COLLECTION (LIST)

1

1

LIST

- Lists are used to store multiple values in a single variable.
- Lists are used to store collections of data
- Lists are enclosed in square brackets:

```
L1 = ["one", "two", "three"]
L2 = [2,3,6,12,5,3]     # allow duplicate values
L3 = [True,False]
L4 = ["xyz","ABC",25,1.4]
```

2

2

Accessing Individual Elements

```
L = [23, 56, 6, -9, 8, 6] # there are 6 elements
     0   1   2   3  4  5   :  positive index
    -6  -5  -4  -3 -2 -1   :  negative index
```

3

3

List Length

```
# Xuất ra chiều dài (số phần tử) của list
L = ["app", "ana", "anh"]
print(len(L))
```

```
Output:
3
```

4

4

Constructor list()

```
# Dùng list() constructor để tạo list
L = list(("app", "ana", "anh"))
print(type(L))
print(len(L))
```

```
Output:
<class 'list'>
3
```

5

5

Access List

```
# Dùng list() constructor để tạo list
L = list(("app", "ana",  "anh"))
print(L[1])
print(L[-1])
```

```
Output:
ana
anh
```

6

6

Slicing

- Slicing lets you extract a part of any string/list based on a start index and an end index.
- Syntax:
  `string/list_name[`*`starting_index`*`:`*`finishing_index`*`:`*`character_iterate`*`]`
  - **string/list_name** is the name of the variable holding the string/list.
  - **starting_index** is the index of the beginning character/element which you want in your sub-string/list.
  - **finishing_index** is one more than the index of the last character/element that you want in your substring/sublist.
  - **character_iterate**

7

7

Access List

```
# range of index
L = ["lem", "ana", "app", "ang", "win", "mon", "go"]
print(L[2:5])


Output:
["app", "ang", "win"]
```

8

8

Access List

```
# range of index
L = ["lem", "ana", "app", "ang", "win", "mon", "go"]
print(L[2:])


Output:
["app", "ang", "win", "mon", "go"]
```

9

9

Access List

```
# range of index
L = ["lem", "ana", "app", "ang", "win", "mon", "go"]
print(L[:5])


Output:
["lem", "ana", "app", "ang", "win"]
```

10

10

Access List

```
# range of index
L = ["lem", "ana", "app", "ang", "win", "mon", "go"]
print(L[-3:-1])


Output:
["win", "mon"]
```

11

11

Access List

```
# range of index
L = ["lem", "ana", "app", "ang", "win", "mon", "go"]
print(L[0:7:2])


Output:
["lem", "app", "win", "go"]
```

12

12

Access List

```
# range of index
L = ["lem", "ana", "app", "ang", "win", "mon", "go"]
print(L[0::2])
```

Output:
["lem", "app", "win", "go"]

13

13

Access List

```
# range of index
L = ["lem", "ana", "app", "ang", "win", "mon", "go"]
print(L[::2])
```

Output:
["lem", "app", "win", "go"]

14

14

Access List

```
# Kiểm tra có ‘anh’ trong L không
L = ["lem", "ana", "app", "ang", "win", "mon", "go"]
if "anh" in L:
  print("Có 'anh' trong L")
else:
  print("Không có 'anh' trong L")
```

Output:
Không có 'anh' trong L

15

15

Change List

```
L = ["a", "b", "c"]
L[1] =  "bb"
print(L)
```

Output:
["a", "bb", "c"]

16

16

Change List

```
L = ["a", "b", "c"]
L[1:3] =  ["ab", "dd"]
print(L)
```

Output:
[‘a’, ‘ab’, ‘dd’]

17

17

Change List

```
L = ["a", "b", "c"]
L[1:2] =  ["b1", "b2"]
print(L)
```

Output:
['a', 'b1', 'b2', 'c']

18

18

Change List

```
L = ["a", "b", "c"]
L[1:3] =  ["b1"]
print(L)
```

Output:
['a', 'b1']

19

19

Insert items

```
L = ["a", "b", "c"]
L.insert(2,"b1")
print(L)
```

Output:
['a', 'b', 'b1', 'c']

20

20

List Methods

Python has a set of built-in methods that you can use on lists.

