# UBER SUPPLY AND DEMAND ANALYSIS

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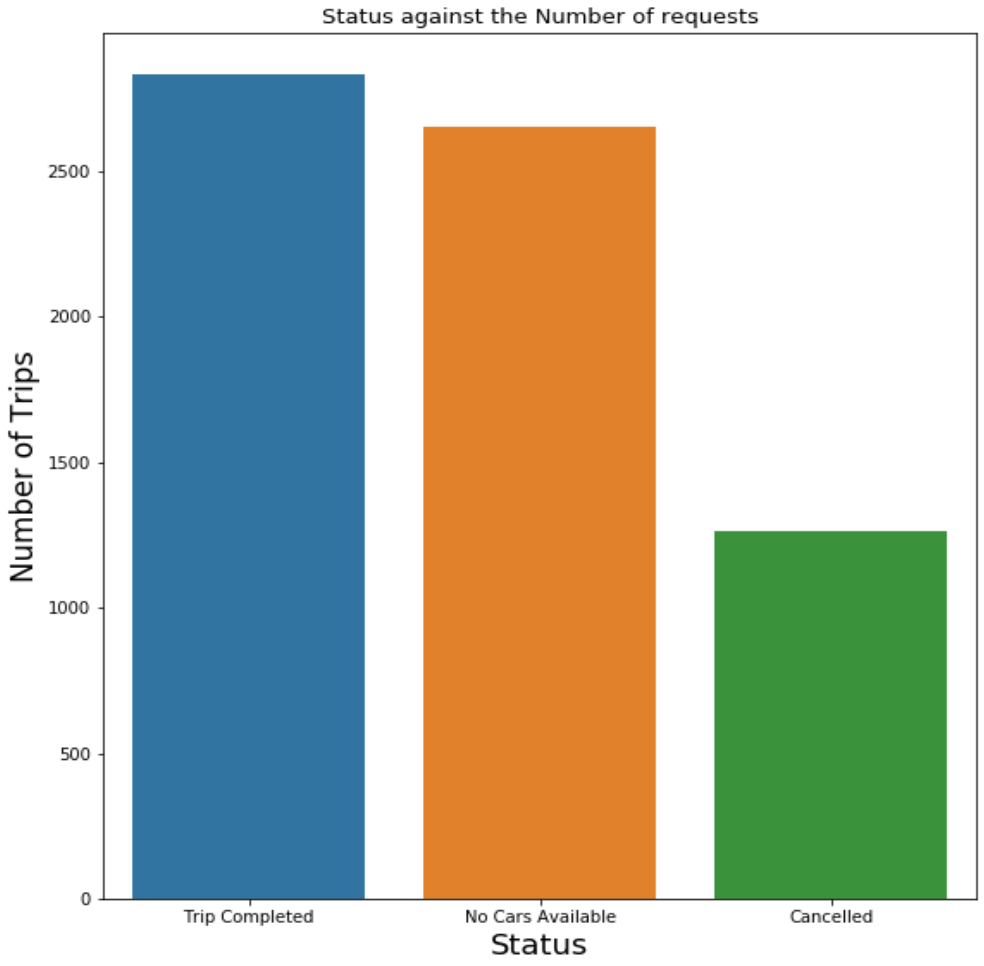
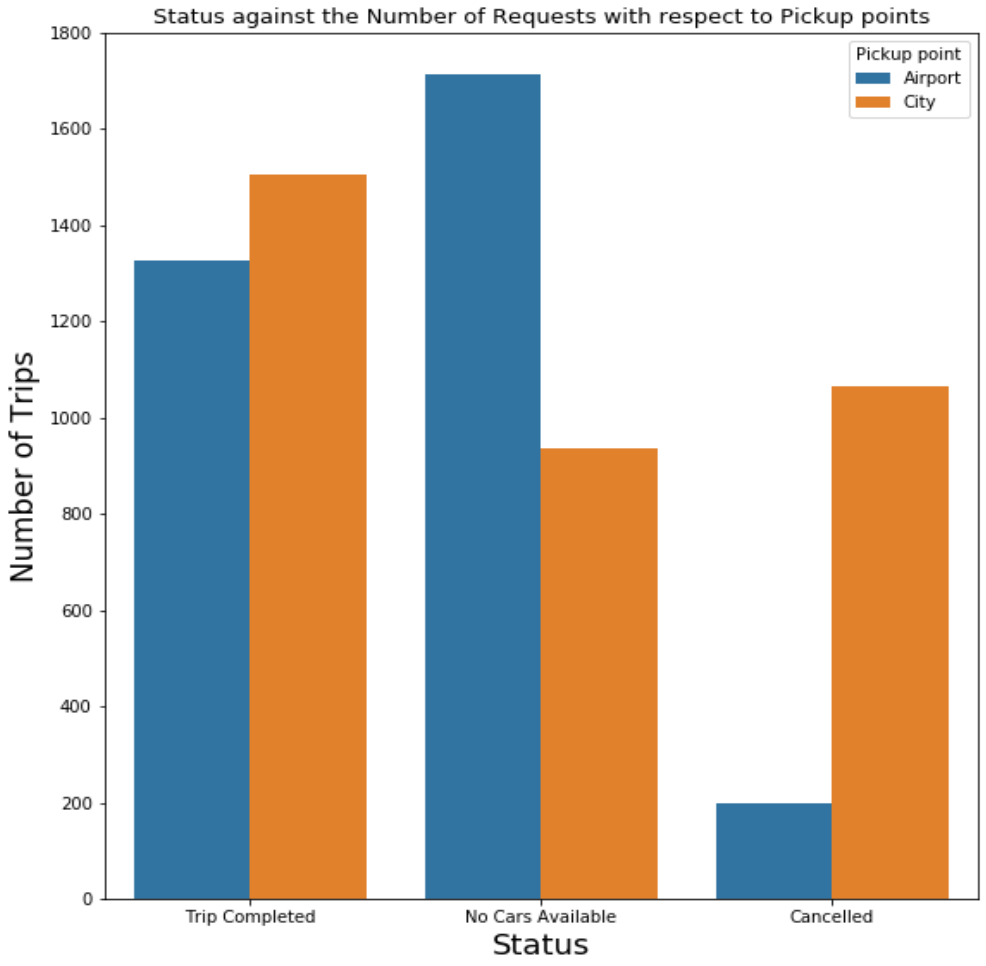
# Problem Statement

- Given a **masked data set** which is similar to what data analysts at Uber handle.
- The aim of analysis is to identify the root cause of the problem (i.e. cancellation and non-availability of cars) and recommend ways to improve the situation.

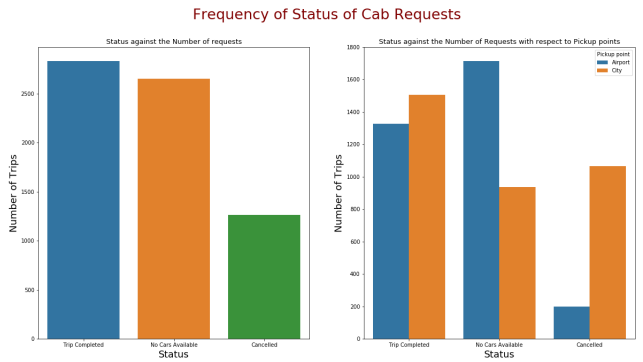
# Preliminary Analysis

## Frequency of Status of Cab Requests



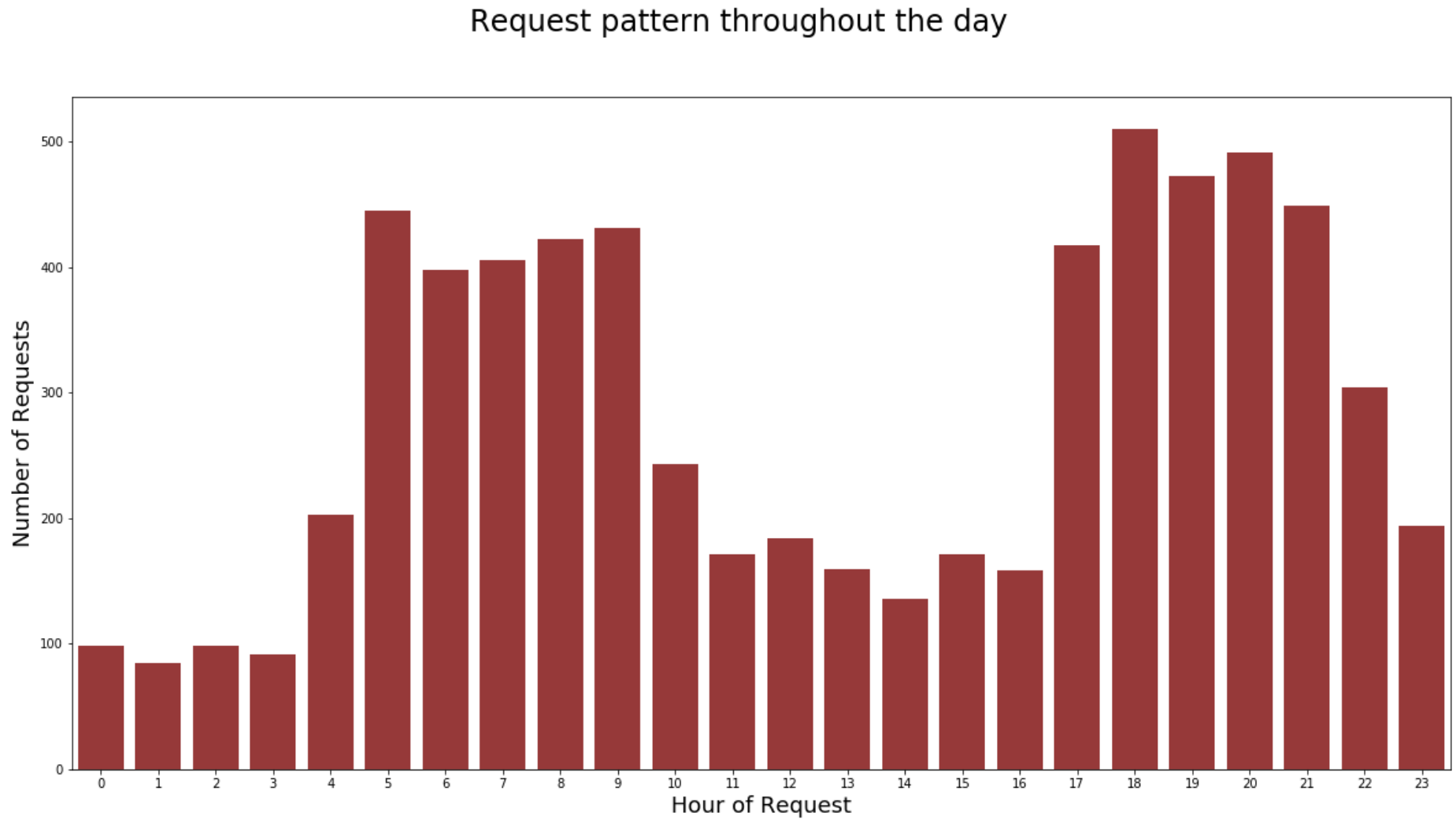

- First plot  shows the frequency of the status of cab requests
- Second plot shows frequency of status with respect to the pick-up point



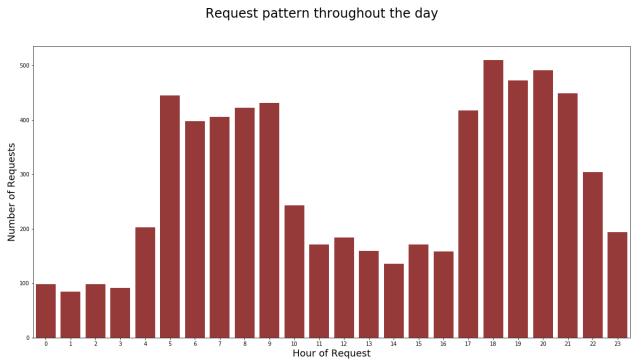

# Explanation:

- From the first plot we can draw a conclusion that though number of trips completed has the highest frequency, the frequency of no cars available and cancelled trips is more than 50%.
- From the second plot we can draw a conclusion that, frequency of no cars available is higher when the pickup is from Airport and that frequency of cancellations is higher when the pickup is from City.
- Hence, we can easily conclude there is a supply and demand gap.

# Preliminary Analysis Contd.




- Further analyzing the cab request pattern throughout the day

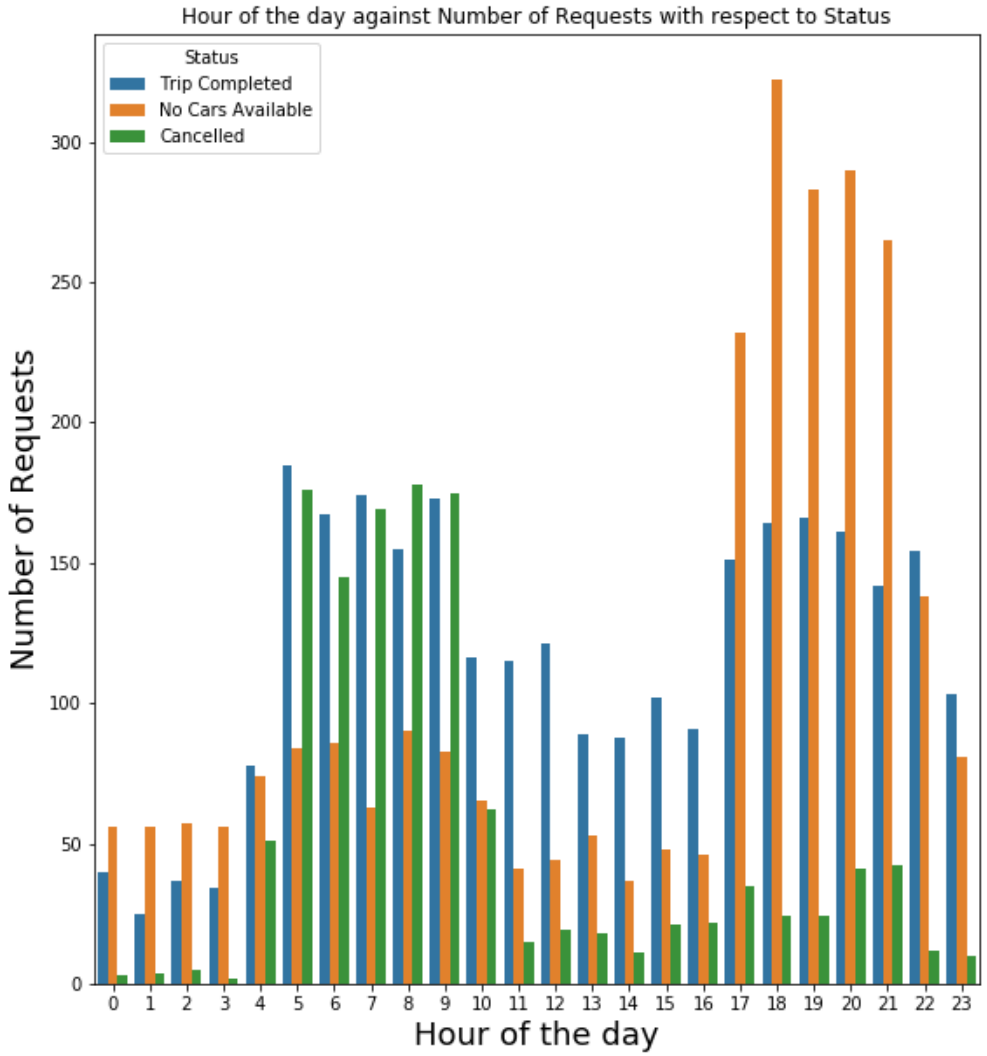


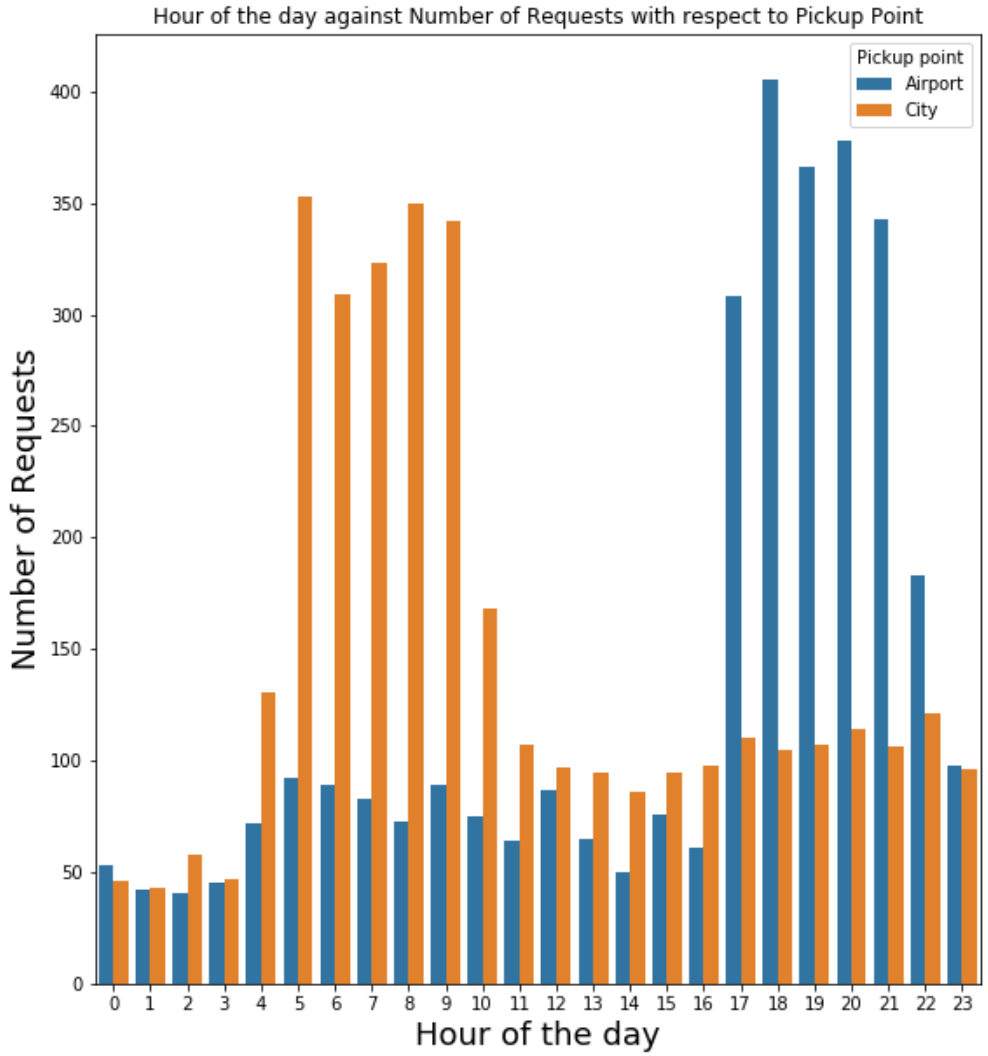

# Explanation:

- From the graph we conclude,
- The frequency of cab requests starts from 5 in the morning to 10 in the morning which is considered as Morning Peak Hours.
- The frequency of cab requests starts from 5 in the evening to 10 in the evening which is considered as Evening Peak Hours

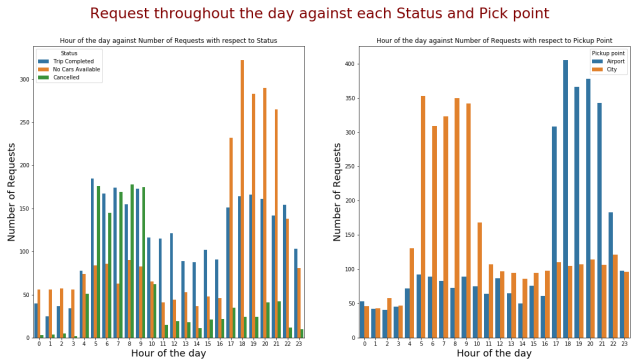
# Analysis of Cab Request pattern

## Request throughout the day against each Status and Pick point



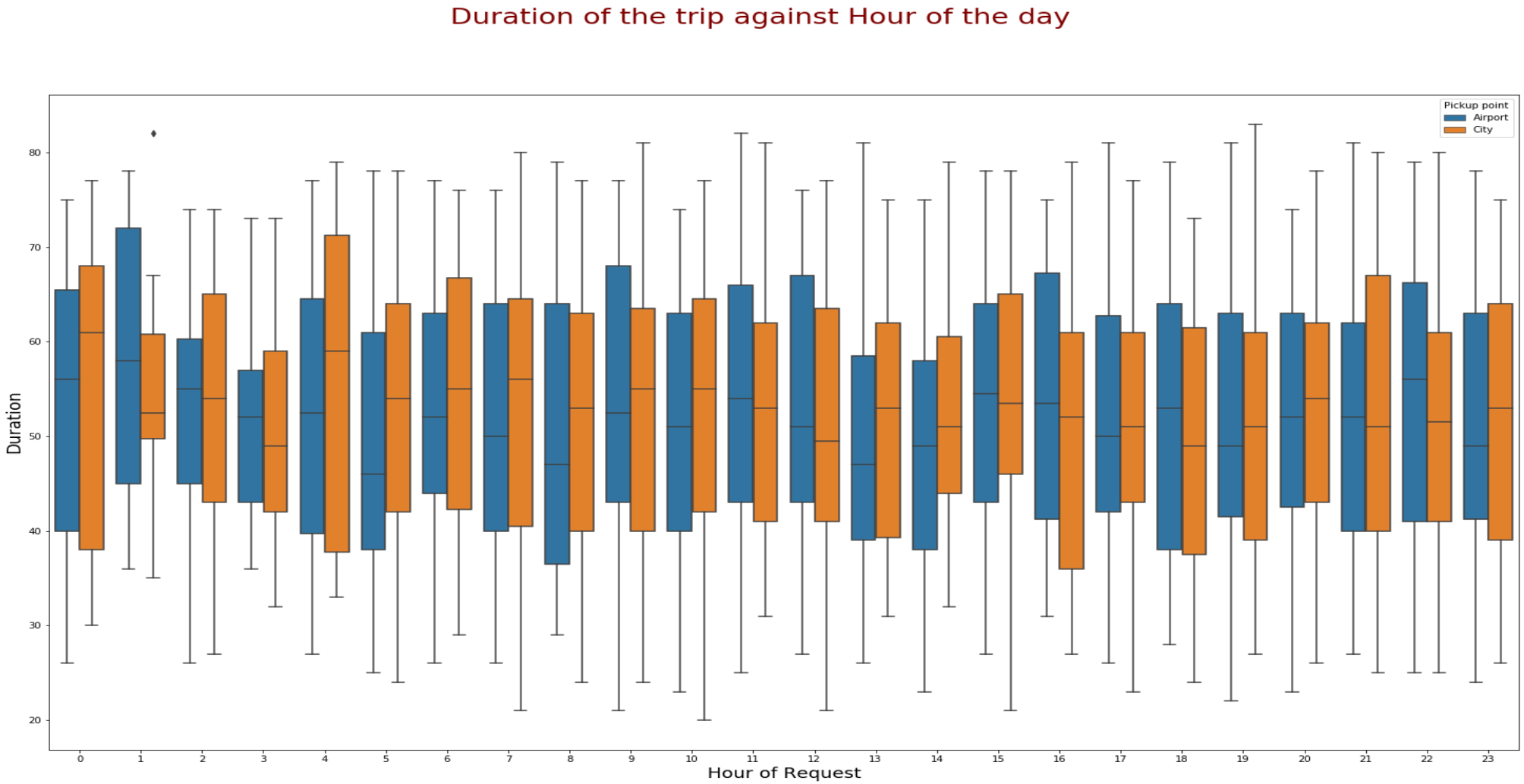

- Plot to analyze the Request throughout the day against each Status and Pick point



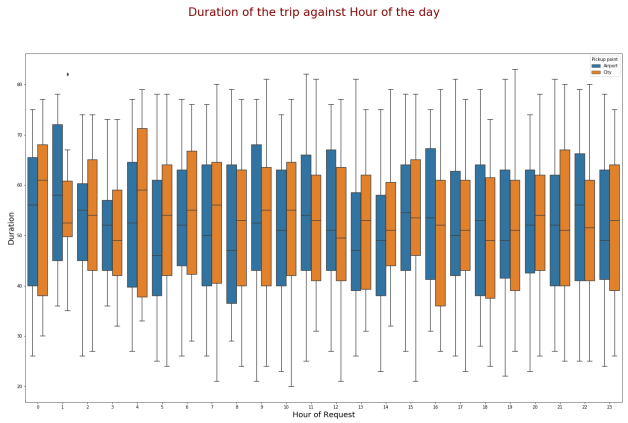

# Explanation:

- From the plot 1 we can conclude that the frequency of cancellation is high during Morning peak hours and frequency of No cars available is high during Evening Peak Hours
- From the plot 2 we can conclude that the frequency of cab requests is high from City during Morning Peak Hours and the frequency of cab requests is high from Airport during Evening Peak Hours

# Trip duration Analysis



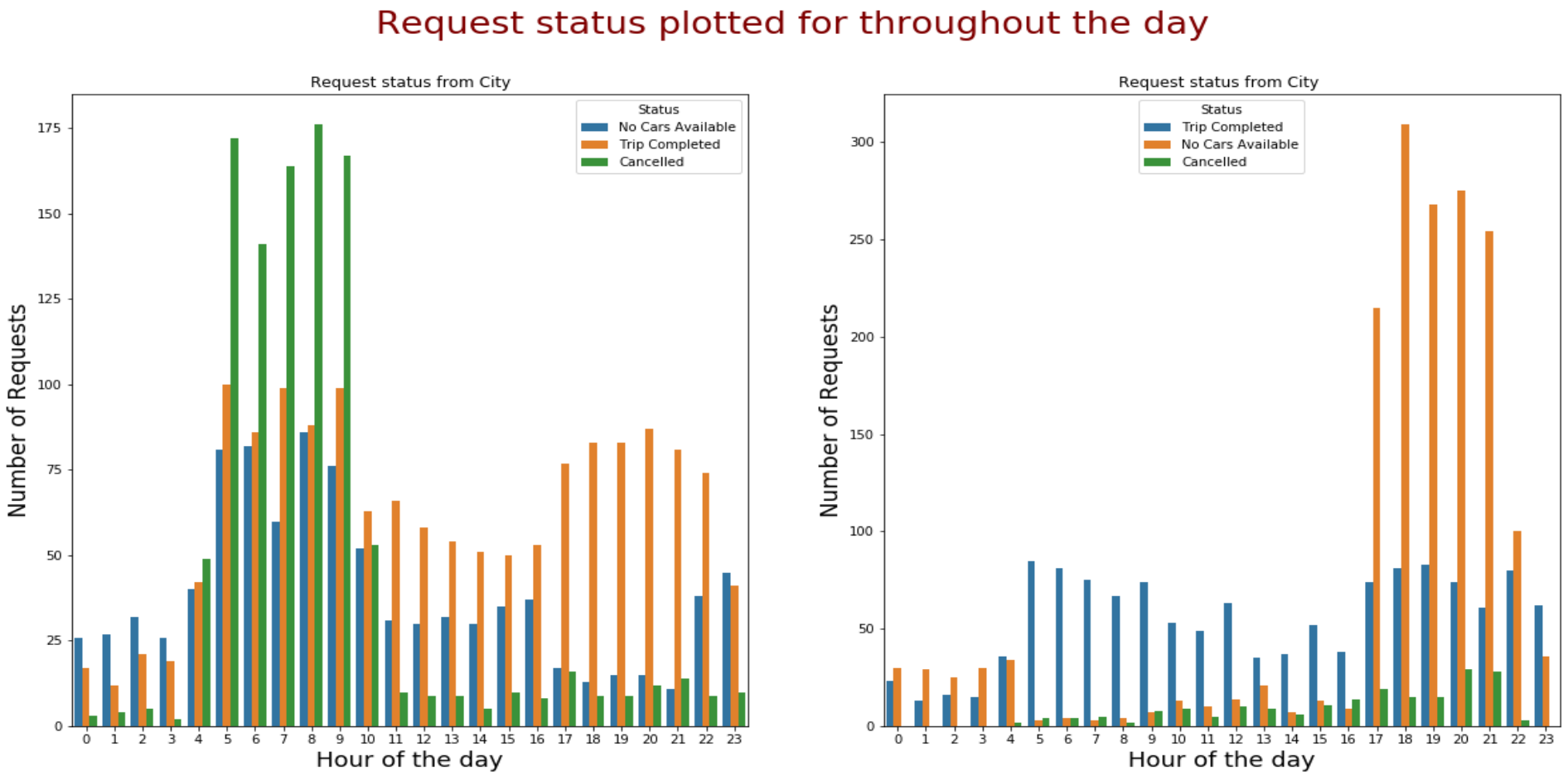

- Box Plot to analyze the Trip duration for Airport and City request against each hour of the day



