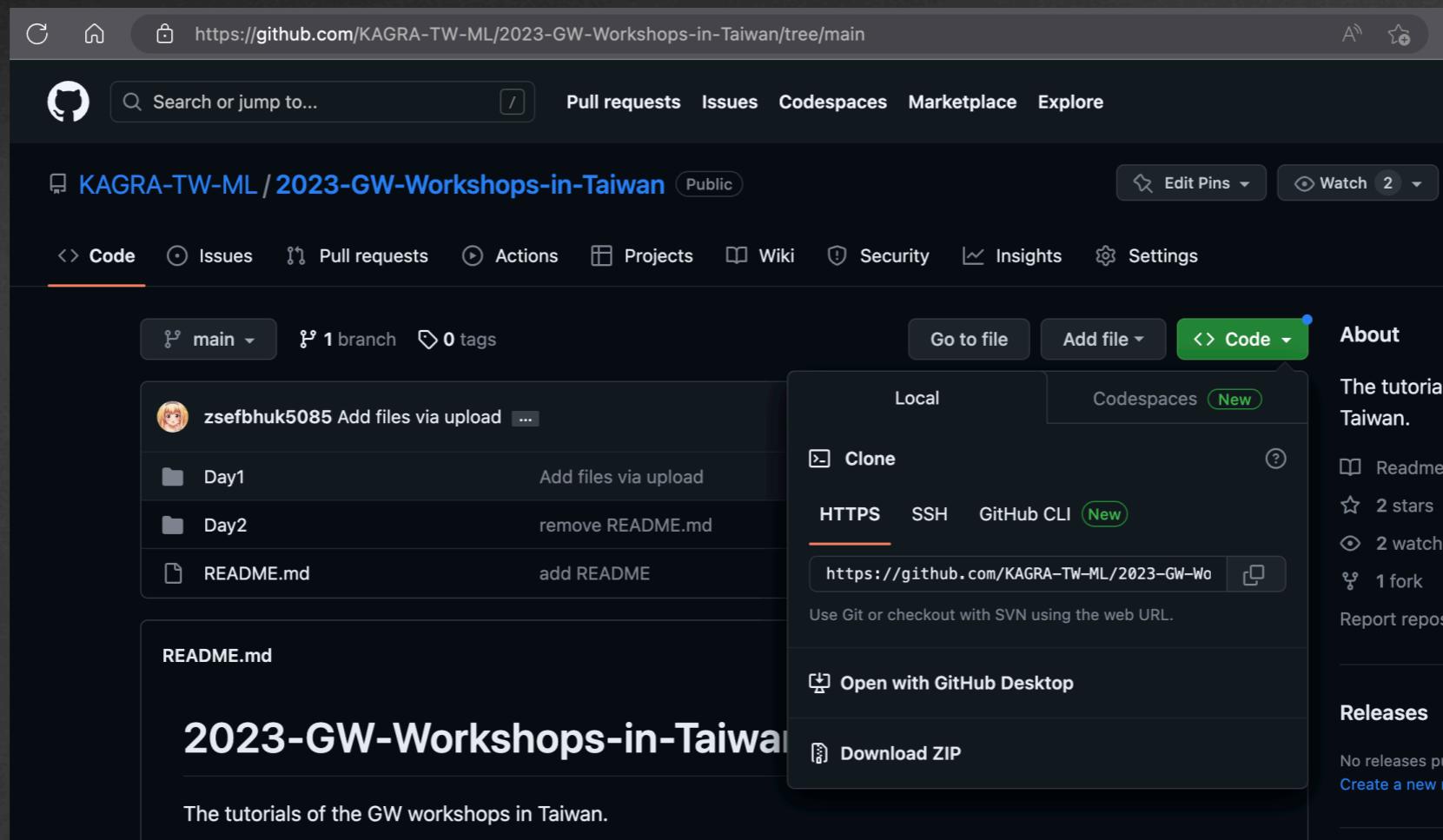


Installing Software Packages

Setting up python environment

Check Our GitHub Page!

