Challenge 18 is the Tableau Challenge. We were given a site to access to New York Citi Bike Data and were advised to download 1-3 csv files to analyze. I selected two csv files – January 2022 and January 2023.   
  
To start, I combined both of these data sets in Jupyter Notebook through Pandas and then had one CSV file. This file was imported to Tableau to begin creating worksheets to analyze.

I created four interactive dashboards that answered a question. I placed them into a story with the questions above them and a brief overview of observations.

Below is the analysis that I would discuss in a meeting, along with the visualizations – either the dashboards or the story:  
  
  
**Dashboard 1:** How have the rides changed between January 2022 and January 2023 by rider type?   
There is a filter option for Casual, Member, or both, which filters all the visualizations on the dashboard.  
  
The first visualization shows the total number of rides in 2022 and 2023 and the difference was calculated, which is 109.5%. The ridership has increased immensely over the past year, especially for members. Either there was a large increase in the number of members or the members are riding much more frequently.   
The second visualization compares the start hour for the rides. Though the number of rides has obviously increased, the curve of the times is similar with peaks between 0700-0900 and then again between 1700-1900 hours. When looking at the start hour for member, it seems that members are likely riding to commuting because the times peak at commuting hours. The casual numbers seem to have a slow increase throughout the day, peaking at around 1600-1700 hours.   
The final visualization shows the change in the top 10 starting stations (for 2023) and the percent change for each. When analyzing this data, I found that there was a station that had data for 2022 but not 2023 and found that the station was titled differently for each year so I grouped the station names. This shows the stations and the increases. Some stations saw more that 100% increase between 2022 and 2023.  
  
**Dashboard 2**: How does the geography of the start station differ from the end station?  
There is a filter for year on this dashboard. I have zip code boundaries but did not label them as it was too much for the map.   
  
These maps show the start and end stations for the rides. This was formatted as a density map so hotspots can be observed. For both years, it looks like the rides start in the middle of Jersey City with the stations all relatively close and not a large spread. This makes me think that most of the riders live in the city as this is where they are accessing the bikes. The end stations are more spread out with a cluster in New York City, and some points going up to Manhattan and Newark. The data is not as concentrated as the starting locations. Comparing the years, there were not notable changes in the geography of the points.

**Dashboard 3:** How does the Day of the Week impact the Begin and End time?  
This dashboard has charts to show the pattern of days of week and hour of day. There is a Rider Type (casual or member) filter option.  
  
The visualization on the left is for the begin time. This shows that weekdays, there were a large number of rides during commute times – 0600-0800 hours, and then again between 1600-1900 hours. Tuesday at 1800 hours was the busiest start and end time of the whole week. The weekends saw a gradual increase until about 1400 hours, and then a steady decline. When breaking this data out by member and casual, the members appeared to be more of the commuters and the casual members had a large number of rides on the weekends, especially Sunday from 1100 hours to 1600 hours.

**Dashboard 4**: How far is an average trip?  
This dashboard has two visualizations that have the average distance of trips by year, day of the week, type of bike, and casual vs. member.  
  
The first visualization has the average distance by year for casual and member riders. Neither casual nor member saw significant increases. There was an increase of 3.5% between January of 2022 and January 2023 for casual riders and the member rider average distance increased 4.6 % during the same time frame. The casual riders had a longer average distance than the members, likely because members seem to often use the bikes for commuting, where as the casual riders are riding more leisurely.   
The second visualization has the average trip by the bike type. The options are classic, docked and electric bikes. The electric bikes had a slightly longer average trip than the docked and classic bikes. The day of the week didn’t have a large difference for bike type, though the average trips were longer on weekdays for all except the docked bike, which had a low average on Sunday.