Bike Share Toronto Data (2018)

In [1]:
```
# Import libraries
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
# Load Bike Share Toronto data
b18_q1 = pd.read_csv(r"C:\Users\on3_a\Documents\Data Analytics, Big Data & Predictive Analytics/Data/2018-Q1.c
b18_q2 = pd.read_csv(r"C:\Users\on3_a\Documents\Data Analytics, Big Data & Predictive Analytics/Data/2018-Q2.c
b18_q3 = pd.read_csv(r"C:\Users\on3_a\Documents\Data Analytics, Big Data & Predictive Analytics/Data/2018-Q3.c
b18_q4 = pd.read_csv(r"C:\Users\on3_a\Documents\Data Analytics, Big Data & Predictive Analytics/Data/2018-Q4.c
```

In [3]:
```
toronto = [b18_q1, b18_q2, b18_q3, b18_q4]
bike_share = pd.concat(toronto)
bike_share.head()
```

Out[3]:

	trip_id	trip_duration_seconds	from_station_id	trip_start_time	from_station_name	trip_stop_time	to_station_id	to_station_name	user_type
0	2383648	393	7018	1/1/2018 0:47	Bremner Blvd / Rees St	1/1/2018 0:54	7176	Bathurst St / Fort York Blvd	Annual Member
1	2383649	625	7184	1/1/2018 0:52	Ossington Ave / College St	1/1/2018 1:03	7191	Central Tech (Harbord St)	Annual Member
2	2383650	233	7235	1/1/2018 0:55	Bay St / College St (West Side) - SMART	1/1/2018 0:59	7021	Bay St / Albert St	Annual Member
3	2383651	1138	7202	1/1/2018 0:57	Queen St W / York St (City Hall)	1/1/2018 1:16	7020	Phoebe St / Spadina Ave	Annual Member
4	2383652	703	7004	1/1/2018 1:00	University Ave / Elm St	1/1/2018 1:12	7060	Princess St / Adelaide St E	Annual Member

In [4]:
```
bike_share.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1922955 entries, 0 to 363489
Data columns (total 9 columns):
 #   Column                 Dtype
---  ------                 -----
 0   trip_id                int64
 1   trip_duration_seconds  int64
 2   from_station_id        int64
 3   trip_start_time        object
 4   from_station_name      object
 5   trip_stop_time         object
 6   to_station_id          int64
 7   to_station_name        object
 8   user_type              object
dtypes: int64(4), object(5)
memory usage: 146.7+ MB
```

In [5]:
```
# Convert trip_start_time and trip_stop_time to DateTime Format
cols = ['trip_start_time','trip_stop_time']
bike_share[cols] = bike_share[cols].apply(pd.to_datetime)
```

In [6]:
```
# Extract hour, month, and day from trip_start_time and trip_stop_time
bike_share['hour_start'] = bike_share['trip_start_time'].apply(lambda time: time.hour)
bike_share['month_start'] = bike_share['trip_start_time'].apply(lambda time: time.month)
bike_share['weekday_start'] = bike_share['trip_start_time'].apply(lambda time: time.dayofweek)
```

In [7]:
```
bike_share['hour_stop'] = bike_share['trip_stop_time'].apply(lambda time: time.hour)
bike_share['month_stop'] = bike_share['trip_stop_time'].apply(lambda time: time.month)
bike_share['weekday_stop'] = bike_share['trip_stop_time'].apply(lambda time: time.dayofweek)
```

In [8]:
```
bike_share.head()
```

Out[8]:

	trip_id	trip_duration_seconds	from_station_id	trip_start_time	from_station_name	trip_stop_time	to_station_id	to_station_name	user_type
0	2383648	393	7018	2018-01-01 00:47:00	Bremner Blvd / Rees St	2018-01-01 00:54:00	7176	Bathurst St / Fort York Blvd	Annual Member
1	2383649	625	7184	2018-01-01 00:52:00	Ossington Ave / College St	2018-01-01 01:03:00	7191	Central Tech (Harbord St)	Annual Member
2	2383650	233	7235	2018-01-01 00:55:00	Bay St / College St (West Side) - SMART	2018-01-01 00:59:00	7021	Bay St / Albert St	Annual Member
3	2383651	1138	7202	2018-01-01 00:57:00	Queen St W / York St (City Hall)	2018-01-01 01:16:00	7020	Phoebe St / Spadina Ave	Annual Member
4	2383652	703	7004	2018-01-01 01:00:00	University Ave / Elm St	2018-01-01 01:12:00	7060	Princess St / Adelaide St E	Annual Member

In [9]:
```
# For clarity, assign month number to month and day number to day
mon = {1:'Jan',2:'Feb',3:'Mar',4:'Apr',5:'May',6:'Jun',7:'Jul',8:'Aug',9:'Sep',10:'Oct',11:'Nov',12:'Dec'}
bike_share['month_start'] = bike_share['month_start'].map(mon)
bike_share['month_stop'] = bike_share['month_stop'].map(mon)
```

In [10]:
```
day = {0:'Mon',1:'Tue',2:'Wed',3:'Thu',4:'Fri',5:'Sat',6:'Sun'}
bike_share['weekday_start'] = bike_share['weekday_start'].map(day)
bike_share['weekday_stop'] = bike_share['weekday_stop'].map(day)
```

In [11]:
```
bike_share.head()
```

Out[11]:

	trip_id	trip_duration_seconds	from_station_id	trip_start_time	from_station_name	trip_stop_time	to_station_id	to_station_name	user_type
0	2383648	393	7018	2018-01-01 00:47:00	Bremner Blvd / Rees St	2018-01-01 00:54:00	7176	Bathurst St / Fort York Blvd	Annual Member
1	2383649	625	7184	2018-01-01 00:52:00	Ossington Ave / College St	2018-01-01 01:03:00	7191	Central Tech (Harbord St)	Annual Member
2	2383650	233	7235	2018-01-01 00:55:00	Bay St / College St (West Side) - SMART	2018-01-01 00:59:00	7021	Bay St / Albert St	Annual Member
3	2383651	1138	7202	2018-01-01 00:57:00	Queen St W / York St (City Hall)	2018-01-01 01:16:00	7020	Phoebe St / Spadina Ave	Annual Member
4	2383652	703	7004	2018-01-01 01:00:00	University Ave / Elm St	2018-01-01 01:12:00	7060	Princess St / Adelaide St E	Annual Member

In [13]:
```
pd.set_option('display.float_format', lambda x: '%.3f' % x)
bike_share.describe()
```

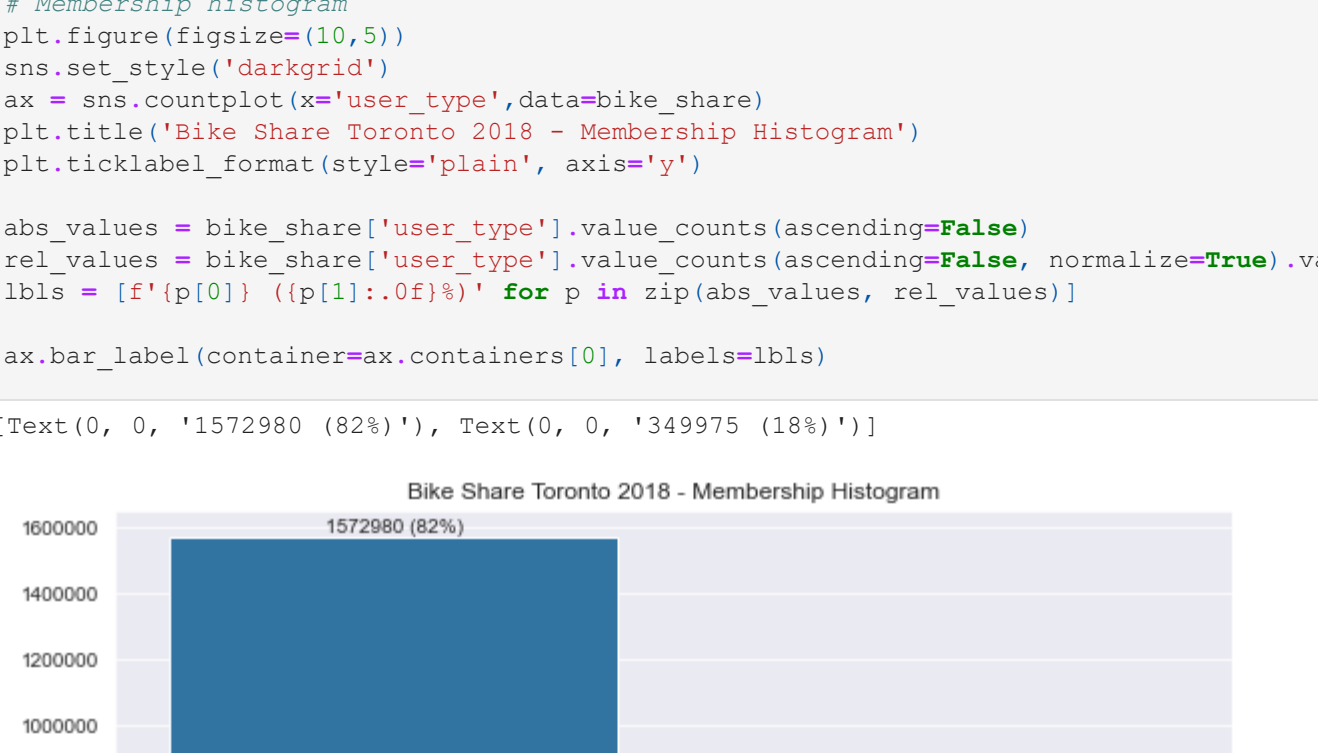
Out[13]:

	trip_id	trip_duration_seconds	from_station_id	to_station_id	hour_start	hour_stop
count	1922955.000	1922955.000	1922955.000	1922955.000	1922955.000	1922955.000
mean	3490799.282	962.976	7134.140	7133.976	14.157	14.329
std	624895.735	1595.530	103.423	103.546	4.865	4.933
min	2383648.000	60.000	7000.000	7000.000	0.000	0.000
25%	2955251.500	422.000	7042.000	7042.000	10.000	10.000
50%	3494072.000	670.000	7109.000	7107.000	15.000	15.000
75%	4027557.500	1051.000	7222.000	7222.000	18.000	18.000
max	4581277.000	55077.000	7391.000	7391.000	23.000	23.000

Visualize Data

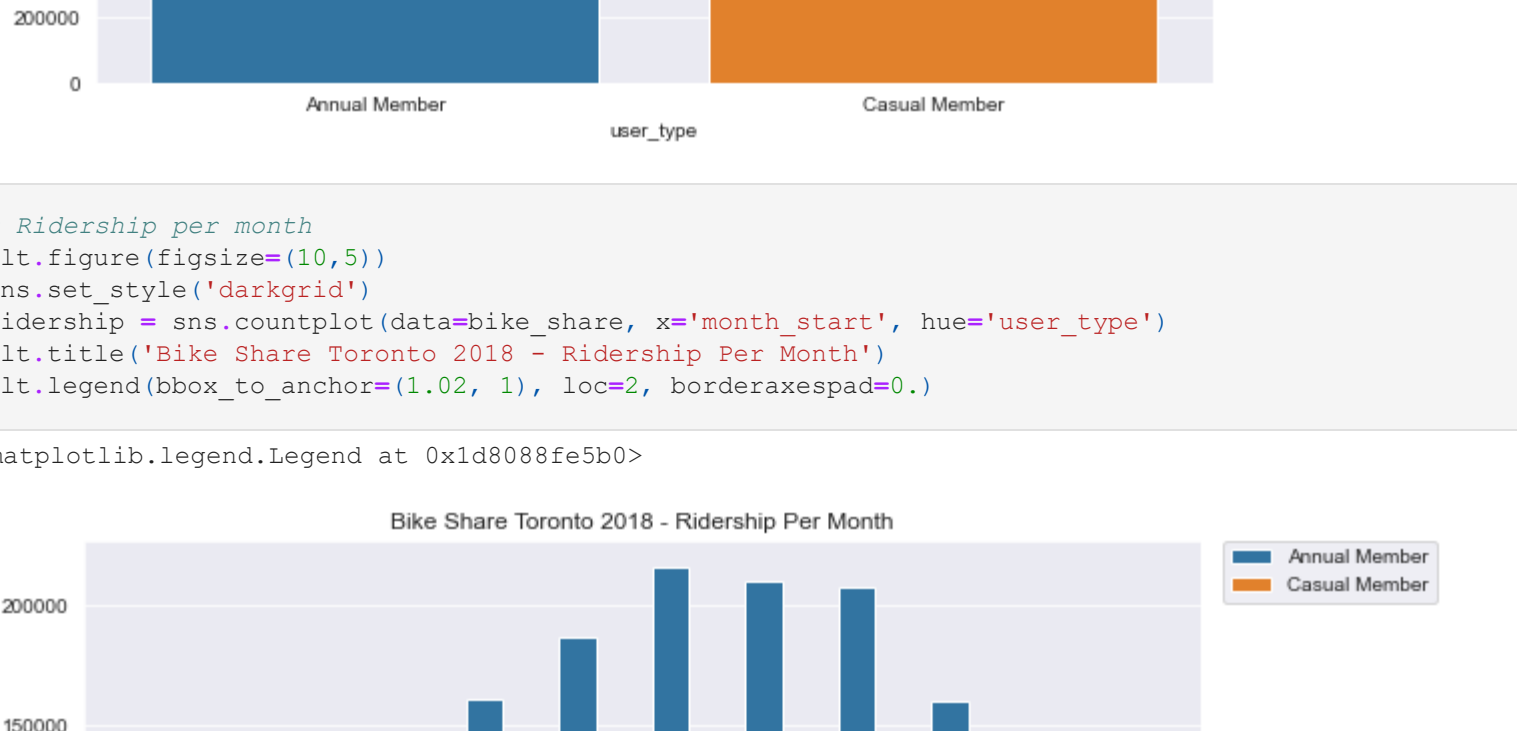
In [85]:
```
# Membership histogram
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
ax = sns.countplot(x='user_type',data=bike_share)
plt.title('Bike Share Toronto 2018 - Membership Histogram')
plt.ticklabel_format(style='plain', axis='y')

abs_values = bike_share['user_type'].value_counts(ascending=False)
rel_values = bike_share['user_type'].value_counts(ascending=False, normalize=True).values * 100
lbls = [f'{p[0]} ({p[1]:.0f}%)' for p in zip(abs_values, rel_values)]

ax.bar_label(container=ax.containers[0], labels=lbls)
```

Out[85]: [Text(0, 0, '1572980 (82%)'), Text(0, 0, '349975 (18%)')]



In [38]:
```
# Ridership per month
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
ridership = sns.countplot(data=bike_share, x='month_start', hue='user_type')
plt.title('Bike Share Toronto 2018 - Ridership Per Month')
plt.legend(bbox_to_anchor=(1.02, 1), loc=2, borderaxespad=0.)
```

Out[38]: <matplotlib.legend.Legend at 0x1d8088fe5b0>



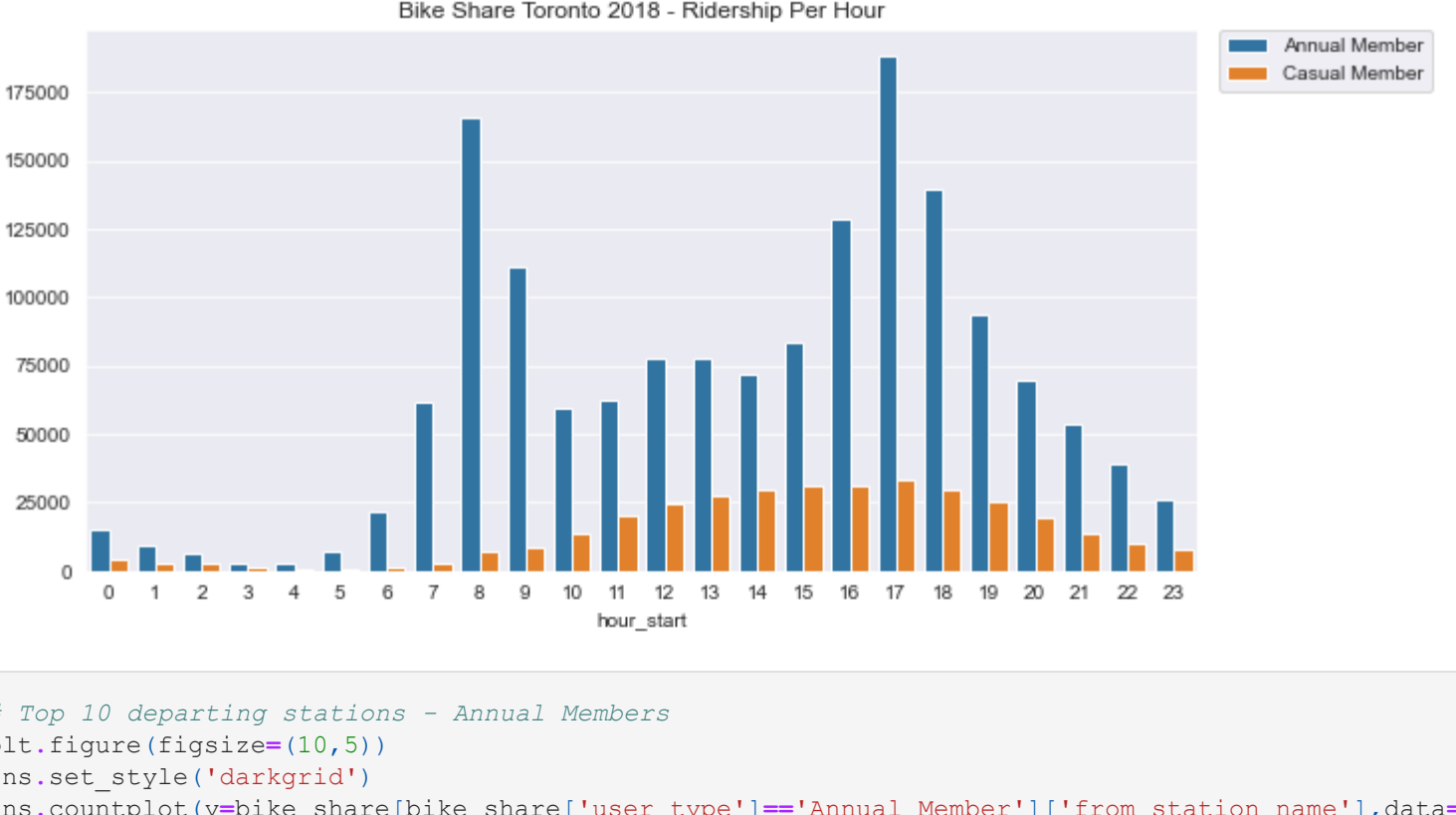
In [106]:
```
# Order month by ridership
trips_month = bike_share.groupby(['month_start'])['trip_id'].count().reset_index()
trips_month.sort_values(by=['trip_id'], ascending=False).reset_index(drop=True)
```

Out[106]:

	month_start	trip_id
0	Jul	286316
1	Aug	281219
2	Sep	255001
3	Jun	250837
4	May	212750
5	Oct	175879
6	Nov	104287
7	Apr	94783
8	Mar	84969
9	Dec	83324
10	Feb	49731
11	Jan	43859

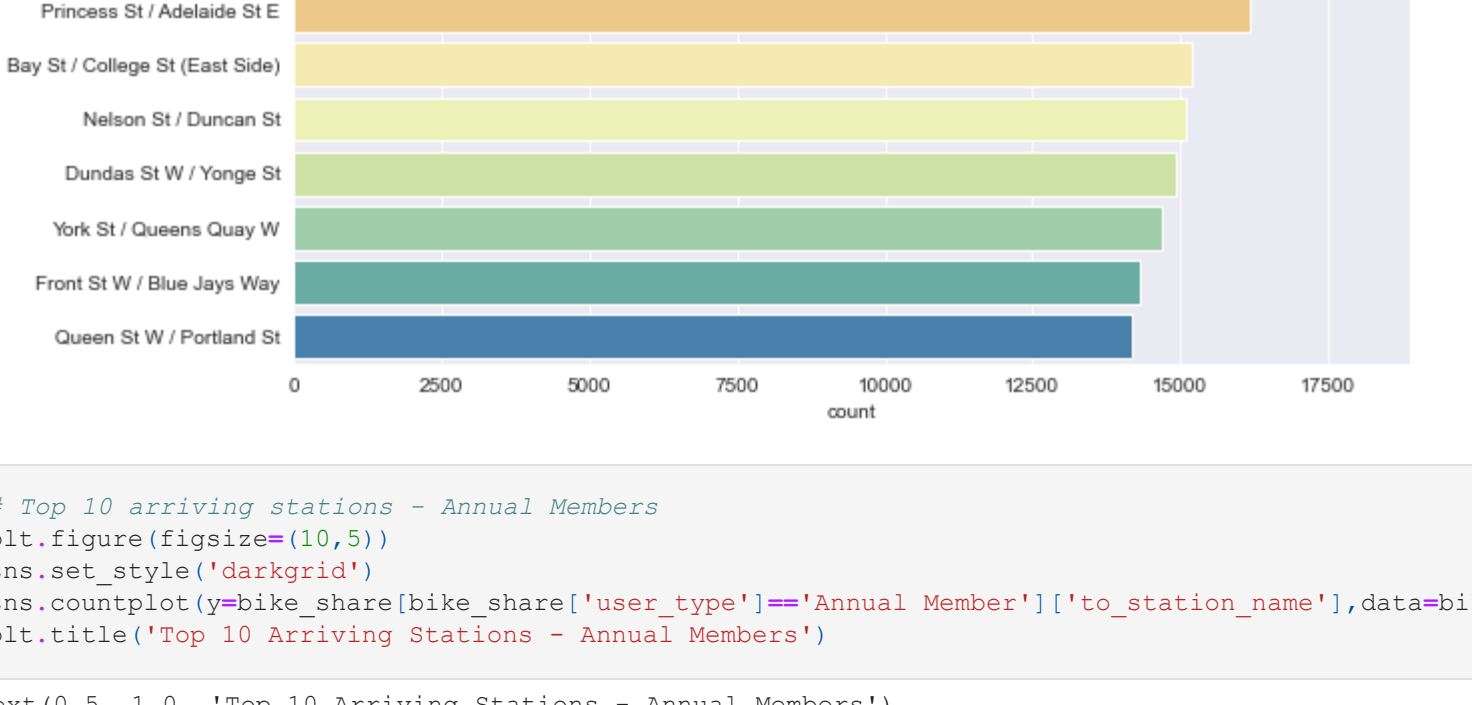
In [39]:
```
# Ridership per day of week
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
ridership = sns.countplot(data=bike_share, x='weekday_start', hue='user_type')
plt.title('Bike Share Toronto 2018 - Ridership Per Day')
plt.legend(bbox_to_anchor=(1.02, 1), loc=2, borderaxespad=0.)
```

Out[39]: <matplotlib.legend.Legend at 0x1d808938040>



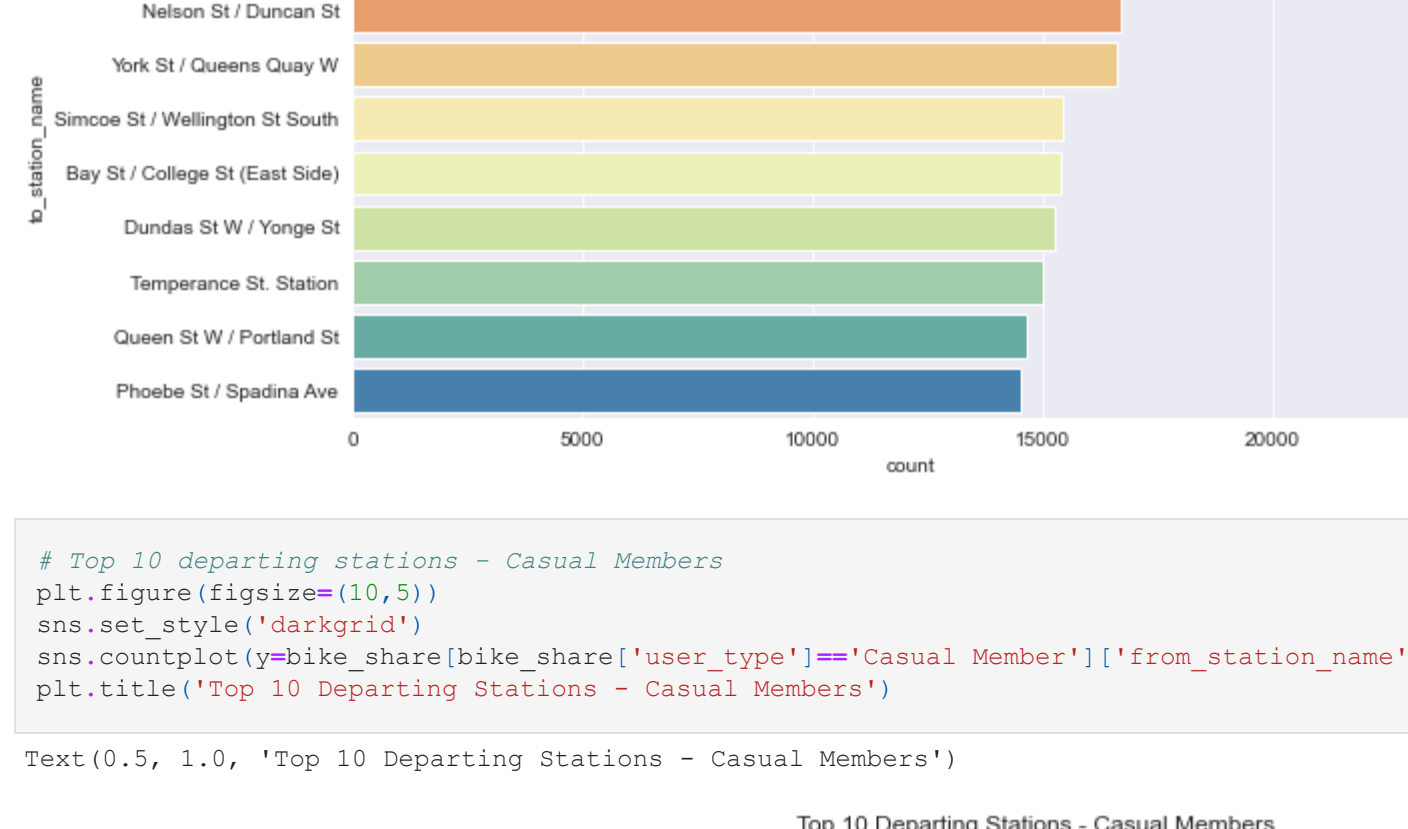
In [40]:
```
#Ridership per hour of day
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
ridership = sns.countplot(data=bike_share, x='hour_start', hue='user_type')
plt.title('Bike Share Toronto 2018 - Ridership Per Hour')
plt.legend(bbox_to_anchor=(1.02, 1), loc=2, borderaxespad=0.)
```

Out[40]: <matplotlib.legend.Legend at 0x1d808ae1970>



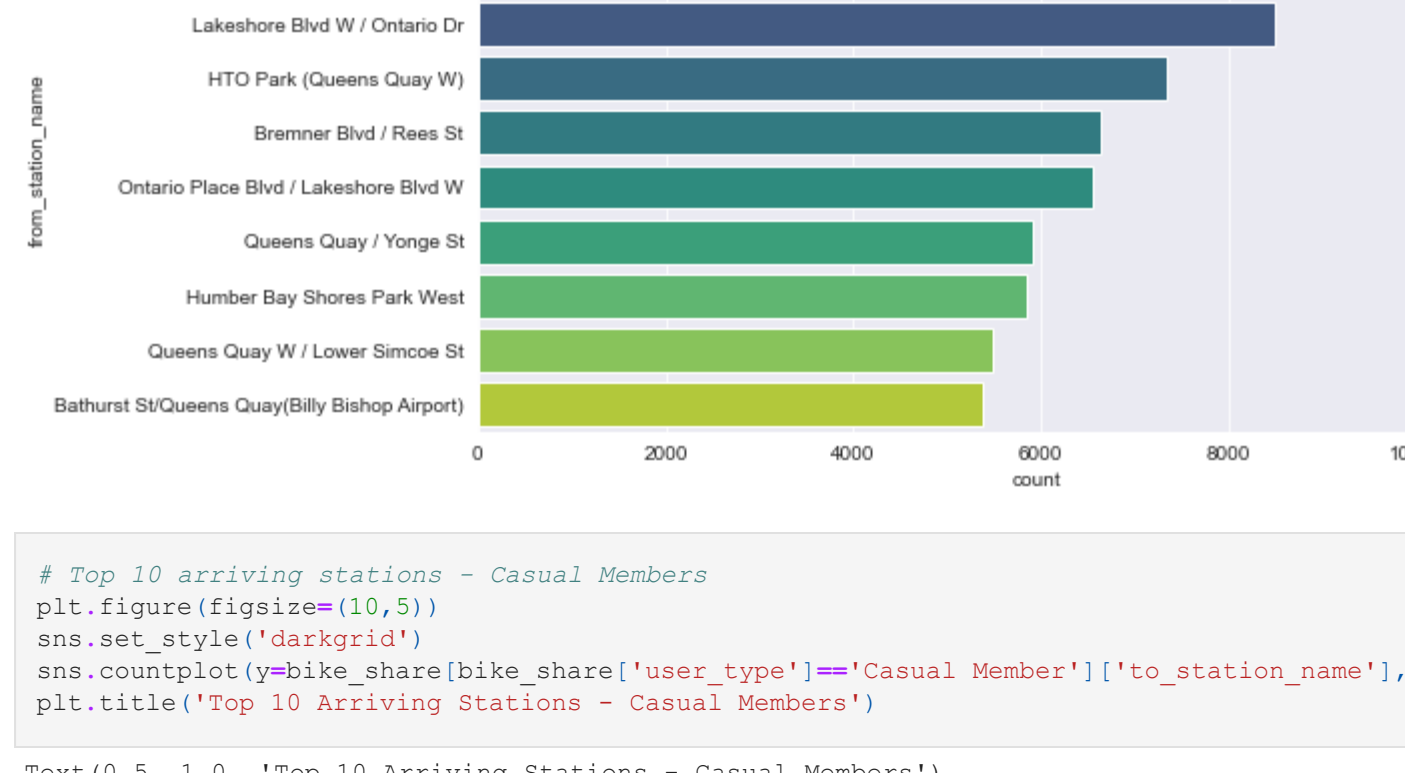
In [61]:
```
# Top 10 departing stations - Annual Members
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.countplot(y=bike_share[bike_share['user_type']=='Annual Member']['from_station_name'],data=bike_share, pal
plt.title('Top 10 Departing Stations - Annual Members')
```

Out[61]: Text(0.5, 1.0, 'Top 10 Departing Stations - Annual Members')



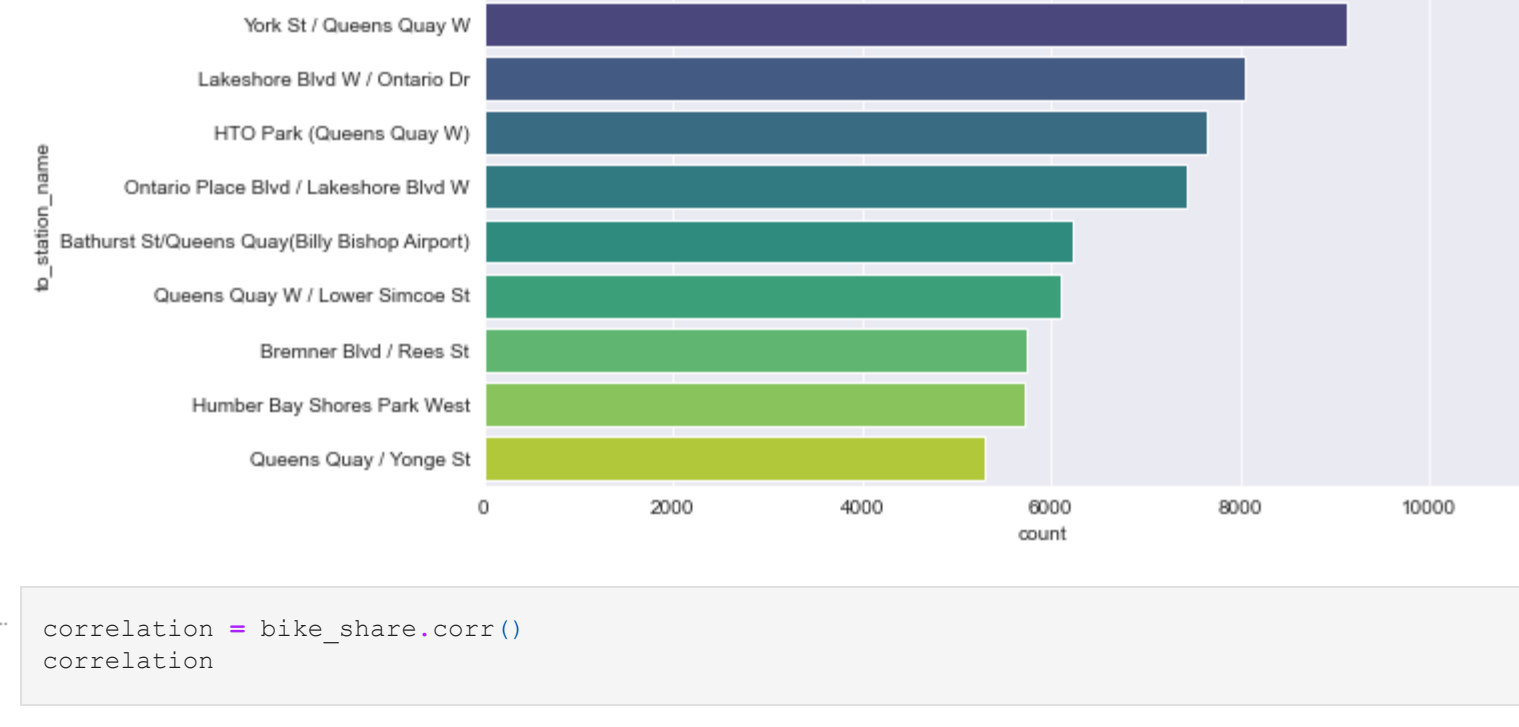
In [62]:
```
# Top 10 arriving stations - Annual Members
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.countplot(y=bike_share[bike_share['user_type']=='Annual Member']['to_station_name'],data=bike_share, palett
plt.title('Top 10 Arriving Stations - Annual Members')
```

Out[62]: Text(0.5, 1.0, 'Top 10 Arriving Stations - Annual Members')



In [64]:
```
# Top 10 departing stations - Casual Members
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.countplot(y=bike_share[bike_share['user_type']=='Casual Member']['from_station_name'],data=bike_share, pal
plt.title('Top 10 Departing Stations - Casual Members')
```

Out[64]: Text(0.5, 1.0, 'Top 10 Departing Stations - Casual Members')



In [65]:
```
# Top 10 arriving stations - Casual Members
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.countplot(y=bike_share[bike_share['user_type']=='Casual Member']['to_station_name'],data=bike_share, palett
plt.title('Top 10 Arriving Stations - Casual Members')
```

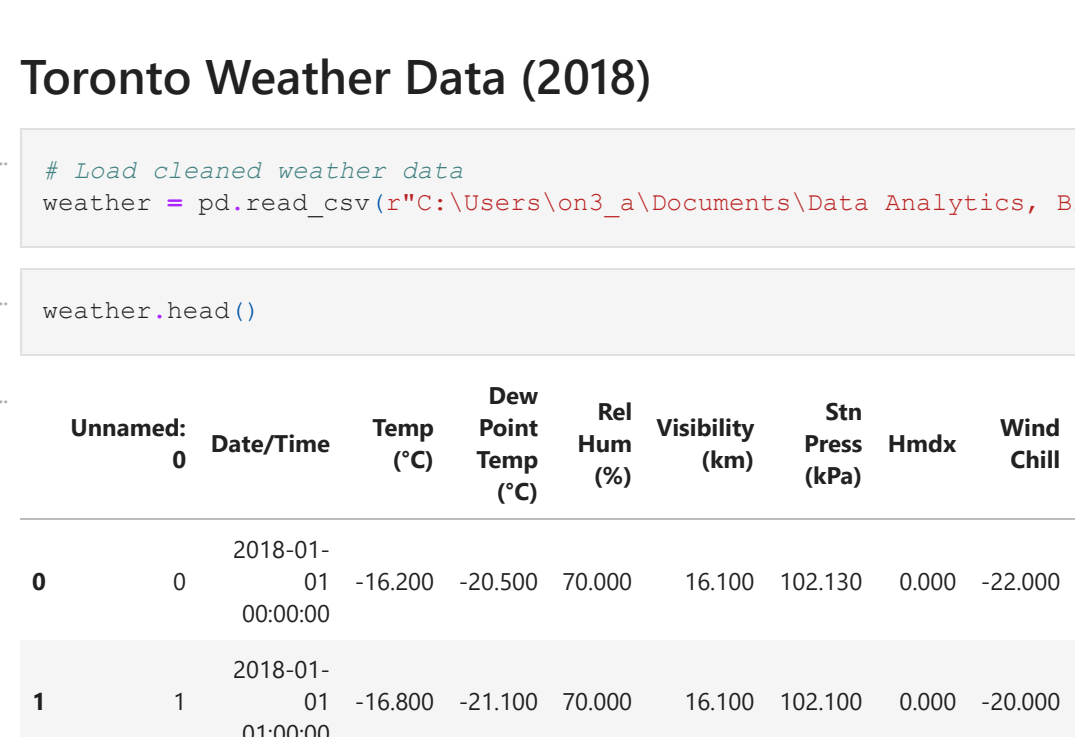
Out[65]: Text(0.5, 1.0, 'Top 10 Arriving Stations - Casual Members')

In [110]:
```
correlation = bike_share.corr()
correlation
```

Out[110]:

	trip_id	trip_duration_seconds	from_station_id	to_station_id	hour_start	hour_stop
trip_id	1.000	-0.036	0.138	0.140	-0.011	-0.013
trip_duration_seconds	-0.036	1.000	0.030	0.039	0.023	0.071
from_station_id	0.138	0.030	1.000	0.121	-0.005	-0.002
to_station_id	0.140	0.039	0.121	1.000	0.043	0.045
hour_start	-0.011	0.023	-0.005	0.043	1.000	0.953
hour_stop	-0.013	0.071	-0.002	0.045	0.953	1.000

In [118]:
```
sns.heatmap(correlation, cmap="coolwarm")
plt.title('Correlation Between Variables')
plt.show()
```



Toronto Weather Data (2018)

In [120]:
```
# Load cleaned weather data
weather = pd.read_csv(r"C:\Users\on3_a\Documents\Data Analytics, Big Data & Predictive Analytics/Data/Weather 2
```

In [121]:
```
weather.head()
```

Out[121]:

	Unnamed: 0	Date/Time	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Visibility (km)	Stn Press (kPa)	Hmdx	Wind Chill	Strong Wind	Fog	Freezing Rain	Haze	Heavy Rain	Moderate Rain	Modera Sn
0	0	2018-01-01 00:00:00	-16.200	-20.500	70.000	16.100	102.130	0.000	-22.000	0	0	0	0	0	0	
1	1	2018-01-01 01:00:00	-16.800	-21.100	70.000	16.100	102.100	0.000	-20.000	0	0	0	0	0	0	
2	2	2018-01-01 02:00:00	-17.300	-20.800	75.000	16.100	102.150	0.000	-26.000	0	0	0	0	0	0	
3	3	2018-01-01 03:00:00	-17.900	-21.600	73.000	16.100	102.130	0.000	-24.000	0	0	0	0	0	0	
4	4	2018-01-01 04:00:00	-17.200	-21.100	72.000	16.100	102.090	0.000	-21.000	0	0	0	0	0	0	

In [124]:
```
weather.drop(['Unnamed: 0'], axis=1, inplace=True)
```

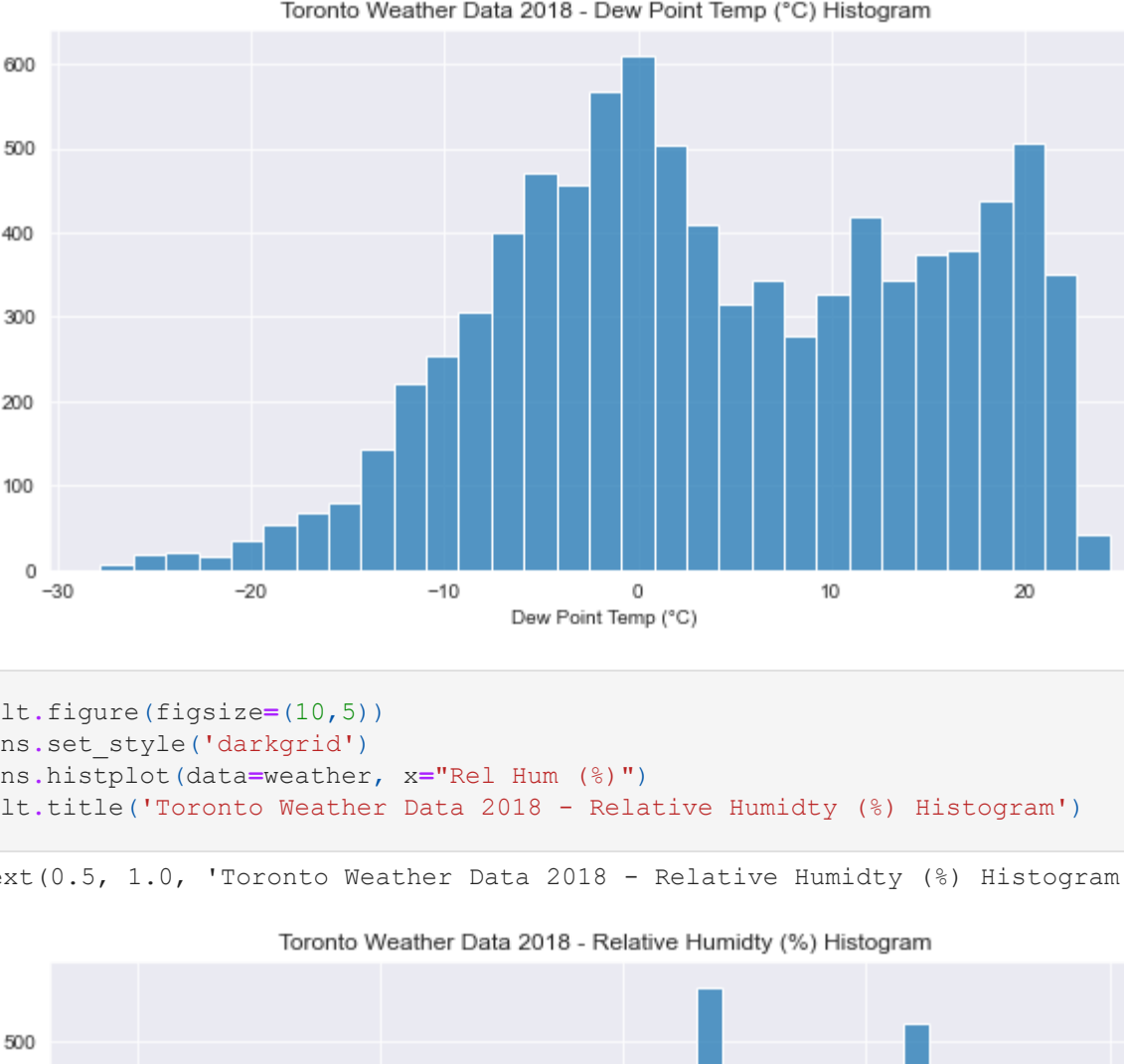
In [125]:
```
weather.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8760 entries, 0 to 8759
Data columns (total 18 columns):
 #   Column               Non-Null Count  Dtype
---  ------               --------------  -----
 0   Date/Time            8760 non-null   object
 1   Temp (°C)            8760 non-null   float64
 2   Dew Point Temp (°C)  8760 non-null   float64
 3   Rel Hum (%)          8760 non-null   float64
 4   Visibility (km)      8760 non-null   float64
 5   Stn Press (kPa)      8760 non-null   float64
 6   Hmdx                 8760 non-null   float64
 7   Wind Chill           8760 non-null   float64
 8   Strong Wind          8760 non-null   int64
 9   Fog                  8760 non-null   int64
 10  Freezing Rain        8760 non-null   int64
 11  Haze                 8760 non-null   int64
 12  Heavy Rain           8760 non-null   int64
 13  Moderate Rain        8760 non-null   int64
 14  Moderate Snow        8760 non-null   int64
 15  Rain                 8760 non-null   int64
 16  Snow                 8760 non-null   int64
 17  Thunderstorms        8760 non-null   int64
dtypes: float64(7), int64(10), object(1)
memory usage: 1.2+ MB
```

Visualize Data

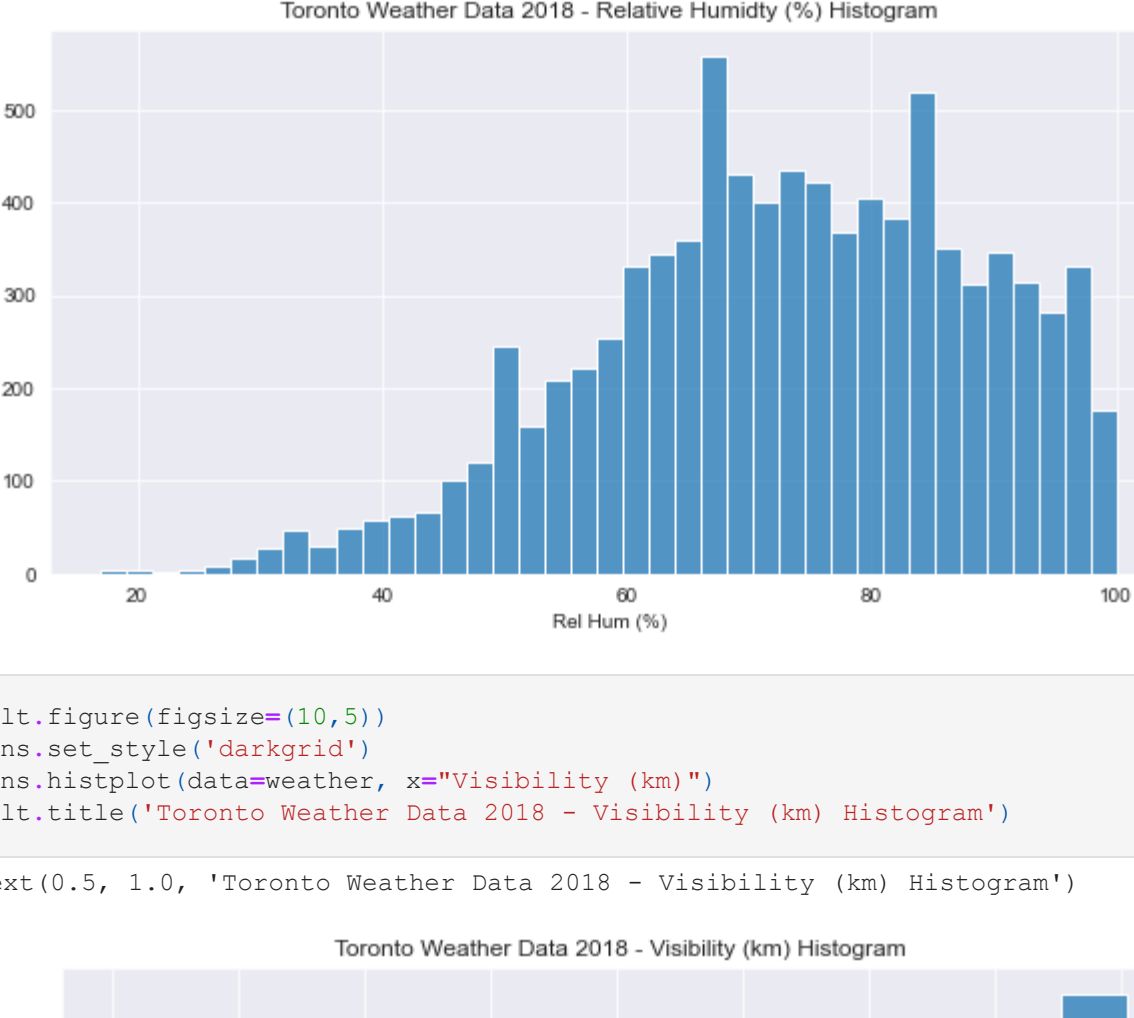
In [128]:
```
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.histplot(data=weather, x="Temp (°C)")
plt.title('Toronto Weather Data 2018 - Temperature (°C) Histogram')
```

Out[128]: Text(0.5, 1.0, 'Toronto Weather Data 2018 - Temperature (°C) Histogram')



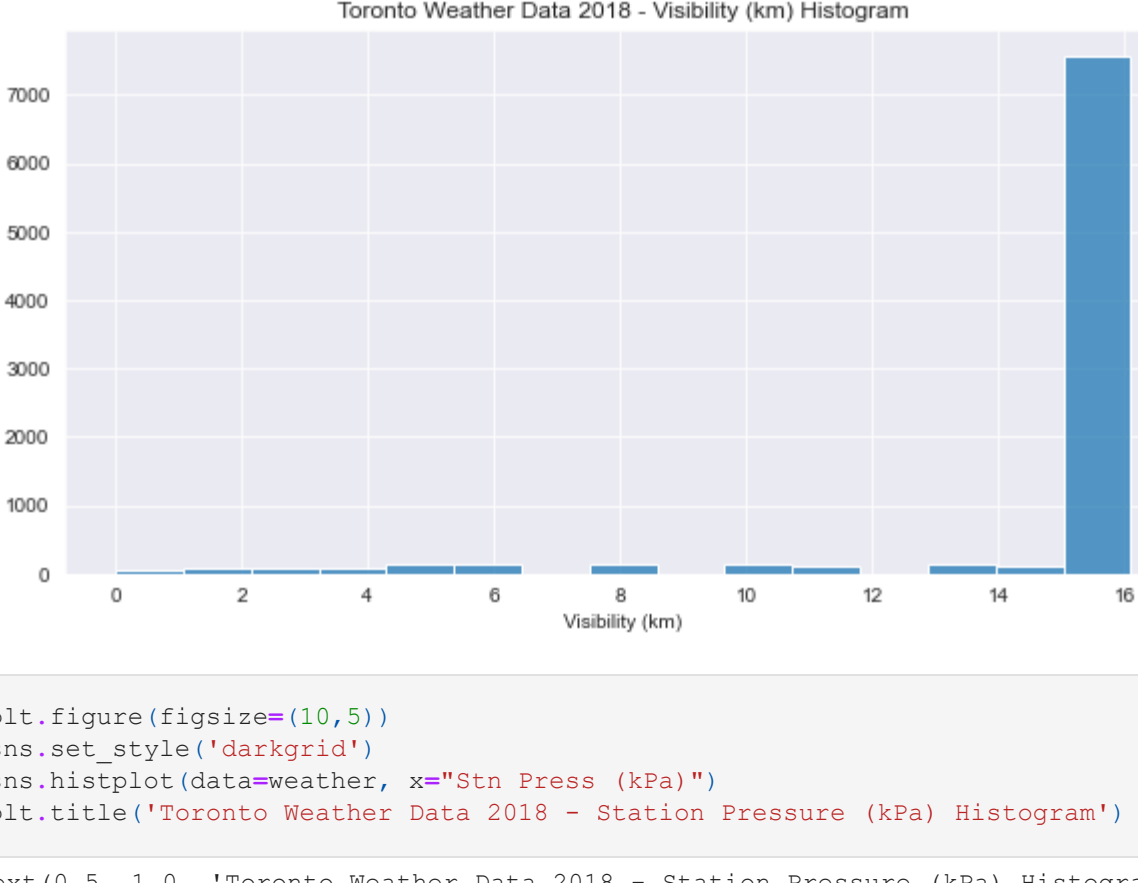
In [131]:
```
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.histplot(data=weather, x="Dew Point Temp (°C)")
plt.title('Toronto Weather Data 2018 - Dew Point Temp (°C) Histogram')
```

Out[131]: Text(0.5, 1.0, 'Toronto Weather Data 2018 - Dew Point Temp (°C) Histogram')



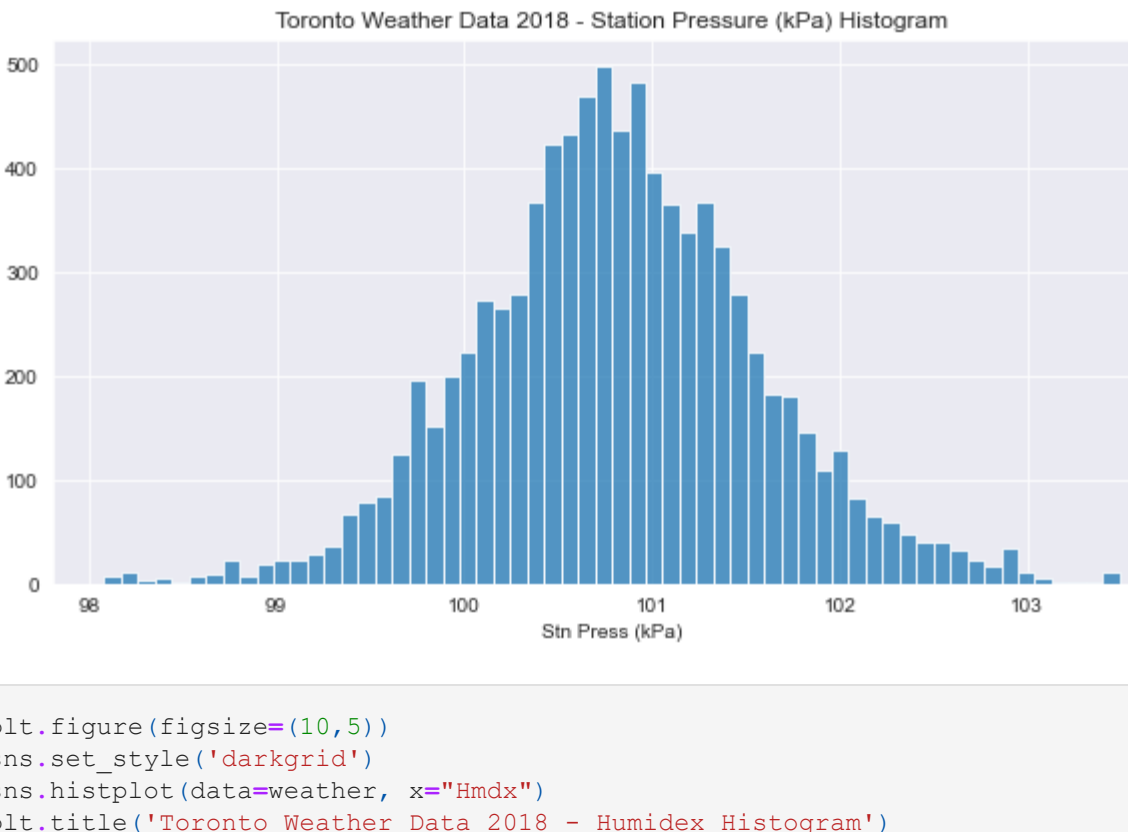
In [132]:
```
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.histplot(data=weather, x="Rel Hum (%)")
plt.title('Toronto Weather Data 2018 - Relative Humidty (%) Histogram')
```

Out[132]: Text(0.5, 1.0, 'Toronto Weather Data 2018 - Relative Humidty (%) Histogram')



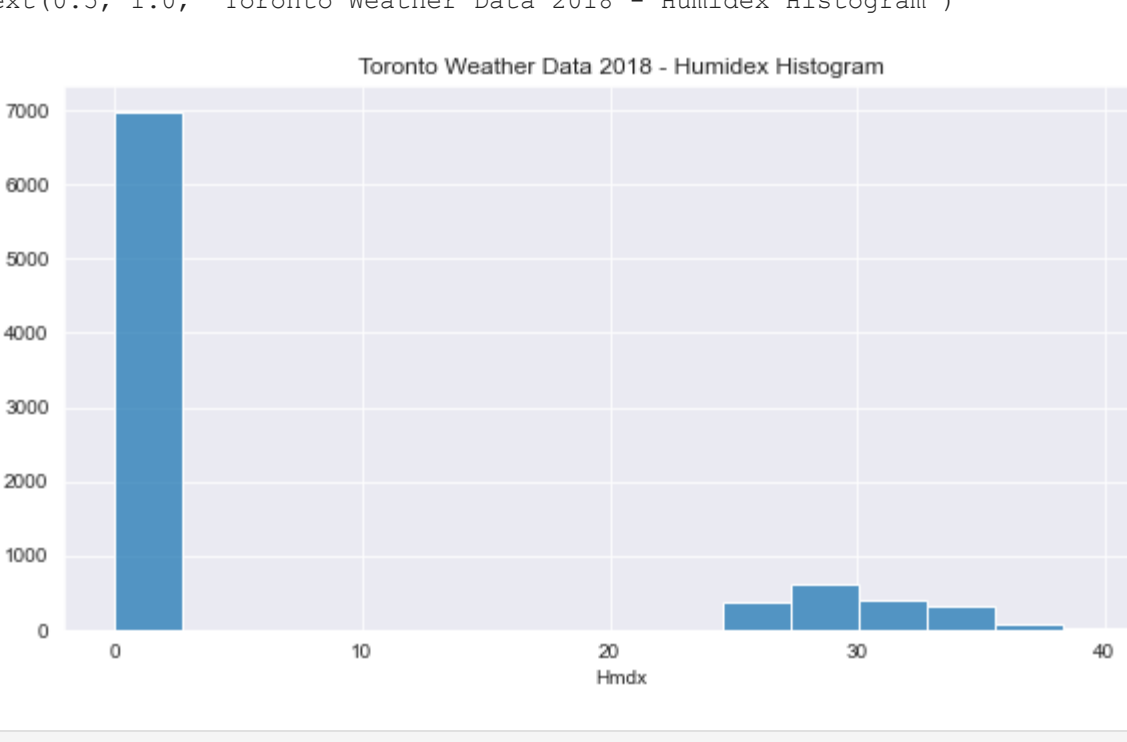
In [133]:
```
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.histplot(data=weather, x="Visibility (km)")
plt.title('Toronto Weather Data 2018 - Visibility (km) Histogram')
```

Out[133]: Text(0.5, 1.0, 'Toronto Weather Data 2018 - Visibility (km) Histogram')



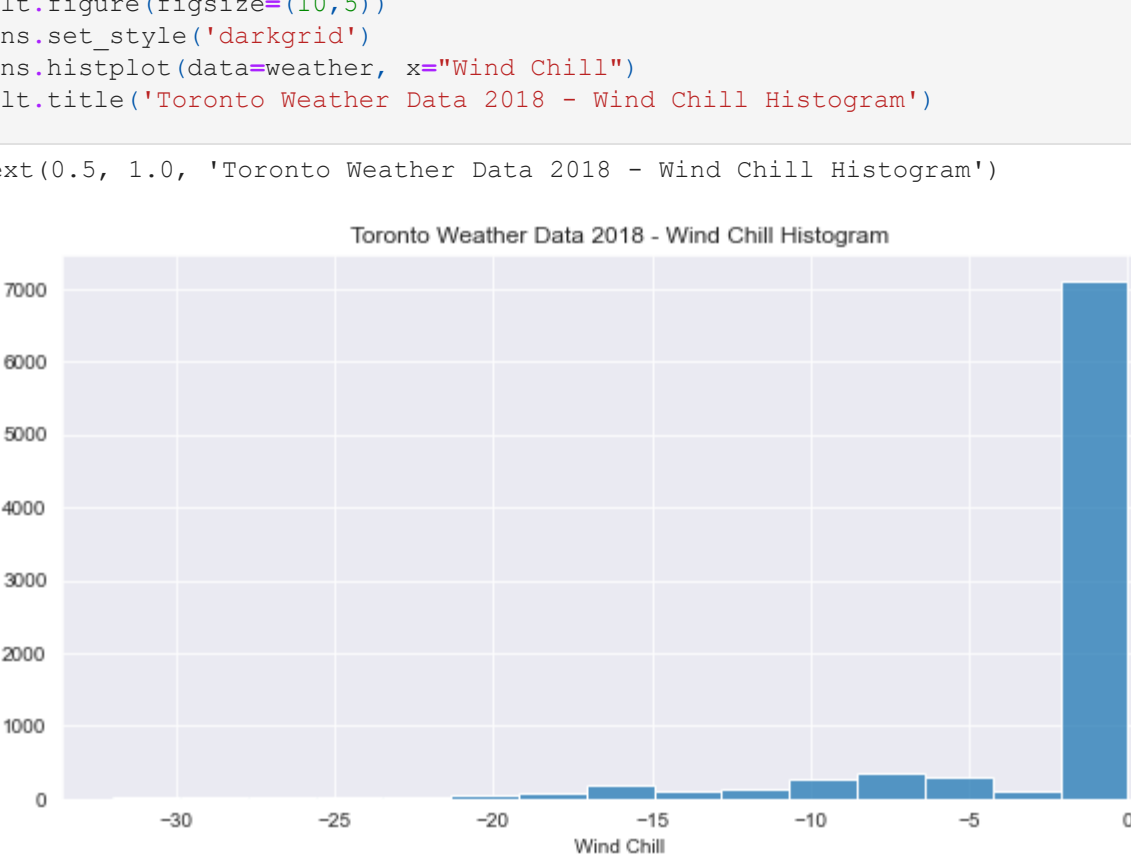
In [134]:
```
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.histplot(data=weather, x="Stn Press (kPa)")
plt.title('Toronto Weather Data 2018 - Station Pressure (kPa) Histogram')
```

Out[134]: Text(0.5, 1.0, 'Toronto Weather Data 2018 - Station Pressure (kPa) Histogram')



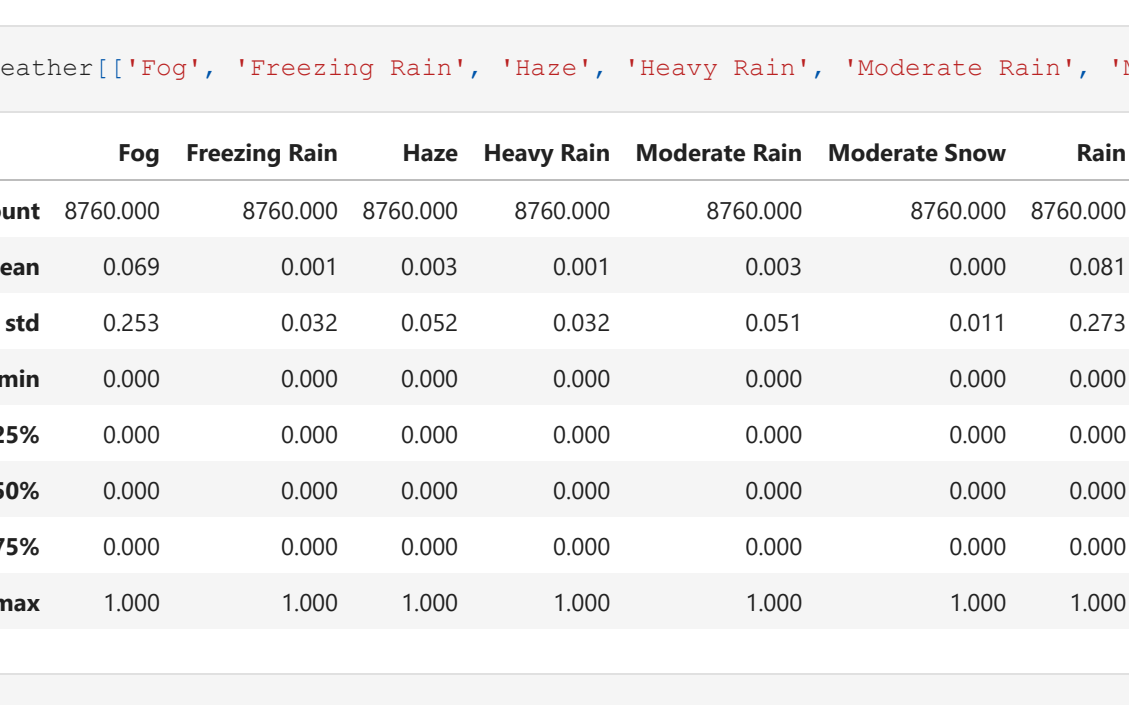
In [135]:
```
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.histplot(data=weather, x="Hmdx")
plt.title('Toronto Weather Data 2018 - Humidex Histogram')
```

Out[135]: Text(0.5, 1.0, 'Toronto Weather Data 2018 - Humidex Histogram')



In [136]:
```
plt.figure(figsize=(10,5))
sns.set_style('darkgrid')
sns.histplot(data=weather, x="Wind Chill")
plt.title('Toronto Weather Data 2018 - Wind Chill Histogram')
```

Out[136]: Text(0.5, 1.0, 'Toronto Weather Data 2018 - Wind Chill Histogram')



In [146]:
```
weather[['Fog', 'Freezing Rain', 'Haze', 'Heavy Rain', 'Moderate Rain', 'Moderate Snow', 'Rain', 'Snow', 'Thunc
```

Out[146]:

	Fog	Freezing Rain	Haze	Heavy Rain	Moderate Rain	Moderate Snow	Rain	Snow	Thunderstorms
count	8760.000	8760.000	8760.000	8760.000	8760.000	8760.000	8760.000	8760.000	8760.000
mean	0.069	0.001	0.003	0.001	0.003	0.000	0.081	0.039	0.002
std	0.253	0.032	0.052	0.032	0.051	0.011	0.273	0.195	0.043
min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
75%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
max	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

In [156]:
```
# Boolean counts/occurrences for last 9 features (Strong wind - Thunderstorms)
(weather == True).sum()
```

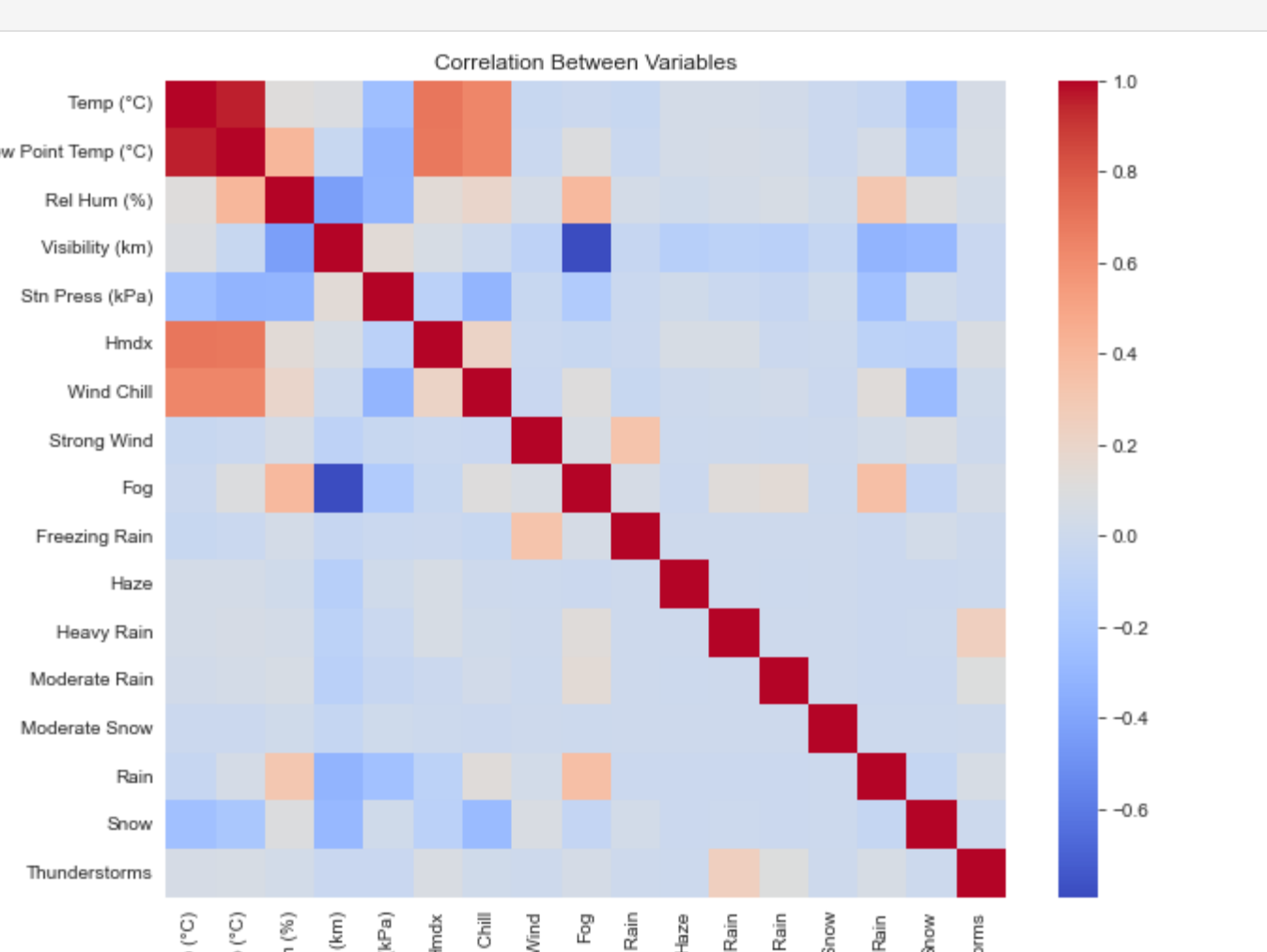
Out[156]:
```
Date/Time                0
Temp (°C)               53
Dew Point Temp (°C)     21
Rel Hum (%)              0
Visibility (km)          9
Stn Press (kPa)          0
Hmdx                     0
Wind Chill               0
Strong Wind             16
Fog                    602
Freezing Rain            9
Haze                    24
Heavy Rain               9
Moderate Rain           23
Moderate Snow            1
Rain                   712
Snow                   346
Thunderstorms           16
dtype: int64
```

In [169]:
```
weather_correlation = weather.corr()
weather_correlation
```

Out[169]:

	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Visibility (km)	Stn Press (kPa)	Hmdx	Wind Chill	Strong Wind	Fog	Freezing Rain	Haze	Heavy Rain	Moderate Rain	Moderate Snow	Rain
Temp (°C)	1.000	0.951	0.114	0.088	-0.253	0.697	0.634	-0.032	-0.010	-0.031	0.036	0.038	0.019	-0.014	-0.043
Dew Point Temp (°C)	0.951	1.000	0.410	-0.034	-0.322	0.686	0.631	-0.020	0.095	-0.018	0.039	0.047	0.035	-0.010	0.045
Rel Hum (%)	0.114	0.410	1.000	-0.430	-0.316	0.132	0.188	0.041	0.391	0.039	0.017	0.039	0.061	0.013	0.309
Visibility (km)	0.088	-0.034	-0.430	1.000	0.138	0.058	-0.007	-0.087	-0.794	-0.043	-0.122	-0.099	-0.114	-0.047	-0.323
Stn Press (kPa)	-0.253	-0.322	-0.316	0.138	1.000	-0.106	-0.317	-0.034	-0.158	-0.017	0.013	-0.018	-0.043	0.007	-0.235
Hmdx	0.697	0.686	0.132	0.058	-0.106	1.000	0.209	-0.021	-0.034	-0.016	0.055	0.056	-0.010	-0.005	-0.095
Wind Chill	0.634	0.631	0.188	-0.007	-0.317	0.209	1.000	-0.030	0.106	-0.034	0.002	0.013	0.021	-0.016	0.123
Strong Wind	-0.032	-0.020	0.041	-0.087	-0.034	-0.021	-0.030	1.000	0.062	0.332	-0.002	-0.001	-0.002	-0.000	0.026
Fog	-0.010	0.095	0.391	-0.794	-0.158	-0.034	0.106	0.062	1.000	0.048	-0.014	0.118	0.145	-0.003	0.358
Freezing Rain	-0.031	-0.018	0.039	-0.043	-0.017	-0.016	-0.034	0.332	0.048	1.000	-0.002	-0.001	-0.002	-0.000	-0.010
Haze	0.036	0.039	0.017	-0.122	0.013	0.055	0.002	-0.002	-0.014	-0.002	1.000	-0.002	-0.003	-0.001	-0.016
Heavy Rain	0.038	0.047	0.039	-0.099	-0.018	0.056	0.013	-0.001	0.118	-0.001	-0.002	1.000	-0.002	-0.000	-0.010
Moderate Rain	0.019	0.035	0.061	-0.114	-0.043	-0.010	0.021	-0.002	0.145	-0.002	-0.003	-0.002	1.000	-0.001	-0.015
Moderate Snow	-0.014	-0.010	0.013	-0.047	0.007	-0.005	-0.016	-0.000	-0.003	-0.000	-0.001	-0.000	-0.001	1.000	-0.003
Rain	-0.043	0.045	0.309	-0.323	-0.235	-0.095	0.123	0.026	0.358	-0.010	-0.016	-0.010	-0.015	-0.003	1.000
Snow	-0.243	-0.197	0.094	-0.290	0.013	-0.102	-0.281	0.074	-0.055	0.030	-0.011	-0.007	-0.010	-0.002	-0.045
Thunderstorms	0.053	0.059	0.031	-0.030	-0.030	0.069	0.018	-0.002	0.041	-0.001	-0.002	0.249	0.102	-0.000	0.056

In [176]:
```
plt.figure(figsize=(10,8))
sns.heatmap(weather_correlation, cmap="coolwarm")
plt.title('Correlation Between Variables')
plt.show()
```



Combined Data

In [177]:
```
# Load cleaned combined data
df = pd.read_csv(r"C:\Users\on3_a\Documents\Data Analytics, Big Data & Predictive Analytics/Data/bikeshare_weat
```

In [178]:
```
df.head()
```

Out[178...

	Unnamed: 0	date	trips	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Visibility (km)	Stn Press (kPa)	Hmdx	Wind Chill	...	Freezing Rain	Haze	Heavy Rain	Moderate Rain	Moderate Snow	Ra
0	0	2018-01-01 00:00:00	4	-16.200	-20.500	70.000	16.100	102.130	0.000	-22.000	...	0	0	0	0	0	
1	1	2018-01-01 01:00:00	10	-16.800	-21.100	70.000	16.100	102.100	0.000	-20.000	...	0	0	0	0	0	
2	2	2018-01-01 02:00:00	6	-17.300	-20.800	75.000	16.100	102.150	0.000	-26.000	...	0	0	0	0	0	
3	3	2018-01-01 03:00:00	14	-17.900	-21.600	73.000	16.100	102.130	0.000	-24.000	...	0	0	0	0	0	
4	4	2018-01-01 04:00:00	6	-17.200	-21.100	72.000	16.100	102.090	0.000	-21.000	...	0	0	0	0	0	

5 rows × 22 columns

In [179...

```
df.drop(['Unnamed: 0'], axis=1, inplace=True)
```

In [182...

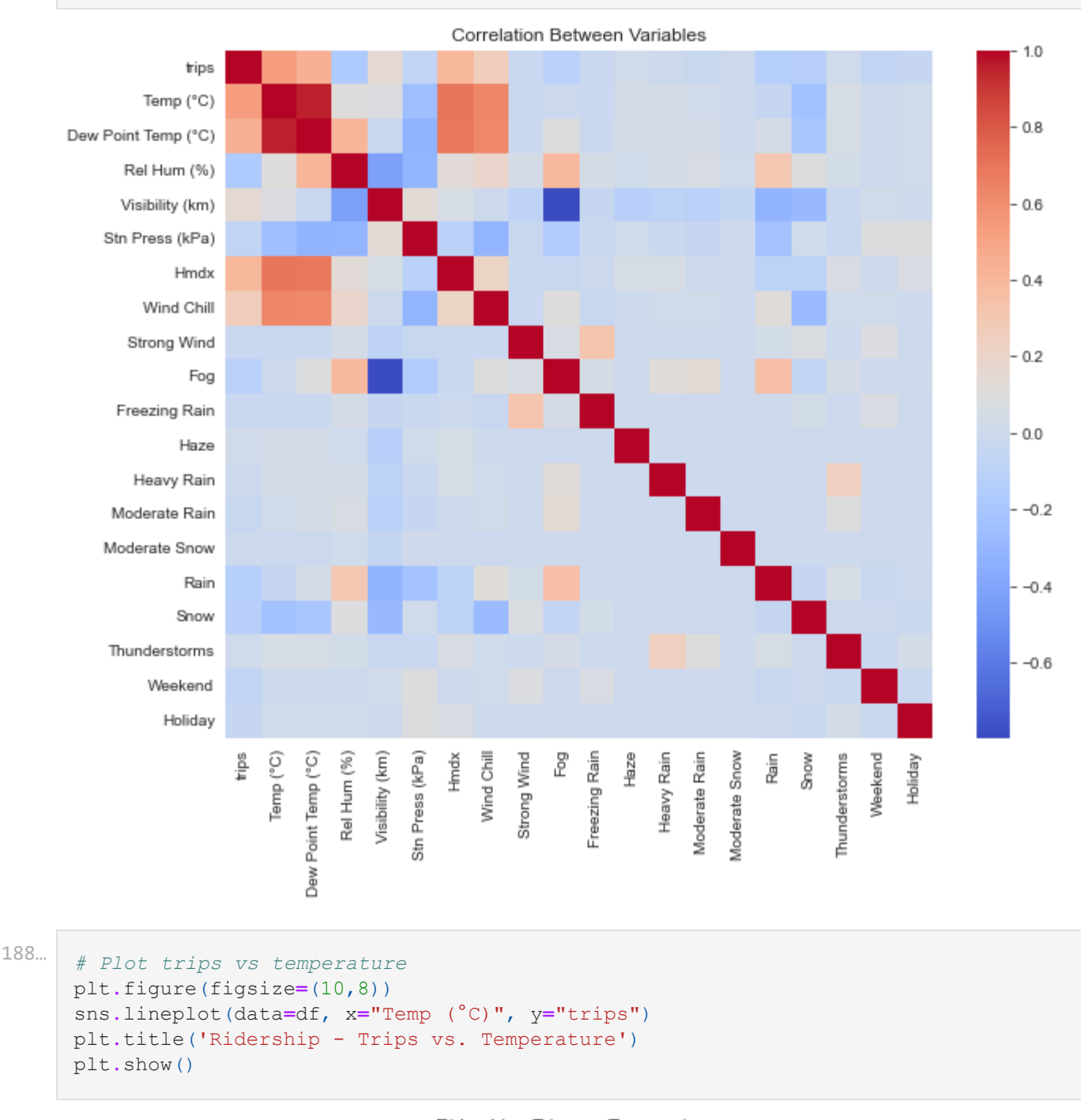
```
df_correlation = df.corr()
df_correlation
```

Out[182...

	trips	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Visibility (km)	Stn Press (kPa)	Hmdx	Wind Chill	Strong Wind	Fog	Freezing Rain	Haze	Heavy Rain	Moderate Rain	Moderate Snow
trips	1.000	0.532	0.439	-0.164	0.157	-0.067	0.410	0.260	-0.030	-0.120	-0.026	0.022	-0.005	-0.033	-0.007
Temp (°C)	0.532	1.000	0.951	0.114	0.088	-0.250	0.698	0.630	-0.033	-0.010	-0.031	0.036	0.038	0.019	-0.014
Dew Point Temp (°C)	0.439	0.951	1.000	0.411	-0.034	-0.319	0.686	0.628	-0.020	0.095	-0.018	0.039	0.047	0.035	-0.010
Rel Hum (%)	-0.164	0.114	0.411	1.000	-0.430	-0.316	0.132	0.188	0.041	0.391	0.039	0.017	0.039	0.061	0.013
Visibility (km)	0.157	0.088	-0.034	-0.430	1.000	0.137	0.058	-0.007	-0.087	-0.796	-0.043	-0.123	-0.100	-0.114	-0.048
Stn Press (kPa)	-0.067	-0.250	-0.319	-0.316	0.137	1.000	-0.105	-0.314	-0.034	-0.158	-0.017	0.013	-0.018	-0.043	0.007
Hmdx	0.410	0.698	0.686	0.132	0.058	-0.105	1.000	0.208	-0.022	-0.034	-0.016	0.055	0.056	-0.010	-0.005
Wind Chill	0.260	0.630	0.628	0.188	-0.007	-0.314	0.208	1.000	-0.031	0.105	-0.035	0.001	0.013	0.021	-0.016
Strong Wind	-0.030	-0.033	-0.020	0.041	-0.087	-0.034	-0.022	-0.031	1.000	0.063	0.332	-0.002	-0.001	-0.002	-0.000
Fog	-0.120	-0.010	0.095	0.391	-0.796	-0.158	-0.034	0.105	0.063	1.000	0.048	-0.014	0.118	0.145	-0.003
Freezing Rain	-0.026	-0.031	-0.018	0.039	-0.043	-0.017	-0.016	-0.035	0.332	0.048	1.000	-0.002	-0.001	-0.002	-0.000
Haze	0.022	0.036	0.039	0.017	-0.123	0.013	0.055	0.001	-0.002	-0.014	-0.002	1.000	-0.002	-0.003	-0.001
Heavy Rain	-0.005	0.038	0.047	0.039	-0.100	-0.018	0.056	0.013	-0.001	0.118	-0.001	-0.002	1.000	-0.002	-0.000
Moderate Rain	-0.033	0.019	0.035	0.061	-0.114	-0.043	-0.010	0.021	-0.002	0.145	-0.002	-0.003	-0.002	1.000	-0.001
Moderate Snow	-0.007	-0.014	-0.010	0.013	-0.048	0.007	-0.005	-0.016	-0.000	-0.003	-0.000	-0.001	-0.000	-0.001	1.000
Rain	-0.134	-0.044	0.044	0.308	-0.323	-0.234	-0.095	0.122	0.026	0.357	-0.010	-0.016	-0.010	-0.015	-0.003
Snow	-0.124	-0.241	-0.196	0.094	-0.289	0.012	-0.101	-0.280	0.075	-0.055	0.031	-0.011	-0.006	-0.010	-0.002
Thunderstorms	0.017	0.053	0.059	0.031	-0.030	-0.030	0.069	0.018	-0.002	0.041	-0.001	-0.002	0.249	0.102	-0.000
Weekend	-0.067	-0.005	-0.008	-0.007	0.018	0.091	-0.008	0.023	0.082	-0.012	0.069	-0.015	-0.003	-0.002	-0.004
Holiday	-0.039	0.014	0.020	0.021	0.004	0.091	0.074	-0.002	-0.008	0.008	-0.006	-0.010	-0.006	-0.009	-0.002

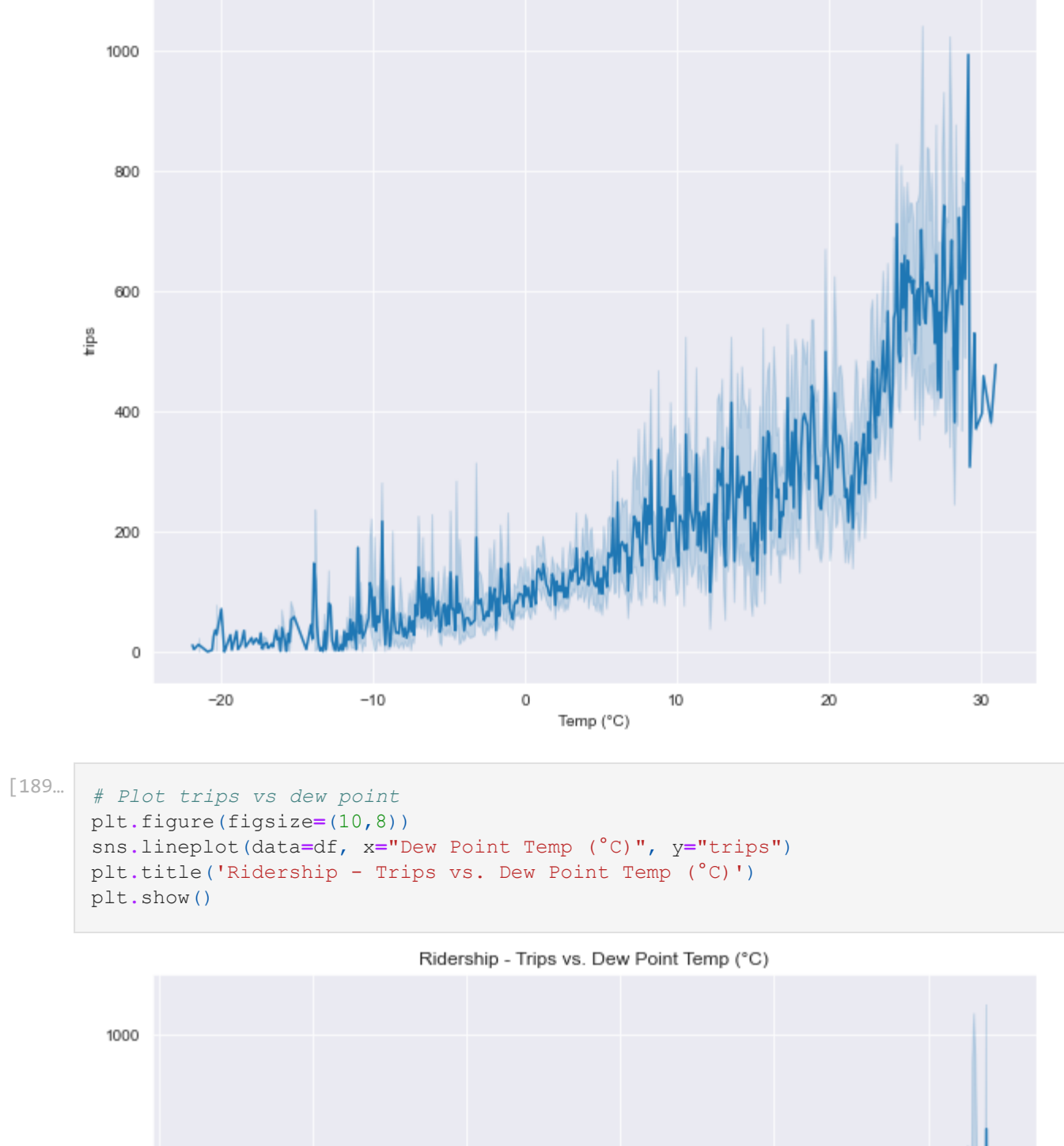
In [183...

```
plt.figure(figsize=(10,8))
sns.heatmap(df_correlation, cmap="coolwarm")
plt.title('Correlation Between Variables')
plt.show()
# Can see that trips are highly correlated to temperature, dew point, and humidex
```



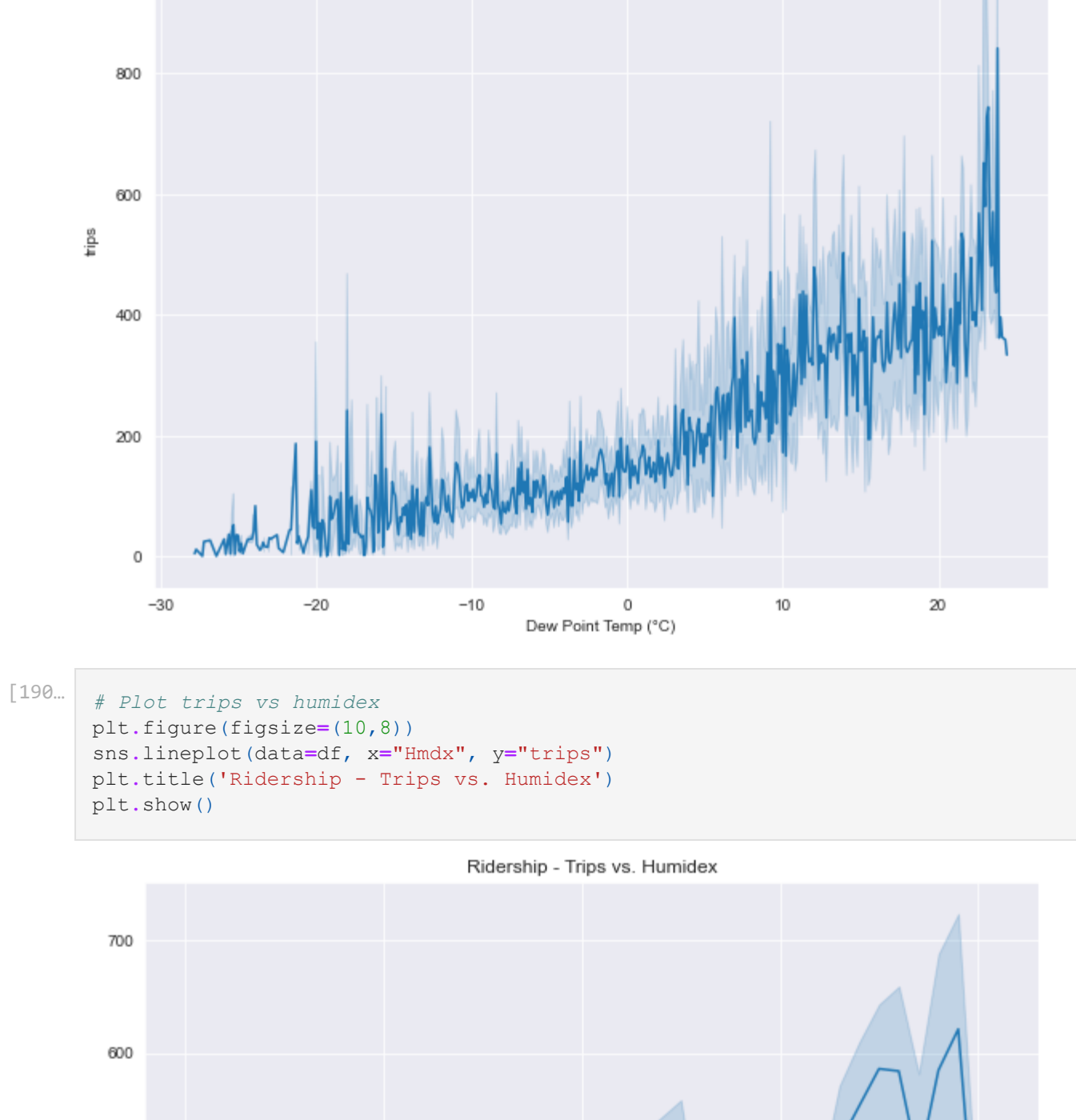
In [188...

```
# Plot trips vs temperature
plt.figure(figsize=(10,8))
sns.lineplot(data=df, x="Temp (°C)", y="trips")
plt.title('Ridership - Trips vs. Temperature')
plt.show()
```



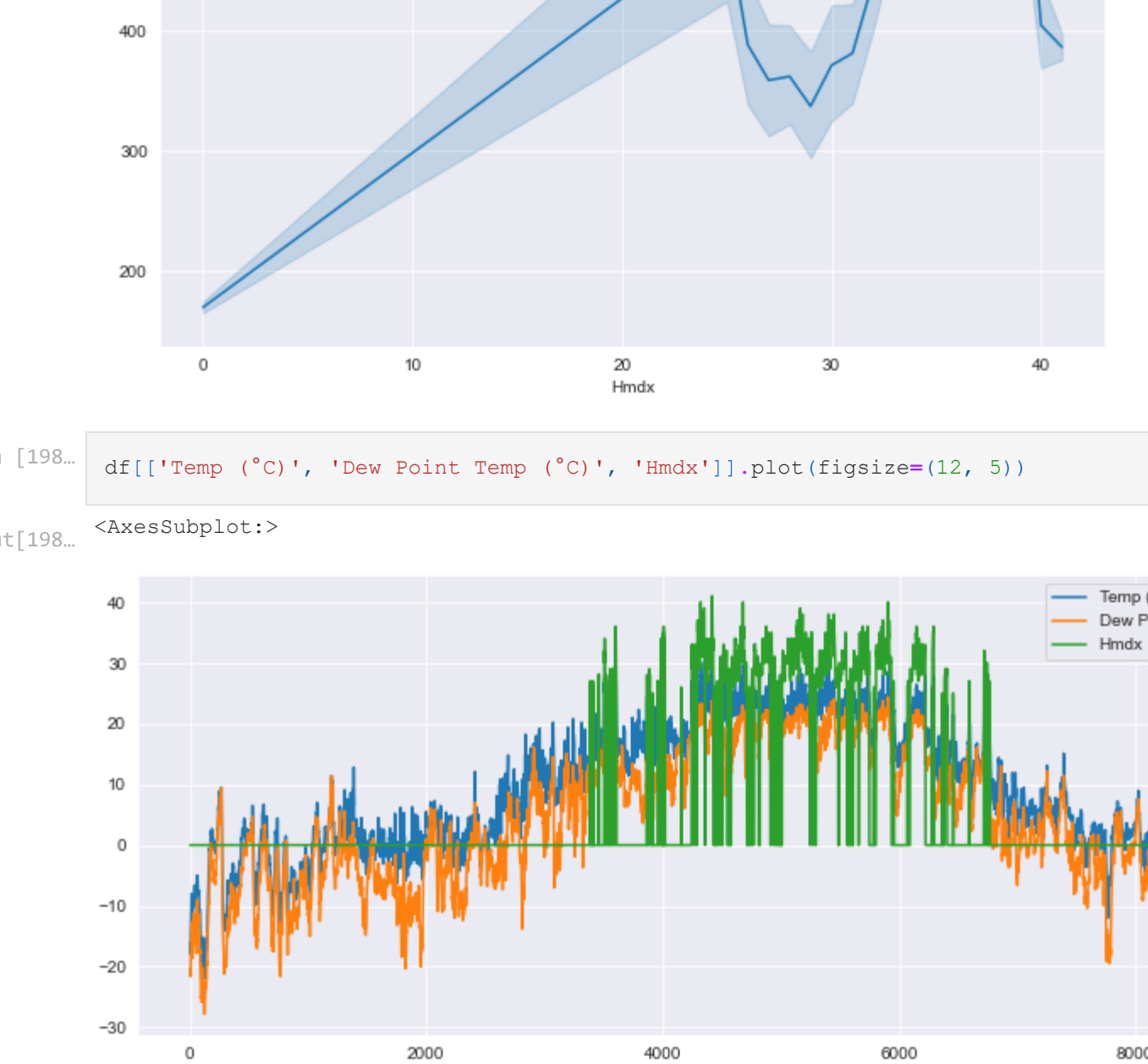
In [189...

```
# Plot trips vs dew point
plt.figure(figsize=(10,8))
sns.lineplot(data=df, x="Dew Point Temp (°C)", y="trips")
plt.title('Ridership - Trips vs. Dew Point Temp (°C)')
plt.show()
```



In [190...

```
# Plot trips vs humidex
plt.figure(figsize=(10,8))
sns.lineplot(data=df, x="Hmdx", y="trips")
plt.title('Ridership - Trips vs. Humidex')
plt.show()
```



In [198...

```
df[['Temp (°C)', 'Dew Point Temp (°C)', 'Hmdx']].plot(figsize=(12, 5))
```

Out[198... <AxesSubplot:>