Introduction to computer systems. Architecture of computer systems.

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POCKET COMPUTERS

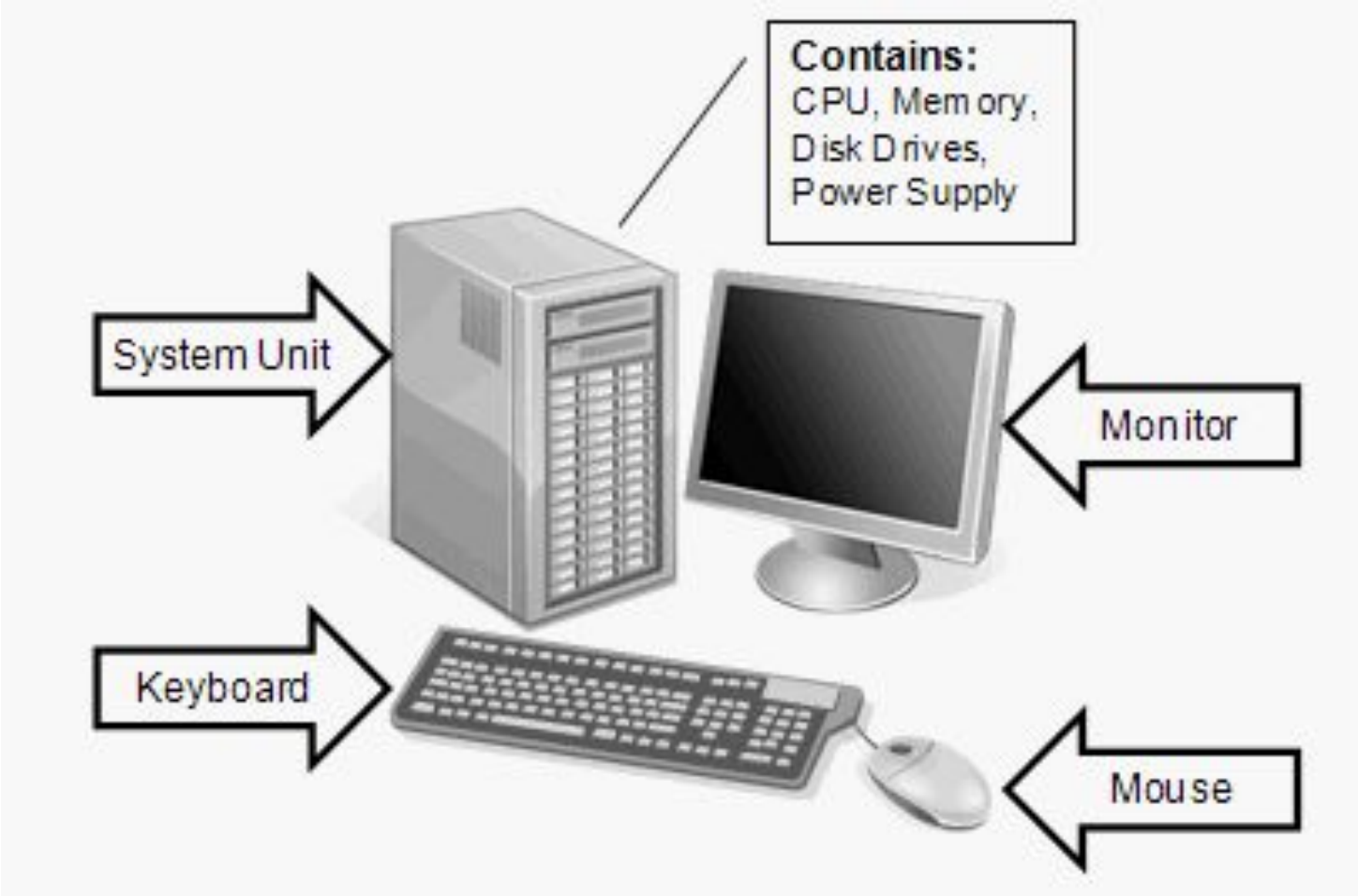
DESKTOP COMPUTER

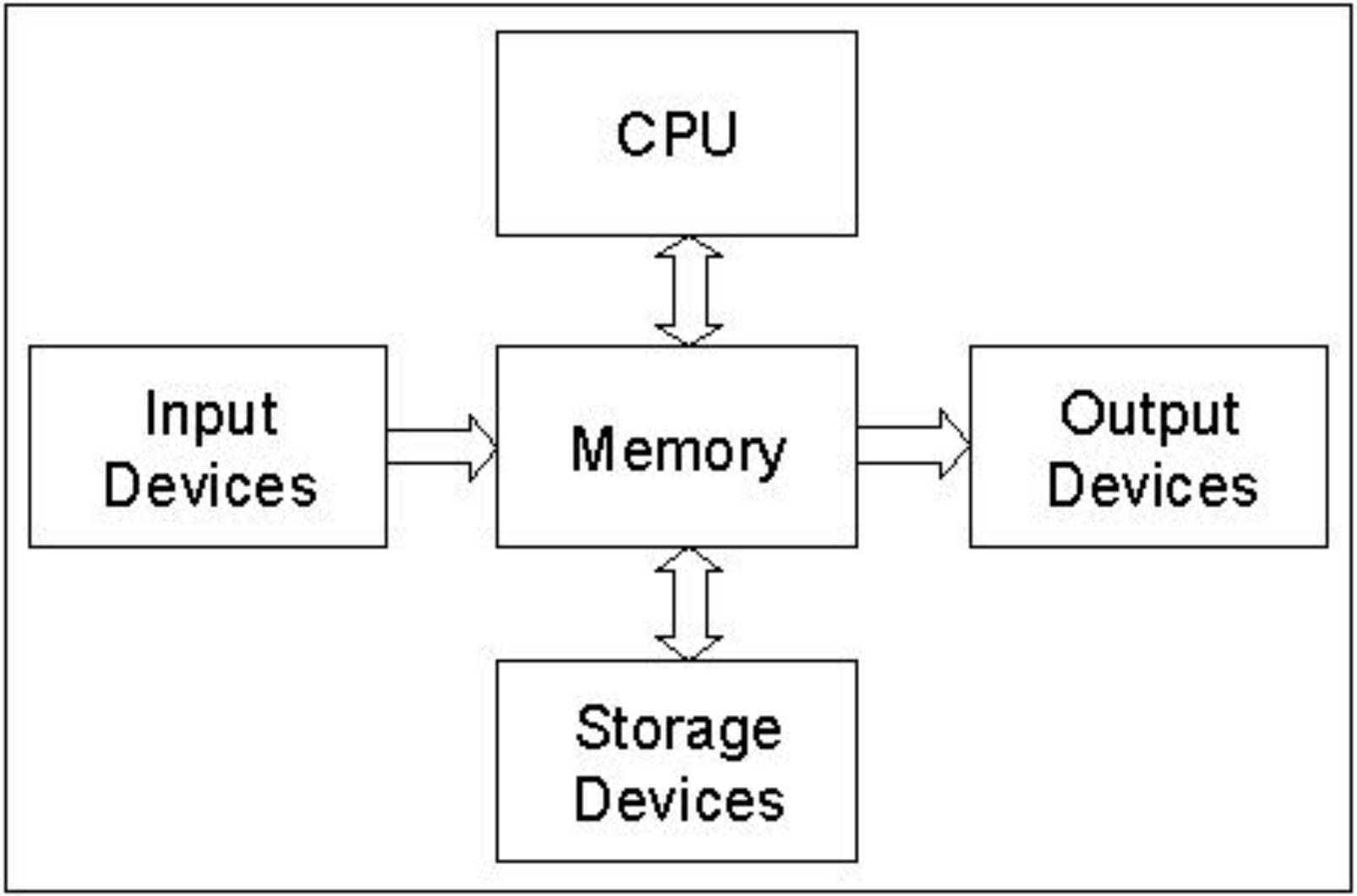
LAPTOP COMPUTERS

MAINFRAME

SUPERCOMPUTER

BASED COMPONENTS OF COMPUTER




CPU
Input Devices
Memory
Output Devices
Storage Devices

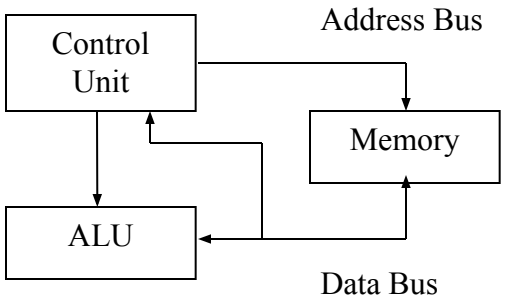
What does memory look like?

