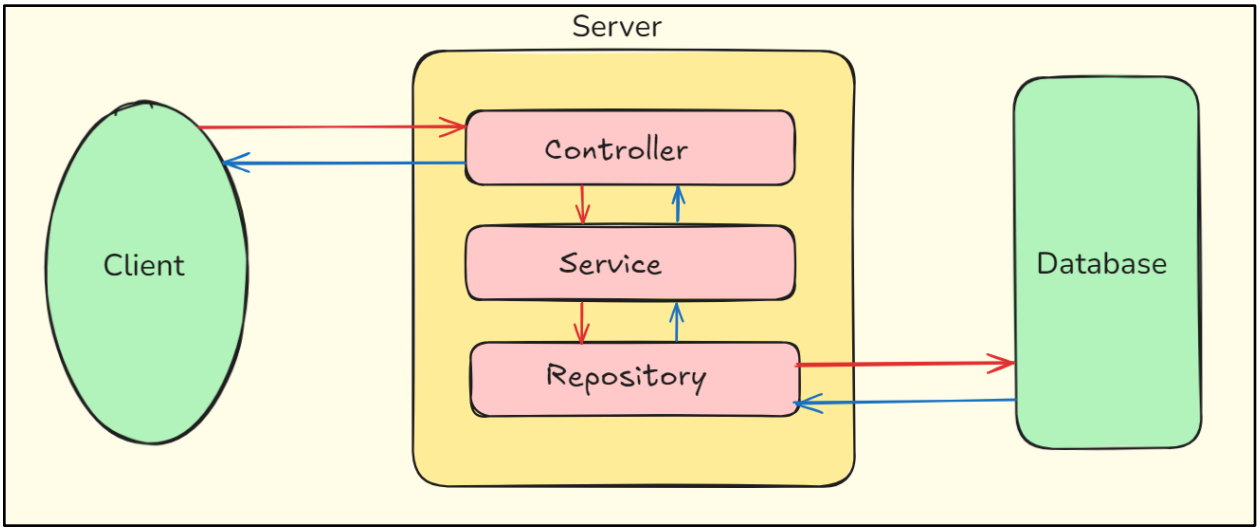
03 - Different Layers

Spring Boot applications are built on the MVC (Model-View-Controller) architectural pattern, which organizes the application into three separate layers, each with a specific role.



1. **Controller:**
    - The Controller is the entry point of the application and acts as an intermediary between the user interface and the backend services.
    - It accepts incoming HTTP requests, processes the data, and returns the response to the client.
    - Controllers are responsible for handling user interactions and delegating the necessary business logic to the Service Layer.
    - It returns the processed data (such as JSON or XML) to the user interface.

    Key Annotation: @RestController or @Controller

2. **Service:**
    - The Service Layer contains the business logic of the application.
    - It performs the necessary processing of the data received from the Controller Layer and often interacts with the Repository Layer to retrieve or store data in the database.
    - Service layer is also responsible for applying validation, calculations, and complex operations before returning the processed data back to the controller.

    Key Annotation: @Service

3. **Repository:**
    - The Repository Layer (also called the Data Access Object layer) is responsible for interacting with the database.
    - It contains methods that perform CRUD (Create, Read, Update, Delete) operations on the data.
    - Repository layer is decoupled from the business logic that allows for easier testing and maintenance of the codebase.

    Key Annotation: @Repository

👉 **Benefits of Using Layered Architecture:**

➢ **Separation of Concerns**: Each layer is responsible for a specific task, making the code modular and easier to maintain.

➢ **Testability**: By decoupling the layers, individual layers can be tested separately.

➢ **Reusability**: Services and repositories can be reused across different controllers or applications.

➢ **Scalability**: Changes in one layer can be done without affecting the other layers, making the application easier to scale and modify.