

About Jupyter

Jupyter Notebook

- The IPython Notebook, now known as the Jupyter Notebook, is an interactive computational environment, in which you can combine code execution, rich text, mathematics, plots and rich media. The code can be written and executed directly on a browser. It is like a notebook that contains your code.

<https://jupyter.org/>

<https://ipython.org/notebook.html>

Getting started with Jupyter

- For using Jupyter, we will rely on Anaconda installation which is available through the following link:
<https://docs.anaconda.com/anaconda/install/>
- Anaconda provides a navigator, which is a graphical user interface, for the desktop that allows the launch of various applications for Python and R without using any command-line commands. Anaconda includes Jupyter Notebook as an application within it. Throughout this course, we will write all our code on Jupyter notebook.

Opening the Jupyter notebook

The screenshot displays the Anaconda Navigator application window. The title bar reads "Anaconda Navigator" with standard window controls. Below the title bar is a menu bar with "File" and "Help". The main header area features the "ANACONDA NAVIGATOR" logo on the left and a "Sign in to Anaconda Cloud" button on the right. A left-hand sidebar contains navigation options: "Home", "Environments", "Learning", and "Community".

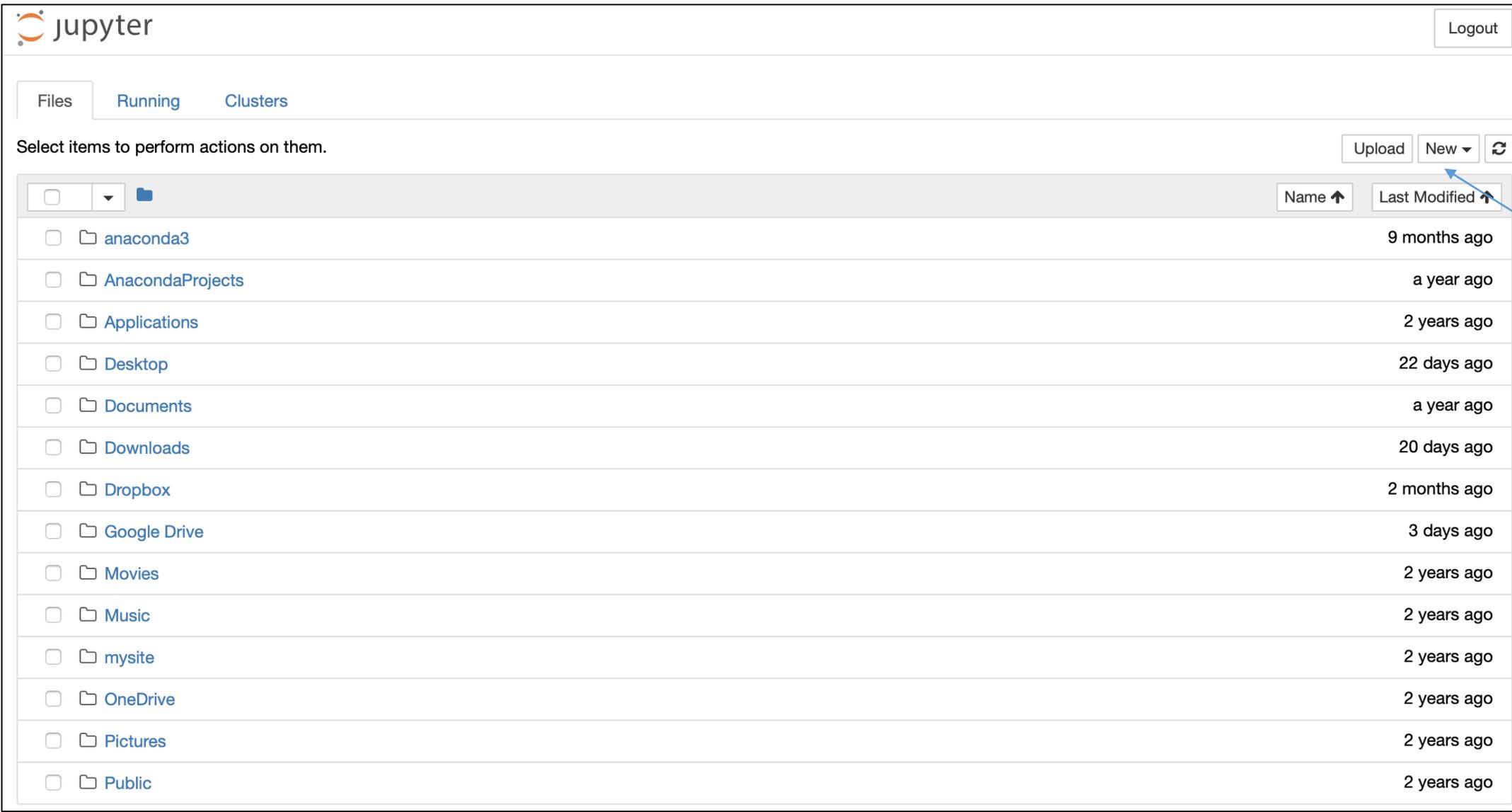
The central workspace is titled "Applications on" and shows a dropdown menu set to "base (root)" and a "Channels" button. A "Refresh" button is located in the top right of this section. The applications are displayed in a grid:

