COMP10001 Foundations of Computing
Semester 1, 2022

Tutorial Questions: Week 5

— VERSION: 1478, DATE: MARCH 28, 2022 —

Discussion

1. What is a "method"? How do methods differ from functions? How are they the same?

   Now try Exercise 1

2. What is the difference between a "list" and a "tuple"?

3. How do we add and remove items from a list?

   Now try Exercise 2

4. What is "iteration" in programming? Why do we need it?

5. What are the two main types of loop in python? How do we write them?

6. What do we mean by the "loop variable" in a `for` loop?

7. What are the differences between the two main types of loops? In which situations are they used?

8. Is it always possible to convert a `while` loop into a `for` loop and vice versa? How do we do it?

   Now try Exercises 3 & 4

Exercises

1. Evaluate the following method calls given the assignment `s = "Computing is FUN!"` Think about the input and output of each method. You're not expected to know all methods for all types: if you haven't seen some of these before, your best guess based on the name will probably be right!

   (a) `s.isupper()`

   (b) `s.upper()`

   (c) `s.endswith("FUN!")`

   (d) `s.count('i')`

   (e) `s.strip('!')`

   (f) `s.replace('i', '!')`

2. Evaluate the following given the assignment `lst = [2, ("green", "eggs", "ham"), False]`

   (a) `lst[2]`

   (b) `lst[1][-2]`

   (c) `lst[1][-2][:3]`

   (d) `lst.append(5); print(lst)`

   (e) `lst.pop(2); print(lst)`

3. What is the output of the following snippets of code containing loops?

   (a)
   ```
   i = 2
   while i < 8:
       print(f"The square of {i} is {i * i}")
       i = i + 2
   ```

   (b)
   ```
   for ingredient in ("corn", "pear", "chilli", "fish"):
       if ingredient.startswith('c'):
           print(ingredient, "is delicious!")
       else:
           print(ingredient, "is not!")
   ```

(c)
```
i = 0
colours = ("pink", "red", "blue", "gold", "red")
while i < len(colours):
    if colours[i] == "red":
        print("Found red at index", i)
    i += 1
```

(d)
```
MIN_WORD_LEN = 5
long_words = 0
text = "There once lived a princess"
for word in text.split():
    if len(word) >= MIN_WORD_LEN:
        print(word, "is too long!")
        long_words += 1
print(long_words, "words were too long")
```

4. Rewrite the loops in Questions 3a and 3b, converting `for` loops to `while` loops and vice versa.

Problems

1. Write a function which takes a positive integer input `n` and prints the thirteen times tables from `1 * 13` until `n * 13`.

2. Write a function which converts a temperature between degrees Celsius and Fahrenheit. It should take a float, the temperature to convert, and a string, either `'c'` or `'f'` indicating a conversion from degrees Celsius and Fahrenheit respectively. The formulae for conversion are below.

$$C = \frac{F - 32}{1.8} \qquad F = C \times 1.8 + 32$$

3. Write a function which takes a tuple of strings and returns a list containing only the strings which contain at least one exclamation mark or asterisk symbol. `words_with_symbols(('hi', 'there!', '*_*'))` should return `['there!', '*_*']`.