

## Software Engineering Final Project

### Language Learning App

#### Group Report

#### Team Members :

Zeina Ayman	202200351
Mai Waheed	202200556
Habiba Khalil	202200720
Nour Helmy	202202012
Lujain Ahmad	202201738
Shahd Tarek	202202018
Farida Mohamed	202202579

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## Chapter 1 :

### 1.1 Introduction :

In our increasingly interconnected world, proficiency in multiple languages has become not just a desirable skill but a necessity. Whether you're a seasoned traveler, a business professional expanding into global markets, or simply someone eager to connect with people from diverse cultures, mastering a new language has never been more relevant or valuable. Our Language Learning App recognizes the importance of this skill in today's landscape and is committed to providing learners with the tools they need to thrive in a multilingual world. Whether you're a beginner taking your first steps or an advanced learner aiming for fluency, our app offers a comprehensive solution to help you achieve your language learning goals effectively and efficiently.

### 1.2 Problem Statement :

Traditional language learning methods often fall short in providing learners with the engagement and personalization they need to succeed. Static textbooks and monotonous drills fail to capture the interest of modern learners, leading to frustration and disengagement. Furthermore, a lot of people find it difficult to become fluent due to hectic schedules and restricted access to language teachers. Our app addresses these challenges head-on by offering a dynamic learning environment that adapts to individual needs, providing interactive lessons, immersive experiences, and flexible scheduling options.

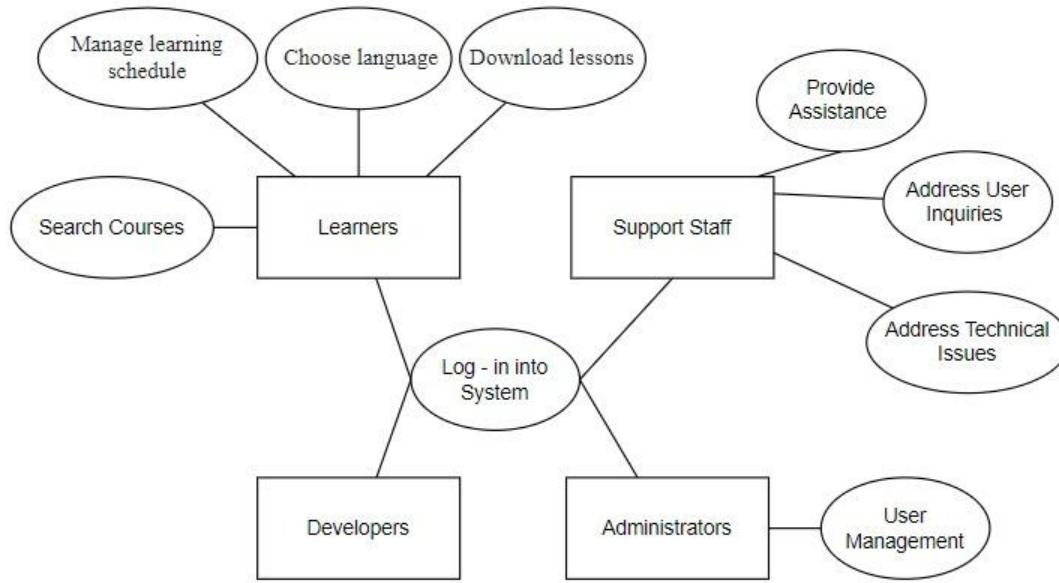
### 1.3 Purpose of the Application :

The language learning app's goal is to give users a practical and efficient platform so they may pick up new languages at their own speed. It seeks to eliminate language barriers.

### 1.4 Key Features of the Application :

- Interactive Learning Modules.
- Personalized Learning Experience.
- Gamification Elements
- Comprehensive Content.
- Progress Tracking and Assessment.
- Offline Access.

### 1.5 Software Architecture :



### 1.6 Stakeholders :

- Users ( Learners )
- Support Staff
- Developers

## Chapter 2 :

### 2.1 Functional Requirements :

ID	Requirement	Priority
R1	The language learning app should allow users to create and log in to their accounts and manage their profiles with personal information and learning preferences.	Must Have
R2	The language learning app should allow users to choose the language they want to learn from a list of languages ( English , French , German ).	Must Have
R3	The language learning app should provide structured learning modules for different aspects of language learning, such as vocabulary, grammar, speaking, listening, reading, and writing.	Must Have
R4	The language learning app should offer interactive lessons with multimedia content, including audio, video, and text.	Must Have
R5	The language learning app should include quizzes, exercises, and drills to reinforce learning and assess comprehension.	Must Have
R6	The language learning app should track users' progress through lessons, quizzes, and exercises, and display their achievements.	Must Have
R7	The language learning app should provide personalized recommendations for lessons and activities based on users' learning history and preferences.	Could Have
R8	The language learning app should encourage users and recognize their accomplishments, include elements like leaderboards, badges, levels, and points.	Should Have
R9	The language learning app should include listening comprehension exercises with audio recordings of native speakers.	Must Have

R10	The language learning app should provide writing practice exercises with prompts and feedback on grammar and vocabulary usage.	Must Have
R11	The language learning app should offer speaking practice exercises with voice recognition technology to provide feedback on pronunciation and fluency.	Must Have
R12	The language learning app should offer reading passages with comprehension questions to improve reading skills.	Must Have
R13	The language learning app should prepare users for language proficiency exams and certifications by offering relevant study materials and practice tests.	Should Have
R14	The language learning app should allow users to search for specific lessons, topics, or vocabulary words within the app.	Should Have
R15	The language learning app should allow users to download lessons and content for offline access when internet connectivity is not available.	Must Have
R16	The language learning app should offer study planners, reminders, and progress trackers to help users manage their learning schedule effectively.	Should Have
R17	The language learning app should include an in-app dictionary with definitions, translations, and contextual usage examples for vocabulary words.	Must Have
R18	The language learning app should allow the users to change their personal information and learning preferences.	Must Have
R19	The language learning app should synchronize progress data across devices when the app is online ( whenever it is connected to the internet, it will synchronize ).	Must Have
R20	The language learning app should offer customer support services to assist users with technical issues, inquiries, and feedback.	Must Have

R21	The language learning app should implement a notification system to alert users about upcoming lessons, reminders, and new content.	Should Have
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## 2.2 Non – Functional Requirements :

ID	Requirement	Priority
Security		
R22	The language learning app must adhere to data protection laws, implement secure authentication procedures, and encrypt user data and privacy.	Must Have
Scalability		
R23	The language learning app should be able to handle 110 of concurrent users without experiencing performance degradation.	Must Have
Performance		
R24	The language learning app should load pages within 7 seconds on a stable internet connection and moderate bandwidth.	Must Have
Compatibility		
R25	The language learning app should be compatible with a wide range of devices, operating systems, and screen sizes to accommodate different user preferences.	Should Have
Multi-Platform Availability		
R26	The language learning app should be available for download and installation from multiple platforms, including the Apple App Store, Google Play Store, macOS, and Windows.	Must Have
Usability		
R27	The language learning app should have user-friendly interfaces, clear directions for finishing tasks, and be simple to use and navigate.	Must Have

Data Backup and Recovery		
R28	The language learning app should regularly back up user data whenever it is online and provide mechanisms for recovering data in case of accidental loss.	Should Have
Support and Maintenance		
R29	The language learning app should provide ongoing support and maintenance services, including bug fixes, software updates, and user assistance.	Must Have
Interoperability		
R30	The language learning app should be able to integrate with external systems and services, such as social media platforms, language proficiency tests, and online dictionaries.	Should Have
Localization		
R31	The language learning app should support multiple languages (English , French , German) and cultural preferences, including localized content and user interface elements.	Should Have

### 2.3 User Stories :

**US1.** As a user, I want to be able to create an account and log in so that I can access the language learning app and manage my profiles with personal information and learning preferences.

Scenario : Account Creation and Profile Management.

Given : A user opens the language learning app.

When : They navigate to the sign-up page and choose to create an account.

Then : They should be able to fill in their personal information and create a new account.

And : They should be able to log in with their credentials.

And : They should have the option to manage their profile with personal information and learning preferences.

Estimation : 5 story points

Priority : High

**US2.** As a user, I want to choose the language I want to learn from a list of available options.

Scenario : Language Selection.

Given : A user is logged into the language learning app.

When : They navigate to the language selection page.

Then : They should see a list of available languages.

And : They should be able to select the language they want to learn.

Estimation : 2 story points

Priority : High

**US3.** As a user, I want access to structured learning modules for different aspects of language learning.

Scenario : Accessing Learning Modules.

Given : A user is logged into the language learning app.

When : They navigate to the learning modules section.

Then : They should see modules for vocabulary, grammar, speaking, listening, reading, and writing.

Estimation : 3 story points

Priority : Medium

**US4.** As a user, I want interactive lessons with multimedia content for effective learning.

Scenario : Interactive Learning Experience.

Given : A user is in the learning module.

When : They select a specific lesson.

Then : They should have access to interactive content including audio, video, and text.

And : They should be able to interact with the content for learning.

Estimation : 8 story points

Priority : High

**US5.** As a user, I want the language learning app to include quizzes, exercises, and drills to reinforce learning and assess comprehension.

Scenario : Accessing Quizzes and Exercises.

Given : A user is in the language learning app.

When : They navigate to the quizzes and exercises section.

Then : They should have access to various quizzes, exercises, and drills.

And : They should be able to complete these activities to reinforce learning and assess comprehension.

Estimation : 5 story points

Priority : High

**US6.** As a user, I want the language learning app to track my progress through lessons, quizzes, and exercises, and display my achievements.

Scenario : Tracking Progress and Displaying Achievements.

Given : A user is using the language learning app.

When : They complete lessons, quizzes, and exercises.

Then : Their progress should be tracked and displayed within the app.

And : Their achievements should be visible to them, motivating further learning.

Estimation : 8 story points

Priority : High

**US7.** As a user, I want the language learning app to provide personalized recommendations for lessons and activities based on my learning history and preferences.

Scenario : Personalized Recommendations.

Given : A user has a learning history and preferences stored in the language learning app.

When : They navigate to the recommendations section.

Then : They should receive personalized recommendations for lessons and activities based on their learning history and preferences.

Estimation : 8 story points

Priority : High

**US8.** As a user, I want the language learning app to encourage me and recognize my accomplishments through elements like leaderboards, badges, levels, and points.

Scenario : Encouragement and Recognition.

Given : A user is using the language learning app.

When : They achieve milestones or complete tasks.

Then : They should be encouraged and recognized through elements like leaderboards, badges, levels, and points.

Estimation : 8 story points

Priority : Medium

**US9.** As a user, I want the language learning app to include listening comprehension exercises with audio recordings of native speakers.

Scenario : Listening Comprehension Exercises.

Given : A user is in the language learning app.

When : They access listening comprehension exercises.

Then : They should be presented with audio recordings of native speakers for listening comprehension practice.

Estimation : 5 story points

Priority : High

**US10.** As a user, I want the language learning app to provide writing practice exercises with prompts and feedback on grammar and vocabulary usage.

Scenario : Writing Practice Exercises.

Given : A user is in the language learning app.

When : They access writing practice exercises.

Then : They should be provided with prompts for writing practice.

And : They should receive feedback on grammar and vocabulary usage to improve their writing skills.

Estimation : 5 story points

Priority : High

**US11.** As a user, I want the language learning app to provide feedback on pronunciation and fluency.

Scenario : Pronunciation and Fluency Feedback.

Given : A user is practicing speaking in the language learning app.

When : They speak into the app or record themselves.

Then : They should receive feedback on their pronunciation and fluency to improve their speaking skills.

Estimation : 8 story points

Priority : High

**US12.** As a user, I want the language learning app to offer reading passages with comprehension questions to improve reading skills.

Scenario : Reading Comprehension Practice.

Given : A user is in the language learning app.

When : They access reading passages.

Then : They should be presented with comprehension questions to improve their reading skills.

Estimation : 5 story points

Priority : High

**US13.** As a user, I want the language learning app to prepare me for language proficiency exams and certifications by offering relevant study materials and practice tests.

Scenario : Exam Preparation.

Given : A user is preparing for a language proficiency exam.

When : They navigate to the exam preparation section.

Then : They should have access to relevant study materials and practice tests to help them prepare for the exam.

Estimation : 8 story points

Priority : High

**US14.** As a user, I want the language learning app to allow me to search for specific lessons, topics, or vocabulary words within the app.

Scenario : Searching for Content.

Given : A user is in the language learning app.

When : They need to find specific lessons, topics, or vocabulary words.

Then : They should be able to search for them within the app.

Estimation : 3 story points

Priority : Medium

**US15.** As a user, I want the language learning app to allow me to download lessons and content for offline access when internet connectivity is not available.

Scenario : Offline Access.

Given : A user is using the language learning app.

When : They have limited or no internet connectivity.

Then : They should be able to download lessons and content for offline access.

Estimation : 5 story points

Priority : High

**US16.** As a user, I want the language learning app to offer study planners, reminders, and progress trackers to help me manage my learning schedule effectively.

Scenario : Learning Schedule Management.

Given : A user is using the language learning app.

When : They need to manage their learning schedule.

Then : They should have access to study planners, reminders, and progress trackers within the app.

Estimation : 8 story points

Priority : High

**US17.** As a user, I want the language learning app to include an in-app dictionary with definitions, translations, and contextual usage examples for vocabulary words.

Scenario : Accessing In-App Dictionary.

Given : A user is using the language learning app.

When : They encounter a new vocabulary word.

Then : They should be able to access an in-app dictionary.

And : The dictionary should provide definitions, translations, and contextual usage examples for the vocabulary word.

Estimation : 5 story points

Priority : High

**US18.** As a user, I want the language learning app to allow me to change my personal information and learning preferences.

Scenario : Changing Personal Information and Preferences.

Given : A user is logged into the language learning app.

When : They navigate to their profile settings.

Then : They should be able to change their personal information and learning preferences as needed.

Estimation : 3 story points

Priority : Medium

**US19.** As a user, I want the language learning app to synchronize progress data across devices when the app is online to ensure seamless learning continuity.

Scenario : Progress Data Synchronization.

Given : A user is using the language learning app on multiple devices.

When : They make progress on one device.

Then : The progress data should synchronize across all devices when the app is online.

Estimation : 8 story points

Priority : High

**US20.** As a user, I want the language learning app to offer customer support services to assist me with technical issues, inquiries, and feedback.

Scenario : Accessing Customer Support.

Given : A user encounters technical issues, has inquiries, or wants to provide feedback.

When : They navigate to the customer support section.

Then : They should have access to customer support services for assistance.

Estimation : 5 story points

Priority : High

**US21.** As a user, I want the language learning app to implement a notification system to alert me about upcoming lessons, reminders, and new content.

Scenario : Notification System.

Given : A user is using the language learning app.

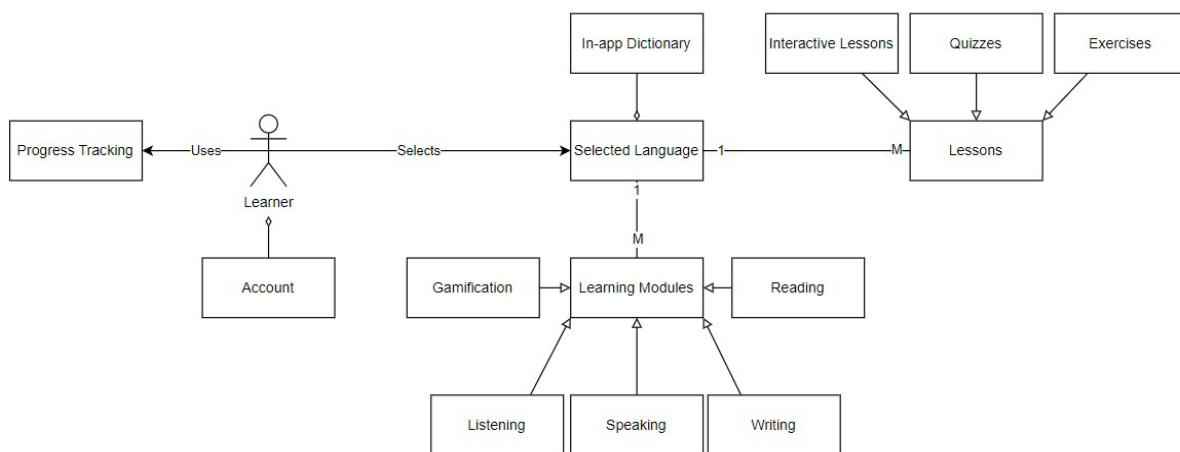
When : There are upcoming lessons, reminders, or new content.

Then : They should receive notifications to alert them about these events.

Estimation : 5 story points

Priority : High

## 2.4 Domain Model :



## **2.5 User Interview Questions :**

- What language (s) are you interested in learning ?
- What motivated you to start learning a new language ?
- How do you currently approach language learning ?
- What challenges have you encountered in your language learning journey ?
- What specific language skills are you looking to improve ?
- What are your preferred learning methods or techniques ?
- How do you track your progress in language learning ?
- Have you used any language learning apps before ? If so, what features did you find most helpful ?
- How do you stay motivated and engaged when learning a new language ?
- What are your long-term language learning goals, and how do you plan to achieve them ?
- Within how many months do you expect to reach your goal in learning language chosen ?

### **2.5.1 User Interviews :**

We interviewed Aya Abdelshafy, a graphic design student at NGU who is willing to learn French so it will help her when she travels abroad.

#### **Interview with Aya :**

[https://drive.google.com/file/d/1heiSHym3jkXjdHW0XHNbL2BMI4jevqLU/view?usp=share\\_link](https://drive.google.com/file/d/1heiSHym3jkXjdHW0XHNbL2BMI4jevqLU/view?usp=share_link)

We interviewed Habiba Hesham, a fashion design student at NGU who is willing to learn Italian so it will boost her CV and job applications and make her special in her field.

#### **Interview with Habiba :**

[https://drive.google.com/file/d/1Ubsz3ZSzrdzNdjmbynPIqG7iQNNIWp6S/view?usp=share\\_link](https://drive.google.com/file/d/1Ubsz3ZSzrdzNdjmbynPIqG7iQNNIWp6S/view?usp=share_link)

## 2.5.2 User Interviews Insights :

- **New Requirements :**

- Users desire customizable learning paths based on proficiency, goals, and interests, enhancing satisfaction and engagement by incorporating features that allow for individualization.
- Interviewees expressed difficulty in finding effective pronunciation practice tools, suggesting interactive exercises with real-time feedback could help enhance speaking proficiency.

- **Omitted Requirements :**

- None.

- **Confirmed Requirements :**

- User interviews emphasized the significance of progress tracking in motivation and learning outcomes, confirming the need for comprehensive metrics like proficiency levels, lessons completed, and learning streaks.
- Users emphasized the importance of a supportive community, including discussion forums, language exchange opportunities, and peer support networks, to promote collaboration and engagement.

- **Recommended Requirements :**

- Users desire a diverse range of learning materials beyond app's built-in content, and recommend seamless integration with external resources like podcasts and online courses for a comprehensive learning experience.
- The interview highlights the importance of personalized learning recommendations, recommending the use of machine learning algorithms or user profiling mechanisms to boost user engagement and satisfaction.

## 2.6 Personas :



### Aya



#### Gender

Female



#### Nationality

Egyptian



#### Occupation

Graphic Design Student

## Goals & Needs

- She aspires to achieve fluency in her chosen language, enabling her to communicate confidently in various settings, both professionally and personally.
- She needs interactive and engaging learning materials that cater to her preferred learning style, whether visual, auditory, or kinesthetic.

## Pains

- She struggles to find time for language learning amidst her busy schedule, often feeling overwhelmed by other commitments.
- Without immersion or native speakers to practice with, she feels her speaking and listening skills stagnate, hindering her progress.



## Habiba



### Gender

Female



### Nationality

Egyptian



### Occupation

Fashion Design Student

## Goals & Needs

- She seeks to enhance her career prospects by becoming proficient in a new language, opening up opportunities for international employment or collaboration.
- She aims to attain fluency in her chosen language, enabling her to communicate confidently in various professional and personal settings.

## Pains

- She fears making mistakes or sounding foolish when practicing speaking, which holds her back from engaging in conversation and building confidence.
- Maintaining consistent motivation to learn a new language can be challenging for her, especially when progress feels slow and she faces competing priorities.



## Ahmed



### Gender

Male



### Nationality

Egyptian



### Occupation

Engineer looking to immigrate

## Goals & Needs

- He aims to improve their fluency in the desired country by enhancing their speaking, reading, writing, and listening skills.
- Lessons that incorporate cultural context to help understand the social norms and customs of the destination country.
- Prepare for and pass required language proficiency exams such as IELTS, TOEFL, or others specific to the destination country.

## Pains

- Difficulty in understanding and being understood in everyday interactions, leading to frustration and isolation.
- Struggling to balance language learning with other responsibilities such as work, family, and preparation for migration logistics.
- Stress and anxiety related to preparing for and passing language proficiency exams.

## **2.7 Competitors :**

Duolingo is a popular language learning app that offers structured modules, interactive lessons, quizzes, exercises, personalized recommendations, gamification, listening comprehension exercises, reading passages, and exam preparation. It also provides offline access, study planners, progress trackers, an in-app dictionary, and synchronizes progress data across devices.

Rosetta Stone is a popular language learning platform with a range of features including account creation, language selection, interactive lessons, quizzes, personalized recommendations, gamification, listening comprehension exercises, reading passages, exam preparation, offline access, study planners, progress trackers, in-app dictionary, synchronization across devices, and customer support services.

### **2.7.1 Duolingo :**

**Link :** <https://www.duolingo.com/>

#### **Pros :**

- Engaging, gamified interface.
- Wide variety of languages available.
- Structured learning with progress tracking.

#### **Cons :**

- Limited depth in advanced topics.
- Overemphasis on translation exercises.
- Less personalized learning paths.

### **2.7.2 Rosetta Stone :**

**Link :** <https://www.rosettastone.com/>

#### **Pros :**

- Immersion method for natural language acquisition.
- Comprehensive curriculum covering all language skills.
- Speech recognition for pronunciation feedback.
- Flexible access with online and offline options.

#### **Cons :**

- Less prominent gamification elements.
- Limited language selection compared to other platforms.

## Chapter 3 :

### 3.1 Use Cases :

<b>Name</b>	Account Creation and Management
<b>ID</b>	UC1
<b>Brief Description</b>	Users create accounts, log in, and manage their profiles with personal information and learning preferences.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User accesses the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the account creation or login page.</li> <li>2. User selects the option to create a new account or log in.</li> <li>3. User provides necessary personal information (name, email, etc.) for account creation or login.</li> <li>4. User accesses their profile settings to manage personal information and learning preferences.</li> <li>5. User saves any changes made to their profile settings.</li> </ol>
<b>Post Conditions</b>	User successfully creates an account, logs in, and manages their profile with personal information and learning preferences.
<b>Alternatives</b>	None
<b>Errors</b>	Invalid information provided during account creation or login, prompting the user to correct it.

<b>Name</b>	Language Selection
<b>ID</b>	UC2
<b>Brief Description</b>	Users select the language they want to learn from a list of available options.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the language selection page within the app.</li> <li>2. User views a list of available languages to learn.</li> <li>3. User selects the language they want to learn from the list.</li> </ol>
<b>Post Conditions</b>	User successfully selects the desired language to learn.
<b>Alternatives</b>	None
<b>Errors</b>	Inability to load available languages or select a language due to technical issues, prompting the user to retry or contact support.

<b>Name</b>	Accessing Structured Learning Modules
<b>ID</b>	UC3
<b>Brief Description</b>	Users access structured learning modules for different aspects of language learning.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the learning modules section.</li> <li>2. User selects a specific aspect of language learning (e.g., vocabulary, grammar).</li> <li>3. User chooses a module within the selected aspect.</li> <li>4. User starts or resumes learning within the module.</li> </ol>
<b>Post Conditions</b>	User accesses the selected learning module successfully.
<b>Alternatives</b>	None
<b>Errors</b>	Module selection failure due to technical issues, prompting the user to retry or contact support.

<b>Name</b>	Completing Interactive Lessons
<b>ID</b>	UC4
<b>Brief Description</b>	Users complete interactive lessons with multimedia content.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User selects an interactive lesson.</li> <li>2. User engages with multimedia content (audio, video, text) within the lesson.</li> <li>3. User completes exercises or activities embedded in the lesson.</li> <li>4. User receives feedback on their performance.</li> </ol>
<b>Post Conditions</b>	User completes the interactive lesson successfully.
<b>Alternatives</b>	None
<b>Errors</b>	Failure to load multimedia content or exercises due to connectivity issues, prompting the user to check their internet connection.

<b>Name</b>	Taking Quizzes and Exercises
<b>ID</b>	UC5
<b>Brief Description</b>	Users take quizzes and exercises to reinforce learning and assess comprehension.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User accesses the quizzes and exercises section.</li> <li>2. User selects a specific quiz or exercise.</li> <li>3. User completes the quiz or exercise.</li> <li>4. User receives immediate feedback on their performance.</li> </ol>
<b>Post Conditions</b>	User completes the quiz or exercise successfully.
<b>Alternatives</b>	None
<b>Errors</b>	Quiz or exercise submission failure due to technical issues, prompting the user to retry or contact support.

<b>Name</b>	Tracking Progress
<b>ID</b>	UC6
<b>Brief Description</b>	Users track their progress through lessons, quizzes, and exercises.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User accesses the progress tracking section.</li> <li>2. User views their completed lessons, quiz results, and exercise performance.</li> <li>3. User checks their overall learning progress.</li> </ol>
<b>Post Conditions</b>	User tracks their learning progress successfully.
<b>Alternatives</b>	None
<b>Errors</b>	Inaccurate or missing progress data due to system errors, prompting the user to contact support for assistance.

<b>Name</b>	Receiving Personalized Recommendations
<b>ID</b>	UC7
<b>Brief Description</b>	Users receive personalized recommendations for lessons and activities based on their learning history and preferences.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User accesses the recommendations section.</li> <li>2. System analyzes user's learning history and preferences.</li> <li>3. System generates personalized recommendations for lessons and activities.</li> <li>4. User views and selects recommended lessons or activities.</li> </ol>
<b>Post Conditions</b>	User receives and interacts with personalized recommendations successfully.
<b>Alternatives</b>	None
<b>Errors</b>	Failure to generate or display personalized recommendations due to system errors, prompting the user to retry or contact support.

<b>Name</b>	Viewing Leaderboards and Achievements
<b>ID</b>	UC8
<b>Brief Description</b>	Users view leaderboards and achievements to track their progress and compare with others.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the leaderboard or achievements section within the app.</li> <li>2. User views their own progress and achievements.</li> <li>3. User compares their progress and achievements with other users on the leaderboard.</li> </ol>
<b>Post Conditions</b>	User gains insight into their progress and achievements relative to others.
<b>Alternatives</b>	None
<b>Errors</b>	Inability to load leaderboards or achievements due to technical issues, prompting the user to retry or contact support.

<b>Name</b>	Accessing Listening Comprehension Exercises
<b>ID</b>	UC9
<b>Brief Description</b>	Users access listening comprehension exercises with audio recordings of native speakers.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the listening comprehension exercises section.</li> <li>2. User selects a specific listening comprehension exercise.</li> <li>3. User listens to the audio recording of a native speaker.</li> <li>4. User completes comprehension activities related to the audio content.</li> </ol>
<b>Post Conditions</b>	User completes listening comprehension exercises successfully.
<b>Alternatives</b>	None
<b>Errors</b>	Inability to access audio recordings or complete comprehension activities due to technical issues, prompting the user to retry or contact support.

<b>Name</b>	Accessing Writing Practice Exercises
<b>ID</b>	UC10
<b>Brief Description</b>	Users access writing practice exercises with prompts and receive feedback on grammar and vocabulary usage.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the writing practice exercises section.</li> <li>2. User selects a specific writing prompt or exercise.</li> <li>3. User completes the writing exercise, composing a written response.</li> <li>4. System provides feedback on grammar and vocabulary usage in the written response.</li> </ol>
<b>Post Conditions</b>	User completes writing practice exercises and receives feedback successfully.
<b>Alternatives</b>	None
<b>Errors</b>	Failure to provide feedback on writing exercises due to technical issues, prompting the user to retry or contact support.

<b>Name</b>	Speaking Practice with Voice Recognition
<b>ID</b>	UC11
<b>Brief Description</b>	Users engage in speaking practice exercises utilizing voice recognition technology for pronunciation and fluency feedback.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User has access to the speaking practice module within the app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User selects a speaking practice exercise from the app's available options.</li> <li>2. User reads aloud the provided prompt or sentence using their device's microphone.</li> <li>3. Voice recognition technology analyzes the user's pronunciation and fluency.</li> <li>4. App provides real-time feedback on pronunciation accuracy and fluency level.</li> </ol>
<b>Post Conditions</b>	User receives feedback on their speaking performance and can proceed to the next exercise or review.
<b>Alternatives</b>	User may choose to repeat the exercise for improvement or skip to another exercise.
<b>Errors</b>	Voice recognition may inaccurately assess pronunciation due to background noise or speech impediments.

<b>Name</b>	Reading Passages with Comprehension Questions
<b>ID</b>	UC12
<b>Brief Description</b>	Users engage in reading passages followed by comprehension questions to enhance reading skills.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User has access to the reading module within the app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User selects a reading passage from the app's library or curriculum.</li> <li>2. User reads the passage at their own pace, utilizing app features such as text highlighting or audio narration if available.</li> <li>3. After reading, user answers comprehension questions related to the passage.</li> <li>4. App provides immediate feedback on the accuracy of user's responses.</li> </ol>
<b>Post Conditions</b>	User completes the reading exercise and gains understanding of the passage content.
<b>Alternatives</b>	User may review the passage or questions if needed before submitting answers.
<b>Errors</b>	App may encounter errors in providing feedback or scoring responses accurately, impacting user's learning experience.

