Data analyst Nanodegree
Explore weather trends
Project 1

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SQL Code:

- **Write a SQL query to extract the city level data.**
  SELECT * FROM city_list WHERE country = 'Saudi Arabia';
  SELECT * FROM city_data
  WHERE country = 'Saudi Arabia' AND city = 'Mecca';

- **Write a SQL query to extract the global data.**
  SELECT * FROM global_data;

  --Altering the columns name to join the two tables and downloading it in a CSV format

  ALTER TABLE city_data RENAME COLUMN avg_temp to Cd;
  ALTER TABLE global_data RENAME COLUMN avg_temp to GD;

  SELECT global_data.year , global_data.GD , city_data.CD
  FROM global_data JOIN city_data -- Joining tables
  ON global_data.year = city_data.year -- reference for join
  WHERE city LIKE 'Mecca'

Tools used:

The csv is opened via python idle
A line chart was created in python idle
For extraction sql is used

Python Code:

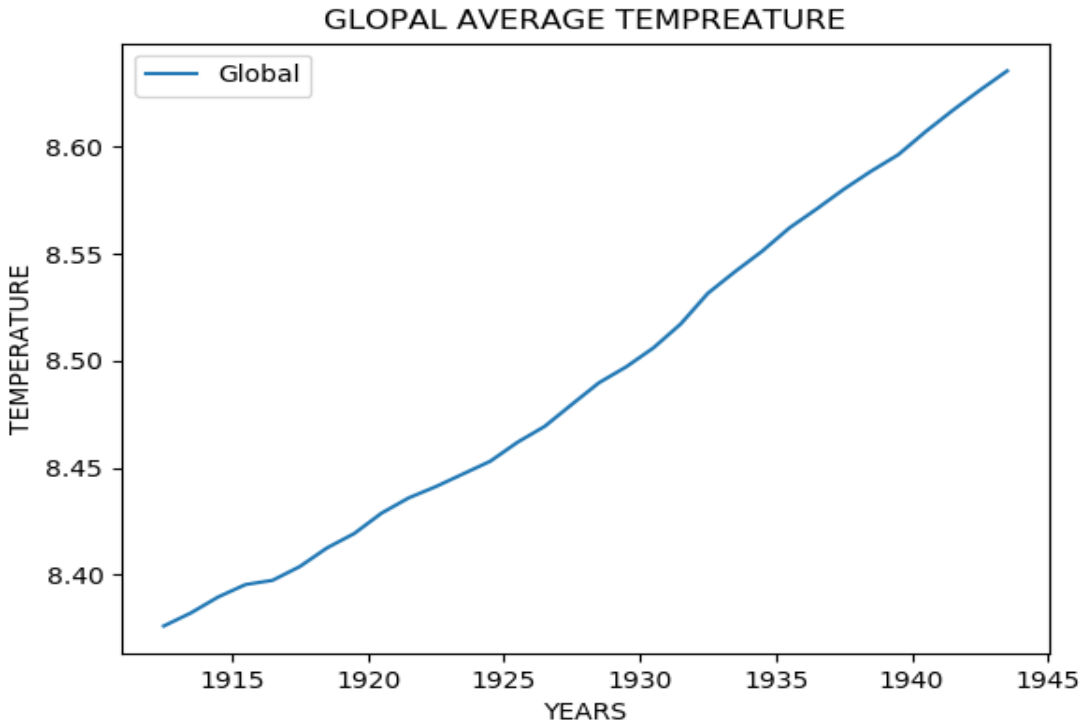
```
import numpy as np
import pandas as pd
from matplotlib import pyplot as plt
# importing some liberaries to help in moving average calculation and displaying the chart

data= pd.read_csv("results-f.csv")
# reading the csv file that contains the data
```

```
def moving_average(Moving_Avg_range,data_input):
# the moving average calculation will need the range of moving average the data
from the csv file to calculate the output
    output=data_input.rolling(window=Moving_Avg_range, on="cd")
    output=output.mean()
    return output

Moving_Average_Chart=moving_average(140,data)
# the range that is used here is 140

plt.plot(Moving_Average_Chart['year'],Moving_Average_Chart['gd'],label='Global
')
# plotting the global data line
# Gd for global data

plt.plot(Moving_Average_Chart['year'],Moving_Average_Chart['cd'],label='Mecca
')
#plotting the city data line
# Cd for city data
plt.legend()
plt.xlabel("YEARS")
plt.ylabel("TEMPERATURE")
plt.title("GLOPAL AVERAGE TEMPREATURE VS MECCA CITY")
# naming the x and y labels and the title
plt.show()
#displaying the chart
```

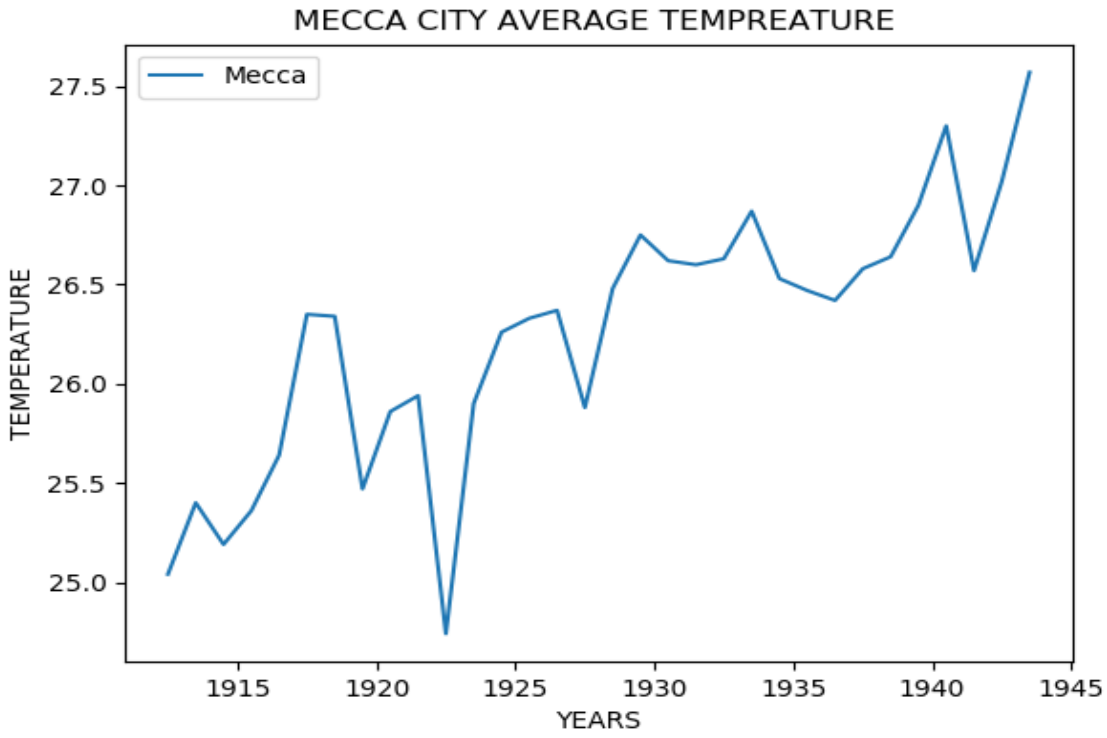
Moving Averages:

The Moving Average is used to observe the trends in temperature
I have used 140 range Moving Average to get the line chart smoother.

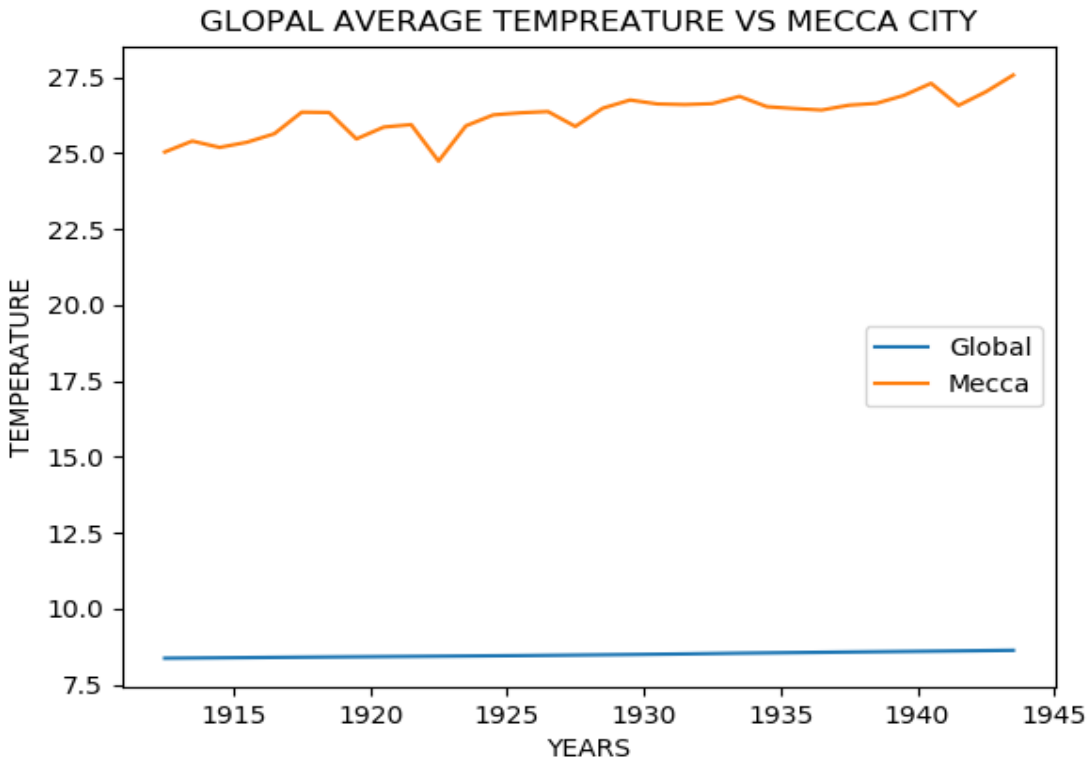
After the *moving average function was calculated the chart for the global data will be like this*



And the chart for the city data will look like this



The final chart is only showing the moving average for both city data and global data



Observations:

- Global average temperature varies between 7.65 to 9.51 Degree, but Mecca city average temperature varies between 22.46 to 27.05 Degree.
- There is a big difference between the mecca city chart and the global chart because when comparing both of them it shows that the mecca city is hotter then Global average temperature.
- When choosing a short range like 10 or 20 the lines will be messy in the chart, that why I found the range of 140 is ideal because the lines in the chart is relatively smooth.
- In the global chart it shows that the temperature increases by the years.
- In the both the city chart and the global chart it shows that the maximum temperature from 1915 to 1945 is 1945 that is 27.05 degree for city chart and 9.51 for global chart.