FH AACHEN
UNIVERSITY OF APPLIED SCIENCES

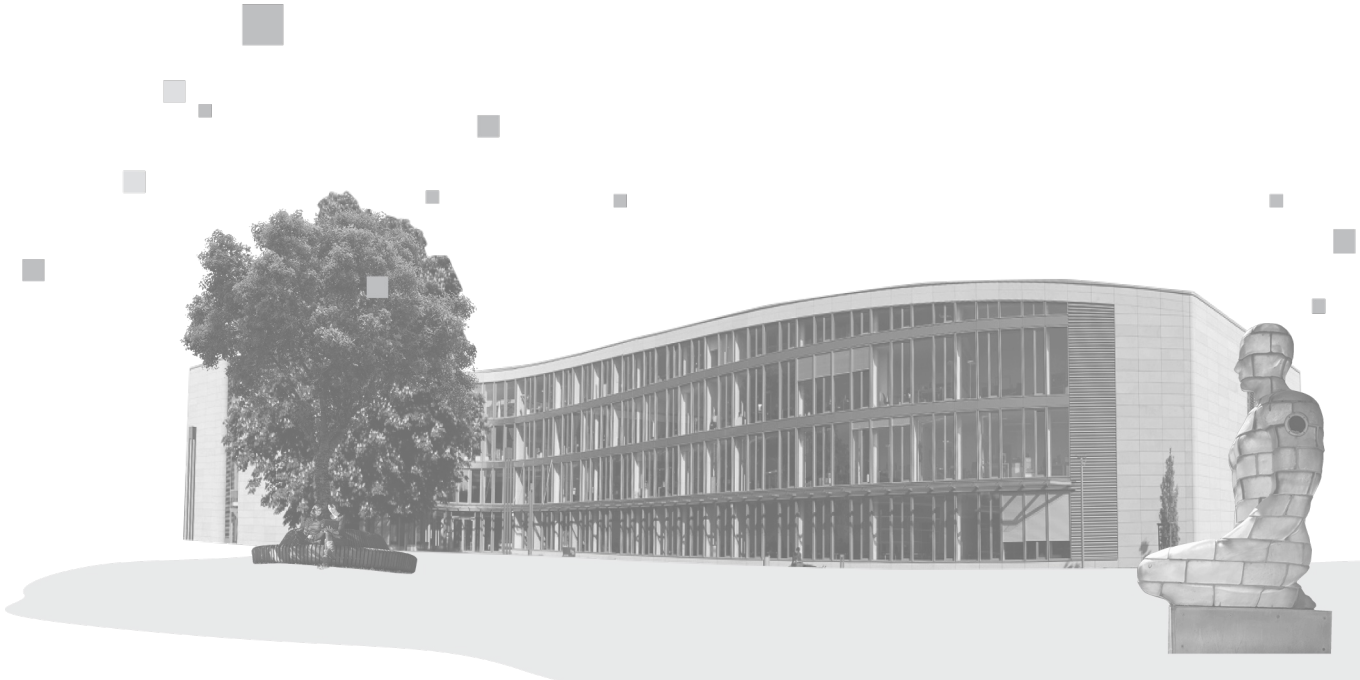
HPI Hasso Plattner Institut
Digital Engineering · Universität Potsdam

Week 3: Complex Data Types

Unit 2: What Are Dictionaries?

Christian Drumm

Stephan Jacobs



Design IT.
Create Knowledge.

www.hpi.de

What are dictionaries?
Drawback of lists and tuples: access only by index

- In lists and tuples, individual elements can only be accessed by index.
  - This is sometimes cumbersome.
- Take a telephone book as an example:
  - You do not want to search for the third number.
  - You want to look up the number by a name.
- This is what dictionaries are made for: The elements are accessed not by index but by a key.
  - In the example with the telephone, the name is the key.

Name	Telephone Number
P. McCartney	123 456
J. Lennon	987 654 321
G. Harrison	11 342 555
R. Starr	777 888 32

What are dictionaries?
Definition and handling of dictionaries

- Dictionaries consists of *key-value pairs*. That means, there is always a key, which can be used to access the value.
  - In the telephone book, the key is the name of a person and the value is the telephone number.
- Syntax:
  - Dictionaries are represented by curly braces { }
  - The key-value pairs are separated by commas ,
  - Each key-value pair is represented as follows:

    `key : value`

```
tel = {"P.McCartney" : 123456,
       "J.Lennon" : 987654321,
       "G.Harrison" : 11342555,
       "R.Starr" : 77788832}
print(tel)
```

```
print(tel["G.Harrison"])
```

- An individual value is accessed by putting the key in square brackets.
- It is possible to add, change, and delete entries in the dictionary.
- Trying to access a nonexistent key leads to an error.

