



# FINAL REPORT

LEFT4DEAD

SENG2021

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# Requirements Analysis

## Purpose of the System

In modern lives, there is great demand for access to a variety of detailed weather information from people from all walks. Modern people tend to search for different kinds of weather information for multiple purposes. For example, examining the weather forecast before determining to bring an umbrella and choosing a good day for activities such as fishing and BBQ.

People require real time and long-term weather information. There is an increased demand for apps to be more relevant and personalised in addressing user needs. For our application, we have decided to address this need by:

- Displaying weather forecasts for different time intervals – short-term and long-term.
- Collecting real time current, hourly and daily weather information, and presenting it to the user in a clean and efficient manner.
- Presenting a collection of weather information for different, grouped by their respective countries.
- Recommending potential activities for the user in their chosen city based on real time weather information.

## Problems Addressed

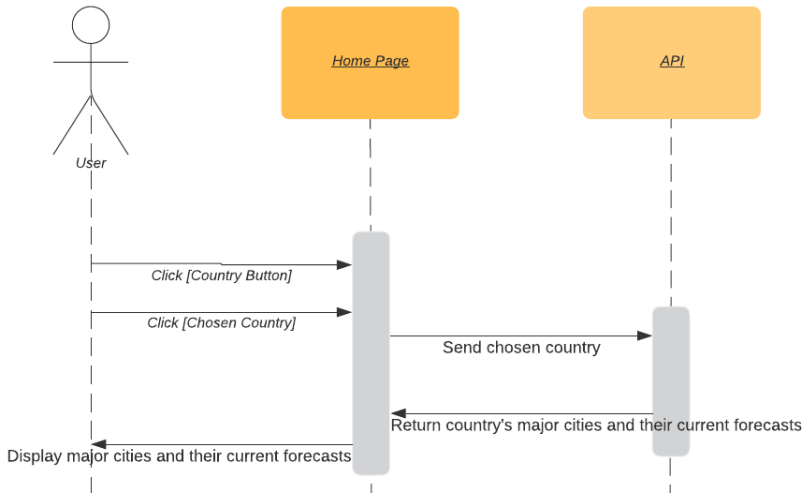
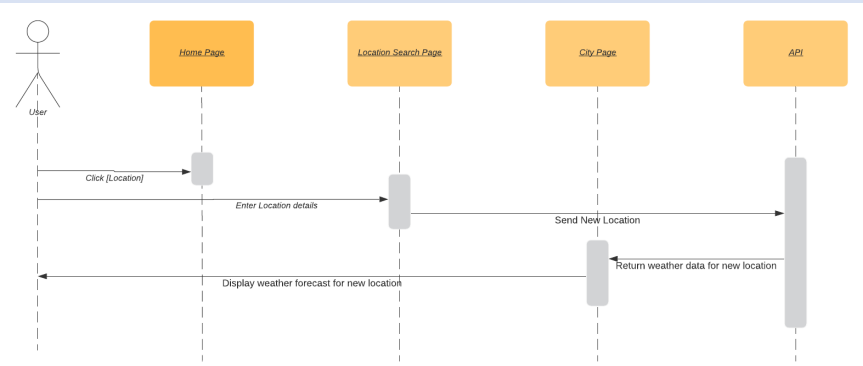
The problem statements below represent the final problems which we solved in our project:

- There is a lack of detailed weather information portals across the world which only present relevant weather data for mass consumers in a clean and efficient manner.
- The majority of weather portals, which display detailed weather data, overwhelm their users with too much information which is not relevant to them.
- Many current weather applications lack personalisation for the user, and do not give users recommendations of potential activities they can do based on the weather.
- Users should be able to search for different locations for their weather data, and view basic weather data across their country.
- Users should be able to view future hourly and daily weather forecasts.

## User Stories

Since our last report, we have added, removed and altered various user stories. This occurred based on any new ideas we had during development, as well as any restrictions we had with our chosen APIs and skill-level of team members.

| Page      | Feature  | As a user...   | Scenario   | Sequence Diagram   |
|-----------|--|--|--|--|
| Home Page | Access to the general weather forecast for major cities in your country. | <ul style="list-style-type: none"> <li>- I want to see the minimum and maximum temperatures for each major city so that I can gain a general understanding of the climate of those cities.</li> <li>- I want to see the icons representing the weather forecasts for each major city so that I can gain a quick and visual idea of the condition in those cities.</li> </ul> | <p><b>Scenario:</b> Viewing the weather for major cities in Australia.</p> <p><b>GIVEN</b> I am in Australia and I am on the home page.<br/> <b>THEN</b> I should see basic weather information for major Australian cities.</p> | <pre> sequenceDiagram     actor User     participant HP as Home Page     participant API as API     User-&gt;&gt;HP: Send country     activate HP     HP-&gt;&gt;API: Send Country     activate API     API--&gt;&gt;HP: Return cities in country and their current temperatures     deactivate API     HP--&gt;&gt;User: Display cities and temperatures     deactivate HP   </pre> |
|           | Access the general weather information for                               | <ul style="list-style-type: none"> <li>- I want to be able to switch different units displayed by</li> </ul>   | <p><b>Scenario:</b> View the weather in Brazil.</p>  |  |

|  |  |  |   |   |
|--|--|--|---|---|
|  | major cities in other countries.                     | clicking the button on the top of the main page so that I can see the preference unit in the searching result later.   | <p><b>GIVEN</b> I am on the home page.<br/> <b>WHEN</b> I click on the settings panel.<br/> <b>THEN</b> I click on the countries button.<br/> <b>THEN</b> I click on Brazil.<br/> <b>THEN</b> I should be taken back to the home page, now showing the forecast for major Brazilian cities.</p>   |  <pre> sequenceDiagram     actor User     participant HP as Home Page     participant API as API     User-&gt;&gt;HP: Click [Country Button]     User-&gt;&gt;HP: Click [Chosen Country]     HP-&gt;&gt;API: Send chosen country     API--&gt;&gt;HP: Return country's major cities and their current forecasts     HP--&gt;&gt;User: Display major cities and their current forecasts   </pre>  |
|  | Access weather information for another city or town. | <ul style="list-style-type: none"> <li>- I want to be able to search for a specific location so that I can obtain detailed weather information for that location.</li> <li>- I want to be able to enter the location by either the name or geo-position so that I can search based on the information</li> </ul> | <p><b>Scenario:</b> View the weather in New York City.</p> <p><b>GIVEN</b> I am on the home page.<br/> <b>WHEN</b> I click on the settings panel.<br/> <b>THEN</b> I click on the search button.<br/> <b>THEN</b> I type in New York City and click search.<br/> <b>THEN</b> I should be taken to a page with detailed weather information for New York City.</p> |  <pre> sequenceDiagram     actor User     participant HP as Home Page     participant LSP as Location Search Page     participant CP as City Page     participant API as API     User-&gt;&gt;HP: Click [Location]     User-&gt;&gt;LSP: Enter Location details     LSP-&gt;&gt;API: Send New Location     API--&gt;&gt;CP: Return weather data for new location     CP--&gt;&gt;User: Display weather forecast for new location   </pre> |

|                      |   |  |  |   |
|----------------------|---|--|--|---|
|                      |   | <p>I have for the location.</p> <ul style="list-style-type: none"> <li>- I want to be able to see the weather in a foreign city I will vacation in next week, so I can pack my bag appropriately according to the weather forecast.</li> <li>- I want to see an icon representing the weather forecasts for my chosen city so that I can gain a quick and visual idea of the weather.</li> </ul> |  |   |
| <b>Location Page</b> | Access current weather conditions for a given location. | <ul style="list-style-type: none"> <li>- I want to see a weather icon and temperature so that I can gain a general idea about the weather at a glance.</li> </ul>  | <p><b>Scenario:</b> View current weather conditions in New York City.</p> <p><b>GIVEN</b> I am on the home page.<br/> <b>WHEN</b> I click on the settings panel.</p> | <pre> sequenceDiagram     actor User     participant HP as Home Page     participant SP as Search Page     participant API as API      User-&gt;&gt;HP: Click [Search Button]     activate HP     HP-&gt;&gt;SP: Enter Location details     deactivate HP     activate SP     SP-&gt;&gt;API: Send New Location     deactivate SP     activate API     API-&gt;&gt;SP: Return location's real-time weather forecasts     deactivate API     SP-&gt;&gt;HP: Display location's weather forecast for today     deactivate SP     deactivate HP   </pre> |

|  |  |   |  |  |
|--|--|---|--|--|
|  |  | <ul style="list-style-type: none"><li>- I want to know the precipitation information at a glance, so that I can prepare for sunny/raining/snowing/storm weather.</li><li>- I want to know the humidity and cloud cover information at a glance, so that I can make decisions about hanging up my laundry outside</li><li>- I want to see the UV index and wind speed/direction data at a glance so that I can gain information to prepare for outdoor activities.</li></ul> | <p><b>THEN</b> I click on the search button.</p> <p><b>THEN</b> I type in New York City and click search.</p> <p><b>THEN</b> I should be taken to a page showing the real-time weather data for New York City.</p> |  |
|--|--|---|--|--|



Access hourly weather forecasts.

- I want to see the weather icons and forecasted temperature for the following 12 hours so that I can get an overall view of how the weather will change over the day.
- I want to see whether it will rain in the afternoon, so I can know if I should hang up the washing inside or outside.
- I want to see a detailed weather forecast for different hours over the day so that I can have a general idea of the expected precipitation levels and wind

**Scenario:** Get the hourly weather information for Sydney.

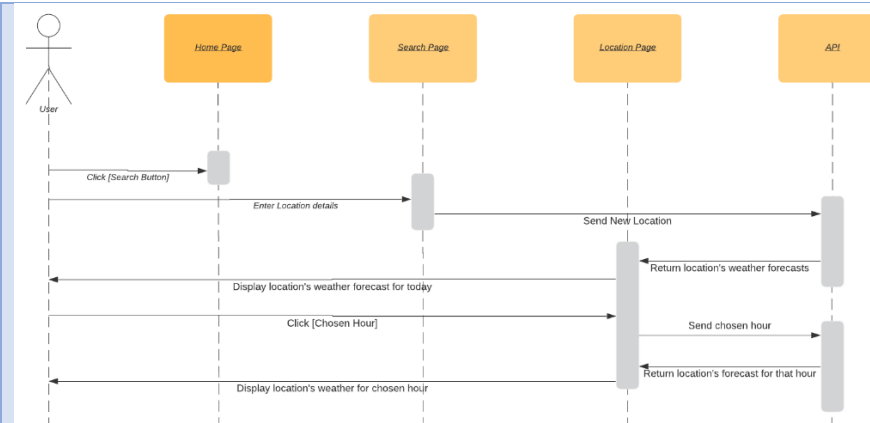
**GIVEN** I am on the home page and in Australia.

**WHEN** I click on Sydney

**THEN** I should go to a page with Sydney's weather forecast for the day.

**WHEN** I click on a specific hour within the 12-hor span.

**THEN** I should see a modal which shows the forecasted weather information for that specific hour.



|                                 |  |  |   |  |
|---------------------------------|--|--|---|--|
|                                 |  | <p>speed I should expect for the day.</p> <ul style="list-style-type: none"> <li>- I want to be able to access the detailed hourly information for one of the coming hours, so that I can take a very careful look at detailed information for a specific hour in the near future conveniently.</li> </ul> |   |  |
| Access daily weather forecasts. | <ul style="list-style-type: none"> <li>- I want to be able to see the maximum and minimum forecasted temperatures so that I can determine whether it will be warm enough later in the day to hang up the washing outside.</li> </ul> | <p><b>Scenario:</b> Get the current weather information about Sydney.</p> <p><b>GIVEN</b> I am on the home page and not in Australia.</p> <p><b>WHEN</b> I click on the settings panel.</p> <p><b>THEN</b> I click on the search button.</p>   | <pre> sequenceDiagram     actor User     participant HP as Home Page     participant SP as Search Page     participant LP as Location Page     participant API as API      User-&gt;&gt;HP: Click [Search Button]     activate HP     HP-&gt;&gt;SP: Enter Location details     deactivate HP     activate SP     SP-&gt;&gt;LP: Send New Location     deactivate SP     activate LP     LP-&gt;&gt;API: Return location's weather forecasts     deactivate LP     activate API     API-&gt;&gt;LP: Return location's weather forecasts     deactivate API     LP-&gt;&gt;User: Display location's weather forecast for today     deactivate LP     User-&gt;&gt;LP: Click [Chosen Day]     activate LP     LP-&gt;&gt;API: Send chosen day     deactivate LP     activate API     API-&gt;&gt;LP: Return location's forecast for that day     deactivate API     LP-&gt;&gt;User: Display location's weather for chosen day     deactivate LP   </pre> |  |

|  |  |   |  |  |
|--|--|---|--|--|
|  |  | <ul style="list-style-type: none"><li>- I want to be able to see details about astronomy so that I can see the times of day when the sun and moon are predicted to rise and set.</li><li>- I want to see basic weather data for the weekend so that I can decide whether it will be appropriate to go camping.</li><li>- I want to be able to access the detailed daily information for one of the coming days by a click, so that I can take a very careful look at detailed information for a specific day in the near future easily.</li></ul> | <p><b>THEN</b> I type in Sydney and click search.</p> <p><b>THEN</b> I should be taken to a page with detailed weather information for Sydney.</p> |  |
|--|--|---|--|--|

Access historical weather data for my chosen location.

- I want to be able to view the weather data from a specific date in the past, so that I can get a general idea of the weather patterns for that time of year.

**Scenario:** See the weather forecast for June in Tamworth (and it is April).

**GIVEN** I am on the home page and in Australia.

**WHEN** I click on the settings panel.

**THEN** I click on the search button.

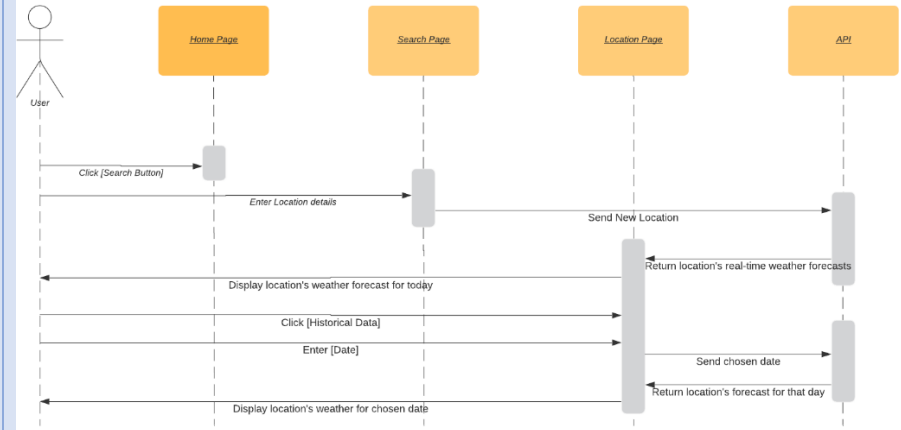
**THEN** I type in Tamworth and click search.

**THEN** I should be taken to a page with detailed weather information for Tamworth.

**WHEN** I click on the "historical" button.

**AND** choose June 3<sup>rd</sup>, 2009.

**THEN** I should go to a page showing a detailed weather data from June 3<sup>rd</sup>, 2009 in Tamworth.



Get recommendations for activities to do based on today's weather.

- I want to be recommended activities I can do based on the weather so that I can participate in weather-appropriate activities.

