UDACITY

# PROJECT 1

# EXPLORE WEATHER TRENDS

**June 8th,2020**

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## OVERVIEW:

**I**n this project I have analyzed Montreal City's and global temperature data and have compared the temperature trends both of the data with some interesting findings.

## INSTRUCTIONS:

- **Extract data:** Extract data from the csv file.
- **Open CSV:** Tool used Microsoft Excel 2020.
- **Create Line Graph:** To compare Montreal city's average temperature with the global average temperature.
- **List Observations:** List some insightful findings (Similarities and differences) between the global average and Montreal city's average.

## OBJECTIVES:

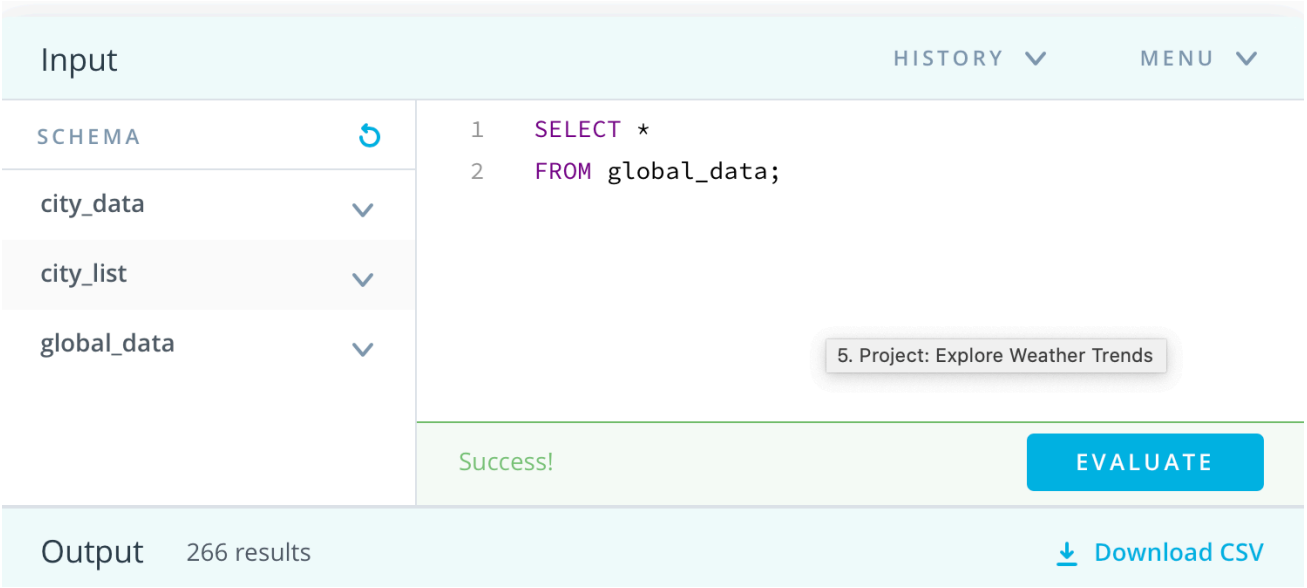
1. Data extraction from SQL and export the findings to CSV file.
2. Make extracted data readable and visualize via graph/chart.
3. List the observations on the data.

## TOOLS USED:

1. **SQL** – Used Udacity's workspace to write queries on the database.
2. **Microsoft Excel** – Used Microsoft excel to find 10 Year moving average of both Montreal's and Global average temperature.
3. **Line Graph**- Used Microsoft excel Line chart option to create and Line graph.

## OUTLINE:

- **Step 1:** Extract Global Data



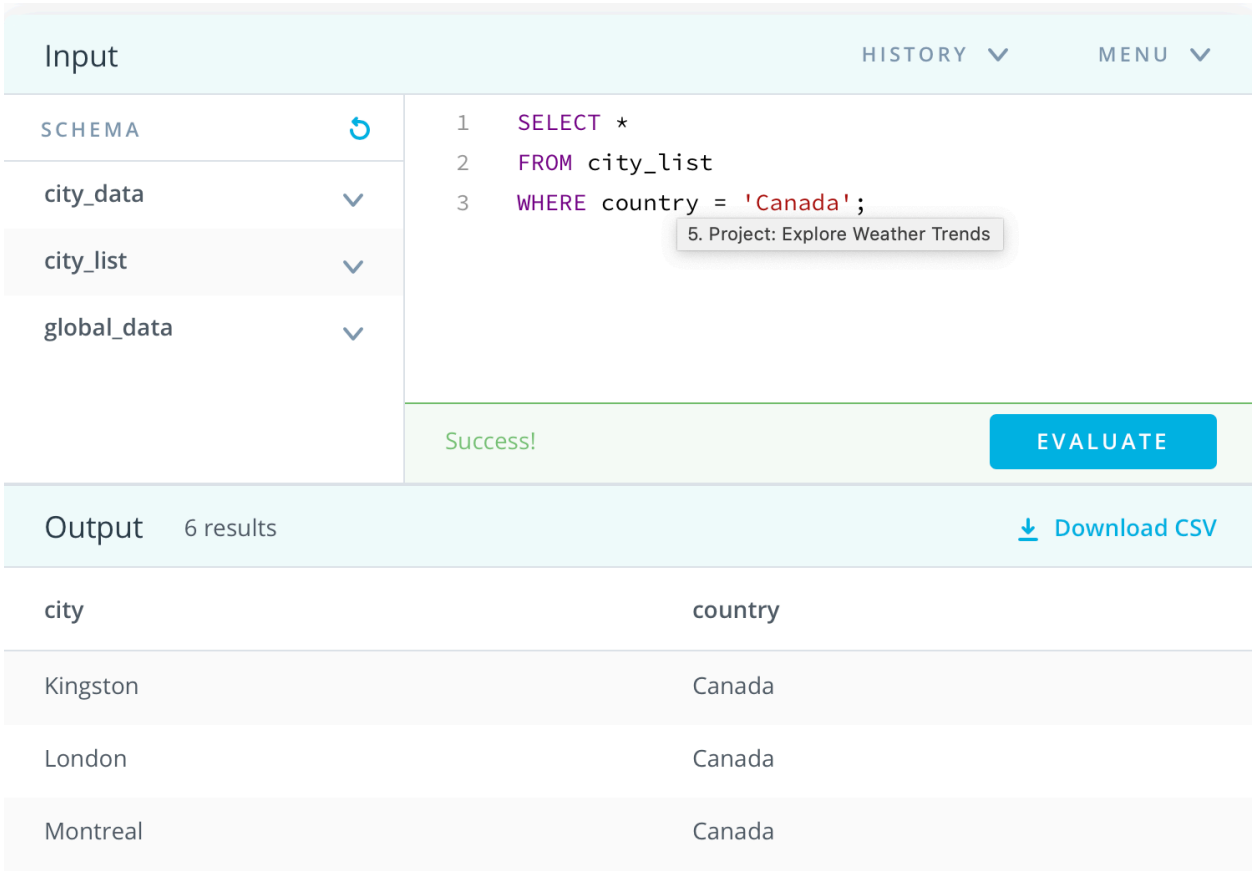
- Use Udacity's Workspace or any SQL compiler to write queries and extract data to a CSV file and Download to Local machine.

**Query:**

```
SELECT *

FROM global_data;
```

- **Step 2:** To check available cities in 'Canada'



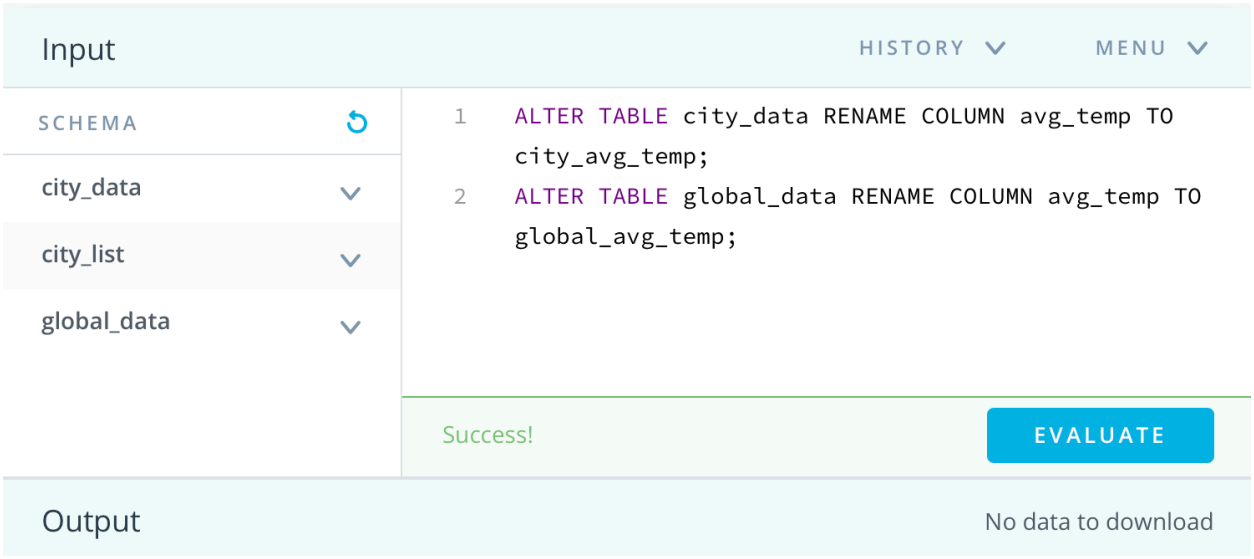
- Use Udacity's Workspace or any SQL compiler to write queries and extract data to a CSV file and Download to Local machine.

  **Query:**

```
SELECT *
FROM city_list
WHERE country = 'Canada';
```

The nearest Big city to my geo location is Montreal. So, from this point only Montreal city's data will be considered to compare.

- **Step 3:** Change the similar column name in tables.



Now as the City is Montreal, which is the nearest Big city, we will alter the similar table names in both tables. We will change avg_temp in both city_data and global_data to their respected names.

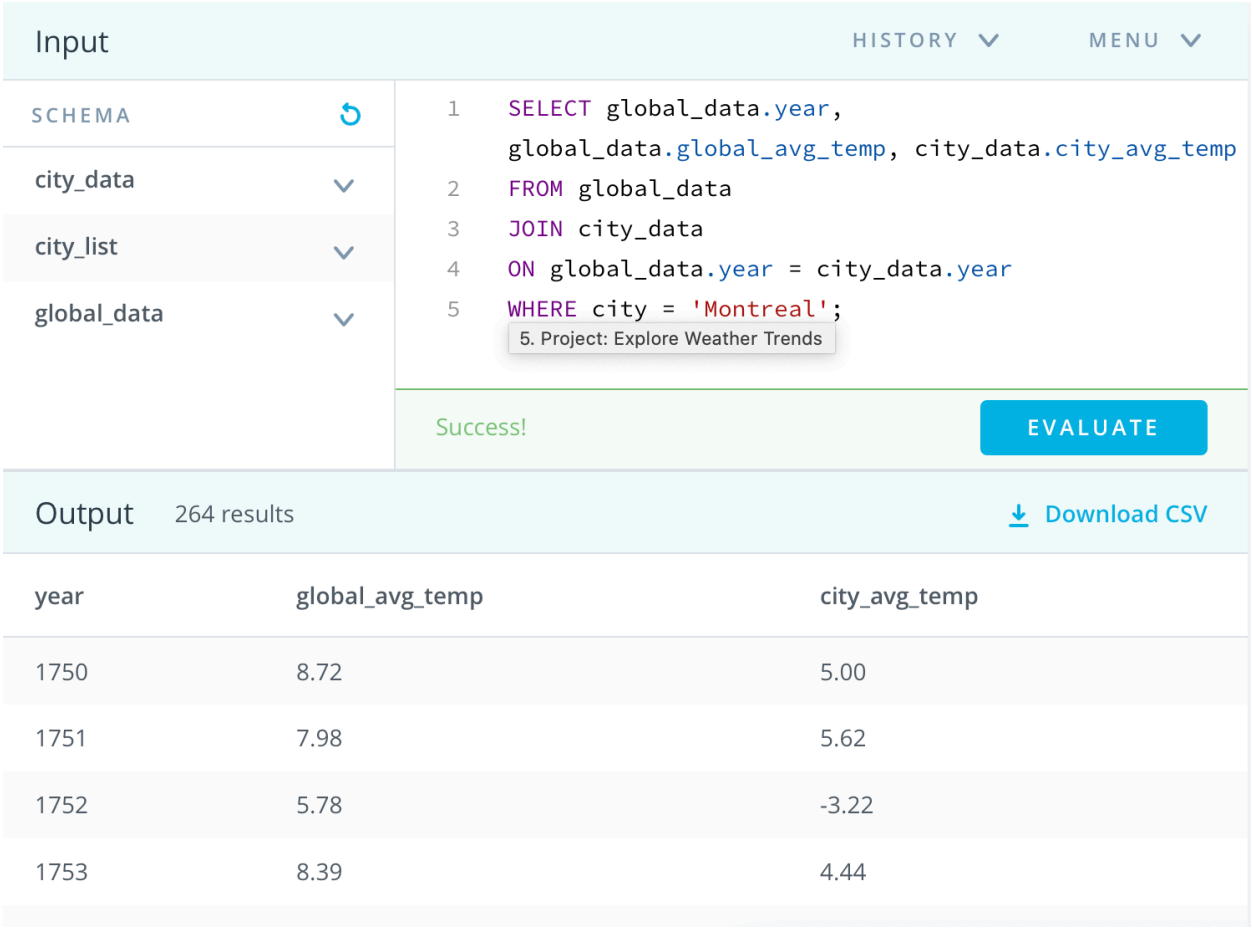
**Query:**

```
ALTER TABLE city_data RENAME COLUMN avg_temp TO city_avg_temp;

ALTER TABLE global_data RENAME COLUMN avg_temp TO global_avg_temp;
```

*Continue to next page.

- **Step 4:** Join both tables to obtain relevant data.




After extract data from query below, Download the data or export the data to CSV file and open file in Microsoft excel.

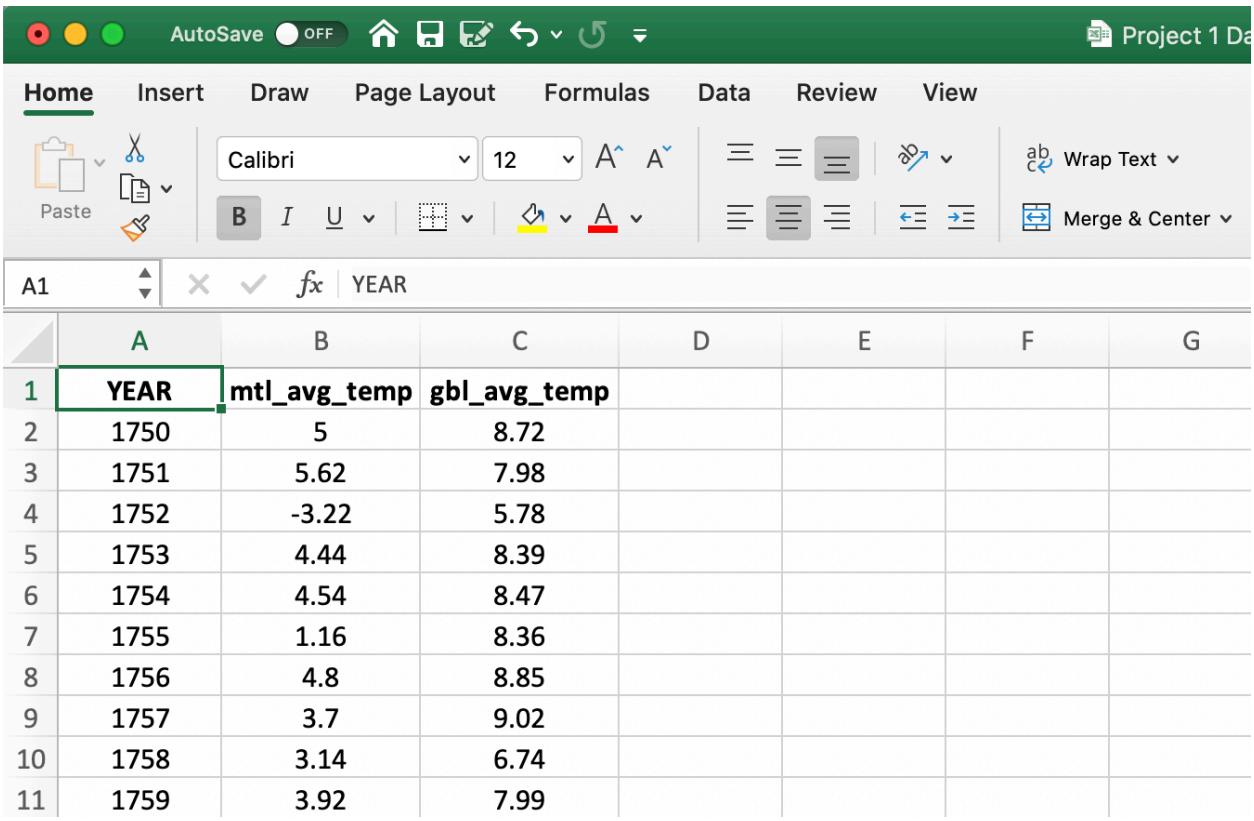
## Query:

```
SELECT global_data.year, global_data.global_avg_temp,
city_data.city_avg_temp
FROM global_data
JOIN city_data
```

```
ON global_data.year = city_data.year
WHERE city = 'Montreal'
and global_data.year BETWEEN 1750 and 2013;
```

