In [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn import preprocessing,svm
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
```

In [2]:
```
df=pd.read_csv(r"C:\Users\pappu\Downloads\fiat500_VehicleSelection_Dataset.csv")
df
```

Out[2]:

	ID	model	engine_power	age_in_days	km	previous_owners	lat	lon	price
0	1	lounge	51	882	25000	1	44.907242	8.611560	8900
1	2	pop	51	1186	32500	1	45.666359	12.241890	8800
2	3	sport	74	4658	142228	1	45.503300	11.417840	4200
3	4	lounge	51	2739	160000	1	40.633171	17.634609	6000
4	5	pop	73	3074	106880	1	41.903221	12.495650	5700
...	...	...	...	...	...	...	...	...	...
1533	1534	sport	51	3712	115280	1	45.069679	7.704920	5200
1534	1535	lounge	74	3835	112000	1	45.845692	8.666870	4600
1535	1536	pop	51	2223	60457	1	45.481541	9.413480	7500
1536	1537	lounge	51	2557	80750	1	45.000702	7.682270	5990
1537	1538	pop	51	1766	54276	1	40.323410	17.568270	7900

1538 rows × 9 columns

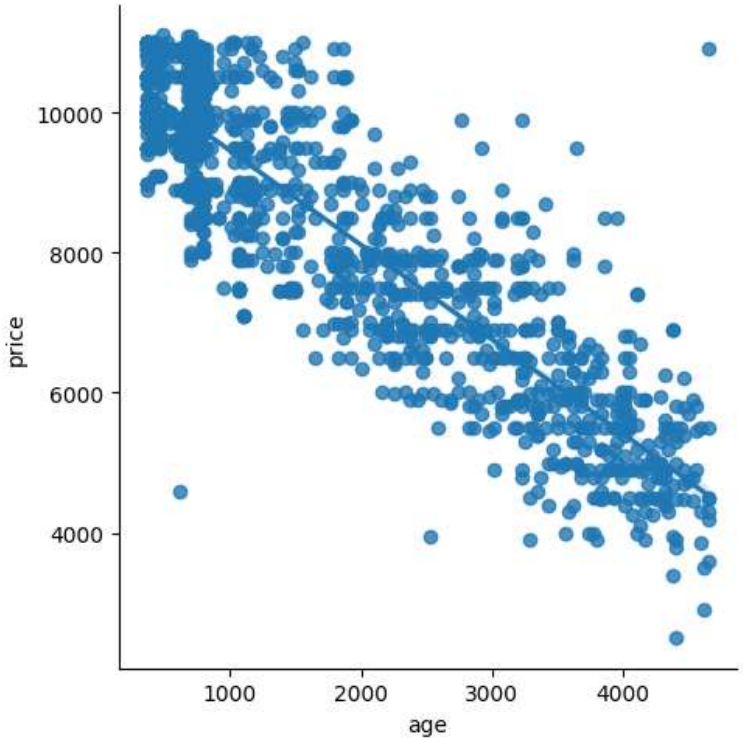
In [3]:
```
df=df[['age_in_days','price']]
df.columns=['age','price']
df.head(10)
```

Out[3]:

	age	price
0	882	8900
1	1186	8800
2	4658	4200
3	2739	6000
4	3074	5700
5	3623	7900
6	731	10750
7	1521	9190
8	4049	5600
9	3653	6000

In [4]:
```
sns.lmplot(x='age',y='price',data=df)
```

Out[4]:
```
<seaborn.axisgrid.FacetGrid at 0x22aa1608700>
```



In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1538 entries, 0 to 1537
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   age     1538 non-null   int64
 1   price   1538 non-null   int64
dtypes: int64(2)
memory usage: 24.2 KB
```

In [13]:
```
x=df[['age']]
y=df['price']
```

In [14]:
```
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2)
```

In [15]:
```
lr=LinearRegression()
```

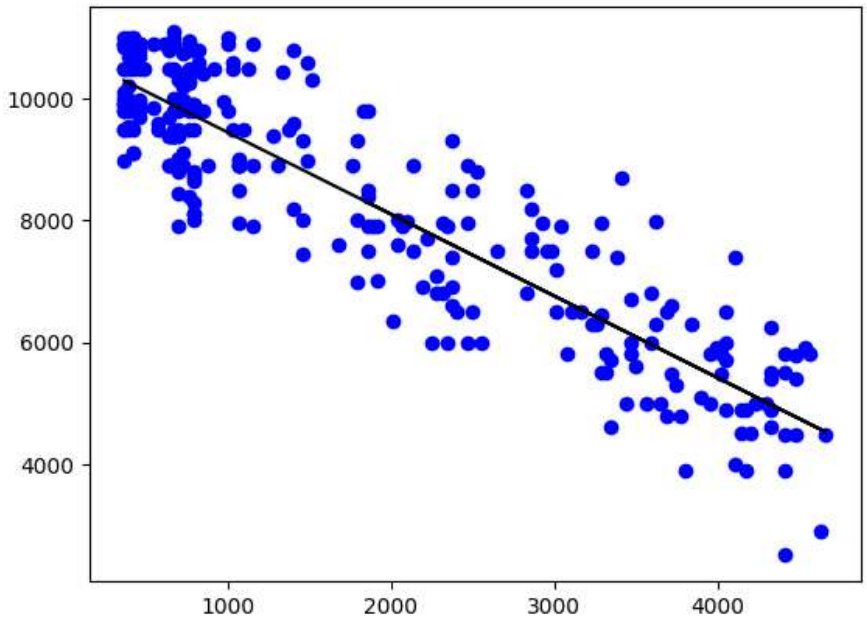
In [16]:
```
lr.fit(x_train,y_train)
```

Out[16]:
```
LinearRegression()
```

In [17]:
```
lr.score(x_test,y_test)
```

Out[17]:
```
0.821255557906873
