

# anaconda python distribution



We'll use **Python 3** included in the **Anaconda distribution**

Anaconda is a **free** Python distribution for large-scale data processing, predictive analytics, and scientific computing

Anaconda ships with easy-to-use installers for almost every platform, that drastically **reduce the burden** of setting up the environment (esp. on Windows)

# | conda & anaconda

- **Conda**
  - Open Source package manager for any language (Python, R, C/C++, ...)
- **Anaconda**
  - software distribution (Open Source and Commercial editions)
  - company supporting Anaconda (formerly Continuum Analytics)



<https://conda.io>



<https://anaconda.org>

# conda concepts

- **Conda package**

- archive containing the files to be installed + metadata (system libraries, binaries, etc.)

- **Conda channel**

- repository of conda packages

- **Conda environment**

- directory with a specific Python version and a collection of conda packages
- self-contained & isolated

```
conda create --name=py311 python=3.11  
conda activate py311
```

```
/Users/chierici/miniforge3/envs/py311  
├── bin  
├── conda-meta  
├── etc  
├── include  
├── lib  
├── share  
└── ssl
```

Directory structure of a conda environment  
(macOS)

# conda channels

- **Anaconda default channels**
  - pkgs/main
  - pkgs/r
  - `conda config --show default_channels`
- **Extra channels**
  - conda-forge: community-led collection of recipes <https://conda-forge.org>
  - bioconda: specific to biomedical research <https://bioconda.github.io>
  - anyone can create a channel

# | anaconda, miniconda, etc.

- **Anaconda:** the full distribution (500 MB)
- **Miniconda:** minimal installer (60 MB) with Python, **conda** & **pip** package managers + a small number of packages
- **Miniforge:** community-led minimal installer, with **conda-forge** as the default and only channel
- **Mambaforge:** a minimal installer specific to **conda-forge**, with **mamba** package manager

# package managers

## conda

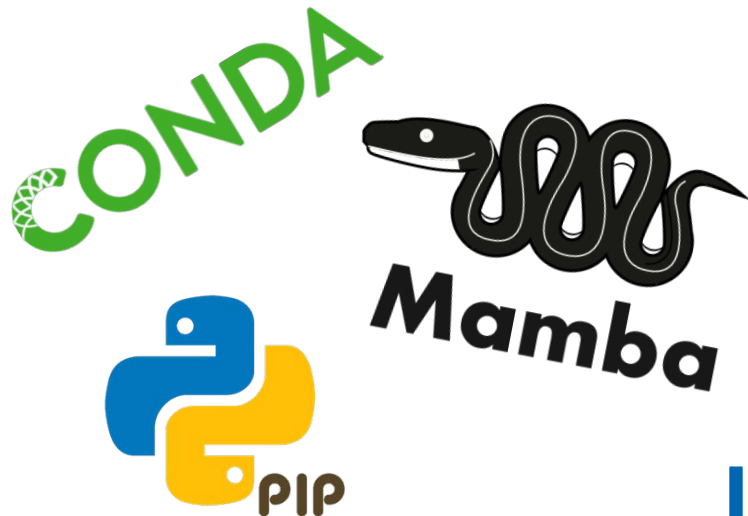
- the anaconda/miniconda package and environment manager
- can install Python packages as well as system libraries
- `conda install <package name>`
- `conda create --name test python=3`

## mamba

- a fast drop-in replacement for conda
- more reliable dependency solving
- e.g. `mamba install <package name>`

## pip

- the **package installer for Python**
- e.g. `pip install <package name>`



# integrated development environments (IDEs) for python

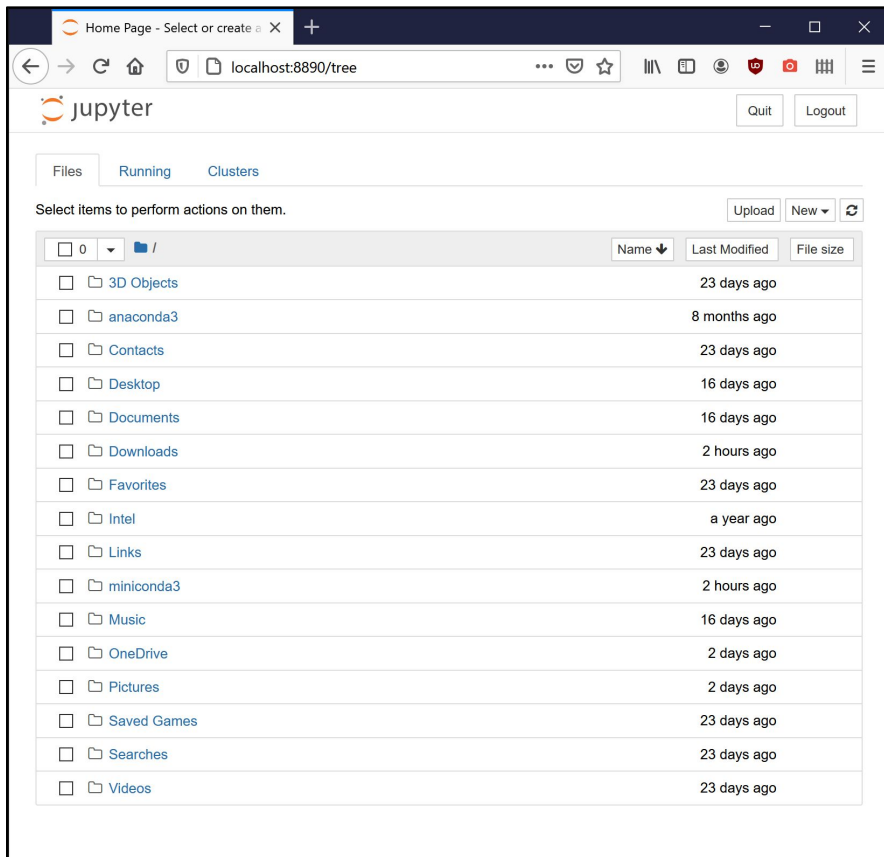


# integrated development environments

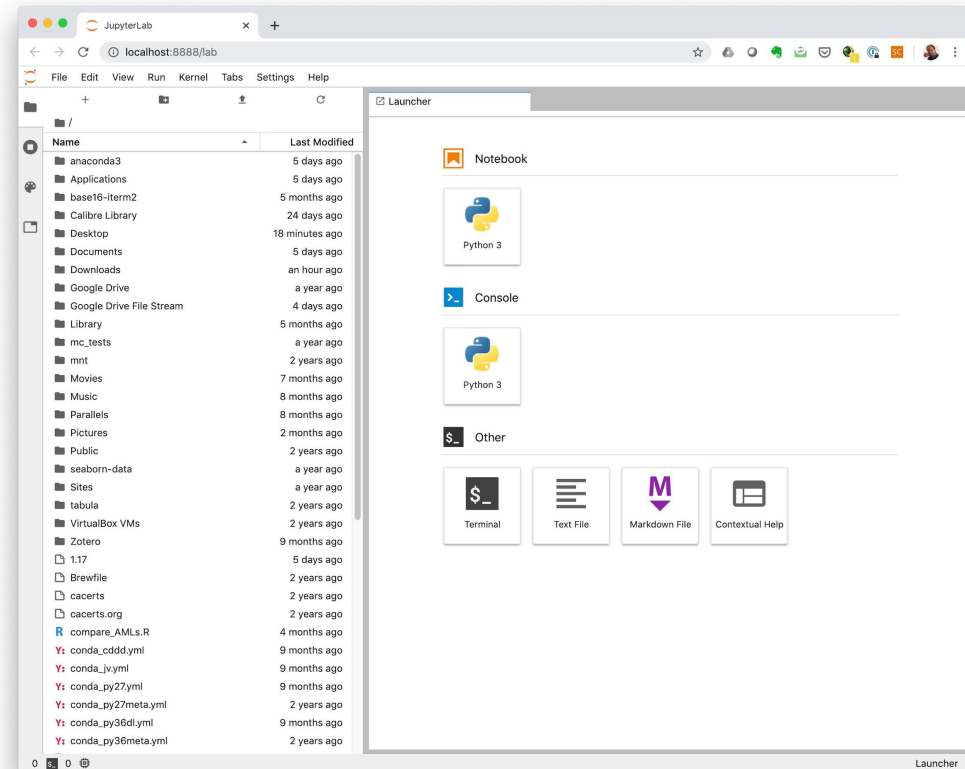
- Software tools for programmers
- Graphical User Interfaces
- Facilitate software development
- Components:
  - source code editor
  - compiler / interpreter
  - terminal
  - file manager
  - etc.



# Jupyter Notebook



Default view is a (basic) file browser



Next-gen Notebook interface

Default view:

- a file browser panel
- a launcher panel

# Anaconda: Jupyter Lab

1. Open Anaconda Navigator
2. Launch JupyterLab

A new tab will open in your default browser

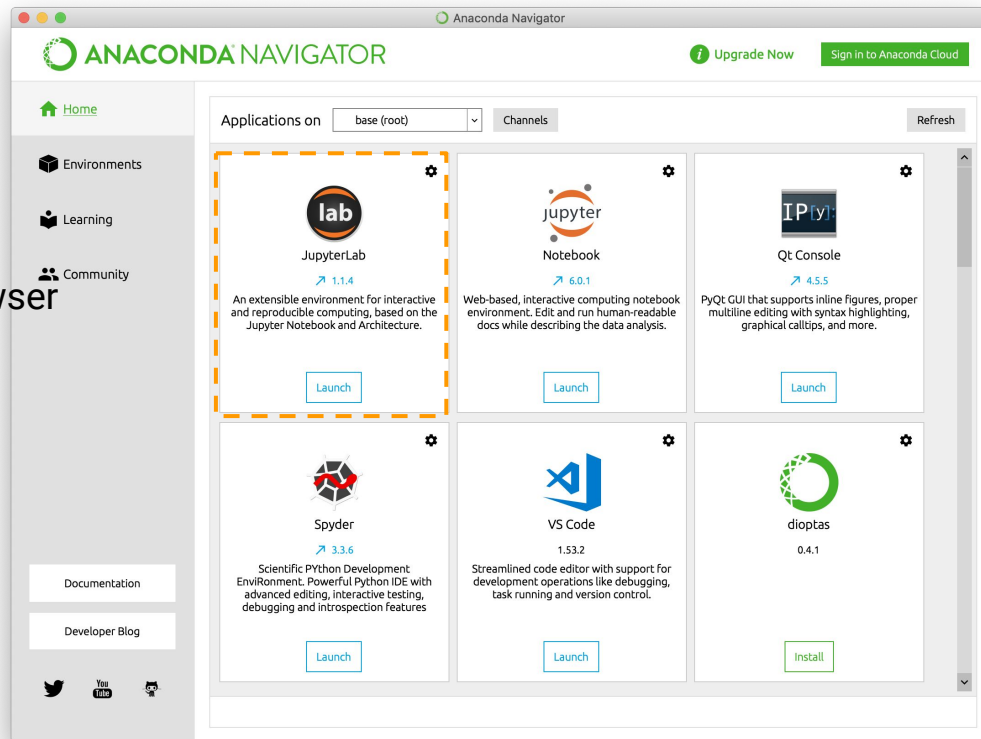
## Command-line alternative

Windows: open up Anaconda prompt

Linux/macOS: open up Terminal app

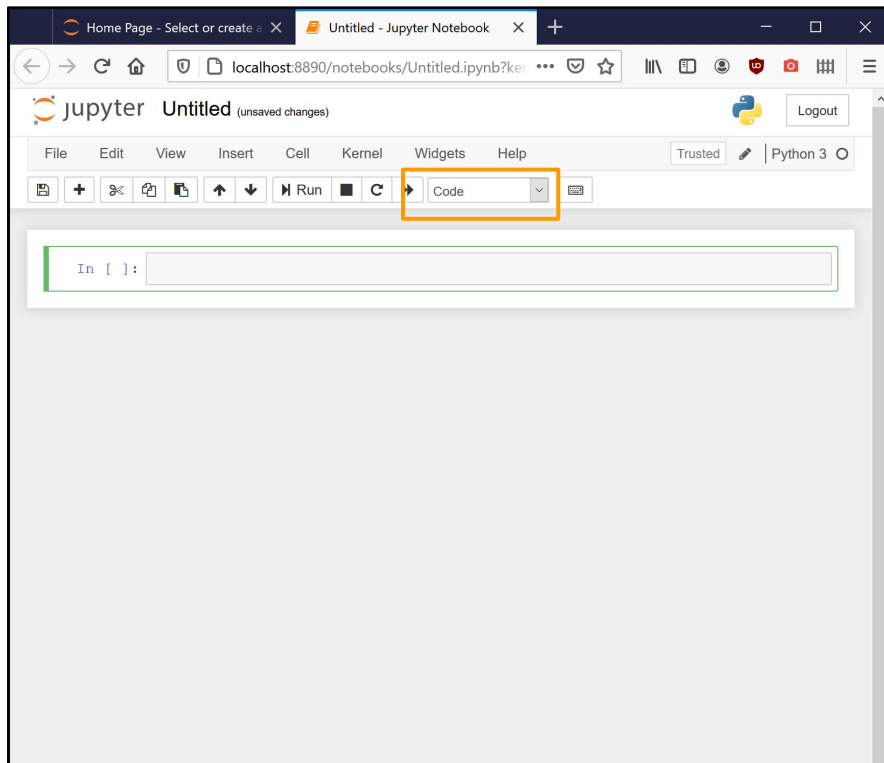
Then type

```
$ jupyter lab
```



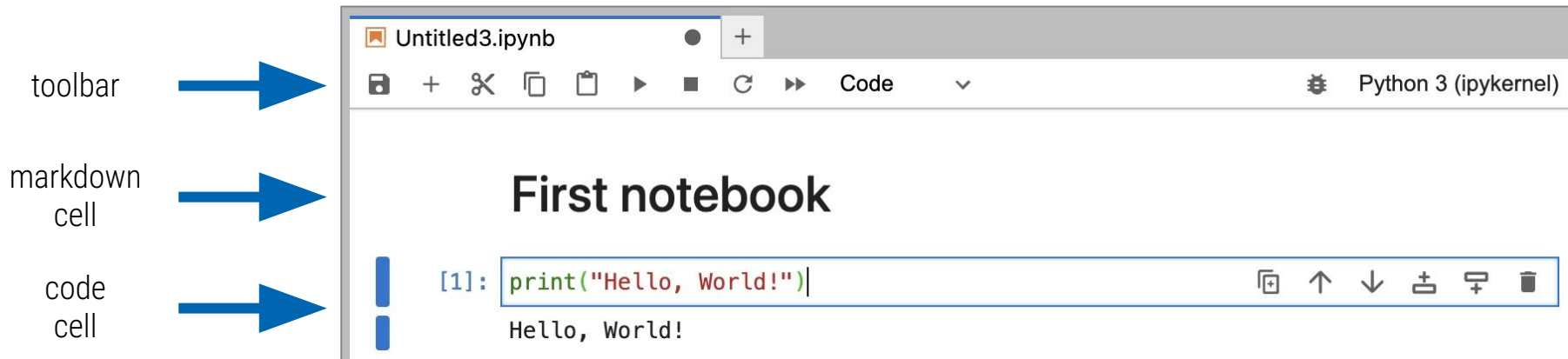
version numbers may/will differ from your own installation

# the jupyter notebook



- A web-based interactive computing platform
- Made up of **cells** containing
  - **Code**
  - **Narrative text** (Markdown)
- You can change cell types via a dropdown menu

# notebooks at a glance



Markdown?

- A markup language for text formatting
- Uses plain-text
- Examples:
  - # A header
  - ## A subheader
  - **bold**
  - *italics*

Markdown practice: <https://commonmark.org/help/tutorial/>