- Memory ~ RAM
- Looks like a table
- Address and Data
- Address is the location
- Data is the actual value
- Memory stores both data and **assembly instructions**

Address	Data
0	36
1	3765
2	786
3	356
4	252
5	67980
6	2355
7	4234
8	3466

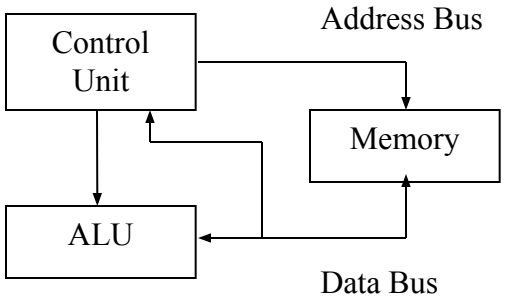
Central Processing Unit (CPU)

- Also called the “chip” or “processor”
- The brain of the computer
- Major components:
  - Arithmetic Logic Unit (ALU)
    - calculator
  - Control unit
    - controls the calculator
  - Communication bus systems



Fetch-Execute Cycle

1. Fetch instruction from memory
2. Decode instruction in control unit
3. Execute instruction (data may be fetched from memory)
4. Store results if necessary
5. Repeat!

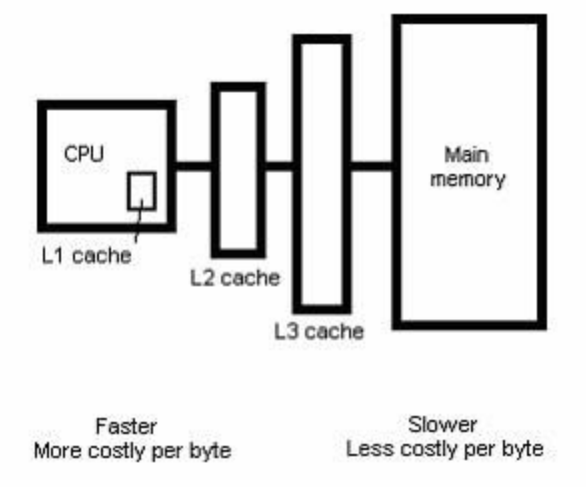


Registers

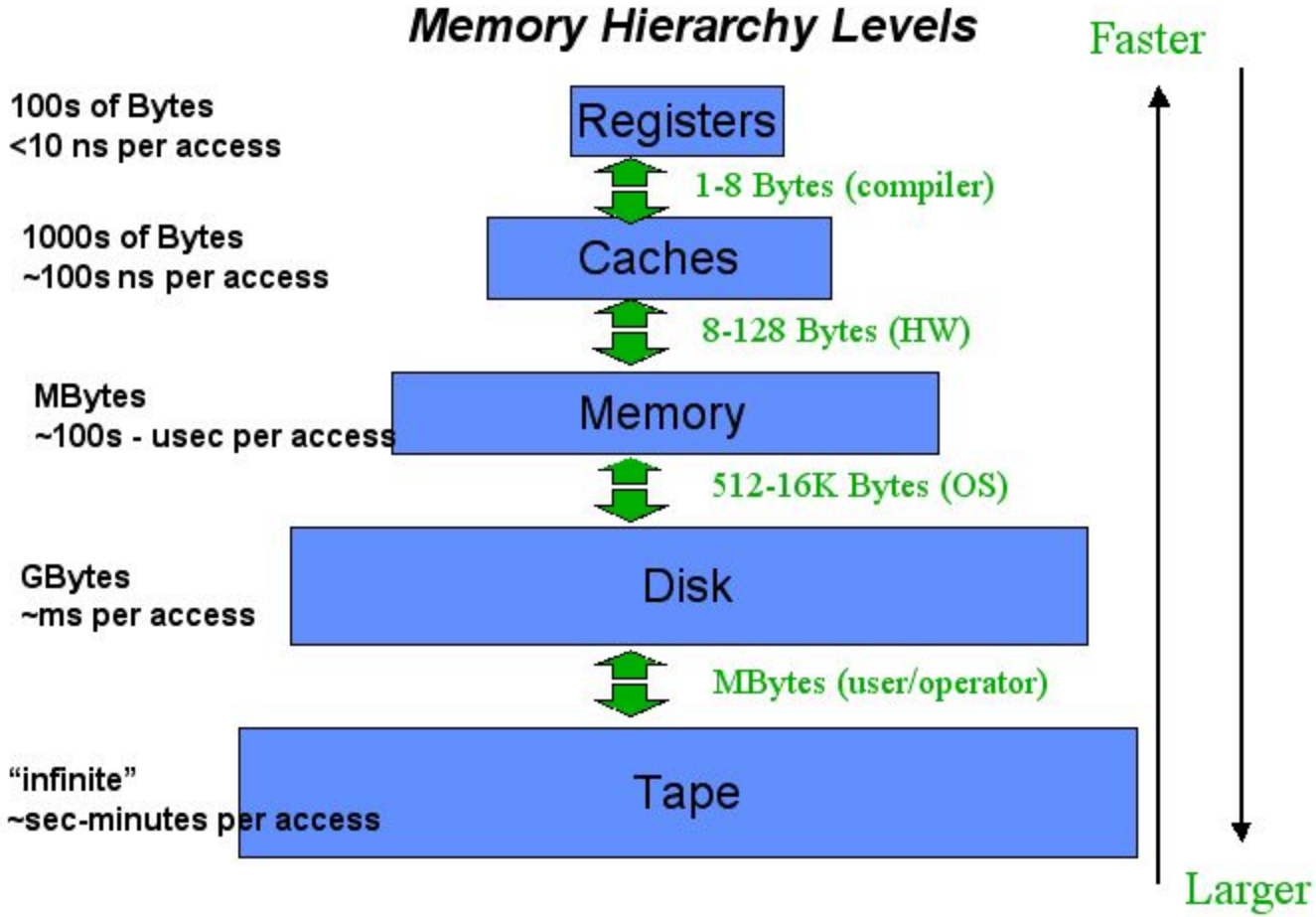
- Temporary storage containers used inside the CPU
- Extremely fast
- Fixed size, usually multiples of 8-bits
  - Also called a “word”
  - Example: 32-bit machines (4-byte words)
- How large is a word in a 64-bit machine?

Cache

- Slower than registers
- Faster than RAM
- Located in front of main RAM
- Different levels of cache
- Level1 (L1) and Level2 (L2)
- Size is usually around 1 MB

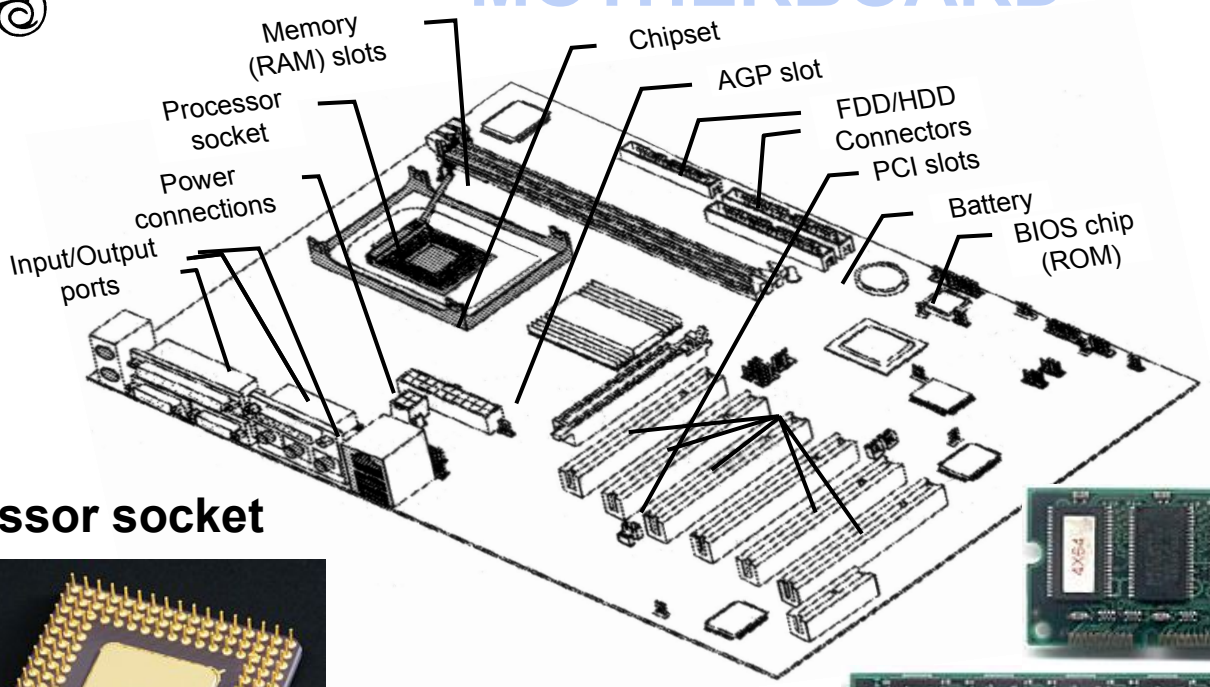


Memory Hierarchy

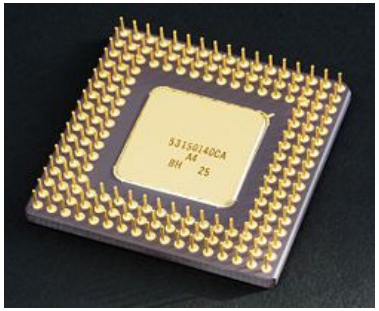



Top Cover Panel
Back Of Frame
Power Cord Plug
I/O Connector Ports
Power Supply
Power Supply Fan Vent
I/O Template
Expansion Slot Inserts
Vent Holes
Feet (Back Pair)
Front Of Frame
External 5.25" Drive Bays
External/Internal 3.5" Drive Bays
LED and Speaker Wires
Auxiliary Cooling Fan
Drive Power Connectors
Bottom Of Frame

MOTHERBOARD

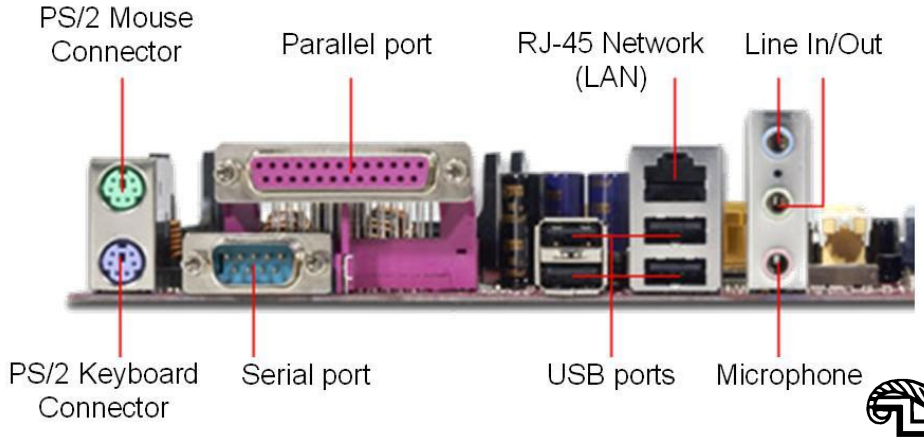


Processor socket



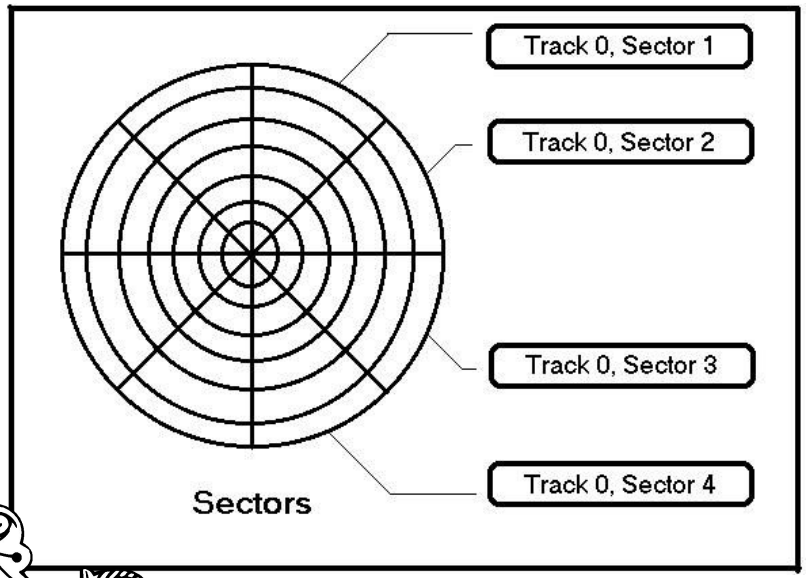
RAM chips

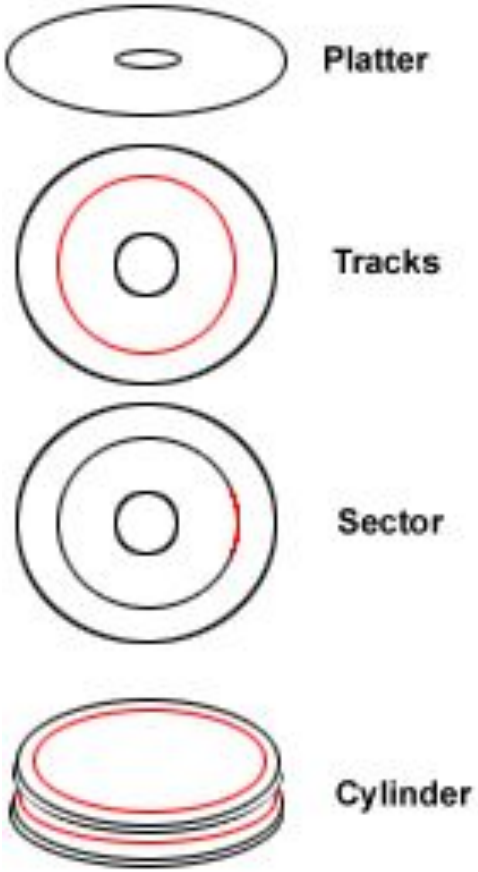
Input/output ports



EXTERNAL MEMORY

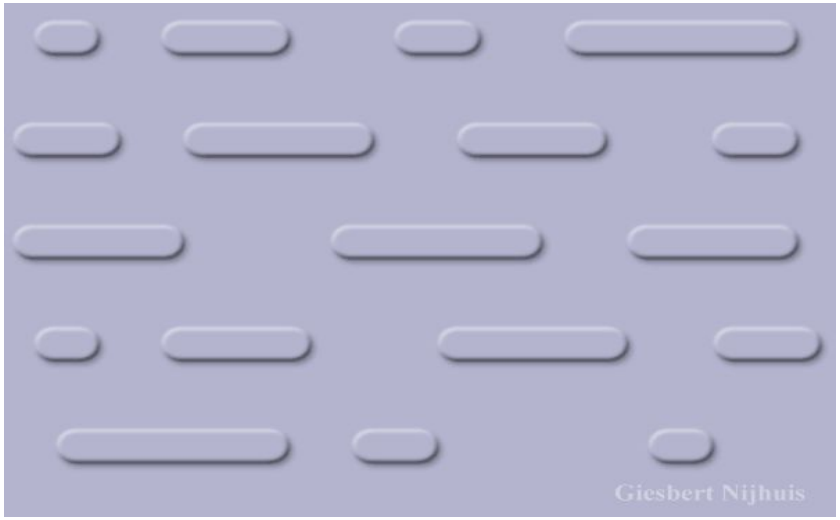
Hard Drives


Track 0, Sector 1
Track 0, Sector 2
Track 0, Sector 3
Track 0, Sector 4
Sectors


Platter
Tracks
Sector
Cylinder
http://www.computerhope.com

CD/DVDs

- Lands and pits used to represent binary
- Optical medium - lasers and refraction used to read lands and pits



INPUT

Output Devices

Lines connecting the name of the device and the name of the action performed by them.

Outputs information

Mouse

Keeps information

Hard Driver

Plotter

Microphone

Keyboard

Monitor

Joystick

Scanner

CPU

Printer

Monitor

Web-cam

CD

Inputs information

Speakers

Process information