In [157]:
```
import pandas as pd
```

In [158]:
```
data=pd.read_csv("/home/placement/Desktop/reddy/fiat500.csv")
```

In [159]:
```
data.describe()
```

Out[159]:

	ID	engine_power	age_in_days	km	previous_owners	lat	lon	price
count	1538.000000	1538.000000	1538.000000	1538.000000	1538.000000	1538.000000	1538.000000	1538.000000
mean	769.500000	51.904421	1650.980494	53396.011704	1.123537	43.541361	11.563428	8576.003901
std	444.126671	3.988023	1289.522278	40046.830723	0.416423	2.133518	2.328190	1939.958641
min	1.000000	51.000000	366.000000	1232.000000	1.000000	36.855839	7.245400	2500.000000
25%	385.250000	51.000000	670.000000	20006.250000	1.000000	41.802990	9.505090	7122.500000
50%	769.500000	51.000000	1035.000000	39031.000000	1.000000	44.394096	11.869260	9000.000000
75%	1153.750000	51.000000	2616.000000	79667.750000	1.000000	45.467960	12.769040	10000.000000
max	1538.000000	77.000000	4658.000000	235000.000000	4.000000	46.795612	18.365520	11100.000000

In [160]:
```
data.tail(10)#last 10 rows
```

Out[160]:
```
        ID   model  engine_power  age_in_days      km  previous_owners        lat       lon  price
1528  1529  lounge            51         2861  126000                1  43.841980  10.51531   5500
1529  1530  lounge            51          731   22551                1  38.122070  13.36112   9900
1530  1531  lounge            51          670   29000                1  45.764648   8.99450  10800
1531  1532   sport            73         4505  127000                1  45.528511   9.59323   4750
1532  1533     pop            51         1917   52008                1  45.548000  11.54947   9900
1533  1534   sport            51         3712  115280                1  45.069679   7.70492   5200
1534  1535  lounge            74         3835  112000                1  45.845692   8.66687   4600
1535  1536     pop            51         2223   60457                1  45.481541   9.41348   7500
1536  1537  lounge            51         2557   80750                1  45.000702   7.68227   5990
1537  1538     pop            51         1766   54276                1  40.323410  17.56827   7900
```

In [161]:
```
data1=data.drop(['ID','lat','lon'],axis=1)
```

In [162]:
```
data1
```

Out[162]:
```
       model  engine_power  age_in_days      km  previous_owners  price
   0  lounge            51          882   25000                1   8900
   1     pop            51         1186   32500                1   8800
   2   sport            74         4658  142228                1   4200
   3  lounge            51         2739  160000                1   6000
   4     pop            73         3074  106880                1   5700
 ...     ...           ...          ...     ...              ...    ...
1533   sport            51         3712  115280                1   5200
1534  lounge            74         3835  112000                1   4600
1535     pop            51         2223   60457                1   7500
1536  lounge            51         2557   80750                1   5990
1537     pop            51         1766   54276                1   7900

1538 rows × 6 columns
```

In [163]:
```
data1['model']=data1['model'].map({'lounge':1,'pop':2,'sport':3})
```

```
In [164]: data1
```

```
Out[164]:
          model  engine_power  age_in_days      km  previous_owners  price
    0         1            51          882   25000                1   8900
    1         2            51         1186   32500                1   8800
    2         3            74         4658  142228                1   4200
    3         1            51         2739  160000                1   6000
    4         2            73         3074  106880                1   5700
  ...       ...           ...          ...     ...              ...    ...
 1533         3            51         3712  115280                1   5200
 1534         1            74         3835  112000                1   4600
 1535         2            51         2223   60457                1   7500
 1536         1            51         2557   80750                1   5990
 1537         2            51         1766   54276                1   7900

1538 rows × 6 columns
```

```
In [165]: data2=data1.loc[(data.model=='lounge')]
```

