

```
In [5]: import numpy as np
```

```
In [6]: np.__version__
```

```
Out[6]: '2.1.3'
```

```
In [7]: my_list=[0,1,2,3,4,5]
my_list
```

```
Out[7]: [0, 1, 2, 3, 4, 5]
```

```
In [8]: type(my_list)
```

```
Out[8]: list
```

```
In [9]: my_list
```

```
Out[9]: [0, 1, 2, 3, 4, 5]
```

```
In [10]: arr=np.array(my_list)
arr
```

```
Out[10]: array([0, 1, 2, 3, 4, 5])
```

```
In [11]: print(type(arr))
```

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

```
In [12]: np.arange(10)
```

```
Out[12]: array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])
```

```
In [13]: np.arange(10,20)
```

```
Out[13]: array([10, 11, 12, 13, 14, 15, 16, 17, 18, 19])
```

```
In [14]: np.arange(10,50,5)
```

```
Out[14]: array([10, 15, 20, 25, 30, 35, 40, 45])
```

```
In [15]: np.arange(-20,10)
```

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

```
In [16]: np.zeros(5)
```

```
Out[16]: array([0., 0., 0., 0., 0.])
```

```
In [17]: np.zeros([2,2])
```

```
Out[17]: array([[0., 0.],  
               [0., 0.]])
```

```
In [18]: np.zeros([5,4])
```

```
Out[18]: array([[0., 0., 0., 0.],  
               [0., 0., 0., 0.],  
               [0., 0., 0., 0.],  
               [0., 0., 0., 0.],  
               [0., 0., 0., 0.]])
```

```
In [19]: np.zeros((10,10),dtype=int)
```

```
Out[19]: array([[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],  
               [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]])
```

```
In [20]: np.ones(2)
```

```
Out[20]: array([1., 1.])
```

```
In [21]: np.ones(2,dtype=int)
```

```
Out[21]: array([1, 1])
```

```
In [22]: np.ones([2,2])
```

```
Out[22]: array([[1., 1.],  
               [1., 1.]])
```

```
In [23]: np.ones([4,5])
```

```
Out[23]: array([[1., 1., 1., 1., 1.],  
               [1., 1., 1., 1., 1.],  
               [1., 1., 1., 1., 1.],  
               [1., 1., 1., 1., 1.]])
```

```
In [24]: arr
```

```
Out[24]: array([0, 1, 2, 3, 4, 5])
```

```
In [25]: rand(3,2)
```

```
-----
NameError                                Traceback (most recent call last)
Cell In[25], line 1
----> 1 rand(3,2)

NameError: name 'rand' is not defined
```

```
In [26]: random.rand(3,2)
```

```
-----
NameError                                Traceback (most recent call last)
Cell In[26], line 1
----> 1 random.rand(3,2)

NameError: name 'random' is not defined
```

```
In [27]: np.random.rand(3)
```

```
Out[27]: array([0.60326559, 0.84678733, 0.26487382])
```

```
In [28]: np.random.randint(4,6)
```

```
Out[28]: 4
```

```
In [34]: a=np.random.randint(0,10,4)
         print(a)
```

```
[6 7 7 2]
```

```
In [35]: n=np.random.randint(10,40,(8,10))
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [36]: n[5]
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [37]: n
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [38]: n[0:6]
print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [39]: n
print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [40]: n[::-1]
print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [41]: n
print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [42]: n[:,2]
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [43]: n
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [44]: n[0]
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [45]: n
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [46]: n[0:5]
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [47]: n[0,5]
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [48]: n
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [49]: n[5,-3]
         print(n)
```

```
[[37 36 20 14 14 10 35 11 23 33]
 [31 20 28 33 25 26 35 16 28 12]
 [30 38 38 10 37 13 29 23 23 39]
 [33 34 26 30 36 36 10 13 27 38]
 [24 39 30 39 27 39 27 29 23 23]
 [30 35 35 21 38 15 39 31 36 27]
 [35 10 19 35 10 18 25 21 26 16]
 [31 16 10 16 10 25 30 15 12 13]]
```

```
In [56]: import numpy as np
         x=np.int32(10)
         print(x)
```

```
10
```

```
In [57]: np.arange(1,13).reshape(6,2)
```

```
Out[57]: array([[ 1,  2],  
               [ 3,  4],  
               [ 5,  6],  
               [ 7,  8],  
               [ 9, 10],  
               [11, 12]])
```