BB1000
Python för bioteknologi

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Starting up a computer (a.k.a. booting)

https://www.computerhope.com/jargon/b/boot.htm

1. Pressing the power button on the computer starts up the power supply, which subsequently provides power to the other hardware components inside the computer case.
2. A self diagnostic is performed, also known as a POST (power-on self test), to check if all hardware in the computer is working properly.
3. The BIOS (basic input/output system) checks the hard drive for the boot loader, located in the first sector of the hard drive.
4. The boot loader looks for the operating system on the hard drive (or alternative boot device) and begins loading the found operating system (e.g., Linux, macOS, or Windows).
5. Hardware drivers are loaded, allowing the operating system to interact and utilize the hardware components inside the computer case.
6. If configured in the operating system, a login screen is displayed, allowing the user to enter a username and password to log in.
7. Any additional programs configured to start with the operating system, known as startup programs, are loaded. Common startup programs include antivirus software.

File system and file tree

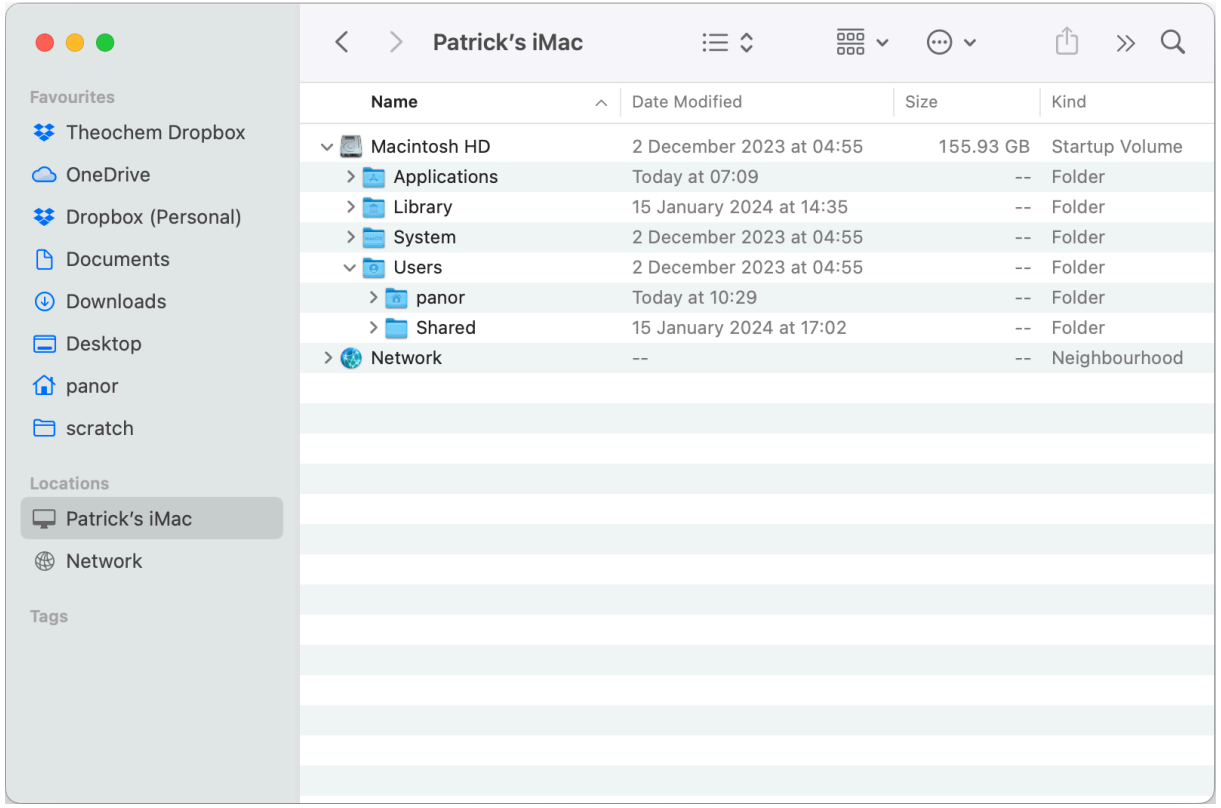
A **file system** is a structure used by an operating system to **organize and manage files on a storage device** such as a hard drive, solid state drive (SSD), or USB flash drive. It defines how data is stored, accessed, and organized on the storage device.