FH AACHEN
UNIVERSITY OF APPLIED SCIENCES

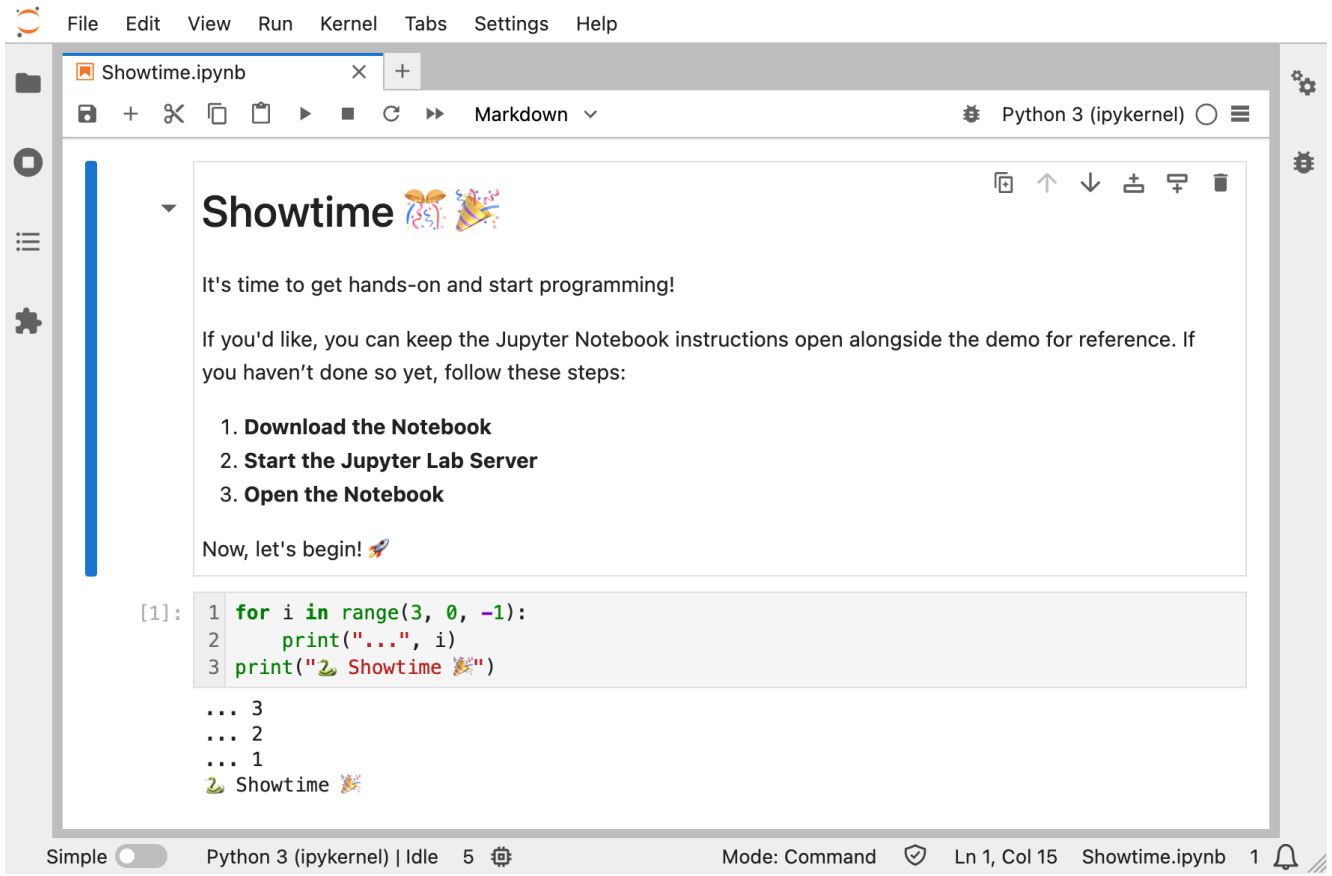
What are dictionaries? Showtime

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



What are dictionaries?
Summary / key takeaways

In this unit you learned ...

- … that elements in dictionaries can be accessed by a key, not by an index
- … the elements in dictionaries are key-value pairs
- … dictionaries are mutable, i.e. it is possible to add, delete, and change elements