

Designing the Future: *Early & Future Visions of HCI*

Prof. James A. Landay
Computer Science Department
Stanford University

Autumn 2023
November 6, 2023

Hall of Fame or Shame?



Virgin America Website

Courtesy Andrea S.

<https://www.virginamerica.com/book>

The screenshot shows the Virgin America website's flight booking interface. At the top, there is a navigation bar with the Virgin America logo on the left, followed by buttons for 'BOOK', 'CHECK IN', and 'MANAGE'. To the right of these buttons are links for 'Deals', 'Flying With Us', 'Where We Fly', 'Fees', 'Flight Status', and 'Flight Alerts'. On the far right of the navigation bar are the 'elevate' logo and 'Sign In' and 'Sign Up' buttons.

Below the navigation bar, there are three radio buttons for trip type: 'Round Trip' (selected), 'One Way', and 'Multi City'.

The main heading reads 'Book from **San Francisco** to', with a dropdown arrow next to 'San Francisco'.

Below the heading, there are six buttons for destination selection:

- BOSTON MA (BOS)
- LAS VEGAS NV (LAS)
- LOS ANGELES CA (LAX)
- NEW YORK/EWR NJ (EWR)
- NEW YORK/JFK NY (JFK)
- ALL CITIES (with a dropdown arrow)

Hall of Fame or Shame?



Virgin America Website

Courtesy Andrea S.

<https://www.virginamerica.com/book>

Who's flying?

Adults 1 + -	Children (Age 2-14) 1 + -	Lap Infants (Age 0-2) 0 + -	Pets 0 + -
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[Have special requests?](#)

CONTINUE WITH 2 GUESTS

Hall of Fame or Shame?



Virgin America Website

Courtesy Andrea S.

<https://www.virginamerica.com/book>

Round Trip One Way Multi City

SELECT DEPARTING DATE

Sun Mon Tue Wed Thu Fri Sat ^ | v

October 2014

				TODAY 02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18

Hall of Fame or Shame?



Virgin America Website

Courtesy Andrea S.

<https://www.virginamerica.com/book>

Round Trip One Way Multi City

SELECT RETURNING DATE

Sun Mon Tue Wed Thu Fri Sat ^ | v

October 2014

				TODAY 02	03	04
05	06	07	08	09	10	11
12	13	14	Departing 15 ✓	16	17	18

Hall of Fame or Shame?



Virgin America Website

Courtesy Andrea S.

<https://www.virginamerica.com/book>

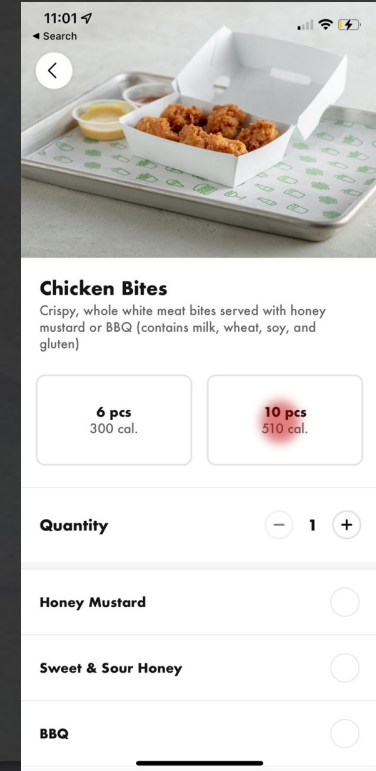
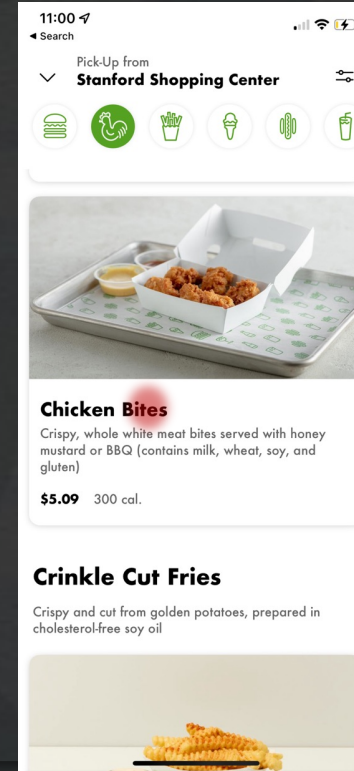
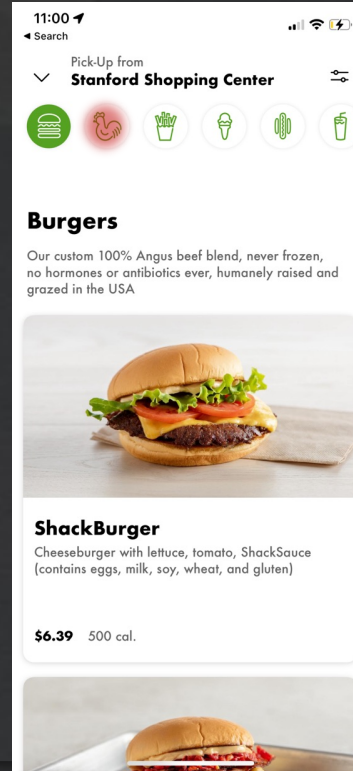
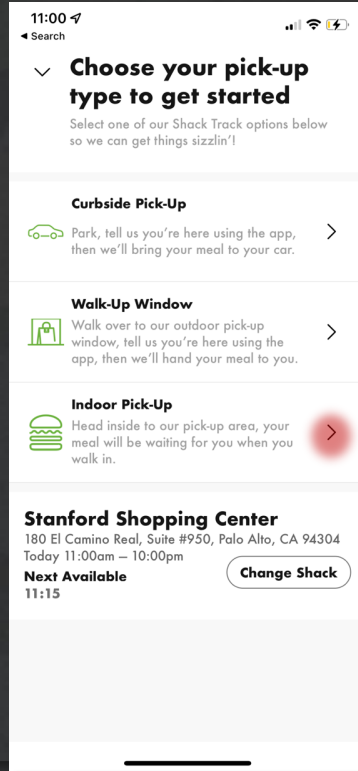
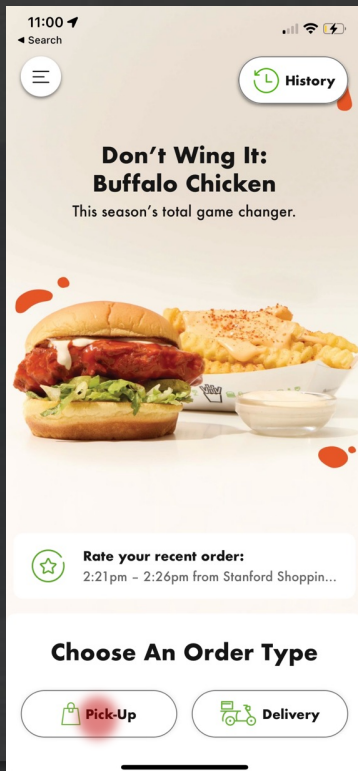
The screenshot shows the Virgin America booking interface. At the top, there is a navigation bar with the Virgin America logo and links for BOOK, CHECK IN, and MANAGE. Below this, there are links for Deals, Flying With Us, Where We Fly, Fees, Flight Status, and Flight Alerts. The main content area is divided into three sections:

- Book from San Francisco to:** This section features a dropdown menu for the origin city (San Francisco) and a dropdown menu for the destination city. The destination options are: BOSTON MA (BOS), LAS VEGAS NV (LAS), LOS ANGELES CA (LAX), NEW YORK/EWR NJ (EWR), NEW YORK/JFK NY (JFK), and ALL CITIES.
- Who's flying?:** This section allows users to specify the number of passengers. It includes four input fields: Adults (set to 1), Children (Age 2-14) (set to 1), Lap Infants (Age 0-23) (set to 0), and Pets (set to 0). Each field has plus and minus buttons to adjust the count. A link for "Have special requests?" is located below the Adults field. A "CONTINUE WITH 2 GUESTS" button is positioned below the Children field.
- SELECT DEPARTING DATE:** This section displays a calendar for October 2014. The days of the week are listed at the top: Sun, Mon, Tue, Wed, Thu, Fri, Sat. The calendar grid shows dates from 02 to 18. The date 17 is highlighted with a purple border.

Hall of Fame or Shame?



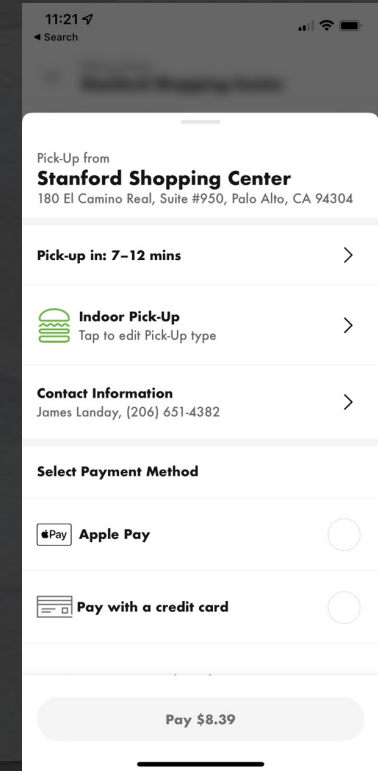
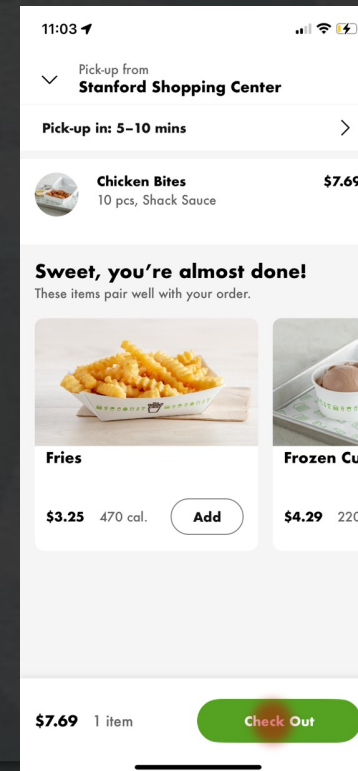
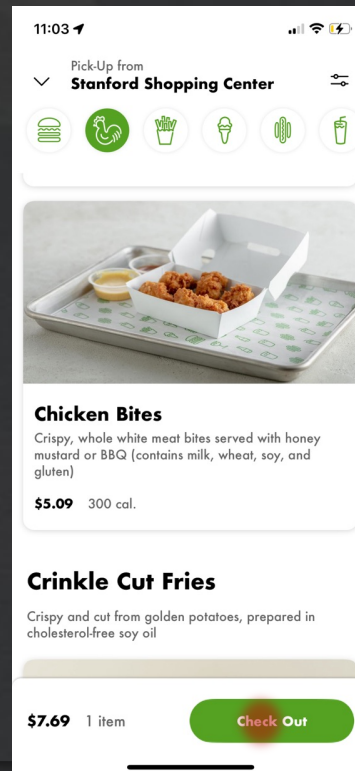
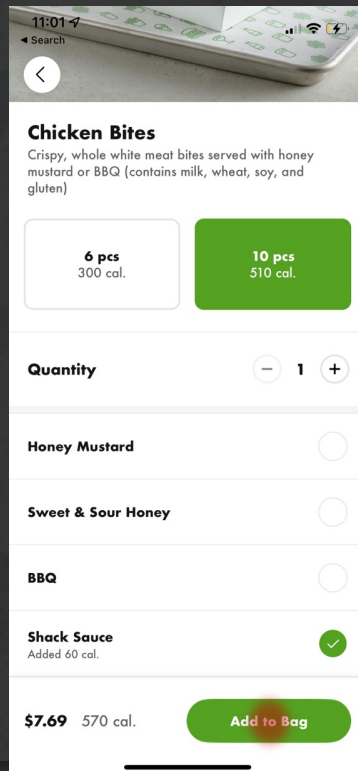
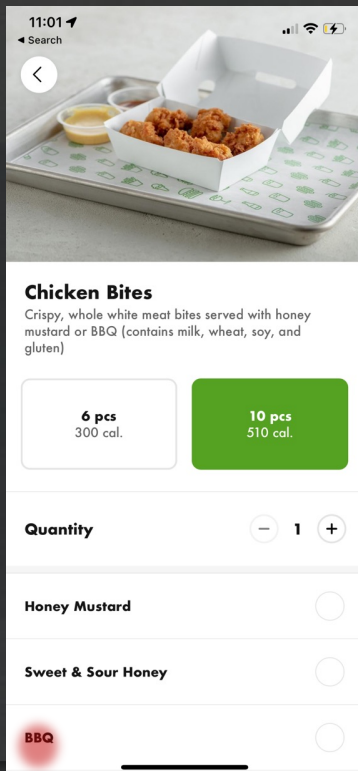
Shake Shack iPhone App



Hall of Fame or Shame?



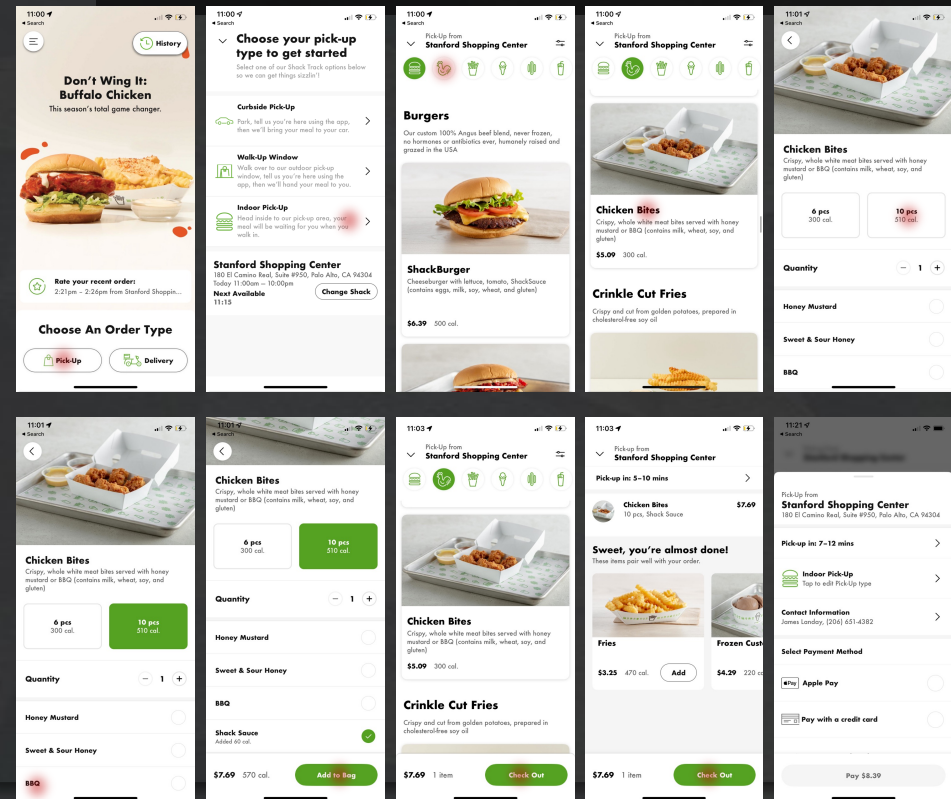
Shake Shack iPhone App



Hall of Fame or Shame?



Shake Shack iPhone App



Hall of Fame!



Shake Shack iPhone App

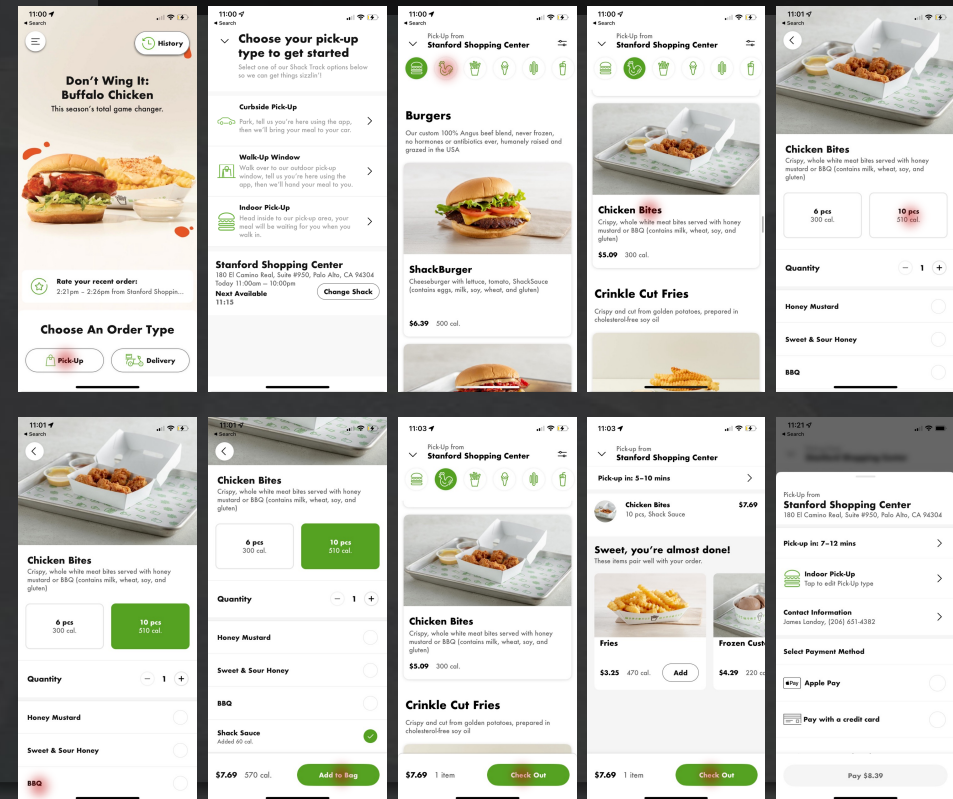
Aesthetic images of their food

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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Outline

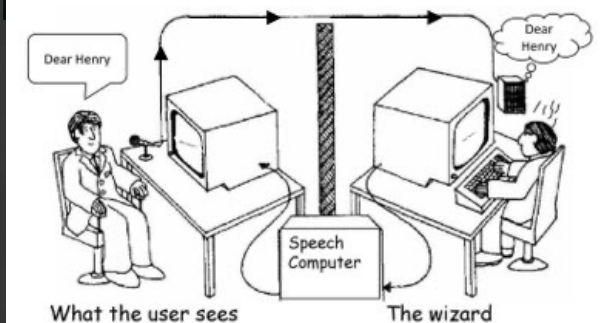
- Wizard of Oz Technique
- Computing in 1945
- Vannevar Bush & “As We May Think”
- Doug Engelbart & Augmenting Intellect
- SketchPad, Dynabook & The Xerox Star
- 2023 CS147 Film Festival Awards
- Team Break
- Future Visions of HCI

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



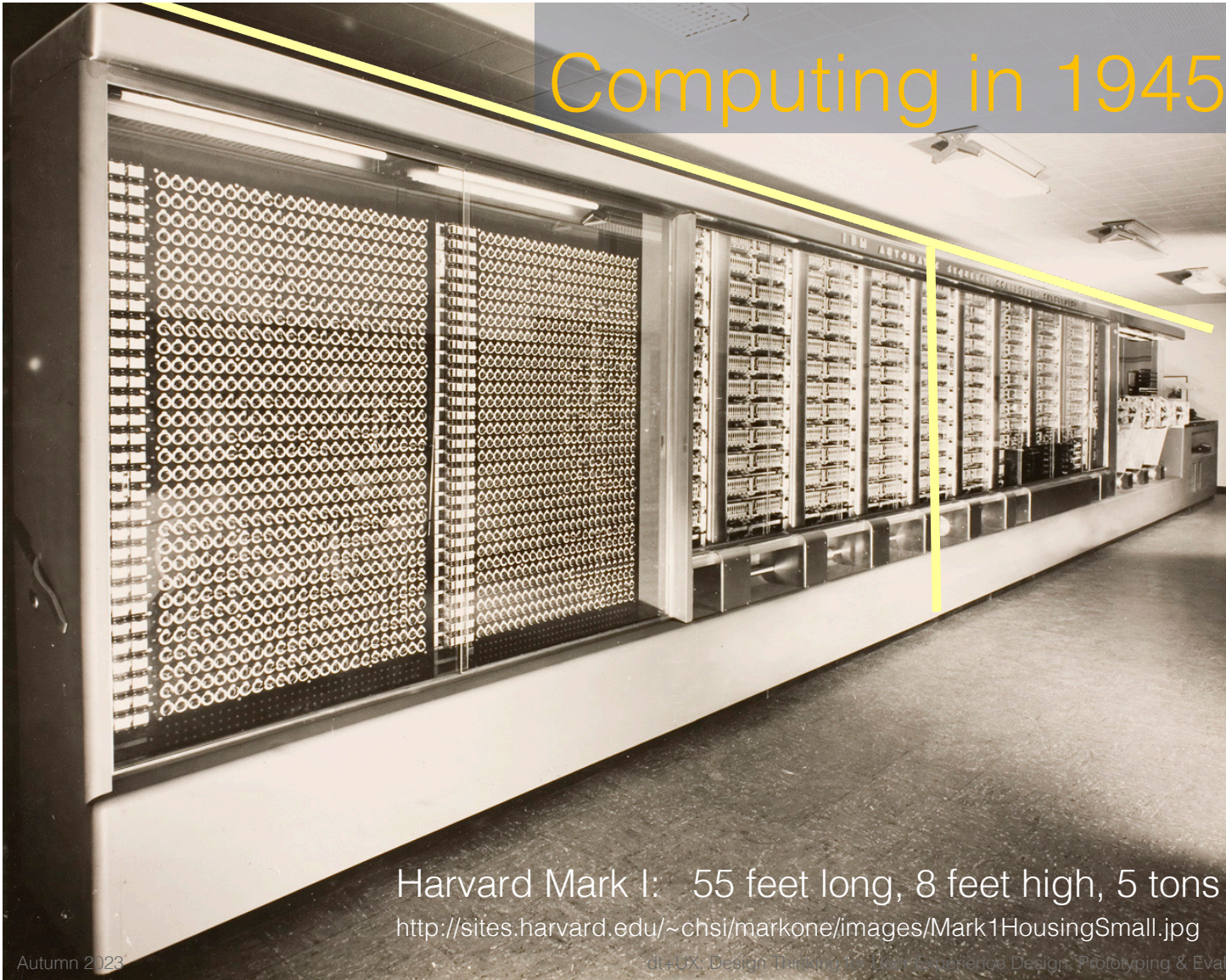
Wizard of Oz Technique



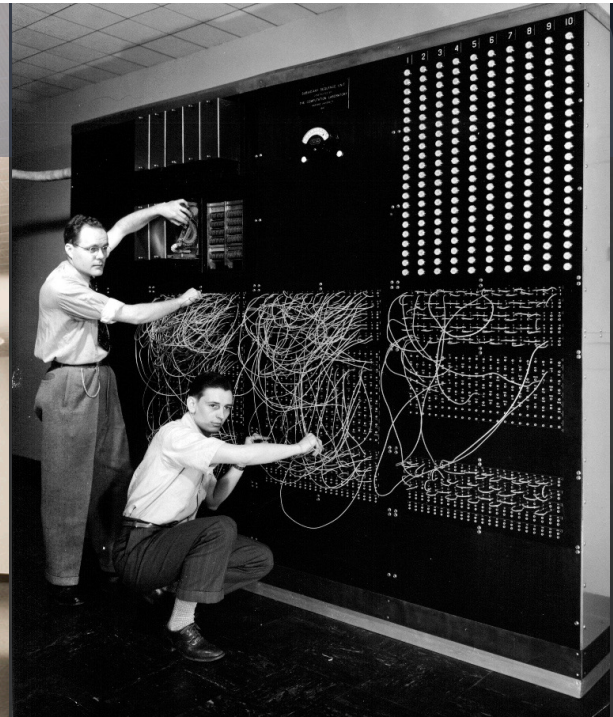
Carbon Shopper

- much more important for hard to implement features

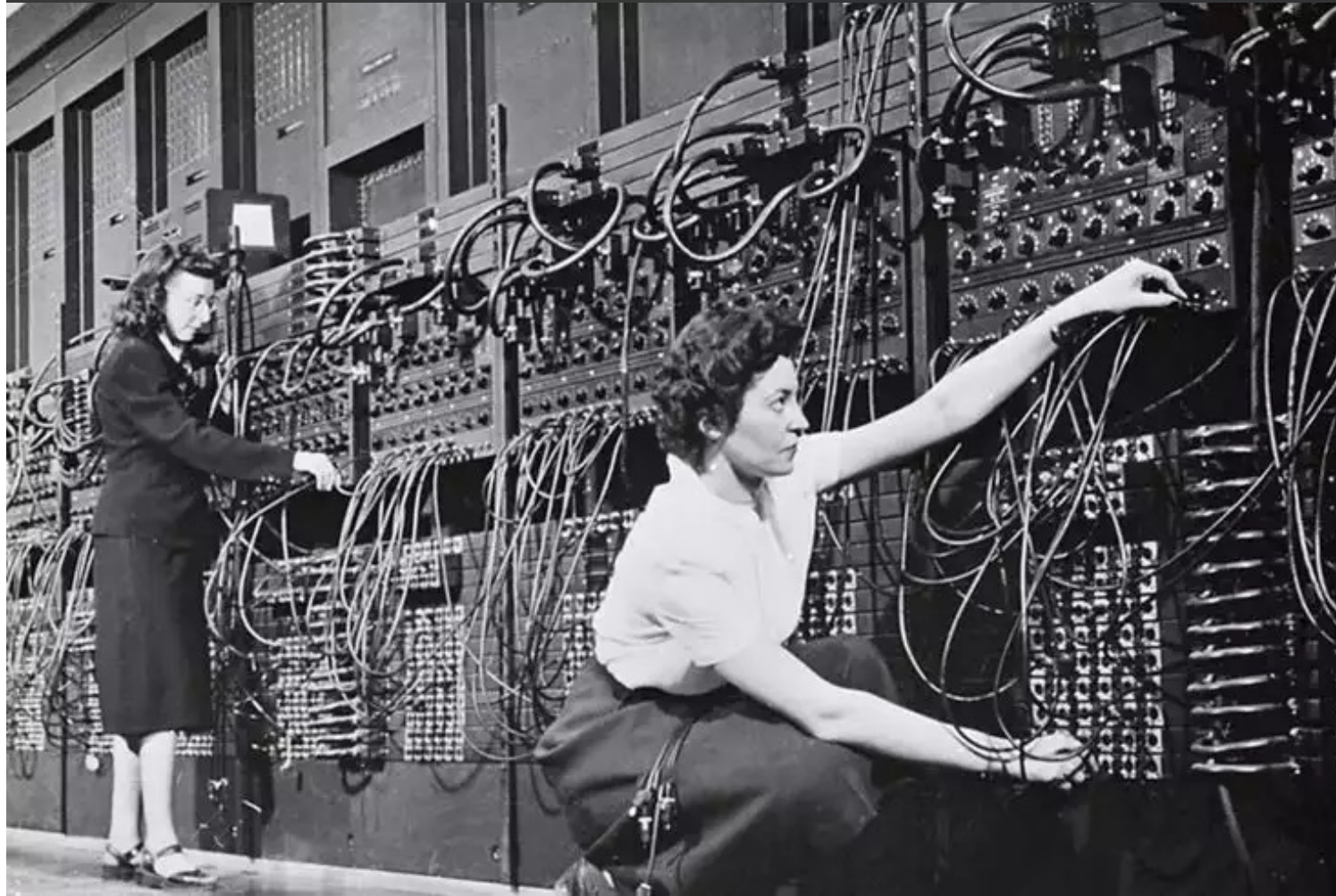
Computing in 1945



