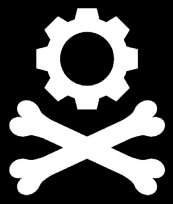
WELCOME TO *FIRST* TECH CHALLENGE!



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Your Club Officers

Captain

Thomas Xin

*@logicalx_*

Assistant Captain

Andrew Greene

@uncommonsense001

Engineering

Graham Fielding

Nicholas Apessos

@qwerty123qwert

Outreach

Harry Horvath

@halcyon.12

Grace Chiu

@bobbimectiliton

Programming

Nathan Tao

Stephen Cai

@kk201431873

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Disclaimer: Discord info is subject to change

Google Classroom

Invite Code: ekacqih

QR Code:

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Section 1: Introductions

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Nathan Tao

- **Junior, Programming Director**
  - Computer vision
  - Full-stack projects
- **Interested in supporting creative outreach projects**
  - Last year: Game Jam, Vlogumentary
  - Open to build websites, edit videos, and help other outreach projects that you guys want to undertake

Me when computer vision works

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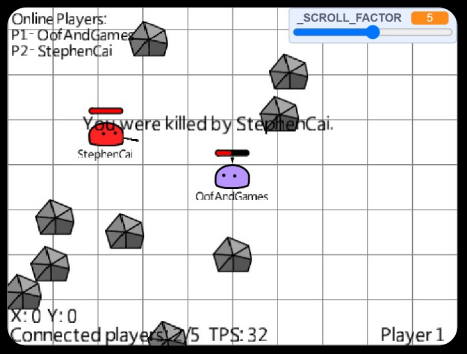
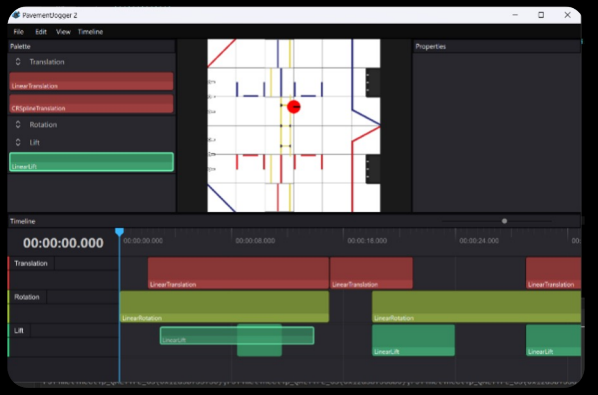
Stephen Cai

- **Senior programming director**
  - My main languages are Scratch & Java
  - Working on a path planning software
- **Member for three years**
  - Freshman year: engineering
  - Sophomore & Junior year: programming
- **Current Hobbies include:**
  - Robotics, ofc (specifically control theory)
  - Writing & playing music
  - Minecraft



Multiplayer Shooter Game on Scratch



Path Planning Software
"PavementJogger"

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Your Turn!

- Let's get to know each other! Please share:
  - Your name and/or preferred name
  - Why you chose to join the Robotics Club
  - What you hope to learn/do in the Programming department
  - A fun fact about yourself

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Section 2: What is *FIRST*/FTC?

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What is *FIRST*?

- For Inspiration and Recognition of Science and Technology
- "*FIRST* is a global **robotics community** preparing young people for the future and the world's leading youth-serving nonprofit **advancing STEM education.**"

☆ Excellence in **STEM**

☆ Excellence in **Promoting STEM**

Source: https://www.firstinspires.org/

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Gracious Professionalism®

☆ "Gracious Professionalism is part of the ethos of ***FIRST***…
"Participants compete intensely while treating each other with **respect and empathy**." ☆

- *FIRST Website - Mission Statement*

"What Gracious Professionalism Means to Me"

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What is FTC?

- FIRST Tech Challenge
- New challenge every year—this year is *"Into The Deep"*

INTO THE DEEP℠

PRESENTED BY RTX

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Your Job as an FTC Programmer

- Develop software
- Proactively contribute to the community

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Your Job as an FTC Programmer

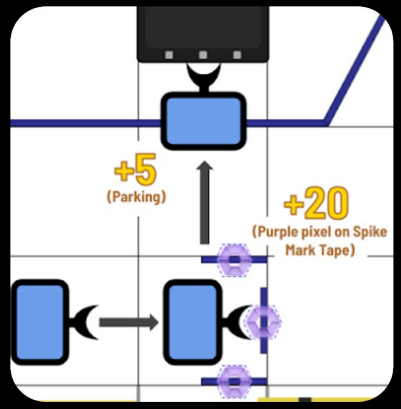
➢ **Develop software for:**

- Efficient manual control of the robot;
- Reliable detection of fiducial markers;
- Consistent autonomous control of the robot.

● **Proactively contribute to the community**

Tele-Operation (Teleop)

Computer Vision (CV)



Autonomous (Auto)

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Your Job as an FTC Programmer

- Develop software
- ➢ **Proactively contribute to the community by:**
  - Volunteering at community events;
  - Spreading the word for these events;
  - Helping the Outreach Department with fundraisers (e.g. bake sales)

Library Workshop

JCCMW Open House

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Section 3: Training/Labs Overview

Schedule Topics Overview Teams

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Generic Club Schedule

Regular schedule

- Monday: **3PM - 5PM**
- Wednesday: **3PM - 5PM**
- Friday: **2:05PM - 4PM**

Busy schedule (before comps)

- Friday: **2:05PM - 5PM**
- Other weekdays: **3PM - 6PM**

You are under *NO* obligation to attend (all of) every meeting!!!

But, it is highly recommended that you attend this training course regularly!

✯ **IMPORTANT**: This training course will last from **9/9-10/7**.

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Lab Topics!!

- **Unit 0 (9/9-13)**: GitHub & Android Studio Setup ← **We are here!**
- **Unit 1 (9/16-20)**: Basics of TeleOp
  - Lab: The Floor Is Lava
- **Unit 2 (9/23-27)**: Basics of Autonomous
  - Lab: Parallel Parking
- **Unit 3 (9/30-10/7)**: Basics of Computer Vision
  - Lab: Red-Light-Green-Light Competition

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Lab Overview

- Teams will be formed and will compete against each other for Pirate Booty (PB) Points.
- Weekly lab schedule:
  - Each lab will be introduced on **Monday**
  - Teams will be allotted **robot time** on a rotating basis
    - *Your team cannot "stash" time if you don't use it*
  - Lab Trials will happen at the end of **Friday**'s meeting (except Unit 3).

✯ Team with the most PB Points earns: **a candy bag of their choice** OR **Pirate's Booty snacks** (converted from points).

1 PB Point = 1 oz Pirate's Booty (conversion rates subject to change)

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Lab Teams

Team #	Members	Total PB Points
Team 1	**TA**: Aaron He May B, Arjan B, Cici Z, Wesley S, Nicholas M	1
Team 2	**TA**: Om Sanan Madison W, Ari S, Sam G, Viir S, Jonah S	1
Team 3	**TA**: Alexander Kempe Ofir S, Luke L, Sky C, Asher C, Emma Y	1

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Section 4: Setup

Android Studio — Git — GitHub

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What is Android Studio?

- Integrated Development Environment (IDE)
  - Where you write code: it's basically a fancy text editor

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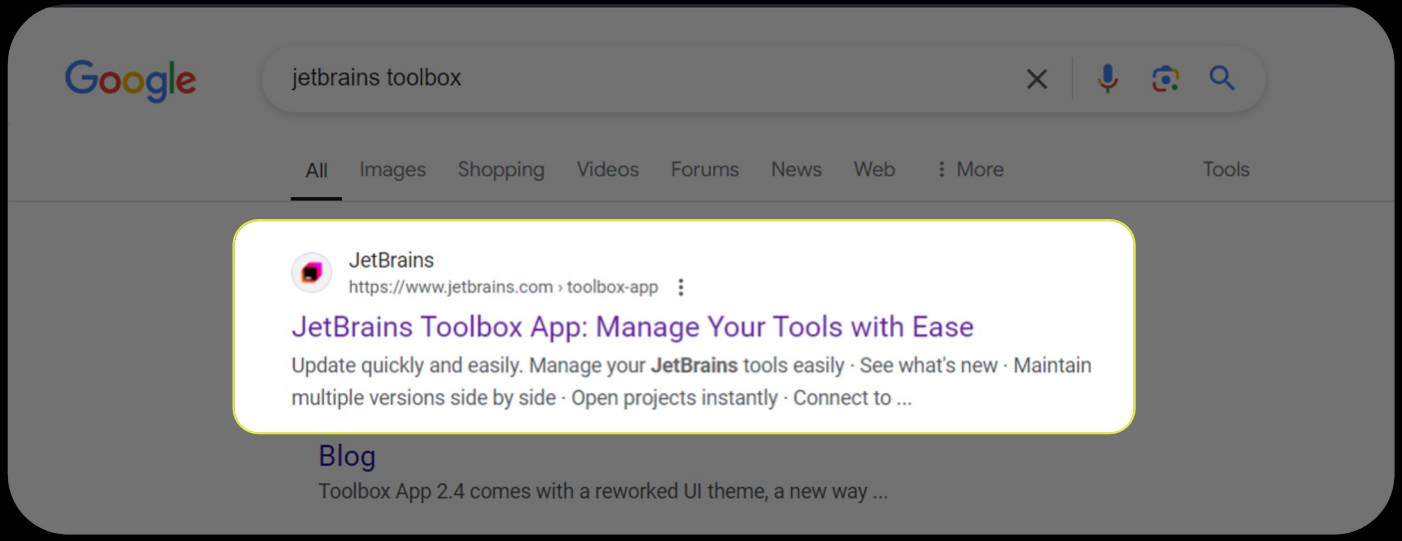
Installing Android Studio

- Google “jetbrains toolbox” and open the first link (jetbrains.com).



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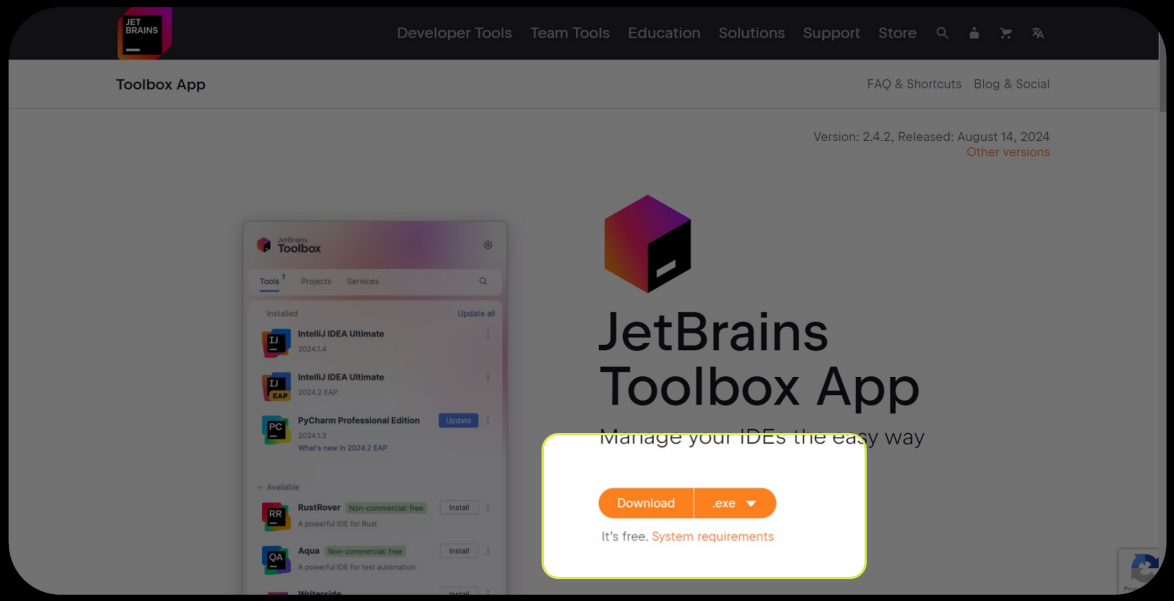
Installing Android Studio

- Download the installer from the homepage.



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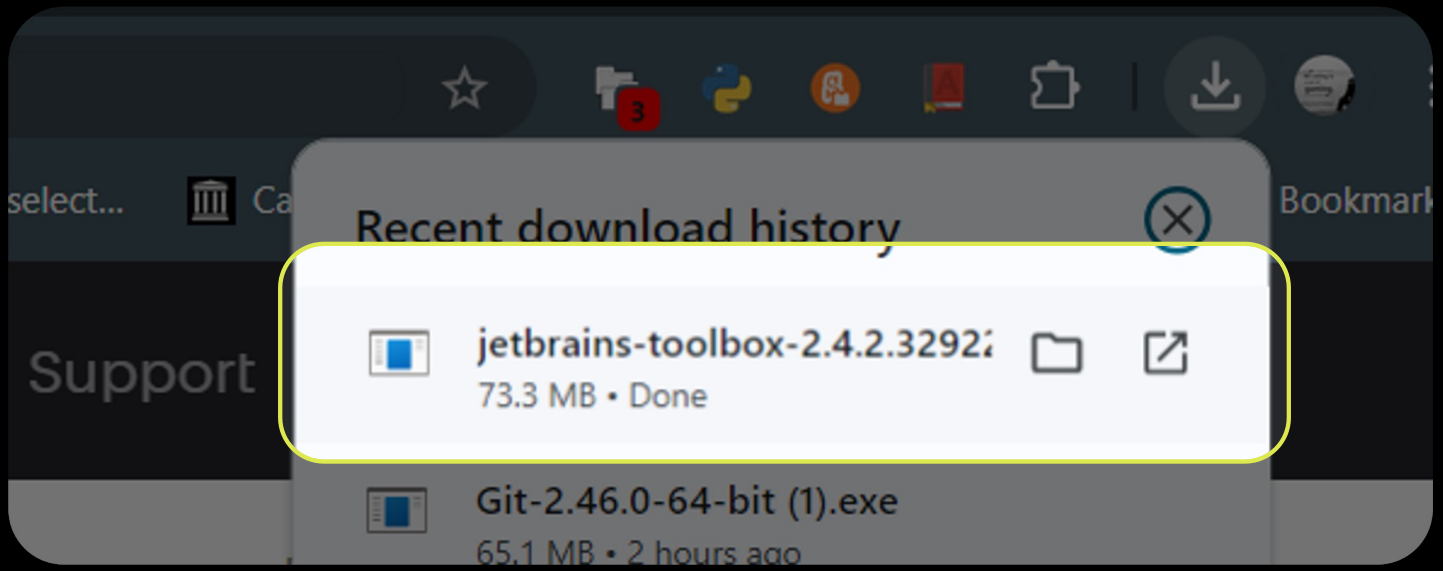
Installing **Android Studio**

- Run the executable after it finishes downloading.



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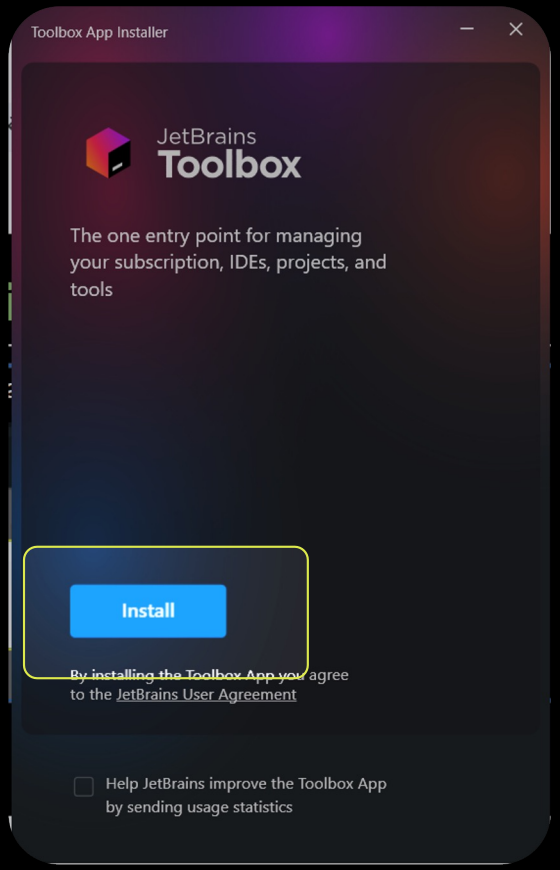
Installing Android Studio

- Press “Install”.



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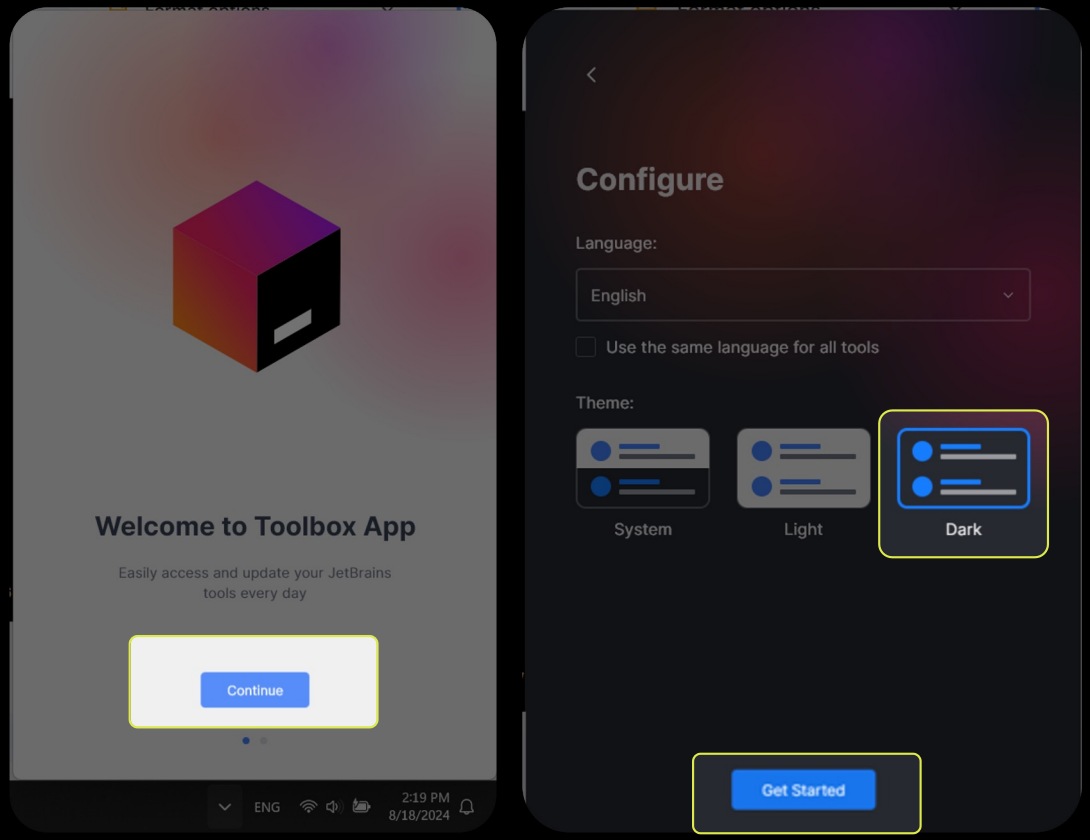
Installing Android Studio

- Continue through the setup and choose Dark Mode (This is necessary for becoming a programmer)



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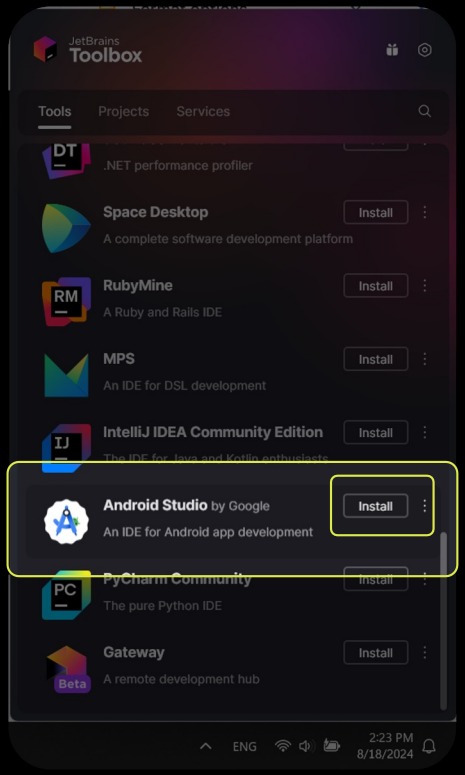
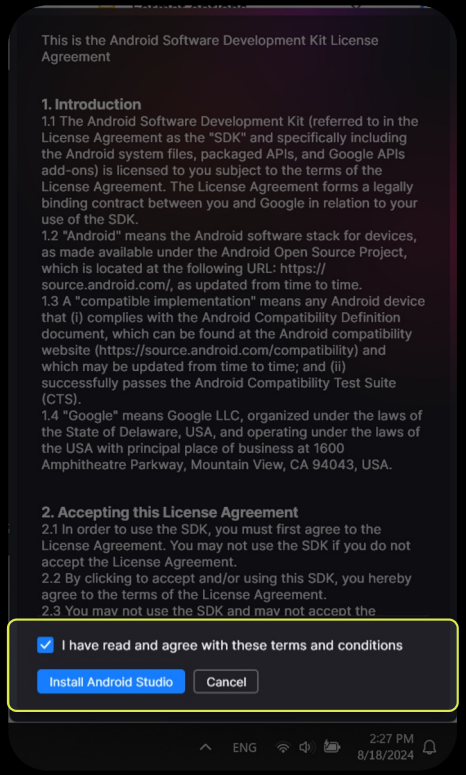
Installing Android Studio

- Once you're on the home screen, scroll down to Android Studio and hit "Install".
- Accept the T&C and press "Install Android Studio"
- You're all set!!🎉





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What is Git?

- **Local Version Control**: Keeps track of changes you've made to your code.
  - Important if you want to revert back to an older version!
- Code gets "committed" from Android Studio to Git (analogous to a snapshot).

Code written in IDE

Local Version Control

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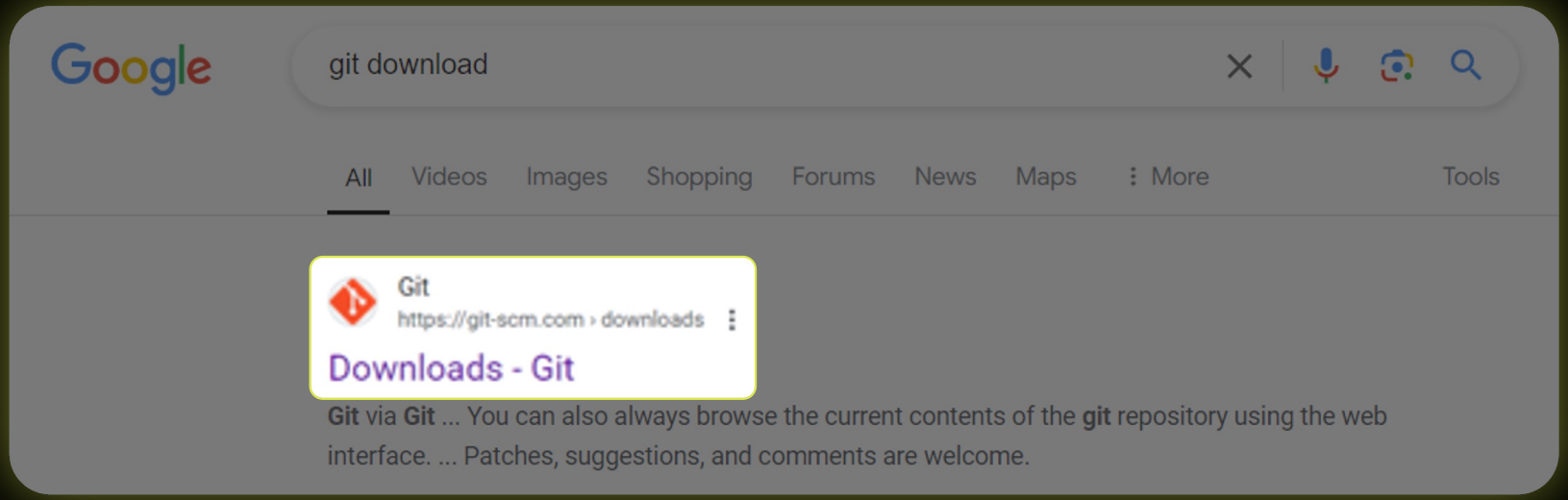
Installing Git

- Search “git download”; click on the first result (git-scm.com).



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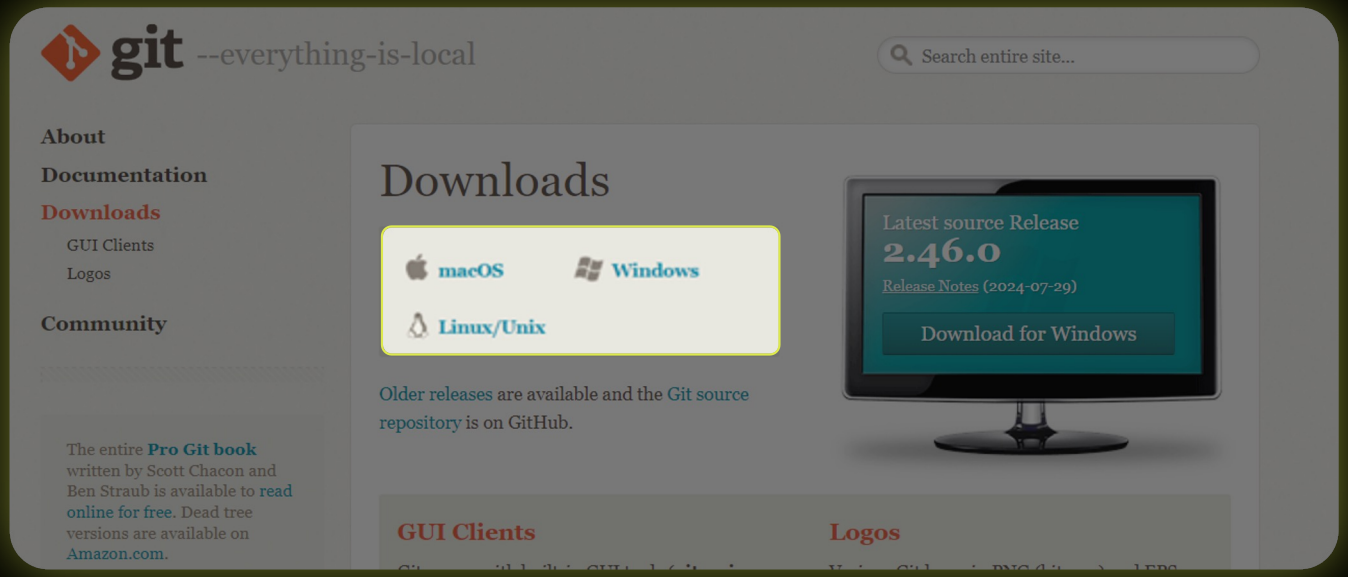
Installing Git

- Find the correct executable for your machine.



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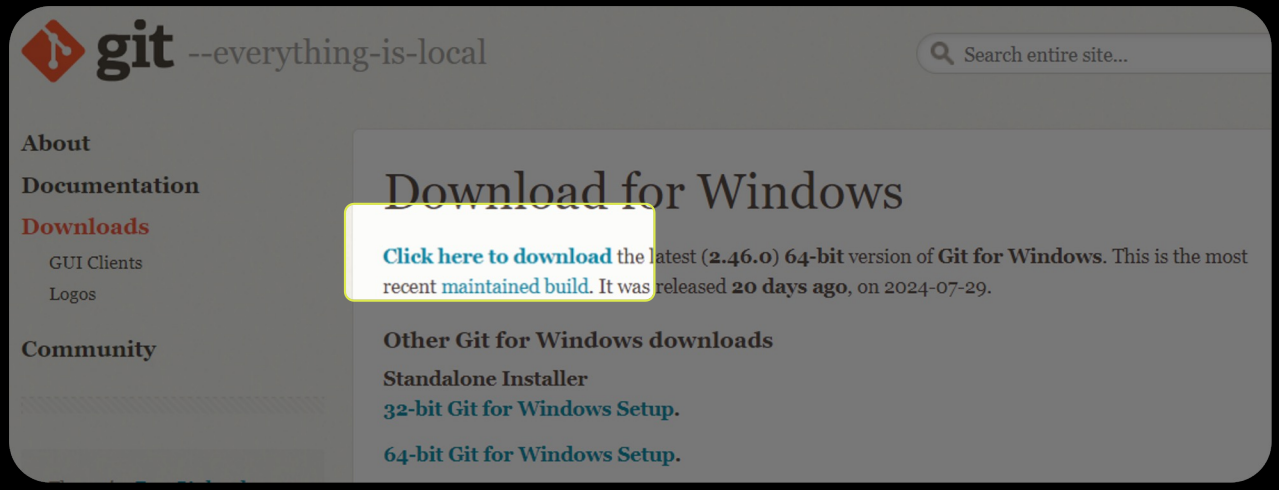
Installing Git

- Download the from the recommended link (this picture is an example for Windows computers; if you have another OS then follow those instructions).



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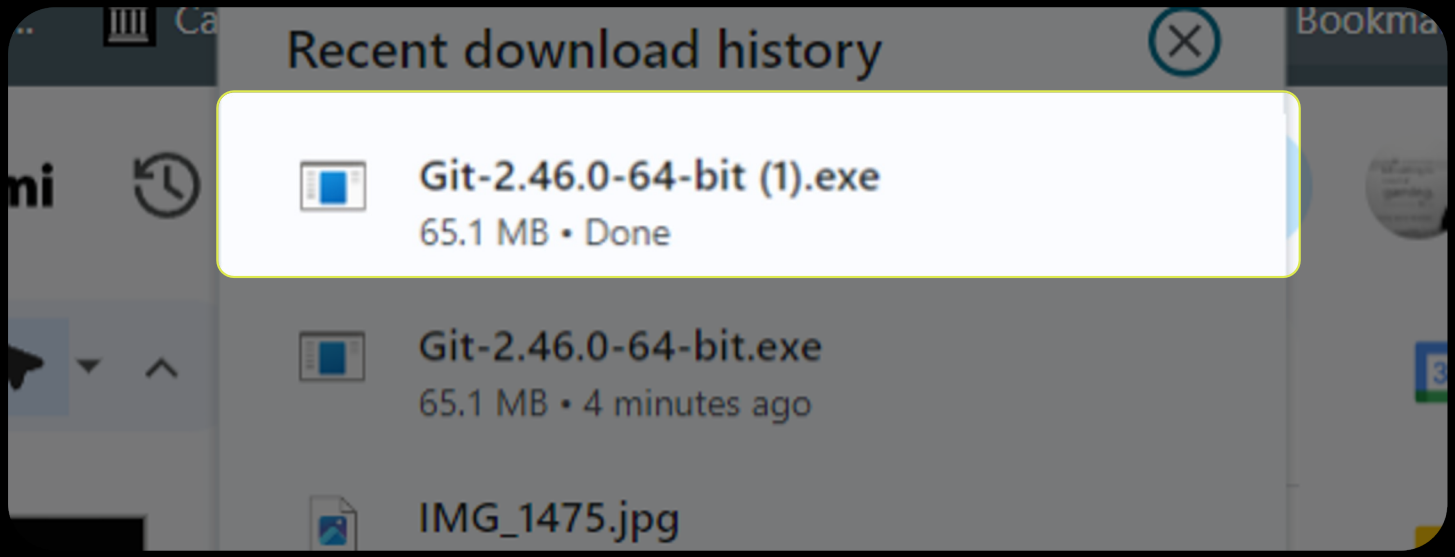
Installing Git

- Run the executable



Note: I accidentally downloaded it twice 💀

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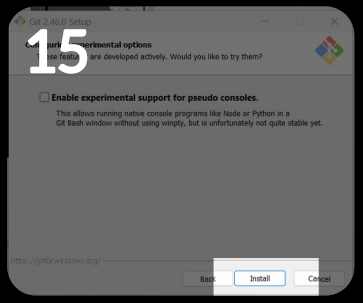
Installing Git

- Run the executable and keep pressing “Next”



- Finally, press “Install”

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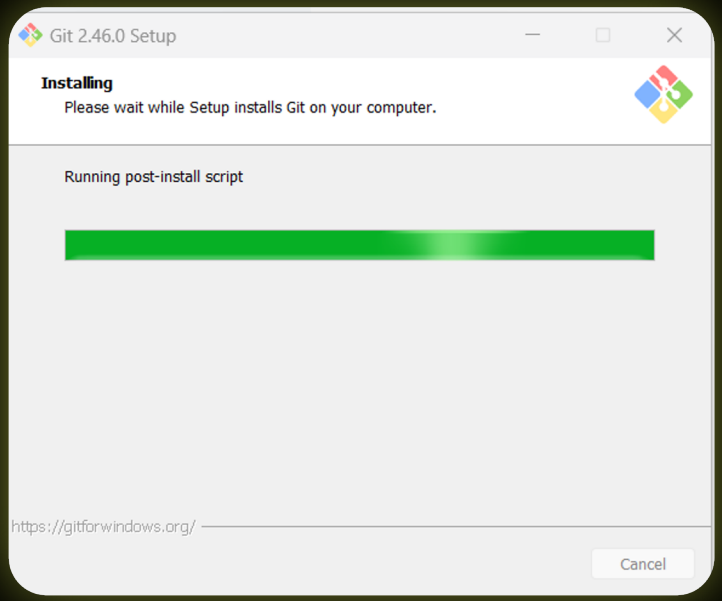
Installing Git

- Wait for it Git to finish installing



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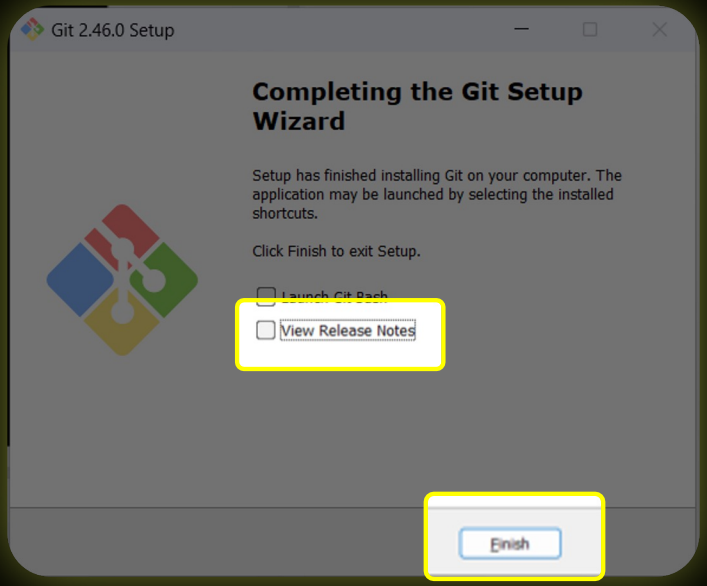
Installing Git

- Untick “View Release Notes” and press Finish



Congratulations, you’ve installed Git!

🎉👏👏👏

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What is GitHub?

- **Remote Version Control**: Essential for keeping code safe and backed-up!!
  - GitHub is where we store ALL of our team's code.
- Commits get "pushed" and "pulled" from Git to Github

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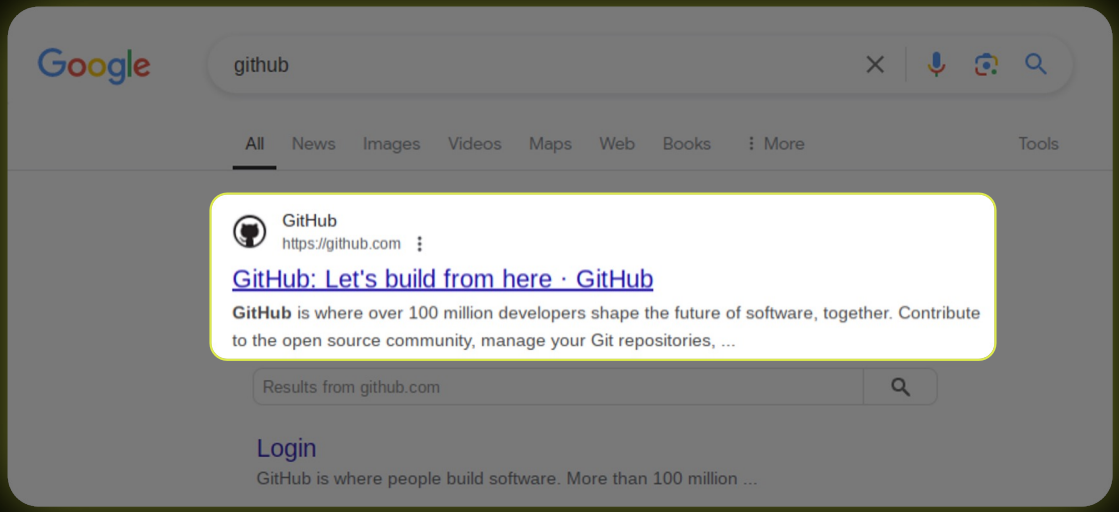
Joining GitHub

- Search “github” (github.com).



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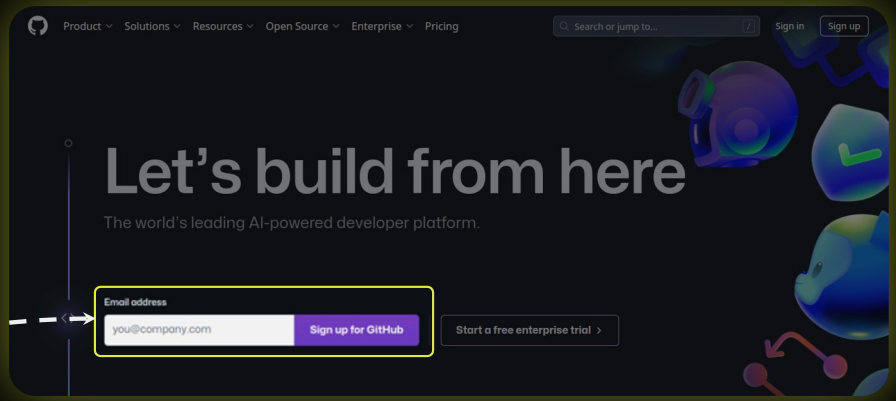
Joining GitHub

- Sign up (your personal email).
- Let a programming officer know your username. We will invite you to edit our GitHub repository (our code base).



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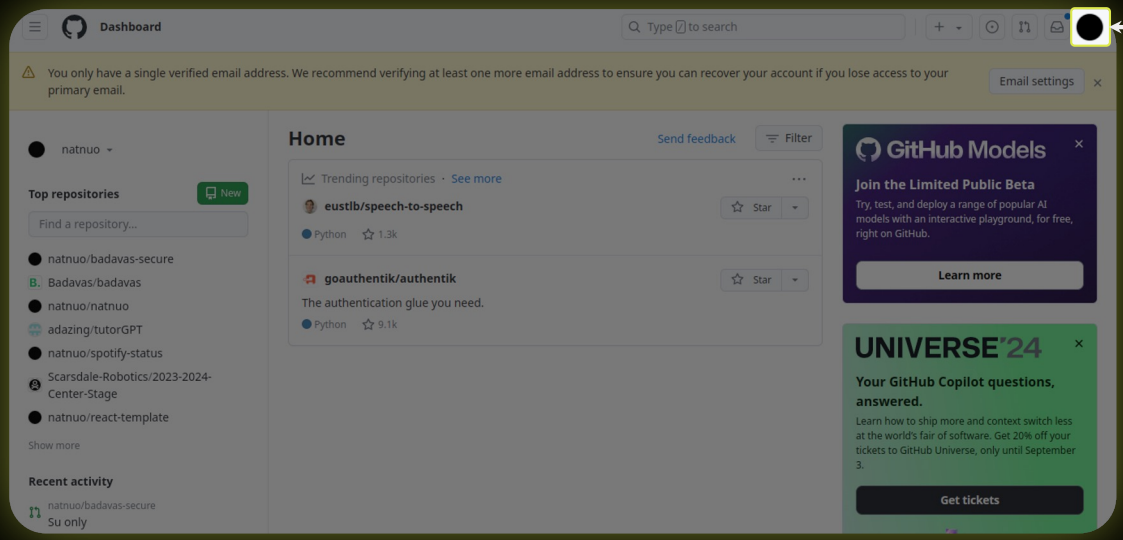
Configuring Your Access Token

- In GitHub, click on your profile picture.



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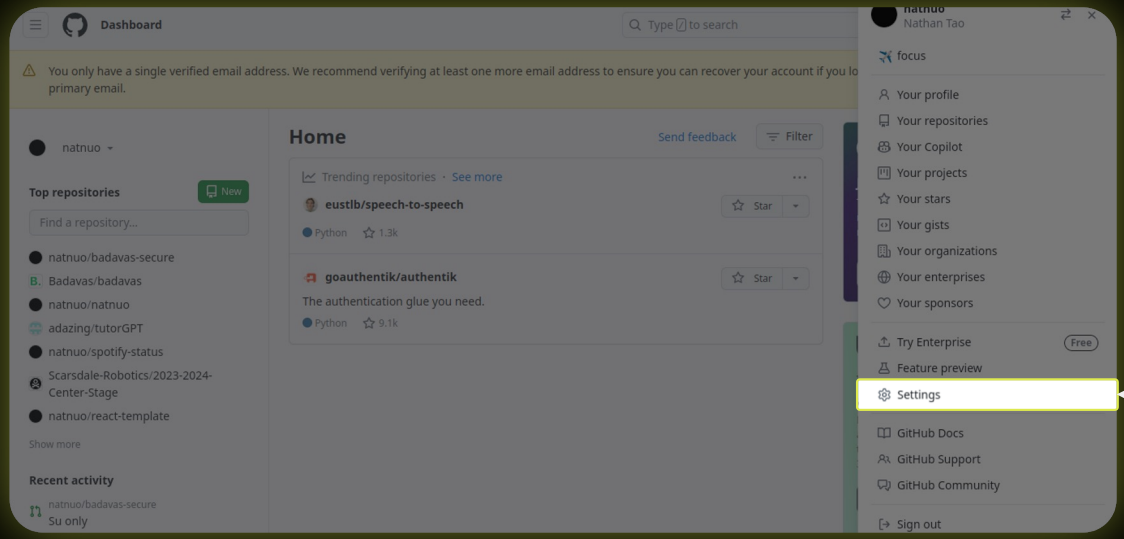
Configuring Your Access Token

- View your settings.



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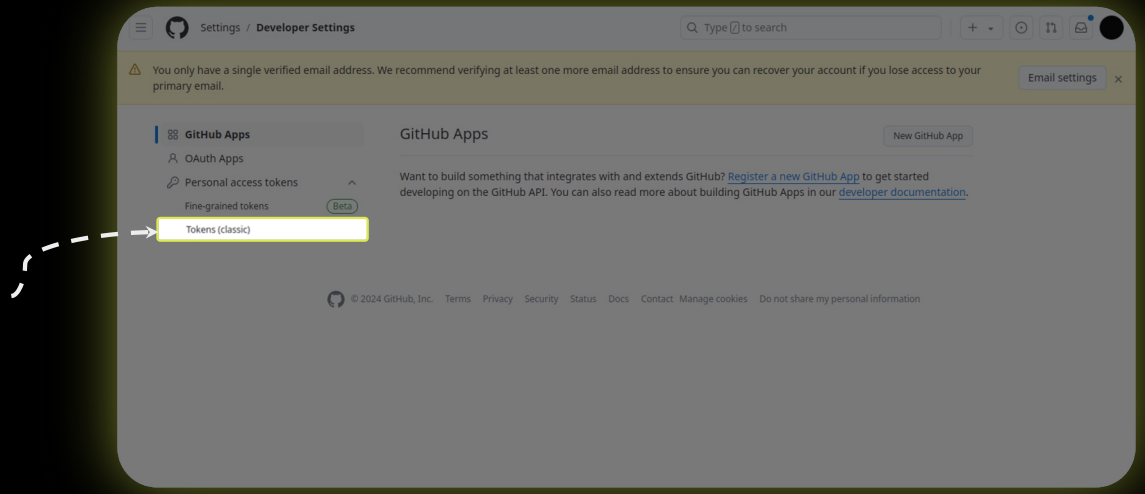
Configuring Your **Access Token**

- Scroll down, go to “*developer settings*”, then select “*Personal access tokens*” → “*Tokens (classic)*”.



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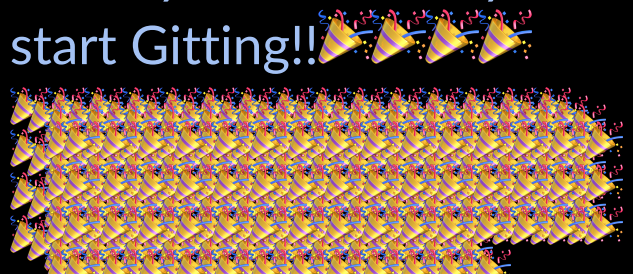
Configuring Your **Access Token**

- Click "*Generate new token*" → "*Generate new token (classic)*".
- Set the expiration to 7 days.
- Set the note to anything you want.
- Check all the items of the "*repo*" scope.
- Generate the token.
- Copy the resulting token. Save this value. (This value should start with `ghp_`).

Hooray! You're ready to start Gitting!!



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Section 5: Let's Make Changes!

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How to Make Changes

- Let's learn how to make a change to our codebase.
- Overview of steps:
  - **Clone** (or **pull**)
  - **Branch** and **checkout**
  - *Make your changes*
  - Git **add**
  - Git **commit**
  - Git **push**
  - Create a **pull request**

} ✯ Try to remember these three!

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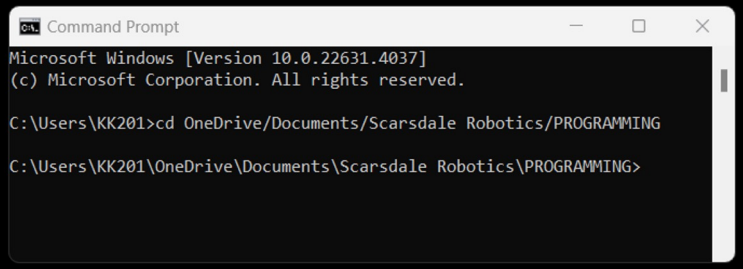
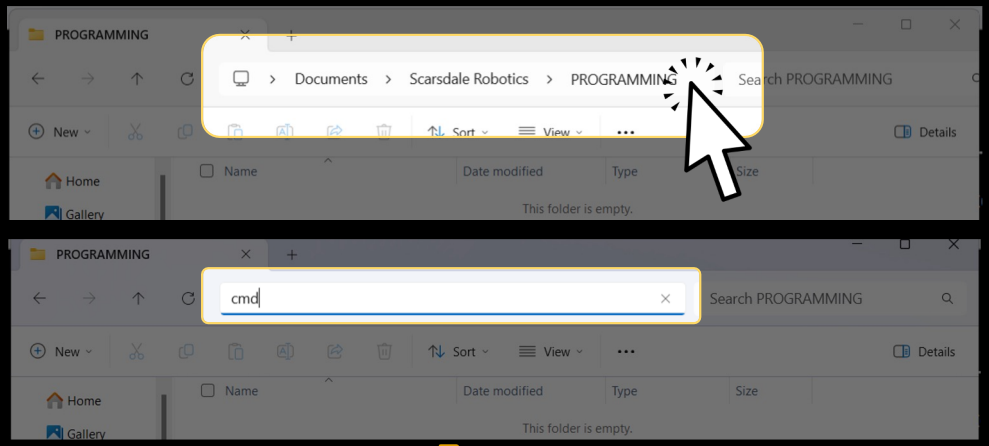
Cloning the Training Repository

- Cloning makes a local copy of a remote repository (folder containing code).
  - Necessary if you do not have the code locally!
- First, find or create the folder where you want to store your repositories in, and **open a terminal in that directory** *(there are multiple ways to do this)**.

*cd Method



*File Explorer Method (Windows)



Open your folder in  *, type "cmd," and hit Enter*

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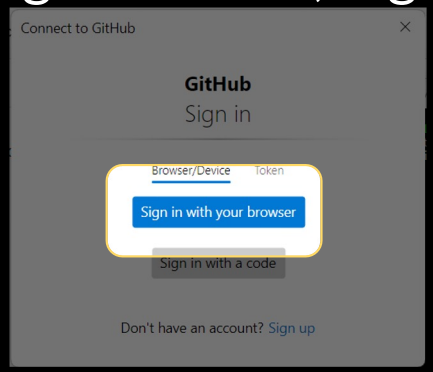
Cloning the Training Repository

- Then, paste the following and hit Enter*:

```
git clone https://github.com/Scarsdale-Robotics/2024-2025-Training-Program-U0.git
```

You can also get the HTTP link by going to https://github.com/Scarsdale-Robotics/2024-2025-Training-Program-U0 and clickin <> Code on

- If prompted for your username, input your GitHub username.
- If prompted for your password, input the personal access token we just created.
- If prompted with a login window, login using your GitHub account.



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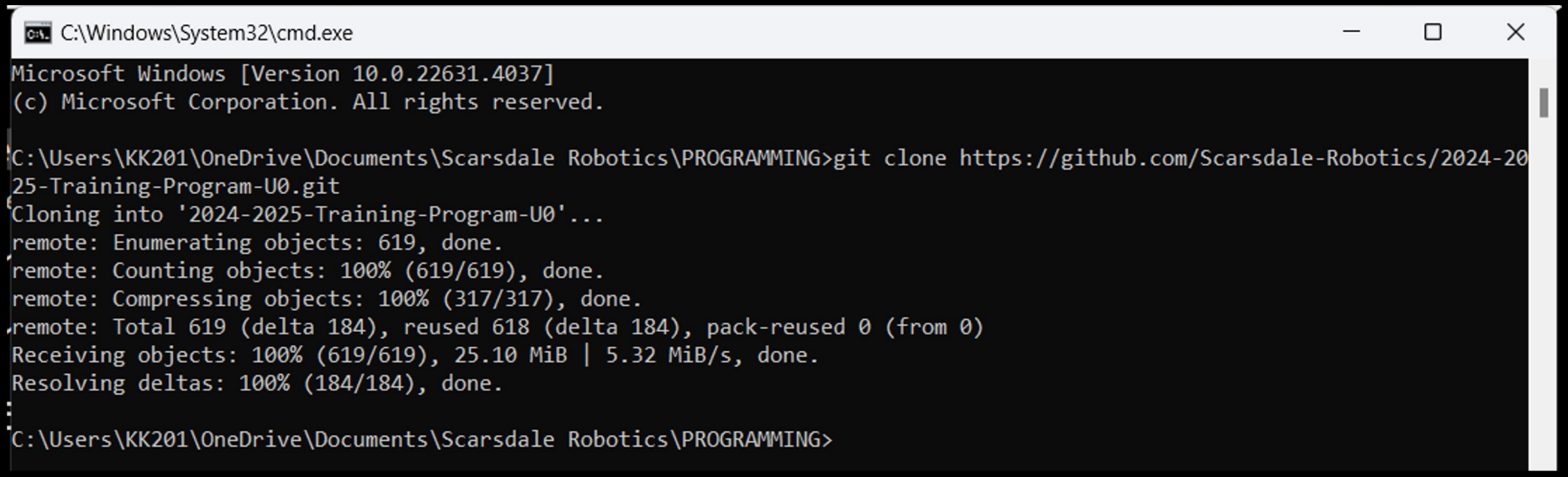
Cloning the Training Repository

- You should see some outputs like this, which means it worked!



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Cloning the Training Repository

What's actually happening?

- On GitHub, all the history of our code is stored—like a revision history in Google Docs. The command "`git clone`" is similar to opening a Google Doc your computer—you are getting our code. You can then make changes and send a pull request when you're done (we'll get to this in a bit…).

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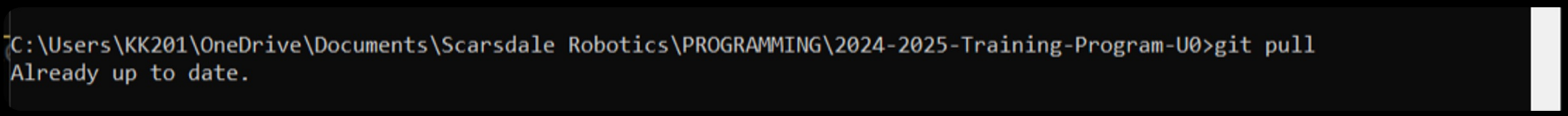
Pulling the Training Repository

- If you already have the repository locally, **cd into it (**`cd 2024-2025-Training-Program-U0`**)**, type `git pull`, and hit Enter.



My repo is already up to date!

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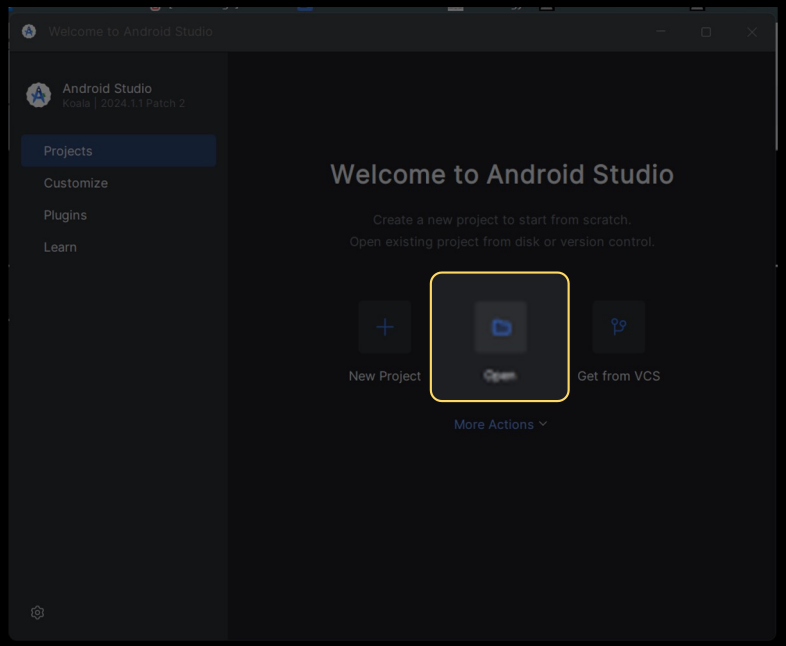
Opening in Android Studio

- Launch the Android Studio application and click “Open”.



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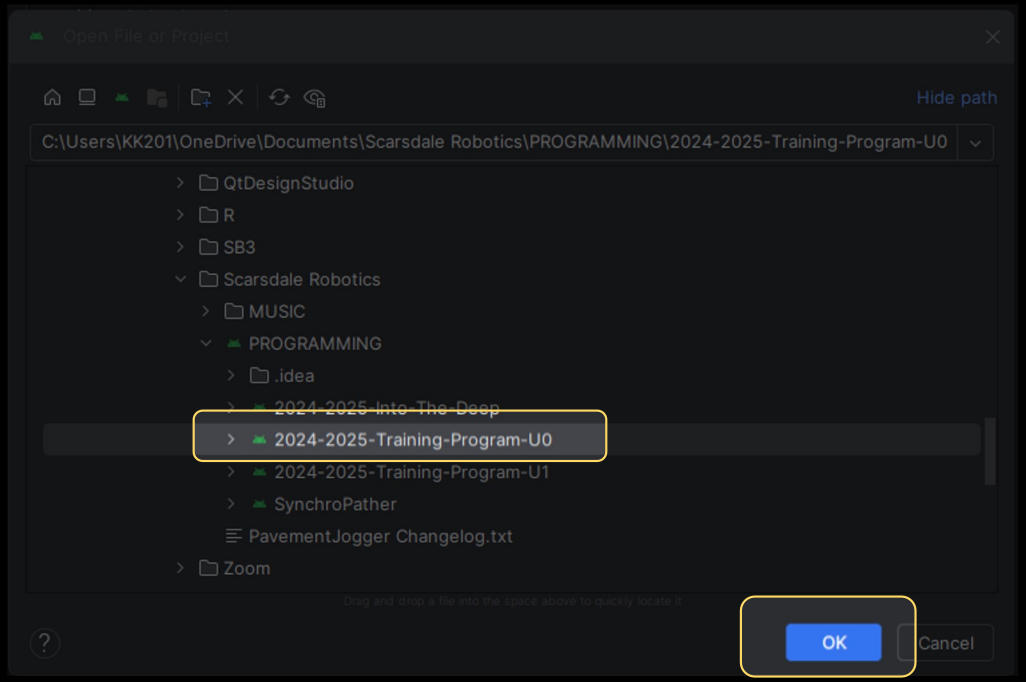
Opening in Android Studio

- Navigate or paste in the path to the “2024-2025-Training-Program-U0” folder and press “OK”.

It should have the icon!



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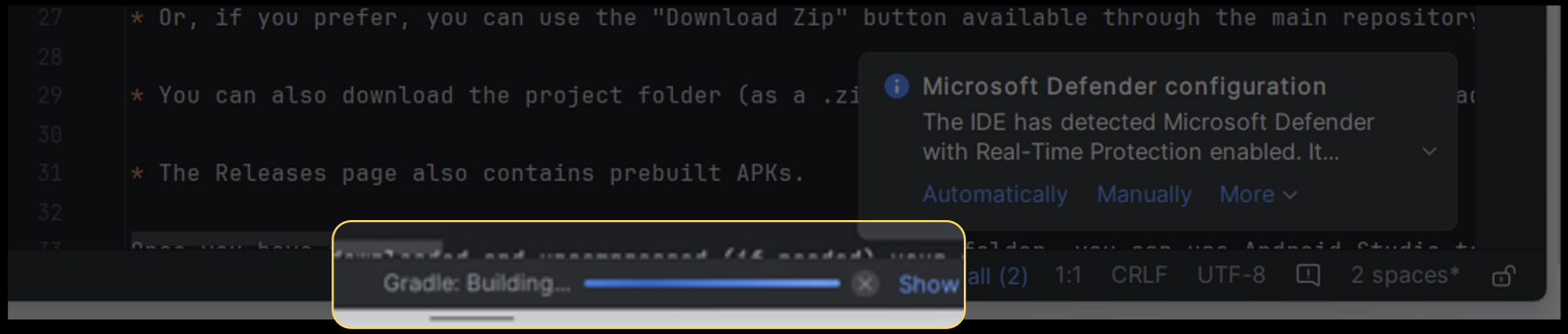
Opening in Android Studio

- Wait until Gradle finishes building. This is important because Android Studio has to download online FTC libraries onto our machine.



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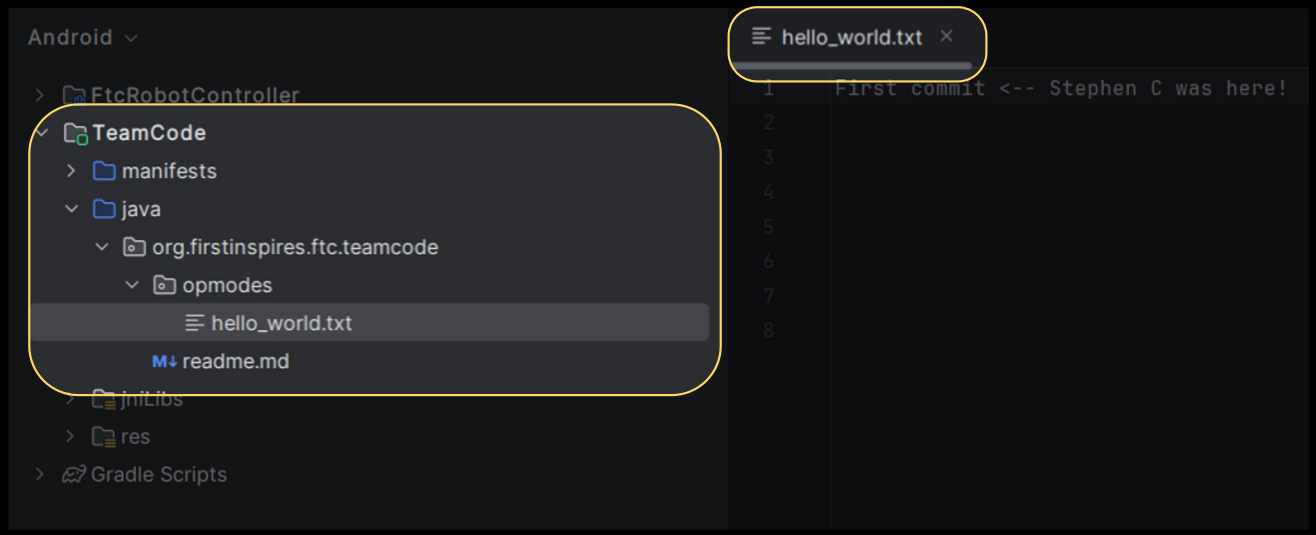
Opening in Android Studio

- Open the file tree starting from “TeamCode” until “opmodes”. Double click the file called “hello_world.txt” to open it!



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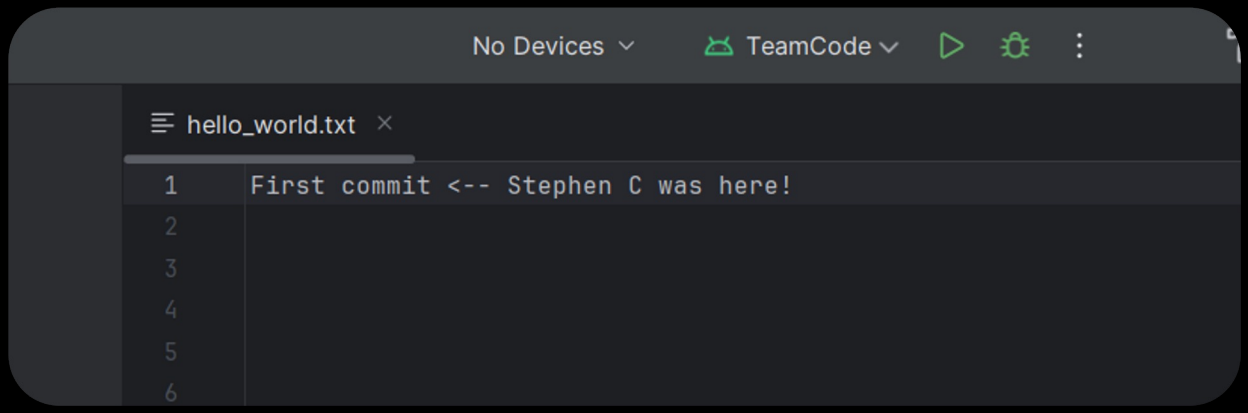
Opening in Android Studio

- This file was added in Stephen's initial commit to the repository. Let's do something similar...



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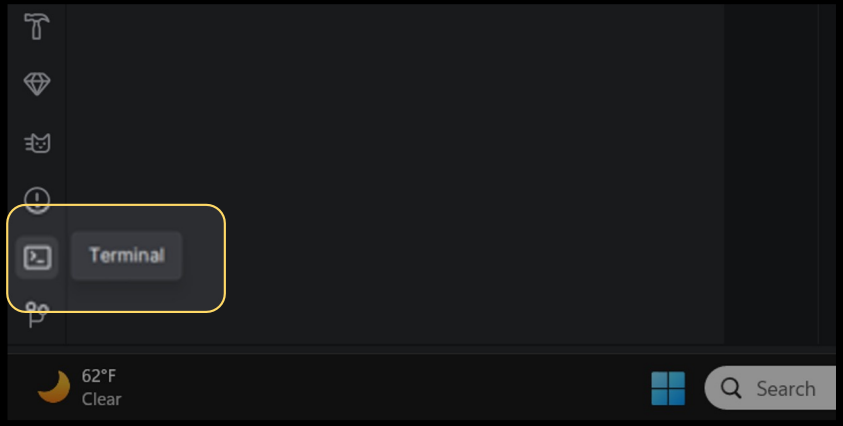
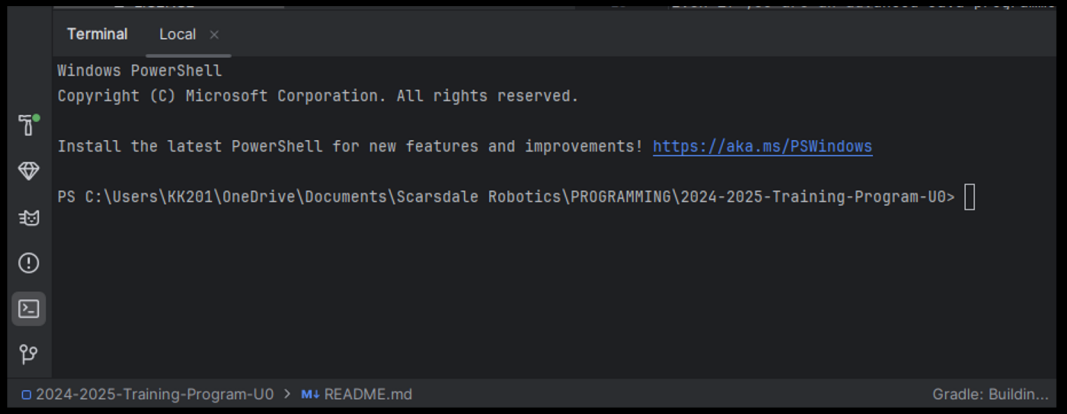
Branching Off

- First let's create a new **branch**, where we can privately make changes and later merge them into the main branch.
- Press the Terminal button in the bottom left to open one.





Your terminal window!

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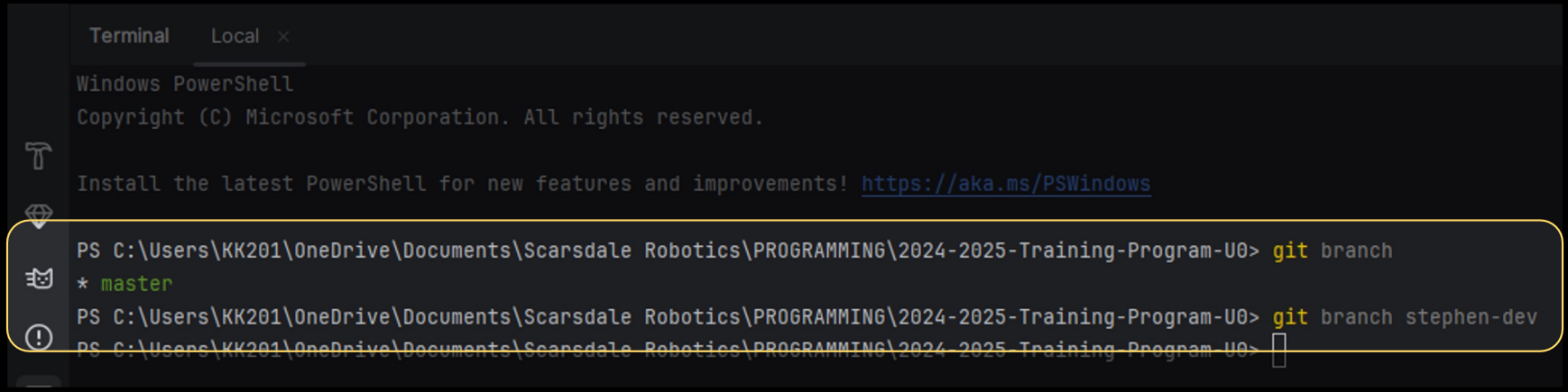
Branching Off

1. Enter in "`git branch`" to see what branch you're on; it should say `master` (green means selected).
2. To create a new branch, type "`git branch [your name]-dev`" and hit enter ("Dev" is short for development branch).



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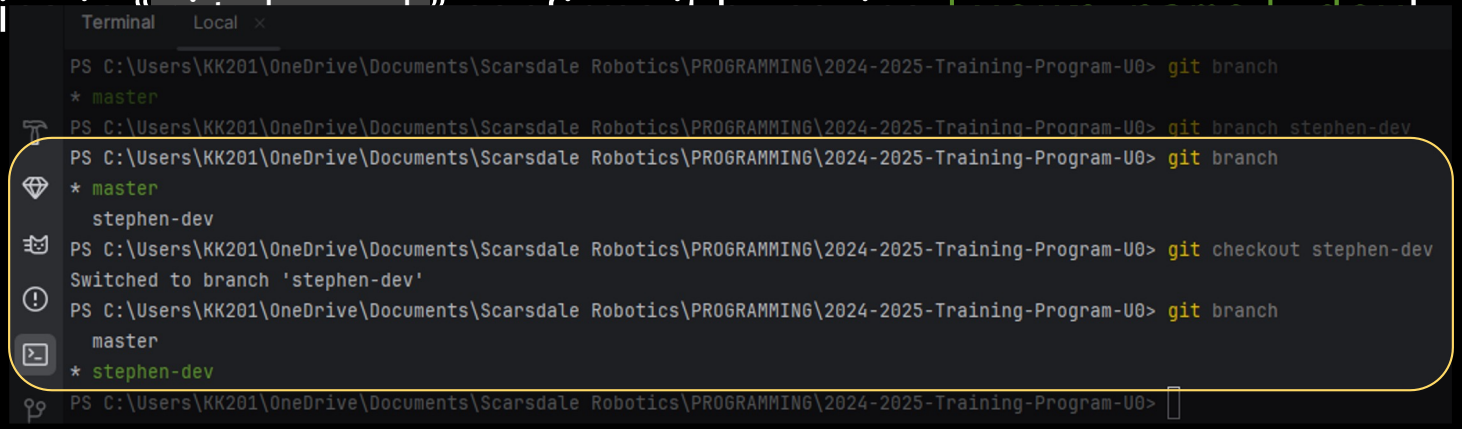
Checking Out a Branch

1. Enter in "`git branch`" again, it should still say `master`. Why isn't the dev branch selected?
2. We've only *created* a branch. Enter in "`git checkout [branch name]`" to select it.
3. Enteri[illegible]



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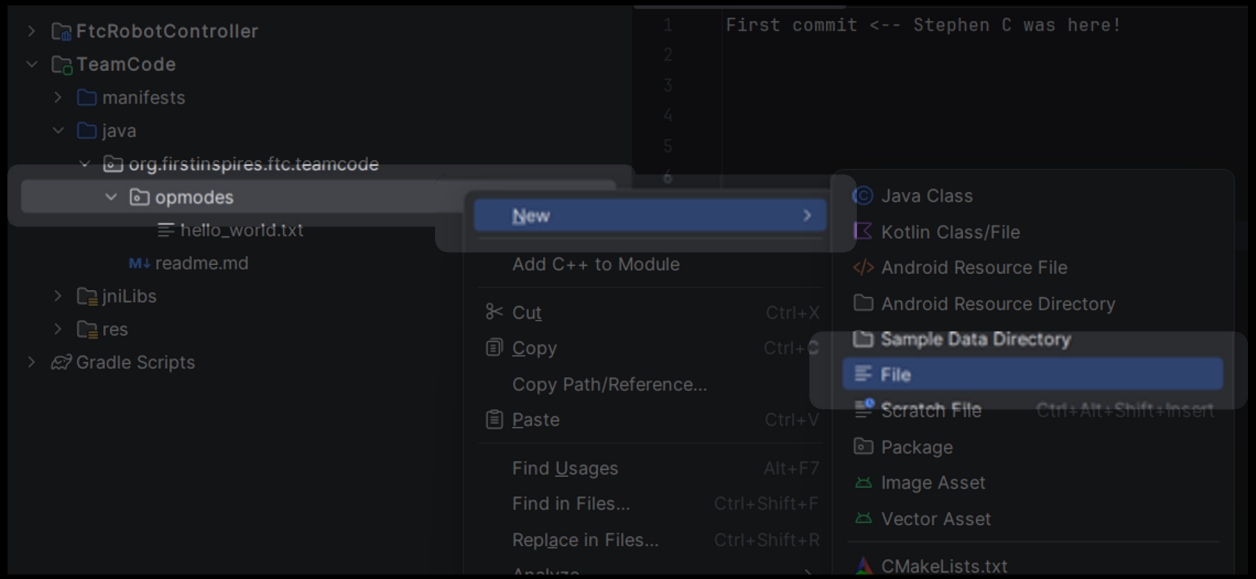
You're on a private development branch! Let's make some changes now.

Make Some Changes

- Right click on the “opmodes” folder and select “New” > ”File”; call the new file:



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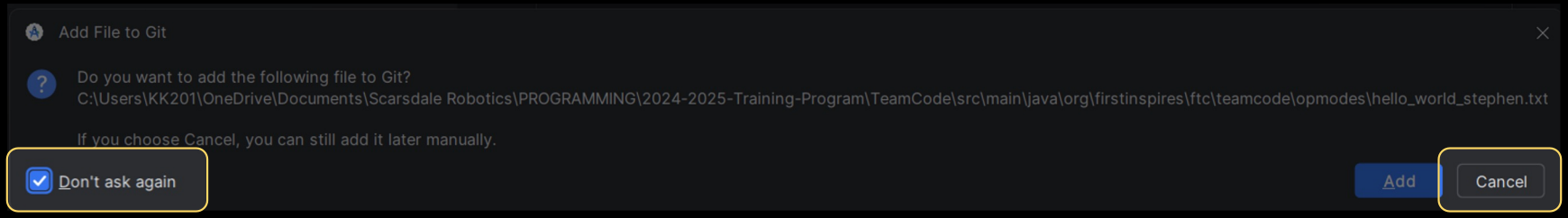
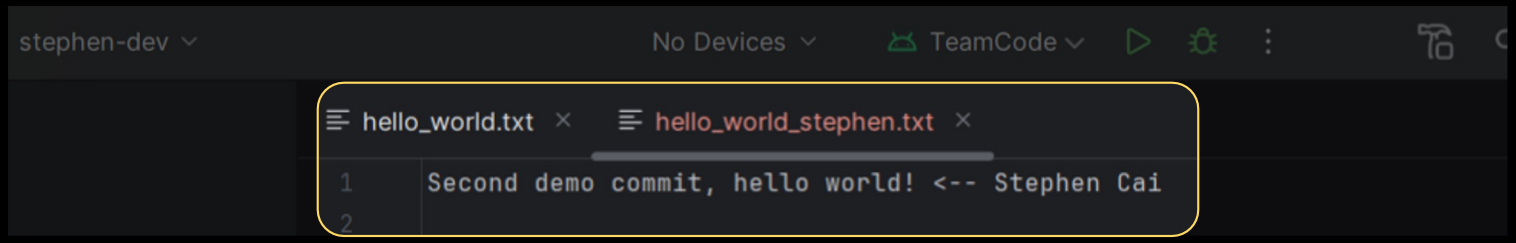
Make Some Changes

- If you're prompted with an "Add File to Git" dialog, tick the "Don't ask again" box and press "Cancel". You can manage your own files in Git!



- Type your name, a greeting, or whatever you want into the file (appropriate pls)



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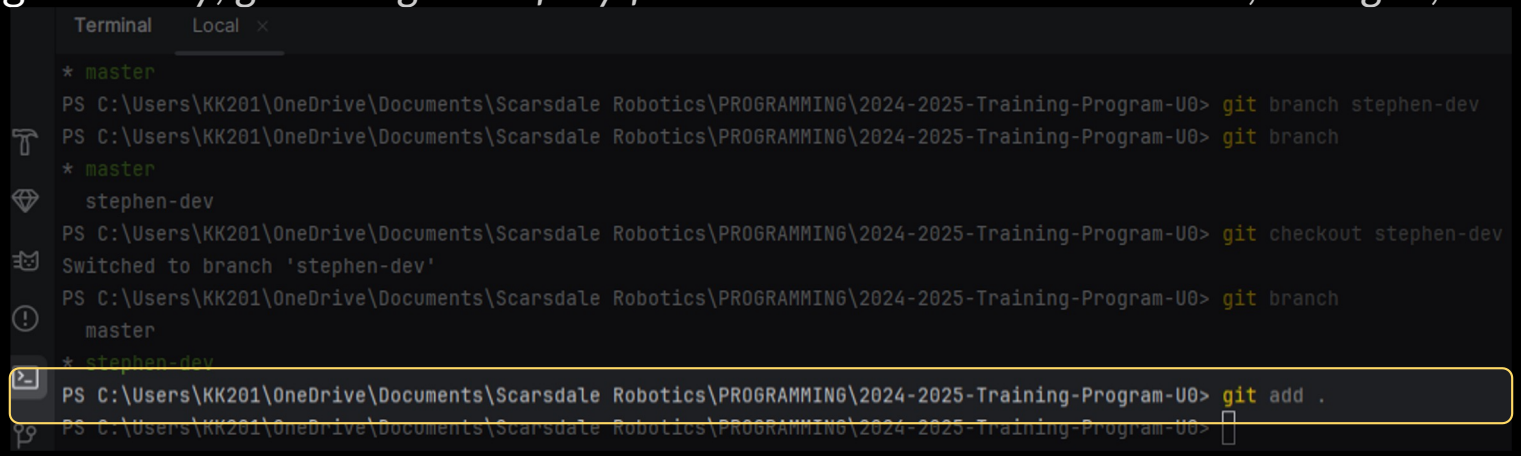
Git Adding

- Now, we need to *stage our changes* to be committed, which means, we need to tell Git which files we modified.
- The easiest way to do this is by entering "`git add .`" into the terminal, which is basically telling Git: "*Hey, go through all of my files and see which ones are new, changed, or removed*".



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Git Committing

- Next, we use Git to commit (remember “snapshot”) our code by entering in:
  `git commit -m “[say something here!]”`
- The `-m` just sets the following string within quotes as the commit’s message. This is useful for describing what you added, removed, or fixed in your commit.
- If you are told to run `git config --global ...` twice, do as instructed. Your name should be your GitHub username.

```
PS C:\Users\KK201\OneDrive\Documents\Scarsdale Robotics\PROGRAMMING\2024-2025-Training-Program-U0> git branch
  master
* stephen-dev
PS C:\Users\KK201\OneDrive\Documents\Scarsdale Robotics\PROGRAMMING\2024-2025-Training-Program-U0> git add .
PS C:\Users\KK201\OneDrive\Documents\Scarsdale Robotics\PROGRAMMING\2024-2025-Training-Program-U0> git commit -m "funny lil commit message ._."
[stephen-dev 1fd82ab] funny lil commit message ._.
 1 file changed, 1 insertion(+), 1 deletion(-)
PS C:\Users\KK201\OneDrive\Documents\Scarsdale Robotics\PROGRAMMING\2024-2025-Training-Program-U0>
```

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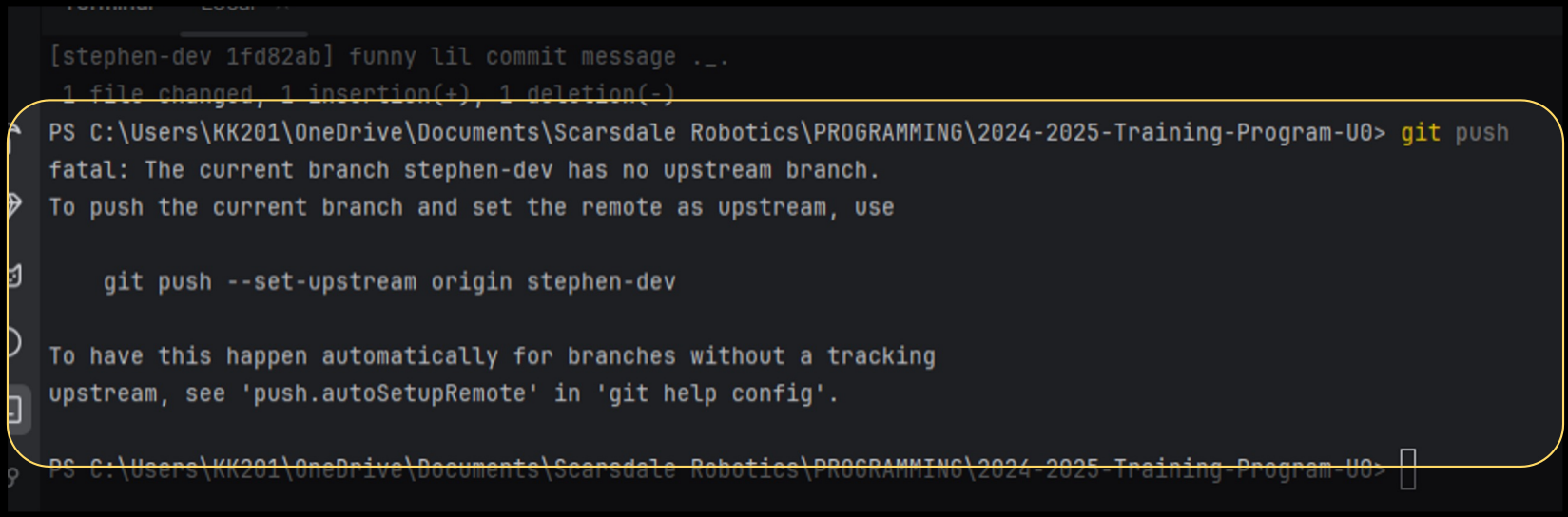
Git Pushing

