Conditional Statements

If-statements and more boolean logic

CS for Social Good

Control Flow

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The control flow is the order in which a program executes individual instructions.

Conditional Statements

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def say_hello( ):
        name = input("What is your name?")
        print("Hello," + name)
```

Conditional Statements

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Every time you run the program, it will prompt the user for their name and then print out a greeting.

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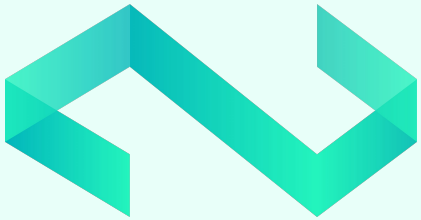


Control Flow

We can create alternate control flows in a program by introducing a **control flow statement** to dictate which lines of code in the program get executed.

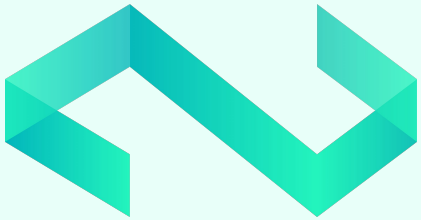
One way to do this is by using an if-statement.

Conditional Statements

Comparators

Before we get into control-flow statements, let's discuss comparators.

Comparators compare two expressions and return a boolean.
Here are some common comparators



Comparators

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`==`	equal to	`!=`	not equal to
`>`	greater than	`<`	less than
`>=`	greater than or equal to	`<=`	less than or equal to

Conditional Statements

Coding Break!

Pull up your Google Collab notebook and try out the Comparators section.

The goal is to modify the code so that when you run each cell, the output prints **True**.

This can be done in many different ways.
Try to be as creative as possible!

The If-Statement

You've learned about the boolean data type; now it is time to see how you can use boolean values to control the path of your computer programs.

If-statements contain lines of code that are only executed if the condition in the if-statement evaluates to True.

```
x = 12
if x > 5:                    →    Output:
    print("Hello!")
```

Conditional Statements

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```

→ Output:

Conditional Statements

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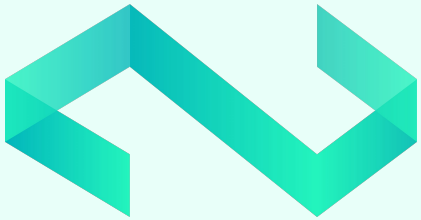
if x > 5:
    print("Hello!")
```

→ Output: Hello!

Conditional Statements



The If-Statement

Breaking down the code:
If-statements have four main components:

The keyword `**if**`
A **conditional statement** that evaluates to True or False
A colon `**:**` at the end of the line
A **code block** indented one tab further than the if-statement

```
x = 12
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→ Output: Hello

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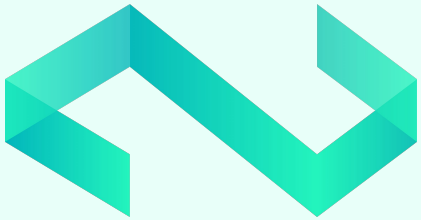
If-statements have four main components:

The keyword `**if**`
A **conditional statement** that evaluates to True or False
A colon `**:**` at the end of the line
A **code block** indented one tab further than the if-statement

```
x = 12
if x > 5 :
    print("Hello!")
```

→ Output: Hello

Note: *every* line indented one tab further than the if-statement will execute if the condition of the if-statement is met.



Coding Break!

Pull up your Google Collab notebook and try out the If-Statement section.

The goal is to enter inputs that will cause the if-statement to execute the print statement in it's code block.

For the third cell, you get to write an if-statement by yourself!

The If-Statement

What will the following code do?

Code

```
age = input("How old are you?")
print("You are" + age + ".")
if age == "18":
        print("Wow!")
        print("Me too!")
print("When's your birthday?")
```

Output

The If-Statement

What will the following code do?

Code

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age = input("How old are you?")
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if age == "18":
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Output

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Output

How old are you?

The If-Statement

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```

Output

How old are you? 16

The If-Statement

What will the following code do?

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```
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if age == "18":
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        print("Me too!")
print("When's your birthday?")
```

Output

```
How old are you? 16
```

The If-Statement

What will the following code do?

Code

```
age = input("How old are you?")
print("You are" + age + ".")
if age == "18":
        print("Wow!")
        print("Me too!")
print("When's your birthday?")
```

Output

```
How old are you? 16
You are 16.
```

The If-Statement

What will the following code do?

Code

```
age = input("How old are you?")
print("You are" + age + ".")
if age == "18":
        print("Wow!")
        print("Me too!")
print("When's your birthday?")
```

Output

```
How old are you? 16
You are 16.
```

The If-Statement

What will the following code do?

Code

```
age = input("How old are you?")
print("You are" + age + ".")
if age == "18":
        print("Wow!")
        print("Me too!")
print("When's your birthday?")
```

Output

```
How old are you? 16
You are 16.
```

The If-Statement

What will the following code do?

Code

```
age = input("How old are you?")
print("You are" + age + ".")
if age == "18":
        print("Wow!")
        print("Me too!")
print("When's your birthday?")
```

Output

```
How old are you? 16
You are 16.
When's your birthday?
```

The If-Statement

What will the following code do?

Code

```
age = input("How old are you?")
print("You are" + age + ".")
if age == "18":
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Output

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```

Output

How old are you?

The If-Statement

What will the following code do?

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print("You are" + age + ".")
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print("When's your birthday?")
```

Output

How old are you? 18

The If-Statement

What will the following code do?

