



# Construction Work on MTA System at the Lexington Ave / 59th St Subway Station

Rachel Goodridge



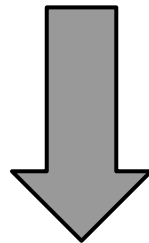
# Background

- Huff construction company has been hired to complete some repairs on the Lexington Avenue/59th Street subway station entrance in Manhattan.
- They will need to close the station during repairs for a total of 16 non-consecutive hours and plan to do their work sometime during the month of October 2021.
- When would be the best days/times for Huff construction workers to close the station in order to minimize the number of travelers who are displaced?



# Tools and Process

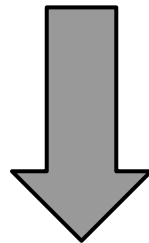
1. Ingest MTA turnstile data for each October 2015-2020 into a SQL database.



	Date_Time	Traffic	Weekday	Year	Day	Time	Week
0	2015-10-01 00:00:00	16381.0	Thursday	2015	1	00:00:00	40
1	2015-10-01 04:00:00	2196.0	Thursday	2015	1	04:00:00	40
2	2015-10-01 08:00:00	16329.0	Thursday	2015	1	08:00:00	40
3	2015-10-01 12:00:00	41571.0	Thursday	2015	1	12:00:00	40
4	2015-10-01 16:00:00	33118.0	Thursday	2015	1	16:00:00	40

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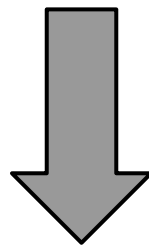
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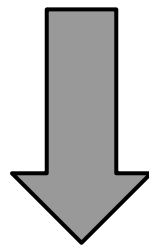
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3. Dissect the data using Pandas library tools.
  - Convert from cumulative entrances / exits to new data every 4 hours.
  - Focus on the total traffic of the station rather than on the turnstile level.



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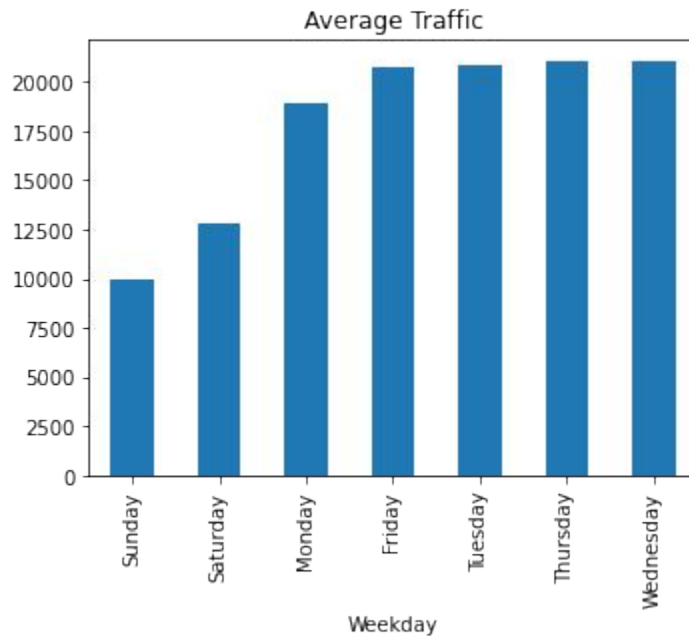
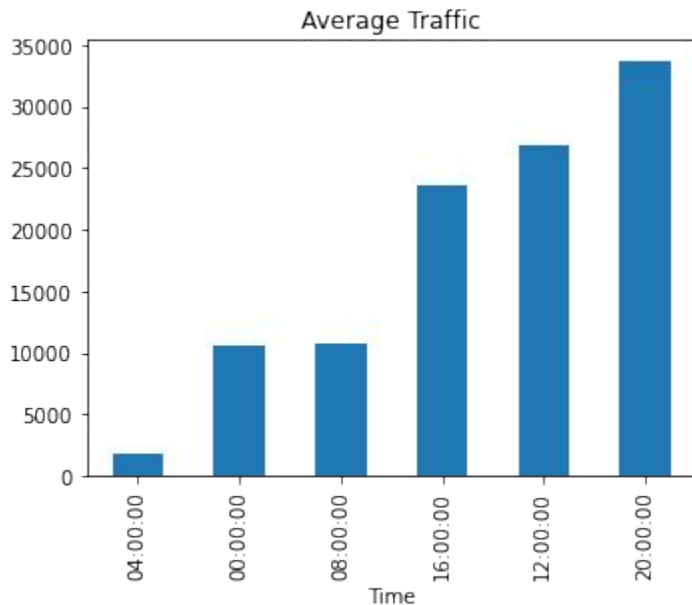
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4. Visualize the data with Matplotlib library tools.



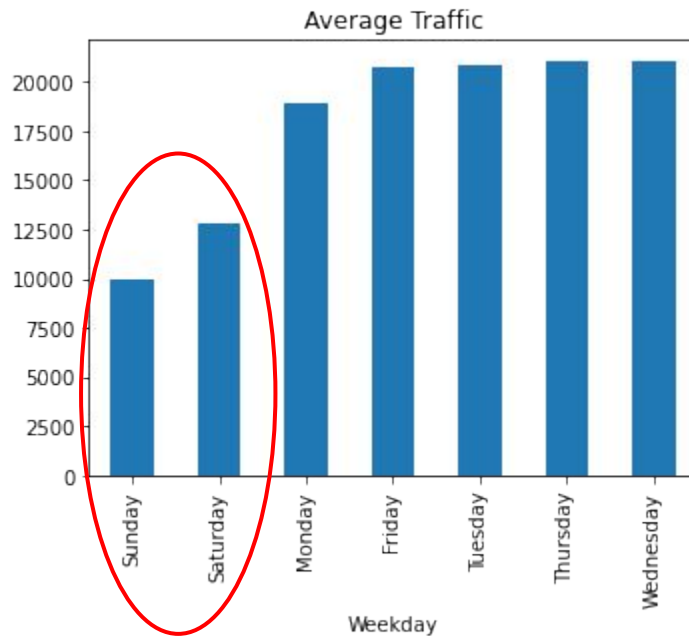
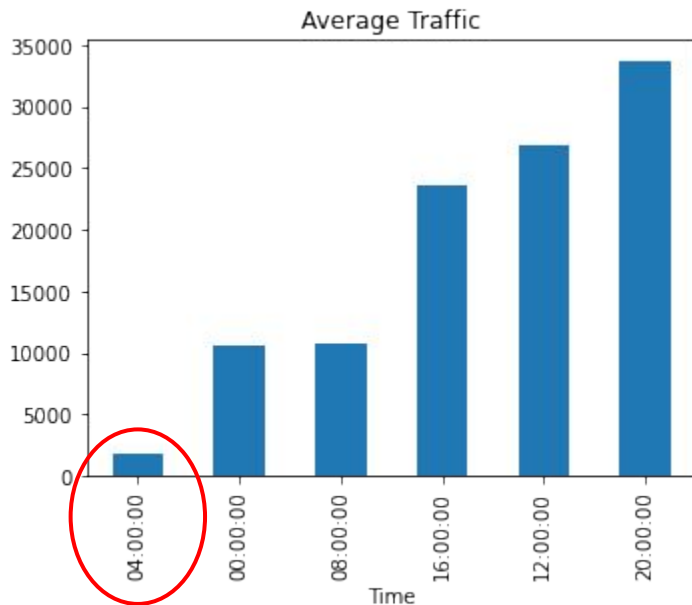
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# Average Traffic by Time of Day and Day of Week



- The time block from midnight to 4am has the lowest traffic on average.
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# Grouping Data by Time and then by Day

Traffic		
Weekday	Time	
Monday	04:00:00	1263.222222
Tuesday	04:00:00	1449.962963
Thursday	04:00:00	1628.111111
Wednesday	04:00:00	1634.423077
Friday	04:00:00	1863.307692
Sunday	04:00:00	2415.884615
Saturday	04:00:00	2549.851852
Sunday	08:00:00	3037.115385
Saturday	08:00:00	4845.037037
Monday	00:00:00	7029.222222

Despite results on the previous slide, the 12am - 4am time block has less traffic on any weekday than on the weekend.

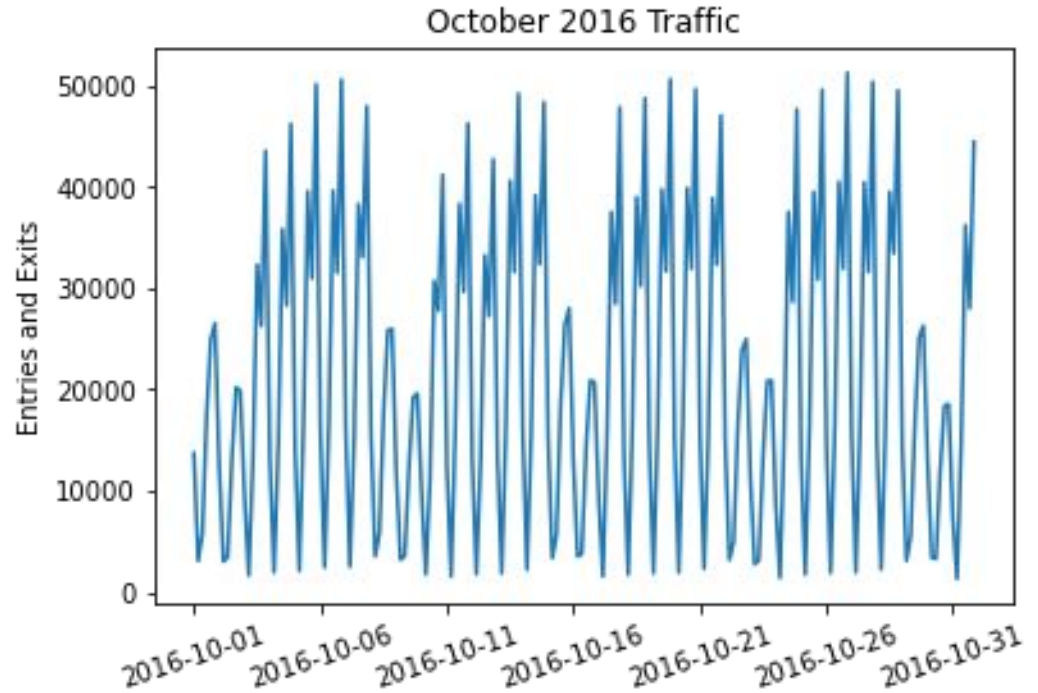
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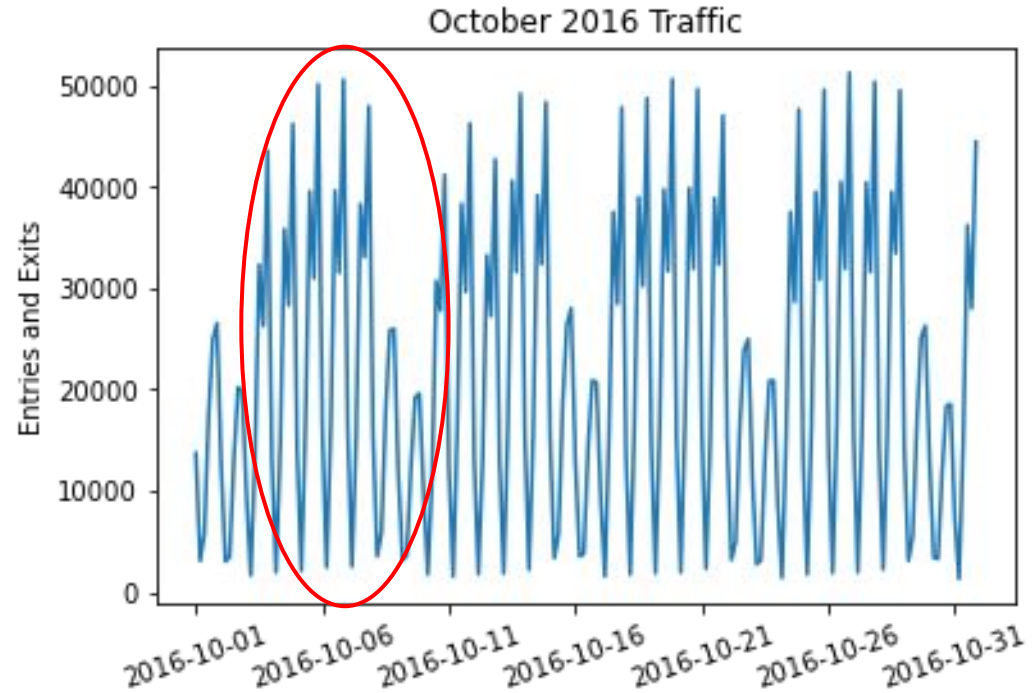
# Why is this happening?

- We can look at the raw data for each month of October.
- For example, here is the data from October 2016.



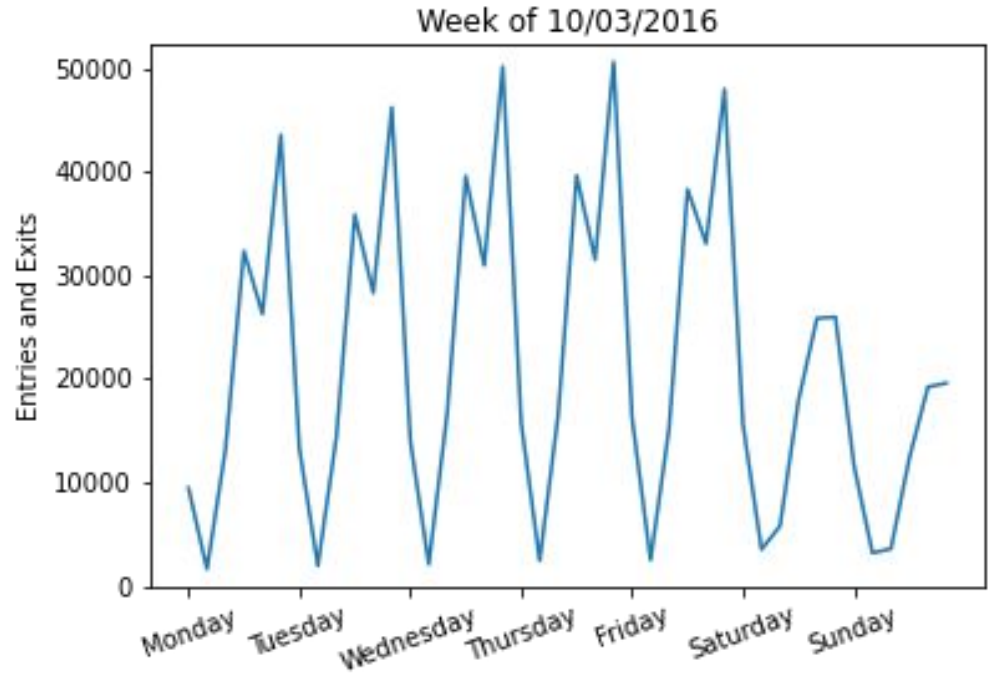
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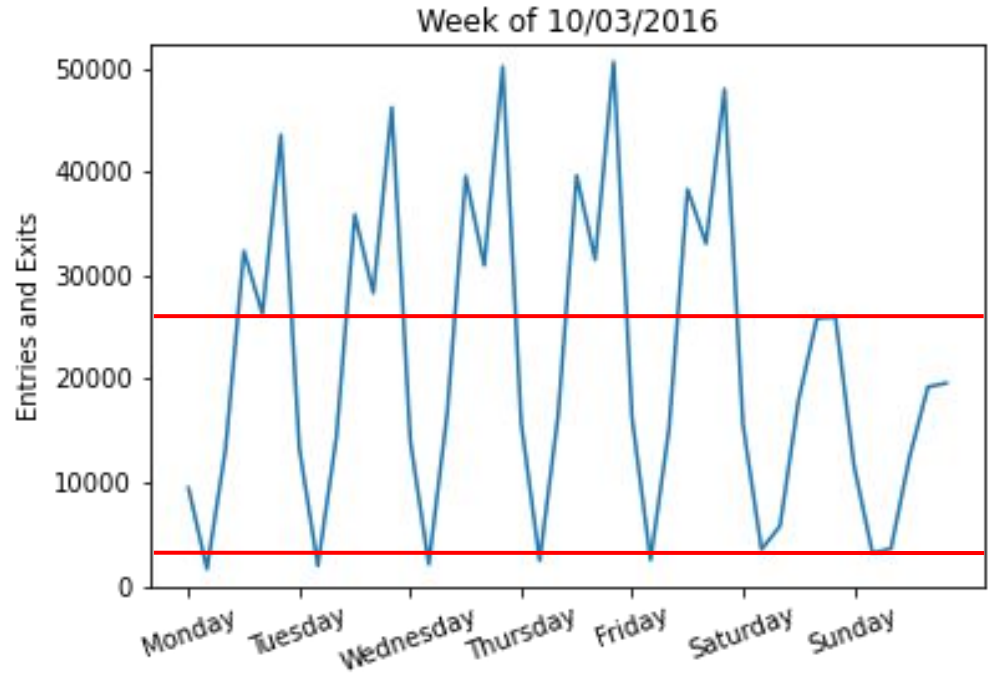
# Take a Closer Look . . .

