

# Deliverable 2

## Part 1: Software Architecture

### External data sources

Our system will be accessing information about the user's location, particularly their city/town name, geo-position and IP address. It will then use this information to fetch data from our APIs regarding their selected city/town's urban weather information, ocean and mountain-specific information. The system will also fetch specific monthly, daily and hourly information for the given location, and use all the information we have accessed to recommend activities that are appropriate for the given weather.

### Software components

#### Front End:

- Bootstrap

#### Back End:

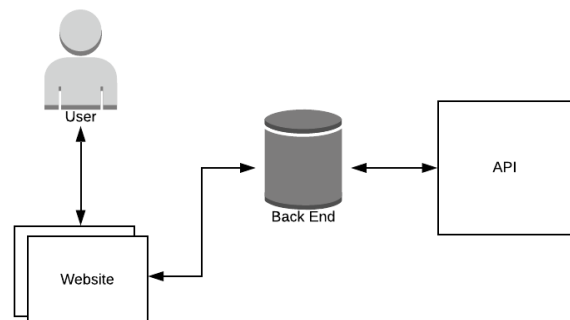
- AccuWeather
- World Weather Online
- Flask



### Relating choices to components

For our backend, we will be using Flask, a Python micro web framework, to build our backend and work in conjunction with our APIs, AccuWeather and World Weather Online, which fetch the weather data that will be returned to the web application and displayed to the user. We will request data regarding urban weather data for the given location, as well as the temperatures which we will display over the following 12 hours and following five days, from the AccuWeather API. On the other hand, our World Weather Online API will return other weather data related to our Marine and Ski modes, sun and moon-related information, and long-term weather information. Based on the information we receive from both APIs; our system will then take a pre-determined list of potential activities already stored and rank them based on their appropriateness according to the weather from the World Weather Online search API. This will then be returned to the web application and displayed to the user.

For our frontend, we will be using the Bootstrap framework to design a responsive and mobile-friendly web application. The code for our frontend will thus be written in HTML, CSS and jQuery (a JavaScript library).



### The choice of an implementation/technology or framework and choice of platform

For our frontend, we will be implementing the Bootstrap framework for the design of our web application. This will be implemented with a combination of web development languages, namely HTML, CSS and jQuery. The goal of this is to provide the user with an attractive aesthetic that is clear and easy to navigate. On the other hand, our backend will use Python to implement a Flask server which will host the web application and adhere to user requests such as fetching data from the APIs.

Our product will be able to be used across all platforms – Mac OS, Windows and Linux, as well as on mobile devices.

### Key benefits and achievements of our architectural choices

Our system will be collecting weather data from two APIs, AccuWeather and World Weather Online. This will ensure that there will be a wider pool of data that we can collect from, and the user should be able to find any weather data they need. Additionally, our system sorts the weather data it collects according to different modes. This is a key benefit of our system, as it tailors according to the user's needs and only presents them with the weather data that is relevant to them. For example, if a surfer wanted data regarding tide levels at their local beach, our Marine mode would present them with this specific information and cut out other irrelevant information to them such as moon phases or cloud cover. Finally, our choice to use the Bootstrap framework for the development of our frontend will create an appealing and sleek aesthetic which is responsive and mobile-friendly. The aim of this is to expand the number of platforms our application can run on, particularly targeting mobile devices as the majority of people today have access to a smartphone with web browsing capabilities.

## Part 2: Initial Software Design

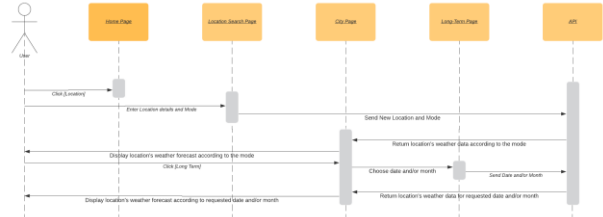
### User stories and sequence diagrams

Page	Feature	As a user...	Scenario	Sequence Diagram
Main	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.</p> <p><b>THEN</b> I should see basic weather information for major Australian cities.</p>	<pre> sequenceDiagram     actor User     participant Home Page     participant API     User-&gt;&gt;Home Page: Send country     activate Home Page     Home Page-&gt;&gt;API: Send Country     activate API     API--&gt;&gt;Home Page: Return cities in country and their current temperatures     deactivate API     Home Page--&gt;&gt;User: Display cities and temperatures     deactivate Home Page     </pre>
	Change between Celsius and Fahrenheit.	<ul style="list-style-type: none"> <li>I want to be able to switch different units displayed by clicking the button on the top of the main page so that I can see the preference unit in the searching result later.</li> </ul>	<p><b>Scenario:</b> Change the weather display to Fahrenheit.</p> <p><b>GIVEN</b> I am on the home page and my weather is set to Celsius.</p> <p><b>WHEN</b> I click “°F/°C”</p> <p><b>THEN</b> the weather display should change to Fahrenheit.</p>	<pre> sequenceDiagram     actor User     participant Home Page     participant Functions     User-&gt;&gt;Home Page: Click °F / °C     activate Home Page     Home Page-&gt;&gt;Functions: changeMeasurement(newType, currTemp)     activate Functions     Functions--&gt;&gt;Home Page: Return newTemp     deactivate Functions     Home Page--&gt;&gt;User: Display new temperatures     deactivate Home Page     </pre>
Location	Access weather information for	<ul style="list-style-type: none"> <li>I want to be able to search for a specific location so that I can</li> </ul>	<p><b>Scenario:</b> View the weather in New York City.</p>	

