

1.what is list?

```
In [ ]: list is a ordered collection of items.
we can add any data type in list(data type>>str,int,float,tuple,dict,etc..)
list is a mutable data type it means we can add delete or update list items.
duplicate items are allowed in list.
lists are enclosed by [] bracket.
list items are comma separated.
lists are slower than tuple.it occupies more memory.
lists are more functional.
```

```
In [39]: #Ex:
list1=[2,3,4.5,"python",8+4j,{2,3,4}]
print(list1)

[2, 3, 4.5, 'python', (8+4j), {2, 3, 4}]
```

2.what is tuple?

```
In [ ]: Tuple is ordered collection of items.
tuple is immutable data type.
we cant add ,delete ,update tuple.
duplicate items are allowed in tuple.
tuple is enclosed by ().
tuple work fast.
tuple occupies less memory.
```

```
In [40]: #Ex:
tuple1=(1,2,3,2,3,4.7,"data",3+4j)
print(tuple1)

(1, 2, 3, 2, 3, 4.7, 'data', (3+4j))
```

3 what is difference between list and tuple?

In []: list:	tuple:
1.list are mutable data type	1.tuple are immutable data type.
2.list are enclosed by []	2.tuples are enclosed by().
3.list are slower than tuple.	3.tuples are faster than list.
4.list occupies more memory.	4.tuple occupies more memor

4.python program to find lagest element in list

```
In [16]: #1st method:
list1=[23,45,666,33,87,98]
print("The largest no in list is :",max(list1))
print()
#2nd method:
list1.sort()
print("the largest no in list is :",list1[-1])

The largest no in list is : 666

the largest no in list is : 666
```

5. python program to interchange 1st and last element of list

```
In [21]: list2=[22,34,5,12,34]
print("The given list is: ",list2)
list2[0],list2[-1]=list2[-1],list2[0]
print()
print("The list after intechnging: ",list2)

The given list is: [22, 34, 5, 12, 34]

The list after intechnging: [34, 34, 5, 12, 22]
```

6. python program to swap two elements

```
In [22]: list2=[22,34,5,12,34]
print("The given list is: " ,list2)
list2[0],list2[1]=list2[1],list2[0]
print()
print("The list after swaping: ",list2)
```

The given list is: [22, 34, 5, 12, 34]

The list after swaping: [34, 22, 5, 12, 34]

7.python program to reverse a list

```
In [12]: #1st method:
list3=[3,45,56,23,44]
x=list3[::-1]
print("The given list is: " ,list3)
print("*****50")
print("The reversed list is:",x)
print("*****50")

#2nd method:
y=[]
for i in list3:
    y.insert(0,i)
print("The reversed list is:" ,y)
print("*****50")

#3rd method:
list3.reverse()
print("The reversed list is: ",list3)
```

The given list is: [3, 45, 56, 23, 44]

The reversed list is: [44, 23, 56, 45, 3]

The reversed list is: [44, 23, 56, 45, 3]

The reversed list is: [44, 23, 56, 45, 3]

8. python program to count occurrence of an element in list:

```
In [16]: list4= [3,4,5,6,7,8,9,10,7]

x=list4.count(7)
print("the occurance of 7 is:",x)
```

the occurance of 7 is: 2

```
In [5]: li=[]
n=int(input("Enter size of list"))
for i in range(0,n):

    e=int(input("Enter element of list "))
    li.append(e)

print("Original list: ",li)
print("*****50)

for j in range(1,n+1):
    n=int(input("Enter element to be checked in list "))
    print(n,"has occured",li.count(n),"times")
```

```
Enter size of list6
Enter element of list 4
Enter element of list 5
Enter element of list 4
Enter element of list 4
Enter element of list 6
Enter element of list 7
Original list: [4, 5, 4, 4, 6, 7]
*****
Enter element to be checked in list 5
5 has occured 1 times
Enter element to be checked in list 6
6 has occured 1 times
Enter element to be checked in list 4
4 has occured 3 times
Enter element to be checked in list 7
7 has occured 1 times
Enter element to be checked in list 2
2 has occured 0 times
Enter element to be checked in list 8
8 has occured 0 times
```

```
In [6]: list1=[2,3,2,4,6,5,7,6,8,6,5,4,2]
list2=[]
for i in list1:
    if i not in list2:
        list2.append(i)
print(list2)
for i in range(0,len(list2)):
    print(f"The no '{list2[i]}' has occured", {list1.count(list2[i])}, "times in a list")
```

```
[2, 3, 4, 6, 5, 7, 8]
The no '2' has occured {3} times in a list
The no '3' has occured {1} times in a list
The no '4' has occured {2} times in a list
The no '6' has occured {3} times in a list
The no '5' has occured {2} times in a list
The no '7' has occured {1} times in a list
The no '8' has occured {1} times in a list
```

```
In [10]: print(list1.count(list2[i-1]))
```

```
-----
IndexError                                Traceback (most recent call last)
~\AppData\Local\Temp\ipykernel_5844\3041365404.py in <module>
----> 1 print(list1.count(list2[i-1]))

IndexError: list index out of range
```

9.python program to find sum of elements of list.

```
In [13]: list6=[1,2,333,44,53]
print("The sum of elements in list is: ",sum(list6))

#2nd method:

sum1=0
for i in list6:
    sum1+=i
print("The sum of list elements is: ",sum1)
```

```
The sum of elements in list is: 433
The sum of list elements is: 433
```

10 python program to multiply elements in list.

```
In [12]: list1=[2,3,4,5,6]
mul=1
for i in list1:
    mul*=i
print( "The multiplication of list elements is: ",mul)
```

The multiplication of list elements is: 720

11.what are the ways to find length of list

```
In [16]: # 1.by using n built len function
list7=[1,2,333,44,53]
print("The length of list is: ",len(list7))

# 2.by using for loop:
count1=0
for i in list7:
    count1=count1+1
print("The length of list is: ",count1)
```

The length of list is: 5

The length of list is: 5

12. python program to find smallest and largest element in list (without min,max function)

```
In [29]: list8=[23,4,3,44,55,65]
list8.sort()
print("The given list is      : ",list8)
print("The largest element is : ",list8[-1])
print("The smallest element is : ",list8[0])
```

The given list is : [3, 4, 23, 44, 55, 65]

The largest element is : 65

The smallest element is : 3

13. python program to find area of circle

```
In [41]: radius=int(input("enter the radius of circle: "))
pi=3.14
area_of_circle=pi*radius*radius
print( "the area of circle is  : ",area_of_circle)
```

enter the radius of circle: 5

the area of circle is : 78.5

14.take input from user .Again take input from user and search it in list and delete that element,if found.Iterate over a list using for loop

```
In [25]: li=[]
n=int(input("Enter size of list"))
for i in range(0,n):
    e=int(input("Enter element of list "))
    li.append(e)
B=int(input("Enter an element to search and delete: "))
print("the list is ",li)
li.append(B)

for i in li:

    li.remove(B)

print("The list after deleting element is: ",li)
```

Enter size of list5

Enter element of list 4

Enter element of list 4

Enter element of list 5

Enter element of list 4

Enter element of list 5

Enter an element to search and delete: 5

the list is [4, 4, 5, 4, 5]

The list after deleting element is: [4, 4, 4]

15. you are given a list of integer elements. make a new list that will store a square of elements of previous list (with and without list comprehension)

In [13]: *#without list comprehension:*

```
input_list=[2,5,6,12]
new_list=[]
for i in input_list:
    new_list.append(i**2)
print("The given list is ",input_list)
print("The output list is ",new_list)
print()
```

using list comprehension:

```
new_list=[i**2 for i in input_list]
print("The output list is: ",new_list)
```

The given list is [2, 5, 6, 12]
The output list is [4, 25, 36, 144]

The output list is: [4, 25, 36, 144]

16. WAP to create two lists, one containing even nos and other containing odd nos between (0,151)

```
In [15]: even=[]
odd=[]
for i in range(0,152):
    if i % 2 == 0:
        even.append(i)
    else:
        odd.append(i)
print("The even nos of list are : ",even)
print()
print("The odd nos of list are : ",odd)
```

The even nos of list are : [0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150]

The odd nos of list are : [1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151]

17. python program to count even and odd nos in a list

```
In [16]: list11=[10,22,33,43,4,56,77]
even=0
odd=0
for i in list11:
    if i%2==0:
        even+=1
    else:
        odd+=1
print("The even nos in list are: ",even)
print()
print("The odd nos in list are: ",odd)
```

