iris

January 11, 2023

#Pandas Exercise

import required Libraries

[ ]:
```
import numpy as np
import seaborn as sns
import pandas as pd
```

2- Import datasets

[ ]:
```
iris = sns.load_dataset('iris')
iris
```

[ ]:

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	setosa
1	4.9	3.0	1.4	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
4	5.0	3.6	1.4	0.2	setosa
..	…	…	…	…	…
145	6.7	3.0	5.2	2.3	virginica
146	6.3	2.5	5.0	1.9	virginica
147	6.5	3.0	5.2	2.0	virginica
148	6.2	3.4	5.4	2.3	virginica
149	5.9	3.0	5.1	1.8	virginica

[150 rows x 5 columns]

[ ]:
```
iris.dtypes
```

[ ]:
```
sepal_length    float64
sepal_width     float64
petal_length    float64
petal_width     float64
species          object
dtype: object
```

[ ]:
```
iris.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   sepal_length  150 non-null    float64
 1   sepal_width   150 non-null    float64
 2   petal_length  150 non-null    float64
 3   petal_width   150 non-null    float64
 4   species       150 non-null    object
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
```

[ ]:
```
iris.head()
iris.tail()
```

[ ]:

	sepal_length	sepal_width	petal_length	petal_width	species
145	6.7	3.0	5.2	2.3	virginica
146	6.3	2.5	5.0	1.9	virginica
147	6.5	3.0	5.2	2.0	virginica
148	6.2	3.4	5.4	2.3	virginica
149	5.9	3.0	5.1	1.8	virginica

[ ]:
```
iris.index
iris.columns
```

[ ]:
```
Index(['sepal_length', 'sepal_width', 'petal_length', 'petal_width',
       'species'],
      dtype='object')
```

