List

List is a mutable sequence data type.
Lists are mutable sequences, typically used to store collections of homogeneous items (similar type). List is also used for storing heterogeneous data (different type).

10	20	30	40	50

10	1.5	True	"abc"	1+2j

List allows duplicate items or values or elements.
In application development list is used to represent group values/items, where duplicates are allowed and read data sequential and random.
"list class" is used to represent list object
All collection types are dynamic in size.
All collections are called iterables.

How to create list?

Lists may be constructed in several ways:
- Using a pair of square brackets to denote the empty list: []
- Using square brackets, separating items with commas: [a], [a, b, c]
- Using a list comprehension: [x for x in iterable]
- Using the type constructor: list() or list(iterable)

```
>>> a=[]
>>> type(a)
<class 'list'>
```

```
>>> print(a)
[]
>>> b=[10,20,30,40,50]
>>>print(b)
[10, 20, 30, 40, 50]
>>>student1=[101,"naresh","python",4000.0]
>>>print(student1)
[101, 'naresh', 'python', 4000.0]
>>>print(type(student1))
<class 'list'>
>>>salesList=[50000,60000,90000,67000]
>>>c=list()
>>>print(c)
[]
>>> print(type(c))
<class 'list'>
>>> d=list(range(5))
>>> print(d)
[0, 1, 2, 3, 4]
>>> e=list(range(10,110,10))
>>> print(e)
[10, 20, 30, 40, 50, 60, 70, 80, 90, 100]
>>> f=list("NARESH")
>>> print(f)
['N', 'A', 'R', 'E', 'S', 'H']
>>> g=list([10,20,30,40,50])
>>> print(g)
[10, 20, 30, 40, 50]
```

How to read content of list?
We can read the content of list in different ways
1. Using index
2. Slicing
3. Iterator
4. Enumerate
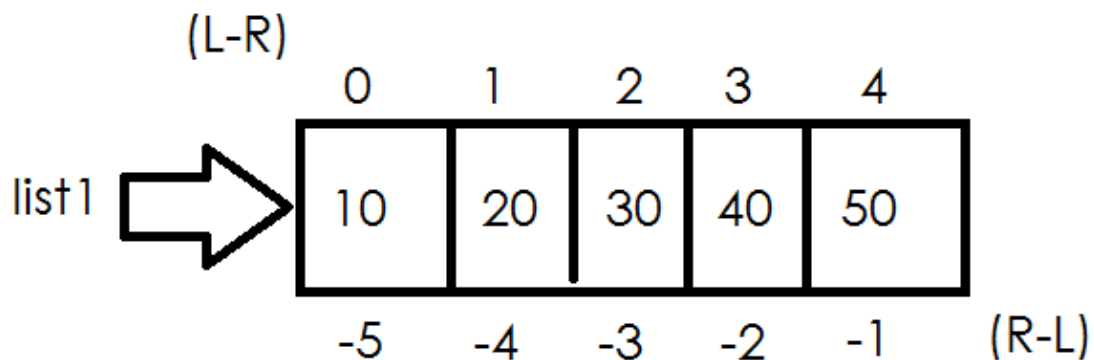
5. for loop

using index

Index is an integer value, which is used to identify each value/item in list. using index we can read items sequential or randomly.

This index can be +ve or –ve

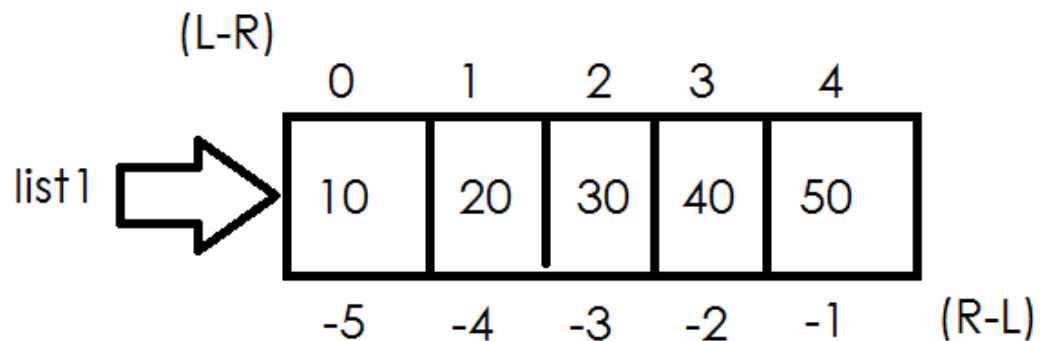+ve index is used to read elements/items in forward direction(L-R)
-ve index is used to read elements/items in backward direction (R-L)

list1=[10,20,30,40,50]

```
          (L-R)
              0    1    2    3    4
           ┌────┬────┬────┬────┬────┐
list1 ⟹    │ 10 │ 20 │ 30 │ 40 │ 50 │
           └────┴────┴────┴────┴────┘
             -5   -4   -3   -2   -1    (R-L)
```

Syntax: list-name[index]

list1=[10,20,30,40,50]

(L-R)

```
        0    1    2    3    4
      +----+----+----+----+----+
list1 | 10 | 20 | 30 | 40 | 50 |
      +----+----+----+----+----+
       -5   -4   -3   -2   -1    (R-L)
```

list1 [0] --> 10   list1 [-1] --> 50
list1 [1] --> 20   list1 [-2] --> 40
list1 [2] --> 30   list1 [-3] --> 30
list1 [3] --> 40   list1 [-4] --> 20
list1 [4] --> 50   list1 [-5] --> 10
list1 [5] --> IndexError list1 [-6] --> IndexError

```
>>> list1=[10,20,30,40,50]
>>> print(list1[0],list1[1],list1[2],list1[3],list1[4])
10 20 30 40 50
>>> print(list1[-1],list1[-2],list1[-3],list1[-4],list1[-5])
50 40 30 20 10
>>> print(list1[5])
Traceback (most recent call last):
  File "<pyshell#23>", line 1, in <module>
    print(list1[5])
IndexError: list index out of range
>>> print(list1[-6])
Traceback (most recent call last):
  File "<pyshell#24>", line 1, in <module>
    print(list1[-6])
IndexError: list index out of range
```

```
>>> list1=list(range(10,210,10))
>>> print(list1)
[10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170,
180, 190, 200]
>>> for i in range(20):
    print(list1[i])


10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
>>> for i in range(20):
...     print(list1[i],end=' ')
...
...
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190
200
>>> for i in range(-1,-21,-1):
...     print(list1[i],end=' ')
...
...
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20
10
```