

# NUMPY

```
In [13]: import numpy as np
```

```
In [15]: np.__version__
```

```
Out[15]: '1.26.4'
```

```
In [17]: import sys  
sys.version
```

```
Out[17]: '3.12.7 | packaged by Anaconda, Inc. | (main, Oct 4 2024, 13:17:27) [MSC v.192  
9 64 bit (AMD64)]'
```

```
In [19]: my_list = [0,1,2,3,4,5]  
my_list
```

```
Out[19]: [0, 1, 2, 3, 4, 5]
```

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

```
Out[21]: list
```

```
In [23]: arr = np.array(my_list)
```

```
In [25]: type(arr)
```

```
Out[25]: numpy.ndarray
```

```
In [27]: np.arange(15)
```

```
Out[27]: array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14])
```

```
In [29]: my_list
```

```
Out[29]: [0, 1, 2, 3, 4, 5]
```

12/03/2025

```
In [32]: np.arange(10)
```

```
Out[32]: array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])
```

```
In [34]: np.arange(3.0)
```

```
Out[34]: array([0., 1., 2.])
```

```
In [36]: np.array(0, 5)
```

```
-----
TypeError                                Traceback (most recent call last)
Cell In[36], line 1
----> 1 np.array(0, 5)

TypeError: Cannot interpret '5' as a data type
```

```
In [38]: np.arange(10, 20)
```

```
Out[38]: array([10, 11, 12, 13, 14, 15, 16, 17, 18, 19])
```

```
In [40]: np.arange(20,10) #1st arg must be < 2nd arg
```

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

```
In [42]: np.arange(-20, 10)
```

```
Out[42]: 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 [44]: np.arange()
```

```
-----
TypeError                                Traceback (most recent call last)
Cell In[44], line 1
----> 1 np.arange()

TypeError: arange() requires stop to be specified.
```

```
In [46]: np.arange(10,30,5) # start with 10 and from 30 and step 5
```

```
Out[46]: array([10, 15, 20, 25])
```

```
In [48]: np.arange(10,30,5,8)
```

```
-----
TypeError                                Traceback (most recent call last)
Cell In[48], line 1
----> 1 np.arange(10,30,5,8)

TypeError: Cannot interpret '8' as a data type
```

```
In [50]: np.zeros(3)
```

```
Out[50]: array([0., 0., 0.])
```

```
In [52]: np.zeros(10)
```

```
Out[52]: array([0., 0., 0., 0., 0., 0., 0., 0., 0., 0.])
```

```
In [54]: np.zeros(2, dtype=int)
```

```
Out[54]: array([0, 0])
```

```
In [56]: np.zeros = np.zeros([2,2])
```

```
In [58]: np.zeros((2,10))
```

```
-----
TypeError                                Traceback (most recent call last)
Cell In[58], line 1
----> 1 np.zeros((2,10))

TypeError: 'numpy.ndarray' object is not callable
```

In [60]: `np.zeros((5,10))`

```
-----
TypeError                                Traceback (most recent call last)
Cell In[60], line 1
----> 1 np.zeros((5,10))

TypeError: 'numpy.ndarray' object is not callable
```

In [62]: `np.zeros(10)`

```
-----
TypeError                                Traceback (most recent call last)
Cell In[62], line 1
----> 1 np.zeros(10)

TypeError: 'numpy.ndarray' object is not callable
```

In [64]: `np.zeros(10,30)`

```
-----
TypeError                                Traceback (most recent call last)
Cell In[64], line 1
----> 1 np.zeros(10,30)

TypeError: 'numpy.ndarray' object is not callable
```

In [66]: `np.ones(3)`

Out[66]: `array([1., 1., 1.])`

In [68]: `np.ones(4,5)`

```
-----
TypeError                                Traceback (most recent call last)
Cell In[68], line 1
----> 1 np.ones(4,5)

File ~\anaconda3\Lib\site-packages\numpy\core\numeric.py:191, in ones(shape, dtype, order, like)
    188 if like is not None:
    189     return _ones_with_like(like, shape, dtype=dtype, order=order)
--> 191 a = empty(shape, dtype, order)
    192 multiarray.copyto(a, 1, casting='unsafe')
    193 return a

TypeError: Cannot interpret '5' as a data type
```

In [70]: `np.ones((5,4),dtype=int)`

```
Out[70]: array([[1, 1, 1, 1],
               [1, 1, 1, 1],
               [1, 1, 1, 1],
               [1, 1, 1, 1],
               [1, 1, 1, 1]])
```

```
In [72]: rand(3,2)
```

```
-----
NameError                                Traceback (most recent call last)
Cell In[72], line 1
----> 1 rand(3,2)

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

```
In [74]: rand(3,2)
         random.rand(3,2)
```

```
-----
NameError                                Traceback (most recent call last)
Cell In[74], line 1
----> 1 rand(3,2)
      2 random.rand(3,2)

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

```
In [76]: np.random.rand(5)
```

```
Out[76]: array([0.8710753 , 0.95613288, 0.84597501, 0.75849031, 0.93401809])
```

```
In [78]: np.random.rand(4)
```

```
Out[78]: array([0.05684515, 0.79911483, 0.07604393, 0.97720399])
```

```
In [80]: np.random.rand(3,5)
```

```
Out[80]: array([[0.60140209, 0.55542108, 0.10768882, 0.79352356, 0.99739242],
               [0.49877315, 0.8410526 , 0.85333337, 0.17917259, 0.7687913 ],
               [0.08309581, 0.94689578, 0.15993067, 0.94643477, 0.97487311]])
```

```
In [82]: np.random.randint(2,4)
```

```
Out[82]: 2
```

13/03/2025

```
In [85]: np.random.randint(10,40,(10,10))
```

```
Out[85]: array([[11, 18, 34, 35, 20, 26, 10, 10, 15, 23],
               [23, 14, 17, 33, 13, 33, 23, 39, 24, 18],
               [23, 10, 22, 35, 37, 37, 15, 24, 19, 12],
               [17, 11, 27, 34, 10, 22, 34, 28, 20, 33],
               [18, 21, 23, 21, 35, 16, 29, 30, 25, 29],
               [15, 15, 12, 26, 36, 15, 17, 28, 34, 23],
               [16, 13, 12, 34, 11, 31, 18, 37, 38, 35],
               [32, 19, 19, 25, 22, 32, 33, 15, 30, 35],
               [22, 31, 32, 27, 29, 13, 24, 22, 19, 10],
               [34, 39, 28, 17, 12, 31, 36, 39, 37, 15]])
```

```
In [87]: np.arange(1,13)
```

```
Out[87]: array([ 1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12])
```

```
In [89]: np.arange(1,13).reshape(3,4)
```

```
Out[89]: array([[ 1,  2,  3,  4],
                [ 5,  6,  7,  8],
                [ 9, 10, 11, 12]])
```

```
In [91]: np.arange(1,13).reshape(4,3)
```

```
Out[91]: array([[ 1,  2,  3],
                [ 4,  5,  6],
                [ 7,  8,  9],
                [10, 11, 12]])
```

slicing in matrix

```
In [100... b = np.random.randint(10,20,(5,4))
```

```
In [102... b = np.random.randint(10,20,(5,4))
```

```
In [104... np.random.randint(10,20,(5,4))
```

```
Out[104... array([[18, 18, 10, 10],
                [16, 10, 12, 19],
                [11, 18, 16, 14],
                [10, 13, 17, 15],
                [12, 18, 16, 17]])
```

```
In [106... b = np.random.randint(10,20,(5,4))
```

```
In [108... b [:]
```

```
Out[108... array([[12, 10, 17, 12],
                [18, 12, 18, 15],
                [13, 12, 13, 12],
                [17, 19, 17, 18],
                [18, 14, 14, 17]])
```

```
In [110... b[1:3] #it will print entire row
```

```
Out[110... array([[18, 12, 18, 15],
                [13, 12, 13, 12]])
```

```
In [112... b[1,2] # it will print the specific element
```

```
Out[112... 18
```

```
In [114... b
```

```
Out[114... array([[12, 10, 17, 12],
                [18, 12, 18, 15],
                [13, 12, 13, 12],
                [17, 19, 17, 18],
                [18, 14, 14, 17]])
```

In [116... `b[1,2]`

Out[116... 18

In [120... `b[1,-1]` *#backward slicing from the right side*

Out[120... 15

In [122... `b[2:3]`

Out[122... `array([[13, 12, 13, 12]])`

In [124... `b[0:-2]` *#-2-1=3 print the first 3 rows*

Out[124... `array([[12, 10, 17, 12],  
[18, 12, 18, 15],  
[13, 12, 13, 12]])`

In [126... `b[-4:2]`

Out[126... `array([[18, 12, 18, 15]])`

In [128... `b`

Out[128... `array([[12, 10, 17, 12],  
[18, 12, 18, 15],  
[13, 12, 13, 12],  
[17, 19, 17, 18],  
[18, 14, 14, 17]])`

In [130... `b[-4:2]`

Out[130... `array([[18, 12, 18, 15]])`

## operations

In [143... `np.random.randint(1,10(10,10))`

```
<>:1: SyntaxWarning: 'int' object is not callable; perhaps you missed a comma?
<>:1: SyntaxWarning: 'int' object is not callable; perhaps you missed a comma?
C:\Users\mujahed\AppData\Local\Temp\ipykernel_8976\1940598122.py:1: SyntaxWarnin
g: 'int' object is not callable; perhaps you missed a comma?
np.random.randint(1,10(10,10))
```

```
-----
TypeError                                Traceback (most recent call last)
Cell In[143], line 1
----> 1 np.random.randint(1,10(10,10))
```

```
TypeError: 'int' object is not callable
```

In [139... `np.random.randint(10,100,(10,10))`

```
Out[139... array([[87, 53, 39, 62, 12, 70, 89, 74, 55, 37],  
          [55, 36, 34, 36, 93, 10, 66, 71, 38, 38],  
          [21, 92, 99, 77, 81, 48, 80, 87, 23, 21],  
          [68, 69, 55, 65, 49, 37, 42, 87, 21, 65],  
          [67, 25, 11, 47, 87, 67, 87, 88, 12, 97],  
          [42, 16, 12, 30, 54, 76, 55, 41, 75, 56],  
          [27, 59, 84, 36, 56, 28, 46, 16, 58, 50],  
          [13, 11, 11, 70, 84, 25, 65, 69, 69, 62],  
          [22, 14, 28, 44, 86, 76, 78, 59, 58, 67],  
          [75, 38, 35, 59, 49, 35, 62, 96, 85, 54]])
```

In [ ]:

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In [ ]:

In [ ]: