

EECS 4441 Human-Computer Interaction

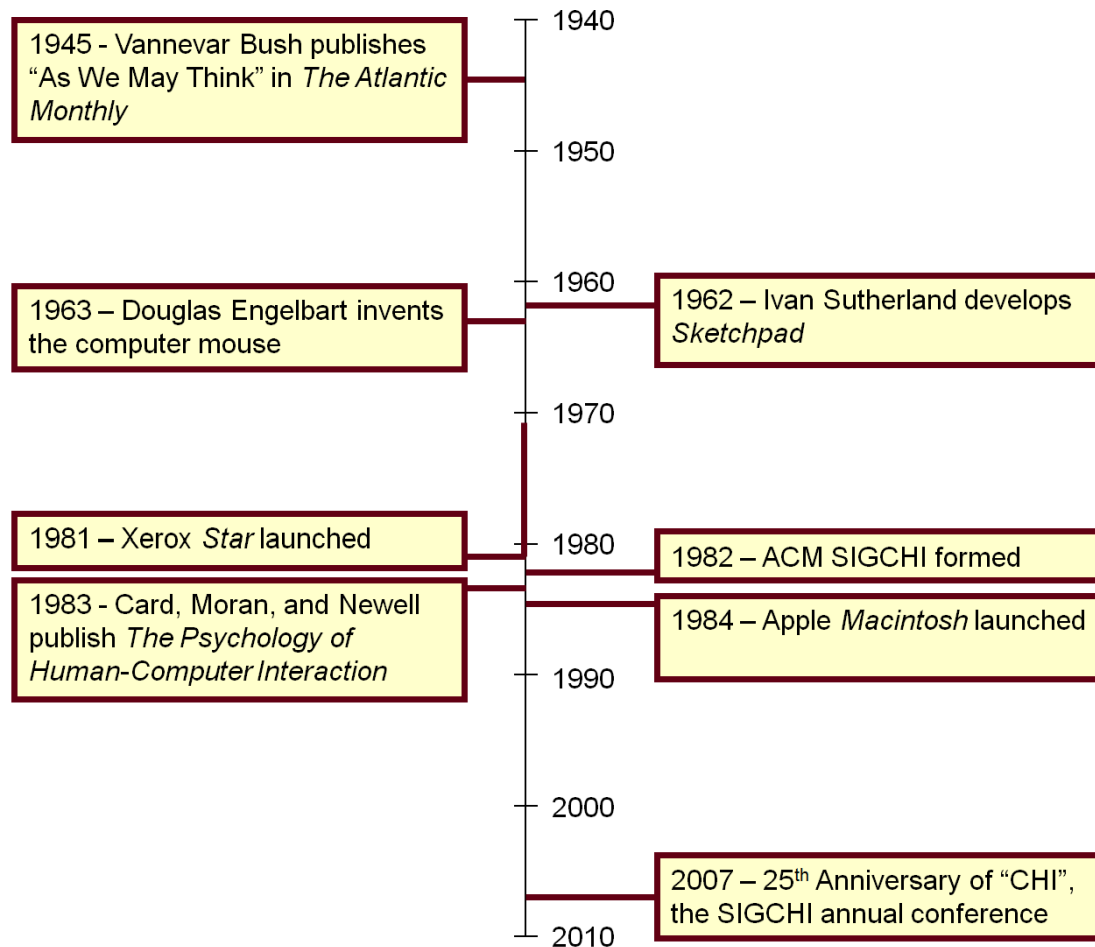
Topic #1: Historical Perspective

I. Scott MacKenzie

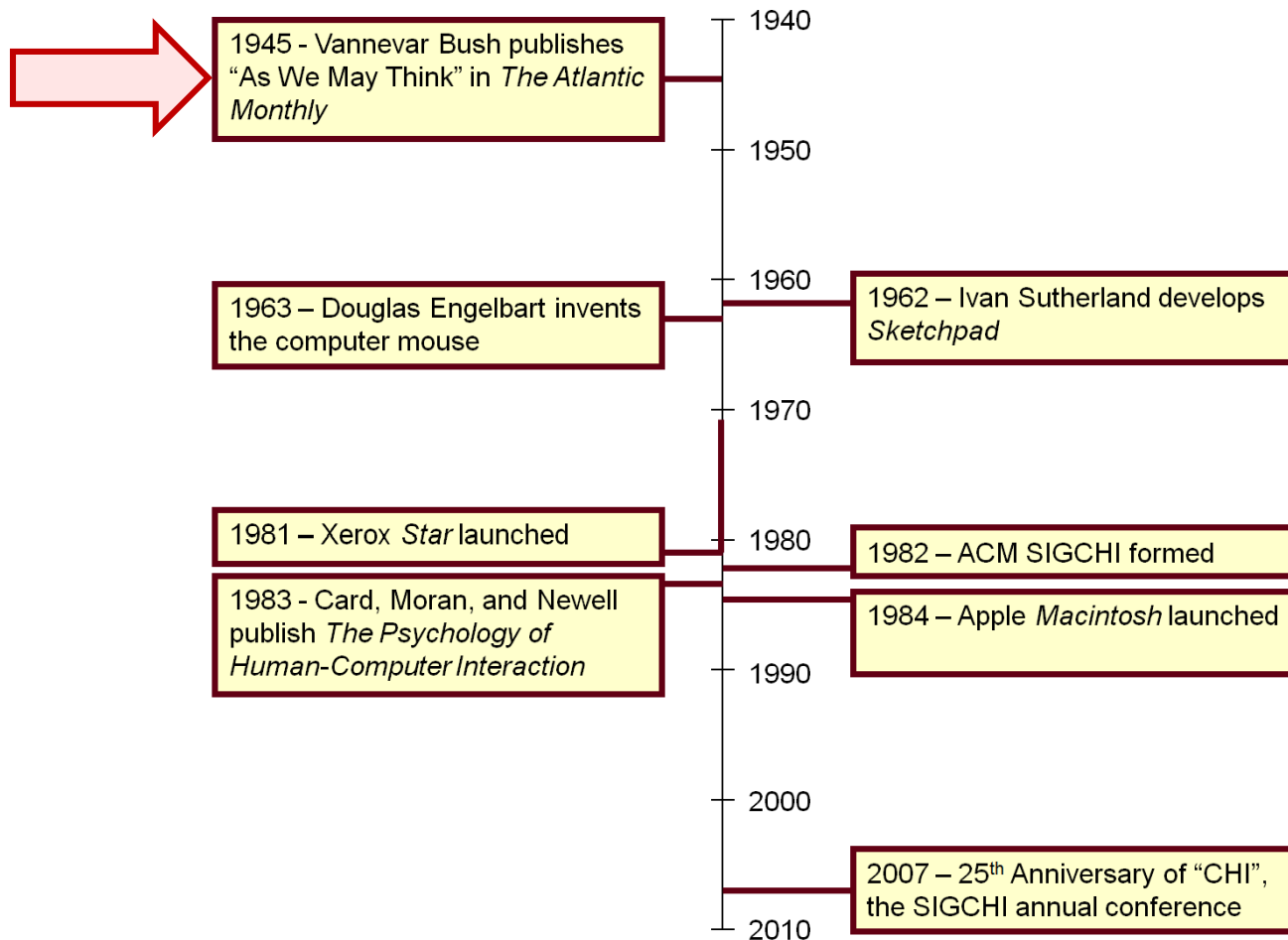
York University, Canada



Significant Event Timeline



Significant Event Timeline




“As We May Think” Vannevar Bush (1945)



Reprinted in...



As we may think

Full Text:  [Pdf](#)

Author: [Vannevar Bush](#) Director of the Office of Scientific Research and Development

Published in:

· Magazine

[interactions](#) [Interactions Homepage](#) [archive](#)

Volume 3 Issue 2, March 1996

Pages 35 - 46

[ACM](#) New York, NY, USA

[table of contents](#) [doi>10.1145/227181.227186](#)



1996 Article

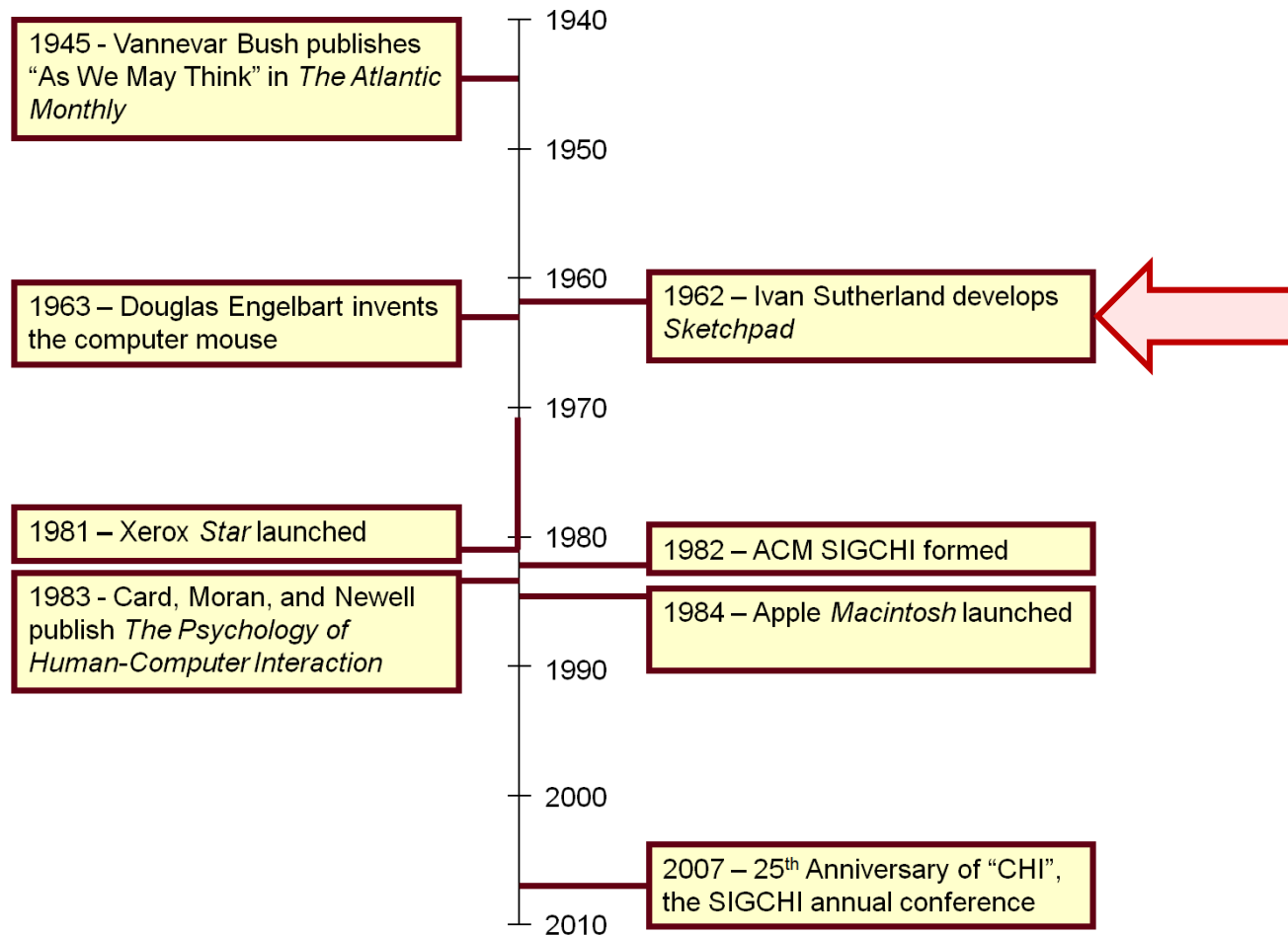


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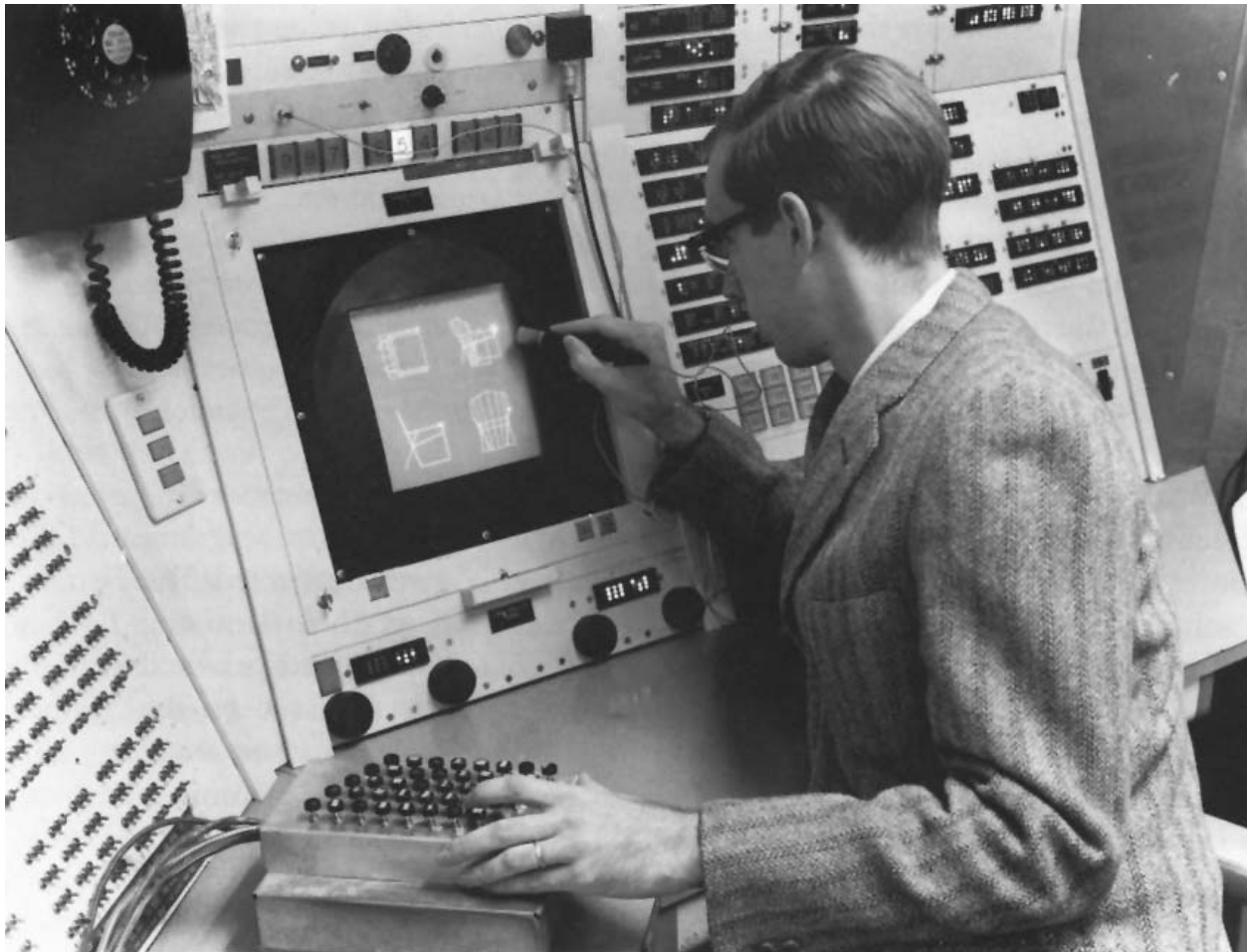
[Link](#)

Significant Event Timeline



Sketchpad

Ivan Sutherland (1962)



Viewable on...



[Part 1](#)

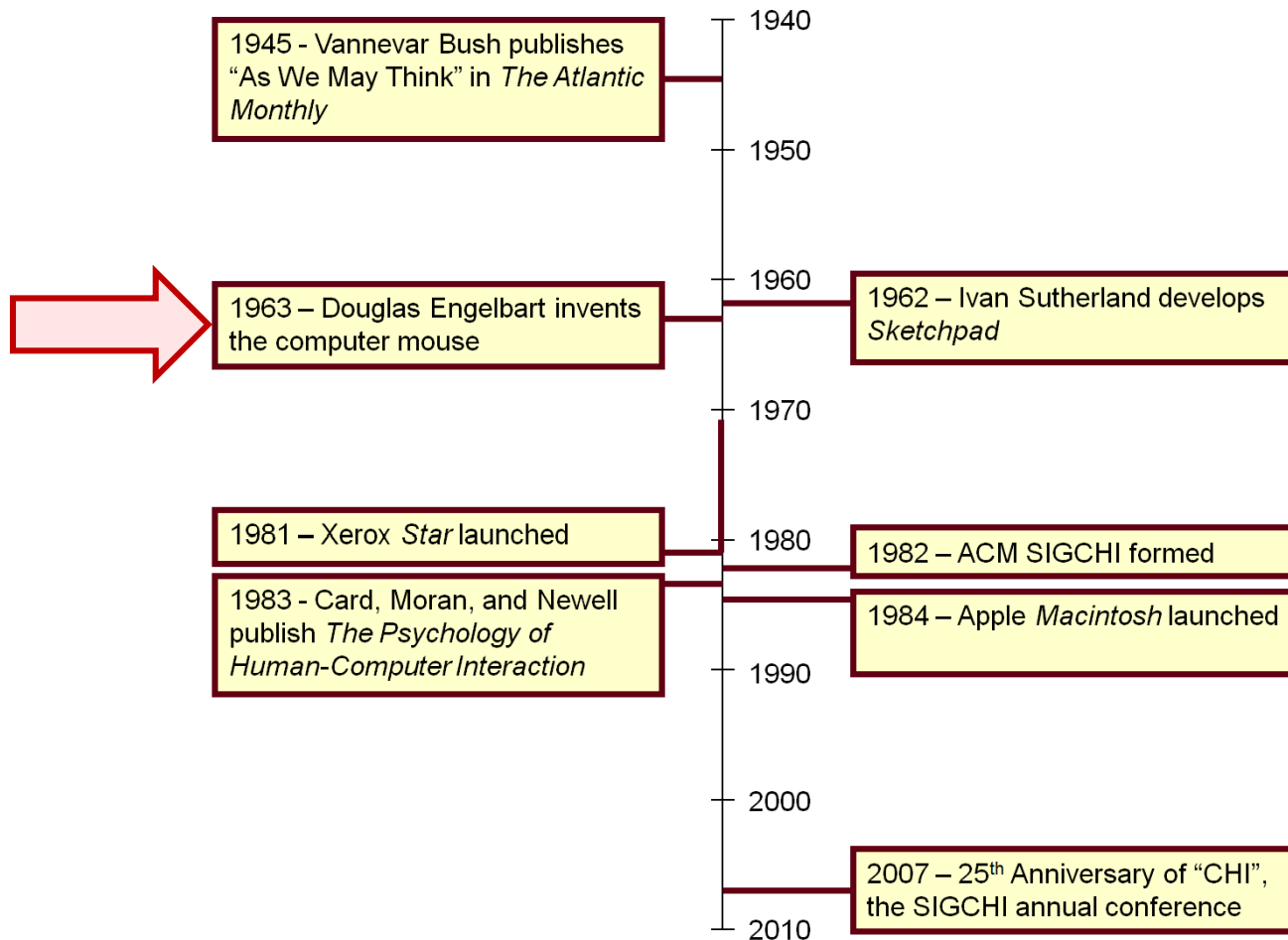
[Part 2](#)

Sketchpad: “Direct Manipulation”

- Direct manipulation features:
 - Visibility of objects
 - Incremental action and rapid feedback
 - Reversibility
 - Exploration
 - Syntactic correctness of all actions
 - Replacing language with action
- Term coined by Ben Shneiderman¹

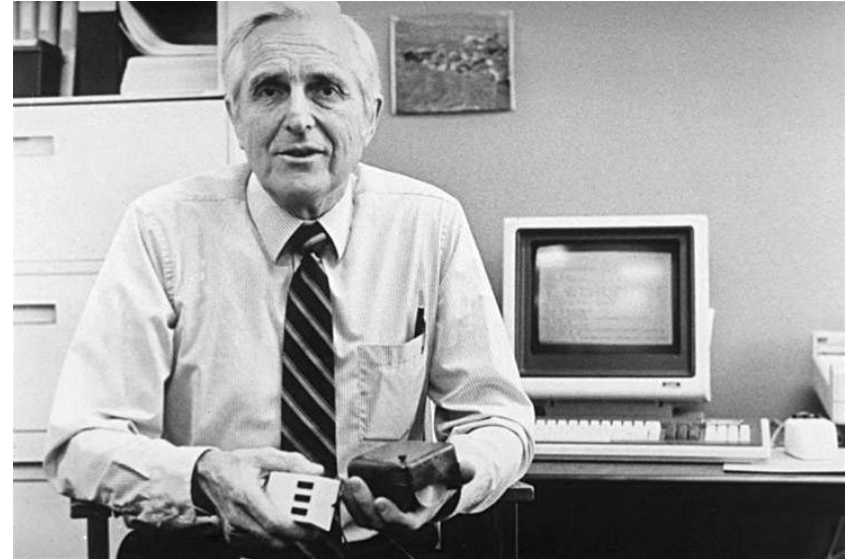
¹ Shneiderman, B., Direct manipulation: A step beyond programming languages, in *IEEE Computer*, 1983, August, 57-69.

Significant Event Timeline



Invention of the Mouse

Doug Engelbart (1963)



[Link 1](#)

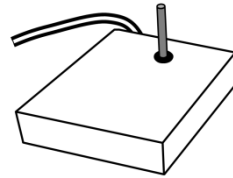
[Link 2](#)

HCI's First User Study¹

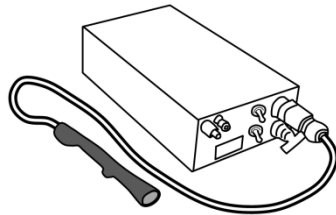
A comparative evaluation of...



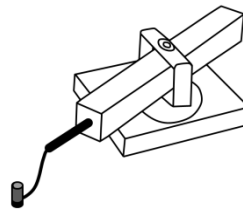
Mouse



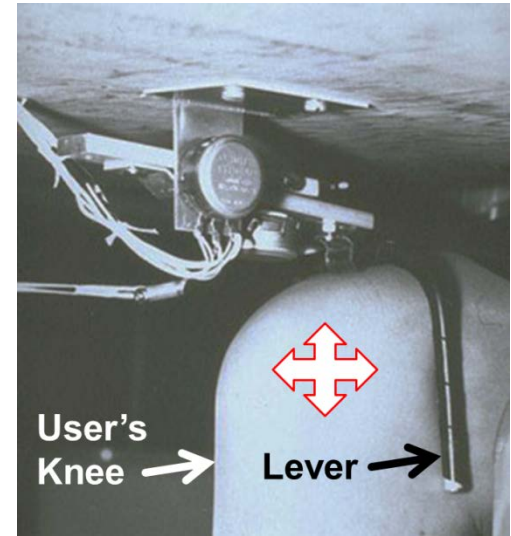
Joystick



Lightpen



Grafacon



Knee-controlled lever

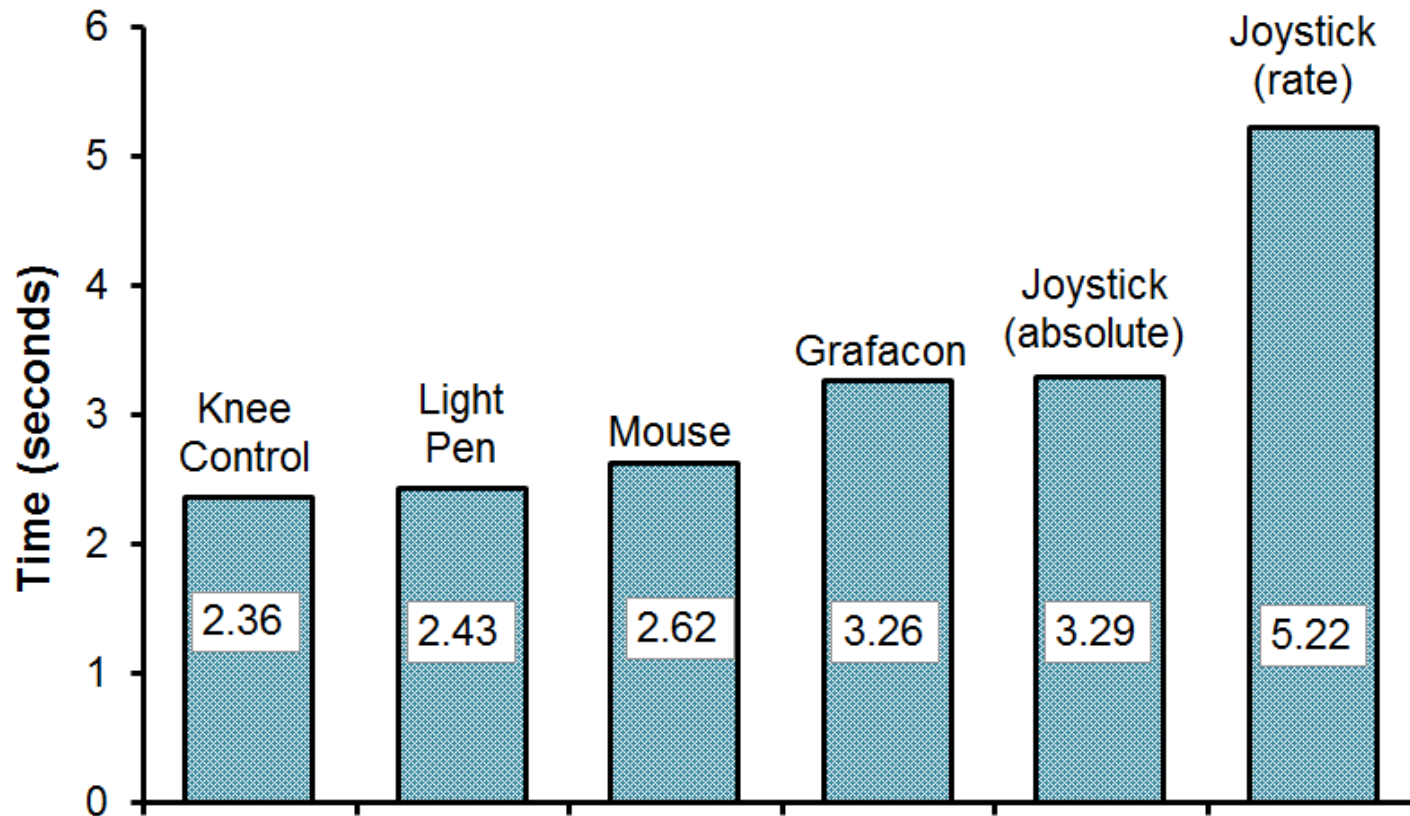
[Link](#)

¹ English, W. K., Engelbart, D. C., & Berman, M. L. (1967). Display selection techniques for text manipulation. *IEEE Transactions on Human Factors in Electronics*, HFE-8(1), 5-15.

Experiment Design

- Participants: 13
- Independent variable
 - “Input method” with six levels: mouse, light pen, Grafacon, joystick (position-control), joystick (rate-control), knee-controlled lever
- Dependent variables
 - Task completion time, error rate
 - (Note: task completion time = access time + motion time)
- Within-subjects, counterbalanced
- Task:
 - Press spacebar, acquire device, position cursor on target, select target

Results (1)

