Registration ID:GO_STP_10461

Assignment:2

Q:1 Is a list mutable?

The list is a mutable data type. Once a list has been created:
Elements can be modified. Individual values can be replaced. The order of elements can be changed

Q:2 Does a list need to be homogeneous?

no, a list can heterogenous and can be homogenous it supports both types of data

Q:3 What is the difference between a list and a tuple?

~Lists are mutable,the list is better for performing operations such as insertion and deletion,lists consume more memory, the unexpected changes and errors are more likely to occur.
~ Tuples are immutable, the tuple data type is appropriate for accessing the elements, tuple consumes less memory as compared to the list, Tuple does not have many built-in methods.

Q:4 How do find the number of elements in the list?

There is a built-in function called len() for getting the total number of items in a list, tuple, arrays, dictionary, etc. The len() method takes an argument where you may provide a list and it returns the length of the given list. And we can use for loop to count the length.

Q:5 How to check whether the list is empty or not?

```
if len(a)==0:
   print ("list is empty")
else:
   print ("list is not empty")
```

Q:6 How to find the first and last element of the list?

~Using only index in any list the first element is assigned index value 0 and the last element can be considered as a value -1. So we apply these index values to the list directly and get the desired result.

~List slicing is another method in which we directly refer to the positions of elements using the slicing technique using colons. The first element is accessed by using a blank value before the first colon and the last element is accessed by specifying the len() with -1 as the input.
~We can also use a for loop within operator giving the index values as 0 and -1

Q:7 How do find the largest and lowest value in the list?

~Sort the list in ascending order and print the first element in the list.
list.sort()
~Using min() method:print("lowest value is:", min(list))
~Using max() method:print("largest value is:", max(list))

Q:8 How to access elements of the list?

We can access elements using for loop:for x in list1: print x, list slicing: print(list1[2:5])

Q:9 Remove elements in a list before a specific index

The del function helps to delete the list variable from code, pop function helps to delete the individual element according to the positioning of the list. Return the position value, remove function helps to delete the first occurrence of the number or string mentioned in its arguments, Clear function clear all elements present in the list without deleting its variable.

Q:10 Remove elements in a list between 2 indices

del my_list[2:6]

Q:11 Return every 2nd element in a list between 2 indices

```
a_list = [0, 1, 2, 3,4,5,6,7,8,9,10]
        ele = a_list[::2]
        print(ele)
        O/P: 0,2,4,6,8
```

Q:12 Get the first element from each nested list in a list

```
Alist = [['Mon', 1], ['Tue', 'Wed', "Fri"], [12,3,7]]
        for item in Alist:
                print((item[0]))
```

Q:13 How to modify elements of the list?

```
thislist = ["apple", "banana", "cherry"]
                thislist[1] = "mango"
                print(thislist)
```

Q:14 How to concatenate two lists?

method1:for i in test_list2 :test_list1.append(i)
method2:test_list1 = test_list1 + test_list2 method3:test_list1.extend(test_list2)
method4:res_list = [*test_list1, *test_list2]

Q:15 How to add two lists element-wise in python?

```
res = [i + j for i, j in zip(test_list1, test_list2)]
```

Q:16 Difference between del and clear?

Del: To remove items by index or slice we can use the del method in python. It removes the specified index element.

Clear: clear() method in python is used to empty the entire list. This can be used if someone wants an empty list for any other purpose.

Q:17 Difference between remove and pop?

Ans Remove() deletes the matching element from the list whereas the del and pop remove the element present at the specified index.

Q:18 Difference between append and extend?

Ans Append: Adds its argument as a single element to the end of a list. The length of the list increases by one.
Whereas
extend(): Iterates over its argument and adding each element to the list and extending the list. The length of the list increases by many elements in its argument.

Q:19 Difference between indexing and Slicing?

Ans "Indexing" means referring to an element of an iterable by its position within the iterable whereas "Slicing" means getting a subset of elements from an iterable based on their indices.