The even nos in list are: 4

The odd nos in list are: 3

18 WAP to make new list containing only numbers which are divisible by 4,6,8,10,3,5,7,9 in separate list for range(0,152)

```
In [26]: new_list=[]
for i in range(0,152):
    if i %4==0:
        new_list.append(i)
    elif i%6==0:
        new_list.append(i)
    elif i% 8==0:
        new_list.append(i)
    elif i % 10==0:
        new_list.append(i)
    elif i% 3==0:
        new_list.append(i)
    elif i% 5==0:
        new_list.append(i)
    elif i% 7==0:
        new_list.append(i)
    elif i% 9==0:
        new_list.append(i)
print(new_list)
```

[0, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 24, 25, 27, 28, 30, 32, 33, 35, 36, 39, 40, 42, 44, 45, 48, 49, 50, 51, 52, 54, 55, 56, 57, 60, 63, 64, 65, 66, 68, 69, 70, 72, 75, 76, 77, 78, 80, 81, 84, 85, 87, 88, 90, 91, 92, 93, 95, 96, 98, 99, 100, 102, 104, 105, 108, 110, 111, 112, 114, 115, 116, 117, 119, 120, 123, 124, 125, 126, 128, 129, 130, 132, 133, 135, 136, 138, 140, 141, 144, 145, 147, 148, 150]

```
In [34]: list1= [i for i in range(0,152) if i % 4==0]
list2= [i for i in range(0,152) if i % 6==0]
list3= [i for i in range(0,152) if i % 8==0]
list4=[i for i in range(0,152) if i % 10==0]
list5= [i for i in range(0,152) if i % 3==0]
list6= [i for i in range(0,152) if i % 5==0]
list7= [i for i in range(0,152) if i % 7==0]
list8= [i for i in range(0,152) if i % 9==0]
print("The list divisible by 4 is : ",list1)
print()
print("The list divisible by 6 is : ",list2)
print()
print("The list divisible by 8 is : ",list3)
print()
print("The list divisible by10 is : ",list4)
print()
print("The list divisible by 3 is : ",list5)
print()
print("The list divisible by 5 is : ",list6)
print()
print("The list divisible by 7 is : ",list7)
print()
print("The list divisible by 9 is : ",list8)
```

The list divisible by 4 is : [0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144, 148]

The list divisible by 6 is : [0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114, 120, 126, 132, 138, 144, 150]

The list divisible by 8 is : [0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96, 104, 112, 120, 128, 136, 144]

The list divisible by10 is : [0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150]

The list divisible by 3 is : [0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99, 102, 105, 108, 111, 114, 117, 120, 123, 126, 129, 132, 135, 138, 141, 144, 147, 150]

The list divisible by 5 is : [0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150]

The list divisible by 7 is : [0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84, 91, 98, 105, 112, 119, 126, 133, 140, 147]

The list divisible by 9 is : [0, 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117, 126, 135, 144]

19.From a list containg int,string,floats,make three lists to store them separately

```
In [26]: list11=[2,3334,44,'python','class',3.4,22.3]
int_list=[]
float_list=[]
string_list=[]
```

```
for i in list11:
    if type(i)==int:
        int_list.append(i)
    elif type(i)==float:
        float_list.append(i)
    else:
        string_list.append(i)

print("The integer list is ",int_list)
print("The float list is ",float_list)
print("The string list is ",string_list)
```

```
The integer list is [2, 3334, 44]
The float list is [3.4, 22.3]
The string list is ['python', 'class']
```

20.what is difference between python append() and extend() methods

```
In [ ]: append method add single element to the last index of list. by append method length inceases by 1
extend method add multiple indivisual elements to the last of list. by extend method length increases as no of elements
```

```
In [3]: #Ex.
#1. append() method:
```

```
list1=[1,2,3,4,5]
list2=[33,45,23,1]
list1.append(list2)
print(list1,len(list1))
```

```
#2.extend method:
list3=[1,2,3,4,5]
list4=[33,45,23,1]
list3.extend(list4)
print(list3,len(list3))
```

```
[1, 2, 3, 4, 5, [33, 45, 23, 1]] 6
[1, 2, 3, 4, 5, 33, 45, 23, 1] 9
```

21. WAP to append a list to second list

```
In [5]: list1=[1,2,3,4,5]
list2=[33,45,23,1]
list2.append(list1)
print(list2,len(list2))
```

```
[33, 45, 23, 1, [1, 2, 3, 4, 5]] 5
```

```
In [27]: list1=[5,8,7,10,12]
list2=[1,2,3,4,5]
for i in list2:
    list1.append(i)
print(list1)
```

```
[5, 8, 7, 10, 12, 1, 2, 3, 4, 5]
```

22 WAP to find third largest element in list

```
In [22]: list2=[33,45,23,1,22,34,11,563,56,7,6,55,78]
list2.sort()
print(list2)
print("the third largest element is :",list2[-3])
```

```
[1, 6, 7, 11, 22, 23, 33, 34, 45, 55, 56, 78, 563]
the third largest element is : 56
```

23.WAP to get frequency of elements in a list

```
In [13]: a=[1,2,3,1,4,3,5,4,6,5,7,4,55,55,4,3,4]
b=set(a)
print(b)
for i in b:
    v=a.count(i)
    print(f"{i} is found: {v} ")
```

```
{1, 2, 3, 4, 5, 6, 7, 55}
1 is found: 2
2 is found: 1
3 is found: 3
4 is found: 5
5 is found: 2
6 is found: 1
7 is found: 1
55 is found: 2
```

```
In [28]: l = ["python","data science","java","pyhton","java"]
print(l)
p = input("Enter word for which frequency required from list :- ")
for i in l:
    if i==p:
        cnt=l.count(p)
print(f"Frequency of {p} in list is {cnt}")
```

```
['python', 'data science', 'java', 'pyhton', 'java']
Enter word for which frequency required from list :- java
Frequency of java in list is 2
```

24. WAP to check whether list contains sublist

```
In [41]: list1=[3,4,55,34,76]
list2=[4,55]
if list2 in list1:
    print("sublist is present")
else:
    print("sublist not present")
```

```
sublist not present
```

25.write a program to generate all sublist of list

```
In [18]: li=[1,2,3,4]
sub=[]
for i in range(len(li)+1):
    for j in range(i):
        sub.append(li[j:i])
print(sub)
```

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

26. write a program to find common items from two lists.

```
In [52]: list1=[2,3,2,3,4,5]
list2=[2,11,3,4,2,5]
new_list=[]
for i in list1:
    if i in list2:
        new_list.append(i)
print(new_list)
```

```
[2, 3, 2, 3, 4, 5]
```

```
In [35]: a=[10,11,12,13,14,15,17,18]
b=[10,11,12,13,14,15,16,17,18]
e=[]
for i in range (len(a)):
    for j in range(len(b)):
        if a[i]==b[j]:
            e.append(a[i])
print(e)
```

```
[10, 11, 12, 13, 14, 15, 17, 18]
```

27.how to flatten a list in python?


```
In [29]: l=[[1,2],[2,3],[4,5],[5,6]]
l1=[]
for i in l:
    l1.extend(i)
print(l1)
```

[1, 2, 2, 3, 4, 5, 5, 6]

28.how to sort a list in ascending and desending order without using sort function?

```
In [11]: list1=[2,3,33,88,63,2,98,67]
## descending order:

for i in range(len(list1)):      #i=0,1,2,3,4,5,6,7
    for j in range(i+1,len(list1)):#j=1,2,3,4,5,6,7
        if list1[i]<list1[j]:
            list1[i],list1[j]=list1[j],list1[i]
print("Given list is : ", list1)
print("Descending order list is: " ,list1)
print()
```

ascending order:

```
for i in range(len(list1)):
    for j in range(i+1,len(list1)):
        if list1[i]>list1[j]:
            list1[i],list1[j]=list1[j],list1[i]

print("Ascending order list is : ",list1)
```

Given list is : [98, 88, 67, 63, 33, 3, 2, 2]
Descending order list is: [98, 88, 67, 63, 33, 3, 2, 2]

Ascending order list is : [2, 2, 3, 33, 63, 67, 88, 98]

29.How to sort a tuple?

In []: By using built in function `sorted()` we can sort a `tuple`

```
In [1]: tuple1=(2,3,3,9,4)
x=sorted(tuple1)
x
```

Out[1]: [2, 3, 3, 4, 9]

30. Write a python program to convert list of multiple integers to single integer. a[11,33,50]>>113350

```
In [11]: list1=[11,33,50]
for i in list1:
    print(i,end='')
```

113350

31.Difference between del and clear?

In []: **del** is a keyword in python whereas clear is a function of list.
By using **del** keyword we remove asingle element of the list. In case of clear we get empty list.

32. Difference between remove and pop?

In remove function we have to give the value whichwe want to remove and in pop we have to give index no of that value which we want to delete from list . By default pop retuens value at last index

```
In [13]: list1=[2,3,22,44,56,78,82,87]
list1.remove(87)
print(list1)
```

[2, 3, 22, 44, 56, 78, 82]

```
In [15]: list1=[2,3,22,44,56,78,82,87]
list1.pop(3)
print(list1)
```

```
[2, 3, 22, 56, 78, 82, 87]
```

```
In [16]: list1=[2,3,22,44,56,78,82,87]
list1.pop()
print(list1)
```

```
[2, 3, 22, 44, 56, 78, 82]
```

33.Difference between indexing and slicing

```
In [ ]: Indexing is used to obtain individual elements. Slicing is used to obtain a sequence of elements.
```

```
In [17]: # Indexing:
lst1=[9,76,98,55,77,53,64]
lst1[0]
```

```
Out[17]: 9
```

```
In [19]: #slicing:
lst1=[9,76,98,55,77,53,64]
lst1[1:5]
```

```
Out[19]: [76, 98, 55, 77]
```

34.Difference between sort and sorted?

```
In [ ]: sort function is used for list and sorted is built in function. both are diffeent in there syntax.
for list we can use both function
```

```
In [21]: #sort function:
list1=[9,76,98,55,77,53]
list1.sort()
print(list1)

#sorted function:

list1=[9,76,98,55,77,53]
x=sorted(list1)
print(x)
```

```
[9, 53, 55, 76, 77, 98]
```

```
[9, 53, 55, 76, 77, 98]
```

35.Difference between reverse and reversed?

```
In [ ]: reverse()
reverse method is used to reverse the list.it wil reverse the original list.
return type is none.
reverse method is supported to only by lists.

reversed()
reversed() method returns an iterator that accesses the given sequence in the reverse order
return type() is reversed iterator object.
reversed function is supported by other iterables.
string tuple and dictionary.
```

36.what is difference between copy and deepcopy?

```
In [ ]: copy:
copy only useful for lists only, not for nested one.
no need to import external library.
this one is faster.
copy is not recursive.
any changes made to a copy of object will be reflected in the original object as well.
basically it creates new variable that shares the reference of the original object.
Deep copy:
deepcopy used for nested list and also for general list.
need to import external library.
deepcopy is slower than copy.
Deepcopy is recursive.
any changes made to a copy of object will not be reflected in the original object as well.
```

37. how to check whether a list is empty or not?

```
In [ ]: If length of list is 0 then given list is empty.
```

```
In [44]: list1=[2,3,4,5,63]
if len(list1)==0:
    print("The list is empty")
else:
    print("The list is not empty")
```

The list is not empty

```
In [45]: list1=[]
if len(list1)==0:
    print("The list is empty")
else:
    print("The list is not empty")
```

The list is empty

38 how to concatenate two lists?

```
In [47]: list1=[2,3,4,5,2,6,5]
list2=[3,1,2,5,6,7]
list3=list1+list2
print(list3)
```

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

39. How to find occurrence of an element in python list?

```
In [ ]: The easiest way to count the number of occurrence in a python list of a given item is to use python .count() method.
The method is applied to a given list and takes single argument. The argument passed into the method is counted
and number of occurrences of that item in the list is returned.
```

```
In [48]: list1=[1,2,3,2,1,2,3,4,5,6,7,5,6]
list1.count(4)
```

Out[48]: 1

```
In [49]: list1.count(1)
```

Out[49]: 2

40. How to flatten a list?

```
In [36]: l=[[1,2],[2,3],[4,5],[5,6]]
l1=[]
for i in l:
    print(i)
    l1.extend(i)
    print(l1)
print(l1)
```

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

```
Out[36]: [1, 2, 2, 3, 4, 5, 5, 6]
```