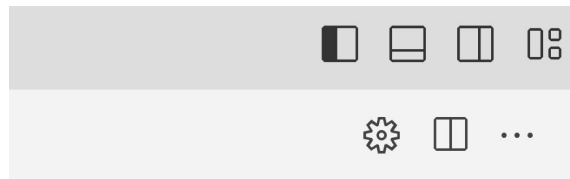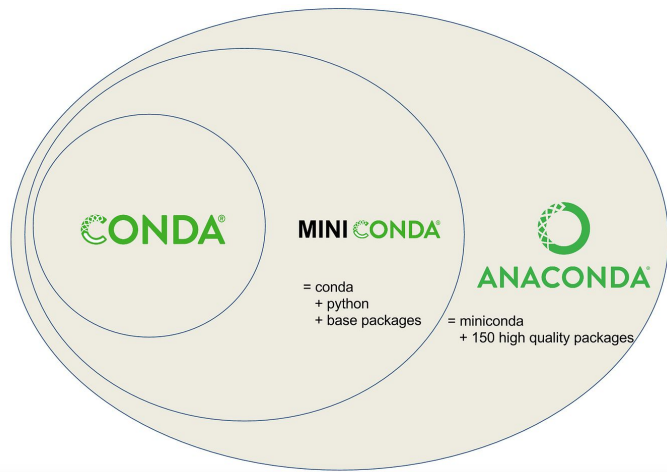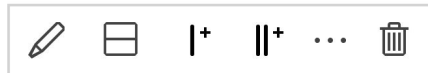# HAS Tools:

Managing python environments with conda

November 4, 2024

Where does `base` come from?

- Your jupyter kernel for the class so far has been supplied by me

- I created it so that you would have all the necessary tools for class:

  - numpy, matplotlib, pandas, xarray, etc

- It is a "conda" environment

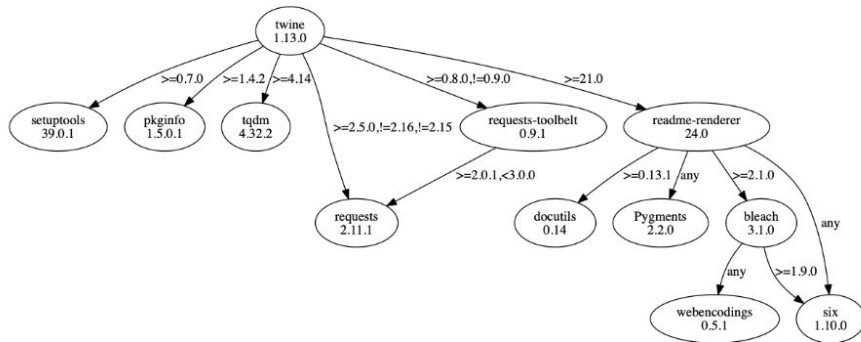- conda is a tools for software package dependency management

base (Python 3.10.8)

CONDA®

MINI CONDA®

= conda
+ python
+ base packages

ANACONDA®

= miniconda
+ 150 high quality packages

software package dependency management

- wow this sounds super fun!

- many of the packages we use require other, underlying packages

  - pandas requires numpy & matplotlib
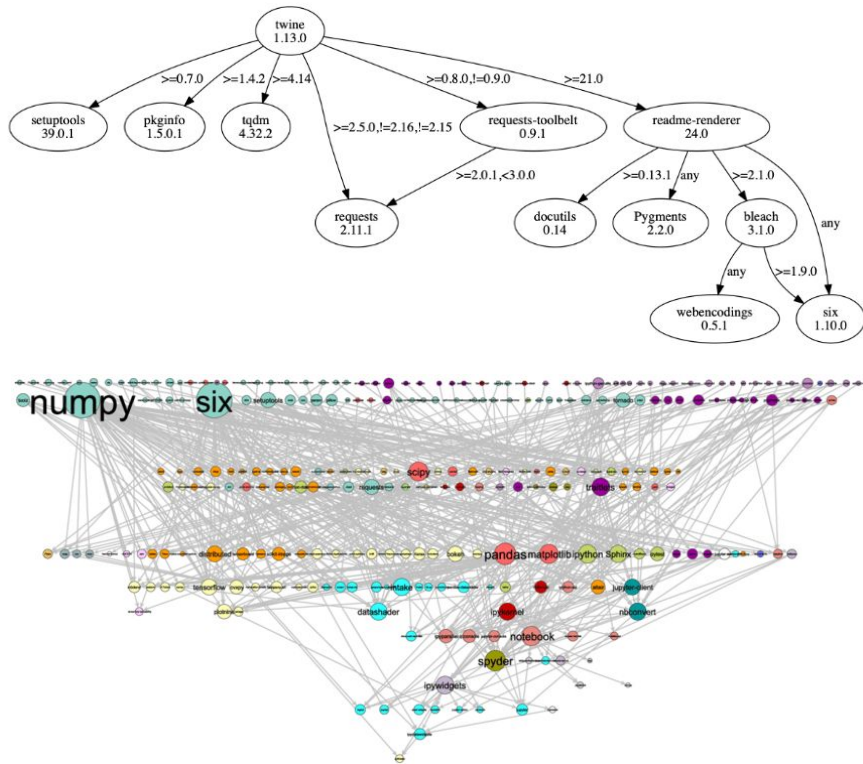
software package dependency management

- wow this sounds super fun!

- many of the packages we use require other, underlying packages

  - pandas requires numpy & matplotlib

- seems like a simple idea, but quickly becomes quite challenging!

- I wanted to hide this complexity from you while you learned

Python packaging at large

- Sadly, python has a very bad package management situation

- Many options are available:
    - pip (default)
    - conda (mostly scientists)
    - poetry (sensible default)
    - uv (up and coming)
    - pipenv (bad name)
    - pdm, hatch, pixi…
- All of them have major flaws

- Conda is slow, heavy, and brittle, but allows for including non-python packages

Aside: conda is the backbone of Anaconda Navigator

Many of you who have used python before this class may have used this

It's a GUI interface to the conda package manager
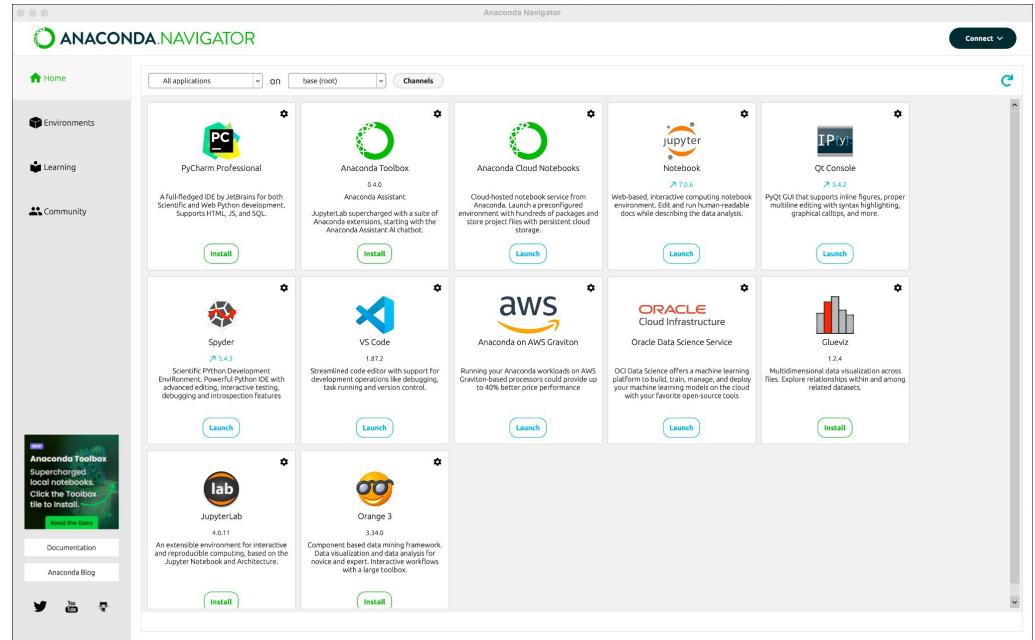
Maintaining multiple "environments"

- In this class we are only using the base environment, but generally you may need to have multiple sets of packages installed independently
- Each of these is referred to as an environment
- Environments contain logically separated "sandboxes" which can contain different software packages

```
INS (base) configs >>> conda env list
# conda environments:
#
base                  *  /home/andrbenn/miniconda3
all                      /home/andrbenn/miniconda3/envs/all
cmip_swe                 /home/andrbenn/miniconda3/envs/cmip_swe
dask                     /home/andrbenn/miniconda3/envs/dask
goes                     /home/andrbenn/miniconda3/envs/goes
hydrogen                 /home/andrbenn/miniconda3/envs/hydrogen
ml                       /home/andrbenn/miniconda3/envs/ml
mpi                      /home/andrbenn/miniconda3/envs/mpi
neuralhydrology          /home/andrbenn/miniconda3/envs/neuralhydrology
noaa_owp                 /home/andrbenn/miniconda3/envs/noaa_owp
warp                     /home/andrbenn/miniconda3/envs/warp
weatherbench             /home/andrbenn/miniconda3/envs/weatherbench
```

Demo time