System Analysis and Design.
Unit - 1.
Chapter 1.1.
Review questions.

(1) what is information systems analysis and design?

Ans. Information systems analysis and design is a method used by companies to create and maintain systems that perform basic business functions. ~~Its may~~ Its main goal is to improve employee efficiency by applying software solutions to key business tasks. A structured approach must be used in order to ensure success.

(2) How has systems analysis and design changed over the past four decades?

Ans. Over the past four decades, systems analysis and design (SAD) have undergone significant transformations. Advancements in technology, such as Powerful computers, cloud computing, and AI, have expanded the scope of SAD. Agile methodologies have replaced rigid waterfall approaches, allowing for faster and more flexible development. User-centered design and UX considerations now play a central role. Globalization has facilitated outsourcing and diverse collaboration. Security integration has become paramount in the face of increasing cyber threats.

Data-centric approaches prioritize data analysis and modeling. Rapid prototyping and simulation enable early feedback. Emphasis on flexibility, scalability, sustainability, and AI integration has shaped more adaptable and user-centric solutions.

(3) What is IS? List and explain different types of IS?

Ans. An informatio system is an arrangement of people, data, processes, communications, and information technology that interact to support and improve day-to-day operations in a business, as well as support the problem-solving and decision-making needs of management and users.

The different types of IS are as follows:
(i) Transaction Processing Systems (TPS)
(ii) Management Information Systems (MIS)
(iii) Decision Support System (DSS)
(iv) Expert System
(v) Office automation Systems (OAS)

(i) Transaction Processing Systems.

Computerized systems that perform and record the daily routine transactions necessary to conduct the business; they serve the organizations operational level.

Transaction processing systems are information system applications that capture and process data about business transactions.

It includes data maintenence, which provides for custodial updates to stored data.

Business process redesign (BPR) is the study, analysis and redesign of fundamental business (transaction) processes to reduce costs and/or improve value added to the business

TPS is a type of IS that manages data created in every day operations. This includes storing, formatting, processing, retrieving and creating some new aggregate data.

Examples: purchasing transactions, sales orders, sales transactions, payroll, employee data, inventory etc

(ii) Management Information System (MIS)

A management information system (MIS) is an information system application that provides for management-oriented reporting. These reports are usually generated on a predetermined schedule and appear in a pre arranged format.

Management Information System or MIS broadly refers to a computer-based system that provides managers with the tools to organize, evaluate and efficiently manage departments within an organization.

Information systems at the management level of organization that serve the functions of planning, controlling and decision making by providing routine summary and exception reports.

MIS summarise and report on the organisation's basic operations.

It produce reports for managers interested in historic trends on a regular basis.

MIS operate at the tactical level.

Example: Annual budgeting

(iii) Decision Support System (DSS).

A decision support System (DSS) is an information system application that provides its users with decision oriented information whenever a decision-making situation arises. When applied to executive managers, these systems are sometimes called executive information systems (EIS).

A Decision Support System (DSS) is an interactive computer-based system or subsystem intended to help decision makers use communication technologies, data, documents, knowledge and/or models to identify and solve problems, complete decision process tasks and make decisions. Decision Support System is a general term for any computer application that enhances a person or groups ability to make decisions. Information Systems at the management level of an organization that combine data and sophisticated analytical models to support non routine decision making.

(iv) Expert System

An expert system is a system that employs human knowledge captured in a computer to solve problems that ordinarily require human expertise.

An expert system is a computer based program that tries to emulate human reasoning. It does this by combining the knowledge of human experts and then following a set of rules, draws inferences.

An expert system is made up of three parts:

→ A knowledge base stores all of the facts, rules and information needed to represent the knowledge of the expert.

○ An inference engine interprets the rules and facts to find solutions to user queries.

○ A user interface allows new knowledge to be entered and the system queried.

(v) Office Automation Systems.

Office Automation Systems (OAS) support the wide range of business office activities that provide for improved work flow and communications between workers, regardless of whether or not those workers are located in the same office.

Personal information systems are those designed to meet the needs of a single user. They are designed to boost an individuals productivity.

Work group information systems are those designed to meet the needs of a work group. They are designed to boost the groups productivity.

(4) What are some key characteristics of a modern approach to systems Analysis and Design?

As The key characteristics of a modern approach to systems Analysis and Design are:-

(i) Agile methodolgies.

It emphasises on iterative and incremental development, allowing for flexibility and adoptability to changing requirements.

(ii) User-Centric Design:

Strong focus on understanding and meeting user needs, resulting in intuitive and user-friendly systems.

(iii) Prototyping and Rapid feedback

Use of rapid prototypis to gather early feedback from stakeholders and Users, leading to better designs.

(iv) Collaborative approach.

Close collaboration between stakeholders, developers, designees and users throughout the development process.

(v) Integration of AI and automation.

Incorporation of AI and automation to enhance efficiency and decision-making.

(ii) Analysis.

Phase of SDLC in which the current system is studied and alternative replacement systems are proposed.

- Gather information to learn problem domain
- Define system requirements.
- Build prototypes for discovery of requirements.
- Prioritize requirements.
- Generate and evaluate alternatives
- Reviewing recommendations with management.

(iii) Design.

Phase of SDLC in which the system chosen for development in systems analysis is first described independently of any computer platform (logical design) and is then transformed into technology-specific details (physical design) from which all programming and system construction can be accomplished.

- Design and integrate the network
- Design the application architecture
- Design the user interface
- Design the system interfaces
- Design and integrate the database
- Prototype for design details
- Design and integrate system controls

(iv) Implementation

Phase of the SDLC in which the information system is coded, tested and installed in the organization.

- Construct software components.
- Verify and test
- Convert data
- Train users and document the system
- Install the system

(v) Support/Maintainence

The final phase in which the information system is systematically repaired and improved.

- Maintain System
  - Small patches, repairs and updates

- Enhance System
  - Small upgrades or enhancements to expand system capabilities
  - Larger enhancements may require separate development projects.

- Support users
  - Help desk and/or support team

(6) Briefly explain the central/heart stage of the system development process

Ans. After collecting the system requirements, they are thoroughly analyzed by experts.
After analyzing them properly, the design for implementation is done by keeping a stress on meeting the requirements.
As a next step, the system design is implemented with the help of information from previous stages, so that the system meets the expected goals.

The heart stages include:

(i) Analysis : System Analyst gather and prioritize system requirements, ensuring a clear understanding of user needs and goals.

(ii) Design : A detailed plan is created, outlining the system's structure, components and interactions.

(iii) Implementation: The system is built according to the design, involving coding, training, integration and testing.

(7) List and explain some of the problems with the traditional Waterfall SDLC.

Ans. The problems with the traditional Waterfall SDLC are

(i) System requirements "locked in" after being determined (can't change).

(ii) Limited user involvement (only in requirements phase).

(iii) Too much focus on milestone deadlines of SDLC phases to the detriment of sound development practices.

(8) What are CASE tools?

Ans. Computer Aided Software Engineering (CASE) tools are automated software packages that help to automate activities in the SDLC.

It ranges from simple diagramming tools to very sophisticated programs to document and automate most of the stages in the SDLC.

(•) Each component is ~~equally~~ more important on the basis of the system. Meaning they are equally important in a normal system.

(10) Describe how CASE is used to support each phase of the SDLC

Ans CASE is used to support each phase of the SDLC in the below described ways:

(i) Planning Phase.

~~Co~~ CASE tools assist in gathering and documenting initial project requirements and objectives. They facilitate feasibility studies and cost-benefit analyses to determine project viability.

(ii) Analysis Phase
CASE tools aid in modeling and visualizing the systems requirements and processes, such as data flow diagrams, entity-relationship diagrams and use case diagrams

(iii) Design Phase
• CASE tools help create detailed design specifications including architecture diagrams, data models and class diagrams.

(iv) Implementation Phase:
- Integrated Development Environments (IDEs) provided by CASE tools offer code editors with syntax highlighting, code completion and debugging capabilities, making coding more efficient.

(v) Maintainance Phase:
- Case tools aid in tracking and managing software defects, changes and enhacements.