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DATA 3320
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It has been a full week since one of my good friends from my childhood came to Seattle to visit me before we both graduate later this spring. She attends New York University in New York City, and we are both from the San Francisco Bay Area. Of course, one of the conversation topics was about the weather. I argued that it rains more in New York City while she argued that it rained more here in Seattle. Interestingly, Professor Egan's family in New York City refuses to visit Seattle due to the rain. The purpose of this project is to figure out whether it rains more in Seattle or New York City by using data science methodology. We used data downloaded from the National Centers for Environmental Information. There are two original datasets called seattle_rain.csv and ny_rain.csv, which were both downloaded from the NOAA Climate Data tool from January 2020 to January 2024.

First off, I would like to preface that everyone experiences a "rainy" day differently and not everyone here is a meteorologist. I decided to use the number of 2 as a threshold for some of the analysis to follow. In 2011, I experienced my first real "rainy" day where my entire class had to evacuate to the school building due to extreme rain and flood watch. Never in my 9 years had I experienced rain like that, so from then on, that is how I have described an extremely rainy day. I would like to answer the questions of: "Are there any extreme rainfall events for either city?", "Which city holds the most frequency in rainy days?", and "How does the. Time of year in each city affect the average rainfall?"

My first analysis answers question 1, showing extreme rainfall events that took place over the course of the 4 years using the number 2 as the threshold for finding values that exceeded that number. As you can see, Seattle is only mentioned once while New York City is mentioned in the other entries.

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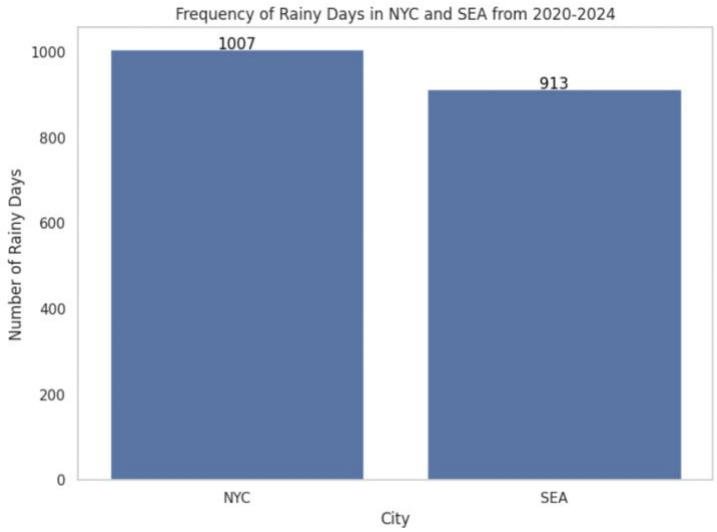
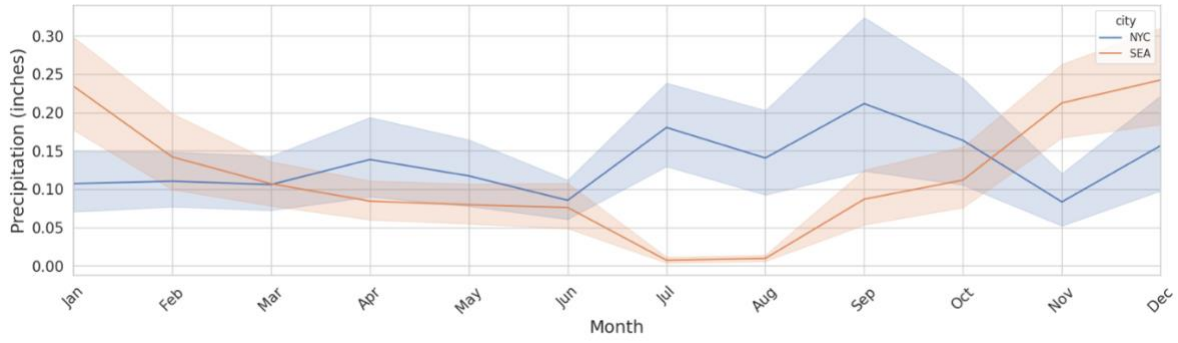
The extreme rainfall events found:
           date city  precipitation  month  year
555  2021-07-09  NYC       2.366429      7  2021
600  2021-08-23  NYC       2.795000      8  2021
610  2021-09-02  NYC       4.244615      9  2021
664  2021-10-26  NYC       2.112857     10  2021
665  2021-10-27  NYC       2.027857     10  2021
1367 2023-09-29  NYC       2.541538      9  2023
1368 2023-09-30  NYC       2.373077      9  2023
1440 2023-12-11  NYC       2.009333     12  2023
1447 2023-12-18  NYC       2.099231     12  2023
2895 2023-12-05  SEA       2.710000     12  2023
```

This analysis shows a bar chart that answer the question of finding the city that holds the most frequency in rainy days. Unlike the previous analysis, I indicate in the code that a rainy day was any value greater than 0. This is to account for those who have different perspectives on what a rainy day feels like. According to the evidence, New York City (NYC) has the most frequency with a little less than 100 days more than Seattle.



The last analysis looks at the months which can help answer the question of how the time of the year in each city can affect the average rainfall. Based on my own knowledge, I would predict that the winter and spring months in Seattle would experience the most rain due to the climate in the Pacific Northwest while it would rain more in the late summer in the Mid Atlantic. Below the line chart includes confidence bands indicating the statistical measure of confidence intervals. Based on the highlighted range for each city, we are 95% confident that the precipitation values for every month lies within each range. This visualization shows that New York City experiences more precipitation over the course of the 12 months with over 0.05 inches per month. And comparatively shows that Seattle rains harder in certain months according to the seasons.



Overall, this project has helped me conclude that it rains more in New York City than in Seattle. I hope that with reading these analyses that both my friend and Professor Egan's family can be convinced to visit Seattle since it does not rain as much as it does in New York City.