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
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 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 …