In [166]:

```
data2
```

Out[166]:

	model	engine_power	age_in_days	km	previous_owners	price
0	1	51	882	25000	1	8900
3	1	51	2739	160000	1	6000
6	1	51	731	11600	1	10750
7	1	51	1521	49076	1	9190
11	1	51	366	17500	1	10990
...	...	...	...	...	...	...
1528	1	51	2861	126000	1	5500
1529	1	51	731	22551	1	9900
1530	1	51	670	29000	1	10800
1534	1	74	3835	112000	1	4600
1536	1	51	2557	80750	1	5990

1094 rows × 6 columns

In [167]:

```
y=data2['price']
x=data2.drop('price',axis=1)
```

In [168]:
```
y
```

Out[168]:
```
0        8900
3        6000
6       10750
7        9190
11      10990
        ...  
1528     5500
1529     9900
1530    10800
1534     4600
1536     5990
Name: price, Length: 1094, dtype: int64
```

In [169]:
```
x
```

Out[169]:

	model	engine_power	age_in_days	km	previous_owners
0	1	51	882	25000	1
3	1	51	2739	160000	1
6	1	51	731	11600	1
7	1	51	1521	49076	1
11	1	51	366	17500	1
...	...	...	...	...	...
1528	1	51	2861	126000	1
1529	1	51	731	22551	1
1530	1	51	670	29000	1
1534	1	74	3835	112000	1
1536	1	51	2557	80750	1

1094 rows × 5 columns

In [170]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.33,random_state=42)
```

In [171]:
```
x_test.head(5)
```

Out[171]:

	model	engine_power	age_in_days	km	previous_owners
676	1	51	762	18609	1
215	1	51	701	25000	1
146	1	51	4018	152900	1
1319	1	51	731	20025	1
1041	1	51	640	38231	1

In [172]:
```
x_train.shape
```

Out[172]:
```
(732, 5)
```

In [173]:
```
y_train.shape
```

Out[173]:
```
(732,)
```

In [174]:
```
x_train.head()
```

Out[174]:

	model	engine_power	age_in_days	km	previous_owners
441	1	51	762	36448	1
701	1	51	701	27100	1
695	1	51	3197	51083	1
1415	1	51	670	33000	1
404	1	51	456	14000	1

In [175]:
```
y_train.head()
```

Out[175]:
```
441      8980
701     10300
695      5880
1415    10490
404      9499
Name: price, dtype: int64
```

In [176]:
```
x_test.head()
```

Out[176]:

	model	engine_power	age_in_days	km	previous_owners
676	1	51	762	18609	1
215	1	51	701	25000	1
146	1	51	4018	152900	1
1319	1	51	731	20025	1
1041	1	51	640	38231	1

In [177]:
```
y_test.head()
```

Out[177]:
```
676     10250
215      9790
146      5500
1319     9900
1041     8900
Name: price, dtype: int64
```

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [186]:

```
from sklearn.model_selection import GridSearchCV
from sklearn.linear_model import Ridge
#ridge regression
alpha = [1e-15, 1e-10, 1e-8, 1e-4, 1e-3,1e-2, 1, 5, 10, 20,30]

ridge = Ridge()

parameters = {'alpha': alpha}

ridge_regressor = GridSearchCV(ridge, parameters)

ridge_regressor.fit(x_train, y_train)
```

Out[186]:

```
GridSearchCV(estimator=Ridge(),
             param_grid={'alpha': [1e-15, 1e-10, 1e-08, 0.0001, 0.001, 0.01, 1,
                                   5, 10, 20, 30]})
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

In [187]:

```
ridge_regressor.best_params_
```

Out[187]:

```
{'alpha': 30}
```

In [188]:

```
ridge=Ridge(alpha=30)
ridge.fit(x_train,y_train)
y_pred_ridge=ridge.predict(x_test)
```

In [189]:

```
from sklearn.metrics import mean_squared_error
Ridge_Error=mean_squared_error(y_pred_ridge,y_test)
Ridge_Error
```

Out[189]:

```
519771.8129989742
```

In [190]:

```
from sklearn.metrics import r2_score
r2_score(y_test,y_pred_ridge)
```

Out[190]:

```
0.8373030813683995
```

In [192]:

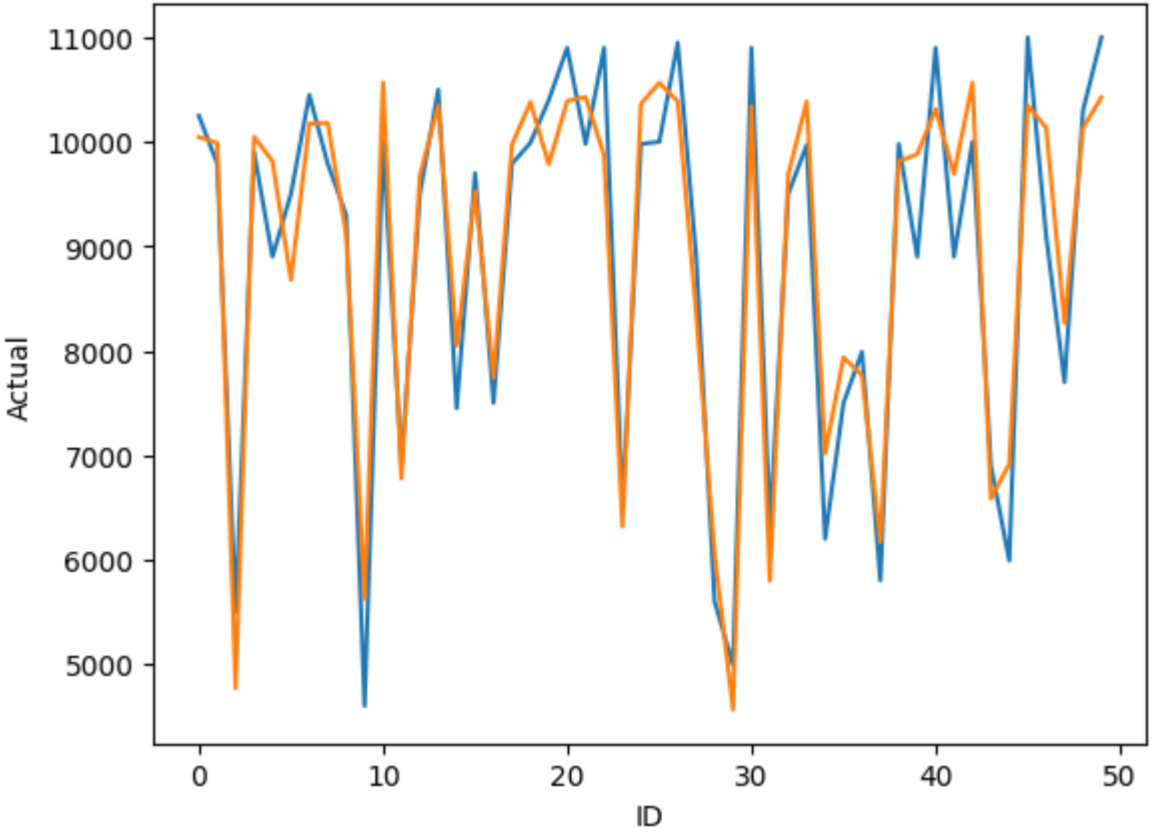
```
Results=pd.DataFrame(columns=['Actual','predicted'])
Results['Actual']=y_test
Results['predicted']=y_pred_ridge
Results=Results.reset_index()
Results['ID']=Results.index
Results.head(10)
```

Out[192]:

	index	Actual	predicted	ID
0	676	10250	10045.347779	0
1	215	9790	9989.171535	1
2	146	5500	4769.099603	2
3	1319	9900	10048.683238	3
4	1041	8900	9813.944798	4
5	1425	9500	8678.143561	5
6	409	10450	10173.797921	6
7	617	9790	10180.627008	7
8	1526	9300	9107.315259	8
9	1010	4600	5625.007407	9

```
In [196]: import seaborn as sns
          import matplotlib.pyplot as plt
          sns.lineplot(x='ID',y='Actual',data=Results.head(50))
          sns.lineplot(x='ID',y='predicted',data=Results.head(50))
          plt.plot()
```

```
Out[196]: []
```

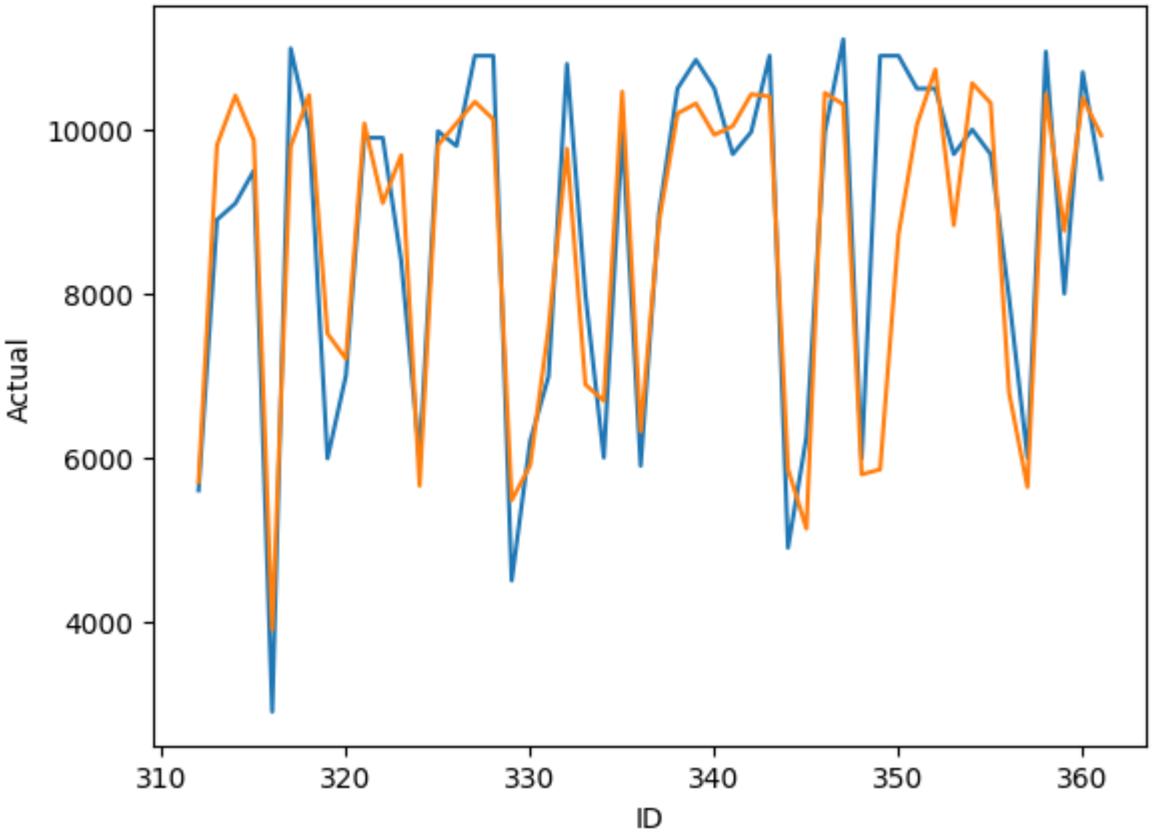


In [197]:

```
import seaborn as sns
import matplotlib.pyplot as plt
sns.lineplot(x='ID',y='Actual',data=Results.tail(50))
sns.lineplot(x='ID',y='predicted',data=Results.tail(50))
plt.plot()
```

Out[197]:

```
[]
```



In [ ]: