Project: Exploring Weather Trends

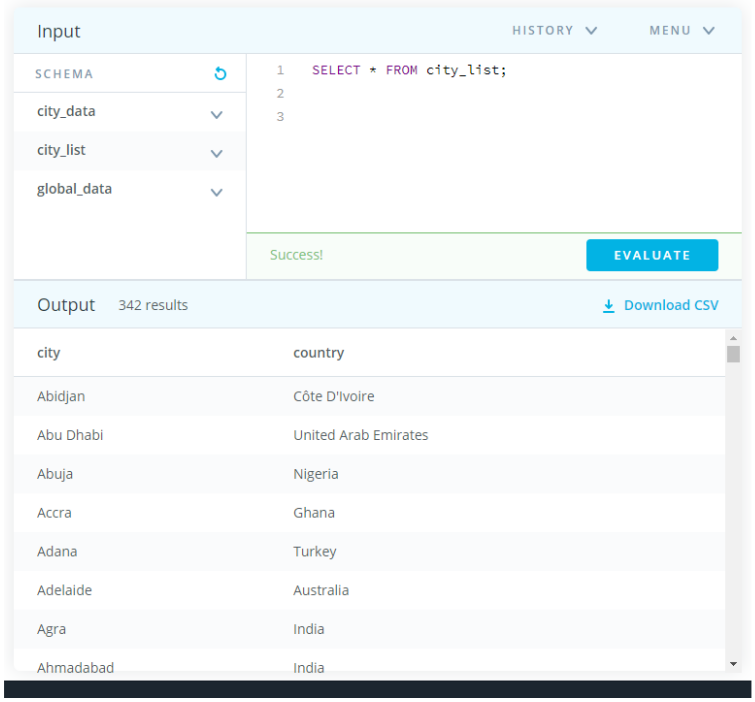
Name: Jiawei He

The Steps:

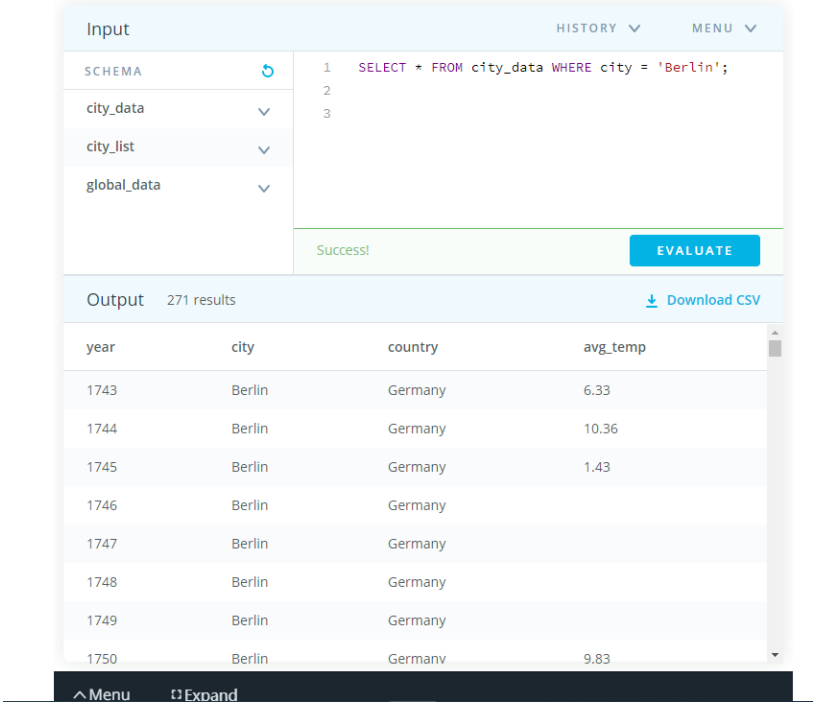
1. Extract the data:

a. SELECT * FROM city_list;

