In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import Lasso
from sklearn import metrics
```

In [2]:
```
car_dataset = pd.read_csv('car data.csv')
```

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

Out[3]:

	Car_Name	Year	Selling_Price	Present_Price	Kms_Driven	Fuel_Type	Seller_Type	Transmission	Ov
0	ritz	2014	3.35	5.59	27000	Petrol	Dealer	Manual	
1	sx4	2013	4.75	9.54	43000	Diesel	Dealer	Manual	
2	ciaz	2017	7.25	9.85	6900	Petrol	Dealer	Manual	
3	wagon r	2011	2.85	4.15	5200	Petrol	Dealer	Manual	
4	swift	2014	4.60	6.87	42450	Diesel	Dealer	Manual	

In [4]:
```
car_dataset.shape
```

Out[4]:
```
(301, 9)
```

In [5]:
```
car_dataset.info()
```

```
<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
```

In [6]:
```
car_dataset.describe()
```

Out[6]:

	Year	Selling_Price	Present_Price	Kms_Driven	Owner
count	301.000000	301.000000	301.000000	301.000000	301.000000
mean	2013.627907	4.661296	7.628472	36947.205980	0.043189
std	2.891554	5.082812	8.644115	38886.883882	0.247915
min	2003.000000	0.100000	0.320000	500.000000	0.000000
25%	2012.000000	0.900000	1.200000	15000.000000	0.000000
50%	2014.000000	3.600000	6.400000	32000.000000	0.000000
75%	2016.000000	6.000000	9.900000	48767.000000	0.000000
max	2018.000000	35.000000	92.600000	500000.000000	3.000000

In [7]:
```
car_dataset.isnull().sum()
```

Out[7]:
```
Car_Name         0
Year             0
Selling_Price    0
Present_Price    0
Kms_Driven       0
Fuel_Type        0
Seller_Type      0
Transmission     0
Owner            0
dtype: int64
```

In [8]:
```
# Checking the distribution of categorical data
```

In [9]:
```
print(car_dataset.Fuel_Type.value_counts())
print(car_dataset.Seller_Type.value_counts())
print(car_dataset.Transmission.value_counts())
```

```
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
```

Encoding the Categorical Data

In [10]:
```
# encoding 'Fuel_Type'column
car_dataset.replace({'Fuel_Type':{'Petrol':0,'Diesel':1,'CNG':2}},inplace=True)

# encoding 'Seller_Type'column
car_dataset.replace({'Seller_Type':{'Dealer':0,'Individual':1}},inplace=True)

# encoding'Transmission'column
car_dataset.replace({'Transmission':{'Manual':0,'Automatic':1}},inplace=True)
```

In [11]:
```
car_dataset.dtypes
```

Out[11]:
```
Car_Name          object
Year               int64
Selling_Price    float64
Present_Price    float64
Kms_Driven         int64
Fuel_Type          int64
Seller_Type        int64
Transmission       int64
Owner              int64
dtype: object
```

In [12]:
```
car_dataset.head()
```

Out[12]:

	Car_Name	Year	Selling_Price	Present_Price	Kms_Driven	Fuel_Type	Seller_Type	Transmission	O
0	ritz	2014	3.35	5.59	27000	0	0	0	
1	sx4	2013	4.75	9.54	43000	1	0	0	
2	ciaz	2017	7.25	9.85	6900	0	0	0	
3	wagon r	2011	2.85	4.15	5200	0	0	0	
4	swift	2014	4.60	6.87	42450	1	0	0	

Splitting the data into Training data and test data

In [13]:
```
X = car_dataset.drop(['Car_Name','Selling_Price'],axis=1)
Y = car_dataset['Selling_Price']
```

In [14]:
```
print(X)
print(Y)
```

```
     Year  Present_Price  Kms_Driven  Fuel_Type  Seller_Type  Transmission  \
0    2014           5.59       27000          0            0             0
1    2013           9.54       43000          1            0             0
2    2017           9.85        6900          0            0             0
3    2011           4.15        5200          0            0             0
4    2014           6.87       42450          1            0             0
..    ...            ...         ...        ...          ...           ...
296  2016          11.60       33988          1            0             0
297  2015           5.90       60000          0            0             0
298  2009          11.00       87934          0            0             0
299  2017          12.50        9000          1            0             0
300  2016           5.90        5464          0            0             0

     Owner
0        0
1        0
2        0
3        0
4        0
..     ...
296      0
297      0
298      0
299      0
300      0

[301 rows x 7 columns]
0       3.35
1       4.75
2       7.25
3       2.85
4       4.60
       ...
296     9.50
297     4.00
298     3.35
299    11.50
300     5.30
Name: Selling_Price, Length: 301, dtype: float64
```

Splitting Training and test data

In [15]:
```
X_train,X_test,Y_train,Y_test = train_test_split(X,Y,test_size=0.1,random_state=2)
```

Model Training

1.Linear Regression

In [16]:
```
# loading the linear regression model

lin_reg_model = LinearRegression()
```

In [17]:
```
lin_reg_model.fit(X_train,Y_train)
```

Out[17]:
```
LinearRegression()
```

Model Evalution

In [18]:
```
# Prediction on Training data
training_data_prediction = lin_reg_model.predict(X_train)
```

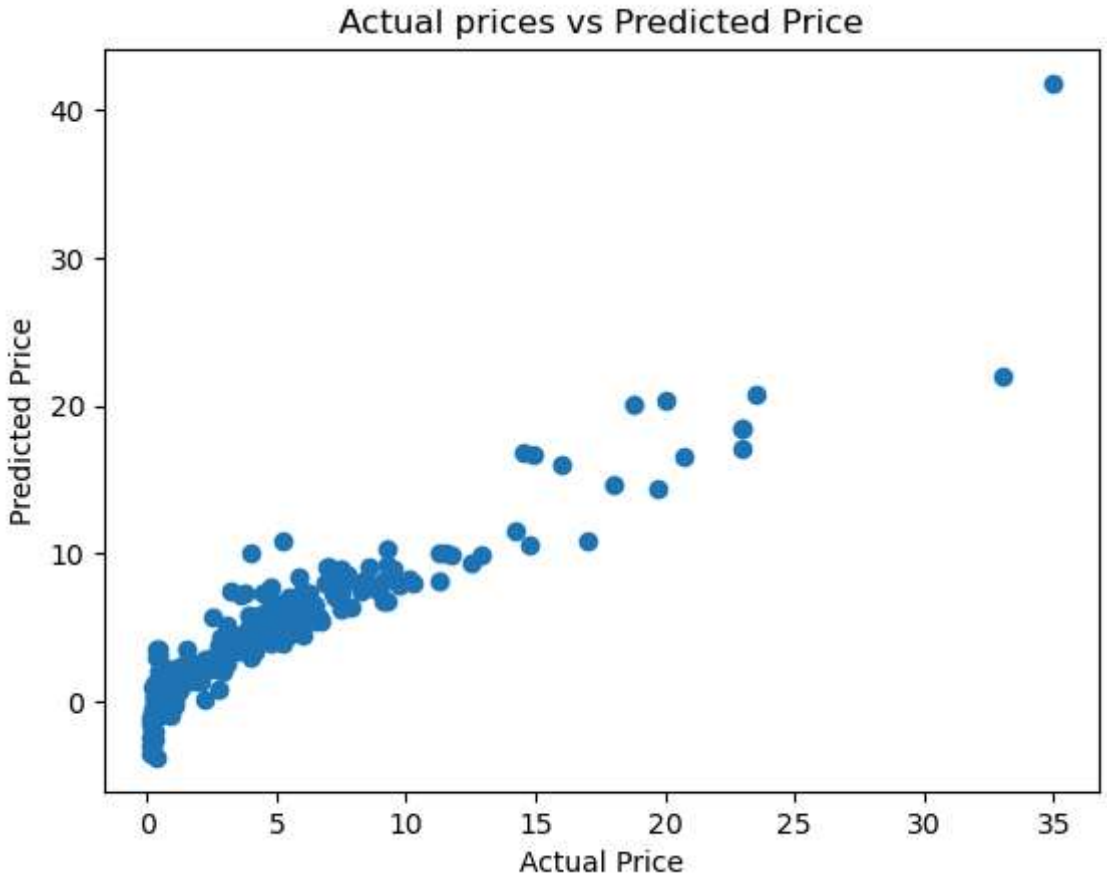
In [19]:
```
# R squared Error

error_score = metrics.r2_score(Y_train,training_data_prediction)
print("R squared Error : ",error_score)
```

```
R squared Error :  0.8799451660493705
```

Visualize the actual prices and predicted prices

In [20]:
```
plt.scatter(Y_train,training_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title("Actual prices vs Predicted Price")
plt.show()
```



In [21]:
```
# prediction on Test data
test_data_prediction = lin_reg_model.predict(X_test)
```

In [22]:
```
# R squared Error

error_score = metrics.r2_score(Y_test,test_data_prediction)
print("R squared Error : ",error_score)
```

```
R squared Error :  0.836576671502687
```

In [23]:
```
plt.scatter(Y_test,test_data_prediction)
plt.xlabel("Actual Price")
```

```
plt.ylabel("Predicted Price")
plt.title("Actual prices vs Predicted Price")
plt.show()
```

2.Lasso Regression

In [24]:
```
# loading the lasso regression model

lass_reg_model = Lasso()
```

In [25]:
```
lass_reg_model.fit(X_train,Y_train)
```

Out[25]:
```
Lasso()
```

Model Evalution

In [26]:
```
# Prediction on Training data
training_data_prediction = lass_reg_model.predict(X_train)
```

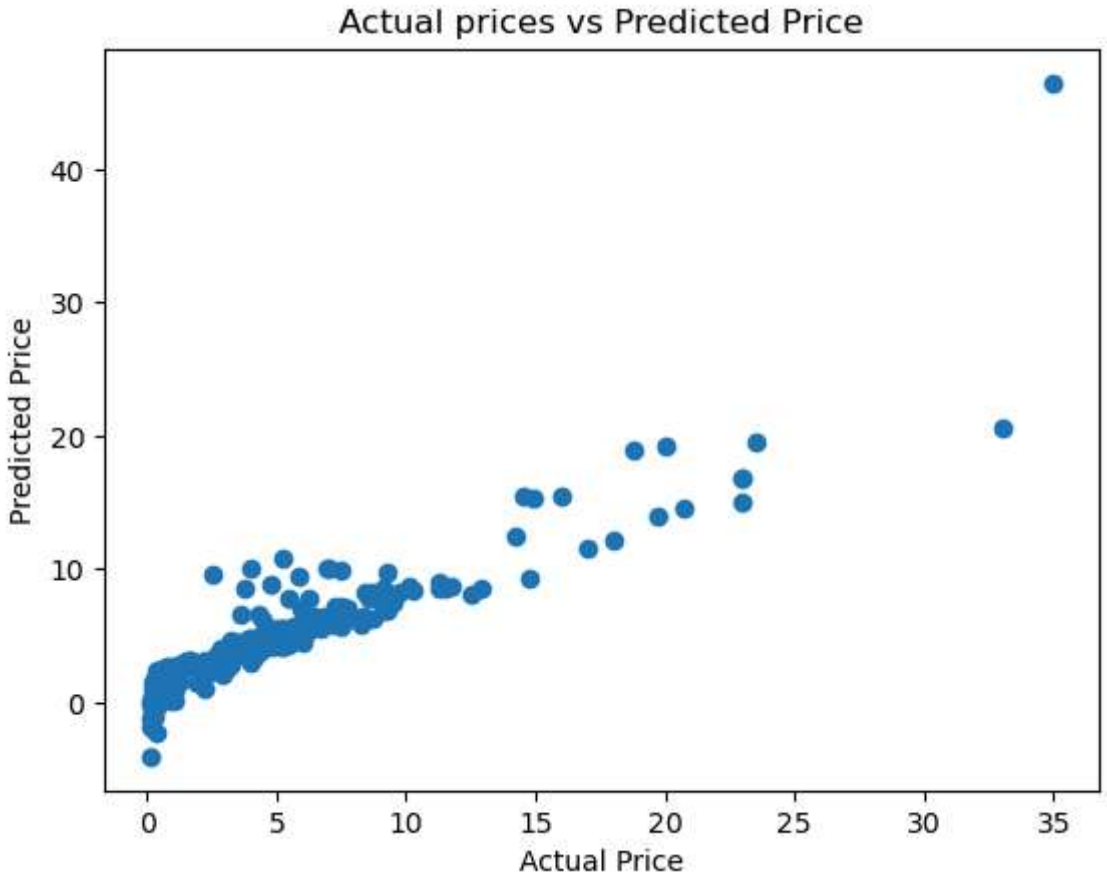
In [27]:
```
# R squared Error

error_score = metrics.r2_score(Y_train,training_data_prediction)
print("R squared Error : ",error_score)
```

```
R squared Error :  0.8427856123435794
```

Visualize the actual prices and predicted prices

In [28]:
```
plt.scatter(Y_train,training_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title("Actual prices vs Predicted Price")
plt.show()
```



In [29]:
```
# prediction on Test data
test_data_prediction = lass_reg_model.predict(X_test)
```

In [30]:
```
# R squared Error

error_score = metrics.r2_score(Y_test,test_data_prediction)
print("R squared Error : ",error_score)
```

```
R squared Error :  0.8709167941173195
```

In [ ]:
```

```