Replacing NULL values with Average

SELECT year , city , country , COALESCE (avg_temp , 26.5308737864077670) FROM city_data WHERE country='India' AND city='Ahmadabad'

Output	218 results			⬇ Download CSV
1801	Ahmadabad	India	25.73	
1802	Ahmadabad	India	27.01	
1803	Ahmadabad	India	26.77	
1804	Ahmadabad	India	27.09	
1805	Ahmadabad	India	26.67	
1806	Ahmadabad	India	26.57	
1807	Ahmadabad	India	26.10	
1808	Ahmadabad	India	26.5308737864077670	
1809	Ahmadabad	India	26.5308737864077670	

Checking For Any Skipped Years[None Found]

WITH diff AS (SELECT year , CASE WHEN (LAG(year) OVER (ORDER BY year)) IS NULL THEN 1749 ELSE (LAG(year) OVER (ORDER BY year)) END AS lag FROM global_data ORDER BY year)

SELECT * FROM diff WHERE year - lag = 1

Output	266 results	⬇ Download CSV
year	**avg_temp**	**lag**
1750	8.72	1749
1751	7.98	1750
1752	5.78	1751
1753	8.39	1752
1754	8.47	1753
1755	8.36	1754
1756	8.85	1755
1757	9.02	1756

Finding Average Temperature[1796-2013]

SELECT AVG(avg_temp) FROM city_data WHERE country='India' AND city='Ahmadabad'

Output	1 results	⬇ Download CSV

avg
26.5308737864077670

Local Running Average Interval Yearly

WITH main AS (SELECT year , city , country , COALESCE (avg_temp , 26.5308737864077670) AS year_avg_temp FROM city_data WHERE country='India' AND city='Ahmadabad')

SELECT year , city , country , AVG (year_avg_temp) OVER (PARTITION BY (year) ORDER BY year) AS running_avg FROM main

Output	218 results		⬇ Download CSV

year	city	country	running_avg
1796	Ahmadabad	India	26.3500000000000000
1797	Ahmadabad	India	27.4500000000000000
1798	Ahmadabad	India	25.8200000000000000
1799	Ahmadabad	India	26.6200000000000000
1800	Ahmadabad	India	26.5600000000000000
1801	Ahmadabad	India	25.7300000000000000
1802	Ahmadabad	India	27.0100000000000000
1803	Ahmadabad	India	26.7700000000000000

GLOBAL DATA CSV DOWNLOAD

SELECT year , AVG (avg_temp) OVER (ORDER BY year) AS running_avg FROM global_data

Output	266 results	Download CSV

year	running_avg
1750	8.7200000000000000
1751	8.3500000000000000
1752	7.4933333333333333
1753	7.7175000000000000
1754	7.8680000000000000
1755	7.9500000000000000
1756	8.0785714285714286
1757	8.1962500000000000

LOCAL AHMEDABAD - INDIA DATA CSV DOWNLOAD

WITH main AS (SELECT year , city , country , COALESCE (avg_temp , 26.5308737864077670) AS year_avg_temp FROM city_data WHERE country='India' AND city='Ahmadabad')

SELECT year , AVG (year_avg_temp) OVER (PARTITION BY (year) ORDER BY year) AS running_avg FROM main

Output	218 results	Download CSV

year	running_avg
1796	26.3500000000000000
1797	27.4500000000000000
1798	25.8200000000000000
1799	26.6200000000000000
1800	26.5600000000000000
1801	25.7300000000000000
1802	27.0100000000000000
1803	26.7700000000000000

Upper and Lower Limits of Years in Global and Local Data

SELECT MAX(year) , MIN(year) FROM global_data

Output	1 results	⬇ Download CSV

max	min
2015	1750

SELECT MAX(year) , MIN(year) FROM city_data WHERE country='India' AND city='Ahmadabad'

Output	1 results	⬇ Download CSV

max	min
2013	1796

Global and Local Temperature moving average over 15 years plot

```python
In [8]: plt.plot(x, z, '-b', linewidth=1, markersize=0 , label = "global interval 15 year")
        plt.plot(xa, za, '-g', linewidth=1 , label = "(Ahmedabad - India) interval 15 years")
        plt.xlabel('Years')
        plt.ylabel('Temperature in Celsius')
        plt.title('Global Vs Local temperature [1750-2015]')
        plt.legend()
        plt.show()
```
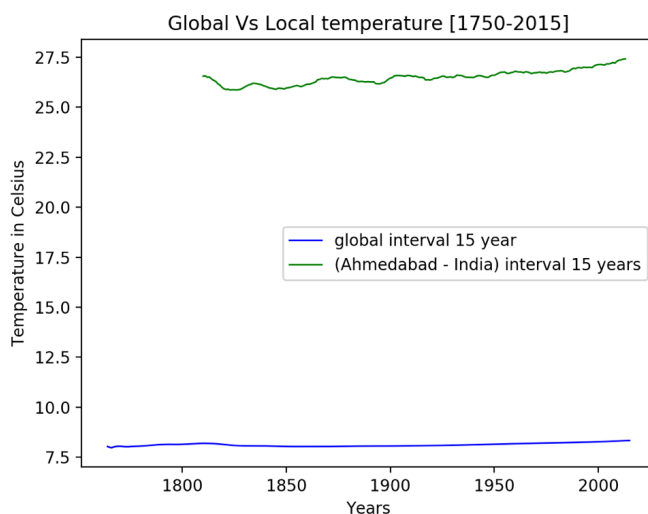
GLOBAL Dataset

```
In [1]: import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt
        from datetime import datetime
        %matplotlib notebook
```

```
In [2]: dataframe = pd.read_csv('global.csv')
        dataframe.head(10)
```

Out[2]:

	year	running_avg
0	1750	8.720000
1	1751	8.350000
2	1752	7.493333
3	1753	7.717500
4	1754	7.868000
5	1755	7.950000
6	1756	8.078571
7	1757	8.196250
8	1758	8.034444
9	1759	8.030000

