
Welcome to Psyche Sampling Lander Simulator

We're so glad to have you join the team! This guide is meant to provide team specific information to help you get off to a great and productive start.

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WHO WE ARE

Our Mission

Our goal is to provide a realistic, engaging exploration experience that lets you discover all the exciting features of the Psyche Asteroid!

If you have any further Questions don't be afraid to ask! It's better to be embarrassed now about not knowing something than pretending you know something you don't.

Bad news revealed early is Good news!

PRODUCT & PROCESS

Project Process

We have developed a Psyche Lander Simulation system that allows users to land a spacecraft on the Asteroids surface. The goal is for the system to accurately simulate the Psyche environment, including atmospheric conditions, gravity, and terrain, providing a realistic landing experience. Users can control the spacecraft in real time. The project includes visual feedback with detailed (currently 2D) graphics and real-time telemetry data to monitor crucial parameters like altitude, speed, and fuel. This system serves as an educational tool and a research aid for space agencies and enthusiasts interested in Space exploration.

Frameworks and Applications We Used:

React Framework

- Find installation instructions on Page 19

IDE: Visual Code Community (2022)

- Find instructions on page 5

GitHub Repository

- Get Onboarded with Cassie
- Reach out to Prasad on Slack to get access to the Repository
- Instructions can be found on page 8 of this document

.NET

- Find Link Here: <https://dotnet.microsoft.com/en-us/download>

RESOURCES

Glossary of terms

Onboarding: Procedures to integrate and familiarize you with the way things should be done in this Project.

“MASS.client” This is stuff for the frontend.

“MASS.server” which is stuff for the backend

(Optional:) Learn The Coding Language

Not everything is used in the project, however it's a good way to get familiar with some of the material if you've never used React, Three.js or C++.

All The JavaScript You needs to Know For React:

https://youtu.be/m55PTVUrlnA?si=VMzvj7hF_gR5F8dq

All The JavaScript You Need To Know For React (More JS to Know)

<https://youtu.be/ACaT1Gfhe6I?si=Cz1Q5HSxwRBQTSIB>

React Tutorial For Beginners:

<https://youtu.be/hn80mWvP-9g?si=v7rzpOGWVZ126ULo>

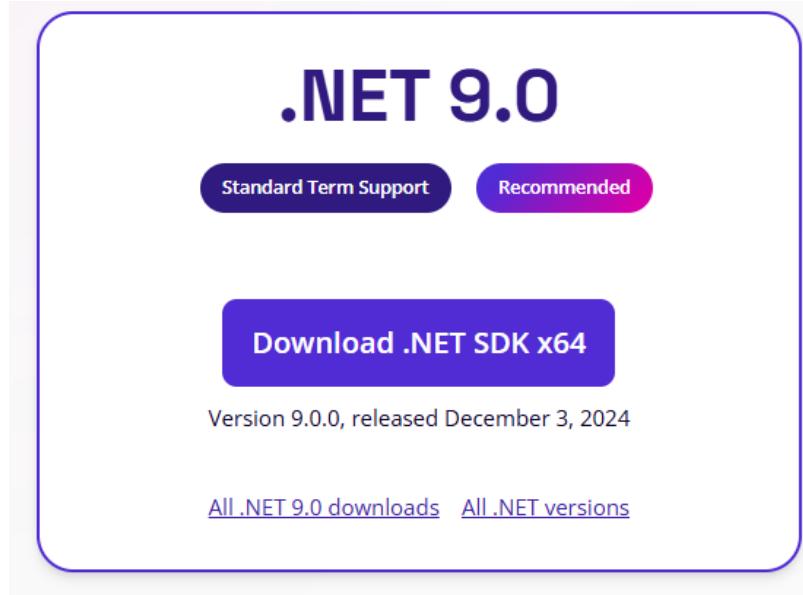
Three.js Explained in 100 seconds with example (2023)

<https://youtu.be/fNFkDc7WawQ?si=OR0R9RVrR8YKkl1z>

Step-by-step Instructions:

To Install .Net

Step 1: go To this link <https://dotnet.microsoft.com/en-us/download> and find this download button

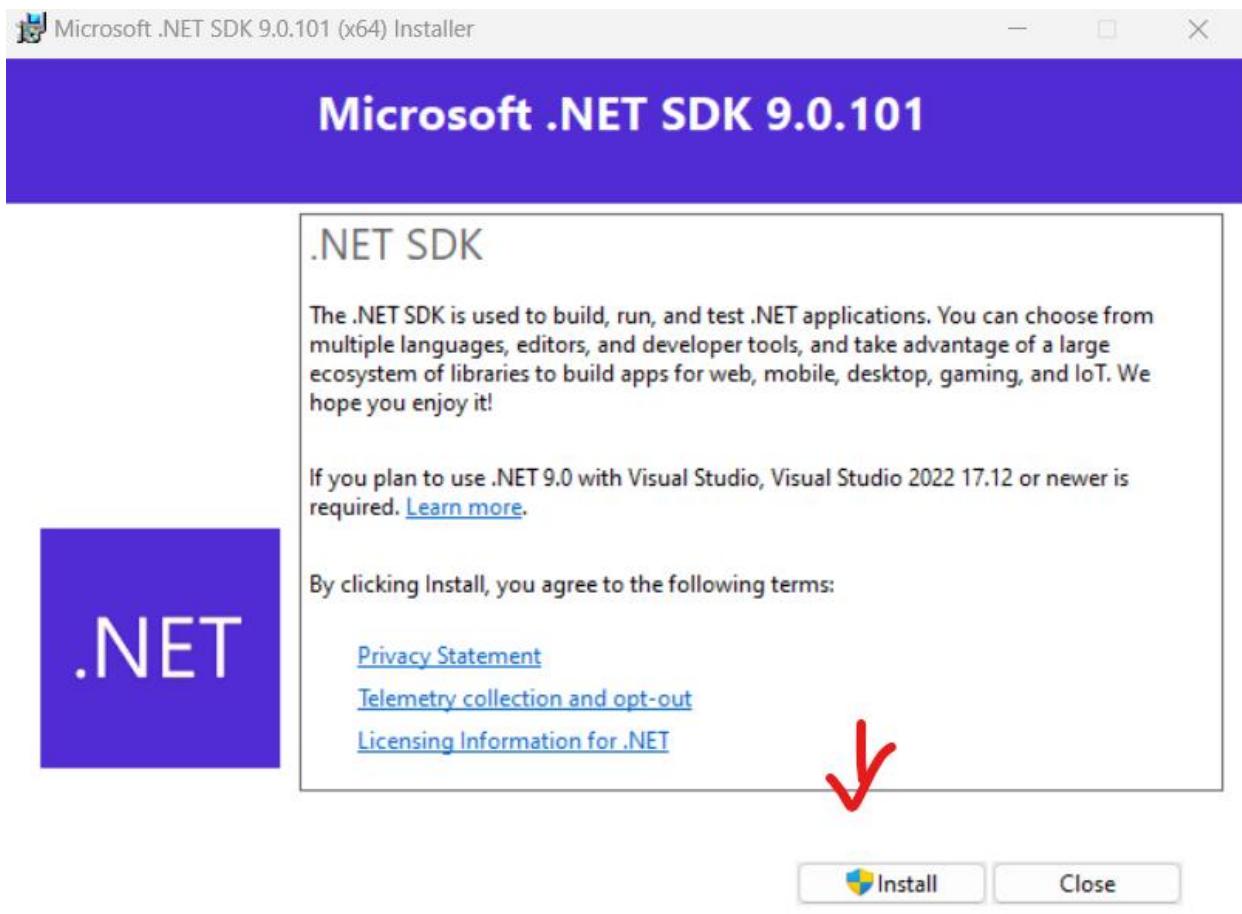


Step 2: go to your downloads folder on your computer and find something akin to:

“Dotnet-sdk-9.0.101-win-x64”

 dotnet-sdk-9.0.101-win-x64	12/8/2024 12:59 PM	Application	218,535 KB
--	--------------------	-------------	------------

it will open something like this, click “install”



[I couldn't take a screenshot of this part, but a Popup asked: “Do you want to allow this app to make changes to your device” Click “Yes” and it should be installed.]

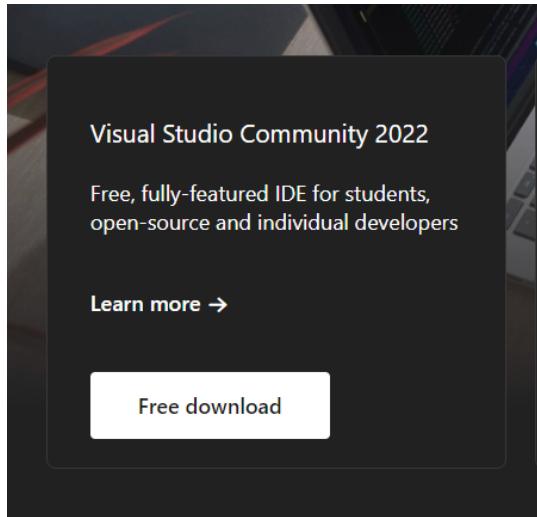
Install IDE and Cloning the repository:

If you already have the IDE installed but need help to clone the repository, go to step 7.

Step 1: Click on this link: <https://visualstudio.microsoft.com/vs/community/>

Step 2: Download

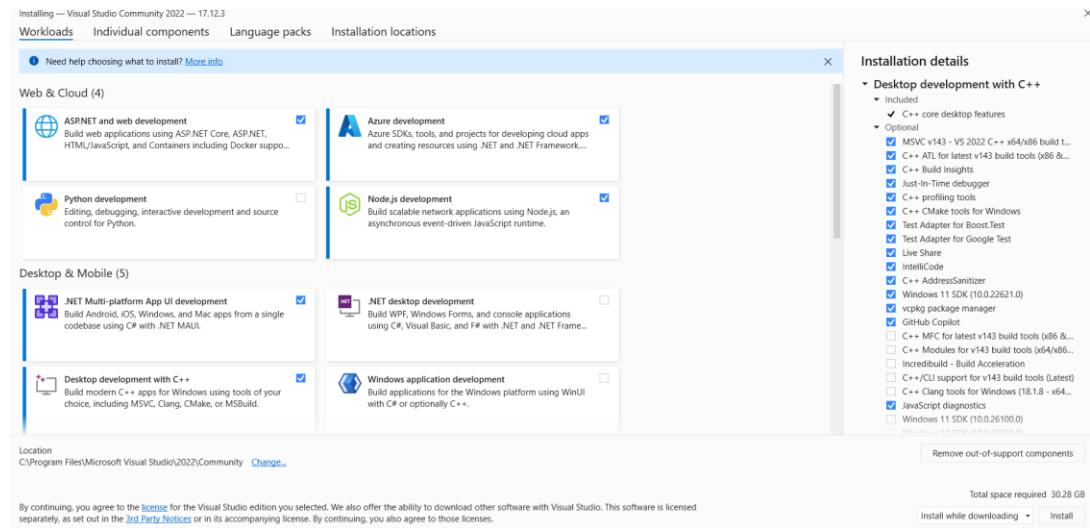
Find the “Free Download” button. It’s at the bottom of the page.



Step 3: Accept the Download and when done Open the IDE

Step 4: Extensions

When it installs it's going to open the WorkLoads tap and ask if you want anything added in.



I personally accepted these for myself, feel free to do research on if you need the other development tools, however for this project at this time you just need the following workload extensions:

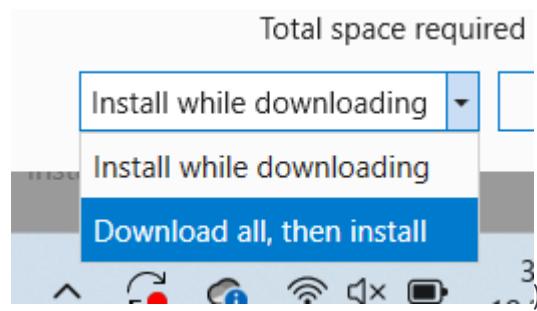
- ASP.NET and Web Development
- Azure Development
- Node.js development
- .Net Multi Platform APP UI development

Step 5: Installation

At the bottom Right corner it will give you two buttons. One is a dropdown “Install while Downloading” and the other the actual “Install” button.

I used the dropdown and choose “Download All, then install”

(Close up image below:

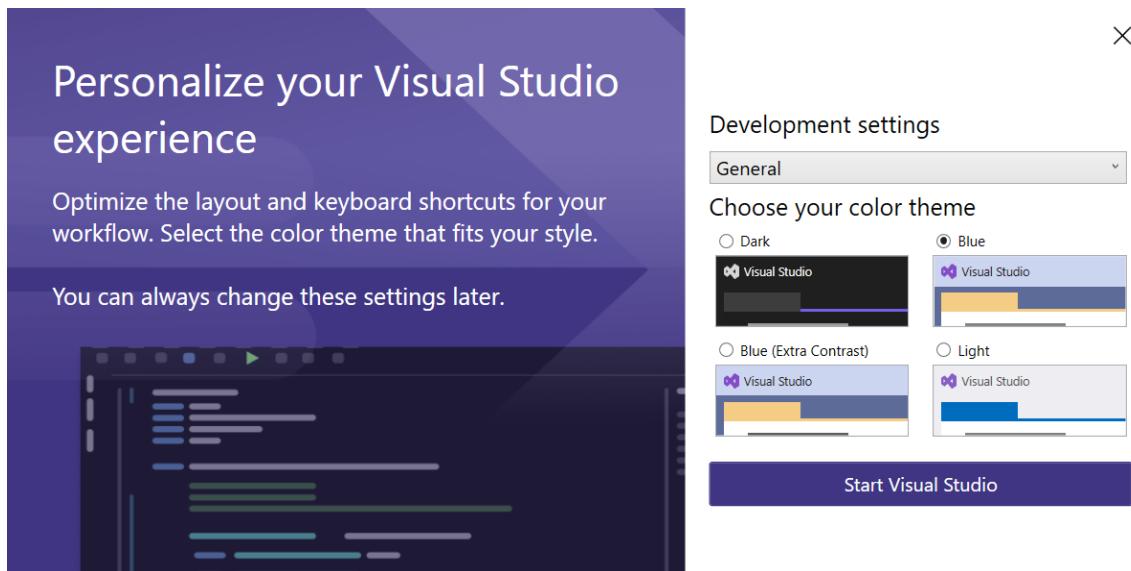


Click "Install".

It will take some time for it to install.

Note: It will ask you to sign in, if you choose not to connect to your github account I would encourage you to sign in with your School/student account.

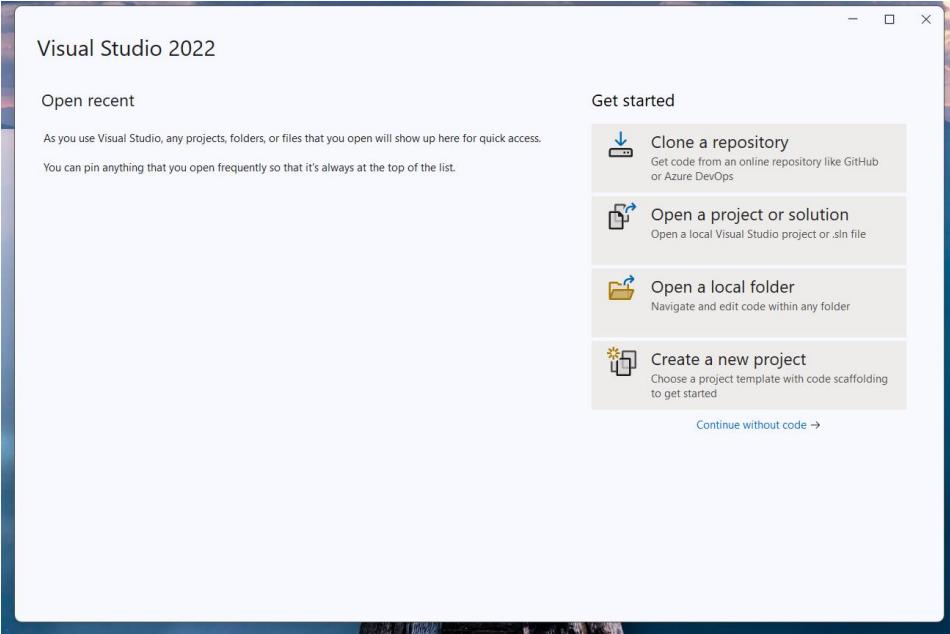
Step 6: Design preference (This is up to you)



Step 7 : Finding And Cloning The Repository!

