PythonTip 02 - List Slicing-class-version

February 21, 2024

1 List Slicing

List slicing is a way to get not just one element of a list, but a whole portion.

[ ]:
```
L = ["a", "b", "c", "d", "e", "f"]
L[2]
```

[ ]:
```
'c'
```

`L[a:b]` means the portion of the list from index `a` (inclusive) to index `b` (exclusive).

[ ]:
```
L[2:5] # [L[2], L[3], L[4]]
```

[ ]:
```
['c', 'd', 'e']
```

If you leave out `a`, it starts from the beginning of the list. If you leave out `b`, it goes to the end.

[ ]:
```
L[:4]
```

[ ]:
```
['a', 'b', 'c', 'd']
```

[ ]:
```
L[1:]
```

[ ]:
```
['b', 'c', 'd', 'e', 'f']
```

[ ]:
```
print(L[:])
```

[ ]:
```
R = L[:] # a copy of the list!
R = list(L) # another way to do the same thing
```

[ ]:
```
L = [1,2,3,4,5]
```

[ ]:
```
R = L.copy()
```

[ ]:
```
print(id(L))
print(id(R))
```

```
4572045760
4357474432
```

[ ]:
```
R.append(6)
```

[ ]:
```
print(L)
print(R)
```

```
[1, 2, 3, 4, 5]
[1, 2, 3, 4, 5, 6]
```

[ ]:
```
L = ['a', 'b', 'c', 'd', 'e', 'f']
R = list(L)
print(L)
print(R)
```

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

[ ]:
```
R.pop(0)
print(R)
print(L)
```

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

[ ]:
```
print(L)
```

```
['b', 'c', 'd', 'e', 'f']
```

[ ]:

You can use a third piece `L[a:b:c]`, and `c` means how much to go up by each time.

[ ]:
```
print(L[1:5:2])
print([L[1], L[3]])
```

```
['b', 'd']
['b', 'd']
```

[ ]:
```
L = list(range(0, 21))
print(L)
```

```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
```

[ ]:
```
L[::3]
```

[ ]:
```
[0, 3, 6, 9, 12, 15, 18]
```

[ ]:

[ ]:
```
L[::-1]
```

[ ]:
```
[20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0]
```

[ ]:
```
L[::-2]
```

[ ]:
```
[20, 18, 16, 14, 12, 10, 8, 6, 4, 2, 0]
```

Lastly, you can use negative indexing too. For example, to get the last 3 elements of a list:

[ ]:
```
L[-3]
```

[ ]:
```
18
```

[ ]:
```
L[-3:]
```

[ ]:
```
[18, 19, 20]
```

[ ]:
```
L[len(L)-3:]
```

[ ]:
```
[18, 19, 20]
```

To get all except the last element:

[ ]:
```
L[:len(L)-1]
```

[ ]:
```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19]
```

[ ]:
```
L[:-1]
```

[ ]:
```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19]
```

[ ]:
```

```

[ ]:
```

```

[ ]:
```
L
```

[ ]:
```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
```

[ ]:
```
L[:round(len(L)/2)]
```

[ ]:
```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

[ ]:
```
L[round(len(L)/2):]
```

[ ]:
```
[10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
```

[ ]:
```
L[:5]
```

[ ]:
```
[0, 1, 2, 3, 4]
```

[ ]:
```
L[5:]
```

[ ]: [5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]

[ ]:
```
23 // 5
```

[ ]: 4

[ ]:
```
int(23/5)
```

[ ]: 4

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

[ ]:
```
from copy import deepcopy
R = deepcopy(L)
```

[ ]:
```
print(L)
print(R)
```

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

[ ]:
```
R[0].append(10)
```

[ ]:
```
print(L)
print(R)
```

```
[[1, 2, 3], [4, 5, 6], [7, 8]]
[[1, 2, 3, 10], [4, 5, 6], [7, 8]]
```

[ ]: