# Chapter 1: Introduction to System

## Short Question from the Chapter "Introduction to System":

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## EXERCISE Short Questions with Answers

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**1. Define a system. What are its basic components?**
**Ans.** A system is a group of parts that work together to achieve a common goal.
The **basic components** are:

- **Input** → things we give to the system.
- **Process** → work done inside the system.
- **Output** → results produced.
- **Storage** → keeps data for later use.
- **Control** → checks that the system is working properly.

**2. Differentiate between natural and artificial systems.**

**Ans.**

- **Natural systems**: Made by nature, not by humans. Example: solar system, human body.
- **Artificial systems**: Made by humans for specific goals. Example: banking system, computer network.

**3. Describe the main components of a computer system.**
**Ans.** The main components are:

1. **Input devices** (keyboard, mouse)
2. **Processing unit** (CPU, ALU, CU)
3. **Output devices** (monitor, printer)
4. **Storage** (RAM, hard disk)
5. **Control system** (Operating System)

**4. List and describe the types of computing systems.**

**Ans.**

- **Microcomputers** → small computers like desktops and laptops.
- **Minicomputers** → medium-sized, used by small businesses.
- **Mainframes** → large computers, used by banks, airlines.
- **Supercomputers** → very powerful, used for weather forecasting, space research.

**5. What are the main components of the Von Neumann architecture?**

**Ans.**

1. **Input/Output devices**
2. **Memory unit**
3. **Arithmetic Logic Unit (ALU)**
4. **Control Unit (CU)**
5. **System bus (for communication)**

**6. What is the Von Neumann computer architecture? List its key components.**
**Ans.** The Von Neumann architecture is a computer design where **data and instructions are stored in the same memory**.
Its key components are:

- Input/Output devices
- Memory
- Arithmetic Logic Unit (ALU)
- Control Unit (CU)
- System bus

**7. What are the four main steps in the Von Neumann architecture's instruction cycle?**

**Ans.**

1. **Fetch** → get instruction from memory.
2. **Decode** → understand the instruction.
3. **Execute** → perform the instruction.
4. **Store** → save the result (if needed).

**8. What is the Von Neumann bottleneck?**
**Ans.** It is the **slow speed problem** that happens because both data and instructions use the same path (system bus). This creates a bottleneck (traffic jam).

**9. What is a key advantage of the Von Neumann architecture?**
**Ans.** It uses **one memory for both data and instructions**, which makes the design **simple, flexible, and cheaper**.

**10. What are the three main requirements for a computing system to function?**

**Ans.**

1. **Hardware** → physical parts of computer.
2. **Software** → programs that give instructions.
3. **User** → person who operates the system.

# Additional Short Questions with Answers

## Topic 1: Definition & Characteristics of a System

**Q1. What is the main purpose of a system?**
A system works to achieve a specific goal or objective by combining its parts.

**Q2. Why is "interconnection" important in a system?**
Because without connection between parts, the system cannot work as one unit.

**Q3. What do we mean by the boundary of a system?**
It separates the system from its environment and shows what is inside or outside.

**Q4. Give one example of a system in daily life.**
A school system: students (input), teaching (process), and educated students (output).

**Q5. Why are objectives necessary for a system?**
Without objectives, a system has no direction or purpose.

## Topic 2: Components of a System

**Q1. What is the role of Input in a system?**
Input provides the raw material or data for processing.

**Q2. Why is Process important in a system?**
Process converts input into meaningful output.

**Q3. What is Output?**
Output is the final result produced by the system after processing.

**Q4. What is the function of Storage in a system?**
It saves data and instructions for current or future use.

**Q5. Why is Control important in a system?**
Control checks if the system is working properly and meeting its goal.

## Topic 3: Types of Systems

**Q1. Give two examples of natural systems.**
Examples: human body and solar system.

**Q2. Give two examples of artificial systems.**
Examples: banking system and traffic control system.

**Q3. What is a simple system?**
A system with few components and easy operation, e.g., thermostat.

**Q4. What is a complex system?**
A system with many components, like the Internet.

**Q5. Differentiate between open and closed system.**
Open system interacts with environment; closed system does not.

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## Topic 4: System Environment & Boundaries

**Q1. What is meant by system environment?**
Everything outside the system boundary that can affect it.

**Q2. What is a static environment?**
An environment that stays the same unless the system changes it.

**Q3. What is a dynamic environment?**
An environment that changes continuously on its own.

**Q4. How does feedback connect a system with its environment?**
Feedback helps the system adjust according to environment changes.

**Q5. Give an example of a system and its environment.**
A school (system) and society (environment).

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## Topic 5: System Modeling & Abstraction

**Q1. What is system modeling?**
It is creating a simple picture of a system to understand it easily.

**Q2. Why do we use block diagrams in system modeling?**
To show the relationship between input, process, and output.

**Q3. What is abstraction in systems?**
It means ignoring extra details and focusing on main points.

**Q4. Give one benefit of system modeling.**
It helps in problem solving and designing new systems.

**Q5. Give an example of a simple model.**
Traffic light model showing inputs, process, and outputs.

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## Topic 6: Computer as a System (Von Neumann, OS, Bus)

**Q1. Why is a computer called a system?**
Because it has input, process, output, storage, and control parts.

**Q2. What is the role of the Operating System (OS)?**
It manages hardware, software, and user interaction.

**Q3. What is Von Neumann architecture?**
It is a computer design where data and instructions share the same memory.

**Q4. What is the Von Neumann bottleneck?**
A slow speed problem due to one path for data and instructions.

**Q5. What is the role of the system bus?**
It transports data, instructions, and control signals among components.

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