

Computers

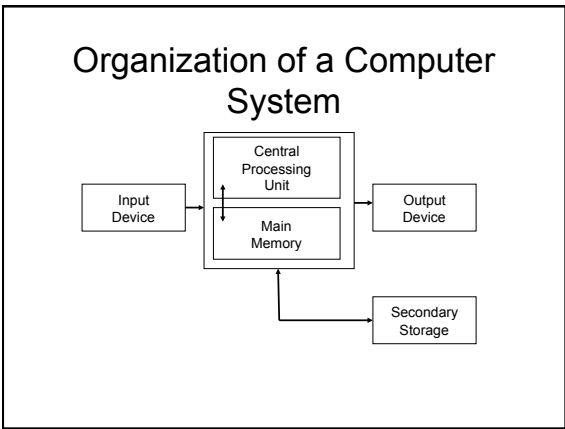
Definition

- A computer is a machine for manipulating data according to a list of instructions. (wikipedia.org)
- Computer. A machine that can be programmed to manipulate symbols.

- Computers can perform complex and repetitive procedures quickly, precisely and reliably and can quickly store and retrieve large amounts of data.

History of Computing Hardware

First Generation	Mechanical/Electromechanical
Second Generation	Vacuum Tube
Third Generation	Integrated Circuits
Fourth Generation	VLSI
Theoretical	Optical, quantum, chemical



- ### Input Devices
- Keyboard
 - Scanner
 - OCR
 - Mouse
 - ...

Output Devices

- Printer
 - Dot matrix
 - Inkjet
 - Laser
- Video Terminal
- ...

Memory

- There are different kinds of computer memory, which is storage for your computer.
- RAM
- ROM
- Secondary storage

Secondary Storage

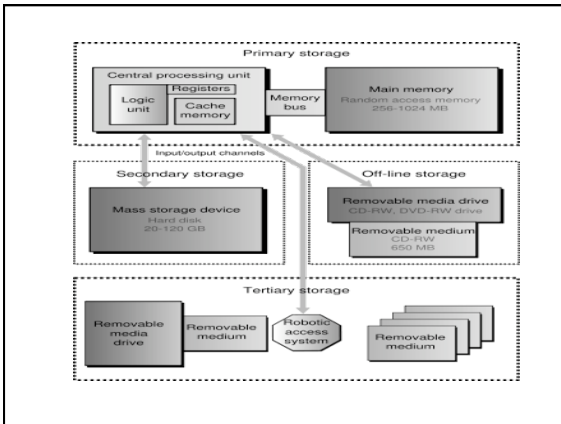
- **secondary storage**, or **external memory**, is computer memory that is not directly accessible to the central processing unit of a computer, requiring the use of computer's input/output channels.
- Secondary storage is used to store data that is not in active use. Secondary storage is usually slower than primary storage, or internal memory, but also almost always has much higher capacity-to-cost ratio and is non-volatile, which makes it perfect for the preservation of stored information in an event of power loss.

Storage devices

- Flash memory
- Floppy disk
- Hard disk drive
- Magnetic tape
- Optical disc drive
- Paper tape
- Punch card
- RAM disk
- USB flash drive
- Zip Drive

Giant Step

- Microprocessor



System

- Layers of a computer system

Software (applications)
Operating System
Hardware

(from the most general and basic components to the most specialized)

Operating System

- interface between the hardware and the software

- interface between the hardware and the user

Describing Computer Performance

- Early computers such as Colossus and ENIAC were able to process between 5 and 100 operations per second.
- The first commercial computer (1951), the UNIVAC I, operated at a rate of 100,000 addition operations per second.
- A typical PC today can perform a billion (1,000,000,000) additions per second.

More Performance

- **FLOPS** (or **flops**) is an acronym meaning **F**loating point **O**perations **P**er **S**econd. The FLOPS is a measure of a computer's performance, especially in fields of scientific calculations that make heavy use of floating point calculations.

Nomenclature

<http://en.wikipedia.org/wiki/SI>

Aspects of Performance

- **Computer performance** is characterized by the amount of useful work accomplished by a computer system compared to the time and resources used.
- Depending on the context, good computer performance may involve one or more of the following:
 - Short response time for a given piece of work
 - High throughput (rate of processing work)
 - Low utilization of computing resource(s)
 - High availability of the computing system or application

Software

- Any program that we run on the computer is an example of software.
- All software is instructions that are written by programmers.
- Algorithm: a precise and systematic method for producing a specified result.
- Written in a programming language that can be compiled to machine code.
- Machine instructions are very simple and there aren't very many.
