CPU, Memory, and Assembly

Why?

- Why should all CS majors learn about these low-level details?
- Why not teach this information in an elective?

CPU Notes

- We'll focus on a useful (but not quite right) description
- We'll discuss how processors were first made
- Newer processors "emulate" the PDP-11 experience (from the 70s), but they are much more complex
- For example, they incorporate speculative execution and have 100s of instructions executing at the same time
- Ever heard of Spectre or Meltdown?
- https://www.cloudflare.com/learning/security/threats/meltdown-spectre/

CPU and Memory High-Level Diagram

CPU and Memory Mid-Level Diagram

Code Demo

https://godbolt.org/

Debugging Demo