

Human-Computer Interaction

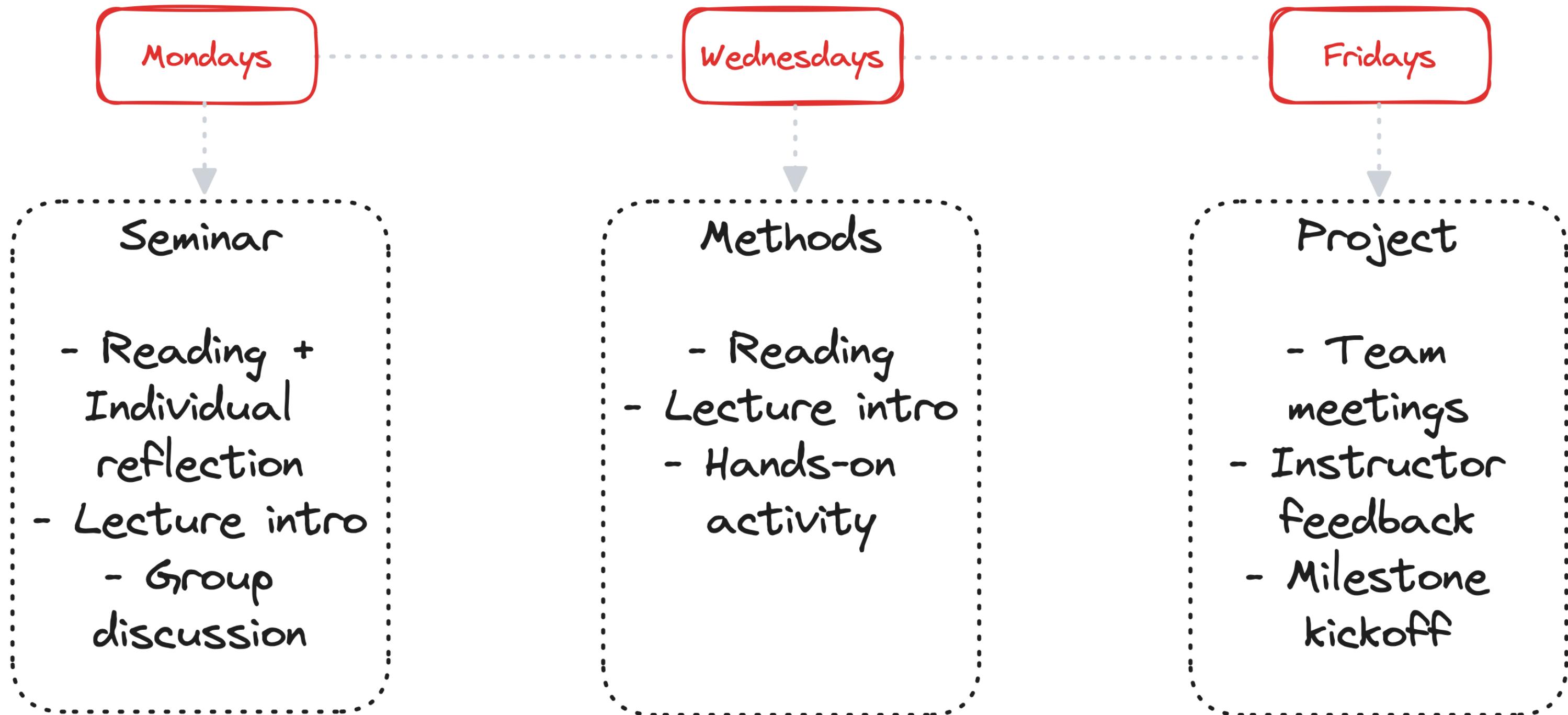
# History of HCI

Professor Bilge Mutlu

# Today's Agenda

- » Course format update
- » Topic overview: *History of HCI*
- » Discussion

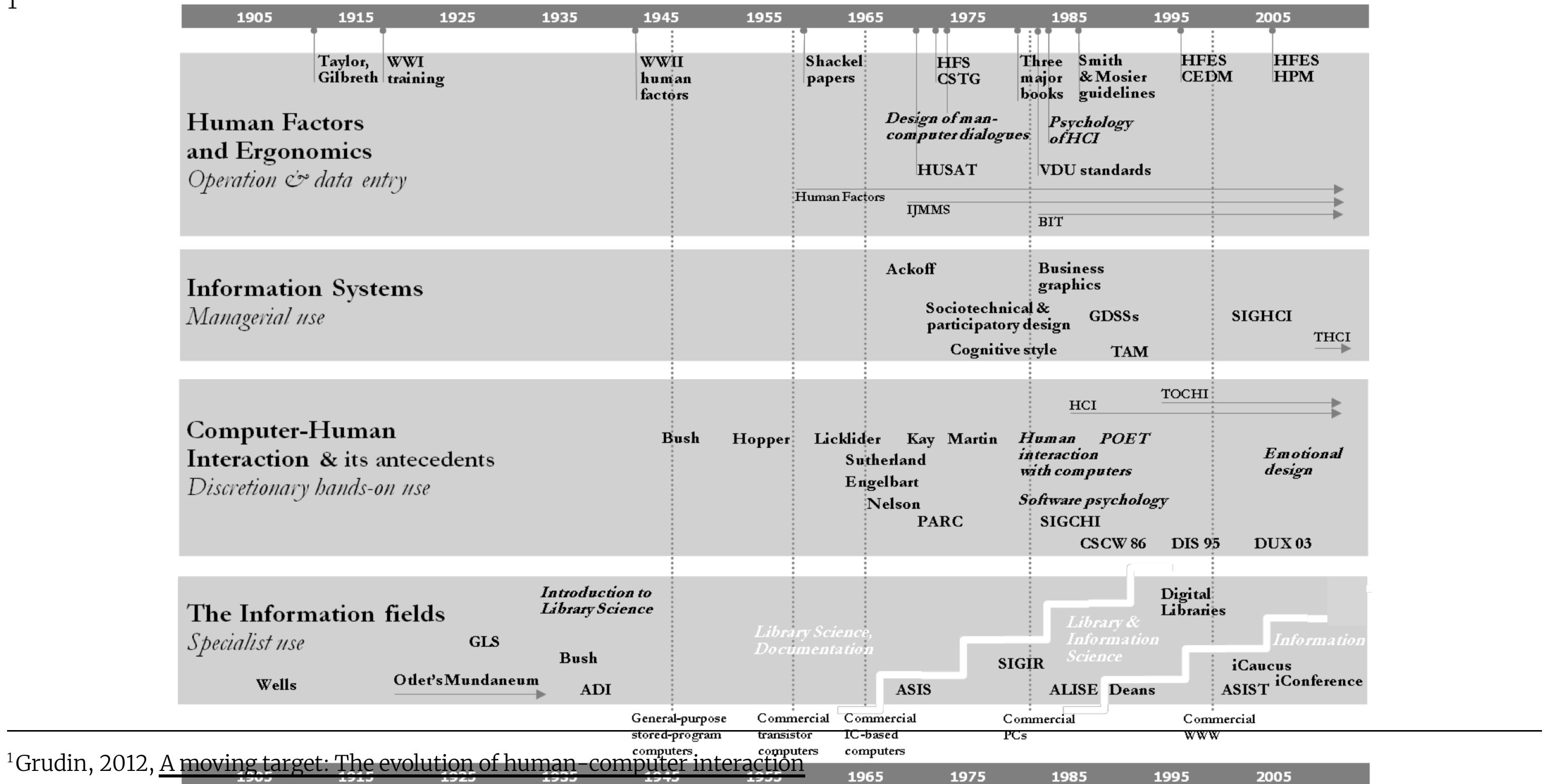
# Course Format Update



# Associated Updates

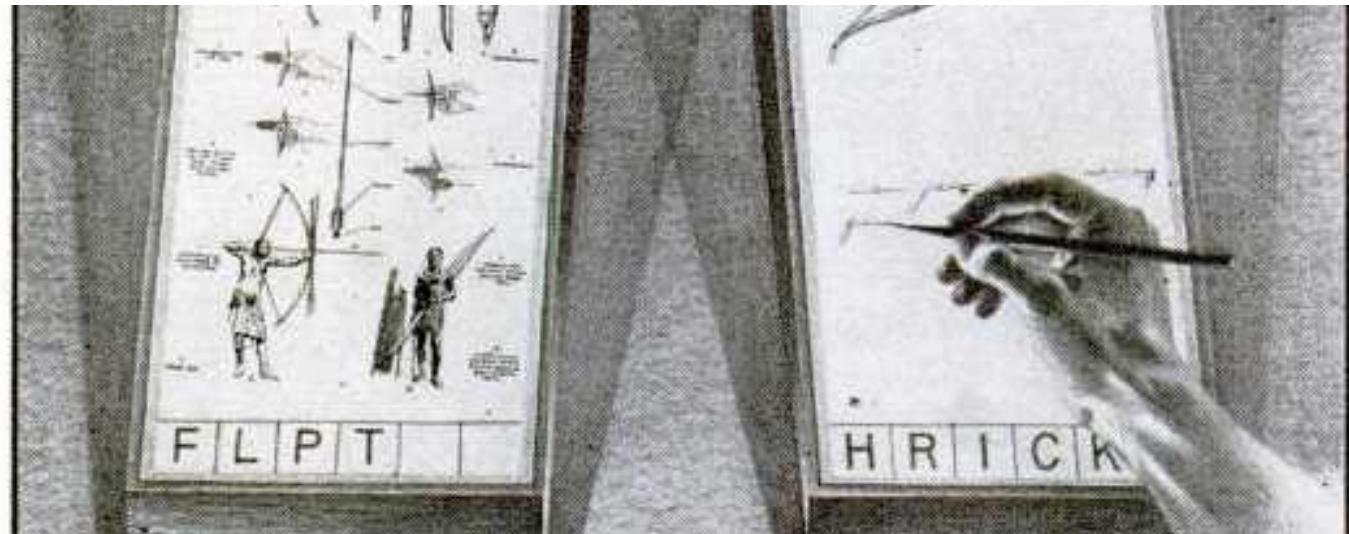
- » **Instructor office hours:** Friday class time
- » No project discussions on Mondays or Wednesdays
- » We will make project teams this Friday — do not miss class!

# Topic overview: *History of HCI*

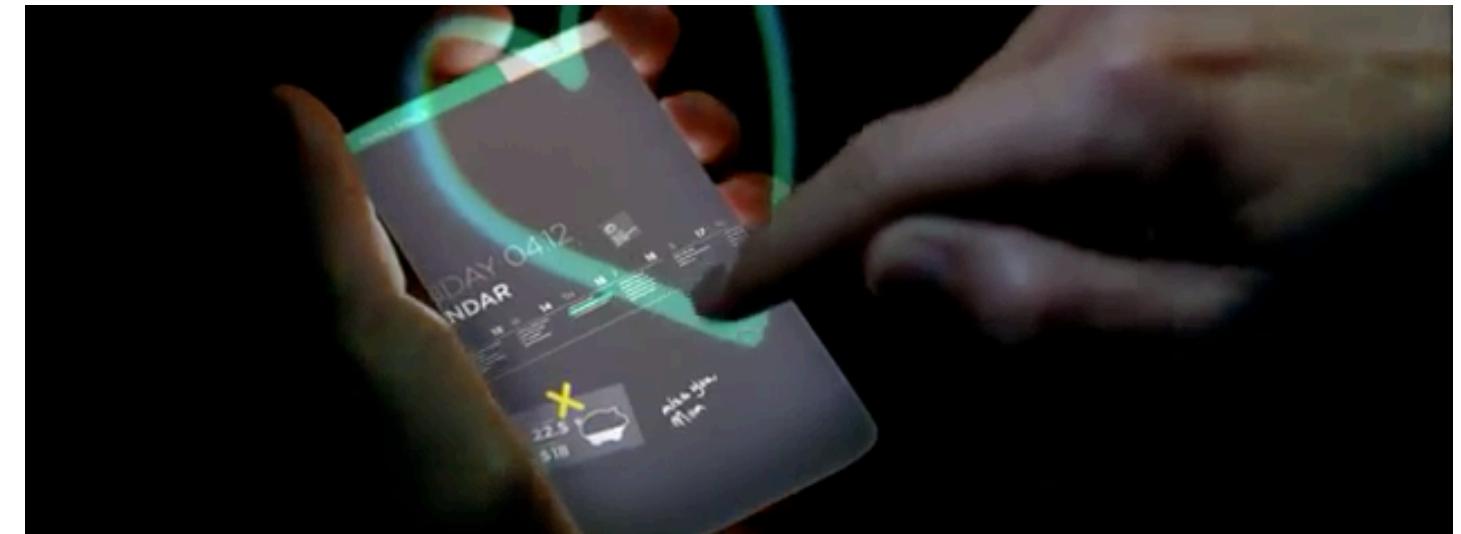


<sup>1</sup>Grudin, 2012, A moving target: The evolution of human-computer interaction

# 1945 (Vannevar Bush)<sup>2</sup>



# 2011 (Microsoft)



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<sup>2</sup>Wired, Microsoft

# 1940s<sup>3</sup>

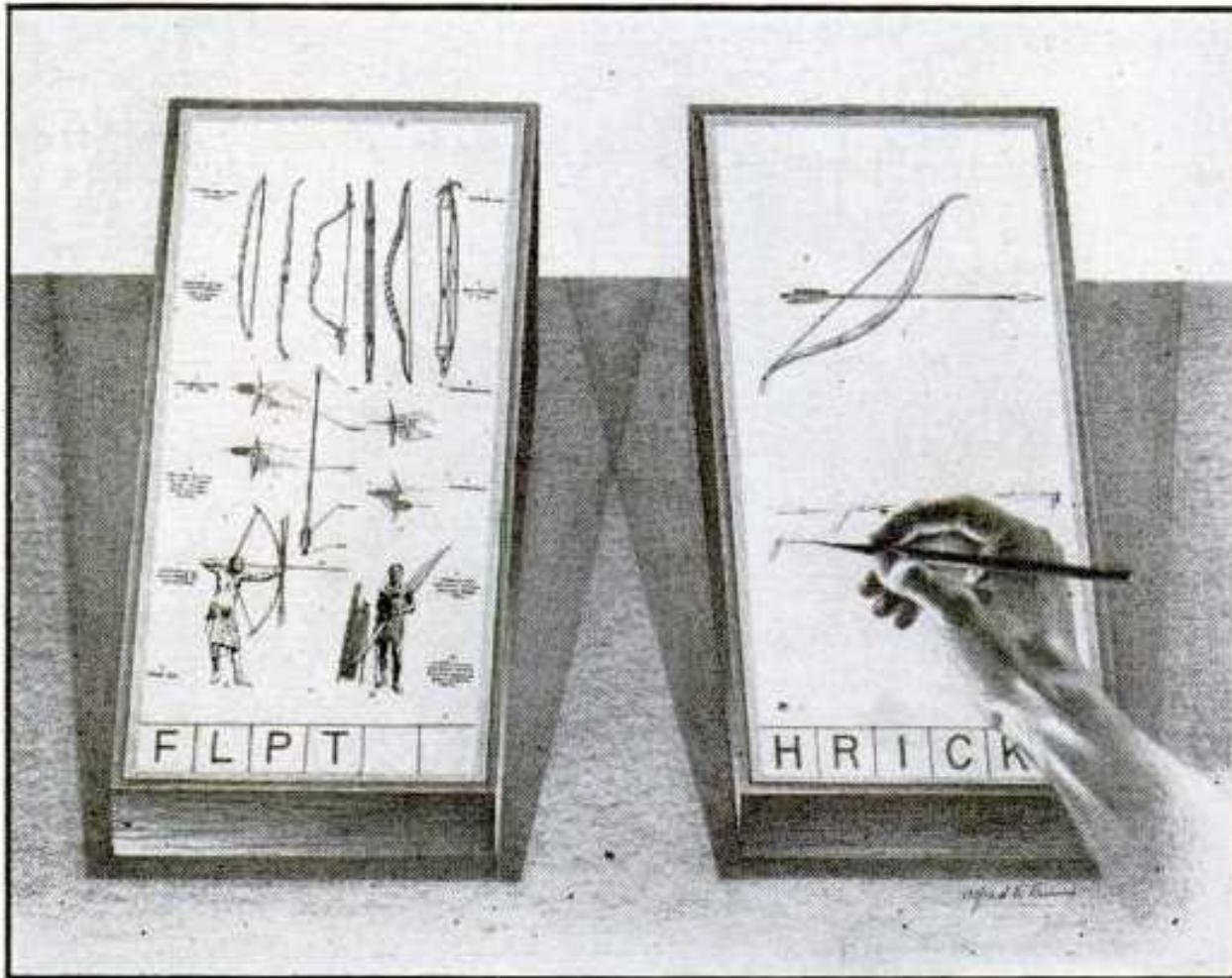
Memex, 1945, Vannevar Bush, OSRD

- » Stores all records/articles/communications
- » Items retrieved by indexing, keywords, cross-referencing
- » Information linked through associative trails

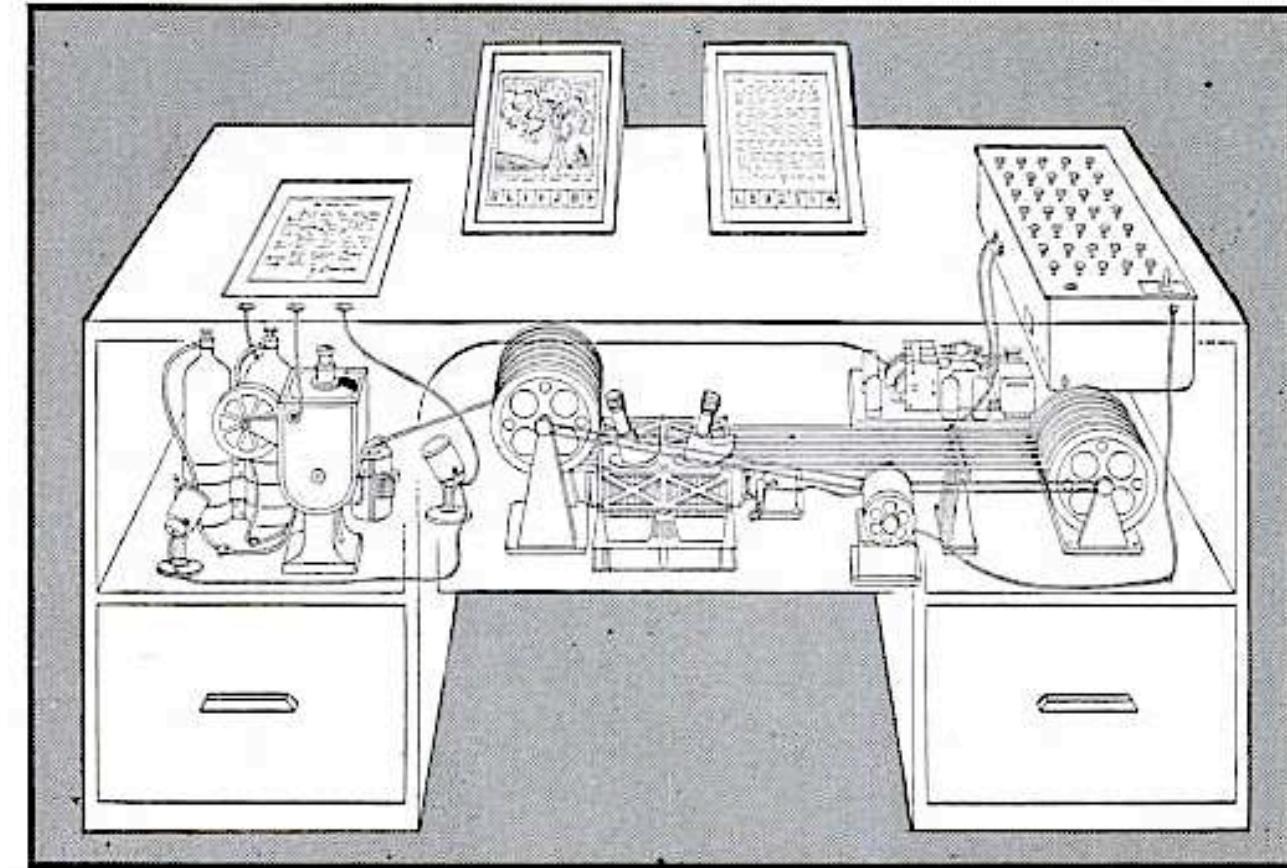


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<sup>3</sup> Image source



**MEMEX IN USE** is shown here. On one transparent screen the operator of the future writes notes and commentary dealing with reference material which is projected on the screen at left. Insertion of the proper code symbols at the bottom of right-hand screen will tie the new item to the earlier one after notes are photographed on supermicrofilm.



**MEMEX** in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicro-film filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.

## AS WE MAY THINK CONTINUED

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<sup>4</sup> Image source

# 1960s<sup>5</sup>

*Man-Computer Symbiosis*, 1960, Joseph Licklider, ARPA

*“Men will set the goals, formulate the hypotheses, determine the criteria, and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking.”*



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<sup>5</sup> Image source

# 1960s<sup>6</sup>

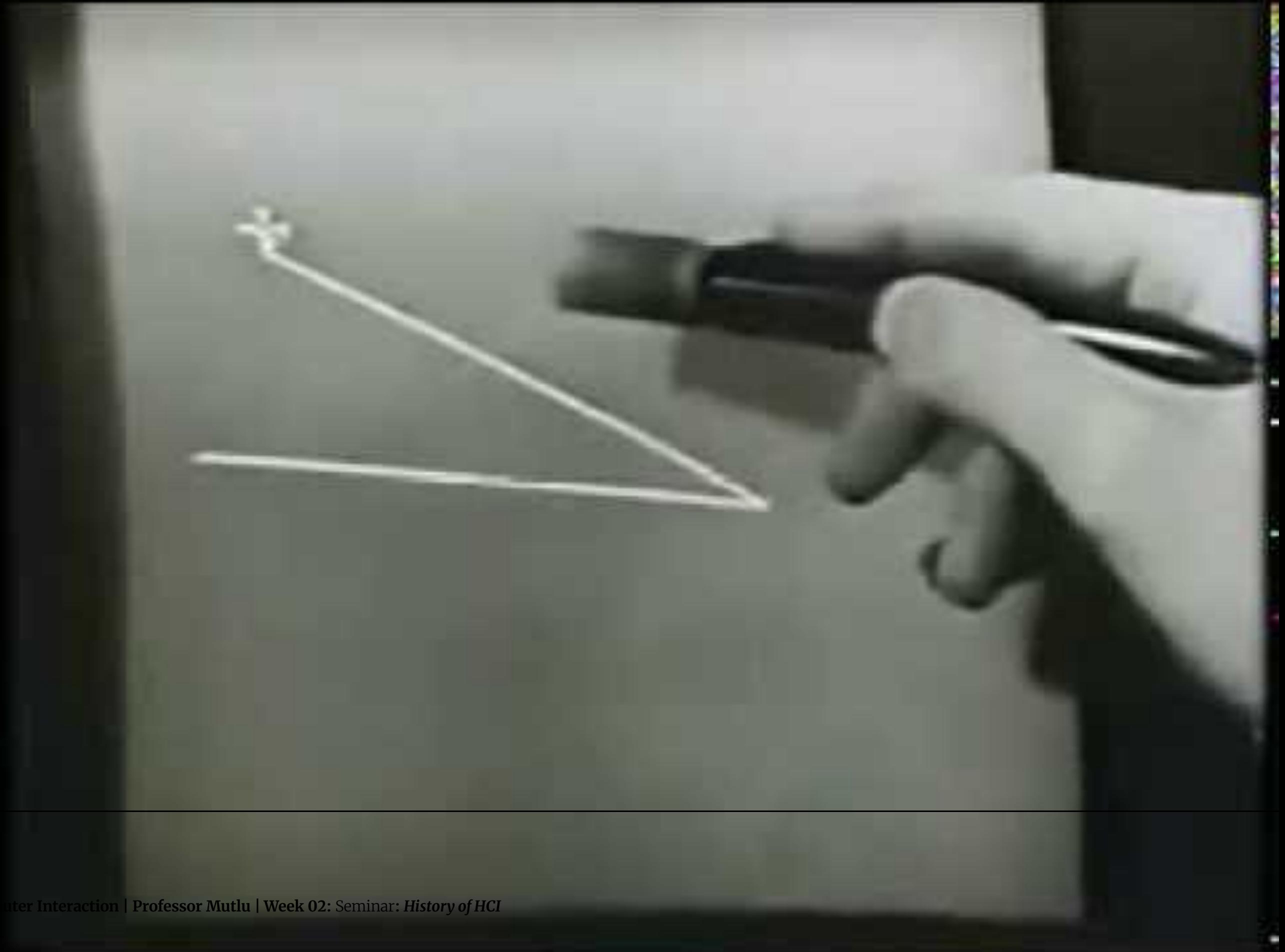
SketchPad, 1963, Ivan Sutherland, MIT

"Sketchpad: A Man-machine Graphical Communications System" introduced hierarchy, object-oriented graphics, constraints, icons, copying, light pen as input device, recursive operations

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<sup>6</sup>Image source

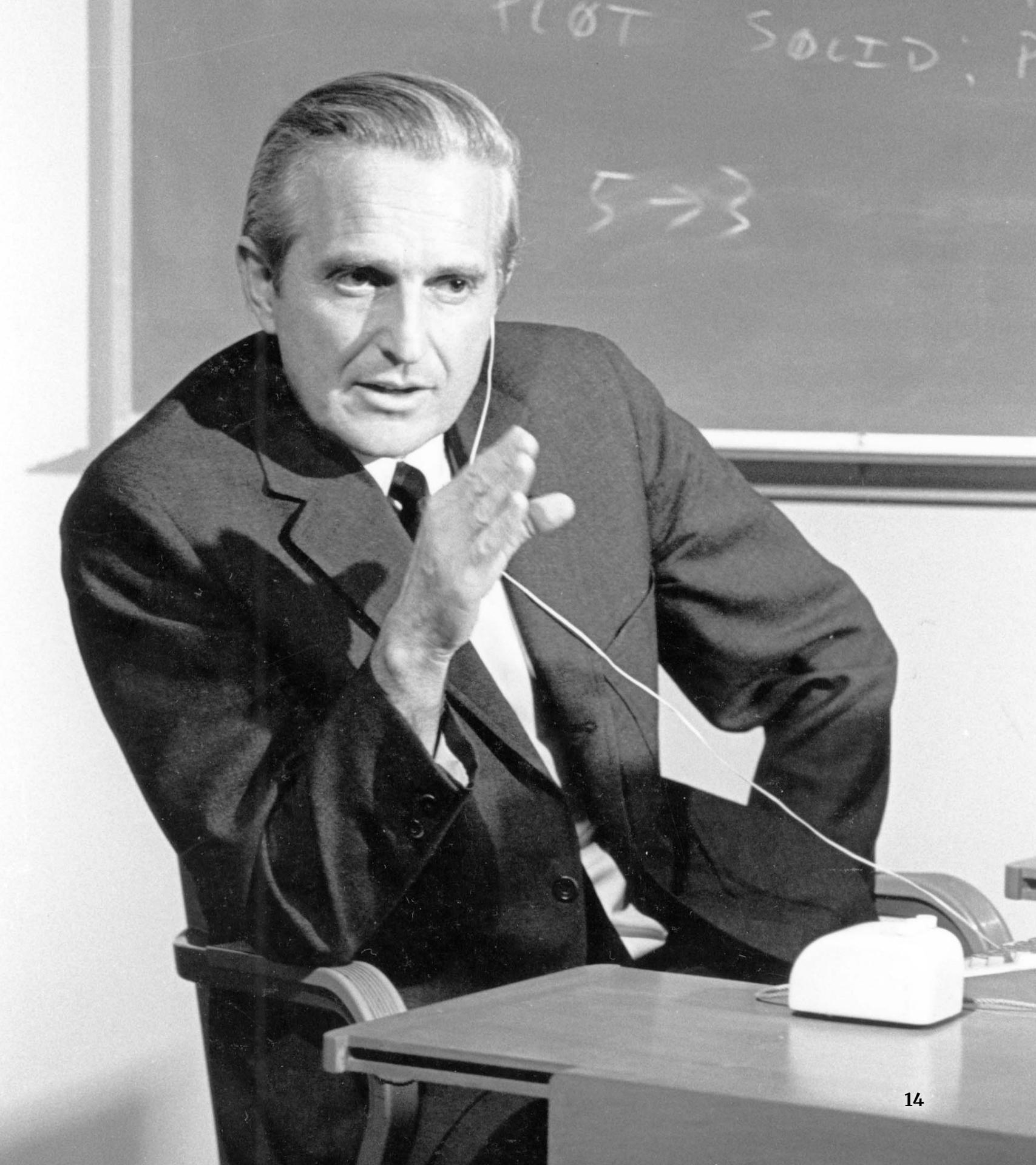




# 1960s<sup>8</sup>

*The Mouse*, 1968, Douglas Engelbart, Stanford Research Institute (SRI)

“Mother of all demos” introduced *hierarchical hypertext, multimedia, windows, shared files, electronic messaging, video conferencing*



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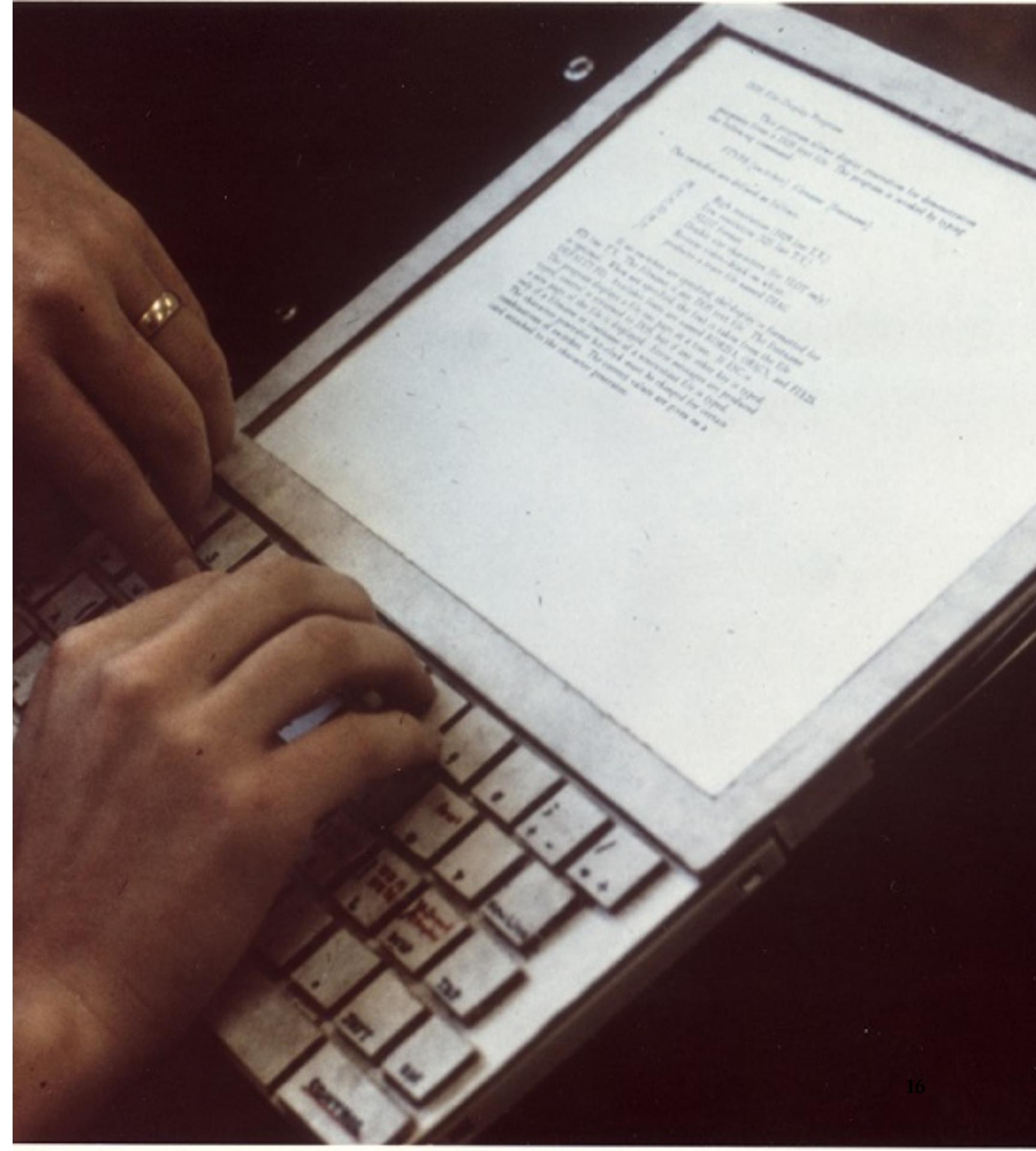
<sup>8</sup>Image source



# 1960s<sup>10</sup>

Dynabook, 1968, Alan Kay, Xerox PARC

The Dynabook mockup introduced *personal computer, desktop interface*



<sup>10</sup> Image source

# 1970s

Xerox Alto, 1973, Xerox PARC<sup>11</sup> <sup>12</sup>

The first computer to support an OS based on a GUI that integrated the ideas developed for Dynabook: the *desktop metaphor, GUI, ethernet*

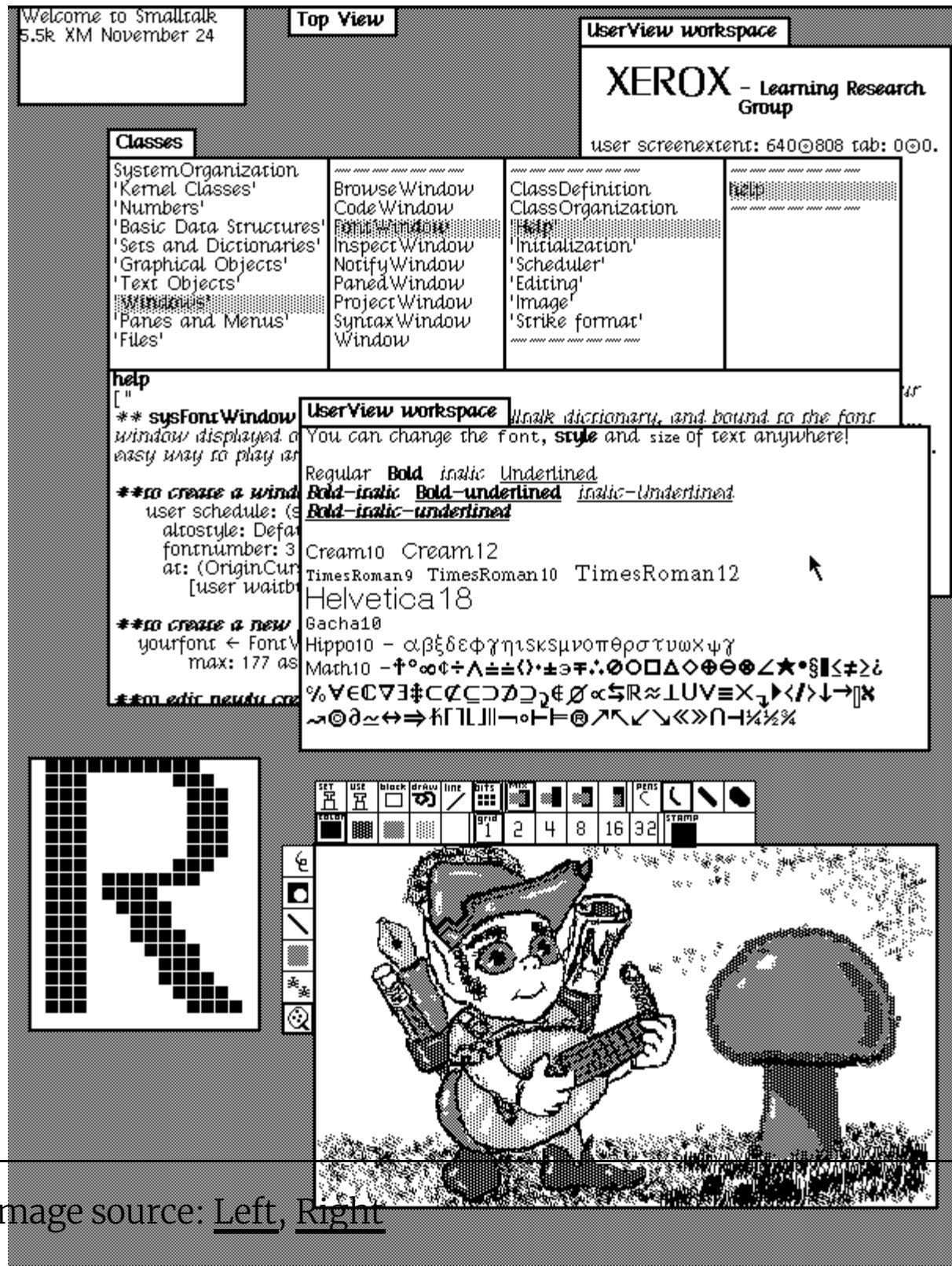


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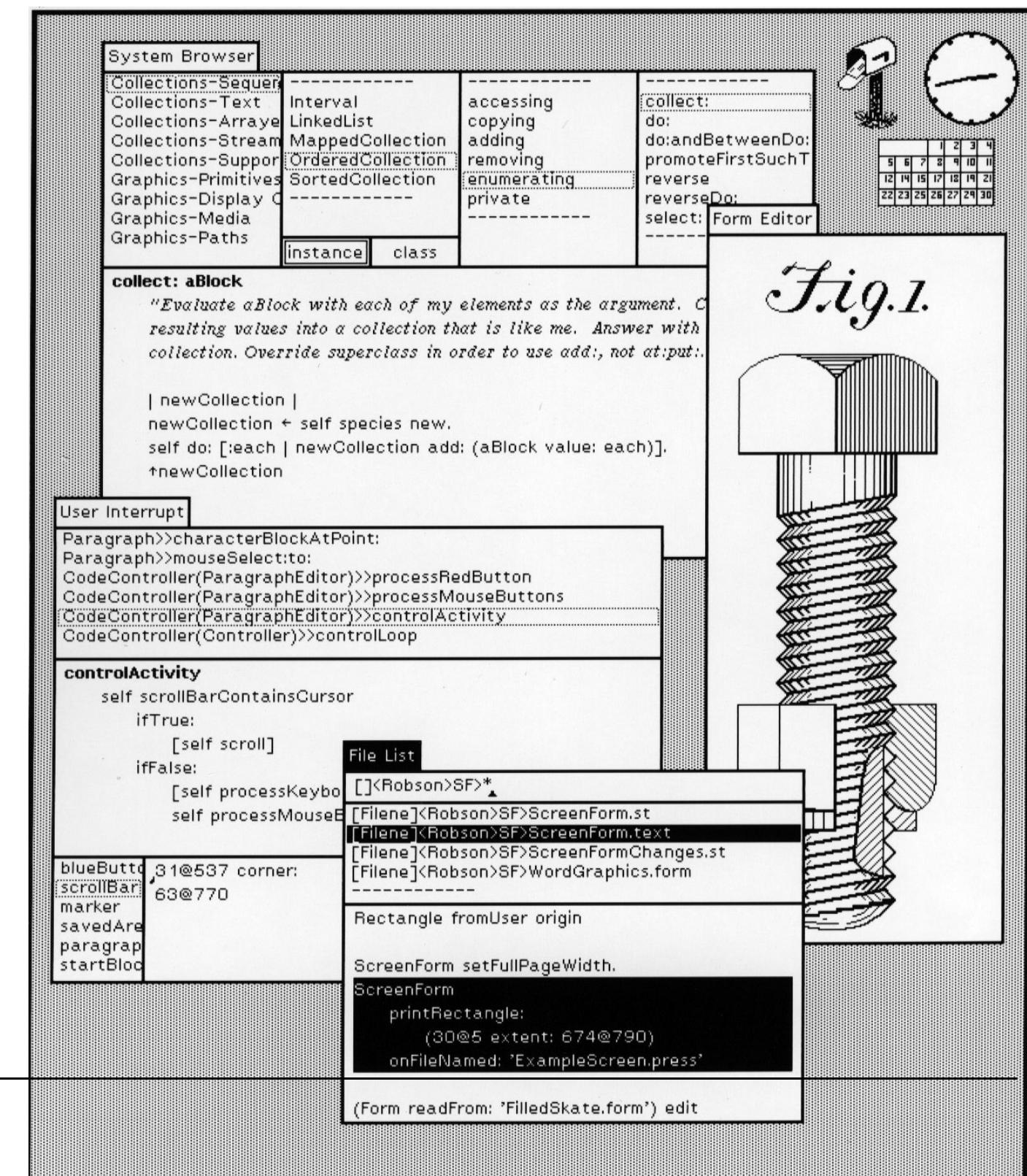
<sup>11</sup>[Wikipedia: Xerox Alto](#)

<sup>12</sup>[Image source](#)

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<sup>13</sup> Image source: [Left](#), [Right](#)



*Fig. I.*

# 1970s <sup>14</sup>

Apple II, 1977, Apple

Personal computer that was first mass production, color graphics



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<sup>14</sup> Image source

# 1980s<sup>15</sup> <sup>16</sup> <sup>17</sup>

Xerox Star, 1981, Xerox PARC

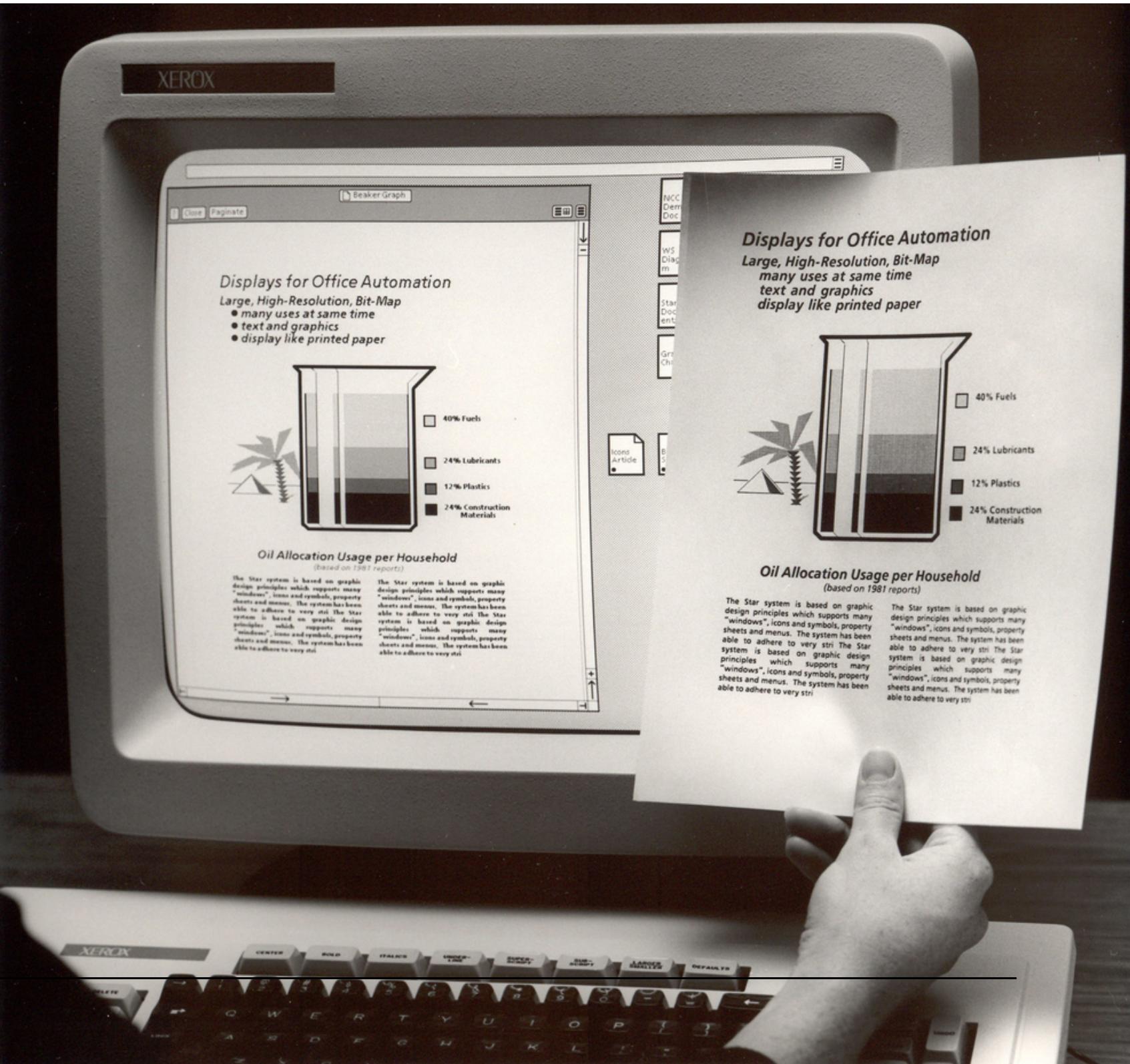
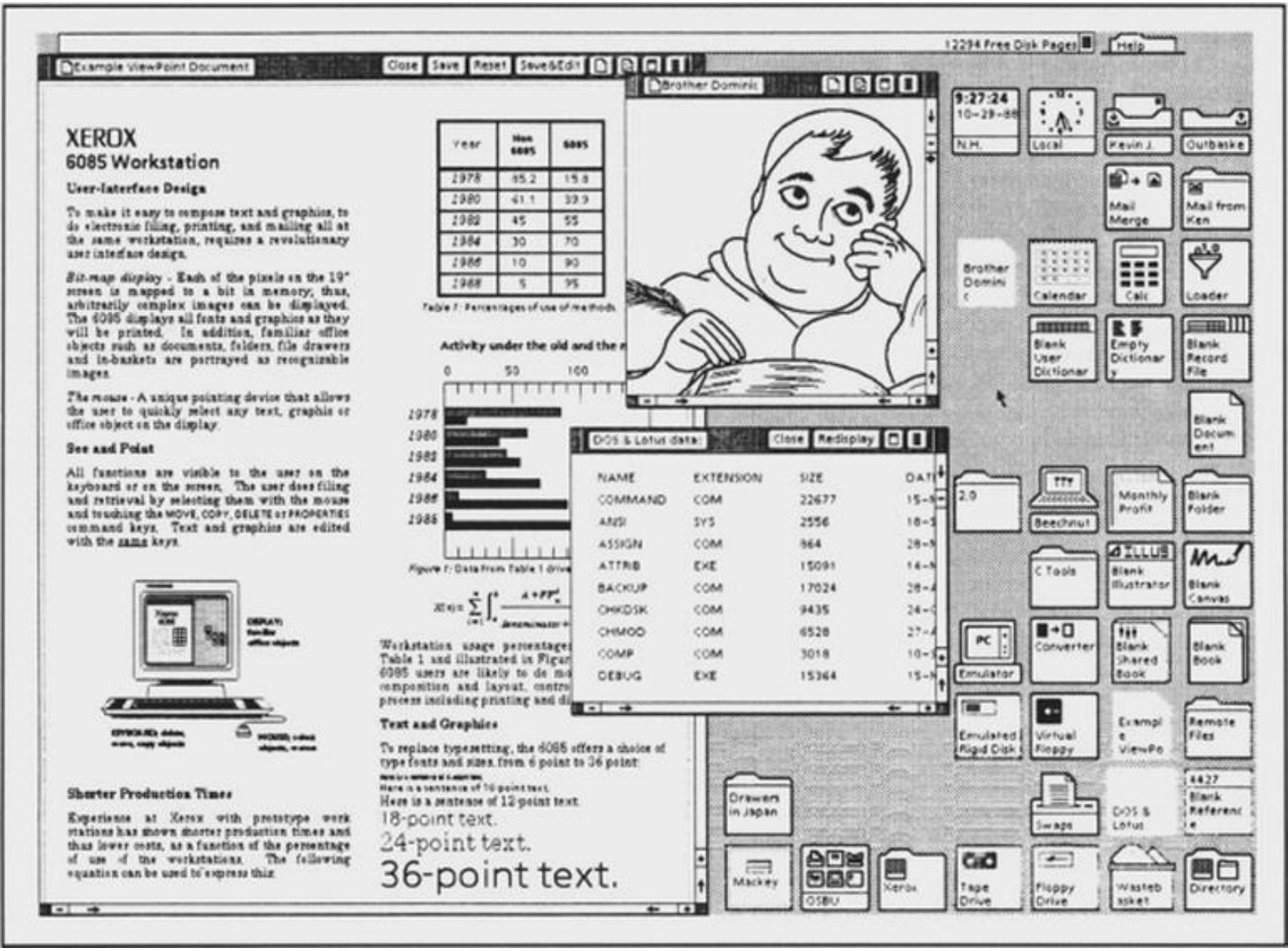
First commercial system with a user interface that integrates today's technologies, including windows, icons, folders, mouse, etc.



<sup>15</sup> Wikipedia: [Xerox Star](#)

<sup>16</sup> Videos of the Star Interface: [Part 1](#), [Part 2](#)

<sup>17</sup> [Image source](#)



<sup>18</sup> Image source: [Left](#), [Right](#)

### *Evolution of "Document" icon Shape*

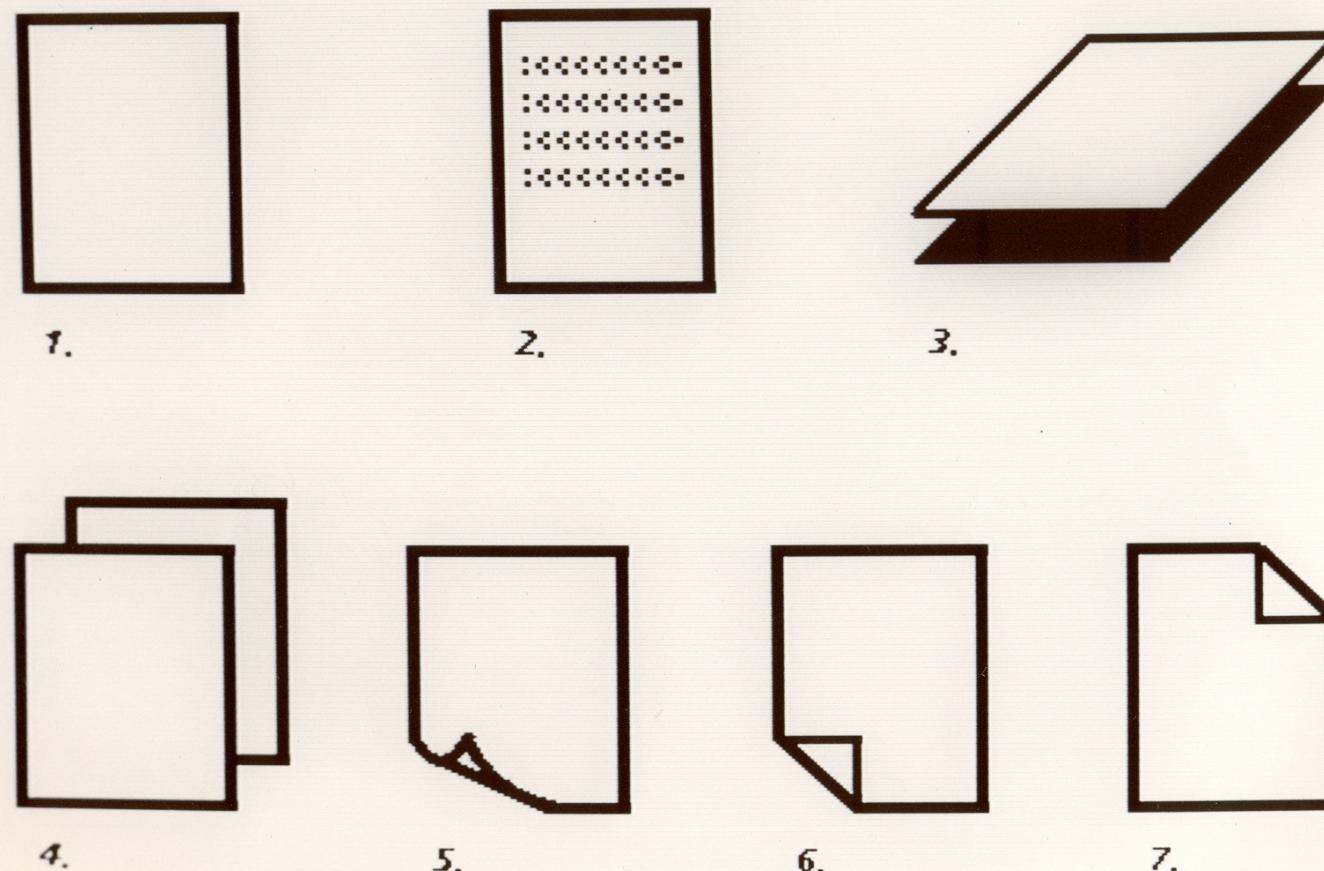
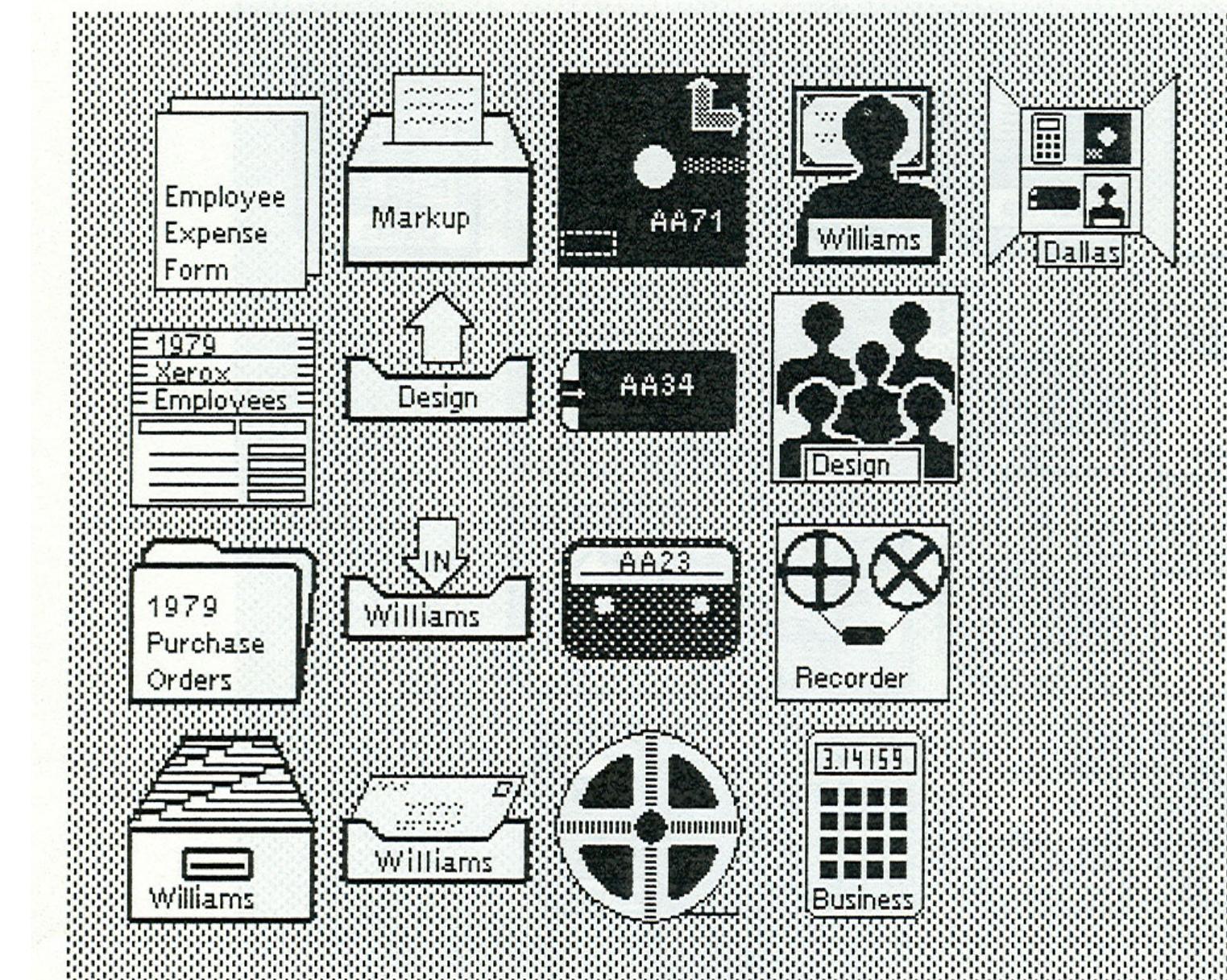


Figure 4.  
Set 4 (Judd)



document      printer      floppy disk      user      directory

record file      out-basket      mag. card      group

folder      in-basket      cassette      recorder

file drawer      in-basket (with mail)      mag. tape      calculator

<sup>19</sup> Image source: [Left](#), [Right](#)

# 1980s<sup>29</sup>

User testing of Xerox Star

*The design effort took more than six years .... The actual implementation involved from 20 to, eventually, 45 programmers over 3.5 years producing over 250,000 lines of high level code.*

By the time of the initial Star release, the Functional Test Group had performed over 15 distinct human-factors tests, using over 200 experimental subjects and lasting for over 400 hours.

<sup>29</sup> Bewley et al.

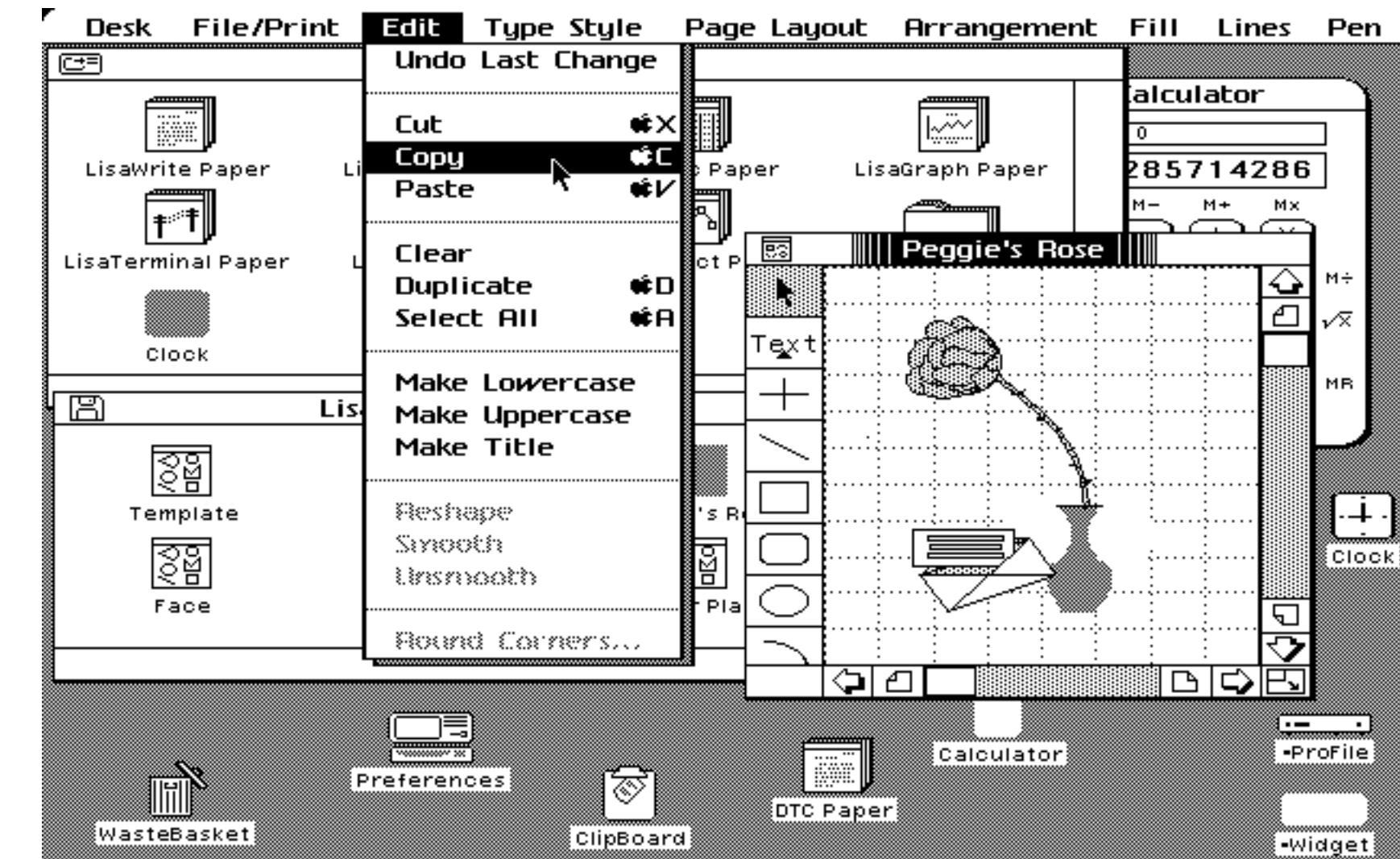
Test Topic	No. Sub	Tot. Hrs	Impact
Selection Schemes	28	64	Lead to new design; validated new scheme
Keyboard (6 layouts)	20	40	Led to design of keyboard
Display	20	10	Specified display phosphor and refresh rate
Tab-indent	16	16	Caused redesign of Tab and Indent functionality
Labels	12	6	Caused change in property sheet and keyboard labels
Property Sheets	20	40	Identified potential interface problems and redesigns
Fonts	8	6	Led to decision on screen-paper coordination
Icons	20	30	Led to design of icons
Initial Dialogue	12	36	Led to design of training facility and materials
HELP	2	6	Validated HELP design ideas
Graphics	10	65	Led to redesign; validated new design
Graphic Idioms	4	16	Contributed to redesigns
J-Star Labels	25	25	Led to design of keyboard labels for Japanese-Star

Figure 8. Partial listing of Star-1 Functional Tests

# 1980s<sup>28</sup>

Apple Lisa, 1983, Apple

Included many user interface innovations,  
including *pull-down menus*, *dialog boxes*, *one-button mouse*



<sup>28</sup> [Ars Technica](#)

# 1980s<sup>20</sup>

The Knowledge Navigator, 1987, Hugh Dubberly, Apple ATG

Vision introduced *speech interfaces, virtual agents*



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<sup>20</sup> Image source

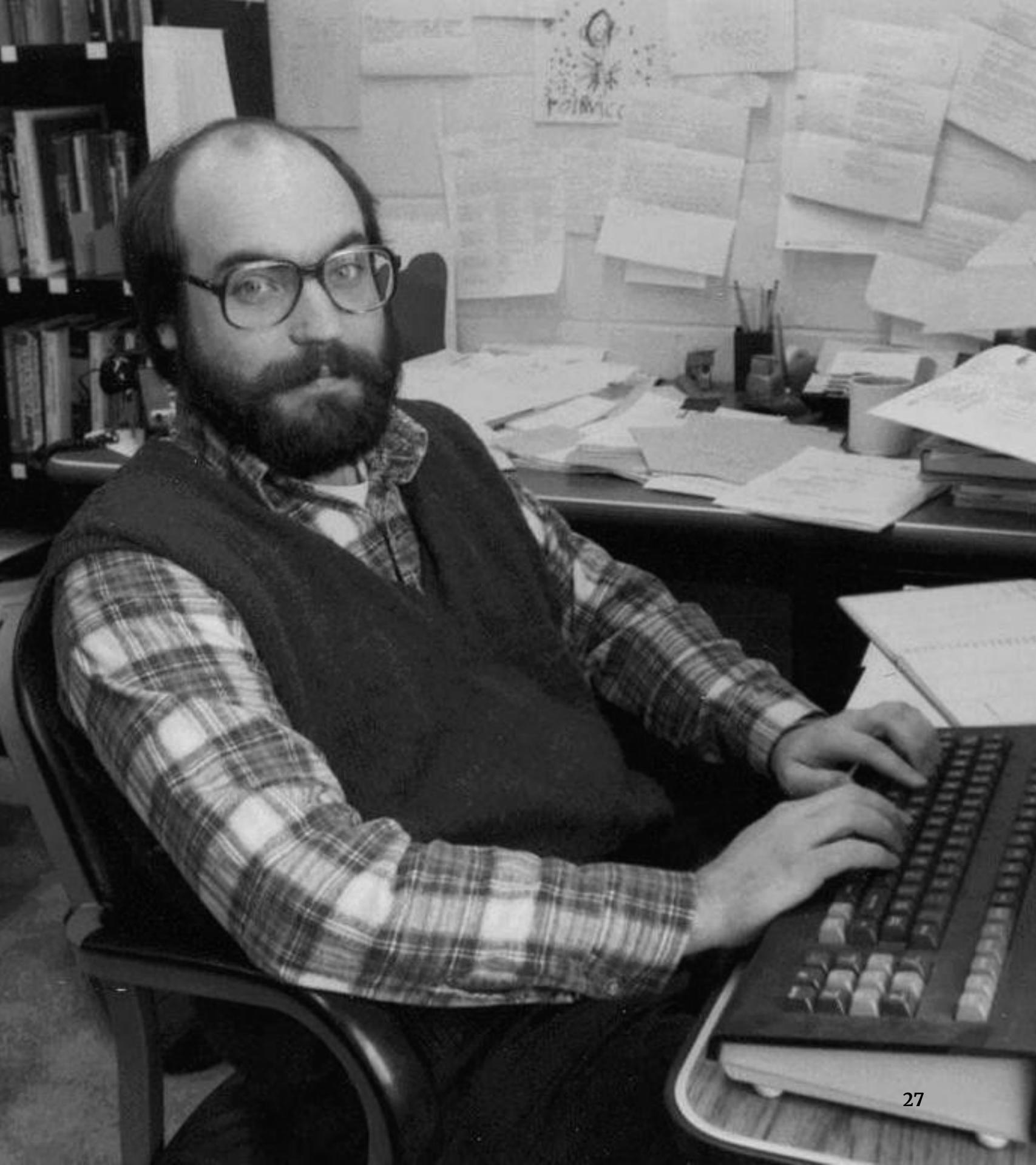


# 1990s<sup>22</sup>

*Ubiquitous computing*, 1991, Mark Weiser, Xerox PARC

## The Computer for the 21st Century

*“The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.”*



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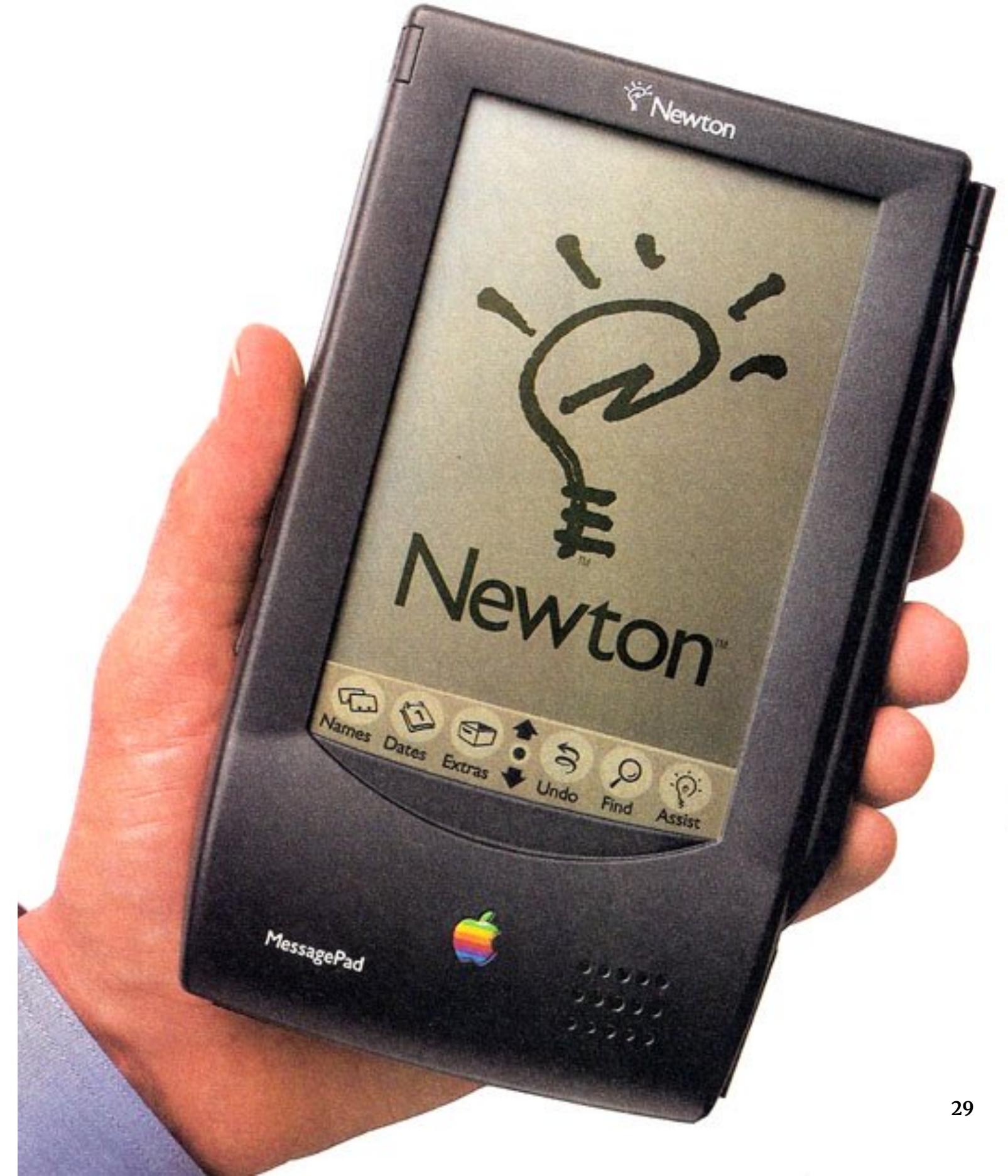
<sup>22</sup> Image source



# 1990s<sup>24</sup>

Apple Newton, 1992, Apple

The first handheld, wireless communication assistant; interaction entirely using a stylus;  
\$699!



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<sup>24</sup> Image source



# 1990s<sup>26</sup>

Clearboard, 1992, Hiroshi Ishii, NTT

Prototype introduced *shared visual workspace*,  
*matched reference points*, *videoconferencing*



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<sup>26</sup> Image source



# Discussion

# Discussion Format

- » Group discussion ~15 minutes
  - » Separate to 10 groups randomly
  - » Discuss with your group members
  - » Take notes in the shared doc – pick your group number
- » Summary from each group & discussion ~10 minutes
- » We will distill takeaways and share notes after class

# Some Questions

- » What did you take from the history you read?
- » What was surprising, unintuitive, unexpected?
- » How does what you read change how you see HCI?
- » How did external resources challenge/complement?
- » ...

# What's Next?

- » **Wednesday:** Read "Chapter 1 - Introduction to HCI research" from textbook
- » **Friday:** Be prepared to choose a research topic and a team