ENSF 592: Programming Fundamentals for Data Engineers

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Lecture 5: Lists

September 20, 2019

Agenda

1. Key ideas in Ch 10

2. Exercise 10.1, 10.2, 10.3

3. Preparation for next lecture

Notes: Key ideas

- Lists are mutable, can contain a mix of types, and can be nested
- List traversal with for: elements vs index (use range(len(t)))
- list 'math' using + and * same as string -> create new list
- slicing same as strings -> create new list. t2 = t[:] creates a copy.
- list methods: append(), extend(), sort() -> modify list
- map -> apply a function to each element in a list
- filter -> select certain elements of a list
- reduce -> combine elements of a list
- string to character list -> use list()
- string.split() creates a list of delimited elements
- ''.join() is the opposite of split.
- Object, reference and aliasing -> use `is` to check if same object
- If the aliased object is mutable, changes affect all references
- Look at `bad_delete_head()`

Notes: Exercise 10.1

Nested sum

```
def nested_sum(t):
    """Computes the total of all numbers in a list of lists.

    t: list of list of numbers

    returns: number
    """
    total = 0
    for nested in t:
        total += sum(nested)
    return total
```

Notes: Exercise 10.2

Cumulative sum

```
def cumsum(t):
    """Computes the cumulative sum of the numbers in t.

    t: list of numbers

    returns: list of numbers
    """
    total = 0
    res = []
    for x in t:
        total += x
        res.append(total)
    return res
```

Notes: Exercise 10.3

Middle

```
def middle(t):
    """Returns all but the first and last elements of t.

    t: list

    returns: new list
    """
    return t[1:-1]
```

Preparation For Next Lab/Lecture

Read/follow Ch 11 and 12 in Think Python 2e