# Project 1

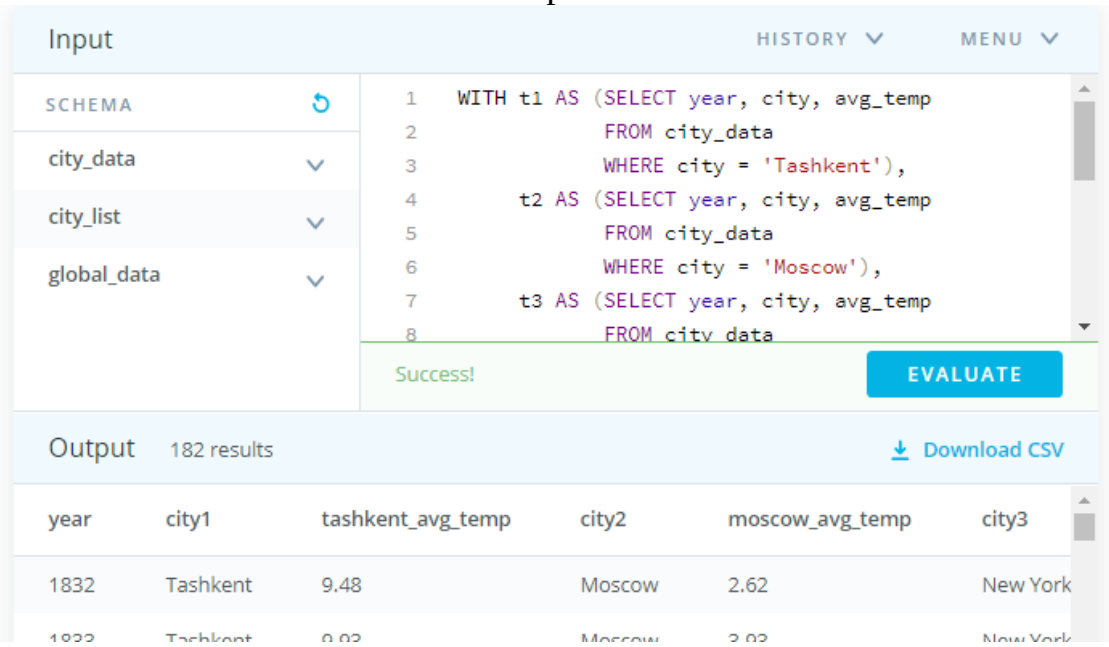
## Exploring Weather Trends

**Extracting data.**

Let's compare and analyze average temperatures among Tashkent (my home city), Moscow, New York and the world as a whole. For that we will use the following SQL codes for extracting the necessary data:

```
WITH t1 AS (SELECT year, city, avg_temp
                FROM city_data
               WHERE city = 'Tashkent'),
     t2 AS (SELECT year, city, avg_temp
                FROM city_data
                WHERE city = 'Moscow'),
     t3 AS (SELECT year, city, avg_temp
                FROM city_data
                WHERE city = 'New York')
SELECT t1.year, t1.city city1, t1.avg_temp tashkent_avg_temp, t2.city city2, t2.avg_temp moscow_avg_temp, t3.city city3, t3.avg_temp new_york_avg_temp, gd.avg_temp global_avg_temp
FROM t1
JOIN t2
ON t1.year = t2.year
JOIN t3
ON t1.year = t3.year
JOIN global_data gd
ON t1.year = gd.year
```

To avoid "nulls", I intentionally have chosen my home city Tashkent's data as the 1st table for joining the other two cities' data, expecting it has less complete yearly data than Moscow and New York for the whole period.



The code runs successfully and there is no null. And now we can download the CSV file.

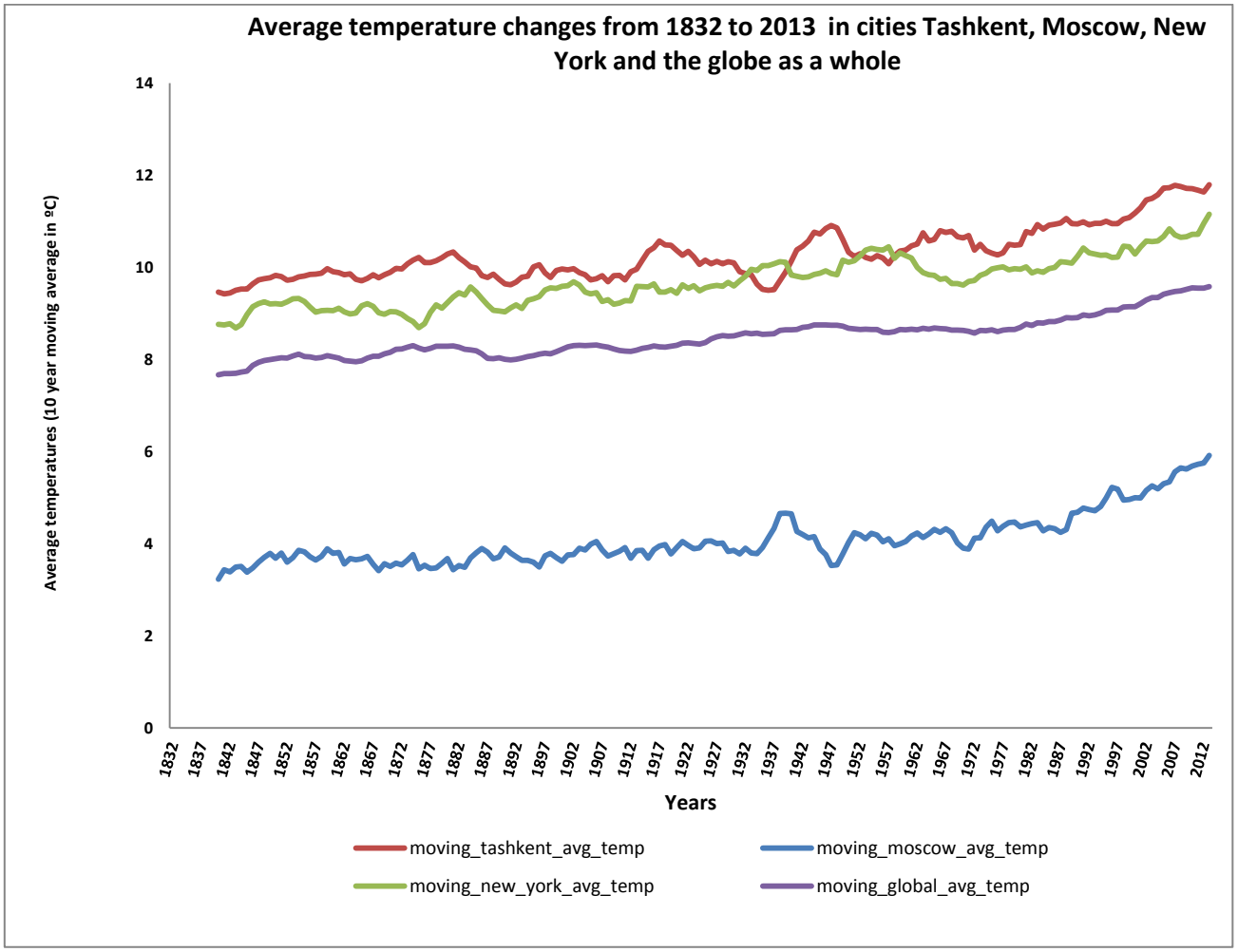
We will open the CSV file with MS Excel.

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | year | city1 | ashkent_avg_tem | moving_tashkent_avg_temp | city2 | noscow_avg_tem | moving_moscow_avg_temp | city3 | ew_york_avg_ten | moving_new_york_avg_temp | global_avg_temp | moving_global_avg_temp |
| 2 | 1832 | Tashkent | 9.48 | | Moscow | 2.62 | | New York | 9.15 | | 7.45 | |
| 3 | 1833 | Tashkent | 9.93 | | Moscow | 3.93 | | New York | 9.15 | | 8.01 | |
| 4 | 1834 | Tashkent | 9.95 | | Moscow | 3.86 | | New York | 9.32 | | 8.15 | |
| 5 | 1835 | Tashkent | 9.15 | | Moscow | 2.89 | | New York | 8.48 | | 7.39 | |
| 6 | 1836 | Tashkent | 9.65 | | Moscow | 4.03 | | New York | 7.51 | | 7.70 | |
| 7 | 1837 | Tashkent | 9.32 | | Moscow | 2.97 | | New York | 8.12 | | 7.38 | |
| 8 | 1838 | Tashkent | 9.02 | | Moscow | 2.85 | | New York | 8.73 | | 7.51 | |

Now we calculate the moving averages.

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| | year | city1 | tashkent_avg_temp | moving_tashkent_avg_temp | city2 | moscow_avg_temp | moving_moscow_avg_temp | city3 | ew_york_avg_ |
| | 1832 | Tashkent | 9.48 | | Moscow | 2.62 | | New York | 9.1 |
| | 1833 | Tashkent | 9.93 | | Moscow | 3.93 | | New York | 9.1 |
| | 1834 | Tashkent | 9.95 | | Moscow | 3.86 | | New York | 9.3 |
| | 1835 | Tashkent | 9.15 | | Moscow | 2.89 | | New York | 8.4 |
| | 1836 | Tashkent | 9.65 | | Moscow | 4.03 | | New York | 7.5 |
| | 1837 | Tashkent | 9.32 | | Moscow | 2.97 | | New York | 8.1 |
| | 1838 | Tashkent | 9.02 | | Moscow | 2.85 | | New York | 8.7 |
| | 1839 | Tashkent | 9.05 | | Moscow | 3.49 | | New York | 9.1 |
| | 1840 | Tashkent | 9.63 | =+СРЗНАЧ(C2:C10) | Moscow | 2.46 | 3.23 | New York | 9.2 |
| | 1841 | Tashkent | 9.13 | 9.43 | Moscow | 4.46 | 3.44 | New York | 9.0 |
| | 1842 | Tashkent | 10.10 | 9.44 | Moscow | 3.51 | 3.39 | New York | 9.4 |
| | 1843 | Tashkent | 10.51 | 9.51 | Moscow | 4.81 | 3.50 | New York | 8.4 |

Then we will visualize the data for further analysis and comparison using Excel tools. For this a line chart best suits since time is included in our data, which is continuous.



From this visualization, we can make four conclusions:

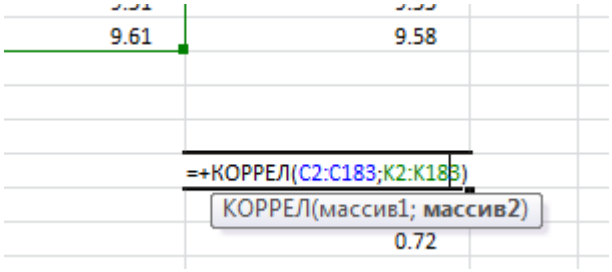
1. Average temperatures in Tashkent and New York have always been higher than the global average, whilst it has been lower in Moscow.

2. Advocating the concerns about the global warming, global temperatures is constantly rising after the beginning of the first industrial revolution (the beginning of the 19th century), which was about 8 ºC in the beginning and 9.3 ºC in 2013.

3. We can see a strong correlation among average temperatures in the three cities and the globe, which shows that the climate in the three cities has been following suit getting warmer and warmer despite some slight fluctuations.

4. We can even see acceleration in that temperature rising in the beginning of the third industrial revolution (in the beginning of the 1970s). This acceleration is even sharper in Moscow from the 1990s.

Indeed, the correlation of average temperatures between Tashkent and the globe, and between New York and the globe is equally 0.72 which is way strong. This means 1 ºC rise in global temperatures might result in 0.72 ºC temperature leap in Tashkent and New York. Or vice versa.




The correlation of average temperatures between Moscow and the globe is 0.6 which is less stronger.