## **In-Class Question 11**

Question)

You know when you use *list.index(item)* on a list, it can only return the index of the first occurrence of *item*.

Here is a program demonstrating how to improve *List.index(item)*. It works by looking for all occurrences of a number from a list of numbers.

```
numbers = [ \
    28, 32, 30, 12, 6, \
    6, 7, 9, 10, 17, \
    37, 12, 41, 21, 37, \
    28, 25, 7, 30, 45 \
]
print("The list is:")
print(numbers)
number = int(input("Give me the number: "))
size = len(numbers)
while len(numbers) > 0:
    if numbers[0] == number:
        print(size - len(numbers), end=" ")
    numbers = numbers[ SEE_QUESTION ]
```

As you can see, the content of **SEE\_QUESTION** is not shown in the above code.

Here are some examples of using the program. The text in bold and italics (e.g. *hello*) is the text entered by the user.

Example 1 The list is: [28, 32, 30, 12, 6, 6, 7, 9, 10, 17, 37, 12, 41, 21, 37, 28, 25, 7, 30, 45] Give me the number: *6* 4 5 Example 2 The list is: [28, 32, 30, 12, 6, 6, 7, 9, 10, 17, 37, 12, 41, 21, 37, 28, 25, 7, 30, 45] Give me the number: **30** 2 18 Example 3 The list is: [28, 32, 30, 12, 6, 6, 7, 9, 10, 17, 37, 12, 41, 21, 37, 28, 25, 7, 30, 45] Give me the number: **28** 0 15

What is the missing code that needs to replace **SEE\_QUESTION**? You need to enter the missing code.

Correct answer(s):

- 1:
- 1::
- 1::1
- 1:len(numbers)
- 1:len(numbers):1

## Explanation:

• By examining the loop condition:

```
while len(numbers) > 0:
```

you can see the loop runs when there are items inside the numbers list

- In other words, the loop stops when the list is empty
- Therefore, the loop content needs to remove some items from numbers so that the loop condition can work correctly
- The loop does that using the last line of code inside the loop, which is the one that you need to work on:

```
numbers = numbers[ SEE_QUESTION ]
```

• To remove items from the list, one way to do that is by using slicing, i.e.:

numbers = numbers[ <start> : <end> : <step> ]

- From the if statement at the start of the loop, the number that the user is interested in, i.e. the number variable, is always compared against the first item of the list
- To make the program work,
  - you need to make sure the number is compared against every item in the list, not only the first number
  - that means the first item of the list cannot remain the same throughout the loop
- You can achieve this by removing the first item from the numbers list
- The simplest way to do that is by writing this slice notation:

```
numbers = numbers[ 1 : ]
```

- You do not need to provide the end number and the step number because by default, slicing will extract items until the end of the list with a step number of 1
- You can also use the alternative answers as shown above in the correct answers