- JupyterLab** (0.32.1): An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture. [Launch]
- Jupyter Notebook** (5.5.0): Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis. [Launch]
- Qt Console** (4.3.1): PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more. [Launch]
- Spyder** (3.2.8): Scientific Python Development Environment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features. [Launch]
- VS Code** (1.35.1): Streamlined code editor with support for development operations like debugging, task running and version control. [Launch]
- Glueviz** (0.15.2): Multidimensional data visualization across files. Explore relationships within and among related datasets. [Install]
- Orange 3** (3.23.1): Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox. [Install]
- RStudio** (1.1.456): A set of integrated tools designed to help you be more productive with R. Includes R essentials and notebooks. [Install]

A blue arrow points from the text "Click here" to the "Launch" button of the Jupyter Notebook application.

At the bottom of the sidebar, there are links for "Documentation" and "Developer Blog", and social media icons for Twitter, YouTube, and GitHub.

Opens in browser



The screenshot shows the JupyterLab interface with the 'Files' tab selected. At the top left is the 'jupyter' logo, and at the top right is a 'Logout' button. Below the logo are three tabs: 'Files', 'Running', and 'Clusters'. A message says 'Select items to perform actions on them.' To the right of this message are buttons for 'Upload', 'New', and a refresh icon. Below this is a file browser table with columns for 'Name' and 'Last Modified'. The table lists various folders with their last modified dates. A blue arrow points from the text 'Click here' to the 'New' button.

jupyter Logout

Files Running Clusters

Select items to perform actions on them. Upload New ↻

<input type="checkbox"/>	<input type="checkbox"/>	Name ↑	Last Modified ↑
<input type="checkbox"/>	📁	anaconda3	9 months ago
<input type="checkbox"/>	📁	AnacondaProjects	a year ago
<input type="checkbox"/>	📁	Applications	2 years ago
<input type="checkbox"/>	📁	Desktop	22 days ago
<input type="checkbox"/>	📁	Documents	a year ago
<input type="checkbox"/>	📁	Downloads	20 days ago
<input type="checkbox"/>	📁	Dropbox	2 months ago
<input type="checkbox"/>	📁	Google Drive	3 days ago
<input type="checkbox"/>	📁	Movies	2 years ago
<input type="checkbox"/>	📁	Music	2 years ago
<input type="checkbox"/>	📁	mysite	2 years ago
<input type="checkbox"/>	📁	OneDrive	2 years ago
<input type="checkbox"/>	📁	Pictures	2 years ago
<input type="checkbox"/>	📁	Public	2 years ago