	another city or town.	<p>obtain detailed weather information for that location.</p> <ul style="list-style-type: none"> <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 I have for the location.</li> <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> </ul>	<p><b>GIVEN</b> I am on the home page.  <b>WHEN</b> I click on the location button.  <b>THEN</b> I type in New York City and click search.  <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     activate HP     HP-&gt;&gt;LSP: Enter Location details     deactivate HP     activate LSP     LSP-&gt;&gt;API: Send New Location     deactivate LSP     activate API     API-&gt;&gt;CP: Return weather data for new location     deactivate API     CP-&gt;&gt;HP: Display weather forecast for new location     deactivate CP     deactivate HP </pre>
<b>Mode Select</b>	Search for weather information that is either urban-specific, marine-related, or ski-related.	<ul style="list-style-type: none"> <li>• I want to be able to search for specific weather information according to my needs so that I do not have to see weather information that I find irrelevant.</li> <li>• I want to get the period and status of the tide so that I can determine whether it is a good idea to go surfing.</li> <li>• I want to get the information about temperature, wind, precipitation, humidity, visibility and pressure information so that I can better prepare for marine-related activities.</li> <li>• I want to see data about snow, wind, freeze level and</li> </ul>	<p><b>Scenario:</b> searching for weather in Los Angeles in urban mode.</p> <p><b>GIVEN</b> I am on home page  <b>WHEN</b> I click on the location button.  <b>THEN</b> I fill in the blanks to search for my location.  <b>AND</b> I choose “Urban” from the dropdown.  <b>THEN</b> I should be taken to a page showing urban-specific weather information in Los Angeles.</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     activate HP     HP-&gt;&gt;LSP: Enter Location details and Mode     deactivate HP     activate LSP     LSP-&gt;&gt;API: Send New Location and Mode     deactivate LSP     activate API     API-&gt;&gt;CP: Return location's weather data according to the mode     deactivate API     CP-&gt;&gt;HP: Display location's weather forecast according to the mode     deactivate CP     deactivate HP </pre>

		<p>visibility on the bottom, mid and top of the mountain for every 3 hours, so that I can prepare for my skiing plan that day.</p>	<p><b>Scenario:</b> Check the tide at Manly.</p> <p><b>GIVEN</b> I am on the home page and in Australia.</p> <p><b>WHEN</b> I click on the location button.</p> <p><b>THEN</b> I type in Manly, select “marine” and click search.</p> <p><b>THEN</b> I should be taken to a page with detailed marine weather information for Manly.</p> <p><b>THEN</b> I can check the tide to see if it is a good time to surf at Manly beach.</p>	
<p><b>Daily Weather</b></p>	<p>View current and short-term weather information.</p> <p>View information about moon phases and times when the sun/moon rises and sets.</p>	<ul style="list-style-type: none"> <li>I want to see the detailed current weather information so that I can have a better understanding of the current weather situation.</li> <li>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.</li> <li>I want to see whether it will rain in the afternoon, so I can</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 location button.</p> <p><b>WHEN</b> I enter the details for Sydney, pick “urban” from the</p>	<pre> sequenceDiagram     actor User     participant Home Page     participant Location Search Page     participant City Page     participant API      User-&gt;&gt;Home Page: Click [Location]     activate Home Page     Home Page-&gt;&gt;Location Search Page: Enter Location details and Mode     deactivate Home Page     activate Location Search Page     Location Search Page-&gt;&gt;API: Send New Location and Mode     deactivate Location Search Page     activate API     API-&gt;&gt;City Page: Return location's weather forecasts for today     deactivate API     activate City Page     City Page-&gt;&gt;User: Display location's weather forecast for today     deactivate City Page   </pre>