```

In [18]:
```
y_pred=lr.predict(x_test)
plt.scatter(x_test,y_test,color='b')
plt.plot(x_test,y_pred,color='k')
plt.show()
```



Ridge Regression

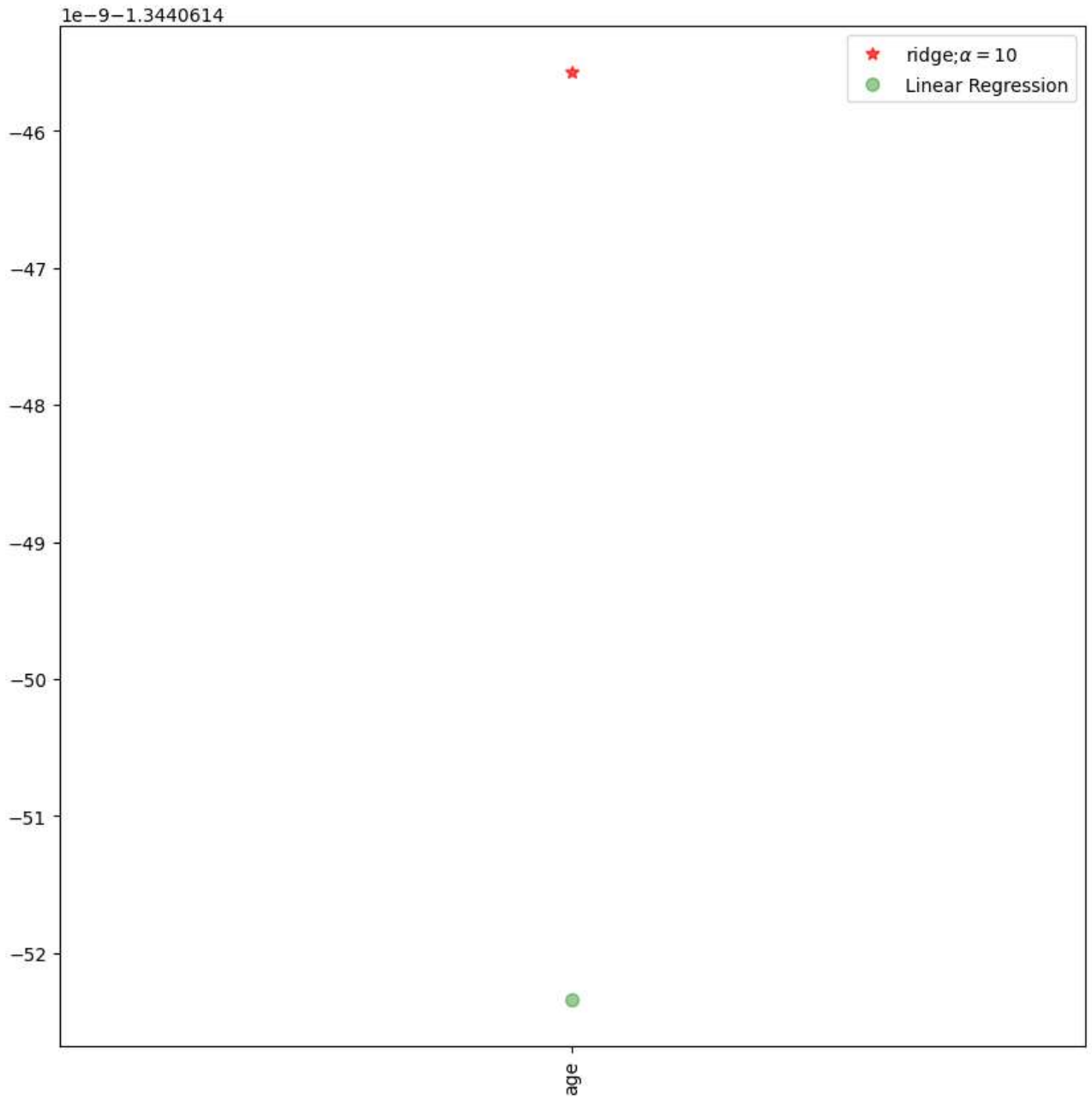
In [19]:
```
from sklearn.linear_model import Ridge,RidgeCV
from sklearn.linear_model import Lasso
from sklearn.preprocessing import StandardScaler
```

In [21]:
```
ridgereg=Ridge(alpha=10)
ridgereg.fit(x_train,y_train)
train_score_ridge=ridgereg.score(x_train,y_train)
test_score_ridge=ridgereg.score(x_test,y_test)
print('\nRidgeModel:')
print("Train score of Ridge model is {}".format(train_score_ridge))
print("Test score of Ridge model is {}".format(test_score_ridge))
```

```
RidgeModel:
Train score of Ridge model is 0.7915522127367757
Test score of Ridge model is 0.8212555579118922
```

In [22]:
```
features=['age']
target=['price']
```

In [25]:
```
plt.figure(figsize=(10,10))
plt.plot(features,ridgereg.coef_,alpha=0.7,linestyle='none',marker='*',markersize=7,color='red',label=r'ridg
plt.plot(features,lr.coef_,alpha=0.4,linestyle='none',marker='o',markersize=7,color='green',label='Linear Re
plt.xticks(rotation=90)
plt.legend()
plt.show()
```

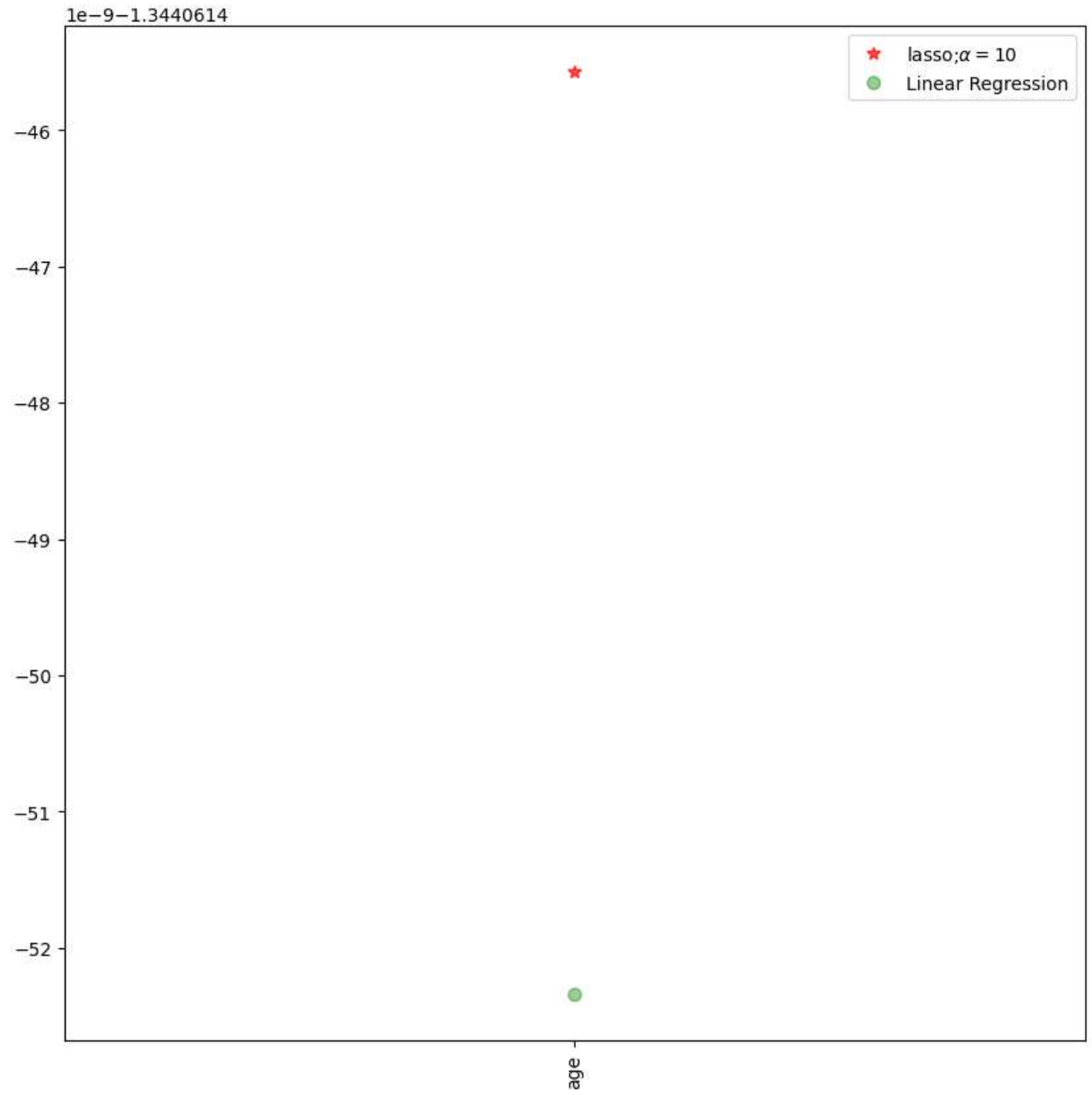


Lasso Regression

In [26]:
```
lassoreg=Ridge(alpha=10)
lassoreg.fit(x_train,y_train)
train_score_lasso=lassoreg.score(x_train,y_train)
test_score_lasso=lassoreg.score(x_test,y_test)
print('\nLassoModel:')
print("Train score of lasso model is {}".format(train_score_lasso))
print("Test score of lasso model is {}".format(test_score_lasso))
```

```
LassoModel:
Train score of lasso model is 0.7915522127367757
Test score of lasso model is 0.8212555579118922
```

In [27]:
```
plt.figure(figsize=(10,10))
plt.plot(features,ridgereg.coef_,alpha=0.7,linestyle='none',marker='*',markersize=7,color='red',label=r'lass
plt.plot(features,lr.coef_,alpha=0.4,linestyle='none',marker='o',markersize=7,color='green',label='Linear Re
plt.xticks(rotation=90)
plt.legend()
plt.show()
```



In [28]:
```
from sklearn.linear_model import LassoCV
lasso_cv=LassoCV(alphas=[0.0001,0.001,0.01,0.1,1,10],random_state=0).fit(x_train,y_train)
print(lasso_cv.score(x_train,y_train))
print(lasso_cv.score(x_test,y_test))
```

```
0.7915522127199759
0.8212555624826794
```

In [ ]: