

Outline for April 2, 2007

Question: You hear a lot about how computers have helped humanity, and how people are using them to improve the world. What are some problems that computers have introduced or exacerbated?

1. Greetings and felicitations!
2. Coming of the Internet
 - a. Recap
 - i. First telephone connection from Bell Labs to Dartmouth College
 - ii. Department of Defense funds development of ARPANET, which becomes operational in 1969
 - b. ARPANET splits into two different networks in early 1980s
 - c. BITNET, FIDO, CSNET, others appear about this time
 - d. NSFNET connects supercomputing centers throughout the country
3. Coming of the World Wide Web
 - a. Email one of the first protocols developed (early 1970s)
 - b. Many other protocols in wide use
 - c. Tim Berners-Lee develops http protocol to allow physicists at CERN to share research data easily over the Internet
 - d. This becomes widely available, and popular, around 1994 ... *we've never been the same since!*
4. Anatomy of a computer
 - a. CPU: arithmetic, logic, floating-point; Program Counter (PC)
 - b. Storage hierarchy: registers, main memory, secondary storage
 - c. Connections: the bus
 - d. I/O: SCSI, USB, PCI (and PCI-express), others; interrupts (more details on this later)
 - e. Software: operating system, applications
5. How it starts: the boot process
 - a. Idea: execute small segment of code in memory that loads bigger program, that loads system ("bootstrap")
 - b. When powered up, PC loaded with particular memory address
 - c. Address is in BIOS, which has program to run self-test, load information needed to read from secondary storage (more on this later)
 - d. Program then determines which secondary storage device to read from (on PCs, order can be set in BIOS; usually floppy, CD, hard drive)
 - e. Program reads in boot block (boot sector), which tells computer where to look for the operating system
 - f. Computer loads, runs operating system