



Subject: Programming With Python (01CT1309)

Aim: Write a python program to create, append and remove lists in python.

Experiment No: 04

Date:

Enrollment No: 92400133055

[GITHUB](#)

Aim: Write a python program to create, append and remove lists in python.

IDE:

A collection of items can be managed and stored in an ordered sequence using a Python list, a flexible and robust data structure. Because lists may hold components of several data types—integers, texts, and even other lists—they are incredibly versatile for various computer applications. You can quickly add, remove, and alter elements from Python lists and carry out operations like sorting and slicing.

Example of List in Python

```
ages = [19, 26, 29]
```

```
print(ages)
```

Output:

```
1 ages = [19, 26, 29]
2 print(ages)
```

PROBLEMS

OUTPUT

DEBUG CONSOLE

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
```

- [19, 26, 29]
- PS E:\SEM 3\PWP>

Task:

```
a = list(range(5))
```

```
print(a)
```

Output:



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```
4     a = list(range(5))
5     print(a)
```

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PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"

- [0, 1, 2, 3, 4]
- PS E:\SEM 3\PWP>

b = list(range(5,10))

print(b)

Output:

```
7     b = list(range(5,10))
8     print(b)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"

- [5, 6, 7, 8, 9]
- PS E:\SEM 3\PWP>

c = list(range(0,10,2))

print(c)

output:

```
10    c = list(range(0,10,2))
11    print(c)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"

- [0, 2, 4, 6, 8]
- PS E:\SEM 3\PWP>

d = list(range(10,0,-2))

print(d)



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output:

```
13     d = list(range(10,0,-2))
14     print(d)
```

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OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
```

- [10, 8, 6, 4, 2]
- PS E:\SEM 3\PWP>

Add Elements to a Python List

1. Python append() Method

Adds element to the end of a list.

```
List = ['Mathematics', 'chemistry', 1997, 2000]
```

```
List.append(20544)
```

```
print(List)
```

output:

```
16     List = ['Mathematics', 'chemistry', 1997, 2000]
17     List.append(20544)
18     print(List)
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
```

- ['Mathematics', 'chemistry', 1997, 2000, 20544]
- PS E:\SEM 3\PWP>

2. Python insert() Method

Inserts an element at the specified position.



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```
List = ['Mathematics', 'chemistry', 1997, 2000]
```

```
# Insert at index 2 value 10087
```

```
List.insert(2, 10087)
```

```
print(List)
```

```
output:
```

```
21     List = ['Mathematics', 'chemistry', 1997, 2000]
22     List.insert(2, 10087)
23     print(List)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Code + □ ✖

```
| PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
| ['Mathematics', 'chemistry', 10087, 1997, 2000]
| PS E:\SEM 3\PWP>
```

3. Python extend() Method

Adds items of an iterable(list.) to the end of a list.

```
List1 = [1, 2, 3]
```

```
List2 = [2, 3, 4, 5]
```

```
# Add List2 to List1
```

```
List1.extend(List2)
```

```
print(List1)
```

```
output:
```



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```
25 List1 = [1, 2, 3]
26 List2 = [2, 3, 4, 5]
27 List1.extend(List2)
28 print(List1)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Code +

```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
● [1, 2, 3, 2, 3, 4, 5]
○ PS E:\SEM 3\PWP>
```

Important Functions of the Python List

1. Python sum() Method

Calculates the sum of all the elements of the List.

```
List = [1, 2, 3, 4, 5]
print(sum(List))
output
```

```
30 List = [1, 2, 3, 4, 5]
31 print(sum(List))
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Code +

```
● PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
15
○ PS E:\SEM 3\PWP>
```

Task:

```
List = ['gfg', 'abc', 3]
print(sum(List))
output:
```

no output as sum function only works with numerical data



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2. Python count() Method

Calculates the total occurrence of a given element of the List.

```
List = [1, 2, 3, 1, 2, 1, 2, 3, 2, 1]
print(List.count(1))
List = ['a', 'b', 'c', 'd', 'a']
print(List.count('a'))
```

output:

```
36     List = [1, 2, 3, 1, 2, 1, 2, 3, 2, 1]
37     print(List.count(1))
38
39     List = ['a', 'b', 'c', 'd', 'a']
40     print(List.count('a'))
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
● 4
  2
○ PS E:\SEM 3\PWP>
```

3. Python len() Method

Calculates the total length of the List.

```
List = [1, 2, 3, 1, 2, 1, 2, 3, 2, 1]
print(len(List))
output:
```



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```
43     List = [1, 2, 3, 1, 2, 1, 2, 3, 2, 1]
44     print(len(List))
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
▶ 10
▶ PS E:\SEM 3\PWP>
```

4. Python index() Method

Returns the index of the first occurrence. The start and end indexes are not necessary parameters.

```
List = [1, 2, 3, 1, 2, 1, 2, 3, 2, 1]
print(List.index(2))
output:
```

```
46     List = [1, 2, 3, 1, 2, 1, 2, 3, 2, 1]
47     print(List.index(2))
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
1
PS E:\SEM 3\PWP>
```

Task:

```
List = [1, 2, 3, 1, 2, 1, 2, 3, 2, 1]
print(List.index(2, 2))
output:
```



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```
49     List = [1, 2, 3, 1, 2, 1, 2, 3, 2, 1]
50     print(List.index(2, 2))
```

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
```

● 4

○ PS E:\SEM 3\PWP>

5. Python min() Method

Calculates minimum of all the elements of List.

```
numbers = [5, 2, 8, 1, 9]
```

```
print(min(numbers))
```

output:

```
53     numbers = [5, 2, 8, 1, 9]
54     print(min(numbers))
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
```

● 1

○ PS E:\SEM 3\PWP>

6. Python max() Method

Calculates the maximum of all the elements of the List.

```
numbers = [5, 2, 8, 1, 9]
```

```
print(max(numbers))
```

output:



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```
56     numbers = [5, 2, 8, 1, 9]
57     print(max(numbers))
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
● 9
○ PS E:\SEM 3\PWP>
```

7. Python sort() Method

Sort the given data structure (both tuple and list) in ascending order.

List = [2.3,4.445,3,5.33,1.054,2.5]

List.sort()

print(List)

output:

```
59     List = [2.3,4.445,3,5.33,1.054,2.5]
60     List.sort()
61     print(List)
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
[1.054, 2.3, 2.5, 3, 4.445, 5.33]
PS E:\SEM 3\PWP>
```

List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]
#Reverse flag is set True
List.sort(reverse=True)
print(List)
output:



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```
63     List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]
64     List.sort(reverse=True)
65     print(List)
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
[5.33, 4.445, 3, 2.5, 2.3, 1.054]
PS E:\SEM 3\PWP>
```

8. Python reverse() Method

reverse() function reverses the order of list.

```
# creating a list
list=[1,2,3,4,5]
#reversing the list
list.reverse()
#printing the list
print(list)
```

Output:

```
67     list = [1,2,3,4,5]
68     list.reverse()
69     print(list)
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
▶ [5, 4, 3, 2, 1]
▶ PS E:\SEM 3\PWP>
```



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Deletion of List Elements

To Delete one or more elements, i.e. remove an element, many built-in Python list functions can be used, such as `pop()` and `remove()` and keywords such as `del`.

1. Python `pop()` Method

Removes an item from a specific index in a list.

List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]

`print(List.pop())`

output:

```
71     List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]
72     print(List.pop())
```

PROBLEMS

OUTPUT

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PS E:\SEM 3\PWP> `python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"`

2.5

PS E:\SEM 3\PWP>

List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]

`print(List.pop(0))`

output:

```
74     List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]
75     print(List.pop(0))
```

PROBLEMS

OUTPUT

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PS E:\SEM 3\PWP> `python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"`

2.3

PS E:\SEM 3\PWP>

2. Python `del()` Method

Deletes an element from the list using it's index.



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List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]

del List[0]

print(List)

output:

```
77     List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]
78     del List[0]
79     print(List)
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
[4.445, 3, 5.33, 1.054, 2.5]
PS E:\SEM 3\PWP>
```

3. Python remove() Method

Removes a specific element using it's value/name.

List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]

List.remove(3)

print(List)

output:

```
81     List = [2.3, 4.445, 3, 5.33, 1.054, 2.5]
82     List.remove(3)
83     print(List)
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
[2.3, 4.445, 5.33, 1.054, 2.5]
PS E:\SEM 3\PWP>
```



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```
# removing duplicates from a list using dictionaries
```

```
my_list_1 = [5, 2, 90, 24, 10, 2, 90, 34]
```

```
my_list_2 = ['a', 'a', 'a', 'b', 'c', 'd', 'd', 'e']
```

```
# removing duplicates from list 1
```

```
my_list_1 = list(dict.fromkeys(my_list_1))
```

```
print(my_list_1)
```

```
output:
```

```
85     my_list_1 = [5, 2, 90, 24, 10, 2, 90, 34]
86     my_list_2 = ['a', 'a', 'a', 'b', 'c', 'd', 'd', 'e']
87     my_list_1 = list(dict.fromkeys(my_list_1))
88     print(my_list_1)
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
```

[5, 2, 90, 24, 10, 34]

PS E:\SEM 3\PWP>

```
# removing duplicates from list 2
```

```
my_list_2 = list(dict.fromkeys(my_list_2))
```

```
print(my_list_2)
```

```
output:
```

```
90     my_list_2 = ['a', 'a', 'a', 'b', 'c', 'd', 'd', 'e']
91     my_list_2 = list(dict.fromkeys(my_list_2))
92     print(my_list_2)
```

PROBLEMS

OUTPUT

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
```

['a', 'b', 'c', 'd', 'e']

PS E:\SEM 3\PWP>



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Combining lists

We can even combine lists with the help of the `zip()` function which results in a list of tuples. Here each item from list A is combined with corresponding elements from list B in the form of a tuple.

combining lists with the help of `zip()` function

```
my_list_1 = [5, 2, 90, 24, 10]
my_list_2 = [6, 3, 91, 25, 12]
```

combined

```
my_combined_list = list(zip(my_list_1, my_list_2))
print(my_combined_list)
```

output:

```
94     my_list_1 = [5, 2, 90, 24, 10]
95     my_list_2 = [6, 3, 91, 25, 12]
96     my_combined_list = list(zip(my_list_1, my_list_2))
97     print(my_combined_list)
```

PROBLEMS

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
[(5, 6), (2, 3), (90, 91), (24, 25), (10, 12)]
PS E:\SEM 3\PWP>
```

Finding the most common item

To find the most frequent element we make use of the `set()` function. The `set()` function removes all the duplicates from the list, and the `max()` function returns the most frequent element (which is found with the help of 'key'). The key is an optional single argument function.

to find the most frequent element from the list

```
my_list = ['a', 'a', 'a', 'b', 'c', 'd', 'd', 'e']
most_frequent_value = max(set(my_list), key=my_list.count)
print("The most common element is:", most_frequent_value)
output:
```



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```
104     my_list = ['a', 'a', 'a', 'b', 'c', 'd', 'd', 'e']
105     most_frequent_value = max(set(my_list), key=my_list.count)
106     print("The most common element is:", most_frequent_value)
```

PROBLEMS

OUTPUT

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- PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"
The most common element is: a
- PS E:\SEM 3\PWP>

Flatten a list of lists

Sometimes we encounter a list where each element in itself is a list. To convert a list of lists into a single list, we use list comprehension.

```
# to flatten a list_of_lists by using list comprehension
```

```
list_of_lists = [[1, 2],
                 [3, 4],
                 [5, 6],
                 [7, 8]]
```

```
# using list comprehension
```

```
my_list = [item for List in list_of_lists for item in List]
```

```
print(my_list)
```

```
output
```



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```
108     list_of_lists = [[1, 2],  
109         [3, 4],  
110         [5, 6],  
111         [7, 8]]  
112 my_list = [item for List in list_of_lists for item in List]  
113 print(my_list)
```

PROBLEMS

OUTPUT

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PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\lab_4.py"

▶ [1, 2, 3, 4, 5, 6, 7, 8]

○ PS E:\SEM 3\PWP>

Post Lab Exercise:

- a. Write a Python program to multiply all the items in a list.

```
1 #Question 1  
2 import math  
3 numbers = [1,3,5,7,9]  
4 product = math.prod(numbers)  
5 print("Product of list elements:", product)
```

PROBLEMS 1

OUTPUT

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PORTS

▶ PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\post_lab_4.py"
▶ Product of list elements: 945
PS E:\SEM 3\PWP> █

- b. Write a Python program to get the largest number from a list.



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Faculty of Engineering & Technology
Department of Information and Communication Technology

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```
7 #Question 2
8 numbers = [11, 12, 13, 14, 15]
9 print("Largest number:", max(numbers))
```

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PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\post_lab_4.py"

- Largest number: 15
- PS E:\SEM 3\PWP>

c. Write a Python program to remove duplicates from a list.

```
11 #Question 3
12 user = [1, 2, 2, 3, 4, 4, 5]
13 removed = list(set(user))
14 print("List after removing duplicates:", removed)
```

PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\post_lab_4.py"

- List after removing duplicates: [1, 2, 3, 4, 5]
- PS E:\SEM 3\PWP>

d. Write a Python program to get the frequency of elements in a list.

```
16 #Question 4
17 from collections import Counter
18 items = ['yes', 'no', 'yes', 'yes', 'no', 'yes']
19 freq = Counter(items)
20 print(freq)
```

PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\post_lab_4.py"

- Counter({'yes': 4, 'no': 2})
- PS E:\SEM 3\PWP>



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- e. Find common items from two lists

```
22 #Question 5
23 l1 = [1, 2, 3, 4, 5]
24 l2 = [3, 4, 5, 6, 7]
25 common = list(set(l1).intersection(l2))
26 print("Common items:", common)
```

PROBLEMS **1** OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\post_lab_4.py"
Common items: [3, 4, 5]
PS E:\SEM 3\PWP>
```

- f. Convert a list of multiple integers into a single integer

```
29 nums = [1, 2, 3, 4]
30 single_int = ""
31 for n in nums:
32     single_int = single_int + str(n)
33 single_int = int(single_int)
34 print(single_int)
```

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```
PS E:\SEM 3\PWP> python -u "e:\SEM 3\PWP\Class Tutorials\post_lab_4.py"
● 1234
○ PS E:\SEM 3\PWP>
```