In [ ]:

```
Write Python program to write the data
given below to a CSV file.(university question)
SN Name                          Country          Contribution              Year
1     Linus Torvalds          Finland         Linux Kernel              1991
2     Tim Berners-Lee       England        World Wide Web       1990
3     Guido van Rossum    Netherlands   Python                        1991
```

Write Python program to write the data given below to a CSV file.(university question) SN Name Country Contribution Year 1 Linus Torvalds Finland Linux Kernel 1991 2 Tim Berners-Lee England World Wide Web 1990 3 Guido van Rossum Netherlands Python 1991

In [ ]:

```
# importing pandas as pd
import pandas as pd
# dictionary of lists
# creating a dataframe from a dictionary
df = pd.DataFrame([[1,' Linus Torvalds','Finland','Linux Kernel ',1991],
      [2,'Tim Berners-Lee','England','World Wide Web',1990],
      [3,'Guido van Rossum','Netherlands','Python',1991]],
columns=['SN','Name','Country','Contribution','Year'])
print("data frame with defaut index=",df)
df=df.set_index('SN')
print("data frame with SN as index=",df)
print(df)
df.to_csv('invenrs.csv')
```

```
data frame with defaut index=    SN              Name      Country    Cont
ribution  Year
0   1    Linus Torvalds      Finland   Linux Kernel   1991
1   2   Tim Berners-Lee      England  World Wide Web  1990
2   3  Guido van Rossum  Netherlands          Python  1991
data frame with SN as index=                 Name      Country    Contribu
tion  Year
SN
1     Linus Torvalds      Finland   Linux Kernel   1991
2    Tim Berners-Lee      England  World Wide Web  1990
3   Guido van Rossum  Netherlands          Python  1991
                Name      Country    Contribution  Year
SN
1     Linus Torvalds      Finland   Linux Kernel   1991
2    Tim Berners-Lee      England  World Wide Web  1990
3   Guido van Rossum  Netherlands          Python  1991
```

Given a file “auto.csv” of automobile data with the fields index, company, body-style, wheel-base, length, engine-type, num-of-cylinders, horsepower, average-mileage, and price, write Python codes using Pandas to read the csv file and do the following 1) From the given dataset print the first and last five rows

In [ ]:

```
import pandas as pd
df = pd.read_csv("/content/Automobile_data.csv")
print(df.head(5))
print("last rows")
print(df.tail(5))
```

```
   index      company   body-style  wheel-base  length engine-type  \
0      0  alfa-romero  convertible        88.6   168.8        dohc
1      1  alfa-romero  convertible        88.6   168.8        dohc
2      2  alfa-romero    hatchback        94.5   171.2        ohcv
3      3         audi        sedan        99.8   176.6         ohc
4      4         audi        sedan        99.4   176.6         ohc

  num-of-cylinders  horsepower  average-mileage    price
0             four         111               21  13495.0
1             four         111               21  16500.0
2              six         154               19  16500.0
3             four         102               24  13950.0
4             five         115               18  17450.0
last rows
    index      company body-style  wheel-base  length engine-type  \
56     81  volkswagen      sedan        97.3   171.7         ohc
57     82  volkswagen      sedan        97.3   171.7         ohc
58     86  volkswagen      sedan        97.3   171.7         ohc
59     87       volvo      sedan       104.3   188.8         ohc
60     88       volvo      wagon       104.3   188.8         ohc

   num-of-cylinders  horsepower  average-mileage    price
56             four          85               27   7975.0
57             four          52               37   7995.0
58             four         100               26   9995.0
59             four         114               23  12940.0
60             four         114               23  13415.0
```

Clean the dataset and update the CSV file Replace all column values which contain ?, n.a, or NaN.

In [ ]:

```
import pandas as pd
df = pd.read_csv("/content/Automobile_data.csv",na_values={
'price':["?","n.a",'NaN'," "],
'stroke':["?","n.a",'NaN'," "],
'horsepower':["?","n.a",'NaN'],
'peak-rpm':["?","n.a",'NaN',' '],
'average-mileage':["?","n.a",'NaN']})
DF2=df.fillna(0)
DF2.to_csv("/content/Automobil4.csv")
```

In [ ]:

```
import pandas as pd
df = pd.read_csv("/content/Automobile_data.csv")
DF2=df.fillna(0)
DF2.to_csv("/content/Automobil5.csv")
```

In [ ]:

```
#Find the most expensive car company name
import pandas as pd
df = pd.read_csv("/content/Automobile_data.csv")
company = df [['company','price']][df.price==df['price'].max()]
print(company)
```

```
          company    price
35  mercedes-benz  45400.0
```

In [ ]:

```
#Find the most expensive car company name
import pandas as pd
df = pd.read_csv("Automobile_data.csv")
DF1=df.sort_values(by=['price'],
ascending=False)[['company','price']]
DF1.head(1)
```

Out[ ]:

	company	price
35	mercedes-benz	45400.0

In [ ]:

```
#maximum price of each companies
import pandas as pd
df = pd.read_csv("/content/Automobile_data.csv")
df1=df.groupby('company')['body-style','horsepower','price'].max()
print(df1)
```

```
              body-style  horsepower    price
company
alfa-romero    hatchback         154  16500.0
audi               wagon         115  18920.0
bmw                sedan         182  41315.0
chevrolet          sedan          70   6575.0
dodge          hatchback          68   6377.0
honda              wagon         101  12945.0
isuzu              sedan          78   6785.0
jaguar             sedan         262  36000.0
mazda              sedan         101  18344.0
mercedes-benz      wagon         184  45400.0
mitsubishi         sedan          88   8189.0
nissan             wagon         152  13499.0
porsche        hatchback         288  37028.0
toyota             wagon         156  15750.0
volkswagen         sedan         100   9995.0
volvo              wagon         114  13415.0

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:4: FutureWarn
ing: Indexing with multiple keys (implicitly converted to a tuple of keys)
will be deprecated, use a list instead.
  after removing the cwd from sys.path.
```

In [ ]:

```
# Print All Toyota Cars details
import pandas as pd
df = pd.read_csv("/content/Automobile_data.csv")
company =print(df[df['company']=='toyota'])
print(company)
```

```
    index company body-style  wheel-base  length engine-type num-of-cylind
ers  \
48     66  toyota  hatchback        95.7   158.7         ohc             f
our
49     67  toyota  hatchback        95.7   158.7         ohc             f
our
50     68  toyota  hatchback        95.7   158.7         ohc             f
our
51     69  toyota      wagon        95.7   169.7         ohc             f
our
52     70  toyota      wagon        95.7   169.7         ohc             f
our
53     71  toyota      wagon        95.7   169.7         ohc             f
our
54     79  toyota      wagon       104.5   187.8        dohc
six

    horsepower  average-mileage    price
48          62               35   5348.0
49          62               31   6338.0
50          62               31   6488.0
51          62               31   6918.0
52          62               27   7898.0
53          62               27   8778.0
54         156               19  15750.0
None
```

In [ ]:

```
import pandas as pd
df = pd.read_csv("Automobile_data.csv")
car_Manufacturers = df.groupby('company')
toyotaDf = car_Manufacturers.get_group('toyota')
print(toyotaDf)
```

```
    index company body-style  wheel-base  length engine-type num-of-cylind
ers  \
48     66  toyota  hatchback        95.7   158.7         ohc             f
our
49     67  toyota  hatchback        95.7   158.7         ohc             f
our
50     68  toyota  hatchback        95.7   158.7         ohc             f
our
51     69  toyota      wagon        95.7   169.7         ohc             f
our
52     70  toyota      wagon        95.7   169.7         ohc             f
our
53     71  toyota      wagon        95.7   169.7         ohc             f
our
54     79  toyota      wagon       104.5   187.8        dohc
six

    horsepower  average-mileage    price
48          62               35   5348.0
49          62               31   6338.0
50          62               31   6488.0
51          62               31   6918.0
52          62               27   7898.0
53          62               27   8778.0
54         156               19  15750.0
```

