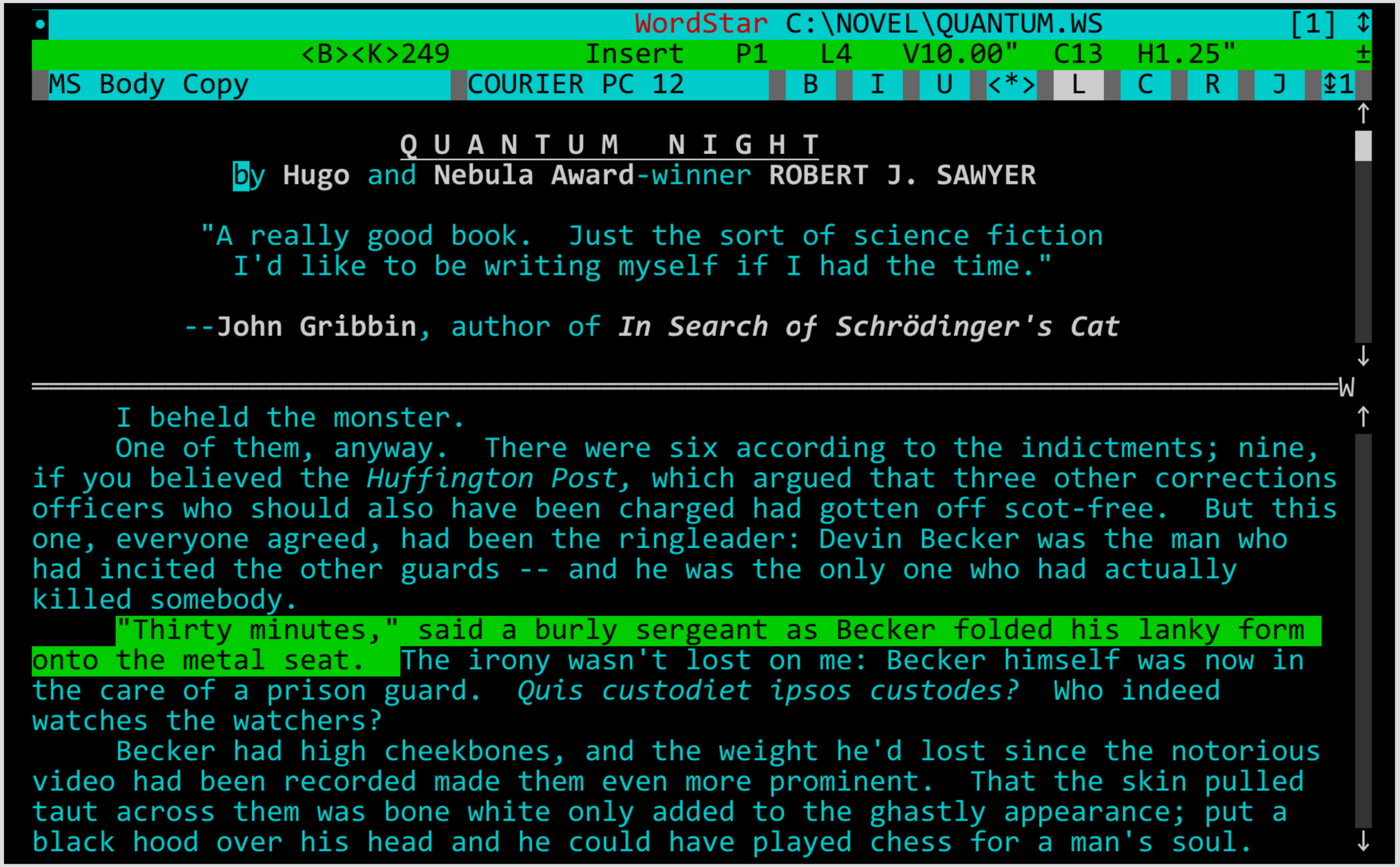
everything you wanted to know about software but were afraid to ask

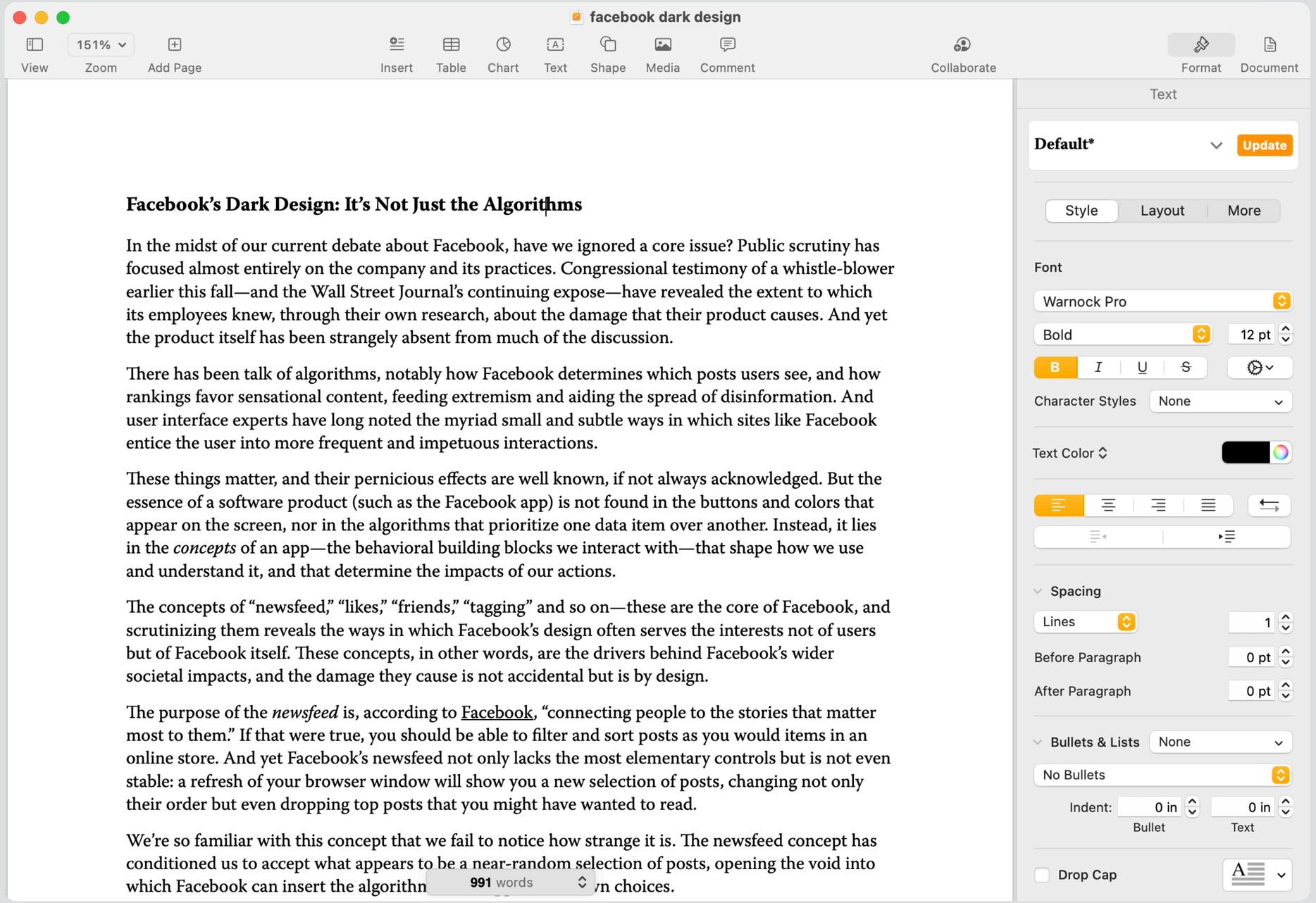
Daniel Jackson · Leading Jewish Minds · May 12, 2022

part 1:
how did we get here?

from word star (1978)...

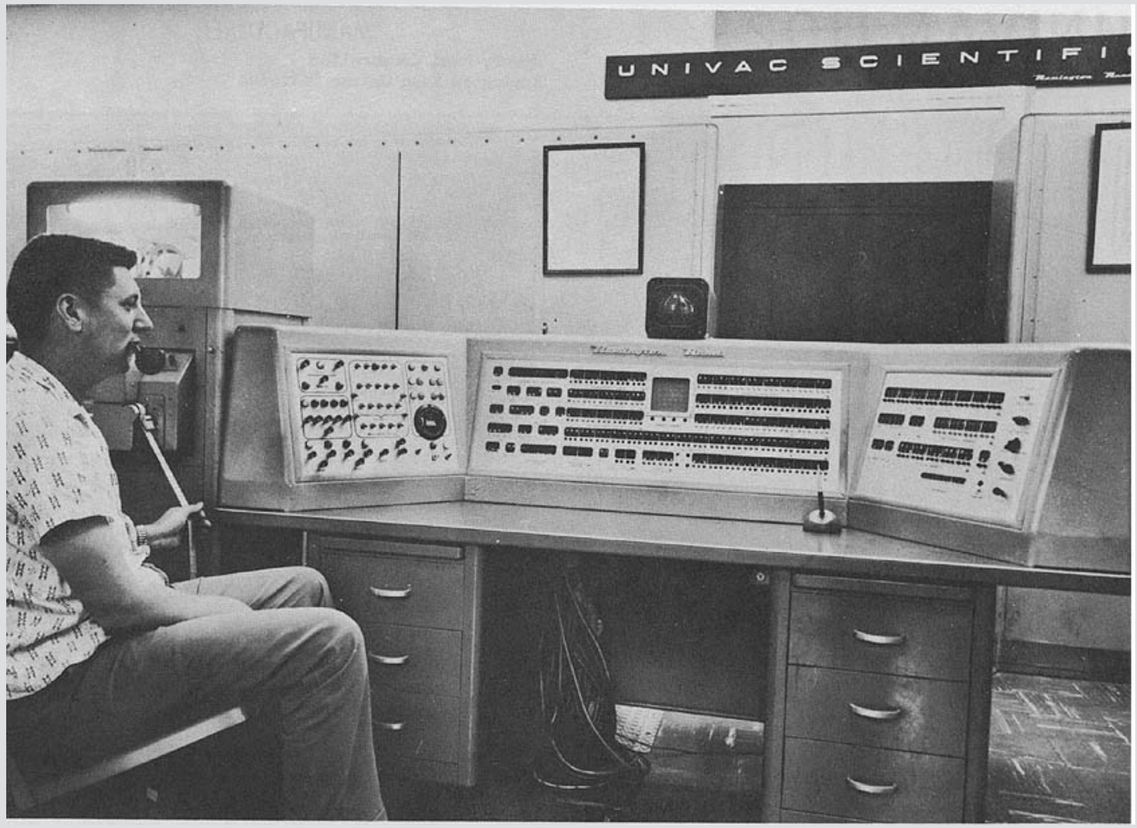


... to apple pages (2005)



tech-driven design:
from code-breakers to memory extenders

the first digital computers: code-breaking, weather & missile trajectories



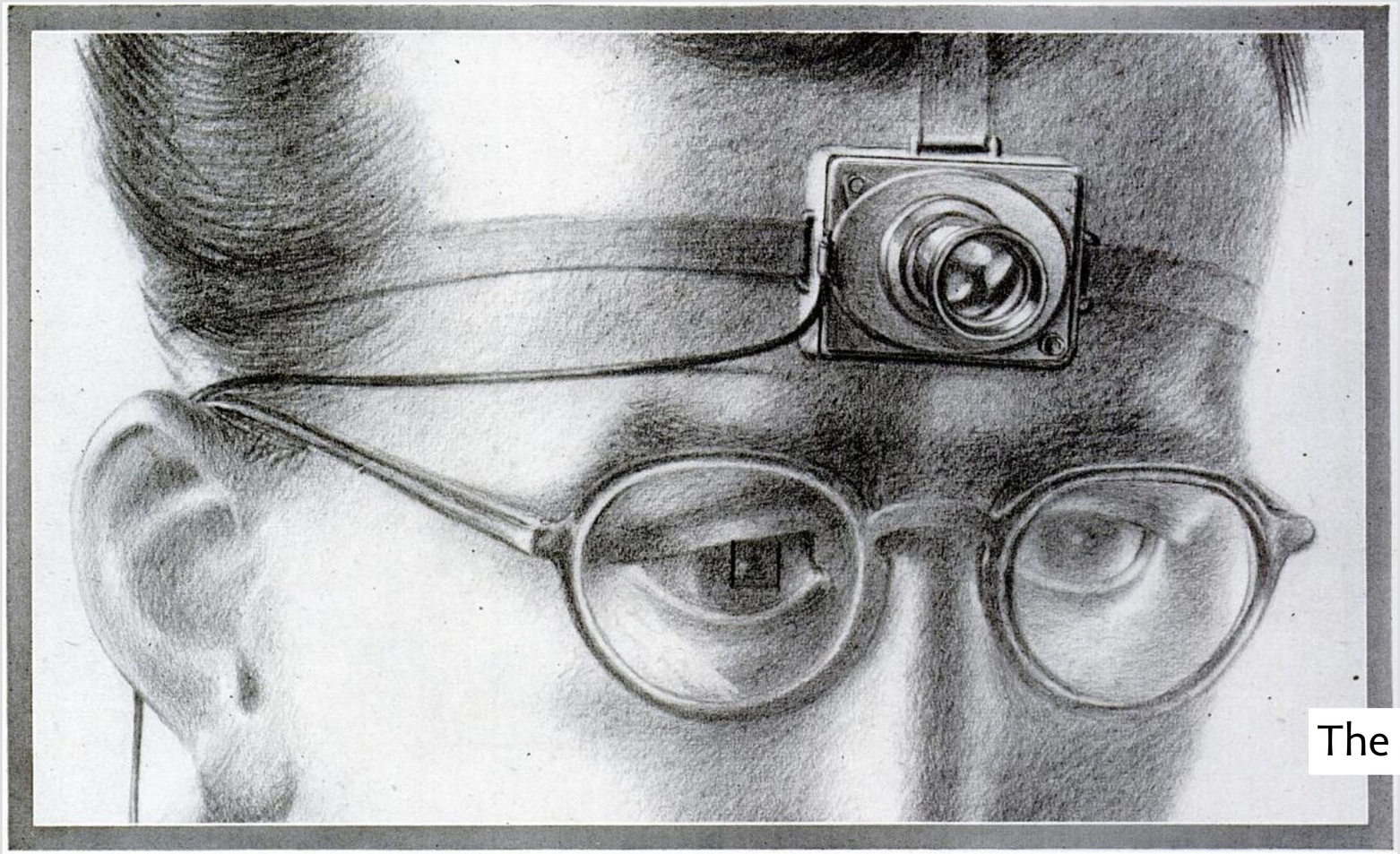
Univac 1101 console (1950)

Univac 1103 (1950)

computers for payroll, inventory and tea!

LEO 1: Lyons Electronic Office (1951)

vannevar bush: a new role for computing



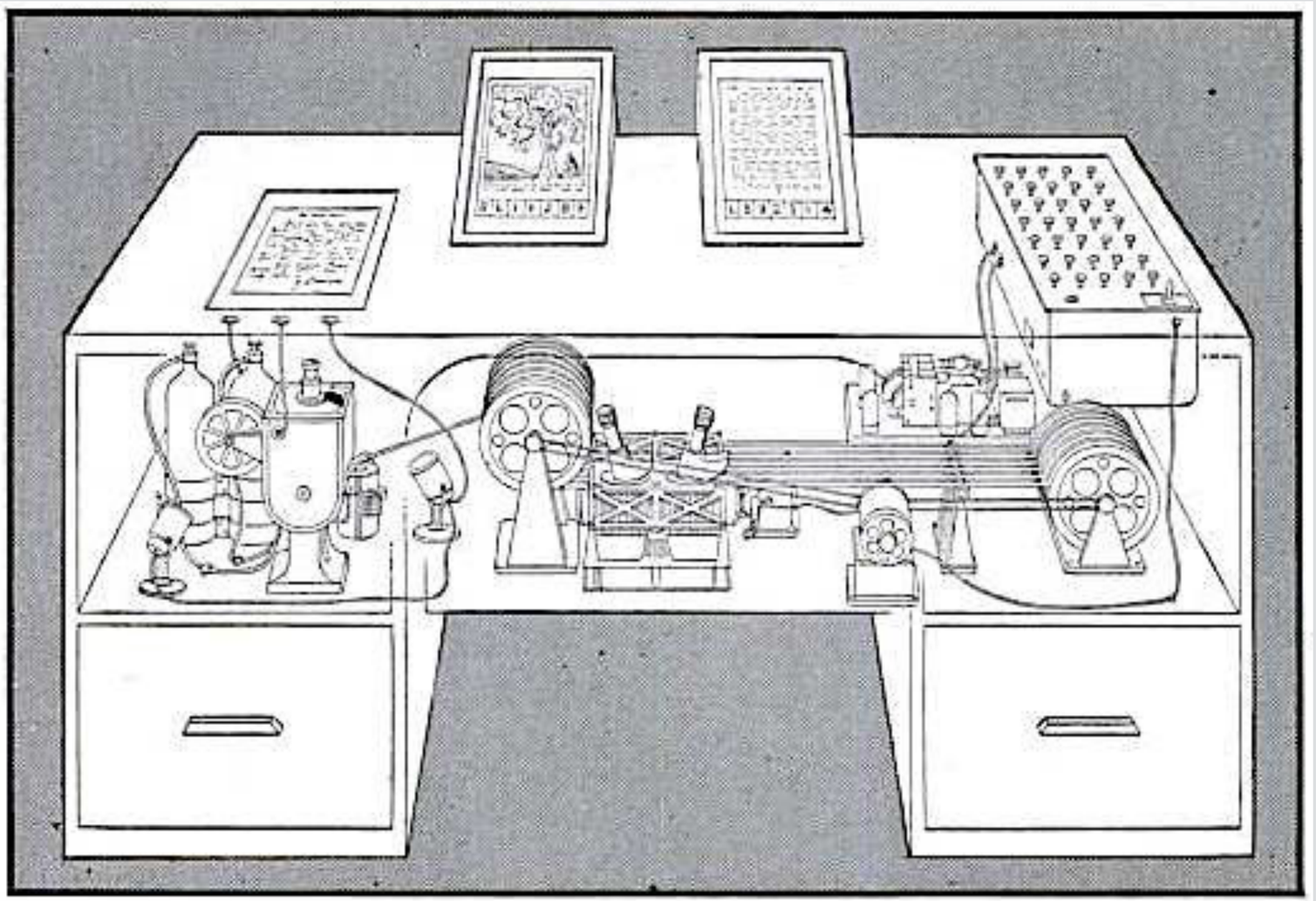
A SCIENTIST OF THE FUTURE RECORDS EXPERIMENTS WITH A TINY CAMERA FITTED WITH UNIVERSAL-FOCUS LENS. THE SMALL SQUARE IN THE EYEGLASS AT THE LEFT SIGHTS THE OBJECT

The Atlantic, July 1945

AS WE MAY THINK

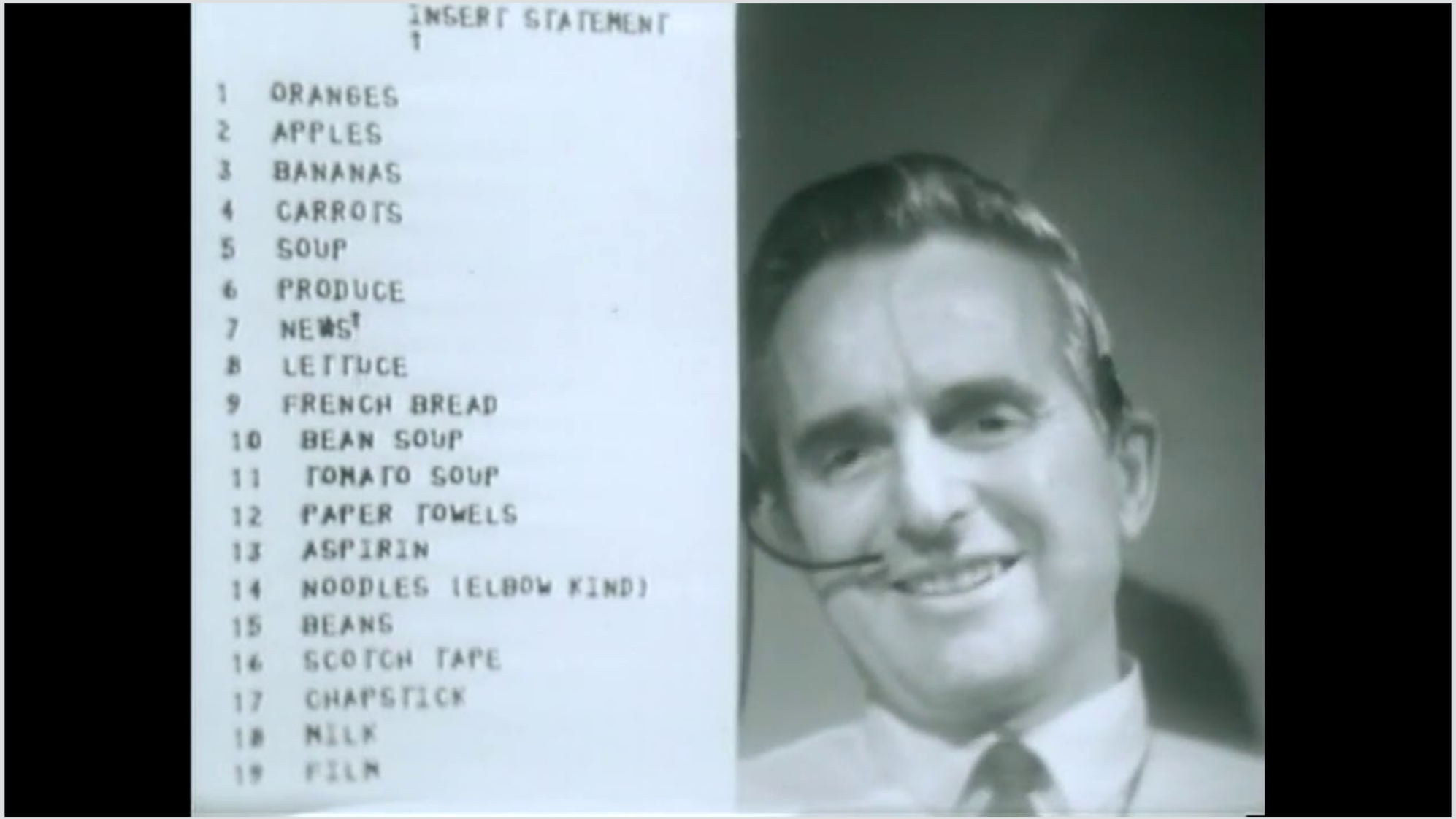
A TOP U. S. SCIENTIST FORESEES A POSSIBLE FUTURE WORLD IN WHICH MAN-MADE MACHINES WILL START TO THINK

the “memex” memory extender



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 supermicrofilm 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.

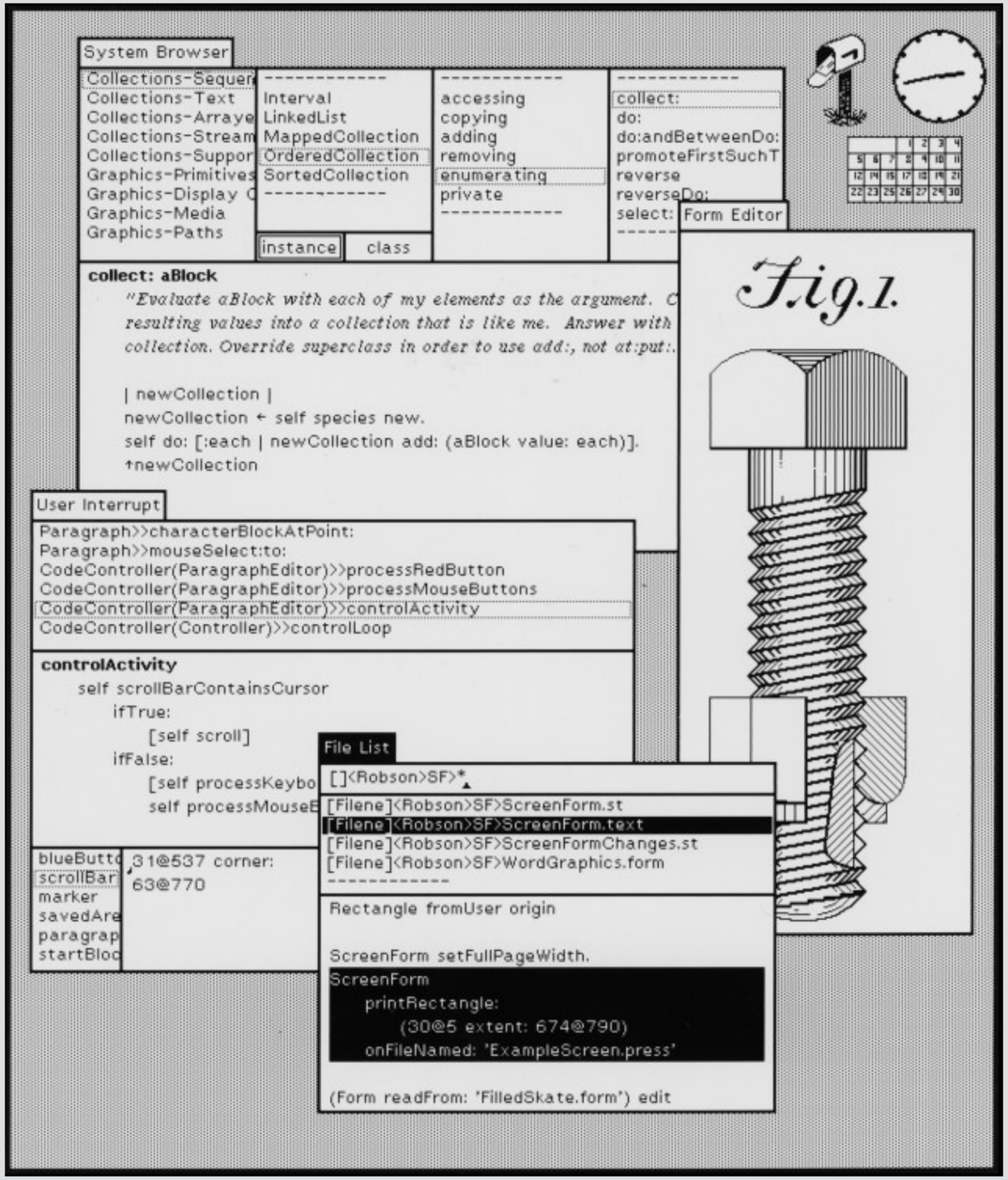
doug engelbart and the augmentation research center at SRI



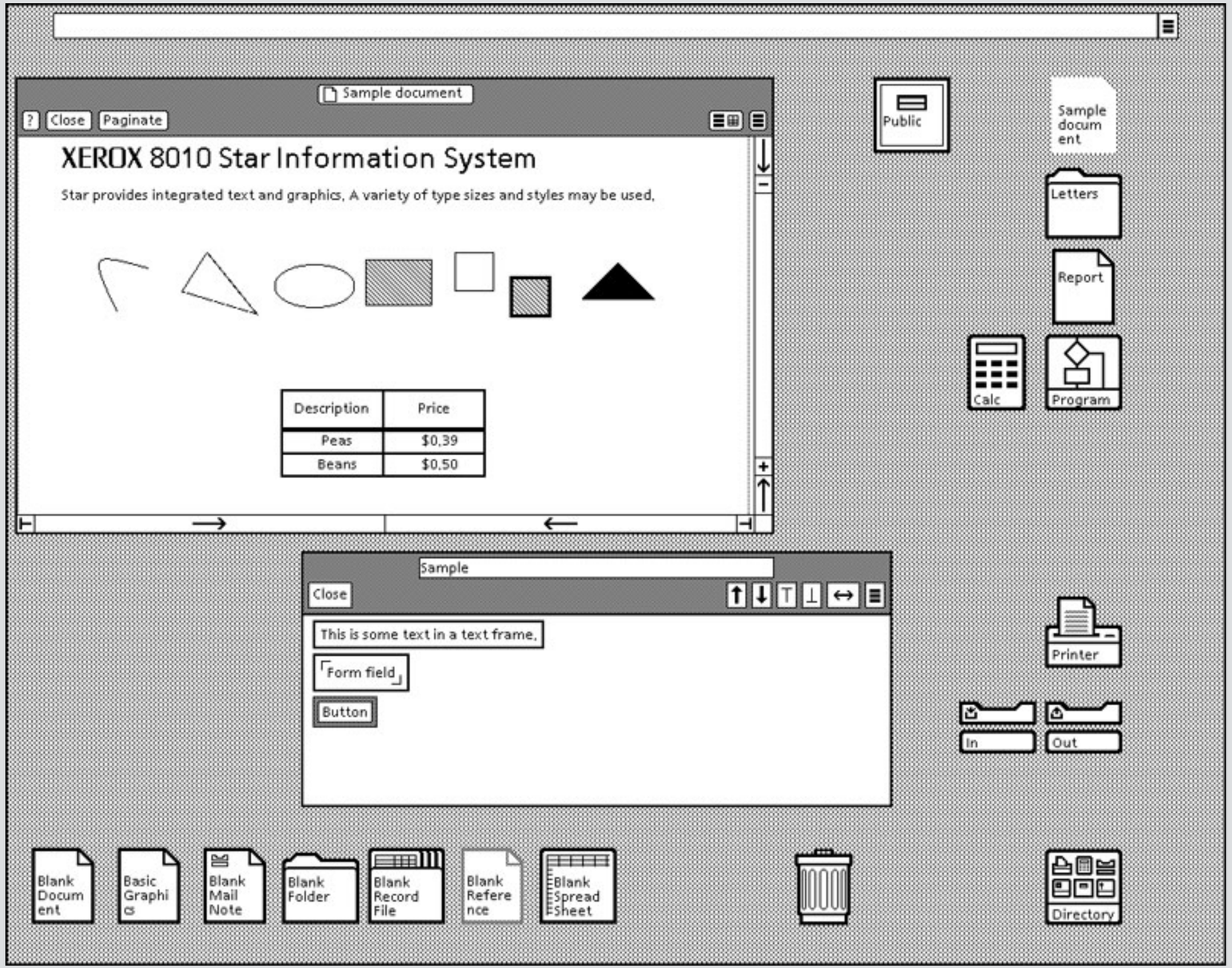
"the mother of all demos" (1968)

doug engelbart's mouse (1968)

xerox alto (1973)



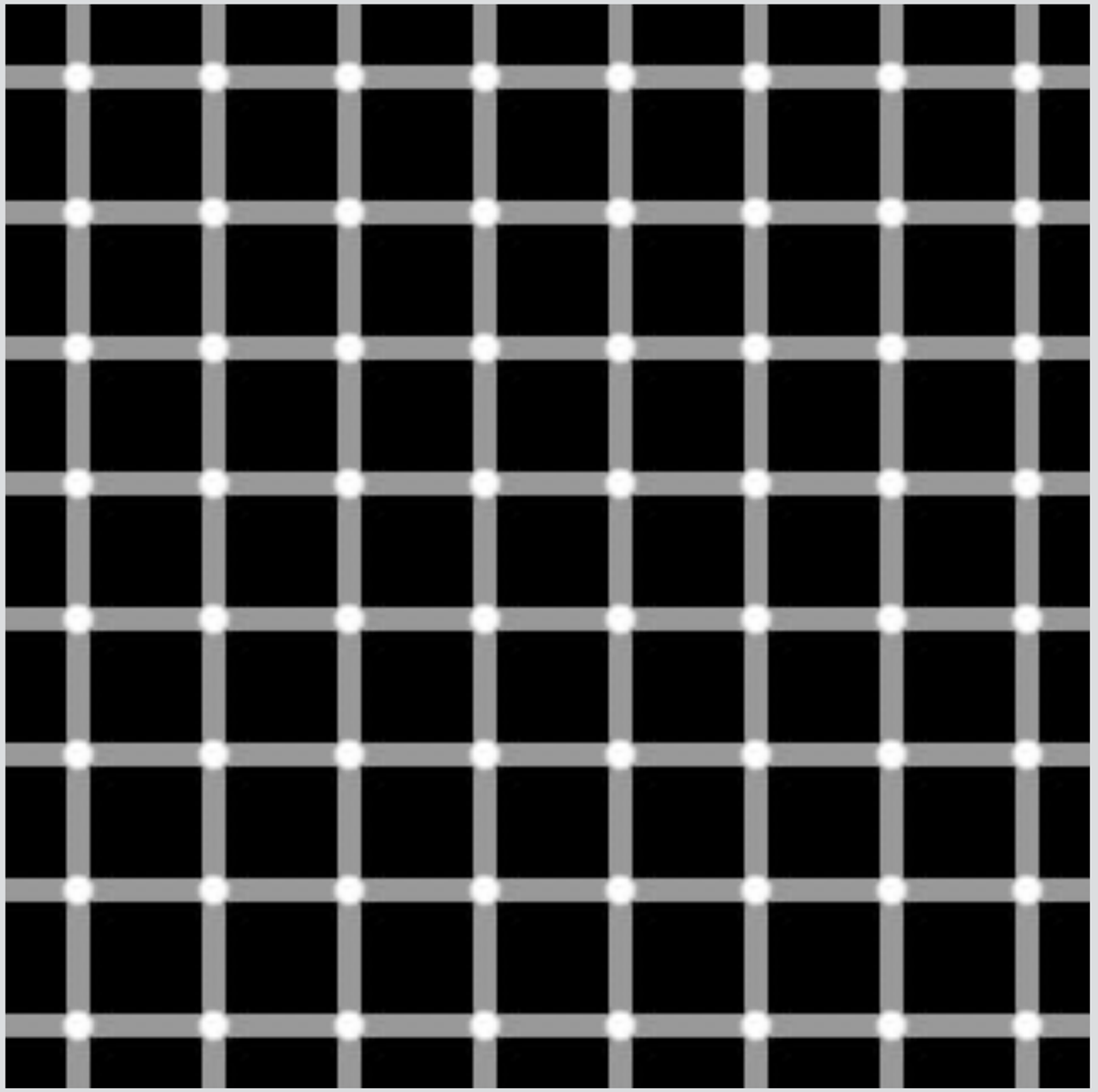
xerox star (1981)



apple macintosh (1984)

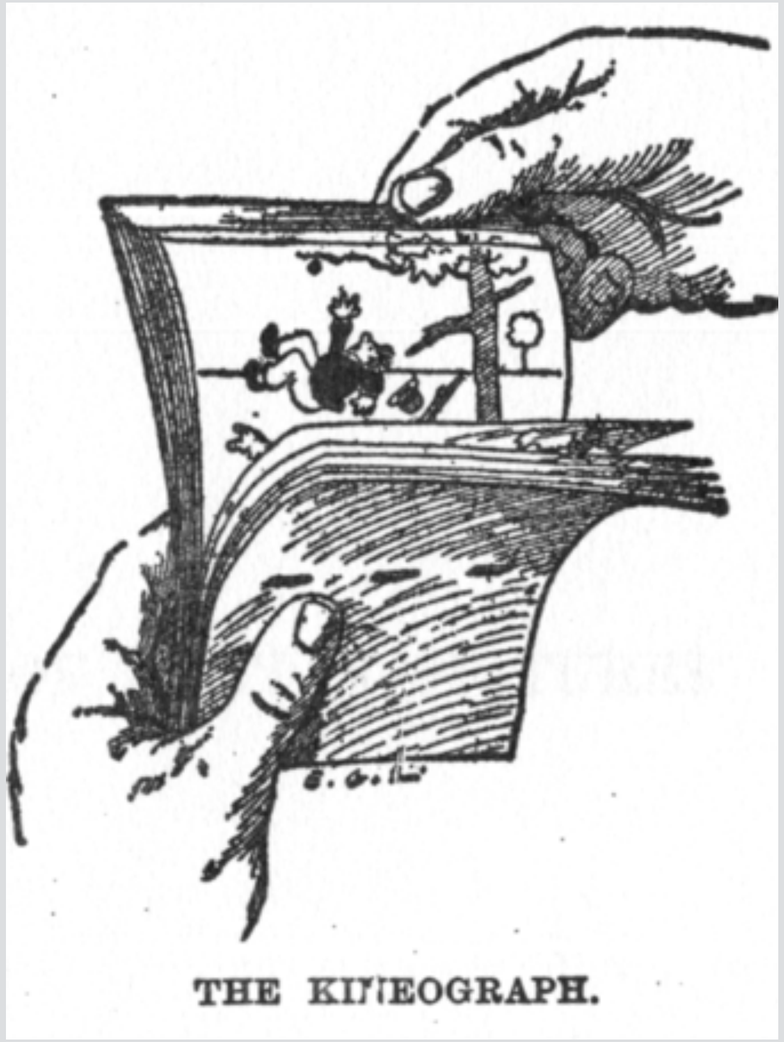
human-driven design:
from doors to usability heuristics

the herman illusion: perception & brain function

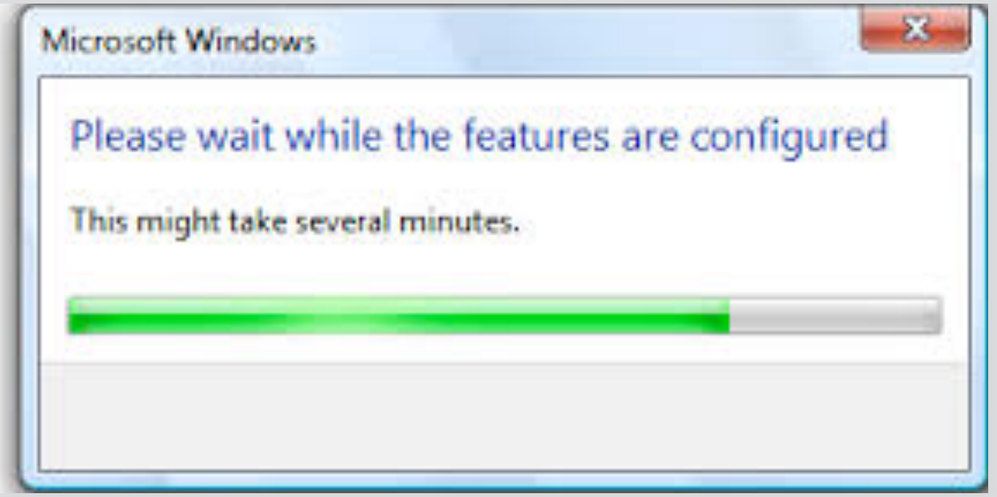


perceptual fusion

stimuli within 100ms are fused:
less than this feels instantaneous

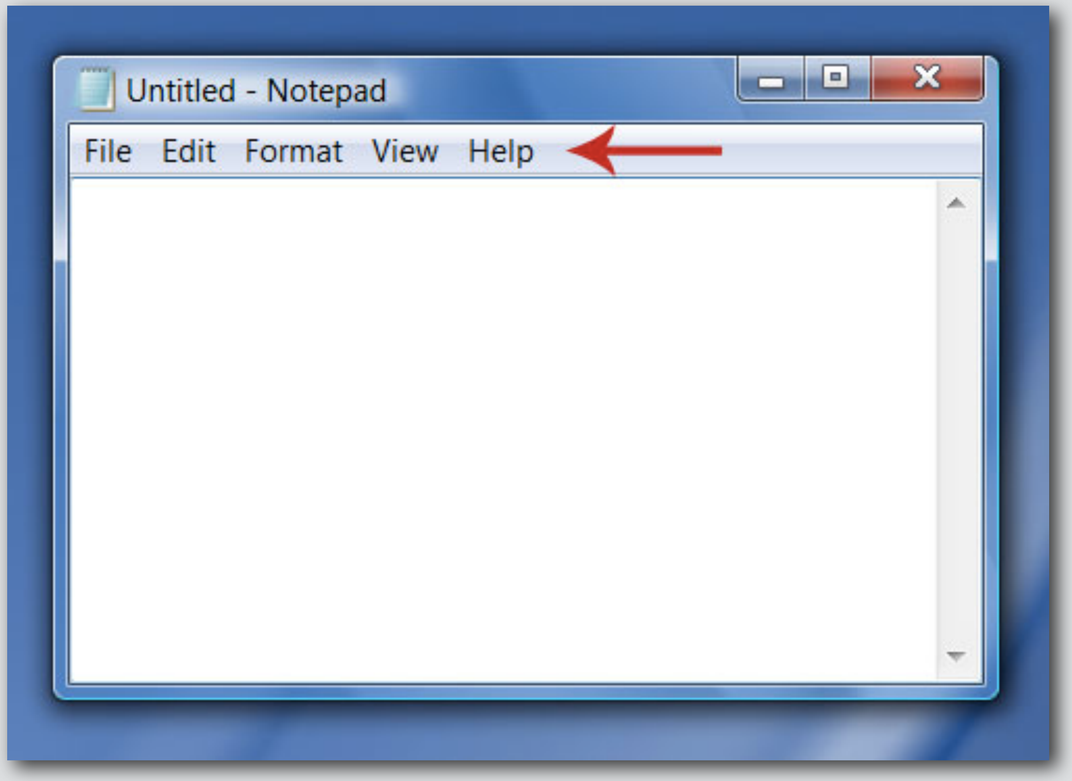


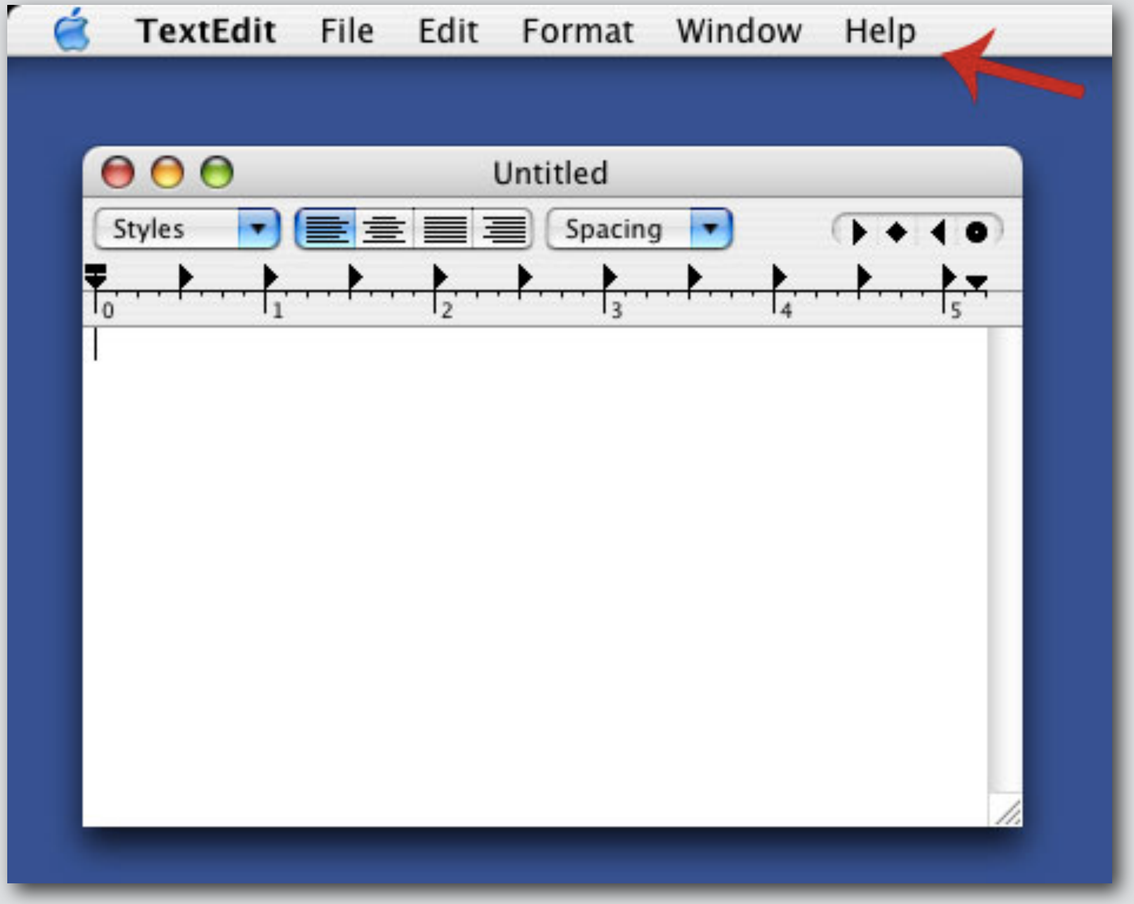
an early flip book



progress bar

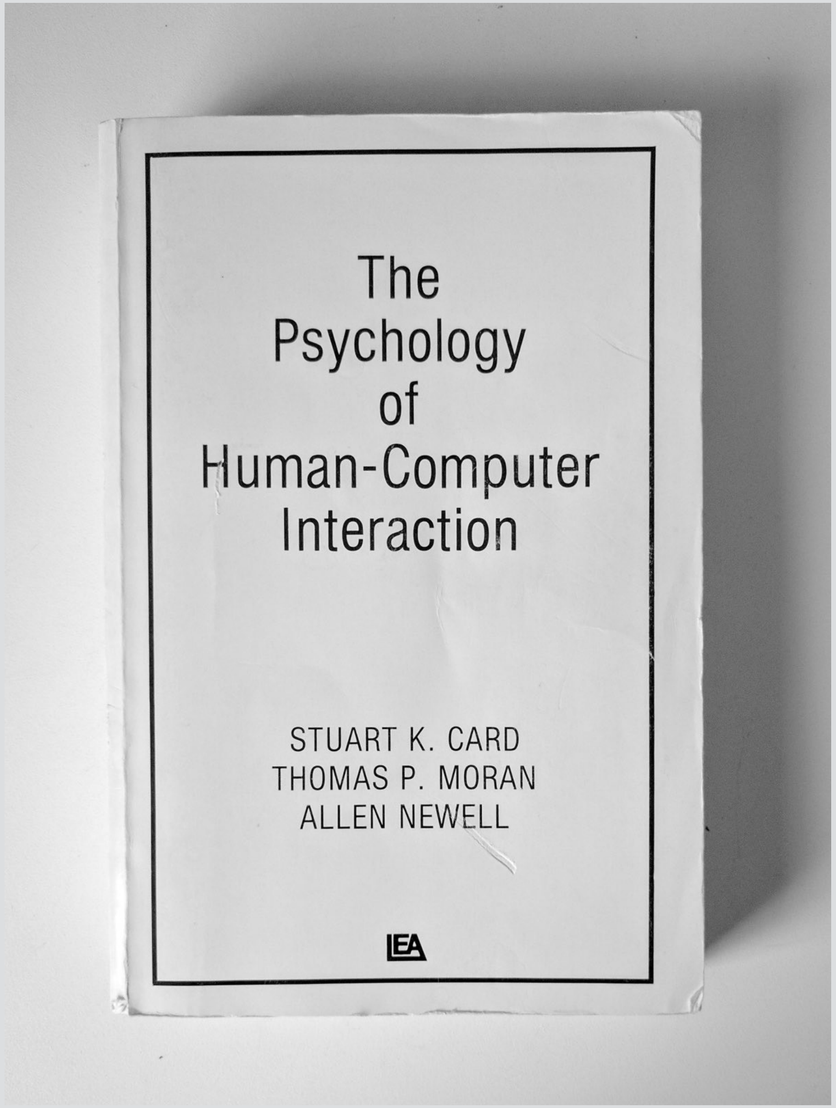
windows vs. mac: which is better?

