list

- list is an heterogenous array

consider list 'a' then functions are:

- len(a)
- type(a)
- joining of lists: l1,l2 be list join is l1+l2
- joining about a point: converting to str type then abt a point
- l1.extend(l2): l2 is also added to l3
- list using loop: l=list(i for i in range(1,6))
- slicing: l[a:b]
- append: add 1 element at a time in the ending of the list
- insert: add 1 element anywhere in the list
- remove: delete using element/address
- pop: delete from the last
- del: delete using address

In [3]:

```
a=list()
print(type(a))
```

```
<class 'list'>
```

In [4]:

```
b=[1,2,"hello"]
len(b)
```

Out[4]:

```
3
```

In [13]:

```
#joining lists

l1=list([1,2,3,"hello"])
l2=list([2,4,1,"world"])
l3=l1+l2
print(l3)

#joining a critical point bw every element

a="_"
l4=str(l3)
print(type(l4))
a.join(l4)
```

```
[1, 2, 3, 'hello', 2, 4, 1, 'world']
<class 'str'>
```

Out[13]:

```
"[_1_,_ _2_,_ _3_,_ _'_h_e_l_l_o_'_,_ _2_,_ _4_,_ _1_,_ _'_w_o_r_l_d_'_]"
```

In [16]:

```
#joining a critical point bw every element using extend function

l3.extend(l2)
print(l3)
```

```
[1, 2, 3, 'hello', 2, 4, 1, 'world', 2, 4, 1, 'world', 2, 4, 1, 'world']
```

In [25]:

```
#creating list using loop

l=list([i*i for i in range(1,6)])
print(l)
```

```
[1, 4, 9, 16, 25]
```

In [26]:

```
#list slicing:

l=[1,2,3,"h3llo",34.5]
print(l[:4])
```

```
[1, 2, 3, 'h3llo']
```

insertion and deletion

- append: add 1 element at a time in the ending of the list
- insert: add 1 element anywhere in the list
- remove: delete using element/address
- pop: delete from the last
- del: delete using address

In [32]:

```
#append single value

l=[1,2]
l.append(3)
print(l)

#nesting of lists

l.append(l)
print(l)

l.append(["hello","add",32.45])
print(l)
```

```
[1, 2, 3]
[1, 2, 3, [...]]
[1, 2, 3, [...], ['hello', 'add', 32.45]]
```

In [36]:

```
# adding elements is diff from append:

l=list([1,2,3])
print(l,end="   New list:  ")
l.append(["hello",34.5])
print(l)

m=list([1,2,3])
print(m,end="   New list:  ")
print(m+["hello",34.5])
```

```
[1, 2, 3]   New list:  [1, 2, 3, ['hello', 34.5]]
[1, 2, 3]   New list:  [1, 2, 3, 'hello', 34.5]
```

In [52]:

```
# accessing element in a 2d list:
```

```
# accessing element in a 2d list:

l=[1,2,3]
l.append(["hello",23,2])
print(l)

print(l[2])
print(l[3])
print(l[3][1])
```

```
[1, 2, 3, ['hello', 23, 2]]
3
['hello', 23, 2]
23
```

In [53]:

```
#removing elements from a lst:

print(l)
l.remove(3)
print(l)
l.remove(l[2])
print(l)
```

```
[1, 2, 3, ['hello', 23, 2]]
[1, 2, ['hello', 23, 2]]
[1, 2]
```

In [57]:

```
# del functionn to remove elements:

l=[1,2,3,4,5]
del l[2]
print(l)
```

```
[1, 2, 4, 5]
```

In [60]:

```
#popping
# removes the last element
print(l)
l.pop()
print(l)
```

```
[1, 2, 4, 5]
[1, 2, 4]
```

In [61]:

```
#multiplying contents:

print(l)
l*=4
print(l)
```

```
[1, 2, 4]
[1, 2, 4, 1, 2, 4, 1, 2, 4, 1, 2, 4]
```

In [66]:

```
#searching in list:

l=[ i for i in range(20)]
print(12 in l)
```

```
True
```

In [76]:

```
# printing elements:

for i in l:
    print(i,end="|")

print()

for i in l:
    print(l[i],end="|")
```

```
0|1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16|17|18|19|
0|1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16|17|18|19|
```

In [114]:

```
# insertion elements:

l=[i*i for i in range(3,8)]
print(l)
l.insert(3,20)
print(l)
```

```
[9, 16, 25, 36, 49]
[9, 16, 25, 20, 36, 49]
```

In [100]:

```
# finding maximum/min element in a list:

print(l)
print(max(l))
print(min(l))
```

```
[9, 16, 25, 20, 36, 49, 20, 20, 20, 20, 20, 20, 20, 20, 20]
49
9
```

In [115]:

```
# finding index of an element:
#return error if element not found

print(l)
print(l.index(20))
l.append(20)

print(l.index(20))
```

```
[9, 16, 25, 20, 36, 49]
3
3
```

In [134]:

```
# sorting of a list using sorted:
# this does not change the original list

print(sorted(l))
print(l)
l=sorted(l)
print(l)
```

```
['1', '2', '5', 'hello', 'iello', 'se']
['1', '2', '5', 'hello', 'iello', 'se']
['1', '2', '5', 'hello', 'iello', 'se']
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-134-bcba54cd0f19> in <module>()
      6 l=sorted(l)
      7 print(l)
----> 8 l=sorted(rev=True)

TypeError: Function takes at least 1 positional arguments (0 given)
```

In [132]:

```
# sorting of a list containing strings only:
#here sorting is acc to dictionary

l=["1","2","hello","se","iello","5"]
sorted(l)
```

Out[132]:

```
['1', '2', '5', 'hello', 'iello', 'se']
```

In [141]:

```
# sorting using sort function:

l=[1,4,2,7,4,3]
l.sort()
"""here list is a class and we made an object l of that class & this object access the function so
rt of that class using
l.sort()"""
print(l)
l.sort(reverse=True)            # reerse sort
print(l)
```

```
[1, 2, 3, 4, 4, 7]
[7, 4, 4, 3, 2, 1]
```

In [14]:

```
# taking an int list input:

n=[int(i) for i in input().split()]
print(type(n))

print(n)
# or

for i in n:
    print(i,end=" ")
```

```
1 2 6 3 9
<class 'list'>
[1, 2, 6, 3, 9]
1 2 6 3 9
```