IMPORTING REQUIRED LIBRARIES

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

READING THE DATASET

```
df=pd.read_csv('/content/drive/MyDrive/Data set ML/train-data 1.csv')
df
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mil
0	0	Maruti Wagon R LXI CNG	Mumbai	2010	72000	CNG	Manual	First	k
1	1	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	Diesel	Manual	First	1
2	2	Honda Jazz V	Chennai	2011	46000	Petrol	Manual	First	
3	3	Maruti Ertiga VDI	Chennai	2012	87000	Diesel	Manual	First	2
4	4	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	40670	Diesel	Automatic	Second	
...	...	...	...	...	...	...	...	...	

```
df.head()
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileag
0	0	Maruti Wagon R LXI CNG	Mumbai	2010	72000	CNG	Manual	First	26.(km/k
1	1	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	Diesel	Manual	First	19.6 kmp

```
df.tail()
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mile
6014	6014	Maruti Swift VDI	Delhi	2014	27365	Diesel	Manual	First	2 k
6015	6015	Hyundai Xcent 1.1 CRDi S	Jaipur	2015	100000	Diesel	Manual	First	2 k
6016	6016	Mahindra Xylo D4	Jaipur	2012	55000	Diesel	Manual	Second	1

```
df.columns
```

```
Index(['Unnamed: 0', 'Name', 'Location', 'Year', 'Kilometers_Driven',
       'Fuel_Type', 'Transmission', 'Owner_Type', 'Mileage', 'Engine', 'Power',
       'Seats', 'New_Price', 'Price'],
      dtype='object')
```

```
df.dtypes
```

```
Unnamed: 0           int64
Name                object
```

```
Location             object
Year                  int64
Kilometers_Driven     int64
Fuel_Type            object
Transmission         object
Owner_Type           object
Mileage              object
Engine               object
Power                object
Seats               float64
New_Price            object
Price               float64
dtype: object
```

```
df['Name'].value_counts()
```

```
Mahindra XUV500 W8 2WD           49
Maruti Swift VDI                 45
Honda City 1.5 S MT              34
Maruti Swift Dzire VDI           34
Maruti Swift VDI BSIV            31
                                 ..
Ford Fiesta Titanium 1.5 TDCi     1
Mahindra Scorpio S10 AT 4WD       1
Hyundai i20 1.2 Era               1
Toyota Camry W4 (AT)              1
Mahindra Xylo D4 BSIV             1
Name: Name, Length: 1878, dtype: int64
```

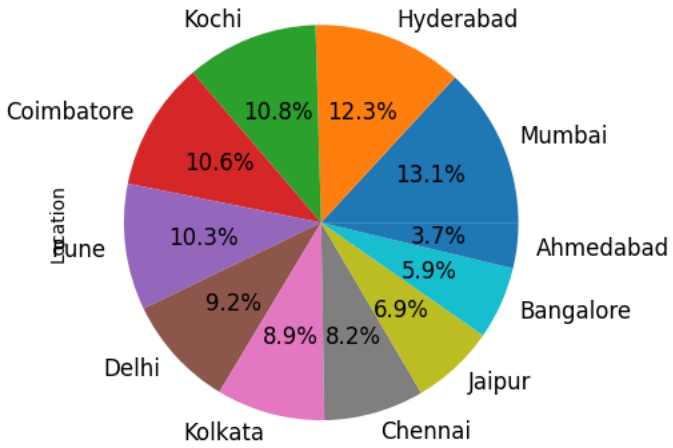
```
loc=df['Location'].value_counts()
loc
```

```
Mumbai        790
Hyderabad     742
Kochi         651
Coimbatore    636
Pune          622
Delhi         554
Kolkata       535
Chennai       494
Jaipur        413
Bangalore     358
Ahmedabad     224
Name: Location, dtype: int64
```

LOCATION COUNT GRAPH

```
loc.plot(kind='pie',fontsize=12,autopct='%1.1f%%')
```

```
<Axes: ylabel='Location'>
```




```
fuel=df['Fuel_Type'].value_counts()
fuel
```

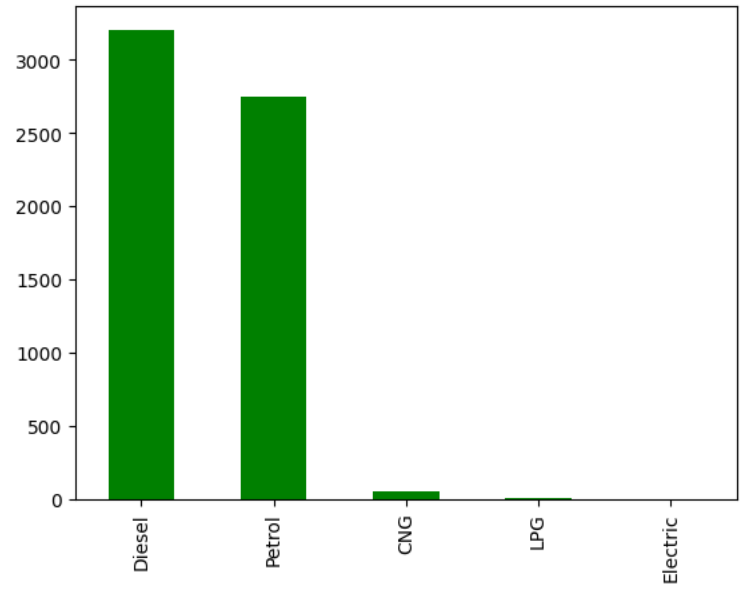
```
Diesel      3205
Petrol      2746
CNG           56
```

```
LPG           10
Electric       2
Name: Fuel_Type, dtype: int64
```

FUEL COUNT GRAPH

```
fuel.plot(kind='bar',fontsize=10,color='green')
```

```
<Axes: >
```



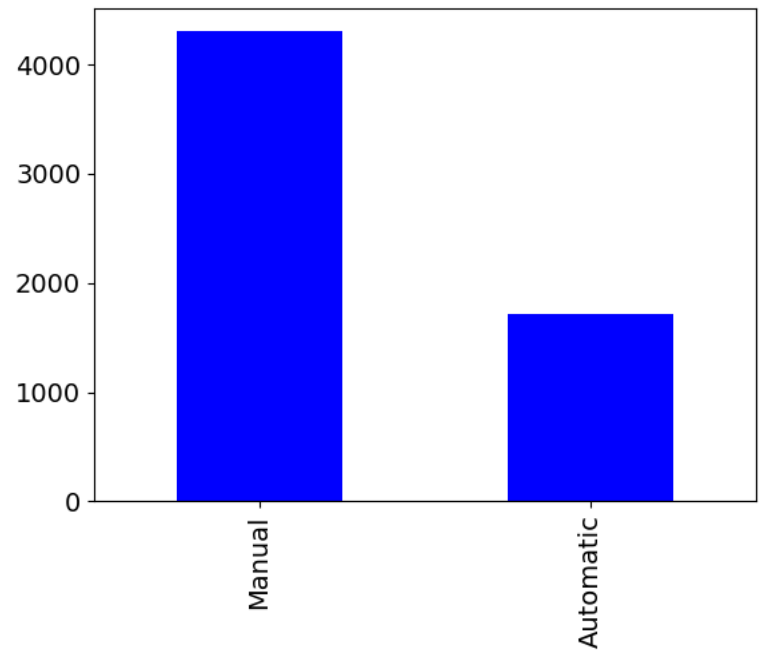

```
trans=df['Transmission' ].value_counts()
trans
```

```
Manual       4299
Automatic    1720
Name: Transmission, dtype: int64
```

TRANSMISSION COUNT GRAPH

```
trans.plot(kind='bar',fontsize=14,color='blue')
```

```
<Axes: >
```



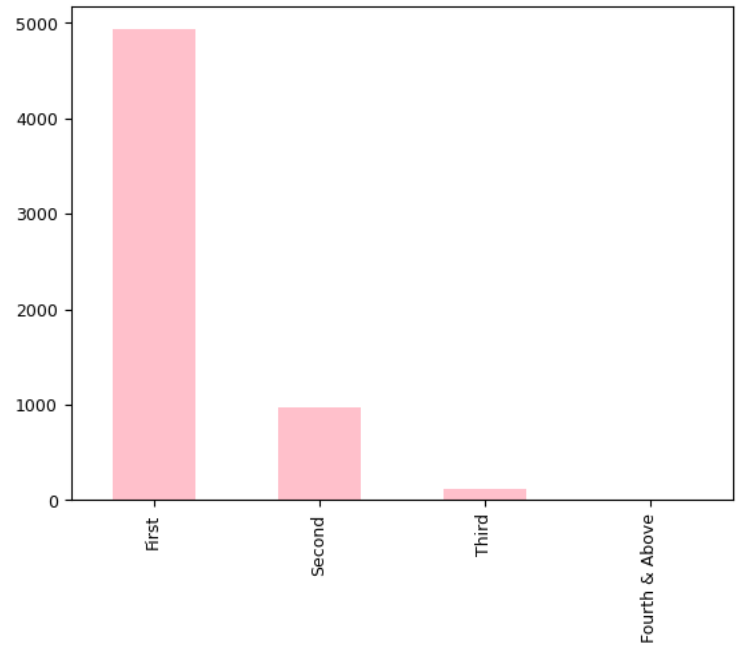
```
owner=df['Owner_Type'].value_counts()
owner
```

```
First             4929
Second             968
Third              113
Fourth & Above       9
Name: Owner_Type, dtype: int64
```

OWNER COUNT GRAPH

```
owner.plot(kind='bar',fontsize=9,color='pink')
```

```
<Axes: >
```




```
df.isna().sum()
```

```
Unnamed: 0              0
Name                    0
Location                0
Year                    0
Kilometers_Driven       0
Fuel_Type               0
Transmission            0
Owner_Type              0
Mileage                 2
Engine                 36
Power                  36
Seats                  42
New_Price            5195
Price                   0
dtype: int64
```

```
#Encoding

#here we use get_dummy

df1=pd.get_dummies(df[['Location','Fuel_Type','Transmission','Owner_Type']],drop_first=True)
df1
```

	Location_Bangalore	Location_Chennai	Location_Coimbatore	Location_Delhi	Location_Hyderabad	Lo
0	0	0	0	0	0	
1	0	0	0	0	0	
2	0	1	0	0	0	
3	0	1	0	0	0	
4	0	0	1	0	0	
...	...	...	...	...	...	
6014	0	0	0	1	0	

```
#joining 2 dataframes df and df1 called concatination

dfe=pd.concat([df,df1],axis=1)
dfe
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mil
0	0	Maruti Wagon R LXI CNG	Mumbai	2010	72000	CNG	Manual	First	k
1	1	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	Diesel	Manual	First	1
2	2	Honda Jazz V	Chennai	2011	46000	Petrol	Manual	First	
3	3	Maruti Ertiga VDI	Chennai	2012	87000	Diesel	Manual	First	2
4	4	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	40670	Diesel	Automatic	Second	
...	...	...	...	...	...	...	...	...	
6014	6014	Maruti Swift VDI	Delhi	2014	27365	Diesel	Manual	First	
6015	6015	Hyundai Xcent 1.1 CRDi S	Jaipur	2015	100000	Diesel	Manual	First	
6016	6016	Mahindra Xylo D4 BSIV	Jaipur	2012	55000	Diesel	Manual	Second	
6017	6017	Maruti Wagon R VXI	Kolkata	2013	46000	Petrol	Manual	First	
6018	6018	Chevrolet Beat Diesel	Hyderabad	2011	47000	Diesel	Manual	First	2

6019 rows × 32 columns

```
dfe.drop(['Unnamed: 0','Name','New_Price','Location','Fuel_Type','Transmission','Owner_Type'],axis=1,inplace=True)
```

```
dfe
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Price	Location_Bangalore	Location_Chenn
0	2010	72000	26.6 km/kg	998 CC	58.16 bhp	5.0	1.75	0	
1	2015	41000	19.67 kmpl	1582 CC	126.2 bhp	5.0	12.50	0	
2	2011	46000	18.2 kmpl	1199 CC	88.7 bhp	5.0	4.50	0	
3	2012	87000	20.77 kmpl	1248 CC	88.76 bhp	7.0	6.00	0	
4	2013	40670	15.2 kmpl	1968 CC	140.8 bhp	5.0	17.74	0	
...	...	...	...	...	...	...	...	...	
6014	2014	27365	28.4 kmpl	1248 CC	74 bhp	5.0	4.75	0	
6015	2015	100000	24.4 kmpl	1120 CC	71 bhp	5.0	4.00	0	
6016	2012	55000	14.0	2498	112	8.0	2.90	0	

```
#removing the units in the data(string)

dfe['Mileage']=dfe['Mileage'].str.replace('km/kg','')
dfe['Mileage']=dfe['Mileage'].str.replace('kmpl','')
dfe['Engine']=dfe['Engine'].str.replace('CC','')
dfe['Power']=dfe['Power'].str.replace('bhp','')


dfe
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Price	Location_Bangalore	Location_Chenn
0	2010	72000	26.6	998	58.16	5.0	1.75	0	
1	2015	41000	19.67	1582	126.2	5.0	12.50	0	
2	2011	46000	18.2	1199	88.7	5.0	4.50	0	
3	2012	87000	20.77	1248	88.76	7.0	6.00	0	
4	2013	40670	15.2	1968	140.8	5.0	17.74	0	
...	...	...	...	...	...	...	...	...	
6014	2014	27365	28.4	1248	74	5.0	4.75	0	
6015	2015	100000	24.4	1120	71	5.0	4.00	0	
6016	2012	55000	14.0	2498	112	8.0	2.90	0	
6017	2013	46000	18.9	998	67.1	5.0	2.65	0	
6018	2011	47000	25.44	936	57.6	5.0	2.50	0	

6019 rows × 25 columns

```
#null----> 0
dfe['Mileage']=dfe['Mileage'].str.replace('null','0')
dfe['Engine']=dfe['Engine'].str.replace('null','0')
dfe['Power']=dfe['Power'].str.replace('null','0')


dfe
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Price	Location_Bangalore	Location_Chenn
0	2010	72000	26.6	998	58.16	5.0	1.75	0	
1	2015	41000	19.67	1582	126.2	5.0	12.50	0	
2	2011	46000	18.2	1199	88.7	5.0	4.50	0	
3	2012	87000	20.77	1248	88.76	7.0	6.00	0	
4	2013	40670	15.2	1968	140.8	5.0	17.74	0	
...	...	...	...	...	...	...	...	...	
6014	2014	27365	28.4	1248	74	5.0	4.75	0	

```
#data type conversion

dfe['Mileage']=dfe['Mileage'].astype(float)
dfe['Engine']=dfe['Engine'].astype(float)
dfe['Power']=dfe['Power'].astype(float)


dfe.dtypes
```

```
Year                          int64
Kilometers_Driven             int64
Mileage                     float64
Engine                      float64
Power                       float64
Seats                       float64
Price                       float64
Location_Bangalore            uint8
Location_Chennai              uint8
Location_Coimbatore           uint8
Location_Delhi                uint8
Location_Hyderabad            uint8
Location_Jaipur               uint8
Location_Kochi                uint8
Location_Kolkata              uint8
Location_Mumbai               uint8
Location_Pune                 uint8
Fuel_Type_Diesel              uint8
Fuel_Type_Electric            uint8
Fuel_Type_LPG                 uint8
Fuel_Type_Petrol              uint8
Transmission_Manual           uint8
Owner_Type_Fourth & Above     uint8
Owner_Type_Second             uint8
Owner_Type_Third              uint8
dtype: object
```

```
#engine,power,milege --->null  ------>0

dfe.loc[dfe.Engine==0,'Engine']=np.NaN   #NaN ie missing value
dfe.loc[dfe.Mileage==0,'Mileage']=np.NaN
dfe.loc[dfe.Power==0,'Power']=np.NaN


dfe.isna().sum()
```

```
Year                          0
Kilometers_Driven             0
Mileage                      70
Engine                       36
Power                       143
Seats                        42
Price                         0
Location_Bangalore            0
Location_Chennai              0
Location_Coimbatore           0
Location_Delhi                0
Location_Hyderabad            0
Location_Jaipur               0
Location_Kochi                0
Location_Kolkata              0
Location_Mumbai               0
Location_Pune                 0
Fuel_Type_Diesel              0
Fuel_Type_Electric            0
Fuel_Type_LPG                 0
Fuel_Type_Petrol              0
```

```
Transmission_Manual            0
Owner_Type_Fourth & Above      0
Owner_Type_Second              0
Owner_Type_Third               0
dtype: int64
```

```
#handle Missing value

dfe['Engine']=dfe['Engine'].fillna(dfe['Engine'].mean())
dfe['Mileage']=dfe['Mileage'].fillna(dfe['Mileage'].mean())
dfe['Power']=dfe['Power'].fillna(dfe['Mileage'].mean())
dfe['Seats']=dfe['Seats'].fillna(dfe['Seats'].mode()[0])
```

```
dfe.isna().sum()
```

```
Year                         0
Kilometers_Driven            0
Mileage                      0
Engine                       0
Power                        0
Seats                        0
Price                        0
Location_Bangalore           0
Location_Chennai             0
Location_Coimbatore          0
Location_Delhi               0
Location_Hyderabad           0
Location_Jaipur              0
Location_Kochi               0
Location_Kolkata             0
Location_Mumbai              0
Location_Pune                0
Fuel_Type_Diesel             0
Fuel_Type_Electric           0
Fuel_Type_LPG                0
Fuel_Type_Petrol             0
Transmission_Manual          0
Owner_Type_Fourth & Above    0
Owner_Type_Second            0
Owner_Type_Third             0
dtype: int64
```

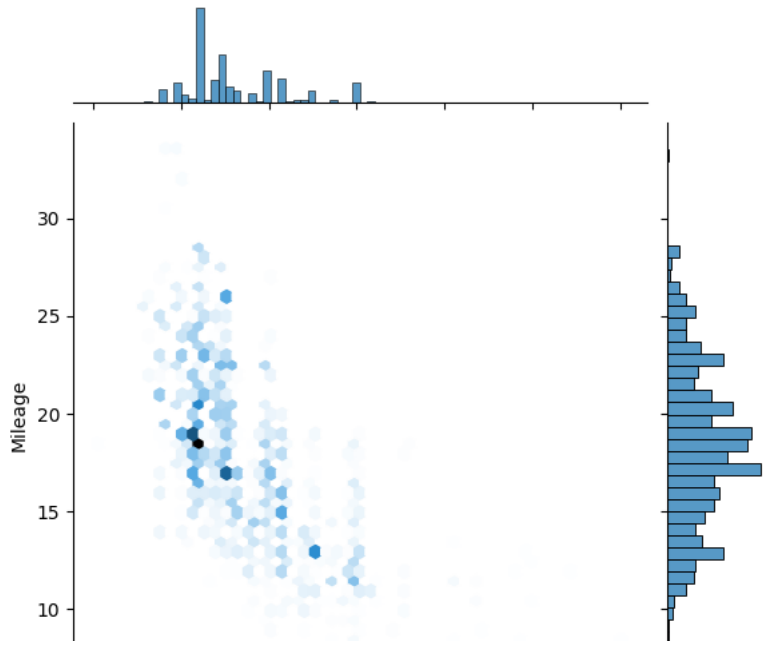
```
x=dfe.drop(['Price'],axis=1)
x
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Location_Bangalore	Location_Chennai	Loc
0	2010	72000	26.60	998.0	58.16	5.0	0	0	
1	2015	41000	19.67	1582.0	126.20	5.0	0	0	
2	2011	46000	18.20	1199.0	88.70	5.0	0	1	
3	2012	87000	20.77	1248.0	88.76	7.0	0	1	
4	2013	40670	15.20	1968.0	140.80	5.0	0	0	
...	...	...	...	...	...	...	...	...	
6014	2014	27365	28.40	1248.0	74.00	5.0	0	0	
6015	2015	100000	24.40	1120.0	71.00	5.0	0	0	
6016	2012	55000	14.00	2498.0	112.00	8.0	0	0	
6017	2013	46000	18.90	998.0	67.10	5.0	0	0	
6018	2011	47000	25.44	936.0	57.60	5.0	0	0	

6019 rows × 24 columns

```
sns.jointplot(x='Engine',y='Mileage',data=dfe,kind='hex')
```

```
<seaborn.axisgrid.JointGrid at 0x7f20f1e55c00>
```




```
y=dfe['Price']
y
```

```
0        1.75
1       12.50
2        4.50
3        6.00
4       17.74
        ...
6014     4.75
6015     4.00
6016     2.90
6017     2.65
6018     2.50
Name: Price, Length: 6019, dtype: float64
```

TESTING DATA

```
df2=pd.read_csv('/content/drive/MyDrive/Data set ML/test-data.csv')
df2
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mi
		Maruti Alto							

```
df2.head()
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage
0	0	Maruti Alto K10 LXI CNG	Delhi	2014	40929	CNG	Manual	First	32.26 km/kg
1	1	Maruti Alto 800 2016-	Coimbatore	2013	54493	Petrol	Manual	Second	24.7 kmpl
3	3	Etios Liva	Hyderabad	2012	139000	Diesel	Manual	First	

```
df2.tail()
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mi
1229	1229	Volkswagen Vento Diesel Trendline	Hyderabad	2011	89411	Diesel	Manual	First	
1230	1230	Volkswagen Polo GT TSI	Mumbai	2015	59000	Petrol	Automatic	First	

```
df2.columns
```

```
Index(['Unnamed: 0', 'Name', 'Location', 'Year', 'Kilometers_Driven',
       'Fuel_Type', 'Transmission', 'Owner_Type', 'Mileage', 'Engine', 'Power',
       'Seats', 'New_Price'],
      dtype='object')
```

```
df2.dtypes
```

```
Unnamed: 0             int64
Name                  object
Location              object
Year                   int64
Kilometers_Driven      int64
Fuel_Type             object
Transmission          object
Owner_Type            object
Mileage               object
Engine                object
Power                 object
Seats                float64
New_Price             object
dtype: object
```

```
df2['Name'].value_counts()
```

```
Maruti Alto LXi                                        9
Honda City 1.5 V MT                                    8
Maruti Swift Dzire VDI                                 8
Volkswagen Polo 1.2 MPI Highline                       8
Hyundai i10 Magna                                      7
                                                      ..
Hyundai Santro GLS I - Euro II                         1
Honda City i DTec VX Option BL                         1
Land Rover Discovery 4 SDV6 SE                         1
Hyundai Verna CRDi 1.6 SX Option                       1
Mercedes-Benz E-Class 2009-2013 E 220 CDI Avantgarde   1
Name: Name, Length: 769, dtype: int64
```

```
loc2=df2['Location'].value_counts()
loc2
```

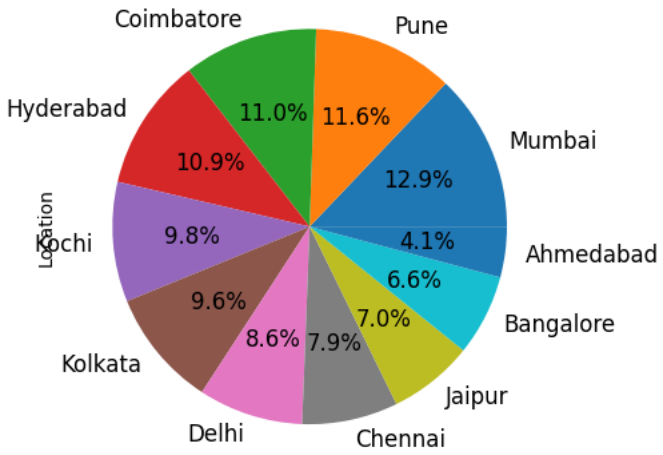
```
Mumbai        159
Pune          143
Coimbatore    136
Hyderabad     134
```

```
Kochi         121
Kolkata       119
Delhi         106
Chennai        97
Jaipur         86
Bangalore      82
Ahmedabad      51
Name: Location, dtype: int64
```

LOCATION COUNT GRAPH

```
loc2.plot(kind='pie',fontsize=12,autopct='%1.1f%%')
```

```
<Axes: ylabel='Location'>
```



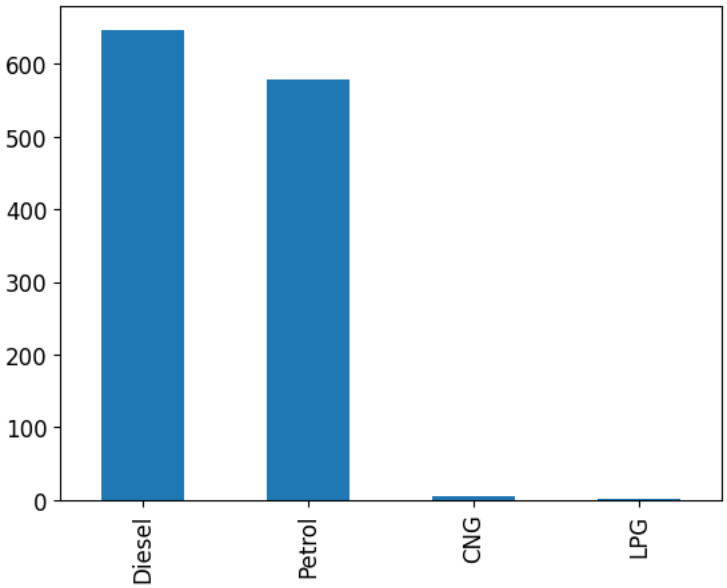

```
fuel2=df2['Fuel_Type'].value_counts()
fuel2
```

```
Diesel    647
Petrol    579
CNG         6
LPG         2
Name: Fuel_Type, dtype: int64
```

FUEL COUNT GRAPH

```
fuel2.plot(kind='bar',fontsize=12)
```

```
<Axes: >
```



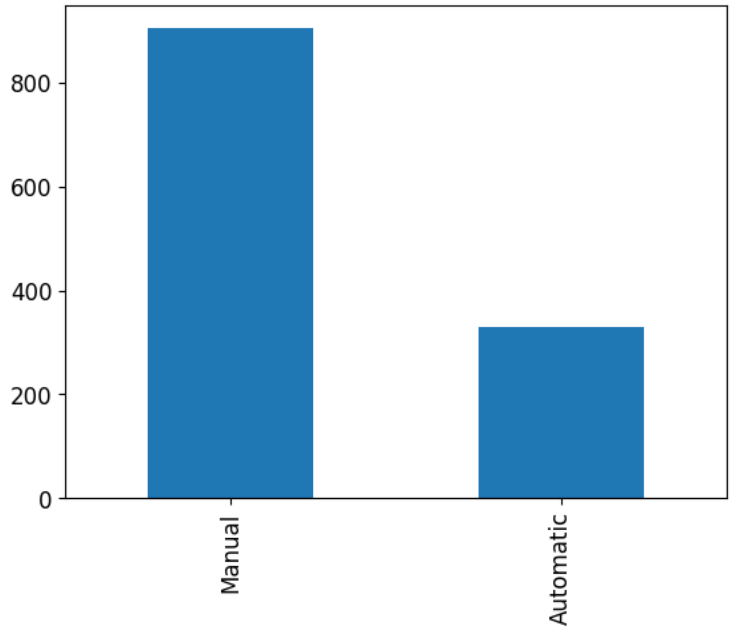
```
trans2=df2['Transmission'].value_counts()
trans
```

```
Manual       4299
Automatic    1720
Name: Transmission, dtype: int64
```

TRANSMISSION COUNT GRAPH

```
trans2.plot(kind='bar',fontsize=12)
```

```
<Axes: >
```




```
owner2=df2['Owner_Type'].value_counts()
owner2
```

```
First             1023
Second             184
Third               24
Fourth & Above       3
Name: Owner_Type, dtype: int64
```

OWNER COUNT GRAPH

```
owner2.plot(kind='bar',fontsize=12)
```

```
<Axes: >
```


```
df2.isna().sum()
```

```
Unnamed: 0             0
Name                   0
Location               0
Year                   0
Kilometers_Driven      0
Fuel_Type              0
Transmission           0
Owner_Type             0
Mileage                0
Engine                10
Power                 10
Seats                 11
New_Price           1052
dtype: int64
```

```
df3=pd.get_dummies(df2[['Location','Fuel_Type','Transmission','Owner_Type']],drop_first=True)
df3
```

	Location_Bangalore	Location_Chennai	Location_Coimbatore	Location_Delhi	Location_Hyderabad	Lo
0	0	0	0	1	0	
1	0	0	1	0	0	
2	0	0	0	0	0	
3	0	0	0	0	1	
4	0	0	0	0	0	
...	...	...	...	...	...	
1229	0	0	0	0	1	
1230	0	0	0	0	0	
1231	0	0	0	0	0	
1232	0	0	0	0	0	
1233	0	0	0	0	0	

1234 rows × 17 columns

```
dfg=pd.concat([df2,df3],axis=1)
dfg
```

	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mi
0	0	Maruti Alto K10 LXI CNG	Delhi	2014	40929	CNG	Manual	First	
1	1	Maruti Alto 800 2016-2019 LXI	Coimbatore	2013	54493	Petrol	Manual	Second	
2	2	Toyota Innova Crysta Touring Sport 2.4 MT	Mumbai	2017	34000	Diesel	Manual	First	
3	3	Toyota Etios Liva GD	Hyderabad	2012	139000	Diesel	Manual	First	
4	4	Hyundai i20 Magna	Mumbai	2014	29000	Petrol	Manual	First	
...	...	...	...	...	...	...	...	...	...
		Volkswagen							

```
dfg.drop(['Unnamed: 0','Name','New_Price','Location','Fuel_Type','Transmission','Owner_Type'],axis=1,inplace=True)
```

Trendline

```
dfg
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Location_Bangalore	Location_Chennai	Loc
0	2014	40929	32.26 km/kg	998 CC	58.2 bhp	4.0	0	0	
1	2013	54493	24.7 kmpl	796 CC	47.3 bhp	5.0	0	0	
2	2017	34000	13.68 kmpl	2393 CC	147.8 bhp	7.0	0	0	
3	2012	139000	23.59 kmpl	1364 CC	null bhp	5.0	0	0	
4	2014	29000	18.5 kmpl	1197 CC	82.85 bhp	5.0	0	0	
...	...	...	...	...	...	...	...	...	
1229	2011	89411	20.54 kmpl	1598 CC	103.6 bhp	5.0	0	0	
1230	2015	59000	17.21 kmpl	1197 CC	103.6 bhp	5.0	0	0	
1231	2012	28000	23.08 kmpl	1461 CC	63.1 bhp	5.0	0	0	
1232	2013	52262	17.2 kmpl	1197 CC	103.6 bhp	5.0	0	0	
1233	2014	72443	10.0 kmpl	2148 CC	170 bhp	5.0	0	0	

1234 rows × 23 columns

```
dfg['Mileage']=dfg['Mileage'].str.replace('km/kg','')
dfg['Mileage']=dfg['Mileage'].str.replace('kmpl','')
dfg['Engine']=dfg['Engine'].str.replace('CC','')
dfg['Power']=dfg['Power'].str.replace('bhp','')
```

```
dfg
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Location_Bangalore	Location_Chennai	Loc
0	2014	40929	32.26	998	58.2	4.0	0	0	
1	2013	54493	24.7	796	47.3	5.0	0	0	
2	2017	34000	13.68	2393	147.8	7.0	0	0	
3	2012	139000	23.59	1364	null	5.0	0	0	
4	2014	29000	18.5	1197	82.85	5.0	0	0	
...	...	...	...	...	...	...	...	...	
1229	2011	89411	20.54	1598	103.6	5.0	0	0	
1230	2015	59000	17.21	1197	103.6	5.0	0	0	
1231	2012	28000	23.08	1461	63.1	5.0	0	0	
1232	2013	52262	17.2	1197	103.6	5.0	0	0	

```
dfg['Mileage']=dfg['Mileage'].str.replace('null','0')
dfg['Engine']=dfg['Engine'].str.replace('null','0')
dfg['Power']=dfg['Power'].str.replace('null','0')
```

```
dfg
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Location_Bangalore	Location_Chennai	Loc
0	2014	40929	32.26	998	58.2	4.0	0	0	
1	2013	54493	24.7	796	47.3	5.0	0	0	
2	2017	34000	13.68	2393	147.8	7.0	0	0	
3	2012	139000	23.59	1364	0	5.0	0	0	
4	2014	29000	18.5	1197	82.85	5.0	0	0	
...	...	...	...	...	...	...	...	...	
1229	2011	89411	20.54	1598	103.6	5.0	0	0	
1230	2015	59000	17.21	1197	103.6	5.0	0	0	
1231	2012	28000	23.08	1461	63.1	5.0	0	0	
1232	2013	52262	17.2	1197	103.6	5.0	0	0	
1233	2014	72443	10.0	2148	170	5.0	0	0	

1234 rows × 23 columns

```
dfg['Mileage']=dfg['Mileage'].astype(float)
dfg['Engine']=dfg['Engine'].astype(float)
dfg['Power']=dfg['Power'].astype(float)
```

```
dfg.dtypes
```

```
Year                         int64
Kilometers_Driven            int64
Mileage                    float64
Engine                     float64
Power                      float64
Seats                      float64
Location_Bangalore           uint8
Location_Chennai             uint8
Location_Coimbatore          uint8
Location_Delhi               uint8
Location_Hyderabad           uint8
Location_Jaipur              uint8
Location_Kochi               uint8
Location_Kolkata             uint8
Location_Mumbai              uint8
Location_Pune                uint8
Fuel_Type_Diesel             uint8
Fuel_Type_LPG                uint8
Fuel_Type_Petrol             uint8
Transmission_Manual          uint8
Owner_Type_Fourth & Above    uint8
```

```
Owner_Type_Second              uint8
Owner_Type_Third               uint8
dtype: object
```

```
dfg.loc[dfg.Engine==0,'Engine']=np.NaN
dfg.loc[dfg.Mileage==0,'Mileage']=np.NaN
dfg.loc[dfg.Power==0,'Power']=np.NaN
```

```
dfg.isna().sum()
```

```
Year                          0
Kilometers_Driven             0
Mileage                      13
Engine                       10
Power                        32
Seats                        11
Location_Bangalore            0
Location_Chennai              0
Location_Coimbatore           0
Location_Delhi                0
Location_Hyderabad            0
Location_Jaipur               0
Location_Kochi                0
Location_Kolkata              0
Location_Mumbai               0
Location_Pune                 0
Fuel_Type_Diesel              0
Fuel_Type_LPG                 0
Fuel_Type_Petrol              0
Transmission_Manual           0
Owner_Type_Fourth & Above     0
Owner_Type_Second             0
Owner_Type_Third              0
dtype: int64
```

```
dfg['Engine']=dfg['Engine'].fillna(dfg['Engine'].mean())
dfg['Mileage']=dfg['Mileage'].fillna(dfg['Mileage'].mean())
dfg['Power']=dfg['Power'].fillna(dfg['Mileage'].mean())
dfg['Seats']=dfg['Seats'].fillna(dfg['Seats'].mode()[0])
```

```
dfg.isna().sum()
```

```
Year                          0
Kilometers_Driven             0
Mileage                       0
Engine                        0
Power                         0
Seats                         0
Location_Bangalore            0
Location_Chennai              0
Location_Coimbatore           0
Location_Delhi                0
Location_Hyderabad            0
Location_Jaipur               0
Location_Kochi                0
Location_Kolkata              0
Location_Mumbai               0
Location_Pune                 0
Fuel_Type_Diesel              0
Fuel_Type_LPG                 0
Fuel_Type_Petrol              0
Transmission_Manual           0
Owner_Type_Fourth & Above     0
Owner_Type_Second             0
Owner_Type_Third              0
dtype: int64
```

```
x_test=dfg
x_test.head()
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Location_Bangalore	Location_Chennai	Lo
0	2014	40929	32.26	998.0	58.200000	4.0	0	0	
1	2013	54493	24.70	796.0	47.300000	5.0	0	0	

```
#training data(x_train=x,y_train=y)

x=dfe.drop(['Fuel_Type_Electric','Price'],axis=1)
x
```

	Year	Kilometers_Driven	Mileage	Engine	Power	Seats	Location_Bangalore	Location_Chennai	Loc
0	2010	72000	26.60	998.0	58.16	5.0	0	0	
1	2015	41000	19.67	1582.0	126.20	5.0	0	0	
2	2011	46000	18.20	1199.0	88.70	5.0	0	1	
3	2012	87000	20.77	1248.0	88.76	7.0	0	1	
4	2013	40670	15.20	1968.0	140.80	5.0	0	0	
...	...	...	...	...	...	...	...	...	
6014	2014	27365	28.40	1248.0	74.00	5.0	0	0	
6015	2015	100000	24.40	1120.0	71.00	5.0	0	0	
6016	2012	55000	14.00	2498.0	112.00	8.0	0	0	
6017	2013	46000	18.90	998.0	67.10	5.0	0	0	
6018	2011	47000	25.44	936.0	57.60	5.0	0	0	

6019 rows × 23 columns

MODEL CREATION

```
from sklearn.linear_model import LinearRegression
model=LinearRegression()
model.fit(x,y)
y_pred=model.predict(x_test)
y_pred
```

```
array([ 3.51755114, -0.79961877, 15.6800196 , ...,  1.63752141,
        9.72820759, 21.79700279])
```

```
import seaborn as sns
sns.heatmap(df.corr())
```

```
<ipython-input-80-534f4f3c80b7>:2: FutureWarning: The default value of numeric_only in DataFrame.corr i
  sns.heatmap(df.corr())
<Axes: >
```