Python Lecture 2 Notes: Control Flow

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1 Introduction and learning outcomes from class

Here's a quick summary of what we went over & learned in class!

a. understand the construction of different types of flow (if statements, for loops, while loops)

b. be able to construct if statements, for loops, and while loops on your own

c. understand where in our code we would WANT to put these different kinds of loops

2 if statements

If statements are one of the main types of control flow you'll be using. These let you run one section of code **if** one statement holds true, and other code **if** not. These statements rely on **Booleans**, so you're going to want to make sure that you're familiar with those if you're using these statements. The syntax for these:

```
if boolean:
    run some code
elif other_boolean:
    run some more code
else:
    run different code
```

So we can have three elements of an if statement. **if**, **elif**, and **else**. We **absolutely need if**, if we are going to use this type of statement. The others are optional, but useful. **If** requires the word **if**, a boolean followed by a colon, and then an indented block of code. elif requires the same. **else** doesn't require any boolean at all; just a colon and indented block of code.

We would want to use these when we have different conditions in our code; maybe trial type 1 if we want to show our participants a cat, if trial type 2 we show them a dog.

3 for loops

These are also central to our experiments! We use these when we want to do something **for** a certain number of times. The syntax of a for loop is as follows:

```
for item in iterator:

    run some code
```

Iterator is some type of object that has multiple items, that we can iterate over. An example is: a list; this syntax will grab the first item of a list, assign it to the variable **item**, and then allow us to do things with **item**. This will last till the end of the loop. Then we return to the top of the loop, grab a new item from our list, and assign THAT item to the variable **item**. We then need an indented block of code; this is the code that our model will run.

4 while loops

These are the last and least common type of loop you'll use in a psych experiment.

These loops are things that we use when we don't know how long we should run a loop for. For instance, maybe we want to ask participants a question until they answer it correctly. Then we would use a while loop! The syntax for these goes like this:

```
while boolean:
    run some code
```

So to use these, we need the following. We need the word **while**, followed by a boolean variable or statement, followed immediately by a colon. This is followed by an indented block of code that will then run as long as the boolean at the top is **TRUE**. We need ways to get out of these loops then, since they'll run for as long as the boolean at the top is **TRUE**. There are two ways to get of these. The first is by making sure that the boolean at the top can become **FALSE**. We can do this by creating a statement within the loop that will change the value of the boolean to FALSE. Maybe, for example, if our participant answers the question correctly.

We can also use the word **break**. Putting the word **break** inside the loop will immediately stop execution of the code inside and break us out of the loop.