**Scenario:** See a list of recommended weather-appropriate activities in Sydney.

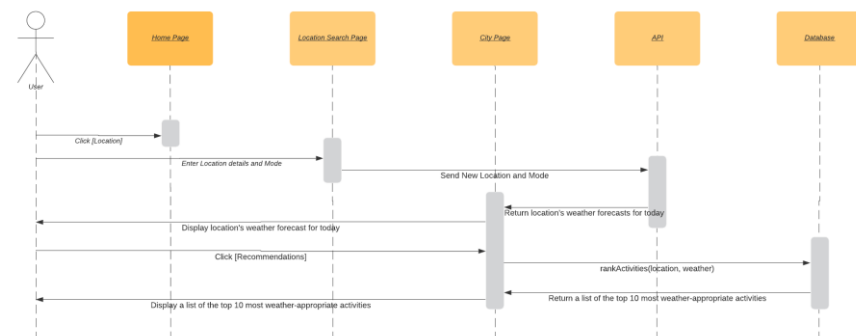
**GIVEN** I am on the home page and in Australia.

**WHEN** I click on Sydney

**THEN** I should go to a page with Sydney's weather forecast for the day.

**WHEN** I click on the recommendations button.

**THEN** I should see a list of the top 10 most weather-appropriate activities.



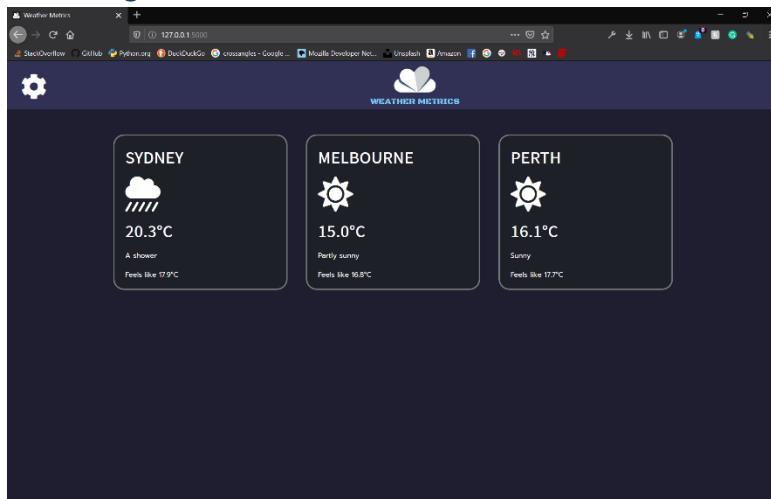
# System Design

## Architecture

For the Frontend of the application, a Bootstrap Framework was implemented using HTML, CSS and JavaScript for a responsive and user-friendly webpage. This communicates with our Backend server, a Python Flask micro web framework, which collects data from our APIs in JSON format and then pass it on to our Flask templates on the front-end, to be displayed to the user. The APIs being used are AccuWeather, which provides urban weather data over a 5 day period, and WorldWeatherOnline, which provides past weather data.

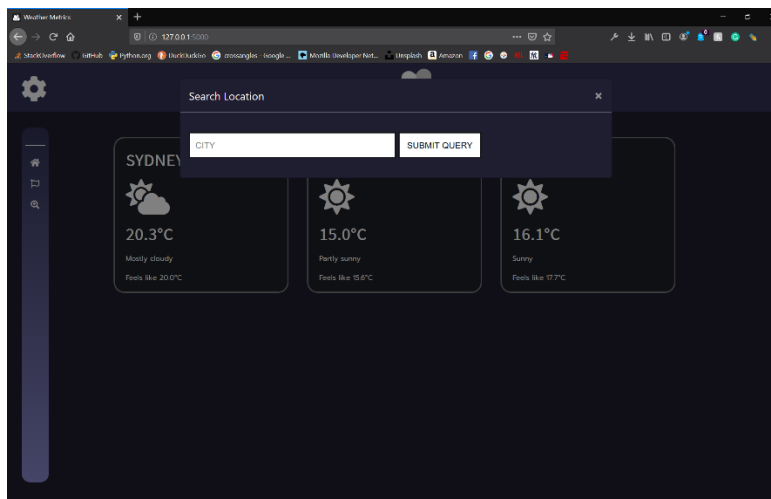
## Implementation

### Home Page



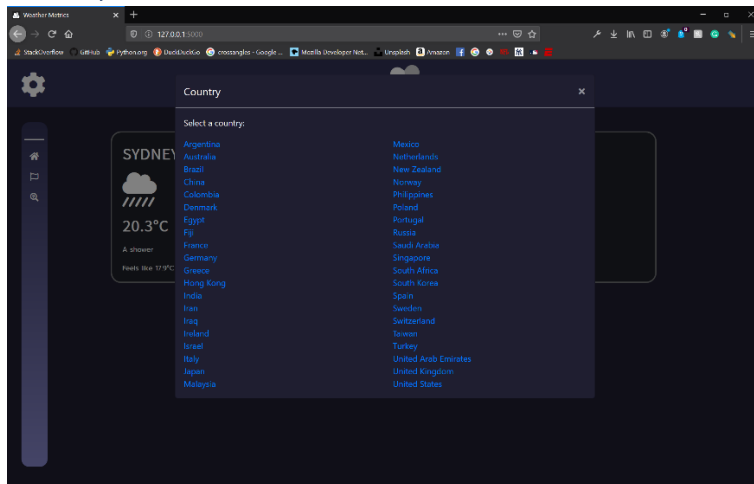
Home dashboard displaying the forecast for major cities in the user's country.

