CSCI 141

Scott Wehrwein

Conditional Statements
Goals

• Know how to use an `if statement` to conditionally execute a block of code.

• Know how to use an `if/else statement` to choose which of two code blocks to execute.
So far:

Python can do everything you already knew how to do using a calculator.
What's next?

• Up next: Making **decisions** based on the value of a boolean expression.

• Also: a new kind of **statement**!
Let’s talk about the weather

Weather Conditions

Weather-Appropriate Gear
Let’s talk about the weather

Suppose we have bool variable is_raining

Here’s the logic (pseudocode):

- if it is raining, tell the user to bring a raincoat

Here’s the Python code:

```python
if is_raining:
    print("You should wear a raincoat!")
```
Let’s talk about the weather

Suppose we have bool variables `is_raining` and `is_windy`

Here’s the logic (pseudocode):
- if it is raining and windy, tell the user to bring a raincoat
- if is raining and not windy, tell the user to bring an umbrella

Here’s the Python code:

```python
if is_raining and is_windy:
    print("You should wear a raincoat!")
if is_raining and not is_windy:
    print("You should bring an umbrella")
```
The **if** statement

```python
if is_raining:
    print("You should wear a raincoat!"
```

Notes:
- In Python, the indentation is **required**.
- Indenting with tabs or spaces is acceptable.
- We’ll use the most common convention: indent 4 spaces beyond the line with the `if`
- Thonny follows this convention for you.
Demo
Demo

• using the is_raining example

• if statement with a condition that evaluates to True vs False

• statements after the indented code block

• multiple lines in the code block
Another weather question

Should you wear a coat or a sweater?

```python
if temperature < 40:
    print("Wear a coat!")
if temperature >= 40:
    print("Wear a sweater!")
```

How many times did we check the value of temperature?

Can we make this any simpler?

**Yes:** it’s a common use case to want to choose between two mutually exclusive paths of execution (code blocks). (i.e., one or the other)
Another weather question

Should you wear a coat or a sweater?

```python
if temperature < 40:
    print("Wear a coat!")
else:
    print("Wear a sweater!")
```

How many times did we check the value of `temperature`?

Can we make this any simpler?

**Yes:** it’s a common use case to want to choose between two mutually exclusive paths of execution (code blocks). (i.e., one or the other)
The if/else Statement

- **if** keyword
- A boolean expression (the condition)
- An indented code block to be executed if the condition evaluates to **True**
  ```python
  if temperature < 40:
    print("Wear a coat!")
  else:
    print("Wear a sweater!")
  ```
- **else** keyword
- An indented code block to be executed if the condition evaluates to **False**
What does the following program print?

```python
if 2 + 5 == 5:
    print(2 + 5)
else:
    print("not equal")
```

Demo: debug mode in Thonny
What does the following program print?

```python
a = 5
if a >= 5 and a <= 5:
    print(a)
else:
    print("nope")
```

Is there a better way to write the condition?
Aim for Simplicity

The program on the right does exactly the same thing, but is easier to read, and therefore is preferable.