In [ ]:

```
#Print total cars of all companies
import pandas as pd
df = pd.read_csv("Automobile_data.csv")
df1=df.groupby('company')
for company,company_df in df1:
  print(company,company_df)
```

```
alfa-romero    index      company   body-style  wheel-base  length engine-
type  \
0      0  alfa-romero  convertible        88.6   168.8        dohc
1      1  alfa-romero  convertible        88.6   168.8        dohc
2      2  alfa-romero    hatchback        94.5   171.2        ohcv

  num-of-cylinders  horsepower  average-mileage    price
0             four         111               21  13495.0
1             four         111               21  16500.0
2              six         154               19  16500.0
audi    index company body-style  wheel-base  length engine-type num-of-cy
linders  \
3      3    audi      sedan        99.8   176.6         ohc             fo
ur
4      4    audi      sedan        99.4   176.6         ohc             fi
ve
5      5    audi      sedan        99.8   177.3         ohc             fi
ve
6      6    audi      wagon       105.8   192.7         ohc             fi
ve

   horsepower  average-mileage    price
3         102               24  13950.0
4         115               18  17450.0
5         110               19  15250.0
6         110               19  18920.0
bmw     index company body-style  wheel-base  length engine-type num-of-cy
linders  \
7       9     bmw      sedan       101.2   176.8         ohc              f
our
8      10     bmw      sedan       101.2   176.8         ohc              f
our
9      11     bmw      sedan       101.2   176.8         ohc
six
10     13     bmw      sedan       103.5   189.0         ohc
six
11     14     bmw      sedan       103.5   193.8         ohc
six
12     15     bmw      sedan       110.0   197.0         ohc
six

    horsepower  average-mileage    price
7          101               23  16430.0
8          101               23  16925.0
9          121               21  20970.0
10         182               16  30760.0
11         182               16  41315.0
12         182               15  36880.0
chevrolet     index    company body-style  wheel-base  length engine-type
\
13     16  chevrolet  hatchback        88.4   141.1           l
14     17  chevrolet  hatchback        94.5   155.9         ohc
15     18  chevrolet      sedan        94.5   158.8         ohc

   num-of-cylinders  horsepower  average-mileage   price
13            three          48               47  5151.0
14             four          70               38  6295.0
15             four          70               38  6575.0
dodge     index company body-style  wheel-base  length engine-type num-of-
cylinders  \
16     19   dodge  hatchback        93.7   157.3         ohc              f
```

```
our
17     20   dodge  hatchback        93.7   157.3         ohc             f
our

    horsepower  average-mileage   price
16          68               31  6377.0
17          68               31  6229.0
honda     index company body-style  wheel-base  length engine-type num-of-
cylinders  \
18     27   honda      wagon        96.5   157.1         ohc             f
our
19     28   honda      sedan        96.5   175.4         ohc             f
our
20     29   honda      sedan        96.5   169.1         ohc             f
our

    horsepower  average-mileage    price
18          76               30   7295.0
19         101               24  12945.0
20         100               25  10345.0
isuzu     index company body-style  wheel-base  length engine-type num-of-
cylinders  \
21     30   isuzu      sedan        94.3   170.7         ohc             f
our
22     31   isuzu      sedan        94.5   155.9         ohc             f
our
23     32   isuzu      sedan        94.5   155.9         ohc             f
our

    horsepower  average-mileage   price
21          78               24  6785.0
22          70               38     NaN
23          70               38     NaN
jaguar     index company body-style  wheel-base  length engine-type num-of
-cylinders  \
24     33  jaguar      sedan       113.0   199.6        dohc
six
25     34  jaguar      sedan       113.0   199.6        dohc
six
26     35  jaguar      sedan       102.0   191.7        ohcv           twe
lve

    horsepower  average-mileage    price
24         176               15  32250.0
25         176               15  35550.0
26         262               13  36000.0
mazda     index company body-style  wheel-base  length engine-type num-of-
cylinders  \
27     36   mazda  hatchback        93.1   159.1         ohc             f
our
28     37   mazda  hatchback        93.1   159.1         ohc             f
our
29     38   mazda  hatchback        93.1   159.1         ohc             f
our
30     39   mazda  hatchback        95.3   169.0       rotor
two
31     43   mazda      sedan       104.9   175.0         ohc             f
our

    horsepower  average-mileage    price
27          68               30   5195.0
```

```
28          68               31   6095.0
