**[Course Number]**

**[Course Name]**

**ASSIGNMENT 1: TRANSIT DATA**

**Assigned: [Assigned Date]**

**Due: [Due Date]**

*You should work individually on this assignment. Please submit a 2-page write-up answering the five questions and upload an excel spreadsheet showing your supporting calculations to the class website.*

# Background

Your first assignment provides you with hands-on experience working with transit data collected using Automated Passenger Counters (APC). This dataset is based on actual data collected by the Metro Transit, the transit operator in Minneapolis–Saint Paul region. Metro Transit operates local bus service, express bus service, and bus rapid transit (BRT). This dataset counts the total number of passengers boarding (on) and alighting (off) at each stop for three bus routes operated by Metro Transit. It can be used to determine the average and maximum load along each route. Additionally, it can be used to calculate passenger miles traveled, which is one of the metrics assembled in the National Transit Database (NTD).

# Dataset

Metro Transit has asked you to conduct a route-level load analysis using APC data. The data can be found in an Excel spreadsheet on the course website. The spreadsheet includes has the number of passengers who boarded and alighted for each bus stop along three different bus routes. Each bus route represents a different type of bus service operated by Metro Transit (Local, Express, BRT). The columns provided in the dataset are as follows:

* **Route Classification:** the classification of the specific route (Local, Express, BRT)
* **Route:** the number of the route
* **Stop Seq:** the sequence of the stop from the beginning of the route
* **Stop Name:** the stop name
* **Pax Boarded:** the number of passengers who boarded the bus at the specific stop
* **Pax Alighted:** the number of passengers who alighted the bus at the specific stop
* **Distance Between Stops:** the distance between stops in miles. This column is provided only for the BRT route**.** This distance is approximate and is based on the odometer reading**.**

# Questions

You should submit a short report (no more than 2 pages excluding figures) that answers the following five questions. **You must turn in your 2-page write-up by the beginning of class on the due date to receive full credit.**

1. **Calculate Passenger Load for Each Route:**
2. What was the average load (i.e., the average number of passengers onboard) for each of the three routes? To calculate this for each route, use the load at each stop divided by the total number of stops on the route. The total number of stops includes stops without passenger boardings or alightings.
3. What was the peak (maximum) load on each route, and at which stop(s) did this occur?
4. **Graph** **Passenger Load for Each Route:** Plot the load at each stop along each of the three routes. Each graph (one graph for the local route, one for the express route, and one for BRT) should have stop names on the x-axis (in sequential order) and the number of passengers onboard along the y-axis. Also, include a (horizontal) line showing the average load along the route. Last, identify the peak (maximum) load point on each graph.
5. **Discuss the Differences between Routes**: Briefly compare and discuss the passenger loads (average, maximum) for each of the three routes. Which route had the highest loads? Lowest loads? Were these expected? 2-3 sentences are sufficient.
6. **Unlinked Passenger Trips and Passenger Miles (for the BRT route only):**
7. What was the total number of (unlinked) passenger trips? Also, calculate the ratio of unlinked passenger trips to vehicle revenue miles traveled (vehicle revenue miles represents the total distance traveled by the vehicle for this trip).
8. Is this ratio higher or lower than the 2019 ratio of unlinked passenger trips to vehicle revenue miles for bus service from the National Transit Database? Why?

*Hint: download the NTD Transit Agency Profile for Minneapolis’s Metro Transit by searching here:* [*https://www7.fta.dot.gov/ntd/transit-agency-profiles*](https://www7.fta.dot.gov/ntd/transit-agency-profiles)

1. What was the total number of passenger miles travelled on this BRT trip?
2. What was the average trip length per passenger on this BRT trip?
3. **Advantages and Disadvantages of APC:** Briefly discuss one advantage and one disadvantage of using APC as compared to conducting manual counts. 2-3 sentences are sufficient.