جامعة الانبار

كلية العلوم التطبيقية – هيت

الحاسوب -1

BASIC COMPUTER SKILLS

On any given day, you will encounter computer systems in much of what you do, even if you don't realize it. The television channels you watch, the radio stations that you listen to, the car that you drive in, and even the cash register at the local grocery store are all controlled in some way by computer systems! They help us perform tasks, keep track of information, and even control the airplanes that fly above us. Throughout the course of this class, you will learn about how computers work, how to perform simple tasks, and more. As with most products, computers are designed in a variety of ways. There are, however, major similarities regardless of the brand (e.g., Dell, Apple, Acer, HP, Lenovo) of the computer.

Laptop

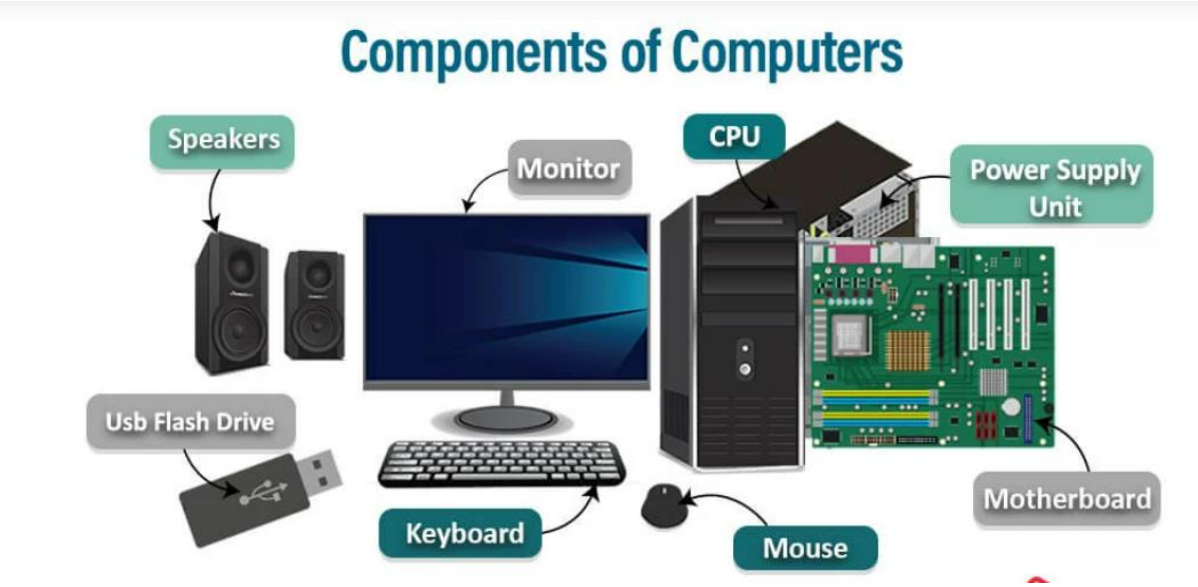
Desktop

What is a Computer?

A computer is an electronic device that processes data, executes instructions, and produces results. Computers are used in various fields, including education, research, healthcare, communication, and entertainment

There are two main types of computers: **Desktop Computers** and **Laptop Computers**. Desktop computers are larger, stationary devices designed for use in one location, typically at a desk. They consist of separate components such as a tower (CPU), monitor, keyboard, and mouse, allowing for greater customization and upgrades.

- **Computer Components :** A computer consists of two main components: hardware and software, which work together to perform tasks and operate efficiently.



1. Hardware: Refers to the physical components of a computer system that you can touch and see

Central Processing Unit (CPU) – The brain of the computer that processes instructions and runs programs.

Memory (RAM) – Temporary storage that helps the computer run tasks quickly but resets when turned off.

Hard Drive (HDD/SSD) – Stores files, software, and the operating system permanently.

Motherboard – The main circuit board that connects and allows communication between all components.

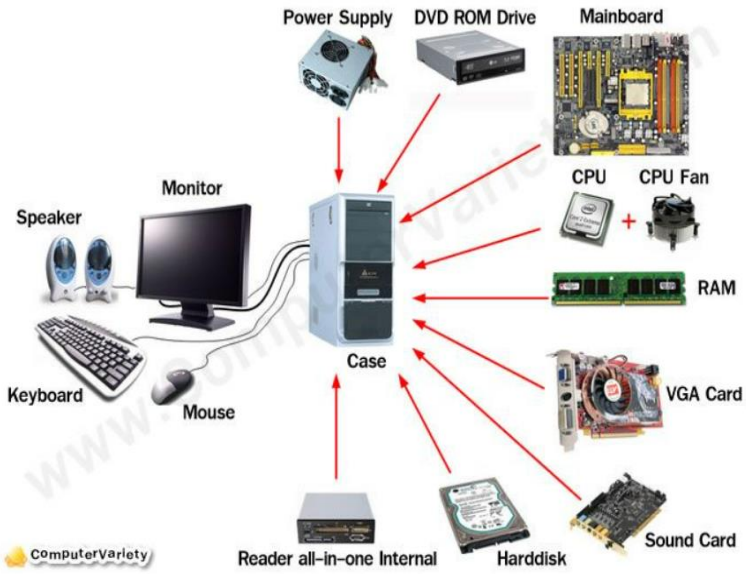
Graphics Processing Unit (GPU) – Handles images and videos, improving display quality and performance.

Monitor/Screen – is an output device that displays visual information generated by the computer's graphics card.

Power Supply Unit (PSU): Converts electricity from a power source into the proper form to power the computer's components.

Keyboard – A device with keys used for typing letters, numbers, and commands.

Mouse – A device that moves the cursor and helps select or open files and programs.



2. Software: refers to the collection of programs, procedures, and data used by a computer. Software can be system software (like an operating system) or application software (like productivity tools or games).

Examples of Software:

- **Operating Systems (OS)**:

- **Productivity Software**:

✓ **Microsoft Word**: A word processor used for writing documents.
✓ **Microsoft Excel**: A spreadsheet program used for data analysis, charts.
✓ **Google Docs**: A cloud-based word processing app.

- **Web Browsers**:

✓ **Google Chrome**: A fast and widely-used web browser.
✓ **Mozilla Firefox**: Another popular web browser known for privacy features.

- **Creative Software**:

✓ **Adobe Photoshop**: A photo editing and graphic design software.
✓ **Adobe Premiere Pro**: A video editing application used by professionals.

- **Media Players**:

✓ **VLC Media Player**: A versatile program that can play most media files.
✓ **Windows Media Player**: A default media player for Windows-based PCs.

- **Utility Software**:

✓ **Antivirus Software**: Programs like **McAfee** or **Norton**
✓ **Disk Cleanup**: A tool that removes unnecessary files

(Input/Output Unit) I/O Unit: is an essential part of a computer. It allows the computer to communicate with external devices. The I/O unit handles both input (data coming into the computer) and output (data going out from the computer), making it easier for users to interact with the system

Input Devices: These are the hardware components through which users send data or commands to the computer

Examples: Keyboard, Mouse ,Scanner, Microphone

Output Devices: These devices allow the computer to send processed data or results back to the user or external systems

Examples: Monitor, Printer, Speakers

Electronics and Communication: The Role of Computers

Computers are integral to modern electronics and communication systems. They serve as the foundation for many electronic devices, enabling faster and more efficient operations.

- **Electronic Devices**: Many consumer electronics, such as smartphones, smart TVs, tablets, and wearable devices, rely on computer systems. These devices use both hardware (such as sensors, displays, and microprocessors) and software to function.
- **Communication**: In the field of communication, computers facilitate the exchange of information

Memory Types

Memory is essential for storing data and instructions temporarily or permanently. There are different types of memory in a computer system:

- **Primary Memory** (also known as **Main Memory**):
    - **RAM (Random Access Memory)**: Temporary memory that is used by the CPU to store data that is actively being processed. RAM is volatile, meaning data is lost when the computer is turned off.
    - **ROM (Read-Only Memory)**: Permanent memory that contains critical instructions for booting up the computer. ROM is non-volatile, meaning data is retained even when the computer is powered off.
- **Secondary Memory**: This refers to permanent storage devices that hold data even when the computer is turned off.
    - **Hard Disk Drive (HDD)**: A mechanical storage device that stores data on magnetic disks.
    - **Solid-State Drive (SSD)**: A faster, more durable storage device that stores data using flash memory.
    - **Optical Drives** (CD, DVD, Blu-ray): These are used to read and write data on optical discs.
    - **USB Flash Drives**: Small, portable storage devices that use flash memory.
- **Cache Memory**: A small, high-speed memory located close to the CPU. It stores frequently used data and instructions to speed up processing. Cache memory is faster than RAM but has a smaller capacity.
- **Virtual Memory**: An extension of RAM that uses a portion of secondary storage (usually a hard drive) to simulate extra RAM when the physical RAM is full. This helps to prevent performance issues when running memory-intensive applications.

The **Central Processing Unit (CPU)**, often referred to as the "brain" of the computer, is responsible for executing instructions and performing calculations necessary for the operation of a computer.

Here are the **basic components of a CPU**

1. Control Unit (CU)

- **Role**: The Control Unit coordinates and controls the execution of instructions in the CPU. It directs the flow of data between the CPU, memory, and other components of the computer system.
- **Function**:

  Decodes instructions from memory.

  Controls the timing and sequencing of operations.

  Sends control signals to other parts of the CPU and the rest of the system to execute instructions.

2. Arithmetic Logic Unit (ALU)

- **Role**: The ALU is responsible for performing arithmetic and logical operations.
- **Function**:
  - **Arithmetic Operations**: Includes addition, subtraction, multiplication, and division.
  - **Logical Operations**: Includes comparisons such as greater than, less than, and equal to, and logical operations like AND, OR, and NOT.
  - The ALU handles the actual computation and decision-making in a CPU.

3. Registers

- **Role**: Registers are small, high-speed storage locations within the CPU used to store data temporarily while the CPU processes instructions.
- **Function**:
  - **General-purpose Registers**: Used for temporary storage of data that is being manipulated by the ALU (e.g., operands, intermediate results).
  - **Special-purpose Registers**: Include specific registers like the Program Counter (PC), Instruction Register (IR), and Accumulator.
  - **Program Counter (PC)**: Keeps track of the address of the next instruction to be executed.
  - **Instruction Register (IR)**: Holds the current instruction being executed.

4. Cache Memory

- **Role**: Cache memory is a small, fast storage area that stores frequently used data or instructions to reduce the time needed to fetch them from the slower main memory (RAM).
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- **Function**:
    - Caches store copies of data from the main memory that are often accessed, speeding up the retrieval of this data.
    - The cache helps improve the overall speed and efficiency of the CPU.

5. Bus Interface Unit (BIU)

- **Role**: The Bus Interface Unit is responsible for managing the communication between the CPU and other components, like memory and I/O devices.
- **Function**:
    - Handles the reading and writing of data to and from memory (RAM).
    - The BIU controls the address bus, data bus, and control bus to facilitate data transfer between the CPU and external components.

6. Execution Unit (EU)

- **Role**: The Execution Unit carries out the instructions that the Control Unit sends to it, especially those that require data processing or arithmetic.
- **Function**:
    - Receives data from registers and the ALU and performs operations on that data.
    - The Execution Unit typically contains the ALU and is involved in the actual data manipulation tasks

Operating System (OS)

Computers without operating systems are exactly like televisions without a signal: They will turn on, but you will be looking at a blank screen with no hope of interacting with it (the lights are on, but nobody's home)!

An Operating System (OS) is essential software that acts as an intermediary between computer hardware and software applications. It manages hardware resources such as the CPU, memory, storage, and input/output devices, ensuring that these resources are allocated efficiently to different programs and tasks. The OS provides a user interface (UI), allowing users to interact with the system and run various applications. Key functions of an OS include process management, memory management, file system management, and device control.

The OS also handles system security, ensuring that unauthorized users cannot access sensitive data or resources. It manages system tasks such as multitasking, enabling users

to run multiple applications simultaneously without interference. Modern operating systems often come with built-in networking capabilities, allowing devices to connect and communicate over local networks or the internet. Popular operating systems include Windows, macOS, Linux, and Android, each offering different features and benefits based on their target audience and use cases.

Functions of an OS for Desktops and Laptops:

1. **Process Management**:
    - The OS controls the execution of programs and allocates CPU time to ensure efficient multitasking (running multiple programs at once).
2. **Memory Management**:
    - It manages the computer's memory (RAM) to ensure that running programs do not overwrite each other's data and that the system runs smoothly.
3. **File System Management**:
    - The OS organizes, stores, retrieves, and manages access to files stored on hard drives (HDD) or solid-state drives (SSD).
4. **Device Management**:

- The OS handles communication between software and hardware, ensuring peripherals like printers, keyboards, mice, monitors, etc., work properly through device drivers.

5. **User Interface**:
   - **Graphical User Interface (GUI)** or **Command-Line Interface (CLI)** provides a way for users to interact with the computer. For desktops and laptops, a GUI is most common, allowing users to use windows, icons, and menus.
6. **Security and User Authentication**:
   - It controls access to the system, ensuring users log in with the right credentials and preventing unauthorized access to data.

Types of Operating Systems for Desktops and Laptops:

1. **Windows**:
   - The most popular OS for desktops and laptops. It's known for its user-friendly interface and wide compatibility with applications and hardware.

2. **macOS**:
   - The OS used on Apple's desktop and laptop computers (Macs). Known for its sleek design, stability, and integration with other Apple devices.

Table comparing Windows and macOS for desktops and laptops

Windows	The most popular OS for desktops and laptops.	PCs, Laptops (Dell, HP, Lenovo, etc.) .
macOS	The OS used on Apple's desktop and laptop computers (Macs)	Apple MacBooks, iMac, Mac mini

Turning On the Computer and Logging On:

Let's get started! As you sit down at your desk, you can assume that your computer system is one of three states:

● OFF: When the computer is off, nothing is powered on. The screen remains black with no images displayed, and there is no sound coming from the computer. The power button (if present) may not be lit, and no functions will respond to mouse or keyboard input.

● ON: When the computer is on, you will see the operating system's startup screen, and the monitor will display images. The CPU may produce a soft noise (like a fan spinning), and the power button (if it lights up) should be illuminated. The pointer (mouse cursor) on the screen should move when you move the mouse, and the keyboard will respond to your inputs.

● SLEEP MODE: In Sleep Mode, the computer is still technically on but consumes less power. The screen may go dark, but the system is still running in the background.

Different Options for Turning Off a Computer

Options to Turn Off a Computer:

1. **Shut Down**: This is the normal way to turn off the computer. It closes all applications, saves your settings, and powers down the computer completely.

   For Windows: Click **Start** > **Power** > **Shut Down**.

   For macOS: Click the **Apple menu** > **Shut Down**.

2. **Restart**: This option turns off the computer and then automatically turns it back on. It's useful when you need to install updates or fix minor issues.

   For Windows: Click **Start** > **Power** > **Restart**.

   For macOS: Click the **Apple menu** > **Restart**.

3. **Sleep**: The computer is still on but in a low-power state. The screen may turn off, but the computer is ready to quickly resume when you wake it up.

   For Windows: Click **Start** > **Power** > **Sleep**.

   For macOS: Click the **Apple menu** > **Sleep**.

4. **Force Shutdown**: If the computer is frozen and not responding, press and hold the **power button** for about 5-10 seconds to force it to turn off. This is not recommended unless necessary, as it may cause data loss

Logging On

Once you turn the computer on, the computer will go through a series of automated tasks before it is ready for you to interact with it; this process is called "startup." This process will last between one and two minutes. If the computer is not working correctly, you may see an error message during startup. If the computer is performing as it should, however, you will probably see one of the following screens:

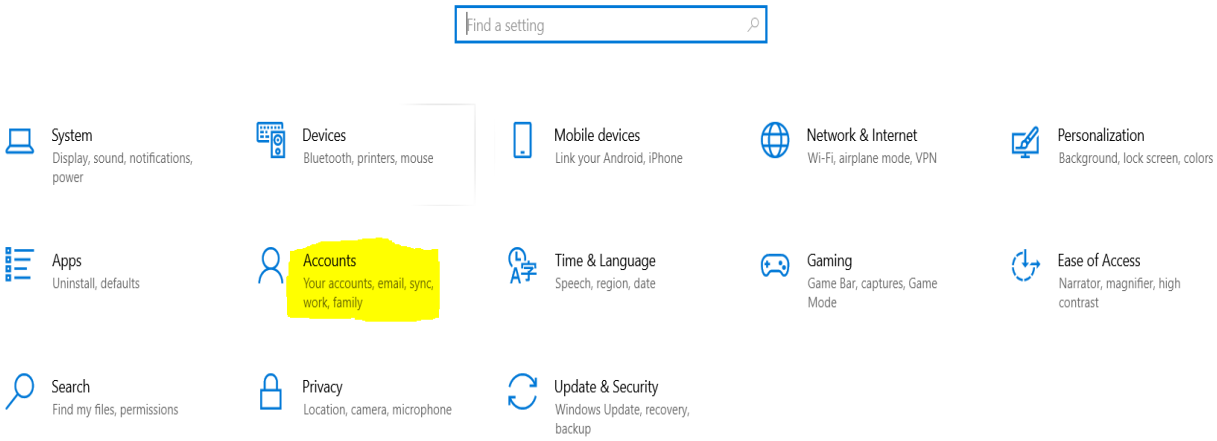
This is called a "Log On" window, and it means that the computer is password protected. If you do not see this window upon starting the computer, you can assume that your computer is NOT password-protected and may be used by anyone. To log on, you simply enter your user name and password. If you are using a public library computer, this could be your library card number

To create a password on your Windows computer, follow these steps:

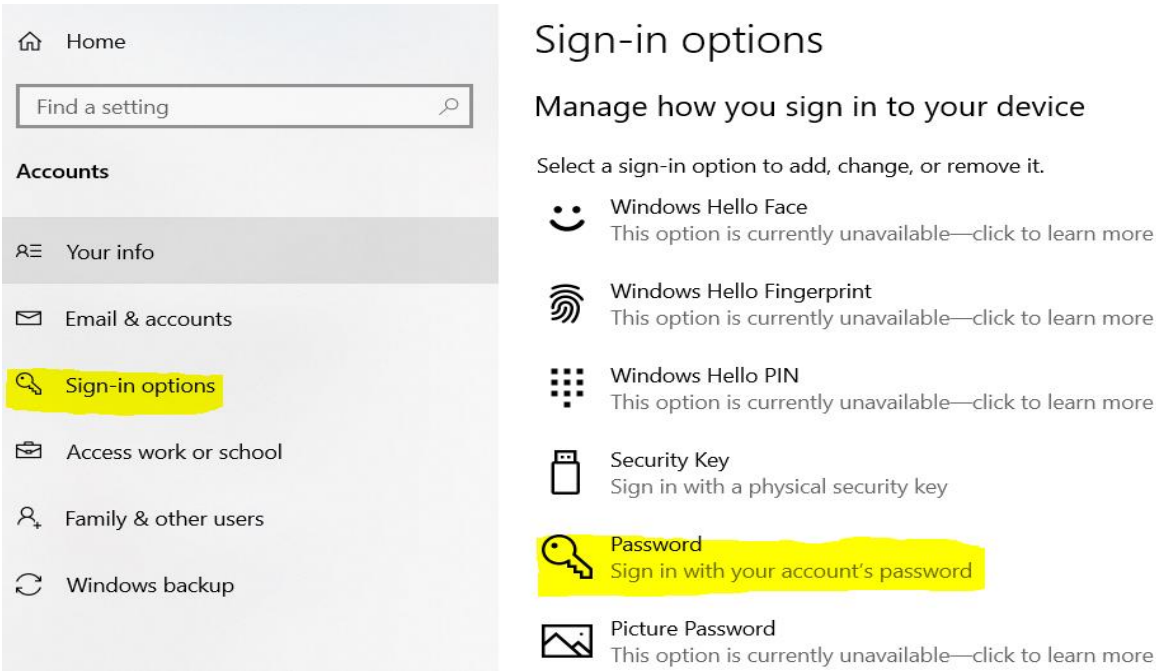
For Windows :

1. **Click the Start Menu** (Windows icon) in the bottom-left corner.

2. Select **Settings** (gear icon).
3. Go to **Accounts**.



4. Under **Sign-in options**, look for the **Password** section.
5. Click **Add** (if you don't have a password already) or **Change** (if you want to modify an existing password).



7. **Choose a strong password** – a mix of uppercase and lowercase letters, numbers, and special characters is recommended for security.

The Desktop

After you log on, the computer will display what is known as your desktop within a few seconds to a few minutes (if your computer is newer, this will probably go faster). Here you will see a digital representation of something similar to a reallife office space, complete with a workspace, files and file folders, and even a recycling bin.

To change the background picture (also known as the wallpaper) on your Windows computer, follow these steps:

For Windows :

1. **Right-click on the Desktop** anywhere without icons.
2. Select **Personalize** from the menu.
3. In the **Background** section, you'll see options to choose a picture, solid color, or slideshow.

4. To choose a new image:
    - ✓ **Click on "Browse"** under **Choose your picture**.
    - ✓ Navigate to the folder where your desired image is stored, and select it.
    - ✓ The image will immediately set as your desktop background.
5. You can also choose a **slideshow** or a **solid color** by selecting the options from the dropdown menu.

THE KEYBOARD AND MOUSE

Keyboard Commands

1. **Backspace**: This key deletes letters backward ().
2. **Delete:** This key deletes letters forward ().
3. **Shift:** This key, when pressed WITH another key, will perform a secondary function.
4. **Spacebar**: This key enters a space between words or letters.
5. **Tab:** This key will indent what you type, or move the text to the right.
6. **Caps Lock**: Pressing this key will make every letter you type capitalized.
7. **Control (Ctrl):** This key, when pressed WITH another key, performs a shortcut.

8. **Enter**: This key either gives you a new line, or executes a command (pressed in a word processing program, it begins a new line).

9. **Number Keypad**: These are exactly the same as the numbers at the top of the keyboard; some people find them easier to use in this position.

10. **Arrow Keys:** Like the mouse, these keys are used to navigate through a document or pag

Mouse Types

Standard Mouse: Typically has a left and right button and a scroll wheel between them. Used for basic navigation and selection.

Wireless Mouse: A mouse that communicates with a computer via Bluetooth or a USB receiver, eliminating the need for cords.

Gaming Mouse: A type of high-precision mouse designed for gaming, often with customizable buttons and higher DPI (dots per inch) settings for precision.

The Mouse

While the keyboard is primarily used to insert/input and manipulate text and numbers on a computer, the mouse is used mostly for navigating around the screen

1. The LEFT mouse button SELECTS items.

2. The RIGHT mouse button GIVES YOU MORE OPTIONS.

3. Double-Clicking the LEFT mouse button EXECUTES options (for example, you can open a program by double-clicking an icon on the desktop).

5.Double-Clicking the RIGHT mouse button does not do anything.