Science 1000: Part #3 (Wareham):

Getting Here:
The Networked Society (1970–now)

THE DAWN OF PERSONAL COMPUTERS
THE COMPUTER USABILITY REVOLUTION
COMPUTER NETWORKS
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 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
Early experiments in networking computers done in 1960’s; mostly mathematical analyses of networking schemes.
Computer Networks


• 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
Thousands of nodes in ARPAnet by end of 1970’s; many more on other networks created in 1980s.

In late, 1980’s, networks interconnected ⇒ Internet!

Computing in 2016: 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 . . .