# **Chapter 3**

# **System Design**

* 1. **Introduction**
* This section provides a brief introduction to the concepts of system design.
  1. **Purpose of the system**
* This section explains the main purpose or goal of the proposed system.
* The purpose of the system could be “To provide a user-friendly, efficient, and secure method for hospital staff to access and update patient records.”
  1. **Design goals**
* These are the goals that the design of the system aims to achieve. They guide the design process and decisions.
* The design objectives might include “Maximize system usability”, “Ensure data security”, and “Optimize system performance.”
* Aspects like scalability, performance, reliability, maintainability, and security.
  1. **Current software architecture** (if applicable)
* This section describes the existing software architecture that the proposed system will be based on or replace.
* Discuss the components, modules, and their interactions.
* Discuss the limitations of the current architecture.
* Briefly explain why a new architecture is needed.
* Use diagrams if needed
  1. **Proposed software architecture**
* Write a short paragraph about the high level description of the architecture of the system.
* Discuss how the proposed architecture addresses the design goals and requirements.
* Compare with the current architecture (if applicable)
  + 1. **Subsystem decomposition**
* This is a decomposition of the system into smaller, manageable subsystems.
* These subsystems will be the components in the component diagram.
* Additionally,
  + Briefly describe each component/subsystem and its purpose.
  + Explain the dependencies between components/subsystem.
    1. **Component diagram**
* This is a UML diagram that shows the components of the system and their interactions.
  + 1. **Deployment diagram**
* This is a UML diagram that shows the physical deployment of the system components on hardware nodes.
* Show how the system will be deployed on servers and devices.
* Explain the deployment strategy and its impact on system performance and reliability.
  + 1. **Persistent data management**
* This section describes how the system will manage and store data.
* Identify the types of data(documents, audio, video, user info.,…etc. ) that will be stored persistently.
* Discuss the chosen database technology, data storage mechanisms. and data access methods.
* Maybe discuss data backup, recovery, and integrity.
  + 1. **Detailed Database Design**
       1. **Relational tables**
* List all the tables in your document in detail with their keys and types
  + - 1. **Normalization**
* Normalize any table that requires it (up to 3rd normal form if necessary)
  + - 1. **EER**
* Draw the extended entity relation diagram
  + - 1. **OO-Relational mapping**
* Show a mapping of the tables onto the objects(classes).
  + 1. **Access control and security**
* This section outlines the measures that will be taken to ensure the system’s security and control access to its resources.
* Discuss how data privacy and security are maintained.
* Explain user authentication, authorization, and data encryption methods.
  + 1. **Global software control**
* This section describes how the overall control flow of the software will be managed.
* describe how requests are initiated and how subsystems synchronize.
  + 1. **Boundary conditions**
* This section describes how the system will behave at its boundaries, like startup, shutdown, error conditions, extreme conditions like high user traffic/load …etc.
* specific extreme or unusual scenarios
* And how the system will handle these conditions?