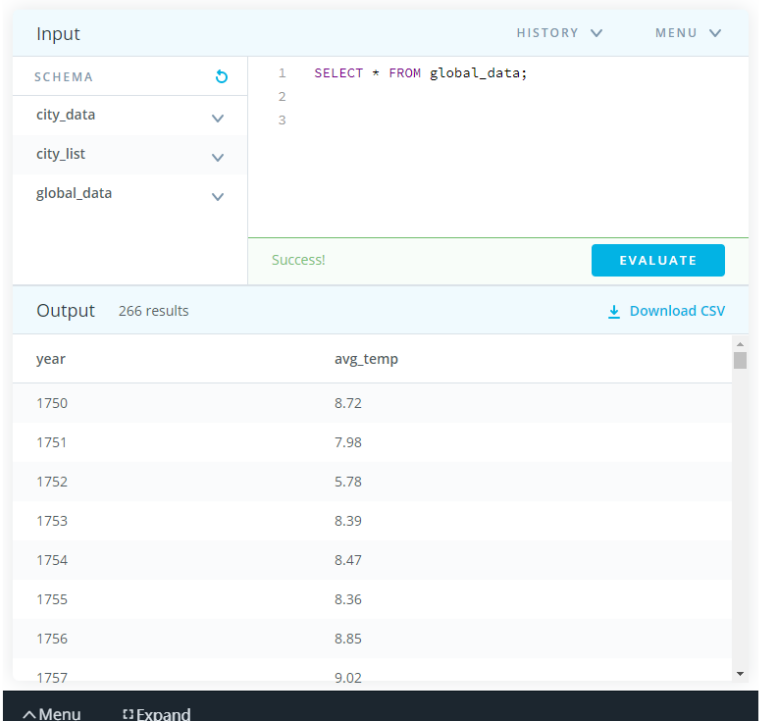
- global_data - This contains the average global temperatures by year (°C).



b. SELECT * FROM city_data WHERE city = 'Berlin';



c. SELECT * FROM global_data;



2. Export all three results to CSV.

3. Open up the CSV files with MS Excel.

4. Combine the Global data and Berlin (Germany) data in one sheet.

5. Calculate moving averages

a. Calculate the 10-year moving average temperature of global in column “10-Year_MA_global” with method “Moving Average” of the “Data Analysis” tool in Excel (=AVERAGE(B2:B11)) .

b. Calculate the 10-year moving average temperature of Berlin in column “10-Year_MA_Berlin” with method “Moving Average” of the “Data Analysis” tool in Excel (=AVERAGE(C2:C11)) .

6. Create the line chart:

a. Insert 2D line chart

b. Add the MA_global and MA_Berlin data Series to the chart.

c. Modify the horizontal axis label to indicate the years.

d. Add legend, chart title and axis title.

7. Analyze the chart by making the required observations.

year	avg_temp	Berlin_avg_temp	10-Year_MA_global	10-Year_MA_Berlin
1750	8.72	9.83		
1751	7.98	9.75		
1752	5.78	4.84		
1753	8.39	8.72		
1754	8.47	8.49		
1755	8.36	8.26		
1756	8.85	9.62		
1757	9.02	9.15		
1758	6.74	8.25		
1759	7.99	9.04	8.03	8.595
1760	7.19	8.99	7.88	8.511
1761	8.77	9.47	7.96	8.483
1762	8.61	8.53	8.24	8.852
1763	7.5	8.62	8.15	8.842
1764	8.4	8.91	8.14	8.884
1765	8.25	8.54	8.13	8.912
1766	8.41	8.87	8.09	8.837
1767	8.22	8.14	8.01	8.736
1768	6.78	8.03	8.01	8.714
1769	7.69	8.46	7.98	8.656
1770	7.69	8.5	8.03	8.607
1771	7.85	7.45	7.94	8.405
1772	8.19	9.13	7.9	8.465
1773	8.22	9.52	7.97	8.555
1774	8.77	8.46	8.01	8.51
1775	9.18	10.1	8.1	8.666
1776	8.3	8.36	8.09	8.615
1777	8.26	8.29	8.09	8.63
1778	8.54	9.43	8.27	8.77
1779	8.98	10.47	8.4	8.971
1780	9.43	8.78	8.57	8.999
1781	8.1	9.98	8.6	9.252
1782	7.9	8.61	8.57	9.2
1783	7.68	9.76	8.51	9.224
1784	7.86	7.67	8.42	9.145
1785	7.36	7.42	8.24	8.877
1786	8.26	7.68	8.24	8.809
1787	8.03	9.27	8.21	8.907
1788	8.45	8.33	8.21	8.797
1789	8.33	8.99	8.14	8.649
1790	7.98	9.09	8	8.68
1791	8.23	9.55	8.01	8.637
1792	8.09	8.9	8.03	8.666
1793	8.23	9.18	8.08	8.608
1794	8.53	10.02	8.15	8.843
1795	8.35	8.87	8.25	8.988
1796	8.27	9.01	8.25	9.121
1797	8.51	10.07	8.3	9.201
1798	8.67	9.33	8.32	9.301