### Search Bar



Search bar where the user can query for a specific location.

## Country Modal

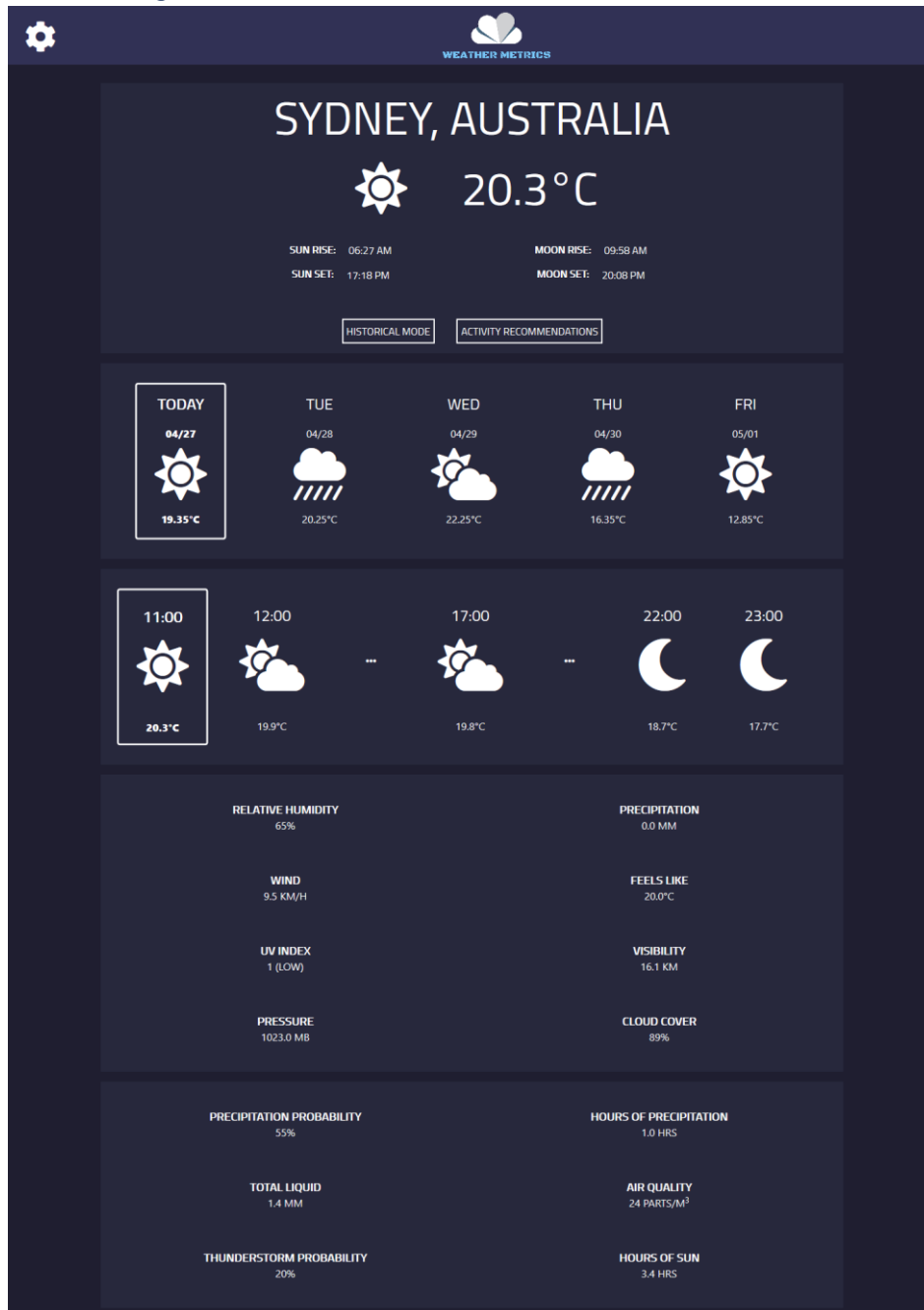


Modal where the user can choose the dashboard to alter to the major cities of a different country.



This is the end result after choosing a country, in this example, Brazil.

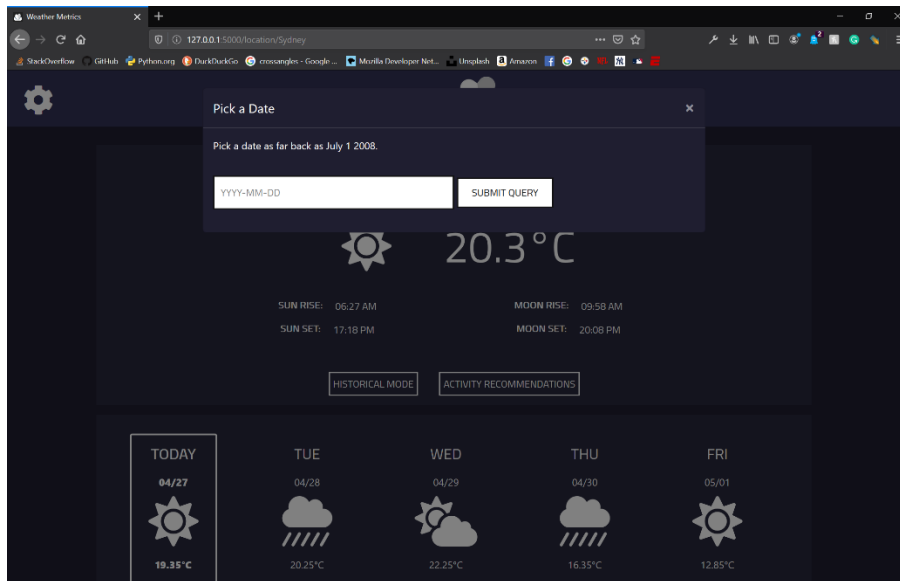
## Location Page



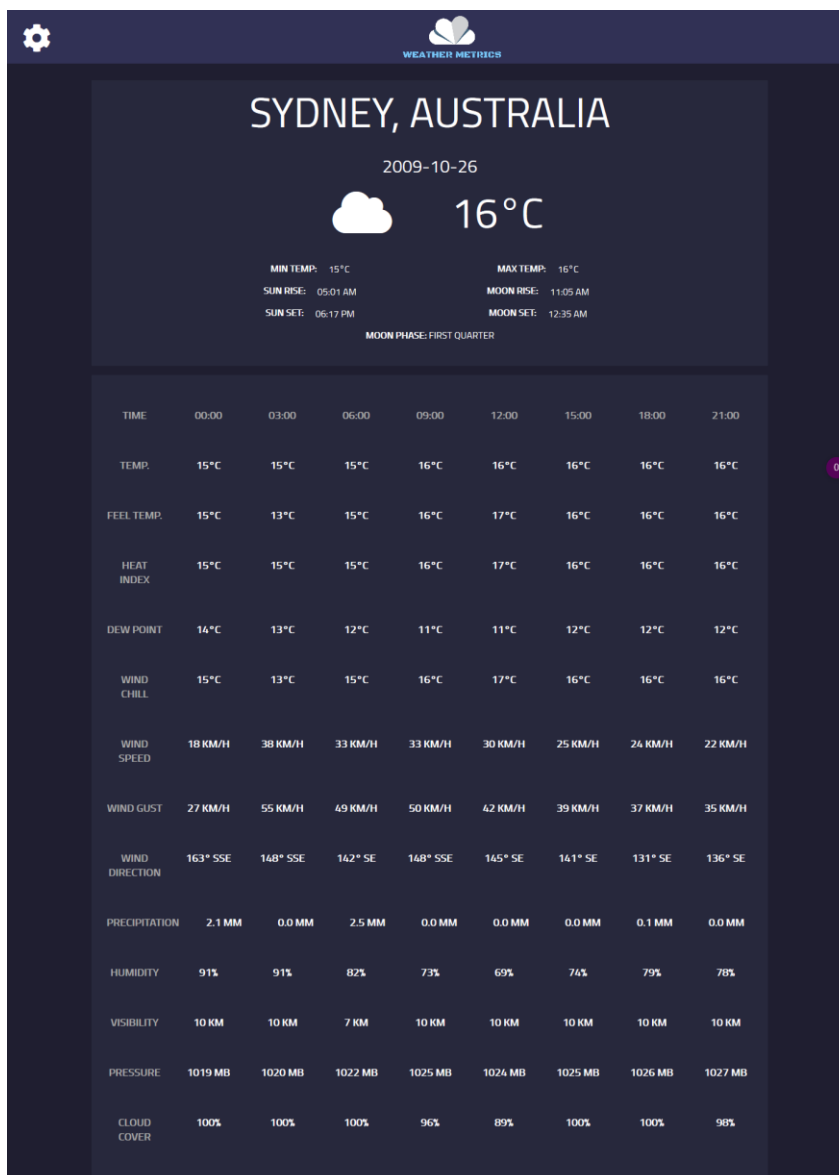
After a user chooses, for example, Sydney, they are taken to a page displaying real-time weather data.



## Historical Data

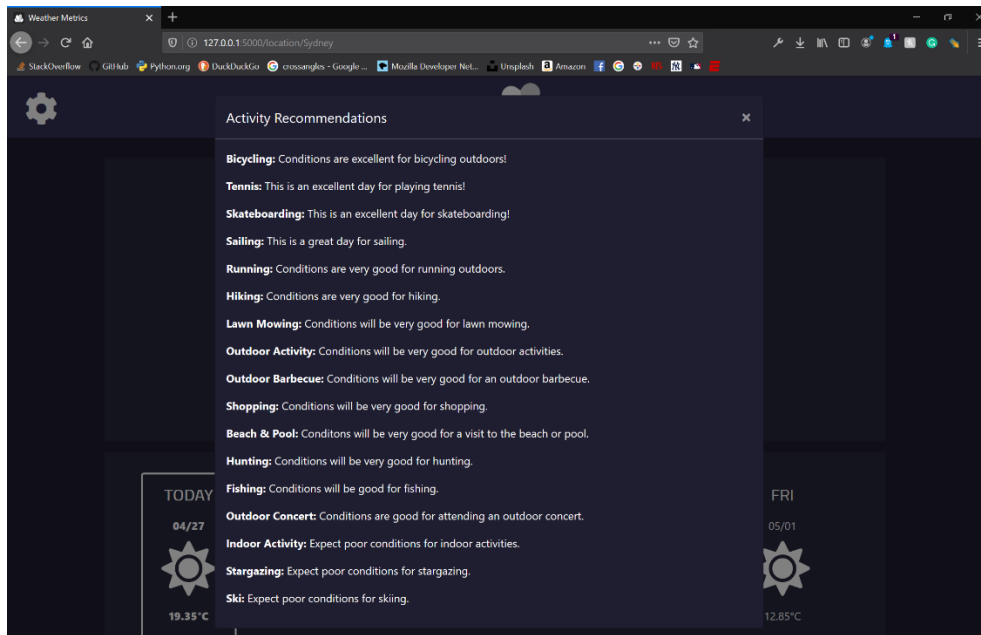


When a user clicks on the “Historical Data” button, a modal appears with a search bar.



After the user queries a date from the search bar, they are taken to a page displaying weather data over three-hour intervals for the requested date and location.

## Recommendations Modal



When a user clicks on the "Activity Recommendations" button, a modal appears with a list of activities, ranked from best to worst

## Hourly Modal



When a user clicks on a specific hour, a modal appears showing the weather forecast for that specific hour.

## Daily Modal



When a user clicks on a specific day, a modal appears showing the weather forecast for that specific day.

## Advantages/Benefits

Our implementation of the weather forecast app allows users to easily access data for all nearby locations, and give a list of favourable activities to do based on the weather condition. The information is condensed into an easily navigable application, and presented as an aesthetically pleasing and responsive interface. The user is provided with a large range of accessible data, but only shown data on the sections they select, allowing the app to be powerful without overwhelming the user, by carefully tailoring the extent of information to be shown according to the user's needs. Due to the Bootstrap interface, this application can easily be used on both desktop and mobile platforms, greatly increasing inclusivity and accessibility.

## Home Page

On the home page, current temperature, real feel temperature and a weather description are displayed to the user. Through the AccuWeather API, our system collects the major cities in the user's country and then outputs this data for each of these cities. This is advantageous as it provides basic data to the user that is most relevant to them and their current location.

On all pages, there is a sidebar allowing the user to choose a country to get weather data for cities specific to that country, and a search bar allowing the user to query for any location worldwide.

### Location Page

We have developed a very efficient location page which is the hub for all weather data on our website. Whenever the user clicks on a major city on the home page, or send a query for a particular location, they are redirected to a location template page, where our system collects data for the given city from the AccuWeather API and then fills in the template with the relevant data.

This page features daily and hourly modes for the location, where the user can view weather forecasts for over 5-day or 12-hour intervals. Our historical data search modal, utilising the WorldWeatherOnline API, is also showcased on this page, as well as a modal for our recommendations system.

### Historical Data Page

When the user queries a specific date, they are taken to this page showcasing weather data for this date and location. We present the data in a table format, because our consensus was that this was the most elegant and efficient way to output this data, as we collect data for three-hour intervals from the WorldWeatherOnline API.

## Team Organisation and appraisal

Generally, our team has undergone 4 phases during this project, which is closely related to the deliverable processing. The 4 phases are Deliverable 1, Deliverable 2, Deliverable 3 and Deliverables 4 & 5. Overall, the team adopted the method of flat management. Namely, this means that each member of the team would self-determine their amount of work. The team is supposed to communicate through online chatting. As they work, other team members have the responsibility of affording the rest of the jobs.

In conclusion, this method of organization provides the team with a large flexibility for the arrangement of the team's affairs. However, due to the imbalance of the ability of each person of the team, the work attribution from everyone is turned out to be different in different stages or even throughout the project. Those who are willing to contribute more or have more capability eventually work more than the rest of the team. It is worth considering the relationship between the downside of this organization method and the difference of willingness and capability between every team member. In the future, this method should be improved by adding more restrictions on the team member such as setting a minimum standard line so that the balance of the contribution will be improved.

### Deliverable 1

This phase is the first step of our project. During this stage, the goal of this project is determined and the very beginning theoretical is started. This includes problem statements, user stories, low-fidelity prototype and high-fidelity prototype.

At the beginning, two of our team members proposed three project ideas, with two of the ideas rejected due to the problem on the APIs. After creating a team document, one team member finished a rough draft of the problem statement and later it was improved by another team member. All team members declared and completed their own part of user stories. For the prototype, one team member finished the low-fidelity prototype and another team member made a high-fidelity prototype based on the low one. Finally, one team member improved the layout of the document and then submitted the file.

### Deliverable 2

This phase is the second step of the project. During this stage, the software architecture and the initial design of the software were determined and documented. This phase largely depends on the previous stage and thus some of the document content is reused from the previous one, such as the user stories.

Once the document is created, one team member lists a frame of the content for the topic for this phase and another team member writes a draft of the idea for the software architecture under this frame. The first hand-drawing draft version of sequence diagram is done by one of the team members and submitted into the online chat room, which is later improved and redrawn on computer by another team member. Finally, one team member gathered the draft ideas for software architecture and the sequence diagram accompanied with the user stories into a new document with a better layout. The file is submitted by the same person.

### Deliverable 3

This phase is the third step of the project. For this stage, the team is required to demonstrate all the works they have done so far. This includes the business idea and requirement and the technical point of view that is coming up so far.

At the beginning, one of the team members sent a document that contained the business idea and requirement. After that, one team member made a draft version of PPT that included the framework of points for business idea/requirement and the software technical points. This PPT is later on improved and decorated by another team member. The team does a practice together and makes the arrangement of the presentation before the formal presentation.

### Deliverables 4 & 5

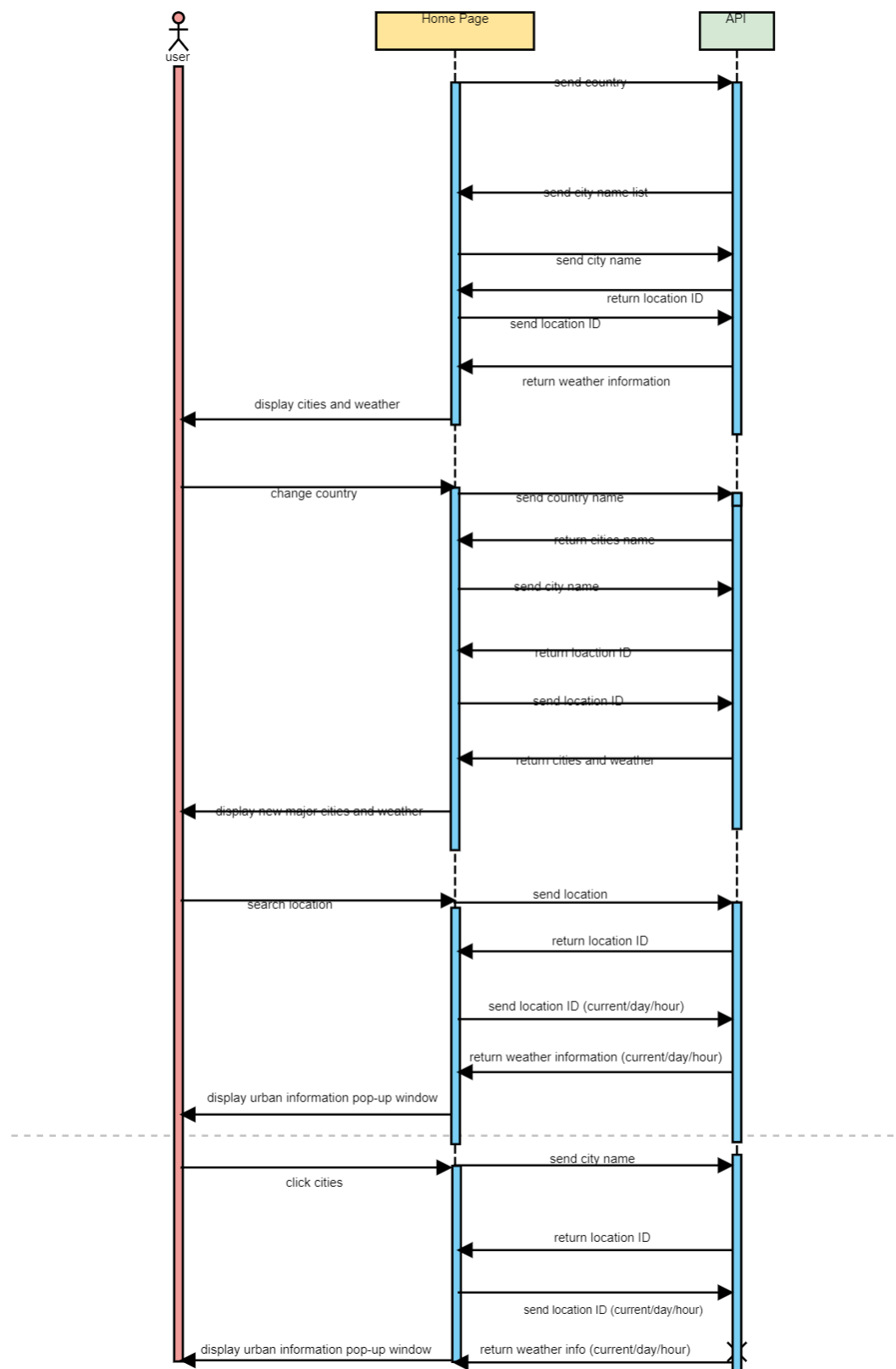
This phase is the final phase of this project. This stage includes code implement for the program (final product), the final demo presentation, and the final report. The demo presentation includes updated business ideas/requirements and the technical point of view. The final report includes the requirement analysis part (problem statement and user stories), the design and code inspection part (system design, design related diagram, description of the code structure) and the team organization/appraisal part.

The code implemented for the program is done by one team member who is the best programmer of the team. The team organization for the presentation is like the previous stage (one team member takes charge of business part/ theory and another takes charge of the demo of prototype).

As for the report, one of the team members finished a beginning version of the problem statement and user stories which is updated from the previous stage according to the feature of the final product, the draft version of updated sequence diagram and the part of team organization and appraisal. The design and code inspection part are done by the coder and the rest of the team.

# Appendices

## Sequence Diagram for overall application



## ER Diagram for overall application

