Importing Libraries

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from datetime import datetime
import warnings
warnings.filterwarnings('ignore')

df = pd.read_csv("UberDataset.csv")

df
```

```
            START_DATE          END_DATE  CATEGORY
START  \
0     01-01-2016 21:11  01-01-2016 21:17  Business       Fort Pierce

1     01-02-2016 01:25  01-02-2016 01:37  Business       Fort Pierce

2     01-02-2016 20:25  01-02-2016 20:38  Business       Fort Pierce

3     01-05-2016 17:31  01-05-2016 17:45  Business       Fort Pierce

4     01-06-2016 14:42  01-06-2016 15:49  Business       Fort Pierce

...                ...               ...       ...               ...

1151  12/31/2016 13:24  12/31/2016 13:42  Business           Kar?chi

1152  12/31/2016 15:03  12/31/2016 15:38  Business  Unknown Location

1153  12/31/2016 21:32  12/31/2016 21:50  Business        Katunayake

1154  12/31/2016 22:08  12/31/2016 23:51  Business           Gampaha

1155            Totals               NaN       NaN               NaN


                   STOP    MILES          PURPOSE
0          Fort Pierce      5.1   Meal/Entertain
1          Fort Pierce      5.0              NaN
2          Fort Pierce      4.8  Errand/Supplies
3          Fort Pierce      4.7          Meeting
4       West Palm Beach     63.7   Customer Visit
...                ...      ...              ...
1151  Unknown Location      3.9   Temporary Site
1152  Unknown Location     16.2          Meeting
1153           Gampaha      6.4   Temporary Site
```

```
1154         Ilukwatta     48.2   Temporary Site
1155               NaN  12204.7              NaN

[1156 rows x 7 columns]
```

```
df.shape
```

```
(1156, 7)
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1156 entries, 0 to 1155
Data columns (total 7 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   START_DATE  1156 non-null   object 
 1   END_DATE    1155 non-null   object 
 2   CATEGORY    1155 non-null   object 
 3   START       1155 non-null   object 
 4   STOP        1155 non-null   object 
 5   MILES       1156 non-null   float64
 6   PURPOSE     653 non-null    object 
dtypes: float64(1), object(6)
memory usage: 63.3+ KB
```

```
df.isnull().sum()
```

```
START_DATE      0
END_DATE        1
CATEGORY        1
START           1
STOP            1
MILES           0
PURPOSE       503
dtype: int64
```

Data Preprocessing

```
df['PURPOSE'].fillna('NOT',inplace=True)
```

```
df.head()
```

```
         START_DATE           END_DATE  CATEGORY        START  
STOP  \
0  01-01-2016 21:11  01-01-2016 21:17  Business  Fort Pierce      Fort
Pierce
1  01-02-2016 01:25  01-02-2016 01:37  Business  Fort Pierce      Fort
Pierce
```

```
2  01-02-2016 20:25  01-02-2016 20:38  Business  Fort Pierce      Fort
Pierce
3  01-05-2016 17:31  01-05-2016 17:45  Business  Fort Pierce      Fort
Pierce
4  01-06-2016 14:42  01-06-2016 15:49  Business  Fort Pierce  West
Palm Beach

   MILES          PURPOSE
0    5.1   Meal/Entertain
1    5.0              NOT
2    4.8  Errand/Supplies
3    4.7          Meeting
4   63.7   Customer Visit
```

```
df["START_DATE"]= pd.to_datetime(df["START_DATE"],errors="coerce")
df["END_DATE"]= pd.to_datetime(df["END_DATE"],errors="coerce")

df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1156 entries, 0 to 1155
Data columns (total 7 columns):
 #   Column      Non-Null Count  Dtype
---  ------      --------------  -----
 0   START_DATE  421 non-null    datetime64[ns]
 1   END_DATE    420 non-null    datetime64[ns]
 2   CATEGORY    1155 non-null   object
 3   START       1155 non-null   object
 4   STOP        1155 non-null   object
 5   MILES       1156 non-null   float64
 6   PURPOSE     1156 non-null   object
dtypes: datetime64[ns](2), float64(1), object(4)
memory usage: 63.3+ KB
```

