In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings("ignore")
```

In [2]:
```
car_dataset = pd.read_csv(r"C:\Users\s323\Desktop\Gatherings\Data Science\Datasets\
```

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

Out[3]:

	Car_Name	Year	Selling_Price	Present_Price	Kms_Driven	Fuel_Type	Seller_Type	Transmission
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 [7]:
```
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 [8]:
```
car_dataset.describe()
```

Out[8]:

	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 [9]:
```
car_dataset.columns
```

Out[9]:
```
Index(['Car_Name', 'Year', 'Selling_Price', 'Present_Price', 'Kms_Driven',
       'Fuel_Type', 'Seller_Type', 'Transmission', 'Owner'],
      dtype='object')
```

In [10]:
```
car_dataset.isnull().sum()
```

Out[10]:
```
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 [12]:
```
# Checking the distribution of cateofrical data
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
```

Label Encoding

In [17]:
```
# changing text/cateogorical value to numerical value
# Fuel_Type - Petrol is 0, Diesel is 1, CNG is 2
car_dataset.replace({"Fuel_Type":{"Petrol":0,"Diesel":1,"CNG":2}},inplace=True)
# Seller_Type- Dealer is 0, Individual is 1
car_dataset.replace({"Seller_Type":{"Dealer":0,"Individual":1}},inplace=True)
# Transmission- Manual is 0, Automatic is 1
car_dataset.replace({"Transmission":{"Manual":0,"Automatic":1}},inplace=True)
```

In [18]:
```
car_dataset.head()
```

Out[18]:

	Car_Name	Year	Selling_Price	Present_Price	Kms_Driven	Fuel_Type	Seller_Type	Transmission
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 and Target

In [20]:
```
X = car_dataset.drop(["Car_Name","Selling_Price"],axis=1)
Y = car_dataset["Selling_Price"]
```

In [21]:
```
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 [22]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test = train_test_split(X,Y,test_size=.1,random_state=2)
```

Model Training

In [23]:
```
from sklearn.linear_model import LinearRegression
model = LinearRegression()
```

In [24]:
```
model.fit(x_train,y_train)
```

Out[24]:
```
LinearRegression()
```

Model Evaluation

In [31]:
```
from sklearn.metrics import accuracy_score
```

In [32]:
```
train_data_predictions = model.predict(x_train)
```

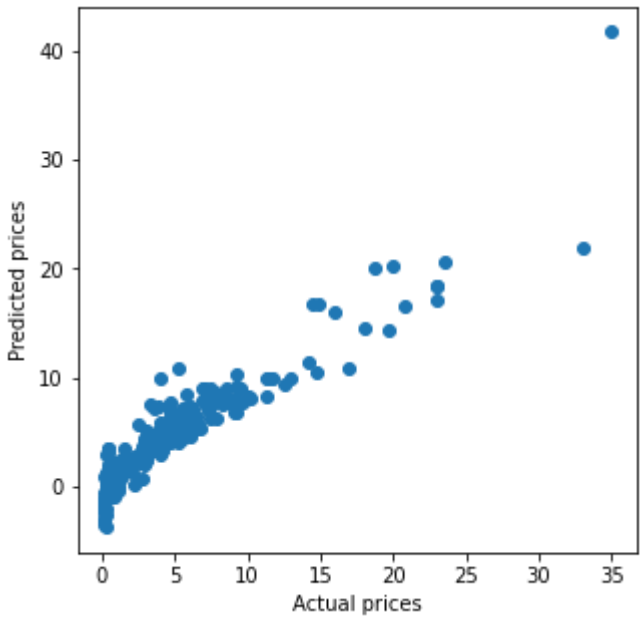
In [33]:
```
from sklearn import metrics
```

In [40]:
```
error_score = metrics.r2_score(y_train, train_data_predictions)
print("R squared Error : ", error_score)
```

```
R squared Error :  0.87994516604937
```

Visulazise for accuracy - No accuracy score in Regression, it is only used for classification

In [44]:
```
# visualize for actual price and predicted price
plt.figure(figsize=(5,5))
plt.scatter(y_train,train_data_predictions)
plt.xlabel("Actual prices")
plt.ylabel("Predicted prices")
plt.show()
```

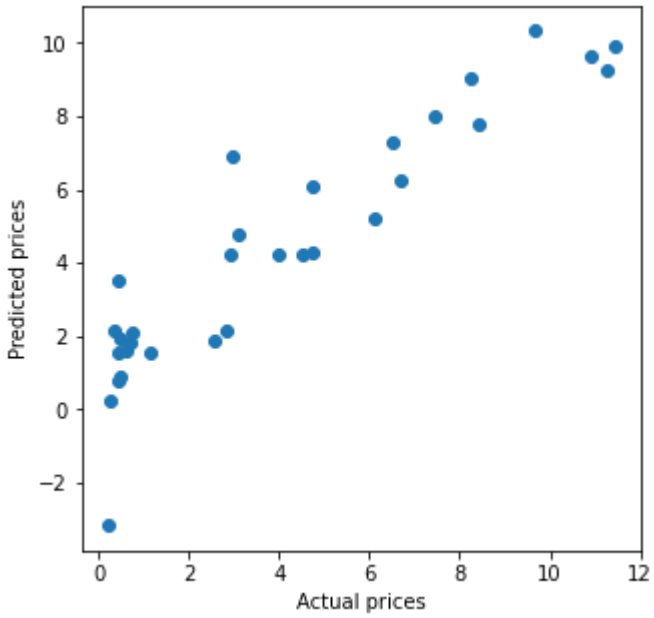


In [45]:
```
test_data_predictions = model.predict(x_test)
```

In [46]:
```
error_score = metrics.r2_score(y_test, test_data_predictions)
print("R squared Error : ", error_score)
```

```
R squared Error :  0.8365766715025409
```

In [48]:
```
# visualize for actual price and predicted price
plt.figure(figsize=(5,5))
plt.scatter(y_test,test_data_predictions)
plt.xlabel("Actual prices")
plt.ylabel("Predicted prices")
plt.show()
```



Lasso Regression

In [49]:
```
from sklearn.linear_model import Lasso
```

In [51]:
```
Lasso_model = Lasso()
```

In [52]:
```
Lasso_model.fit(x_train,y_train)
```

Out[52]:
```
Lasso()
```

Model Evaluation

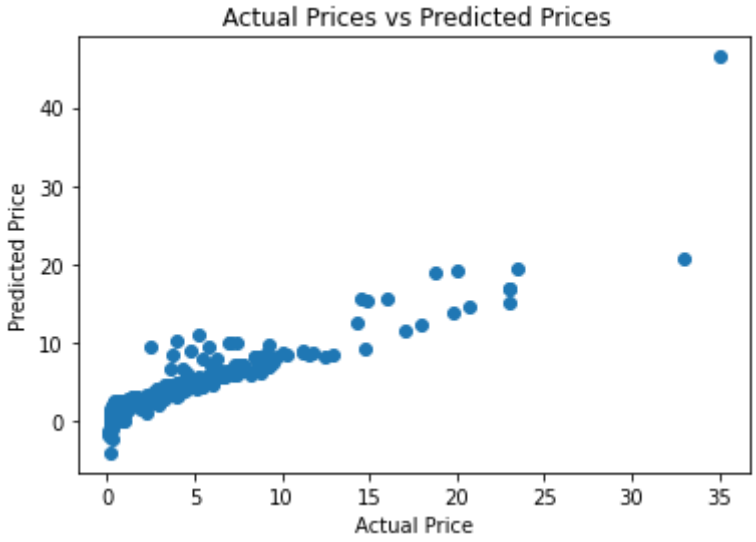
In [53]:
```
training_data_prediction = Lasso_model.predict(x_train)
```

In [54]:
```
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 [55]:
```
plt.scatter(y_train, training_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title(" Actual Prices vs Predicted Prices")
plt.show()
```



In [58]:
```
test_data_prediction = Lasso_model.predict(x_test)
```

In [61]:
```
prinerror_score = metrics.r2_score(y_test, test_data_prediction)
("R squared Error : ", error_score)
```

Out[61]:
```
('R squared Error : ', 0.8427856123435794)
```

In [62]:
```
plt.scatter(y_test, test_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title(" Actual Prices vs Predicted Prices")
plt.show()
```

In [ ]: