

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

```
In [5]: a = np.array([1,2,3], dtype="int32")  
print(a)
```

```
[1 2 3]
```

```
In [13]: b = np.array([[9.0,8.0,7.0],[6.0,5.0,4.0]])  
print(b)
```

```
[[9. 8. 7.]  
 [6. 5. 4.]]
```

```
In [14]: a.dtype
```

```
Out[14]: dtype('int32')
```

```
In [15]: a.size
```

```
Out[15]: 3
```

```
In [16]: a.itemsize
```

```
Out[16]: 4
```

```
In [17]: a.nbytes
```

```
Out[17]: 12
```

```
In [21]: a[0]
```

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

```
In [29]: b[1 , 2]
```

```
Out[29]: 4.0
```

```
In [31]: b[1 :]
```

```
Out[31]: array([[6., 5., 4.]])
```

```
In [32]: b[:, 2]
```

```
Out[32]: array([7., 4.])
```

```
In [33]: b[0 , 1 : -1 :2]
```

```
Out[33]: array([8.])
```

```
In [37]: b = np.array([[9.0,8.0,7.0],[6.0,5.0,4.0]])  
print(b)
```

```
[[9. 8. 7.]  
 [6. 5. 4.]]
```

```
In [40]: b[0 , 1] = 2  
print(b)
```

```
[[9. 2. 7.]  
 [6. 5. 4.]]
```

```
In [41]: b[:,2] = [1 , 2]  
print(b)
```

```
[[9. 2. 1.]  
 [6. 5. 2.]]
```

```
In [ ]: 3D example
```

```
In [42]: b = np.array([[[1,2],[3,4]],[[5,6],[7,8]]])  
print(b)
```

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

```
In [43]: b[0 , 1 , 1]
```

```
Out[43]: 4
```

```
In [45]: b[:, 1 , :] = [[4 , 5],[8 , 8]]  
print(b)
```

```
[[[1 2]  
  [4 5]]  
  
 [[5 6]  
  [8 8]]]
```

```
In [48]: np.zeros([2,3])
```

```
Out[48]: array([[0., 0., 0.],  
                [0., 0., 0.]])
```

```
In [49]: np.ones([4,3])
```

```
Out[49]: array([[1., 1., 1.],  
                [1., 1., 1.],  
                [1., 1., 1.],  
                [1., 1., 1.]])
```

```
In [52]: np.full([3 , 2], 99)
```

```
Out[52]: array([[99, 99],
                [99, 99],
                [99, 99]])
```

```
In [54]: np.full_like(a , 8)
```

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

```
In [55]: np.random.randint(-4 , 8 , size = (3,3))
```

```
Out[55]: array([[ 4,  4, -4],
                [ 3, -2, -1],
                [-3, -2,  5]])
```

```
In [56]: np.identity(5)
```

```
Out[56]: 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 [57]: arr = np.array([[1,2,3]])
r1 = np.repeat(arr,3, axis=0)
print(r1)
```

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

```
In [58]: output = np.ones((5,5))
print(output)
```

```
[[1. 1. 1. 1. 1.]
 [1. 1. 1. 1. 1.]
 [1. 1. 1. 1. 1.]
 [1. 1. 1. 1. 1.]
 [1. 1. 1. 1. 1.]]
```

```
In [5]: z = np.zeros((3,3))
z[1,1] = 9
print(z)
```

```
[[0. 0. 0.]
 [0. 9. 0.]
 [0. 0. 0.]]
```

```
In [6]: a = np.array([1,2,3])
b = a.copy()
b[0] = 100
print(a)
```

```
[1 2 3]
```

```
In [7]: a = np.array([1,2,3,4])
print(a)

a + 2

a - 2

a * 2

a / 2

b = np.array([1,0,1,0])
a + b

a ** 2
```

```
[1 2 3 4]
```

```
Out[7]: array([ 1,  4,  9, 16], dtype=int32)
```

```
In [9]: np.cos(a)
```

```
Out[9]: array([ 0.54030231, -0.41614684, -0.9899925 , -0.65364362])
```

```
In [10]: a = np.ones((2,3))
print(a)
b = np.full((3,2), 2)
print(b)
np.matmul(a,b)
```

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

```
Out[10]: array([[6., 6.],
               [6., 6.]])
```

```
In [11]: c = np.identity(3)
np.linalg.det(c)
```

```
Out[11]: 1.0
```

```
In [15]: stats = np.array([[1,2,3],[4,5,6]])
stats

np.min(stats)

np.max(stats, axis=1)

np.sum(stats, axis=0)
```

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

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

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

```
In [19]: v1 = np.array([1,2,3,4])
v2 = np.array([5,6,7,8])
np.vstack([v1,v2,v1,v2])
```

```
Out[19]: array([[1, 2, 3, 4],
               [5, 6, 7, 8],
               [1, 2, 3, 4],
               [5, 6, 7, 8]])
```

```
In [20]: h1 = np.ones((2,4))
h2 = np.zeros((2,2))
np.hstack((h1,h2))
```

```
Out[20]: array([[1., 1., 1., 1., 0., 0.],
               [1., 1., 1., 1., 0., 0.]])
```

```
In [ ]:
```