NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

College of Computing and Data Science

**Software tools for CA6000**

We will be using Python in CA6000 (and other MCAAI courses) for the various programming exercises. Python is currently the most popular programming language for AI applications development, with many resources available online. It is also easy to pick-up as it has 'English-Like' syntax which resemble natural English.

There are several platforms and software tools that are commonly used in Python applications development. We will be using the Jupyterlab for code development as this is the platform widely used in industry for data analysis and AI applications development. We will also learn how to use other popular packages for AI development such as the following during the course:

- Numpy
- Pandas
- Matplotlib
- Seaborn
- Scikit-Learn
- TensorFlow & Keras
- PyTorch

We will also use AI chatbots such as ChatGPT or Gemini to assist you doing the programming exercises, as this is how you will be using them when working in the industry. (You may want to setup a free account with them,  although it is not necessary)

To prepare for the hands-on exercises during the lessons, you will hence need to install various packages on your Laptop computer before the class. One of the most user friendly way to do this is by installing the Anaconda Distribution (available at https://www.anaconda.com/download). Its installation is very straight forward, but the latest version by default includes a lot of software and packages that we will not need that take up a lot of disk space. (But you can use it if you want)

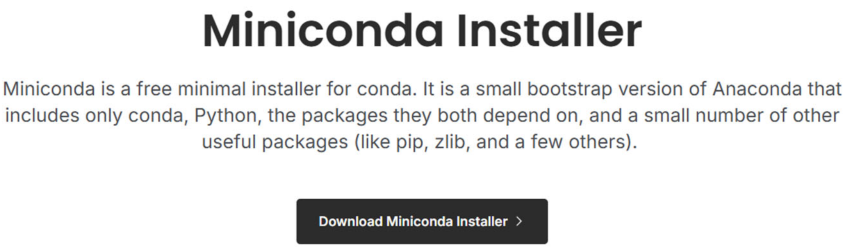
My recommendation is to install only the necessary packages for CA6000, using Miniconda with Anaconda Navigator, plus the JupyterLab. The following pages describe the steps that you can follow to install the following:

A. Installing Miniconda
B. Installing Navigator
C. Installing JupyterLab

(We will install other packages later when they are needed for the lessons).

**A. Installing Miniconda** (Procedure and screenshots are as of Nov 2025)

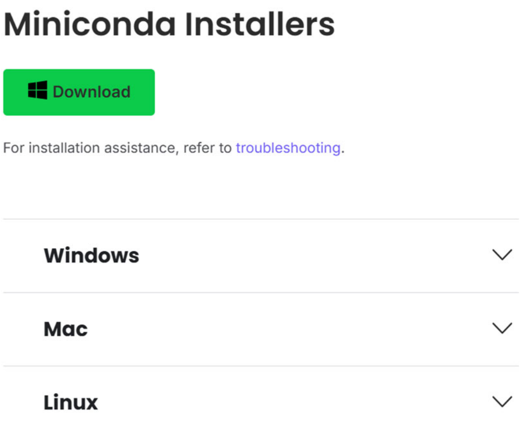
- Go to **Anaconda.com/download**
- At bottom of the webpage, you will see the installer



Miniconda Installer

Miniconda is a free minimal installer for conda. It is a small bootstrap version of Anaconda that includes only conda, Python, the packages they both depend on, and a small number of other useful packages (like pip, zlib, and a few others).

- Click on the button and this will bring you to another page which you can select the version of Operating System you are using, and download the corresponding one.

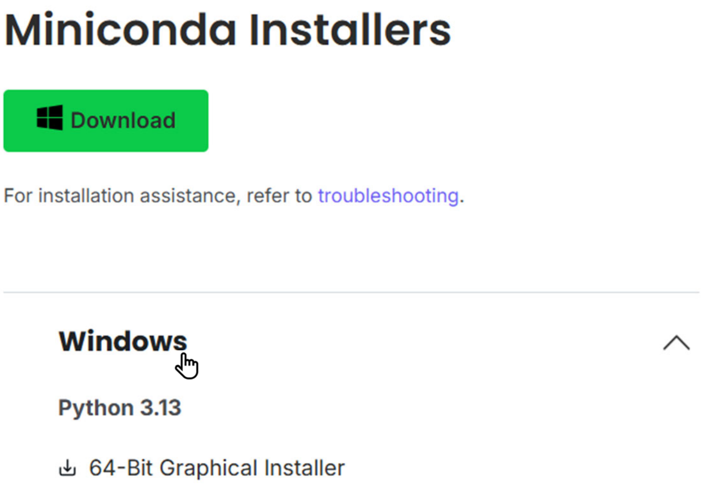


Miniconda Installers

For installation assistance, refer to troubleshooting.

The following assume that you are using a Windows based computer (but it should be similar with other OS).

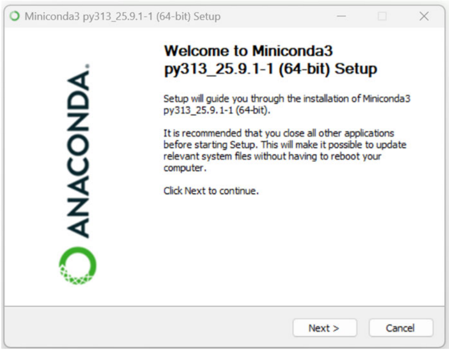
- Select Windows to download the installation file



Miniconda Installers

For installation assistance, refer to troubleshooting.

- Run the installation file (e.g., Miniconda3-latest-Windows-x86_64.exe) and you will see the various screenshots as shown below during its installation.



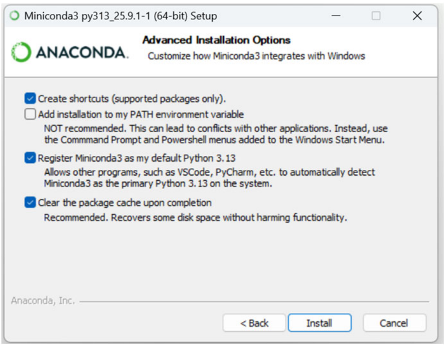
Miniconda3 py313_25.9.1-1 (64-bit) Setup

**Welcome to Miniconda3 py313_25.9.1-1 (64-bit) Setup**

Setup will guide you through the installation of Miniconda3 py313_25.9.1-1 (64-bit).

It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.

Click Next to continue.



Miniconda3 py313_25.9.1-1 (64-bit) Setup

**Advanced Installation Options**

Customize how Miniconda3 integrates with Windows

☑ Create shortcuts (supported packages only).

☐ Add installation to my PATH environment variable

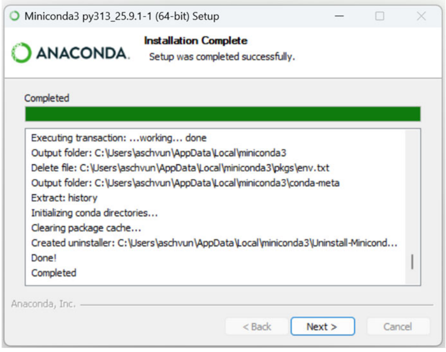
NOT recommended. This can lead to conflicts with other applications. Instead, use the Commmand Prompt and Powershell menus added to the Windows Start Menu.

☑ Register Miniconda3 as my default Python 3.13

Allows other programs, such as VSCode, PyCharm, etc. to automatically detect Miniconda3 as the primary Python 3.13 on the system.

☑ Clear the package cache upon completion

Recommended. Recovers some disk space without harming functionality.



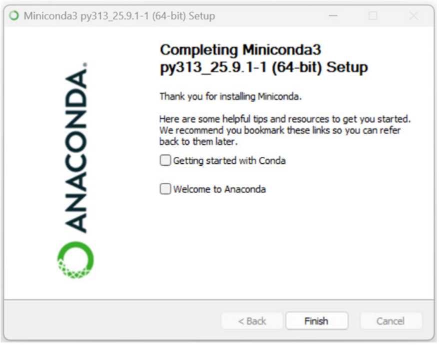
Miniconda3 py313_25.9.1-1 (64-bit) Setup

**Installation Complete**

Setup was completed successfully.

Completed

```
Executing transaction: ...working... done
Output folder: C:\Users\aschvun\AppData\Local\miniconda3
Delete file: C:\Users\aschvun\AppData\Local\miniconda3\pkgs\env.txt
Output folder: C:\Users\aschvun\AppData\Local\miniconda3\conda-meta
Extract: history
Initializing conda directories...
Clearing package cache...
Created uninstaller: C:\Users\aschvun\AppData\Local\miniconda3\Uninstall-Minicond...
Done!
Completed
```



Miniconda3 py313_25.9.1-1 (64-bit) Setup

**Completing Miniconda3 py313_25.9.1-1 (64-bit) Setup**

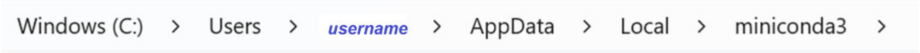
Thank you for installing Miniconda.

Here are some helpful tips and resources to get you started. We recommend you bookmark these links so you can refer back to them later.

☐ Getting started with Conda

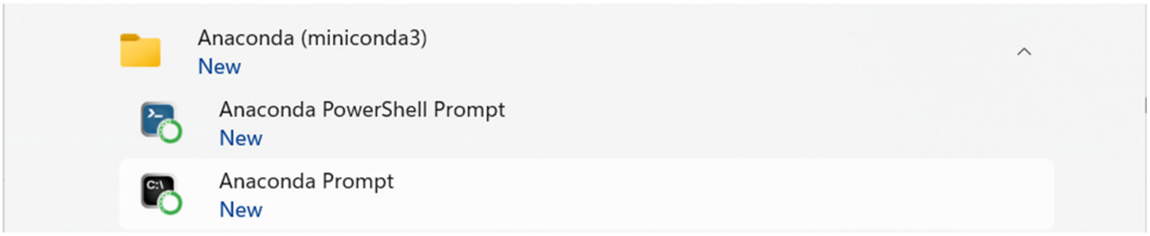
☐ Welcome to Anaconda

Note: The program most likely will be installed in the following directory on your computer:



Windows (C:) > Users > *username* > AppData > Local > miniconda3 >

- Once the installation is completed, click the **Start** button (the Windows icon ⊞ ) and you should be able to see the following entries in the program list

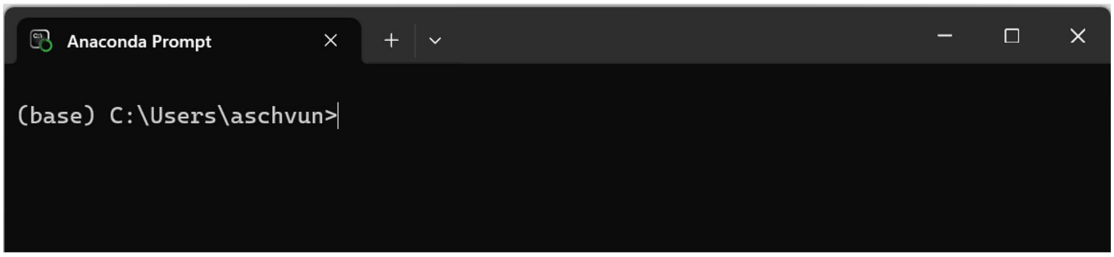


Anaconda (miniconda3)
New

Anaconda PowerShell Prompt
New

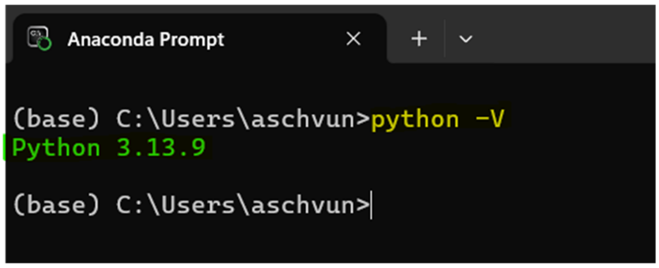
Anaconda Prompt
New

- Select Anaconda Prompt, which will launch a text based console that will allow you to issue various commands.



```
(base) C:\Users\aschvun>
```

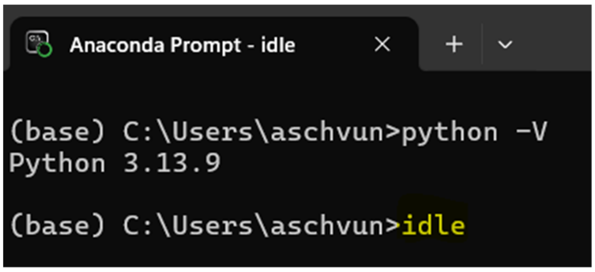
- Miniconda comes with Python installed. You can check the Python's version installed on your computer by typing the command 'python -V' in the console prompt



```
(base) C:\Users\aschvun>python -V
Python 3.13.9

(base) C:\Users\aschvun>
```

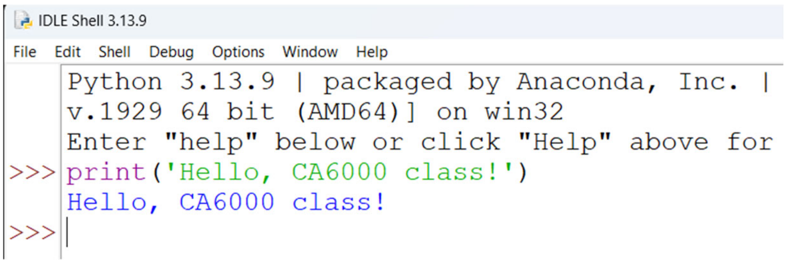
- Miniconda also provides a Python's Integrated Development and Learning Environment (IDLE) that can be used for writing, editing and running Python code.

