Effective Programming Practices for Economists

Software engineering

Defining custom containers

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Some drawbacks of dictionaries

```
>>> student = {
...   "first_name": "Janos",
...   "last_name": "Gabler",
...   "email": "janos@uni-bonn.de",
... }

>>> student["frist_name"]
----------------------------------------
KeyError Traceback (most recent call last)
...
KeyError: 'frist_name'
```

- Typos lead to runtime errors
- Mutable
- Hard to document/know which keys should be there
- No autocomplete for keys

NamedTuples

```
>>> from typing import NamedTuple

>>> class Student(NamedTuple):
...     first_name: str
...     last_name: str
...     email: str

>>> student = Student(
...     first_name="Janos",
...     last_name="Gabler",
...     email="janos@uni-bonn.de",
... )

>>> student.first_name
'Janos'
```

- Typos can be detected by an IDE
- Immutable
- Easy to document/know which attributes are there
- Autocomplete for attributes works

Dataclasses

```
>>> from dataclasses import dataclass

>>> @dataclass
... class Student:
...     first_name: str
...     last_name: str
...     email: str

>>> student = Student(
...     first_name="Janos",
...     last_name="Gabler",
...     email="janos@uni-bonn.de",
... )

>>> student.first_name
'Janos'
```

- Same advantages as as `NamedTuple`
- Mutable by default but can by made immutable
- Many powerful options: Documentation

Reminder

- Dictionaries are awesome! One of the most optimized data structures you can imagine.
- You'll need to learn when to use
  - dicts
  - NamedTuples
  - dataclasses