```
from sklearn import datasets
import pandas as pd
import numpy as np
iris=datasets.load_iris()
print(iris)
```

```
{'data': array([[5.1, 3.5, 1.4, 0.2],
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       [5.8, 4. , 1.2, 0.2],
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       [4.8, 3.1, 1.6, 0.2],
       [5.4, 3.4, 1.5, 0.4],
       [5.2, 4.1, 1.5, 0.1],
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       [6. , 2.2, 5. , 1.5],
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       [5.6, 2.8, 4.9, 2. ],
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       [6.7, 3.1, 5.6, 2.4],
       [6.9, 3.1, 5.1, 2.3],
```

```
       [5.8, 2.7, 5.1, 1.9],
       [6.8, 3.2, 5.9, 2.3],
       [6.7, 3.3, 5.7, 2.5],
       [6.7, 3. , 5.2, 2.3],
       [6.3, 2.5, 5. , 1.9],
       [6.5, 3. , 5.2, 2. ],
       [6.2, 3.4, 5.4, 2.3],
       [5.9, 3. , 5.1, 1.8]]), 'target': array([0, 0, 0, 0, 0, 0, 0,
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0,
       0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2,
2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2]),
'frame': None, 'target_names': array(['setosa', 'versicolor',
'virginica'], dtype='<U10'), 'DESCR': '.. _iris_dataset:\n\nIris
plants dataset\n--------------------\n\n**Data Set Characteristics:**\
n\n    :Number of Instances: 150 (50 in each of three classes)\
n    :Number of Attributes: 4 numeric, predictive attributes and the
class\n    :Attribute Information:\n        - sepal length in cm\n
- sepal width in cm\n        - petal length in cm\n        - petal
width in cm\n        - class:\n                - Iris-Setosa\n
- Iris-Versicolour\n                - Iris-Virginica\
n                \n    :Summary Statistics:\n\n    ============== ====
==== ======= ===== ====================\n                    Min  Max
Mean    SD   Class Correlation\n    ============== ==== ==== =======
===== ====================\n    sepal length:   4.3  7.9   5.84   0.83
0.7826\n    sepal width:    2.0  4.4   3.05   0.43   -0.4194\n
petal length:   1.0  6.9   3.76   1.76    0.9490  (high!)\n    petal
width:    0.1  2.5   1.20   0.76    0.9565  (high!)\n
============== ==== ==== ======= ===== ====================\n\
n    :Missing Attribute Values: None\n    :Class Distribution: 33.3%
for each of 3 classes.\n    :Creator: R.A. Fisher\n    :Donor: Michael
Marshall (MARSHALL%PLU@io.arc.nasa.gov)\n    :Date: July, 1988\n\nThe
famous Iris database, first used by Sir R.A. Fisher. The dataset is
taken\nfrom Fisher\'s paper. Note that it\'s the same as in R, but not
as in the UCI\nMachine Learning Repository, which has two wrong data
points.\n\nThis is perhaps the best known database to be found in the\
npattern recognition literature.  Fisher\'s paper is a classic in the
field and\nis referenced frequently to this day.  (See Duda & Hart,
for example.)  The\ndata set contains 3 classes of 50 instances each,
where each class refers to a\ntype of iris plant.  One class is
linearly separable from the other 2; the\nlatter are NOT linearly
```

```
separable from each other.\n\n.. topic:: References\n\n   - Fisher,
R.A. "The use of multiple measurements in taxonomic problems"\n
Annual Eugenics, 7, Part II, 179-188 (1936); also in "Contributions
to\n     Mathematical Statistics" (John Wiley, NY, 1950).\n   - Duda,
R.O., & Hart, P.E. (1973) Pattern Classification and Scene Analysis.\n
(Q327.D83) John Wiley & Sons.  ISBN 0-471-22361-1.  See page 218.\n
- Dasarathy, B.V. (1980) "Nosing Around the Neighborhood: A New
System\n     Structure and Classification Rule for Recognition in
Partially Exposed\n     Environments".  IEEE Transactions on Pattern
Analysis and Machine\n     Intelligence, Vol. PAMI-2, No. 1, 67-71.\n
- Gates, G.W. (1972) "The Reduced Nearest Neighbor Rule".  IEEE
Transactions\n     on Information Theory, May 1972, 431-433.\n   - See
also: 1988 MLC Proceedings, 54-64.  Cheeseman et al"s AUTOCLASS II\n
conceptual clustering system finds 3 classes in the data.\n   - Many,
many more ...', 'feature_names': ['sepal length (cm)', 'sepal width
(cm)', 'petal length (cm)', 'petal width (cm)'], 'filename':
'iris.csv', 'data_module': 'sklearn.datasets.data'}
```

```
print(type(iris))
```

```
<class 'sklearn.utils.Bunch'>
```

```
print(type(iris.data))
```

```
<class 'numpy.ndarray'>
```

```
print(type(iris.target))
```

```
<class 'numpy.ndarray'>
```

```
print(iris.keys())
```

```
dict_keys(['data', 'target', 'frame', 'target_names', 'DESCR',
'feature_names', 'filename', 'data_module'])
```

```
print(iris.data.shape)
```

```
(150, 4)
```

```
print(iris.target_names)
```

```
['setosa' 'versicolor' 'virginica']
```

```
x=iris.data
y=iris.target
print(x)
print(y)
```

```
[[5.1 3.5 1.4 0.2]
 [4.9 3.  1.4 0.2]
 [4.7 3.2 1.3 0.2]
 [4.6 3.1 1.5 0.2]
```

```
[5.  3.6 1.4 0.2]
[5.4 3.9 1.7 0.4]
[4.6 3.4 1.4 0.3]
[5.  3.4 1.5 0.2]
[4.4 2.9 1.4 0.2]
[4.9 3.1 1.5 0.1]
[5.4 3.7 1.5 0.2]
[4.8 3.4 1.6 0.2]
[4.8 3.  1.4 0.1]
[4.3 3.  1.1 0.1]
[5.8 4.  1.2 0.2]
[5.7 4.4 1.5 0.4]
[5.4 3.9 1.3 0.4]
[5.1 3.5 1.4 0.3]
[5.7 3.8 1.7 0.3]
[5.1 3.8 1.5 0.3]
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[5.1 3.7 1.5 0.4]
[4.6 3.6 1.  0.2]
[5.1 3.3 1.7 0.5]
[4.8 3.4 1.9 0.2]
[5.  3.  1.6 0.2]
[5.  3.4 1.6 0.4]
[5.2 3.5 1.5 0.2]
[5.2 3.4 1.4 0.2]
[4.7 3.2 1.6 0.2]
[4.8 3.1 1.6 0.2]
[5.4 3.4 1.5 0.4]
[5.2 4.1 1.5 0.1]
[5.5 4.2 1.4 0.2]
[4.9 3.1 1.5 0.2]
[5.  3.2 1.2 0.2]
[5.5 3.5 1.3 0.2]
[4.9 3.6 1.4 0.1]
[4.4 3.  1.3 0.2]
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[5.  3.5 1.3 0.3]
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[4.4 3.2 1.3 0.2]
[5.  3.5 1.6 0.6]
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[4.8 3.  1.4 0.3]
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[4.6 3.2 1.4 0.2]
[5.3 3.7 1.5 0.2]
[5.  3.3 1.4 0.2]
[7.  3.2 4.7 1.4]
[6.4 3.2 4.5 1.5]
[6.9 3.1 4.9 1.5]
```

```
[5.5 2.3 4.  1.3]
[6.5 2.8 4.6 1.5]
[5.7 2.8 4.5 1.3]
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[4.9 2.4 3.3 1. ]
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[5.  2.  3.5 1. ]
[5.9 3.  4.2 1.5]
[6.  2.2 4.  1. ]
[6.1 2.9 4.7 1.4]
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[6.7 3.1 4.4 1.4]
[5.6 3.  4.5 1.5]
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[6.2 2.2 4.5 1.5]
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[6.8 2.8 4.8 1.4]
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[6.  2.9 4.5 1.5]
[5.7 2.6 3.5 1. ]
[5.5 2.4 3.8 1.1]
[5.5 2.4 3.7 1. ]
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```

```
 [7.1 3.  5.9 2.1]
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[0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

```
0 0
 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1
 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2
2 2
 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
2 2
 2 2]

#convert dataset to dataframe
df=pd.DataFrame(x,columns=iris.feature_names)
print(df)

     sepal length (cm)  sepal width (cm)  petal length (cm)  petal
width (cm)
0                  5.1               3.5                1.4
0.2
1                  4.9               3.0                1.4
0.2
2                  4.7               3.2                1.3
0.2
3                  4.6               3.1                1.5
0.2
4                  5.0               3.6                1.4
0.2
..                 ...               ...                ...
...
145                6.7               3.0                5.2
2.3
146                6.3               2.5                5.0
1.9
147                6.5               3.0                5.2
2.0
148                6.2               3.4                5.4
2.3
149                5.9               3.0                5.1
1.8

[150 rows x 4 columns]

print(df.head()) #printing first 5 rows

   sepal length (cm)  sepal width (cm)  petal length (cm)  petal width
(cm)
0                5.1               3.5                1.4
0.2
1                4.9               3.0                1.4
0.2
2                4.7               3.2                1.3
0.2
```

```
3                4.6               3.1                1.5
0.2
4                5.0               3.6                1.4
0.2
```

```
print(df.tail())#printing last 5 rows
```

```
     sepal length (cm)  sepal width (cm)  petal length (cm)  petal
width (cm)
145                6.7               3.0                5.2
2.3
146                6.3               2.5                5.0
1.9
147                6.5               3.0                5.2
2.0
148                6.2               3.4                5.4
2.3
149                5.9               3.0                5.1
1.8
```

```
print(df.describe())
```

```
       sepal length (cm)  sepal width (cm)  petal length (cm)  \
count         150.000000        150.000000         150.000000
mean            5.843333          3.057333           3.758000
std             0.828066          0.435866           1.765298
min             4.300000          2.000000           1.000000
25%             5.100000          2.800000           1.600000
50%             5.800000          3.000000           4.350000
75%             6.400000          3.300000           5.100000
max             7.900000          4.400000           6.900000

       petal width (cm)
count        150.000000
mean           1.199333
std            0.762238
min            0.100000
25%            0.300000
50%            1.300000
75%            1.800000
max            2.500000
```

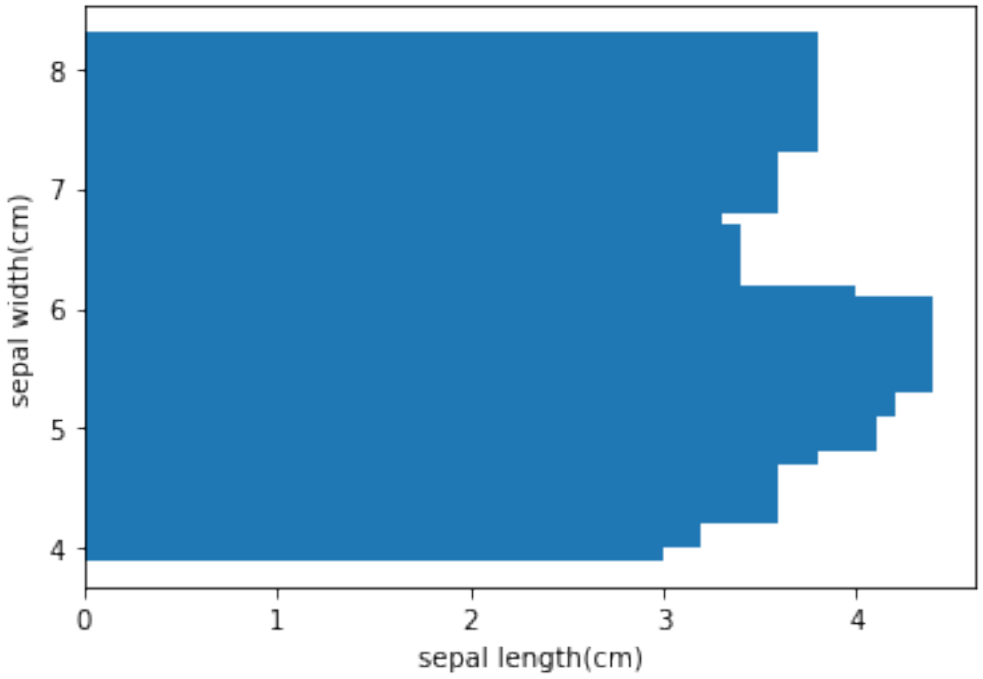
```
print(df.shape)
```

```
(150, 4)
```

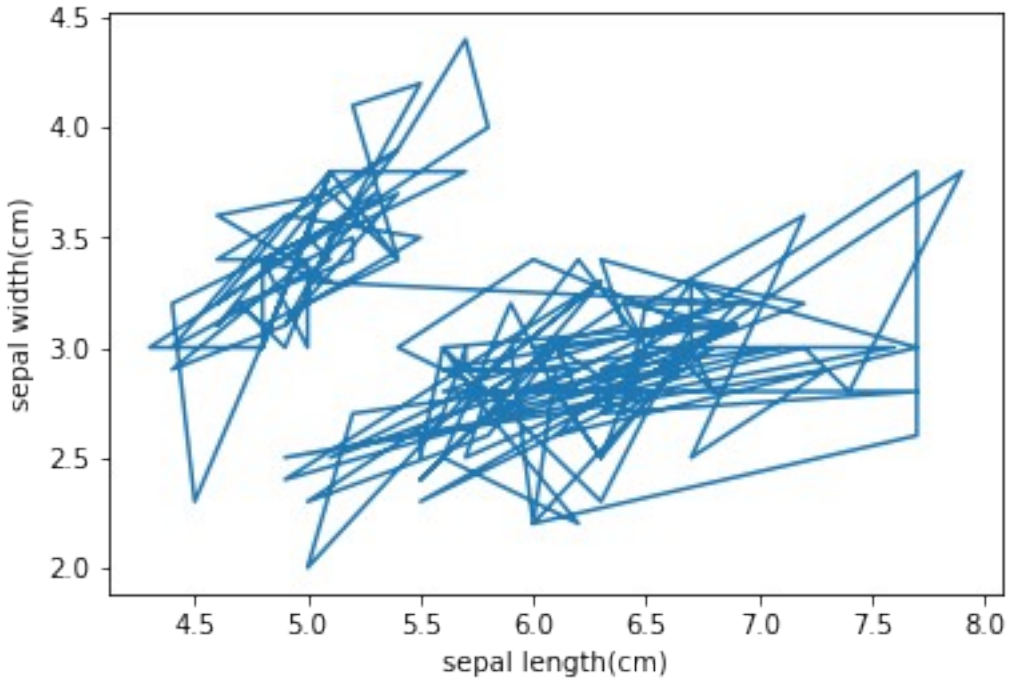
```
a=df["sepal length (cm)"] #accessing df columns for plotting
b=df["sepal width (cm)"]
print(a,b)
```

```
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 (cm), Length: 150, dtype: float64 0      3.5
1      3.0
2      3.2
3      3.1
4      3.6
      ...
145    3.0
146    2.5
147    3.0
148    3.4
149    3.0
Name: sepal width (cm), Length: 150, dtype: float64
```

```
import matplotlib.pyplot as plt
plt.barh(a,b)
plt.xlabel("sepal length(cm)")
plt.ylabel("sepal width(cm)")
plt.show()
```

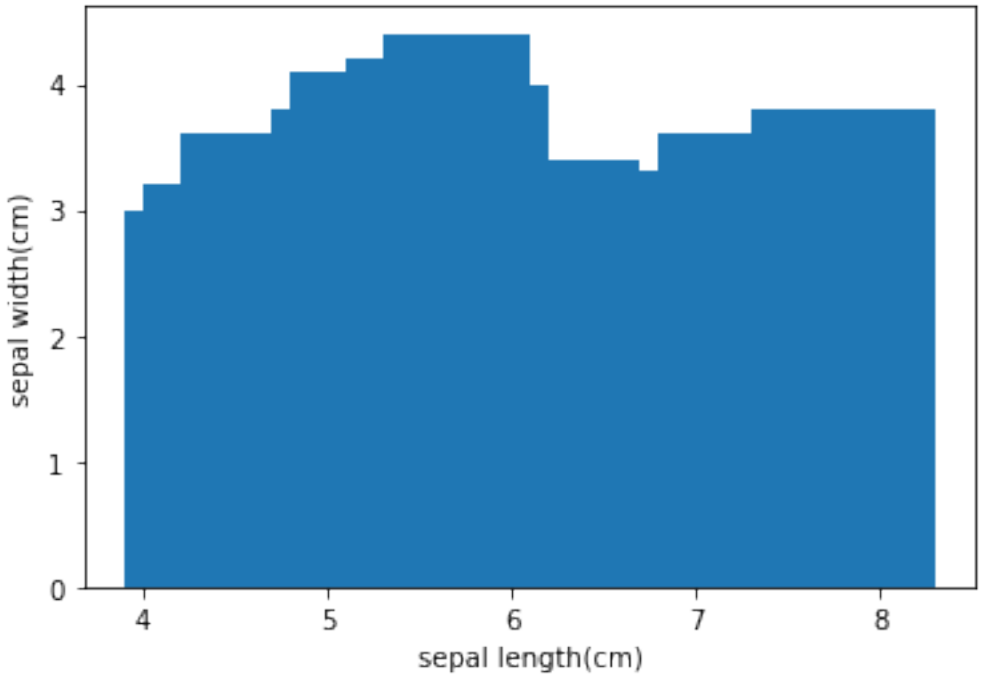



```
plt.plot(a,b)
plt.xlabel("sepal length(cm)")
plt.ylabel("sepal width(cm)")
plt.show()
```



```
plt.pie(a,b)
plt.show()
```

```
plt.bar(a,b)
plt.xlabel("sepal length(cm)")
plt.ylabel("sepal width(cm)")
plt.show()
```




```
plt.plot(x,y)
plt.show()
```