In [3]:
```python
import pandas as pd
```

In [4]:
```python
data= pd.read_csv('/home/placement/Desktop/fiat500.csv')
```

In [19]:
```python
print(data)
```

```
        ID    model
0        1   lounge
1        2      pop
2        3    sport
3        4   lounge
4        5      pop
...    ...      ...
1533  1534    sport
1534  1535   lounge
1535  1536      pop
1536  1537   lounge
1537  1538      pop

[1538 rows x 2 columns]
```

In [6]: `data.head(10)`

Out[6]:

	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
5	6	pop	74	3623	70225	1	45.000702	7.682270	7900
6	7	lounge	51	731	11600	1	44.907242	8.611560	10750
7	8	lounge	51	1521	49076	1	41.903221	12.495650	9190
8	9	sport	73	4049	76000	1	45.548000	11.549470	5600
9	10	sport	51	3653	89000	1	45.438301	10.991700	6000

In [7]: `data.tail(10)`

Out[7]:

	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 [8]: `data.describe()`

Out[8]:

	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 [9]: `data.shape`

Out[9]: `(1538, 9)`

In [10]:
```
data.sort_values("ID")
```

Out[10]:

	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 [11]:
```
data.columns
```

Out[11]:
```
Index(['ID', 'model', 'engine_power', 'age_in_days', 'km', 'previous_owners',
       'lat', 'lon', 'price'],
      dtype='object')
```

In [12]:
```
data.index
```

Out[12]:
```
RangeIndex(start=0, stop=1538, step=1)
```

In [13]:
```python
data=data.loc[:,['ID','model']]
data.head(10)
```

Out[13]:

	ID	model
0	1	lounge
1	2	pop
2	3	sport
3	4	lounge
4	5	pop
5	6	pop
6	7	lounge
7	8	lounge
8	9	sport
9	10	sport

In [14]:
```python
x=pd.DataFrame(data['ID'])
y=pd.DataFrame(data['model'])
x.size,y.size
```

Out[14]: (1538, 1538)

In [16]:
```python
data.ndim
```

Out[16]: 2

In [17]:
```python
data.sample()
```

Out[17]:

	ID	model
497	498	lounge

In [20]: `data.dtypes`

Out[20]:
```
ID          int64
model      object
dtype: object
```

In [20]:
```python
import pandas as pd
import numpy as np
data= pd.read_csv('/home/placement/Desktop/fiat500.csv')
print(data)
```

```
        ID    model  engine_power  age_in_days      km  previous_owners  \
0        1   lounge            51          882   25000                1
1        2      pop            51         1186   32500                1
2        3    sport            74         4658  142228                1
3        4   lounge            51         2739  160000                1
4        5      pop            73         3074  106880                1
...    ...      ...           ...          ...     ...              ...
1533  1534    sport            51         3712  115280                1
1534  1535   lounge            74         3835  112000                1
1535  1536      pop            51         2223   60457                1
1536  1537   lounge            51         2557   80750                1
1537  1538      pop            51         1766   54276                1

            lat        lon  price
0     44.907242   8.611560   8900
1     45.666359  12.241890   8800
2     45.503300  11.417840   4200
3     40.633171  17.634609   6000
4     41.903221  12.495650   5700
...         ...        ...    ...
1533  45.069679   7.704920   5200
1534  45.845692   8.666870   4600
1535  45.481541   9.413480   7500
1536  45.000702   7.682270   5990
1537  40.323410  17.568270   7900

[1538 rows x 9 columns]
```

In [21]: `data.dtypes`

Out[21]:
```
ID                 int64
model             object
engine_power       int64
age_in_days        int64
km                 int64
previous_owners    int64
lat              float64
lon              float64
price              int64
dtype: object
```

In [22]: `data.describe()`

Out[22]:

	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 [23]: `data['previous_owners'].unique()`

Out[23]: `array([1, 2, 3, 4])`

In [24]: `list(data.columns)`

Out[24]:
```
['ID',
 'model',
 'engine_power',
 'age_in_days',
 'km',
 'previous_owners',
 'lat',
 'lon',
 'price']
```

In [25]: `data.groupby(['model']).count()`

Out[25]:

model	ID	engine_power	age_in_days	km	previous_owners	lat	lon	price
lounge	1094	1094	1094	1094	1094	1094	1094	1094
pop	358	358	358	358	358	358	358	358
sport	86	86	86	86	86	86	86	86

In [26]: `data.groupby(['previous_owners']).count()`

Out[26]:

previous_owners	ID	model	engine_power	age_in_days	km	lat	lon	price
1	1389	1389	1389	1389	1389	1389	1389	1389
2	117	117	117	117	117	117	117	117
3	23	23	23	23	23	23	23	23
4	9	9	9	9	9	9	9	9

In [27]: `data.iloc[0]`

Out[27]:
```
ID                           1
model                   lounge
engine_power                51
age_in_days                882
km                       25000
previous_owners              1
lat                  44.907242
lon                    8.61156
price                     8900
Name: 0, dtype: object
```

In [28]:
```python
data1= data.drop(['lat','ID'],axis=1)
data1= data.drop(['lon','ID'],axis=1)
```

In [29]: `print(data)`

```
         ID    model  engine_power  age_in_days      km  previous_owners  \
0         1   lounge            51          882   25000                1
1         2      pop            51         1186   32500                1
2         3    sport            74         4658  142228                1
3         4   lounge            51         2739  160000                1
4         5      pop            73         3074  106880                1
...     ...      ...           ...          ...     ...              ...
1533   1534    sport            51         3712  115280                1
1534   1535   lounge            74         3835  112000                1
1535   1536      pop            51         2223   60457                1
1536   1537   lounge            51         2557   80750                1
1537   1538      pop            51         1766   54276                1

            lat        lon  price
0     44.907242   8.611560   8900
1     45.666359  12.241890   8800
2     45.503300  11.417840   4200
3     40.633171  17.634609   6000
4     41.903221  12.495650   5700
...         ...        ...    ...
1533  45.069679   7.704920   5200
1534  45.845692   8.666870   4600
1535  45.481541   9.413480   7500
1536  45.000702   7.682270   5990
1537  40.323410  17.568270   7900

[1538 rows x 9 columns]
```

In [30]: `print(data1)`

```
        model  engine_power  age_in_days      km  previous_owners        lat  \
0      lounge            51          882   25000                1  44.907242
1         pop            51         1186   32500                1  45.666359
2       sport            74         4658  142228                1  45.503300
3      lounge            51         2739  160000                1  40.633171
4         pop            73         3074  106880                1  41.903221
...       ...           ...          ...     ...              ...        ...
1533    sport            51         3712  115280                1  45.069679
1534   lounge            74         3835  112000                1  45.845692
1535      pop            51         2223   60457                1  45.481541
1536   lounge            51         2557   80750                1  45.000702
1537      pop            51         1766   54276                1  40.323410

      price
0      8900
1      8800
2      4200
3      6000
4      5700
...     ...
1533   5200
1534   4600
1535   7500
1536   5990
1537   7900

[1538 rows x 7 columns]
```

In [31]: `data['price'].sum()`

Out[31]: 13189894

In [32]:
```python
data2=data.loc[(data.model=='lounge')&(data.previous_owners==1)]
data2
```

Out[32]:

	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
3	4	lounge	51	2739	160000	1	40.633171	17.634609	6000
6	7	lounge	51	731	11600	1	44.907242	8.611560	10750
7	8	lounge	51	1521	49076	1	41.903221	12.495650	9190
11	12	lounge	51	366	17500	1	45.069679	7.704920	10990
...	...	...	...	...	...	...	...	...	...
1528	1529	lounge	51	2861	126000	1	43.841980	10.515310	5500
1529	1530	lounge	51	731	22551	1	38.122070	13.361120	9900
1530	1531	lounge	51	670	29000	1	45.764648	8.994500	10800
1534	1535	lounge	74	3835	112000	1	45.845692	8.666870	4600
1536	1537	lounge	51	2557	80750	1	45.000702	7.682270	5990

993 rows × 9 columns

In [33]:
```python
data['km']<50000
```

Out[33]:
```
0       True
1       True
2       False
3       False
4       False
        ...
1533    False
1534    False
1535    False
1536    False
1537    False
Name: km, Length: 1538, dtype: bool
```

In [34]:
```python
data3=data[data['km']<50000]
data3
```

Out[34]:

	ID	model	engine_power	age_in_days	km	previous_owners	lat	lon	price
0	1	lounge	51	882	25000	1	44.907242	8.61156	8900
1	2	pop	51	1186	32500	1	45.666359	12.24189	8800
6	7	lounge	51	731	11600	1	44.907242	8.61156	10750
7	8	lounge	51	1521	49076	1	41.903221	12.49565	9190
10	11	pop	51	790	43286	1	40.871429	14.43896	8950
...	...	...	...	...	...	...	...	...	...
1525	1526	lounge	51	790	41870	1	45.707249	11.47760	9500
1526	1527	lounge	51	1705	23600	1	38.122070	13.36112	9300
1527	1528	pop	51	517	3000	1	40.748241	14.52835	9999
1529	1530	lounge	51	731	22551	1	38.122070	13.36112	9900
1530	1531	lounge	51	670	29000	1	45.764648	8.99450	10800

900 rows × 9 columns

In [35]: `data`

Out[35]:

	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 [39]: `data7=data.drop(['model'],axis=1)`

In [40]: `data7`

Out[40]:

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

1538 rows × 8 columns

In [41]: `data7.corr()`

Out[41]:

	ID	engine_power	age_in_days	km	previous_owners	lat	lon	price
ID	1.000000	-0.034059	-0.060753	-0.006537	0.007803	-0.058207	0.058941	0.028516
engine_power	-0.034059	1.000000	0.319190	0.285495	-0.005030	0.005721	-0.005032	-0.277235
age_in_days	-0.060753	0.319190	1.000000	0.833890	0.075775	0.062982	-0.042667	-0.893328
km	-0.006537	0.285495	0.833890	1.000000	0.097539	0.035519	0.004839	-0.859373
previous_owners	0.007803	-0.005030	0.075775	0.097539	1.000000	0.001697	-0.026836	-0.076274
lat	-0.058207	0.005721	0.062982	0.035519	0.001697	1.000000	-0.766646	-0.011733
lon	0.058941	-0.005032	-0.042667	0.004839	-0.026836	-0.766646	1.000000	-0.003541
price	0.028516	-0.277235	-0.893328	-0.859373	-0.076274	-0.011733	-0.003541	1.000000

In [ ]: