நான் முதல்வன்

IBM

9530

ST.MOTHER THERESA ENGINEERING COLLEGE

COMPUTER SCIENCE AND ENGINEERING

NM-ID :1F5902C07E80DFCA24D42E87C655E5DC

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Completed the project named as

Phase-2

SOLUTION DESIGN &
ARCHITECTURE

SUBMITTED BY,

A.SUSAIYAMMAL
PH.NO:9360984679

1. Introduction to Solution Design

Solution design is the bridge between **requirements** and **implementation**. It translates the problem statement into a **well-defined architecture**, specifying how the system's components, modules, and data will interact. The main goals of solution design are:

- To provide a **blueprint** for system development.
- To ensure **scalability, reliability, and maintainability**.
- To clearly define **data flow, control flow, and communication** between modules.

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2. System Architecture Overview

The system is built on a **multi-tier architecture** that ensures separation of concerns. Typically, this includes:

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1. **Presentation Layer (Client/UI)**
    - Interfaces through which users interact.
    - Examples: Web pages, mobile apps, dashboards.
2. **Application Layer (Business Logic)**
    - Implements the project's core functionalities.
    - Handles validation, processing, and workflow.

3. Module Design

The system is divided into **independent modules** for clarity and maintainability. Each module handles a **specific function**. Example modules:

- **User Module**: Registration, login, profile management.
- **Admin Module**: Monitoring, managing data, generating reports.
- **Database Module**: CRUD operations, indexing, query handling.
- **Security Module**: Authentication, authorization, encryption.
- **Communication Module**: Interaction between client and server.

4. Data Design

Data design ensures information is organized efficiently.

- **Database Schema**: Defines tables, attributes, primary and foreign keys.
- **Normalization**: Eliminates redundancy and ensures consistency.
- **ER Diagram Example (Student/Customer System)**:

5. Process Design (DFD & Flowcharts)

Data Flow Diagram (DFD)

- **Level 0 (Context Diagram):** Shows system as a single process with external entities.

📌 Diagram (DFD Level 0 Example)

Copy code

```
[User] ---> (System) ---> [Admin]
```

- **Level 1 (Detailed DFD):** Breaks the system into sub-processes.

6. User Interface Design (UI/UX)

The UI provides interaction between users and the system.

- **Login Page** – Authentication.
- **Dashboard** – Displays modules.
- **Forms** – Input fields for operations.
- **Reports/Outputs** – Summary data.

7. Security & Performance Design

- **Authentication & Authorization** – Secure login with roles.
- **Encryption** – Protects sensitive data (e.g., passwords, payments).
- **Performance** – Caching, load balancing, optimized queries.
- **Scalability** – Ability to handle growing users.

8. Conclusion of Design & Architecture

The **solution design** ensures that the system is **well-structured, scalable, and secure**.

- Architecture divides the system into **manageable layers**.
- Modules ensure **clarity and maintainability**.
- Data design ensures **consistency and integrity**.
- Security & performance measures guarantee **reliability**.