Name: YIJIE (JACK) ZHANG

PROJECT 1

- **TOOL**: I use Excel to open the CSV, calculate the moving averages and create the line chart.

  The SQL query used to extract the data is included. The query runs without error and pulls the intended data.
  - 1. *SQL :select * from global_data;* Then download CSV. Get the global years and temperatures data.
  - 2. *SQL :select * from city_list;* Then download CSV. Got all city and countries data. Find the closest big city (Victoria, Canada) around my residence.
  - 3. *SQL : select * from city_data where city = 'Victoria';* Then download CSV. Get the years and average temperature data only from Victoria City.

- Now, I got the years and average temperatures data both from Victoria City and the globe. Then I copy and paste these columns into one CSV file in order to furtherly compare and analyze.

- **Key considerations when deciding how to visualize the trends:**
  - The original data assessment: My residential city is close to Victoria City of Canada. So I choose to analyse the data of Victoria and the globe. The temperature data of Victoria is from 1828-2013, with the missing data of year 1830, 1831 and 1846. While the global data is from 1750-2015.
  - In order to compare them on the same basis, I choose the time frame from year 1832 to 2013 for both Victoria and the globe.
  - During the period of 181 years (1832-2013), I use 5 year moving average to smooth out the yearly volatility and observe the long term trend. So the first data emerge from year 1836. The array of data is from year 1836 to 2013.

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- **Two main similarities in the trends:**
  - Generally speaking, during the long period, the temperatures trend for both local and the globe is going up. The temperature rise from 5.8 to 8.2 in Victoria, while from 7.7 to 9.6 in the globe. Possibly, this is an evidence of global warming.

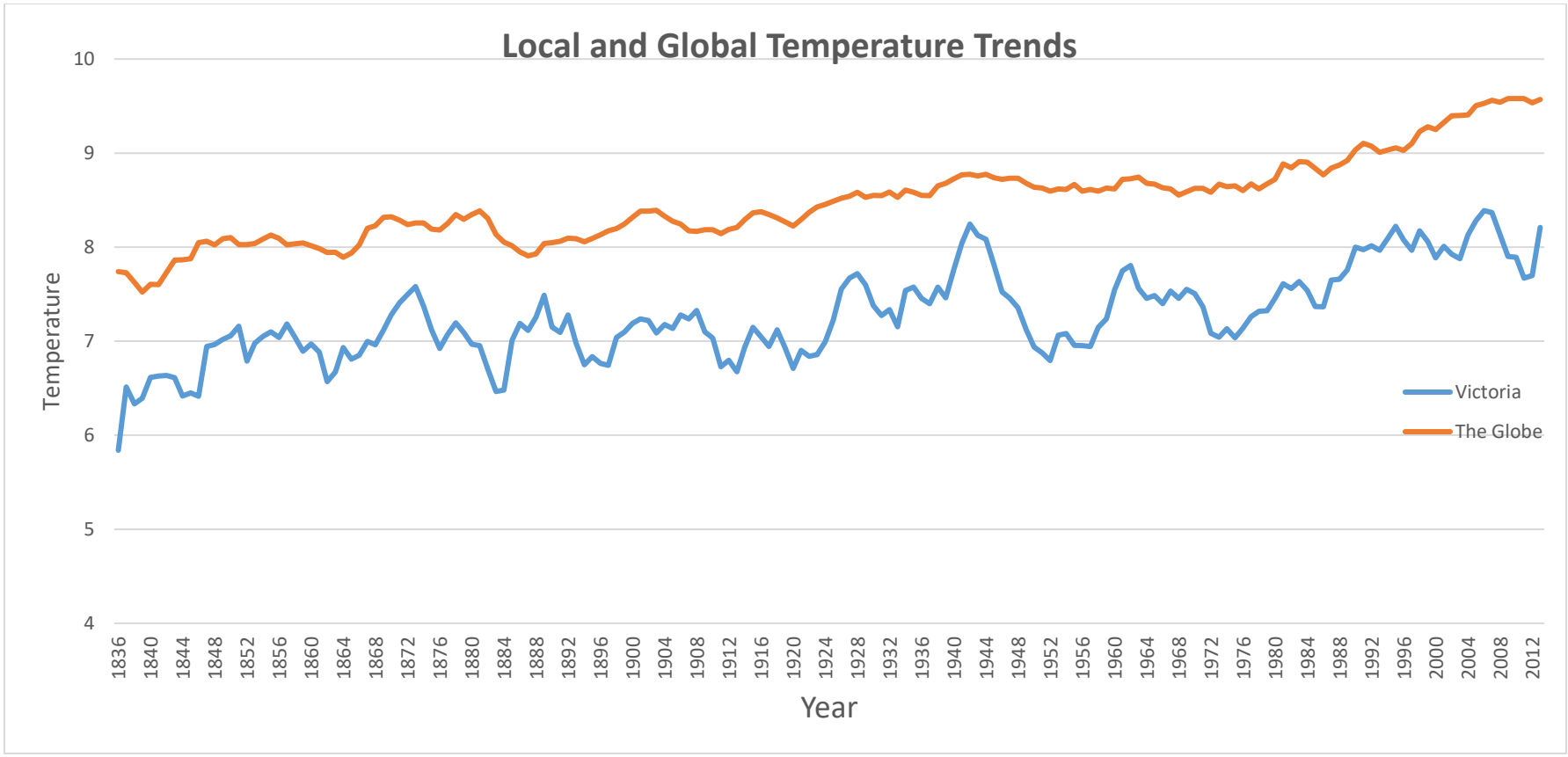
- Furthermore, both for the local city and the globe, during the recent 50 years, the increase of temperature become much more obvious comparing to earlier period in the history. For example, in the globe, the temperature stayed around 8 degree during the 100 years (1843-1953). But it significantly increased from around 8 degree to 9 degree within 50 years after 1953. In Victoria, there is similar change during this period. This might be the consequence of rapid economic development and globalization after the Second World War. More and more families own cars and air conditioners that emit heat into the environment.

- **Two main differences in the trends:**
  - Firstly, the temperature of the globe is always about 1.5 degree higher than that of the local city during the 167 years. I think the location of Victoria City explains this. Canada is located in north hemisphere and often associated with cold weather, rain and snow.
  - Secondly, the temperature volatility of the local city is much higher than that of the globe. While the Victoria City is a specific spot on earth, the globe is consisted of thousands of cities and states. The mixture of these different climate models flatten the general temperature change.

- **The correlation coefficient:**
    - I use the function CORREL ( ) of the Excel to calculate the two arrays of moving averages, the result is 0.8364. This shows the temperatures of both have high correlation. It is not hard to explain this because every city is a part of the earth. Everyone and everyplace is involved into the global climate change.

- **Estimate the average temperature in my city based on the average global temperature:**
    - I use the function FORCAST ( ) of the Excel to estimate the future number. In my excel file, H10:H187 is the known x (global temperatures), and array E10:E187 is the known y (local temperatures). If the average global temperature is 9.7 (x = 9.7) in the future, then the function FORECAST (9.7, E10:E187, H10:H187) shows the local temperature possibly is 8.33 (y=8.33).

- **Line chart** with local and global temperature trends:


Local and Global Temperature Trends
Temperature
Year
Victoria
The Globe
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1848
1852
1856
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1864
1868
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