		<p>know if I should hang up the washing inside or outside.</p> <ul style="list-style-type: none"> <li>• I want to see a detailed weather forecast for the whole day so that I can have a general idea of the expected precipitation levels and wind speed I should expect for the day.</li> <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> <li>• I want to be able to enter a page see details about astronomy so that I can see information about the moon phases and the time of day when the sun and moon are predicted to rise and set.</li> </ul>	<p>dropdown and click search.</p> <p><b>THEN</b> I should be taken to a page with “Urban” weather information for Sydney.</p>	
	<p>Get recommendations for activities to do based on today’s weather.</p>	<ul style="list-style-type: none"> <li>• I want to be recommended activities I can do based on the weather so that I can participate in weather-appropriate activities.</li> </ul>	<p><b>Scenario:</b> See a list of recommended weather-appropriate activities in Sydney.</p> <p><b>GIVEN</b> I am on the home page and in Australia.</p> <p><b>WHEN</b> I click on Sydney</p>	<pre> sequenceDiagram     actor User     participant HomePage     participant LocationSearchPage     participant CityPage     participant API     participant Database      User-&gt;&gt;HomePage: Click (Home)     activate HomePage     HomePage-&gt;&gt;LocationSearchPage: Enter Location and click     deactivate HomePage     activate LocationSearchPage     LocationSearchPage-&gt;&gt;API: Send New Location and Mode     deactivate LocationSearchPage     activate API     API-&gt;&gt;Database: Return location's weather forecasts for today     deactivate API     activate Database     Database-&gt;&gt;CityPage: Click (Recommendations)     deactivate Database     activate CityPage     CityPage-&gt;&gt;API: askActivities(location, weather)     deactivate CityPage     activate API     API-&gt;&gt;CityPage: Return a list of the top 10 most weather appropriate activities     deactivate API     deactivate CityPage   </pre>

			<p><b>THEN</b> I should go to a page with Sydney's weather forecast for the day.</p> <p><b>WHEN</b> I click on the recommendations button.</p> <p><b>THEN</b> I should see a list of the top 10 most weather-appropriate activities and locations around the city for these activities.</p>	
<p><b>Long-Term Weather</b></p>	<p>I want to have complete information about the long term future weather.</p>	<ul style="list-style-type: none"> <li>I want to be able to view the weather forecast over the coming weeks and months so that I can get a general idea of what weather patterns I should expect in the future.</li> </ul>	<p><b>Scenario:</b> See the weather forecast for June in Tamworth (and it is April).</p> <p><b>GIVEN</b> I am on the home page and in Australia.</p> <p><b>WHEN</b> I click on the location button.</p> <p><b>THEN</b> I type in Tamworth, select "urban" and click search.</p> <p><b>THEN</b> I should be taken to a page with detailed urban weather information for Tamworth.</p>	 <pre> sequenceDiagram     actor User     participant Home as Home Page     participant Search as Location Search Page     participant City as City Page     participant Forecast as Long-Term Page     participant DB as DB      User-&gt;&gt;Home: Click Sydney     activate Home     Home-&gt;&gt;Search: Enter Location details and click     deactivate Home     activate Search     Search-&gt;&gt;DB: Send New Location and Mode     deactivate Search     activate DB     DB-&gt;&gt;City: Return location's weather data according to the mode     deactivate DB     activate City     City-&gt;&gt;Forecast: Display location's weather forecast according to the mode     deactivate City     activate Forecast     Forecast-&gt;&gt;Forecast: Click Jump Search     Forecast-&gt;&gt;DB: Check Date and/or month     deactivate Forecast     activate DB     DB-&gt;&gt;Forecast: Send Date and/or month     deactivate DB     activate Forecast     Forecast-&gt;&gt;City: Return location's weather data for requested date and/or month     deactivate Forecast     deactivate City     deactivate DB   </pre>

			<p><b>WHEN</b> I click on the “long-term” button.  <b>AND</b> choose June 3<sup>rd</sup>.  <b>THEN</b> I should go to a page showing a detailed weather forecast for June 3<sup>rd</sup> in Tamworth.</p>	
<p><b>Hourly Weather</b></p>	<p>View specific weather forecasts for each hour of the day.</p>	<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> <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>Scenario:</b> Get the hourly weather information for Sydney.</p> <p><b>GIVEN</b> I am on the home page and in Australia.  <b>WHEN</b> I click on Sydney  <b>THEN</b> I should go to a page with Sydney’s weather forecast for the day.</p> <p><b>WHEN</b> I click on a specific hour within the 12-hor span.  <b>THEN</b> I should be taken to a page showing the forecasted weather information for that specific hour.</p>	<pre> sequenceDiagram     actor User     participant Home Page     participant Location Search Page     participant City Page     participant API      User-&gt;&gt;Home Page: Click (Location)     activate Home Page     Home Page-&gt;&gt;Location Search Page: Enter Location details and Mode     deactivate Home Page     activate Location Search Page     Location Search Page-&gt;&gt;API: Send New Location and Mode     deactivate Location Search Page     activate API     API-&gt;&gt;City Page: Return location's weather data according to the mode     deactivate API     activate City Page     City Page-&gt;&gt;City Page: Display location's weather forecast according to the mode     deactivate City Page     City Page-&gt;&gt;City Page: Click (hour)     activate City Page     City Page-&gt;&gt;API: Send hour     deactivate City Page     activate API     API-&gt;&gt;City Page: Return location's weather data for requested hour     deactivate API     activate City Page     City Page-&gt;&gt;City Page: Display location's weather forecast according to requested hour     deactivate City Page   </pre>