

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

Upload our Dataset

```
In [2]: cars_data = pd.read_csv("Car_sales.csv")
cars_data.head()
```

```
Out[2]:
```

	Manufacturer	Model	Sales_in_thousands	__year_resale_value	Vehicle_type	Price_in_tho
0	Acura	Integra	16.919	16.360	Passenger	
1	Acura	TL	39.384	19.875	Passenger	
2	Acura	CL	14.114	18.225	Passenger	
3	Acura	RL	8.588	29.725	Passenger	
4	Audi	A4	20.397	22.255	Passenger	

```
In [3]: cars_data.shape
```

```
Out[3]: (157, 16)
```

Data Cleaning

```
In [4]: cars_data.isna().sum()
```

```
Out[4]: Manufacturer      0
Model                    0
Sales_in_thousands      0
__year_resale_value     36
Vehicle_type            0
Price_in_thousands      2
Engine_size             1
Horsepower              1
Wheelbase               1
Width                   1
Length                  1
Curb_weight             2
Fuel_capacity           1
Fuel_efficiency         3
Latest_Launch          0
Power_perf_factor       2
dtype: int64
```

```
In [5]: print("mean :", cars_data['__year_resale_value'].mean())
print("median :", cars_data['__year_resale_value'].median())
```

```
mean : 18.07297520661157
median : 14.18
```

```
In [6]: cars_data['__year_resale_value'].fillna(cars_data['__year_resale_value'].median(),i
cars_data.isna().sum()
```

```
Out[6]: Manufacturer      0
Model                    0
Sales_in_thousands      0
__year_resale_value      0
Vehicle_type            0
Price_in_thousands      2
Engine_size             1
Horsepower              1
Wheelbase               1
Width                   1
Length                  1
Curb_weight             2
Fuel_capacity           1
Fuel_efficiency          3
Latest_Launch           0
Power_perf_factor        2
dtype: int64
```

```
In [7]: threshold = len(cars_data) * 0.05
print("threshold : ",threshold)
cols_to_drop = cars_data.columns[cars_data.isna().sum() <= threshold ]
cars_data.dropna(subset=cols_to_drop,inplace=True)
cars_data.isna().sum()
```

```
threshold : 7.8500000000000005
```

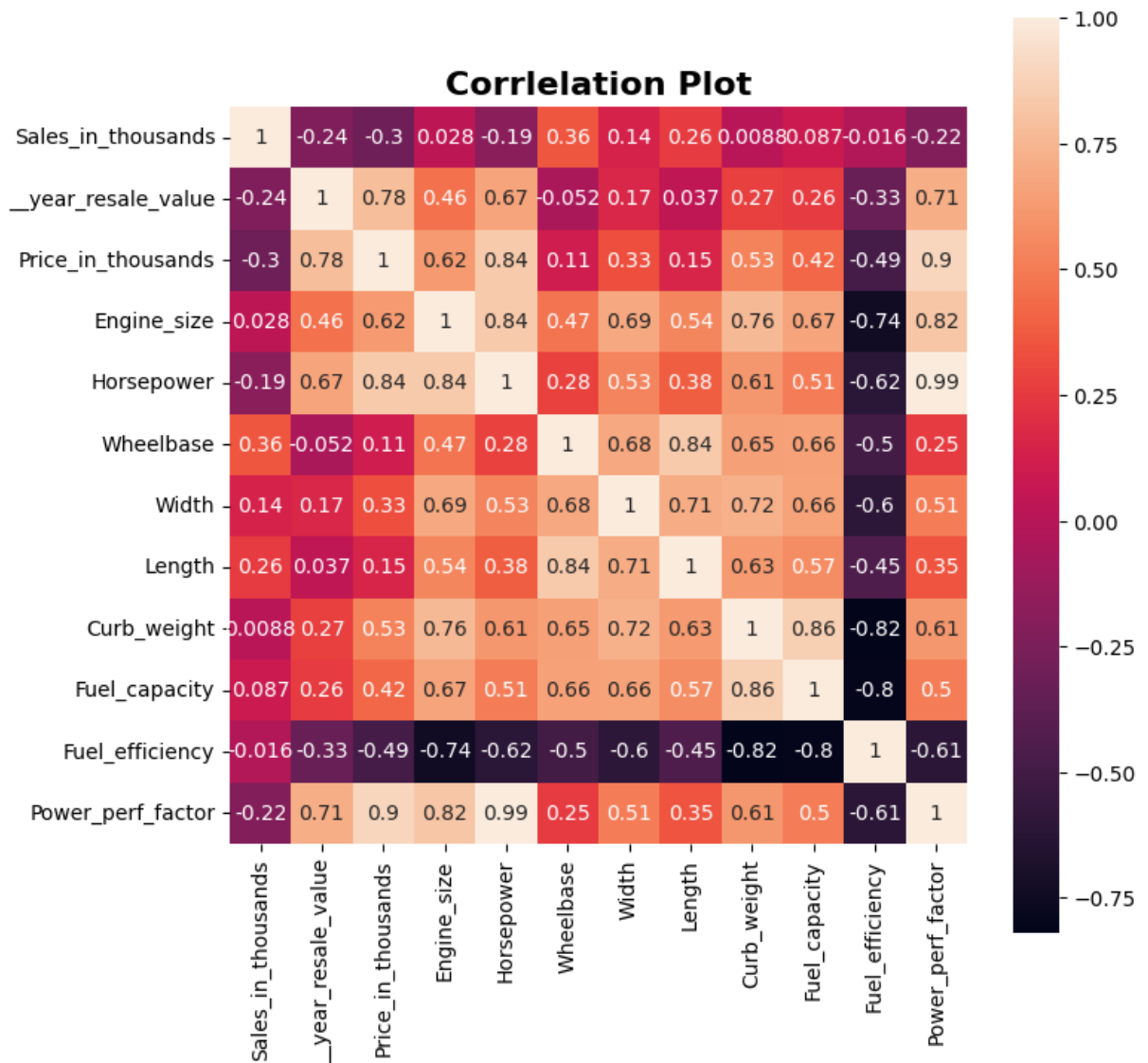
```
Out[7]: Manufacturer      0
Model                    0
Sales_in_thousands      0
__year_resale_value      0
Vehicle_type            0
Price_in_thousands      0
Engine_size             0
Horsepower              0
Wheelbase               0
Width                   0
Length                  0
Curb_weight             0
Fuel_capacity           0
Fuel_efficiency          0
Latest_Launch           0
Power_perf_factor        0
dtype: int64
```

```
In [8]: cars_data.describe()
```

Out[8]:	Sales_in_thousands	__year_resale_value	Price_in_thousands	Engine_size	Horsepower
count	152.000000	152.000000	152.000000	152.000000	152.000000
mean	53.359072	17.144671	27.331822	3.049342	184.809211
std	68.938380	10.301344	14.418669	1.049818	56.823152
min	0.110000	5.160000	9.235000	1.000000	55.000000
25%	13.714000	12.527500	17.888750	2.300000	147.500000
50%	29.213000	14.180000	22.747000	3.000000	175.000000
75%	68.069750	17.806250	31.938750	3.575000	211.250000
max	540.561000	67.550000	85.500000	8.000000	450.000000

Finging Realtionship in data

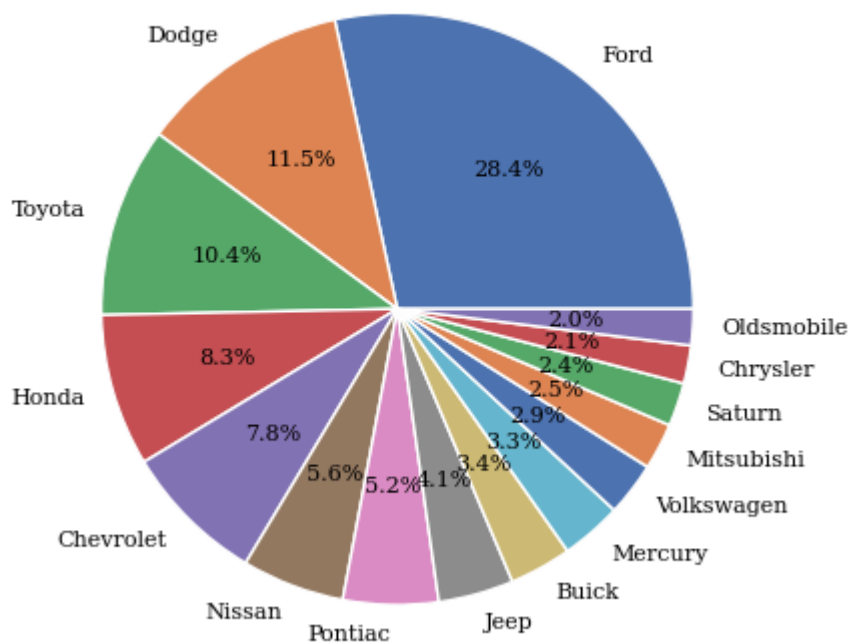
```
In [9]: corr = cars_data.corr(numeric_only=True)
plt.figure(figsize=(8,8))
sns.heatmap(corr,annot=True,square=True)
plt.title("Corrlelation Plot",fontsize=16,fontweight="bold")
plt.show()
```



Analysing The Manufacturer's sales

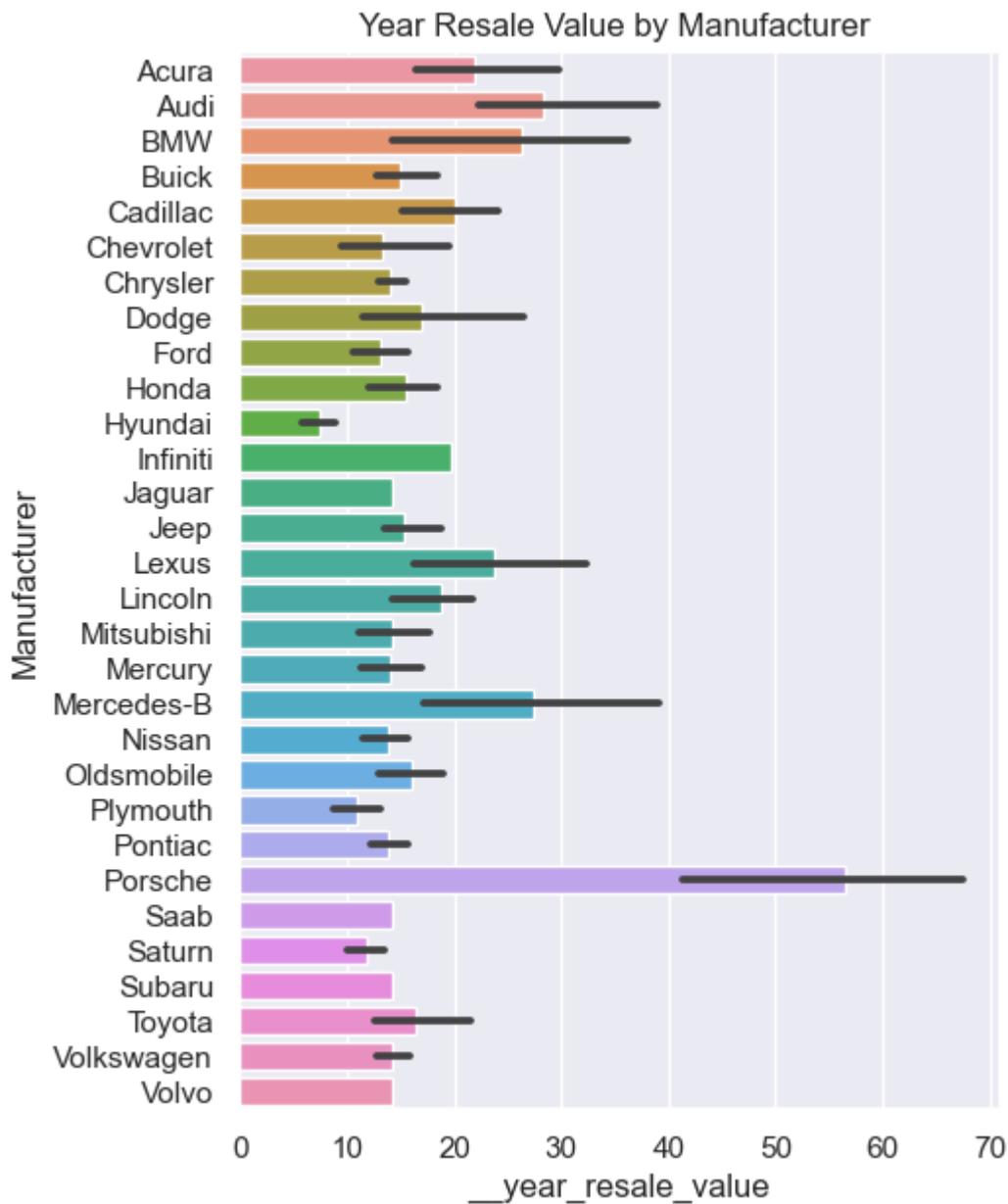
```
In [10]: man_sales = cars_data.groupby('Manufacturer')['Sales_in_thousands'].sum().nlargest(
font = {'family': 'serif',
        'color': 'black',
        'weight': 'normal',
        'size': 8,
        'rotation' : 0,
        }
sns.set_theme(style="darkgrid")
plt.pie(man_sales, labels=man_sales.index, autopct='%1.1f%%', textprops=font)
plt.title('The top 15 Manufacturer in sales')
plt.show()
```

The top 15 Manufacturer in sales



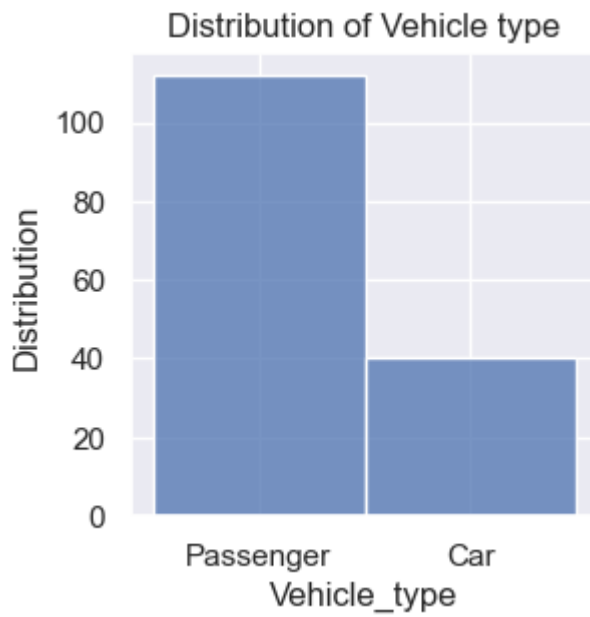
Year Resale Value by Manufacturer

```
In [11]: plt.figure(figsize=(5, 7))
sns.barplot(data=cars_data, x="__year_resale_value", y="Manufacturer")
plt.title('Year Resale Value by Manufacturer ')
plt.ylabel("Manufacturer")
plt.show()
```

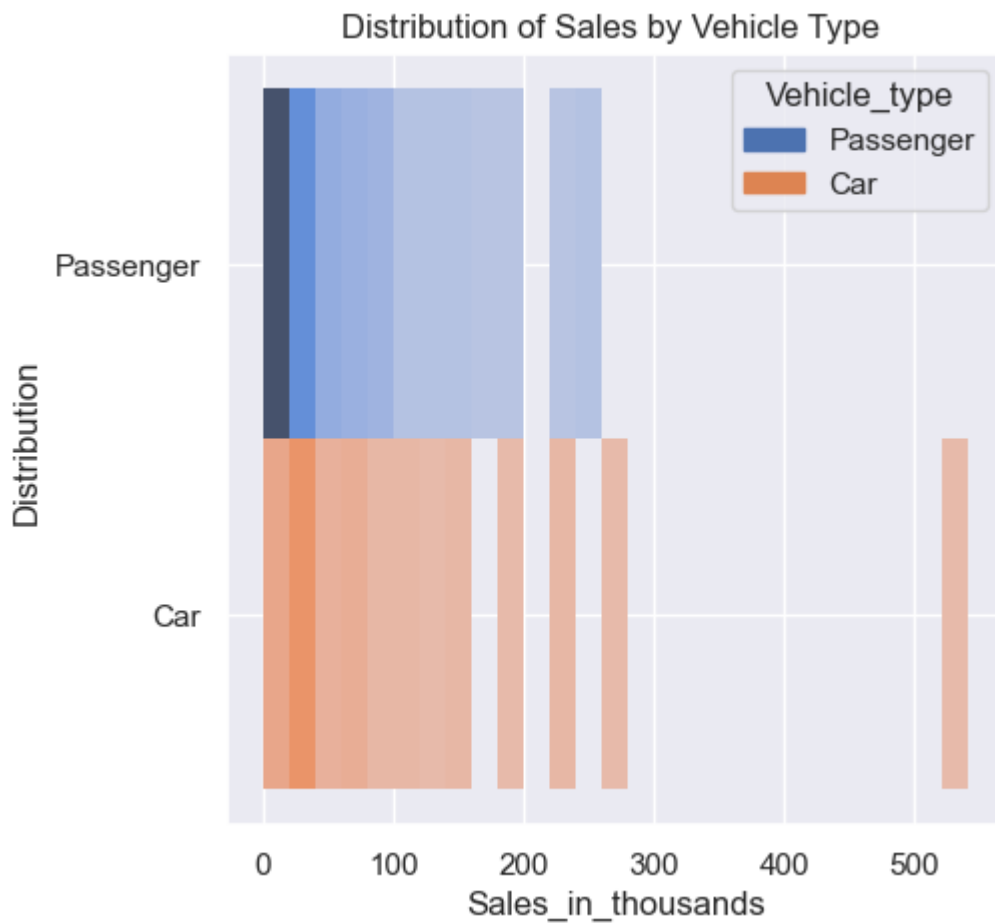


Analysing the Vehicle type

```
In [12]: plt.figure(figsize=(3, 3))
sns.histplot(data=cars_data, x="Vehicle_type")
plt.title('Distribution of Vehicle type')
plt.ylabel("Distribution")
plt.show()
```



```
In [13]: plt.figure(figsize=(5, 5))
sns.histplot(data=cars_data, x="Sales_in_thousands", y="Vehicle_type", hue="Vehicle_t
plt.title('Distribution of Sales by Vehicle Type ')
plt.ylabel("Distribution")
plt.show()
```



