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# **Software Requirements Specification**

**for**

## **SafeHotel**

**Version 1.6 approved**

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**200604**

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## Revision History

Name	Date	Reason For Changes	Version
Lau Chen Yi Wynne Liang Jia Rui Teo Han Hua Xie Hao Xuan	08/02/22	Update SRS: <ul style="list-style-type: none"> <li>- Introduction</li> <li>- System Features</li> <li>- Other Nonfunctional Requirements</li> <li>- Other Requirements (Data Dictionary etc)</li> <li>- Use Case Diagram</li> <li>- Use Case Description</li> </ul>	1.0
Liang Jia Rui Teo Han Hua	09/02/22	Update SRS: <ul style="list-style-type: none"> <li>- External Interface Requirements</li> <li>- System Features</li> <li>- Use Case Description</li> </ul>	1.1
Lau Chen Yi Wynne Liang Jia Rui Teo Han Hua Xie Hao Xuan	21/02/22	Update SRS: <ul style="list-style-type: none"> <li>- Dialog Map</li> <li>- Key Boundary Classes and Control Classes</li> <li>- Sequence Diagram</li> <li>- Use Case Diagram</li> <li>- Use Case Description</li> </ul>	1.2
Lau Chen Yi Wynne Liang Jia Rui Teo Han Hua Xie Hao Xuan	31/03/22	Update SRS: <ul style="list-style-type: none"> <li>- Class Diagram</li> <li>- Dialog Map</li> <li>- Sequence Diagram</li> <li>- Use Case Diagram</li> <li>- Use Case Description</li> </ul>	1.3
Lau Chen Yi Wynne Teo Han Hua	06/04/22	Update SRS: <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Overall Description</li> <li>- External Interface Requirements</li> <li>- System Features</li> <li>- Other Nonfunctional Requirements</li> <li>- Other Requirements</li> </ul>	1.4
Liang Jia Rui	07/04/22	Update SRS: <ul style="list-style-type: none"> <li>- External Interface Requirements</li> </ul>	1.5
Lau Chen Yi Wynne	10/04/22	Update SRS: <ul style="list-style-type: none"> <li>- Test Cases</li> </ul>	1.6

# **1. Introduction**

## **1.1 Purpose**

This document presents a detailed description of the website SafeHotel. It will explain the purpose and features of the website, its implementation, interfaces, as well as the constraints under which it must operate.

## **1.2 Document Conventions**

Title – font: Times, size: 18, style: bold

Subtitle – font: Times, size: 14, style: bold

Text – font: Times, size: 12, style normal

## **1.3 Intended Audience and Reading Suggestions**

- Tourists who are traveling to, or are already in Singapore, and are looking for a hotel to stay in.
- Singapore residents who are looking for a hotel for a staycation.
- Programmers who may be interested in working on the project and developing it further.

## **1.4 Product Scope**

SafeHotel is a website developed on a cloud-based platform. It aims to provide users with real-time information on the price and location of hotels in Singapore, alongside the number of detected Covid-19 cases who have visited the area within a 3-day time frame. This is to enable users of the website to make informed decisions by comparing the different prices and Covid-19 risk levels among hotels of the same region. As such, it gives the users an ease of mind when booking their chosen hotel.

## **1.5 References**

- Hotel dataset: <https://www.booking.com/city/sg>
- Detected Covid-19 case number by region: <https://covidsitrep.moh.gov.sg>

## **2. Overall Description**

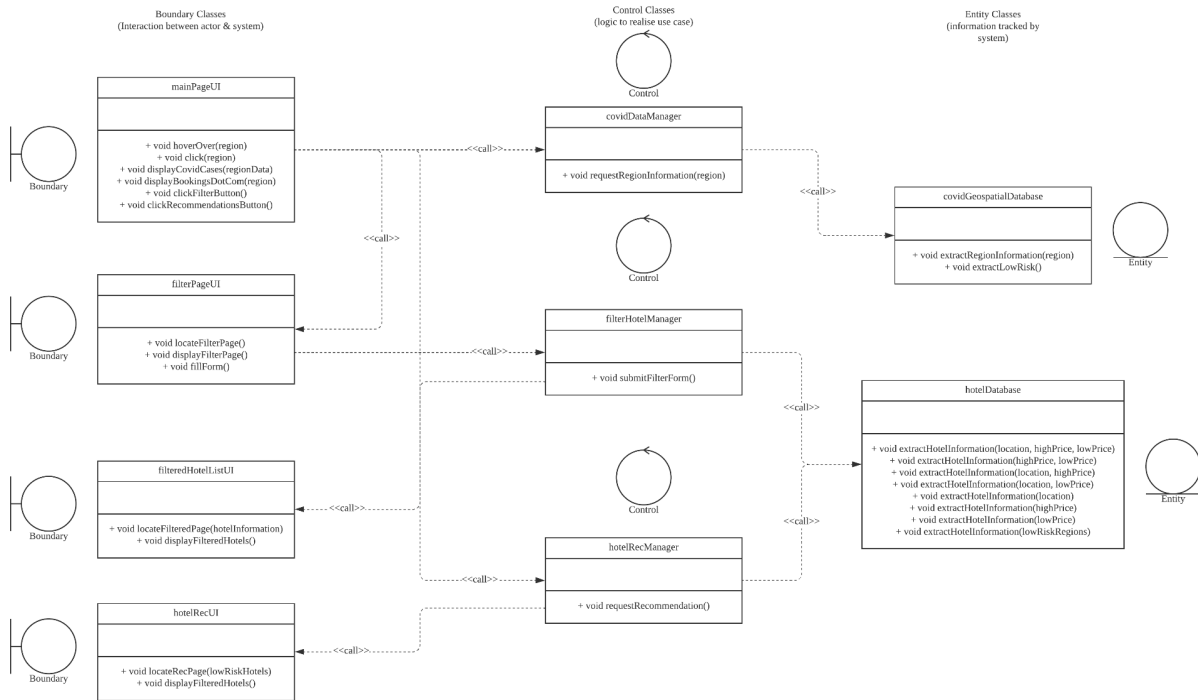
### **2.1 Product Perspective**

SafeHotel is a website developed for users who are intending to book a hotel but are worried about the Covid-19 situation in Singapore. This product combines the function of the Covid-19 geospatial data and hotel information in Singapore, allowing users to choose their hotels with an ease of mind.

### **2.2 Product Functions**

- Main page:
  - Map of Singapore: contains the number of detected Covid-19 cases who have visited the different areas for the past 3 days.
  - Filter Your Hotels button: brings the user to the Filter page.
  - Daily Recommendations button: brings the user to the Daily Recommendations page.
- Filter page:
  - Location filter: drop-down menu of regions that has at least one hotel.
  - Price filter: for the users to input their desired pricing range.
  - Search button: brings the user to the Filtered Hotels page.
- Filtered Hotels page
  - List of filtered hotels: hotels according to the user's input in the Filter page.
- Daily Recommendations page:
  - List of recommended hotels: hotels with low Covid-19 risks according to the number of detected Covid-19 cases.

## • Class Diagram



## 2.3 User Classes and Characteristics

- **Tourists:** Visitors from overseas who have landed in Singapore and intend to stay for up to a few weeks.
- **Singapore Residents:** People currently residing in Singapore and have a few days off to go for a staycation.

## 2.4 Operating Environment

Since SafeHotel is a web application, it will work as long as the browser used by the user supports JavaScript.

## 2.5 Design and Implementation Constraints

- Scraped hotel data from <https://www.booking.com/city/sg> using SelectorLib and python, where data will be stored locally in a database.
  - Due to constraints, we standardized the number of rooms and people when scraping hotel data off <https://www.booking.com/city/sg>, using 1 room and 2 adults throughout.
  - Due to the ever-changing hotel prices, we dynamically change the check-in and check-out dates when scraping hotel data off <https://www.booking.com/city/sg> to get the most updated prices of the hotels.
- Extracted the number of detected Covid-19 cases from <https://covidsitrep.moh.gov.sg>, where data will be stored locally in a database.
  - Due to the ever-changing Covid-19 situation in Singapore, we extracted the real-time data of Covid-19 cases from <https://covidsitrep.moh.gov.sg>, which contains the number of detected Covid-19 cases who have visited the area within a 3-day time frame.
- Not all hotel regions on the homepage will be able to display a list of hotels in the specified region
  - Some regions such as Lavender, Sentosa, Tiong Bahru, Pearl's Hill, is able to bring the user to booking.com whereby it will display the list of hotels in these districts
  - Whereas some regions such as Cecil will simply bring the user to booking.com whereby it will display a list of hotels in Singapore.

## 2.6 User Documentation

- Readme file link: <https://github.com/ForwardStar/safe-hotel/blob/main/README.pdf>
- Full download of application: <https://github.com/ForwardStar/safe-hotel>

## 2.7 Assumptions and Dependencies

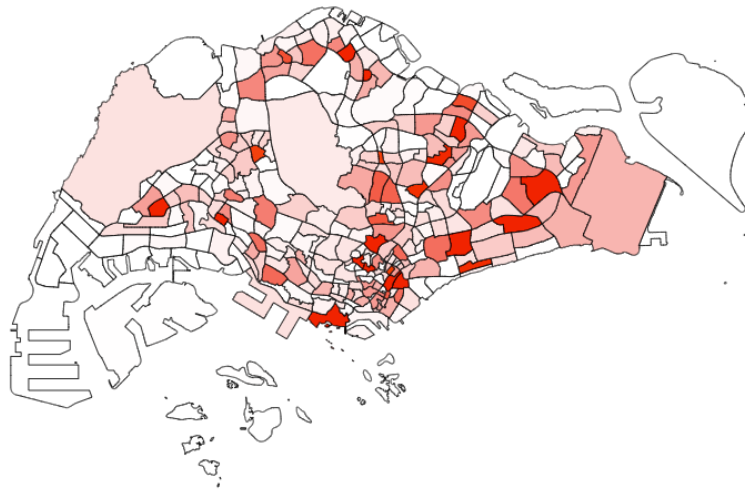
Our website depends heavily on the data available on <https://www.booking.com/city/sg> and <https://covidsitrep.moh.gov.sg>. Hence, if either of these websites no longer update, or are not working as we expected, there will be difficulties in extracting accurate real-time data from these websites. This will result in our website having missing data and thus may not work as intended. Any changes in SelectorLib and the HTML may also affect how our website works.

## 3. External Interface Requirements

### 3.1 User Interfaces

#### 3.1.1 UC1 View Safest Area

SINGAPORE MAP



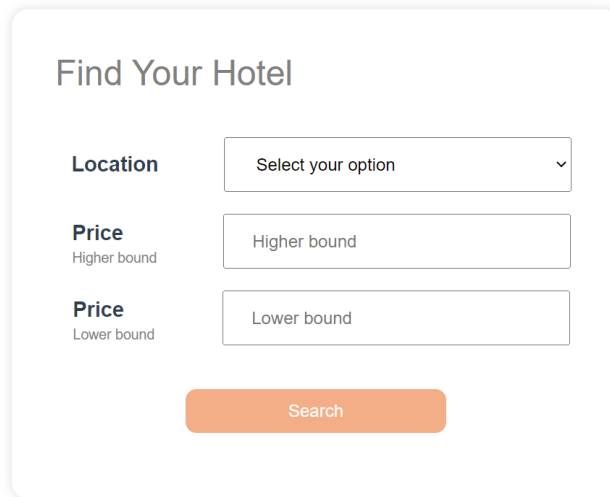
Filter Your Hotels

Daily Recommendations

This is SafeHotel’s main page, consisting of the map of Singapore, a “Filter Your Hotel” button and a “Daily Recommendations” button.



### 3.1.2 UC2 View Filtered Hotel List



The form is titled "Find Your Hotel" and is contained within a light gray rounded rectangle. It features three filter sections: "Location" with a dropdown menu showing "Select your option" and a downward arrow; "Price" with a "Higher bound" input field; and another "Price" section with a "Lower bound" input field. Below these fields is an orange "Search" button.

This is the filter page the user will see after clicking on the “Filter Your Hotel” button. This filter page consists of a drop-down menu to filter the location, two input bars for the higher and lower bound of the price of hotels, and a “Search” button.

### Search Results



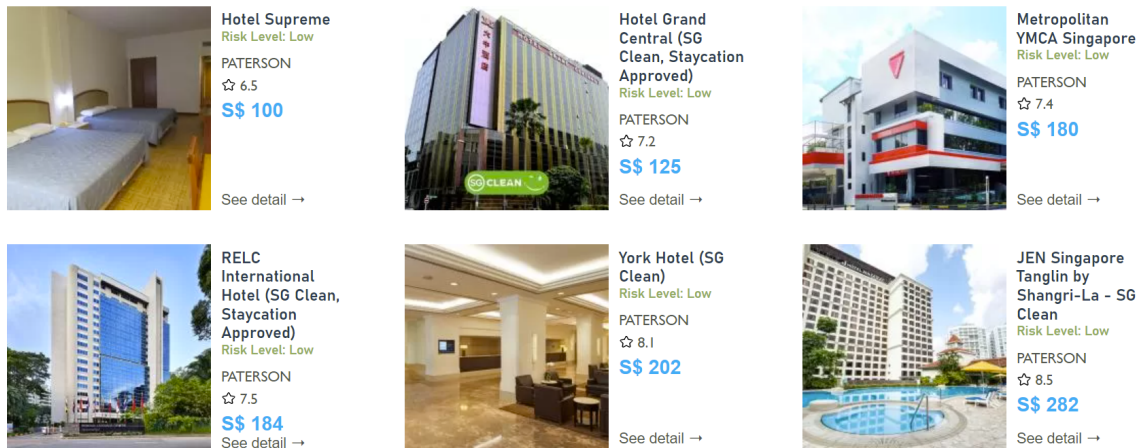
The search results are displayed in a list format. Each item includes a hotel image, its name, location, rating, risk level, price, and a book button.

Hotel Image	Hotel Name	Location	Rating	Risk Level	Price	Action
	New Orchid Hotel (SG Clean)	BALESTIER	5.2	Medium	S\$ 74	Book
	Fragrance Hotel - Classic (SG Clean)	BALESTIER	7.5	Medium	S\$ 79	Book

After the user finishes inputting their criteria for the hotels and clicks on the “Search” button, a list of hotels according to their criteria will be shown. This list of hotels is arranged according to its Covid-19 risk levels, where hotels with a risk level of “Low” will be at the front of the list.

### 3.1.3 UC3 View Daily Recommendation

#### Daily Recommendations



This is the daily recommendations page users will see after clicking on the “Daily Recommendations” button in the main page.

## 3.2 Hardware Interfaces

- For running of the system:
  - Any internet web browser
- For network connection:
  - Wireless Network Interface Card (WNIC) or a modem chip with cellular modem

## 3.3 Software Interfaces

- The software is implemented using Flask as the backend server and Vue 3 as the frontend framework.
- The software uses Singapore’s Covid-19 data from <https://covidstrep.moh.gov.sg/> and hotel data from <https://www.booking.com/city/sg>, and it fetches data through web scraping.
- Web scraping is done through Python’s requests library.
- The software data is stored in .json files or .js files.
- The map data is generated by the server and stored in a .svg file.
- The software uses http requests to transmit data between the front end and the server. This feature is implemented using axios 0.26.0.

### **3.4 Communications Interfaces**

- The software requires a network connection to fetch Covid-19 data and hotel information, and users must have a network connection to access this web application.
- The software should support web browsers including Chrome and Edge.
- The software should use HTTP connection to scrape data and share data between the front end and the backend server.

## 4. System Features

### 4.1 Use Case Description

Use Case ID:	01		
Use Case Name:	View Safest Area		
Created By:	Teo Han Hua	Last Updated By:	Lau Chen Yi Wynne
Date Created:	08-Feb-2022	Date Last Updated:	28-Mar-2022

Actor:	User
Description:	User accesses the main page, which consists of a map and two buttons. In this case, the user would choose to either hover over a region or click on a region on the map in which a list of hotels in the region will be displayed.
Preconditions:	<ol style="list-style-type: none"> <li>1. Device must be connected to WiFi/Cellular Data.</li> <li>2. User is on mainPageUI, which consists of the geospatial Covid-19 data of Singapore, a “Filter Your Hotels” button and a “Daily Recommendations” button.</li> </ol>
Postconditions:	<ol style="list-style-type: none"> <li>1. The webpage will display the number of Covid-19 cases in the region when a region is hovered over by mouse.</li> <li>2. If the user clicks on a region, it will bring the user to an external webpage.</li> </ol>
Priority:	High
Frequency of Use:	Every time the user hovers over a region on the map and clicks on it.
Flow of Events:	<ol style="list-style-type: none"> <li>1. User hovers over a region of the map on the mainPageUI.</li> <li>2. mainPageUI will request for the number of Covid-19 cases in the region from the covidDataManager.</li> </ol>

	<ol style="list-style-type: none"><li>3. covidDataManager will extract the number of Covid-19 cases of the region from covidGeospatialDatabase.</li><li>4. mainPageUI will then display the number of Covid-19 cases of the region.</li><li>5. User clicks on a region on the mainPageUI.</li><li>6. mainPageUI will bring us to an external link, containing a list of hotels from that region.</li></ol>
Alternative Flows:	NULL
Exceptions:	NULL
Includes:	NULL
Special Requirements:	NULL
Assumptions:	NULL
Notes and Issues:	NULL

Use Case ID:	02		
Use Case Name:	View Filtered Hotel List		
Created By:	Teo Han Hua	Last Updated By:	Lau Chen Yi Wynne
Date Created:	08-Feb-2022	Date Last Updated:	18-March-2022

Actor:	User
Description:	Users access the filter page, from mainPageUI, where they would input the criteria of the hotels and a list of hotels, according to their criteria, would be displayed.
Preconditions:	<ol style="list-style-type: none"> <li>1. Device must be connected to WiFi/cellular data.</li> <li>2. User is on mainPageUI, which consists of the geospatial Covid-19 data of Singapore, a “Filter Your Hotels” button and a “Daily Recommendations” button.</li> </ol>
Postconditions:	<ol style="list-style-type: none"> <li>1. The webpage will display a list of hotels that fit the user’s criteria.</li> </ol>
Priority:	High
Frequency of Use:	Every time the user presses the “Filter Your Hotels” button on the mainPageUI, inputs their desired criteria and presses the “Search” button on the filterPageUI.
Flow of Events:	<ol style="list-style-type: none"> <li>1. User clicks on the “Filter Your Hotels” button on mainPageUI.</li> <li>2. mainPageUI will send a message to filterPageUI.</li> <li>3. filterPageUI will display the filter page, with 3 input bars (Location, Upper bound price, Lower bound price) and the “Search” button.</li> <li>4. The User will enter all 3 criteria, and then press the “Search” button.</li> <li>5. filterPageUI will send the location, upper bound price and lower bound price to filterHotelManager.</li> </ol>

	<ol style="list-style-type: none"> <li>6. filterHotelManager will then send the information received to hotelDatabase to extract the hotels that have met the criteria.</li> <li>7. filterHotelManager will then send all required hotel information to the filteredHotelListUI.</li> <li>8. filteredHotelListUI will display the filtered list of hotels. This list of hotels is arranged according to its Covid-19 risk level, where hotels with a risk level of “Low” is at the front of the list.</li> </ol>
Alternative Flows:	<p>AF-S4: Only the upper and lower bound price are filled in</p> <ol style="list-style-type: none"> <li>1.1 The User will enter the upper and lower bound price, and then press the search button.</li> <li>1.2 filterPageUI will send the upper and lower bound price to filterHotelManager.</li> <li>1.3 Return to step 6.</li> </ol> <p>AF-S4: Only the location and upper bound price are filled in</p> <ol style="list-style-type: none"> <li>2.1 The User will enter the location and upper bound price, and then press the search button.</li> <li>2.2 filterPageUI will send the location and upper bound price to filterHotelManager.</li> <li>2.3 Return to step 6.</li> </ol> <p>AF-S4: Only the location and lower bound price are filled in</p> <ol style="list-style-type: none"> <li>3.1 The User will enter the location and lower bound price, and then press the search button.</li> <li>3.2 filterPageUI will send the location and lower bound price to filterHotelManager.</li> <li>3.3 Return to step 6.</li> </ol> <p>AF-S4: Only the location is filled in</p> <ol style="list-style-type: none"> <li>4.1 The User will enter the location and then press the search button.</li> <li>4.2 filterPageUI will send the location to filterHotelManager.</li> <li>4.3 Return to step 6.</li> </ol> <p>AF-S4: Only the upper bound price is filled in</p>

	<p>5.1 The User will enter the upper bound price, and then press the search button.</p> <p>5.2 filterPageUI will send the upper bound price to filterHotelManager.</p> <p>5.3 Return to step 6.</p> <p>AF-S4: Only the lower bound price is filled in</p> <p>6.1 The User will enter the lower bound price, and then press the search button.</p> <p>6.2 filterPageUI will send the lower bound price to filterHotelManager.</p> <p>6.3 Return to step 6.</p>
Exceptions:	<p>EX 1. Hotel of required criteria not found.</p> <p>1.1 filteredHotelList will display an empty list.</p>
Includes:	NULL
Special Requirements:	NULL
Assumptions:	<p>1. fillForm() assumes that after filling in the criteria, the user would press the search button, which would inform the filterPageUI to submit the criteria to filterHotelManager.</p>
Notes and Issues:	NULL



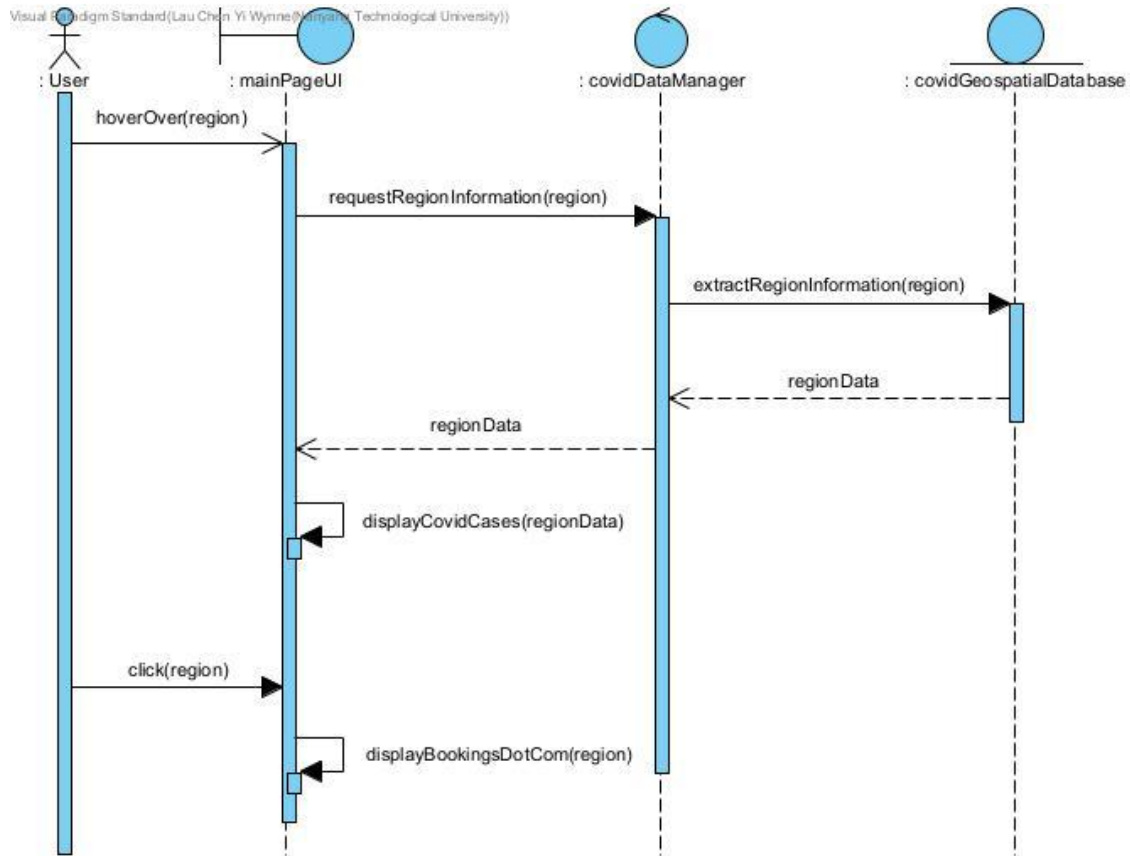
Use Case ID:	03		
Use Case Name:	View Daily Recommendation		
Created By:	Liang Jiarui	Last Updated By:	Lau Chen Yi Wynne
Date Created:	08-Feb-2022	Date Last Updated:	18-March-2022

Actor:	User
Description:	User will receive a list of hotels that are recommended to them according to the number of Covid-19 cases in that region.
Preconditions:	<ol style="list-style-type: none"> <li>1. Device must be connected to WiFi/cellular data.</li> <li>2. User is on the main page, which consists of the geospatial Covid-19 data of Singapore, a “Filter Your Hotels” button and a “Daily Recommendations” button.</li> </ol>
Postconditions:	<ol style="list-style-type: none"> <li>1. The webpage will display a list of recommended hotels.</li> </ol>
Priority:	High
Frequency of Use:	Every time the user presses the “Daily Recommendation” button.
Flow of Events:	<ol style="list-style-type: none"> <li>1. User clicks on the “Daily Recommendation” button on mainPageUI.</li> <li>2. mainPageUI will request a list of recommended hotels from hotelRecManager.</li> <li>3. hotelRecManager will extract a list of low Covid-19 risk regions from the covidGeospatialDatabase.</li> <li>4. Using the list of low Covid-19 risk regions extracted, hotelRecManager will extract a list of hotels from hotelDatabase accordingly.</li> <li>5. hotelRecManager will then display a list of recommended hotels where the risk of Covid-19 infection is low.</li> </ol>
Alternative Flows:	NULL

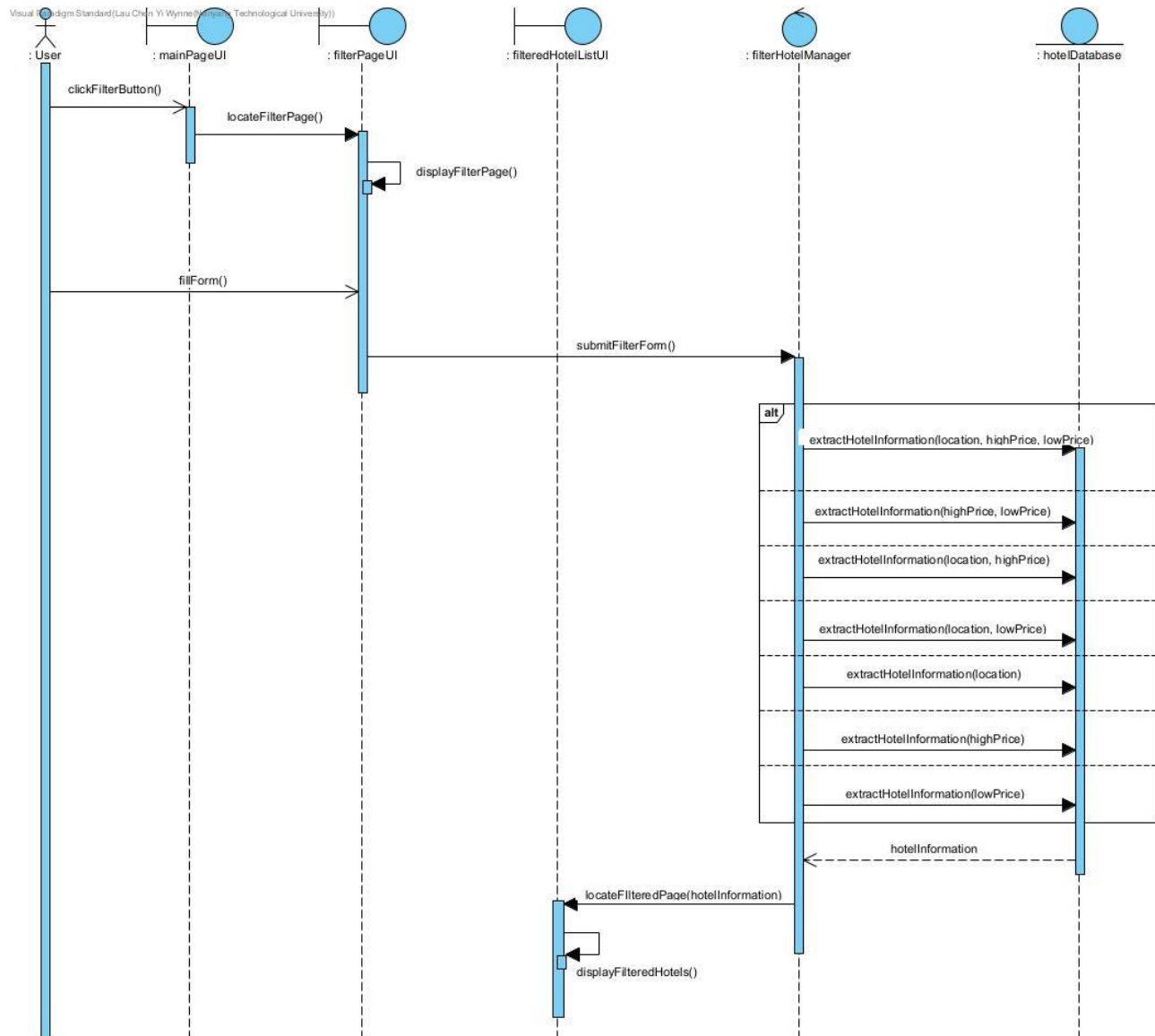
Exceptions:	NULL
Includes:	NULL
Special Requirements:	NULL
Assumptions:	NULL
Notes and Issues:	NULL

## 4.2 Sequence Diagram

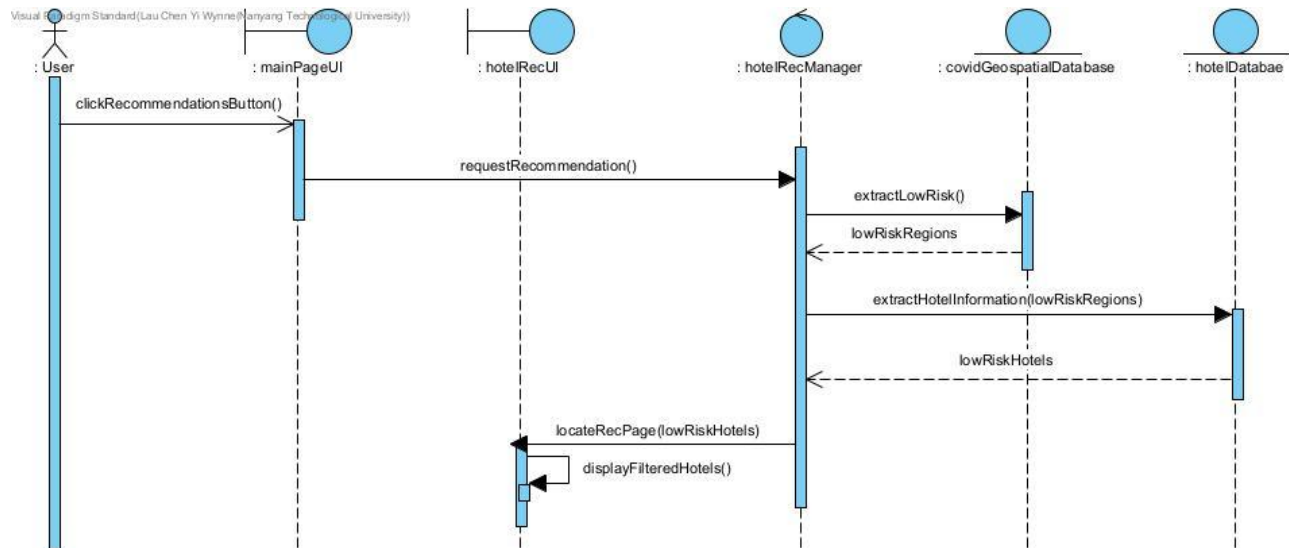
### 4.2.1 UC1 View Safest Area



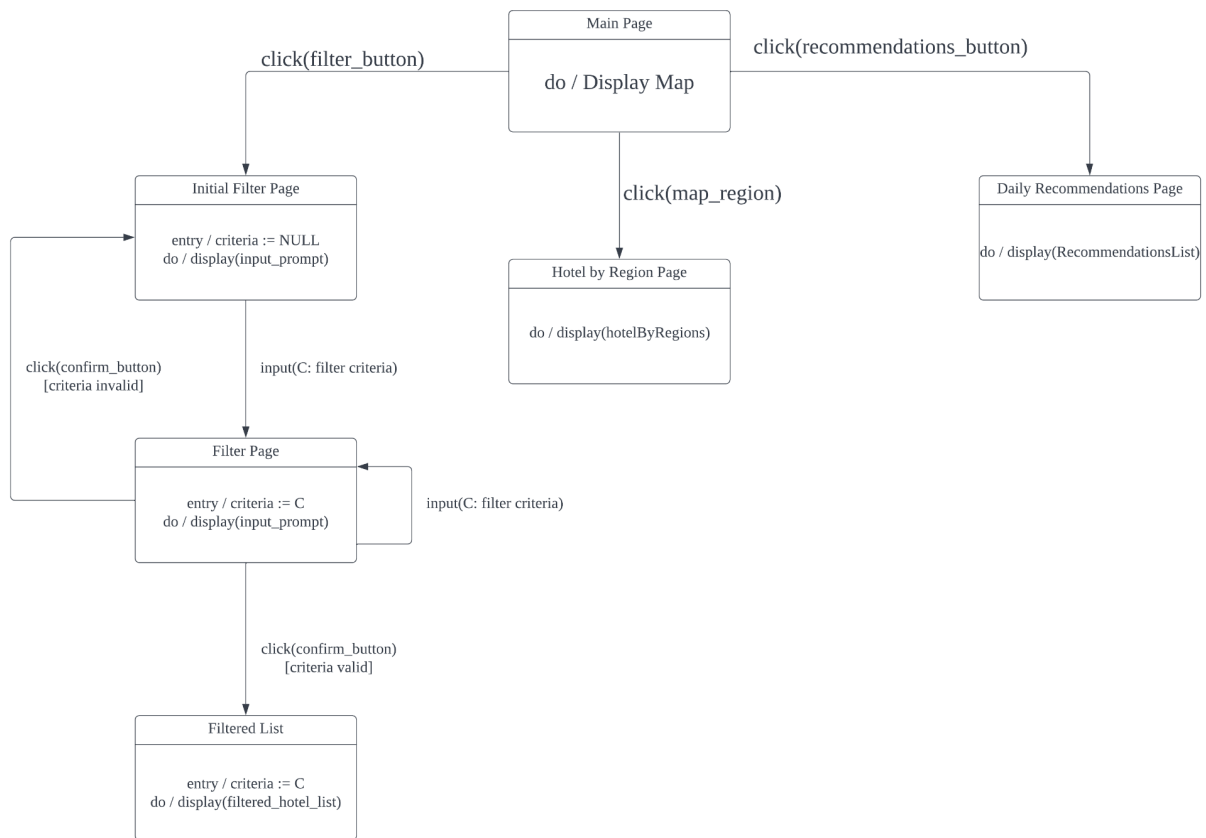
## 4.2.2 UC2 View Filtered Hotel List



## 9.3 UC3 View Daily Recommendation



### 4.3 Dialog Map



## **5. Other Nonfunctional Requirements**

### **5.1 Performance Requirements**

SafeHotel is a web application. It requires good Internet status and does not have performance requirements on user devices.

### **5.2 Safety Requirements**

SafeHotel does not have any safety requirements as users do not need to provide their personal data to the website.

### **5.3 Security Requirements**

Data transmissions are through “https” secure access. Therefore it is impossible for hackers to derive the messages sent between users and the server.

### **5.4 Software Quality Attributes**

- User interface of the system is developed with Javascript and needs to fit the screen of the user device;
- System must scrape covid-19 data to update its database daily;
- System must scrape hotel data to update its database daily;
- System must provide up-to-date data in the user interface from its database;
- System must format the data properly in the user interface;
- Implementation of the system should be encapsulated and have well-formatting comments for future development;
- Every developer should develop the product with their own branch;
- The merge branch request of each developer should be reviewed by at least another developer before applied;
- Unit tests must be applied and the system must pass all unit tests.

### **5.5 Business Rules**

SafeHotel is an open-source product. Developers can clone the project, raise issues and upload their patches under limited cases. MIT license is adopted for the product.

## 6. Other Requirements

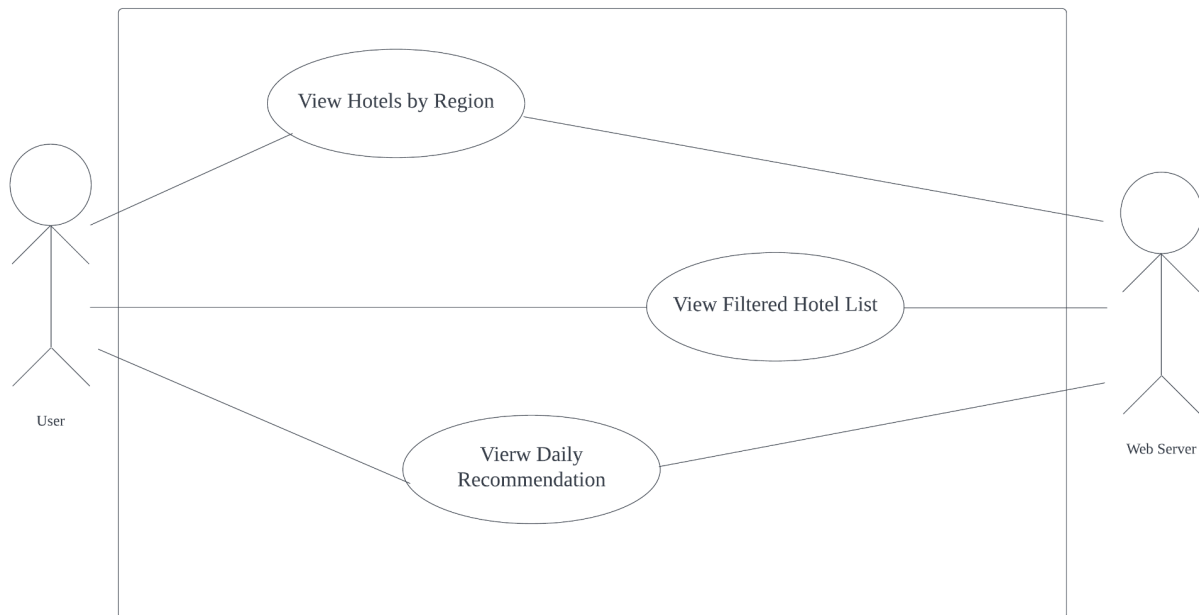
### 6.1 Data Dictionary

Term	Description
Area/ region	The different subzones in Singapore.
Covid-19 data/ Covid-19 geospatial data	Data scraped from <a href="https://covidsitrep.moh.gov.sg">https://covidsitrep.moh.gov.sg</a> , includes: <ul style="list-style-type: none"><li>• number of Covid-19 cases by region</li></ul>
Covid-19 Risk Level	<p>The Covid-19 risk level shows the covid situation of a certain region. The Covid-19 risk level is based on the number of cases in the region. The data is fetched from <a href="https://covidsitrep.moh.gov.sg">https://covidsitrep.moh.gov.sg</a>.</p> <p>There are five covid risk levels:</p> <ul style="list-style-type: none"><li>• Low: no. of detected Covid-19 cases <math>\leq 50</math></li><li>• Medium Low: <math>51 \leq</math> no. of detected Covid-19 cases <math>\leq 150</math></li><li>• Medium: <math>151 \leq</math> no. of detected Covid-19 cases <math>\leq 300</math></li><li>• Medium High: <math>301 \leq</math> no. of detected Covid-19 cases <math>\leq 500</math></li><li>• High: <math>501 \leq</math> no. of detected Covid-19 cases</li></ul>
Developer	A developer is a person who contributes to the product.
Hotel data/ information	Data scraped from booking.com, includes: <ul style="list-style-type: none"><li>• name</li><li>• image</li><li>• price</li><li>• location</li><li>• review</li><li>• url of the individual hotels.</li></ul>
System	The system refers to the SafeHotel web application and other supported components in the server.
User	A user refers to an entity who accesses the website.



## 6.2 Use Case Diagram

### SafeHotel



## 6.3 Test Cases and Testing Results

### 6.3.1 UC2 View Filtered Hotel List

Location: filterHotelManager

VALID Location, INVALID Lower Bound Price and VALID Upper Bound Price

Input	Location	Lower Bound Price	Upper Bound Price	Oracle	Actual Output
Test #1	City Hall	300	200	Invalid	Warning displayed
Test #2	NA	-100	NA	Invalid	Warning displayed

## VALID Location, VALID Lower Bound Price and INVALID Upper Bound Price

Input	Location	Lower Bound Price	Upper Bound Price	Oracle	Actual Output
Test #3	City Hall	200	100	Invalid	Warning displayed
Test #4	NA	NA	-100	Invalid	Warning displayed

## VALID Location, VALID Lower Bound Price and VALID Upper Bound Price

Input	Location	Lower Bound Price	Upper Bound Price	Oracle	Actual Output
Test #5	Bencoolen	NA	NA	Hotels in Bencoolen	Hotels in Bencoolen
Test #6	NA	100	NA	Hotels above \$100	Hotels above \$100
Test #7	NA	NA	200	Hotels below \$200	Hotels below \$200
Test #8	Boat Quay	100	NA	Hotels in Boat Quay above \$100	Hotels in Boat Quay above \$100
Test #9	Changi Airport	NA	200	Hotels in Changi Airport below \$200	Hotels in Changi Airport below \$200
Test #10	NA	100	200	Hotels between \$100 and \$200	Hotels between \$100 and \$200
Test #11	Bugis	50	100	Hotels in Bugis, between \$50 and \$100	Hotels in Bugis, between \$50 and \$100
Test #12	NA	NA	NA	All hotels in Singapore	All hotels in Singapore

Source: [http://www.frontiernet.net/~kwiegers/process\\_assets/srs\\_template.doc](http://www.frontiernet.net/~kwiegers/process_assets/srs_template.doc)