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