Method	Description
append()	Adds an element at the end of the list
clear()	Removes all the elements from the list
copy()	Returns a copy of the list
count()	Returns the number of elements with the specified value
extend()	Add the elements of a list (or any iterable), to the end of the current list
index()	Returns the index of the first element with the specified value
insert()	Adds an element at the specified position
pop()	Removes the element at the specified position
remove()	Removes the item with the specified value
reverse()	Reverses the order of the list
sort()	Sorts the list

21

21

Extend List

```
thislist = ["apple", "banana", "cherry"]
tropical = ["mango", "pineapple", "papaya"]
thislist.extend(tropical)
print(thislist)
```

22

22

Extend List

```
thislist = ["apple", "banana", "cherry"]
thistuple = ("kiwi", "orange")
thislist.extend(thistuple)
print(thislist)
```

23

23

Remove Specified Item

```
thislist = ["apple", "banana", "cherry"]
thislist.remove("banana")
print(thislist)
```

24

24

Remove Specified Index

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

25

25

Remove Specified Index

```
thislist = ["apple", "banana", "cherry"]
thislist.pop()
print(thislist)
```

26

26

Remove Specified Index

```
thislist = ["apple", "banana", "cherry"]
del thislist[0]
print(thislist)
```

27

27

Remove Specified Index

```
thislist = ["apple", "banana", "cherry"]
del thislist
```

28

28

Clear the List

```
thislist = ["apple", "banana", "cherry"]
thislist.clear()
print(thislist)
```

29

29

Loop

```
#
thislist = ["apple", "banana", "cherry"]
for x in thislist:
  print(x)
```

30

30

Loop List

```
#
thislist = ["apple", "banana", "cherry"]
for i in range(len(thislist)):
  print(thislist[i])
```

31

31

Loop List

```
#
thislist = ["apple", "banana", "cherry"]
i = 0
while i < len(thislist):
  print(thislist[i])
  i = i + 1
```

32

32

List comprehension

```
#
thislist = ["apple", "banana", "cherry"]
[print(x) for x in thislist]
```

33

33

List comprehension

```
#
fruits=["apple", "banana", "cherry", "kiwi", "mango"]
newlist = [x for x in fruits if "a" in x]
print(newlist)
```

34

34

Sort List

```
thislist = ["orange", "mango", "kiwi", "pineapple"]
thislist.sort()
print(thislist)
```

35

35

Sort List

```
thislist = [100, 50, 65, 82, 23]
thislist.sort()
print(thislist)
```

36

36

Sort List

```
thislist = ["orange", "mango", "kiwi", "pineapple"]
thislist.sort(reverse = True)
print(thislist)
```

37

37

Reverse Order

```
thislist = ["banana", "Orange", "Kiwi", "cherry"]
thislist.reverse()
print(thislist)
```

38

38

Copy List

```
thislist = ["apple", "banana", "cherry"]
mylist = thislist.copy()
print(mylist)
```

39

39

Join two lists

```
list1 = ["a", "b", "c"]
list2 = [1, 2, 3]

list3 = list1 + list2
print(list3)
```

40

40

Join two lists

```
list1 = ["a", "b" , "c"]
list2 = [1, 2, 3]

for x in list2:
  list1.append(x)

print(list1)
```

41

41

Count List

```
L = [ 1, 2, 6, 4, 8, 5, 9, 7, 8, 10,
1, 6, 3, 8, 6, 10, 3, 8, 2, 7,
6, 5, 7, 6, 8, 6, 7, 5, 6, 6,
5, 6, 7, 5, 6, 4, 8, 6, 8, 10 ]
print("Rating     Frequency")
for i in range(1,11):
   print("%6d %13d" %(i,L.count(i)))
```

42

42

Viết chương trình cho người dùng nhập 3 số nguyên. Sau đó, in ra số dấu hoa thị tương ứng với 3 số nguyên đó theo mẫu sau:

```
Enter integer 1: 9
Enter integer 2: 7
Enter integer 3: 12
Element      Value  Asterisks
      0          9  *********
      1          7  *******
      2         12  ************
```

43

43