Introduction

The goal is to try to reduce both the number and severity of car collisions in Seattle. We are given a dataset and try to both qualitatively and quantitatively highlight the drivers of number and severity of car collisions as to help drivers avoid catastrophic situations.

This dataset can be used by a wide array of constituents. Individual citizens who are trying to be careful, public planning officials, and first responders.

Data

We start with the CSV file provided. The dependent variable is accident severity ranked 0 to 5 with 5 being the most severe. We will use all other columns as independent variables to predict 1) accidents and 2) severity of accidents.

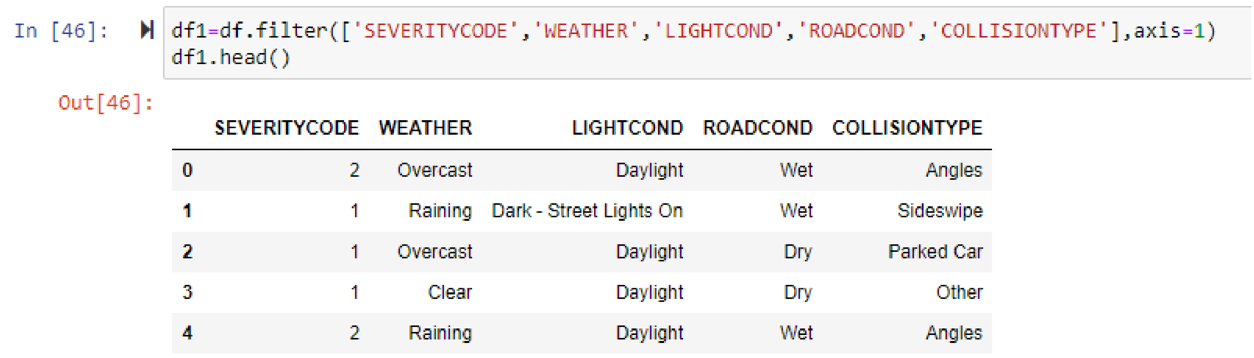
The table contains far too many columns that could theoretically be independent variables. I picked 4 independent variables to analyze that seemed the most relevant:

a) Road conditions
b) Light conditions
c) Weather
d) Collison type

Methodology

I primarily used Pandas to convert the CSV file to a dataframe. I also used SKLearn to balance the severity outcomes as it was an unbalanced dataset leaning to less severe accidents.

First, I narrowed the table down to a smaller dataframe to evaluate only 4 independent variables.



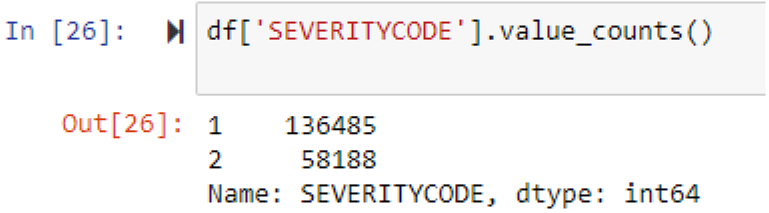
In [46]:

```
df1=df.filter(['SEVERITYCODE','WEATHER','LIGHTCOND','ROADCOND','COLLISIONTYPE'],axis=1)
df1.head()
```

Out[46]:

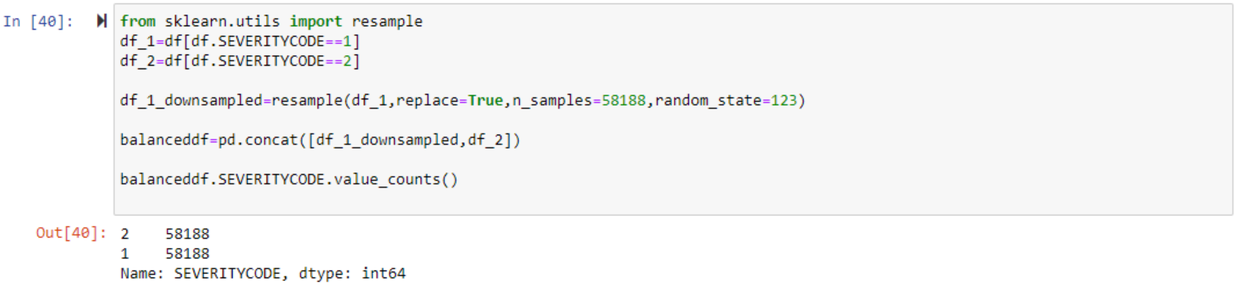
	SEVERITYCODE	WEATHER	LIGHTCOND	ROADCOND	COLLISIONTYPE
0	2	Overcast	Daylight	Wet	Angles
1	1	Raining	Dark - Street Lights On	Wet	Sideswipe
2	1	Overcast	Daylight	Dry	Parked Car
3	1	Clear	Daylight	Dry	Other
4	2	Raining	Daylight	Wet	Angles

Then I started analyzing the dependent variable – accident severity with value counts and found the accidents were skewed to less severe (1) at 70%.



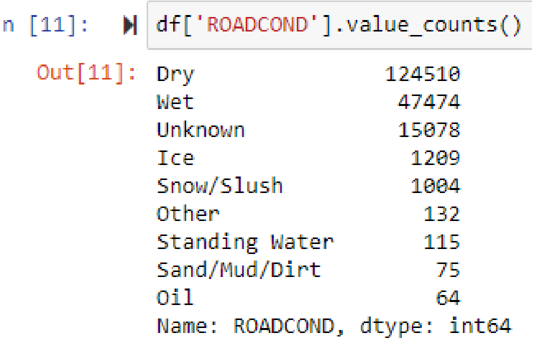
```
In [26]:   df['SEVERITYCODE'].value_counts()

Out[26]: 1    136485
         2     58188
         Name: SEVERITYCODE, dtype: int64
```

For further analysis (beyond the scope of this report), I downsampled the 1 severity to match the 2 cases.

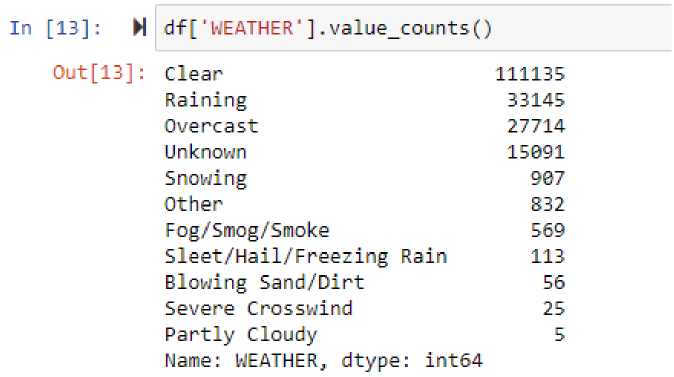


```
In [40]:   from sklearn.utils import resample
           df_1=df[df.SEVERITYCODE==1]
           df_2=df[df.SEVERITYCODE==2]

           df_1_downsampled=resample(df_1,replace=True,n_samples=58188,random_state=123)

           balanceddf=pd.concat([df_1_downsampled,df_2])

           balanceddf.SEVERITYCODE.value_counts()

Out[40]: 2    58188
         1    58188
         Name: SEVERITYCODE, dtype: int64
```

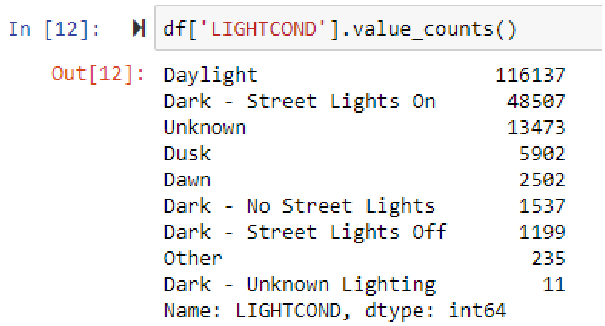
Then, I ran the value counts for the 4 independent variables:



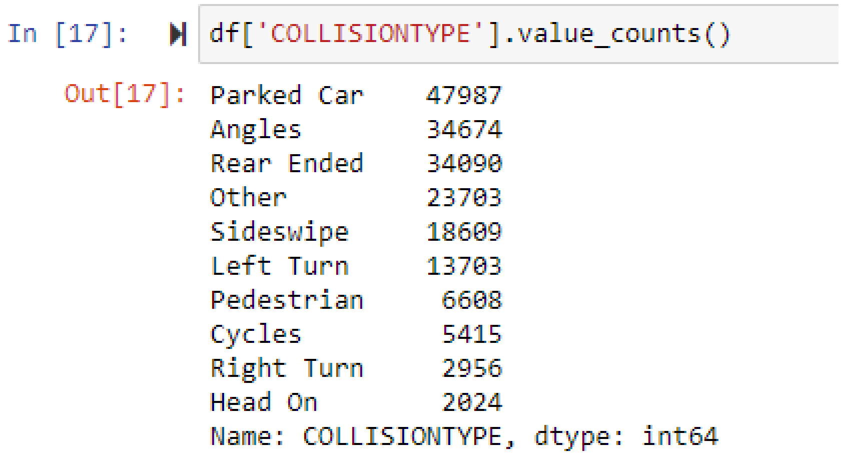
```
n [11]:   df['ROADCOND'].value_counts()

Out[11]: Dry               124510
         Wet                47474
         Unknown            15078
         Ice                 1209
         Snow/Slush          1004
         Other                132
         Standing Water       115
         Sand/Mud/Dirt         75
         Oil                   64
         Name: ROADCOND, dtype: int64
```



```
In [13]:  df['WEATHER'].value_counts()

Out[13]:  Clear                       111135
          Raining                      33145
          Overcast                     27714
          Unknown                      15091
          Snowing                        907
          Other                          832
          Fog/Smog/Smoke                 569
          Sleet/Hail/Freezing Rain       113
          Blowing Sand/Dirt               56
          Severe Crosswind                25
          Partly Cloudy                    5
          Name: WEATHER, dtype: int64
```



```
In [12]:  df['LIGHTCOND'].value_counts()

Out[12]:  Daylight                    116137
          Dark - Street Lights On      48507
          Unknown                      13473
          Dusk                          5902
          Dawn                          2502
          Dark - No Street Lights       1537
          Dark - Street Lights Off      1199
          Other                          235
          Dark - Unknown Lighting         11
          Name: LIGHTCOND, dtype: int64
```



```
In [17]:  df['COLLISIONTYPE'].value_counts()

Out[17]:  Parked Car    47987
          Angles        34674
          Rear Ended    34090
          Other         23703
          Sideswipe     18609
          Left Turn     13703
          Pedestrian     6608
          Cycles         5415
          Right Turn     2956
          Head On        2024
          Name: COLLISIONTYPE, dtype: int64
```

Results

The 1st 3 independent variable outcomes did not pass the sense test as with most accidents, conditions were:

- Dry
- Clear
- Daylight

Discussion

However, the 4th variable collision type was the telling variable: it showed the most common collisions were with parked cars.

> **Accidents with parked cars are minor and are usually out of carelessness rather than a major contributing factor. This explains why the severity was skewed to less severe.**

Conclusions

The dataset we were provided involves non-severe minor accidents that were likely out of carelessness or inexperience than some external condition.

For Seattle, they should run more data with severity skewed towards the more fatal accidents to see the contributing factors in order to assist city planning and promote driver awareness.