Computer Systems and Architecture - Notes

Harvey Hyatt

1 The von Neumann Architecture

Even in a simple program, the computer needs to be able to perform many different tasks:

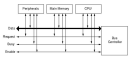
- Arithmetic
- Logic
- Program flow
- Comparisons
- Input/Output
- Store internal state of program

Instructions and Data Computer programs are made up of Instructions (usually a sequential set) and Data to be manipulated by the instructions. Both of these are represented (physically) in the same way - you can not tell them apart without looking at them in detail. Because of this we need to store instructions and data in separate regions of memory, and have separate "datapaths" for instructions and data.

Requirements of a Computing Device

- Load the program from some external device
- Process instructions in the correct order (need mechanism to keep track of progress)
- Access data in accordance with program's instructions
- Perform computations
- Take decisions according to computation results
- Send results of computations to external device

The CPU in Context asdf


Peripherals
Boot Memory
CPU
Clk
Request
Bus
Enable
Bus controller