Introduction to Pluto

Week 01

Vivaldo Mendes
Instituto Universitário de Lisboa (ISCTE-IUL)
vivaldo.mendes@iscte-iul.pt

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Tasks in week 1

- Everything in this course will be done using a ***computer***
  - ‣ Theoretical questions
  - ‣ Practical exercises
  - ‣ Mock tests/exams
  - ‣ Formal evaluation moments: tests/exams

Tasks in week 1

- We have to install two programs on your computer:
  - ‣ ***Julia*** programming language
  - ‣ ***Pluto.jl*** (one package developed for Julia)
- Week 1 deals only with the introduction to ***Pluto notebooks***
- No macroeconomics will be taught during this week
- Do not worry:
  - ‣ this is a macroeconomics course
  - ‣ not a computational one
  - ‣ you will learn macroeconomics in the following weeks

1. Installing Julia

The following slides are a short version of more detailed information available **here**

Installing Julia on Windows

- Download the correct executable for the Windows OS, by clicking here: ***Windows installer Julia v1.10.10***
- Save the downloaded executable somewhere on your computer, or keep it in the ***Downloads*** folder.
- Click on top of the executable to install Julia
- Allow the installation to be done in the default directory

- Click on: ☑ Add Julia to Path (if you forgot to click, start again)
- Click on: Finish
- Installation completed

Installing Julia on a Mac

1. Choose the correct Apple executable according to your processor:
   - *Intel/Rosetta* or *Apple Silicon*
2. If your Mac has an Intel or Rosetta processor, you can download the correct executable from here: ***macOS x86 (Intel or Rosetta) Julia v1.10.10***
3. If your Mac has an Apple Silicon processor, you can download the correct executable from here: ***macOS (Apple Silicon) Julia v1.10.10***
4. Check the **Downloads** folder and drag the executable to the **Applications** folder.
5. Installation completed.

Installing Julia on Linux

See detailed information available **here**

2. Running Julia

Starting Julia

- To start Julia, click on its icon on the desktop:


Julia window

- The following black window will appear on your monitor:
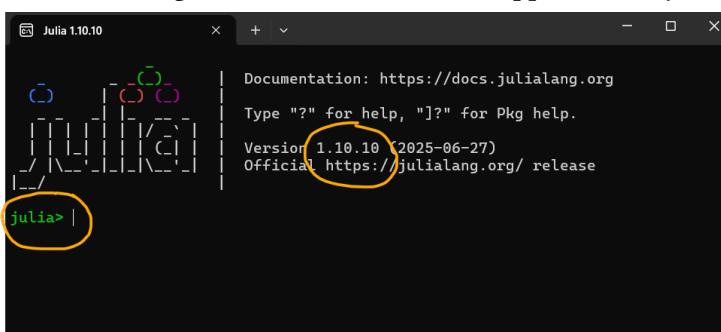
- Julia runs in two modes: ***Julia mode*** and ***Pkg mode***

- what are these modes for? Next slides

Julia mode

- When we start Julia, by default it runs in *Julia mode*.

- In the image below, julia> indicates that we are in this mode:
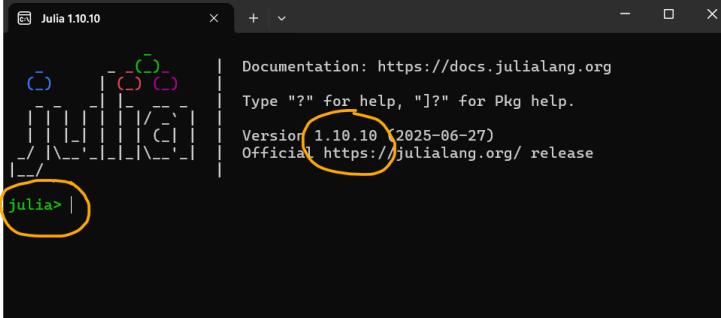

- In Julia mode we do computation:

  ‣ we write code
  ‣ and the computer executes it and displays the output.


Julia mode: an example

- If you type 4+4 followed by ↵ Enter after the prompt julia>
- You   will   get   8   as   the   output.

Julia mode: an example

- If you type 4+4 followed by ↵ Enter after the prompt julia>
- You will get 8 as the output.

- Julia is installed and running well.

- Julia window is ugly and not very handy

- That is the reason why we will use Pluto notebooks instead.

Pkg mode

- To move from Julia mode to Pkg mode, in mode julia> :
  - ‣ type the following character on your keyboard:]
- Different keyboards have different ways of typing]
  - ‣ click simultaneously on Alt Gr and 9 (usually do it on Windows)
  - ‣ click simultaneously on Option and 9 (usually do it on Mac)
  - ‣ click simultaneously on Alt Gr and 9 (usually do it on Linux)
- In ***Pkg mode*** we create projects and install packages

Pkg mode

- Now, (@v1.11) pkg> in the black window indicates that we are in Pkg mode:
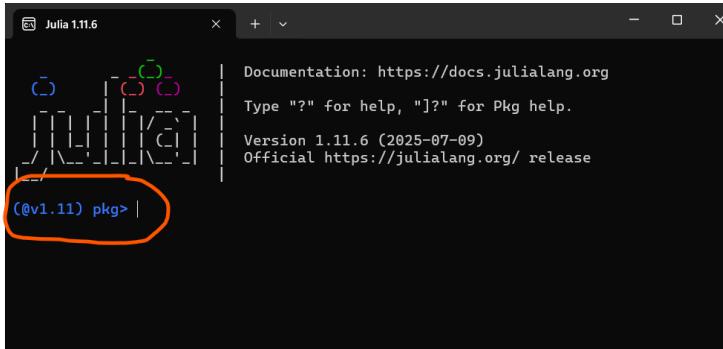
- To go back to mode julia>, click on the following keyboard's key:

  - ‣ ⇐backspace (on Windows),
  - ‣ delete (on a Mac)
  - ‣ ⇐backspace (on Linux)

3. Installing Pluto

Installing Pluto

- Start Julia, if it is not already running
- Go to Pkg mode: (@v1.11) pkg>
- Once in Pkg mode, type:
  - ‣ add Pluto followed by clicking on ⏎ Enter
- Let the computer do the installation: needs no intervention by you
- When the installation is finished, to go back to mode julia> click on:
  - ‣ ⇐backspace (on Windows),
  - ‣ delete (on a Mac)
  - ‣ ⇐backspace (on Linux)

- That is it: Pluto is installed on your computer.

4. Updating your installation

Updating Pluto

> ⚠ Please do not update Pluto
>
> - The instructions below **should not be used in our course** unless the teaching team explicitly tells you to do so.
> - In Julia 1.10.10, the notebooks will load faster if we do not update our installation.

Updating Pluto

For general users
- From time to time, new versions of Pluto come out
- We recommend you to update your Pluto installation every two weeks
- It is very simple and takes around 1 minute

Updating Pluto

- Start Julia and go to mode: (@v1.11) pkg>
- Once in Pkg mode, type:
  ‣ update followed by clicking on ⮐ Enter
- Let the computer update your system:
  ‣ You do not need to intervene during this process
- When the updating is finished, go back to mode julia> by clicking on:
  ‣ ⇐backspace (on Windows)
  ‣ delete (on Mac)
  ‣ ⇐backspace (on Linux)
- It is done.

5. Using Pluto
See more detailed information available **here**

Starting Pluto
- Start Julia and keep it in mode julia>
- Type in its black window: import Pluto ; Pluto.run()
- Click on ⮐ Enter and Julia will open Pluto in your browser

- You will see a window like this:
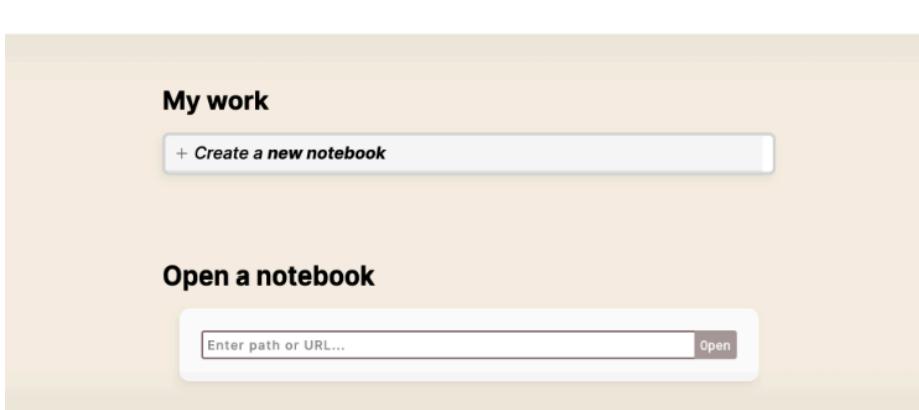
Opening a Pluto notebook

- A Pluto notebook is an electronic file, like Excel or Power Point files.
- The extensions are different:
  - **.jl** (Pluto file), **.xls** (Excel file), **.ppt** (Power Point file)

> ⚠ Pluto notebooks are loaded differently
>
> - To open a Pluto notebook, the double-click on top of the file ***does not work***
> - Neither do the usual drag-and-drop in Mac
>   - Even if the drag-and-drop seems to work, do not do it …
>   - …**you will loose your work**
> - You have to tell Pluto where your notebook **is located**.

Opening a Pluto notebook

To tell Pluto where your notebook is located, you have to:

- Put the Pluto notebook in a folder on your computer.
- So your notebook has an address (**Path**) on your computer
- You have to copy that address and paste it into Pluto's Open a notebook window
- How to get the address (**Path**) of your notebook?
- See next slide

Copy your notebook's path: Windows 11

- Put the cursor on top of your file
- Mouse right-click on your file
- You will get a pop-up menu with a lot of options
- Choose: Copy as path
- Go to the Pluto window you have opened before
- Paste the copied path into the Open a notebook box in the Pluto window
-

See next figure (click on any key)

Copy your notebook's path: Windows 11

welcome to **Pluto**.jl

1. Paste the Path of your notebook into this box

2. Click on Open

My work

+ Create a new notebook

Open a notebook

Enter path or URL... | Open
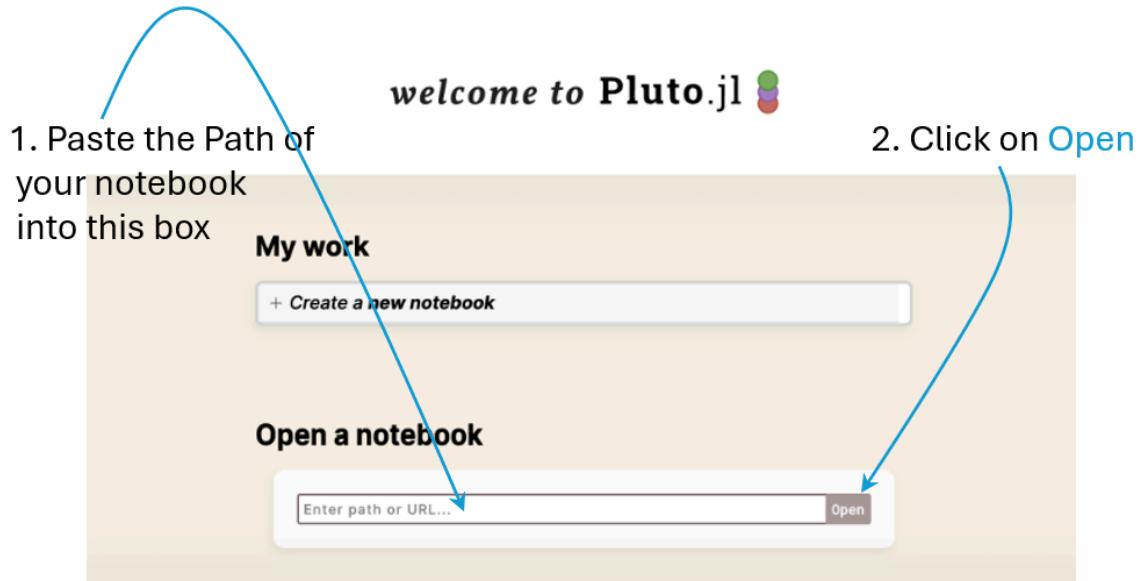
Copy your notebook's path: Windows 10

- Put the cursor on top of your file
- Mouse right-click on your file
- Choose: Properties
- Copy the path in Location
- The Path will look like this: G:\Macro\Week01
- Paste the copied path into the Open a notebook box in the Pluto window
-

See next figure (click on any key)

