Unit_6_Python_APIs Melissa Morgan

# WeatherPy

**Note**

- Instructions have been included for each segment. You do not have to follow them exactly, but they are included to help you think through the steps.

In [1]:
```
# Dependencies and Setup
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
import requests
import time

# Import API key
from api_keys import api_key

# Incorporated citipy to determine city based on latitude and longitude
from citipy import citipy

# Output File (CSV)
output_data_file = "output_data/cities.csv"

# Range of latitudes and longitudes
lat_range = (-90, 90)
lng_range = (-180, 180)
```

## Generate Cities List

In [2]:
```
# List for holding lat_lngs and cities
lat_lngs = []
cities = []

# Create a set of random lat and lng combinations
lats = np.random.uniform(low=-90.000, high=90.000, size=1500)
lngs = np.random.uniform(low=-180.000, high=180.000, size=1500)
lat_lngs = zip(lats, lngs)

# Identify nearest city for each lat, lng combination
for lat_lng in lat_lngs:
    city = citipy.nearest_city(lat_lng[0], lat_lng[1]).city_name

    # If the city is unique, then add it to a our cities list
    if city not in cities:
        cities.append(city)

# Print the city count to confirm sufficient count
len(cities)
```

Out[2]: 609

## Perform API Calls

- Perform a weather check on each city using a series of successive API calls.
- Include a print log of each city as it'sbeing processed (with the city number and city name).

In [3]:
```
# URL for get requests
base_url = "http://api.openweathermap.org/data/2.5/weather?"

# Create dictionary
params = {"units": "imperial", "appid": api_key}
```

In [4]:
```
# Create DataFrame
data_df = pd.DataFrame(columns=['City','Cloudiness','Country','Date','Humidi
```

In [5]:

```
# Create loop
record_count = 1

for i, city in enumerate(cities):
    params["q"] = city

    try:
        response = requests.get(base_url, params = params).json()
        data_df.loc[i, "City"] = city
        data_df.loc[i, "Cloudiness"] = response['clouds']['all']
        data_df.loc[i, "Country"] = response['sys']['country']
        data_df.loc[i, "Date"] = response['dt']
        data_df.loc[i, "Humidity"] = response['main']['humidity']
        data_df.loc[i, "Lat"] = response['coord']['lat']
        data_df.loc[i, "Lng"] = response['coord']['lon']
        data_df.loc[i, "Max Temp"] = response['main']['temp_max']
        data_df.loc[i, "Wind Speed"] = response['wind']['speed']
        print(f"Processing Record {record_count} | {city}")

    except:
        print(f"City not found. Skipping...")
    record_count += 1

# Print message for completion
print("-----------------------------\nData Retrieval Complete\n-----------
```

```
City not found. Skipping...
Processing Record 152 | jumla
Processing Record 153 | klaksvik
Processing Record 154 | westport
Processing Record 155 | byron bay
Processing Record 156 | ahipara
Processing Record 157 | vanavara
Processing Record 158 | palic
Processing Record 159 | honiara
Processing Record 160 | pisco
City not found. Skipping...
Processing Record 162 | plerin
Processing Record 163 | terney
Processing Record 164 | lavrentiya
Processing Record 165 | santa rosa
Processing Record 166 | ancud
Processing Record 167 | zyryanka
Processing Record 168 | birao
Processing Record 169 | castro
```

## Convert Raw Data to DataFrame

- Export the city data into a .csv.
- Display the DataFrame

In [6]:
```
# Export the city data into a .csv
# Note to avoid any issues later, use encoding="utf-8"
data_df.to_csv(r"C:\Users\Melissa Morgan\Documents\SMU\SMU_Homework\Unit_06_
```

In [7]:
```
# Display the DataFrame
data_df.head(10)
```

Out[7]:

| | City | Cloudiness | Country | Date | Humidity | Lat | Lng | Max Temp | Wind Speed |
|---|---|---|---|---|---|---|---|---|---|
| 0 | rorvik | 0 | NO | 1570136241 | 64 | 64.86 | 11.24 | 37.99 | 8.05 |
| 1 | rikitea | 98 | PF | 1570136340 | 76 | -23.12 | -134.97 | 68.99 | 16.4 |
| 2 | georgetown | 20 | GY | 1570136340 | 66 | 6.8 | -58.16 | 89.6 | 11.41 |
| 3 | jackson | 1 | US | 1570136079 | 47 | 32.3 | -90.18 | 96.8 | 4.7 |
| 4 | grootfontein | 20 | NA | 1570136340 | 14 | -19.56 | 18.1 | 61.58 | 5.44 |
| 5 | praia da vitoria | 20 | PT | 1570136341 | 77 | 38.73 | -27.07 | 69.8 | 13.29 |
| 6 | belushya guba | NaN | NaN | NaN | NaN | NaN | NaN | NaN | NaN |
| 7 | port alfred | 84 | ZA | 1570136341 | 87 | -33.59 | 26.89 | 59 | 3.11 |
| 8 | cabo san lucas | 20 | MX | 1570136220 | 54 | 22.89 | -109.91 | 88 | 14.99 |
| 9 | illoqqortoormiut | NaN | NaN | NaN | NaN | NaN | NaN | NaN | NaN |

In [12]:
```
# Ignore missing data & Display Clean DataFrame
data_df.dropna(inplace= True)
data_df['Date'] = pd.to_datetime(data_df['Date'],unit='s')
data_df.head(10)
```

Out[12]:

| | City | Cloudiness | Country | Date | Humidity | Lat | Lng | Max Temp | Wind Speed |
|---|---|---|---|---|---|---|---|---|---|
| 0 | rorvik | 0 | NO | 2019-10-03 20:57:21 | 64 | 64.86 | 11.24 | 37.99 | 8.05 |
| 1 | rikitea | 98 | PF | 2019-10-03 20:59:00 | 76 | -23.12 | -134.97 | 68.99 | 16.4 |
| 2 | georgetown | 20 | GY | 2019-10-03 20:59:00 | 66 | 6.8 | -58.16 | 89.6 | 11.41 |
| 3 | jackson | 1 | US | 2019-10-03 20:54:39 | 47 | 32.3 | -90.18 | 96.8 | 4.7 |
| 4 | grootfontein | 20 | NA | 2019-10-03 20:59:00 | 14 | -19.56 | 18.1 | 61.58 | 5.44 |
| 5 | praia da vitoria | 20 | PT | 2019-10-03 20:59:01 | 77 | 38.73 | -27.07 | 69.8 | 13.29 |
| 7 | port alfred | 84 | ZA | 2019-10-03 20:59:01 | 87 | -33.59 | 26.89 | 59 | 3.11 |
| 8 | cabo san lucas | 20 | MX | 2019-10-03 20:57:00 | 54 | 22.89 | -109.91 | 88 | 14.99 |
| 10 | kapaa | 75 | US | 2019-10-03 20:57:00 | 70 | 22.08 | -159.32 | 84.2 | 18.34 |
| 11 | naze | 98 | NG | 2019-10-03 20:59:02 | 96 | 5.43 | 7.07 | 72.59 | 1.9 |

In [13]:
```
# Display the DataFrame
data_df.count()
```

Out[13]:
```
City          550
Cloudiness    550
Country       550
Date          550
Humidity      550
Lat           550
Lng           550
Max Temp      550
Wind Speed    550
dtype: int64
```

## Plotting the Data

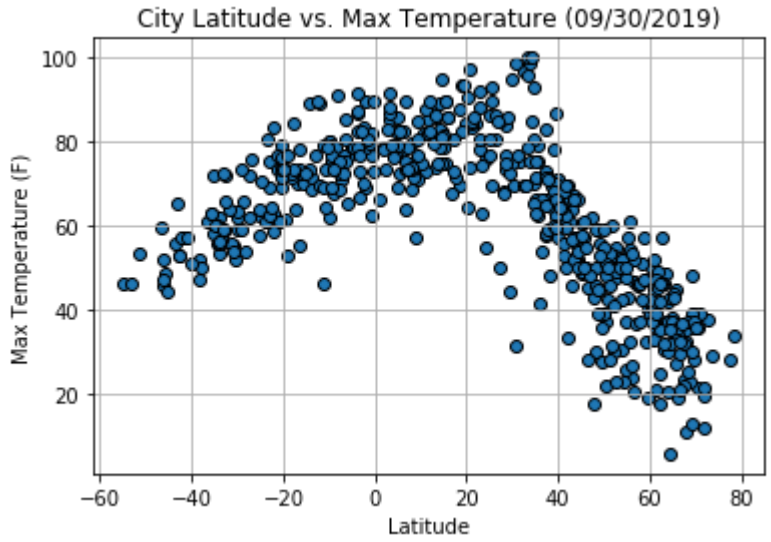
- Use proper labeling of the plots using plot titles (including date of analysis) and axes labels.
- Save the plotted figures as .pngs.

### Latitude vs. Temperature Plot

In [14]:
```
# Build a scatter plot
plt.scatter(data_df["Lat"], data_df["Max Temp"], edgecolor = 'black')

# Incorporate other graph properties
plt.title("City Latitude vs. Max Temperature (09/30/2019)")
plt.xlabel("Latitude")
plt.ylabel("Max Temperature (F)")
plt.grid(True)

# Save an image of the chart to view in a folder
plt.savefig("Lat_vs_Temp.png")
```

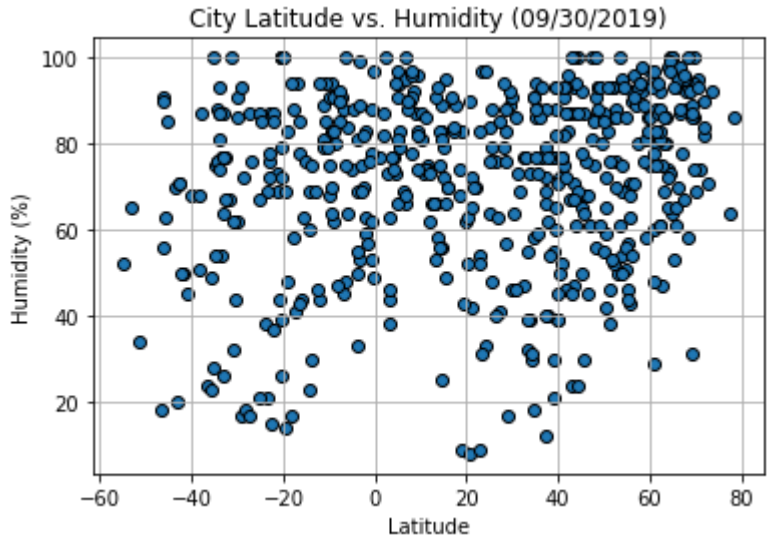



**Latitude vs. Humidity Plot**

In [16]:
```
# Build a scatter plot
plt.scatter(data_df["Lat"], data_df["Humidity"], edgecolor = 'black')

# Incorporate other graph properties
plt.title("City Latitude vs. Humidity (09/30/2019)")
plt.xlabel("Latitude")
plt.ylabel("Humidity (%)")
plt.grid(True)

# Save an image of the chart to view in a folder
plt.savefig("Lat_vs_Humidity.png")
```

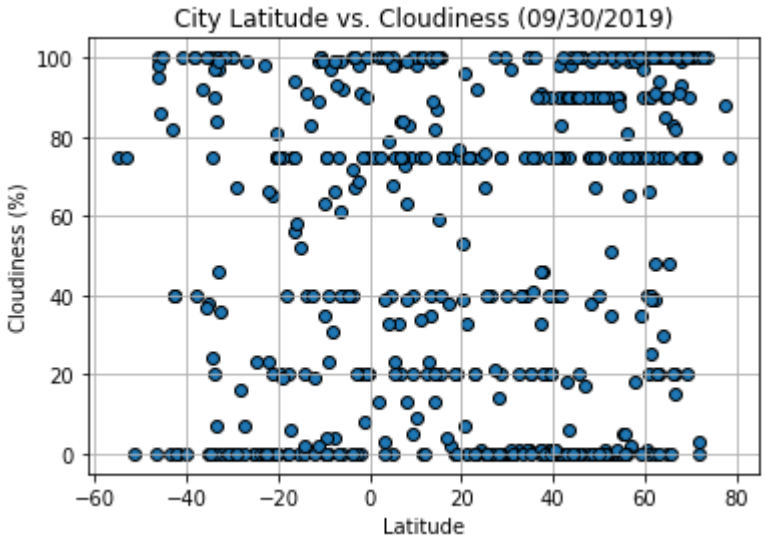



**Latitude vs. Cloudiness Plot**

In [18]:
```
# Build a scatter plot
plt.scatter(data_df["Lat"], data_df["Cloudiness"], edgecolor = 'black')

# Incorporate other graph properties
plt.title("City Latitude vs. Cloudiness (09/30/2019)")
plt.xlabel("Latitude")
plt.ylabel("Cloudiness (%)")
plt.grid(True)

# Save an image of the chart to view in a folder
plt.savefig("Lat_vs_Cloudiness.png")
```




**Latitude vs. Wind Speed Plot**

In [20]:

```
# Build a scatter plot
plt.scatter(data_df["Lat"], data_df["Wind Speed"], edgecolor = 'black')

# Incorporate other graph properties
plt.title("City Latitude vs. Wind Speed (mph) (09/30/2019)")
plt.xlabel("Latitude")
plt.ylabel("Wind Speed (mph)")
plt.grid(True)

# Save an image of the chart to view in a folder
plt.savefig("Lat_vs_Wind_Speed.png")
```