Designing the Future:
Early & Future Visions of HCI

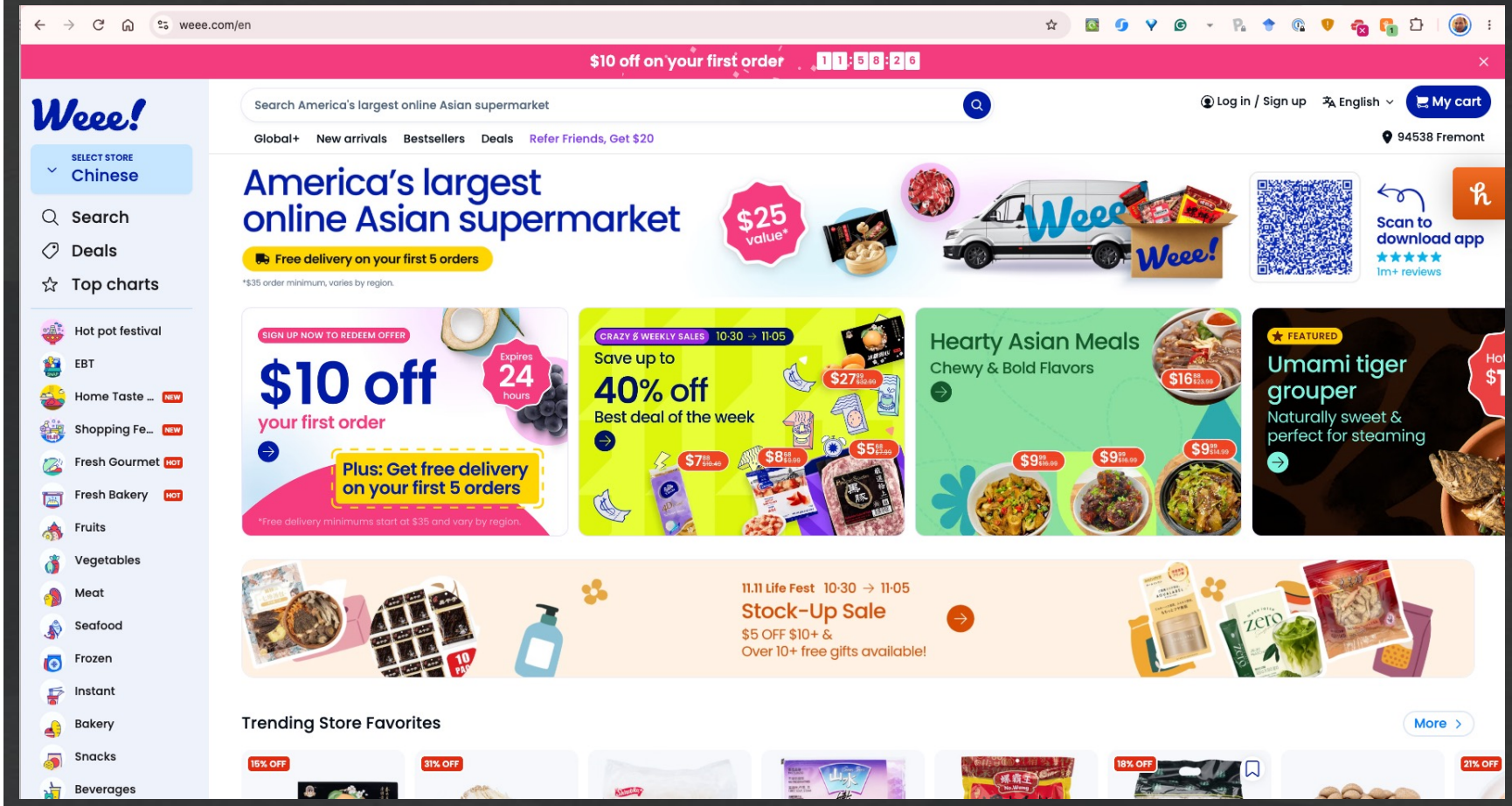
Prof. James A. Landay
Computer Science Department
Stanford University

Autumn 2026

November 4, 2026

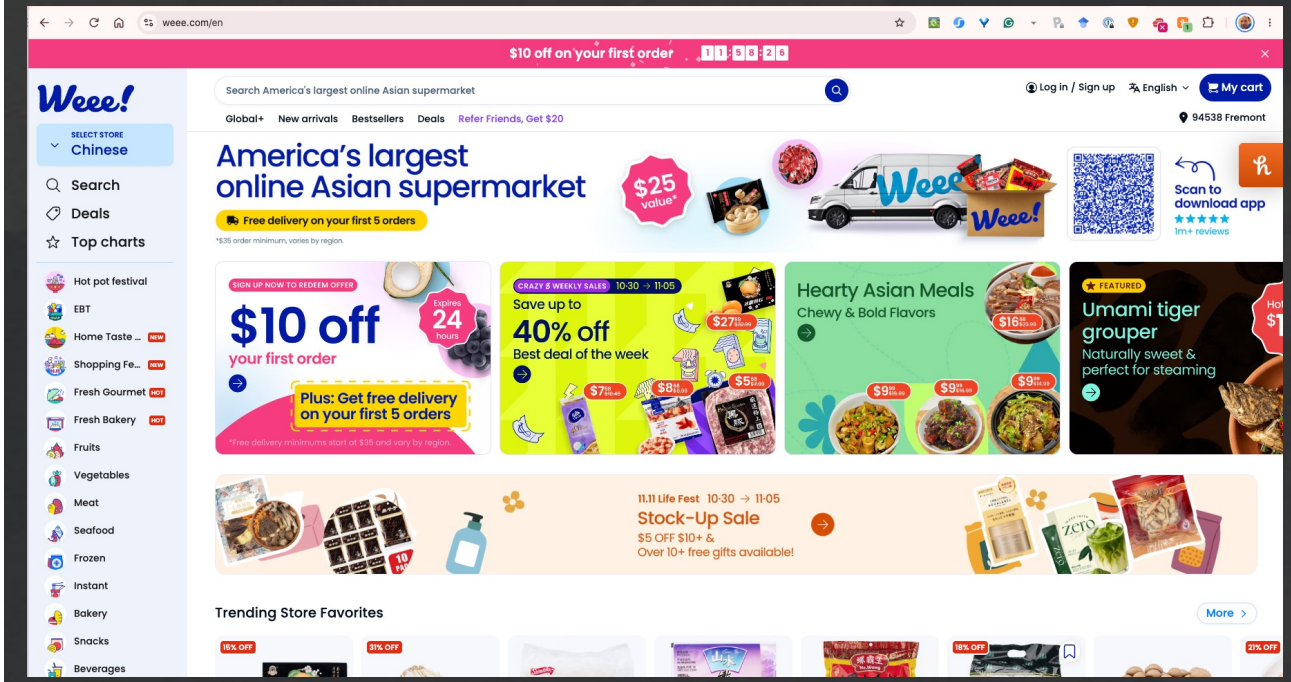
Music: https://soundcloud.com/dansuneroquette

Hall of Fame or Shame?



Weee!

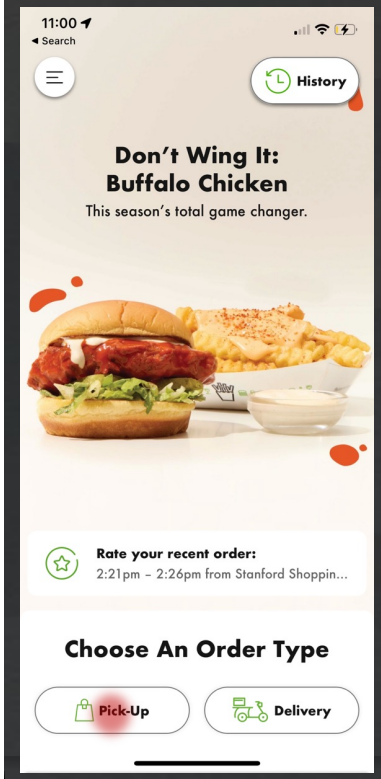
Hall of Shame!

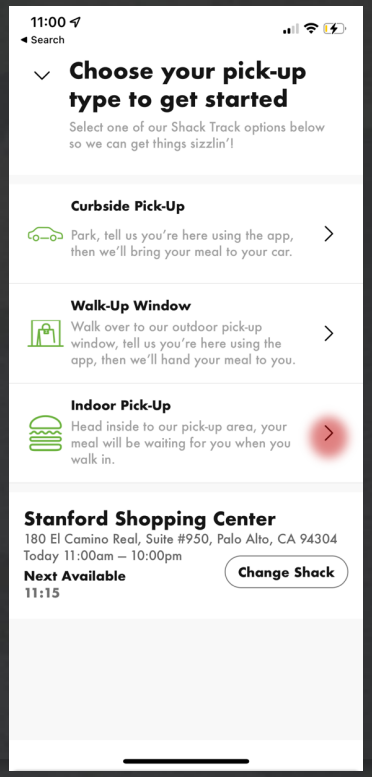


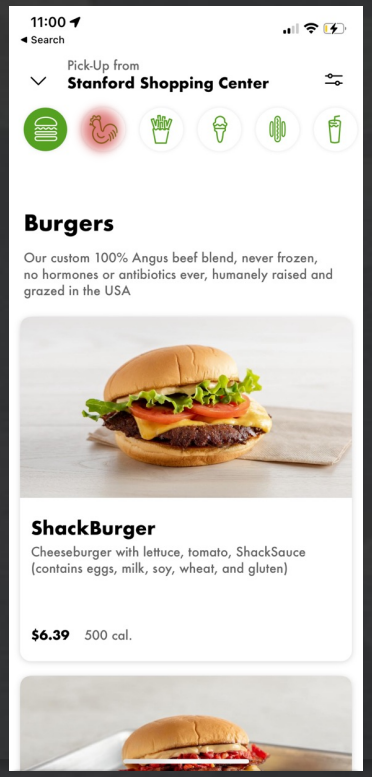
- Cluttered, competing promotional banners & colors
- Too many font sizes & styles
- Too many different options on the sidebar
- Too many calls to action

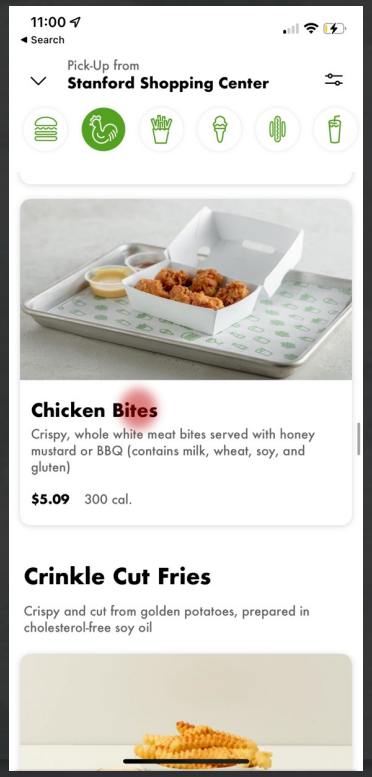
Hall of Fame or Shame?

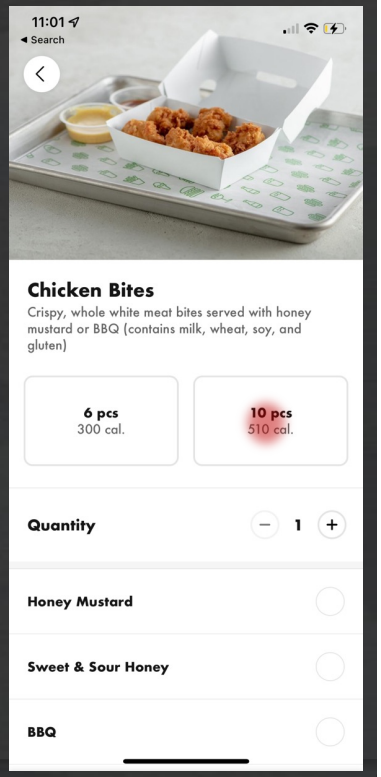
Shake Shack iPhone App







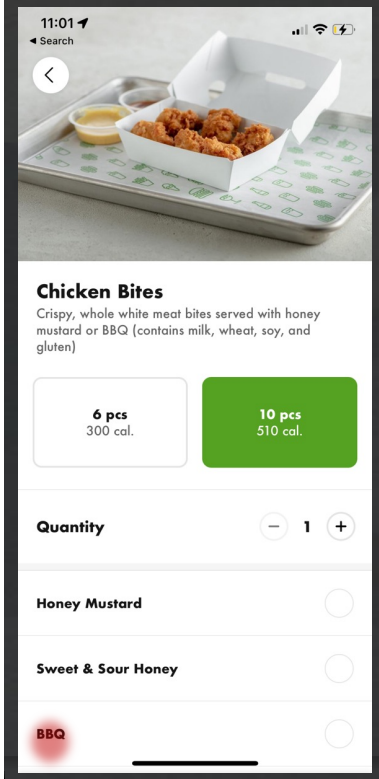


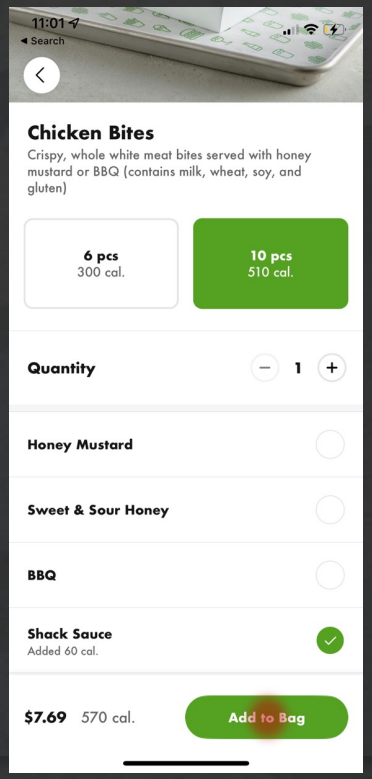


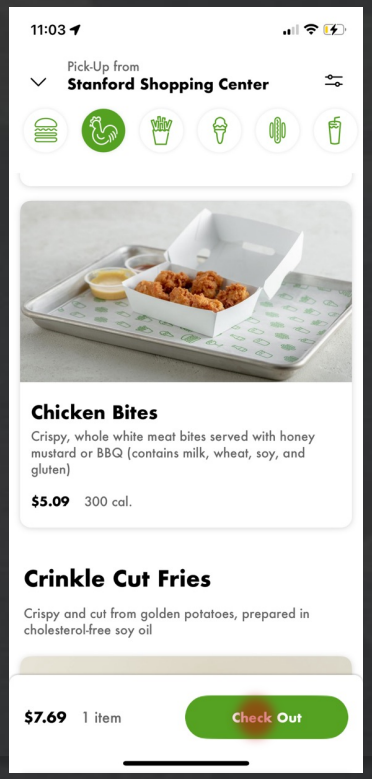
Hall of Fame or Shame?

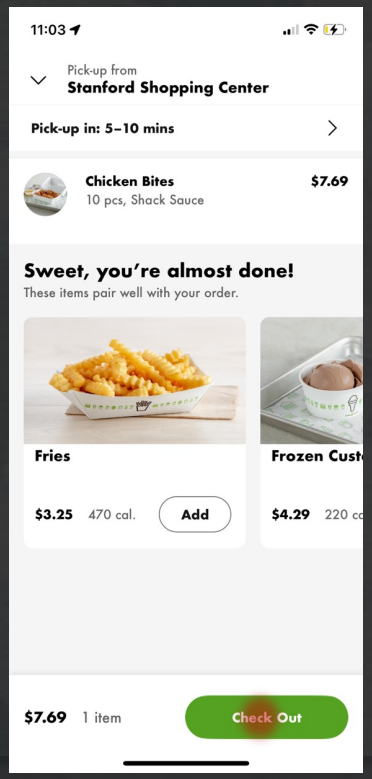


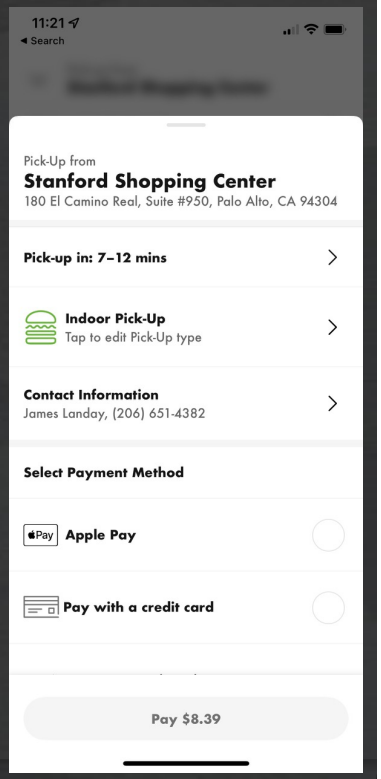
Shake Shack iPhone App







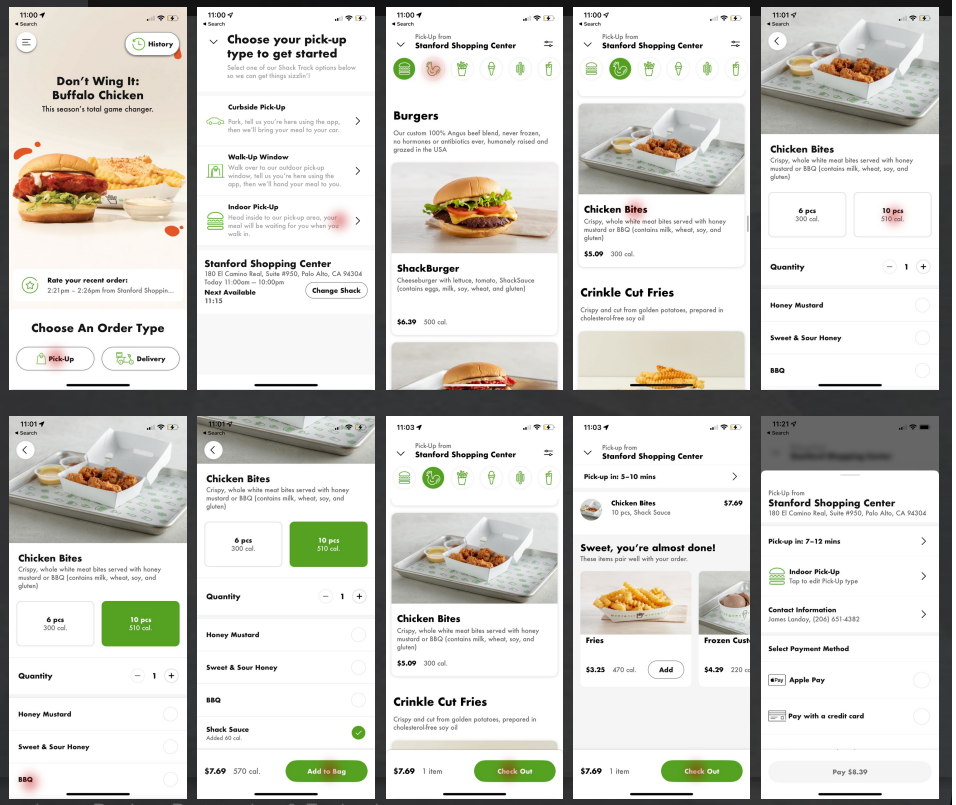




Hall of Fame or Shame?



Shake Shack iPhone App



Hall of Fame!

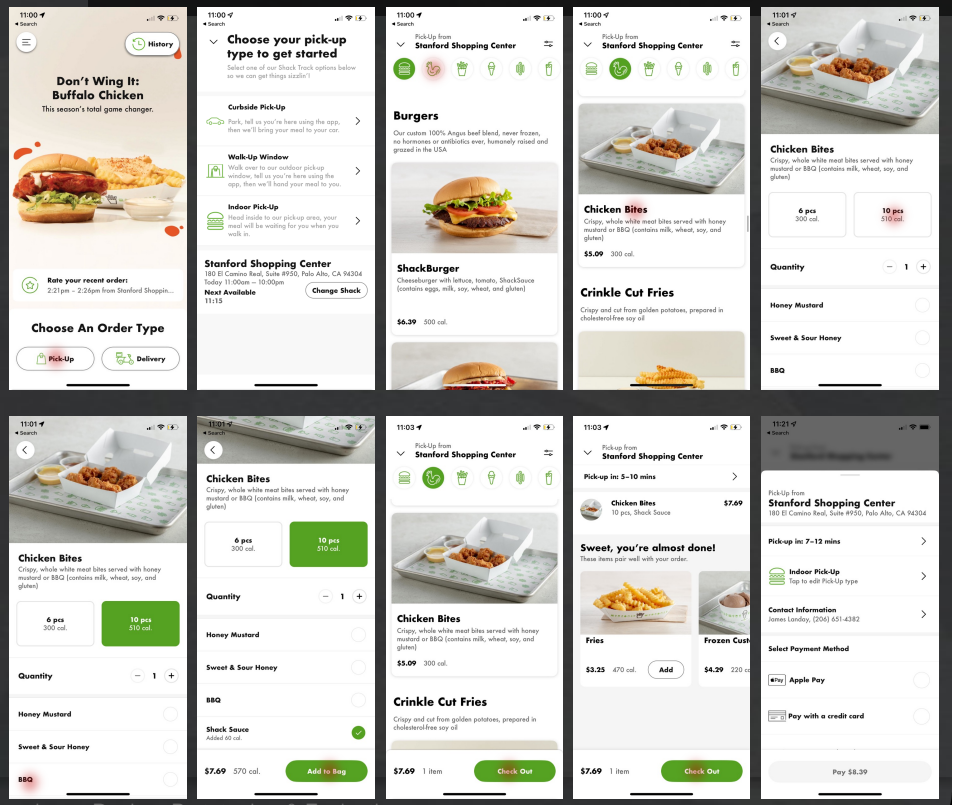
Shake Shack iPhone App

Aesthetic images of their food

Whitespace shows what is important

Simple icons are easy to figure out

Only one key accent color (green)
- for selection & key next step (“Add”)



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Music: https://soundcloud.com/dansuneroquette

Outline

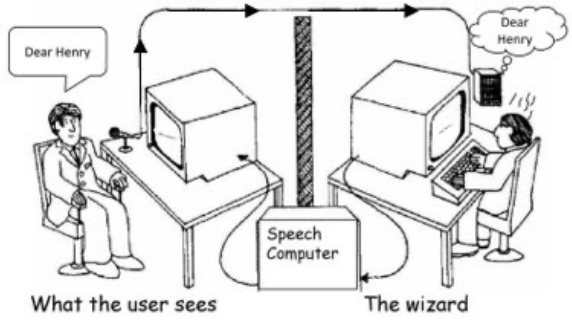
- Wizard of Oz Technique
- Computing in 1945
- Vannevar Bush & “As We May Think”
- Doug Engelbart & Augmenting Intellect
- SketchPad, Dynabook & The Xerox Star
- Team Break
- Future Visions of HCI

Wizard of Oz Technique

- Faking the interaction. Comes from?
  - the film “The Wizard of OZ”
    - “the man behind the curtain”
- Long tradition in computer industry
  - e.g., prototype of a PC w/ a DEC VAX (minicomputer) behind the curtain
  - much more important for hard to implement features



Wizard of Oz testing – The listening type writer IBM 1984



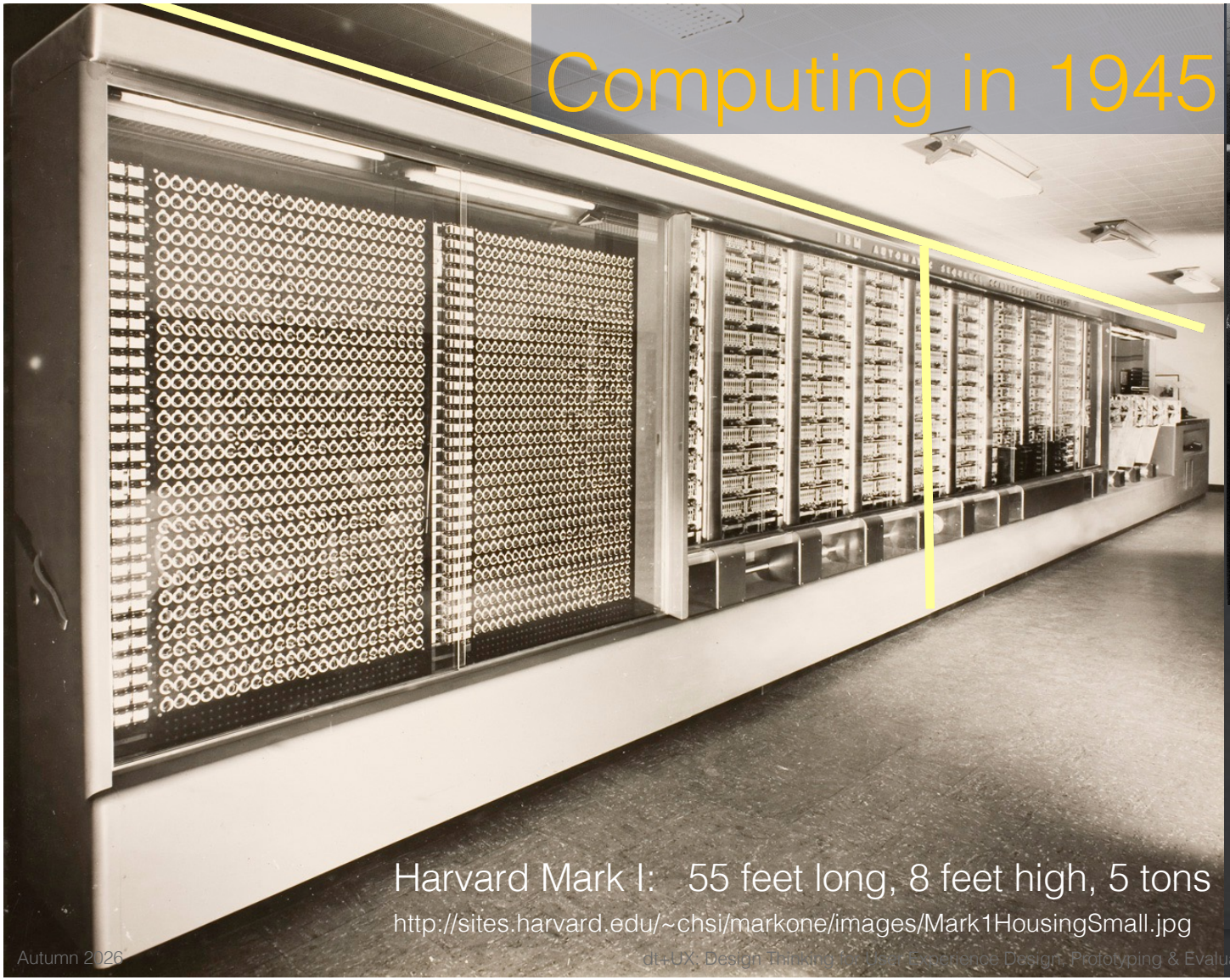
Wizard of Oz Technique

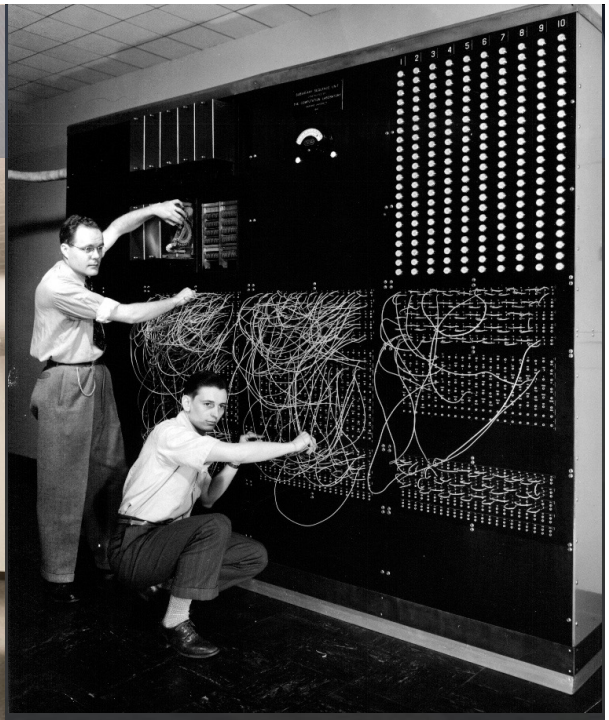


Carbon Shopper

- much more important for hard to implement features

Computing in 1945

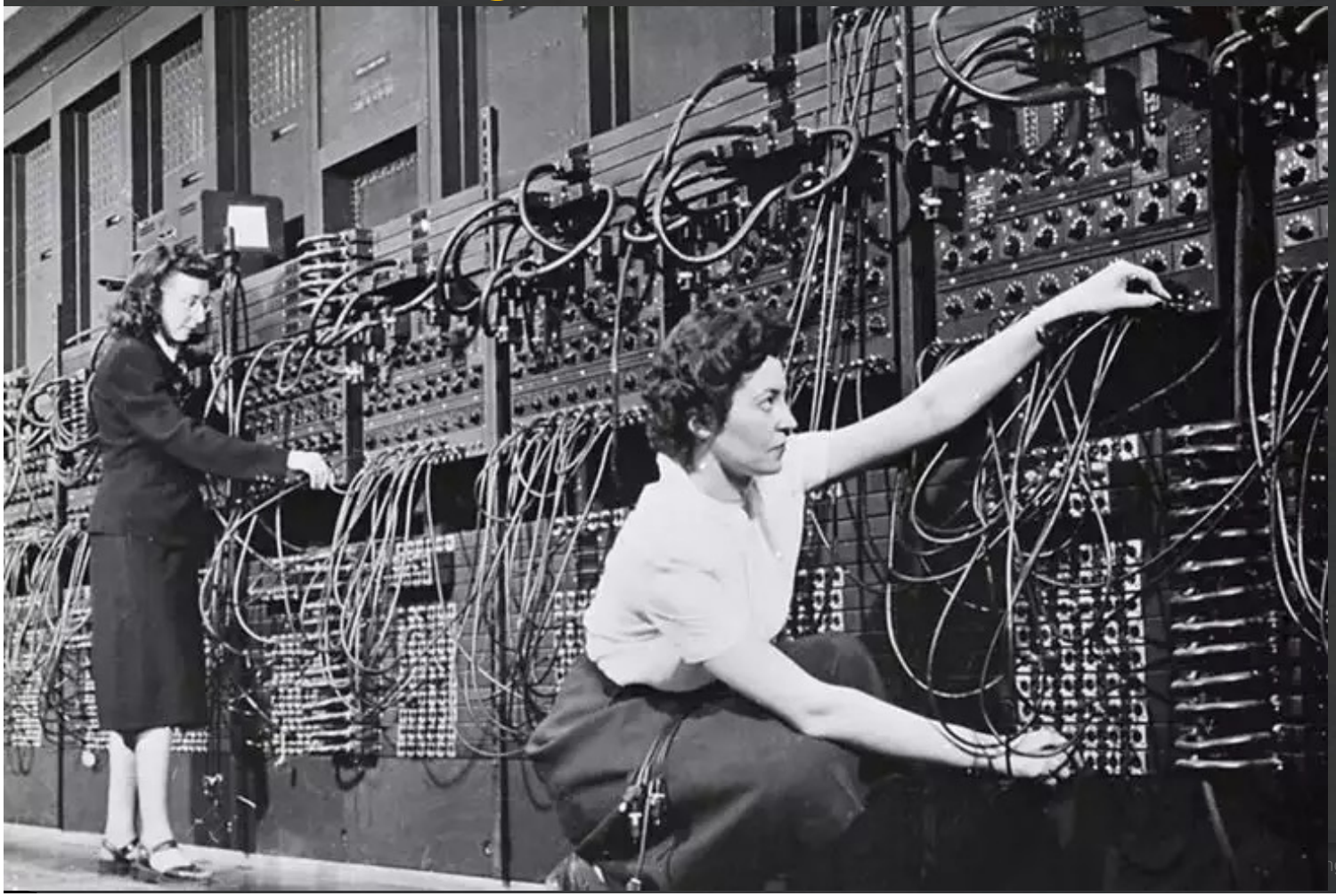




Harvard Mark I: 55 feet long, 8 feet high, 5 tons

http://sites.harvard.edu/~chsi/markone/images/Mark1HousingSmall.jpg

Computing in 1945



ENIAC

First Electronic, General Purpose Computer

http://www.phillyvoice.com/70-years-ago-six-philly-women-eniac-digital-computer-programmers/

Sister Mary Kenneth Keller

Sister Mary Kenneth Keller, from Cleveland, Ohio, was one of the first women, and very likely *the* first woman, to receive a Ph.D. degree in computer science in the United States. Keller entered the Sisters of Charity, a Catholic religious order, in 1932 and professed her vows in 1940. Later, she studied at DePaul University, where she received a B.S. degree in mathematics and an M.S. degree in mathematics and physics. In 1965, she received a Ph.D. degree in computer science from the University of Wisconsin. Her dissertation work involved constructing algorithms that performed analytic differentiation on algebraic expressions, written in CDC FORTRAN 63 [9].

As a graduate student, Keller also studied at Dartmouth, Purdue, and the University of Michigan. At Dartmouth, the university broke the "men only" rule and allowed her to work in the computer center, where she participated in the development of BASIC.

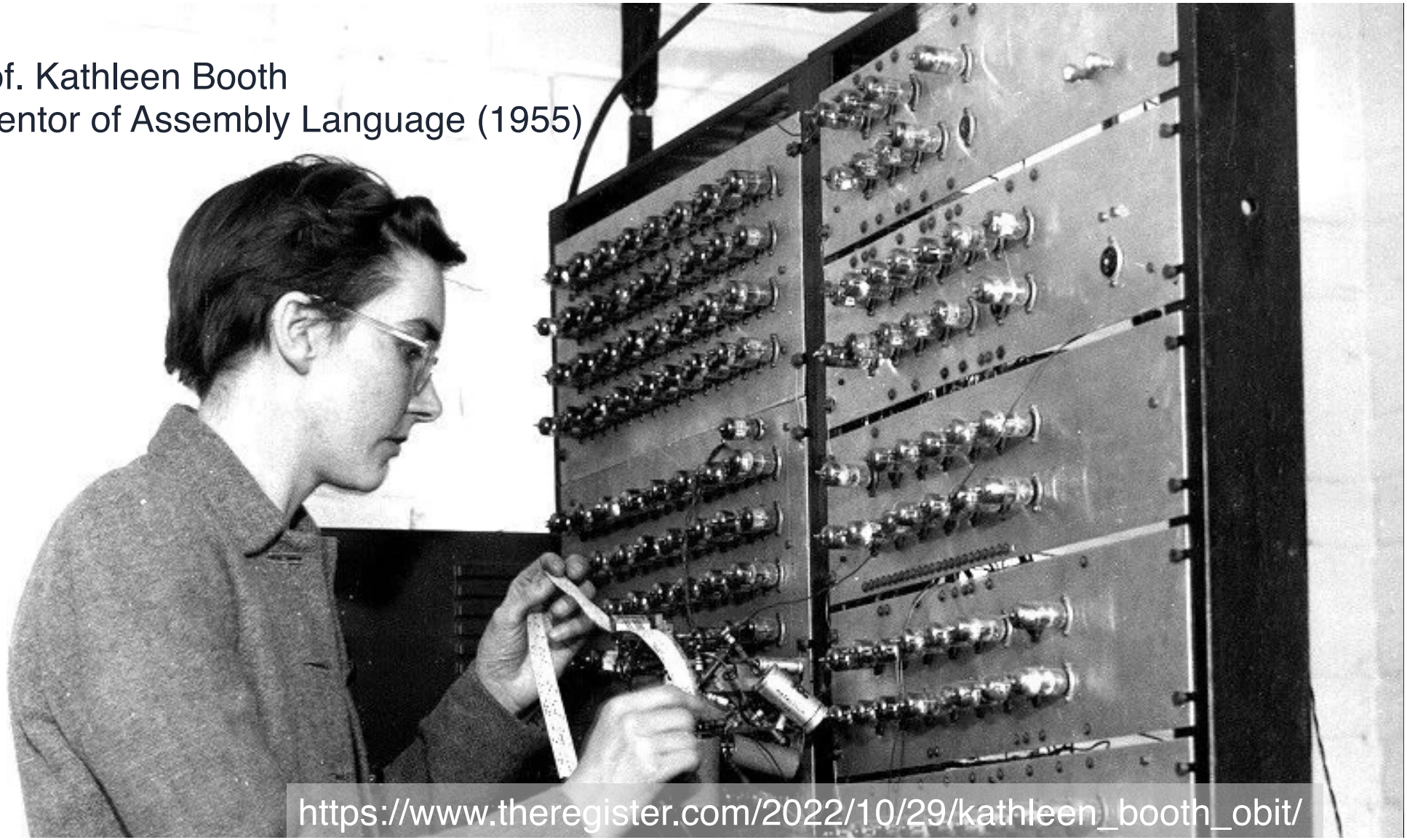
After receiving her Ph.D. degree, Keller accepted an offer of a faculty position at Clarke College in Dubuque, Iowa. Keller founded the Computer Science Department there and chaired it for 20 years. She also established a master's degree program for computer applications in education.

Keller felt that women should be involved in computer science and especially in the field of information specialist. In her words, "We're having an information explosion, among others, and it's certainly obvious that information is of no use unless it's available." Keller's vision extended beyond education and reached toward artificial intelligence. "For the first time, we can now mechanically simulate the cognitive process. We can make studies in artificial intelligence. Beyond that, this mechanism [the computer] can be used to assist humans in learning. As we are going to have more mature students in greater numbers as time goes on, this type of teaching will probably be increasingly important." Sister Mary Keller died at the age of 71 but has left a legacy of computers and education at Clarke College.



