

Chapter 1

- 1. Definition of Systems & Systems
Analysis and Design SAD**
- 2. Components of a System**

What is a system

- **A collection of elements (people, processes, technology, etc.) that interact to achieve a purpose.**
- **A system is a collection of interconnected elements—such as people, processes, technology, or resources—that work together to achieve a specific purpose or function.**

- **These elements interact within a defined boundary, often influenced by feedback mechanisms, to produce outcomes that align with the system's goal.**
- **It combines analytical, technical, and managerial skills to create efficient, scalable, and user-focused systems.**
- **Systems can be found in nature, technology, organizations, and more.**

- **In the context of Systems Analysis and Design SAD, a system often refers to an information system—a set of hardware, software, data, people, and procedures that interact to collect, process, store, and distribute information to support organizational functions.**

Key Features of a System:

Components: The individual parts (e.g., hardware, employees, or rules).

Interactions: Relationships or exchanges between components (e.g., data flow, communication).

Purpose: The system's intended objective (e.g., producing goods, maintaining balance).

Boundary: What is included in the system versus its external environment.

Feedback: Loops that influence behavior (positive feedback amplifies, negative feedback stabilizes).

Examples

Ecosystem: Plants, animals, and environmental factors interacting to sustain life (e.g., a forest).

Computer System: Hardware, software, and networks processing data (e.g., a laptop).

Organizational System: People, workflows, and tools achieving business goals (e.g., a company's logistics).

Transportation System: Roads, vehicles,
and signals enabling movement (e.g., a
subway network).

Key Components

1. Systems Analysis

- **Focuses on understanding the problem domain and defining system requirements.**
- **Involves gathering and analyzing business needs, user expectations, and existing system limitations.**

Key activities

Requirement Gathering: Interviews, surveys, and observation to collect stakeholder needs.

Feasibility Analysis: Assessing technical, economic, operational, and legal feasibility.

Problem Identification: determine inefficiencies, redundancies, or gaps in current processes.

Modeling: Creating diagrams (e.g., data flow diagrams, ERDs, use case diagrams) to represent system processes and data.

2. Systems Design:

- **Focuses on creating a blueprint for the system based on analysis findings.**
- **Involves defining system architecture, interfaces, databases, and components.**

Key activities:

Architectural Design: Outlining hardware, software, and network infrastructure.

Interface Design: Creating user-friendly interfaces for interaction.

Data Design: Structuring databases and data storage solutions.

Process Design: Defining workflows, algorithms, and system logic.

Prototyping Building to validate design with stakeholders.

B.Components of a System

A system typically consists of the following key components:

1. Inputs

The resources, data, or materials that enter the system to be processed.

Example: In a payroll system, inputs include employee work hours and pay rates.

2. Processes

The activities, operations, or transformations that manipulate inputs to produce outputs.

Example: In a payroll system, processes include calculating wages , deductions, and taxes.

3. Outputs

The results or products generated by the system after processing inputs.

Example: In a payroll system, outputs include paychecks and payroll reports.

4. Feedback

Information about the system's performance or outputs that is used to adjust or improve the system.

Example: Employee feedback on payroll errors can lead to system improvements.

5. Environment

The external factors or surroundings that influence the system but are outside its control.

Example: Government tax regulations affecting a payroll system.

6. Boundaries

The limits that define what is included in the system and what is external to it.

Example: A payroll system may exclude employee processes.

7. Interfaces

- **Points of interaction between the system and its environment or other systems.**

Example: A user interface for employees to submit work hours in a payroll system.

8. Controls

- **Mechanisms to ensure the system operates correctly and securely, such as rules, policies, or validation checks.**

Example: Access controls to prevent unauthorized changes to payroll data.

Example: Online Shopping System

Inputs: Customer orders, payment details.

Processes: Order processing, inventory updates, payment verification.

Outputs: Order confirmations , shipping notifications

Feedback: Customer reviews or return requests.

Environment: Market trends, internet connectivity.

Boundaries: Excludes physical delivery logistics.

Interfaces: Website or mobile app for customer interaction.

Controls: Security protocols for payment processing.

End