

In [113]:

```
1 arr
```

Out[113]:

```
array([13, 14, 15, 16, 17, 18, 19])
```

In []:

```
1
```

11th August 2021

In [1]:

```
1 import numpy as np
```

In [2]:

```
1 a = np.array([[0.0,0.0,0.0],
2               [10.0,10.0,10.0],
3               [20.0,20.0,20.0],
4               [30.0,30.0,30.0]
5               ])
```

In [3]:

```
1 a
```

Out[3]:

```
array([[ 0.,  0.,  0.],
       [10., 10., 10.],
       [20., 20., 20.],
       [30., 30., 30.]])
```

In [4]:

```
1 b = np.array([1.0,2.0,3.0])
```

In [5]:

```
1 b
```

Out[5]:

```
array([1., 2., 3.]
```

In [6]:

```
1 a + b
```

Out[6]:

```
array([[ 1.,  2.,  3.],
       [11., 12., 13.],
       [21., 22., 23.],
       [31., 32., 33.]])
```

In []:

```
1
```

In [7]:

```
1 a
```

Out[7]:

```
array([[ 0.,  0.,  0.],
       [10., 10., 10.],
       [20., 20., 20.],
       [30., 30., 30.]])
```

In []:

```
1
```

In [10]:

```
1 arr = np.arange(1,21)
```

In [11]:

```
1 arr
```

Out[11]:

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

In [12]:

```
1 arr = arr.reshape(5,4)
```

In [13]:

```
1 arr
```

Out[13]:

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

In [15]:

```
1 arr[0]
```

Out[15]:

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

In [16]:

```
1 arr[1]
```

Out[16]:

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

In [17]:

```
1 arr[2]
```

Out[17]:

```
array([ 9, 10, 11, 12])
```

In [18]:

```
1 arr[3]
```

Out[18]:

```
array([13, 14, 15, 16])
```

In [19]:

```
1 arr[4]
```

Out[19]:

```
array([17, 18, 19, 20])
```

In [20]:

```
1 arr
```

Out[20]:

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

In [22]:

```
1 arr[0:3,1:3]
```

Out[22]:

```
array([[ 2,  3],
       [ 6,  7],
       [10, 11]])
```

In [24]:

```
1 arr[2:5,2:4]
```

Out[24]:

```
array([[11, 12],
       [15, 16],
       [19, 20]])
```

In [25]:

```
1 arr[2:5]
```

Out[25]:

```
array([[ 9, 10, 11, 12],
       [13, 14, 15, 16],
       [17, 18, 19, 20]])
```

In []:

```
1
```

In [26]:

```
1 arr
```

Out[26]:

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

In [31]:

```
1 arr[0:5,0:4:3]
```

Out[31]:

```
array([[ 1,  4],
       [ 5,  8],
       [ 9, 12],
       [13, 16],
       [17, 20]])
```

In []:

```
1
```

In [33]:

```
1 arr[0:5,0:4:3]
```

Out[33]:

```
array([[ 1,  4],
       [ 5,  8],
       [ 9, 12],
       [13, 16],
       [17, 20]])
```

In []:

```
1
```

In [41]:

```
1 arr1 = np.arange(70,90).reshape(5,4)
```

In [42]:

```
1 arr1
```

Out[42]:

```
array([[70, 71, 72, 73],
       [74, 75, 76, 77],
       [78, 79, 80, 81],
       [82, 83, 84, 85],
       [86, 87, 88, 89]])
```

In [43]:

```
1 arr1[1:4,1:3]
```

Out[43]:

```
array([[75, 76],
       [79, 80],
       [83, 84]])
```

In [45]:

```
1 arr1[0:5:2,0:3:2]
```

Out[45]:

```
array([[70, 72],
       [78, 80],
       [86, 88]])
```

In []:

```
1
```

In [48]:

```
1 arr1[0:5,0:1]
```

Out[48]:

```
array([[70],
       [74],
       [78],
       [82],
       [86]])
```

In []:

```
1
```

Flattenning of the Array

In [49]:

```
1 arr = np.arange(8).reshape(2,4)
```

In [50]:

```
1 arr
```

Out[50]:

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

In []:

```
1
```

In [53]:

```
1 arr = arr.flatten()
```

In [54]:

```
1 arr
```

Out[54]:

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

In []:

```
1
```

Transpose

In [62]:

```
1 myarr = np.arange(12).reshape(3,4)
```

In [63]:

```
1 myarr
```

Out[63]:

```
array([[ 0,  1,  2,  3],
       [ 4,  5,  6,  7],
       [ 8,  9, 10, 11]])
```

In [64]:

```
1 myarr.transpose()
```

Out[64]:

```
array([[ 0,  4,  8],
       [ 1,  5,  9],
       [ 2,  6, 10],
       [ 3,  7, 11]])
```

In [65]:

```
1 myarr
```

Out[65]:

```
array([[ 0,  1,  2,  3],
       [ 4,  5,  6,  7],
       [ 8,  9, 10, 11]])
```

In []:

```
1
```

concat

In [66]:

```
1 x = np.array([[1,2],[3,4]])
```

In [67]:

```
1 x
```

Out[67]:

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

In [68]:

```
1 y = np.array([[5,6],[7,8]])
```

In [69]:

```
1 y
```

Out[69]:

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

In [71]:

```
1 np.concatenate((x,y),axis=0) #axis 0 => column based
```

Out[71]:

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

In [73]:

```
1 np.concatenate((x,y),axis=1) #axis=1 => row based
```

Out[73]:

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

In []:

```
1
```

append

In [75]:

```
1 arr1 = np.array([[1,2,3],[4,5,6]])
```

In [76]:

```
1 arr1
```

Out[76]:

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

In [78]:

```
1 np.append(arr1,[[10,20,30]],axis=0)
```

Out[78]:

```
array([[ 1,  2,  3],
       [ 4,  5,  6],
       [10, 20, 30]])
```

In [79]:

```
1 arr1
```

Out[79]:

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

In [81]:

```
1 arr1
```

Out[81]:

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

In [80]:

```
1 np.append(arr1,[[40,50,60],[70,80,90]],axis=1)
```

Out[80]:

```
array([[ 1,  2,  3, 40, 50, 60],
       [ 4,  5,  6, 70, 80, 90]])
```

In [82]:

```
1 arr1
```

Out[82]:

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

In []:

```
1
```

delete

In [83]:

```
1 myarr = np.arange(12).reshape(3,4)
```

In [84]:

```
1 myarr
```

Out[84]:

```
array([[ 0,  1,  2,  3],
       [ 4,  5,  6,  7],
       [ 8,  9, 10, 11]])
```

In [85]:

```
1 np.delete(myarr,5)
```

Out[85]:

```
array([ 0,  1,  2,  3,  4,  6,  7,  8,  9, 10, 11])
```

In [86]:

```
1 myarr
```

Out[86]:

```
array([[ 0,  1,  2,  3],
       [ 4,  5,  6,  7],
       [ 8,  9, 10, 11]])
```

In []:

```
1
```

In [87]:

```
1 np.delete(myarr,2,axis=1)
```

Out[87]:

```
array([[ 0,  1,  3],
       [ 4,  5,  7],
       [ 8,  9, 11]])
```

In []:

```
1
```

In []:

```
1
```

unique

In [88]:

```
1 data = np.array([5,3,6,2,7,5,6,9,2,9])
```

In [89]:

```
1 data
```

Out[89]:

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

In [90]:

```
1 np.unique(data)
```

Out[90]:

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

In []:

```
1
```

In [91]:

```
1 res,count = np.unique(data,return_counts=True)
```

In [92]:

```
1 res
```

Out[92]:

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

In [93]:

```
1 count
```

Out[93]:

```
array([2, 1, 2, 2, 1, 2])
```

In []:

```
1
```

In [94]:

```
1 data
```

Out[94]:

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

In [95]:

```
1 np.sin(data)
```

Out[95]:

```
array([-0.95892427,  0.14112001, -0.2794155 ,  0.90929743,  0.6569866 ,  
       -0.95892427, -0.2794155 ,  0.41211849,  0.90929743,  0.41211849])
```

In [96]:

```
1 np.tan(data)
```

Out[96]:

```
array([-3.38051501, -0.14254654, -0.29100619, -2.18503986,  0.87144798,  
       -3.38051501, -0.29100619, -0.45231566, -2.18503986, -0.45231566])
```

In [99]:

```
1 np.log(data)
```

Out[99]:

```
array([1.60943791, 1.09861229, 1.79175947, 0.69314718, 1.94591015,  
       1.60943791, 1.79175947, 2.19722458, 0.69314718, 2.19722458])
```

In [100]:

```
1 np.cos(data)
```

Out[100]:

```
array([ 0.28366219, -0.9899925 ,  0.96017029, -0.41614684,  0.75390225,  
        0.28366219,  0.96017029, -0.91113026, -0.41614684, -0.91113026])
```

In []:

```
1
```