Click “Start Visual studio”

Now that it's downloaded you should be able to get started:



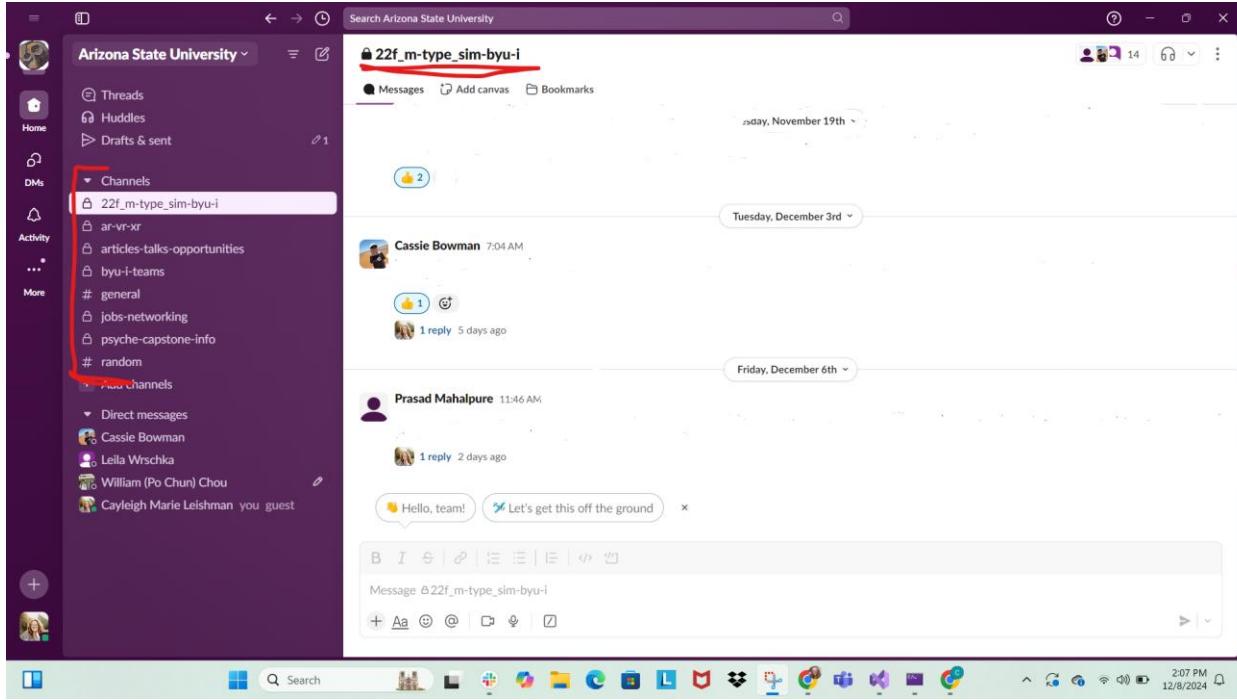
Click “Clone A Repository”

NOTE:

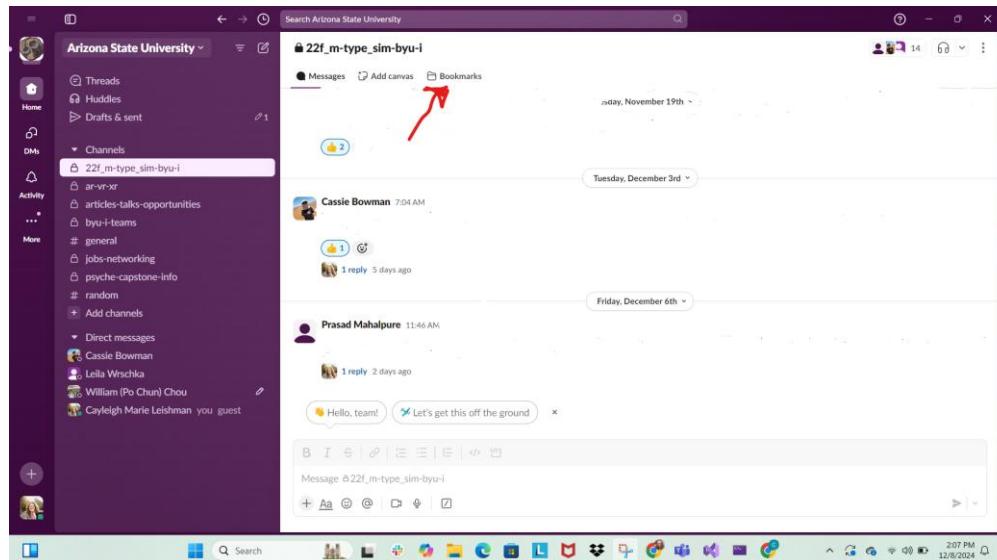
The rest of the instructions assumes you have already accepted the repository invitation through Github. If you haven't been fully onboarded yet, or gotten that invitation to join the Iridium github repository, you'll have to come back to this step another time. You should get a link to the Github Psyche Repository soon enough. I had to just accept the invitation through my School email since that's what my github account is connected to. Some of my teammates had to accept it on github directly. Talk to your Team Lead or Professor if you can't find the github “accept the invitation.” You are not the only one with that issue, I promise. Even after accepting the invitation I can only find the github link through Slack or a link I bookmarked.

Open your Slack account connected to Arizona State University

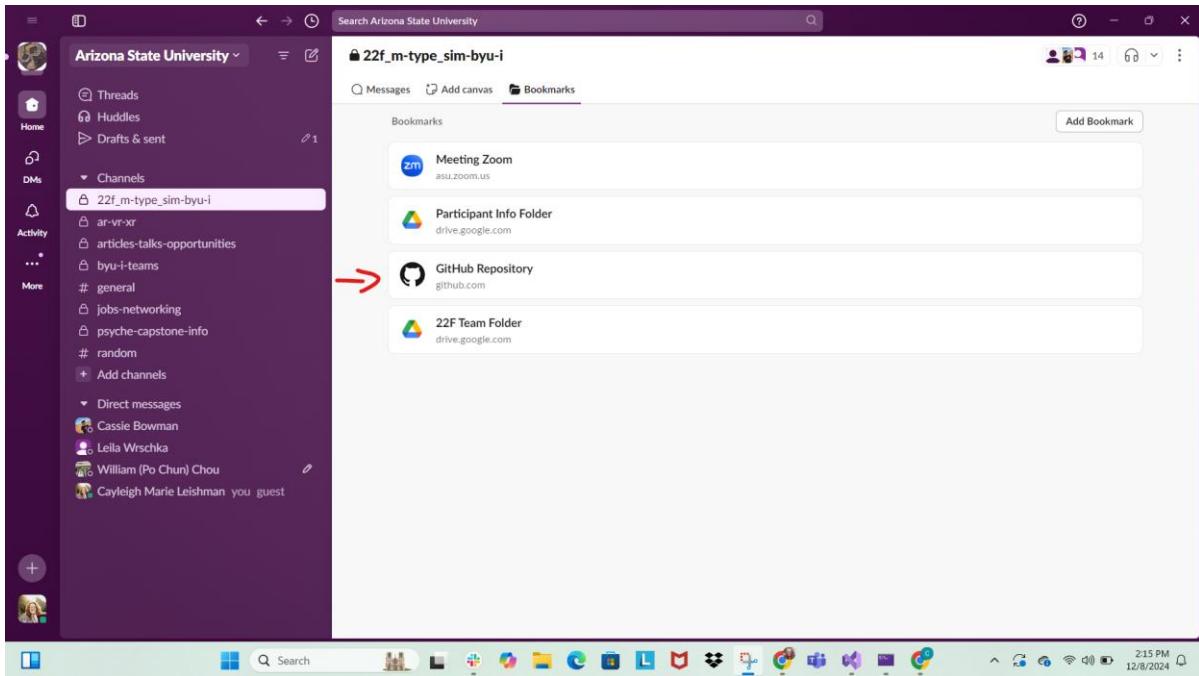
Find the Arizona State University channel, then find the subchannel you are a part of. I was part of the “22F_M-type_sim-byu-i” channel. Your channel may not be in this photo but you should be able to find it on this side with the red line on the left hand side. Open it up:



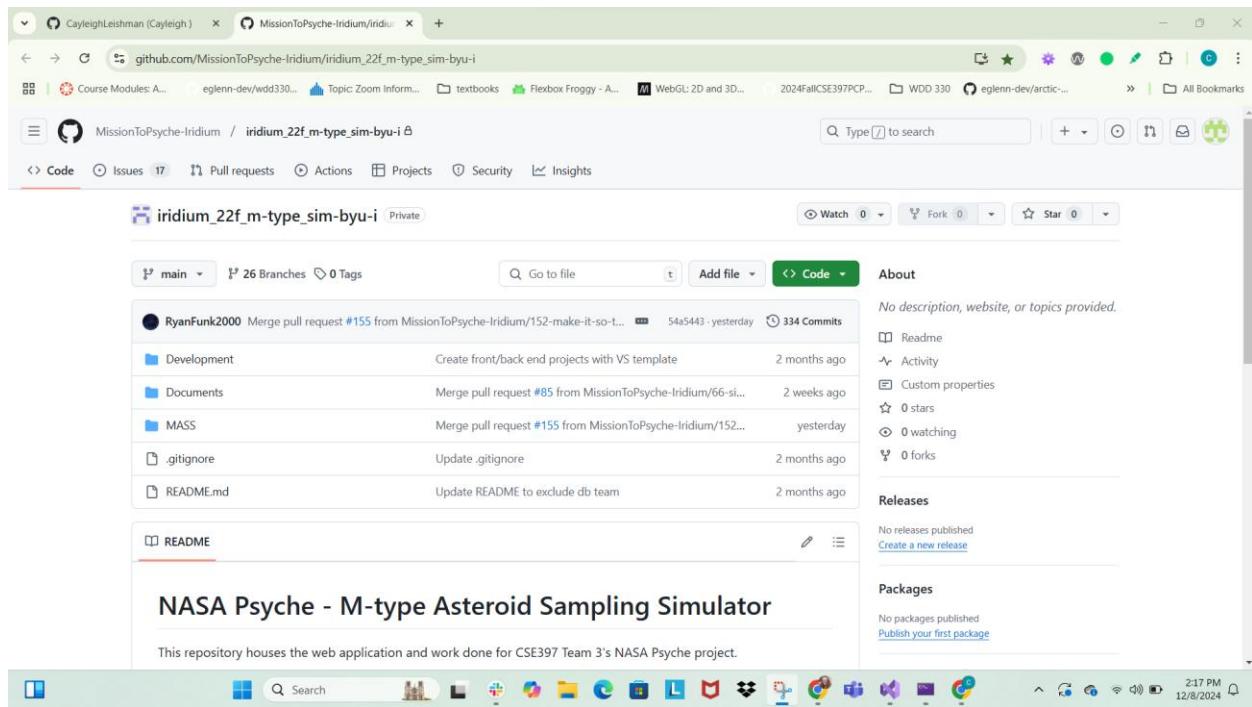
Find the bookmark



Now, your slack may look different, but after you click the bookmark you should see the github Repository (next to the red arrow in the image)

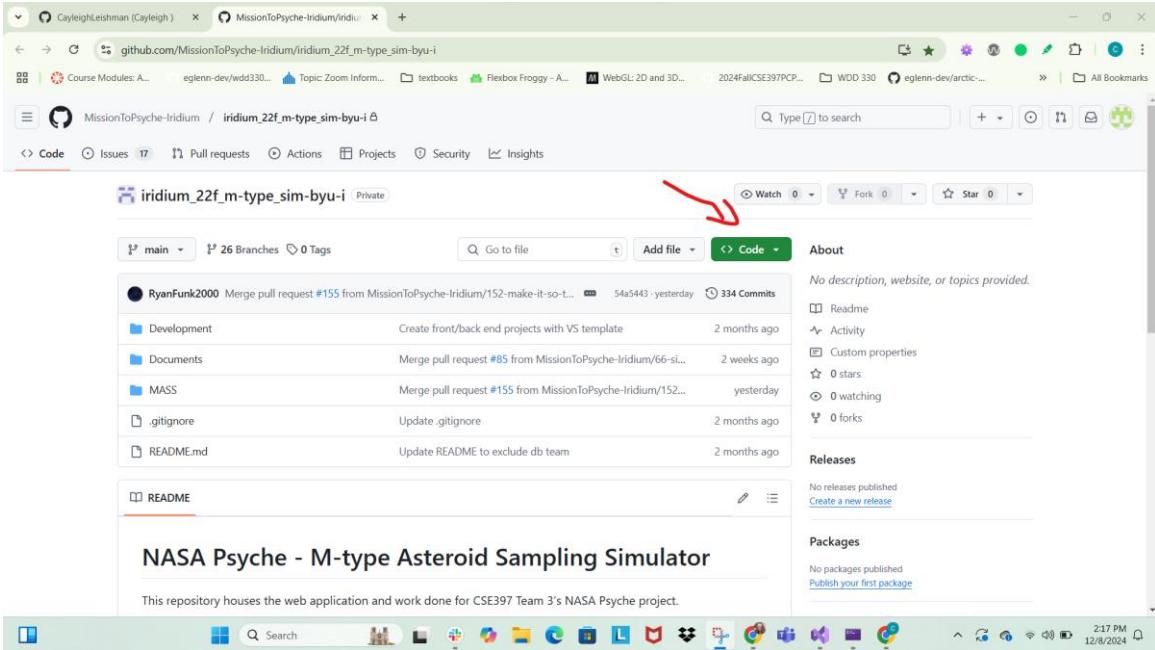


And it should lead you to the repository

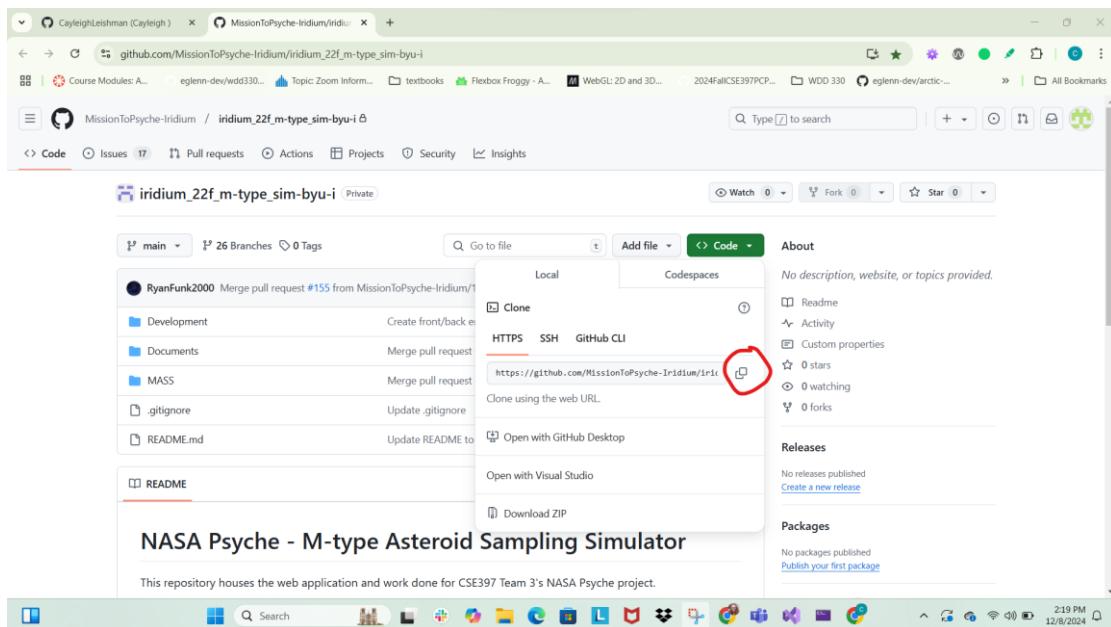


If the above image looks different from what you see or nothing shows, you may not have accepted or received the invitation yet. Wait patiently and inform your Lead about it.

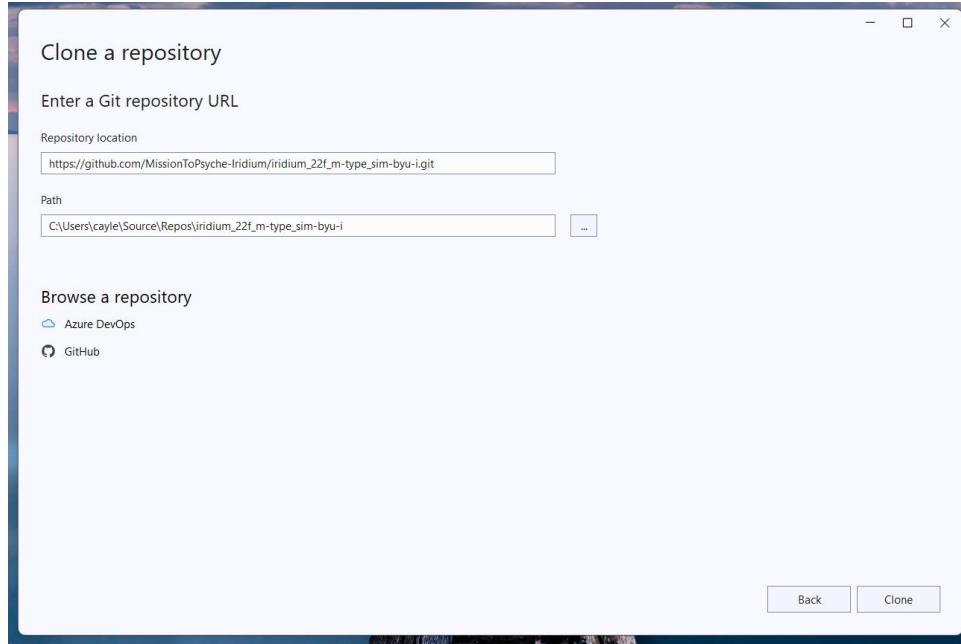
Click "Code"



This should appear. Click where the red circle is. I just made you copy your repository link:

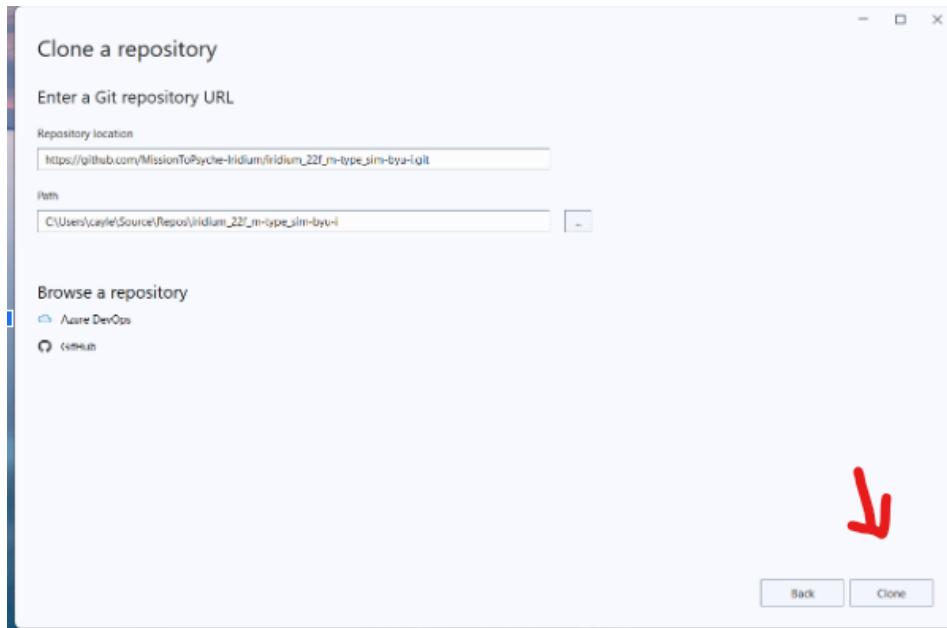


Go to Visual studio again and copy the github link to the top Where it says “repository location”



I just let “Path” choose where it went, but you can also choose a different folder for it to be in.

Click “clone” (where arrow is pointing)

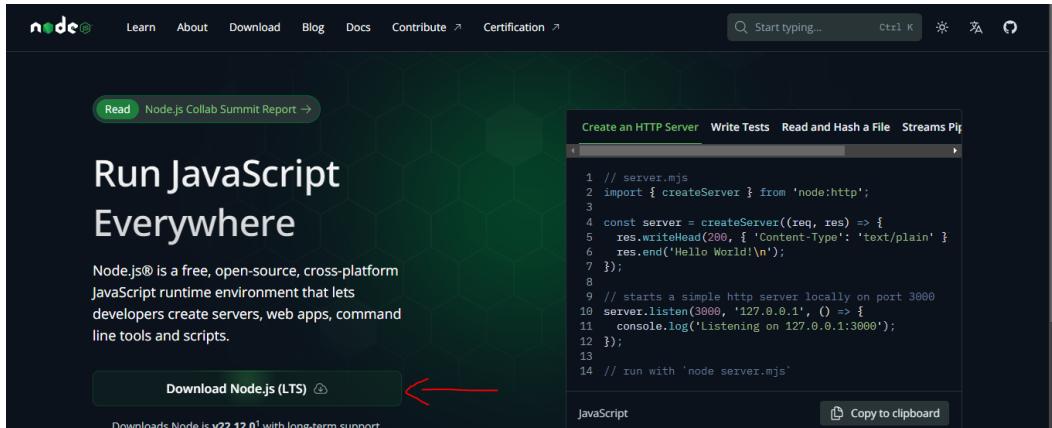


To Install Node.js

Some individuals still struggle to have everything set up, so I would also suggest you follow along with this step:

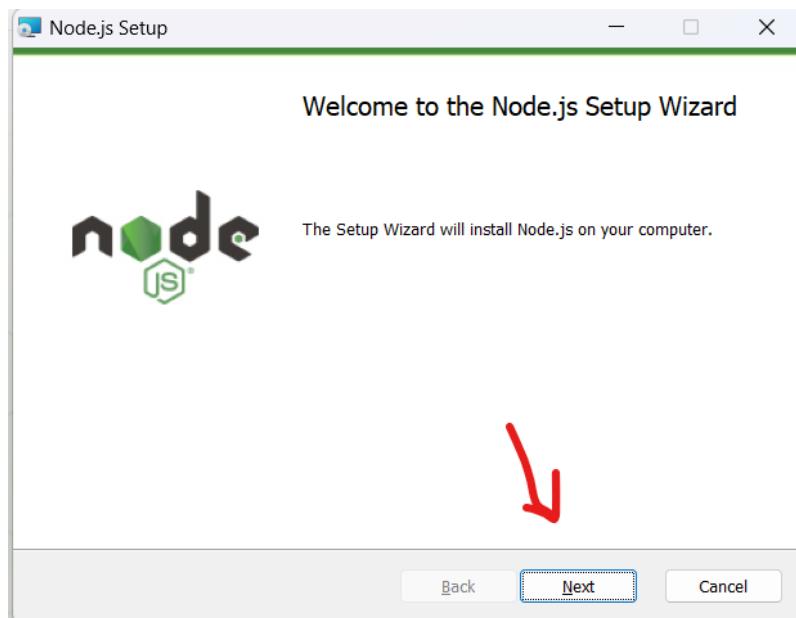
Open the link. <https://nodejs.org/en>

Find the “Download Node (LTS)” Button (In photo right besides the red arrow)

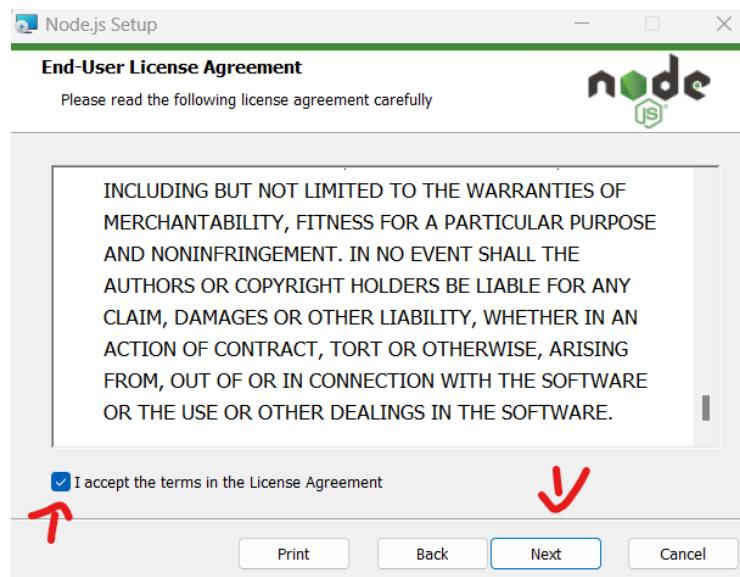


I had a pop up to lead me to something that allowed me to click “download”

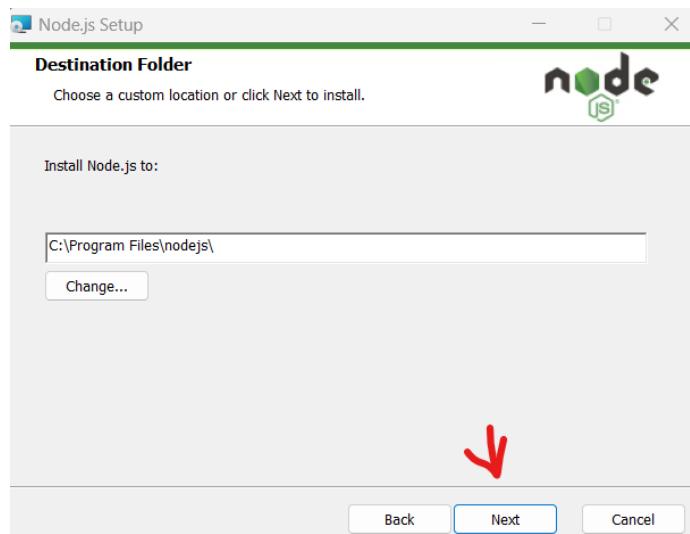
Click “next”



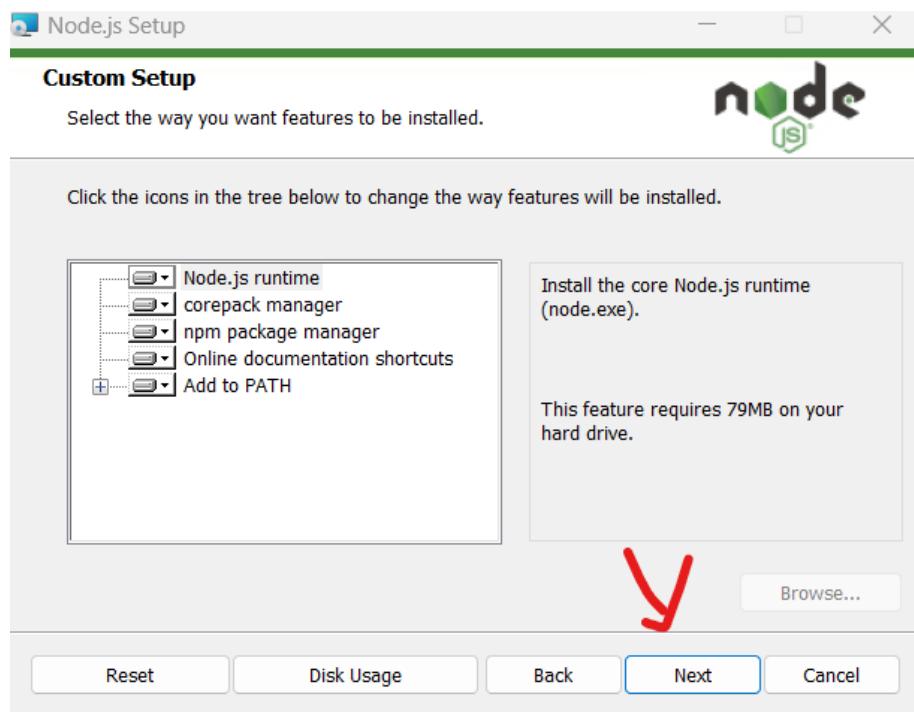
Accept the terms and condition and click “Next”



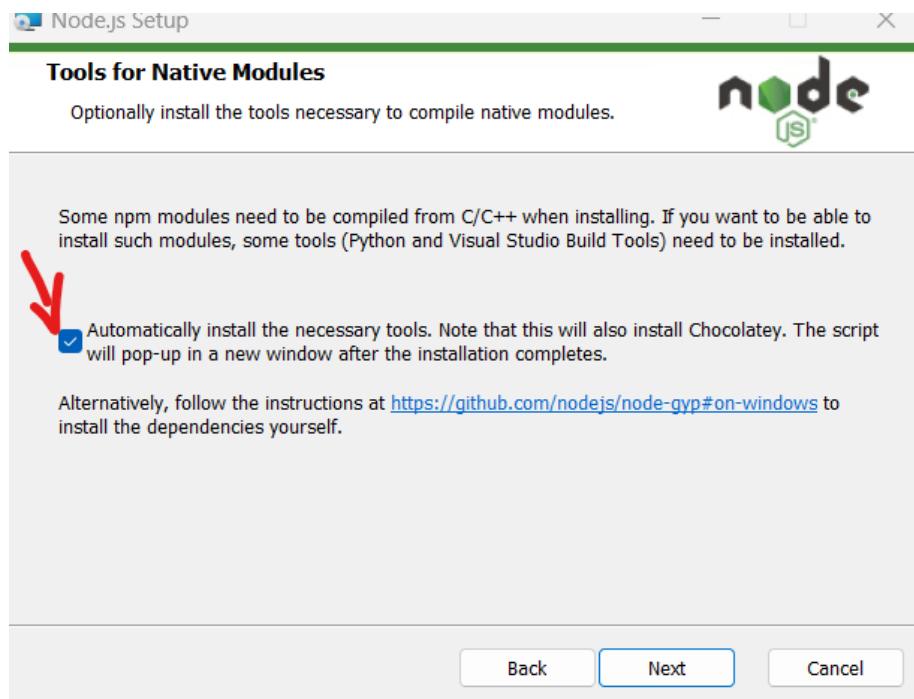
This is just telling you what folder to put it in. Your computer should have an automatic place for it so just click “next”



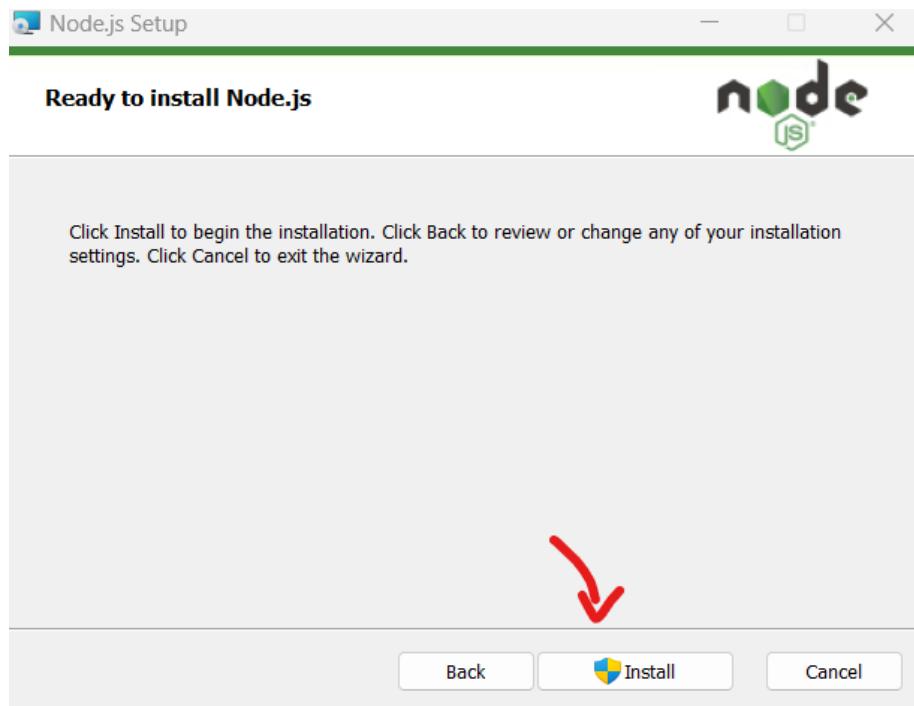
This is just asking if you want to change the way it's installed, I just click “next”



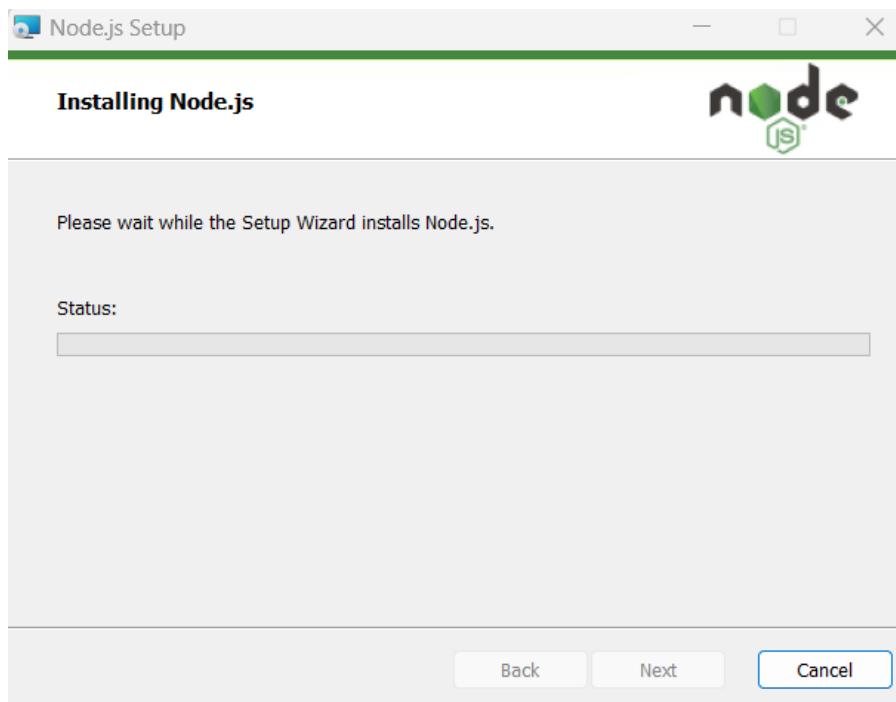
I personally also click the button to allow automatic installation of the necessary tools.)



Click "install"



A popup like this will show

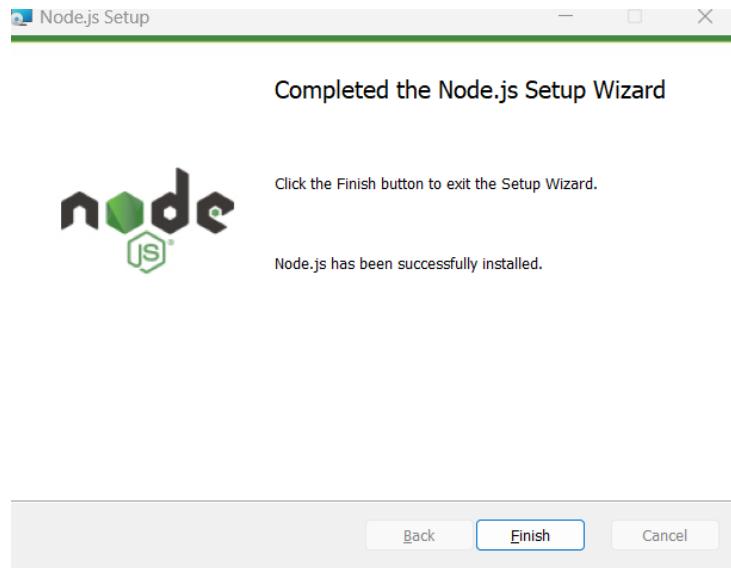


I couldn't get a screenshot of this part but a popup will ask:

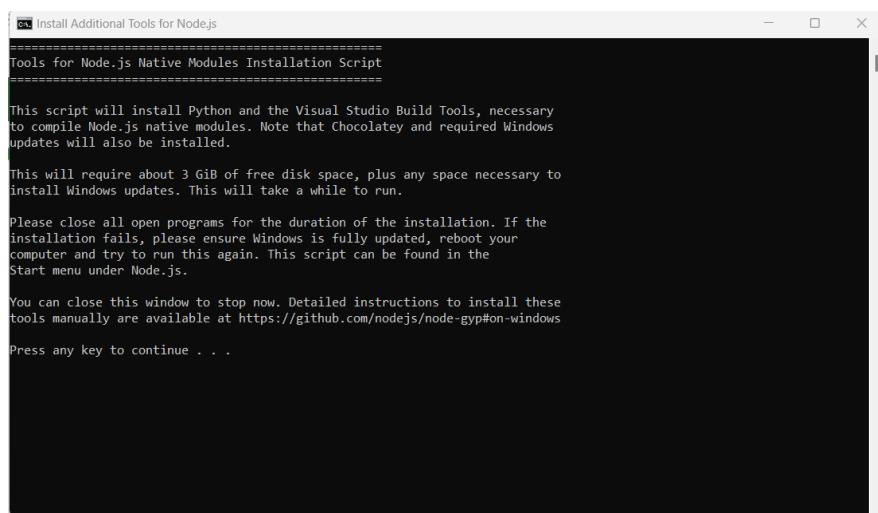
“Do you want to allow to make changes”

Click “Allow”

This will then show up. Click “Finish”



This will also show up, but you can just close it.

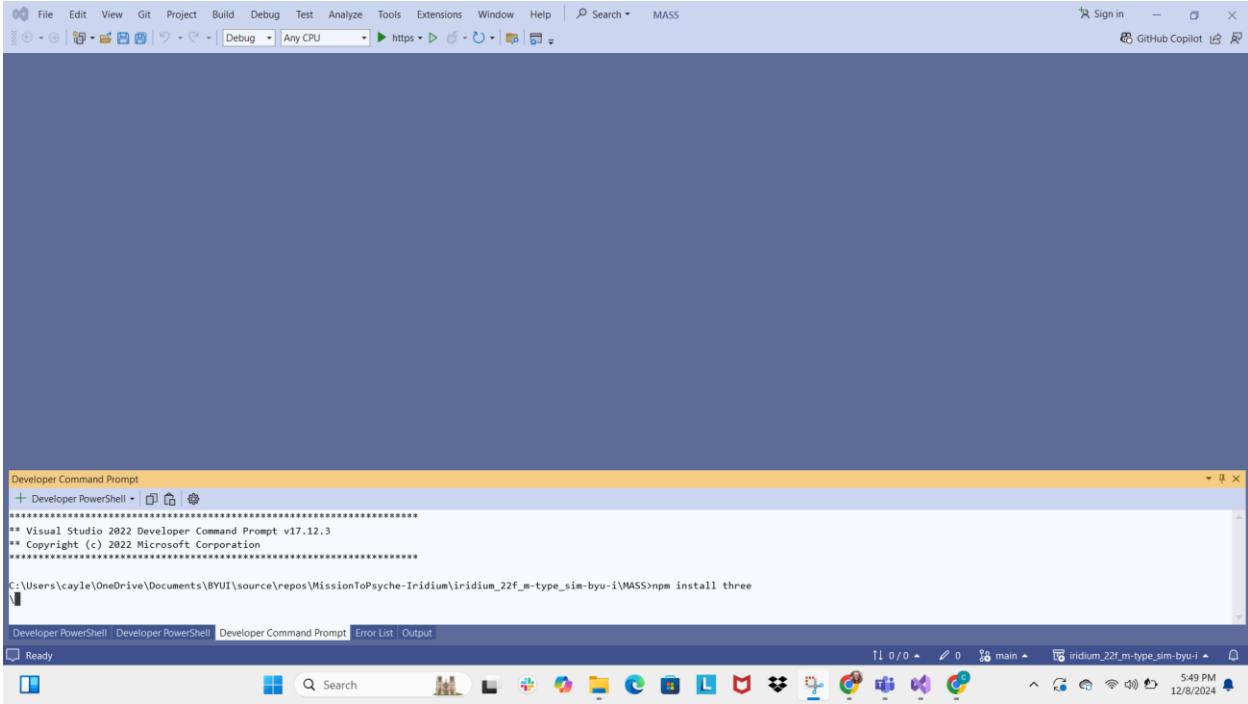


Install Three.js

Open the IDE to the Github repository.

If you can't find the terminal, In this document find "How Do I Open the Terminal" (under page 32)

Type in "npm install three"



If all goes well, something akin to this should appear!

```
C:\Users\cayle\OneDrive\Documents\BYUI\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS>npm install three
added 9 packages, and audited 10 packages in 17s
found 0 vulnerabilities

C:\Users\cayle\OneDrive\Documents\BYUI\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS>
```

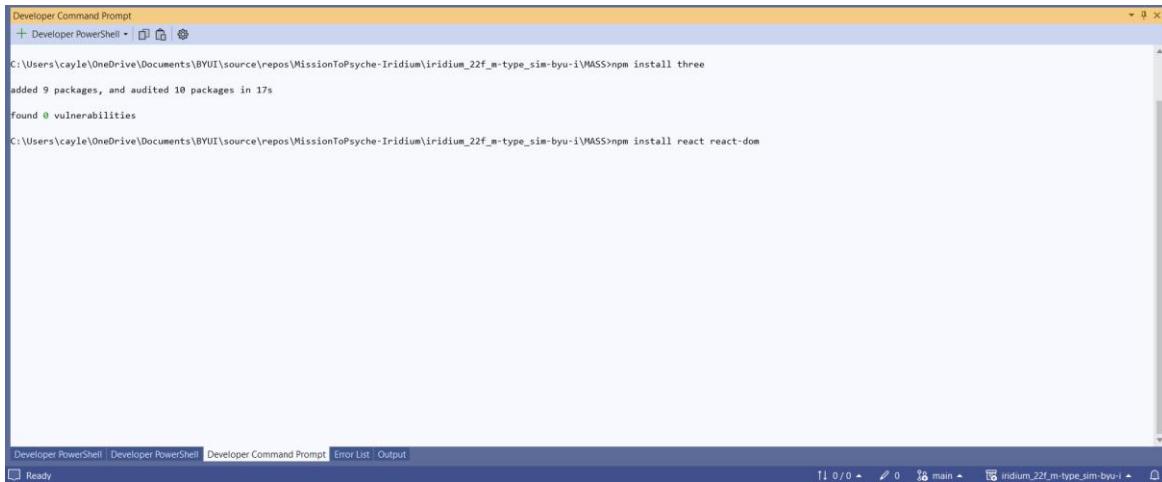
And You've completed this step!

If you get an error, check the "How Do I Open the Terminal" Common Troubleshooting Errors on page 32 to see if it's one of our common errors. If not, contact your lead or professor for further assistance.

Install React

Open the IDE to the Github repository. If you can't find the terminal, in this document find "How Do I Open the Terminal" (under page 32)

Type in "npm install react react-dom" and press enter



A screenshot of a Windows Developer Command Prompt window. The title bar says "Developer Command Prompt". The window contains the following text:

```
C:\Users\cayle\OneDrive\Documents\BYUI\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS>npm install three
added 9 packages, and audited 10 packages in 17s
found 0 vulnerabilities

C:\Users\cayle\OneDrive\Documents\BYUI\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS>npm install react react-dom
```

The status bar at the bottom shows "Ready" and some build statistics: 11 0/0, 0 0, 98 main, and a file path "iridium_22f_m-type_sim-byu-i".

If all goes well then you should be good to go! If it's in Red then you have some errors and will need to get ahold of either the smartest person on your team, the lead or your professor.

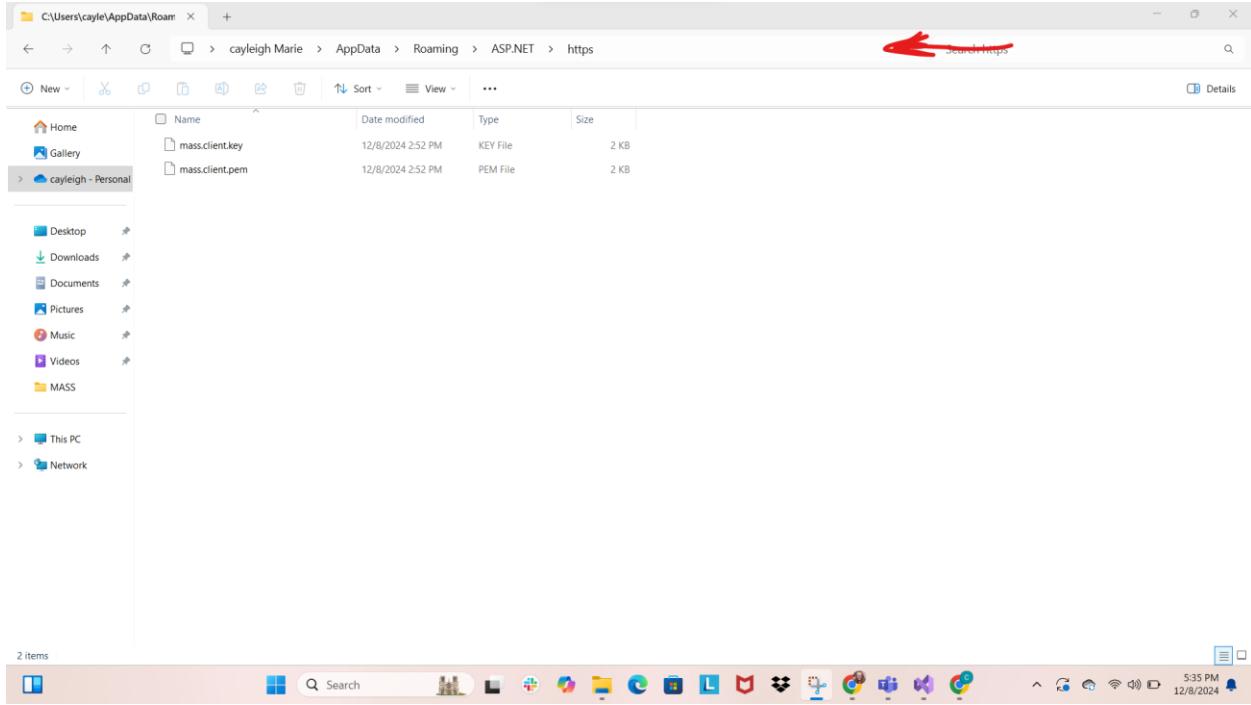
```
C:\Users\cayle\OneDrive\Documents\BYUI\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS>npm install react react-dom
up to date, audited 10 packages in 4s
found 0 vulnerabilities

C:\Users\cayle\OneDrive\Documents\BYUI\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS>
```

Install Certificates to See Frontend

A lot of individuals with Windows were able to get the back end running just fine, but not the front end. So I highly recommend you follow along with this step, especially if you had errors trying to run the simulation. Keep in mind, this is on a windows computer and may work differently on a different Operating System.

Open your file explorer and click where the red arrow points.

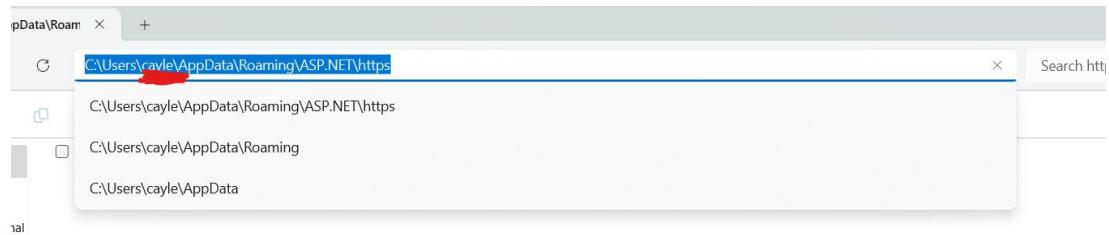


You should see something that looks like: C:\Users\cayle\AppData\Roaming\ASP.NET\https. It won't be exactly that, but you should have something similar.

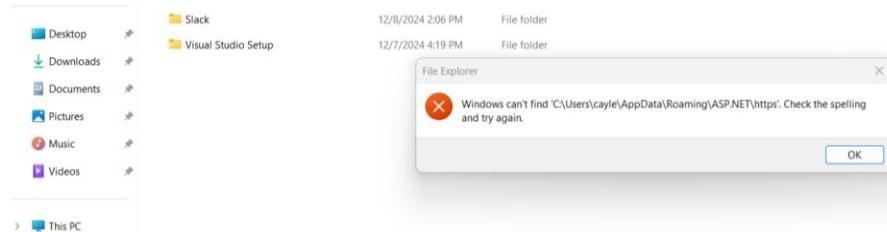
copy “\AppData\Roaming\ASP.NET\https” and paste it right after your username.

