**List Data Structure**

**28-03-2025**

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-> a pre-defined datatype

which has a built-in class

which is named as "list".

How to define the list?

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1) using []:

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# using []

l1 = []

l2 = [11,22,33,44,55]

# list must be defined with []

l3 = 10,20,30,40

print(type(l1))

print(type(l2))

print(type(l3))

2) using list():

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# list() is one of the type conversion function

# when we want to create a list from other collections

l4 = list("Python")

l5 = list((12,24,36,48,60))

print(type(l4))

print(type(l5))

3) using eval():

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# run time list

l6 = eval(input("Enter a list:"))

print(type(l6))

4) using split():

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Syntax:

 list-data = string-data.split('separator')

# when we want to create a list from the string, we can use "split()".

s1 = "28-03-2025"

s2 = "Python is easy"

l = s1.split('-')

print(type(l))

print(l)

List Features:

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1) List is ordered.

2) Indexing is possible.

3) Slicing is also possible.

4) List Homogeneous ==> when the list is defined with same datatype

5) List is Heterogeneous ==> when the list is defined with different datatypes

6) List is mutable datatype

Because after the definition we can be allowed to modify the data within the same address location.

l1 = [10,20,30,33,22,11,12,24,36] # homogeneous

l2 = [True,'abc',1-23j,1.009,123] # heterogeneous

print(l1)

print(l1[0],l1[1],l1[2])

print(l1[-1],l1[-2],l1[-3])

print(l1[::3])

print(l1[::-1])

print(type(l1))

print(type(l2))

print(id(l1))

l1[1] = 110

print(l1)

print(id(l1))

l7 = s2.split()

print(l7)

Traversing on the list:

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# printing of list elements with +eve and -eve index

l1 = [10,20,30,40,50]

index = 0

for i in l1:

 print("The element at positive index",index,"is = ",i)

 index = index + 1

index1 = 0

for j in l1:

 print("The element at negative index",index1 - len(l1),"is = ",j)

 index1 += 1

ind = 0

for k in l1:

 print("Element at positive index",ind,"and at negative index",ind-len(l1),"is = ",k)

 ind += 1

inds = -1

for l in l1[::-1]:

 print("Element at",inds,"is = ",l)

 inds = inds - 1

List Functions:

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1) count():

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-> When we want to count the number of occurrences of each element/specified element in a list we can use "count()".

Syntax:

 list-data.count(element)

Note:

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when the element is fount in the list, count() can return the number of occurrences

but if the element is not found then, count() can return '0'.

l1 = [1,2,3,4,5,5,3,1,1,3,5]

print(l1.count(1))

for i in l1:

 print("The number of occurrences for",i,"is = ",l1.count(i))

print(l1.count(100))

2) index():

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-> to find the first occurrence of the specified element in a list, we can use "index()"

Syntax:

 list-data.index(element)

l1 = [11,22,33,44,55,55,44,33,22,11]

print(l1.index(11))

print(l1.index(33))

3) How to add elements into the list:

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i) append():

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when we want to add the element at the last in the list, we can use "append()".

Ex:

[10,20]

append(30) ==> [10,20,30]

append(40) ==> [10,20,30,40]

Syntax:

 list-data.append(element)

ii) insert():

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When we want to add the element at the specified index/position of the list, we can use "insert()".

Syntax:

 list-data.insert(index, element)

l1 = list()

print(l1)

l1.append(10) # [10]

l1.append(20) # [10,20]

l1.append(30) # [10,20,30]

print(l1)

l1.insert(1,11)

print(l1)

l1.insert(2,22)

print(l1)

How to remove elements from list:

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1) remove():

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-> to remove the specified element from the list, we can use "remove()".

Syntax:

 list-data.remove(element)

2) pop():

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-> to remove the last element from the list we can use "pop()".

Syntax:

 list-data.pop()

-> To remove the element based on the index, we can use "pop()".

Syntax:

 list-data.pop(index)

or

del list-data[index]

l1 = [10,11,20,22,30,33,40,44]

print(l1)

l1.remove(11)

print(l1)

l1.pop()

print(l1)

l1.pop(1)

print(l1)

del l1[2]

print(l1)

How to reverse the list:

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using slicing:

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 list-data-name[::-1]

reverse():

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Syntax:

 list-data.reverse()

l1 = [10,20,30,40,50]

print(l1)

l1.reverse()

print(l1)

Sorting of list:

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sort():

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-> to arrange elements of list in ascending:

 list-data.sort()

-> to arrange elements of list in descending order:

 list-data.sort(reverse = True)

l1 = [10,-1,0,11,-7,27,19,97,23,26,79]

print(l1)

l1.sort()

print(l1)

l1.sort(reverse = True)

print(l1)