

# 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 [2]: # Import Dependencies
import requests
import os
import json
import pandas as pd
import numpy as np
import time
import matplotlib.pyplot as plt
from pprint import pprint
from api_keys import weather_api_key
from citipy import citipy
from scipy.stats import linregress
```

## Generate Cities List

```
In [9]: # Use Citipy to get the random list of cities

lats = np.random.uniform(low=-90.000, high=90.000, size=900)
langs = np.random.uniform(low=-180.000, high=180.000, size=900)
Cities_art = zip(lats,langs)
City_List = []

for lst in Cities_art:
    city = citipy.nearest_city(lst[0], lst[1])
    City_List.append(city.city_name)
print(len(City_List))
```

900

## 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's being processed (with the city number and city name).

```

In [10]: # Base weather URL
url = "http://api.openweathermap.org/data/2.5/weather?"
units = "imperial"

# Build partial query URL
query_url = f"{url}appid={weather_api_key}&units={units}&q="

# Set up variables.
City_count = 0
Set_count = 1

# set up lists to hold reponse info
city = []
lat = []
lang = []
temp_max = []
humidity = []
cloudiness = []
windspeed = []
country = []
date = []

# Loop through the list of cities and perform a request for data on each City
for cities in City_List:
    response = requests.get(query_url + cities).json()

    if City_count < 50:
        City_count = City_count + 1
    else:
        Set_count = Set_count + 1
        City_count = 1

    try:
        print(f"Processing Record " + str(City_count) + " Set " + str(Set_count))
        city.append(response['name'])
        lat.append(response['coord']['lat'])
        lang.append(response['coord']['lon'])
        temp_max.append(response['main']['temp_max'])
        humidity.append(response['main']['humidity'])
        cloudiness.append(response['clouds']['all'])
        windspeed.append(response['wind']['speed'])
        country.append(response['sys']['country'])
        date.append(response['dt'])
    except (NameError, KeyError):
        print ('City not found. Skipping...')

```

```

Processing Record 1 Set 1| Kapaa
Processing Record 2 Set 1| Le Moule
Processing Record 3 Set 1| Bethel
Processing Record 4 Set 1| Saint Paul Harbor
Processing Record 5 Set 1| Palmer
Processing Record 6 Set 1| Ponta do Sol
Processing Record 7 Set 1| Port Elizabeth
Processing Record 8 Set 1| Hong Kong
Processing Record 9 Set 1| Bethel
Processing Record 10 Set 1| Bredasdorp

```

```
City not found. Skipping...
City not found. Skipping...
Processing Record 13 Set 1| Kapaa
Processing Record 14 Set 1| Faanui
Processing Record 15 Set 1| Saint-Philippe
Processing Record 16 Set 1| Yanam
Processing Record 17 Set 1| Cape Town
Processing Record 18 Set 1| Busselton
Processing Record 19 Set 1| Punta Arenas
Processing Record 20 Set 1| Saldanha
Processing Record 21 Set 1| Souillac
Processing Record 22 Set 1| Ushuaia
Processing Record 23 Set 1| Busselton
Processing Record 24 Set 1| Atuona
Processing Record 25 Set 1| Butaritari
City not found. Skipping...
Processing Record 27 Set 1| Nizhniy Baskunchak
Processing Record 28 Set 1| Ushuaia
Processing Record 29 Set 1| Laas
City not found. Skipping...
Processing Record 31 Set 1| Bredasdorp
Processing Record 32 Set 1| Vaini
City not found. Skipping...
Processing Record 34 Set 1| Port Alfred
City not found. Skipping...
Processing Record 36 Set 1| Saint-Philippe
Processing Record 37 Set 1| Princeton
Processing Record 38 Set 1| La Peca
Processing Record 39 Set 1| Mataura
Processing Record 40 Set 1| Busselton
Processing Record 41 Set 1| Saskylakh
Processing Record 42 Set 1| Port Hedland
Processing Record 43 Set 1| Mt. Pleasant
Processing Record 44 Set 1| Nago
Processing Record 45 Set 1| Manakara
Processing Record 46 Set 1| Dakar
Processing Record 47 Set 1| Albany
Processing Record 48 Set 1| Ribeira Grande
Processing Record 49 Set 1| Kavieng
Processing Record 50 Set 1| Woodward
Processing Record 1 Set 2| Bengkulu
Processing Record 2 Set 2| Kapaa
Processing Record 3 Set 2| Rikitea
Processing Record 4 Set 2| Paidha
Processing Record 5 Set 2| Poum
Processing Record 6 Set 2| Hobyo
Processing Record 7 Set 2| Belmonte
Processing Record 8 Set 2| Cabo San Lucas
Processing Record 9 Set 2| Atbasar
Processing Record 10 Set 2| Nyazepetrovsk
Processing Record 11 Set 2| Son Tay
Processing Record 12 Set 2| Longyearbyen
Processing Record 13 Set 2| San Ignacio
Processing Record 14 Set 2| Naushki
Processing Record 15 Set 2| George Town
Processing Record 16 Set 2| Ostrovnoy
Processing Record 17 Set 2| Banjarmasin
```

```
City not found. Skipping...
Processing Record 19 Set 2| Khatanga
Processing Record 20 Set 2| Rikitea
Processing Record 21 Set 2| Punta Arenas
Processing Record 22 Set 2| Severobaykal'sk
Processing Record 23 Set 2| Atuona
Processing Record 24 Set 2| Mataura
Processing Record 25 Set 2| Maraã
Processing Record 26 Set 2| High Level
Processing Record 27 Set 2| Cape Town
Processing Record 28 Set 2| Qaanaaq
Processing Record 29 Set 2| Bengkulu
Processing Record 30 Set 2| Constitución
Processing Record 31 Set 2| Busselton
Processing Record 32 Set 2| Yulara
Processing Record 33 Set 2| Khatanga
Processing Record 34 Set 2| Avarua
Processing Record 35 Set 2| Hunchun
Processing Record 36 Set 2| Vaini
Processing Record 37 Set 2| Bairiki Village
Processing Record 38 Set 2| Jamestown
Processing Record 39 Set 2| Hilo
Processing Record 40 Set 2| New Norfolk
Processing Record 41 Set 2| Barrow
Processing Record 42 Set 2| Mar del Plata
Processing Record 43 Set 2| Nikolskoye
Processing Record 44 Set 2| Lorengau
Processing Record 45 Set 2| Tuktoyaktuk
Processing Record 46 Set 2| Chapais
Processing Record 47 Set 2| Punta Arenas
Processing Record 48 Set 2| Pevek
Processing Record 49 Set 2| Olinda
Processing Record 50 Set 2| Ushuaia
Processing Record 1 Set 3| Tasiilaq
Processing Record 2 Set 3| Caldwell
Processing Record 3 Set 3| Makkah al Mukarramah
Processing Record 4 Set 3| Punta Arenas
Processing Record 5 Set 3| Saint-Philippe
Processing Record 6 Set 3| Esso
Processing Record 7 Set 3| Buala
Processing Record 8 Set 3| Hilo
Processing Record 9 Set 3| Nhulunbuy
Processing Record 10 Set 3| Cape Town
City not found. Skipping...
Processing Record 12 Set 3| Puerto Ayora
Processing Record 13 Set 3| College
Processing Record 14 Set 3| Arlit
Processing Record 15 Set 3| Matola
City not found. Skipping...
Processing Record 17 Set 3| Rikitea
Processing Record 18 Set 3| Port Alfred
Processing Record 19 Set 3| Busselton
Processing Record 20 Set 3| Cidreira
Processing Record 21 Set 3| Lata
Processing Record 22 Set 3| Ushuaia
Processing Record 23 Set 3| Punta Arenas
Processing Record 24 Set 3| Rikitea
```

