# Project 3

# Creating an Interactive Weather Dashboard

The Meteorologists:

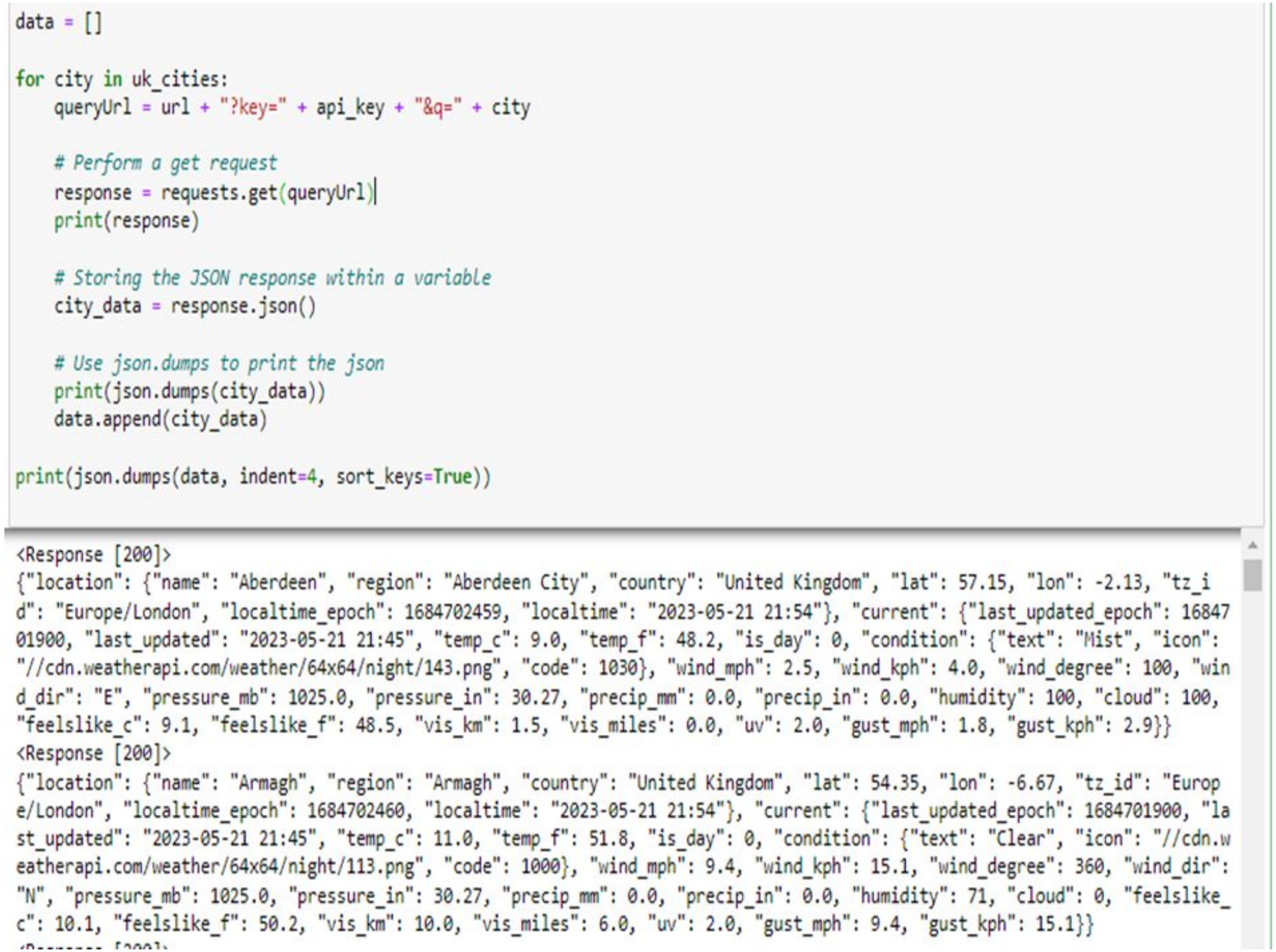
- Vera Styles
- Isil Bulut
- Julia Begley
- Lewis Russell
- Diego Lorenzo

# Project Introduction

- We created a weather dashboard that shows weather information for a UK city chosen by the user in a drop down menu.
- It features interactive maps and charts that live update with data from WeatherAPI.com.
- There is current information, such as temperature, humidity, UV levels and sunset time.
- There is also historical analysis of weather conditions over the previous year.

# Data Extract

- A list of UK cities was created.
- Jupyter Notebook and Python codes were used to extract data from WeatherAPI.com using the request library.
- JSON data was exported to a JSON file.

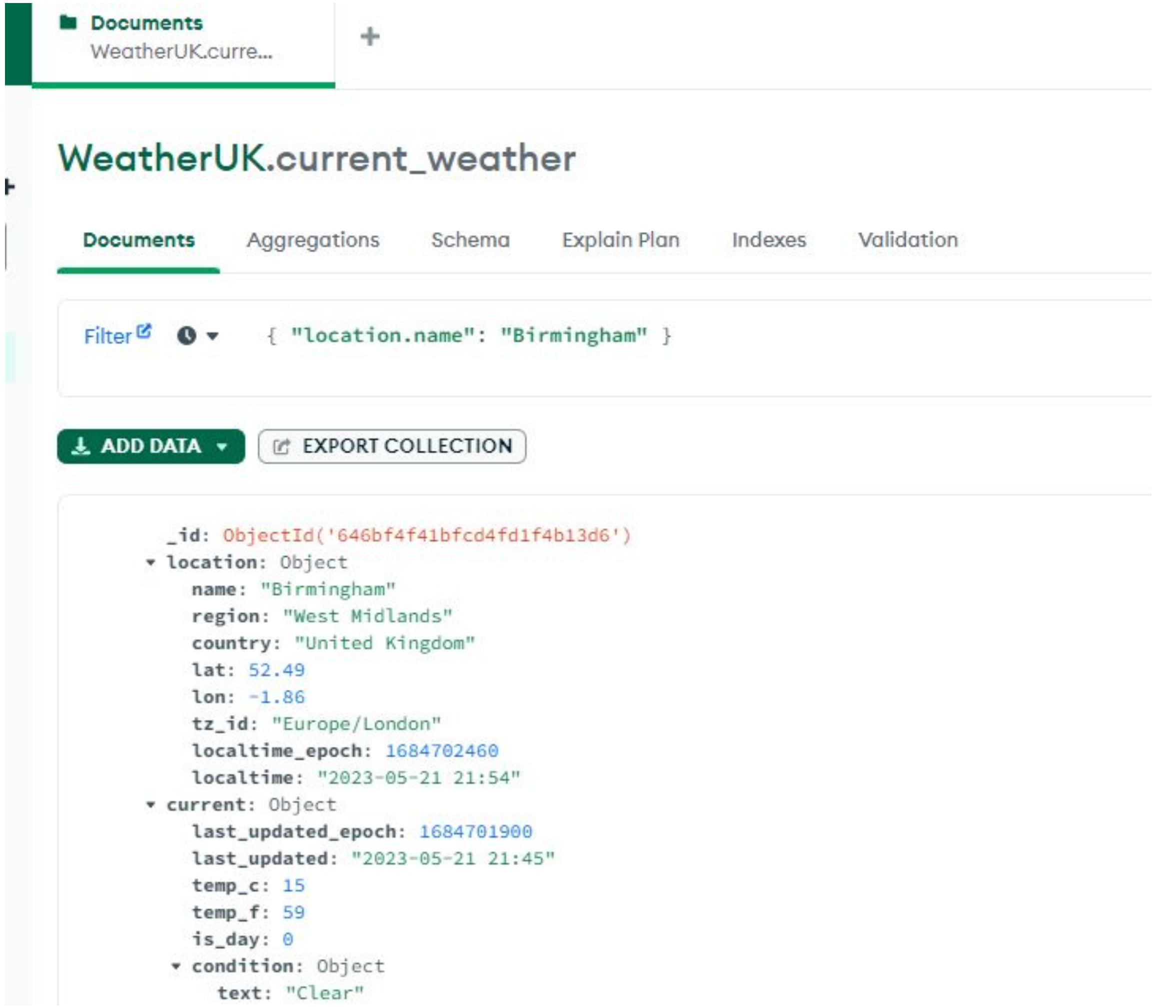


```python
data = []

for city in uk_cities:
    queryUrl = url + "?key=" + api_key + "&q=" + city

    # Perform a get request
    response = requests.get(queryUrl)
    print(response)

    # Storing the JSON response within a variable
    city_data = response.json()

    # Use json.dumps to print the json
    print(json.dumps(city_data))
    data.append(city_data)

print(json.dumps(data, indent=4, sort_keys=True))
```

```
<Response [200]>
{"location": {"name": "Aberdeen", "region": "Aberdeen City", "country": "United Kingdom", "lat": 57.15, "lon": -2.13, "tz_i
d": "Europe/London", "localtime_epoch": 1684702459, "localtime": "2023-05-21 21:54"}, "current": {"last_updated_epoch": 16847
01900, "last_updated": "2023-05-21 21:45", "temp_c": 9.0, "temp_f": 48.2, "is_day": 0, "condition": {"text": "Mist", "icon":
"//cdn.weatherapi.com/weather/64x64/night/143.png", "code": 1030}, "wind_mph": 2.5, "wind_kph": 4.0, "wind_degree": 100, "win
d_dir": "E", "pressure_mb": 1025.0, "pressure_in": 30.27, "precip_mm": 0.0, "precip_in": 0.0, "humidity": 100, "cloud": 100,
"feelslike_c": 9.1, "feelslike_f": 48.5, "vis_km": 1.5, "vis_miles": 0.0, "uv": 2.0, "gust_mph": 1.8, "gust_kph": 2.9}}
<Response [200]>
{"location": {"name": "Armagh", "region": "Armagh", "country": "United Kingdom", "lat": 54.35, "lon": -6.67, "tz_id": "Europ
e/London", "localtime_epoch": 1684702460, "localtime": "2023-05-21 21:54"}, "current": {"last_updated_epoch": 1684701900, "la
st_updated": "2023-05-21 21:45", "temp_c": 11.0, "temp_f": 51.8, "is_day": 0, "condition": {"text": "Clear", "icon": "//cdn.w
eatherapi.com/weather/64x64/night/113.png", "code": 1000}, "wind_mph": 9.4, "wind_kph": 15.1, "wind_degree": 360, "wind_dir":
"N", "pressure_mb": 1025.0, "pressure_in": 30.27, "precip_mm": 0.0, "precip_in": 0.0, "humidity": 71, "cloud": 0, "feelslike_
c": 10.1, "feelslike_f": 50.2, "vis_km": 10.0, "vis_miles": 6.0, "uv": 2.0, "gust_mph": 9.4, "gust_kph": 15.1}}
```

# Data Extract

- The saved JSON file was imported to MongoDB and a database and collection were generated.



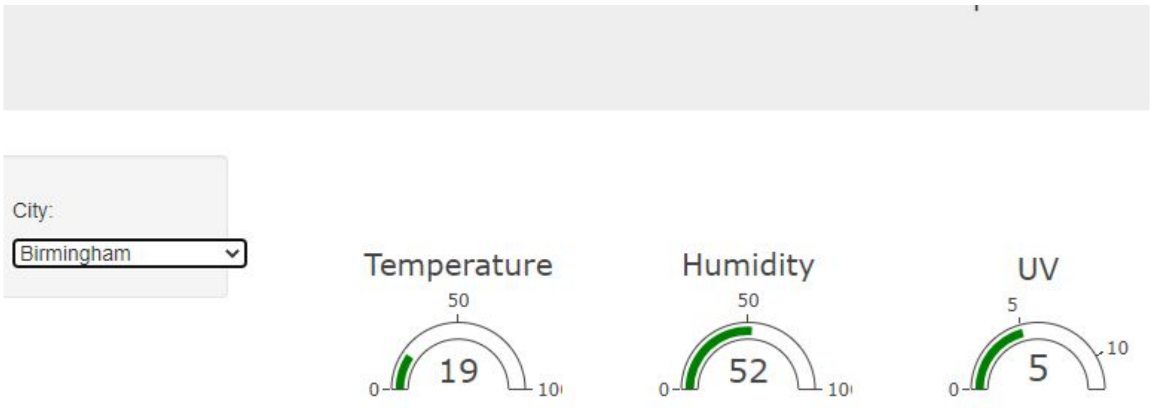
WeatherUK.current_weather

```
{ "location.name": "Birmingham" }
```

```
  _id: ObjectId('646bf4f41bfcd4fd1f4b13d6')
▾ location: Object
    name: "Birmingham"
    region: "West Midlands"
    country: "United Kingdom"
    lat: 52.49
    lon: -1.86
    tz_id: "Europe/London"
    localtime_epoch: 1684702460
    localtime: "2023-05-21 21:54"
▾ current: Object
    last_updated_epoch: 1684701900
    last_updated: "2023-05-21 21:45"
    temp_c: 15
    temp_f: 59
    is_day: 0
  ▾ condition: Object
      text: "Clear"
```

# Data Visualisation: Gauges

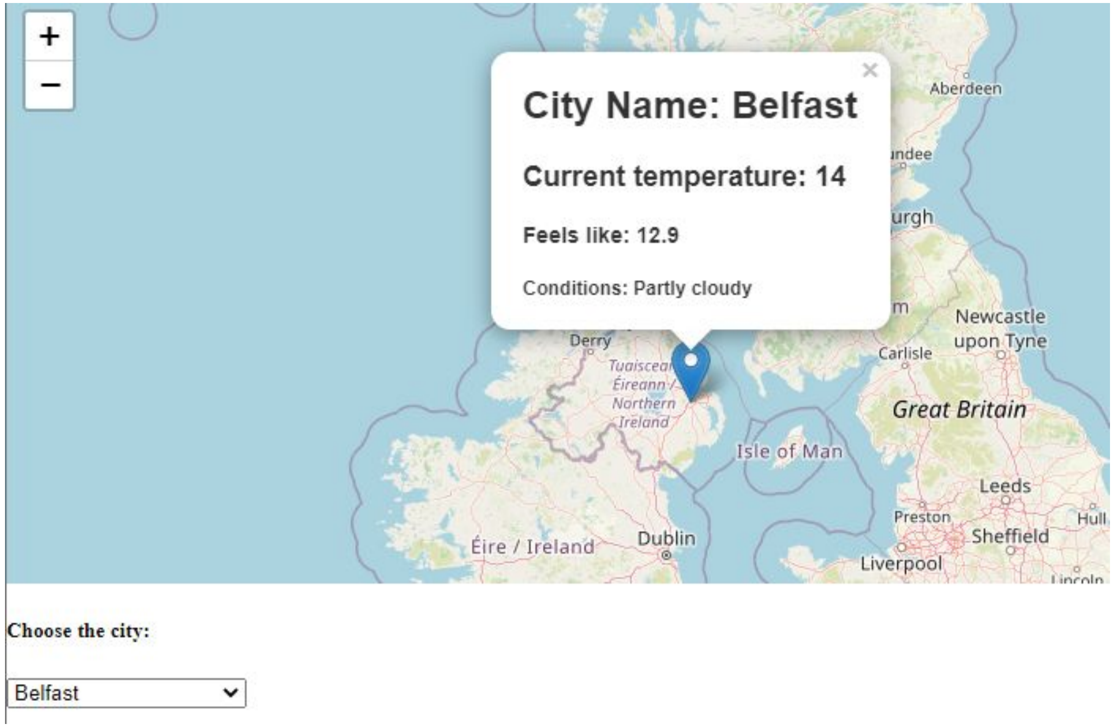
- A drop down menu was created in order to allow the user to interact and choose a city.
- Gauge charts for current temperature, humidity and UV were developed using Javascript and the Plotly data visualisation library.



City:
Birmingham

# Data Visualisation: Map

- A drop down menu was created in order to allow the user to interact with the menu by choosing a city.
- A map with cities markers was created using Javascript, Leaflet and visualisation libraries.
- When the user clicks, a pop up shows *City name*, *Current temperature*, *Feels like* and *Conditions* for the chosen city.



City Name: Belfast

Current temperature: 14

Feels like: 12.9

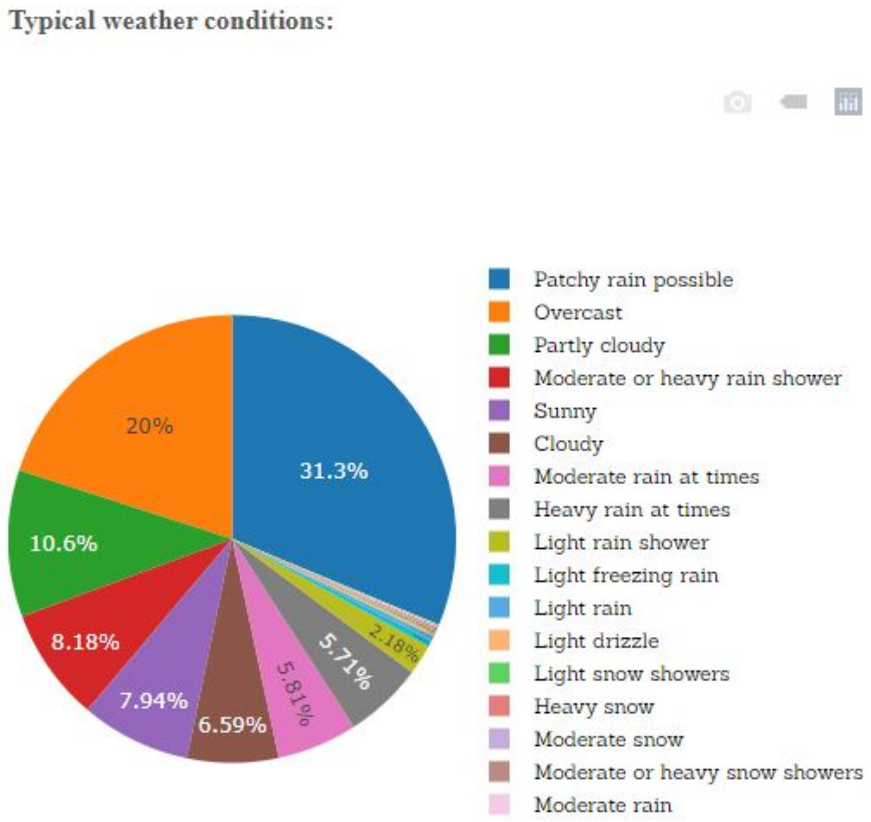
Conditions: Partly cloudy

Choose the city:

Belfast

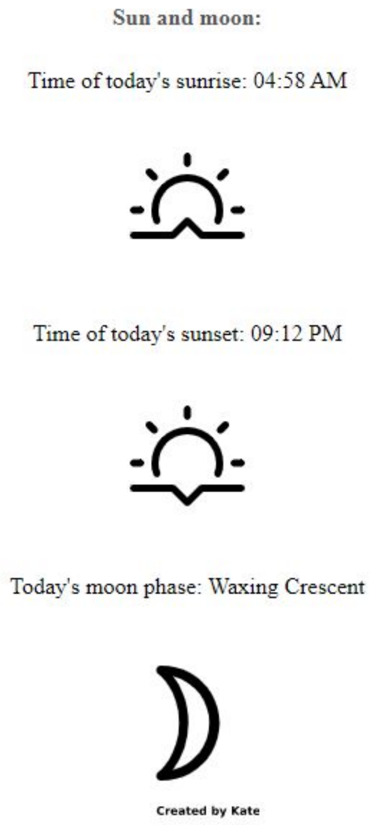
# Data Visualisation: Pie chart

- A for loop generated a list of 365 days' worth of dates and makes a d3 JSON call to collect data for each.
- A pie chart was created to represent that data using javascript and Ploty.
- The pie chart shows the distribution of weather conditions in the chosen city over the past year.



# Data Visualisation: Sun and Moon

- A d3 JSON API call extracts data on the sun and moon for the chosen city.
- The time of sunrise and sunset are shown for the current date in the chosen city.
- The current moon phase is also shown.
- The sunrise and sunset images are fixed and the moon phase image changes to match the current moon phase.



Sun and moon:

Time of today's sunrise: 04:58 AM

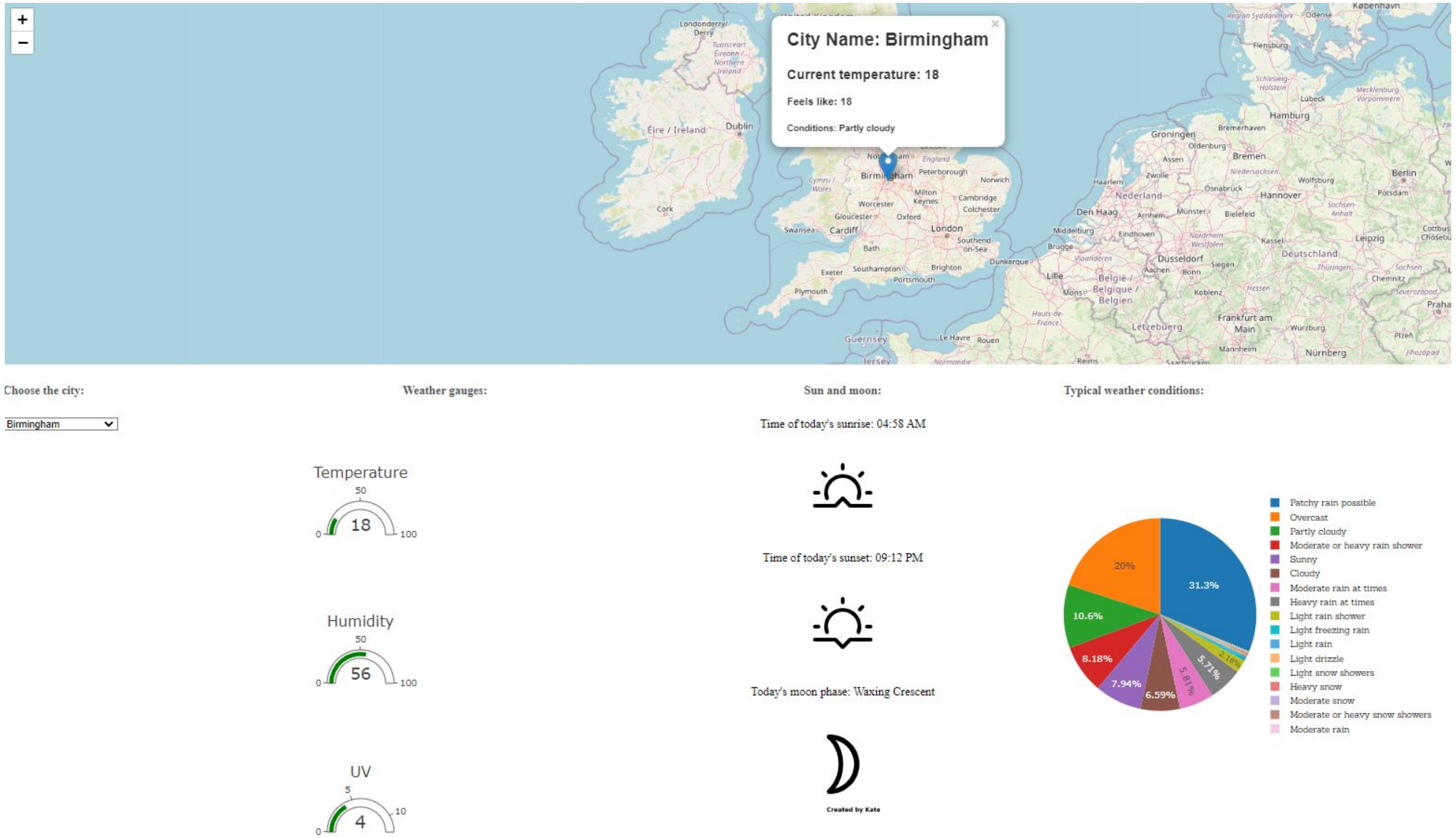
Time of today's sunset: 09:12 PM

Today's moon phase: Waxing Crescent

Created by Kate

# Compilation:

- We combined our code to pull from the same city drop down menu.
- We also created HTML and CSS code to create the layout and formatting for our dashboard.



City Name: Birmingham

Current temperature: 18

Feels like: 18

Conditions: Partly cloudy

Choose the city:

Birmingham

Weather gauges:

Sun and moon:

Time of today's sunrise: 04:58 AM

Time of today's sunset: 09:12 PM

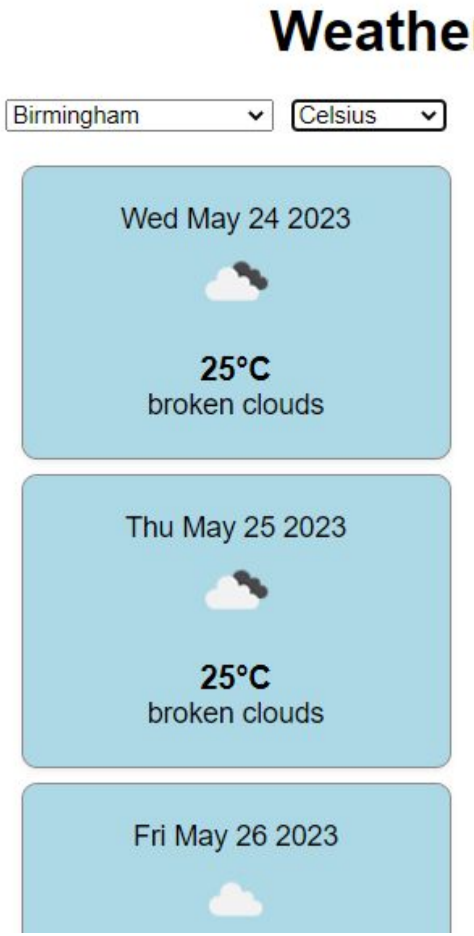
Today's moon phase: Waxing Crescent

Created by Kate

Typical weather conditions:

# Extra Data Visualisation: Weather Dashboard

- A drop down menu was created in order to allow the user to type in the name of their chosen city.
- After a city is selected the dashboard shows current temperature and sky conditions as well as a 5-day forecast.
- An additional dropdown menu allows to toggle between Kelvin, Celsius and Fahrenheit.



Weather Dashboard

Birmingham
Celsius

Wed May 24 2023
25°C
broken clouds

Thu May 25 2023
25°C
broken clouds

Fri May 26 2023

# Challenges & Overcoming Them

- Compiling functions combining html, css and javascript. Working simultaneously on those three languages rather than working on individual basis.
- Managing multiple functions that were all able to pull from a single source (drop down menu) for the city to use for the data analysis.
- We would have liked to combine some of the past weather conditions into groups for easier analysis, such as ‘rain’, ‘sun’, etc. but this would have been complex and we did not have time.
- We were not able to combine Lewis’ code with the rest as it was based on a search box rather than a drop down menu, so we have kept this as a separate bonus dashboard.