

Elements of System Analysis:

There are four basic elements in system analysis:

- a) Output: The output of system determine what the objectives or goals are achieve, what is the purpose of our work. in other words what is the main aim behind the system.
- b) Input: Once we know the output, we can easily determine what the inputs should be sometimes. the essential elements of inputs are:
 - i) Accuracy: If the data is not accurate, the outputs were wrong.
 - ii) Timeliness: If data is not obtained in time, the entire system falls into areas.
 - iii) Proper format: The inputs must be available in proper format.
 - iv) Economy: The data must be produced at the least cost.
- c) Files: files are used to store data. Most of the inputs necessary for the system may be historical or it may be possible that these are generated from within the system. These are stored in files.
- d) Processes: The processes involves a set of logical steps. These steps are required to be instructed to the computer and this is done by a series of instructions called program. This program is the details of how the inputs and files are converted into outputs.

* Types of Systems.

System have been Classified in different ways. Common classifications are:

1) Physical or abstract System

Physical Systems are tangible entities that may be static or dynamic in operation.

Abstract Systems are conceptual or non-physical entities which may be as straightforward as formulas of relationships among sets or variables or models the abstract conceptualization of Physical situations.

2) Open or Closed System.

An Open System continually interacts with its environments, it receives inputs from and delivers outputs output to the outside. An information system belongs to this category, since it must adapt to the changing demands of the user.

A closed system is isolated from environmental influences. In real world completely closed systems are rare.

3) Deterministic or Probabilistic System:

A deterministic system is one in which the occurrence of all events is perfectly predictable.

Probabilistic system is one in which the occurrence of event can not be perfectly predicated. An example of such a system is a warehouse and its contents.

4) Man-made Information System:

An information system is the basis for interaction between the user and the analyst. It determines the nature of relationship among decision makers.

Man-made 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.

The major Information Systems are:

i) Formal Information System:

A formal information system is based on the Organisation chart. It is concerned with the pattern of authority, communication and workflow.

ii) Informal System:

An information system is an employee based system designed to meet personal and vocational needs and to help in the solution of work-related problems. It is considered to be a useful system because it works within the framework of the business and its stated policies.

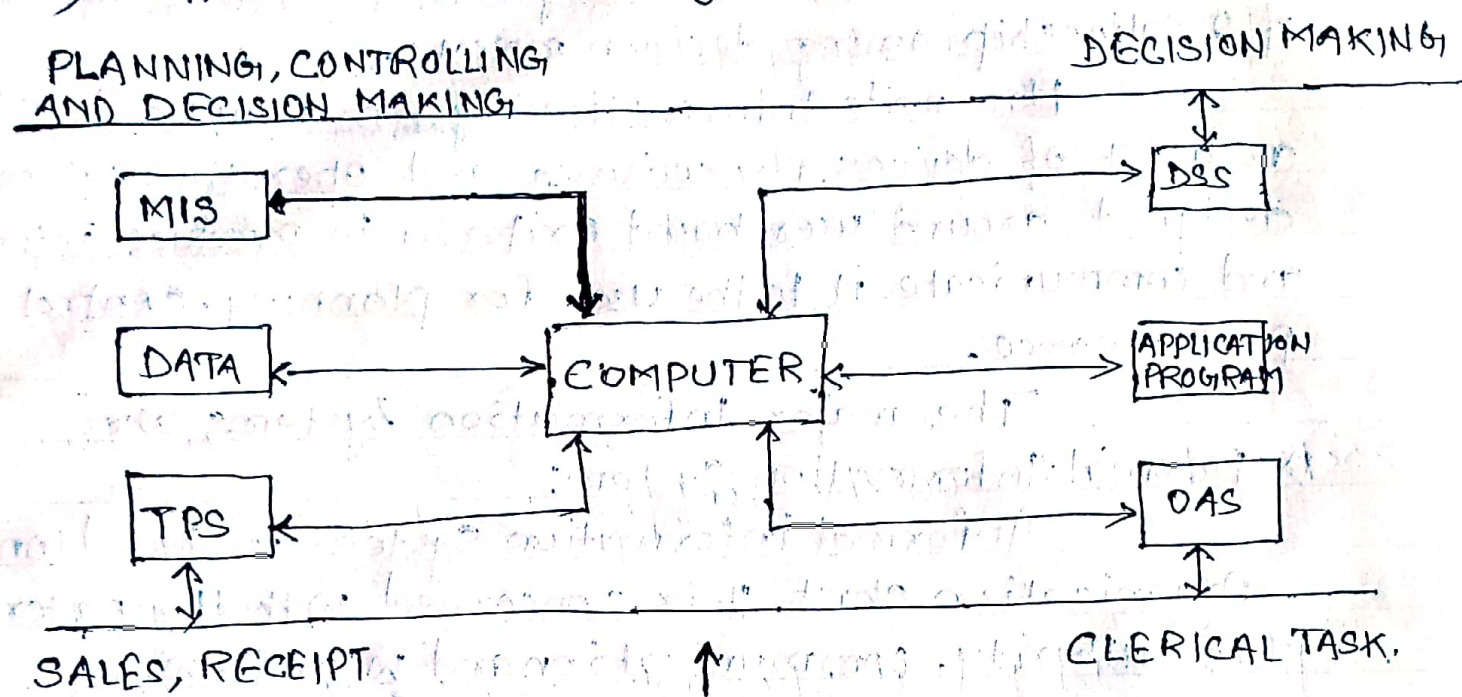
iii) Computer Based Information System:

Third category of information system depends mainly on the computer for handling business applications. There is a class of systems known as collectively as computer based information system to meet a variety of business needs.

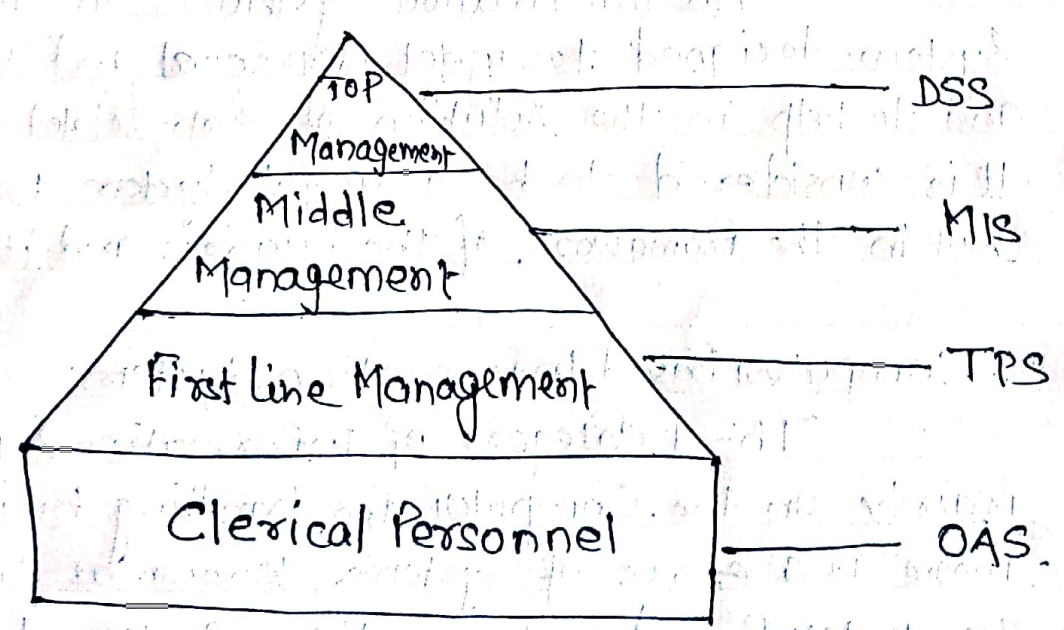
They are classified as:

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- i) Decision Support System (DSS)
- ii) Management Information System (MIS)
- iii) Transaction Processing System (TPS)
- iv) Office Automation System (OAS)



