



COMP 150: Basics of Computer Organization

Week 02, Lecture 03



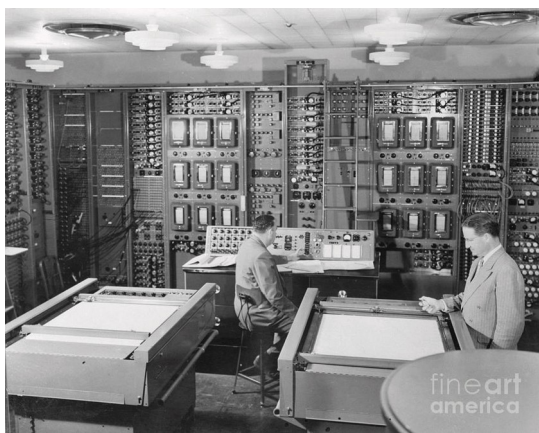
Agenda

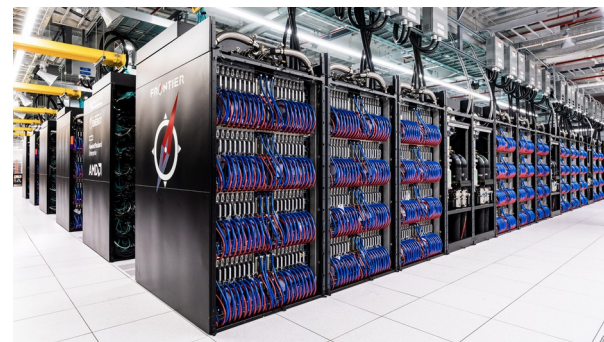
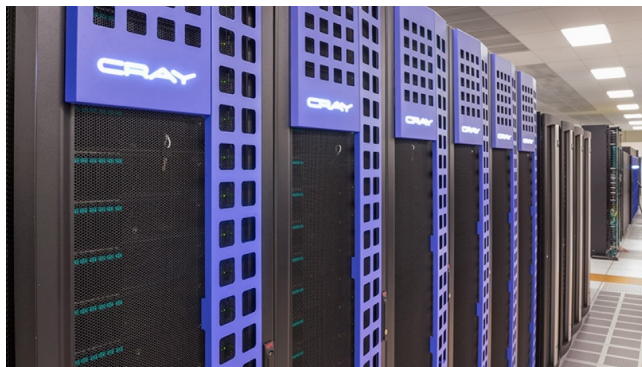
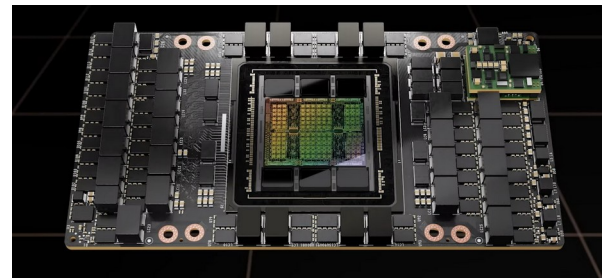
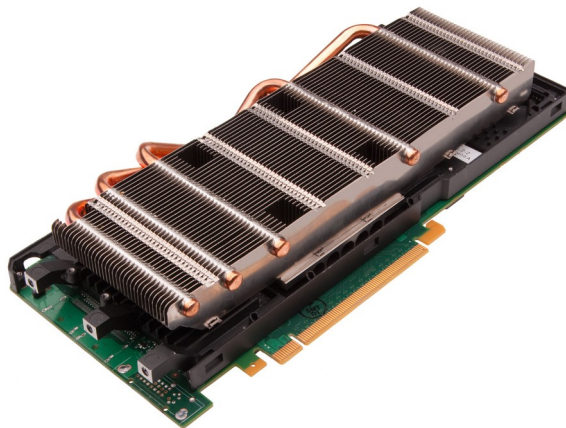
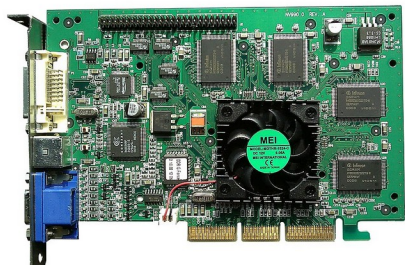
1. Quiz (5 minutes)
2. How does a computer work?

Quiz (5 min)

Computers through the Late 20th Century

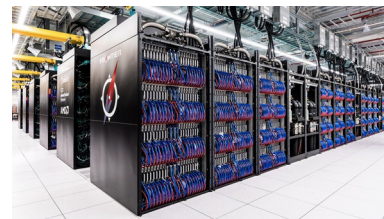
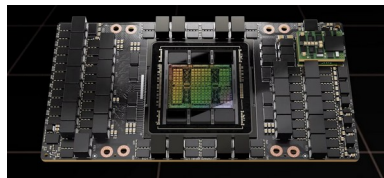
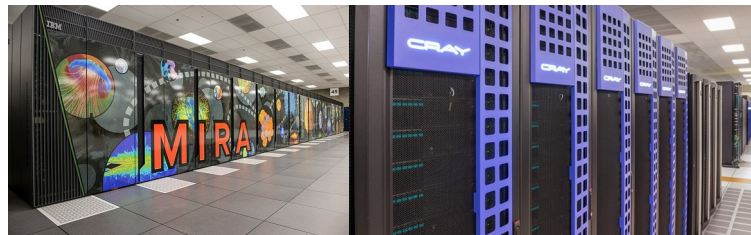
- 1960s:
 - Massive purpose-built machines
- 1970s/1980s:
 - Mainframes
 - Supercomputers
- 1990s:
 - PCs
 - Supercomputers
 - (Et tu, Brute: mainframes)
- 2000s:
 - PCs, but more portable!
 - Supercomputers
 - Unfortunately, yes, *still* mainframes.
- 2010s:
 - PCs
 - Supercomputers! Big ones!
 - *Graphics cards*
- 2020s:
 - PCs*
 - Supercomputers of many shapes and sizes
 - Accelerators are key





Commonalities

- Interface
- Input
- Interconnect
- Compute
- Scale



The Computer - In Pictures

Board Discussion

And now: The Internet!

- History (context)
- Why did we need it?
- Why do we need it now?
- How did it start?
- How did it change?
- How does it work now?

Important terms:

- Packet
- ISP
- DNS

And now: The Internet!

- ARPANET: 1969
 - DoD ARPA
 - Idea of “packets” of information
 - Concept of a massive interconnect
 - Protocols emerge (and TCP/IP have stayed)
- NSFNET: 1986
 - National Science Foundation
 - Major arteries interconnect supercomputers across mainland USA
 - Internet Service Providers start up, offering inlets
- World Wide Web: 1989
 - CERN
 - Hypertext documents shared across a file-folder-like system
 - Optical cables laid across the ocean in 1990 enabled true global traffic
- Then: web was transport, local machines were workers
- Now: nearly *everything* is web-based

And now: The Internet!

Why *did* we need it?

- Send information across huge distances
- Only way computers could speak to each other

Why do we need it *now*?

- Everything - absolutely everything - uses the internet

And now: The Internet!

How did it *start*?

- Connections between major research institutions
- Expanded to include commerce locations (stock exchanges and banks)
- Expanded to local areas

And now: The Internet!

How did it change?

- Wires
- Addresses
- *More* addresses?
- Even *more*?
- Cross-continent
- Satellites

And now: The Internet!

How does it work now?

- Client/server
- Request/response
- Server-side computation, client-side computation
 - Recall: mainframes vs PCs vs supercomputers
- Satellites and browser computation

The Internet - In Pictures

Board Discussion

In Review: That was a lot.

1. Ancient computers were calculators
2. Industrial revolution pushed the technology (binary -- looms)
3. WWII forced the mathematicians and engineers into the same room
4. Tech races in the early cold war era meant more and better machines
5. Corporate needs ruled the 80s and 90s
6. WWW : 1990
7. From 1940 to 2000, went from:
 - a. Massive machines
 - b. Mainframes and terminals, supercomputers
 - c. PCs and workstations, supercomputers
 - d. PCs, supercomputers, and browser-based computing
8. General structure of a computer
9. General structure of the internet

Friday:

- Our first lab: Hello World
- Should take less than 15 minutes