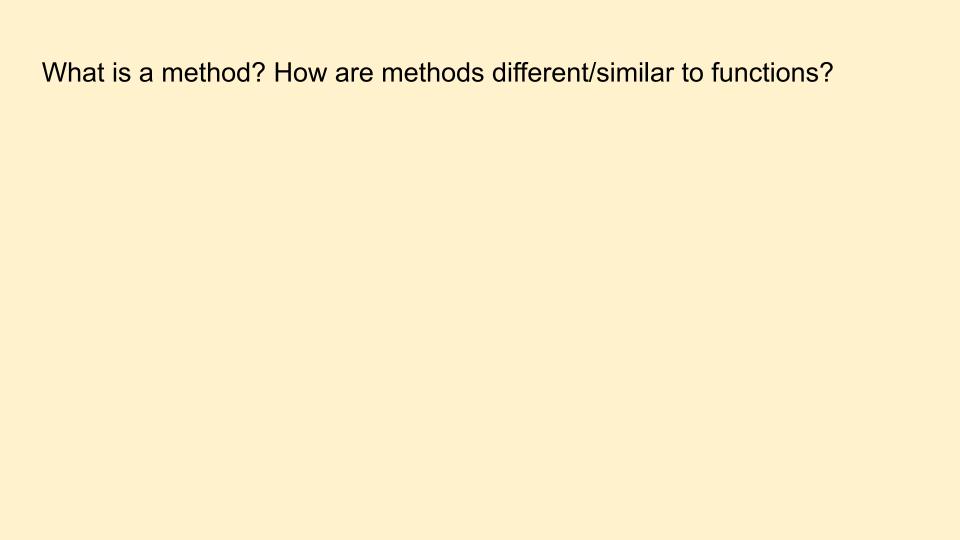
COMP10001

Week 5

Methods, iteration and loops



What is a method? How are methods different/similar to functions?

- Like functions, methods run some pre-defined code to achieve a task
- Both are called with brackets, containing arguments
- Methods are "attached" to an object with a full stop:
 - function_name(arguments, ...) VS object.method_name(arguments, ...)
- So methods can do fun things like edit the object they're called on in-place!

Let's do an exercise!

Let s="Computing is FUN!". What happens when we apply the methods below?

s.isupper()

s.count("n")

s.upper()

s.strip("!")

s.endswith("fun!")

s.replace("i", "!")

Let's do an exercise!

Let s="Computing is FUN!". What happens when we apply the methods below?

```
s.isupper()
                                      s.count("n")
 False
s.upper()
                                      s.strip("!")
"COMPUTING IS FUN!"
                                        "Computing is FUN"
s.endswith("fun!")
                                      s.replace("i", "!")
True
                                        "Computing is FUN!"
```

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- Tuples are not!

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- We can make changes to mutable items "in-place"
 - E.g. lst += [3]

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- Tuples are not!
- We can make changes to mutable items "in-place"
 - E.g. lst += [3]
- Lists initialised with square brackets
 - E.g. lst = [1,2,3]
- Tuples initialised with rounds brackets
 - E.g. tup = (1,)
 - Or the tuple() function!

How do we add and remove items from a list?

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- .append(item),
- .insert(index, item),
- .extend(lst)

- pop(index)
- del
- .remove(item)
- .clear()

Let's do an exercise!

Let lst=[2, ("green", "eggs", "ham"), False]. What happens when we use the expressions below?

lst[2]
lst.append(5); print(lst)

lst[1][-2] lst.pop(2); print(lst)

Let's do an exercise!

```
Let lst=[2, ("green", "eggs", "ham"), False]. What happens when we use the expressions below?
```

```
lst[2]
                                          lst.append(5); print(lst)
                                     [2, ("green", "eggs", "ham"), False, 5]
 False
lst[1][-2]
                                          lst.pop(2); print(lst)
 "eggs"
                                         False
                                         [2, ("green", "eggs", "ham")]
lst[1][-2][:3]
                                          lst.reverse(); print(lst)
True
                                          [False, ("green", "eggs", "ham"), 2]
```

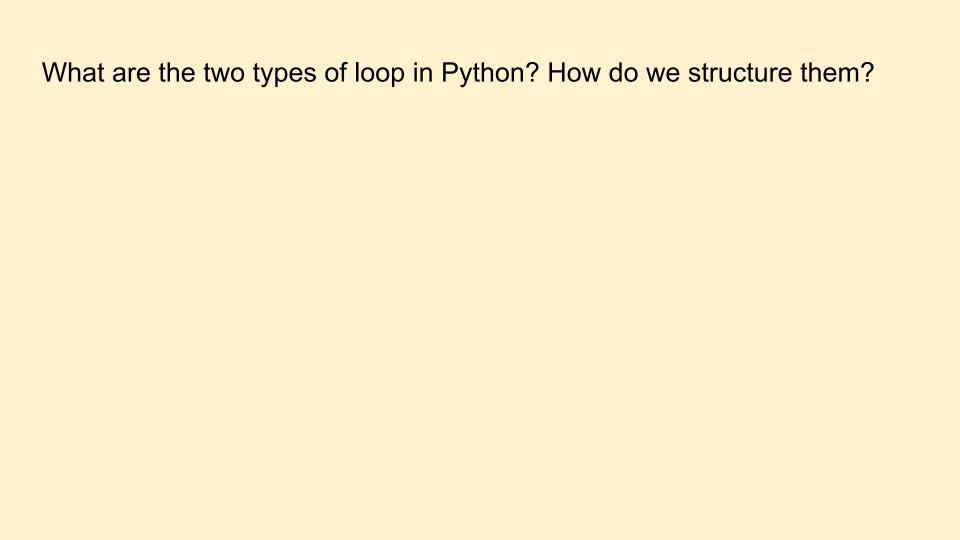
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- Iteration = executing a section of code repeatedly
 - often with a small change each time
- We need to do this all the time in programming!
- Writing the same instructions over and over again is inefficient! Unreadable!
 Error-prone!



What are the two types of loop in Python? How do we structure them?

- For loops

```
For <loop variable> in <sequence>:

Do something with the loop variable
...
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While loops

. . .

```
While <condition>:

Do something
```

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 - finite/controlled number of iterations
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 - infinite/uncontrolled number of iterations

- For loops are great when we know in advance how many times we need our loop to run
- While loops are great when we don't know!

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```
lst = ["a","b","c"]
for letter in lst:
    print(letter + "!")
```

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```
i = 1
j = 1
while i < 5:
    print(i, j, i + j)
    hold = i
    i = i + j
    j = hold</pre>
```

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    i = i + j
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```

i	j	i+j
1	1	2

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i	j	i+j
1	1	2
2	1	3

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```
i = 1
j = 1
while i < 5:
    print(i, j, i + j)
    hold = i
    i = i + j
    j = hold</pre>
```

i	j	i+j
1	1	2
2	1	3
3	2	5



What is the output of the following snippets?

```
i = 2
while i < 8:
    print(f"The_square_of_{i}_is_{i_*_i}")
    i = i + 2</pre>
```

```
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")
```

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

for ingredient in ("corn", "pear", "chilli", "fish"):
    if ingredient.startswith('c'):
        print(ingredient, "is_delicious!")
    else:
        print(ingredient, "is_not!")</pre>
```

Rewrite the snippets with an alternative loop command!

```
i = 2
while i < 8:
    print(f"The_square_of_{i}_is_{i_*_i}")
    i = i + 2</pre>
```

```
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")
```

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

for ingredient in ("corn", "pear", "chilli", "fish"):
    if ingredient.startswith('c'):
        print(ingredient, "is_delicious!")
    else:
        print(ingredient, "is_not!")</pre>
```

What's wrong with this code? How should we fix it?

```
def largest_num(nums):
    maxnum = nums[0]
    for num in nums:
        if num > maxnum:
            maxnum = num
            return maxnum
```

Let's jump in breakout rooms for Ex. 3

```
for i in range(5):
    print(i**2)
```

```
for i in range(5):
    print(i**2)
```



```
for ingredient in ("carrot", "lettuce", "cucumber", "tomato"):
    if ingredient.startswith('c'):
        print(ingredient, "is delicious")
    else:
        print(ingredient, "is tasty")
```

```
for ingredient in ("carrot", "lettuce", "cucumber", "tomato"):
    if ingredient.startswith('c'):
        print(ingredient, "is delicious")
    else:
        print(ingredient, "is tasty")
```

carrot is delicious
lettuce is tasty
cucumber is delicious
tomato is tasty

```
i = 0
colours = ("olive", "red", "violet", "turquoise", "red", "red", "amber")
while i < len(colours):
    if colours[i] == "red":
        print("Found red at index", i)
    i += 1</pre>
```

```
i = 0
colours = ("olive", "red", "violet", "turquoise", "red", "red", "amber")
while i < len(colours):
    if colours[i] == "red":
        print("Found red at index", i)
    i += 1</pre>
```

Found red at index 1 Found red at index 4 Found red at index 5

```
MIN_WORD_LEN = 4
long_words = 0
text = "Once upon a time in a land far away 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")
```

```
MIN_WORD_LEN = 4
long_words = 0
text = "Once upon a time in a land far away 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")
```

lived is too long!
princess is too long!
2 words were too long

Last exercise for today! Do the following snippets do the same thing? What are their advantages/disadvantages?

```
print("We need some saws")
print("We need some hammers")
print("We need some cogs")
print("We need some nails")

def get_str(part):
    return f"We need some {part}"

def get_str(part):
    return f"We need some {part}"

for part in parts:
    print(get_str("saws"))
print(get_str("hammers"))
print(get_str("cogs"))
```

print(get_str("nails"))

Coding problems

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

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.

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