

Summary

In this project, I will analyze Riyadh, London and global temperature data and compare the temperature trends in Riyadh and London to the overall global temperature trends.

Steps of the Project:

- **Extracting the Data :**

The data were extracted from SQL tables, and then displayed in Excel sheet tables to make it easier to study and analyze, and then present it in a line chart later.

1. **Extracting data from city data table :**

```
SELECT year, avg_temp  
FROM city_data  
WHERE city='Riyadh'
```

2. **Extracting data from global data table :**

```
SELECT *  
FROM global_data
```

- **Calculating the moving averages for both sets of data:**

To make data smoother and easier to observe the long term trends, I have chosen the basis of 5 years to calculate the moving average for both sets of data. There were little changes in temperatures in both sets of data over the years, so using a higher number for the moving average meant a smoother data than usual, which I needed to avoid to make data readable.

To calculate the moving average, I calculated the average temperature for each 5 years until I covered all data in both sets. **¹Here are the tables ²below³:**

The temperature values are made whole numbers instead of decimals just to make data more logical and ¹appealing to temperature values common format.

I excluded the data for years between 1750 and 1842 because we don't have data for this period for Riyadh city. ²

The missing values from Riyadh table (year1846 and year 1847) were computed by calculating the averages of ³the previous years before using them to calculate the moving average.

	Riyadh City Average Temperature	
Year	Temperature	Moving AVG
1843	25	
1844	15	
1845	21	
1846	20	
1847	20	20
1848	25	20
1849	25	22
1850	24	23
1851	25	24
1852	25	25
1853	25	25
1854	25	25
1855	25	25
1856	25	25
1857	24	25
1858	25	25
1859	25	25
1860	25	25
1861	24	25
1862	24	25
1863	24	24
1864	25	24
1865	25	24
1866	25	25
1867	25	25
1868	25	25
1869	25	25
1870	25	25
1871	25	25
1872	25	25
1873	25	25
1874	25	25
1875	24	25
1876	25	25
1877	25	25
1878	26	25
1879	25	25
1880	25	25

1881	26	25
1882	25	25
1883	25	25
1884	25	25
1885	25	25
1886	25	25
1887	25	25
1888	25	25
1889	26	25
1890	25	25
1891	25	25
1892	25	25
1893	25	25
1894	25	25
1895	25	25
1896	25	25
1897	25	25
1898	25	25
1899	25	25
1900	25	25
1901	26	25
1902	25	25
1903	25	25
1904	25	25
1905	25	25
1906	25	25
1907	24	25
1908	25	25
1909	26	25
1910	25	25
1911	24	25
1912	25	25
1913	25	25
1914	25	25
1915	25	25
1916	25	25
1917	25	25
1918	25	25
1919	25	25
1920	25	25
1921	25	25

1922	25	25
1923	25	25
1924	26	25
1925	25	25
1926	25	25
1927	25	25
1928	25	25
1929	25	25
1930	25	25
1931	25	25
1932	25	25
1933	25	25
1934	25	25
1935	26	25
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1940	26	25
1941	25	25
1942	25	25
1943	25	25
1944	26	25
1945	25	25
1946	25	25
1947	26	25
1948	25	25
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1951	26	25
1952	26	25
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1955	25	26
1956	25	25
1957	25	25
1958	26	25
1959	24	25
1960	26	25
1961	25	25
1962	26	25

1963	26	25
1964	25	26
1965	26	25
1966	26	26
1967	25	25
1968	25	25
1969	26	26
1970	26	26
1971	25	25
1972	25	25
1973	26	25
1974	25	25
1975	25	25
1976	25	25
1977	26	25
1978	26	25
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1981	26	26
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1995	26	25
1996	26	26
1997	25	26
1998	27	26
1999	27	26
2000	27	26
2001	27	26
2002	26	27
2003	27	27

2004	26	26
2005	26	26
2006	26	26
2007	26	26
2008	26	26
2009	27	26
2010	27	27
2011	26	27
2012	27	27
2013	28	27

	Global Average Temperature between 1843-2013	
Year	Temperature	Moving AVG
1843	8	
1844	8	
1845	8	
1846	9	
1847	8	8
1848	8	8
1849	8	8
1850	8	8
1851	8	8
1852	8	8
1853	8	8
1854	8	8
1855	8	8
1856	8	8
1857	8	8
1858	8	8
1859	8	8
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1864	8	8
1865	8	8
1866	8	8
1867	8	8

1868	8	8
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1871	8	8
1872	8	8
1873	8	8
1874	8	8
1875	8	8
1876	8	8
1877	9	8
1878	9	8
1879	8	8
1880	8	8
1881	8	8
1882	8	8
1883	8	8
1884	8	8
1885	8	8
1886	8	8
1887	8	8
1888	8	8
1889	8	8
1890	8	8
1891	8	8
1892	8	8
1893	8	8
1894	8	8
1895	8	8
1896	8	8
1897	8	8
1898	8	8
1899	8	8
1900	9	8
1901	9	8
1902	8	8
1903	8	8
1904	8	8
1905	8	8
1906	8	8
1907	8	8
1908	8	8

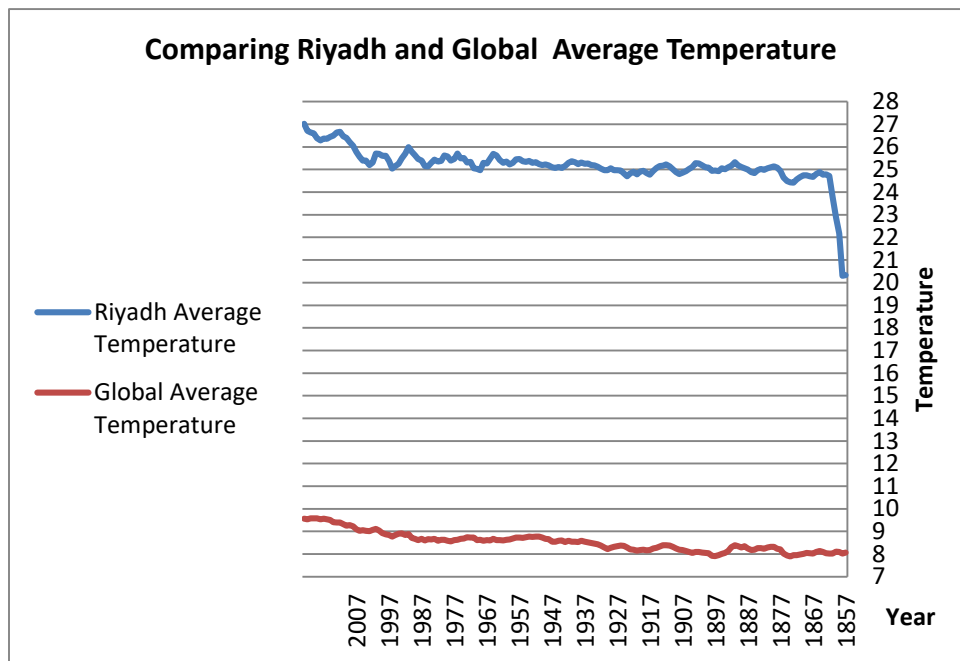
1909	8	8
1910	8	8
1911	8	8
1912	8	8
1913	8	8
1914	9	8
1915	9	8
1916	8	8
1917	8	8
1918	8	8
1919	8	8
1920	8	8
1921	9	8
1922	8	8
1923	8	8
1924	9	8
1925	9	8
1926	9	9
1927	9	9
1928	9	9
1929	8	9
1930	9	9
1931	9	9
1932	9	9
1933	8	9
1934	9	9
1935	9	9
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1942	9	9
1943	9	9
1944	9	9
1945	9	9
1946	9	9
1947	9	9
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1949	9	9

1950	8	9
1951	9	9
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1954	9	9
1955	9	9
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1962	9	9
1963	9	9
1964	8	9
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1996	9	9
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1998	10	9
1999	9	9
2000	9	9
2001	9	9
2002	10	9
2003	10	9
2004	9	9
2005	10	10
2006	10	10
2007	10	10
2008	9	10
2009	10	10
2010	10	10
2011	10	10
2012	10	10
2013	10	10

- **Presenting Data in a Line Chart:**

Riyadh and global temperatures are two sets of data that I need to compare over a long period of time. And since, these two sets of data have minor changes; a line chart is the best tool to visualize them in a meaningful way that helps me to observe the long term trends and movements for both sets, and then compare their results.



- Observations About the Data :**

1. From the line chart, I can see that Riyadh is hotter on average compared to the global temperature average. Riyadh city temperature data range was between 20 and 27 while the global temperature data range was between 8 and 10. This difference is shown in the line chart consistent over time.
2. From the line chart, I can see that changes in Riyadh city's average temperature are more than the changes in the global average temperature.
3. From the line chart, I can see that the world is getting hotter but at slow rate. This trend shown at the line chart graphs as a consistent trend over the last few hundred years.
4. From the line chart, I can see that the only similarity between Riyadh and global average temperature that they are both increasing at a small rate.

- **More Observations on the Data :**

To study the relationship between Riyadh temperature average and the global temperature average, I have used the correlation coefficient to see if they have a positive, negative or no relationship. After computing the correlation coefficient by using the CORREL function in the excel sheet and implement it on the two data sets of temperature averages, the correlation coefficient was found to be **0.68168**. That means that Riyadh temperature averages and the global temperature averages have a strong positive relationship; meaning if one of them increases the other will increase also.

After observing Riyadh temperature averages and the global temperature averages, I found that we can't estimate the average temperature in Riyadh based on the average global temperature directly. Actually, I compared these two sets of data to find that the average temperature in Riyadh is 3 times higher than the global average temperature, so we can estimate the average temperature in Riyadh by multiplying the global average temperature by 3.

- **Including London Data to the study :**

- **Extracting data from city data table :**

```
SELECT year, avg_temp
FROM city_data
WHERE city='London'
```

- **Calculating the moving average⁴ :**

The moving average for London temperatures was computed in the same way that was computed for Riyadh and the global world, and also for the same reasons.

	London City Average temperature between 1843 - 2013	
Year	Temperature	Moving AVG
1843	9	
1844	9	
1845	8	
1846	10	
1847	9	9
1848	10	9
1849	9	9
1850	9	10
1851	9	9
1852	10	9
1853	8	9
1854	9	9
1855	8	9
1856	9	9
1857	10	9
1858	9	9
1859	10	9
1860	8	9
1861	9	9
1862	10	9
1863	10	9
1864	9	9

I excluded the data for years between 1743 and 1842 to make it similar to the comparison to Riyadh and global ⁴ world average temperature.

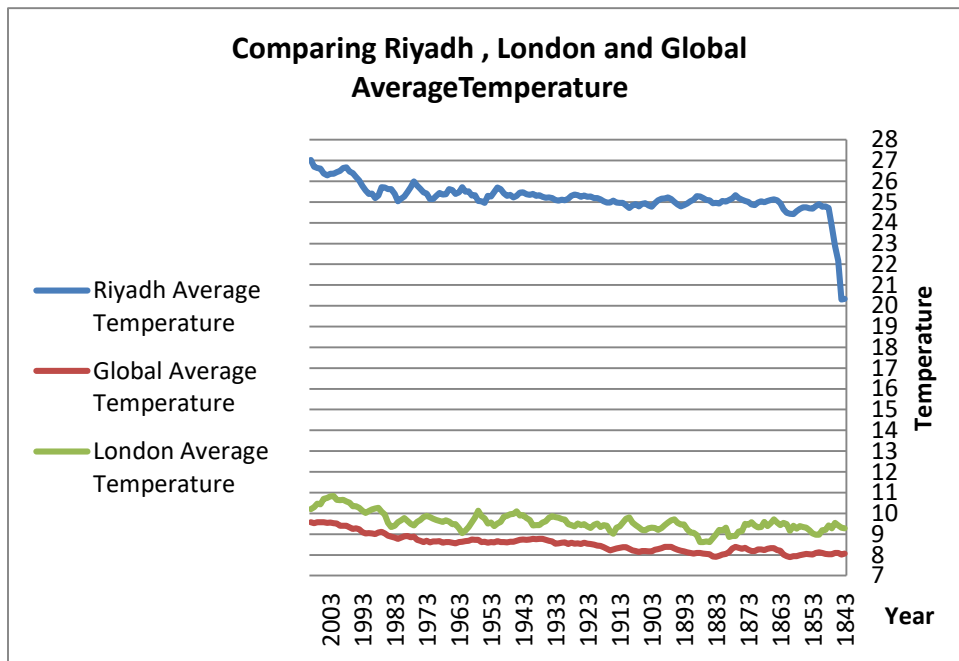
1865	10	9
1866	10	10
1867	9	9
1868	11	10
1869	9	10
1870	9	10
1871	9	9
1872	10	10
1873	9	9
1874	9	9
1875	9	9
1876	10	10
1877	9	9
1878	9	9
1879	8	9
1880	9	9
1881	9	9
1882	9	9
1883	9	9
1884	10	9
1885	9	9
1886	9	9
1887	8	9
1888	8	9
1889	9	9
1890	9	9
1891	9	9
1892	8	9
1893	10	9
1894	9	9
1895	9	9
1896	9	9
1897	10	9
1898	10	9
1899	10	10
1900	10	10
1901	9	10
1902	9	10
1903	9	9
1904	9	9
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1906	10	9
1907	9	9
1908	9	9
1909	9	9
1910	9	9
1911	10	9
1912	10	9
1913	10	10
1914	10	10
1915	9	10
1916	9	10
1917	9	9
1918	10	9
1919	8	9
1920	10	9
1921	11	9
1922	9	9
1923	9	9
1924	9	10
1925	9	9
1926	10	9
1927	9	9
1928	10	9
1929	9	9
1930	10	10
1931	9	9
1932	10	9
1933	10	9
1934	10	10
1935	10	10
1936	9	10
1937	10	10
1938	10	10
1939	10	10
1940	9	10
1941	9	10
1942	9	9
1943	10	9
1944	10	9
1945	10	10
1946	10	10

1947	10	10
1948	10	10
1949	11	10
1950	10	10
1951	10	10
1952	9	10
1953	10	10
1954	9	10
1955	9	10
1956	9	9
1957	10	10
1958	10	10
1959	11	10
1960	10	10
1961	10	10
1962	9	10
1963	8	10
1964	10	9
1965	9	9
1966	10	9
1967	10	9
1968	9	9
1969	9	9
1970	10	10
1971	10	10
1972	9	10
1973	10	10
1974	10	10
1975	10	10
1976	10	10
1977	10	10
1978	9	10
1979	9	10
1980	10	10
1981	9	9
1982	10	9
1983	10	10
1984	10	10
1985	9	10
1986	9	10
1987	9	9

1988	10	9
1989	11	10
1990	11	10
1991	10	10
1992	10	10
1993	10	10
1994	10	10
1995	11	10
1996	9	10
1997	11	10
1998	10	10
1999	11	10
2000	11	10
2001	10	11
2002	11	11
2003	11	11
2004	11	11
2005	11	11
2006	11	11
2007	11	11
2008	10	11
2009	11	11
2010	9	10
2011	11	10
2012	10	10
2013	10	10

- **Presenting London in a Line Chart with the other lines:**



- **Observations About the Date :**

5. From the line chart, I can see that Riyadh is hotter on average compared to London and the global temperature averages. Riyadh city temperature data range is between °20 and °27 while the global temperature data range is between °8 and °10, and London temperature data range is between °9 and °11. This difference is shown in the line chart consistent over time.
6. From the line chart, I can notice that London temperature is decreasing after 2003.
7. From the line chart, I can see that London temperature average range is almost the same as the global temperature average range.

- **More Observations on the Data :**

To study the relationship between London temperature averages and the global temperature averages, I have used the correlation coefficient to see if they have a positive, negative or no relationship. After computing the correlation coefficient by using the CORREL

function in the excel sheet and implement it on the two data sets of temperature averages, the correlation coefficient was found to be 0.841855. . That means that London temperature averages and the global temperature averages have a high strong positive relationship; meaning if one of them increases the other will increase also.

After observing London temperature averages and the global temperature averages, I found that we can estimate the average temperature in London based on the global average temperature because their values are so close from each other.

References:

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