

# Numpy Arrays

```
In [72]: import numpy as np
```

```
In [73]: arr1=np.array([1,2,3,4,5])  
arr1
```

```
Out[73]: array([1, 2, 3, 4, 5])
```

```
In [74]: type(arr1)
```

```
Out[74]: numpy.ndarray
```

```
In [75]: arr2=np.array([[1,2,3],[4,5,6]])  
arr2
```

```
Out[75]: array([[1, 2, 3],  
               [4, 5, 6]])
```

```
In [76]: arr3=np.zeros((2,3))  
arr3
```

```
Out[76]: array([[0., 0., 0.],  
               [0., 0., 0.]])
```

```
In [77]: arr4=np.ones((3,3))  
arr4
```

```
Out[77]: array([[1., 1., 1.],  
               [1., 1., 1.],  
               [1., 1., 1.]])
```

```
In [78]: arr5=np.identity(5)  
arr5
```

```
Out[78]: array([[1., 0., 0., 0., 0.],  
               [0., 1., 0., 0., 0.],  
               [0., 0., 1., 0., 0.],  
               [0., 0., 0., 1., 0.],  
               [0., 0., 0., 0., 1.]])
```

```
In [79]: arr6=np.arange(5,16,2)  
arr6
```

```
Out[79]: array([ 5,  7,  9, 11, 13, 15])
```

```
In [80]: arr7=np.linspace(10,20,10)  
arr7
```

```
Out[80]: array([10.          , 11.11111111, 12.22222222, 13.33333333, 14.44444444,  
               15.55555556, 16.66666667, 17.77777778, 18.88888889, 20.          ])
```

```
In [81]: arr8=arr7.copy()  
arr8
```

```
Out[81]: array([10.          , 11.11111111, 12.22222222, 13.33333333, 14.44444444,  
               15.55555556, 16.66666667, 17.77777778, 18.88888889, 20.          ])
```

```
In [82]: arr1
```

```
Out[82]: array([1, 2, 3, 4, 5])
```

## Properties & Attributes

1. Shape
2. nDim
3. Size
4. ItemSize
5. Dtype
6. astype()

```
In [83]: arr1.shape
```

```
Out[83]: (5,)
```

```
In [84]: arr2.shape
```

```
Out[84]: (2, 3)
```

```
In [85]: arr9=np.array([[[1,2],[3,4]],[[5,6],[7,8]]])
```

```
In [86]: arr9
```

```
Out[86]: array([[[1, 2],
                 [3, 4]],
                [[5, 6],
                 [7, 8]]])
```

```
In [87]: arr9.shape
```

```
Out[87]: (2, 2, 2)
```

```
In [88]: arr9.ndim
```

```
Out[88]: 3
```

```
In [89]: arr2
```

```
Out[89]: array([[1, 2, 3],
                [4, 5, 6]])
```

```
In [90]: arr2.ndim
```

```
Out[90]: 2
```

```
In [91]: arr1.ndim
```

```
Out[91]: 1
```

```
In [92]: arr1.size
```

```
Out[92]: 5
```

```
In [93]: arr9
Out[93]: array([[1, 2],
               [3, 4]],

              [[5, 6],
               [7, 8]])

In [94]: arr9.size
Out[94]: 8

In [95]: arr9.itemsize
Out[95]: 4

In [96]: arr8.itemsize
Out[96]: 8

In [97]: arr8.dtype
Out[97]: dtype('float64')

In [98]: arr9.dtype
Out[98]: dtype('int32')

In [99]: arr9.astype('float')
Out[99]: array([[1., 2.],
               [3., 4.]],

              [[5., 6.],
               [7., 8.]])

In [100... lista=range(100)
arr11=np.arange(100)

In [101... import sys

In [102... print(sys.getsizeof(87)*len(lista))
2800

In [103... print(arr11.itemsize*arr11.size)
400

In [104... import time

In [105... x=range(100000)
y=range(100000, 200000)

start_time=time.time()

c=[(x,y) for x,y in zip(x,y)]

print(time.time()-start_time)

0.041504621505737305
```

```
In [106... a=np.arange(100000)
b=np.arange(100000,200000)

start_time=time.time()
c=a+b

print(time.time()-start_time)

0.013541460037231445
```

```
In [107... arr12=np.arange(24).reshape(6,4)
arr12
```

```
Out[107]: array([[ 0,  1,  2,  3],
               [ 4,  5,  6,  7],
               [ 8,  9, 10, 11],
               [12, 13, 14, 15],
               [16, 17, 18, 19],
               [20, 21, 22, 23]])
```

```
In [108... arr12[2]
```

```
Out[108]: array([ 8,  9, 10, 11])
```

## Print 3rd Column

```
In [109... arr12[:,2]
```

```
Out[109]: array([ 2,  6, 10, 14, 18, 22])
```

## Print 3rd and 4th column

```
In [110... arr12[:, 1:3]
```

```
Out[110]: array([[ 1,  2],
               [ 5,  6],
               [ 9, 10],
               [13, 14],
               [17, 18],
               [21, 22]])
```

```
In [111... arr12[:,2]
```

```
Out[111]: array([[0, 1, 2, 3],
               [4, 5, 6, 7]])
```

```
In [112... arr12[2:4, 1:3]
```

```
Out[112]: array([[ 9, 10],
               [13, 14]])
```

```
In [113... arr12
```

```
Out[113]: array([[ 0,  1,  2,  3],
               [ 4,  5,  6,  7],
               [ 8,  9, 10, 11],
               [12, 13, 14, 15],
               [16, 17, 18, 19],
               [20, 21, 22, 23]])
```

```
In [114... arr12[4:6, 2:4]
```

```
Out[114]: array([[18, 19],  
                [22, 23]])
```

```
In [115... arr12[4:,2:]
```

```
Out[115]: array([[18, 19],  
                [22, 23]])
```

```
In [116... for i in arr12:  
            print(i)
```

```
[0 1 2 3]  
[4 5 6 7]  
[ 8  9 10 11]  
[12 13 14 15]  
[16 17 18 19]  
[20 21 22 23]
```

```
In [117... for i in np.nditer(arr12):  
            print(i)
```

```
0  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23
```

```
In [118... arr1=np.array([1,2,3,4,5,6])  
arr2=np.array([4,5,6,7,8,9])
```

```
In [119... arr1-arr2
```

```
Out[119]: array([-3, -3, -3, -3, -3, -3])
```

```
In [120... arr1*arr2
```

```
Out[120]: array([ 4, 10, 18, 28, 40, 54])
```

```
In [121... arr1*2
```

```
Out[121]: array([ 2,  4,  6,  8, 10, 12])
```

```
In [122... arr2>3
```

```
Out[122]: array([ True,  True,  True,  True,  True,  True])
```

```
In [123... arr3=np.arange(6).reshape(2,3)  
arr4=np.arange(6,12).reshape(3,2)
```

```
In [124... arr3.dot(arr4)
```

```
Out[124]: array([[ 28,  31],  
                [100, 112]])
```

```
In [129... arr4
```

```
Out[129]: array([[ 6,  7],  
                [ 8,  9],  
                [10, 11]])
```

```
In [130... arr4.max()
```

```
Out[130]: 11
```

```
In [131... arr4.min(axis=0)
```

```
Out[131]: array([6, 7])
```

```
In [132... arr4.min(axis=1)
```

```
Out[132]: array([ 6,  8, 10])
```

```
In [133... arr4.sum()
```

```
Out[133]: 51
```

```
In [134... arr4.sum(axis=0)
```

```
Out[134]: array([24, 27])
```

```
In [135... arr4.mean()
```

```
Out[135]: 8.5
```

```
In [138... arr4.std()
```

```
Out[138]: 1.707825127659933
```

```
In [139... np.sin(arr4)
```

```
Out[139]: array([[ -0.2794155 ,  0.6569866 ],  
                [ 0.98935825,  0.41211849],  
                [ -0.54402111, -0.99999021]])
```

```
In [140... np.median(arr4)
```

```
Out[140]: 8.5
```

```
In [141... np.mean(arr4)
```

Out[141]: 8.5

In [143... `np.exp(arr4)`

Out[143]: array([[ 403.42879349, 1096.63315843],  
[ 2980.95798704, 8103.08392758],  
[22026.46579481, 59874.1417152 ]])

In [ ]: