DS2000
Fall 2021
Handout: Conditionals

All programming languages must be able to:

1. remember things,
2. repeat things,
3. communicate, and
4. make decisions.

Conditionals are all about #4: making decisions. A conditional fundamentally alters the **flow of control** of a program (our textbook calls it "flow of execution"... same thing).

Python code is executed the way you wrote it, from top to bottom and left to right, just like reading a book. Which is OK, but very boring. Conditionals allow us to **branch** -- maybe we do this thing, but maybe this other thing instead.

In general, a conditional has a few possible formats:

```
if condition:
      # do if condition is True
```

```
if condition:
      # do if condition is True
else:
      # do if condition is False
```

```
if condition1:
      # do if condition 1 is True
elif condition2:
      # do if condition2 is True
else:
      # do if both 1 and 2 are False
```

You can add on to these basically to your heart's content. But you always have:

- Exactly one ***if***
- zero or one ***else***
- zero or more ***elif***

The **condition** has to be a boolean value, which is either True or False. Nothing else. No room for ambiguity in this part of computer science.

Most values can be compared using the following operators:

Operator	Meaning
`<`	Less than
`<=`	Less than or equal to
`>`	Greater than
`>=`	Greater than or equal to
`==`	Is equal to
`!=`	Is not equal to

Boolean expressions can also be combined using the following operators:

Operator	Input	Output
`and`	Two boolean values	**`True`** if both inputs are **`True`**, **`False`** otherwise
`or`	Two boolean values	**`False`** if both inputs are **`False`**, **`True`** otherwise
`not`	One boolean value	**`True`** if the input is **`False`**, **`False`** if the input is **`True`**

Conditional Examples

As always, spacing really matters in Python. Look at how we've set up the examples below. Let's say we have a variable called ***season*** and another called ***episode***, and we've been watching Cobra Kai :)

Source Code	Notes
`if season == 1:` `  print("First season!!")`	If you're watching the first season, we say so. If not, nothing happens.

`if season == 1:`
`  print("First season!!")`
`elif season == 2 and episode == 2:`
`  print("My favorite!")`
	If you're watching the first season, we say so.
	
	Otherwise, if you're watching my fave episode, we tell you that instead.
	
	If neither thing is true, nothing happens.

`if season == 1 and episode < 4:` `  print("Early in season one.")`	If it's early in the first season, we say so.

else: print("Good, you stuck with it!")	Otherwise, we made it deep into the show and now we're addicted.