Software Requirements Specification

for

Cross Border

Version 1.1 approved

Prepared by Team SimpleOne

Nanyang Technological University

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Revision History

Name	Date	Reason For Changes	Version
Jolene Chan	27/01/24	Added introduction and basic product functions	1.0
Aaron Chen	28/01/24	Added product functions and non-functional requirements	1.0.1
Jolene Chan	29/01/24	Added functional requirements and use case descriptions for registration features	1.0.2
Banerjee Mohor Jolene Chan Aaron Chen	31/01/24	Edited functional requirements and use case descriptions	1.0.3
Banerjee Mohor Jolene Chan	01/02/24	Added use case descriptions and functional requirements for new features	1.0.4
Aaron Chen	01/02/24	Added Settings Page	1.0.5
Aaron Chen	03/02/24	Added some use case descriptions	1.0.6
Aaron Chen	03/02/24	Added more non-functional requirements	1.0.7
Banerjee Mohor	04/02/24	Added more functional requirements	1.0.8
Jolene Chan	04/02/24	Revised functional requirements and use case descriptions, Edited formatting	1.0.9
Jolene Chan	04/02/24	Finalized for submission of Lab 1 deliverables	1.1

Product Description and Target Audience

Our web application "Cross Border" is specifically designed for migrant workers in Singapore, facilitating access to essential services and information tailored to their unique needs. It encompasses features like a personalized news feed, currency exchange calculator, navigation for the cheapest routes, and a directory of nearby amenities. Additionally, the app includes an AI chatbot to assist with inquiries, making daily life in Singapore more navigable and comfortable for the migrant community. Through these functionalities, the app aims to enhance the overall living and working experience of migrant workers in Singapore.

Our target users of this application are the migrant workers from countries like China, Malaysia, India etc., who are employed in various sectors in Singapore.

These sectors include:

- Construction activities
- Food and Beverage
- General Services such as cleaning work, plumbing, working as an electrician etc.

Product Functions

1. **Login Page**
- The User can register for an account using their phone number.
- The User shall be authenticated by using OTP.

2. **Profile Page**
- The User can view and edit their personal information on their profile such as name, gender, age, home country, profession, area of residence in Singapore, and profile picture.

3. **News Page**

- The App shall display news articles in chronological order, with the top news headline at the topmost part of the page.

- The User can filter the news articles to display world news, local news (Singapore news), or news from their home country.

4. **Navigation Page**

- The User can enter their current location or a custom location (home address by default), choose a destination, and the App shall display the cheapest transit route between the two locations.

5. **Amenities Page**

- The User can enter their current location or a custom location (home address by default), choose the type of amenities such as restaurants, hospitals, etc., and 5 of the nearest chosen amenities shall be displayed with some details.

6. **Image Translation and AI (Artificial Intelligence) Chatbot Page**

- The User can upload an image or take a photo of a billboard, signboard, etc., and the text shall be translated by an AI Chatbot to the User's desired language.

- The User can submit questions to the AI Chatbot and shall receive assistance on topics they are not familiar with.

7. **Currency Exchange Dashboard Page**

- The market rate of conversion between SGD and the User's home country currency shall be displayed.

- The User can input an amount in SGD, and the converted amount to the User's home country currency shall be displayed and vice versa.

8. **Bookmarks and Favorites Page**

- The User can read the list of news articles they have bookmarked and the amenities they have chosen as favorites.

- The User can also remove some bookmarked articles and favorite amenities from the list.

9. Settings Page

- The App settings such as privacy settings, profile settings, and language can be changed.

Use Case Descriptions and Functional Requirements

1.   Register New Account

1.1   Use Case Description

Use Case ID:	REG01		
Use Case Name:	Register New Account		
Created By:	Jolene Chan	Last Updated By:	Jolene Chan
Date Created:	29 January 2024	Date Last Updated:	4 February 2024

Actor:	New User (Initiating Actor), Database
Description:	A first-time user can register for an account by clicking the "Sign Up" button.
Preconditions:	1. The user must be connected to the internet. 2. The user must not have an existing account. (The user's phone number must not be associated with an existing account in the database.)
Postconditions:	1. The user shall be successfully registered for an account. 2. The system shall add the user's new account and phone number to the database. 3. The user shall be logged into the system. 4. The system shall display the Create Profile Page.
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. After the new user launches the app, the Login Page is displayed. 2. The user clicks the "Sign Up" button on the Login Page.

	3. The system prompts the user to input their phone number.
	4. The user enters their phone number, then clicks the "Send OTP" button.
	5. The system sends an OTP to the user's phone number and prompts the user to key it into the app.
	6. The user enters the OTP.
	7. The system verifies the OTP and creates a new account for the user.
	8. The system logs the user into their new account and redirects them to the Create Profile Page. (REG02 – Create New Profile)
Alternative Flows:	<u>AF-S4: The user clicks the "Send OTP" button without entering a phone number</u>
	1. The system displays the message "Please enter a valid local phone number."
	2. The system returns to Step 4 and waits for inputs from the user.
	<u>AF-S4: The user inputs a phone number that is not a local phone number</u>
	1. The system displays the message "Please enter a valid local phone number."
	2. The system returns to Step 4 and waits for inputs from the user.
	<u>AF-S4: The user inputs a phone number that is already associated with an existing account</u>
	1. The system displays the message "Phone number is already associated with an account."
	2. The system returns to the Login Page.
	<u>AF-S5: The user fails to enter the OTP within the time limit</u>
	1. The system displays the message "OTP has expired."
	2. The user can click the "Resend OTP" button and the system will send another OTP to the user's phone number.
	3. The system returns to Step 6 and waits for inputs from the user.

	AF-S6: The user enters the OTP incorrectly 1. The system displays the message "Incorrect OTP." 2. The user can click the "Resend OTP" button and the system will send another OTP to the user's phone number. 3. The system returns to Step 6 and waits for inputs from the user. AF-S7: The user fails to enter the OTP thrice (enters wrong OTP or does not enter within time limit) 1. The system displays the message "Too many failed attempts." 2. The system returns to Step 1 and the user is prompted to initiate signup process again from the start.
Exceptions:	EX1: The system loses internet connection 1. The system displays the error message "Network connection lost." 2. The system returns to the Login Page. EX2: The user did not receive the OTP 1. The user can click the "Resend OTP" button and the system will send another OTP to the user's phone number. 2. The system returns to Step 6 and waits for inputs from the user.
Includes:	REG02 - Create New Profile
Special Requirements:	
Assumptions:	
Notes and Issues:	

1.2 Functional Requirements

1. The system must allow the user to create an account.

   1.1 The system must display a numeric input field for the user to enter their phone number.

   1.1.1 The input field must require the user to enter exactly 8 numbers.

1.2   When the user clicks the "Send OTP" button, the system must verify that the user has input a valid phone number.

    1.2.1   The system must verify that it is an 8-digit number.

    1.2.2   The system must verify that it is a valid local phone number.

    1.2.3   The system must verify that the phone number is not already associated with an existing account in the database.

1.3   The system must display whether the phone number is valid or not.

    1.3.1   If the phone number is invalid, then the system shall display an error message.

    1.3.2   If the phone number is valid, then the system shall send a one-time password (OTP) to the user's phone number.

        1.3.2.1 The OTP shall be 6 digits long.

        1.3.2.2 The OTP shall be valid for 5 minutes.

1.4   When the OTP is sent, the system must display a numeric input field for the user to enter the OTP.

    1.4.1   The input field must require the user to enter exactly 6 numbers.

1.5   When the user clicks the "Verify" button, the system must verify that the user has input the correct OTP within the time limit.

    1.5.1   The system must verify that it is a 6-digit number.

    1.5.2   The system must verify that the OTP is entered within 5 minutes of being sent.

    1.5.3   The system must verify that the OTP entered matches the OTP sent.

1.6   If the OTP is not entered after 5 minutes of being sent, the system changes the "Verify" button into a "Resend OTP" button.

    1.6.1   When the user clicks the "Resend OTP" button, the system shall send another OTP to the user's phone number.

        1.6.1.1 The new OTP must not be the same as previous OTPs sent.

1.7   The system must display whether the OTP is successfully verified or not.

    1.7.1   If the OTP is incorrect, then the system shall display an error message.

    1.7.2   If the OTP is correct, then the system shall log the user into their new account.

1.7.3   The system shall redirect the user to the Create Profile Page.

2.   Create New Profile

2.1 Use Case Description

Use Case ID:	REG02		
Use Case Name:	Create New Profile		
Created By:	Jolene Chan	Last Updated By:	Jolene Chan
Date Created:	29 January 2024	Date Last Updated:	4 February 2024

Actor:	New User (Initiating Actor), Database
Description:	After registering for an account, the new user inputs their personal information to create their profile.
Preconditions:	1. The user must be connected to the internet. 2. The user must be logged in to their account. 3. The user's account must not have an existing profile already created.
Postconditions:	1. The user shall successfully create their profile which contains the following personal information: unique username, password, security questions, full name, gender, date of birth, email-id (optional), home country, profession, area of residence (with mandatory postal code), phone number, profile picture (optional) 2. The system shall display the Home Page. 3. The user shall be able to access the features of the app. 4. The user's profile information shall be used to provide personalized services in the app.
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. After the user has successfully registered for a new account, the Create Profile Page is displayed.

	2. The system prompts the user to input their personal information, such as unique username, password, security questions, full name, gender, age, home country, profession, and area of residence. The user can optionally add a profile picture and an email-id.
	3. The user clicks the "Confirm" button to submit the form.
	4. The system saves the user's profile information into the database.
	5. The system displays a welcome message and redirects the user to the Home Page.
Alternative Flows:	AF-S3: The user clicks the "Confirm" button without filling all the required fields
	1. The system displays the message "Please fill in all required fields."
	2. The system returns to Step 2 and waits for complete inputs from the user.
	AF-S2: The user enters a username that is not unique
	1. The system displays the message "This username is already in use."
	2. The system waits for a unique username from the user.
Exceptions:	EX1: The system loses internet connection
	1. The system displays the error message "Network connection lost."
	2. The system returns to the Login Page.
Includes:	
Special Requirements:	
Assumptions:	
Notes and Issues:	

2.2 Functional Requirements

1. The system must allow the new user to enter profile details

1.1 The system must display the Create Profile Page following successful user registration.

1.2 The system must allow a new user to input personal information to create a profile after account registration.

    1.2.1 The system must prompt the user to input the following personal information:

        1.2.1.1 Unique username

        1.2.1.2 Password

        1.2.1.3 Security questions and answers

        1.2.1.4 Full name

        1.2.1.5 Gender

        1.2.1.6 Date of birth

        1.2.1.7 Email-id (optional)

        1.2.1.8 Home country

        1.2.1.9 Profession

        1.2.1.10 Area of residence (with mandatory postal code)

        1.2.1.11 Phone number

        1.2.1.12 Profile picture (optional)

1.3 The system must provide a "Confirm" button for the user to submit their profile information.

1.4 The system must verify all required fields are filled before allowing the profile submission.

    1.4.1 If required fields are missing, the system must display an error message: "Please fill in all required fields."

1.5 If the user attempts to use a username that is already in use, the system shall display: "This username is already in use."

