SYSTEM ANALYSIS AND DESIGN

UNIT-1

System:

Definitions:

- System is a set of components that interact to accomplish some purpose. e.g. College system, Economic system, Language system, a Business and its parts - Marketing, Sales, Research, Shipping, Accounting, Government.
- system is a collection of elements or components that are organized for a common purpose.
- A system is a group of interacting or interrelated elements that act according to a set of rules to form a unified whole.
- A system is "an orderly grouping of interdependent components linked together according to a plan to achieve a specific goal."

Information System (I.S.):

Interrelated components working together to collect, process, store, and disseminate information to support decision making, coordination control analysis and visualization in an organization.

System Analysis:

Process of gathering and interpreting facts, diagnosing problems, and using the facts to improve the system.

Systems Design:

Process of planning a new system to replace or complement the old. Analysis specifies what the system should do and design states how to achieve the objective.

Characteristics:

1. **Organization:** Organization implies structure and order. It is the arrangement of components that helps to achieve predetermined objectives.
2. **Interaction:** It is defined by the manner in which the components operate with each other.
3. **Interdependence:** Interdependence means how the components of a system depend on one another. For proper functioning, the components are coordinated and linked together according to a specified plan. The output of one subsystem is the required by other subsystem as input.
4. **Integration:** Integration is concerned with how a system components are connected together. It means that the parts of the system work together within the system even if each part performs a unique function.
5. **Central Objective:** The objective of system must be central. It may be real or stated. It is not uncommon for an organization to state an objective and operate to achieve another.

Elements of a System:

A system has three basic elements input, processing and output. The other elements include control, feedback, boundaries, environment and interfaces.

1. **Input:** Input is what data the system receives to produce a certain output.
2. **Output:** What goes out from the system after being processed is known as Output.
3. **Processing:** The process involved to transform input into output is known as Processing.
4. **Control:** In order to get the desired results, it is essential to monitor and control the input, Processing and the output of the system. This job is done by the control.
5. **Feedback:** The Output is checked with the desired standards of the output set and the necessary steps are taken for achieving the output as per the standards, this process is called as Feedback. It helps to achieve a much better control in the system.
6. **Boundaries:** The boundaries are nothing but the limit of the system. Setting up boundaries helps for better concentration of the actives carried in the system.

7. **Environment:** The things outside the boundary of the system are known as environment. Change in the environment affects the working of the system.
8. **Interfaces:** The interconnections and the interactions between the sub-systems are known as the Interfaces. They may be inputs and outputs of the systems.

Types of system:

1. Open and closed system:

Open Systems:

a. Involve continuous interaction with the environment.
b. So exchanges the information, material, energy with the environment.
c. Is open and also self-organizing in the nature.
d. Is also adoptive or adaptive to the changing environment as it is flexible.

Closed System:

a. Shuns any kind of the exchange with the environment. b. Is rigid in nature.
b. Is not at all amenable to the change.
c. Is also self-contained. e. Is somewhat isolated in the nature.

2. Physical and Abstract System:

Abstract System (Conceptual System):

a. Are theoretical and explanatory in the nature.
b. Provide the much-needed clarification.
c. Provide theoretical framework for which there may or may not be any real-life counterpart.
d. E.g., of such systems can be philosophy, theology etc.

Physical System (Empirical System):

a. Are very practical, specific and also very operational in the nature.
b. Can be based on the conceptual system.
c. Examination system, surgery act as very good examples of the empirical systems.

3. **Formal & Informal System**

Formal Information System:

It is based on the flow of information in the form of memos, instructions, etc., from top level to lower levels of management.

Informal Information System:

It is employee-based system which solves the day to day work related problems.

4. Computer Based System:

This system is directly dependent on the computer for managing business applications. For example, automatic library system, railway reservation system, banking system, etc.

Major categories of CBIS available these days are:

Management Information System (MIS):

An MIS is a set of computer-based system and procedure implemented to help managers in their crucial job of decision making. The actual process will involve the collection, organization, distribution and storage of organization wide information for managerial analysis and control.

Decision Support System (DSS):

A key factor in a use of decision support system is determining what information is needed. DSS advances the capabilities of MIS. A DSS is an interactive computer-based system intended to help managers to make decisions. A DSS helps a manager to retrieve, summarize and analyze decision relevant to data.

Interpersonal Communicational System:

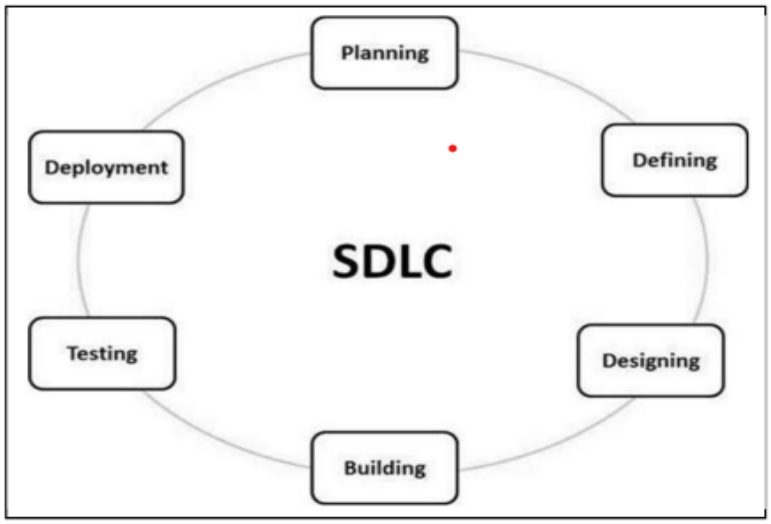
Interpersonal communication is usually defined by communication scholars in numerous ways, usually describing participants who are dependent upon one another. It can involve one on one conversations or individuals interacting with many people within a society. It helps us understand how and why people behave and communicate in different ways to construct and negotiate a social reality.

Software Development Life Cycle

System Development Life Cycle (SDLC) is a conceptual model which includes policies and procedures for developing or altering systems throughout their life cycles.

The life cycle defines a methodology for improving the quality of software and the overall development process.

A typical Software Development Life Cycle consists of the following stages –



Stage 1: Planning and Requirement Analysis

Requirement analysis is the most important and fundamental stage in SDLC. This information is then used to plan the basic project approach and to conduct product feasibility study in the economical, operational and technical areas.

Planning for the quality assurance requirements and identification of the risks associated with the project is also done in the planning stage.

Stage 2: Defining Requirements

Once the requirement analysis is done the next step is to clearly define and document the product requirements and get them approved from the customer or the market analysts. This is done through an SRS (Software Requirement Specification) document which consists of all the product requirements to be designed and developed during the project life cycle.

Stage 3: Designing the Product Architecture

SRS is the reference for product architects to come out with the best architecture for the product to be developed. Based on the requirements specified in SRS, usually more than one design approach for the product architecture is proposed and documented in a DDS - Design Document Specification.

This DDS is reviewed by all the important stakeholders and based on various parameters as risk assessment, product robustness, design modularity, budget and time constraints, the best design approach is selected for the product.

Stage 4: Building or Developing the Product

In this stage of SDLC the actual development starts and the product is built. The programming code is generated as per DDS during this stage. If the design is performed in a detailed and organized manner, code generation can be accomplished without much hassle. The programming language is chosen with respect to the type of software being developed.

Stage 5: Testing the Product

This stage is usually a subset of all the stages as in the modern SDLC models, the testing activities are mostly involved in all the stages of SDLC. However, this stage refers to the testing only stage of the product where product defects are reported, tracked, fixed and retested, until the product reaches the quality standards defined in the SRS.

Stage 6: Deployment in the Market and Maintenance

Once the product is tested and ready to be deployed it is released formally in the appropriate market. Sometimes product deployment happens in stages as per the business strategy of that organization. The product may first be released in a limited segment and tested in the real business environment (UAT- User acceptance testing).

Then based on the feedback, the product may be released as it is or with suggested enhancements in the targeting market segment. After the product is released in the market, its maintenance is done for the existing customer base