<b>Name</b>	Participating in Language Proficiency Exams
<b>ID</b>	UC13
<b>Brief Description</b>	Users prepare for and participate in language proficiency exams within the language learning app.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the exam preparation section.</li> <li>2. User selects a specific language proficiency exam.</li> <li>3. User accesses relevant study materials and practice tests for the selected exam.</li> <li>4. User practices and prepares for the exam using the provided resources.</li> <li>5. User schedules and takes practice tests to assess their readiness.</li> </ol>
<b>Post Conditions</b>	User completes exam preparation successfully.
<b>Alternatives</b>	None
<b>Errors</b>	Inability to access exam preparation resources due to technical issues, prompting the user to retry or contact support.

<b>Name</b>	Searching for Lessons, Topics, or Vocabulary Words
<b>ID</b>	UC14
<b>Brief Description</b>	Users search for specific lessons, topics, or vocabulary words within the app.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User has access to the search functionality within the app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User accesses the search bar within the app.</li> <li>2. User enters keywords related to the desired lesson, topic, or vocabulary word.</li> <li>3. App displays relevant search results matching the entered keywords.</li> <li>4. User selects the desired result to access the corresponding lesson, topic, or word.</li> </ol>
<b>Post Conditions</b>	User finds and accesses the desired content within the app.
<b>Alternatives</b>	User may refine search queries or explore suggested related content if initial search results are not satisfactory.
<b>Errors</b>	Search functionality may return irrelevant or inaccurate results due to keyword mismatches or indexing issues.

<b>Name</b>	Downloading Lessons and Content for Offline Access
<b>ID</b>	UC15
<b>Brief Description</b>	Users download lessons and content for offline access when internet connectivity is not available.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User has access to the download functionality within the app and sufficient device storage.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the desired lesson or content within the app.</li> <li>2. User selects the option to download the lesson or content for offline access.</li> <li>3. App begins downloading the selected content to the user's device.</li> <li>4. Once downloaded, user can access the content without internet connectivity.</li> </ol>
<b>Post Conditions</b>	User successfully downloads and accesses the content offline.
<b>Alternatives</b>	User may prioritize certain lessons or content for download based on their preferences or immediate learning needs.
<b>Errors</b>	Download may fail due to insufficient storage space or network connectivity issues, prompting the need for retrying the download process.

<b>Name</b>	Utilizing Study Planners and Reminders
<b>ID</b>	UC16
<b>Brief Description</b>	Users utilize study planners, reminders, and progress trackers to manage their learning schedule effectively.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the language learning app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User accesses the study planner and reminders section.</li> <li>2. User sets up a study plan by specifying learning goals, study times, and topics.</li> <li>3. User receives reminders for upcoming study sessions and tasks.</li> <li>4. User tracks their progress using the progress tracker.</li> </ol>
<b>Post Conditions</b>	User effectively manages their learning schedule using study planners and reminders.
<b>Alternatives</b>	None
<b>Errors</b>	Failure to receive reminders or track progress due to system errors, prompting the user to retry or contact support.

<b>Name</b>	In-App Dictionary Integration
<b>ID</b>	UC17
<b>Brief Description</b>	Users can access an in-app dictionary to obtain definitions, translations, and contextual usage examples for vocabulary words.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is engaged in a learning session within the app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User encounters an unfamiliar word during a lesson or practice session.</li> <li>2. User selects the word and activates the in-app dictionary feature.</li> <li>3. App retrieves and displays definitions, translations, and usage examples for the word.</li> <li>4. User saves the word or continues learning with the provided information.</li> </ol>
<b>Post Conditions</b>	User gains clarity on the word's meaning and usage.
<b>Alternatives</b>	User may choose to bookmark the word for later review.
<b>Errors</b>	In-app dictionary may fail to provide accurate or relevant information for certain words.

<b>Name</b>	Personal Information and Preferences Management
<b>ID</b>	UC18
<b>Brief Description</b>	Users can update their personal information and learning preferences within the app.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the "Profile Settings" section of the app.</li> <li>2. User selects the option to edit personal information or learning preferences.</li> <li>3. User modifies details such as name, email, language proficiency level, etc.</li> <li>4. User saves the updated information.</li> </ol>
<b>Post Conditions</b>	User's profile information and learning preferences are updated.
<b>Alternatives</b>	User may choose to revert changes or reset preferences to default settings.
<b>Errors</b>	App may encounter errors while saving changes due to connectivity issues.

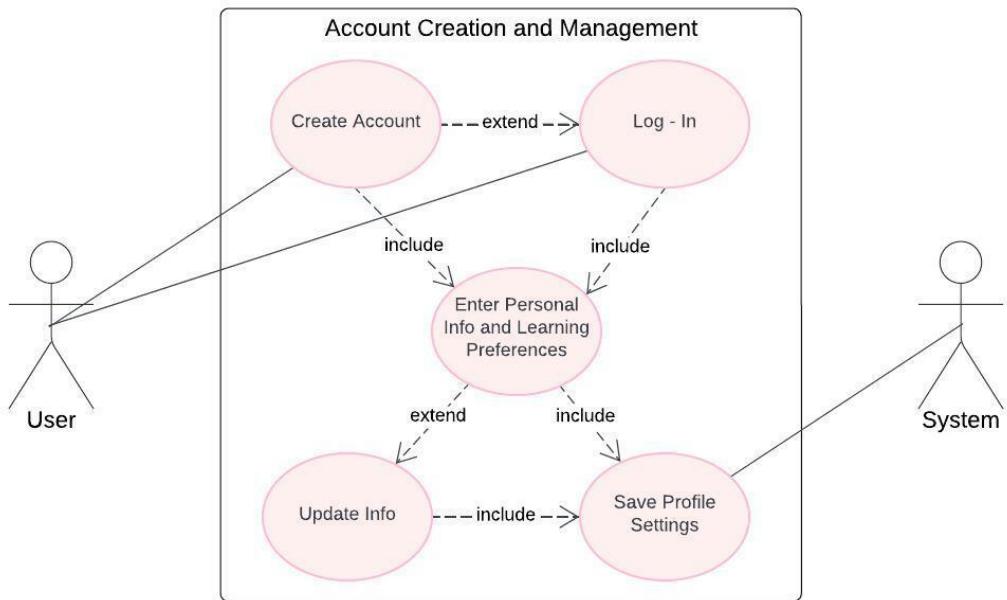
<b>Name</b>	Progress Data Synchronization
<b>ID</b>	UC19
<b>Brief Description</b>	User's progress data is synchronized across devices to ensure continuity in learning experience.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User is logged into the app on multiple devices with internet connectivity.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User logs into the app on a new device.</li> <li>2. App detects existing user account and prompts for synchronization.</li> <li>3. App synchronizes progress data, including completed lessons, achievements, and study plans.</li> <li>4. User can seamlessly continue learning from the new device.</li> </ol>
<b>Post Conditions</b>	User's progress data is synchronized across all devices.
<b>Alternatives</b>	User may choose to opt out of synchronization for certain data types.
<b>Errors</b>	Synchronization may fail due to server issues or conflicting data.

<b>Name</b>	Customer Support Assistance
<b>ID</b>	UC20
<b>Brief Description</b>	Users can access customer support services within the app for technical issues, inquiries, and feedback.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	Customer Support Representative
<b>Pre Condition</b>	User encounters an issue or requires assistance while using the app.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User navigates to the "Support" or "Help Center" section of the app.</li> <li>2. User describes the issue or inquiry through a chat or email interface.</li> <li>3. App forwards the request to customer support representatives.</li> <li>4. Customer support representative responds promptly with assistance or resolution.</li> </ol>
<b>Post Conditions</b>	User receives assistance or resolution for the reported issue.
<b>Alternatives</b>	User may choose to escalate the issue if not resolved satisfactorily.
<b>Errors</b>	Customer support system may experience delays or technical glitches.

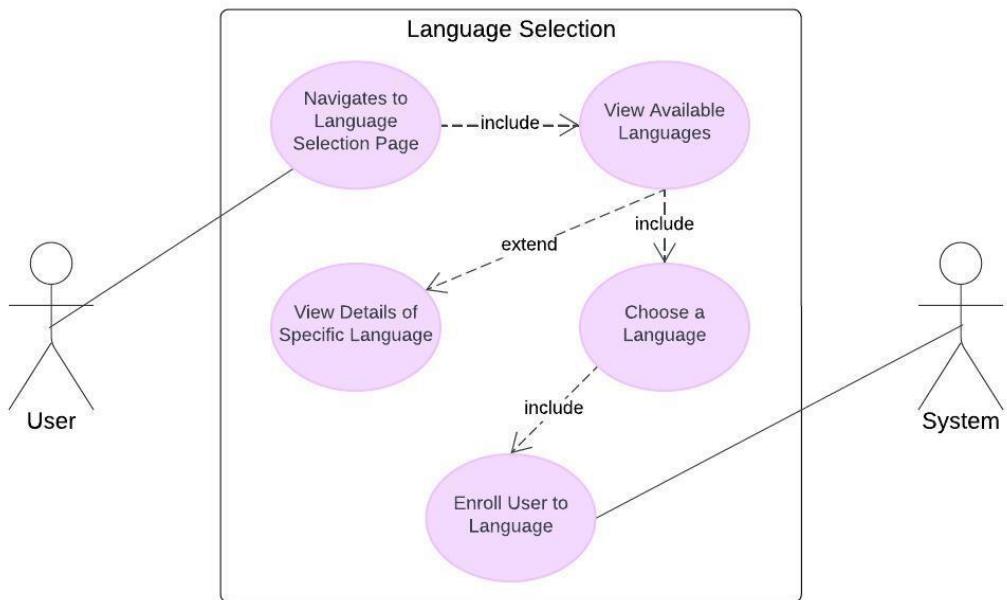
<b>Name</b>	Notification System Implementation
<b>ID</b>	UC21
<b>Brief Description</b>	Users receive notifications about upcoming lessons, reminders, and new content within the app.
<b>Primary Actor (s)</b>	Users
<b>Secondary Actor (s)</b>	System
<b>Pre Condition</b>	User enables notifications within the app settings.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. App schedules notifications for upcoming lessons, reminders, and new content releases.</li> <li>2. User receives notifications on their device at scheduled times.</li> <li>3. User can interact with notifications to view details or take action.</li> </ol>
<b>Post Conditions</b>	User stays informed about relevant updates and events within the app.
<b>Alternatives</b>	User may choose to customize notification preferences or disable notifications for certain types of events.
<b>Errors</b>	Notifications may fail to deliver due to device settings or app malfunction.

