```
import numpy as np
```

```
lst=[1,2,3,4,5,7,9]
print(lst)
print(type(lst))
print(len(lst))
```

```
[1, 2, 3, 4, 5, 7, 9]
<class 'list'>
7
```

```
x=np.random.randint(0,20,(4,4))
y=np.random.randint(0,20,4)
```

```
print(x)
print(y)
```

```
[[ 8  1  5  2]
 [ 2 14 14 18]
 [18  1 11 19]
 [ 9  8 10  9]]
[ 9 19 12  8]
```

```
x+y
```

```
array([[17, 20, 17, 10],
       [11, 33, 26, 26],
       [27, 20, 23, 27],
       [18, 27, 22, 17]])
```

```
x=np.random.randint(40,100,(100,10))
x
```

```
array([[86, 75, 74, 94, 55, 91, 92, 59, 90, 66],
       [68, 49, 55, 55, 59, 78, 94, 79, 91, 89],
       [82, 71, 80, 97, 87, 67, 90, 76, 56, 56],
       [48, 80, 43, 41, 84, 59, 84, 90, 52, 69],
       [72, 52, 55, 76, 76, 66, 56, 64, 58, 43],
       [92, 79, 66, 58, 69, 50, 78, 65, 93, 66],
       [83, 49, 69, 63, 78, 74, 64, 58, 94, 43],
       [49, 55, 65, 72, 57, 55, 95, 74, 70, 87],
       [74, 90, 85, 72, 97, 99, 44, 68, 40, 51],
       [58, 96, 65, 56, 83, 95, 71, 45, 98, 43],
       [48, 95, 70, 78, 56, 85, 85, 68, 94, 75],
       [92, 95, 81, 71, 82, 80, 44, 42, 77, 76],
       [91, 48, 87, 59, 64, 40, 99, 82, 66, 98],
       [71, 43, 86, 61, 46, 82, 79, 94, 75, 87],
       [72, 97, 67, 83, 95, 64, 98, 44, 52, 88],
       [62, 65, 48, 62, 57, 71, 56, 75, 82, 49],
       [80, 80, 82, 76, 73, 45, 51, 58, 91, 84],
       [56, 93, 79, 77, 90, 91, 81, 82, 70, 56],
       [55, 60, 60, 88, 48, 93, 68, 97, 71, 79],
       [55, 67, 69, 65, 77, 80, 85, 68, 98, 63],
       [47, 98, 88, 66, 80, 78, 63, 69, 53, 47],
       [66, 92, 96, 45, 87, 62, 53, 87, 82, 51],
       [75, 86, 66, 75, 70, 58, 87, 71, 85, 95],
       [85, 62, 43, 65, 46, 68, 90, 62, 45, 65],
       [93, 86, 76, 69, 83, 42, 67, 92, 76, 77],
       [49, 46, 58, 80, 90, 91, 62, 68, 45, 56],
       [58, 67, 41, 54, 74, 82, 97, 79, 77, 98],
       [89, 81, 47, 44, 85, 48, 97, 63, 64, 95],
       [85, 65, 87, 58, 88, 74, 55, 42, 42, 93],
       [55, 99, 67, 82, 91, 53, 70, 79, 54, 53],
       [61, 98, 98, 53, 87, 68, 78, 49, 74, 98],
       [93, 57, 47, 71, 73, 48, 63, 76, 80, 83],
       [90, 63, 75, 83, 48, 47, 95, 45, 85, 63],
       [40, 52, 64, 90, 89, 48, 61, 58, 71, 55],
       [98, 89, 82, 79, 84, 78, 80, 78, 86, 59],
       [77, 63, 57, 89, 88, 45, 87, 40, 76, 99],
       [74, 77, 70, 51, 96, 99, 98, 78, 66, 71],
       [94, 64, 77, 60, 98, 52, 63, 84, 88, 81],
       [75, 80, 64, 91, 82, 76, 96, 82, 63, 63],
       [57, 94, 96, 92, 46, 58, 87, 73, 94, 89],
       [90, 93, 50, 99, 67, 70, 82, 87, 91, 92],
       [51, 64, 58, 92, 98, 72, 58, 60, 86, 71],
       [94, 67, 85, 91, 43, 79, 83, 51, 57, 51],
       [49, 40, 97, 61, 87, 48, 92, 47, 72, 87],
       [46, 77, 41, 62, 97, 49, 78, 72, 72, 77],
       [60, 72, 46, 84, 65, 45, 89, 88, 62, 69],
       [97, 92, 67, 87, 84, 76, 40, 56, 52, 85],
       [55, 75, 83, 66, 89, 46, 74, 60, 44, 50],
       [66, 91, 58, 42, 65, 42, 58, 99, 54, 90],
       [51, 90, 55, 65, 58, 57, 50, 59, 75, 69],
```

```
        [80, 54, 64, 54, 40, 44, 79, 51, 45, 79],
        [98, 40, 90, 72, 93, 88, 55, 43, 70, 60],
        [77, 75, 76, 59, 60, 40, 86, 62, 79, 81],
        [69, 62, 68, 79, 66, 68, 98, 49, 81, 93],
        [45, 67, 81, 52, 73, 74, 54, 55, 76, 62],
        [92, 46, 91, 50, 86, 69, 79, 77, 99, 41],
        [83, 66, 58, 52, 88, 48, 62, 88, 90, 89],
        [71, 84, 64, 88, 57, 67, 51, 96, 71, 88]
```

```
y=x.mean(axis=0)
y
```

```
array([71.89, 71.67, 68.3 , 71.  , 72.62, 66.47, 71.83, 68.27, 71.1 ,
       72.49])
```

```
z=x[x>y]
z
```

```
array([86, 75, 74, 94, 91, 92, 90, 78, 94, 79, 91, 89, 82, 80, 97, 87, 67,
       90, 76, 80, 84, 84, 90, 72, 76, 76, 92, 79, 78, 93, 83, 69, 78, 74,
       94, 72, 95, 74, 87, 74, 90, 85, 72, 97, 99, 96, 83, 95, 98, 95, 70,
       78, 85, 85, 94, 75, 92, 95, 81, 82, 80, 77, 76, 91, 87, 99, 82, 98,
       86, 82, 79, 94, 75, 87, 72, 97, 83, 95, 98, 88, 71, 75, 82, 80, 80,
       82, 76, 73, 91, 84, 93, 79, 77, 90, 91, 81, 82, 88, 93, 97, 79, 69,
       77, 80, 85, 98, 98, 88, 80, 78, 69, 92, 96, 87, 87, 82, 75, 86, 75,
       87, 71, 85, 95, 85, 68, 90, 93, 86, 76, 83, 92, 76, 77, 80, 90, 91,
       74, 82, 97, 79, 77, 98, 89, 81, 85, 97, 95, 85, 87, 88, 74, 93, 99,
       82, 91, 79, 98, 98, 87, 68, 78, 74, 98, 93, 73, 76, 80, 83, 90, 75,
       83, 95, 85, 90, 89, 98, 89, 82, 79, 84, 78, 80, 78, 86, 77, 89, 88,
       87, 76, 99, 74, 77, 70, 96, 99, 98, 78, 94, 77, 98, 84, 88, 81, 75,
       80, 91, 82, 76, 96, 82, 94, 96, 92, 87, 73, 94, 89, 90, 93, 99, 70,
       82, 87, 91, 92, 92, 98, 72, 86, 94, 85, 91, 79, 83, 97, 87, 92, 72,
       87, 77, 97, 78, 72, 72, 77, 72, 84, 89, 88, 97, 92, 87, 84, 76, 85,
       75, 83, 89, 74, 91, 99, 90, 90, 75, 80, 79, 79, 98, 90, 72, 93, 88,
       77, 75, 76, 86, 79, 81, 79, 68, 98, 81, 93, 81, 73, 74, 76, 92, 91,
       86, 69, 79, 77, 99, 83, 88, 88, 90, 89, 84, 88, 67, 96, 88, 92, 99,
       75, 98, 76, 93, 84, 74, 81, 81, 83, 89, 82, 81, 89, 74, 77, 74, 76,
       76, 71, 79, 98, 94, 95, 96, 97, 82, 84, 90, 90, 98, 81, 72, 98, 92,
       81, 89, 86, 81, 89, 88, 82, 81, 75, 83, 83, 78, 84, 83, 95, 88, 96,
       83, 87, 88, 83, 84, 81, 71, 92, 84, 82, 91, 98, 69, 81, 73, 70, 97,
       83, 98, 85, 75, 91, 81, 93, 70, 74, 74, 90, 87, 92, 85, 79, 73, 74,
       78, 89, 98, 74, 88, 95, 91, 95, 69, 80, 78, 97, 74, 98, 94, 89, 74,
       98, 67, 74, 82, 84, 81, 85, 78, 89, 85, 95, 73, 79, 97, 78, 82, 77,
       73, 84, 77, 95, 96, 97, 91, 92, 80, 74, 81, 86, 91, 85, 94, 96, 88,
       75, 79, 96, 96, 79, 92, 80, 79, 85, 95, 93, 91, 73, 72, 85, 88, 81,
       73, 90, 85, 88, 93, 90, 84, 82, 83, 94, 73, 83, 97, 90, 79, 91, 98,
       75, 72, 84, 76, 78, 82, 70, 95, 83, 93, 72, 97, 71, 95, 74, 90, 92,
       90, 85, 73, 91, 75, 97, 98, 93, 99, 83, 73, 97, 88, 88, 90, 86, 81,
       96, 75, 94, 92, 73])
```

series dataframe

```
import numpy as np
import pandas as pd
```

```
np.__version__
```

```
'1.23.5'
```

```
pd.__version__
```

```
'1.5.3'
```

```
lst=[1,2,3,4]
s=pd.Series(lst)
s
```

```
0    1
1    2
2    3
3    4
dtype: int64
```

```
s.index
```

```
RangeIndex(start=0, stop=4, step=1)
```

```
s=pd.Series(lst, index=list("abcd"))
s
```

```
a    1
b    2
c    3
d    4
dtype: int64
```

```
s.values
```

```
array([1, 2, 3, 4])
```

```
s>0
```

```
a    True
b    True
c    True
d    True
dtype: bool
```

```
s*5
```

```
a     5
b    10
c    15
d    20
dtype: int64
```

```
s[s>0]
```

```
a    1
b    2
c    3
d    4
dtype: int64
```

```
d={'telangana': 'hyderabad','ap': 'ammaravthi','karnataka': 'banglore','mahaeastra': 'mumbai','tamilnadu': 'chennai'}
d
```

```
{'telangana': 'hyderabad',
 'ap': 'ammaravthi',
 'karnataka': 'banglore',
 'mahaeastra': 'mumbai',
 'tamilnadu': 'chennai'}
```

```
s1=pd.Series(d)
s1
```

```
telangana      hyderabad
ap            ammaravthi
karnataka       banglore
mahaeastra        mumbai
tamilnadu        chennai
dtype: object
```

```
s1['kerala'] = 'thiravantapuram'
s1
```

```
telangana           hyderabad
ap                 ammaravthi
karnataka            banglore
mahaeastra             mumbai
tamilnadu             chennai
kerala        thiravantapuram
dtype: object
```