# Experiment:- 2

**Student Name:** **UID:**
**Branch: CSE** **Section/Group:**
**Semester: 5th** **Date of Performance:**
**Subject Code: 20CSP-317**
**Subject Name: MACHINE LEARNING LAB**

## Aim/Overview of the practical:

Implement Data Visualization.

## Task to be done:

To perform Data Visualization on any standard dataset.

## Apparatus/Simulator used:

- Jupyter Notebook/Google Collab
- Python
- pandas Library
- seaborn Library
- Standard Dataset

## Code and Output:

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
cars_data=pd.read_csv('Toyota.csv',index_col=0,na_values=["??","????"])
```

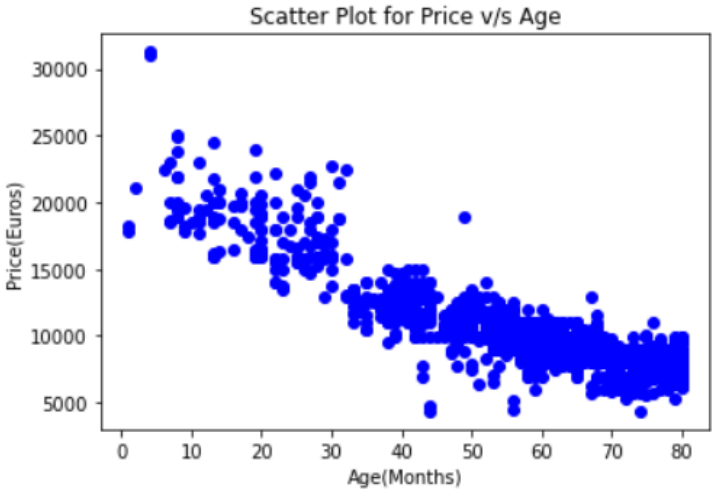
In [3]:
```
cars_data
```

Out[3]:

| | Price | Age | KM | FuelType | HP | MetColor | Automatic | CC | Doors | Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 13500 | 23.0 | 46986.0 | Diesel | 90.0 | 1.0 | 0 | 2000 | three | 1165 |
| **1** | 13750 | 23.0 | 72937.0 | Diesel | 90.0 | 1.0 | 0 | 2000 | 3 | 1165 |
| **2** | 13950 | 24.0 | 41711.0 | Diesel | 90.0 | NaN | 0 | 2000 | 3 | 1165 |
| **3** | 14950 | 26.0 | 48000.0 | Diesel | 90.0 | 0.0 | 0 | 2000 | 3 | 1165 |
| **4** | 13750 | 30.0 | 38500.0 | Diesel | 90.0 | 0.0 | 0 | 2000 | 3 | 1170 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **1431** | 7500 | NaN | 20544.0 | Petrol | 86.0 | 1.0 | 0 | 1300 | 3 | 1025 |
| **1432** | 10845 | 72.0 | NaN | Petrol | 86.0 | 0.0 | 0 | 1300 | 3 | 1015 |
| **1433** | 8500 | NaN | 17016.0 | Petrol | 86.0 | 0.0 | 0 | 1300 | 3 | 1015 |
| **1434** | 7250 | 70.0 | NaN | NaN | 86.0 | 1.0 | 0 | 1300 | 3 | 1015 |
| **1435** | 6950 | 76.0 | 1.0 | Petrol | 110.0 | 0.0 | 0 | 1600 | 5 | 1114 |

1436 rows × 10 columns

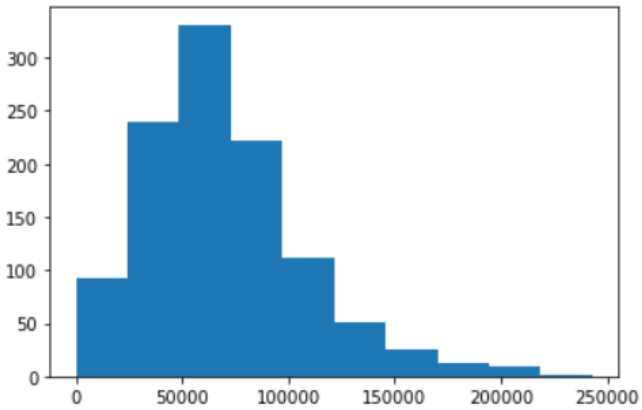
In [6]:
```
plt.scatter(cars_data['Age'],cars_data['Price'],c='blue')
plt.title('Scatter Plot for Price v/s Age')
plt.xlabel("Age(Months)")
plt.ylabel("Price(Euros)")
plt.show()
```




## Plotted Histogram

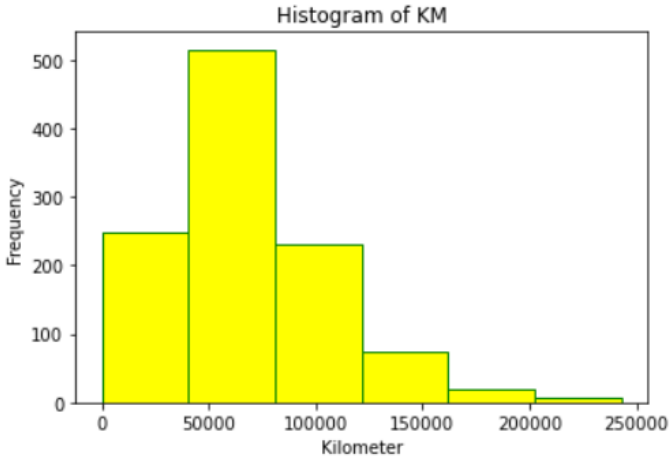
In [7]:
```
plt.hist(cars_data['KM'])
```

Out[7]:
```
(array([ 92., 239., 331., 222., 111.,  51.,  25.,  13.,  10.,   2.]),
 array([1.000000e+00, 2.430090e+04, 4.860080e+04, 7.290070e+04,
        9.720060e+04, 1.215005e+05, 1.458004e+05, 1.701003e+05,
        1.944002e+05, 2.187001e+05, 2.430000e+05]),
 <BarContainer object of 10 artists>)
```

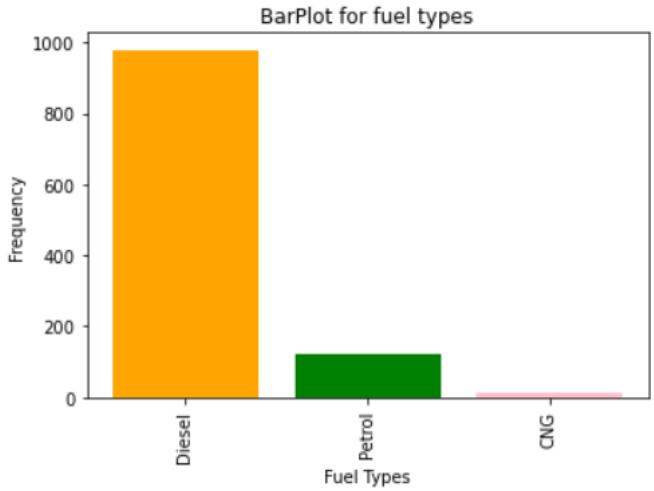


In [9]:
```
plt.hist(cars_data['KM'],color='yellow',edgecolor='green',bins=6)
plt.title('Histogram of KM')
plt.xlabel('Kilometer')
plt.ylabel('Frequency')
```

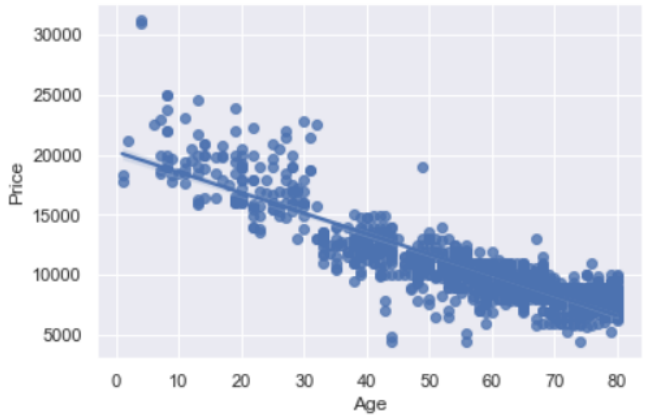
Out[9]:
```
Text(0, 0.5, 'Frequency')
```




In [15]:
```
plt.bar(index,counts,color=['orange','green','pink'])
plt.title('BarPlot for fuel types')
plt.xlabel('Fuel Types')
plt.ylabel('Frequency')
plt.xticks(index,FuelType,rotation=90)
plt.show()
```

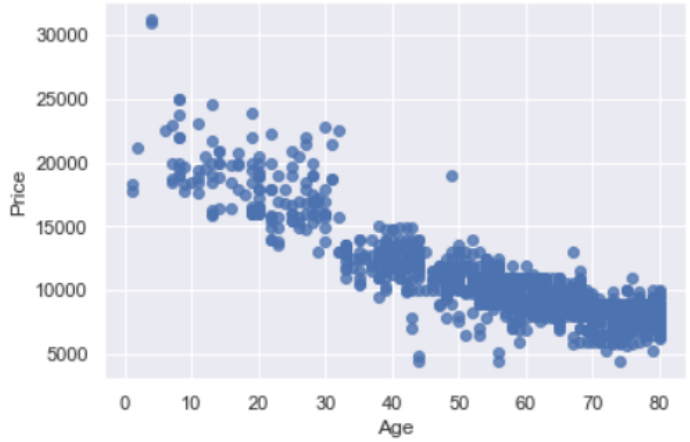


```
In [16]: import seaborn as sns

In [17]: sns.set(style='darkgrid')

In [18]: sns.regplot(x=cars_data['Age'],y=cars_data['Price'])
Out[18]: <AxesSubplot:xlabel='Age', ylabel='Price'>
```



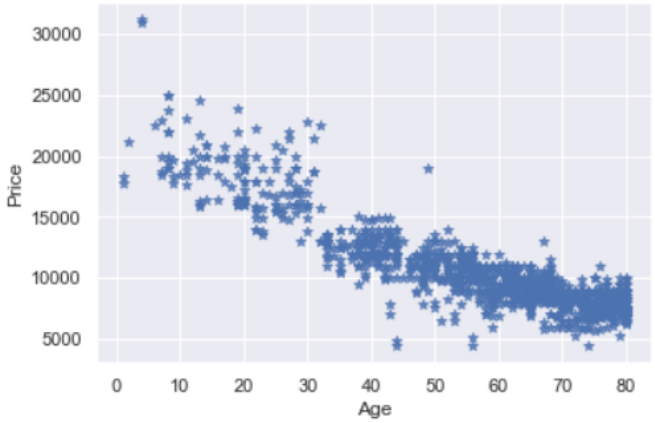

To remove the regression line we have to make it false as its default value is true.

```
In [19]: sns.regplot(x=cars_data['Age'],y=cars_data['Price'],fit_reg=False)
Out[19]: <AxesSubplot:xlabel='Age', ylabel='Price'>
```



In [20]:
```
sns.regplot(x=cars_data['Age'],y=cars_data['Price'],fit_reg=False,marker="*")
```

Out[20]:
```
<AxesSubplot:xlabel='Age', ylabel='Price'>
```

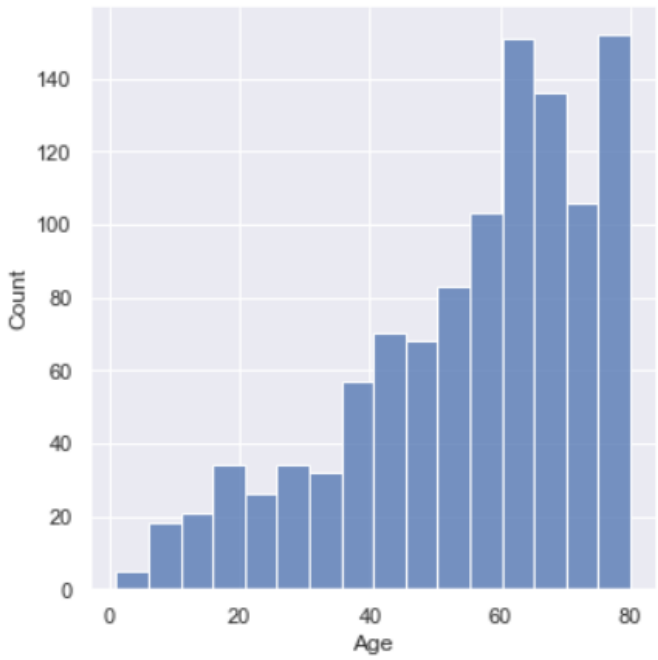



In [22]:
```
sns.lmplot(x='Age',y='Price',data=cars_data,fit_reg=False,hue='FuelType',legend=True,palette="Set1")
```

Out[22]:
```
<seaborn.axisgrid.FacetGrid at 0x21e37793b20>
```

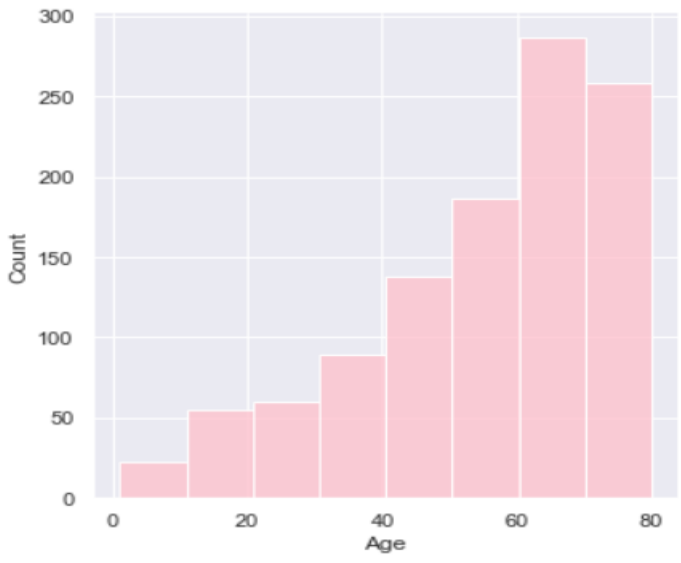
In [24]:
```
sns.displot(cars_data['Age'])
```

Out[24]:
```
<seaborn.axisgrid.FacetGrid at 0x21e3a4481f0>
```



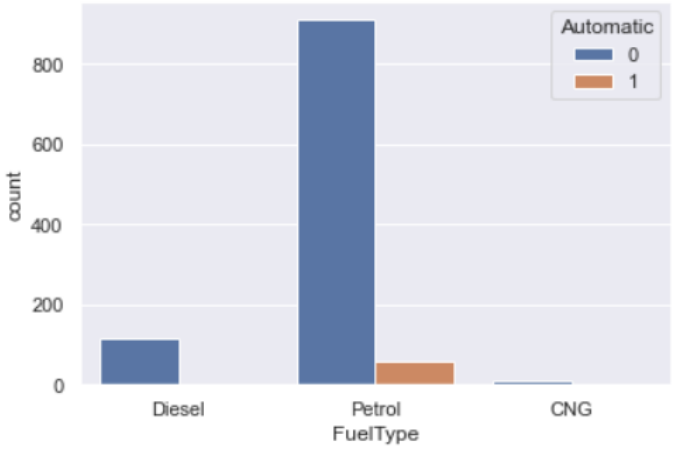

In [25]:
```
sns.displot(cars_data['Age'],color='pink',bins=8)
```

Out[25]:
```
<seaborn.axisgrid.FacetGrid at 0x21e3778e670>
```



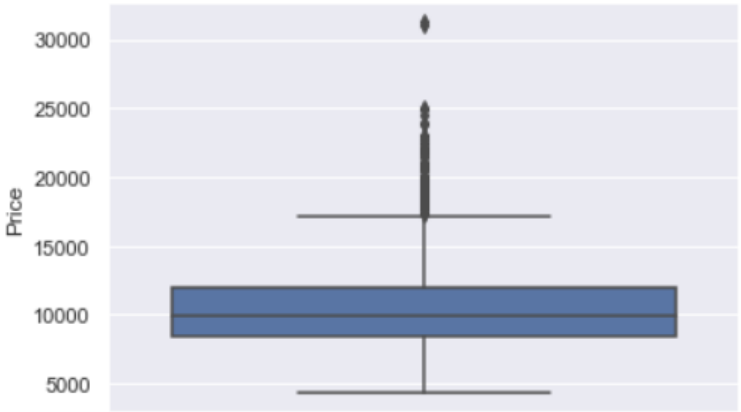
In [26]:
```
sns.countplot(x='FuelType',data=cars_data,hue="Automatic")
```

Out[26]: <AxesSubplot:xlabel='FuelType', ylabel='count'>



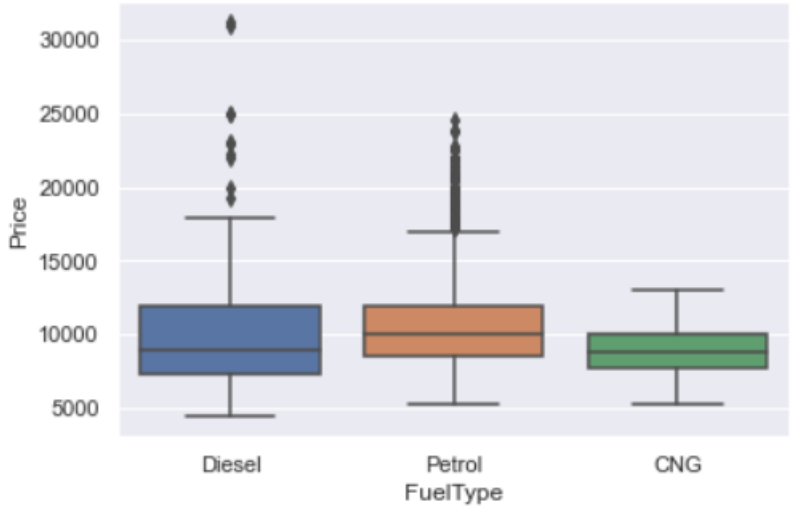

In [27]:
```
sns.boxplot(y=cars_data['Price'])
```

Out[27]: <AxesSubplot:ylabel='Price'>



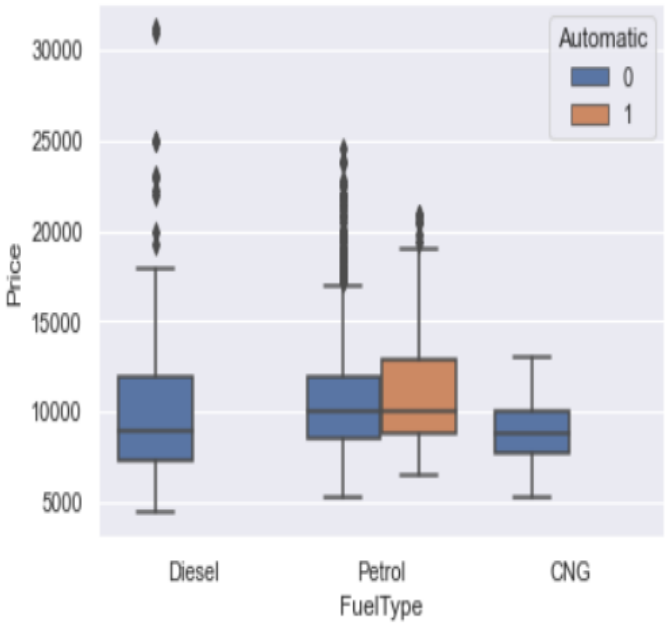
In [28]:
```
sns.boxplot(x=cars_data['FuelType'],y=cars_data['Price'])
```

Out[28]:
```
<AxesSubplot:xlabel='FuelType', ylabel='Price'>
```



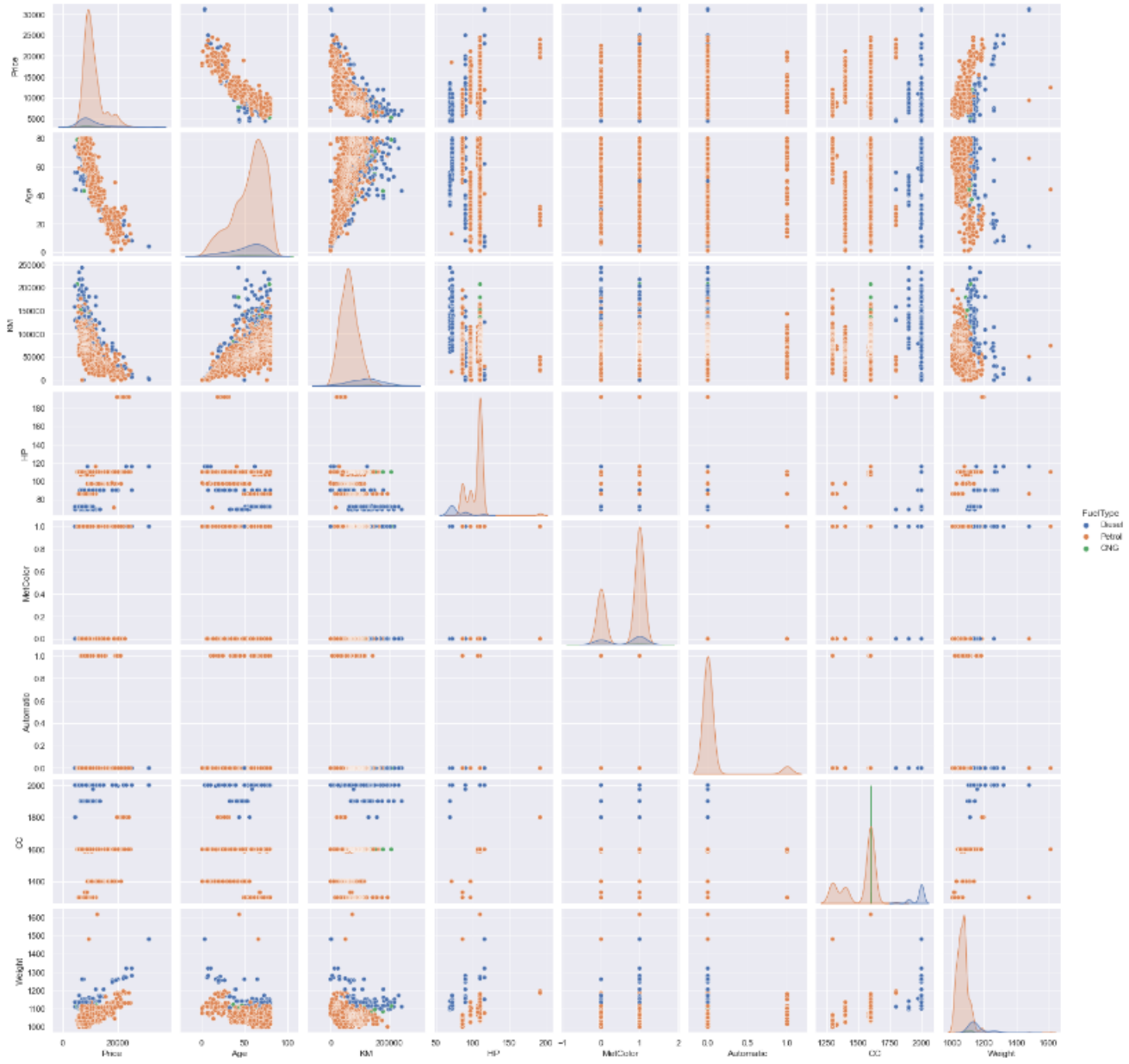

In [29]:
```
sns.boxplot(x='FuelType',y=cars_data['Price'],hue="Automatic",data=cars_data)
```

Out[29]:
```
<AxesSubplot:xlabel='FuelType', ylabel='Price'>
```



In [30]:
```
sns.pairplot(cars_data,kind="scatter",hue="FuelType")
```

Out[30]:
```
<seaborn.axisgrid.PairGrid at 0x21e3a6cdd60>
```



**Learning outcomes (What I have learnt):**

1. To understand Data Visualization.
2. Learn about pandas', matplotlib and seaborn library/package ofpython.
3. Learn about the different methods/functions that are needed togenerate different types of graphs, charts and plots of the given dataset.
4. Leaned about regression line, KDE.

**Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):**

| Sr. No. | Parameters | Marks Obtained | Maximum Marks |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| | | | |