Code

```
age = input("How old are you?")
print("You are" + age + ".")
if age == "18":
        print("Wow!")
        print("Me too!")
print("When's your birthday?")
```

Output

```
How old are you? 18
```

The If-Statement

What will the following code do?

Code

```
age = input("How old are you?")
print("You are" + age + ".")
if age == "18":
        print("Wow!")
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print("When's your birthday?")
```

Output

```
How old are you? 18
You are 18.
```

The If-Statement

What will the following code do?

Code

```
age = input("How old are you?")
print("You are" + age + ".")
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print("When's your birthday?")
```

Output

```
How old are you? 18
You are 18.
```

The If-Statement

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```

Output

```
How old are you? 18
You are 18.
```

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Output

```
How old are you? 18
You are 18.
Wow!
```

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Output

```
How old are you? 18
You are 18.
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Output

```
How old are you? 18
You are 18.
Wow!
Me too!
When's your birthday?
```

The If-Else-Statement

Conditional Statements

The If-Else-Statement

Now say we want to execute one code block if a condition is met, otherwise we want to execute a different code block.

Code **Output**

```
x = 6
y = 6
if x / 3 + y / 2 == 7:
        print("Correct!")
if x / 3 + y / 2 != 7:
        print("Try again")
```

The If-Else-Statement

Now say we want to execute one code block if a condition is met, otherwise we want to execute a different code block.

Code **Output**

```
x = 6
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Is there a way to simplify it?

The If-Else-Statement

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Yes! If-else statement to the rescue

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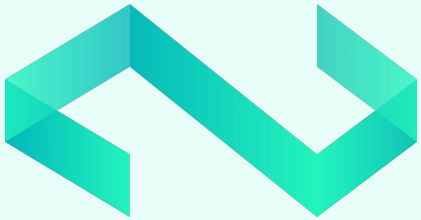

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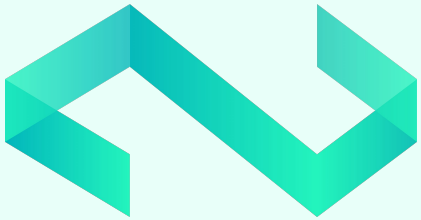

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```

Output

```
Try again
```

The If-Else-Statement

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Code

```
x = 6
y = 6
if x / 3 + y / 2 = 7:
        print(“Correct!”)
else:
        print(“Try again”)
```

Output

```
Try again
```

This code has a bug in it, so it won’t run. Can anyone see the bug?

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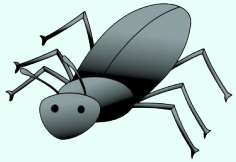

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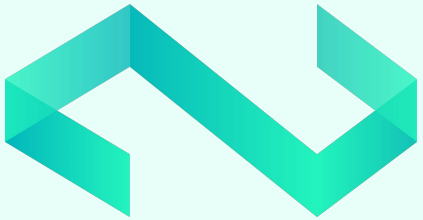

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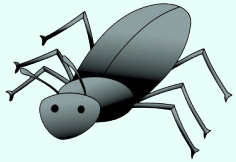

Output

Try again

This is an easy mistake to make, so watch out for it!

This code has a bug in it, so it won't run. Can anyone see the bug?

The If-Else-Statement

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Code

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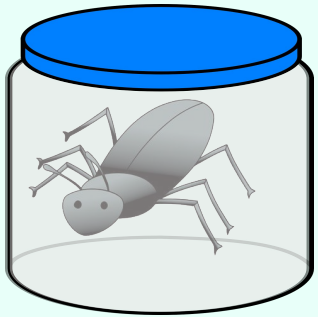


Output

Try again

This code has a bug in it, so it won't run. Can anyone see the bug?

Coding Break!

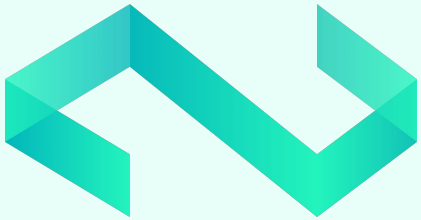
Pull up your Google Collab notebook and try out the If/Else-Statement section.

This section asks you to write all of your own code from scratch.

See how far you can get on your own, but please ask for help if you need it!

Logical Operators

Sometimes you might have more than one condition you are testing.
This is where logical operators come in.



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x = 2
y = 4
If x > 3 or y > 3:
        print("Correct!")
else:
        print("Try again")
```

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This is where logical operators come in.

You can use **or** to check if **at least** one condition is true.

```
x = 2
y = 4
If x > 3 or y > 3:
        print("Correct!")
else:
        print("Try again")
```

→ Correct!

Logical Operators

Sometimes you might have more than one condition you are testing.
This is where logical operators come in.

You can use **and** to check if **both** conditions are true.

```
x = 2
y = 4
If x > 3 and y > 3:
        print("Correct!")
else:
        print("Try again")
```

Logical Operators

Sometimes you might have more than one condition you are testing.
This is where logical operators come in.

You can use **and** to check if **both** conditions are true.

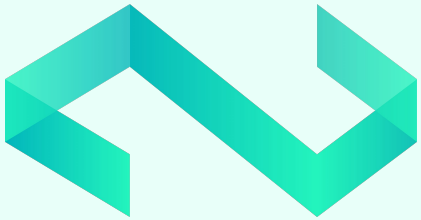
```
x = 2
y = 4
If x > 3 and y > 3:
        print("Correct!")
else:
        print("Try again")
```

→ Try again

Coding Break!

Pull up your Google Collab notebook and try out the Logical Operators section.

For this section, you will modify the inputs so that the cell prints **`True`** when you run it.



Next Time

Next time we will wrap up one final thing about if-statements before we begin learning about loops in Python.