In [30]:
```
import pandas as pd
data=pd.read_csv("//home/placement/Desktop/EEE(222)/fiat500.csv")
```

In [31]:
```
data.describe()
```

Out[31]:

	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 [32]:
```
data.head(10)
```

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
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 [33]:
```
data1=data.drop(['model'],axis=1)
data1.head(10)
```

Out[33]:

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

In [34]:
```
cor=data1.corr()
cor
```

Out[34]:

	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 [35]:
```
data['model'].unique()
```

Out[35]:
```
array(['lounge', 'pop', 'sport'], dtype=object)
```

In [36]:
```
list(data.columns)
```

Out[36]:
```
['ID',
 'model',
 'engine_power',
 'age_in_days',
 'km',
 'previous_owners',
 'lat',
 'lon',
 'price']
```

In [37]:
```
data['engine_power'].unique()
```

Out[37]:
```
array([51, 74, 73, 62, 63, 66, 77, 58])
```

In [38]:
```
data['km'].unique()
```

Out[38]:
```
array([ 25000,  32500, 142228, 160000, 106880,  70225,  11600,  49076,
        76000,  89000,  43286,  17500,  18450, 120000,  40500,  28200,
       110000,  96848,  31000,  20030,  19037,   8000,  27595,  14900,
         9218, 124000, 100000,  28900,   4000,  59216,  99477,  21730,
       140000,  32033, 138116,  17000,  58527,  43100,  13373, 119000,
        28500,  83000,  98000,  12693,  14586,  27640,  49000, 107000,
        66000,  35000,  24651,  71900,  11200, 124050,  69395,  17961,
        18669,  22700,  56000,  22669,  50000,  39743,  27466,  22609,
        94485, 188000,  94000,  60786,  41950,  16971,  45300,  75359,
        12585, 103000,  77149,  13587,  55595,  17250, 145000,  20849,
       107375,  17841,  44778,  78681, 123000,  17912,  69916,  97700,
        11500,  12372, 165600,  28000,  86000,  18592,  41558,  96000,
        19000,  18183,  75500,  39500, 128000,  12929, 113254,  18000,
        16643,  92300,  34873, 102000,  16135,  95350,  19909,  16518,
       113000, 105000, 104000,  56779,  17590,   7772,  85000,  75900,
        21400, 112400,  18590, 175000,  34012,  53589,  14431,  80000,
        81900, 124100,  46000, 176000,  13124, 152900,  15917,  74000,
        13215,  14732,  67000,  39916,  13600,  21580, 106000,  35304,
       174000,  51786,  70000,  16755,  48268,  97000, 114000,  15341,
```