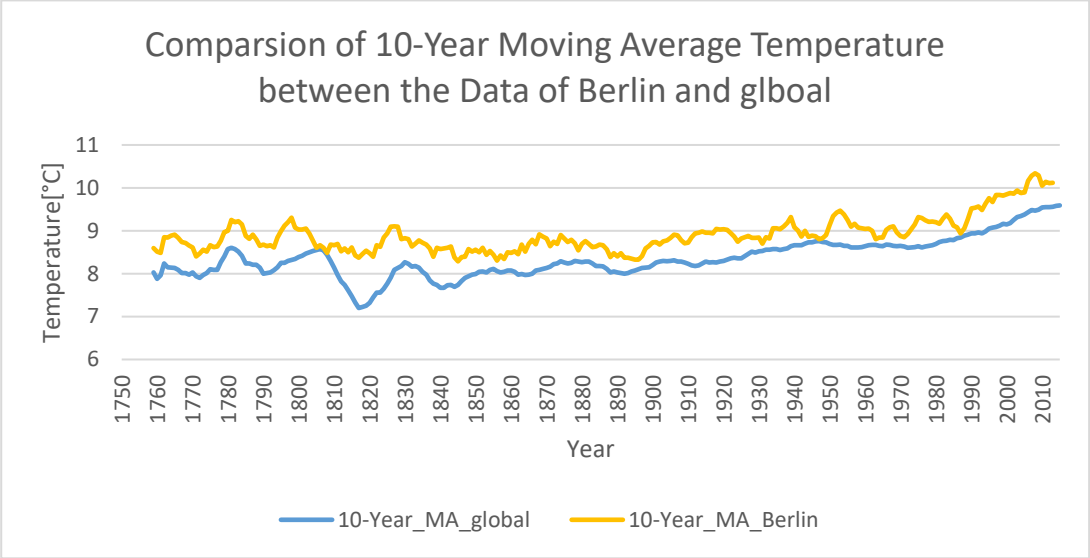
1799	8.51	6.72	8.34	9.074
1800	8.48	8.6	8.39	9.025
1801	8.59	9.61	8.42	9.031
1802	8.58	9.08	8.47	9.049
1803	8.5	8.02	8.5	8.933
1804	8.84	8.36	8.53	8.767
1805	8.56	7.2	8.55	8.6
1806	8.43	9.67	8.57	8.666
1807	8.28	9.42	8.54	8.601
1808	7.63	8.15	8.44	8.483
1809	7.08	8.66	8.3	8.677
1810	6.92	8.46	8.14	8.663
1811	6.86	9.93	7.97	8.695
1812	7.05	7.35	7.82	8.522
1813	7.74	8.66	7.74	8.586
1814	7.59	7.46	7.61	8.496
1815	7.24	8.38	7.48	8.614
1816	6.94	7.75	7.33	8.422
1817	6.98	8.92	7.2	8.372
1818	7.83	9	7.22	8.457
1819	7.37	9.43	7.25	8.534
1820	7.62	7.86	7.32	8.474
1821	8.09	9.15	7.45	8.396
1822	8.19	10.05	7.56	8.666
1823	7.72	8.26	7.56	8.626
1824	8.55	9.61	7.65	8.841
1825	8.39	9.32	7.77	8.935
1826	8.36	9.35	7.91	9.095
1827	8.81	8.99	8.09	9.102
1828	8.17	8.94	8.13	9.096
1829	7.94	6.52	8.18	8.805
1830	8.52	8.08	8.27	8.827
1831	7.64	8.93	8.23	8.805
1832	7.45	8.34	8.16	8.634
1833	8.01	8.89	8.18	8.697
1834	8.15	10.4	8.14	8.776
1835	7.39	8.81	8.04	8.725
1836	7.7	8.88	7.98	8.678
1837	7.38	8.12	7.84	8.591
1838	7.51	6.98	7.77	8.395
1839	7.63	8.63	7.74	8.606
1840	7.8	7.74	7.67	8.572
1841	7.69	9.06	7.67	8.585
1842	8.02	8.51	7.73	8.602
1843	8.17	9.18	7.74	8.631
1844	7.65	7.85	7.69	8.376
1845	7.85	7.92	7.74	8.287
1846	8.55	9.84	7.83	8.383
1847	8.09	8.24	7.9	8.395
1848	7.98	8.75	7.94	8.572

1849	7.98	8.03	7.98	8.512
1850	7.9	8.2	7.99	8.558
1851	8.18	8.5	8.04	8.502
1852	8.1	9.54	8.05	8.605
1853	8.04	7.55	8.03	8.442
1854	8.21	8.69	8.09	8.526
1855	8.11	7.07	8.11	8.441
1856	8	8.5	8.06	8.307
1857	7.76	9.39	8.03	8.422
1858	8.1	7.97	8.04	8.344
1859	8.25	9.6	8.07	8.501
1860	7.96	8	8.07	8.481
1861	7.85	8.87	8.04	8.518
1862	7.56	8.91	7.98	8.455
1863	8.11	9.81	7.99	8.681
1864	7.98	6.99	7.97	8.511
1865	8.18	8.88	7.98	8.692
1866	8.29	9.44	8	8.786
1867	8.44	8.41	8.07	8.688
1868	8.25	10.24	8.09	8.915
1869	8.43	9.06	8.11	8.861
1870	8.2	7.57	8.13	8.818
1871	8.12	7.08	8.16	8.639
1872	8.19	9.97	8.22	8.745
1873	8.35	9.27	8.24	8.691
1874	8.43	9.08	8.29	8.9
1875	7.86	8.04	8.26	8.816
1876	8.08	8.64	8.24	8.736
1877	8.54	8.95	8.25	8.79
1878	8.83	9.38	8.3	8.704
1879	8.17	7.46	8.28	8.544
1880	8.12	9.08	8.27	8.695
1881	8.27	7.75	8.28	8.762
1882	8.13	9.28	8.28	8.693
1883	7.98	8.54	8.24	8.62
1884	7.77	9.2	8.18	8.632
1885	7.92	8.47	8.18	8.675
1886	7.95	8.55	8.17	8.666
1887	7.91	7.93	8.11	8.564
1888	8.09	7.61	8.03	8.387
1889	8.32	8.34	8.05	8.475
1890	7.97	8.35	8.03	8.402
1891	8.02	8.48	8.01	8.475
1892	8.07	8.28	8	8.375
1893	8.06	8.5	8.01	8.371
1894	8.16	8.96	8.05	8.347
1895	8.15	8.28	8.07	8.328
1896	8.21	8.57	8.1	8.33
1897	8.29	8.69	8.13	8.406
1898	8.18	9.42	8.14	8.587

1899	8.4	8.96	8.15	8.649
1900	8.5	9.16	8.2	8.73
1901	8.54	8.58	8.26	8.74
1902	8.3	7.63	8.28	8.675
1903	8.22	9.28	8.3	8.753
1904	8.09	9.15	8.29	8.772
1905	8.23	8.9	8.3	8.834
1906	8.38	9.31	8.31	8.908
1907	7.95	8.52	8.28	8.891
1908	8.19	8.35	8.28	8.784
1909	8.18	8.16	8.26	8.704
1910	8.22	9.33	8.23	8.721
1911	8.18	9.89	8.19	8.852
1912	8.17	8.49	8.18	8.938
1913	8.3	9.41	8.19	8.951
1914	8.59	9.5	8.24	8.986
1915	8.59	8.56	8.28	8.952
1916	8.23	9.3	8.26	8.951
1917	8.02	8.39	8.27	8.938
1918	8.13	9.42	8.26	9.045
1919	8.38	8	8.28	9.029
1920	8.36	9.37	8.3	9.033
1921	8.57	9.78	8.33	9.022
1922	8.41	7.76	8.36	8.949
1923	8.42	8.58	8.37	8.866
1924	8.51	8.3	8.36	8.746
1925	8.53	9.32	8.36	8.822
1926	8.73	9.57	8.41	8.849
1927	8.52	8.72	8.46	8.882
1928	8.63	8.92	8.51	8.832
1929	8.24	7.99	8.49	8.831
1930	8.63	9.48	8.52	8.842
1931	8.72	8.35	8.53	8.699
1932	8.71	9.23	8.56	8.846
1933	8.34	8.32	8.56	8.82
1934	8.63	10.69	8.57	9.059
1935	8.52	9.34	8.57	9.061
1936	8.55	9.3	8.55	9.034
1937	8.7	9.41	8.57	9.103
1938	8.86	9.77	8.59	9.188
1939	8.76	9.32	8.64	9.321
1940	8.76	7.04	8.66	9.077
1941	8.77	7.62	8.66	9.004
1942	8.73	7.8	8.66	8.861
1943	8.76	9.67	8.7	8.996
1944	8.85	9.31	8.73	8.858
1945	8.58	9.64	8.73	8.888
1946	8.68	9.12	8.75	8.87
1947	8.8	8.79	8.76	8.808
1948	8.75	9.96	8.74	8.827