Sister Mary Kenneth Keller was one of the first women to receive a Ph.D. degree in computer science in the United States. (Courtesy Mount Carmel Archives)

Prof. Kathleen Booth
Inventor of Assembly Language (1955)



https://www.theregister.com/2022/10/29/kathleen_booth_obit/

Vannevar Bush Kicked Off Big Science

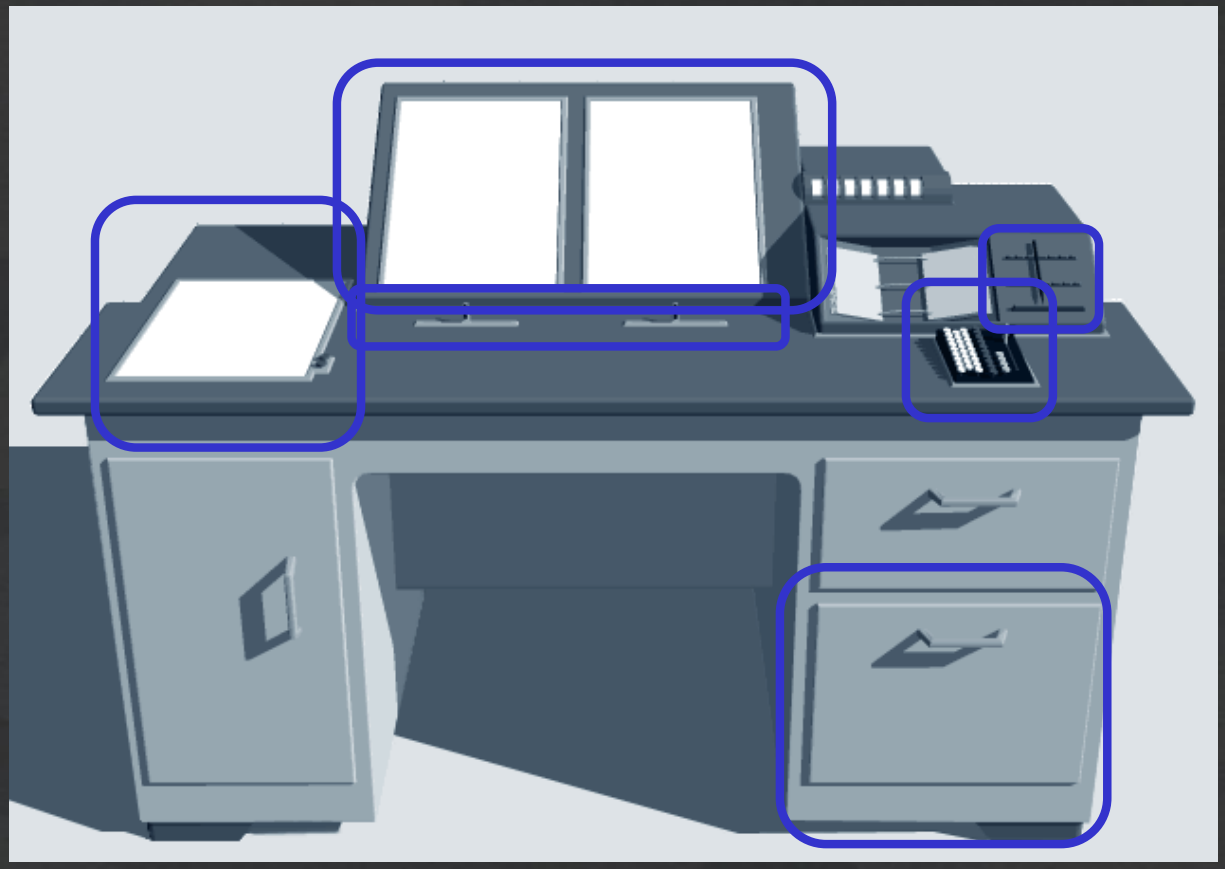
- MIT faculty member
- Coordinated WWII scientific effort
- Social contract for science
  - federal government funds universities
  - universities do basic research
  - helps economy & national defense

- "As We May Think", the *Atlantic Monthly*, July 1945
- Futuristic inventions ?
  - wearable cameras to record life
  - encyclopedia for a nickel
  - automatic transcripts of speech
  - trails of discovery
  - capture of nerve impulses
  - Memex



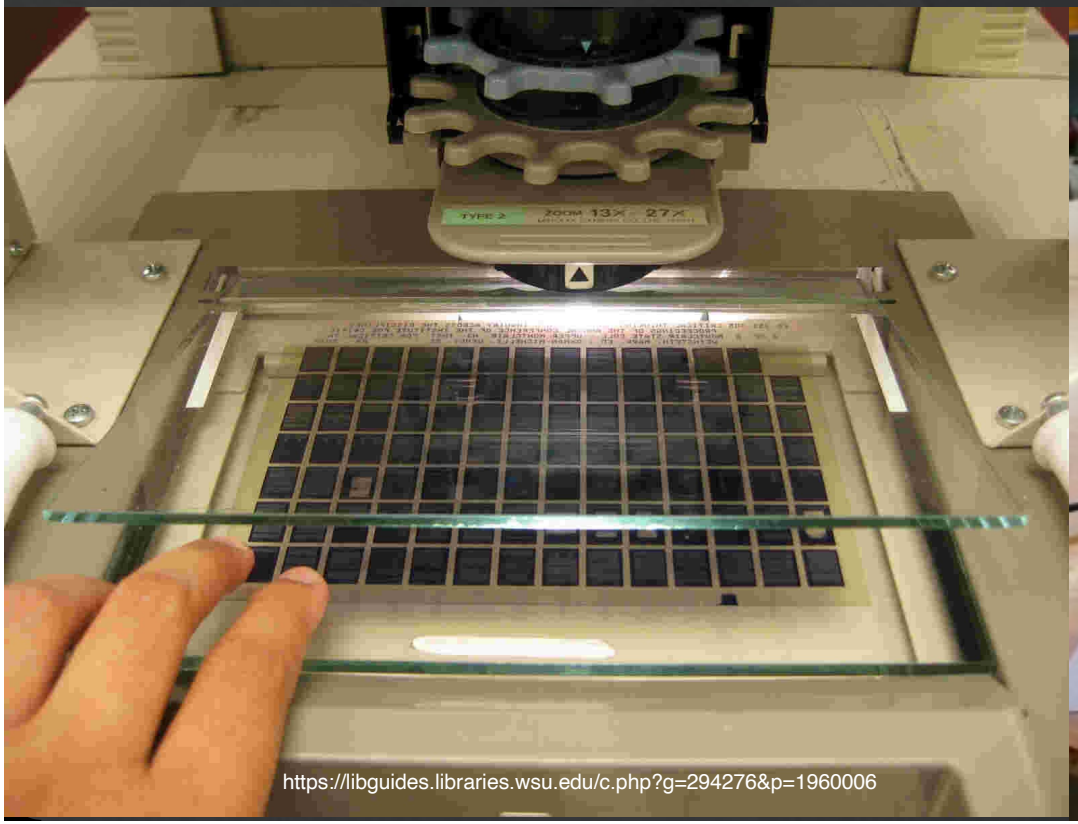
http://www-eecs.mit.edu/AY95-96/events/bush/

Memex



Picture from http://www.dynamicdiagrams.com/design/memex/model.htm#downloa
Demo at http://www.dynamicdiagrams.com/case_studies/mit_memex.html

Microfiche



https://libguides.libraries.wsu.edu/c.php?g=294276&p=1960006



https://images.easytechjunkie.com/microfiche1.jpg

Was Bush Right?

- Some predictions have come true
  - increased specialization
  - flood of information
  - faster / cheaper / smaller / more reliable

- What did Bush miss or we are still waiting for?
  - microphotography?
  - digital technologies?
  - non-science / non-office apps?
  - memex?

Was he right? Memex never built… or was it?



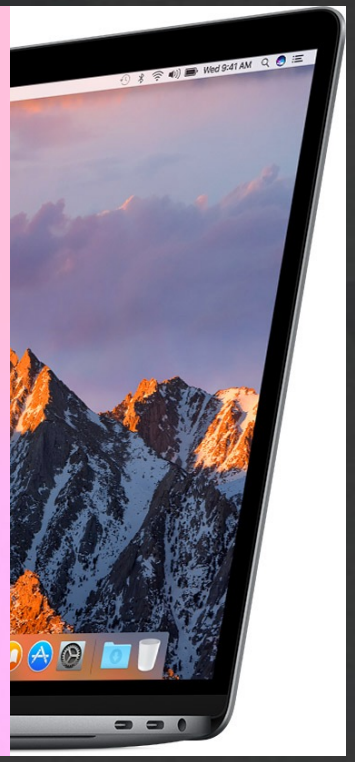
Memex #001 by Trevor Smith
2013

http://trevor.smith.name/memex/

Predicting → Inventing the Future

Computers weren't always like this…





Computers don't have to be like this!

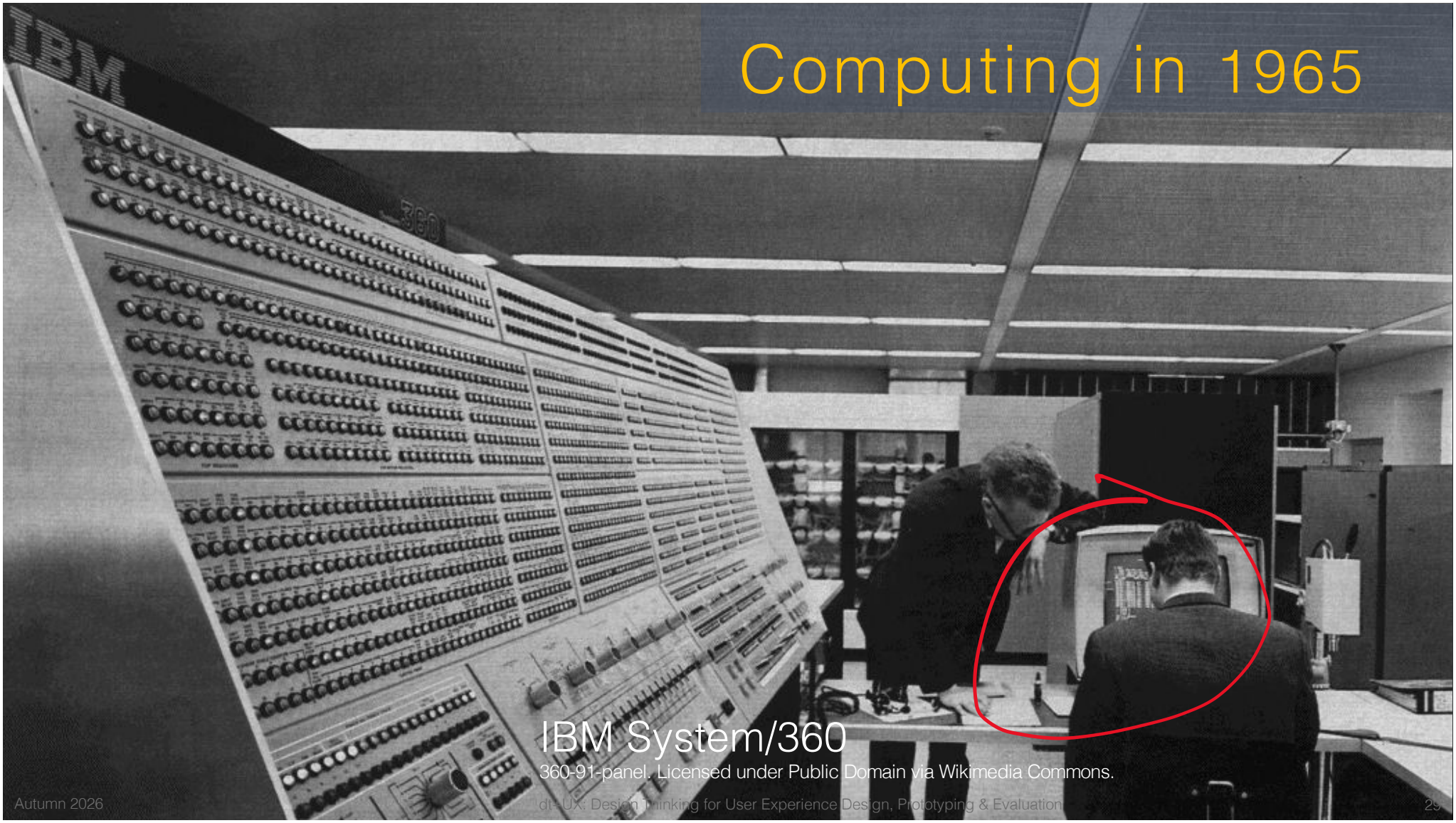


Computing in 1965

IBM System/360

Bundesarchiv B 145 Bild-F038812-0014, Wolfsburg, VW Autowerk by Bundesarchiv, B 145 Bild-F038812-0014 / Schaack, Lothar / CC-BY-SA. Licensed under CC BY-SA 3.0 de via Wikimedia Commons.

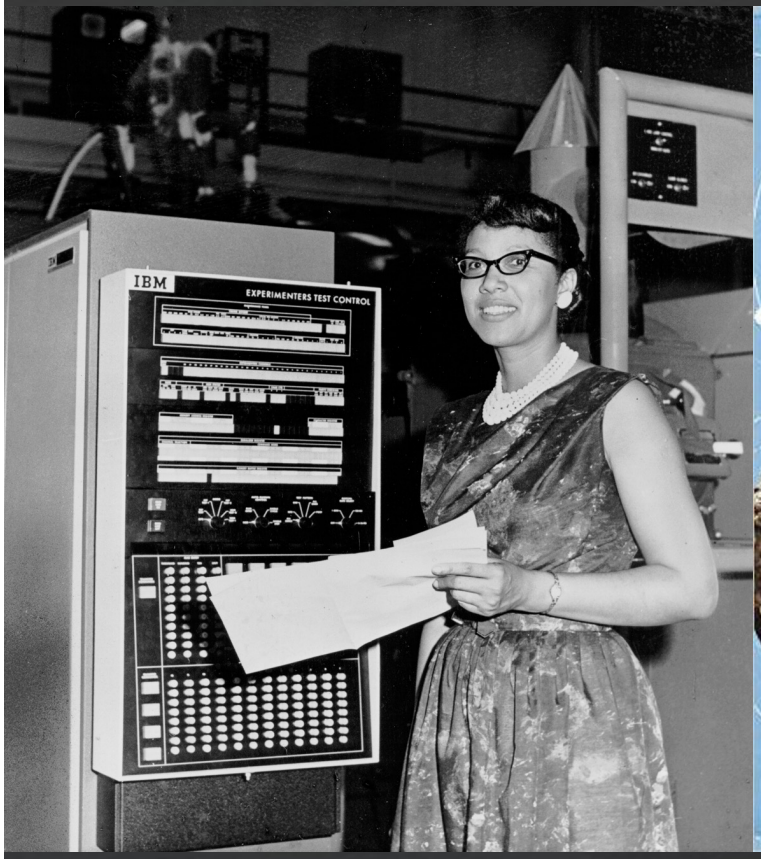
Computing in 1965

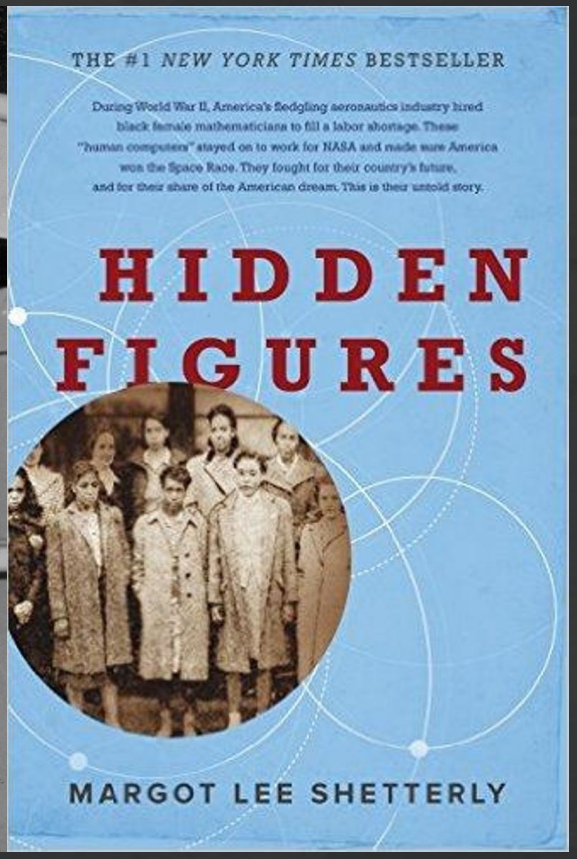


IBM System/360

360-91-panel. Licensed under Public Domain via Wikimedia Commons.

Computing in 1965





Melba Roy Mouton, an early programmer at NASA (one of the "Hidden Figures").

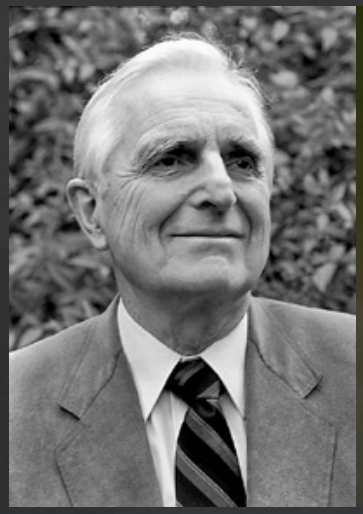
Melba Roy headed the group of NASA mathematicians, known as "computers," who tracked the Echo satellites.

Roy's computations helped produce the orbital element timetables by which millions could view the satellite from Earth as it passed overhead.

She went on to become Program Production Section Chief at Goddard Space Flight Center.

Douglas Engelbart (Turing Award 1997)

Augmenting Human Intellect







- Stanford Research Institute (SRI) in the 1960s
- 1962 Paper “Conceptual Model for Augmenting Human Intellect”
  - complexity of problems increasing → need new tools to solve
- Demoed NLS (oNLine System), 1968 Fall Joint Computer Conf. (SF)
- Known for?
  - mouse

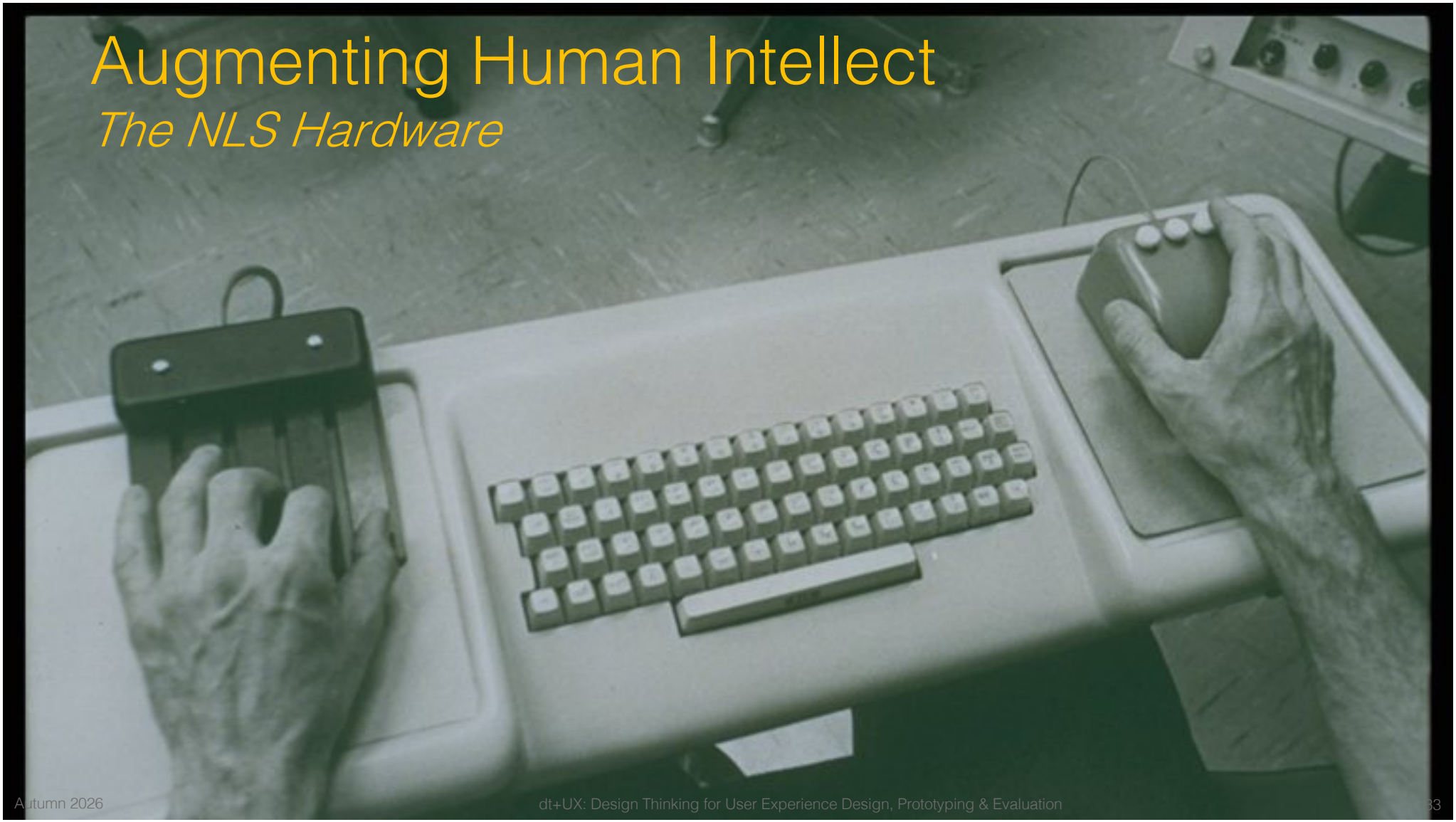
Engelbart's Crusade

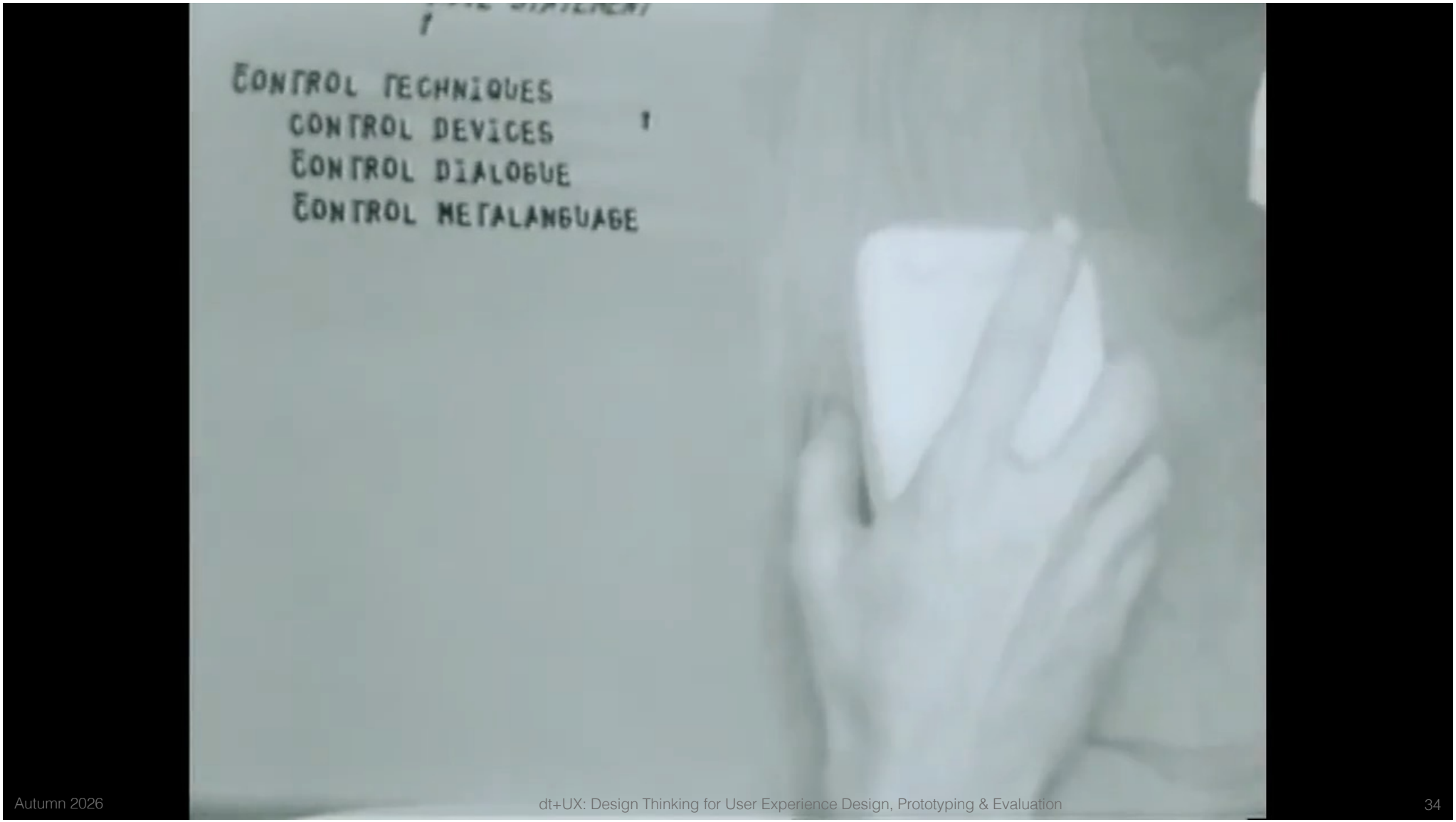
"The complexity of a lot of the problems [in the world] and the means for solving them are just getting to be too much. The time available for solving a lot of the problems is getting shorter and shorter. So the urgency goes up… The complexity/urgency factor had transcended what humans can cope with. I suddenly flashed that if you could do something to improve human capability to cope with that, then you'd really contribute something basic."

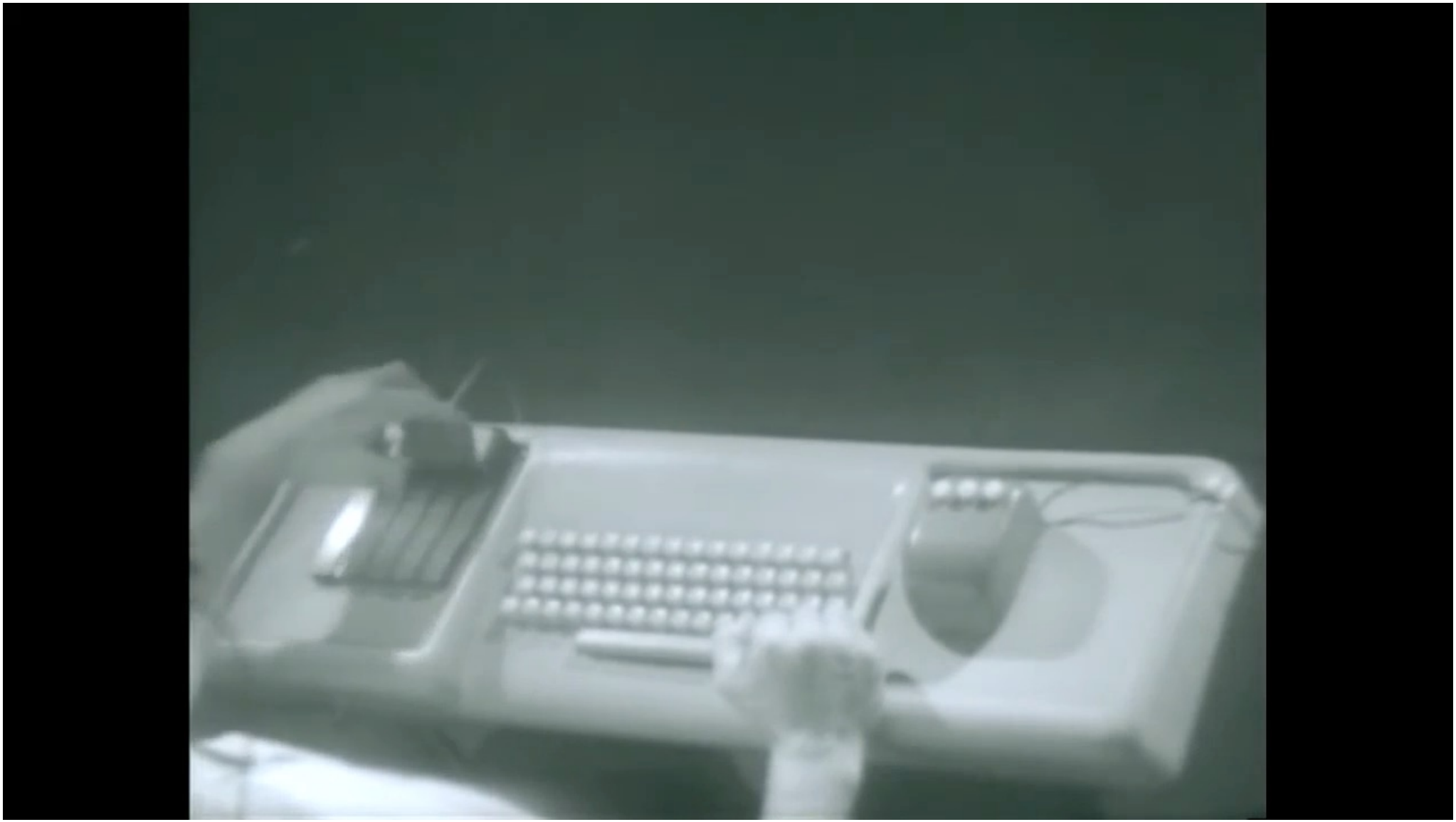
– Douglas Engelbart (1996)

Augmenting Human Intellect

The NLS Hardware




CONTROL TECHNIQUES
CONTROL DEVICES
CONTROL DIALOGUE
CONTROL METALANGUAGE



INTRODUCTION

OVERALL ABOUT PROGRAM

NLS AS AN "INSTRUMENT"

CONTROL TECHNIQUES

NLS IMPLEMENTATION

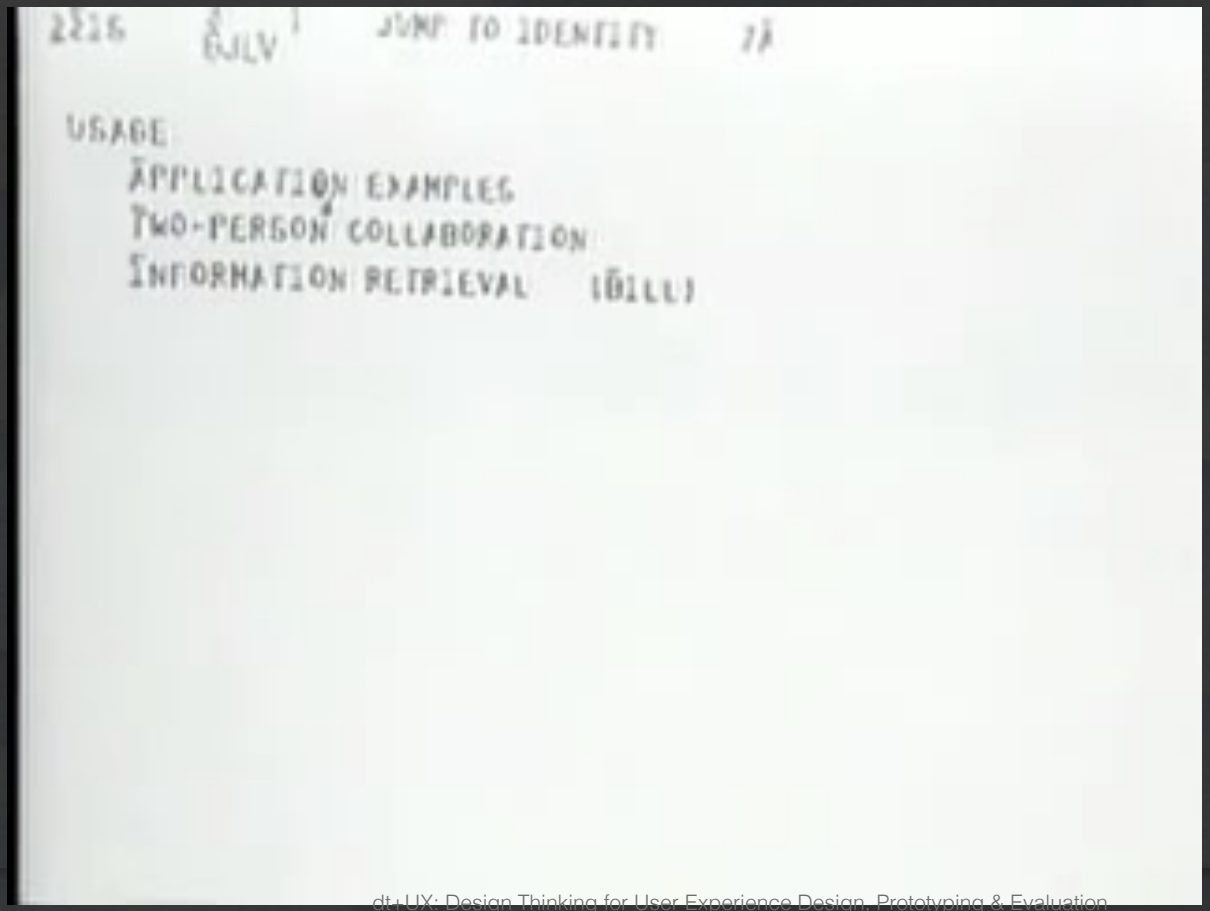
USAGE

ACTIVITIES

CREDITS

Augmenting Human Intellect

The NLS Software



Augmenting Human Intellect: Firsts!

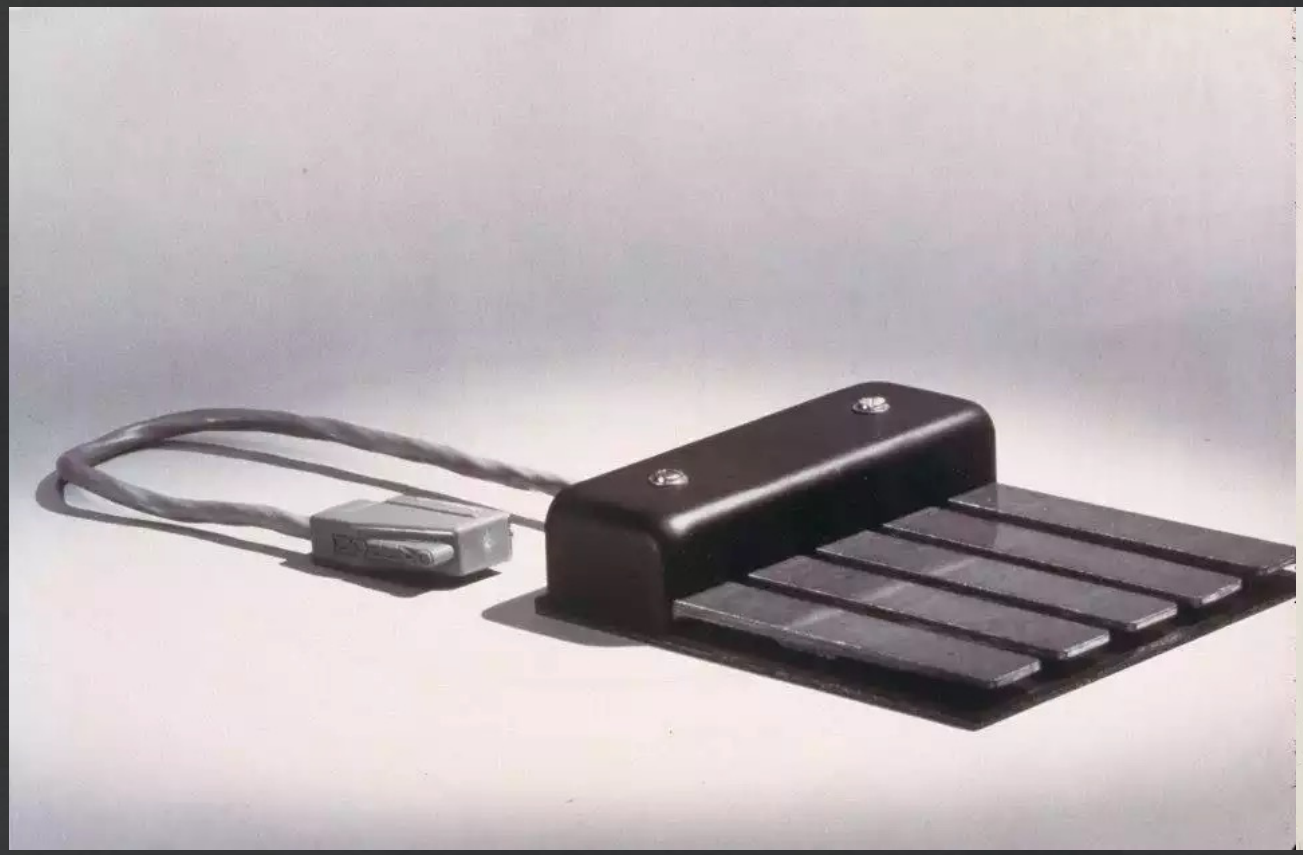
- First mouse, and ?
- First 2D editing & windows
- First hypertext
- First word processing
- First document version control
- First groupware (shared screen teleconferencing)
- First context-sensitive help
- First distributed client-server
- Many, many more!

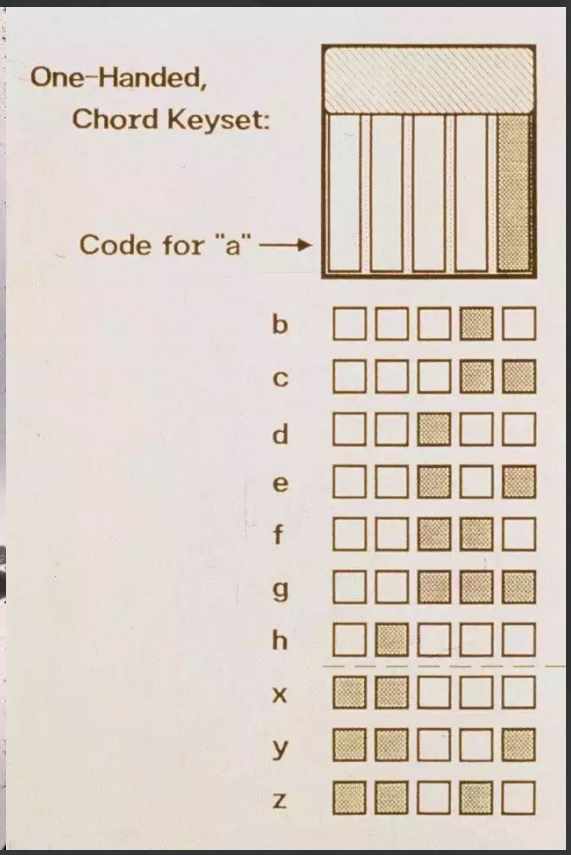
https://www.dougengelbart.org/mousesite/About.html

NLS Was for Expert Use – Two Hands at Once!



Chorded Keyboard





Tricycles & Bicycles: Specialized Tools



http://www.athensnews.com/ohio/article-42835-good-for-the-heart-tricycle-race-fundraiser-now-open-to-all.html



http://www.flickriver.com/photos/hotair2112/134303284/

Tricycles vs. Bicycles

"If ease of use was the only valid criterion, people would stick to tricycles and never try bicycles." – Douglas Engelbart

Engelbart's Influences

Douglas C. Engelbart
Stanford Research Institute
Menlo Park, California

http://web.stanford.edu/dept/SUL/library/extra4/sloan/mousesite/EngelbartPapers/LetterToVBush.html

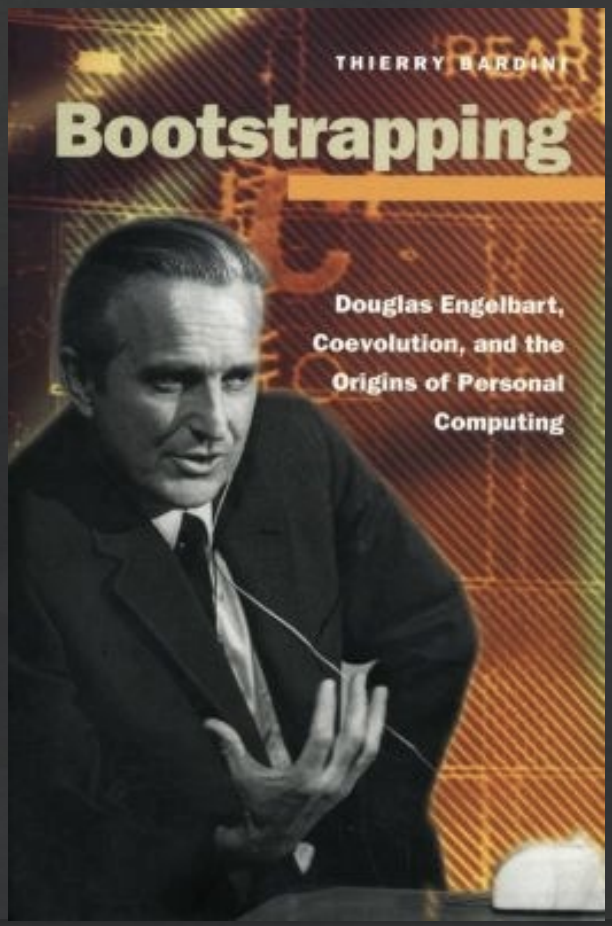
May 24, 1962

Dr. Vannevar Bush
Professor Emeritus
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dear Dr. Bush:

I wish permission from you to extract lengthy and definitely acknowledged quotes from your article, "As We May Think," that appeared in The Atlantic Monthly, July, 1945. These quotes would appear in a report that I am writing for the Air Force Office of Scientific Research, and I am sending a parallel request to The Atlantic Monthly.

More on Englebart



Bootstrapping, Thierry Bardini, 2000

"Program on Human Effectiveness", Douglas C. Engelbart, 1962

Tools for Thought, Ch. 9 "The Loneliness of a Long-Distance Thinker", Howard Rheingold, 2000

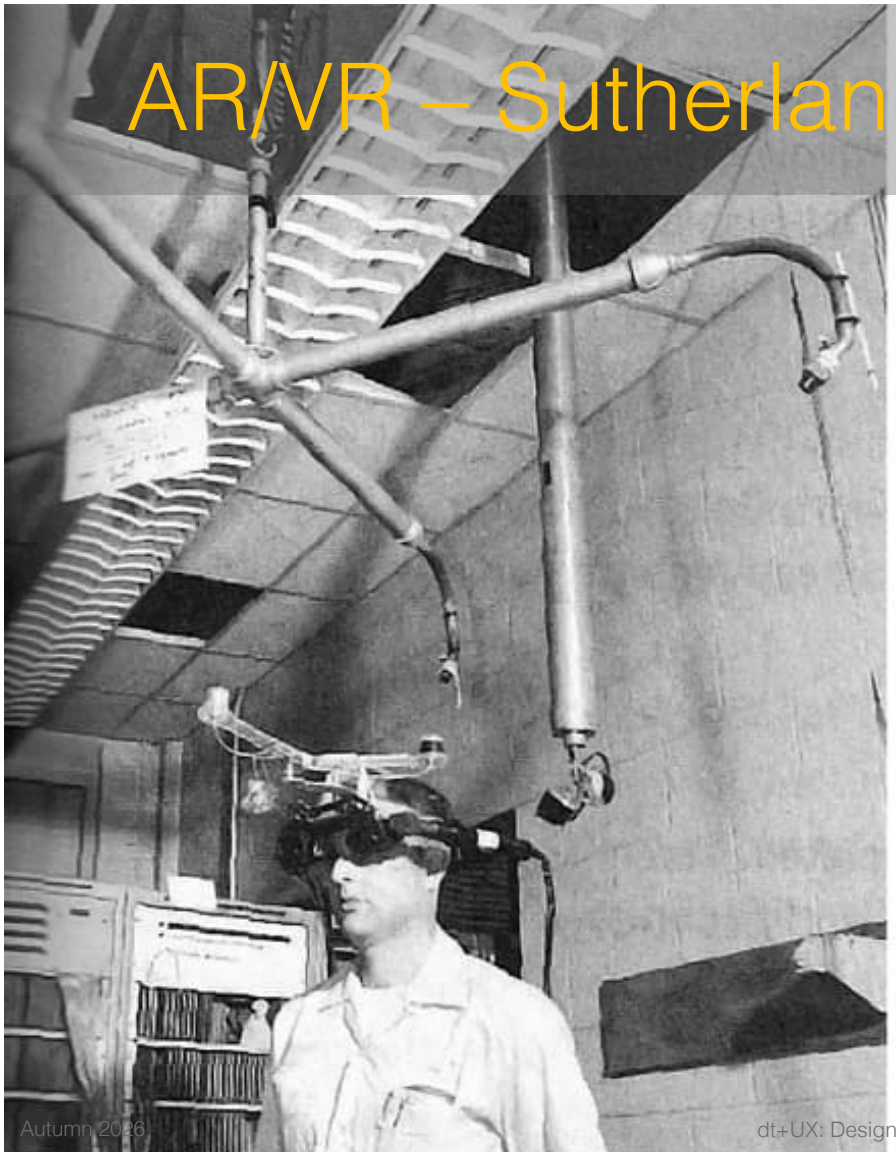
MouseSite (video clips/papers)

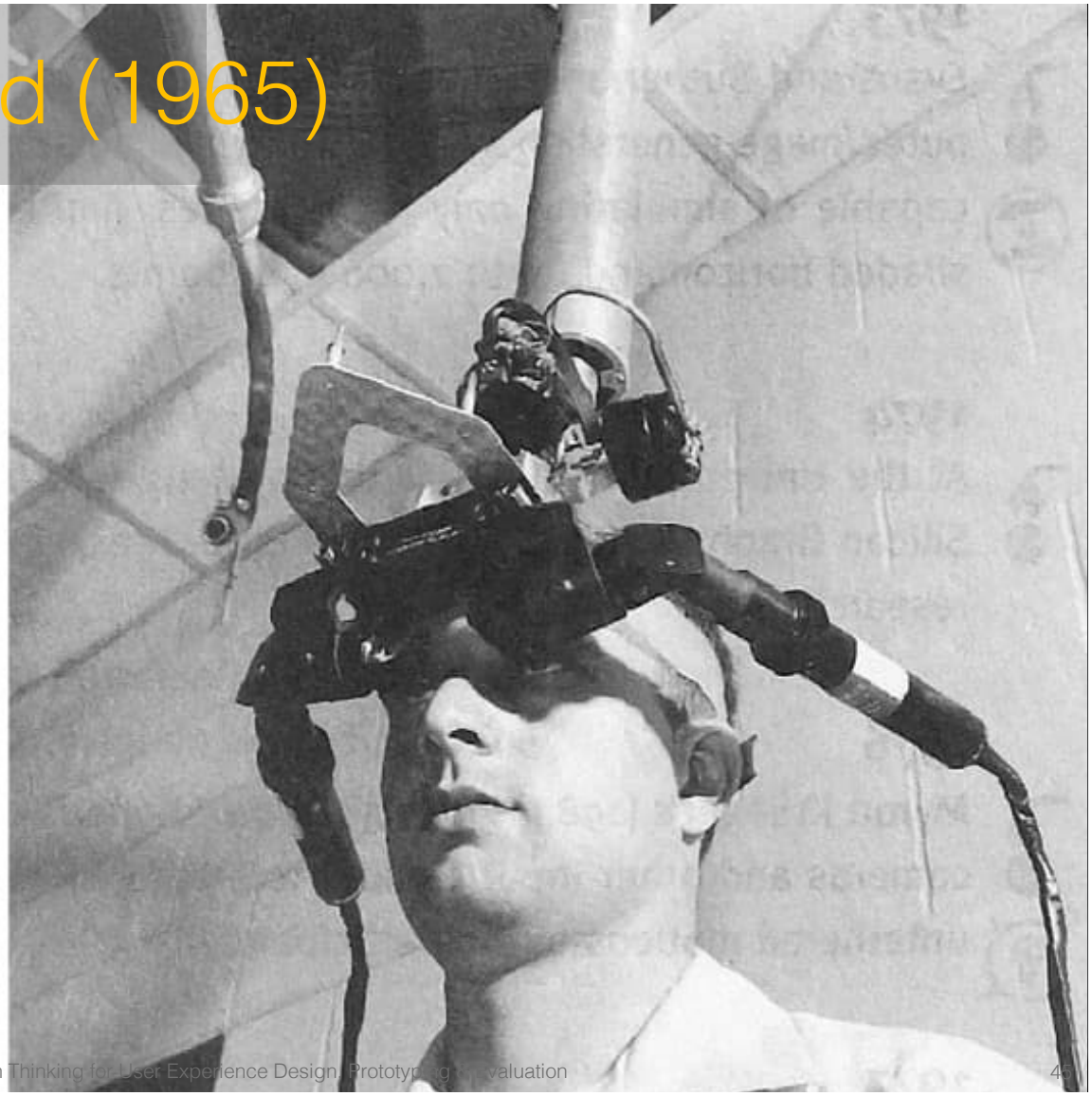
https://dougengelbart.org/mousesite/

SketchPad – Sutherland (1963)



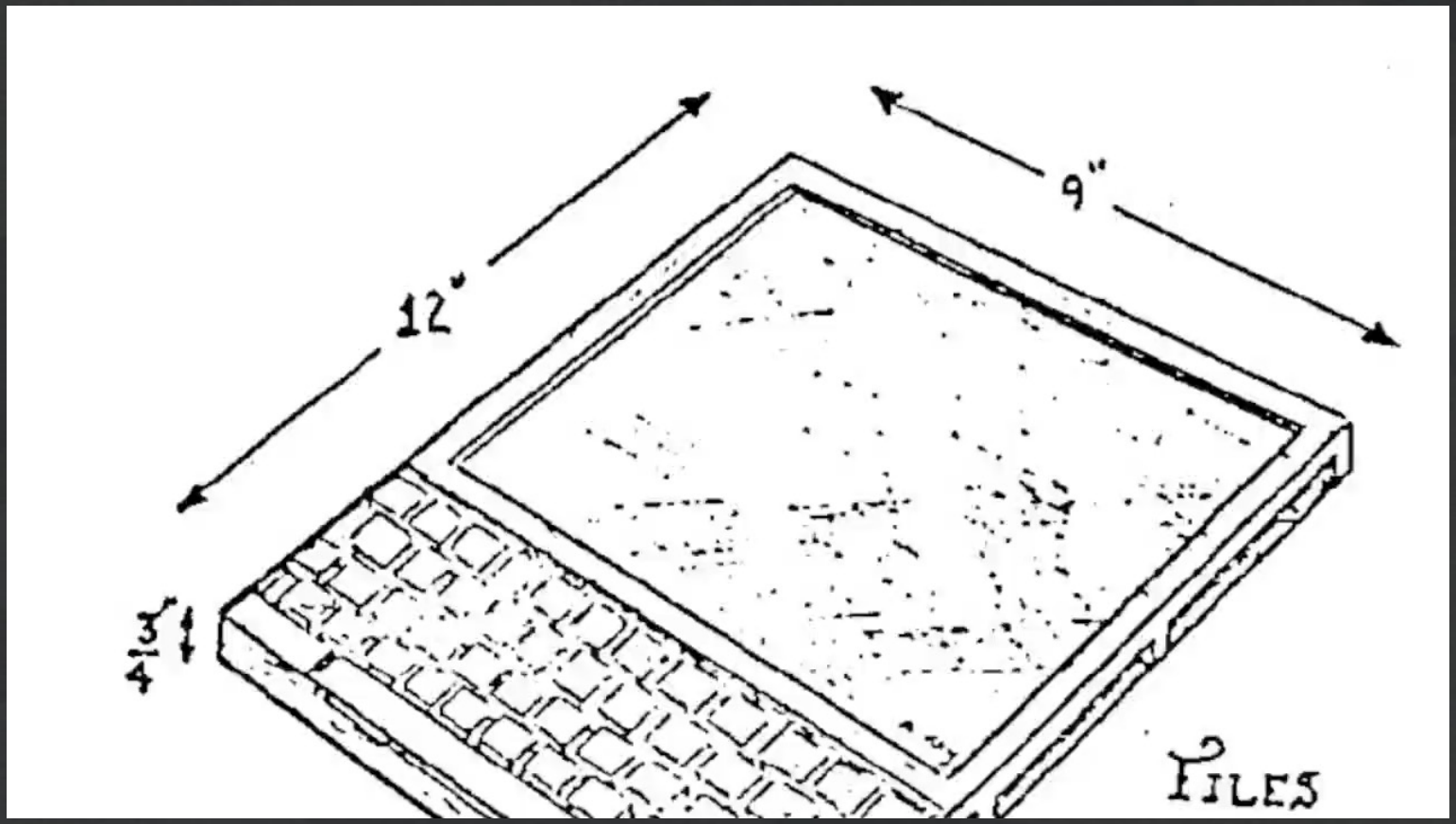
AR/VR – Sutherland (1965)



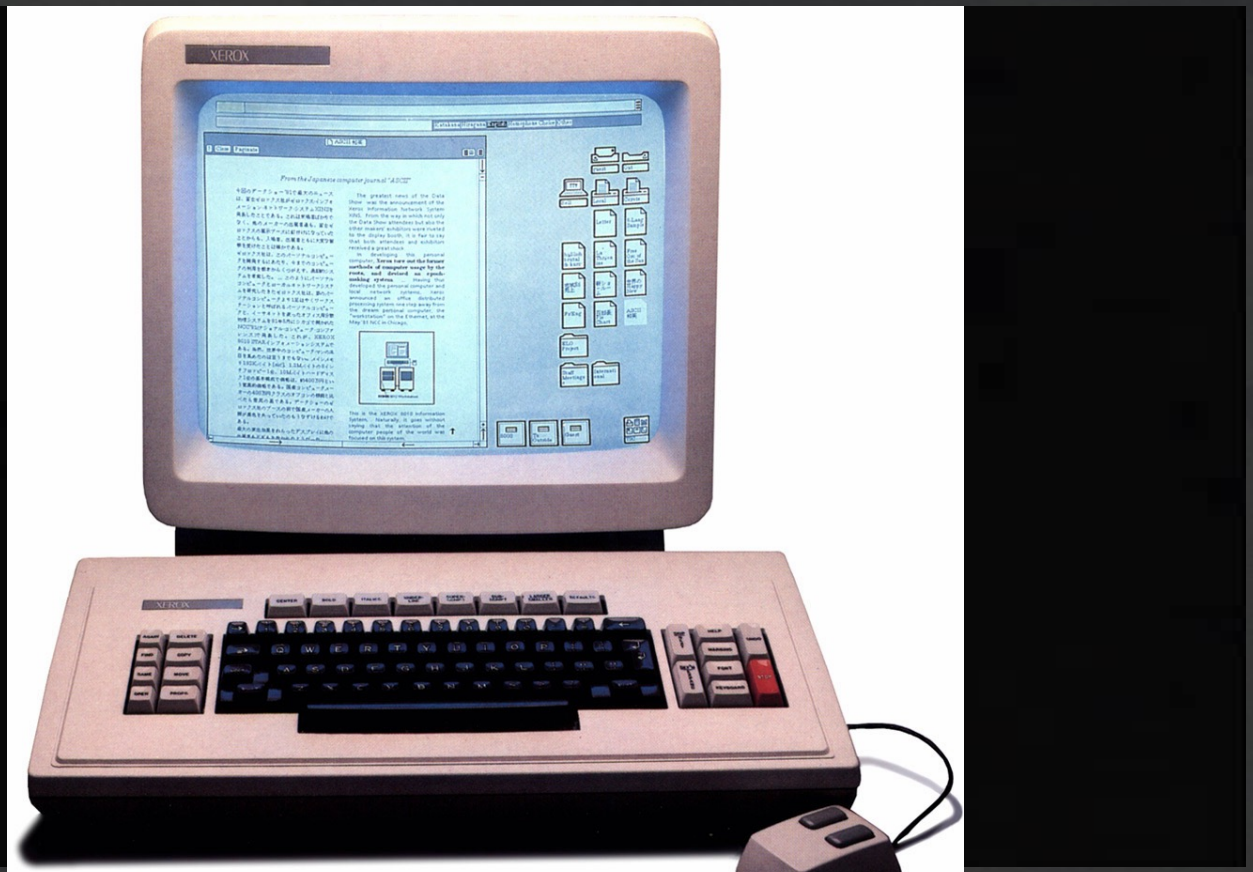




Dynabook – Kay (1974)



Xerox Star – 1st Commercial GUI (1981)



WYSIW hat Y Get

“The best way to predict the future is to invent it”

Alan Kay

Administrivia

- Keep up w/ readings/HW on class website
  - http://hci.stanford.edu/cs147
  - midterm coming up Wed next week
- Practice midterm has been released – study it
- Everyone should be working on HE (A7) now
- Questions?

Midterm

Scope: Everything through Usability Testing (Week 8 - Lecture 14) including Reading/Videos/Podcasts, Lectures, Assignments.

Format: Will primarily be a multi-part design problem (but know and be able to demonstrate *all* aspects of the design process & use facts for reasoning for your answers), with some multiple choice/short answer as well.

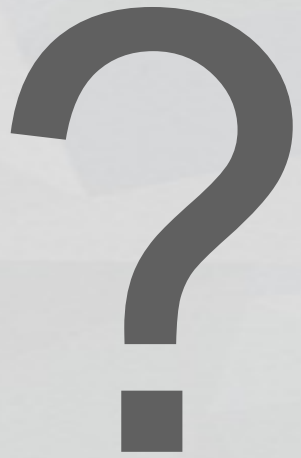
Place: Hybrid exam – part I in class & part II (design problem) at home (Gradescope)

Time: This midterm will take place during a 24-hour window starting Wednesday, Nov. 12, at 1:30 pm Pacific time. You will have ~1:30 for part I in class and ~2 hour for part II at home.

TEAM BREAK

“The best way to predict the future is to invent it”

Alan Kay

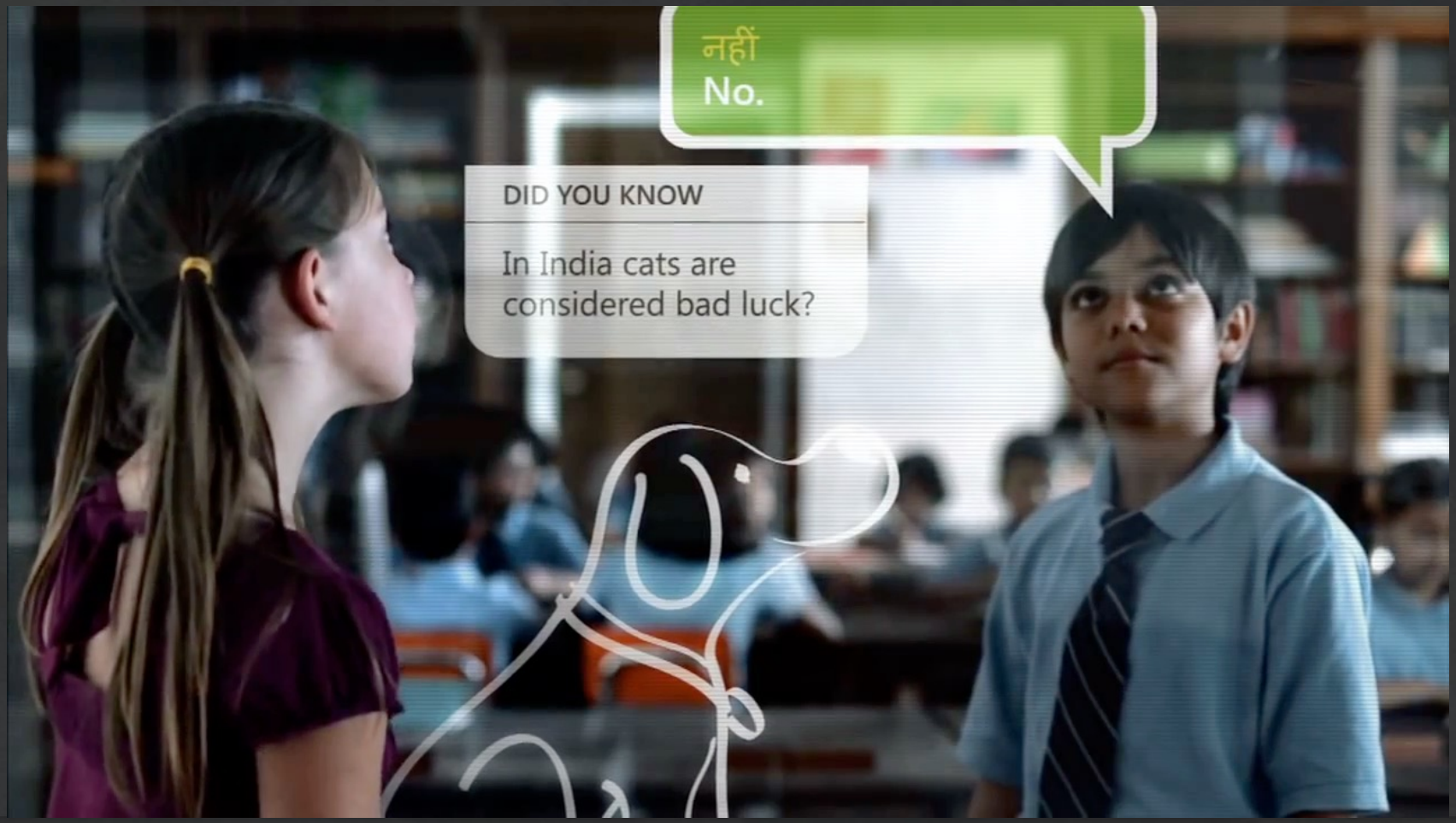


The Future

Minority Report (2002)



Microsoft Productivity Future Vision 2019 (2009)



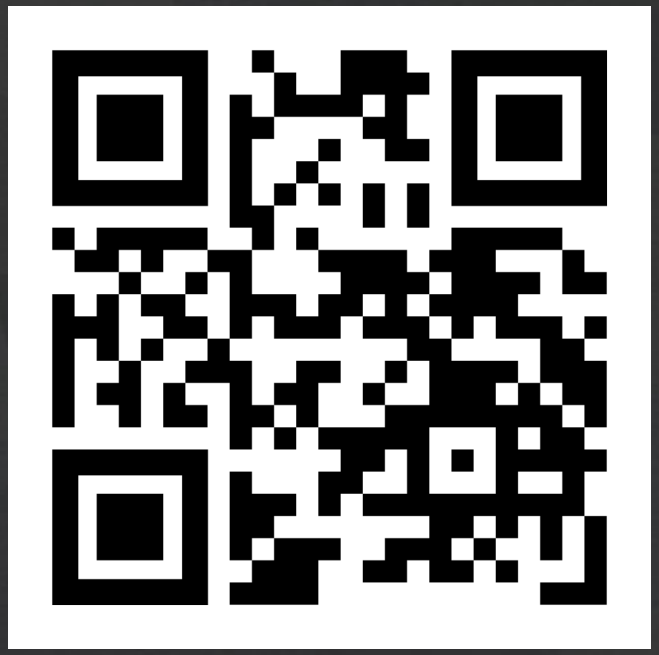
Spike Jonze's Her (2013)



Next Time

- Lecture
  - Usability Testing (no reading)
  - Midterm Review
  - Bring your questions
- Studio
  - Group Heuristic Evaluation (need to participate to get a grade)

Exit ticket



hci.st/cs147-26au-exit-7-765