In [1]:
```
#pip install numpy
```

In [2]:
```
import numpy as np
```

In [36]:
```
array = np.array([1,2,3], dtype="float")
print(array)
```

```
[1. 2. 3.]
```

In [37]:
```
array.shape
```

Out[37]:
```
(3,)
```

type(array)

In [6]:
```
array.ndim
```

Out[6]:
```
1
```

In [38]:
```
array.dtype
```

Out[38]:
```
dtype('float64')
```

In [8]:
```
array.size
```

Out[8]:
```
3
```

In [9]:
```
array.itemsize
```

Out[9]:
```
4
```

In [11]:
```
array.nbytes
```

Out[11]:
```
12
```

In [18]:
```
array2 = np.array([[1,2,3],
                   [4,5,6],
                   [7,8,9]])
print(array2)
```

```
[[1 2 3]
 [4 5 6]
 [7 8 9]]
```

In [19]:
```
array2.ndim
```

Out[19]:
```
2
```

In [20]:
```
array2.shape
```

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

In [21]:
```
type(array2)
```

Out[21]:
```
numpy.ndarray
```

In [26]:
```
array2.nbytes
```

Out[26]:
```
36
```

In [25]:
```
array2.itemsize
```

Out[25]:
```
4
```

In [29]:
```
array3 = np.array([[[1,2,3],[4,5,6],[7,8,9],
                   [7,8,9],[4,5,6],[1,2,3]]])
print(array3)
```

```
[[[1 2 3]
  [4 5 6]
  [7 8 9]
  [7 8 9]
  [4 5 6]
  [1 2 3]]]
```

In [39]:
```
array3 = np.array([[[1,2,3],[4,5,6],[7,8,9]],  #item-1

                   [[7,8,9],[4,5,6],[1,2,3]]]) #item-2
array3
```

Out[39]:
```
array([[[1, 2, 3],
        [4, 5, 6],
        [7, 8, 9]],

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

In [33]:
```
array3.shape
```

Out[33]:
```
(2, 3, 3)
```

In [60]:
```
random_array = np.random.randint(1,100, size=(2,3,3), dtype="int")
print(random_array)
```

```
[[[38 86 31]
  [38 44 41]
  [36 81 50]]

 [[96 67 63]
  [96 12 38]
  [84 91 29]]]
```

In [68]:
```
a = np.zeros(((3,3)), dtype="int")
```

```
a
```

Out[68]:
```
array([[0, 0, 0],
       [0, 0, 0],
       [0, 0, 0]])
```

In [69]:
```
np.ones(((3,3)), dtype="int")
```

Out[69]:
```
array([[1, 1, 1],
       [1, 1, 1],
       [1, 1, 1]])
```

In [71]:
```
np.ones((3), dtype="int")
```

Out[71]:
```
array([1, 1, 1])
```

In [72]:
```
np.identity(3, dtype="int")
```

Out[72]:
```
array([[1, 0, 0],
       [0, 1, 0],
       [0, 0, 1]])
```

In [73]:
```
np.eye(3,3,-1, dtype="int")
```

Out[73]:
```
array([[0, 0, 0],
       [1, 0, 0],
       [0, 1, 0]])
```

In [74]:
```
np.arange(1,10,2)
```

Out[74]:
```
array([1, 3, 5, 7, 9])
```

In [75]:
```
np.arange(1,30,5)
```

Out[75]:
```
array([ 1,  6, 11, 16, 21, 26])
```

In [78]:
```
np.linspace(1,10,5, dtype="int")
```

Out[78]:
```
array([ 1,  3,  5,  7, 10])
```

In [83]:
```
np.linspace(1,10,5, dtype="float")  # 5 is number
```

Out[83]:
```
array([ 1.  ,  3.25,  5.5 ,  7.75, 10.  ])
```

In [97]:
```
new_array=np.random.randint(1,10, size=(2,3,3), dtype="int")
print(new_array)
```

```
[[[9 5 9]
  [3 1 6]
  [4 1 2]]

 [[3 8 8]
  [7 3 2]
  [8 3 7]]]
```

In [104…
```
new_array[1,2,2]   #iRC
```

Out[104…
```
7
```

In [110…
```
new_array[0, 1:3, 1:3]   # here 2 not including 2, c=c+1
```

Out[110…
```
array([[1, 6],
       [1, 2]])
```

In [113…
```
array = np.array([[1,2,3],
                  [4,5,6]])
array
```

Out[113…
```
array([[1, 2, 3],
       [4, 5, 6]])
```

In [114…
```
np.reshape(array, (3,2))
```

Out[114…
```
array([[1, 2],
       [3, 4],
       [5, 6]])
```

In [116…
```
np.resize(array, (3,3))
```

Out[116…
```
array([[1, 2, 3],
       [4, 5, 6],
       [1, 2, 3]])
```

In [117…
```
array = np.array([[1,2,3],
                  [4,5,6]])
array
```

Out[117…
```
array([[1, 2, 3],
       [4, 5, 6]])
```

In [118…
```
np.ravel(array)    # convert to Vector
```

Out[118…
```
array([1, 2, 3, 4, 5, 6])
```

In [119…
```
array = np.array([[1,2,3],
                  [4,5,6]])
array
```

Out[119…
```
array([[1, 2, 3],
       [4, 5, 6]])
```

In [121…
```
array.flatten()    # convert to Vector
```

Out[121…
```
array([1, 2, 3, 4, 5, 6])
```

In [126…
```
a = np.arange(1,10).reshape(3,3)
a
```

Out[126…
```
array([[1, 2, 3],
       [4, 5, 6],
```

```
       [7, 8, 9]])
```

In [127…
```
b = 2*a
print(b)
```

```
[[ 2  4  6]
 [ 8 10 12]
 [14 16 18]]
```

In [128…
```
c=np.vstack((a,b))
c
```

Out[128…
```
array([[ 1,  2,  3],
       [ 4,  5,  6],
       [ 7,  8,  9],
       [ 2,  4,  6],
       [ 8, 10, 12],
       [14, 16, 18]])
```

In [129…
```
np.row_stack((a,b))
```

Out[129…
```
array([[ 1,  2,  3],
       [ 4,  5,  6],
       [ 7,  8,  9],
       [ 2,  4,  6],
       [ 8, 10, 12],
       [14, 16, 18]])
```

In [130…
```
np.concatenate((a,b),axis=1)
```

Out[130…
```
array([[ 1,  2,  3,  2,  4,  6],
       [ 4,  5,  6,  8, 10, 12],
       [ 7,  8,  9, 14, 16, 18]])
```

In [131…
```
np.column_stack((a,b))
```

Out[131…
```
array([[ 1,  2,  3,  2,  4,  6],
       [ 4,  5,  6,  8, 10, 12],
       [ 7,  8,  9, 14, 16, 18]])
```

In [132…
```
np.dstack((a,b))
```

Out[132…
```
array([[[ 1,  2],
        [ 2,  4],
        [ 3,  6]],

       [[ 4,  8],
        [ 5, 10],
        [ 6, 12]],

       [[ 7, 14],
        [ 8, 16],
        [ 9, 18]]])
```

In [ ]: