System Analysis and Design

System's Concept

- Term system is derived from the Greek word '***Systema'*** which means an ***organized relationship*** among ***functioning units or components.***

Definition of System

- A system is an ***orderly grouping*** of ***interdependent components*** linked together according to a ***plan*** to achieve a ***specific objective.***

Characteristics of a System

- Organization
- Interaction
- Interdependence
- Integration
- Central Objective

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- Organization-It implies structure and order.
- Interaction-It refers to manner in which each component functions with other components of the system.
- Interdependence-Units/parts are dependent on each other.

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- Integration-The parts of a system work together within the system even though each part performs a unique function.

- Central Objective-Objective may be real or stated. All the components work together to achieve that particular objective.

Elements of a System

- Outputs and Inputs
- Processor
- Control
- Feedback
- Environment
- Boundaries and Interface

Continued…

- **Inputs and Outputs-** Inputs are the elements that enter the system for processing and output is the result of processing.

- **Processor-** It is the element that involves the actual transformation of input into output.

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- **Control-** The control element guides the system.
- **Feedback-** Output is compared against performance standards.
- **Environment-** It is the suprasytem within which an organization operates.
- **Boundaries and Interface-** A system should be defined by its limits.

Types of System

- Physical or Abstract System
- **Physical** – These are tangible entities that may be **static or dynamic in operation**. For example- parts of a computer center are the desks, chairs etc. that facilitate operation of the computer. They are static and a programmed computer is dynamic.

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- **Abstract System –** These are conceptual or non physical entities. For example- the abstract conceptualization of physical situations. A model is a representation of a real or planned system. A model is used to visualize relationships.

Deterministic or Probabilistic System

- Deterministic System – It operates in a predictable manner and the interaction between parts is known with certainty. For example: Two molecules of hydrogen and one molecule of oxygen makes water.

- Probabilistic System – It shows probable behavior. The exact output is not known. For example: weather forecasting, mail delivery.

Social, Human Machine, Machine System

- Social System- It is made up of people. For example: social clubs, societies
- Human Machine System- When both human and machines are involved to perform a particular a particular task to achieve a target. For example:- Computer.
- Machine System- Where human interference is neglected. All the tasks are performed by the machine.

Natural and Manufactured

- Natural System- The system which is natural. For example- Solar system, Seasonal System.
- Manufactured System- System made by man is called manufactured system. For example- Rockets, Dams, Trains.

Permanent or Temporary System

- Permanent System- Which persists for long time. For example- policies of business.
- Temporary System- Made for specified time and after that they are dissolved. For example- setting up DJ system.

Adaptive and Non Adaptive System

- Adaptive System- respond to change in the environment in such a way to improve their performance and to survive. For example- Human beings, animals.

- Non Adaptive System-The system which doesn’t respond to the environment. For example- Machines

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- **Open System** – It has many interfaces with its environment. It interacts across its boundaries, it receives inputs from and delivers outputs to the outside world. It must adapt to the changing demands of the user.
- **Closed System –** It is isolated from the environmental influences. A completely closed system is rare.

Characteristics of Open Systems

- Input from outside- Open systems are self adjusting and self regulating. When functioning properly open system reaches a steady state or equilibrium.
- Entropy- Dynamic systems run down over time resulting in loss of energy or entropy. Open systems resist entropy by seeking new input or modifying the processes to return to a steady state.

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- Process, output and cycles- Open system produce useful output and operate in cycles, following a continuous flow path.
- Differentiation- They have a tendency toward an increasing specialization of functions and a greater differentiation of their components. For example the role of machines and people tend toward greater specialization and greater interaction.

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- Equifinality- Goals are achieved through differing courses of action and a variety of paths.

Man Made Information Systems

- Information System may be defined as a set of **devices, procedures, and operating systems** designed around user based criteria to produce information and communicate it to the user **for planning, control and performance.**

Formal Information Systems

- It is based on the organization represented by organization chart.
- The chart is a map of positions and their authority relationships, indicated by boxes and connected by straight lines.

Categories of Information

- **Strategic Information-** relates to ling range planning policies that are direct interest to upper management and for long range goals. For example- population growth, trends in financial investment, human resources.
- This information is achieved with the aid of DSS.

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- **Managerial Information-** It is of direct use to middle management and department heads for implementation and control. For example- sales analysis, cash flow projections, and annual financial statements.
- This information is of use in short and intermediate range planning- i.e. months rather than years.
- It is maintained with the help of MIS.

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- Operational Information- It is short term, daily information used to operate departments and to enforce the day to day rules and regulations of the business. For example- daily employee absence sheets, overdue purchase orders, current stock.
- It is established by data processing systems.

Informal Information Systems

- It is an employee based system designed to meet personnel and vocational needs and to help solve, work related problems.

Computer Based Information System

- It relies on computer for handling business applications.