Data Analyst Nanodegree Program

Project 1 : Explore Weather Trends

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Project Summary

In this project, the students will analyse local and global temperature data and compare the temperature trends where he/she live to overall global temperature trends.

Goals

To extract the data from the portal by using SQL. And be able to calculate the moving average and based on that create a line chart where we describe the similarities and differences between the global temperature trends and the city temperature trends in Saudi Arabia, Mecca.

Tools Used

1. SQL: To extract the weather data from the database.

2. Excel sheet: To calculate moving avg. and to create the line charts used for analysis.

Steps:

1. Extract the Data from the Temperatures Database using SQL.

In order to view the data, I used the following queries:

- To extract the global data :

```
SELECT gl.year, gl.avg_temp
FROM global_data gl
;
```

- View the City list to see the nearest city , in this case Mecca , KSA :

```
SELECT cl.country , cl.city
FROM city_list cl
;
```

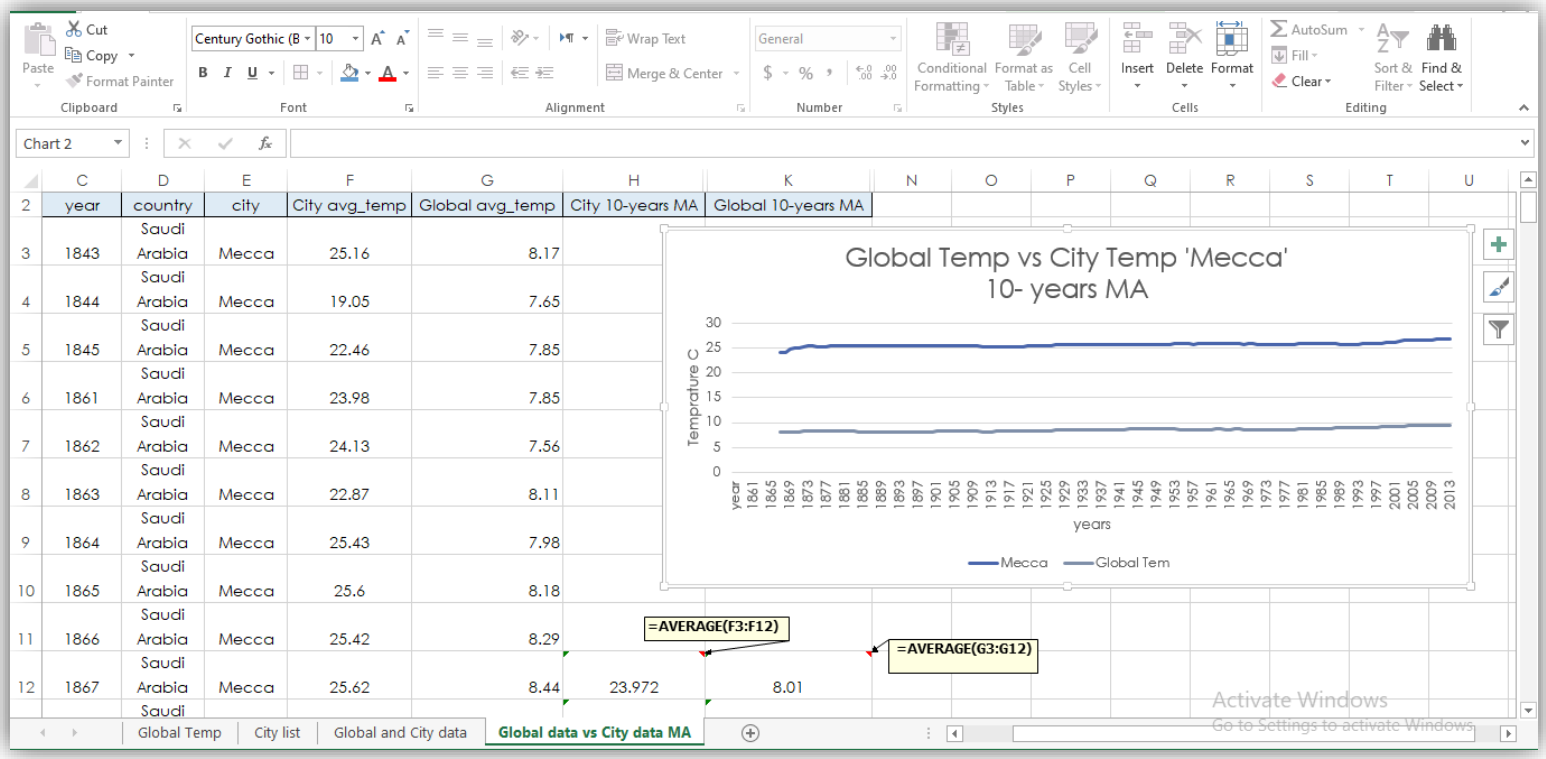
- The last query , Extract the data of Mecca to compare it with the global data. In this case, I need the average temperatures to be in the same years for both , to have efficient analysis and those years with empty or null temperature will be removed. To distinguish between the two averages, I rename both temp.averages to city_avg_temp , global_avg_temp by using ‘as’ function.

```
SELECT cd.year,cd.country , cd.city , cd.avg_temp as city_avg_temp , gd.avg_temp as
global_avg_temp

FROM global_data gd, city_data cd

WHERE cd.city = 'Mecca'

AND gd.year = cd.year

AND NOT cd.avg_temp=0

;
```

***Note** : all the output will be copied in excel file , and it will be attached.

2. Calculate the Moving Average to facilitate the process.

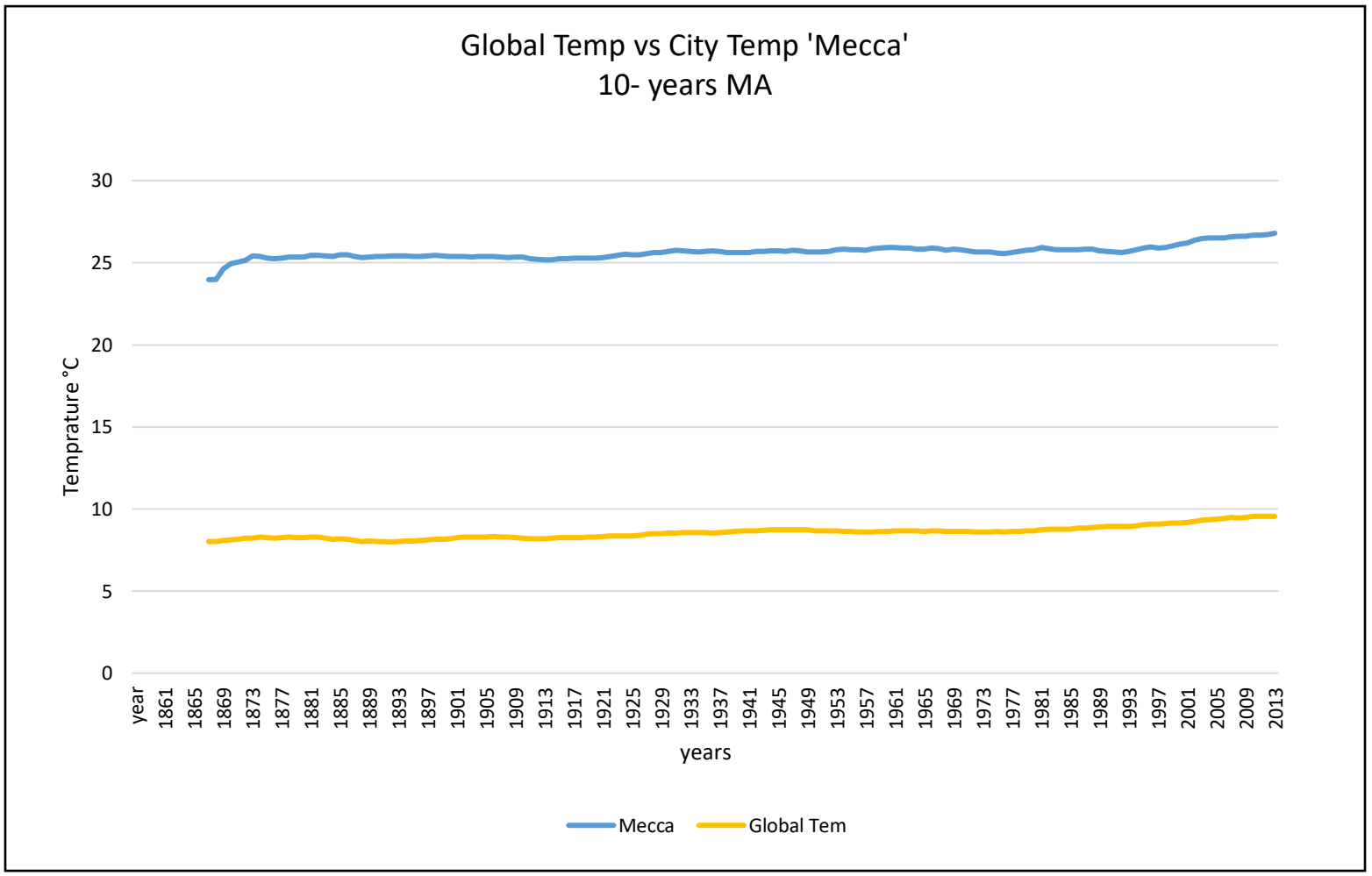
I decide to calculate the moving average for the 10th year- MA. I used AVERAGE() Formula in order to calculate the MA of the temperatures. I used both formulas AVERAGE(F3:F12) - AVERAGE(G3:G12) as shown in the pic bellow.



year	country	city	City avg_temp	Global avg_temp	City 10-years MA	Global 10-years MA
1843	Saudi Arabia	Mecca	25.16	8.17		
1844	Saudi Arabia	Mecca	19.05	7.65		
1845	Saudi Arabia	Mecca	22.46	7.85		
1861	Saudi Arabia	Mecca	23.98	7.85		
1862	Saudi Arabia	Mecca	24.13	7.56		
1863	Saudi Arabia	Mecca	22.87	8.11		
1864	Saudi Arabia	Mecca	25.43	7.98		
1865	Saudi Arabia	Mecca	25.6	8.18		
1866	Saudi Arabia	Mecca	25.42	8.29		
1867	Saudi Arabia	Mecca	25.62	8.44	23.972	8.01
	Saudi					

3. Create the line chart for Mecca temperature vs. Global temperature along with the observation.

Based on the data I got form calculating the moving average, I create the below line chart to easily compare between both data and for efficient reading and analysis.



Observation :

- From the graph, the city average temperature range in the late eighties till 2013 is between 23.9 °C to 26.8 °C. In the other side, the global temperature range is between 8 °C to almost 10 (9.55)°C.
- It noticed that there is a big difference between the global and the city temperature, the City.temp is higher than the global.temp . If we pick for example the beginning years (1867) we will see: city avg.temp ’23.9 °C’ > global avg.temp ‘8.0 °C’ which is a big gap by almost 16 °C.

- The city weather is hooter than the global based on the averages in the graph. It result from many factors such as the location of the city and the continues changes in the climate.
- From 1867 till 2013, both temperatures averages, global and Mecca's, have overlapped lines it goes up and down with slight differences, it keeps incresses over the years. Even when the global average temperature reach its highest value in 2013 (9.5°C) still the city average is higher with avg. differences 17.3°C.