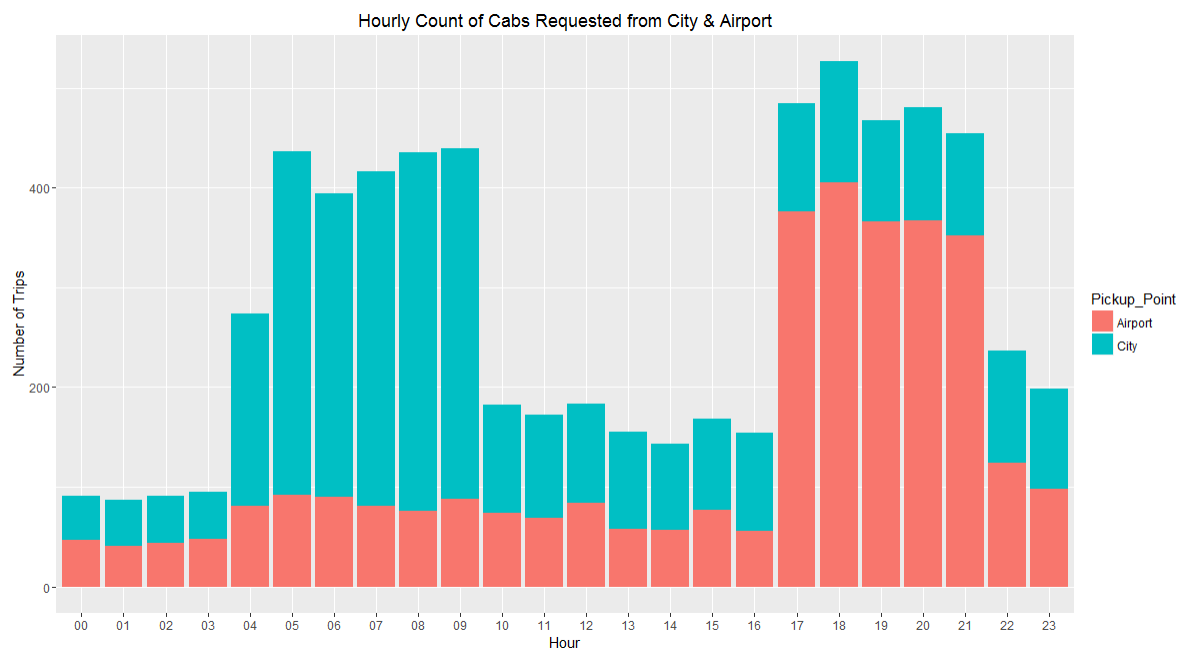**All components of this case study have to be executed in R.**

DATA PREPARATION:

1. Make a grouped bar chart depicting the hour-wise trip request made at city
   and airport respectively. You can aggregate the data for all 5 days on the
   same axis of 24 hours. Each bar should correspond to an hour and pick-up
   point (city / airport) should be displayed in two colors.

2. In the bar chart (question 1), you'll be able to see 5 major time blocks based
   on the frequency of requests made at the city and airport. You have to now
   divide the request-time into 5 time-slots described below. Make an
   additional column "Time_Slot" which takes these 5 categorical values
   depending on the request time:
   - Pre_Morning
   - Morning_Rush
   - Day_Time
   - Evening_Rush
   - Late_Night

   Note: The division of time-slots may not have one right answer.

Plot a bar chart for number of trips made during different time-slots in R and paste the image here

Number of Completed trips made for each time slots
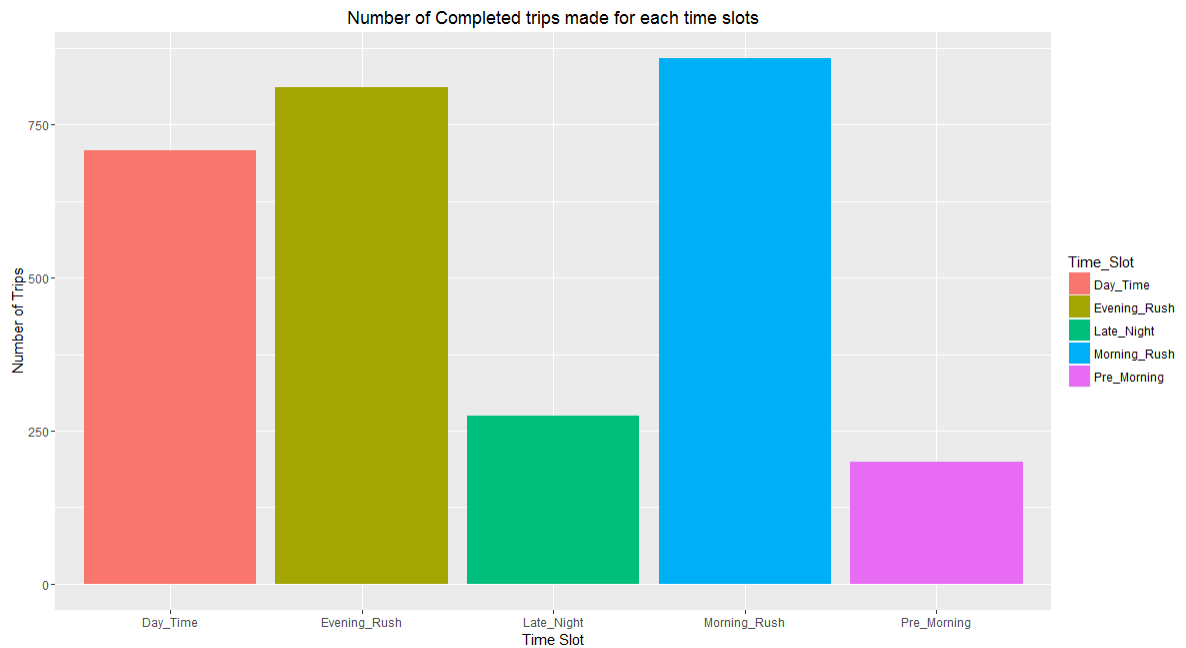
Also give the count of the number of trips made during different time slots you have decided.

- Pre_Morning:199
- Morning_Rush: 859
- Day_Time: 708
- Evening_Rush: 811
- Late_Night: 275

PROBLEM IDENTIFICATION:

1.Make a stacked bar chart where each bar represents a time slot and y axis shows the frequency of requests. Different proportions of bars should represent the completed, cancelled and no cars available out of the total customer requests.
Please paste a copy of your plot here.

Number of trips made for different time slots with different trip status
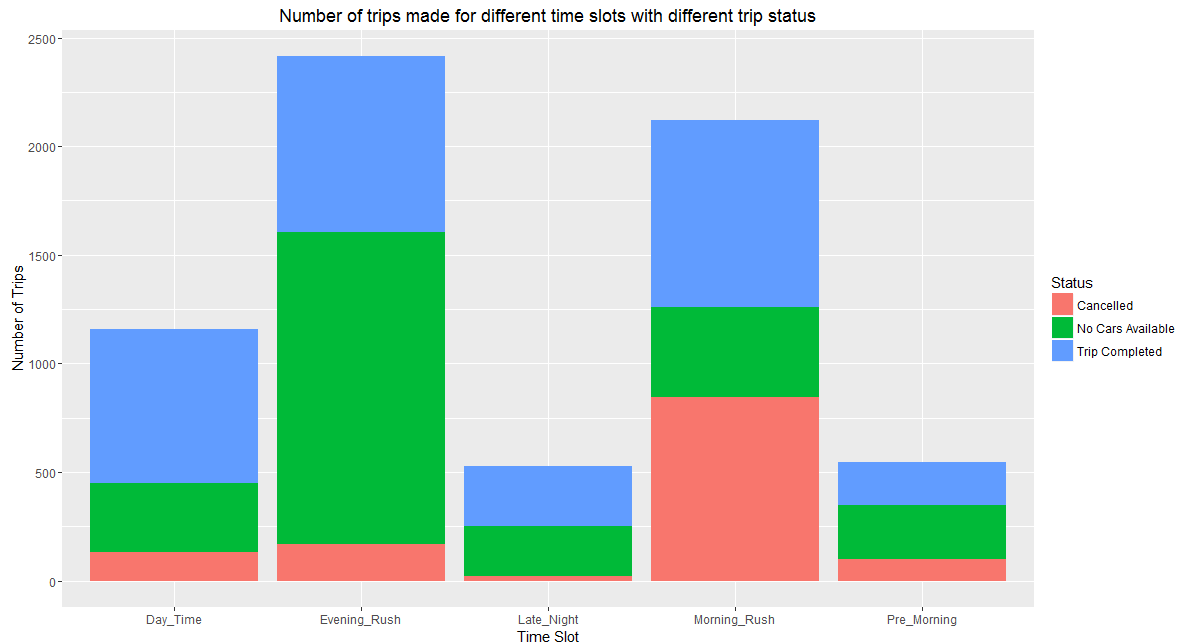
2. Visually identify the 2 most pressing problems for Uber, out of the 15 possible scenarios (5 slots * 3 trip status).
Case 1:- Morning Rush & Cancelled Cabs
Case 2 :- Evening Rush & No Cars Available

3. Enter your diagnosis results here:
   - Problem 1: Cancelled Cars for Morning Rush Time Slot
   - Problem 2: No Cars Available for Evening Rush Time Slot

Problem 1: Morning Rush & Cancelled Cabs

1. For the time slot when problem 1 exists, plot a stacked bar chart to find out if the problem is more severe for pick-up requests made at the airport or the city. As a next step, you have to determine the number of times this issue exists in that time slot.

- Find the percentage breakup for the total number of issues in this time slot based on the pick-up point.

Please paste your plot here.

Stack Bar Chart for the Morning Rush - Cancelled Car Status
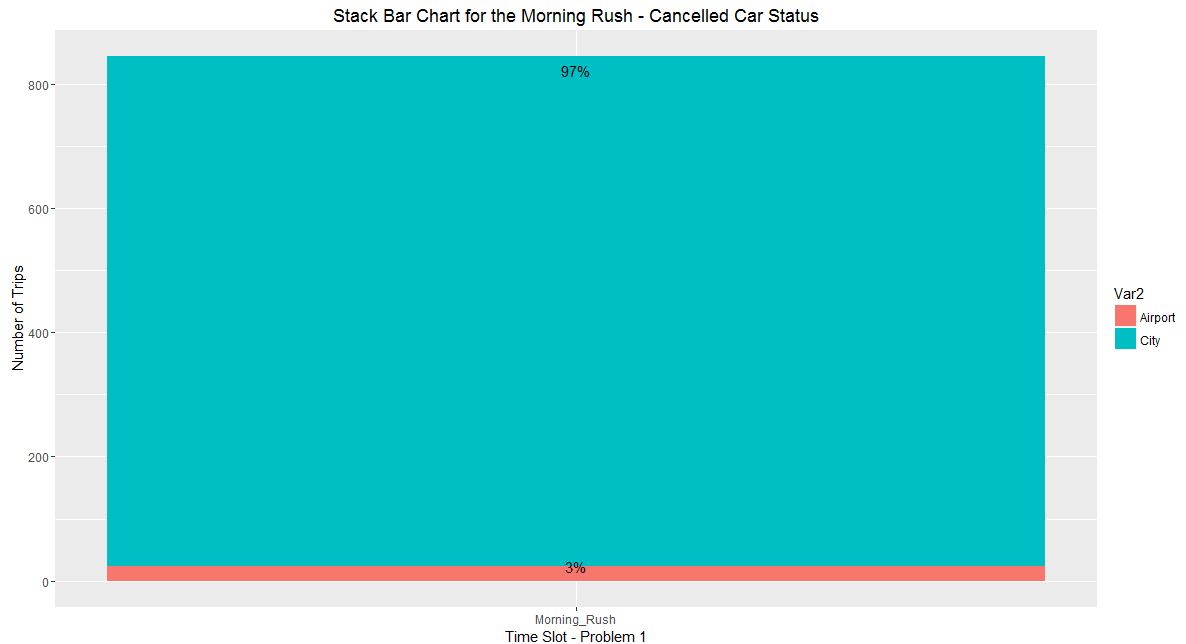
- What is the percentage of total issues at (based on pick-up point):
  - Airport :3
  - City : 97

  For Morning Rush, the problem is for City Pickup for Cancelled Cars

2. Now let's find out the gap between supply and demand. For this case, the demand is the number of trip requests made at the city, whereas the supply is the number of trips completed from city to the airport.

   Total No. of trip requests made in city: 3515
   Total No. of trips completed from city to airport: 1512
   No. of trip requests made in city: 1693 (For Morning Slot)
   No. of trips completed from city to airport:476 (For Morning Slot)

3. What do you think is the reason for this issue for the supply demand gap? (Write the answer in less than 100 words).

City Pickup Demand Graph for different time slots
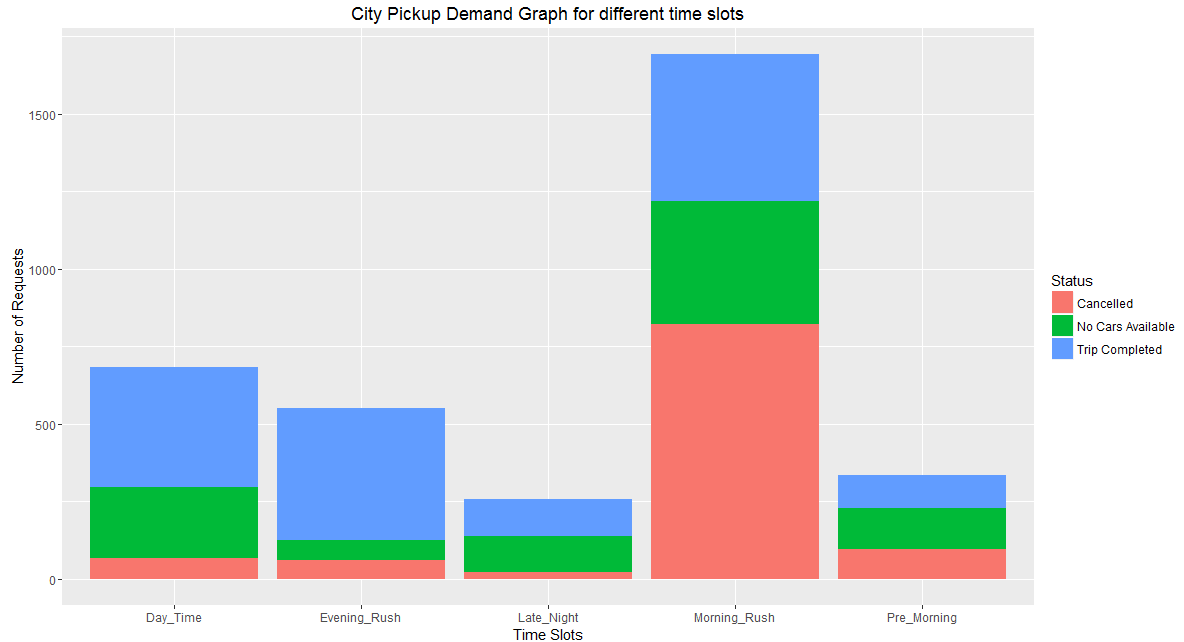
Based on above Graph, it's clear that in Morning Rush, there are mostly cancelled cars for the bookings made from City i.e. the drivers are cancelling the cab requests during the morning rush time slot if made from city. The reason, can be the unavailability or the drivers for airport trips. They might be preferring local trips. If one driver takes an Airport trio during this time, then the wait time for him at Airport is more, because of limited incoming flights.

4. What is your recommendation to Uber (Not more than 50 words)?
    a. Increase the fares for this slot from City to Airport, so that the drivers/Uber will not suffer big & hence the cancellation from drivers will get reduced.
    b. Sharing Cabs to Airport at marginal discounts to each customer can encourage the drivers not to cancel the Cabs as the earning per trip will increase.

Problem 2: Evening Rush & No Cars Available

1. For the time slot when problem 2 exists, plot the stacked bar chart to find out if the issue is for pick-up request made at the airport or the city. Just like problem 1:

• Find the percentage breakup for issue based on the pick-up point for the

time slot in which problem 2 exists.

Please paste your plot here.
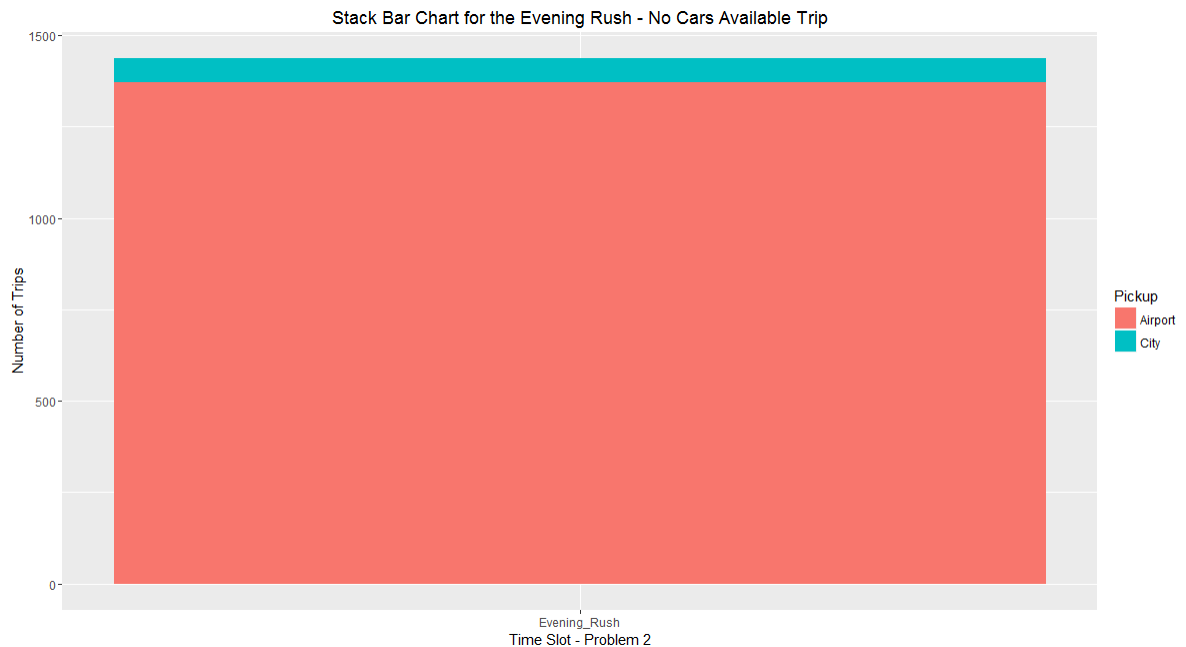
- What is the percentage of total issues at (based on pick-up point):
  - Airport :95
  - City : 5

<mark>No Cars are Available during Evening Rush from Airport</mark>

2. Now let's find out the gap between supply and demand. For this case, the demand is the number of trip requests made at the airport, whereas the supply is the number of trips completed from airport to the city.

   Total No. of trip requests made at the airport: 3251
   Total No. of trips completed from airport to the city: 1340
   No. of trip requests made at the airport: 1866(For Evening Rush)
   No. of trips completed from airport to the city: 387(For Evening Rush)

3. What do you think is the reason for this issue for this supply demand gap? (Not more than 100 words)?

Airport Pickup Demand Graph for different time slots
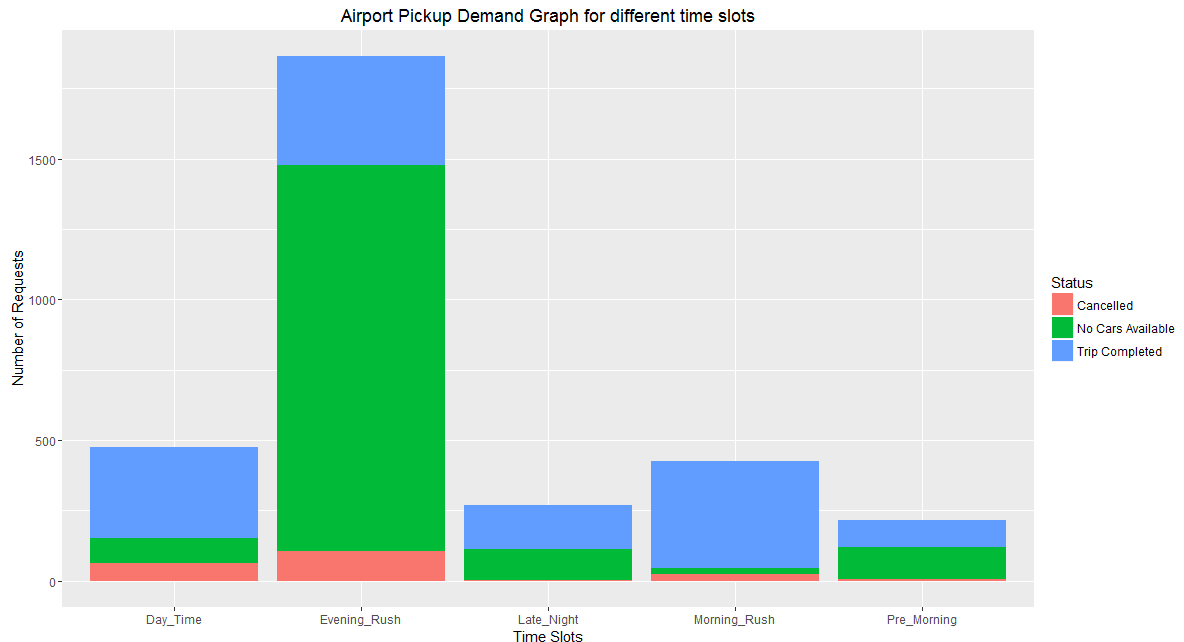
During the evening rush time slot, the cars were not available in Airport, as sufficient cars did not reach the airport to serve the required demands. The Morning rush issue, where the drivers were cancelling the city pickup to airport, the sufficient number of cars could not be made available to service the request during the evening rush at airport.

4. What is your recommendation to Uber (Not more than 50 words)?
Encouraging Sharing of Cabs by customer.

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I would like to provide a solution based on both the cases combined together as per my understanding. If Uber selects the working hours of Cab drivers based on location of their home wisely, a part of both the problem can be resolved. Suppose, there are two types of drivers, one having homes near Airport & others having homes in Cities. **Now, the Drivers having homes near Airport, will not mind going to airport from city during Morning Rush timing when there was most cancellation**. They can relax at their home/take a break when there is no Flights & less demand. During the low flights & less demand time of "Day Time", max attempt of satisfying the demands can be done by other drivers and not these drivers. **This will, make the availability of the Airport home drivers during the Evening Rush time from airport to City**. This way, they will be able to sort the problem of Cancellation & No cars available for both the time slot. Strategic selection of drivers, their home & their working hours can help resolve all these problems. This may be one solution or one way to think of the approach of the solution.