```
df["Date"]=pd.DatetimeIndex(df["START_DATE"]).date
df["Time"]=pd.DatetimeIndex(df["START_DATE"]).hour

df["Day-Night"] =
pd.cut(x=df["Time"],bins=[0,10,15,19,24],labels=["Morning","Afternon",
"Evening","Night"])

df.head()
```

```
           START_DATE            END_DATE  CATEGORY        START  \
0 2016-01-01 21:11:00 2016-01-01 21:17:00  Business  Fort Pierce
1 2016-01-02 01:25:00 2016-01-02 01:37:00  Business  Fort Pierce
2 2016-01-02 20:25:00 2016-01-02 20:38:00  Business  Fort Pierce
3 2016-01-05 17:31:00 2016-01-05 17:45:00  Business  Fort Pierce
4 2016-01-06 14:42:00 2016-01-06 15:49:00  Business  Fort Pierce

             STOP  MILES          PURPOSE        Date  Time Day-Night
```

```
0      Fort Pierce    5.1   Meal/Entertain  2016-01-01  21.0     Night
1      Fort Pierce    5.0              NOT  2016-01-02   1.0   Morning
2      Fort Pierce    4.8  Errand/Supplies  2016-01-02  20.0     Night
3      Fort Pierce    4.7          Meeting  2016-01-05  17.0   Evening
4  West Palm Beach   63.7   Customer Visit  2016-01-06  14.0  Afternon
```

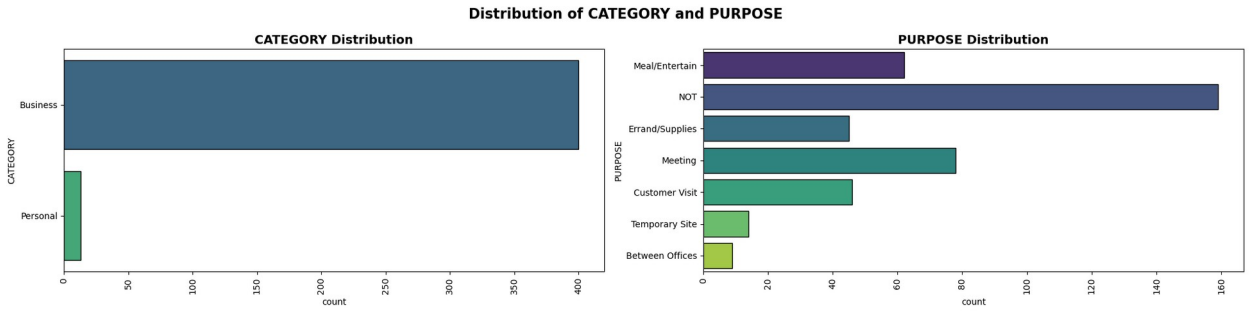
```
df.dropna(inplace=True)
```

```
df.shape
```

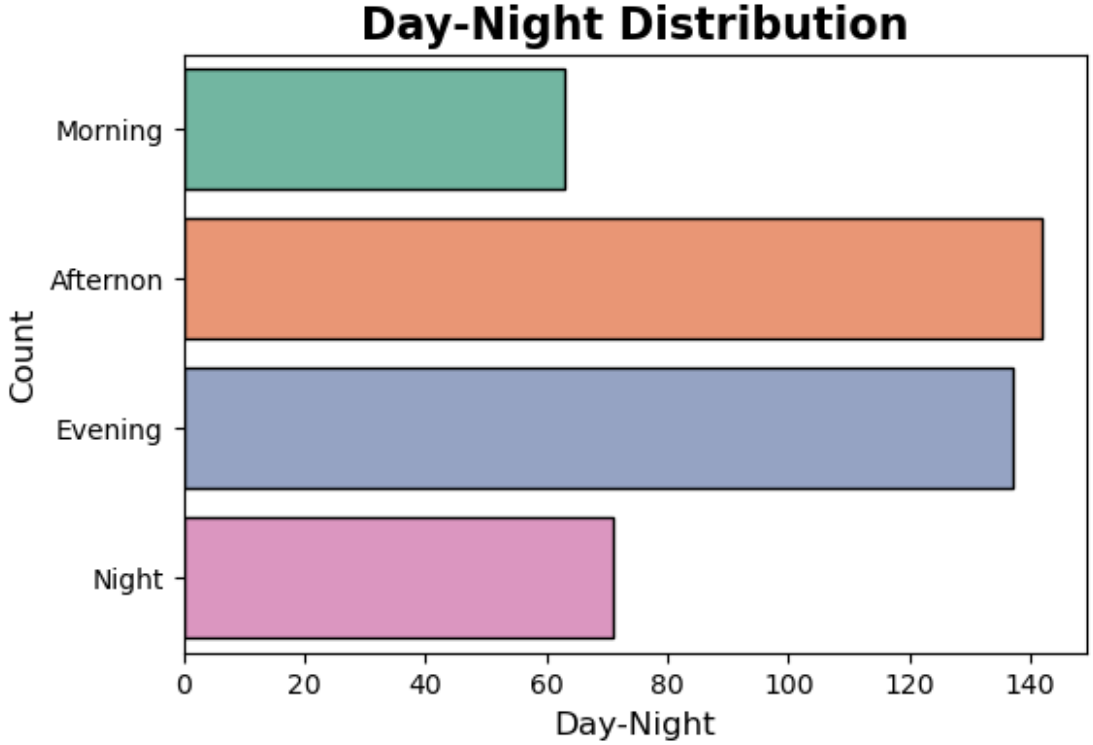
```
(413, 10)
```

Data Visulization

```
# Create the figure with a larger size
plt.figure(figsize=(20, 5))

# Title for the whole figure
plt.suptitle("Distribution of CATEGORY and PURPOSE", fontsize=16,
fontweight='bold')

# Left subplot
plt.subplot(1, 2, 1)  # 1 row, 2 columns, first plot on the left
sns.countplot(df['CATEGORY'], palette='viridis', edgecolor='black')
plt.xticks(rotation=90)
plt.title("CATEGORY Distribution", fontsize=14, fontweight='bold')  #
Title for the left subplot

# Right subplot
plt.subplot(1, 2, 2)  # 1 row, 2 columns, second plot on the right
sns.countplot(df['PURPOSE'], palette='viridis', edgecolor='black')
plt.xticks(rotation=90)
plt.title("PURPOSE Distribution", fontsize=14, fontweight='bold')  #
Title for the right subplot

# Show the plot
plt.tight_layout()  # Adjust layout to prevent overlap of titles and
labels
plt.show()
```




```python
# Set the global color palette to "pastel"
sns.set_palette("muted")

# Create the countplot with improved aesthetics
plt.figure(figsize=(6, 4))  # Set figure size
ax = sns.countplot(y=df["Day-Night"],
edgecolor="black",palette="Set2")  # Use the global pastel palette

# Add a title and axis labels
ax.set_title("Day-Night Distribution", fontsize=16, fontweight='bold')
# Title
ax.set_xlabel("Day-Night", fontsize=12)  # X-axis label
ax.set_ylabel("Count", fontsize=12)  # Y-axis label

# Show the plot
plt.show()
```



```
df['Month']=pd.DatetimeIndex(df['START_DATE']).month

month_label = { 1.0: 'Jan', 2.0: 'Feb', 3.0: 'Mar', 4.0: 'Apr', 5.0:
'May', 6.0: 'Jun',
                7.0: 'Jul', 8.0: 'Aug', 9.0: 'Sep', 10.0: 'Oct', 11.0:
'Nov', 12.0: 'Dec'}

df['Month']=df.Month.map(month_label)

mon=df.Month.value_counts(sort=False)

df.head()
```

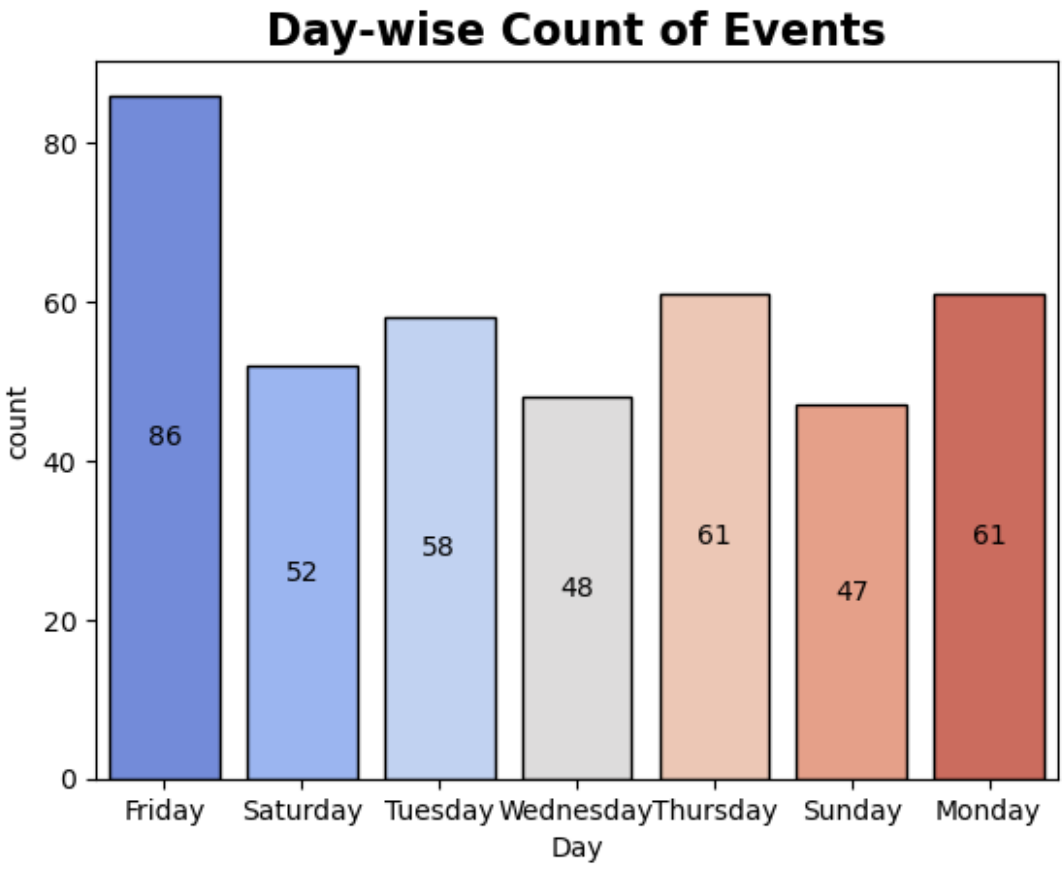
```
            START_DATE             END_DATE  CATEGORY        START  \
0 2016-01-01 21:11:00 2016-01-01 21:17:00  Business  Fort Pierce
1 2016-01-02 01:25:00 2016-01-02 01:37:00  Business  Fort Pierce
2 2016-01-02 20:25:00 2016-01-02 20:38:00  Business  Fort Pierce
3 2016-01-05 17:31:00 2016-01-05 17:45:00  Business  Fort Pierce
4 2016-01-06 14:42:00 2016-01-06 15:49:00  Business  Fort Pierce

               STOP  MILES          PURPOSE        Date  Time Day-Night
Month  \
0      Fort Pierce    5.1   Meal/Entertain  2016-01-01  21.0     Night
Jan
1      Fort Pierce    5.0              NOT  2016-01-02   1.0   Morning
Jan
2      Fort Pierce    4.8  Errand/Supplies  2016-01-02  20.0     Night
Jan
3      Fort Pierce    4.7          Meeting  2016-01-05  17.0   Evening
Jan
4  West Palm Beach   63.7   Customer Visit  2016-01-06  14.0  Afternon
Jan

         Day
0     Friday
1   Saturday
2   Saturday
3    Tuesday
4  Wednesday
```

```
df['Day']=df.START_DATE.dt.weekday

day_label = { 0.0: 'Monday',
    1.0: 'Tuesday',
    2.0: 'Wednesday',
    3.0: 'Thursday',
    4.0: 'Friday',
    5.0: 'Saturday',
    6.0: 'Sunday'}

df['Day']=df.Day.map(day_label)
```

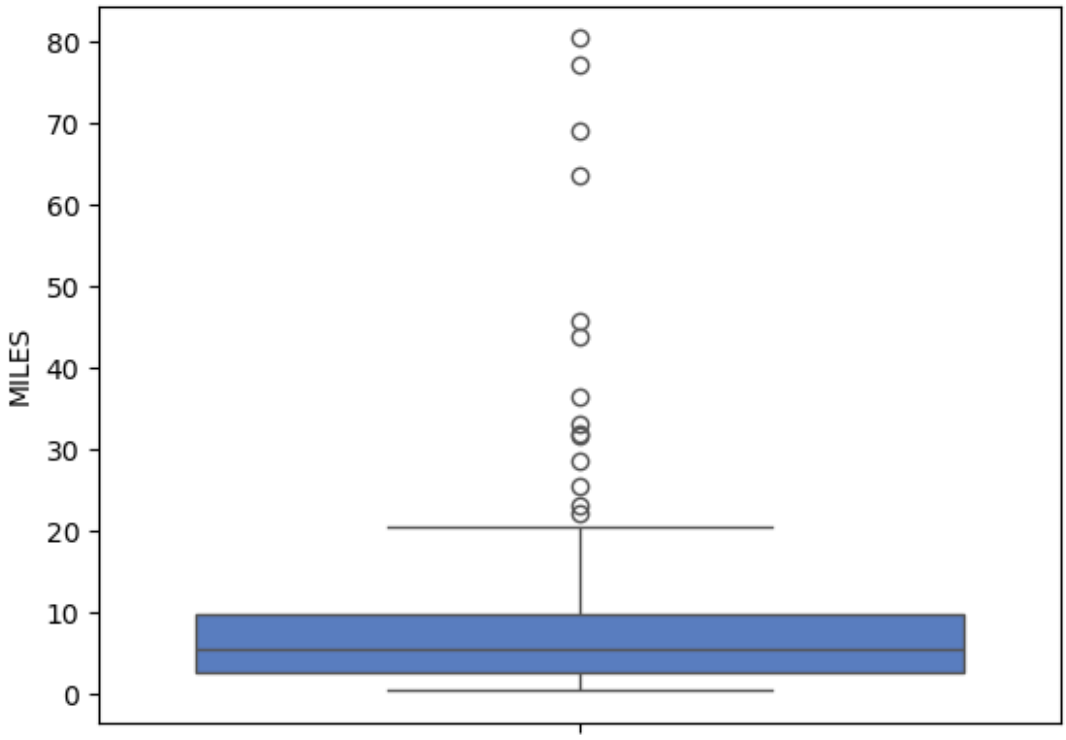
```
df.head()
```

```
            START_DATE             END_DATE  CATEGORY        START  \
0 2016-01-01 21:11:00 2016-01-01 21:17:00  Business  Fort Pierce
1 2016-01-02 01:25:00 2016-01-02 01:37:00  Business  Fort Pierce
2 2016-01-02 20:25:00 2016-01-02 20:38:00  Business  Fort Pierce
3 2016-01-05 17:31:00 2016-01-05 17:45:00  Business  Fort Pierce
4 2016-01-06 14:42:00 2016-01-06 15:49:00  Business  Fort Pierce

               STOP  MILES          PURPOSE        Date  Time Day-Night
Month  \
0      Fort Pierce    5.1   Meal/Entertain  2016-01-01  21.0     Night
Jan
1      Fort Pierce    5.0              NOT  2016-01-02   1.0   Morning
Jan
2      Fort Pierce    4.8  Errand/Supplies  2016-01-02  20.0     Night
Jan
3      Fort Pierce    4.7          Meeting  2016-01-05  17.0   Evening
Jan
4  West Palm Beach   63.7   Customer Visit  2016-01-06  14.0  Afternon
Jan

         Day
0     Friday
1   Saturday
2   Saturday
3    Tuesday
4  Wednesday
```

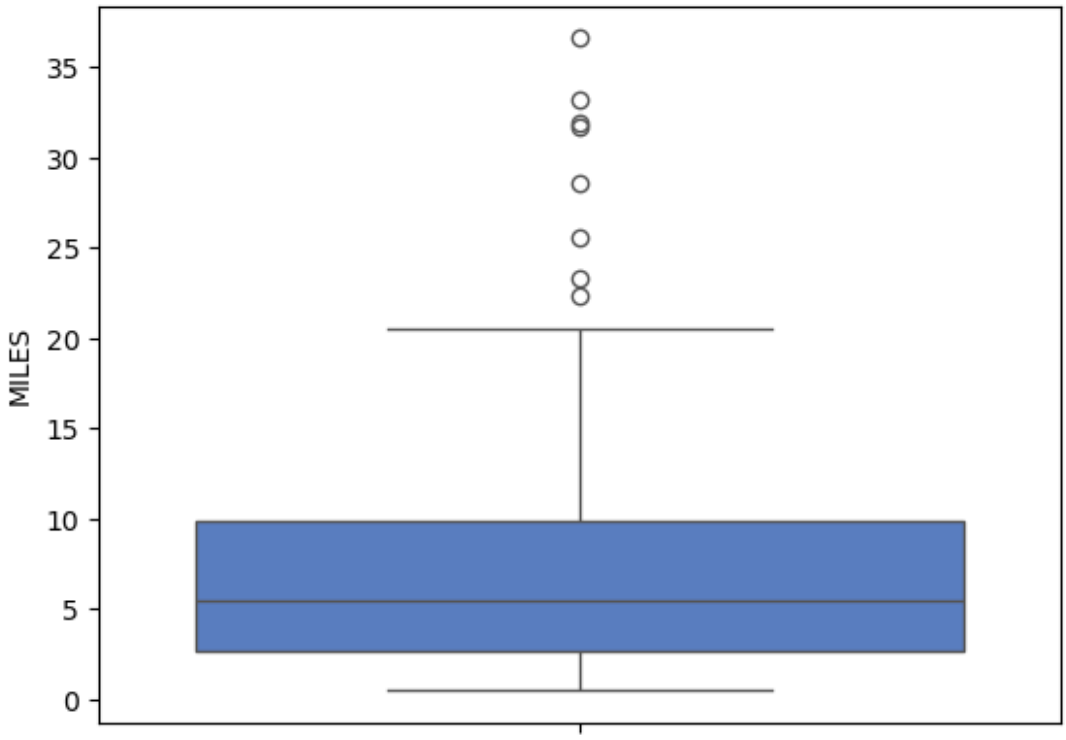
```
# Assuming day_label contains counts of the 'Day' column
day_label = df['Day'].value_counts(sort=False)

# Create the barplot
ax = sns.barplot(x=day_label.index, y=day_label, edgecolor='black',
palette='coolwarm')

# Annotate each bar with its value
for bar in ax.containers:
    ax.bar_label(bar, fmt='%.0f', label_type='center')  # '%.0f'
formats the label as an integer

plt.title("Day-wise Count of Events", fontsize=16, fontweight='bold')
plt.show()
```



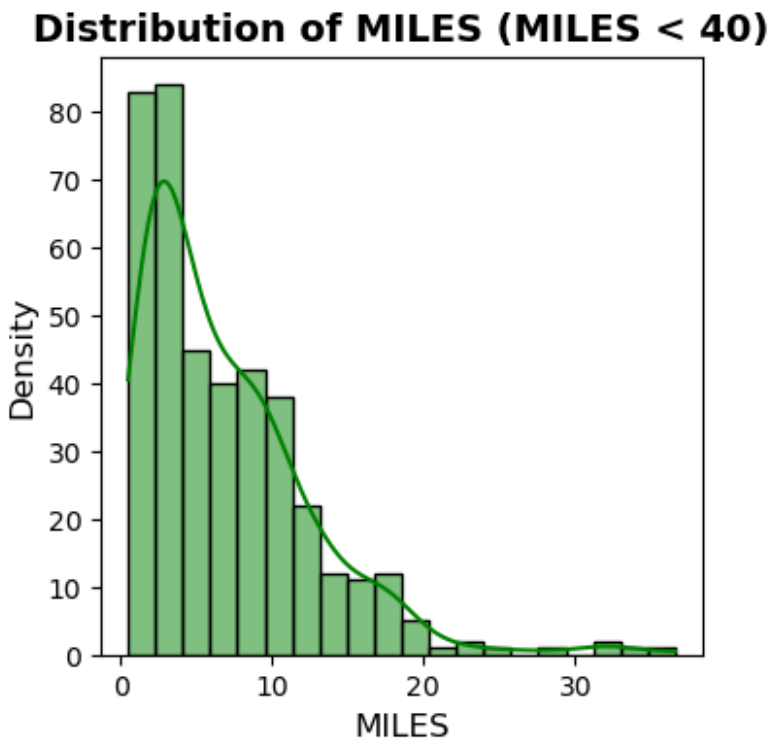

```
sns.boxplot(df[df['MILES']<100]['MILES'])
plt.show()
```




```
sns.boxplot(df[df['MILES']<40]['MILES'])
plt.show()
```




```
# Filter the data
filtered_data = df[df['MILES'] < 40]['MILES']

# Plot the histogram and KDE
plt.figure(figsize=(4,4))
sns.histplot(filtered_data, kde=True, bins=20, color='green',
edgecolor='black')

# Add title and labels
plt.title("Distribution of MILES (MILES < 40)", fontsize=14,
fontweight='bold')
plt.xlabel("MILES", fontsize=12)
plt.ylabel("Density", fontsize=12)

# Show the plot
plt.show()
```


Distribution of MILES (MILES < 40)
Density
MILES
0
10
20
30
0
10
20
30
40
50
60
70
80