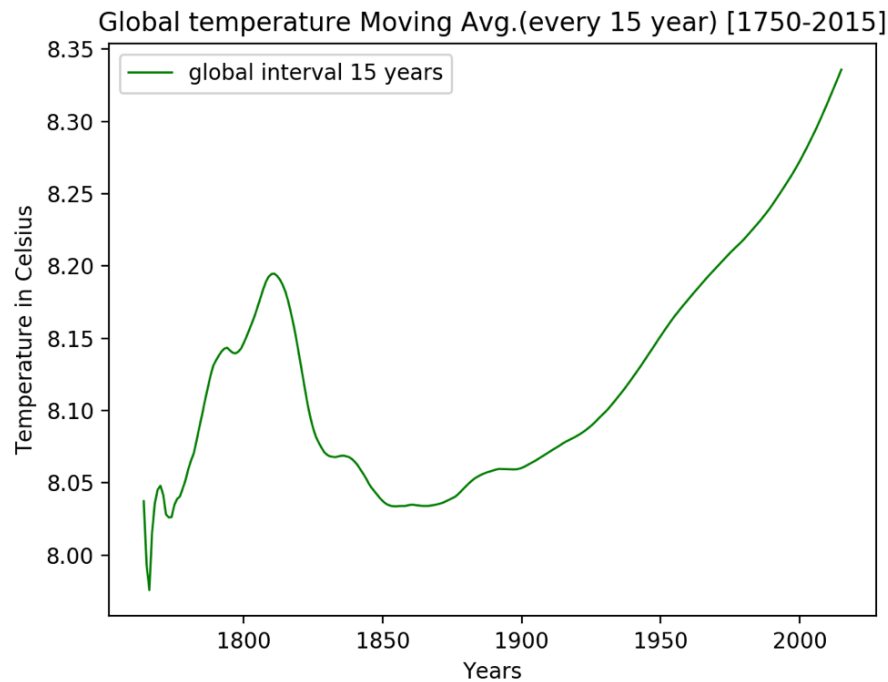# Running Average Plotted [GLOBAL]

```
In [13]: y = dataframe['running_avg']
         x = dataframe['year']
         dataframe['avg'] = dataframe.iloc[:,1].rolling(window=15).mean()
         z = dataframe['avg']

         plt.plot(x, y, '-g', linewidth=1, markersize=0 , label = "global interval 1 year")
         plt.xlabel('Years')
         plt.ylabel('Temperature in Celsius')
         plt.title('Global temperature Moving Avg.(every year) [1750-2015]')
         plt.legend()
         plt.show()
```
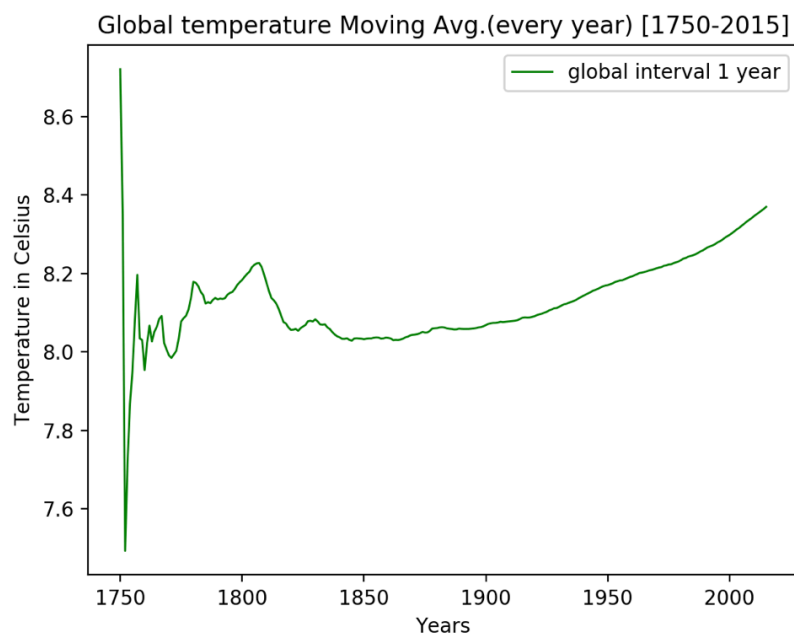
Moving Average Interval 15 years Plotted [Global]

```
In [15]: plt.plot(x, z, '-g', linewidth=1, markersize=0 , label = "global interval 15 years")
         plt.xlabel('Years')
         plt.ylabel('Temperature in Celsius')
         plt.title('Global temperature Moving Avg.(every 15 year) [1750-2015]')
         plt.legend()
         plt.show()
```


LOCAL [Ahmedabad - India] Dataset

```
In [6]: data = pd.read_csv('amd_ind.csv')
        data.head(10)
```

Out[6]:

	year	running_avg
0	1796	26.35
1	1797	27.45
2	1798	25.82
3	1799	26.62
4	1800	26.56
5	1801	25.73
6	1802	27.01
7	1803	26.77
8	1804	27.09
9	1805	26.67

Running Average Plotted [LOCAL Ahmedabad - India]

```
In [22]: ya = data['running_avg']
         xa = data['year']
         data['avg'] = data.iloc[:,1].rolling(window=15).mean()
         za = data['avg']

         plt.plot(xa, ya, '-g', linewidth=1, markersize=0 , label = "(Ahmedabad - India) interval 1 year")
         plt.xlabel('Years')
         plt.ylabel('Temperature in Celsius')
         plt.title('(Ahmedabad - India) temperature Moving Avg.(every year) [1796-2013]')
         plt.legend()
         plt.show()
```
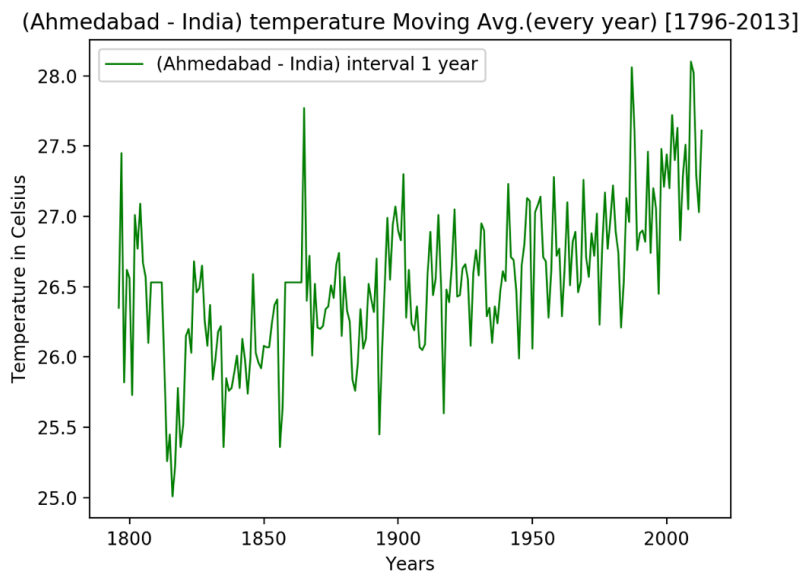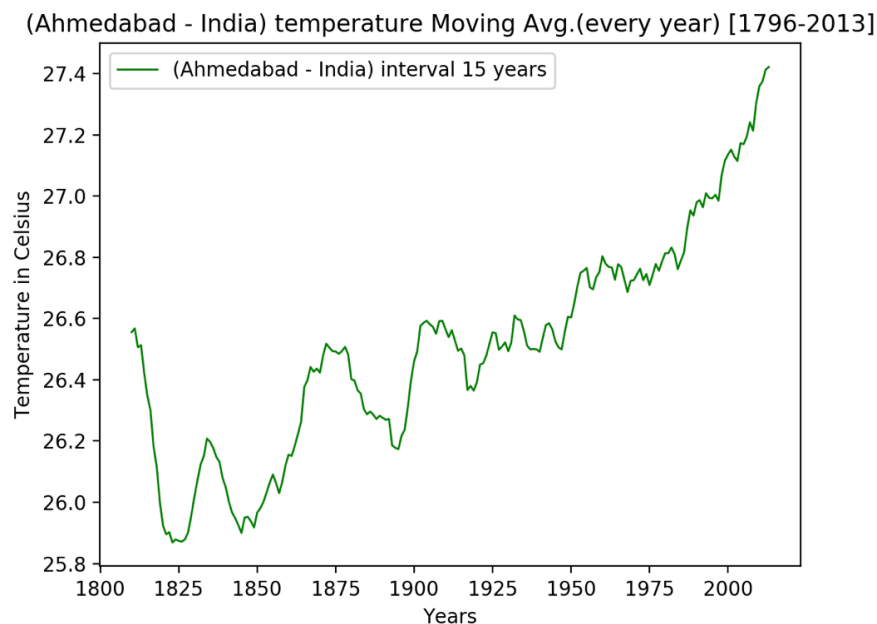

Moving Average Interval 15 years Plotted [LOCAL]

Type to enter text

```
In [23]: plt.plot(xa, za, '-g', linewidth=1 , label = "(Ahmedabad - India) interval 15 years")
         plt.xlabel('Years')
         plt.ylabel('Temperature in Celsius')
         plt.title('(Ahmedabad - India) temperature Moving Avg.(every year) [1796-2013]')
         plt.legend()
         plt.show()
```

Comparison Between Global and Local Temperature trends

Global Vs Local temperature [1750-2015]
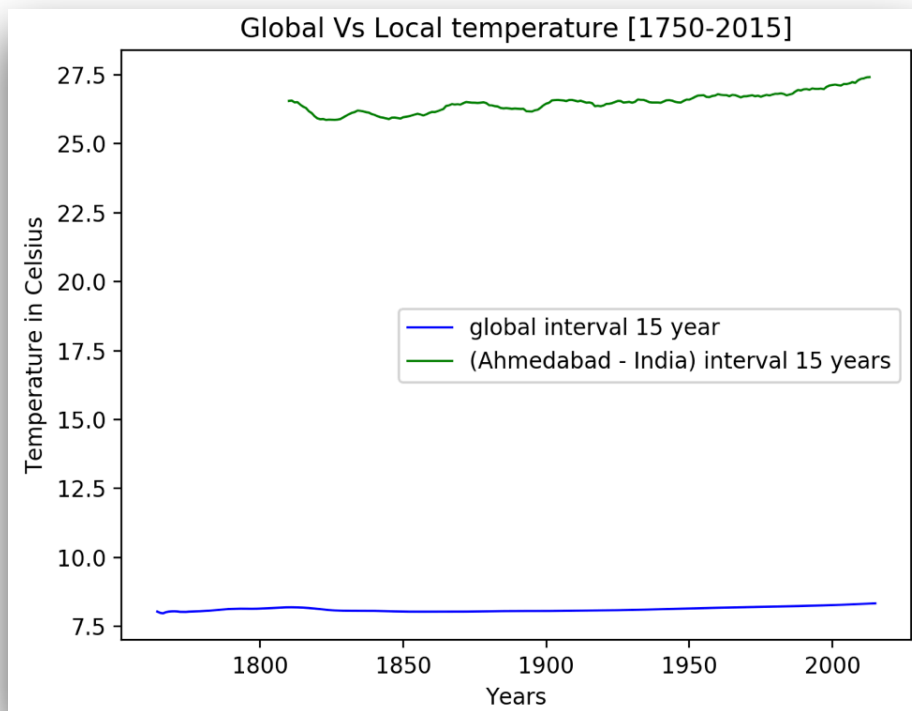
1 -> IS YOUR CITY HOTTER OR COOLER ON AVERAGE COMPARED TO THE GLOBAL AVERAGE? HAS THE DIFFERENCE BEEN CONSISTENT OVER TIME?

WITH c AS (SELECT year , avg_temp
        FROM city_data
        WHERE country='India' AND city='Ahmadabad')

SELECT c.year , AVG(c.avg_temp - g.avg_temp) OVER (ORDER BY c.year) AS running_diff
FROM c
JOIN global_data AS g
ON c.year = g.year

Output	218 results	⬇ Download CSV

year	running_diff
1796	18.0800000000000000
1797	18.5100000000000000
1798	18.0566666666666667
1799	18.0700000000000000
1800	18.0720000000000000
1801	17.9166666666666667
1802	17.9900000000000000
1803	18.0250000000000000

- The Difference between the Global temperature and temperature in my Locality has increased over time with the difference reaching almost 0.12 Celsius over a span of almost 200 years.
- My Locality is on an average 18.07 Celsius hotter than the Global temperate which was obtained from the graph below.

```
In [30]: ya = df1['running_diff']
         xa = df1['year']
         df1['avg'] = df1.iloc[:,1].rolling(window=15).mean()
         za = df1['avg']

         plt.plot(xa, za, '-g', linewidth=1, markersize=0 , label = "Moving diffrence Average")
         plt.xlabel('Years')
         plt.ylabel('Diffrence in Temperature in Celsius')
         plt.title('LOCAL — GLOBAL TREND')
         plt.legend()
         plt.show()
```


LOCAL - GLOBAL TREND
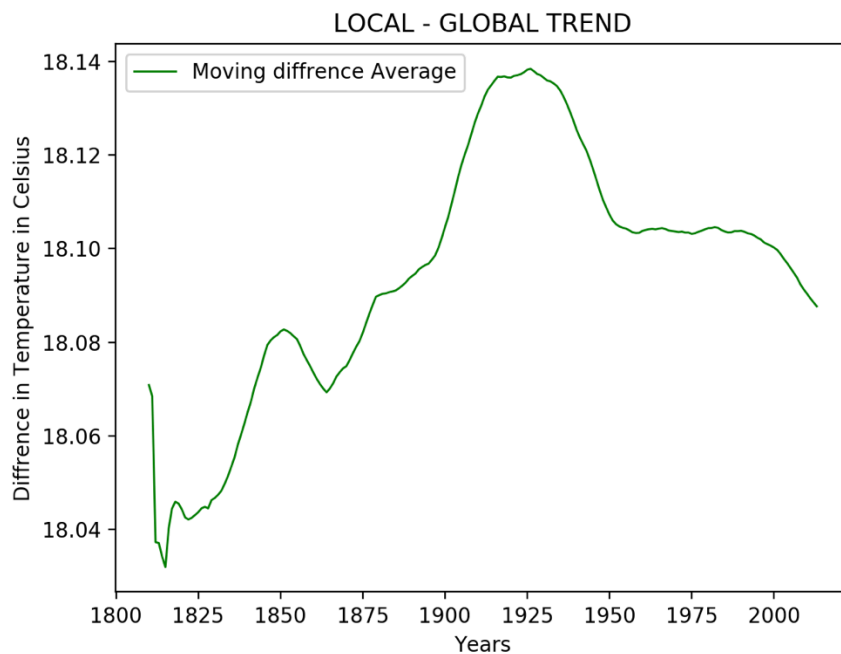
2 -> WHAT DOES THE OVERALL TREND LOOK LIKE? IS THE WORLD GETTING HOTTER OR COOLER? HAS THE TREND BEEN CONSISTENT OVER THE LAST FEW HUNDRED YEARS?

```
In [15]: plt.plot(x, z, '-g', linewidth=1, markersize=0 , label = "global interval 15 years")
         plt.xlabel('Years')
         plt.ylabel('Temperature in Celsius')
         plt.title('Global temperature Moving Avg.(every 15 year) [1750-2015]')
         plt.legend()
         plt.show()
```
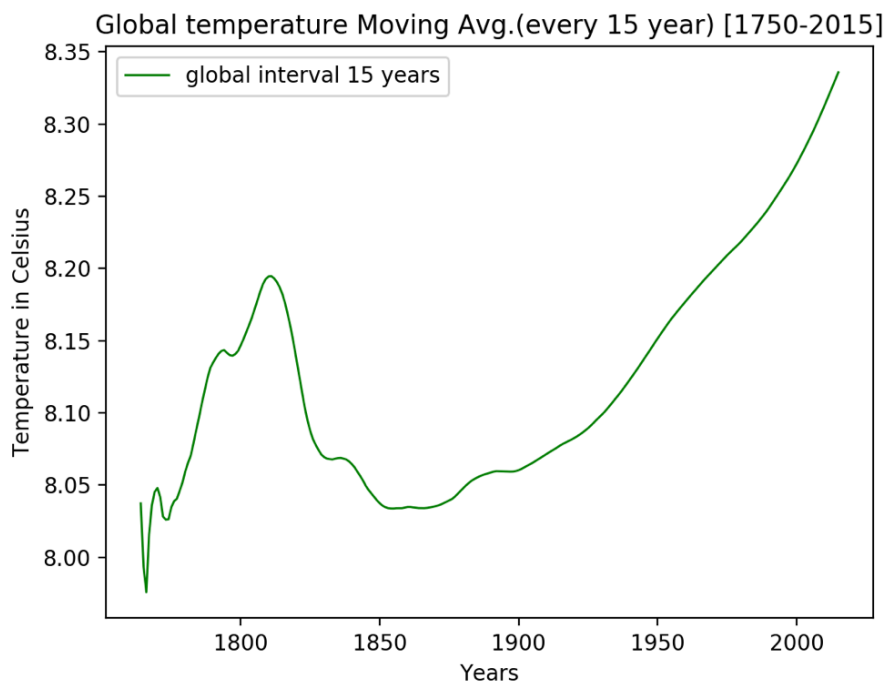
- The overall trend from the graph shows that the earth is getting hotter and for the past 100 years this trend has been consistent with the temperature rising exponentially.

3 -> HOW DO THE CHANGES IN YOUR CITY'S TEMPERATURES OVER TIME COMPARE TO THE CHANGES IN THE GLOBAL AVERAGE?

- Ahmedabad's [India] temperature has risen by 1.6 celsius in the past 200 years while the Global temperature has risen by 0.35 celsius in the same time period.
- This tells us that the rise in temperature is similar trend in both the cases but the local temperature has risen almost 4-5 times over the past 200 years which is a Red indication for us.

4 -> WHAT HAPPENS IF THIS TREND CONTINUES?

- If a similar trend is continued then the temperature will keep on increasing exponentially and will make living conditions miserable on earth we need to learn from this analysis the importance to maintain and control the temperature of our locality.

— ANALYSIS DONE BY SHAURYA SINHA
   USING - PYTHON & SQL