

Special Topics in Digital Media
DM-UY 4114 A
Program in Integrated Digital Media

History of Computing: How the Computer Became Personal
MCC-UE 1171
Department of Media, Culture, and Communication

Instructors

Tega Brain
brain@nyu.edu

Office: 2 MetroTech Center # 878 (BK)

Laine Nooney
laine.nooney@nyu.edu

Office: 239 Green St #717 (WS)

Office Hours: 4:30-6pm Wednesdays, or by appointment

Course Information

Wednesdays, 2-4:30PM

2 Metrotech Center, Room 811

Course Overview

Meeting once per week, this course aims to (1) explore how historical and cultural knowledge can be enriched through hands-on technological practice, and (2) deepen an aesthetic exploration of digital media through greater awareness of the historical materiality of computer technology. The course will alternate between seminars offering historical analysis, lecture and discussion of aspects of computer history, and labs offering technical instruction and hands on experimentation with some of these tools and technologies. This course's readings and activities move students from the innermost workings of the computer through to the implications of its outermost cultural forms and materiality, with a historical focus on the computer's development from the mid-1970s to the late-1980s.

Learning Outcomes

- Students will develop a working knowledge of a computer's internal operations
- Students will review and reflect on the political and cultural contexts that spurred computer production and consumption within the United States
- Students will analyze primary documents for the purpose of making historical claims
- Students will deconstruct and critique notions of technological progress and advancement (both contemporary and historical), otherwise known as technological determinism
- Students will work with the fundamental building blocks of computation like electronic circuits, binary logic and microcontrollers
- Students will conceptualize, design and prototype a speculative historical artefact

Required Texts

This course will require approximately 20-40 pages of reading per week. All readings are provided as PDFs of NYU Classes and/or website links.

Course Slack

This course makes use of the collaborative team tool Slack, and our Slack site is <https://computerhistories.slack.com>. All students will be sent an invite on the first day of class. We will use the course Slack to facilitate groupwork, handle some assignment submissions, share links and resources, and to answer questions. We will post assignment sheets on Slack, but all readings will remain on NYU Classes.

Staying in Touch

If you have general questions about an assignment, project or reading, feel free to email us, post the question on Slack in #general, or send a direct message in Slack. Whatever you do, please contact both professors in the message. Please note: we won't discuss grades or performance over Slack or email. Please come to office hours to discuss, if necessary.

Assignments

Your grade in this course will be based on the follow breakdown of assignments:

- 10% Exit Tickets
- 20% Primary Document Analysis
- 15% Pitch Materials: Annotated Bibliography
- 15% Pitch Materials: In-Class Pitch
- 15% Final Project: Written Documentation
- 30% Final Project: Project Submission

PART A: Analyzing the Past

Exit Tickets (10%)

At the end of each lecture or studio based class (12 classes out of the semester), you will have five minutes to send a direct message “Exit Ticket” to the Professors via Slack. Exit Tickets serve as a way for us to get a sense of where everyone is at when class ends.

Exit Tickets include one of the following:

- An issue we did not address that you would like addressed
- A question you have based on today's discussion
- A point you still do not understand that you want clarified
- A question you wanted to ask but did not

- **In Professor Brain's labs, this may also include sending one or more images

We may either respond to your questions via Slack, or combine questions to address the issues the following class. Exit Tickets are graded pass/fail. Since you can be absent for 2 days of class, we will only grade you for 10 tickets. If you exceed 2 absences, Exit Tickets cannot be made up.

Due date: Weekly (weeks 1-12)

Further information: Individual assignment. Online submission.

Primary Document Analysis (15%)

A core part of our learning objectives in this course is to *learn how to learn about the past*. To do that, this assignment will ask you to spend time with a single issue of a computer enthusiast magazine from sometime between 1975-1985 (choices for individual issues will be given when the assignment is formally assigned on February 20), and then provide a 4-5 page analysis that accomplishes the requirements below.

1. Provide a thorough, analytic description of the magazine (1-page). Elements examined might include (but are not limited to): who does it seem intended for, what is its tone, does there seem to be a specific content emphasis, either in terms of platform, subcultural interests, or some other quality? How broad or narrow is its coverage? Students should develop their own insights, based on their specific magazine, that go beyond these questions.
2. An analysis of that specific magazine *as a historical document*. In other words, what can be derived about computer culture, user practices, consumer or corporate anxieties, etc by analyzing the form and content of the magazine? Students should aim to make an overarching claim about the magazine that is supported by analysis of specific features (article content, advertisements, etc.). Students are expected to move beyond content summary to offer a deep, compelling, thoughtful analysis.

Analysis must be printed out, stapled, and turned in on the due date. Student may use whatever citation style they are most familiar with, but it must be consistently implemented throughout.

Late papers will not be accepted. Papers should be thoroughly proofread and free from grammatical and punctuation errors. Students who need assistance with editing should seek help from the Writing Center.

Due date: March 27th at the start of class.

Further information: Individual assignment. Submit a printed copy in class.

PART B: Speculative Historical Artifact

The series of assignments in the last half of semester builds on what you have learned about historic cultures and practices of personal computing. Working in groups (or in special cases, individually), these assignments will scaffold you to create a scenario and “speculative historical artefact” that relates historically, critically and imaginatively to one of the topic areas covered in this course. These tasks are divided into project pitch materials, and final project materials.

Pitch Materials: In-Class Pitch (15%)

Building on the in class exercises and your own research, identify and discuss some of the contextual variables that are at play in your chosen topic/time period. By modifying one or more of these variables, develop a speculative historical scenario, Use this to ideate and sketch out one or more ideas for historical artifacts from this period. Your artifact might be a fictional primary document that addresses a certain aspect of computing like an advertising campaign, an instructional video, a manual, a pamphlet, a magazine article, a patent, packaging for software, a demo, a faire booth etc. You could also prototype of a speculative historic computational technology like some software, a peripheral device like a printer, a controller, a monitor, a scanner, computer furniture or another ergonomic device for computing. Present your historical scenario and pitch your idea(s) for fictional artifacts. To be followed by class discussion and critique.

Due date: April 10th in class.

Further information: Group (or in special cases, individual) assignment. In class presentation.

Pitch Materials: Annotated Bibliography (15%)

As an exercise preparing you for the final project, student groups will produce a 5-entry annotated bibliography, based on research you conducted beyond the course readings as part of your final project. Annotations include a Chicago-style bibliography entry, and a 150-200 word paragraph summarizing the article/book/etc. Your group’s annotated bibliography must include a minimum of two primary and two secondary documents. Students are expected to independently scour online and offline primary documents to locate of-the-era articles, news coverage and artifacts relating to their interests.

Due date: April 10th in class.

Further information: Group (or in special cases, individual) assignment. Submit a printed copy in class.

Final Project: Design Rationale (15%)

Write a 2-3 page paper describing the design rationale of your fictional artifact. This text should describe your speculative past and how you developed it. What variables changed and what different imaginative context has this produced? It should situate your artifact within this context and describe what issues it addresses. This paper should also describe how you used historical documents to inform your design practice.

Due date: May 8th at the start of class.

Further information: Group (or in special cases, individual) assignment. Submit a printed copy in class.

Final Project: Presentation and Documentation of Artifact (25%)

Present your final speculative historical artifact in class and give an overview of your background research and the historical documents that have informed your design process. Your presentation should include documentation of your artifact in images or video.

Due date: May 8th at the start of class.

Further information: Group (or in special cases, individual) assignment. In class presentation.

Evaluation Rubric

A= Excellent

This work is comprehensive and detailed, integrating themes and concepts from discussions, lectures and readings. Writing is clear, analytical and organized. Arguments offer specific examples and concisely evaluate evidence. Students who earn this grade are prepared for class, synthesize course materials and contribute insightfully.

B=Good

This work is complete and accurate, offering insights at general level of understanding. Writing is clear, uses examples properly and tends toward broad analysis. Classroom participation is consistent and thoughtful.

C=Average

This work is correct but is largely descriptive, lacking analysis. Writing is vague and at times tangential. Arguments are unorganized, without specific examples or analysis. Classroom participation is inarticulate.

D= Unsatisfactory

This work is incomplete, and evidences little understanding of the readings or discussions.

Arguments demonstrate inattention to detail, misunderstand course material and overlook significant themes. Classroom participation is spotty, unprepared and off topic.

F=Failed

This grade indicates a failure to participate and/or incomplete assignments

A = 94-100

A- = 90-93

B+ = 87-89

B = 84-86

B- = 80-83

C+ = 77-79

C = 74-76

C- = 70-73

D+ = 65-69

D = 60-64

F = 0-59

Course Policies

Absences, Lateness and Life

There are several reasons we want you to arrive to class regularly, on time, and stay for the entirety of class:

- it gives you space and time to deeply engage with the texts and ask questions as part of a learning community
- it prevents confusion about course content and assignments
- it's respectful to everyone in the classroom
- it minimizes distraction
- it helps keep you from falling behind, preventing added stress, anxiety, the extra work of sending emails or arranging meetings to catch up, etc

Our *recommendation* is that you miss no more than 1 class. Our *policy* is that you miss no more than 2 classes. As a safeguard to prevent abuse of attendance, our policy also states that you can lose half your final letter grade with each subsequent lateness.

Important: When "life happens," please email us both, in the same email. We can help you much more effectively if we are aware of any personal struggles or issues you are having in the

moment, rather than days or weeks after. Important: if you fall behind, please email us. We can work a strategy to get you back on track. You will not be in trouble for asking for help.

Absences are yours to do with as you please; you do not need to provide “proof” of an absence (i.e. you don’t need to email me doctor’s notes, plane tickets, etc.).

All assignments should be in at the beginning of class, via the format specified, regardless of whether you are present for class. This policy instills “fairness” across the classroom—all students are given the same amount of time to work on an assignment. We typically reduce an assignment grade by 5% for each calendar day late, beginning with the due date (i.e. assignments turned in after class but on the due date will still receive 5% off). Exit Tickets can’t be made up.

Format

Please type and double-space your written work. Typing improves the clarity and readability of your work and double-spacing allows room for me to comment. Please also number and staple multiple pages. Please refer to assignment sheets for specific citation guidelines.

Grade Appeals

All students have the right to contest a grade. Please allow two days to pass before you submit a grade appeal. This gives you time to reflect on my assessment. If you still want to appeal your grade, please submit a short but considered paragraph detailing your concerns. Based on this paragraph I will review the question and either augment your grade or refine my explanation for your score.

Laptop/Tablet Courtesy

As a general rule, laptops are not permitted during course lectures given by either professor or any guest lecturer, unless stated otherwise. This means all note-taking should be done by hand. We encourage you to print out your readings so you can access them during lecture, but this is not required. Additionally, cell phones or other electronic devices should be stowed away during class.

If you require a laptop or tablet as part of special accommodations with the Moses Center, please arrange to have that documentation sent along to us. If you have specific concerns about this policy, please speak with both of us after class or over email.

Email Policy

We typically respond very quickly to email but can’t always promise to get back to you right away. Please give us 48 hours to respond to an email (so please note: “night before” emails may not get answered in time). Please note: We do not discuss grades or class performance over email.

Scheduling Meetings

We hold communal office hours immediately after class, from 4:30-6pm. If you need to schedule a meeting at another time, please email whichever professor is most equipped to address your question (historical questions to Prof. Nooney, creative and technical questions to Prof. Brain). In the case of questions about policies, absences, grades, etc, please email us both.

Academic Dishonesty and Plagiarism

The relationship between students and faculty is the keystone of the educational experience at New York University in the Steinhardt School of Culture, Education, and Human Development. This relationship takes an honor code for granted and mutual trust, respect, and responsibility as foundational requirements. Thus, how you learn is as important as what you learn. A university education aims not only to produce high-quality scholars, but to also cultivate honorable citizens.

Academic integrity is the guiding principle for all that you do, from taking exams to making oral presentations to writing term papers. It requires that you recognize and acknowledge information derived from others and take credit only for ideas and work that are yours.

You violate the principle of academic integrity when you cheat on an exam, submit the same work for two different courses without prior permission from your professors, receive help on a take-home examination that calls for independent work, or plagiarize.

Plagiarism, one of the gravest forms of academic dishonesty in university life, whether intended or not, is academic fraud. In a community of scholars, whose members are teaching, learning, and discovering knowledge, plagiarism cannot be tolerated.

Plagiarism is failure to properly assign authorship to a paper, a document, an oral presentation, a musical score, and/or other materials that are not your original work. You plagiarize when, without proper attribution, you do any of the following: copy verbatim from a book, an article, or other media; download documents from the Internet; purchase documents; report from other's oral work; paraphrase or restate someone else's facts, analysis, and/or conclusions; or copy directly from a classmate or allow a classmate to copy from you.

Your professors are responsible for helping you to understand other people's ideas, to use resources and conscientiously acknowledge them, and to develop and clarify your own thinking. You should know what constitutes good and honest scholarship, style guide preferences, and formats for assignments for each of your courses. Consult your professors for help with problems related to fulfilling course assignments, including questions related to attribution of sources.

Through reading, writing, and discussion, you will undoubtedly acquire ideas from others, and exchange ideas and opinions with others, including your classmates and professors. You will be

expected, and often required, to build your own work on that of other people. In so doing, you are expected to credit those sources that have contributed to the development of your ideas.

Avoiding Academic Dishonesty

- Organize your time appropriately to avoid undue pressure, and acquire good study habits, including note taking.
- Learn proper forms of citation. Always check with your professors of record for their preferred style guides. Directly copied material must always be in quotes; paraphrased material must be acknowledged; even ideas and organization derived from your own previous work or another's work need to be acknowledged.
- Always proofread your finished work to be sure that quotation marks, footnotes and other references were not inadvertently omitted. Know the source of each citation.
- Do not submit the same work for more than one class without first obtaining the permission of both professors even if you believe that work you have already completed satisfies the requirements of another assignment.
- Save your notes and drafts of your papers as evidence of your original work.

Disciplinary Sanctions

When a professor suspects cheating, plagiarism, and/or other forms of academic dishonesty, appropriate disciplinary action may be taken following the department procedure or through referral to the Committee on Student Discipline.

The Steinhardt School Statement on Academic Integrity is consistent with the New York University Policy on Student Conduct, published in the NYU Student Guide.

Student Resources

- Students with physical or learning disabilities are required to register with the Moses Center for Students with Disabilities, 726 Broadway, 2nd Floor, (212-998-4980) and are required to present a letter from the Center to the instructor at the start of the semester in order to be considered for appropriate accommodation.
- Writing Center (Washington Square): 411 Lafayette, 4th Floor. Schedule an appointment online at <https://nyu.mywconline.com> or just walk-in.

Our Accountability to You and Us to Each Other

Students and faculty each have responsibility for maintaining an appropriate learning environment. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, (a)sexual orientation, (a)gender, gender identity and gender expression, age, disability, immigration status, language, 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 (a)gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.

Course Reading Schedule

January 30: Welcome Day

- In-Class Historical Artifacts Analysis: *Byte*, September 1975

Unit One: Tinkering and Processing

February 6: Homebrew and the Counterculture: Origins of Personal Computing

- Selection from “Chapter 10: The Shaping of the Personal Computer,” *Computer: A History of the Information Machine*. Martin Campbell-Kelly, William Aspray, Nathan Ensmenger, and Jeffrey Yost. 3rd Edition. Boulder, CO: Westview Press, 2014. Pgs. 229-238.
- Petrick, Elizabeth. “Imagining the Personal Computer: Conceptualizations of the Homebrew Computer Club 1975-1977.” *IEEE Annals of the History of Computing*. Vol. 39, No. 4. Oct-Dec 2017, pp 27-39.
- Ian Litterick and Chris Smithers, *How Computers Work*, Hodder Wayland (1983). pgs 1-27.
- In-Class Historical Artifacts Analysis: Whole Earth Catalog; Homebrew Computer Club Newsletter Issue #6 August 20, 1975; Dr Dobb's Journal of Computer Calisthenics & Orthodontia February 1976

Additional Reading:

- Turner, Fred. *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*. Introduction and Chapter 1. Chicago, IL: University of Chicago Press (2006) pp 1-39.
- Brand, Stewart. "Spacewar: Fanatic Life and Symbolic Death among the Computer Bums." *Rolling Stone* 7 (1972): 50-58.
- Walter Isaacson, *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution*, Simon and Schuster (2014). Chapter 8, pp. 263-312.

February 13: From 0-1: An Intro to Electronics and Binary Logic

This hands-on lab introduces students to the basics of electricity, circuits, common components, switches and binary logic.

- Choi, Taeyoon, *Skating the Circuits*, Handmade Computer (2017).
- Choi, Taeyoon, *Binary Logic*, Handmade Computer (2017). Read up to but not including the section titled *Binary Numbers*.
- Altair 8800 Operators Manual (1975), pp. 1-8.

Additional Reading:

- Petzold, Charles. *Code: The hidden language of computer hardware and software*. Microsoft Press, 2000. Chapter 4 “Anatomy of a Flashlight”.

- Scherz, Paul. *Practical electronics for inventors*. McGraw-Hill, Inc., 2006. Chapter 3.

Unit Two: Chips, Bits and Bytes

February 20: Beyond Hackers and Hobbyists: The Computer Goes Home

- *Time*, Machine of the Year, “The Computer Moves In,” January 3, 1983.
- Selection from “Chapter 10: The Shaping of the Personal Computer,” *Computer: A History of the Information Machine*. Martin Campbell-Kelly, William Aspray, Nathan Ensmenger, and Jeffrey Yost. 3rd Edition. Boulder, CO: Westview Press, 2014. Pgs. 238-249.
- Alvin Toffler. *The Third Wave*. Bantam Books, 1981. Introduction and Chapter 1. pp 1-18.
- Primary Document Analysis Assigned
- In-Class Historical Artifacts Analysis: Apple II/IIe (1977, 1983); Apple IIc (1984); Computers for Everybody: 1984 Buyer’s Guide; Apple II advertising (late 70s-early 1980s).

Additional Reading:

- Freiburger, Paul and Michael Swaine, *Fire in the Valley: The Making of the Personal Computer*, Osbourne/McGraw-Hill (1984). Selections from Chapter 6 “Retailing the Revolution” pp. 157-187.

February 27: Counting, Encoding & Decoding

This hands-on lab introduces students to different counting systems like binary, octal and hexadecimal as well as character encoding systems such as ASCII.

- Petzold, Charles. *Code: The hidden language of computer hardware and software*. Microsoft Press, 2000. Chapter 8 “Alternatives to 10”.

Additional Reading:

- Petzold, Charles. *Code: The hidden language of computer hardware and software*. Microsoft Press, 2000. Chapter 9 “Bit by Bit by Bit”.

Unit Three: Software Foundations

March 6: Compilers, Interpreters & Operating Systems // GUEST LECTURER: Ramsey Nasser

- Walter Isaacson, *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution*, Simon and Schuster (2014). Chapter 9: Software, pp: 313-381.

Unit Four: Input/Output

March 13: Desktops and Peripherals

- Selection from “Chapter 11: Broadening the Appeal,” *Computer: A History of the Information Machine*. Martin Campbell-Kelly, William Aspray, Nathan Ensmenger, and Jeffrey Yost. 3rd Edition. Boulder, CO: Westview Press, 2014. Pgs. 253-267.
- Atkinson, Paul. "The best laid plans of mice and men: the computer mouse in the history of computing." *Design Issues* 23.3 (2007): 46-61.
- Primary Document Analysis Exercise
- In-Class Historical Artifacts Analysis: Apple Macintosh w/ Mouse (1984); Apple Imagewriter II (1985)

March 20: Spring Break!

March 27: Arduino and Microcontrollers

Primary Document Analysis Due

Introduction to Final Assignment

- Igoe, Tom. “Microcontrollers: The Basics.” Web blog post. *ITP Physical Computing Blog*, New York University, July 16, 2014

Additional Reading:

- Massimo, Banzi. "Getting started with Arduino." *Make: Books* (2011).

Unit Five: The Body Computational

April 3: Use, Design and the Body

Ideation Exercise for Final Project

- Shoshana Zuboff, *In the Age of the Smart Machine: The Future of Work and Power*, Chapter 4 “Office Technology as Exile and Integration,” Basic Books (1984) pp. 124-159.
- Petrick, Elizabeth. *Making Computers Accessible: Disability Rights and Digital Technology*. Selection from “Chapter 2: Early Personal Computing Accessibility, 1980-1987.” Baltimore, MD: Johns Hopkins Press (2015) pp. 35-47.
- *Tone Up at the Terminals: An Exercise Guide for High-Tech Automated Office Workers*. New York State Library. Date estimated late 1980s.
- In-Class Historical Artifacts Analysis: *Home Offices and Workspaces* (1986); *INMAC Office Supply Catalog 1984*; Roy Mason, *Xanadu: The Computerized Home of Tomorrow and How it Can Be Yours Today!* Acropolis Books (1983).

Additional Reading:

- Atkinson, Paul. "Man in a briefcase: the social construction of the laptop computer and the emergence of a type form." *Journal of design history* 18.2 (2005): 191-205.

April 10: Pitch Presentations and Next Steps

In-Class Pitch Brief Due

Annotated Bibliography Due

- Dunne, Anthony, and Fiona Raby. *Speculative everything: design, fiction, and social dreaming*. MIT press, 2013. Chapter 3, Design as Critique.

Unit Six: The Computer Supply Chain

April 17: E-Waste Field Trip

- Nathan Ensmenger, "The Environmental History of Computing." *Technology and Culture* 59, no. 5 (2018): S7-S33.

Additional Reading

- Sterne, Jonathan. "Out with the Trash: On the Future of New Media." *Residual Media*. University of Minnesota Press, 2007. pp 16-31.

April 24: 1st Prototypes and In-Class Crit

May 1: Guest Artist and Project Checkup

May 8: Final Presentations

Final Artifact due.

Final Project Written Documentation due.