Lec 1: COMPUTER FUNDAMENTALS- Part1
Dr. Sedeeq Al-khazraji
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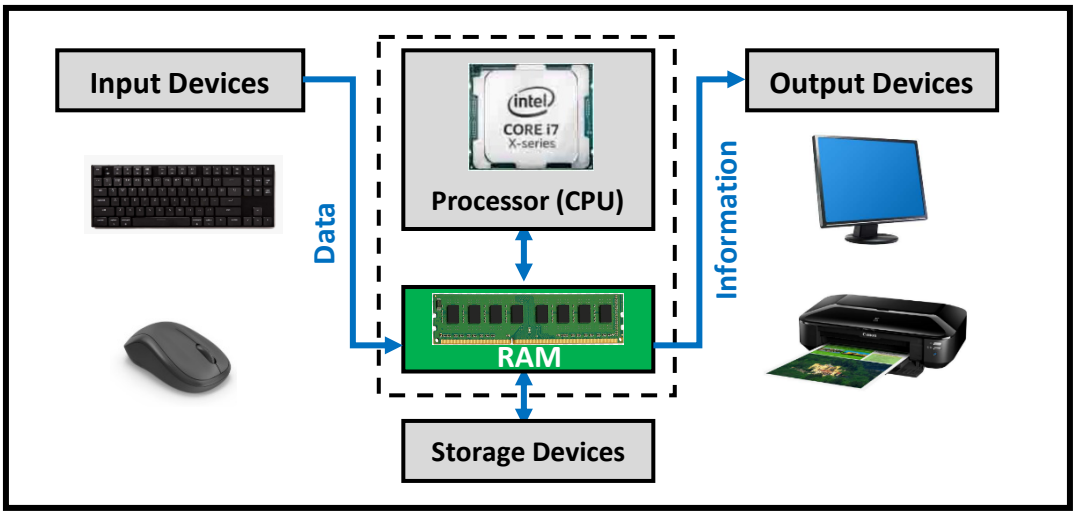
1.1 BASICS OF A COMPUTER

❖ What is a computer?

A computer is an electronic machine that accepts data, stores and processes it according to instructions (programs) in order to produce the results (information). The word "computer" comes from the word 'compute', which means to calculate.



Data: is a raw material and unorganized facts that need to be processed.

Information: When data is processed, organized, structured or presented in a given context to make them useful, it is called **Information**.

1.2 CLASSIFICATIONS OF COMPUTERS

1.2.1 Personal Computer (or Microcomputer)

- **Desktop Computer**: a personal computer designed to fit on a desk. It is typically made up of a system unit (Case), a keyboard, a mouse, and a monitor.

- **Laptop Computer**: a portable computer with an integrated screen and keyboard. It is battery-powered and more portable than a desktop computer.
- **Tablet Computer:** a handheld computer that is more portable than a laptop. Instead of a keyboard and mouse, tablets use a touch-sensitive screen for typing and navigation.
- **Smartphone:** a more powerful version of a traditional cell phone with a touch-sensitive screen. Smartphones can connect to the Internet and you can use them for browsing the Web, receiving and sending emails, or playing games.

Desktop

Laptop

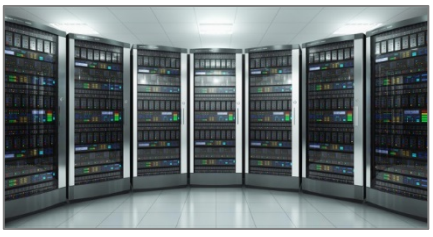
Tablet

Smartphone

1.2.2 Server

A server is a software or hardware device that accepts and responds to requests made over a network. The device that makes the request, and receives a response from the server, is called ***a client***. On the Internet, the term "Server" commonly refers to the computer system that receives requests for web files and sends those files to the client.

1.2.3 Mainframe Computer



A very large and expensive computer capable of supporting hundreds, or even thousands, of users simultaneously. In some ways, mainframes are more powerful than supercomputers because they support more simultaneous programs. However, supercomputers can execute a single program faster than a mainframe.

1.2.4 Supercomputer

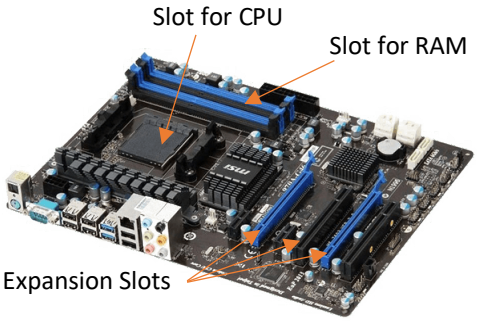
The fastest and most powerful type of computer. Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations, such as weather forecasting, nuclear energy research, and petroleum exploration.

1.3 HARDWARE

The term hardware refers to the physical component of the computer. Computer hardware incudes input devices, output devices, central processing unit (CPU), motherboard, power supply, random access memory (RAM), and other components.

1.3.1 Motherboard

The motherboard is the main circuit board of your computer. It is where most of the parts and peripherals are connected. It holds the central processing unit CPU, random access memory RAM, read only memory ROM, and other components.



1.3.2 The Central Processing Unit (CPU)

Central processing unit (CPU) is the central component of the Computer System. Sometimes it is called as microprocessor or processor. It is the brain of the computer. All functions and processes that are done on a computer are performed directly or indirectly by the processor.

The CPU consists of transistors that receives data and instructions, process (calculate) the data according to the instructions, and produce the results of the calculations. The most common types of computer processors are Intel and AMD.

❖ Processor Speed

The Speed of the CPU is a primary factor that determines the computer's performance. CPU speed is the number of cycles per second at which the processor operates and can process information. The more cycles that a processor unit can complete per second, the faster data can be processed. Processor speed is measured in ***megahertz***.

A hertz equals one cycle per second. For Example, a processor with 3.8 GHz runs 3.8 billion cycle per second. To help CPUs run faster, multi-core processors were developed. Multi-core processor means having two or more processors on one integrated circuit, such as: dual-core and quad-core processors.

❖ Parts of the processor:

1. **Arithmetic Logic Unit (ALU)**: It is the part of the computer processor (CPU) used to perform arithmetic operations (such as: addition, subtraction, multiplication, and division) and logic operations such as comparison.
2. **Control Unit (CU)**: It directs operations within a computer's processor. It receives instructions from a program, then passes them to the arithmetic logic unit (ALU), and sends these results of processing to the corresponding program as output.
3. **Register**: It is a temporary storage area of the computer processor. It holds data that is being worked on by the processor. The size of the register is measured in ***bits***. The available sizes in the market are 32-bit or 64-bit.

❖ How a processor works?

For every single instruction to be execute, the CPU repeats the machine cycle that consists of four operations: ***fetching, decoding, exulting, and storing***.

Fetching: is the process of getting the instruction or data from the memory.

Decoding: is the process of translating the instruction into signals that computer can execute.

Executing: is the process of carrying out the command.

Storing: means writing the result to the memory.