Car Dataset

```
import pandas as pd
car=pd.read_csv(r"Cars Data.csv")
```

```
car.head()
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheelbase
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0	17.0	23.0	4451.0	106.0
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0	24.0	31.0	2778.0	101.0
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	200.0	22.0	29.0	3230.0	105.0

Next steps: Generate code with car | View recommended plots | New interactive sheet

```
car.shape
```

```
(432, 15)
```

Data preprocessing

Data cleaning

```
car.isnull().sum()
```

	0
Make	4
Model	4
Type	4
Origin	4
DriveTrain	4
MSRP	4
Invoice	4
EngineSize	0
Cylinders	0
Horsepower	0
MPG_City	0
MPG_Highway	0
Weight	0
Wheelbase	0
Length	0

dtype: int64

```
car["Cylinders"].fillna(car["Cylinders"].mean(), inplace=True)
car["EngineSize"].fillna(car["EngineSize"].mean(), inplace=True)
car["Horsepower"].fillna(car["Horsepower"].mean(), inplace=True)
car["MPG_City"].fillna(car["MPG_City"].mean(), inplace=True)
car["MPG_Highway"].fillna(car["MPG_Highway"].mean(), inplace=True)
car["Weight"].fillna(car["Weight"].mean(), inplace=True)
car["Wheelbase"].fillna(car["Wheelbase"].mean(), inplace=True)
car["Length"].fillna(car["Length"].mean(), inplace=True)
```

```
<ipython-input-21-092880777e5a>:1: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assigr
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting val

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].m


  car["Cylinders"].fillna(car["Cylinders"].mean(), inplace=True)
<ipython-input-21-092880777e5a>:2: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assigr
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting val

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].m


  car["EngineSize"].fillna(car["EngineSize"].mean(), inplace=True)
<ipython-input-21-092880777e5a>:3: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assigr
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting val

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].m


  car["Horsepower"].fillna(car["Horsepower"].mean(), inplace=True)
<ipython-input-21-092880777e5a>:4: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assigr
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting val

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].m


  car["MPG_City"].fillna(car["MPG_City"].mean(), inplace=True)
<ipython-input-21-092880777e5a>:5: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assigr
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting val

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].m
```

```
  car["MPG_Highway"].fillna(car["MPG_Highway"].mean(), inplace=True)
<ipython-input-21-092880777e5a>:6: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assigr
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting val

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].m


  car["Weight"].fillna(car["Weight"].mean(), inplace=True)
<ipython-input-21-092880777e5a>:7: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assigr
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting val

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].m


  car["Wheelbase"].fillna(car["Wheelbase"].mean(), inplace=True)
<ipython-input-21-092880777e5a>:8: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assigr
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting val

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].m


  car["Length"].fillna(car["Length"].mean(), inplace=True)
```

```
car
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheel
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0	17.0	23.0	4451.0	
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0	24.0	31.0	2778.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	200.0	22.0	29.0	3230.0	
3	Acura	TL 4dr	Sedan	Asia	Front	$33,195	$30,299	3.2	6.0	270.0	20.0	28.0	3575.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	$43,755	$39,014	3.5	6.0	225.0	18.0	24.0	3880.0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	$40,565	$38,203	2.4	5.0	197.0	21.0	28.0	3450.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	$42,565	$40,083	2.3	5.0	242.0	20.0	26.0	3450.0	
429	Volvo	S80 T6	Sedan	Europe	Front	$45,210	$42,573	2.9	6.0	268.0	19.0	26.0	3653.0	

Next steps: Generate code with car | View recommended plots | New interactive sheet

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

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheelbase
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0	17.0	23.0	4451.0	106.0
		RSX												

Next steps: Generate code with car | View recommended plots | New interactive sheet

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

Make	count
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

dtype: int64

filtering only asia and europe origin records

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

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheelbase
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0	17.0	23.0	4451.0	106.0
		RSX												

Next steps: Generate code with car | View recommended plots | New interactive sheet

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

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheel
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0	17.0	23.0	4451.0	
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0	24.0	31.0	2778.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	200.0	22.0	29.0	3230.0	
3	Acura	TL 4dr	Sedan	Asia	Front	$33,195	$30,299	3.2	6.0	270.0	20.0	28.0	3575.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	$43,755	$39,014	3.5	6.0	225.0	18.0	24.0	3880.0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	$40,565	$38,203	2.4	5.0	197.0	21.0	28.0	3450.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	$42,565	$40,083	2.3	5.0	242.0	20.0	26.0	3450.0	
429	Volvo	S80 T6	Sedan	Europe	Front	$45,210	$42,573	2.9	6.0	268.0	19.0	26.0	3653.0	

removing unwanted records

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

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheelbase
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0	17.0	23.0	4451.0	106.0
		RSX												

Next steps: Generate code with car | View recommended plots | New interactive sheet

```
car[car['Weight']>4000]
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0	17.0	23.0	4451.0
15	Audi	A4 3.0 Quattro convertible 2dr	Sedan	Europe	All	$44,240	$40,075	3.0	6.0	220.0	18.0	25.0	4013.0
17	Audi	A6 4.2 Quattro 4dr	Sedan	Europe	All	$49,690	$44,936	4.2	8.0	300.0	17.0	24.0	4024.0
18	Audi	A8 L Quattro 4dr	Sedan	Europe	All	$69,190	$64,740	4.2	8.0	330.0	17.0	24.0	4399.0
20	Audi	RS 6 4dr	Sports	Europe	Front	$84,600	$76,417	4.2	8.0	450.0	15.0	22.0	4024.0
...	...	...	...	...	...	...	...	...	...	...	...	...	...
405	Volkswagen	Touareg V6	SUV	Europe	All	$35,515	$32,243	3.2	6.0	220.0	15.0	20.0	5086.0

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

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Whe
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0	24.0	31.0	2778.0	
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	200.0	22.0	29.0	3230.0	
3	Acura	TL 4dr	Sedan	Asia	Front	$33,195	$30,299	3.2	6.0	270.0	20.0	28.0	3575.0	
4	Acura	3.5 RL 4dr	Sedan	Asia	Front	$43,755	$39,014	3.5	6.0	225.0	18.0	24.0	3880.0	
5	Acura	3.5 RL w/Navigation 4dr	Sedan	Asia	Front	$46,100	$41,100	3.5	6.0	225.0	18.0	24.0	3893.0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	
427	Volvo	C70 LPT convertible 2dr	Sedan	Europe	Front	$40,565	$38,203	2.4	5.0	197.0	21.0	28.0	3450.0	
428	Volvo	C70 HPT convertible 2dr	Sedan	Europe	Front	$42,565	$40,083	2.3	5.0	242.0	20.0	26.0	3450.0	

Applying a function on a column

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

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheelbase
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0	17.0	23.0	4451.0	106.0
		RSX												

Next steps: Generate code with car | View recommended plots | New interactive sheet

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

```
car
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheel
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265.0	23.0	23.0	4451.0	
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200.0	30.0	31.0	2778.0	