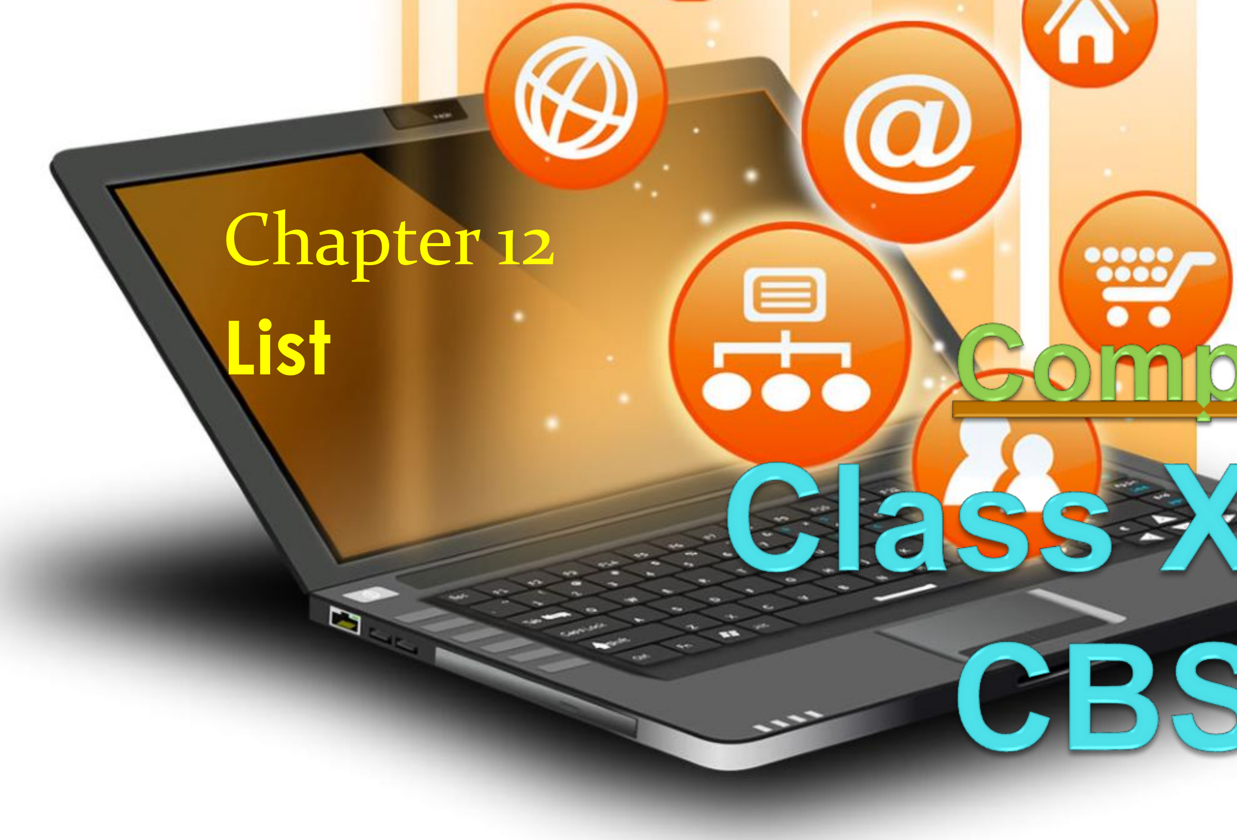
New syllabus 2022-23

Chapter 12

List

Computer Science

Class XI (As per CBSE Board)



