In [ ]:
```
numpy --> numerical + python

scipy --->

numpy --> numpy is basically use for multidimensional arrays and metrics


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release 1.0 version in 2006.
```

In [2]:
```
"1" + "1"
```

Out[2]: '11'

In [3]:
```
!pip install numpy
```

```
Requirement already satisfied: numpy in c:\users\jitud\appdata\local\programs\pyt
hon\python313\lib\site-packages (2.2.6)
[notice] A new release of pip is available: 25.1.1 -> 25.2
[notice] To update, run: python.exe -m pip install --upgrade pip
```

In [4]:
```
import numpy as np
```

In [5]:
```
np.__version__
```

Out[5]: '2.2.6'

1 dimension

In [9]:
```
# convert list to array


my_list = [20,30,40,50]
print(my_list)
myarray = np.array(my_list)
myarray
```

```
[20, 30, 40, 50]
```

Out[9]: array([20, 30, 40, 50])

In [10]:
```
type(my_list)
```

Out[10]: list

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

Out[11]: numpy.ndarray

In [12]:
```
np.array(range(1,6))
```

Out[12]: array([1, 2, 3, 4, 5])

2 dimension(2d)

In [13]:
```
d2 = np.array([[1,2],[3,4]])
d2
```

Out[13]:
```
array([[1, 2],
       [3, 4]])
```

In [14]:
```
d2.shape
```

Out[14]:
```
(2, 2)
```

In [15]:
```
type(d2)
```

Out[15]:
```
numpy.ndarray
```

In [16]:
```
d2.ndim # to know the dimension
```

Out[16]:
```
2
```

In [17]:
```
d2.nbytes
```

Out[17]:
```
32
```

In [18]:
```
d2.size
```

Out[18]:
```
4
```

In [19]:
```
d3 = np.array([[True, False],[False, True]])
d3
```

Out[19]:
```
array([[ True, False],
       [False,  True]])
```

In [20]:
```
d3.shape
```

Out[20]:
```
(2, 2)
```

3D

In [34]:
```
d3 = np.array([[[1,2],[3,4],[4,5]]])
d3
```

Out[34]:
```
array([[[1, 2],
        [3, 4],
        [4, 5]]])
```

In [35]:
```
d3.ndim
```

Out[35]:
```
3
```

In [36]:
```
d3.shape
```

Out[36]: (1, 3, 2)

Array with random number

In [ ]:
```
# rand() --> generate a new number
```

In [40]:
```
np.random.rand()
```

Out[40]: 0.13152334757433426

In [44]:
```
np.random.rand(3)
```

Out[44]: array([0.37674613, 0.63755376, 0.31668569])

In [46]:
```
np.random.rand(2,2)
```

Out[46]:
```
array([[0.00324818, 0.01584879],
       [0.97827107, 0.86280402]])
```

In [48]:
```
# randint

np.random.randint(2,100)
```

Out[48]: 21

In [60]:
```
x = np.random.randint(2,10000,5)
```

In [61]:
```
x
```

Out[61]: array([8509, 9877, 5212, 4029, 3163], dtype=int32)

In [62]:
```
x.max()
```

Out[62]: np.int32(9877)

In [63]:
```
x.min()
```

Out[63]: np.int32(3163)

In [65]:
```
x.argmax()
```

Out[65]: np.int64(1)

In [ ]:
```

```