2.0*. New York, NY: Basic Books, 2006.
- MacCormick, John. *Nine Algorithms That Changed the Future: The Ingenious Ideas That Drive Today's Computers*. Princeton, NJ: Princeton University Press, 2012.
- Messerschmitt, David G. *Understanding Networked Applications: A First Course*. San Francisco, CA: Morgan Kaufmann, 2000.
- Messerschmitt, David G., and Clemens Szyperski. *Software Ecosystem: Understanding an Indispensable Technology and Industry*. Cambridge, MA: MIT Press, 2003.
- Petzold, Charles. *Code: The Hidden Language of Computer Hardware and Software*. Redmond, WA: Microsoft Press, 1999.
- Shapiro, Carl, and Hal Varian. *Information Rules*. Boston, MA: Harvard Business School Press, 1999.
- Silberschatz, Abraham, Peter B. Galvin, and Greg Gagne. *Operating System Concepts*. 7th ed. Hoboken, NJ: J. Wiley & Sons, 2005.
- Tanenbaum, Andrew S. *Structured Computer Organization*. Fifth ed. Upper Saddle River, NJ: Prentice Hall, 2006.
- Tanenbaum, Andrew S. *Modern Operating Systems*. 2nd ed. Upper Saddle River, NJ: Prentice Hall, 2001.
- Tough, Alistair G., and Michael Moss, eds. *Record Keeping in a Hybrid Environment: Managing the Creation, Use, Preservation and Disposal of Unique Information Objects in Context*, Chandos Information Professional Series. Oxford: Chandos, 2006.
- White, Ron and Timothy Edward Downs. *How Computers Work*. 9th Edition. How It Works Series. Indianapolis, IN: Que, 2008.

For the weekly readings, the following labels indicate where specific course readings can be located:

B = Book for purchase

R = Reserves at SILS Library in Manning Hall

C = Course site in Sakai (https://sakai.unc.edu/), where copies of some readings are available (under Course Documents > Readings)

O = Online through UNC license. NOTE: Accessing these materials can require you either to use a computer with a UNC IP address or visit the associated sites through a UNC proxy server. See: Off-Campus Access, http://proxy.lib.unc.edu/setupinfo.html. If you're off campus and want to enter a given page through a UNC proxy server, you can use the following bookmarklet: javascript:location.href='http://libproxy.lib.unc.edu/login?

url='+location.href

W = Publicly accessible Web

Another resource that you might find interesting is Computer Science Unplugged, http://csunplugged.org/ [developed for primary school, but also informative for adults

Tools to Support Curation of Digital Collections - This class is not focused on specific applications. However, it is often helpful to know what software is available to support various activities that relate to the topics of the course. For a directory of tools, see: http://coptr.digipres.org/

Part 1 - Nature and Characteristics of Contemporary Information Technologies

May 19, Session 1 - Course Overview; Nature and Characteristics of Contemporary Information Technologies

May 19, Session 2 - Technology - Definition, Characteristics and Social Dynamics

- Unexpected consequences
- Importance of social context and limits of technological determinism
- Values/norms and practices being embedded in technology
- Why we all need to care about the technology that supports and enacts our work

Focal Readings:

W, R - Lessig, Lawrence. *Code: Version 2.0*. New York, NY: Basic Books, 2006. http://codev2.cc/ [Read: Code is Law (1-9), Regulating Code (61-80)]

C - Tenner, Edward. "Ever Since Frankenstein." In *Why Things Bite Back: Technology and the Revenge of Unintended Consequences*, 3-32. New York, NY: Knopf, 1996.

C - Winner, Langdon. "Do Artifacts Have Politics?" *Daedalus* 109, no. 1 (1980): 121-36.

Other Related Readings

May 20, Session 3 - Technological Components: Historical Origins and Interoperability

- Evolution of ICTs:
  - From purpose-built computers to mainframes, time sharing, minicomputers, personal computers, client-server, mobile devices
  - Dominant storage technologies from given eras
  - History of the Internet

- Interoperability
  - Tight vs. loose coupling

- Concept of inteface (including API)
- Concept of open systems
- Encapsulation
- Portability
- Forward and backward compatibility

Focal Reading:

R - Campbell-Kelly, Martin, and William Aspray. *Computer: A History of the Information Machine*. Second ed. Boulder, CO: Westview, 2004.

Other Related Readings

May 20, Session 4 - General Overview of Computer Architecture

- Main hardware and software components that make computers work
- Role and relationships of main components
- Three main resource types: processing, storage, movement of data

Focal Readings:

C, R - Messerschmitt, David G. *Understanding Networked Applications: A First Course*. San Francisco, CA: Morgan Kaufmann, 2000. [Building Blocks and System Architecture (113-117)]

B - White, Ron and Timothy Edward Downs. *How Computers Work*. 9th Edition. How It Works Series. Indianapolis, IN: Que, 2007. [11-15 (Can you find all the errors on p.13?), 37-45, 66-71, 108-111]

Other Related Readings

May 21, Seesion 5 - How to Read a Bit - Storage, Signal Detection and the Logic of Bits

- Operation and characteristics of media (magnetic and optical)
- Different types of storage
- Signal (and noise) processing
- Basic operations and logic of bits
- Inevitability of bit-level data corruption

Focal Readings:

C, R - Kernighan, Brian W. "Bits, Bytes, and Representation of Information." In *D Is for Digital: What a Well-Informed Person Should Know About Computers and Communications*, 21-34. DisforDigital.net, 2012.

C, R - Petzold, Charles. *Code: The Hidden Language of Computer Hardware and Software*. Redmond, WA: Microsoft Press, 1999. [Bytes and Hex (180-189)]

W - Rosenthal, David S. H, Daniel C. Rosenthal, Ethan L. Miller, Ian F. Adams, Mark W. Storer, and Erez Zadok. "The Economics of Long-Term Digital Storage." Paper presented at Memory of the World in the Digital Age. September 26-28, 2012, Vancouver, British Columbia, Canada. http://www.lockss.org/locksswp/wp-content/uploads/2012/09/unesco2012.pdf

B - White, Ron and Timothy Edward Downs. *How Computers Work*. 9th Edition. How It Works Series. Indianapolis, IN: Que, 2007. [How Tablet PCs Set You Free (16-17); Data Storage (155-193); How Digital Cameras Capture Light (254-255)]

Other Related Readings

May 21, Session 6 - Representation Information (Part 1)

- Compression
- Data structures and data types
- Databases
- Encryption
- File formats
- Images (vector and raster)
- Digital audio

Focal Readings:

C, R - MacCormick, John. "Data Compression: Something for Nothing." *Nine Algorithms That Changed the Future: The Ingenious Ideas That Drive Today's Computers*, 105-121. Princeton, NJ: Princeton University Press, 2012.

W - Rothenberg, Jeff. "Ensuring the Longevity of Digital Information." Washington, DC: Council on Library and Information Resources, 1999. http://www.clir.org/pubs/archives/ensuring.pdf [See specifically: "Old bit streams never die--they just become unreadable" and "Itâ€™s all in the program" (2-11)]

B - White, Ron and Timothy Edward Downs. *How Computers Work*. 9th Edition. How It Works Series. Indianapolis, IN: Que, 2007. [How Tablet PCs Read Your Handwriting (18-19); How Software Applications Do Your Work (119-143); How Digital Sound Tricks Your Ear (272-273); How a Digital Camera Squeezes Video Down to Size (282-283); How Prime Numbers Protect Prime Secrets (396-397); How Printers Work (406-409)]

Other Related Readings

May 22, Session 7 - Representation Information (Part 2) - Text Encoding and Structure

- Fonts
- Optical character recognition (OCR)
- Structured, unstructured and semi-structured data
- Markup languages (including XML)
- Serialization

Focal Readings:

C - Haralambous, Yannis, and P. Scott Horne. *Fonts & Encodings*. Sebastopol, CA: O'Reilly Media, 2007. [Introduction (1-17); Before Unicode (27-52 (skimming 29-50 to get an idea of the various types of encoding)); Characters, glyphs, bytes: An introduction to Unicode (53-93 (skimming 62-93 to get an idea of the complexity and scope of Unicode)); Properties of Unicode characters (95-125 (skim to become familiar with categories of character properties)); Fonts and Web Pages (315-366, familiarize yourself with the main ways that fonts are identified and represented on the Web)]

C, R - Messerschmitt, David G. *Understanding Networked Applications: A First Course*. San Francisco, CA: Morgan

Kaufmann, 2000. [Information Content (108-111); Data Sharing (415-423)]

B - White, Ron and Timothy Edward Downs. *How Computers Work*. 9th Edition. How It Works Series. Indianapolis, IN: Que, 2007. [How Word Processors Format Text (144-145); How Optical Character Recognition Works (218-219)]

Other Related Readings

May 22, Session 8 - Identifiers for Digital Objects

- Commonly used identifiers (e.g. file names, URLs)
- Promising approaches for persistent identifiers
- Differences between local and global identifiers

Focal Readings:

W - Campbell, Douglas. "Identifying the Identifiers." Paper presented at the International Conference on Dublin Core and Metadata Applications, Singapore, August 27-31, 2007. http://dcpapers.dublincore.org/index.php/pubs/article/download/868/864

W - Hilse, Hans-Werner, and Jochen Kothe. *Implementing Persistent Identifiers: Overview of Concepts, Guidelines and Recommendations*. London: Consortium of European Research Libraries, 2006. http://webdoc.sub.gwdg.de/edoc/ah/2006/hilse_kothe/urn%3Anbn%3Ade%3Agbv%3A7-isbn-90-6984-508-3-8.pdf [Pay particular attention to the following pages: 1-7, 40-48]

W - Lyons, Susan. "Persistent Identification of Electronic Documents and the Future of Footnotes." *Law Library Journal* 97, no. 4 (2005): 681-94. http://www.aallnet.org/products/pub_llj_v97n04/2005-42.pdf

Related Video of Possible Interest: Van de Sompel, Herbert, Robert Sanderson, and Michael Nelson. "Memento: Time Travel for the Web." Coalition for Networked Information Fall 2009 Membership Meeting, December 14-15, 2009, Washington, DC. http://vimeo.com/8365394 [See especially the first 15 minutes, in which Van de Sompel articulates the resource referencing problems being addressed by Memento.]

Other Related Readings

May 23, Session 9 - Operating Systems and File Systems

- What the OS does
- Major ways in which software can depend upon the OS

Focal Readings:

O, R- Carrier, Brian. "File System Analysis." In *File System Forensic Analysis*, 125-153. Boston, MA: Addison-Wesley, 2005. http://proquest.safaribooksonline.com.libproxy.lib.unc.edu/0321268172/ch08

W, R - Farmer, Dan, and Wietse Venema. "File System Basics." In *Forensic Discovery*. Upper Saddle River, NJ: Addison-Wesley, 2005. http://www.porcupine.org/forensics/forensic-discovery/chapter3.html

C, R - St. Amant, Robert. "Operating Systems: Working Together." In *Computing for Ordinary Mortals*, 108-130. New York, NY: Oxford University Press, 2013.

Other Related Readings

May 23, Session 10 - Moving Bits around - Input/Output and Networks

- Input/Output mechanisms
- Data communications
- Layers (network stack)
- Types of networks
- Internet protocols
- Local area network (LAN) and wide area network (WAN)
- Firewalls

Focal Readings:

C, R - Garrido, JosÃ© M., and Richard Schlesinger. *Principles of Modern Operating Systems*. Sudbury, MA: Jones and Bartlett Publishers, 2008. [The I/O System (219-244)]

C, R - Messerschmitt, David G. *Understanding Networked Applications: A First Course*. San Francisco, CA: Morgan Kaufmann, 2000. [Networked Computing Infrastructure and The Internet (118-131); Two Host Architectures and Three-Tier Client-Server Architecture (140-148); Communication Services (345-368); Network Architecture and Protocols (517-538)] [345-368 is in a separate file through Sakai, rather than the main book excerpt document]

B, R - White, Ron and Timothy Edward Downs. *How Computers Work*. 9th Edition. How It Works Series. Indianapolis, IN: Que, 2008. [How Curcuits Juggle Data (21-29); Input/Output Devices (204-217, 230-241); How the Internet Works (315-321, 333-337, 339-341, 344-345, 348-349, 361-365, 368-373, 384-385)]

Other Related Readings

May 27, Session 11 - Making and Running Software - Essential Components

- Programming - fundamentals of what programming languages do and some of their common elements
- Roles and differences between source code, assembly code, object code, compilers, interpreters, machine instructions
- Viruses

Focal Readings:

C, R - Kernighan, Brian W. "Programming and Programming Languages." *D Is for Digital: What a Well-Informed Person Should Know About Computers and Communications*, 65-83. DisforDigital.net, 2012.

C, R - Messerschmitt, David G. *Understanding Networked Applications: A First Course*. San Francisco, CA: Morgan Kaufmann, 2000. [Programming an Application (325-344)]

C, R - St. Amant, Robert. "Programming: Putting Plans Into Action." In *Computing for Ordinary Mortals*, 81-107. New York, NY: Oxford University Press, 2013.

B, R - White, Ron and Timothy Edward Downs. *How Computers Work*. 9th Edition. How It Works Series. Indianapolis, IN: Que, 2008. [How Programming Languages Work (95-103); Viruses (386-391)]

Other Related Readings

May 27, Session 12 - Industry Patterns, Players, Relationships and Trends

- Obsolescence
- Network Effects
- Lockin, legacy systems and angry orphans

Focal Readings:

C, O, R - Messerschmitt, David G. and Clemens Szyperski. *Software Ecosystem: Understanding an Indispensable Technology and Industry*. Cambridge, MA: MIT Press, 2005. [Software Supply Industry (171-197); Software Creation Industry (200-265)] http://www.netlibrary.com.libproxy.lib.unc.edu/AccessProduct.aspx?ProductId=100089

O, R - Shapiro, Carl, and Hal Varian. "Recognizing Lock-In." In *Information Rules*, 103-134. Boston, MA: Harvard Business School Press, 1999. http://www.netlibrary.com.libproxy.lib.unc.edu/AccessProduct.aspx?ProductId=35060

Other Related Readings

Part 2 - Strategies and Approaches

May 28, Session 13 - Organizational and Conceptual Approaches

- Taking complexity, change and robustness seriously
- Change management
- Models and modeling

Focal Readings:

C, R - Axelrod, Robert, and Michael D. Cohen. *Harnessing Complexity: Organizational Implications of a Scientific Frontier*. New York, NY: The Free Press, 1999. [Introduction (1-31); Conclusion (152-160)]

W - Lee, Cal. "Never Optimize: Building & Managing a Robust Cyberinfrastructure." History and Theory of Infrastructure: Distilling Lessons for New Scientific Cyberinfrastructures, Ann Arbor, MI, September 28 - October 1, 2006. http://ils.unc.edu/callee/never-optimize.pdf

Other Related Readings

May 28, Session 14 - Architectural and System Design Approaches

- Configuration management
- Modularity and decomposability
- Standards
- Being indirect on purpose - abstraction and virtualization
- Gateways
- Reengineering
- Code Reuse
- Middleware

Focal Readings:

C, O, R - Baldwin, Carliss Y., and Kim B. Clark. "What is Modularity?" *Design Rules*. Vol. 1: The Power of Modularity, 63-92. Cambridge, MA: MIT Press, 2000. http://site.ebrary.com.libproxy.lib.unc.edu/lib/uncch/Top?

id=2001005

C - Cargill, Carl F. "A History of Standards" and "A User Perspective on Technical Standardization." In *Open Systems Standardization: A Business Approach*, 14-25, 89-96. Upper Saddle River, NJ: Prentice Hall, 1997.

C - Seacord, Robert, Daniel Plakosh, and Grace Lewis. "The Legacy Crisis," "Understanding the Legacy System," and "Recommendations." *Modernizing Legacy Systems: Software Technologies, Engineering Processes and Business Practices*, 1-17, 57-67, 303-308. New York, NY: Addison-Wesley, 2003.

Other Related Readings

May 29, Sessions 15 and 16 - Synthesis and Conclusions

May 30 - Synthesis and Conclusions [No in-class session. Partipate in online activity for this day.]

Final Exam - June 16-17 (you choose 3-hour block on one of these days).

Other Related Readings by Week:

Session 2 - Technology - Definition, Characteristics and Social Dynamics

O - Bowker, Geoffrey C., and Susan Leigh Star. *Sorting Things Out: Classification and Its Consequences*. Cambridge, MA: MIT Press, 1999. http://webcat.lib.unc.edu/record=b4005639

W - Imaging the Internet: A History and Forecast. http://www.elon.edu/predictions/

W - Kling, Rob. "What Is Social Informatics and Why Does It Matter?" *D-Lib Magazine* 5, no. 1 (1999). http://www.dlib.org/dlib/january99/kling/01kling.html

C - Sproull, Lee S., and Sara Kiesler. "Beyond Efficiency." and "A Two-Level Perspective on Technology." In *Connections: New Ways of Working in the Networked Organization*, 1-17 and 19-35. Cambridge, MA: MIT Press, 1991.

Session 3 - Technological Components: Historical Origins and Interoperability

O - Abbate, Janet. *Inventing the Internet*. Cambridge, MA: MIT Press, 2000. http://webcat.lib.unc.edu/record=b4005077

W - Babbage Difference Engine in Motion. https://www.youtube.com/watch?v=jiRgdaknJCg

W - Besser, Howard. "Digital Longevity." In *Handbook for Digital Projects: A Management Tool for Preservation and*

Access, edited by Maxine K. Sitts. Andover, MA: Northeast Document Conservation Center, 2000. http://www.gseis.ucla.edu/~howard/Papers/sfs-longevity.html

Brown, Adrian. "Preservation." In *Archiving Websites: A Practical Guide for Information Management Professionals*, 82-126. London: Facet, 2006.

W - Computer History Museum. "Timeline of Computer History." http://www.computerhistory.org/timeline/

W - Digital Preservation and Technology Timeline. Cornell University Library. http://www.library.cornell.edu/iris/tutorial/dpm/timeline/index.html

W - Kay, Russell. "35 Technologies that shaped the industry." *Computerworld*. September 30, 2002. http://www.computerworld.com/managementtopics/management/story/0,10801,74632,00.html

W- McDonough, Jerome. "Structural Metadata and the Social Limitation of Interoperability: A Sociotechnical View of XML and Digital Library Standards Development." Paper presented at Balisage: The Markup Conference, August 12-15, 2008. http://www.balisage.net/Proceedings/vol1/html/McDonough01/BalisageVol1-McDonough01.html

W - Metadata Basics. Dublin Core Metadata Initiative. http://dublincore.org/metadata-basics/ [See especially the four levels of interoperability.]

W - Moore, Reagan. "Towards a Theory of Digital Preservation." *International Journal of Digital Curation* 1, No. 3 (2008). http://www.ijdc.net/index.php/ijdc/article/viewFile/63/42

Shasha, Dennis Elliott, and Cathy A. Lazere. *Out of Their Minds: The Lives and Discoveries of 15 Great Computer Scientists*. New York: Copernicus, 1995.

C - Smith, Richard E. "A Historical Overview of Computer Architecture." *Annals of the History of Computing* 10, no. 4 (1989): 277-303.

R - Tanenbaum, Andrew S. *Structured Computer Organization*. Fifth ed. Upper Saddle River, NJ: Prentice Hall, 2006. [Milestones in Computer Architecture, 13-26]

O - Tzitzikas, Yannis. "Dependency Management for the Preservation of Digital Information." In *Database and Expert Systems Applications*, 582-92. Berlin: Springer, 2007.

Session 4 - General Overview of Computer Architecture

R - Tanenbaum, Andrew S. *Structured Computer Organization*. Fifth ed. Upper Saddle River, NJ: Prentice Hall, 2006. [Chapter 2 (Computer Systems Organization): 51-134]

Session 5 - How to Read a Bit - Storage, Signal Detection and the Logic of Bits

O - Bairavasundaram, Lakshmi N., Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, Garth R. Goodson, and Bianca Schroeder. "An Analysis of Data Corruption in the Storage Stack." *ACM Transactions on Storage* 4, no. 3 (2008). http://doi.acm.org.libproxy.lib.unc.edu/10.1145/1416944.1416947

O - Balkestein, Marjan, and Heiko Tjalsma. "The ADA Approach: Retro-Archiving Data in an Academic

Environment." *Archival Science* 7, no. 1 (2007): 89-105.

W - Brezinski, Dominique, and Tom Killalea. "Guidelines for Evidence Collection and Archiving." Request for Comments 3227. 2002. http://www.ietf.org/rfc/rfc3227.txt

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I would like to express my gratitude to Jean-François Blanchette, Kelly Garrett, and Paul Resnick for making the materials from their courses (IS 270: Introduction to Information Technology at UCLA, and SI 540: Understanding Networked Computing at the University of Michigan) available. They have been extremely useful to me in preparation of this course.