

# FINC-672 – WORKSHOP IN FINANCE: EMPIRICAL RESEARCH

SETTING UP JULIA AND PLUTO

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# GOALS

- ☐ Install Julia
- ☐ Install Pluto
- ☐ Opening and saving Pluto notebooks

# STEP 1: INSTALL JULIA

- Go to <https://julialang.org/downloads> and download the current stable release, Julia 1.6.2, using the correct version for your operating system (Linux x86, Mac, Windows, etc).

## Current stable release: v1.6.2 (July 14, 2021)

Checksums for this release are available in both [MD5](#) and [SHA256](#) formats.

<b>Windows</b> <a href="#">[help]</a>	64-bit (installer), 64-bit (portable)	32-bit (installer), 32-bit (portable)	
<b>macOS</b> <a href="#">[help]</a>	64-bit		
<b>Generic Linux on x86</b> <a href="#">[help]</a>	64-bit (GPG), 64-bit (musl) <sup>[1]</sup> (GPG)	32-bit (GPG)	
<b>Generic Linux on ARM</b> <a href="#">[help]</a>	64-bit (AArch64) (GPG)	32-bit (ARMv7-a hard float) (GPG)	
<b>Generic Linux on PowerPC</b> <a href="#">[help]</a>	64-bit (little endian) (GPG)		
<b>Generic FreeBSD on x86</b> <a href="#">[help]</a>	64-bit (GPG)		
<b>Source</b>	Tarball (GPG)	Tarball with dependencies (GPG)	GitHub

## STEP 2: RUN JULIA

- After installing, **make sure that you can run Julia**. On some systems, this means searching for the "Julia 1.6.0" program installed on your computer; in others, it means running the command `julia` in a terminal. Make sure that you can execute `1 + 1`:

A screenshot of a terminal window titled "fons@woof: ~". The prompt is "fons@woof:~\$". The user has entered "julia", which has triggered the Julia REPL startup sequence. This includes a colorful ASCII art logo of a dog's head (blue, red, green, and pink) and a series of vertical bars forming a stylized face. To the right of the logo, the following text is displayed:  
Documentation: <https://docs.julialang.org>  
Type "?" for help, "]"?" for Pkg help.  
Version 1.5.0-rc1.0 (2020-06-26)  
Official <https://julialang.org/> release  
  
The prompt changes to "julia>". The user enters "1+1", and the output "2" is shown. Then, the user enters "# yay!", and the prompt returns to "julia>".

→ Make sure that you are able to launch Julia and calculate 1+1 before proceeding!

## STEP 3: INSTALL PLUTO

- Next we will install the [Pluto notebook](#) that we will be using during the course. Pluto is a *Julia programming environment* designed for interactivity and quick experiments.
- Open the **Julia REPL**. This is the command-line interface to Julia, similar to the previous screenshot.
- Here you type *Julia commands*, and when you press ENTER, it runs, and you see the result.

## STEP 3: INSTALL PLUTO (CONT'D)

- To install Pluto, we want to run a *package manager command*. To switch from *Julia* mode to *Pkg* mode, type `]` (closing square bracket) at the `julia>` prompt.
- The line turns blue and the prompt changes to `pkg>`, telling you that you are now in *package manager mode*.
  - This mode allows you to do operations on **packages** (also called libraries).

```
julia> ]  
(@v1.6) pkg>
```

## STEP 3: INSTALL PLUTO (CONT'D)

- To install Pluto, run the following (case sensitive) command to *add* (install) the package to your system by downloading it from the internet.
- You should only need to do this **once** for each installation of Julia.
- This might take a couple of minutes.

```
(@v1.6) pkg> add Pluto
```

### STEP 3: INSTALL PLUTO (CONT'D)

```
Fons@woof:~$ julia
```

```
Documentation: https://docs.julia-lang.org  
Type "?" for help, "]"? for Pkg help.  
Version 1.5.0-rc1.0 (2020-06-26)  
Official https://julia-lang.org/ release
```

```
julia>
```

```
(@v1.5) pkg> add Pluto  
Updating registry at '~/.julia/registries/General'  
##### 100.0%  
Resolving package versions...  
Installed Pluto - v0.11.9  
Updating '~/asdfasfd/Project.toml'  
[c3e4b0f8] + Pluto v0.11.9  
Updating '~/asdfasfd/Manifest.toml'  
[cd3eb016] + HTTP v0.8.17  
[83e8ac13] + IniFile v0.5.0  
[739be429] + MbedTLS v1.0.2  
[c8ffd9c3] + MbedTLS_jll v2.16.6+1  
[99f44e22] + MsgPack v1.1.0  
[c3e4b0f8] + Pluto v0.11.9  
[2a0f44e3] + Base64  
[ade2ca70] + Dates  
[8ba89e20] + Distributed  
[b77e0a4c] + InteractiveUtils  
[76f85450] + LibGit2  
[8f399da3] + Libdl  
[56d4b016] + Logging
```

→ You can now close the terminal.



