Conditionals

C-START Python PD Workshop
A boolean is a type of data which can be one of two values: True or False
A **boolean** is a type of data which can be one of two values: *True* or *False*

```python
mybool = True
print(mybool)
```
A **boolean** is a type of data which can be one of two values: **True** or **False**

```python
mybool = True
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```

```
True
```
== is for **equality testing**. An expression `a == b` will be True iff `a` has the same value as `b`, False otherwise.
Another Kind of Equals

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```python
>>> year = 2017
>>> year == 2016
False
>>> year == 2017
True
```
if condition:
    # do something
elif other_condition:
    # do something else
else:
    # do something else
Branching

```python
if condition:
    # do something
elif other_condition:
    # do something else
else:
    # do something else
```

```python
name = input("What is your name? ")
if name == "Jack":
    print("Your name is the best!"")
elif len(name) == 4:
    print("Your name is 4 letters and not 'Jack'!")
else:
    print("Pleased to meet you", name)
```
### Comparison Operators

<table>
<thead>
<tr>
<th>Operator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;</code></td>
<td>Less than</td>
</tr>
<tr>
<td><code>&lt;=</code></td>
<td>Less or equal</td>
</tr>
<tr>
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</tr>
<tr>
<td><code>==</code></td>
<td>Equal</td>
</tr>
<tr>
<td><code>!=</code></td>
<td>Not Equal</td>
</tr>
</tbody>
</table>

```python
age = int(input("What is your age? "))

if age < 0:
    print("I don't think so")
elif age <= 10:
    print("Wow! You're young!")
elif age != 16:
    print("Cool cool.")
else:
    print("Sweet sixteen.")
```

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Comparison Operators

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```
In Python, indentation not only provides style to help yourself and others read your code, but also provides functionality by denoting the scope of the operation. Consider the following example:

```python
# i was defined previously in this program
if i > 0:
    print("i is positive")
    if i % 2 == 0:
        print("i is even")
    print("hello")
print("goodbye")
```

1. What will be printed if `i` is 3?
2. What will be printed if `i` is -2?
3. What will be printed if `i` is 4?
# Indentation Denotes Scope

In Python, indentation not only provides style to help yourself and others read your code, but also provides functionality by **denoting the scope of the operation**. Consider the following example:

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not is an operator which gives the opposite boolean of what it receives. In other words:

- not False is True
- not True is False

Example of using not in an if statement:

```python
def main function:
    fish = input("What is your fish's name? ")
    if not len(fish) > 3:
        print("What a short name!")
```
**not** is an operator which gives the opposite boolean of what it receives. In other words:

- **not False** is **True**
- **not True** is **False**

So what is **not not not** **False**?
Try in your Interactive Interpreter!
**Opposite Day: Using `not`**

`not` is an operator which gives the opposite boolean of what it receives. In other words:

- `not False` is `True`
- `not True` is `False`

So what is `not not not False`?

Try in your Interactive Interpreter!

Example of using `not` in an `if` statement:

```python
fish = input("What is your fish's name? ")
if not len(fish) > 3:
    print("What a short name!")
```
What if you want to test the existence of multiple conditions? This is what **and** and **or** are for.

```python
fav = int(input("Favorite number? "))
hate = int(input("Least favorite number? "))
if fav * hate == 63 and fav > hate and fav > 0:
    print("Yeah, because 7 ate 9, right?")
elif fav % 2 != 0 or hate % 2 != 0:
    print("What an odd choice.")
else:
    print("Even Steven.")
```
and and or are evaluated left to right, and not all statements will be evaluated if they don’t need to.

In other words, if the first part of an and is False, Python knows the statement is False won’t bother wasting its time on the second part.

Likewise, if the first part of an or is True, Python knows the statement is True and won’t bother wasting its time on the second part.

Computer programmers call this short-circuiting.
Practice: Short Circuiting

Which code block is more efficient, given i is even half of the time, modulus (%) is very fast, and hardfunc takes a few seconds to compute?

```python
if hardfunc(i) and i % 2 == 0:
    print("Hello!")
```

```python
if i % 2 == 0 and hardfunc(i):
    print("Hello!")
```

Note: hardfunc is not built-in to Python, we are just using it as an imaginary example function here.
Practice: Spot the Bug(s)!

What is wrong with the snippet of code below?

```python
pets = input("How many pets do you have? ")
if pets < 0:
    print("That's impossible! ")
if pets = 0:
    print("Try pets sometime! ")
else:
    print("Can I meet them? ")
```
Practice: Spot the Bug(s)!

Corrected code snippet:

```python
pets = int(input("How many pets do you have? "))
if pets < 0:
    print("That's impossible!")
elif pets == 0:
    print("Try pets sometime!")
else:
    print("Can I meet them?")
```