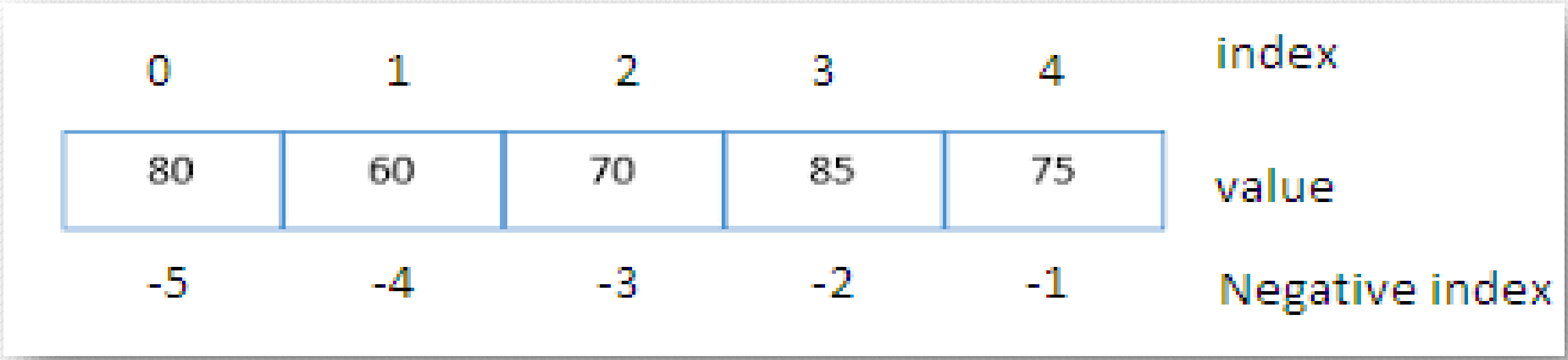
Visit : python.mykvs.in for regular updates

LIST

It is a collections of items and each item has its own index value.

Index of first item is 0 and the last item is n-1.Here n is number of items in a list.

Indexing of list



0	1	2	3	4	index
80	60	70	85	75	value
-5	-4	-3	-2	-1	Negative index

LIST

Creating a list

Lists are enclosed in square brackets [ ] and each item is separated by a comma.

Initializing a list

Passing value in list while declaring list is initializing of a list

e.g.

```
list1 = [‘English', ‘Hindi', 1997, 2000]
list2 = [11, 22, 33, 44, 55 ]
list3 = ["a", "b", "c", "d"]
```

Blank list creation

A list can be created without element

```
List4=[ ]
```

LIST

Access Items From A List

List items can be accessed using its index position.

e.g.

```
list =[3,5,9]
print(list[0])
print(list[1])
print(list[2])
print('Negative indexing')
print(list[-1])
print(list[-2])
print(list[-3])
```

output

```
3
5
9
Negative indexing
9
5
3
```

LIST

Iterating/Traversing Through A List

List elements can be accessed using looping statement.
e.g.

```
list =[3,5,9]
for i in range(0, len(list)):
    print(list[i])
```

Output

```
3
5
9
```

Slicing of A List

List elements can be accessed in subparts.

e.g.

```
list =['I','N','D','I','A']
print(list[0:3])
print(list[3:])
print(list[:])
```

Output

```
['I', 'N', 'D']
['I', 'A']
['I', 'N', 'D', 'I', 'A']
```

LIST

Updating / Manipulating Lists

We can update single or multiple elements of lists by giving the slice on the left-hand side of the assignment operator.

e.g.

```
list = ['English', 'Hindi', 1997, 2000]
print ("Value available at index 2 : ", list[2])
list[2:3] = 2001,2002 #list[2]=2001 for single item update
print ("New value available at index 2 : ", list[2])
print ("New value available at index 3 : ", list[3])
```

Output

```
('Value available at index 2 : ', 1997)
('New value available at index 2 : ', 2001)
('New value available at index 3 : ', 2002)
```

LIST

Add Item to A List

append() method is used to add an Item to a List.

e.g.

```
list=[1,2]
print('list before append', list)
list.append(3)
print('list after append', list)
```

Output

```
('list before append', [1, 2])
('list after append', [1, 2, 3])
```

NOTE :- extend() method can be used to add multiple item at a time in list.eg - list.extend([3,4])

LIST

Add Item to A List

append() method is used to add an Item to a List.

e.g.

```
list=[1,2]
print('list before append', list)
list.append(3)
print('list after append', list)
```

Output

```
('list before append', [1, 2])
('list after append', [1, 2, 3])
```

NOTE :- extend() method can be used to add multiple item at a time in list.eg - `list.extend([3,4])`

Add Two Lists

e.g.

```
list = [1,2]
list2 = [3,4]
list3 = list + list2
print(list3)
```

OUTPUT

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

LIST

Delete Item From A List

e.g.

```
list=[1,2,3]
print('list before delete', list)
del list [1]
print('list after delete', list)
```

Output

```
('list before delete', [1, 2, 3])
('list after delete', [1, 3])
```

e.g.

```
del list[0:2] # delete first two items
del list # delete entire list
```

Basic List Operations

Python Expression	Results	Description
len([4, 2, 3])	3	**Length**
[4, 2, 3] + [1, 5, 6]	[4, 2, 3, 1, 5, 6]	**Concatenation**
[‘cs!'] * 4	['cs!', 'cs!', 'cs!', 'cs!']	**Repetition**
3 in [4, 2, 3]	True	**Membership**
for x in [4,2,3] : print (x,end = ' ')	4 2 3	**Iteration**

Important methods and functions of List

Function	Description
list.append()	Add an Item at end of a list
list.extend()	Add multiple Items at end of a list
list.insert()	insert an Item at a defined index
list.remove()	remove an Item from a list
del list[index]	Delete an Item from a list
list.clear()	empty all the list
list.pop()	Remove an Item at a defined index
list.index()	Return index of first matched item
list.sort()	Sort the items of a list in ascending or descending order
list.reverse()	Reverse the items of a list
len(list)	Return total length of the list.
max(list)	Return item with maximum value in the list.
min(list)	Return item with min value in the list.
list(seq)	Converts a tuple, string, set, dictionary into list.
Count(element)	Counts number of times an element/object in the list

Some Programs on List

* find the largest/max number in a list **#Using sort**

```
a=[]
n=int(input("Enter number of elements:"))
for i in range(1,n+1):
   b=int(input("Enter element:"))
   a.append(b)
a.sort()
print("Largest element is:",a[n-1])
```

#using function definition

```
def max_num_in_list( list ):
   max = list[ 0 ]
   for a in list:
      if a > max:
         max = a
   return max
print(max_num_in_list([1, 2, -8, 0]))
```

```
list1, list2 = [123, 'xyz', 'zara', 'abc'], [456, 700, 200]
print "Max value element : ", max(list1)
print "Max value element : ", max(list2)
Output
Max value element :  zara
Max value element :  700
```

Some Programs on List

* find the mean of a list

```
def Average(lst):    #finding mean of a number
   return sum(lst) / len(lst)

# Driver Code
lst = [15, 9, 55, 41, 35, 20, 62, 49]
average = Average(lst)

# Printing average of the list
print("Average of the list =", round(average, 2))
```

Output

```
Average of the list = 35.75
```

Note : The inbuilt function mean() can be used to calculate the mean(average) of the list.e.g. mean(list)

Some Programs on List

* Linear Search

```
list_of_elements = [4, 2, 8, 9, 3, 7]

x = int(input("Enter number to search: "))

found = False

for i in range(len(list_of_elements)):
 if(list_of_elements[i] == x):
  found = True
  print("%d found at %dth position"%(x,i))
  break
if(found == False):
 print("%d is not in list"%x)
```

LIST

Some Programs on List

* Frequency of an element in list

```
import collections
my_list = [101,101,101,101,201,201,201,201]
print("Original List : ",my_list)
ctr = collections.Counter(my_list)
print("Frequency of the elements in the List : ",ctr)
```

OUTPUT

```
 Original List :  [101, 101,101, 101, 201, 201, 201, 201]
Frequency of the elements in the List :  Counter({101: 4, 201:4})
```

NOTE :SAME CAN BE DONE USING COUNT FUNCTION.E.G. lst.count(x)