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Exercise 1

Finger Exercises due Aug 5, 2020 20:30 -03

Exercise 1

10/11 points (graded)
ESTIMATED TIME TO COMPLETE: 12 minutes

In this problem, we'll examine how indirection works. Consider the following definitions:

```
a = [1, 2, 3, 4, 0]
b = [3, 0, 2, 4, 1]
c = [3, 2, 4, 1, 5]
```

1. What is the value of the following expressions? If you think there will be an error, please type in 'error' (without quotes) in the input box.

    1. `a[0]`

    1 ✔ **Answer:** 1

    2. `b[1]`

    0 ✔ **Answer:** 0

    3. `a[a[1]]`

3 ✔ **Answer:** 3

4. `b[b[2]]`

2 ✔ **Answer:** 2

5. `a[b[2]]`

3 ✔ **Answer:** 3

6. `c[a[b[3]]]`

3 ✔ **Answer:** 3

7. `a[c[a[b[0]]]]`

error ✔ **Answer:** error

8. `a[c[a[b[3]]]]`

4 ✔ **Answer:** 4

2. Assume we have defined the following function:

```
def foo(L):
    val = L[0]
    while (True):
        val = L[val]
```

Which of the following statement(s) will result in an infinite loop?

- [x] `foo(a)`
- [x] `foo(b)`

- [ ] `foo(c)`

Explanation:
The function `foo` first binds `val` to the 0th element of `L`, `L[0]`. Then, `val` is bound to element `L[L[0]]`, then `L[L[L[0]]]`, and so on.
Calling `foo` on lists `a` and `b` results in an infinite loop - `foo(a)` traverses indicies 0->1->2->3->4->0 and `foo(b)` traverses indicies 0->3->4->1->0.
`foo(c)` results in an error, because `L[5]` does not exist.

3. Consider the following code:

```
num = ???
L = [5, 0, 2, 4, 6, 3, 1]
val = 0
for i in range(0, num):
    val = L[L[val]]

print(val)
```

1. What is the smallest value that `num` can be such that the number 3 is printed?

- ◯ 0
- ◉ 1
- ◯ 3
- ◯ 5
- ◯ Impossible

✔

2. Now, we redefine `L` to be:

```
L = [2, 0, 1, 5, 3, 4]
```

What is the smallest value that `num` can be such that the number 3 is printed?

- ◯ 0
- ◯ 3
- ◯ 5
- ◉ Impossible ✔

Explanation:
When `L = [5, 0, 2, 4, 6, 3, 1]`, we need to set `num = 1` to get 3 to print out.
When `L = [2, 0, 1, 5, 3, 4]`, there is no way to get to the number 3 if we start from `val = 0`, because the indirection structure for L is (0->2->1->0, 3->5->4->3).

Enviar

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