Programming Essentials

(Chapter-8)

8.1 Define Lists and its type

List: A **list** is a data structure in Python that is a mutable, or changeable, ordered sequence of elements. Each element or value that is inside of a list is called an item. Just as strings are defined as characters between quotes, lists are defined by having values between square brackets [ ].

8.2 Assigning Values in Lists

```
list1 = ['physics', 'chemistry', 1997, 2000]
list2 = [1, 2, 3, 4, 5 ]
list3 = ["a", "b", "c", "d"]
print (list1[0])
print (list2[2])
print (list3[1:3])
```

Output:

```
        physics
        3
        ['b', 'c']
```

8.3 Explain Updating and Deleting List Elements

- Update list elements: You can update single or multiple elements of lists by giving the slice on the left-hand side of the assignment operator, and you can add to elements in a list with the append() method. For example:

list = ['physics', 'chemistry', 1997, 2000];

print "Value available at index 2 : "

print (list[2])

list[2] = 2001;

print "New value available at index 2 : "

print (list[2])

Output: Value available at index 2 :

1997

New value available at index 2 :

2001

- **Deleting List Elements:** To remove a list element, you can use either the del statement if you know exactly which element(s) you are deleting or the remove() method if you do not know. For example:

list1 = ['physics', 'chemistry', 1997, 2000];

print list1;

del list1[2];

print "After deleting value at index 2 : "

print list1;

Output: ['physics', 'chemistry', 1997, 2000]

         After deleting value at index 2 :

         ['physics', 'chemistry', 2000]

8.4 State Basic List Operations

Python Expression	Results	Description
len([1,2,3])	3	Length
[1,2,3] + [4,5,6]	[1,2,3,4,5,6]	Concatenation
["Hello"]*3	[Hello, Hello, Hello]	Repetition
3 in [1,2,3]	True	Membership

8.5 Explain Built-in List Functions and Methods

- **Built-in List Functions:**

cmp(list1, list2)   Compares elements of both lists

len(list)   Gives the total length of the list

max(list)   Return item from the list with max value

min(list)   Return item from the list with min value

list(seq)   Converts a Tuple into list

List methods:

list.append(obj)   appends a passed *obj into the list.*

aList = [123, 'xyz', 'zara', 'abc'];

aList.append(2009);

print (aList)

Output: [123, 'xyz', 'zara', 'abc', 2009]

list.count(obj)   count of how many times *obj in list.*

aList = [123, 'xyz', 'zara', 'abc', 123];

print ("Count for 123 : ", aList.count(123))

print ("Count for zara : ", aList.count('zara'))

Output :   Count for 123 : 2

                 Count for zara : 1

list.insert(index,obj)

inserts object *obj into list at offset index.*

aList = [123, 'xyz', 'zara', 'abc']

aList.insert(3, 2009)

print ("Final List : ", aList)

Output:

Final List : [123, 'xyz', 'zara', 2009, 'abc']

•Differences between Function & Methods:

- A function is a piece of code that is called by name. It can be passed data to operate on (i.e., the parameters) and can optionally return data (the return value). All data that is passed to a function is explicitly passed.

```
def sum(num1, num2):

return num1 + num2
```

- A method is a piece of code that is called by name that is associated with an object. In most respects it is identical to a function except for two key differences.

- It is implicitly passed for the object for which it was called.

- It is able to operate on data that is contained within the class.

```
class Dog:
    def my_method(self):
        print "I am a Dog"
dog = Dog()
dog.my_method()      # Prints "I am a Dog"
```

```python
#Use of Function & Method in list
b=50 # b is a Variable
# a1 is used as a list
a1=[10,20,32,33,22,44,55,34,53,45,22,56.25,22,89,34]
print(len(a1)) #len() is a function for calculate the length of a list
print(max(a1)) #max() is a function for determin the largest value from a list
print(min(a1)) #min() is a function for determin the smallest value from a list
a1.append(90)     #append() is a method
a1.insert(1,15)   #insert() is a method
print(a1)
print(a1.count(22)) #count() is a method
```

১০টি সংখ্যা / কতগুলো সংখ্যা যোগ করার একটি প্রোগ্রাম লেখ।

```
1  numbers=[34,54,56,21,34,56,78,87,85,70]
2  Summation=sum(numbers)
3  print(Summation)
```

১। পাইথনে List বলতে কী বোঝায়? List এর বৈশিষ্ট কী? সাধারণ ভেরিয়েবলের তুলনায় লিস্ট ব্যবহারের সুবিধা কী?

২। লিস্ট ফাংশন কী? লিস্টে ব্যবহৃত $len()$, $max()$ ও $min()$ ফাংশনের কাজ লেখ।

৩। লিস্ট ম্যাথড কী? লিস্টে ব্যবহৃত $append()$, $insert()$ ও $count()$ ম্যাথডের কাজ লেখ।

৪। ১০টি সংখ্যা / কতগুলো সংখ্যা যোগ করার একটি প্রোগ্রাম লেখ।