Tutorial Week 11

Tuesday, November 17, 2020 12:18 PM

```
import numpy as np

a = np.array([20,30,40,50])
print(a)
b = np.arange(4)
print(b)
-------------
[20 30 40 50]
[0 1 2 3]

---------

import numpy as np

a = np.array([20,30,40,50])
print(a)
b = np.arange(4)
print(b)
c = a + b
print(c)
-------------
[20 30 40 50]
[0 1 2 3]
[20 31 42 53]
--------------------------

#numpy adds array operators which are nice
#can create 2d array
--------------------

A= np.array([[1,1],
                  [0,1]])
B = np.array([[2,0],
                 [3,4]])
C = A * B
print(A, B)
print(C)
-----------------------
[[1 1]
[0 1]] [[2 0]
[3 4]]
[[2 0]
[0 4]]
------------------
```

Use index in an array

```
a = np.array([20, 30, 40, 50])
print(a[1])
print(a[[1,3]])

--------
30
[30 50]
-----------
arr2 = np.array([[1.7,6,8], [1.5,3.4,7]])
print(arr2)
print(arr2[0,1]) #(row,column)
------------
[[1.7 6. 8. ],
[1.5 3.4 7. ]]
6.0
----------------
```

Read data from a file (.csv and .txt)

```
games = np.genfromtxt('Games.csv', delimiter = ',', skip_header = 1, dtype = ]int') #float default
print(games)
-------------
```

lots of info dont want to type

```
------------
games = np.genfromtxt('Games.csv', delimiter = ',', skip_header = 1, dtype = ]int')
print(games)
print(games.size)
print(games.shape)
```

Other Useful Functions to generate Arrays

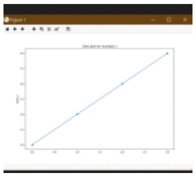
```
a = np.arange(15)
print(a)
-----------
[ 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14]
---------------
a = np.arrange(15).reshape(3,5)
[[0 1 2 3 4],
[5 6 7 8 9],
[10 11 12 13 14]]
```

```
a = np.arrange(15).reshape(3,5)
c = np.zeros((3,4))
print(c)
-------
[[0. 0. 0. 0.],
[0. 0. 0. 0.],
[0. 0. 0. 0.]]
-----------
d = np.ones((3,5))
e = np.empty((2,5))
print(d)
print(e)
-------------
[d all ones]
[e random numbers]
------------------
a = np.random.random(10)
print(a)
b = np.random.randint(100, size = 10)
print(b)
print(np.max(b))
print(np.min(b))
print(np.average(b))
print(np.median(b))
print(np.std(b))
----------
[10 random numbers]
[10 random ints range 0-100]
[prints max of the 10 random ints]
[prints minof the 10 random ints]
[prints avg of the 10 random ints]
[prints median of the 10 random ints]
[prints standard deviation of the 10 random ints]

------------------------
data = np.array([[2,4,6,8], [7,5,3,1], [1,2,3,0]])
print(np.max(data)
print(np.max(data, axis = 0))
-------------
8
[ 7 5 6 8 ] # max value of each column
----------
data = np.array([[2,4,6,8], [7,5,3,1], [1,2,3,0]])
print(np.max(data, axis =1))
------------------
[ 8 7 3 ] # max of each row??????????????????
```

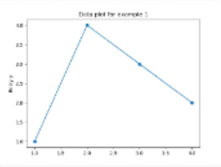
```
import matplotlib.pyplot as plt

fig1 = plt.figure()
plt.plot([1,2,3,4], marker = 'o')
plt.title('Data plot for example 1')
plt.ylable('Entry y')
plt.show()
--------------------
```



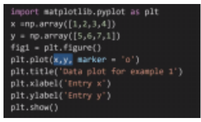
```
---------------------
import matplotlib.pyplot as plt

fig1 = plt.figure()
plt.plot([1,2,3,4], [1,4,3,2], marker = 'o')
plt.title('Data plot for example 1')
plt.ylable('Entry y')
plt.show()
--------------------
```



```
import matplotlib.pyplot as plt

fig1 = plt.figure()
plt.plot([1,2,3,4], [1,4,3,2], marker = 'o')
plt.title('Data plot for example 1')
plt.ylable('Entry y')
plt.xlabel('Entry x')
plt.show()
```



```
import matplotlib.pyplot as plt
x =np.array([1,2,3,4])
y = np.array([5,6,7,1])
fig1 = plt.figure()
plt.plot(x,y, marker = 'o')
plt.title('Data plot for example 1')
plt.xlabel('Entry x')
plt.ylabel('Entry y')
plt.show()
```