In [39]:
```
data['lat'].unique()
```

Out[39]:
```
array([44.90724182, 45.66635895, 45.50329971, 40.63317108, 41.90322113,
       45.0007019 , 45.54800034, 45.43830109, 40.87142944, 45.06967926,
       45.42657089, 40.53158951, 40.91136169, 45.6972084 , 41.08235168,
       43.78237152, 45.35438919, 45.70724869, 40.83581161, 44.50608826,
       45.68825912, 45.43811035, 40.96617889, 40.97645187, 45.13167191,
       41.34975052, 40.55056381, 40.75593185, 44.28387833, 45.50516129,
       45.33407974, 45.34931946, 45.74602127, 41.95972061, 38.2181282 ,
       45.39360046, 42.34196854, 45.4054718 , 40.84590149, 40.8401413 ,
       41.06240082, 46.17649841, 43.86997986, 45.23141098, 45.46796036,
       42.15787888, 45.69522858, 45.6958313 , 44.50883865, 43.9381218 ,
       41.66950989, 41.29956055, 45.79785919, 44.75489044, 45.76697922,
       41.37656021, 45.31818008, 45.5712204 , 45.67927933, 41.83264923,
       41.80298996, 38.91444016, 44.71540833, 41.7690506 , 44.29430008,
       41.26411057, 45.67340088, 45.76464844, 45.55654907, 44.30582047,
       43.88206863, 40.85889816, 41.35784912, 45.35776901, 45.72071838,
       44.39997101, 40.92166901, 45.6848793 , 45.96493149, 41.06985092,
       45.6095314 , 44.33253098, 45.70610046, 40.39588928, 45.7012291 ,
       45.7768898 , 45.60689163, 45.43878937, 45.58409119, 45.44327164,
       45.52497864, 45.66292953, 42.92044067, 43.06753159, 40.93085098,
       43.52069855, 39.29122162, 45.74074173, 45.67483902, 40.75220871,
       41.12586975, 41.27293015, 45.64609909, 40.78419113, 42.45336914,
       45.60697174, 40.69556046, 38.12207031, 41.15206146, 40.92649078,
       43.81702042, 40.46537018, 45.46350098, 39.33176041, 45.32979965,
       44.13837051, 44.98873901, 45.54597855, 45.85166168, 44.41175842,
       45.38684082, 37.72787857, 45.7907486 , 45.77878189, 45.73727036,
       40.69672012, 45.61695862, 43.62332916, 37.8167305 , 45.38145828,
       44.06312943, 44.43400955, 45.56040955, 44.11185837, 45.81475067,
       45.75424957, 45.07889938, 46.79201889, 45.3355217 , 44.69252014,
       42.56283188, 43.9126091 , 45.51256943, 44.55202866, 40.87839127,
       43.87985992, 45.6835289 , 44.03533173, 44.70143127, 45.0127182 ,
       37.6079483 , 45.6100502 , 45.46580124, 41.10787964, 43.33272171,
       40.67237854, 45.5320015 , 41.80591965, 43.25386047, 41.02598953,
       45.53868866, 45.81275177, 43.34375   , 41.77008057, 44.90443039,
       45.62141037, 42.14385986, 45.55812073, 45.5501709 , 45.83068848,
       44.76641846, 40.92850113, 45.02238846, 45.31705856, 45.13325882,
       45.20227814, 45.28242111, 44.79853058, 44.92488098, 45.19305038,
       44.50482178, 40.9952507 , 45.05659866, 45.50944901, 45.59614944,
       45.66228104, 42.10467911, 45.64250183, 45.64123917, 45.50442123,
       45.77859116, 45.82556152, 45.70059967, 44.05541992, 46.16872025,
```

```
40.82139969, 45.32001114, 44.99895096, 44.69559097, 36.85583878,
45.51205063, 45.00674057, 40.74824142, 45.7832489 , 45.50054932,
39.21453857, 40.67348099, 40.91917038, 45.14241028, 37.51858139,
43.96585083, 45.40943909, 38.31806946, 40.40106964, 40.17470169,
45.54444122, 40.6095314 , 40.96757126, 41.46273041, 45.21540833,
45.73326111, 45.78366852, 45.49222946, 43.23400116, 45.53725052,
45.53659058, 43.95793152, 45.52046967, 43.78451157, 45.65016174,
45.60054016, 45.63330841, 45.42092133, 45.76396942, 45.52672958,
45.6563797 , 40.85470963, 45.49541855, 45.53371811, 40.65832138,
44.38822174, 45.36412811, 45.55258942, 40.88721848, 41.99634933,
45.59859848, 41.11426163, 46.03120041, 37.72546005, 40.50030136,
44.83839035, 40.73484039, 45.71659088, 40.80760956, 40.92314148,
45.62813187, 41.63029099, 44.75260925, 45.95497131, 45.63243103,
45.51815033, 45.04724121, 45.31200027, 43.89894867, 45.69115829,
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44.54637146, 45.88607025, 45.53266144, 45.44424057, 42.46390915,
46.07004929, 45.77669144, 45.5200386 , 45.21854019, 45.73284912,
45.98527908, 41.64091873, 45.61869812, 46.45465851, 41.20460129,
45.00690079, 45.60868835, 45.4790802 , 45.07107925, 40.74029922,
43.75807953, 45.43610001, 41.40813828, 38.22293854, 45.77899933,
44.41038895, 45.68421173, 44.09373856, 41.8230896 , 40.86045837,
45.07014847, 40.63722992, 45.56373978, 41.07221985, 42.94897842,
45.49134827, 41.72117996, 45.74349976, 43.20687866, 44.00579071,
40.66714096, 43.52902985, 45.06312943, 45.61186981, 45.50646973,
46.01776123, 42.74776077, 44.58037186, 45.64572144, 45.96057129,
41.60960007, 45.13882065, 45.56449127, 45.92216873, 42.10424042,
43.4397583 , 45.03190994, 41.20264816, 44.71783829, 43.86373901,
45.62984848, 46.49528122, 45.76197052, 39.93104172, 45.5198288 ,
43.71086121, 45.35660172, 45.42673111, 45.25130844, 45.72039032,
45.57373047, 44.64805984, 45.74077988, 44.98553085, 45.14113998,
44.0098114 , 41.45072174, 40.91075134, 45.45331955, 45.70759964,
43.37266159, 45.12158966, 40.56388855, 41.2329483 , 42.51440811,
39.84526062, 45.25228119, 40.91109085, 43.70996094, 45.69655991,
40.91411972, 42.09685898, 37.50395966, 45.81071091, 45.67449188,
45.57213974, 43.46353912, 43.88188934, 45.51285172, 43.52130127,
43.84197998, 45.60982895, 41.05591965, 45.19216156, 45.50133896,
40.9921608 , 45.57402039, 40.3579483 , 45.29212189, 40.94717026,
45.77658844, 39.69966125, 45.63032913, 41.08335114, 45.36685944,
45.43244934, 44.51242828, 45.07133102, 40.9556694 , 40.56082916,
42.10237122, 45.65993118, 45.63404083, 41.68379974, 45.66067886,
41.2392807 , 45.40507126, 43.56518173, 44.64313126, 40.33591843,
44.63998032, 45.02709961, 45.16025162, 41.31988907, 42.34614944,
```

```
       40.41302109, 45.1778717 , 43.25925064, 45.3956604 , 40.81591034,
       45.38516998, 46.13788986, 45.77568817, 43.89019012, 45.61143875,
       41.68928146, 45.16540909, 45.82658005, 46.79561234, 45.67181015,
       44.33240128, 40.53305054, 46.21461105, 38.17837143, 44.54187012,
       41.74177933, 39.2908783 , 40.85173035, 42.28702927, 45.42324829,
       41.58634949, 41.59114075, 45.06888962, 45.72438049, 41.14123154,
       45.54148102, 42.66495895, 37.51136017, 44.53776932, 45.80202103,
       44.9061203 , 37.23033905, 44.81375122, 44.88497925, 40.70410919,
       45.52851105, 45.84569168, 45.48154068, 40.32341003])
```

In [40]:
```
data.groupby(['lat']).count()
```

Out[40]:

lat	ID	model	engine_power	age_in_days	km	previous_owners	lon	price
36.855839	2	2	2	2	2	2	2	2
37.230339	2	2	2	2	2	2	2	2
37.503960	1	1	1	1	1	1	1	1
37.511360	1	1	1	1	1	1	1	1
37.518581	2	2	2	2	2	2	2	2
...	...	...	...	...	...	...	...	...
46.214611	1	1	1	1	1	1	1	1
46.454659	1	1	1	1	1	1	1	1
46.495281	3	3	3	3	3	3	3	3
46.792019	2	2	2	2	2	2	2	2
46.795612	1	1	1	1	1	1	1	1

449 rows × 8 columns

In [41]:
```
data.groupby(['model']).count()
```

Out[41]:

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 [42]:
```
data1=data.drop(['lat','ID'],axis=1)
```

In [43]:
```
data.head(5)
```

Out[43]:

	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

In [44]:
```
data1.head(5)
```

Out[44]:

	model	engine_power	age_in_days	km	previous_owners	lon	price
0	lounge	51	882	25000	1	8.611560	8900
1	pop	51	1186	32500	1	12.241890	8800
2	sport	74	4658	142228	1	11.417840	4200
3	lounge	51	2739	160000	1	17.634609	6000
4	pop	73	3074	106880	1	12.495650	5700

In [45]:
```
data['price'].sum()
```

Out[45]:
```
13189894
```

In [46]:
```
data2=data.loc[(data.model=='lounge')]
```

In [47]:
```
data2
```

Out[47]:

	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

1094 rows × 9 columns

In [48]:
```
data2=data.loc[(data.km<=112000)]
```

In [49]:
```
data2
```

Out[49]:

	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
4	5	pop	73	3074	106880	1	41.903221	12.49565	5700
5	6	pop	74	3623	70225	1	45.000702	7.68227	7900
6	7	lounge	51	731	11600	1	44.907242	8.61156	10750
...	...	...	...	...	...	...	...	...	...
1532	1533	pop	51	1917	52008	1	45.548000	11.54947	9900
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

1369 rows × 9 columns

In [50]:
```
data2=data.loc[(data.model=='lounge')&(data.previous_owners==1)]
```

In [51]:
```
data2
```

Out[51]:

	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 [52]:
```
data2=data.loc[(data.model=='lounge')&(data.previous_owners==2)]
data2
```

Out[52]:

	ID	model	engine_power	age_in_days	km	previous_owners	lat	lon	price
31	32	lounge	51	4169	99477	2	40.550564	14.225625	5900
32	33	lounge	51	821	21730	2	41.903221	12.495650	10500
34	35	lounge	51	640	32033	2	44.283878	11.888140	9790
98	99	lounge	51	456	18592	2	45.393600	10.482240	10900
109	110	lounge	51	3562	113254	2	44.305820	8.483640	6100
...	...	...	...	...	...	...	...	...	...
1391	1392	lounge	51	3804	130000	2	44.541870	10.781420	6400
1392	1393	lounge	51	1766	29400	2	41.741779	12.644180	7300
1393	1394	lounge	51	609	32665	2	41.107880	14.208810	9400
1394	1395	lounge	51	670	35755	2	41.107880	14.208810	9400
1487	1488	lounge	73	4596	220000	2	40.976452	14.172280	3850

81 rows × 9 columns

In [53]:
```
data2.count()
```

Out[53]:
```
ID                81
model             81
engine_power      81
age_in_days       81
km                81
previous_owners   81
lat               81
lon               81
price             81
dtype: int64
```

In [54]:
```
data2=data.loc[(data.model=='lounge')&(data.previous_owners==3)]
data2
```

Out[54]:

	ID	model	engine_power	age_in_days	km	previous_owners	lat	lon	price
78	79	lounge	51	456	13587	3	45.393600	10.482240	10900
79	80	lounge	51	1797	55595	3	45.766979	11.738400	7800
80	81	lounge	51	397	17250	3	45.069679	7.704920	10050
284	285	lounge	51	1917	49000	3	45.357769	9.612210	7800
285	286	lounge	51	397	14877	3	45.465801	8.886410	9980
286	287	lounge	51	366	17642	3	38.122070	13.361120	11000
449	450	lounge	51	2313	56600	3	45.131672	8.449170	7950
450	451	lounge	51	701	22794	3	41.107880	14.208810	9600
1049	1050	lounge	51	2466	83490	3	43.529030	12.162184	6490
1305	1306	lounge	51	1461	39500	3	45.922169	12.361500	9800
1306	1307	lounge	51	670	14475	3	41.107880	14.208810	9700
1307	1308	lounge	51	1400	58684	3	45.688259	8.731450	8900
1497	1498	lounge	51	397	15840	3	38.122070	13.361120	10700

In [55]:
```
data2.count()
```

Out[55]:
```
ID                13
model             13
engine_power      13
age_in_days       13
km                13
previous_owners   13
lat               13
lon               13
price             13
dtype: int64
```

In [56]:
```
data2.price.sort_values(ascending=False)
```

Out[56]:
```
286     11000
78      10900
1497    10700
80      10050
285      9980
1305     9800
1306     9700
450      9600
1307     8900
449      7950
79       7800
284      7800
1049     6490
Name: price, dtype: int64
```

In [ ]:
```

```