

# Week 3: Complex Data Types

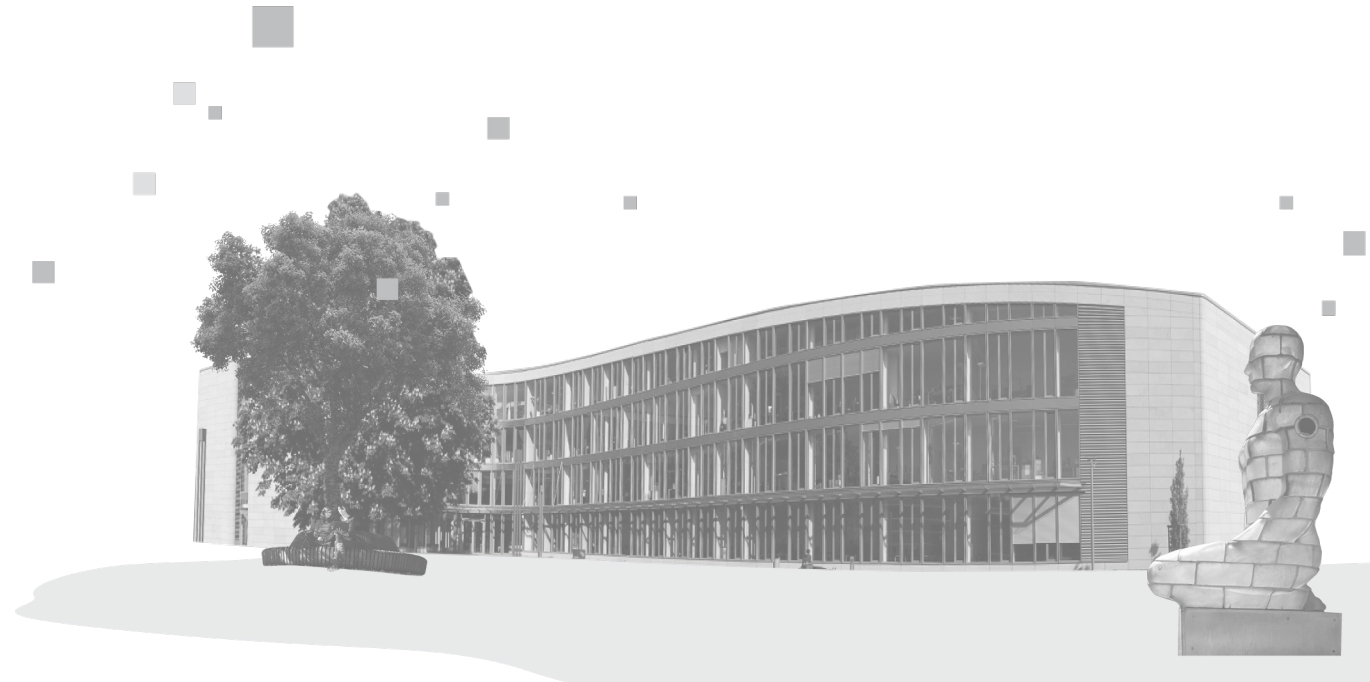
## Unit 3: When to Use Lists, Dictionaries, and Tuples

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# When to use lists, dictionaries, and tuples

## Differences

Theoretically, lists, dictionaries, and tuples are almost interchangeable.

Each data structure has its advantages and disadvantages in certain use cases

- Lists
  - Useful when lots of objects of the same type (e.g. lots of cars, lots of students) have to be handled
  - Access only by index
- Tuples
  - Immutable, not changeable
  - This can be an advantage when the structure of objects is not to be changed
- Dictionaries
  - Access via key; a key is required
  - In contrast to lists: random access of elements possible via key; not necessary to search through a list
  - In contrast to tuples: structure of objects can be changed, the elements of the directory can have a name (the key) which has advantages in certain situations

Combination of different types useful and often necessary

# When to use lists, dictionaries, and tuples

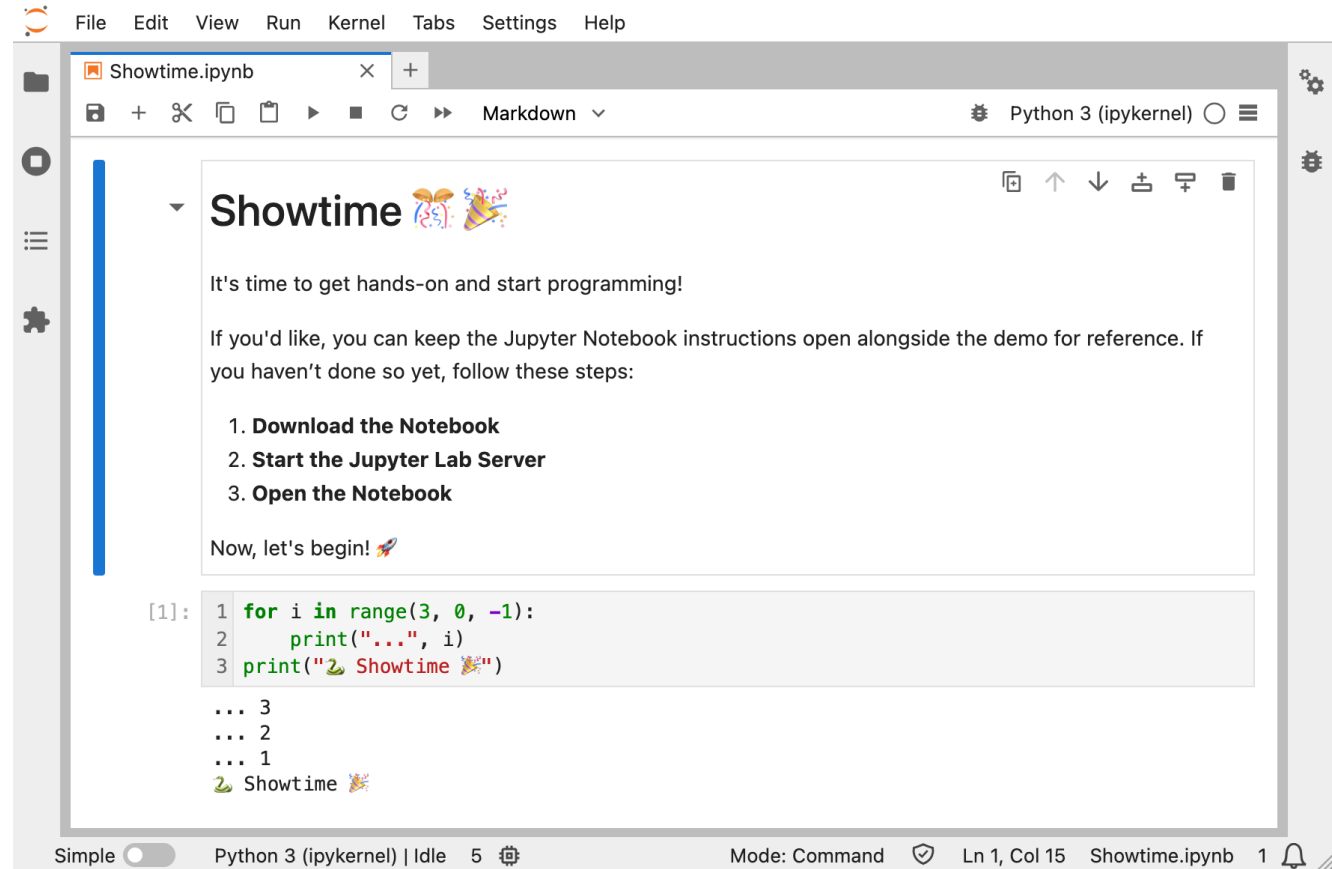
## Showtime

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: a text area and a code cell. The text area, titled 'Showtime' with a party popper emoji, contains the following text: '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 code cell, labeled '[1]:', contains a Python loop that prints a countdown and a 'Showtime' message with a party popper emoji. The output of the code cell shows the countdown from 3 to 1 and the 'Showtime' message. The bottom status bar indicates the notebook is running on 'Python 3 (ipykernel)' in 'Idle' mode, with the cursor at 'Ln 1, Col 15'.

```
[1]: 1 for i in range(3, 0, -1):
      2     print("...", i)
      3 print("🎉 Showtime 🎉")
      ... 3
      ... 2
      ... 1
      🎉 Showtime 🎉
```

# When to use lists, dictionaries, and tuples

## Summary / key takeaways

In this unit you learned ...

- ... the different use cases for lists, tuples, and dictionaries

