Basic Hardware

Principles of Computing

2014
Contained in this Slide Deck

• We are going to review some basic concepts and then watch a brief video that will help to “glue” everything together
The von Neumann Architecture

- Stored program and data
- Most modern computers built on this architecture
(Simplified) Basic Components

- I/O Devices
  - Peripheral devices
- Memory
- CPU
I/O Devices

• Many devices for input, output, and some that do both
• Each device is assigned an address on a bus
• The bus is the communication mechanism through which the device communicates with the rest of the system
Memory

• Memory is actually an entire subsystem
• Memory is used to store data or instructions, represented in bits
• Memories can be very large – to locate specific content, it is divided into memory addresses
• Internal tables keep track of the address(es) where data (for example files or programs) is stored
CPU

• Central Processing Unit
• Often called the “brain” – but remember it cannot think; it only does what told to do by a human
• It consists of two key components
  – Control unit
  – ALU
• Some computers may have more than one CPU
Control Unit

• Main purpose is to fetch, decode and execute instructions stored in memory
• This is the fetch→decode→execute→instruction execution cycle
• Also includes a clock for sequencing and timing
ALU

• Arithmetic and Logic Unit
• Called on to perform math or logic operations
I/O, Memory, CPU

• These are the main components
• How do they work together?
• Two more supporting subsystems
  – Bus
    • Communications channel between devices
  – BIOS - Basic I/O Subsystem
    • Acts as gateway between an I/O device and the CPU
I/O, Memory, CPU

http://ed.ted.com/lessons/inside-your-computer-bettina-bair#review

This video puts it all together in very simple terms.

Video credit: Bettina Blair, Ted Ed.
## Important Terms

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