

System

System is a set of interacting or interdependent components forming an integrated whole. A system can be described as a set of objects joined together for a common objective.

Components of system:

1. **Hardware:** It refers to the physical layer of the information system. It includes computers, networks, scanners, digital capture devices, and other technology-based infrastructure.
2. **Software:** It refers to the logical layer of information system that makes hardware function properly. It includes system software (OS, device driver, etc.) and application software.
3. **Data:** It is raw facts, figures, and measurements, etc. which are used as input for the system. It may be alphabets, digits, figures and other symbols.
4. **Processes:** It refers to processes, or procedures, describe the tasks that users, managers, and IT staff members perform.
5. **People:** It refers to users who interact with information system. The users within the organization include managers, technicians, sales representatives, corporate officers, etc. are called internal users and the users outside the organization include customers, suppliers, etc. are called external users.

Information System

An information system is a computer based system which is an integrated set of different components for collection, process, storage and transmission of data. Simply, it is a system which processes supplied/collected data and generates information that can be used for decision making at different levels for the betterment of an organization. The types of information system are:

1. **Transaction processing system:** it processes data resulting from business transactions, updates operational database such as sales and inventory processing and accounting systems.
2. **Management information system:** it is the integrated modern approach of management, information and computerized system. It provides information to support the operations, management, decision making functions of an organization.
3. **Decision support system:** It is the information system at the organization's senior level management that combines data and sophisticated analytical models or data analysis tools to support semi-structures and unstructured decision makings.
4. **Executive support system:** it is also known as executive information system. It operates on the executive level of management. It provides critical information from many sources customized to the information needs of executives.

System Analyst

System analyst is a people who is involved in analyzing, designing, implementing and evaluating computer based information to support the decision making and operation of an organization.

The roles of system analyst area as follows:

1. Change event
2. Investigate event
3. Analysis and evaluate
4. Implement and manipulate
5. Motivate and monitoring
6. Defining the requirements
7. Designing system
8. Solving Problems

The characteristics of system analyst are as follows:

1. Knowledge of organizations
2. Knowledge of computer system
3. Good inter-personal relation
4. Communication skills
5. Analytical skill
6. Well educated with sharp mind
7. Flexibility

System Development Model

a. Waterfall model

It is a oldest type of model for software engineering. The fundamental processes of waterfall model are as follows:

1. Requirements analysis and definition: it is the first stage of waterfall model. In this stage, the developer should identify the actual requirements of the given problem.
2. System design: in this stage the systems design process partition the requirements to either hardware or software systems.
3. Implementation and unit system: During this stage, the system design is realized and tested as a complete system to ensure that the software requirements have been met.
4. Operation and maintenance: in this stage, the system is installed to the desire location. The maintenance involves correcting errors which were not discovered in earlier stages of the life cycle, improving the implementation of system units and enhancing the system's service as new requirements are discovered.

b. Prototyping model

It is the iterative process of system development which is more appropriate for developing new system where there is no clear idea of requirements, inputs and outputs.

1. Identify the user needs: the system analyst interviews the user to obtain an idea of what is required from the system.
2. Develop a prototype: the system analyst, working uses one or more prototyping tools to develop a prototype.
3. Determine if prototype is acceptable: the analyst educates the user in prototype use and provides an opportunity from becoming familiar with the system.
4. Use the prototype: the prototype becomes the operational system.

c. Spiral Model

In this model, process is represented as a spiral rather than as a sequence of activities with backtracking.

1. Planning: the project is reviewed and a decision made whether to continue with a further loop of the spiral. If it is decided to continue, plans are drawn up for the next phase of the project.
2. Risk analysis: for each of the identified project risks, a detailed analysis is carried out. Steps are taken to reduce the risk. For example, if there is a risk that the requirements are inappropriate, a prototype system may be developed.
3. Software development: after risk evaluation, a development model for the system is chosen.
4. User evaluation: specific objectives for the phase of the project are defined by the evaluation of users. Constraints on the process and the product are identified. And a detailed management plan is drawn up.

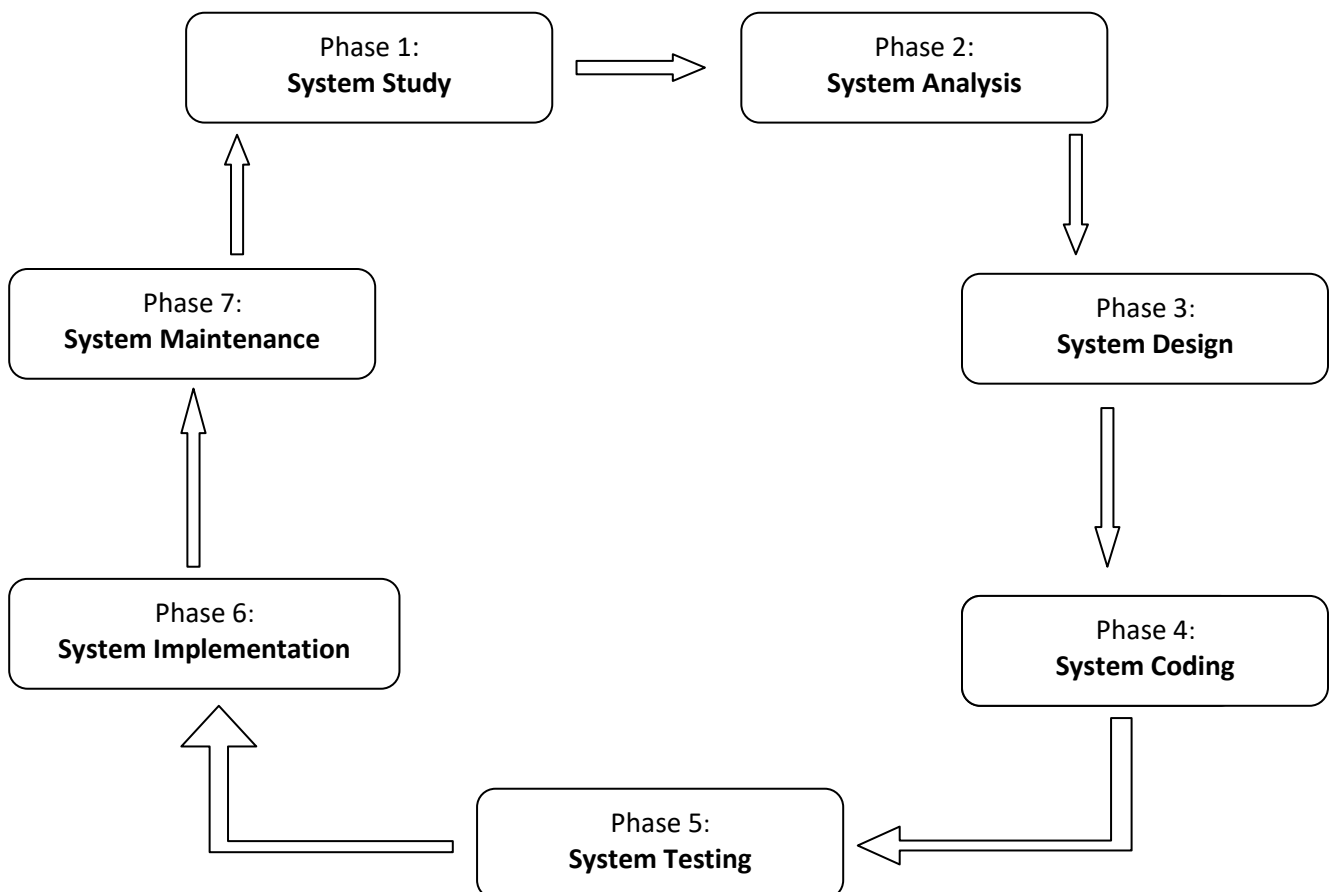
SDLC

Systems Development Life Cycle is a specific set of procedures, steps, and documents that carry a project through its technical development. System Development Life Cycle (SDLC) is a methodology used to develop, maintain, and replace information systems.

The different phases of SDLC are as follows:

1. System Study: A system is intended to meet the needs of an organization. Thus the first step in the design is to specify these needs or requirements. The top manager of the organization takes the basic decision to use a computer based (information) system for managing the organization.

2. **System Analysis:** System analysis is the dissection of a system into its component pieces to study how those component pieces interact and work. System analysis is a term that collectively describes the early phases of development. It is defined as those phases and activities that focus on the business problem, independent of technology.
3. **System Design:** The next step is to develop the logical design of the system. During this phase, the logic of the system, namely, the information requirement of users, and use this to find the necessary database.
4. **System Coding:** After designing a logical diagram of a system then next step is to convert into program. This process is called system coding. Flowchart, algorithm, Pseudocode, etc. are the outlines the procedures for taking the input data and processing it into usable output.
5. **System testing:** It is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. System testing also provides an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation.
6. **System Implementation:** Implementation involves testing the installed system, converting from the old system to the new one and training the users. This phase consists of implementation of the system into a production environment, and resolution of the problem identified in testing phase.
7. **System Maintenance:** It begins after the system is implemented. Like any system, there is an ageing process that requires periodic maintenance of hardware and software. The content of the review will include objectives met, cost, performance, standards and recommendation.



Feasibility study

Feasibility study is the most important activity in the system analysis phase. It analyses the proposed system from different aspects so that it makes us clear that how practical or beneficial the system will be to the organization. So it tells us whether the system is feasible to design or not. Thus it is necessary before system design.

The different levels of feasibility study are as:

1. **Economical feasibility:**
It concerns with cost effectiveness of the system. The main objective of economical feasibility is to calculate approximate cost-both the development cost and the operational cost and the benefits from the system.
2. **Technical feasibility:**
It concerns with the availability of the hardware, software and the support equipments for the complete development of the system.
3. **Operational feasibility:**
It concerns with smooth operation of the system. It is all about the problems that may occur during operation of the system after its development.
4. **Behavior feasibility:**
It concerns with behavior of the users and the society towards the new system. Generally, most of the traditional employees are not easily ready to upgrade them with the new system.
5. **Schedule feasibility:**
It is the process of splitting project into tasks and estimate time and resources required to complete each task. It determines the deadline to complete a system and schedule the task accordingly.
6. **Legal feasibility:**
It concerns with legal issue of the system. If the system is illegal then the system designing is meaningless. Everything is measured whether it is legal or illegal. It considers copyright law, foreign law, foreign trade, tax, etc.

Need of Feasibility Study:

- Gives focus to the project and outline alternatives
- Narrows system alternatives
- Surfaces new opportunities through the investigation process
- Identifies reasons not to proceed
- Enhances the probability of success by addressing and justifying factors
- Provides quality information for decision making
- Helps to increase investment in the system
- Provides documentation that the system was thoroughly investigated
- Helps in securing funding from lending institutions and other sources
- determines whether the system meets the goal of the users or not
- determines the limitations and constraints before starting to develop the system

SYSTEM ANALYSIS AND DESIGN TOOLS

System Analysis and Design makes use of the various tools for representing and facilitating comprehension of the complex processes and procedure involved. Some of the tools used in System Analysis and Design process are

Algorithm

Algorithm is defined as a set of rules that define how a particular problem can be solved in finite number of steps. In another word, algorithm is a step by step representation of instructions to solve the problem. An algorithm must be composed of a finite set of steps, each of which may require one or more operations

Flowchart

The pictorial representation of the programs or the algorithm is known as flowcharts. It is nothing but a diagrammatic representation of the various steps involved in designing a system. A flowchart consists of a set of symbols which is connected by arrows.

Data Flow Diagram (DFD)

DFD is the logical diagram to describe the flow of data inside the components of system. It is easier to understand or grasp when being explained and most important to all, it is much more precise and less ambiguous than a narrative one. The main components are: process, data store, data flow, external entities.

ER Diagram

The E-R diagram is an overall logical structure of a database that can be expressed graphically. It was developed to facilitated database design and the simplicity and pictorial clarity of this diagramming technique have done great help in the designing part of database. The main components are attributes, entities and relationship.

Case Diagram

Computer aided software engineering tool is automatic computer based program that helps for software engineering and SDLC process. It is very fast and effective tools for the development of big scale software. It helps in analysis, design, implementation, testing and maintenance.

System Flowchart

System flowchart describes the internal architecture of a system that describes how data are moved inside the internal components of a system. Program flowchart describes to solve the application types of real world problem.

CASE Tools

CASE tools are automated software tools used by the system analyst to develop the system. CASE tools offer a wide range of benefits that can increase the ability of analysts to meet user requirements. They improve the quality and productivity of the systems. They improve the amount of interaction between developers and users.

Decision Table

A decision table allows an analyst to set out in a clear way what could be a confusing situation. It consists of two parts: Conditions & Actions

Decision Tree

A decision tree is another way of presenting a potentially confusing situation in a clear, concise & unambiguous manner. Following figure illustrates the decision tree for the discount policy.