  Type the command 'idle' in the console



```
(base) C:\Users\aschvun>python -V
Python 3.13.9

(base) C:\Users\aschvun>idle
```

- Another text based windows, the IDLE Shell window will pop out, which you can issue some Python statement for testing, such as the following.



```
    Python 3.13.9 | packaged by Anaconda, Inc. |
    v.1929 64 bit (AMD64)] on win32
    Enter "help" below or click "Help" above for
>>> print('Hello, CA6000 class!')
    Hello, CA6000 class!
>>> 
```

If you are able to see the above, the miniconda has been successfully installed on your computer.

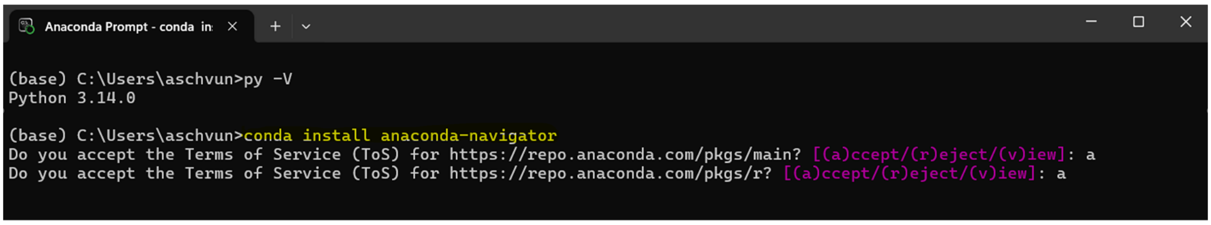
(You can terminate the IDEL Shell before moving to the next step - installing the Anaconda Navigator, and follows by the JupyterLab.)

**Note:** While we will start with using IDLE Shell to learn the basics of Python programming, its text based interface is not suitable for developing more complex applications. In practice, programme developers will use graphical user interface (GUI) based development tools such as Jupyterlab (which we will use in CA6000) and others such as PyCharm, VS Code etc.

## B. Installing Anaconda Navigator

Anaconda Navigator is a desktop GUI based package that allows you to easily install other software packages and launch applications.

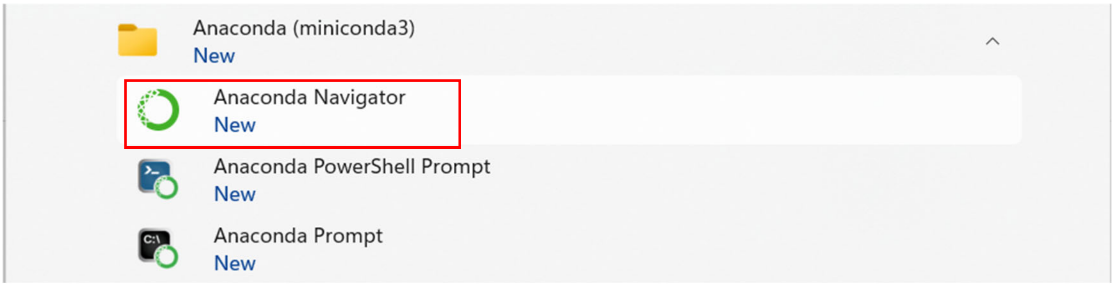
- To install the Navigator, open an Anaconda Prompt console and type the command ‘conda install anaconda-navigator’



```
(base) C:\Users\aschvun>py -V
Python 3.14.0

(base) C:\Users\aschvun>conda install anaconda-navigator
Do you accept the Terms of Service (ToS) for https://repo.anaconda.com/pkgs/main? [(a)ccept/(r)eject/(v)iew]: a
Do you accept the Terms of Service (ToS) for https://repo.anaconda.com/pkgs/r? [(a)ccept/(r)eject/(v)iew]: a
```

Accept the various questions to install the package.

- Once the installation is completed, the Navigator will appear under the Anaconda App as shown below.



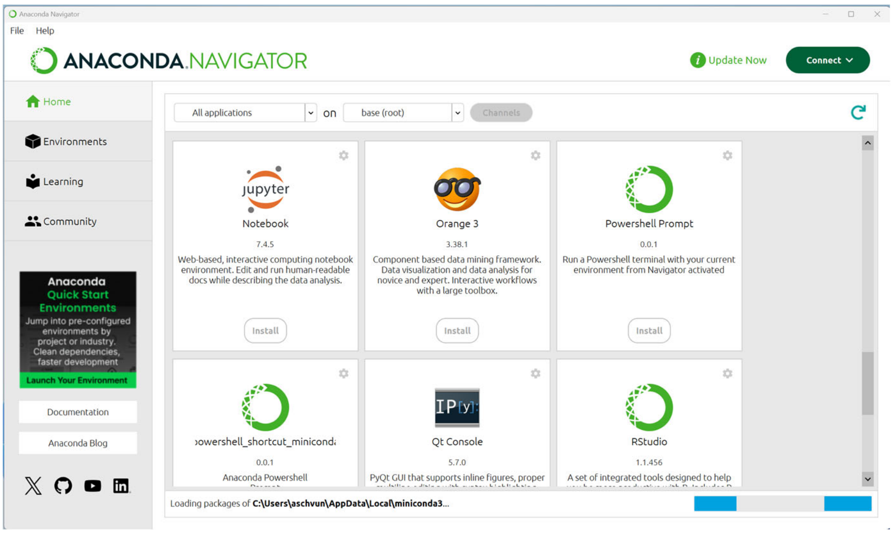
Anaconda (miniconda3)
New

Anaconda Navigator
New

Anaconda PowerShell Prompt
New

Anaconda Prompt
New

- Launch the Navigator and you will see a GUI interface as shown below. You will see a list of applications shown in the form of tiles.



Notebook
7.4.5
Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.

Orange 3
3.38.1
Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox.

Powershell Prompt
0.0.1
Run a Powershell terminal with your current environment from Navigator activated

›owershell_shortcut_minicond‹
0.0.1
Anaconda Powershell

Qt Console
5.7.0
PyQt GUI that supports inline figures, proper

RStudio
1.1.456
A set of integrated tools designed to help

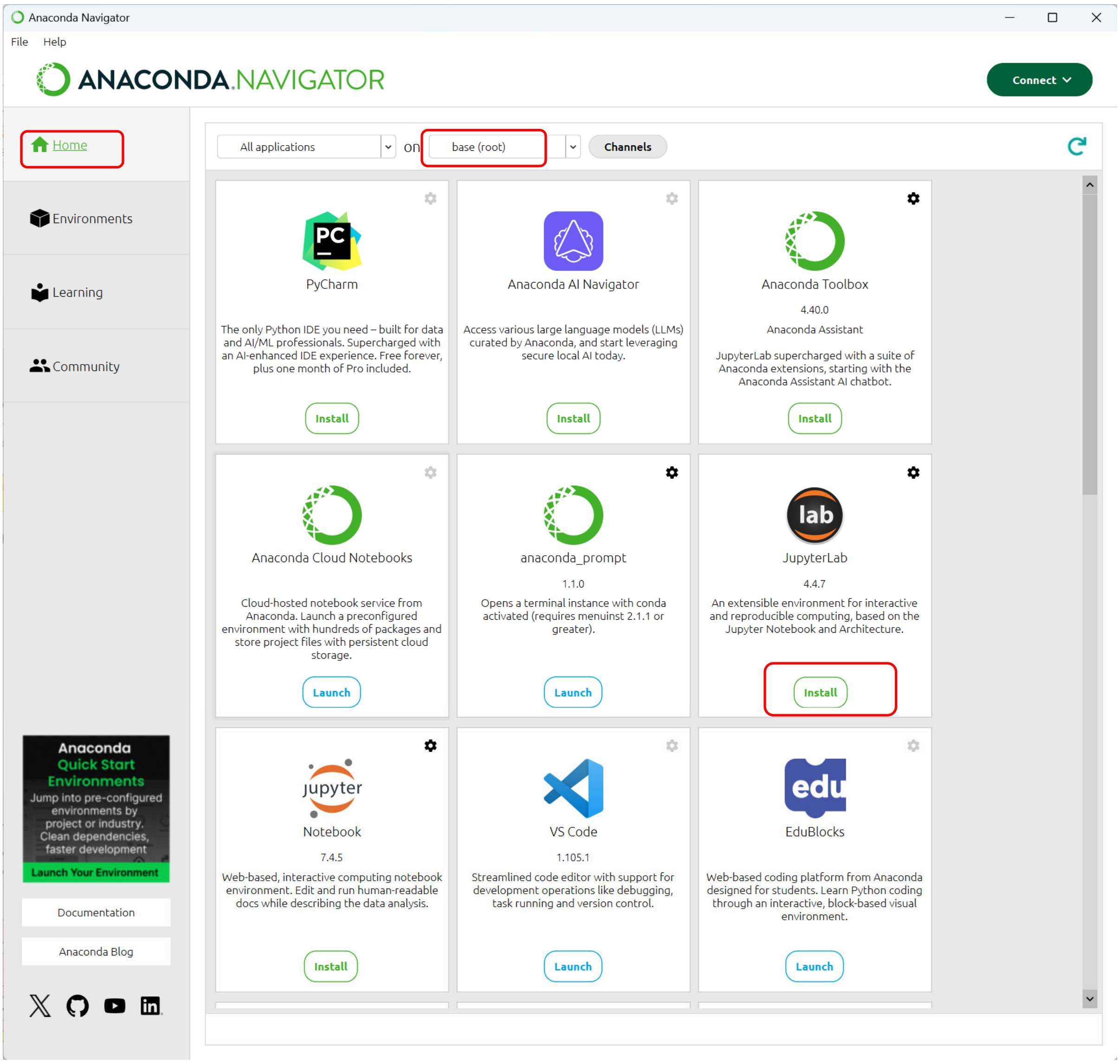
Loading packages of **C:\Users\aschvun\AppData\Local\miniconda3**...

We can use this Navigator to install other programs and packages that we will be using in this course.

## D. Installing JupyterLab

The first program that we will install through the Navigator is the JupyterLab, which is a popular platform used in AI applications development.

- On the ‘Home’ page of the Navigator, check that the base(root) is the current environment selection (we will learn more about environment later).



PyCharm
The only Python IDE you need – built for data and AI/ML professionals. Supercharged with an AI-enhanced IDE experience. Free forever, plus one month of Pro included.
Install

Anaconda AI Navigator
Access various large language models (LLMs) curated by Anaconda, and start leveraging secure local AI today.
Install

Anaconda Toolbox
4.40.0
Anaconda Assistant
JupyterLab supercharged with a suite of Anaconda extensions, starting with the Anaconda Assistant AI chatbot.
Install

Anaconda Cloud Notebooks
Cloud-hosted notebook service from Anaconda. Launch a preconfigured environment with hundreds of packages and store project files with persistent cloud storage.
Launch

anaconda_prompt
1.1.0
Opens a terminal instance with conda activated (requires menuinst 2.1.1 or greater).
Launch

JupyterLab
4.4.7
An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.
Install

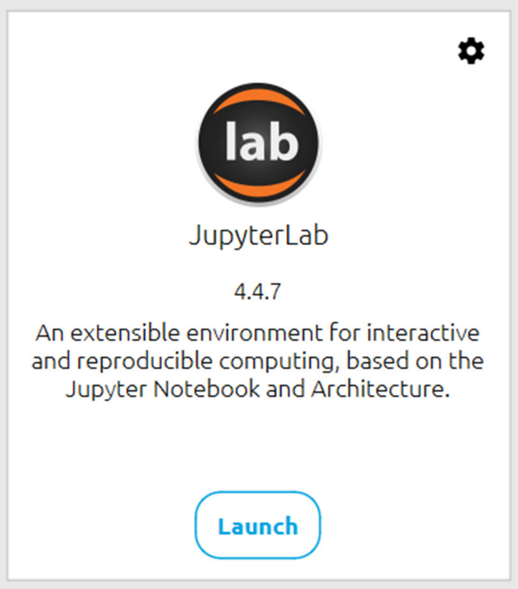
Notebook
7.4.5
Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.
Install

VS Code
1.105.1
Streamlined code editor with support for development operations like debugging, task running and version control.
Launch

EduBlocks
Web-based coding platform from Anaconda designed for students. Learn Python coding through an interactive, block-based visual environment.
Launch

- Scroll the page until you find the “JupyterLab” tile in the application list.
- Click its Install button to install the program.

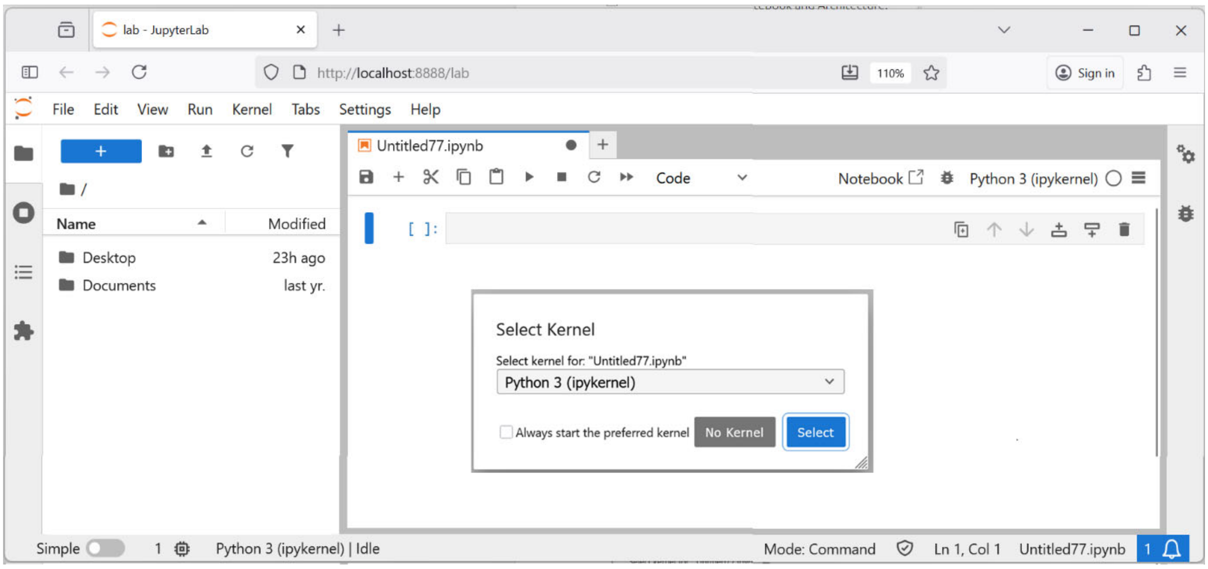
Once it is installed, you will see that its button has changed to 'Launch'


JupyterLab

4.4.7

An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.

- Click on the Launch button to start the program.
  The JupyterLab interface will then appear in your default web browser (typically at http://localhost:8888/lab, meaning port 8888 of localhost).



| Name | Modified |
|---|---|
| Desktop | 23h ago |
| Documents | last yr. |

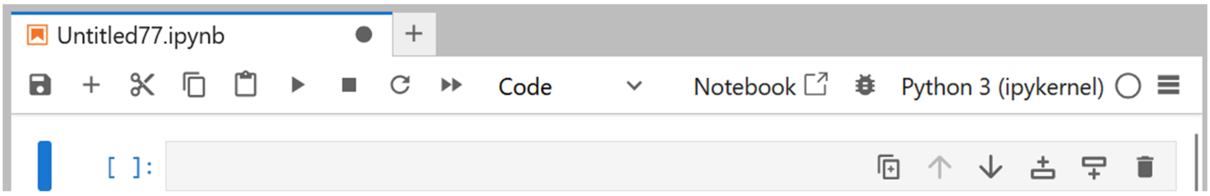
Select Kernel

Select kernel for: "Untitled77.ipynb"

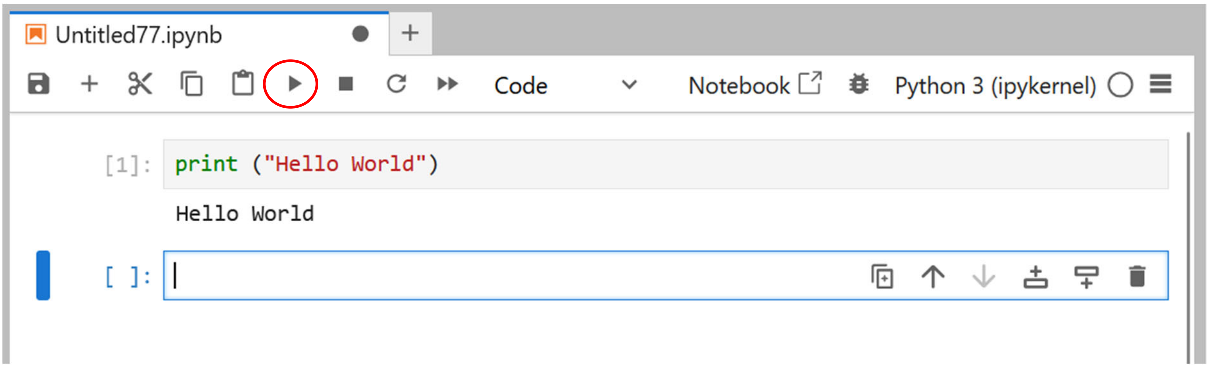
Python 3 (ipykernel)

□ Always start the preferred kernel

- An empty cell will also appear in this webpage

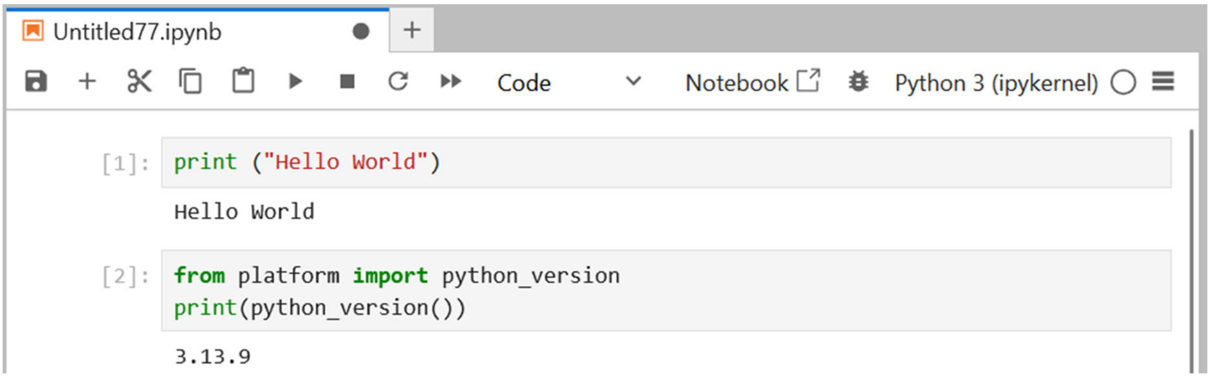


- To test that the JupyterLab is installed properly (which should be), you can type a simple Python print statement in the cell and click the run button ▶:



```
[1]: print ("Hello World")

     Hello World

[ ]:
```

- Another Example

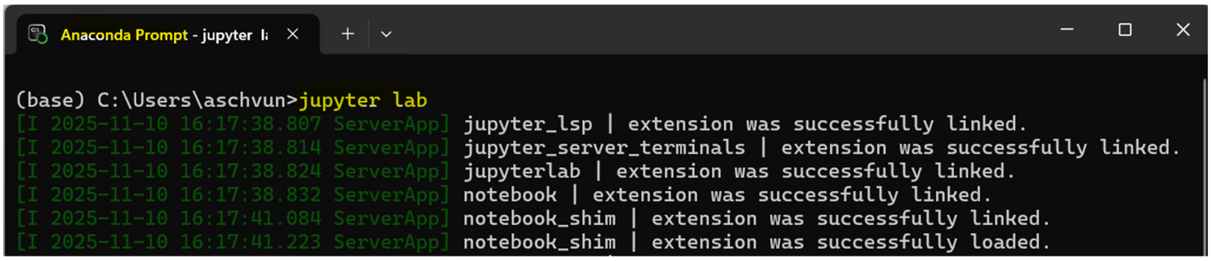


```
[1]: print ("Hello World")

     Hello World

[2]: from platform import python_version
     print(python_version())

     3.13.9
```

If the JupyterLab successfully executes the above, it is installed successfully. You can terminate the Navigator program. (We will be installing other packages later)

## Launching of JupyterLab

While you can subsequently launch the JupyterLab through the Navigator as above, it is much faster to do it through the Anacondo Prompt console as shown below



```
(base) C:\Users\aschvun>jupyter lab
[I 2025-11-10 16:17:38.807 ServerApp] jupyter_lsp | extension was successfully linked.
[I 2025-11-10 16:17:38.814 ServerApp] jupyter_server_terminals | extension was successfully linked.
[I 2025-11-10 16:17:38.824 ServerApp] jupyterlab | extension was successfully linked.
[I 2025-11-10 16:17:38.832 ServerApp] notebook | extension was successfully linked.
[I 2025-11-10 16:17:41.084 ServerApp] notebook_shim | extension was successfully linked.
[I 2025-11-10 16:17:41.223 ServerApp] notebook_shim | extension was successfully loaded.
```