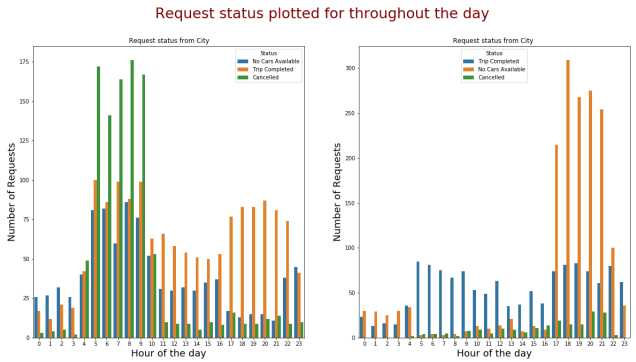

# Explanation:

- From Airport to City **Average trip duration** is high during Evening Peak Hours and from City to Airport average trip duration is high during Morning Peak Hours
- From the above analysis we can easily conclude that higher **Average trip duration** from City to Airport is the reason for high cancellations.
- Also considering the fact that no cars are available during Evening Peak Hours from Airport to City (from previous plot), we can conclude that the **Average trip duration** from Airport to City is not a problem in this case.

# Request Status analysis from City and Airport




- Plot to analyze request status from City and Airport



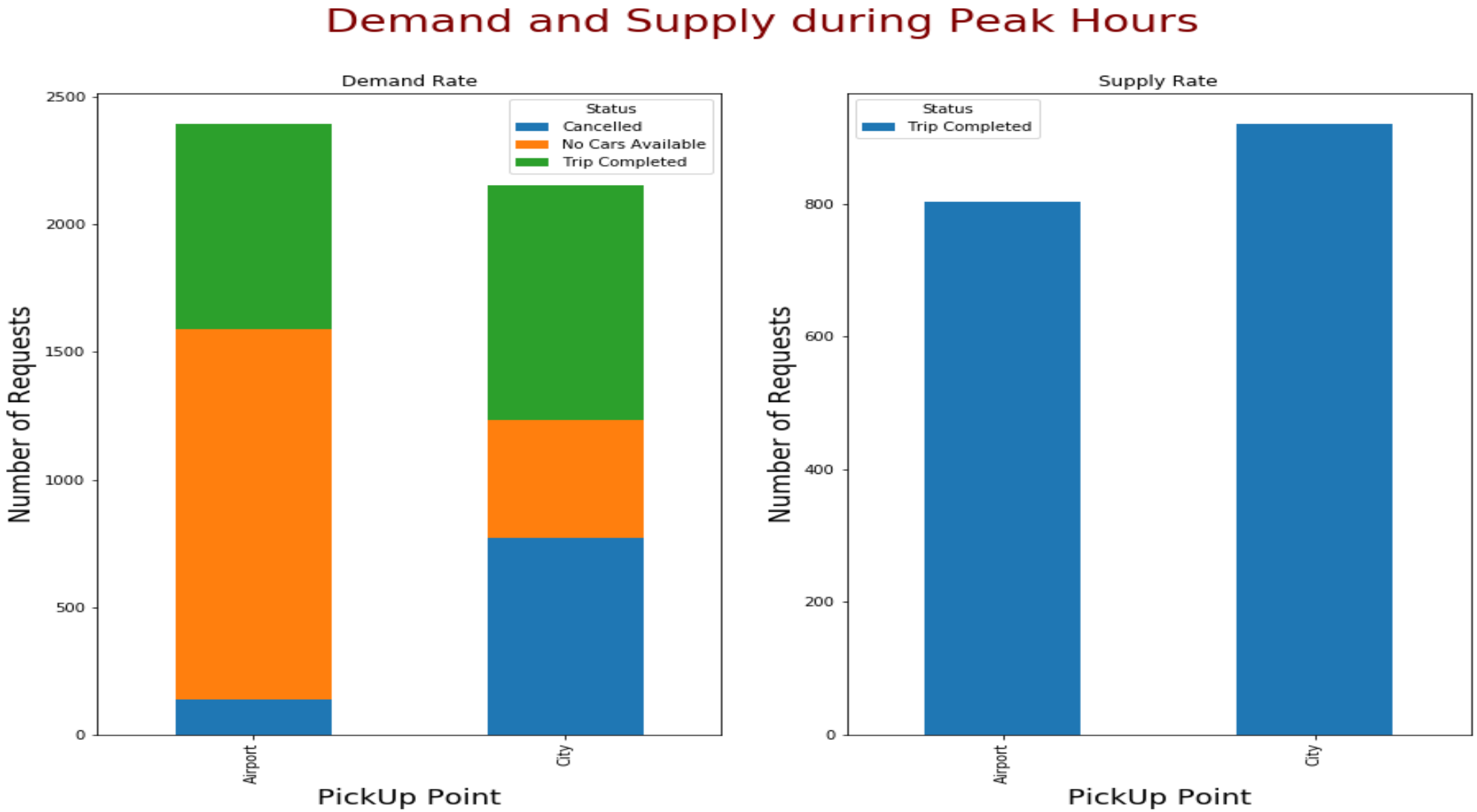

# Explanation:

- From plot 1: Morning Peak Hours there is lot of Cancellations from the City .
- From plot 2: Evening Peak Hours frequency of No cabs available is high from the Airport .
- Hence, we can easily conclude that Cancellation is the issue during Morning Peak Hours from City and that No cabs available is the issue during Evening Peak Hours from Airport.

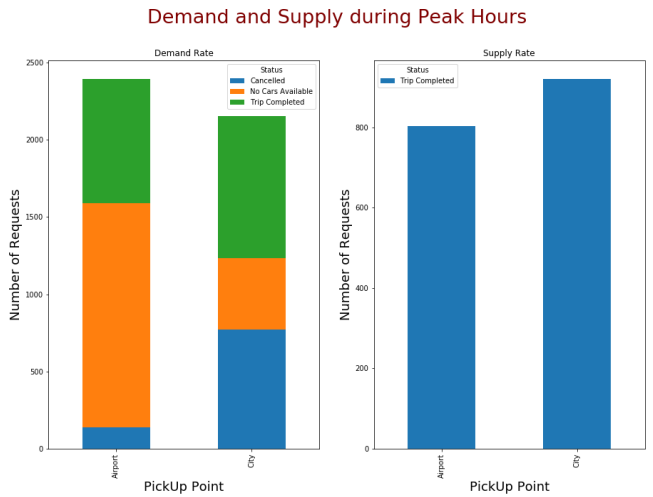
# Conclusions from Preliminary Analysis

- We can easily identify the supply demand gap.
- The gap is evident during the peak hours of the day.
- The average trip duration from City to Airport is high during Morning Peak Hours. This leads to an assumption that this is the reason for high cancellation of requests from City to Airport
- We will further analyze the Peak Hours data to understand the supply and demand gap better.

# Analysis of Supply and Demand



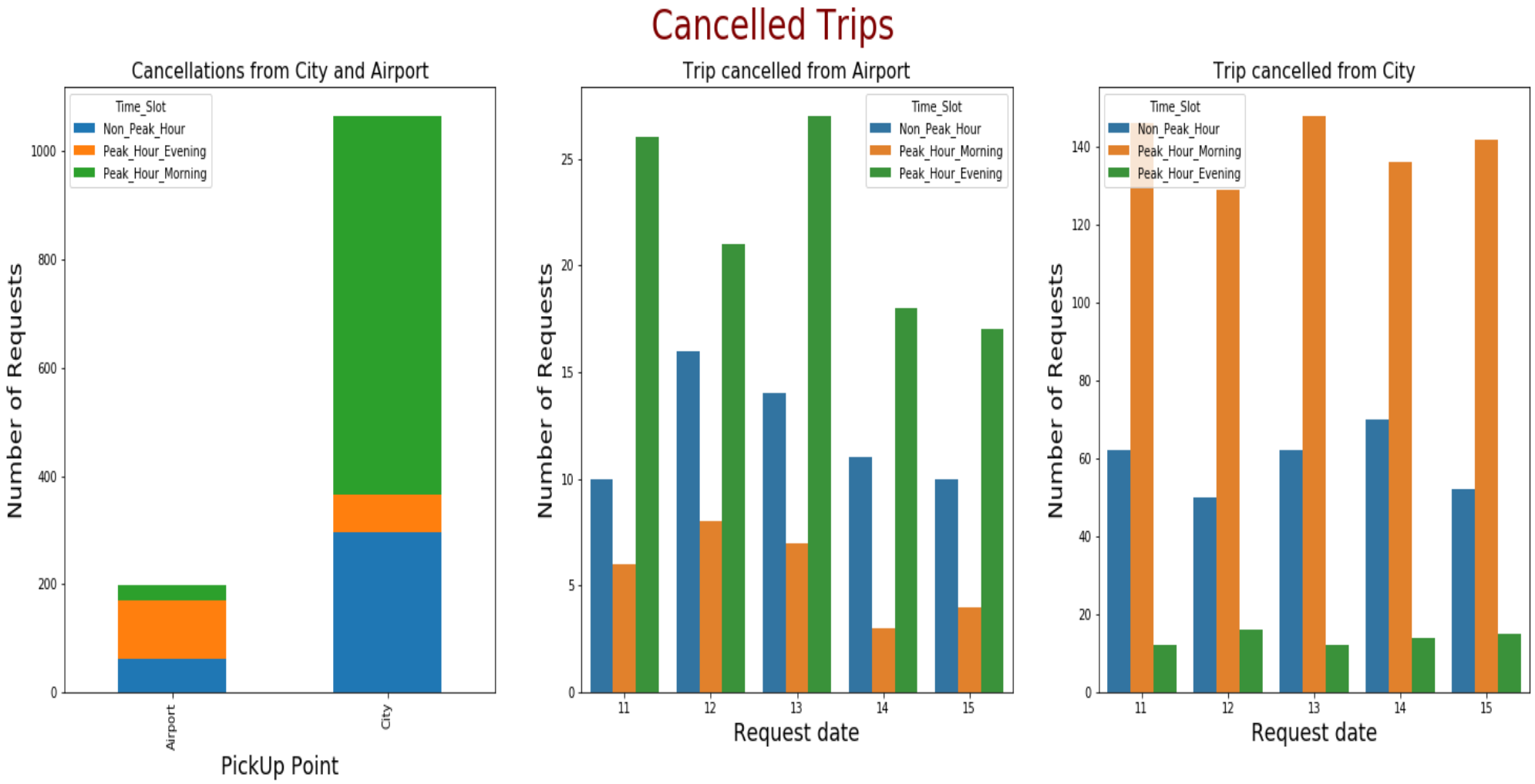

- Plot to analyze Demand and Supply during Peak Hours




# Explanation:

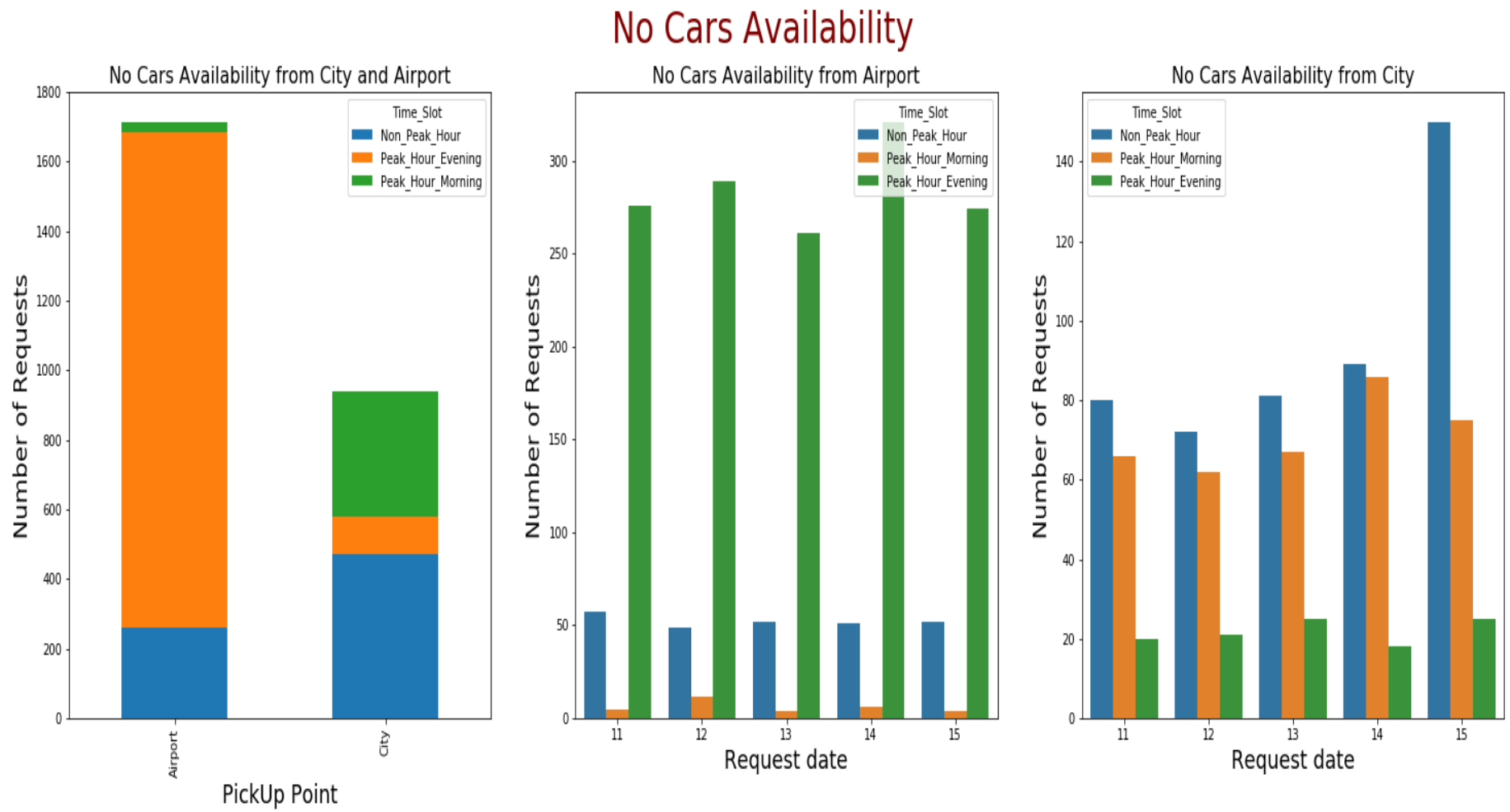
- From both the plots we can conclude thast there is a huge gap between supply and demand during the Peak hours of the day

# Analysis of Cancelled Trips

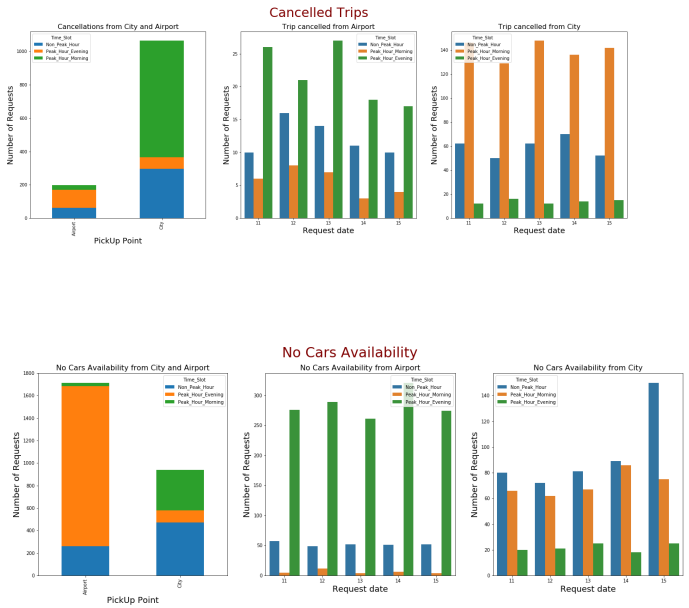



- Plot to analyze cancelled trips from city and airport

# Analysis of Cancelled Trips




- Plot to analyze unavailability from city and airport




# Explanation:

- From the previous two set of plots, following is the analysis
  - Cancellation Plots shows that cancellation issue is retsricted to city pickups and it persists throughout the dates given in the dataset
  - No Cars Availibilty Plots shows that unavailibilty of cars is retsricted to airport pickups and it persists throughout the dates given in the dataset

# Conclusion

- The frequency of Cancellations is high during the Morning Peak Hours for the requests coming in from the City.
    - Reason:
        - As we saw, the average trip duration is high in the morning and this could be a potential reason for the drivers to cancel the trip to the airport.
    - Recommendation:
        - We could possibly increase the incentives provided to the driver who accepts the trip to airport during the morning peak hours.
        - We could also reduce the " total number of compulsory trips" for a day for all those drivers who does an average of three trips to and fro the airport and city.
- The frequency of car unavailability is high during the Evening Peak Hours for the requests coming in from the Airport

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    - Reason:
        - Fewer cabs going to the airport as there is less requests before evening peak hours and or higher number of planes landing during the evening peak hours that eventually increases the supply and demand gap.
    - Recommendation:
        - We could ensure to sign up a greater number of drivers to meet the demand during that time.