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## **Project: USA State-wise Daily Temperature on December 2024**

An In-Depth Look at State-wise Minimum and Maximum Temperatures Across the U.S.  
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This is my first project on what I've learned through youtube and websites for last few months, I got a csv file from kaggle. It was very difficult to understand at first and wasn't usable for my SQL queries. I used chatgpt to organize the data. After that, I made a table named 'temp' based on the data on PostgreSQL .

**Languages:** SQL

**Tools:** PostgreSQL

There are some tasks to do . Let's look at what they are...

### **\*\*\*\*\*Tasks to do \*\*\*\*\***

1. Average minimum and average maximum temperature of each state.
2. Average temperature of USA in the month December, 2024.
3. Average temperature of each state in December, 2024.
4. Minimum average temperature in December.
5. Maximum average temperature in December.
6. Average temperature of USA on every day in December 24 (in celcius ).

## Solving the tasks:

### 1. Average minimum and average maximum temperature of each state:

```
select state,  
round(avg(average_temperature_min),2) as state_avg_min,  
round(avg(average_temperature_max),2) as state_avg_max  
from temp  
group by state;
```

|    | state<br>character varying (20) | state_avg_min<br>numeric | state_avg_max<br>numeric |
|----|---------------------------------|--------------------------|--------------------------|
| 1  | Oklahoma                        | 34.63                    | 54.28                    |
| 2  | North Carolina                  | 32.22                    | 51.28                    |
| 3  | Colorado                        | 20.10                    | 39.87                    |
| 4  | Mississippi                     | 35.27                    | 54.89                    |
| 5  | Florida                         | 45.29                    | 64.99                    |
| 6  | Vermont                         | 20.44                    | 34.86                    |
| 7  | Delaware                        | 29.76                    | 50.27                    |
| 8  | Nevada                          | 29.98                    | 49.83                    |
| 9  | Louisiana                       | 39.37                    | 60.95                    |
| 10 | New York                        | 25.01                    | 44.85                    |
| 11 | West Virginia                   | 30.14                    | 50.19                    |
| 12 | South Carolina                  | 34.77                    | 54.57                    |
| 13 | New Jersey                      | 30.20                    | 49.97                    |
| 14 | New Mexico                      | 35.15                    | 54.92                    |
| 15 | Hawaii                          | 60.17                    | 79.91                    |
| 16 | Arkansas                        | 32.19                    | 52.70                    |
| 17 | Missouri                        | 30.21                    | 50.37                    |
| 18 | Connecticut                     | 24.81                    | 44.39                    |

|    | state<br>character varying (20) | state_avg_min<br>numeric | state_avg_max<br>numeric |
|----|---------------------------------|--------------------------|--------------------------|
| 18 | Connecticut                     | 24.81                    | 44.39                    |
| 19 | South Dakota                    | 15.02                    | 34.96                    |
| 20 | Iowa                            | 20.06                    | 38.11                    |
| 21 | Indiana                         | 28.05                    | 45.48                    |
| 22 | Massachusetts                   | 24.79                    | 45.45                    |
| 23 | Rhode Island                    | 29.97                    | 49.77                    |
| 24 | Ohio                            | 27.84                    | 45.69                    |
| 25 | Michigan                        | 20.02                    | 34.94                    |
| 26 | Minnesota                       | 14.74                    | 29.72                    |
| 27 | Pennsylvania                    | 27.94                    | 46.00                    |
| 28 | Washington                      | 34.50                    | 50.42                    |
| 29 | Wisconsin                       | 19.58                    | 34.93                    |
| 30 | Montana                         | 10.19                    | 29.97                    |
| 31 | Kentucky                        | 30.47                    | 50.02                    |
| 32 | Arizona                         | 44.48                    | 65.08                    |
| 33 | Illinois                        | 30.17                    | 45.11                    |
| 34 | Virginia                        | 29.52                    | 50.17                    |
| 35 | Maryland                        | 30.72                    | 49.85                    |
| 36 | Georgia                         | 38.57                    | 58.10                    |

|    | state<br>character varying (20) | state_avg_min<br>numeric | state_avg_max<br>numeric |
|----|---------------------------------|--------------------------|--------------------------|
| 33 | Illinois                        | 30.17                    | 45.11                    |
| 34 | Virginia                        | 29.52                    | 50.17                    |
| 35 | Maryland                        | 30.72                    | 49.85                    |
| 36 | Georgia                         | 38.57                    | 58.10                    |
| 37 | Wyoming                         | 9.86                     | 30.13                    |
| 38 | Utah                            | 25.04                    | 45.54                    |
| 39 | New Hampshire                   | 19.77                    | 35.37                    |
| 40 | North Dakota                    | 9.89                     | 27.95                    |
| 41 | Nebraska                        | 20.02                    | 39.69                    |
| 42 | Maine                           | 19.38                    | 34.94                    |
| 43 | California                      | 45.05                    | 64.75                    |
| 44 | Tennessee                       | 31.80                    | 51.97                    |
| 45 | Kansas                          | 25.20                    | 44.51                    |
| 46 | Texas                           | 40.07                    | 60.11                    |
| 47 | Oregon                          | 34.65                    | 49.73                    |
| 48 | Idaho                           | 25.00                    | 40.24                    |
| 49 | Alaska                          | 9.81                     | 20.14                    |
| 50 | Alabama                         | 34.34                    | 54.93                    |

## 2. Average temperature of USA in the month December, 2024:

```
select
round(avg(average_temp),2) as us_average_temp
from(
select date,
round(avg((average_temperature_min+average_temperature_max)/2),2) as average_temp
from temp
group by date);
```

|   | us_average_temp |
|---|-----------------|
|   | numeric         |
| 1 | 37.63           |

(Temperature in Fahrenheit)

Why do we need to know the average temperature of USA? Let's think about a condition where a student from Gabon might ask her/his teacher about the temperature of USA on December 2024. This information may work at that moment.

Here I have computed the average temperature on each day as per the formula:

$$temp = \frac{min + max}{2}$$

As we have the minimum and maximum temperature of each day then we can calculate the temperature from their average.

## 3. Average temperature of each state in December,2024 :

```
select state,
round(avg((average_temperature_min+average_temperature_max)/2),2) as average_each_state
from temp
group by state;
```

|    | state<br>character varying (20) 🔒 | average_each_state<br>numeric 🔒 |
|----|-----------------------------------|---------------------------------|
| 1  | Oklahoma                          | 44.46                           |
| 2  | North Carolina                    | 41.75                           |
| 3  | Colorado                          | 29.99                           |
| 4  | Mississippi                       | 45.08                           |
| 5  | Florida                           | 55.14                           |
| 6  | Vermont                           | 27.65                           |
| 7  | Delaware                          | 40.01                           |
| 8  | Nevada                            | 39.90                           |
| 9  | Louisiana                         | 50.16                           |
| 10 | New York                          | 34.93                           |
| 11 | West Virginia                     | 40.16                           |
| 12 | South Carolina                    | 44.67                           |
| 13 | New Jersey                        | 40.09                           |
| 14 | New Mexico                        | 45.03                           |
| 15 | Hawaii                            | 70.04                           |
| 16 | Arkansas                          | 42.45                           |
| 17 | Missouri                          | 40.29                           |
| 18 | Connecticut                       | 34.60                           |

|    | state<br>character varying (20) 🔒 | average_each_state<br>numeric 🔒 |
|----|-----------------------------------|---------------------------------|
| 19 | South Dakota                      | 24.99                           |
| 20 | Iowa                              | 29.08                           |
| 21 | Indiana                           | 36.77                           |
| 22 | Massachusetts                     | 35.12                           |
| 23 | Rhode Island                      | 39.87                           |
| 24 | Ohio                              | 36.77                           |
| 25 | Michigan                          | 27.48                           |
| 26 | Minnesota                         | 22.23                           |
| 27 | Pennsylvania                      | 36.97                           |
| 28 | Washington                        | 42.46                           |
| 29 | Wisconsin                         | 27.26                           |
| 30 | Montana                           | 20.08                           |
| 31 | Kentucky                          | 40.25                           |
| 32 | Arizona                           | 54.78                           |
| 33 | Illinois                          | 37.64                           |
| 34 | Virginia                          | 39.84                           |
| 35 | Maryland                          | 40.28                           |
| 36 | Georgia                           | 48.33                           |

|    | state<br>character varying (20) 🔒 | average_each_state<br>numeric 🔒 |
|----|-----------------------------------|---------------------------------|
| 33 | Illinois                          | 37.64                           |
| 34 | Virginia                          | 39.84                           |
| 35 | Maryland                          | 40.28                           |
| 36 | Georgia                           | 48.33                           |
| 37 | Wyoming                           | 20.00                           |
| 38 | Utah                              | 35.29                           |
| 39 | New Hampshire                     | 27.57                           |
| 40 | North Dakota                      | 18.92                           |
| 41 | Nebraska                          | 29.85                           |
| 42 | Maine                             | 27.16                           |
| 43 | California                        | 54.90                           |
| 44 | Tennessee                         | 41.89                           |
| 45 | Kansas                            | 34.85                           |
| 46 | Texas                             | 50.09                           |
| 47 | Oregon                            | 42.19                           |
| 48 | Idaho                             | 32.62                           |
| 49 | Alaska                            | 14.97                           |
| 50 | Alabama                           | 44.63                           |

#### 4. Minimum average temperature in December:

```
select
round(avg(average_temperature_min),2) as avg_min
from temp;
```

|   | avg_min<br>numeric |
|---|--------------------|
| 1 | 28.32              |

Here we found the average minimum temperature of USA in December was 28.32° Farenheit.

### 5. Maximum average temperature in December :

```
select
round(avg(average_temperature_max),2) as avg_max
from temp;
```



|   | avg_max<br>numeric |
|---|--------------------|
| 1 | 46.94              |

Here we found the average maximum temperature of USA in December was 46.94° Farenheit.

If we average this two temperature we will get the average temperature of December which is 37.63° Farenheit.

### 6. Average temperature of USA on every day in December 24 (in celcius ):

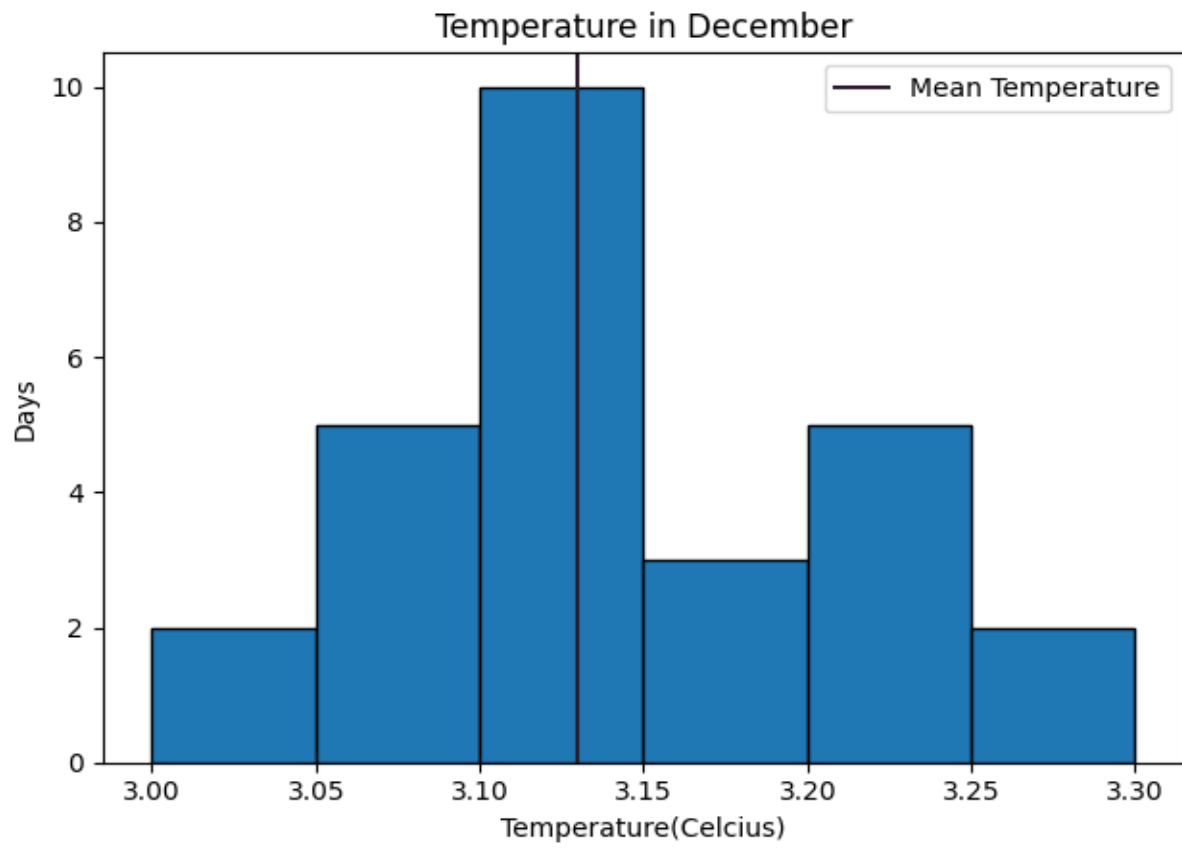
```
select date,
round(5*(average_temperature_each_day-32)/9,2) avg_temp_celcius
from(
select date,
round(avg((average_temperature_min+average_temperature_max)/2),2)
as average_temperature_each_day
from temp
group by date
);
```

|    | date  | round <br>numeric |
|----|--|--|
| 1  | 2024-12-29   | 3.15   |
| 2  | 2024-12-31   | 3.23   |
| 3  | 2024-12-28   | 3.09   |
| 4  | 2024-12-17   | 3.16   |
| 5  | 2024-12-03   | 3.23   |
| 6  | 2024-12-22   | 3.29   |
| 7  | 2024-12-04   | 2.94   |
| 8  | 2024-12-07   | 3.15   |
| 9  | 2024-12-09   | 3.30   |
| 10 | 2024-12-23   | 3.14   |
| 11 | 2024-12-05   | 3.37   |
| 12 | 2024-12-02   | 3.01   |
| 13 | 2024-12-08   | 3.22   |
| 14 | 2024-12-24   | 3.14   |
| 15 | 2024-12-19   | 3.04   |
| 16 | 2024-12-16   | 3.23   |
| 17 | 2024-12-06   | 2.95   |
| 18 | 2024-12-26   | 3.12   |

Hence i have completed my query tasks using SQL.

### **Histogram of the temperatures in December:**

I used Matplotlib and pandas to plot a histogram that shows us the temperature in celcius of USA over the month December. I found the mean temperature at 3.13 and showed to in the graph as a vertical line at 3.13 .The graph shows that in majority of the days in December ,the temperature was between 3.10 and 3.15 degree celcius. Anyone can easily make a conclution about the temperature by looking at the graph.



Thank You...