Programming for psychologists

Practical 1.2: Setup

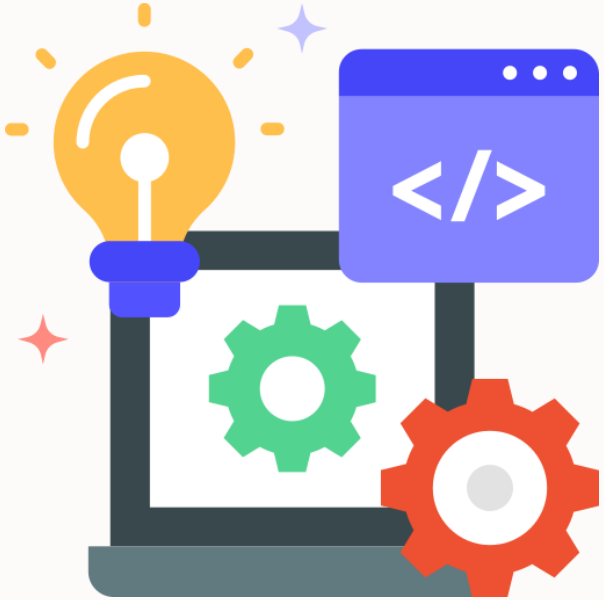
Matthias Nau

Prepare your laptop

You will be following the practicals on your own laptop, which involves installing new software.

To minimize problems later, please:

- Create sufficient space on your laptop (~5 GB).
- Reboot your laptop.
- Ideally, update your operating system to the latest version.



Good news: At the end of the course, your laptop will be ready for your future projects, including your thesis project.

Setting up **Python** – We need to install a few things!

VS Code

Miniconda

Python

Jupyter Notebooks

Visual Studio Code

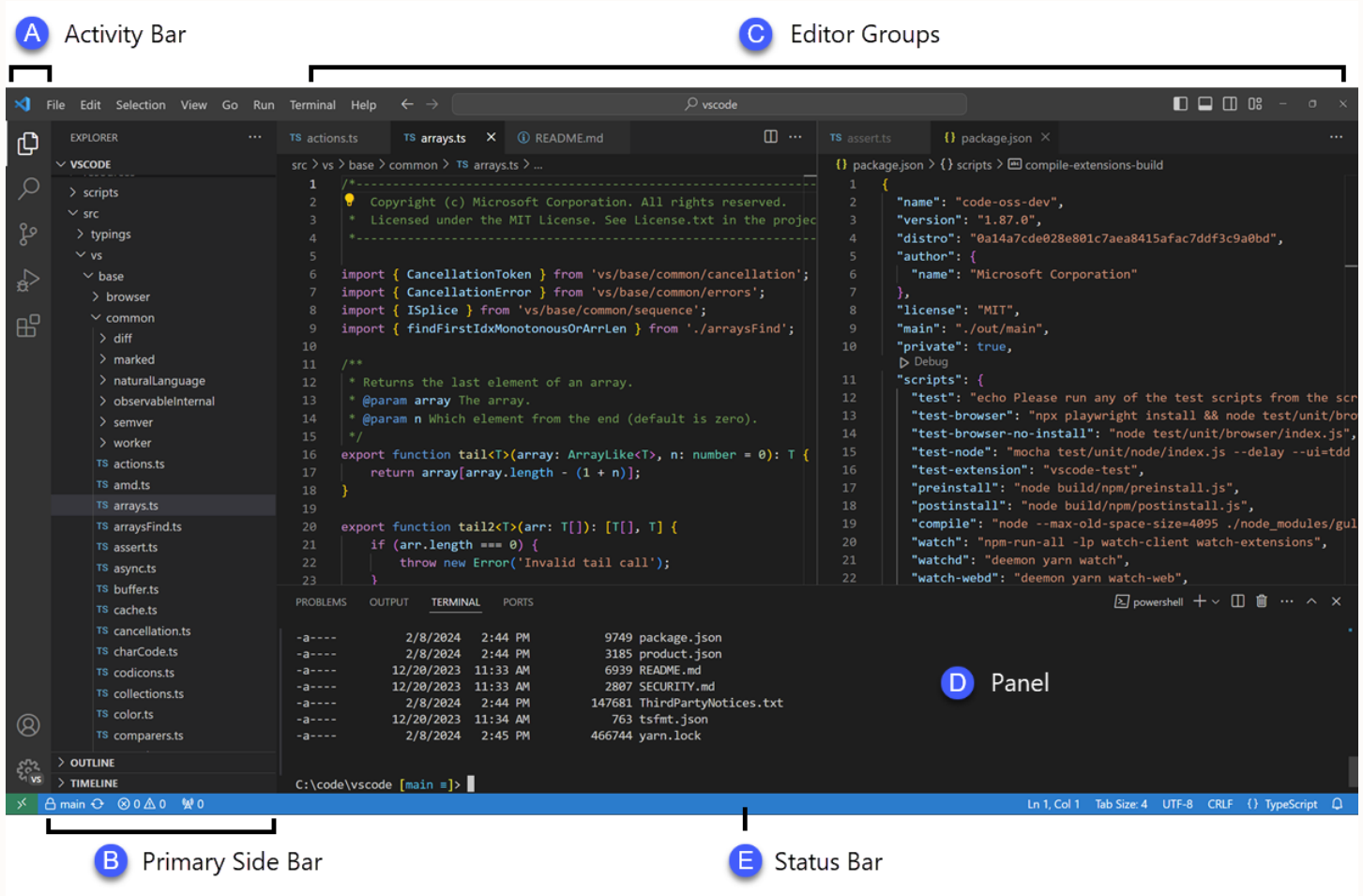
Visual Studio Code

Integrated development environment (IDE)

Dedicated coding software with lots of great features for programmers

VS Code for short

VS Code comes with great plugins called "**Extensions**"

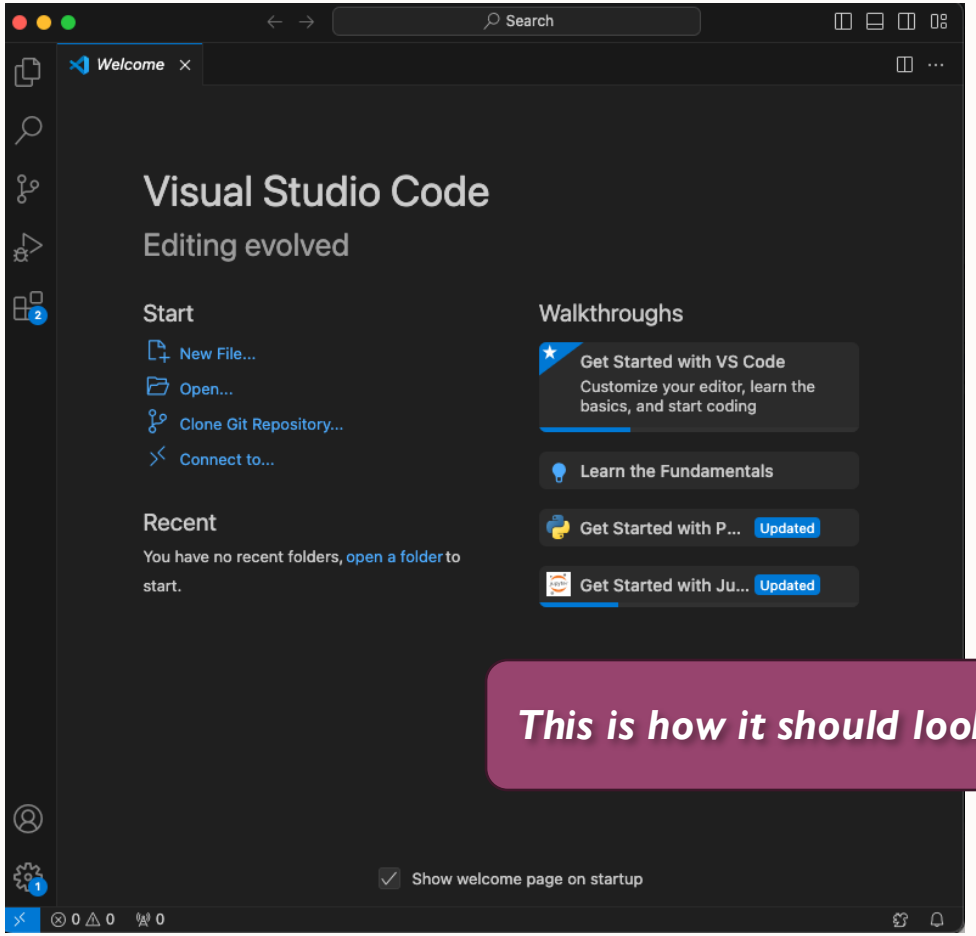


https://code.visualstudio.com/docs/getstarted/userinterface

Visual Studio Code

Installation

- 1) Visit https://code.visualstudio.com/
- 2) Click on the "**Download**" button and wait for the download to finish.
- 3.1) On Windows, double-click on the downloaded .exe file to install VS Code
- 3.2) On Mac, unzip the downloaded .zip file, drag & drop the unzipped file to the Application folder.
- 4) Open the VS Code app

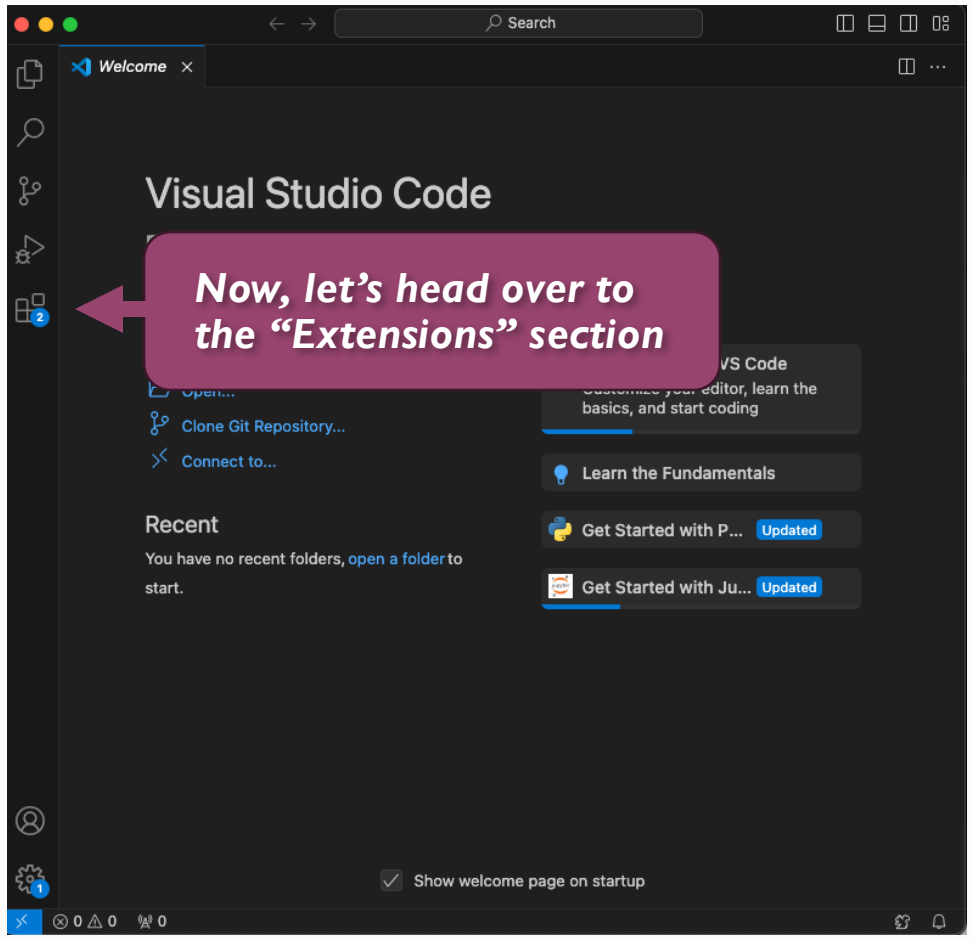


Visual Studio Code

Extensions

Extensions are plugins that add more features to VS Code to enhance your coding environment.

- 1) Go to the "**Extensions**" section

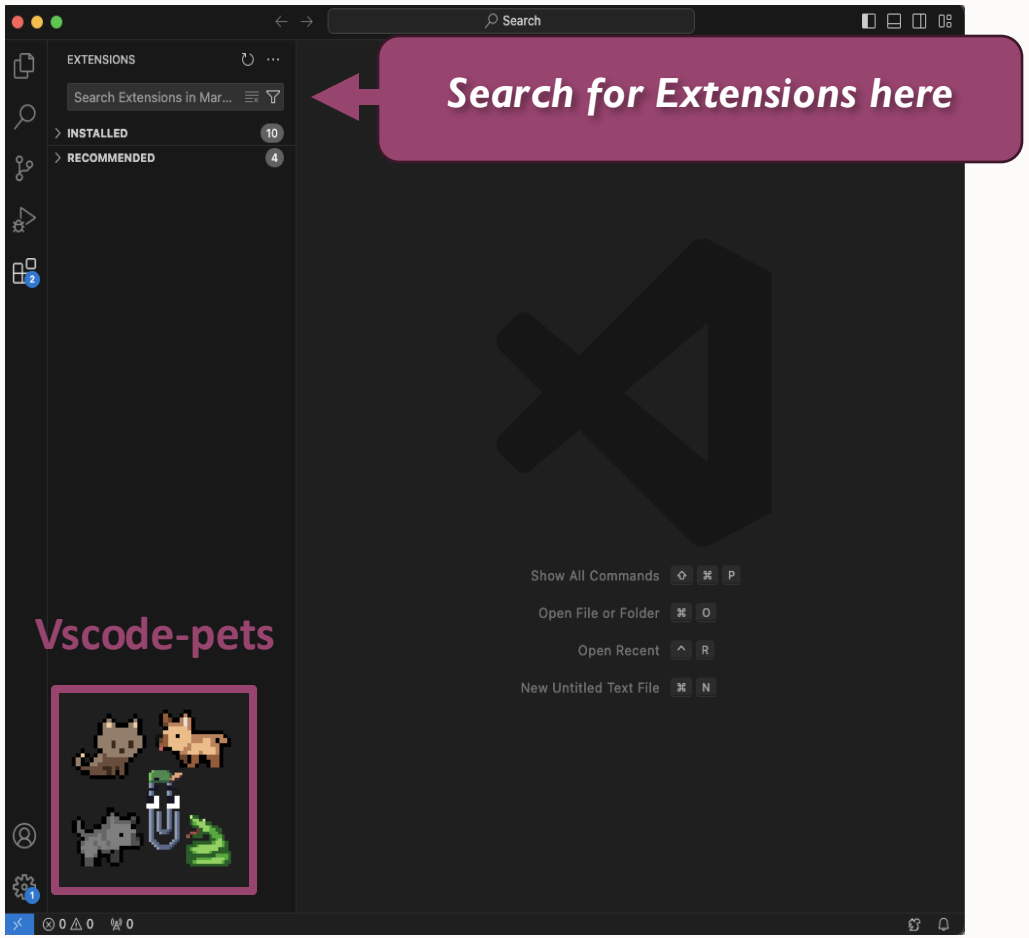


Visual Studio Code

Extensions

Extensions are plugins that add more features to VS Code to enhance your coding environment.

- 1) Go to the "**Extensions**" section
- 2) Using the search bar, look for and install the following extensions:
  - **Python**
  - **Python debugger**
  - **Vscode-pets** (optional) :)




Miniconda

Miniconda

Virtual environment manager

Python is typically used inside **virtual environments (VE),** isolated spaces on your computer where you can write & run code without affecting other environments.

Example VE 1

Python 2.7

Libraries:
NumPy 1.14.4,
Matplotlib 2.2.5

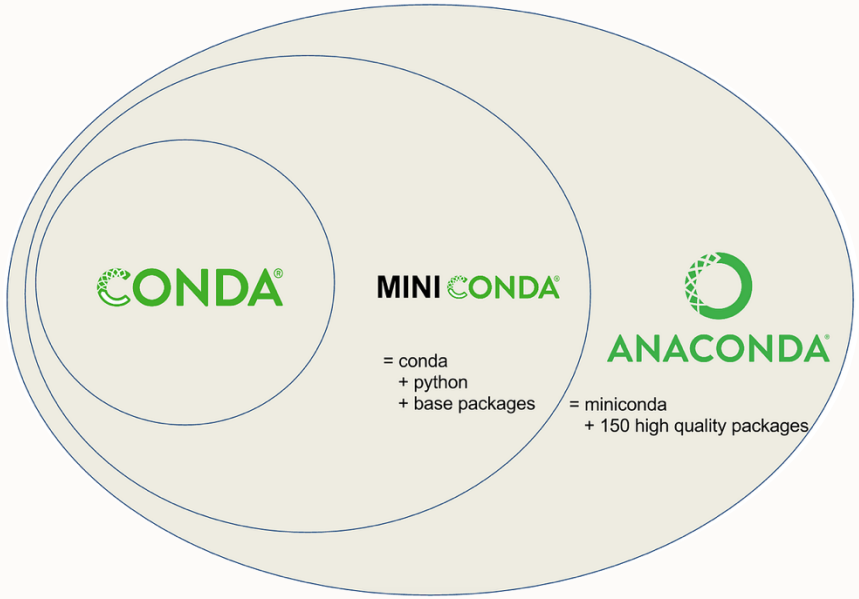
Example VE 2

Python 3.6

Libraries:
Pandas 1.0.1
PySpark 2.4.8

To set up and organize environments, we need a **VE manager.**

Our VE manager will be **Conda**, specifically the distribution **Miniconda,** which includes **Python**

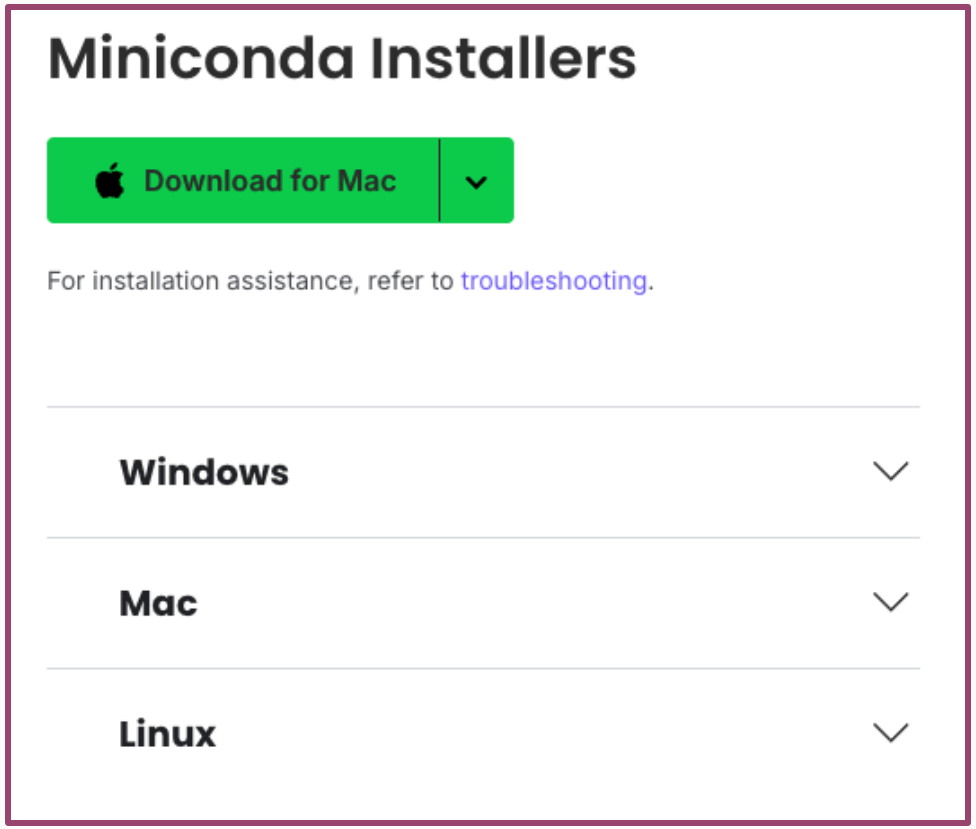


Miniconda

Installation

- 1) Go to https://www.anaconda.com/download
- 2) Scroll down to the "**Miniconda installers**" section and click on "Download Miniconda Installer"
- 3) **Download the "Graphical Installer"** corresponding to your operating system (Windows: .exe, Mac: .pkg).
- 3) **Install** miniconda by double-clicking on the downloaded file and following the instructions.

  When asked, agree to the **license agreement**.

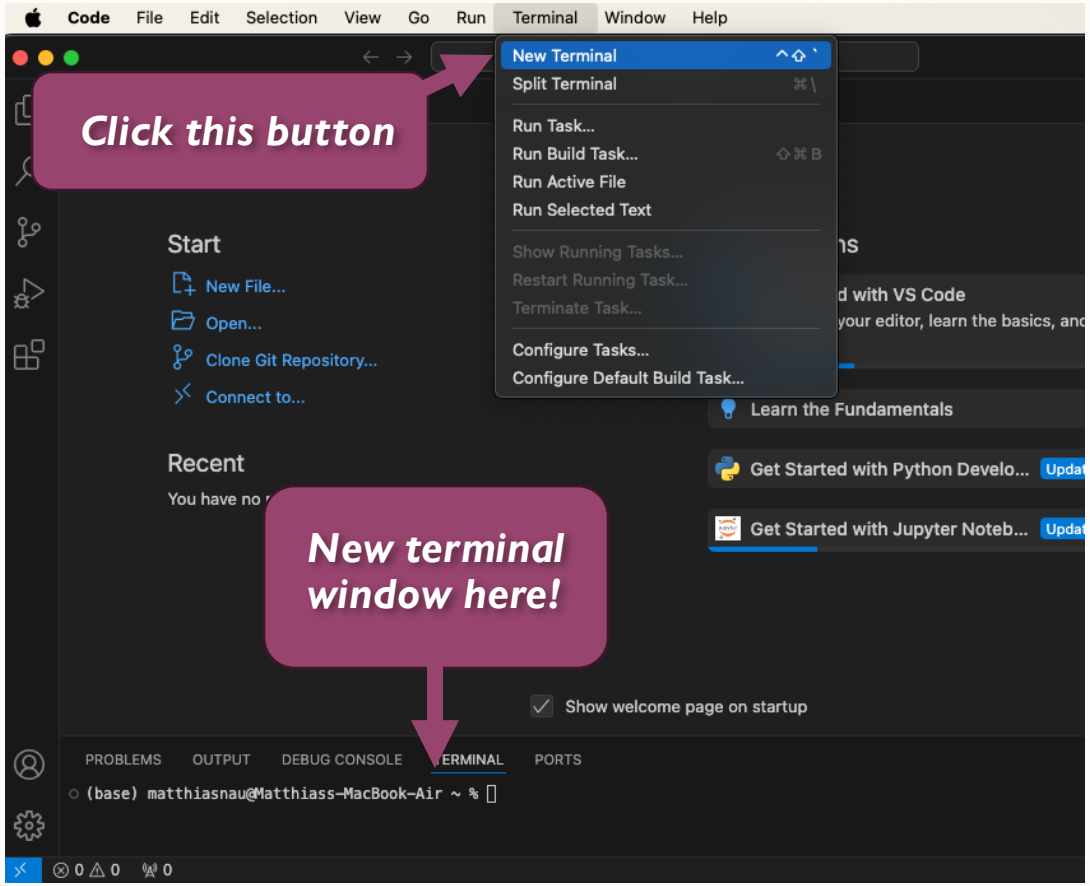


Miniconda

Confirming installation

- 1) Restart **VS Code**.
- 2) Within **VS Code**, go to the "**Terminal**" tap and click "**New terminal**"
- 3) In the Terminal, type "conda --version" and hit Enter. You should see the version you just installed.

  (e.g., conda 25.7.0)



Miniconda

Create a new Conda environment

- 1) Open a new Terminal within **VS Code** as before.

- 2) In the Terminal, run "**conda create --name pycourse python=3.12.4**".

  When asked to "Proceed ([y]/n)?", type "yes" and hit Enter.

- 3) Check if it worked by activating your conda environment.
  To do so, run "**conda activate pycourse**" in the Terminal.

  It should look something like this:

```
matthiasnau@Matthiass-MacBook-Air ~ % conda activate pycourse
(pycourse) matthiasnau@Matthiass-MacBook-Air ~ %
```

This (pycourse) indicates that your environment works and is activated.
Anything you run now will be executed within this environment only.


Python

Python

Included in Miniconda. We just need to ensure that it was installed properly inside the your conda environment

- 1) Make sure your conda environment pycourse is activated.
  If not, activate it via "**conda activate pycourse**".

- 2) Within the activated conda environment, run "**python --version**"

  You should see: **Python 3.12.4**

Note: If you get the wrong Python version (e.g., Python 2) despite following these steps, your computer may need an update.

Jupyter Notebooks

Jupyter Notebooks

Multiple ways to write and run Python code

- **Scripts**
  Text files with .py extension that run from the Terminal.
- **Notebooks**
  Interactive documents containing executable code, text, equations, visualizations, and media.

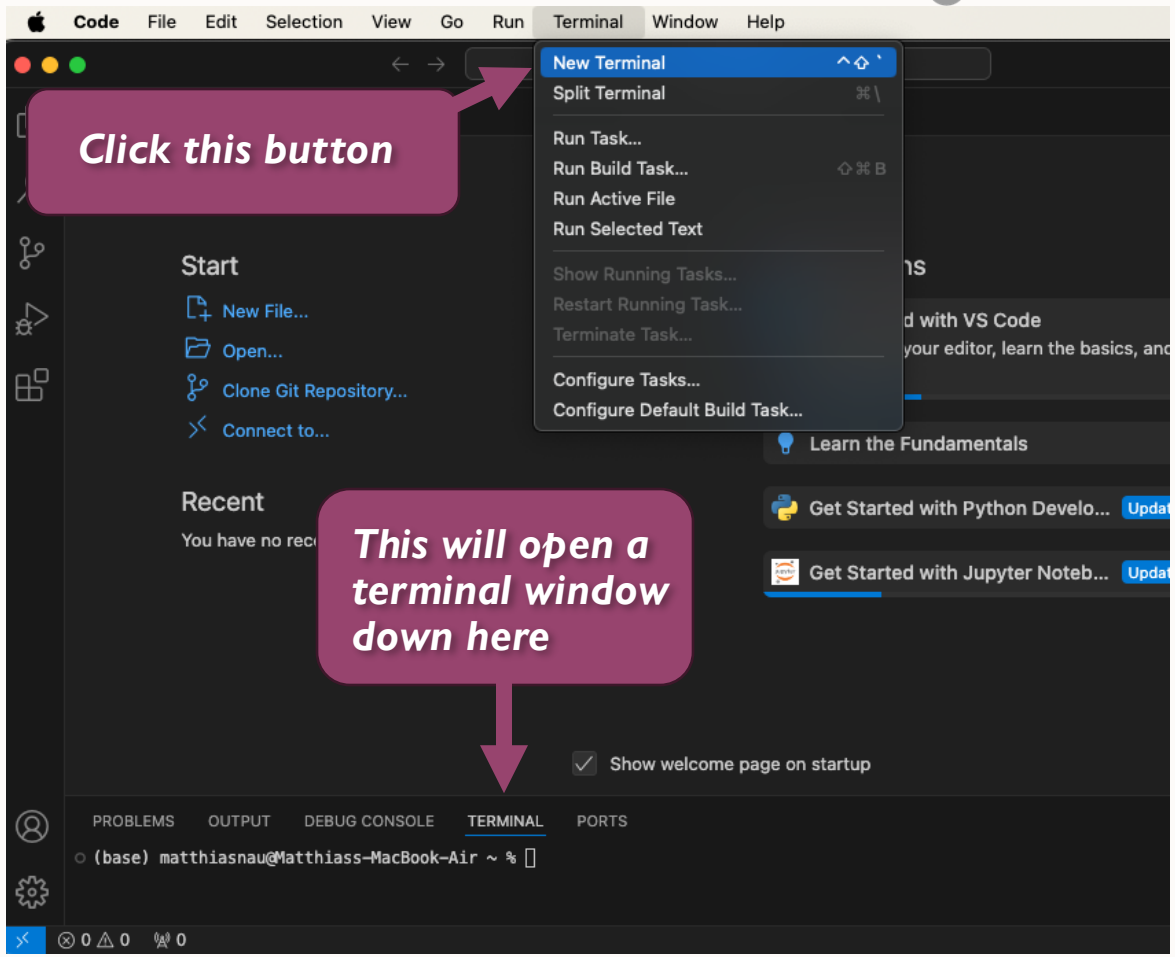
In this course, we will mostly use Notebooks, specifically **Jupyter Notebooks**

Example notebook

Jupyter Notebooks

Jupyter is included in Miniconda, we just need to confirm its installation

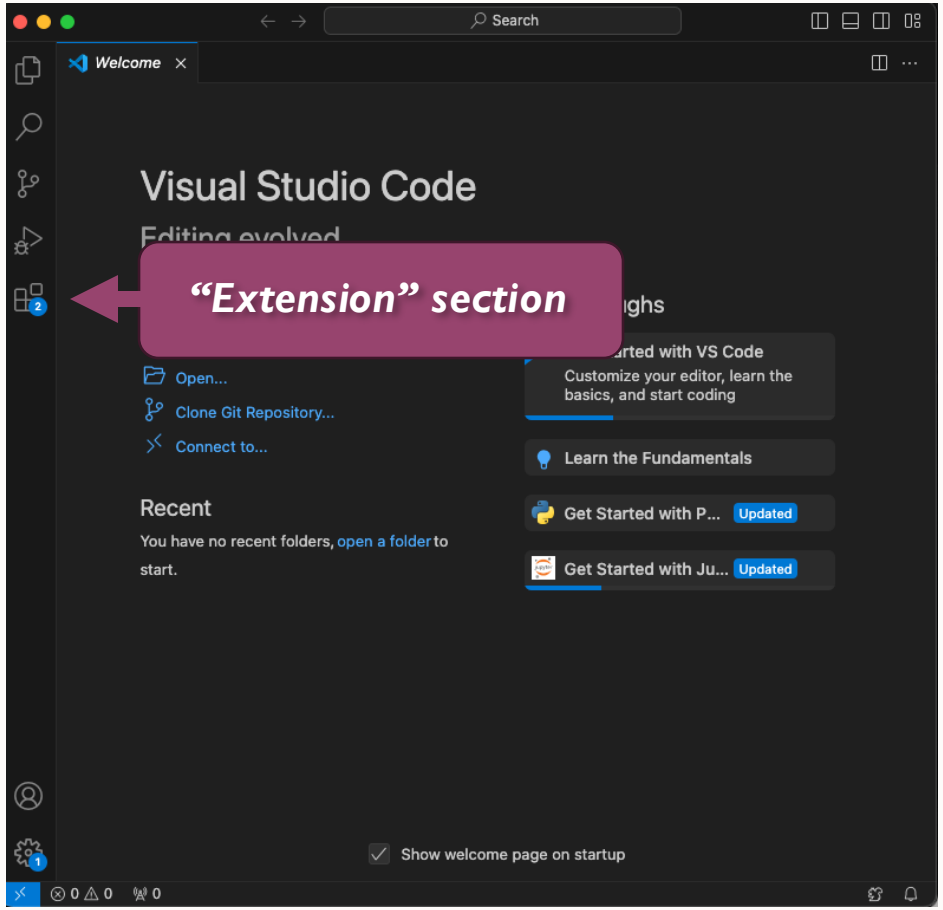
- 1) Within **VS Code**, go to the "Terminal" tap and click "**New terminal**"
- 2) Activate your **conda environment** via "**conda activate pycourse**"
- 3.1) In the Terminal, run "**jupyter --version**". You should see a range of packages (e.g., IPython : 8.26.0 or a later version)
- 3.2) If Jupyter is NOT installed, run: "**pip install jupyter**", then re-run "**jupyter --version**".



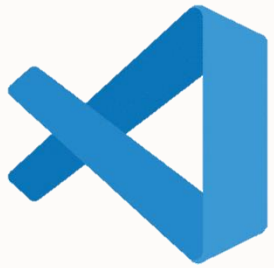
Jupyter Notebooks

Telling VS Code how to use Jupyter.

- 1) Go to the "**Extensions**" section
- 2) Using the search bar, look for and install the following extensions:
  - **Jupyter**
  - **Jupyter Cell Tags**
  - **Jupyter Keymap**
  - **Jupyter Slide Show**
  - **Jupyter Notebook Renderers**
- 3) Restart VS Code



Setting up **Python** – We needed to install a few things!



VS Code

- Integrated development environment
- Main software running the show

Miniconda

- Creates and manages virtual environments
- Integrated into VS Code

Python

- Main programming language
- Included in Miniconda

Jupyter Notebooks

- Interactive documents for coding
- Included in Miniconda

Running **Python**

1) Create a new Jupyter Notebook

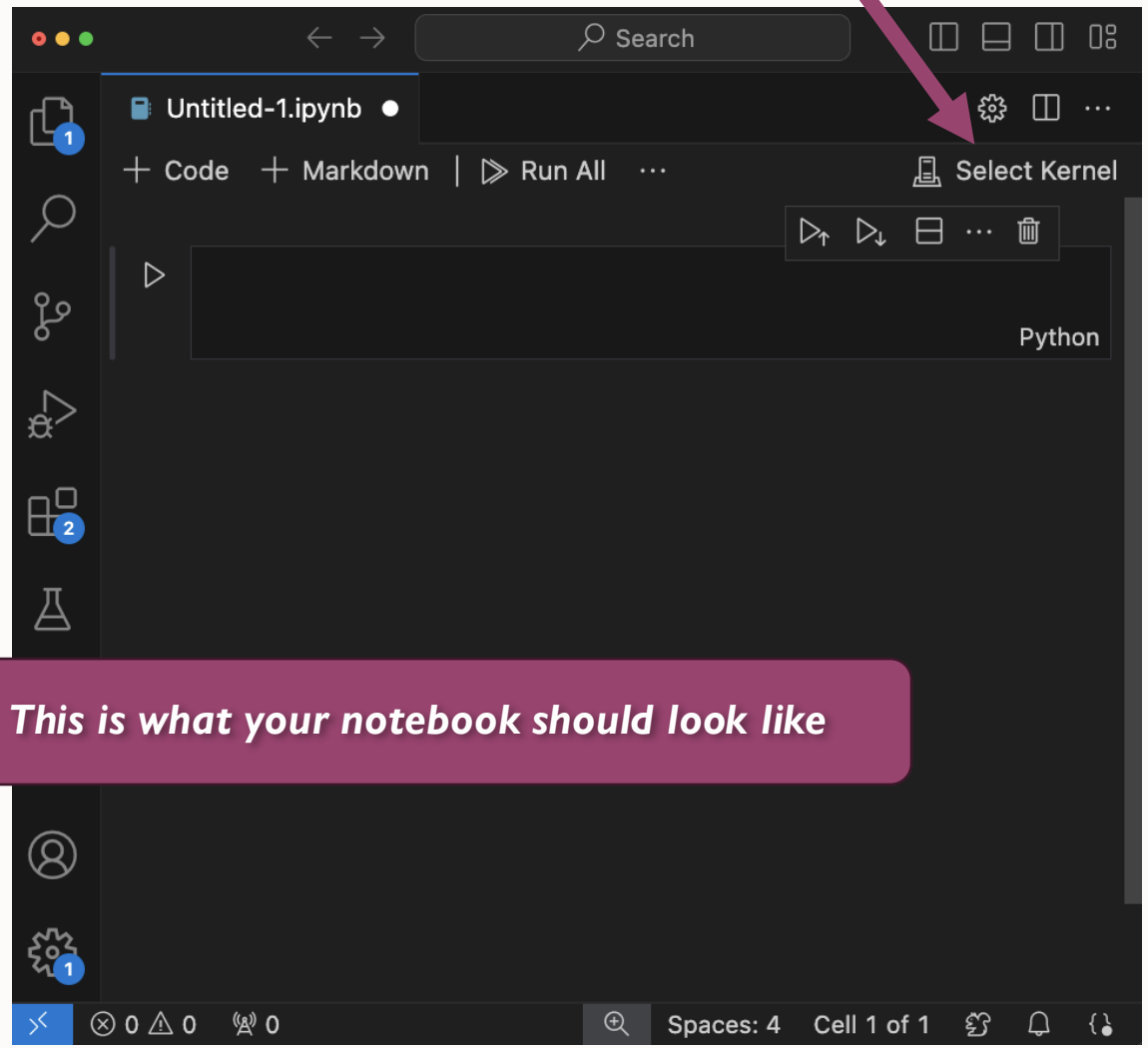
In VS Code, click "**File**", then "**New File…**", then "**Jupyter Notebook .ipynb Support**".

A new notebook called "**Untitled-1.ipynb**" will be opened.

2) Select the Conda environment

VS Code sees all installations of Python (here called **Kernels**), incl. those in virtual environments

To select yours, click "**Select Kernel**", then "**Python Environments…**", and then choose "**pycourse (Python 3.12.4)**" from the list



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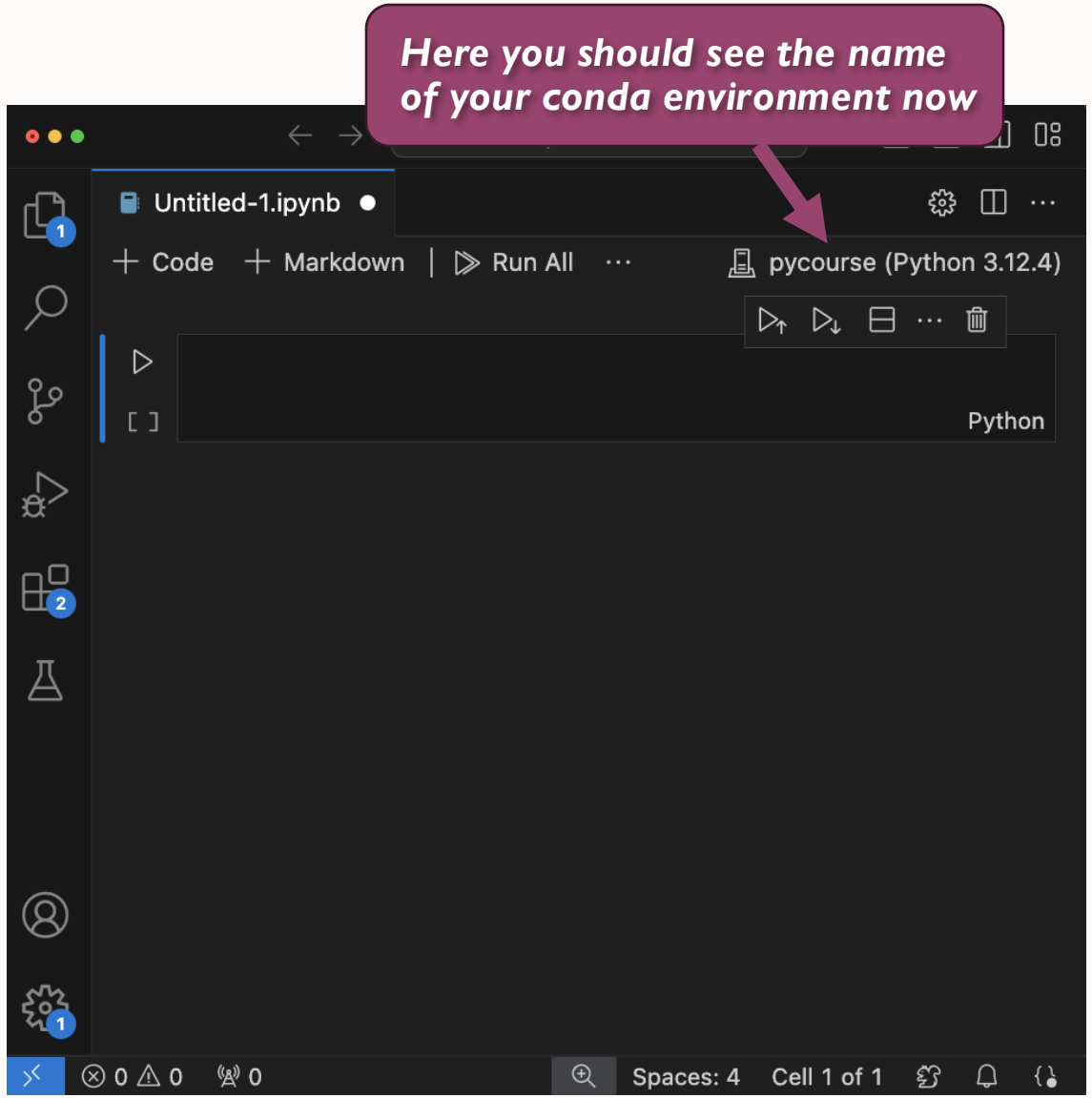
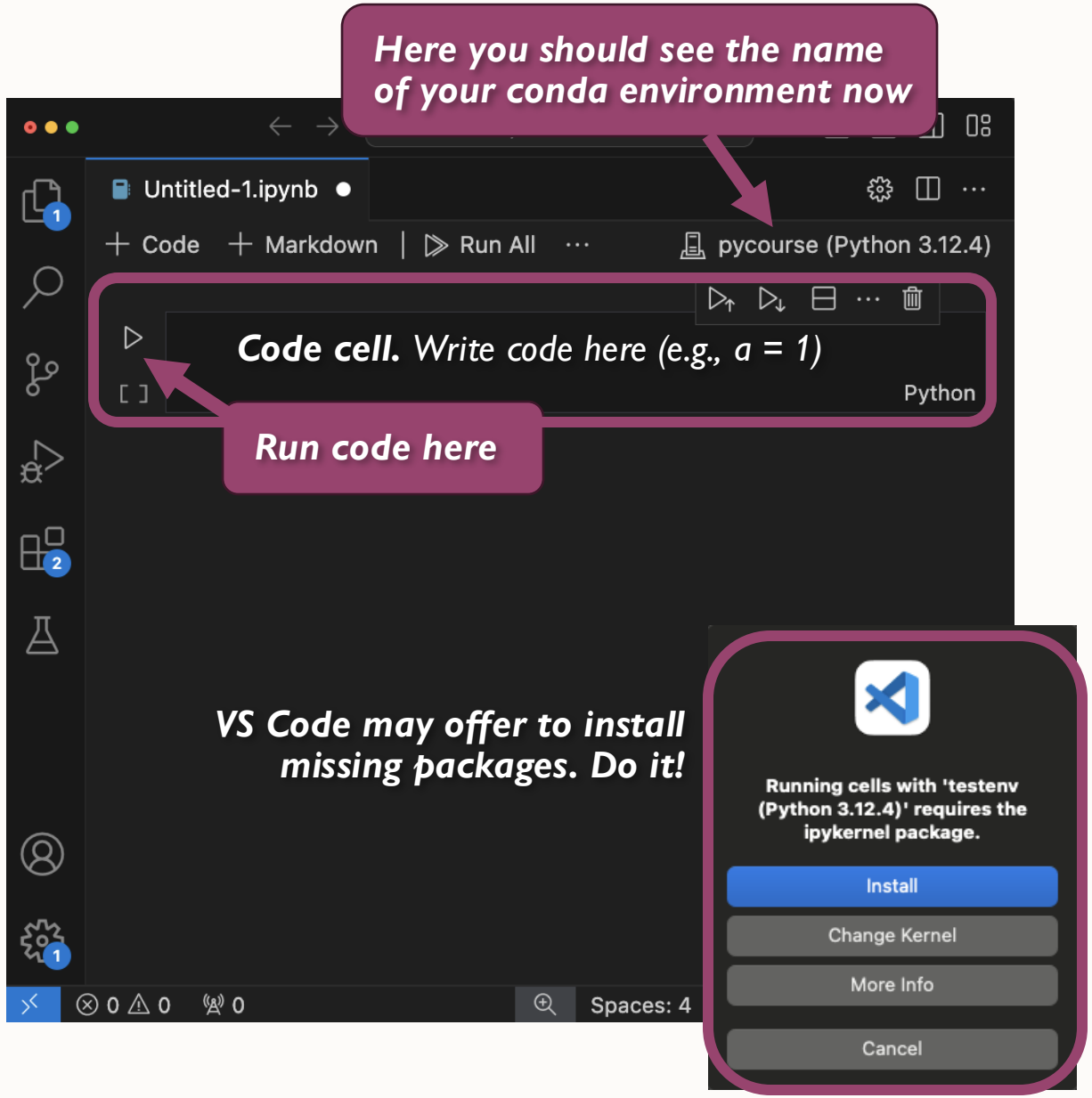


Running **Python**

3) Write code

We write code in the notebook's **Code cells**.

Cells can then be executed by clicking on the "**Run**" symbol (or by pressing "Ctr + Enter").



Running **Python**

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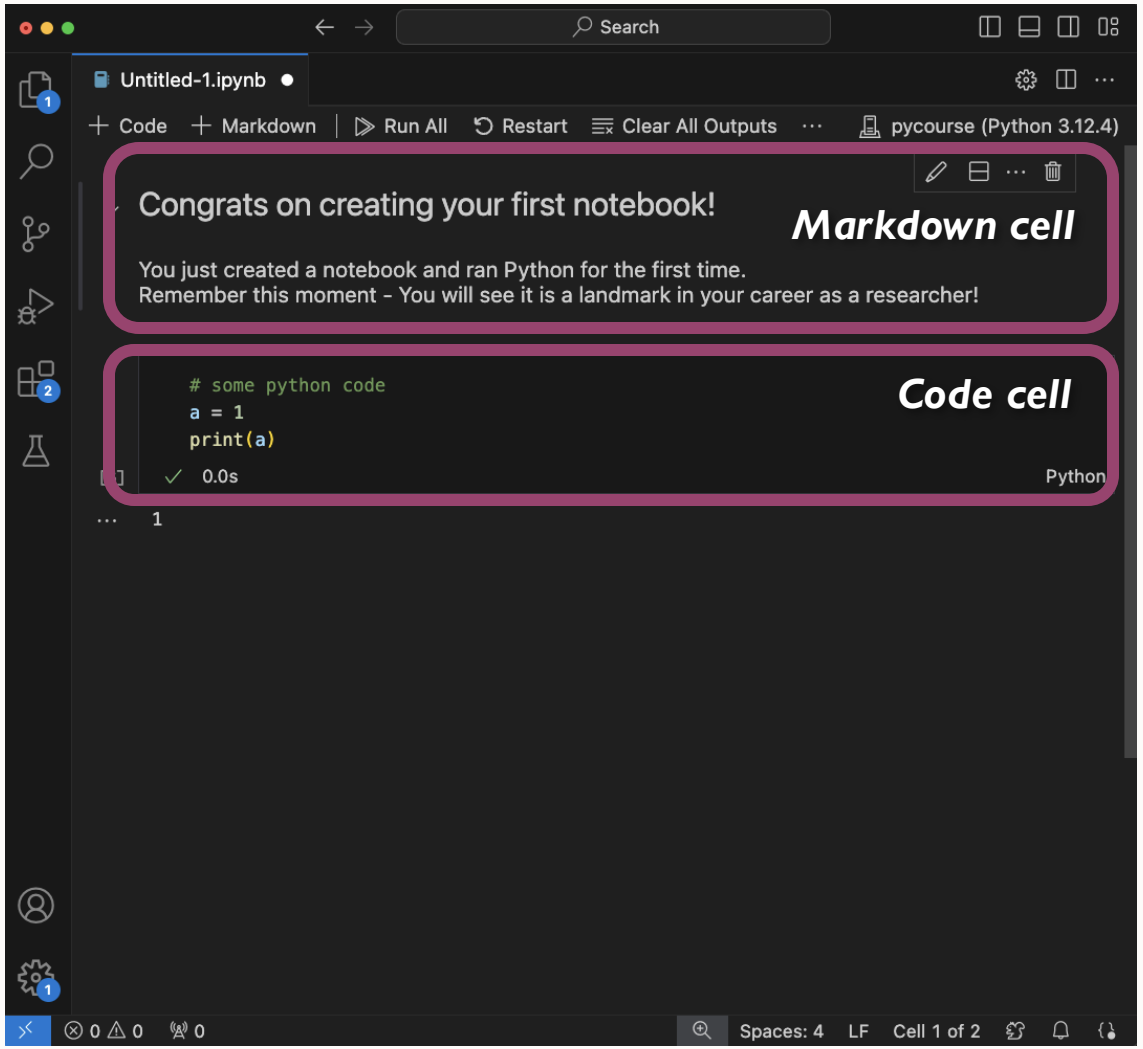
4) Write formatted text

Notebooks allow adding text, embed media etc. via **Markdown Cells**.

This is extremely useful for organizing your notebook, adding documentation etc.

For an overview on **Markdown commands** click here (e.g., how to change font size):
https://www.markdownguide.org/basic-syntax/




That’s a wrap!