```
#import required libraries
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LinearRegression
from sklearn import metrics

car_data = pd.read_csv('car data.csv')

car_data.head()

car_data.info()

car_data.isnull().sum()

car_data.describe()
car_data.columns
print(car_data['Fuel_Type'].value_counts())
print(car_data['Seller_Type'].value_counts())
print(car_data['Transmission'].value_counts())
fuel_type = car_data['Fuel_Type']
seller_type = car_data['Seller_Type']
transmission_type = car_data['Transmission']
selling_price = car_data['Selling_Price']

from matplotlib import style

style.use('ggplot')
fig = plt.figure(figsize=(15,5))
fig.suptitle('Visualizing categorical data columns')
plt.subplot(1,3,1)
plt.bar(fuel_type,selling_price, color='royalblue')
plt.xlabel("Fuel Type")
plt.ylabel("Selling Price")
plt.subplot(1,3,2)
plt.bar(seller_type, selling_price, color='red')
plt.xlabel("Seller Type")
plt.subplot(1,3,3)
plt.bar(transmission_type, selling_price, color='purple')
plt.xlabel('Transmission type')
plt.show()

fig, axes = plt.subplots(1,3,figsize=(15,5), sharey=True)
fig.suptitle('Visualizing categorical columns')
sns.barplot(x=fuel_type, y=selling_price, ax=axes[0])
sns.barplot(x=seller_type, y=selling_price, ax=axes[1])
sns.barplot(x=transmission_type, y=selling_price, ax=axes[2])

petrol_data = car_data.groupby('Fuel_Type').get_group('Petrol')
petrol_data.describe()

seller_data = car_data.groupby('Seller_Type').get_group('Dealer')
seller_data.describe()

#manual encoding
car_data.replace({'Fuel_Type':{'Petrol':0, 'Diesel':1, 'CNG':2}}, inplace=True)
#one hot encoding
car_data = pd.get_dummies(car_data, columns=['Seller_Type', 'Transmission'], drop_first=True)

plt.figure(figsize=(10,7))
sns.heatmap(car_data.corr(), annot=True)
plt.title('Correlation between the columns')
plt.show()

fig=plt.figure(figsize=(7,5))
plt.title('Correlation between present price and selling price')
sns.regplot(x='Present_Price', y='Selling_Price', data=car_data)

X = car_data.drop(['Car_Name','Selling_Price'], axis=1)
y = car_data['Selling_Price']

print("Shape of X is: ",X.shape)
print("Shape of y is: ", y.shape)
```

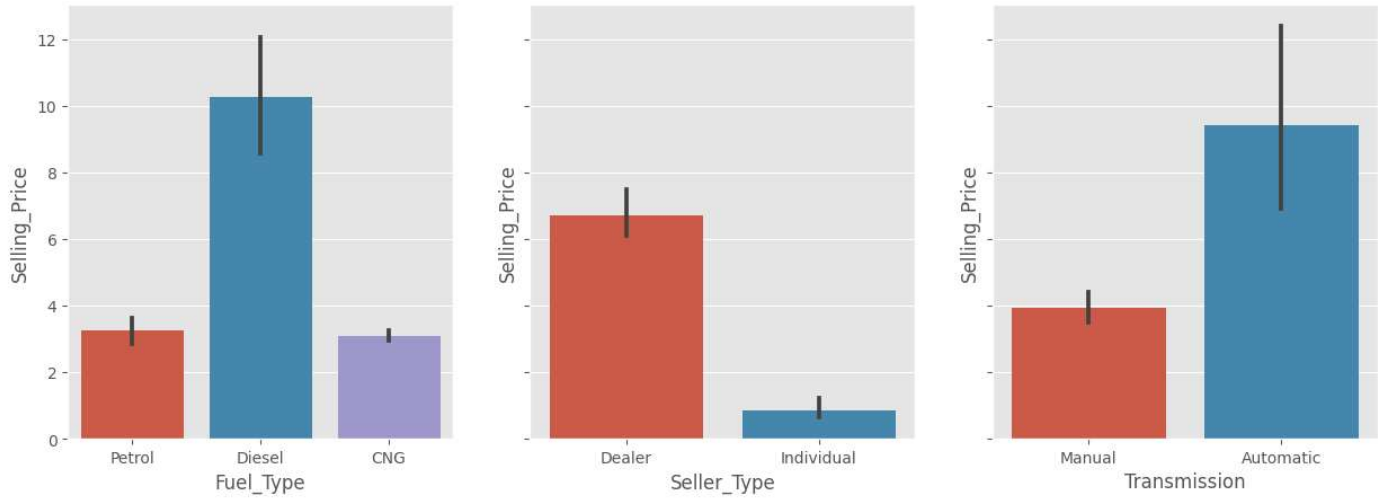
```
X_train, X_test, y_train, y_test = train_test_split(X,y, test_size=0.3, random_state=42)

print("X_test shape:", X_test.shape)
print("X_train shape:", X_train.shape)
print("y_test shape: ", y_test.shape)
print("y_train shape:", y_train.shape)

scaler = StandardScaler()

X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

model = LinearRegression()

model.fit(X_train, y_train)

pred = model.predict(X_test)

from sklearn.metrics import mean_absolute_error, mean_squared_error, r2_score

print("MAE: ", (metrics.mean_absolute_error(pred, y_test)))
print("MSE: ", (metrics.mean_squared_error(pred, y_test)))
print("R2 score: ", (metrics.r2_score(pred, y_test)))

sns.regplot(x=pred, y=y_test)
plt.xlabel("Predicted Price")
plt.ylabel('Actual Price')
plt.title("ACtual vs predicted price")
plt.show()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 301 entries, 0 to 300
Data columns (total 9 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Car_Name       301 non-null    object 
 1   Year           301 non-null    int64  
 2   Selling_Price  301 non-null    float64
 3   Present_Price  301 non-null    float64
 4   Kms_Driven     301 non-null    int64  
 5   Fuel_Type      301 non-null    object 
 6   Seller_Type    301 non-null    object 
 7   Transmission   301 non-null    object 
 8   Owner          301 non-null    int64  
dtypes: float64(2), int64(3), object(4)
memory usage: 21.3+ KB
Petrol    239
Diesel     60
CNG         2
Name: Fuel_Type, dtype: int64
Dealer        195
Individual    106
Name: Seller_Type, dtype: int64
Manual       261
Automatic     40
Name: Transmission, dtype: int64
```

Visualizing categorical data columns


```
<ipython-input-3-b5dfb04f1acf>:64: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future versio
  sns.heatmap(car_data.corr(), annot=True)
```

Visualizing categorical columns



Correlation between the columns