- Check <https://github.com/KAGRA-TW-ML/2023-GW-Workshops-in-Taiwan> for all the material in this workshop!
 - Use the `git clone` command or download the ZIP file
- Also, check <https://github.com/gw-odw/odw-2023> for more tutorials



Ways to Running Python

Google Colab

- Free to use
- No need for disk space
- GPU support
- Notebook interface
- Has **dogs, cats, and crabs**
- Limited runtime (24h for free) and disk space
- Need \$ to run in the background
- Need to reinstall the package when reopening the notebook

Your Computer

- Unlimited execution time
- Only need to install the packages once
- The flexibility of managing virtual environments
- Background execution when using terminal
- Needs some disk space
- May not have GPU support
- Additional efforts to set up the environment
- No dogs, cats, and crabs

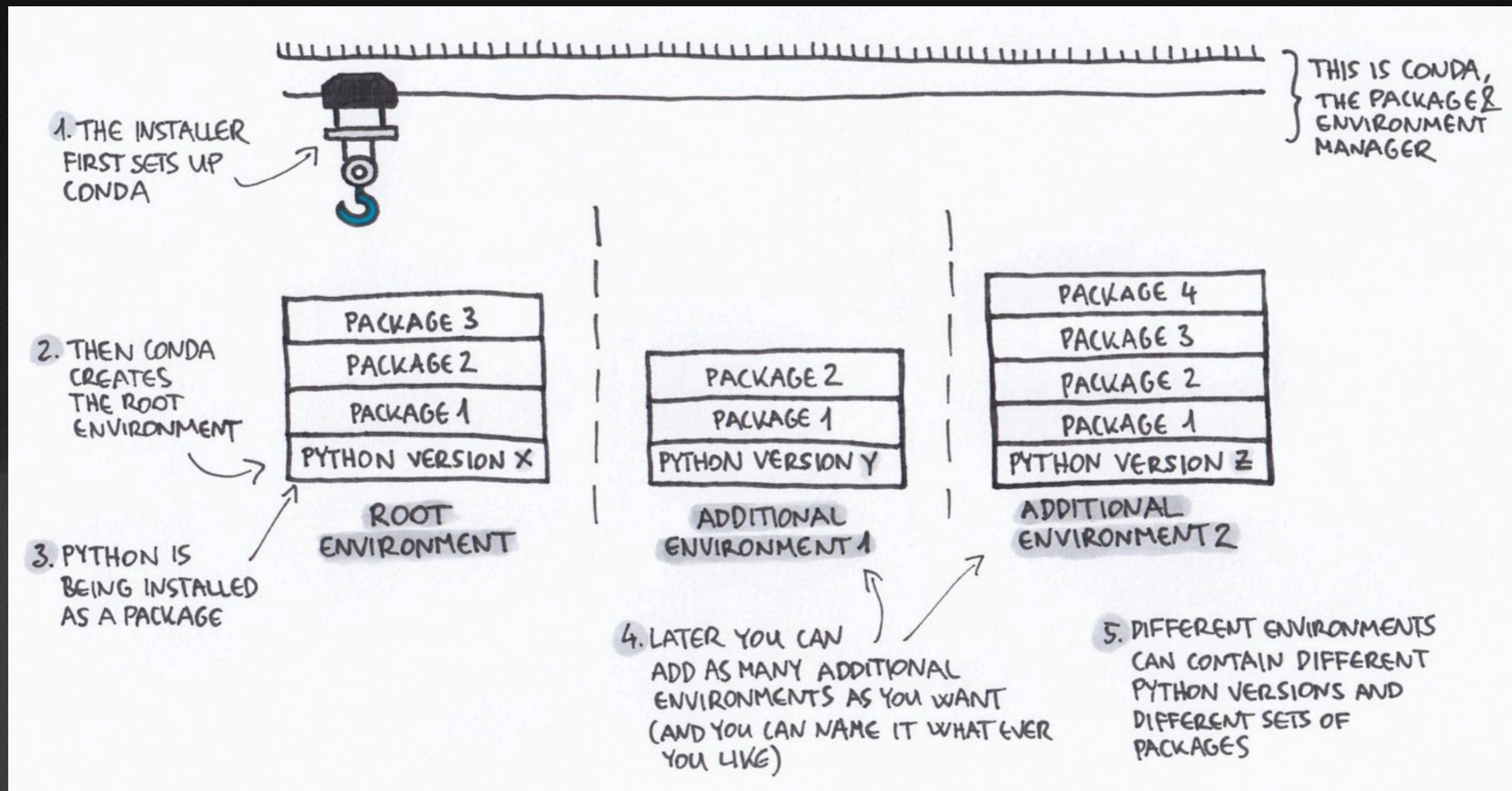
Preparations to Run GW Analysis on Your PC

- Setting up Conda environment (install Miniconda)
- Installing IGWN software packages

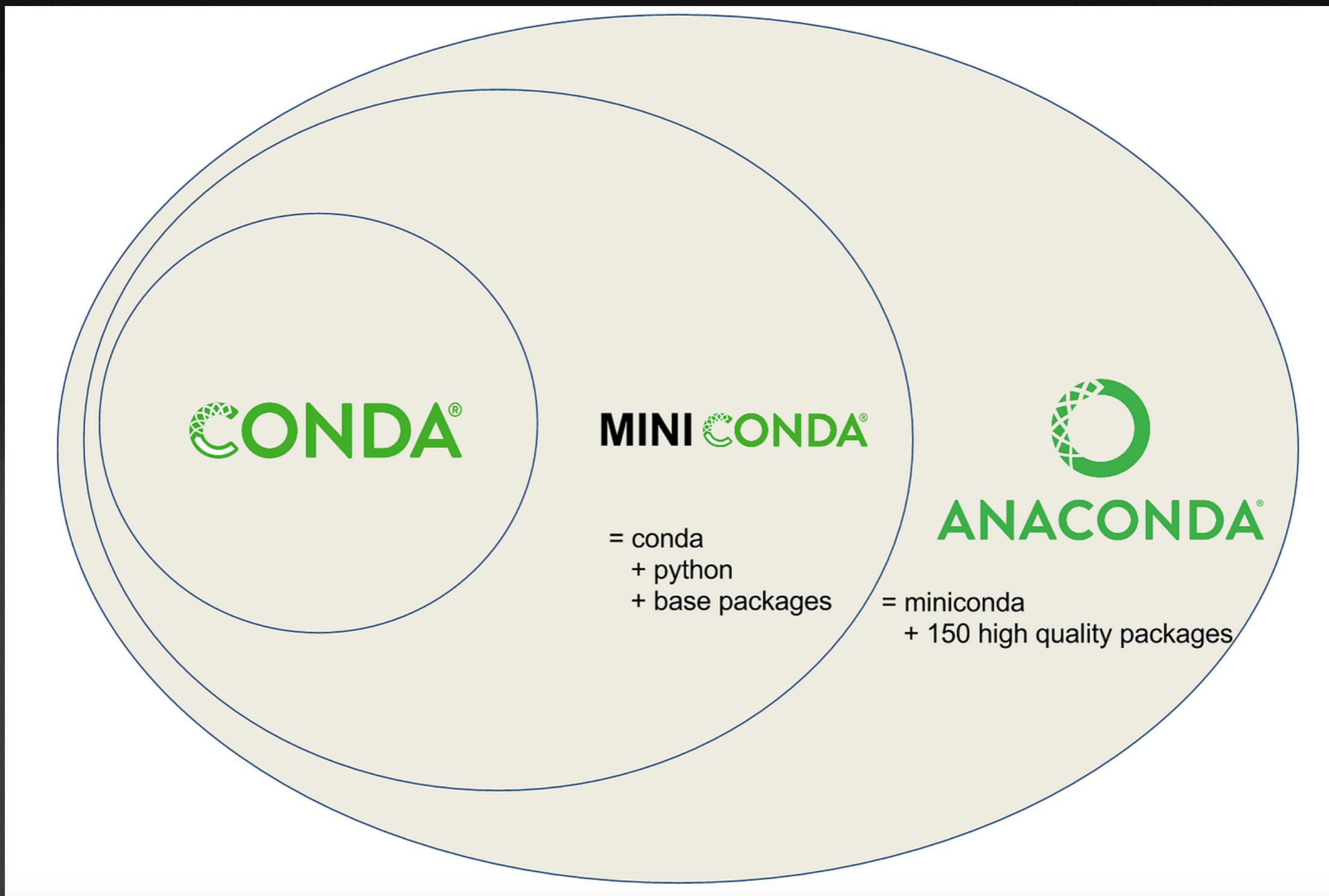
For Windows Users...

- Some fundamental IGWN packages require a Linux environment
- It is recommended to install **Windows Subsystem for Linux (WSL)** on your laptop
- See <https://learn.microsoft.com/en-us/windows/wsl/install> for more details

Conda: Environment Management



Miniconda V.S. Anaconda



Installing Miniconda

- Go to <https://docs.conda.io/en/latest/miniconda.html> to download the installer (bash files are preferred)

https://docs.conda.io/en/latest/miniconda.html A

Latest Miniconda Installer Links

Latest - Conda 23.3.1 Python 3.10.10 released April 24, 2023

Platform	Name	SHA256 hash
Windows	Miniconda3 Windows 64-bit	307194e1f12bbeb52b083634e89cc67db4f7980b
	Miniconda3 Windows 32-bit	4fb64e6c9c28b88beab16994bfba4829110ea314
macOS	Miniconda3 macOS Intel x86 64-bit bash	5abc78b664b7da9d14ade330534cc98283bb838c
	Miniconda3 macOS Intel x86 64-bit pkg	cca31a0f1e5394f2b739726dc22551c2a19afdf6
	Miniconda3 macOS Apple M1 64-bit bash	9d1d12573339c49050b0d5a840af0ff6c32d33c3
	Miniconda3 macOS Apple M1 64-bit pkg	6997472c5ff90a772eb77e6397f4e3e227736c83
Linux	Miniconda3 Linux 64-bit	aef279d6baea7f67940f16aad17ebe5f6aac9748
	Miniconda3 Linux-aarch64 64-bit	6950c7b1f4f65ce9b87ee1a2d684837771ae7b2e
	Miniconda3 Linux-ppc64le 64-bit	b3de538cd542bc4f5a2f2d2a79386288d6e04f0e
	Miniconda3 Linux-s390x 64-bit	ed4f51afc967e921ff5721151f567a4c43c4288a

Also for WSL users!



Some Useful Conda Commands

- Create environment

```
conda create --name abc
```

- Activate the environment

```
conda activate abc
```

- Back to the root environment

```
conda deactivate
```

- List all environments on this computer

```
conda env list
```

IGWN Software Packages

- Contains all the necessary packages for GW data analysis
 - See <https://computing.docs.ligo.org/conda/environments/igwn-py39/> for details

General Packages

- Numpy
- Scipy
- Pandas
- ipython
- ... etc.

GW Packages

- PyCBC
- GstLAL
- GWPy
- Bilby
- Bayestar
- ... etc.

Installing IGWN Packages

- Add the conda-forge channel

```
conda config --add channels conda-forge
```

- Download the YAML file from <https://computing.docs.ligo.org/conda/environments/igwn-py39/>

- Create conda environment

```
conda env create --file igwn-py39.yaml
```

- Activate the environment

```
conda activate igwn-py39
```

Get the workshop tutorials

- Clone the workshop files from the Git repo

```
git clone https://github.com/KAGRA-TW-ML/2023-GW-Workshops-in-Taiwan.git
```

