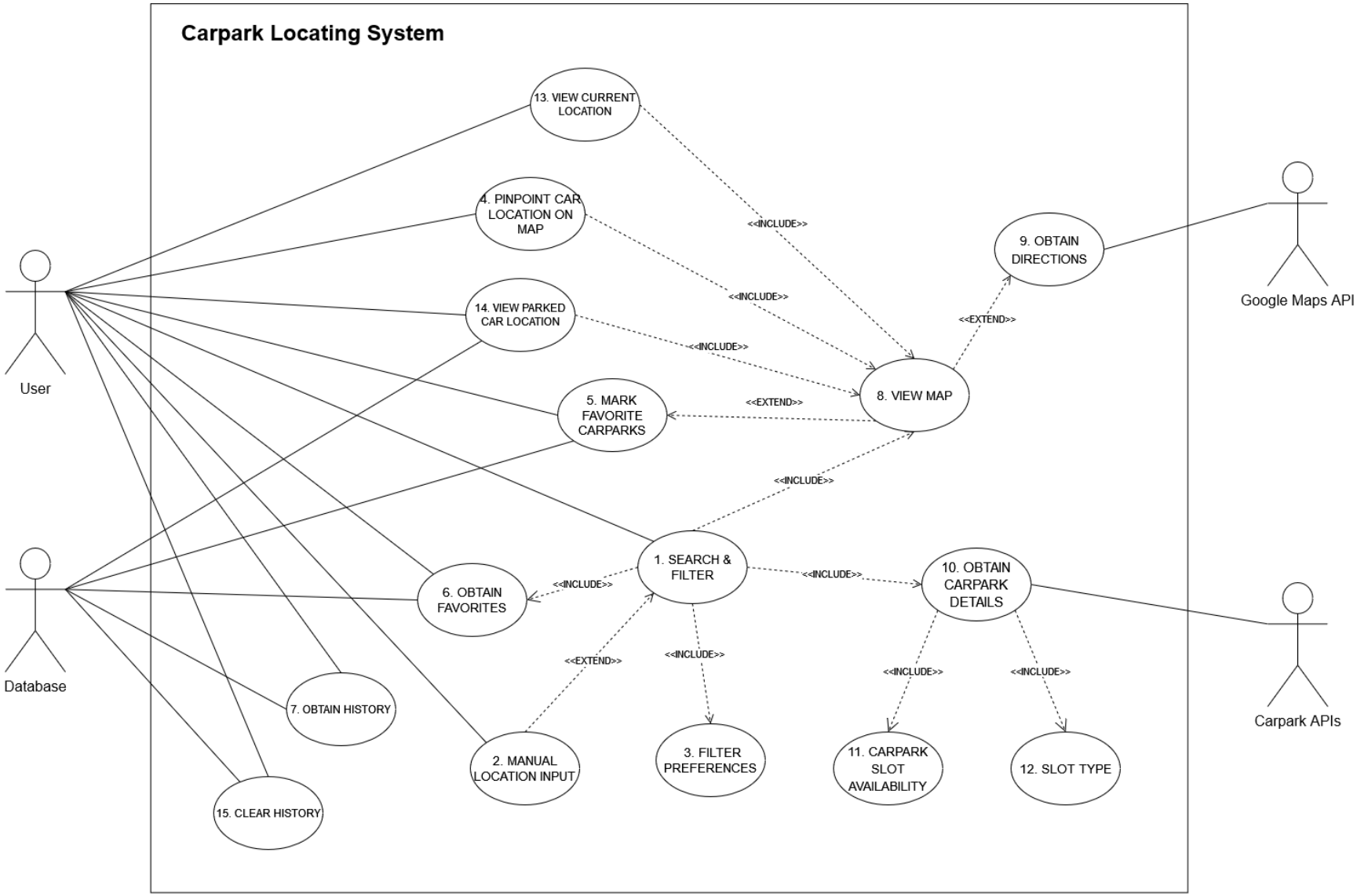
Carpark Locating System
13. VIEW CURRENT LOCATION
4. PINPOINT CAR LOCATION ON MAP
14. VIEW PARKED CAR LOCATION
5. MARK FAVORITE CARPARKS
6. OBTAIN FAVORITES
7. OBTAIN HISTORY
15. CLEAR HISTORY
2. MANUAL LOCATION INPUT
3. FILTER PREFERENCES
1. SEARCH & FILTER
8. VIEW MAP
9. OBTAIN DIRECTIONS
10. OBTAIN CARPARK DETAILS
11. CARPARK SLOT AVAILABILITY
12. SLOT TYPE
<<INCLUDE>>
<<EXTEND>>
User
Database
Google Maps API
Carpark APIs

User Case ID	01		
Use Case Name	Search & Filter		
Created By	Chee Han	Last Updated by	Chee Han
Date Created	03/09/2023	Date Last Updated	08/09/2023

Actor	User, Google Map API
Description	This use case involves searching for carparks based on location, distance, and availability.
Preconditions	● Location services are enabled ● User has network connectivity
Postconditions	● Carpark results displayed ● Map display updated
Priority	High
Frequency of Use	High
Flow of Events	1. User opens app 2. System displays map with preferred search radius 3. System initiates search with either user current location or user keyed location 4. Google Map API checks for list of carparks within search radius 5. System displays results on map as markers
Alternative Flows	NIL
Exceptions	User turned off GPS location services 1. System will prompt user to turn on location services Invalid Carpark API response 1. System displays “Carpark information currently unavailable”
Includes	View Map, Search Radius, Obtain Carpark Details, Obtain Favourites
Special Requirements	Results be displayed in a way that users can find available parking in no more than 2 steps
Assumptions	User has a stable network connection

Notes and Issues	NIL

User Case ID	02		
Use Case Name	Manual Location Input		
Created By	Chee Han	Last Updated by	Chee Han
Date Created	03/09/2023	Date Last Updated	08/09/2023

Actor	User, Google Maps API
Description	This use case allows the user to manually input a location
Preconditions	● User presses the search bar
Postconditions	● User presses enter
Priority	Medium
Frequency of Use	Medium
Flow of Events	1. User press on search bar 2. User keys in location 3. Google Map API gives list of possible intended locations (Auto-complete) 4. User enters desired location 5. System initiates Search and Filter use case
Alternative Flows	User keys in an unknown location 1. System displays “Location Not Found” User keys in a location out of Singapore 1. System displays “Invalid Location”
Exceptions	Invalid Google Map API response 1. System displays “Map information currently unavailable”
Includes	NIL
Special Requirements	NIL
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	03		
Use Case Name	Filter Preferences		
Created By	Chee Han	Last Updated by	Chee Han
Date Created	03/09/2023	Date Last Updated	12/09/2023

Actor	User, Database
Description	Users can set a preferred search radius (e.g. 1 km, 5 km) for nearby carparks and in terms of their carpark availability.
Preconditions	● User presses filter icon on search bar
Postconditions	● New filter preferences has been set
Priority	High
Frequency of Use	Low
Flow of Events	1. System displays results based on previous filters 2. User press filter icon 3. User updates filter preferences 4. System updates filter preferences in the Database 5. System filters current results according to new preferences
Alternative Flows	Resetting to Default: 1. From step 2, user press reset default 2. System reset filter preferences to original No carpark found in filter parameters: 1. Display empty map 2. System displays “No Carpark Found”
Exceptions	NIL
Includes	NIL
Special Requirements	● User must be able to adjust search radius with a slider or drop-down list ● Limit the filter preferences to a max and min value

Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	04		
Use Case Name	Pinpoint Car Location on Map		
Created By	Chee Han	Last Updated by	Chee Han
Date Created	03/09/2023	Date Last Updated	08/09/2023

Actor	User, Database
Description	Users can pinpoint their car's location on the map
Preconditions	● User pins location as car location
Postconditions	● Car location displayed on map ● Car location unpinned by user
Priority	Low
Frequency of Use	Medium
Flow of Events	1. User reaches carpark 2. User presses pin car location button 3. System prompts for carpark slot details 4. User enters parking slot details 5. System saves entered information to the Database 6. System marks car location and slot details
Alternative Flows	If pin car button has already been pressed 1. After step 2, System confirms user request to unmark car location 2. System will unmark the car location and remove any previously entered details upon confirmation
Exceptions	NIL
Includes	NIL
Special Requirements	Size of pin-point marker should be small and visible enough to indicate the correct carpark when there are multiple carparks in the same vicinity
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	05		
Use Case Name	Mark Favorite Carparks		
Created By	Chee Han	Last Updated by	Chee Han
Date Created	08/09/2023	Date Last Updated	08/09/2023

Actor	User, Database
Description	Users can bookmark their handpicked carparks
Preconditions	● Users pressed favourite icon on specific carparks
Postconditions	● Carparks marked as favourite
Priority	Low
Frequency of Use	Low
Flow of Events	1. User press on carpark bubble 2. User press star icon 3. System sends request to database 4. Database saves carpark to user's favourites
Alternative Flows	If the carpark is already a favourite of the user 1. After step 4, Database remove carpark from user's favourites
Exceptions	NIL
Includes	NIL
Special Requirements	NIL
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	06		
Use Case Name	Obtain Favourite		
Created By	Chee Han	Last Updated by	Chee Han
Date Created	08/09/2023	Date Last Updated	08/09/2023

Actor	User, Database
Description	Users can view their favourite carparks
Preconditions	● Search and Filter was initiated ● Users pressed favourite option in menu
Postconditions	● Search and Filter completes ● Favourites list displayed
Priority	Low
Frequency of Use	Low
Flow of Events	1. Search and Filter initiated 2. System request user's favourites from Database 3. Database sends user's favourites
Alternative Flows	1. User navigates to the favourites page 2. Continues with steps 2 and 3 If user has no favourites 3. System displays "No favourites available" Else 3. System displays favourites list
Exceptions	NIL
Includes	NIL
Special Requirements	NIL
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	07		
Use Case Name	Obtain History		
Created By	Chee Han	Last Updated by	Chee Han
Date Created	08/09/2023	Date Last Updated	08/09/2023

Actor	User, Database
Description	User can view their parking transaction history
Preconditions	● User navigates to history page
Postconditions	● User's parking cost history is displayed
Priority	Low
Frequency of Use	Low
Flow of Events	1. User goes to history page 2. System requests Database for user's parking history 3. Database sends user's parking history 4. System display user parking cost history
Alternative Flows	If user does not have a history yet 1. Database send not found 2. System displays "No Parking History"
Exceptions	NIL
Includes	NIL
Special Requirements	Database needs to save user history from past 3 months
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	08		
Use Case Name	View Map		
Created By	Arjun	Last Updated by	Arjun
Date Created	03/09/2023	Date Last Updated	03/09/2023

Actor	User, Google Maps API
Description	Display of carpark locations and availability of carpark slots within the map.
Preconditions	User launches app
Postconditions	● Show the nearest carparks to the user's location ● Show the availability of carpark slots in those nearby carparks
Priority	High
Frequency of Use	High
Flow of Events	1. User launches app 2. System initiates Search & Filter 3. System display results on map
Alternative Flows	NIL
Exceptions	Invalid Google Map API response 1. Grey map out 2. System displays "Map information currently unavailable" Invalid Carpark API response 1. System displays "Carpark information currently unavailable"
Includes	NIL
Special Requirements	● Map view must be compatible with a variety of devices and screen sizes ● Icons on the map must be visible for everyone
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	09		
Use Case Name	Obtain Directions		
Created By	Arjun	Last Updated by	Chee Han
Date Created	03/09/2023	Date Last Updated	08/09/2023

Actor	Google Maps API
Description	Uses the google maps API to obtain the directions to the carpark that the user has chosen.
Preconditions	User clicks on the carpark that he has chosen.
Postconditions	The map shows the directions to the carpark that the user has chosen
Priority	Medium
Frequency of Use	High
Flow of Events	1. User press on 'Go Here!' 2. Google API obtains relevant directions from current location to carpark
Alternative Flows	NIL
Exceptions	User has turned off GPS location services 1. System will prompt "Turn on location services" Invalid Google Maps API response 1. System displays "Directions currently unavailable"
Includes	NIL
Special Requirements	Travelling time and distance should be calculated and updated in real-time
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	10		
Use Case Name	Obtain Carpark Details		
Created By	Arjun	Last Updated by	Arjun
Date Created	03/09/2023	Date Last Updated	07/09/2023

