

car-price-model

July 22, 2024

```
[2]: import pandas as pd
import numpy as np

from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
```

```
[3]: cars_data = pd.read_csv('Cardetails.csv')
```

```
[4]: cars_data.head()
```

```
[4]:
```

		name	year	selling_price	km_driven	fuel	\
0		Maruti Swift Dzire VDI	2014	450000	145500	Diesel	
1		Skoda Rapid 1.5 TDI Ambition	2014	370000	120000	Diesel	
2		Honda City 2017-2020 EXi	2006	158000	140000	Petrol	
3		Hyundai i20 Sportz Diesel	2010	225000	127000	Diesel	
4		Maruti Swift VXi BSIII	2007	130000	120000	Petrol	

	seller_type	transmission	owner	mileage	engine	max_power	\
0	Individual	Manual	First Owner	23.4 kmpl	1248 CC	74 bhp	
1	Individual	Manual	Second Owner	21.14 kmpl	1498 CC	103.52 bhp	
2	Individual	Manual	Third Owner	17.7 kmpl	1497 CC	78 bhp	
3	Individual	Manual	First Owner	23.0 kmpl	1396 CC	90 bhp	
4	Individual	Manual	First Owner	16.1 kmpl	1298 CC	88.2 bhp	

		torque	seats
0		190Nm@ 2000rpm	5.0
1		250Nm@ 1500-2500rpm	5.0
2		12.7@ 2,700(kgm@ rpm)	5.0
3		22.4 kgm at 1750-2750rpm	5.0
4		11.5@ 4,500(kgm@ rpm)	5.0

```
[5]: cars_data.drop(columns=['torque'], inplace=True)
```

```
[10]: cars_data.head()
```

```
[10]:
```

		name	year	selling_price	km_driven	fuel	\
0		Maruti Swift Dzire VDI	2014	450000	145500	Diesel	

1	Skoda Rapid 1.5 TDI Ambition	2014	370000	120000	Diesel
2	Honda City 2017-2020 EXi	2006	158000	140000	Petrol
3	Hyundai i20 Sportz Diesel	2010	225000	127000	Diesel
4	Maruti Swift VXi BSIII	2007	130000	120000	Petrol

	seller_type	transmission	owner	mileage	engine	max_power	\
0	Individual	Manual	First Owner	23.4 kmpl	1248 CC	74 bhp	
1	Individual	Manual	Second Owner	21.14 kmpl	1498 CC	103.52 bhp	
2	Individual	Manual	Third Owner	17.7 kmpl	1497 CC	78 bhp	
3	Individual	Manual	First Owner	23.0 kmpl	1396 CC	90 bhp	
4	Individual	Manual	First Owner	16.1 kmpl	1298 CC	88.2 bhp	

	seats
0	5.0
1	5.0
2	5.0
3	5.0
4	5.0

```
[12]: cars_data.shape
```

```
[12]: (8128, 12)
```

```
[14]: #preprocessing
```

```
[16]: #NULL Check
```

```
[18]: cars_data.isnull().sum()
```

```
[18]: name          0
      year          0
      selling_price  0
      km_driven     0
      fuel          0
      seller_type    0
      transmission  0
      owner         0
      mileage       221
      engine        221
      max_power     215
      seats         221
      dtype: int64
```

```
[20]: cars_data.dropna(inplace=True)
```

```
[22]: cars_data.shape
```

```
[22]: (7907, 12)
```

```
[24]: #Duplicate Check
```

```
[26]: cars_data.duplicated().sum()
```

```
[26]: 1189
```

```
[28]: cars_data.drop_duplicates(inplace=True)
```

```
[30]: cars_data.shape
```

```
[30]: (6718, 12)
```

```
[32]: cars_data
```

```
[32]:
```

		name	year	selling_price	km_driven	\
0		Maruti Swift Dzire VDI	2014	450000	145500	
1		Skoda Rapid 1.5 TDI Ambition	2014	370000	120000	
2		Honda City 2017-2020 EXi	2006	158000	140000	
3		Hyundai i20 Sportz Diesel	2010	225000	127000	
4		Maruti Swift VXI BSIII	2007	130000	120000	
...		
8121	Maruti	Wagon R VXI BS IV with ABS	2013	260000	50000	
8122		Hyundai i20 Magna 1.4 CRDi	2014	475000	80000	
8123		Hyundai i20 Magna	2013	320000	110000	
8124		Hyundai Verna CRDi SX	2007	135000	119000	
8125		Maruti Swift Dzire ZDi	2009	382000	120000	

		fuel	seller_type	transmission	owner	mileage	\
0	Diesel	Individual	Manual	First Owner	23.4 kmpl		
1	Diesel	Individual	Manual	Second Owner	21.14 kmpl		
2	Petrol	Individual	Manual	Third Owner	17.7 kmpl		
3	Diesel	Individual	Manual	First Owner	23.0 kmpl		
4	Petrol	Individual	Manual	First Owner	16.1 kmpl		
...		
8121	Petrol	Individual	Manual	Second Owner	18.9 kmpl		
8122	Diesel	Individual	Manual	Second Owner	22.54 kmpl		
8123	Petrol	Individual	Manual	First Owner	18.5 kmpl		
8124	Diesel	Individual	Manual	Fourth & Above Owner	16.8 kmpl		
8125	Diesel	Individual	Manual	First Owner	19.3 kmpl		

	engine	max_power	seats
0	1248 CC	74 bhp	5.0
1	1498 CC	103.52 bhp	5.0
2	1497 CC	78 bhp	5.0
3	1396 CC	90 bhp	5.0

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4      1298 CC      88.2 bhp      5.0
...
8121      998 CC      67.1 bhp      5.0
8122     1396 CC     88.73 bhp      5.0
8123     1197 CC     82.85 bhp      5.0
8124     1493 CC      110 bhp      5.0
8125     1248 CC      73.9 bhp      5.0

```

[6718 rows x 12 columns]

```
[34]: cars_data.info()
```

```

<class 'pandas.core.frame.DataFrame'>
Index: 6718 entries, 0 to 8125
Data columns (total 12 columns):
#   Column          Non-Null Count  Dtype
---  -
0   name             6718 non-null   object
1   year             6718 non-null   int64
2   selling_price    6718 non-null   int64
3   km_driven        6718 non-null   int64
4   fuel             6718 non-null   object
5   seller_type      6718 non-null   object
6   transmission     6718 non-null   object
7   owner            6718 non-null   object
8   mileage          6718 non-null   object
9   engine           6718 non-null   object
10  max_power        6718 non-null   object
11  seats            6718 non-null   float64
dtypes: float64(1), int64(3), object(8)
memory usage: 682.3+ KB

```

```
[36]: #Data Analysis
```

```

[38]: for col in cars_data.columns:
      print('Unique values of ' + col)
      print(cars_data[col].unique())
      print("=====")

```

Unique values of name

```

['Maruti Swift Dzire VDI' 'Skoda Rapid 1.5 TDI Ambition'
 'Honda City 2017-2020 EXi' ... 'Tata Nexon 1.5 Revotorq XT'
 'Ford Freestyle Titanium Plus Diesel BSIV'
 'Toyota Innova 2.5 GX (Diesel) 8 Seater BS IV']
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```

Unique values of year

```

[2014 2006 2010 2007 2017 2001 2011 2013 2005 2009 2016 2012 2002 2015

```

2018 2019 2008 2020 1999 2000 2003 2004 1994 1998 1997 1995 1996]

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Unique values of selling_price

[450000	370000	158000	225000	130000	440000	96000	45000
	350000	200000	500000	92000	280000	180000	400000	778000
	150000	680000	174000	950000	525000	600000	575000	275000
	300000	220000	254999	670000	730000	650000	330000	366000
	1149000	425000	2100000	925000	675000	819999	390000	1500000
	700000	1450000	1090000	850000	1650000	1750000	1590000	1689999
	1425000	265000	190000	630000	540000	448000	745000	1025000
	235000	1700000	1200000	610000	2500000	484999	315000	290000
	455000	351000	535000	175000	565000	120000	725000	185000
	615000	270000	625000	866000	375000	522000	451999	475000
	780000	595000	1140000	360000	105000	135000	690000	3975000
	5150000	3200000	4100000	4500000	6000000	3790000	5800000	1864999
	2700000	795000	3400000	2650000	5850000	975000	805000	2625000
	811000	550000	645000	2550000	599000	875000	894999	340000
	1525000	2150000	1900000	2900000	10000000	160000	515000	40000
	480000	487000	386000	100000	490000	345000	85000	215000
	320000	459999	65000	720000	800000	520000	580000	420000
	1250000	830000	335000	329000	775000	524000	245000	910000
	900000	250000	1100000	640000	409999	165000	80000	1000000
	110000	170000	1380000	1300000	530000	310000	1150000	380000
	404000	114999	465000	210000	4600000	509999	90000	409000
	395000	81000	555000	229999	1210000	325000	60000	89000
	434999	3000000	570000	1550000	64000	140000	503000	3800000
	2000000	740000	750000	5400000	5500000	779000	2475000	240000
	1085000	95000	1290000	219000	260000	840000	292000	385000
	1050000	735000	560000	585000	760000	430000	643000	285000
	660000	268000	88000	561000	755000	125000	1600000	801000
	317000	495000	236000	1800000	415000	217000	466000	605000
	1350000	337000	655000	196000	299000	634000	1225000	238000
	590000	195000	715000	168000	531000	1625000	145000	441000
	67500	321000	298000	1075000	681000	810000	573000	101000
	1019999	244000	1165000	241000	327000	620000	204999	576000
	695000	231000	261000	371000	421000	710000	1040000	199000
	305000	1745000	611000	75000	55000	1325000	885000	108000
	272000	1125000	388000	757000	626000	793000	3750000	1400000
	1925000	844999	2940000	1825000	890000	770000	467000	711000
	511000	166000	392000	833000	35000	880000	1030000	521000
	451000	472000	649000	429000	1576000	825000	470000	1560000
	1950000	786000	731000	191000	651000	445000	93150	403000
	144000	52000	302000	869999	155000	246000	405000	70000
	3250000	1143000	635000	1575000	318000	152000	248000	1465000
	1080000	678000	1460000	756000	665000	2950000	377000	1675000
	169000	685000	749000	899000	259000	416000	773000	889000
	118000	256000	1888000	99000	2280000	31504	295000	444000
	860000	2450000	198000	2825000	2125000	3350000	365000	919999

2600000	839000	1594000	161000	423000	551000	50000	411000
1530000	376000	1850000	86000	822000	30000	252000	131000
128000	790000	604000	1175000	141000	151000	577000	83000
946000	356000	955000	978999	348000	399000	362000	499000
358000	278000	426000	211000	1270000	426999	960000	1031000
72000	479000	764000	2199000	3600000	184000	119000	267000
328000	112999	39000	2850000	2800000	3900000	221000	631000
308000	940000	361000	355000	7200000	930000	1670000	980000
486000	242000	654000	835000	408000	94500	1110000	438999
911999	693000	449000	1390000	698000	539000	765000	562000
571000	589000	227999	1151000	1295000	4090000	347000	493000
545000	1475000	287000	1630000	501000	181000	2711000	1035000
316000	813000	1190000	378000	156000	194000	754000	55599
1511000	78000	250999	312000	66000	369000	149000	752000
142000	111000	206000	567000	699000	632000	905000	1145000
58000	179000	1515000	178000	222000	387000	1405000	282000
458000	157000	497000	1227000	574000	121000	3100000	68000
1920000	808000	512000	671000	799000	1365000	1490000	80500
189000	892000	93000	1680000	667000	204000	42000	694000
861999	476999	5200000	2375000	2750000	1385000	785000	1275000
1748999	132000	33351	2064000	469000	906000	797000	6223000
5923000	6523000	122000	891000	346000	532000	974000	483000
138000	432000	1757000	412000	126000	736000	579000	187000
4000000	1898999	482000	401000	737000	291000	999000	957000
834000	297000	669000	616000	129000	115999	861000	3251000
911000	148000	433000	488000	67000	516000	136000	29999
124000	1938000	172000	59000	3500000	537000	849000	851000
597000	741000	556000	549000	679000	969999	1237000	31000
666000	54000	374000	455999	453000	258000	428000	262000
389000	339000	277000	578000	684000	949000	227000	5830000
721000	751000	2400000	990000	1282000	1147000	558000	722000
563000	2300000	2200000	488999	276000	434000	372000	1520000
202999	541000	254000	528000	102000	311000	977000	1251000
1445000	98000	59259	153000	1051000	591000	319000	454000
1160000	3300000	791000	802999	1789999	1044999	279000	944999
1859000	2175000	430999	803999	934000	357000	965000	341000
75527	1132000	352000	252999	313000	391000	2051000	212000
2575000	1516000	359000	209000	1220000	1180000	45957	1265000
382000	526000	90177	46000	307000	746000]		

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Unique values of km_driven

[145500	120000	140000	127000	45000	175000	5000	90000	169000
68000	100000	40000	70000	53000	80000	50000	72000	35000
28000	25000	2388	16200	10000	15000	42000	60000	76000
28900	86300	23300	32600	10300	77000	99000	27800	49800
151000	54700	64000	63000	127700	33900	59000	110000	147000
30000	135000	9850	78000	170000	49000	32000	38000	44000
12000	55500	61500	150000	37800	114000	48000	69000	13000

76139	65000	1303	31800	20000	17000	21000	37000	29500
7500	19000	41000	39000	22000	47000	72200	49900	9000
11000	95000	18000	46100	16000	9654	24300	42163	8000
71000	9500	36600	14000	120600	86000	7800	31377	75000
93000	125000	13500	162500	92500	158000	2000	181000	193000
122358	95200	33033	63063	207890	7976	16500	99361	33000
80100	160000	26000	29000	58000	36000	185000	162000	67000
52000	68089	58343	38817	56494	79328	5621	25538	69779
56290	8500	7032	106000	240000	214000	1000	265000	134000
2136	250000	130000	99500	119000	44665	123000	34000	146000
85000	201850	46000	190000	43000	14200	19100	54000	101500
55735	1500	181491	53319	40906	31711	43755	66693	59549
94385	73730	221889	116104	150546	148120	142000	126000	24000
101000	168000	165000	98500	98000	77800	51492	136000	91000
167000	180000	6000	91500	132478	51000	105000	137500	88000
156060	107000	57000	300000	200000	18945	144000	107825	1620
141000	108000	55000	37944	90400	96000	193623	63186	219000
23000	94000	140500	143000	195000	360003	8079	114368	79990
81632	155201	101504	90165	86017	85036	125531	206000	49700
74000	6550	56000	41779	31000	13534	7000	28156	63309
155000	11500	3000	157000	27000	26300	89100	104000	210000
216000	84000	161000	72113	113000	96443	51500	104500	49102
81000	227000	117000	8576	19723	21446	52289	52236	54470
25471	33928	59736	54290	2118	61379	58544	74381	63982
56429	19500	56832	30528	65285	20102	52380	74250	57247
178000	42323	42462	54723	42545	20375	43978	40200	27233
28832	103000	142500	115000	35500	17500	92000	4500	83000
6750	18500	50478	9200	2300	4295	5229	4701	6757
28182	11533	11688	57728	23712	70670	43381	79011	58500
43500	12700	49455	46815	334000	100875	118000	128000	144030
176000	89000	97000	12800	65100	15200	82000	116500	145000
73000	113226	160500	132000	217000	139000	3500	62000	1500000
120005	16830	93468	16589	53201	25272	53619	6001	202000
71717	84321	177000	205000	41800	88700	188000	225000	5500
4875	2700	58511	26235	26766	1600	24522	13663	58945
375000	156975	27620	143200	138000	189000	156000	10800	67500
255000	71850	112000	159000	76131	51777	64788	46951	74537
23500	68600	13887	66000	24400	27500	67840	380000	112880
61915	184000	6200	16700	7967	9656	68609	33360	14317
87237	62960	26634	163720	67998	20706	100581	67303	79139
84784	130376	33500	22053	78432	270000	7200	117500	78500
115717	4000	26432	46702	46706	53523	56365	49563	56432
52365	53512	46533	58632	65300	39395	230000	32500	64800
248000	66444	218463	153000	87185	137000	3564	48756	80322
173000	148000	6500	220000	108957	22200	260000	42108	79000
17100	43001	100600	92385	116000	72500	82500	50600	121000
101903	85568	3100	186000	59300	89322	48300	23511	22512
62900	52442	34156	34152	62841	38600	27654	48698	32995

90150	85700	25339	41232	68240	92651	88754	23700	69500
28050	22947	7672	36659	44500	9900	124316	6544	49600
198000	103994	35008	31100	42312	54891	18890	75010	4337
14495	83585	48406	56239	33243	15858	87847	87000	112072
52269	15780	2360457	108800	12500	577414	121941	152186	82246
89580	2789	35278	2860	78562	36088	129000	500000	133000
64500	24500	45500	71500	93500	60300	44391	56315	15151
114321	37333	330000	291000	21500	197000	40300	30030	29029
72072	82082	80600	58609	33003	165500	5800	68700	102996
96500	52412	85472	87452	66530	32331	172000	23456	136500
111000	42500	47200	246000	5200	10500	93331	109000	5400
102000	29700	7600	29340	80800	24265	56900	88200	40800
8588	305000	212000	101200	179150	84487	264000	51146	298000
149000	291977	36800	52200	248200	7720	57882	242000	55380
18816	33019	47747	45900	68697	147279	24700	43526	55885
16034	156040	93415	122000	68519	22966	2350	59872	91182
59500	75500	152500	69123	77524	40523	23600	290000	24177
121779	15381	74800	109322	475000	61000	80500	65755	2600
15500	50700	440000	152000	200400	7300	9750	157138	285000
127991	13120	87500	62200	87540	231438	239451	154000	426000
182000	215000	77300	61260	17601	4773	57900	8600	78010
83844	23999	91400	178500	66953	166000	131000	100750	48676
79500	200185	49025	76460	47370	45217	222300	44600	28080
28800	21900	28100	7673	96272	22500	7400	370000	150360
42130	147500	56194	54188	54043	66657	35582	54327	7949
59734	49185	56389	58245	36422	42535	40736	56246	55403
105358	49200	81500	3177	39414	30078	44588	49907	67082
112879	10200	1300	175802	192000	73840	320000	24857	26442
50800	40142	9400	12584	4300	14548	44772	48500	28782
28451	36500	44885	131111	58400	23400	3010	163000	77088
136511	36710	28180	44077	55768	123278	26500	18484	2560
103655	56975	187000	218000	73257	26320	38426	116700	176062
77500	39500	55896	30400	164000	271000	75262	91863	47552
14700	19700	145241	95500	53473	75958	31596	85710	129627
55130	22522	51856	29434	34500	6825	112011	53534	248119
24019	19600	376412	183000	108916	59865	68140	53190	70100
47725	70195	77395	74321	80235	77150	61100	82300	82050
29899	59235	201000	77215	48228	58559	50856	18300	59292
21147	61173	91567	33400	92686	67600	49500	112048	30646
43011	104300	73500	280000	35700	22700	21871	55425	37659
37500	19800	45629	68850	45775	68203	97343	82507	59400
125876	56800	65204	2286	15732	49523	36521	64481	49060
37161	60175	49957	43235	50699	1	50074	30154	26263
84925	46357	46737	110048	186388	20171	37151	58161	50171
55161	9599	16151	28161	80868	194000	191000]		

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Unique values of fuel

['Diesel' 'Petrol' 'LPG' 'CNG']

=====

Unique values of seller_type

['Individual' 'Dealer' 'Trustmark Dealer']

=====

Unique values of transmission

['Manual' 'Automatic']

=====

Unique values of owner

['First Owner' 'Second Owner' 'Third Owner' 'Fourth & Above Owner'
'Test Drive Car']

=====

Unique values of mileage

['23.4 kmpl' '21.14 kmpl' '17.7 kmpl' '23.0 kmpl' '16.1 kmpl' '20.14 kmpl'
'17.3 km/kg' '23.59 kmpl' '20.0 kmpl' '19.01 kmpl' '17.3 kmpl'
'19.3 kmpl' '18.9 kmpl' '18.15 kmpl' '24.52 kmpl' '19.7 kmpl'
'22.54 kmpl' '21.0 kmpl' '25.5 kmpl' '26.59 kmpl' '21.5 kmpl' '20.3 kmpl'
'21.4 kmpl' '24.7 kmpl' '18.2 kmpl' '16.8 kmpl' '24.3 kmpl' '14.0 kmpl'
'18.6 kmpl' '33.44 km/kg' '23.95 kmpl' '17.0 kmpl' '20.63 kmpl'
'13.93 kmpl' '16.0 kmpl' '17.8 kmpl' '18.5 kmpl' '12.55 kmpl'
'12.99 kmpl' '14.8 kmpl' '13.5 kmpl' '26.0 kmpl' '20.65 kmpl' '27.3 kmpl'
'11.36 kmpl' '17.68 kmpl' '14.28 kmpl' '18.53 kmpl' '14.84 kmpl'
'21.12 kmpl' '20.36 kmpl' '21.27 kmpl' '18.16 kmpl' '22.0 kmpl'
'25.1 kmpl' '20.51 kmpl' '21.66 kmpl' '25.2 kmpl' '22.9 kmpl'
'16.02 kmpl' '20.54 kmpl' '22.77 kmpl' '15.71 kmpl' '23.1 kmpl'
'19.02 kmpl' '19.81 kmpl' '26.2 km/kg' '16.47 kmpl' '15.04 kmpl'
'19.1 kmpl' '21.79 kmpl' '18.8 kmpl' '21.21 kmpl' '15.37 kmpl'
'11.79 kmpl' '19.0 kmpl' '14.3 kmpl' '15.8 kmpl' '15.1 kmpl' '19.09 kmpl'
'22.32 kmpl' '21.9 kmpl' '14.53 kmpl' '21.63 kmpl' '20.85 kmpl'
'20.45 kmpl' '19.67 kmpl' '23.01 kmpl' '20.77 kmpl' '17.92 kmpl'
'17.01 kmpl' '22.37 kmpl' '19.33 kmpl' '9.5 kmpl' '12.83 kmpl'
'22.48 kmpl' '16.78 kmpl' '14.67 kmpl' '15.0 kmpl' '13.96 kmpl'
'18.0 kmpl' '12.07 kmpl' '26.21 kmpl' '10.8 kmpl' '16.3 kmpl' '13.6 kmpl'
'14.74 kmpl' '15.6 kmpl' '19.56 kmpl' '22.69 kmpl' '19.16 kmpl'
'18.12 kmpl' '12.1 kmpl' '17.5 kmpl' '42.0 kmpl' '20.4 kmpl' '21.1 kmpl'
'19.44 kmpl' '13.0 kmpl' '21.43 kmpl' '22.95 kmpl' '16.2 kmpl'
'15.3 kmpl' '28.09 kmpl' '17.4 kmpl' '19.4 kmpl' '26.6 km/kg' '17.6 kmpl'
'28.4 kmpl' '14.1 kmpl' '25.17 kmpl' '22.74 kmpl' '17.57 kmpl'
'16.95 kmpl' '19.49 kmpl' '17.21 kmpl' '13.2 kmpl' '14.2 kmpl'
'26.8 kmpl' '25.4 kmpl' '11.5 kmpl' '27.28 kmpl' '17.97 kmpl' '12.8 kmpl'
'16.55 kmpl' '12.05 kmpl' '14.07 kmpl' '21.02 kmpl' '11.57 kmpl'
'17.9 kmpl' '15.96 kmpl' '17.1 kmpl' '17.19 kmpl' '21.01 kmpl'
'24.0 kmpl' '25.6 kmpl' '21.38 kmpl' '23.84 kmpl' '23.08 kmpl'
'14.24 kmpl' '20.71 kmpl' '15.64 kmpl' '14.5 kmpl' '16.34 kmpl'
'27.39 kmpl' '11.1 kmpl' '13.9 kmpl' '20.88 km/kg' '20.92 kmpl'
'23.8 kmpl' '24.4 kmpl' '15.29 kmpl' '21.19 kmpl' '22.5 kmpl' '19.6 kmpl'
'23.65 kmpl' '25.32 kmpl' '23.5 kmpl' '16.6 kmpl' '23.9 kmpl' '20.8 kmpl'
'27.62 kmpl' '12.9 kmpl' '25.44 kmpl' '17.88 kmpl' '22.7 kmpl'
'17.2 kmpl' '15.42 kmpl' '19.68 kmpl' '18.7 kmpl' '15.4 kmpl']

'19.34 kmpl' '22.71 kmpl' '25.8 kmpl' '13.7 kmpl' '12.2 kmpl'
 '18.49 kmpl' '9.0 kmpl' '0.0 kmpl' '13.58 kmpl' '10.1 kmpl' '20.5 kmpl'
 '25.0 kmpl' '10.5 kmpl' '22.07 kmpl' '22.3 kmpl' '15.26 kmpl'
 '20.62 kmpl' '27.4 kmpl' '23.2 kmpl' '14.4 kmpl' '18.4 kmpl'
 '30.46 km/kg' '14.02 kmpl' '11.0 kmpl' '20.6 kmpl' '22.05 kmpl'
 '20.2 kmpl' '18.1 kmpl' '22.1 kmpl' '19.87 kmpl' '13.01 kmpl'
 '18.06 kmpl' '26.1 kmpl' '16.52 kmpl' '13.55 kmpl' '24.2 kmpl'
 '25.83 kmpl' '11.2 kmpl' '17.09 kmpl' '21.03 kmpl' '17.45 kmpl'
 '21.64 kmpl' '21.94 km/kg' '13.87 kmpl' '19.98 kmpl' '20.52 kmpl'
 '23.57 kmpl' '11.7 kmpl' '17.43 kmpl' '18.88 kmpl' '13.68 kmpl'
 '11.18 kmpl' '20.89 kmpl' '11.8 kmpl' '19.62 kmpl' '21.7 kmpl'
 '14.9 kmpl' '19.5 kmpl' '10.91 kmpl' '15.7 kmpl' '20.73 kmpl'
 '15.85 kmpl' '20.7 kmpl' '14.23 kmpl' '16.5 kmpl' '17.36 kmpl'
 '12.6 kmpl' '16.36 kmpl' '14.95 kmpl' '16.9 kmpl' '19.2 kmpl'
 '16.96 kmpl' '22.15 kmpl' '18.78 kmpl' '19.61 kmpl' '17.71 kmpl'
 '18.3 kmpl' '19.12 kmpl' '19.72 kmpl' '12.0 kmpl' '11.4 kmpl'
 '23.03 kmpl' '11.07 kmpl' '15.9 kmpl' '17.67 kmpl' '20.46 kmpl'
 '13.1 kmpl' '13.45 km/kg' '24.8 kmpl' '15.73 kmpl' '15.11 kmpl'
 '12.7 kmpl' '21.2 kmpl' '20.38 kmpl' '21.56 kmpl' '13.22 kmpl'
 '14.49 kmpl' '15.05 kmpl' '23.26 kmpl' '15.41 kmpl' '13.8 kmpl'
 '22.27 kmpl' '32.52 km/kg' '14.66 kmpl' '12.12 kmpl' '16.84 kmpl'
 '14.09 kmpl' '14.7 kmpl' '13.4 kmpl' '15.5 kmpl' '13.49 kmpl'
 '11.88 km/kg' '14.6 kmpl' '10.75 kmpl' '24.5 kmpl' '11.74 kmpl'
 '16.07 kmpl' '15.63 kmpl' '26.3 km/kg' '23.7 km/kg' '25.47 kmpl'
 '17.05 kmpl' '23.3 kmpl' '11.9 kmpl' '13.38 kmpl' '20.86 kmpl'
 '19.2 km/kg' '10.9 kmpl' '18.25 kmpl' '15.2 kmpl' '20.37 kmpl'
 '17.8 km/kg' '21.8 kmpl' '11.96 kmpl' '24.04 kmpl' '19.69 kmpl'
 '13.73 kmpl' '21.04 kmpl' '25.01 kmpl' '10.93 kmpl' '10.9 km/kg'
 '24.29 kmpl' '13.44 kmpl' '20.07 kmpl' '21.1 km/kg' '19.08 kmpl'
 '20.34 kmpl' '11.68 kmpl' '12.5 kmpl' '12.3 kmpl' '23.87 kmpl'
 '16.38 kmpl' '17.42 kmpl' '10.0 kmpl' '18.24 kmpl' '10.71 kmpl'
 '19.59 kmpl' '16.7 kmpl' '19.83 kmpl' '21.76 kmpl' '16.05 kmpl'
 '20.28 kmpl' '16.25 kmpl' '16.73 kmpl' '18.48 kmpl' '13.2 km/kg'
 '21.4 km/kg' '14.99 kmpl' '18.76 kmpl' '16.4 kmpl' '19.64 kmpl'
 '14.94 kmpl' '16.6 km/kg' '16.0 km/kg' '17.11 kmpl' '22.8 km/kg'
 '32.26 km/kg' '33.0 km/kg' '12.4 kmpl' '18.44 kmpl' '16.09 kmpl'
 '19.0 km/kg' '12.62 kmpl' '21.13 kmpl' '15.17 kmpl' '21.73 kmpl'
 '21.72 kmpl' '12.85 kmpl' '14.81 kmpl' '13.24 kmpl' '14.4 km/kg'
 '21.49 kmpl' '14.62 kmpl' '26.83 km/kg' '11.45 kmpl' '12.08 kmpl'
 '15.74 kmpl' '11.3 kmpl' '15.1 km/kg' '14.21 kmpl' '11.72 kmpl'
 '16.51 kmpl']

=====

Unique values of engine

['1248 CC' '1498 CC' '1497 CC' '1396 CC' '1298 CC' '1197 CC' '1061 CC'
 '796 CC' '1364 CC' '1399 CC' '1461 CC' '993 CC' '1198 CC' '1199 CC'
 '998 CC' '1591 CC' '2179 CC' '1368 CC' '2982 CC' '2494 CC' '2143 CC'
 '2477 CC' '1462 CC' '2755 CC' '1968 CC' '1798 CC' '1196 CC' '1373 CC'
 '1598 CC' '1998 CC' '1086 CC' '1194 CC' '1172 CC' '1405 CC' '1582 CC']

```
'999 CC' '2487 CC' '1999 CC' '3604 CC' '2987 CC' '1995 CC' '1451 CC'
'1969 CC' '2967 CC' '2497 CC' '1797 CC' '1991 CC' '2362 CC' '1493 CC'
'1599 CC' '1341 CC' '1794 CC' '799 CC' '1193 CC' '2696 CC' '1495 CC'
'1186 CC' '1047 CC' '2498 CC' '2956 CC' '2523 CC' '1120 CC' '624 CC'
'1496 CC' '1984 CC' '2354 CC' '814 CC' '793 CC' '1799 CC' '936 CC'
'1956 CC' '1997 CC' '1499 CC' '1948 CC' '2997 CC' '2489 CC' '2499 CC'
'2609 CC' '2953 CC' '1150 CC' '1994 CC' '1388 CC' '1527 CC' '2199 CC'
'995 CC' '2993 CC' '1586 CC' '1390 CC' '909 CC' '2393 CC' '3198 CC'
'1339 CC' '2835 CC' '2092 CC' '1595 CC' '2496 CC' '1596 CC' '1597 CC'
'2596 CC' '2148 CC' '1299 CC' '1590 CC' '2231 CC' '2694 CC' '2200 CC'
'1795 CC' '1896 CC' '1796 CC' '1422 CC' '1489 CC' '2359 CC' '2197 CC'
'2999 CC' '1781 CC' '2650 CC' '1343 CC' '2446 CC' '3498 CC' '2198 CC'
'2776 CC' '1950 CC']
```

=====

Unique values of max_power

```
['74 bhp' '103.52 bhp' '78 bhp' '90 bhp' '88.2 bhp' '81.86 bhp' '57.5 bhp'
'37 bhp' '67.1 bhp' '68.1 bhp' '108.45 bhp' '60 bhp' '73.9 bhp' '67 bhp'
'82 bhp' '88.5 bhp' '46.3 bhp' '88.73 bhp' '64.1 bhp' '98.6 bhp'
'88.8 bhp' '83.81 bhp' '83.1 bhp' '47.3 bhp' '73.8 bhp' '34.2 bhp'
'35 bhp' '81.83 bhp' '40.3 bhp' '121.3 bhp' '138.03 bhp' '160.77 bhp'
'117.3 bhp' '116.3 bhp' '83.14 bhp' '67.05 bhp' '168.5 bhp' '100 bhp'
'120.7 bhp' '98.63 bhp' '175.56 bhp' '103.25 bhp' '171.5 bhp' '100.6 bhp'
'174.33 bhp' '187.74 bhp' '170 bhp' '78.9 bhp' '88.76 bhp' '86.8 bhp'
'108.495 bhp' '108.62 bhp' '93.7 bhp' '103.6 bhp' '98.59 bhp' '189 bhp'
'67.04 bhp' '68.05 bhp' '58.2 bhp' '82.85 bhp' '81.80 bhp' '73 bhp'
'120 bhp' '94.68 bhp' '160 bhp' '65 bhp' '155 bhp' '69.01 bhp'
'126.32 bhp' '138.1 bhp' '83.8 bhp' '126.2 bhp' '98.96 bhp' '62.1 bhp'
'86.7 bhp' '188 bhp' '214.56 bhp' '177 bhp' '280 bhp' '148.31 bhp'
'254.79 bhp' '190 bhp' '177.46 bhp' '204 bhp' '141 bhp' '117.6 bhp'
'241.4 bhp' '282 bhp' '150 bhp' '147.5 bhp' '108.5 bhp' '103.5 bhp'
'183 bhp' '181.04 bhp' '157.7 bhp' '164.7 bhp' '91.1 bhp' '400 bhp'
'68 bhp' '75 bhp' '85.8 bhp' '87.2 bhp' '53 bhp' '118 bhp' '103.2 bhp'
'83 bhp' '84 bhp' '58.16 bhp' '147.94 bhp' '74.02 bhp' '53.3 bhp'
'80 bhp' '88.7 bhp' '97.7 bhp' '121.36 bhp' '162 bhp' '140 bhp' '94 bhp'
'100.57 bhp' '82.9 bhp' '83.11 bhp' '70 bhp' '153.86 bhp' '121 bhp'
'126.3 bhp' '73.97 bhp' '171 bhp' '69 bhp' '99.6 bhp' '102 bhp' '105 bhp'
'63 bhp' '79.4 bhp' '97.9 bhp' '63.1 bhp' '66.1 bhp' '110 bhp'
'174.5 bhp' '53.26 bhp' '73.75 bhp' '67.06 bhp' '64.08 bhp' '37.5 bhp'
'189.3 bhp' '158.8 bhp' '61.7 bhp' '55.2 bhp' '71.01 bhp' '73.74 bhp'
'147.9 bhp' '71 bhp' '77 bhp' '121.4 bhp' '113.4 bhp' '47 bhp' '130 bhp'
'57.6 bhp' '138 bhp' '52.8 bhp' '53.64 bhp' '53.5 bhp' '76.8 bhp'
'82.4 bhp' '113.42 bhp' '76 bhp' '84.8 bhp' '56.3 bhp' '218 bhp'
'112 bhp' '92 bhp' '105.5 bhp' '169 bhp' '95 bhp' '72.4 bhp' '115 bhp'
'152 bhp' '91.2 bhp' '156 bhp' '74.9 bhp' '62 bhp' '105.3 bhp'
'73.94 bhp' '85.80 bhp' '85 bhp' '118.3 bhp' '72 bhp' '147.51 bhp'
'58 bhp' '64 bhp' '126.24 bhp' '76.9 bhp' '194.3 bhp' '99.23 bhp'
'89.84 bhp' '123.7 bhp' '118.35 bhp' '99 bhp' '241 bhp' '136 bhp'
'261.4 bhp' '104.68 bhp' '37.48 bhp' '104 bhp' '88.50 bhp' '63.12 bhp']
```

```
'91.7 bhp' '102.5 bhp' '177.6 bhp' '45 bhp' '123.37 bhp' '147.8 bhp'
'184 bhp' '84.48 bhp' '68.07 bhp' '74.96 bhp' '167.6 bhp' '152.87 bhp'
'112.2 bhp' '83.83 bhp' '197 bhp' '110.4 bhp' '104.55 bhp' '103 bhp'
'103.3 bhp' '66 bhp' '108.6 bhp' '165 bhp' '163.7 bhp' '116.9 bhp'
'94.93 bhp' '127 bhp' '198.5 bhp' '179.5 bhp' '120.69 bhp' '121.31 bhp'
'138.08 bhp' '187.7 bhp' '80.8 bhp' '86.79 bhp' '93.87 bhp' '116.6 bhp'
'143 bhp' '92.7 bhp' '88 bhp' '58.33 bhp' '78.8 bhp' '64.4 bhp' '125 bhp'
'139.01 bhp' '254.8 bhp' '181 bhp' '258 bhp' '55.23 bhp' '270.9 bhp'
'265 bhp' '157.75 bhp' '101 bhp' '186 bhp' '187.4 bhp' '224 bhp'
'64.9 bhp' '148 bhp' '35.5 bhp' '89.75 bhp' '32.8 bhp' '91.72 bhp'
'106 bhp' '98.97 bhp' '66.6 bhp' '86 bhp' '65.3 bhp' '98.82 bhp'
'198.25 bhp' '38 bhp' '142 bhp' '132 bhp' '174.57 bhp' '178 bhp'
'163.2 bhp' '203.2 bhp' '177.5 bhp' '175 bhp' '57 bhp' '80.84 bhp'
'68.4 bhp' '167.67 bhp' '170.63 bhp' '52 bhp' '149.5 bhp' '48.21 bhp'
' bhp' '201.1 bhp' '100.5 bhp' '144 bhp' '194.4 bhp' '168.7 bhp'
'104.5 bhp' '103.26 bhp' '116.4 bhp' '98.79 bhp' '80.9 bhp' '58.3 bhp'
'272 bhp' '235 bhp' '167.62 bhp' '170.30 bhp' '139.46 bhp' '158 bhp'
'110.5 bhp' '82.5 bhp' '141.1 bhp' '38.4 bhp' '197.2 bhp' '161 bhp'
'194 bhp' '122.4 bhp' '134.10 bhp' '60.2 bhp' '134 bhp' '203 bhp'
'135.1 bhp']
```

```
=====
```

```
Unique values of seats
```

```
[ 5.  4.  7.  8.  6.  9. 10. 14.  2.]
```

```
=====
```

```
[40]: def get_brand_name(car_name):
       car_name = car_name.split(' ')[0]
       return car_name.strip()
```

```
[42]: def clean_data(value):
       value = value.split(' ')[0]
       value = value.strip()
       if value == '':
           value = 0
       return float(value)
```

```
[44]: get_brand_name('Maruti Swift Dzire VDI')
```

```
[44]: 'Maruti'
```

```
[46]: cars_data['name'] = cars_data['name'].apply(get_brand_name)
```

```
[48]: cars_data['name'].unique()
```

```
[48]: array(['Maruti', 'Skoda', 'Honda', 'Hyundai', 'Toyota', 'Ford', 'Renault',
'Mahindra', 'Tata', 'Chevrolet', 'Datsun', 'Jeep', 'Mercedes-Benz',
'Mitsubishi', 'Audi', 'Volkswagen', 'BMW', 'Nissan', 'Lexus',
```

```
'Jaguar', 'Land', 'MG', 'Volvo', 'Daewoo', 'Kia', 'Fiat', 'Force',
'Ambassador', 'Ashok', 'Isuzu', 'Opel'], dtype=object)
```

```
[50]: cars_data['mileage'] = cars_data['mileage'].apply(clean_data)
```

```
[52]: cars_data['max_power'] = cars_data['max_power'].apply(clean_data)
```

```
[54]: cars_data['engine'] = cars_data['engine'].apply(clean_data)
```

```
[56]: for col in cars_data.columns:
        print('Unique values of ' + col)
        print(cars_data[col].unique())
        print("=====")
```

Unique values of name

```
['Maruti' 'Skoda' 'Honda' 'Hyundai' 'Toyota' 'Ford' 'Renault' 'Mahindra'
'Tata' 'Chevrolet' 'Datsun' 'Jeep' 'Mercedes-Benz' 'Mitsubishi' 'Audi'
'Volkswagen' 'BMW' 'Nissan' 'Lexus' 'Jaguar' 'Land' 'MG' 'Volvo' 'Daewoo'
'Kia' 'Fiat' 'Force' 'Ambassador' 'Ashok' 'Isuzu' 'Opel']
```

=====

Unique values of year

```
[2014 2006 2010 2007 2017 2001 2011 2013 2005 2009 2016 2012 2002 2015
2018 2019 2008 2020 1999 2000 2003 2004 1994 1998 1997 1995 1996]
```

=====

Unique values of selling_price

```
[ 450000   370000   158000   225000   130000   440000    96000    45000
  350000   200000   500000    92000   280000   180000   400000   778000
  150000   680000   174000   950000   525000   600000   575000   275000
  300000   220000   254999   670000   730000   650000   330000   366000
1149000   425000  2100000   925000   675000   819999   390000  1500000
  700000  1450000  1090000   850000  1650000  1750000  1590000  1689999
1425000   265000   190000   630000   540000   448000   745000  1025000
  235000  1700000  1200000   610000  2500000   484999   315000   290000
  455000   351000   535000   175000   565000   120000   725000   185000
  615000   270000   625000   866000   375000   522000   451999   475000
  780000   595000  1140000   360000   105000   135000   690000  3975000
5150000  3200000  4100000  4500000  6000000  3790000  5800000  1864999
2700000   795000  3400000  2650000  5850000   975000   805000  2625000
  811000   550000   645000  2550000   599000   875000   894999   340000
1525000  2150000  1900000  2900000 10000000   160000   515000    40000
  480000   487000   386000   100000   490000   345000    85000   215000
  320000  459999    65000   720000   800000   520000   580000   420000
1250000   830000   335000   329000   775000   524000   245000   910000
  900000   250000  1100000   640000   409999   165000    80000  1000000
  110000   170000  1380000  1300000   530000   310000  1150000   380000
  404000   114999   465000   210000  4600000   509999    90000   409000
  395000    81000   555000   229999  1210000   325000    60000    89000
```

434999	3000000	570000	1550000	64000	140000	503000	3800000
2000000	740000	750000	5400000	5500000	779000	2475000	240000
1085000	95000	1290000	219000	260000	840000	292000	385000
1050000	735000	560000	585000	760000	430000	643000	285000
660000	268000	88000	561000	755000	125000	1600000	801000
317000	495000	236000	1800000	415000	217000	466000	605000
1350000	337000	655000	196000	299000	634000	1225000	238000
590000	195000	715000	168000	531000	1625000	145000	441000
67500	321000	298000	1075000	681000	810000	573000	101000
1019999	244000	1165000	241000	327000	620000	204999	576000
695000	231000	261000	371000	421000	710000	1040000	199000
305000	1745000	611000	75000	55000	1325000	885000	108000
272000	1125000	388000	757000	626000	793000	3750000	1400000
1925000	844999	2940000	1825000	890000	770000	467000	711000
511000	166000	392000	833000	35000	880000	1030000	521000
451000	472000	649000	429000	1576000	825000	470000	1560000
1950000	786000	731000	191000	651000	445000	93150	403000
144000	52000	302000	869999	155000	246000	405000	70000
3250000	1143000	635000	1575000	318000	152000	248000	1465000
1080000	678000	1460000	756000	665000	2950000	377000	1675000
169000	685000	749000	899000	259000	416000	773000	889000
118000	256000	1888000	99000	2280000	31504	295000	444000
860000	2450000	198000	2825000	2125000	3350000	365000	919999
2600000	839000	1594000	161000	423000	551000	50000	411000
1530000	376000	1850000	86000	822000	30000	252000	131000
128000	790000	604000	1175000	141000	151000	577000	83000
946000	356000	955000	978999	348000	399000	362000	499000
358000	278000	426000	211000	1270000	426999	960000	1031000
72000	479000	764000	2199000	3600000	184000	119000	267000
328000	112999	39000	2850000	2800000	3900000	221000	631000
308000	940000	361000	355000	7200000	930000	1670000	980000
486000	242000	654000	835000	408000	94500	1110000	438999
911999	693000	449000	1390000	698000	539000	765000	562000
571000	589000	227999	1151000	1295000	4090000	347000	493000
545000	1475000	287000	1630000	501000	181000	2711000	1035000
316000	813000	1190000	378000	156000	194000	754000	55599
1511000	78000	250999	312000	66000	369000	149000	752000
142000	111000	206000	567000	699000	632000	905000	1145000
58000	179000	1515000	178000	222000	387000	1405000	282000
458000	157000	497000	1227000	574000	121000	3100000	68000
1920000	808000	512000	671000	799000	1365000	1490000	80500
189000	892000	93000	1680000	667000	204000	42000	694000
861999	476999	5200000	2375000	2750000	1385000	785000	1275000
1748999	132000	33351	2064000	469000	906000	797000	6223000
5923000	6523000	122000	891000	346000	532000	974000	483000
138000	432000	1757000	412000	126000	736000	579000	187000
4000000	1898999	482000	401000	737000	291000	999000	957000
834000	297000	669000	616000	129000	115999	861000	3251000

911000	148000	433000	488000	67000	516000	136000	29999
124000	1938000	172000	59000	3500000	537000	849000	851000
597000	741000	556000	549000	679000	969999	1237000	31000
666000	54000	374000	455999	453000	258000	428000	262000
389000	339000	277000	578000	684000	949000	227000	5830000
721000	751000	2400000	990000	1282000	1147000	558000	722000
563000	2300000	2200000	488999	276000	434000	372000	1520000
202999	541000	254000	528000	102000	311000	977000	1251000
1445000	98000	59259	153000	1051000	591000	319000	454000
1160000	3300000	791000	802999	1789999	1044999	279000	944999
1859000	2175000	430999	803999	934000	357000	965000	341000
75527	1132000	352000	252999	313000	391000	2051000	212000
2575000	1516000	359000	209000	1220000	1180000	45957	1265000
382000	526000	90177	46000	307000	746000]		

=====

Unique values of km_driven

[145500	120000	140000	127000	45000	175000	5000	90000	169000
68000	100000	40000	70000	53000	80000	50000	72000	35000
28000	25000	2388	16200	10000	15000	42000	60000	76000
28900	86300	23300	32600	10300	77000	99000	27800	49800
151000	54700	64000	63000	127700	33900	59000	110000	147000
30000	135000	9850	78000	170000	49000	32000	38000	44000
12000	55500	61500	150000	37800	114000	48000	69000	13000
76139	65000	1303	31800	20000	17000	21000	37000	29500
7500	19000	41000	39000	22000	47000	72200	49900	9000
11000	95000	18000	46100	16000	9654	24300	42163	8000
71000	9500	36600	14000	120600	86000	7800	31377	75000
93000	125000	13500	162500	92500	158000	2000	181000	193000
122358	95200	33033	63063	207890	7976	16500	99361	33000
80100	160000	26000	29000	58000	36000	185000	162000	67000
52000	68089	58343	38817	56494	79328	5621	25538	69779
56290	8500	7032	106000	240000	214000	1000	265000	134000
2136	250000	130000	99500	119000	44665	123000	34000	146000
85000	201850	46000	190000	43000	14200	19100	54000	101500
55735	1500	181491	53319	40906	31711	43755	66693	59549
94385	73730	221889	116104	150546	148120	142000	126000	24000
101000	168000	165000	98500	98000	77800	51492	136000	91000
167000	180000	6000	91500	132478	51000	105000	137500	88000
156060	107000	57000	300000	200000	18945	144000	107825	1620
141000	108000	55000	37944	90400	96000	193623	63186	219000
23000	94000	140500	143000	195000	360003	8079	114368	79990
81632	155201	101504	90165	86017	85036	125531	206000	49700
74000	6550	56000	41779	31000	13534	7000	28156	63309
155000	11500	3000	157000	27000	26300	89100	104000	210000
216000	84000	161000	72113	113000	96443	51500	104500	49102
81000	227000	117000	8576	19723	21446	52289	52236	54470
25471	33928	59736	54290	2118	61379	58544	74381	63982
56429	19500	56832	30528	65285	20102	52380	74250	57247

178000	42323	42462	54723	42545	20375	43978	40200	27233
28832	103000	142500	115000	35500	17500	92000	4500	83000
6750	18500	50478	9200	2300	4295	5229	4701	6757
28182	11533	11688	57728	23712	70670	43381	79011	58500
43500	12700	49455	46815	334000	100875	118000	128000	144030
176000	89000	97000	12800	65100	15200	82000	116500	145000
73000	113226	160500	132000	217000	139000	3500	62000	1500000
120005	16830	93468	16589	53201	25272	53619	6001	202000
71717	84321	177000	205000	41800	88700	188000	225000	5500
4875	2700	58511	26235	26766	1600	24522	13663	58945
375000	156975	27620	143200	138000	189000	156000	10800	67500
255000	71850	112000	159000	76131	51777	64788	46951	74537
23500	68600	13887	66000	24400	27500	67840	380000	112880
61915	184000	6200	16700	7967	9656	68609	33360	14317
87237	62960	26634	163720	67998	20706	100581	67303	79139
84784	130376	33500	22053	78432	270000	7200	117500	78500
115717	4000	26432	46702	46706	53523	56365	49563	56432
52365	53512	46533	58632	65300	39395	230000	32500	64800
248000	66444	218463	153000	87185	137000	3564	48756	80322
173000	148000	6500	220000	108957	22200	260000	42108	79000
17100	43001	100600	92385	116000	72500	82500	50600	121000
101903	85568	3100	186000	59300	89322	48300	23511	22512
62900	52442	34156	34152	62841	38600	27654	48698	32995
90150	85700	25339	41232	68240	92651	88754	23700	69500
28050	22947	7672	36659	44500	9900	124316	6544	49600
198000	103994	35008	31100	42312	54891	18890	75010	4337
14495	83585	48406	56239	33243	15858	87847	87000	112072
52269	15780	2360457	108800	12500	577414	121941	152186	82246
89580	2789	35278	2860	78562	36088	129000	500000	133000
64500	24500	45500	71500	93500	60300	44391	56315	15151
114321	37333	330000	291000	21500	197000	40300	30030	29029
72072	82082	80600	58609	33003	165500	5800	68700	102996
96500	52412	85472	87452	66530	32331	172000	23456	136500
111000	42500	47200	246000	5200	10500	93331	109000	5400
102000	29700	7600	29340	80800	24265	56900	88200	40800
8588	305000	212000	101200	179150	84487	264000	51146	298000
149000	291977	36800	52200	248200	7720	57882	242000	55380
18816	33019	47747	45900	68697	147279	24700	43526	55885
16034	156040	93415	122000	68519	22966	2350	59872	91182
59500	75500	152500	69123	77524	40523	23600	290000	24177
121779	15381	74800	109322	475000	61000	80500	65755	2600
15500	50700	440000	152000	200400	7300	9750	157138	285000
127991	13120	87500	62200	87540	231438	239451	154000	426000
182000	215000	77300	61260	17601	4773	57900	8600	78010
83844	23999	91400	178500	66953	166000	131000	100750	48676
79500	200185	49025	76460	47370	45217	222300	44600	28080
28800	21900	28100	7673	96272	22500	7400	370000	150360
42130	147500	56194	54188	54043	66657	35582	54327	7949

59734	49185	56389	58245	36422	42535	40736	56246	55403
105358	49200	81500	3177	39414	30078	44588	49907	67082
112879	10200	1300	175802	192000	73840	320000	24857	26442
50800	40142	9400	12584	4300	14548	44772	48500	28782
28451	36500	44885	131111	58400	23400	3010	163000	77088
136511	36710	28180	44077	55768	123278	26500	18484	2560
103655	56975	187000	218000	73257	26320	38426	116700	176062
77500	39500	55896	30400	164000	271000	75262	91863	47552
14700	19700	145241	95500	53473	75958	31596	85710	129627
55130	22522	51856	29434	34500	6825	112011	53534	248119
24019	19600	376412	183000	108916	59865	68140	53190	70100
47725	70195	77395	74321	80235	77150	61100	82300	82050
29899	59235	201000	77215	48228	58559	50856	18300	59292
21147	61173	91567	33400	92686	67600	49500	112048	30646
43011	104300	73500	280000	35700	22700	21871	55425	37659
37500	19800	45629	68850	45775	68203	97343	82507	59400
125876	56800	65204	2286	15732	49523	36521	64481	49060
37161	60175	49957	43235	50699	1	50074	30154	26263
84925	46357	46737	110048	186388	20171	37151	58161	50171
55161	9599	16151	28161	80868	194000	191000]		

=====

Unique values of fuel

['Diesel' 'Petrol' 'LPG' 'CNG']

=====

Unique values of seller_type

['Individual' 'Dealer' 'Trustmark Dealer']

=====

Unique values of transmission

['Manual' 'Automatic']

=====

Unique values of owner

['First Owner' 'Second Owner' 'Third Owner' 'Fourth & Above Owner'
'Test Drive Car']

=====

Unique values of mileage

[23.4	21.14	17.7	23.	16.1	20.14	17.3	23.59	20.	19.01	19.3	18.9
18.15	24.52	19.7	22.54	21.	25.5	26.59	21.5	20.3	21.4	24.7	18.2
16.8	24.3	14.	18.6	33.44	23.95	17.	20.63	13.93	16.	17.8	18.5
12.55	12.99	14.8	13.5	26.	20.65	27.3	11.36	17.68	14.28	18.53	14.84
21.12	20.36	21.27	18.16	22.	25.1	20.51	21.66	25.2	22.9	16.02	20.54
22.77	15.71	23.1	19.02	19.81	26.2	16.47	15.04	19.1	21.79	18.8	21.21
15.37	11.79	19.	14.3	15.8	15.1	19.09	22.32	21.9	14.53	21.63	20.85
20.45	19.67	23.01	20.77	17.92	17.01	22.37	19.33	9.5	12.83	22.48	16.78
14.67	15.	13.96	18.	12.07	26.21	10.8	16.3	13.6	14.74	15.6	19.56
22.69	19.16	18.12	12.1	17.5	42.	20.4	21.1	19.44	13.	21.43	22.95
16.2	15.3	28.09	17.4	19.4	26.6	17.6	28.4	14.1	25.17	22.74	17.57
16.95	19.49	17.21	13.2	14.2	26.8	25.4	11.5	27.28	17.97	12.8	16.55
12.05	14.07	21.02	11.57	17.9	15.96	17.1	17.19	21.01	24.	25.6	21.38

```

23.84 23.08 14.24 20.71 15.64 14.5 16.34 27.39 11.1 13.9 20.88 20.92
23.8 24.4 15.29 21.19 22.5 19.6 23.65 25.32 23.5 16.6 23.9 20.8
27.62 12.9 25.44 17.88 22.7 17.2 15.42 19.68 18.7 15.4 19.34 22.71
25.8 13.7 12.2 18.49 9. 0. 13.58 10.1 20.5 25. 10.5 22.07
22.3 15.26 20.62 27.4 23.2 14.4 18.4 30.46 14.02 11. 20.6 22.05
20.2 18.1 22.1 19.87 13.01 18.06 26.1 16.52 13.55 24.2 25.83 11.2
17.09 21.03 17.45 21.64 21.94 13.87 19.98 20.52 23.57 11.7 17.43 18.88
13.68 11.18 20.89 11.8 19.62 21.7 14.9 19.5 10.91 15.7 20.73 15.85
20.7 14.23 16.5 17.36 12.6 16.36 14.95 16.9 19.2 16.96 22.15 18.78
19.61 17.71 18.3 19.12 19.72 12. 11.4 23.03 11.07 15.9 17.67 20.46
13.1 13.45 24.8 15.73 15.11 12.7 21.2 20.38 21.56 13.22 14.49 15.05
23.26 15.41 13.8 22.27 32.52 14.66 12.12 16.84 14.09 14.7 13.4 15.5
13.49 11.88 14.6 10.75 24.5 11.74 16.07 15.63 26.3 23.7 25.47 17.05
23.3 11.9 13.38 20.86 10.9 18.25 15.2 20.37 21.8 11.96 24.04 19.69
13.73 21.04 25.01 10.93 24.29 13.44 20.07 19.08 20.34 11.68 12.5 12.3
23.87 16.38 17.42 10. 18.24 10.71 19.59 16.7 19.83 21.76 16.05 20.28
16.25 16.73 18.48 14.99 18.76 16.4 19.64 14.94 17.11 22.8 32.26 33.
12.4 18.44 16.09 12.62 21.13 15.17 21.73 21.72 12.85 14.81 13.24 21.49
14.62 26.83 11.45 12.08 15.74 11.3 14.21 11.72 16.51]

```

=====

Unique values of engine

```

[1248. 1498. 1497. 1396. 1298. 1197. 1061. 796. 1364. 1399. 1461. 993.
1198. 1199. 998. 1591. 2179. 1368. 2982. 2494. 2143. 2477. 1462. 2755.
1968. 1798. 1196. 1373. 1598. 1998. 1086. 1194. 1172. 1405. 1582. 999.
2487. 1999. 3604. 2987. 1995. 1451. 1969. 2967. 2497. 1797. 1991. 2362.
1493. 1599. 1341. 1794. 799. 1193. 2696. 1495. 1186. 1047. 2498. 2956.
2523. 1120. 624. 1496. 1984. 2354. 814. 793. 1799. 936. 1956. 1997.
1499. 1948. 2997. 2489. 2499. 2609. 2953. 1150. 1994. 1388. 1527. 2199.
995. 2993. 1586. 1390. 909. 2393. 3198. 1339. 2835. 2092. 1595. 2496.
1596. 1597. 2596. 2148. 1299. 1590. 2231. 2694. 2200. 1795. 1896. 1796.
1422. 1489. 2359. 2197. 2999. 1781. 2650. 1343. 2446. 3498. 2198. 2776.
1950.]

```

=====

Unique values of max_power

```

[ 74. 103.52 78. 90. 88.2 81.86 57.5 37. 67.1
68.1 108.45 60. 73.9 67. 82. 88.5 46.3 88.73
64.1 98.6 88.8 83.81 83.1 47.3 73.8 34.2 35.
81.83 40.3 121.3 138.03 160.77 117.3 116.3 83.14 67.05
168.5 100. 120.7 98.63 175.56 103.25 171.5 100.6 174.33
187.74 170. 78.9 88.76 86.8 108.495 108.62 93.7 103.6
98.59 189. 67.04 68.05 58.2 82.85 81.8 73. 120.
94.68 160. 65. 155. 69.01 126.32 138.1 83.8 126.2
98.96 62.1 86.7 188. 214.56 177. 280. 148.31 254.79
190. 177.46 204. 141. 117.6 241.4 282. 150. 147.5
108.5 103.5 183. 181.04 157.7 164.7 91.1 400. 68.
75. 85.8 87.2 53. 118. 103.2 83. 84. 58.16
147.94 74.02 53.3 80. 88.7 97.7 121.36 162. 140.
94. 100.57 82.9 83.11 70. 153.86 121. 126.3 73.97

```

```

171.    69.    99.6  102.    105.    63.    79.4   97.9   63.1
 66.1  110.   174.5  53.26  73.75  67.06  64.08  37.5  189.3
158.8  61.7   55.2  71.01  73.74  147.9   71.    77.   121.4
113.4  47.    130.   57.6  138.    52.8  53.64  53.5   76.8
 82.4  113.42  76.    84.8   56.3  218.   112.   92.   105.5
169.    95.    72.4  115.   152.    91.2  156.   74.9   62.
105.3  73.94  85.    118.3   72.   147.51  58.    64.   126.24
 76.9  194.3  99.23  89.84  123.7  118.35  99.   241.   136.
261.4  104.68  37.48  104.    63.12  91.7   102.5  177.6   45.
123.37 147.8  184.    84.48  68.07  74.96  167.6  152.87  112.2
 83.83 197.   110.4  104.55  103.   103.3   66.   108.6  165.
163.7  116.9  94.93  127.   198.5  179.5  120.69  121.31  138.08
187.7  80.8   86.79  93.87  116.6  143.    92.7   88.   58.33
 78.8  64.4  125.   139.01  254.8  181.   258.   55.23  270.9
265.   157.75  101.   186.   187.4  224.    64.9  148.   35.5
 89.75  32.8  91.72  106.    98.97  66.6   86.    65.3  98.82
198.25  38.   142.   132.   174.57  178.   163.2  203.2  177.5
175.    57.    80.84  68.4  167.67  170.63  52.   149.5  48.21
  0.   201.1  100.5  144.   194.4  168.7  104.5  103.26  116.4
 98.79  80.9   58.3  272.   235.   167.62  170.3  139.46  158.
110.5  82.5  141.1   38.4  197.2  161.   194.   122.4  134.1
 60.2  134.   203.   135.1 ]

```

=====

Unique values of seats

```
[ 5.  4.  7.  8.  6.  9. 10. 14.  2.]
```

=====

```

[58]: cars_data['name'].replace(['Maruti', 'Skoda', 'Honda', 'Hyundai', 'Toyota',
    ↪ 'Ford', 'Renault',
    'Mahindra', 'Tata', 'Chevrolet', 'Datsun', 'Jeep', 'Mercedes-Benz',
    'Mitsubishi', 'Audi', 'Volkswagen', 'BMW', 'Nissan', 'Lexus',
    'Jaguar', 'Land', 'MG', 'Volvo', 'Daewoo', 'Kia', 'Fiat', 'Force',
    'Ambassador', 'Ashok', 'Isuzu', 'Opel'],
    ↵
    ↪ [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31]
    ,inplace=True)

```

```
[60]: cars_data['transmission'].unique()
```

```
[60]: array(['Manual', 'Automatic'], dtype=object)
```

```
[62]: cars_data['transmission'].replace(['Manual', 'Automatic'],[1,2], inplace=True)
```

```
[64]: cars_data['seller_type'].unique()
```

```
[64]: array(['Individual', 'Dealer', 'Trustmark Dealer'], dtype=object)
```

```
[66]: cars_data['seller_type'].replace(['Individual', 'Dealer', 'Trustmark_
↳Dealer'],[1,2,3], inplace=True)
```

```
[67]: cars_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 6718 entries, 0 to 8125
Data columns (total 12 columns):
#   Column          Non-Null Count  Dtype
---  -
0   name             6718 non-null   int64
1   year             6718 non-null   int64
2   selling_price    6718 non-null   int64
3   km_driven        6718 non-null   int64
4   fuel             6718 non-null   object
5   seller_type      6718 non-null   int64
6   transmission     6718 non-null   int64
7   owner            6718 non-null   object
8   mileage          6718 non-null   float64
9   engine           6718 non-null   float64
10  max_power        6718 non-null   float64
11  seats            6718 non-null   float64
dtypes: float64(4), int64(6), object(2)
memory usage: 682.3+ KB
```

```
[70]: cars_data['fuel'].unique()
```

```
[70]: array(['Diesel', 'Petrol', 'LPG', 'CNG'], dtype=object)
```

```
[72]: cars_data['fuel'].replace(['Diesel', 'Petrol', 'LPG', 'CNG'],[1,2,3,4],
↳inplace=True)
```

```
[74]: cars_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 6718 entries, 0 to 8125
Data columns (total 12 columns):
#   Column          Non-Null Count  Dtype
---  -
0   name             6718 non-null   int64
1   year             6718 non-null   int64
2   selling_price    6718 non-null   int64
3   km_driven        6718 non-null   int64
4   fuel             6718 non-null   int64
5   seller_type      6718 non-null   int64
6   transmission     6718 non-null   int64
7   owner            6718 non-null   object
8   mileage          6718 non-null   float64
```

```

9   engine          6718 non-null   float64
10  max_power       6718 non-null   float64
11  seats           6718 non-null   float64
dtypes: float64(4), int64(7), object(1)
memory usage: 682.3+ KB

```

```
[76]: cars_data.reset_index(inplace=True)
```

```
[78]: cars_data
```

```
[78]:
```

	index	name	year	selling_price	km_driven	fuel	seller_type	\
0	0	1	2014	450000	145500	1	1	
1	1	2	2014	370000	120000	1	1	
2	2	3	2006	158000	140000	2	1	
3	3	4	2010	225000	127000	1	1	
4	4	1	2007	130000	120000	2	1	
...
6713	8121	1	2013	260000	50000	2	1	
6714	8122	4	2014	475000	80000	1	1	
6715	8123	4	2013	320000	110000	2	1	
6716	8124	4	2007	135000	119000	1	1	
6717	8125	1	2009	382000	120000	1	1	

	transmission	owner	mileage	engine	max_power	seats
0	1	First Owner	23.40	1248.0	74.00	5.0
1	1	Second Owner	21.14	1498.0	103.52	5.0
2	1	Third Owner	17.70	1497.0	78.00	5.0
3	1	First Owner	23.00	1396.0	90.00	5.0
4	1	First Owner	16.10	1298.0	88.20	5.0
...
6713	1	Second Owner	18.90	998.0	67.10	5.0
6714	1	Second Owner	22.54	1396.0	88.73	5.0
6715	1	First Owner	18.50	1197.0	82.85	5.0
6716	1	Fourth & Above Owner	16.80	1493.0	110.00	5.0
6717	1	First Owner	19.30	1248.0	73.90	5.0

```
[6718 rows x 13 columns]
```

```
[80]: cars_data['owner'].unique()
```

```
[80]: array(['First Owner', 'Second Owner', 'Third Owner',
        'Fourth & Above Owner', 'Test Drive Car'], dtype=object)
```

```
[82]: cars_data['owner'].replace(['First Owner', 'Second Owner', 'Third Owner',
        'Fourth & Above Owner', 'Test Drive Car'],
        [1,2,3,4,5], inplace=True)
```

```
[84]: cars_data.drop(columns=['index'], inplace=True)
```

```
[86]: for col in cars_data.columns:
      print('-----')
      print(col)
      print(cars_data[col].unique())
```

name

[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31]

year

[2014 2006 2010 2007 2017 2001 2011 2013 2005 2009 2016 2012 2002 2015
2018 2019 2008 2020 1999 2000 2003 2004 1994 1998 1997 1995 1996]

selling_price

[450000	370000	158000	225000	130000	440000	96000	45000
350000	200000	500000	92000	280000	180000	400000	778000
150000	680000	174000	950000	525000	600000	575000	275000
300000	220000	254999	670000	730000	650000	330000	366000
1149000	425000	2100000	925000	675000	819999	390000	1500000
700000	1450000	1090000	850000	1650000	1750000	1590000	1689999
1425000	265000	190000	630000	540000	448000	745000	1025000
235000	1700000	1200000	610000	2500000	484999	315000	290000
455000	351000	535000	175000	565000	120000	725000	185000
615000	270000	625000	866000	375000	522000	451999	475000
780000	595000	1140000	360000	105000	135000	690000	3975000
5150000	3200000	4100000	4500000	6000000	3790000	5800000	1864999
2700000	795000	3400000	2650000	5850000	975000	805000	2625000
811000	550000	645000	2550000	599000	875000	894999	340000
1525000	2150000	1900000	2900000	10000000	160000	515000	40000
480000	487000	386000	100000	490000	345000	85000	215000
320000	459999	65000	720000	800000	520000	580000	420000
1250000	830000	335000	329000	775000	524000	245000	910000
900000	250000	1100000	640000	409999	165000	80000	1000000
110000	170000	1380000	1300000	530000	310000	1150000	380000
404000	114999	465000	210000	4600000	509999	90000	409000
395000	81000	555000	229999	1210000	325000	60000	89000
434999	3000000	570000	1550000	64000	140000	503000	3800000
2000000	740000	750000	5400000	5500000	779000	2475000	240000
1085000	95000	1290000	219000	260000	840000	292000	385000
1050000	735000	560000	585000	760000	430000	643000	285000
660000	268000	88000	561000	755000	125000	1600000	801000
317000	495000	236000	1800000	415000	217000	466000	605000
1350000	337000	655000	196000	299000	634000	1225000	238000
590000	195000	715000	168000	531000	1625000	145000	441000

67500	321000	298000	1075000	681000	810000	573000	101000
1019999	244000	1165000	241000	327000	620000	204999	576000
695000	231000	261000	371000	421000	710000	1040000	199000
305000	1745000	611000	75000	55000	1325000	885000	108000
272000	1125000	388000	757000	626000	793000	3750000	1400000
1925000	844999	2940000	1825000	890000	770000	467000	711000
511000	166000	392000	833000	35000	880000	1030000	521000
451000	472000	649000	429000	1576000	825000	470000	1560000
1950000	786000	731000	191000	651000	445000	93150	403000
144000	52000	302000	869999	155000	246000	405000	70000
3250000	1143000	635000	1575000	318000	152000	248000	1465000
1080000	678000	1460000	756000	665000	2950000	377000	1675000
169000	685000	749000	899000	259000	416000	773000	889000
118000	256000	1888000	99000	2280000	31504	295000	444000
860000	2450000	198000	2825000	2125000	3350000	365000	919999
2600000	839000	1594000	161000	423000	551000	50000	411000
1530000	376000	1850000	86000	822000	30000	252000	131000
128000	790000	604000	1175000	141000	151000	577000	83000
946000	356000	955000	978999	348000	399000	362000	499000
358000	278000	426000	211000	1270000	426999	960000	1031000
72000	479000	764000	2199000	3600000	184000	119000	267000
328000	112999	39000	2850000	2800000	3900000	221000	631000
308000	940000	361000	355000	7200000	930000	1670000	980000
486000	242000	654000	835000	408000	94500	1110000	438999
911999	693000	449000	1390000	698000	539000	765000	562000
571000	589000	227999	1151000	1295000	4090000	347000	493000
545000	1475000	287000	1630000	501000	181000	2711000	1035000
316000	813000	1190000	378000	156000	194000	754000	55599
1511000	78000	250999	312000	66000	369000	149000	752000
142000	111000	206000	567000	699000	632000	905000	1145000
58000	179000	1515000	178000	222000	387000	1405000	282000
458000	157000	497000	1227000	574000	121000	3100000	68000
1920000	808000	512000	671000	799000	1365000	1490000	80500
189000	892000	93000	1680000	667000	204000	42000	694000
861999	476999	5200000	2375000	2750000	1385000	785000	1275000
1748999	132000	33351	2064000	469000	906000	797000	6223000
5923000	6523000	122000	891000	346000	532000	974000	483000
138000	432000	1757000	412000	126000	736000	579000	187000
4000000	1898999	482000	401000	737000	291000	999000	957000
834000	297000	669000	616000	129000	115999	861000	3251000
911000	148000	433000	488000	67000	516000	136000	29999
124000	1938000	172000	59000	3500000	537000	849000	851000
597000	741000	556000	549000	679000	969999	1237000	31000
666000	54000	374000	455999	453000	258000	428000	262000
389000	339000	277000	578000	684000	949000	227000	5830000
721000	751000	2400000	990000	1282000	1147000	558000	722000
563000	2300000	2200000	488999	276000	434000	372000	1520000
202999	541000	254000	528000	102000	311000	977000	1251000

1445000	98000	59259	153000	1051000	591000	319000	454000
1160000	3300000	791000	802999	1789999	1044999	279000	944999
1859000	2175000	430999	803999	934000	357000	965000	341000
75527	1132000	352000	252999	313000	391000	2051000	212000
2575000	1516000	359000	209000	1220000	1180000	45957	1265000
382000	526000	90177	46000	307000	746000]		

km_driven

[145500	120000	140000	127000	45000	175000	5000	90000	169000
68000	100000	40000	70000	53000	80000	50000	72000	35000
28000	25000	2388	16200	10000	15000	42000	60000	76000
28900	86300	23300	32600	10300	77000	99000	27800	49800
151000	54700	64000	63000	127700	33900	59000	110000	147000
30000	135000	9850	78000	170000	49000	32000	38000	44000
12000	55500	61500	150000	37800	114000	48000	69000	13000
76139	65000	1303	31800	20000	17000	21000	37000	29500
7500	19000	41000	39000	22000	47000	72200	49900	9000
11000	95000	18000	46100	16000	9654	24300	42163	8000
71000	9500	36600	14000	120600	86000	7800	31377	75000
93000	125000	13500	162500	92500	158000	2000	181000	193000
122358	95200	33033	63063	207890	7976	16500	99361	33000
80100	160000	26000	29000	58000	36000	185000	162000	67000
52000	68089	58343	38817	56494	79328	5621	25538	69779
56290	8500	7032	106000	240000	214000	1000	265000	134000
2136	250000	130000	99500	119000	44665	123000	34000	146000
85000	201850	46000	190000	43000	14200	19100	54000	101500
55735	1500	181491	53319	40906	31711	43755	66693	59549
94385	73730	221889	116104	150546	148120	142000	126000	24000
101000	168000	165000	98500	98000	77800	51492	136000	91000
167000	180000	6000	91500	132478	51000	105000	137500	88000
156060	107000	57000	300000	200000	18945	144000	107825	1620
141000	108000	55000	37944	90400	96000	193623	63186	219000
23000	94000	140500	143000	195000	360003	8079	114368	79990
81632	155201	101504	90165	86017	85036	125531	206000	49700
74000	6550	56000	41779	31000	13534	7000	28156	63309
155000	11500	3000	157000	27000	26300	89100	104000	210000
216000	84000	161000	72113	113000	96443	51500	104500	49102
81000	227000	117000	8576	19723	21446	52289	52236	54470
25471	33928	59736	54290	2118	61379	58544	74381	63982
56429	19500	56832	30528	65285	20102	52380	74250	57247
178000	42323	42462	54723	42545	20375	43978	40200	27233
28832	103000	142500	115000	35500	17500	92000	4500	83000
6750	18500	50478	9200	2300	4295	5229	4701	6757
28182	11533	11688	57728	23712	70670	43381	79011	58500
43500	12700	49455	46815	334000	100875	118000	128000	144030
176000	89000	97000	12800	65100	15200	82000	116500	145000
73000	113226	160500	132000	217000	139000	3500	62000	1500000
120005	16830	93468	16589	53201	25272	53619	6001	202000

71717	84321	177000	205000	41800	88700	188000	225000	5500
4875	2700	58511	26235	26766	1600	24522	13663	58945
375000	156975	27620	143200	138000	189000	156000	10800	67500
255000	71850	112000	159000	76131	51777	64788	46951	74537
23500	68600	13887	66000	24400	27500	67840	380000	112880
61915	184000	6200	16700	7967	9656	68609	33360	14317
87237	62960	26634	163720	67998	20706	100581	67303	79139
84784	130376	33500	22053	78432	270000	7200	117500	78500
115717	4000	26432	46702	46706	53523	56365	49563	56432
52365	53512	46533	58632	65300	39395	230000	32500	64800
248000	66444	218463	153000	87185	137000	3564	48756	80322
173000	148000	6500	220000	108957	22200	260000	42108	79000
17100	43001	100600	92385	116000	72500	82500	50600	121000
101903	85568	3100	186000	59300	89322	48300	23511	22512
62900	52442	34156	34152	62841	38600	27654	48698	32995
90150	85700	25339	41232	68240	92651	88754	23700	69500
28050	22947	7672	36659	44500	9900	124316	6544	49600
198000	103994	35008	31100	42312	54891	18890	75010	4337
14495	83585	48406	56239	33243	15858	87847	87000	112072
52269	15780	2360457	108800	12500	577414	121941	152186	82246
89580	2789	35278	2860	78562	36088	129000	500000	133000
64500	24500	45500	71500	93500	60300	44391	56315	15151
114321	37333	330000	291000	21500	197000	40300	30030	29029
72072	82082	80600	58609	33003	165500	5800	68700	102996
96500	52412	85472	87452	66530	32331	172000	23456	136500
111000	42500	47200	246000	5200	10500	93331	109000	5400
102000	29700	7600	29340	80800	24265	56900	88200	40800
8588	305000	212000	101200	179150	84487	264000	51146	298000
149000	291977	36800	52200	248200	7720	57882	242000	55380
18816	33019	47747	45900	68697	147279	24700	43526	55885
16034	156040	93415	122000	68519	22966	2350	59872	91182
59500	75500	152500	69123	77524	40523	23600	290000	24177
121779	15381	74800	109322	475000	61000	80500	65755	2600
15500	50700	440000	152000	200400	7300	9750	157138	285000
127991	13120	87500	62200	87540	231438	239451	154000	426000
182000	215000	77300	61260	17601	4773	57900	8600	78010
83844	23999	91400	178500	66953	166000	131000	100750	48676
79500	200185	49025	76460	47370	45217	222300	44600	28080
28800	21900	28100	7673	96272	22500	7400	370000	150360
42130	147500	56194	54188	54043	66657	35582	54327	7949
59734	49185	56389	58245	36422	42535	40736	56246	55403
105358	49200	81500	3177	39414	30078	44588	49907	67082
112879	10200	1300	175802	192000	73840	320000	24857	26442
50800	40142	9400	12584	4300	14548	44772	48500	28782
28451	36500	44885	131111	58400	23400	3010	163000	77088
136511	36710	28180	44077	55768	123278	26500	18484	2560
103655	56975	187000	218000	73257	26320	38426	116700	176062
77500	39500	55896	30400	164000	271000	75262	91863	47552

14700	19700	145241	95500	53473	75958	31596	85710	129627
55130	22522	51856	29434	34500	6825	112011	53534	248119
24019	19600	376412	183000	108916	59865	68140	53190	70100
47725	70195	77395	74321	80235	77150	61100	82300	82050
29899	59235	201000	77215	48228	58559	50856	18300	59292
21147	61173	91567	33400	92686	67600	49500	112048	30646
43011	104300	73500	280000	35700	22700	21871	55425	37659
37500	19800	45629	68850	45775	68203	97343	82507	59400
125876	56800	65204	2286	15732	49523	36521	64481	49060
37161	60175	49957	43235	50699	1	50074	30154	26263
84925	46357	46737	110048	186388	20171	37151	58161	50171
55161	9599	16151	28161	80868	194000	191000]		

fuel

[1 2 3 4]

seller_type

[1 2 3]

transmission

[1 2]

owner

[1 2 3 4 5]

mileage

[23.4	21.14	17.7	23.	16.1	20.14	17.3	23.59	20.	19.01	19.3	18.9
18.15	24.52	19.7	22.54	21.	25.5	26.59	21.5	20.3	21.4	24.7	18.2
16.8	24.3	14.	18.6	33.44	23.95	17.	20.63	13.93	16.	17.8	18.5
12.55	12.99	14.8	13.5	26.	20.65	27.3	11.36	17.68	14.28	18.53	14.84
21.12	20.36	21.27	18.16	22.	25.1	20.51	21.66	25.2	22.9	16.02	20.54
22.77	15.71	23.1	19.02	19.81	26.2	16.47	15.04	19.1	21.79	18.8	21.21
15.37	11.79	19.	14.3	15.8	15.1	19.09	22.32	21.9	14.53	21.63	20.85
20.45	19.67	23.01	20.77	17.92	17.01	22.37	19.33	9.5	12.83	22.48	16.78
14.67	15.	13.96	18.	12.07	26.21	10.8	16.3	13.6	14.74	15.6	19.56
22.69	19.16	18.12	12.1	17.5	42.	20.4	21.1	19.44	13.	21.43	22.95
16.2	15.3	28.09	17.4	19.4	26.6	17.6	28.4	14.1	25.17	22.74	17.57
16.95	19.49	17.21	13.2	14.2	26.8	25.4	11.5	27.28	17.97	12.8	16.55
12.05	14.07	21.02	11.57	17.9	15.96	17.1	17.19	21.01	24.	25.6	21.38
23.84	23.08	14.24	20.71	15.64	14.5	16.34	27.39	11.1	13.9	20.88	20.92
23.8	24.4	15.29	21.19	22.5	19.6	23.65	25.32	23.5	16.6	23.9	20.8
27.62	12.9	25.44	17.88	22.7	17.2	15.42	19.68	18.7	15.4	19.34	22.71
25.8	13.7	12.2	18.49	9.	0.	13.58	10.1	20.5	25.	10.5	22.07
22.3	15.26	20.62	27.4	23.2	14.4	18.4	30.46	14.02	11.	20.6	22.05
20.2	18.1	22.1	19.87	13.01	18.06	26.1	16.52	13.55	24.2	25.83	11.2
17.09	21.03	17.45	21.64	21.94	13.87	19.98	20.52	23.57	11.7	17.43	18.88
13.68	11.18	20.89	11.8	19.62	21.7	14.9	19.5	10.91	15.7	20.73	15.85
20.7	14.23	16.5	17.36	12.6	16.36	14.95	16.9	19.2	16.96	22.15	18.78

```

19.61 17.71 18.3 19.12 19.72 12. 11.4 23.03 11.07 15.9 17.67 20.46
13.1 13.45 24.8 15.73 15.11 12.7 21.2 20.38 21.56 13.22 14.49 15.05
23.26 15.41 13.8 22.27 32.52 14.66 12.12 16.84 14.09 14.7 13.4 15.5
13.49 11.88 14.6 10.75 24.5 11.74 16.07 15.63 26.3 23.7 25.47 17.05
23.3 11.9 13.38 20.86 10.9 18.25 15.2 20.37 21.8 11.96 24.04 19.69
13.73 21.04 25.01 10.93 24.29 13.44 20.07 19.08 20.34 11.68 12.5 12.3
23.87 16.38 17.42 10. 18.24 10.71 19.59 16.7 19.83 21.76 16.05 20.28
16.25 16.73 18.48 14.99 18.76 16.4 19.64 14.94 17.11 22.8 32.26 33.
12.4 18.44 16.09 12.62 21.13 15.17 21.73 21.72 12.85 14.81 13.24 21.49
14.62 26.83 11.45 12.08 15.74 11.3 14.21 11.72 16.51]

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engine

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[1248. 1498. 1497. 1396. 1298. 1197. 1061. 796. 1364. 1399. 1461. 993.
1198. 1199. 998. 1591. 2179. 1368. 2982. 2494. 2143. 2477. 1462. 2755.
1968. 1798. 1196. 1373. 1598. 1998. 1086. 1194. 1172. 1405. 1582. 999.
2487. 1999. 3604. 2987. 1995. 1451. 1969. 2967. 2497. 1797. 1991. 2362.
1493. 1599. 1341. 1794. 799. 1193. 2696. 1495. 1186. 1047. 2498. 2956.
2523. 1120. 624. 1496. 1984. 2354. 814. 793. 1799. 936. 1956. 1997.
1499. 1948. 2997. 2489. 2499. 2609. 2953. 1150. 1994. 1388. 1527. 2199.
995. 2993. 1586. 1390. 909. 2393. 3198. 1339. 2835. 2092. 1595. 2496.
1596. 1597. 2596. 2148. 1299. 1590. 2231. 2694. 2200. 1795. 1896. 1796.
1422. 1489. 2359. 2197. 2999. 1781. 2650. 1343. 2446. 3498. 2198. 2776.
1950.]

```

max_power

```

[ 74. 103.52 78. 90. 88.2 81.86 57.5 37. 67.1
68.1 108.45 60. 73.9 67. 82. 88.5 46.3 88.73
64.1 98.6 88.8 83.81 83.1 47.3 73.8 34.2 35.
81.83 40.3 121.3 138.03 160.77 117.3 116.3 83.14 67.05
168.5 100. 120.7 98.63 175.56 103.25 171.5 100.6 174.33
187.74 170. 78.9 88.76 86.8 108.495 108.62 93.7 103.6
98.59 189. 67.04 68.05 58.2 82.85 81.8 73. 120.
94.68 160. 65. 155. 69.01 126.32 138.1 83.8 126.2
98.96 62.1 86.7 188. 214.56 177. 280. 148.31 254.79
190. 177.46 204. 141. 117.6 241.4 282. 150. 147.5
108.5 103.5 183. 181.04 157.7 164.7 91.1 400. 68.
75. 85.8 87.2 53. 118. 103.2 83. 84. 58.16
147.94 74.02 53.3 80. 88.7 97.7 121.36 162. 140.
94. 100.57 82.9 83.11 70. 153.86 121. 126.3 73.97
171. 69. 99.6 102. 105. 63. 79.4 97.9 63.1
66.1 110. 174.5 53.26 73.75 67.06 64.08 37.5 189.3
158.8 61.7 55.2 71.01 73.74 147.9 71. 77. 121.4
113.4 47. 130. 57.6 138. 52.8 53.64 53.5 76.8
82.4 113.42 76. 84.8 56.3 218. 112. 92. 105.5
169. 95. 72.4 115. 152. 91.2 156. 74.9 62.
105.3 73.94 85. 118.3 72. 147.51 58. 64. 126.24
76.9 194.3 99.23 89.84 123.7 118.35 99. 241. 136.
261.4 104.68 37.48 104. 63.12 91.7 102.5 177.6 45.

```

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123.37 147.8 184. 84.48 68.07 74.96 167.6 152.87 112.2
83.83 197. 110.4 104.55 103. 103.3 66. 108.6 165.
163.7 116.9 94.93 127. 198.5 179.5 120.69 121.31 138.08
187.7 80.8 86.79 93.87 116.6 143. 92.7 88. 58.33
78.8 64.4 125. 139.01 254.8 181. 258. 55.23 270.9
265. 157.75 101. 186. 187.4 224. 64.9 148. 35.5
89.75 32.8 91.72 106. 98.97 66.6 86. 65.3 98.82
198.25 38. 142. 132. 174.57 178. 163.2 203.2 177.5
175. 57. 80.84 68.4 167.67 170.63 52. 149.5 48.21
0. 201.1 100.5 144. 194.4 168.7 104.5 103.26 116.4
98.79 80.9 58.3 272. 235. 167.62 170.3 139.46 158.
110.5 82.5 141.1 38.4 197.2 161. 194. 122.4 134.1
60.2 134. 203. 135.1 ]

```

seats

```
[ 5.  4.  7.  8.  6.  9. 10. 14.  2.]
```

```
[88]: cars_data.isnull().sum()
```

```

[88]: name          0
      year          0
      selling_price  0
      km_driven     0
      fuel          0
      seller_type   0
      transmission  0
      owner         0
      mileage       0
      engine        0
      max_power     0
      seats         0
      dtype: int64

```

```

[90]: input_data = cars_data.drop(columns=['selling_price'])
      output_data =cars_data['selling_price']

```

```

[92]: x_train, x_test, y_train, y_test = train_test_split(input_data, output_data,
      ↪test_size=0.2)

```

```
[94]: #model Creation
```

```
[96]: model = LinearRegression()
```

```
[98]: #Train MModel
```

```
[100]: model.fit(x_train, y_train)
```

```
[100]: LinearRegression()
```

```
[102]: predict = model.predict(x_test)
```

```
[104]: predict
```

```
[104]: array([891704.48222041, 137640.9423407 , 847955.08583859, ...,  
         458245.93146008, 255251.1387412 , 605181.42605531])
```

```
[106]: x_train.head(1)
```

```
[106]:      name  year  km_driven  fuel  seller_type  transmission  owner  mileage \  
575     9  2016     50000     1             1             1      3     14.1  
  
      engine  max_power  seats  
575  2179.0     147.94    7.0
```

```
[108]: input_data_model = pd.DataFrame(  
      [[5,2022,12000,1,1,1,1,12.99,2494.0,100.6,5.0]],  
      columns=['name', 'year', 'km_driven', 'fuel', 'seller_type', 'transmission', 'owner', 'mileage', 'e
```

```
[110]: input_data_model
```

```
[110]:      name  year  km_driven  fuel  seller_type  transmission  owner  mileage \  
0      5  2022     12000     1             1             1      1     12.99  
  
      engine  max_power  seats  
0  2494.0     100.6    5.0
```

```
[112]: model.predict(input_data_model)
```

```
[112]: array([973996.01777788])
```

```
[114]: import pickle as pk
```

```
[116]: pk.dump(model, open('model.pkl', 'wb'))
```

```
[ ]:
```