```
Processing Record 25 Set 3| Raudeberg
Processing Record 26 Set 3| Ponta do Sol
Processing Record 27 Set 3| Lebu
Processing Record 28 Set 3| Cayenne
Processing Record 29 Set 3| Zig
Processing Record 30 Set 3| Poum
Processing Record 31 Set 3| Rikitea
Processing Record 32 Set 3| East London
Processing Record 33 Set 3| Vaini
Processing Record 34 Set 3| Jamestown
City not found. Skipping...
Processing Record 36 Set 3| Iqaluit
Processing Record 37 Set 3| Nikolskoye
Processing Record 38 Set 3| Atuona
Processing Record 39 Set 3| Severo-Kuril'sk
City not found. Skipping...
Processing Record 41 Set 3| Katsuura
Processing Record 42 Set 3| Albany
Processing Record 43 Set 3| Ushuaia
Processing Record 44 Set 3| Mataura
Processing Record 45 Set 3| Hermanus
Processing Record 46 Set 3| Naze
Processing Record 47 Set 3| Rikitea
Processing Record 48 Set 3| Puerto Ayora
Processing Record 49 Set 3| Mataura
Processing Record 50 Set 3| Chokurdakh
Processing Record 1 Set 4| Havre-St-Pierre
Processing Record 2 Set 4| Kahului
City not found. Skipping...
Processing Record 4 Set 4| Punta Arenas
Processing Record 5 Set 4| Bāglung
Processing Record 6 Set 4| Chokurdakh
Processing Record 7 Set 4| East London
Processing Record 8 Set 4| Rawson
Processing Record 9 Set 4| New Norfolk
Processing Record 10 Set 4| Katsuura
City not found. Skipping...
Processing Record 12 Set 4| Kapoeta
Processing Record 13 Set 4| Bredasdorp
Processing Record 14 Set 4| Qaqortoq
Processing Record 15 Set 4| Rikitea
Processing Record 16 Set 4| Saint-Pierre
Processing Record 17 Set 4| Lompoc
Processing Record 18 Set 4| Tuktoyaktuk
Processing Record 19 Set 4| Atuona
Processing Record 20 Set 4| Rikitea
Processing Record 21 Set 4| Albany
Processing Record 22 Set 4| Bintulu
Processing Record 23 Set 4| Greenwood
Processing Record 24 Set 4| Port Alfred
Processing Record 25 Set 4| Albany
City not found. Skipping...
Processing Record 27 Set 4| Mataura
City not found. Skipping...
Processing Record 29 Set 4| Swedru
Processing Record 30 Set 4| San Policarpo
Processing Record 31 Set 4| Thompson
```

```
Processing Record 32 Set 4| Rikitea
Processing Record 33 Set 4| Ushuaia
Processing Record 34 Set 4| Port Alfred
Processing Record 35 Set 4| Amherst
Processing Record 36 Set 4| Chifeng
Processing Record 37 Set 4| Sampit
Processing Record 38 Set 4| Mastic Beach
City not found. Skipping...
Processing Record 40 Set 4| Koumac
Processing Record 41 Set 4| Bluff
Processing Record 42 Set 4| Esna
Processing Record 43 Set 4| Hithadhoo
Processing Record 44 Set 4| Vaini
Processing Record 45 Set 4| Breves
Processing Record 46 Set 4| Punta Arenas
Processing Record 47 Set 4| Rikitea
Processing Record 48 Set 4| Jamestown
Processing Record 49 Set 4| Hilo
Processing Record 50 Set 4| Airai
Processing Record 1 Set 5| College
City not found. Skipping...
Processing Record 3 Set 5| Cape Town
City not found. Skipping...
Processing Record 5 Set 5| Mataura
Processing Record 6 Set 5| Avera
Processing Record 7 Set 5| Rikitea
Processing Record 8 Set 5| Mariental
Processing Record 9 Set 5| Hobart
Processing Record 10 Set 5| Bluff
Processing Record 11 Set 5| Faanui
Processing Record 12 Set 5| Rikitea
Processing Record 13 Set 5| Qaanaaq
Processing Record 14 Set 5| Provideniya
Processing Record 15 Set 5| Impfondo
Processing Record 16 Set 5| Eureka
Processing Record 17 Set 5| Porto-Novo
Processing Record 18 Set 5| Rikitea
Processing Record 19 Set 5| Bluff
Processing Record 20 Set 5| Cherskiy
Processing Record 21 Set 5| Tura
Processing Record 22 Set 5| Rikitea
Processing Record 23 Set 5| Shagonar
Processing Record 24 Set 5| Yeppoon
Processing Record 25 Set 5| Qaanaaq
City not found. Skipping...
Processing Record 27 Set 5| Hattiesburg

Processing Record 28 Set 5| Tura
Processing Record 29 Set 5| Ushuaia
Processing Record 30 Set 5| Mataura
Processing Record 31 Set 5| West Plains
Processing Record 32 Set 5| Mar del Plata
Processing Record 33 Set 5| Hermanus
Processing Record 34 Set 5| Castro
Processing Record 35 Set 5| Busselton
Processing Record 36 Set 5| Jamestown
Processing Record 37 Set 5| Beloha
```

```
Processing Record 38 Set 5| Cidreira
City not found. Skipping...
Processing Record 40 Set 5| Jamestown
Processing Record 41 Set 5| Dicabisagan
Processing Record 42 Set 5| Mahébourg
Processing Record 43 Set 5| Ushuaia
Processing Record 44 Set 5| Saskylakh
Processing Record 45 Set 5| Bangangté
Processing Record 46 Set 5| Beringovskiy
Processing Record 47 Set 5| Airai
City not found. Skipping...
Processing Record 49 Set 5| Kaitangata
Processing Record 50 Set 5| Kraksaan
Processing Record 1 Set 6| Pisco
Processing Record 2 Set 6| Severo-Kuril'sk
Processing Record 3 Set 6| Massaguet
Processing Record 4 Set 6| Mairi
Processing Record 5 Set 6| Sioux Lookout
Processing Record 6 Set 6| Albany
City not found. Skipping...
Processing Record 8 Set 6| Turukhansk
Processing Record 9 Set 6| Pryazha
Processing Record 10 Set 6| Vaini
Processing Record 11 Set 6| Coyah
Processing Record 12 Set 6| Sibü
Processing Record 13 Set 6| Upernavik
Processing Record 14 Set 6| Oro Valley
City not found. Skipping...
Processing Record 16 Set 6| Katherine
Processing Record 17 Set 6| Ofakim
Processing Record 18 Set 6| Nanortalik
Processing Record 19 Set 6| Severo-Kuril'sk
Processing Record 20 Set 6| Hilo
Processing Record 21 Set 6| Ushuaia
Processing Record 22 Set 6| Khatanga
Processing Record 23 Set 6| New Norfolk
Processing Record 24 Set 6| Akdepe
Processing Record 25 Set 6| Cape Town
Processing Record 26 Set 6| Provideniya
Processing Record 27 Set 6| Soyo
Processing Record 28 Set 6| Vila Velha
Processing Record 29 Set 6| New Norfolk
City not found. Skipping...
Processing Record 31 Set 6| Bemidji
Processing Record 32 Set 6| Sakaiminato
Processing Record 33 Set 6| Rupert
City not found. Skipping...
Processing Record 35 Set 6| Saint Paul Harbor
Processing Record 36 Set 6| Tigil'
City not found. Skipping...
Processing Record 38 Set 6| Goderich
Processing Record 39 Set 6| Bluff
Processing Record 40 Set 6| Srednekolymsk
Processing Record 41 Set 6| Logansport
Processing Record 42 Set 6| Pevek
City not found. Skipping...
Processing Record 44 Set 6| Ushuaia
```

```
Processing Record 45 Set 6| Tuktoyaktuk
Processing Record 46 Set 6| Punta Arenas
Processing Record 47 Set 6| Alyangula
Processing Record 48 Set 6| Zagora
Processing Record 49 Set 6| Bluff
Processing Record 50 Set 6| Laguna
Processing Record 1 Set 7| Shimoda
Processing Record 2 Set 7| Kamina
Processing Record 3 Set 7| Tiksi
Processing Record 4 Set 7| Morondava
Processing Record 5 Set 7| Rikitea
Processing Record 6 Set 7| Severo-Kuril'sk
Processing Record 7 Set 7| Dingle
Processing Record 8 Set 7| Mataura
Processing Record 9 Set 7| Chokurdakh
Processing Record 10 Set 7| Dikson
Processing Record 11 Set 7| San Patricio
Processing Record 12 Set 7| Vaini
Processing Record 13 Set 7| Busselton
Processing Record 14 Set 7| Hofn
Processing Record 15 Set 7| Jamestown
Processing Record 16 Set 7| Bengkulu
Processing Record 17 Set 7| Kloulklubed
Processing Record 18 Set 7| Kapaa
City not found. Skipping...
Processing Record 20 Set 7| Hobart
City not found. Skipping...
Processing Record 22 Set 7| Muros
Processing Record 23 Set 7| Jamestown
Processing Record 24 Set 7| Kargasok
Processing Record 25 Set 7| Kokopo
Processing Record 26 Set 7| Havre-St-Pierre
Processing Record 27 Set 7| Butaritari
Processing Record 28 Set 7| Altay
Processing Record 29 Set 7| Morón
Processing Record 30 Set 7| Vaitape
Processing Record 31 Set 7| Longyearbyen
Processing Record 32 Set 7| Hofn
Processing Record 33 Set 7| Atuona
Processing Record 34 Set 7| Saskylakh
Processing Record 35 Set 7| Punta Arenas
Processing Record 36 Set 7| Puerto del Rosario
Processing Record 37 Set 7| Saint Paul Harbor
Processing Record 38 Set 7| Tocopilla
Processing Record 39 Set 7| Kapaa
City not found. Skipping...
City not found. Skipping...
Processing Record 42 Set 7| Albany
Processing Record 43 Set 7| Vega de Alatorre
Processing Record 44 Set 7| Kapaa
Processing Record 45 Set 7| Yazd
Processing Record 46 Set 7| Haines Junction
Processing Record 47 Set 7| Bredasdorp
Processing Record 48 Set 7| Bilibino
Processing Record 49 Set 7| Bethel
Processing Record 50 Set 7| Sitka
Processing Record 1 Set 8| Carutapera
```



Processing Record 2 Set 8| Bulawayo  
Processing Record 3 Set 8| Lebu  
City not found. Skipping...  
Processing Record 5 Set 8| Tuktoyaktuk  
Processing Record 6 Set 8| Dunmore Town  
City not found. Skipping...  
Processing Record 8 Set 8| Ushuaia  
Processing Record 9 Set 8| Lebu  
Processing Record 10 Set 8| Nouakchott  
Processing Record 11 Set 8| Kalmunai  
Processing Record 12 Set 8| Arraial do Cabo  
Processing Record 13 Set 8| Naro Moru  
Processing Record 14 Set 8| Ibrā'  
Processing Record 15 Set 8| Sulangan  
Processing Record 16 Set 8| Nikolskoye  
Processing Record 17 Set 8| Monforte de Lemos  
Processing Record 18 Set 8| Lagoa  
Processing Record 19 Set 8| Albany  
Processing Record 20 Set 8| Hilo  
Processing Record 21 Set 8| Ilulissat  
Processing Record 22 Set 8| Busselton  
Processing Record 23 Set 8| Butaritari  
Processing Record 24 Set 8| Bluff  
Processing Record 25 Set 8| Mataura  
Processing Record 26 Set 8| Fort Nelson  
Processing Record 27 Set 8| Ushuaia  
Processing Record 28 Set 8| São José da Coroa Grande  
Processing Record 29 Set 8| Arraial do Cabo  
Processing Record 30 Set 8| Pevek  
Processing Record 31 Set 8| Saldanha  
Processing Record 32 Set 8| Tuatapere  
Processing Record 33 Set 8| Gao  
Processing Record 34 Set 8| Vaini  
Processing Record 35 Set 8| Quatre Cocos  
Processing Record 36 Set 8| Yumen  
Processing Record 37 Set 8| Kupang  
City not found. Skipping...  
Processing Record 39 Set 8| Ushuaia  
Processing Record 40 Set 8| Avera  
Processing Record 41 Set 8| Butaritari  
Processing Record 42 Set 8| Batemans Bay  
Processing Record 43 Set 8| Manta  
Processing Record 44 Set 8| Biak  
Processing Record 45 Set 8| Vostok  
Processing Record 46 Set 8| São João da Barra  
Processing Record 47 Set 8| Saint Paul Harbor  
Processing Record 48 Set 8| Sørland  
Processing Record 49 Set 8| Puerto Ayora  
Processing Record 50 Set 8| Acapulco de Juárez  
City not found. Skipping...  
Processing Record 2 Set 9| Kalabo  
Processing Record 3 Set 9| Mataura  
Processing Record 4 Set 9| Tiksi  
Processing Record 5 Set 9| New Norfolk  
Processing Record 6 Set 9| Alice Springs  
Processing Record 7 Set 9| Whitecourt  
Processing Record 8 Set 9| Nyurba

```
Processing Record 9 Set 9| Kapaa
Processing Record 10 Set 9| Port Elizabeth
Processing Record 11 Set 9| Mahébourg
Processing Record 12 Set 9| Rikitea
Processing Record 13 Set 9| Vaini
Processing Record 14 Set 9| Punta Arenas
Processing Record 15 Set 9| Punta Arenas
Processing Record 16 Set 9| João Câmara
Processing Record 17 Set 9| Oriximiná
Processing Record 18 Set 9| Saint-Philippe
Processing Record 19 Set 9| Cayenne
Processing Record 20 Set 9| Kirakira
Processing Record 21 Set 9| Saint Paul Harbor
Processing Record 22 Set 9| Zhigansk
Processing Record 23 Set 9| Churapcha
Processing Record 24 Set 9| Chui
Processing Record 25 Set 9| Tahe
Processing Record 26 Set 9| Mataura
Processing Record 27 Set 9| Rikitea
Processing Record 28 Set 9| Vaini
Processing Record 29 Set 9| Isangel
Processing Record 30 Set 9| Kapaa
Processing Record 31 Set 9| Punta Arenas
Processing Record 32 Set 9| Mataura
Processing Record 33 Set 9| Mont-Dore
City not found. Skipping...
City not found. Skipping...
Processing Record 36 Set 9| Kapaa
Processing Record 37 Set 9| Sørland
Processing Record 38 Set 9| Nouna
Processing Record 39 Set 9| Peachtree City
Processing Record 40 Set 9| Talara
Processing Record 41 Set 9| Airai
Processing Record 42 Set 9| Pevek
Processing Record 43 Set 9| Lebu
Processing Record 44 Set 9| Tiksi
Processing Record 45 Set 9| Atuona
Processing Record 46 Set 9| Saint Paul Harbor
Processing Record 47 Set 9| Port Alfred
Processing Record 48 Set 9| Rikitea
Processing Record 49 Set 9| Port Alfred
Processing Record 50 Set 9| Ajdabiya
Processing Record 1 Set 10| Saint Anthony
Processing Record 2 Set 10| Yellowknife
Processing Record 3 Set 10| Punta Arenas
Processing Record 4 Set 10| Sinazongwe
Processing Record 5 Set 10| Vaini
Processing Record 6 Set 10| Roebourne
Processing Record 7 Set 10| Mezen'
Processing Record 8 Set 10| Tuktoyaktuk
Processing Record 9 Set 10| New Norfolk
Processing Record 10 Set 10| Rikitea
Processing Record 11 Set 10| Sembakung
Processing Record 12 Set 10| Rikitea
Processing Record 13 Set 10| Xai-Xai
Processing Record 14 Set 10| Tuktoyaktuk
City not found. Skipping...
```

```
Processing Record 16 Set 10| Bethel
Processing Record 17 Set 10| Hermanus
Processing Record 18 Set 10| Bagdadin
Processing Record 19 Set 10| Ushuaia
Processing Record 20 Set 10| Pangnirtung
City not found. Skipping...
Processing Record 22 Set 10| Kapaa
Processing Record 23 Set 10| Rikitea
Processing Record 24 Set 10| New Norfolk
Processing Record 25 Set 10| Hobart
Processing Record 26 Set 10| Atuona
Processing Record 27 Set 10| Vaini
City not found. Skipping...
Processing Record 29 Set 10| Camargo
Processing Record 30 Set 10| Bredasdorp
City not found. Skipping...
Processing Record 32 Set 10| Al Bardiyah
Processing Record 33 Set 10| Cockburn Town
Processing Record 34 Set 10| Hermanus
Processing Record 35 Set 10| Albany
Processing Record 36 Set 10| Torbay
Processing Record 37 Set 10| Ushuaia
Processing Record 38 Set 10| Tuy Hoa
Processing Record 39 Set 10| Mataura
Processing Record 40 Set 10| Nikolskoye
Processing Record 41 Set 10| Ushuaia
Processing Record 42 Set 10| Bredasdorp
Processing Record 43 Set 10| West Wendover
Processing Record 44 Set 10| Jamestown
Processing Record 45 Set 10| Saskylakh
Processing Record 46 Set 10| Cape Town
Processing Record 47 Set 10| Alekseyevsk
Processing Record 48 Set 10| Port Lincoln
Processing Record 49 Set 10| Havelock
Processing Record 50 Set 10| Xiaoshi
Processing Record 1 Set 11| Hermanus
Processing Record 2 Set 11| Airai
Processing Record 3 Set 11| Kavieng
Processing Record 4 Set 11| Severodvinsk
Processing Record 5 Set 11| Jambi City
Processing Record 6 Set 11| Albany
Processing Record 7 Set 11| Alice Springs
Processing Record 8 Set 11| Terme
Processing Record 9 Set 11| Ushuaia
Processing Record 10 Set 11| Mar del Plata
Processing Record 11 Set 11| Strezhevoy
Processing Record 12 Set 11| Punta Arenas
City not found. Skipping...
Processing Record 14 Set 11| Kulhudhuffushi
Processing Record 15 Set 11| Kumul
Processing Record 16 Set 11| Yellowknife
Processing Record 17 Set 11| Sørland
Processing Record 18 Set 11| Isla Vista
Processing Record 19 Set 11| Whittlesea
Processing Record 20 Set 11| Termez
Processing Record 21 Set 11| Geraldton
City not found. Skipping...
```

```
City not found. Skipping...
Processing Record 24 Set 11| Córdoba
Processing Record 25 Set 11| Abu Kamal
Processing Record 26 Set 11| Aksu
Processing Record 27 Set 11| Nanortalik
Processing Record 28 Set 11| Hobart
Processing Record 29 Set 11| Hobart
Processing Record 30 Set 11| Pangnirtung
Processing Record 31 Set 11| Ürümqi
Processing Record 32 Set 11| Vaini
Processing Record 33 Set 11| Mataura
Processing Record 34 Set 11| Auki
Processing Record 35 Set 11| Abaí
Processing Record 36 Set 11| Dingle
Processing Record 37 Set 11| Punta Arenas
Processing Record 38 Set 11| Guaratuba
Processing Record 39 Set 11| Cherskiy
Processing Record 40 Set 11| Lavrentiya
Processing Record 41 Set 11| Najrān
Processing Record 42 Set 11| Itarema
Processing Record 43 Set 11| Vaini
Processing Record 44 Set 11| Ushuaia
Processing Record 45 Set 11| Umluj
Processing Record 46 Set 11| Goderich
Processing Record 47 Set 11| Horta
City not found. Skipping...
Processing Record 49 Set 11| Petites Anses
Processing Record 50 Set 11| Magadan
Processing Record 1 Set 12| Severo-Kuril'sk
Processing Record 2 Set 12| Nikolskoye
Processing Record 3 Set 12| Charleston
Processing Record 4 Set 12| Tumbagaan
Processing Record 5 Set 12| Hilo
Processing Record 6 Set 12| Esso
Processing Record 7 Set 12| Mataura
Processing Record 8 Set 12| Manche
Processing Record 9 Set 12| Busselton
Processing Record 10 Set 12| Sarangani
Processing Record 11 Set 12| Tooele
Processing Record 12 Set 12| Ribeira Grande
Processing Record 13 Set 12| Hilo
Processing Record 14 Set 12| New Norfolk
City not found. Skipping...
Processing Record 16 Set 12| Provideniya
Processing Record 17 Set 12| Soyo
Processing Record 18 Set 12| Mozarlândia
Processing Record 19 Set 12| Busselton
Processing Record 20 Set 12| Nikolskoye
Processing Record 21 Set 12| Neuquén
Processing Record 22 Set 12| Puerto Ayora
Processing Record 23 Set 12| Aksu
Processing Record 24 Set 12| Iquitos
Processing Record 25 Set 12| Vaini
Processing Record 26 Set 12| Hilo
Processing Record 27 Set 12| Zabul Province
Processing Record 28 Set 12| Barrow
Processing Record 29 Set 12| Ushuaia
```

```
Processing Record 30 Set 12| Butaritari
Processing Record 31 Set 12| Longyearbyen
Processing Record 32 Set 12| Punta Arenas
Processing Record 33 Set 12| Upernavik
Processing Record 34 Set 12| Hong Kong
Processing Record 35 Set 12| Cabo San Lucas
Processing Record 36 Set 12| Lisakovsk
Processing Record 37 Set 12| Puerto Ayora
Processing Record 38 Set 12| Ostrovnoy
Processing Record 39 Set 12| Butaritari
Processing Record 40 Set 12| Olbia
Processing Record 41 Set 12| Gigmoto
Processing Record 42 Set 12| Belmonte
Processing Record 43 Set 12| Mossamedes
Processing Record 44 Set 12| Taoudenni
Processing Record 45 Set 12| Ponta do Sol
Processing Record 46 Set 12| Santa Cruz de la Sierra
Processing Record 47 Set 12| Alta Floresta
Processing Record 48 Set 12| Zyryanovsk
Processing Record 49 Set 12| Labuan
Processing Record 50 Set 12| Mataura
Processing Record 1 Set 13| Kapaa
Processing Record 2 Set 13| Puerto Ayora
Processing Record 3 Set 13| Kapaa
Processing Record 4 Set 13| Albany
Processing Record 5 Set 13| Salinópolis
Processing Record 6 Set 13| Inzer
Processing Record 7 Set 13| Rikitea
Processing Record 8 Set 13| Abnūb
City not found. Skipping...
Processing Record 10 Set 13| Punta Arenas
Processing Record 11 Set 13| Bluff
Processing Record 12 Set 13| Kavieng
Processing Record 13 Set 13| Pangkalanbuun
Processing Record 14 Set 13| Cayenne
City not found. Skipping...
Processing Record 16 Set 13| Lunglei
Processing Record 17 Set 13| Riyadh
Processing Record 18 Set 13| Dikson
Processing Record 19 Set 13| Tweed
Processing Record 20 Set 13| Butaritari
Processing Record 21 Set 13| Mutare
Processing Record 22 Set 13| Nouadhibou
Processing Record 23 Set 13| Katsuura
Processing Record 24 Set 13| Oakdale
Processing Record 25 Set 13| Vaini
Processing Record 26 Set 13| Albany
Processing Record 27 Set 13| Jamestown
Processing Record 28 Set 13| Bethel
Processing Record 29 Set 13| New Albany
Processing Record 30 Set 13| Nikolskoye
Processing Record 31 Set 13| Port Hedland
Processing Record 32 Set 13| Makushino
Processing Record 33 Set 13| Codrington
Processing Record 34 Set 13| San Patricio
Processing Record 35 Set 13| Tiksi
Processing Record 36 Set 13| Atuona
```

```
Processing Record 37 Set 13| Yulara
Processing Record 38 Set 13| Manaure
Processing Record 39 Set 13| Rawson
Processing Record 40 Set 13| Hilo
Processing Record 41 Set 13| Cherskiy
Processing Record 42 Set 13| Rio Verde de Mato Grosso
Processing Record 43 Set 13| Bredasdorp
Processing Record 44 Set 13| Carnarvon
Processing Record 45 Set 13| Ahipara
Processing Record 46 Set 13| San Jose
Processing Record 47 Set 13| Dunedin
Processing Record 48 Set 13| Saiha
Processing Record 49 Set 13| Santa Maria
Processing Record 50 Set 13| Klaksvík
Processing Record 1 Set 14| Padang
Processing Record 2 Set 14| Ushuaia
Processing Record 3 Set 14| Jamestown
Processing Record 4 Set 14| Iqaluit
Processing Record 5 Set 14| Caçapava
Processing Record 6 Set 14| Guadalupe y Calvo
Processing Record 7 Set 14| Igrim
Processing Record 8 Set 14| Bluff
Processing Record 9 Set 14| Bambous Virieux
Processing Record 10 Set 14| Ushuaia
Processing Record 11 Set 14| Ushuaia
Processing Record 12 Set 14| Butaritari
Processing Record 13 Set 14| Dhanwār
Processing Record 14 Set 14| Caledonia
Processing Record 15 Set 14| Williams Lake
Processing Record 16 Set 14| Castro
Processing Record 17 Set 14| Port Lincoln
Processing Record 18 Set 14| Povrly
Processing Record 19 Set 14| Jamestown
Processing Record 20 Set 14| Rikitea

Processing Record 21 Set 14| Novobirilyussy
City not found. Skipping...
Processing Record 23 Set 14| Tuktoyaktuk
City not found. Skipping...
Processing Record 25 Set 14| Mar del Plata
Processing Record 26 Set 14| Avarua
Processing Record 27 Set 14| Cape Town
Processing Record 28 Set 14| Boddam
Processing Record 29 Set 14| Kosh-Agach
Processing Record 30 Set 14| Ancud
Processing Record 31 Set 14| Saint Charles
Processing Record 32 Set 14| Olutanga
Processing Record 33 Set 14| Maniitsoq
Processing Record 34 Set 14| Kapaa
Processing Record 35 Set 14| Narsaq
Processing Record 36 Set 14| Cidreira
Processing Record 37 Set 14| Mataura
Processing Record 38 Set 14| Jalu
Processing Record 39 Set 14| Kiryat Gat
Processing Record 40 Set 14| Koumac
Processing Record 41 Set 14| Bathsheba
Processing Record 42 Set 14| Zarubino
City not found. Skipping...
```

```
Processing Record 44 Set 14| Hermanus
Processing Record 45 Set 14| Saldanha
Processing Record 46 Set 14| Vila Franca do Campo
Processing Record 47 Set 14| Matairea
Processing Record 48 Set 14| Yellowknife
Processing Record 49 Set 14| Albany
Processing Record 50 Set 14| Busselton
Processing Record 1 Set 15| Kanadey
Processing Record 2 Set 15| New Norfolk
Processing Record 3 Set 15| Prome
Processing Record 4 Set 15| Daoukro
Processing Record 5 Set 15| Adrar
Processing Record 6 Set 15| Punta Arenas
Processing Record 7 Set 15| Busselton
Processing Record 8 Set 15| Hilo
Processing Record 9 Set 15| Avarua
Processing Record 10 Set 15| Constitución
Processing Record 11 Set 15| Kuytun
Processing Record 12 Set 15| Bluff
Processing Record 13 Set 15| Dikson
Processing Record 14 Set 15| Kapaa
Processing Record 15 Set 15| Togur
Processing Record 16 Set 15| Mayo
Processing Record 17 Set 15| Avarua
Processing Record 18 Set 15| Puerto Ayora
Processing Record 19 Set 15| Bluff
Processing Record 20 Set 15| Busselton
Processing Record 21 Set 15| Lagoa
Processing Record 22 Set 15| Cape Town
Processing Record 23 Set 15| Kushima
Processing Record 24 Set 15| Lubao
Processing Record 25 Set 15| Bariloche
Processing Record 26 Set 15| Taoudenni
Processing Record 27 Set 15| Santa Vitória do Palmar
Processing Record 28 Set 15| Pevek
Processing Record 29 Set 15| Albany
Processing Record 30 Set 15| Usinsk
Processing Record 31 Set 15| Yellowknife
Processing Record 32 Set 15| Betsiamites
Processing Record 33 Set 15| Pangnirtung
Processing Record 34 Set 15| Matairea
Processing Record 35 Set 15| Los Algarrobos
Processing Record 36 Set 15| Gamboma
City not found. Skipping...
Processing Record 38 Set 15| Erzin
Processing Record 39 Set 15| Punta Arenas
Processing Record 40 Set 15| Inhambane
Processing Record 41 Set 15| Inhambane
Processing Record 42 Set 15| Ushuaia
Processing Record 43 Set 15| Severnyy
Processing Record 44 Set 15| Avarua
Processing Record 45 Set 15| Husavik
Processing Record 46 Set 15| Matairea
Processing Record 47 Set 15| San Patricio
Processing Record 48 Set 15| Trenggalek
Processing Record 49 Set 15| Matairea
Processing Record 50 Set 15| Butaritari
```

```
Processing Record 1 Set 16| Port Alfred
Processing Record 2 Set 16| Pevek
Processing Record 3 Set 16| Punta Arenas
Processing Record 4 Set 16| Ende
Processing Record 5 Set 16| Gazli
Processing Record 6 Set 16| Avarua
Processing Record 7 Set 16| Bredasdorp
City not found. Skipping...
Processing Record 9 Set 16| Kumul
Processing Record 10 Set 16| Fortuna
Processing Record 11 Set 16| Okhotsk
Processing Record 12 Set 16| Vaini
Processing Record 13 Set 16| Antalaha
Processing Record 14 Set 16| East London
Processing Record 15 Set 16| Rikitea
Processing Record 16 Set 16| Kavieng
Processing Record 17 Set 16| Cape Town
Processing Record 18 Set 16| Cidreira
Processing Record 19 Set 16| Fereydūnkenār
City not found. Skipping...
Processing Record 21 Set 16| Honiara
Processing Record 22 Set 16| Honolulu
Processing Record 23 Set 16| Srednekolymsk
Processing Record 24 Set 16| Jamestown
Processing Record 25 Set 16| Mataura
Processing Record 26 Set 16| Mayo
Processing Record 27 Set 16| Chokurdakh
Processing Record 28 Set 16| Hirado
Processing Record 29 Set 16| Punta Arenas
Processing Record 30 Set 16| Adrar
Processing Record 31 Set 16| Tasiilaq
Processing Record 32 Set 16| Wau
Processing Record 33 Set 16| Fort Dodge
Processing Record 34 Set 16| Avarua
Processing Record 35 Set 16| Kapaa
Processing Record 36 Set 16| Kapaa
City not found. Skipping...
Processing Record 38 Set 16| Bluff
Processing Record 39 Set 16| Ritchie
Processing Record 40 Set 16| Asău
City not found. Skipping...
Processing Record 42 Set 16| Safford
Processing Record 43 Set 16| Carnarvon
Processing Record 44 Set 16| Butaritari
Processing Record 45 Set 16| Cape Town
City not found. Skipping...
Processing Record 47 Set 16| Bereket
Processing Record 48 Set 16| Ahipara
Processing Record 49 Set 16| Esim
Processing Record 50 Set 16| Rikitea
Processing Record 1 Set 17| Rikitea
Processing Record 2 Set 17| Tamandaré
Processing Record 3 Set 17| Rikitea
Processing Record 4 Set 17| Ushuaia
Processing Record 5 Set 17| Tuktoyaktuk
Processing Record 6 Set 17| Adeje
Processing Record 7 Set 17| Yellowknife
```



```
Processing Record 8 Set 17| Camacha
Processing Record 9 Set 17| Mar del Plata
Processing Record 10 Set 17| Arrondissement de Calais
Processing Record 11 Set 17| Baharly
Processing Record 12 Set 17| Banda Aceh
Processing Record 13 Set 17| Khatanga
Processing Record 14 Set 17| Severo-Kuril'sk
City not found. Skipping...
Processing Record 16 Set 17| Cape Town
Processing Record 17 Set 17| Oranjestad
Processing Record 18 Set 17| Bredasdorp
Processing Record 19 Set 17| Carnarvon
Processing Record 20 Set 17| Udaipur
Processing Record 21 Set 17| Punta Arenas
Processing Record 22 Set 17| Mahébourg
Processing Record 23 Set 17| Puerto Ayora
Processing Record 24 Set 17| Tall Kayf
Processing Record 25 Set 17| Sri Aman
Processing Record 26 Set 17| Pangnirtung
Processing Record 27 Set 17| Busselton
Processing Record 28 Set 17| Kapaa
Processing Record 29 Set 17| Albany
Processing Record 30 Set 17| Bambous Virieux
Processing Record 31 Set 17| Hermanus
Processing Record 32 Set 17| Busselton
Processing Record 33 Set 17| Kidal
Processing Record 34 Set 17| Bluff
Processing Record 35 Set 17| Barrow
Processing Record 36 Set 17| Hobart
Processing Record 37 Set 17| Taoudenni
Processing Record 38 Set 17| Port Elizabeth
Processing Record 39 Set 17| Rome
Processing Record 40 Set 17| Bluff
Processing Record 41 Set 17| Moose Jaw
Processing Record 42 Set 17| Lipin Bor
Processing Record 43 Set 17| Kapaa
Processing Record 44 Set 17| Doha
Processing Record 45 Set 17| Albany
Processing Record 46 Set 17| Kirakira
Processing Record 47 Set 17| Hithadhoo
Processing Record 48 Set 17| Qaanaaq
Processing Record 49 Set 17| Binghamton
City not found. Skipping...
Processing Record 1 Set 18| Busselton
Processing Record 2 Set 18| Castro
Processing Record 3 Set 18| Vaini
Processing Record 4 Set 18| Hilo
Processing Record 5 Set 18| Padang
Processing Record 6 Set 18| Acarí
Processing Record 7 Set 18| Jamestown
Processing Record 8 Set 18| Punta Arenas
Processing Record 9 Set 18| Rikitea
Processing Record 10 Set 18| Vaini
Processing Record 11 Set 18| Yulara
Processing Record 12 Set 18| Ushuaia
Processing Record 13 Set 18| Cidreira
Processing Record 14 Set 18| Ushuaia
```

```
Processing Record 15 Set 18| Castro
Processing Record 16 Set 18| Salalah
Processing Record 17 Set 18| Aklavik
Processing Record 18 Set 18| Punta Arenas
Processing Record 19 Set 18| Nikolskoye
City not found. Skipping...
Processing Record 21 Set 18| Albany
Processing Record 22 Set 18| Upernavik
Processing Record 23 Set 18| Cidreira
Processing Record 24 Set 18| Bredasdorp
Processing Record 25 Set 18| Diamantino
Processing Record 26 Set 18| Yumen
Processing Record 27 Set 18| Moose Factory
Processing Record 28 Set 18| Rikitea
Processing Record 29 Set 18| Kaduna
Processing Record 30 Set 18| Chokurdakh
Processing Record 31 Set 18| Bredasdorp
Processing Record 32 Set 18| Atuona
Processing Record 33 Set 18| Jamestown
Processing Record 34 Set 18| Mataura
Processing Record 35 Set 18| Busselton
Processing Record 36 Set 18| Husavik
Processing Record 37 Set 18| Clyde River
Processing Record 38 Set 18| Puerto Quijarro
Processing Record 39 Set 18| Narsaq

Processing Record 40 Set 18| Talnakh
Processing Record 41 Set 18| Kamenka
City not found. Skipping...
Processing Record 43 Set 18| Ushuaia
Processing Record 44 Set 18| East London
Processing Record 45 Set 18| Kaitangata
Processing Record 46 Set 18| Saint-Pierre
Processing Record 47 Set 18| Port Alfred
Processing Record 48 Set 18| Ushuaia
Processing Record 49 Set 18| Cherskiy
Processing Record 50 Set 18| Castro
```

## Convert Raw Data to DataFrame

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

```
In [12]: # create a data frame from city name, lat, lon, max temp, humidity, cloudiness, w
weather_dict = {
    "City": city,
    "Lat": lat,
    "Lng": lang,
    "Max Temp": temp_max,
    "Humidity": humidity,
    "Cloudiness": cloudiness,
    "Wind Speed": windspeed,
    "Country": country,
    "Date": date
}
weather_data = pd.DataFrame(weather_dict)
weather_data_unique = weather_data.drop_duplicates(subset=['City'], keep='last')

weather_data_unique.to_csv("weather_data.csv", index=False, header=True)
weather_data_unique
```

Out[12]:

	City	Lat	Lng	Max Temp	Humidity	Cloudiness	Wind Speed	Country	Date
1	Le Moule	16.33	-61.35	75.20	88	100	2.24	GP	1603956416
4	Palmer	42.16	-72.33	46.99	100	90	1.48	US	1603956416
13	Yanam	16.73	82.22	89.58	40	5	7.36	IN	1603956418
18	Souillac	-20.52	57.52	80.01	57	17	8.99	MU	1603956418
23	Nizhniy Baskunchak	48.22	46.83	50.67	47	66	16.91	RU	1603956419
...	...	...	...	...	...	...	...	...	...
834	Saint-Pierre	-21.34	55.48	75.20	73	75	28.86	RE	1603955843
835	Port Alfred	-33.59	26.89	69.58	76	100	8.08	ZA	1603956052
836	Ushuaia	-54.80	-68.30	42.80	81	40	36.91	AR	1603955915
837	Cherskiy	68.75	161.30	5.18	92	80	3.49	RU	1603956447
838	Castro	-24.79	-50.01	58.50	50	0	1.92	BR	1603956077

399 rows × 9 columns

```
In [13]: # Get the statistical data on the Weather data
weather_data_unique.describe()
```

Out[13]:

	Lat	Lng	Max Temp	Humidity	Cloudiness	Wind Speed	Date
<b>count</b>	399.000000	399.000000	399.000000	399.000000	399.000000	399.000000	3.990000e+02
<b>mean</b>	19.073308	15.519398	59.826015	71.959900	52.411028	8.159323	1.603956e+09
<b>std</b>	33.023181	92.201567	23.532644	21.676085	41.103149	5.932812	1.911567e+02
<b>min</b>	-54.800000	-175.200000	-11.470000	6.000000	0.000000	0.430000	1.603956e+09
<b>25%</b>	-8.765000	-68.405000	42.900000	62.000000	1.500000	3.465000	1.603956e+09
<b>50%</b>	22.690000	20.230000	67.460000	77.000000	63.000000	6.930000	1.603956e+09
<b>75%</b>	44.720000	100.345000	78.800000	88.000000	95.500000	10.970000	1.603956e+09
<b>max</b>	78.220000	179.320000	102.200000	100.000000	100.000000	36.910000	1.603957e+09

## Inspect the data and remove the cities where the humidity > 100%.

Skip this step if there are no cities that have humidity > 100%.

```
In [14]: weather_fil = weather_data_unique.loc[weather_data_unique['Humidity'] < 100]
weather_fil.describe()
```

Out[14]:

	Lat	Lng	Max Temp	Humidity	Cloudiness	Wind Speed	Date
<b>count</b>	388.000000	388.000000	388.000000	388.000000	388.000000	388.000000	3.880000e+02
<b>mean</b>	18.758505	16.696521	59.983247	71.164948	52.595361	8.249974	1.603956e+09
<b>std</b>	33.149304	92.564224	23.649585	21.452877	41.087399	5.970970	1.877875e+02
<b>min</b>	-54.800000	-175.200000	-11.470000	6.000000	0.000000	0.430000	1.603956e+09
<b>25%</b>	-8.855000	-68.120000	42.800000	61.750000	1.750000	3.620000	1.603956e+09
<b>50%</b>	22.580000	24.795000	67.570000	77.000000	63.500000	6.930000	1.603956e+09
<b>75%</b>	43.970000	101.692500	78.812500	88.000000	96.000000	11.210000	1.603956e+09
<b>max</b>	78.220000	179.320000	102.200000	99.000000	100.000000	36.910000	1.603957e+09

```
In [15]: # Get the indices of cities that have humidity over 100%.
drop_list = list(weather_data_unique.loc[weather_data_unique['Humidity'] >= 100].drop_list)
```

Out[15]: [4, 68, 163, 198, 264, 345, 360, 566, 579, 601, 734]

```
In [16]: # Make a new DataFrame equal to the city data to drop all humidity outliers by in
# Passing "inplace=False" will make a copy of the city_data DataFrame, which we c
Clean_city_data = weather_data_unique.drop(drop_list)
Clean_city_data
```

Out[16]:

	City	Lat	Lng	Max Temp	Humidity	Cloudiness	Wind Speed	Country	Date
1	Le Moule	16.33	-61.35	75.20	88	100	2.24	GP	1603956416
13	Yanam	16.73	82.22	89.58	40	5	7.36	IN	1603956418
18	Souillac	-20.52	57.52	80.01	57	17	8.99	MU	1603956418
23	Nizhniy Baskunchak	48.22	46.83	50.67	47	66	16.91	RU	1603956419
25	Laas	46.62	10.70	37.40	86	75	4.70	IT	1603956069
...	...	...	...	...	...	...	...	...	...
834	Saint-Pierre	-21.34	55.48	75.20	73	75	28.86	RE	1603955843
835	Port Alfred	-33.59	26.89	69.58	76	100	8.08	ZA	1603956052
836	Ushuaia	-54.80	-68.30	42.80	81	40	36.91	AR	1603955915
837	Cherskiy	68.75	161.30	5.18	92	80	3.49	RU	1603956447
838	Castro	-24.79	-50.01	58.50	50	0	1.92	BR	1603956077

388 rows × 9 columns

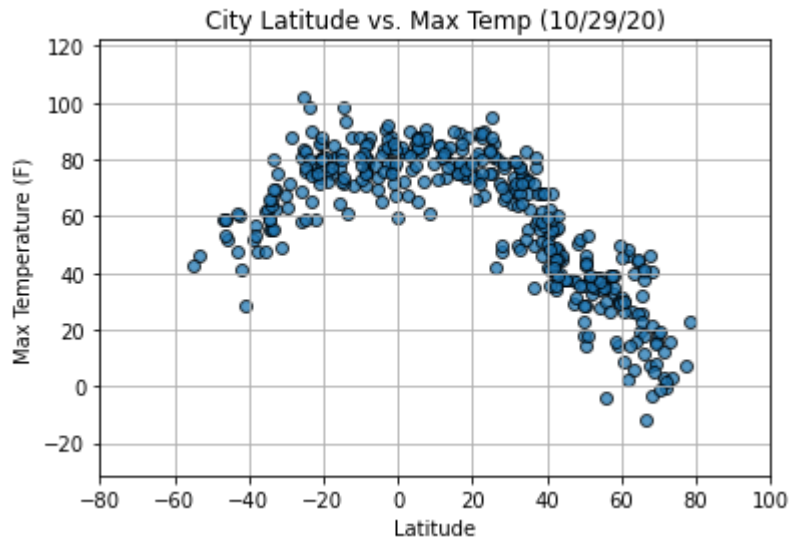
## Plotting the Data

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

```
In [17]: # Define function to create scatter plot for city Latitude and other weather meas
def plot_grp(y,y_label):
    axs_y = plt.scatter(Clean_city_data['Lat'],Clean_city_data[y],alpha=0.75,edge
    plt.title(f"City Latitude vs. {y} ({time.strftime('%m/%d/%y')})")
    plt.xlabel('Latitude')
    plt.ylabel(y_label)
    plt.xlim(-80,100)
    plt.ylim(min(Clean_city_data[y])-20,max(Clean_city_data[y])+20)
    plt.grid()
    plt.savefig(os.path.join('Images',f'City Latitude_vs_{y}.png'))
```

## Latitude vs. Temperature Plot

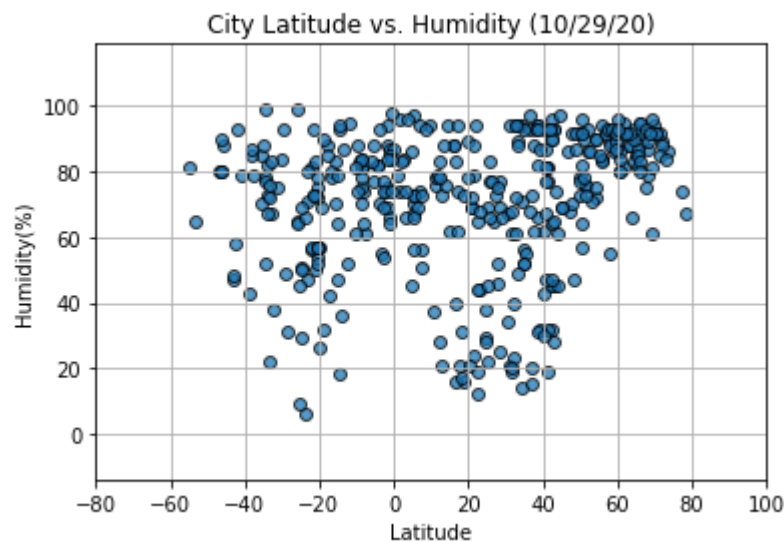
```
In [18]: Lat_temp_plot = plot_grp(y='Max Temp',y_label='Max Temperature (F)')
Lat_temp_plot
```



Observation: From the above plot we can infer that temperatures are higher in the cities near the equator.

## Latitude vs. Humidity Plot

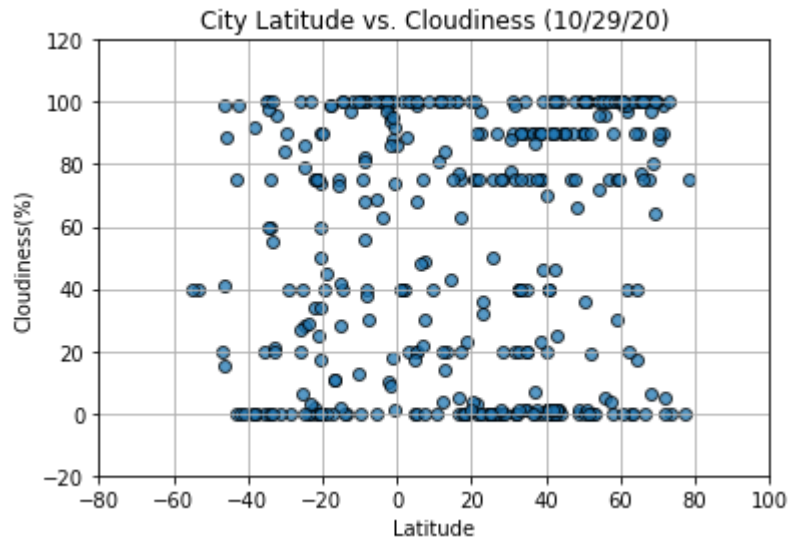
```
In [19]: Lat_Humidity_plot = plot_grp(y='Humidity',y_label='Humidity(%)')
Lat_Humidity_plot
```



Observation: From the above plot we can infer that Humidity is higher in the cities on the northern hemisphere.

## Latitude vs. Cloudiness Plot

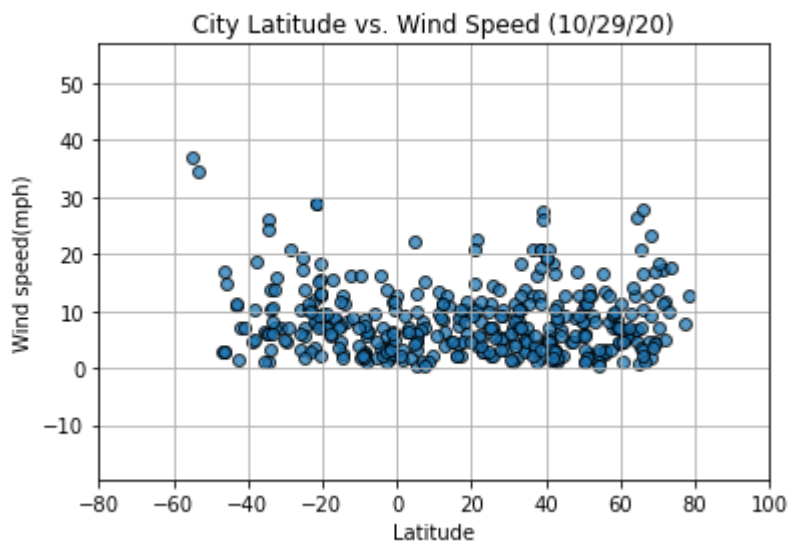
```
In [20]: Lat_Cloud_plot = plot_grp(y='Cloudiness',y_label='Cloudiness(%)')
Lat_Cloud_plot
```



In [ ]: Observation: From the above plot we can infer cloudiness points are distributed ev

## Latitude vs. Wind Speed Plot

```
In [21]: Lat_Wind_plot = plot_grp(y='Wind Speed',y_label='Wind speed(mph)')
Lat_Wind_plot
```



Observation: From the above plot we can infer windspeed is higher in two cities (Punta Arenas and Ushuaia) of southern hemisphere.

## Linear Regression

```
In [22]: # Create Df for Northern Hemisphere data

North_Hemisphere = Clean_city_data[Clean_city_data['Lat'] >= 0]

# Define function to create liner regression plot for Northern Hemisphere Latitude

def plot_line_north(y,y_label):
    (slope, intercept, rvalue, pvalue, stderr) = linregress(North_Hemisphere['Lat'], North_Hemisphere[y])
    regress_values = North_Hemisphere['Lat'] * slope + intercept
    line_eq = "y = " + str(round(slope,2)) + "x + " + str(round(intercept,2))

    plt.scatter(North_Hemisphere['Lat'],North_Hemisphere[y])
    plt.plot(North_Hemisphere['Lat'],regress_values,"r-")
    plt.annotate(line_eq,(40,20),fontsize=15,color="red")
    plt.xlabel('Latitude')
    plt.ylabel(y_label)
    print(f"The r-squared is: {rvalue**2}")
    plt.savefig(os.path.join('Images',f'North Hemisphere Latitude_vs_{y}.png'))
```

```
In [23]: # Create Df for Southern Hemisphere data

South_Hemisphere = Clean_city_data[Clean_city_data['Lat'] < 0]
# South_Hemisphere

# Define function to create liner regression plot for Southern Hemisphere Latitude

def plot_line_south(y,y_label):
    (slope, intercept, rvalue, pvalue, stderr) = linregress(South_Hemisphere['Lat'], South_Hemisphere[y])
    regress_values = South_Hemisphere['Lat'] * slope + intercept
    line_eq = "y = " + str(round(slope,2)) + "x + " + str(round(intercept,2))

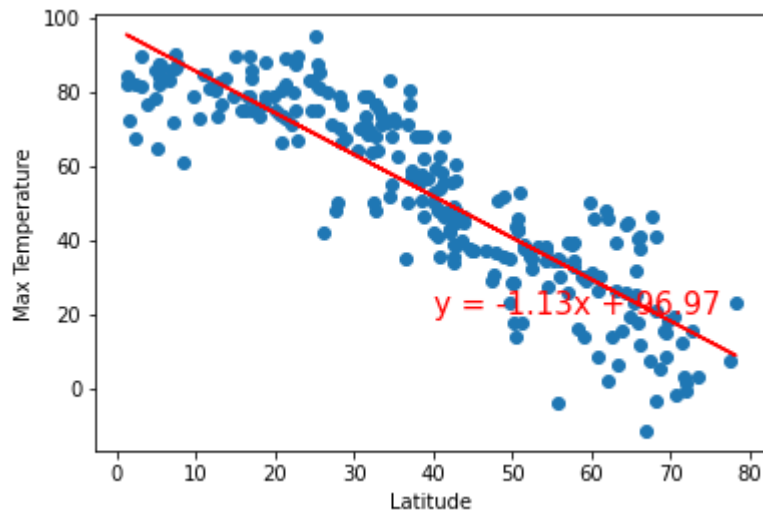
    plt.scatter(South_Hemisphere['Lat'],South_Hemisphere[y])
    plt.plot(South_Hemisphere['Lat'],regress_values,"r-")
    plt.annotate(line_eq,(-50,35),fontsize=15,color="red")
    plt.xlabel('Latitude')
    plt.ylabel(y_label)
    print(f"The r-squared is: {rvalue**2}")
    plt.savefig(os.path.join('Images',f'South Hemisphere Latitude_vs_{y}.png'))
```

### Northern Hemisphere - Max Temp vs. Latitude Linear Regression



```
In [24]: North_lat_temp = plot_line_north(y='Max Temp',y_label='Max Temperature')  
North_lat_temp
```

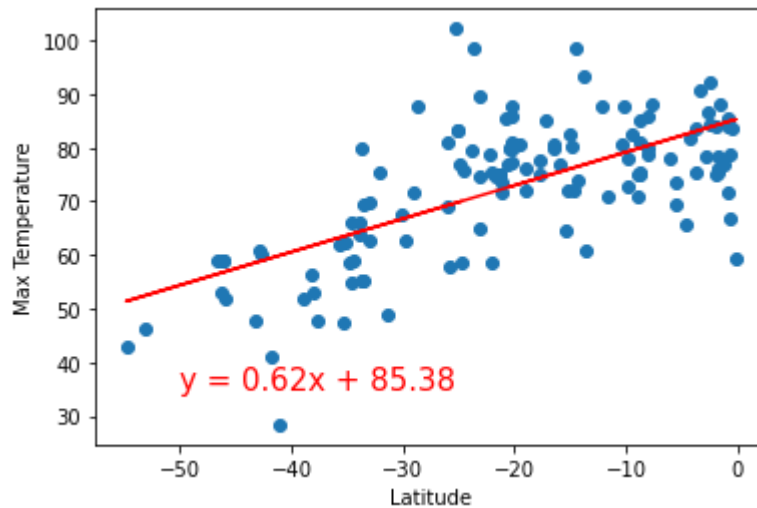
The r-squared is: 0.7837971017341837



### Southern Hemisphere - Max Temp vs. Latitude Linear Regression

```
In [25]: South_lat_temp = plot_line_south(y='Max Temp',y_label='Max Temperature')
South_lat_temp
```

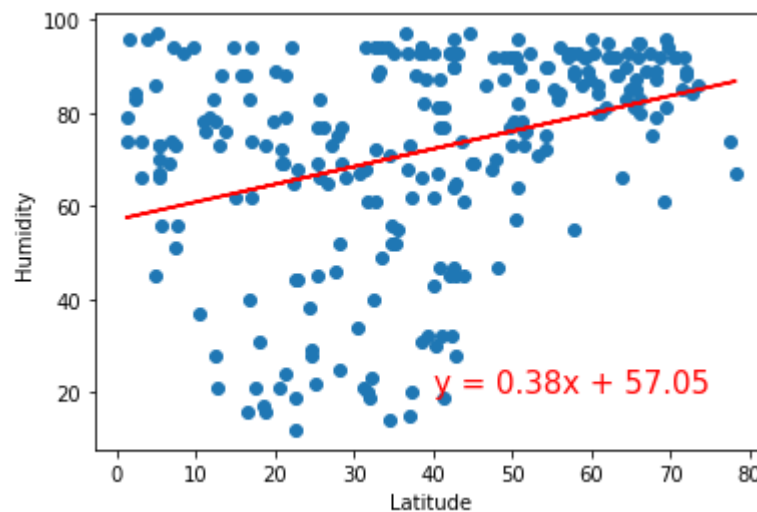
The r-squared is: 0.42616694260788485



### Northern Hemisphere - Humidity (%) vs. Latitude Linear Regression

```
In [26]: North_lat_humid = plot_line_north(y='Humidity',y_label='Humidity')
North_lat_humid
```

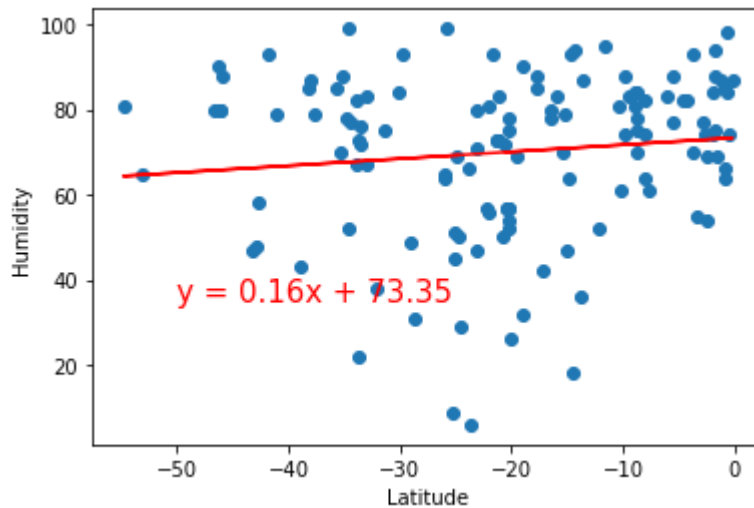
The r-squared is: 0.11048704865534624



### Southern Hemisphere - Humidity (%) vs. Latitude Linear Regression

```
In [27]: South_lat_humid = plot_line_south(y='Humidity',y_label='Humidity')
South_lat_humid
```

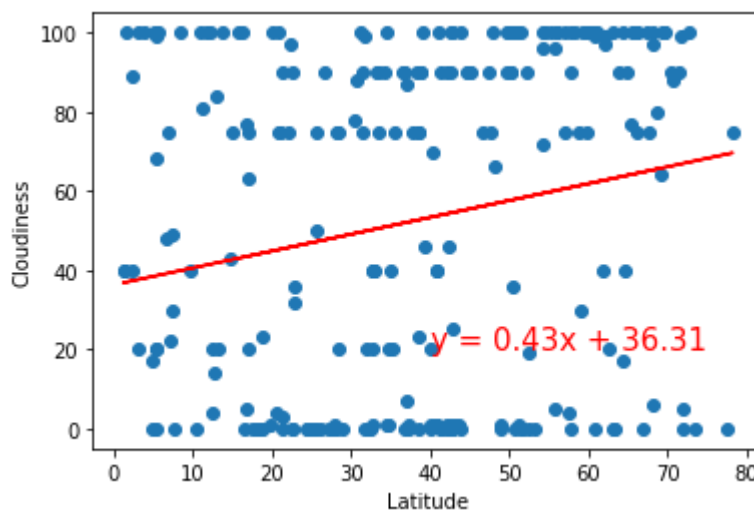
The r-squared is: 0.013746950814504458



### Northern Hemisphere - Cloudiness (%) vs. Latitude Linear Regression

```
In [28]: North_lat_cloud = plot_line_north(y='Cloudiness',y_label='Cloudiness')
North_lat_cloud
```

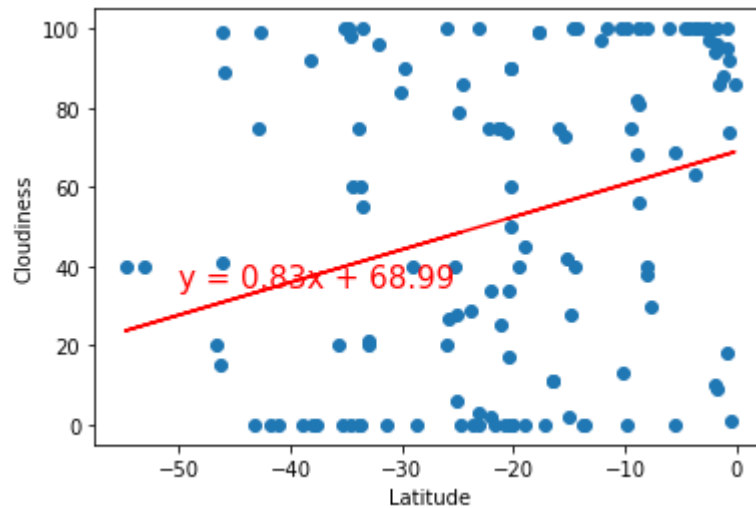
The r-squared is: 0.04052075412011578



### Southern Hemisphere - Cloudiness (%) vs. Latitude Linear Regression

```
In [29]: South_lat_cloud = plot_line_south(y='Cloudiness',y_label='Cloudiness')
South_lat_cloud
```

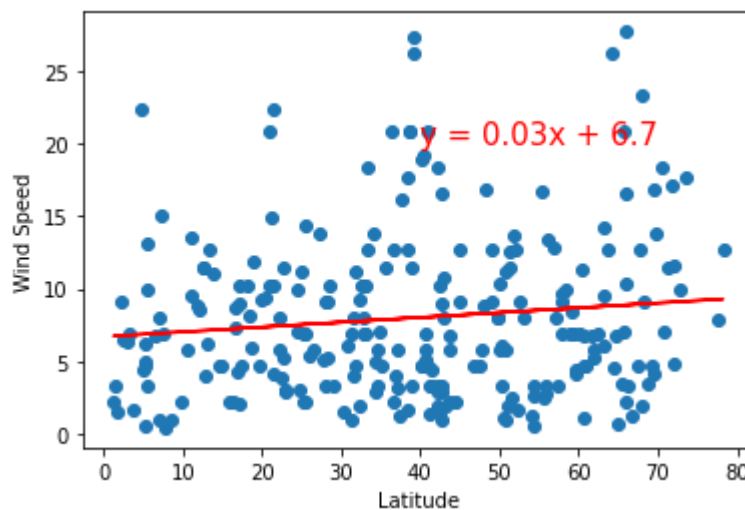
The r-squared is: 0.07987253126894392



### Northern Hemisphere - Wind Speed (mph) vs. Latitude Linear Regression

```
In [30]: North_lat_wind = plot_line_north(y='Wind Speed',y_label='Wind Speed')
North_lat_wind
```

The r-squared is: 0.01379118709735928



### Southern Hemisphere - Wind Speed (mph) vs. Latitude Linear Regression

```
In [155]: South_lat_wind = plot_line_south(y='Wind Speed',y_label='Wind Speed')
South_lat_wind
```

The r-squared is: 0.3378725327391036

