Unit-01

System: attributes, properties and characteristics

What is a System?

→ System is an interrelated set of components, with identifiable boundary, working together for some purpose. “System is a collection of elements which work together to perform the specific task in predefine manner”. Example Solar system, Digestive System, Eco- System, Computer System etc.

Major components of system

1. **Input:**

→ This is the raw data or information that is fed into the system for processing. Inputs are necessary for the system to perform its functions and produce outputs.

2. **Process:**

→ Processes are the operations or transformations that the system performs on the input data to generate the desired output. This is where the actual work or computation takes place.

3. **Control:**

→ The control component manages and regulates the activities of the system to ensure that it operates within specified parameters. It involves monitoring, feedback, and adjustments to maintain stability and achieve the system's goals.

4. **Output:**

→ Outputs are the results or products generated by the system after processing the input data. These outputs are the outcomes of the system's operations.

5. **Feedback:**

→ Feedback is information about the system's performance that is sent back to the system. It helps the system make adjustments to improve its functioning or maintain stability.

6. **Boundaries:**

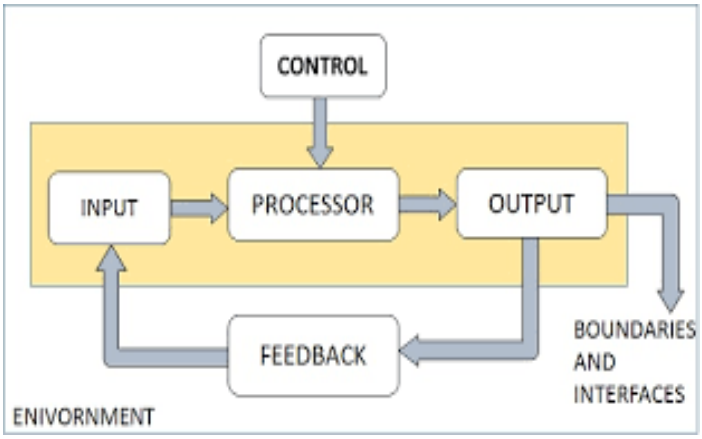
→ Boundaries define the limits of the system and separate it from its external environment. They help in identifying what is part of the system and what is external to it.

7. **Interface:**

→ While you mentioned "interface" in the question, it's not explicitly listed in the components. An interface facilitates communication and interaction between different components or systems. It ensures that different parts of the system can work together seamlessly.

8. **Environment:**

→ The environment represents the external context in which the system operates. It provides inputs to the system and receives outputs. The environment can also influence the behavior of the system.



Properties of System

1. **System:**

→ A system is a set of interrelated components working together to achieve a common goal. It exhibits properties such as organization, boundaries, components, and interconnectivity.

2. **Subsystem:**

→ A subsystem is a system within a larger system. It has its own components and functions but is part of a larger integrated system.

3. **Integration:**

→ Integration refers to the process of combining different components or systems into a unified whole. It involves making separate systems or components work together seamlessly.

4. **Purpose:**

→ Purpose defines the reason for the existence of a system or its components. It clarifies the goals and objectives the system aims to achieve.

5. **Interface:**

→ An interface is the point where two systems or components meet and interact. It includes the methods and protocols for communication between them.

6. **Interaction:**

→ Interaction involves the exchange of information or energy between system components or between systems. It is crucial for the functioning and performance of the overall system.

7. **Interrelated Components:**

→ Components within a system are interrelated, meaning they depend on each other. Changes in one component can affect others, highlighting the interconnected nature of systems.

8. **I/O (Input and Output):**

→ Input represents the data or signals received by a system, while output is the result produced by the system. Input and output are fundamental to system functioning.

Analytical Representation of a System

→ Analytical representation of a system involves expressing its structure, components, and interactions in a formal or mathematical way. This representation is crucial for analyzing, modeling, and understanding the behavior of the system. Several analytical methods are used, depending on the nature of the system.

System Stakeholders

→ Stakeholders in a system are individuals, groups, or entities that have an interest or stake in the development, implementation, and success of the system. These stakeholders can influence or be influenced by the system and its outcomes. Identifying and understanding stakeholders is crucial for effective system analysis, design, and management.

User

→ The term "user" generally refers to anyone who interacts with the system in some way. Users can be categorized into different groups based on their roles and responsibilities.

User Roles:

- System Administrators
- Developers/Programmers
- Database Administrators (DBAs)
- Business Analysts
- Quality Assurance/Testers

End User

→ "End user" specifically refers to the individuals who directly use the system for its intended purpose. These are the ultimate consumers of the system's output and functionality. End users interact with the system's interface and features to achieve specific goals or tasks.

End User Roles:

- Regular Users
- Power Users
- Power Users
- System Managers
- Executive Stakeholders

System Attributes, Properties and Characteristics

System Attributes:

→ Attributes refer to the inherent characteristics or features that define a system and contribute to its overall identity. Examples Reliability, Scalability, Modularity.

System Properties:

→ Properties are the qualities or attributes that describe the behavior, nature, or state of a system. Examples Performance, Availability, Security.

System Characteristics:

→ Characteristics are the distinctive features or qualities that give a system its unique identity. Examples Adaptability, Robustness, User-Friendliness.

SDLC (System Development Life cycle)

→ SDLC stands for Software Development Life Cycle. It's a process used by software developers to design, develop, test, and deploy high-quality software. The stages typically include planning, analysis, design, implementation, testing, deployment, and maintenance. It provides a structured approach to software development, ensuring that the final product meets customer requirements and is delivered on time and within budget.

Steps in System Development Life cycle

The Steps in System Development Life cycle include:

Planning:

→ Defining the project scope, goals, and requirements. Establishing a roadmap for the development process.

Analysis:

→ Gathering and understanding user requirements. Analyzing the existing system and identifying areas for improvement.

Design:

→ Creating a detailed blueprint for the system based on the requirements. This involves architectural, data, interface, and procedural design.

Implementation:

→ Coding or building the system based on the design specifications. This is the phase where the actual development of the software takes place.

Testing:

→ Systematically evaluating the software to ensure it meets the specified requirements. This includes unit testing, integration testing, and system testing.

Deployment:

→ Introducing the software into the operational environment. This involves installing the system, training users, and transitioning from the old system to the new one.

Maintenance:

→ Ongoing support, troubleshooting, and updates to ensure the system continues to meet user needs. This phase addresses issues that arise post-deployment and may involve making enhancements or fixing bugs.

Quality software

→ Quality software is abstract concept. Its presence can be difficult to define, but its absence can be easy to see instantly. “The quality of software can be defined as the ability of the software to function as per user requirement.”

→ The aspect that conclude software quality include.

- Good Design
- Reliability
- Durability
- Consistency
- maintainability
- Value for money

System/Product Life Cycle Concepts

→ The System or Product Life Cycle refers to the stages a product or system goes through from its conceptualization, development, introduction to the market, usage, and eventual retirement or discontinuation. Understanding these life cycle stages is crucial for effective product or system management, strategic planning, and decision-making.

Contract system development

→ When engaging in system development through a contractual relationship, it typically involves entering into a formal agreement or contract between a client (buyer) and a service provider (vendor or contractor). This contract outlines the terms, conditions, deliverables, responsibilities, and other aspects of the system development project.