Use Cases

for

Route Planner

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version
Nadya Yuki Wangsajaya	08/09/2024	First Draft	1.0

Guidance for Use Case Template

Document each use case using the template shown in the Appendix. This section provides a description of each section in the use case template.

1. Use Case Identification

1.1. Use Case ID

Give each use case a unique numeric identifier, in hierarchical form: X.Y. Related use cases can be grouped in the hierarchy. Functional requirements can be traced back to a labeled use case.

1.2. Use Case Name

State a concise, results-oriented name for the use case. These reflect the tasks the user needs to be able to accomplish using the system. Include an action verb and a noun. Some examples:

- View part number information.
- Manually mark hypertext source and establish link to target.
- Place an order for a CD with the updated software version.

1.3. Use Case History

1.3.1 Created By

Supply the name of the person who initially documented this use case.

1.3.2 Date Created

Enter the date on which the use case was initially documented.

1.3.3 Last Updated By

Supply the name of the person who performed the most recent update to the use case description.

1.3.4 Date Last Updated

Enter the date on which the use case was most recently updated.

2. Use Case Definition

2.1. Actor

An actor is a person or other entity external to the software system being specified who interacts with the system and performs use cases to accomplish tasks. Different actors often correspond to different user classes, or roles, identified from the customer community that will use the product. Name the actor(s) that will be performing this use case.

2.2. Description

Provide a brief description of the reason for and outcome of this use case, or a high-level description of the sequence of actions and the outcome of executing the use case.

2.3. Preconditions

List any activities that must take place, or any conditions that must be true, before the use case can be started. Number each precondition. Examples:

1. User's identity has been authenticated.
2. User's computer has sufficient free memory available to launch task.

2.4. Postconditions

Describe the state of the system at the conclusion of the use case execution. Number each postcondition. Examples:

1. Document contains only valid SGML tags.
2. Price of item in database has been updated with new value.

2.5. Priority

Indicate the relative priority of implementing the functionality required to allow this use case to be executed. The priority scheme used must be the same as that used in the software requirements specification.

2.6. Frequency of Use

Estimate the number of times this use case will be performed by the actors per some appropriate unit of time.

2.7. Flow of Events

Provide a detailed description of the user actions and system responses that will take place during execution of the use case under normal, expected conditions. This dialog sequence will ultimately lead to accomplishing the goal stated in the use case name and description. This description may be written as an answer to the hypothetical question, "How do I <accomplish the task stated in the use case name>?" This is best done as a numbered list of actions performed by the actor, alternating with responses provided by the system.

2.8. Alternative Flows

Document other, legitimate usage scenarios that can take place within this use case separately in this section. State the alternative course, and describe any differences in the sequence of steps that take place. Number each alternative course using the Use Case ID as a prefix, followed by "AC" to indicate "Alternative Course". Example: X.Y.AC.1.

2.9. Exceptions

Describe any anticipated error conditions that could occur during execution of the use case, and define how the system is to respond to those conditions. Also, describe how the system is to respond if the use

case execution fails for some unanticipated reason. Number each exception using the Use Case ID as a prefix, followed by "EX" to indicate "Exception". Example: X.Y.EX.1.

2.10. Includes

List any other use cases that are included ("called") by this use case. Common functionality that appears in multiple use cases can be split out into a separate use case that is included by the ones that need that common functionality.

2.11. Special Requirements

Identify any additional requirements, such as nonfunctional requirements, for the use case that may need to be addressed during design or implementation. These may include performance requirements or other quality attributes.

2.12. Assumptions

List any assumptions that were made in the analysis that led to accepting this use case into the product description and writing the use case description.

2.13. Notes and Issues

List any additional comments about this use case or any remaining open issues or TBDs (To Be Determineds) that must be resolved. Identify who will resolve each issue, the due date, and what the resolution ultimately is.

Use Case Template

Use Case ID:	LOG1		
Use Case Name:	Login		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User
Description:	Returned users must log in to access the application features.
Preconditions:	User has registered for an account previously
Postconditions:	User is logged in
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	1. User fills in their username and password on the registration page 2. The system verifies the User's username and password from the database 3. If the User's username and password are verified, the User is logged in and the system displays the homepage 4. User is able to perform the use case "View Map"
Alternative Flows:	LOG1.AF-S3: If username is not found or incorrect password is entered 1. The system displays, "Incorrect username or password" 2. The system returns to step 1
Exceptions:	LOG1.EX1: If the database is not responding to queries 1. The system displays, "Our system is down at the moment. Please try again in a few minutes." 2. The system returns to step 1
Includes:	NIL
Special Requirements:	1. User must be able to login within 3 seconds
Assumptions:	1. User is connected to Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	LOG2		
Use Case Name:	Register New Account		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User
Description:	First time users must register for an account by clicking on the button “Register”.
Preconditions:	User should not have been registered previously
Postconditions:	User has successfully created the account and automatically logged in
Priority:	Medium
Frequency of Use:	Low
Flow of Events:	1. User presses the “Register” button on the registration page 2. The system prompts the User to create an account by typing their display name, username, and password 3. User inputs their display name, username, and password, and presses “Register” 4. The system checks if the information submitted is valid and sufficient 5. If the User keys in a valid username and password, the system stores this information into a database 6. User is prompted to log in using the use case “Login”
Alternative Flows:	LOG2.AF-S5: If username is taken by another user 1. The system displays, “Username is already taken. Please user another username” 2. The system returns to step 2 LOG2.AF-S5: If password does not meet the requirements 1. The system displays “Password is not strong enough! Please enter another password. Password must be at least 8 character long.” 2. The system returns to step 2 LOG2.AF-S5: If email address is invalid 1. The system displays “Email address is invalid. Please enter a valid email address.” 2. The system returns to step 2 LOG2.AF-S5: If email address is found in the database 1. The system displays “Email address has already been used. Please log in.” 2. The system returns to step 6
Exceptions:	NIL
Includes:	NIL

Special Requirements:	1. User must be able to create a new account and get logged in within 3 seconds
Assumptions:	1. User agrees to have their data collected and stored 2. User is connected to Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	LOG3		
Use Case Name:	Sign Out		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User
Description:	User is able to sign out when logged in
Preconditions:	User is logged in and User is at the homepage
Postconditions:	User is signed out and User is at the login page
Priority:	High
Frequency of Use:	Medium
Flow of Events:	1. User is at the homepage 2. User presses on the “Sign out” button 3. The system displays the login page 4. User is able to perform the use case “Register New Account” or “Login”
Alternative Flows:	NIL
Exceptions:	NIL
Includes:	NIL
Special Requirements:	1. User must be able to sign out within 3 seconds
Assumptions:	1. User is connected to the Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	VM1		
Use Case Name:	View Map		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	09/09/2024	Date Last Updated:	

Actor:	User, OneMap API
Description:	User is able to see and interact with a map centered around Bishan Area (center of Singapore)
Preconditions:	User is logged in
Postconditions:	The system displays an interactive map centered around the center of Singapore
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The system requests OneMap API to generate a map centralized around Bishan area 2. User is able to interact with the map using the included use case “Zoom In and Out of Map” and “Pan Map” 3. The system shows “Plan Route” button below the generated map 4. User is able to press the “Plan Route” button and perform the included use case “Plan Route”
Alternative Flows:	NIL
Exceptions:	VM1.EX1: If OneMap API is not responding to queries 1. The system will generate a pop-up, “Sorry, system is currently down. Please try again in a few minutes.” 2. The system prompts User to quit the app
Includes:	Zoom In and Out of Map Pan Map
Special Requirements:	1. Map must be displayed within 3 seconds 2. The map view must be clear and compatible to a variety of mobile device models and screen sizes 3. The map interface must have appropriate labels 4. The map information must be accurate
Assumptions:	1. User is connected to the Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	VM2		
Use Case Name:	Zoom In and Out of Map		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	8/09/2024	Date Last Updated:	

Actor:	User
Description:	User is able to zoom in and out the displayed map
Preconditions:	User sees the map
Postconditions:	The map is zoomed in or out
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	1. User pinches the map 2. The system registers the User's gesture 3. If the map can still be zoomed, the map zooms according to the User's pinch, anchored on the place where the User pinches
Alternative Flows:	VM2.AF-S3: If the map reaches maximum / minimum zoom, the map maintains the same zoom
Exceptions:	NIL
Includes:	NIL
Special Requirements:	1. The map must respond to the gesture within 1 second
Assumptions:	1. User is connected to the Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	VM3		
Use Case Name:	Pan Map		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User
Description:	User is able to pan the map displayed
Preconditions:	User sees the map
Postconditions:	The map pans according to User's gestures
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	1. User swipes to a certain direction (e.g. right) 2. The system registers the User's gestures 3. The system pans the map in the opposite direction of the User's swipe
Alternative Flows:	NIL
Exceptions:	NIL
Includes:	NIL
Special Requirements:	1. The map must respond to the gesture within 1 second
Assumptions:	1. User is connected to the Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	PR1		
Use Case Name:	Plan Route		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User
Description:	User is able to input the starting point and the running distance and receive route suggestions
Preconditions:	User pressed on the “Plan Route” button on the homepage
Postconditions:	User is able to view the route chosen
Priority:	High
Frequency of Use:	High
Flow of Events:	1. User can view the map using the included use case “View Map” 2. The system takes in User’s starting and end point using included use case “Select Start / End Point” 3. The system searches for landmarks within the perimeter of the start point and the end point 4. The system prompts User to pick from a drop-down of landmarks 5. Upon selection, the system generates and displays the route using the included use case “Generate Route” 6. User chooses a route 7. User is able to perform the included use case “Route Navigation”
Alternative Flows:	NIL
Exceptions:	NIL
Includes:	View Map Generate Route Select Start / End Point Route Navigation
Special Requirements:	NIL
Assumptions:	1. User is connected to Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	PR2		
Use Case Name:	Select Start/End Point		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User, OneMap API
Description:	User is able to select the start point and end point of their run
Preconditions:	User sees the map
Postconditions:	The system gathers the coordinates of the location selected by User
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user can choose the start point by keying in the address or placing a pin on the map 2. If User chooses to input the starting point by typing in the textbox and pressing "Next" button, the system queries OneMap API for the coordinates of the location inputted by User 3. If the input location is valid, the user can choose the end point by keying in the address or placing a pin on the map 4. If User chooses to input the end point by typing in the textbox and pressing "Next" button, the system queries OneMap API for the coordinates of the location inputted by User 5. If the input location is valid, the system will save the locations for route planning.
Alternative Flows:	PR2.AF-S2/AF-S4: If User chooses to input the starting/end point by placing a pin on the displayed map 1. The system gathers User's location using the included use case "Enable Live Location" 2. The pin is initially at the User's current location 3. User is able to interact with the map using the use case "View Map" 4. User selects the starting point pointed by the pin and pressing "Next" button 5. The system queries OneMap API for the coordinates of the pin and goes to step 3/step 5 PR2.AF-S3/AF-S5: If the User's inputted location is not found 1. The system queries OneMap API for suggestions of other locations with similar names 2. The system displays these other locations as drop-down options 3. User can choose one of the options, otherwise the system returns to step 1/step 3
Exceptions:	PR2.EX1: If OneMap API is not responding to queries

	1. The system will generate a pop-up, "Sorry, system is currently down. Please try again in a few minutes." 2. The system prompts User to quit the app
Includes:	Enable Live Location
Special Requirements:	NIL
Assumptions:	1. User is connected to the Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	PR3		
Use Case Name:	Enable Live Location		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User
Description:	User is prompted on whether to enable live location tracking
Preconditions:	User sees the map
Postconditions:	The system is able to gather User's location
Priority:	High
Frequency of Use:	Medium
Flow of Events:	1. The system displays a pop-up message box prompting the user to enable live location tracking 2. The system will explain the purpose of collecting the location data 3. User chooses to enable live location tracking
Alternative Flows:	PR3.AF-S3: If the User chooses not to enable live location tracking 1. User's current location is assumed to be in Bishan area (center of Singapore)
Exceptions:	NIL
Includes:	NIL
Special Requirements:	NIL
Assumptions:	1. User is connected to Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	PR4		
Use Case Name:	Generate Route		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	09/09/2024	Date Last Updated:	

Actor:	OneMap API
Description:	The system generates a route from the selected start and end point that passes through the selected landmark
Preconditions:	The system has gathered User's start and end point, and chosen landmark
Postconditions:	Three route is generated, each with their sheltered version
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The system queries OneMap API for possible routes from start and end point that pass through the selected landmark (if any) 2. If there are more than 3 possible routes, the system randomly chooses 3 routes with different distances 3. The system generates an alternative sheltered route using the included use case "Generate Sheltered Route" 4. The system gathers weather information using the included use case "Access Weather Information" 5. If the weather is bad, the system displays the alternative sheltered routes first 6. If the weather is fair, the system displays the default unsheltered routes first
Alternative Flows:	PR4.AF-S2: If there are less or equal than 3 routes 1. The system returns to step 3
Exceptions:	PR4.EX1: If OneMap API is not responding to queries 1. The system will generate a pop-up, "Sorry, system is currently down. Please try again in a few minutes." 2. The system prompts User to quit the app
Includes:	Generate Sheltered Route Access Weather Information
Special Requirements:	1. More than 95% of users should be able to complete the route generation and selection process within 2 minutes 2. Each unique route generated must be traced with different colours 3. The routes must be generated within 5 seconds 4. The routes must only run through accessible paths 5. The generated route must be within 5% of user's chosen distance
Assumptions:	1. User is connected to the Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	PR5		
Use Case Name:	Generate Sheltered Route		
Created By:	Huang Yongjian	Last Updated By:	
Date Created:	09/09/2024	Date Last Updated:	

Actor:	OneMap API
Description:	The system generates a route that prioritises usage of sheltered linkway
Preconditions:	The user chose to generate the route with the specified starting and end point and landmarks (if any)
Postconditions:	A sheltered route between starting and end point will be generated.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The system queries OneMap API for the routes from start and end point that pass through the selected landmark (if any) 2. The system queries its database to retrieve the sheltered linkway dataset and overlay onto the route generated 3. The system will choose the route with the most overlap with the sheltered linkway locations 4. The system will use heuristic search strategies to identify the nearest shelter for each of the unsheltered portions of the route and redirect the route to prioritise sheltered linkway usage
Alternative Flows:	PR5.AF-S4: If the nearest shelter that fulfills the defined heuristic function does not exist, the unsheltered portion will be retained in the route.
Exceptions:	PR5.EX1: If OneMap API is not responding to queries 1. The system will generate a pop-up, “Sorry, system is currently down. Please try again in a few minutes.” 2. The system prompts User to quit the app PR5.EX2: If the database is not responding to queries 1. The system will generate a pop-up, “Sorry, system is currently down. Please try again in a few minutes.” 2. The system prompts User to quit the app
Includes:	NIL
Special Requirements:	NIL
Assumptions:	1. User is connected to the Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	PR6		
Use Case Name:	Access Weather Information		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	09/09/2024	Date Last Updated:	

Actor:	Weather API
Description:	The system queries the weather forecast for route generation purposes
Preconditions:	The three routes and their sheltered version have been generated
Postconditions:	The system gathered the weather forecast
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The system queries the Weather API for the weather forecast in the next hour in the perimeter of the start and end point 2. The system categorises the weather forecast as “fair” or “bad” (the latter means raining / too hot)
Alternative Flows:	NIL
Exceptions:	PR6.EX1: If Weather API is not responding to queries 1. The system displays “Current weather is unavailable” 2. The system returns the default fair weather
Includes:	NIL
Special Requirements:	NIL
Assumptions:	1. User is connected to the Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	RN1		
Use Case Name:	Route Navigation		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User, OneMap API, Text to Speech API
Description:	User is able to navigate the route while running through text-to-speech instructions
Preconditions:	User has chosen a route
Postconditions:	User reached the endpoint or User ended the run prematurely
Priority:	High
Frequency of Use:	High
Flow of Events:	1. User presses the "Start run" button 2. User is able to view and interact with the map with the chosen route highlighted 3. If User's location is enabled and User starts to run, the system queries OneMap API for detailed step-by-step instruction of the selected route 4. The system continuously queries OneMap API for the User's real-time location 5. The system displays the User's location as a cursor on the map 6. The system reads out loud the instruction using text-to-speech according to User's live location 7. The system displays the distance covered by User 8. The system displays the time elapsed since the start of this use case 9. Once the User reaches endpoint, or stopped running, the user presses "End Run" and the included use case "End Run" is triggered
Alternative Flows:	RN1.AF-S3: If User's location is not enabled 1. The system will explain that the start run feature is only accessible if the app has permission to the User's location 2. The system will prompt the user to provide location access using the included use case "Enable Live Location" 3. Return to step 3
Exceptions:	RN1.EX1: If OneMap API is not responding to queries 1. The system will generate a pop-up, "Sorry, system is currently down. Please try again in a few minutes." 2. The system prompts User to quit the app
Includes:	Enable Live Location, End Run
Special Requirements:	1. The text-to-speech must be generated within 1 second 2. The cursor must follow the User in real-time 3. The cursor's location and User's actual location must be within 5%

Assumptions:	1. User is connected to Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	RN2		
Use Case Name:	End Run		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User
Description:	User is prompted to confirm to end the run
Preconditions:	User has pressed “End Run” button
Postconditions:	Post-run summary is displayed to the User
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The system will display a pop-up to confirm if the user wants to end the run. 2. If the User clicks “Yes” button, the system displays the post-run summary using the included use case “Generate Post-run Summary”
Alternative Flows:	RN2.AF-S2: If the User clicks “No” button, the system will resume the tracking of the run and go to step 5 of use case “Route Navigation”
Exceptions:	NIL
Includes:	Generate Post-run Summary
Special Requirements:	NIL
Assumptions:	1. User is connected to the Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:	RN3		
Use Case Name:	Generate Post-run Summary		
Created By:	Nadya Yuki	Last Updated By:	
Date Created:	08/09/2024	Date Last Updated:	

Actor:	User
Description:	User is able to view the post-run summary, which includes the time taken, distance ran, and a map showing the path taken during the run
Preconditions:	The system has gathered the end point location
Postconditions:	The system displays the post-run summary
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The system calculates the total time taken to run in HH:MM:SS format 2. The system generates a map of the route taken by User, from the start point to the current location 3. The system calculates the distance covered by User 4. The system generates a post-run summary containing the details in step 1 to 3
Alternative Flows:	NIL
Exceptions:	NIL
Includes:	NIL
Special Requirements:	1. The post run summary must be generated within 3 seconds
Assumptions:	1. User is connected to Internet
Notes and Issues:	NIL

Use Case Template

Use Case ID:			
Use Case Name:			
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actor:	
Description:	
Preconditions:	
Postconditions:	
Priority:	
Frequency of Use:	
Flow of Events:	
Alternative Flows:	
Exceptions:	
Includes:	
Special Requirements:	
Assumptions:	
Notes and Issues:	