SYSTEM ANALYSIS & DESIGN - 1

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THE SYSTEM CONCEPT

The term "system" is used in many different ways. Everyone is familiar with such expressions as "Professor Rajneesh has an impossible grading system" or "Deepak has a great system to manage friends."

In our daily life, the word "System" comes across many a times but rarely the word is understood in its fullest sense. Almost every one of us have heard about Systems such as Education System, Economic System, Office System, Solar System, but what do they imply in the real sense is a main question.

But for computer users, a system is a group of parts that are integrated for the purpose of achieving some objective.

The following three characteristics are key:

- **A group of parts**
- **Integrated parts**
- **A common purpose of achieving some objective**

Since a computer is a group of integrated parts that have the common purpose of performing the operations called for in the program being executed, it qualifies as a system.

- *A system is an* *orderly grouping of interdependent components linked together according to a plan to achieve a specific objective.* **The word component may refer to physical parts, managerial steps or a subsystem in a multi-level structure.**

- We can also define *a system where elements interacts with each other, responding to certain inputs to produce outputs as shown in figure.*

Inputs →

System

Outputs →

DETERMINISTIC AND PROBABILISTIC SYSTEM

- Systems where one can predict the occurrence of events perfectly are called as deterministic systems and those systems where the events cannot be perfectly predictable are called probabilistic systems.

- Example of a deterministic system could be a production system where the production unit that is a automobile production unit which produce 3 scooters in one hour, so the output after 8 hours could be perfectly predicted i.e. it would be 24 scooters. Example of a probabilistic system could be the closing balance of cash in an airlines reservation office on a given day. Unfortunately, it is the probabilistic system that the system analyst deals mostly with.

CLOSED AND OPEN SYSTEM

- These type of systems is based on their degree of independence.

- A closed system is one which is self-contained, that it does not interact with its environment.

- A open system has many interfaces with its environment.

There are five important characteristics of open system:

- *Inputs from outside*

- *Entropy*

- *Process, Output and Cycles*

- *Differentiation*

- *Equifinality*

STABLE SYSTEMS

- In *stable systems*, there are well defined relationship between the various components but if these relationships have external disturbances then they are capable of returning to their desired state.

- For example, in an Inventory Control System, the Reorder Level of particular items is based on demand forecasts and past experiences. We can call a Inventory Control System as negative feed back mechanism wherein we record the things when they are deviating from limits.

- When the system has several such feed back loops whereby, if one loop is out of control another is activated to restore control, it is known as an *ultra-stable system.*

CHARACTERISTICS OF SYSTEM

The basic characteristics of system are

- Organization
- Interaction
- Interdependence
- Integration
- Central objective

Organization

Organization implies structure and order. The traditional principles on which organizations have been structured aim to achieve parity of authority and responsibility.

- *Harmony of objectives*
- *Unity of command*
- *Unit of direction*

Interaction

- Interaction refers to the manner in which each component functions with other components of the system.

- In a business system, for example, purchasing must interact with production, advertising with sales, and payroll with personnel.

Interdependence

- Interdependence means that parts of the organization or computer system depend upon each other. They are coordinated and linked together according to a plan.

- For example, in an education system:- a student is dependent on teacher to guide him/her and a teacher in turn is dependent on student where teacher expects student to respond him/her favourably and positively.

Integration

- Integration refers to the holism of system. Integration is concerned with how a system is tied together. It is more than sharing a physical part or location. It means that parts of system work together within the system even though each part performs a unique function. Successful Integration will typically produce a greater, clearer and total impact than each component works separately.

Central Objective

- The last characteristic of a system is its central objective. Objectives may be real or stated. Although stated objective may be the real objective, it is not uncommon for an organization to state one objective and operate to achieve another.

- The user should be aware of the central objectives of a computer application early in the analysis for a successful design and conversion. The analyst must work around such obstacles to identify the real objective of the proposed change.

- A system is not as simple as definition describes.

- We presuppose that output generated by the system is always according to the specifications.

- Suppose a computer program generating a output report might give the output but not according to desired specifications.

- A *feed back* is sought to check what went wrong in our specification.

- After we receive the feed back we correct the program and again run the program to get the report.

- In fact what has been introduced in the system is a control mechanism.

- To get a stable system, a control mechanism is always necessary. Whenever the output of a system deviates from the limits which has been set, a control mechanism is required either to adjust the process or the inputs.

- Forces of control mechanism may not be able to adjust the inputs or processes in a way so as to bring output within the limits specified. In that case the output itself has to be adjusted.

- Figure below shows how controls in system would work
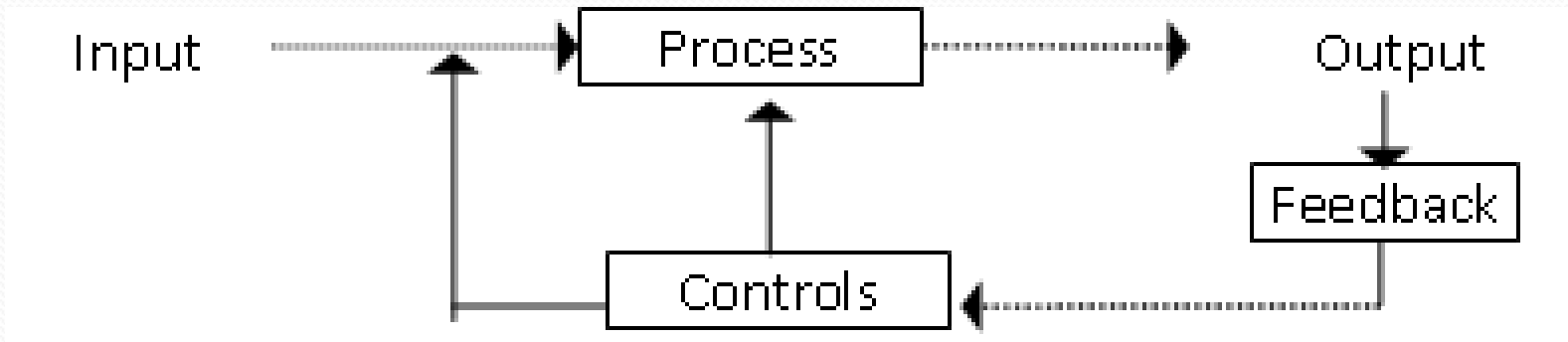
- Every system which gets out of control, there must be a way of restoring controls. The system involved could be economic, political, social institution such as business houses, government agencies, colleges and universities and usually a computer could be considered as an aid for improving the systems operation. System analyst may be responsible for system analysis, detail design of the computer system and outlining system specification.

The system analyst has two primary objectives

- Assessment objective
- Assistance objective

Assessment objective : A system analyst has to observe, understand and evaluate the interactions which routinely occurs as a part of the Job under investigation.

Herein the analyst has to know.

- What is being done ?
- Who is doing it ?
- Why is it being done ?
- How is it being done ?
- What are major problems in doing it ?

Assistance Objective : A system analyst is to provide alternative solutions to make the existing system more efficient.

- For this job, he seeks the help of the computer. At such times he acts like a communication-link between technology and user.

- Analyst now finds out other ways to deal with the existing problem and also checks the benefits and liabilities associated with these alternative approaches.

- Better assessment of problems will provide better assistance, and probably the presence of other kinds of assistance gives the analyst a broader perspective for the assessment.

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