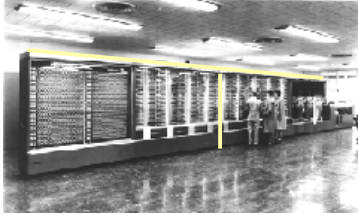


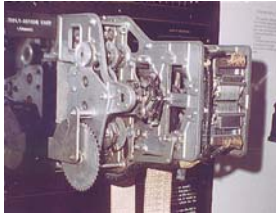
chapter 4
Paradigms
(additional materials)

Beginnings - Computing in 1945



• Harvard Mark I
- Picture from <http://plano.dsi.uminho.pt/museum/indexmark.htm>
• 55 feet long, 8 feet high, 5 tons

Context - Computing in 1945




- Ballistics calculations
- Physical switches (before microprocessor)
- Paper tape
- Simple arithmetic & fixed calculations (before programs)
- 3 seconds to multiply

Picture from <http://www.gmcc.ab.ca/~supp/>

IN THE EARLY YEARS OF THE HISTORY OF COMPUTING, HUMAN-COMPUTER INTERACTION

Batch Processing

- Computer had one task, performed sequentially
- No "interaction" between operator and computer after starting the run
- Punch cards, tapes for input
- Serial operations



IN THE EARLY YEARS OF THE HISTORY OF COMPUTING, HUMAN-COMPUTER INTERACTION


People

- Who are the people associated with various interactive paradigm shifts?

IN THE EARLY YEARS OF THE HISTORY OF COMPUTING, HUMAN-COMPUTER INTERACTION

Other Resources

- Howard Rheingold – *Tools for Thought*
 - History of interactive breakthroughs




- On-line at <http://www.rheingold.com/texts/tft/>

Dr. J. R. Licklider
Professor of Psychology, MIT
HUMAN-COMPUTER INTERACTION

Innovator: Vannevar Bush



- "As We May Think" - 1945 Atlantic Monthly
 - "...publication has been extended far beyond our present ability to make real use of the record."
- Postulated **Memex** device
 - Stores *all* records/articles/communications
 - Items retrieved by indexing, keywords, cross references (now called hyperlinks)
 - (Envisioned as microfilm, not computer)
- Interactive and nonlinear components are key
- <http://www.theatlantic.com/unbound/flashbks/computer/bushf.htm>



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HUMAN-COMPUTER INTERACTION

More About Vannevar Bush


- Name rhymes with "Beaver"
- Faculty member MIT
- Coordinated WWII effort
6000 US scientists
- Social contract for science
 - federal government funds universities
 - universities do basic research
 - research helps economy & national defense

Dr. J. R. Licklider
Professor of Psychology, MIT
HUMAN-COMPUTER INTERACTION

Innovator: J. R. Licklider


- 1960 - Postulated "man-computer symbiosis"
- Couple human brains and computing machines tightly to revolutionize information handling



HUMAN-COMPUTER INTERACTION

Innovator: Ivan Sutherland

- SketchPad - 1963 PhD thesis at MIT
 - Hierarchy - pictures & subpictures
 - Master picture with instances (ie, OOP)
 - Constraints
 - Icons
 - Copying
 - Light pen input device
 - Recursive operations




HUMAN-COMPUTER INTERACTION

Innovator: Douglas Englebart

- Landmark system/demo:
 - hierarchical hypertext, multimedia, mouse, high-res display, windows, shared files, electronic messaging, CSCW, teleconferencing, ...

Inventor of mouse




HUMAN-COMPUTER INTERACTION

About Doug Engelbart

- Graduate of Berkeley (EE '55)
 - "bi-stable gaseous plasma digital devices"
- Stanford Research Institute (SRI)
 - Augmentation Research Center
- 1962 Paper "Conceptual Model for Human Intellect"
 - Complexity of problems increasing
 - Need better ways of solving problems

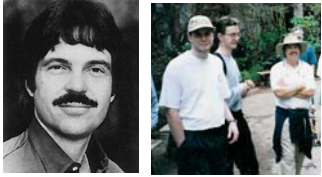
Picture of Engelbart from bootstrap.org



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HUMAN-COMPUTER INTERACTION

Innovator: Alan Kay

- Dynabook - Notebook sized computer loaded with multimedia and can store everything
- @PARC
- Personal computing
- Desktop interface
- Overlapping windows



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Innovator: Ben Shneiderman


- Coins and explores notion of direct manipulation of interface
- Long-time Director of HCI Lab at Maryland



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HUMAN-COMPUTER INTERACTION

Innovator: Ted Nelson

- Computers can help people, not just business
- Coined term "hypertext"



Innovator: Nicholas Negroponte

IN THE SPACES BETWEEN
HUMAN-COMPUTER
INTERACTION

- MIT Architecture Machine Group
 - '69-'80s - prior to Media Lab
- Ideas
 - wall-sized displays, video disks, AI in interfaces (agents), speech recognition, multimedia with hypertext
 - Put That There (Video)



Innovator: Mark Weiser

IN THE SPACES BETWEEN
HUMAN-COMPUTER
INTERACTION

- Introduced notion of *Ubiquitous Computing* and *Calm Technology*
 - It's everywhere, but recedes quietly into background
- CTO of Xerox PARC