

# **Effective Programming Practices for Economists**

## **Installation and execution**

### **Environment files and environments**

Janoś Gabler and Hans-Martin von Gaudecker

# Environment files vs. environments

- An **environment.yml** file:
  - A recipe to create an environment
  - Under version control
  - Shared with team members
- A conda/mamba **environment**:
  - A collection of Python packages stored on your computer
  - Independent of other environments you might have
- You create an environment from an environment file by typing

```
mamba env create -f environment.yml
```

# Anatomy of environment.yml

```
name: mini-env
channels:
  - conda-forge
  - nodefaults
dependencies:
  - python==3.11
  - pandas
  - pip:
    - pdbp
```

- Name can be anything, except that it must not contain spaces
- Channels: You rarely need more than conda-forge
- Dependencies: Python, list of Python packages
  - Can have equality or inequality constraints on versions
  - Only use pip for packages that are not conda/mamba installable
- Environment files should be hand-written and maintained

# Dependencies installed automatically

- The mini environment from above will contain the following packages
- Most are low-level dependencies you don't have to care about
- Some exact versions are OS specific
- Listing all of them would create a non-portable environment

|                  |            |                 |              |
|------------------|------------|-----------------|--------------|
| _libgcc_mutex    | 0.1        | numpy           | 1.26.2       |
| _openmp_mutex    | 4.5        | openssl         | 3.2.0        |
| bzip2            | 1.0.8      | pandas          | 2.1.4        |
| ca-certificates  | 2023.11.17 | pdbp            | 1.5.0        |
| ld_impl_linux-64 | 2.40       | pip             | 23.3.1       |
| libblas          | 3.9.0      | pygments        | 2.17.2       |
| libcbblas        | 3.9.0      | python          | 3.11.0       |
| libffi           | 3.4.2      | python-dateutil | 2.8.2        |
| libgcc-ng        | 13.2.0     | python-tzdata   | 2023.3       |
| libgfortran-ng   | 13.2.0     | python_abi      | 3.11         |
| libgfortran5     | 13.2.0     | pytz            | 2023.3.post1 |
| libgomp          | 13.2.0     | readline        | 8.2          |
| liblapack        | 3.9.0      | setuptools      | 68.2.2       |
| libns1           | 2.0.1      | six             | 1.16.0       |
| libopenblas      | 0.3.25     | tabcompleter    | 1.3.0        |
| libsqlite        | 3.44.2     | tk              | 8.6.13       |
| libstdcxx-ng     | 13.2.0     | tzdata          | 2023c        |
| libuuid          | 2.38.1     | wheel           | 0.42.0       |
| libzlib          | 1.2.13     | xz              | 5.2.6        |
| ncurses          | 6.4        |                 |              |

# How to add a package

- Just installing packages into an environment from the shell is not reproducible
- Instead:
  - Add the package to `environment.yml`
  - Use `mamba env update -f environment.yml`
- If you have any problem:
  - `mamba env remove -n mini-env`
  - `mamba env create -f environment.yml`