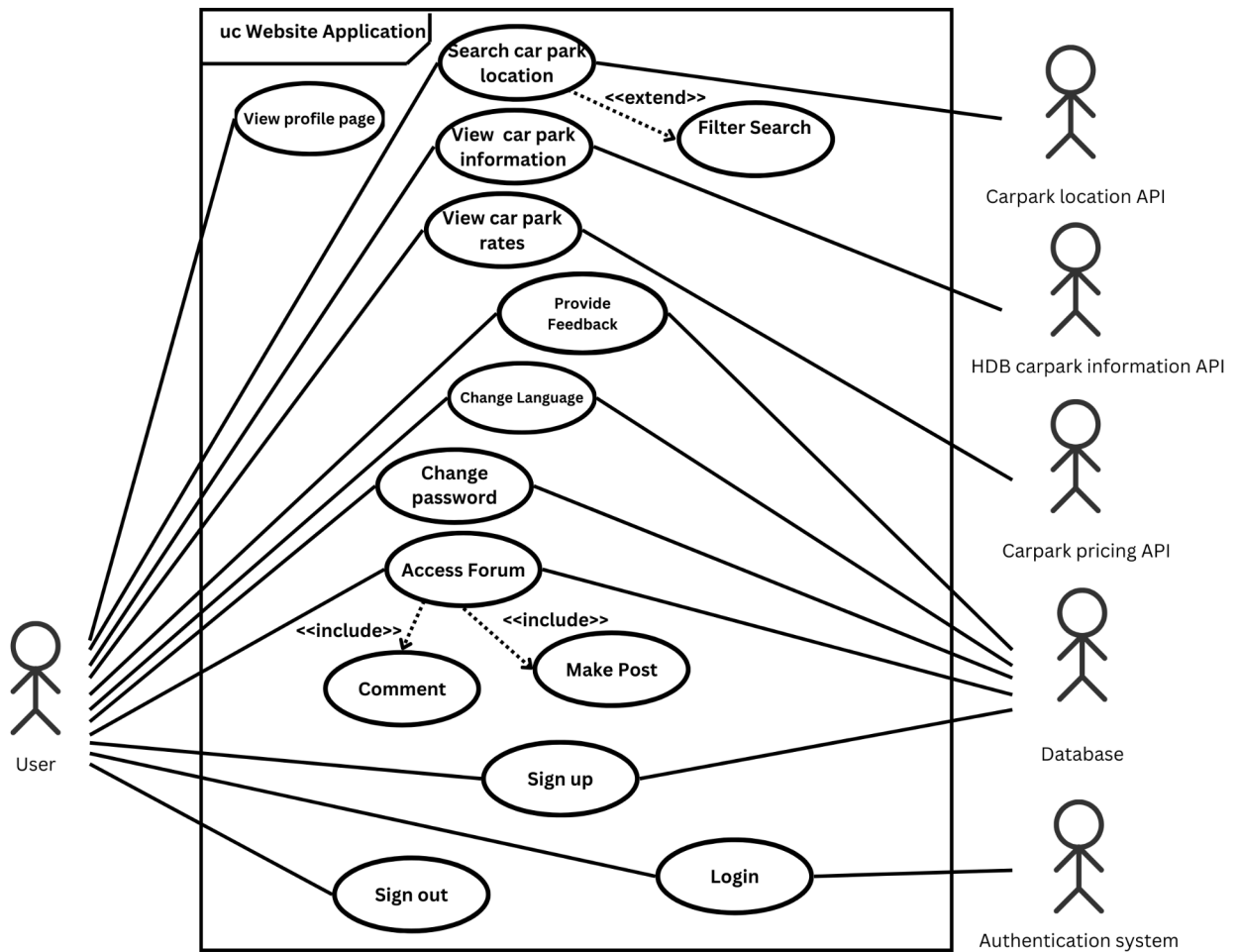


# SC2006 FDAE TEAM 2 LAB 2

|  |           |
|--|-----------|
| <b>USE CASE DIAGRAM</b>                                  | <b>2</b>  |
| <b>USE CASE DESCRIPTIONS</b>                             | <b>3</b>  |
| Sign up  | 3         |
| Login  | 4         |
| Change Password  | 5         |
| Sign Out   | 6         |
| View Profile Page  | 7         |
| Search car park location                                 | 8         |
| Filter Search  | 9         |
| View car park information                                | 10        |
| View car park rates                                      | 11        |
| Change Language  | 12        |
| Access Forum   | 14        |
| Comment  | 15        |
| Make Post  | 17        |
| Feedback   | 18        |
| <b>KEY BOUNDARY CLASSES AND CONTROL CLASSES</b>          | <b>20</b> |
| Boundary Classes — interaction between actor and system  | 20        |
| Control Classes — logic to realise use case              | 20        |
| Entity Classes — information tracked by System           | 20        |
| <b>CLASS DIAGRAM</b>                                     | <b>21</b> |
| <b>SEQUENCE DIAGRAM</b>                                  | <b>22</b> |
| 1. Sign Up   | 22        |
| 2. Login and Sign Out                                    | 22        |
| 3. Change password                                       | 23        |
| 4. View profile page                                     | 24        |
| 5. Search car park location (extend to) -> filter search | 24        |
| 6. View car park information                             | 25        |
| 7. View car park rates                                   | 26        |
| 8. Give feedback   | 27        |
| 9. View forum (posting comments & pictures)              | 28        |
| 10. Change language                                      | 29        |
| <b>DIALOG MAP</b>  | <b>30</b> |

# USE CASE DIAGRAM



# USE CASE DESCRIPTIONS

|                    |  |
|--------------------|--|
| Use Case Name      | Sign up  |
| Actor:             | User, Database   |
| Description:       | Allow new user to create account   |
| Preconditions:     | User does not have an existing account   |
| Postconditions:    | New user account created   |
| Flow of Events:    | <p>S1: User opens app for the first time</p> <p>S2: User is brought to login page</p> <p>S3: User clicks on “Sign up” button and redirected to sign up page</p> <p>S4: User enters relevant details (full name, email, userID, phone number, car plate number)</p> <p>S5: App stores new user information in database</p> <p>S6: User enters main page</p>   |
| Alternative Flows: | <p>AF-S4-1: Email/Phone Number is in wrong format</p> <ol style="list-style-type: none"><li>1. App displays “Please ensure Email/Phone Number is in correct format.” message</li><li>2. App remains at step S4 until requirements are met</li></ol> <p>AF-S4-2: Password and Confirm Password doesn’t Match</p> <ol style="list-style-type: none"><li>1. App displays “Please ensure passwords match.” message</li></ol> |

|             |   |
|-------------|---|
|             | <p>2. App remains at step S4 until requirements are met</p> <p>AF-S5: Email already registered</p> <ol style="list-style-type: none"> <li>1. App displays "Email already in use. Please use a different email or log in." message</li> <li>2. App returns to step S2</li> </ol> |
| Exceptions: | <p>EX1: Database is inaccessible</p> <p>EX2: Network error</p> <ol style="list-style-type: none"> <li>1. App displays "Error. Not connected to the internet."</li> </ol>  |

|                 |   |
|-----------------|---|
| Use Case Name   | Login   |
| Actor:          | User, Authentication System   |
| Description:    | Allow user to log in  |
| Preconditions:  | <p>User has an existing account</p> <p>User has not logged in on device before</p>  |
| Postconditions: | User is logged in and authenticated   |
| Flow of Events: | <p>S1: User opens app</p> <p>S2: User is brought to login page</p> <p>S3: User enters email/password</p> <p>S4: Authentication System verifies login details with database</p> <p>S5: User is logged in successfully</p> <p>S6: User enters main page</p> |

|                    |   |
|--------------------|---|
| Alternative Flows: | <p>AF-S4-1: Login password is invalid</p> <ol style="list-style-type: none"> <li>1. App displays “Wrong Password. Please try again.” message</li> <li>2. App returns to step S2</li> </ol> <p>AF-S4-2: Login email is invalid</p> <ol style="list-style-type: none"> <li>1. App displays “User does not exist. Please create a new account.” message</li> <li>2. App returns to step S2</li> </ol>  |
| Exceptions:        | <p>EX1: Password is entered wrongly 3 times and user exists</p> <ol style="list-style-type: none"> <li>1. App displays “You have entered an invalid password 3 times. Please change your password. ”</li> <li>2. Initiate “Change Password” use case</li> </ol> <p>EX2: Authentication System/ Database is inaccessible</p> <p>EX3: Network error</p> <ol style="list-style-type: none"> <li>1. App displays “Error. Not connected to the internet.”</li> </ol> |

|                 |                                      |
|-----------------|--------------------------------------|
| Use Case Name   | Change Password                      |
| Actor:          | User, Database                       |
| Description:    | Allow user to change password        |
| Preconditions:  | User has an existing account         |
| Postconditions: | User password is changed             |
| Flow of Events: | S1: User clicks on “Change Password” |

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|                    | <p>S2: App requests user to enter existing password and new password twice</p> <p>S3: If no problems password is changed</p> <p>S4: App updates the database</p>   |
| Alternative Flows: | <p>AF-S1: User forgot password and failed to login thrice and was redirected to change password</p> <ol style="list-style-type: none"> <li>1. App sends an OTP to user through mobile/email</li> <li>2. App requests user to enter OTP</li> <li>3. User enters OTP</li> <li>4. App verifies OTP with authentication system</li> <li>5. Skip to step S4 when OTP is correct, else display 'Please enter the correct OTP.'</li> </ol> <p>AF-S3: Password and Confirm Password doesn't Match</p> <ol style="list-style-type: none"> <li>1. App displays "Please ensure passwords match." message</li> <li>2. App remains at step S2 until requirements are met</li> </ol> |
| Exceptions:        | <p>EX1: Authentication System/ Database is inaccessible</p> <p>EX2: Network error</p> <ol style="list-style-type: none"> <li>1. App displays "Error. Not connected to the internet."</li> </ol>  |

|                |  |
|----------------|--|
| Use Case Name: | Sign Out   |
| Actor:         | User   |
| Description:   | Allow user to log out of the app   |
| Preconditions: | <p>User is logged in and authenticated</p> <p>User is on the main page</p> |

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| Postconditions:    | User is logged out and return to the login page   |
| Flow of Events:    | <p>S1: User taps the “Sign Out” button</p> <p>S2: App prompts user with a confirmation message “Are you sure you want to sign out?”</p> <p>S3: User confirms the sign-out action</p> <p>S4: App clears user session data</p> <p>S5: User is signed out and redirected to the login page</p> |
| Alternative Flows: | <p>AF-S3: User cancels sign-out</p> <ol style="list-style-type: none"> <li>1. App returns to the main page without logging out</li> </ol>   |
| Exceptions:        | <p>EX1: Sign-out fails due to a system error</p> <ol style="list-style-type: none"> <li>1. App displays “There was an error signing you out. Please try again later.” message</li> </ol>  |

|                 |   |
|-----------------|---|
| Use Case Name   | View Profile Page   |
| Actor:          | User  |
| Description:    | Allow users to view and update their profile information      |
| Preconditions:  | User is logged in and on the homepage                         |
| Postconditions: | User can view and update their profile information            |
| Flow of Events: | S1: User selects the “Profile” option from the navigation bar |

|                    |   |
|--------------------|---|
|                    | <p>S2: App retrieves the user's profile data from the User Authentication System</p> <p>S3: App displays the user's profile information including email, username, vehicle number plate, and other relevant details</p> <p>S4: User can edit their details such as email, password, or vehicle number plate</p> <p>S5: User confirms changes and updates are saved to the User Authentication System</p> <p>S6: App confirms changes have been successfully updated</p> |
| Alternative Flows: | <p>AF-S4: User cancels profile updates</p> <ol style="list-style-type: none"> <li>1. App returns to the homepage without saving any changes</li> </ol>  |
| Exceptions:        | <p>EX1: Profile update fails due to system error</p> <ol style="list-style-type: none"> <li>1. App displays "There was an error updating your profile. Please try again later."</li> </ol>  |

|                 |  |
|-----------------|--|
| Use Case Name   | Search car park location                                     |
| Actor:          | User, Carpark Location API                                   |
| Description:    | Allow users to search for specific car park locations        |
| Preconditions:  | User is logged in and on the homepage                        |
| Postconditions: | User is presented with search results for car park locations |
| Flow of Events: | S1: User enters a location or address into the search bar    |



|                    |  |
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|                    | <p>S2: App processes the input and retrieves matching car park locations from the Car Park Information System</p> <p>S3: App displays a list of car parks that match the search query, including their names and general location information</p> <p>S4: User can click on any car park in the list for more detailed information</p>  |
| Alternative Flows: | <p>AF-S2-1: No matching car parks found</p> <ol style="list-style-type: none"> <li>1. App displays “No car parks found matching your search. Please try again with different keywords.”</li> <li>2. Return to step S1</li> </ol>   |
| Exceptions:        | <p>EX1: Search query fails due to system error.</p> <ol style="list-style-type: none"> <li>1. App displays “There was an error processing your search. Please try again later.”</li> </ol> <p>EX2: API rate limit exceeded.</p> <ol style="list-style-type: none"> <li>1. App displays “There was an overload of requests. Please try again later.”</li> </ol> <p>EX3: Network error</p> <ol style="list-style-type: none"> <li>1. App displays “Error. Not connected to the internet.”</li> </ol> |

|                |  |
|----------------|--|
| Use Case Name  | Filter Search  |
| Actor:         | User, Carpark Location API   |
| Description:   | Extends search by allowing users to filter by types of parking, payment options, and amenities like electric vehicle charging stations |
| Preconditions: | User is logged in and on the homepage  |

|                    |   |
|--------------------|---|
| Postconditions:    | User is presented with filtered search results for car parks  |
| Flow of Events:    | <p>S1: User enters a location or address into the search bar</p> <p>S2: User chooses from a list of filters to filter the search result by</p> <p>S3: App displays a list of car parks that match the search query and filters, including their names and general location information</p> <p>S4: User can click on any car park in the list for more detailed information</p>  |
| Alternative Flows: | <p>AF-S3: No matching car parks found</p> <ol style="list-style-type: none"> <li>1. App displays "No car parks found matching your search. Please try again with different keywords."</li> </ol>  |
| Exceptions:        | <p>EX1: Search query fails due to system error</p> <ol style="list-style-type: none"> <li>1. App displays "There was an error processing your search. Please try again later."</li> </ol> <p>EX2: API rate limit exceeded.</p> <ol style="list-style-type: none"> <li>1. App displays "There was an overload of requests. Please try again later."</li> </ol> <p>EX3: Network error</p> <p>App displays "Error. Not connected to the internet."</p> |

|               |                                   |
|---------------|-----------------------------------|
| Use Case Name | View car park information         |
| Actor:        | User, HDB Carpark Information API |

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|--------------------|---|
| Description:       | Allow users to view real-time availability and information about HDB car parks  |
| Preconditions:     | User is logged in and on the homepage   |
| Postconditions:    | User views the real-time availability and information of parking lots   |
| Flow of Events:    | <p>S1: User selects a car park from the list or searches for a specific car park</p> <p>S2: App retrieves real-time parking availability for the selected car park</p> <p>S3: App displays the parking lot details including rates, operating hours, gantry height, and payment methods</p> |
| Alternative Flows: | <p>AF-S2: No parking lots available</p> <ol style="list-style-type: none"> <li>App displays “No available parking lots at the moment. Please try again later.”</li> </ol>   |
| Exceptions:        | <p>EX1: Real-time data retrieval fails</p> <ol style="list-style-type: none"> <li>App displays “Unable to retrieve parking availability. Please try again later.”</li> </ol> <p>EX2: Network error</p> <p>App displays “Error. Not connected to the internet.”</p>                          |

|               |   |
|---------------|---|
| Use Case Name | View car park rates   |
| Actor:        | User, Carpark Pricing API   |
| Description:  | Allow users to view the parking rates for selected car parks based on the date and time |

|                    |   |
|--------------------|---|
| Preconditions:     | User is logged in and has selected a specific car park  |
| Postconditions:    | User views the parking rates for the selected car park  |
| Flow of Events:    | <p>S1: User selects a car park to view details</p> <p>S2: App displays the car park details, including the available parking rates</p> <p>S3: User selects a date and time for parking to see specific rates for that period</p> <p>S4: App displays the relevant rates based on the user's selection</p> <p>S5: User can choose to reserve a parking spot based on the displayed rates</p> |
| Alternative Flows: | <p>AF-S3: No rates available for selected date and time</p> <ol style="list-style-type: none"> <li>1. App displays "No available parking rates for the selected time. Please try a different time."</li> </ol>  |
| Exceptions:        | <p>EX1: Rates retrieval fails due to system error</p> <ol style="list-style-type: none"> <li>1. App displays "There was an error retrieving parking rates. Please try again later."</li> </ol>  |

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|----------------|--|
| Use Case Name  | Change Language                                  |
| Actor:         | User, Database                                   |
| Description:   | Allows user to change language of user interface |
| Preconditions: | User is logged in                                |

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|--------------------|--|
| Postconditions:    | User interface language changed to preferred language  |
| Flow of Events:    | <p>S1: User enters Profile Page</p> <p>S2: User navigates to the settings section of the Profile Page</p> <p>S3: User selects the "Language" option from the settings menu</p> <p>S4: App displays a list of available languages</p> <p>S5: User selects their preferred language from the list</p> <p>S6: App updates the interface language to the selected language by fetching the translations from the Database</p> <p>S7: App confirms the language change and displays a message "Language updated successfully."</p>  |
| Alternative Flows: | <p>AF-S4: No available languages</p> <ol style="list-style-type: none"> <li>1. If there are no available languages for the user to choose from, the app displays a message "No language options are available at the moment."</li> <li>2. App returns to the Profile Page or settings section for the user to take further action.</li> </ol> <p>AF-S5: User cancels language change</p> <ol style="list-style-type: none"> <li>1. User chooses to cancel the language change after selecting a language.</li> <li>2. App returns to the Profile Page without applying any language change.</li> </ol> |
| Exceptions:        | <p>EX1: Language change fails due to system error</p> <ol style="list-style-type: none"> <li>1. App displays "Unable to update language settings. Please try again later."</li> <li>2. App returns to the Profile Page with no language change applied.</li> </ol>   |

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|  | <p>EX2: Language preference not saved after session restart</p> <ol style="list-style-type: none"> <li>1. App displays “Your language preference could not be saved. Please try again.”</li> <li>2. User is prompted to reselect their language or return to default settings.</li> </ol> <p>EX3: Database error</p> <ol style="list-style-type: none"> <li>1. App displays “Unable to update language settings. Please try again later.</li> <li>2. App returns to the Profile Page with no language change applied.</li> </ol> <p>EX4: Network error</p> <ol style="list-style-type: none"> <li>1. App displays “Error. Not connected to the internet.”</li> </ol> |
|--|--|

|                 |  |
|-----------------|--|
| Use Case Name   | Access Forum   |
| Actor:          | User, Database   |
| Description:    | Allows user to access community forum to interact with other users and share experiences   |
| Preconditions:  | User is logged in  |
| Postconditions: | User views posts from other users or successfully posts  |
| Flow of Events: | <p>S1: User navigates to Community Page</p> <p>S2: App fetches forum data from the Database</p> <p>S3: User granted access to Forum page</p> <p>S4: User scrolls and views others’ posts</p> |

|                    |   |
|--------------------|---|
| Alternative Flows: | <p>AF-S4-1: User adds comments</p> <ol style="list-style-type: none"> <li>1. See included 'Comment' use case</li> </ol> <p>AF-S4-2: User makes and shares a post</p> <ol style="list-style-type: none"> <li>2. See included 'Make Post' use case</li> </ol>   |
| Exceptions:        | <p>EX1: Database error</p> <ol style="list-style-type: none"> <li>1. App displays "Unable to update language settings. Please try again later."</li> <li>2. App returns to the Profile Page with no language change applied.</li> </ol> <p>EX2: Network error</p> <ol style="list-style-type: none"> <li>1. App displays "Error. Not connected to the internet."</li> </ol> |
| Includes:          | Comment, Make Post  |

|                 |  |
|-----------------|--|
| Use Case Name   | Comment  |
| Actor:          | User, Database   |
| Description:    | Allows user to comment on other's posts  |
| Preconditions:  | User is logged in and on a post page   |
| Postconditions: | User successfully comments on a post   |
| Flow of Events: | <p>S1: User sees a post and has something to comment</p> <p>S2: User types comment in provided text field and adds image attachment if he wants to</p> |

|                    |  |
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|                    | <p>S3: If there are no problems user posts his comment by clicking 'Comment'</p> <p>S4: App stores his comment in the Database by updating the document containing the post being commented on</p>   |
| Alternative Flows: | <p>AF-S3-1: Attachment has invalid file type</p> <ol style="list-style-type: none"> <li>1. App displays "Invalid attachment type. Please try again".</li> <li>2. Attachment is not uploaded</li> </ol> <p>AF-S3-2: Attachment file size is too big</p> <ol style="list-style-type: none"> <li>1. App displays "Please do not exceed 10mb."</li> <li>2. Attachment is not uploaded</li> </ol> <p>AF-S3-3: User cancels comment submission</p> <ol style="list-style-type: none"> <li>1. App returns to the previous screen without submitting any comment</li> </ol> <p>AF-S5: User deletes comment after posting</p> <ol style="list-style-type: none"> <li>1. App removes comment from post document in Database and moves it to 'Deleted Comments'</li> <li>2. Comment is no longer displayed</li> </ol> |
| Exceptions:        | <p>EX1: Database error</p> <ol style="list-style-type: none"> <li>1. App displays "Unable to update language settings. Please try again later."</li> <li>2. App returns to the Profile Page with no language change applied.</li> </ol> <p>EX2: Network error</p> <ol style="list-style-type: none"> <li>1. App displays "Error. Not connected to the internet."</li> </ol> <p>EX3: Comment text exceeds character limit</p> <ol style="list-style-type: none"> <li>1. App displays "Your comment is too long. Please shorten your message."</li> </ol>  |



|  |  |
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|  | EX4: Comment submission fails due to system error<br><br>1. App displays "There was an error submitting your comment. Please try again later." |
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|--------------------|--|
| Use Case Name      | Make Post  |
| Actor:             | User, Database   |
| Description:       | Allows user to make and share a post   |
| Preconditions:     | User is logged in and in the forum   |
| Postconditions:    | User successfully posts a post   |
| Flow of Events:    | S1: User has something to share<br><br>S2: User types post in text box and includes image attachments if he wants to<br><br>S3: If there are no problems User makes a post by clicking 'Post'<br><br>S4: App creates a new document for his post and stores it in the Database   |
| Alternative Flows: | AF-S3-1: Attachment has invalid file type<br><br>1. App displays "Invalid attachment type. Please try again".<br>2. Attachment is not uploaded<br><br>AF-S3-2: Attachment file size is too big<br><br>1. App displays "Please do not exceed 10mb."<br>2. Attachment is not uploaded<br><br>AF-S3-3: User cancels post submission |

|             |  |
|-------------|--|
|             | <ol style="list-style-type: none"> <li>1. App returns to the previous screen without submitting any post</li> </ol> <p>AF-S5: User deletes post after posting</p> <ol style="list-style-type: none"> <li>1. App sets the status of post in Database to 'Deleted'</li> <li>2. The post is no longer displayed</li> </ol>  |
| Exceptions: | <p>EX1: Database error</p> <ol style="list-style-type: none"> <li>1. App displays "Unable to update language settings. Please try again later."</li> <li>2. App returns to the Profile Page with no language change applied.</li> </ol> <p>EX2: Network error</p> <ol style="list-style-type: none"> <li>1. App displays "Error. Not connected to the internet."</li> </ol> <p>EX3: Post text exceeds character limit</p> <ol style="list-style-type: none"> <li>1. App displays "Your post is too long. Please shorten your text."</li> </ol> <p>EX4: Post submission fails due to system error</p> <ol style="list-style-type: none"> <li>1. App displays "There was an error submitting your comment. Please try again later."</li> </ol> |

|                |   |
|----------------|---|
| Use Case Name  | Feedback  |
| Actor:         | User, Database  |
| Description:   | Allows users to provide feedback on their experience with the app |
| Preconditions: | <p>User is logged in</p> <p>User is on the feedback page</p>      |

|                    |   |
|--------------------|---|
| Postconditions:    | User's feedback is stored in the database for review  |
| Flow of Events:    | <p>S1: User selects the "Feedback" option from the navigation menu</p> <p>S2: App prompts the user to enter their feedback</p> <p>S3: User enters feedback in the provided text field</p> <p>S4: User submits the feedback</p> <p>S5: App confirms submission with a message "Thank you for your feedback"</p> <p>S6: Feedback is stored in the system for review</p>   |
| Alternative Flows: | <p>AF-S2-1: User cancels feedback submission</p> <ol style="list-style-type: none"> <li>App returns to the previous screen without submitting any feedback</li> </ol>   |
| Exceptions:        | <p>EX1: Feedback submission fails due to system error</p> <ol style="list-style-type: none"> <li>App displays "There was an error submitting your feedback. Please try again later."</li> </ol> <p>EX2: Feedback text exceeds character limit</p> <ol style="list-style-type: none"> <li>App displays "Your feedback is too long. Please shorten your message."</li> </ol> <p>EX3: Network error</p> <ol style="list-style-type: none"> <li>App displays "Error. Not connected to the internet."</li> </ol> |

# KEY BOUNDARY CLASSES AND CONTROL CLASSES

## Boundary Classes — interaction between actor and system

- SearchInterface
- SignupForm
- ProfilePage
- ChangeLanguageInterface
- LoginForm
- ForumPage
- FeedbackPage
- HomePage

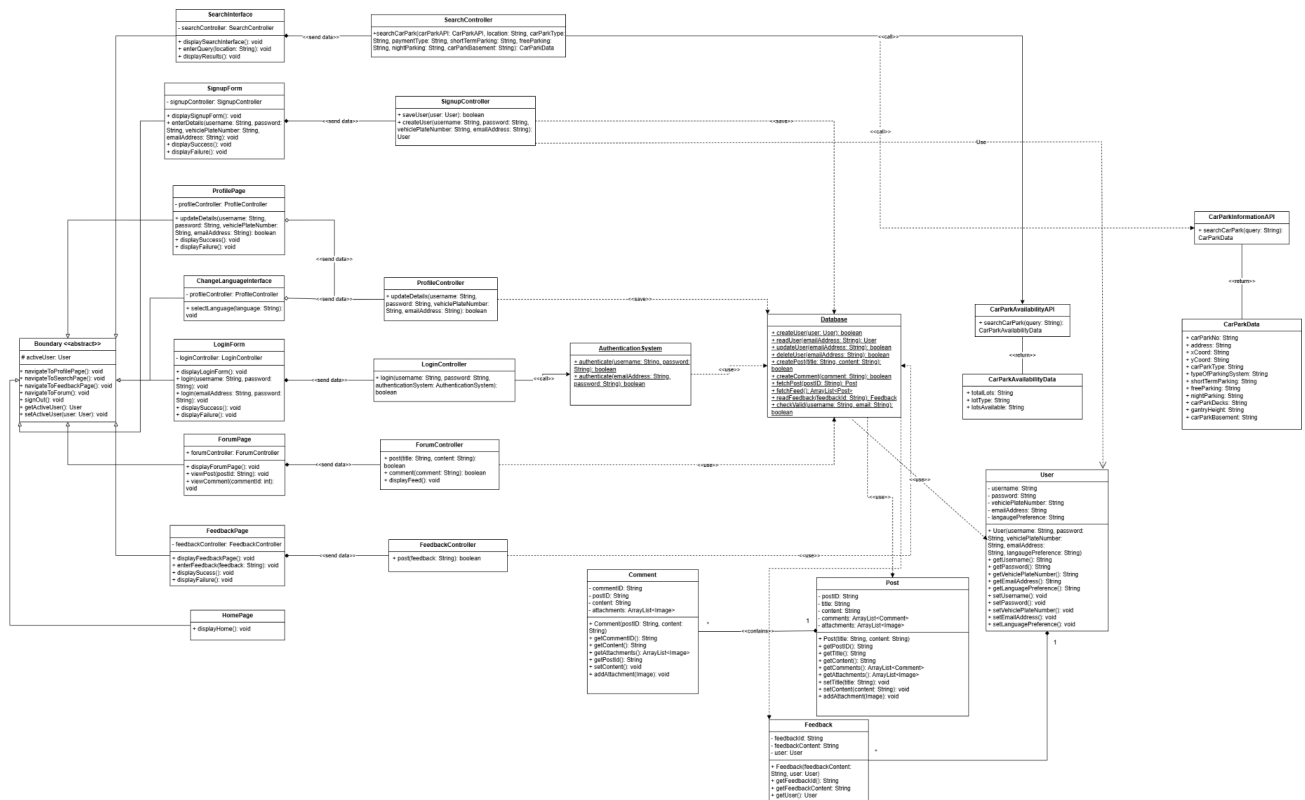
## Control Classes — logic to realise use case

- SearchController
- SignupController
- ProfileController
- LoginController
- ForumController
- FeedbackController
- AuthenticationSystem

## Entity Classes — information tracked by System

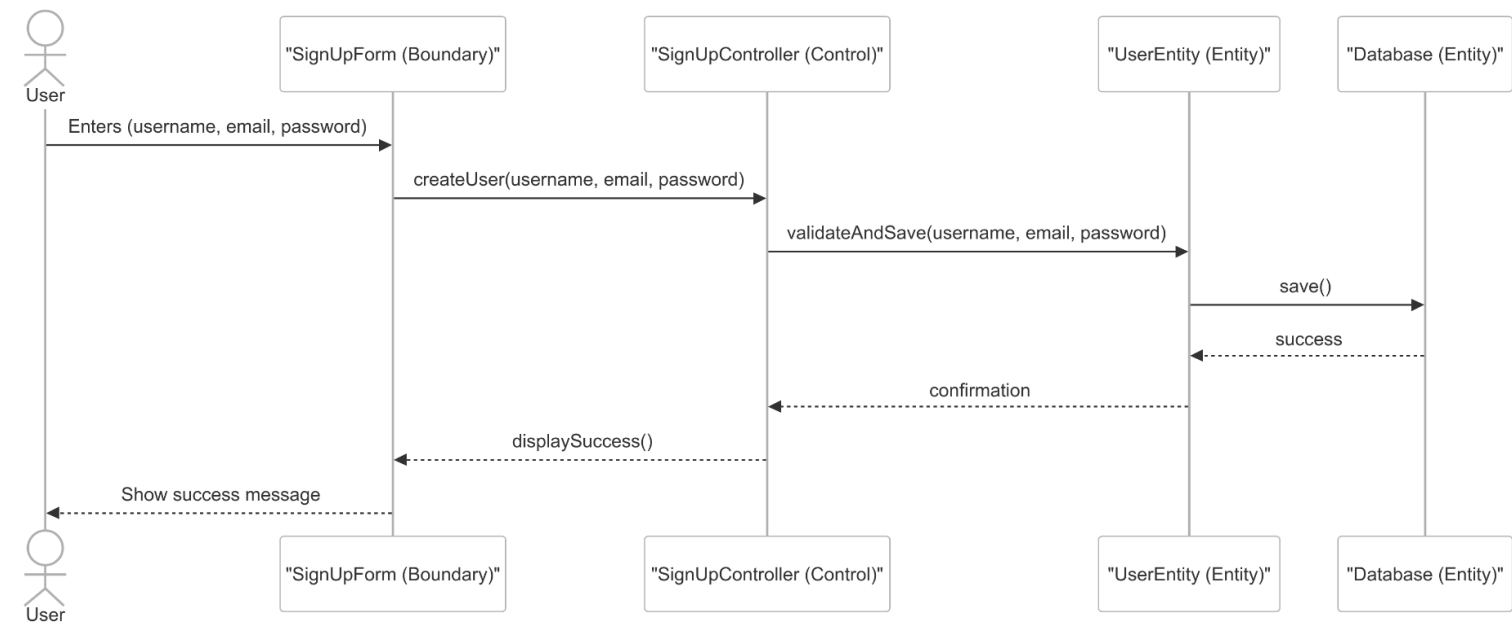
- CarparkInformationAPI
- CarparkAvailabilityAPI
- Database
- User
- Post
- Comment
- Feedback

# CLASS DIAGRAM

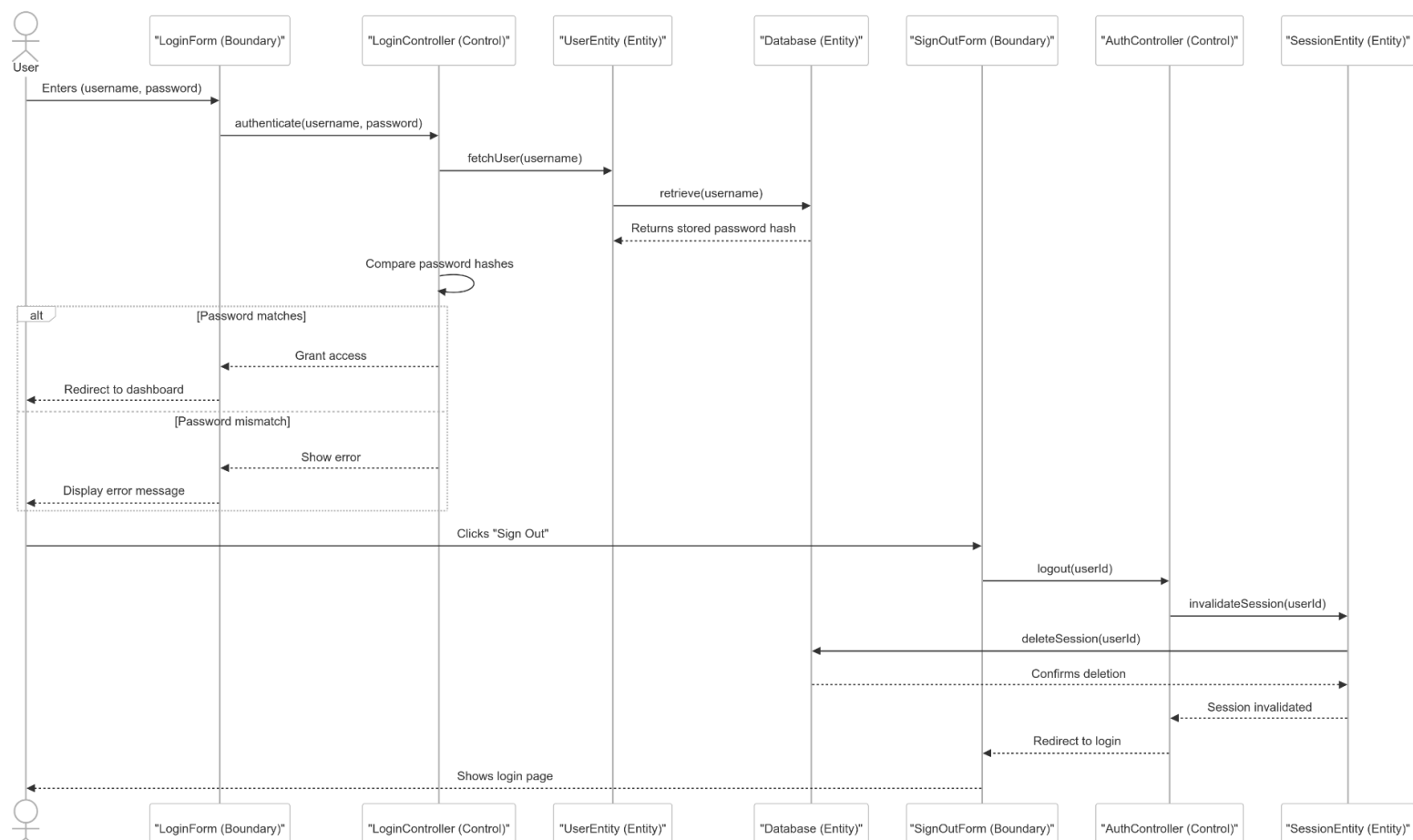


# SEQUENCE DIAGRAM

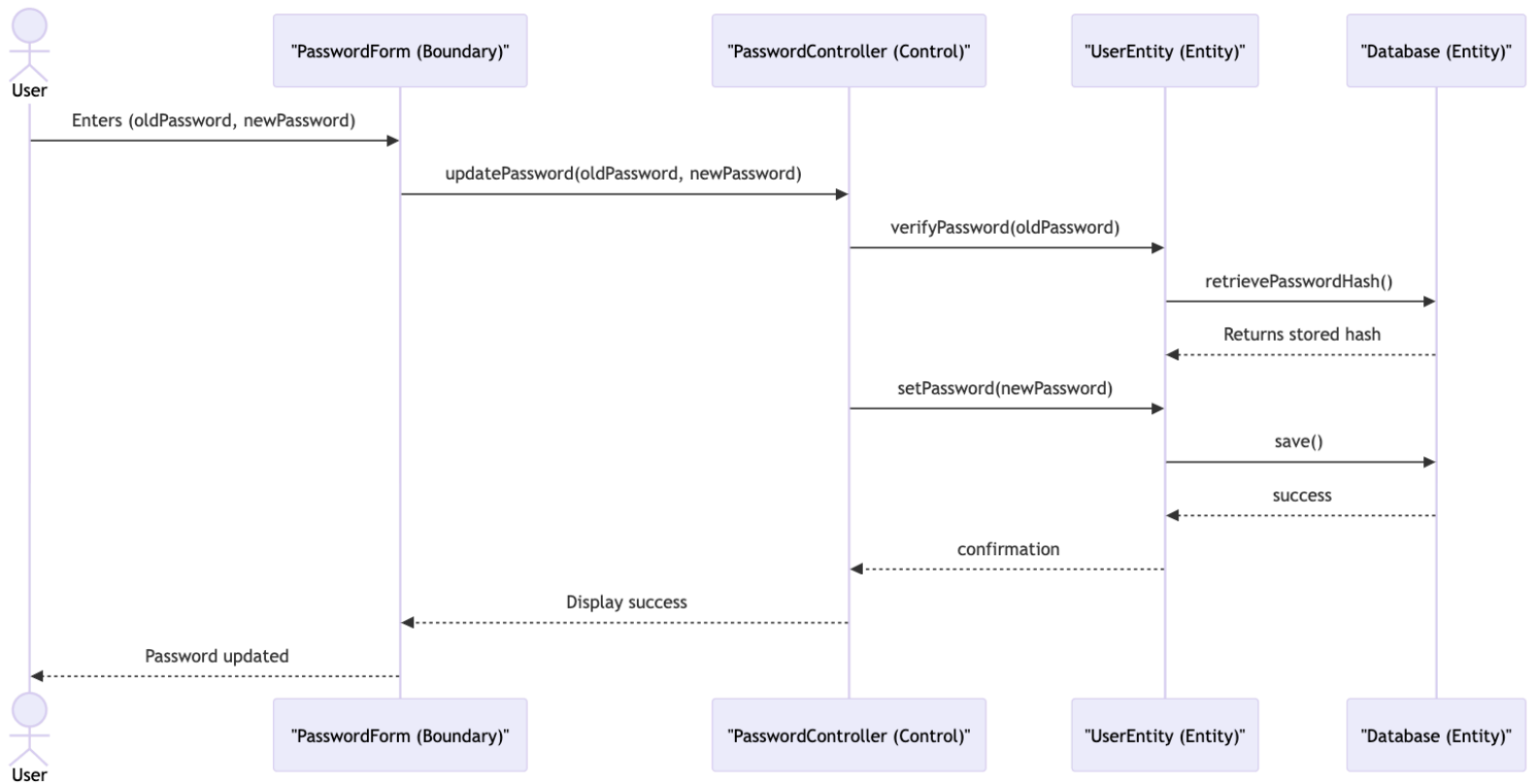
## 1. Sign Up



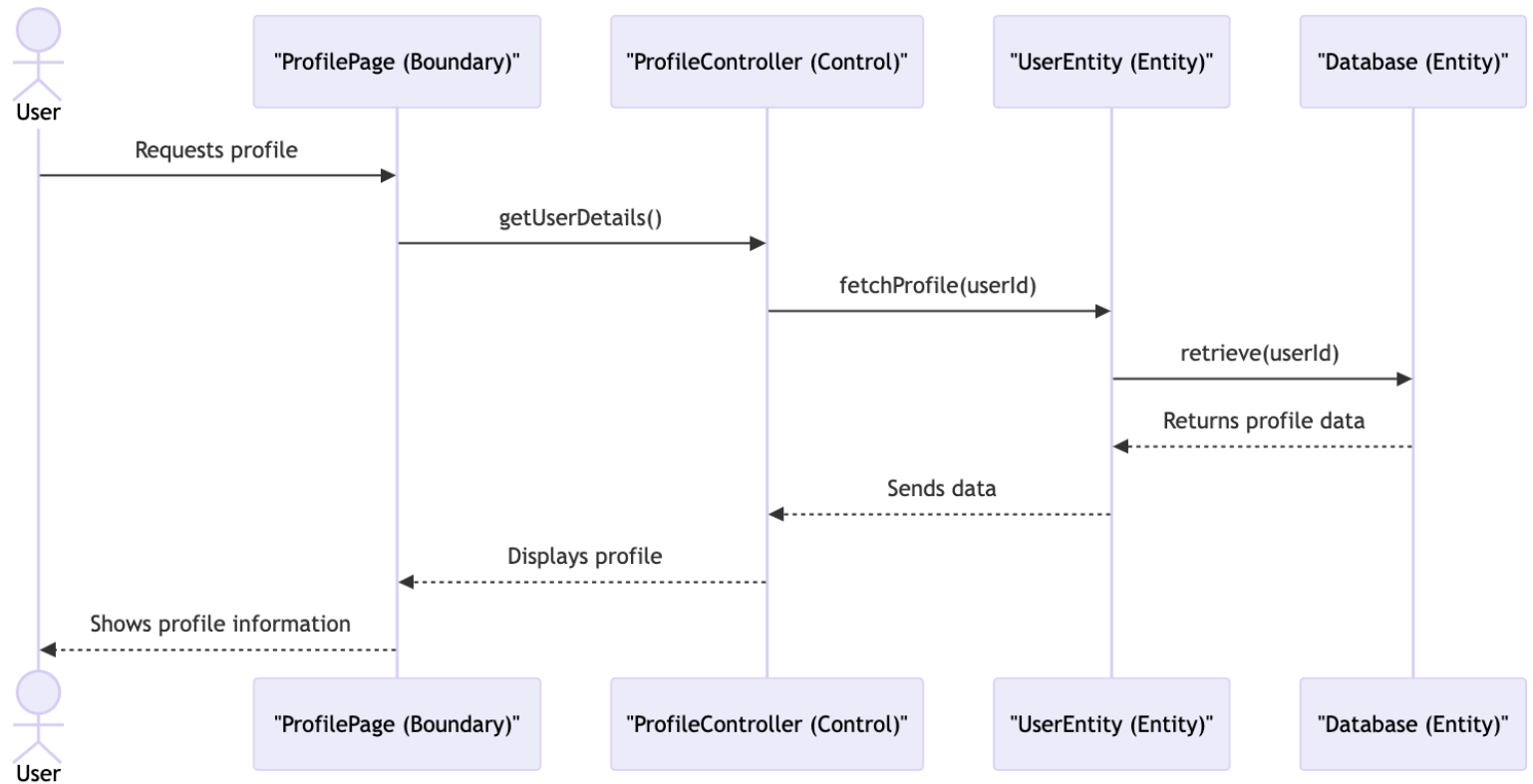
## 2. Login and Sign Out



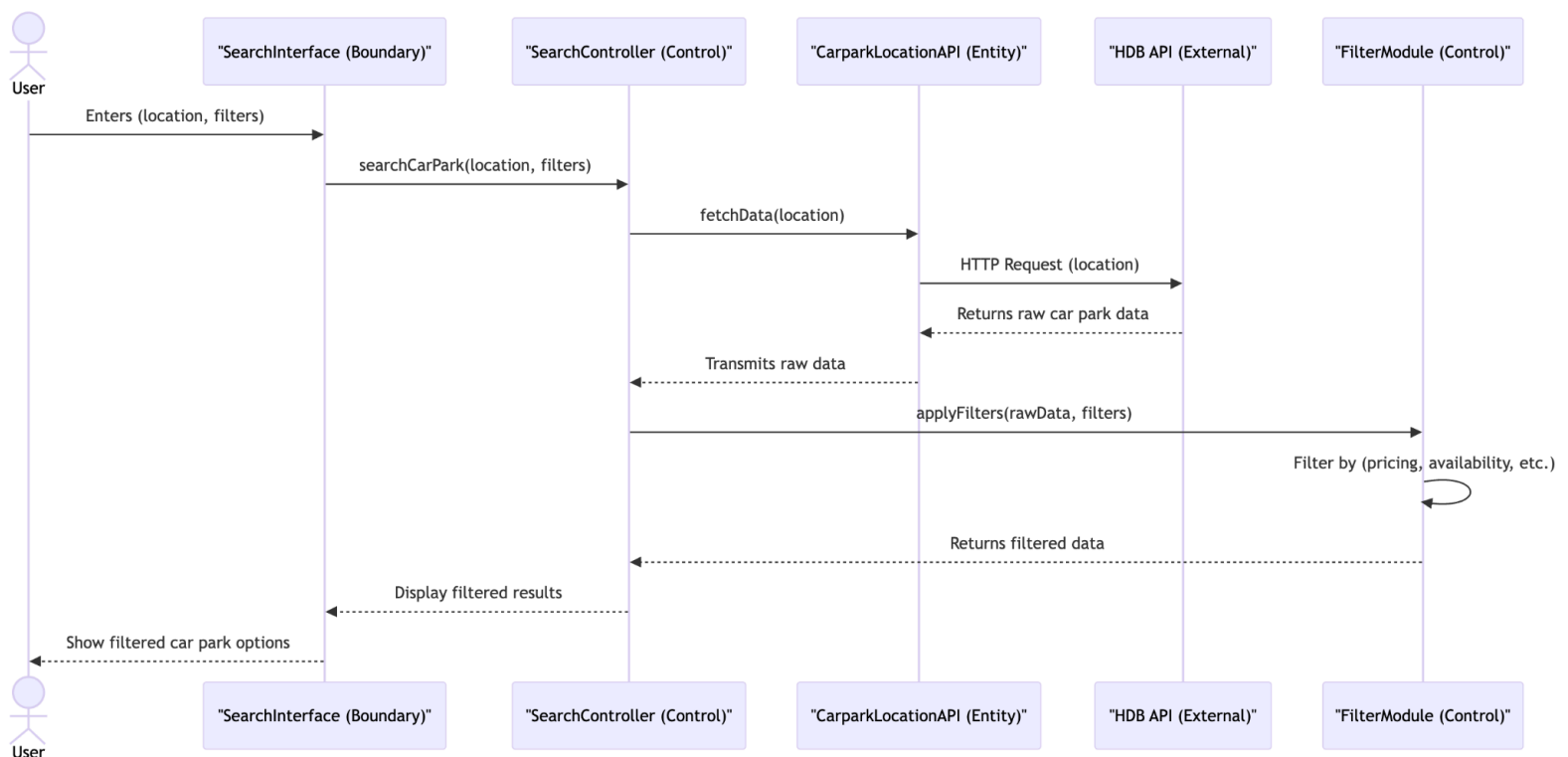
### 3. Change password



#### 4. View profile page

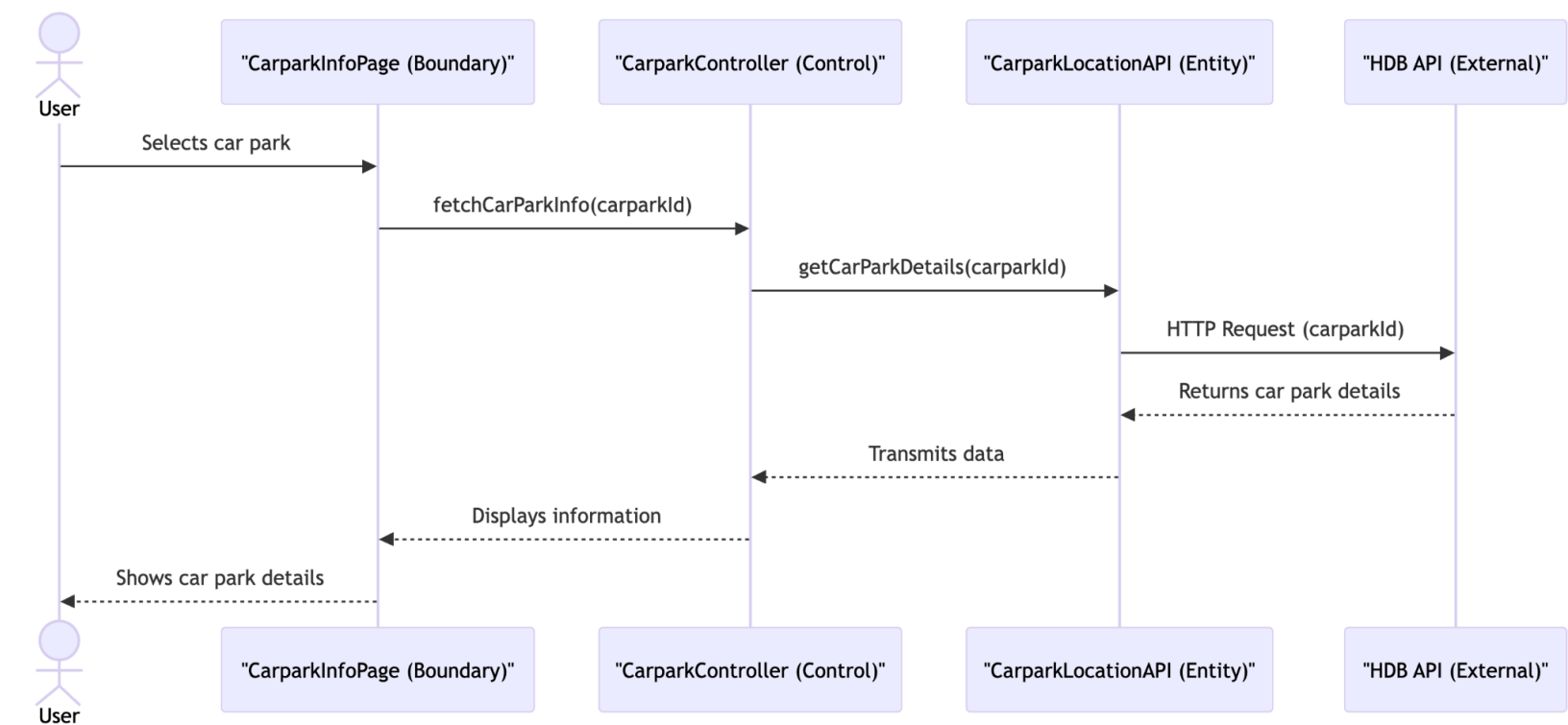


#### 5. Search car park location (extend to) -> filter search

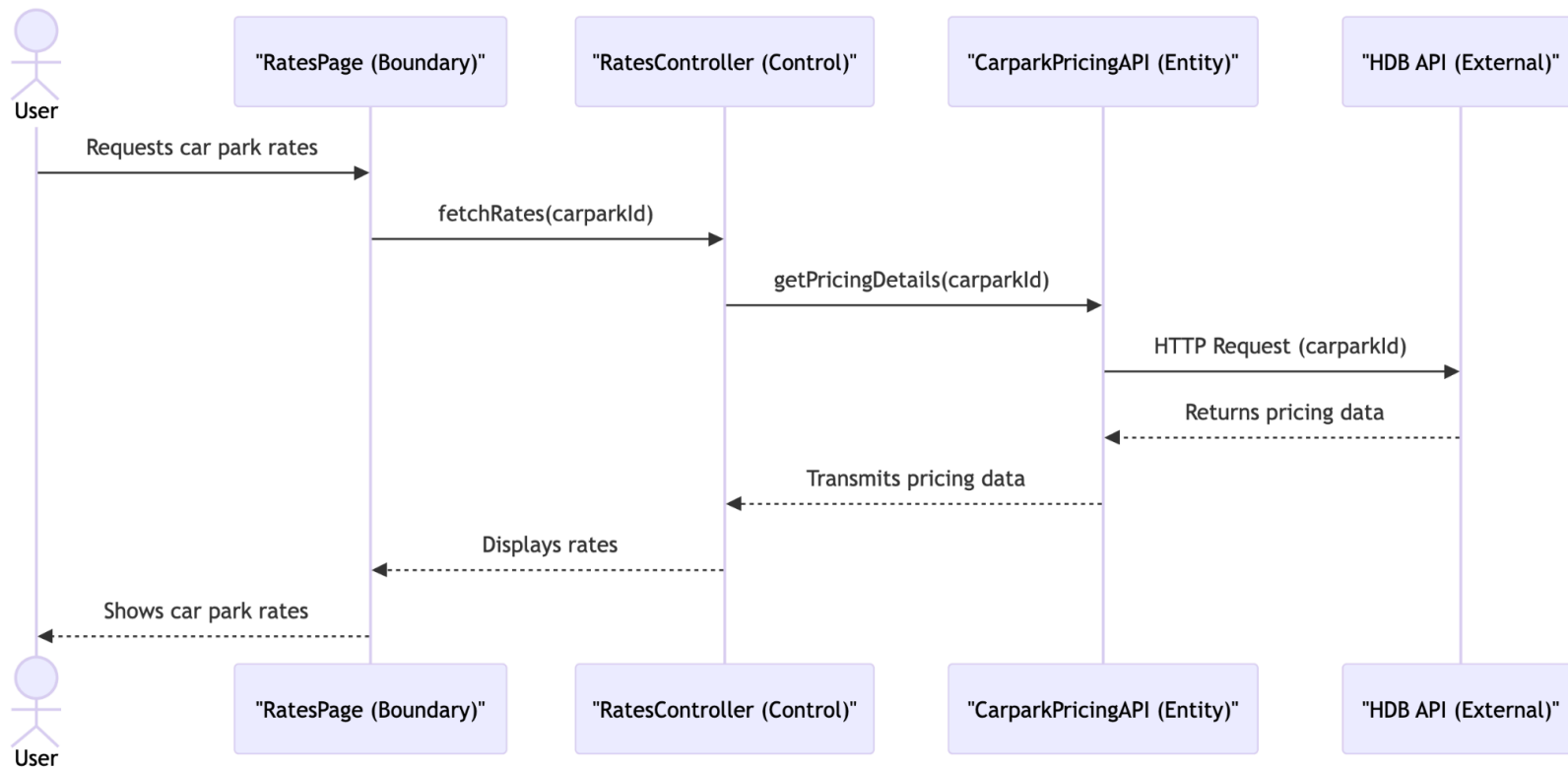




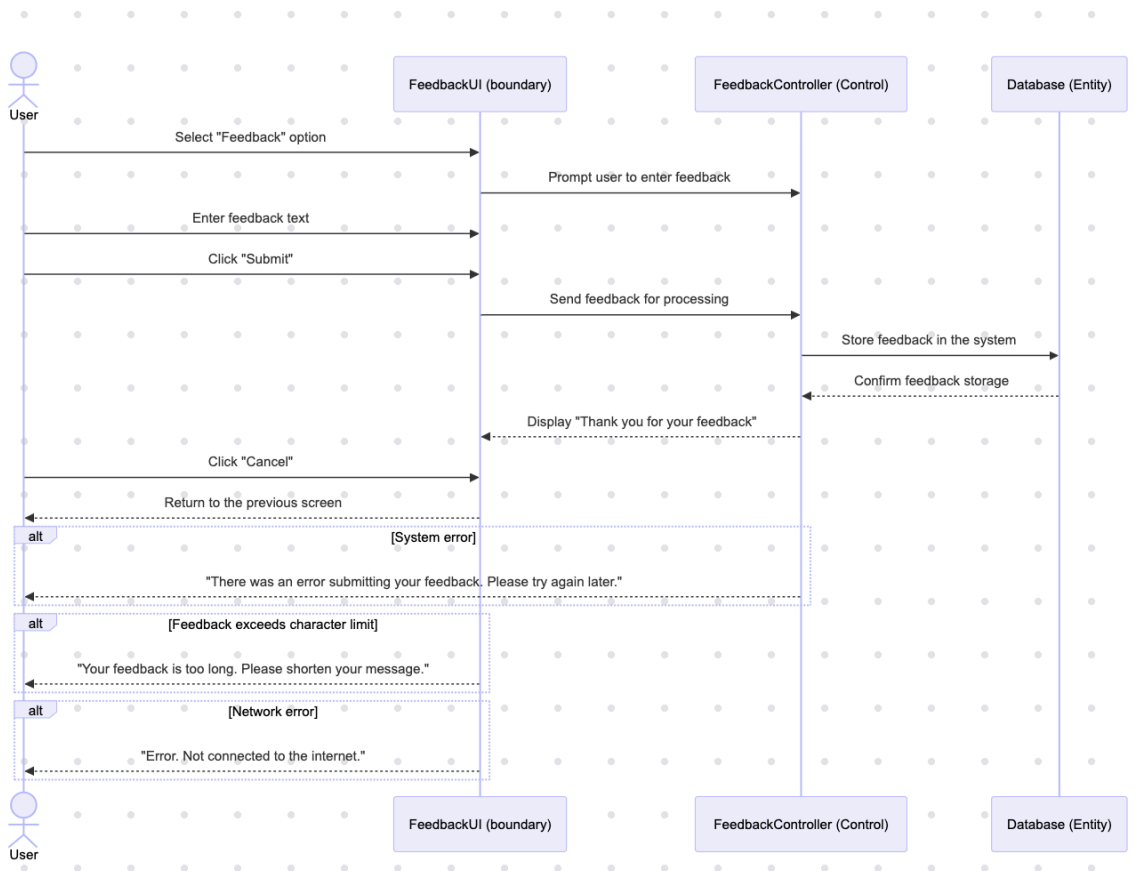
# 6. View car park information



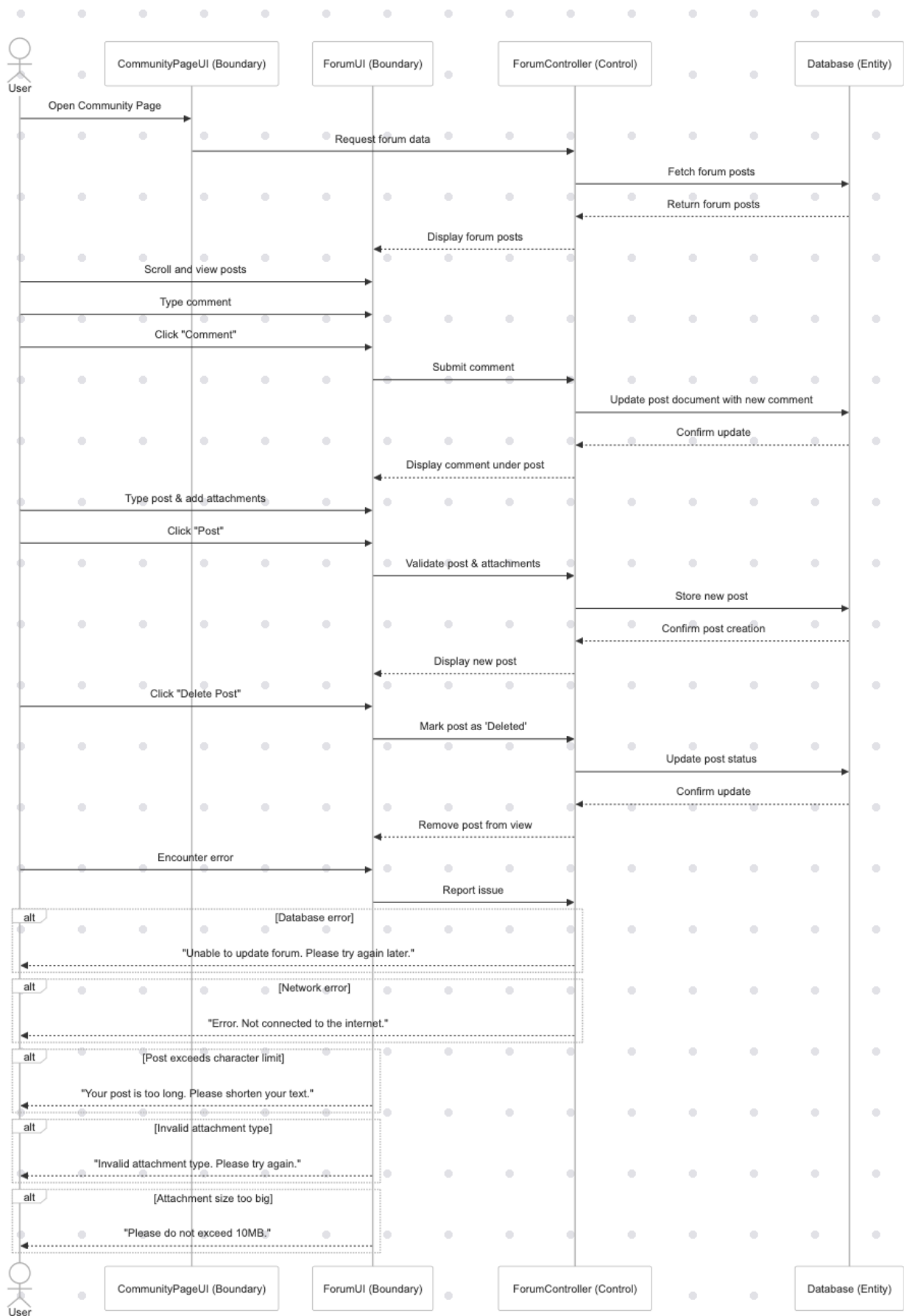
# 7. View car park rates



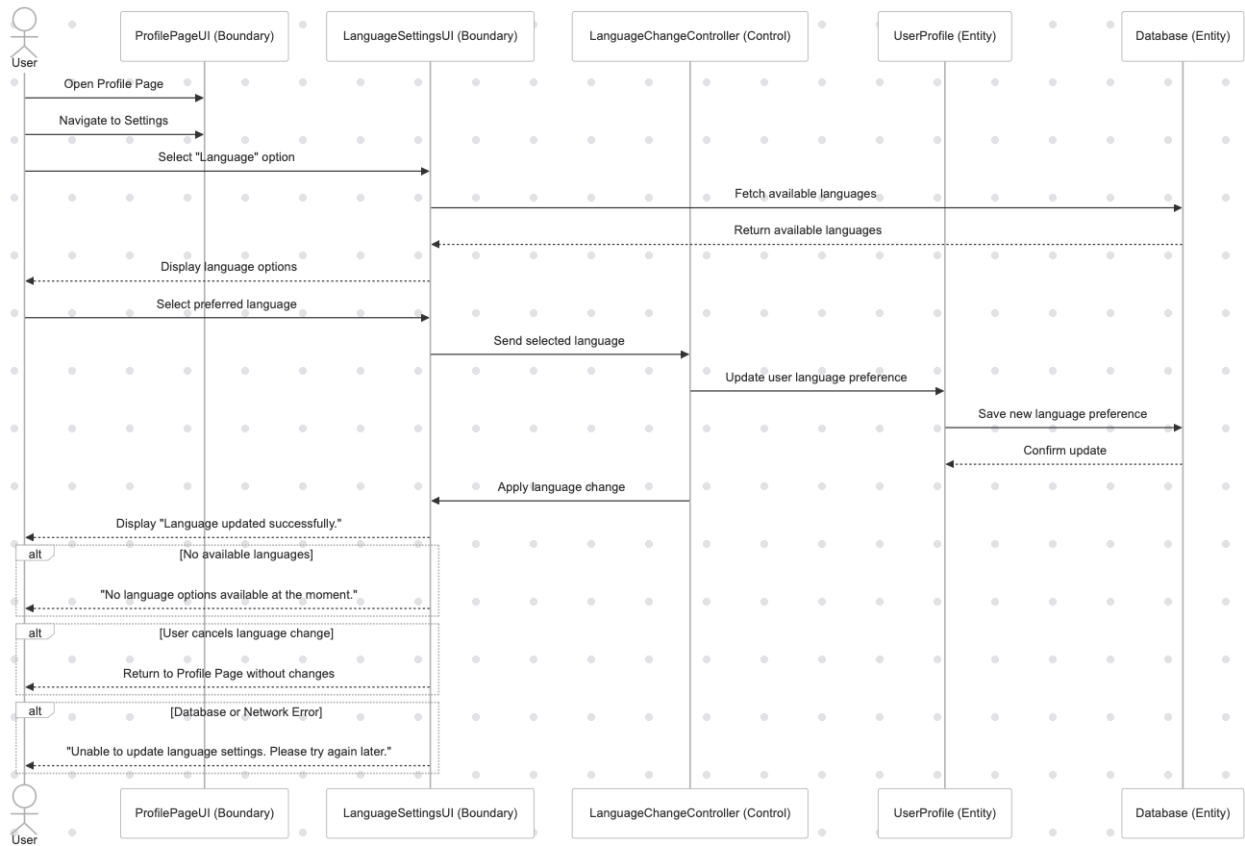
## 8. Give feedback



## 9. View forum (posting comments & pictures)



## 10. Change language



# DIALOG MAP

