Q. Consider only the below columns and prepare a prediction model for predicting Price.

Corolla<-Corolla[c("Price","Age_08_04","KM","HP","cc","Doors","Gears","Quarterly_Tax","Weight")]

1. Import Necessary Libraries

In [1]:
```
import pandas as pd
import numpy as np

import matplotlib.pyplot as plt
import seaborn as sns

import warnings
warnings.filterwarnings("ignore")

from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import mean_squared_error,mean_absolute_error

import statsmodels.formula.api as smf
```

2. Import data Or Data Collection

In [2]:
```
toyota_corolla_data = pd.read_csv(r"E:\Data Science by John\Assignments\Assignment 5- Multi Linear Regression\ToyotaCorol
toyota_corolla_data
```

Out[2]:

	Id	Model	Price	Age_08_04	Mfg_Month	Mfg_Year	KM	Fuel_Type	HP	Met_Color	...	Central_Lock	Powered_Windows	Power_Ste
0	1	TOYOTA Corolla 2.0 D4D HATCHB TERRA 2/3-Doors	13500	23	10	2002	46986	Diesel	90	1	...	1	1	
1	2	TOYOTA Corolla 2.0 D4D HATCHB TERRA 2/3-Doors	13750	23	10	2002	72937	Diesel	90	1	...	1	0	
2	3	TOYOTA Corolla 2.0 D4D HATCHB TERRA 2/3-Doors	13950	24	9	2002	41711	Diesel	90	1	...	0	0	
3	4	TOYOTA Corolla 2.0 D4D HATCHB TERRA 2/3-Doors	14950	26	7	2002	48000	Diesel	90	0	...	0	0	
4	5	TOYOTA Corolla 2.0 D4D HATCHB SOL 2/3-Doors	13750	30	3	2002	38500	Diesel	90	0	...	1	1	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	

	Id	Model	Price	Age_08_04	Mfg_Month	Mfg_Year	KM	Fuel_Type	HP	Met_Color	...	Central_Lock	Powered_Windows	Power_Stee
1431	1438	TOYOTA Corolla 1.3 16V HATCHB G6 2/3-Doors	7500	69	12	1998	20544	Petrol	86	1	...	1	1	
1432	1439	TOYOTA Corolla 1.3 16V HATCHB LINEA TERRA 2/3-...	10845	72	9	1998	19000	Petrol	86	0	...	0	0	
1433	1440	TOYOTA Corolla 1.3 16V HATCHB LINEA TERRA 2/3-...	8500	71	10	1998	17016	Petrol	86	0	...	0	0	
1434	1441	TOYOTA Corolla 1.3 16V HATCHB LINEA TERRA 2/3-...	7250	70	11	1998	16916	Petrol	86	1	...	0	0	
1435	1442	TOYOTA Corolla 1.6 LB LINEA TERRA 4/5-Doors	6950	76	5	1998	1	Petrol	110	0	...	0	0	

1436 rows × 38 columns

3. Data Preparation

In [3]:
```
toyota_corolla_data_req = toyota_corolla_data[["Price","Age_08_04","KM","HP","cc","Doors","Gears","Quarterly_Tax","Weigh
toyota_corolla_data_req
```

Out[3]:

	Price	Age_08_04	KM	HP	cc	Doors	Gears	Quarterly_Tax	Weight
0	13500	23	46986	90	2000	3	5	210	1165
1	13750	23	72937	90	2000	3	5	210	1165
2	13950	24	41711	90	2000	3	5	210	1165
3	14950	26	48000	90	2000	3	5	210	1165
4	13750	30	38500	90	2000	3	5	210	1170
...	...	...	...	...	...	...	...	...	...
1431	7500	69	20544	86	1300	3	5	69	1025
1432	10845	72	19000	86	1300	3	5	69	1015
1433	8500	71	17016	86	1300	3	5	69	1015
1434	7250	70	16916	86	1300	3	5	69	1015
1435	6950	76	1	110	1600	5	5	19	1114

1436 rows × 9 columns

4. Data Understanding

4.1 Perform Initial Analysis

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

Out[4]:
```
(1436, 9)
```

In [5]:
```
toyota_corolla_data_req.dtypes
```

Out[5]:
```
Price            int64
Age_08_04        int64
KM               int64
HP               int64
cc               int64
Doors            int64
Gears            int64
Quarterly_Tax    int64
Weight           int64
dtype: object
```

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

Out[6]:

	Price	Age_08_04	KM	HP	cc	Doors	Gears	Quarterly_Tax	Weight
count	1436.000000	1436.000000	1436.000000	1436.000000	1436.00000	1436.000000	1436.000000	1436.000000	1436.00000
mean	10730.824513	55.947075	68533.259749	101.502089	1576.85585	4.033426	5.026462	87.122563	1072.45961
std	3626.964585	18.599988	37506.448872	14.981080	424.38677	0.952677	0.188510	41.128611	52.64112
min	4350.000000	1.000000	1.000000	69.000000	1300.00000	2.000000	3.000000	19.000000	1000.00000
25%	8450.000000	44.000000	43000.000000	90.000000	1400.00000	3.000000	5.000000	69.000000	1040.00000
50%	9900.000000	61.000000	63389.500000	110.000000	1600.00000	4.000000	5.000000	85.000000	1070.00000
75%	11950.000000	70.000000	87020.750000	110.000000	1600.00000	5.000000	5.000000	85.000000	1085.00000
max	32500.000000	80.000000	243000.000000	192.000000	16000.00000	5.000000	6.000000	283.000000	1615.00000

In [7]:
```
toyota_corolla_data_req.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1436 entries, 0 to 1435
Data columns (total 9 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Price          1436 non-null   int64
 1   Age_08_04      1436 non-null   int64
 2   KM             1436 non-null   int64
 3   HP             1436 non-null   int64
 4   cc             1436 non-null   int64
 5   Doors          1436 non-null   int64
 6   Gears          1436 non-null   int64
 7   Quarterly_Tax  1436 non-null   int64
 8   Weight         1436 non-null   int64
dtypes: int64(9)
memory usage: 101.1 KB
```

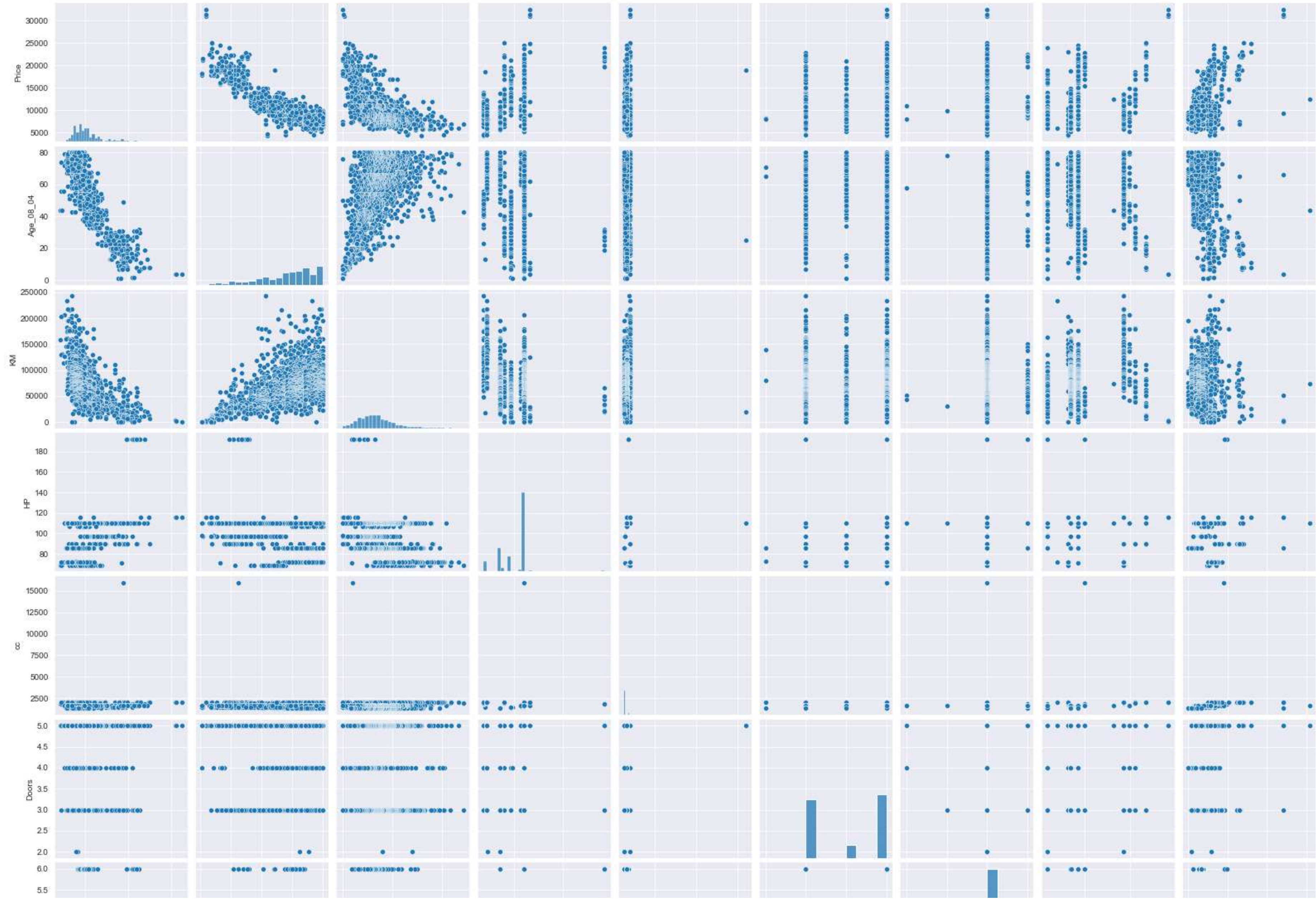
In [8]:
```
toyota_corolla_data_req.isna().sum()
```

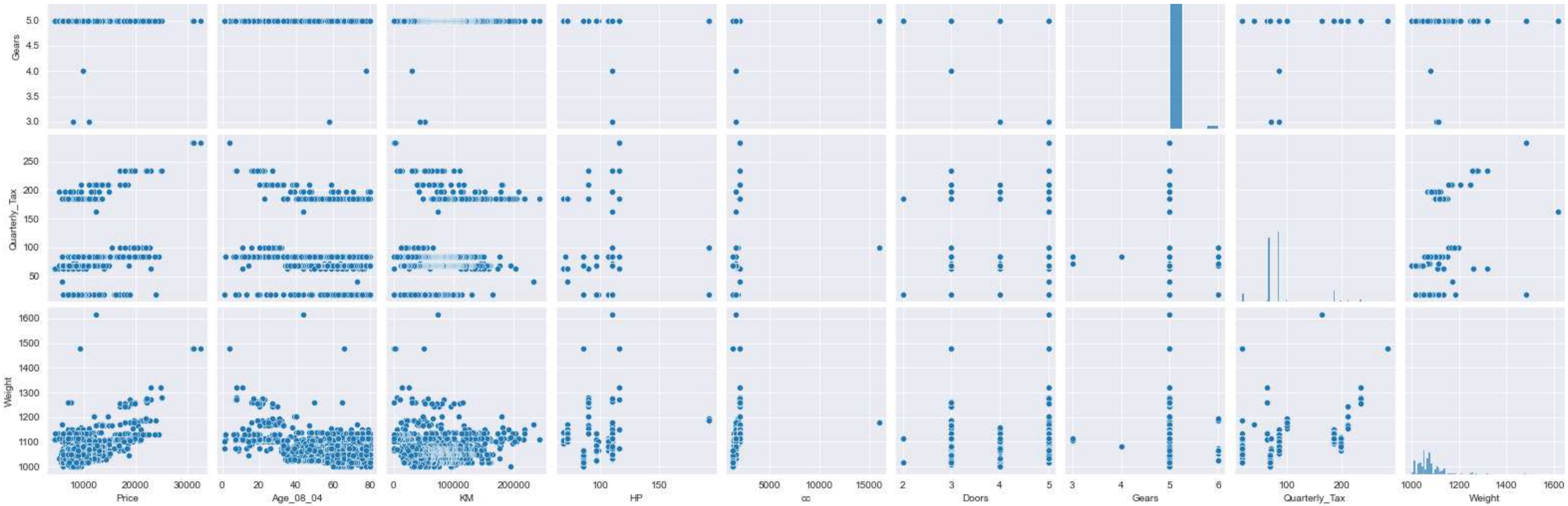
Out[8]:
```
Price            0
Age_08_04        0
KM               0
HP               0
cc               0
Doors            0
Gears            0
Quarterly_Tax    0
Weight           0
dtype: int64
```

4.2 Assumptions Check

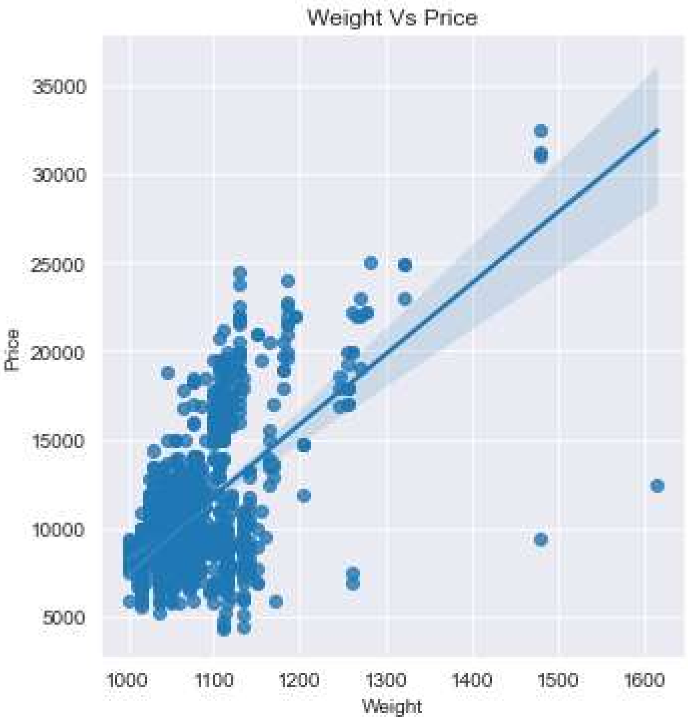
1. Linearity Check

In [11]:
```
sns.set_style(style='darkgrid')
sns.pairplot(toyota_corolla_data_req)
plt.show()
```

