In [1]:
```
import numpy as np
```

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

In [3]:
```
type(arr)
```

Out[3]:
```
numpy.ndarray
```

In [4]:
```
arr.ndim
```

Out[4]:
```
2
```

In [5]:
```
arr.shape
```

Out[5]:
```
(2, 3)
```

In [6]:
```
arr.size
```

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

In [7]:
```
arr.dtype
```

Out[7]:
```
dtype('int32')
```

In [8]:
```
c = np.zeros((3,4))
```

In [9]:
```
c
```

Out[9]:
```
array([[0., 0., 0., 0.],
       [0., 0., 0., 0.],
       [0., 0., 0., 0.]])
```

In [10]:
```
np.ones((3,4))
```

Out[10]:
```
array([[1., 1., 1., 1.],
       [1., 1., 1., 1.],
       [1., 1., 1., 1.]])
```

In [11]:
```
np.eye(3)
```

Out[11]:
```
array([[1., 0., 0.],
       [0., 1., 0.],
       [0., 0., 1.]])
```

In [12]:
```
f = np.arange(0,30,5)
```

In [13]:
```
f
```

Out[13]:
```
array([ 0,  5, 10, 15, 20, 25])
```

In [14]:
```
g = np.linspace(0,5,10)
```

In [15]:
```
g
```

Out[15]:
```
array([0.        , 0.55555556, 1.11111111, 1.66666667, 2.22222222,
       2.77777778, 3.33333333, 3.88888889, 4.44444444, 5.        ])
```

In [16]:
```
arr = np.array([[1,2,3,4],
                [5,2,4,2],
                [1,2,0,1]])
```

In [17]:
```
newarr = arr.reshape((4,3))
```

In [18]:
```
newarr
```

Out[18]:
```
array([[1, 2, 3],
       [4, 5, 2],
       [4, 2, 1],
       [2, 0, 1]])
```

In [19]:
```
flarr = newarr.flatten()
```

In [20]:
```
flarr
```

Out[20]:
```
array([1, 2, 3, 4, 5, 2, 4, 2, 1, 2, 0, 1])
```

In [21]:
```
arr
```

Out[21]:
```
array([[1, 2, 3, 4],
       [5, 2, 4, 2],
       [1, 2, 0, 1]])
```

Array Indexing

In [22]:
```
arr2 = np.array([[-1,2,0,4],
                 [4,-0.5,6,0],
                 [2.6,0,7,8],
                 [3,-7,4,2.0]])
```

In [23]:
```
arr2[1:, :3]
```

Out[23]:
```
array([[ 4. , -0.5,  6. ],
       [ 2.6,  0. ,  7. ],
       [ 3. , -7. ,  4. ]])
```

In [24]:
```
arr2[1:, :3:2]
```

Out[24]:
```
array([[4. , 6. ],
       [2.6, 7. ],
       [3. , 4. ]])
```

In [25]:
```
arr2[1::2, :3:2]
```

Out[25]:
```
array([[4., 6.],
       [3., 4.]])
```

In [26]:
```
arr3 = np.array([[1,5,6],
                 [4,7,2],
                 [3,1,9]])
```

In [27]:
```
arr3.max(axis=1)
```

Out[27]:
```
array([6, 7, 9])
```

In [28]:
```
arr3.max(axis=0)
```

Out[28]:
```
array([4, 7, 9])
```

In [29]:
```
array4 = np.array([[-1,3,0,4],
           [4,-0.5,6,4],
           [2.6,0,7,9],
           [3,-7,4,2.2]])
```

In [30]:
```
temp = array4[[0,1,2,3], [3,2,1,0]]
```

In [31]:
```
temp
```

Out[31]:
```
array([4., 6., 0., 3.])
```

In [35]:
```
cond = arr > 0
```

In [36]:
```
temp = arr[cond]
```

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

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

Basic Operations

In [38]:
```
a = np.array([1,2,5,3])
```

In [39]:
```
print(a+1)
```

```
[2 3 6 4]
```

In [40]:
```
print(a-2)
```

```
[-1  0  3  1]
```

In [41]:
```
print(a**2)
```

```
[ 1  4 25  9]
```

In [42]:
```
a = np.array([[1,2,3],[3,4,5],[9,6,0]])
```

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

```
[[1 2 3]
 [3 4 5]
 [9 6 0]]
```

In [44]:
```
print(a.T)
```

```
[[1 3 9]
 [2 4 6]
 [3 5 0]]
```

In [45]:
```
print(a.cumsum(axis=1))
```

```
[[ 1  3  6]
 [ 3  7 12]
 [ 9 15 15]]
```

In [46]:
```
print(a.cumsum(axis=0))
```

```
[[ 1  2  3]
 [ 4  6  8]
 [13 12  8]]
```

In [48]:
```
a = np.array([[1, 2],
              [3, 4]])
```

In [49]:
```
b = np.array([[4,3],
              [2,1]])
```

In [50]:
```
print(a+b)
```

```
[[5 5]
 [5 5]]
```

Sorting Array

In [51]:
```
a = np.array([[1, 4, 2],
              [3, 4,6],
              [0, -1, 5]])
```

In [52]:
```
print(np.sort(a, axis = None))
```

```
[-1  0  1  2  3  4  4  5  6]
```

In [53]:
```
print(np.sort(a, axis = 0, kind='mergesort'))
```

```
[[ 0 -1  2]
 [ 1  4  5]
 [ 3  4  6]]
```

In [54]:
```
dtypes = [('name', 'S10'), ('grad_year', int), ('cgpa', float)]
```

In [55]:
```
values = [('Hrithik', 2009, 8.5), ('Ajay', 2008, 8.7), ('Pankaj', 2008, 7.9), ('Aakash', 2009, 9.0)]
```

In [56]:
```
arr = np.array(values, dtype=dtypes)
```

In [57]:
```
print(np.sort(arr, order = 'name'))
```

```
[(b'Aakash', 2009, 9. ) (b'Ajay', 2008, 8.7) (b'Hrithik', 2009, 8.5)
 (b'Pankaj', 2008, 7.9)]
```

In [58]:
```
print(np.sort(arr, order = ['grad_year','cgpa']))
```

```
[(b'Pankaj', 2008, 7.9) (b'Ajay', 2008, 8.7) (b'Hrithik', 2009, 8.5)
 (b'Aakash', 2009, 9. )]
```

Stacking

In [59]:
```
a = np.array([[1, 2],
              [3, 4]])
```

In [60]:
```
b = np.array([[5, 6],
              [7, 8]])
```

print(np.vstack((a,b)))

In [62]:
```
print(np.hstack((a,b)))
```

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

In [63]:
```
c = np.array([5,6])
```

In [64]:
```
print(np.column_stack((a,c)))
```

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

Splitting

In [65]:
```
a = np.array([[1,3,5,7,9,11],
              [2,4,6,8,10,12]])
```

In [66]:
```
print(np.hsplit(a,2))
```

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

In [67]:
```
print(np.vsplit(a,2))
```

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

In [ ]: