### Car dataset analysis

January 23, 2024

### 1 Working on Real Project with Python (cars Dataset)

(A Part of Big Data Analyst)

Cars Dataset

Cars Dataset Here, the data of Differenr is given with their specifications.¶ this data is availables as CSV file, we are going to analysze this data set using the pandas DataFrame.

```
[1]: import pandas as pd
     car=pd.read_csv(r"C:\Users\Dell\Desktop\Car Data Analyst\car.csv")
[2]:
[2]:
            Make
                                      Model
                                                      Origin DriveTrain
                                                                               MSRP
                                               Туре
     0
           Acura
                                         MDX
                                                SUV
                                                        Asia
                                                                           $36,945
                                                                           $23,820
     1
           Acura
                            RSX Type S 2dr
                                              Sedan
                                                        Asia
                                                                   Front
     2
                                    TSX 4dr
                                              Sedan
                                                                   Front
                                                                           $26,990
           Acura
                                                        Asia
     3
           Acura
                                     TL 4dr
                                              Sedan
                                                        Asia
                                                                   Front
                                                                           $33,195
     4
           Acura
                                 3.5 RL 4dr
                                              Sedan
                                                                   Front
                                                                           $43,755
                                                        Asia
                  C70 LPT convertible 2dr
     423
                                                                           $40,565
          Volvo
                                                                   Front
                                              Sedan
                                                      Europe
     424
          Volvo
                  C70 HPT convertible 2dr
                                              Sedan
                                                      Europe
                                                                   Front
                                                                           $42,565
     425
          Volvo
                                 S80 T6 4dr
                                                                           $45,210
                                              Sedan
                                                      Europe
                                                                   Front
     426
          Volvo
                                         V40
                                              Wagon
                                                      Europe
                                                                   Front
                                                                           $26,135
     427
          Volvo
                                       XC70
                                              Wagon
                                                      Europe
                                                                     All
                                                                           $35,145
                     EngineSize
                                   Cylinders
                                               Horsepower
                                                            MPG_City
                                                                       MPG_Highway
            Invoice
     0
           $33,337
                             3.5
                                          6.0
                                                       265
                                                                   17
                                                                                  23
                             2.0
                                          4.0
                                                                   24
     1
           $21,761
                                                       200
                                                                                  31
     2
           $24,647
                             2.4
                                          4.0
                                                                   22
                                                                                  29
                                                       200
           $30,299
     3
                             3.2
                                          6.0
                                                       270
                                                                   20
                                                                                  28
           $39,014
                             3.5
                                          6.0
                                                       225
                                                                   18
                                                                                  24
                             2.4
     423
          $38,203
                                          5.0
                                                       197
                                                                   21
                                                                                  28
     424
          $40,083
                             2.3
                                          5.0
                                                       242
                                                                                  26
                                                                   20
     425
          $42,573
                                          6.0
                             2.9
                                                       268
                                                                   19
                                                                                  26
     426
           $24,641
                             1.9
                                          4.0
                                                       170
                                                                   22
                                                                                  29
     427
           $33,112
                             2.5
                                          5.0
                                                       208
                                                                   20
                                                                                  27
```

|     | Weight | Wheelbase | Length |
|-----|--------|-----------|--------|
| 0   | 4451   | 106       | 189    |
| 1   | 2778   | 101       | 172    |
| 2   | 3230   | 105       | 183    |
| 3   | 3575   | 108       | 186    |
| 4   | 3880   | 115       | 197    |
|     | •••    | •••       | •••    |
| 423 | 3450   | 105       | 186    |
| 424 | 3450   | 105       | 186    |
| 425 | 3653   | 110       | 190    |
| 426 | 2822   | 101       | 180    |
| 427 | 3823   | 109       | 186    |
|     |        |           |        |

```
[5]: car.isnull().sum()
[5]: Make
                     0
     Model
                     0
                     0
     Туре
     Origin
                     0
     DriveTrain
                     0
     MSRP
                     0
     Invoice
                     0
     EngineSize
                     0
     Cylinders
                     2
     Horsepower
                     0
     MPG_City
                     0
     MPG_Highway
                     0
     Weight
                     0
     Wheelbase
                     0
     Length
                     0
     dtype: int64
```

### 2 1. Instruction (For data Cleaning)

Find all Null Values in the dataset. If there is any null values in any columns ,then fill the mean of that columns.

```
[10]: car.Cylinders.isnull().sum()
[10]: 2
[11]: car.Cylinders.mean()
[11]: 5.807511737089202
```

```
[13]: car.Cylinders.fillna(car.Cylinders.mean(),inplace=True)
[14]: car.Cylinders.isnull().sum()
[14]: 0
[15]:
      car.isnull().sum()
[15]: Make
                      0
                      0
      Model
      Туре
                      0
      Origin
                      0
      DriveTrain
                      0
      MSRP
                      0
                      0
      Invoice
      EngineSize
                      0
      Cylinders
                      0
      Horsepower
                      0
      MPG_City
                      0
      MPG_Highway
                      0
      Weight
                      0
      Wheelbase
                      0
      Length
                      0
      dtype: int64
```

#### 3 2. Questions (Based on value counts)

Check what are different type of make are there in our dataset. And what is the count (Occurrence ) of each Make I the data ?

```
[21]: Make
      Toyota
                        28
      Chevrolet
                        27
      Mercedes-Benz
                        26
      Ford
                        23
      \mathtt{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
                         9
      Buick
                         9
      Mercury
                         9
      Lincoln
      Saturn
                         8
      Cadillac
                         8
      Suzuki
                         8
      Infiniti
                         8
      GMC
                         8
                         7
      Acura
                         7
      Porsche
      Saab
                         7
      Land Rover
                         3
      Oldsmobile
                         3
      Jeep
                         3
                         2
      Scion
      Isuzu
                         2
                         2
      MINI
      Hummer
                         1
      Name: count, dtype: int64
[32]: # with filter
      car[(car["Origin"]=="Asia") | (car["Origin"]=="Europe")]
[32]:
            Make
                                      Model
                                              Туре
                                                     Origin DriveTrain
                                                                              MSRP \
      0
           Acura
                                        MDX
                                                SUV
                                                       Asia
                                                                    All
                                                                         $36,945
```

```
1
     Acura
                      RSX Type S 2dr
                                       Sedan
                                                 Asia
                                                            Front
                                                                   $23,820
2
                              TSX 4dr
                                                                   $26,990
     Acura
                                       Sedan
                                                 Asia
                                                            Front
3
     Acura
                               TL 4dr
                                       Sedan
                                                 Asia
                                                            Front
                                                                   $33,195
                          3.5 RL 4dr
                                                                   $43,755
4
     Acura
                                       Sedan
                                                 Asia
                                                            Front
       •••
                                                              •••
    Volvo
                                                            Front
423
            C70 LPT convertible 2dr
                                               Europe
                                                                   $40,565
                                       Sedan
424
    Volvo
            C70 HPT convertible 2dr
                                                            Front
                                                                   $42,565
                                       Sedan
                                               Europe
425 Volvo
                          S80 T6 4dr
                                       Sedan
                                               Europe
                                                            Front
                                                                   $45,210
426 Volvo
                                                                   $26,135
                                  V40
                                       Wagon
                                               Europe
                                                            Front
427
    Volvo
                                 XC70
                                       Wagon
                                               Europe
                                                              All
                                                                   $35,145
      Invoice EngineSize
                            Cylinders
                                        Horsepower
                                                     MPG_City
                                                               MPG_Highway
0
     $33,337
                       3.5
                                   6.0
                                                265
                                                            17
                                                                          23
     $21,761
                       2.0
                                   4.0
                                                            24
1
                                                200
                                                                          31
2
     $24,647
                       2.4
                                   4.0
                                                200
                                                            22
                                                                          29
3
     $30,299
                       3.2
                                   6.0
                                                270
                                                            20
                                                                          28
     $39,014
4
                                   6.0
                       3.5
                                                225
                                                            18
                                                                          24
. .
                                                  •••
     $38,203
423
                       2.4
                                   5.0
                                                197
                                                            21
                                                                          28
424
     $40,083
                       2.3
                                   5.0
                                                242
                                                            20
                                                                          26
425
     $42,573
                       2.9
                                   6.0
                                                268
                                                            19
                                                                          26
426
     $24,641
                       1.9
                                   4.0
                                                170
                                                            22
                                                                          29
427
     $33,112
                       2.5
                                   5.0
                                                208
                                                            20
                                                                          27
     Weight
             Wheelbase Length
0
       4451
                    106
                             189
1
       2778
                    101
                             172
2
       3230
                    105
                             183
3
       3575
                    108
                             186
4
       3880
                             197
                    115
        •••
423
       3450
                    105
                             186
424
       3450
                    105
                             186
425
                             190
       3653
                    110
426
       2822
                    101
                             180
427
       3823
                    109
                             186
```

```
[35]: ### with isin funtion
car[car.Origin.isin(["Asia","Europe"])]
```

| [35]: | Make  | Model          | Type  | Origin | ${\tt DriveTrain}$ | MSRP     | \ |
|-------|-------|----------------|-------|--------|--------------------|----------|---|
| 0     | Acura | MDX            | SUV   | Asia   | All                | \$36,945 |   |
| 1     | Acura | RSX Type S 2dr | Sedan | Asia   | Front              | \$23,820 |   |
| 2     | Acura | TSX 4dr        | Sedan | Asia   | Front              | \$26,990 |   |
| 3     | Acura | TI. 4dr        | Sedan | Asia   | Front              | \$33,195 |   |

| 4      | Acura    |             | 3.5 RL   | 4dr   | Sedan | Asi   | a Fro    | nt \$43,75 | 55         |
|--------|----------|-------------|----------|-------|-------|-------|----------|------------|------------|
|        |          | 070 IDE     |          |       |       | -     |          |            |            |
| 423    |          | C70 LPT con |          |       |       | Europ |          |            |            |
| 424    |          | C70 HPT con |          |       | Sedan | -     |          |            |            |
| 425    | Volvo    |             | S80 T6   |       | Sedan | Europ |          | nt \$45,21 |            |
| 426    | Volvo    |             |          | V40   | Wagon | _     |          | · ·        |            |
| 427    | Volvo    |             |          | XC70  | Wagon | Europ | e A      | 11 \$35,14 | <u>.</u> 5 |
|        | Invoic   | e EngineSi  | ze Cyli  | nders | Horse | power | MPG_City | MPG_Highw  | ay \       |
| 0      | \$33,337 | 3           | .5       | 6.0   |       | 265   | 17       |            | 23         |
| 1      | \$21,761 | 2           | .0       | 4.0   |       | 200   | 24       |            | 31         |
| 2      | \$24,647 | 2           | .4       | 4.0   |       | 200   | 22       |            | 29         |
| 3      | \$30,299 | 3           | .2       | 6.0   |       | 270   | 20       |            | 28         |
| 4      | \$39,014 |             | .5       | 6.0   |       | 225   | 18       |            | 24         |
|        | •••      |             |          |       | •••   | •••   | •••      |            |            |
| 423    | \$38,203 | 2           | .4       | 5.0   |       | 197   | 21       |            | 28         |
| 424    | \$40,083 | 2           | .3       | 5.0   |       | 242   | 20       |            | 26         |
| 425    | \$42,573 | 2           | .9       | 6.0   |       | 268   | 19       |            | 26         |
| 426    | \$24,641 | 1           | .9       | 4.0   |       | 170   | 22       |            | 29         |
| 427    | \$33,112 | 2           | .5       | 5.0   |       | 208   | 20       |            | 27         |
|        | Waight   | Wheelbase   | I on m+h |       |       |       |          |            |            |
| 0      | 4451     | 106         | 189      |       |       |       |          |            |            |
| 1      | 2778     | 100         | 172      |       |       |       |          |            |            |
| 2      | 3230     | 101         | 183      |       |       |       |          |            |            |
| 3      | 3575     | 103         | 186      |       |       |       |          |            |            |
| 3<br>4 |          |             |          |       |       |       |          |            |            |
| =      | 3880     | 115         | 197      |       |       |       |          |            |            |
| 400    |          |             |          |       |       |       |          |            |            |
| 423    | 3450     | 105         | 186      |       |       |       |          |            |            |
| 424    | 3450     | 105         | 186      |       |       |       |          |            |            |
| 425    | 3653     | 110         | 190      |       |       |       |          |            |            |
| 426    | 2822     | 101         | 180      |       |       |       |          |            |            |
| 427    | 3823     | 109         | 186      |       |       |       |          |            |            |
|        |          |             |          |       |       |       |          |            |            |