CBIS in an Organisational Context



The Hierarchical view of CBIS

i) Decision Support System: Offers the kind of information that support managers who must make decisions that are not highly structured, also called unstructured or semi structured decisions. The decision support system supports to make structure decision where the problem is not structure, but does not replace judgement of manager.

ii) Management Information System:

MIS providing information for policy making, management planning and control ~~process~~ purpose. MIS are more concerned with management functions. MIS can be described as information system that can provide all levels of management with information essential to the running of smooth business. This information must be relevant, timely, accurate, complete and concise as is ~~and~~ economically feasible.

iii) Transaction Processing System:

A TPS can be defined as a computer based system that captures, classifies, stores, maintains, updates and retrieves transaction data for record keeping and for input to other types of CBIS. TPSs are aimed at improving the routine business activities on which all organisations depend. (A transaction is any event or activity that affects the whole organisation. Placing orders, billing customers, hiring of employees and depositing cheques are some of the common transaction. All organisation process transactions as a major part of their daily business activities. TPS provide speed and accuracy and can be programmed to follow routines without any variance. The most successful organisation perform this work of transaction processing in a very systematic way.

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iv) Office Automation System.

Office Automation Systems are most rapidly expanding CBIS. This system being developed with the hopes and expectations that they will increase the efficiency and productivity of office workers - typists, secretaries, administrative assistants, staff professionals, managers.

An OAS can be described as a multi-function, integrated computer based system that allows many office activities to be performed in an electronic mode.

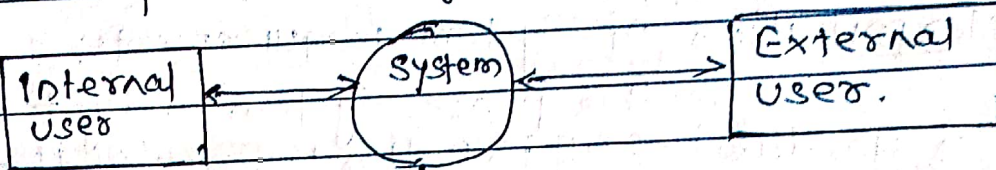
Question:

- i) What is System? Explain various characteristics of a system?
- ii) Explain the basic elements in System analysis.
- iii) Explain various type of system.?
- iv) Explain CBIS and its types.?

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SYSTEM DEVELOPMENT LIFE CYCLE (SDLC)

The system development life cycle is classically way of as the set of activities that analysts, designers and users carry out to develop and implement an information system. the system development life cycle consists of the following activities.



Preliminary Investigation

Determination of System Requirements.

Design of System

Development of Software

System Test

Implementation, Evaluation & Maintenance

Note: → Generally Six phases (if we consider Implementation, evaluation and maintenance ~~separately~~ separately then SDLC is eight phases.)

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1. Preliminary Investigation

Preliminary Investigation: In this phase system analyst initiates the request. This activity has three parts:

- i) Request clarification
- ii) Feasibility Study
- iii) Request approval.

2. Determination of System Requirements:

In this phase system analyst is detailed understanding of all important facts of the business area under investigation. The key questions are

- What is being done?
- How is it being done?
- How frequently does it occur?
- How great is the volume of transactions or decisions?
- How well is the task being performed?
- Does a problem exist?
- If a problem exists, how serious is it? What is the underlying cause?

To answer the above questions, system analysts discuss with different category of persons to collect the facts about the business process and their opinions of why things happen as they do and their views for changing the existing process. Some tools are used in analysis like DFD, interviews, onsite observations and questionnaires. Once the structured analysis is completed, analyst has finally understanding of What is to be done

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Design of System

The design of an Information System produces the details that clearly describe how a system will meet the requirements identified during systems analysis. System developer refer to this state as logical design and to process of developing program software which is referred to as physical design. The systems design also describes the data to be input, calculated or stored. Individual data items and calculation procedures are written in detail. The detailed design information is passed on to the programming staff for the purpose of software development. Designers are responsible for providing programmers with complete and clearly outlined software specifications.

Development of Software:

In this phase programmers develop program. Programmers are also responsible for documenting the program, providing an explanation of how and why certain procedures are coded in specific ways. Documentation is essential to test the program and carry on maintenance once the application has been installed.

System Testing: During systems testing, the system is used experimentally to ensure that the software does not fail. Special test data are input for processing, and the results examined and test according to its specifications and in the way user expect.

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Implementation, Evaluation and Maintenance

Implementation is the process of having systems personnel check out and put new equipment into use, train users, install the new application and construct any files of data needed to use it.

Evaluation of the system is performed to identify its strengths and weakness. The actual evaluation occurs along any of the following dimensions:

- * Operational Evaluation.
- * Organisational Impact
- * User Manager Assessment
- * Development Performance.

Maintenance : is necessary to eliminate errors in the working system during its working life. and to tune the system to any variations in its working environment. System planners must always plan for resource availability to carry out these maintenance functions. The importance of maintenance is to continue to bring the new system to standards

Software Crisis

Software crisis can be broadly classified in the following major areas:

→ From Programmer's Point of View

The following types of Problems may contribute, in maximum cases to Software Crisis:

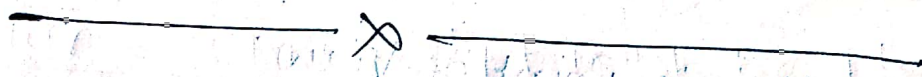
- Problem of Compatibility
- Problem of Portability
- Problem in documentation
- Problem in coordination of work of different people where a team is initiating to develop software.
- Problems that arise during actual run time in the organisation. Some time the errors are not detected during sample run.
- Problem of Piracy of Software.
- Customer normally expand their specifications after Program design and implementation has taken place.
- Problem of maintenance in proper manner.

→ From User's Point of View

There are many sources of Problems that arise out of the user's end. Some of these are as follows:

- How to choose a Software from total market availability.
- How to ensure which software is compatible with his hardware specifications.
- The customised Software generally does not meet his total requirements.
- Problem of virus.
- Problem of Software bugs, which comes to knowledge of customer after considerable data entry.

- Certain Softwares run only on specific operating system environment.
- The problem of compatibility for users may be because of different size and density of disk.
- Problem in learning all the facilities provided by the software because companies gives only selective information in manual.
- Certain Software run and create files which expand their used memory spaces and create problem of disk management.
- Software crisis develops when system memory requirement of software is more than the existing requirement and/or availability.
- Problem of different versions of software.
- Security problem for protected data in software.



Role of a System Analyst

Question: Who is System Analyst? What a System analyst does? and What are the various attributes of an effective System Analyst?

Answer: A system analyst is a person who conducts a study, identifies activities and objectives and determines a procedure to achieve the objectives. Designing and implementing systems to suit organisational needs are the functions of the System analyst. He play a major role in seeing business benefit from Computer technology.

The analyst is a person with unique skills. He uses these skills to coordinate the efforts of different type of persons in an organisation to achieve business goals.

→ A System Analyst carries out the following Roles:

a) The first and most important task of System analyst is problem definition.

b) Initially a System analyst must consult with managers, users and other data processing professionals in defining problems and developing solution of a problem.

c) Having gathered the data relating to a problem, the System analyst analyses them and think of plan to solve it.

d) System analysts coordinate the process of developing software.

e) System analysts are referred as planner to develop a plan to meet the management's objectives.

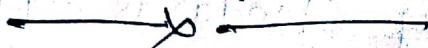
f) System analyst coordinates the testing procedures and help in deciding whether or not the new system is meeting standards established in the planning phase.

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* Attributes of an effective Systems Analyst

System analyst must have the following attributes:

- Knowledge of People: System analyst work with other, he or she must understand their needs and what motivates them to develop system properly.
- Knowledge of Business functions:
A system analyst must know the environment in which he or she works. A working knowledge of accounting and marketing principles is a must since so many systems are built around these two areas. He must be familiar with his company's product and services and management's policies in areas concerning him.
- Knowledge of Data Processing Principles: The System analyst must fully aware about the potential and limitations of Computers.
- Ability to Communicate: As a coordinator, a System analyst must communicate properly with people of different levels within an organisation.
- Flexibility - System analyst must be flexible in their thinking. The analyst's goal is to produce the system that will be the best for his organisation. This requires an open mind and flexibility in his idea.
- An analytical mind: System analyst requires an analytical mind to select pertinent data and concentrate on them in defining problems and forming solutions.
- Well educated and Sharp mind - Analyst must have sharp mind to learn quickly how people do their jobs and develop ways for them to do it better.



Ques. Why System Projects?

Systems projects are initiated for different reasons.

The most important reasons are:

a) Capability: Information Systems add Capability in 3 ways:

i) Improved ~~volume~~ speed Processing Speed.

ii) Increased Volume.

iii) Faster retrieval of information.

b) Control

i) Greater accuracy and Consistency.

ii) Better Security

c) Communication:

i) Enhanced Communication

ii) Integration of business areas

d) Cost

i) Monitor Cost

ii) Reduce Cost

e) COMPETITIVENESS:

i) Lock in Customers

ii) Lock out Competitors

iii) Improve arrangements with Suppliers

iv) New product development.

SOURCES OF PROJECT REQUESTS

There are mainly four primary sources of Project Requests. The requesters inside the Organisation are: Department Managers, Senior Executives, and System Analysts. In addition outside the organisation like government agencies

* Requests from Department Managers

Who deal with day to day business activities.

* Requests from Senior Executives:

Who takes decision & manage the entire Organisation.

* Requests from System Analysts

Who work in side Organisation. they may write system proposal or encouraging a manager to allow the writing of a proposal on their behalf.

* Requests from Outside Groups:

Developments outside the Organisation also lead to project requests. like government agencies.

→ Managing Project Review and Selection:

Mainly three committees formats are:

* Steering Committee.

* Information systems Committee.

* User Group Committee.

PRELIMINARY INVESTIGATION

To determine the feasibility of the system. The purpose of the preliminary investigation is to evaluate project requests. It is the collecting of information that helps committee members to evaluate the merits of the project request and make an informed judgement about the feasibility of the proposed project.

Analysts working on the preliminary investigation should accomplish the following objectives:

- * Clarify and understand the project request
- * determine the size of the project.
- * assess costs and benefits of alternative approaches.
- * determine the technical and operational feasibility of alternative approaches.
- * report the findings to management, with recommendations outlining the acceptance or rejection of the proposal.

The data that the analysts collect during preliminary investigations are gathered through three primary methods:

- : reviewing organisation documents.
- : On-site observations
- : conducting interviews.

Testing Project Feasibility:

PT examine project feasibility, i.e. the system will be useful to the organisation. Three important tests of feasibility are studied - they are

- * Operational feasibility
- * Technical feasibility
- * Economic feasibility.

Problem Classifications and Definitions:

System analysts use several questions to specify the problems (requirements) for a new project with any accuracy. Some of questions are:

- i) What is the problem?
- ii) How complex is it?
- iii) What are its likely causes?
- iv) Why is it important that the problem be solved?
- v) What are possible solutions to the problem?
- vi) What types of benefits can be expected once the problem is solved?

Defining a Problem.

- * The Problem of Reliability
- * The Problem of Validity.
- * The Problem of Accuracy.
- * The Problem of Economy
- * The Problem of Timeliness
- * The Problem of Capacity
- * The Problem of Throughput

Sources of Problem/Opportunity

Organisations usually face problems or have opportunity due to the following:

- * a new product or Plant or branch.
- * a new market or new process
- * failure of an existing system
- * inefficiency of an existing system
- * structural errors in the existing system, etc.

In addition some organisation based reasons are also these are:

- * The performance of the system
- * The information being supplied and its form
- * The economy of processing
- * The control of the information processing
- * The efficiency of the existing system.
- * The security of the data and software.
- * The security of the equipment and Personnel.

After identification of the problems, it is defined and a general direction or method for solving this problem is also determined. Then project boundaries are defined. The management establishes the term of reference as well as the resources to be provided for the project.

FEASIBILITY STUDY.

A feasibility study is carried out to select the best system that meets performance requirements.

Feasibility is the determination of whether or not a project is worth doing. The process followed in making this determination is called a feasibility study. It determines that a project is feasible, the analyst can prepare the project specification which finalizes project requirements.

Different Types of Feasibility:

In the conduct of the feasibility study, the analyst will usually consider seven distinct, but inter-related types of feasibility. They are:

1) Technical Feasibility: This is concerned with specifying equipment and software that will successfully satisfy the user requirement. The technical needs of the system may vary considerably,

- * The facility to produce outputs in a given time.
- * Response time under certain conditions.
- * Ability to process a certain volume of transaction at a particular speed.
- * Facility to communicate data to ~~distinct~~ distant location.

2) Operational Feasibility: It is mainly related to human organisational and political aspects. The points to be considered are:

- What changes will be brought with the system?
- What organisational structures are disturbed?
- What new skills will be required? Do the existing staff members have these skills? If not, can they be trained in due course of time?

3→ Economic feasibility: Economic analysis is the most frequently used technique for evaluating the effectiveness of a proposed system. More commonly known as Cost/Benefit analysis. This is an ongoing effort that improves in accuracy at each phase of the system life cycle.

4→ Social feasibility: social feasibility is a determination of whether a proposed project will be acceptable to the people or not. This determination typically examines the probability of the project being accepted by the group directly affected by the proposed system change.

5→ Management feasibility: It is determination of whether a proposed project will be acceptable to management, or not.

6→ Legal feasibility: is a determination of whether a proposed project accepts on known Acts, Statutes, as well as any pending legislation.

7→ Time feasibility:

Time feasibility is a determination of whether a proposed project can be implemented fully within a stipulated time frame. If a project takes too much time it is likely to be rejected.



Steps in feasibility study.

Following steps are involved in the feasibility analysis. They are:

- i) Form a Project team and appoint a project leader.
- ii) Prepare system flowcharts.
- iii) Enumerate potential Purposed systems.
- iv) Define and identify characteristics of Proposed System.
- v) Determine and Evaluate performance and cost effectiveness of each proposed System.
- vi) Weight system performance and cost data.
- vii) Select the best proposed System.
- viii) Prepare and report final project directive to management.

SYSTEM: means an organised relationship among the functioning units or components.

A business system combine policies, Personnel equipment and Computer facilities to Co-ordinate the activities of a business organization. Essentially, a business system represents an organized way of achieving the pre-determined objective of an organisation.

A common idea that suggests, A system is an orderly grouping of interdependent components linked together according to plan to achieve a specific goal. Each component is part of the total system and has to do its own share of work for the system to achieve the desired goal.

SYSTEMS STUDY, SYSTEM ANALYSIS AND SYSTEM APPROACH

Systems Study: may be defined as "a study of the operations of a set of connected elements and of the inter-connections between these elements".

Systems Analysis is a management technique which helps us in designing a new system or improving an existing system.

Systems Approach: Shows a set of procedure for solving a particular problem. It applies scientific methods to observe, clarify, identify and solve a problem with special care being taken to understand the inter-relatedness between elements and their system characteristics.

Characteristics of a System: The following characteristics are present in all systems:

- a) Organisation: implies structure and order. It is the arrangement of components that helps to achieve objectives. In the business system, the hierarchical relationship starting with the president on top and leading downward to the blue collar workers represents the organization structure.
- b) Interaction: Interaction refers to the procedure in which each component functions with other components of the system. ~~for~~ for example. In a computer system the CPU must interact with other units to solve a problem.
- c) Interdependence means that component of the organization or computer system depend on one another. They are coordinated and linked together in a planned way to achieve an objective.
- d) Integration is concerned with how a system is tied together. successful integration will typically produce a better result as a whole rather than if each component works independently.
- e) Central Objectives: is the last characteristic of a system. The important point is that users must be aware about the central objective well in advance.