Q:20 Difference between sort and sorted?

Ans: The primary difference between the list sort() function and the sorted() function is that the sort() function will modify the list it is called on whereas The sorted() function will create a new list containing a sorted version of the list it is given

Q:21 Difference between reverse and reversed?

Ans: reverse() reverses the elements in the container whereas reversed() doesn't reverse anything, it merely returns an object that can be used to iterate over the container's elements in reverse order.

Q:22 Difference between copy and deep copy?

Ans: A shallow copy constructs a new compound object and then (to the extent possible)

inserts references into it to the objects found in the original. A deep copy constructs a new compound object and then, recursively, inserts copies into it of the objects found in the original.

Q:23 How to remove duplicate elements in the list?

Ans: To remove the duplicates from a list, you can make use of the built-in function set(). The specialty of the set() method is that it returns distinct elements.
Example:

```
my_list = [1,1,2,3,2,2,4,5,6,2,1]
my_final_list = set(my_list)
print(list(my_final_list))
```

Q:24 How to find an index of an element in the python list?

Ans index() to find only the index of the first occurrence of an item in a list. Call list. index(value) to find the index of the first occurrence of a value in a list

Q:25 How to find the occurrences of an element in the python list?

Ans: The count() method returns the number of times an element appears in the list.

Q:26 How to insert an item at a given position?

Ans: insert() is an inbuilt function in Python that inserts a given element at a given index in a list.

Q:27 How to check if an item is on the list?

Ans: To check if the item exists in the list, use Python “in operator”. We can use in operator with if condition, and if the item exists in the list, then condition returns True, and if not, then it returns false.

Q:28 How to flatten a list in python?

Converting a list of lists (2D), into a list (1D) is called flattening.
One way to do so is use nested loop
Example:

```
List_2D = [[1,2,3],[4,5,6],[7,8,9]] #List to be flattened
List_flat = []

for i in range(len(List_2D)): #Traversing through the main list
  for j in range (len(List_2D[i])): #Traversing through each sublist
    List_flat.append(List_2D[i][j]) #Appending elements into our flat_list

print("Original List:",List_2D)
print("Flattened List:",List_flat)
```

Q:29 How to convert a python list to other data structures like set, tuple, dictionary?

Ans: Typecasting a list to tuple can be done by simply using tuple(list_name).

Q:30 How to apply a function to all items in the list?

Ans: Apply a function to each member of a Python list:

1.Using map() function:
the map() function applies a function to every item of iterable and yields the results. The following code converts a list of lowercase characters to a list of uppercase characters:
Example:

```
chars = ['a', 'b', 'c']

upper = list(map(str.upper, chars))
print(upper)
```

2. Using List Comprehension:
use list comprehension to construct a new list, where each element results from some function applied to each member of the given list. Following is a simple example demonstrating usage of this function:
Example:

```
chars = ['a', 'b', 'c']

upper = [ch.upper() for ch in chars]
print(upper)
```

3. Using lambda function:
Another plausible way of mapping is to create small anonymous functions using the lambda function. This is often useful when the conversion function is not available.

Example:

```
odd = [1, 3, 5, 7, 9]

  even = list(map(lambda x: x + 1, odd))
  print(even)
```

Q:31 How to filter the elements based on a function in a python list?

Ans: Python has a built-in function called filter() that allows you to filter a list. The filter() function iterates over the elements of the list and applies the fn() function to each element. It returns an iterator for the elements where the fn() returns True.
Example:

```
scores = [70, 60, 80, 90, 50]
filtered = filter(lambda score: score >= 70, scores)

print(list(filtered))
```

Q:32 How python lists are stored in memory?

Ans: For the implementation of a list, a contiguous array of references to other objects is used. Python keeps a pointer to this array and the array's length is stored in a list head structure.This makes indexing of a list independent of the size of the list or the value of the index. When items are appended or inserted the array of references is resized