Use Case ID:	REG	
Use Case Name:	Register	
Created By:	Ng Yao Hong	Last Updated By:
Date Created:	08/02/2024	Date Last Updated:

Actor:	User
Description:	First time users must register for an account before gaining access to the system's features. They can register for an account by clicking on the 'Register' button. After registering, they will be able to search for the station's crowd level and timing, view personalized route recommendations, and earn points.
Preconditions:	The user must not have a registered account.
Postconditions:	The user has successfully created an account and is logged in.
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. User clicks on 'Sign Up' on the 'Log In' page. 2. System prompts the user to enter username, password, and email address. 3. User inputs the required information and clicks 'Register'. 4. System checks whether the information submitted is sufficient and valid. 5. System stores this information into the database. 6. User is logged in.
Alternative Flows:	REG-AF-S3 If the input username is taken by another user: 1. System displays "Username already exists. Please use another username." 2. System returns to Step 2. REG-AF-S3 If the input password does not meet the requirements: 1. System displays "Passwords do not match requirements." 2. System returns to Step 2. REG-AF-S3 If the input email address is invalid: 1. System displays "Please enter a valid email address." 2. System returns to Step 2.
Exceptions:	• User attempts to register email address which has already been used • Registration form timed out due to 30 minutes of inactivity
Includes:	Nil
Special Requirements:	• Password encryption
Assumptions:	• User is connected to the Internet.
Notes and Issues:	• Implementation of email verification to verify user's email address

Use Case ID:	LOGIN1
Use Case Name:	Login
Created By:	Choo Kean Yee
Last Updated By:	
Date Created:	08/02/2024
Date Last Updated:	

Actor:	User
Description:	User must log in in order to access features of the application
Preconditions:	User has registered for an account.
Postconditions:	User has logged in
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. Users input their username and password into the respective fields. 2. User clicks on the login button 3. System verifies the user's credentials from the database 4. System displays the homepage

Alternative Flows:	LOGIN1-AF-S1 If username or password is incorrect:
	    1. Display "Incorrect username and/or password"
	    2. System returns to Step 1
	
	LOGIN1-AF-S1 If user forgets password:
	    1. User clicks on "Forget Password"
	    2. User will be prompted to enter their email address
	    3. User enters their email address
	    4. If user enters a valid email address, the system sends an email to that address with their password.
	    5.

Exceptions:	• User locked out after 10 failed login attempts • Login session expires after 30 minutes of inactivity
Includes:	Nil
Special Requirements:	• Implement account lockout measures to ensure security
Assumptions:	• User is connected to the Internet
Notes and Issues:	Nil

Use Case ID:	FPW		
Use Case Name:	Forget password		
Created By:	Ng Yao Hong	Last Updated By:	
Date Created:	08/02/2024	Date Last Updated:	

Actor:	User
Description:	Users who have forgotten their password are able to initiate the password reset process by utilizing the reset link sent to their registered email address.
Preconditions:	1. Users must have a registered account. 2. Users have forgotten their password.
Postconditions:	User successfully resets the password and gains access to the account.
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. User clicks on the "Forget Password" button on the login page. 2. System prompts the user to enter the email address associated with their account. 3. User enters the email address and submits the response. 4. System validates the email address and sends a password reset link to the user's email. 5. User receives the email and clicks on the provided link. 6. System prompts the user to create a new password. 7. User enters a new password and submits the response. 8. System updates the password and confirms the successful password reset.
Alternative Flows:	FPW-AF-S3: If the email address entered by the user is not found in the system: 1. Display "Invalid email address." 2. System returns to Step 2. FPW-AF-S5: If the user does not receive the password reset email: 1. System allows the user to request email resending. 2. System returns to Step 4.
Exceptions:	EX1 If the reset link has expired: 1. Users are notified. 2. User needs to initiate the process again.
Includes:	Nil
Special Requirements:	• The password reset link has a limited validity period to enhance security.
Assumptions:	• Users have access to the email account associated with their account.
Notes and Issues:	Nil

Use Case ID:	VCL		
Use Case Name:	View Crowd Level		
Created By:	Nicholas Koh	Last Updated By:	
Date Created:	08/02/2024	Date Last Updated:	

Actor:	User
Description:	Users are able to view the current crowding levels of MRT / LRT platforms through real-time Dynamic Datasets from LTA's DataMall API. Users are also able to view predicted passenger volumes at bus stops and traffic flow as well using past data. This feature aims to enable users to make more informed decisions about their travel plans, avoiding congested routes and opting for less crowded alternatives.
Preconditions:	• The applications must have access to the internet to fetch live data from LTA Datamall API • LTA Datamall API must be operational and providing accurate real-time data on crowing levels • Previous data of Passenger Volume by Origin Destination Bus Stops and Traffic Flow has to be included within the application
Postconditions:	• The application updates the displayed data at regular intervals or whenever the user requests a refresh
Priority:	High
Frequency of Use:	Low to Medium
Flow of Events:	1. User opens the application and selects the "View Crowd Level" feature 2. Application fetches latest crowding data from LTA Datamall API for Platform Crowd Density Real Time 3. Application analyzes past data for Passenger Volume by Origin Destination Bus Stops and Traffic Flow, predicting current crowd density 4. Application displays current crowding levels for buses, MRT / LRT and roads 5. The user can select specific stations or locations to view detailed crowding information
Alternative Flows:	VCL-AF-S2: If user is not connected to the internet 1. Application analyzes past data for Platform Crowd Density 2. Returns to Step 3
Exceptions:	• If LTA Datamall API is down or not responding, alternative flow is used instead, but accuracy is reduced • If user's device loses connectivity, alternative flow is used instead, but accuracy is reduced
Includes:	• Real-time data fetching from LTA Datamall API
Special Requirements:	• Offline datasets must be updated frequently locally to ensure accuracy • Application must handle API rate limits and data consumption efficiently
Assumptions:	• LTA Datamall datasets are updated frequently • LTA Datamall API provides accurate and timely data
Notes and Issues:	• Improve predictive analytics of forecasting using various other factors such as accidents or special occasions which are unforeseen

Use Case ID:	VRR
Use Case Name:	View Route Recommendations
Created By:	Seow Wan Ting Melissa
Date Created:	08/02/2024

Last Updated By:	
Date Last Updated:	

Actor:	User
Description:	Users are able to input their start location and final destination, and receive a suggested route to their destination. Users will be able to select their preference whether they want to favor a quicker route or a less crowded route with less crowd density.
Preconditions:	- User must be logged in to their account - The application must have access to the internet to fetch live data
Postconditions:	Application displays the recommended route for the user
Priority:	High
Frequency of Use:	High
Flow of Events:	1. User opens the application and selects the "View Route Recommendations" feature 2. User inputs their start location 3. User inputs their destination location 4. User selects their preference: less time or less crowd volume 5. User clicks on "Generate Route" 6. Application displays the best route that suits the user's preference and gets them to their destination 7. User can select specific stations or locations along this route to view detailed crowding information and predicted time taken
Alternative Flows:	ROUTE1-AF-S2-S3 1. Input that the User has entered is an invalid start and/or destination location. 2. System displays "Please enter a valid destination address." 3. System returns to Step 2/Step 3
Exceptions:	LTA Datamall API used for obtaining real time data is down
Includes:	Display Recommended Route
Special Requirements:	Must provide alternative recommendations or next best route for users to choose
Assumptions:	LTA Datamall dataset provides accurate and timely data
Notes and Issues:	Nil

Use Case ID:	AP	
Use Case Name:	Access Points	
Created By:	Jodian Low	Last Updated By:
Date Created:	08/02/2024	Date Last Updated:

Actor:	User
Description:	Users are able access their points by clicking on the button "Access Points". They are able to manage their points and view their points' history.
Preconditions:	User must be logged into their account
Postconditions:	User is able to successfully view and manage the points they have
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	1. User clicks on "Access Point" and will be brought into the access point interface 2. User can manage their points by choosing the available options 3. Assuming users has points, all options will execute as expected 4. After managing their points, user can return back to the main menu page
Alternative Flows:	AP-AF-3 If user has no points to manage: 1. Page will be blank and System displays "No points available" 2. User will have to manually navigate back to the main menu page
Exceptions:	Nil
Includes:	• Display Available Points
Special Requirements:	• When no points available, display suggestion on how to earn points • Ensure points are secure and cannot be manipulated • Ensure accurate allocation of points
Assumptions:	Nil
Notes and Issues:	• Scalability of points system if new ways to earn points are introduced

Use Case ID:	ADD
Use Case Name:	Add Points
Created By:	Jodian Low
Last Updated By:	
Date Created:	08/02/2024
Date Last Updated:	

Actor:	System
Description:	System will credit points into user's account whenever user complete an activity that will earn them points
Preconditions:	User must be logged into their account and has completed a specific task that awards them points
Postconditions:	System is able to successfully add points into the user account
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	1. When user has completed an activity or task, the system should automatically credit the right amount of points into the user's account and display a message stating how many points the user have earned 2. Users can verify that the right amount of points is credited using the "Access Point" function
Alternative Flows:	ADD-AF-S1 If system is temporarily down and unable to add points into the user account: 1. System will display "System temporarily down and points will be credited at a later timing. Do come back and check the points later"
Exceptions:	• Points cannot be added due to system error • User completes activity but points not credited accurately and timely
Includes:	Nil
Special Requirements:	• Implement retry mechanism for crediting points • Regular checks of logs should be implemented to ensure accurate allocation of points
Assumptions:	• Users are following the selected mode of transportation (walking/public transport/car/etc)
Notes and Issues:	• Potential implementation of live location tracking compared to route suggested to ensure integrity

Use Case ID:	CLAIM		
Use Case Name:	Claim Rewards		
Created By:	Jodian Low	Last Updated By:	
Date Created:	08/02/2024	Date Last Updated:	

Actor:	User
Description:	Users are able to claim rewards using the points they have earned from completing tasks
Preconditions:	User must be logged into their account and has available points
Postconditions:	System is able to successfully deduct points from the user account and users are able to claim the reward
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	1. Users click on "Claim Rewards" in the "Access Point" interface 2. Users will choose the corresponding rewards to claim with the amount of points available 3. After redeeming the reward, system will display a notification to verify that the reward has been claimed 4. System will keep track of the rewards claim
Alternative Flows:	CLAIM-AF-S2 If user selected a reward that requires more points than what the user has: 1. System will display "Insufficient points! Please select other rewards" 2. User will have to choose another available reward for them
Exceptions:	• User attempts to claim a reward for which they have insufficient points for • Reward is out of stock
Includes:	Nil
Special Requirements:	• Real-time update of reward availability to prevent users from selecting unavailable rewards • Automatic refund of points if claimed rewards becomes unavailable
Assumptions:	• All types of rewards are made visible to the users. Doing so may motivate certain users to actively try to earn more points and increase usage and user interaction.
Notes and Issues:	• New rewards should be added regularly to ensure desirability of points

Use Case ID:	VU	
Use Case Name:	Verify User	
Created By:	Ng Yao Hong	Last Updated By:
Date Created:	08/02/2024	Date Last Updated:

Actor:	User
Description:	User initiates two-factor authentication (2FA) via email for account verification when logging in from a new or unrecognized device.
Preconditions:	1. Users must have a registered account. 2. Users must attempt to log in from a device not previously associated with the account.
Postconditions:	User is successfully verified and gains access to the system from the new device.
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. User attempts to log in from a new or unrecognized device. 2. System detects the unfamiliar device and triggers a 2FA verification via email. 3. User receives a verification code sent to the registered email address. 4. User enters the received code into the provided field. 5. System validates the code.
Alternative Flows:	VU-AF-S3 If the user does not receive the code within a reasonable time: 1. System allows the user to request code resending. 2. System returns to Step 2.
Exceptions:	EX1 If the entered code is incorrect: 1. System prompts the user to re-enter the correct code.
Includes:	Nil
Special Requirements:	Nil
Assumptions:	1. The user has access to the email account associated with the system.
Notes and Issues:	Nil

Use Case ID:	VIEWREW		
Use Case Name:	View Rewards		
Created By:	Seow Wan Ting Melissa	Last Updated By:	
Date Created:	08/02/2024	Date Last Updated:	

Actor:	User
Description:	Users are able to view the rewards they have previously claimed through CLAIM.
Preconditions:	User must be logged into their account
Postconditions:	User is able to view the rewards previously claimed, and can use them to exchange for said rewards.
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	1. User clicks on "View Rewards" in the "Access Point" interface 2. System displays a list of the rewards that the user has claimed before. 3. Upon selecting one of the rewards, the system will display a more detailed page with a description of the reward, and a method of redeeming this reward: whether by simply clicking a "Redeem" button or by producing a QR code to be scanned. 4. After the reward has been successfully used, the system will remove it from the user's claimed rewards, and it will no longer show up in View Rewards until the user claims it again.
Alternative Flows:	VIEWREW-AF-2: If the user has not yet claimed any rewards: 1. System will display the message "You have not yet claimed any rewards!"
Exceptions:	• User has not claimed any rewards yet • Unable to collect information on past reward information
Includes:	Nil
Special Requirements:	• Provide recommendations for rewards to claim
Assumptions:	Nil
Notes and Issues:	Nil

Use Case ID:	VAT
Use Case Name:	View Arrival Timing
Created By:	Seow Wan Ting Melissa
Date Created:	08/02/2024

Last Updated By:	
Date Last Updated:	

Actor:	User
Description:	Users are able to view the up-to-date estimated arrival timings of buses through real-time Dynamic Datasets from LTA's DataMall API. This feature aims to enable users to make more informed decisions about their travel plans, avoiding potential long waits and wasted time in transit.
Preconditions:	• The applications must have access to the internet to fetch live data from LTA Datamall API • LTA Datamall API must be operational and providing accurate real-time data on crowing levels
Postconditions:	• The application updates the displayed data at regular intervals or whenever the user requests a refresh
Priority:	High
Frequency of Use:	High
Flow of Events:	1. User opens the application and selects the "View Arrival Timing" feature 2. Application fetches latest crowding data from LTA Datamall API for Bus Arrival Timings 3. Application displays a map, allowing the user to select specific bus stops to view details on the bus arrival timings 4. When a specific bus stop is selected, it will show all the estimated arrival timings of all buses that come to that stop according to LTA Datamall's API
Alternative Flows:	Nil
Exceptions:	• If LTA Datamall API is down or not responding, alternative flow is used instead, but accuracy is reduced
Includes:	• Real-time data fetching from LTA Datamall API
Special Requirements:	• Offline datasets must be updated frequently locally to ensure accuracy • Application must handle API rate limits and data consumption efficiently
Assumptions:	• LTA Datamall datasets are updated frequently • LTA Datamall API provides accurate and timely data
Notes and Issues:	Nil

Use Case ID:	DISPLAY	
Use Case Name:	Display	
Created By:	Seow Wan Ting Melissa	Last Updated By:
Date Created:	08/02/2024	Date Last Updated:

Actor:	System
Description:	System will display on the screen the required information.
Preconditions:	NIL
Postconditions:	• System is able to successfully display the information required to the user, in a presentable and neat manner.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. When user chooses one of the use cases that includes DISPLAY, the system will display the required information on the app.
Alternative Flows:	Nil
Exceptions:	Nil
Includes:	Nil
Special Requirements:	Nil
Assumptions:	Nil
Notes and Issues:	Nil