## STEP 4: OPEN PLUTO IN BROWSER

- Use a modern browser: Mozilla, Firefox or Google Chrome
- We need a browser to view Pluto notebooks. Firefox and Chrome work best.
- That's it. We have installed Julia and Pluto and are now ready to launch an interactive Pluto notebook.

## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

- ◇ **Step 1:** Start the Julia REPL, like you did during the setup. In the REPL, type:

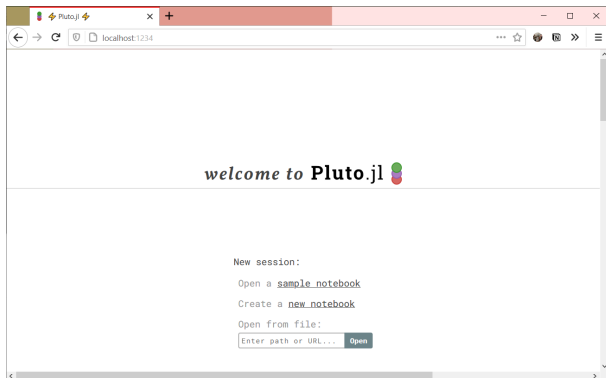
```
julia> using Pluto  
julia> Pluto.run()
```

## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

[illegible]

## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

→ The terminal tells us to go to `http://localhost:1234/` (or a similar URL). Let's open Firefox or Chrome and type that into the address bar.



## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

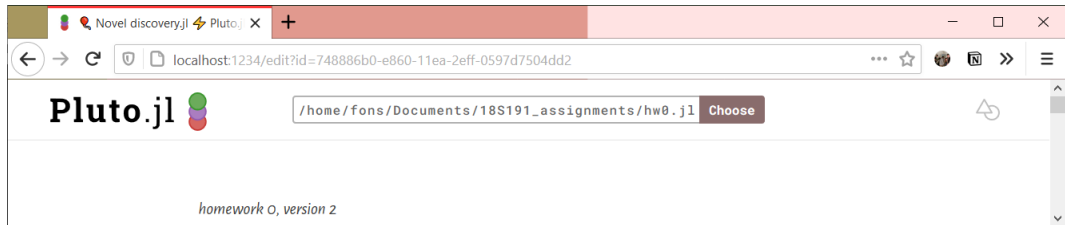
- If you're curious about what a *Pluto notebook* looks like, have a look at the **sample notebooks**. Samples 1, 2 and 6 may be useful for learning some basics of Julia programming.
- If nothing happens in the browser the first time, close Julia and try again.

## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

◇ **Step 2:** Opening an existing notebook file.

- This is the main menu - here you can create new notebooks, or open existing ones.
- Our homework assignments will always be based on a **template notebook**, available on Canvas.
- To start from a template notebook from Canvas, download it and enter the **full path** to the template into the blue box in the main menu.
- Then press ENTER.
- *More on finding full paths in step 3.*

## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)



## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

### ◇ **Step 3:** Saving a notebook

- We first need a folder to save our homework in.
- Open your file explorer and create one.
- Next, we need to know the **absolute path** of that folder.
- Here's how you do that in [▶ Windows](#), [▶ MacOS](#).



## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

- For example, you might have in Windows

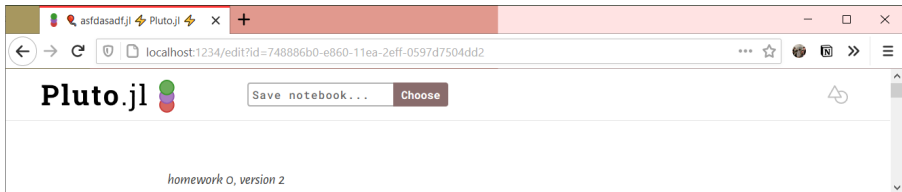
```
C:\Users\Yourusername\Documents\18S191_assignments\
```

- Or in MacOS

```
/Users/fonsi/Documents/18S191_assignments/
```

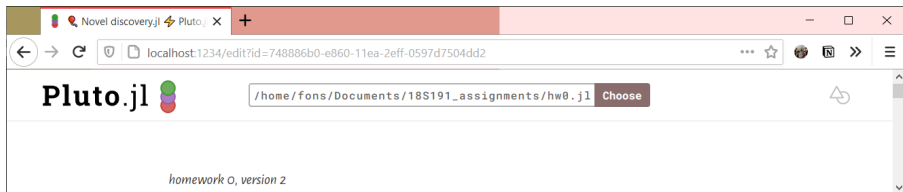
## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

- Now that we know the absolute path, go back to your Pluto notebook, and at the top of the page, click on **"Save notebook..."**.



## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

- This is where you type the **new path+filename** for your notebook:
- For example, you might have:



- Click *Choose*.

## SECOND TIME: RUNNING PLUTO & OPENING A NOTEBOOK (CONT'D)

### ◇ **Step 4:** Sharing a notebook

- After working on your notebook (your code is autosaved when you run it), you will find your notebook file in the folder we created in Step 3.
- This the file that you can share with others, or submit as your homework assignment to Canvas.

## WRAP-UP

- ✓ Install Julia
- ✓ Install Pluto
- ✓ Opening and saving Pluto notebooks