**Class Notes**

**Unit - 1**

**System Concepts and Information System Environment:**

**Over View of System Analysis and Design**

Systems development can generally be thought of as having two major components: Systems analysis and Systems design. System design is the process of planning a new business system or one to replace or complement an existing system. But before this planning can be done, we must thoroughly understand the old system and determine how computers can best be used to make its operation more effective. System analysis, then, is the process of gathering and interpreting facts, diagnosing problems, and using the information to recommend improvements to the system. This is the job of the systems analyst.

Consider, for example, the stockroom operation of a clothing store. To better control its inventory and gain access to more up – to – date information about stock levels and reordering, the store asks a system analyst, to “computerize” its stockroom operations. Before one can design a system to capture data, update files, and produce reports, one needs to know more about the store operations: what forms are being used to store information manually, such as requisitions, purchase orders, and invoices and what reports are being produced and how they are being used.

**What is a SYSTEM?**

•         A system is a group of interrelated components working together toward a common goal by accepting inputs and producing outputs in an organized transformation process.

–        Components and their attribution

•         Systems structure: relationship between components

•         Subsystems

–        Environment and Boundary

–        Input and Output

**Definition of a System**

The term system may be defined as an orderly arrangement of a set of interrelated and interdependent element that operate collectively to accomplish some common purpose or goal. **For example –** human body is a system, consisting of various parts such as head, heart, hands, legs and so on. The various body parts are related by mean of connecting networks of blood vessels and nerves and the system has a main goal of “living”. Thus, a system can be described by specifying its parts, the way in which they are related, and goals which they are expected to achieve. A business is also a system is also a system where economic resources such as people, money, material, machines, etc are transformed by various organizational processes (such as production, marketing, finance etc.) into goods and services. A computer based information system is also a system which is a collection of people, hardware, software, data and procedures that interact to provide timely information to authorized people who need it.

**Type of system**

1. Elements
2. interactive behavior
3. degree of human intervention
4. working/output

**Elements of Systems**

* **A component --** an irreducible part or aggregation of parts that make up a system, also called a subsystem
* **Interrelated components**-- Dependence of one subsystem on one or more subsystems
* **Boundary** -- The line that marks the inside and outside of a system and that sets off the system from its environment
* **Purpose**--   The overall goal or function of a system
* **Environment** -- Everything external to a system that interacts with the system
* **Interface** -- Point of contact where a system meets its environment or where subsystems meet each other.
* **Constraint** -- A limit to what a system can accomplish
* **Input** -- Whatever a system takes from its environment in order to fulfill its purpose
* **Output** -- Whatever a system returns from its environment in order to fulfill its purpose

**Types OF System:**

1. **Open and Closed and closed system**

* **Open system**

A system that interacts freely with its environment, taking input and returning output

**For example**- The education system or any business process system will quickly change when the environment changes. To do this, an open system will interact with element that exist and influence from outside the boundary of the system.

* **Closed system**

A system that is cut off from its environment and does not interact with it

**For example**- Consider a ‘throw-away’ type sealed digital watch, which is a system, composed of a number of components that work in a cooperative fashion designed to perform some specific task. This watch is a closed system as it is completely isolated from its environment for its operation. Such closed system will finally run down or become disorganized. This movement to disorder is termed on increase in entropy.

1. **Formal & Informal Information Systems**

**Formal Information System:**  
A formal information system is based on the organisation represented by the organization chart. The chart is a map of position and their authority relationship,indicated by boxes and connected by straight lines. it is concerned with the pattern of authority, communication and work flow.   
**Informal Information System:**  
The informal information system is employee based system design to meet personnel and vocational needs and to help in the solution of work-related problems. it also funnels information upward through indirect channels. In this way, it is considered to be a useful system because it works within the framework of the business and its stated policies.

1. **Computer Based Information System (CBIS)**

A CBIS is an organized integration of hardware and software technologies and human elements designed to produce timely, integrated, accurate and useful information for decision making purposes.

For any given application the following features must be present:-

Easy to use interactive (two way) interfaces

* Touch screen
* GUI
* Menu Driven Interface
* Color Screen
* Buttons
* Labels
* Voice Activated
* Tones, on phones

Use of advanced technologies

* Phone (inc WAP)
* digital television
* Teleconferencing (audio, video and computer)
* Integration of voice, data and images through ISDN’s (integrated services digital networks)
* Image transfer systems through facsimile

Fast processing

* Searching (Google gives you search times)
* Looking up name in a database

Rapid responses

* To input
* To requests

1. **Management Information System**

Many experts have defined MIS in different language. A management information system has been defined by Davis and Olson as “an integrated user-machine system designed for providing information to support operational control, management control and decision making function is an organization”.

|  |
| --- |
| **Management** |
| **Information** |
| **Systems** |

1. **Decision Support Systems – DSS (definition)**

The best decision support systems provide high-level summaries and drilldowns to details.  
Decision Support Systems (DSS) are a specific class of computerized information system that supports business and organizational decision-making activities. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions.  
Typical information that a decision support application might gather and present would be:

* Accessing all of your current information assets, including legacy and relational data sources, cubes, data warehouses, and data marts
* Comparative sales figures between one week and the next
* Projected revenue figures based on new product sales assumptions
* The consequences of different decision alternatives, given past experience in a context that is described

1. **General Business Knowledge**

For an individual that’s new to business and wants to negotiate Procurement contracts at some point their career, one of the first things they need to do is start to build their knowledge and skills.

 To be a good negotiator you need knowledge and skills in a number of areas.

1. General business knowledge and skills.
2. Procurement knowledge and skills
3. Contracting knowledge and skills
4. Negotiation knowledge and skills
5. **Interpersonal Communicational System**

**Interpersonal communication** is usually defined by [communication](https://en.wikipedia.org/wiki/Communication) scholars in numerous ways, usually describing participants who are dependent upon one another. It can involve one on one [conversations](https://en.wikipedia.org/wiki/Conversation) or [individuals](https://en.wikipedia.org/wiki/Individual) interacting with many people within a [society](https://en.wikipedia.org/wiki/Society). It helps us understand how and why people behave and communicate in different ways to construct and negotiate a [social reality](https://en.wikipedia.org/wiki/Social_reality). While interpersonal communication can be defined as its own area of study, it also occurs within other contexts like groups and organizations. Interpersonal communication is the process that we use to communicate our ideas, thoughts, and feelings to another person. Our interpersonal communication skills are learned behaviors that can be improved through knowledge, practice, feedback, and reflection.

### UNIT -2

### The System Development Life Cycle:

## System Development Life Cycle (SDLC) Methodologies

SDLC (System Development Life Cycle), just as the name implies, is defined as the process (as a whole) of developing system or software to meet certain requirements. It covers many activities; starts from understanding why the system should be built, studying the project feasibility, analyzing problems, choosing the system design and architecture, implementing and testing it, up to delivering the system as product to the user. SDLC is a process of gradual refinement, meaning that it is done through several development phases. Each phase continues and refines what’s done in the previous phase. Commonly known development phases in SDLC are:

* **Planning**. It is the process of understanding why the system should be built and defining its requirements. It also includes feasibility study from several different perspectives, technical, economic, and organization feasibility aspects.
* **Analysis**. This phase includes activities such as problems identifying and analysis, and even predicting potential problems that may arise in the future regarding the system. The deliverables / products of this phase will drive how the system will be built and guide the developers’ works.
* **Design**. System analysis leads to design decision, which exactly determines how the system operates in terms of process, data, hardware, network infrastructures, user interface, and other important factors in the system environment.
* **Implementation**. This is probably the most resource-, cost-, and time-consuming phase of all. This is when the system is actually built, tested, and finally installed. It also includes activities such as user training and system maintenance. Some experts like to separate them into different phases **Deployment** and **Maintenance**. However the four phases are the most commonly known and accepted steps.

## Recognition of Needs

One must know what the problem is before it can be solved. The basis of candidate system is recognition of need for improving the system. The key question is:

**What is the problem?**

This recognition of need leads to a preliminary survey or an initial investigation of current system to determine whether an alternative system can solve the problem. If the problem is serious enough, management may have an analyst look at it.

The idea for change may originate in the environment or within the firm. Environment-based ideas originate from customers, vendors, government sources etc. When investigated each of these ideas may lead to a problem definition. Idea for change may also come from with in the organization â€“ top management, the user, the analyst. User-originated ideas also prompt initial investigation.

**Impetus for System Change**

The ideas for change originate in the environment or from within the firm Environment-based ideas originate from customers, vendors, government sources, and the like. For example, new unemployment compensation regulations may make it necessary to change the restructures. Customer complaints about the delivery of orders may prompt an investigation of the delivery schedule, the experience of truck drivers, or the volume of orders to be delivered. When investigated, each of these ideas may lead to a problem definition as a first step in the system life cycle process.

**Feasibility Study**

Depending on the results of the initial investigation, the survey is expanded to a more detailed feasibility study. As we shall learn, a feasibility study is a test of a system proposal according to its workability impact on the organization, ability to meet user needs, and effective use of resources. It focuses on there major questions:

* What are the user’s demonstrable needs and how does a candidate system meet them?
* What resources are available for given candidate systems? Is the problem worth solving?
* What are the likely impact of the candidate system on the organization? How will it fit within the organization’s master MIS plan?

**Analysis**

Analysis is a detailed study of the various operations performed by a system and their relationships with in and outside of the system.

**System Design**

Based on the user requirements and the detailed analysis of a new system, the new system must be designed. This is the phase of system designing. It is the most crucial phase in the development of a system. The logical system design arrived at as a result of system analysis and is converted into physical system design. In the design phase the SDLC process continues to move from the what questions of the analysis phase to the how *.* The logical design produced during the analysis is turned into a physical design - a detailed description of what is needed to solve original problem. Input, output, databases, forms, codification schemes and processing specifications are drawn up in detail. In the design stage, the programming language and the hardware and software platform in which the new system will run are also decided. Data structure, control process, equipment source, workload and limitation of the system, Interface, documentation, training, procedures of using the system, taking backups and staffing requirement are decided at this stage.

There are several tools and techniques used for describing the system design of the system. These tools and techniques are: Flowchart, Data flow diagram (DFD), Data dictionary, Structured English, Decision table and Decision tree which will be discussed in detailed in the next lesson.

#### Coding

The system design needs to be implemented to make it a workable system. his demands the coding of design into computer language, i.e., programming language. This is also called the programming phase in which the programmer converts the program specifications into computer instructions, which we refer to as programs. It is an important stage where the defined procedures are transformed into control specifications by the help of a computer language. The programs coordinate the data movements and control the entire process in a system. A well written code reduces the testing and maintenance effort. It is generally felt that the programs must be modular in nature. This helps in fast development, maintenance and future changes, if required. Programming tools like compilers, interpreters and language like c, c++, and java etc., are used for coding .with respect to the type of application. The right programming language should be chosen.

#### Testing

Before actually implementing the new system into operations, a test run of the system is done removing all the bugs, if any. It is an important phase of a successful system. After codifying the whole programs of the system, a test plan should be developed and run on a given set of test data. The output of the test run should match the expected results. Sometimes, system testing is considered as a part of implementation process.

Using the test data following test run are carried out:

* Program test
* System test

**Program test** : When the programs have been coded and compiled and brought to working conditions, they must be individually tested with the prepared test data. All verification and validation be checked and any undesirable happening must be noted and debugged (error corrected).

**System Test :** After carrying out the program test for each of the programs of the system and errors removed, then system test is done. At this stage the test is done on actual data. The complete system is executed on the actual data. At each stage of the execution, the results or output of the system is analyzed. During the result analysis, it may be found that the outputs are not matching the expected output of the system. In such case, the errors in the particular programs are identified and are fixed and further tested for the expected output. All independent modules be brought together and all the interfaces to be tested between multiple modules, the whole set of software is tested to establish that all modules work together correctly as an application or system or package.

When it is ensured that the system is running error-free, the users are called with their own actual data so that the system could be shown running as per their requirements.

**Implementation**

The implementation phase is directly concerned with user training, site preparation and file conversion. During the final testing, user acceptance testing is followed by the user training. Conversion usually takes place at about the same time when the user is being trained. Once the program become available and data are ready for testing and the results are OK then the program is run with â€œliveâ€ data. Otherwise, a diagnostic procedure is used to locate and correct errors in the program.

**Post-Implementation and Maintenance**

After the installation phase is completed and the user or staff is adjusted to the changes create by the candidate system. Evaluation and Maintenance begins. If the new information is inconsistent with the design specifications then changes have to be made. Hardwareâ€™s also require periodic maintenance to keep in tune with design specifications.

Changes in organizations requirements or environmental factors also call for system enhancements. This change requires evaluation, program modifications and further testing.

**Systems Analyst**

"These are knowledge workers who facilitate the development of information systems and computer applications by bridging the communications gap that exists between non-technical system users, and System designers and developers."

**Need of Systems Analysts**

Systems analysts work as a link between Business people, & Computer Programmers. Business People may define the business to be computerized, i.e. establish scope of computerization. However, they may not fully understand the capabilities and limitations of modern information technology. Computer programmers apply information technology to build information systems which solves these problems but need not fully understand the business usages they are computerizing or supporting.

Systems Analysts due to their expertise in development, knowledge of business processes, awareness of industry best practices, bridge the gap by translating the scope of computerization into how the systems will handle the transactional flows and the relationship between the various aspects of the business for the programmers whilst keeping the overall objectives and requirements, both corporate and IT related in perspective.

**Role of System Analyst**

**The system analyst is a person** who is thoroughly aware of the system and guides the system development project by giving proper directions. He is an expert having technical and interpersonal skills to carry out development tasks required at each phase.

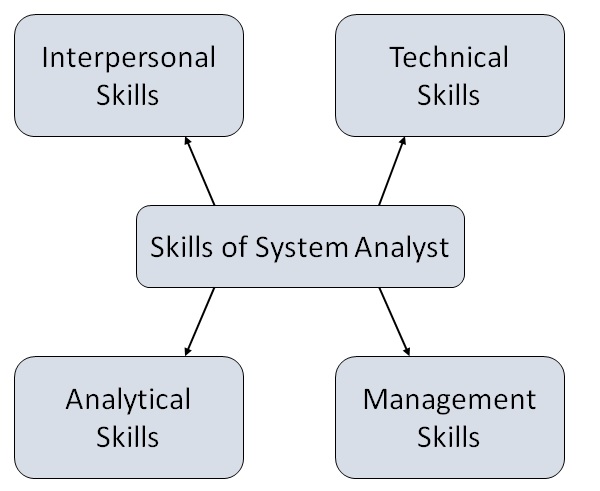
He pursues to match the objectives of information system with the organization goal.

Main Roles

* Defining and understanding the requirement of user through various Fact finding techniques.
* Prioritizing the requirements by obtaining user consensus.
* Gathering the facts or information and acquires the opinions of users.
* Maintains analysis and evaluation to arrive at appropriate system which is more user friendly.
* Suggests many flexible alternative solutions, pick the best solution, and quantify cost and benefits.
* Draw certain specifications which are easily understood by users and programmer in precise and detailed form.
* Implemented the logical design of system which must be modular.
* Plan the periodicity for evaluation after it has been used for some time, and modify the system as needed.

**Attributes of a Systems Analyst**

The following figure shows the attributes a systems analyst should possess −



**Interpersonal Skills**

* Interface with users and programmer.
* Facilitate groups and lead smaller teams.
* Managing expectations.
* Good understanding, communication, selling and teaching abilities.
* Motivator having the confidence to solve queries.

**Analytical Skills**

* System study and organizational knowledge
* Problem identification, problem analysis, and problem solving
* Sound commonsense
* Ability to access trade-off
* Curiosity to learn about new organization

**Management Skills**

* Understand users jargon and practices.
* Resource & project management.
* Change & risk management.
* Understand the management functions thoroughly.

**Technical Skills**

* Knowledge of computers and software.
* Keep abreast of modern development.
* Know of system design tools.
* Breadth knowledge about new technologies.