Chapter 3: Strings, Lists, Tuples, and Maps

Wednesday, March 7, 2018 11:20 AM

1. Strings, Lists, Tuples, and Maps
    a. Strings
        i. Strings are created by putting single quotes (' ') or double quotes (" ") around a text

```
Fred = "why do gorillas have big nostrils? Big fingers!!"
Fred = 'What is pink and fluffy? Pink fluff!!'
```

        ii. Multiline strings (''')
            1) Allows us to combine double and single quotes in our string without causing errors
                a)
```
fred = '''How do dinosaurs pay their bills?
With tyrannosaurus checks!'
```

        iii. Embedding values in strings

```
>>> nums = 'What did the number %s say to the number %s? Nice belt!!'
>>> print(nums % (0, 8))
What did the number 0 say to the number 8? Nice belt!!
```

        iv. Multiplying strings
            1) Just as 10 multiplied by 5 yields 50, a string multiplied by a number yields multiples of that string.
                a)
```
>>> print(10 * 'a')
aaaaaaaaaa
```

    b. Lists
        i. Lists
            1) A list is a data type used in storing ordered items
                a)
```
>>> wizard_list = ['spider legs', 'toe of frog', 'eye of newt',
                   'bat wing', 'slug butter', 'snake dandruff']
>>> print(wizard_list)
['spider legs', 'toe of frog', 'eye of newt', 'bat wing', 'slug
butter', 'snake dandruff']
```

            2) Items in a list can be accessed by calling the index position inside square

brackets([])

a) >>> print(wizard_list[2])
eye of newt

3) Items in a list can be changed

a) >>> wizard_list[2] = 'snail tongue'
>>> print(wizard_list)
['spider legs', 'toe of frog', 'snail tongue', 'bat wing', 'slug butter', 'snake dandruff']

4) A subset of items can be selected using a colon(:) inside square brackets.

a) >>> print(wizard_list[2:5])
['snail tongue', 'bat wing', 'slug butter']

5) List can be used to store all sorts of items, like:

a) Numbers

i) >>> some_numbers = [1, 2, 5, 10, 20]

b) Strings

i) >>> some_strings = ['Which', 'Witch', 'Is', 'Which']

c) Mixtures of numbers and strings

i) >>> numbers_and_strings = ['Why', 'was', 6, 'afraid', 'of', 7, 'because', 7, 8, 9]
>>> print(numbers_and_strings)
['Why', 'was', 6, 'afraid', 'of', 7, 'because', 7, 8, 9]

d) Other lists

i) >>> strings = ['I', 'kicked', 'my', 'toe', 'and', 'it', 'is', 'sore'] >>> mylist = [numbers, strings]
>>> print(mylist)
[[1, 2, 3, 4], ['I', 'kicked', 'my', 'toe', 'and', 'it', 'is', 'sore']]

ii. Adding items to a list

1) Use the append function (a chunk of code that tells Python to do something)

a) >>> wizard_list.append('bear burp')
>>> print(wizard_list)
['spider legs', 'toe of frog', 'snail tongue', 'bat wing', 'slug butter', 'snake dandruff', 'bear burp']

iii. Removing Items from a list

1) Use the del command (short for delete)

a)
```
>>> del wizard_list[5]
>>> print(wizard_list)
['spider legs', 'toe of frog', 'snail tongue', 'bat wing', 'slug
butter', 'bear burp', 'mandrake', 'hemlock', 'swamp gas']
```

iv. List arithmetic (math)

1) Use operators such as plus(+) sign to join lists and multiplication(*) sign

a)
```
>>> list1 = [1, 2, 3, 4]
>>> list2 = ['I', 'tripped', 'over', 'and', 'hit', 'the', 'floor']
>>> print(list1 + list2)
[1, 2, 3, 4, 'I', 'tripped', 'over', 'and', 'hit', 'the', 'floor']
```

b)
```
>>> list1 = [1, 2]
>>> print(list1 * 5)
[1, 2, 1, 2, 1, 2, 1, 2, 1, 2]
```

2) Lists cannot be divided (/) or subtracted (-); this will give you errors. You've been warned.

c. Tuples

i. A tuple is a like a list that uses parentheses ()

1)
```
>>> fibs = (0, 1, 1, 2, 3)
>>> print(fibs[3])
2
```

ii. Tuples, unlike lists, cannot change once you've created it. You will get an error if you try. You've been warned.

d. Maps

i. A map (also referred to as a dict, short for dictionary) is a collection of things, like lists and tuples.

1)
```
>>> favorite_sports = {'Ralph Williams' : 'Football',
                       'Michael Tippett' : 'Basketball',
                       'Edward Elgar' : 'Baseball',
                       'Rebecca Clarke' : 'Netball',
                       'Ethel Smyth' : 'Badminton',
                       'Frank Bridge' : 'Rugby'}
```

ii. Each item in a map has a *key* and a corresponding *value*.

Table 3-1: Keys Pointing to Values in a Map of Favorite Sports

Key	Value
Ralph Williams	Football
Michael Tippett	Basketball
Edward Elgar	Baseball

Rebecca Clarke	Netball
Ethel Smyth	Badminton
Frank Bridge	Rugby

iii. Maps items are accessible using the name as the key

1) >>> print(favorite_sports['Rebecca Clarke'])
Netball

iv. Maps items can be deleted by using its key

1) >>> del favorite_sports['Ethel Smyth']
>>> print(favorite_sports)
{'Rebecca Clarke': 'Netball', 'Michael Tippett': 'Basketball', 'Ralph Williams': 'Football', 'Edward Elgar': 'Baseball', 'Frank Bridge': 'Rugby'}

v. Maps items can be replaced by using its key

1) >>> favorite_sports['Ralph Williams'] = 'Ice Hockey'
>>> print(favorite_sports)
{'Rebecca Clarke': 'Netball', 'Michael Tippett': 'Basketball', 'Ralph Williams': 'Ice Hockey', 'Edward Elgar': 'Baseball', 'Frank Bridge': 'Rugby'}