Monen

Software Architecture Document

Version 1.0

Revision History

| **Date** | **Version** | **Description** | **Author** |
| --- | --- | --- | --- |
| 29/11/2023 | 1.0 | Initial edit | Quang |
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Software Architecture Document

# Introduction

# Architectural Goals and Constraints

**Platform Compatibility:**

- The app must be compatible with iOS (version 14 and above) and Android (version 8 and above) platforms.

**Performance:**

- The app should load within 3 seconds on standard mobile devices.

- Each flashcard loading time should be less than 1 second to ensure a seamless user experience.

- Response time for the user interaction should be less than 0.5 seconds.

**Scalability:**

- The app should handle a minimum of 30,000 concurrent users without performance degradation.

- The backend server should be scalable to accommodate an increasing number of users and flashcard sets.

**Security:**

- User data must be encrypted and securely stored.

- The app must comply with industry-standard data protection regulations and user privacy standards.

**Usability:**

- The app interface should be intuitive, ensuring ease of use for all users.

- The app must provide clear instructions and guidance for new users.

**Reliability and Availability:**

- The flashcard deck library server should have a minimum uptime of 99.9% to ensure accessibility at all times.

- Regular maintenance and updates should be performed during non-peak hours to minimize user disruption.

- The app should be available even when there is no internet connection.

**Documentation:**

- Provide an online user manual accessible within the app, detailing features, navigation, and troubleshooting steps.

- Include in-app tooltips and guides to assist users in understanding app functionalities.

**Design Constraints:**

- The app design should be responsive and optimized for various screen sizes, including smartphones and tablets.

- Utilize lightweight graphics to minimize app size and reduce data usage.

**Dependency:**

- Integrate the app with popular messaging and social media platforms for easy sharing and collaboration among users.

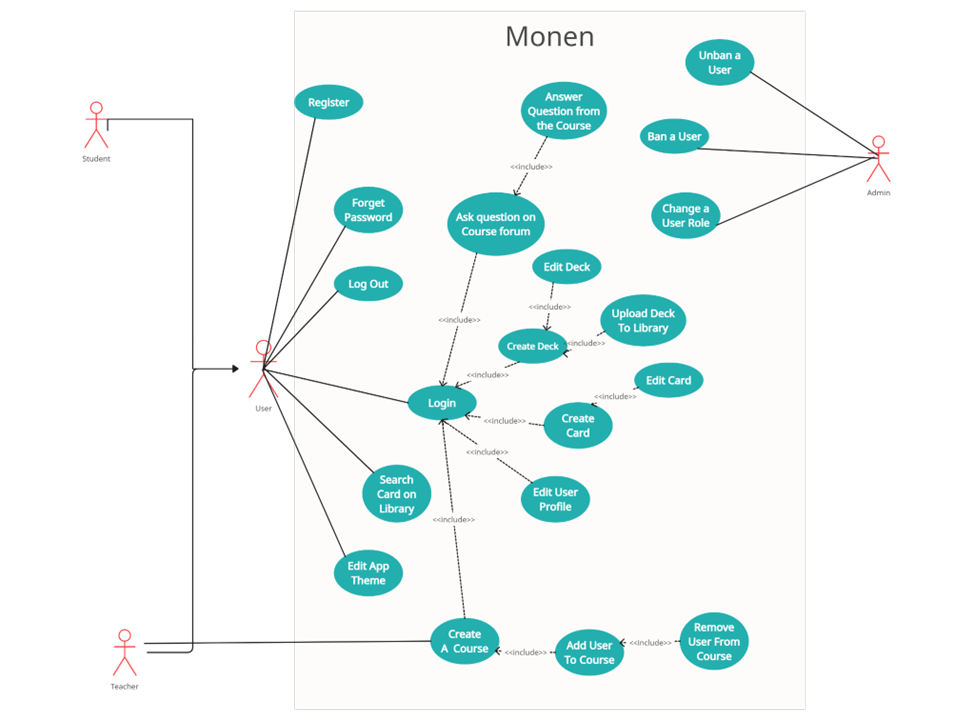
- Collaborate with cloud service providers to ensure reliable storage and backup of user data.

**Documentation and Packaging:**

- Provide clear installation instructions for both iOS and Android users.

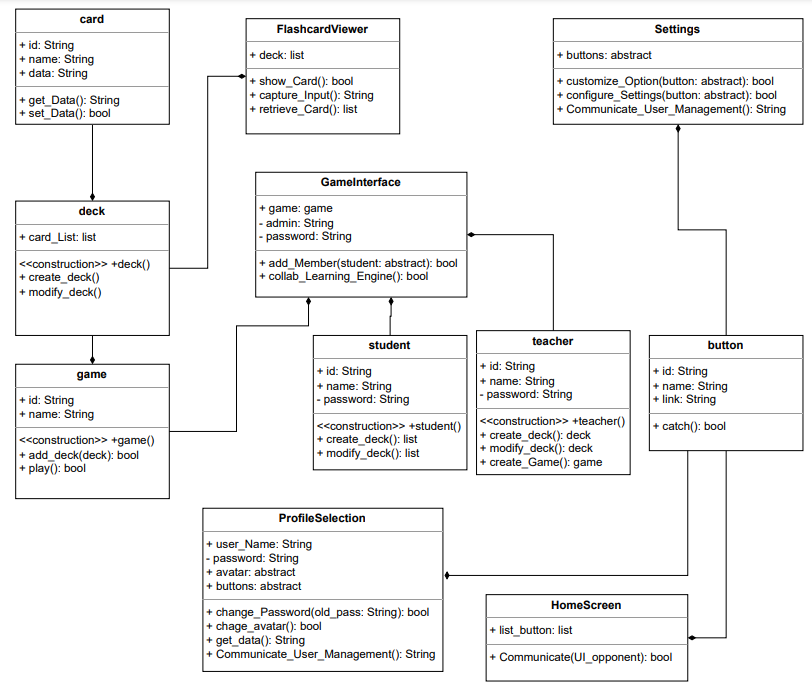
- Include a comprehensive user guide explaining app features and best practices.

# Use-Case Model

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# Logical View

## Component: User Interface

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**HomeScreen**:

* Responsibilities:
  + Displaying the main screen with access to different features.
  + Handling navigation to other sections of the app.
* Relationships:
  + Communicates with other UI components for feature access.

**FlashcardViewer:**

* Responsibilities:
  + Presenting flashcards with questions and answers.
  + Capturing user input for flashcard interactions.
* Relationships:
  + Interacts with the Learning Engine to retrieve flashcards.

**GameInterface:**

* Responsibilities:
  + Hosting interactive learning games.
  + Managing game sessions and user progress.
* Relationships:
  + Collaborates with the Learning Engine for game content.

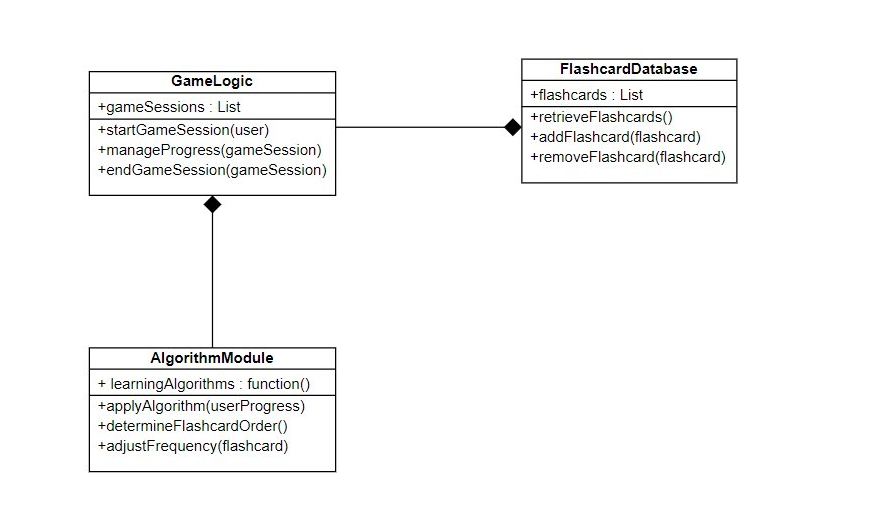
**ProfileSection:**

* Responsibilities:
  + Displaying user profiles and progress.
  + Allowing users to manage account settings.
* Relationships:
  + Communicates with User Management for profile data.

**Settings:**

* Responsibilities:
  + Providing customization options and preferences.
  + Allowing users to configure app settings.
* Relationships:
  + Interacts with User Management for user preferences.

## Component: Learning Engine

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**FlashcardDatabase:**

* Responsibilities:
  + Storing and managing a diverse set of flashcards.
  + Facilitating retrieval of flashcards for display.
* Relationships:
  + Accessed by FlashcardViewer and AlgorithmModule.

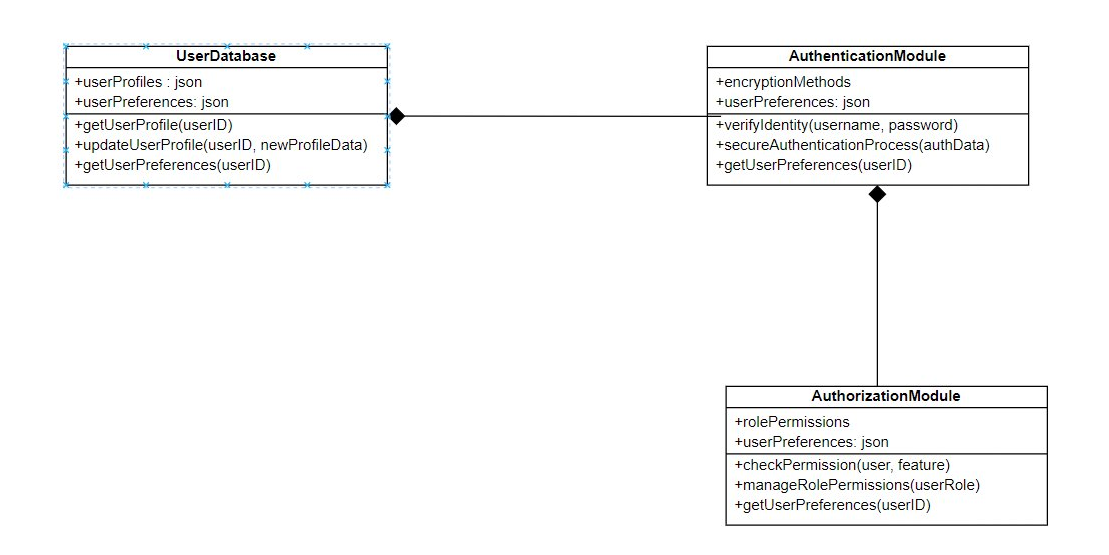
**AlgorithmModule:**

* Responsibilities:
  + Applying learning algorithms to adapt to user progress.
  + Determining the order and frequency of flashcards.
* Relationships:
  + Interacts with FlashcardDatabase and GameLogic.

**GameLogic:**

* Responsibilities:
  + Implementing interactive games aligned with learning objectives.
  + Managing game sessions and user achievements.
* Relationships:
  + Collaborates with FlashcardDatabase for game content.

## Component: User Management and Authentication



**UserDatabase:**

* Responsibilities:
  + Storing user profiles, progress, and preferences.
  + Providing data for user-related functionalities.
* Relationships:
  + Accessed by ProfileSection and Settings.

**AuthenticationModule**:

* Responsibilities:
  + Verifying user identity during login.
  + Ensuring secure authentication processes.
* Relationships:
  + Communicates with UserDatabase for user verification.

**AuthorizationModule:**

* Responsibilities:
  + Controlling access to specific features based on user roles.
  + Managing permissions for various app functionalities.
* Relationships:
  + Interacts with other components to enforce access control.

## 

## Component: Course

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**CourseManagementModule:**

* Responsibilities:
  + Facilitating the creation and management of courses.
  + Handling the enrollment of students in a course.
* Relationships:
  + Interacts with UserDatabase for user information.
  + Manages FlashcardDeck instances.

**FlashcardDeck:**

* Responsibilities:
  + Representing a set of flashcards created by a teacher.
  + Storing questions and answers for a specific course.
* Relationships:
  + Belongs to a CourseManagementModule.
  + Accessed by students enrolled in the course.

**ForumModule:**

* Responsibilities:
  + Managing a forum associated with each course.
  + Allowing students to post questions and teachers to provide answers.
* Relationships:
  + Connected to CourseManagementModule for course association.
  + Contains instances of ForumPosts.

**Student:**

* Responsibilities:
  + Representing a student enrolled in a course.
  + Accessing and interacting with flashcard decks.
* Relationships:
  + Enrolled in courses managed by CourseManagementModule.

**Teacher:**

* Responsibilities:
  + Representing a teacher who creates and manages courses.
  + Responding to questions posted in the forum.
* Relationships:
  + Creates and manages courses in CourseManagementModule.
  + Participates in the ForumModule as an authoritative figure.

# Deployment

**User Interface Component:**

* These components are deployed on user devices (Android, iOS).
* User interactions with these components occur directly on the end-user's device.

**Learning Engine Component:**

* Deployed on the server side, typically on a cloud server or dedicated hosting infrastructure.
* These components interact with the server to retrieve and process data.

**User Management and Authentication Component:**

* Deployed on the server side along with the Learning Engine components.
* Responsible for managing user profiles, authentication processes, and access control.

**Course Component:**

* CourseManagementModule, FlashcardDeck, and ForumModule are deployed on the server side.
* Student and Teacher components are associated with user devices but interact with server-side components.

# Implementation View

/Intro2SE-21CLC02-Group09

│

├── /src

│ ├── /components

│ │ ├── /UserInterface

│ │ │ ├── HomeScreen

│ │ │ │ ├── HomeScreen.js

│ │ │ │ └── ...

│ │ │ ├── FlashcardViewer

│ │ │ │ ├── FlashcardViewer.js

│ │ │ │ └── ...

│ │ │ ├── GameInterface

│ │ │ │ ├── GameInterface.js

│ │ │ │ └── ...

│ │ │ ├── ProfileSection

│ │ │ │ ├── ProfileSection.js

│ │ │ │ └── ...

│ │ │ ├── Settings

│ │ │ │ ├── Settings.js

│ │ │ │ └── ...

│ │ │ └── ...

│ │ │

│ ├── /learningEngine

│ │ ├── FlashcardDatabase

│ │ │ ├── FlashcardDatabase.js

│ │ │ └── ...

│ │ ├── AlgorithmModule

│ │ │ ├── AlgorithmModule.js

│ │ │ └── ...

│ │ ├── GameLogic

│ │ │ ├── GameLogic.js

│ │ │ └── ...

│ │ └── ...

│ │

│ ├── /userManagement

│ │ ├── UserDatabase

│ │ │ ├── UserDatabase.js

│ │ │ └── ...

│ │ ├── AuthenticationModule

│ │ │ ├── AuthenticationModule.js

│ │ │ └── ...

│ │ ├── AuthorizationModule

│ │ │ ├── AuthorizationModule.js

│ │ │ └── ...

│ │ └── ...

│ │

│ ├── /course

│ │ ├── CourseManagementModule

│ │ │ ├── CourseManagementModule.js

│ │ │ └── ...

│ │ ├── FlashcardDeck

│ │ │ ├── FlashcardDeck.js

│ │ │ └── ...

│ │ ├── ForumModule

│ │ │ ├── ForumModule.js

│ │ │ └── ...

│ │ ├── Student

│ │ │ ├── Student.js

│ │ │ └── ...

│ │ └── ...

│ │

│ └── /common

│ ├── Utils

│ │ ├── HelperFunctions.js

│ │ └── ...

│ ├── Constants

│ │ ├── AppConstants.js

│ │ └── ...

│ └── ...

│

└── ...

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