Click here

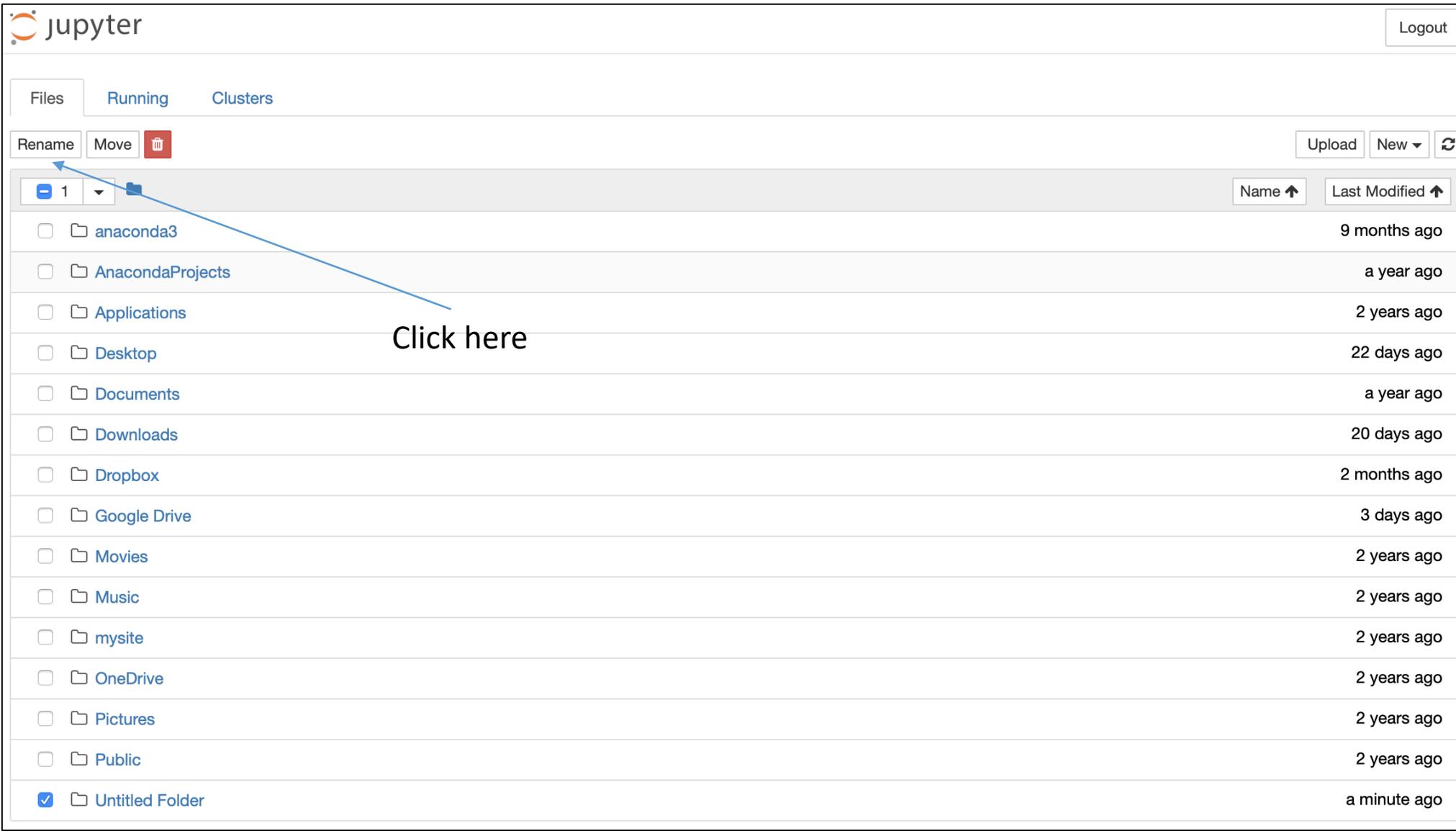
Create a folder

The screenshot shows the JupyterLab interface. At the top left is the 'jupyter' logo. At the top right is a 'Logout' button. Below the logo are three tabs: 'Files', 'Running', and 'Clusters'. Below the tabs is the text 'Select items to perform actions on them.' To the right of this text are three buttons: 'Upload', 'New', and a refresh icon. A dropdown menu is open from the 'New' button, showing options for 'Notebook' (Python 3, R) and 'Other' (Text File, Folder, Terminal). A blue arrow points from the text 'Click here' to the 'Folder' option in the dropdown menu. The main area displays a list of folders with checkboxes and creation dates.

Folder Name	Creation Date
anaconda3	
AnacondaProjects	
Applications	
Desktop	
Documents	a year ago
Downloads	20 days ago
Dropbox	2 months ago
Google Drive	3 days ago
Movies	2 years ago
Music	2 years ago
mysite	2 years ago
OneDrive	2 years ago
Pictures	2 years ago
Public	2 years ago

Click here

Select the folder



The screenshot shows the JupyterLab interface with the 'Files' tab selected. The top navigation bar includes 'Files', 'Running', and 'Clusters'. Below this, there are action buttons: 'Rename', 'Move', and a trash icon. On the right, there are 'Upload', 'New', and a refresh icon. The main area displays a table of folders with columns for 'Name' and 'Last Modified'. A blue arrow points to the 'Untitled Folder' at the bottom of the list, with the text 'Click here' next to it.

	Name ↑	Last Modified ↑
<input type="checkbox"/>	anaconda3	9 months ago
<input type="checkbox"/>	AnacondaProjects	a year ago
<input type="checkbox"/>	Applications	2 years ago
<input type="checkbox"/>	Desktop	22 days ago
<input type="checkbox"/>	Documents	a year ago
<input type="checkbox"/>	Downloads	20 days ago
<input type="checkbox"/>	Dropbox	2 months ago
<input type="checkbox"/>	Google Drive	3 days ago
<input type="checkbox"/>	Movies	2 years ago
<input type="checkbox"/>	Music	2 years ago
<input type="checkbox"/>	mysite	2 years ago
<input type="checkbox"/>	OneDrive	2 years ago
<input type="checkbox"/>	Pictures	2 years ago
<input type="checkbox"/>	Public	2 years ago
<input checked="" type="checkbox"/>	Untitled Folder	a minute ago

Rename it

The image shows a JupyterLab interface with a 'Rename directory' dialog box open. The dialog box has a title bar with 'Rename directory' and a close button. Inside, it says 'Enter a new directory name:' followed by a text input field containing 'data science'. At the bottom of the dialog are 'Cancel' and 'Rename' buttons. The background shows a file browser with a list of folders and their last modified times.

JupyterLab Interface Elements:

- Top left: jupyter logo
- Top right: Logout button
- Navigation tabs: Files, Running, Clusters
- File actions: Rename, Move, Delete
- File list controls: 1 selected, folder icon
- File list columns: Name ↑, Last Modified ↑

Rename Directory Dialog:

- Title: Rename directory
- Text: Enter a new directory name:
- Input field: data science
- Buttons: Cancel, Rename

File List (Background):

Name	Last Modified
anaconda3	9 months ago
AnacondaProjects	a year ago
Applications	2 years ago
Desktop	22 days ago
Documents	a year ago
Downloads	20 days ago
Dropbox	2 months ago
Google Drive	3 days ago
Movies	2 years ago
Music	2 years ago
mysite	2 years ago
OneDrive	2 years ago
Pictures	2 years ago
Public	2 years ago
Untitled Folder	2 minutes ago

Folder is renamed

The screenshot shows the JupyterLab interface with the 'Files' tab selected. At the top right, there is a 'Logout' button. Below the navigation tabs, there are buttons for 'Upload', 'New', and a refresh icon. The main area displays a table of folders with columns for 'Name' and 'Last Modified'. The 'data science' folder is highlighted with a blue box, and a blue arrow points to it from the text 'Click here'.

<input type="checkbox"/>	Name ↑	Last Modified ↑
<input type="checkbox"/>	anaconda3	9 months ago
<input type="checkbox"/>	AnacondaProjects	a year ago
<input type="checkbox"/>	Applications	2 years ago
<input checked="" type="checkbox"/>	data science	4 minutes ago
<input type="checkbox"/>	Desktop	22 days ago
<input type="checkbox"/>	Documents	a year ago
<input type="checkbox"/>	Downloads	20 days ago
<input type="checkbox"/>	Dropbox	2 months ago
<input type="checkbox"/>	Google Drive	3 days ago
<input type="checkbox"/>	Movies	2 years ago
<input type="checkbox"/>	Music	2 years ago
<input type="checkbox"/>	mysite	2 years ago
<input type="checkbox"/>	OneDrive	2 years ago
<input type="checkbox"/>	Pictures	2 years ago
<input type="checkbox"/>	Public	2 years ago

Working folder

jupyter Logout

Files **Running** Clusters

Select items to perform actions on them.

Upload New ↕ ↻

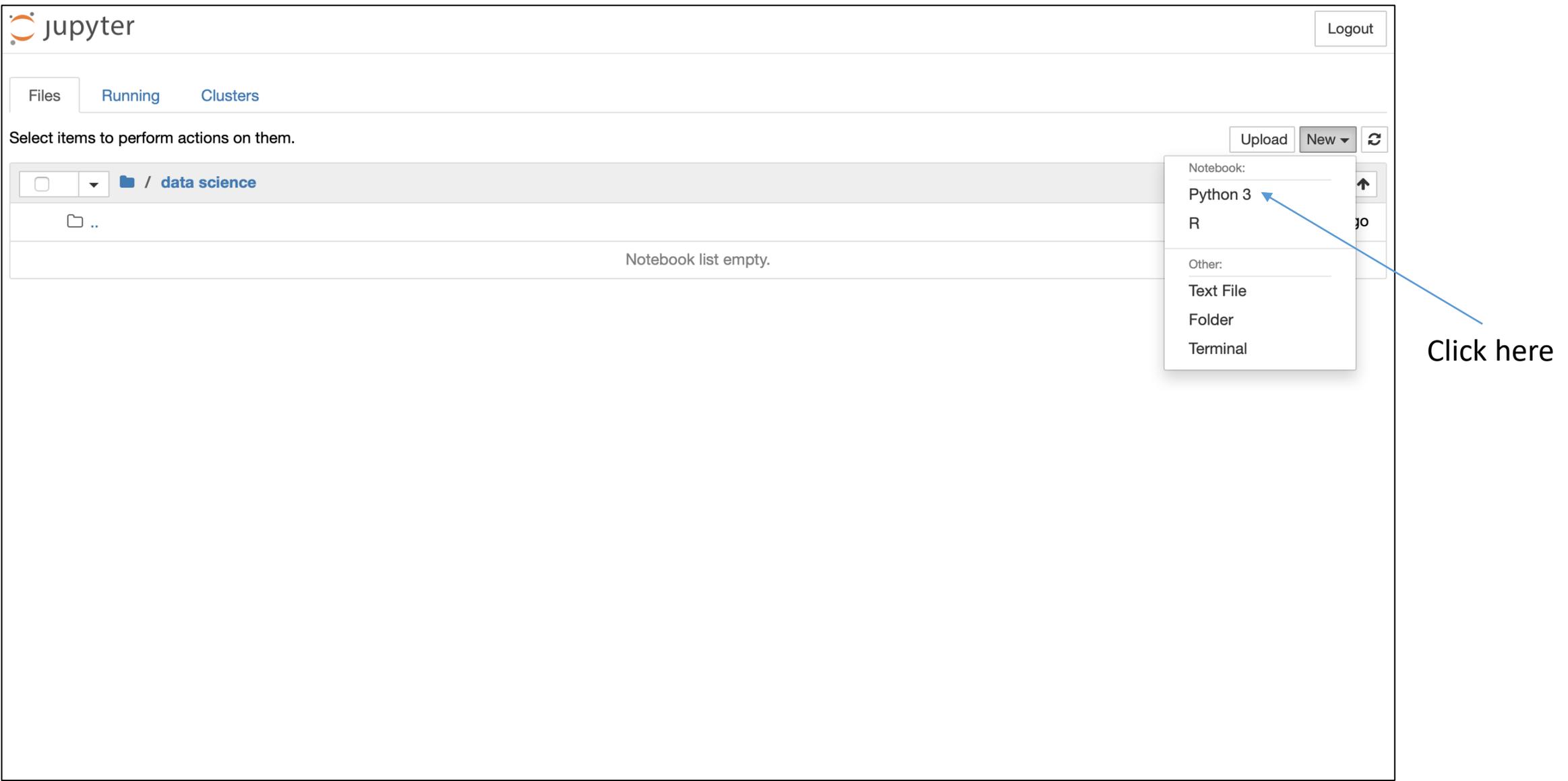
/ data science Name ↑ Last Modified ↑

seconds ago

Notebook list empty.