1.6 Upon successful profile creation, the system shall save the user's profile information into the database.

1.7 The system shall redirect the user to the Home Page after profile creation.

    1.7.1 The system shall display a welcome message.

    1.7.2 The user's profile information shall be utilized to provide personalized services within the app.

3.   Login

3.1 Use Case Description

Use Case ID:	LOG01		
Use Case Name:	Login		
Created By:	Jolene Chan	Last Updated By:	Jolene Chan
Date Created:	30 January 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor), Database
Description:	A user can log in to their account to access the features of the app.
Preconditions:	1. The user must be connected to the internet. 2. The user must have an existing account in the system. 3. The user must not be already logged in to their account.
Postconditions:	1. The user is logged into their account. 2. The system displays the Home Page.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. After the new user launches the app, the Login Page is displayed. 2. The user inputs their username and password. If it matches an existing account, then the user passes the first step of authentication and is directed to the next. 3. The system extracts the phone number registered with this username from the database. 4. The system sends an OTP to the user's phone number and prompts the user to key it into the app. 5. The user enters the OTP. 6. The system verifies the OTP and logs the user into their account.

	7. The system redirects the user to the Home Page.
Alternative Flows:	AF-S2: The user inputs a non-existent username 1. The system displays the message "No account has been created with this username. Please sign up instead." 2. The system returns to the Login Page. AF-S2: The user inputs a wrong password 1. The user is given the error prompt "Password is incorrect. Please retry." 2. The user is prompted to re-enter the password AF-S2: The user inputs a wrong password thrice 1. The system displays the prompt "Too many failed attempts" 2. The user is returned to the Login Page. AF-S2: The user clicks on "Forgot Password" 1. The user is redirected to Step 3 and taken through OTP authentication steps. 2. After that the user is taken to a page with 6 Security Questions, the answer to which is set in user's profile by the user. 3. If any of them is answered incorrectly, then the system displays message "Security Questions answered incorrectly." The user is taken back to the Login Page. 4. If they are answered correctly, the user is logged in successfully and is taken to the password reset page directly to recover the lost password. AF-S3: The user inputs a phone number that is not associated with an existing account 1. The system displays the message "No account has been created with this phone number. Please sign up instead."

	2. The system returns to the Login Page. AF-S5: The user fails to enter the OTP within the time limit 1. The system displays the message "OTP has expired." 2. The user can click the "Resend OTP" button and the system will send another OTP to the user's phone number. 3. The system returns to Step 4 and waits for inputs from the user. AF-S5: The user enters the OTP incorrectly 3. The system displays the message "Incorrect OTP." 4. The user can click the "Resend OTP" button and the system will send another OTP to the user's phone number. 3. The system returns to Step 4 and waits for inputs from the user. AF-S5: The user fails to enter the OTP thrice (enters wrong OTP or does not enter within time limit) 1. The system displays the message "Too many failed attempts." 2. The system returns to Login Page.
Exceptions:	EX1: The system loses internet connection 1. The system displays the error message "Network connection lost." 2. The system returns to the Login Page. EX2: The user did not receive the OTP 1. The user can click the "Resend OTP" button and the system will send another OTP to the user's phone number. 2. The system returns to Step 5 and waits for inputs from the user.
Includes:	

Special Requirements:	
Assumptions:	
Notes and Issues:	

3.2   Functional Requirements

1.   The system must allow the user to log in to their account.

   1.1   The system must display the Login Page upon app launch for users not already logged in.

   1.1.1   The system must require the user to input their username and password.

   1.1.2   The system must verify that the username and password entered matches against the system's user account database.

   1.2   The system must implement two-factor authentication for an added layer of security.

   1.2.1   Upon successful username and password verification, the system must extract the user's registered phone number from the database.

   1.2.2   The system must send an OTP to the user's registered phone number.

   1.2.3   The system must prompt the user to enter the received OTP within the app.

   1.2.4   The system must verify the entered OTP against the sent OTP to complete the login process.

   1.3   The system must address scenarios where the user enters incorrect login credentials.

   1.3.1   If a non-existent username is entered, then the system must display "No account has been created with this username. Please sign up instead."

   1.3.2   If an incorrect password is entered, then the system must prompt "Password is incorrect. Please retry."

   1.3.2.1 The system shall allow up to three attempts before displaying "Too many failed attempts."

   1.4   The system must support users in recovering lost passwords through security questions.

   1.4.1   If "Forgot Password" is selected, the system must initiate OTP verification followed by security question authentication for password reset.

   1.5   The system must manage OTP verification challenges.

1.5.1   If the OTP is not entered within the time limit or entered incorrectly, then the system shall allow the user to request a new OTP.

1.6   Upon successful login, the system must redirect the user to the Home Page.

1.7   The system must use the user's profile information to provide personalized services within the app.

4.   Logout

4.1   Use Case Description

Use Case ID:	LOG02		
Use Case Name:	Logout		
Created By:	Jolene Chan	Last Updated By:	Jolene Chan
Date Created:	1 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor)
Description:	A user can log out of their account.
Preconditions:	1. The user must be connected to the internet. 2. The user must be already logged in to their account.
Postconditions:	1. The user is logged out of their account. 2. The system displays the Login Page.
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. The user clicks the "Log Out" button. 2. The system logs the user out of their account. 3. The system redirects the user to the Login Page.
Alternative Flows:	
Exceptions:	EX1: The system loses internet connection 1. The system displays the error message "Network connection lost."
Includes:	
Special Requirements:	
Assumptions:	
Notes and Issues:	

4.2   Functional Requirements

1.   The system must allow the user to log out of their account.

1.1 When the user clicks the "Log Out" button, the system shall redirect the user to the Login Page.

5. Delete Account

5.1 Description

Use Case ID:	DEL01		
Use Case Name:	Delete Account		
Created By:	Jolene Chan	Last Updated By:	Jolene Chan
Date Created:	1 February 2024	Date Last Updated:	1 February 2024

Actor:	User (Initiating Actor), Database
Description:	A user can delete their account from the database.
Preconditions:	1. The user must be connected to the internet. 2. The user must be already logged in to their account.
Postconditions:	1. The user is logged out of their account. 2. The system displays the Login Page. 3. The data related to the user's account is deleted from the database.
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. The user clicks the "Delete Account" button. 2. The system asks the user to confirm the deletion of their account. 3. The user clicks the "Confirm Delete Account" button. 4. The system logs the user out of their account. 5. The system redirects the user to the Login Page. 6. The data related to the user's account is deleted from the database.
Alternative Flows:	AF-S3: The user clicks the "Cancel" button instead 1. The system stays on the same page and does not take any further action until the user triggers something else.
Exceptions:	EX1: The system loses internet connection

	1. The system displays the error message "Network connection lost."
Includes:	
Special Requirements:	
Assumptions:	
Notes and Issues:	

5.2 Functional Requirements

1.   The system shall allow the user to delete their account.

   1.1   When the user clicks the "Delete Account" button, the system shall ask the user to confirm the deletion of their account.

   1.1.1   The system shall display a "Confirm Delete Account" button and a "Cancel" button.

   1.2   The system shall either proceed with or cancel the deletion process depending on the user's confirmation.

   1.2.1   When the user clicks the "Confirm Delete Account" button, then the system shall redirect the user to the Login Page.

   1.2.2   When the user clicks the "Cancel" button, then the system shall stay on the same page and not take any further action until user clicks on something else.

   1.3   If the user confirms to delete their account, then the system must delete the data related to the user's account from the database.

   1.3.1   If the user attempts to log in or re-register for a new account with their phone number, the system shall verify that the phone number is no longer associated with an existing account in the database.

   1.3.1.1 The system shall deny login with that phone number and display an error message.

   1.3.1.2 The system shall allow registration of a new account with that phone number.

6.   Change Settings

6.1   Use Case Description

Use Case ID:	CHG01		
Use Case Name:	Change Settings		
Created By:	Aaron Chen	Last Updated By:	Jolene Chan
Date Created:	4 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor)
Description:	A user can change the settings of the app according to their preferences.
Preconditions:	1. The user must be connected to the internet. 2. The user must have an existing account in the system. 3. The user must be already logged in to their account.
Postconditions:	1. The system shall change the settings to the user's preferences.
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	1. The user clicks the Settings widget on the Home Page to get redirected to the Settings Page. 2. The user can choose to click Profile widget, Language widget, Privacy widget. 3. If the user clicks on the profile widget, the system redirects them to the View Profile Page. (EDT01 – Edit Profile) 4. If the user clicks on the Language widget or Privacy widget, the system redirects the user to the respective type of settings page and the respective settings can be changed.
Alternative Flows:	
Exceptions:	EX1: The system loses internet connection 1. The system displays the error message "Network connection lost."

Extends:	PRF01 – View Profile
	PRF02 – Edit Profile
Special Requirements:	
Assumptions:	
Notes and Issues:	

6.2   Functional Requirements

1.   The system must provide users with the ability to access and modify their settings.

    1.1   The system must display a settings widget on the home screen.

        1.1.1   The system must redirect the user to the Settings Page upon clicking the settings widget.

    1.2   The system must offer distinct categories within settings for user customization.

        1.2.1   The system must include separate widgets for Profile, Language, and Privacy settings on the Settings Page.

    1.3   The system must enable users to edit their profile information.

        1.3.1   The system must redirect the user to the Profile Page when the Profile widget is selected. (PRF01 – View Profile)

            1.3.1.1 The system must allow modifications to user profile information on the Edit Profile Page. (PFR02 – Edit Profile).

    1.4   The system must allow users to change their preferred language for the app interface.

        1.4.1   The system must redirect the user to the Language Settings Page when the Language widget is selected.

            1.4.1.1 The system must provide options for language selection and save the user's choice.

    1.5   The system must facilitate changes to user privacy preferences.

        1.5.1   The system must redirect the user to the Privacy Settings Page when the Privacy widget is selected.

        1.5.1.1 The system must offer privacy-related settings options and save changes made by the user.

7.   View Profile

7.1   Use Case Description

Use Case ID:	PRF01		
Use Case Name:	View Profile		
Created By:	Jolene Chan	Last Updated By:	Jolene Chan
Date Created:	4 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor), Database
Description:	A user can view their personal information on their profile.
Preconditions:	1. The user must be connected to the internet. 2. The user must have an existing account in the system. 3. The user must be already logged in to their account.
Postconditions:	1. The system displays the user's profile information.
Priority:	High
Frequency of Use:	Medium
Flow of Events:	1.The user clicks on the profile icon. 2.The system displays profile information.
Alternative Flows:	
Exceptions:	EX1: The system loses internet connection 1. The system displays the error message "Network connection lost."
Extends:	PRF02 – Edit Profile
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.2   Functional Requirements

1.   The system must display the user's information on their Profile Page.

1.1   The system must display the following information:

      1.1.1   Unique username

      1.1.2   Full name

      1.1.3   Gender

      1.1.4   Date of birth

      1.1.5   Email-id

      1.1.6   Home country

      1.1.7   Profession

      1.1.8   Area of residence and postal code

      1.1.9   Phone number

      1.1.10 Profile picture

1.2   If any of the optional entries have not been provided by the user, then the system must display a blank entry.

8.   Edit Profile

8.1   Use Case Description

Use Case ID:	PRF02		
Use Case Name:	Edit Profile		
Created By:	Aaron Chen	Last Updated By:	Jolene Chan
Date Created:	4 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor)
Description:	A user can edit the information on their profile.
Preconditions:	1. The user must be connected to the internet. 2. The user must have an existing account in the system. 3. The user must be already logged in to their account.
Postconditions:	1.The system updates the user's profile to reflect the changes.
Priority:	
Frequency of Use:	
Flow of Events:	1. The user navigates to the profile page. 2. The user clicks on the specific profile detail that they want to edit. 3. The user inputs the desired changes. 4. The user clicks "Confirm Changes",
Alternative Flows:	AF-S4 User inputs invalid inputs such as when age is not a number, area of residence does not exist etc. 1.The system displays the message "Invalid Changes!". 2.The system returns to Step 2.
Exceptions:	EX1: The system loses internet connection 1. The system displays the error message "Network connection lost."
Includes:	
Special Requirements:	

Assumptions:	
Notes and Issues:	

8.2 Functional Requirements

1.   The system must enable users to edit their profile details.

1.1   The system must allow users to click on specific profile details they wish to edit directly within their profile page.

1.2   The system must facilitate user input for profile changes.

1.2.1   The system must provide input fields for users to enter or change their details such as name, phone number, email, etc.

1.2.2   The system must include a "Confirm Changes" button to submit the changes.

1.3   The system must ensure validity of user inputs during profile editing.

1.3.1 The system must validate inputs for specific fields (e.g. age must be a number, area of residence must exist).

1.3.1.1 Username must only contain alphanumeric characters.

1.3.1.2 Date of birth must be a valid date in the past.

1.3.1.3 Email-id must be a valid email address.

1.3.1.4 Home country must be a supported country.

1.3.1.5 Area of residence and postal code must exist.

1.3.1.6 Phone number must be a valid local phone number.

1.3.3   If input validation fails, then the system must prompt users to correct the inputs.

1.3.3.1 If inputs are found to be invalid, then the system must display a message "Invalid Changes!"

1.4   The system must save the changes made by the user.

1.4.1   The system must display the updated information on the Profile Page.

9.   Watch News

9.1   Use Case Description

Use Case ID:	NEWS01		
Use Case Name:	Watch News		
Created By:	Banerjee Mohor	Last Updated By:	Jolene Chan
Date Created:	1 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor), News API
Description:	A user can watch the latest news from Singapore, their home country or the entire world.
Preconditions:	1. The user must be connected to the internet. 2. The user must have a valid account registered with the app. 3. The user must be logged into their account. 4. The user must be on the Home Page.
Postconditions:	1. The user will be able to see the news depending upon the location they choose – Singapore, the world or their home country. 2. The news will be displayed in chronological order with the latest news at the top. 3. The user can save a news article to their bookmarks. 4. The user can select a new article to read.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user clicks the news widget on the home screen to get redirected to the News page. 2. The user selects either Singapore, their home country or the world from a drop- down menu. 3. The app shows the news from the selected location to the user arranged in chronological order with the latest news at the top.

	4. The user has the option to add each news article displayed has an option to add it to their bookmarks for later reading.
	5. The user clicks on a news headline.
	6. The system redirects the user to the full news articles.
Alternative Flows:	<u>AF-S3: The user clicks on the "Show News" button without selecting any location</u>
	1. The system displays the error message "Please choose a location from the drop-down menu."
	2. The system returns to Step 2 and waits for complete inputs from the user.
Exceptions:	<u>EX1: The system loses internet connection</u>
	1. The system displays the error message "Network connection lost."
	2. The system returns to the Login Page.
Includes:	
Special Requirements:	
Assumptions:	
Notes and Issues:	

9.2   Functional Requirements

1.   The system must allow the user to see news from Singapore, their home country or the world.

   1.1   The system must display a drop-down menu for the user to select a location – "Singapore", "Home Country", or "World".

      1.1.1   When the user selects a location and "Show News", then the system shall display the most recent news from that location.

      1.1.2   If the user selects "Home Country", then the system shall display news from their home country indicated in their profile.

   1.2   The system must display the news arranged in chronological order, with the most recent news at the top of the page.

   1.3   The system must allow the user the option to save a news article for later reading.

1.3.1   The news article will be saved into the user's bookmarks.

1.4   When the user selects a news headline, the system shall redirect the user to the full news article.

10.   Search Nearest Amenities

10.1   Description

Use Case ID:	MAP01		
Use Case Name:	Search Nearest Amenities		
Created By:	Banerjee Mohor	Last Updated By:	Jolene Chan
Date Created:	1 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor), Places API, Maps API
Description:	The user can search for the nearest amenities from a specified starting location.
Preconditions:	1. The user must be connected to the internet. 2. The user must have a valid account registered with the app. 3. The user must be logged into their account. 4. The user must be on the Home Page.
Postconditions:	1. The user will be able to see the nearest 5 locations of the amenity chosen, such as restaurant/hawker center/pharmacy/MRT/bus stop etc. 2. The user will be able to add amenities to their favorites for future reference.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user clicks on the Amenities widget on the home screen and is redirected to the Amenities page. 2. When the user places the cursor in the empty text field for entering a starting location, a dropdown menu will appear. 3. This menu will display the user's recent search history, listing the last five starting locations they've previously looked up. 4. Additionally, within this dropdown menu, users will find the choices to select "Current Location", which utilizes geolocation

	tracking to automatically detect their present position, or "Home," which utilizes the default home address specified in their profile settings. 5. The user has the option to either manually input a new starting location or select a previous one from their search history, opt for their current location, or choose their predefined home address from the dropdown menu. 6. The user can select from a list of amenities by clicking on a specific icon associated with their choice. Amenities listed will include common facilities like restaurants, hawker centers, malls, pharmacies, MRTs, bus stops, hospitals, etc. 7. The user will click on the "Find" button. 8. The App will display the nearest 5 locations of the chosen amenity to the starting location. They will be highlighted on the map and a list will be displayed below the map comprising of these 5 locations and accompanied by some details of each location (like opening/ closing time, distance, etc.) for the user's convenience. 9. The user can mark some amenities as favorites for future reference.
Alternative Flows:	<u>AF-S5: The user entered a non-existent address.</u> 1. The system displays the message "Please enter a valid address.". 2. The system returns to Step 5. <u>AF-S7: The user clicks the "Find" button without choosing starting location</u> 1. The system displays the message "Please choose a starting location.".

	2. The system returns to Step 5.
	AF-S7: The user clicks the "Find" button without choosing amenity
	1. The system displays the message "Please choose an amenity from the drop-down menu.".
	2. The system returns to Step 6.
	AF-S7: The user clicks the "Find" button and less than 5 of the amenity can be retrieved.
	1. If more than 0 amenities are found, the system displays the amenities list with the message below "Insufficient <<Name of Amenity>> found.". Else the system display "No such amenity found in this area."
Exceptions:	EX1: The user opts to use current location as starting location, but geolocation tracking is disabled in the user's device settings.
	1. The system displays the message "Please enable geolocation tracking on your device.".
	2. The system returns to Step 5.
	EX2: The user opts to use home as starting location, but home address is not entered in the profile details.
	1. The system displays the message "Please key in home address manually/enable home address in profile settings" and redirects the user to Step 5.
Includes:	
Special Requirements:	
Assumptions:	

Notes and Issues:	

10.2   Functional Requirements

1.   The system shall allow the user to search for the nearest amenities from a specified starting location.

   1.1   When the user interacts with the Amenities widget on the home screen, the system shall redirect the user to the Amenities search page.

   1.2   The system shall display an input field for entering a starting location.

   1.2.1   The system must allow the user to select their starting location by choosing from the dropdown menu or entering a new location manually.

   1.2.2   When focused, the system shall provide a dropdown menu for the starting location input field.

   1.2.2.1 The dropdown menu shall list the user's last five search histories, an option for "Current Location," and an option for "Home."

   1.3   The system shall provide a selection of amenities for the user to choose from, each type represented by a specific icon.

   1.4   When the user clicks the "Find" button, the system must verify that there is a valid starting address, and an amenity type is selected.

   1.4.1   If the user enters a non-existent address, then the system shall notify the user to provide a valid address.

   1.4.2   If the user selects "Current Location" but geolocation is not enabled, then the system shall prompt the user to enable geolocation.

   1.4.3   If the user selects "Home" but no address is specified in their profile, then the system shall prompt the user to enter a home address.

   1.4.4   If the user has not selected an amenity type, then the system shall prompt the user to choose one.

   1.5   The system shall mark the locations of up to the 5 nearest of the chosen amenity relative to the starting location.

   1.5.1   If there are no nearby amenities of the chosen type, the system shall display the message "No such amenity found in this area."

   1.5.2   The system shall provide details such as opening/closing times and distance.

1.6   The system shall allow the user the option to save an amenity for future reference.

      1.6.1   The location and details of the amenity will be saved into the user's favorites list.

11.   Search Cheapest Route

11.1   Use Case Description

Use Case ID:	MAP02		
Use Case Name:	Search Cheapest Route		
Created By:	Banerjee Mohor	Last Updated By:	Jolene Chan
Date Created:	2 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor), Places API, Maps API
Description:	The system shall enable users to search for the cheapest transit route from a starting location to an end location.
Preconditions:	1. The user must be connected to the internet. 2. The user must have a valid account registered with the app. 3. The user must be logged into their account. 4. The user must be on the Home Page
Postconditions:	1. The user will be able to see the cheapest transit route from a starting location to end location.
Priority:	
Frequency of Use:	
Flow of Events:	1. The user clicks on the Cheapest Route widget on the home screen 2. When the user places the cursor in the empty text field for entering a starting location, a dropdown menu will appear. This menu will display the user's recent search history, listing the last five starting locations they've previously looked up. Additionally, within this dropdown menu, users will find the choices to select "Current Location", which utilizes geolocation tracking to automatically detect their present position, or "Home", which utilizes the default home address specified in their profile settings.

	3. The user has the option to either manually input a new starting location or select a previous one from their search history, opt for their current location, or choose their predefined home address from the dropdown menu. 4. When the user places the cursor in the empty text field for entering an end location, a dropdown menu will appear. This menu will display the user's recent search history, listing the last five starting locations they've previously looked up. Additionally, within this dropdown menu, users will find the choices to select "Current Location", which utilizes geolocation tracking to automatically detect their present position, or "Home", which utilizes the default home address specified in their profile settings. 5. The user will click on the "Show Cheapest Route" button. 6. The App will display the cheapest route on the map and the different modes of travel, route taken, journey time and estimated cost.
Alternative Flows:	AF-S3: The user entered a non-existent address. 1. The system displays the message "Please enter a valid address.". 2. The system returns to Step 3. AF-S5: The user clicks on the "Show Cheapest Route" button without choosing starting location. 1.The system displays the message "Please choose a start location.". 2.The system returns to Step 3. AF-S5: The user clicks on the "Show Cheapest Route" button without choosing end location.

	1.The system displays the message "Please choose an end location.". 2.The system returns to Step 4. AF-S5: The user entered the same start and end location. 1.The system displays the message "Start and end location cannot be the same!". 2.The system returns to Step 3. AF-S5: The user clicks on the "Show Cheapest Route" button but there no route is found. 1.The system displays the message "No Route Found!".
Exceptions:	EX1: The user opts to use current location as starting location, but geolocation tracking is disabled in the user's device settings. 1.The system displays the message "Please enable geolocation tracking on your device.". 2.The system returns to Step 3. EX2: The user opts to use home as starting location, but home address is not entered in the profile details. 1. The system displays the message "Please enter home address" and redirects the user to the profile page.
Includes:	
Special Requirements:	
Assumptions:	
Notes and Issues:	

11.2 Functional Requirements

1.   The system shall enable users to search for the cheapest transit route from a starting location to an end location.

    1.1   When the user accesses the Cheapest Route widget on the home screen, the system shall navigate the user to the route search page.

    1.2   The system shall display input fields for entering both starting and end locations.

        1.2.1   Users must be able to select their starting and end locations by choosing from the dropdown menu or entering new locations manually.

        1.2.2   When focused, the system shall provide a dropdown menu for the starting location and end location input fields.

            1.2.2.1 The dropdown menu shall list the user's last five search histories, options for "Current Location" and "Home".

    1.3   When the user clicks the "Show Cheapest Route" button, the system must verify that the starting location and end location are valid.

        1.3.1   If the user does not choose a starting or end location, the system shall prompt the user accordingly.

        1.3.2   If the user enters a non-existent address, then the system shall notify the user to provide a valid address.

        1.3.3   If the user selects "Current Location" but geolocation is not enabled, then the system shall prompt the user to enable geolocation.

        1.3.4   If the user selects "Home" but no address is specified in their profile, then the system shall prompt the user to enter a home address.

        1.3.5   If the starting and end locations entered are the same, then the system shall notify the user of the error.

    1.4   The system shall display the cheapest route on the map, including different modes of travel, route taken, journey time, and estimated cost.

        1.4.1   If no route is found, then the system shall display "No Route Found!"

12   Access Bookmarks and Favorites

12.1   Use Case Description

Use Case ID:	BOOK01		
Use Case Name:	Access Bookmarks and Favorites		
Created By:	Banerjee Mohor	Last Updated By:	Jolene Chan
Date Created:	4 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor)
Description:	This use case describes the process by which users can access and manage their bookmarked news articles and favorite amenities through a dedicated page in the app.
Preconditions:	1. The user must be connected to the internet. 2. The user must have a valid account registered with the app. 3. The user must be logged into their account. 4. The user must be on the home page.
Postconditions:	The user will be able to view, access, and manage (including remove) their bookmarked news articles and favorite amenities.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user clicks on the Bookmarks and Favorites widget on the home screen. 2. The user selects one of two options: "Bookmarked News Articles" or "Favorite Amenities". 3. The selected page displays the user's bookmarked or favorited items. 4. The user can click on any item to access it. 5. The user has the option to remove any item from their bookmarks or favorites.

Alternative Flows:	AF-S4: The user selects to remove an item but then decides to cancel the action. 1. The system displays a confirmation message "Are you sure you want to remove this item?" with "Confirm" and "Cancel" options. 2. If the user clicks "Cancel", the item remains in the bookmarks or favorites. AF-S5: If the bookmarks or favorites list is empty. 1. The system displays a message "Your list is currently empty."
Exceptions:	
Includes:	
Special Requirements:	
Assumptions:	
Notes and Issues:	

12.2 Functional Requirements

1. The system must provide users with a mechanism to access their bookmarked news articles and favorite amenities.

    1.1 The system must include a Bookmarks and Favorites widget on the home screen.

        1.1.1 The system must redirect users to a dedicated page for bookmarks and favorites upon selecting the widget.

    1.2 The system must allow users to choose between viewing bookmarked news articles and favorite amenities.

        1.2.1 If the user selects "Bookmarked News Articles", then the system displays the user's saved news articles.

        1.2.2 If the user selects "Favorite Amenities", then the system displays their saved amenities.

    1.3 The system must enable users to interact with and manage their bookmarks and favorites.

1.3.1   The system must provide functionality for users to click on any item to access it.

      1.3.1.1 If the user clicks on a news article, the system shall display the full new article.

      1.3.1.2 If the user clicks on an amenity, the system shall display the details of that amenity.

1.3.2   The system must offer an option for users to remove any item from their bookmarks or favorites.

      1.3.2.1 The system shall display a confirmation message "Are you sure you want to remove this item?" with "Confirm" and "Cancel" options.

      1.3.2.2 If the user confirms to remove the item, the corresponding news article or amenity can no longer be accessed from the list.

1.3.3   If the user does not have any bookmarks or favorites, the system shall display the message "Your list is currently empty."

13.   Currency Exchange Calculator

13.1   Use Case Description

Use Case ID:	CEC01		
Use Case Name:	Currency Exchange Calculator		
Created By:	Banerjee Mohor	Last Updated By:	Jolene Chan
Date Created:	4 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor), Currency Exchange API
Description:	This use case outlines the functionality for users to calculate currency exchange rates from one currency to another, including the ability to input an amount in a starting currency and receive the equivalent in a chosen end currency based on current market rates.
Preconditions:	1. The user must be connected to the internet. 2. The user must have a valid account registered with the app. 3. The user must be logged into their account. 4. The user must be on home page
Postconditions:	The user will be able to view the current market exchange rate and convert a given amount from one currency to another.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user clicks the Currency Exchange Calculator widget on the home screen. 2. The current market exchange rate is displayed at the top of the screen. 3. The user selects a starting currency (SGD/USD/Home country currency) and an end currency from the available options. 4. The user enters an amount in the starting currency to convert. 5. The user clicks "Convert".

	6. The system calculates and displays the equivalent amount in the end currency based on the current market rate.
Alternative Flows:	<u>AF-S5: If the start or end currency is not chosen.</u> 1. The system displays an error message "Please select both a start and end currency." 2. The system returns to Step 3 and waits for inputs from the user. <u>AF-S5: If the start and end currencies selected are the same.</u> 1. The system displays an error message "Start and end currency cannot be the same." 2. The system returns to Step 3 and waits for inputs from the user. <u>AF-S5: If the user attempts to convert without entering an amount.</u> 1. The system displays an error message "Please enter an amount to convert." 2. The system returns to Step 4 and waits for inputs from the user.
Exceptions:	
Includes:	
Special Requirements:	The system must fetch real-time currency exchange rates from a reliable financial data API.
Assumptions:	
Notes and Issues:	

12.2   Functional Requirements

1.   The system must provide users with access to currency exchange functionalities.

  1.1   The system must display a Currency Exchange Calculator widget on the home screen.

      1.1.1   The system must redirect users to the currency exchange interface upon selecting the widget.

1.2 The system must present current market exchange rates to the user.

    1.2.1 The system must show the current market exchange rates at the top of the currency exchange interface.

1.3   The system must facilitate the selection of starting and ending currencies and input of conversion amount.

    1.3.1 The system must allow users to select a starting currency (e.g., SGD, USD, Home country currency) and an end currency from the available options.

      1.3.2   If "Home Country currency" is selected, then the system shall use the currency of the country indicated as "home country" in the user's profile.

1.4   The system must provide an input field for users to enter the amount in the starting currency they wish to convert.

1.5   The system must verify that the user has input a starting amount, and that the start and end currency are not the same.

    1.5.1   If the user does not choose a start or end currency, then the system shall display an error message "Please select both a start and end currency."

    1.5.2   If the user inputs the same start and end currency, the system shall display an error message "Start and end currency cannot be the same."

    1.5.3   If the user attempts to convert without entering an amount, the system shall display an error message "Please enter an amount to convert."

1.6   The system must calculate and display the equivalent amount in the end currency based on the current market rate upon user submission.

14.   Interact with AI Chatbot

14.1   Description

Use Case ID:	AIQNA01		
Use Case Name:	Interact with AI Chatbot		
Created By:	Banerjee Mohor	Last Updated By:	Jolene Chan

Date Created:	4 February 2024	Date Last Updated:	4 February 2024

Actor:	User (Initiating Actor), AI Chatbot API
Description:	This use case describes the functionality for users to interact with an AI-powered chatbot by asking questions and uploading images for analysis, where they can receive immediate automated responses.
Preconditions:	1. The user must be connected to the internet. 2. The user must have a valid account registered with the app. 3. The user must be logged into their account. 4. The user must be on home page
Postconditions:	The user will be able to ask questions and upload images to receive relevant responses and information from the AI chatbot.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user clicks the AI Chatbot (Q&A) widget on the home screen. 2. The user is taken to the chatbot interaction page. 3. The user can type in questions into a text input field or upload images through a file upload interface. 4. The chatbot processes the input and provides relevant responses, information, or actions based on the query or image analysis. 5. The user can continue to interact with the chatbot by asking more questions or uploading additional images.
Alternative Flows:	AF-S3: If the user asks a question that the chatbot cannot understand or answer. 1. The system displays a message "I'm not sure how to answer that. Can you ask in a different way or try a different question?"

	AF-S4: If the uploaded image is not in a supported format or is too large.
	1. The system displays an error message "Unsupported image format or image too large. Please upload a different image."
Exceptions:	
Includes:	
Special Requirements:	
Assumptions:	
Notes and Issues:	Considerations for user privacy and data handling policies for uploaded images and conversation logs should be addressed.

14.2   Functional Requirements

1.   The system must provide a mechanism for users to initiate interaction with an AI-powered chatbot.

    1.1   The system must display an AI Chatbot (Q&A) widget on the home screen.

        1.1.1   The system must direct users to the chatbot interaction page upon selecting the widget.

    1.2   The system must facilitate various forms of user input for interaction with the chatbot.

        1.2.1   The system must offer a text input field for typing questions.

            1.2.1.1 The system must analyze text questions and provide relevant answers.

        1.2.2   The system must include a file upload interface for image analysis submissions.

            1.2.2.1 The system must analyze uploaded images and provide insights or actions based on the image content.

    1.3   The system must allow users to engage in ongoing interaction with the chatbot.

        1.3.1   The system must enable users to ask additional questions or upload more images without restarting the interaction process.

    1.4   The system must manage instances where the chatbot cannot understand or answer a query.

    1.4.1   The system must display a message prompting the user to rephrase the question or ask something different.

  1.5   The system must handle unsupported image formats or sizes.

      1.5.1   The system must address issues with image uploads that do not meet system requirements.

      1.5.2   The system must inform users of unsupported image formats or size restrictions and request a different image.

Non-Functional Requirements

1.   Performance Requirements

- The system must achieve full functionality within 10 seconds of opening.
- The system's login process shall be achieved within 5 seconds.
- The system must display and return results of nearest amenities searched within 5seconds.
- The system must display and return results of cheapest route to target location within 5 seconds.
- The system must display and return results of the converted currency amount from the chosen currency amount within 5 seconds.
- The system must send OTP to the user within 20 seconds when an OTP is requested.

2.   Security Requirements

- The system must hash passwords before storing them into the database to protect against data breaches.

3. **Scalability Requirements**

- The system must perform normally when concurrent users are at most 10000.

4. **Supportability Requirements**

- The system's external APIs must be easily updated and maintained.

- The system must be implemented so that extra features can be easily added.

- The system must be implemented so that defects can be easily fixed.

5. **Reliability Requirements**

- The system must be running at least 98% of the time.

- The system must automatically detect faults within 30 minutes of fault emergence.

- The system must report faults within 5 minutes after fault detection.

- The system must reboot within 10 minutes after a fault has been fixed.

6. **Usability Requirements**

- The system must be compatible with Google Chrome and Safari.

Data Dictionary

Term	Definition
User	A Person with an account in the system and uses the services the application provides.
OTP	An automatically generated alphanumeric string that authenticates the user for a login session.
Amenity	A desirable feature or facility such as a hospital, restaurant, parks etc.
Profile	A list of user profile details such as name, gender, age, home country, profession, area of residence in Singapore and profile picture.

Password	A string of characters (alphabets, numbers, special characters) that is used to login to the account and protect it from unauthorized users.
Chronological	Following the order which they occurred.
Transit Route	Mode of transport and the route which they take between a starting point and end point.
Currency Exchange Rate	The rate at which one currency will be exchanged for another currency.
System	CROSS BORDER application
Geolocation Tracking	The ability to track a device's whereabouts using GPS, cell phone towers, Wi-Fi access points or a combination of these.