You'll want it to look something like:

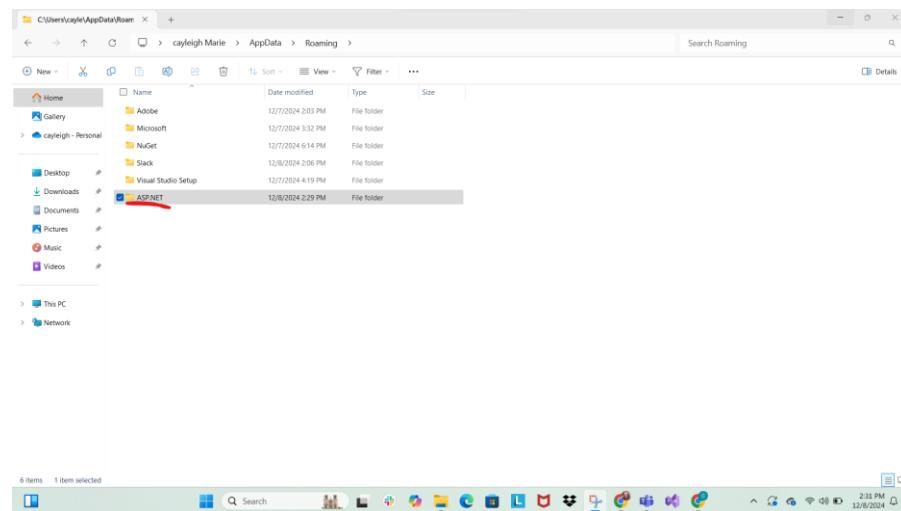
“C:\Users\[username]\AppData\Roaming\ASP.NET\https” For example mine is cayle:



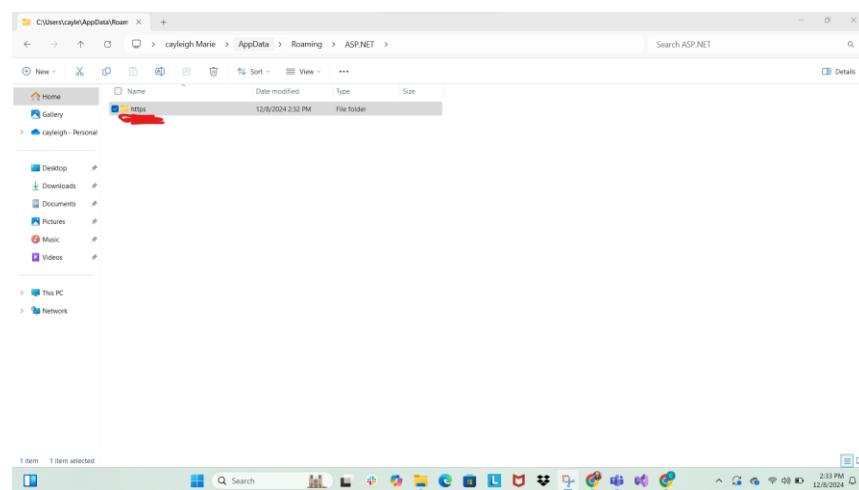
If you have this error, Follow this the next few steps (If you don't then you likely won't need to worry about this step) :



Create a folder in the Roaming Folder called “ASP.NET” in all capitals (without the quotes)



Go inside that folder and create a folder called “https” (without the quotes)



Close the folder

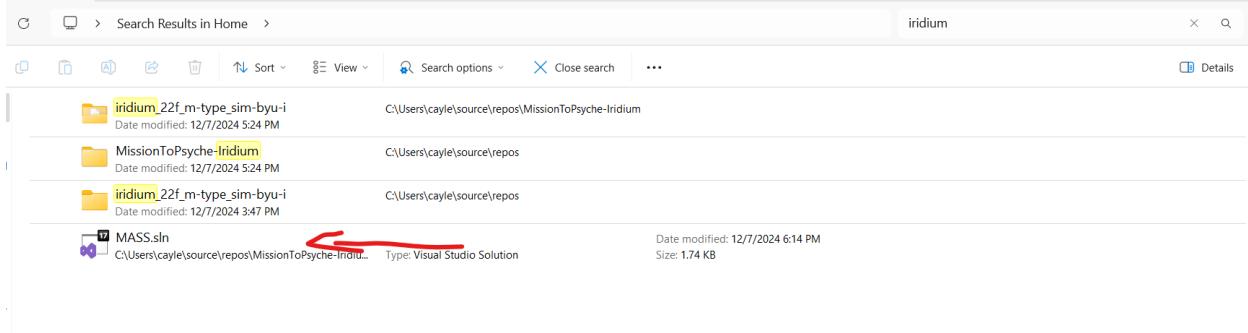
You're all done and should be Free to follow “How to Run Locally” on page 23

How to Run Locally -Lets See the Simulation!

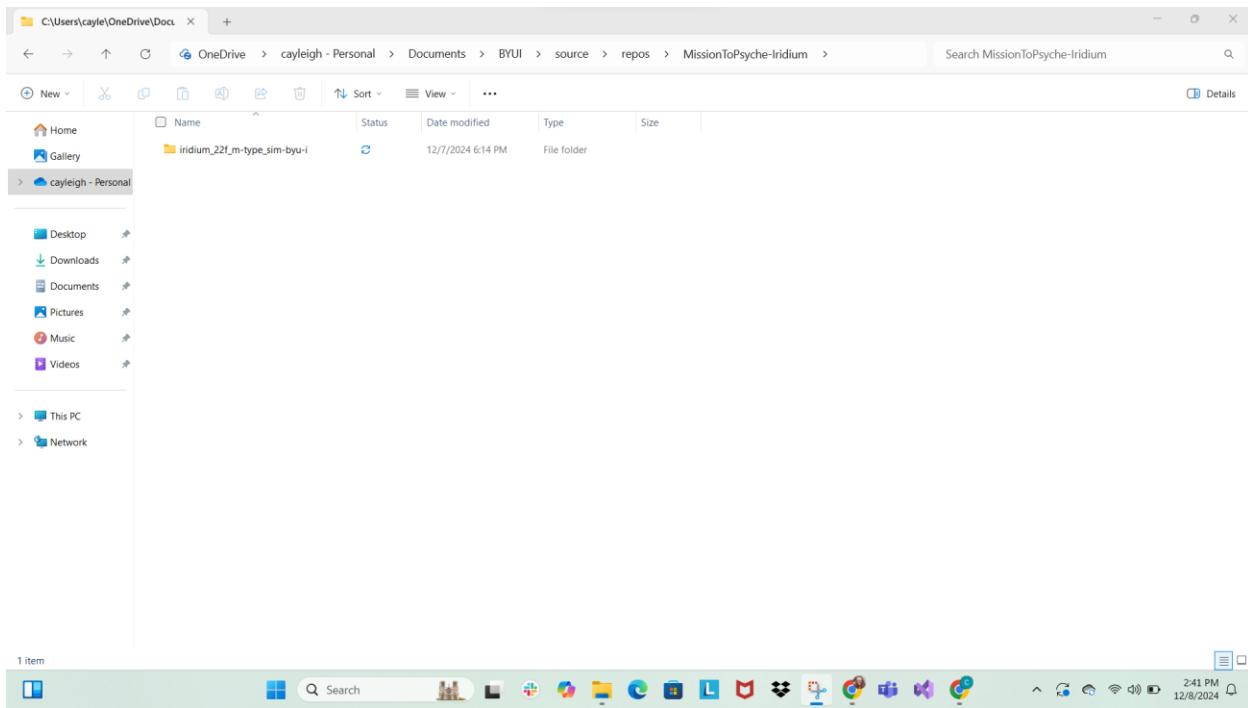
My Teammates and I actually found it more effective to open the project from our folder.

Step 1: Go to the repository in your File Explorer:

Go to where you put the repository in the folder. (If you don't remember where you put it, you should be able to search "iridium" and click where the arrow is pointing and skip to step 3)

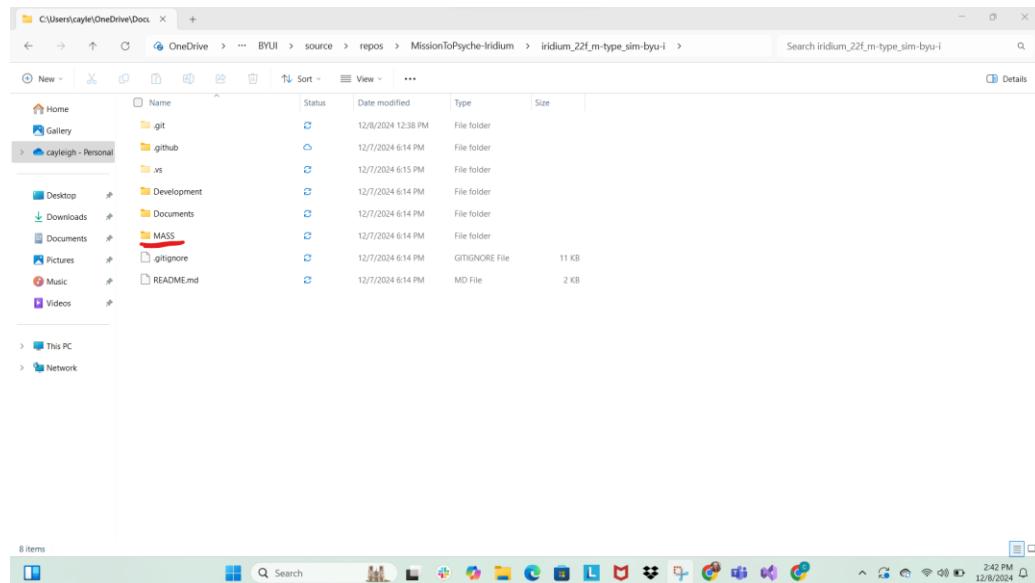


Go to where you downloaded your repository



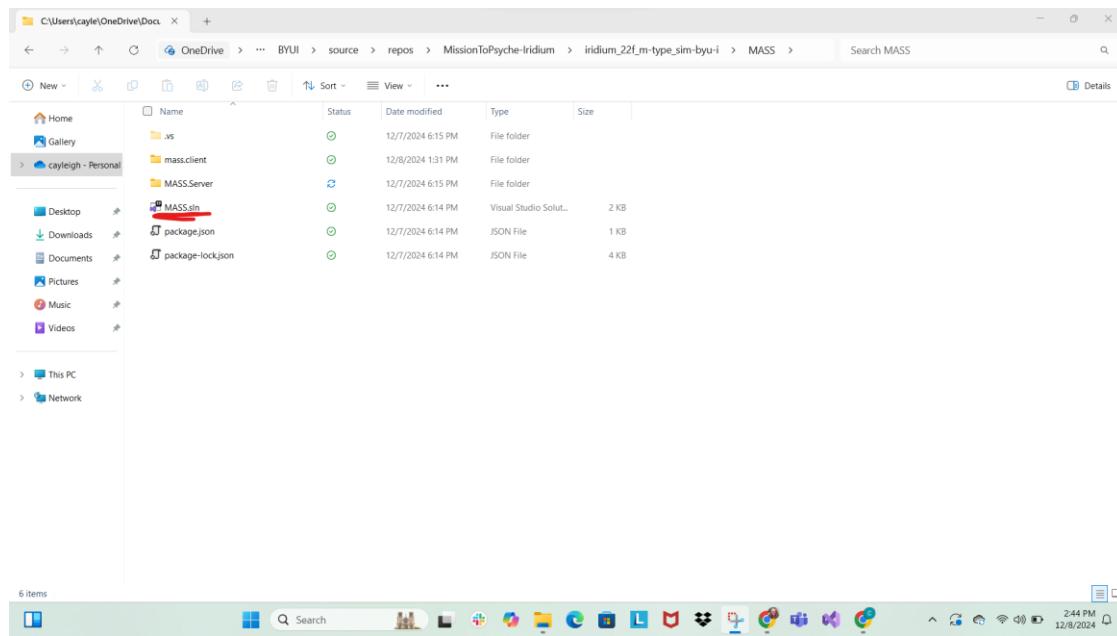
Step 2: MASS Folder

Enter that folder and then click MASS (Where we put all the code)



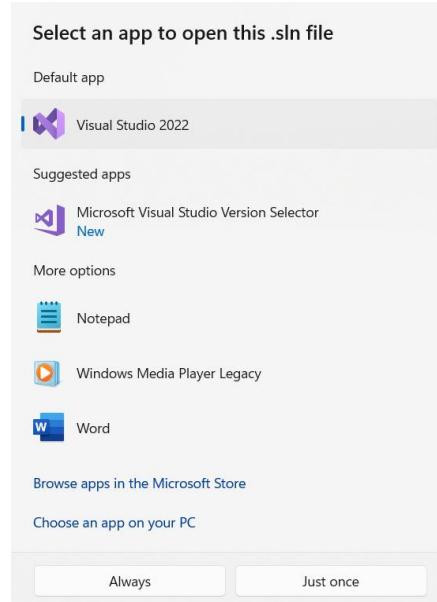
Step 3: Open the Proper file

Once you enter that folder you'll want to double click "MASS.in"



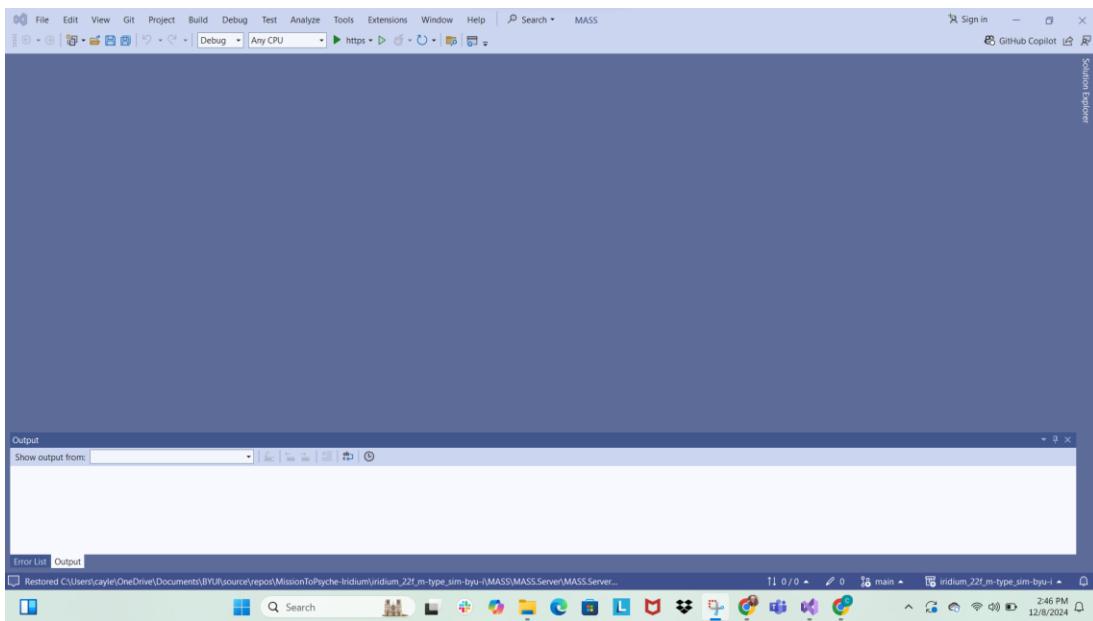
Step 4: Open in VS

If it's the first time (and yours might look different) it'll ask what you want to open it as. Click "Visual Studio 2022"

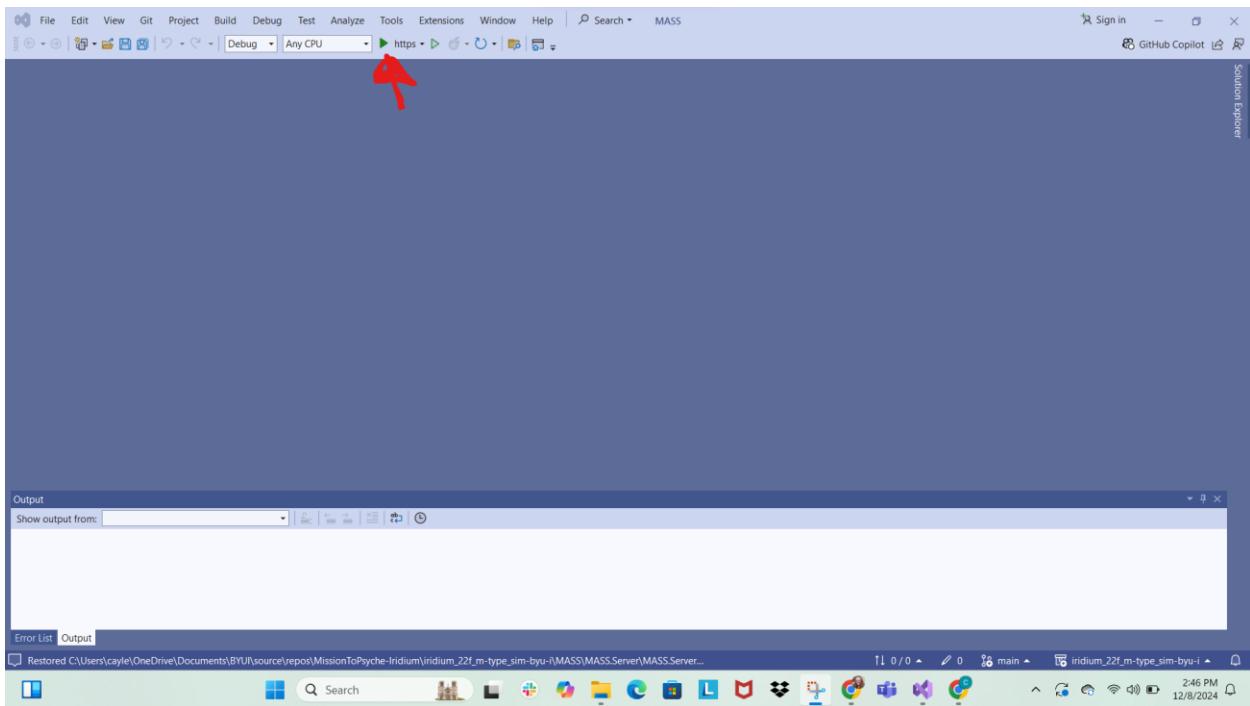


Step 5: Open the Simulation!