### 3.2 Use Cases Diagrams :

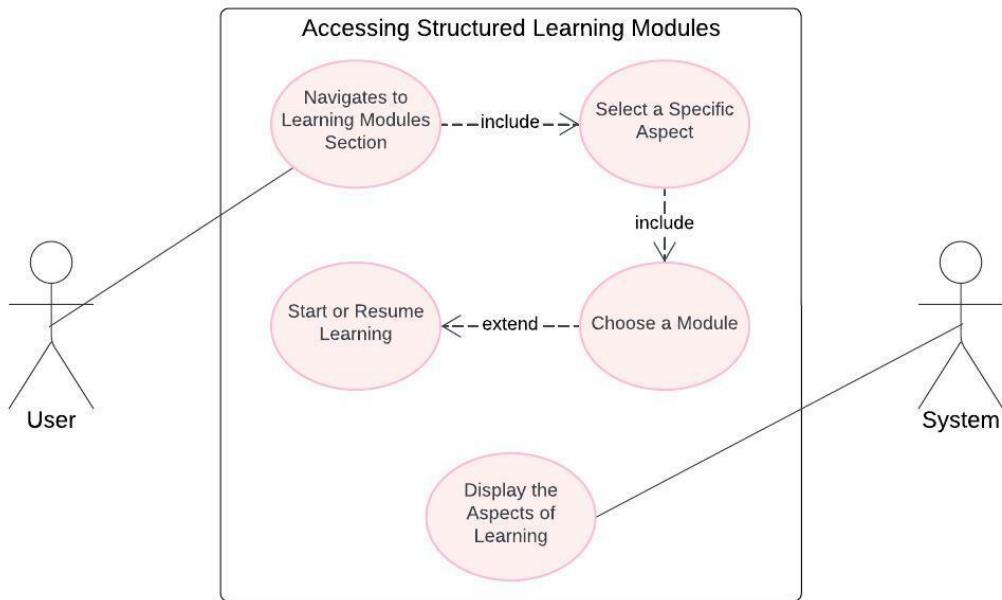
UC1 Diagram



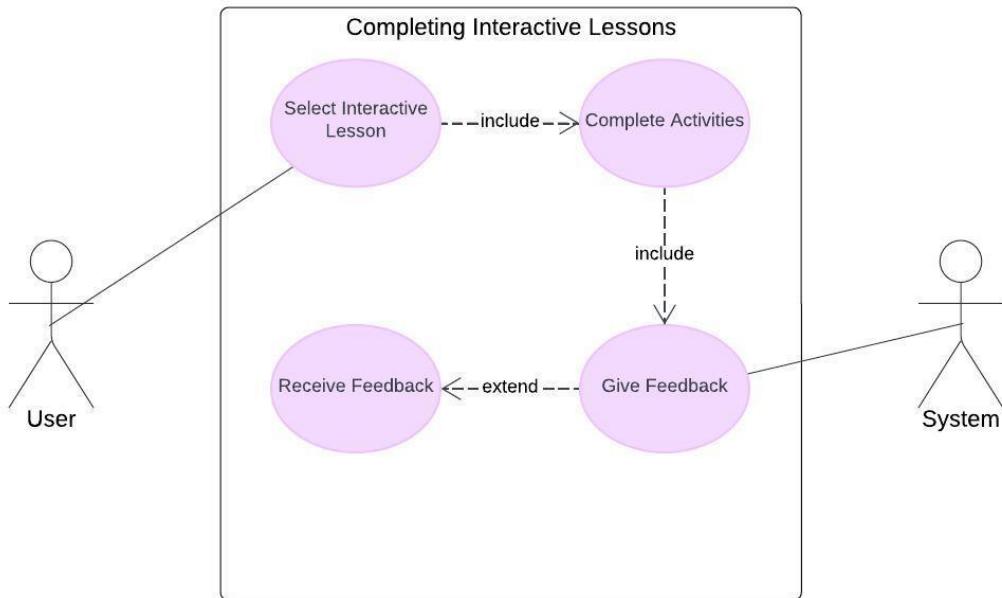
UC2 Diagram



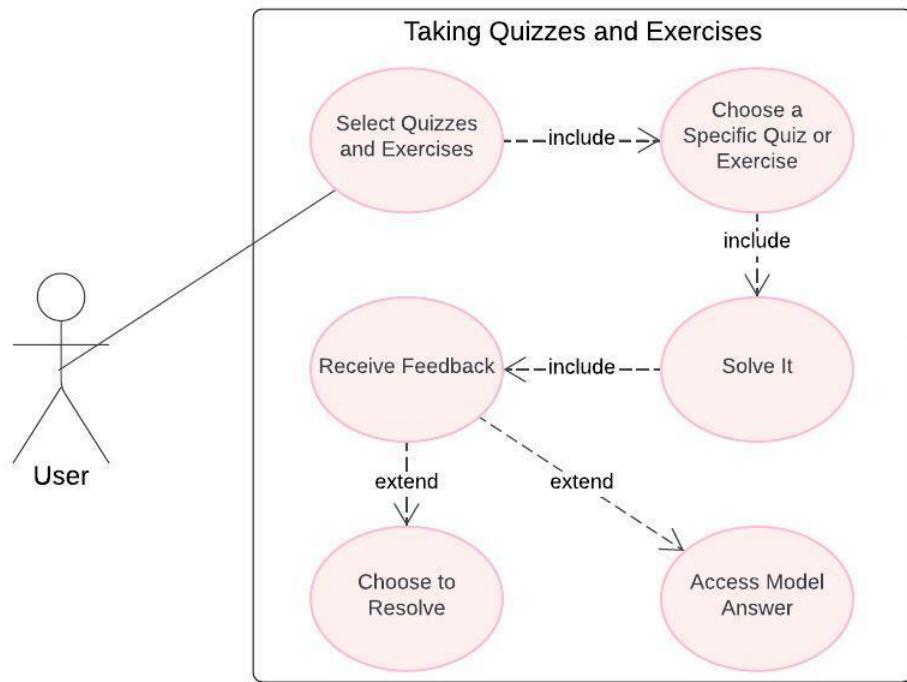
UC3 Diagram



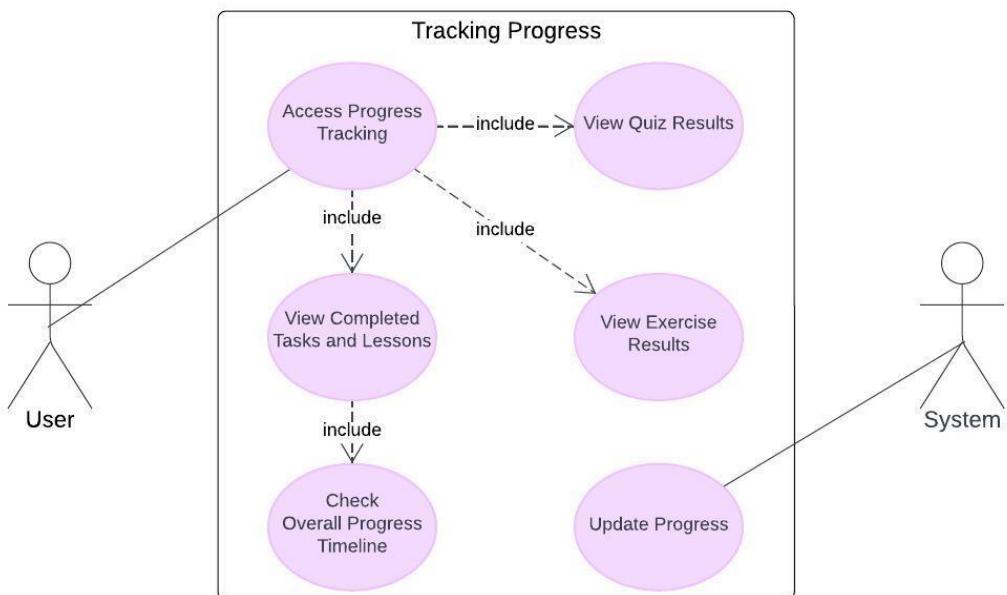
UC4 Diagram



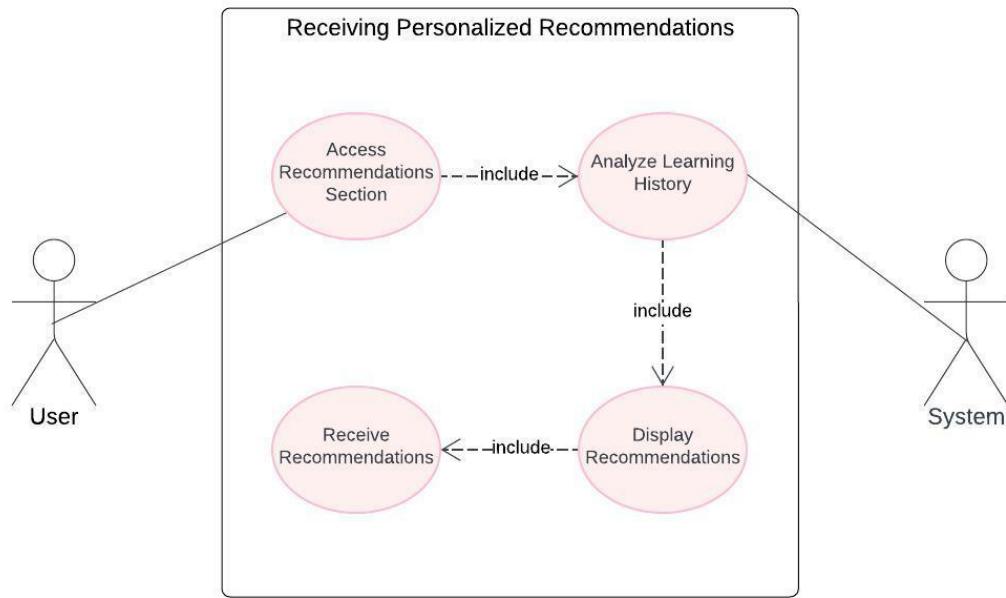
UC5 Diagram



UC6 Diagram



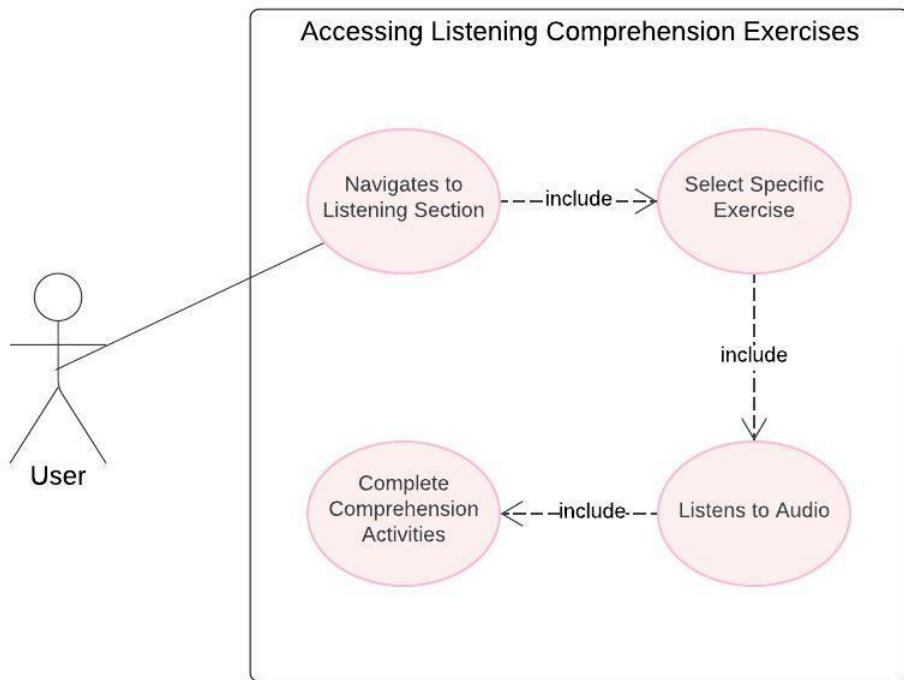
UC7 Diagram



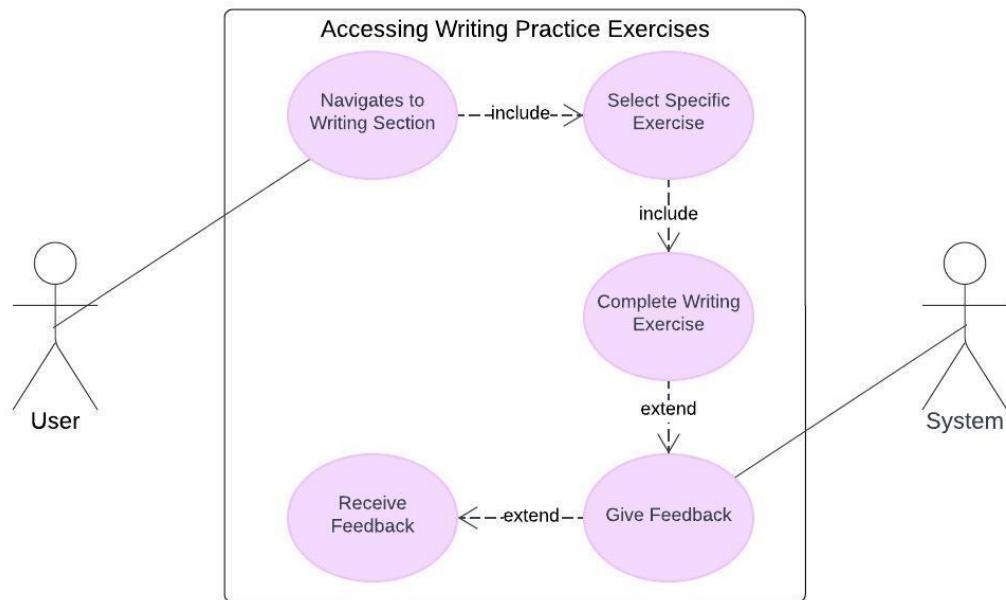
UC8 Diagram



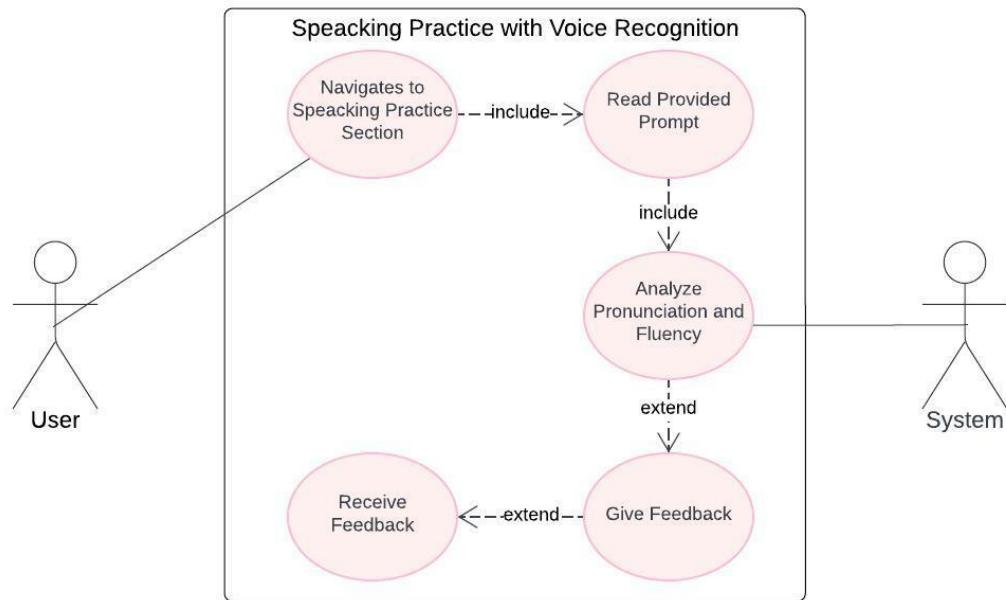
UC9 Diagram



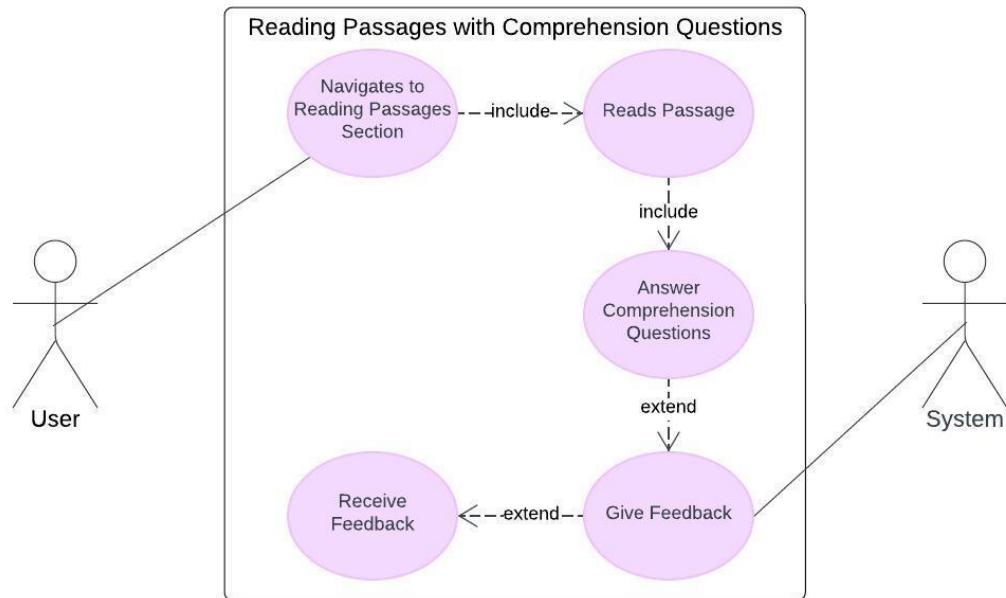
UC10 Diagram



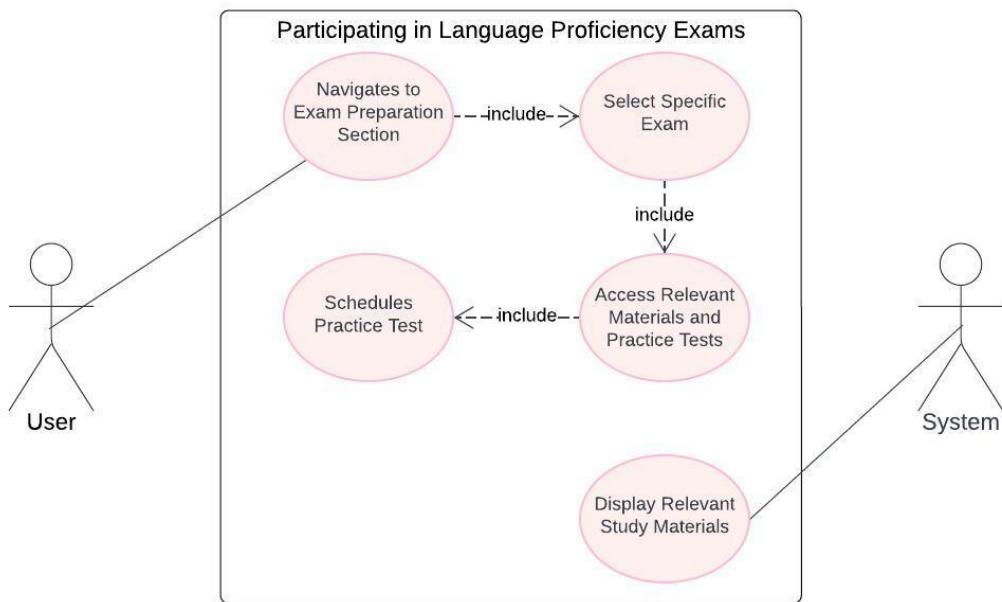
UC11 Diagram



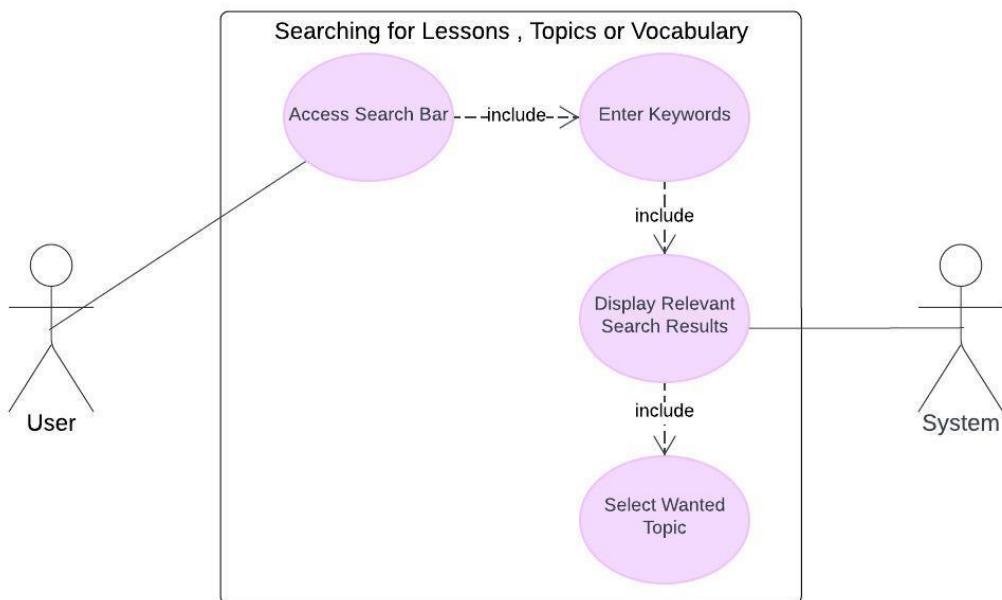
UC12 Diagram



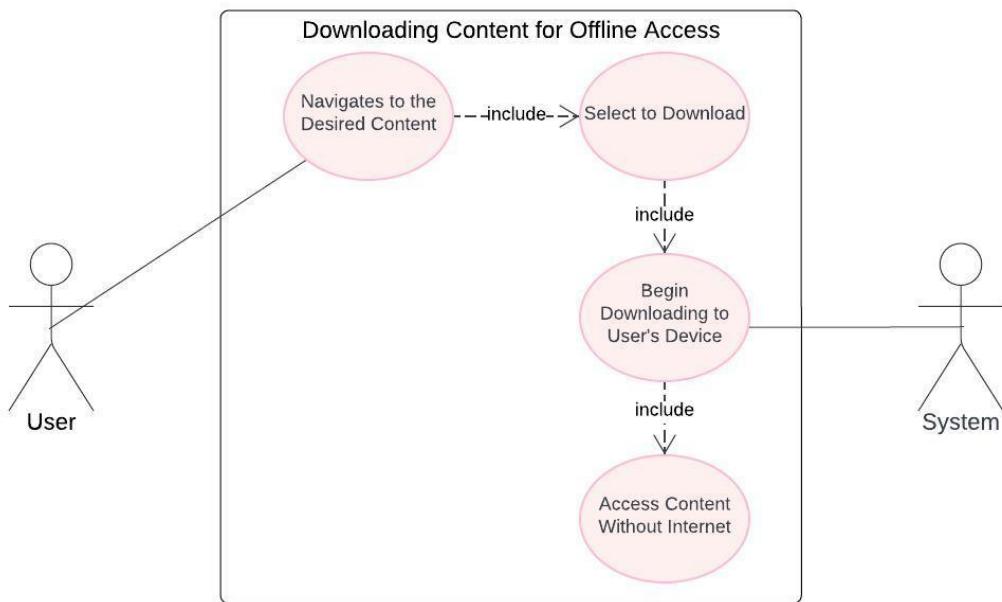
UC13 Diagram



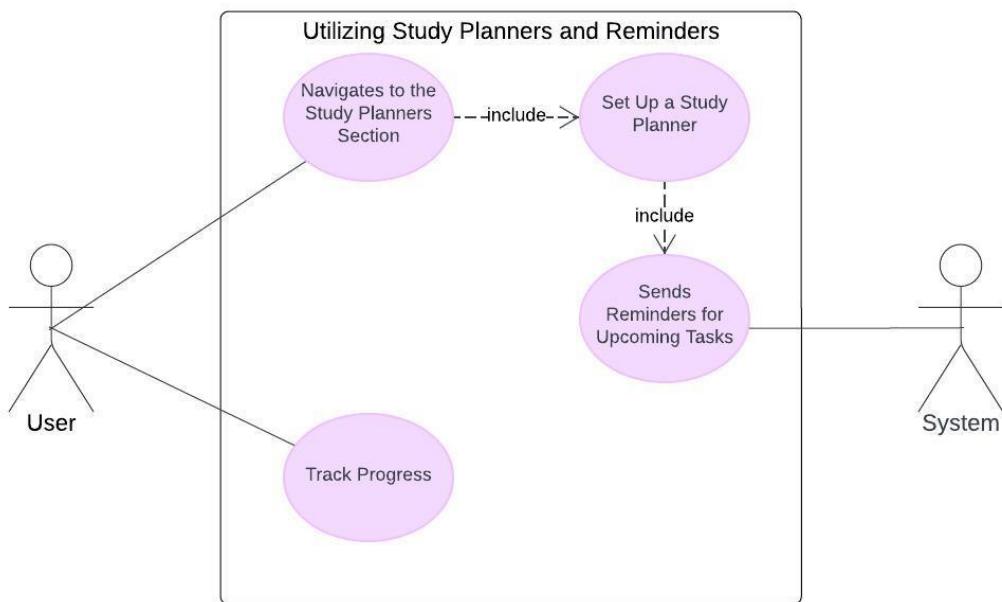
UC14 Diagram



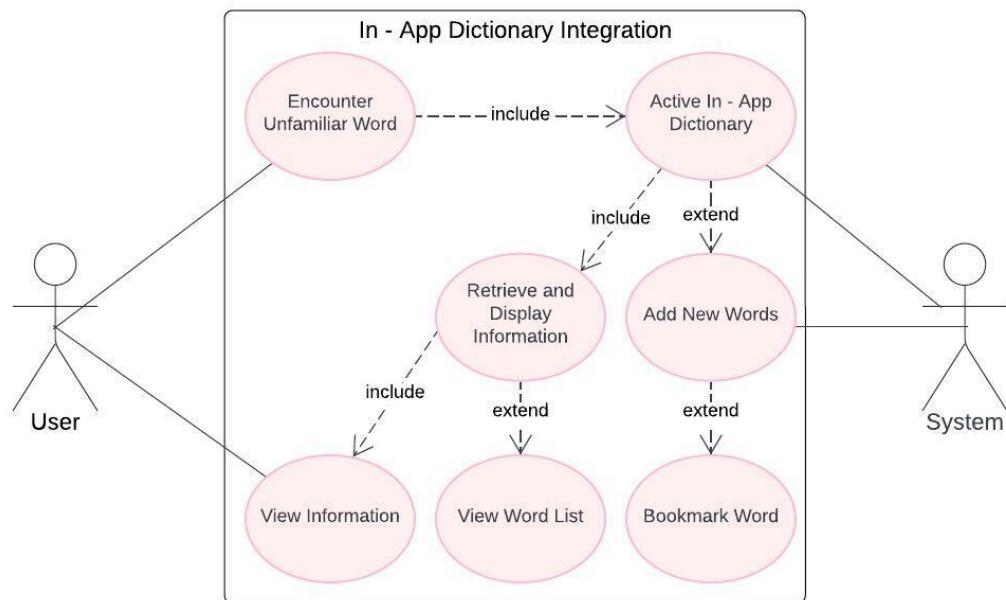
UC15 Diagram



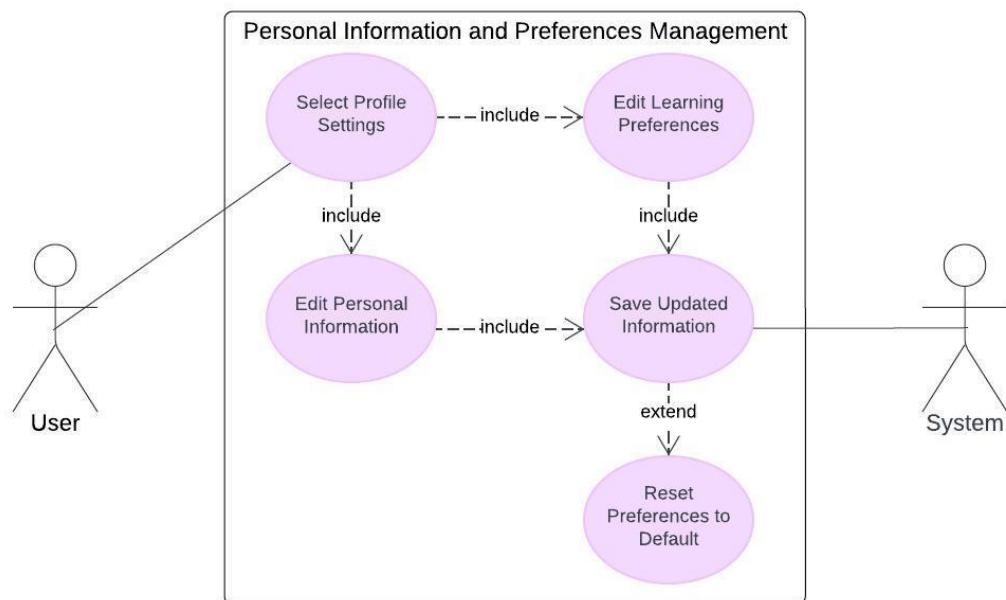
UC16 Diagram



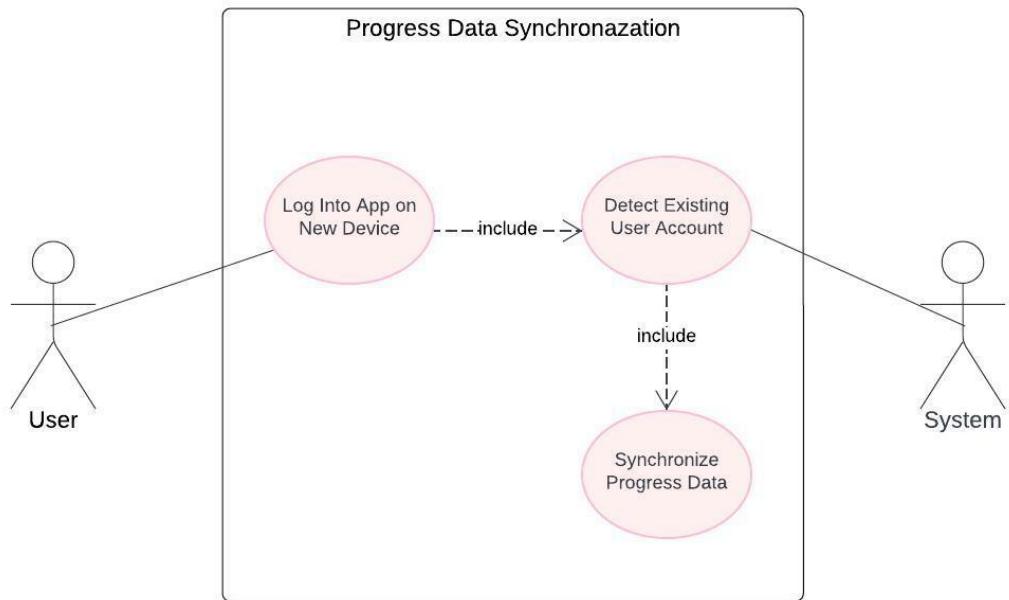
## UC17 Diagram



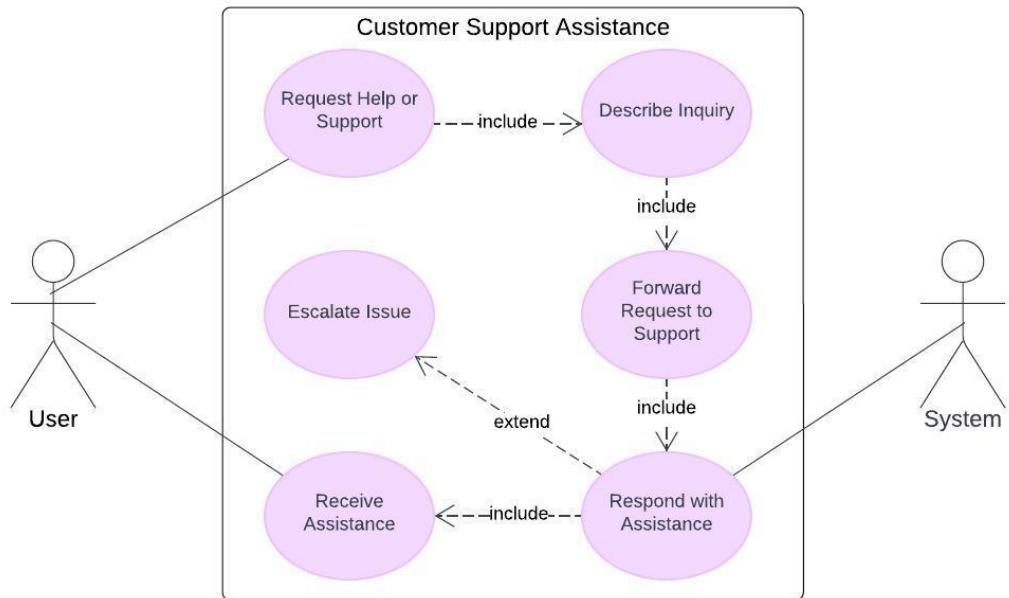
## UC18 Diagram



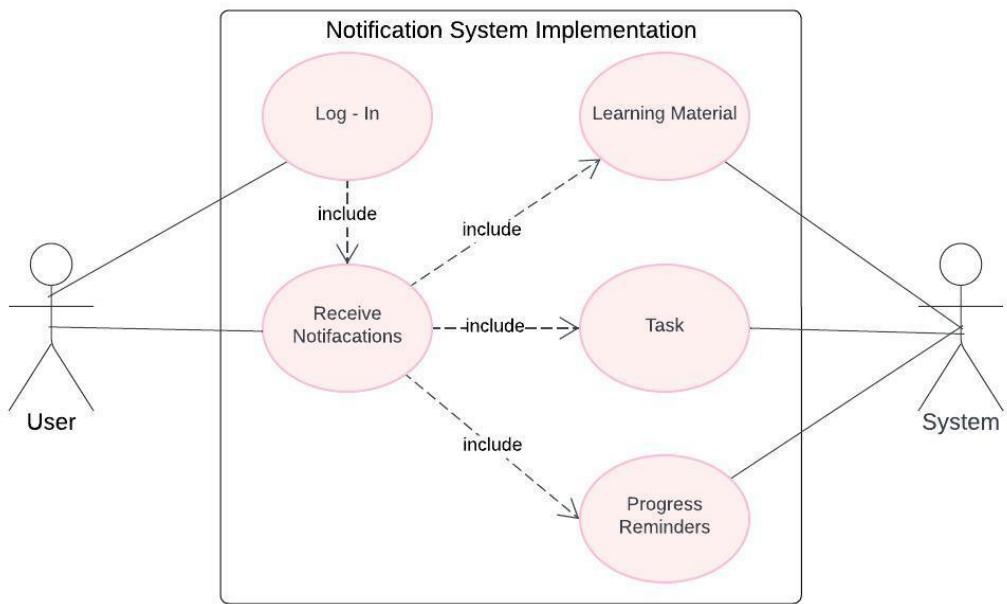
UC19 Diagram



UC20 Diagram

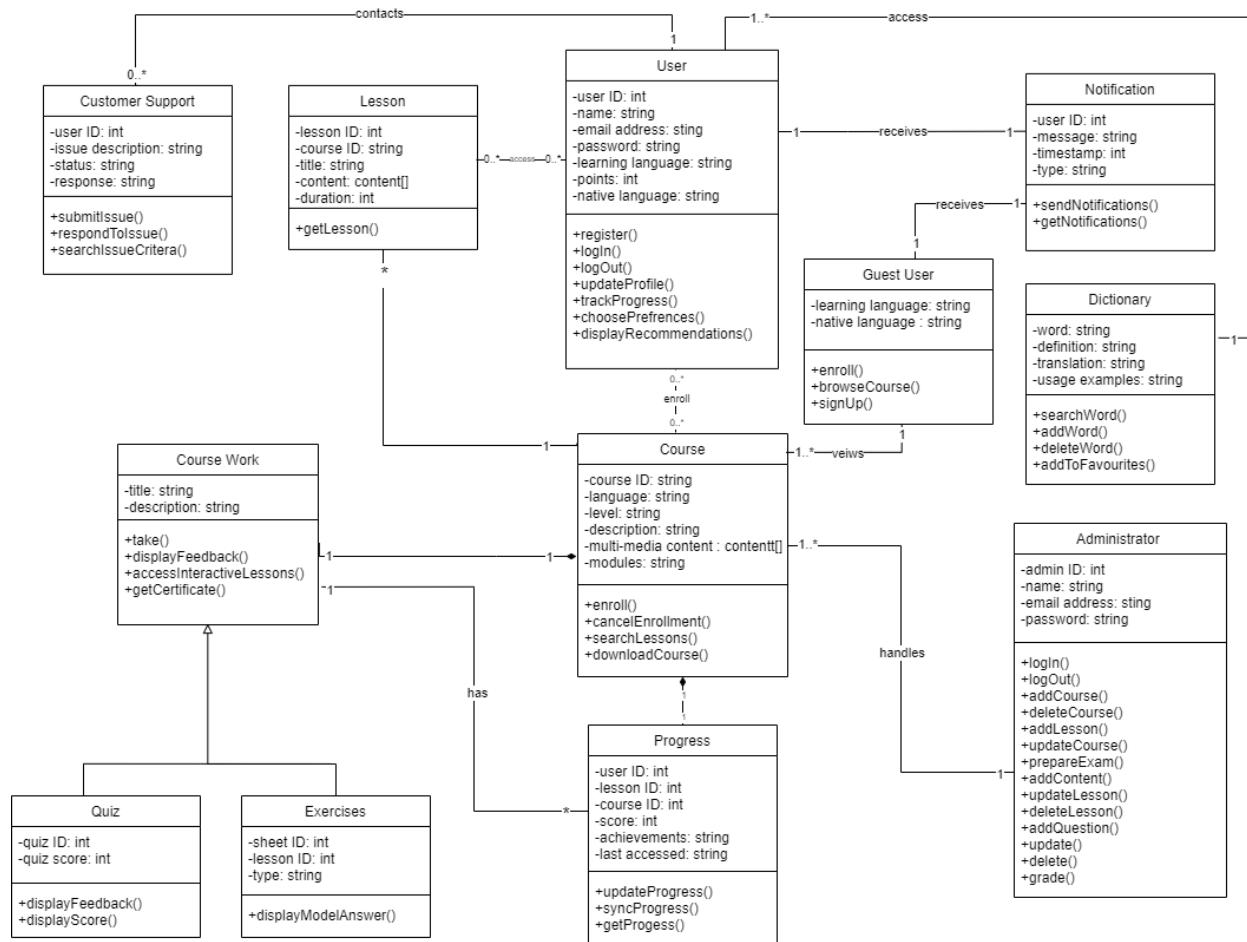


UC21 Diagram

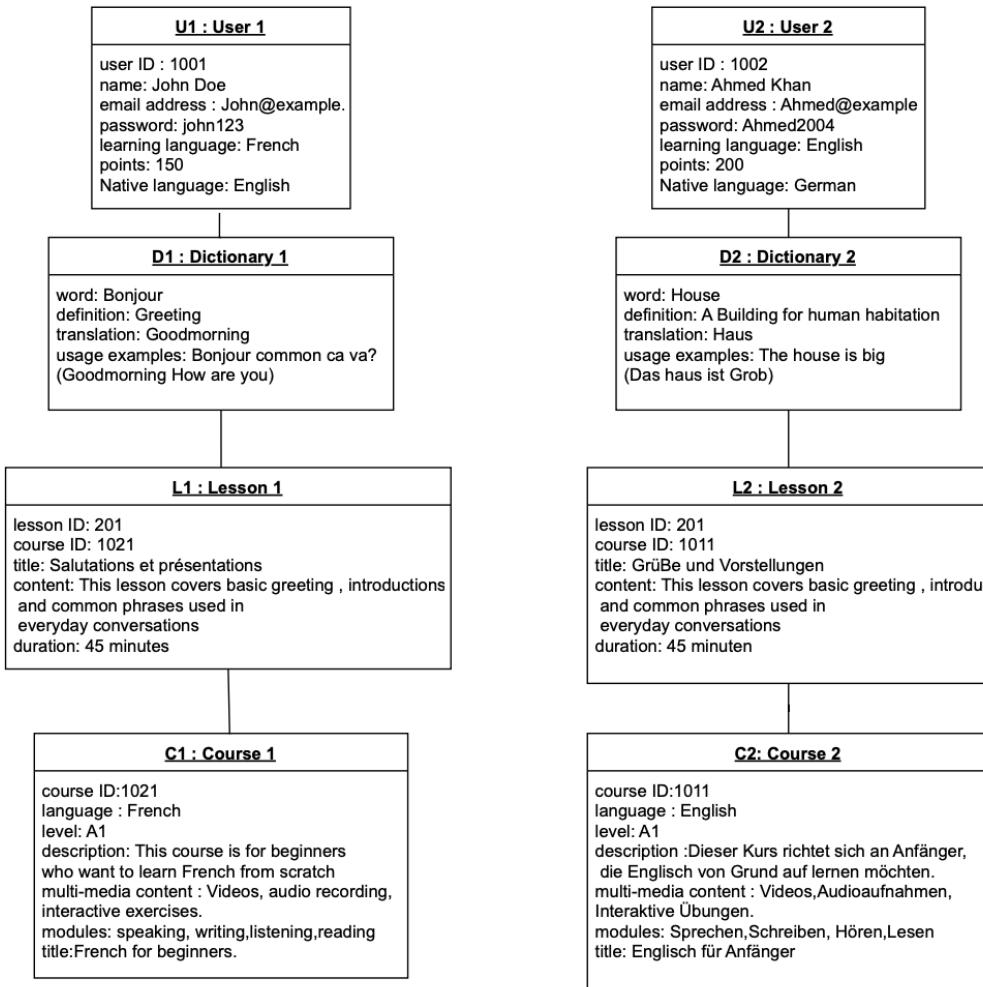


## Chapter 4 :

### 4.1 Class Diagram :

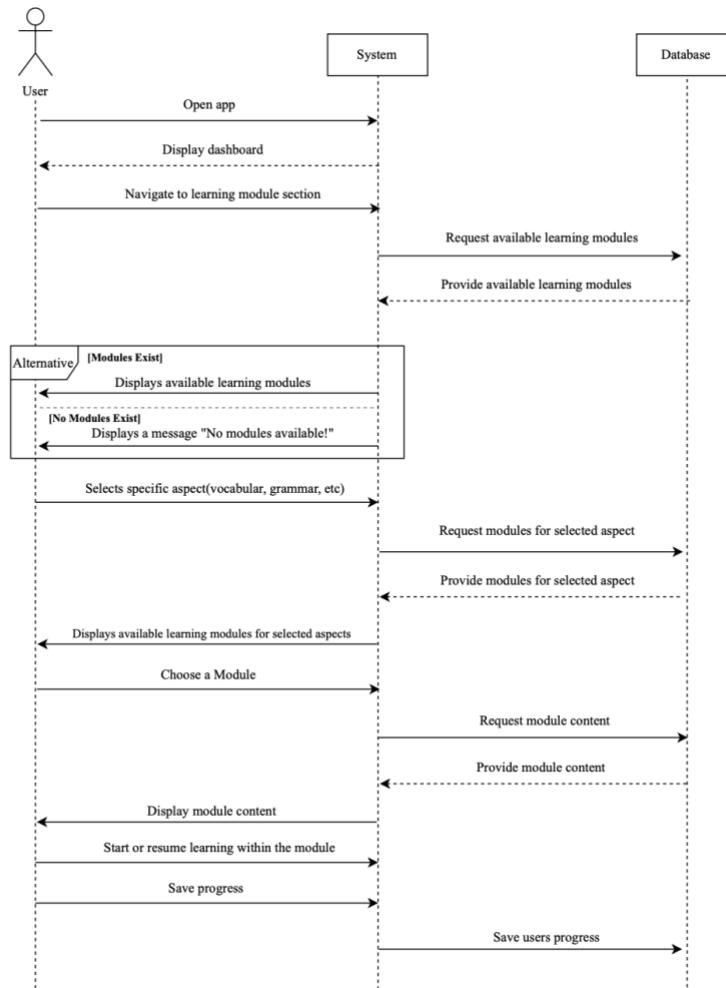


## 4.2 Object Diagram :

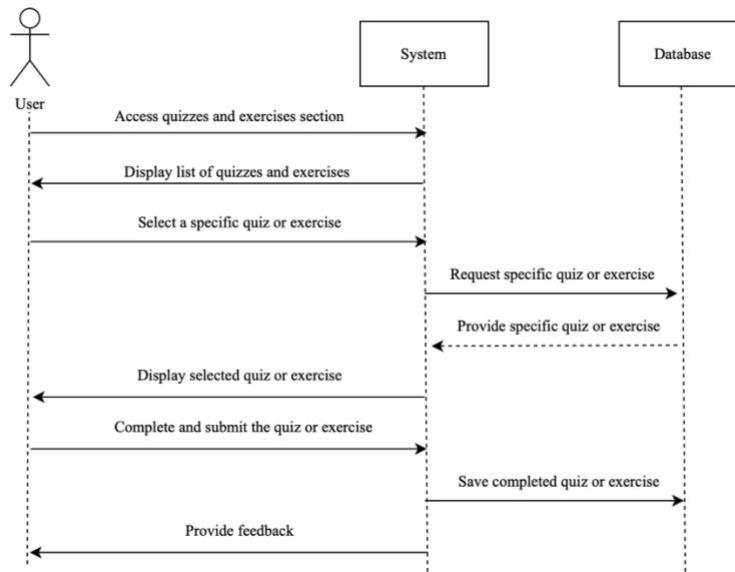


### 4.3 Sequence Diagram :

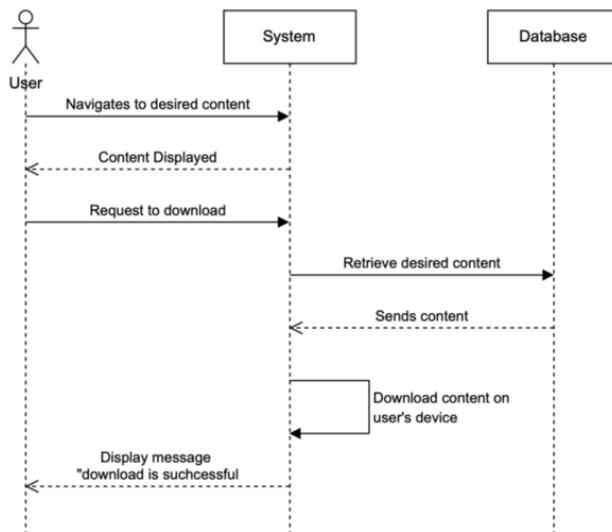
#### 1. Accessing Structured Learning Modules :



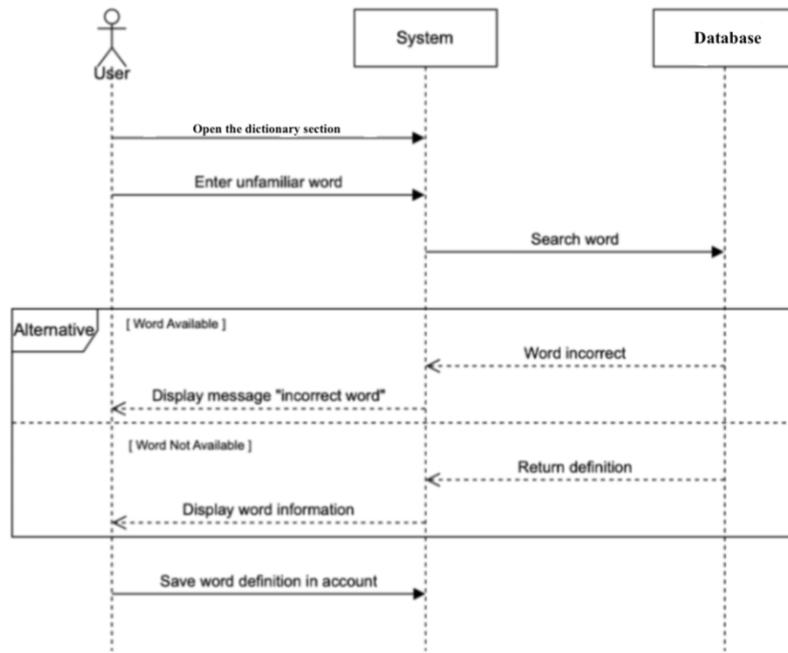
## 2. Taking Quizzes and Exercises :



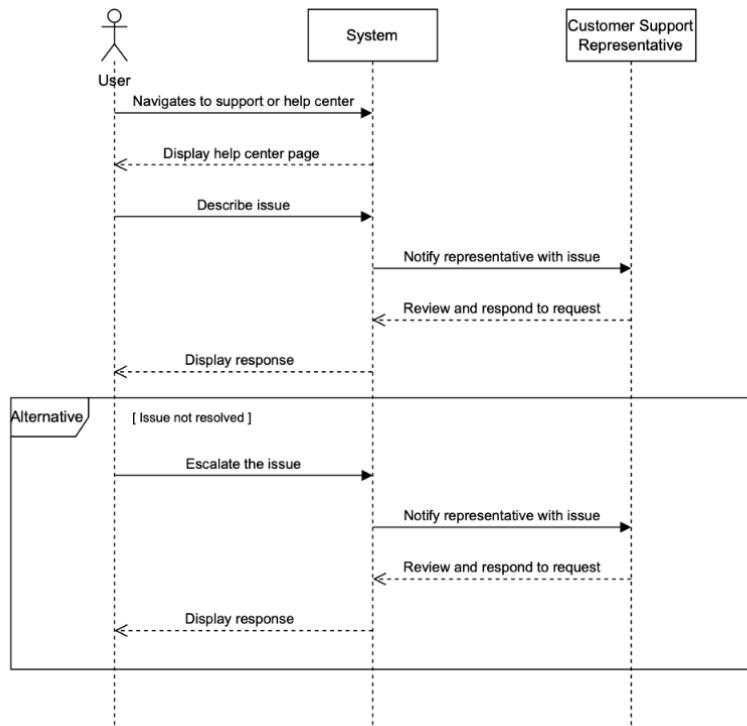
## 3. Downloading Lessons and Content for Offline Access :



#### 4. In-App Dictionary Integration :

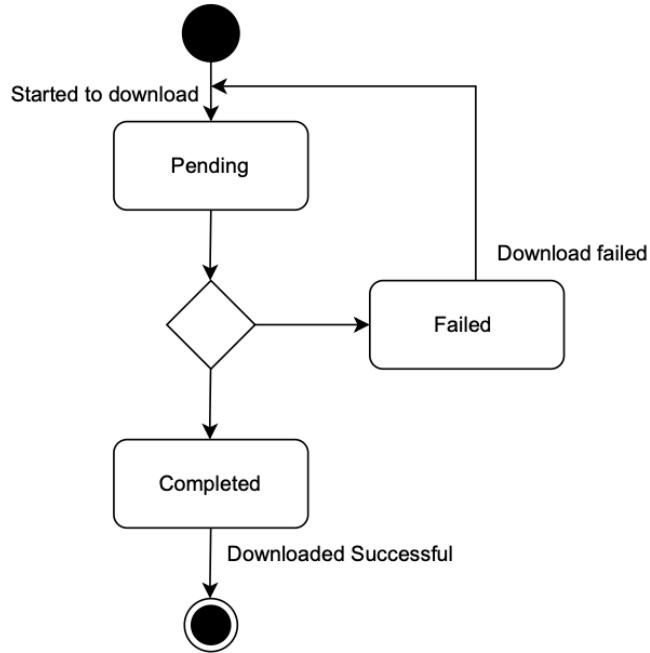


#### 5. Customer Support Assistance :

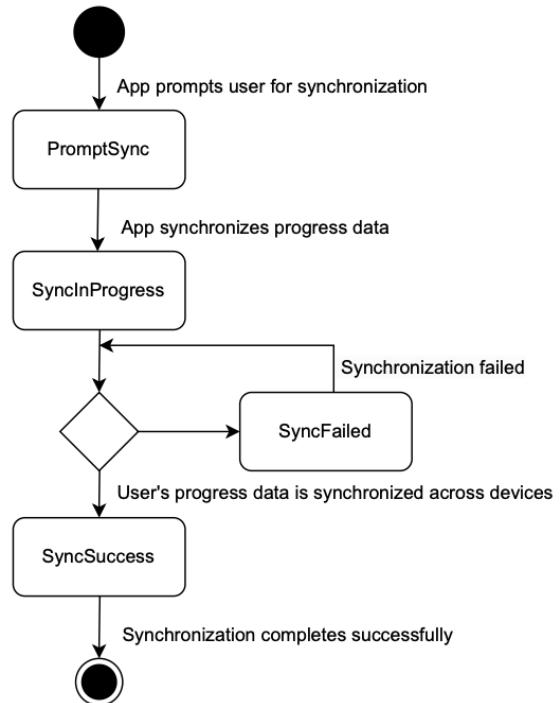


#### 4.4 State Machine Diagram :

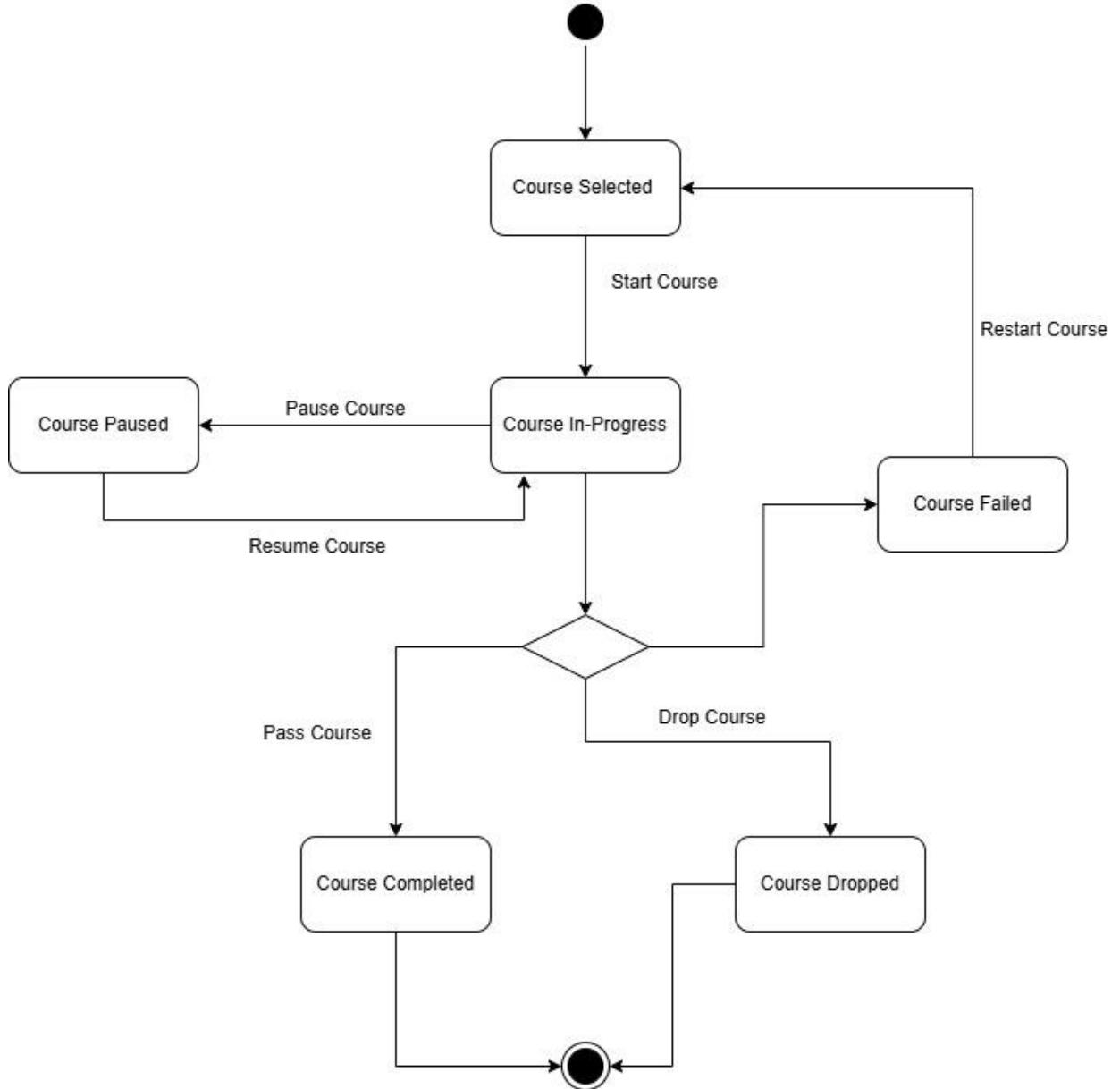
1. Downloading Lessons and Content for Offline Access :



2. Progress Data Synchronization :

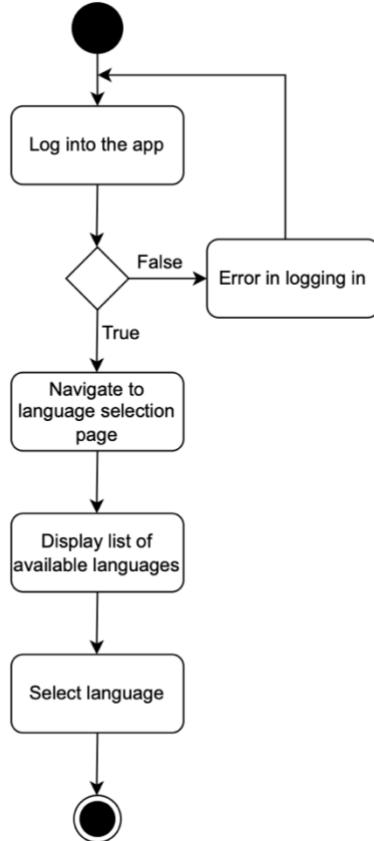


3. Language Course Progress :

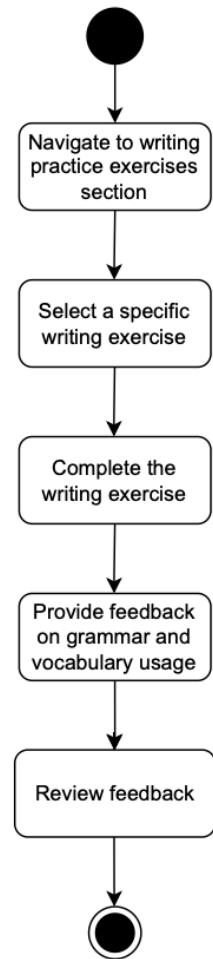


#### 4.5 Activity Diagram :

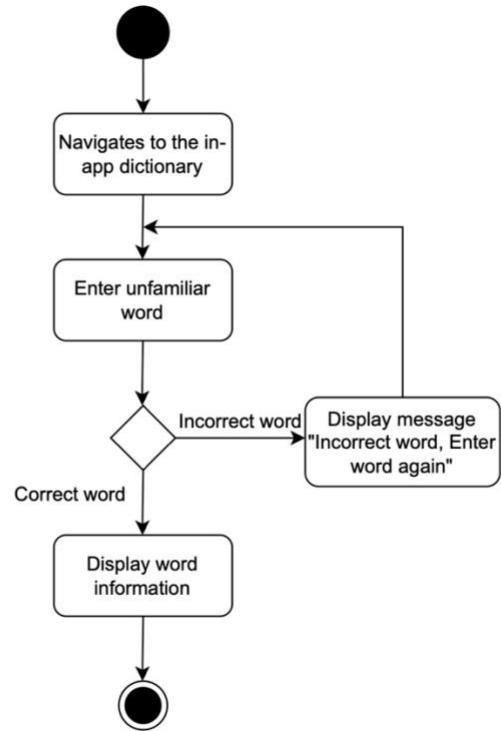
##### 1. Language Selection :



2. Accessing Writing Practice Exercises :



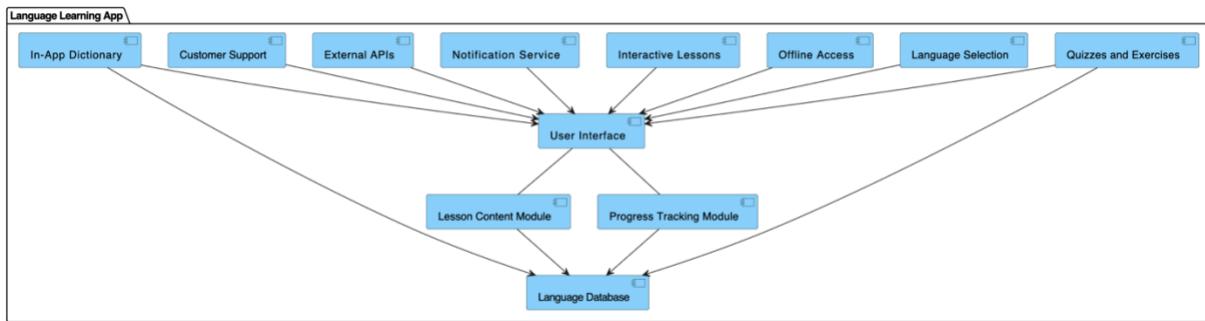
3. In-App Dictionary Integration :



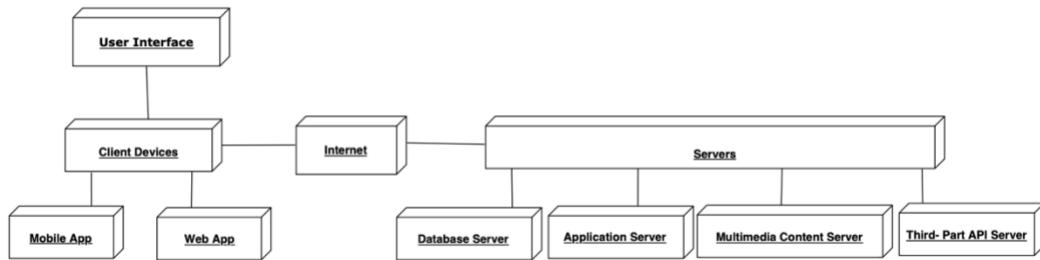
4. Personal Information and Preferences Management :



#### 4.6 Component Diagram :

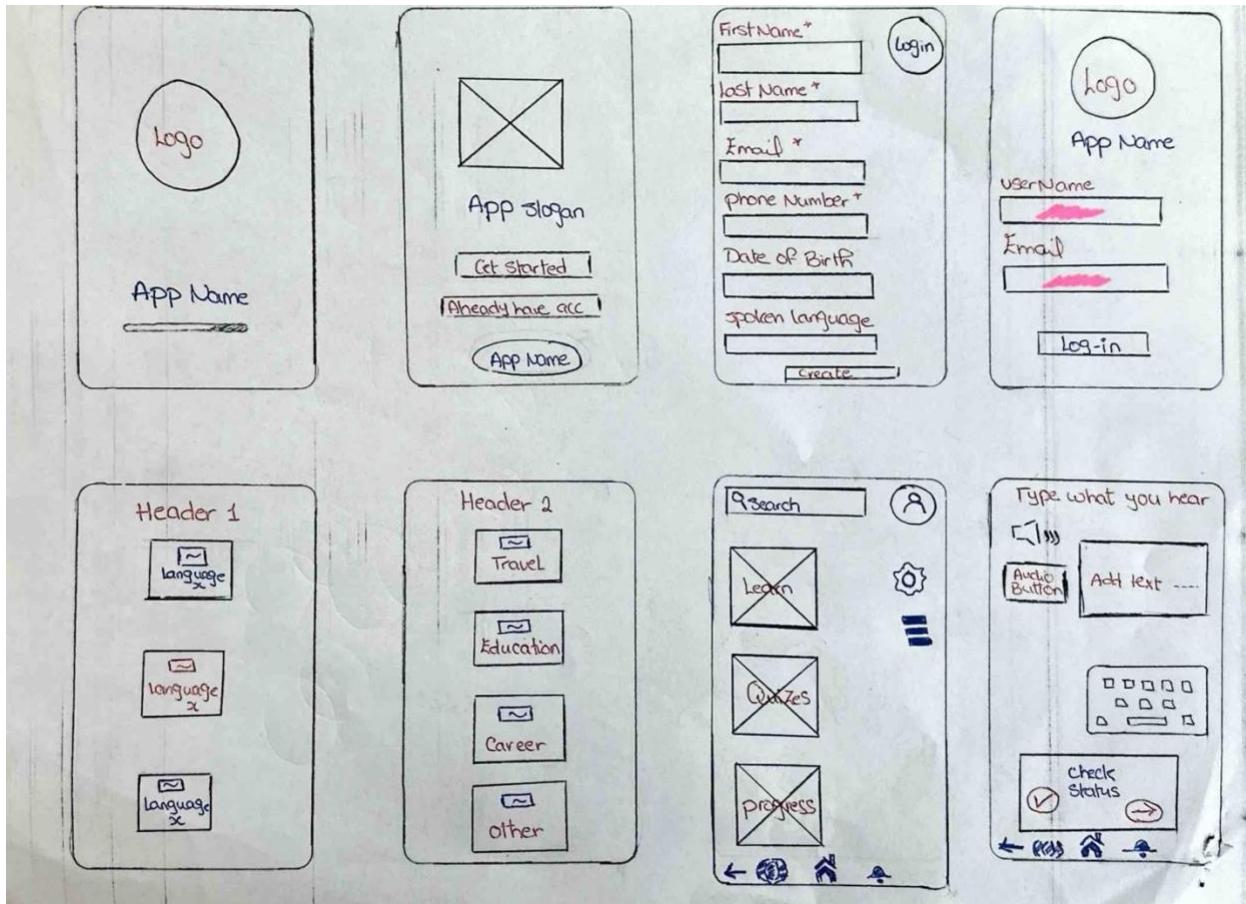


#### 4.7 Deployment Diagram :



## Chapter 5 :

### 5.1 Sketches :

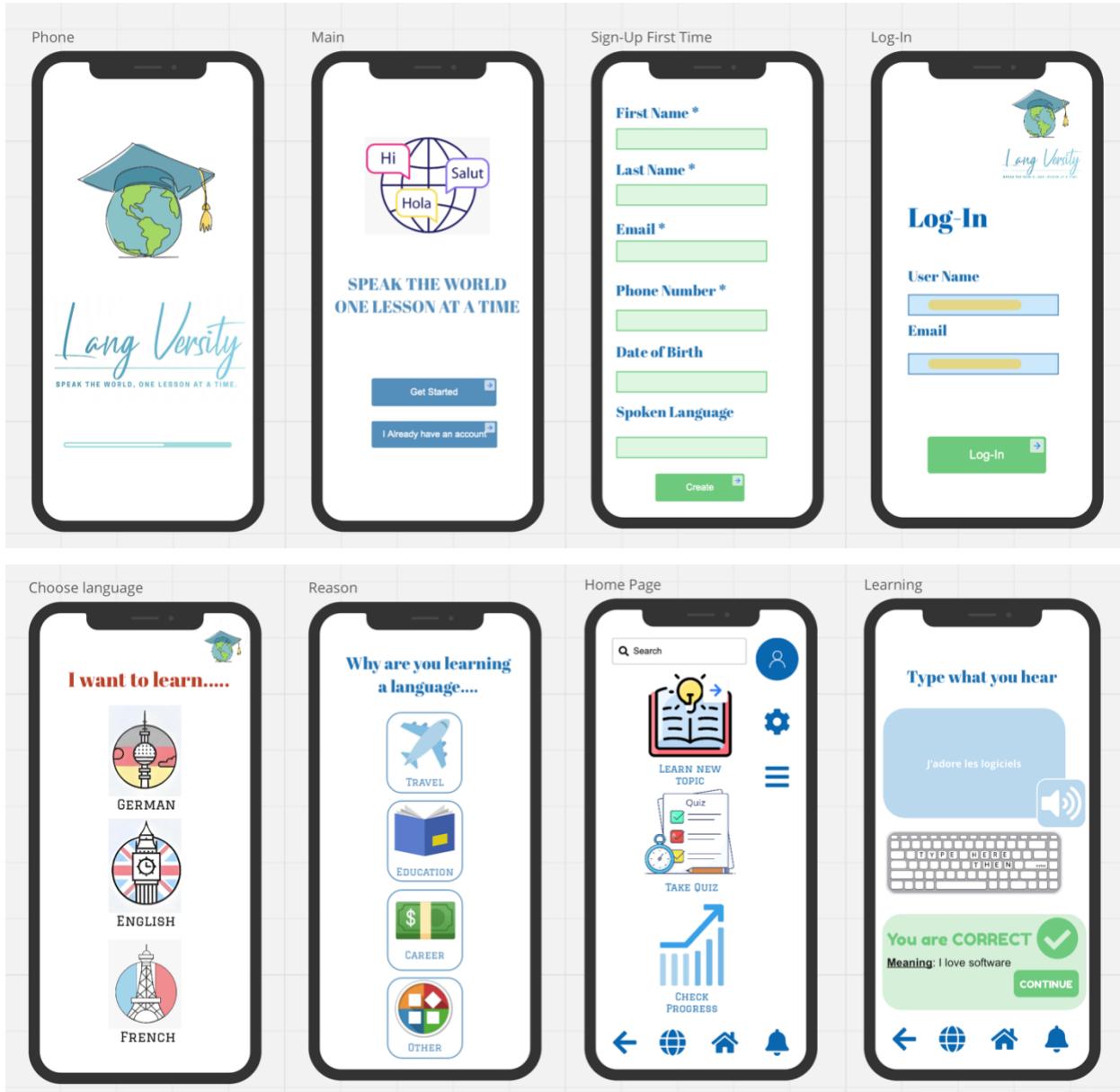


## 5.2 Wireframes :



### 5.3 User Interface :

[https://miro.com/welcomeonboard/ZzhaOWdRUU9FbTA1c2FIUTd0Vm5hdGlYYnBMbjdUaIQySXkydmdNUEZKTUpFcUxMVTFEaDVMdkFIMFAxckhWbnwzNDU4NzY0NTgyNTU1MDkwNDM1fDI=?share\\_link\\_id=339179396383](https://miro.com/welcomeonboard/ZzhaOWdRUU9FbTA1c2FIUTd0Vm5hdGlYYnBMbjdUaIQySXkydmdNUEZKTUpFcUxMVTFEaDVMdkFIMFAxckhWbnwzNDU4NzY0NTgyNTU1MDkwNDM1fDI=?share_link_id=339179396383)



## Chapter 6 :

### 6.1 Summary :

The language learning app is designed to offer a comprehensive and engaging learning experience for users who want to learn languages such as English, French, and German. The app is set to expand by adding multiple different languages over time, enhancing its reach and utility. Key features of the app include the ability to manage user accounts and profiles, structured learning modules, interactive lessons, and a variety of multimedia content. Additionally, the app emphasizes progress tracking, personalized recommendations, and practice exercises for various language skills. It also provides real-time feedback on spelling, writing, listening, and reading exercises. To enhance its functionality, the app will integrate AI speech-to-text models like Phonexia <https://www.phonexia.com/> and translation tools like TalkpalAI <https://www.deepl.com/en/translator>, ensuring accurate and efficient language learning support.

### 6.2 Conclusion :

The language learning app aims to revolutionize the way users learn new languages by combining comprehensive features and advanced technologies. By offering a wide range of languages and employing AI-driven tools, the app ensures an immersive and personalized learning experience. The integration of real-time feedback and progress tracking further enhances user engagement and effectiveness. As the app continues to expand and incorporate new languages and technologies, it holds the potential to become an indispensable resource for language learners worldwide.

## Bonus Chapter 7 :

### 7.1 Test Cases :

Test Case ID	Scenario / Name	Test Steps	Test Data	Expected Results	Actual Results	Pass / Fail
TC01	User Registration - Valid Data	<ol style="list-style-type: none"> <li>1. Navigate to the registration page.</li> <li>2. Enter valid details in all required fields.</li> <li>3. Click on the 'Register' button.</li> </ol>	<ul style="list-style-type: none"> <li>- Username: user1</li> <li>- Email: user1@example.com</li> <li>- Password: Password123</li> </ul>	User should be successfully registered and redirected to the welcome page.	User successfully registered and redirected to the welcome page.	Pass
TC02	User Login - Valid Credentials	<ol style="list-style-type: none"> <li>1. Navigate to the login page.</li> <li>2. Enter valid username in the username field.</li> <li>3. Enter valid password in the password field.</li> <li>4. Click on the 'Login' button.</li> </ol>	<ul style="list-style-type: none"> <li>- Username: user1</li> <li>- Password: Password123</li> </ul>	User should be successfully logged in and redirected to the homepage.	User successfully logged in and redirected to the homepage.	Pass
TC03	Choose Language to Learn	<ol style="list-style-type: none"> <li>1. Log in with valid credentials.</li> <li>2. Navigate to the language selection page.</li> <li>3. Select a language from the list of available options.</li> <li>4. Click on the 'Save' button.</li> </ol>	<ul style="list-style-type: none"> <li>- Selected Language: German</li> </ul>	The selected language should be saved as the user's language preference.	The selected language was saved as the user's language preference.	Pass

TC04	Access Structured Learning Modules	<ol style="list-style-type: none"> <li>1. Log in with valid credentials.</li> <li>2. Navigate to the learning modules page.</li> <li>3. Select a module (e.g., Vocabulary).</li> <li>4. Open a lesson within the module.</li> </ol>	- Module: Vocabulary	The user should be able to access and start the selected lesson.	The user accessed and started the selected lesson.	Pass
TC05	Complete Interactive Lesson	<ol style="list-style-type: none"> <li>1. Log in with valid credentials.</li> <li>2. Navigate to an interactive lesson with multimedia content.</li> <li>3. Complete the lesson, including audio, video, and text sections.</li> </ol>	- Lesson: Beginner German - Lesson 1	The user should be able to complete the lesson and proceed to the next one.	The user completed the lesson and proceeded to the next one.	Pass
TC06	Take a Quiz	<ol style="list-style-type: none"> <li>1. Log in with valid credentials.</li> <li>2. Navigate to a quiz section.</li> <li>3. Complete the quiz.</li> </ol>	- Quiz: Vocabulary Quiz - Lesson 1	The user should be able to complete the quiz and receive a score and feedback.	The user completed the quiz and received a score and feedback.	Pass
TC07	Track User Progress	<ol style="list-style-type: none"> <li>1. Log in with valid credentials.</li> <li>2. Complete a lesson and a quiz.</li> <li>3. Navigate to the progress tracking page.</li> </ol>	- User: user1	The user's progress should be updated and displayed accurately.	The user's progress was updated and displayed accurately.	Pass

TC08	Receive Personalized Lesson Recommendations	<ol style="list-style-type: none"> <li>1. Log in with valid credentials.</li> <li>2. Complete several lessons and quizzes.</li> <li>3. Navigate to the recommendations page.</li> </ol>	- User: user1	The user should receive personalized lesson recommendations based on their learning history and preferences.	The user received personalized lesson recommendations.	Pass
TC09	Access Offline Content	<ol style="list-style-type: none"> <li>1. Log in with valid credentials.</li> <li>2. Download a lesson for offline access.</li> <li>3. Disconnect from the internet.</li> <li>4. Attempt to access the downloaded lesson.</li> </ol>	- Lesson: Beginner French - Lesson 1	The user should be able to access the downloaded lesson without an internet connection.	The user accessed the downloaded lesson without an internet connection.	Pass
TC10	Use In-App Dictionary	<ol style="list-style-type: none"> <li>1. Log in with valid credentials.</li> <li>2. Navigate to the dictionary section.</li> <li>3. Search for a vocabulary word.</li> <li>4. Review the definition, translation, and usage examples.</li> </ol>	- Word: Bonjour	The user should see the definition, translation, and contextual usage examples for the word.	The user saw the definition, translation, and contextual usage examples for the word.	Pass

## Appendices :

### 8.1 Glossary :

<b>Language Learning Application Glossary</b>				
Term	Abbreviation	Definition	Synonyms allowed	Synonyms not allowed
System		The overall structure of the language learning app, including hardware, software, network, and data resources that enable the app's functionalities. (The application itself)	Application, app	
Administrator	Admin	This actor represents an individual with an administrative function within the system. Tasks include controlling access, adding, updating and deleting lessons or courses, and overall monitoring.		user
User		An individual who interacts with the language learning app to learn a new language. Users can create accounts, access learning modules, track progress, and use all available features to facilitate their learning experience.	learner	
In-App Dictionary		A feature providing definitions, translations, and usage examples for vocabulary words. Can be used by users who have not yet registered but with limited features.	Dictionary	Translator
Learning Modules	modules	Organized sections covering different aspects of language learning like vocabulary, grammar, speaking, listening, reading, and writing. Interactive Lessons		
Points		Numerical scores awarded to users for completing lessons and activities.		
Voice Recognition Technology		Tool that analyzes and provide feedback on users' pronunciation and fluency.	Automatic speech recognition	
Data Synchronization		The process of updating user data across multiple devices when connected to the internet.		update
Secure Authentication		Procedures to verify user identity securely such as two factor authentication		
Data Encryption		Protecting user data by converting it into a secure format		
Interoperability		The app's ability to integrate with external systems and services such as social media platforms, language proficiency tests and online dictionaries		
Localization		Adapting the app to support multiple languages (English, French and German) and cultural preferences, including localized content and interface elements.		
Native Language		The language that the user speaks natively and learned from birth	First language, mother tongue	Primary language
Learning language		The language that the user is aiming to learn through the app	Study language	Secondary Language, foreign language

## 8.2 Who Did What :

	Zeina	Mai	Nour	Farida	Habiba	Lujain	Shahd
<b>Chapter 1</b>							
<b>Introduction</b>	✓	✓					
<b>Problem Statement</b>	✓	✓					
<b>Purpose of the Application</b>				✓		✓	✓
<b>Key Features</b>			✓		✓		
<b>Software Architecture</b>			✓		✓		
<b>Stakeholders</b>	✓						
<b>Chapter 2</b>							
<b>Functional Requirements</b>	✓	✓	✓	✓	✓	✓	✓
<b>Non-Functional Requirements</b>	✓	✓		✓			
<b>User Stories</b>	✓	✓	✓	✓	✓	✓	✓
<b>Domain Model</b>			✓		✓		
<b>User Interview Questions</b>		✓		✓	✓		
<b>User Interviews</b>	✓	✓					
<b>User Interviews Insights</b>	✓	✓		✓			
<b>Personas</b>	✓	✓	✓	✓	✓	✓	✓
<b>Competitors</b>	✓						
<b>Chapter 3</b>							
<b>Use Cases</b>	✓	✓	✓	✓	✓	✓	✓
<b>Use Cases Diagrams</b>	✓	✓	✓	✓	✓	✓	✓

	Zeina	Mai	Nour	Farida	Habiba	Lujain	Shahd
<b>Chapter 4</b>							
<b>Class Diagram</b>				✓	✓		✓
<b>Object Diagram</b>				✓	✓		
<b>Sequence Diagram</b>	✓	✓	✓	✓	✓	✓	✓
<b>State Machine Diagram</b>	✓	✓				✓	
<b>Activity Diagram</b>	✓	✓	✓			✓	✓
<b>Component Diagram</b>			✓	✓	✓	✓	
<b>Deployment Diagram</b>			✓	✓	✓	✓	
<b>Chapter 5</b>							
<b>Sketches</b>				✓			
<b>Wireframes</b>		✓					
<b>User Interface</b>		✓					
<b>Chapter 6</b>							
<b>Summary</b>	✓					✓	✓
<b>Conclusion</b>	✓			✓			
<b>Chapter 7</b>							
<b>Test Cases</b>	✓	✓	✓	✓	✓	✓	✓
<b>Appendices</b>							
<b>Glossary</b>							✓