Click here

Start Python notebook



The image shows the JupyterLab interface. At the top left is the Jupyter logo and the word "jupyter". At the top right is a "Logout" button. Below the logo are three tabs: "Files", "Running", and "Clusters". Below the tabs is a message: "Select items to perform actions on them." To the right of this message are three buttons: "Upload", "New", and a refresh icon. Below the buttons is a breadcrumb navigation bar showing a folder icon, a dropdown arrow, and the text "/ data science". Below the breadcrumb is a folder icon and the text "..". Below this is a large empty area with the text "Notebook list empty." On the right side of the interface, a dropdown menu is open, showing the following options: "Notebook:", "Python 3", "R", "Other:", "Text File", "Folder", and "Terminal". A blue arrow points from the text "Click here" to the "Python 3" option in the dropdown menu.

jupyter Logout

Files Running Clusters

Select items to perform actions on them.

Upload New ↕ ↻

📁 / data science

📁 ..

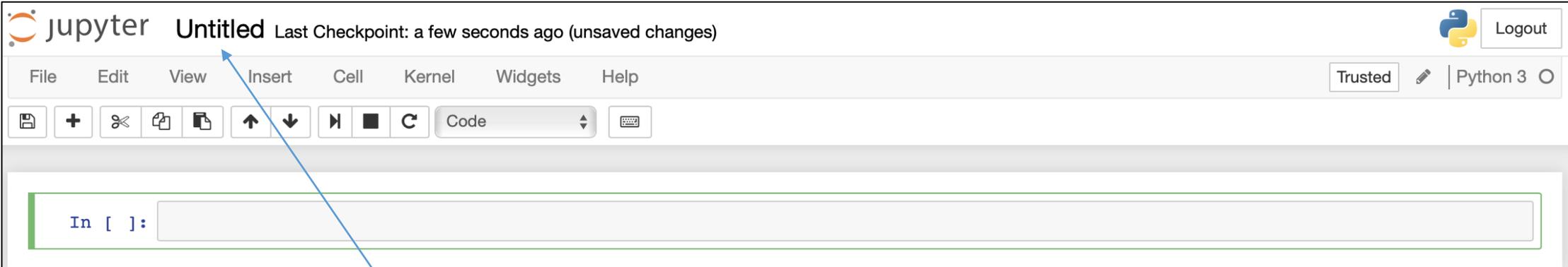
Notebook list empty.

Notebook:
Python 3
R

Other:
Text File
Folder
Terminal

Click here

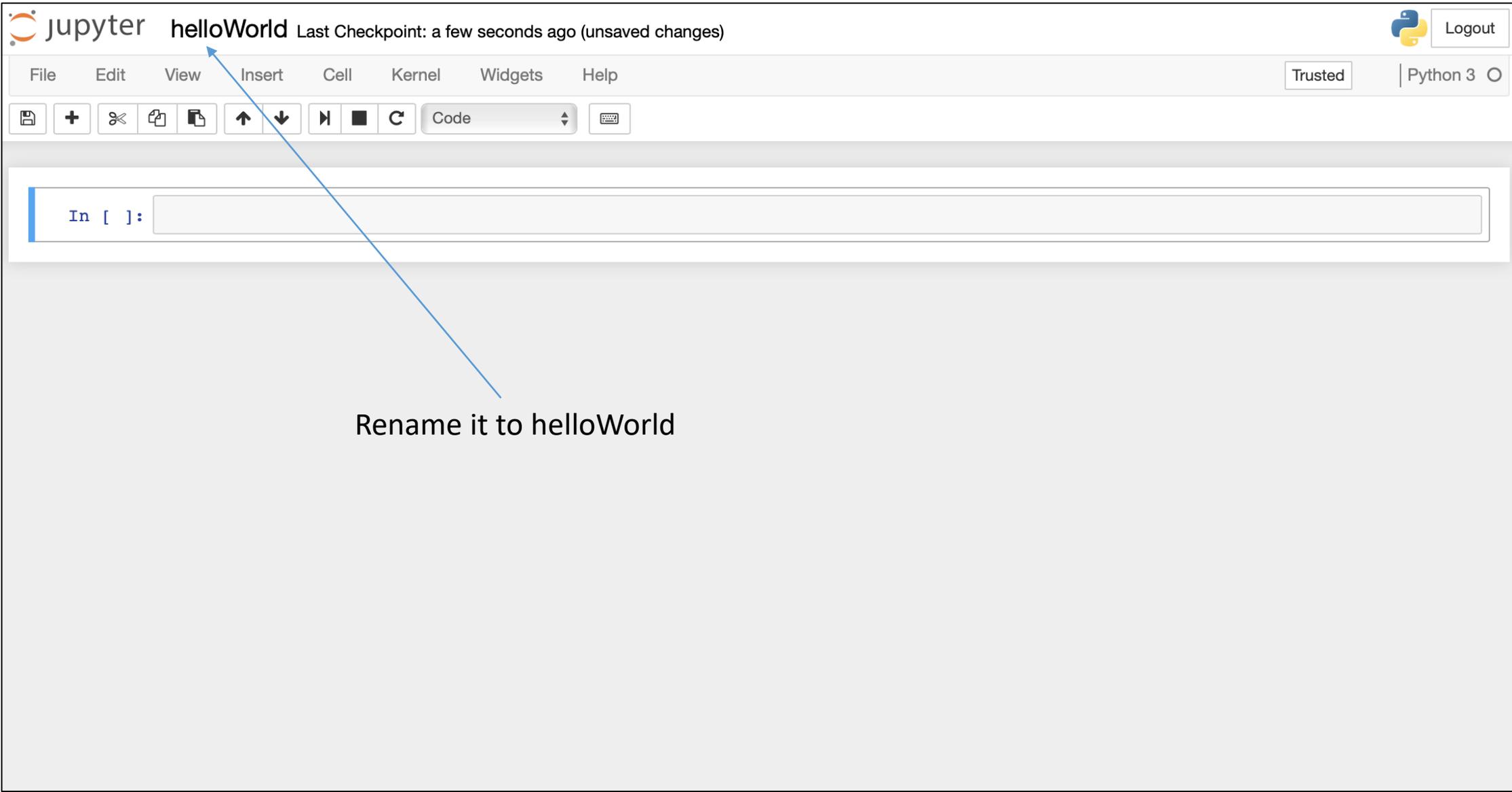
A notebook is created



The screenshot shows the Jupyter Notebook interface. At the top left, the Jupyter logo is followed by the text "jupyter" and "Untitled". To the right of "Untitled" is the text "Last Checkpoint: a few seconds ago (unsaved changes)". In the top right corner, there is a Python logo and a "Logout" button. Below this is a menu bar with "File", "Edit", "View", "Insert", "Cell", "Kernel", "Widgets", and "Help". To the right of the menu bar are "Trusted" and "Python 3" with a dropdown arrow. Below the menu bar is a toolbar with icons for save, add, undo, redo, copy, paste, up, down, run, stop, and refresh. A dropdown menu is set to "Code" with a keyboard icon. Below the toolbar is a code cell with the text "In []:" followed by a large empty input field.

Click here to change file name

Rename the file



The screenshot shows the JupyterLab interface. At the top left, the Jupyter logo is followed by the text "jupyter helloWorld" and "Last Checkpoint: a few seconds ago (unsaved changes)". On the top right, there is a Python logo and a "Logout" button. Below this is a menu bar with "File", "Edit", "View", "Insert", "Cell", "Kernel", "Widgets", and "Help". To the right of the menu bar are "Trusted" and "Python 3" indicators. Below the menu bar is a toolbar with icons for saving, adding, deleting, copying, pasting, undo, redo, and a dropdown menu currently set to "Code". Below the toolbar is a code cell with the prompt "In []:" followed by an empty input field. A blue arrow points from the text "Rename it to helloWorld" at the bottom of the image to the "View" menu item in the JupyterLab interface.

Logout

Trusted | Python 3

File Edit View Insert Cell Kernel Widgets Help

Code

In []:

Rename it to helloWorld

Select items to perform actions on them.

Upload New ↕ ↻

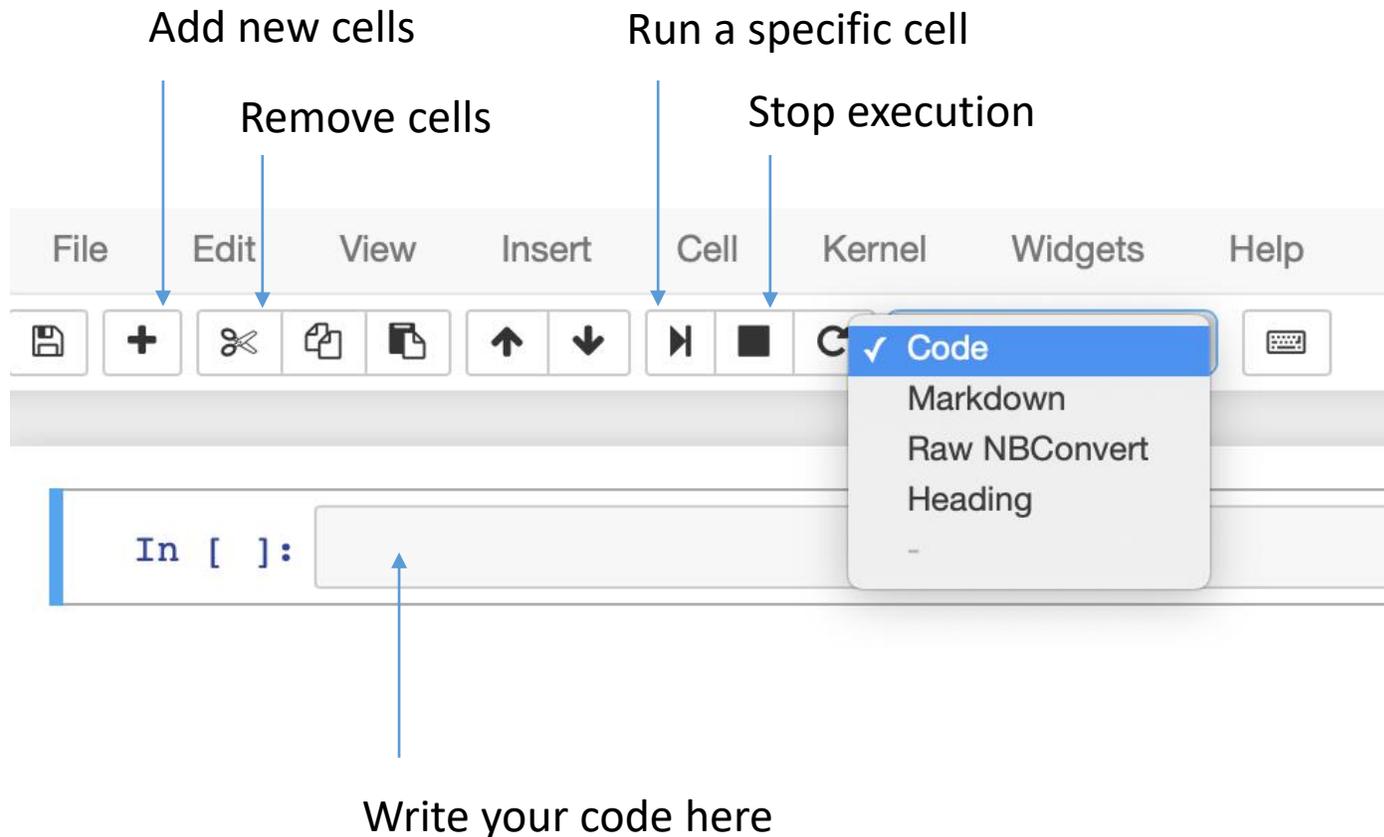
/ data science

Name ↑ Last Modified ↑

<input type="checkbox"/>	..	seconds ago
<input type="checkbox"/>	 helloWorld.ipynb	Running seconds ago

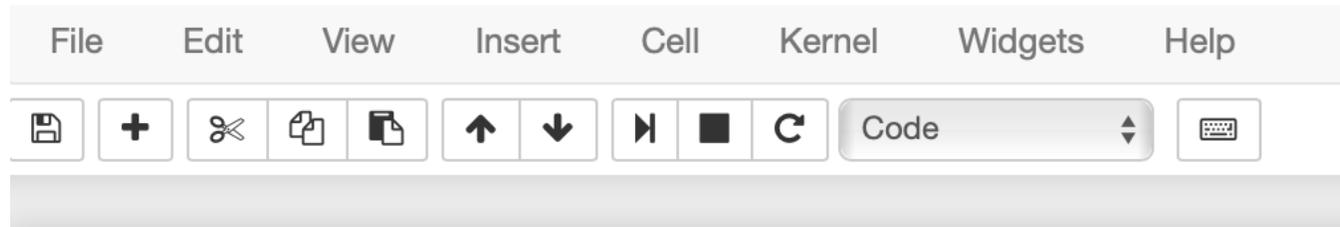
Code cells

- The code in Jupyter is written in code cells. Each cell represents a piece of code that accomplishes a task.



Code cells

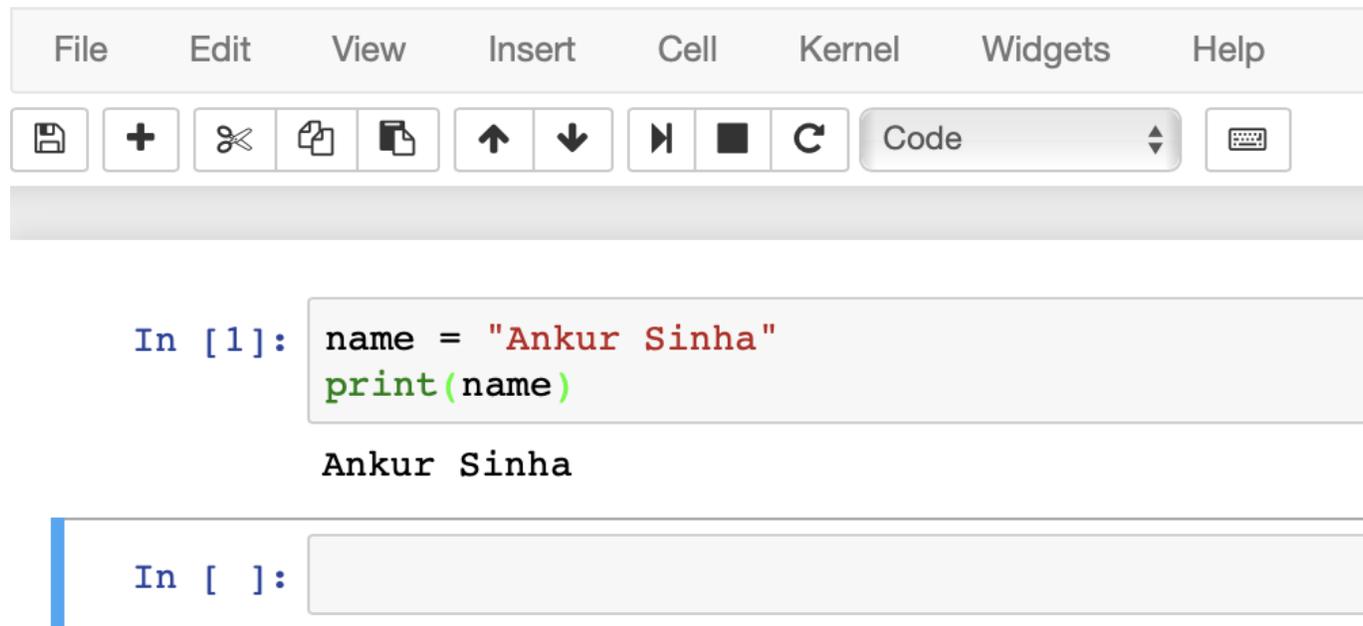
- The shortcut to execute the cells is Shift+Enter



```
In [1]: name = "Ankur Sinha"  
print(name)
```