[ ]:
```
iris.to_numpy()
```

[ ]:
```
array([[5.1, 3.5, 1.4, 0.2, 'setosa'],
       [4.9, 3.0, 1.4, 0.2, 'setosa'],
       [4.7, 3.2, 1.3, 0.2, 'setosa'],
       [4.6, 3.1, 1.5, 0.2, 'setosa'],
       [5.0, 3.6, 1.4, 0.2, 'setosa'],
       [5.4, 3.9, 1.7, 0.4, 'setosa'],
       [4.6, 3.4, 1.4, 0.3, 'setosa'],
       [5.0, 3.4, 1.5, 0.2, 'setosa'],
       [4.4, 2.9, 1.4, 0.2, 'setosa'],
       [4.9, 3.1, 1.5, 0.1, 'setosa'],
       [5.4, 3.7, 1.5, 0.2, 'setosa'],
       [4.8, 3.4, 1.6, 0.2, 'setosa'],
       [4.8, 3.0, 1.4, 0.1, 'setosa'],
       [4.3, 3.0, 1.1, 0.1, 'setosa'],
       [5.8, 4.0, 1.2, 0.2, 'setosa'],
       [5.7, 4.4, 1.5, 0.4, 'setosa'],
```

```
[5.4, 3.9, 1.3, 0.4, 'setosa'],
[5.1, 3.5, 1.4, 0.3, 'setosa'],
[5.7, 3.8, 1.7, 0.3, 'setosa'],
[5.1, 3.8, 1.5, 0.3, 'setosa'],
[5.4, 3.4, 1.7, 0.2, 'setosa'],
[5.1, 3.7, 1.5, 0.4, 'setosa'],
[4.6, 3.6, 1.0, 0.2, 'setosa'],
[5.1, 3.3, 1.7, 0.5, 'setosa'],
[4.8, 3.4, 1.9, 0.2, 'setosa'],
[5.0, 3.0, 1.6, 0.2, 'setosa'],
[5.0, 3.4, 1.6, 0.4, 'setosa'],
[5.2, 3.5, 1.5, 0.2, 'setosa'],
[5.2, 3.4, 1.4, 0.2, 'setosa'],
[4.7, 3.2, 1.6, 0.2, 'setosa'],
[4.8, 3.1, 1.6, 0.2, 'setosa'],
[5.4, 3.4, 1.5, 0.4, 'setosa'],
[5.2, 4.1, 1.5, 0.1, 'setosa'],
[5.5, 4.2, 1.4, 0.2, 'setosa'],
[4.9, 3.1, 1.5, 0.2, 'setosa'],
[5.0, 3.2, 1.2, 0.2, 'setosa'],
[5.5, 3.5, 1.3, 0.2, 'setosa'],
[4.9, 3.6, 1.4, 0.1, 'setosa'],
[4.4, 3.0, 1.3, 0.2, 'setosa'],
[5.1, 3.4, 1.5, 0.2, 'setosa'],
[5.0, 3.5, 1.3, 0.3, 'setosa'],
[4.5, 2.3, 1.3, 0.3, 'setosa'],
[4.4, 3.2, 1.3, 0.2, 'setosa'],
[5.0, 3.5, 1.6, 0.6, 'setosa'],
[5.1, 3.8, 1.9, 0.4, 'setosa'],
[4.8, 3.0, 1.4, 0.3, 'setosa'],
[5.1, 3.8, 1.6, 0.2, 'setosa'],
[4.6, 3.2, 1.4, 0.2, 'setosa'],
[5.3, 3.7, 1.5, 0.2, 'setosa'],
[5.0, 3.3, 1.4, 0.2, 'setosa'],
[7.0, 3.2, 4.7, 1.4, 'versicolor'],
[6.4, 3.2, 4.5, 1.5, 'versicolor'],
[6.9, 3.1, 4.9, 1.5, 'versicolor'],
[5.5, 2.3, 4.0, 1.3, 'versicolor'],
[6.5, 2.8, 4.6, 1.5, 'versicolor'],
[5.7, 2.8, 4.5, 1.3, 'versicolor'],
[6.3, 3.3, 4.7, 1.6, 'versicolor'],
[4.9, 2.4, 3.3, 1.0, 'versicolor'],
[6.6, 2.9, 4.6, 1.3, 'versicolor'],
[5.2, 2.7, 3.9, 1.4, 'versicolor'],
[5.0, 2.0, 3.5, 1.0, 'versicolor'],
[5.9, 3.0, 4.2, 1.5, 'versicolor'],
[6.0, 2.2, 4.0, 1.0, 'versicolor'],
```

```
[6.1, 2.9, 4.7, 1.4, 'versicolor'],
[5.6, 2.9, 3.6, 1.3, 'versicolor'],
[6.7, 3.1, 4.4, 1.4, 'versicolor'],
[5.6, 3.0, 4.5, 1.5, 'versicolor'],
[5.8, 2.7, 4.1, 1.0, 'versicolor'],
[6.2, 2.2, 4.5, 1.5, 'versicolor'],
[5.6, 2.5, 3.9, 1.1, 'versicolor'],
[5.9, 3.2, 4.8, 1.8, 'versicolor'],
[6.1, 2.8, 4.0, 1.3, 'versicolor'],
[6.3, 2.5, 4.9, 1.5, 'versicolor'],
[6.1, 2.8, 4.7, 1.2, 'versicolor'],
[6.4, 2.9, 4.3, 1.3, 'versicolor'],
[6.6, 3.0, 4.4, 1.4, 'versicolor'],
[6.8, 2.8, 4.8, 1.4, 'versicolor'],
[6.7, 3.0, 5.0, 1.7, 'versicolor'],
[6.0, 2.9, 4.5, 1.5, 'versicolor'],
[5.7, 2.6, 3.5, 1.0, 'versicolor'],
[5.5, 2.4, 3.8, 1.1, 'versicolor'],
[5.5, 2.4, 3.7, 1.0, 'versicolor'],
[5.8, 2.7, 3.9, 1.2, 'versicolor'],
[6.0, 2.7, 5.1, 1.6, 'versicolor'],
[5.4, 3.0, 4.5, 1.5, 'versicolor'],
[6.0, 3.4, 4.5, 1.6, 'versicolor'],
[6.7, 3.1, 4.7, 1.5, 'versicolor'],
[6.3, 2.3, 4.4, 1.3, 'versicolor'],
[5.6, 3.0, 4.1, 1.3, 'versicolor'],
[5.5, 2.5, 4.0, 1.3, 'versicolor'],
[5.5, 2.6, 4.4, 1.2, 'versicolor'],
[6.1, 3.0, 4.6, 1.4, 'versicolor'],
[5.8, 2.6, 4.0, 1.2, 'versicolor'],
[5.0, 2.3, 3.3, 1.0, 'versicolor'],
[5.6, 2.7, 4.2, 1.3, 'versicolor'],
[5.7, 3.0, 4.2, 1.2, 'versicolor'],
[5.7, 2.9, 4.2, 1.3, 'versicolor'],
[6.2, 2.9, 4.3, 1.3, 'versicolor'],
[5.1, 2.5, 3.0, 1.1, 'versicolor'],
[5.7, 2.8, 4.1, 1.3, 'versicolor'],
[6.3, 3.3, 6.0, 2.5, 'virginica'],
[5.8, 2.7, 5.1, 1.9, 'virginica'],
[7.1, 3.0, 5.9, 2.1, 'virginica'],
[6.3, 2.9, 5.6, 1.8, 'virginica'],
[6.5, 3.0, 5.8, 2.2, 'virginica'],
[7.6, 3.0, 6.6, 2.1, 'virginica'],
[4.9, 2.5, 4.5, 1.7, 'virginica'],
[7.3, 2.9, 6.3, 1.8, 'virginica'],
[6.7, 2.5, 5.8, 1.8, 'virginica'],
[7.2, 3.6, 6.1, 2.5, 'virginica'],
```

```
       [6.5, 3.2, 5.1, 2.0, 'virginica'],
       [6.4, 2.7, 5.3, 1.9, 'virginica'],
       [6.8, 3.0, 5.5, 2.1, 'virginica'],
       [5.7, 2.5, 5.0, 2.0, 'virginica'],
       [5.8, 2.8, 5.1, 2.4, 'virginica'],
       [6.4, 3.2, 5.3, 2.3, 'virginica'],
       [6.5, 3.0, 5.5, 1.8, 'virginica'],
       [7.7, 3.8, 6.7, 2.2, 'virginica'],
       [7.7, 2.6, 6.9, 2.3, 'virginica'],
       [6.0, 2.2, 5.0, 1.5, 'virginica'],
       [6.9, 3.2, 5.7, 2.3, 'virginica'],
       [5.6, 2.8, 4.9, 2.0, 'virginica'],
       [7.7, 2.8, 6.7, 2.0, 'virginica'],
       [6.3, 2.7, 4.9, 1.8, 'virginica'],
       [6.7, 3.3, 5.7, 2.1, 'virginica'],
       [7.2, 3.2, 6.0, 1.8, 'virginica'],
       [6.2, 2.8, 4.8, 1.8, 'virginica'],
       [6.1, 3.0, 4.9, 1.8, 'virginica'],
       [6.4, 2.8, 5.6, 2.1, 'virginica'],
       [7.2, 3.0, 5.8, 1.6, 'virginica'],
       [7.4, 2.8, 6.1, 1.9, 'virginica'],
       [7.9, 3.8, 6.4, 2.0, 'virginica'],
       [6.4, 2.8, 5.6, 2.2, 'virginica'],
       [6.3, 2.8, 5.1, 1.5, 'virginica'],
       [6.1, 2.6, 5.6, 1.4, 'virginica'],
       [7.7, 3.0, 6.1, 2.3, 'virginica'],
       [6.3, 3.4, 5.6, 2.4, 'virginica'],
       [6.4, 3.1, 5.5, 1.8, 'virginica'],
       [6.0, 3.0, 4.8, 1.8, 'virginica'],
       [6.9, 3.1, 5.4, 2.1, 'virginica'],
       [6.7, 3.1, 5.6, 2.4, 'virginica'],
       [6.9, 3.1, 5.1, 2.3, 'virginica'],
       [5.8, 2.7, 5.1, 1.9, 'virginica'],
       [6.8, 3.2, 5.9, 2.3, 'virginica'],
       [6.7, 3.3, 5.7, 2.5, 'virginica'],
       [6.7, 3.0, 5.2, 2.3, 'virginica'],
       [6.3, 2.5, 5.0, 1.9, 'virginica'],
       [6.5, 3.0, 5.2, 2.0, 'virginica'],
       [6.2, 3.4, 5.4, 2.3, 'virginica'],
       [5.9, 3.0, 5.1, 1.8, 'virginica']], dtype=object)
```

[ ]:
```
iris.describe()
```

[ ]:

	sepal_length	sepal_width	petal_length	petal_width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.057333	3.758000	1.199333
std	0.828066	0.435866	1.765298	0.762238

```
min         4.300000     2.000000     1.000000     0.100000
25%         5.100000     2.800000     1.600000     0.300000
50%         5.800000     3.000000     4.350000     1.300000
75%         6.400000     3.300000     5.100000     1.800000
max         7.900000     4.400000     6.900000     2.500000
```

[ ]:
```
iris.T
```

[ ]:
```
                0       1       2       3       4       5       6       7    \
sepal_length    5.1     4.9     4.7     4.6     5.0     5.4     4.6     5.0
sepal_width     3.5     3.0     3.2     3.1     3.6     3.9     3.4     3.4
petal_length    1.4     1.4     1.3     1.5     1.4     1.7     1.4     1.5
petal_width     0.2     0.2     0.2     0.2     0.2     0.4     0.3     0.2
species      setosa  setosa  setosa  setosa  setosa  setosa  setosa  setosa

                8       9    …       140        141        142        143  \
sepal_length    4.4     4.9  …       6.7        6.9        5.8        6.8
sepal_width     2.9     3.1  …       3.1        3.1        2.7        3.2
petal_length    1.4     1.5  …       5.6        5.1        5.1        5.9
petal_width     0.2     0.1  …       2.4        2.3        1.9        2.3
species      setosa  setosa  …  virginica  virginica  virginica  virginica

                   144        145        146        147        148        149
sepal_length       6.7        6.7        6.3        6.5        6.2        5.9
sepal_width        3.3        3.0        2.5        3.0        3.4        3.0
petal_length       5.7        5.2        5.0        5.2        5.4        5.1
petal_width        2.5        2.3        1.9        2.0        2.3        1.8
species      virginica  virginica  virginica  virginica  virginica  virginica

[5 rows x 150 columns]
```

[ ]:
```
iris.sort_index(axis=1, ascending=False)
```

[ ]:
```
       species  sepal_width  sepal_length  petal_width  petal_length
0       setosa          3.5           5.1          0.2           1.4
1       setosa          3.0           4.9          0.2           1.4
2       setosa          3.2           4.7          0.2           1.3
3       setosa          3.1           4.6          0.2           1.5
4       setosa          3.6           5.0          0.2           1.4
..         …            …             …            …             …
145  virginica          3.0           6.7          2.3           5.2
146  virginica          2.5           6.3          1.9           5.0
147  virginica          3.0           6.5          2.0           5.2
148  virginica          3.4           6.2          2.3           5.4
149  virginica          3.0           5.9          1.8           5.1

[150 rows x 5 columns]
```

[ ]:
```
iris.sort_values(by='petal_width')
```

[ ]:
```
     sepal_length  sepal_width  petal_length  petal_width    species
32            5.2          4.1           1.5          0.1     setosa
13            4.3          3.0           1.1          0.1     setosa
37            4.9          3.6           1.4          0.1     setosa
9             4.9          3.1           1.5          0.1     setosa
12            4.8          3.0           1.4          0.1     setosa
..            …            …             …            …       …
140           6.7          3.1           5.6          2.4  virginica
114           5.8          2.8           5.1          2.4  virginica
100           6.3          3.3           6.0          2.5  virginica
144           6.7          3.3           5.7          2.5  virginica
109           7.2          3.6           6.1          2.5  virginica

[150 rows x 5 columns]
```

[ ]:
```
iris.sort_values(by='petal_width', ascending=False)
```

[ ]:
```
     sepal_length  sepal_width  petal_length  petal_width    species
100           6.3          3.3           6.0          2.5  virginica
109           7.2          3.6           6.1          2.5  virginica
144           6.7          3.3           5.7          2.5  virginica
114           5.8          2.8           5.1          2.4  virginica
140           6.7          3.1           5.6          2.4  virginica
..            …            …             …            …       …
12            4.8          3.0           1.4          0.1     setosa
13            4.3          3.0           1.1          0.1     setosa
37            4.9          3.6           1.4          0.1     setosa
32            5.2          4.1           1.5          0.1     setosa
9             4.9          3.1           1.5          0.1     setosa

[150 rows x 5 columns]
```

[ ]:
```
iris['sepal_length']
```

[ ]:
```
0      5.1
1      4.9
2      4.7
3      4.6
4      5.0
      …
145    6.7
146    6.3
147    6.5
148    6.2
149    5.9
```

```
Name: sepal_length, Length: 150, dtype: float64
```

[ ]:
```
iris[0:10]
```

[ ]:
```
   sepal_length  sepal_width  petal_length  petal_width species
0           5.1          3.5           1.4          0.2  setosa
1           4.9          3.0           1.4          0.2  setosa
2           4.7          3.2           1.3          0.2  setosa
3           4.6          3.1           1.5          0.2  setosa
4           5.0          3.6           1.4          0.2  setosa
5           5.4          3.9           1.7          0.4  setosa
6           4.6          3.4           1.4          0.3  setosa
7           5.0          3.4           1.5          0.2  setosa
8           4.4          2.9           1.4          0.2  setosa
9           4.9          3.1           1.5          0.1  setosa
```

[ ]:
```
iris[4 : 8]
```

[ ]:
```
   sepal_length  sepal_width  petal_length  petal_width species
4           5.0          3.6           1.4          0.2  setosa
5           5.4          3.9           1.7          0.4  setosa
6           4.6          3.4           1.4          0.3  setosa
7           5.0          3.4           1.5          0.2  setosa
```

[ ]:
```
iris.loc[0:10, ['sepal_width', 'petal_width']]
```

[ ]:
```
    sepal_width  petal_width
0           3.5          0.2
1           3.0          0.2
2           3.2          0.2
3           3.1          0.2
4           3.6          0.2
5           3.9          0.4
6           3.4          0.3
7           3.4          0.2
8           2.9          0.2
9           3.1          0.1
10          3.7          0.2
```

[ ]:
```
iris.iloc[3]
```

[ ]:
```
sepal_length       4.6
sepal_width        3.1
petal_length       1.5
petal_width        0.2
species         setosa
Name: 3, dtype: object
```

```
[ ]: iris.iloc[3:5, 0:2]
```

```
[ ]:    sepal_length  sepal_width
     3           4.6          3.1
     4           5.0          3.6
```

```
[ ]: iris.iloc[[1, 2, 4], [0, 2]]
```

```
[ ]:    sepal_length  petal_length
     1           4.9           1.4
     2           4.7           1.3
     4           5.0           1.4
```

```
[ ]: iris.iloc[1:3, :]
```

```
[ ]:    sepal_length  sepal_width  petal_length  petal_width species
     1           4.9          3.0           1.4          0.2  setosa
     2           4.7          3.2           1.3          0.2  setosa
```

```
[ ]: iris.iloc[:, 1:3]
```

```
[ ]:      sepal_width  petal_length
     0            3.5           1.4
     1            3.0           1.4
     2            3.2           1.3
     3            3.1           1.5
     4            3.6           1.4
     ..           …             …
     145          3.0           5.2
     146          2.5           5.0
     147          3.0           5.2
     148          3.4           5.4
     149          3.0           5.1

     [150 rows x 2 columns]
```

```
[ ]: iris.iloc[1, 1]
```

```
[ ]: 3.0
```

```
[ ]: iris.iat[1, 1]
```

```
[ ]: 3.0
```

```
[ ]: iris[iris["sepal_width"] < 2.5]
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width     species
     41           4.5          2.3           1.3          0.3      setosa
```

```
53           5.5          2.3           4.0          1.3  versicolor
57           4.9          2.4           3.3          1.0  versicolor
60           5.0          2.0           3.5          1.0  versicolor
62           6.0          2.2           4.0          1.0  versicolor
68           6.2          2.2           4.5          1.5  versicolor
80           5.5          2.4           3.8          1.1  versicolor
81           5.5          2.4           3.7          1.0  versicolor
87           6.3          2.3           4.4          1.3  versicolor
93           5.0          2.3           3.3          1.0  versicolor
119          6.0          2.2           5.0          1.5   virginica
```

[ ]:
```
df2 = iris.copy()
```

[ ]:
```
df2['E'] = iris["sepal_width"] < 3.5
df2
```

[ ]:
```
     sepal_length  sepal_width  petal_length  petal_width    species      E
0             5.1          3.5           1.4          0.2     setosa  False
1             4.9          3.0           1.4          0.2     setosa   True
2             4.7          3.2           1.3          0.2     setosa   True
3             4.6          3.1           1.5          0.2     setosa   True
4             5.0          3.6           1.4          0.2     setosa  False
..            …            …             …            …       …       …
145           6.7          3.0           5.2          2.3  virginica   True
146           6.3          2.5           5.0          1.9  virginica   True
147           6.5          3.0           5.2          2.0  virginica   True
148           6.2          3.4           5.4          2.3  virginica   True
149           5.9          3.0           5.1          1.8  virginica   True

[150 rows x 6 columns]
```

[ ]:
```
df =df2[df2["E"].isin(["False","True"])]
df
```

[ ]:
```
Empty DataFrame
Columns: [sepal_length, sepal_width, petal_length, petal_width, species, E]
Index: []
```

[ ]:
```
df2.mean()
```

```
C:\Users\muham\AppData\Local\Temp\ipykernel_14032\3587575296.py:1:
FutureWarning: The default value of numeric_only in DataFrame.mean is
deprecated. In a future version, it will default to False. In addition,
specifying 'numeric_only=None' is deprecated. Select only valid columns or
specify the value of numeric_only to silence this warning.
  df2.mean()
```

```
sepal_length    5.843333
sepal_width     3.057333
petal_length    3.758000
petal_width     1.199333
E               0.833333
dtype: float64
```

```
df2.mean(1)
```

```
C:\Users\muham\AppData\Local\Temp\ipykernel_14032\2560881108.py:1:
FutureWarning: Dropping of nuisance columns in DataFrame reductions (with
'numeric_only=None') is deprecated; in a future version this will raise
TypeError.  Select only valid columns before calling the reduction.
  df2.mean(1)
```

```
0      2.04
1      2.10
2      2.08
3      2.08
4      2.04
       …
145    3.64
146    3.34
147    3.54
148    3.66
149    3.36
Length: 150, dtype: float64
```

```
df2.value_counts()
```

```
sepal_length  sepal_width  petal_length  petal_width  species     E
5.8           2.7          5.1           1.9          virginica   True     2
6.2           2.2          4.5           1.5          versicolor  True     1
              2.9          4.3           1.3          versicolor  True     1
              3.4          5.4           2.3          virginica   True     1
6.3           2.3          4.4           1.3          versicolor  True     1
                                                                         ..
5.4           3.9          1.3           0.4          setosa      False    1
                           1.7           0.4          setosa      False    1
5.5           2.3          4.0           1.3          versicolor  True     1
              2.4          3.7           1.0          versicolor  True     1
7.9           3.8          6.4           2.0          virginica   False    1
Length: 149, dtype: int64
```

```

```

```

```

[ ]:

[ ]:

[ ]: