Tutorial 1: Introduction to Operating Systems

1. Define an Operating System.

An operating system (OS) is a program that acts as an intermediary between the user and the computer hardware.
It manages hardware resources and provides a convenient environment for executing user programs.

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2. What are the main goals of an Operating System?

- Execute user programs and make solving user problems easier.
- Make the system convenient to use.
- Use the computer hardware efficiently.

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3. List and briefly describe the four main components of a computer system.

1. **Hardware:** Provides the basic computing resources (CPU, memory, I/O devices).
2. **Operating System:** Controls and coordinates hardware among users and applications.
3. **Application Programs:** Define how resources are used to solve user problems.
4. **Users:** People, other computers, or machines interacting with the system.

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4. Explain the two roles of an operating system.

- **Resource Allocator:** Manages all resources and decides how to allocate them efficiently and fairly.
- **Control Program:** Controls program execution to prevent errors and misuse of the computer.

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5. What should the operating system prioritize in shared vs. dedicated systems?

- **Shared systems:** Focus on efficient resource allocation and fairness.
- **Dedicated systems:** Focus on user convenience and performance.
- **Embedded systems:** Optimize for reliability and minimal user interaction.

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6. What is the function of the system bus?

The system bus connects the CPU, memory, and I/O devices, allowing communication between them.
It can be divided into **data**, **address**, and **control** buses.

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7. Why is the CPU called the brain of the computer?

Because it performs all processing tasks, executes instructions, and controls the operation of other components