

Python Numpy Arrays

Numpy Tutorials

Numpy is a general-purpose array-processing package. It provides a high performance multidimensional arrays object, and tools for working with these arrays. It is a fundamental package for scientific computing with python

What is an Array

An array is a data structure that stores values of same data types. In Python this is the main difference between arrays and lists. While python lists contain values corresponding to different data types, arrays in python can only contain values corresponding to same data types.

In [1]:

```
# import the library
import numpy as np
```

In [5]:

```
list=[1,2,3,4,5,6]
np.array(list)
```

Out[5]:

```
array([1, 2, 3, 4, 5, 6])
```

In [6]:

```
list=[1,2,3,4,5,6]
arr=np.array(list)
```

In [7]:

```
type(arr)
```

Out[7]:

```
numpy.ndarray
```

In [8]:

```
arr.shape
```

Out[8]:

```
(6,)
```

In [9]:

```
list1=[1,2,3,4,5,6]
list2=[2,3,4,5,6,7]
list3=[3,4,5,6,7,8]
`
np.array([list1,list2,list3])
```

Out[9]:

```
array([[1, 2, 3, 4, 5, 6],
       [2, 3, 4, 5, 6, 7],
       [3, 4, 5, 6, 7, 8]])
```

In [10]:

```
list1=[1,2,3,4,5,6]
list2=[2,3,4,5,6,7]
list3=[3,4,5,6,7,8]

arr1=np.array([list1,list2,list3])
```

In [12]:

```
arr1
```

Out[12]:

```
array([[1, 2, 3, 4, 5, 6],
       [2, 3, 4, 5, 6, 7],
       [3, 4, 5, 6, 7, 8]])
```

In [11]:

```
arr1.shape
```

Out[11]:

```
(3, 6)
```

In [13]:

```
arr
```

Out[13]:

```
array([1, 2, 3, 4, 5, 6])
```

In [24]:

```
# indexing
arr[5]
```

Out[24]:

```
7
```

In [25]:

```
arr[5]=7
```

In [26]:

```
arr
```

Out[26]:

```
array([1, 2, 3, 7, 5, 7])
```

In [31]:

```
arr[1:]
```

Out[31]:

```
array([2, 3, 7, 5, 7])
```

In [28]:

```
arr[-1]
```

Out[28]:

```
7
```

In [33]:

```
arr[:-1]
```

Out[33]:

```
array([1, 2, 3, 7, 5])
```

In [34]:

```
arr[::-1]
```

Out[34]:

```
array([7, 5, 7, 3, 2, 1])
```

In [35]:

```
arr[:,2]
```

Out[35]:

```
array([1, 3, 5])
```

In [36]:

```
arr[:, -2]
```

Out[36]:

```
array([7, 7, 2])
```

In [37]:

```
arr1
```

Out[37]:

```
array([[1, 2, 3, 4, 5, 6],
       [2, 3, 4, 5, 6, 7],
       [3, 4, 5, 6, 7, 8]])
```

In [43]:

```
arr1[:,1]
```

Out[43]:

```
array([2, 3, 4])
```

In [44]:

```
arr1[:,2]
```

Out[44]:

```
array([3, 4, 5])
```

In [46]:

```
arr1[1:,1:3]
```

Out[46]:

```
array([[3, 4],
       [4, 5]])
```

In [55]:

```
arr1[1:,4:6]
```

Out[55]:

```
array([[6, 7],
       [7, 8]])
```

In [52]:

```
arr1[1:,4:6]
```

Out[52]:

```
array([[6, 7],
       [7, 8]])
```

In [58]:

```
arr1[0:,2:4]
```

Out[58]:

```
array([[3, 4],
       [4, 5],
       [5, 6]])
```

In [57]:

```
arr1[:,4:]
```

Out[57]:

```
array([[5, 6],
       [6, 7],
       [7, 8]])
```

In [62]:

```
arr1[:,4:].shape
```

Out[62]:

```
(3, 2)
```

In [61]:

```
arr1.shape
```

Out[61]:

```
(3, 6)
```

In [66]:

```
arr1[0:,5]
```

Out[66]:

```
array([6, 7, 8])
```

In [69]:

```
## EDA
```

```
arr
```

Out[69]:

```
array([1, 2, 3, 7, 5, 7])
```

In [70]:

```
arr<2
```

Out[70]:

```
array([ True, False, False, False, False, False])
```

In [72]:

```
arr[arr<2]
```

Out[72]:

```
array([1])
```

In [74]:

```
arr1
```

Out[74]:

```
array([[1, 2, 3, 4, 5, 6],
       [2, 3, 4, 5, 6, 7],
       [3, 4, 5, 6, 7, 8]])
```

In [80]:

```
arr1.reshape(6,3)
```

Out[80]:

```
array([[1, 2, 3],
       [4, 5, 6],
       [2, 3, 4],
       [5, 6, 7],
       [3, 4, 5],
       [6, 7, 8]])
```

In [81]:

```
## machanism to creat array
np.arange(1,10,1)
```

Out[81]:

```
array([1, 2, 3, 4, 5, 6, 7, 8, 9])
```

In [96]:

```
np.arange(2,30,2).reshape(2,7)
```

Out[96]:

```
array([[ 2,  4,  6,  8, 10, 12, 14],
       [16, 18, 20, 22, 24, 26, 28]])
```

In [97]:

```
np.arange(2,30,2).reshape(1,14)
```

Out[97]:

```
array([[ 2,  4,  6,  8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28]])
```

In [102]:

```
np.arange(2,30,2).reshape(1,14,1)
```

Out[102]:

```
array([[ 2],
       [ 4],
       [ 6],
       [ 8],
      [10],
      [12],
      [14],
      [16],
      [18],
      [20],
      [22],
      [24],
      [26],
      [28]])
```

In [103]:

```
arr1
```

Out[103]:

```
array([[1, 2, 3, 4, 5, 6],
       [2, 3, 4, 5, 6, 7],
       [3, 4, 5, 6, 7, 8]])
```

In [104]:

```
arr1*arr1
```

Out[104]:

```
array([[ 1,  4,  9, 16, 25, 36],
       [ 4,  9, 16, 25, 36, 49],
       [ 9, 16, 25, 36, 49, 64]])
```

In [106]:

```
arr1*3
```

Out[106]:

```
array([[ 3,  6,  9, 12, 15, 18],
       [ 6,  9, 12, 15, 18, 21],
       [ 9, 12, 15, 18, 21, 24]])
```

In [108]:

```
np.ones((5,4))
```

Out[108]:

```
array([[1., 1., 1., 1.],
       [1., 1., 1., 1.],
       [1., 1., 1., 1.],
       [1., 1., 1., 1.],
       [1., 1., 1., 1.]])
```

In [109]:

```
np.zeros((4,5))
```

Out[109]:

```
array([[0., 0., 0., 0., 0.],
       [0., 0., 0., 0., 0.],
       [0., 0., 0., 0., 0.],
       [0., 0., 0., 0., 0.]])
```

In [114]:

```
np.random.randint(5,50,2)
```

Out[114]:

```
array([35, 37])
```

In [117]:

```
np.random.randint(10,50,4).reshape(2,2)
```

Out[117]:

```
array([[32, 22],
       [22, 26]])
```

In [118]:

```
np.random.randn(5,6)
```

Out[118]:

```
array([[ -1.51762836,  0.20226457, -0.61244101, -0.69931494, -0.59248755,
        -0.18751773],
       [ 0.61102307,  1.50355961, -0.82077993, -1.36315621, -1.3625713 ,
        -0.6895793 ],
       [ 0.16446618,  1.73053385, -0.11726427,  0.15899015,  0.97273845,
        -0.14200948],
       [-1.28560928,  0.72177527, -0.96739582, -0.73007461, -0.15725108,
         0.84587744],
       [ 2.47965247,  1.30353108, -0.75214644, -0.52940072,  0.01768831,
        -0.9050276 ]])
```


In [123]:

```
np.random.random_sample((4,7))
```

Out[123]:

```
array([[0.8617793 , 0.55640153, 0.54903161, 0.73497156, 0.69936035,  
        0.67708625, 0.86619963],  
       [0.99647432, 0.80231555, 0.62983759, 0.34912114, 0.39989486,  
        0.48704597, 0.59621436],  
       [0.25328661, 0.88594051, 0.83125258, 0.73573449, 0.67586859,  
        0.35739874, 0.91048403],  
       [0.80603125, 0.84149889, 0.54837997, 0.5710185 , 0.58324758,  
        0.35839672, 0.01517705]])
```

In []: