Architecture

Architecture

- The mechanical components of a computer
  - Also known as hardware
  - Different than software (the code that runs the hardware)

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Visible components

- Monitor
- Keyboard (maybe)
- Mouse (maybe)
- Tower (maybe)
- Speakers (maybe)
- Cables (maybe)

Hidden Components

- CPU → Central Processing Unit
  - The "brain" of the computer
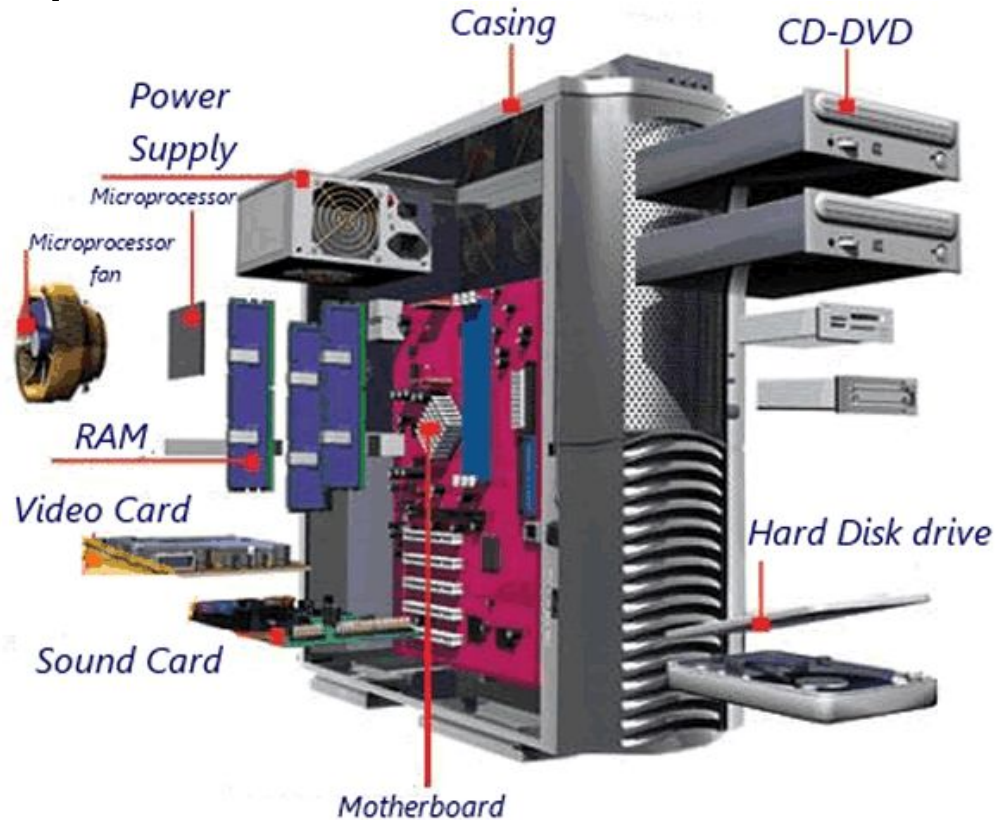 - Controls which programs can run, in which order the programs run, how much memory they get, etc...

Hidden Components

- CPU → Central Processing Unit
  - Many different companies make them

Intel	PCs, Desktop Macs
Apple	iPads, newer iPhones
AMD	PS4
Nvidia	Google self-driving car

Hidden Components

Casing

CD-DVD

Power Supply

Microprocessor

Microprocessor fan

RAM

Video Card

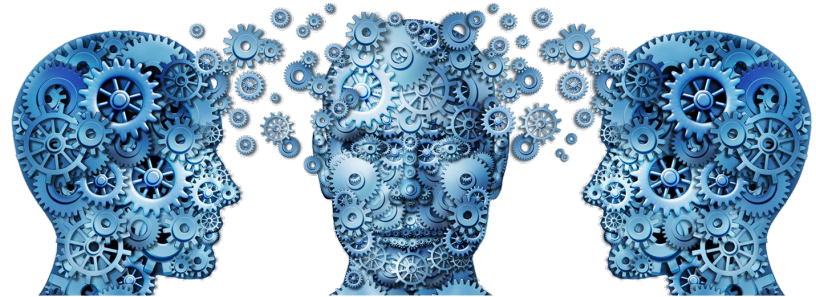Sound Card

Hard Disk drive

Motherboard

Memory

- Holds information
  - What are some pieces of hardware that store memory?
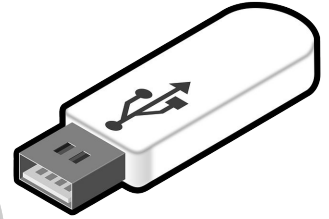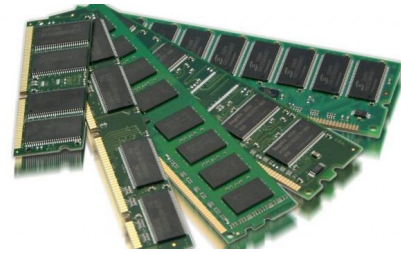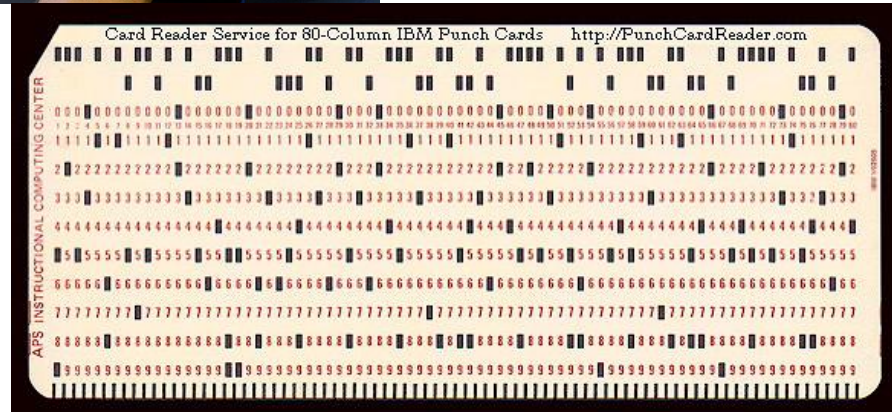
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Memory

- RAM (Random Access Memory)
- USB (Universal Serial Bus)
- CD (Compact Disk)
- DVD (Digital Video Player)
- Hard Disk

Memory

- VCR Cassette
- Laser disk
- Punch Card
- Paper...

Memory

- Which types of memory are the best?
  - Have to consider...
    - Cost
    - Ruggedness
    - Volatile/Nonvolatile
    - Speed
    - Power
    - Sequential/Random
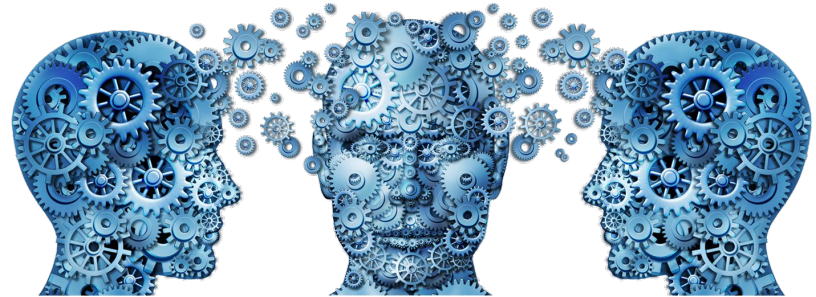   - etc...

Memory

- No matter what kind...
- Made of *capacitors*
  - Capacitors = switches
  - Can either be charged or uncharged
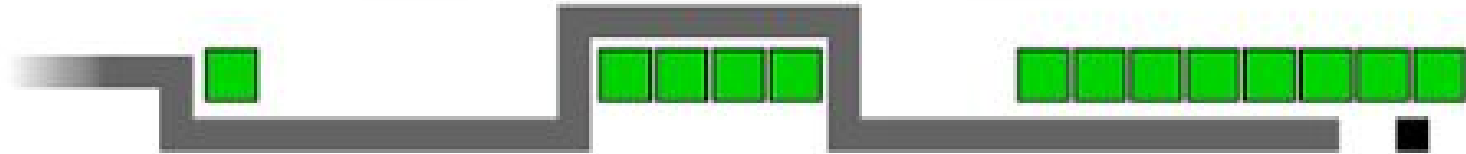
  - Charged = on (1)
  - Uncharged = off (0)

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Memory Organization

- Each capacitor is called a *bit*
- 8 bits = 1 *byte*
  - (Also, 4 bits = 1 *nibble*)

Memory Organization

- *Word* = the most efficient way of processing information for a CPU
  - Changes based on the CPU

  - Older CPUs → 1 word = 32 bits
  - Newer CPUs → 1 word = 64 bits

Memory Organization

- How do computers keep track of all this?
  - Binary Numbers!