In [1]:
```
import pandas as pd
```

In [2]:
```
car = pd.read_csv(r'C:\Users\Gauri\Downloads\Projects\car dataset analysis with
```

In [3]:
```
car.head()
```

Out[3]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	200.0
3	Acura	TL 4dr	Sedan	Asia	Front	$33,195	$30,299	3.2	6.0	270.0
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	$43,755	$39,014	3.5	6.0	225.0

In [4]:
```
car.shape
```

Out[4]:
```
(432, 15)
```

Q. 1) Instruction (For Data Cleaning) - Find all Null Values in the dataset. If there is any null value in any column, then fill it with the mean of that column.

In [5]:
```
car.isnull()
```

Out[5]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	I
0	False	False	False	False	False	False	False	False	False	False	
1	False	False	False	False	False	False	False	False	False	False	
2	False	False	False	False	False	False	False	False	False	False	
3	False	False	False	False	False	False	False	False	False	False	
4	False	False	False	False	False	False	False	False	False	False	
...	...	...	...	...	...	...	...	...	...	...	
427	False	False	False	False	False	False	False	False	False	False	
428	False	False	False	False	False	False	False	False	False	False	
429	False	False	False	False	False	False	False	False	False	False	
430	False	False	False	False	False	False	False	False	False	False	
431	False	False	False	False	False	False	False	False	False	False	

432 rows × 15 columns

In [9]:
```
car.isnull().sum()
```

Out[9]:
```
Make           4
Model          4
Type           4
Origin         4
DriveTrain     4
MSRP           4
Invoice        4
EngineSize     4
Cylinders      0
Horsepower     4
MPG_City       4
MPG_Highway    4
Weight         4
Wheelbase      4
Length         4
dtype: int64
```

In [13]:
```
car['Cylinders'].fillna(car['Cylinders'].mean(),inplace = True)
```

In [8]:
```
car
```

Out[8]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsep
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	
3	Acura	TL 4dr	Sedan	Asia	Front	$33,195	$30,299	3.2	6.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	$43,755	$39,014	3.5	6.0	
...	...	...	...	...	...	...	...	...	...	
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	$40,565	$38,203	2.4	5.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	$42,565	$40,083	2.3	5.0	
429	Volvo	S80 T6 4dr	Sedan	Europe	Front	$45,210	$42,573	2.9	6.0	
430	Volvo	V40	Wagon	Europe	Front	$26,135	$24,641	1.9	4.0	
431	Volvo	XC70	Wagon	Europe	All	$35,145	$33,112	2.5	5.0	

432 rows × 15 columns

Q. 2) Question (Based on Value Counts)- Check what are the different types of Make are there in our dataset. And, what is the count (occurrence) of each Make in the data ?

In [16]:
```
car.head(2)
```

Out[16]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0

In [17]:

```
car['Make'].value_counts()
```

Out[17]:

```
Toyota           28
Chevrolet        27
Mercedes-Benz    26
Ford             23
BMW              20
Audi             19
Honda            17
Nissan           17
Volkswagen       15
Chrysler         15
Dodge            13
Mitsubishi       13
Volvo            12
Jaguar           12
Hyundai          12
Subaru           11
Pontiac          11
Mazda            11
Lexus            11
Kia              11
Buick             9
Mercury           9
Lincoln           9
Saturn            8
Cadillac          8
Suzuki            8
Infiniti          8
GMC               8
Acura             7
Porsche           7
Saab              7
Land Rover        3
Oldsmobile        3
Jeep              3
Scion             2
Isuzu             2
MINI              2
Hummer            1
Name: Make, dtype: int64
```

Q. 3) Instruction (Filtering) - Show all the records where Origin is Asia or Europe.

In [18]:

```
car.head(2)
```

Out[18]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0

In [19]:

```
car[car['Origin'].isin(['Asia','Europe'])]
```

Out[19]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsep
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	
3	Acura	TL 4dr	Sedan	Asia	Front	$33,195	$30,299	3.2	6.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	$43,755	$39,014	3.5	6.0	
...	...	...	...	...	...	...	...	...	...	
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	$40,565	$38,203	2.4	5.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	$42,565	$40,083	2.3	5.0	
429	Volvo	S80 T6 4dr	Sedan	Europe	Front	$45,210	$42,573	2.9	6.0	
430	Volvo	V40	Wagon	Europe	Front	$26,135	$24,641	1.9	4.0	
431	Volvo	XC70	Wagon	Europe	All	$35,145	$33,112	2.5	5.0	

281 rows × 15 columns

Q. 4) Instruction (Removing unwanted records) - Remove all the records (rows) where Weight is above 4000.

In [20]:
```
car.head(2)
```

Out[20]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0

In [21]:
```
car[car['Weight'] > 4000]
```

Out[21]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0
15	Audi	A4 3.0 Quattro convertible 2dr	Sedan	Europe	All	$44,240	$40,075	3.0	6.0
17	Audi	A6 4.2 Quattro 4dr	Sedan	Europe	All	$49,690	$44,936	4.2	8.0
18	Audi	A8 L Quattro 4dr	Sedan	Europe	All	$69,190	$64,740	4.2	8.0
20	Audi	RS 6 4dr	Sports	Europe	Front	$84,600	$76,417	4.2	8.0
...	...	...	...	...	...	...	...	...	...
405	Volkswagen	Touareg V6	SUV	Europe	All	$35,515	$32,243	3.2	6.0
415	Volkswagen	Phaeton 4dr	Sedan	Europe	Front	$65,000	$59,912	4.2	8.0
416	Volkswagen	Phaeton W12 4dr	Sedan	Europe	Front	$75,000	$69,130	6.0	12.0
419	Volkswagen	Passat W8	Wagon	Europe	Front	$40,235	$36,956	4.0	8.0
420	Volvo	XC90 T6	SUV	Europe	All	$41,250	$38,851	2.9	6.0

103 rows × 15 columns

In [23]:
```
#Remove all the records which is greater than 4000

car[~(car['Weight'] > 4000)]
```

Out[23]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Hors
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	
3	Acura	TL 4dr	Sedan	Asia	Front	$33,195	$30,299	3.2	6.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	$43,755	$39,014	3.5	6.0	
5	Acura	3.5 RL w/Navigation 4dr	Sedan	Asia	Front	$46,100	$41,100	3.5	6.0	
...	...	...	...	...	...	...	...	...	...	
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	$40,565	$38,203	2.4	5.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	$42,565	$40,083	2.3	5.0	
429	Volvo	S80 T6 4dr	Sedan	Europe	Front	$45,210	$42,573	2.9	6.0	
430	Volvo	V40	Wagon	Europe	Front	$26,135	$24,641	1.9	4.0	
431	Volvo	XC70	Wagon	Europe	All	$35,145	$33,112	2.5	5.0	

329 rows × 15 columns

Q. 5) Instruction (Applying function on a column) - Increase all the values of 'MPG_City' column by 3.

In [24]:
```
car.head(2)
```

Out[24]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0

In [25]:
```
car['MPG_City'] = car['MPG_City'].apply(lambda x:x+3)
```

In [26]:

```
car
```

Out[26]:

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsep
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	
3	Acura	TL 4dr	Sedan	Asia	Front	$33,195	$30,299	3.2	6.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	$43,755	$39,014	3.5	6.0	
...	...	...	...	...	...	...	...	...	...	
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	$40,565	$38,203	2.4	5.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	$42,565	$40,083	2.3	5.0	
429	Volvo	S80 T6 4dr	Sedan	Europe	Front	$45,210	$42,573	2.9	6.0	
430	Volvo	V40	Wagon	Europe	Front	$26,135	$24,641	1.9	4.0	
431	Volvo	XC70	Wagon	Europe	All	$35,145	$33,112	2.5	5.0	

432 rows × 15 columns

In [ ]: