Artificial Intelligence and Big Data

Postgraduate Program in Central Banking (CEMFI)

Software Installation Notes

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In this course, we will use Nuvolos to run all Python code, which provides a pre-configured environment with all the necessary packages. If you would like to set up a **local Python environment** on your computer instead, you can use the following guide. We use the Anaconda distribution, which simplifies package management and ensures everyone has a consistent development environment. For code editing and running Jupyter notebooks, we use Visual Studio Code (VS Code), a powerful and beginner-friendly code editor.

The following instructions will guide you through installing Python, creating a dedicated environment for this course, and setting up VS Code on your machine.

Anaconda Installation

The first step is to install the Anaconda distribution:

1. Download the Anaconda distribution from anaconda.com. Note: If you are using a M1 Mac (or newer), you have to choose the 64-Bit (Apple silicon) Graphical Installer. With an older Intel Mac, you can choose the 64-Bit (Intel chip) Graphical Installer. With Windows, you can choose the 64-Bit Graphical Installer (i.e., the only Windows option).
2. Open the installer that you have downloaded in the previous step and follow the on-screen instructions.
3. If it asks you to update Anaconda Navigator at the end, you can click `Yes` (to agree to the update), `Yes` (to quit Anaconda Navigator) and then `Update Now` (to actually start the update).

To **confirm that the installation was successful**, you can open a *terminal window* on macOS/Linux or an *Anaconda Prompt* if you are on Windows and run the following command:

```
conda --version
```

This should display the version of Conda that you have installed. If you see an error message, the installation was likely not successful and you should ask for advice from your peers or send me an email.

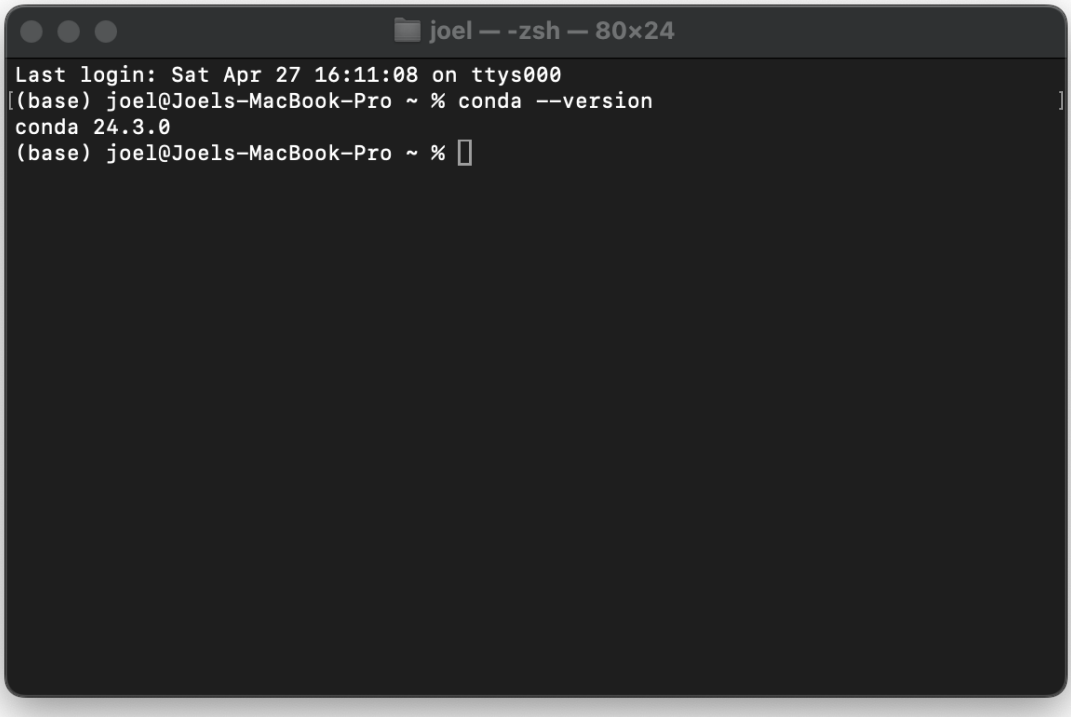

Figure 1: Terminal Output after Anaconda Installation

Creating a Conda Environment

Next, we want to create a new environment for this course that contains the correct Python version and all the Python packages we need. We can do this by creating a new Conda environment from the `environment.yml` provided on Moodle.

1. Open a *terminal window* on macOS/Linux or an *Anaconda Prompt* if you are on Windows.
2. There are two ways to create the Conda environment:

   Option A: Run the following command from the terminal or Anaconda Prompt:

   ```
   conda env create -f https://aibigdata.joelmarbet.com/environment.yml
   ```

   This downloads the `environment.yml` file automatically and creates the environment.

   Option B: Download the `environment.yml` file manually:

i. Navigate to the folder where you have downloaded the `environment.yml` file. On macOS/Linux, you can do this by running the following command in the terminal:

```
cd ~/Downloads
```

which will navigate to the `Downloads` folder in your home directory.

On Windows, you can do this by running the following command in the Anaconda Prompt:

```
cd "%userprofile%/Downloads"
```

which will navigate to the `Downloads` folder in your user profile.

Note that if you use a different path that contains space you need to put the path in quotes, e.g., `cd "~/My Downloads"`.

ii. Create a new Conda environment from the `environment.yml` file by running the following command in the terminal or Anaconda Prompt:

```
conda env create -f environment.yml
```

Either option will create a new Conda environment called `ai-big-data-cemfi` with the correct Python version and all the Python packages we need for this course. Note that the installation might take a few minutes.

3. Activate the new Conda environment by running the following command in the terminal or Anaconda Prompt:

```
conda activate ai-big-data-cemfi
```

To **confirm that the environment was created successfully**, you can run the following command in the terminal or Anaconda Prompt:

```
conda env list
```

This should display a list of all Conda environments on your machine, with an asterisk (`*`) next to the currently active environment. You should see `ai-big-data-cemfi` in the list.

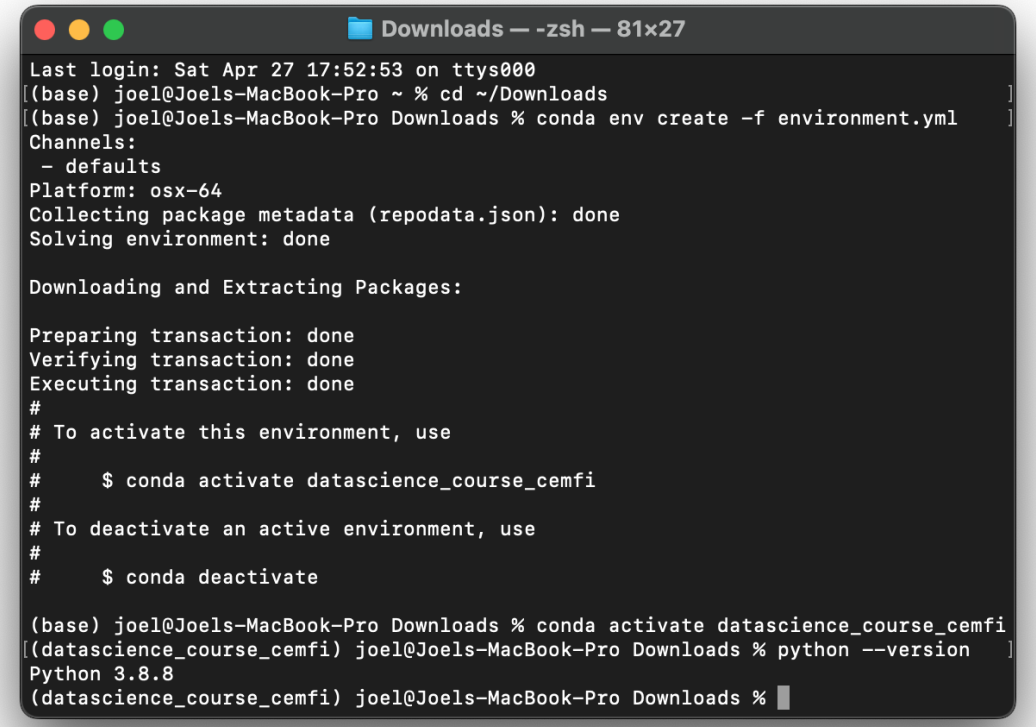

Figure 2: Terminal Output From Environment Creation

Resetting or Updating a Conda Environment

If you accidentally make changes to the environment and want to reset it to the original state, you can do this by navigating to the folder where you have downloaded `environment.yml` and then running the following command in the *terminal* or *Anaconda Prompt*:

```
conda env update --file environment.yml --prune
```

Alternatively, you can also update the environment by running the following command in the *terminal* or *Anaconda Prompt*, which downloads the environment.yml file automatically from the course website:

```
conda env update --file https://aibigdata.joelmarbet.com/environment.yml --prune
```

> This can also be used to update the environment if we add new packages to the `environment.yml` file.

Installing VS Code

The last step is to install the Visual Studio Code (VS Code) editor:

1. Download the Visual Studio Code editor from code.visualstudio.com.
2. Open the installer that you have downloaded in the previous step and follow the on-screen instructions.

We also need to install some VS Code extensions that will help us with Python programming and Jupyter notebooks:

1. Open VS Code.
2. Click on the `Extensions` icon on the left sidebar (or press `Cmd+Shift+X` on macOS or `Ctrl+Shift+X` on Windows).

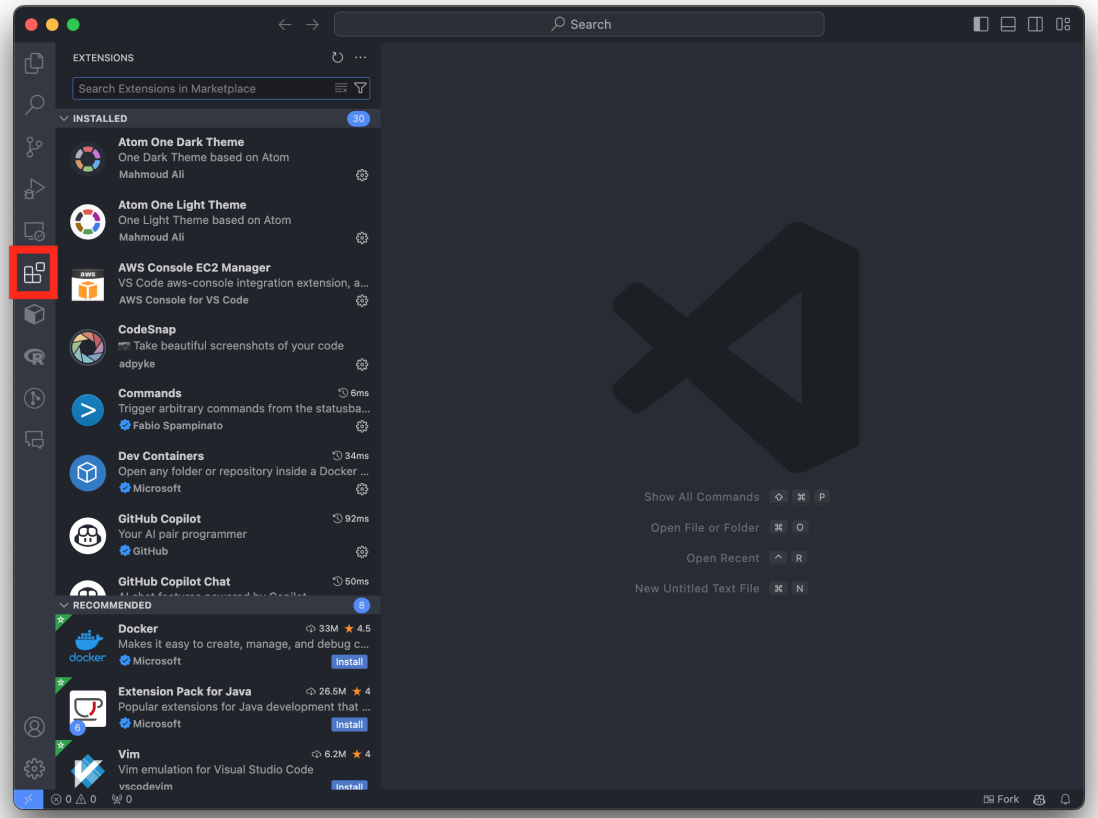

Figure 3: Installing Extensions in VSCode

3. Search for `Python` and click on the `Install` button for the extension that is provided by Microsoft.
4. Search for `Jupyter` and click on the `Install` button for the extension that is provided by Microsoft.

Testing the Installation

To test the installation, you can download a Juypter notebook from Moodle and open it in VS Code:

1. Open the Jupyter notebook in VS Code.

2. Click on `Select Kernel` in the top right corner of the notebook and choose the `ai-big-data-cemfi` kernel.

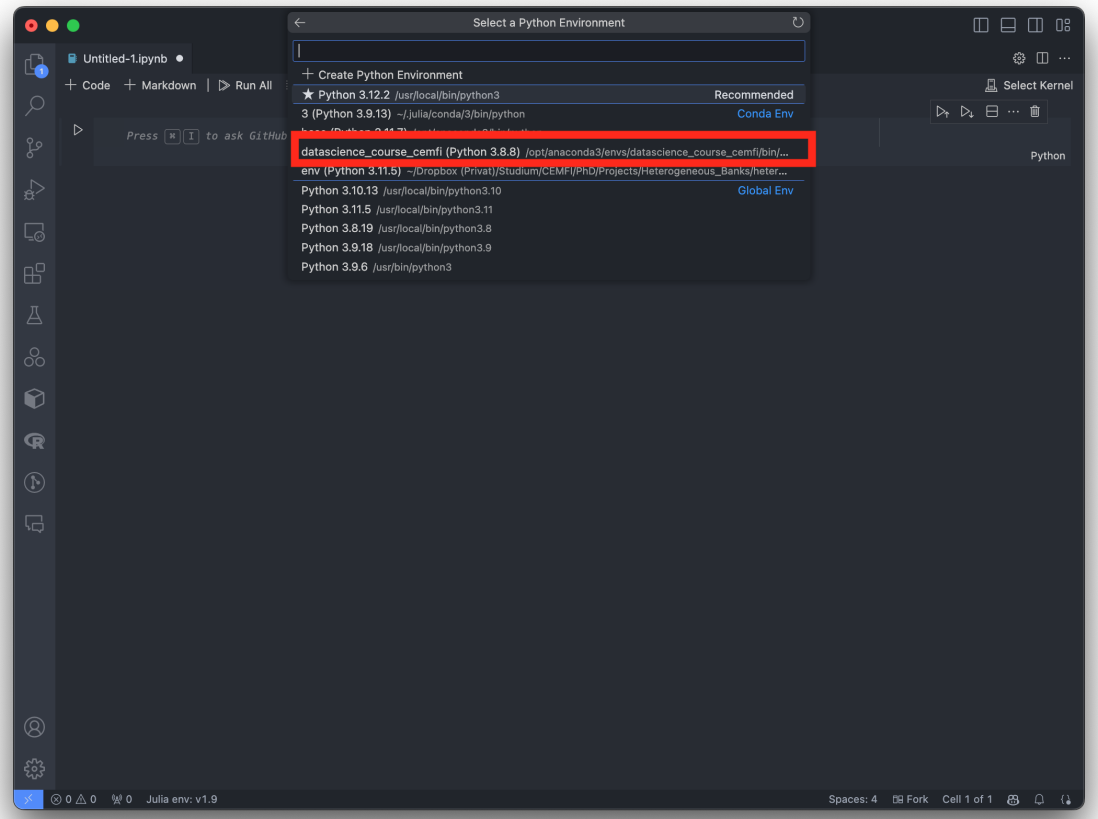

Figure 4: VSCode Jupyter Kernel Selection

3. Run the first cell of the notebook by clicking on the `Execute Cell` button next to the cell on the left.

If you see the output of the cell (or a green check mark below the cell), the installation was successful.

> **Running Jupyter Notebooks in the Browser**
>
> If you have issues running Jupyter notebooks in VSCode, you can also run them in the browser. To do this, you can open a *terminal window* on macOS/Linux or an *Anaconda Prompt* if you are on Windows and run the following command:

```
jupyter notebook
```

This will open a new tab in your default browser with the Jupyter notebook interface. You can then navigate to the folder where you have downloaded the course materials and open the notebooks from there.