Actor	Carpark APIs
Description	The carpark details are retrieved by the Carpark APIs
Preconditions	User clicks on the carpark bubble
Postconditions	The carpark details are retrieved by the Carpark APIs
Priority	High
Frequency of Use	High
Flow of Events	1. System initiates Search & Filter 2. Carpark API obtains relevant carpark details 3. Update colour of carpark bubble on map based on availability 4. User presses on carpark bubble 5. System shows carpark details
Alternative Flows	NIL
Exceptions	Invalid Carpark API response 1. System displays “Carpark information currently unavailable”
Includes	Slot Type, Carpark Slot Availability, Total Slots
Special Requirements	To be initiated every 60 seconds
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	11		
Use Case Name	Carpark Slot Availability		
Created By	Aaron	Last Updated by	Aaron
Date Created	03/09/2023	Date Last Updated	05/09/2023

Actor	Carpark APIs
Description	The carpark APIs provides the number of carpark lots available in the carpark for all carparks in the API.
Preconditions	System initiates Search & Filter.
Postconditions	The number of carpark slots available in the selected carpark would be displayed on the user interface.
Priority	High
Frequency of Use	High
Flow of Events	1. Search & Filter initiates Obtain Carpark Details 2. Carpark API retrieves carpark slot availability
Alternative Flows	NIL
Exceptions	Invalid Carpark API response 1. System displays “Carpark information currently unavailable”
Includes	NIL
Special Requirements	To be initiated every 60 seconds
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	12		
Use Case Name	Slot Type		
Created By	Aaron	Last Updated by	Aaron
Date Created	03/09/2023	Date Last Updated	05/09/2023

Actor	Carpark APIs
Description	There are primarily 3 different types of carpark slots in a carpark depending on the type of vehicle, i.e. cars, motorcycles, lorries/trucks.
Preconditions	System initiates Search & Filter.
Postconditions	Results of the carpark type availability would be shown on the user interface.
Priority	Medium
Frequency of Use	High
Flow of Events	1. Search & Filter initiates Obtain Carpark Details 2. Carpark API retrieves slot type
Alternative Flows	NIL
Exceptions	If slot type is not found, System indicate “Unavailable” Invalid Carpark API response 1. System displays “Carpark information currently unavailable”
Includes	NIL
Special Requirements	To be initiated every 60 seconds
Assumptions	User has a stable network connection
Notes and Issues	NIL

User Case ID	13		
Use Case Name	Current Location		
Created By	Pranav	Last Updated by	Pranav
Date Created	16/09/2023	Date Last Updated	16/09/2023

Actor	User
Description	On clicking the current location button, the map view is reset to show the current location of the user.
Preconditions	The user has moved around the map to view different location, and click the current location button.
Postconditions	The map shows the current location of the user.
Priority	High
Frequency of Use	High
Flow of Events	1. The user clicks the button. 2. The app fetches current user location and moves the map perspective accordingly.
Alternative Flows	NIL
Exceptions	NIL
Includes	View Map
Special Requirements	NIL
Assumptions	User has stable network connection and has location services turned on.
Notes and Issues	NIL

User Case ID	14		
Use Case Name	View Parked Car Location		
Created By	Pranav Parashar	Last Updated by	Pranav Parashar
Date Created	16/09/2023	Date Last Updated	16/09/2023

Actor	User, Database
Description	On clicking the view parked car button, the map view moves to show the location of the parked car.
Preconditions	The user is viewing a different location.
Postconditions	The map shows the parked car on the map.
Priority	High
Frequency of Use	High
Flow of Events	1. The user clicks the necessary button. 2. The app fetches the marked car location and shows it on the map.
Alternative Flows	1. If there is no parked car marked previously, it shows a dialogue box stating, “No location marked”
Exceptions	NIL
Includes	View Map
Special Requirements	NIL
Assumptions	User has stable network connection.
Notes and Issues	NIL

User Case ID	15		
Use Case Name	Clear History		
Created By	Pranav Parshar	Last Updated by	Pranav Parashar
Date Created	16/09/2023	Date Last Updated	16/09/2023

Actor	User, Database
Description	The app clears history data of more than 3 months or the user can manually choose to do the same before that.
Preconditions	History is stored in the database.
Postconditions	History is cleared.
Priority	Medium
Frequency of Use	Low
Flow of Events	1. User clicks clear history button. 2. The history gets deleted from the database.
Alternative Flows	1. If the history is of more than 3 months, it gets deleted automatically. 2. Or, if there is no history to show, on clicking the button, a dialogue box shows, “History already clear”.
Exceptions	NIL
Includes	NIL
Special Requirements	NIL
Assumptions	User has a stable internet connection.
Notes and Issues	NIL