29          68               31   6795.0
30         101               17  11845.0
31          72               31  18344.0
mercedes-benz     index        company body-style  wheel-base  length engi
ne-type  \
32     44  mercedes-benz      sedan       110.0   190.9         ohc
33     45  mercedes-benz      wagon       110.0   190.9         ohc
34     46  mercedes-benz      sedan       120.9   208.1        ohcv
35     47  mercedes-benz    hardtop       112.0   199.2        ohcv

   num-of-cylinders  horsepower  average-mileage    price
32             five         123               22  25552.0
33             five         123               22  28248.0
34            eight         184               14  40960.0
35            eight         184               14  45400.0
mitsubishi     index     company body-style  wheel-base  length engine-typ
e  \
36     49  mitsubishi  hatchback        93.7   157.3         ohc
37     50  mitsubishi  hatchback        93.7   157.3         ohc
38     51  mitsubishi      sedan        96.3   172.4         ohc
39     52  mitsubishi      sedan        96.3   172.4         ohc

   num-of-cylinders  horsepower  average-mileage   price
36             four          68               37  5389.0
37             four          68               31  6189.0
38             four          88               25  6989.0
39             four          88               25  8189.0
nissan     index company body-style  wheel-base  length engine-type num-of
-cylinders  \
40     53  nissan      sedan        94.5   165.3         ohc             f
our
41     54  nissan      sedan        94.5   165.3         ohc             f
our
42     55  nissan      sedan        94.5   165.3         ohc             f
our
43     56  nissan      wagon        94.5   170.2         ohc             f
our
44     57  nissan      sedan       100.4   184.6        ohcv
six

    horsepower  average-mileage    price
40          55               45   7099.0
41          69               31   6649.0
42          69               31   6849.0
43          69               31   7349.0
44         152               19  13499.0
porsche     index  company   body-style  wheel-base  length engine-type  \
45     61  porsche      hardtop        89.5   168.9        ohcf
46     62  porsche  convertible        89.5   168.9        ohcf
47     63  porsche    hatchback        98.4   175.7       dohcv

   num-of-cylinders  horsepower  average-mileage    price
45              six         207               17  34028.0
46              six         207               17  37028.0
47            eight         288               17      NaN
toyota     index company body-style  wheel-base  length engine-type num-of
-cylinders  \
48     66  toyota  hatchback        95.7   158.7         ohc             f
our
49     67  toyota  hatchback        95.7   158.7         ohc             f
```

```
our
50     68  toyota  hatchback        95.7   158.7         ohc             f
our
51     69  toyota      wagon        95.7   169.7         ohc             f
our
52     70  toyota      wagon        95.7   169.7         ohc             f
our
53     71  toyota      wagon        95.7   169.7         ohc             f
our
54     79  toyota      wagon       104.5   187.8        dohc
six

    horsepower  average-mileage    price
48          62               35   5348.0
49          62               31   6338.0
50          62               31   6488.0
51          62               31   6918.0
52          62               27   7898.0
53          62               27   8778.0
54         156               19  15750.0
volkswagen     index     company body-style  wheel-base  length engine-typ
e  \
55     80  volkswagen      sedan        97.3   171.7         ohc
56     81  volkswagen      sedan        97.3   171.7         ohc
57     82  volkswagen      sedan        97.3   171.7         ohc
58     86  volkswagen      sedan        97.3   171.7         ohc

   num-of-cylinders  horsepower  average-mileage   price
55             four          52               37  7775.0
56             four          85               27  7975.0
57             four          52               37  7995.0
58             four         100               26  9995.0
volvo     index company body-style  wheel-base  length engine-type num-of-
cylinders  \
59     87   volvo      sedan       104.3   188.8         ohc             f
our
60     88   volvo      wagon       104.3   188.8         ohc             f
our

    horsepower  average-mileage    price
59         114               23  12940.0
60         114               23  13415.0
```

In [ ]:

```
#Sort all cars by Price column
import pandas as pd
df = pd.read_csv("Automobile_data.csv")
df.sort_values(by=['price'],
ascending=False)[['company','price']]
```

Out[ ]:

	company	price
35	mercedes-benz	45400.0
11	bmw	41315.0
34	mercedes-benz	40960.0
46	porsche	37028.0
12	bmw	36880.0
...	...	...
27	mazda	5195.0
13	chevrolet	5151.0
22	isuzu	NaN
23	isuzu	NaN
47	porsche	NaN

61 rows × 2 columns