

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

In [2]: car = pd.read_csv(r"C:\Users\Aqib\Downloads\2. Cars Data1.csv")

In [3]: car.head()

Out[3]:
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway
0	Acura	MDX	SUV	Asia	All	\$36,945	\$33,337	3.5	6.0	265.0	17.0	23.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	\$23,820	\$21,761	2.0	4.0	200.0	24.0	31.0
2	Acura	TSX 4dr	Sedan	Asia	Front	\$26,990	\$24,647	2.4	4.0	200.0	22.0	29.0
3	Acura	TL 4dr	Sedan	Asia	Front	\$33,195	\$30,299	3.2	6.0	270.0	20.0	28.0
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	\$43,755	\$39,014	3.5	6.0	225.0	18.0	24.0

```
In [4]: car.shape

Out[4]: (432, 15)

For Data Cleaning (to check null values)
```

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

Out[5]:
```

Make	4
Model	4
Type	4
Origin	4
DriveTrain	4
MSRP	4
Invoice	4
EngineSize	4
Cylinders	6
Horsepower	4
MPG_City	4
MPG_Highway	4
Weight	4
Wheelbase	4
Length	4
dtype:	int64

```
In [6]: car['Cylinders'].fillna(car['Cylinders'].mean(), inplace = True)
```

```
In [7]: car

Out[7]:
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway
0	Acura	MDX	SUV	Asia	All	\$36,945	\$33,337	3.5	6.0	265.0	17.0	
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	\$23,820	\$21,761	2.0	4.0	200.0	24.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	\$26,990	\$24,647	2.4	4.0	200.0	22.0	
3	Acura	TL 4dr	Sedan	Asia	Front	\$33,195	\$30,299	3.2	6.0	270.0	20.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	\$43,755	\$39,014	3.5	6.0	225.0	18.0	
...
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	\$40,565	\$38,203	2.4	5.0	197.0	21.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	\$42,565	\$40,083	2.3	5.0	242.0	20.0	
429	Volvo	S80 T6 4dr	Sedan	Europe	Front	\$45,210	\$42,573	2.9	6.0	268.0	19.0	
430	Volvo	V40	Wagon	Europe	Front	\$26,135	\$24,641	1.9	4.0	170.0	22.0	
431	Volvo	XC70	Wagon	Europe	All	\$35,145	\$33,112	2.5	5.0	208.0	20.0	

432 rows × 15 columns

Value Counts (check different types of Make are there in the Dataset, and count occurrence of each Make)

```
In [8]: car.head(2)

Out[8]:
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway
0	Acura	MDX	SUV	Asia	All	\$36,945	\$33,337	3.5	6.0	265.0	17.0	23.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	\$23,820	\$21,761	2.0	4.0	200.0	24.0	31.0

```
In [9]: car['Make'].value_counts()

Out[9]:
```

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

Name: Make, dtype: int64

Filtering (Show all records where origin is Asia and Europe)

```
In [10]: car.head(2)

Out[10]:
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway
0	Acura	MDX	SUV	Asia	All	\$36,945	\$33,337	3.5	6.0	265.0	17.0	23.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	\$23,820	\$21,761	2.0	4.0	200.0	24.0	31.0

```
In [11]: car[car['Origin'].isin(['Asia', 'Europe'])]

Out[11]:
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway
0	Acura	MDX	SUV	Asia	All	\$36,945	\$33,337	3.5	6.0	265.0	17.0	
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	\$23,820	\$21,761	2.0	4.0	200.0	24.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	\$26,990	\$24,647	2.4	4.0	200.0	22.0	
3	Acura	TL 4dr	Sedan	Asia	Front	\$33,195	\$30,299	3.2	6.0	270.0	20.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	\$43,755	\$39,014	3.5	6.0	225.0	18.0	
...
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	\$40,565	\$38,203	2.4	5.0	197.0	21.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	\$42,565	\$40,083	2.3	5.0	242.0	20.0	
429	Volvo	S80 T6 4dr	Sedan	Europe	Front	\$45,210	\$42,573	2.9	6.0	268.0	19.0	
430	Volvo	V40	Wagon	Europe	Front	\$26,135	\$24,641	1.9	4.0	170.0	22.0	
431	Volvo	XC70	Wagon	Europe	All	\$35,145	\$33,112	2.5	5.0	208.0	20.0	

281 rows × 15 columns

Remove unwanted records (where Weight is above 4000)

```
In [12]: car.head(2)

Out[12]:
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway
0	Acura	MDX	SUV	Asia	All	\$36,945	\$33,337	3.5	6.0	265.0	17.0	23.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	\$23,820	\$21,761	2.0	4.0	200.0	24.0	31.0

```
In [17]: car[~(car['Weight'] > 4000)]

Out[17]:
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	\$23,820	\$21,761	2.0	4.0	200.0	24.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	\$26,990	\$24,647	2.4	4.0	200.0	22.0	
3	Acura	TL 4dr	Sedan	Asia	Front	\$33,195	\$30,299	3.2	6.0	270.0	20.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	\$43,755	\$39,014	3.5	6.0	225.0	18.0	
5	Acura	3.5 RL w/Navigation 4dr	Sedan	Asia	Front	\$46,100	\$41,100	3.5	6.0	225.0	18.0	
...
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	\$40,565	\$38,203	2.4	5.0	197.0	21.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	\$42,565	\$40,083	2.3	5.0	242.0	20.0	
429	Volvo	S80 T6 4dr	Sedan	Europe	Front	\$45,210	\$42,573	2.9	6.0	268.0	19.0	
430	Volvo	V40	Wagon	Europe	Front	\$26,135	\$24,641	1.9	4.0	170.0	22.0	
431	Volvo	XC70	Wagon	Europe	All	\$35,145	\$33,112	2.5	5.0	208.0	20.0	

329 rows × 15 columns

```
In [18]: 428-103

Out[18]: 325
```

Apply a function on a column (Increase all the values of 'MPG_City' column by 5)

```
In [19]: car.head(2)

Out[19]:
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway
0	Acura	MDX	SUV	Asia	All	\$36,945	\$33,337	3.5	6.0	265.0	17.0	23.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	\$23,820	\$21,761	2.0	4.0	200.0	24.0	31.0

```
In [20]: car['MPG_City'] = car['MPG_City'].apply(lambda x:x+3)

In [21]: car

Out[21]:
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway
0	Acura	MDX	SUV	Asia	All	\$36,945	\$33,337	3.5	6.0	265.0	20.0	
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	\$23,820	\$21,761	2.0	4.0	200.0	27.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	\$26,990	\$24,647	2.4	4.0	200.0	25.0	
3	Acura	TL 4dr	Sedan	Asia	Front	\$33,195	\$30,299	3.2	6.0	270.0	23.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	\$43,755	\$39,014	3.5	6.0	225.0	21.0	
...
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	\$40,565	\$38,203	2.4	5.0	197.0	24.0	
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430	Volvo	V40	Wagon	Europe	Front	\$26,135	\$24,641	1.9	4.0	170.0	25.0	
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