جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

College of Sciences
Intelligent Medical System Department

Lecture 1

Introduction to computer fundamentals

Subject: Computer Fundamentals

Level: First

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Why Learn Computer Fundamentals?

- Helps you understand how computers work and solve problems effectively.
- Makes it easier to learn new technologies and improve career opportunities.
- Enables safe and efficient use of computers and software.
- Builds confidence to adapt to rapid changes in technology.
- Important for your career as almost every working professional uses computers in one or the other form.

What is a computer?

A computer is an electronic device that processes data according to instructions provided by software programs. It takes input (data), processes it using a central processing unit (CPU), stores information, and produces output (results) to perform various tasks.

Types of Computers

There are various types of computers that are used today based on the need of user. Some of the types are:

- **Desktop:** Desktops are mainly used for regular use and they have separate components mounted together like the monitor, keyboard, mouse, CPU etc. Since the system is primarily kept on a desk for better usability it is called a desktop.

- **Laptop:** Laptops are a portable version of desktops, with all the components integrated into a single unit thus providing mobility to the system. They are great for on-the-go work and come with built-in webcams, Bluetooth and Wi-Fi.

- **Servers:** Servers are special types of computers that are used to manage network resources. They provide services to other systems and computers. Some of the primary tasks of servers include creating databases, hosting and providing support to other applications.

- **Tablets:** Tablets are even more portable than laptops. They are smaller than laptops but are larger than smartphones. They come with touchscreens which makes them perfect for browsing the web, consuming content and personal communications.
- **Other devices:** Other devices include smartphones, game consoles, Smart TVs etc.

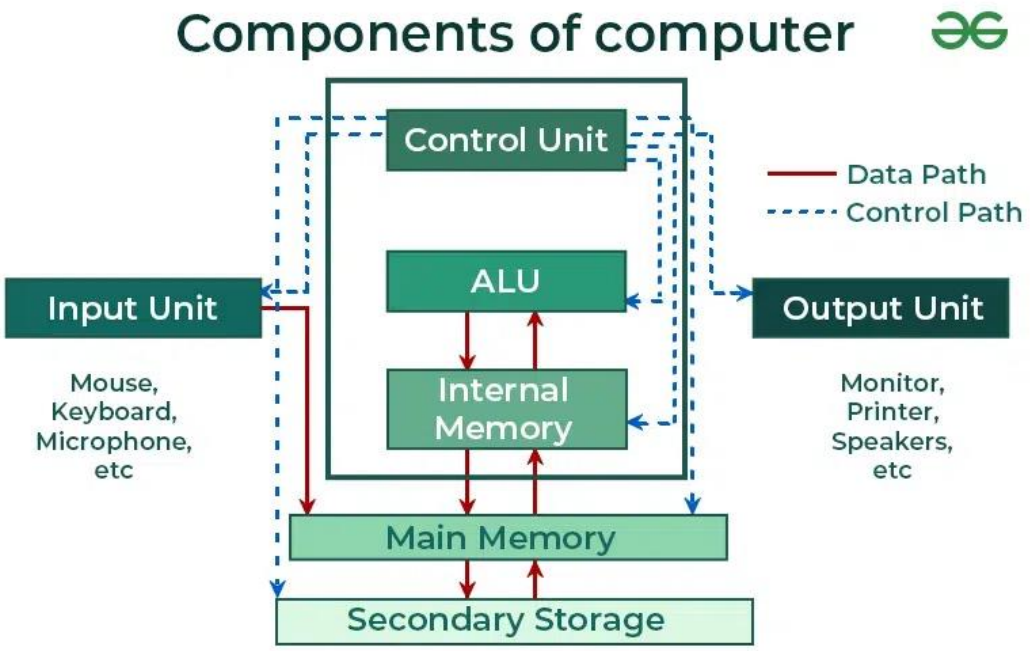
How does the Software Work with Hardware?

When you give input (e.g., typing a letter on a keyboard), the hardware (keyboard) sends this input to the software. The software then converts the input into a machine-readable language (binary) that the CPU can process. The output (e.g., the letter 'A') is then displayed on the screen as a result of this process.

Example Process:

1. You press the Shift key and the A key on your keyboard.
2. The software translates this into machine code and tells the CPU that the letter ‘A’ should be displayed.
3. The CPU processes the input, and the monitor shows the letter 'A'.

How Different Components Communicate?



What is a Software?

Software is a set of instructions that tells the computer what to do when to do, it and how to do it. Examples are, the paint that we use in Microsoft, WhatsApp, and games, all are types of different software. Suppose we want to add 2 numbers and want to know what 2 + 2 is 4. Then we must give the computer instructions,

- **Step-1:** take 2 values.
- **Step-2:** a store that 2 value

- **Step-3:** add 2 value by using + operator
- **Step-4:** save the answer

An interpreter is responsible for converting the software's human-readable code into machine language (binary code) that the CPU understands and executes.

What is Hardware?

Hardware refers to the physical components of a computer that you can touch and see. It includes all the devices and machinery required to make a computer function. Hardware performs tasks like storing data, processing information, and displaying results. Without hardware, there would be no platform for software to run.

Types of Hardware:

- Central Processing Unit (CPU) - Executes instructions and performs calculations.
- Memory (RAM) - Temporarily stores data that the CPU needs during operation.
- Storage Devices (HDD/SSD) - Store data permanently, even when the computer is turned off.
- Input Devices - Allow users to interact with the computer (e.g., keyboard, mouse).
- Output Devices - Display or produce results of the computer's processing (e.g., monitors, printers).

Types of Computers

Computers can be categorized in various ways based on size, processing power, functionality, and other parameters. Here's an overview of the different types:

1. Types of Computers Based on Size

- **Microcomputers:** Microcomputers are meant for individual use. They are small, compact and very small. For example smartphones and desktops.
- **Minicomputers:** They are used in businesses that are mid-sized and are more powerful than microcomputers. Servers are an example of minicomputers.
- **Mainframe computers:** These are used by large organizations. They help in the processing of bulk data.
- **Supercomputers:** These are extremely powerful computers that help in carrying out complex calculations. They aren't meant for personal use and are often used for research purposes.

2. Types of Computers Based on Processing Power

- **Personal computers (PCs):** These are the most common type of computer and are designed for personal use. PCs include desktops, laptops, and tablets.
- **Servers:** Servers are designed to manage and distribute resources and data to multiple users or devices. They are often used in businesses or organizations to store and share data and run applications.
- **Mainframes**: Mainframe computers are large, powerful machines that are designed to handle massive amounts of data and perform complex operations. They are often used in large corporations or government agencies.
- **Supercomputers:** Supercomputers are extremely powerful computers that are designed to process data at extremely high speeds. They are often used for scientific research and other specialized applications.
- **Embedded systems:** Embedded systems are small computers that are built into other devices, such as appliances, cars, and medical devices. They are

designed to perform specific functions and operate without human intervention.

- **Wearable computers:** Wearable computers are small, portable devices that are worn on the body, such as smartwatches or fitness trackers. They are designed to track data and provide information on the go.