File storage is organized into a strict **tree-like hierarchy** with directories (or folders), sub-directories, and so on. The top is referred to as the root directory. To access a stored file, you must follow a specific path to it.

A **home directory** is a file system directory on a multi-user operating system containing files for a given user of the system. The specifics of the home directory (such as its name and location) are defined by the operating system involved.

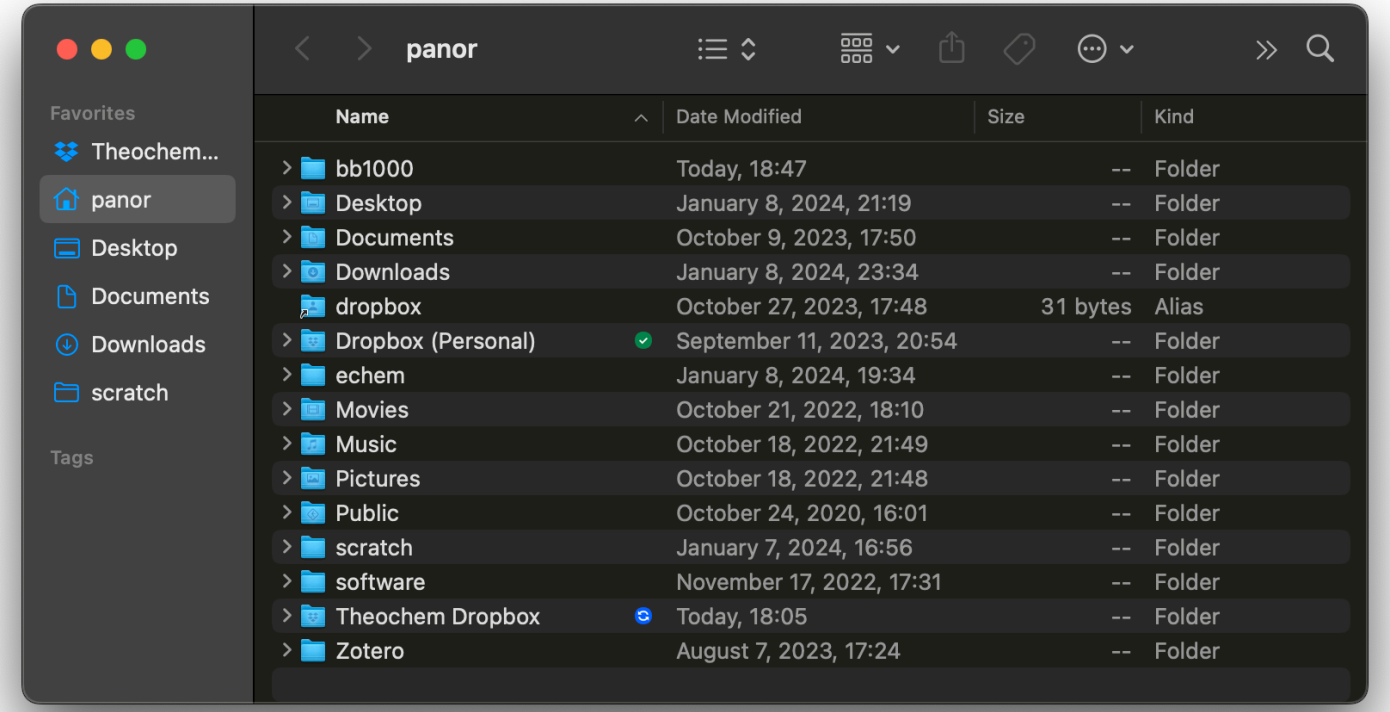
Access and manage the file system

Finder (macOS) and File Explorer (Windows) are file-manager applications that provide a graphical user interface for **accessing and managing the file system**.



Structure your home directory

Create a new and empty folder for the course and give it a logical name, e.g., bb1000. Keep all files for this course inside this folder (use also subfolders).



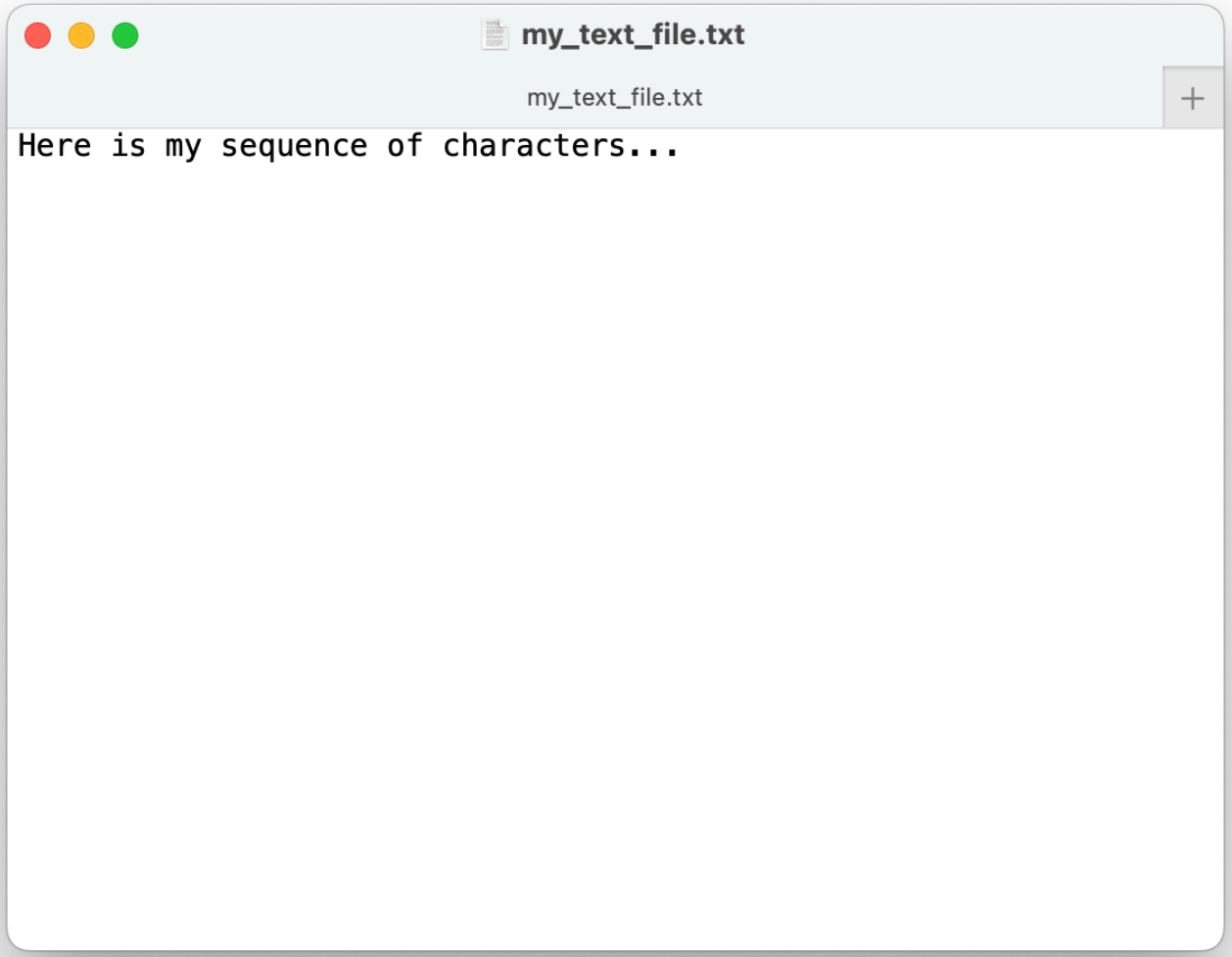
Open a text editor

A text editor is used to create and edit text files, *i.e.*, files containing an unformatted sequence of characters.

- On Windows, we will use Notepad.
- On macOS, we will use TextEdit.

With a text editor, create a file named bb1000.yml and save it in your course folder.

```
name: bb1000
channels:
  - conda-forge
dependencies:
  - python
  - jupyterlab
  - jupyterlab-spellchecker
  - jupyterlab_code_formatter
  - black
  - isort
  - numpy
  - scipy
  - matplotlib
  - pandas
```



Creating conda environments from YAML files

Yet Another Markup Language

- Enter in the course directory:
  % cd bb1000
- Create a conda environment based on a ***.yml** file with the terminal command:
  % conda env create -f bb1000.yml
- Clean up (every now and then):
  % conda clean --all
- Activate the conda environment:
  % conda activate bb1000
- Start JupyterLab:
  % jupyter-lab

File: bb1000.yml

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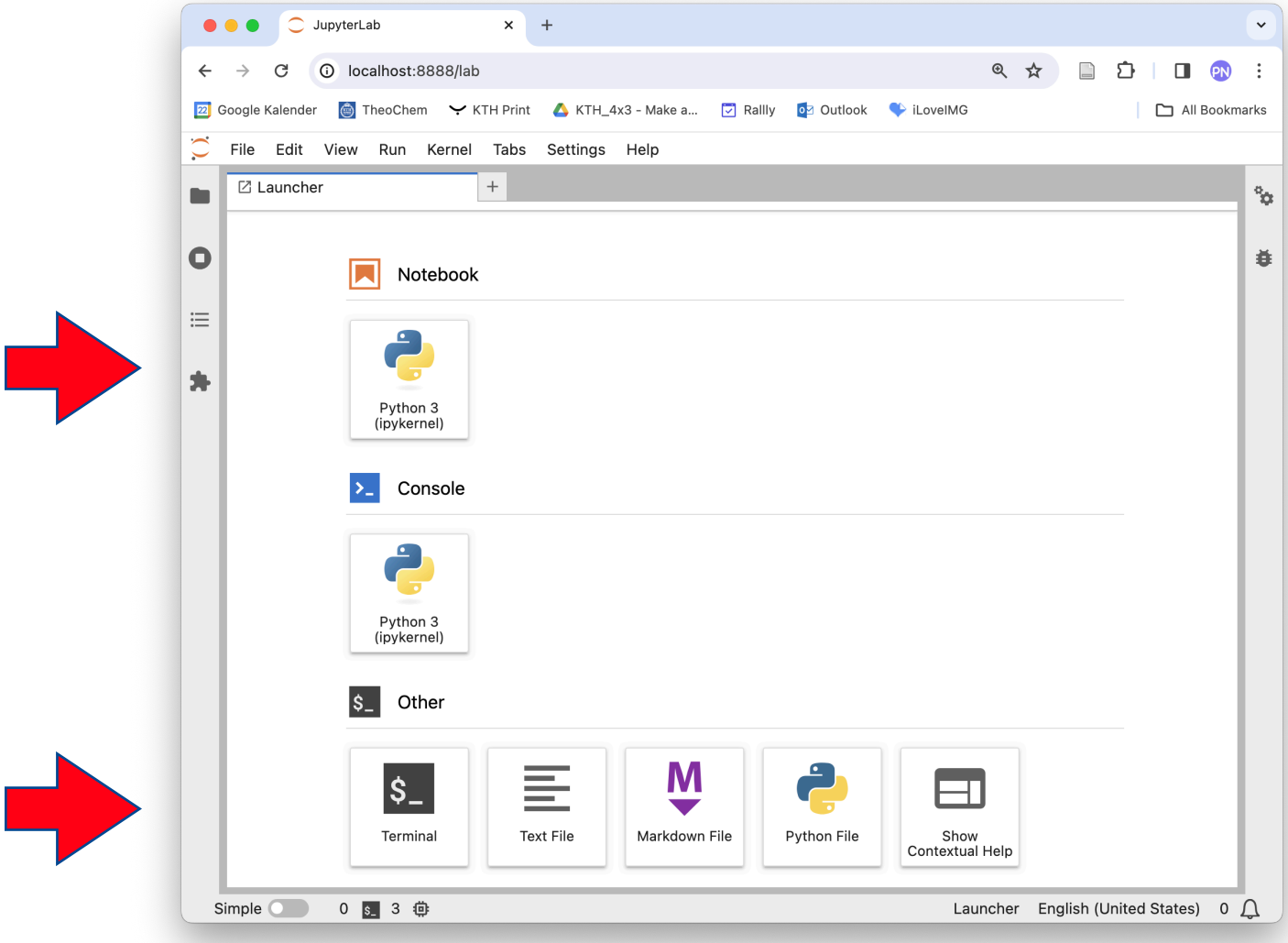
  - pandas
```

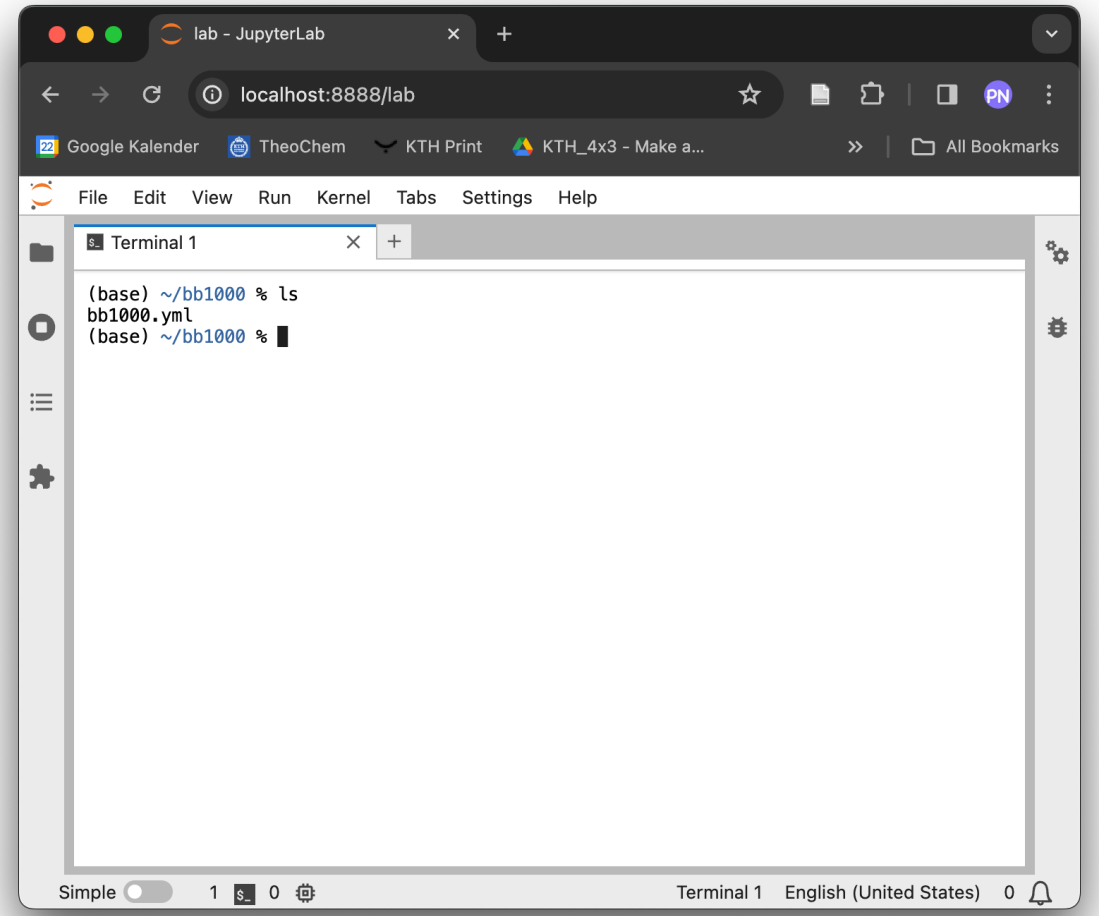
Note: Jupyter notebooks can create, edit, and delete files from the point in the file tree where JupyterLab is started.

JupyterLab provides notebook, terminal, and text editor



JupyterLab terminal

JupyterLab terminal



Some terminal commands

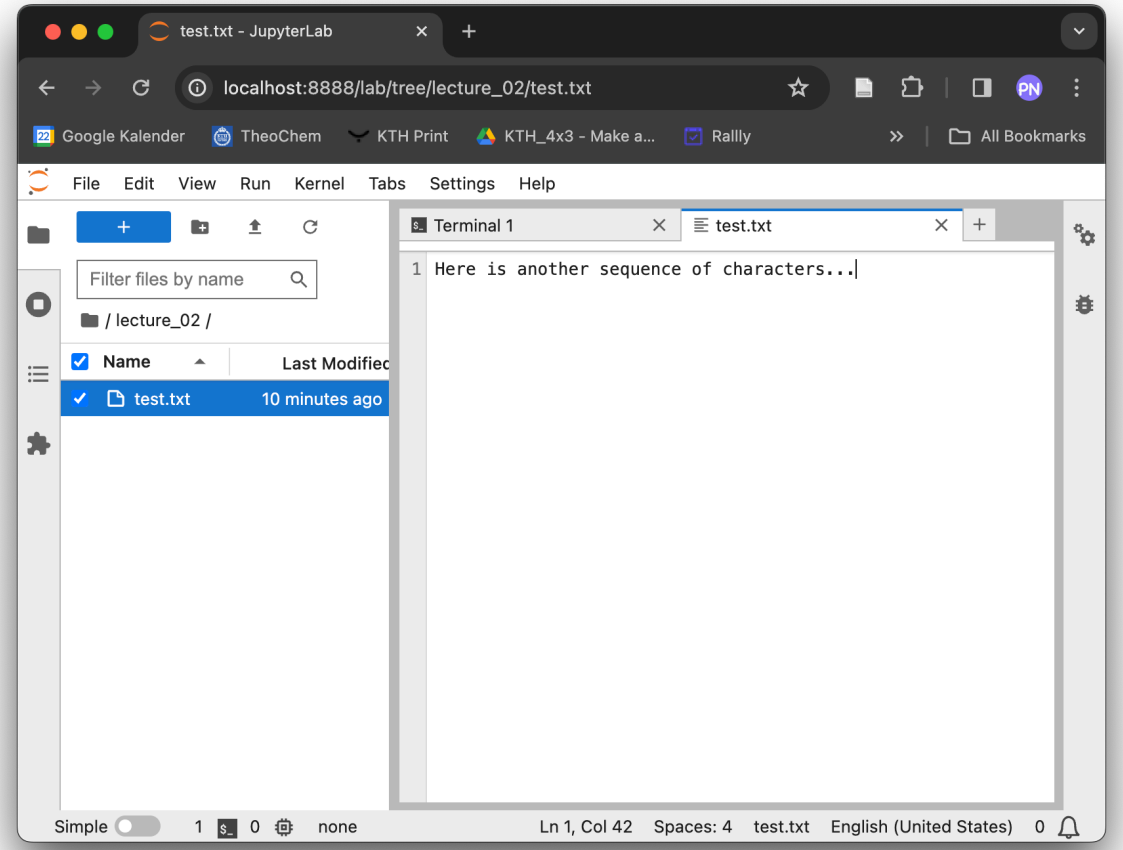
`ls`	list content of directory
`ls -l`	list content and meta-data
`cd <directory>`	change directory
`cd ..`	change upward in file tree
`cd`	change to home directory
`mkdir <directory>`	create (or make) directory
`rm <file>`	remove file
`rm -r <directory>`	remove directory
`pwd`	present working directory

- Inside bb1000, create a folder:
  % mkdir lecture_02
- Enter into the new folder:
  % cd lecture_02
- Check where you are:
  % pwd
- Check that the folder is empty:
  % ls

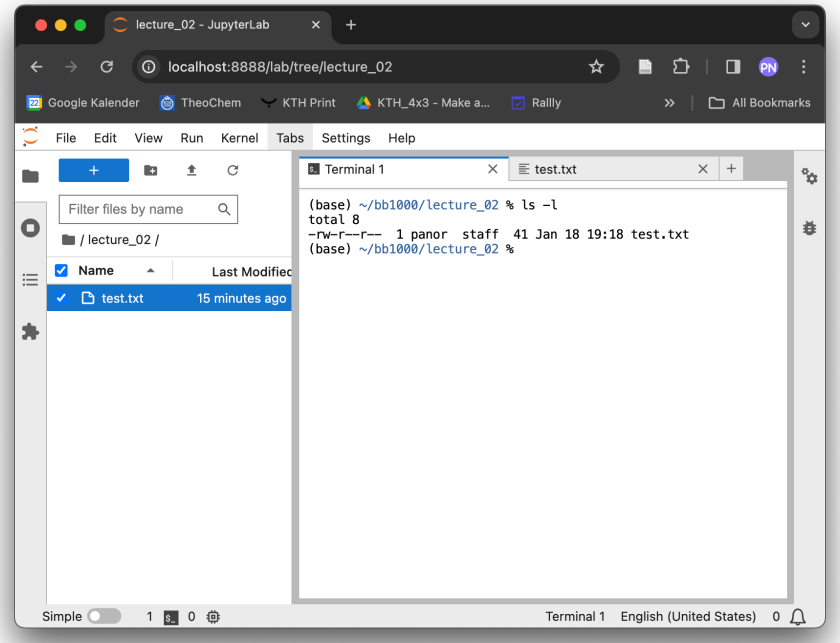
Tip: Start using command-line (or tab) completion.

JupyterLab text editor

JupyterLab text editor



JupyterLab terminal

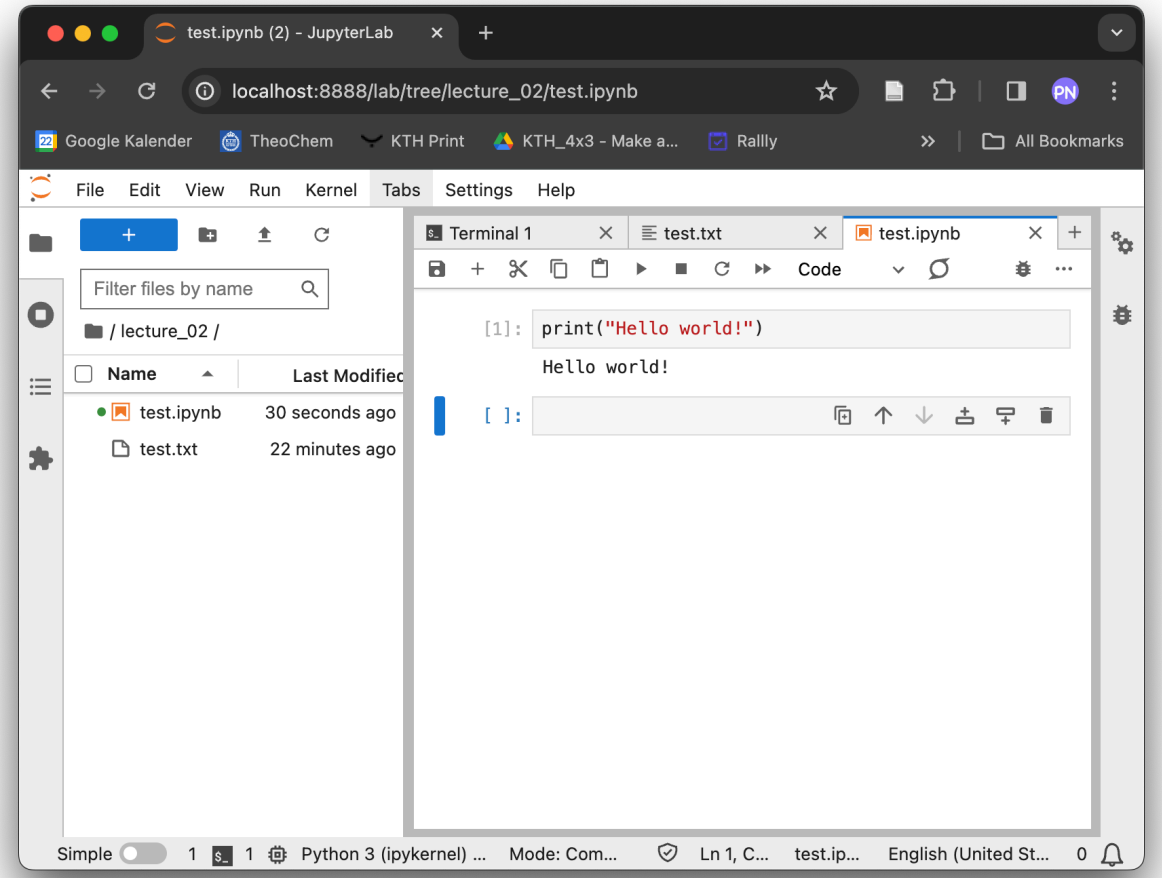


- Inside lecture_02, create a text file and save it under the name test.txt
- In the terminal, run the command:
  % ls -l
- Check the meta-data, what is the file size?
- Compare the file size (in bytes) with the number of characters in your text file.

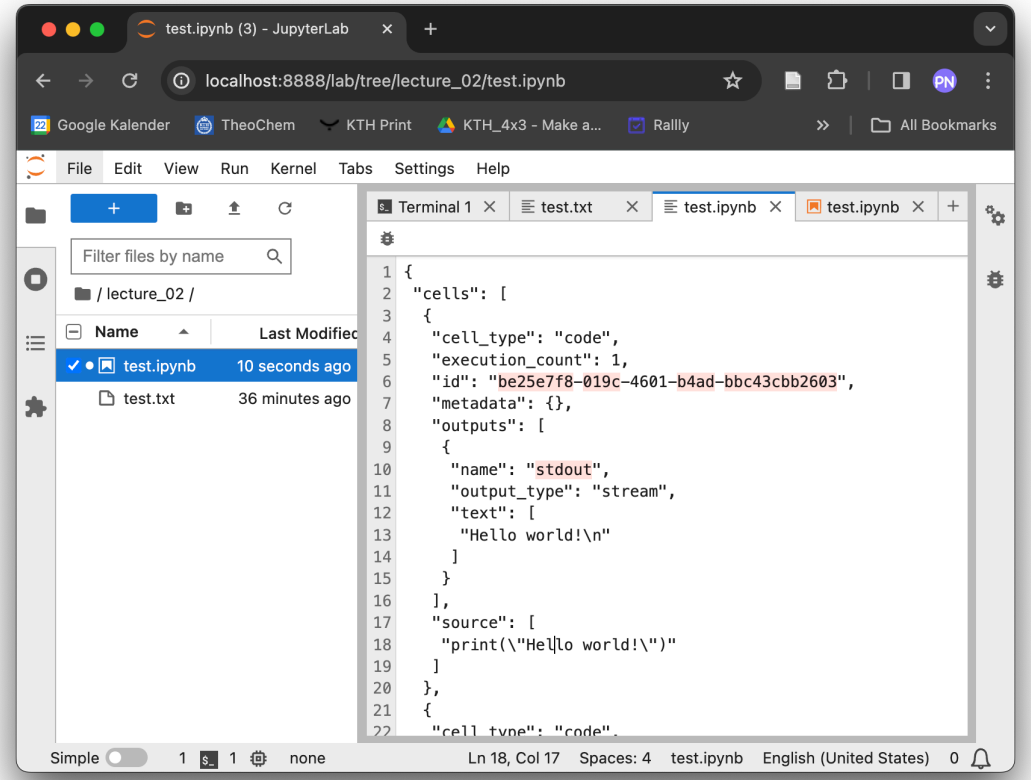
Note: E.g. the letter “A” is stored as the binary 8-bit sequence (byte) “01000001” on the computer.

JupyterLab notebook

JupyterLab notebook



JupyterLab text editor



- Inside lecture_02, create a notebook and save it under the name test.ipynb
- Open the file test.ipynb in a text editor
- Identify your Python code statement

Tip: Start using keyboard shortcuts.

End of computer basics