**Turnstile Cleaner**

Data:

* The MTA publishes weekly summaries of its turnstile-level entries and exits at each station in the network in four-hour increments
* Data collected from <http://web.mta.info/developers/turnstile.html>
* This analysis for USI uses five weeks of turnstile, from January 30th, 2016 to March 4th, 2016
* Stations considered in the analysis are Nassau St, Bedford Ave, Graham Ave, Lorimer St, and Metropolitan Ave (GL Line)

Cleaning and Manipulation

* Had to rename the ‘EXITS’ column because the source data adds many trailing spaces, making it difficult to read

Method

* The turnstile data only measures cumulative inbound and outbound activity in four-hour increments, meaning it is not possible to calculate ‘peak hour’
* Consequently, this method uses average daily exits at the turnstile level for each station by subtracting the daily minimum from the daily maximum
  + Since turnstile entry/exit counts are cumulative since installation, we measure activity based on the differences between the beginning and end of the day
* The script iterates through each turnstile at each station, then calculates the maximum and minimum for each, then stores each value in a Pandas DataFrame
* The final step saves the file for each station to a local location for further analysis in the foot traffic notebook

**Estimating Foot Traffic**

Data:

* Uses files saved from the turnstile cleaning notebook in the first step

Cleaning and Manipulation:

* Remember to rename the first column, as pandas removes the index when files are saved exported to a local machine
* Some turnstiles on some days had very high values, which were deemed anomalies
  + To address this, the notebook replaces the anomalous value with the median value for that turnstile (not for that day, as traffic varies greatly between turnstiles at a station)

Method:

* First, the notebook calculates the average daily total exits for each station over the five-week measurement period
* Summing those values provide the estimated average number of turnstile exits, which is used as a proxy for visitors traveling via subway.
* The percent contribution of each station to total foot traffic is calculated, yielding a table that includes both the number of turnstile exits and their percentages
* The next step is to calculate the new estimated foot traffic after the Canarsie tunnel shuts down
  + LEHD data helped to estimate that impact. J2J flows show that 42% of the 200,000 daily riders that use the Canarsie tunnel are coming to Brooklyn
  + Consequently, the new estimate for the Bedford Ave station is:

* The next step recalculates the foot traffic contribution percentages using the reduced Bedford Ave traffic

**Estimating Size of Local Economy**

*This part attempts to estimate the size of the economy of the area immediately around the Bedford Ave station, as the assumption is that the businesses closest to the station suffering the largest reduction in subway exits (foot traffic) will be impacted by the closure most severely.*

*Expenditure categories came from:* [*http://www.nycedc.com/economic-data/may-2014-economic-snapshot*](http://www.nycedc.com/economic-data/may-2014-economic-snapshot)

* First, total number of households in Williamsburg and the average household total expenditure provide the total expenditures in USD for all of Williamsburg (zip codes 11206, 11211, and 11237)
* Since this study uses expenditures as a proxy for economic activity in a region, there are certain categories that were determined *not* to contribute to the regional economy
  + This study includes Food and Drink, Apparel and Services, Entertainment, Health Care, and Other
  + It does not include Housing, Transportation, Education, or Personal Insurance and Pensions
* The following formula calculated the estimated economic activity in Williamsburg:
* Next, use PLUTO data to calculate the amount of commercial space ( within a quarter-mile radius of the Bedford Ave. Station and the total commercial space (
* Then, divide the two to determine the percent of the economy that exists around the Bedford Ave station
* The final step calculates the size of the economy around Bedford Ave in dollars