- Here we have zoomed in on the first full week of October 2016.
- Weekdays appear to have both higher and lower extremes than the weekends.



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# Conclusions and Recommendations

- While people are more likely to be using the subway during weekdays than on weekends in general, late night hours on the weekends are a bit more popular than late night hours during the week.
- In summary, choosing to close the Lexington Avenue/59th Street station during the 12am-4am time block on a weekday would be a good time for this particular station.

# Additional Questions for Consideration

- What does traffic look like in the surrounding stations?
  - And how would that be affected by closure of the Lexington Ave/59th St station?
  - This is covered briefly in the appendix, but could be investigated more.
- Are there any public events this coming October that might disrupt normal traffic patterns?



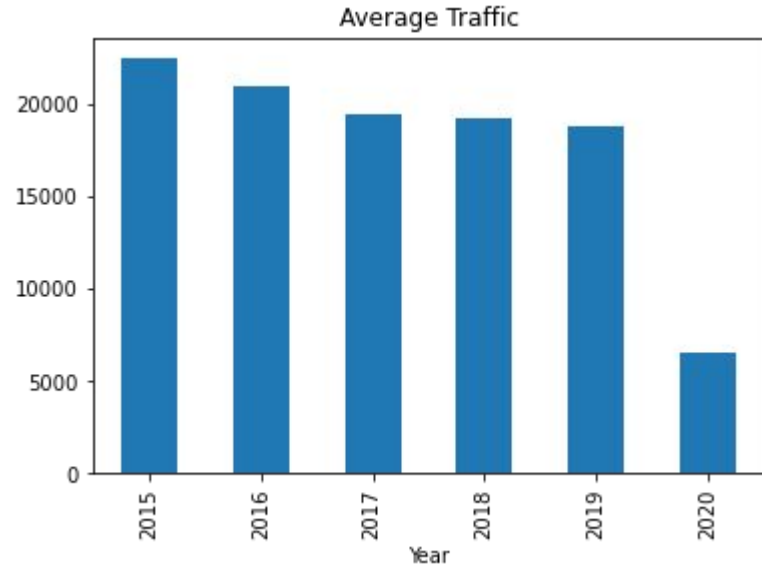
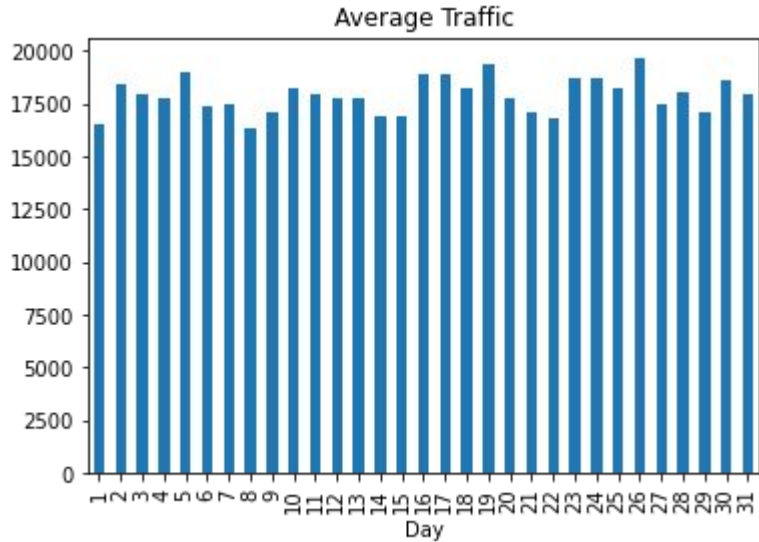


Thank You!

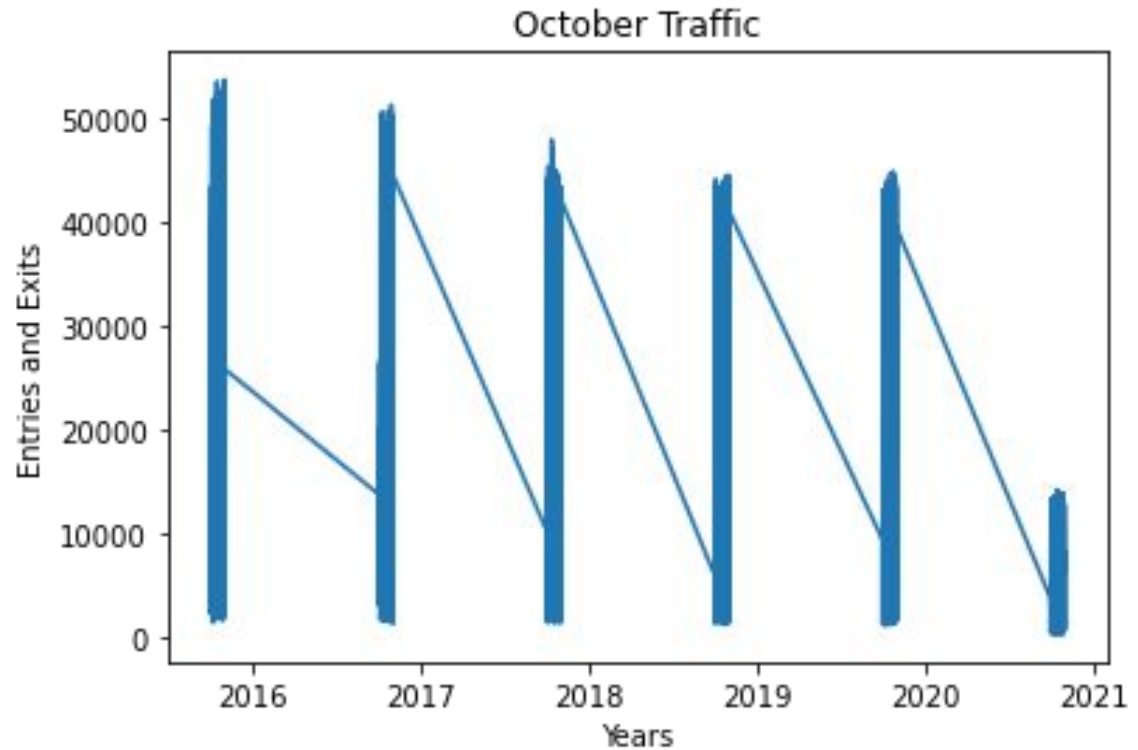


# Appendix

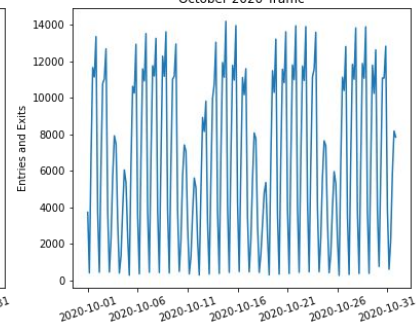
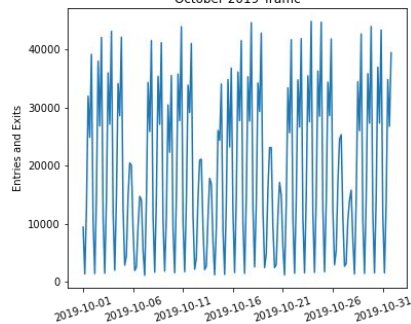
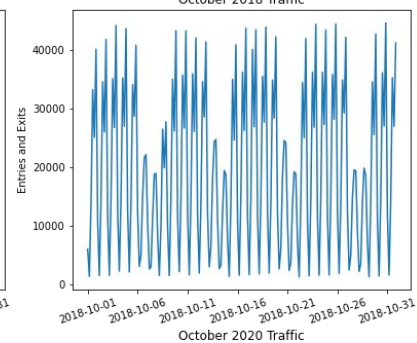
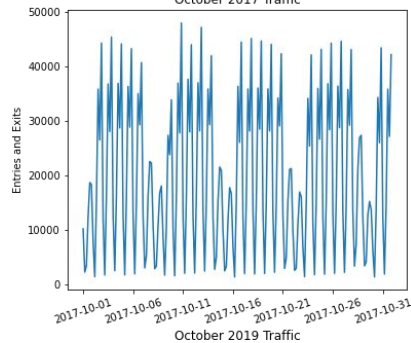
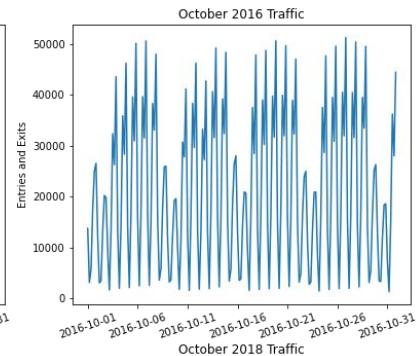
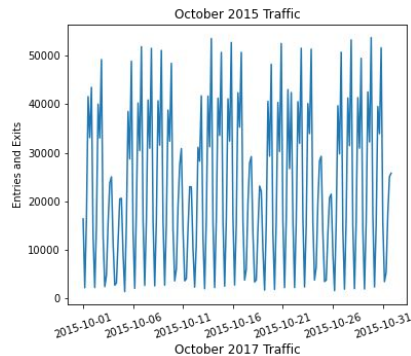
# Average Traffic Grouped by Day of Month and Year



