

```
In [6]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

plt.style.use('seaborn')
%matplotlib inline
```

How to get temperature data in sql

Get global data sql query

```
SELECT * FROM global_data
```

Get Soeul data sql query

```
SELECT * FROM city_data
WHERE city = 'Seoul'
```

How to read data using python

- Temperature data download csv-file
- Dataset load DataFrame of Pandas

```
In [7]: globalData = pd.read_csv("global_data.csv")
seoulData = pd.read_csv("seoul_data.csv")

print("Global Data Shape: {}".format(globalData.shape))
print("Seoul Data Shape: {}".format(seoulData.shape))
```

Global Data Shape: (266, 2)
Seoul Data Shape: (175, 4)

Overview dataset

```
In [8]: print(seoulData.head(10))
print("\n")
print(globalData.head(10))
```

	year	city	country	avg_temp
0	1839	Seoul	South Korea	9.47
1	1840	Seoul	South Korea	10.21
2	1841	Seoul	South Korea	9.44
3	1842	Seoul	South Korea	10.13
4	1843	Seoul	South Korea	10.33
5	1844	Seoul	South Korea	10.15
6	1845	Seoul	South Korea	10.25
7	1846	Seoul	South Korea	10.57
8	1847	Seoul	South Korea	10.59
9	1848	Seoul	South Korea	10.36

	year	avg_temp
0	1750	8.72
1	1751	7.98
2	1752	5.78

```

3  1753      8.39
4  1754      8.47
5  1755      8.36
6  1756      8.85
7  1757      9.02
8  1758      6.74
9  1759      7.99

```

Calculate Moving Average and Transform DataFrame

```

In [9]: def CalculateMovingAverage(df, windowSize = 7):
        data = []
        for i in range(windowSize, df.shape[0] - windowSize):
            data.append([df.year[i], pd.DataFrame.sum(df.avg_temp[i - windowSize:i])/windowSize])

        dfTemp = pd.DataFrame(data = data, columns = ("year", "avg_temp"))
        return dfTemp

dfGlobal = CalculateMovingAverage(globalData, 7)
dfSeoul = CalculateMovingAverage(seoulData, 7)

```

Visualization Data using Matplotlib

```

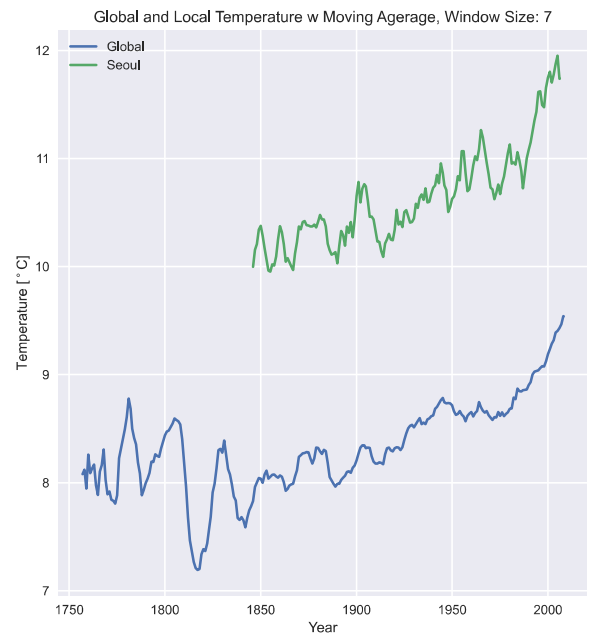
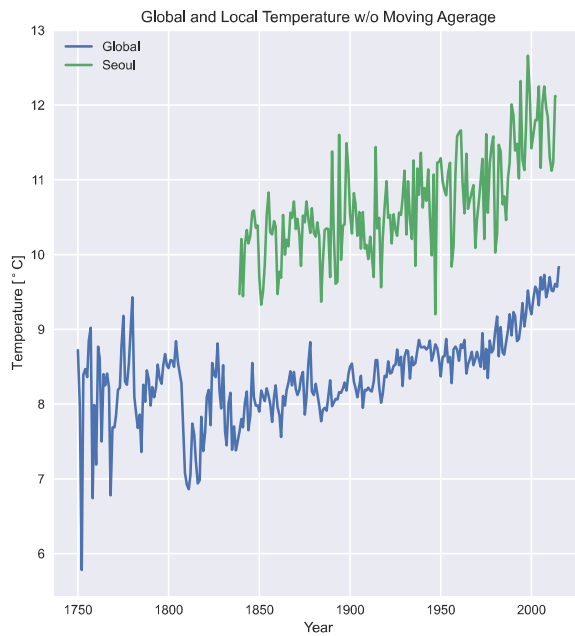
In [10]: fig, ax = plt.subplots(1,2, figsize = (16, 8))

ax[0].plot(globalData.year, globalData.avg_temp, label = "Global")
ax[0].plot(seoulData.year, seoulData.avg_temp, label = "Seoul")
ax[0].set_title("Global and Local Temperature w/o Moving Agerage")
ax[0].set_xlabel("Year")
ax[0].set_ylabel("Temperature [ $^{\circ}\text{C}$ ]")
ax[0].legend()

ax[1].plot(dfGlobal.year, dfGlobal.avg_temp, label = "Global")
ax[1].plot(dfSeoul.year, dfSeoul.avg_temp, label = "Seoul")
ax[1].set_title("Global and Local Temperature w Moving Agerage, Window Size: 7")
ax[1].set_xlabel("Year")
ax[1].set_ylabel("Temperature [ $^{\circ}\text{C}$ ]")
ax[1].legend()

plt.show()

```



Observations

- Seoul city is hotter than the world about 2°C
- Seoul city temperature is increased 2°C during 150 years
- Global and Seoul city temperatures are increasing since 1900 year
- Seoul city has been observed since 1850