

```
In [1]: import numpy as np #np is alias of numpy
```

```
In [2]: np.__version__ #checking version
```

```
Out[2]: '2.2.6'
```

creating a list

```
In [3]: mylist=[0,1,2,3,4,5]  
mylist
```

```
Out[3]: [0, 1, 2, 3, 4, 5]
```

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

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

```
In [5]: arr=np.array(mylist) #converting list to array  
arr
```

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

```
In [6]: print(type(arr))
```

```
<class 'numpy.ndarray'>
```

```
In [8]: # arange  
np.arange(10)
```

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

```
In [9]: np.arange(10,20)
```

```
Out[9]: array([10, 11, 12, 13, 14, 15, 16, 17, 18, 19])
```

```
In [10]: np.arange(10,20,5)
```

```
Out[10]: array([10, 15])
```

```
In [11]: np.arange(10,50,5) #its like range
```

```
Out[11]: array([10, 15, 20, 25, 30, 35, 40, 45])
```

```
In [12]: np.arange(20,10) #1st arg always less than 2nd arg
```

```
Out[12]: array([], dtype=int64)
```

```
In [13]: np.arange(-20,10)
```

```
Out[13]: array([-20, -19, -18, -17, -16, -15, -14, -13, -12, -11, -10, -9, -8,  
                -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5,  
                6, 7, 8, 9])
```

```
In [14]: #zeros  
np.zeros(5) #parameter tuning
```

```
Out[14]: array([0., 0., 0., 0., 0.])
```

```
In [15]: np.zeros(5,dtype=int) #hyperparameter tuning #1d arr
```

```
Out[15]: array([0, 0, 0, 0, 0])
```

```
In [17]: np.zeros([2,2]) #2d arr
```

```
Out[17]: array([[0., 0.],  
               [0., 0.]])
```

```
In [18]: np.zeros([5,4]) #nd arr
```

```
Out[18]: array([[0., 0., 0., 0.],  
               [0., 0., 0., 0.],  
               [0., 0., 0., 0.],  
               [0., 0., 0., 0.],  
               [0., 0., 0., 0.]])
```

```
In [19]: np.zeros([3,3])
```

```
Out[19]: array([[0., 0., 0.],  
               [0., 0., 0.],  
               [0., 0., 0.]])
```

```
In [26]: np.zeros([10,10],dtype=int)
```

```
Out[26]: 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, 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],  
               [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, 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 [23]: np.ones(2,dtype=int)
```

```
Out[23]: array([1, 1])
```

```
In [25]: np.ones([4,5])
```

```
Out[25]: array([[1., 1., 1., 1., 1.],  
               [1., 1., 1., 1., 1.],  
               [1., 1., 1., 1., 1.],  
               [1., 1., 1., 1., 1.]])
```

```
In [27]: y=list(range(12))  
y
```

```
Out[27]: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

```
In [28]: rand(3,2)
```

```
-----
NameError                                Traceback (most recent call last)
Cell In[28], line 1
----> 1 rand(3,2)

NameError: name 'rand' is not defined
```

```
In [29]: random.rand(4,2)
```

```
-----
NameError                                Traceback (most recent call last)
Cell In[29], line 1
----> 1 random.rand(4,2)

NameError: name 'random' is not defined
```

```
In [31]: np.random.rand(3,2)    #it will generate random value random is module rand is f
```

```
Out[31]: array([[3.91179867e-01, 6.84608903e-04],
               [7.48378928e-01, 8.22344332e-01],
               [1.17562010e-01, 2.76892036e-01]])
```

```
In [33]: np.random.rand(3)    # it will generate differernt values will excuting
```

```
Out[33]: array([0.40065751, 0.55589758, 0.5298388 ])
```

```
In [37]: np.random.randint(4,6)    #it will generate value from 4 to 6 as int (n-1) formul
```

```
Out[37]: 5
```

```
In [38]: np.random.randint(0,10)
```

```
Out[38]: 2
```

```
In [40]: np.random.randint(0,10,4)    #it will generate 4 random values
```

```
Out[40]: array([6, 1, 0, 6], dtype=int32)
```

```
In [41]: np.random.randint(0,10,5)
```

```
Out[41]: array([1, 8, 8, 4, 2], dtype=int32)
```

```
In [44]: n=np.random.randint(10,40,(8,10))    #8 is rows and 10 is column size=8*10 matrix
```

```
In [45]: n
```

```
Out[45]: array([[27, 36, 27, 34, 37, 35, 27, 18, 28, 28],
               [28, 29, 29, 38, 36, 39, 38, 14, 19, 37],
               [29, 34, 33, 11, 32, 22, 13, 10, 32, 27],
               [35, 12, 38, 16, 14, 29, 27, 20, 14, 11],
               [27, 12, 34, 35, 29, 31, 28, 16, 23, 38],
               [15, 19, 27, 24, 22, 39, 15, 33, 38, 39],
               [19, 22, 33, 21, 33, 29, 39, 38, 15, 20],
               [28, 37, 31, 32, 24, 18, 26, 32, 38, 26]], dtype=int32)
```

```
In [46]: #index in matrix
         n[0]
```

```
Out[46]: array([27, 36, 27, 34, 37, 35, 27, 18, 28, 28], dtype=int32)
```

```
In [49]: n[5]
```

```
Out[49]: array([15, 19, 27, 24, 22, 39, 15, 33, 38, 39], dtype=int32)
```

```
In [50]: n
```

```
Out[50]: array([[27, 36, 27, 34, 37, 35, 27, 18, 28, 28],
                [28, 29, 29, 38, 36, 39, 38, 14, 19, 37],
                [29, 34, 33, 11, 32, 22, 13, 10, 32, 27],
                [35, 12, 38, 16, 14, 29, 27, 20, 14, 11],
                [27, 12, 34, 35, 29, 31, 28, 16, 23, 38],
                [15, 19, 27, 24, 22, 39, 15, 33, 38, 39],
                [19, 22, 33, 21, 33, 29, 39, 38, 15, 20],
                [28, 37, 31, 32, 24, 18, 26, 32, 38, 26]], dtype=int32)
```

```
In [51]: #slicing in matrix
n[0:6]
```

```
Out[51]: array([[27, 36, 27, 34, 37, 35, 27, 18, 28, 28],
                [28, 29, 29, 38, 36, 39, 38, 14, 19, 37],
                [29, 34, 33, 11, 32, 22, 13, 10, 32, 27],
                [35, 12, 38, 16, 14, 29, 27, 20, 14, 11],
                [27, 12, 34, 35, 29, 31, 28, 16, 23, 38],
                [15, 19, 27, 24, 22, 39, 15, 33, 38, 39]], dtype=int32)
```

```
In [52]: n[::-1]
```

```
Out[52]: array([[28, 37, 31, 32, 24, 18, 26, 32, 38, 26],
                [19, 22, 33, 21, 33, 29, 39, 38, 15, 20],
                [15, 19, 27, 24, 22, 39, 15, 33, 38, 39],
                [27, 12, 34, 35, 29, 31, 28, 16, 23, 38],
                [35, 12, 38, 16, 14, 29, 27, 20, 14, 11],
                [29, 34, 33, 11, 32, 22, 13, 10, 32, 27],
                [28, 29, 29, 38, 36, 39, 38, 14, 19, 37],
                [27, 36, 27, 34, 37, 35, 27, 18, 28, 28]], dtype=int32)
```

```
In [53]: n
```

```
Out[53]: array([[27, 36, 27, 34, 37, 35, 27, 18, 28, 28],
                [28, 29, 29, 38, 36, 39, 38, 14, 19, 37],
                [29, 34, 33, 11, 32, 22, 13, 10, 32, 27],
                [35, 12, 38, 16, 14, 29, 27, 20, 14, 11],
                [27, 12, 34, 35, 29, 31, 28, 16, 23, 38],
                [15, 19, 27, 24, 22, 39, 15, 33, 38, 39],
                [19, 22, 33, 21, 33, 29, 39, 38, 15, 20],
                [28, 37, 31, 32, 24, 18, 26, 32, 38, 26]], dtype=int32)
```

```
In [54]: n[:,1]
```

```
Out[54]: array([[36, 29, 34, 12, 12, 19, 22, 37, 31],
                [29, 29, 33, 12, 12, 22, 22, 38, 31],
                [34, 33, 11, 32, 11, 22, 33, 32, 32],
                [12, 38, 16, 14, 14, 29, 39, 26, 18],
                [12, 34, 35, 29, 31, 28, 16, 23, 38],
                [19, 27, 24, 22, 39, 15, 33, 38, 39],
                [22, 33, 21, 33, 29, 39, 38, 15, 20],
                [37, 31, 32, 24, 18, 26, 32, 38, 26]], dtype=int32)
```

```
In [55]: n[::2] #it will not print every second row or step 2
```

```
Out[55]: array([[27, 36, 27, 34, 37, 35, 27, 18, 28, 28],
               [29, 34, 33, 11, 32, 22, 13, 10, 32, 27],
               [27, 12, 34, 35, 29, 31, 28, 16, 23, 38],
               [19, 22, 33, 21, 33, 29, 39, 38, 15, 20]], dtype=int32)
```

```
In [56]: n
```

```
Out[56]: array([[27, 36, 27, 34, 37, 35, 27, 18, 28, 28],
               [28, 29, 29, 38, 36, 39, 38, 14, 19, 37],
               [29, 34, 33, 11, 32, 22, 13, 10, 32, 27],
               [35, 12, 38, 16, 14, 29, 27, 20, 14, 11],
               [27, 12, 34, 35, 29, 31, 28, 16, 23, 38],
               [15, 19, 27, 24, 22, 39, 15, 33, 38, 39],
               [19, 22, 33, 21, 33, 29, 39, 38, 15, 20],
               [28, 37, 31, 32, 24, 18, 26, 32, 38, 26]], dtype=int32)
```

```
In [57]: n[0]
```

```
Out[57]: array([27, 36, 27, 34, 37, 35, 27, 18, 28, 28], dtype=int32)
```

```
In [59]: n[0:5]
```

```
Out[59]: array([[27, 36, 27, 34, 37, 35, 27, 18, 28, 28],
               [28, 29, 29, 38, 36, 39, 38, 14, 19, 37],
               [29, 34, 33, 11, 32, 22, 13, 10, 32, 27],
               [35, 12, 38, 16, 14, 29, 27, 20, 14, 11],
               [27, 12, 34, 35, 29, 31, 28, 16, 23, 38]], dtype=int32)
```

```
In [67]: # comma it will print specific position
```

```
a=n[0,5]
print(a)
```

35

```
In [61]: n[5,-3]
```

```
Out[61]: np.int32(33)
```

```
In [62]: #reshape
```

```
np.arange(1,13).reshape(3,4) #create a array with 3 rows and 4 column
```

```
Out[62]: array([[ 1,  2,  3,  4],
               [ 5,  6,  7,  8],
               [ 9, 10, 11, 12]])
```

```
In [63]: np.arange(1,13).reshape(5,5)
```

```
-----
ValueError                                Traceback (most recent call last)
Cell In[63], line 1
----> 1 np.arange(1,13).reshape(5,5)

ValueError: cannot reshape array of size 12 into shape (5,5)
```

```
In [64]: np.arange(1,13).reshape(4,3)
```

```
Out[64]: array([[ 1,  2,  3],  
               [ 4,  5,  6],  
               [ 7,  8,  9],  
               [10, 11, 12]])
```

```
In [65]: np.arange(1,13).reshape(6,2)
```

```
Out[65]: array([[ 1,  2],  
               [ 3,  4],  
               [ 5,  6],  
               [ 7,  8],  
               [ 9, 10],  
               [11, 12]])
```

```
In [ ]:
```