Code cells

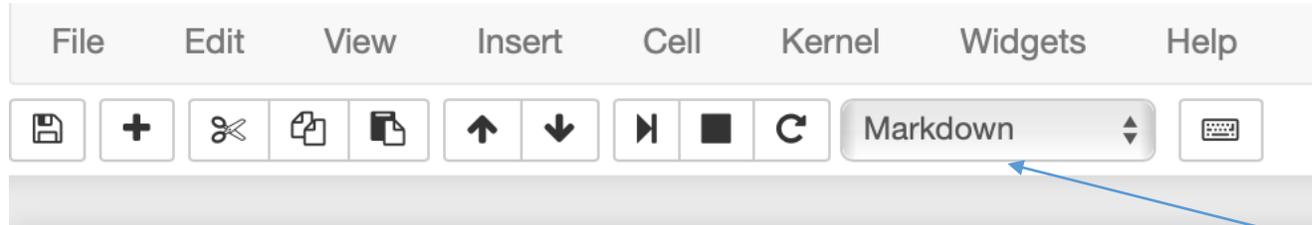
- The shortcut to execute the cells is Shift+Enter



The screenshot displays the top portion of a Jupyter Notebook interface. At the top is a menu bar with the following items: File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. Below the menu bar is a toolbar containing icons for file operations (save, add, delete, copy, paste), navigation (up, down), execution (run, stop, refresh), a dropdown menu currently set to 'Code', and a keyboard icon. Below the toolbar, there are two code cells. The first cell, labeled 'In [1]:', contains the Python code `name = "Ankur Sinha"` and `print(name)`. The output of this cell is 'Ankur Sinha'. The second cell, labeled 'In []:', is currently empty and has a blue vertical bar on its left side.

Markdown cells

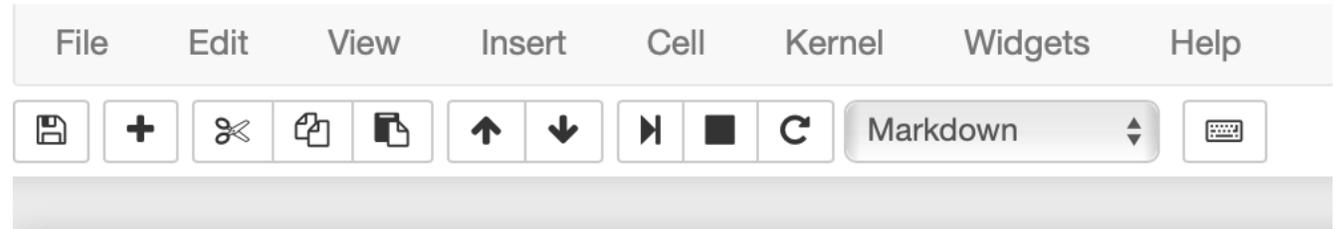
- Text or comments can be added in your code using markdown cells. Jupyter allows text to be written as headings, equations, lists etc.



Change it to Markdown

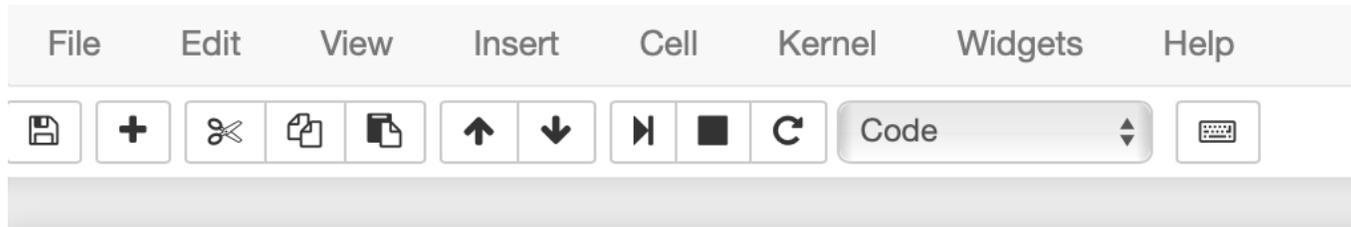
Single, double or multiple # denotes a heading

Markdown cells



```
## Heading for my code
```

Press Shift+Enter to execute



Heading for my code

```
In [ ]:
```



Post execution, it looks like this.

Raw NBConvert

- This is of use only when you are converting your Python code to other forms like HTML or Latex. When you make this conversion, the Raw NBConvert cells are interpreted in a specific way based on the output.
- Raw NBConvert is ignored by Jupyter while you are writing your Python code in cells.

