

Workshop: Section 3 - Introduction to Python: Part 1

Philipp Chapkovski
University of Bonn
chapkovski@uni-bonn.de

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How to Run Python Code

- Using the script file
- Built-in terminal in IDEs like PyCharm.
- Google Colab.
- Jupyter Lab.

Indentation

In Python, indentation is used to define blocks of code. Unlike many other programming languages that use braces `{}` or other markers to indicate code blocks, Python relies on indentation levels to determine the scope of loops, functions, and other constructs.

```
for i in range(3):  
    print("Loop iteration")  
    print(i)  
print("Loop ended")
```

More examples of code blocks: control structure if-else

```
if True:
    print("This is true.")
else:
    print("This is false.")
```

More examples of code blocks: loops

```
# For loop
for i in range(3):
    print(f"For loop iteration: {i}")

# While loop
count = 0
while count < 3:
    print(f"While loop iteration: {count}")
    count += 1
```

Variables and Data Types

- **Variables:** Storage for values
 - `x = 10`
- **Naming:** Lowercase, underscores, start with a letter
 - `my_var = 20`
- **Data Types:**
 - `int`: Whole numbers (`age = 30`)
 - `float`: Decimal numbers (`height = 5.9`)
 - `str`: Text (`name = "John"`)
 - `bool`: True/False (`is_adult = True`)

Basic Operators

- **Arithmetic:** Perform calculations
 - $+$, $-$, $*$, $/$, $\%$
 - $5 + 2 = 7$, $10 \% 3 = 1$
- **Comparison:** Evaluate relations
 - $==$, $!=$, $<$, $>$
 - $5 == 5$ (True), $5 > 2$ (True)
- **Logical:** Combine conditions
 - and, or, not
 - True and False (False), not True (False)

Control Structures

- **Conditionals:** if, elif, else

```
if x > 0:
    print("Positive")
elif x == 0:
    print("Zero")
else:
    print("Negative")
```

- **Logic:** Structure conditions

```
if x > 0 and y > 0:
    print("Both Positive")
```


For Loops

- **Basic For Loop:** Iterate over a sequence

```
for i in range(3):  
    print(f"Basic loop iteration: {i}")
```

- **Iterating Over Lists:**

```
my_list = [1, 2, 3]  
for item in my_list:  
    print(f"List item: {item}")
```

While Loops and Control Statements

- **Basic While Loop:** Repeat as long as condition is True

```
count = 3
while count > 0:
    print(f"While loop count: {count}")
    count -= 1
```

- **Control Statements:** break, continue

```
for i in range(5):
    if i == 2:
        break
    print(f"Loop with break: {i}")
```

```
for i in range(5):
    if i == 2:
        continue
    print(f"Loop with continue: {i}")
```

Strings and f-strings

- **String Basics:** Text enclosed in quotes
 - 'Hello', "World"
- **String Concatenation:** Combining strings
 - 'Hello' + ' ' + 'World'
- **f-strings:** String formatting

```
name = 'Alice'
age = 30
print(f"{name} is {age} years old.")
# Dynamic Expressions: Include calculations
print(f"Five plus two equals {5 + 2}.")
```

Exercise

Task

You are given a list of integers:

```
numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

- Write a for loop to iterate through the list.
- Use an if statement to check if the number is even or odd.
- If the number is even, multiply it by 2.
- If the number is odd, add 1 to it.
- Print the resulting numbers.