## LINE CHART:

**Step 1:** Open file in Excel and check for any empty cells and delete the empty cells.

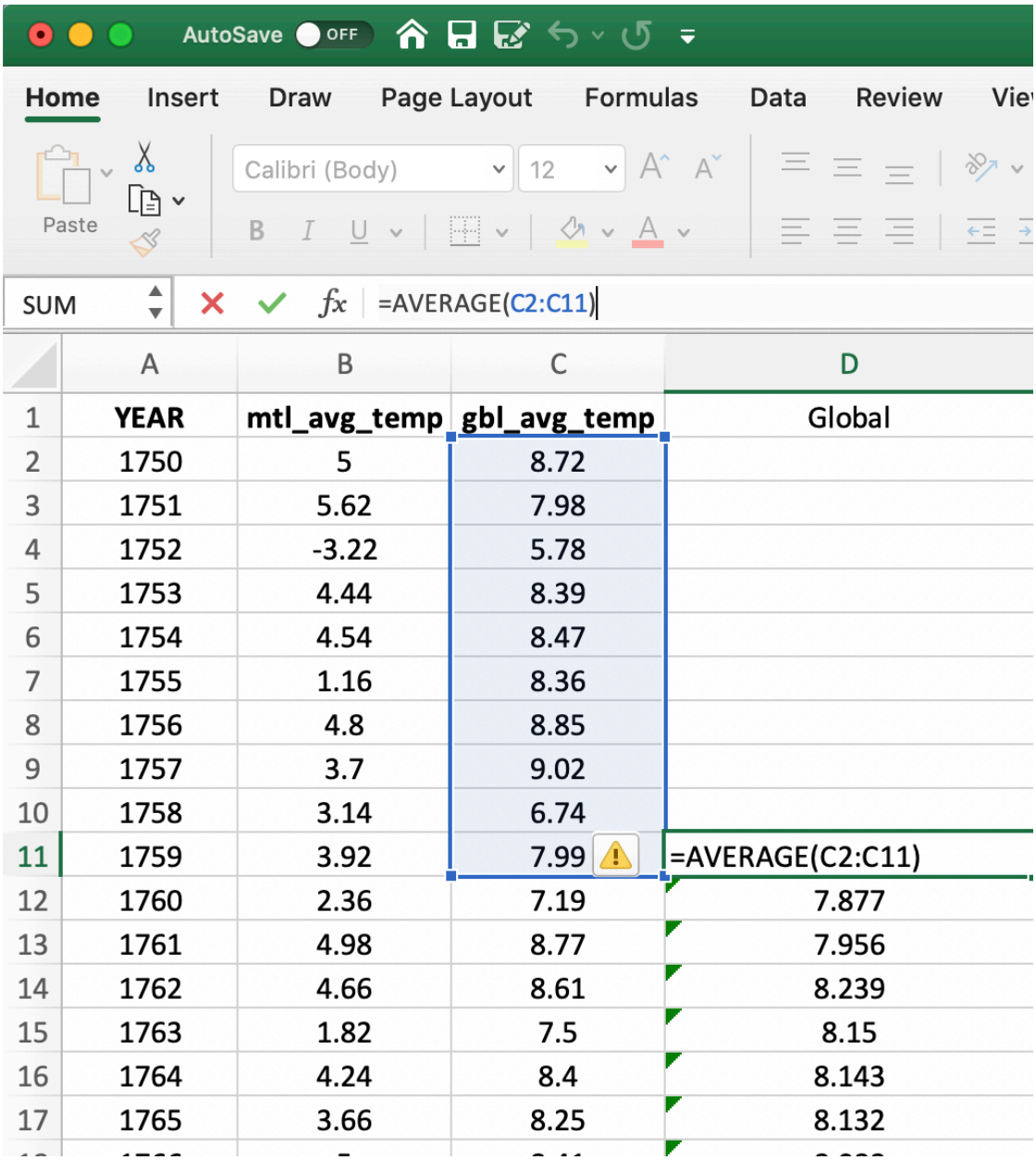



| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | YEAR | mtl_avg_temp | gbl_avg_temp | | | | |
| 2 | 1750 | 5 | 8.72 | | | | |
| 3 | 1751 | 5.62 | 7.98 | | | | |
| 4 | 1752 | -3.22 | 5.78 | | | | |
| 5 | 1753 | 4.44 | 8.39 | | | | |
| 6 | 1754 | 4.54 | 8.47 | | | | |
| 7 | 1755 | 1.16 | 8.36 | | | | |
| 8 | 1756 | 4.8 | 8.85 | | | | |
| 9 | 1757 | 3.7 | 9.02 | | | | |
| 10 | 1758 | 3.14 | 6.74 | | | | |
| 11 | 1759 | 3.92 | 7.99 | | | | |

**Step2:** Find 10 Year Moving average using excel formula,

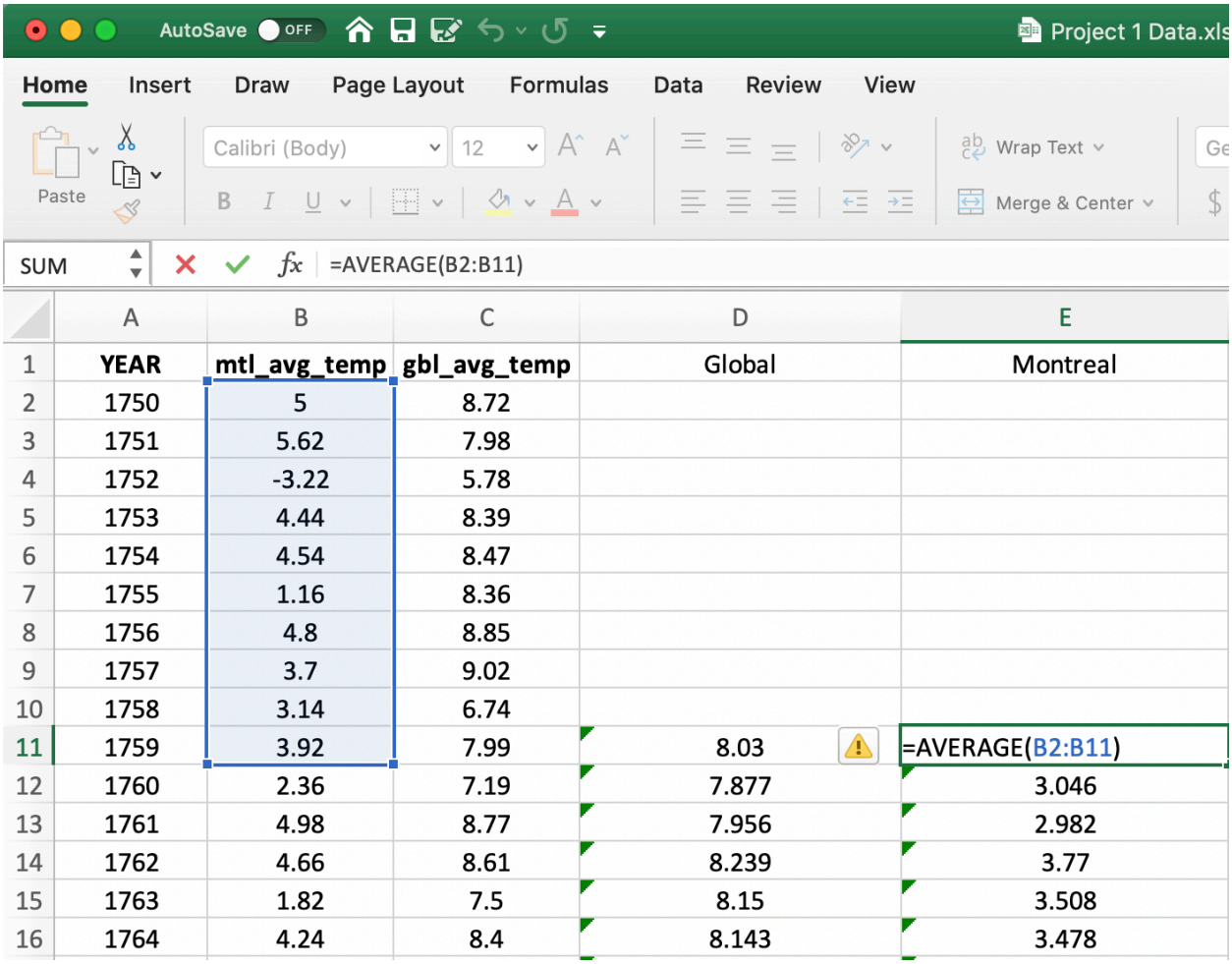
=AVERAGE(column+row : column+row)

- For **Global** data:



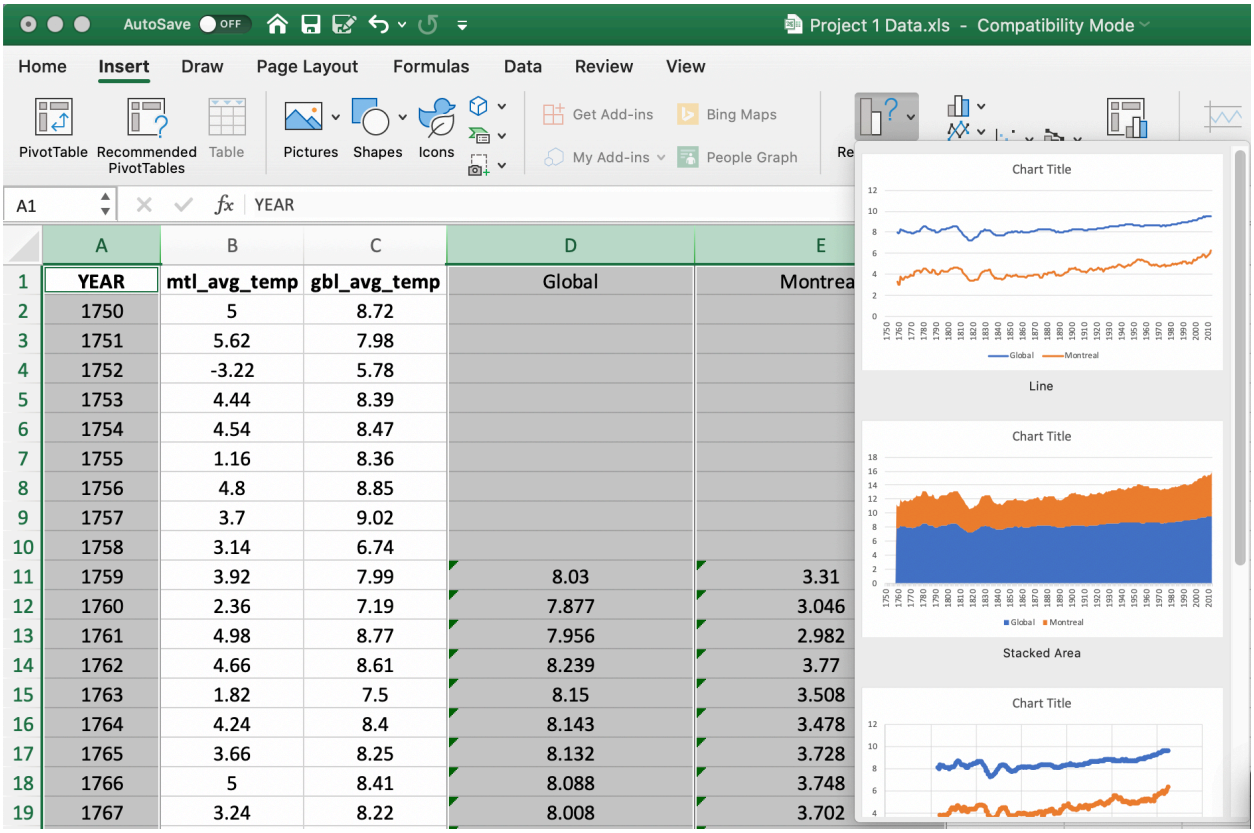

| | A | B | C | D |
|---|---|---|---|---|
| 1 | YEAR | mtl_avg_temp | gbl_avg_temp | Global |
| 2 | 1750 | 5 | 8.72 | |
| 3 | 1751 | 5.62 | 7.98 | |
| 4 | 1752 | -3.22 | 5.78 | |
| 5 | 1753 | 4.44 | 8.39 | |
| 6 | 1754 | 4.54 | 8.47 | |
| 7 | 1755 | 1.16 | 8.36 | |
| 8 | 1756 | 4.8 | 8.85 | |
| 9 | 1757 | 3.7 | 9.02 | |
| 10 | 1758 | 3.14 | 6.74 | |
| 11 | 1759 | 3.92 | 7.99 | =AVERAGE(C2:C11) |
| 12 | 1760 | 2.36 | 7.19 | 7.877 |
| 13 | 1761 | 4.98 | 8.77 | 7.956 |
| 14 | 1762 | 4.66 | 8.61 | 8.239 |
| 15 | 1763 | 1.82 | 7.5 | 8.15 |
| 16 | 1764 | 4.24 | 8.4 | 8.143 |
| 17 | 1765 | 3.66 | 8.25 | 8.132 |

- For **Montreal** data:



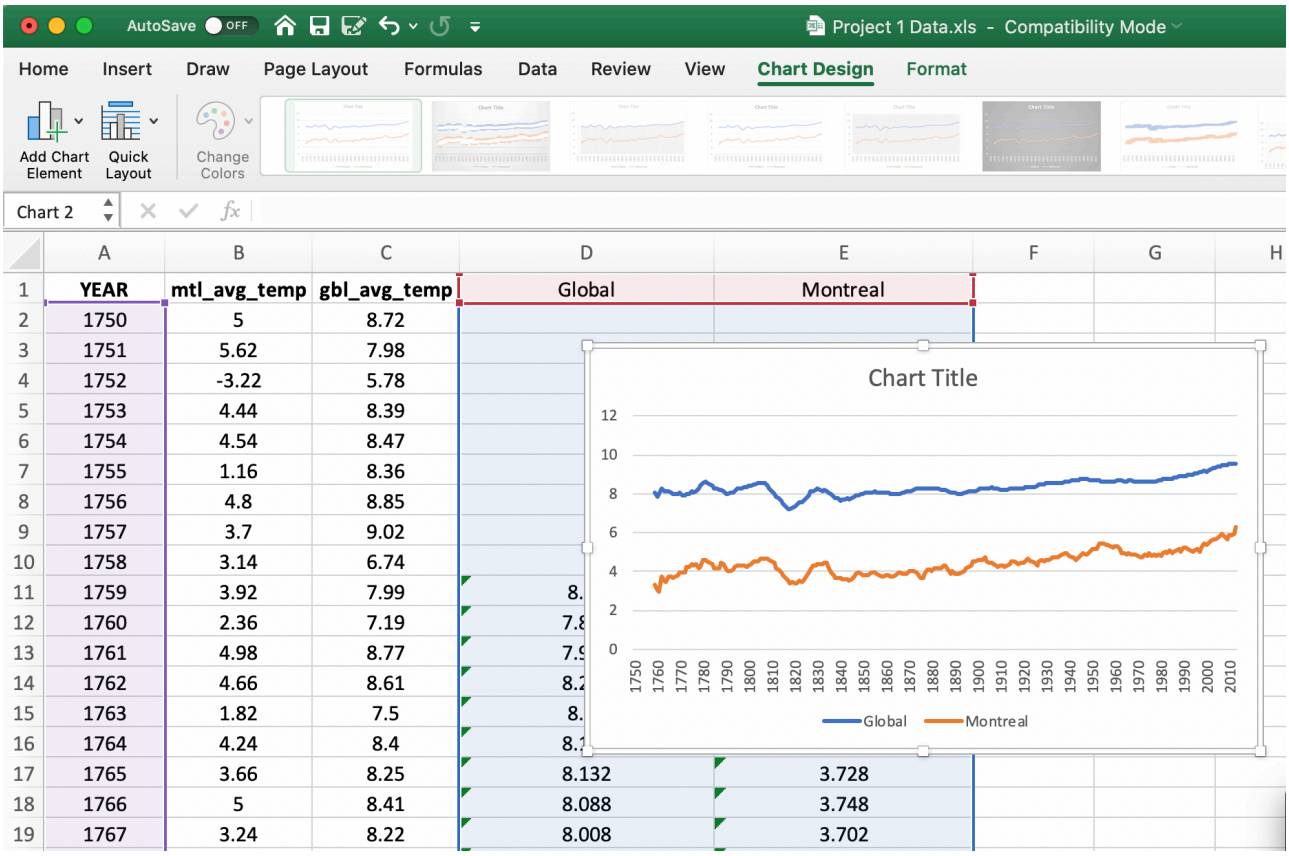

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | **YEAR** | **mtl_avg_temp** | **gbl_avg_temp** | Global | Montreal |
| 2 | 1750 | 5 | 8.72 | | |
| 3 | 1751 | 5.62 | 7.98 | | |
| 4 | 1752 | -3.22 | 5.78 | | |
| 5 | 1753 | 4.44 | 8.39 | | |
| 6 | 1754 | 4.54 | 8.47 | | |
| 7 | 1755 | 1.16 | 8.36 | | |
| 8 | 1756 | 4.8 | 8.85 | | |
| 9 | 1757 | 3.7 | 9.02 | | |
| 10 | 1758 | 3.14 | 6.74 | | |
| 11 | 1759 | 3.92 | 7.99 | 8.03 | =AVERAGE(B2:B11) |
| 12 | 1760 | 2.36 | 7.19 | 7.877 | 3.046 |
| 13 | 1761 | 4.98 | 8.77 | 7.956 | 2.982 |
| 14 | 1762 | 4.66 | 8.61 | 8.239 | 3.77 |
| 15 | 1763 | 1.82 | 7.5 | 8.15 | 3.508 |
| 16 | 1764 | 4.24 | 8.4 | 8.143 | 3.478 |

- **Step 3:** Plot a line graph with required data



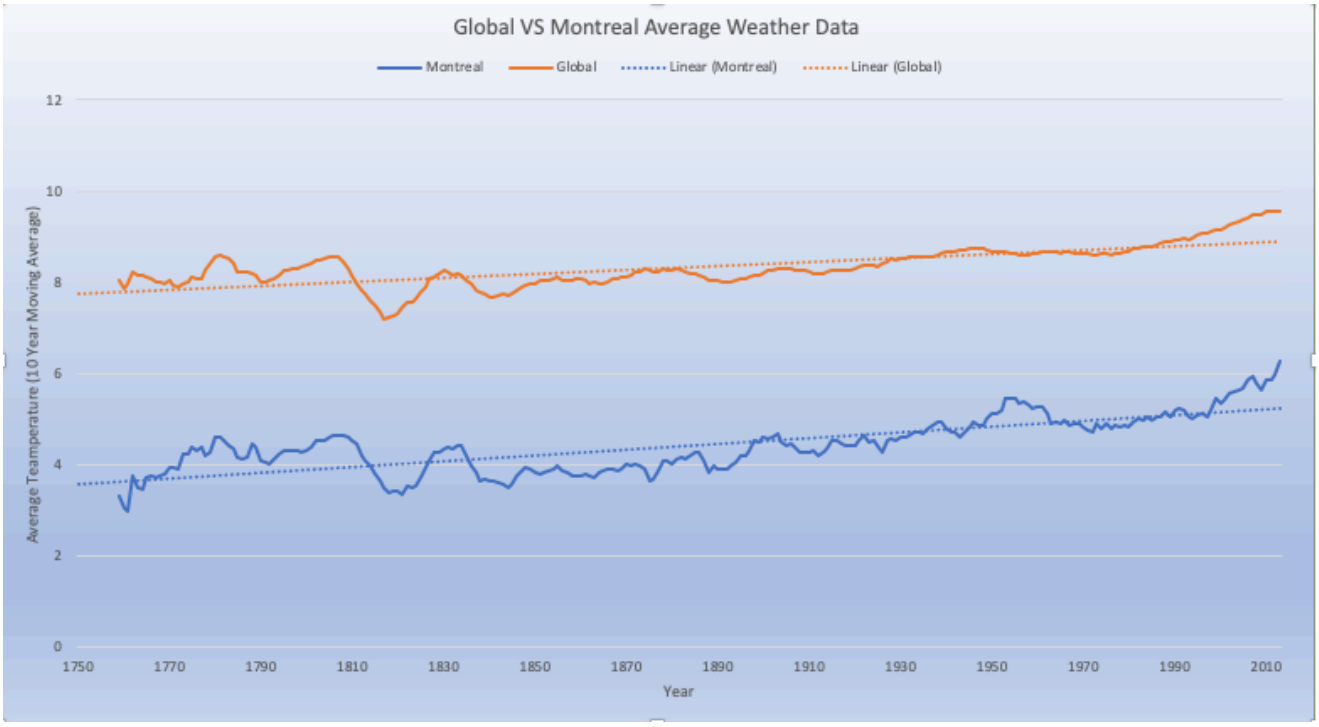

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | YEAR | mtl_avg_temp | gbl_avg_temp | Global | Montrea |
| 2 | 1750 | 5 | 8.72 | | |
| 3 | 1751 | 5.62 | 7.98 | | |
| 4 | 1752 | -3.22 | 5.78 | | |
| 5 | 1753 | 4.44 | 8.39 | | |
| 6 | 1754 | 4.54 | 8.47 | | |
| 7 | 1755 | 1.16 | 8.36 | | |
| 8 | 1756 | 4.8 | 8.85 | | |
| 9 | 1757 | 3.7 | 9.02 | | |
| 10 | 1758 | 3.14 | 6.74 | | |
| 11 | 1759 | 3.92 | 7.99 | 8.03 | 3.31 |
| 12 | 1760 | 2.36 | 7.19 | 7.877 | 3.046 |
| 13 | 1761 | 4.98 | 8.77 | 7.956 | 2.982 |
| 14 | 1762 | 4.66 | 8.61 | 8.239 | 3.77 |
| 15 | 1763 | 1.82 | 7.5 | 8.15 | 3.508 |
| 16 | 1764 | 4.24 | 8.4 | 8.143 | 3.478 |
| 17 | 1765 | 3.66 | 8.25 | 8.132 | 3.728 |
| 18 | 1766 | 5 | 8.41 | 8.088 | 3.748 |
| 19 | 1767 | 3.24 | 8.22 | 8.008 | 3.702 |

Choose the chart style (Line chart). Edit the x axis lable and y axis label to required format and change the intervals to 20-year difference for smooth line chart.




| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | YEAR | mtl_avg_temp | gbl_avg_temp | Global | Montreal | | | |
| 2 | 1750 | 5 | 8.72 | | | | | |
| 3 | 1751 | 5.62 | 7.98 | | | | | |
| 4 | 1752 | -3.22 | 5.78 | | | | | |
| 5 | 1753 | 4.44 | 8.39 | | | | | |
| 6 | 1754 | 4.54 | 8.47 | | | | | |
| 7 | 1755 | 1.16 | 8.36 | | | | | |
| 8 | 1756 | 4.8 | 8.85 | | | | | |
| 9 | 1757 | 3.7 | 9.02 | | | | | |
| 10 | 1758 | 3.14 | 6.74 | | | | | |
| 11 | 1759 | 3.92 | 7.99 | 8. | | | | |
| 12 | 1760 | 2.36 | 7.19 | 7.8 | | | | |
| 13 | 1761 | 4.98 | 8.77 | 7.9 | | | | |
| 14 | 1762 | 4.66 | 8.61 | 8.2 | | | | |
| 15 | 1763 | 1.82 | 7.5 | 8. | | | | |
| 16 | 1764 | 4.24 | 8.4 | 8.1 | | | | |
| 17 | 1765 | 3.66 | 8.25 | 8.132 | 3.728 | | | |
| 18 | 1766 | 5 | 8.41 | 8.088 | 3.748 | | | |
| 19 | 1767 | 3.24 | 8.22 | 8.008 | 3.702 | | | |

- **Step 4:** Stylize the chart to obtain readable data.



**OBSERVATIONS:**

Following are the observations from the data obtained from the raw data:

- Montreal city's average temperature is *dramatically lower than* the global average which gives a very interesting fact that Montreal is nearer to *colder region* and *has less population*.

- When Compared with the global temperature, Montreal's *highs and lows* are of similar pattern to it. Which shows the *impact of global feed* over Montreal's.

- Due to ***Global Warming***, the overall temp is increasing throughout the time frame. This *increase* is although not dramatic but significant enough.

- When smoothened over time frame of 50 years, the line chart looks more smooth but no interesting as the rise and similarities among Global data and Montreal data is not much visible. Moving

Average 10 is perfect for reflecting data for its rise and fall.

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