

```
In [3]: import numpy  
import numpy as np  
from numpy import*
```

```
In [4]: list = [1,2,3]
```

```
In [5]: type(list)
```

```
Out[5]: list
```

```
In [18]: arr = np.array(list)
```

```
In [12]: arr
```

```
Out[12]: array([1, 2, 3])
```

```
In [19]: type(arr)
```

```
Out[19]: numpy.ndarray
```

```
In [20]: arr.shape
```

```
Out[20]: (3,)
```

```
In [21]: arr.ndim
```

```
Out[21]: 1
```

```
In [22]: arr2 = np.array([3,4,5,6,7,8])
```

```
In [23]: arr2
```

```
Out[23]: array([3, 4, 5, 6, 7, 8])
```

```
In [24]: arr2[2:4]
```

```
Out[24]: array([5, 6])
```

```
In [25]: arr2[4] = 90
```

```
In [26]: arr2
```

```
Out[26]: array([ 3,  4,  5,  6, 90,  8])
```

```
In [27]: list1 = [[1,2,3],[1,3,4],[8,9,0]]
```

```
In [28]: listarr = np.array(list1)
```

```
In [29]: listarr
```

```
Out[29]: array([[1, 2, 3],  
                 [1, 3, 4],  
                 [8, 9, 0]])
```

```
In [30]: listarr.shape
```

```
Out[30]: (3, 3)
```

```
In [31]: listarr.ndim
```

```
Out[31]: 2
```

```
create a n 2 dimension arry of 4 rows and 5 columns
```

```
In [35]: ist1=[[1,2,3,4,5],[6,7,8,9,10],[11,12,13,14,15],[16,17,18,19,20]]  
listarr=np.array(ist1)
```

```
In [36]: listarr
```

```
Out[36]: array([[ 1,  2,  3,  4,  5],  
                 [ 6,  7,  8,  9, 10],  
                 [11, 12, 13, 14, 15],  
                 [16, 17, 18, 19, 20]])
```

```
In [43]: listarr[0]
```

```
Out[43]: array([1, 2, 3, 4, 5])
```

```
In [44]: listarr[:, 3]
```

```
Out[44]: array([ 4,  9, 14, 19])
```

```
In [45]: listarr[2:4, 2:5]
```

```
Out[45]: array([[13, 14, 15],  
                 [18, 19, 20]])
```

```
In [46]: listarr.diagonal()
```

```
Out[46]: array([ 1,  7, 13, 19])
```

```
In [49]: listarr[0,0]
```

```
Out[49]: 1
```

```
In [50]: listarr[1,2]
```

```
Out[50]: 8
```

```
In [51]: listarr[2,3]
```

```
Out[51]: 14
```

```
In [53]: listarr[[0,1,2],[0,2,3]]
```

```
Out[53]: array([ 1,  8, 14])
```

```
In [54]: listarr[[0,1,2],[0,2,3]]
```

```
Out[54]: array([ 1,  8, 14])
```

```
1.zeros  
2.ones  
3.eye  
random.rand
```

```
random.randint  
linspace  
arange  
concatenate  
flatten  
ravel  
transpose
```

In [61]: zero = np.zeros((5,5))

In [62]: zero

Out[62]: 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.]])

In [65]: one = np.ones((5,4))

In [67]: one

Out[67]: array([[1., 1., 1., 1.],
 [1., 1., 1., 1.],
 [1., 1., 1., 1.],
 [1., 1., 1., 1.],
 [1., 1., 1., 1.]])

In [69]: np.eye(4,5)

Out[69]: array([[1., 0., 0., 0., 0.],
 [0., 1., 0., 0., 0.],
 [0., 0., 1., 0., 0.],
 [0., 0., 0., 1., 0.]])

In [78]: arange = np.arange(20,30)

In [79]: arange

Out[79]: array([20, 21, 22, 23, 24, 25, 26, 27, 28, 29])

```
In [82]: orange.reshape(5,2)
```

```
Out[82]: array([[20, 21],  
                 [22, 23],  
                 [24, 25],  
                 [26, 27],  
                 [28, 29]])
```

create an array with 16 elements in it and reshape it in to possible ways

```
In [84]: a = np.arange(16)
```

```
In [85]: a.reshape(4,4)
```

```
Out[85]: array([[ 0,  1,  2,  3],  
                 [ 4,  5,  6,  7],  
                 [ 8,  9, 10, 11],  
                 [12, 13, 14, 15]])
```

```
In [86]: a.reshape(2,8)
```

```
Out[86]: array([[ 0,  1,  2,  3,  4,  5,  6,  7],  
                 [ 8,  9, 10, 11, 12, 13, 14, 15]])
```

```
In [87]: a.reshape(8,2)
```

```
Out[87]: array([[ 0,  1],  
                 [ 2,  3],  
                 [ 4,  5],  
                 [ 6,  7],  
                 [ 8,  9],  
                 [10, 11],  
                 [12, 13],  
                 [14, 15]])
```

```
In [97]: np.random.rand(2,3)# - [0,1]
```

```
Out[97]: array([[0.79551583, 0.30777144, 0.75574281],  
                 [0.64969075, 0.67485201, 0.83062147]])
```

```
In [100]: p = np.random.randint(1,100,20).reshape(4,5)
```

```
In [99]: np.linspace(0,10,50)
```

```
Out[99]: array([ 0.          ,  0.20408163,  0.40816327,  0.6122449 ,  0.81632653,
   1.02040816,  1.2244898 ,  1.42857143,  1.63265306,  1.83673469,
   2.04081633,  2.24489796,  2.44897959,  2.65306122,  2.85714286,
   3.06122449,  3.26530612,  3.46938776,  3.67346939,  3.87755102,
   4.08163265,  4.28571429,  4.48979592,  4.69387755,  4.89795918,
   5.10204082,  5.30612245,  5.51020408,  5.71428571,  5.91836735,
   6.12244898,  6.32653061,  6.53061224,  6.73469388,  6.93877551,
   7.14285714,  7.34693878,  7.55102041,  7.75510204,  7.95918367,
   8.16326531,  8.36734694,  8.57142857,  8.7755102 ,  8.97959184,
   9.18367347,  9.3877551 ,  9.59183673,  9.79591837,  10.        ])
```

```
In [101]: p #original data
```

```
Out[101]: array([[93, 81, 74, 91, 98],
 [57, 63, 84, 56, 41],
 [63, 97, 73, 91, 84],
 [55, 18, 29, 87, 59]])
```

```
In [102]: q = p.ravel() # ravel
```

```
In [103]: q
```

```
Out[103]: array([93, 81, 74, 91, 98, 57, 63, 84, 56, 41, 63, 97, 73, 91, 84, 55, 18,
 29, 87, 59])
```

```
In [104]: s = p.flatten() #flatten
```

```
In [105]: s
```

```
Out[105]: array([93, 81, 74, 91, 98, 57, 63, 84, 56, 41, 63, 97, 73, 91, 84, 55, 18,
 29, 87, 59])
```

```
In [106]: q[1] = 100 #changed the contt in ravel array
```

```
In [107]: q
```

```
Out[107]: array([ 93, 100, 74, 91, 98, 57, 63, 84, 56, 41, 63, 97, 73,
 91, 84, 55, 18, 29, 87, 59])
```

```
In [108]: p
```

```
Out[108]: array([[ 93, 100, 74, 91, 98],
 [ 57, 63, 84, 56, 41],
 [ 63, 97, 73, 91, 84],
 [ 55, 18, 29, 87, 59]])
```

```
In [109]: s[3] = 500
```

```
In [110]: s
```

```
Out[110]: array([ 93, 81, 74, 500, 98, 57, 63, 84, 56, 41, 63, 97, 73,
 91, 84, 55, 18, 29, 87, 59])
```

```
In [111]: p
```

```
Out[111]: array([[ 93, 100, 74, 91, 98],
 [ 57, 63, 84, 56, 41],
 [ 63, 97, 73, 91, 84],
 [ 55, 18, 29, 87, 59]])
```

```
In [112]: a = np.arange(9).reshape(3,3)
```

```
In [113]: a
```

```
Out[113]: array([[0, 1, 2],
 [3, 4, 5],
 [6, 7, 8]])
```

```
In [115]: b = np.random.randint(1,10,9).reshape(3,3)
```

```
In [116]: b
```

```
Out[116]: array([[5, 7, 9],  
                  [5, 2, 5],  
                  [5, 4, 2]])
```

```
In [117]: c = np.concatenate((a,b))
```

```
In [118]: c
```

```
Out[118]: array([[0, 1, 2],  
                  [3, 4, 5],  
                  [6, 7, 8],  
                  [5, 7, 9],  
                  [5, 2, 5],  
                  [5, 4, 2]])
```

```
In [119]: d = np.concatenate((a,b),axis = 1)
```

```
In [120]: d
```

```
Out[120]: array([[0, 1, 2, 5, 7, 9],  
                  [3, 4, 5, 5, 2, 5],  
                  [6, 7, 8, 5, 4, 2]])
```

```
In [123]: s = "heee"  
          p = "hello"  
          q = s+p
```

```
In [124]: q
```

```
Out[124]: 'heee\nhello'
```

```
In [125]: e = d.transpose()
```

```
In [126]: e
```

```
Out[126]: array([[0, 3, 6],  
                  [1, 4, 7],  
                  [2, 5, 8],  
                  [5, 5, 5],  
                  [7, 2, 4],  
                  [9, 5, 2]])
```

```
In [129]: p = np.linspace(2,40,8)
```

```
In [130]: p
```

```
Out[130]: array([ 2.          ,  7.42857143, 12.85714286, 18.28571429, 23.71428571,  
                  29.14285714, 34.57142857, 40.        ])
```

```
In [131]: a = np.arange(16).reshape(4,4)
```

```
In [132]: a #original data
```

```
Out[132]: array([[ 0,  1,  2,  3],  
                  [ 4,  5,  6,  7],  
                  [ 8,  9, 10, 11],  
                  [12, 13, 14, 15]])
```

```
In [133]: b = a.ravel() #ravel
```

```
In [134]: b
```

```
Out[134]: array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15])
```

```
In [135]: c = a.flatten()#flatten
```

```
In [137]: c
```

```
Out[137]: array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15])
```

```
In [138]: b[2] = 89
```

```
In [139]: b
```

```
Out[139]: array([ 0,  1, 89,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15])
```

```
In [140]: a
```

```
Out[140]: array([[ 0,  1, 89,  3],
                  [ 4,  5,  6,  7],
                  [ 8,  9, 10, 11],
                  [12, 13, 14, 15]])
```

```
In [141]: c[4] = 900
```

```
In [142]: c
```

```
Out[142]: array([ 0,  1,  2,  3, 900,  5,  6,  7,  8,  9, 10, 11, 12,
                  13, 14, 15])
```

```
In [143]: a
```

```
Out[143]: array([[ 0,  1, 89,  3],
                  [ 4,  5,  6,  7],
                  [ 8,  9, 10, 11],
                  [12, 13, 14, 15]])
```

```
In [144]: import numpy
import numpy as np
from numpy import*
```

```
In [145]: a = arange(16).reshape(4,4)
```

```
In [156]: a
```

```
Out[156]: array([[ 0,  1,  2,  3],
                  [ 4,  5,  6,  7],
                  [ 8,  9, 10, 11],
                  [12, 13, 14, 15]])
```

```
In [147]: list = [1,2,3,5.7]
```

```
In [149]: list[2]
```

```
Out[149]: 3
```

```
In [152]: list[1:3]
```

```
Out[152]: [2, 3]
```

```
In [158]: a[2:4,1:4]
```

```
Out[158]: array([[ 9, 10, 11],  
 [13, 14, 15]])
```

```
collection  
datapreprocessing  
data analysis  
train test  
deployment
```

```
In [ ]:
```