Systems development is systematic process which includes phases such as planning, analysis, design, deployment, and maintenance. Here, in this tutorial, we will primarily focus on −

- Systems analysis
- Systems design

Systems Analysis

It is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components.

System analysis is conducted for the purpose of studying a system or its parts in order to identify its objectives. It is a problem solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose.

Analysis specifies **what the system should do**.

Systems Design

It is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy the specific requirements. Before planning, you need to understand the old system thoroughly and determine how computers can best be used in order to operate efficiently.

System Design focuses on **how to accomplish the objective of the system**.

System Analysis and Design (SAD) mainly focuses on −

- Systems
- Processes
- Technology

What is a System?

The word System is derived from Greek word Systema, which means an organized relationship between any set of components to achieve some common cause or objective.

A system is "an orderly grouping of interdependent components linked together according to a plan to achieve a specific goal."

Constraints of a System

A system must have three basic constraints −

- A system must have some **structure and behavior** which is designed to achieve a predefined objective.

- **Interconnectivity** and **interdependence** must exist among the system components.

- The **objectives of the organization** have a **higher priority** than the objectives of its subsystems.

For example, traffic management system, payroll system, automatic library system, human resources information system.

System Development Life Cycle

An effective System Development Life Cycle (SDLC) should result in a high quality system that meets customer expectations, reaches completion within time and cost evaluations, and works effectively and efficiently in the current and planned Information Technology infrastructure.

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

SDLC is used by analysts to develop an information system. SDLC includes the following activities −

- requirements
- design
- implementation
- testing
- deployment
- operations
- maintenance

Phases of SDLC

Systems Development Life Cycle is a systematic approach which explicitly breaks down the work into phases that are required to implement either new or modified Information System.

Feasibility Study or Planning

- Define the problem and scope of existing system.
- Overview the new system and determine its objectives.
- Confirm project feasibility and produce the project Schedule.
- During this phase, threats, constraints, integration and security of system are also considered.
- A feasibility report for the entire project is created at the end of this phase.

Analysis and Specification

- Gather, analyze, and validate the information.
- Define the requirements and prototypes for new system.
- Evaluate the alternatives and prioritize the requirements.

- Examine the information needs of end-user and enhances the system goal.

- A Software Requirement Specification (SRS) document, which specifies the software, hardware, functional, and network requirements of the system is prepared at the end of this phase.

System Design

- Includes the design of application, network, databases, user interfaces, and system interfaces.

- Transform the SRS document into logical structure, which contains detailed and complete set of specifications that can be implemented in a programming language.

- Create a contingency, training, maintenance, and operation plan.

- Review the proposed design. Ensure that the final design must meet the requirements stated in SRS document.

- Finally, prepare a design document which will be used during next phases.

Implementation

- Implement the design into source code through coding.

- Combine all the modules together into training environment that detects errors and defects.

- A test report which contains errors is prepared through test plan that includes test related tasks such as test case generation, testing criteria, and resource allocation for testing.

- Integrate the information system into its environment and install the new system.

Maintenance/Support

- Include all the activities such as phone support or physical on-site support for users that is required once the system is installing.

- Implement the changes that software might undergo over a period of time, or implement any new requirements after the software is deployed at the customer location.

- It also includes handling the residual errors and resolve any issues that may exist in the system even after the testing phase.

- Maintenance and support may be needed for a longer time for large systems and for a short time for smaller systems.

Life Cycle of System Analysis and Design

The following diagram shows the complete life cycle of the system during analysis and design phase.

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.