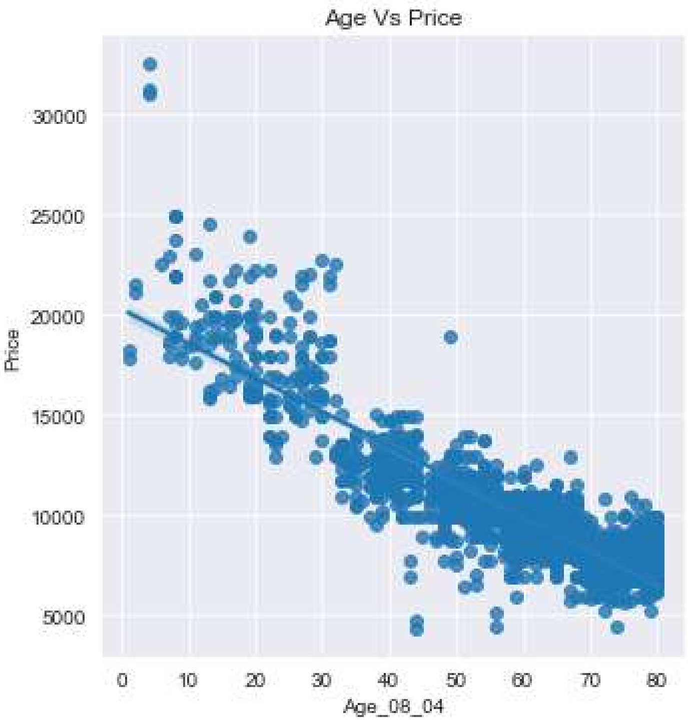



Gears
Quarterly_Tax
Weight
Price
Age_08_04
KM
HP
cc
Doors
Gears
Quarterly_Tax
Weight

In [12]:
```
sns.lmplot(x="Weight", y="Price", data=toyota_corolla_data_req)
plt.title("Weight Vs Price")
plt.show()
```



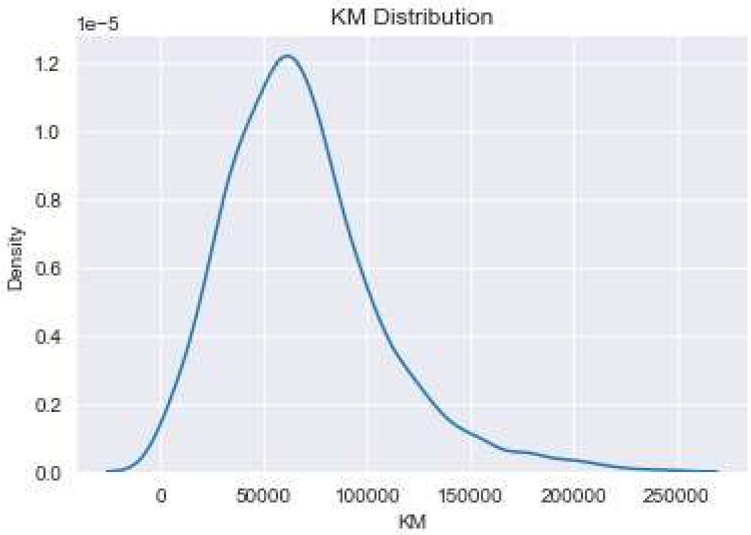
In [13]:
```
sns.lmplot(x="Age_08_04", y="Price", data=toyota_corolla_data_req)
plt.title("Age Vs Price")
plt.show()
```



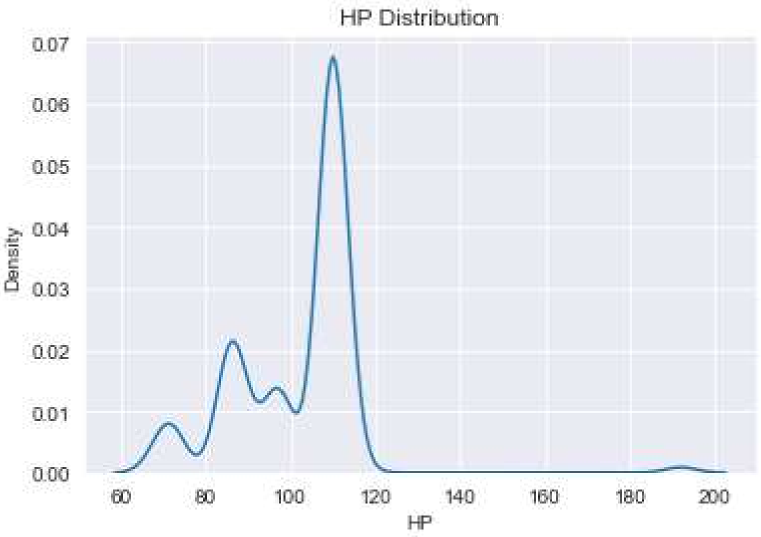
Linearity Test is Failed

2. Normality Test

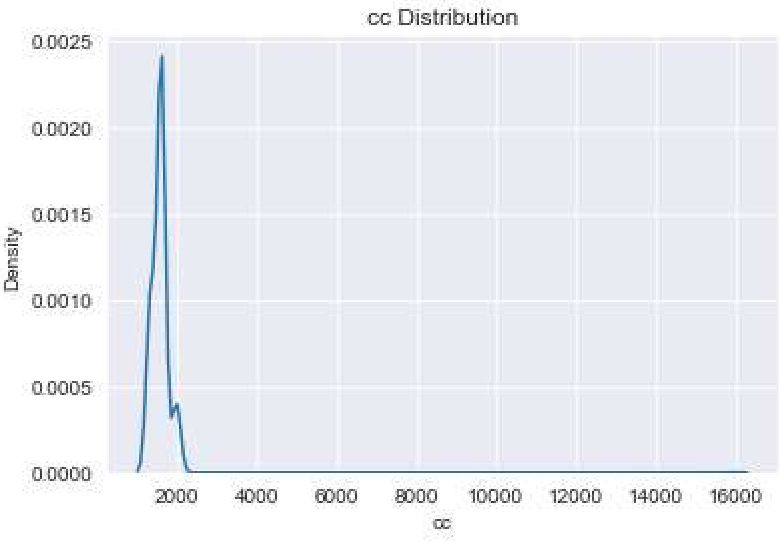
In [14]:
```
sns.kdeplot(data = toyota_corolla_data_req, x='KM')
plt.title('KM Distribution')
plt.show()
```



In [15]:
```
sns.kdeplot(x=toyota_corolla_data_req['HP'])
plt.title('HP Distribution')
plt.show()
```



In [16]:
```
sns.kdeplot(x=toyota_corolla_data_req['cc'])
plt.title('cc Distribution')
plt.show()
```



