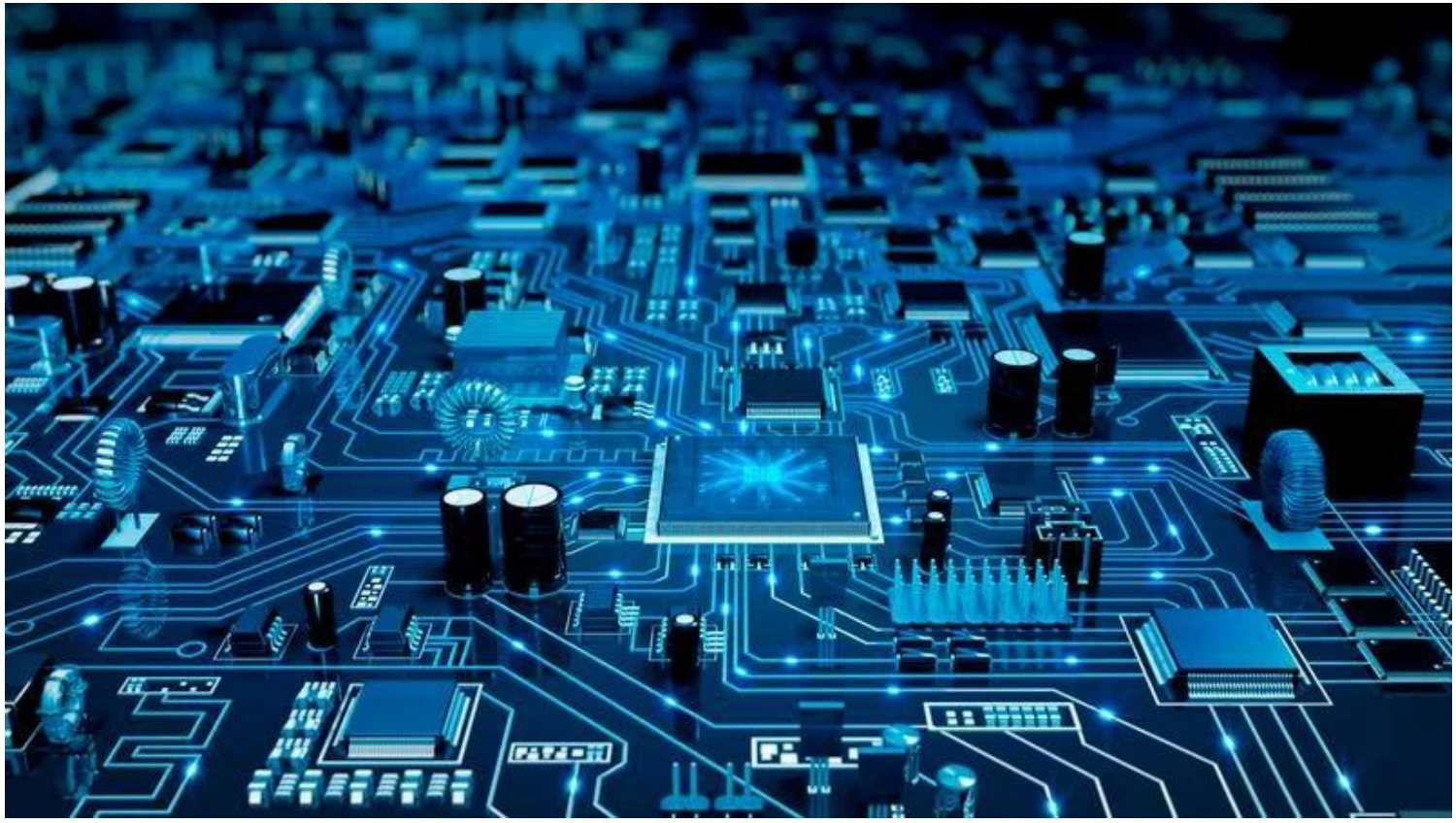
ملخص المحور الأول لمقياس الاعلام الالي

HardWare

Computer sciences (CS)

is the study of computers and computing, including their theoretical and algorithmic foundations, hardware and software, and their uses for processing information.



INFORMATIQUE

INFORMA **TIQUE**

INFORMATION **AUTOMATIQUE**

ICT

Information & Communication Technology

ICT

It refers all devices , network components , application and systems that allow people to interact in the digital world.

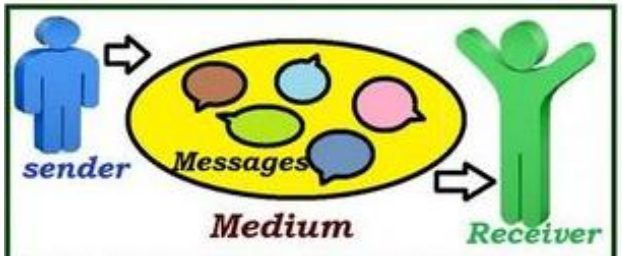
Information

The representation of data in a meaningful way is called Information.

Data : text ,symbols , numbers, pictures, audio and video

Communication

communication referred as imparting or exchanging of information by speaking , writing or using some other medium.



Technology

It refers to methods, systems and devices, which are a result of scientific knowledge, being used for practical purposes.

الحاسوب (الكمبيوتر) Ordinateur/Computer:

1- A computer is defined as an electronic device designed for storing and processing data, typically in binary form

A computer can be described as an electronic device that can receive data, process the data, and produce the result as the outcome

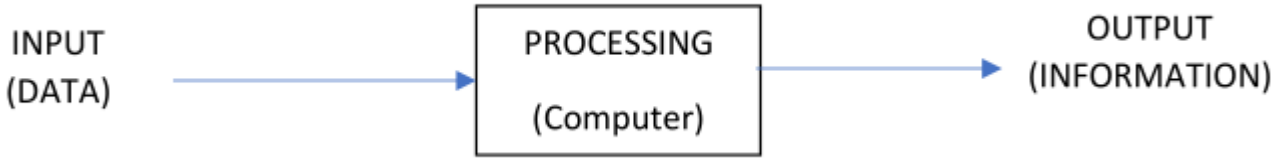
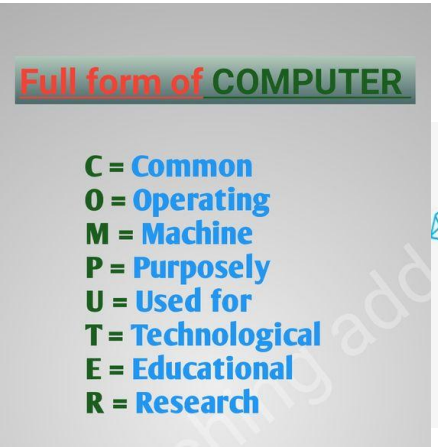
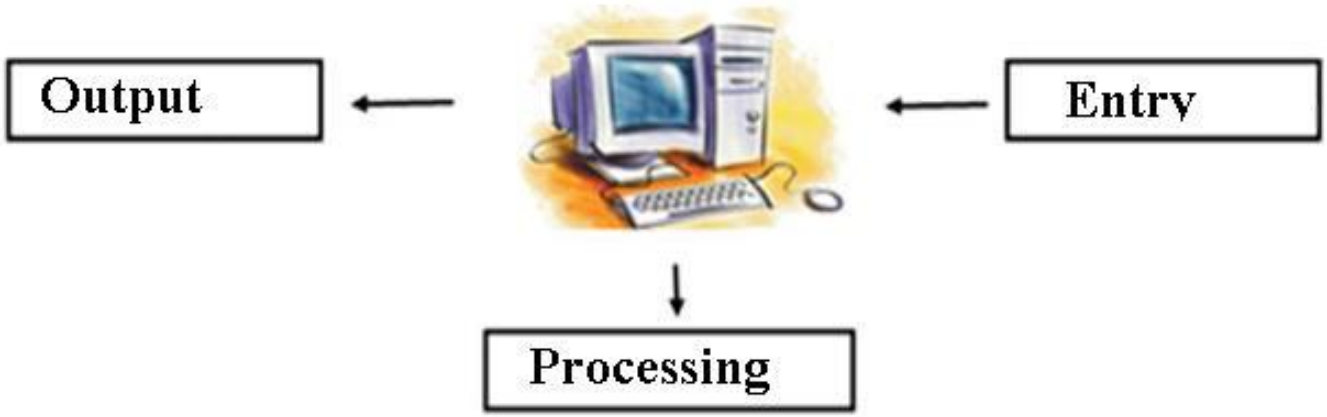


Figure: Computer Device Data Flow Process



The computer is a device capable of processing information according to the following steps:

- Data entry using input units.
- Storing data on storage units
- Data processing by the processor
- Output of data (i.e., results) using output units



Some definitions:

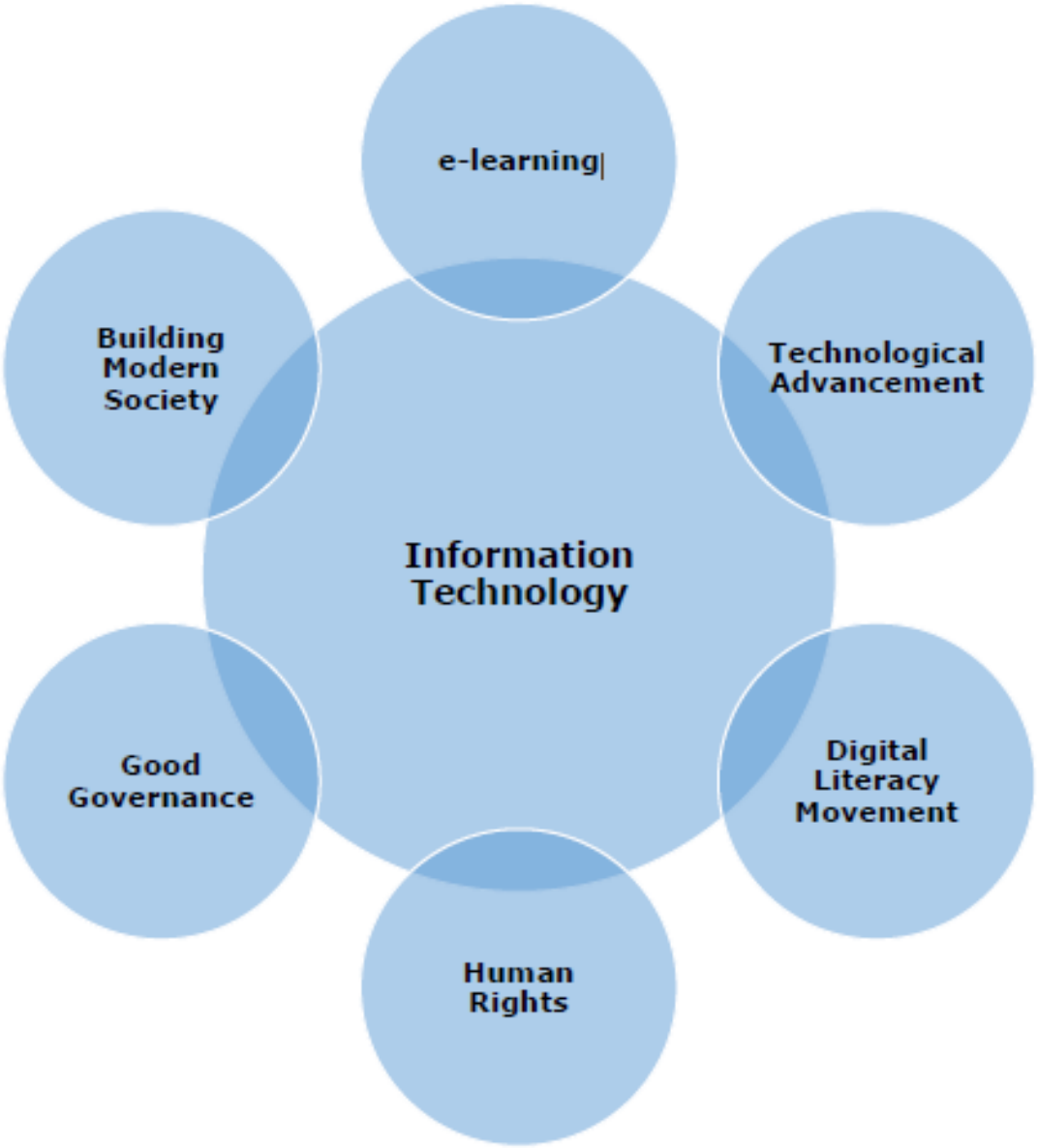
Information: is the result of analyzing and interpreting pieces of data All information is manipulated in binary form (a sequence of 0 and 1, the language of the machine) by the computer.

Data: is defined as a collection of individual facts or statistics, Data can come in the form of text, observations, figures, images, numbers, graphs, or symbols.

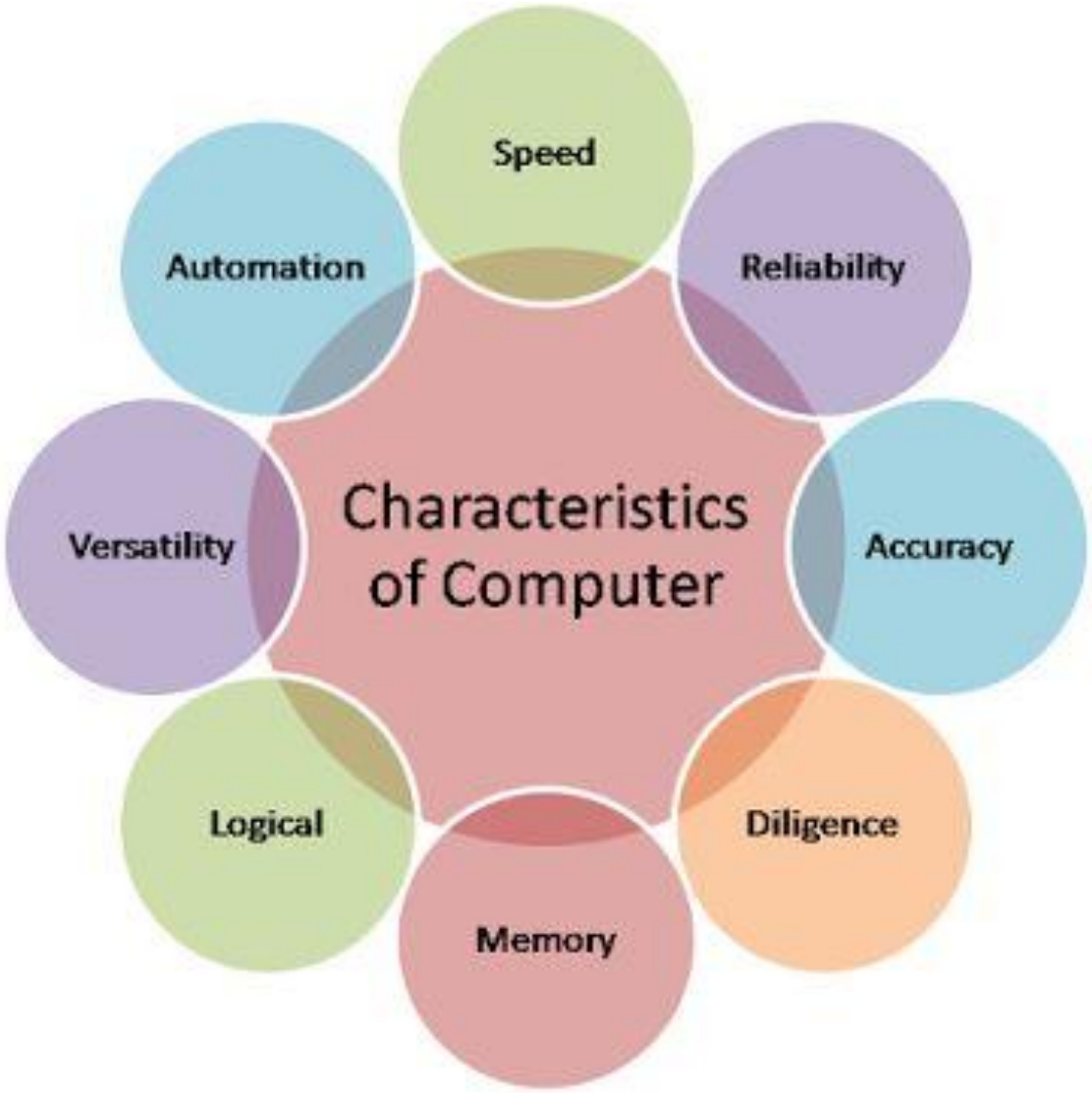
-2- is a raw form of knowledge and, on its own, doesn't carry any significance or purpose.

Data processing: transformation of input data to outputs by a program

APPLICATION OF INFORMATION TECHNOLOGY



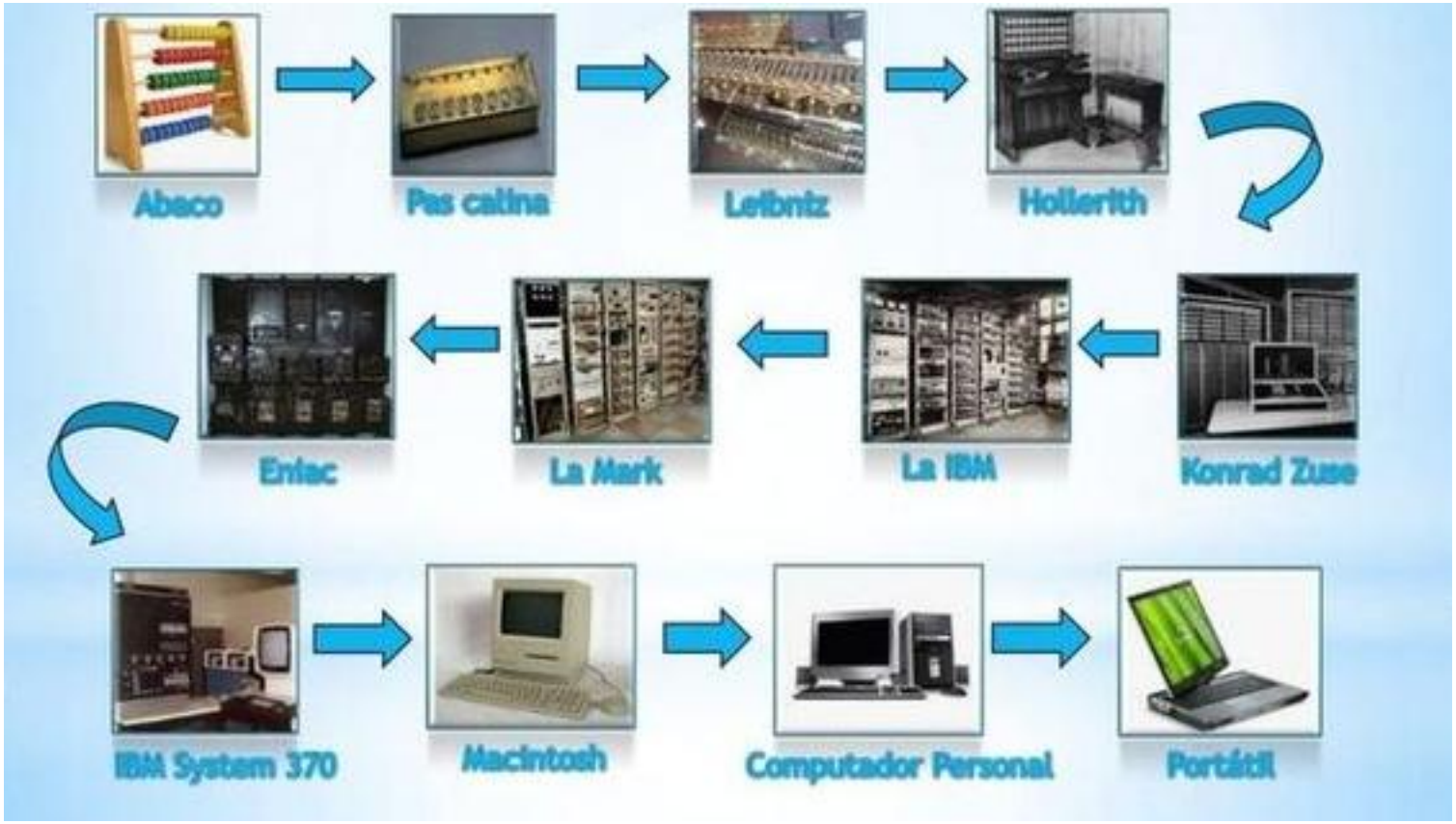
Characteristics of a Computer



History and Evolution of Computer Systems

The History of computer systems is about the developments from early simple devices to aid calculation to modern day computers. The following are some of the calculating devices that precede modern day computers

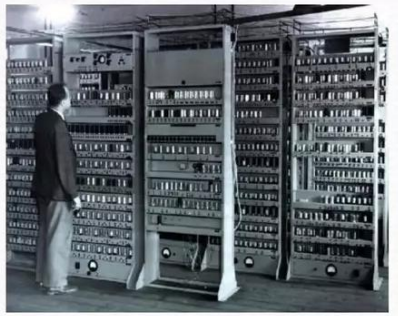
Abacus - Pascal's calculator - The Difference Engine - Mark I
ENIAC(Electronic Numerical Integrator And Computer)



Electronic Era:

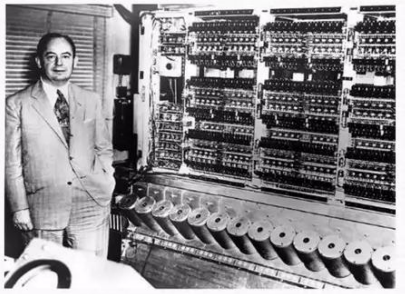
- **ENIAC** (Electronic Numerical Integrator And Calculator) by John W. Mauchly and J.P. Eckert: 1947
- **EDSAC** (Electronic Delay Storage Automatic Calculator) by M. Wilkes: 1949
- **EDVAC** (Electronic Discrete Variable Automatic Calculator) by Von Neuman
- **UNIVAC I** (Universal Automatic Computer) by Mauchly and J.P. Eckert :1951

ENIAC



EDSAC

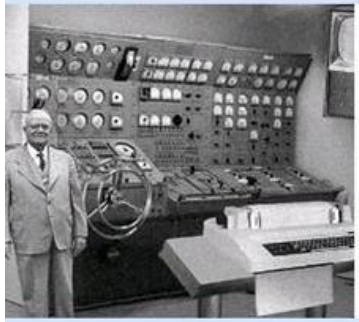
UNIVAC I



EDV

Générations of Computers

1st Generation Computer:



Period	1940-1956
Circuitry	Vacuum tube
Memory Capacity	20 KB
Processing Speed	300 IPS inst. per sec.
Programming Language	Assembly Language
Example of computers	UNIVAC, EDVAC

2nd Generation Computer:

Period	1956-1963
Circuitry	Transistor
Memory Capacity	128KB
Processing Speed	300 IPS
Programming Language	High-level language
Example of computers	IBM 1401, CDC 3600, D UNIVAC 1108

3rd Generation Computer:

Period	1964-1971
Circuitry	Integrated chips (IC)
Memory Capacity	1MB
Processing Speed	1MIPS (1 million inst. per sec.)
Programming Language	C, C++
Example of computers	IBM 360 series, 1900 series

4th Generation Computer:

Period	1971-present
Circuitry	Microprocessor (VLSI)
Memory Capacity	Semiconductor type and very high
Processing Speed	Faster than 3rd generation
Programming Language	C, C++, Java
Example of computers	Pentium series Multimedia, Stimulation

Générations of Computers

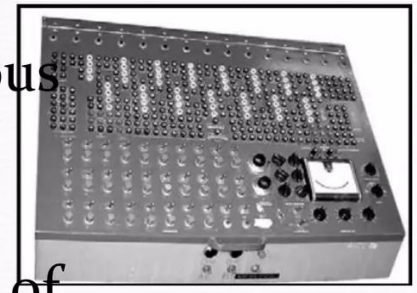
5th Generation Computer:

Period	Present & beyond
Circuitry	ULSI (Ultra Large Scale Integration technology)
Memory Capacity	VLSI and ULSI
Processing Speed	Very fast
Programming Language	All the Higher level languages
Example of computers	Artificial Intelligence, Robotics

Classifications and Types of computers

According to the computer Working Principle:

1. **Analog Computer:** measuring continuous type of input data. like; current, voltage etc.



Analog Computer

2. **Digital Computer:** counting discrete type of input data (digits). Like; number, letter etc.
3. **Hybrid Computer:** combines the features of Analog and Digital computers. Used in Hospital, scientific research etc.

Digital Computer

Classifications and Types of computers

According to the purpose of use:

1. **Special Purpose Computer:** doing particular task or application. (Hybrid computer).

2. **General Purpose Computer:** doing different tasks or different applications. (Digital computer).

Classifications and Types of computers

According to the Computer Size:

1. **Micro Computer:** desktop, laptop, notebook (education, graphical design, etc.). **2. Mini Computer** (data processing programing, business, etc.). 3. **Mainframe Computer** (telecom companies, large scale data processing, etc.). 4. **Super Computer** (weather forecasting, space research

Laptop Desktop

Classifications and Types of computers

Microcomputers:
Desktop and Portable

- Desktop (PC)
- Laptop (Notebook)
- Netbook
- Tablet
- PDA (Personal Digital Assistant) or Handheld
- Smart Phone

Smart Phone

Tablet

Netbook

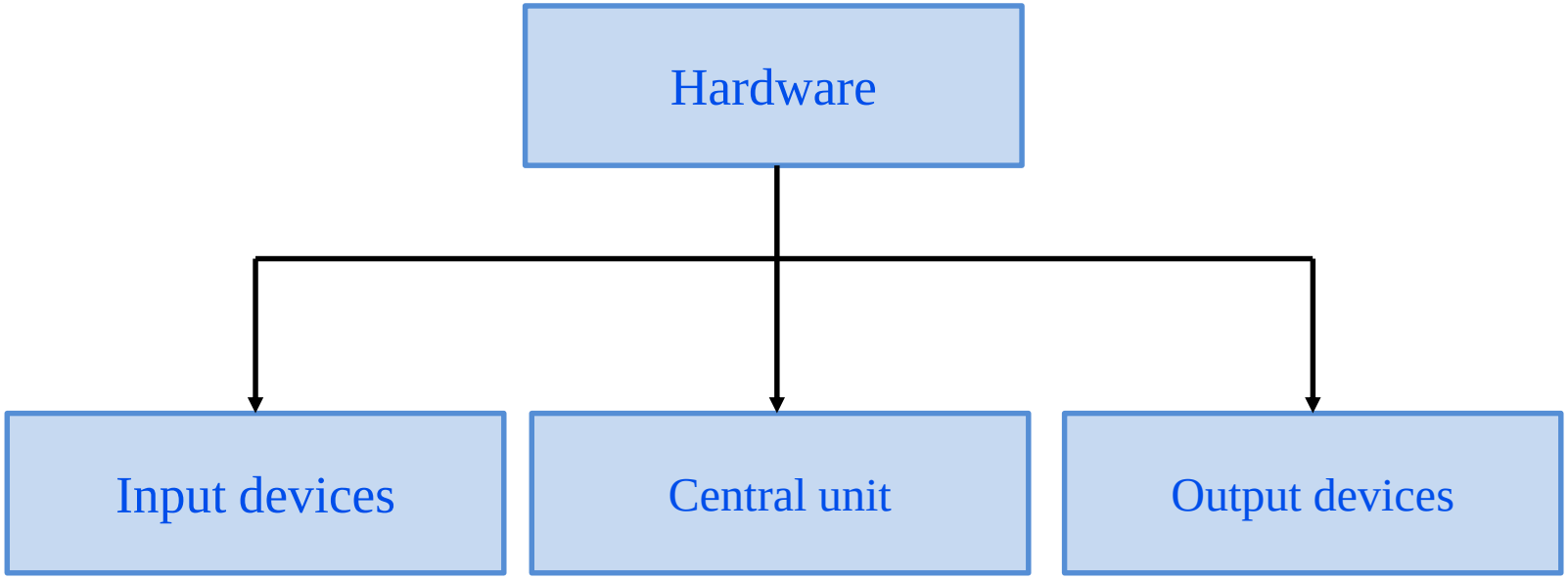
PDA

Computer system consist of two Component

Hardware

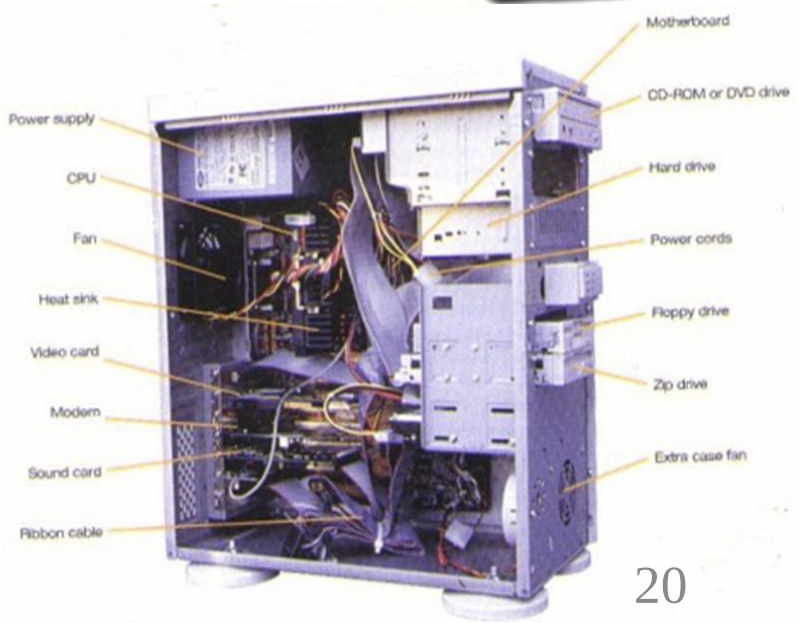
Types of peripheral devices fall into three general categories, they are:

- Input devices: such as a mouse and a keyboard
- Output devices: such as a monitor and a printer
- Central unit



Central unit

The case of the central unit contains several internal components (the motherboard and its components, the disk drive) and external components (CDs/DVDs, flash disks



Central unit

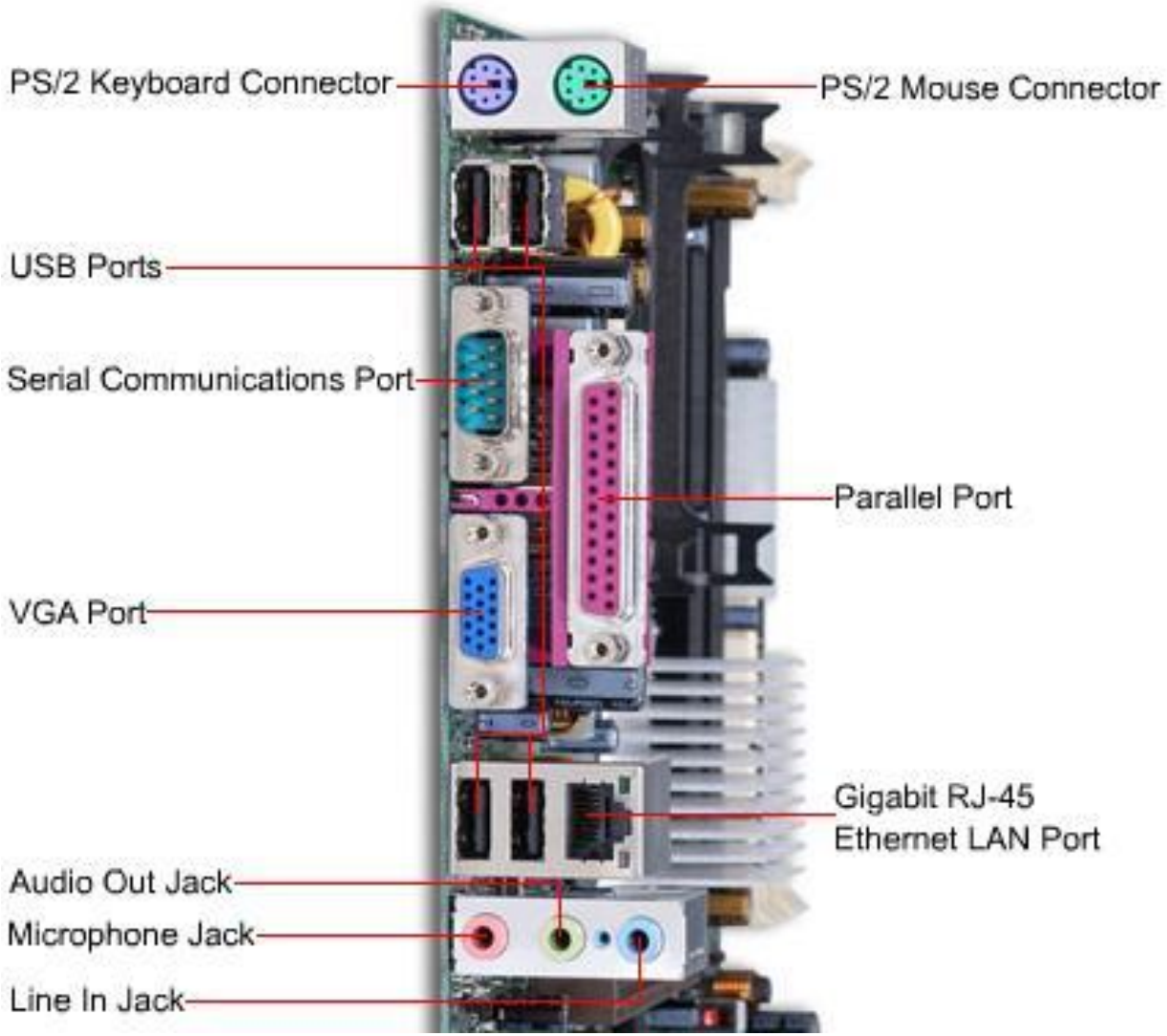
The motherboard and its components

A circuit board that allows the CPU to interact with other parts of the computer

Main board on which we find all the necessary components for the operation of a computer, in particular the processor, the central memory, and the expansion slots intended to receive cards extension

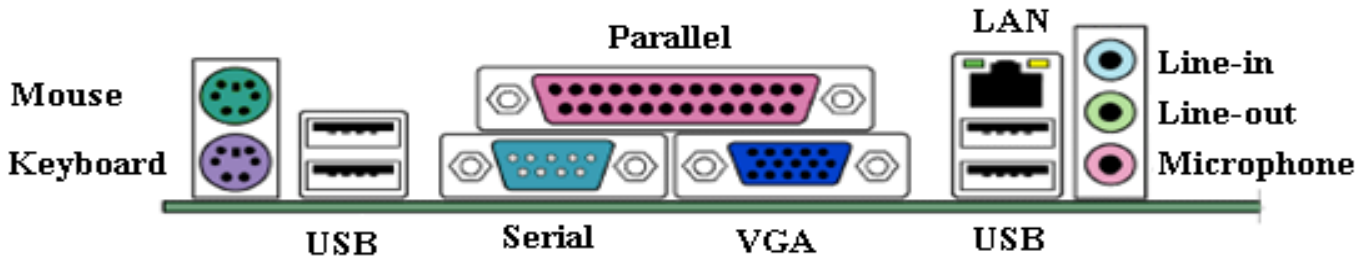
The motherboard and its components

Motherboard ports



The motherboard and its components

Motherboard ports



PS2 port : mouse / keyboard 

Parallel port used to connect multiple peripherals such as a parallel port printer.

Serial port used to connect multiple peripherals such as a serial port printer

VGA port used to connect the central unit to the screen

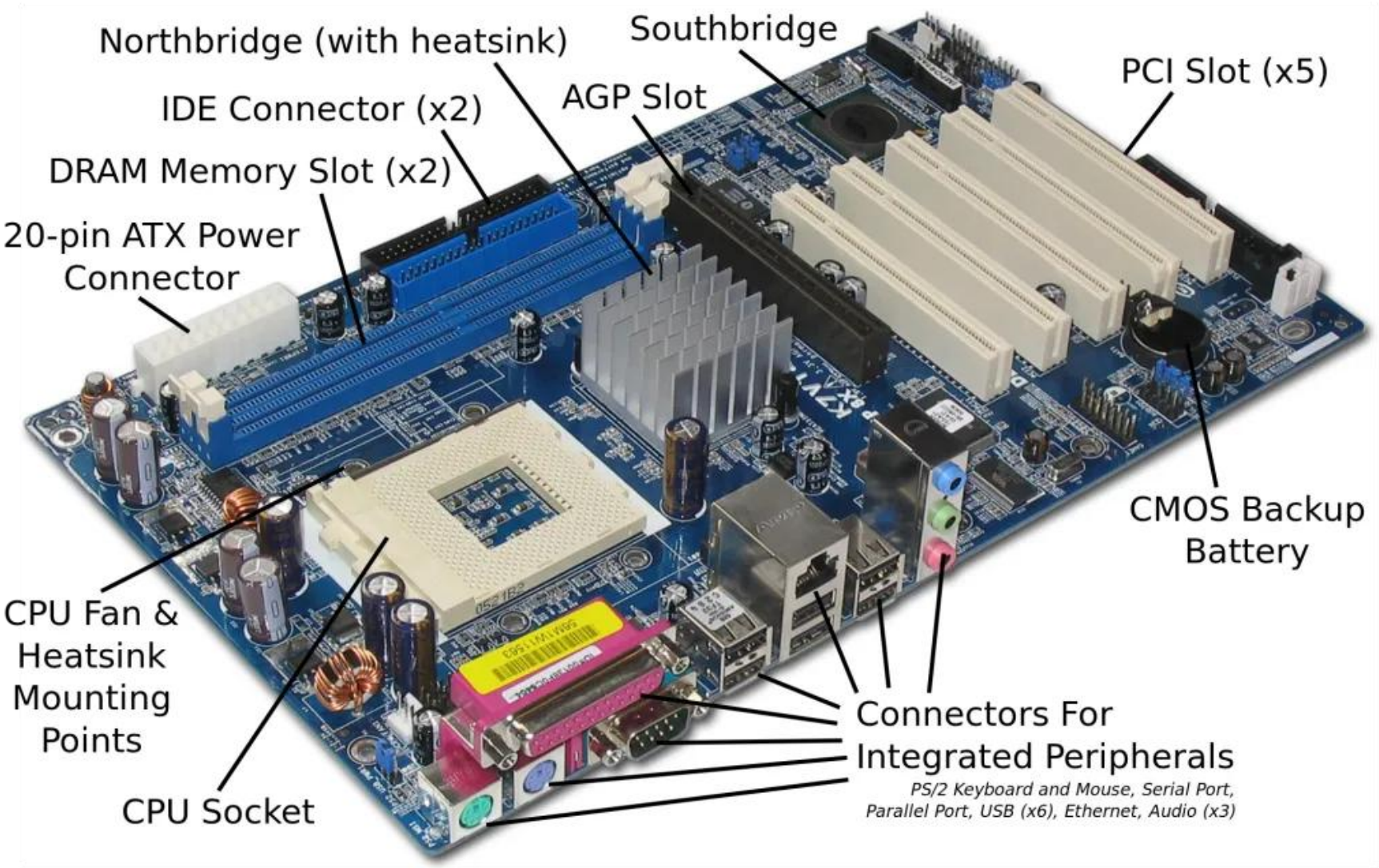
USB Ports

Network port (LAN)

Jack speakers' line-in and line-out

Microphone input jack

The motherboard and its components



Processor

The processor (or CPU, for Central Processing Unit) is the brain of the computer. It is an integrated circuit that allows data processing. It is characterized by its speed, which is measured in Ghz (Giga hertz) which corresponds to the number of operations per second. One Ghz represents one billion operations per second

Central Processing Unit (CPU): It is the main unit inside the computer that executes instructions to do arithmetic and logical operations to process the input data and control all events inside the computer.

Processor

The processor consists of two units: the ALU (Arithmetic and Logic Unit) and the UC (Unit Control).

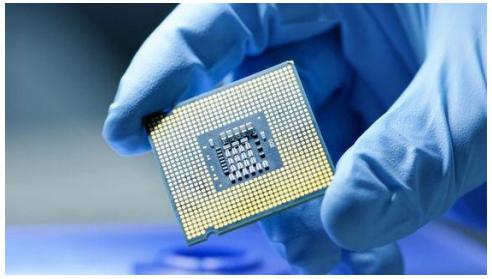
the UC:

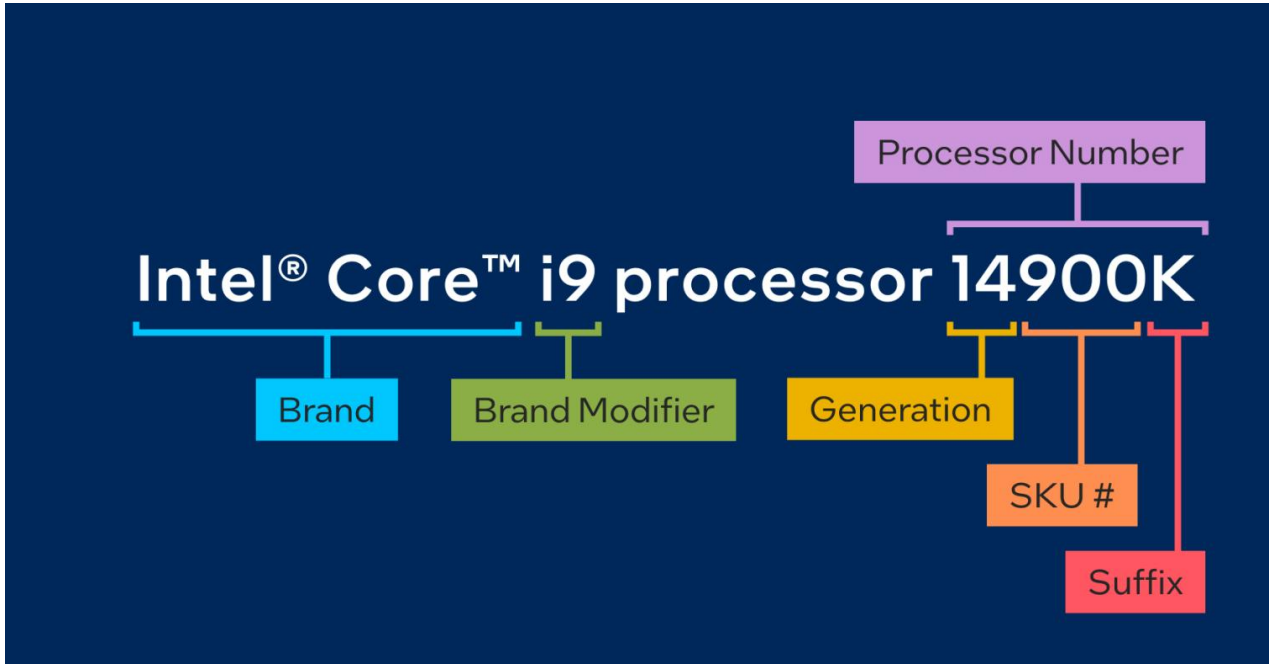
The control unit is responsible for managing the process of moving data and program into and out of memory. It is also responsible for carrying out (executing) program instructions - one at a time. This includes the idea of a 'register' to hold intermediate computational values.

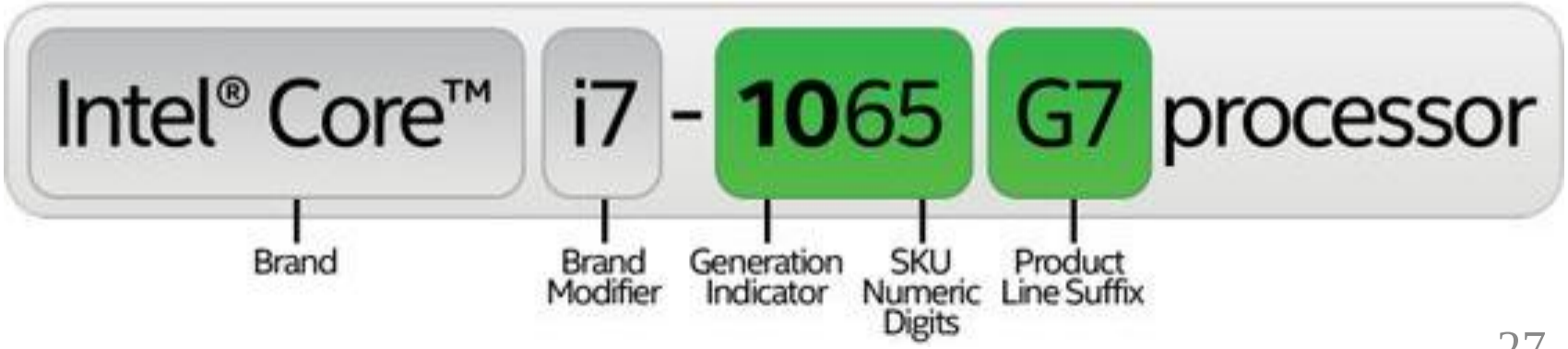
The UAL:

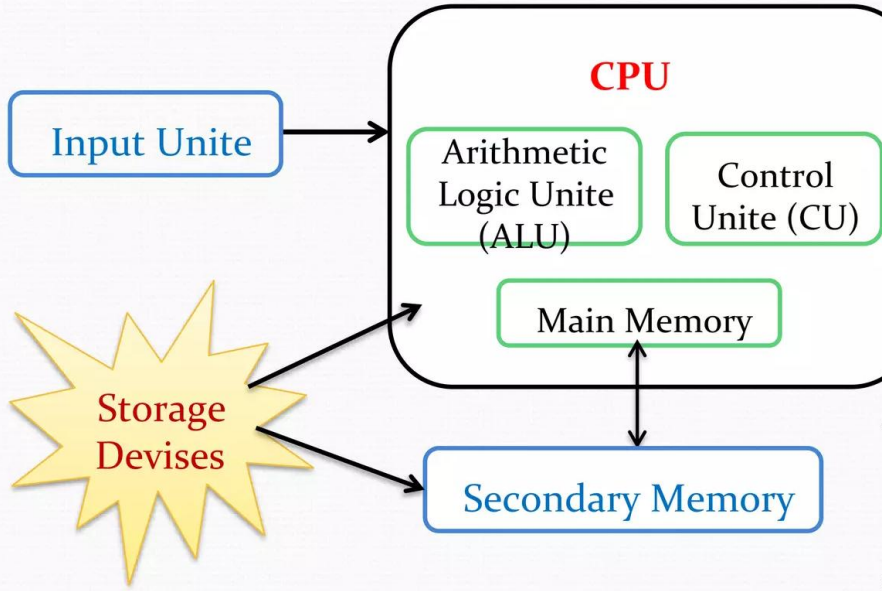
The Arithmetic/ Logic Unit (ALU) performs mathematical operations ((+, -, x, /, …) and logic operations (=, <, >, and, or, not, ...). The ALU is a sub-component of the CPU (Central Processing Unit)

Processor




Processor Number
Intel® Core™ i9 processor 14900K
Brand
Brand Modifier
Generation
SKU #
Suffix


Intel® Core™
i7
-
1065
G7
processor
Brand
Brand Modifier
Generation Indicator
SKU Numeric Digits
Product Line Suffix



- **CPU:** measured in Megahertz (**MHz**) andGigahertz (**GHz**).
- Most popular CPU are: **Intel** and **AMD**.

Memory

The size of a memory is measured in Octet / Byte (abbreviated as Ø). It represents a memory space allowing the storage of a single character (number, letter or any other symbol).

1 Ø = 1 byte = 8 Bit

1 Bit = Binary Digit

8 Bits = 1 Byte

1024 Bytes = 1 KB (Kilo Byte)

1024 KB = 1 MB (Mega Byte)

1024 MB = 1 GB(Giga Byte)

1024 GB = 1 TB(Tera Byte)

1024 TB = 1 PB(Peta Byte)

1024 PB = 1 EB(Exa Byte)

1024 EB = 1 ZB(Zetta Byte)

1024 ZB = 1 YB (Yotta Byte)

1024 YB = 1 (Bronto Byte)

1024 Brontobyte = 1 (Geop Byte)

Computer Data Storage and Memory Devices

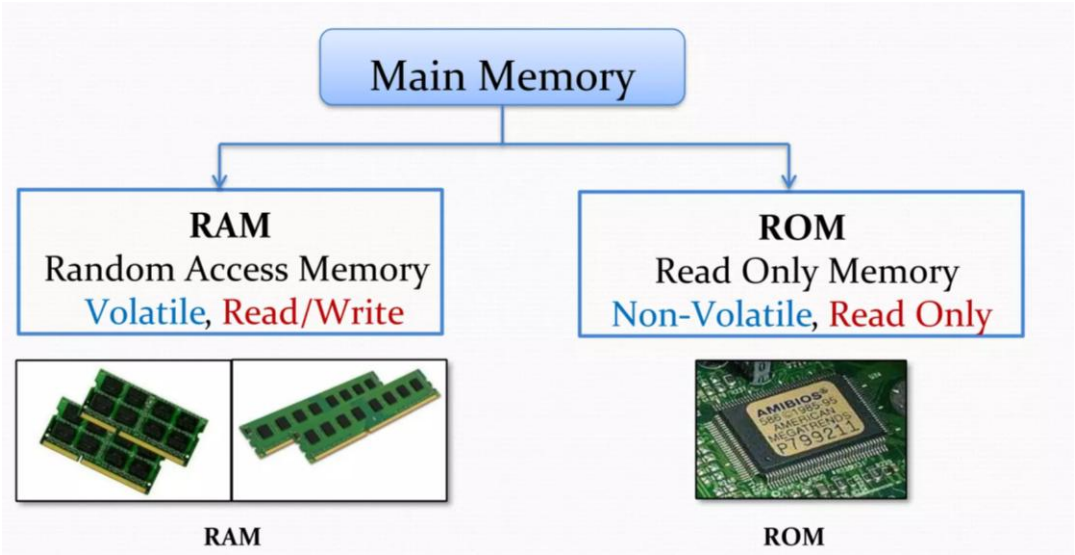
The term memory usually refers to a form of semiconductor storage and sometimes other forms of fast but temporary storage. Similarly, today the term storage more commonly refers to mass storage such as optical discs, forms of magnetic storage like hard disks and other types.

Generally , the computer memory is divided into two category : **primary memory** and **secondary memory**

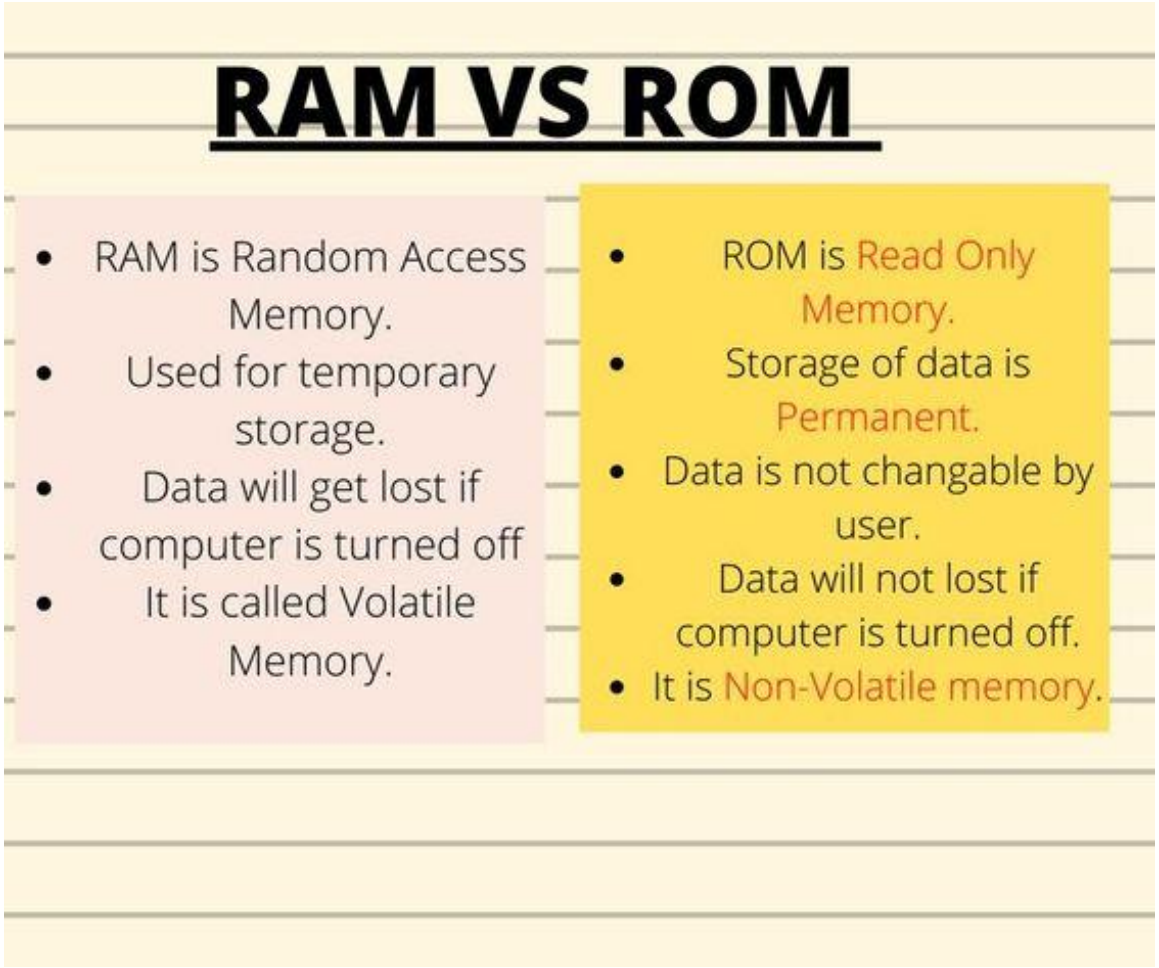
Primary memory

is directly accessible to the CPU

This type of memory is divided into the following two types :



RAM / ROM


RAM VS ROM
RAM is Random Access Memory.
Used for temporary storage.
Data will get lost if computer is turned off
It is called Volatile Memory.
ROM is Read Only Memory.
Storage of data is Permanent.
Data is not changable by user.
Data will not lost if computer is turned off.
It is Non-Volatile memory.

Secondary memories

Secondary memory or storage provides the facility of storing information and programs permanently. It differs from primary memory in that it is not directly accessible by the CPU.

Secondary Memory

- Magnetic Disks:
  - Hard disks (500 GB, 1TB)
  - Floppy disks (MB1.44 MB and 2.88)
- Magnetic Tape (185 GB)
- Optical Storage:
  - CD-ROM, CD-R, CD-RW (700 MB)
  - DVD-ROM, DVD-R, DVD-RW, and DVD-RAM (4.7 GB)

CD: Compact Disk

DVD: Digital Versatile Disk

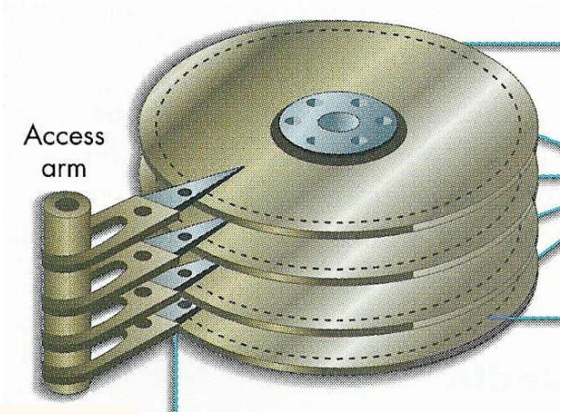
- Pen Drive
- Memory Cards
- External Hard Disk

Floppy Disks Hard and Sold Drives

Pen Drive COM DVD

Magnetic Tape External Hard Disk Memory Cards

(Hard disk Driver)



Power supply unit

The computer power supply module which is located in the system unit case enables the conversion from 100-240V alternating current to low-voltage direct current voltage to power the internal components according to the requirement specifications. Some systems like laptops have the in-built batteries for power backup when utility power supply fails.

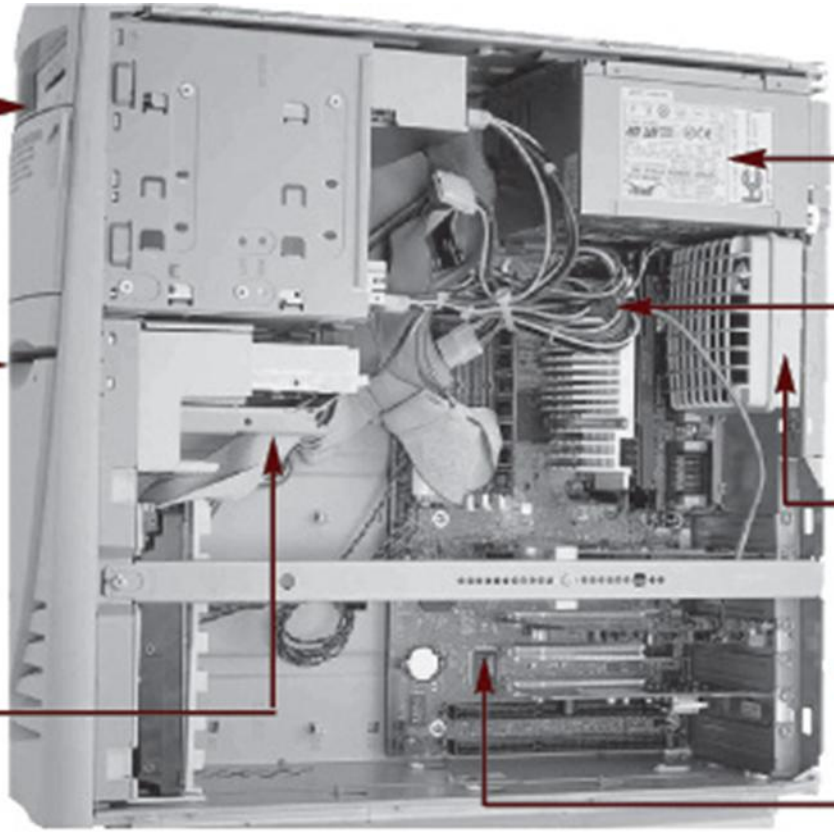
Video card

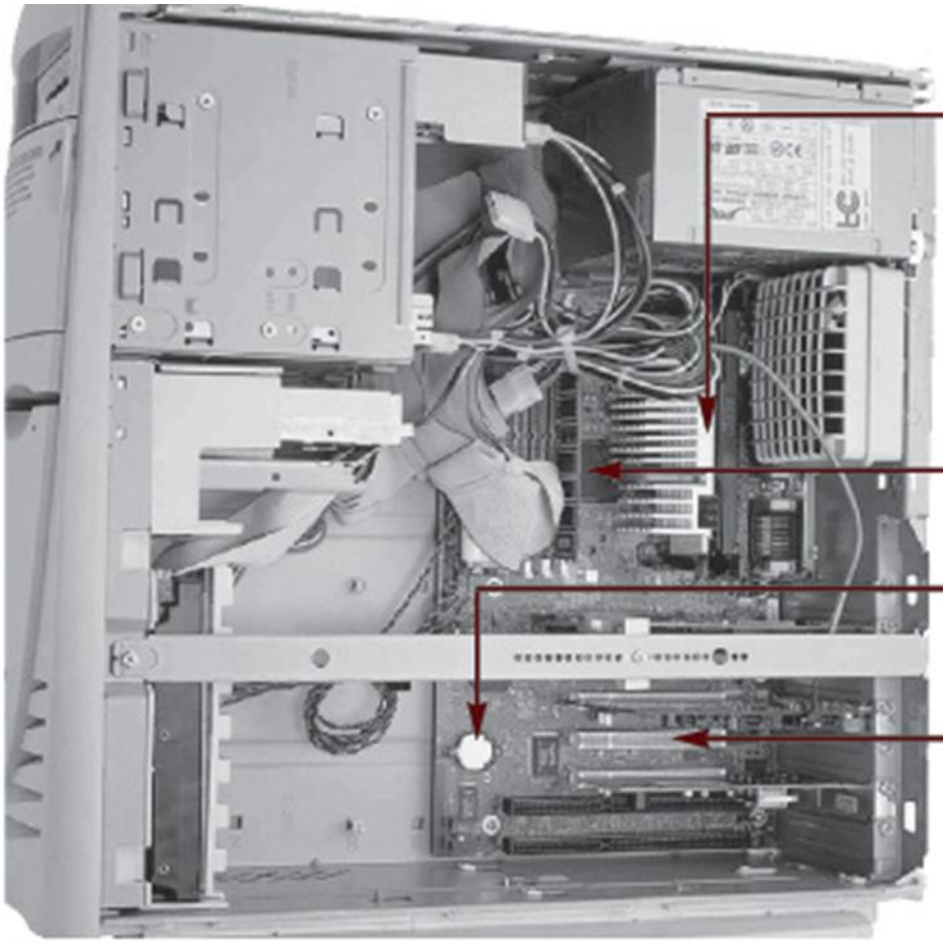
Sound card

Modem

Floppy Disk driver

Lazer Disk driver


محرك الأقراص الضوئية أو المضغوطة
CD-Rom Drive
محرك الأقراص المرنة
Floppy Drive
محرك الأقراص الصلبة
Hard Disk Drive
مزود الطاقة الكهربائية
Power Supply
أسلاك كهربائية
مروحة تبريد
Cooler Fan
اللوحة الأم وبقية الوحدات المثبتة عليها
Motherboard



المعالج
Processor

الذاكرة العشوائية
RAM

بطارية حفظ التاريخ والوقت
Battery

منافذ تثبيت بطاقات/ وحدات إضافية مثل بطاقة صوت أو شبكة
Port/Slots

Input Devices وحدات الإدخال

Input Unit: It is the unit that entered the data in to a computer from the **Input Devices:**

1. Keyboard
2. Mouse
3. Light Pen
4. Trackball
5. Joystick
6. Tag Reader


Mouse


Keyboard


Trackball


Light Pen


Digital Cameras


Joystick


Tag Reader

Input Devices وحدات الإدخال

8. Point Of Sale Terminal (POS Terminal)
9. Magnetic Ink Character Recognition(MICR)
10. Voice Recognition Systems
11. Graphic Tablet
12. Vision Systems
13. Scanners
    - Barcode Reader
    - Optical Mark Reader (OMR)
    - Optical Characters Reader (OCR)


MICR


POS Terminal


VRS


Barcode Reader


OCR

OMR

Graphic Tablet

Output Devices

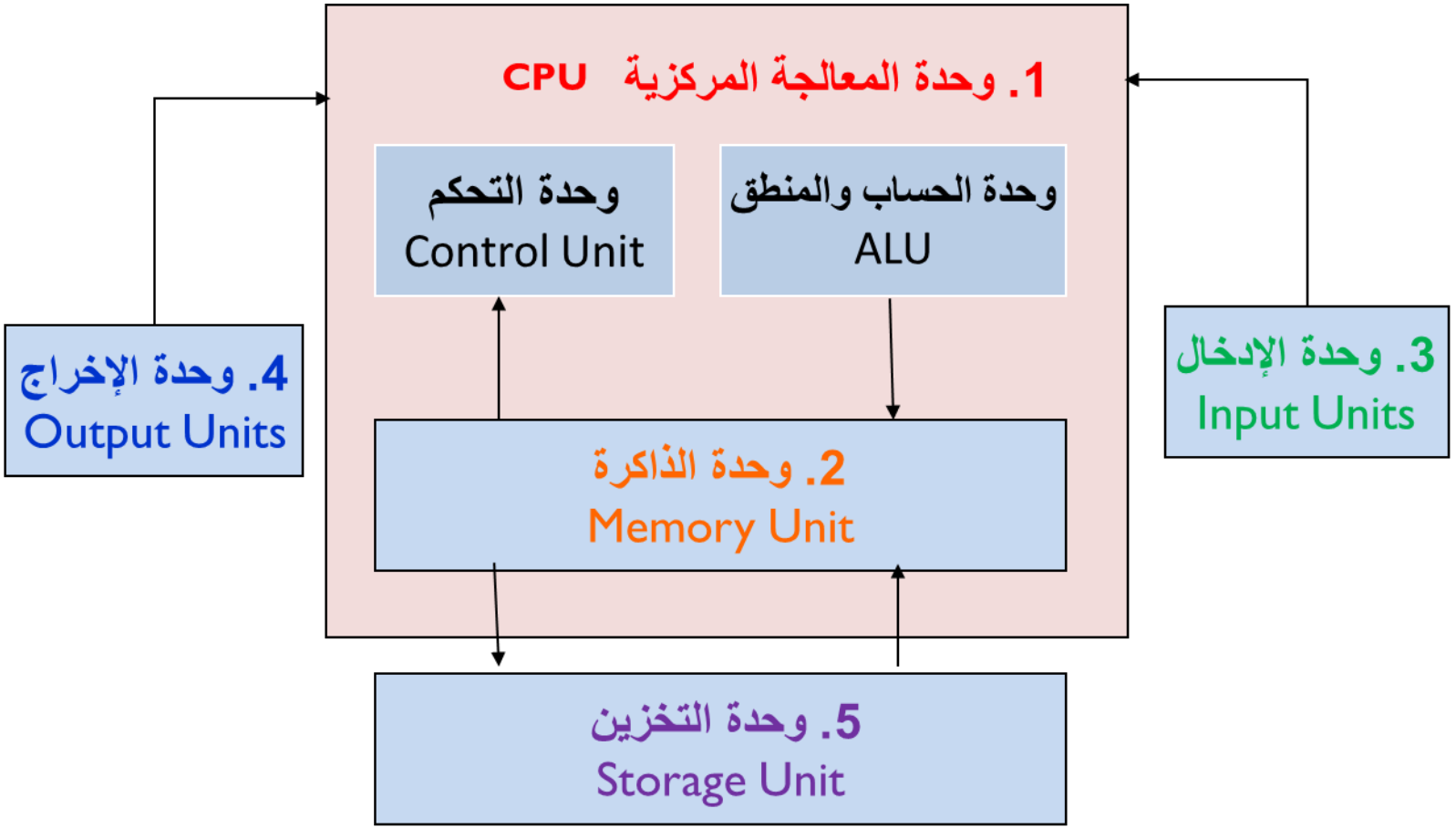
Output Unit: It is the unit that gives the results of processed data as an output from a computer by using the **Output Devices :**

1. Monitors:
   - Cathode Ray Tube (CRT)
   - Liquid Crystal Display (LCD)
   - Light Emitting Diodes (LED)
2. Speakers
3. Printers
4. Plotters

Printer

Monitor

Plotters


1. وحدة المعالجة المركزية CPU
وحدة التحكم
Control Unit
وحدة الحساب والمنطق
ALU
2. وحدة الذاكرة
Memory Unit
3. وحدة الإدخال
Input Units
4. وحدة الإخراج
Output Units
5. وحدة التخزين
Storage Unit