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## Project 1. Temperature trend in Tashkent and World

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### ▼ Outline

1. Extracting and downloading data
2. Cleaning, merging data and calculating moving average (Python).
3. Plotting moving average line charts
4. Observation

#### I. Extracting and downloading data using SQL commands

City name is chosen from using below command

```
select * from city_list  
  
order by country;
```

Selected the city and global data

```
select year, avg_temp from city_data  
  
where city = 'Tashkent';  
  
select * from global_data
```

Saved in city.csv and world.csv file.

#### II. Cleaning, merging data and calculating moving average (Python).

```
### Packages used  
import numpy as np  
import pandas as pd  
import matplotlib.pyplot as plt  
  
### Loading data, renaming columns and merging  
city = pd.read_csv('city.csv')  
world = pd.read_csv('world.csv')  
city.columns = ['year', 'Tashkent']  
world.columns = ['year', 'World']  
df = city.merge(world, how='inner', on='year')
```

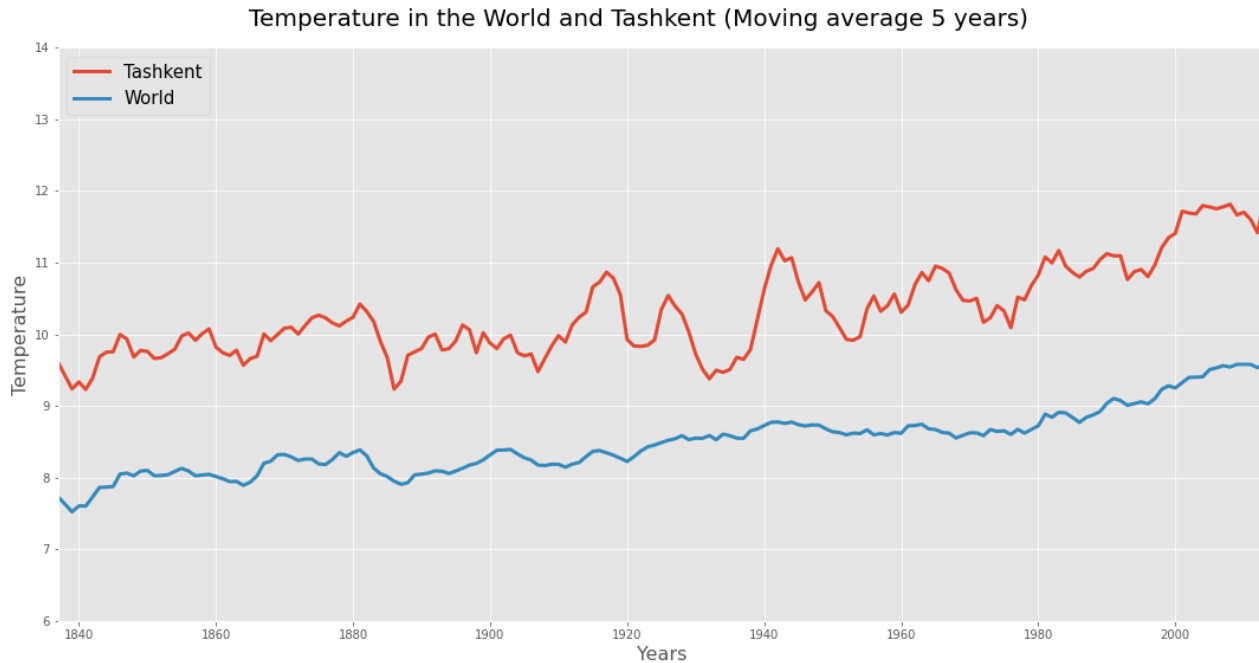
#### Calculations of 5-year moving average temperature.

```
### Calculation of moving averages  
import warnings  
warnings.filterwarnings("ignore")  
  
df['mvTA'] = 0  
df['mvWD'] = 0  
for i in np.arange(5,183):  
    df['mvTA'][i-1] = df[i-5:i]['Tashkent'].mean()  
    df['mvWD'][i-1] = df[i-5:i]['World'].mean()
```

#### III. Plotting moving average line charts

```
### Plotting
```

```
plt.style.use('ggplot')
plt.figure(figsize=(15,8))
plt.plot('year', 'mvTA', data = df, label = 'Tashkent', linewidth=3)
plt.plot('year', 'mvWD', data = df, label = 'World', linewidth=3)
plt.suptitle('Temperature in the World and Tashkent (Moving average 5 years)', fontsize=20)
plt.xlabel('Years', fontsize = 16)
plt.ylabel('Temperature', fontsize = 16)
plt.legend(loc=2, prop={'size': 15})
plt.xlim(df.year.min()+5, df.year.max())
plt.ylim(6, 14)
plt.show()
```



#### IV. Observation

1. Temperature in Tashkent is on average greater than the world temperature. On average temperature difference is about 1.5 degrees. However, during some years difference in temperature reached as high as 4 degrees. The difference in fluctuation is coming due to aggregate character of global temperature (it is average of all countries).
2. Fluctuations in temperature was quite high during the first half of XXs century both in the globe and Tashkent.
3. It looks like until 1980s temperature increase was quite slow. After 1980 global heating accelerated.
4. In general, temperature in Tashkent has similar upward trend over the observed period.