1949	8.59	10.04	8.73	8.899
1950	8.37	9.37	8.69	9.132
1951	8.63	9.72	8.67	9.342
1952	8.64	8.61	8.67	9.423
1953	8.87	10.13	8.68	9.469
1954	8.56	8.41	8.65	9.379
1955	8.63	8.36	8.65	9.251
1956	8.28	7.57	8.61	9.096
1957	8.73	9.46	8.61	9.163
1958	8.77	9.05	8.61	9.072
1959	8.73	9.88	8.62	9.056
1960	8.58	9.22	8.64	9.041
1961	8.8	9.81	8.66	9.05
1962	8.75	8.13	8.67	9.002
1963	8.86	8.12	8.67	8.801
1964	8.41	8.84	8.65	8.844
1965	8.53	8.33	8.64	8.841
1966	8.6	9.34	8.68	9.018
1967	8.7	10.08	8.67	9.08
1968	8.52	9.28	8.65	9.103
1969	8.6	8.43	8.64	8.958
1970	8.7	8.43	8.65	8.879
1971	8.6	9.54	8.63	8.852
1972	8.5	8.88	8.6	8.927
1973	8.95	9.24	8.61	9.039
1974	8.47	9.89	8.62	9.144
1975	8.74	10.08	8.64	9.319
1976	8.35	9.15	8.61	9.3
1977	8.85	9.54	8.63	9.246
1978	8.69	8.86	8.65	9.204
1979	8.73	8.53	8.66	9.214
1980	8.98	8.26	8.69	9.197
1981	9.17	9.18	8.74	9.161
1982	8.64	10.08	8.76	9.281
1983	9.03	10.21	8.77	9.378
1984	8.69	8.94	8.79	9.283
1985	8.66	8.46	8.78	9.121
1986	8.83	8.78	8.83	9.084
1987	8.99	8.09	8.84	8.939
1988	9.2	10.02	8.89	9.055
1989	8.92	10.72	8.91	9.274
1990	9.23	10.71	8.94	9.519
1991	9.18	9.36	8.94	9.537
1992	8.84	10.38	8.96	9.567
1993	8.87	9.34	8.94	9.48
1994	9.04	10.43	8.98	9.629
1995	9.35	9.75	9.05	9.758
1996	9.04	7.88	9.07	9.668
1997	9.2	9.73	9.09	9.832
1998	9.52	10.05	9.12	9.835

1999	9.29	10.58	9.16	9.821
2000	9.2	10.96	9.15	9.846
2001	9.41	9.69	9.18	9.879
2002	9.57	10.26	9.25	9.867
2003	9.53	10.07	9.32	9.94
2004	9.32	9.82	9.34	9.879
2005	9.7	9.92	9.38	9.896
2006	9.53	10.55	9.43	10.163
2007	9.73	10.88	9.48	10.278
2008	9.43	10.66	9.47	10.339
2009	9.51	10.06	9.49	10.287
2010	9.7	8.61	9.54	10.052
2011	9.52	10.56	9.55	10.139
2012	9.51	9.96	9.55	10.109
2013	9.61	10.12	9.56	10.114
2014	9.57		9.58	
2015	9.83		9.59	



Observation:

1. As can be seen from the chart above, the average temperature in Berlin is consistently higher than the global average.
2. It can also be seen that from 1800 to 1820 the average global and Berlin temperatures decreased, especially the average global temperature dropped significantly.
3. From 1840 to about 2010 the average temperature (global and Berlin) was steadily increasing.
4. After 1990, average temperatures (global and Berlin) increased substantially and it can be predicted that temperatures may continue to increase significantly thereafter.