Mine looks like this when it opens.

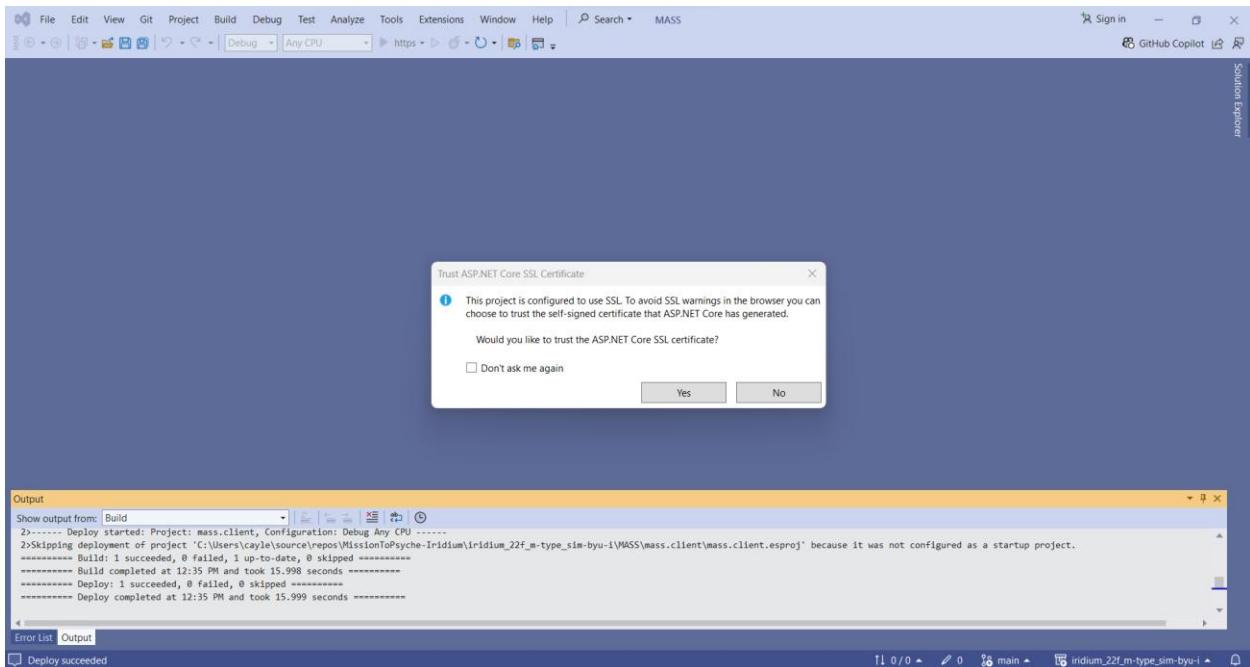


Click “the green arrow” where the red arrow points to



Step 6: Approve Pop ups (If no pop up show, skip to step 7)

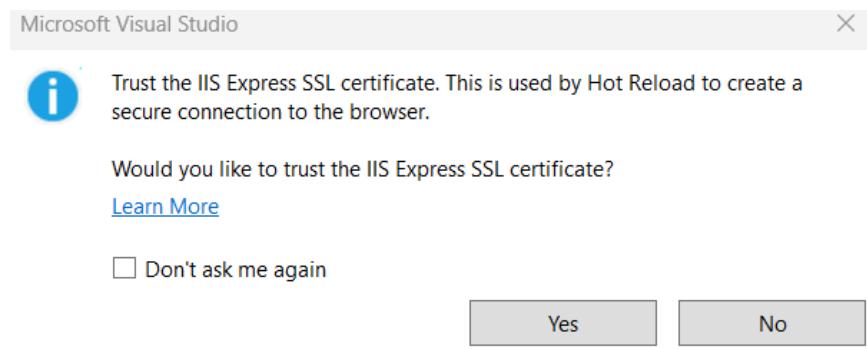
I had this pop up: I clicked “don’t ask me again” and “yes”



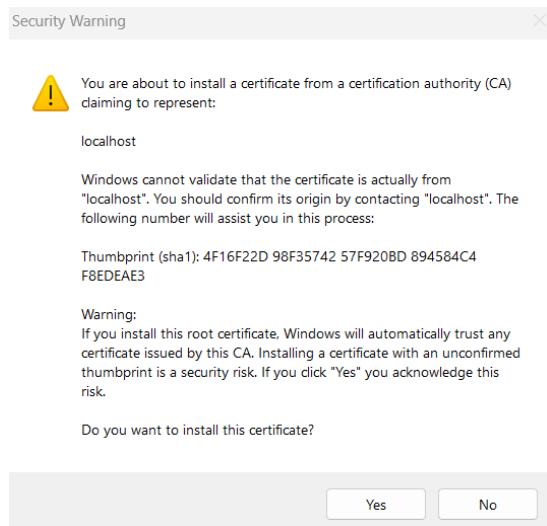
It asks if you want to install this certificate: you want to run localhost so click “yes”



If it asks to trust the IIS Express SSL certificate I said “don’t ask me again” and “yes”

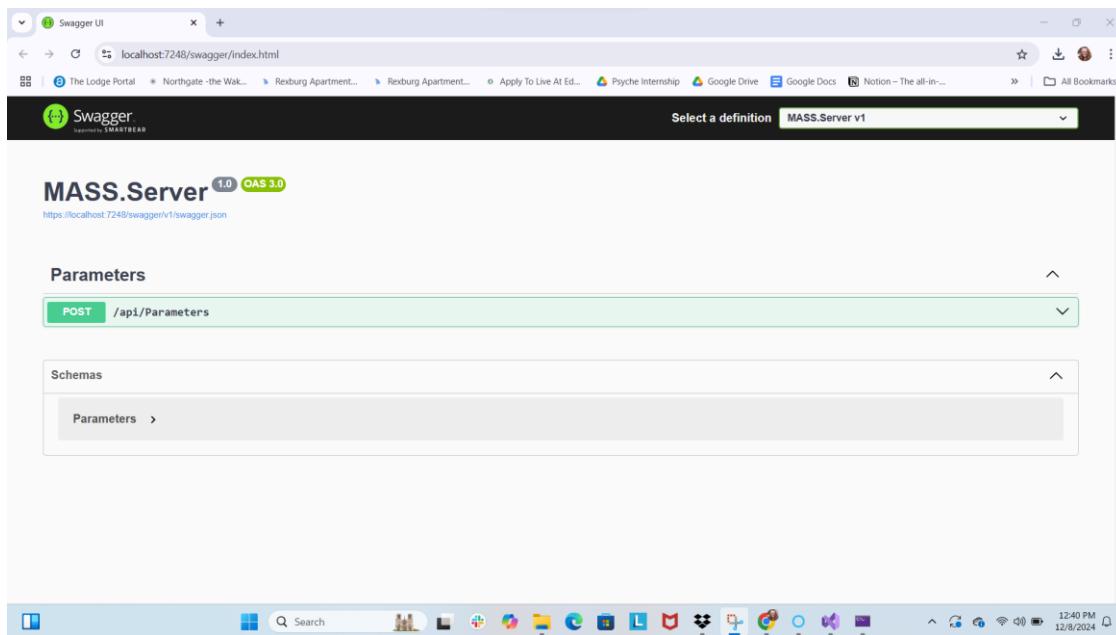


This shows up again, click “yes”:

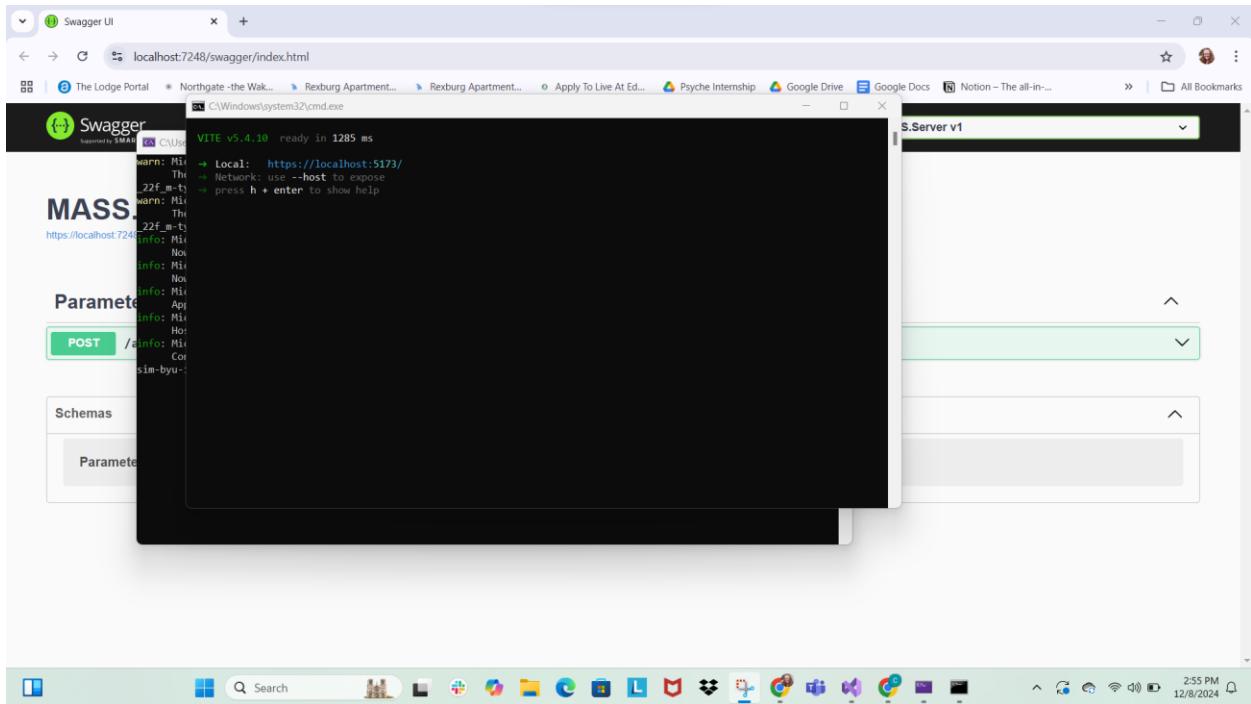


Step 6: Run Simulation!

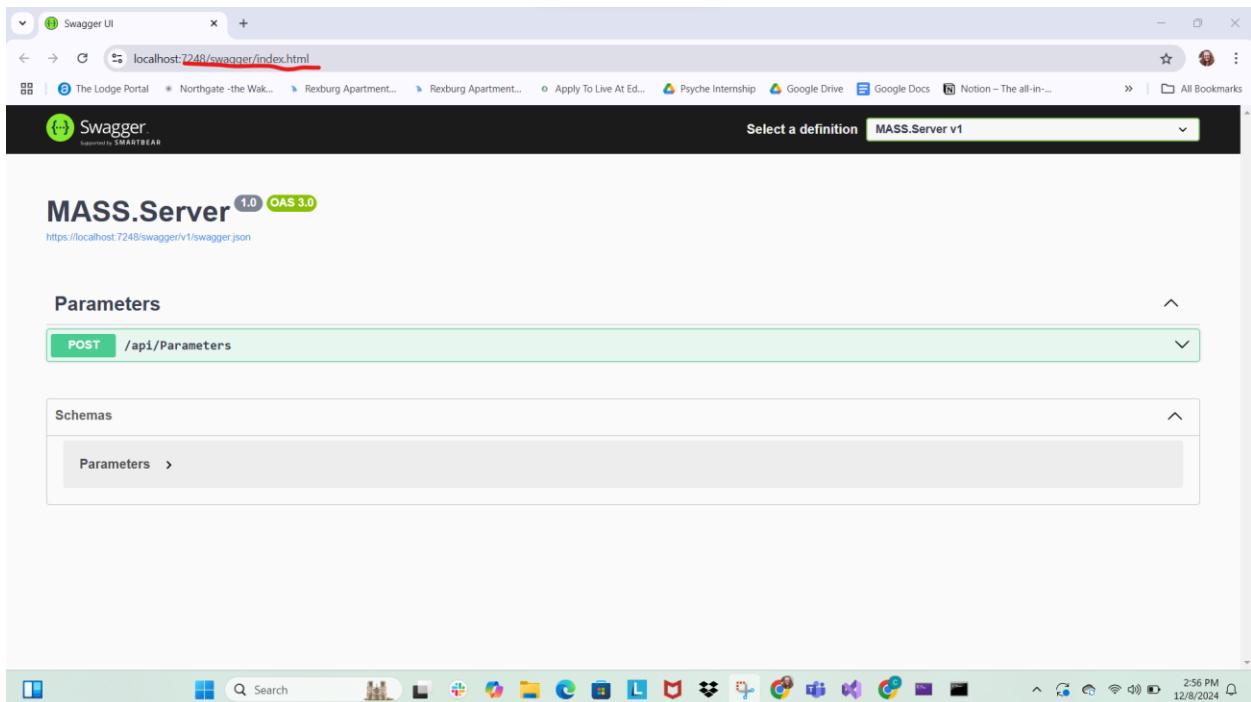
Visual studio community will probably pop up and then one of your web browser should open up.



Don't panic! This is supposed to happen. What you see here is the backend. A terminal should also pop up to show you what the front end localhost link is. If you don't get a terminal or if a terminal doesn't look like the image below, then you may have some more debugging to do than expected.



Go to the Page and delete the stuff I have underlined in red in the image below. Type in “5173”
(Or if your terminal states “[https://localhost:\[differentnumber\]](https://localhost:[differentnumber])” try that number.)



And Tada! You’re on the front end side of things!



Common Troubleshooting Errors:

Green Arrow/Frontend Load Doesn't work!

