numpy crash course

In [12]:
```
import numpy as np
```

In [13]:
```
np.__version__
```

Out[13]:
```
'1.26.4'
```

In [14]:
```
import sys
sys.version
```

Out[14]:
```
'3.12.7 | packaged by Anaconda, Inc. | (main, Oct  4 2024, 13:17:27) [MSC v.1929 6
4 bit (AMD64)]'
```

Creating arrays

In [15]:
```
my_list=[0,1,2,3,4,5]
my_list
```

Out[15]:
```
[0, 1, 2, 3, 4, 5]
```

In [16]:
```
type(my_list)
```

Out[16]:
```
list
```

In [17]:
```
arr=np.array(my_list)
```

array

In [18]:
```
type(arr)
```

Out[18]:
```
numpy.ndarray
```

In [19]:
```
type(my_list)
```

Out[19]:
```
list
```

In [20]:
```
np.
```

```
  Cell In[20], line 1
    np.
       ^
SyntaxError: invalid syntax
```

In [21]:
```
np.arange(15)
```

Out[21]:
```
array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14])
```

In [22]:
```
 np.arange(3.0)
```

Out[22]:
```
array([0., 1., 2.])
```

In [23]:
```
np.arange(10)
```

Out[23]:
```
array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])
```

In [24]:
```
np.arange(0,5)
```

Out[24]:
```
array([0, 1, 2, 3, 4])
```

In [25]:
```
np.arange(10,20)
```

Out[25]:
```
array([10, 11, 12, 13, 14, 15, 16, 17, 18, 19])
```

In [26]:
```
np.arange(20,10)
```

Out[26]:
```
array([], dtype=int32)
```

In [27]:
```
np.arange(-20,10)
```

Out[27]:
```
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 [28]:
```
np.arange(30,20)
```

Out[28]:
```
array([], dtype=int32)
```

In [29]:
```
np.arange(-30,20)
```

Out[29]:
```
array([-30, -29, -28, -27, -26, -25, -24, -23, -22, -21, -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,  10,  11,  12,  13,  14,  15,  16,  17,  18,  19])
```

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

Out[30]:
```
array([], dtype=int32)
```

In [31]:
```
np.arange()
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
Cell In[31], line 1
----> 1 np.arange()

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

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

In [ ]:
```
np.arange(0,10,3)
```

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

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

In [ ]:
```
np.zeros(3,dtype=int)
```

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

In [ ]:
```
zero=np.zeros([2,2])
print(zero)
prinnt(type(zero))
```

In [ ]:
```
zero=np.zeros([2,2])
print(zero)
print(type(zero))
```

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

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

In [ ]:
```
np.zeros((8,8))
```

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

In [ ]:
```
n=(6,7)
n1=(6,8)
print(np.zeros(n1))
```

In [ ]:
```
print(np.zeros(n,dtype=int))
```

In [32]:
```
n
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[32], line 1
----> 1 n

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

In [33]:
```
n1
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[33], line 1
----> 1 n1

NameError: name 'n1' is not defined
```

In [34]:
```
np.ones(3)
```

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

In [35]:
```
np.ones(4,dtype=int)
```

Out[35]:
```
array([1, 1, 1, 1])
```

In [36]:
```
n
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[36], line 1
----> 1 n

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

In [37]:
```
np.ones(n)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[37], line 1
----> 1 np.ones(n)

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

In [38]:
```
np.ones((5,4),dtype=int)
```

Out[38]:
```
array([[1, 1, 1, 1],
       [1, 1, 1, 1],
       [1, 1, 1, 1],
       [1, 1, 1, 1],
       [1, 1, 1, 1]])
```

In [39]:
```
np.twos(2,3)
```

```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
Cell In[39], line 1
----> 1 np.twos(2,3)

File ~\anaconda3\Lib\site-packages\numpy\__init__.py:333, in __getattr__(attr)
    330     "Removed in NumPy 1.25.0"
    331     raise RuntimeError("Tester was removed in NumPy 1.25.")
--> 333 raise AttributeError("module {!r} has no attribute "
    334                      "{!r}".format(__name__, attr))

AttributeError: module 'numpy' has no attribute 'twos'
```

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

In [40]:
```
np.ones(2)
```

Out[40]:
```
array([1., 1.])
```

In [41]:
```
np.ones((2,4))
```

Out[41]:
```
array([[1., 1., 1., 1.],
       [1., 1., 1., 1.]])
```

In [42]:
```
np.ones((6,20),dtype=int)
```

Out[42]:
```
array([[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, 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, 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, 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, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]])
```

In [43]:
```
range(5)
```

Out[43]:
```
range(0, 5)
```

In [44]:
```
r = range(5)
r
```

Out[44]:
```
range(0, 5)
```

In [45]:
```
for i in r:
    print(i)
```

```
0
1
2
3
4
```

In [46]:
```
list(range(5))
```

Out[46]:
```
[0, 1, 2, 3, 4]
```

In [47]:
```
range(1,10)
```

Out[47]:
```
range(1, 10)
```

In [48]:
```
list(range(0,10,3))
```

Out[48]:
```
[0, 3, 6, 9]
```

In [49]:
```
y=list(range(12))
y
```

Out[49]:
```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

In [50]:
```
rand(3,4)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[50], line 1
----> 1 rand(3,4)

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

In [51]:
```
rand(3,4)
random.rand(3,4)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[51], line 1
----> 1 rand(3,4)
      2 random.rand(3,4)

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

In [52]:
```
np.random.rand(2,5)
```

Out[52]:
```
array([[0.1153217 , 0.10482278, 0.99953319, 0.59622701, 0.56639522],
       [0.46107212, 0.44300307, 0.56031279, 0.77500477, 0.57842859]])
```

In [53]:
```
np.random.rand(2,4)
```

Out[53]:
```
array([[0.01556622, 0.79246694, 0.57157737, 0.81371797],
       [0.31407615, 0.85827374, 0.92812891, 0.26390266]])
```

In [54]:
```
np.random.randint(2,5)
```

Out[54]:
```
3
```

In [55]:
```
np.random.randint(0,1)
```

Out[55]:
```
0
```

In [56]:
```
np.random.randint(10,20,5)
```

Out[56]:
```
array([19, 15, 19, 11, 12])
```

In [57]:
```
np.random.randint(1,6,4)
```

Out[57]:
```
array([5, 4, 5, 1])
```

In [58]:
```
np.random.randint(9)
```

Out[58]:
```
7
```

In [59]:
```
np.random.randint(30,20,10)
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Cell In[59], line 1
----> 1 np.random.randint(30,20,10)

File numpy\\random\\mtrand.pyx:780, in numpy.random.mtrand.RandomState.randint()

File numpy\\random\\_bounded_integers.pyx:1425, in numpy.random._bounded_integers._r
and_int32()

ValueError: low >= high
```

In [60]:
```
np.random.randint(5,9)
```

Out[60]: 7

In [61]:
```
np.random.randint(10,80,(10,15))
```

Out[61]:
```
array([[67, 30, 58, 65, 36, 36, 41, 65, 44, 42, 24, 34, 20, 78, 46],
       [57, 70, 57, 27, 47, 34, 78, 59, 41, 27, 74, 29, 73, 74, 74],
       [61, 20, 20, 63, 69, 33, 12, 79, 32, 39, 40, 48, 66, 36, 66],
       [21, 55, 23, 19, 25, 26, 40, 62, 70, 13, 45, 48, 46, 12, 48],
       [20, 79, 14, 27, 18, 73, 30, 62, 31, 66, 20, 77, 50, 11, 74],
       [67, 50, 40, 29, 39, 26, 15, 34, 59, 65, 75, 49, 12, 51, 54],
       [44, 56, 11, 19, 19, 42, 76, 51, 33, 27, 20, 28, 65, 66, 69],
       [66, 52, 79, 14, 42, 16, 11, 39, 26, 74, 60, 65, 17, 34, 21],
       [36, 79, 71, 17, 65, 40, 71, 32, 56, 24, 72, 43, 32, 43, 50],
       [44, 14, 18, 10, 57, 50, 73, 11, 64, 19, 28, 55, 53, 42, 62]])
```

In [62]:
```
np.arange(1,10).reshape(3,3)
```

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

In [63]:
```
np.arange(1,13).reshape(12,1)
```

Out[63]:
```
array([[ 1],
       [ 2],
       [ 3],
       [ 4],
       [ 5],
       [ 6],
       [ 7],
       [ 8],
       [ 9],
       [10],
       [11],
       [12]])
```

In [64]:
```
b=np.random.randint(10,20,(5,4))
b
```

Out[64]:
```
array([[16, 17, 10, 13],
       [14, 19, 11, 14],
       [18, 19, 14, 12],
       [18, 12, 17, 17],
       [12, 17, 14, 10]])
```

In [113…
```
arr
```

Out[113…
```
array([0, 1, 2, 3, 4, 5])
```

In [114…
```
arr.reshape(3,2)
```

Out[114…
```
array([[0, 1],
       [2, 3],
       [4, 5]])
```

In [ ]: