



**Computer Science and Engineering Discipline**  
**Khulna University, Khulna**

**Software Development Project**  
**Course No: CSE 3106**

# **Architecture Pattern**

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## **Project Title:** Kids Learning Software

### **As an Architect,**

I propose the adoption of a Layered Architecture pattern for the kids learning software, So that we can organize the application into distinct layers, promoting separation of concerns and modularity.

### **Components of Layered Architecture:**

#### **a. Presentation Layer:**

- **Responsibility:** The Presentation Layer is responsible for user interaction and interface presentation.
- **Implementation:**
- **Word Learning Interface:** Present word definitions, examples, and interactive learning activities to the user.  
Practice Interface: Display practice exercises, quizzes, and interactive activities for reinforcing learning.  
Progress Dashboard: Show users their learning progress, achievements, and areas for improvement.

#### **b. Application Layer:**

- **Responsibility:** The Application Layer contains the business logic and orchestrates interactions between the presentation layer and the domain layer.
- **Implementation:**  
Word Learning Service: Manage word learning sessions, handle user interactions, and trigger practice activities.  
Practice Service: Manage practice sessions, evaluate user responses, and provide feedback.  
Progress Tracking Service: Retrieve and update user progress data, calculate scores, and communicate with the presentation layer for displaying progress information.

### **c. Domain Layer:**

- **Responsibility:** The Domain Layer encapsulates the core business logic and domain entities of the application.
- **Implementation:**
  - Word Repository: Manage word data, including definitions, examples, and related information.
  - Practice Generator: Generate practice exercises, quizzes, and learning materials based on word lists and user progress.
  - Progress Tracker: Track user progress, calculate scores, achievements, and provide insights for improvement.

### **d. Data Access Layer:**

- **Responsibility:** The Data Access Layer handles data persistence and retrieval operations.
- **Implementation:**
  - Word Database: Store word data, practice exercises, user progress, and other relevant information.
  - Progress Tracking Database: Store user progress data, scores, achievements, and other metrics.

## **Advantages of Layered Architecture for Kids Learning Software:**

- **Modularity:** The Layered Architecture pattern promotes modular design, allowing each layer to be developed, tested, and maintained independently.
- **Separation of Concerns:** Each layer focuses on specific responsibilities, promoting clean separation of business logic, presentation, and data access concerns.
- **Scalability:** With clear boundaries between layers, the software can scale horizontally by adding more instances or vertically by enhancing individual layers.
- **Maintainability:** Changes to one layer can be made without affecting others, facilitating easier maintenance and updates over time.