I pressed the Green Arrow in Visual Studio Code and it gave me a terminal that looks like this:

```

C:\Users\cayle\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS\MASS.Server\bin\Debug\net8.0\MASS.S...
warn: Microsoft.AspNetCore.StaticFiles.StaticFileMiddleware[16]
  The WebRootPath was not found: C:\Users\cayle\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS\MASS.Server\wwwroot. Static files may be unavailable.
warn: Microsoft.AspNetCore.StaticFiles.StaticFileMiddleware[16]
  The WebRootPath was not found: C:\Users\cayle\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS\MASS.Server\wwwroot. Static files may be unavailable.
info: Microsoft.Hosting.Lifetime[14]
  Now listening on: https://localhost:7248
info: Microsoft.Hosting.Lifetime[14]
  Now listening on: http://localhost:5003
info: Microsoft.Hosting.Lifetime[0]
  Application started. Press Ctrl+C to shut down.
info: Microsoft.Hosting.Lifetime[0]
  Hosting environment: Development
info: Microsoft.Hosting.Lifetime[0]
  Content root path: C:\Users\cayle\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS\MASS.Server
fail: Microsoft.AspNetCore.SpaProxy.SpaProxyLaunchManager[0]
  Couldn't start the SPA development server with command 'npm run dev'.

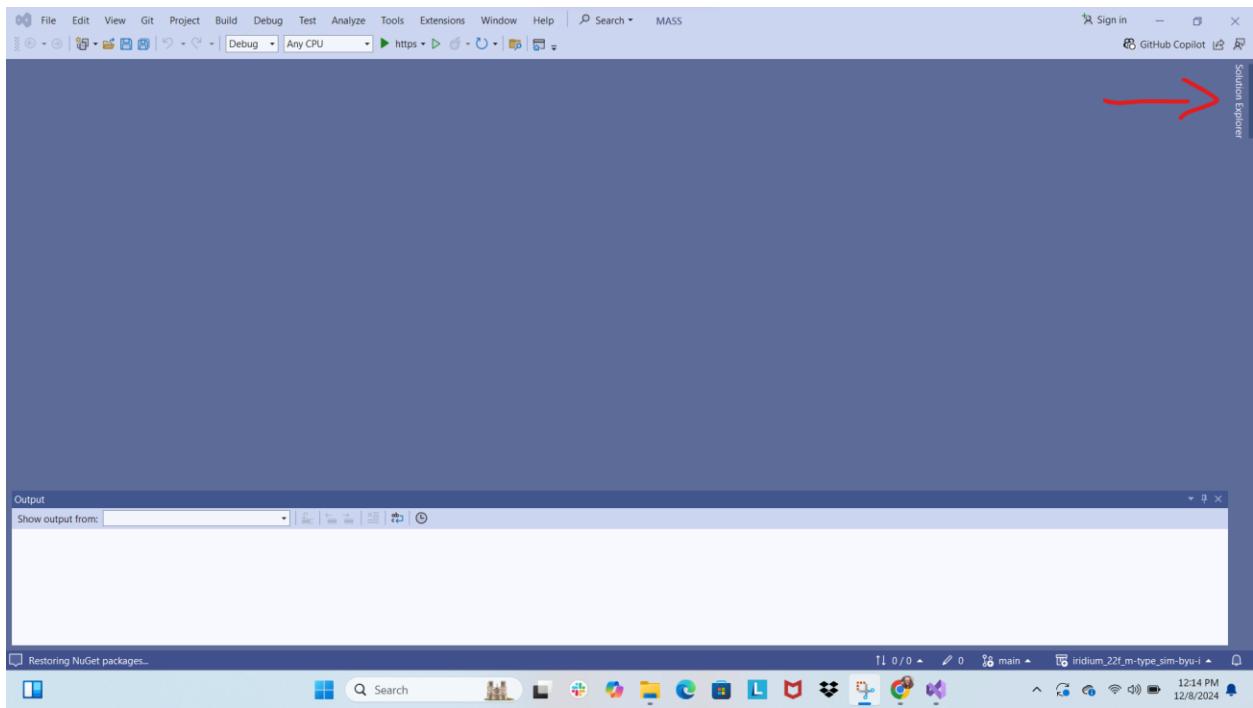
```

- 1) Check that you installed .Net <https://learn.microsoft.com/en-us/dotnet/core/install/how-to-detect-installed-versions?pivots=os-windows>
Install .net on your local computer.
- 2) Follow the instructions from “Install Certificates” from page 21 again

I can't find the Code! But it shows in the Right bottom corner I'm in the repository!

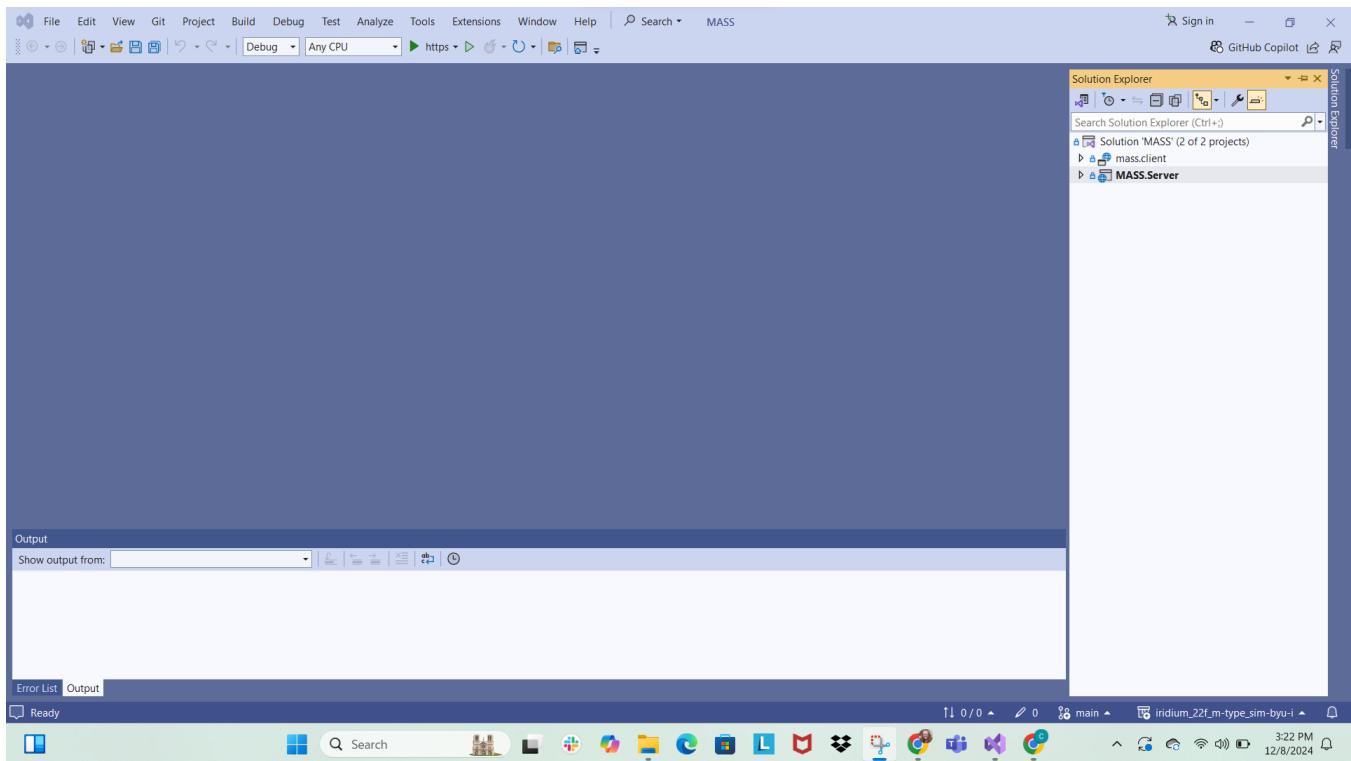
I have a visual studio open but I can't find the folders with the code!

To see all the folders, Click “Solution Explorer”



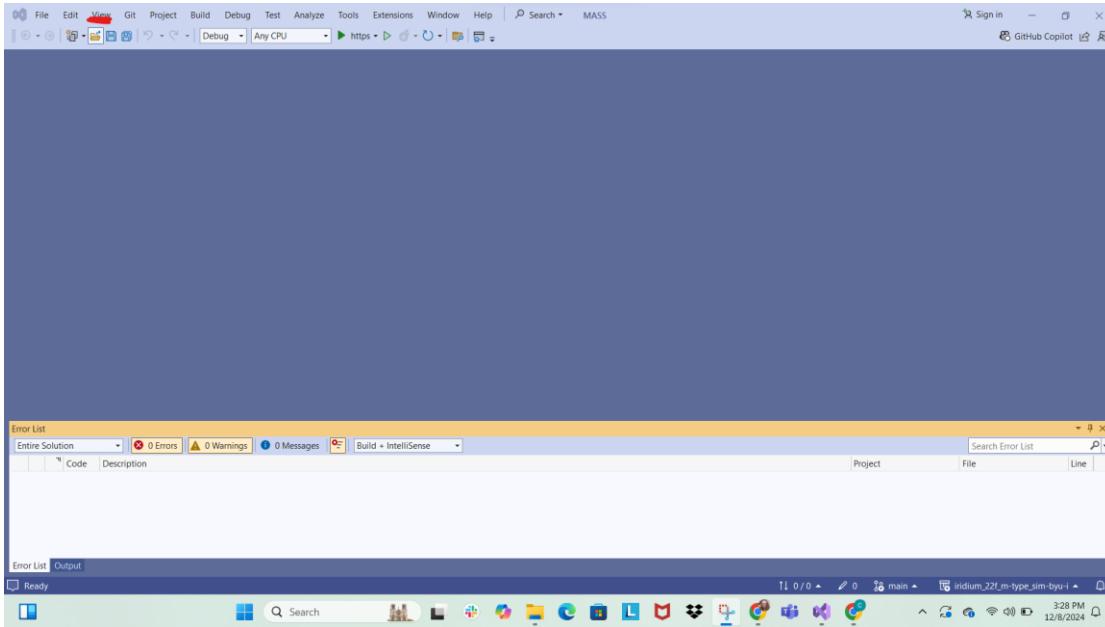
If You don't see the text there, you can also try the command “Ctrl + alt + L”

[My laptop wont let me take screenshots of this part, but if the computer command didn't work, at the top of visual Studio: the third word from the left side, click “view” and Click “Solutions Explorer” right at the top.] It should look like the picture on the next page:

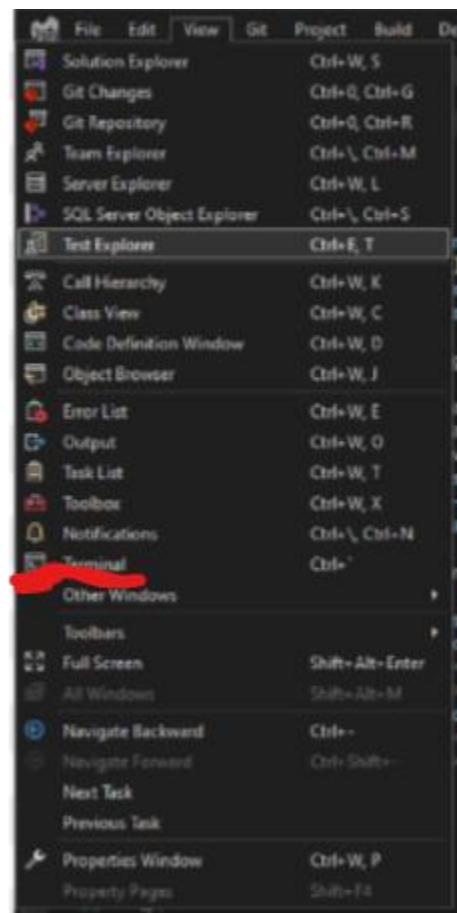


How do I open the Terminal/ Common Terminal Issue:

In the IDE: Click view (where there's the red underline in the image below)



(Can't get a picture from my end but it should look akin to this:)



it should show you the terminal at the bottom of the page.)

NOTE: THE ERROR:

```

Developer PowerShell - [File] [Edit] [View] [Git] [Project] [Build] [Dev]
+ Developer PowerShell - [File] [Edit] [View] [Git] [Project] [Build] [Dev]
npm : File C:\Program Files\nodejs\npm.ps1 cannot be loaded. The file C:\Program Files\nodejs\npm.ps1 is not digitally signed. You cannot run this script on the current system. For more information about
running scripts and setting execution policy, see about_Execution_Policies at https://go.microsoft.com/fwlink/?LinkID=135170.
At line:1 char:1
+ npm run
+ ~~~~~
+ CategoryInfo          : SecurityError: (:) [], PSSecurityException
+ FullyQualifiedErrorId : UnauthorizedAccess
PS C:\Users\cayle\OneDrive\Documents\BYUI\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS>
Developer PowerShell | Error List | Output

```

The screenshot shows a Developer PowerShell window. The command 'npm run' was entered, resulting in an error message: 'File C:\Program Files\nodejs\npm.ps1 cannot be loaded. The file C:\Program Files\nodejs\npm.ps1 is not digitally signed. You cannot run this script on the current system. For more information about running scripts and setting execution policy, see about_Execution_Policies at https://go.microsoft.com/fwlink/?LinkID=135170.' The window title is 'Developer PowerShell' and it has tabs for 'Error List' and 'Output'.

Check if your terminal is running through Powershell (where red underline is in the next picture)

If it is, click on "Developer Powershell (where red underline is):

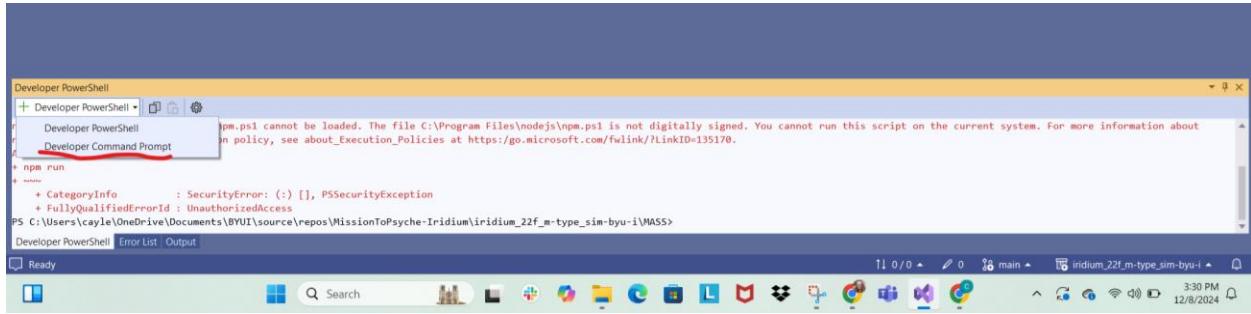
```

Developer PowerShell
+-----+
| Developer PowerShell | ① ② ③ ④ |
| +-----+ |
| | npm -> E:\Work\scripts\Program Files\nodejs\npm.ps1 cannot be loaded. The file C:\Program Files\nodejs\npm.ps1 is not digitally signed. You cannot run this script on the current system. For more information about |
| | running scripts and setting execution policy, see about_Execution_Policies at https://go.microsoft.com/fwlink/?LinkID=135170. |
| | at line:1 char:1 |
| | & npm run |
| | + CategoryInfo          : SecurityError: () [], PSSecurityException |
| | + FullyQualifiedErrorId : UnauthorizedAccess |
PS C:\Users\cayle\OneDrive\Documents\BYUI\source\repos\MissionToPsyche-Iridium\iridium_22f_m-type_sim-byu-i\MASS>
Developer PowerShell Error List Output

```

The screenshot shows a Windows taskbar at the bottom with various icons. The developer PowerShell window is open, displaying a warning message about running unsigned scripts. The command entered was 'npm run'.

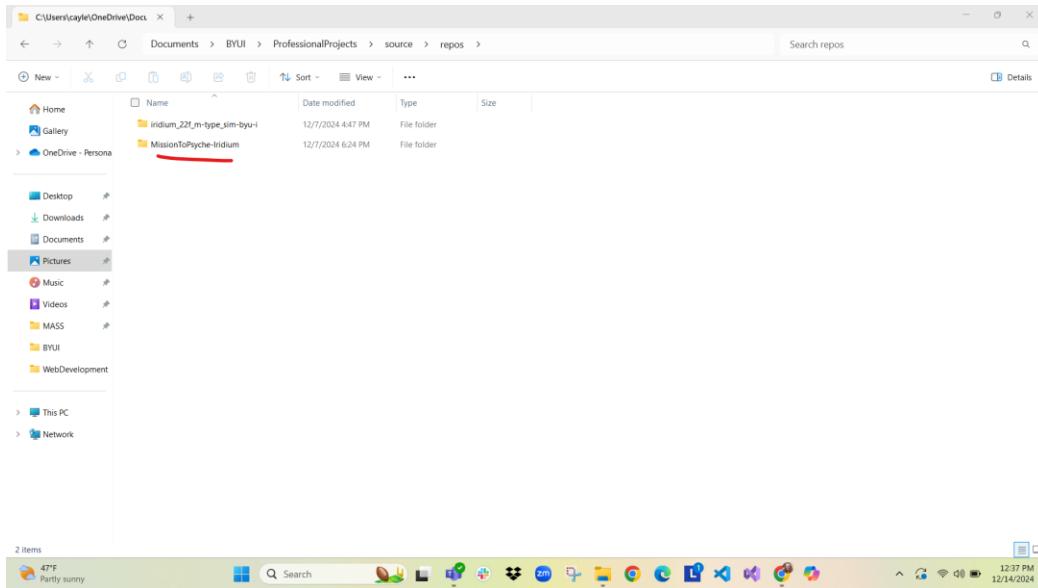
Click on “Developer Command Prompt”



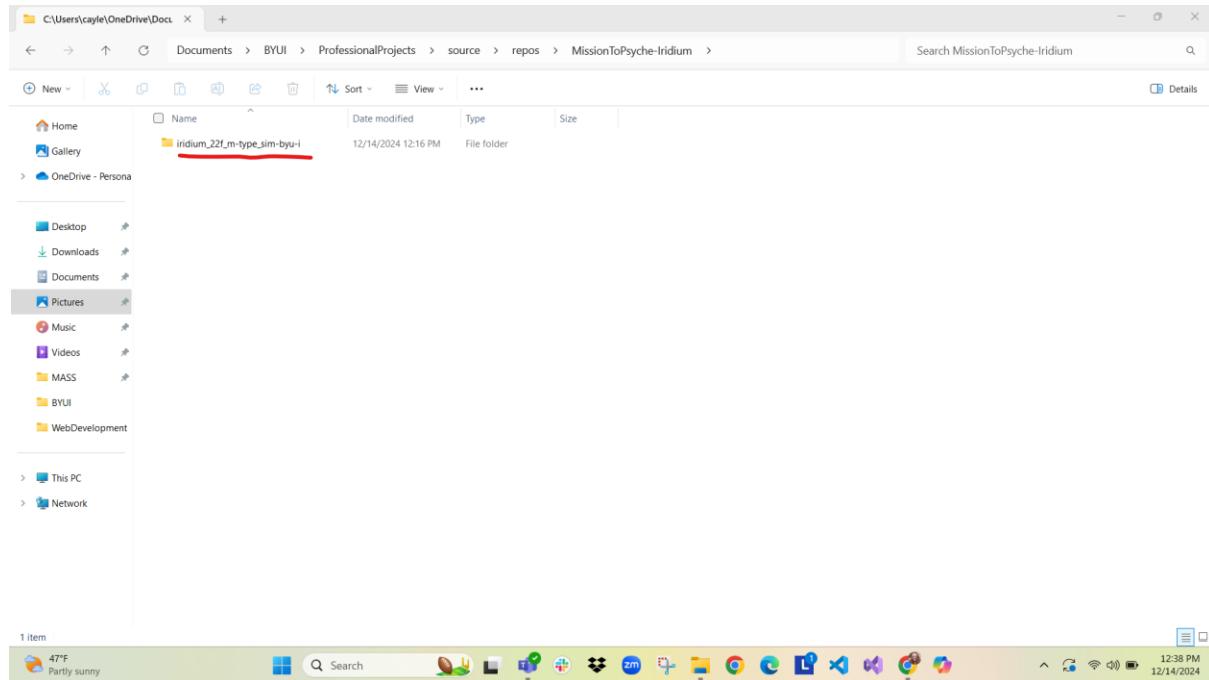
The reason powershell doesn't work is because it's running through Windows Operating system with higher security. It won't work through Visual Studio (Or any IDE that I'm aware of.)

Locating Your Working Folder

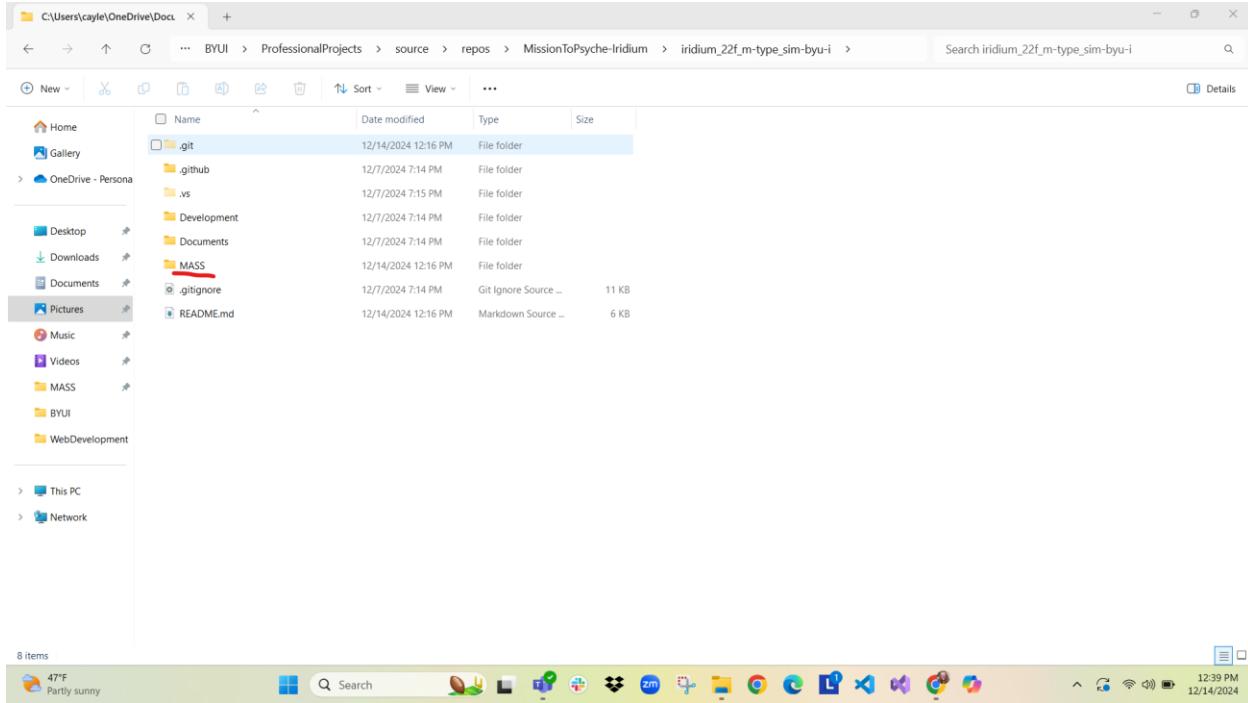
If you're struggling which one is for Frontend or Backend find your folder (I have to click on "MissionToPsyche-iridum")



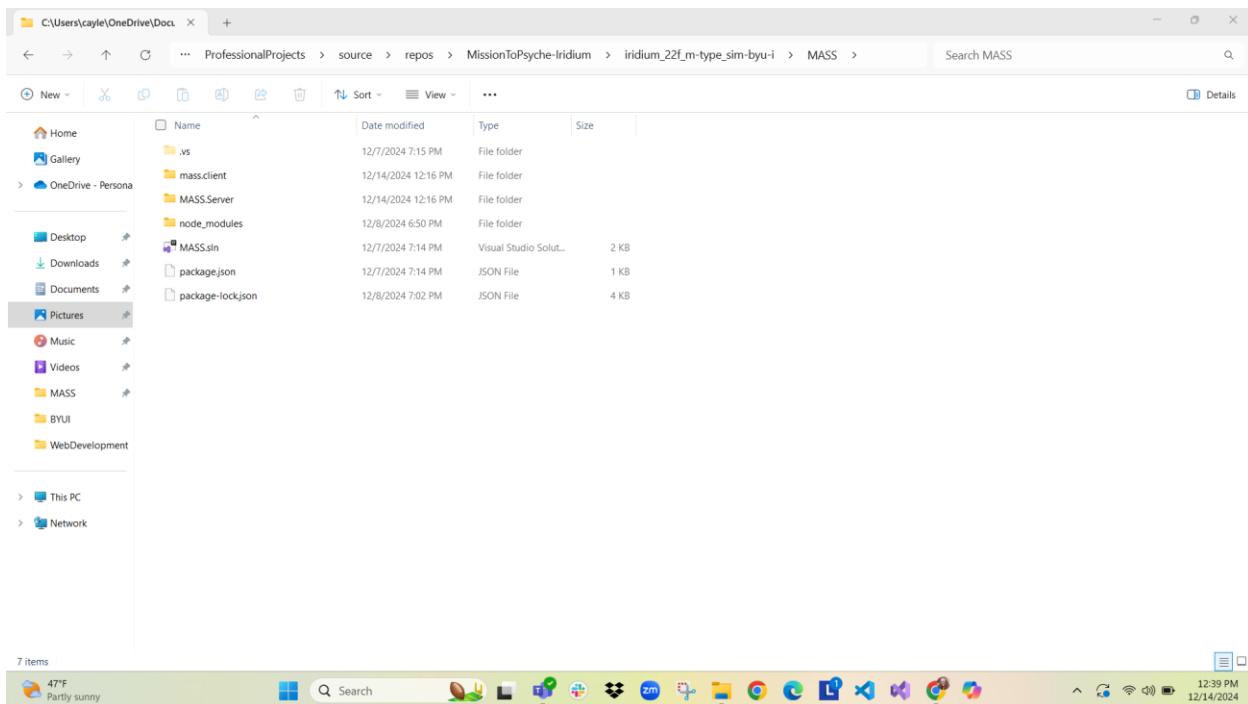
Go to where your Folder is



Then I find The MASS Folder



Open that and you'll should see something akin to this image below:



Click "Mass.sln"

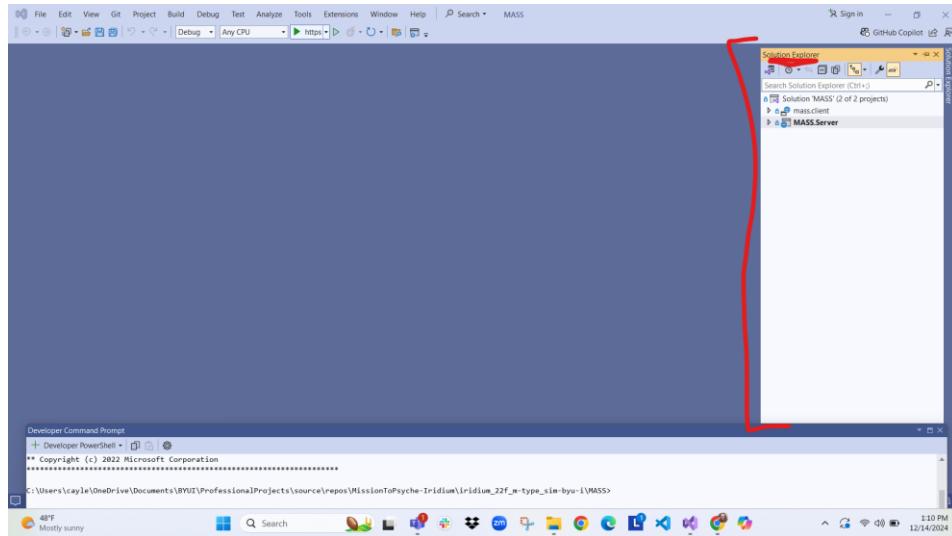
MASS.sln

12/7/2024 7:14 PM

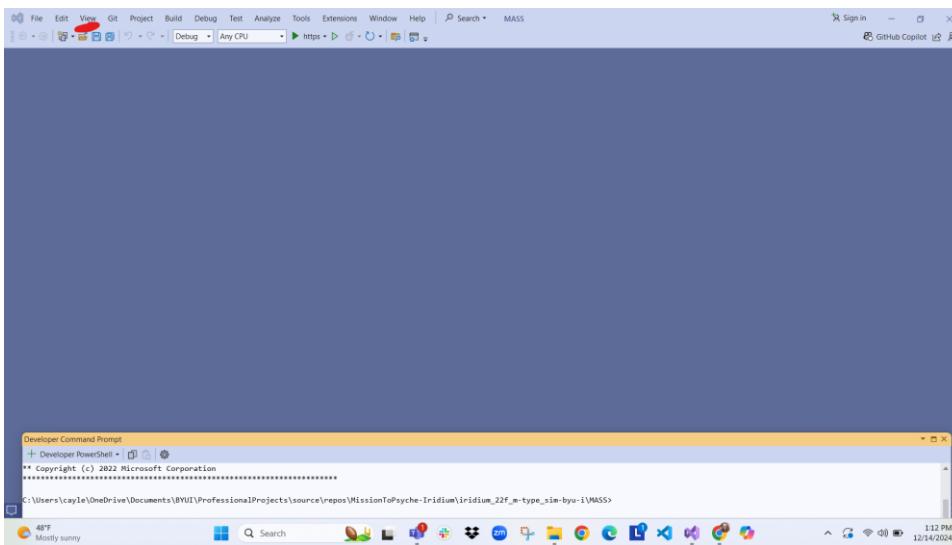
Visual Studio Solut...

2 KB

It should Open Visual Studio [You may have a pop up asking what you want to use to open the file, choose Visual Studio 2022, the purple one.] Find the Solution explorer (with red highlights)



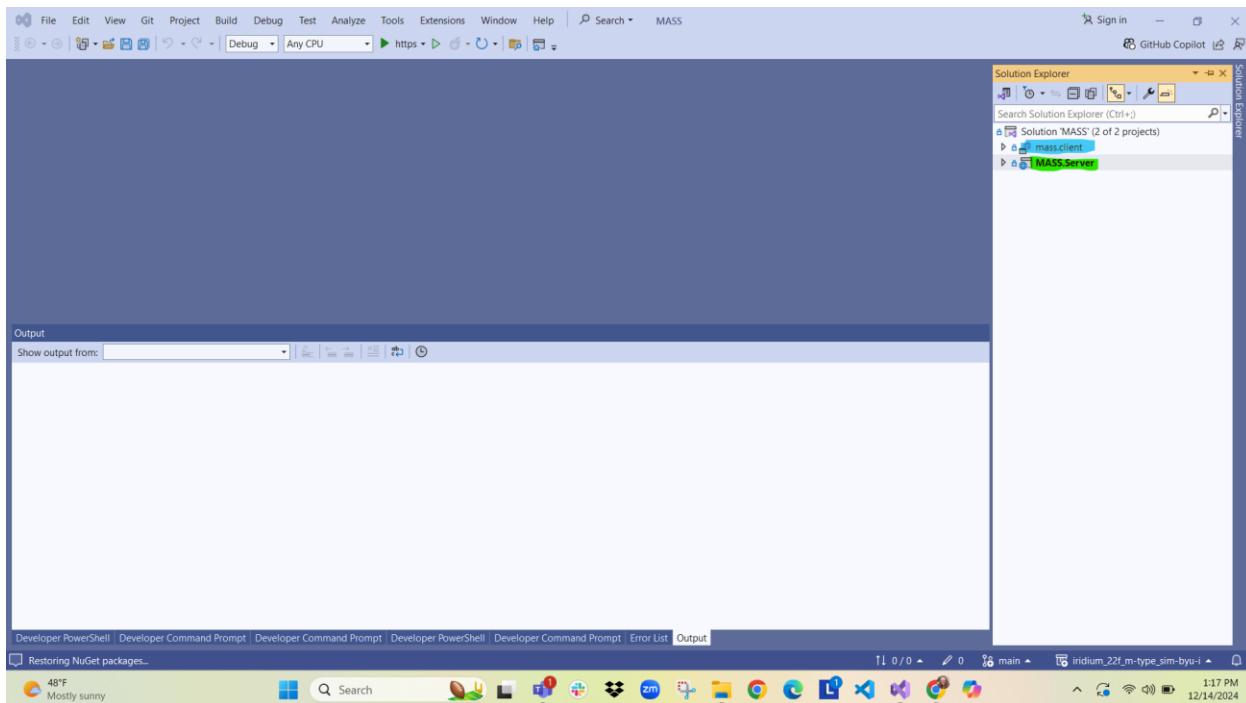
If it doesn't open automatically don't panic! Click View front The top left of the IDE (In the picture where the red underline is)



Click Solution Explorer:



Something akin to this should show!



The Mass.Client (Blue Highlight) is Frontend

The Mass.Server (Green highlight) Is all the stuff for backend

ASP.Net core Errors!

Good news! They have tons of documentation that can help you.

Use these sources to see if they can be of help to you:

<https://learn.microsoft.com/en-us/troubleshoot/developer/webapps/aspnet-welcome>

Okay Great, What Should We Do With This Project?

Our goal is to create an engaging simulation that can get the public excited about the Psyche Asteroid. Communicate with Cassie and Prasad about any goals and expectations they have for you. From my experience, they are fairly flexible and understanding as long as you're trying to

reach that goal. While you do not need to follow along with this checklist, here's some starting points to help you along:

- Make it obvious that the simulator is moving

Though it works when you start the simulation and press the up and down arrow, it can be hard to tell that the simulator is actively moving when it begins. It looks like the only thing that works is the Variable Parameters once you start the simulation. I personally suggest trying to maybe add stars to the background.

- Damage of Spacecraft

When a user accidentally crashes the simulation we need something to show up on the simulator akin to "Spacecraft Damanged. Do you want to turn back time?" or something like that.

- Work With Prasad

Prasad is working to make the simulator page to host properly so the website gets hosted on their servers. He may have more updates on how to make it so when you load the site it goes directly to the Front end rather than just the backend. Maybe Get updates about that and see what he would like to have done.

- Monitor The backend data being sent through the API on the Swagger Debug Browser Window

