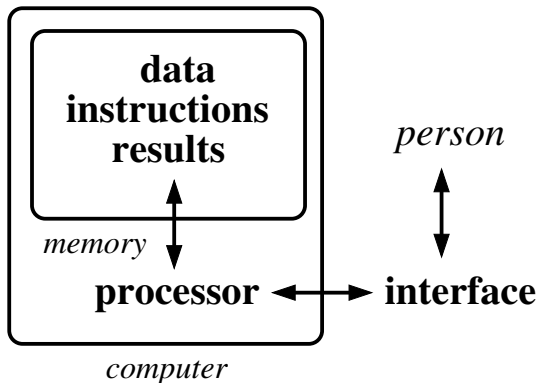


Science 1000: Part #3 (Wareham):

Getting Here: The Networked Society (1970–now)

THE DAWN OF PERSONAL COMPUTERS
THE COMPUTER USABILITY REVOLUTION
COMPUTER NETWORKS

What *is* a Computer? (Take III)



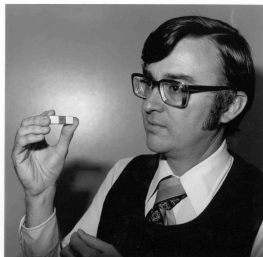
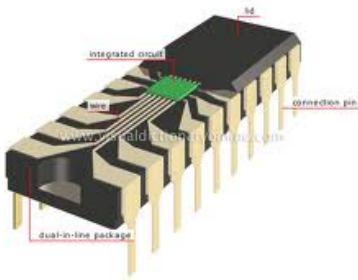
- Proposed by John von Neumann (1903–1957) and collaborators in 1945 as the stored program computer.

Computing in 1970: The State of the Art

- Mainframe computers (government / business / scientific)
- Minicomputers (business / scientific)
- Consolidation of the computer industry (IBM and the Seven Dwarves (BUNCH))
- Computers operate in isolation from human users and other computers

The Personal Computer (PC)

Instead of being a little mainframe, the PC is, in fact, more like an incredibly big chip. – Robert X. Cringely



- The microprocessor was invented by Ted Hoff in 1971.
- Manufactured massively and marketed cheaply as per Intel policy; widely available to small PC startup companies.

The Personal Computer (Cont'd)



Altair 8800
(1975)



Apple II
(1977)



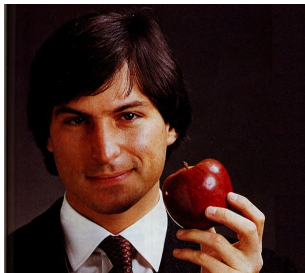
IBM PC
(1981)

The Personal Computer (Cont'd)

- Boom in PCs driven by availability of high-level languages (Microsoft), user-friendly PCs (Apple), and “killer” applications software (spreadsheets, word processing).
- Early debate over shared vs. purchased software.



Bill Gates
(1955–)

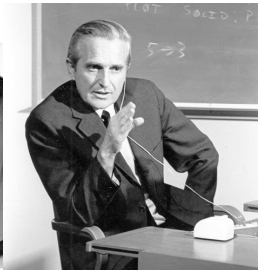


Steve Jobs
(1955-2011)

Human-Computer Interfaces



CRT with light pen
(1955)



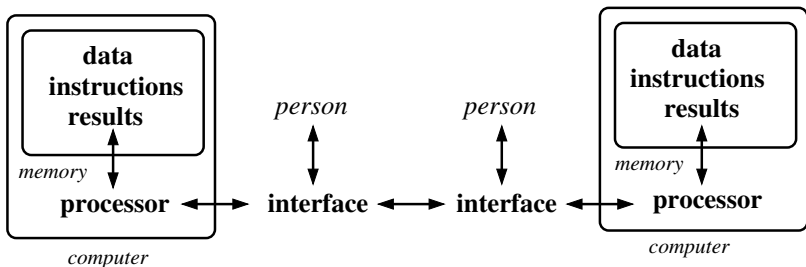
Mouse
(1968)



GUI
(1973)

- GUI = Graphical User Interface.
- Mouse and GUI invented by Douglas Engelbart (1925–2013) in the 1960s; ignored until 1970s.
- The GUI Wars: Xerox vs. Apple vs. Microsoft

What *is* a Computer? (Take IV)

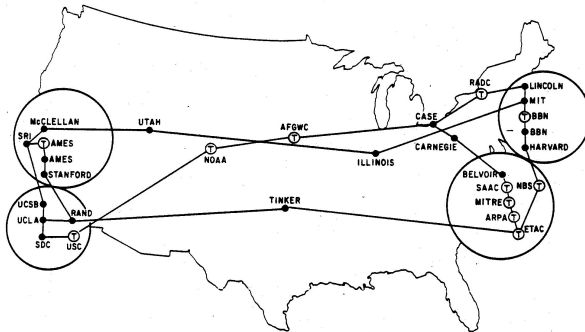


- Early experiments in networking computers done in 1960's; mostly mathematical analyses of networking schemes.

Computer Networks

- First computer network (ARPAnet) operational in 1969; paid for by Advanced Research Projects Agency in US Department of Defense.
- Network built to share data and computing resources – communication between human users not important.
- Based on adaptive multi-route packet switching vs. classic static multi-route dedicated communication line.
- Characteristics:
 - Distributed vs. centralized control
 - Any packet can go anywhere regardless of origin or destination of message
 - All costs distributed over all network nodes

Computer Networks (Cont'd)



- Thousands of nodes in ARPANet by end of 1970's; many more on other networks created in 1980s.
- In late, 1980's, networks interconnected \Rightarrow Internet!
- World-Wide Web created on top of Internet by Tim Berners-Lee (1955–) in 1992.

Computing in 2014: The State of the Art

- Cheap personal computing devices
- Cheap easy-to-use software applications
- Cheap(ish) highspeed wireless
- Massive online media (text / audio / video)
- Massive online personal data
- Massive processing power
- ... All widely available 24/7 ...
- ... And there's more of it all every day ...