Effective Programming Practices for Economists

Installation and execution

Environment files and environments

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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

```yaml
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
libcblas	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
libnsl	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`