

Programming Thinking

Session 4

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Plan for this session

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Boolean operators

operators to produce or combine **bool** values

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operators to produce or combine **bool** values

Conditional execution

to make our programs branch



Plan for this session

Boolean operators

operators to produce or combine **bool** values

Conditional execution

to make our programs branch

Functions

for not repeating ourselves ;)



Boolean operations

We're going to learn two kinds of operators that operate on **bool** values:

- comparison operators
- logical operators

Boolean operations are useful for conditional execution.

Comparison operators

| name | description |
|------------------------|--|
| <code>x == y</code> | x is equal to y |
| <code>x != y</code> | x is not equal to y |
| <code>x > y</code> | x is greater than y |
| <code>x < y</code> | x is lesser than y |
| <code>x >= y</code> | x is greater than or equal than y |
| <code>x <= y</code> | x is lesser than or equal than y |



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Demo

- Are two strings the same?
- Are two **bool** values different?
- Is this number greater than or equal that other one?

Logical operators

We use logical operators to combine **bool** values. They are the operators with the lowest precedence, any other expression will be evaluated before them.

| name | description |
|---------|---|
| x and y | returns True if x and y are True |
| x or y | returns True if either x or y are True |
| not x | negates x |



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| x or y | returns True if either x or y are True |
| not x | negates x |

Demo

Learn about truth tables



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Checkpoint

Any questions or comments about...

- Comparison operators
- logical operators



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Almost all useful programs need to be able to check conditions and change its behaviour accordingly. That's what conditional execution provides.



if statement

the `if` statement is the tool we use for conditional execution in Python

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if <condition>:  
    <body>
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Demo

- What type will the condition in our if statement have?

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Demo

- What type will the condition in our if statement have?
- How can we create a if statement that always executes its body?

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```
if <condition>:  
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Demo

- What type will the condition in our if statement have?
- How can we create a if statement that always executes its body?
- What about one that never does it?

Else clause

The else clause is executed when the condition is evaluated to false:

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    <block>
```

Demo

- Check if a user can drive

Else clause

The else clause is executed when the condition is evaluated to false:

```
if <condition>:  
    <block>  
else:  
    <block>
```

Demo

- Check if a user can drive
- Tell him to wait some time if they can't

Elif clauses are used when there are more possibilities:

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```
if <condition>:  
    <block>  
elif <condition>:  
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Demo

- Check if a user can drive



Elif clause

Elif clauses are used when there are more possibilities:

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if <condition>:  
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elif <condition>:  
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else:  
    <block>
```

Demo

- Check if a user can drive
- Check if they're accompanied by an adult



Elif clause

Elif clauses are used when there are more possibilities:

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if <condition>:  
    <block>  
elif <condition>:  
    <block>  
else:  
    <block>
```

Demo

- Check if a user can drive
- Check if they're accompanied by an adult
- Tell them to wait otherwise



Checkpoint

Any questions or comments about conditional execution?



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Functions

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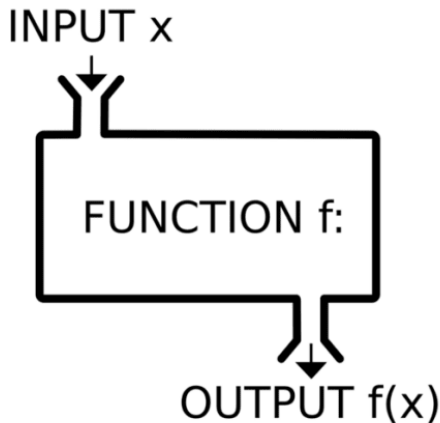
Functions receive **input** as parameters, process the input, and produce **output** as return values.



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Calling functions

The syntax for calling functions is the following:

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function_name(parameter1, parameter2, parameterN)
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Demo

Let's do a small demo with the functions we already know.

Declaring functions

We can declare our own functions using the `def` keyword with the following syntax:

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Demo

Illustrate why indentation is needed.

Returning values from functions

Functions in Python can return values after doing all the operations they perform.



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Demo

Function Parameters

Parameters are values that are injected to the function body when we call it

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Demo



Regarding functions, we've seen:

- Functions

Checkpoint

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- Functions
- Calling them

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- Calling them
- Declaring them



Regarding functions, we've seen:

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- Declaring them
- Returning values from them



Regarding functions, we've seen:

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- Calling them
- Declaring them
- Returning values from them
- Parameters



Regarding functions, we've seen:

- Functions
- Calling them
- Declaring them
- Returning values from them
- Parameters
- **Questions?**



Practice time!

Let's do some practice. We have to create a function `calculate_area_triangle_rectangle` that can calculate the area of either a triangle or a rectangle.

Let's spend 5 mins trying to solve it individually and we'll do that afterwards together.

Recap

Create functions with `def`. Return to produce a value at the end

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Combine comparison & logical operators to check the conditions you need

Create functions with `def`. Return to produce a value at the end

Combine comparison & logical operators to check the conditions you need

Use `if`, `else`, `elif` for conditional execution

- ❶ Create a function `weekly_commute_time` that asks the user their daily commute time and returns their weekly time spent commuting.
- ❷ What do the following expressions return?
 - `True` or `11 > 34`
 - `False` and `(1 == 1)`
 - `(77 // 11) > 6` and `False`
- ❸ Create a function `im_in_love` that takes a weekday number (from monday to friday), and returns how that weekday is (according to The Cure!):

```
I don't care if Monday's blue  
Tuesday's grey and Wednesday too  
Thursday I don't care about you  
It's Friday, I'm in love
```

Recommended read

<https://automatetheboringstuff.com/> is a great resource for learning how to apply Python to day to day tasks.

It's a long book, don't try to read it cover to cover but instead pick up the chapters that catch your eye from the index.

You can start reading the chapters on basics, functions, and control flow.