Background

In addition to subway, bus and commuter rail service, the MTA offers Access-A-Ride paratransit service in compliance with federal Americans with Disabilities Act (ADA) regulations to provide public transportation to customers with disabilities that prevent them from using public buses and trains. (More info here.)

Access-A-Ride (AAR) Paratransit Service operates:

- Within New York City's five boroughs plus three-quarters of a mile beyond fixed-route services that run past NYC's border to nearby areas of Nassau and Westchester counties.
- A shared-ride program (customers may be riding with other customers).
- 24 hours a day, seven days a week, 365 days a year.

All trips are provided to customers using one of three types of contractors:

1. "Primary" providers operate the "white with blue stripe" vans often seen around NYC
2. "Broker" providers are taxi companies contracted to provide trips
3. "E-hail" providers are companies like Lyft and Curb contracted to provide "on-demand" service

While all trips are provided by contracted providers, the MTA operates a single call center to receive trip requests and schedule trips. Each day, the MTA assigns a list of trips to perform to each provider. In the case of "Primary" providers, the schedule includes specific pickup and drop-off times.

To reserve a trip, customers must submit their request by 5PM the day before. They choose whether they want their trip to be a "Pickup" trip or an "Appointment" trip. In "Pickup" trips, customers provide the time they would like to be picked up from the origin and the call center provides an estimated time of arrival at the destination. In "Appointment" trips, customers designate the time they would like to arrive at the destination and the call center provides a mutually agreeable pickup time.

A data file to be sent separately (per the email), is an excerpt of the "Trip" table from Paratransit's scheduling engine. Each row represents a trip requested by a customer, whether it was completed or not.

We generally receive less information about "Broker" and "E-hail" trips than we do "Primary" trips, e.g., pick-up times, etc. Most notably, we consider a successfully delivered "Primary" trip to be "Completed", whereas we consider trips provided on other services to be "Authorized", subject to final review. For this exercise, trips with an outcome of "Authorized" or "Completed" are considered "successful".

Your task:

If you would like to be considered for an internship with MTA Data & Analytics, email us back to request the "Trip" file and accompanying data dictionary. Using the sharing link we send, download the files and analyze the data with Python, SQL, or R. Send us your work as a zip file that includes each of the following:

- a script file that we can run to get similar results to your own. Notate the coding thoroughly, as if you were handing this off to another staff member for follow up. Label the file "CODE"
- An Excel file presenting your responses to "Summary outputs to provide" (next page) with a tab for each of Questions 1, 2, and 3. Label the file "SUMMARY OUTPUTS"
- If you produce a data exploration file, feel free to include it without modification. Label the file "DATA NOTES"
- The "Trip" file you downloaded as either the original CSV or modified through your work. Label the file "DATA"

Summary outputs to provide:

1. The cost of "Primary" trips is significantly higher than “Broker" or "E-hail" trips, but the needs of some customers require "Primary" service. In their efforts to make Paratransit service as cost effective as possible, MTA leaders want to understand the proportion of trips completed on "Primary" vs "Broker" providers. Provide tables like those below to show the total number of successful trips, the average trips per day, and the % of trips by mode (i.e., provider type) for weekday vs. weekend:

Total successful trips				
	Primary	Broker	E-Hail	Total
Weekday (M to F)				
Weekend (Sa & Su)				
Total				

Average trips per day				
	Primary	Broker	E-Hail	Total
Weekday (M to F)				
Weekend (Sa & Su)				
Total				

% of trips by mode				
	Primary	Broker	E-Hail	Total
Weekday (M to F)				
Weekend (Sa & Su)				
Total				

2. For any given provider contract, trip costs are a function of trip distance, duration, and time of day. For late and overnight trips, the MTA generally pays more per unit of distance and time than for morning and daytime service. However, nighttime trips tend to be shorter duration because lighter traffic conditions allow for higher average speeds compared to daytime trips. To help the MTA design the best contract terms, create a histogram to profile arrival times by hour of the day for all successful trips.

3. The MTA is looking to start a new round of procurement for additional “Primary” providers. The location of a provider's depot affects the amount of time vehicles spend driving from the depot to first customer pickup points. This "deadhead" time is costly to us and provides no benefit to our customers.

To help the budget and procurement departments create a "geographic score" for the cost proposal, provide a table like the one below showing the top 10 ZIP codes (5-digit format, not 9-digit format) by their count of successful “Primary” trip pickups occurring in the AM rush hour (06:00 through 10:00). Since this question is future looking, use the time that best describes when customers were scheduled to be picked up, not when our vehicles may have arrived.

ZIP code	Number of Primary trips during AM rush hour
00001	
…	
00010	