Copy your notebook's path: Windows 10

1. Paste the Path of
   your notebook
   into this box

4. Click on Open

welcome to Pluto.jl

My work

+ Create a new notebook

Open a notebook

Enter path or URL...   Open

2. End the Path
by adding a backslash: \

3. A list of files will appear here.
Click on the file you want to run
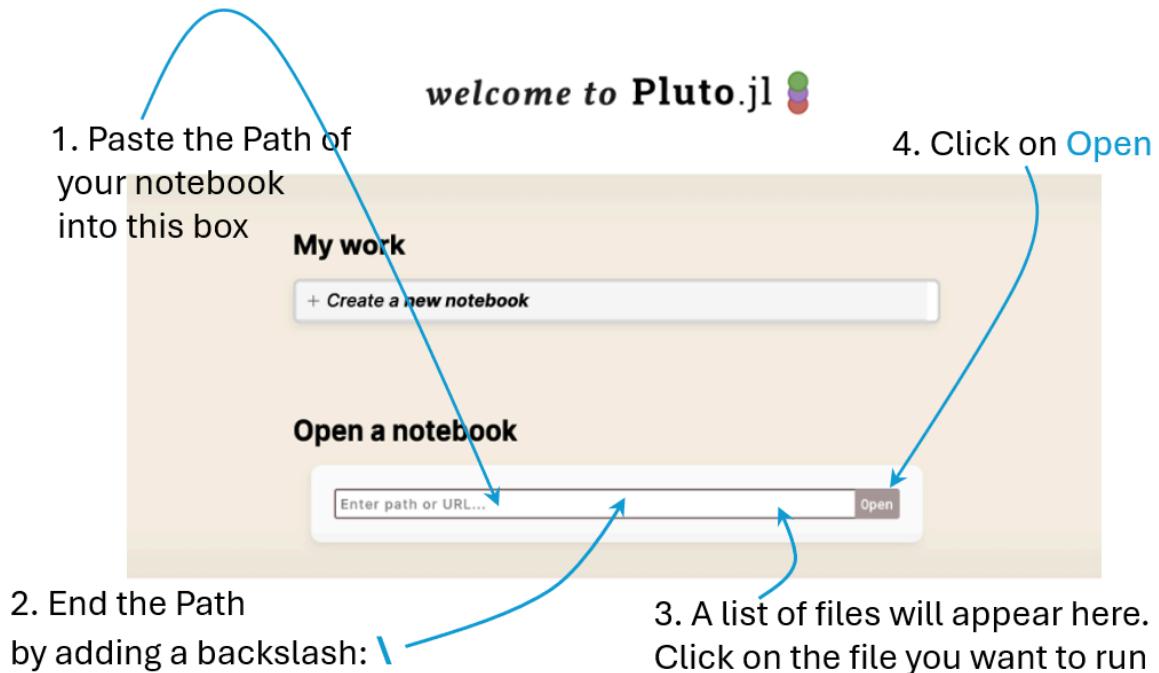
Copy your notebook's path: Mac

- Put the cursor on top of your file
- Mouse right-click on your file
- Choose: Get info
- Copy the path in Where
- The Path will looke like this: G:/Macro/Week01
- Paste the copied path into the Open a notebook box in the Pluto window
-

See next figure (click on any key)

Copy your notebook's path: Mac

1. Paste the Path of your notebook into this box

welcome to **Pluto**.jl

4. Click on Open

My work

+ *Create a new notebook*

Open a notebook

Enter path or URL...   Open

2. End the Path by adding a slash: **/**

3. A list of files will appear here. Click on the file you want to run
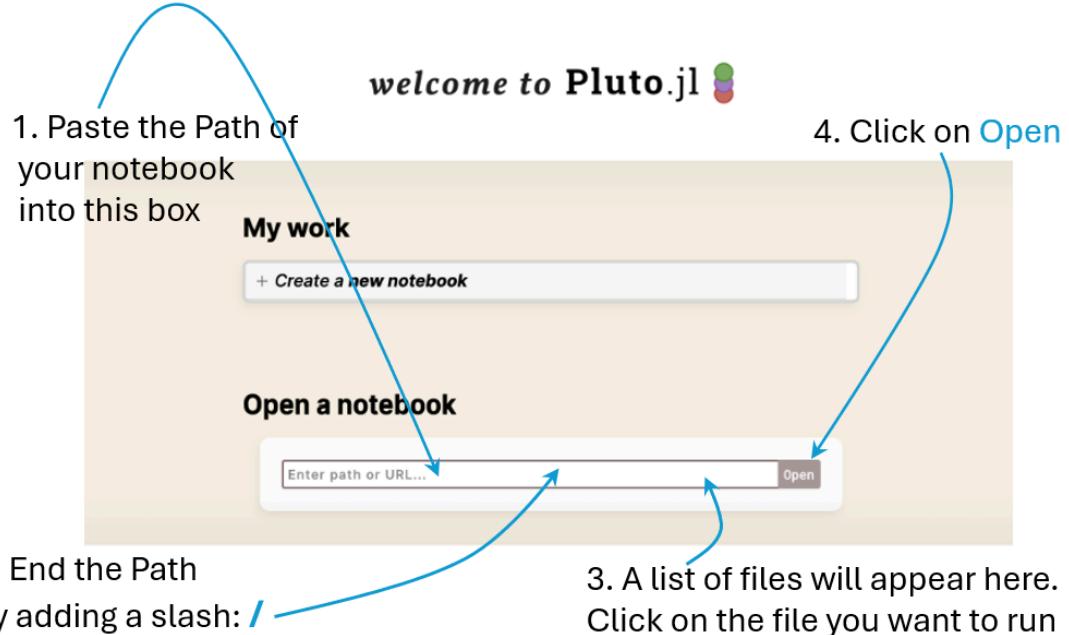
Run the notebook

- By now, you will see the notebook visible on your browser
- To run all cells, click on Run notebook code that you see in next image:

Pluto.jl   rsion\Welcome_Pluto_Week01.jl   Run notebook code

⚠ Scripts and styles not rendered in *Safe preview*

iscte BUSINESS SCHOOL

Week 1 - Welcome to Pluto Notebooks

Introduction to Pluto

Macroeconomics, ISCTE-IUL

End

Bibliography