System Analysis & Design

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Content

- Introduction to System Analysis

A System

- This term is derived from a Greek word *systema* which means an organized relationship among functioning units and components.
- A system is a group of interrelated components that function together to achieve a desired result.
- The basic elements of the system may be listed as:
  - ✓ Resources
  - ✓ Procedures
  - ✓ Data/Information
  - ✓ Processes

Resources

- Every system requires certain resources for the system to exist.
- Resources can be:
  - ✓ Hardware resources may include the computer, its peripherals, stationery
  - ✓ Software resources would include the programs running on these computers and,
  - ✓ the liveware would include the human beings required to operate the system and make it functional.

Procedures

- Every system functions under a set of rules that govern the system to accomplish the defined goal of the system.

- For instance, the Banking systems have their predefined rules for providing interest at different rates for different types of accounts.

Data to Wisdom

Data, raw facts about people, places, events, and things.

Information, data that has been **processed** or reorganized into a **more meaningful** form for someone.

Knowledge, data and information that is further **refined** based on the **facts, truths, beliefs, judgments, experiences**, and expertise of the recipient.

Wisdom, **filtered** and **integrated** knowledge and understanding


Wisdom
Knowldege
Information
Data

Intermediate Data

- Various processes process system's Inputs, before it is transformed into Output, it goes through many intermediary transformations.
- Therefore, it is very important to identify the Intermediate Data

Processes

- The systems have some processes that make use of the resources to achieve the set goal under the defined procedures.
- These processes are the operational element of the system.
- Systems also exhibit certain features and characteristics, some of which are:
  - ✓ Objective
  - ✓ Standards
  - ✓ Environment
  - ✓ Feedback
  - ✓ Boundaries and interfaces

Objective

- Every system has a predefined goal or objective towards which it works.
- A system cannot exist without a defined objective.
- For example, an organization would have an objective of earning maximum possible revenues, for which each department and each individual has to work in coordination.

Standards

- It is the acceptable level of performance for any system.
- Systems should be designed to meet standards.
- Standards can be business specific or organization specific.

Environment

- Every system whether it is natural or man-made co-exists with an environment.
- It is very important for a system to adapt itself to its environment.
- Also, for a system to exist it should change according to the changing environment.

FeedBack

- Feedback is an important element of systems.
- The output of a system needs to be observed and feedback from the output taken so as to improve the system and make it achieve the laid standards.

FeedBack

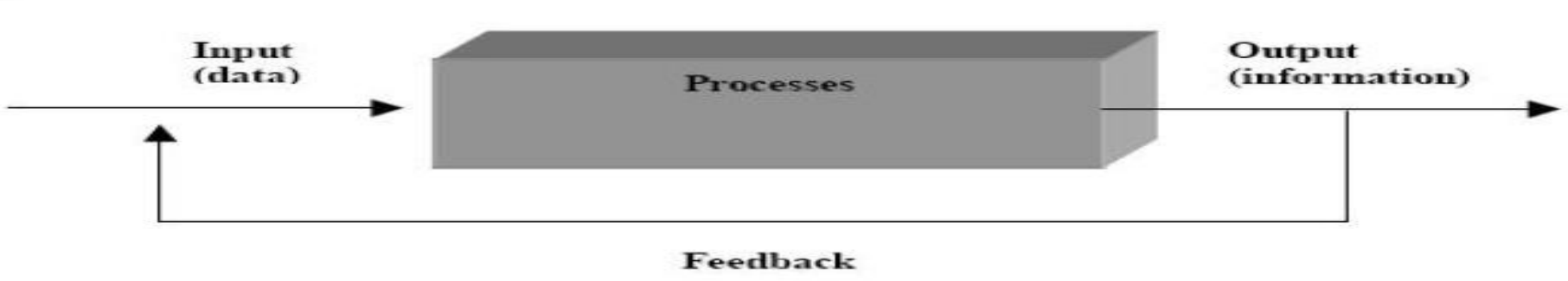


Fig 1.1
A system converts input data into output information

- In fig 1.1, it is shown that a system takes input. It then transforms it into output.
- Also some feedback can come from customer (regarding quality) or it can be some intermediate data (the output of one process and input for the other) that is required to produce final output

Boundaries and Interfaces

- Every system has defined boundaries within which it operates.
- Beyond these limits the system has to interact with the other systems.
- For instance, Personnel system in an organization has its work domain with defined procedures.
- If the financial details of an employee are required, the system has to interact with the Accounting system to get the required details.

Boundaries and Interfaces

- Interfaces are another important element through which the system interacts with the outside world.
- System interacts with other systems through its interfaces.
- Users of the systems also interact with it through interfaces.
- Therefore, these should be customized to the user needs.
- These should be as user friendly as possible.

Classifications of System

- Physical or Abstract System
- Physical systems are tangible entities that we can feel and touch.
- These may be static or dynamic in nature.
- For example, take a computer center. Desks and chairs are the static parts, which assist in the working of the center.
- Static parts don't change. The dynamic systems are constantly changing.
- Computer systems are dynamic system. Programs, data, and applications can change according to the user's needs.

Classifications of System

- Physical or Abstract System
- Abstract systems are conceptual.
- These are not physical entities. They may be formulas, representation or model of a real system

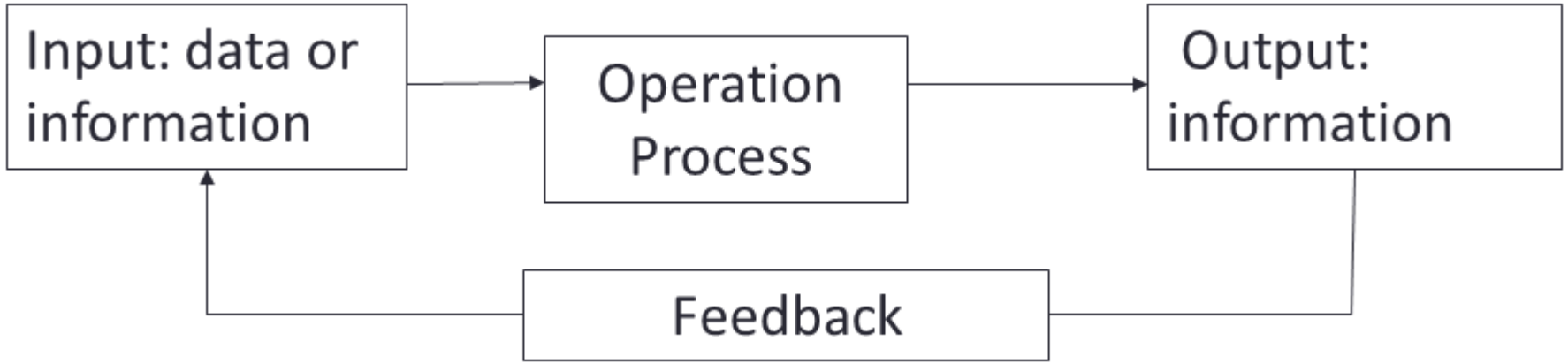
Classifications of System

- Open Closed System
- Systems interact with their environment to achieve their targets.
- Depending upon the interaction with the environment, systems can be divided into two categories, open and closed.
- Open systems: Systems that interact with their environment. Practically most of the systems are open systems. An open system has many interfaces with its environment.
- Closed systems: are systems that don't interact with their environment. Closed systems exist in concept only.

Information System

An information system (IS) is an arrangement of people, data, processes, and information technology that interact to collect data, process, store, and provide as output the information needed to support an organization.

Information technology is a contemporary term that describes the combination of computer technology (hardware and software) with telecommunications technology .



What is Systems Analysis and Design?

- Information Systems are created to solve problems.
- Think of the systems approach as an organized way of dealing with a problem.
- System Analysis and Design, mainly deals with the software development activities for information system.

Systems Analysis and System Design

- **Systems Analysis**: understanding and specifying in detail *what* an information system should do.

- **System Design**: specifying in detail *how* the parts of an information system should be implemented.

Information systems

Information systems fall into one of the following eight categories:

1. **Transaction processing systems (TPS).**
2. **Office automation systems (OAS).**
3. **Knowledge work systems (KWS).**
4. **Management information systems (MIS).**
5. **Decision support systems (DSS).**
6. **Expert systems (ES) and Artificial Intelligence (AI).**
7. **Group decision support systems (GDSS) and Computer-Supported Collaborative Work Systems.**
8. **Executive support systems (ESS).**

Transaction processing systems (TPS)

- TPS is an information system that captures and processes data about routine business transactions such as payroll and inventory.

Office automation systems (OAS)

- OAS is an information system that supports the wide range of business office activities that provide for improved work flow between workers.
- Familiar aspects of OAS include word processing, spreadsheets,, electronic scheduling, and communication through voice mail, and email (electronic mail),.

Knowledge work systems (KWS)

- KWS support professional workers such as scientists, engineers, and doctors by helping them in their efforts to create new knowledge and by allowing them to contribute it to their organization or to society at large.

Management information systems (MIS)

- MIS is an information system that provides for management-oriented reporting based on transaction processing and operations of the organization.
- To access information, users of the management information system share a common database.
- The database stores both data and models that help the user interact with, interpret, and apply that data.
- MIS output information that is used in decision making.

Decision support systems (DSS)

- DSS is an information system that either helps to identify decision making opportunities or provides information to help make decisions.

Expert systems (ES)

- Expert system is an information system that captures the expertise of workers and then simulates that expertise to the benefit of non-experts.

Group decision support systems (GDSS)

- Organizations are becoming increasingly reliant on groups or teams to make decisions together.

- GDSS are intended to bring a group together to solve a problem with the help of various supports such as

  - Voting,
  - Questionnaires,
  - Brainstorming, and
  - Scenario creation.

Executive support systems (ESS)

- ESS help executives organize their interactions with the external environment by providing graphics and communications technologies.
- Although ESS rely on the information generated by TPS and MIS, ESS help their users address unstructured decision problems, by creating an environment that helps them think about strategic problems in an informed way.
- ESS typically involve lots of data analysis and modeling tools such as "what-if" analysis to help strategic decision-making.

Thanks

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