# LIST

- List is a data structure used to represent group of elements as a single entity.
- We can store heterogeneous elements in a list.
- It allows duplicate elements.
- For accessing elements of list, we can use positive as well as negative indexing.
- Insertion order will be preserved in it.
- List is mutable
- The notation of list is [] brackets and the elements are separated by comma.
- In list, we can use slicing also.

## Syntax to create an empty list:

```
list_name = [] or list_name = list()
```

## Syntax to create list:

```
list_name = [ele1,ele2,ele3,…….]
e.g li = [1,3.5,’abc’,True,1]
```

## Accessing list elements:

```
li = [10,20,30,40,50]
       0   1   2   3   4  →+ve index (Left → Right)
      -5  -4  -3  -2  -1 →-ve index (Right → Left)

li[0] = 10 , li[1] = 20
li[-1] = 50 , li[-2] = 40
```

## Updating an element inside a list:

```
li = [10,20,30,40,50]
li[2] = ‘abc’
Now list will be: [10,20,’abc’,40,50]
```

## Iterating over the list:

```
li = [10,20,30,40,50]
for i in li:
        print(i)
```

**OUTPUT:**

```
10
20
30
40
```

```
        50
```

## Nested list:

It means a structure of multiple lists inside list.
e.g

```
mh = [‘Pune’,’Mumbai’]
gj = [‘Surat’,’Bhuj’]

india = [mh , gj]
print(india)

for state in india:
        for cities in state:
                print(cities)
```

**OUTPUT:**

```
[[‘Pune’,’Mumbai’] , [‘Surat’,’Bhuj’]]
Pune
Mumbai
Surat
Bhuj
```

## Common methods in list:

1.append – adds single element at last of list.

```
li = [10,20,30]
li.append(40) #[10,20,30,40]
```

2.extend – adds multiple elements at last of list.

```
li = [10,20,30]
li.extend([40,50,60]) #[10,20,30,40,50,60]
```

3.insert – adds element at specified index.

```
li = [10,20,30]
li.insert(1,40) #[10,40,20,30]
```

4.pop – removes last element.
   pop(i) – removes element at specified index.

```
li = [10,20,30]
li.pop() #[10,20]
li.pop(1) #[10]
```

5.remove – removes specified element.
li = [10,20,30]
li.remove(20) #[10,30]

6.reverse – reverses the list.
li = [10,20,30]
li.reverse() #[30,20,10]

7.sort – it sorts the original list into ascending order.
li = [10,50,20,90,30]
li.sort() #[10,20,30,50,90]

8.clear - Removes all items from the list.
9.index - Returns the index of the first matched item.
10.count - Returns the count of element which is passed as an argument.
11.copy - Returns a copy of the list.

**Common functions on list:**
1.len(list) – It gives the total length of list.
2.max(list) – It gives maximum element from list.
3.min(list) – It gives minimum element from list.
4.sum(list) – It gives sum of all the list elements.

**Mathematical operations on list:**

1. **+** (joining or merging of lists)
   e.g l1 = [1,2,3]
   l2 = [4,5,6]
   l1+l2 #[1,2,3,4,5,6]

2. ***** (repetition of list)
   e.g l1 = [1,2,3]
   l1*3 #[1,2,3,1,2,3,1,2,3]