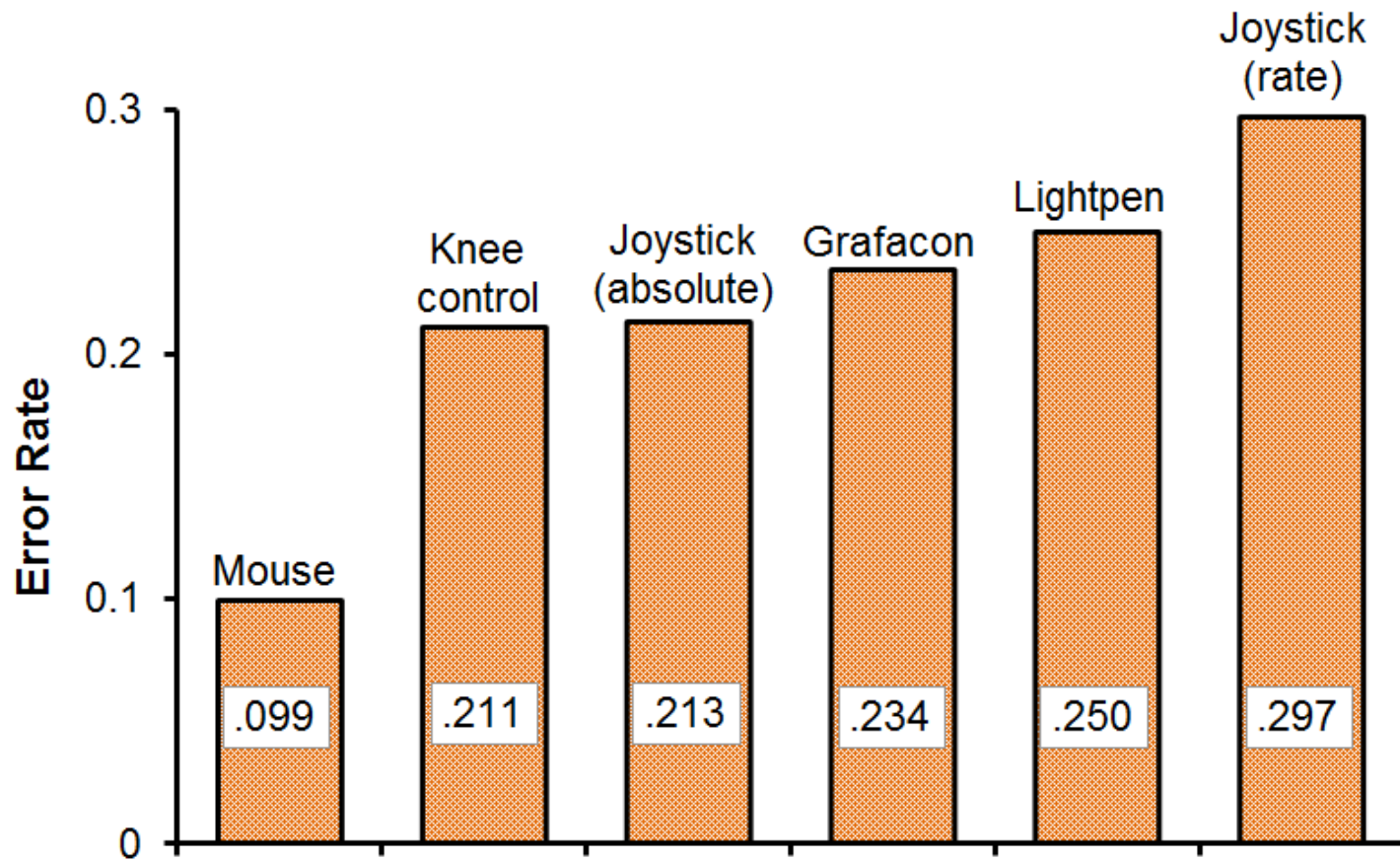


Notes:

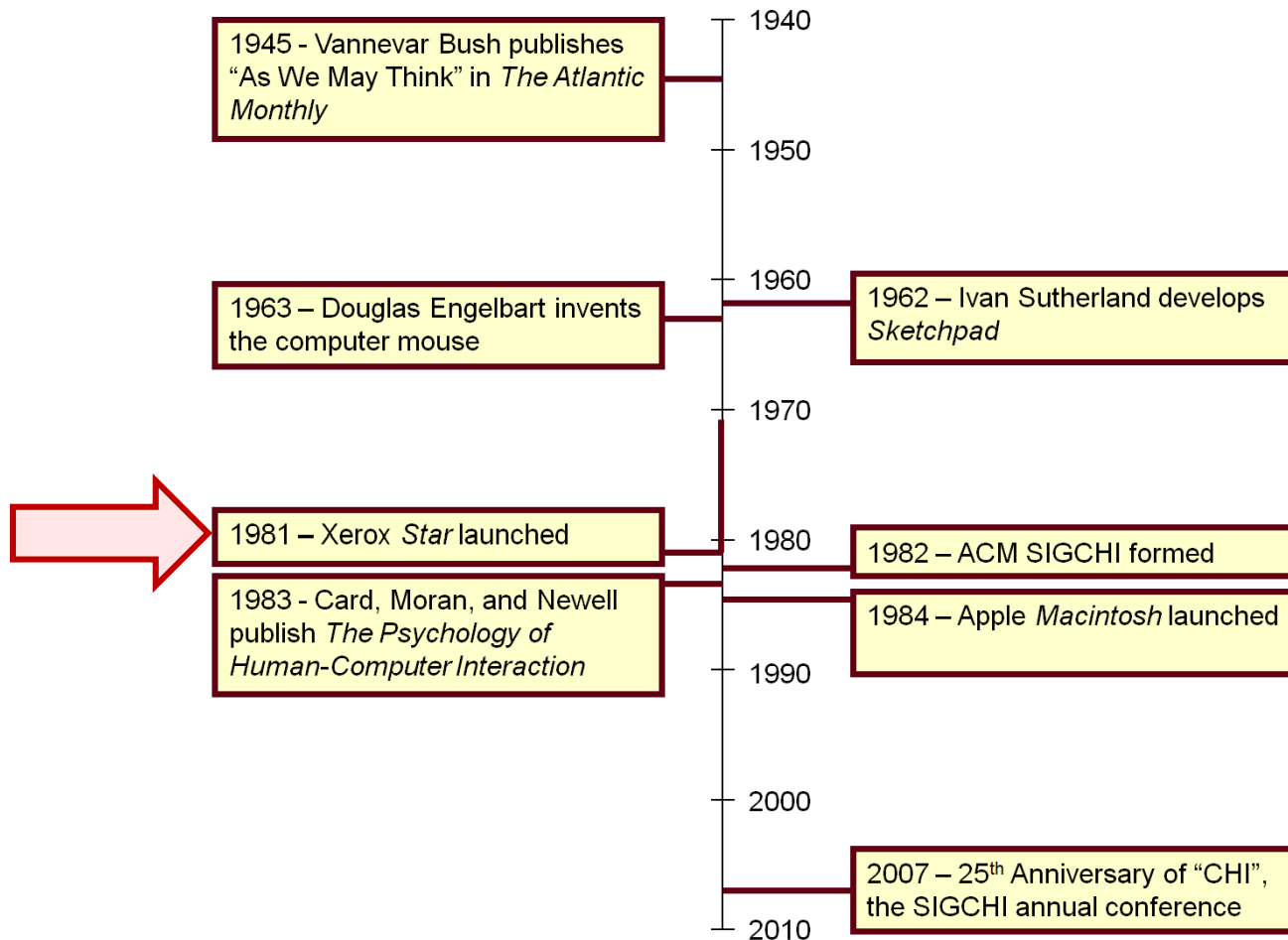
¹ Access time with the knee-controlled lever was zero (since the device is always “acquired”).

² Light pen use is fatiguing, since the user’s arm is held in the air in front of the display.

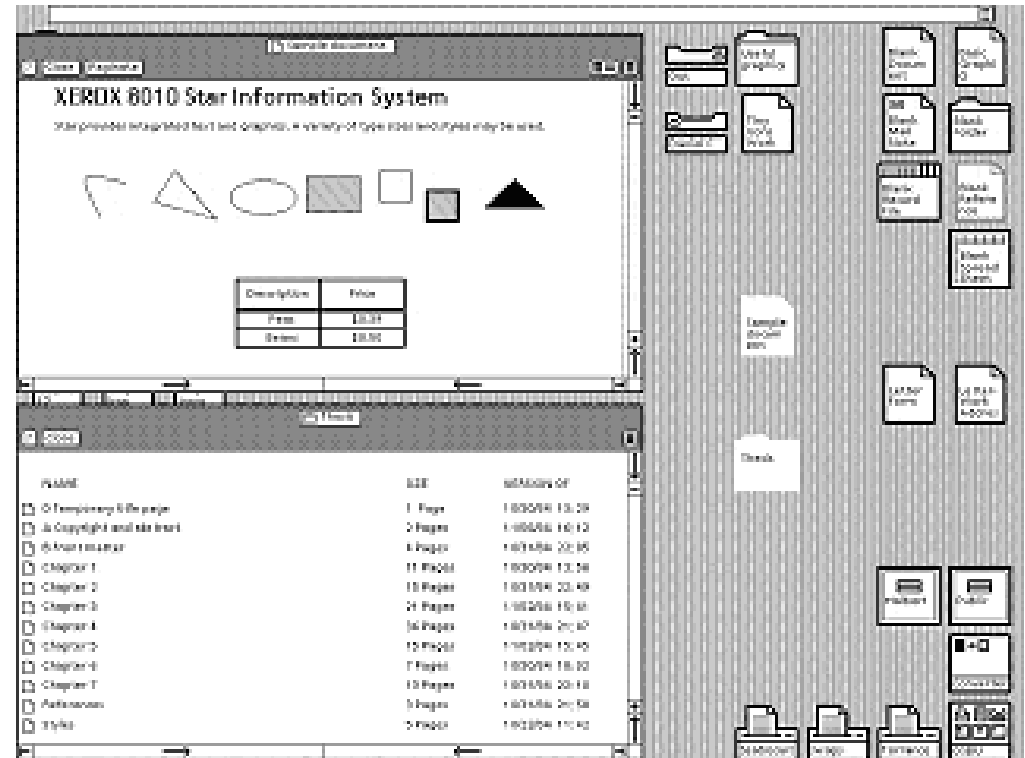
Results (2)



Significant Event Timeline

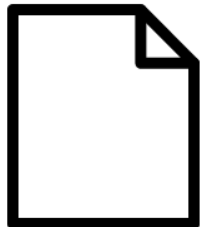


Xerox Star (1981)

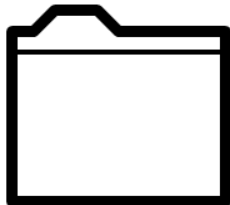


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[-] Copyright and disclaimer	2 Pages	1:000006 14:12
[-] About starstar	4 Pages	1:001404 20:05
[-] Chapter 1	11 Pages	1:000004 13:29
[-] Chapter 2	10 Pages	1:001404 20:05
[-] Chapter 3	21 Pages	1:002406 15:00
[-] Chapter 4	10 Pages	1:001404 20:05
[-] Chapter 5	10 Pages	1:002406 15:00
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[-] Style	5 Pages	1:002406 15:00

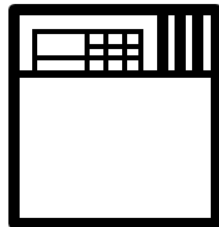
Star GUI Icons



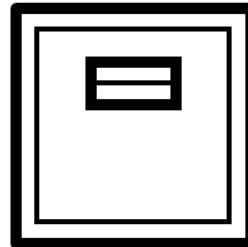
Document



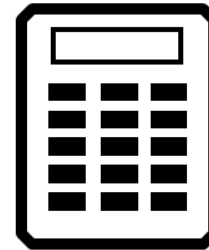
Folder



Record File



File Drawer

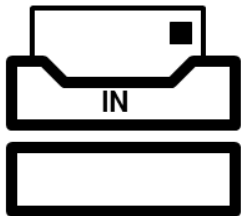


Calculator

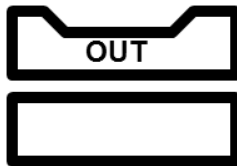


Dialog

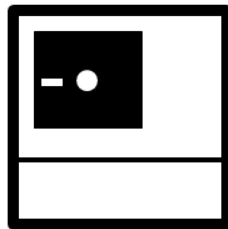
Terminal



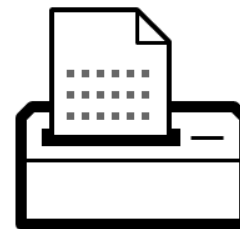
In Tray



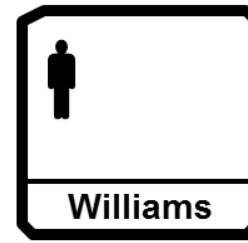
Out Tray



Floppy Disk
Drive

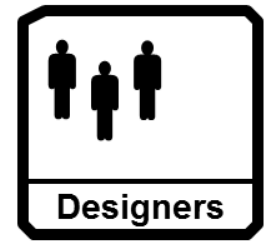


Printer



Williams

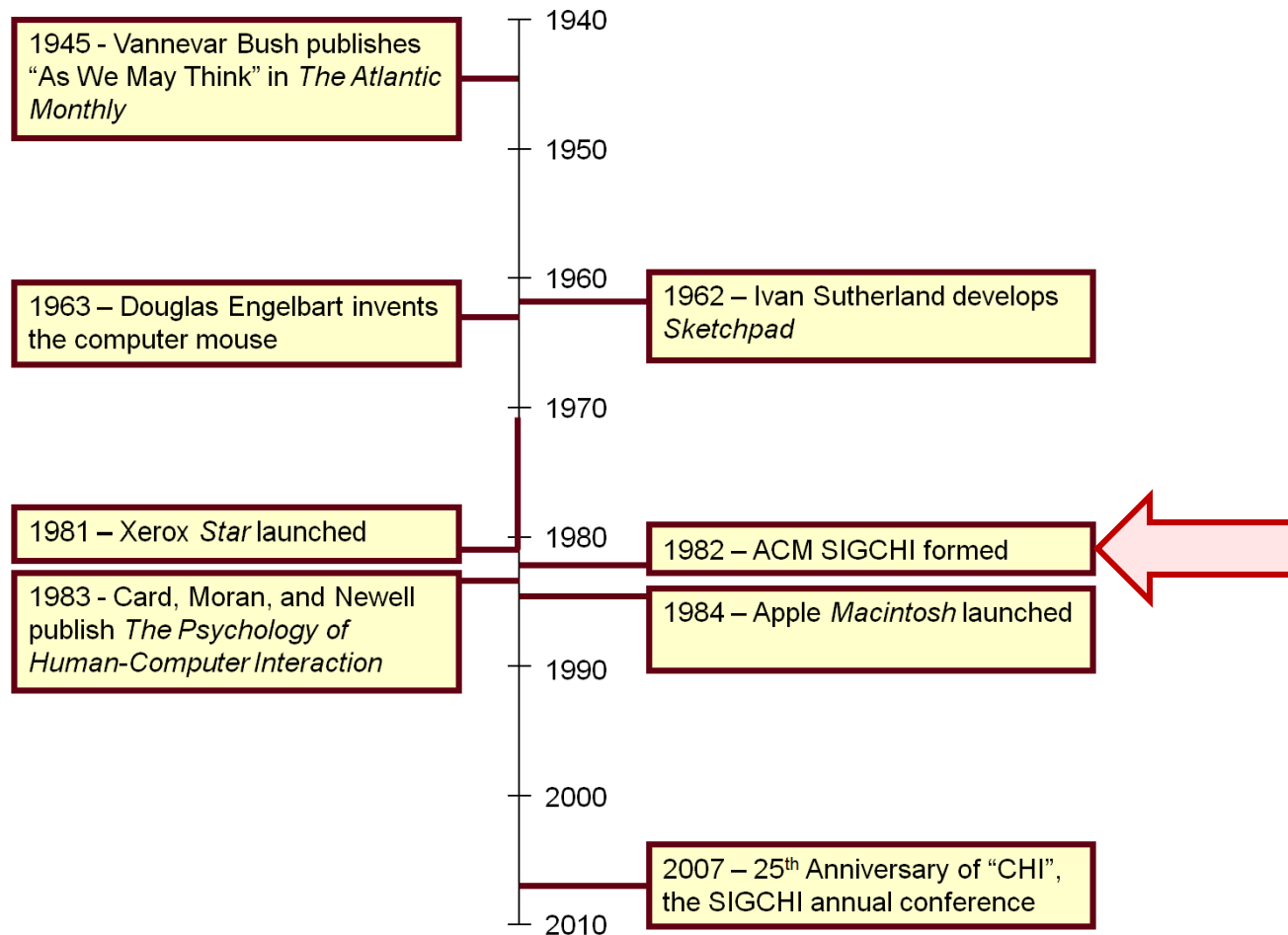
User



Designers

User Group

Significant Event Timeline



Birth of HCI - 1983

- Notable events:

1. First ACM SIGCHI conference (1983)
2. Publication of *The Psychology of Human-Computer Interaction* by Card, Moran, and Newell (1983)
3. Apple *Macintosh* announced via brochures (December, 1983) and launched (January, 1984)

ACM SIGCHI Mission

The ACM Special Interest Group on Computer-Human Interaction is the world's largest association of professionals who work in the research and practice of computer-human interaction. This interdisciplinary group is composed of computer scientists, software engineers, psychologists, interaction designers, graphic designers, sociologists, and anthropologists, just to name some of the domains whose special expertise come to bear in this area. They are brought together by a shared understanding that designing useful and usable technology is an interdisciplinary process, and believe that when done properly it has the power to transform persons' lives.

SIGCHI Web Site

The screenshot shows the SIGCHI website homepage in a browser window. The browser's address bar displays "www.sigchi.org" and the page title is "Welcome — SIGCHI". The website features a large header with the SIGCHI logo (an orange figure with arms raised) and the text "SIGCHI". Below the header is a navigation menu with links for "Home", "Connect", "About SIGCHI", "People", "News", "Resources", "Publications", "Conferences", and "Communities". A secondary menu includes "Local Chapters" and "Chapters".

The main content area is titled "Welcome" and includes the following text:

you are here: [home](#)

Welcome

ACM SIGCHI (Special Interest Group on Computer-Human Interaction) is the premier international society for professionals, academics and students who are interested in human-technology & human-computer interaction (HCI).

To get involved you can [join SIGCHI](#), join one of our [mailing lists](#), become a [volunteer](#), or visit your [local SIGCHI chapter](#). SIGCHI sponsors or co-sponsors [24 different conferences](#). You can freely access more of our conference proceedings for 12 months after each conference from our new [OpenTOC](#): Table of Contents page.

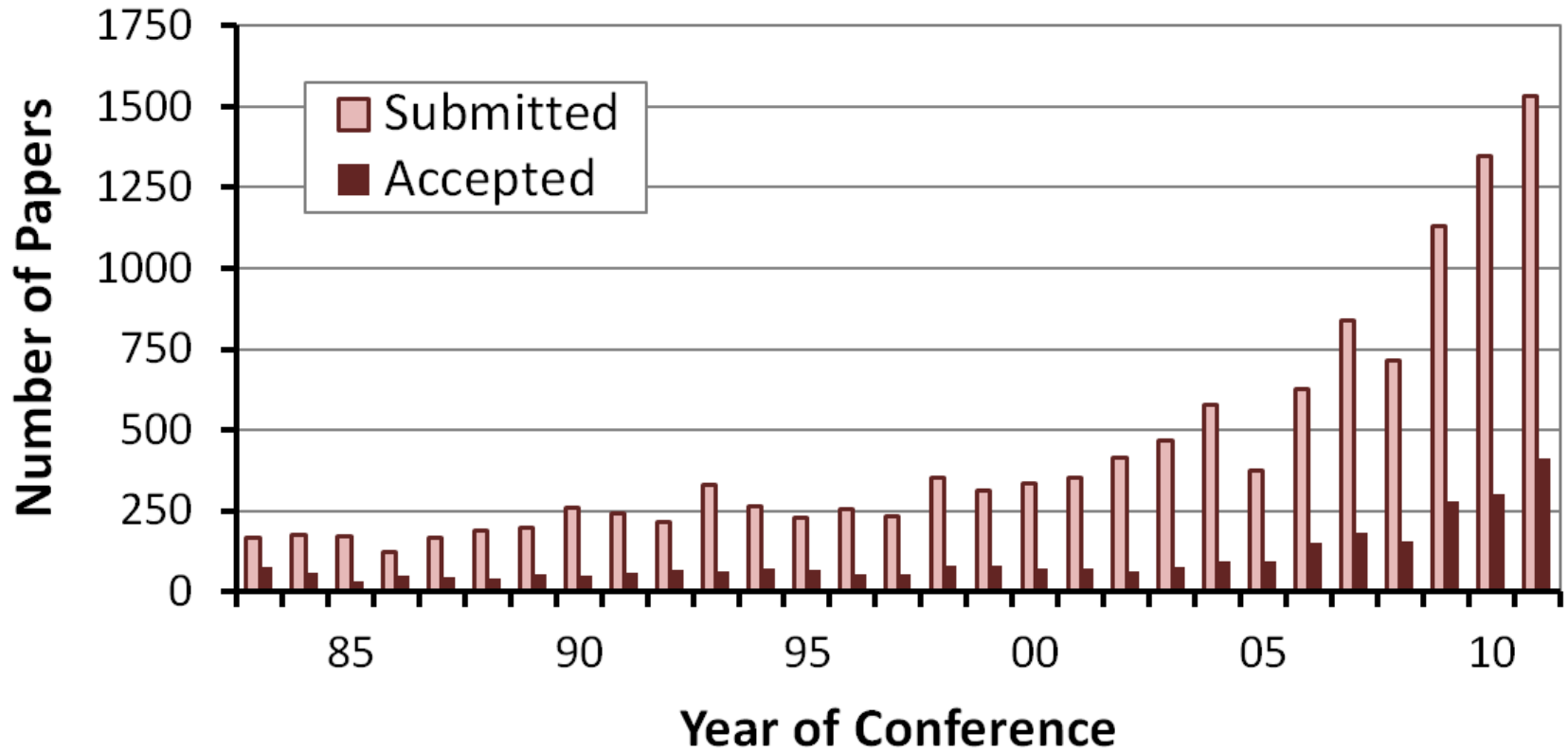
This website includes details of our [publications](#), [communities](#), conferences, [conference dates](#), events, news, [local chapters](#), the [people](#) of SIGCHI along with our [Student Travel Grant](#), [Specialized Conferences Development Fund](#) and [Gary Marsden Student Development Fund](#).

On the right side of the page, there are several promotional banners for upcoming conferences: "CHI 2017" (with the tagline "EXPLORE. INNOVATE. INSPIRE."), "CSCW 2017", "ACM CREATIVITY AND COGNITION 2017" (with the tagline "LIFE-LONG CREATIVITY, LEARNING, AND INNOVATION"), "tvX 2017", and "iui 2017".

At the bottom right, there is a "Send this" button and a vertical scrollbar.

[Link](#)

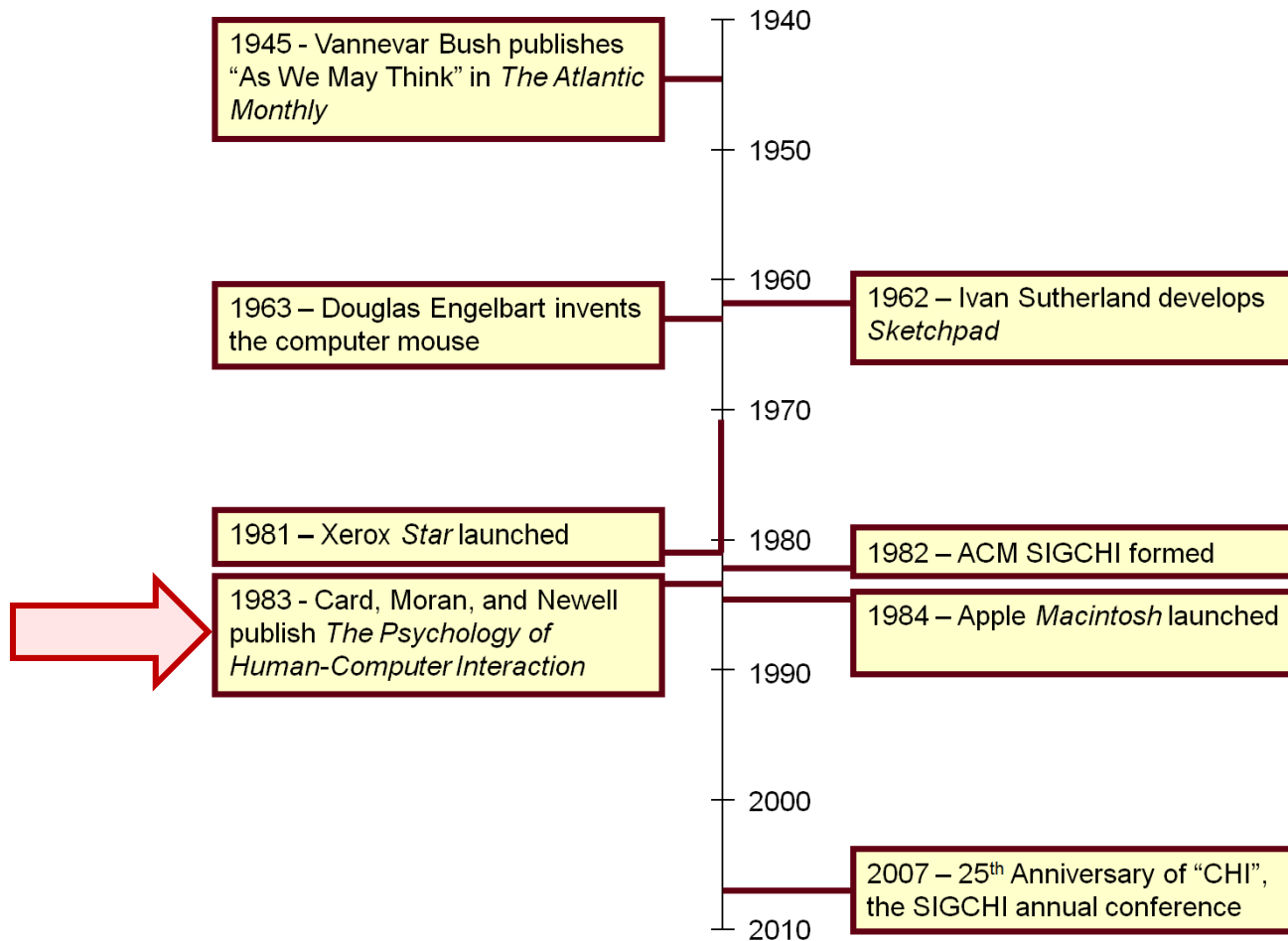
SIGCHI Conference Publications



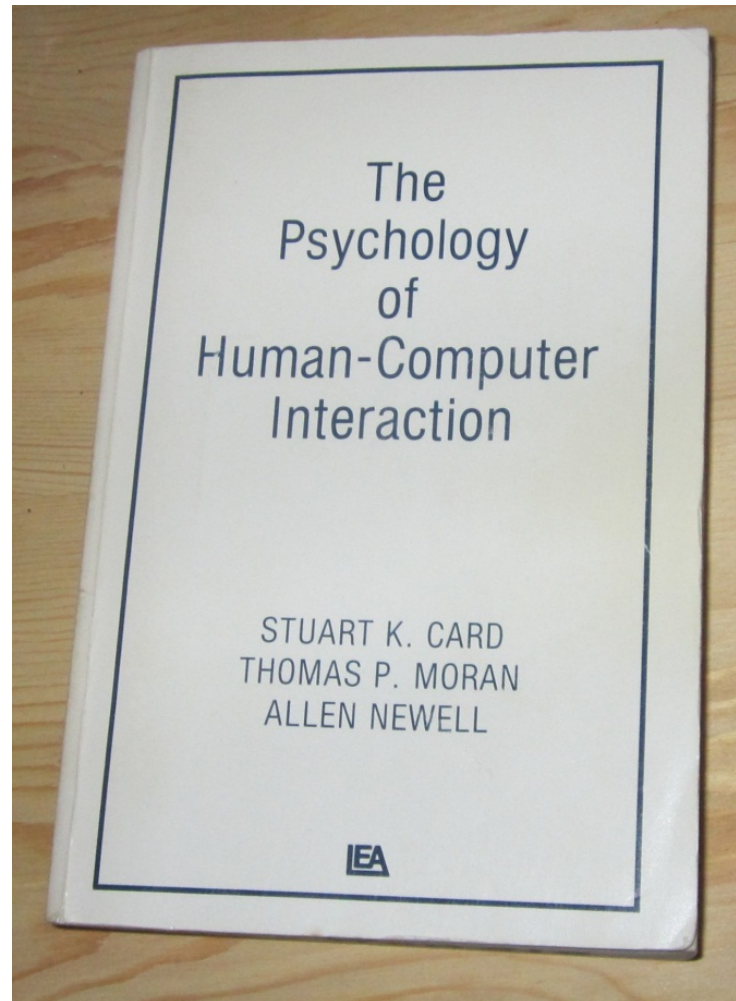
[Updated statistics here](#)

CHI 2017: 2424 submissions, ~25% acceptance rate

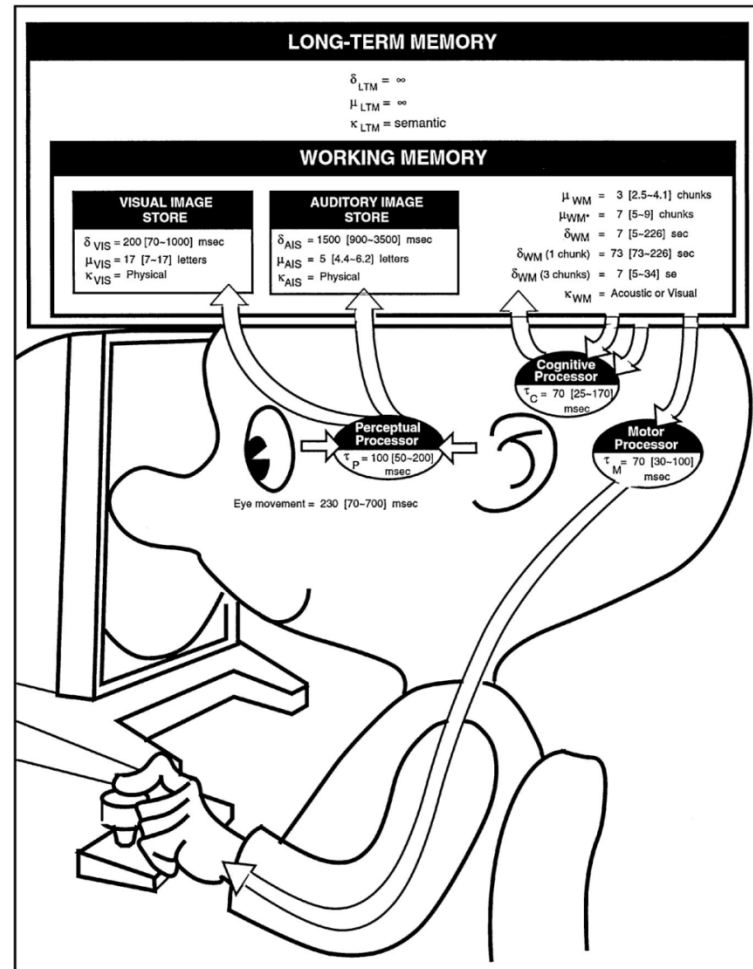
Significant Event Timeline



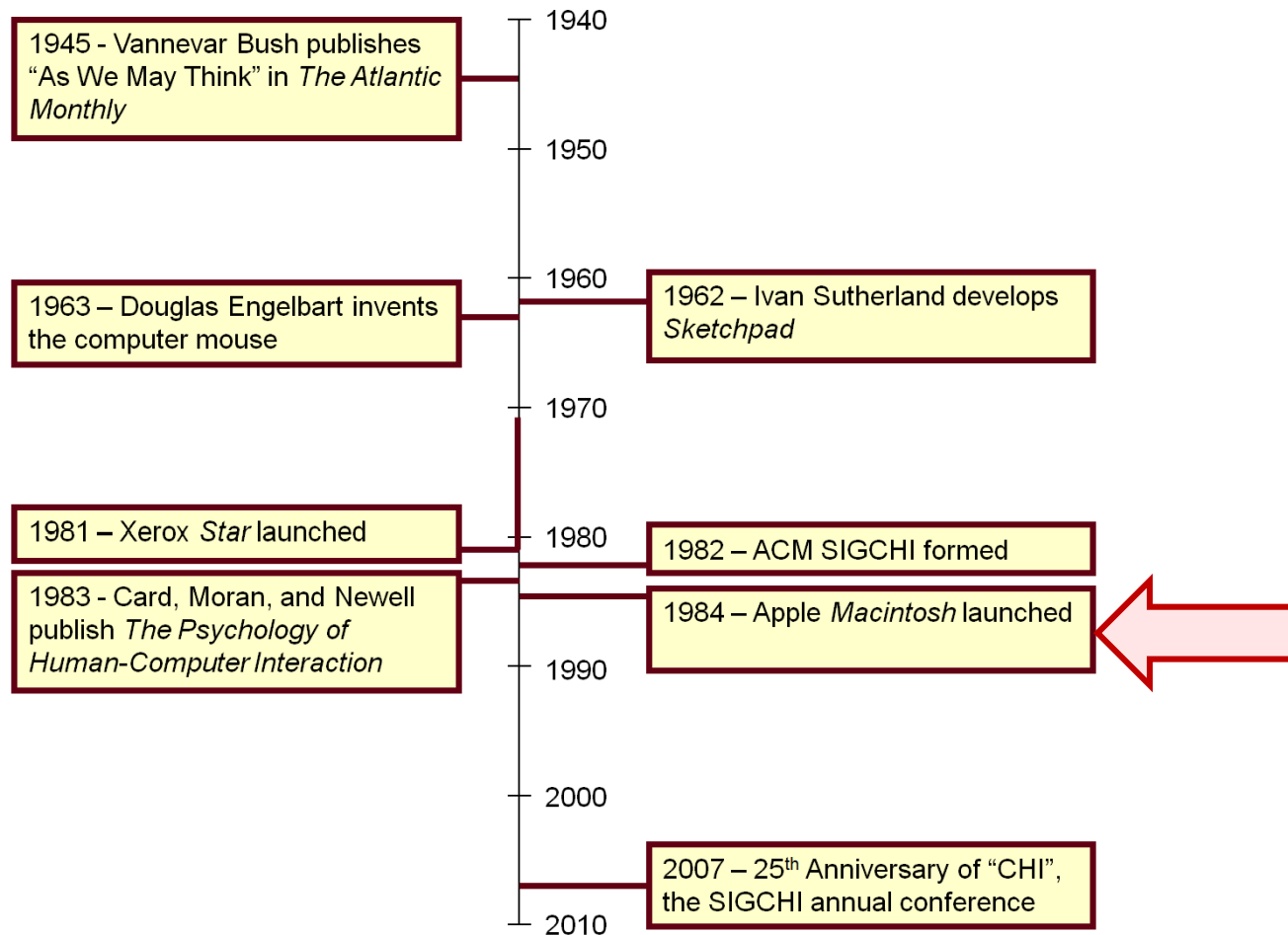
The Psychology of Human-Computer Interaction
Card, Moran, and Newell (1983)



The Model Human Processor



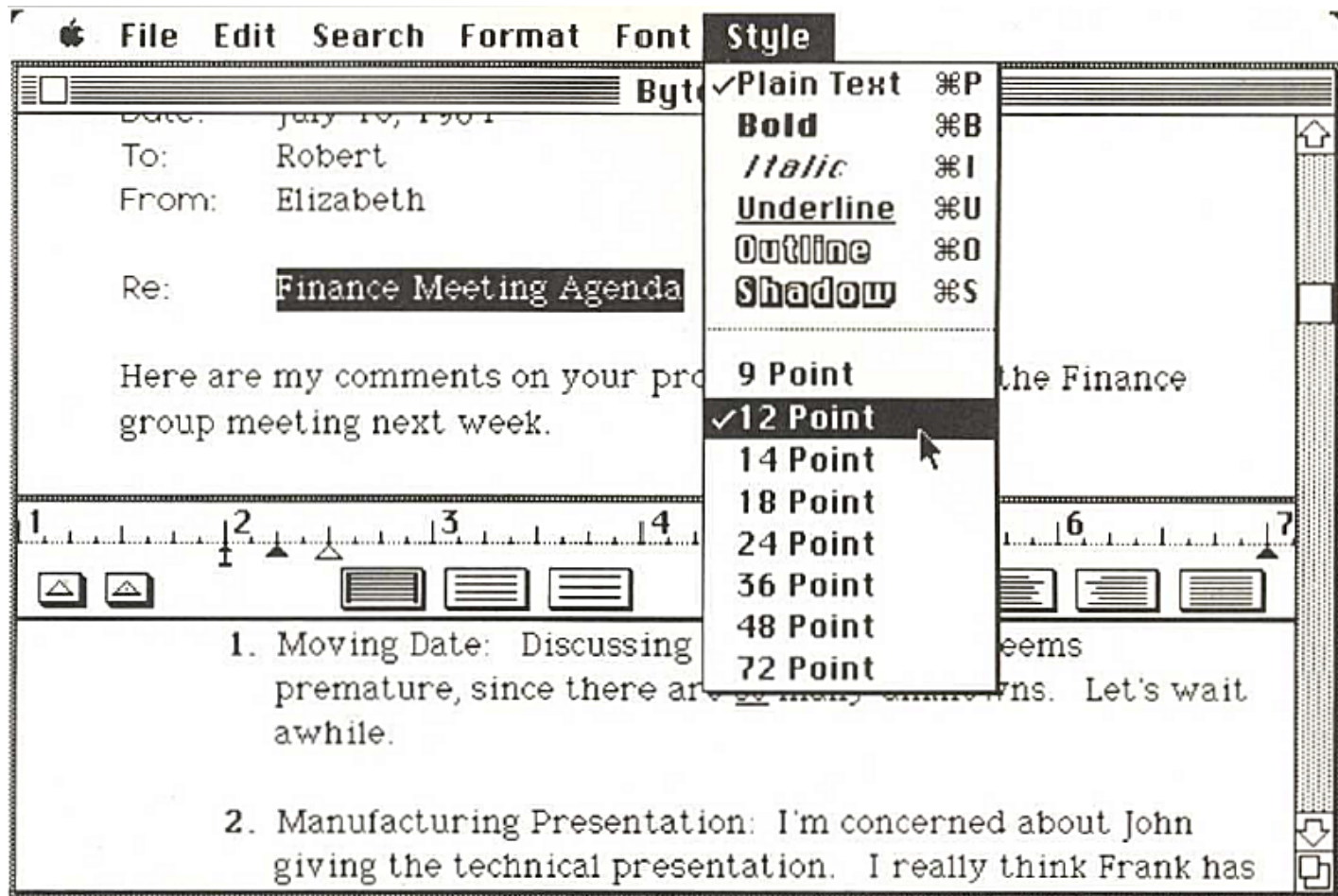
Significant Event Timeline



Apple *Macintosh* (1984)



MacWrite Software



Apple *Macintosh* Commercial (1984)

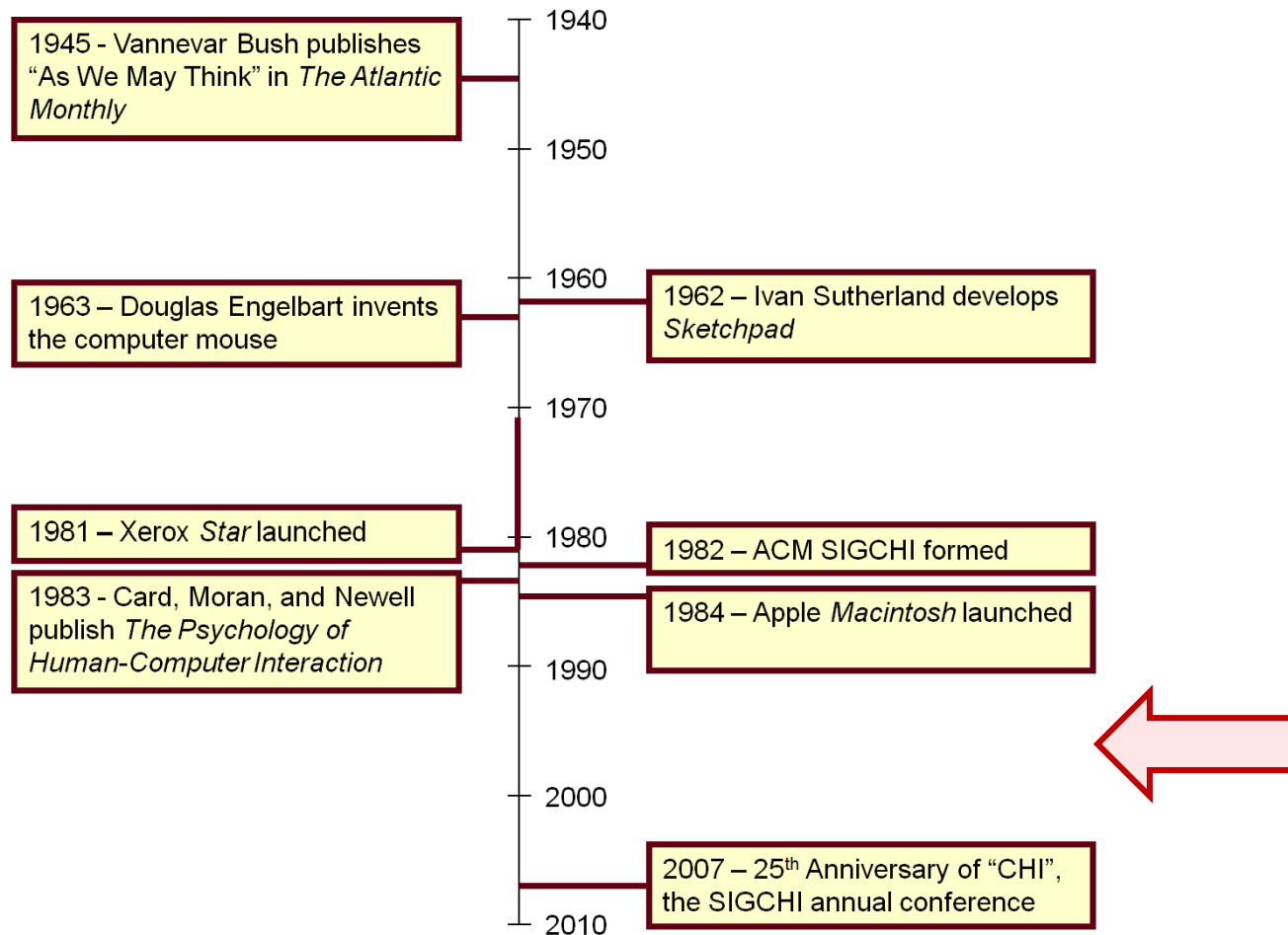


[Link](#)

Apple *Macintosh* Timeline

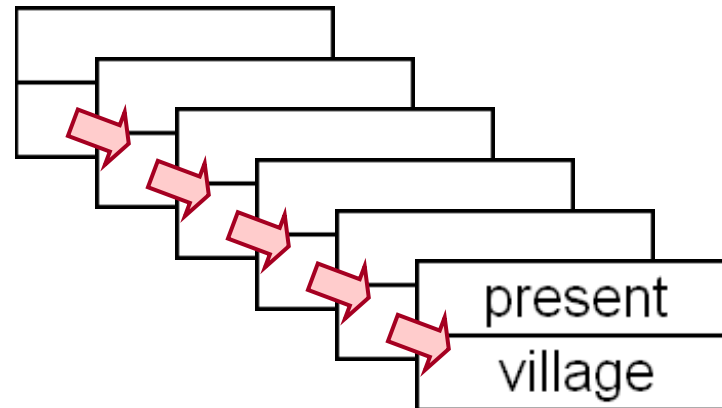
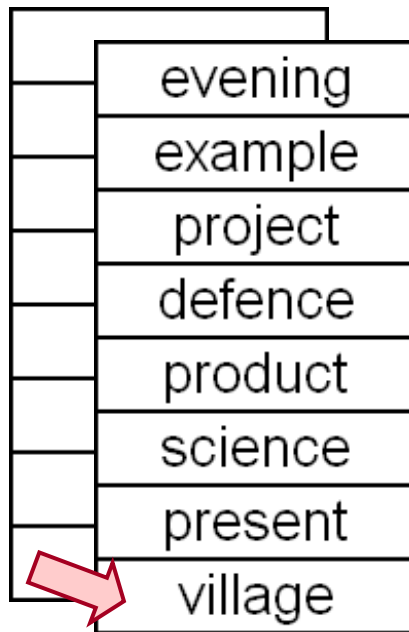
1976	April – Apple Computer Inc. founded in Cupertino, California.
1977	Launch of Apple II. Sells for \$1300 U.S. with 4KB RAM. Hugely successful (more than one million units sold). Works with a text-based command-line interface.
1978	<i>Lisa</i> project started . Goal of producing a powerful (and expensive!) personal computer.
1979	September – <i>Macintosh</i> project started. Goal of producing a low-cost easy-to-use computer for the average consumer. December – Apple and Xerox sign an agreement that allows Xerox to invest in Apple. In return Apple's engineers visit Xerox PARC and see the Xerox <i>Alto</i> . The GUI ideas in the <i>Alto</i> influence <i>Lisa</i> and <i>Macintosh</i> development.
1980	December – Apple goes public through initial public offering (IPO) of its stock.
1981	May – Xerox <i>Star</i> launched at the National Computer Conference (NCC) in Chicago. Members of the <i>Lisa</i> design team are present and see the <i>Star</i> demo. They decide to re-vamp the <i>Lisa</i> interface to be icon-based. August – IBM PC announced. Highly successful, but embodies traditional text-based command-line interface.
1982	<i>Lisa</i> and <i>Macintosh</i> development continue. Within Apple, there is an atmosphere of competition between the two projects
1983	January – <i>Lisa</i> released. <i>Lisa</i> incorporates a GUI and mouse input. Sells for \$10,000 U.S. In the end, <i>Lisa</i> is a commercial failure. December -- brochures distributed in magazines (e.g., <i>Time</i>) pre-announcing the <i>Macintosh</i> .
1984	January 22 – <i>Macintosh</i> ad plays during Super Bowl XVIII. January 24 – <i>Macintosh</i> released. Sells for \$2500 U.S.

Significant Event Timeline



Growth of HCI (1983-...)

- Example of an early research topic
 - [Breadth vs. depth in menu design](#)

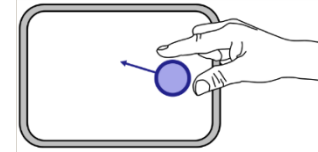


HCI Research

- Research precedes products
- Consider...
 - Two-finger gestures (Apple *iPhone*, 2007)
 - Acceleration-sensing (Nintendo *Wiimote*, 2005)
 - Wheel mouse (Microsoft *Intellimouse*, 1996)
 - Single-stroke text input (Palm's *Graffiti*, 1995)
- Were these ideas born out of engineering or design brilliance? Not really...

- Two-finger gestures:

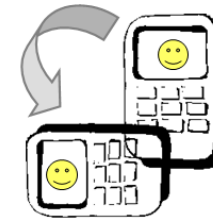
~~2007?~~



1978 ¹

- Acceleration-sensing:

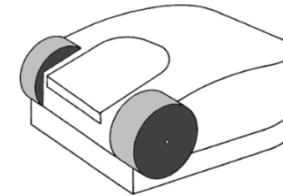
~~2005?~~



1998 ²

- Wheel mouse:

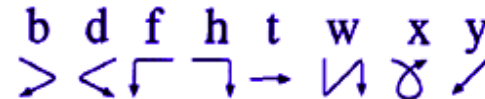
~~1996?~~



1993 ³

- Single-stroke text input:

~~1995?~~



1993 ⁴

¹ Herot, C. F., & Weinzapfel, G. (1978). One-point touch input of vector information for computer displays. *Proc SIGGRAPH '78*, 210-216, New York: ACM.

² Harrison, B., Fishkin, K. P., Gujar, A., Mochon, C., & Want, R. (1998). Squeeze me, hold me, tilt me! An exploration of manipulative user interfaces. *Proc CHI '98*, 17-24, New York: ACM.

³ Venolia, D. (1993). Facile 3D manipulation. *Proc CHI '93*, 31-36, New York: ACM.

⁴ Goldberg, D., & Richardson, C. (1993). Touch-typing with a stylus. *Proc CHI '93*, 80-87, New York: ACM.

Resources

Google Scholar: <http://scholar.google.ca/>

ACM Digital Library: <http://portal.acm.org/>

HCI Bibliography: <http://hcibib.org/>

Wikipedia: <http://en.wikipedia.org/>

Book web site: <http://www.yorku.ca/mack/HCIbook>



Thank You