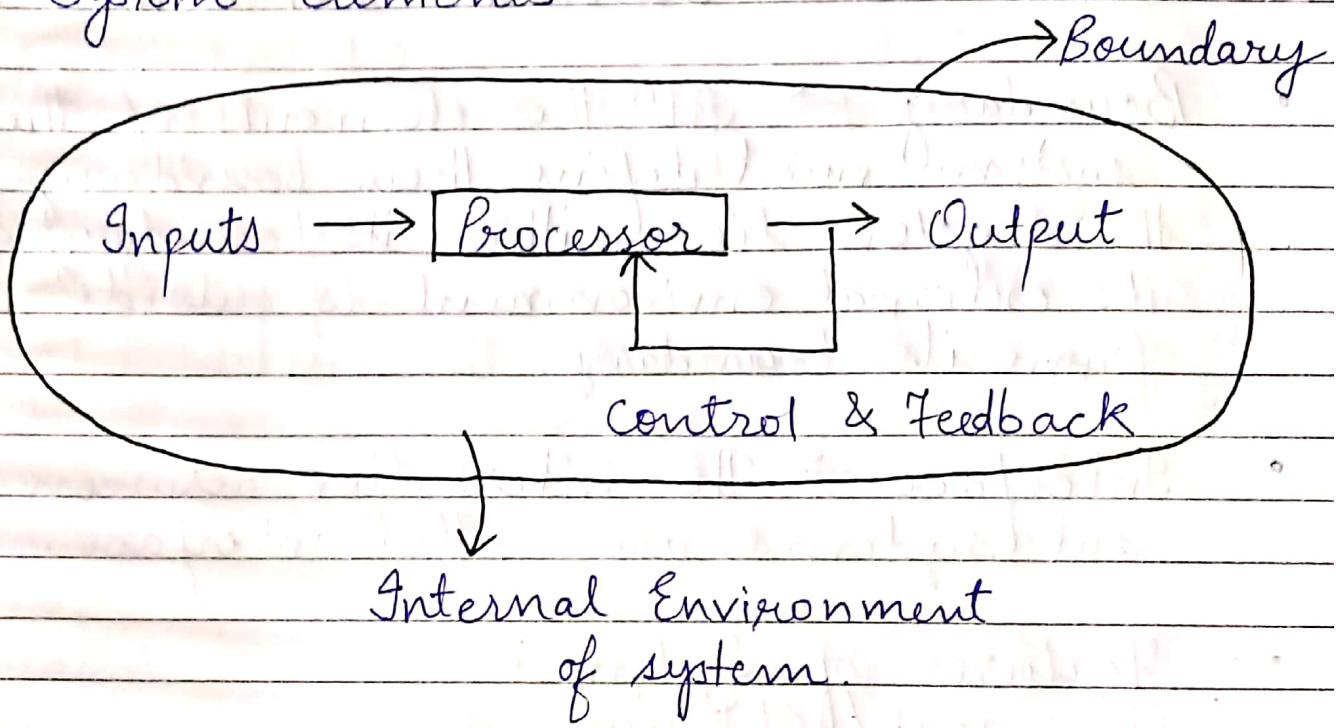


## Ch-1 (Introduction to System)

- System is a group of independent components linked together according to a plan to achieve a specific objective.
- System Elements:



- Input → An input is the element that enters in a system to be processed by the processor.
- Output → A major objective of the system is to produce whatever is expected by the user.
- Processor → It perform the actual transformation of an input into the output through a series of steps.

## Processor

Input → Step 1 → Step 2 → Step 3 → ... → Output

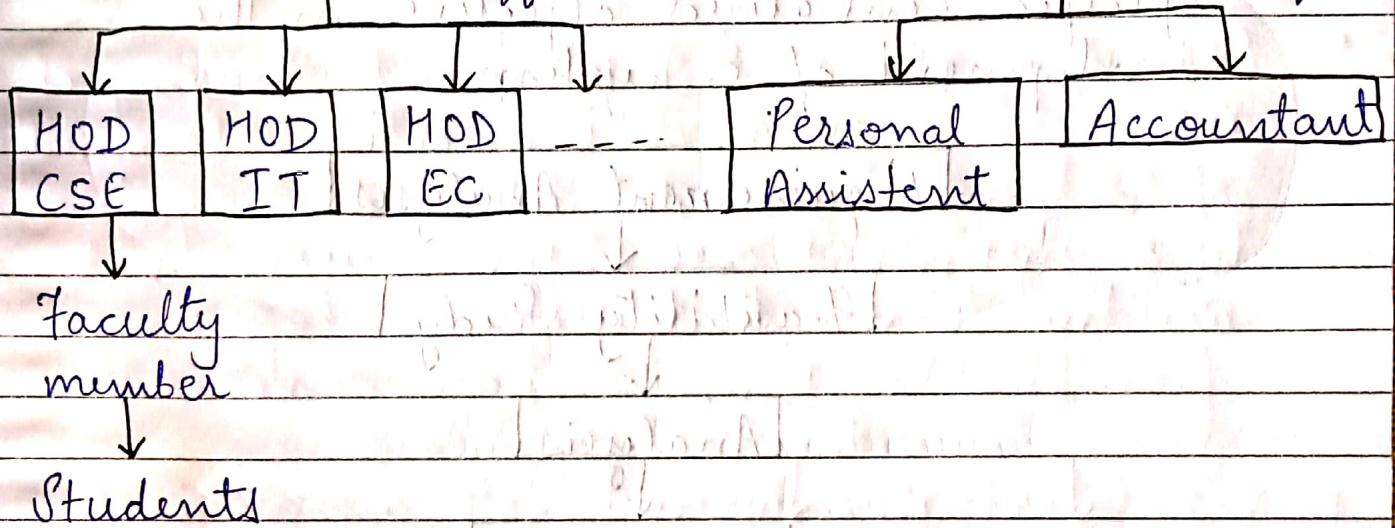
- Environment → It determine the behaviour of the system, how the system behave in the environment.
- Boundary → All the elements of the system must define their boundary, the system lie within its boundary & its external environment is outside from its boundary.
- Interface → The interaction between the sub-systems are called interface.
- Features of System :
  - (i) Goal / Objective
  - (ii) Organization
  - (iii) Interdependence
  - (iv) Integration
  - (v) Interaction
- Goal / Objective → The objective of the system is defined as we are going to achieve some goal through the system.

- Organisation → It concerned with the structure & arrangement of the components of the system to achieve the objective.

Principal

Technical Staff

Non-Technical Staff



- Interdependence → All the components of the system depends upon each other, the output of the one component act as an input to the next component.
- Integration → It is required to assemble all the components or the sub-systems of the system.
- Interaction → It can be done by the inter-relationship of the component

of the system.

- SDLC (System Development Life-Cycle) :

A system Development life-cycle is the process i.e. followed in implementing a computer-based system or sub-system.

SDLC is a framework consisting of a series of various tasks to achieve the specific centralized objective in the development of a system.

Requirement Analysis

Feasibility Study

Analysis

Designing

Coding

Testing

Maintainence

Review and Evolution

- Requirement Analysis → The base of this phase is to survey or initial investigation to determine whether an alternative system can solve the problem.

- Feasibility Study → It is the detailed study or investigation about the system. It is the test of a system proposal according to its workability, impact on the organisation, ability to meet user needs, and effective use of resources.

There are some types of feasibility:

- (i) Technical feasibility → (Hardware, software)  
It is related to the availability of hardware and software to perform essential computing.
- (ii) Economic feasibility → (cost related) The new system should be economically beneficial for that, the cost & benefit analysis is performed.
- (iii) Time feasibility → The system should be implemented within the mentioned time constant.
- (iv) Legal and Ethical feasibility → The new system should exist within the legal and ethical boundaries.

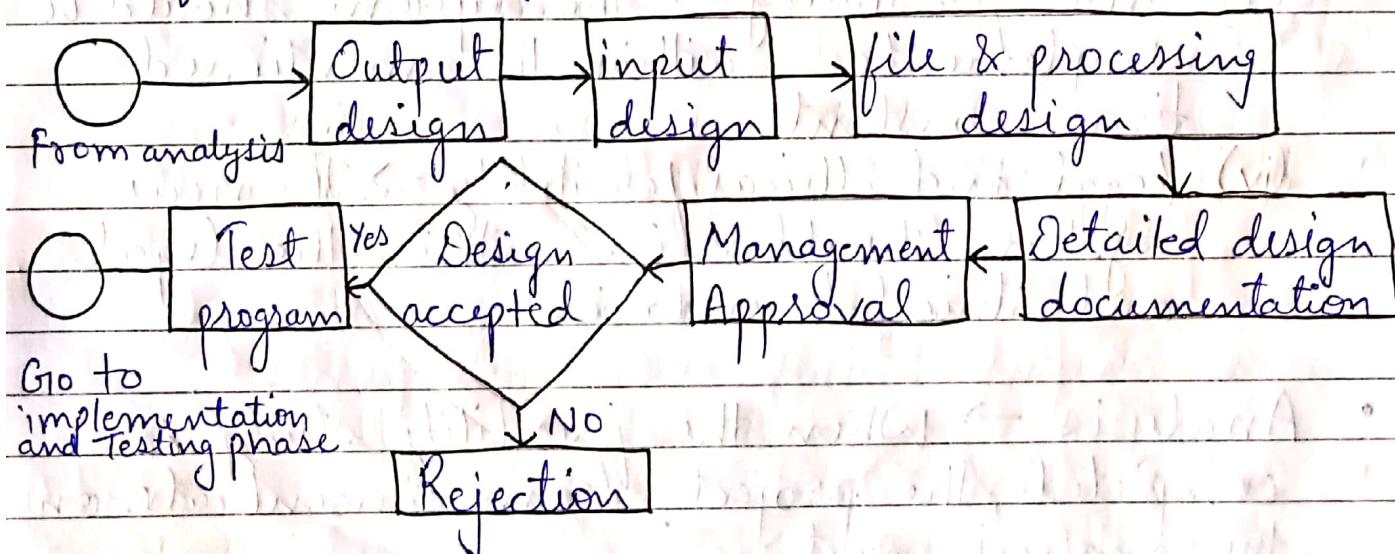
- Analysis → When the feasibility study is completed, the project team concentrate on the analysis part.

Analysis is a detailed study of the various operation performed by a system & their relationship. There are some major objectives:

- (i) Define the scope of new system.
- (ii) Understand the old information system
- (iii) Review the feasibility & cost benefit analysis
- (iv) Develop the functional, structured specification for the new system.

After analysis phase, this phase generate a document called SRS (software requirement specification).

- Designing Phase → It is done by the project manager. System design is the determination of the process and data that are required by a system. It also depends upon what are the things that user are expecting from the system. There are some steps in it:



- (i) Output design → (a) Procedure to produce output  
 (b) Format / Representation of output
- (ii) Input design → (a) Input data are designed  
 (b) Format of input data

- (c) Sample presentations.
- (iii) File & processing design → (a) files of database design to fulfill the requirement of the system.  
(b) In processing design, program construction & testing.
- (iv) Detailed designed documentation → (a) Documentation of details related to the system.  
(b) Documentation of estimation which affect the system.
- (v) Management Approval → (a) All the previous work evalution.  
(b) Any side-effects and risk factors
- (vi) Design accepted → (a) It is to be checked whether the design is accepted or not.

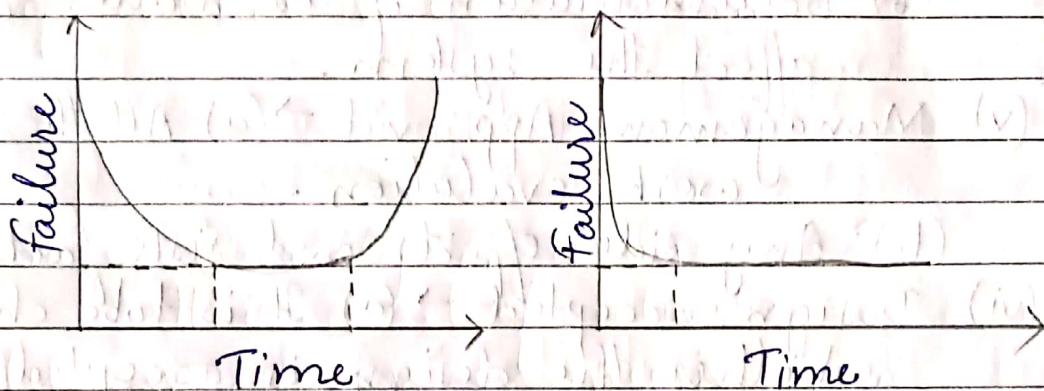
- Coding → In this phase, development of source code on a specific technology is compiled.
- Testing → After developing the code of the system, it enters into the testing phase, which is called as S-T-L-C (System Testing life-cycle).
- Maintenance.

- Software Engineering:

Software is designed as a collection of programs, procedure, data and documentation.

- Characteristics of Software Engineering:

- Software is developed or engineered not manufactured.
- Software doesn't wear out.



\* Failure curve of Hardware or "Bath-Tub" Curve

In this, for hardware product it can be observed that the failure rate/ratio is initially high but it decrease as the components are identified and removed.

After some time, the failure rate is again increased. This gives the plot of hardware reliability over the time which is called the "Bath-Tub Curve".

At the other side, for the software

failure curve, the failure rate is high at the initial level more errors are identified and after some time after removing these errors the curve will come in a stable state.

- Software Life-Cycle Method ::

A SLCM (Process Model) is a descriptive & diagrammatic representation of the software life-cycle. The life-cycle represents all the activities required to make a software product.

Different software life-cycle Models are here -

- (i) Classical Waterfall Model
- (ii) Iterative Waterfall Model
- (iii) Prototype Model
- (iv) Evolutionary Model
- (v) Spiral Model

- Project - Size estimation : Techniques :

Estimation of the size (line of code) of the software is an essential part of software project management. It helps project manager to predict the efforts and time which will be needed to build the project.

Various majors are used in project - size estimation -

- (i) Line of Code

- (ii) Number of entities in ER-Diagram
- (iii) Total Number of DFD (Data flow diagram)
- (iv) Function points

1.) Line of Code → Total number of lines in the source code. KLOC (1000 lines of code), NLOC (Non-comment lines of code)

2.) No. of Entities in ER-Diagram →

- Software Quality Assurance :

It is a set of activities for ensuring quality in software engineering process (life cycle). It ensure that developed software meets and compile with the defined or standardised quality specifications.

- SQA Activities : (Explain all activities)

- (i) Setting the checkpoints (deadline)
- (ii) Creating an SQA management plan
- (iii) Applying software engineering techniques
- (iv) Executing formal technical review (FTR)

(v) Having a multi-testing techniques / strategy.

(vi) Controlling change

- (vii) Performing SQA audit (inspection)
- (viii) Manage good relations
- (X) Maintaining records & reports