

PDS Assignment 2

Name: Pranay Nagireddy, ID: 16344126

```

↳ Unnamed: 0      Name      Location \
3952 4079 Land Rover Range Rover 3.0 Diesel LWB Vogue Hyderabad
4639 4778 Mercedes-Benz S-Class S 350 d Bangalore
3098 3199 BMW 7 Series 730Ld Design Pure Excellence CBU Kolkata
3633 3752 Land Rover Range Rover Sport HSE Kochi
1997 2056 BMW 7 Series 730Ld Eminence Kochi
... ..
5841 6013 Honda Amaze VX i-DTEC Coimbatore
5843 6015 Hyundai Xcent 1.1 CRDi S Jaipur
5844 6016 Mahindra Xylo D4 BSIV Jaipur
5845 6017 Maruti Wagon R VXI Kolkata
5846 6018 Chevrolet Beat Diesel Hyderabad

Year Kilometers_Driven Fuel_Type Transmission Owner_Type Mileage \
3952 2017 25000 Diesel Automatic First 13.33 kmpl
4639 2011 47140 Diesel Automatic Second 13.5 kmpl
3098 2012 41100 Diesel Automatic First 16.77 kmpl
3633 2015 38467 Diesel Automatic First 12.65 kmpl
1997 2015 29966 Diesel Automatic Second 16.77 kmpl
... ..
5841 2015 70602 Diesel Manual First 25.8 kmpl
5843 2015 100000 Diesel Manual First 24.4 kmpl
5844 2012 55000 Diesel Manual Second 14.0 kmpl
5845 2013 46000 Petrol Manual First 18.9 kmpl
5846 2011 47000 Diesel Manual First 25.44 kmpl

Engine Power Seats New_Price Price In_Lakhs Units New
3952 2993 CC 255 bhp 5.0 2.3 Cr 160.00 2.30 Cr 230.0
4639 2925 CC 281.61 bhp 5.0 1.71 Cr 30.00 1.71 Cr 171.0
3098 2993 CC 261.49 bhp 5.0 1.66 Cr 26.50 1.66 Cr 166.0
3633 2993 CC 255 bhp 5.0 1.6 Cr 70.66 1.60 Cr 160.0
1997 2993 CC 261.49 bhp 5.0 1.4 Cr 43.60 1.40 Cr 140.0
... ..
5841 1498 CC 98.6 bhp 5.0 nan 4.83 NaN None NaN
5843 1120 CC 71 bhp 5.0 nan 4.00 NaN None NaN
5844 2498 CC 112 bhp 8.0 nan 2.90 NaN None NaN
5845 998 CC 67.1 bhp 5.0 nan 2.65 NaN None NaN
5846 936 CC 57.6 bhp 5.0 nan 2.50 NaN None NaN

[5847 rows x 17 columns]
```

I observed that the values were expressed in crores and lakhs. To ensure uniformity in units and accurately calculate the mean and mode, I standardized all values to lakhs before continuing with the calculations.

A:

```

↳ Unnamed: 0      0
Name              0
Location          0
Year              0
Kilometers_Driven 0
Fuel_Type         0
Transmission      0
Owner_Type        0
Mileage           2
Engine            36
Power             36
Seats             38
New_Price         0
Price             0
In_Lakhs          5032
Units             5032
New               5032
dtype: int64
Unnamed: 0      0
Name            0
Location        0
Year            0
Kilometers_Driven 0
Fuel_Type       0
Transmission    0
Owner_Type      0
Mileage         0
Engine          0
Power           0
Seats           0
New_Price       0
Price           0
In_Lakhs        0
Units           0
New             0
dtype: int64
```

PDS Assignment 2

Name: Pranay Nagireddy, ID: 16344126

```
Unnamed: 0      Name      Location      Year \
0      1      Hyundai Creta 1.6 CRDi SX Option      Pune      2015
1      2      Honda Jazz V      Chennai      2011
2      3      Maruti Ertiga VDI      Chennai      2012
3      4      Audi A4 New 2.0 TDI Multitronic      Coimbatore      2013
4      6      Nissan Micra Diesel XV      Jaipur      2013
...      ...      ...      ...      ...
5842      6014      Maruti Swift VDI      Delhi      2014
5843      6015      Hyundai Xcent 1.1 CRDi S      Jaipur      2015
5844      6016      Mahindra Xylo D4 BSIV      Jaipur      2012
5845      6017      Maruti Wagon R VXI      Kolkata      2013
5846      6018      Chevrolet Beat Diesel      Hyderabad      2011

Kilometers_Driven      Fuel_Type      Transmission      Owner_Type      Mileage \
0      41000      Diesel      Manual      First      19.67 kmpl
1      46000      Petrol      Manual      First      13 km/kg
2      87000      Diesel      Manual      First      20.77 kmpl
3      40670      Diesel      Automatic      Second      15.2 kmpl
4      86999      Diesel      Manual      First      23.08 kmpl
...      ...      ...      ...      ...
5842      27365      Diesel      Manual      First      28.4 kmpl
5843      100000      Diesel      Manual      First      24.4 kmpl
5844      55000      Diesel      Manual      Second      14.0 kmpl
5845      46000      Petrol      Manual      First      18.9 kmpl
5846      47000      Diesel      Manual      First      25.44 kmpl

Engine      Power      Seats      New_Price      Price      In_Lakhs      Units      New
0      1582 CC      126.2 bhp      5.0      nan      12.50      20.484564      Lakh      23.269926
1      1199 CC      88.7 bhp      5.0      8.61 Lakh      4.50      8.610000      Lakh      8.610000
2      1248 CC      88.76 bhp      7.0      nan      6.00      20.484564      Lakh      23.269926
3      1968 CC      140.8 bhp      5.0      nan      17.74      20.484564      Lakh      23.269926
4      1461 CC      63.1 bhp      5.0      nan      3.50      20.484564      Lakh      23.269926
...      ...      ...      ...      ...
5842      1248 CC      74 bhp      5.0      7.88 Lakh      4.75      7.880000      Lakh      7.880000
5843      1120 CC      71 bhp      5.0      nan      4.00      20.484564      Lakh      23.269926
5844      2498 CC      112 bhp      8.0      nan      2.90      20.484564      Lakh      23.269926
5845      998 CC      67.1 bhp      5.0      nan      2.65      20.484564      Lakh      23.269926
5846      936 CC      57.6 bhp      5.0      nan      2.50      20.484564      Lakh      23.269926

[5847 rows x 17 columns]
```

B:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5847 entries, 0 to 5846
Data columns (total 17 columns):
#   Column              Non-Null Count  Dtype
---  -
0   Unnamed: 0          5847 non-null  int64
1   Name                5847 non-null  object
2   Location            5847 non-null  object
3   Year                5847 non-null  int64
4   Kilometers_Driven  5847 non-null  int64
5   Fuel_Type           5847 non-null  object
6   Transmission        5847 non-null  object
7   Owner_Type          5847 non-null  object
8   Mileage             5847 non-null  float64
9   Engine              5847 non-null  int64
10  Power               5847 non-null  float64
11  Seats               5847 non-null  float64
12  New_Price           798 non-null   float64
13  Price               5847 non-null  float64
14  In_Lakhs            5847 non-null  float64
15  Units               5847 non-null  object
16  New                 5847 non-null  float64
dtypes: float64(7), int64(4), object(6)
memory usage: 776.7+ KB
None

Unamed: 0      Name      Location      Year \
0      1      Hyundai Creta 1.6 CRDi SX Option      Pune      2015
1      2      Honda Jazz V      Chennai      2011
2      3      Maruti Ertiga VDI      Chennai      2012
3      4      Audi A4 New 2.0 TDI Multitronic      Coimbatore      2013
4      6      Nissan Micra Diesel XV      Jaipur      2013

Kilometers_Driven      Fuel_Type      Transmission      Owner_Type      Mileage      Engine \
0      41000      Diesel      Manual      First      19.67      1582
1      46000      Petrol      Manual      First      13.00      1199
2      87000      Diesel      Manual      First      20.77      1248
3      40670      Diesel      Automatic      Second      15.20      1968
4      86999      Diesel      Manual      First      23.08      1461

Power      Seats      New_Price      Price      In_Lakhs      Units      New
0      126.20      5.0      NaN      12.50      20.484564      Lakh      23.269926
1      88.70      5.0      8.61      4.50      8.610000      Lakh      8.610000
2      88.76      7.0      NaN      6.00      20.484564      Lakh      23.269926
3      140.80      5.0      NaN      17.74      20.484564      Lakh      23.269926
4      63.10      5.0      NaN      3.50      20.484564      Lakh      23.269926
```

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Name: Pranay Nagireddy, ID: 16344126

C:

Unnamed: 0		Name	Location	Year	\
0	1	Hyundai Creta 1.6 CRDI SX Option	Pune	2015	
1	2	Honda Jazz V	Chennai	2011	
2	3	Maruti Ertiga VOI	Chennai	2012	
3	4	Audi A4 New 2.8 TDI Multitronic	Coimbatore	2013	
4	6	Nissan Micra Diesel XV	Jaipur	2013	
5	7	Toyota Innova Crysta 2.8 GX AT BS	Mumbai	2016	
6	8	Volkswagen Vento Diesel Comfortline	Pune	2013	
7	9	Tata Indica Vista Quadrajet LS	Chennai	2012	
8	10	Maruti Ciaz Zeta	Kochi	2018	
9	11	Honda City 1.5 V AT Sunroof	Kolkata	2012	

Kilometers_Driven	Owner_Type	Mileage	Engine	Power	Seats	New_Price	\
0	41000	First	19.67	1582	126.20	5.0	NaN
1	46000	First	13.00	1199	88.70	5.0	8.61
2	87000	First	20.77	1248	88.76	7.0	NaN
3	40670	Second	15.20	1968	140.80	5.0	NaN
4	86999	First	23.68	1461	63.10	5.0	NaN
5	36000	First	11.36	2755	171.50	8.0	21.00
6	64330	First	20.54	1598	103.60	5.0	NaN
7	65932	Second	22.30	1248	74.00	5.0	NaN
8	25692	First	21.56	1462	103.25	5.0	10.65
9	60000	First	16.80	1497	116.30	5.0	NaN

Price	In_Lakhs	Units	New	Fuel_Type_Diesel	Fuel_Type_Electric	\
0	12.50	20.484564	Lakh	23.269926	1	0
1	4.50	8.610000	Lakh	8.610000	0	0
2	6.00	20.484564	Lakh	23.269926	1	0
3	17.74	20.484564	Lakh	23.269926	1	0
4	3.50	20.484564	Lakh	23.269926	1	0
5	17.50	21.000000	Lakh	21.000000	1	0
6	5.20	20.484564	Lakh	23.269926	1	0
7	1.95	20.484564	Lakh	23.269926	1	0
8	9.95	10.650000	Lakh	10.650000	0	0
9	4.49	20.484564	Lakh	23.269926	0	0

Fuel_Type_Petrol	Transmission_Automatic	Transmission_Manual	
0	0	0	1
1	1	0	0
2	0	0	1
3	0	1	0
4	0	0	1
5	0	1	0
6	0	0	1
7	0	0	1
8	1	0	1

D:

Unnamed: 0	Name	Location	Year	\
0	1 Hyundai Creta 1.6 CRDi SX Option	Pune	2015	
1	2 Honda Jazz V	Chennai	2011	
2	3 Maruti Ertiga VDI	Chennai	2012	
3	4 Audi A4 New 2.8 TDI Multitronic	Coimbatore	2013	
4	6 Nissan Micra Diesel XV	Jaipur	2013	
...
5842	6014 Maruti Swift VDI	Delhi	2014	
5843	6015 Hyundai Xcent 1.1 CRDi S	Jaipur	2015	
5844	6016 Mahindra Xylo D4 BSIV	Jaipur	2012	
5845	6017 Maruti Wagon R VXI	Kolkata	2013	
5846	6018 Chevrolet Beat Diesel	Hyderabad	2011	

KMs_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	\
0	41000	Diesel	Manual	First	19.67	1582	126.20
1	46000	Petrol	Manual	First	13.00	1199	88.70
2	87000	Diesel	Manual	First	20.77	1248	88.76
3	40670	Diesel	Automatic	Second	15.20	1968	140.80
4	86999	Diesel	Manual	First	23.68	1461	63.10
...
5842	27365	Diesel	Manual	First	28.40	1248	74.00
5843	100000	Diesel	Manual	First	24.40	1120	71.00
5844	55000	Diesel	Manual	Second	14.00	2498	112.00
5845	40000	Petrol	Manual	First	18.90	998	67.10
5846	47000	Diesel	Manual	First	25.44	936	57.60

Seats	New_Price	Price	In_Lakhs	Units	New	new_age	CarAge	
0	5.0	NaN	12.50	20.484564	Lakh	23.269926	9	5
1	5.0	8.61	4.50	8.610000	Lakh	8.610000	13	9
2	7.0	NaN	6.00	20.484564	Lakh	23.269926	12	8
3	5.0	NaN	17.74	20.484564	Lakh	23.269926	11	7
4	5.0	NaN	3.50	20.484564	Lakh	23.269926	11	7
...
5842	5.0	7.88	4.75	7.880000	Lakh	7.880000	10	6
5843	5.0	NaN	4.00	20.484564	Lakh	23.269926	9	5
5844	8.0	NaN	2.90	20.484564	Lakh	23.269926	12	8
5845	5.0	NaN	2.65	20.484564	Lakh	23.269926	11	7
5846	5.0	NaN	2.50	20.484564	Lakh	23.269926	13	9

[5847 rows x 19 columns]

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Name: Pranay Nagireddy, ID: 16344126

E:

Select:

```
[18] #select
      selectquery_data = data[['Name', 'Year', 'Price']]
      print(selectquery_data)
```

		Name	Year	Price
0	Hyundai Creta 1.6 CRDi SX Option		2015	12.50
1		Honda Jazz V	2011	4.50
2		Maruti Ertiga VDI	2012	6.00
3	Audi A4 New 2.0 TDI Multitronic		2013	17.74
4		Nissan Micra Diesel XV	2013	3.50
...	
5842		Maruti Swift VDI	2014	4.75
5843	Hyundai Xcent 1.1 CRDi S		2015	4.00
5844		Mahindra Xylo D4 BSIV	2012	2.90
5845		Maruti Wagon R VXI	2013	2.65
5846		Chevrolet Beat Diesel	2011	2.50

[5847 rows x 3 columns]

Filter:

```
✓ [17] #filter
Os      filterquery_data = data[(data['Year'] > 2016) & (data['Fuel_Type'] == 'Diesel')]
      print(filterquery_data)
```

	Unnamed: 0		Name	Location	Year	\
15	17		Maruti Swift DDiS VDI	Jaipur	2017	
34	36		Maruti Vitara Brezza ZDI Plus	Kochi	2018	
40	42	Mahindra KUV 100 mFALCON D75 K8 Dual Tone		Coimbatore	2017	
58	60	Toyota Innova Crysta 2.4 GX MT 8S		Mumbai	2017	
65	67	Mercedes-Benz C-Class Progressive C 220d		Coimbatore	2019	
...
5757	5924		Mahindra Scorpio 1.99 S4 Plus	Kochi	2017	
5759	5927		Audi Q5 3.0 TDI Quattro Technology	Coimbatore	2018	
5760	5928		Mahindra NuvoSport N6	Coimbatore	2018	
5771	5940		Maruti Dzire LDI	Pune	2018	
5809	5979		ISUZU D-MAX V-Cross 4X4	Jaipur	2017	

	KMs_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	\
15	25000	Diesel	Manual	First	28.40	1248	74.00	
34	50075	Diesel	Manual	First	24.30	1248	88.50	
40	22033	Diesel	Manual	First	25.32	1198	77.00	
58	22000	Diesel	Manual	First	13.68	2393	147.80	
65	15369	Diesel	Automatic	First	0.00	1950	194.00	
...
5757	26741	Diesel	Manual	First	15.40	1997	120.00	
5759	29091	Diesel	Automatic	First	13.22	2967	241.40	
5760	37323	Diesel	Manual	Second	17.45	1493	100.00	
5771	27000	Diesel	Manual	First	28.40	1248	73.75	
5809	25000	Diesel	Manual	First	12.40	2499	134.00	

	Seats	New_Price	Price	In_Lakhs	Units	New	new_age	CarAge
15	5.0	NaN	5.99	20.484564	Lakh	23.269926	7	3
34	5.0	11.12	8.63	11.120000	Lakh	11.120000	6	2
40	6.0	NaN	5.58	20.484564	Lakh	23.269926	7	3
58	8.0	19.34	16.50	19.340000	Lakh	19.340000	7	3
65	5.0	49.14	35.67	49.140000	Lakh	49.140000	5	1
...
5757	7.0	NaN	10.08	20.484564	Lakh	23.269926	7	3
5759	5.0	NaN	45.52	20.484564	Lakh	23.269926	6	2
5760	7.0	10.52	7.29	10.520000	Lakh	10.520000	6	2
5771	5.0	7.91	5.90	7.910000	Lakh	7.910000	6	2
5809	5.0	NaN	8.00	20.484564	Lakh	23.269926	7	3

PDS Assignment 2

Name: Pranay Nagireddy, ID: 16344126

Rename:

Unnamed: 0				Name	Location	Year	\	
0	1	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	Pune	2015		
1	2	Honda Jazz V	Chennai	2011	Chennai	2011		
2	3	Maruti Ertiga VDI	Chennai	2012	Chennai	2012		
3	4	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	Coimbatore	2013		
4	6	Nissan Micra Diesel XV	Jaipur	2013	Jaipur	2013		
...		
5842	6014	Maruti Swift VDI	Delhi	2014	Delhi	2014		
5843	6015	Hyundai Xcent 1.1 CRDi S	Jaipur	2015	Jaipur	2015		
5844	6016	Mahindra Xylo D4 BSIV	Jaipur	2012	Jaipur	2012		
5845	6017	Maruti Wagon R VXI	Kolkata	2013	Kolkata	2013		
5846	6018	Chevrolet Beat Diesel	Hyderabad	2011	Hyderabad	2011		
0	KMs_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power \	
0	41000	Diesel	Manual	First	19.67	1582	126.20	
1	46000	Petrol	Manual	First	13.00	1199	88.70	
2	87000	Diesel	Manual	First	20.77	1248	88.76	
3	40670	Diesel	Automatic	Second	15.20	1968	140.80	
4	86999	Diesel	Manual	First	23.08	1461	63.10	
...	
5842	27365	Diesel	Manual	First	28.40	1248	74.00	
5843	100000	Diesel	Manual	First	24.40	1120	71.00	
5844	55000	Diesel	Manual	Second	14.00	2498	112.00	
5845	46000	Petrol	Manual	First	18.90	998	67.10	
5846	47000	Diesel	Manual	First	25.44	936	57.60	
0	Seats	New_Price	Price	In_Lakhs	Units	New	new_age	CarAge
0	5.0	NaN	12.50	20.484564	Lakh	23.269926	9	5
1	5.0	8.61	4.50	8.610000	Lakh	8.610000	13	9
2	7.0	NaN	6.00	20.484564	Lakh	23.269926	12	8
3	5.0	NaN	17.74	20.484564	Lakh	23.269926	11	7
4	5.0	NaN	3.50	20.484564	Lakh	23.269926	11	7
...
5842	5.0	7.88	4.75	7.880000	Lakh	7.880000	10	6
5843	5.0	NaN	4.00	20.484564	Lakh	23.269926	9	5
5844	8.0	NaN	2.90	20.484564	Lakh	23.269926	12	8
5845	5.0	NaN	2.65	20.484564	Lakh	23.269926	11	7
5846	5.0	NaN	2.50	20.484564	Lakh	23.269926	13	9
[5847 rows x 19 columns]								

Mutate:

Unnamed: 0				Name	Location	Year	\	
0	1	Hyundai Creta 1.6 CRDi SX Option	Pune	2015				
	2	Honda Jazz V	Chennai	2011				
	3	Maruti Ertiga VDI	Chennai	2012				
	4	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013				
	6	Nissan Micra Diesel XV	Jaipur	2013				
...	
5842	6014	Maruti Swift VDI	Delhi	2014				
5843	6015	Hyundai Xcent 1.1 CRDi S	Jaipur	2015				
5844	6016	Mahindra Xylo D4 BSIV	Jaipur	2012				
5845	6017	Maruti Wagon R VXI	Kolkata	2013				
5846	6018	Chevrolet Beat Diesel	Hyderabad	2011				
	KMs_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power \	
0	41000	Diesel	Manual	First	19.67	1582	126.20	
1	46000	Petrol	Manual	First	13.00	1199	88.70	
2	87000	Diesel	Manual	First	20.77	1248	88.76	
3	40670	Diesel	Automatic	Second	15.20	1968	140.80	
4	86999	Diesel	Manual	First	23.08	1461	63.10	
...	
5842	27365	Diesel	Manual	First	28.40	1248	74.00	
5843	100000	Diesel	Manual	First	24.40	1120	71.00	
5844	55000	Diesel	Manual	Second	14.00	2498	112.00	
5845	46000	Petrol	Manual	First	18.90	998	67.10	
5846	47000	Diesel	Manual	First	25.44	936	57.60	
	Seats	New_Price	Price	In_Lakhs	Units	New	new_age	CarAge
0	5.0	NaN	12.50	20.484564	Lakh	23.269926	9	5
1	5.0	8.61	4.50	8.610000	Lakh	8.610000	13	9
2	7.0	NaN	6.00	20.484564	Lakh	23.269926	12	8
3	5.0	NaN	17.74	20.484564	Lakh	23.269926	11	7
4	5.0	NaN	3.50	20.484564	Lakh	23.269926	11	7
...
5842	5.0	7.88	4.75	7.880000	Lakh	7.880000	10	6
5843	5.0	NaN	4.00	20.484564	Lakh	23.269926	9	5
5844	8.0	NaN	2.90	20.484564	Lakh	23.269926	12	8
5845	5.0	NaN	2.65	20.484564	Lakh	23.269926	11	7
5846	5.0	NaN	2.50	20.484564	Lakh	23.269926	13	9
[5847 rows x 19 columns]								

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Name: Pranay Nagireddy, ID: 16344126

Arrange:

```
#arrange
arrangequery = data.sort_values(by='Price', ascending=False)
print(arrangequery.head(5))
```

Unnamed: 0	Name	Location
3952	Land Rover Range Rover 3.0 Diesel LWB Vogue	Hyderabad
5620	Lamborghini Gallardo Coupe	Delhi
5752	Jaguar F Type 5.0 V8 S	Hyderabad
1457	Land Rover Range Rover Sport SE	Kochi
1917	BMW 7 Series 740Li	Coimbatore

Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	
3952	2017	25000	Diesel	Automatic	First	13.33 kmpl
5620	2011	6500	Petrol	Automatic	Third	6.4 kmpl
5752	2015	8000	Petrol	Automatic	First	12.5 kmpl
1457	2019	26013	Diesel	Automatic	First	12.65 kmpl
1917	2018	28060	Petrol	Automatic	First	12.05 kmpl

Engine	Power	Seats	New_Price	Price	In_Lakhs	Units	New
3952	2993 CC	255 bhp	5.0	2.3 Cr	160.00	2.30 Cr	230.0
5620	5204 CC	560 bhp	2.0	nan	120.00	NaN	None
5752	5000 CC	488.1 bhp	2.0	nan	100.00	NaN	None
1457	2993 CC	255 bhp	5.0	1.39 Cr	97.07	1.39 Cr	139.0
1917	2979 CC	320 bhp	5.0	nan	93.67	NaN	None

Summary:

```
[13] #Summarize
summaryquery = data.groupby('Fuel_Type').agg(Average_Price=('Price', 'mean'), Average_Age=('new_age', 'mean')).reset_index()
print(summaryquery)
```

	Fuel_Type	Average_Price	Average_Age
0	Diesel	12.960686	10.209111
1	Electric	12.875000	10.500000
2	Petrol	5.756688	10.954918