# NumPy

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

In [2]:
```
w=[1,2,34,56]
w
```

Out[2]:
```
[1, 2, 34, 56]
```

In [4]:
```
type(w)
```

Out[4]:
```
list
```

In [6]:
```
a=np.array(w)
a
```

Out[6]:
```
array([ 1,  2, 34, 56])
```

In [7]:
```
type(a)
```

Out[7]:
```
numpy.ndarray
```

In [8]:
```
a.data
```

Out[8]:
```
<memory at 0x000002A917F374C0>
```

In [9]:
```
a.dtype
```

Out[9]:
```
dtype('int32')
```

In [12]:
```
np.arange(0,20)
```

Out[12]:
```
array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
       17, 18, 19])
```

In [13]:
```
np.arange(0,20,2)
```

Out[13]:
```
array([ 0,  2,  4,  6,  8, 10, 12, 14, 16, 18])
```

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

Out[14]:
```
16
```

In [15]:
```
len(a)
```

Out[15]:
```
4
```

In [16]:
```
len(a)
```

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

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

Out[17]:
```
4
```

In [18]:
```
a.ndim
```

Out[18]:
```
1
```

In [19]:
```
np.arange(0,100,2)
```

Out[19]:
```
array([ 0,  2,  4,  6,  8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32,
       34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66,
       68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98])
```

In [20]:
```
a4=np.array(1,100)
a4[a4]
```

Out[20]:
```
array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
       17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33,
       34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50,
       51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67,
       68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84,
       85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99])
```

In [21]:
```
np.random.randint(0,500,5)
```

Out[21]:
```
array([187, 156,  87, 100, 143])
```

In [23]:
```
a5=np.random.uniform(5,10,8)
a5
```

Out[23]:
```
array([8.71310037, 7.4429266 , 8.90047855, 8.38046655, 5.68142356,
       5.35366583, 7.04310474, 9.95508689])
```

In [24]:
```
np.floor(a5)
```

Out[24]:
```
array([8., 7., 8., 8., 5., 5., 7., 9.])
```

In [25]:
```
np.trunc(a5)
```

Out[25]:
```
array([8., 7., 8., 8., 5., 5., 7., 9.])
```

In [27]:
```
a=np.array([1,2,3,4,5,6,7])
print(a)
print(type(a))
```

```
[1 2 3 4 5 6 7]
<class 'numpy.ndarray'>
```

In [28]:
```
a=np.array([1])
print(a)
```

```
[1]
```

In [32]:
```
a=np.array([[1,2,3],[3,2,1]])
print(a)
```

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

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

# access array elements

In [3]:
```
import numpy as np
j=np.array([1,2,3,4,5,6,7])
print(j[0])
```

```
1
```

In [4]:
```
print(j[4])
```

```
5
```

In [6]:
```
print(j[1]+j[3])
```

```
6
```

In [7]:
```
print(j[1]-j[3])
```

```
-2
```

In [8]:
```
print(j[1]j[3])
```

```
8
```

# data types

In [ ]:
```
i-int
b-boolean
u-unsigned int
f- float
c-complex float
M-datetime
O-object
S-string
U-unicode string
```

In [9]:
```
j=np.array(["ajay","ajith"])
print(j.dtype)
```

```
<U5
```

In [10]:
```
a=np.arange(0,10)
a
```

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

In [11]:
```
a.sum()
```

Out[11]:
```
45
```

In [12]:
```
np.cumsum(a)
```

Out[12]:
```
array([ 0,  1,  3,  6, 10, 15, 21, 28, 36, 45], dtype=int32)
```

In [14]:
```
np.min(a)
```

Out[14]:
```
0
```

In [15]:
```
a.min()
```

Out[15]:
```
0
```

In [16]:
```
a.mean()
```

Out[16]:
```
4.5
```

In [18]:
```
np.median(a)
```

Out[18]:
```
4.5
```

In [39]:
```
aa=np.array([[1,2],[3,2]])
print(a)
```

```
[ 1  2  3  4  5  6  7 88  9]
```

In [22]:
```
a.sum()
```

Out[22]:
```
8
```

In [23]:
```
np.cumsum(a)
```

Out[23]:
```
array([1, 3, 6, 8], dtype=int32)
```

In [24]:
```
a.mean()
```

Out[24]:
```
2.0
```

In [25]:
```
np.median(a)
```

Out[25]:
```
2.0
```

In [26]:
```
a.argmin()
```

Out[26]:
```
0
```

In [27]:
```
a.argmax()
```

Out[27]:
```
2
```

In [28]:
```
np.var(a)
```

Out[28]:
```
0.5
```

In [29]:
```
np.std(a)
```

Out[29]:
```
0.7071067811865476
```

In [31]:
```
np.percentile(a,10)
```

Out[31]:
```
1.3
```

In [33]:
```
for i in a:
    print(i)
```

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

In [37]:
```
a=np.array([1,2,3,4,5,6,7,88,9])
n=a.reshape(3,3)
print(a)
```

```
[ 1  2  3  4  5  6  7 88  9]
```

In [38]:
```
for i in a:
    print(i)
```

```
1
2
3
4
5
6
7
88
9
```

In [45]:
```
a=np.array([[1,2,3],[3,2,1]])
b=np.array([[4,2,3],[6,5,1]])
c=np.concatenate((a,b),axis=1)
print(c)
```

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

In [43]:
```
a=np.array([1,2,3])
b=np.array([4,2,3])
c=np.concatenate((a,b))
print(c)
```

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

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

In [2]:
```
b=np.array([3,45,67,8,35,89,78])
n=np.array_split(b,3)
print(n)
```

```
[array([ 3, 45, 67]), array([ 8, 35]), array([89, 78])]
```

In [3]:
```
b=np.array([3,45,67,8,35,89,78])
n=np.array_split(b,4)
print(n)
```

```
[array([ 3, 45]), array([67,  8]), array([35, 89]), array([78])]
```

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

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

In [5]:
```
n=np.array_split(a,4)
print(n)
```

```
[array([[1, 2, 3]]), array([[3, 2, 1]]), array([], shape=(0, 3), dtype=int32), array([], shape=(0, 3), dtype=int32)]
```

In [29]:
```
n=np.dsplit(j,3)
print(n)
```

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

In [39]:
```
m=np.array([1,2,3,4,5,6,7,8,9])
b=np.where(m%2==0)
for i in b:
    print(m[i])
```

```
[2 4 6 8]
```

In [40]:
```
b=np.where(m%2==1)
for i in b:
    print(m[i])
```

```
[1 3 5 7 9]
```

In [43]:
```
b=np.where(m==5)
for i in b:
    print(i)
```

```
[4]
```

In [44]:
```
a=np.array([1,np.nan,34,56,78])
a
```

Out[44]:
```
array([ 1., nan, 34., 56., 78.])
```

In [45]:
```
np.isnan(a)
```

Out[45]:
```
array([False,  True, False, False, False])
```

In [48]:
```
a[np.isnan(a)]=1
a
```

Out[48]:
```
array([1.000e+00, 1.111e+03, 3.400e+01, 5.600e+01, 7.800e+01])
```