sequence-name.index(value,start=0,stop=len(sequence))
This method return index of first occurrence of value

```
>>> A=[10,20,30,40,50]
>>> A.index(20)
1
>>> A.index(50)
4
>>> A.index(100)
Traceback (most recent call last):
  File "<pyshell#3>", line 1, in <module>
    A.index(100)
ValueError: 100 is not in list
>>> B=[10,10,10,20,30,40,50]
>>> B.index(10)
0
>>> B.index(10,2,20)
2
```

max() function

This function returns maximum value
The values can be given as individual (OR) given as one collection.

Example:

```
a=max(10,30,20)
print(a)
list1=[10,30,20]
b=max(list1)
print(b)
c=max(["a","c","b"])
print(c)
d=max(["ab","abc","abcd"])
print(d)
e=max(["ab","ac","ba"])
print(e)
f=max(["AB","ab"],key=str.upper)
print(f)
```

Output
30
30
c
abcd
ba
AB

min() function
This function returns minimum value
The values can be individual or collection

sum() function
This function returns sum of values
The values can be individually or collection

len() function
This function returns length of iterable (count of values)

Example:
```
# Write a program to input name, 3 subject marks
# calculate total makrs, maximum sub marks, minimum sub marks
name=input("Name :")
marks=[]
for i in range(3):
    s=int(input(f'Enter Subject{i+1} Marks:'))
    marks.append(s)

total=sum(marks)
max_sub=max(marks)
min_sub=min(marks)
print(f'Name:{name}')
print(f'Marks: {marks}')
print(f'Total Marks: {total}')
print(f'Maximum Marks: {max_sub}')
print(f'Minimum Marks: {min_sub}')
```

Output
Name :naresh
Enter Subject1 Marks:50

```
Enter Subject2 Marks:40
Enter Subject3 Marks:70
Name:naresh
Marks: [50, 40, 70]
Total Marks: 160
Maximum Marks: 70
Minimum Marks: 40
```

Example:

```
# Write a program to input n values into list
# find maximum value, minimum value wihtout using
# any predefined mathod/function

n=int(input("How Many Value?"))
A=[]
for i in range(n):
    value=int(input("Enter Value "))
    A.append(value)

print(A)
for i in range(n):
    if i==0:
        mn_value=A[i]
        mx_value=A[i]
    elif A[i]>mx_value:
        mx_value=A[i]
    elif A[i]<mn_value:
        mn_value=A[i]

print(f'Maximum value {mx_value}')
print(f'Minimum value {mn_value}')
```

Output

```
How Many Value?5
Enter Value 10
Enter Value 30
Enter Value 50
Enter Value 20
Enter Value 40
[10, 30, 50, 20, 40]
```

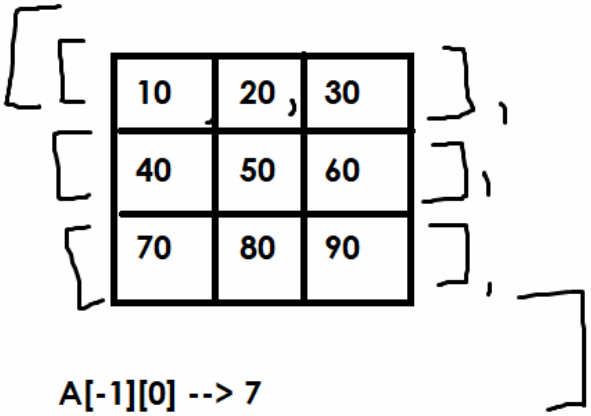
Nested List

Defining list as an element inside list is called nested list

Nested list is used to represent matrix, where data is organized in rows and columns.

```
      0       1       2
A=[[1,2,3],[4,5,6],[7,8,9]]
    0 1 2   0 1 2   0 1 2
```

```
A[0]  --> [1,2,3]
A[1] -->  [4,5,6]
A[2] --> [7,8,9]
A[0][0] --> 1
A[0][1] --> 2
A[0][2] --> 3
A[1][0] --> 4
A[1][1] --> 5
A[1][2] --> 6
A[2][0] --> 7
A[2][1] --> 8
A[2][2] --> 9
A[-1] --> [7,8,9]
A[-2] --> [4,5,6]
A[-3] --> [1,2,3]
```




```
A[-1][0] --> 7
A[-1][-1] --> 9
A[-2][0] --> 4
A[-2][-2] --> 5
```

Example:

```
A=[[10,20],[30,40]]
print(A)
print(A[0])
print(A[1])
print(A[0][0],A[0][1])
print(A[1][0],A[1][1])

#for loop using index
for i in range(2): # 0 1 row index
    for j in range(2): # 0 1 col index
        print(A[i][j],end=' ')
    print()

#for loop without using index
for B in A:
    for value in B:
        print(value,end=' ')
```

```
    print()
```

Output

```
[[10, 20], [30, 40]]
[10, 20]
[30, 40]
10 20
30 40
10 20
30 40
10 20
30 40
```

Example:

```
# Write a program read the values of 2x2 matrix
# and display

A=[]

for i in range(2):
    row=[]
    for j in range(2):
        value=int(input("Enter Value "))
        row.append(value)
    A.append(row)


print(A)
```

Output

```
Enter Value 1
Enter Value 2
Enter Value 3
Enter Value 4
[[1, 2], [3, 4]]
```

Example:

```
# Write a program input 3 students 3 subject marks
# calculate total,avg marks
```

```
marks=[]
for i in range(3):
    row=[]
    for j in range(3):
        s=int(input(f'Enter Student{i+1} Subject{j+1}Marks :'))
        row.append(s)

    marks.append(row)

print(marks)
for row in marks:
    tot_marks=sum(row)
    avg=tot_marks/len(row)
    print(f'{row}\t{tot_marks}\t{avg:.2f}')
```

Output

```
Enter Student1 Subject1Marks :50
Enter Student1 Subject2Marks :60
Enter Student1 Subject3Marks :70
Enter Student2 Subject1Marks :80
Enter Student2 Subject2Marks :90
Enter Student2 Subject3Marks :50
Enter Student3 Subject1Marks :30
Enter Student3 Subject2Marks :40
Enter Student3 Subject3Marks :50
[[50, 60, 70], [80, 90, 50], [30, 40, 50]]
[50, 60, 70]	180	60.00
[80, 90, 50]	220	73.33
[30, 40, 50]	120	40.00
```

Example:

```
A=[[[1,2],[3,4]],[[5,6],[7,8]]]
print(A[0])
print(A[1])
print(A[0][0])
print(A[1][1])
print(A[0][0][0])
print(A[0][0][1])
print(A[0][1][0])
print(A[0][1][1])
```

```
print(A[1][0][0])
print(A[1][0][1])
print(A[1][1][0])
print(A[1][1][1])
```

Output

```
[[1, 2], [3, 4]]
[[5, 6], [7, 8]]
[1, 2]
[7, 8]
1
2
3
4
5
6
7
8
```

Example:

```
# Write a program to print sum of matrices (2x2)

A=[]
B=[]
C=[]
print("Enter Elements of first matrix")
for i in range(2):
    row=[]
    for j in range(2):
        value=int(input("Enter Value :"))
        row.append(value)
    A.append(row)
print("Enter elements of second matrix")
for i in range(2):
    row=[]
    for j in range(2):
        value=int(input("Enter Value :"))
        row.append(value)
```

```
    B.append(row)

for i in range(2):
    row=[]
    for j in range(2):
        row.append(A[i][j]+B[i][j])
    C.append(row)
print(A)
print(B)
print(C)
```

Output

```
Enter Elements of first matrix
Enter Value :1
Enter Value :2
Enter Value :3
Enter Value :4
Enter elements of second matrix
Enter Value :8
Enter Value :5
Enter Value :7
Enter Value :4
[[1, 2], [3, 4]]
[[8, 5], [7, 4]]
[[9, 7], [10, 8]]
```