finding the feature That has more impact on car sales

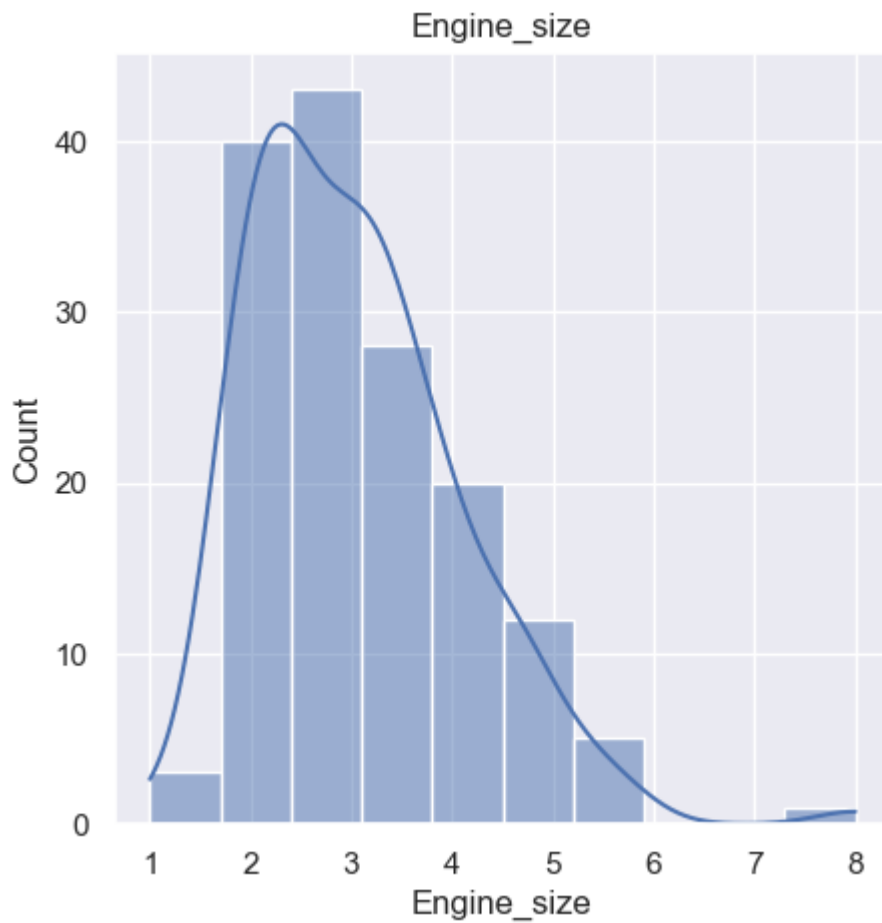
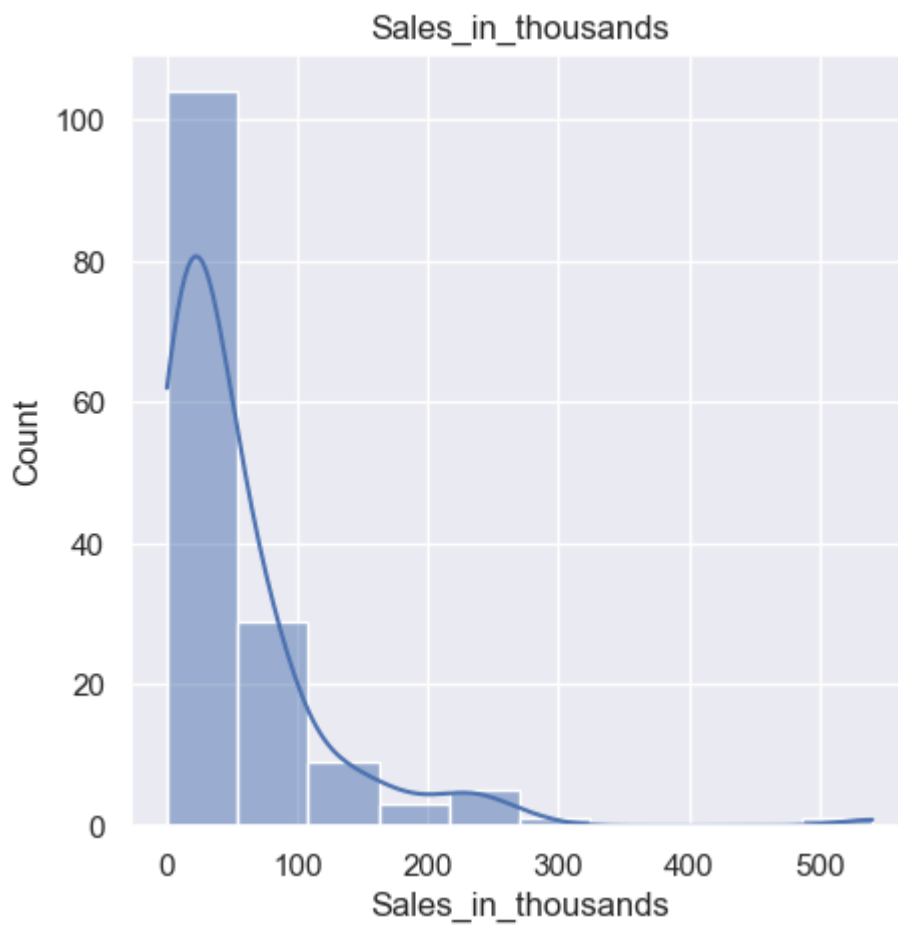
Distribution Analysis

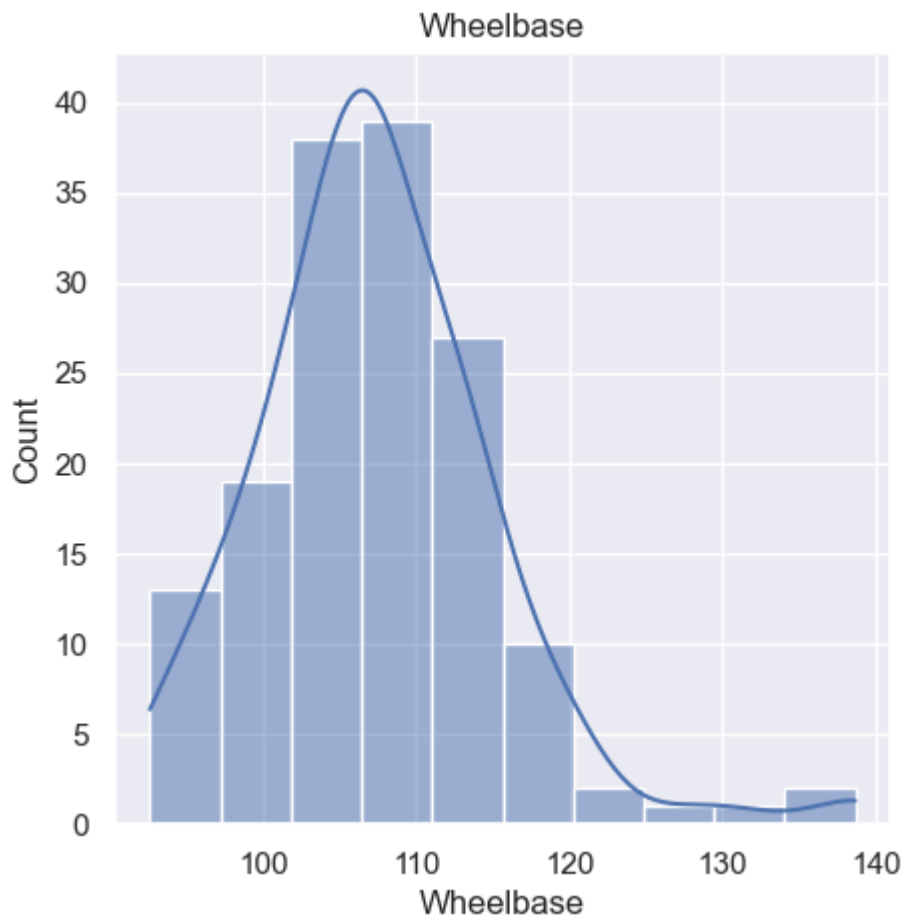
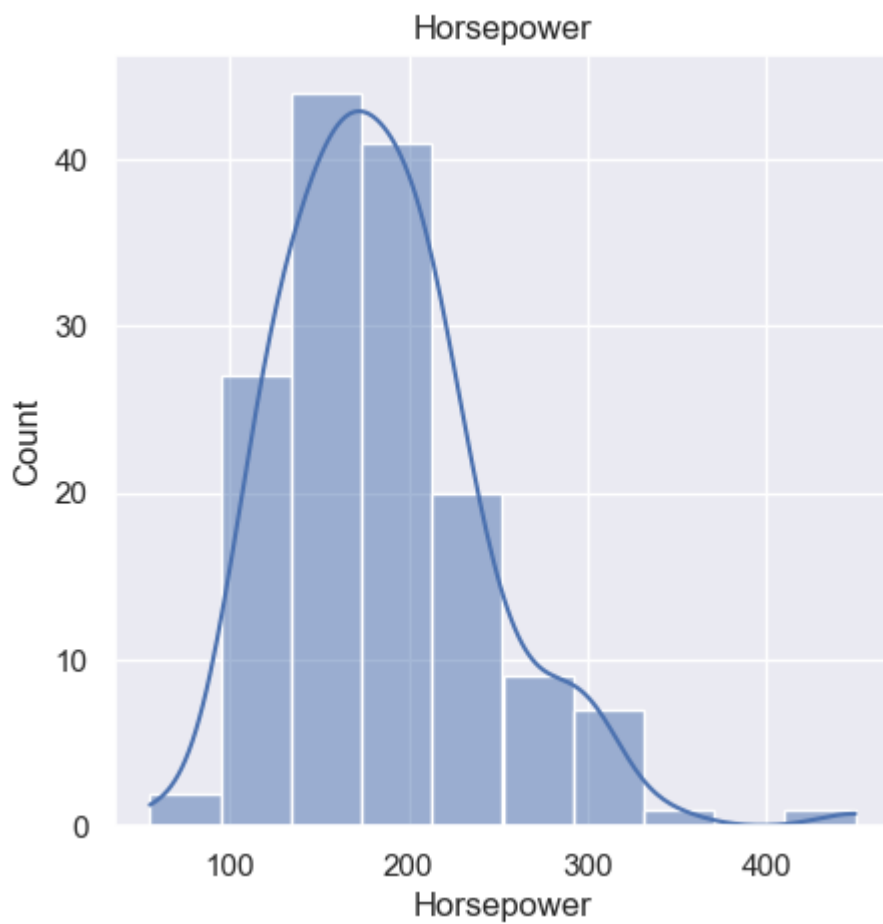
```
In [14]: df_num = cars_data.select_dtypes(include = ['float64', 'int64'])
print(df_num.columns)
df_num = df_num.drop(columns=["__year_resale_value", "Price_in_thousands"])
print(df_num.columns)

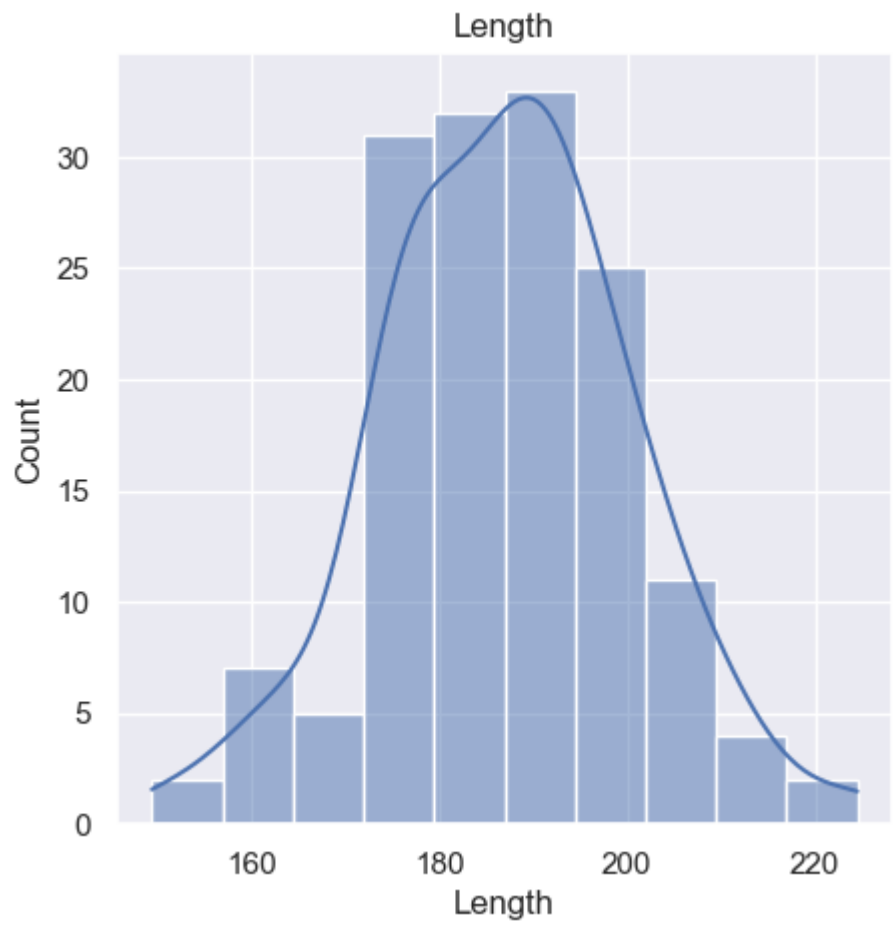
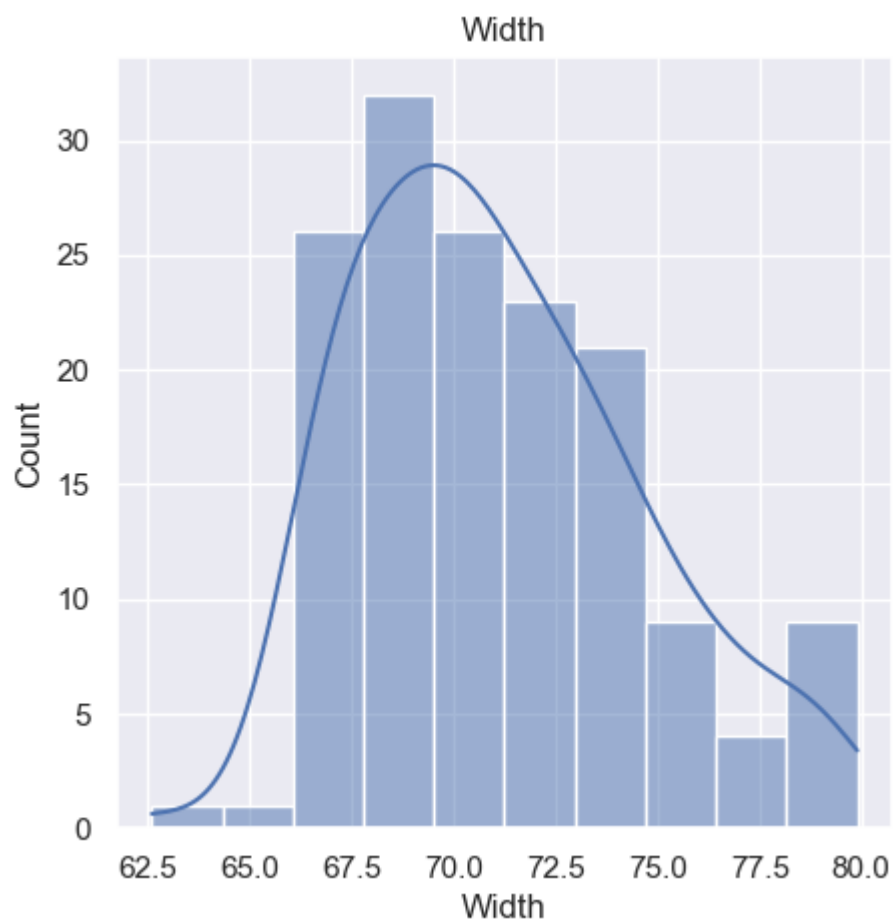
Index(['Sales_in_thousands', '__year_resale_value', 'Price_in_thousands',
      'Engine_size', 'Horsepower', 'Wheelbase', 'Width', 'Length',
      'Curb_weight', 'Fuel_capacity', 'Fuel_efficiency', 'Power_perf_factor'],
      dtype='object')
Index(['Sales_in_thousands', 'Engine_size', 'Horsepower', 'Wheelbase', 'Width',
      'Length', 'Curb_weight', 'Fuel_capacity', 'Fuel_efficiency',
      'Power_perf_factor'],
      dtype='object')
```

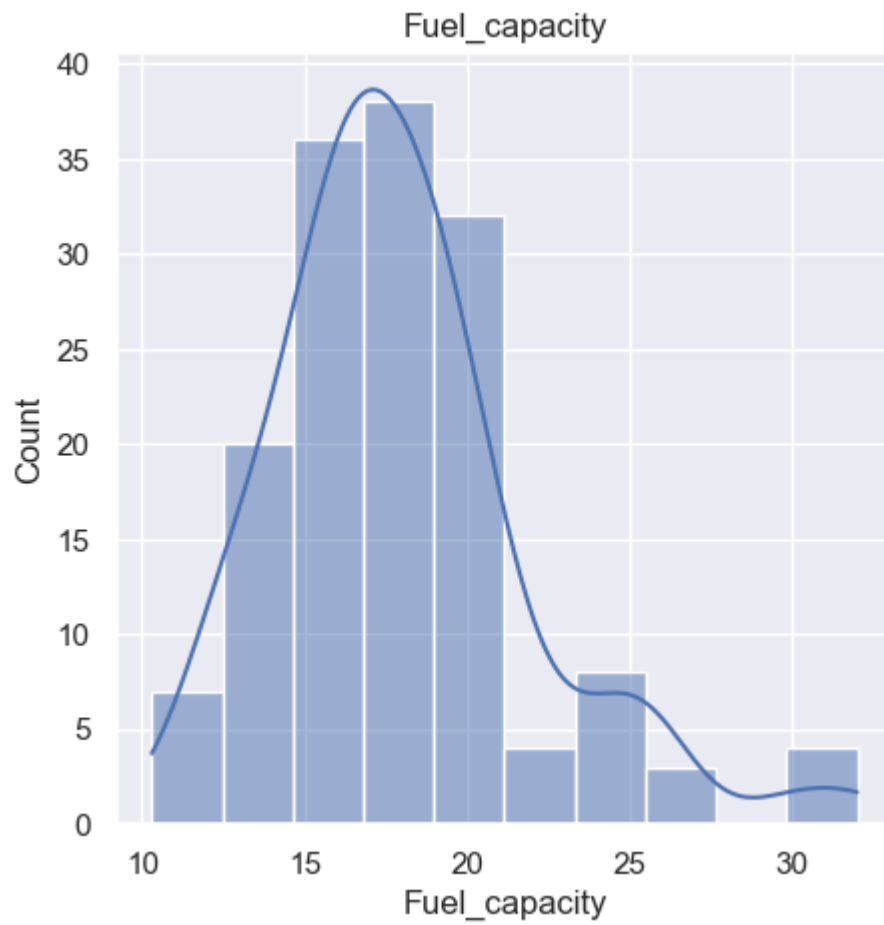
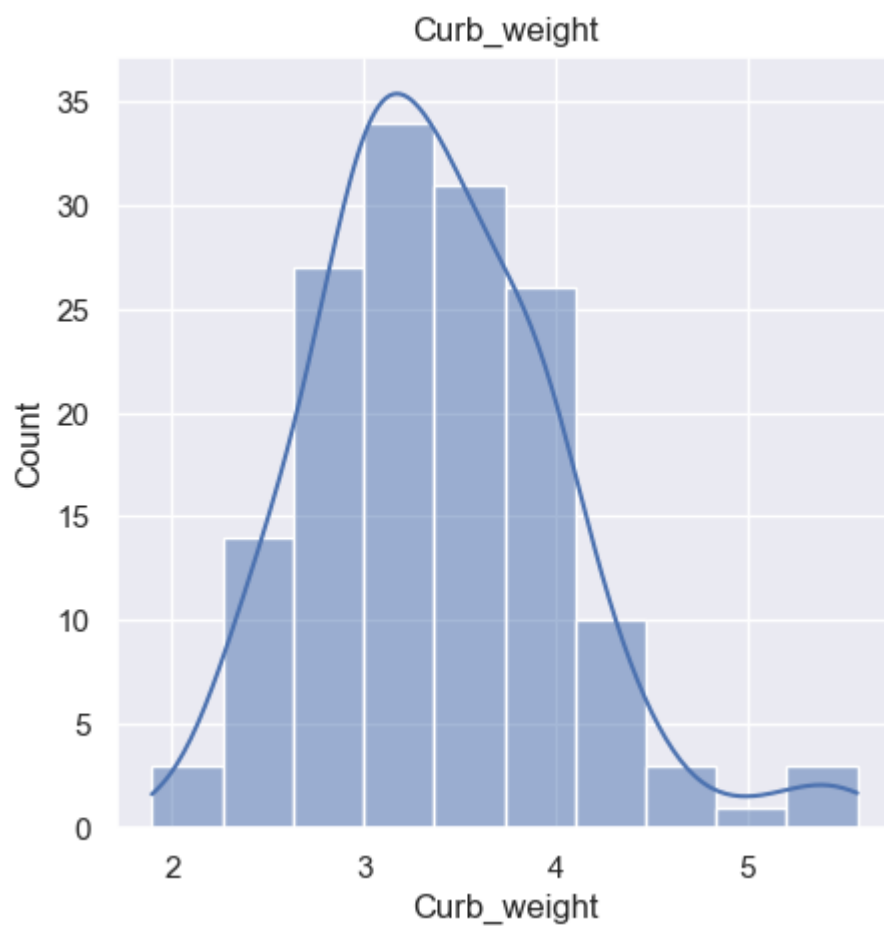
```
In [15]: def plot():
    for p in df_num.columns:
        plt.figure(figsize=(5, 5))
        sns.histplot(df_num[p], bins=10, kde=True)
        plt.title(p)
        plt.show()

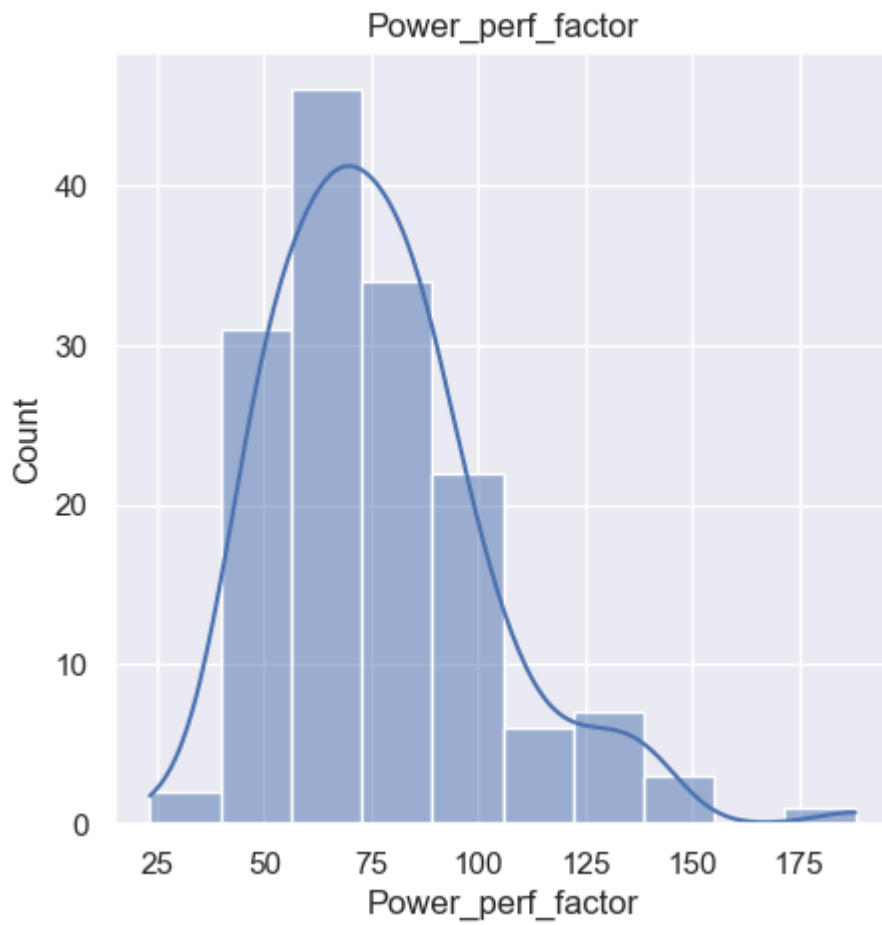
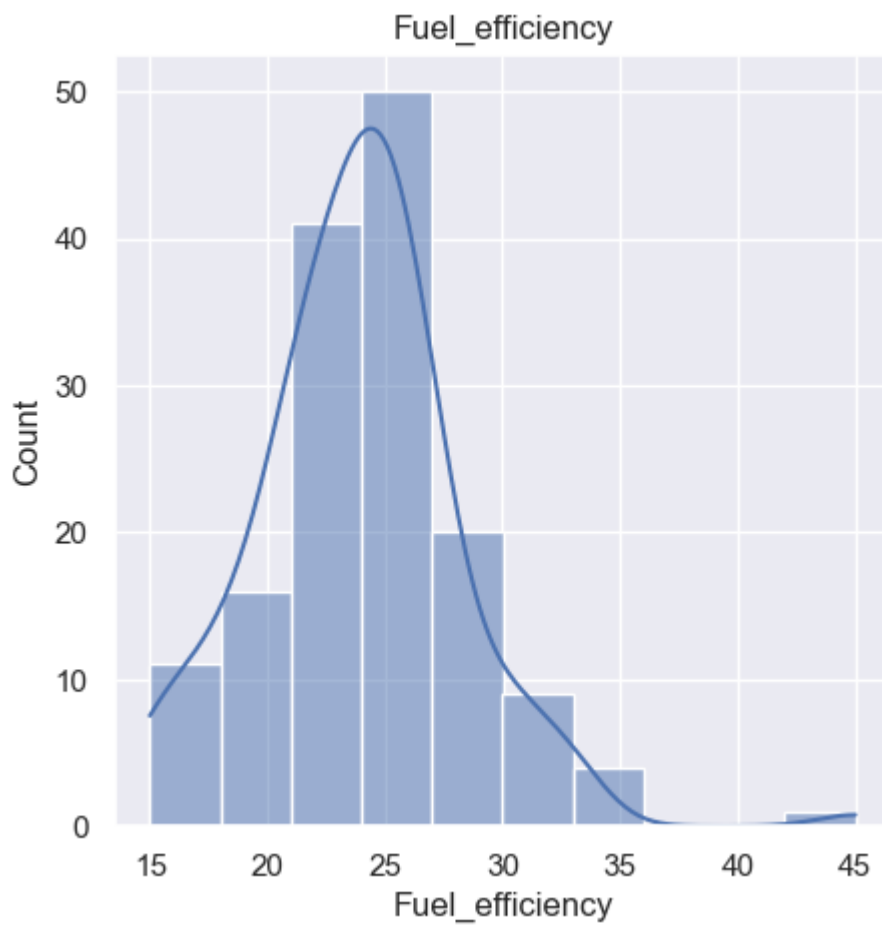
plot()
```



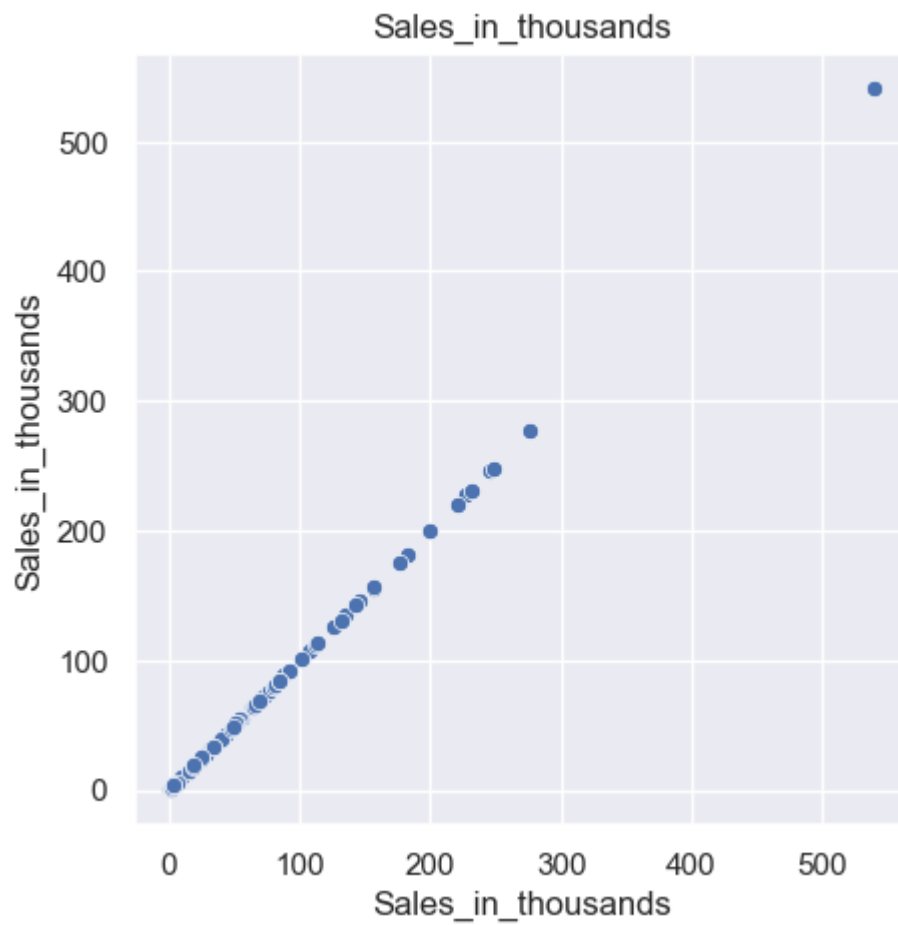


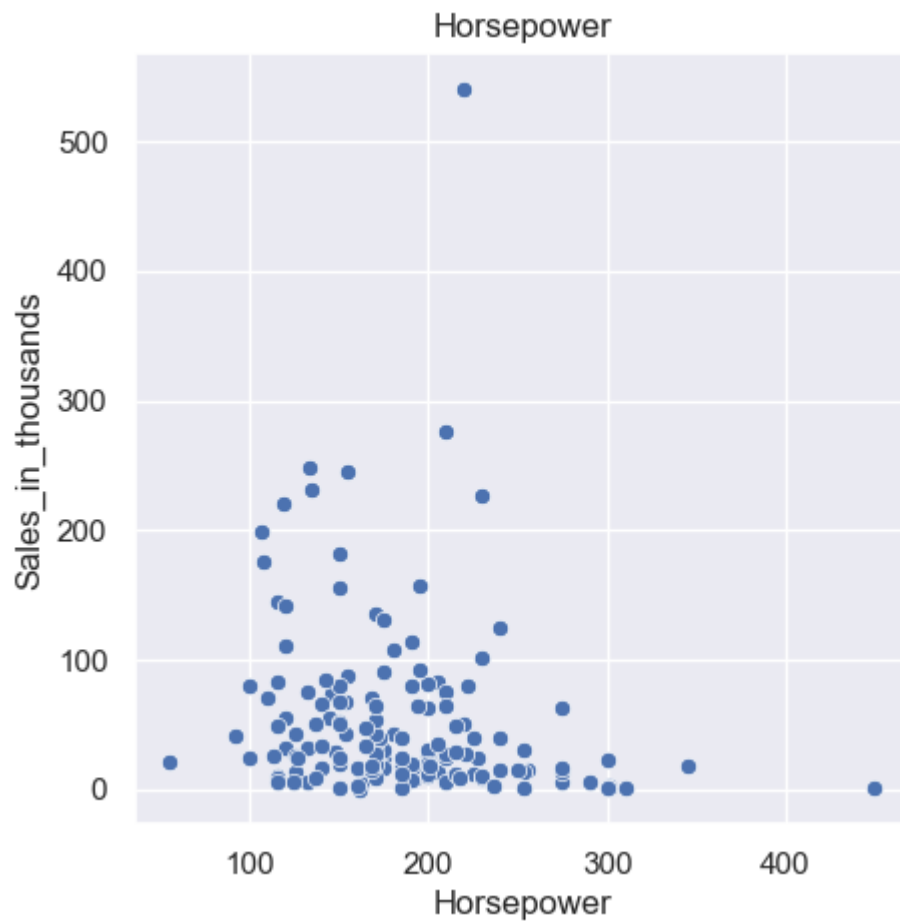
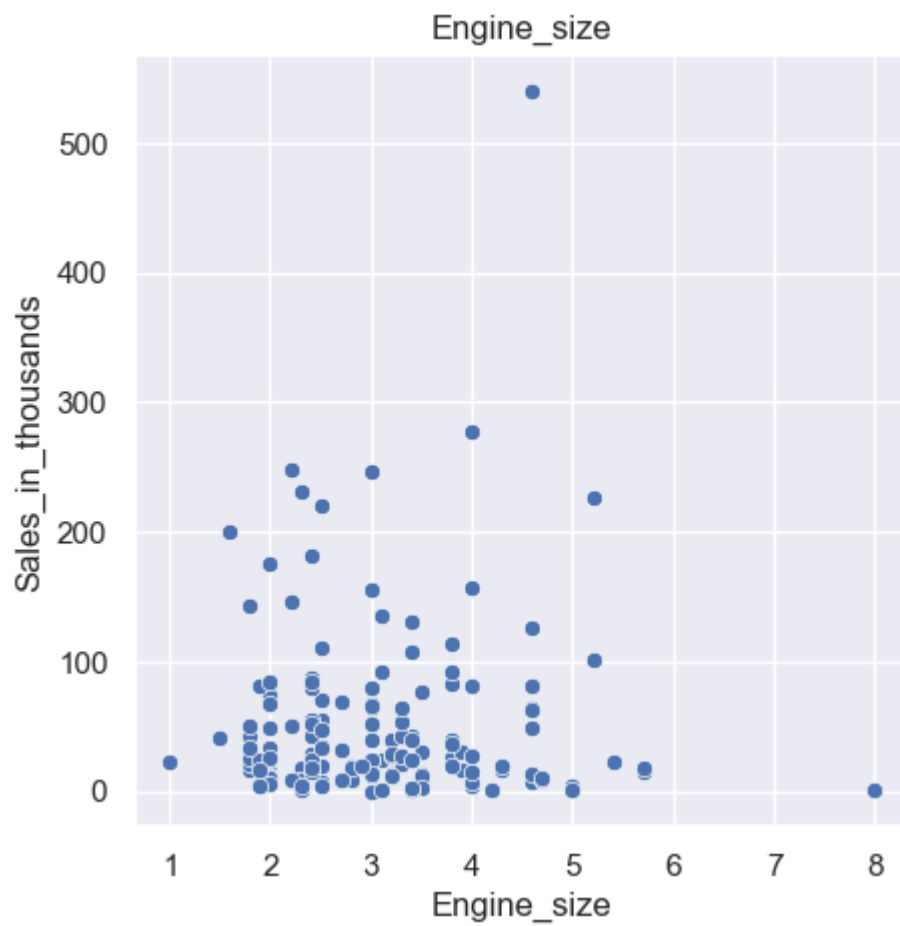


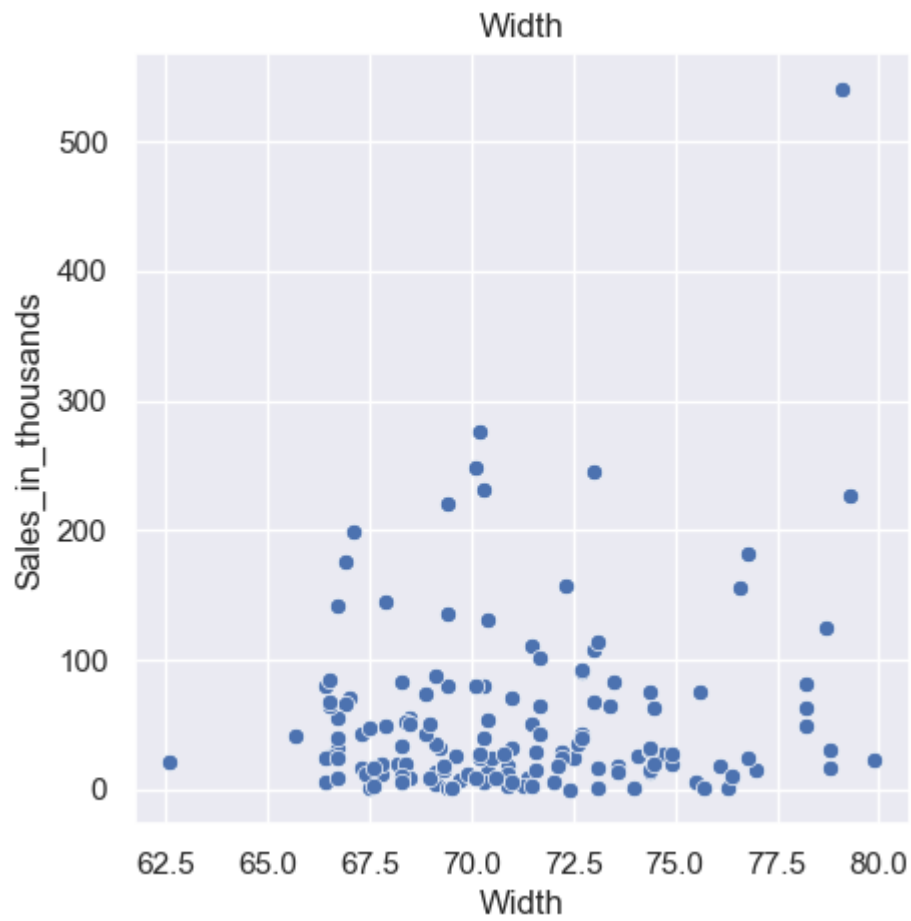
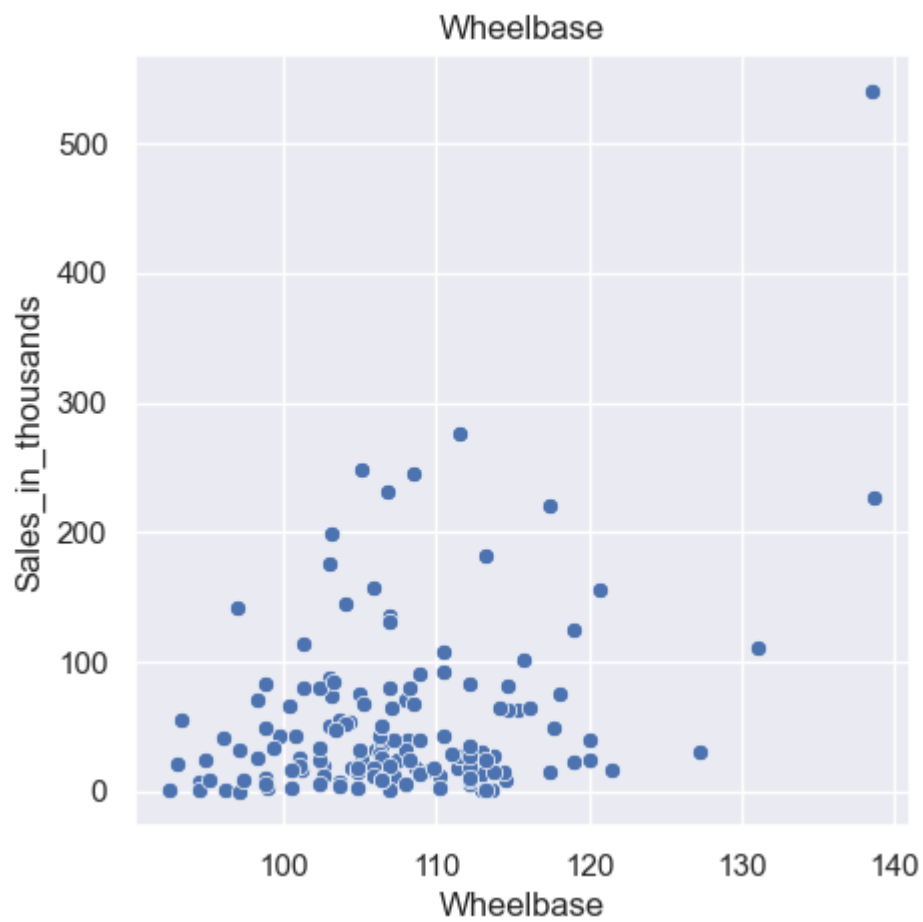


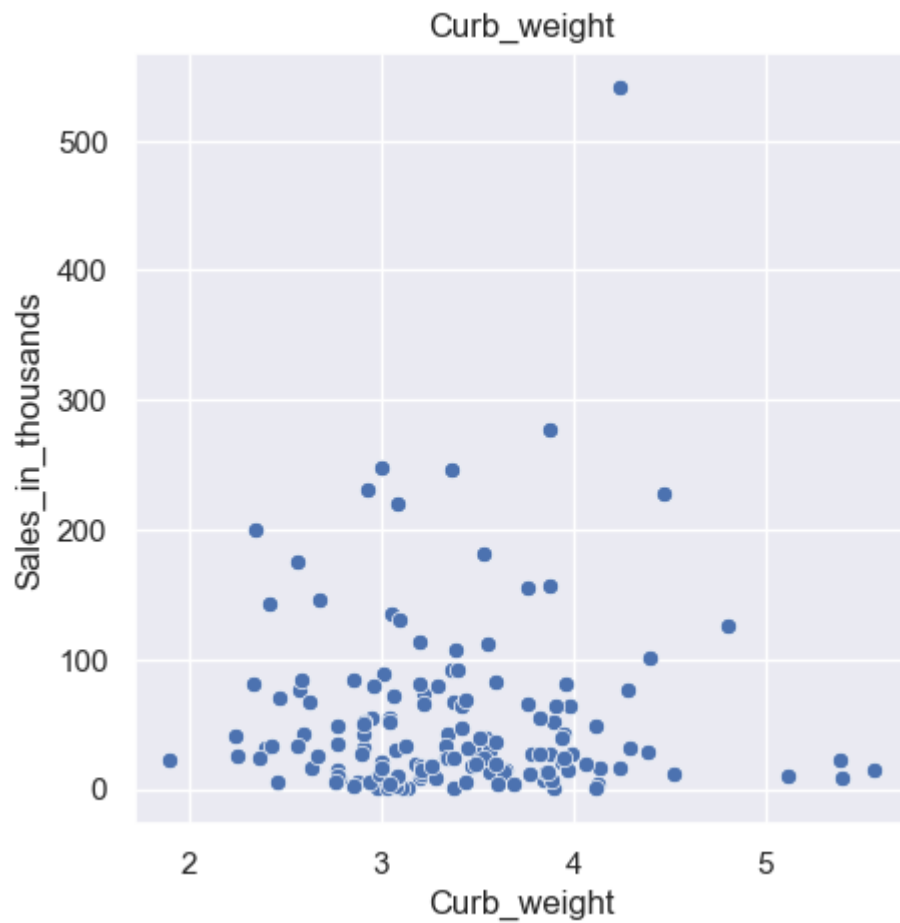
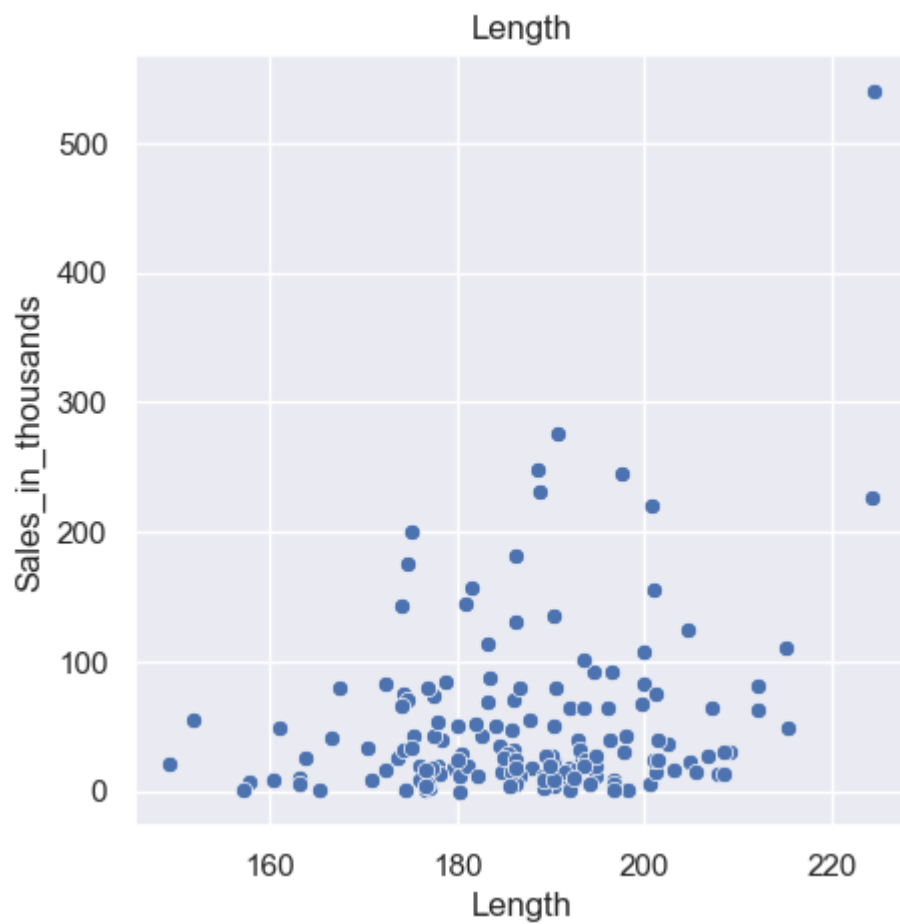
Bivariate Analysis

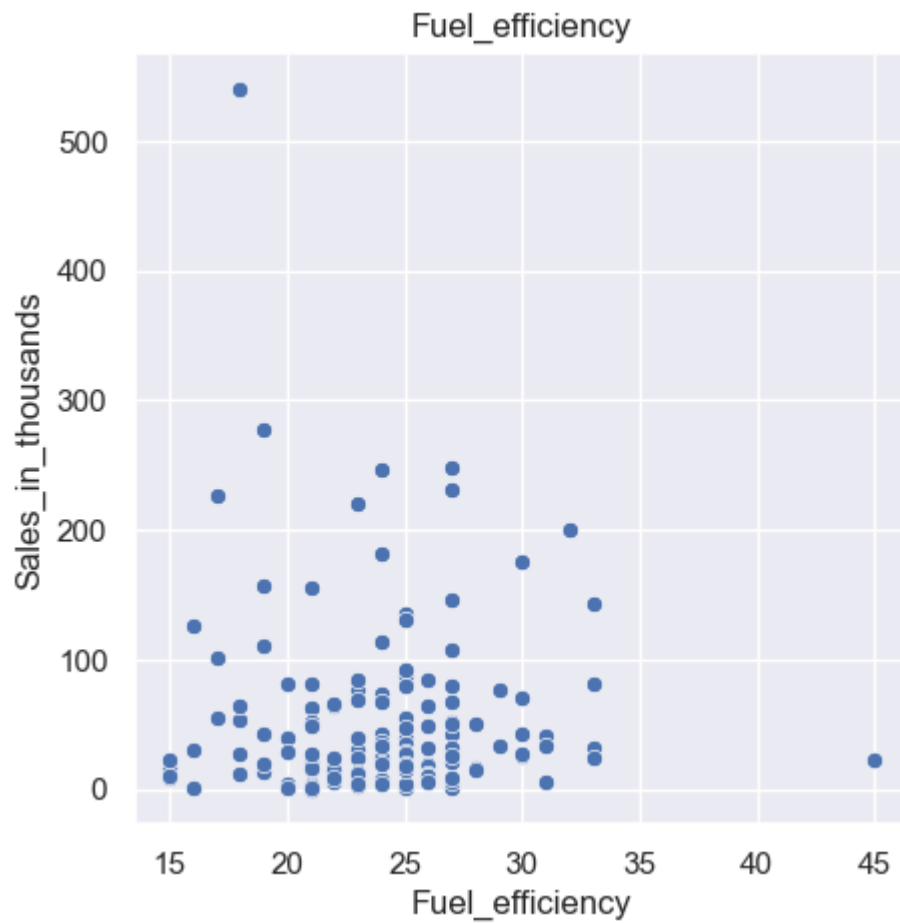
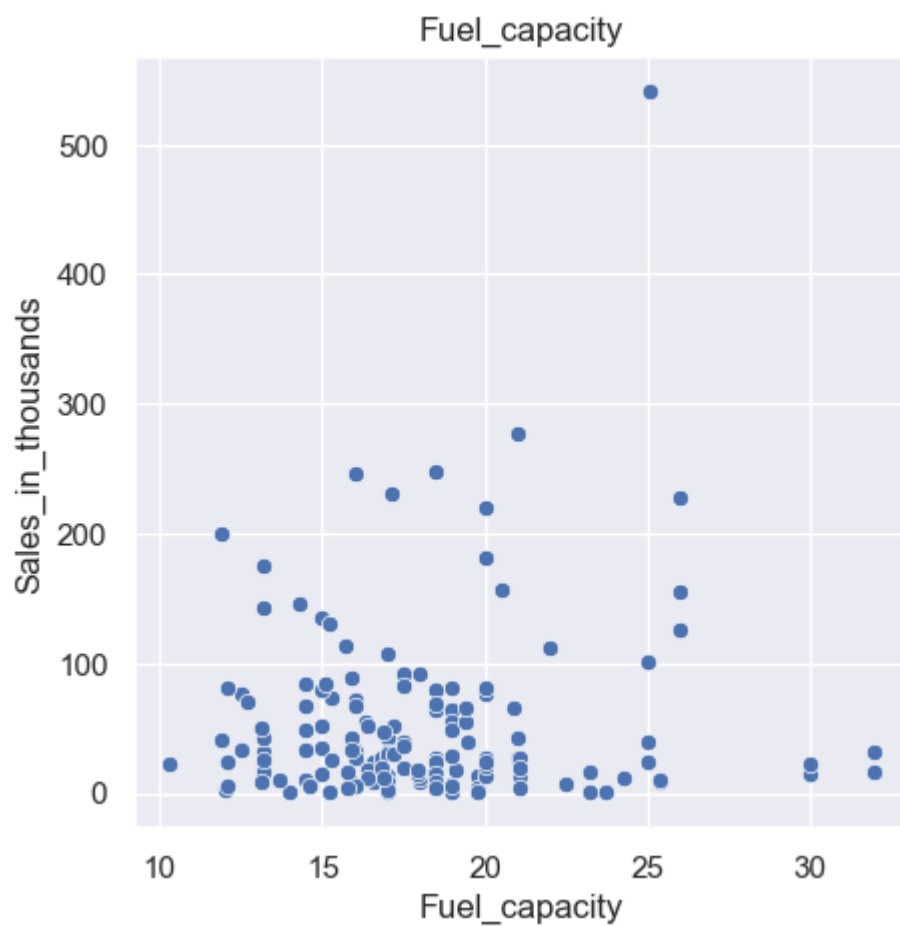
```
In [16]: def Biplot():  
          for u in df_num.columns:  
              plt.figure(figsize=(5, 5))  
              sns.scatterplot(x = u , y="Sales_in_thousands" , data = df_num )  
              plt.title(u)  
              plt.show()  
          Biplot()
```

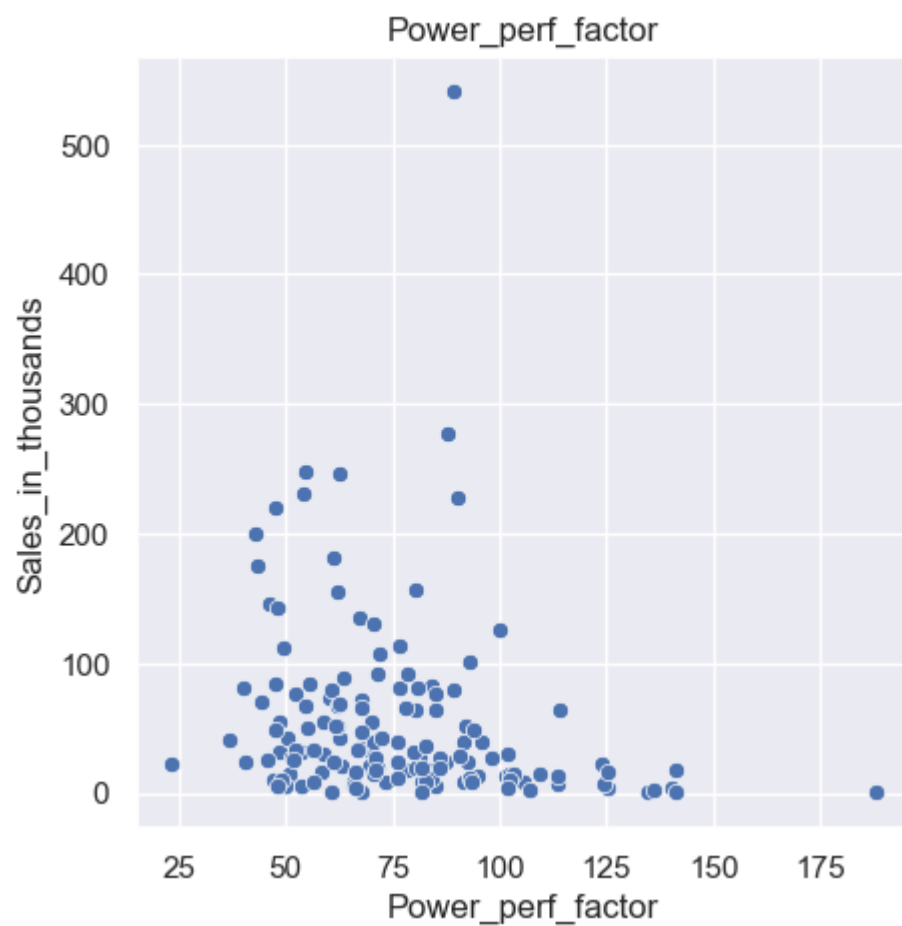












In []: