COMP10001 Foundations of Computing
Semester 1, 2019

Tutorial Questions: Week 6

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Discussion

1. Recall that while loops and for loops are the two types of loops we have learned. How are they similar and how are they different? Where would you use them in different situations?
2. Is it always possible to convert a while loop into a for loop and vice versa? How do we do it?
3. Consider the following while loop and two conversions to for loops. Are the two for loops equivalent? Why might you choose one over the other?

```
count = 0
items = ('eggs', 'spam', 'more␣eggs')
while count < len(items):
    print(f"we␣need␣to␣buy␣more␣{items[count]}")
    count += 1
```

```
items = ('eggs', 'spam', 'more␣eggs')
for count in range(len(items)):
    print(f"we␣need␣to␣buy␣more
{items[count]}")
```

```
items = ('eggs', 'spam', 'more␣eggs')
for item in items:
    print(f"we␣need␣to␣buy␣more
{item}")
```

Now try Exercises 1 & 2

4. In what situations would we use a "dictionary". How is it structured, how do we add and delete items?
5. What is the difference between using the `.pop()` method on a dictionary and using it on a list?
6. In what situations would we use a "set"? How does it differ to a list and a dictionary?
7. What key operations can you perform on sets? How do you add and remove items from them?

Now try Exercises 3 & 4

Exercises

1. Rewrite the following code using a for loop.

```
i = 2
while i < 6:
    print(f"The␣square␣of␣{i}␣is␣{i*i}")
    i = i + 1
```

2. Rewrite the following for loops using while loops.

(a)
```
colours = ["yellow", "green", "purple"]
for colour in colours[1:]:
    print(colour, "is␣my␣favourite␣colour")
```

(b)
```
MIN_WORD_LEN = 6
long_words = 0
for word in text.split():
    if len(word) >= MIN_WORD_LEN:
        long_words += 1
```

3. Evaluate the following given the assignment `d = {"R": 0, "G": 255, "B": 0, "other": {"opacity": 0.6}}`. If `d` changes as a result, give its new value. Assume `d` is reset to its original value after each.

   (a) `"R"in d`
   (b) `d["R"]`
   (c) `d["R"] = 255`
   (d) `d["A"]`
   (e) `d["A"] = 50`
   (f) `d.pop("G")`
   (g) `d["other"]["blur"] = 0.1`
   (h) `d.items()`

4. Evaluate the following given the assignment `s1 = {1, 2, 4}` and `s2 = {3, 4, 5}`. If `s1` or `s2` change as a result, give their new value. Assume `s1` and `s2` are reset to their original values after each.

   (a) `s1.add(7)`
   (b) `s1.add(2)`
   (c) `s2.remove(5)`
   (d) `s1 & s2`
   (e) `s1.union(s2)`
   (f) `s1 - s2`

Problems

1. Write a function which takes a string as input and prints the frequency of each character in the string using a dictionary.
2. Write a function which takes two lists as input and returns a list containing the numbers which they both have in common.