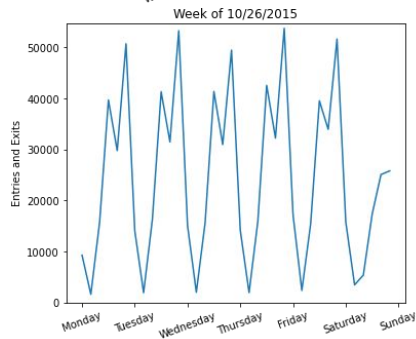
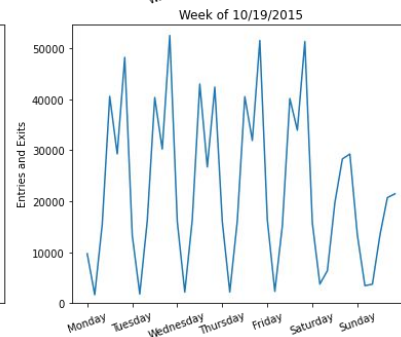
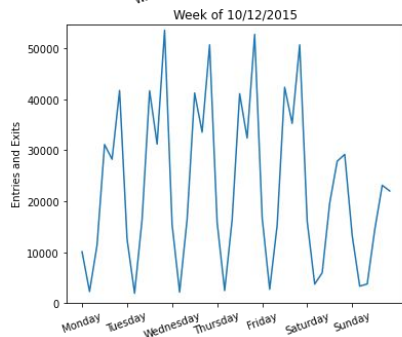
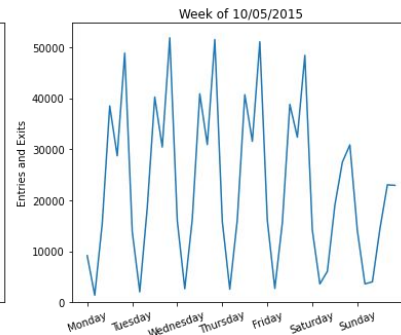
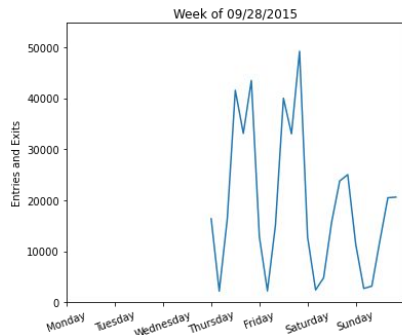
# All October Data 2015-2020



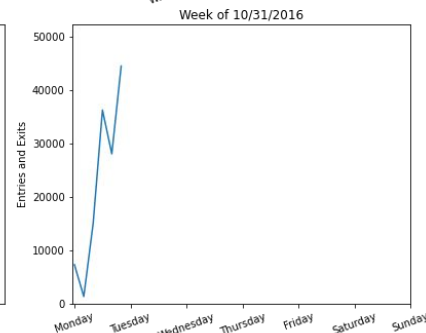
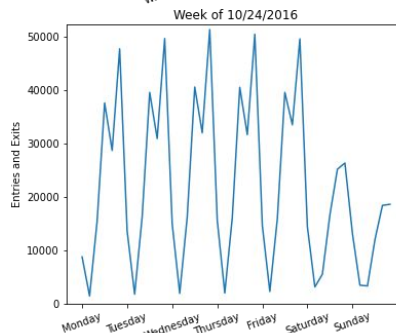
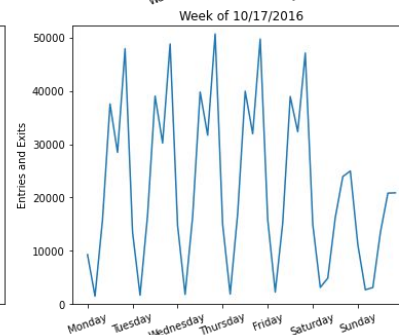
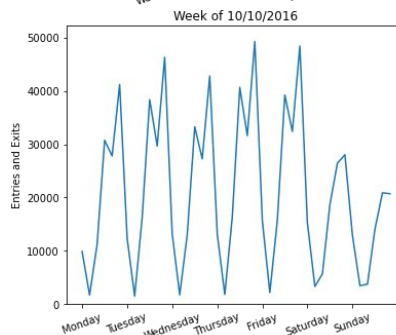
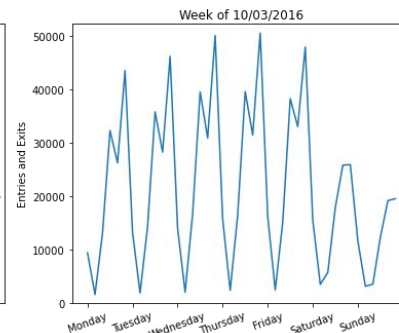
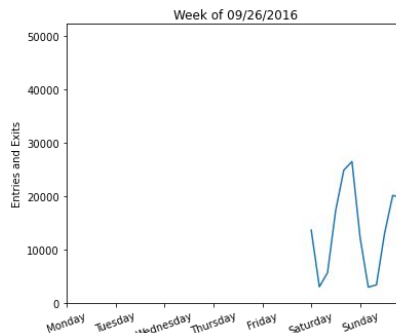
# All October Data Separated by Year



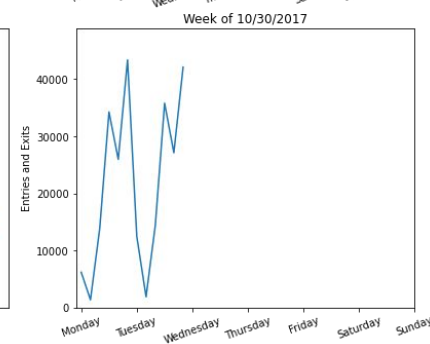
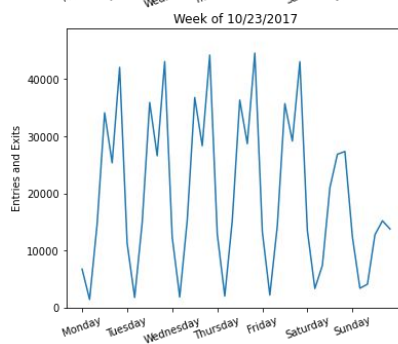
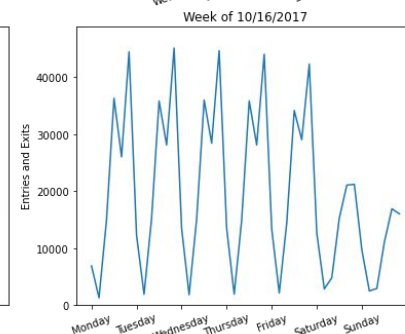
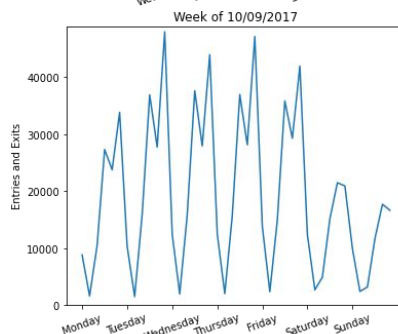
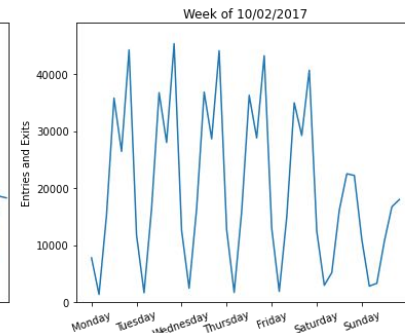
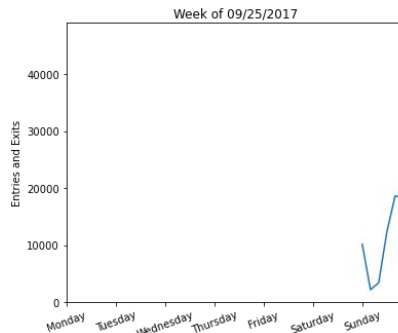
# All Data in October 2015 Separated by Week



