**[Course Number]**

**[Course Name]**

**Homework 6: General Transit Feed Specification**

**Assigned: [Assigned Date]**

**Due: [Due Date]**

# Instructions

This assignment provides you with experience working with the transit data format called the General Transit Feed Specification (GTFS). You should work individually for this assignment. Submit a 2-page report (maximum) answering the 5 questions. If you conduct your analysis in Excel, please upload your spreadsheet showing your work to the class website.

# Dataset

Knoxville Area Transit (KAT) posts transit stop and schedule information in GTFS format on the city’s open data website, which is here: <http://www.knoxvilletn.gov/cms/One.aspx?portalId=109562&pageId=11688599>

Download the most recent GTFS feed (September 2021 to January 2022), which is found in a zipped folder. Unzip the folder, and look at each of the 10 text files. You can open the text files in Excel (such as by converting them to CSV files); alternatively, you can use other software programs if you prefer.

# Questions

1. **Weekday Schedule:** For this question, look at a typical Monday schedule on the Route 17, which operates on Sutherland Avenue in Bearden.

1. According to the “calendar” file, what is the service\_id for a typical Monday schedule (specifically, a non-holiday Monday between September 27 and January 2)?
2. What is the route\_id for Route 17?
3. How many trips run on Route 17 on a typical Monday?
4. How many Route 17 trips on Mondays are in Direction 1 (Going toward Downtown)?
5. Compare your answers from parts c and d to the posted *weekday* schedule for Route 17, which is here: <https://katbus.com/199/Route-17-Sutherland>. Briefly discuss.

2. **Saturday Schedule:** For this question, look at a typical Saturday schedule on the Route 17.

1. According to the “calendar” file, what is the service\_id for a typical Saturday schedule (between September 27 and January 2)?
2. How many trips run on Route 17 on a typical Saturday?
3. How many Route 17 trips on Saturdays are in Direction 1 (Going toward Downtown)?
4. Compare your answers from parts b and c to the previous question about Monday service. Was this what you expected? Consider the impacts of COVID-19 and recent changes in the workforce.
5. Compare your answers from parts b and c to the posted *weekend* schedule for Route 17, which is here: <https://katbus.com/199/Route-17-Sutherland>. Briefly discuss.

3. **Mapping a Route:** For this question, utilize trip\_id 512187 on Route 17.

1. What is the shape\_id that corresponds to trip\_id 512187?
2. Make a scatterplot of the shape\_pt\_lat and shape\_pt\_long values corresponding to the shape\_id from the previous part. Plot longitude on the x-axis, latitude on the y-axis, and label both axes. Include the plot in your 2-page write-up. *(Note: if you would like, you can do this exercise in GIS; however, GIS is not a requirement for this class.)*
3. Compare your answer from part b to the posted *map* for the Route 17, which is available here: <https://katbus.com/199/Route-17-Sutherland>. Briefly discuss.

4. **Stop Times and Stop Locations:** For this question, utilize trip\_id 512168 on Route 17.

1. How many stops does the bus make during trip\_id 512168 on the Route 17?
2. What is the departure time of the *first stop* during trip\_id 512168? What is the departure time of the *last stop*?
3. What is the stop\_id of the *first stop* in the sequence of trip\_id 512168? What is the stop\_id of the *last stop*?
4. What are the *stop names* (stop\_name) that correspond to the first and last stops of trip\_id 512168 (from part c)?
5. Compare your answers from parts b (stop times) and d (stop locations) to the posted schedule and mapfor Route 17, which is here: <https://katbus.com/199/Route-17-Sutherland>. Briefly discuss.

5. **Stop Times:** For this question, look at Knoxville Station (stop\_id 210), which is one of the busiest bus stops in Knoxville.

1. How many trips (by unique trip\_id) stop at Knoxville Station? To answer this question, consider all trips contained in the GTFS feed.
2. How many unique trips *begin* at Knoxville Station? *Hint: use stop\_sequence\_id of 1.*
3. Considering only the trips from part b, when does the *first trip* of the day depart (by departure\_time) from Knoxville Station? What are the corresponding trip\_id(s)?
4. What route\_id(s) do the trip\_id(s) in part c correspond to?
5. What are the names of the routes from part d? Use route\_short\_name to get the route number(s) and route\_long\_name for the road(s).

*Reference: Some questions on this assignment have been adapted from an internal exercise used by the company Remix. Other questions were created by Professor Candace Brakewood at the University of Tennessee.*