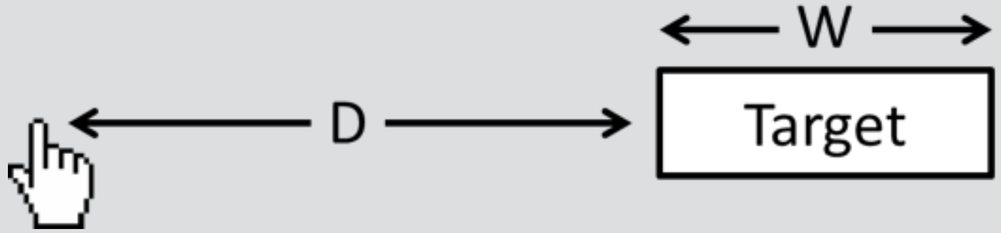




"On Windows the menu bar is right there, no need to move your eye to another part of the screen."

psychology of HCI and fitts's law (1986)



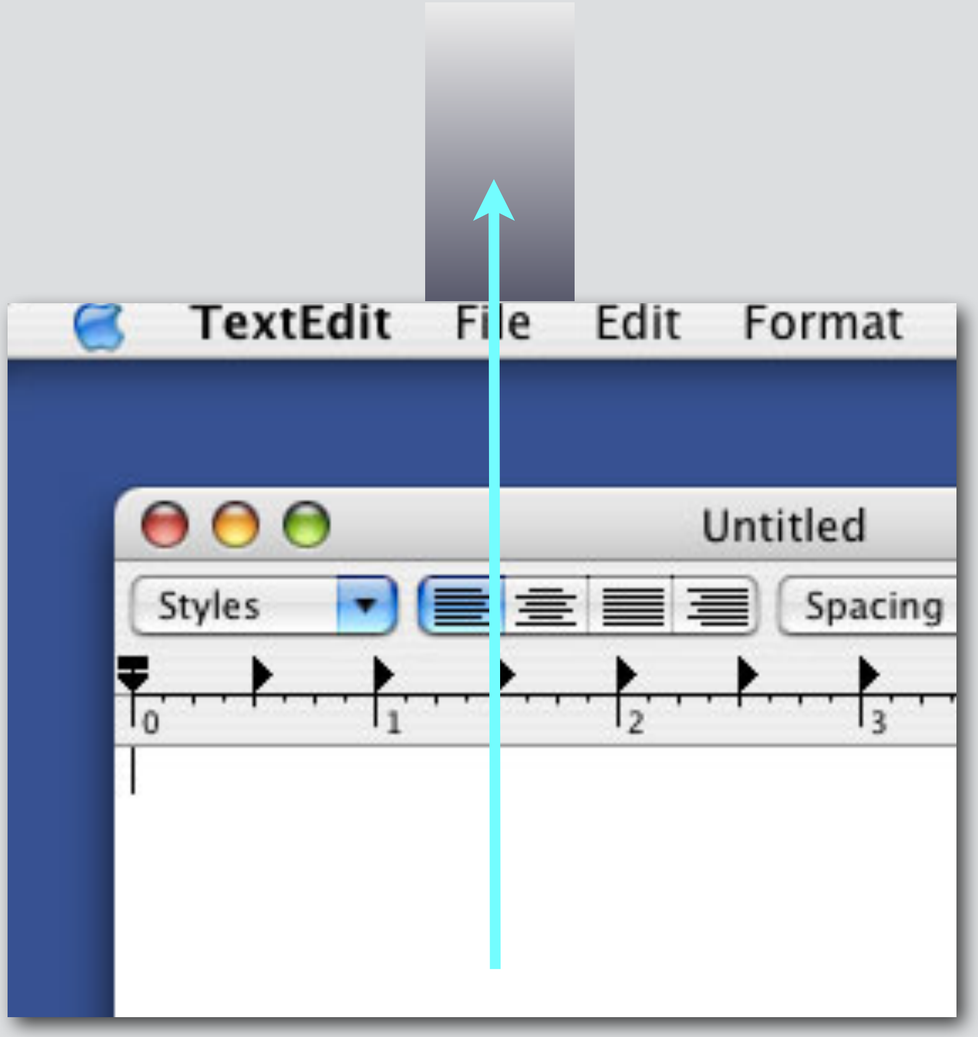


time to move to target is
$a + b.\log(D/W + 1)$

reaction time

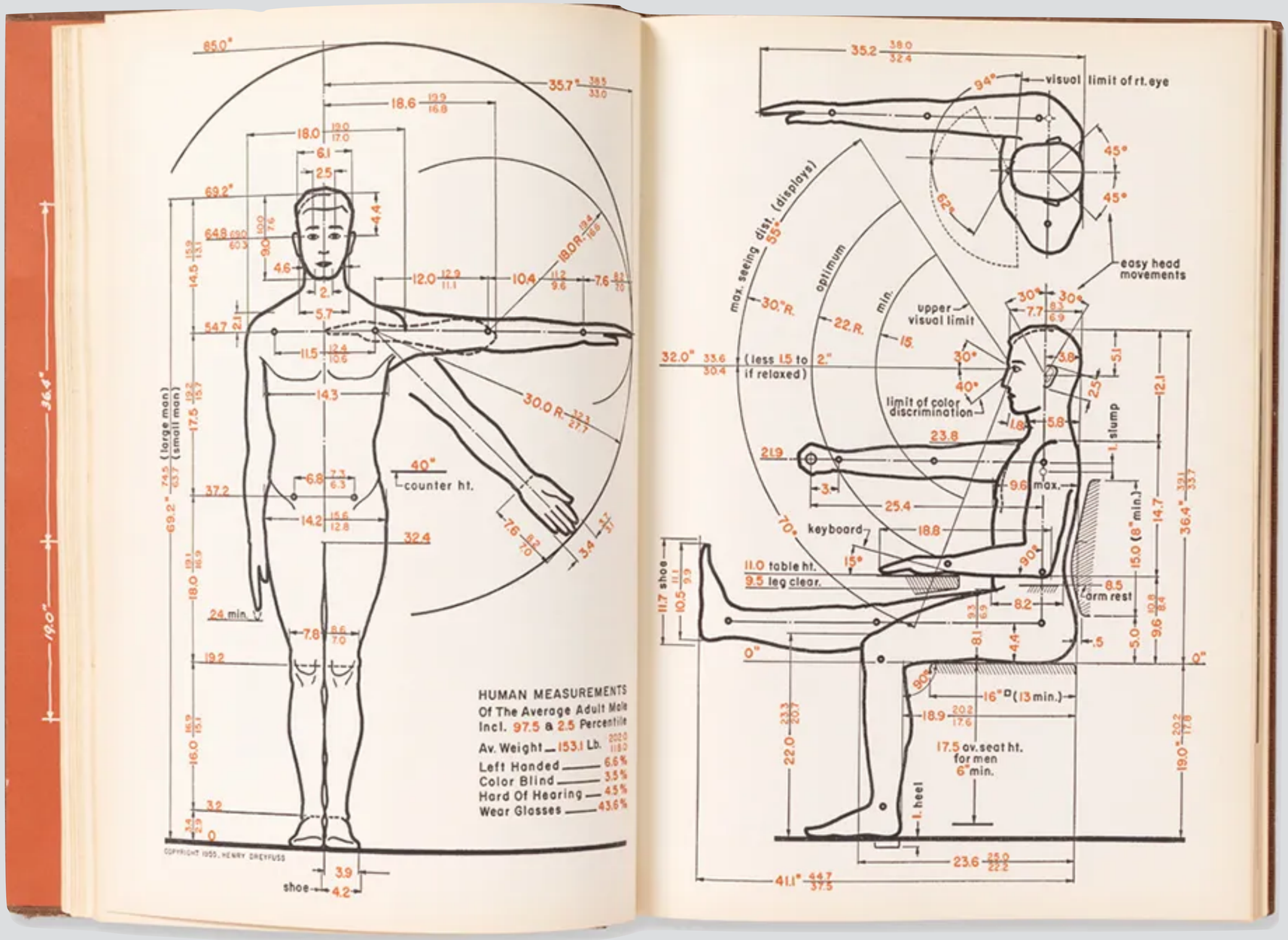
"index of difficulty"

applying fitts's law

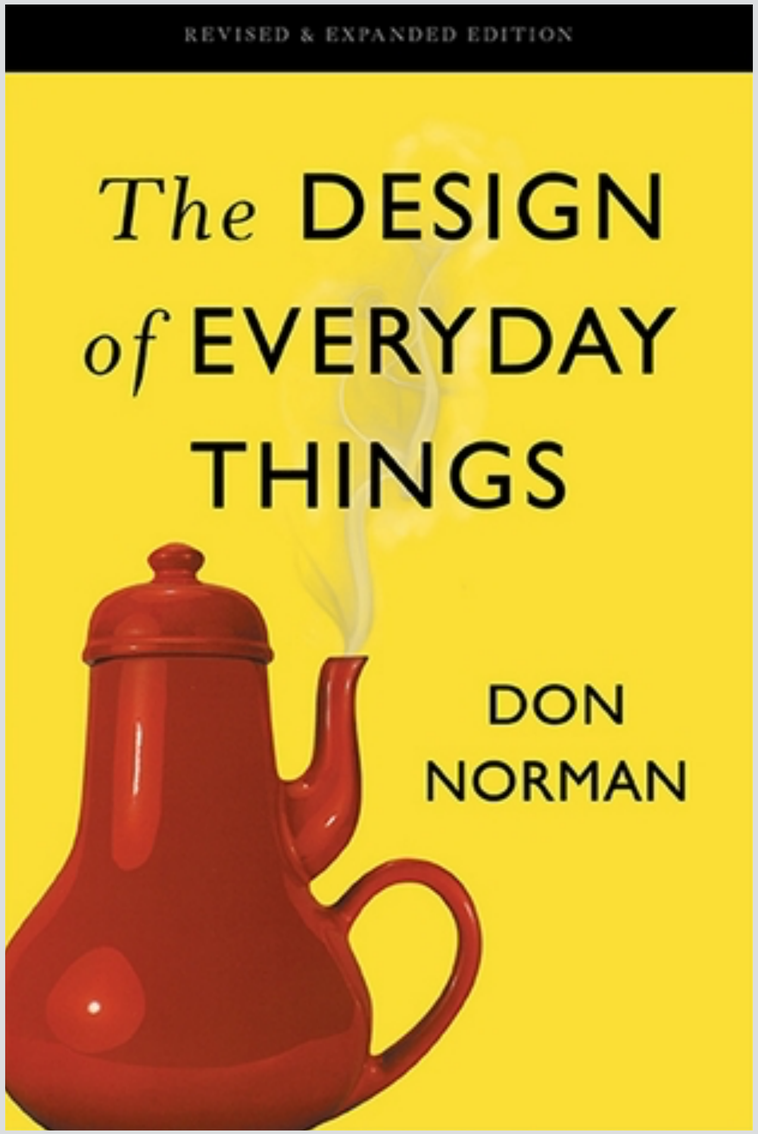


the Mac menu is a bit further away,
but it effectively has **infinite** size,
so it's much quicker to locate

henry dreyfuss, designing for people (1955)



user-centered design



1988

james gibson's affordances, repurposed by don norman (1988)

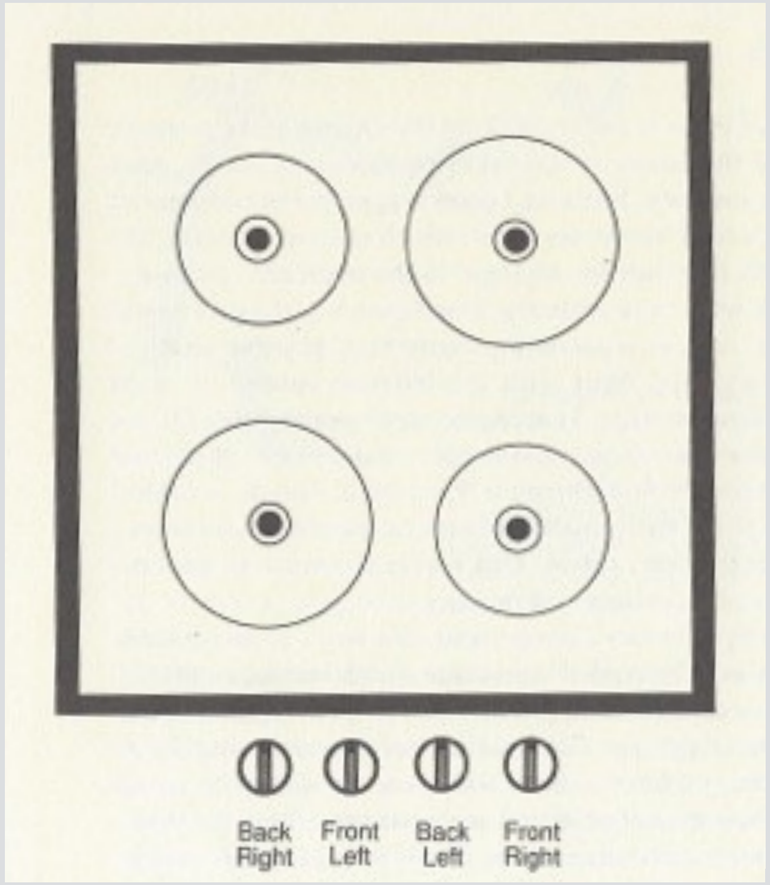
“norman doors”

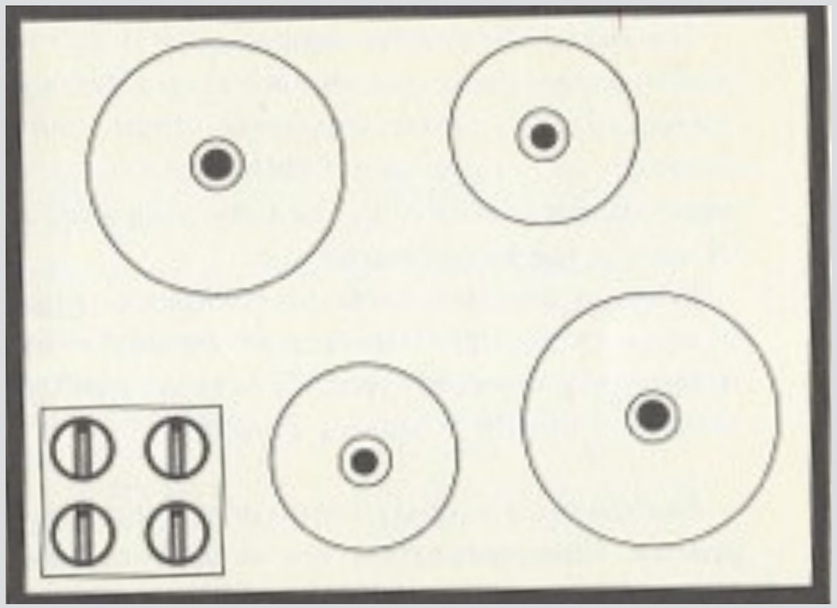
push or pull?

door with user manual

multiple user manuals

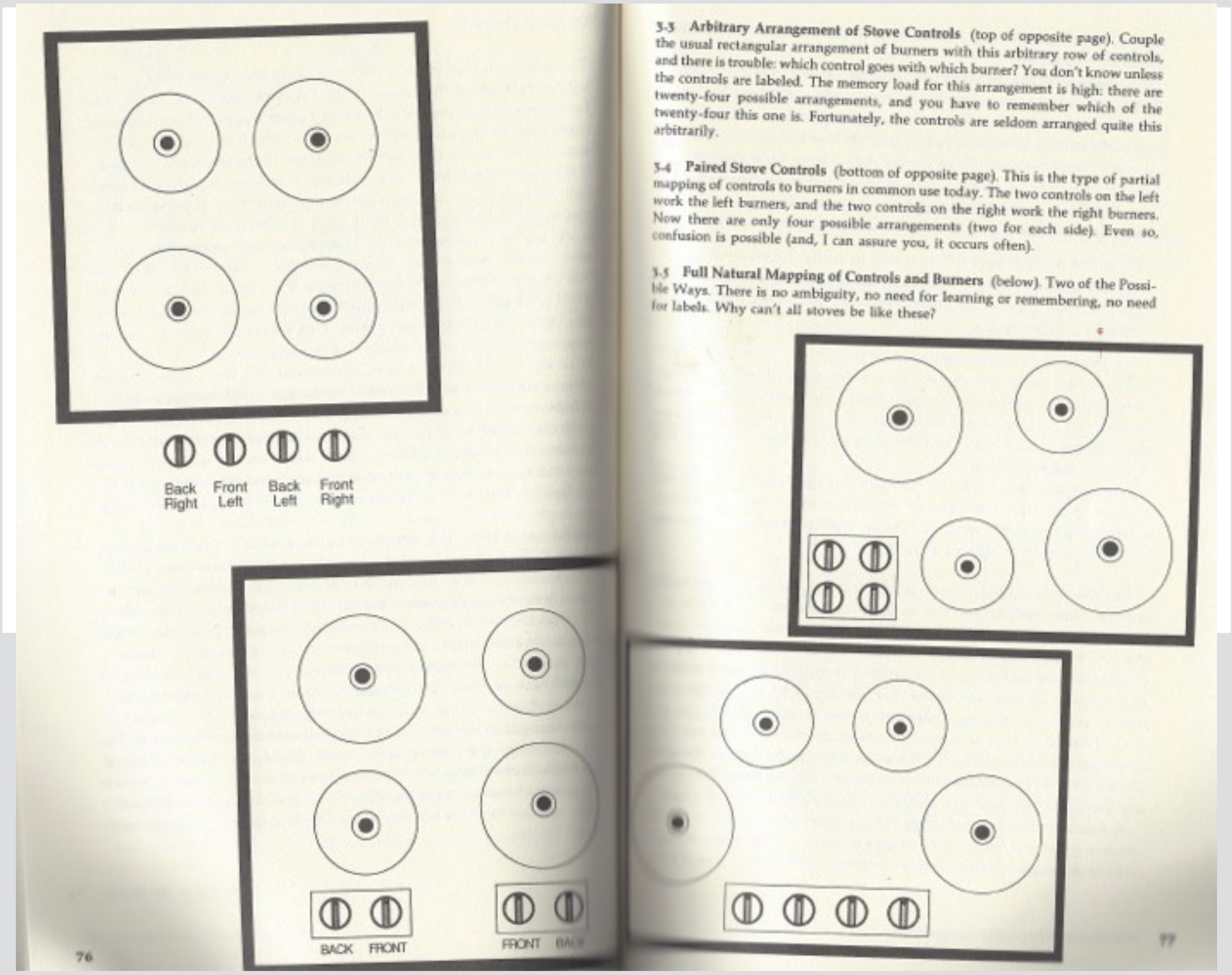
mapping





from: The Design of Everyday Things, Donald Norman

did the book designer read the book?



3-3 Arbitrary Arrangement of Stove Controls (top of opposite page). Couple the usual rectangular arrangement of burners with this arbitrary row of controls, and there is trouble: which control goes with which burner? You don't know unless the controls are labeled. The memory load for this arrangement is high: there are twenty-four possible arrangements, and you have to remember which of the twenty-four this one is. Fortunately, the controls are seldom arranged quite this arbitrarily.

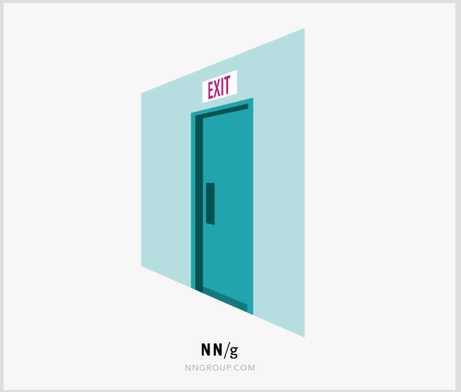
3-4 Paired Stove Controls (bottom of opposite page). This is the type of partial mapping of controls to burners in common use today. The two controls on the left work the left burners, and the two controls on the right work the right burners. Now there are only four possible arrangements (two for each side). Even so, confusion is possible (and, I can assure you, it occurs often).

3-5 Full Natural Mapping of Controls and Burners (below). Two of the Possible Ways. There is no ambiguity, no need for learning or remembering, no need for labels. Why can't all stoves be like these?

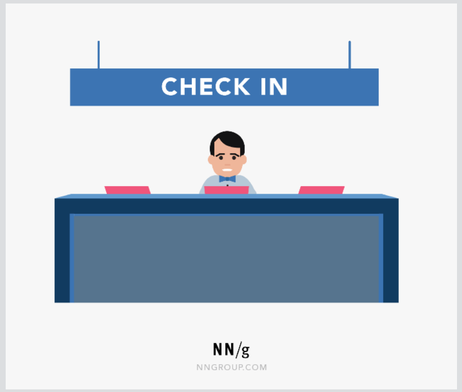
jakob nielsen's heuristics of user interface design (1994)

visibility of system status

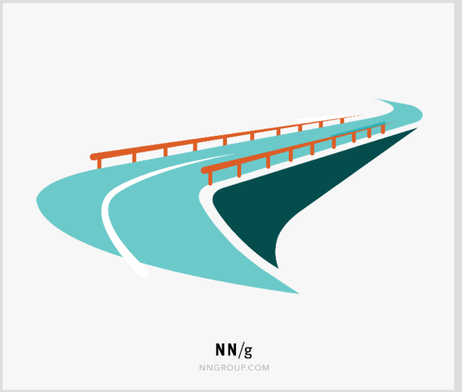
match between system & world



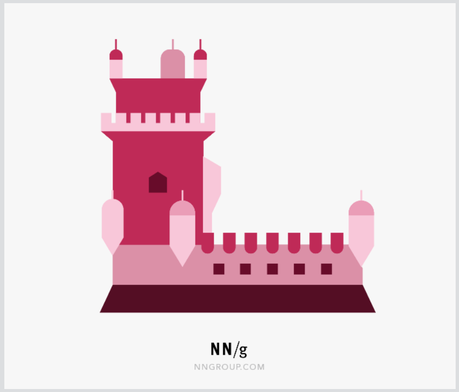
user control & freedom



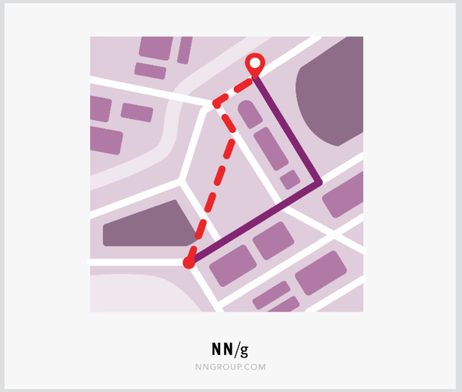
consistency & standards



error prevention

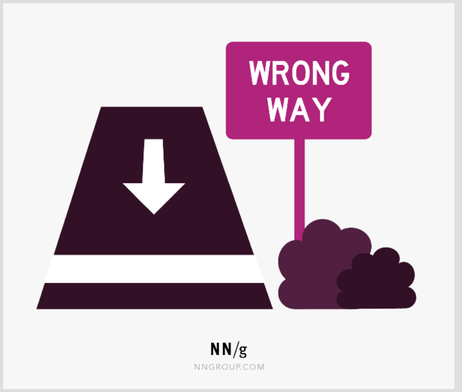


recognition not recall



flexibility & efficiency

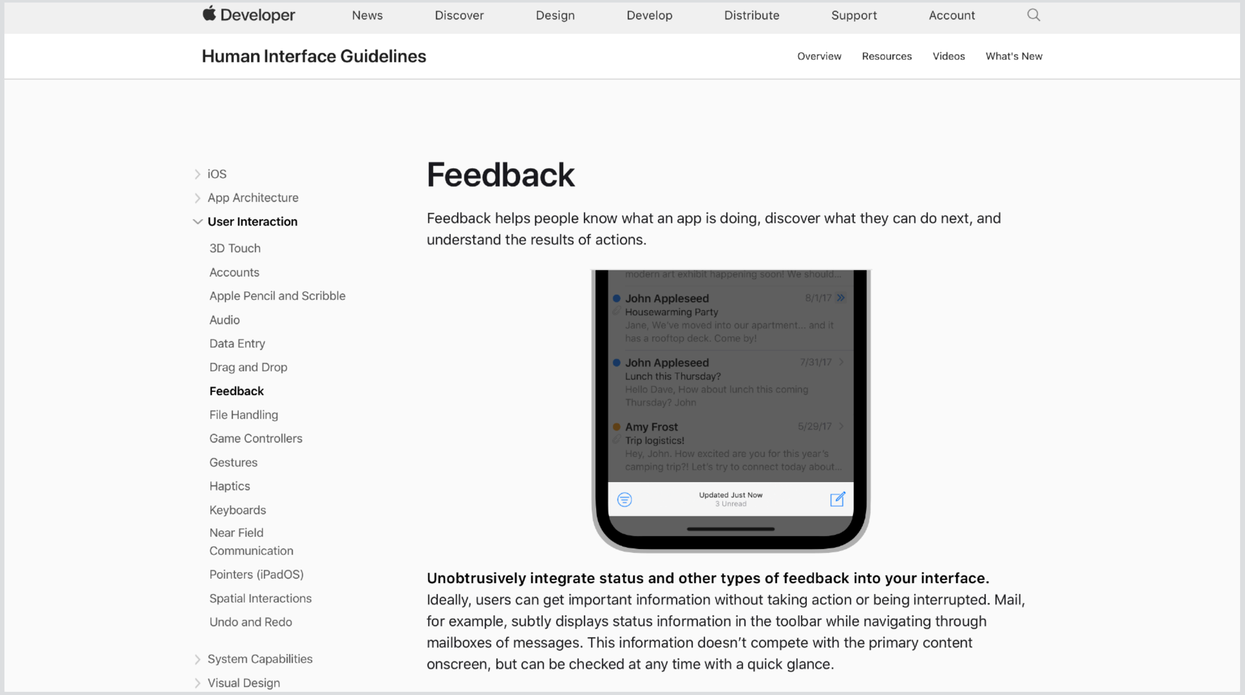
aesthetic & minimalist



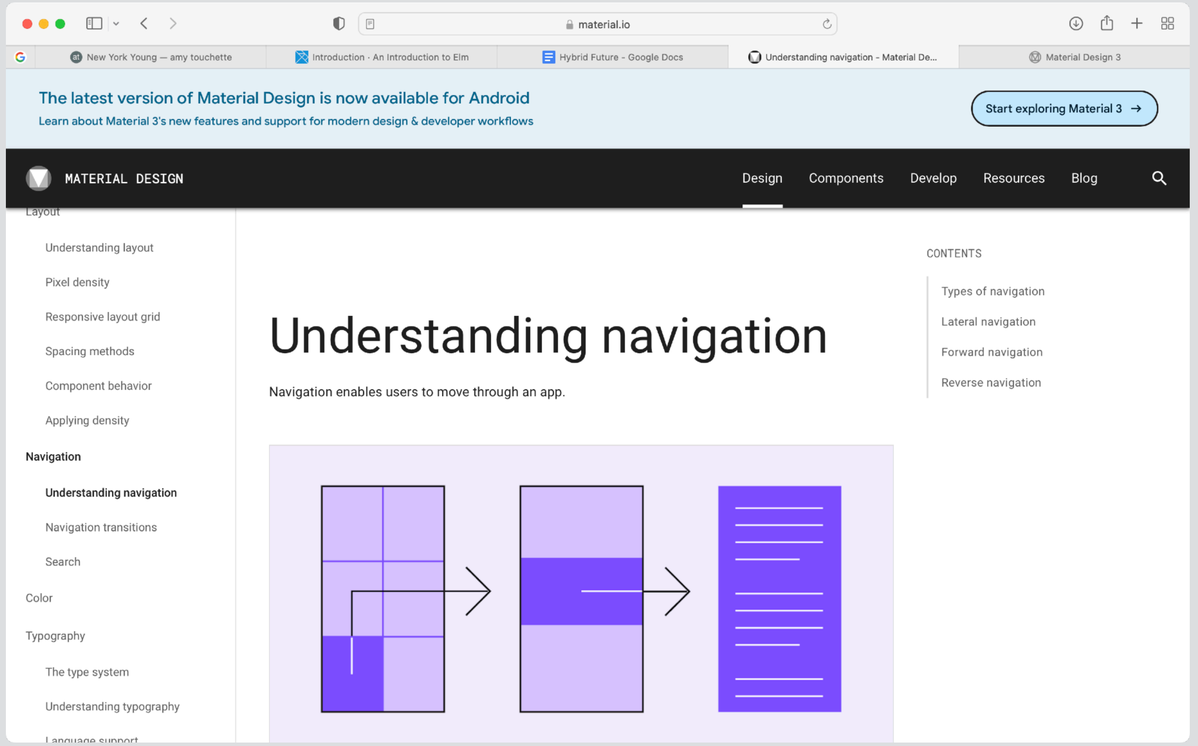
helpful error messages

help & documentation

“design systems”



Apple’s human interface guidelines

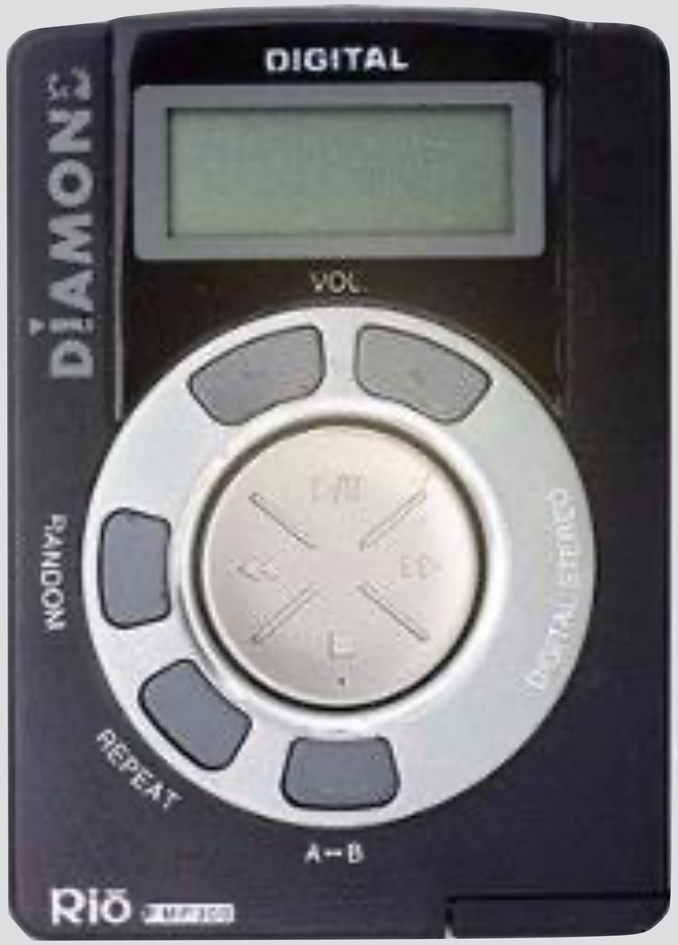


Google’s Material Design

part 2:
the essence of software
5 sample concepts

apple iPod (2001-2022): what made it great?

was it the first MP3 music player?



Rio PMP300 (1998)

Sony MS Walkman (1999)

Apple iPod (2001)

was it the physical design?

Jony Ive, 2001
Apple iPod

Dieter Rams, 1958
pocket transistor radio T3

was it the technology?

Toshiba's 5GB disk (2000)
1.8 inch wide x 5mm thick

apple, IBM and sony's firewire (1995)
1,000 songs in < 10 minutes

the song library concept

some other product-defining concepts

the url concept

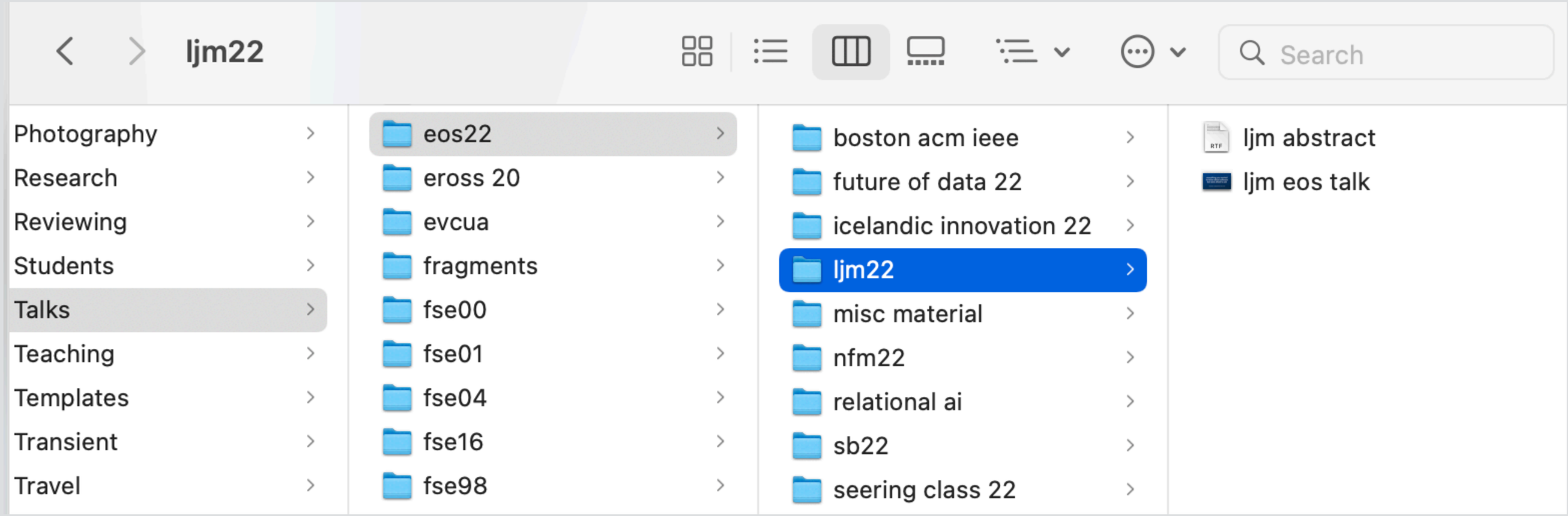
DANIEL JACKSON PHOTOGRAPHY

American Spaces · 2008–2021

Lakeville, Connecticut

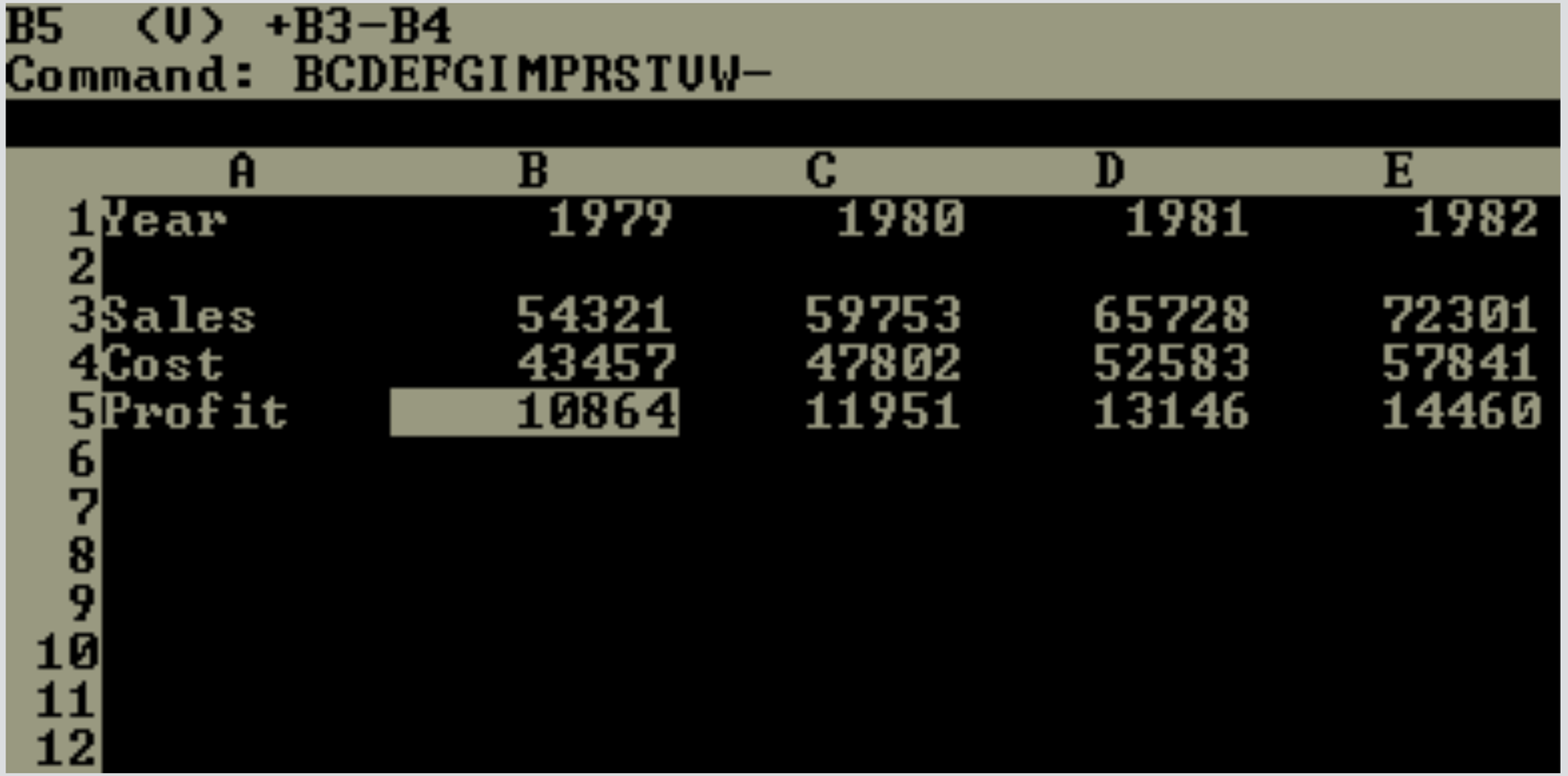
https://dnj.photo/projects/spaces/#image/5

the folder concept



invented as part of Multics operating system (1964)

the spreadsheet formula concept



Dan Bricklin's VisiCalc (1979)

the chatroom concept

WhatsApp (2022)

internet relay chat (1988)

part 3:
confusing concepts

twitter confuses a first lady

Andy Ostroy
@AndyOstroy

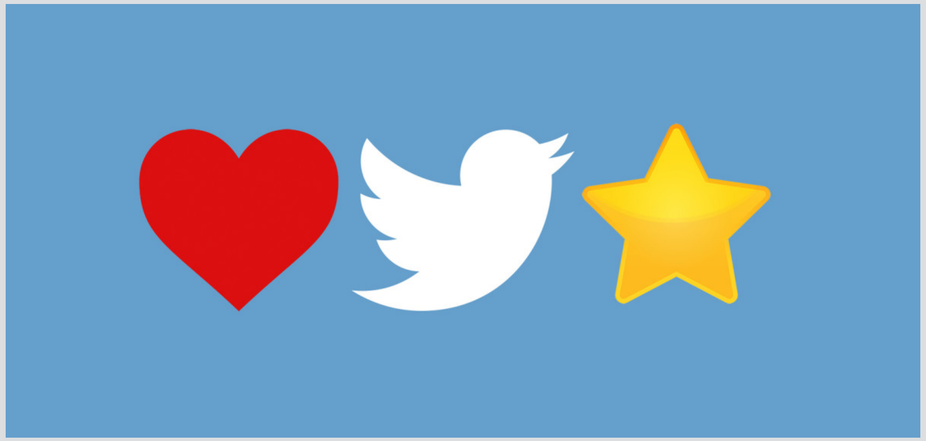
Seems the only #Wall @realDonaldTrump's built is the one between him and @FLOTUS #Melania #trump

8,221 8:15 PM - May 2, 2017

4,022 people are talking about this

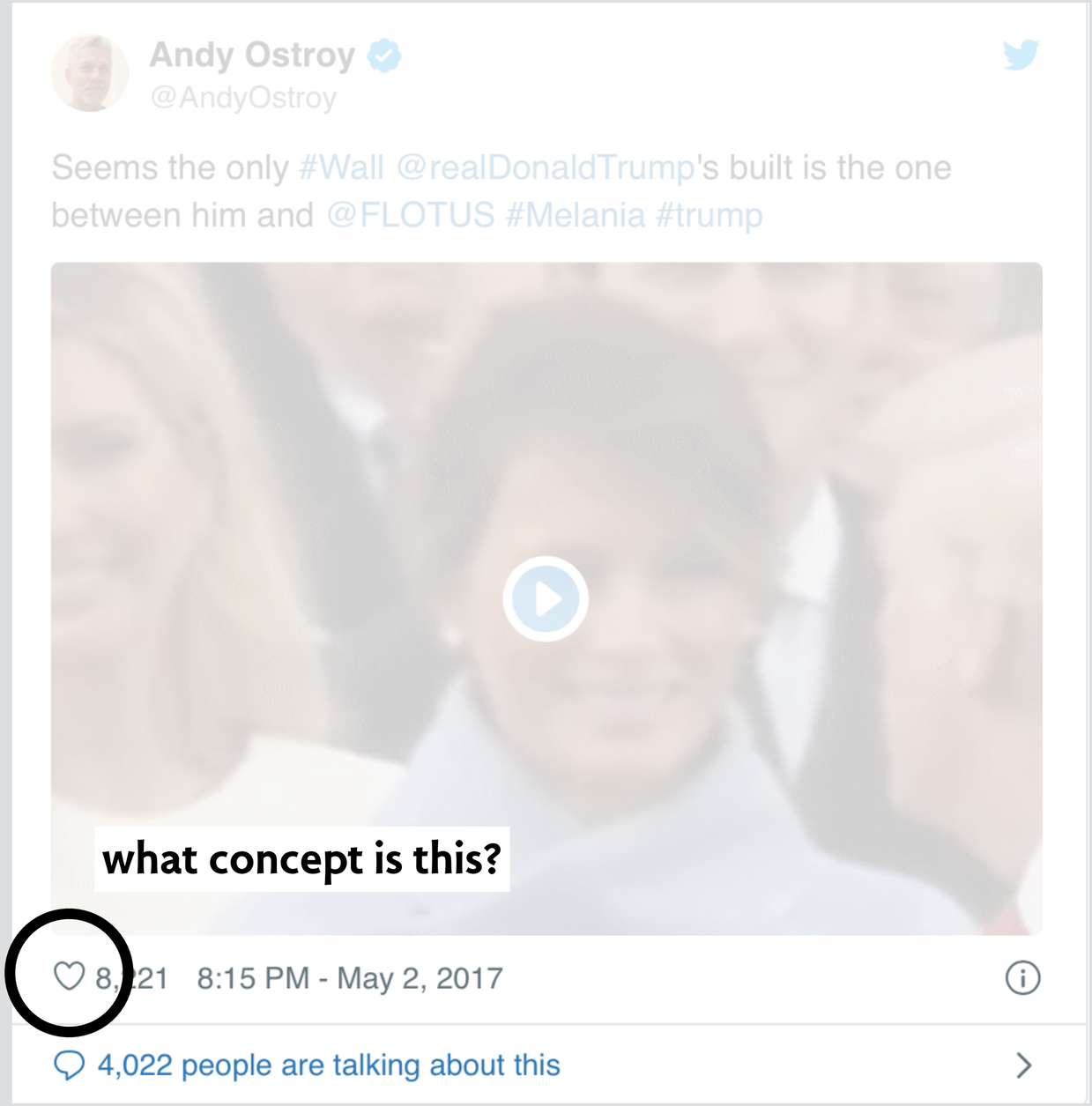
MELANIA TRUMP liked your Tweet

Seems the only #Wall @realDonaldTrump's built is the one between him and @FLOTUS #Melania #trump pic.twitter.com/XiNd2jiLUF



Nov 2, 2015: Twitter changes Favorite (Star) to Like (Heart)

We are changing our star icon for favorites to a heart and we'll be calling them likes... **We know that at times the star could be confusing, especially to newcomers**. You might like a lot of things, but not everything can be your favorite. *Twitter press release*



concept Upvote
purpose rank items by popularity

?

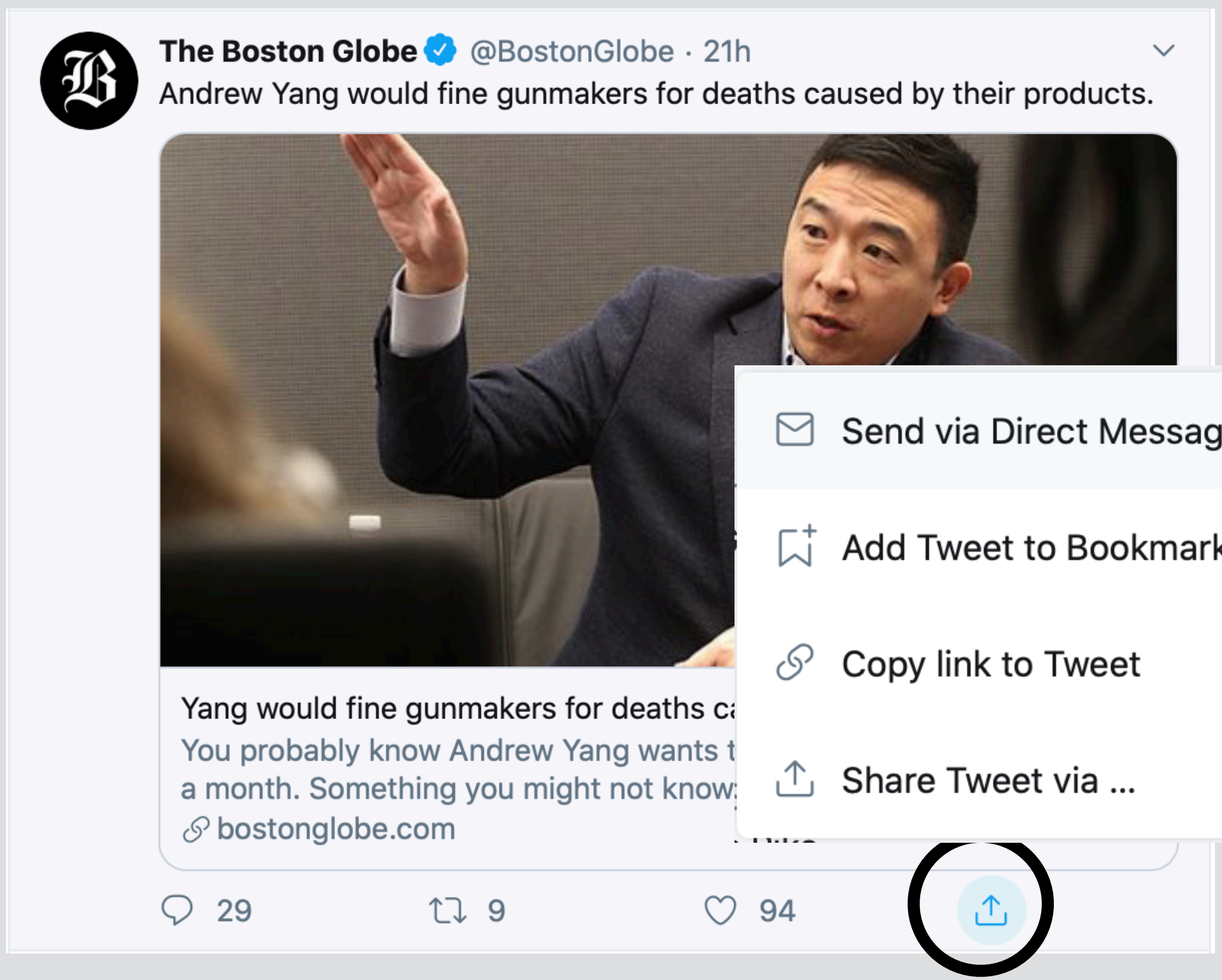
concept Bookmark
purpose save items to revisit

missing concept!

twitter adds a new concept (2018)

concept Upvote

purpose rank items by popularity



concept Bookmark

purpose save items to revisit

concepts
that confuse
(unintentionally)

Quora

Search

Dropbox: Edit

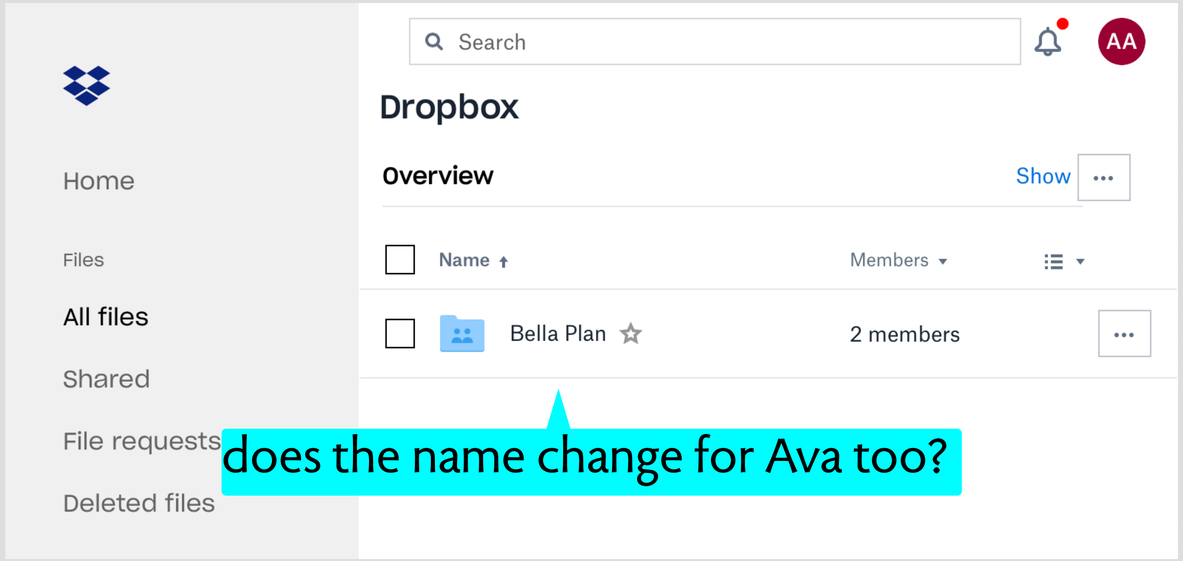
Someone accidentally deleted thousands of files in my company Dropbox: how can I quickly undelete them? Edit

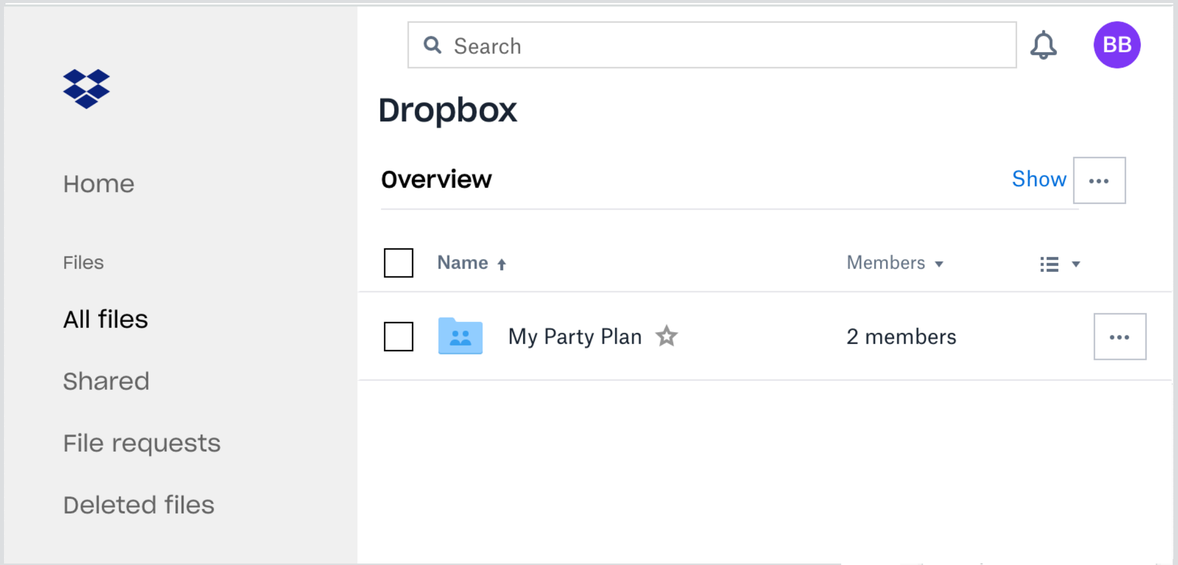
Add Question Details

Comment · Share · Report · Options

Ava is a party planner

Bella is having a party

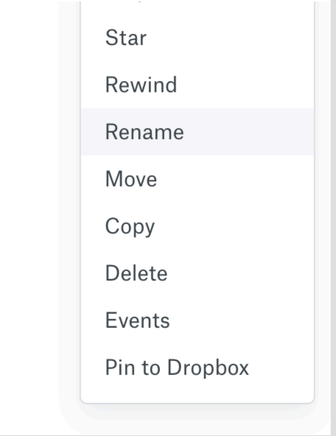




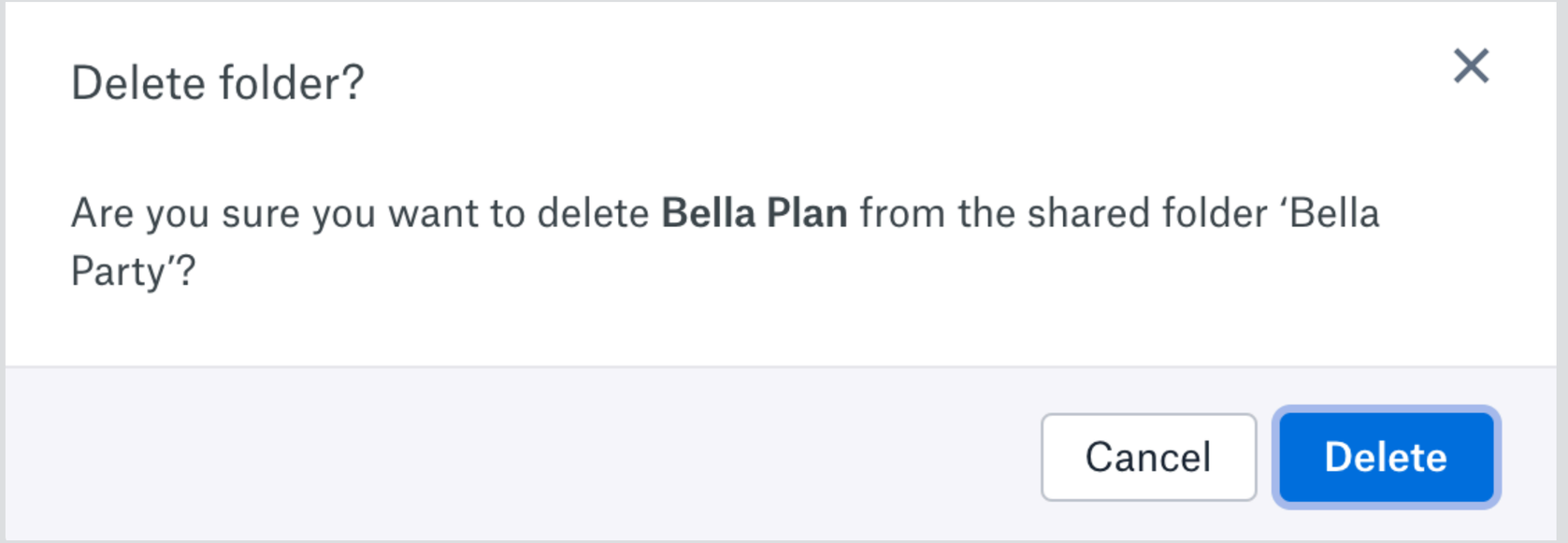
answer: it depends

if Ava just shares Bella Plan with Bella
and Bella renamed the folder, Ava sees no change

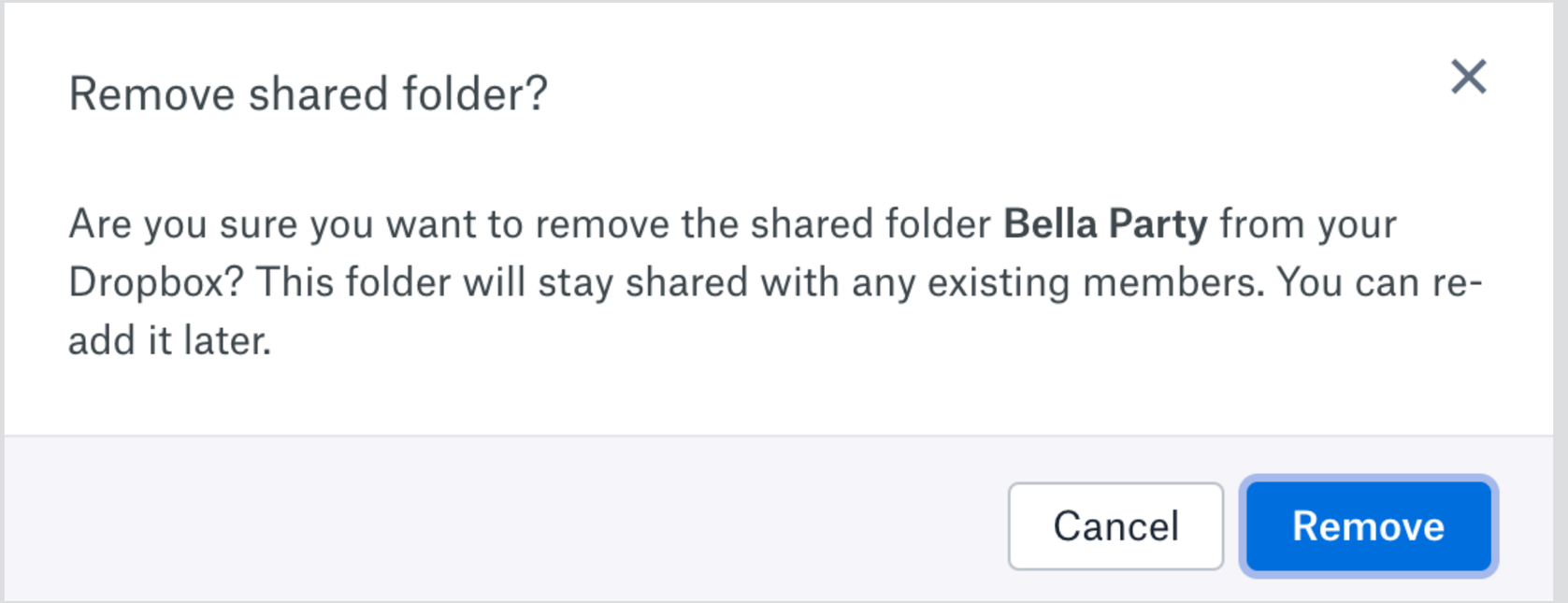
if Ava shared a folder containing Bella Plan
then Ava <u>does</u> see the change



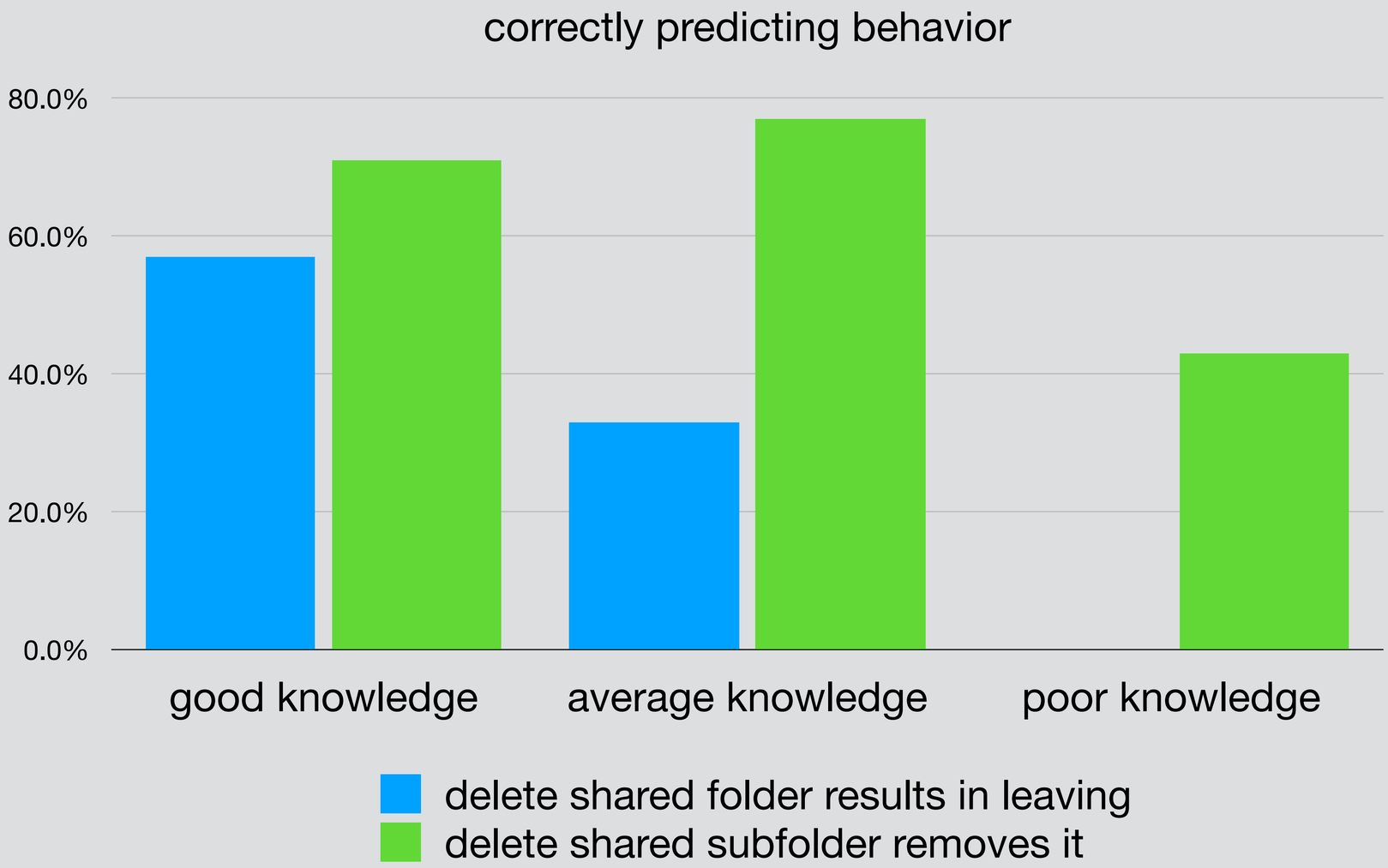
Bella deletes Bella Plan from shared folder Bella Party



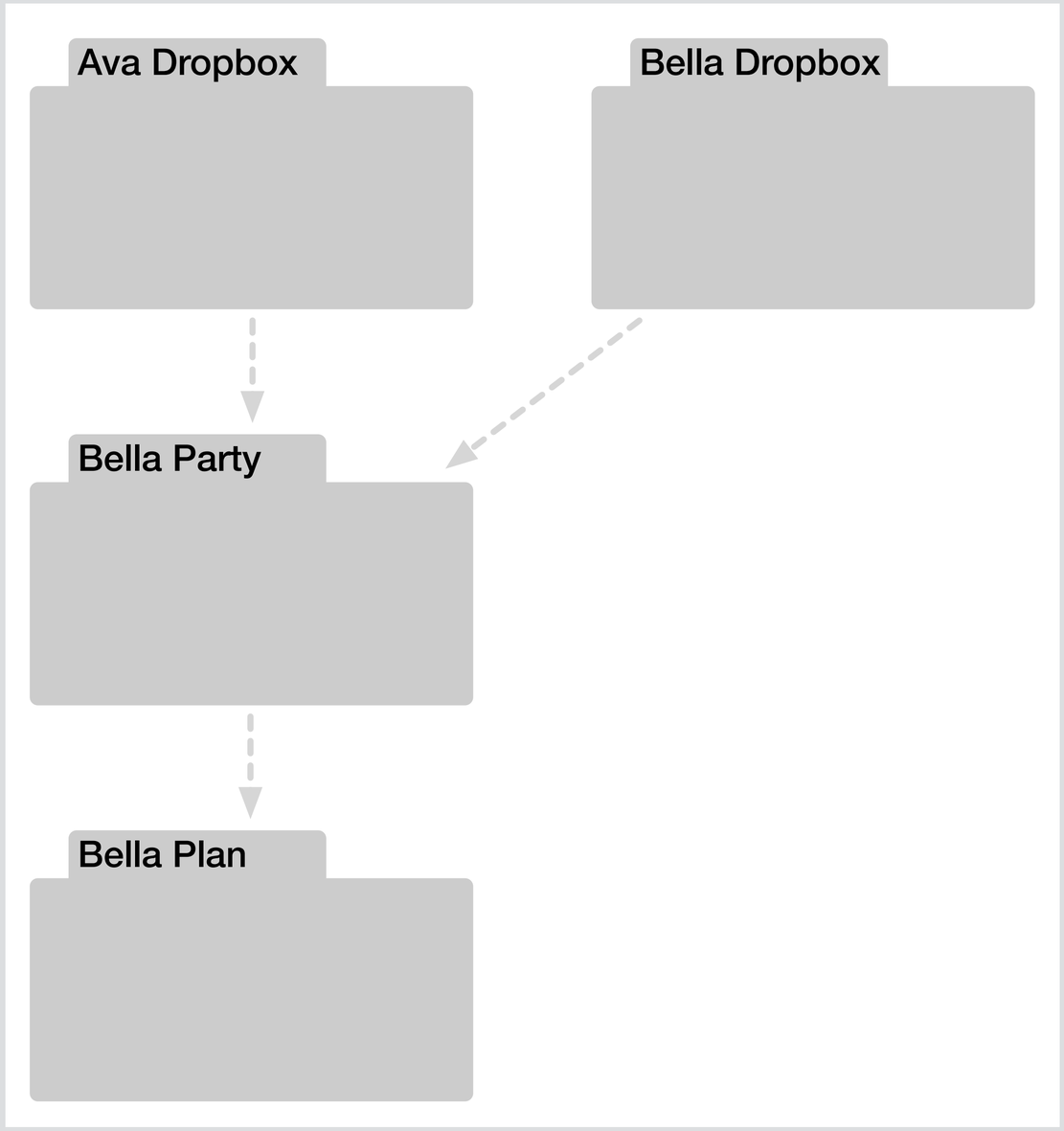
Bella deletes shared folder Bella Party



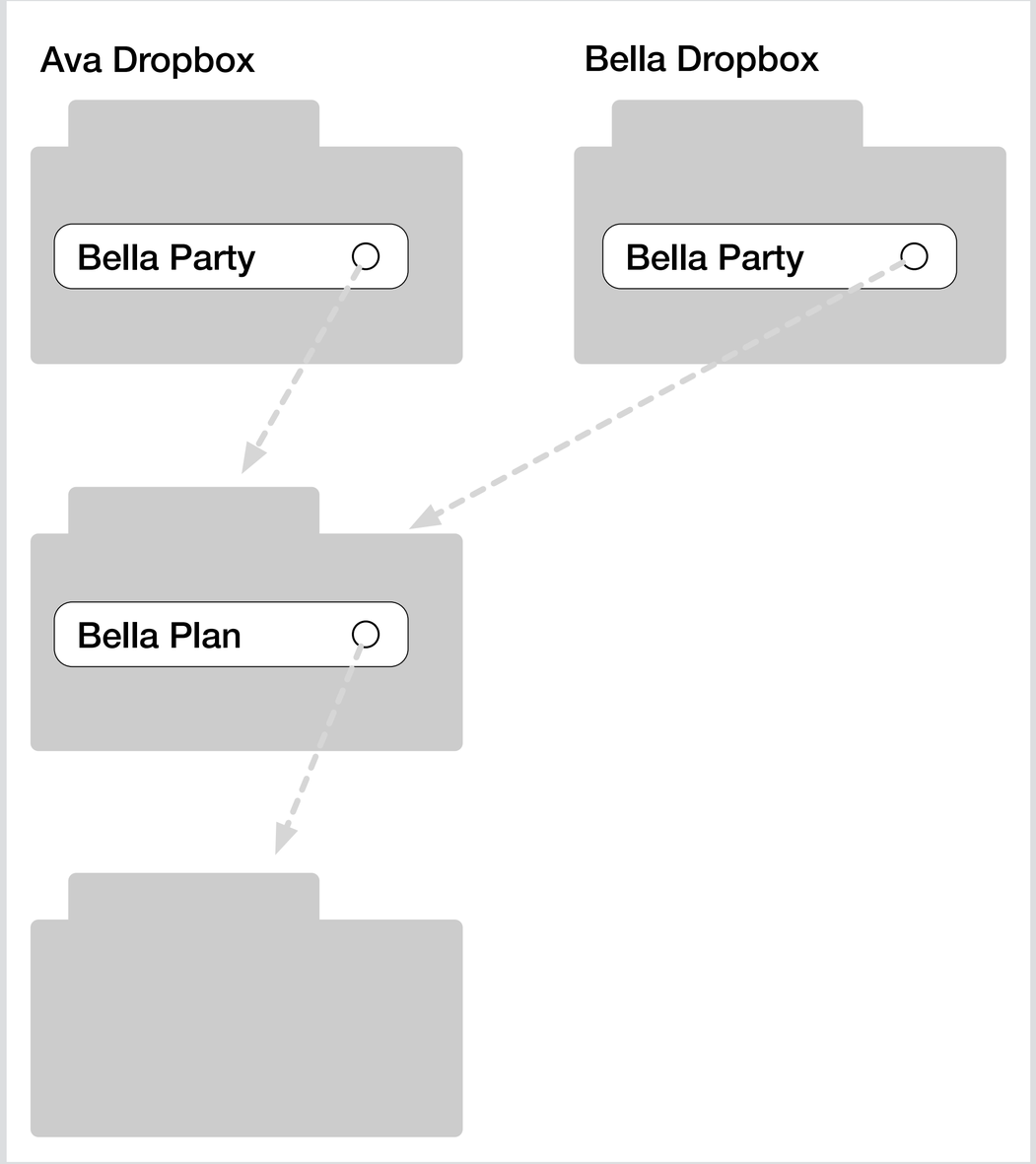
survey of dropbox users (MIT CS undergrads)



Kelly Zhang



how many users believe the folder concept works



how folders actually work (in Dropbox, Unix, Multics)

concepts
that obfuscate
(intentionally)

a dark UI pattern: sneak into basket

ZSL London Zoo Guide Book

ADD TO BASKET +

SUPPORT WILDLIFE WITH A 10% DONATION

Did you know ZSL is a wildlife conservation charity?

As a nonprofit organisation, we kindly ask you include a **10% donation** in the price of your ticket to help us continue our vital conservation work around the world.

Including this small amount and selecting the Gift Aid option at the checkout means we can treat your whole ticket purchase as a donation and claim an extra 25p for every £1 spent - at **no extra cost** to you or us.

ADD TO BASKET *without donation*

ADD TO BASKET ***with donation***

If you are not a UK tax payer your donation will still help ZSL work for wildlife.

Your Basket

Recipient
Yourself

Chosen Date
Saturday 11th March 2017

Tickets
2 × Adult (£24.30) Edit

Discount code

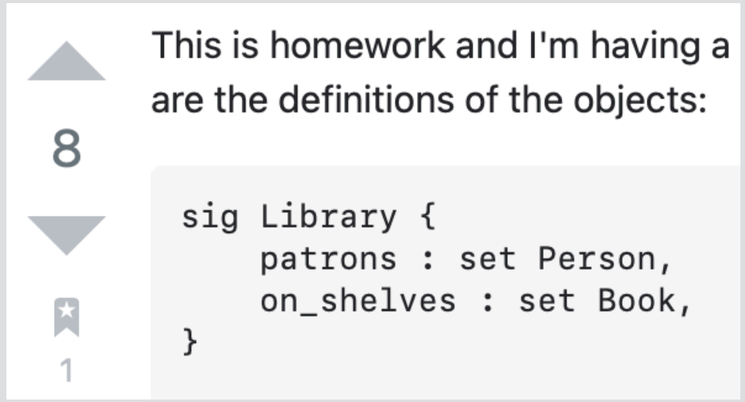
ACTIVATE

To pay today: £48.60

thumbs up, but 3 distinct concepts

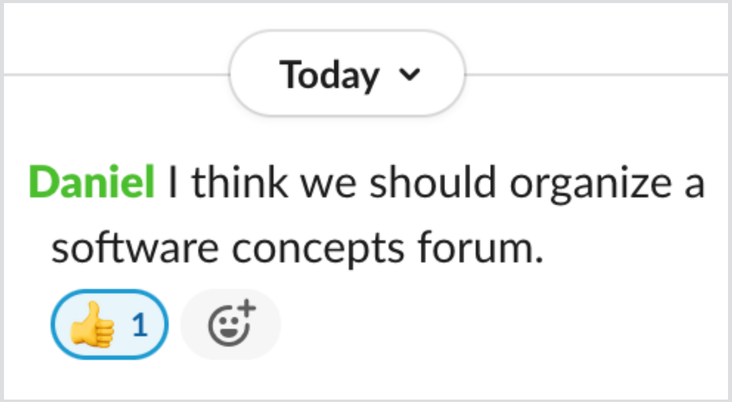
concept Upvote

purpose rank items by popularity



concept Reaction

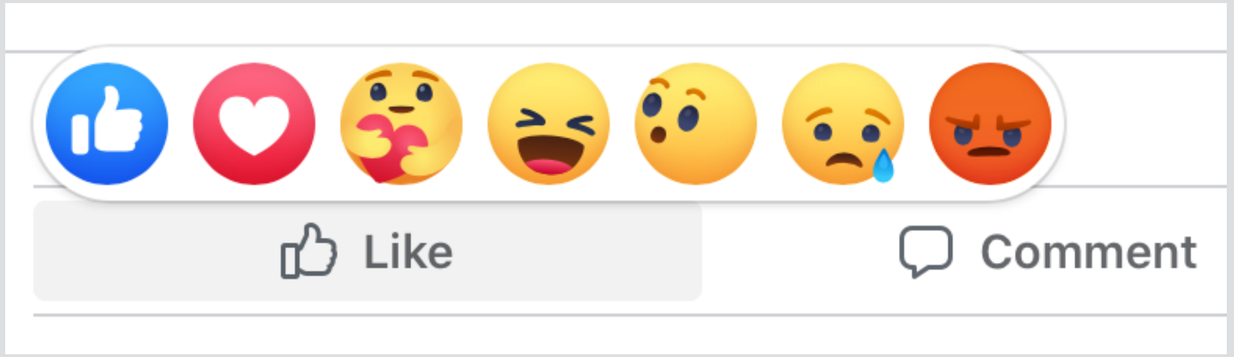
purpose send reactions to author



concept Recommendation

purpose use prior likes to recommend

what is a facebook like?



3 concepts in one!
Reaction (send emoticon to poster)
Upvote (show this post more)
Recommendation (show me more like this)

five dark concepts of surveillance capitalism

upvote

promotes popular content

damages self esteem of teens

profile

infers personal tastes

big pharma advertises to sick people

notification

tells you when new content

endless engagement & interruption

Facebook tag

names people in posts

expands visibility unexpectedly

web beacon

tracks visits to websites

Facebook tracks non members too

closing thoughts

summary: three kinds of invention shape our software

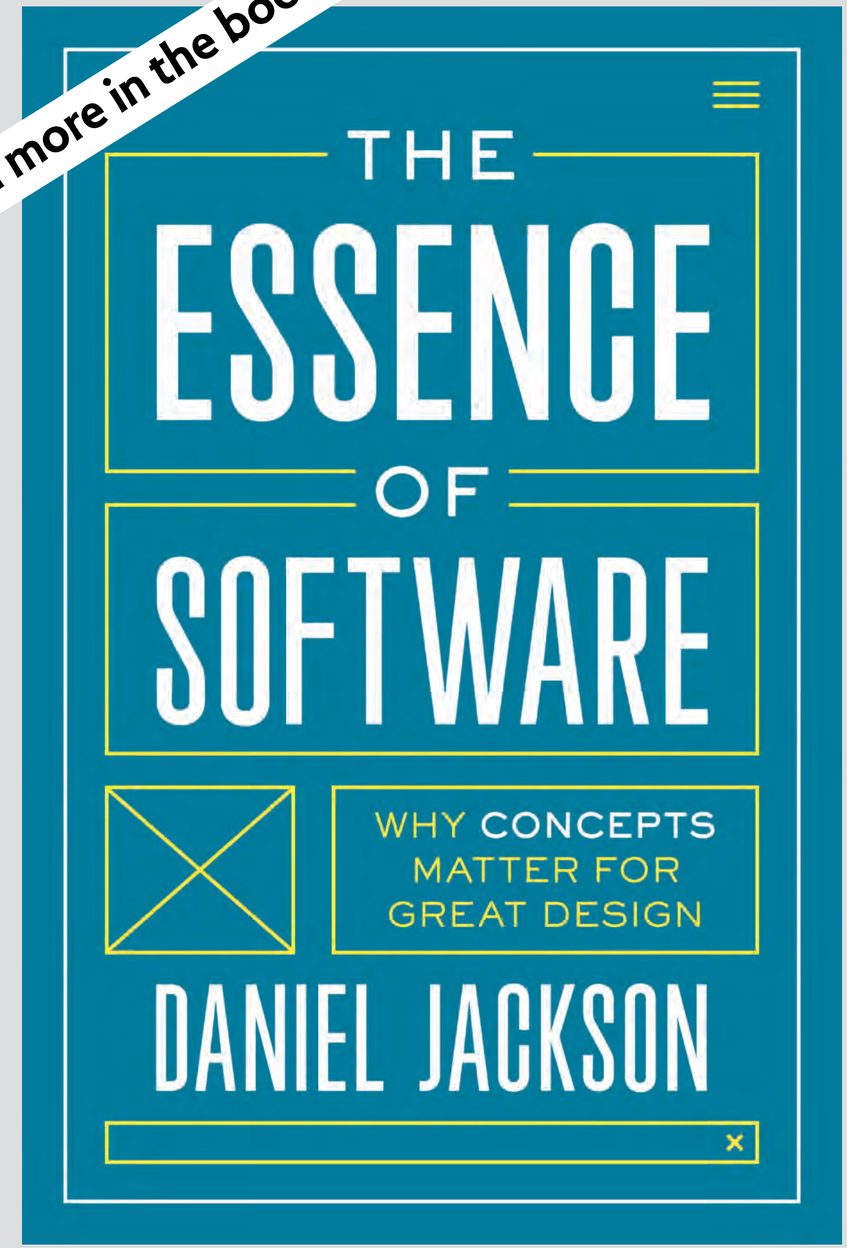
technology

user interfaces

concepts

how we understand our software and whether it's fit for

much more in the book



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