APS106

UNIVERSITY OF TORONTO

more for loops.

Week 3 | Lecture 2 (3.2.2)

While waiting for class to start:

Download and open the Jupyter Notebook (.ipynb) for Lecture 3.2.2

You may also use this lecture's JupyterHub link instead (although opening it locally is encouraged).

Upcoming:

- Reflection 3 released Friday @ 11 AM
- Lab 3 deadline this Friday @ 11 PM
- PRA (Lab) on Friday @ 2PM this week (ONLINE)
- **Midterm** - May 31 in lecture @ 9:10 AM

if nothing else, write #cleancode

Today's Content

- **Lecture 3.2.1**
  - for loops
- **Lecture 3.2.2**
  - **for loops on indices, nested loops**

for loops

- A for loop starts with the keyword for.

```
name = 'Sebastian'

for character in name:
    print(character)
```

for loops

- Next, we provide the name of one of more variables.
- We have called the variable `character`, but you can call it whatever you like as long as it follows rules for naming a variable.

```
name = 'Sebastian'

for character in name:
    print(character)
```

```
for item1, item2 in iterable:
    do something.
```

for loops

- Our variable `character` will be bound to each of the items in the sequence in turn.

```
name = 'Sebastian'

for character in name:
    print(character)
```

for loops

- Specify what the values are in.
- What is the iterable?
- An iterable is an object that can be iterated over.
- Strings are iterable (we know these from last week).
- Lists (**next week**) are iterable.

```
name = 'Sebastian'

for character in name:
    print(character)
```

for loops

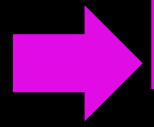
- As with the while loop, the for loop statement ends with a colon.
- This is how Python knows you are going to create a new block of code.

```
name = 'Sebastian'

for character in name:
    print(character)
```

for loops

- Indenting four spaces tells Python what lines of code are in that block you want to repeated.

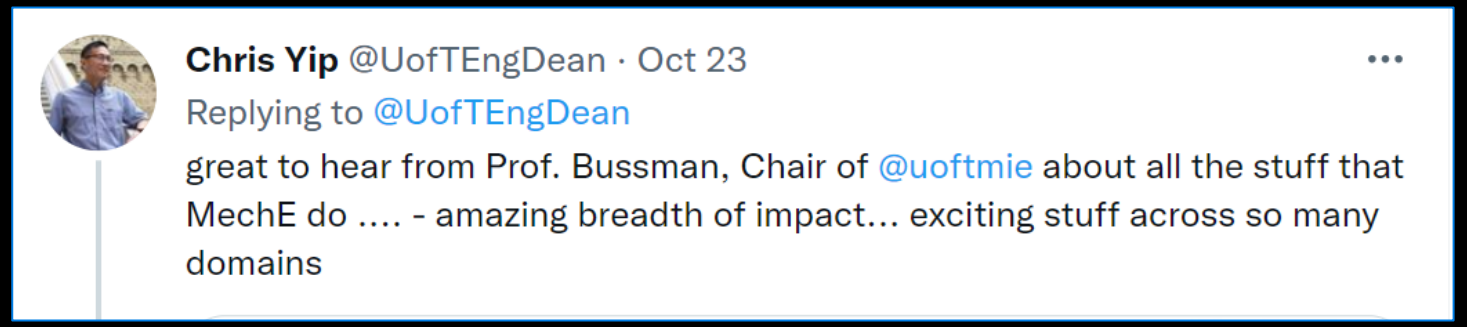
```
name = 'Sebastian'

for character in name:
    print(character)
```



Indent

Breakout Session 1

- We want to do some analysis of Dean Yip's Tweets.
- Before we can do this, we'll need to make the tweet all lower case and replace all the punctuations with white space.
- 'impact... Exciting' → 'impact exciting'



Open your notebook

Click Link:
1. Breakout Session 1

Today's Content

- Looping through indices with a `for` loop.
- Nested `for` loops.

Looping Through Indices

- Last lecture we saw that we can use while loops to loop over the indices of a string.
- Then we saw that a for-loop requires less code but it iterates over the values, not the indices.

```
while
i = 0
while i < len(chrome_4):
    print(i, chrome_4[i])
    i += 1
```

```
for
for character in chrome_4:
    print(character)
```

Looping Through Indices

- Can we use a for loop to loop over indices?

```
while
i = 0
while i < len(chrome_4):
    print(i, chrome_4[i])
    i += 1
```

```
for
for character in chrome_4:
    print(character)
```

Looping on a `range()`

- Python has a built-in function called `range()` that can be used to generate a sequence of numbers. The general syntax of range is as follows:

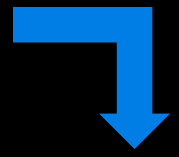
```
range(start, stop, step)
```

- Similar to the string slicing syntax:
  - The stop value is not included in the sequence of numbers generated.
  - Can omit start and step which will result in default values being used. `range(n)` → `range(0, n, 1)`

Looping on a `range()`

- `range()` is typically used in a for loop to iterate over a sequence of numbers.
- `range()` is an iterable.

This thing has to be an iterable.



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

Open your notebook

Click Link:
2. Using range()

Breakout Session 2

- Add up all the even numbers between 1 and 100 using a `for` loop and `range()`.

- 2+4+.....+96+98+100

Open your notebook

Click Link:
3. Breakout Session 2

Breakout Session 3

- Write a function that returns the number of times that a character and the next character are the same.
- If you have a bug in a loop, with probability ~1 its an off-by-one index error.

```
count_adjacent_repeats('abccdeffggh')

>>> 3
```

Open your notebook

Click Link:
4. Breakout Session 3

Nested for Loops

- The bodies of loops can contain any statement, including other loops!
- When this occurs, it is known as a nested loop.

```
for item in iterable:
    do something.
```

```
for i in range(10, 13):
    for j in range(1, 5):
        print(i, j)
```

```
Output
10, 1
10, 2
10, 3
…
```

Nested for Loops

- The bodies of loops can contain any statement, including other loops!
- When this occurs, it is known as a nested loop.

Open your notebook

Click Link:
5. Nested for Loops

Lecture Recap

- The general form of a `for` loops.

```
for item in iterable:
    do something.
```

- Iterable types have indices and items.
- For loops always iterate over the items in the iterable variable.
- Using `range(start, end, step)` we can keep track of where we are in a sequence (i.e. index).

APS106

UNIVERSITY OF TORONTO

more for loops.

Week 3 | Lecture 2 (3.2.2)

if nothing else, write #cleancode