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.

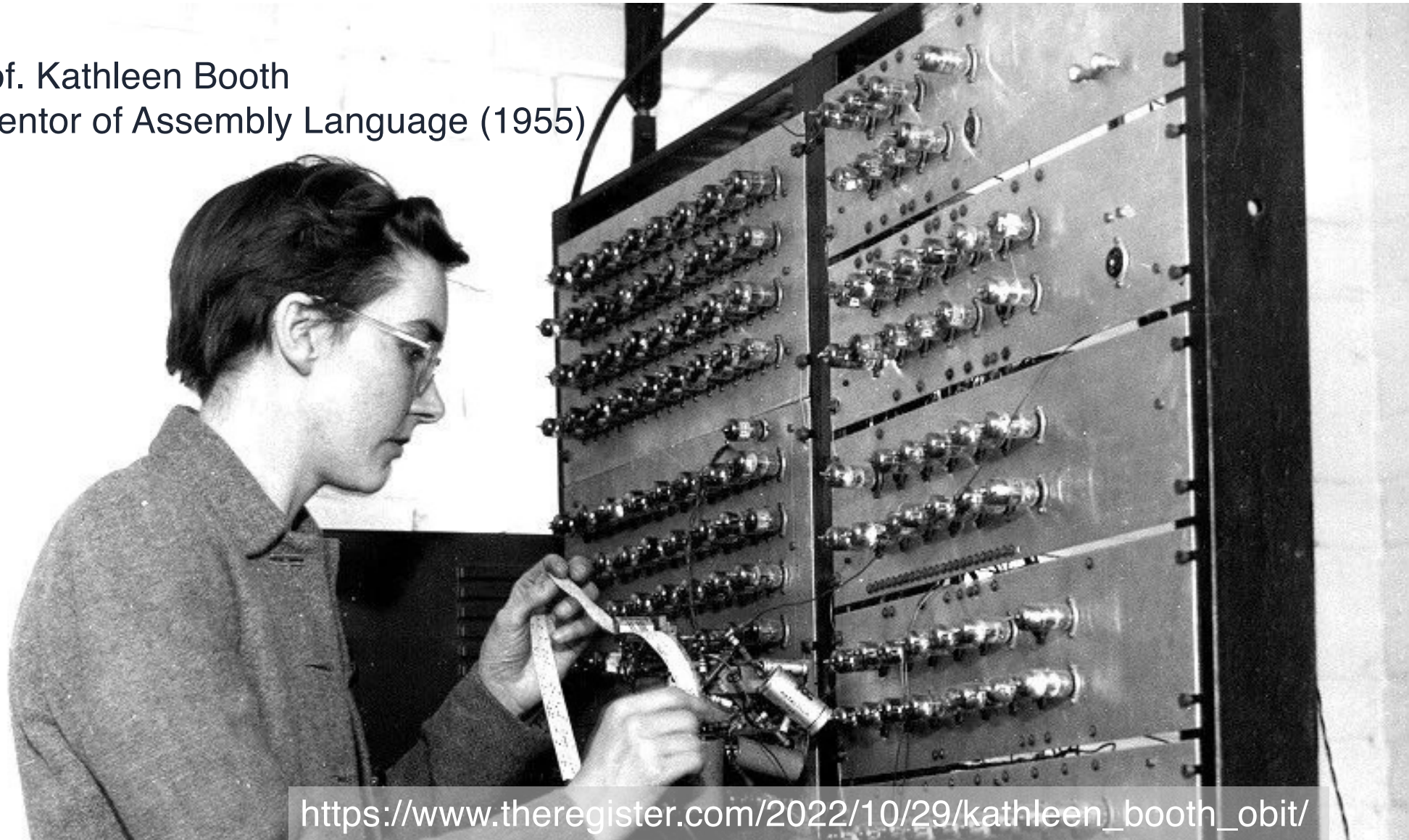
Keller felt that women should be involved in computer science and especially in the field of information specialist. In her words, "We're having an information explosion, among others, and it's certainly obvious that information is of no use unless it's available." Keller's vision extended beyond education 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 – trails of discovery
 - encyclopedia for a nickel – capture of nerve impulses
 - automatic transcripts of speech – Memex

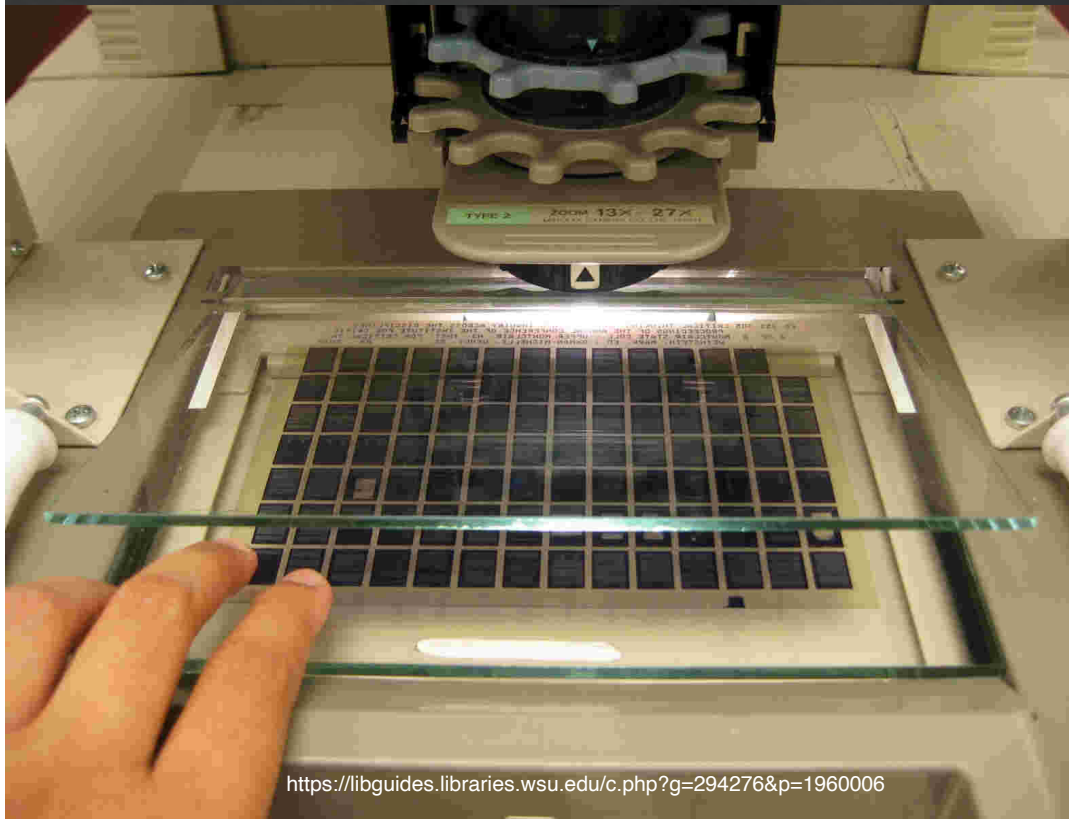


Memex

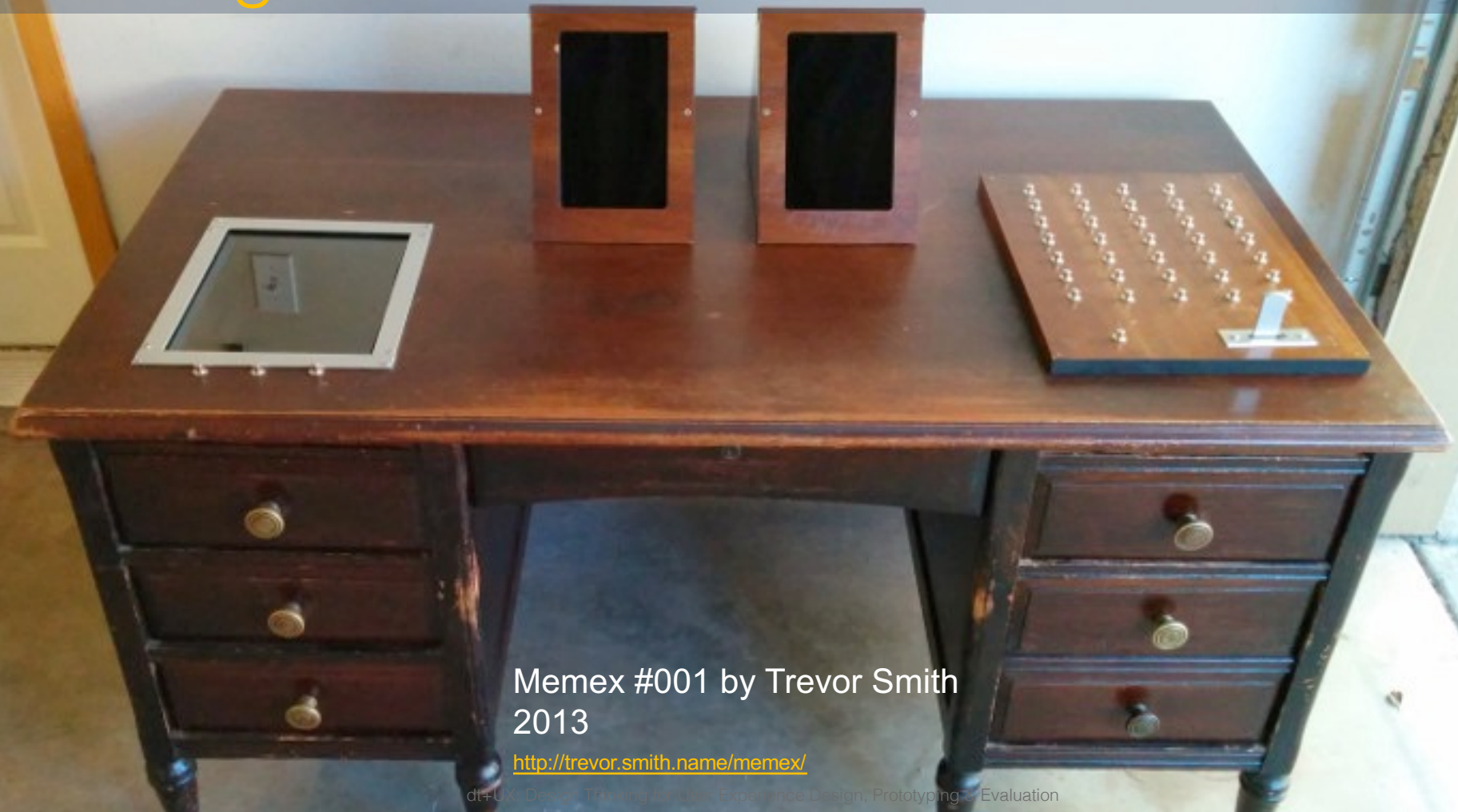


Picture from <http://www.dynamicdiagrams.com/design/memex/model.htm#download>
Demo at http://www.dynamicdiagrams.com/case_studies/mit_memex.html

Microfiche



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



Memex #001 by Trevor Smith
2013

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

dt+UX: Design Thinking for User Experience Design, Prototyping & Evaluation

Predicting → Inventing the Future

Computers weren't always like this...



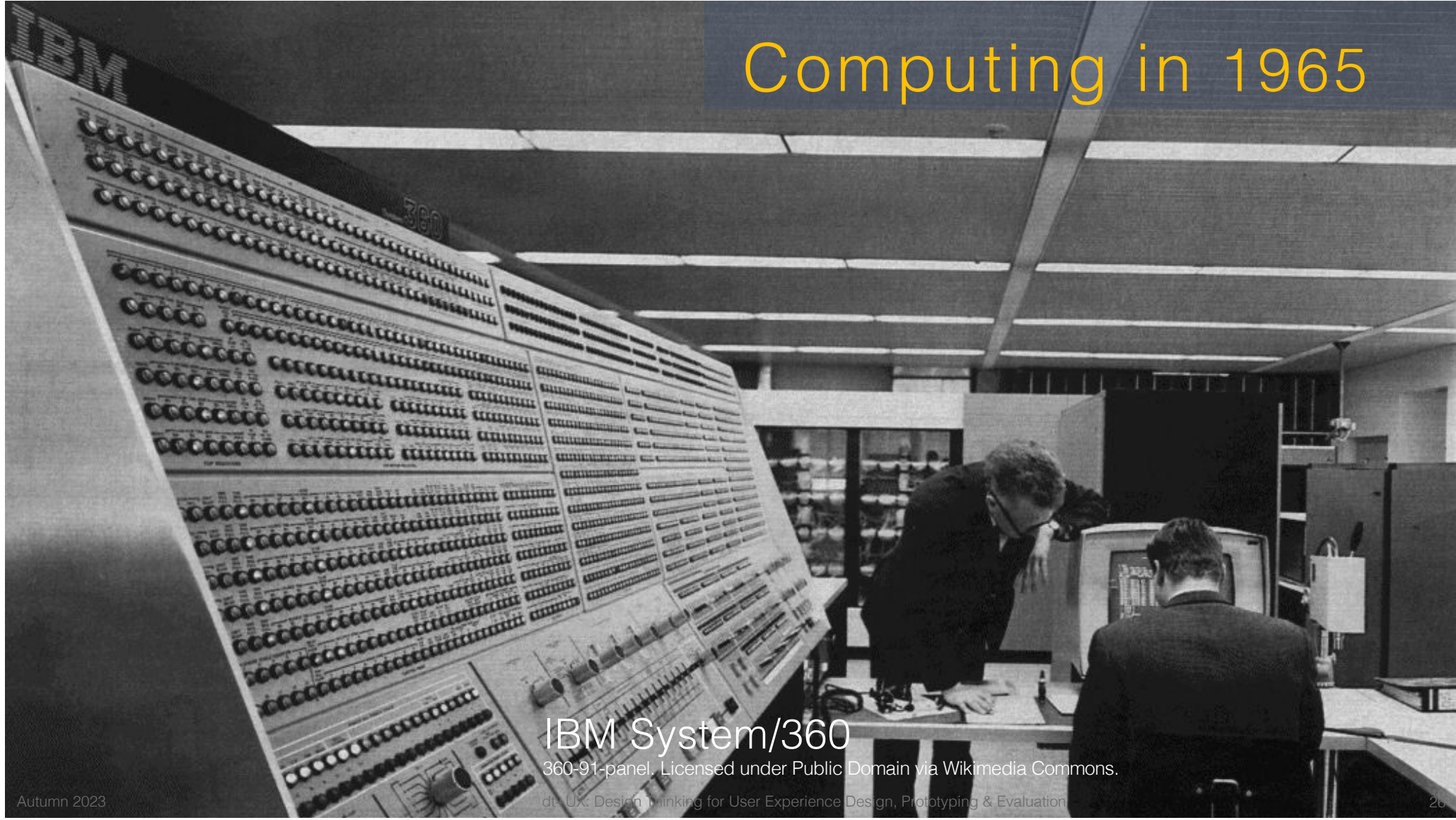
Computers don't have to be like this!

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

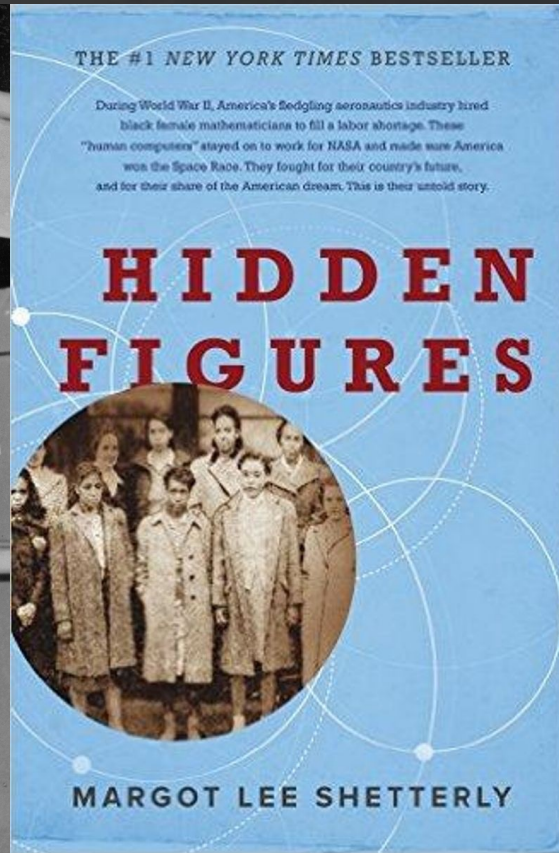
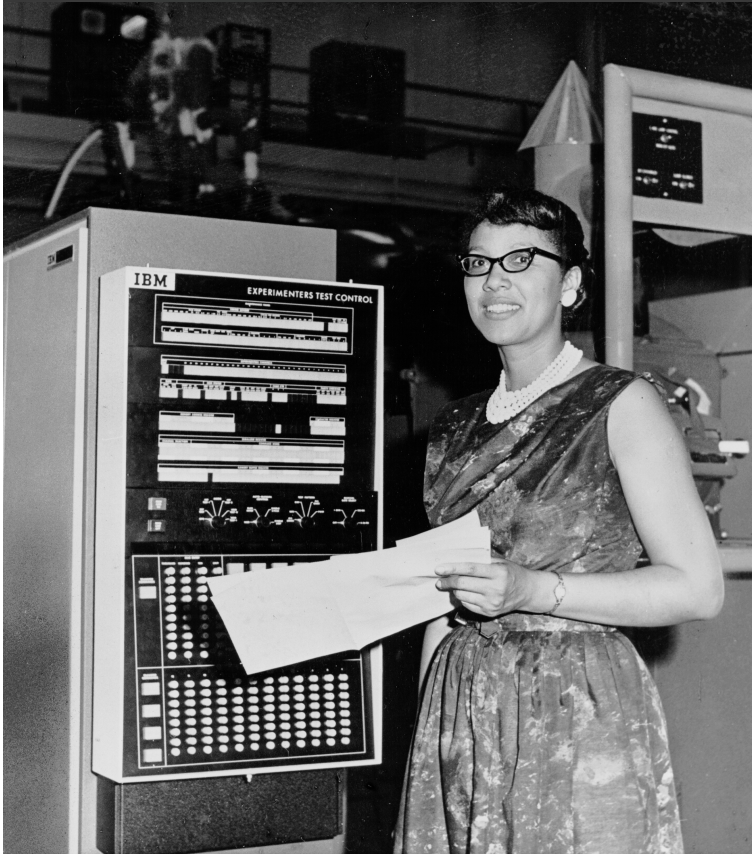


IBM System/360

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

dt-UX: Design Thinking for User Experience Design, Prototyping & Evaluation

Computing in 1965



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

Melba Roy heads the group of NASA mathematicians, known as “computers,” who track the Echo satellites. Roy's computations help produce the orbital element timetables by which millions can view the satellite from Earth as it passes 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

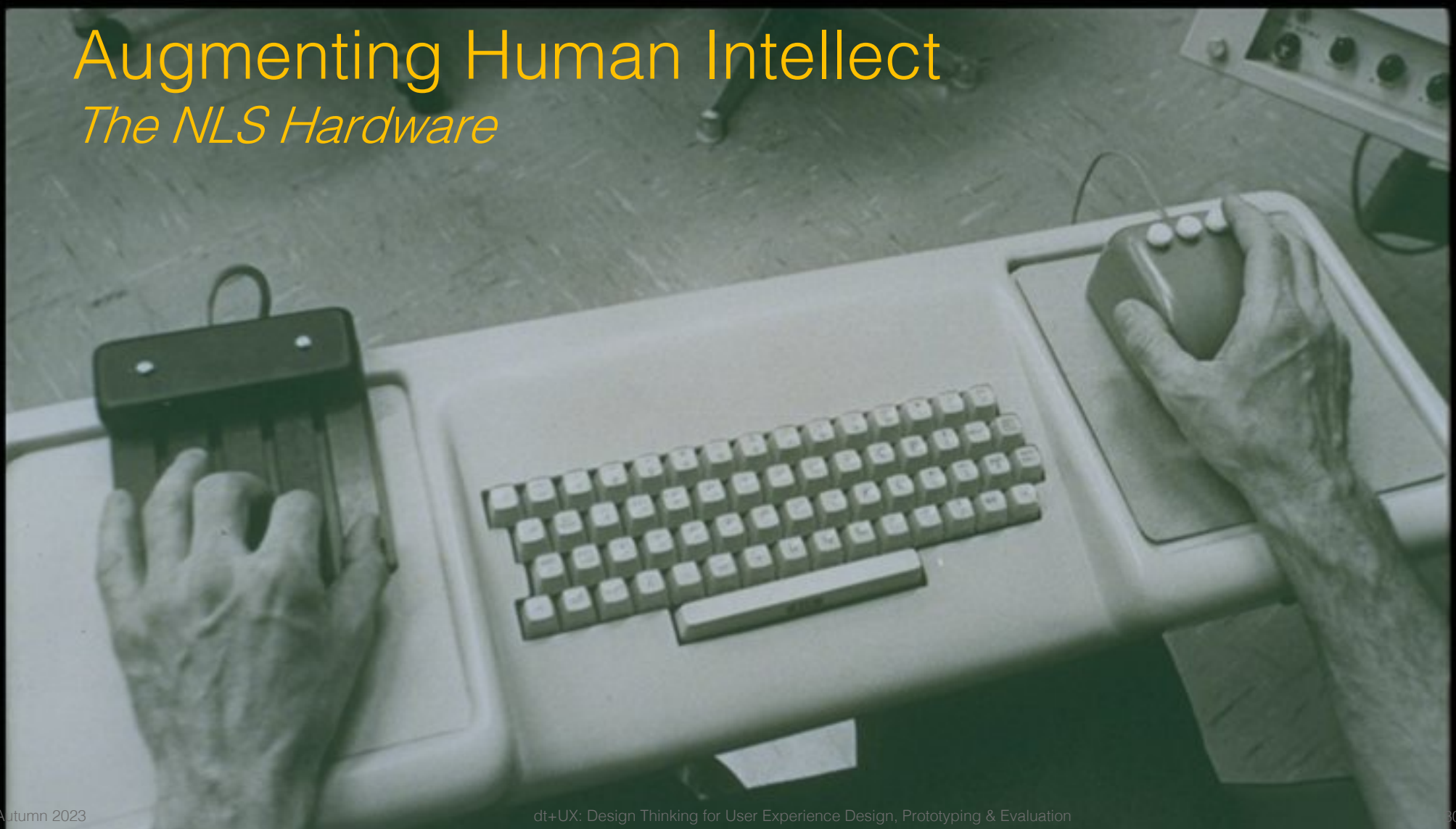
Engelbart's Crusade

*“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



1
INTRODUCTION

OVERALL ABOUT PROGRAM
NLS AS AN INSTRUMENT
CONTROL TECHNIQUES
NLS IMPLEMENTATION
USAGE
ACTIVITIES
CREDITS

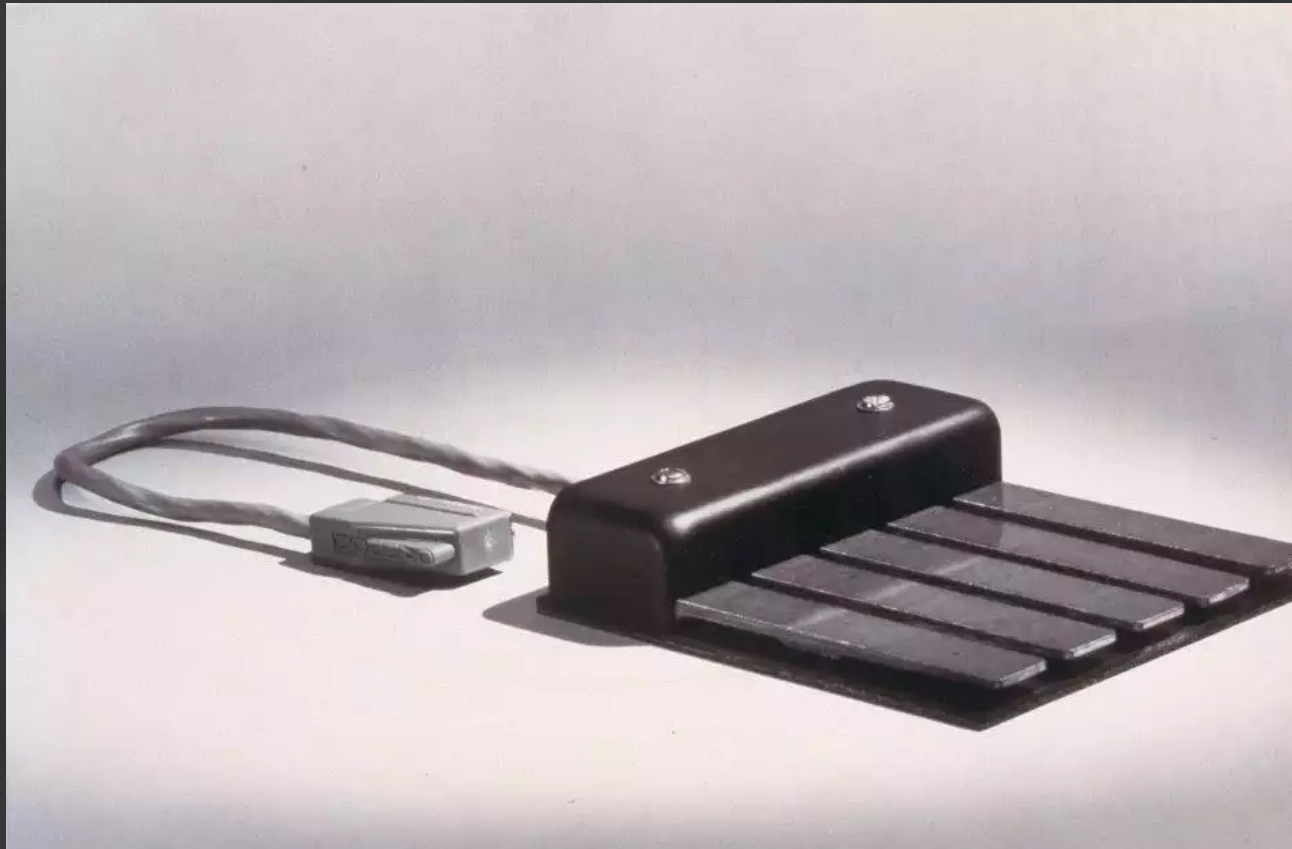
Augmenting Human Intellect: Firsts!

- 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!

NLS Was for Expert Use – Two Hands at Once!

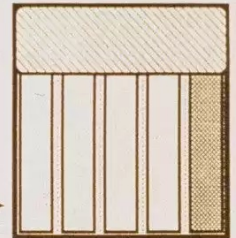


Chorded Keyboard



One-Handed,
Chord Keyset:

Code for "a" →



b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
d	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
h	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
x	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
z	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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.flickrriver.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>

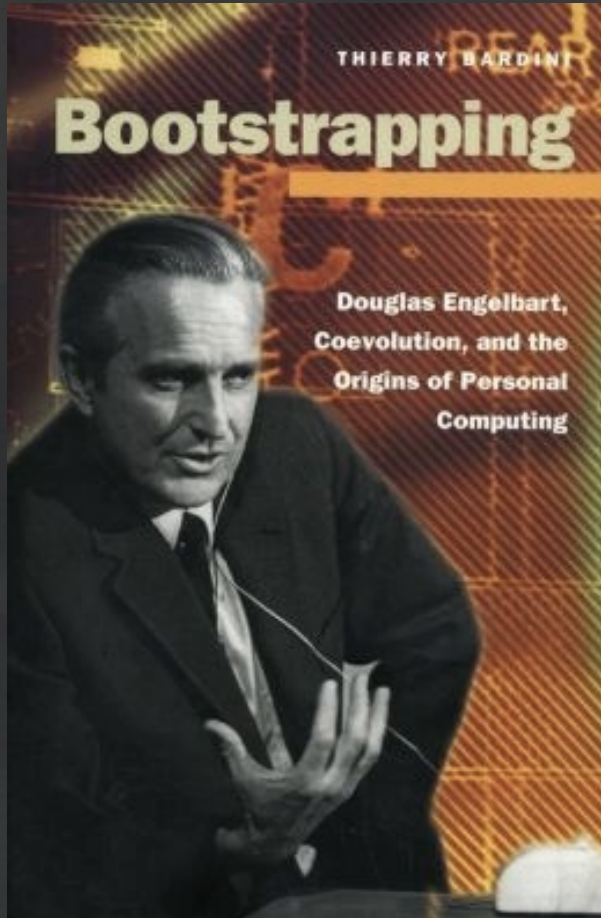
May 24, 1962

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)

<http://web.stanford.edu/dept/SUL/library/extra4/sloan/MouseSite/Archive.html>

SketchPad – Sutherland (1963)



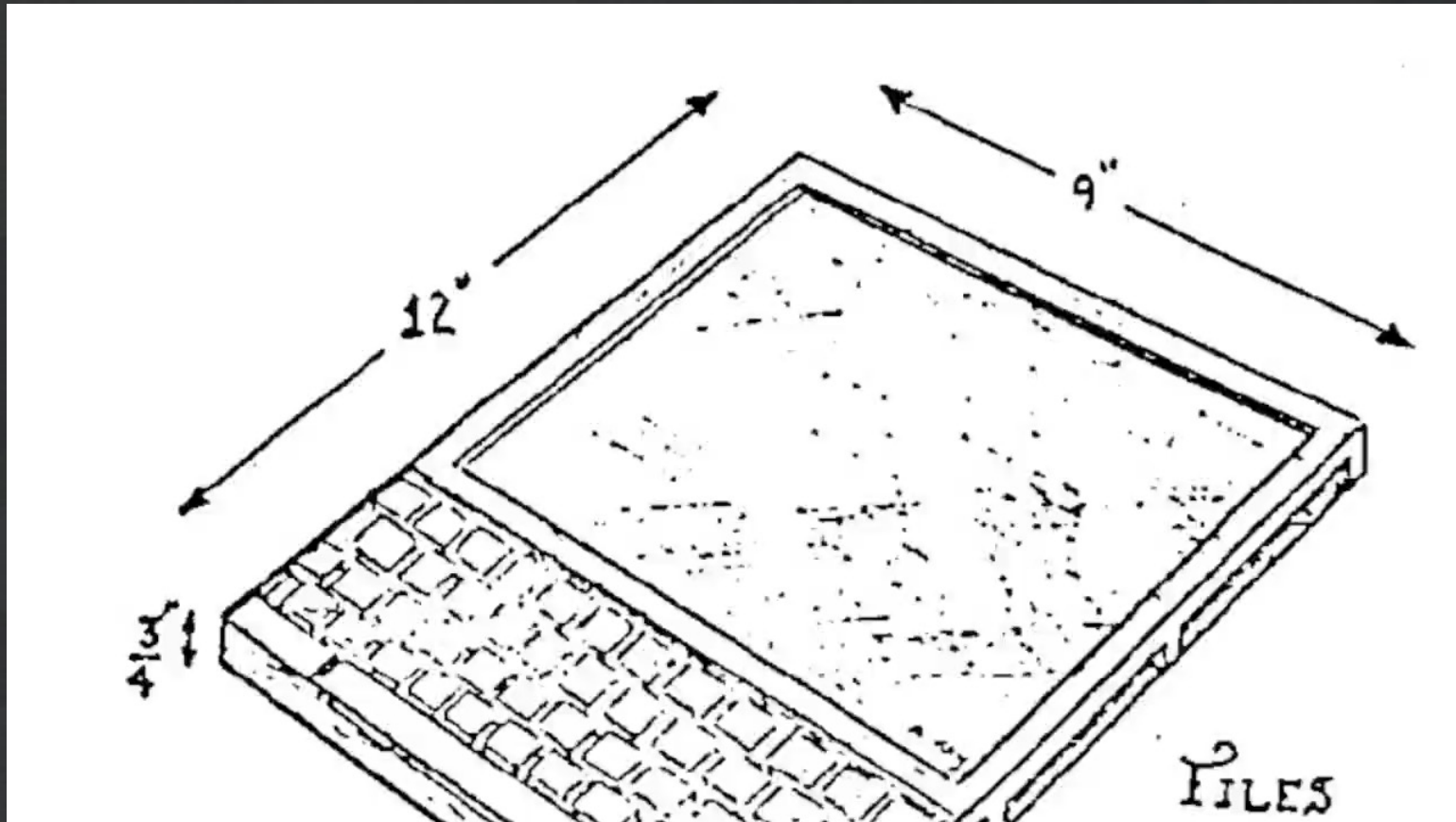
AR/VR – Sutherland (1965)





dt+UX: Design Thinking for User Experience Design, Prototyping & Evaluation

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

2023au CS147 Film Festival Awards

- Best Acting
- Best Music/Soundtrack
- Funniest/Most Humorous
- Best Locations
- Best Production Values
- Most Coherent Values
- Best Project Concept
- Best Overall Video

The Nominees...



Playdate



Fitbud



Spur



QueerX



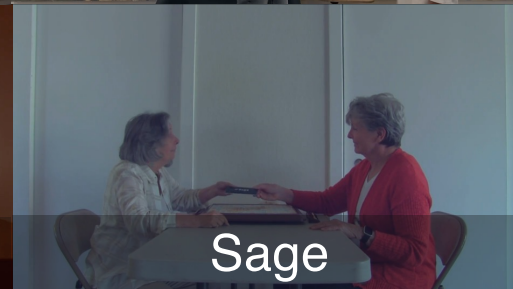
Arbor



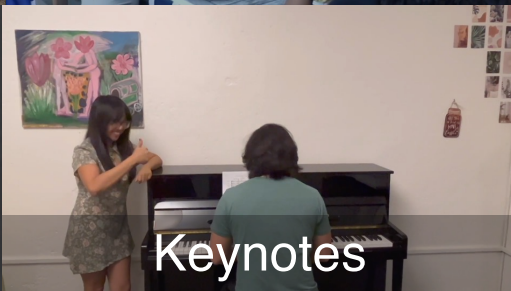
Mersiv



RendezViewz



Sage



Keynotes



Turno

Best Acting

Runner Ups

Arbor

RendezViewz

Winner

Spur

Best Music / Soundtrack

Runner Ups

Turno & Mersiv

RendezViewz

Winner

Keynotes

Funniest/Most Humorous Video

Runner Ups

Mersiv

RendezViewz

Winner

FitBud

Best Locations

Runner Up
Arbor

Winner
Sage

Best Production Values

Runner Ups

Playdate & Turno

Winner

Arbor

Most Coherent Values

Runner Ups

Turno, Arbor, RendezViews

Sage

Winner

QueerX

Best Project Concept

Runner Ups

Mersiv

RendezViewz

Winner

Turno

Best Overall Video

Runner Ups

Mersiv & Spur

Winners

Arbor & FitBud

People's All-Around

Winner

RendezView

Administrivia

- Keep up w/ readings/HW on class website
 - <http://hci.stanford.edu/cs147>
 - midterm coming up Wed next week
- Questions?

Midterm

Scope: Everything through Usability Testing (Week 7 - 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. 15, 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

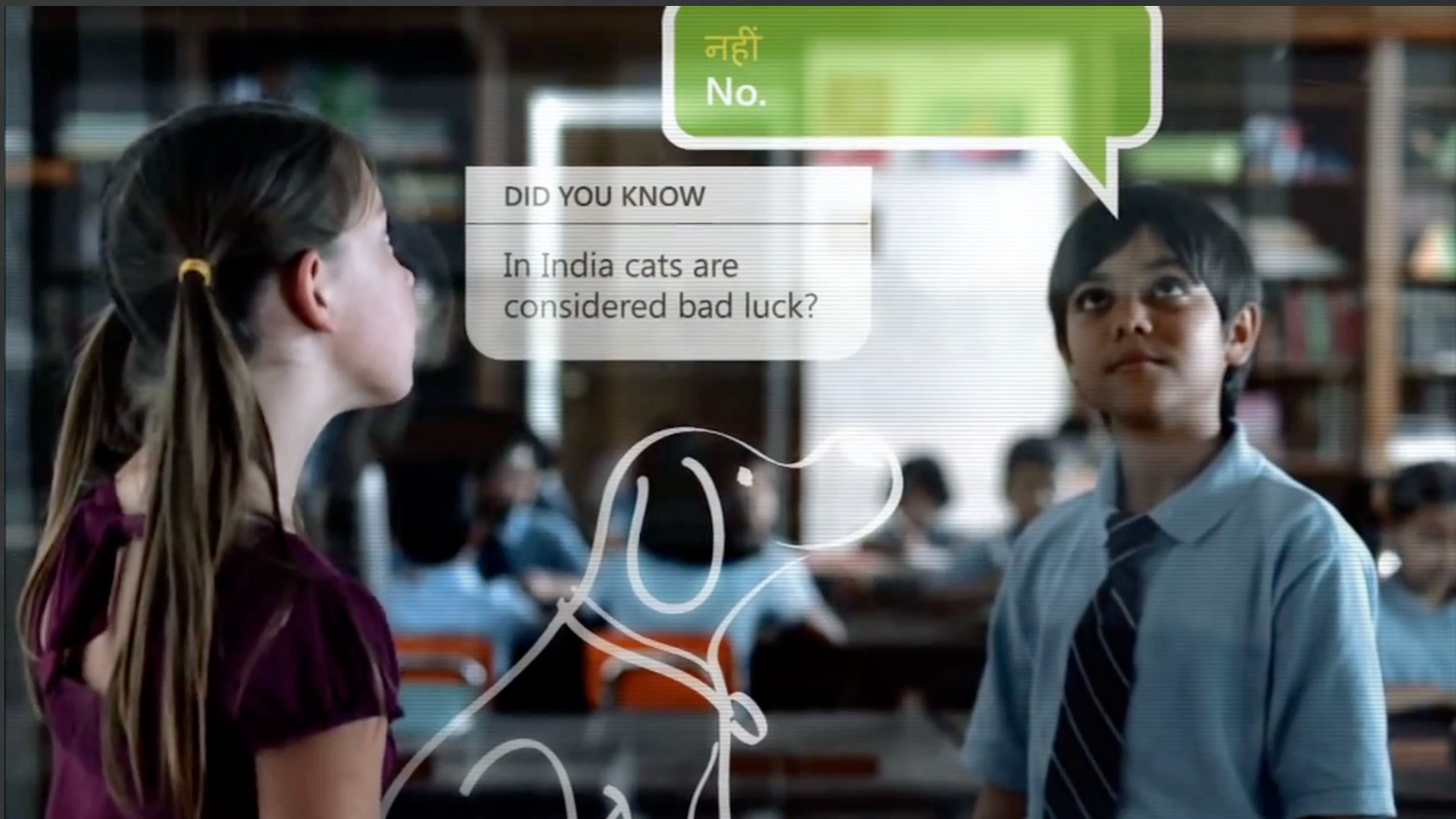


The Future

Minority Report (2002)



Microsoft Productivity Future Vision 2019



Spike Jonze's Her (2013)



Next Time

- Lecture
 - Usability Testing
- Optional videos/readings
 - [Meet the Normals: Adventures in Universal Design](#) (6:42)
 - [“Disability Studies as a Source of Critical Inquiry for the Field of Assistive Technology”](#), Mankoff et al., ASSETS 2010
- Studio
 - Group Heuristic Evaluation (need to participate to get a grade)