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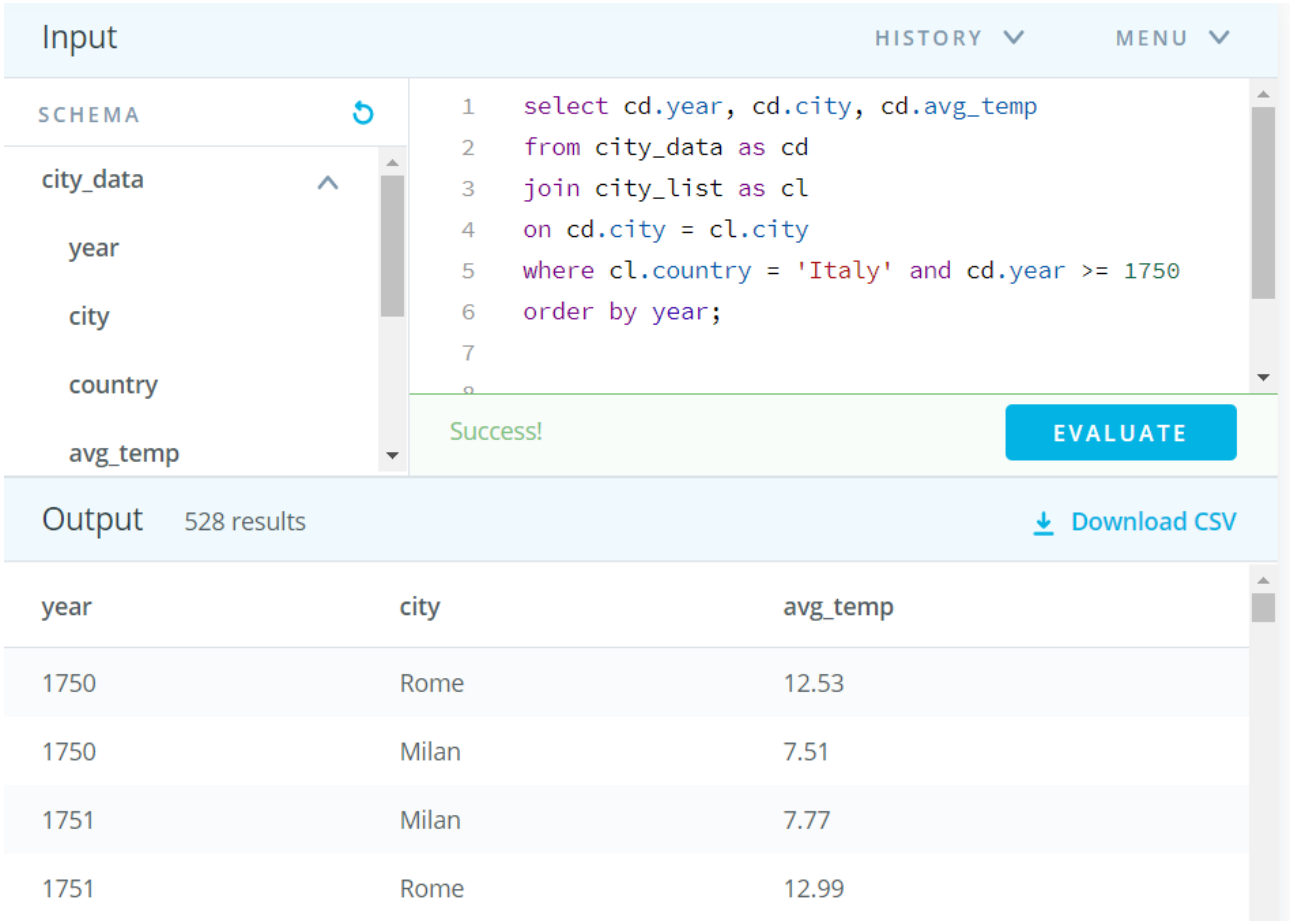
# Explore Weather Trends

# Data Analyst Nanodegree Project #1

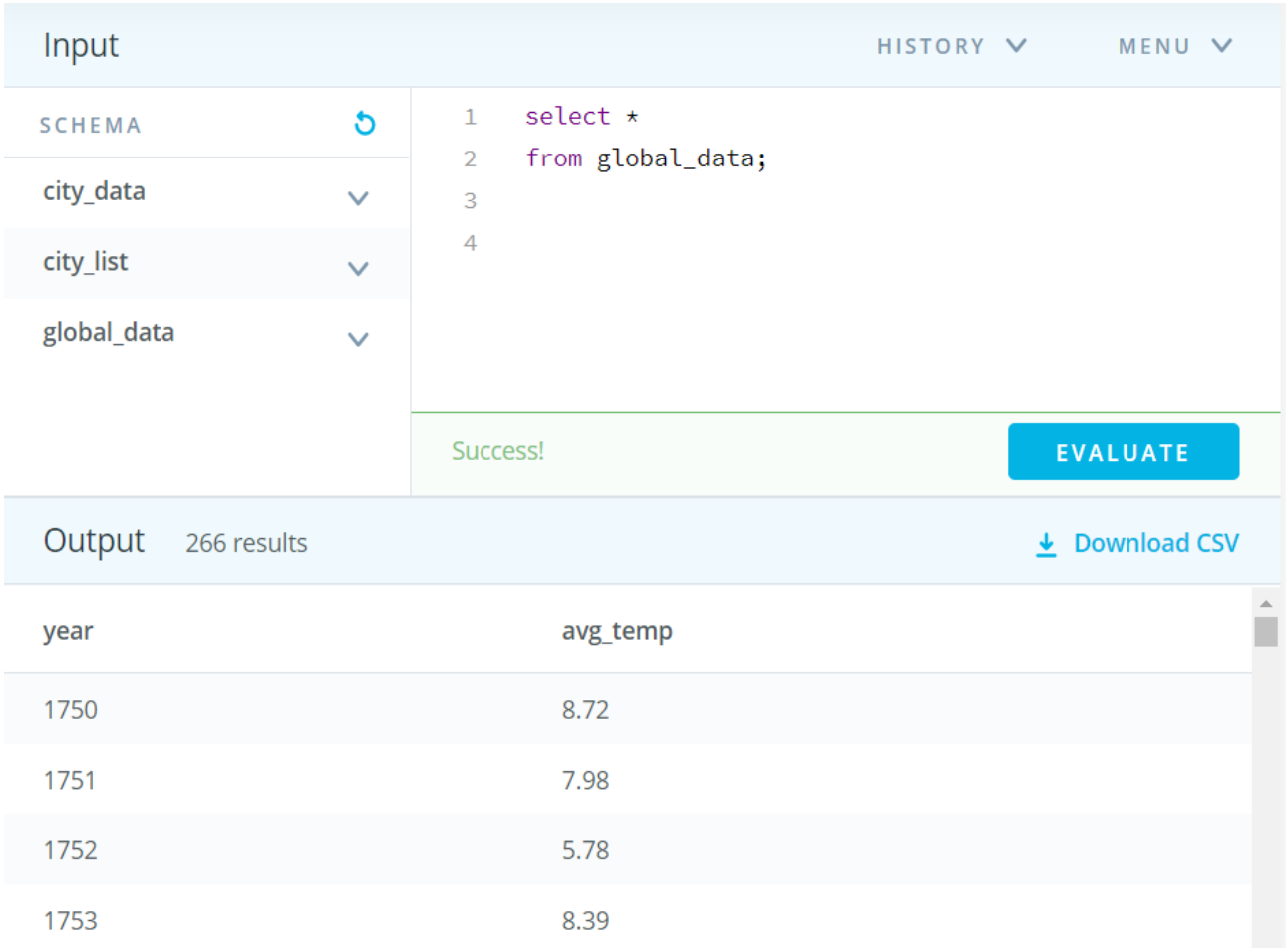
## 1. Extract Data from Database

With the first step, I wrote a query to identify which Italian cities are present in the database, then i extracted the data for these cities by making an aggregation between the city_list and city_data tables. I have used SQL for this purpose.



As you can see, data are available for only 2 Italian cities; since I live more or less in a city located at the same distance between the two, I decided to consider both for the analysis.

Afterwards, i extracted the global data :




## 2. Data Selection

In order to obtain a more useful dataset for analysis, I have chosen to consider the years from 1750 to 2013. This comes from 2 factors:

- The city data lack values in the years from 1746 to 1749 and from 2014 to 2015
- Global data starts right from 1750

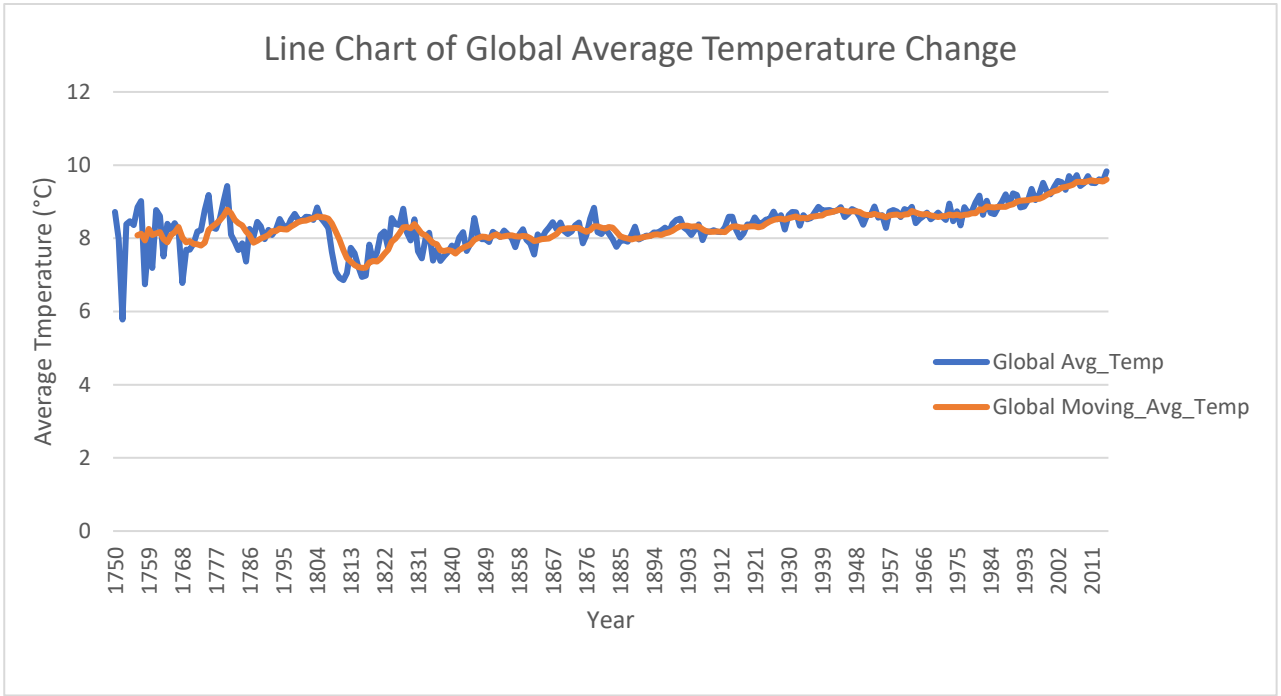
All data extracted using SQL were then downloaded as a CSV file and imported into Excel for the visualization.

# 3. Data Manipulation

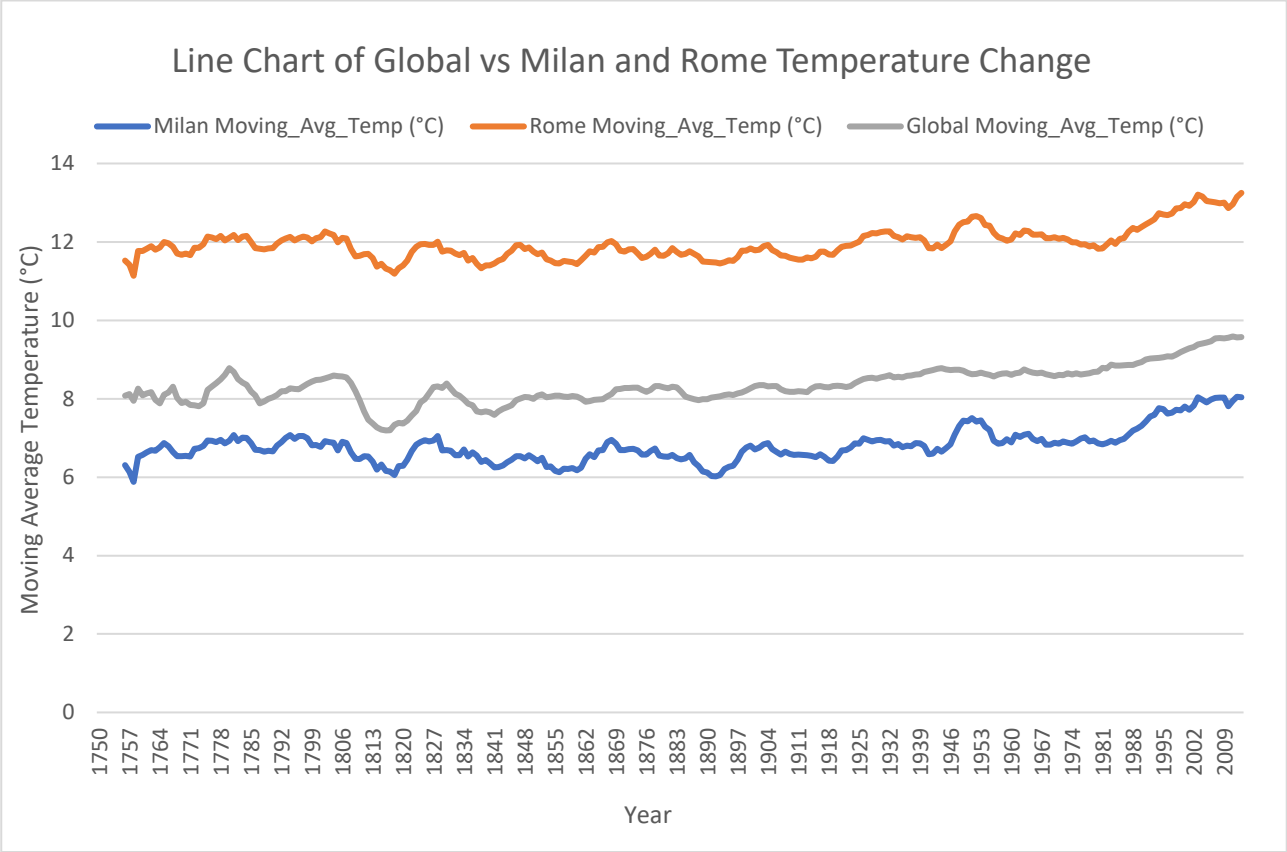
Due to a marked fluctuation of the data that would make the temperature trend unclear, it was decided to replace the year by year average with the moving average. This was obtained by making the average for the first 7 years (1750-1756), then for the interval 1751-1757 and so on up to the last available year.

# 4. Data Visualization

At this point, the global and local trend of average temperatures was represented through a line chart, plotting in Excel the moving average along the y-axis and the range of years on the x-axis.



This first chart above was plotted to show the difference between the year-to-year average and the moving average: it's evident that the moving average makes the fluctuations of the data more contained, facilitating the reading of the trend.




The second line chart compares the average temperature trend of the cities of Milan and Rome with the global one.

# 5. Observations

According to the line charts, the following observations can be deduced:

1. Rome has always been much warmer than Milan, with an average temperature difference that has remained approximately constant around 5 degrees centigrade. The moving average for Milan varies from a minimum value of 5.88°C in 1758 to a maximum value of 8.05°C in 2012; the same

figure for Rome varies between a minimum of 11.13°C in 1758 to a maximum of 13.25°C in 2013.

2. Both cities show an average temperature trend substantially similar to the global one, with an alternation of periods of warming and cooling that continued fairly regularly until the early 1900s, where a progressive warming of the climate is instead evident, both locally and globally. What changes are the absolute temperature values: Rome, with an overall average of 11.95°C, is considerably warmer than the rest of the globe, which stands at 8.35°C, while Milan is moderately colder, with an overall average of 6.79°C.

3. The global trend shows how the planet is getting hotter and hotter. The fluctuations in temperature stopped between the end of the 19th century and the beginning of the 20th century. In fact, the first effects of the second industrial revolution can be traced back to this period.

4. In the last 30 years, the increase in average temperature seems to have accelerated dramatically, probably in relation to the increasingly harmful anthropic action. In fact, the lowest global moving average temperature was recorded in 1816 (7.19°C), while the highest was recorded in 2011 (9.58°C). Furthermore, even more impressive is the progression of the recent years: while between 1750 and 1980 the average temperature settled around 8.23°C (therefore just below the overall average value), in the period from 1981 to 2013 this reached 9.17°C, highlighting a delta of almost 1 degree.