Import Libraries

In [ ]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
sns.set_theme(color_codes=True)
```

Import Dataset

In [ ]:
```
df = pd.read_csv("Sport car price.csv")
df
```

Out[ ]:

	Car Make	Car Model	Year	Engine Size (L)	Horsepower	Torque (lb-ft)	0-60 MPH Time (seconds)	Price (in USD)
0	Porsche	911	2022	3	379	331	4	101,200
1	Lamborghini	Huracan	2021	5.2	630	443	2.8	274,390
2	Ferrari	488 GTB	2022	3.9	661	561	3	333,750
3	Audi	R8	2022	5.2	562	406	3.2	142,700
4	McLaren	720S	2021	4	710	568	2.7	298,000
...	...	...	...	...	...	...	...	...
1002	Koenigsegg	Jesko	2022	5	1280	1106	2.5	3,000,000
1003	Lotus	Evija	2021	Electric Motor	1972	1254	2	2,000,000
1004	McLaren	Senna	2021	4	789	590	2.7	1,000,000
1005	Pagani	Huayra	2021	6	764	738	3	2,600,000
1006	Rimac	Nevera	2021	Electric Motor	1888	1696	1.85	2,400,000

1007 rows × 8 columns

DATA UNDERSTANDING OR DATA PREPROCESSIG

#Top 3 Rows

In [ ]:
```
df.head(3)
```

Out[ ]:

	Car Make	Car Model	Year	Engine Size (L)	Horsepower	Torque (lb-ft)	0-60 MPH Time (seconds)	Price (in USD)
0	Porsche	911	2022	3	379	331	4	101,200
1	Lamborghini	Huracan	2021	5.2	630	443	2.8	274,390
2	Ferrari	488 GTB	2022	3.9	661	561	3	333,750

#Find Shape

In [ ]:
```
df.shape
```

Out[ ]:
```
(1007, 8)
```

#Find Information

In [ ]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1007 entries, 0 to 1006
Data columns (total 8 columns):
 #   Column                  Non-Null Count  Dtype 
---  ------                  --------------  ----- 
 0   Car Make                1007 non-null   object
 1   Car Model               1007 non-null   object
 2   Year                    1007 non-null   int64 
 3   Engine Size (L)         997 non-null    object
 4   Horsepower              1007 non-null   object
 5   Torque (lb-ft)          1004 non-null   object
 6   0-60 MPH Time (seconds) 1007 non-null   object
 7   Price (in USD)          1007 non-null   object
dtypes: int64(1), object(7)
memory usage: 63.1+ KB
```

#Changing Data Types

In [ ]:
```
# Remove comma from Price column
df["Price (in USD)"] = df["Price (in USD)"].str.replace(",","")
# Convert the Price column to integer
df["Price (in USD)"] =df["Price (in USD)"].apply(int)
```

In [ ]:
```
# Change data into float
df["0-60 MPH Time (seconds)"] = df["0-60 MPH Time (seconds)"].str.replace("<","")
df["0-60 MPH Time (seconds)"] = df["0-60 MPH Time (seconds)"].apply(float)
```

In [ ]:
```
# Convert data into integer
df["Torque (lb-ft)"] = df["Torque (lb-ft)"].str.replace(",","").str.replace("+","")
df["Torque (lb-ft)"] = df["Torque (lb-ft)"].str.replace("-","0")
df["Torque (lb-ft)"] = df["Torque (lb-ft)"].fillna("0")
df["Torque (lb-ft)"] = df["Torque (lb-ft)"].apply(int)
```

```
C:\Users\varsh\AppData\Local\Temp\ipykernel_27044\2614027451.py:2: FutureWarning: Th
e default value of regex will change from True to False in a future version. In addi
tion, single character regular expressions will *not* be treated as literal strings
when regex=True.
  df["Torque (lb-ft)"] = df["Torque (lb-ft)"].str.replace(",","").str.replace
("+","")
```

In [ ]:
```
# Convert data into integer
df["Horsepower"] = df["Horsepower"].str.replace("+","").str.replace(",","")
df["Horsepower"] = df["Horsepower"].apply(int)
```

```
C:\Users\varsh\AppData\Local\Temp\ipykernel_27044\1588016146.py:2: FutureWarning: Th
e default value of regex will change from True to False in a future version. In addi
tion, single character regular expressions will *not* be treated as literal strings
when regex=True.
  df["Horsepower"] = df["Horsepower"].str.replace("+","").str.replace(",","")
```

#Segment Engine Size

In [ ]:
```
df["Engine Size (L)"].unique()
```

Out[ ]:
```
array(['3', '5.2', '3.9', '4', '4.4', '6.2', '3.8', '8', '5', '3.5',
       '4.7', '2', '2.9', '6', 'Electric', '6.5', '3.7', 'Electric Motor',
       '2.5', '1.5 + Electric', '6.8', '8.4', nan, '6.6', '7', '1.7',
       '3.3', '-', '6.7', '1.8', 'Electric (tri-motor)', '5.5',
       'Electric (93 kWh)', 'Electric (100 kWh)', 'Hybrid (4.0)', '4.6',
       '3.6', '1.5', 'Hybrid', '5.7', '2.0 (Electric)', '4.0 (Hybrid)',
       '0', '6.4', '6.3', '2.3'], dtype=object)
```

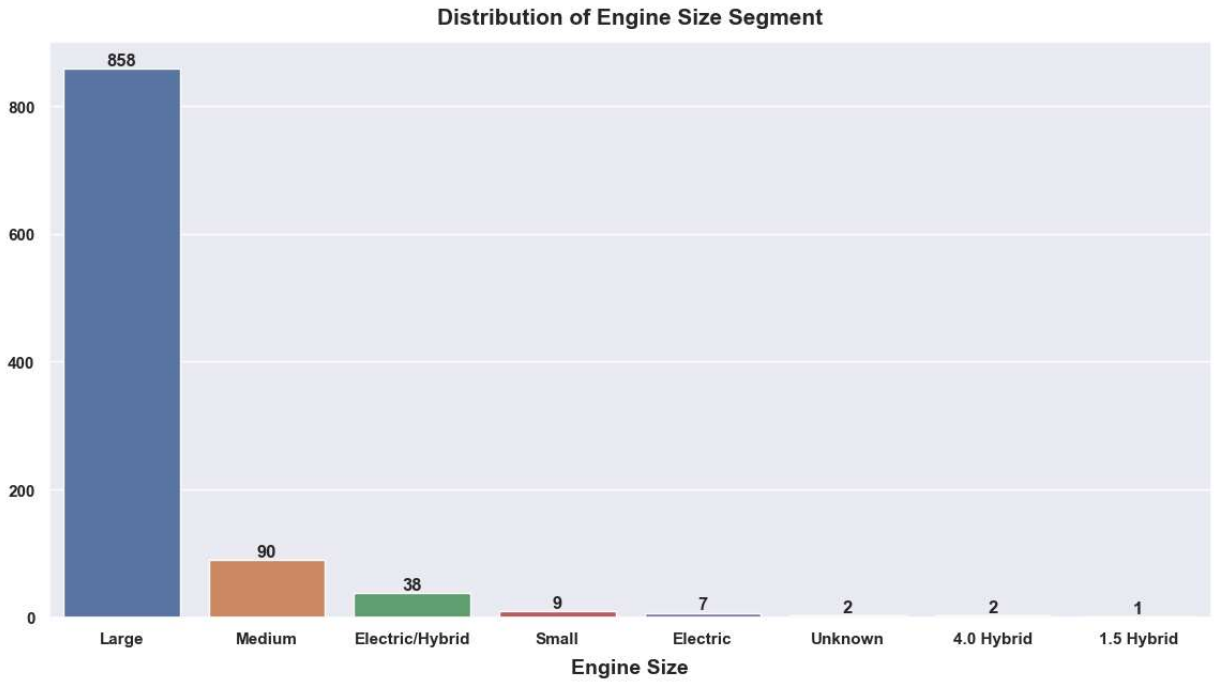
In [ ]:
```
# Define a function to segment the values
def segment_engine_size(engine_size):
    if engine_size in ['Electric','Hybrid']:
        return 'Electric/Hybrid'
    elif engine_size in ['Electric (93 kWh)', 'Electric (100 kWh)','Electric (tri-m
        return 'Electric'
    elif engine_size == '1.5 + Electric':
        return '1.5 Hybrid'
    elif engine_size in ['Hybrid (4.0)','4.0 (Hybrid)']:
        return '4.0 Hybrid'
    elif engine_size == '0':
        return 'Unknown'
    elif engine_size == '-':
        return 'Unknown'
    elif float(engine_size) < 2:
        return 'Small'
    elif float(engine_size) < 3:
        return 'Medium'
    else:
        return'Large'

# Apply the function to the engine size column
df["Engine Size (L)"] = df["Engine Size (L)"].apply(segment_engine_size)
df["Engine Size (L)"].unique()
```

Out[ ]:
```
array(['Large', 'Medium', 'Electric/Hybrid', 'Electric', '1.5 Hybrid',
       'Small', 'Unknown', '4.0 Hybrid'], dtype=object)
```

#Distribution of Engine Size Segment

In [ ]:
```
plt.figure(figsize=(14,7))
ax = sns.countplot(data=df,x=df["Engine Size (L)"],order=df["Engine Size (L)"].valu
plt.title("Distribution of Engine Size Segment",pad=12,fontsize=15,weight="bold")
plt.xticks(weight="bold")
plt.yticks(weight="bold")
plt.xlabel("Engine Size",weight="bold",fontsize= 14,labelpad=8)
plt.ylabel("")
for i in ax.containers:
    i.datavalues
    ax.bar_label(i,weight="bold")
plt.show()
```



#Find Data Types

In [ ]:
```
# Find data types after changing data types
df.dtypes
```

Out[ ]:
```
Car Make                  object
Car Model                 object
Year                       int64
Engine Size (L)           object
Horsepower                 int64
Torque (lb-ft)             int64
0-60 MPH Time (seconds)  float64
Price (in USD)             int64
dtype: object
```

#Statistical Summary

In [ ]:
```
df.describe()
```

Out[ ]:

	Year	Horsepower	Torque (lb-ft)	0-60 MPH Time (seconds)	Price (in USD)
count	1007.000000	1007.000000	1007.000000	1007.000000	1.007000e+03
mean	2021.201589	657.984111	557.347567	3.513406	3.820359e+05
std	2.019802	593.017842	441.906994	0.777639	7.383227e+05
min	1965.000000	181.000000	0.000000	1.800000	2.500000e+04
25%	2021.000000	454.000000	406.000000	2.900000	7.180000e+04
50%	2021.000000	591.000000	509.000000	3.500000	1.400000e+05
75%	2022.000000	708.500000	604.000000	4.000000	2.500000e+05
max	2023.000000	10000.000000	10000.000000	6.500000	5.200000e+06

In [ ]:
```
df.describe(include=object)
```

Out[ ]:

	Car Make	Car Model	Engine Size (L)
count	1007	1007	1007
unique	38	176	8
top	Porsche	GT	Large
freq	88	55	858

#Find Duplicate Values

In [ ]:
```
df.loc[df.duplicated().sum()]
```

Out[ ]:
```
Car Make                    Chevrolet
Car Model                 Camaro ZL1
Year                            2022
Engine Size (L)                Large
Horsepower                       650
Torque (lb-ft)                   650
0-60 MPH Time (seconds)          3.5
Price (in USD)                 69000
Name: 293, dtype: object
```

#Find Null values

In [ ]:
```
df.isna().sum()
```

Out[ ]:
```
Car Make                   0
Car Model                  0
Year                       0
Engine Size (L)            0
Horsepower                 0
Torque (lb-ft)             0
0-60 MPH Time (seconds)    0
Price (in USD)             0
dtype: int64
```

#Remove Car Model Column Because Its Irrelevant And Have Alot Of Unique Values

In [ ]:
```
df["Car Model"].value_counts()
```

Out[ ]:
```
GT                  55
Camaro ZL1          30
Evora GT            27
Continental GT      24
LC 500              24
                    ..
Fenyr SuperSport     1
Panamera Turbo       1
Atom                 1
AMG C 63 S           1
Mustang              1
Name: Car Model, Length: 176, dtype: int64
```

In [ ]:
```
df.drop(columns= "Car Model",inplace=True)
df.head(3)
```

Out[ ]:

	Car Make	Year	Engine Size (L)	Horsepower	Torque (lb-ft)	0-60 MPH Time (seconds)	Price (in USD)
0	Porsche	2022	Large	379	331	4.0	101200
1	Lamborghini	2021	Large	630	443	2.8	274390
2	Ferrari	2022	Large	661	561	3.0	333750

#Segment Car Make

In [ ]:
```
df["Car Make"].unique()
```

Out[ ]:
```
array(['Porsche', 'Lamborghini', 'Ferrari', 'Audi', 'McLaren', 'BMW',
       'Mercedes-Benz', 'Chevrolet', 'Ford', 'Nissan', 'Aston Martin',
       'Bugatti', 'Dodge', 'Jaguar', 'Koenigsegg', 'Lexus', 'Lotus',
       'Maserati', 'Alfa Romeo', 'Ariel', 'Bentley', 'Mercedes-AMG',
       'Pagani', 'Polestar', 'Rimac', 'Acura', 'Mazda', 'Rolls-Royce',
       'Tesla', 'Toyota', 'W Motors', 'Shelby', 'TVR', 'Subaru',
       'Pininfarina', 'Kia', 'Alpine', 'Ultima'], dtype=object)
```

In [ ]:
```
# Define a function to segment the values
def segment_car_make(car_make):
```

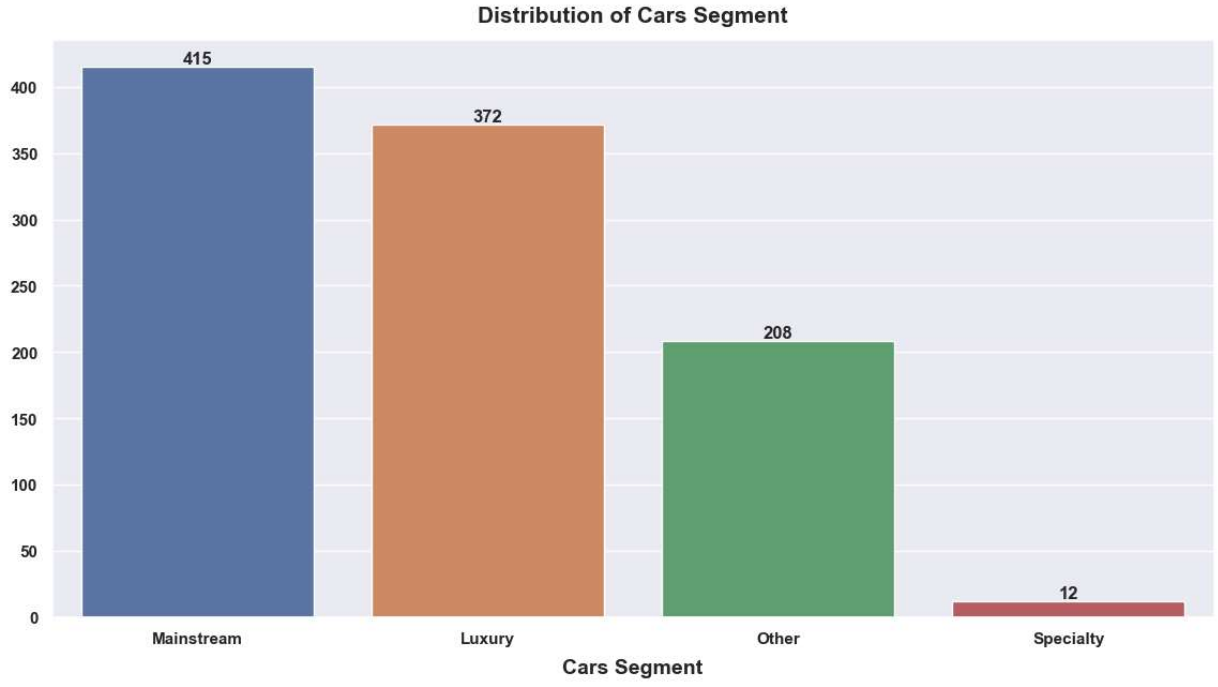
```
    if car_make  in ['Porsche', 'Lamborghini', 'Ferrari','McLaren','Aston Martin','
        return 'Luxury'
    elif car_make in ['Audi','BMW','Mercedes-Benz', 'Chevrolet', 'Ford', 'Nissan','
        return 'Mainstream'
    elif car_make in ['Ariel','W Motors', 'Shelby', 'TVR', 'Subaru','Alpine', 'Ulti
        return 'Specialty'
    else:
        return 'Other'

# Apply the function to the car make column
df["Car Make"] = df["Car Make"].apply(segment_car_make)
df["Car Make"].unique()
```

Out[ ]:
```
array(['Luxury', 'Mainstream', 'Other', 'Specialty'], dtype=object)
```

#Distribution of Cars Segment

In [ ]:
```
plt.figure(figsize=(14,7))
ax = sns.countplot(data=df,x=df["Car Make"],order=df["Car Make"].value_counts().ind
plt.title("Distribution of Cars Segment",pad=12,fontsize=15,weight="bold")
plt.xticks(weight="bold")
plt.yticks(weight="bold")
plt.xlabel("Cars Segment",weight="bold",fontsize= 14,labelpad=8)
plt.ylabel("")
for i in ax.containers:
    i.datavalues
    ax.bar_label(i,weight="bold")
plt.show()
```



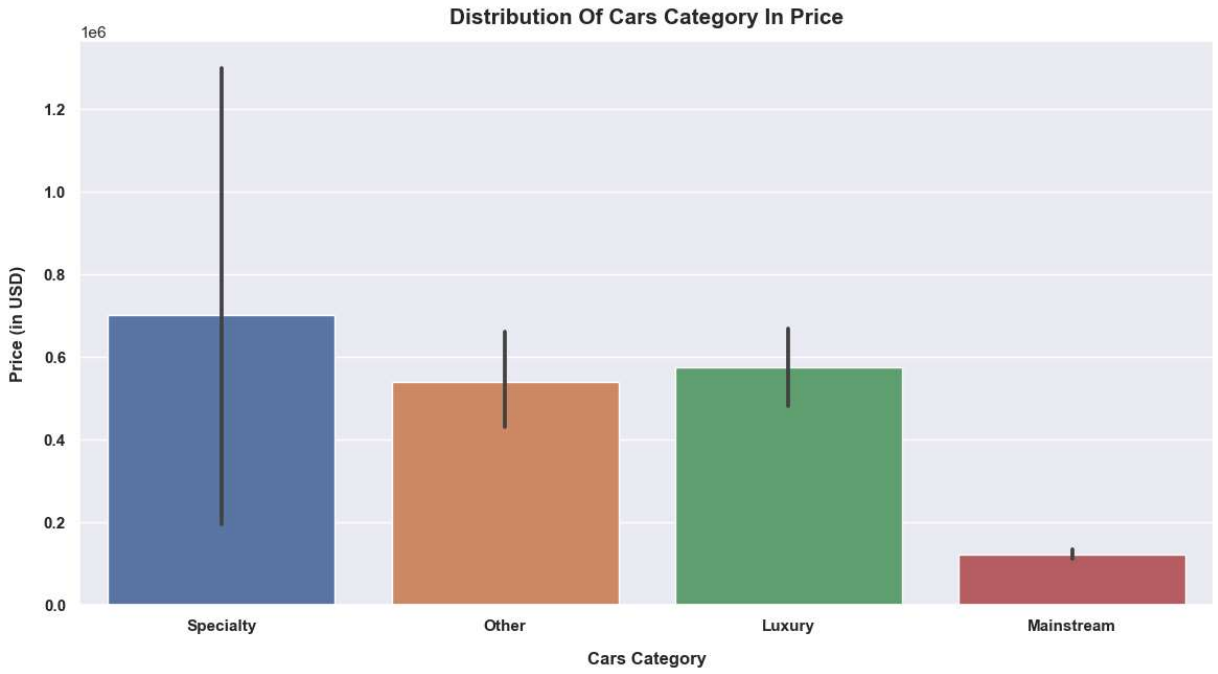
In [ ]:
```
df.head(5)
```

Out[ ]:

	Car Make	Year	Engine Size (L)	Horsepower	Torque (lb-ft)	0-60 MPH Time (seconds)	Price (in USD)
0	Luxury	2022	Large	379	331	4.0	101200
1	Luxury	2021	Large	630	443	2.8	274390
2	Luxury	2022	Large	661	561	3.0	333750
3	Mainstream	2022	Large	562	406	3.2	142700
4	Luxury	2021	Large	710	568	2.7	298000

#Distribution Of Cars Category In Price

In [ ]:
```
plt.figure(figsize=(14,7))
sns.barplot(data=df,x=df["Car Make"],y=df["Price (in USD)"], order=df["Car Make"].v
plt.title("Distribution Of Cars Category In Price",fontsize=15,weight="bold",pad=12
plt.xticks(weight="bold")
plt.yticks(weight="bold")
plt.xlabel("Cars Category",weight="bold",fontsize=12,labelpad=12)
plt.ylabel("Price (in USD)",weight="bold",fontsize=12,labelpad=12)
plt.show()
```



#Distribution Of Engine Size In Price

In [ ]:
```
plt.figure(figsize=(14,7))
sns.boxplot(data=df,x=df["Engine Size (L)"],y=df["Price (in USD)"],order=df["Engine
plt.title("Distribution Of Engine Size In Price",fontsize=15,weight="bold",pad=12)
plt.xticks(weight="bold")
plt.yticks(weight="bold")
plt.xlabel("Engine Size",weight="bold",fontsize=12,labelpad=12)
```

```
plt.ylabel("Price (in USD)",weight="bold",fontsize=12,labelpad=12)
plt.show()
```