

Week 3: Complex Data Types

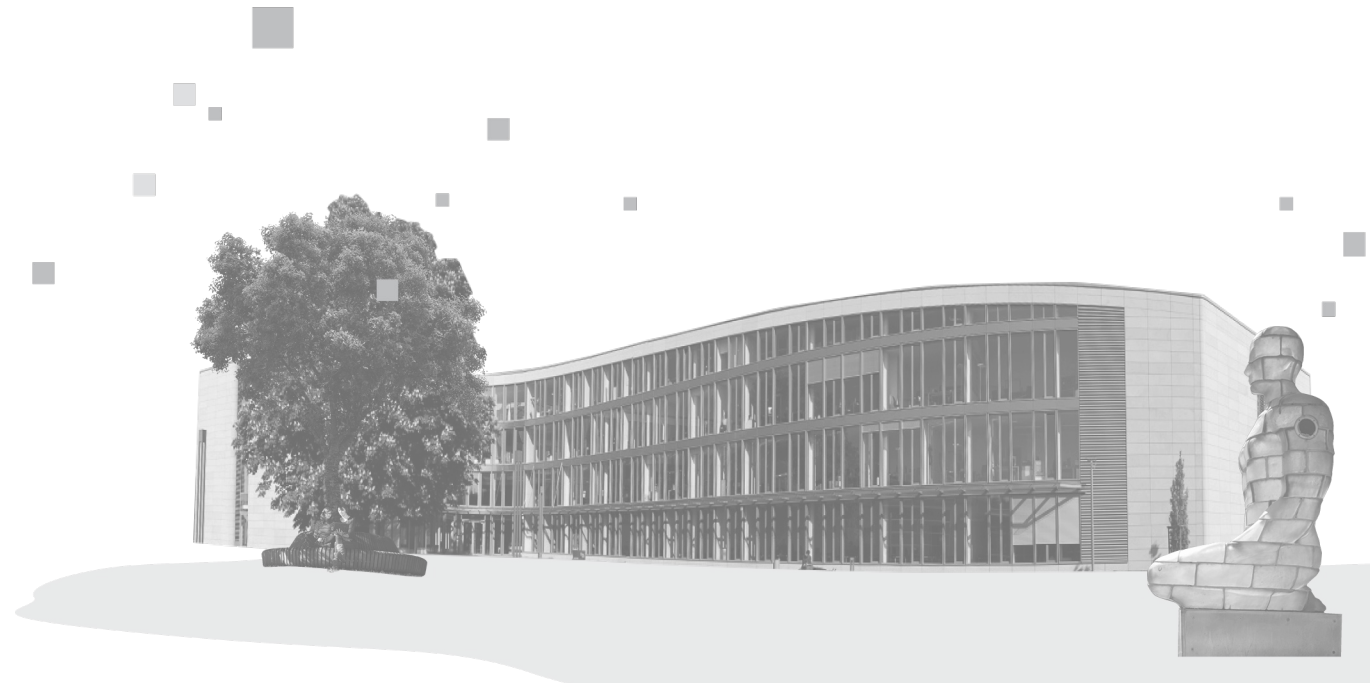
Unit 1: What Are Tuples?

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What are tuples?

Another complex data type is the tuple

- Similar to the list but different intention
 - Lists are used for **many similar** items
 - Tuples are used for items with **many attributes**
 - Example:
Address consists of zip code, city, street, house number
- Syntax:
 - Similar to lists but with parentheses ()
- Semantics:
 - Tuples are immutable, i.e. you cannot change a value of the tuple

```
address = (52066, "Aachen", "Eupener Str. 70", "0241-6009-12345")

student = (
    "Peter",
    "Parker",
    123456,
    "Python for Beginners",
    "pp12345s@university.edu",
    address,
)
```

What are tuples?

Basic operations

- Tuples have an index like lists
 - Actually, square brackets [] are used for indexing tuples!
- Sub-tuples can be defined with slicing
- Combination of list of tuples leads to a powerful structure

```
address = (52066, "Aachen", "Eupener Str. 70", "0241-6009-12345")

student = (
    "Peter",
    "Parker",
    123456,
    "Python for Beginners",
    "pp12345s@university.edu",
    address,
)

print(address[0])
print(student[1])
print(student[5])
print(student[5][2])
print(student[-1])
print(address[-3])
print(address[2])
```

```
numbers = (1, 2, "trois", "four", "V", 6)
print(numbers[2:4])
print(len(numbers))
print(numbers.count(1))
print(numbers.index("V"))
```

What are tuples?

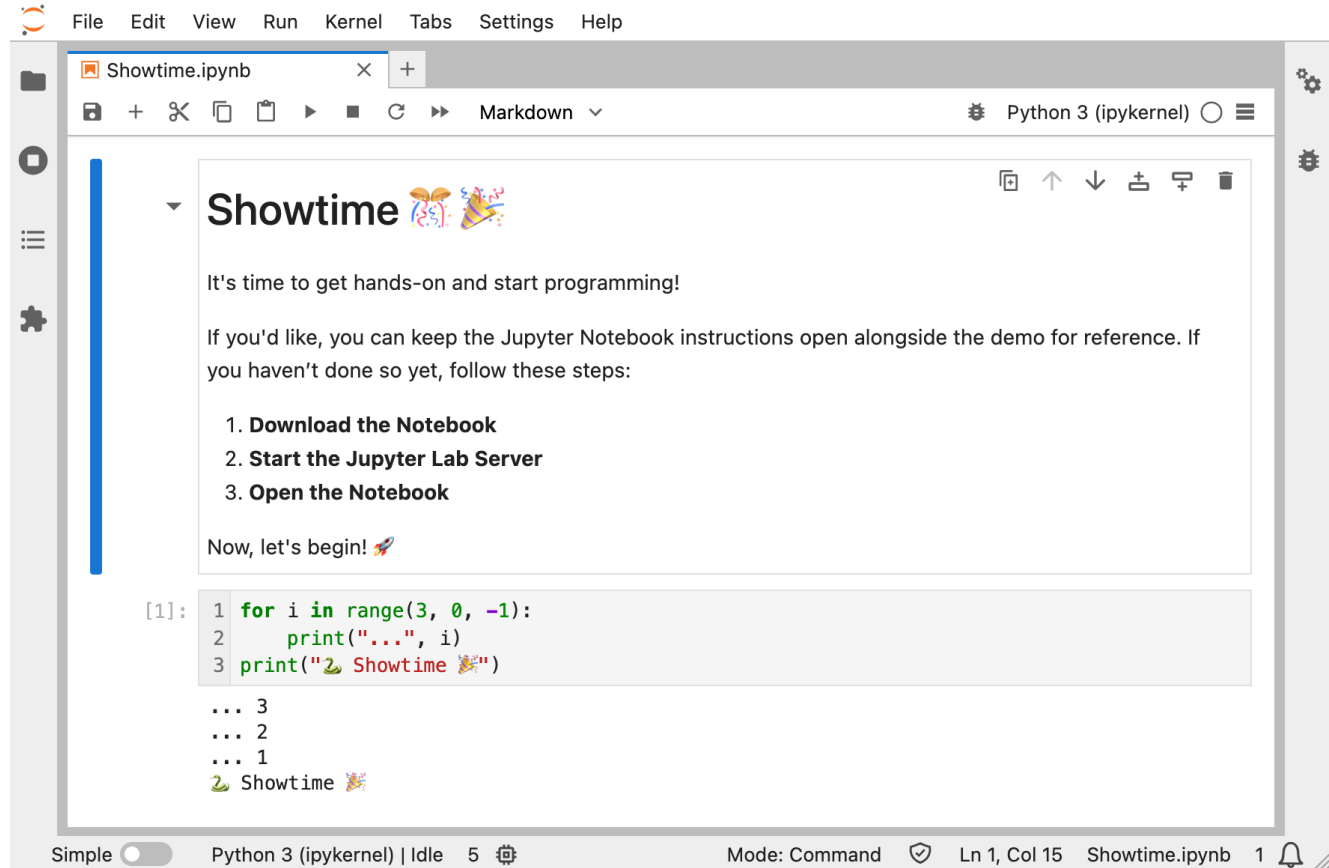
Showtime

Now it's time to get hands on and start programming!

If you like, you can open the [Jupyter Notebook](#) instructions in parallel to the demo.

If you haven't done so yet:

- [Download the Notebook](#)
- [Start the Jupyter Server](#) and open the Notebook



The screenshot shows a Jupyter Notebook window titled 'Showtime.ipynb'. The interface includes a top menu bar (File, Edit, View, Run, Kernel, Tabs, Settings, Help) and a toolbar with icons for file operations and execution. The notebook content is divided into two main sections. The first section, titled 'Showtime' with a party popper emoji, contains text instructions: 'It's time to get hands-on and start programming!', 'If you'd like, you can keep the Jupyter Notebook instructions open alongside the demo for reference. If you haven't done so yet, follow these steps:', a numbered list (1. Download the Notebook, 2. Start the Jupyter Lab Server, 3. Open the Notebook), and 'Now, let's begin!' with a rocket emoji. The second section is a code cell labeled '[1]:' containing a Python loop that prints '3', '2', '1', and 'Showtime' with a rocket emoji. The output of the code cell shows the execution results: '... 3', '... 2', '... 1', and '🚀 Showtime 🚀'. The bottom status bar indicates 'Simple' mode, 'Python 3 (ipykernel) | Idle', '5' lines, 'Mode: Command', 'Ln 1, Col 15', and the filename 'Showtime.ipynb'.

```
File Edit View Run Kernel Tabs Settings Help
Showtime.ipynb
Python 3 (ipykernel)
Markdown
Showtime 🎉
It's time to get hands-on and start programming!
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1. Download the Notebook
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3. Open the Notebook
Now, let's begin! 🚀
[1]: 1 for i in range(3, 0, -1):
      2     print("...", i)
      3     print("🚀 Showtime 🚀")
      ... 3
      ... 2
      ... 1
      🚀 Showtime 🚀
Simple Python 3 (ipykernel) | Idle 5 Mode: Command Ln 1, Col 15 Showtime.ipynb 1
```

What are tuples?

Summary / key takeaways

In this unit you learned ...

- ... what tuples are
- ... why they are used
- ... the differences between lists and tuples
- ... basic operations

