CSCI 141

Scott Wehrwein

Conditional Statements

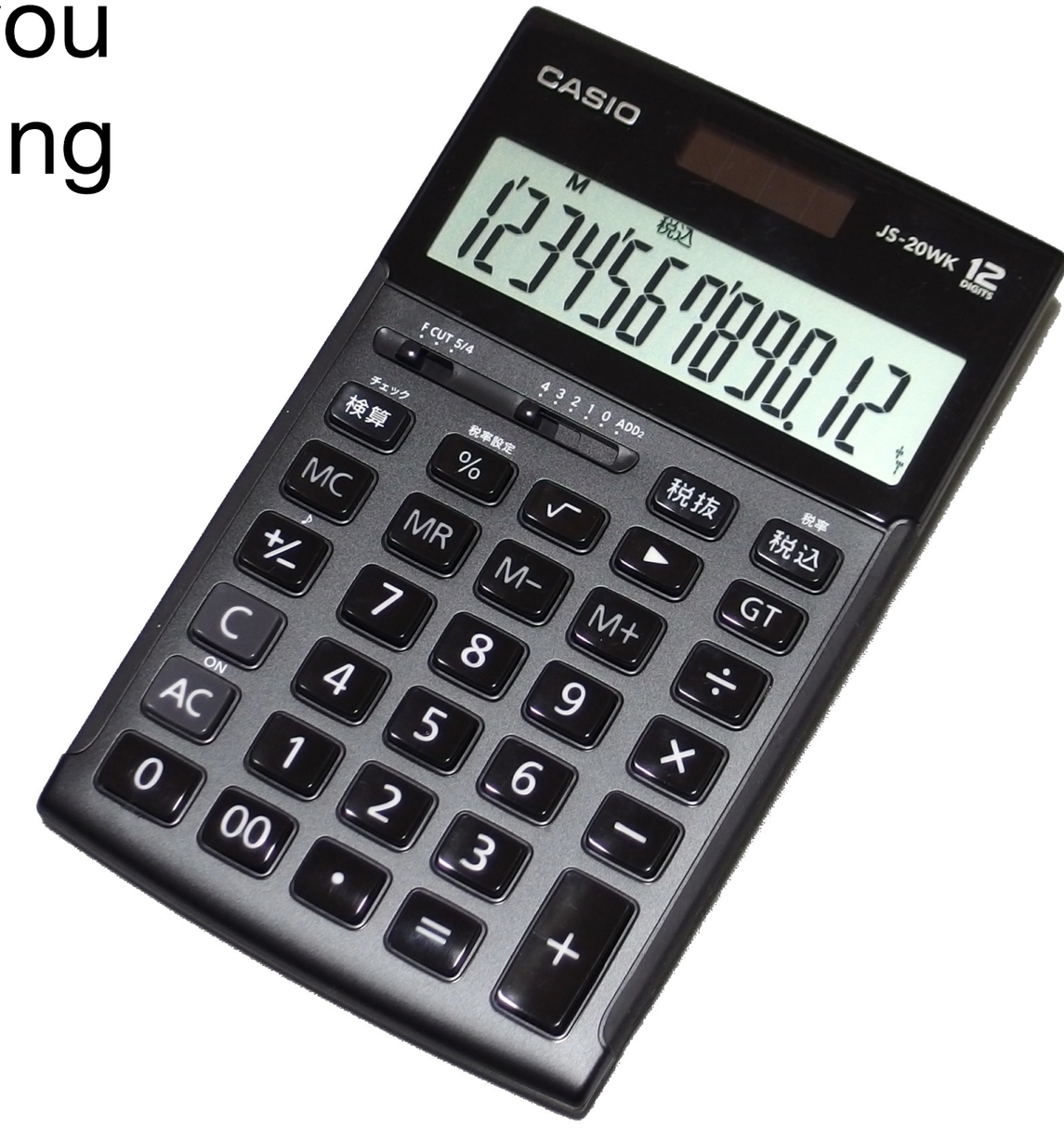
Goals

- 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?

about **what** code to execute

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

- Also: a new kind of **statement**!

Let’s talk about the weather

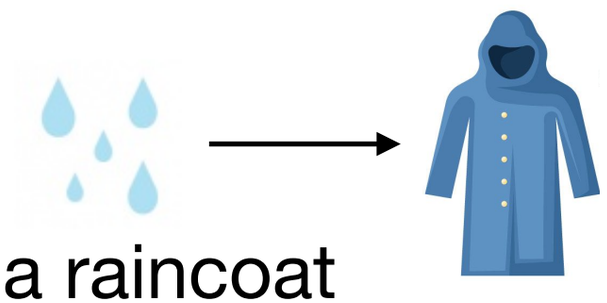
Weather Conditions

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

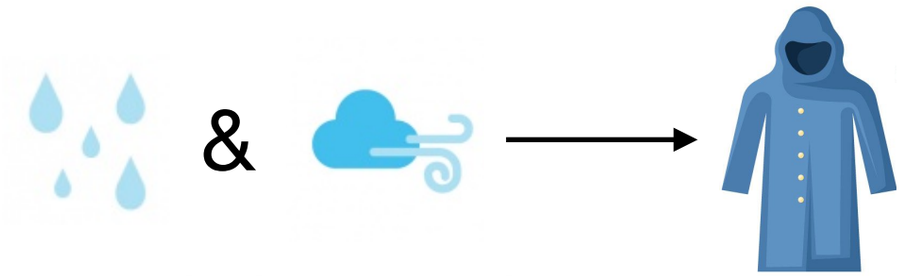
Here’s the Python code:

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

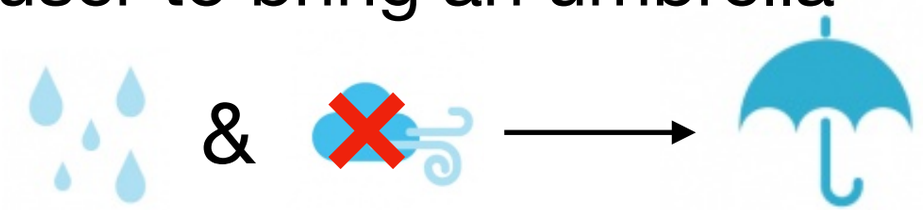
Let’s talk about the weather

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:

```
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

`if` keyword

a boolean expression (the condition)

a colon :

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

an indented code block: one or more statements to be executed if the boolean expression evaluates to **True**

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?

```
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?

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

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

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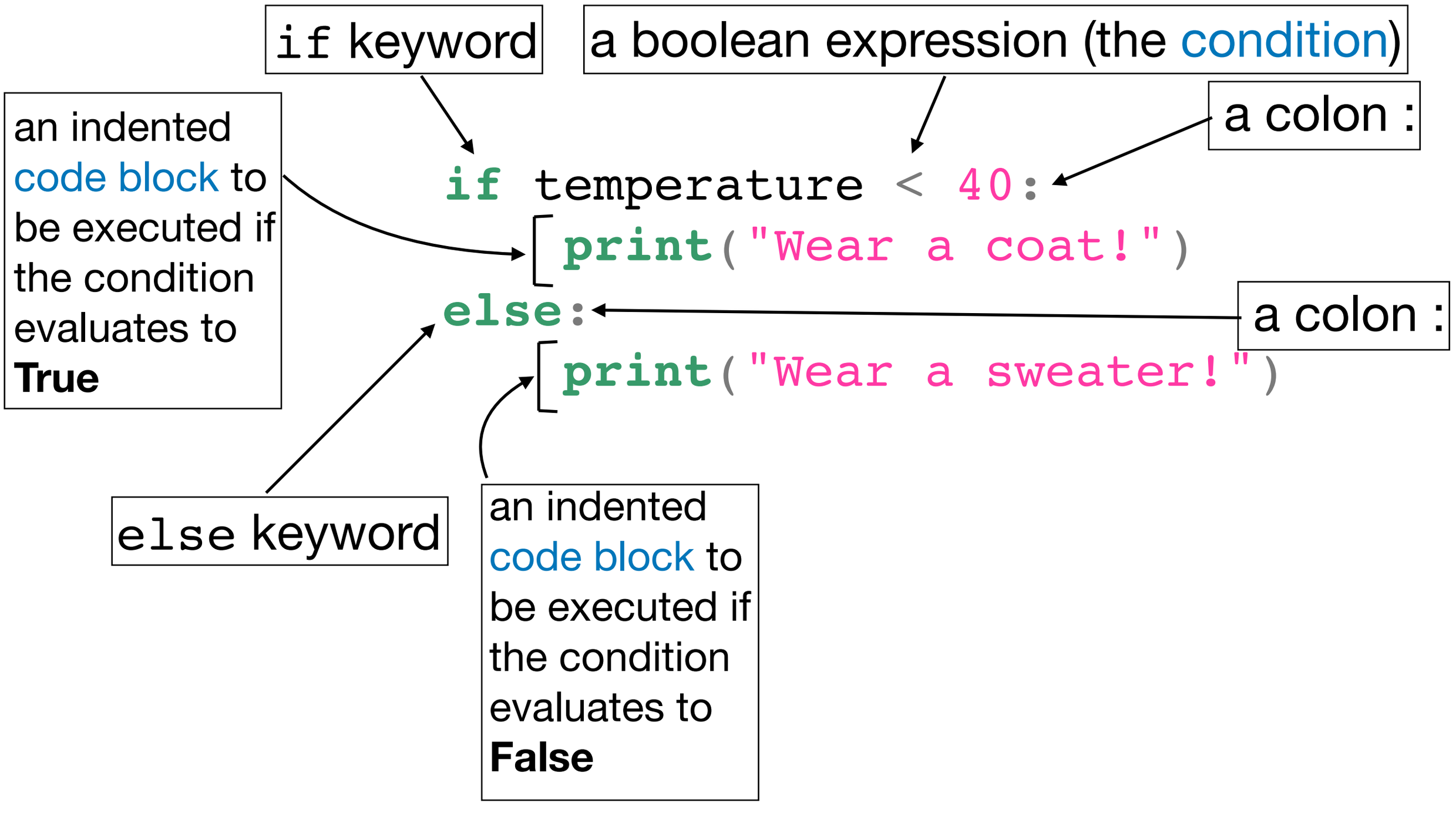
The `if/else` Statement



`if/else`: example

What does the following program print?

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

Demo: debug mode in Thonny

`if/else`: example

What does the following program print?

```
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

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

```
a = 5
if a == 5:
    print(a)
else:
    print("nope")
```

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