Normality Test is Failed

3. No AutoRegression : No any feature is in DataTime data format so this test is passed

4. Multicollinearity

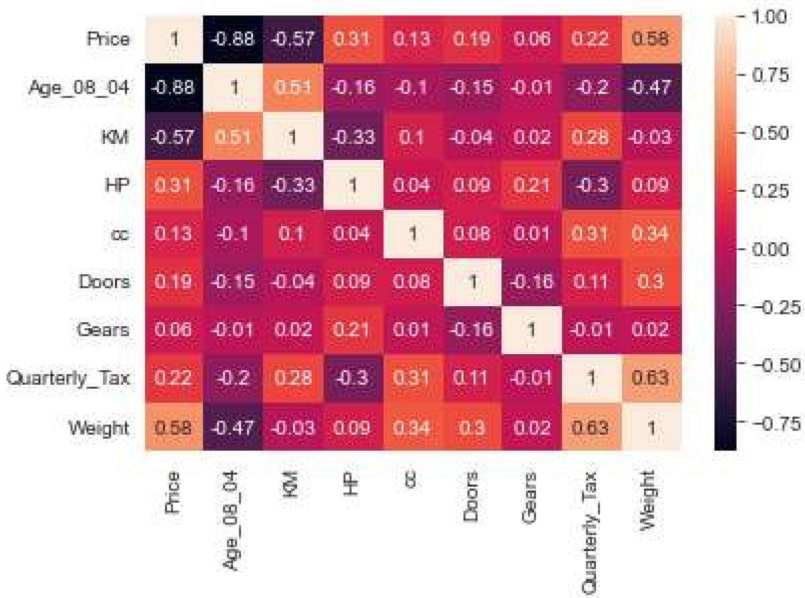
Correlation Matrix

In [17]:
```
corr_matrix = toyota_corolla_data_req.corr().round(2)
corr_matrix
```

Out[17]:

	Price	Age_08_04	KM	HP	cc	Doors	Gears	Quarterly_Tax	Weight
Price	1.00	-0.88	-0.57	0.31	0.13	0.19	0.06	0.22	0.58
Age_08_04	-0.88	1.00	0.51	-0.16	-0.10	-0.15	-0.01	-0.20	-0.47
KM	-0.57	0.51	1.00	-0.33	0.10	-0.04	0.02	0.28	-0.03
HP	0.31	-0.16	-0.33	1.00	0.04	0.09	0.21	-0.30	0.09
cc	0.13	-0.10	0.10	0.04	1.00	0.08	0.01	0.31	0.34
Doors	0.19	-0.15	-0.04	0.09	0.08	1.00	-0.16	0.11	0.30
Gears	0.06	-0.01	0.02	0.21	0.01	-0.16	1.00	-0.01	0.02
Quarterly_Tax	0.22	-0.20	0.28	-0.30	0.31	0.11	-0.01	1.00	0.63
Weight	0.58	-0.47	-0.03	0.09	0.34	0.30	0.02	0.63	1.00

In [18]:
```
sns.heatmap(data = corr_matrix,annot = True)
plt.show()
```



MultiCollinearity Test is Passed

There is very less multicollinearity in the inputs in our data.

5. Homoscedasticity Check II 6. Zero Residual Check

This will be performed post Model Training beacuse we need the errors

5. Model Building

In [19]:
```
x = toyota_corolla_data_req.drop("Price",axis=1)
y = toyota_corolla_data_req[["Price"]]
```

6. Model Training

In [20]:
```
linear_model = LinearRegression()
```

In [21]:
```
linear_model.fit(x,y)
```

Out[21]:
```
LinearRegression()
```

In [22]:
```
linear_model.coef_
```

Out[22]:
```
array([[-1.21658402e+02, -2.08171292e-02,  3.16809058e+01,
        -1.21100301e-01, -1.61664095e+00,  5.94319936e+02,
         3.94908076e+00,  1.69586318e+01]])
```

In [23]:
```
linear_model.intercept_
```

Out[23]:
```
array([-5573.10635791])
```

7. Model Testing

In [24]:
```
y.head()
```

Out[24]:

	Price
0	13500
1	13750
2	13950
3	14950
4	13750

In [25]:
```
y_pred = linear_model.predict(x)
y_pred
```

Out[25]:
```
array([[16812.58050518],
       [16272.35518581],
       [16800.73245987],
       ...,
       [ 8454.29800682],
       [ 8578.03812148],
       [10402.43833285]])
```

8. Model Evaluation

In [26]:
```
error = y - y_pred
error
```

Out[26]:

	Price
0	-3312.580505
1	-2522.355186
2	-2850.732460
3	-1476.496731
4	-2472.419010
...	...
1431	-1293.758297
1432	2553.661579
1433	45.701993
1434	-1328.038121
1435	-3452.438333

1436 rows × 1 columns

.....back to Assumption Check

5. Homoscedasticity Check

In [27]:
```
x
```

Out[27]:

	Age_08_04	KM	HP	cc	Doors	Gears	Quarterly_Tax	Weight
0	23	46986	90	2000	3	5	210	1165
1	23	72937	90	2000	3	5	210	1165
2	24	41711	90	2000	3	5	210	1165
3	26	48000	90	2000	3	5	210	1165
4	30	38500	90	2000	3	5	210	1170
...	...	...	...	...	...	...	...	...
1431	69	20544	86	1300	3	5	69	1025
1432	72	19000	86	1300	3	5	69	1015
1433	71	17016	86	1300	3	5	69	1015
1434	70	16916	86	1300	3	5	69	1015
1435	76	1	110	1600	5	5	19	1114

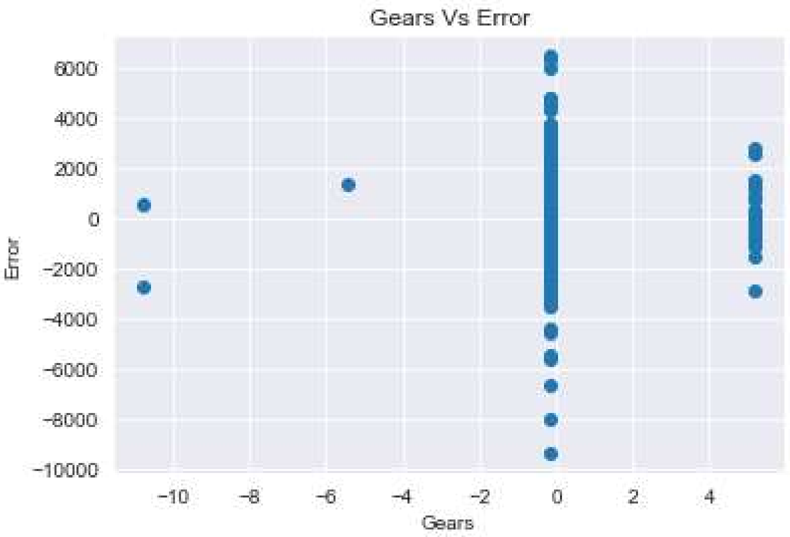
1436 rows × 8 columns

In [28]:
```
std_scaler = StandardScaler()
scaled_x = std_scaler.fit_transform(x)
scaled_x = pd.DataFrame(scaled_x,columns=['Age_08_04','KM','HP','cc','Doors','Gears','Quarterly_Tax','Weight'])
scaled_x.head()
```

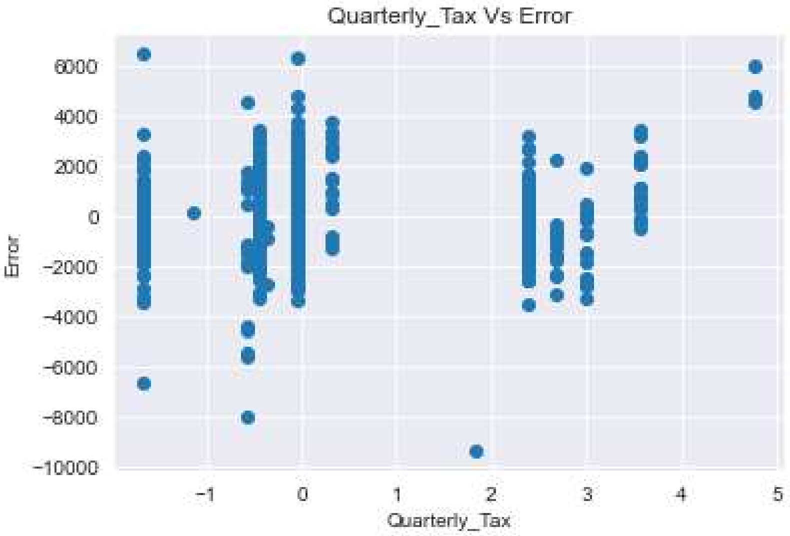
Out[28]:

	Age_08_04	KM	HP	cc	Doors	Gears	Quarterly_Tax	Weight
0	-1.771966	-0.574695	-0.768042	0.997419	-1.085139	-0.140425	2.98868	1.758561
1	-1.771966	0.117454	-0.768042	0.997419	-1.085139	-0.140425	2.98868	1.758561
2	-1.718184	-0.715386	-0.768042	0.997419	-1.085139	-0.140425	2.98868	1.758561
3	-1.610620	-0.547650	-0.768042	0.997419	-1.085139	-0.140425	2.98868	1.758561
4	-1.395491	-0.801028	-0.768042	0.997419	-1.085139	-0.140425	2.98868	1.853577

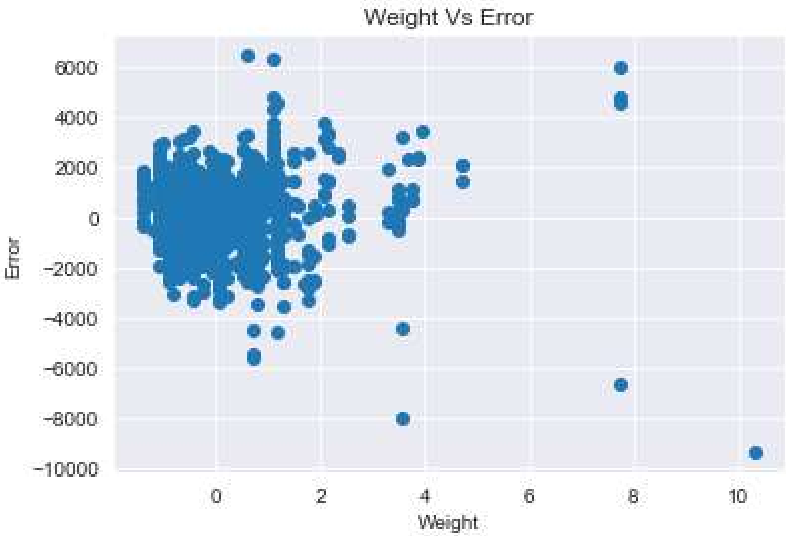
In [29]:
```
plt.scatter(x=scaled_x['Gears'],y=error)
plt.title('Gears Vs Error')
plt.xlabel('Gears')
plt.ylabel('Error')
plt.show()
```



In [30]:
```
plt.scatter(x=scaled_x['Quarterly_Tax'],y=error)
plt.title('Quarterly_Tax Vs Error')
plt.xlabel('Quarterly_Tax')
plt.ylabel('Error')
plt.show()
```



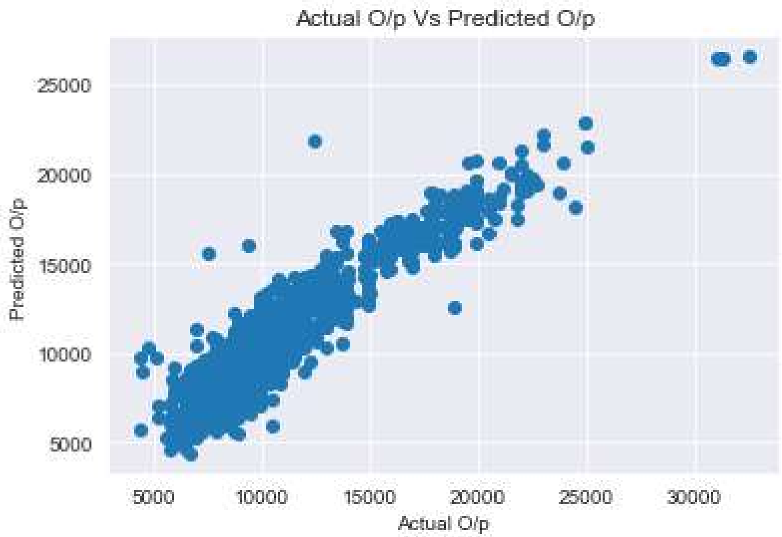
In [31]:
```
plt.scatter(x=scaled_x['Weight'],y=error)
plt.title('Weight Vs Error')
plt.xlabel('Weight')
plt.ylabel('Error')
plt.show()
```



Homoscedasticity Test is Failed

6. Zero Residual Mean Across the Fitted Line

In [32]:
```
plt.scatter(x=y,y=y_pred)
plt.title('Actual O/p Vs Predicted O/p')
plt.xlabel('Actual O/p')
plt.ylabel('Predicted O/p')
plt.show()
```



Zero Residual Mean Test is also Failed

Build Linear Regression using StatsModels

In [33]:
```
toyota_corolla_data_req.head()
```

Out[33]:

	Price	Age_08_04	KM	HP	cc	Doors	Gears	Quarterly_Tax	Weight
0	13500	23	46986	90	2000	3	5	210	1165
1	13750	23	72937	90	2000	3	5	210	1165
2	13950	24	41711	90	2000	3	5	210	1165
3	14950	26	48000	90	2000	3	5	210	1165
4	13750	30	38500	90	2000	3	5	210	1170

In [34]:
```
linear_model_stats = smf.ols('Price~Q("Age_08_04")+KM+HP+cc+Doors+Gears+Q("Quarterly_Tax")+Weight',data = toyota_corolla_
```

8.1 Evaluation Metrics of Linear Regression

In [35]:
```
print('R2Score     :',linear_model_stats.rsquared.round(4))
print('Adj.R2Score :',linear_model_stats.rsquared_adj.round(4))
print('AIC Value   :',linear_model_stats.aic.round(4))
print('BIC Value   :',linear_model_stats.bic.round(4))
print('P-Value     :\n',linear_model_stats.pvalues)
```

```
R2Score     : 0.8638
Adj.R2Score : 0.863
AIC Value   : 24769.0766
BIC Value   : 24816.5032
P-Value     :
 Intercept              8.241949e-05
Q("Age_08_04")        3.354724e-288
KM                     7.538439e-57
HP                     3.757218e-28
cc                     1.790902e-01
Doors                  9.677716e-01
Gears                  2.606549e-03
Q("Quarterly_Tax")     2.619148e-03
Weight                 2.048576e-52
dtype: float64
```

In [37]:
```
linear_model_stats_1 = smf.ols('Price~Q("Age_08_04")+KM+HP+cc',data = toyota_corolla_data_req).fit()
print('R2Score     :',linear_model_stats_1.rsquared.round(4))
print('Adj.R2Score :',linear_model_stats_1.rsquared_adj.round(4))
print('AIC Value   :',linear_model_stats_1.aic.round(4))
print('BIC Value   :',linear_model_stats_1.bic.round(4))
print('P-Value     :\n',linear_model_stats_1.pvalues)
```

```
R2Score     : 0.8135
Adj.R2Score : 0.813
AIC Value   : 25211.8665
BIC Value   : 25238.2146
P-Value     :
 Intercept         2.864486e-250
Q("Age_08_04")    0.000000e+00
KM                3.392364e-20
HP                5.660367e-32
cc                7.621272e-07
dtype: float64
```

In [38]:
```
linear_model_stats_2 = smf.ols('Price~Doors+Gears+Q("Quarterly_Tax")+Weight',data = toyota_corolla_data_req).fit()
print('R2Score     :',linear_model_stats_2.rsquared.round(4))
print('Adj.R2Score :',linear_model_stats_2.rsquared_adj.round(4))
print('AIC Value   :',linear_model_stats_2.aic.round(4))
print('BIC Value   :',linear_model_stats_2.bic.round(4))
print('P-Value     :\n',linear_model_stats_2.pvalues)
```

```
R2Score     : 0.3744
Adj.R2Score : 0.3727
AIC Value   : 26949.9281
BIC Value   : 26976.2762
P-Value     :
 Intercept               1.388159e-58
Doors                   9.294941e-01
Gears                   2.900447e-02
Q("Quarterly_Tax")      4.798122e-18
Weight                 4.552951e-121
dtype: float64
```

In [39]:
```
linear_model_stats_3 = smf.ols('Price~KM+HP+cc+Doors+Gears+Q("Quarterly_Tax")+Weight',data = toyota_corolla_data_req).fi
print('R2Score     :',linear_model_stats_3.rsquared.round(4))
print('Adj.R2Score :',linear_model_stats_3.rsquared_adj.round(4))
print('AIC Value   :',linear_model_stats_3.aic.round(4))
print('BIC Value   :',linear_model_stats_3.bic.round(4))
print('P-Value     :\n',linear_model_stats_3.pvalues)
```

```
R2Score     : 0.6572
Adj.R2Score : 0.6555
AIC Value   : 26092.0394
BIC Value   : 26134.1963
P-Value     :
 Intercept               3.195287e-43
KM                     8.359303e-167
HP                      3.738120e-09
cc                      2.322594e-01
Doors                   9.472273e-01
Gears                   1.643195e-02
Q("Quarterly_Tax")      5.278916e-05
Weight                  2.005482e-91
dtype: float64
```

In [40]:
```
linear_model_stats_4 = smf.ols('Price~KM+HP+cc+Doors+Gears+Q("Quarterly_Tax")',data = toyota_corolla_data_req).fit()
print('R2Score     :',linear_model_stats_4.rsquared.round(4))
print('Adj.R2Score :',linear_model_stats_4.rsquared_adj.round(4))
print('AIC Value   :',linear_model_stats_4.aic.round(4))
print('BIC Value   :',linear_model_stats_4.bic.round(4))
print('P-Value     :\n',linear_model_stats_4.pvalues)
```

```
R2Score     : 0.5428
Adj.R2Score : 0.5409
AIC Value   : 26503.6876
BIC Value   : 26540.5749
P-Value     :
 Intercept              9.055033e-01
KM                    2.728211e-168
HP                     1.943460e-25
cc                     3.340648e-02
Doors                  9.763035e-08
Gears                  1.792430e-02
Q("Quarterly_Tax")     2.679481e-87
dtype: float64
```

In [41]:
```
mean_squared_error(y,y_pred)
```

Out[41]:
```
1790935.608390293
```

In [42]:
```
mean_absolute_error(y,y_pred)
```

Out[42]:
```
1001.5466325182533
```

9. MODEL OPTIMIZATION

In [43]:
```
toyota_corolla_data_req_2 = toyota_corolla_data_req.copy()
toyota_corolla_data_req_2.head()
```

Out[43]:

	Price	Age_08_04	KM	HP	cc	Doors	Gears	Quarterly_Tax	Weight
0	13500	23	46986	90	2000	3	5	210	1165
1	13750	23	72937	90	2000	3	5	210	1165
2	13950	24	41711	90	2000	3	5	210	1165
3	14950	26	48000	90	2000	3	5	210	1165
4	13750	30	38500	90	2000	3	5	210	1170

In [44]:
```
toyota_corolla_data_req_2['log_Age_08_04']     = np.log(toyota_corolla_data_req_2['Age_08_04'])
toyota_corolla_data_req_2['log_KM']            = np.log(toyota_corolla_data_req_2['KM'])
toyota_corolla_data_req_2['log_HP']            = np.log(toyota_corolla_data_req_2['HP'])
toyota_corolla_data_req_2['log_cc']            = np.log(toyota_corolla_data_req_2['cc'])
toyota_corolla_data_req_2['log_Doors']         = np.log(toyota_corolla_data_req_2['Doors'])
toyota_corolla_data_req_2['log_Gears']         = np.log(toyota_corolla_data_req_2['Gears'])
toyota_corolla_data_req_2['log_Quarterly_Tax']= np.log(toyota_corolla_data_req_2['Quarterly_Tax'])
toyota_corolla_data_req_2['log_Weight']        = np.log(toyota_corolla_data_req_2['Weight'])
toyota_corolla_data_req_2.head()
```

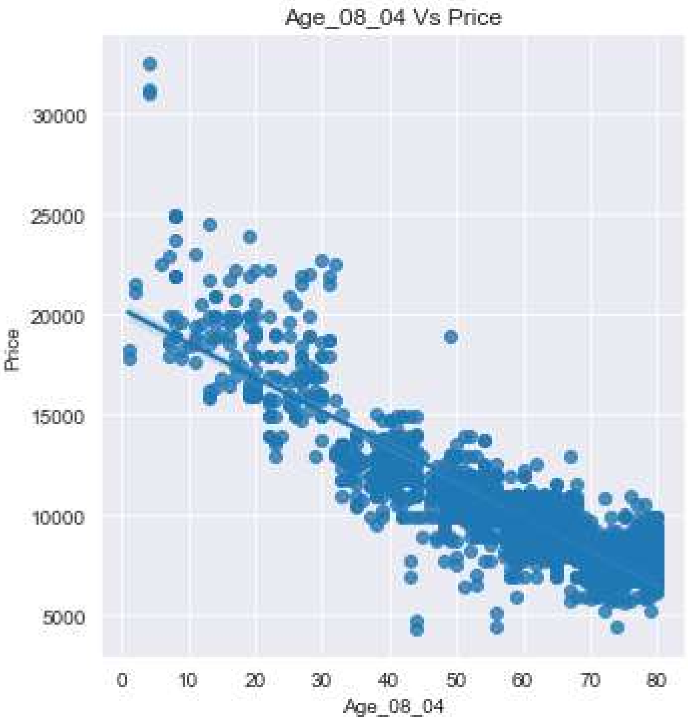
Out[44]:

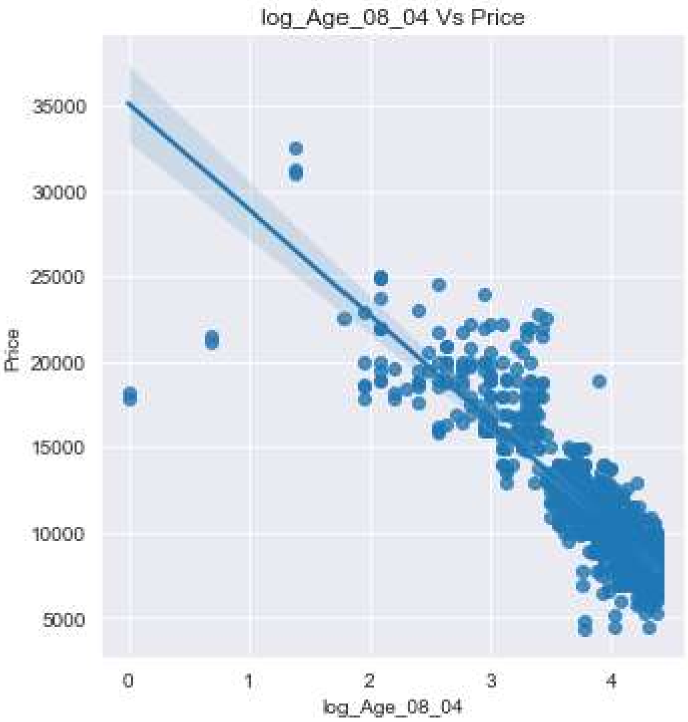
	Price	Age_08_04	KM	HP	cc	Doors	Gears	Quarterly_Tax	Weight	log_Age_08_04	log_KM	log_HP	log_cc	log_Doors	log_Gears
0	13500	23	46986	90	2000	3	5	210	1165	3.135494	10.757605	4.49981	7.600902	1.098612	1.609438
1	13750	23	72937	90	2000	3	5	210	1165	3.135494	11.197351	4.49981	7.600902	1.098612	1.609438
2	13950	24	41711	90	2000	3	5	210	1165	3.178054	10.638520	4.49981	7.600902	1.098612	1.609438
3	14950	26	48000	90	2000	3	5	210	1165	3.258097	10.778956	4.49981	7.600902	1.098612	1.609438
4	13750	30	38500	90	2000	3	5	210	1170	3.401197	10.558414	4.49981	7.600902	1.098612	1.609438

3.2 Assumptions Check

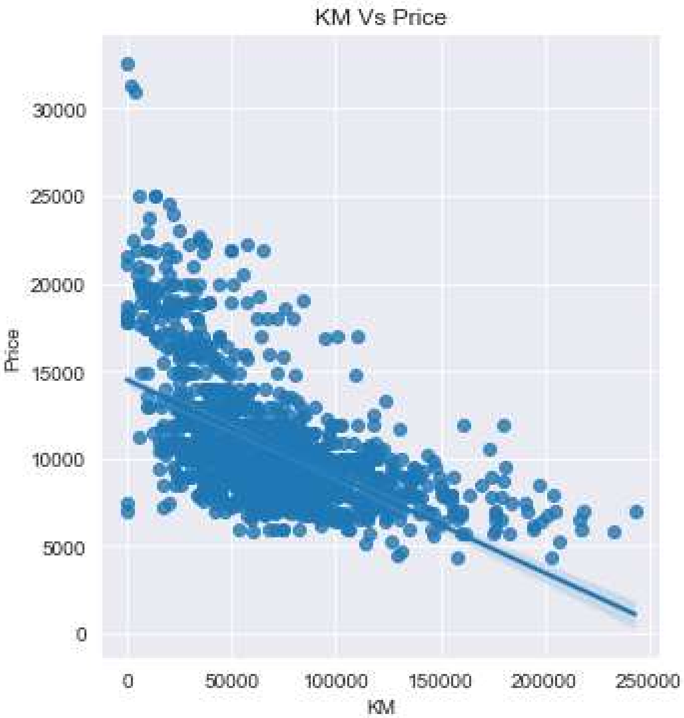
1. Linearity Check

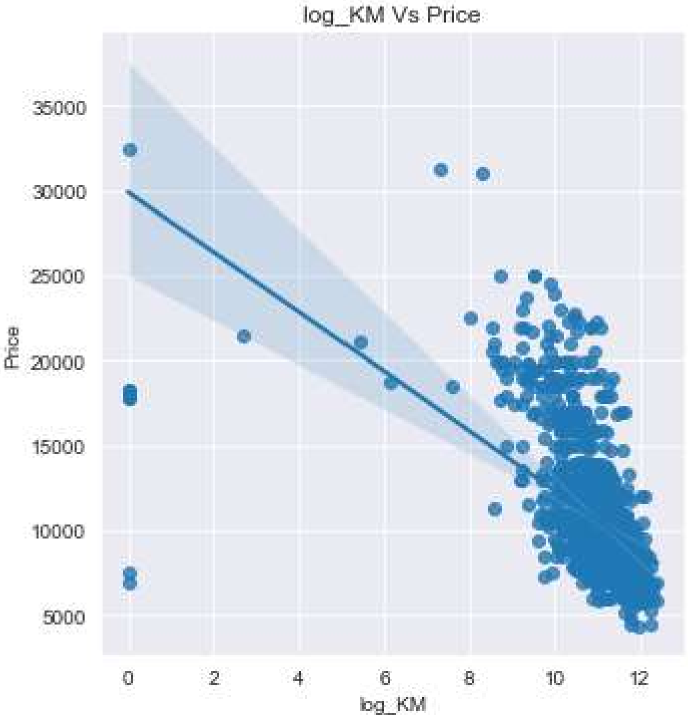
In [45]:
```
sns.lmplot(x="Age_08_04", y="Price", data=toyota_corolla_data_req_2)
plt.title("Age_08_04 Vs Price")

sns.lmplot(x="log_Age_08_04", y="Price", data=toyota_corolla_data_req_2)
plt.title("log_Age_08_04 Vs Price")
plt.show()
```




log_Age_08_04 Vs Price
Price
35000
30000
25000
20000
15000
10000
5000
0
1
2
3
4
log_Age_08_04

In [46]:
```
sns.lmplot(x="KM", y="Price", data=toyota_corolla_data_req_2)
plt.title("KM Vs Price")

sns.lmplot(x="log_KM", y="Price", data=toyota_corolla_data_req_2)
plt.title("log_KM Vs Price")
plt.show()
```

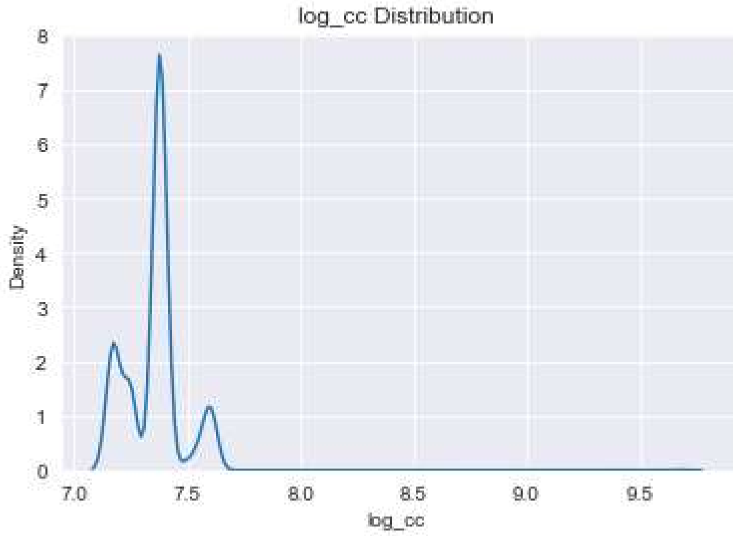



log_KM Vs Price
Price
log_KM
35000
30000
25000
20000
15000
10000
5000
0
2
4
6
8
10
12

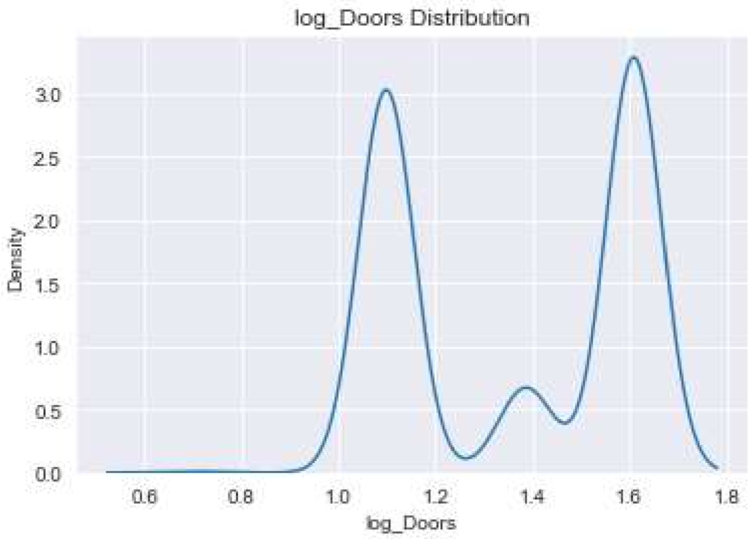
Linearity Test is Failed

2. Normality Test

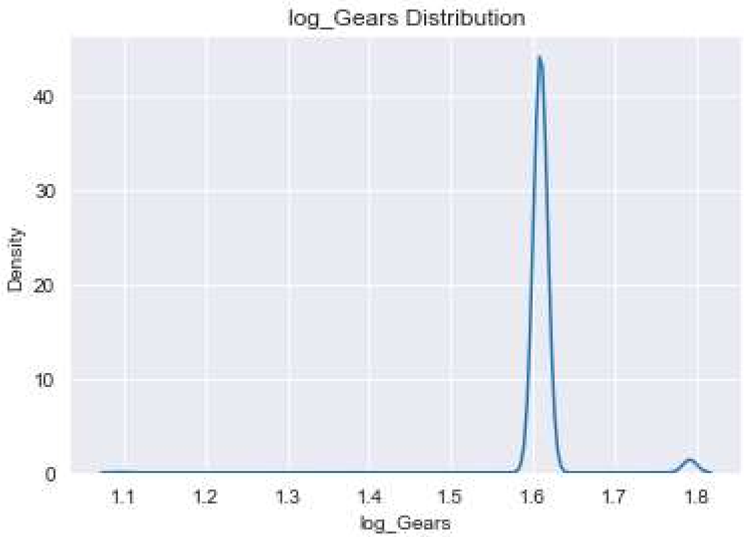
In [47]:
```
sns.kdeplot(data = toyota_corolla_data_req_2, x='log_cc')
plt.title('log_cc Distribution')
plt.show()
```



In [48]:
```
sns.kdeplot(data = toyota_corolla_data_req_2, x='log_Doors')
plt.title('log_Doors Distribution')
plt.show()
```



In [49]:
```
sns.kdeplot(data = toyota_corolla_data_req_2, x='log_Gears')
plt.title('log_Gears Distribution')
plt.show()
```



Normality Test is Failed

Model Building || Training || Evaluation using Statsmodels

In [50]:
```
linear_model_stats_5 = smf.ols('Price~Q("log_Age_08_04")+log_KM+log_HP+log_cc+log_Doors+log_Gears+Q("log_Quarterly_Tax")+
print('R2Score     :',linear_model_stats_5.rsquared.round(4))
print('Adj.R2Score :',linear_model_stats_5.rsquared_adj.round(4))
print('AIC Value   :',linear_model_stats_5.aic.round(4))
print('BIC Value   :',linear_model_stats_5.bic.round(4))
print('P-Value     :\n',linear_model_stats_5.pvalues)
```

```
R2Score     : 0.8353
Adj.R2Score : 0.8344
AIC Value   : 25041.7317
BIC Value   : 25089.1583
P-Value     :
 Intercept                  3.285177e-34
Q("log_Age_08_04")        4.827085e-288
log_KM                     3.236391e-03
log_HP                     3.608349e-60
log_cc                     3.790066e-13
log_Doors                  1.887446e-01
log_Gears                  6.939977e-03
Q("log_Quarterly_Tax")     2.385309e-06
log_Weight                 6.221465e-39
dtype: float64
```

After transformation model performance is not so good.

10. Model Finalization & Model Testing

In [51]:
```
y.head()
```

Out[51]:

	Price
0	13500
1	13750
2	13950
3	14950
4	13750

In [53]:
```
X_test = pd.DataFrame(data=toyota_corolla_data_req.drop(["Price"],axis=1))
X_test.head()
```

Out[53]:

	Age_08_04	KM	HP	cc	Doors	Gears	Quarterly_Tax	Weight
0	23	46986	90	2000	3	5	210	1165
1	23	72937	90	2000	3	5	210	1165
2	24	41711	90	2000	3	5	210	1165
3	26	48000	90	2000	3	5	210	1165
4	30	38500	90	2000	3	5	210	1170

In [54]:
```
y_pred_stat_3 = linear_model_stats.predict(X_test)
y_pred_stat_3.head()
```

Out[54]:
```
0    16812.580505
1    16272.355186
2    16800.732460
3    16426.496731
4    16222.419010
dtype: float64
```

****THE END****