

Interaction Design

Chapter 1 (April 14, 2016, 9am-12pm):
History

Tutorials & Exam

- **Interaction Design** required for Concept Development
- no Podcast, so be here every week :)
- register via UniWorX!

- **tutorials** close to the lecture
- practical exercises to apply theoretical knowledge
- important preparation for the exam
- will be held in breakout sessions during the lecture
- sometimes a bit homework possible

- **Bonus** of 5% in exam possible if you hand in deliverable at the end
- deliverable: sketchbook with works during and inspired by the course / documentation of the course to be delivered at the end of the semester (at the last lecture)
- **Written Exam** will be announced on the website shortly
- exact time and location will be announced soon

Course Overview:

I History & Fundamentals

April / May

June

July

Course Overview:

II Applying Interaction Design

April / May

June

July

Course Overview:

III Beyond the Desktop

April / May

June

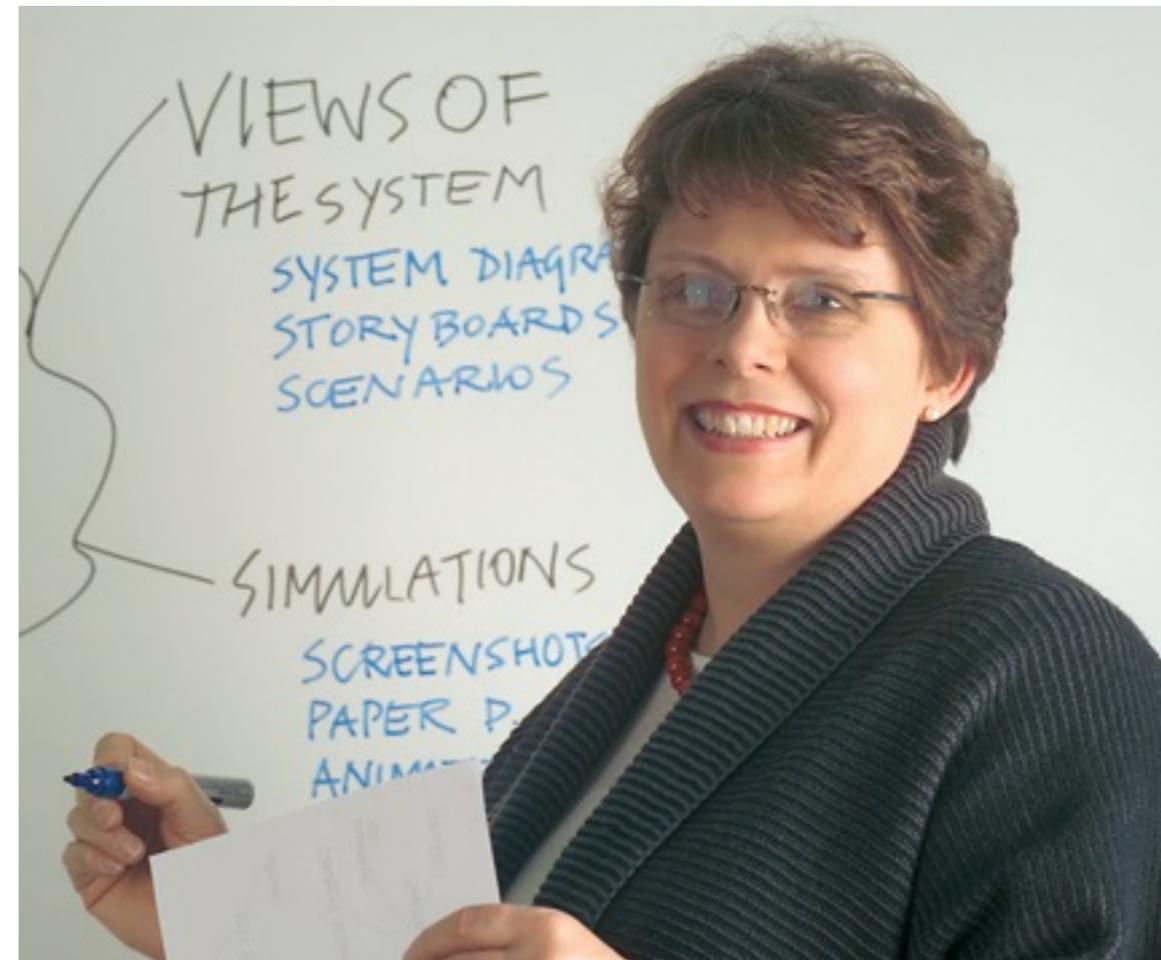
July

History

- Course Overview (Timetable) + Organizational Stuff
- What is Interaction Design?
- The Story of the Mouse
- PARC
- The Desktop Metaphor
- The GUI

Gillian Crampton Smith

- established the first Interaction Design MA program at the Royal College of Art (RCA)
- was the founder and academic director of the Interaction Design Institute Ivrea (IDII)



705 ALMA ST.

ALL SYSTEMS NORMAL

01:53P Wed 09/04/02



AC POWER

ACKNOWLEDGE
STEP



FIRE

Looking back... (Discussion Part)

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-shaping our lives through digital artefacts...

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- good IxD refers to a “mental model”

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- elements of interaction design

Looking back...

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- good IxD refers to a “mental model”
- good IxD provides a “map” of where you are in a system, how you can move around and how you get back to the point where you started
- languages of interaction design
- elements of interaction design
- the part of the interaction designer is to design the **quality** on how the interaction is performed, how the system behaves

Designing for Everyday Life



Designing for Everyday Life

(1) Professional Tools

(2) Game Machines for Teenagers



25 years ago

today

New Challenges

(1) Professional Tools

(2) Game Machines for Teenagers

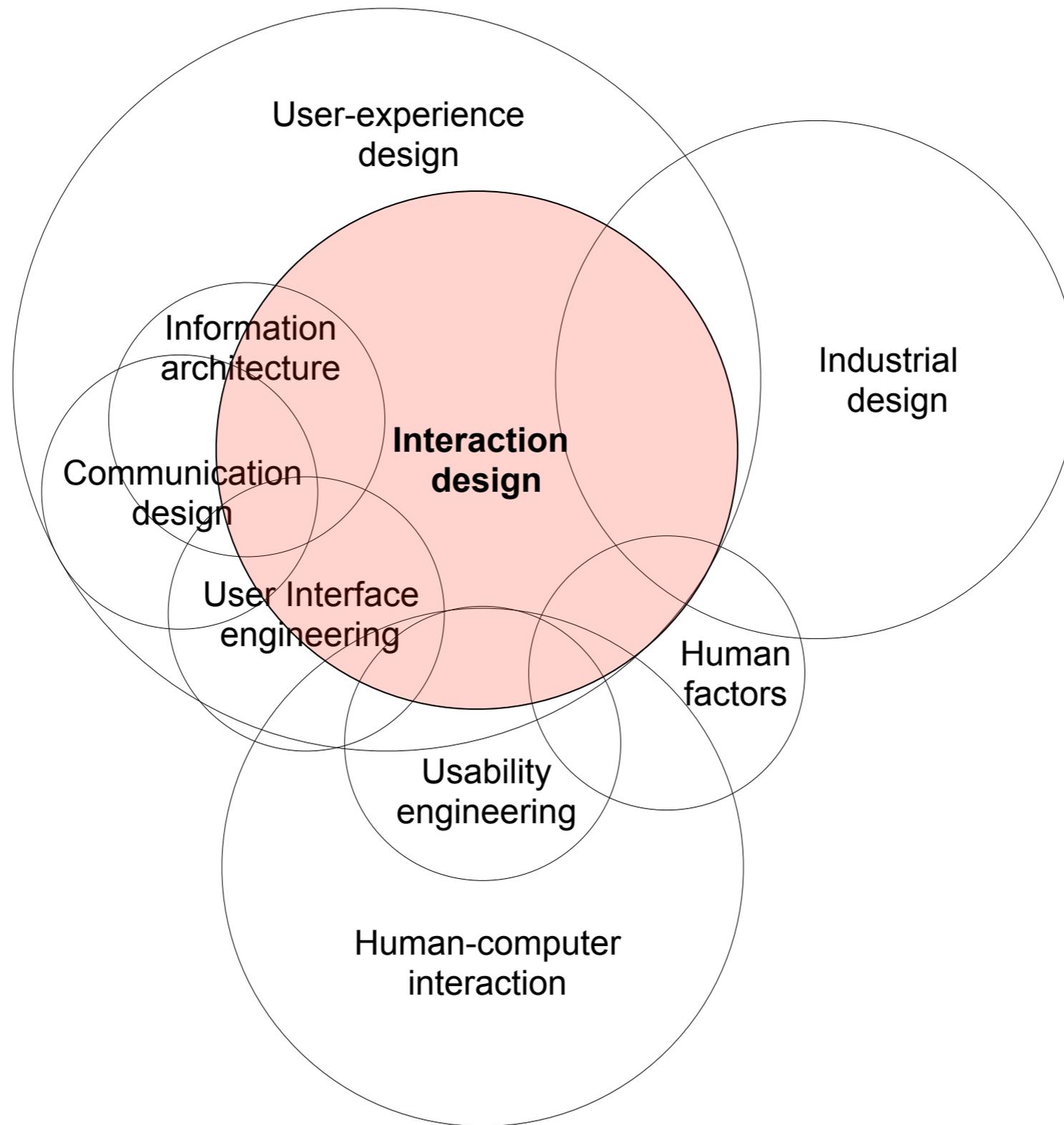
(1) Larger user groups
(e.g. Kids/Parents/
Grandparents)

(2) Various Contexts of
use (e.g. Work/School/
Home/Leisure)



25 years ago

today



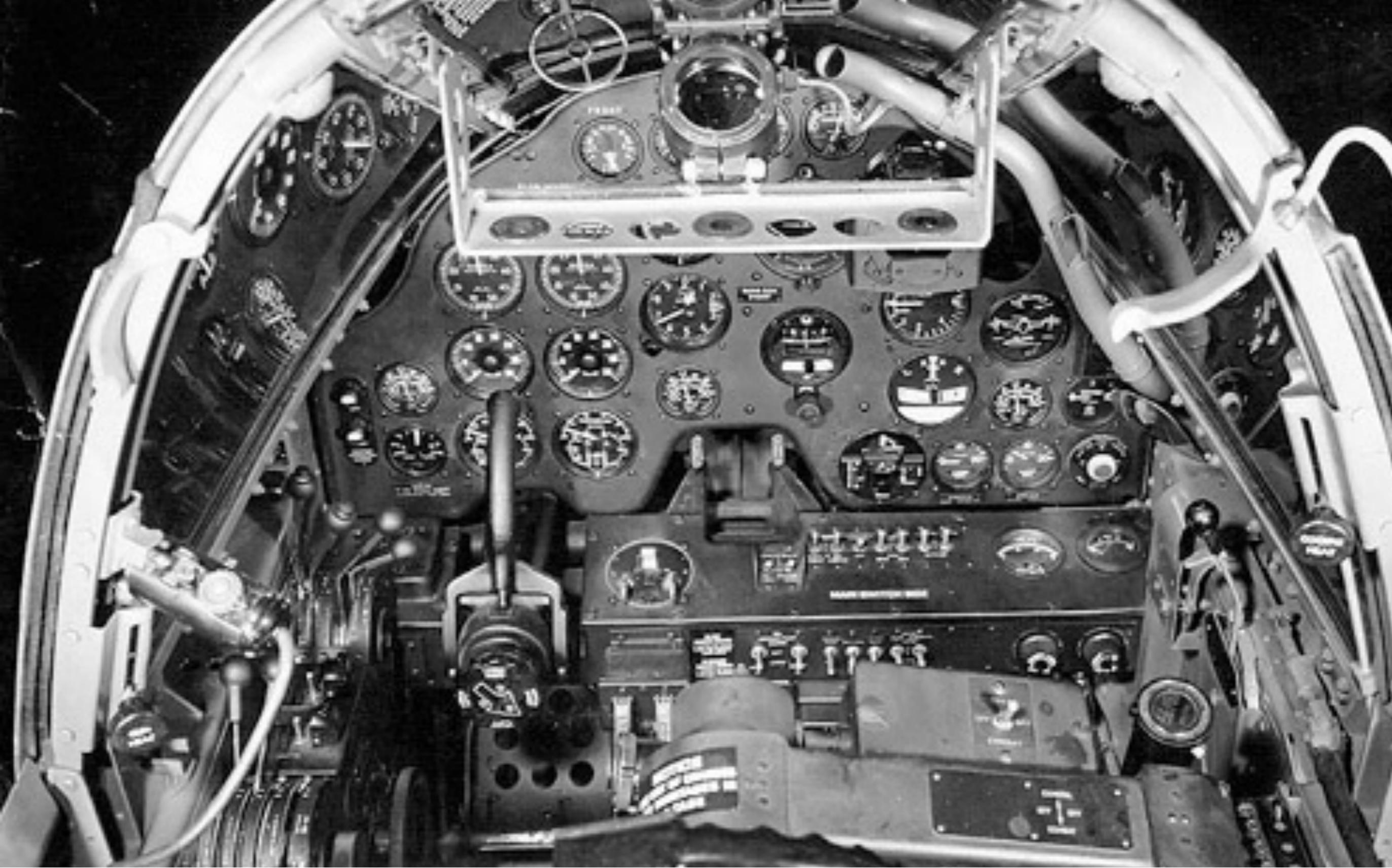
"Great design is as much about prospecting in the past as it is about inventing the future."

Bill Buxton

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The **Beginnings**...(let's jump back to 1943)



P 38 Lightning Cockpit (1943)

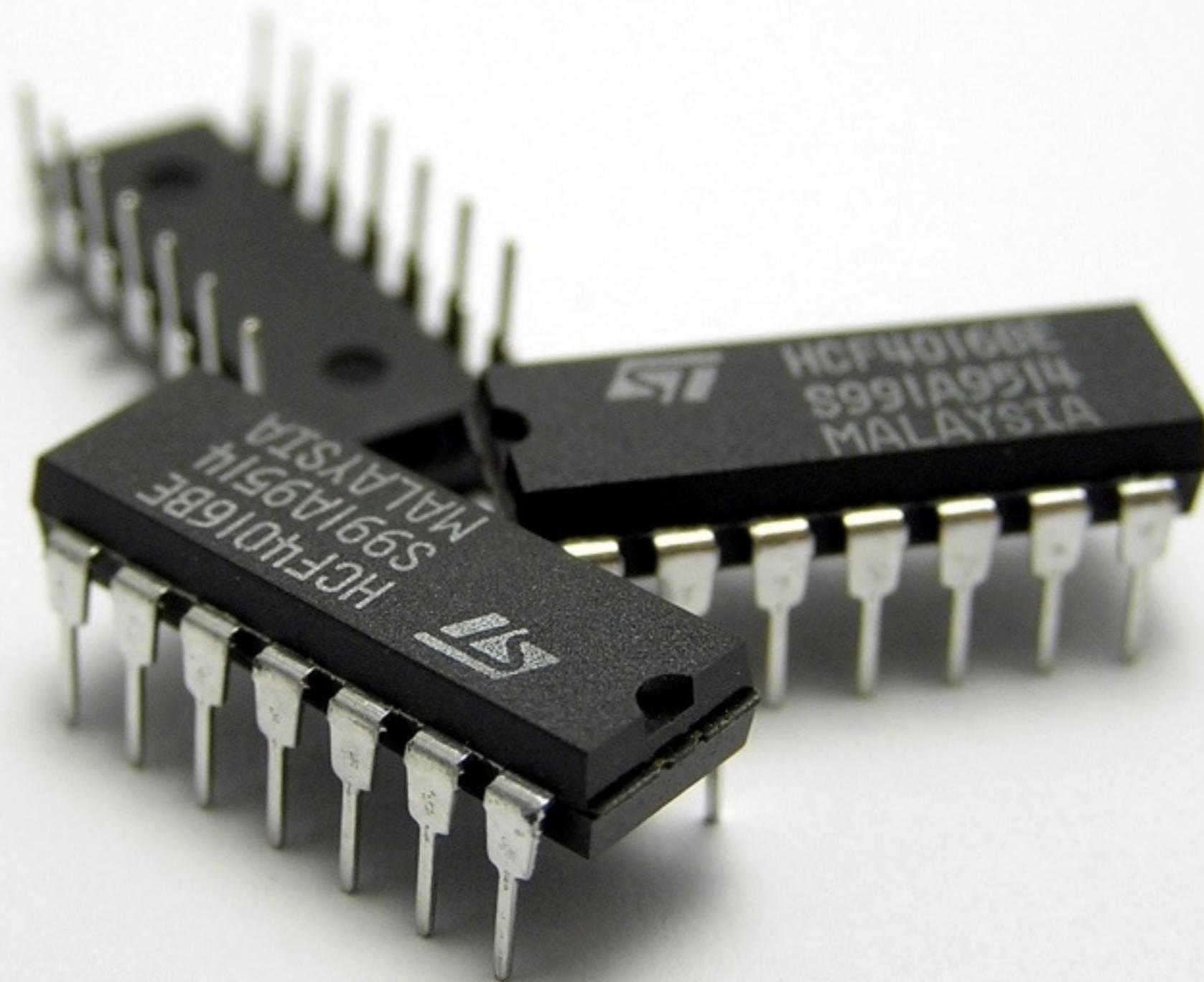


EDSAC computer (1949)

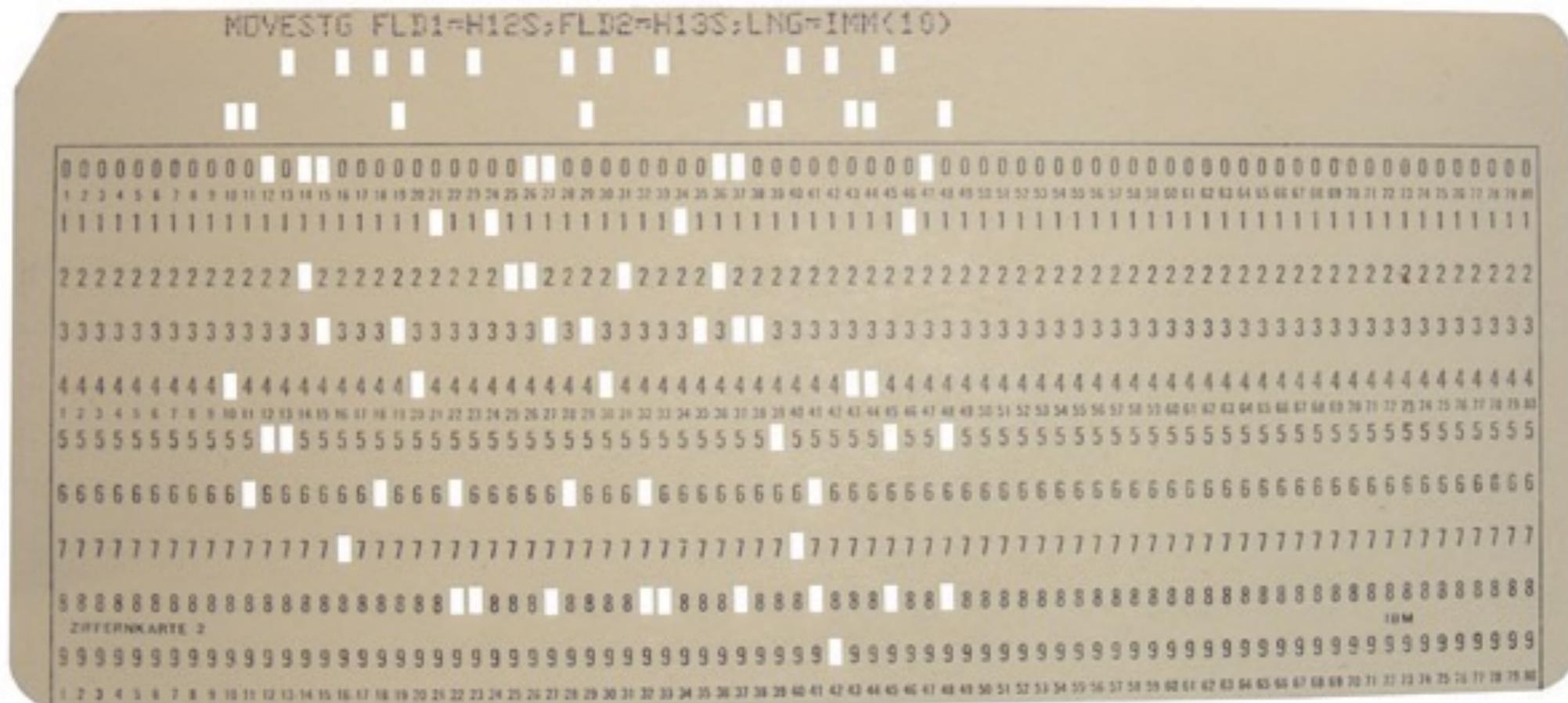
<http://www.xgn.nl/images/upload/20080908172430.jpg>

"I think there is a world market for maybe five computers."

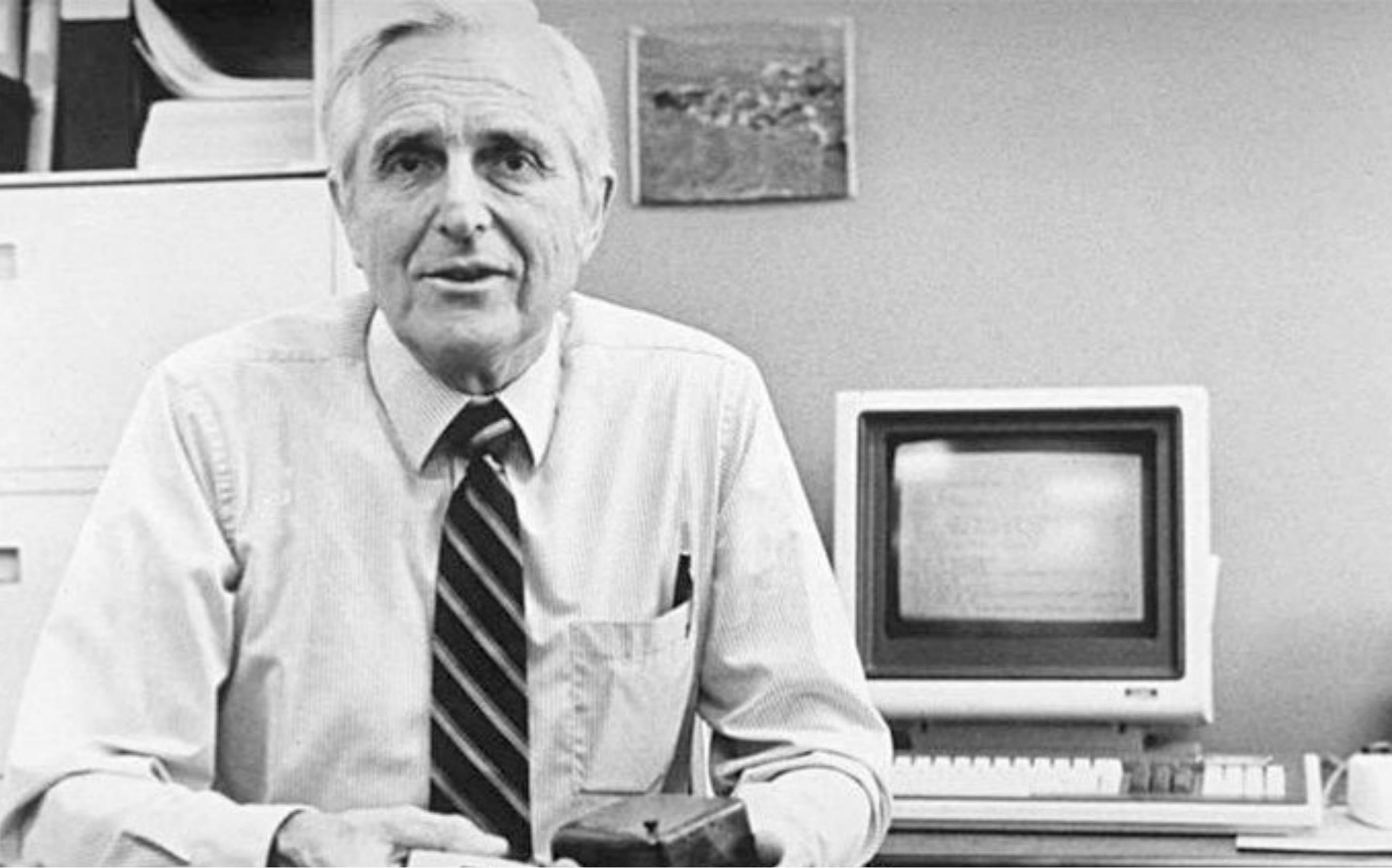
**Thomas Watson,
chairman of IBM, 1943**



Mid sized ICs



Punch Card



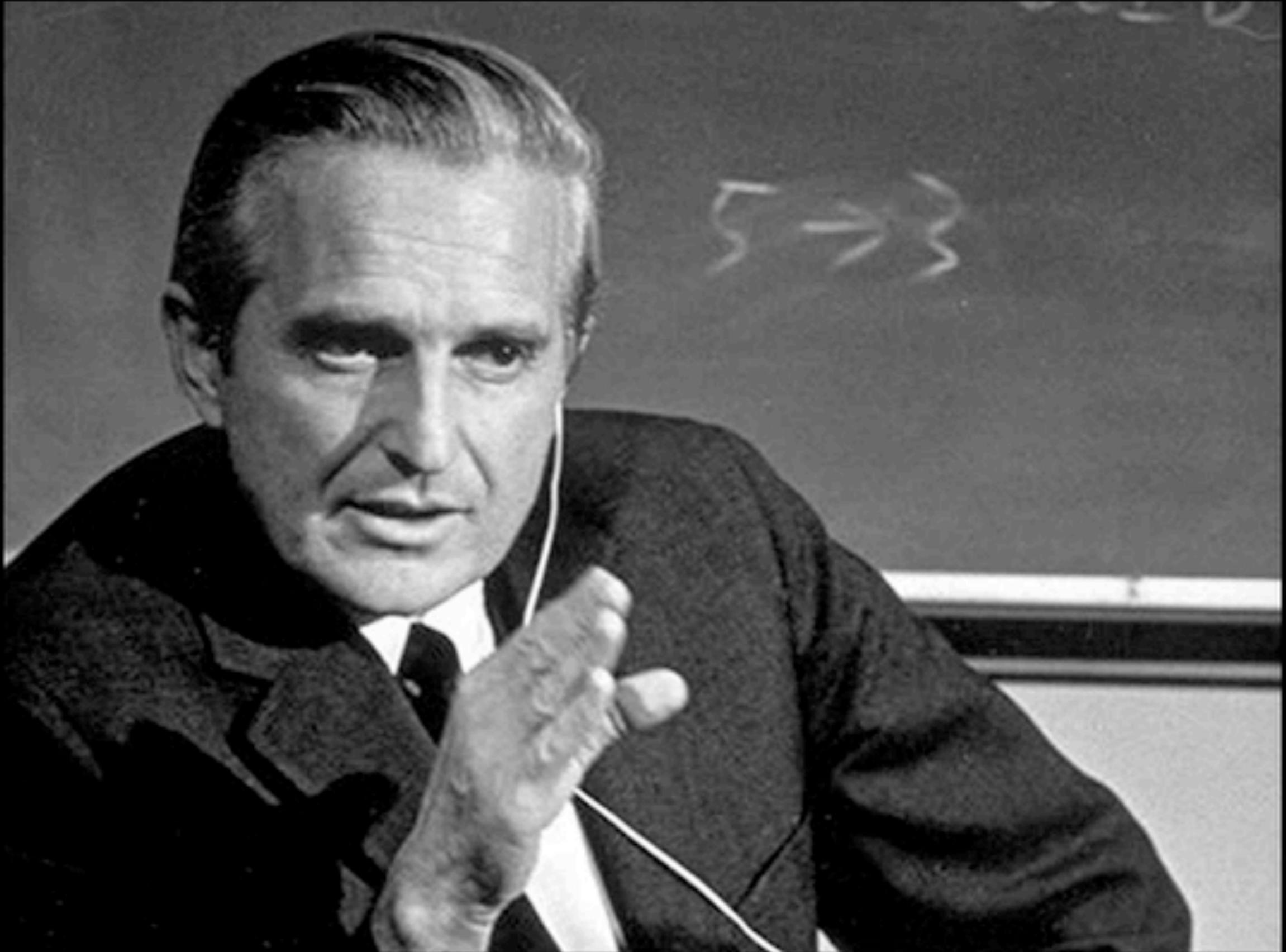
Douglas Engelbart

<http://www.corporationtocommunity.com/wp-content/uploads/2011/02/engelbart.jpg>

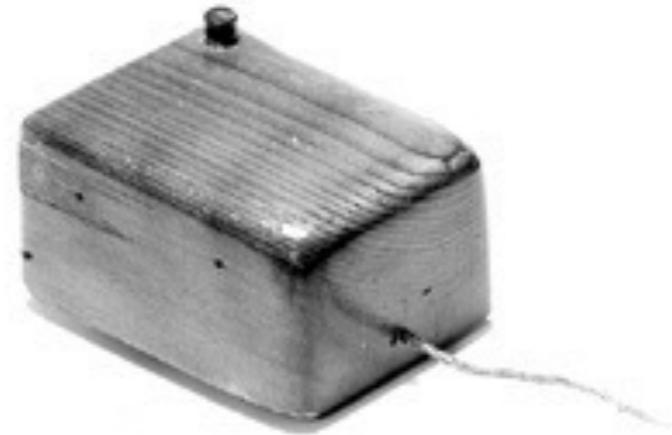
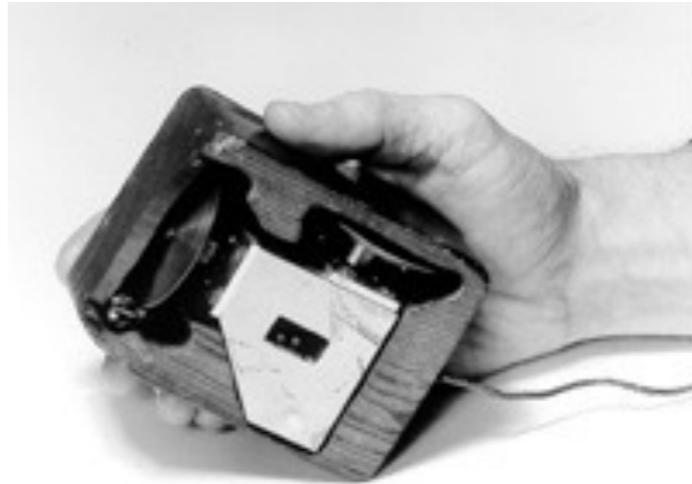
“When you were interacting considerably with the screen, you needed some sort of device to select objects on the screen, to tell the computer that you wanted to do something with them.”

Douglas C. Engelbart, 2003, referring to 1964





Looking back... (Discussion)



Looking back... (Discussion)

-reflection of the process (concept generation)



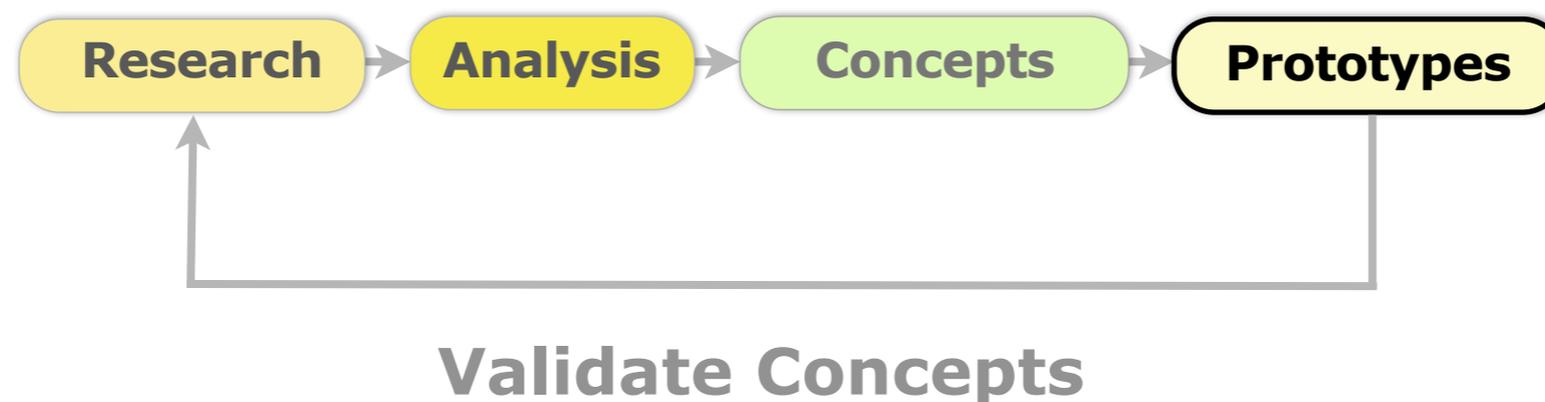
Looking back... (Discussion)

- reflection of the process (concept generation)
- construction of different prototypes (alternative design)



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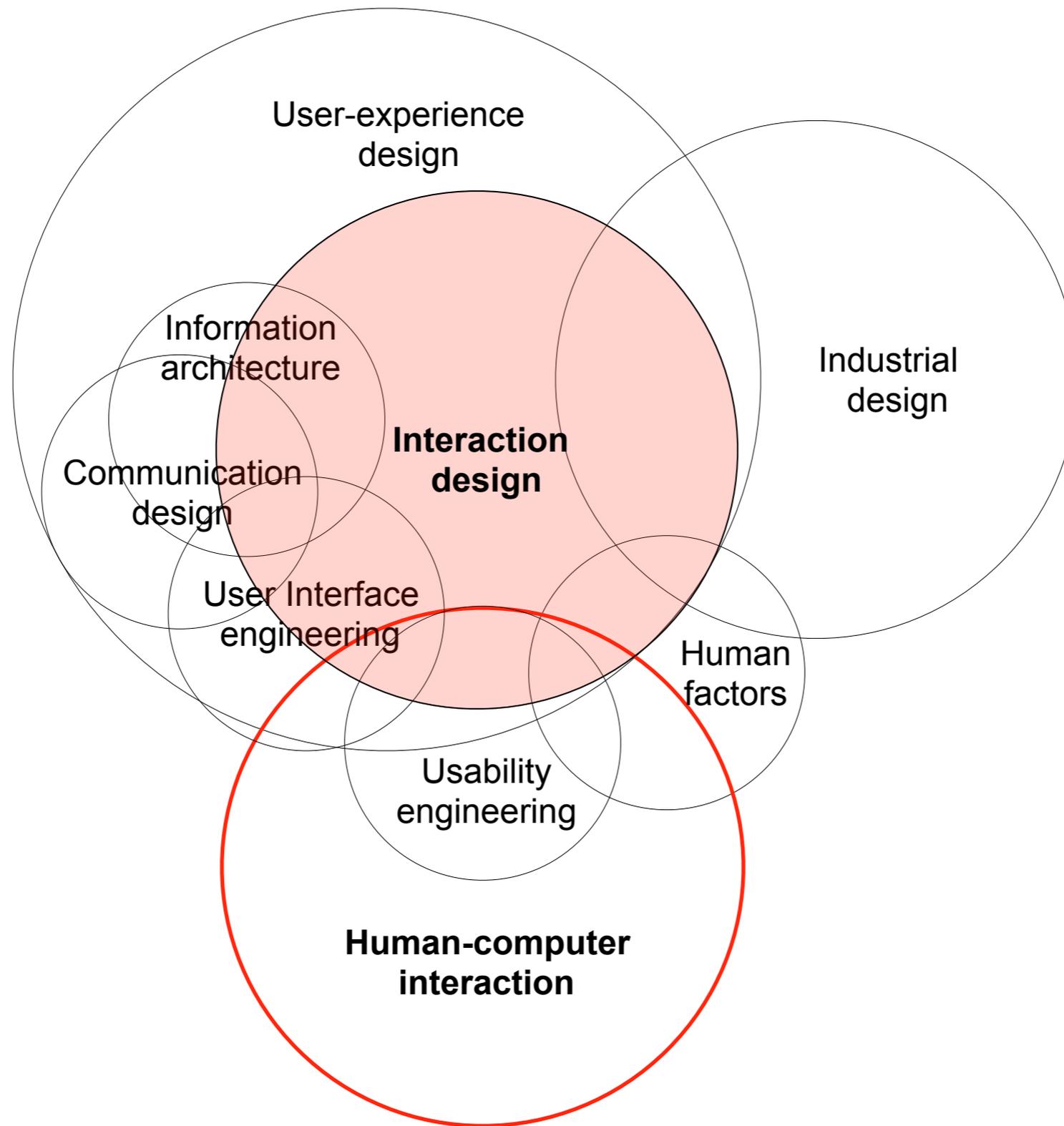
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- construction of different prototypes (alternative design)
- iterative development of prototypes (prototyping and testing)



Looking back... (Discussion)

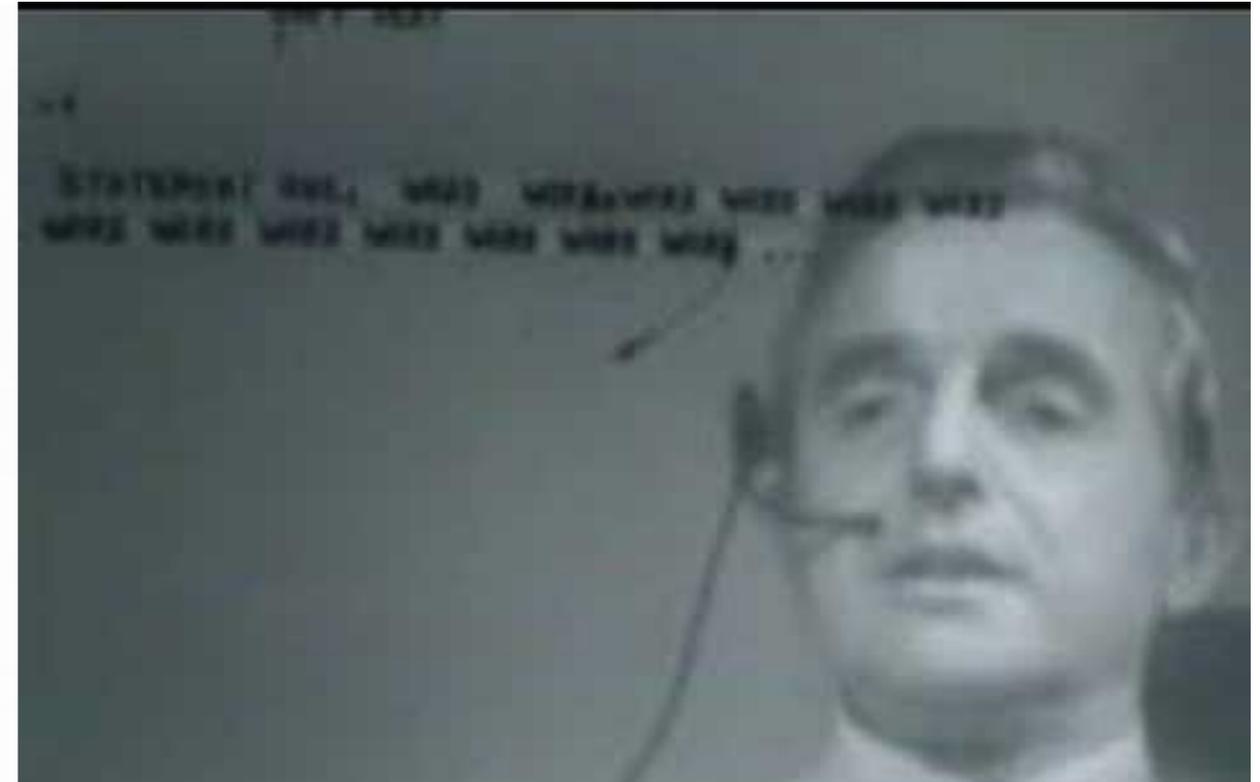
- reflection of the process (concept generation)
- construction of different prototypes (alternative design)
- iterative development of prototypes (prototyping and testing)
- tests with users to validate the approach and make decisions (usability testing)







<http://images.gizmag.com/inline/engelbart-arc-10.jpg>



<http://img.youtube.com/vi/JfIgzSoTMOs/0.jpg>



http://www.w2vr.com/timeline/15_Engelbart_demo1.jpg



http://www.mprove.de/diplom/_media/fig3.2_NLSWorkstation.jpg

Douglas C. Engelbart : **Augmenting human
intellect: A Conceptual Framework**
Stanford Research Institute (SRI), 1962.

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3. Methodology—the methods, procedures, and strategies with which an individual organises his goal-centered (problem-solving) activity.

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4. Training—the conditioning needed by the individual to bring his skills in using augmentation means 1, 2, and 3 to the point where they are operationally effective.

The system we wish to improve can thus be visualised as comprising a trained human being, together with his artefacts, language, and methodology.

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History

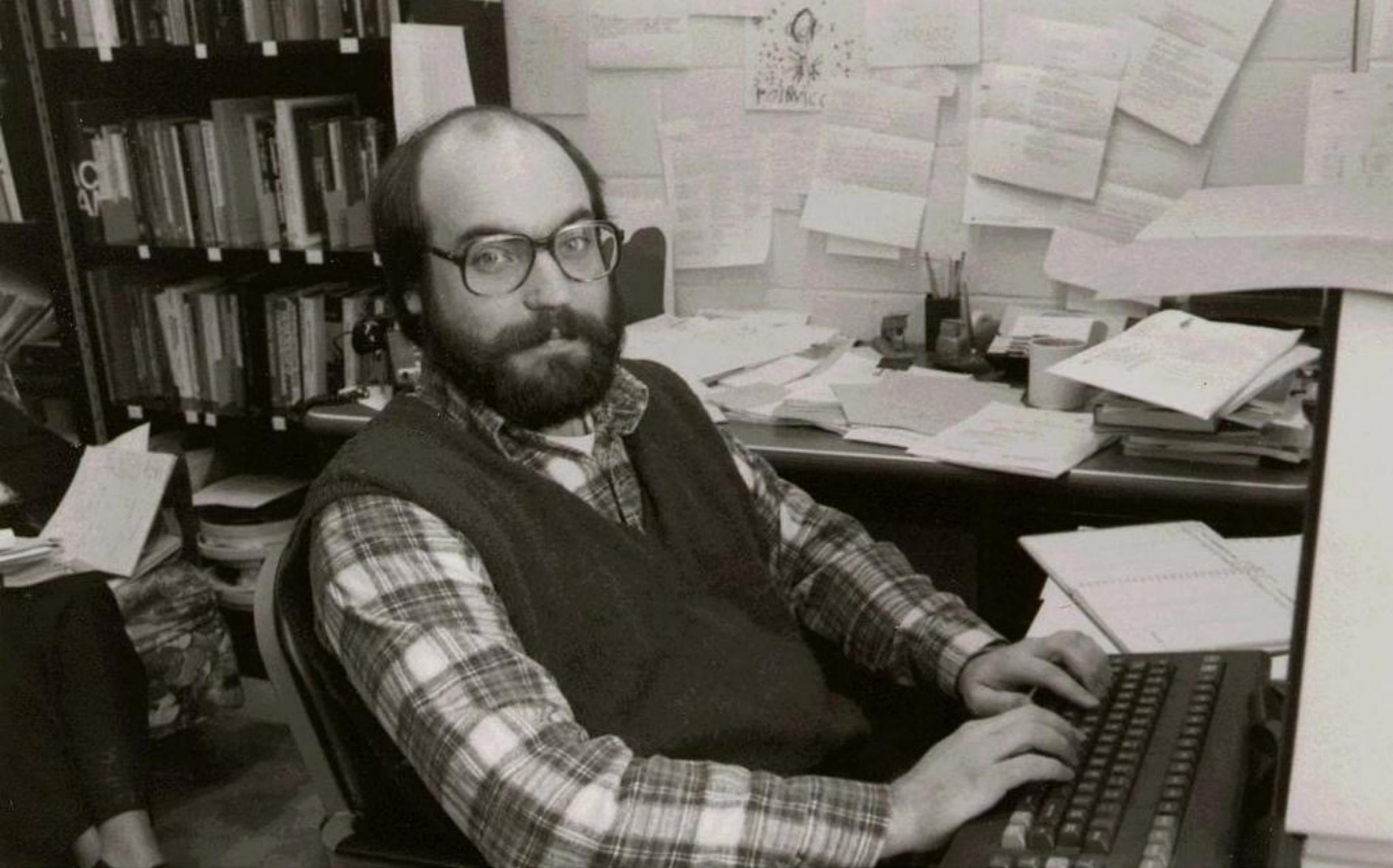
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founded 1970 by Xerox



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Marc Weiser

http://www.cs.umd.edu/projects/photohistory/facultypictures_full/weiser.jpg

The Computer for the 21st Century

Specialized elements of hardware and software, connected by wires, radio waves and infrared, will be so ubiquitous that no one will notice their presence

by Mark Weiser

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

Consider writing, perhaps the first information technology. The ability to represent spoken language symbolically for long-term storage freed information from the limits of individual memory. Today this technology is ubiquitous in industrialized countries. Not only do books, magazines and newspapers convey written information, but so do street signs, billboards, shop signs and even graffiti. Candy wrappers are covered in writing. The constant background presence of these products of "literacy technology" does not require active attention, but the information to be transmitted is ready for use at a glance. It is difficult to imagine modern life otherwise.

Silicon-based information technology, in contrast, is far from having become part of the environment. More than 50 million personal computers have been sold, and the computer nonetheless remains largely in a world of its own. It

is approachable only through complex jargon that has nothing to do with the tasks for which people use computers. The state of the art is perhaps analogous to the period when scribes had to know as much about making ink or baking clay as they did about writing.

The arcane aura that surrounds personal computers is not just a "user interface" problem. My colleagues and I at the Xerox Palo Alto Research Center think that the idea of a "personal" computer itself is misplaced and that the vision of laptop machines, dynabooks and "knowledge navigators" is only a transitional step toward achieving the real potential of information technology. Such machines cannot truly make computing an integral, invisible part of people's lives. We are therefore trying to conceive a new way of thinking about computers, one that takes into account the human world and allows the computers themselves to vanish into the background.

Such a disappearance is a fundamental consequence not of technology but of human psychology. Whenever people learn something sufficiently well, they cease to be aware of it. When you look at a street sign, for example, you absorb its information without consciously performing the act of reading. Computer scientist, economist and Nobelist Herbert A. Simon calls this phenomenon "compiling"; philosopher Michael Polanyi calls it the "tacit dimension"; psychologist J. J. Gibson calls it "visual invariants"; philosophers Hans Georg Gadamer and Martin Heidegger call it the "horizon" and the "ready-to-hand"; John Seely Brown of PARC calls it the "periphery." All say, in essence, that only when things disappear in this way are we freed to use them without thinking and so to focus beyond them on new goals.

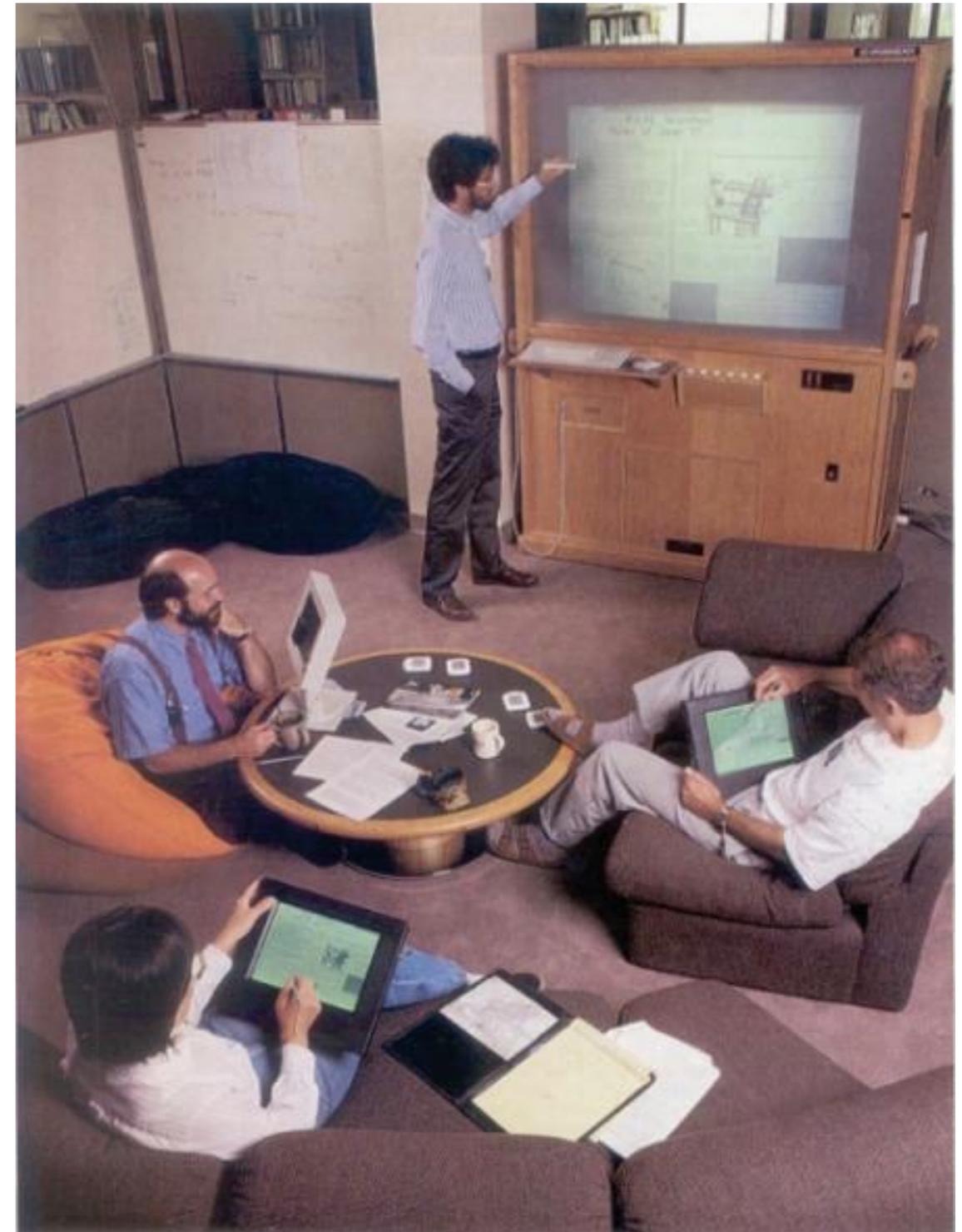
The idea of integrating computers seamlessly into the world at large runs counter to a number of present-day trends. "Ubiquitous computing" in this context does not mean just computers that can be carried to the beach, jungle or airport. Even the most powerful notebook computer, with access to a worldwide information network, still focuses attention on a single box. By analogy with writing, carrying a superlaptop is like owning just one very important book. Customizing this book, even writing millions of other books, does not begin to capture the real power of literacy.

Furthermore, although ubiquitous computers may use sound and video in addition to text and graphics, that does not make them "multimedia computers." Today's multimedia machine makes the computer screen into a demanding focus of attention rather than allowing it to fade into the background.

Perhaps most diametrically opposed to our vision is the notion of virtual reality, which attempts to make a world inside the computer. Users don special goggles that project an artificial scene onto their eyes; they wear gloves or even bodysuits that sense their motions and gestures so that they can move about and manipulate virtual objects. Although it may have its purpose in allowing people to explore realms otherwise inaccessible—the insides of cells, the surfaces of distant planets, the information web of data bases—virtual reality is only a map, not a territory. It excludes desks, offices, other people not wearing goggles and bodysuits, weather, trees, walks, chance encounters and, in general, the infinite richness of the universe. Virtual reality focuses an enormous apparatus on simulating the world rather than on invisibly enhancing the world that already exists. Indeed, the opposition between the

MARK WEISER is head of the Computer Science Laboratory at the Xerox Palo Alto Research Center. He is working on the next revolution of computing after workstations, variously known as ubiquitous computing or embodied virtuality. Before working at PARC, he was a professor of computer science at the University of Maryland; he received his Ph.D. from the University of Michigan in 1979. Weiser also helped found an electronic publishing company and a video arts company and claims to enjoy computer programming "for the fun of it." His most recent technical work involved the implementation of new theories of automatic computer memory reclamation, known in the field as garbage collection.

94 SCIENTIFIC AMERICAN September 1991



<https://www.ics.uci.edu/~corps/phaseii/Weiser-Computer21stCentury-SciAm.pdf>

The Computer for the 21st Century, 1991

<http://www.pmstudio.co.uk/pmstudio/sites/default/files/images/ubicomp1991.jpg>

Stu Card

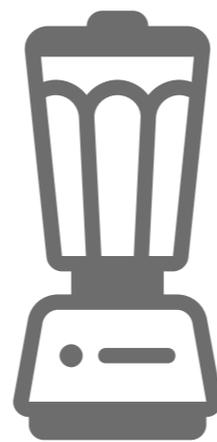
- joined Xerox Palo Alto Research Center (PARC) in 1974
- aimed at perfecting scientific methods to integrate with creative design
- developed a process to predict the behavior of a proposed design, using task analysis, approximation, and calculation
- proposed a partnership between designers and scientists, by providing a science that supports design.





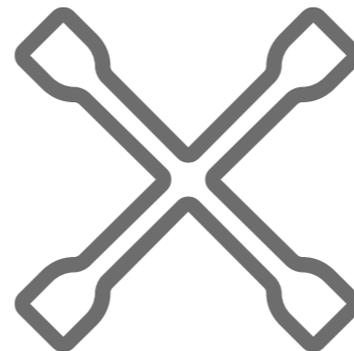
Looking back...

-exploration of the design space through the integration of industrial design



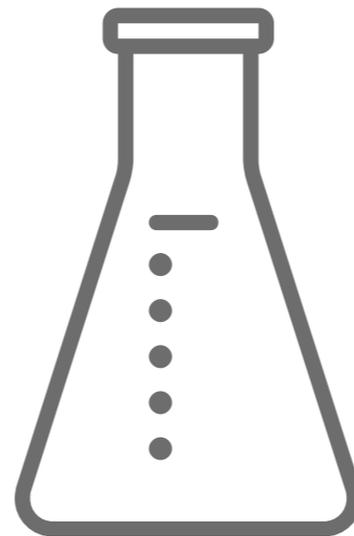
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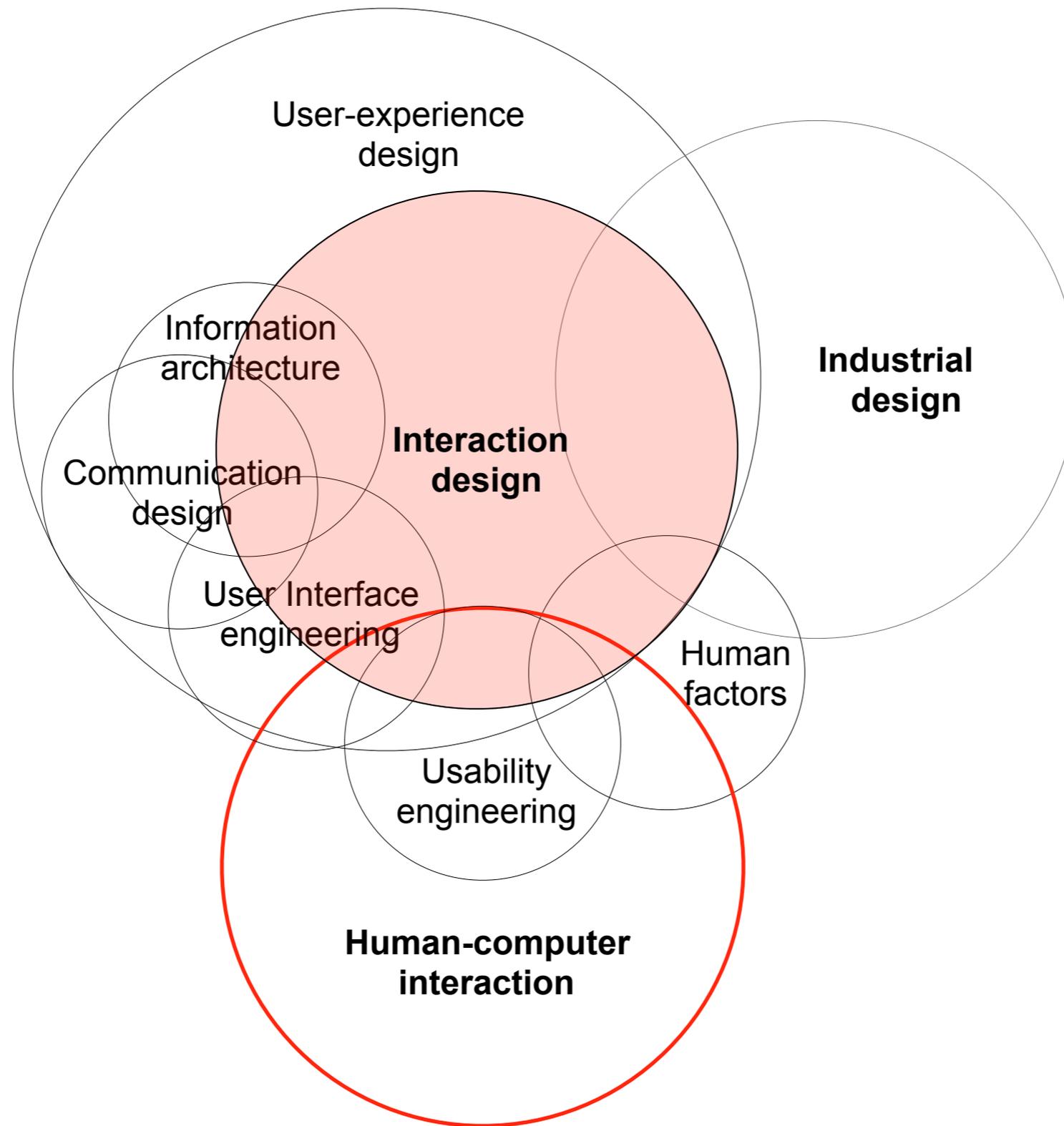
- exploration of the design space through the integration of industrial design
- designers and engineers had to work together (interdisciplinary approach)

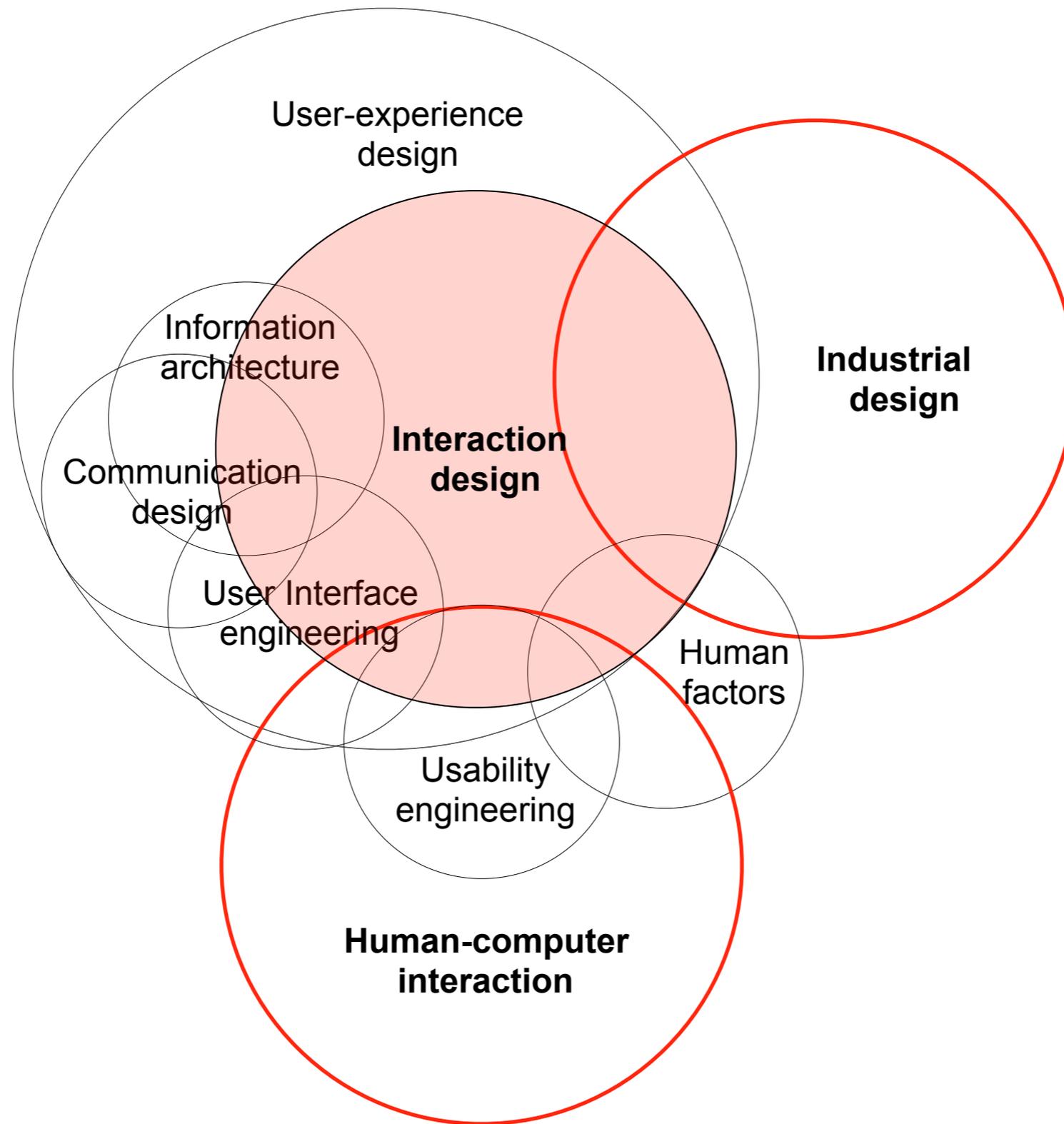


Looking back...

- exploration of the design space through the integration of industrial design
- designers and engineers had to work together (interdisciplinary approach)
- science served to constrain the design space

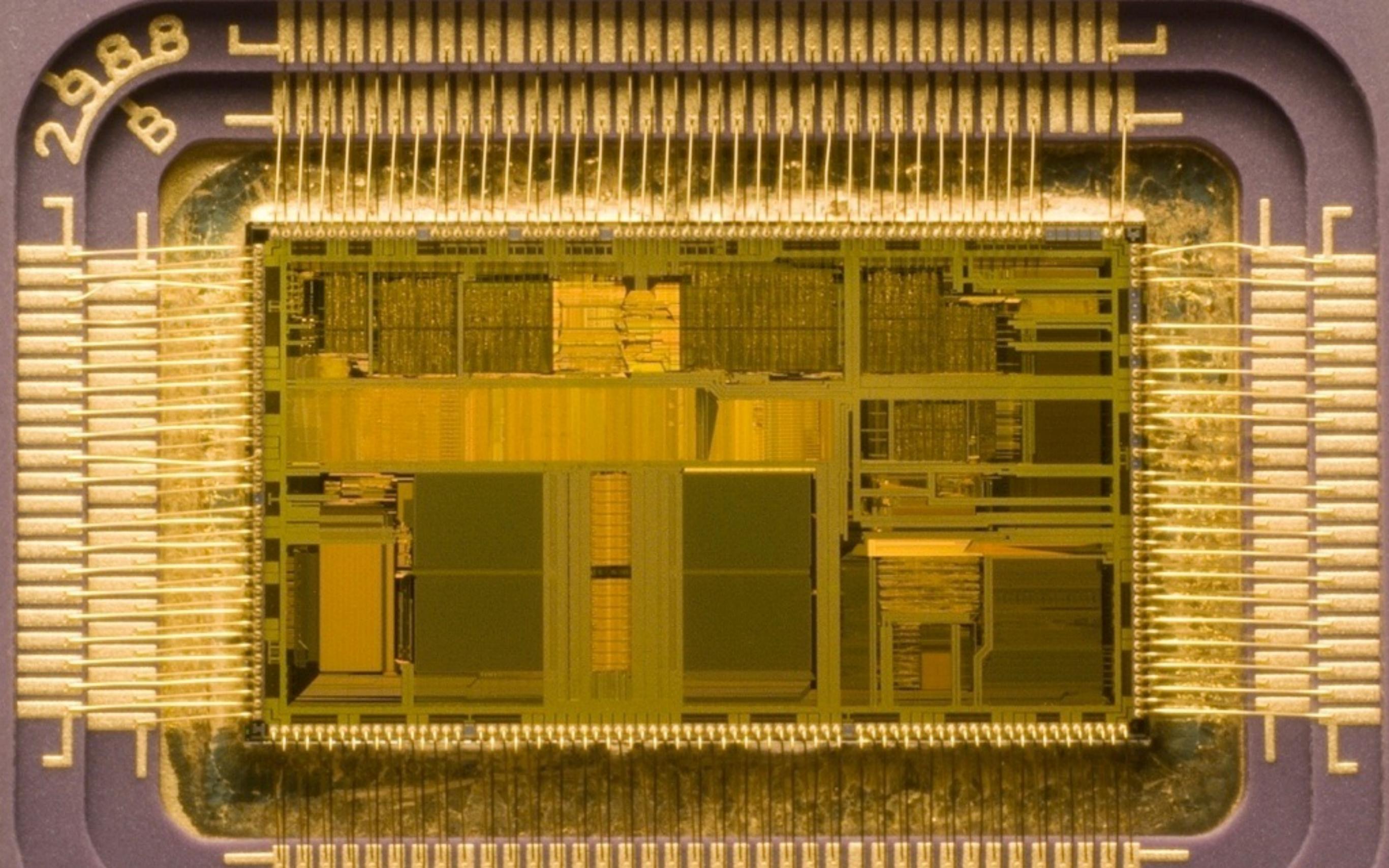






History

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Microprocessor early 1970s

img src: wikimedia creative commons

Tim Mott

- collaborated remotely with Xerox Palo Alto Research Center (PARC) and Larry Tesler
- worked on a new publishing system that included a “desktop metaphor”
- invented a “user centred design process” with Larry Tesler
- later co founded Electronic Arts (EA)



Indent for paragraph

The injured were taken to MeritCare Hospital,

Begin new paragraph

where they were treated. According to Sheriff

Eliminate paragraph

Larry Costello, none were seriously hurt.

Transpose (letters, words)

The driver of the southbound vehicle
the spokesperson MeritCare said

Use figures (or words)

about seventeen workers attended 7 sessions

Spell out (or abbrev.)

the delegate from N.D. came to Moorhead, Minn.

Uppercase

major ed in english literature at Msum

Lowercase

Bachelor's Degree in Mass Communications

Remove space

extra effort will be required

Insert space

according to sources close to the president

Retain original

will be completed in ~~early~~ January

Delete

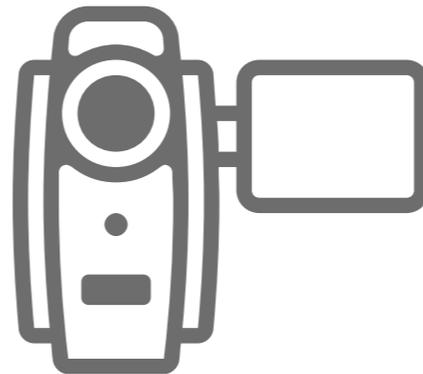
the ~~very~~ exciting climax of the film

Insert word

the exciting climax of the ~~film~~ winning

Looking back...

-spending time to understand users (design research)



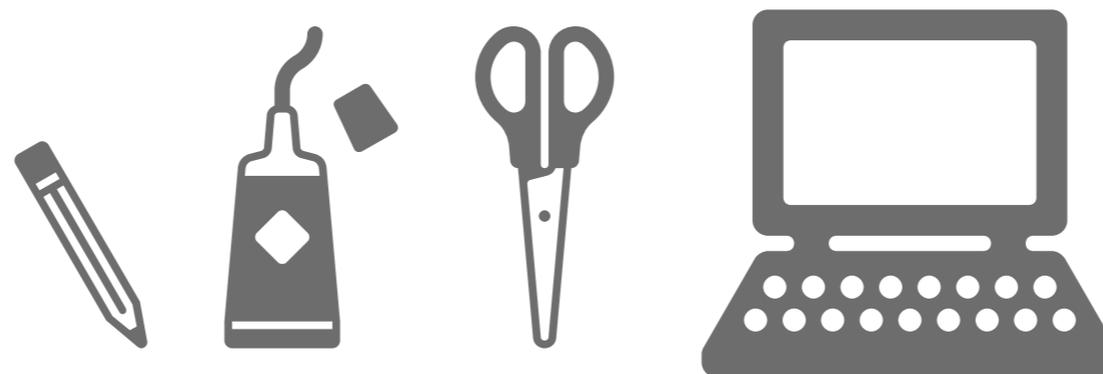
Looking back...

- spending time to understand users (design research)
- designing by involving the users of the system (participatory design techniques)



Looking back...

- spending time to understand users (design research)
- designing by involving the users of the system (participatory design techniques)
- prototyping parts of the system with non functional elements (wizard-of-oz prototyping)



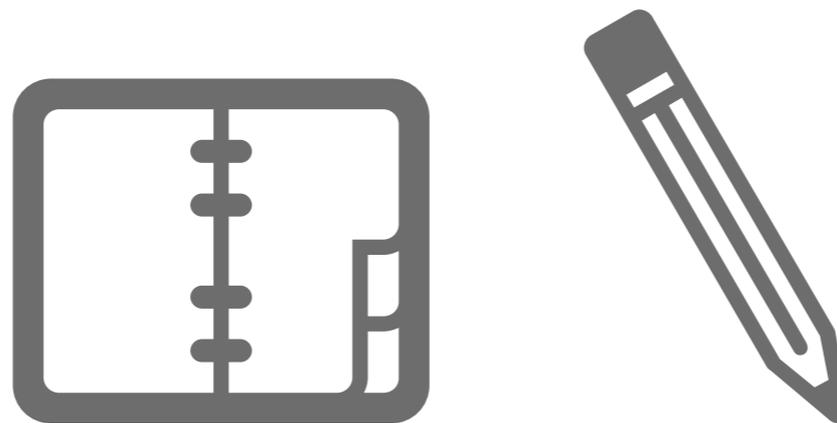
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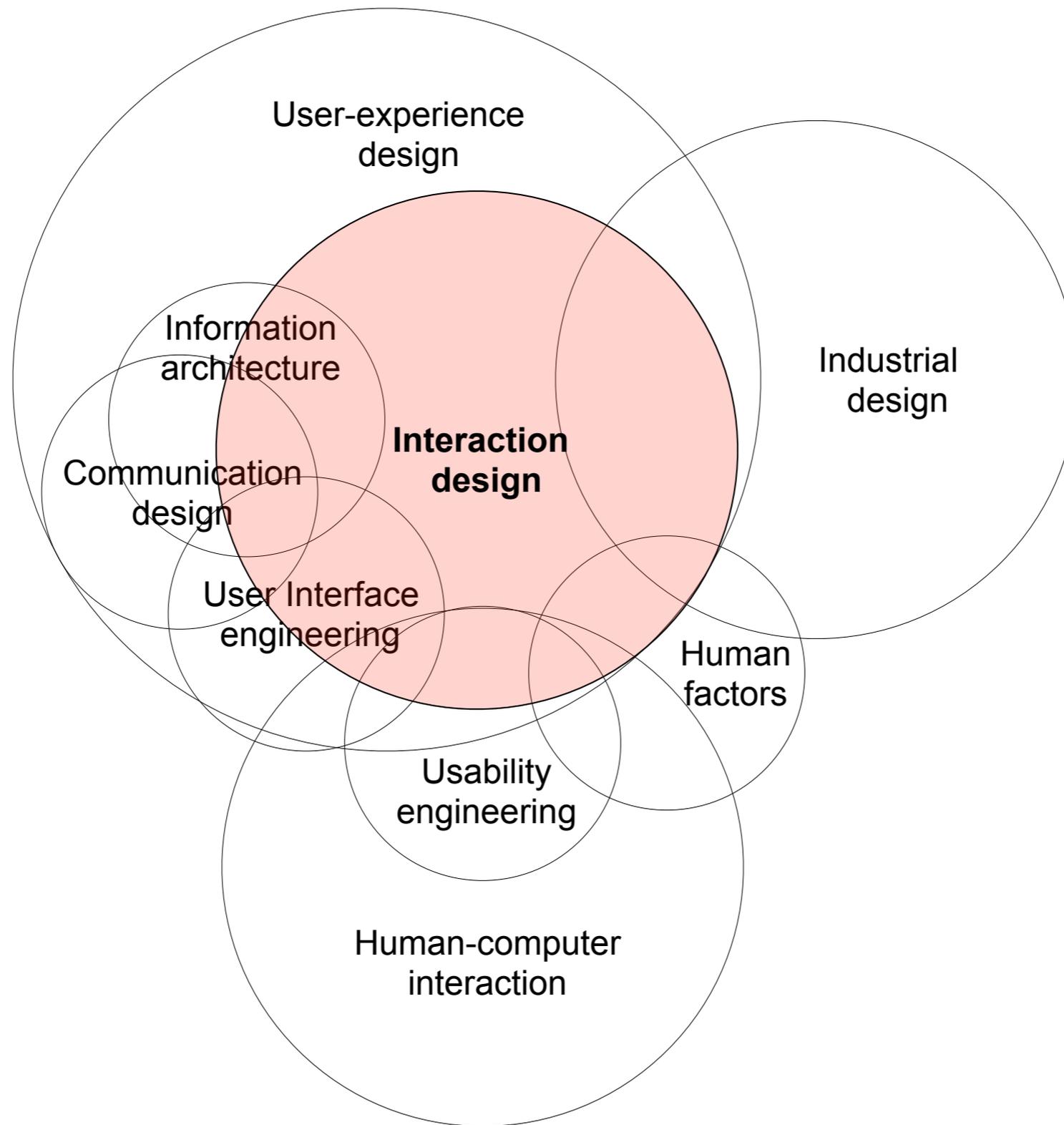
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- designing by involving the users of the system (participatory design techniques)
- prototyping parts of the system with non functional elements (wizard-of-oz prototyping)
- asking users to “walk” them through the system (think aloud method)

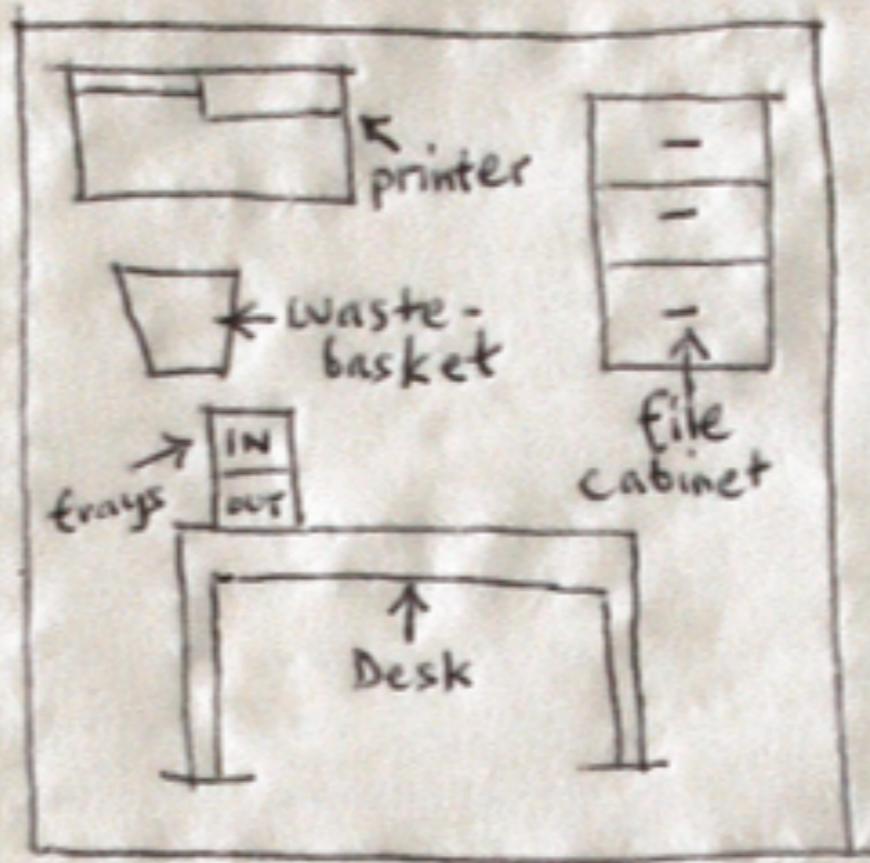


Looking back...

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- prototyping parts of the system with non functional elements (wizard-of-oz prototyping)
- asking users to “walk” them through the system (think aloud method)
- designing the system using mental models user could refer to (metaphors+scenarios)







Office Schematic

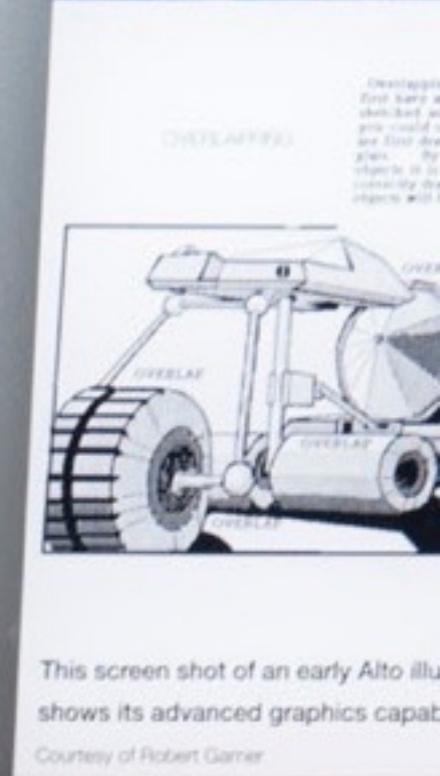


PRINT, FILE, DELETE, MAIL

all are inter-doc

Office Schematic / Desktop Metaphor

Xerox Alto 1973



This screen shot of an early Alto illustrates its advanced graphics capabilities. Courtesy of Robert Garner

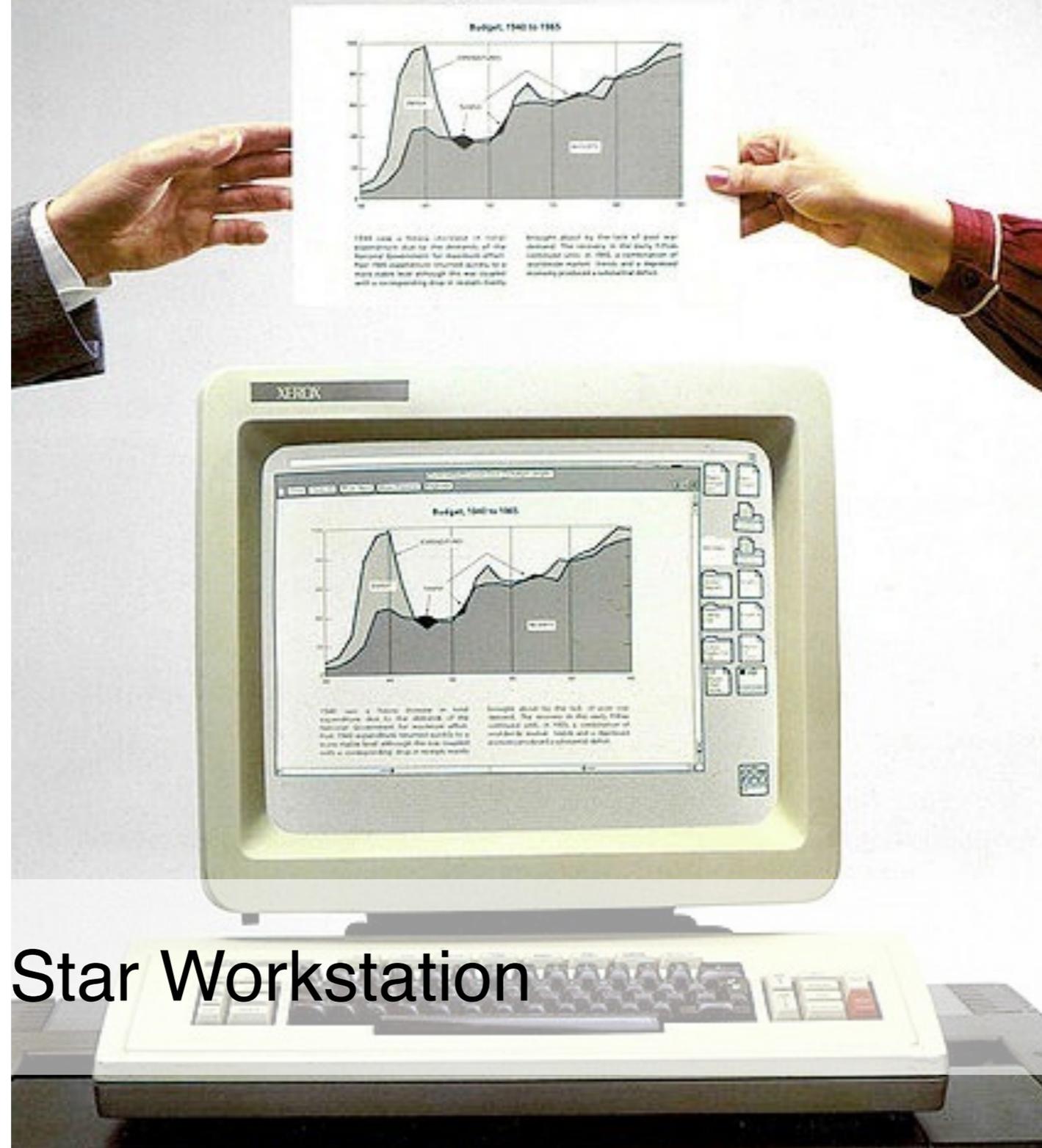
The Xerox Alto boasted the world's first "what you get" (WYSIWYG) editor, mouse, graphical user interface (GUI) and bit-mapped display. Its pop-up menu became the model for the Microsoft® Windows and Apple® Macintosh® interfaces of today. From the collection of The Computer Museum History Center

"There is no reason anyone would want a computer in their home."

**Ken Olson,
president, chairman and founder of DEC, 1977**



Now you can create
documents with words
and pictures



1981 Xerox Star Workstation



Year	Non-MSIS	MSIS
1978	95.2	15.8
1980	41.1	58.9
1983	45	55
1984	30	70
1986	10	90
1988	5	95

Table 1: Percentages of use of methods.

Activity under the old and the new

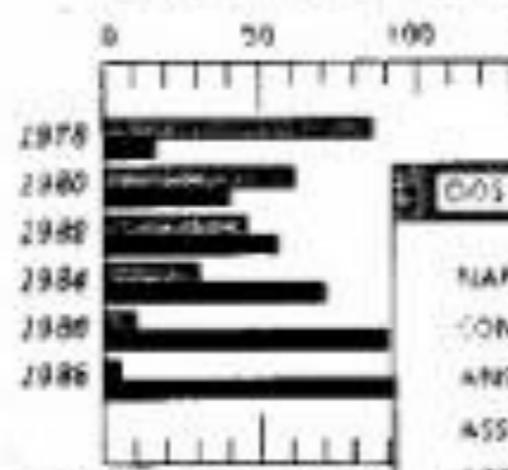


Figure 1: Data from Table 1 drive

$$Workstation usage percentage = \frac{\sum_{i=1}^n \sum_{j=1}^m A_{ij}}{\sum_{i=1}^n \sum_{j=1}^m A_{ij} + \sum_{i=1}^n \sum_{j=1}^m B_{ij}}$$

Workstation usage percentages Table 1 and illustrated in Figure 1. 6085 users are likely to do no composition and layout, create process including printing and di

NAME	EXTENSION	SIZE	DATE
COMMAND	COM	22677	15-11
AND	SYS	2596	18-11
ASSIGN	COM	964	28-11
ATTRIB	EXE	15091	14-11
BACKUP	COM	17024	20-11
CHKDSK	COM	4435	14-11
CHMOD	COM	6528	27-11
COMP	COM	3818	10-11
DEBUG	EXE	15264	15-11

Text and Graphics

To replace typesetting, the 6085 offers a choice of type faces and sizes from 6 point to 36 point:

18-point text.
24-point text.
36-point text.

XEROX 6085 Workstation
User-Interface Design

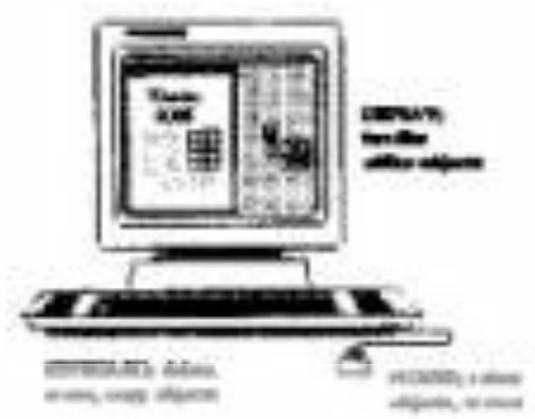
To make it easy to compose text and graphics, to do electronic filing, printing, and mailing all at the same workstation, requires a revolutionary user interface design.

Bit-map display - Each of the pixels on the 19" screen is mapped to a bit in memory; thus, arbitrarily complex images can be displayed. The 6085 displays all text and graphics as they will be printed. In addition, familiar office objects such as documents, folders, file drawers and wastebaskets are portrayed as recognizable images.

The mouse - A unique pointing device that allows the user to quickly select any text, graphic or office object on the display.

See and Point

All functions are visible to the user on the keyboard or on the screen. The user does filing and retrieval by selecting them with the mouse and touching the MOVE, COPY, DELETE or PROPERTIES command keys. Text and graphics are edited with the same keys.



Experience at Xerox with prototype work stations has shown shorter production times and thus lower costs, as a function of the percentage of use of the workstations. The following equation can be used to express this:

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Larry Tesler

- involved users also in the software design process
- joined PARC in 1973
- moved to Apple in 1980
- was the core designer of Apples “Lisa” computer
- invented the “copy and paste” function



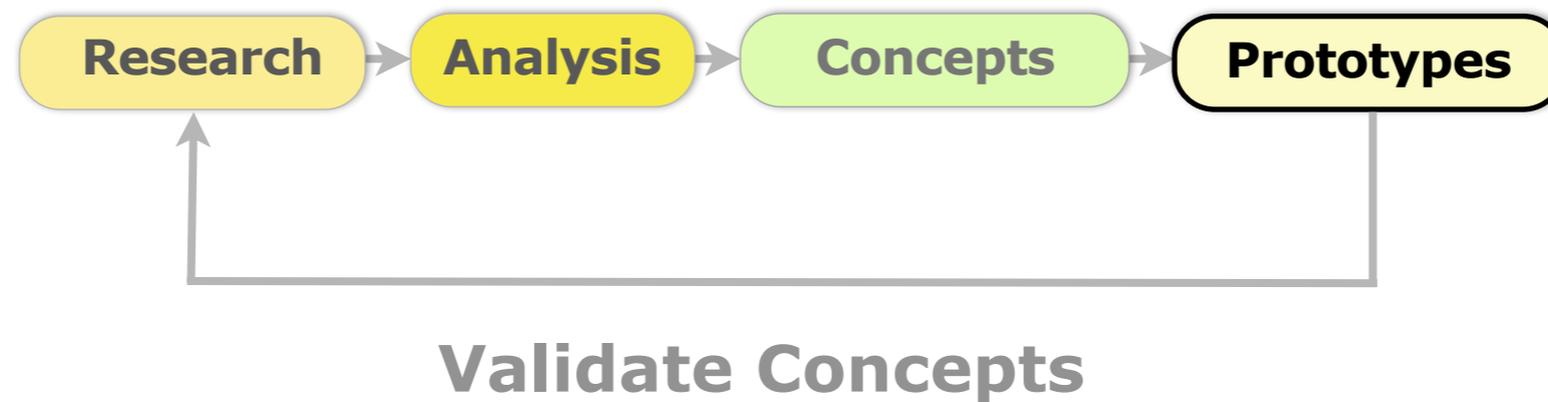
Text Selection

So it became a kind of contest. An unofficial and completely unacknowledged competition to see which of us was the toughest, the coolest, the hardest to get. (He was, but there were times when he didn't know that.) **Who is smarter, you or me?** he asked me again and again: once as he left the apartment in the morning, me wrapped in a towel; once over our whiskies at the King Cole Bar in the St. Regis. And that became the most important question. ▲

EDIT: Copy Insert Delete Search Replace Font Undo

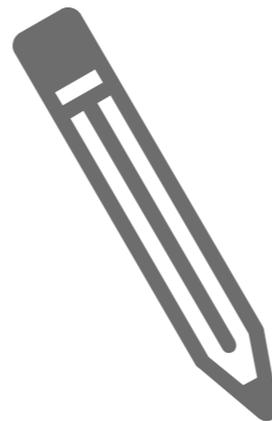
Looking back...

-brainstorming and iterative trying and testing (iterative design process)



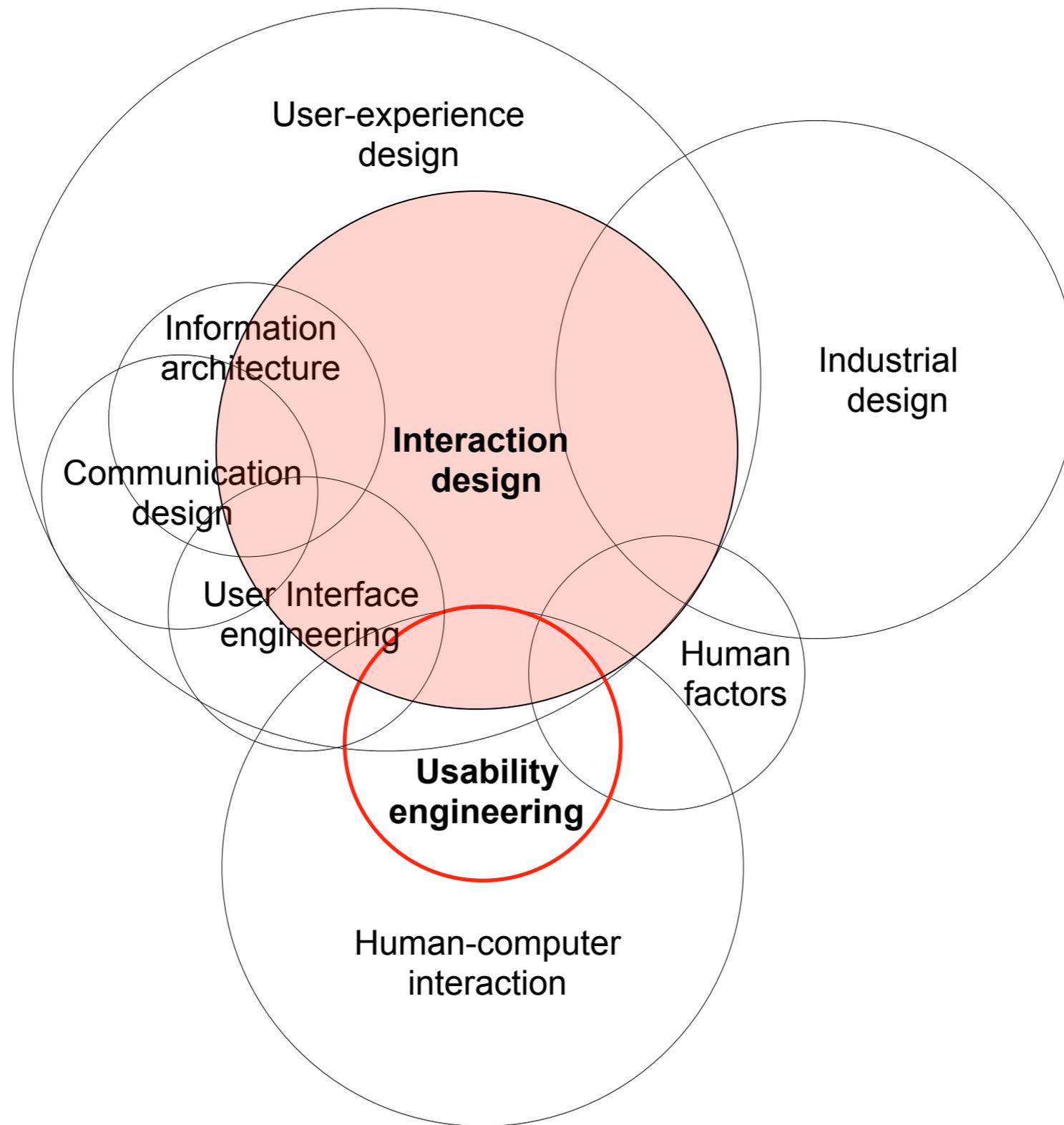
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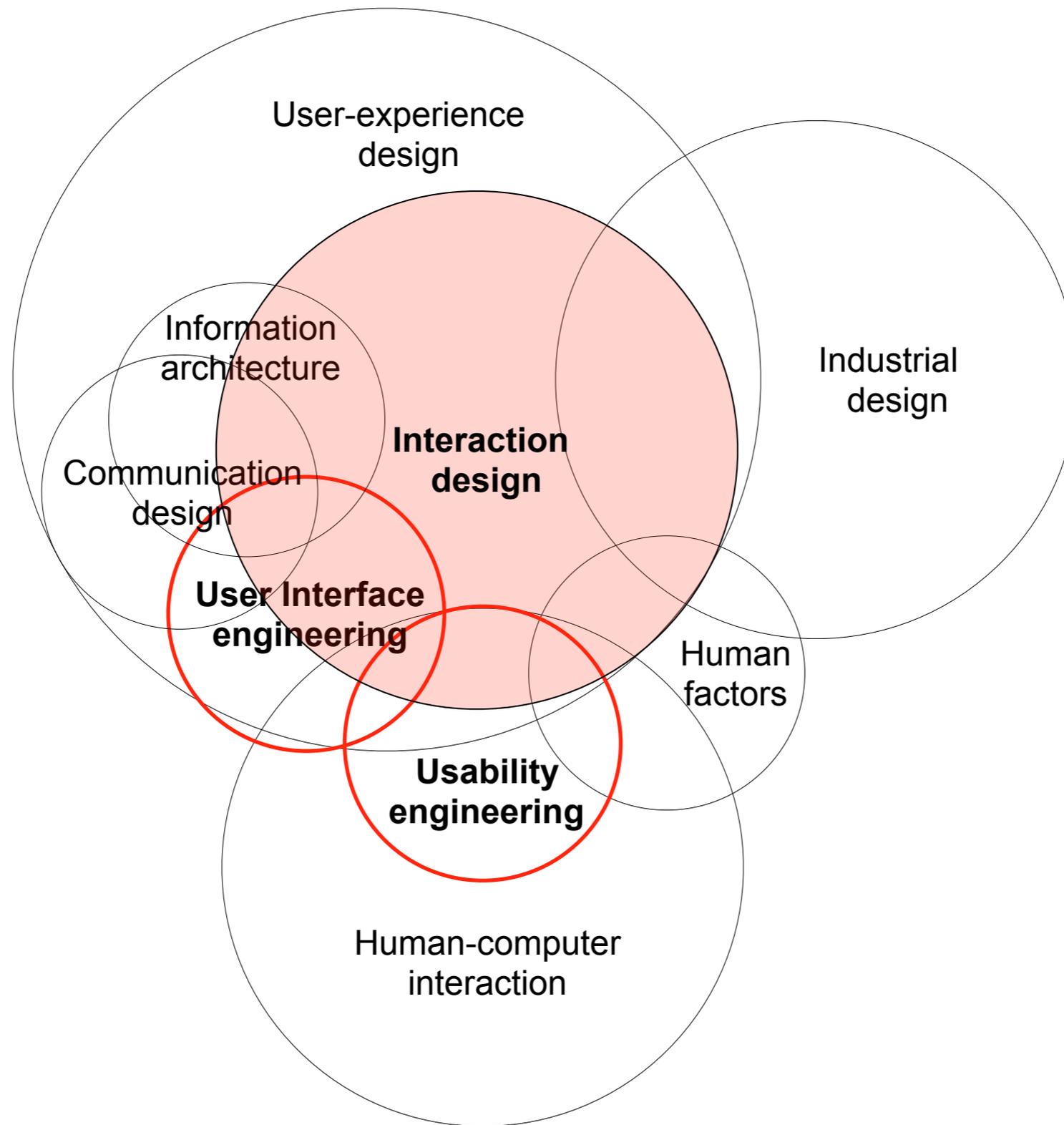
- brainstorming and iterative trying and testing (iterative design process)
- constant, quick and efficient tests with users to improve the system (experience prototyping)

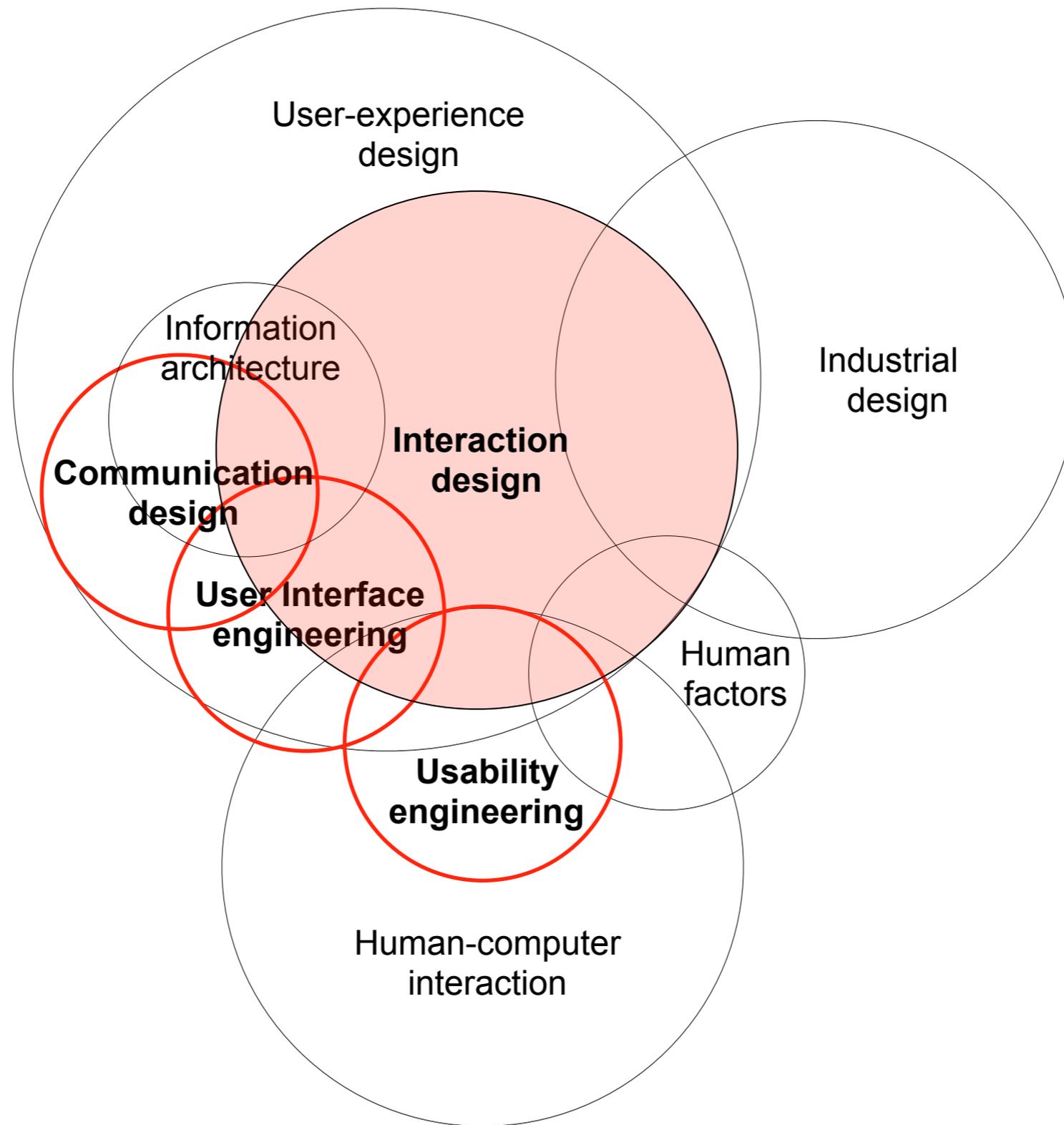


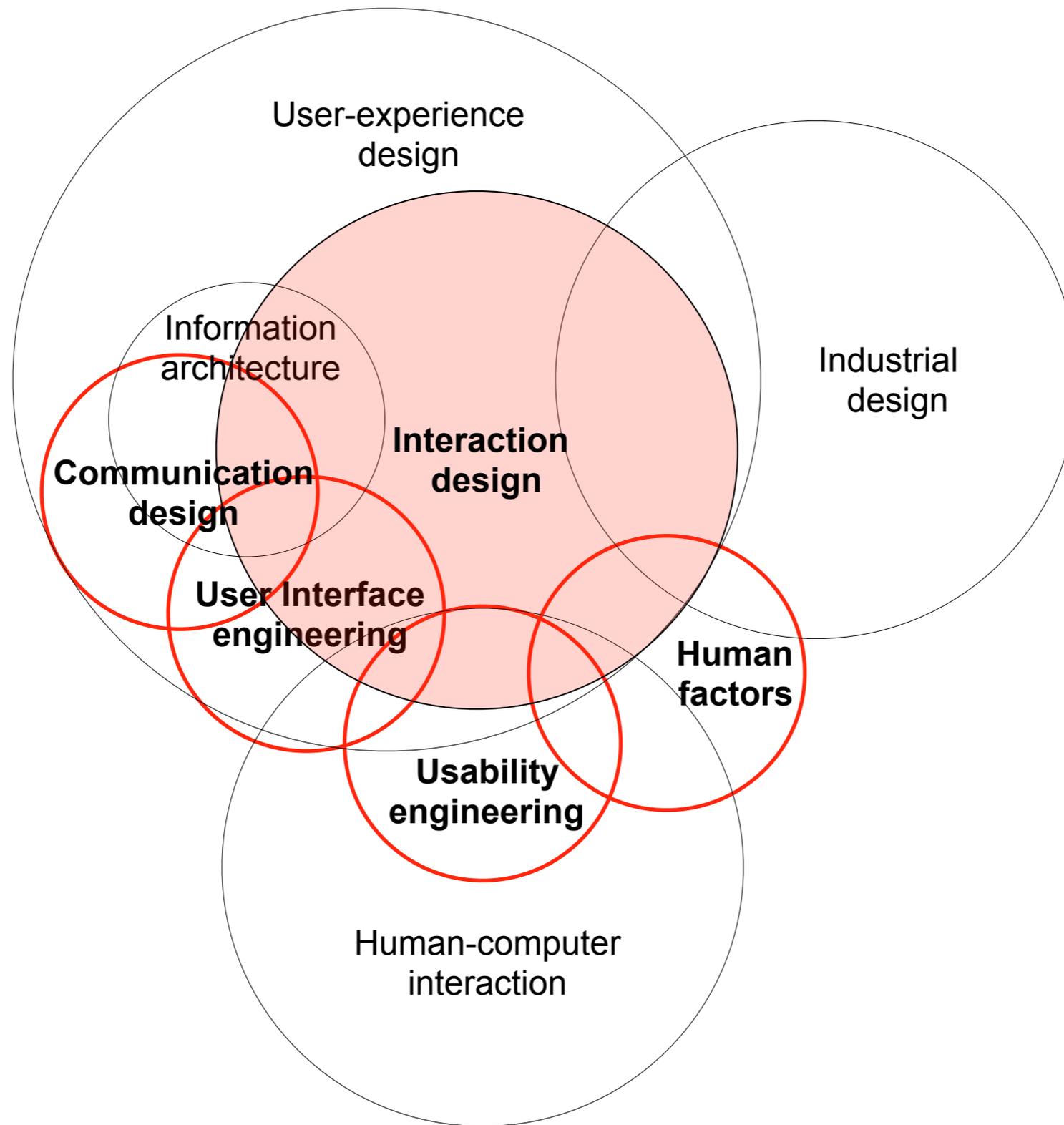
Looking back...

- brainstorming and iterative trying and testing (iterative design process)
- constant, quick and efficient tests with users to improve the system (experience prototyping)
- developing products for the users' core needs (user centred design process)









Bill Atkinson

- was hired by Apple as the “Application Software Department”
- invented the “pull down” menu structure
- was the lead designer of the “Lisa” and the initial “Mac”





Looking back...

-alternative designs in a variety (sketches & prototypes)

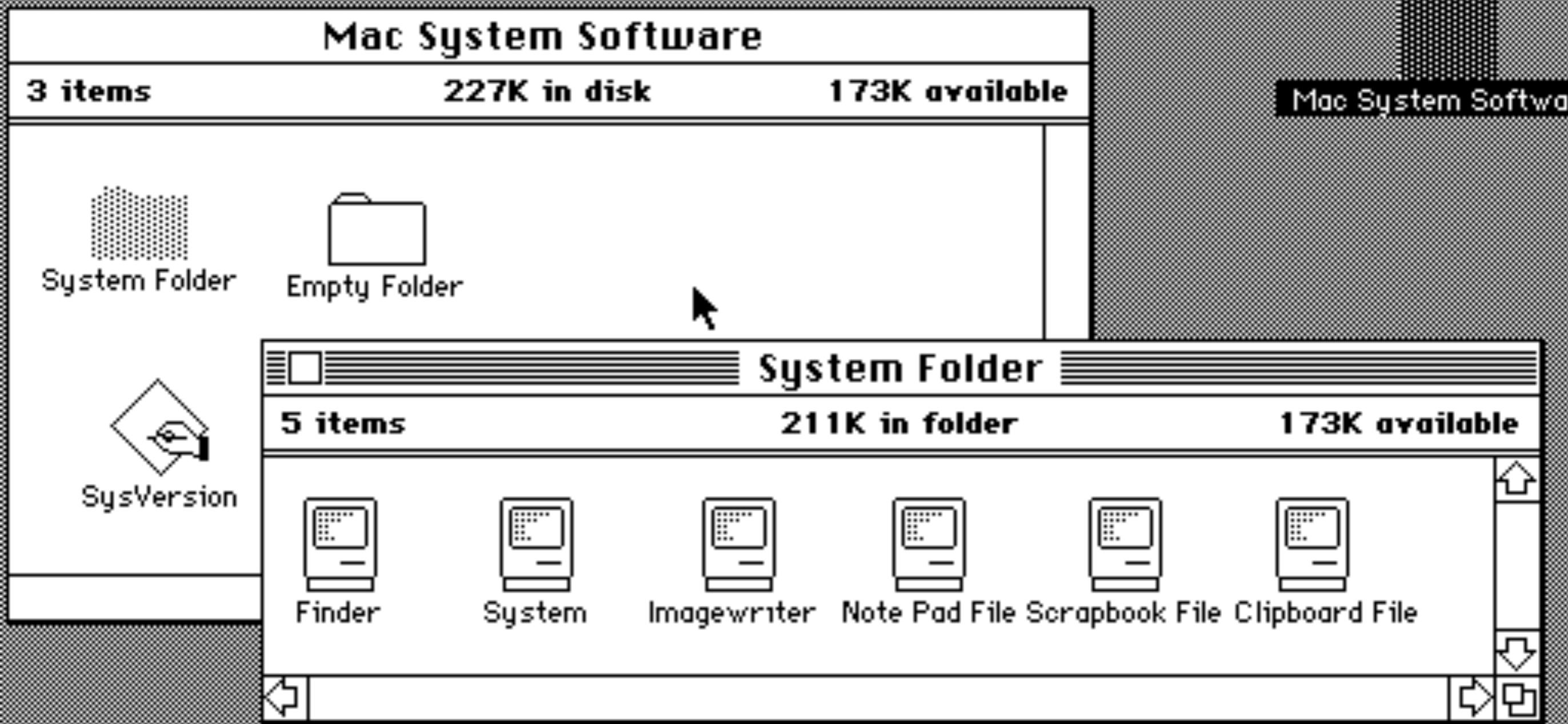
Looking back...

- alternative designs in a variety (sketches & prototypes)
- proposal of a participatory design approach, creating better UIs

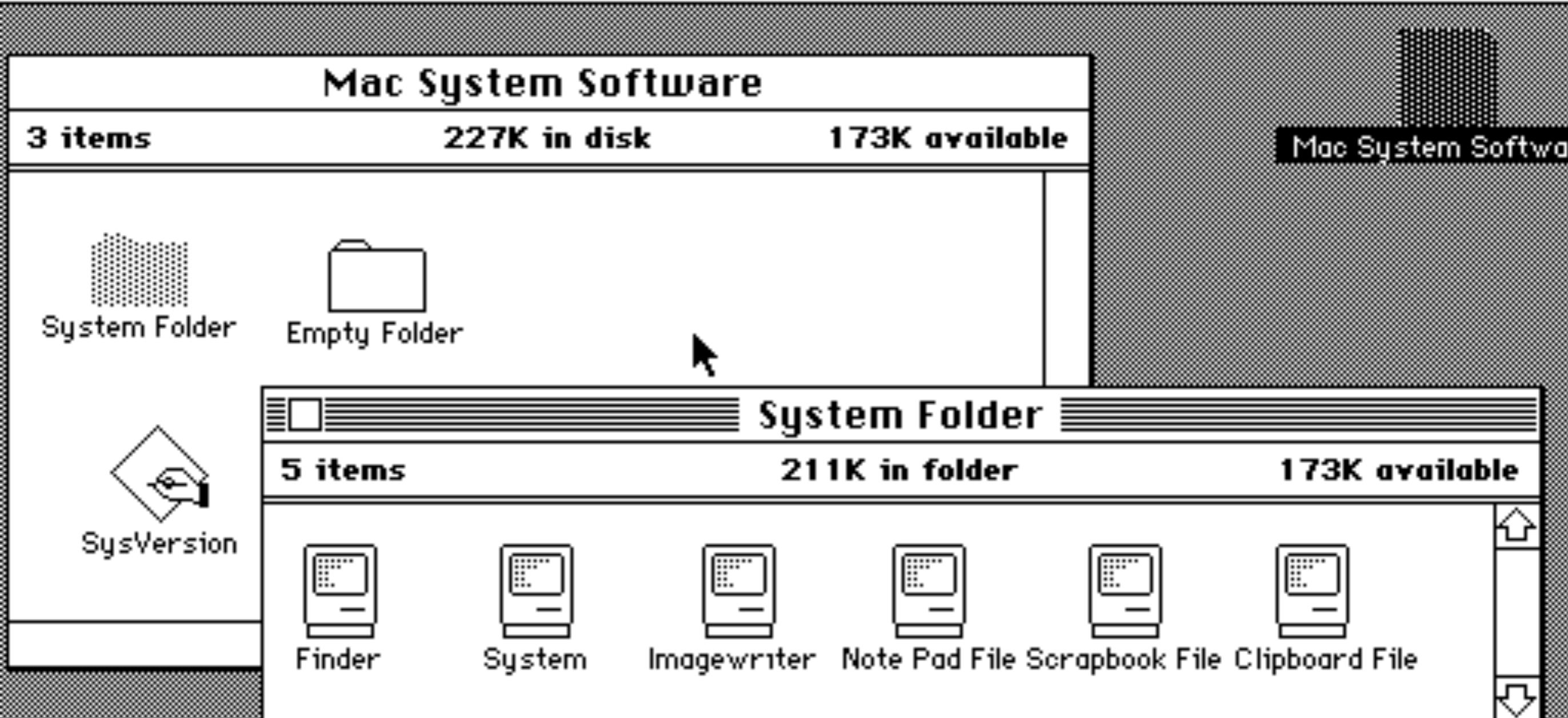


Apple Lisa 1983

<http://media.arstechnica.com/images/gui/11-Mac1.gif>

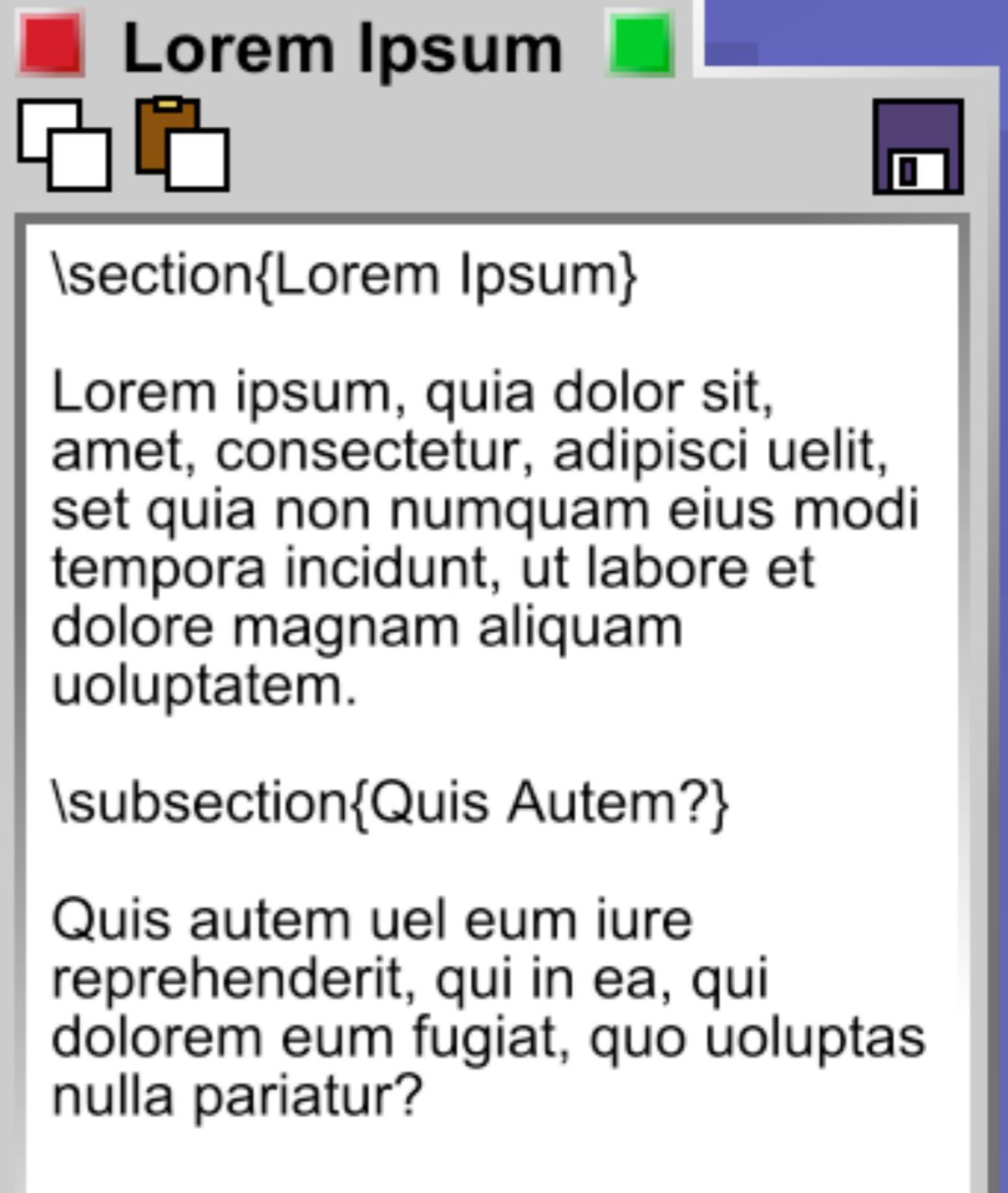
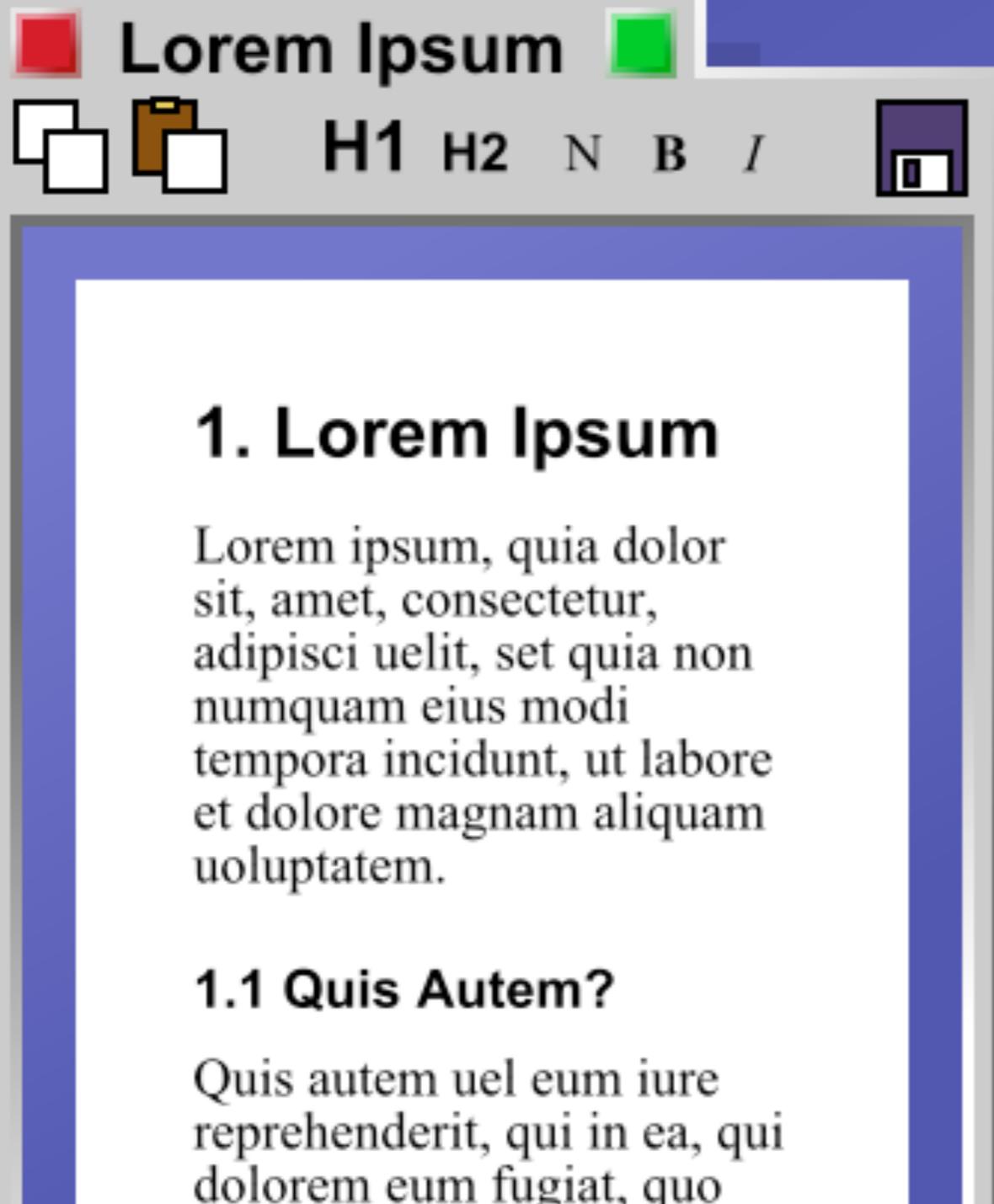


Macintosh System 1.0. January 1984



WIMP

- stands for "window, icon, menu, pointing device"
- coined by Merzouga Wilberts in 1980
- is often incorrectly used as an approximate synonym of "GUI".



WYSIWYG

- user interface that allows the user to view something very similar to the end result
- implies the ability to directly manipulate the layout of a document/presentation/3D model without having to type or remember names of layout commands.

The screenshot shows a Finder window titled "Library". The interface includes a top toolbar with icons for Back, Delete, Burn, Get Info, and New Folder. Below the toolbar is a navigation pane on the left with sections for DEVICES (ol, iDisk, Untitled), SHARED (absolute, anais, armitage, barkeeper, cosinus, fifi, grulemuck, All...), and PLACES (Desktop, awiethoff, Applications, Documents, Downloads). The main pane displays a table of folders:

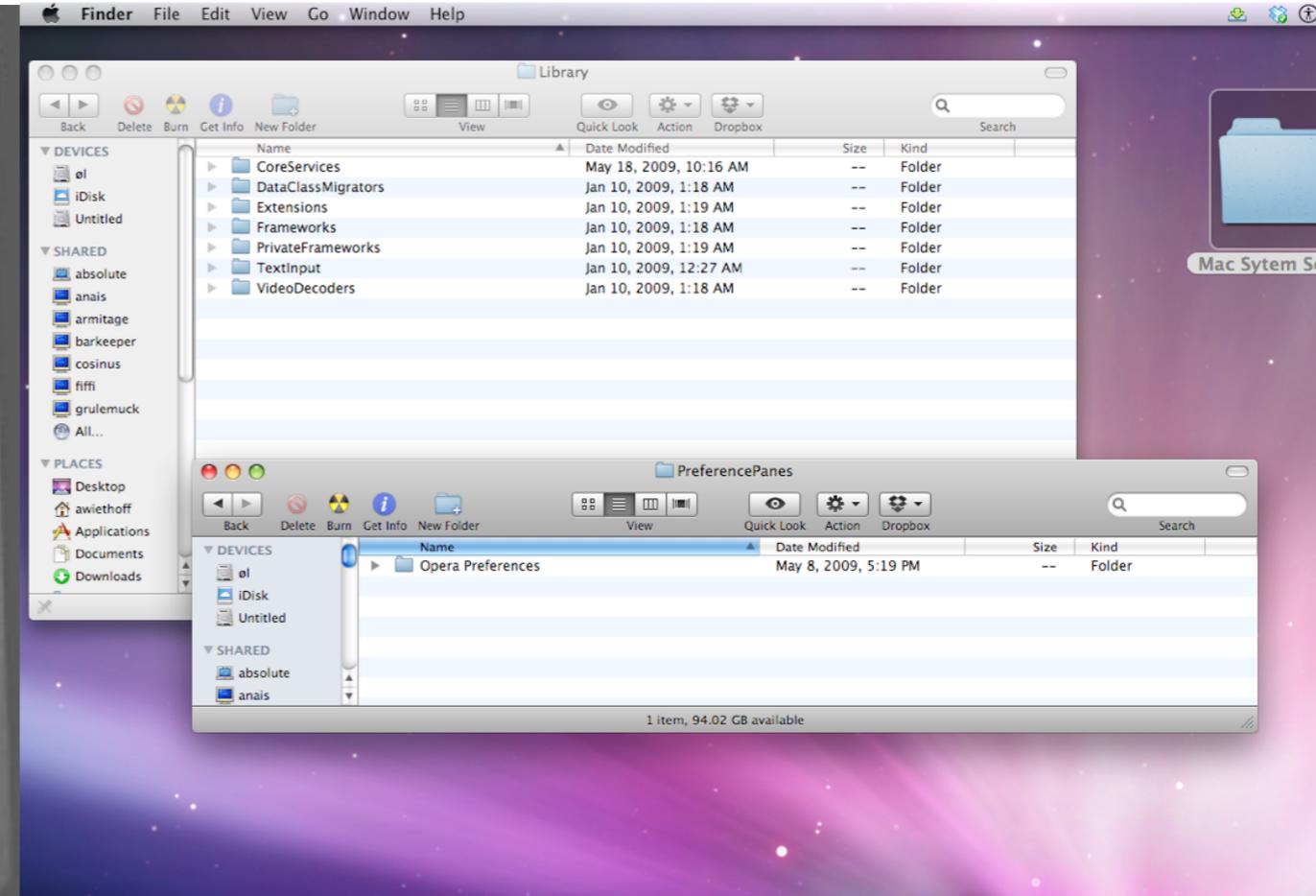
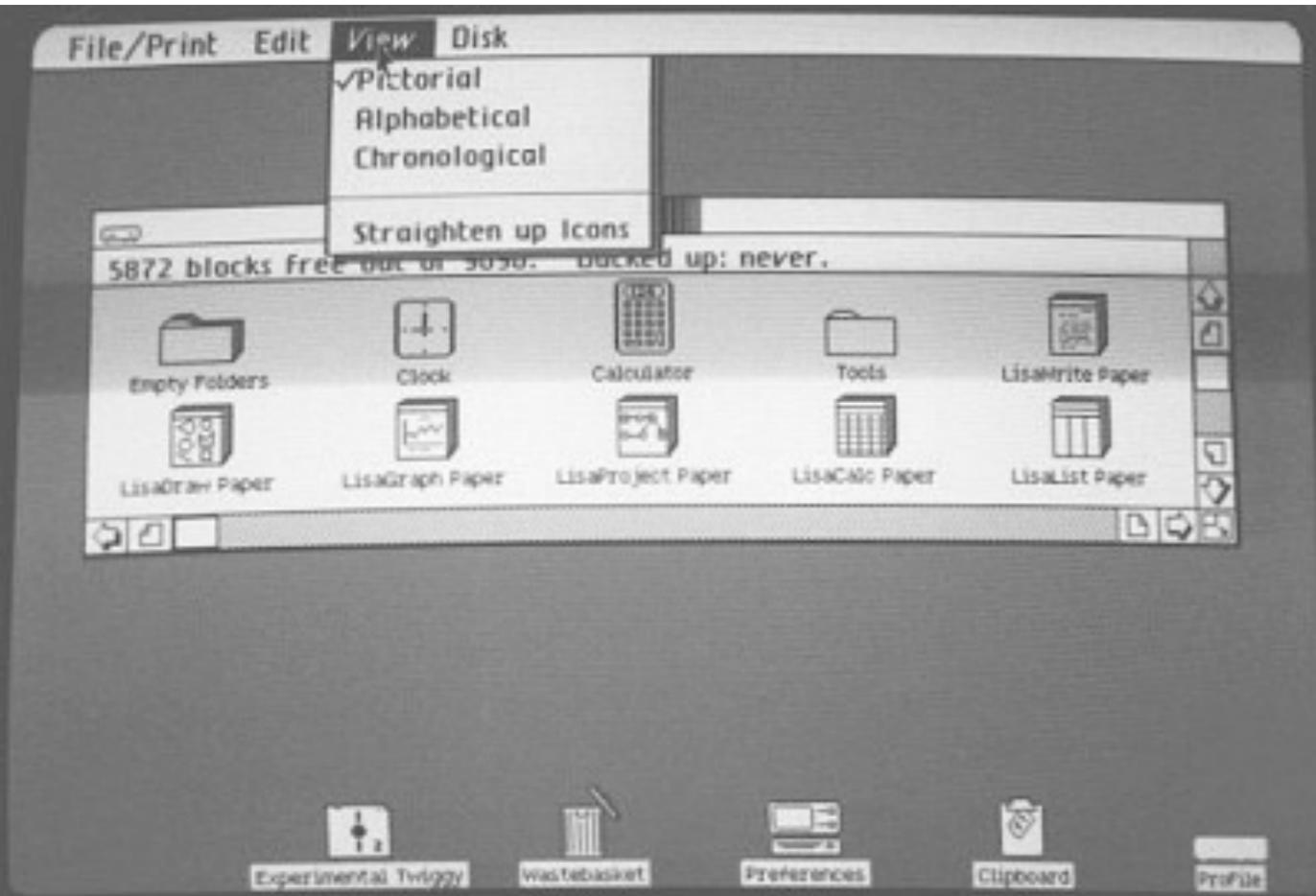
Name	Date Modified	Size	Kind
CoreServices	May 18, 2009, 10:16 AM	--	Folder
DataClassMigrators	Jan 10, 2009, 1:18 AM	--	Folder
Extensions	Jan 10, 2009, 1:19 AM	--	Folder
Frameworks	Jan 10, 2009, 1:18 AM	--	Folder
PrivateFrameworks	Jan 10, 2009, 1:19 AM	--	Folder
TextInput	Jan 10, 2009, 12:27 AM	--	Folder
VideoDecoders	Jan 10, 2009, 1:18 AM	--	Folder

The screenshot shows a Finder window titled "PreferencePanes". The interface is similar to the first window, with a top toolbar and a navigation pane on the left. The main pane displays a table with one folder:

Name	Date Modified	Size	Kind
Opera Preferences	May 8, 2009, 5:19 PM	--	Folder

At the bottom of the window, it says "1 item, 94.02 GB available".

October 2007: Mac OS X 10.5



over 25 years in between....

INTERACTION DESIGN



“There is an objectivity in the process of letting the user decide, the value of which is a recurring theme in this story of designing the desktop and the mouse. **Come up with an idea, build a prototype, and try it on the intended users.** That has proved, time and time again, to be the best way to create innovative solutions.”

Bill Moggridge - Designing Interactions

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- [1] Buxton, W. Sketching User Experiences, *Morgan Kaufmann 2007.*
- [2] Moggridge, B. Designing Interactions, *MIT Press, 2006.*
- [3] Saffer, D. Designing for Interaction, *New Riders 2009.*

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- [4] Sanders, E. An Evolving Map of Design Practice and Design Research. *In ACM Interactions 15,6 2008*
- [5] Sanders, E. Stepping Stones Across the Gap. Essay in DAIM – Rehearsing the Future, *DKDS Press 2010.*

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- [6] http://www.businessweek.com/innovate/next/archives/2008/12/what_apple_lear.html