# All Data in October 2016 Separated by Week

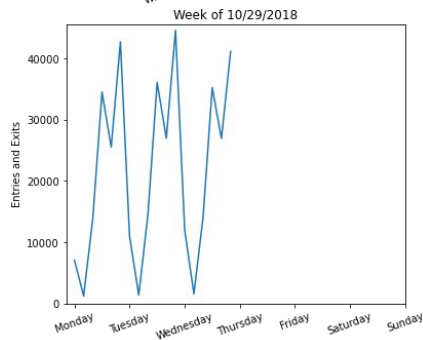
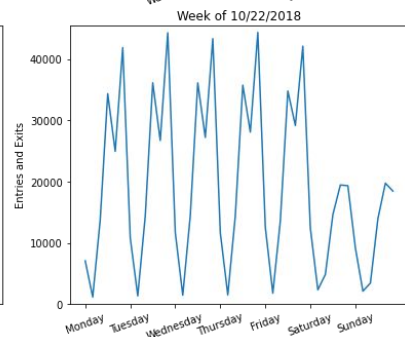
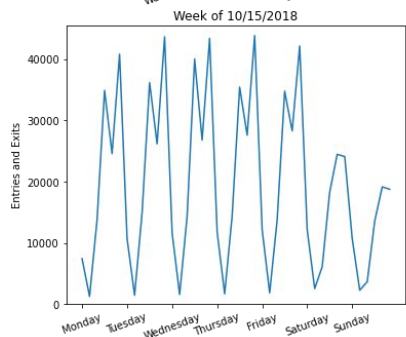
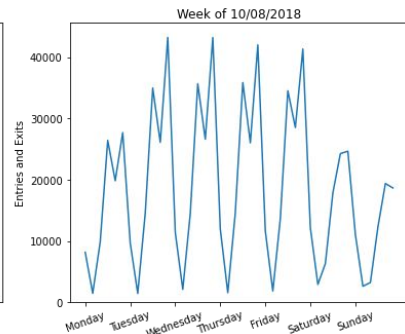
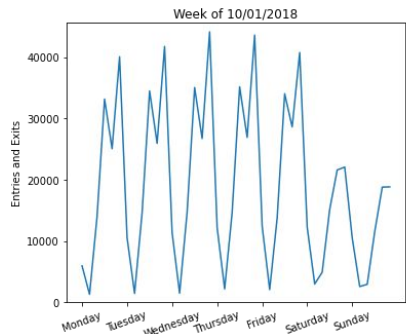


# All Data in October 2017 Separated by Week

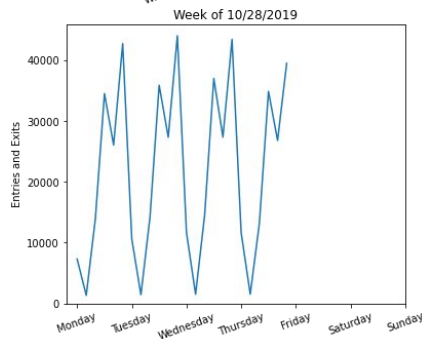
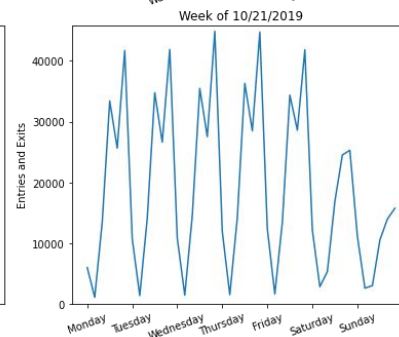
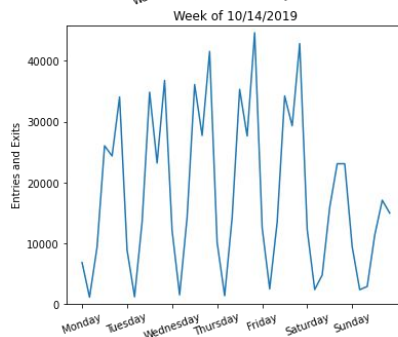
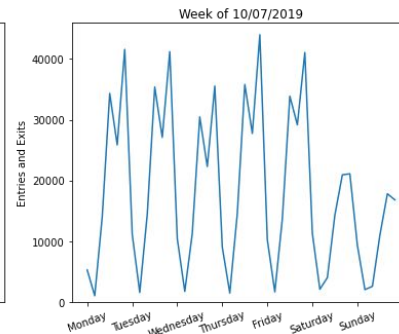
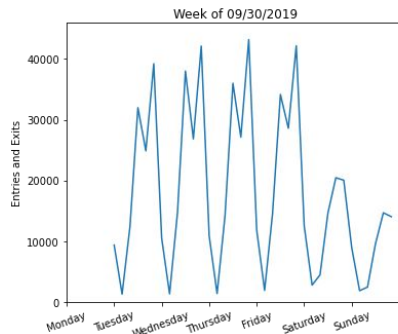




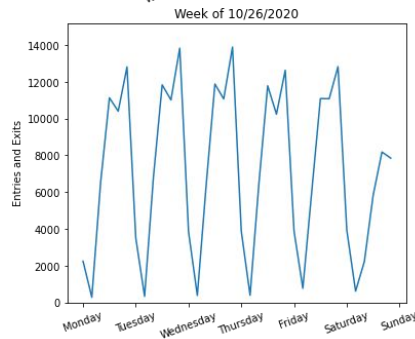
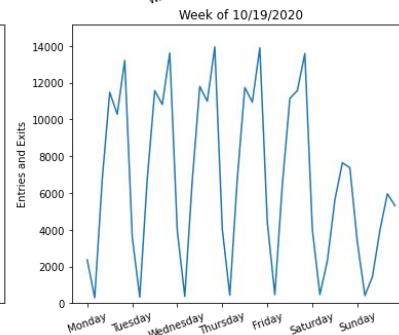
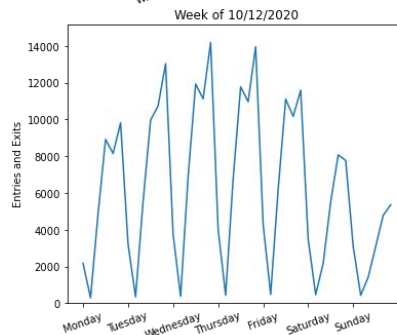
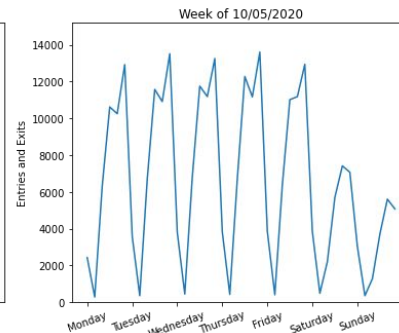
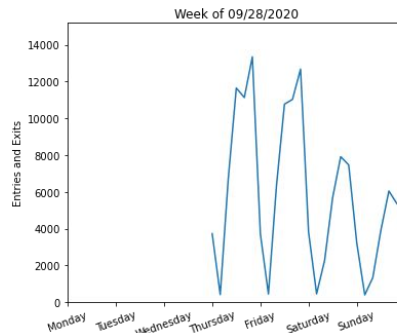
# All Data in October 2018 Separated by Week



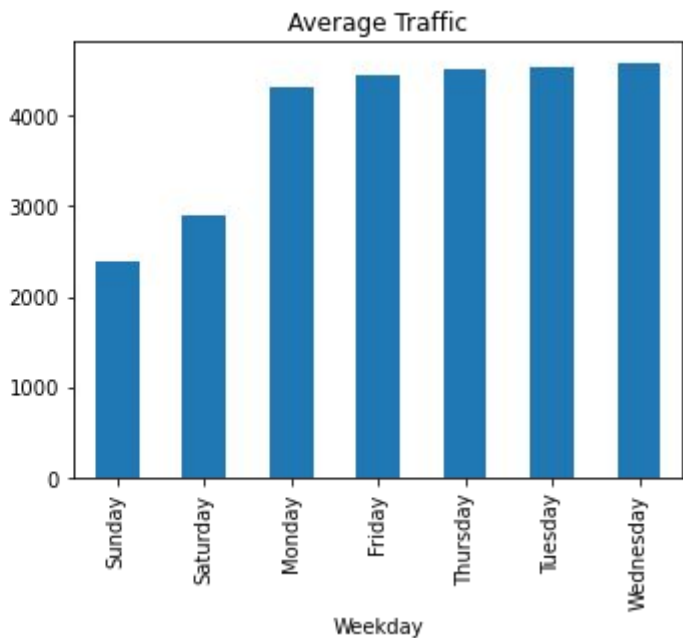
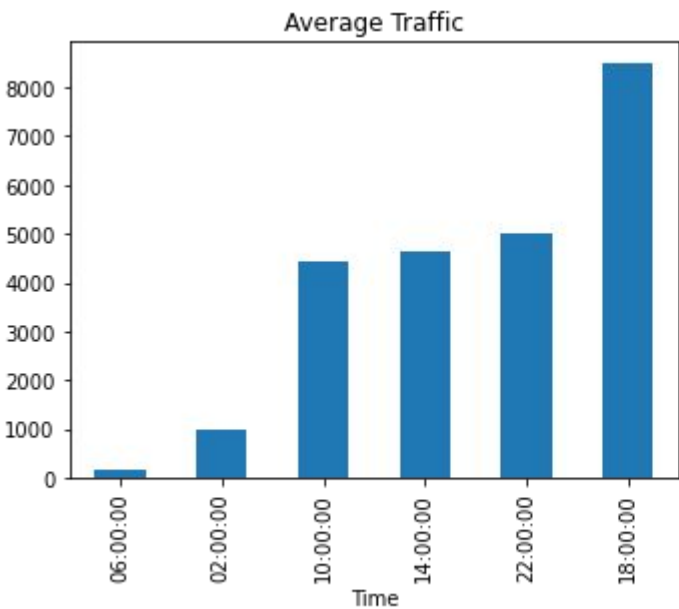
# All Data in October 2019 Separated by Week



# All Data in October 2020 Separated by Week

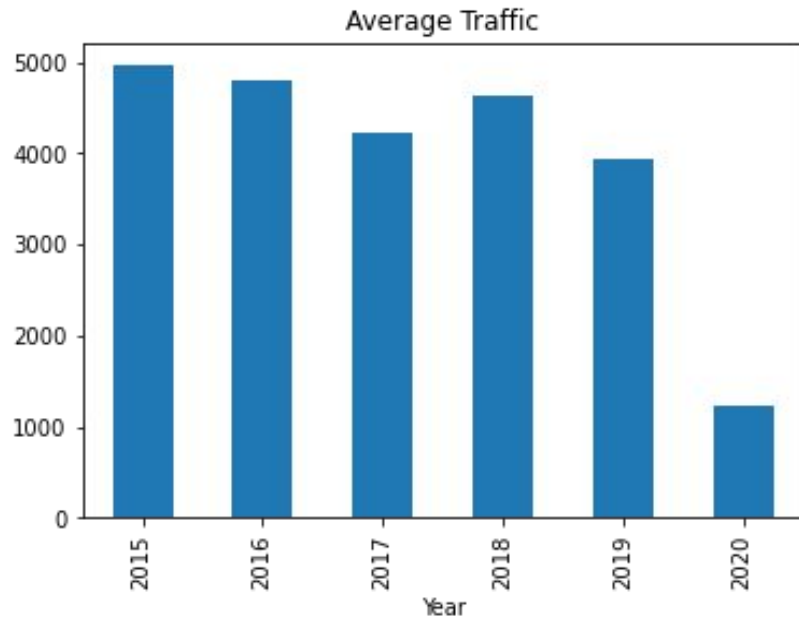
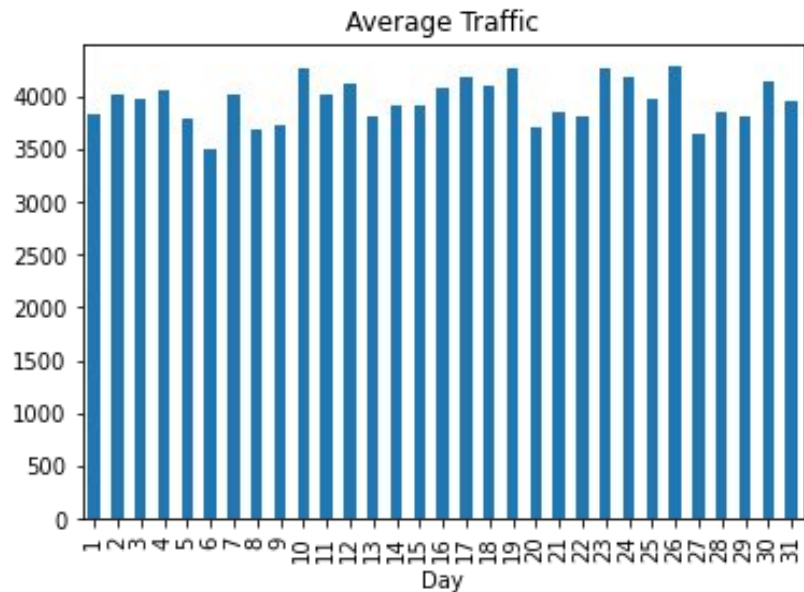


# Patterns from 5 AV/59 ST (aka 5 AVE-59 ST)

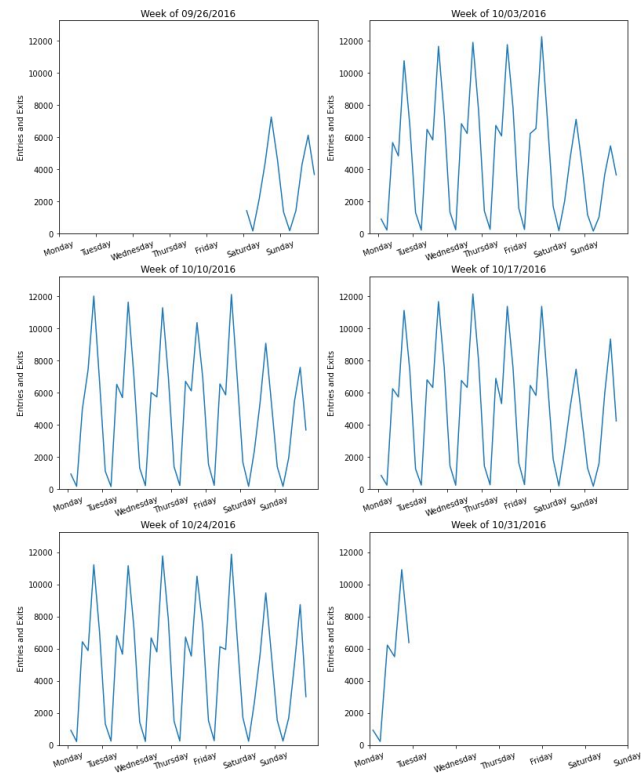
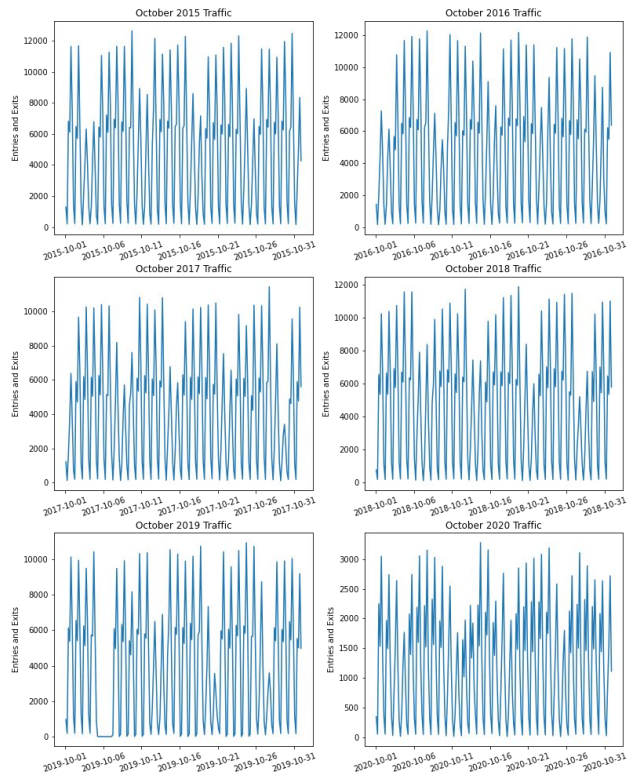


		Traffic
Weekday	Time	
Sunday	06:00:00	125.307692
Saturday	06:00:00	133.703704
Monday	06:00:00	163.407407
Tuesday	06:00:00	171.851852
Wednesday	06:00:00	175.807692
Thursday	06:00:00	177.666667
Friday	06:00:00	180.692308
Monday	02:00:00	685.703704
Tuesday	02:00:00	903.703704
Wednesday	02:00:00	978.346154

# Patterns from 5 AV/59 ST (aka 5 AVE-59 ST)

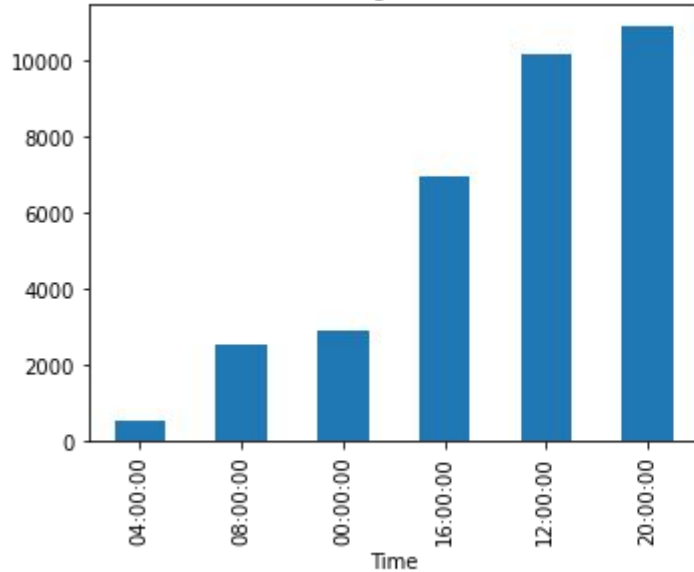


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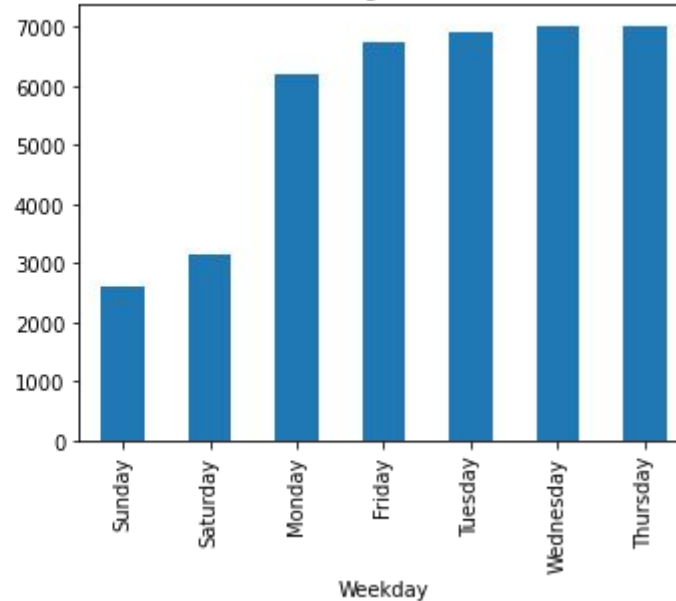


# Patterns from 51 ST

Average Traffic

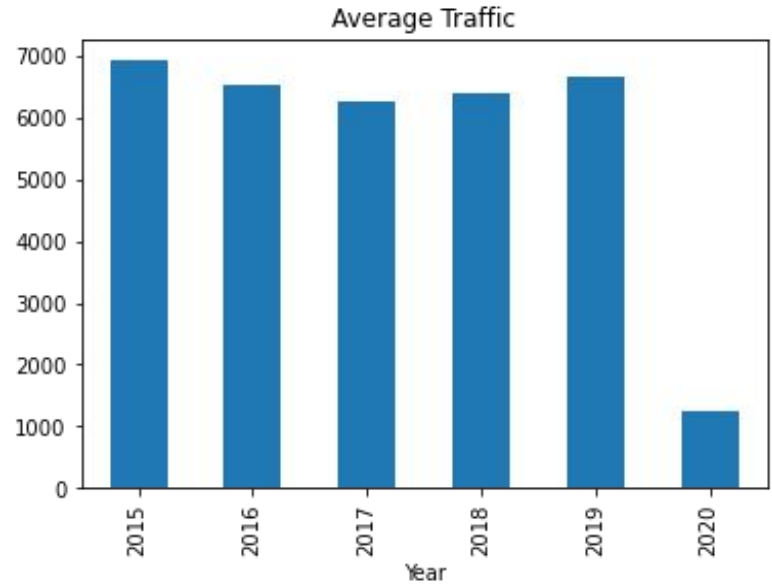
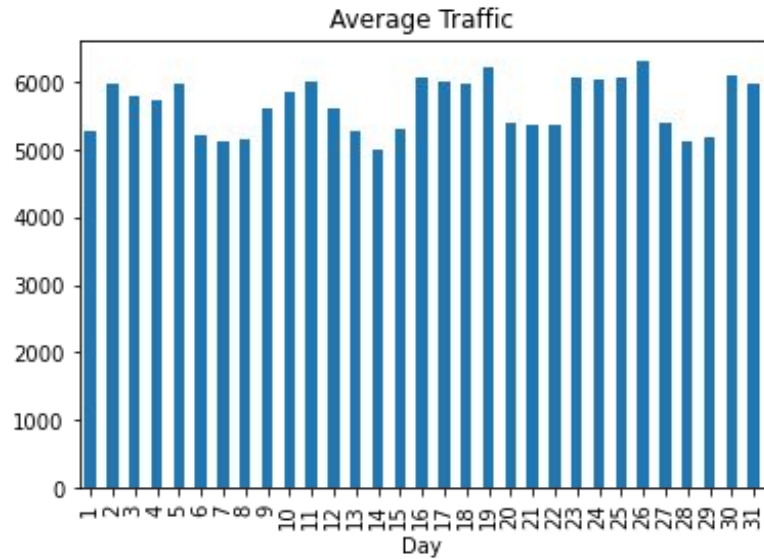


Average Traffic



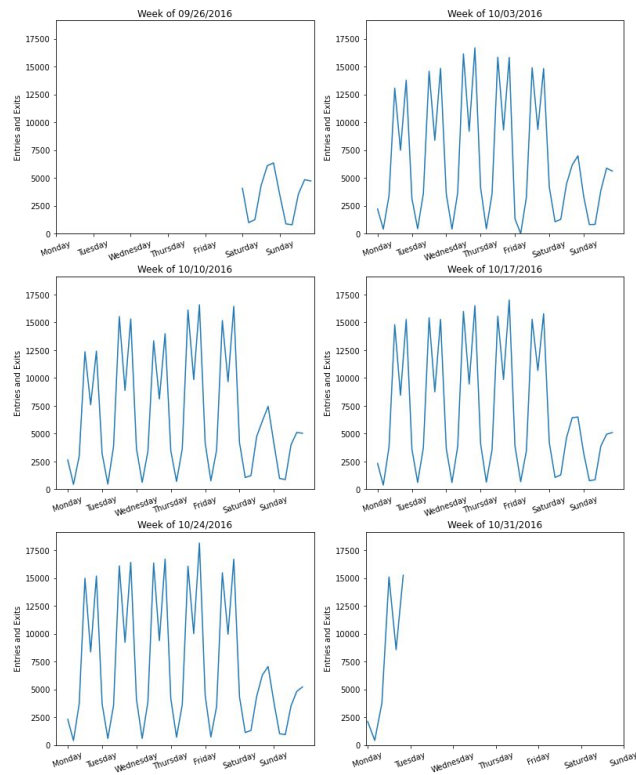
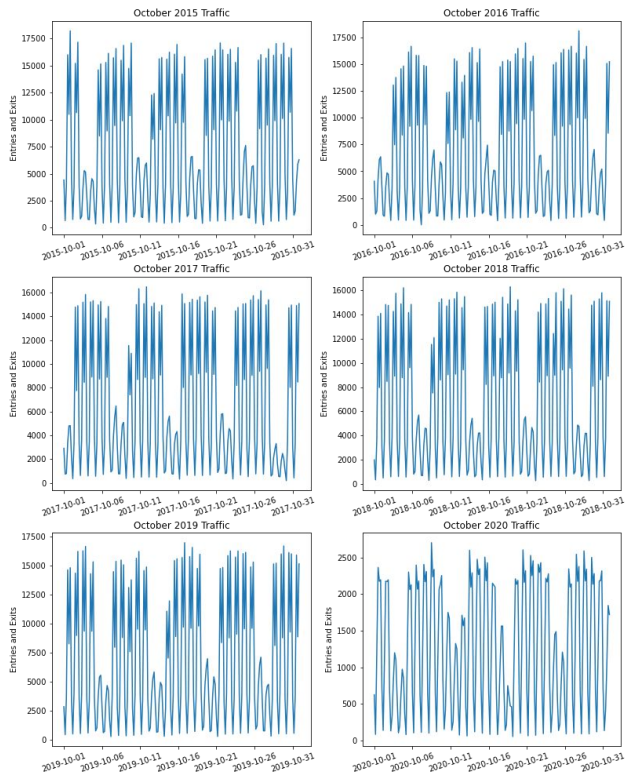
		Traffic
Weekday	Time	
Monday	04:00:00	310.888889
Tuesday	04:00:00	448.185185
Wednesday	04:00:00	487.307692
Thursday	04:00:00	491.111111
Friday	04:00:00	520.076923
Sunday	04:00:00	675.269231
	08:00:00	704.769231
Saturday	04:00:00	772.518519
	08:00:00	1018.185185
Monday	00:00:00	1808.629630

# Patterns from 51 ST



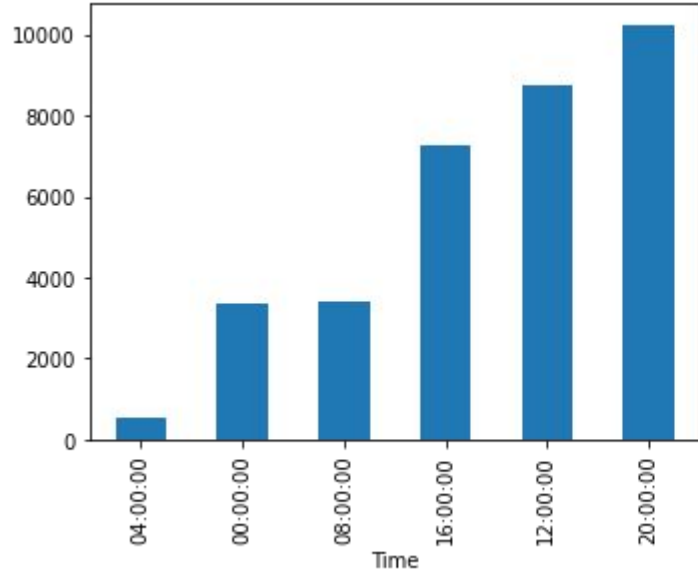


# Patterns from 51 ST

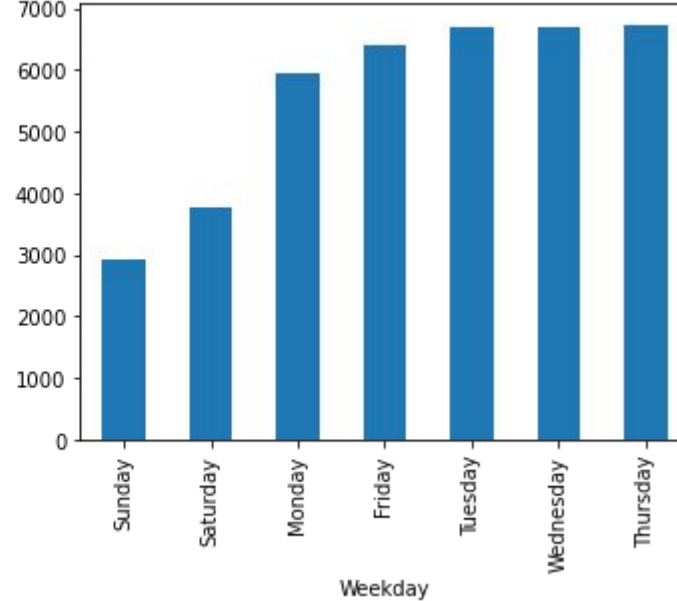


# Patterns from LEXINGTON AV/63

Average Traffic

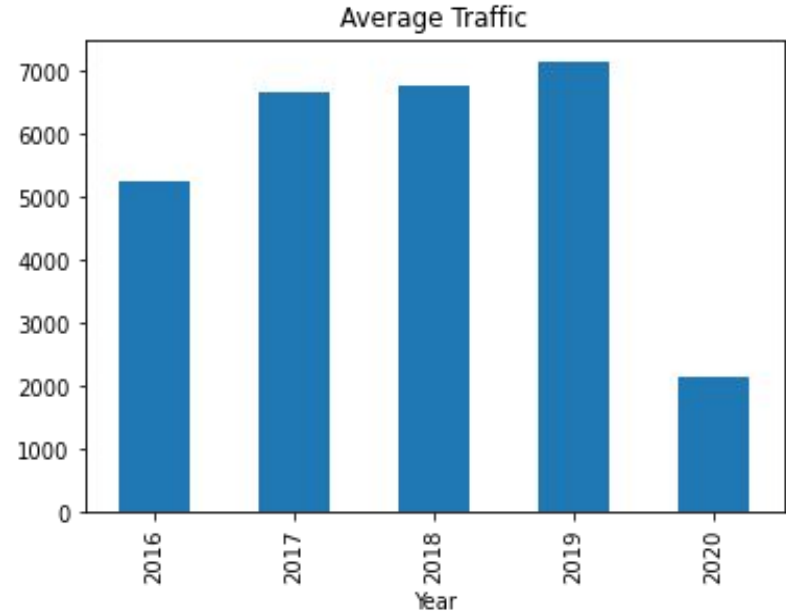
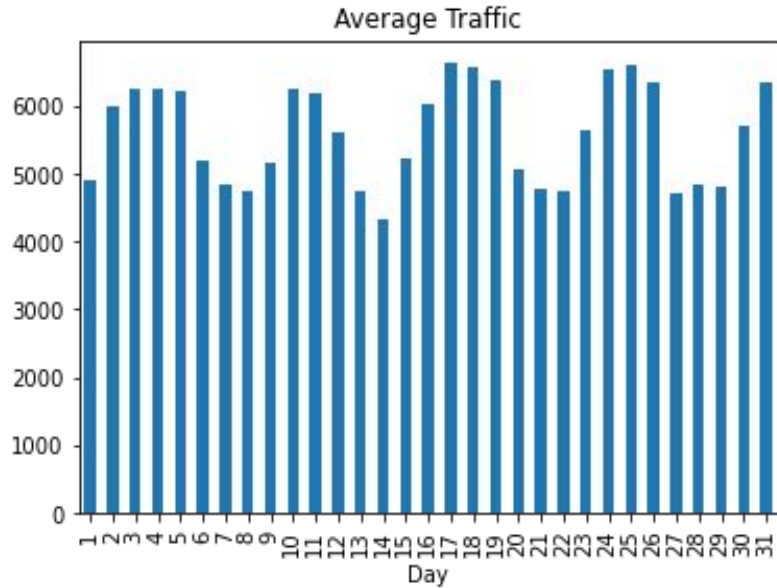


Average Traffic



		Traffic
Weekday	Time	
Monday	04:00:00	393.913043
Tuesday	04:00:00	446.173913
Wednesday	04:00:00	459.045455
Thursday	04:00:00	471.818182
Friday	04:00:00	492.380952
Sunday	04:00:00	800.045455
Saturday	04:00:00	825.500000
Sunday	08:00:00	940.863636
Saturday	08:00:00	1415.409091
Monday	00:00:00	2057.782609

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