

What is a Computer?

A computer is an electronic device which processes data under the control of a set of instructions called program. It has the ability to accept data, execute the program, perform mathematical & logical operations on data. The result of the operations can be reported through output.

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Computer

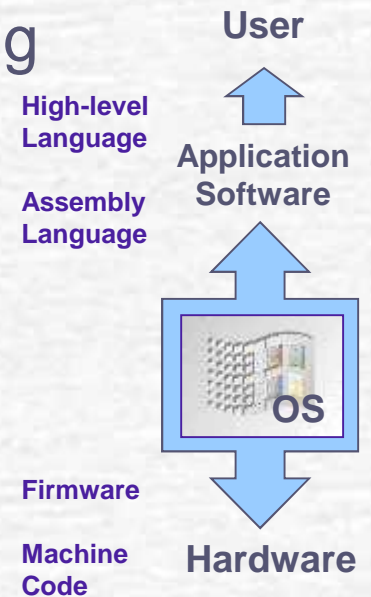
- Device capable of performing computations and making logical decisions
- Computers process data under the control of sets of instructions called computer programs
- *Personal computers*: economical enough for individual
- *Distributed computing*: computing distributed over networks
- *Client/server computing*: sharing of information across computer networks between file servers and clients (personal computers)



What is a Computer? (cont.)

Computer Hardware

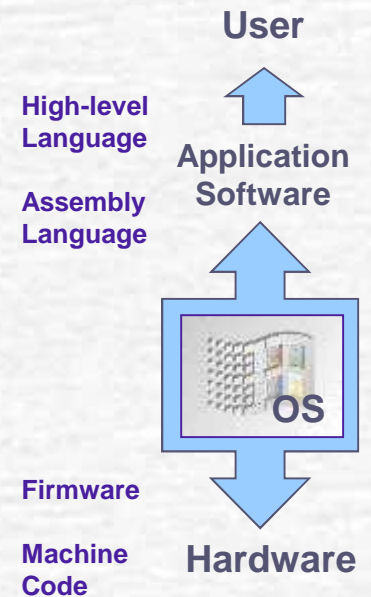
- Various devices comprising a computer:
- Keyboard, screen, mouse, disks, memory, CD-ROM, and processing units
- Hardware Trends: every year or two the following approximately double (Moore's Law):
 - Amount of memory in which to execute programs
 - Amount of secondary storage (such as disk storage)
 - Used to hold programs and data over the longer term
 - Processor speeds
 - The speeds at which computers execute their programs



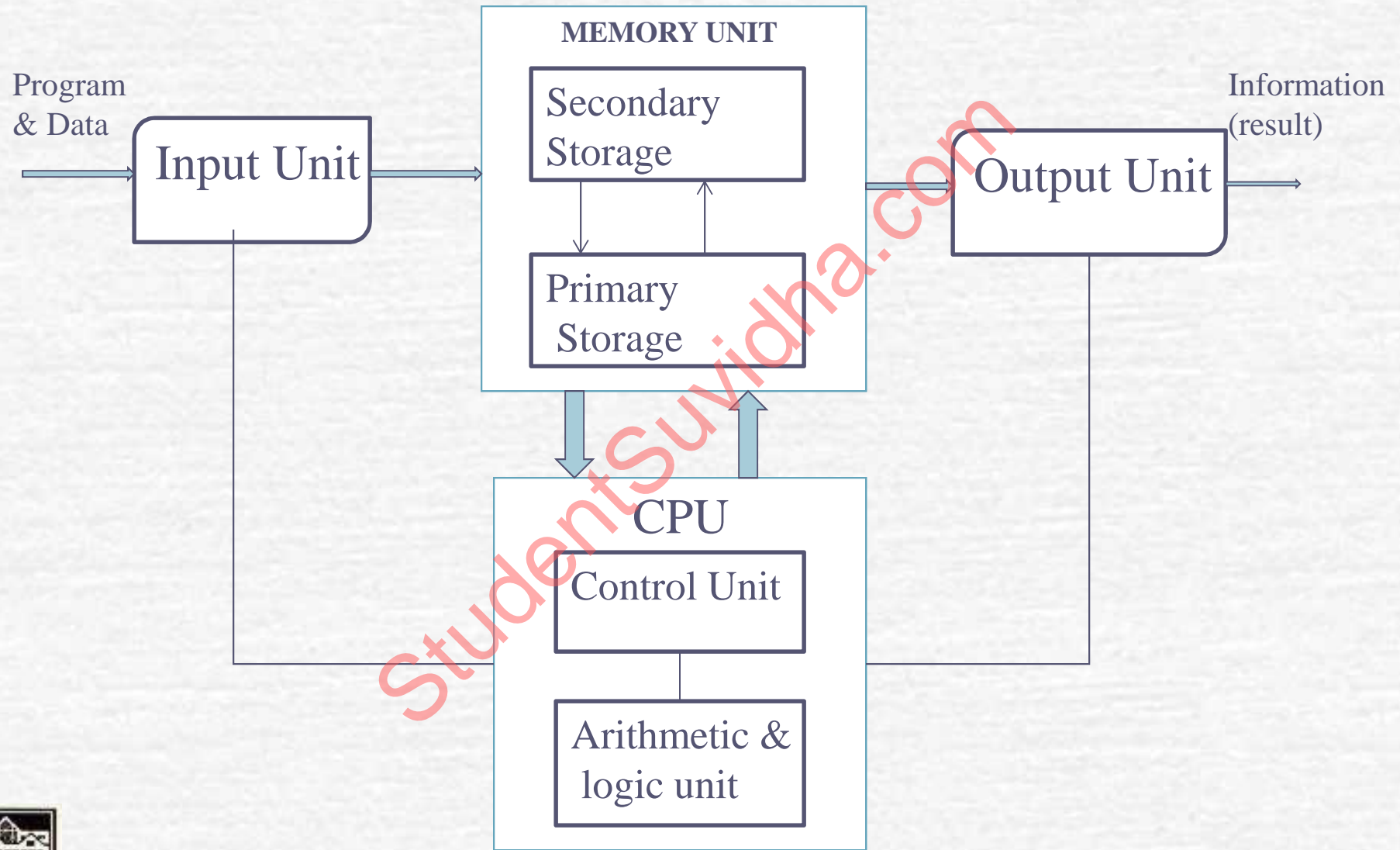
What is a Computer? (cont.)

Computer Software

- Computer Programs that run on a computer, including
 - Operation System (OS)
 - Application Software
 - Computer Language



Basic Computer Organization



Basic Computer Organization

Four units in every computer:

1. **Input unit**

Obtains information from input devices (keyboard, mouse)

2. **Output unit**

Outputs information (to screen, to printer, to control other devices)

3. **Memory unit**

Rapid access, low capacity, stores input information

ROM (Read Only Memory): CMOS, EPROM ...

RAM (Random Access Memory): SRAM, DRAM

4. **CPU(Central Processing Unit)**

Executes the programs stored in the main memory.



Basic Computer Organization (cont.)

Central Processing Unit (CPU),

- “brain” of a computer, consisting of
 - Arithmetic and logic unit (ALU): performs arithmetic calculations (addition, subtraction...) and logic decisions ($>$, $<$, $=$, ...)
 - Control Unit (CU): decodes each machine instruction and sends signal to other components for carrying out the instruction. Supervises and coordinates the other sections of the computer.
- An integrated circuit (IC) that is a full central processing unit is called a microprocessor (μp); a CPU's current instruction and data values are stored temporally inside the CPU in special high-speed memory location called registers.



Computer Organization (cont.)

Memory

- It provides space for storing data and instructions, intermediate results and results for output.
- **Primary Memory:** It is also known as main memory. It is directly accessible by the CPU & volatile in nature i.e. the contents of the main memory are lost as soon as power is switched off.
- **Secondary Memory:** It is also known as auxiliary storage, it includes magnetic storage devices such as hard disks, magnetic drums etc. It is not directly accessible by the CPU, it can be accessed by CPU through Input-Output controllers. It is non volatile memory. The contents can be maintained for a long time even when a computer system switches off or resets. It supplements the limited storage capacity.

