numpy crash course

In [2]:
```
import numpy as np
```

In [4]:
```
np.__version__
```

Out[4]:
```
'1.26.4'
```

In [6]:
```
import sys
sys.version
```

Out[6]:
```
'3.12.4 | packaged by Anaconda, Inc. | (main, Jun 18 2024, 15:03:56) [MSC v.192
9 64 bit (AMD64)]'
```

creating arrays

In [8]:
```
my_list = [0,1,2,3,4,5]
my_list
```

Out[8]:
```
[0, 1, 2, 3, 4, 5]
```

In [11]:
```
type(my_list)
```

Out[11]:
```
list
```

In [13]:
```
arr = np.array(my_list)
```

In [15]:
```
arr
```

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

In [17]:
```
type(arr)
```

Out[17]:
```
numpy.ndarray
```

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

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

In [23]:
```
np.arange(3.0)
```

Out[23]:
```
array([0., 1., 2.])
```

In [25]:
```
np.arange(0,5)
```

Out[25]:
```
array([0, 1, 2, 3, 4])
```

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

Out[27]:
```
array([10, 11, 12, 13, 14, 15, 16, 17, 18, 19])
```

In [29]:
```
np.arange(20,10)
```

Out[29]:
```
array([], dtype=int32)
```

In [31]:
```
np.arange(-20,10)
```

Out[31]:
```
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 [33]:
```
np.arange(-16,10)
```

Out[33]:
```
array([-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 [35]:
```
np.arange(-20,-10)
```

Out[35]:
```
array([-20, -19, -18, -17, -16, -15, -14, -13, -12, -11])
```

In [37]:
```
ar = np.arange(-30,20)
ar
```

Out[37]:
```
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 [39]:
```
np.arange(10,10)
```

Out[39]:
```
array([], dtype=int32)
```

In [41]:
```
np.arange()
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
Cell In[41], line 1
----> 1 np.arange()

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

In [43]:
```
np.arange(10,30,5)
```

Out[43]:
```
array([10, 15, 20, 25])
```

In [45]:
```
np.arange(0,10,3)
```

Out[45]:
```
array([0, 3, 6, 9])
```

In [49]:
```
np.zeros(6)
```

Out[49]:
```
array([0., 0., 0., 0., 0., 0.])
```

In [51]:
```
np.zeros(3) #parameter tunning
```

Out[51]:
```
array([0., 0., 0.])
```

In [53]:
```
np.zeros(5, dtype=int) #hyperparameter tunning
```

Out[53]:
```
array([0, 0, 0, 0, 0])
```

In [55]:
```
np.zeros((2,2), dtype=int)
```

Out[55]:
```
array([[0, 0],
       [0, 0]])
```

In [63]:
```
zeros = np.zeros([2,2])
print(zeros)
print('####')
print(type(zeros))
```

```
[[0. 0.]
 [0. 0.]]
####
<class 'numpy.ndarray'>
```

In [65]:
```
np.ones(3)
```

Out[65]:
```
array([1., 1., 1.])
```

In [67]:
```
np.twos((2,3))
```

```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
Cell In[67], line 1
----> 1 np.twos((2,3))

File ~\kkk\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 [69]:
```
range(5)
```

Out[69]:
```
range(0, 5)
```

In [71]:
```
r = range(5)
r
```

Out[71]:
```
range(0, 5)
```

In [75]:
```
for i in r:
    print (i)
```

```
0
1
2
3
4
```

In [77]:
```
list(range(5))
```

Out[77]:
```
[0, 1, 2, 3, 4]
```

In [81]:
```
list(range(1,10))
```

Out[81]: [1, 2, 3, 4, 5, 6, 7, 8, 9]

In [83]:
```
list(range(1,10,3))
```

Out[83]: [1, 4, 7]

In [85]:
```
rand(3,2)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[85], line 1
----> 1 rand(3,2)

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

In [87]:
```
rand(3,2)
random.rand(3,2)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[87], line 1
----> 1 rand(3,2)
      2 random.rand(3,2)

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

In [95]:
```
np.random.rand(5)
```

Out[95]: array([0.32675094, 0.69206495, 0.464707 , 0.83593439, 0.67195793])

In [99]:
```
np.rand(4)
```

```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
Cell In[99], line 1
----> 1 np.rand(4)

File ~\kkk\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 'rand'
```

In [105…
```
np.random.rand(2,4)
```

Out[105…
```
array([[0.50101502, 0.56983949, 0.91370597, 0.58593096],
       [0.39297738, 0.69563924, 0.82176486, 0.9544772 ]])
```

In [114…
```
np.random.randint(2,4)
```

Out[114… 3

In [122…
```
np.random.randint(2,20)
```

Out[122… 13

In [128…
```
np.random.randint(0,1)
```

Out[128…
```
0
```

In [136…
```
np.random.randint(10,20,3)
```

Out[136…
```
array([18, 16, 14])
```

In [138…
```
np.random.randint(1,6,4)
```

Out[138…
```
array([2, 5, 1, 1])
```

In [142…
```
np.random.randint(10,40,(10,10))
```

Out[142…
```
array([[13, 31, 27, 37, 19, 37, 17, 13, 10, 28],
       [38, 21, 11, 22, 28, 17, 18, 14, 30, 10],
       [30, 21, 22, 20, 13, 11, 30, 14, 28, 29],
       [34, 17, 11, 32, 33, 34, 25, 35, 22, 16],
       [31, 18, 18, 10, 39, 18, 24, 14, 27, 29],
       [24, 35, 10, 13, 26, 35, 23, 12, 15, 25],
       [32, 37, 38, 28, 23, 24, 30, 19, 20, 12],
       [14, 36, 23, 21, 24, 24, 36, 35, 19, 10],
       [25, 24, 25, 18, 31, 34, 27, 37, 29, 34],
       [19, 26, 10, 30, 33, 32, 13, 27, 29, 18]])
```

In [144…
```
b = np.random.randint(10,20,(5,4))
```

In [146…
```
b
```

Out[146…
```
array([[12, 11, 15, 19],
       [15, 18, 17, 11],
       [17, 10, 12, 16],
       [11, 10, 19, 14],
       [12, 14, 14, 14]])
```

In [148…
```
type(b)
```

Out[148…
```
numpy.ndarray
```

In [150…
```
b[:]
```

Out[150…
```
array([[12, 11, 15, 19],
       [15, 18, 17, 11],
       [17, 10, 12, 16],
       [11, 10, 19, 14],
       [12, 14, 14, 14]])
```

In [152…
```
b[1:3]
```

Out[152…
```
array([[15, 18, 17, 11],
       [17, 10, 12, 16]])
```

In [154…
```
b[1,2]
```

Out[154…
```
17
```

In [156…
```
b[1,3]
```

Out[156… 11

In [158…
```
b[2:3]
```

Out[158… array([[17, 10, 12, 16]])

In [160…
```
b[0:-2]
```

Out[160…
```
array([[12, 11, 15, 19],
       [15, 18, 17, 11],
       [17, 10, 12, 16]])
```

In [162…
```
b
```

Out[162…
```
array([[12, 11, 15, 19],
       [15, 18, 17, 11],
       [17, 10, 12, 16],
       [11, 10, 19, 14],
       [12, 14, 14, 14]])
```

In [164…
```
b[0,2]
```

Out[164… 15

In [166…
```
b
```

Out[166…
```
array([[12, 11, 15, 19],
       [15, 18, 17, 11],
       [17, 10, 12, 16],
       [11, 10, 19, 14],
       [12, 14, 14, 14]])
```

In [ ]: