**Practice/Task 2 ---Python Data Structures**

**With solutions**

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28. **How to flatten a list in python?**
29. **How to convert python list to other data structures like set, tuple, dictionary?**
30. **How to apply a function to all items in the list?**
31. **How to filter the elements based on a function in a python list?**
32. **How python lists are stored in memory?**

Answers/Solutions

## ****1. Is a list mutable?****

## Yes, List is ****Mutable**** We can change the value of list after assigning a value.

lst = [1,2,3,4,5]

lst[1] = 'Two'

print(lst)

**2.Does a list need to be homogeneous?**

 No, The list is don't need to be homogeneous, List can contain heterogeneous like integer, float, string, tuple, dictionary.

lst = [1,2.0,'Three',(4),{'Five':5}]

print(lst)

## ****3.What is the difference between a list and a tuple.****

List is Mutable, while Tuple is Immutable, tuples are faster then list.

**list example:**

lst = [1,2,3,4,5]

lst[1] = 'Two'

print(lst)

**tuple example:**

tpl = (1,'Two',3.0,[4])

tpl[1] = 2

it throws a TypeError: 'tuple' object does not support item assignment

**4.How to find the number of elements in the list?**

 Using len() function we can find the number of elements in list.

lst = [1,2,3,4,5]

len(lst)

**5.How to check whether the list is empty or not?**

 if len(lst)==0: using this function we can check list is empty or not.

lst = [1,2,3,4,5]

len(lst)==0

**It return False**

lst = []

len(lst)==0

**It return True**

**6.How to find the first and last element of the list?**

Using Index method we can find the first and last element of a list

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

To find First element : lst[0].

To find Last element : lst[-1].

**7.How to find the largest and lowest value in the list?**

Using min() and Max() inbuild function we can find the minimum and maximum value of a element in a list.

lst = [1,2,3,4,5]

print(min(lst))

print(max(lst))

**8.How to access elements of the list?**

Using Index value we can access the elements in list.

lst = [1,2,3,4,5]

print(lst[3])

print(lst[1:4])

**9.Remove elements in a list before a specific index.**

Using some inbuild functions like pop, remove and del we can remove the elements from the list.

lst = [1,2.0,'Three',(4),{'Five':5}]

lst.pop(3) # Using Index Value

lst.remove('Three') # Using Name Of The Value

del lst[1:3] # Using Index/ Index Range

**10.Remove elements in a list between 2 indices**

a = [1,2,3,4,5,6,7,8,9]

del a[::2]

print(a)

**11.Return every 2nd element in a list between 2 indices**

Use Slicing Method we can return every 2nd element in a list.

a = [1,2,3,4,5,6,7,8,9]

a[::2]

**12.Get the first element from each nested list in a list**

def ext(lst):

  return [item[0] for item in lst]

lst1 = [[1, 2], [3, 4, 5], [6, 7, 8, 9]]

print(ext(lst1))

**13.How to modify elements of the list?**

Using index value and assignment operator we can modify the elements in list.

a = [1,2,3,4,5,6,7,8,9]

a[1]= 'hi'

**14.How to concatenate two lists?**

using + operator we can concatenate two list.

a = [1,2,3,4,5]

b = [6,7,8,9]

print(a+b)

**15.How to add two lists element-wise in python?**

list1 = [1, 2, 3]

list2 = [4, 5, 6]

sum = []

for (a,b) in zip(list1,list2):

  sum.append(a+b)

print(sum)

**16.Difference between del and clear?**

 To remove items by index or slice we can use the del method in python. =>  del list[index] or del list

lst = [1,2.0,'Three',(4),{'Five':5}]

del lst[1:3]

clear() method in python is used to empty the entire list. => list.clear()

lst = [1,2.0,'Three',(4),{'Five':5}]

lst.clear()

**17.Difference between remove and pop?**

remove() method removes the elements from list by parameter.  list.remove(parameter)

lst = [1,2.0,'Three',(4),{'Five':5}]

lst.remove('Three')

pop() method removes the elements from list by index value.    list.pop(index)

lst = [1,2.0,'Three',(4),{'Five':5}]

lst.pop(3)

**18.Difference between append and extend?**

append() method adds an element to a list.

lst = [1,2,3,4,5]

lst1 = [1,2.0,'Three',(4),{'Five':5}]

lst.append(lst1)

lst

[1, 2, 3, 4, 5, [1, 2.0, 'Three', 4, {'Five': 5}]]

extend() method concatenates the first list with another list .

lst = [1,2,3,4,5]

lst1 = [1,2.0,'Three',(4),{'Five':5}]

lst.extend(lst1)

lst

[1, 2, 3, 4, 5, 1, 2.0, 'Three', 4, {'Five': 5}]