## 4 4. instruction (Removing unwanted record)

Remove all the record (rows) where weight is above 4000.

```
[41]: (car.Weight>4000).sum()

[41]: 103

[40]: (car["Weight"]>4000).sum()

[40]: 103
```

```
[42]: car.Weight>4000
[42]: 0
              True
      1
             False
      2
             False
      3
             False
      4
             False
      423
             False
      424
             False
      425
             False
      426
             False
      427
             False
      Name: Weight, Length: 428, dtype: bool
[43]:
     car
[43]:
            Make
                                      Model
                                               Туре
                                                     Origin DriveTrain
                                                                              MSRP
                                        MDX
                                                SUV
      0
           Acura
                                                        Asia
                                                                     All
                                                                          $36,945
      1
                                                                  Front
           Acura
                             RSX Type S 2dr
                                              Sedan
                                                        Asia
                                                                          $23,820
      2
                                    TSX 4dr
                                                                  Front
                                                                          $26,990
           Acura
                                              Sedan
                                                        Asia
      3
           Acura
                                     TL 4dr
                                              Sedan
                                                        Asia
                                                                  Front
                                                                          $33,195
      4
           Acura
                                 3.5 RL 4dr
                                              Sedan
                                                        Asia
                                                                  Front
                                                                          $43,755
                                                                    •••
      423
          Volvo
                   C70 LPT convertible 2dr Sedan
                                                     Europe
                                                                  Front
                                                                          $40,565
      424 Volvo
                   C70 HPT convertible 2dr
                                                                  Front
                                                                          $42,565
                                              Sedan
                                                     Europe
      425 Volvo
                                 S80 T6 4dr
                                              Sedan
                                                     Europe
                                                                  Front
                                                                          $45,210
      426 Volvo
                                         V40
                                                     Europe
                                                                  Front
                                                                          $26,135
                                              Wagon
      427
          Volvo
                                       XC70
                                                     Europe
                                                                          $35,145
                                              Wagon
                                                                     All
                                               Horsepower
            Invoice
                      EngineSize
                                   Cylinders
                                                            MPG_City
                                                                      MPG_Highway
      0
           $33,337
                              3.5
                                         6.0
                                                      265
                                                                  17
                                                                                23
      1
           $21,761
                              2.0
                                          4.0
                                                      200
                                                                  24
                                                                                31
      2
           $24,647
                              2.4
                                                                  22
                                                                                29
                                         4.0
                                                      200
      3
           $30,299
                              3.2
                                         6.0
                                                      270
                                                                  20
                                                                                28
      4
           $39,014
                              3.5
                                          6.0
                                                      225
                                                                  18
                                                                                24
      . .
                                                        •••
      423
           $38,203
                                                                                28
                              2.4
                                         5.0
                                                      197
                                                                  21
           $40,083
      424
                              2.3
                                         5.0
                                                      242
                                                                  20
                                                                                26
      425
           $42,573
                              2.9
                                         6.0
                                                      268
                                                                  19
                                                                                26
      426
           $24,641
                              1.9
                                         4.0
                                                      170
                                                                  22
                                                                                29
      427
           $33,112
                              2.5
                                         5.0
                                                      208
                                                                  20
                                                                                27
           Weight
                    Wheelbase Length
              4451
                                   189
      0
                          106
      1
              2778
                          101
                                   172
      2
              3230
                          105
                                   183
```

| 3   | 3575 | 108 | 186 |
|-----|------|-----|-----|
| 4   | 3880 | 115 | 197 |
|     | •••  |     |     |
| 423 | 3450 | 105 | 186 |
| 424 | 3450 | 105 | 186 |
| 425 | 3653 | 110 | 190 |
| 426 | 2822 | 101 | 180 |
| 427 | 3823 | 109 | 186 |

### [45]: car[~car.Weight>4000,]

#### [45]: Empty DataFrame

Columns: [Make, Model, Type, Origin, DriveTrain, MSRP, Invoice, EngineSize, Cylinders, Horsepower, MPG\_City, MPG\_Highway, Weight, Wheelbase, Length]

Index: []

[46]: car

| [46]: |                          | Make   |         |                              | Mod     | lel                      | Туре    | Origin                              | DriveTrain                     | MSRP                       | \ |
|-------|--------------------------|--|---------|------------------------------|---------|--------------------------|---------|-------------------------------------|--------------------------------|----------------------------|---|
|       | 0                        | Acura  |         |                              | M       | ſDX                      | SUV     | Asia                                | All                            | \$36,945                   |   |
|       | 1                        | Acura  |         | RSX Ty                       | ype S 2 | 2dr                      | Sedan   | Asia                                | Front                          | \$23,820                   |   |
|       | 2                        | Acura  |         |                              | TSX 4   | ldr                      | Sedan   | Asia                                | Front                          | \$26,990                   |   |
|       | 3                        | Acura  |         |                              | TL 4    | ldr                      | Sedan   | Asia                                | Front                          | \$33,195                   |   |
|       | 4                        | Acura  |         | 3                            | .5 RL 4 | ldr                      | Sedan   | Asia                                | Front                          | \$43,755                   |   |
|       |                          | •••  |         |                              | •••     | •••                      | •••     | •                                   |                                |                            |   |
|       | 423                      | Volvo  | C70 LPT | convert                      | tible 2 | 2dr                      | Sedan   | Europe                              | Front                          | \$40,565                   |   |
|       | 424                      | Volvo  | C70 HPT | convert                      | tible 2 | 2dr                      | Sedan   | Europe                              | Front                          | \$42,565                   |   |
|       | 425                      | Volvo  |         | SS                           | 30 T6 4 | ldr                      | Sedan   | Europe                              | Front                          | \$45,210                   |   |
|       | 426                      | Volvo  |         |                              | V       | <i>1</i> 40              | Wagon   | Europe                              | Front                          | \$26,135                   |   |
|       | 427                      | Volvo  |         |                              | XC      | 70                       | Wagon   | Europe                              | All                            | \$35,145                   |   |
|       |                          |  |         |                              |         |                          |         |                                     |                                |                            |   |
|       |                          | Invoic   | _       |                              | •       |                          | Horse   | -                                   | MPG_City MF                    |                            | \ |
|       | 0                        | \$33,337   |         | 3.5                          |         | 6.0                      |         | 265                                 | 17                             | 23                         |   |
|       | 1                        | \$21,761   |         | 2.0                          |         | 4.0                      |         | $\alpha \alpha \alpha$              | 0.4                            | 0.4                        |   |
|       | 2                        | 404 045  |         |                              |         |                          |         | 200                                 | 24                             | 31                         |   |
|       | _                        | \$24,647   |         | 2.4                          |         | 4.0                      |         | 200                                 | 22                             | 29                         |   |
|       | 3                        | \$24,647   |         | 2.4<br>3.2                   |         | 4.0<br>6.0               |         |                                     |                                |                            |   |
|       |                          |  |         |                              |         |                          |         | 200                                 | 22                             | 29                         |   |
|       | 3                        | \$30,299   |         | 3.2                          |         | 6.0                      |         | 200<br>270                          | 22<br>20                       | 29<br>28                   |   |
|       | 3<br>4                   | \$30,299<br>\$39,014                             |         | 3.2<br>3.5                   |         | 6.0                      | <b></b> | 200<br>270<br>225                   | 22<br>20<br>18                 | 29<br>28                   |   |
|       | 3<br>4<br>               | \$30,299<br>\$39,014<br>                         |         | 3.2<br>3.5<br>               | <b></b> | 6.0<br>6.0               |         | 200<br>270<br>225<br>               | 22<br>20<br>18<br>             | 29<br>28<br>24             |   |
|       | 3<br>4<br><br>423        | \$30,299<br>\$39,014<br><br>\$38,203             |         | 3.2<br>3.5<br><br>2.4        |         | 6.0<br>6.0<br>5.0        |         | 200<br>270<br>225<br><br>197        | 22<br>20<br>18<br><br>21       | 29<br>28<br>24<br>28       |   |
|       | 3<br>4<br><br>423<br>424 | \$30,299<br>\$39,014<br><br>\$38,203<br>\$40,083 |         | 3.2<br>3.5<br><br>2.4<br>2.3 |         | 6.0<br>6.0<br>5.0<br>5.0 |         | 200<br>270<br>225<br><br>197<br>242 | 22<br>20<br>18<br><br>21<br>20 | 29<br>28<br>24<br>28<br>26 |   |

Weight Wheelbase Length

| 0          | 4451         | 106        | 189        |
|------------|--------------|------------|------------|
| 1          | 2778         | 101        | 172        |
| 2          | 3230         | 105        | 183        |
| 3          | 3575         | 108        | 186        |
| 4          | 3880         | 115        | 197        |
|            |              |            |            |
| • •        | •••          | ••• •••    |            |
| 423        | <br>3450     | 105        | 186        |
| 423<br>424 |              |            | 186<br>186 |
|            | 3450         | 105        |            |
| 424        | 3450<br>3450 | 105<br>105 | 186        |

| [51]: | car[car["Weight" | ]>4000] |
|-------|------------------|---------|
|-------|------------------|---------|

| [51]: |            | Mal                  | кe    |                |          |            | Mode:       | 1   | Туре  | Or:      | igin | Drive    | Train | \ |
|-------|------------|----------------------|-------|----------------|----------|------------|-------------|-----|-------|----------|------|----------|-------|---|
|       | 0          | Acu                  | ra    |                |          |            | MD          | X   | SUV   |          | Asia |          | All   |   |
|       | 15         | Aud                  | di A  | 4 3.0          | Quattro  | conv       | vertible 2d | r : | Sedan | Eur      | rope |          | All   |   |
|       | 17         | Aud                  | di    |                | A6       | 4.2        | Quattro 4d  | r : | Sedan | Eu       | rope |          | All   |   |
|       | 18         | Aud                  | di    |                |          | A8 L       | Quattro 4d  | r : | Sedan | Eur      | rope |          | All   |   |
|       | 20         | Aud                  | di    |                |          |            | RS 6 4d1    | r S | ports | Eu       | rope |          | Front |   |
|       |            | •••                  |       |                |          |            | •••         |     | •••   |          |      | ••       |       |   |
|       | 401        | Volkswage            | en    |                |          |            | Touareg Ve  | 6   | SUV   | Eu       | rope |          | All   |   |
|       | 411        | Volkswage            | en    |                |          |            | Phaeton 4d  | r : | Sedan | Eu       | rope |          | Front |   |
|       | 412        | Volkswage            |       |                |          | Phae       | eton W12 4d |     | Sedan |          | rope |          | Front |   |
|       | 415        | Volkswage            |       |                |          |            | Passat W    |     | _     |          | rope |          | Front |   |
|       | 416        | Vol                  | VO    |                |          |            | XC90 T6     | 6   | SUV   | Eu       | rope |          | All   |   |
|       |            |                      |       |                |          |            |             |     |       |          |      |          |       |   |
|       | _          | MSRP                 |       | voice          | Engine   |            | Cylinders   |     | -     |          | MPG_ | _ •      | \     |   |
|       | 0          | \$36,945             |       | ,337           |          | 3.5        | 6.0         |     |       | 65       |      | 17       |       |   |
|       | 15         | \$44,240             |       | ,075           |          | 3.0        | 6.0         |     |       | 20       |      | 18       |       |   |
|       | 17         | \$49,690             |       | ,936           |          | 4.2        | 8.0         |     |       | 00       |      | 17       |       |   |
|       | 18         | \$69,190             |       | ,740           |          | 4.2        | 8.0         |     |       | 30       |      | 17       |       |   |
|       | 20         | \$84,600             | \$76  | ,417           |          | 4.2        | 8.0         |     | 4     | 50       |      | 15       |       |   |
|       |            | <br>ФОГ Г1Г          |       |                | •••      | 2.0        |             | ••• |       |          |      | 4 -      |       |   |
|       | 401        | \$35,515             |       | ,243           |          | 3.2        | 6.0         |     |       | 20       |      | 15       |       |   |
|       | 411<br>412 | \$65,000             |       | ,912           |          | 4.2<br>6.0 | 8.0<br>12.0 |     |       | 35<br>20 |      | 16       |       |   |
|       | 412        | \$75,000<br>\$40,235 |       | ,130<br>,956   |          | 4.0        | 8.0         |     |       | 20       |      | 12<br>18 |       |   |
|       | 416        | \$40,235<br>\$41,250 |       | ,956<br>,851   |          | 2.9        | 6.0         |     |       | :70      |      | 15       |       |   |
|       | 410        | Φ41,250              | φοο   | ,001           |          | 2.9        | 6.0         |     | 2     | .00      |      | 15       |       |   |
|       |            | MPG_Hight            | way 1 | <i>w</i> eight | : Wheel  | base       | Length      |     |       |          |      |          |       |   |
|       | 0          | - 0                  | 23    | 4451           |          | 106        | 189         |     |       |          |      |          |       |   |
|       | 15         |                      | 25    | 4013           | 3        | 105        | 180         |     |       |          |      |          |       |   |
|       | 17         |                      | 24    | 4024           | <u>l</u> | 109        | 193         |     |       |          |      |          |       |   |
|       | 18         |                      | 24    | 4399           | )        | 121        | 204         |     |       |          |      |          |       |   |
|       |            |                      |       |                |          |            |             |     |       |          |      |          |       |   |

| 20  | 22 | 4024 |     | 109 | 191 |
|-----|----|------|-----|-----|-----|
|     |    | •••  | ••• | ••• |     |
| 401 | 20 | 5086 |     | 112 | 187 |
| 411 | 22 | 5194 |     | 118 | 204 |
| 412 | 19 | 5399 |     | 118 | 204 |
| 415 | 25 | 4067 |     | 106 | 184 |
| 416 | 20 | 4638 |     | 113 | 189 |

[103 rows x 15 columns]

| Γ541 · | car[~( | carl | "Weight" | 1>4000 | ١(  |
|--------|--------|------|----------|--------|-----|
| LUTI.  | Carl   | Carl | METETIC  | 74000  | 7 1 |

| 20 23 . | 0 00 2 | . (001 [ . |             | ~/_      |        |         |       |            |             |   |
|---------|--------|------------|-------------|----------|--------|---------|-------|------------|-------------|---|
| [54]:   |        | Make       |             | N        | Model  | Туре    | Origi | n DriveTra | in MSRP     | \ |
|         | 1      | Acura      | RS          | X Type S | 3 2dr  | Sedan   | Asi   | a Fro      | nt \$23,820 |   |
|         | 2      | Acura      |             | TS       | K 4dr  | Sedan   | Asi   | a Fro      | nt \$26,990 |   |
|         | 3      | Acura      |             | TI       | L 4dr  | Sedan   | Asi   | a Fro      | nt \$33,195 |   |
|         | 4      | Acura      |             | 3.5 RI   | 4dr    | Sedan   | Asi   | a Fro      | nt \$43,755 |   |
|         | 5      | Acura      | 3.5 RL w/Na | vigation | n 4dr  | Sedan   | Asi   | a Fro      | nt \$46,100 |   |
|         |        | •••        |             | •        |        | •••     |       |            |             |   |
|         | 423    | Volvo      | C70 LPT con | vertible | e 2dr  | Sedan   | Europ | e Fro      | nt \$40,565 |   |
|         | 424    | Volvo      | C70 HPT con |          |        |         | Europ |            | nt \$42,565 |   |
|         | 425    | Volvo      |             | S80 T6   | 3 4dr  |         | Europ |            |             |   |
|         | 426    | Volvo      |             |          | V40    | _       | Europ |            |             |   |
|         | 427    | Volvo      |             |          | XC70   | Wagon   | Europ | e A        | 11 \$35,145 |   |
|         |        | Invoid     | se EngineSi | ze Cvl   | indore | Horse   | nouer | MDC City   | MPG_Highway | \ |
|         | 1      | \$21,761   | _           | .0       | 4.0    | 1101 56 | 200   | 24         | 31          | ` |
|         | 2      | \$24,647   |             | .4       | 4.0    |         | 200   | 22         | 29          |   |
|         | 3      | \$30,299   |             | .2       | 6.0    |         | 270   | 20         | 28          |   |
|         | 4      | \$39,014   |             | .5       | 6.0    |         | 225   | 18         | 24          |   |
|         | 5      | \$41,100   |             | .5       | 6.0    |         | 225   | 18         | 24          |   |
|         |        | •••        |             | •••      |        | •••     | •••   | •••        |             |   |
|         | 423    | \$38,203   | 3 2         | .4       | 5.0    |         | 197   | 21         | 28          |   |
|         | 424    | \$40,083   | 3 2         | .3       | 5.0    |         | 242   | 20         | 26          |   |
|         | 425    | \$42,573   | 3 2         | .9       | 6.0    |         | 268   | 19         | 26          |   |
|         | 426    | \$24,641   | l 1         | .9       | 4.0    |         | 170   | 22         | 29          |   |
|         | 427    | \$33,112   | 2 2         | .5       | 5.0    |         | 208   | 20         | 27          |   |
|         |        | Weight     | Wheelbase   | Longth   |        |         |       |            |             |   |
|         | 1      | 2778       | wheelbase   | 172      |        |         |       |            |             |   |
|         | 2      | 3230       | 105         | 183      |        |         |       |            |             |   |
|         | 3      | 3575       | 108         | 186      |        |         |       |            |             |   |
|         | 4      | 3880       | 115         | 197      |        |         |       |            |             |   |
|         | 5      | 3893       | 115         | 197      |        |         |       |            |             |   |
|         |        |            |             |          |        |         |       |            |             |   |
|         | 423    | 3450       | 105         | 186      |        |         |       |            |             |   |
|         | 424    | 3450       | 105         | 186      |        |         |       |            |             |   |
|         |        |            |             |          |        |         |       |            |             |   |

| 425 | 3653 | 110 | 190 |
|-----|------|-----|-----|
| 426 | 2822 | 101 | 180 |
| 427 | 3823 | 109 | 186 |

# 5 5 instructions (Applying funtion on a column )

increase all the values of "MPG\_City" column by 3

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

6

```
[62]:
     car
[62]:
             Make
                                       Model
                                                       Origin DriveTrain
                                                                                MSRP
                                                Type
      0
            Acura
                                          MDX
                                                 SUV
                                                         Asia
                                                                       All
                                                                            $36,945
      1
            Acura
                             RSX Type S 2dr
                                               Sedan
                                                         Asia
                                                                    Front
                                                                            $23,820
      2
            Acura
                                     TSX 4dr
                                                                    Front
                                                                            $26,990
                                               Sedan
                                                         Asia
      3
            Acura
                                      TL 4dr
                                               Sedan
                                                         Asia
                                                                    Front
                                                                            $33,195
      4
                                  3.5 RL 4dr
            Acura
                                               Sedan
                                                         Asia
                                                                    Front
                                                                            $43,755
      423
           Volvo
                    C70 LPT convertible 2dr
                                                                    Front
                                                                            $40,565
                                               Sedan
                                                       Europe
                   C70 HPT convertible 2dr
      424
           Volvo
                                               Sedan
                                                       Europe
                                                                    Front
                                                                            $42,565
      425
           Volvo
                                  S80 T6 4dr
                                               Sedan
                                                       Europe
                                                                    Front
                                                                            $45,210
                                                                            $26,135
      426
           Volvo
                                          V40
                                               Wagon
                                                       Europe
                                                                    Front
      427
           Volvo
                                         XC70
                                               Wagon
                                                       Europe
                                                                       All
                                                                            $35,145
                                    Cylinders
                                                Horsepower
                                                             MPG_City
                                                                        MPG Highway
             Invoice
                       EngineSize
      0
            $33,337
                               3.5
                                           6.0
                                                        265
                                                                    20
                                                                                   23
            $21,761
                                                                    27
      1
                               2.0
                                           4.0
                                                                                   31
                                                        200
            $24,647
      2
                               2.4
                                           4.0
                                                        200
                                                                    25
                                                                                   29
      3
            $30,299
                               3.2
                                           6.0
                                                        270
                                                                    23
                                                                                   28
      4
            $39,014
                               3.5
                                           6.0
                                                        225
                                                                    21
                                                                                   24
      423
            $38,203
                               2.4
                                           5.0
                                                        197
                                                                    24
                                                                                   28
      424
            $40,083
                               2.3
                                           5.0
                                                                                   26
                                                        242
                                                                    23
      425
                                                                    22
            $42,573
                               2.9
                                           6.0
                                                        268
                                                                                   26
      426
            $24,641
                               1.9
                                           4.0
                                                        170
                                                                    25
                                                                                   29
      427
            $33,112
                               2.5
                                           5.0
                                                        208
                                                                    23
                                                                                   27
            Weight
                    Wheelbase
                               Length
      0
              4451
                           106
                                    189
      1
              2778
                           101
                                    172
      2
              3230
                           105
                                    183
```

| 3   | 3575 | 108 | 186 |
|-----|------|-----|-----|
| 4   | 3880 | 115 | 197 |
|     | •••  |     |     |
| 423 | 3450 | 105 | 186 |
| 424 | 3450 | 105 | 186 |
| 425 | 3653 | 110 | 190 |
| 426 | 2822 | 101 | 180 |
| 427 | 3823 | 109 | 186 |

[]: