

**CAPSTONE PROJECT REPORT**

**Report 3 – System Requirement Specification**

– Ho Chi Minh, October 2020 –

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# I. Project Report

## 1. Status Report

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Work Item** | **Status** | **Notes (Work Item in Details)** |
| 1 |  | Pending |  |
| 2 |  | In Progress |  |
| 3 |  | Completed |  |

## 2. Team Involvements

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Task** | **Member** | **Notes (Task Details, etc.)** |
| 1 |  | KienNT |  |
| 2 |  | TuanTV |  |
| 3 |  | AnhLM |  |

## 3. Issues/Suggestions

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Issue** | **Status** | **Notes (Solution, Suggestion, etc.)** |
| 1 |  | Pending |  |
| 2 |  | In Progress |  |
| 3 |  | Completed |  |

# II. System Requirement Specification

## 1. Overall Description

### 1.1 Product Overview

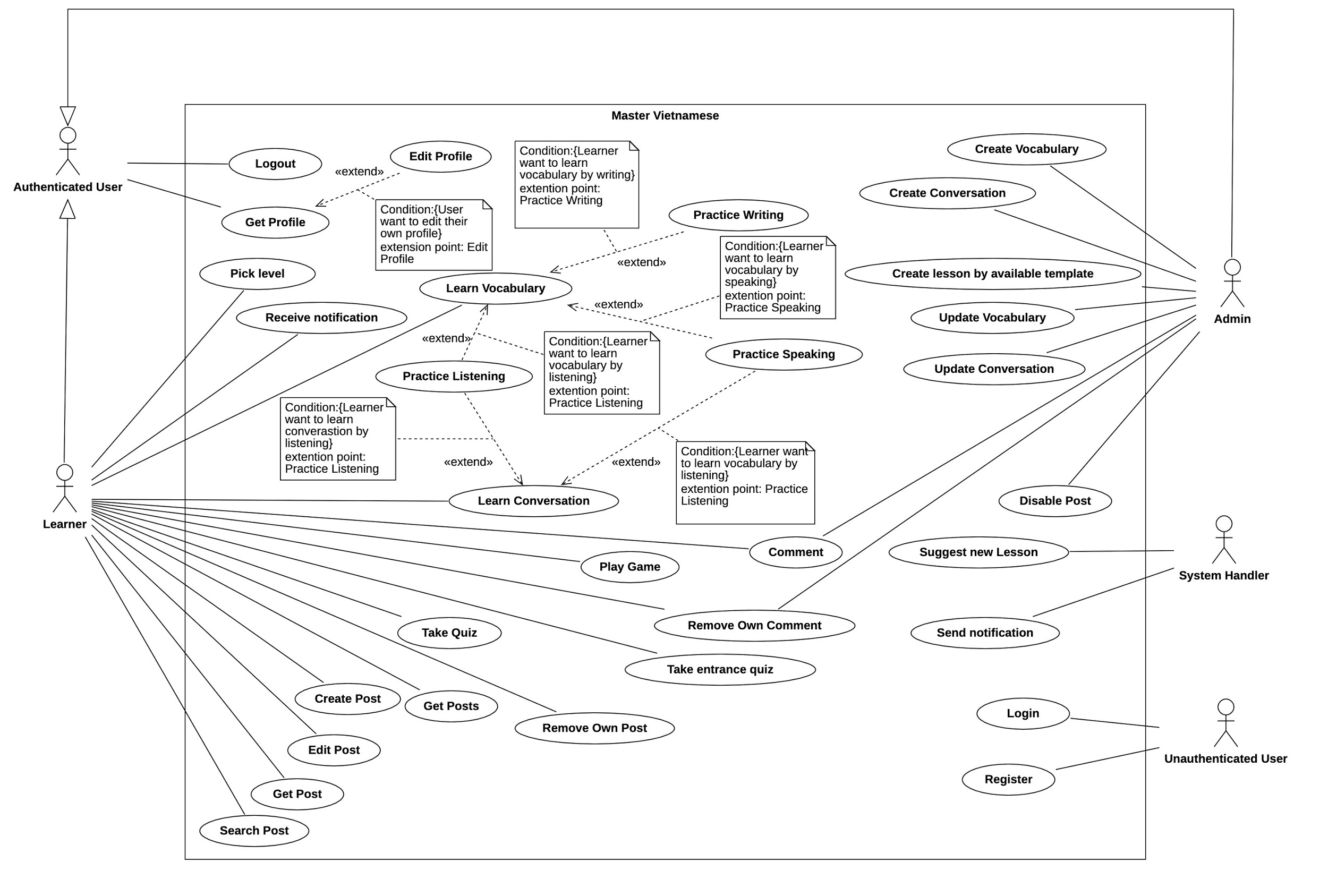
### 1.2 Business Rules

|  |  |
| --- | --- |
| **ID** | **Rule Definition** |
| BR-01 | Must log in to the application |
| BR-02 | Must select level to access lesson |
| BR-03 | Must complete the current lesson to unlock next lesson |
| BR-04 | To complete a lesson, take a quiz |
| BR-05 | Estimate time of loading lesson to lesson screen about 3 to 5 seconds |
| BR-06 | Estimate time of uploading to server about 30 to 60 seconds |
| BR-07 | Must have an account |
| BR-08 | Must have a unique username |
| BR-09 | Must learn at least one lesson |
| BR-10 | Must have internet connection |
| BR-11 | Must have title in create post |
| BR-12 | Must have content in create post |
| BR-13 | Audio record max length is 2 minutes |
| BR-14 | Video record max length is 2 minutes |
| BR-15 | Audio comment max length is 1 minutes |
| BR-16 | New account must have to choose level |
| BR-17 | Must accept notification |
| BR-18 | Form must similar to standard import file |
| BR-18 | Must login with role admin |
| BR-19 | Must login with new account |

## 2. User Requirements

### 2.1 Overview

#### a. Use Case Diagram



###### figure 1: Use Case Diagram

#### b. System Actors

|  |  |  |
| --- | --- | --- |
| **#** | **Actor** | **Description** |
| 1 | Administrator |  |
| 2 | System Handler |  |
| 3 | Learner |  |
| 4 | Authenticated User |  |
| 5 | Guest |  |

#### c. Use Cases List

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Use Case** | **Primary Actors** | **Secondary Actors** |
| 01 | Login | Guest |  |
| 02 | Sign up | Guest |  |
| 03 | Get Profile | Authenticated User |  |
| 04 | Logout | Authenticated User |  |
| 05 | Select Level | Learner |  |
| 06 | Study Lesson | Learner |  |
| 07 | Learn Vocabulary | Learner |  |
| 08 | Learn Conversation | Learner |  |
| 09 | Take quiz | Learner |  |
| 10 | Play Game | Learner |  |
| 11 | Take Entrance Quiz | Learner |  |
| 12 | Get Post | Learner |  |
| 13 | Get Posts | Learner |  |
| 14 | Create Post | Learner |  |
| 15 | Edit Post | Learner |  |
| 16 | Search Post | Learner |  |
| 17 | Comment | Learner | Administrator |
| 18 | Remove Own Comment | Learner | Administrator |
| 19 | Remove Own Post | Learner |  |
| 20 | Create New Lesson | Administrator |  |
| 21 | Create Vocabulary | Administrator |  |
| 22 | Create Conversation | Administrator |  |
| 23 | Create lesson by available form | Administrator |  |
| 24 | Update Lesson | Administrator |  |
| 25 | Update Vocabulary | Administrator |  |
| 26 | Update Conversation | Administrator |  |
| 27 | Suggest New Lesson | System Handler |  |
| 28 | Send Notification | System Handler |  |

### 2.2 Use case detail Learner

#### a. Select Level

|  |  |  |  |
| --- | --- | --- | --- |
| UC ID and Name: | **UC5 - Select Level** | | |
| Created By: | BaoHQ | Date Created: | Oct 20, 2020 |
| Primary Actor: | Learner | Secondary Actors: |  |
| Trigger: | Login button | | |
| Description: | List all levels after the learner registered a new account. We have two levels that learner can choose:   * Beginner: For users who do not have any knowledge about Vietnamese and they want to start learning from the beginning. * Qualification Test: For users who have knowledge about Vietnamese. At this option, users need to take an entrance quiz to determine their level | | |
| Preconditions: | PRE-1: Learner must login new account to the application. | | |
| Post-conditions: | POST-1: If learner choose beginner, system will set level is “Beginner”, and show all beginner lesson for learner. POST-2: If learner choose qualification test system will load quiz for learner to take a test and base on learner result to set level. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner login to the application with new account.  2.a. Learner choose level beginner | 1.1.a Display choose level screen with 2 methods: Beginner and Qualification Test.  2.1.a Display all lessons belong to level beginner | | | |
| Alternative Flows: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.b. Learner login to the application with new account.  2.b. Learner choose qualification test.  3.b. Learner take quiz and submit  [exception] | 1.1.b. Display choose level screen with two methods: Beginner and Qualification Test.  2.1.b. Display quiz for learner to take a test.  3.1.b. Base on result to set level for learner and display all lesson belong to that level. | | | |
| Exceptions: | Learner shut down application while taking quiz, system will not set level for that learner and learner have to choose level again | | |
| Priority: | High | | |
| Frequency of Use: | When user login with new account. | | |
| Business Rules: | BR-1: Must login to the application.  BR-19: Must login with new account. | | |
| Other Information: | Learner must choose level before get to the lesson screen | | |
| Assumptions: | Assume that learner already have level then skip this use case.  If user want to choose level again then use this use case to set level again. | | |

#### b. Login

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-01 - Login** | | |
| Created By: | TuongDM | Date Created: | Oct 20, 2020 |
| Primary Actor: | Guest | Secondary Actors: |  |
| Description: | Guests sign in to the application  There are three ways to login to the application:   * Login by username and password * Login by Facebook * Login by Gmail | | |
| Trigger: | Login button, Facebook button, Gmail button | | |
| Preconditions: | PRE-1. Guest must have an account  PRE-2. Guest must have Facebook account  PRE-3. Guest must have Gmail account | | |
| Post-conditions: | POST-1: If the account already has level then skip the choose level screen to the display all lesson screen.  POST-2: If the account does not have level then show the choose level screen. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Guest opens the application  2.a Guest enters username and password.  [exception 1]  3.a Guest presses Sign In button  [exception 2] | 1.1.a. Show login screen  3.1.a. System authenticate user that login has been success and allow user to access the application | | | |
| Alternative Flows: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.b. Guest opens the application  2.b. Guest logins with Facebook method | 1.1.b. Show login screen  2.1.b. Choose Facebook account to login to the application |  |  |  | | --- | --- | | Learner | Mobile Application | | 1.c. Guest opens the application  2.c. Guest logins with Gmail method | 1.1.c. Show login screen  2.1.c. Choose Gmail account to login to the application | | | |
| Exceptions: | Exception 1: Guest does not fill username and password field  Exception 2: Invalid username or password | | |
| Priority: | High | | |
| Frequency of Use: | Whenever guests want to login to the system. | | |
| Business Rules: | BR-07 | | |
| Other Information: | Password must be encrypt using SHA-256 | | |
| Assumptions: | Assume that guest logins with invalid account system must alert message “Invalid username or password” to guest and let them login again. | | |

#### c. Sign Up

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-02 - Sign Up** | | |
| Created By: | TuongDM | Date Created: | Oct 20, 2020 |
| Primary Actor: | Guest | Secondary Actors: |  |
| Description: | Guest enters their username, password, email, and nation then presses “Sign up” to register a new account. All field must be validate before sign up:   * Username is required. * Email must be valid format. * Password must be more than 8 characters. * Nation is required. | | |
| Trigger: | Sign up link | | |
| Preconditions: | PRE-1: Guest want to create new account. | | |
| Post-conditions: | POST-1: Create new account for user and navigate to login page | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Guest pressed on sign up link  2.a. Guest enter username, password, email, nation.  [exception 1]  3.a. Guest press sign up button  [exception 2] | 1.1.a. Show sign up screen.  3.1.a System save all user information and create new account for user. | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Exception 1: Guest does not fill one of the fields required.  Exception 2: Username is duplicate. | | |
| Priority: | High | | |
| Frequency of Use: | Whenever guest want to create new account | | |
| Business Rules: | BR-08, | | |
| Other Information: | Password must be encrypt using SHA-256.  Email must be valid format.  Password length are from 8 to 16 characters. | | |
| Assumptions: | Assume that guest sign up with existed username, system will throw an alert message “This username already taken”.  If field is blank throw an alert message “This field is required”.  If password length is shorter than 8 or longer than 16 throws an alert message “Password length are from 8 to 16 characters”. | | |

#### d. Get Profile

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-03 - Get Profile** | | |
| Created By: | AnhND | Date Created: | Oct 22, 2020 |
| Primary Actor: | Authenticated User | Secondary Actors: |  |
| Description: | Get all authenticate user profile include:   * Username * Learning progress * Profile picture * Settings | | |
| Trigger: | User icon in display lesson screen. | | |
| Preconditions: | PRE-1: Learner must sign in with their account  PRE-2: Learner must sign in with their Facebook account  PRE-3: Learner must sign in with their Google account  PRE-4: Learner must already have level. | | |
| Post-conditions: | POST-1: Display learner profile screen. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner must already login to the system.  2.a. Click on the user icon in the lesson screen.  [exception] | 1.1.a. Show the lesson screen.  2.1.a Show the profile screen include: user name, user avatar, user progress, settings button | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Cannot connect to database to get user profile. | | |
| Priority: | High | | |
| Frequency of Use: | Whenever user click on profile tab | | |
| Business Rules: | BR-01 | | |
| Other Information: | N/A | | |
| Assumptions: | Assume that learner want to view or update their profile this screen will show:   * User name * User progress (show by progress bar) * User avatar (enable edit avatar) * Settings button * Logout button | | |

#### e. Logout

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-04 - Logout** | | |
| Created By: | AnhND | Date Created: | Oct 22, 2020 |
| Primary Actor: | Authenticated User | Secondary Actors: |  |
| Description: | Authenticated User logout of the system. | | |
| Trigger: | Authenticated user press the logout button in the profile tab to logout their account. | | |
| Preconditions: | PRE-1: Guest must sign in with their account  PRE-2: Guest must sign in with their Facebook account  PRE-3: Guest must sign in with their Google account | | |
| Post-conditions: | Leaner log out the application and navigate to login screen. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner press on profile icon in lesson screen.  2.a. Learner press on Log Out button.  [exception] | 1.1.a. Show the profile screen.  2.1.a System log out the user’s account. | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Cannot logout of the system | | |
| Priority: | High | | |
| Frequency of Use: | Whenever authenticated user want to logout | | |
| Business Rules: | BR-01 | | |
| Other Information: | After log out the user’s account system must navigate to login screen | | |
| Assumptions: | N/A | | |

#### f. Study Lesson

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-06 - Study Lesson** | | |
| Created By: | AnhND | Date Created: | Oct 22, 2020 |
| Primary Actor: | Learner | Secondary Actors: |  |
| Description: | List all the lessons to the lesson tab screen for learner base on t3 levels:   * Beginner * Intermediate * Advance | | |
| Trigger: | After learner login with account that already have level. | | |
| Preconditions: | PRE-1: Must login to the system  PRE-2: Account must already have level | | |
| Post-conditions: | POST-1: Navigate to lesson screen and display all the lessons belong to that level. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner login to the application  [exception] 2.a. Learner presses on one of the lessons | 1.1.a. Show the lesson screen.  2.1.a Show lesson detail screen include: Vocabulary, Conversation, Quiz. | | | |
| Alternative Flows: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.b. Learner click on the suggest lesson notification. | 1.1.b. Open application and navigate to the suggest lesson. | | | |
| Exceptions: | Fail to load lessons | | |
| Priority: | High | | |
| Frequency of Use: | Whenever learner login to the system or re-open the application. | | |
| Business Rules: | BR1, BR2, BR3 | | |
| Other Information: | Must display lesson belong to that level and lock all the lessons that have not unlock yet. | | |
| Assumptions: | Assume that learner has done the quiz in lesson and reach the required mark, system will unlock next lesson.  If learner presses on lock lesson, system will show alert message “Please unlock above lesson to unlock this lesson’. | | |

#### g. Learn Vocabulary

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-07 - Learn Vocabulary** | | |
| Created By: | CuongHX | Date Created: | Oct 22, 2020 |
| Primary Actor: | Learner | Secondary Actors: |  |
| Description: | After choose lesson, choose the vocabulary method. In the vocabulary method include:   * Learn by flashcard * Learn by writing * Learn by speaking * Learn by arrange word | | |
| Trigger: | Learner presses on the vocabulary method in lesson detail. | | |
| Preconditions: | PRE-1. Learner must login to the application  PRE-2. Learner must choose the level  PRE-3. Learner must choose the lesson  PRE-4: Guest must choose a vocabulary method | | |
| Post-conditions: | POST-1: Show vocabulary in flashcard  POST-2: Show vocabulary in writing method  POST-3: Show vocabulary in speaking method  POST-4: Show vocabulary in arrange word method | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner choose one lesson.  2.a. Learner choose vocabulary method.  [exception 1]  3.a. Press “next” button to change to writing method.  4.a. Press the volume button to listen to the sound and type what learner hear.  [exception 2]  5.a. Press the record button to record the above word.  [exception 3]  6.a. Learner arrangement the word | 1.1.a. Show lesson detail screen.  2.1.a. Show vocabulary for learner to learner and flashcard method.  3.1.a. Display writing method  4.1.a. Check what learner just type, if learner type it right system will change to speaking method. Else learner has to type again.  5.1.a. Check what learner just speak, if learner speak it right system will change to arrange word method. Else learner has to speak again.  6.1.a. Check the arrange word. If learner arrange it right system will change to next word. Else learner has to arrange again. | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Exception 1: Cannot load vocabularies.  Exception 2: Invalid data.  Exception 3: Does not have permission to record. | | |
| Priority: | Medium | | |
| Frequency of Use: | Whenever learner learns vocabulary method. | | |
| Business Rules: | BR1, BR2 | | |
| Other Information: | Must count the vocabularies and show for learner that lesson have how many vocabularies. | | |
| Assumptions: | Assume that learner want to learn vocabulary, system must show the vocabulary match with the lesson and throw all these learning methods:   * Learn by flashcard * Learn by writing * Learn by speaking * Learn by arrange word | | |

#### h. Learn Conversation

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-08 - Learn Conversation** | | |
| Created By: | BaoHQ | Date Created: | Oct 22, 2020 |
| Primary Actor: | Learner | Secondary Actors: |  |
| Description: | After choose lesson, choose the conversation method. In the conversation method include:   * Learn by speaking * Learn by arrange sentence | | |
| Trigger: | Learners click on the conversation button in lesson detail. | | |
| Preconditions: | PRE-1. Learner must login to the application  PRE-2. Learner must choose the level  PRE-3. Learner must choose the lesson  PRE-4: Guest must choose a conversation method | | |
| Post-conditions: | POST-1: Show conversation in speaking method  POST-2: Show conversation in arrange sentence method | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner choose one lesson.  2.a. Learner choose conversation method.  [exception 1]  3.a. Learner press on Learn Now button  4.a. Press the record button to record the above sentence.  [exception 2]  5.a. Learner arrangement the sentence | 1.1.a. Show lesson detail screen.  2.1.a. Show conversation for learner to learner.  3.1.a. Display speaking method  4.1.a. Check what learner just speak, if learner speak it right system will change to arrange sentence method. Else learner has to speak again.  6.1.a. Check the arrange sentence. If learner arrange it right system will change to next sentence. Else learner has to arrange again. | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Exception 1: Cannot load vocabularies.  Exception 2: Does not have permission to record. | | |
| Priority: | High | | |
| Frequency of Use: | Whenever learner learns conversation method. | | |
| Business Rules: | BR1, BR2 | | |
| Other Information: | Must count the conversations and show for learner that lesson have how many conversations. | | |
| Assumptions: | Assume that learner want to learn conversation, system must show the conversation match with the lesson and learner must learn through all these learning methods:   * Learn by speaking * Learn by arrange sentence | | |

#### i. Take Quiz

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-09 - Take Quiz** | | |
| Created By: | BaoHQ | Date Created: | Oct 23, 2020 |
| Primary Actor: | Learner | Secondary Actors: |  |
| Description: | Every lesson has a quiz and learner can take one or more quizzes depending on the lesson. | | |
| Trigger: | Learners click on the quiz button in lesson detail. | | |
| Preconditions: | PRE-1. Learner must login to the application  PRE-2. Learner must choose the level  PRE-3. Learner must choose the lesson  PRE-4. Learner must start quiz | | |
| Post-conditions: | POST-1: Show question and answer for learner and learner can take quiz  POST-2: After learner finish there quiz the system will show the result | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. After login learner choose the lesson.  2.a. Learner choose quiz method  [exception 1]  3.a. Learner press on Quiz Now button.  4.a. Choose answer and finish all quiz  [exception 2]  5.a. Choose “Back to lesson screen” button. | 1.1.a. Show lesson detail screen.  2.1.a. Show Quiz detail for learner.  3.1.a. Show all questions and answers belong to that lesson.  4.1.a. After learner finishes the quiz. Check all the answers that learner has answered and return the result screen.  5.1.a. Load all lessons and navigate to the lesson screen. | | | |
| Alternative Flows: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.b. After login learner choose the lesson.  2.b. Learner choose quiz method  3.b. Learner press on Quiz Now button.  4.b. Choose answer and finish all quiz  5.b. Choose “Review” button. | 1.1.b. Show lesson detail screen.  2.1.b. Show Quiz detail for learner.  3.1.b. Show all questions and answers belong to that lesson.  4.1.b. After learner finishes the quiz. Check all the answers that learner has answered and return the result screen.  5.1.b. Load all the answers that user had answered before. |  |  |  | | --- | --- | | Learner | Mobile Application | | 1.c. After login learner choose the lesson.  2.c. Learner choose quiz method  3.c. Learner press on Quiz Now button.  4.c. Choose answer and finish all quiz  5.c. Choose “Re-attempt” button.  [exception 3] | 1.1.c. Show lesson detail screen.  2.1.c. Show Quiz detail for learner.  3.1.c. Show all questions and answers belong to that lesson.  4.1.c. After learner finishes the quiz. Check all the answers that learner has answered and return the result screen.  5.1.c. Reload new quiz for learner. | | | |
| Exceptions: | Exception 1: Cannot load quiz  Exception 2: Cannot load the result for learner  Exception 3: Cannot load the re-attempt quiz for learner | | |
| Priority: | High | | |
| Frequency of Use: | Whenever a learner wants to take a quiz. | | |
| Business Rules: | BR1, BR2, BR3 | | |
| Other Information: | If learner cancels while taking a quiz, this quiz will reset and all quiz progress will be shut down and the result will be not saved.  If learner take a quiz and the result mark is above 8 then unlock next lesson for learner. | | |
| Assumptions: | Assume that learner take quiz and quiz result is not above 8. Then learner must take that quiz again to unlock next lesson. | | |

#### j. Take Entrance Quiz

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-09 - Take Entrance Quiz** | | |
| Created By: | BaoHQ | Date Created: | Oct 23, 2020 |
| Primary Actor: | Learner | Secondary Actors: |  |
| Description: | When learners know a little bit about Vietnamese and they don’t want to learn from the beginning. There is a Take Qualification Test method that will give users a test and evaluate them. | | |
| Trigger: | 1. Learner logins with an account does not have level.  2. Learner clicks on “Test Qualification”. | | |
| Preconditions: | PRE-1. Learner must login to the application with a new account  PRE-2. Learner must choose the “Test Qualification” | | |
| Post-conditions: | POST-1: Show the qualification test questions and answers.  POST-2: Show the result after learner has done the test. POST3-: Show the level that learner belong to. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner logins to application with new account.  [exception 1]  2.a. Learner chooses the “Test Qualification”.  [exception 2]  3.a. Choose answer and finish all quiz.  4.a. Press “OK” button.  [exception 3] | 1.1.a. Show choose level screen.  2.1.a. System will display all questions and answers for the learner.  3.1.a. After learner finishes the quiz. Check all the answers that learner has answered and return the result screen.  5.1.a. Load lesson screen base on the level that learner has been evaluate. | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Exception 1: Invalid username or password.  Exception 2: Cannot load qualification quiz for learner.  Exception 3: Cannot load lessons for learner. | | |
| Priority: | High | | |
| Frequency of Use: | Whenever a learner wants to take a qualification test. | | |
| Business Rules: | BR1, BR2, BR3 | | |
| Other Information: | If a learner cancels while taking a quiz, this quiz will reset and all quiz progress will be shut down and the result will be not saved. | | |
| Assumptions: | Assume that learner take qualification test and the mark like:   * From 0 to 6: Beginner Level * From 6 to 8: Intermediate Level * From 8 to 10: Advance level | | |

#### j. Play Game

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-09 - Play Game** | | |
| Created By: | AnhND | Date Created: | Oct 23, 2020 |
| Primary Actor: | Learner | Secondary Actors: |  |
| Description: | Learner plays games about Vietnamese language to practice Vietnamese language skills. | | |
| Trigger: | Learner chooses the “Game” tab on home screen | | |
| Preconditions: | PRE-1. Guest musts login to the mobile application.  PRE-2. Learner musts learn at least one lesson. | | |
| Post-conditions: | POST-1: Load game screen for learner. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner choose the “Game” tab on the home screen  [exception]  2.a. Learner choose a game to play.  3.a. Learner presses “Start” button to play game. | 1.1.a. Show list game screen.  2.1.a. Show game home screen  3.1.a. Load game for learner. | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Cannot load game to display | | |
| Priority: | Medium | | |
| Frequency of Use: | Whenever a learner wants to play a game. | | |
| Business Rules: | BR1, BR6 | | |
| Other Information: | All content in game must load from lessons. | | |
| Assumptions: | Assume that learner has done the game, system must show the result and save that result for ranked. | | |

#### k. Create post

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-15 - Create Post** | | |
| Created By: | AnhND | Created By: | AnhND |
| Primary Actor: | Learner | Primary Actor: | Learner |
| Description: | This use case allows the learner to create a new post with audio or video. | | |
| Trigger: | Learner presses on the “Create new post” button on the News feed screen. | | |
| Preconditions: | PRE-1. Guest musts login to the mobile application. | | |
| Post-conditions: | Display message “Create post success” and navigate to News feed screen. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1. Learner presses on the “Create new post” button on the News feed screen.  2. Learner enters title and content of new post [Exception1]  3. Learner records audio or video  4. Learner presses on “Post" button | 1.1. Mobile Application displays create a new post screen with title input, content input, video and audio record option.  4.1 Mobile application save post to server. [Exception2] | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Exception 1: Mobile application detects empty title and content and returns message “Title is required” and “Content is required”.  Exception 2: Mobile application detects invalid information of post and returns message to user | | |
| Priority: | High | | |
| Frequency of Use: | Whenever a learner wants to create a new post. | | |
| Business Rules: | BR-11, BR-12, BR-13, BR-14 | | |
| Other Information: | Audio and video record must be saved on Firebase storage | | |
| Assumptions: | Assume that learner create post with blank title and content, the mobile application throw messages to learner “Title is required” and “Content is required” | | |

#### l. Edit post

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-16 - Edit Post** | | |
| Created By: | AnhND | Created By: | AnhND |
| Primary Actor: | Learner | Primary Actor: | Learner |
| Description: | This use case allows the learner to edit their post. | | |
| Trigger: | Learner chooses the “Edit post” option on the Post detail screen. | | |
| Preconditions: | PRE-1. Guest musts login to the mobile application.  PRE-2. Learner musts have their own post. | | |
| Post-conditions: | Success: Display message “Edit post success” and navigate to News feed screen.  Fail: Display message “Edit post failed”. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1. Learner chooses the “Edit post” option on the Post detail screen.  2. Learner enters new title and content [Exception1]  3. Learner records new audio or video  4. Learner presses on “Save" button | 1.1. Mobile Application displays edit post screen with title input, content input, video and audio record option. Edit post screen show all current information of post  4.1 Mobile application save post to server. [Exception2] | | | |
|
| Alternative Flows: | N/A | | |
| Exceptions: | Exception 1: Mobile application detects empty title and content and returns message “Title is required” and “Content is required”.  Exception2: Mobile application detects invalid information of post and return message to user | | |
| Priority: | High | | |
| Frequency of Use: | Whenever a learner wants to edit their post. | | |
| Business Rules: | BR-11, BR-12, BR-13, BR-14 | | |
| Other Information: | Audio and video record must be saved on Firebase storage | | |
| Assumptions: | Assume that learner create post with blank title and content, the mobile application throw messages to learner “Title is required” and “Content is required” | | |

#### l. Search Post

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-17- Search Post** | | |
| Created By: | AnhND | Created By: | AnhND |
| Primary Actor: | Learner | Primary Actor: | Learner |
| Description: | This use case allows the learner search posts by title. | | |
| Trigger: | Learner chooses the “Search” icon button on the News feed | | |
| Preconditions: | PRE-1. Guest musts login to the mobile application. | | |
| Post-conditions: | Display posts that have a title match to search keywords. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner presses on “Search” icon button on the News feed screen  2.a. Learner enters search keywords  3.a. Learner press “Done” on keyboard | 1.1.a. Mobile Application displays search screen with search text box, and search history  3.1.a. Mobile Application displays all posts which have title matched with search keywords [Exception] | | | |
| Alternative Flows: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.b. Learner presses on “Search” icon button on the News feed screen  2.b. Learner tap on a search history | 1.1.b. Mobile Application displays search screen with search text box, and search history  2.1.b. Mobile Application displays all posts which have title matched with search history keywords | | | |
| Exceptions: | Mobile application return message “We cannot find any posts” if learner enters empty search keywords or meaningless keywords | | |
| Priority: | High | | |
| Frequency of Use: | Whenever a learner wants to search a post. | | |
| Business Rules: | BR-20 | | |
| Other Information: | N/A | | |
| Assumptions: | Learner does not enter any keywords and press “Done” to search posts, the mobile application returns message “We cannot find any posts” to learner | | |

#### n. Get Post

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-12- Get Post** | | |
| Created By: | AnhND | Created By: | AnhND |
| Primary Actor: | Learner | Primary Actor: | Learner |
| Description: | This use case allow learner to view detailed information of a post include title, content, video or audio, create date, owner of post, comments | | |
| Trigger: | 1. Learner presses on a post on the News feed screen.  2. Learner presses on a post on Search result screen.  3. Learner presses on a notification of their post. | | |
| Preconditions: | PRE-1. Guest musts login to the mobile application. | | |
| Post-conditions: | Mobile application displays detailed information of post. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner presses on a post on news feed screen. [Exception] | 1.1.a. Mobile Application displays View post details screen with title, content, video or audio, create date, owner of post, comments | | | |
| Alternative Flows: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.b. Learner presses on a post on Search result screen. [Exception] | 1.1.b. Mobile Application displays View post details screen with title, content, video or audio, create date, owner of post, comments |  |  |  | | --- | --- | | Learner | Mobile Application | | 1.c. Learner presses on a notification of their post. [Exception] | 1.1.c. Mobile Application displays View post details screen with title, content, video or audio, create date, owner of post, comments | | | |
| Exceptions: | System cannot get the detailed information and returns a message “You cannot view this post” to leaners | | |
| Priority: | High | | |
| Frequency of Use: | Whenever a learner wants to view detailed information of a post. | | |
| Business Rules: | BR-22 | | |
| Other Information: | Estimate loading post details time must be under 30 seconds | | |
| Assumptions: | Assume that learner want to view post details, this screen will show detail of a post with title, content, video or audio, owner, create date and comments | | |

#### o. Get Posts

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-14- Get Posts** | | |
| Created By: | AnhND | Created By: | AnhND |
| Primary Actor: | Learner | Primary Actor: | Learner |
| Description: | This use case allow learner to view active posts | | |
| Trigger: | Learner chooses “Xin chào Việt Nam” tab on home screen | | |
| Preconditions: | PRE-1. Guest musts login to the mobile application. | | |
| Post-conditions: | Display posts on News feed screen. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner presses on “Xin chào Việt Nam” tab on home page  [Exception] | 1.1.a. Mobile Application display list of posts. Each post information include title, owner, create date, number of comment will be shown | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Mobile application return “There is no posts here. Pull to refresh” when there is no post on the system | | |
| Priority: | High | | |
| Frequency of Use: | Whenever a learner wants to view posts. | | |
| Business Rules: | BR-21 | | |
| Other Information: | 1. News feed must have pull to refresh  2. News feed must have lazy loading | | |
| Assumptions: | Assume that learner want to view posts, this screen will show posts sort by date (Lasted to oldest) | | |

#### p. Comment

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-18- Comment** | | |
| Created By: | AnhND | Created By: | AnhND |
| Primary Actor: | Learner | Primary Actor: | Learner |
| Description: | This use case allows learner and administrator make a comment to a post | | |
| Trigger: | 1. Learner presses on a post on the News feed screen.  2. Learner presses on a post on Search result screen.  3. Learner presses on a notification of their post. | | |
| Preconditions: | PRE-1. Guest musts login to the mobile application | | |
| Post-conditions: | Success: Display a new comment on View Details of post screen | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Learner presses on a post on the News feed screen.  2.a. Learner enters their comment  3.a Learner records audio  4.a Leaner presses “Send” icon button to submit their comment | 1.1.a. Mobile Application displays View post details screen with title, content, video or audio, create date, owner of post, comments and comment bar  4.1.a. Mobile application save comment and update comment on View details post screen [Exception] | | | |
| Alternative Flows: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.b. Learner presses on a post on Search result screen.  2.b. Learner enters their comment  3.b, Learner records audio  4.b. Leaner presses “Send” icon button to submit their comment | 1.1.b. Mobile Application displays View post details screen with title, content, video or audio, create date, owner of post, comments and comment bar  4.1.b. Mobile application save comment and update comment on View details post screen [Exception] |  |  |  | | --- | --- | | Learner | Mobile Application | | 1.c. Learner presses on a notification of their post.  2.c. Learner enters their comment [Exception3]  3.c, Learner records audio  4.c. Leaner presses “Send” icon button to submit their comment | 1.1.c. Mobile Application displays View post details screen with title, content, video or audio, create date, owner of post, comments and comment bar  4.1.c. Mobile application save comment and update comment on View details post screen [Exception] | | | |
| Exceptions: | Exception: Learner does not enter comment and press “Send” to submit comment | | |
| Priority: | High | | |
| Frequency of Use: | Whenever a learner wants to comment on a post. | | |
| Business Rules: | BR-15 | | |
| Other Information: | Estimate submit comment time must be less than 30 seconds | | |
| Assumptions: | Learner enters blank content and presses “Send” icon button to submit comment, mobile application return message “Comment cannot be blank” | | |

### 2.3 Use case detail for Administrator

#### a. Create New Lesson

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-09 - Create New Lesson** | | |
| Created By: | BaoHQ | Date Created: | Oct 23, 2020 |
| Primary Actor: | Administrator | Secondary Actors: |  |
| Description: | For administrator to create new lesson to the system and add it to database | | |
| Trigger: | Administrator click on the create new lesson button on the web admin dashboard. | | |
| Preconditions: | PRE-1. Administrator must login to the web admin dashboard  PRE-2. Admin choose the create new lesson button | | |
| Post-conditions: | POST-1: Display new lesson insert form. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Admin login to the system  [exception 1]  2.a. Click on “Create new lesson” button  3.a. Click on “Create” button  [exception 2] | 1.1.a. Load admin dashboard  2.1.a. Load create lesson screen  3.1.a. Save data to database and re-load lesson table. | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Exception 1: Cannot login to the system  Exception 2: Cannot create new lesson. | | |
| Priority: | Medium | | |
| Frequency of Use: | Whenever administrator wants to create a new lesson. | | |
| Business Rules: | BR-01, BR-06 | | |
| Other Information: | Create new lesson must use standard curriculum.  Create new lesson must add to advance level. | | |
| Assumptions: | N/A | | |

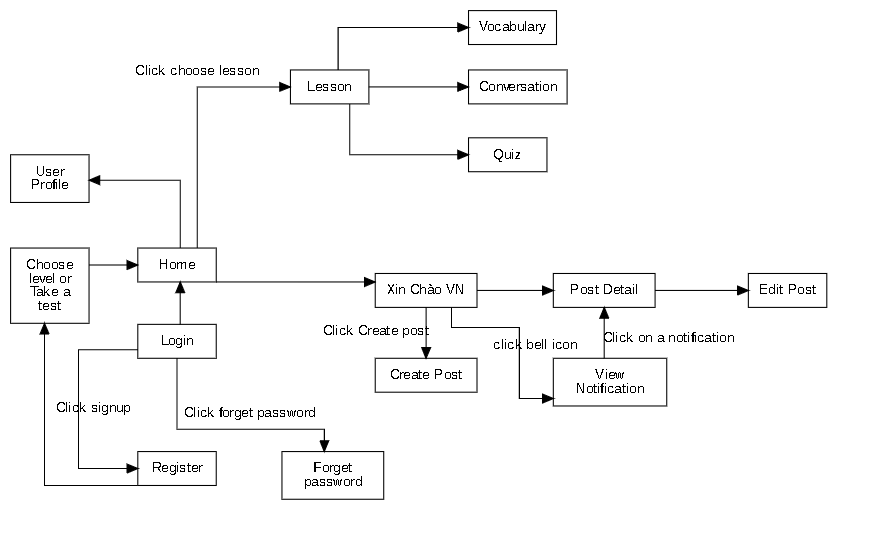
#### b. Create Vocabulary

|  |  |  |  |
| --- | --- | --- | --- |
| ID and Name: | **UC-10 - Create Vocabulary** | | |
| Created By: | BaoHQ | Date Created: | Oct 23, 2020 |
| Primary Actor: | Administrator | Secondary Actors: |  |
| Description: | For administrator to create new vocabulary to the system and add it to database | | |
| Trigger: | Administrator click on the create new vocabulary button on the web admin dashboard. | | |
| Preconditions: | PRE-1. Administrator must login to the web admin dashboard  PRE-2. Administrator choose the create vocabulary method | | |
| Post-conditions: | POST-1: Display new vocabulary insert form. | | |
| Normal Flow: | |  |  | | --- | --- | | Learner | Mobile Application | | 1.a. Admin login to the system  [exception 1]  2.a. Click on “Create new vocabulary” button  3.a. Click on “Create” button  [exception 2] | 1.1.a. Load admin dashboard  2.1.a. Load create vocabulary screen  3.1.a. Save data to database and re-load lesson table. | | | |
| Alternative Flows: | N/A | | |
| Exceptions: | Exception 1: Cannot login to the system  Exception 2: Cannot create new vocabulary. | | |
| Priority: | Medium | | |
| Frequency of Use: | Whenever administrator wants to create new vocabulary | | |
| Business Rules: | BR-18, BR-19 | | |
| Other Information: | Vocabulary must be the new vocabulary.  Vocabulary must belong to 1 lesson. | | |
| Assumptions: | N/A | | |

## 3. Functional Requirements

### 3.1 System Functional Overview

#### a. Screen Flow



#### figure 2: Screen Flow

#### b. Screen Details

|  |  |  |  |
| --- | --- | --- | --- |
| **Id** | **Feature** | **Screen** | **Description** |
| 01 | Login | Sign in |  |
| 02 | Login | Sign up |  |
| 03 | Login | Forget password |  |
| 04 | Learn Vietnamese | Lesson | This screen displays lessons by level of user |
| 05 | Learn Vietnamese | Lesson Details | This screen displays part of a lesson |
| 06 | Learn Vietnamese | Vocabulary | This screen allows user to learn vocabularies of a lesson |
| 07 | Learn Vietnamese | Conversation | This screen allows user to learn vocabularies of a lesson |
| 08 | Learn Vietnamese | Quiz | This screen allows user to take quiz of a lesson |
| 09 | Xin chào Việt Nam | News feed | This screen display posts for user, user can choose between “All posts” or “My posts” tab |
| 10 | Xin chào Việt Nam | Create post | This screen allows user to create their post |
| 11 | Xin chào Việt Nam | Post detail | This screen allows user to see post detail and comments, user also send their comment in this screen |
| 12 | Xin chào Việt Nam | Notification | This screen allows user to see their notification |

#### c. Screen Authorization

|  |  |  |  |
| --- | --- | --- | --- |
| **Screen** | **Role1** | **Role2** | **Role3** |
| Login | x | x | x |
| Sign up | x | x | x |
| Setup level | x |  |  |
| Lessons | x |  | x |
| Lesson details | x |  | x |
| Learn Vocabulary | x |  |  |
| Learn Conversation | x |  |  |
| Do quiz | x |  |  |
| News feed | x | x |  |
| Create post | x | x |  |
| Edit post | x | x |  |
| Post details | x | x |  |
| Search posts | x | x |  |
| Notification | x | x |  |
| Search posts result | x | x |  |
| List games | x |  |  |
| Game | x |  |  |

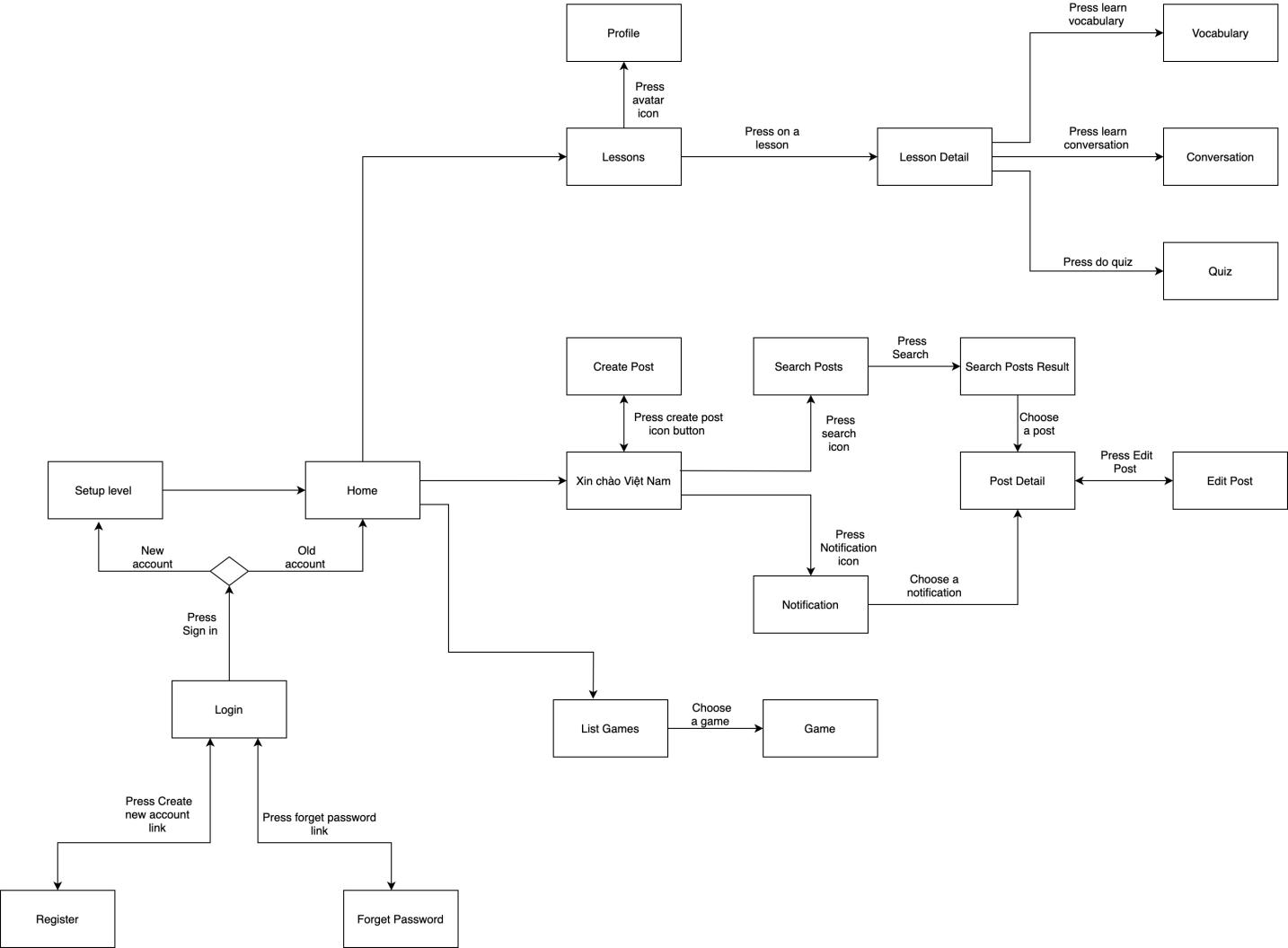
In which:

* Role1: Learner
* Role2: Moderator
* Role3: Admin

#### d. Non-Screen Functions

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Feature** | **System Function** | **Description** |
| 1 | Authentication | Login | This function allows user to login to the system if they have their own account |
| Register | This function allows user to create a new account as a learner |
| 2 | Learn Vietnamese | Learn vocabulary | This function allows learner to learn vocabulary by lesson |
| Learn conversation | This function allows learner to learn conversation by lesson |
| Learn quiz | This function allows learner to take a quiz of a lesson |
| 3 | Xin chào Việt Nam | New Feeds | This function allows learner to view all posts sort by datetime, learner can access notification, search posts and create new account, learner also choose between “My post” to view their posts or “All posts” to view all posts |
|  | Create post | This function allows learner to create their new post, learner can create a post with audio or video record |
|  | Edit post | This function allows learner to edit their post, learner can edit a post with audio or video record |
|  | View post detail | This function allows learner to view detailed of a post, they can choose edit or delete post option if it is their post. |
|  | Comment | This function allows learner to comment on a post, learner can comment with audio record |
|  | Notification | This function allows leaners to view their notification on “Xin chào Việt Nam” |
| 4 | Game | Game | This function allows learner to practice Vietnamese through some funny game. |

#### e. Entity Relationship Diagram

**

#### figure 3: ERD diagram

|  |  |  |
| --- | --- | --- |
| **#** | **Entity** | **Description** |
| 1 | User |  |
| 2 | Lesson |  |
| 3 | Level |  |
| 4 | Vocabulary |  |
| 5 | Conversation |  |
| 6 | Quiz |  |
| 7 | Question |  |
| 8 | Option |  |
| 9 | Answer |  |
| 10 | History |  |
| 11 | Notification |  |
| 12 | Role |  |
| 13 | Post |  |
| 14 | Comment |  |
| 15 | Progress |  |
| 16 | Question\_Type |  |

## 4. Non-Functional Requirements

### 4.1 External Interfaces

#### a. User Interfaces

* Mobile Application:
  + UI-1: User interfaces of mobile application must be obvious and easy to use
  + UI-2: User interfaces support English.
  + UI-3: User interfaces support multiple screen
* Web admin:
  + UI-1: User interfaces of web admin must be obvious and easy to use
  + UI-2: User interfaces support English.
  + UI-3: User interfaces design based on Material Design

#### b. Software Interfaces

Our system uses MSSQL Server as database management system. Test enviroment for mobile application is Android Phone with minimum requirement SDK is SDK 21 and iPhone with minimum requirement iOS version is 9.0. Test enviroment for web admin is Chrome 96 or above. Programming IDE which we use is Android Studio, VSCode and Spring Tool Suite 4.

#### c. Hardware Interfaces

Our system requires a computer or laptop which have internet connection for web admin, Android or iOS phone with camera, audio micro and internet connection.

#### d. Communications Interfaces

The communication interfaces of our system is depent on requesting and receiving data from database through REST API.

### 4.2 Quality Attributes

#### a. Usability

* It will take a learner 1 hour of training to be certified a normal user, 2 hours of training to be certified a power user.
* It will take a user 2 hours of training to be certified an administrator.
* It will take the learner 15 minutes to setup and install the application for the first time.
* The mobile application will have a GUI that follows some study language applications such as Duolingo and Drop. Complex actions and UI shall not be included to keep the application complexity minimized.

#### b. Reliability

* Provide system reliability:
  + Threshold = 99.9%
  + Objective = 99.99% system and application

#### c. Performance

* UI controls such as menus, buttons, checkboxes must provide instantaneous responsiveness
* Provide learning data for learner (vocabulary, conversation and quiz) within 8 seconds
* Part-screen refreshes after user action shall complete within a range between 1 seconds and 5 seconds.

#### d. Dependability

##### d1. Security

* Provide APIs Authentication using JSON Web Token(JWT) to protect resource and restrict access only to verified users.

##### d2. Safety

* All data must be validated before added to database.

#### e. Supportability

* Provide for user the ability to create a new post with record audio or video
* Provide the ability to comment with record audio
* Provide the ability to remind user time to learn by using notification

#### f. Design Constraints

* The mobile application is created using Dart programming language, Flutter framework and followed BLOC architecture
* The web admin is created using JavaScript programming language, ReactJS framework
* The Server is created using JAVA programming language, Spring Boot framework and followed 3-tiers architecture. Database Management System used is MSSQL Server.

#### g. Support Documents

Our system does not use any references to support document writing.

#### h. Purchased Components

We use some third-party such as Azure to deploy server and Firebase to push notification, authentication and storage file.

## 5. Other Requirements

### 5.1 Messages List

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Message code** | **Message Type** | **Context** | **Content** |
| 1 | MSG01 | Toast message with red background | Invalid username or password | *Account is not existed* |
| 2 | MSG02 | In red, under the text box | Input-required fields are empty | *The \* field is required.* |
| 3 | MSG03 | In red, under the text box | Email is invalid | *The email field is not match with email format.* |
| 4 | MSG04 | In red, under the text box | Password must be from 8 to 16 characters | *Password is less than 8 or more than 16 characters.* |
| 5 | MSG05 | Toast message with green background | Success | *Execute a task success.* |
| 6 | MSG06 | Toast message with red background | Username is existed | *Username has been existed when sign up a new account.* |

### 