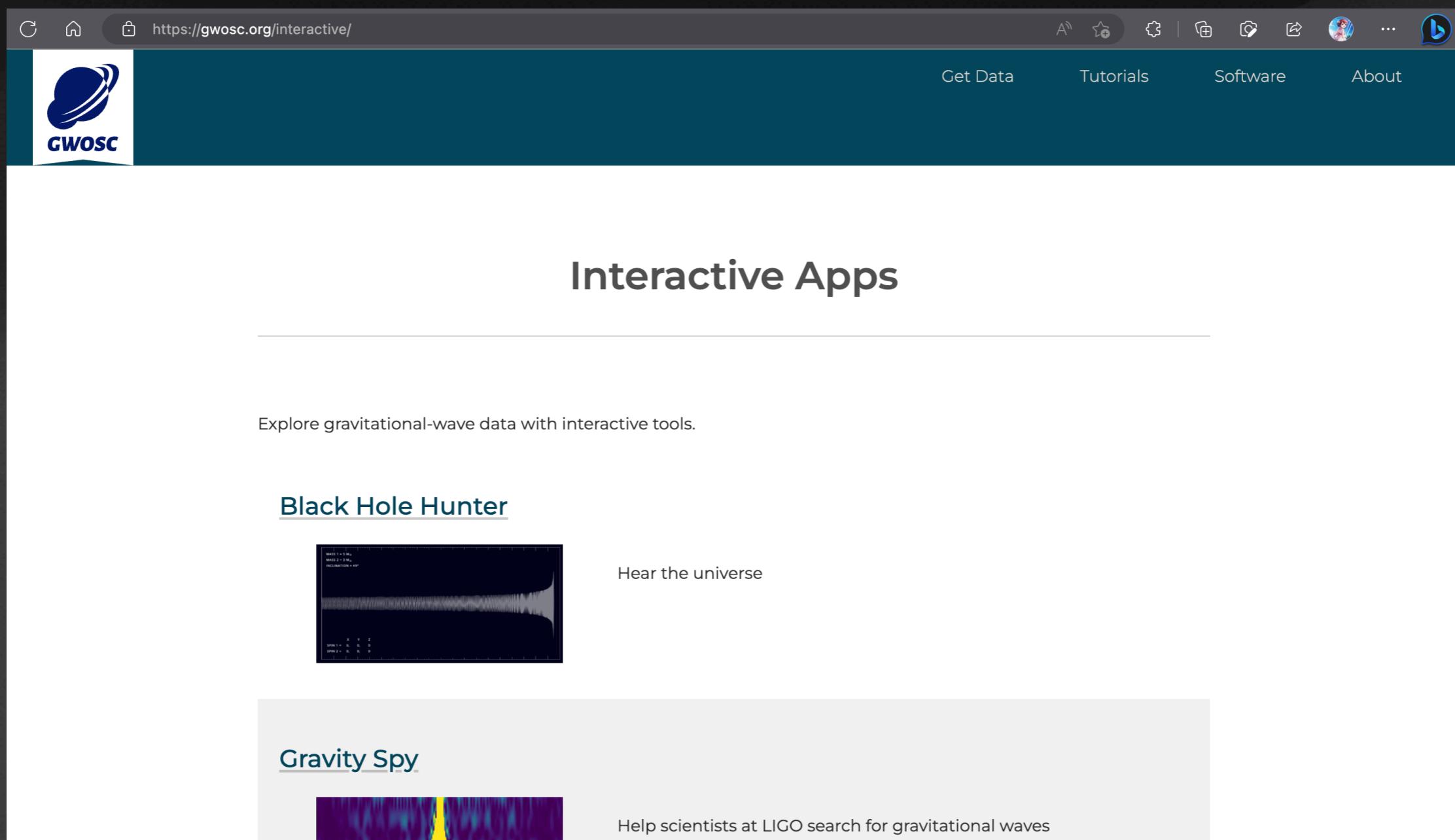
```
cd 2023-GW-Workshops-in-Taiwan
```

- Setup Jupyter environment

```
python -m ipykernel install --user --name igwn-py39 --display-name "Python (igwn-py39)"
```

Interactive APPs on GWOSC

- Go to GWOSC -> Software -> Webapps



The screenshot shows a web browser window with the URL <https://gwosc.org/interactive/> in the address bar. The page has a dark teal header with the GWOSC logo on the left and navigation links for 'Get Data', 'Tutorials', 'Software', and 'About' on the right. Below the header, the title 'Interactive Apps' is centered. A sub-header 'Explore gravitational-wave data with interactive tools.' is followed by two main sections: 'Black Hole Hunter' and 'Gravity Spy'. The 'Black Hole Hunter' section features a visualization of a gravitational wave signal with parameters: MASS 1 = 2.0 M_{Solar}, MASS 2 = 2.0 M_{Solar}, INCLINATION = 45°, SPIN 1 = 0, 0, 0, and SPIN 2 = 0, 0, 0. To its right is the text 'Hear the universe'. The 'Gravity Spy' section features a visualization of a spectrogram with the text 'Help scientists at LIGO search for gravitational waves'.

Get Data Tutorials Software About

Interactive Apps

Explore gravitational-wave data with interactive tools.

[Black Hole Hunter](#)

MASS 1 = 2.0 M_{Solar}
MASS 2 = 2.0 M_{Solar}
INCLINATION = 45°
SPIN 1 = 0, 0, 0
SPIN 2 = 0, 0, 0

Hear the universe

[Gravity Spy](#)

Help scientists at LIGO search for gravitational waves

And you are ready to go!