- Finally, we push our commit to the remote repository! Try entering in `git push`. However, you will likely see this exception:



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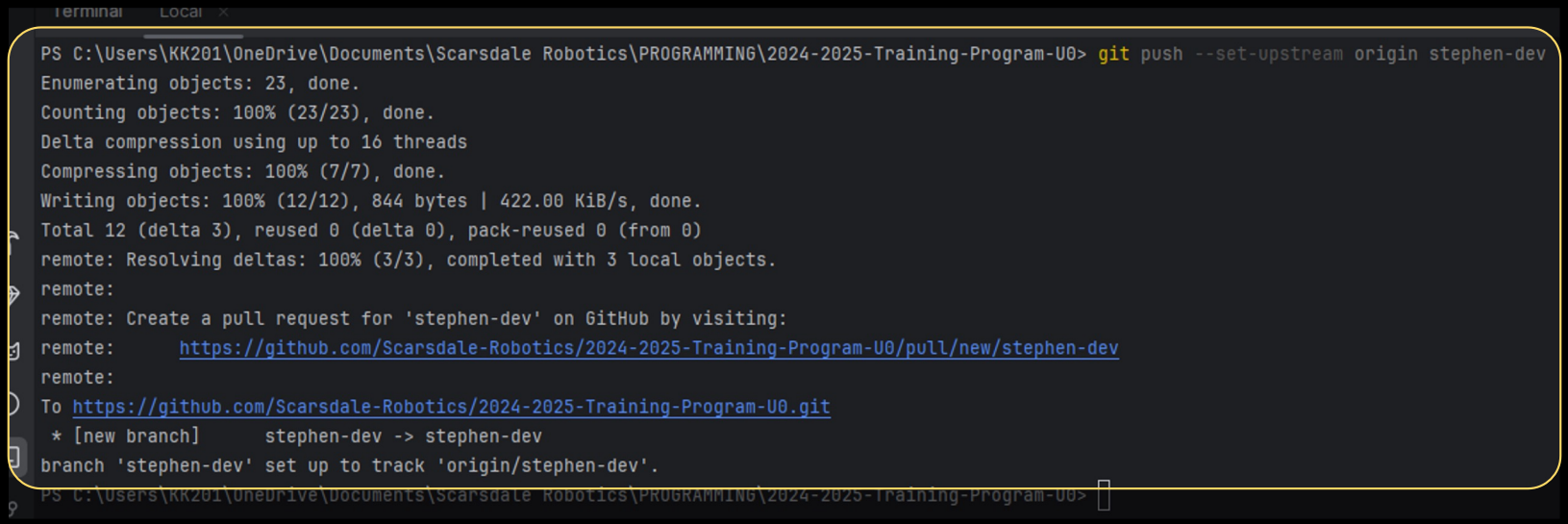
Git Pushing

- In that case, simply enter in the suggested command!

```
git push --set-upstream origin [branch name]
```



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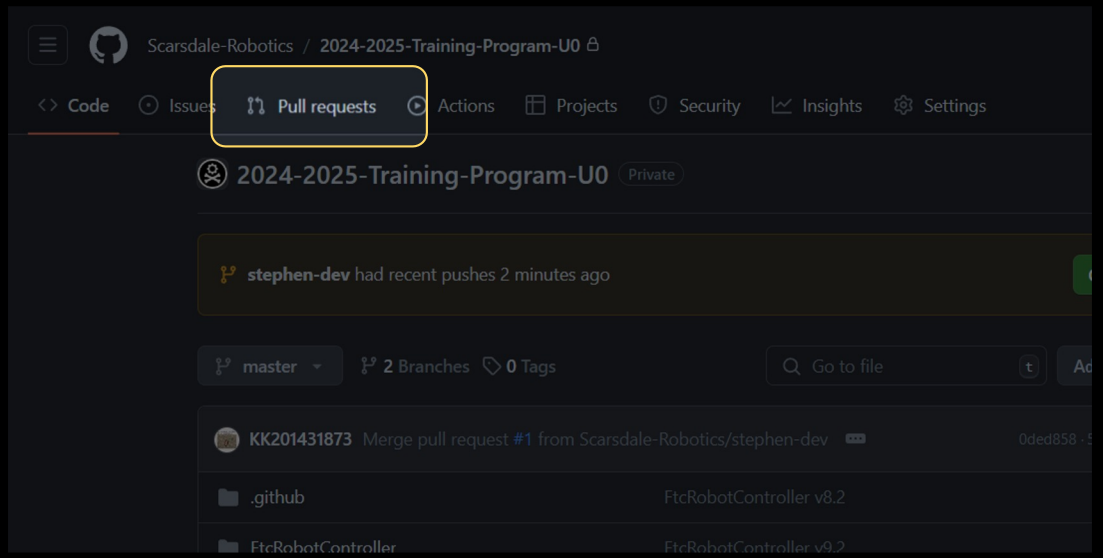
Congrats, you've now learned something that most software devs learn in college!🎉🎉🎉🎉

Creating a **Pull Request**

- It's not completely over yet! We've made some wonderful changes, and we want to merge them into the main branch.
- A **pull request** tells the repository collaborators that you want to merge your changes, so let's create one!
- First, go to the online repo: https://github.com/Scarsdale-Robotics/2024-2025-Training-Program-U0.
- Next, click on "Pull requests".



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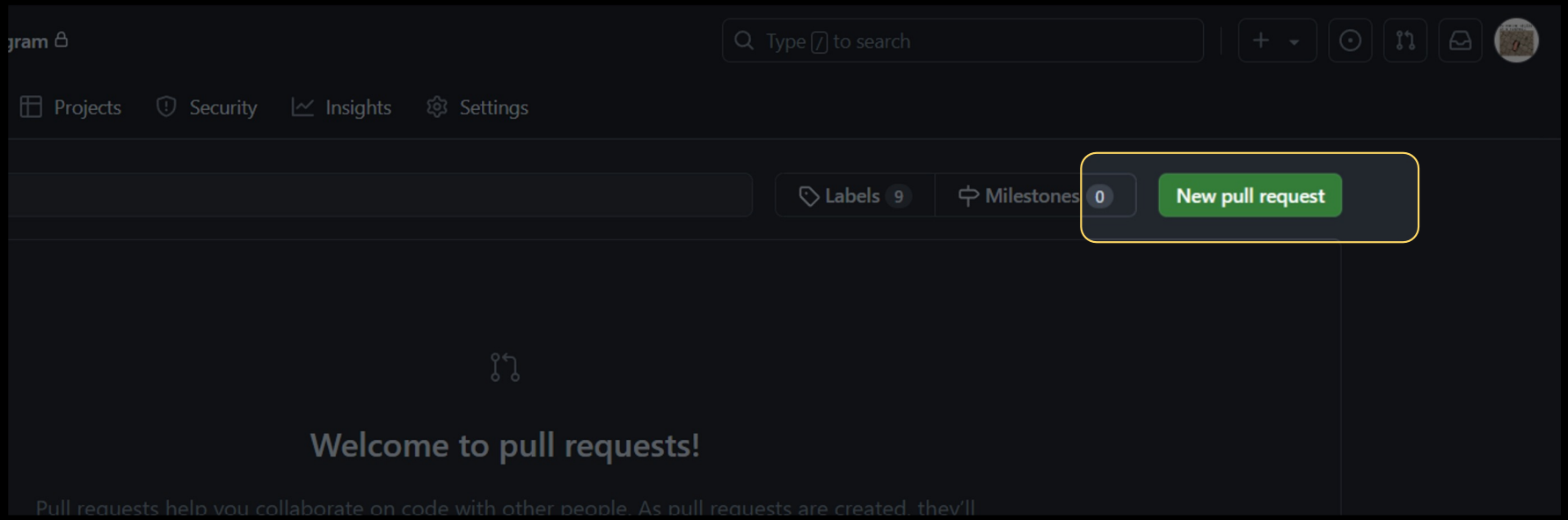
Creating a **Pull Request**

- Then, click “New pull request”.



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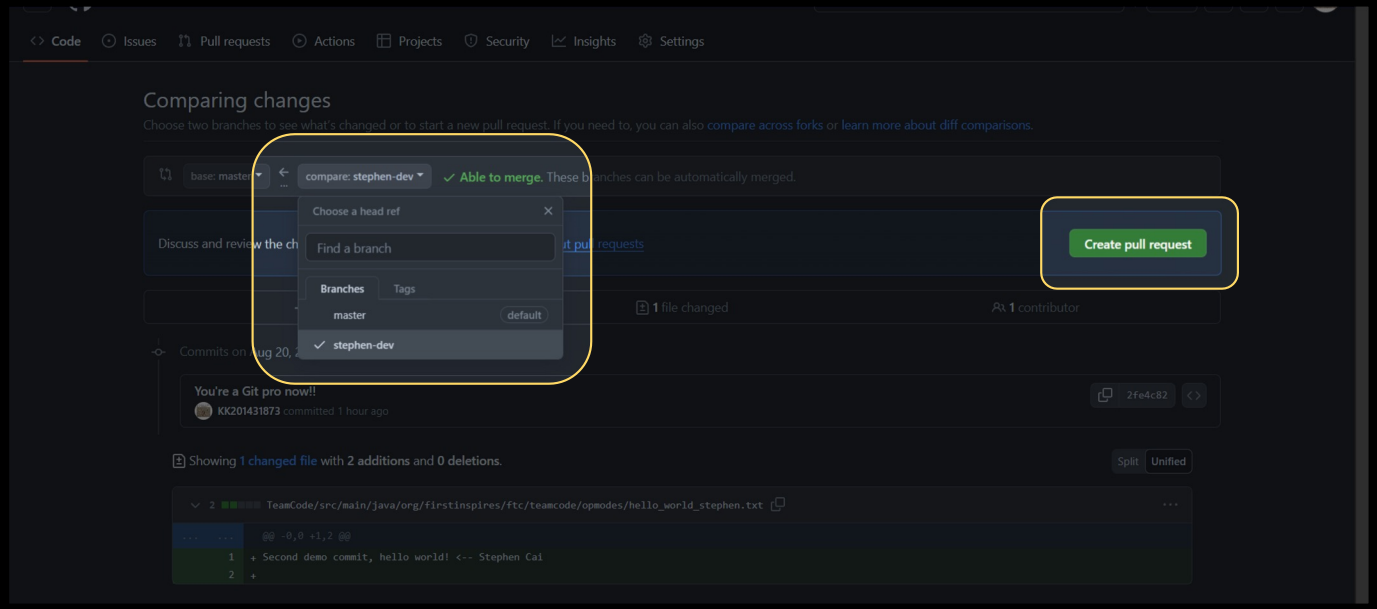
Creating a **Pull Request**

- Choose your branch from the “compare:” dropdown, and then click “Create pull request”.



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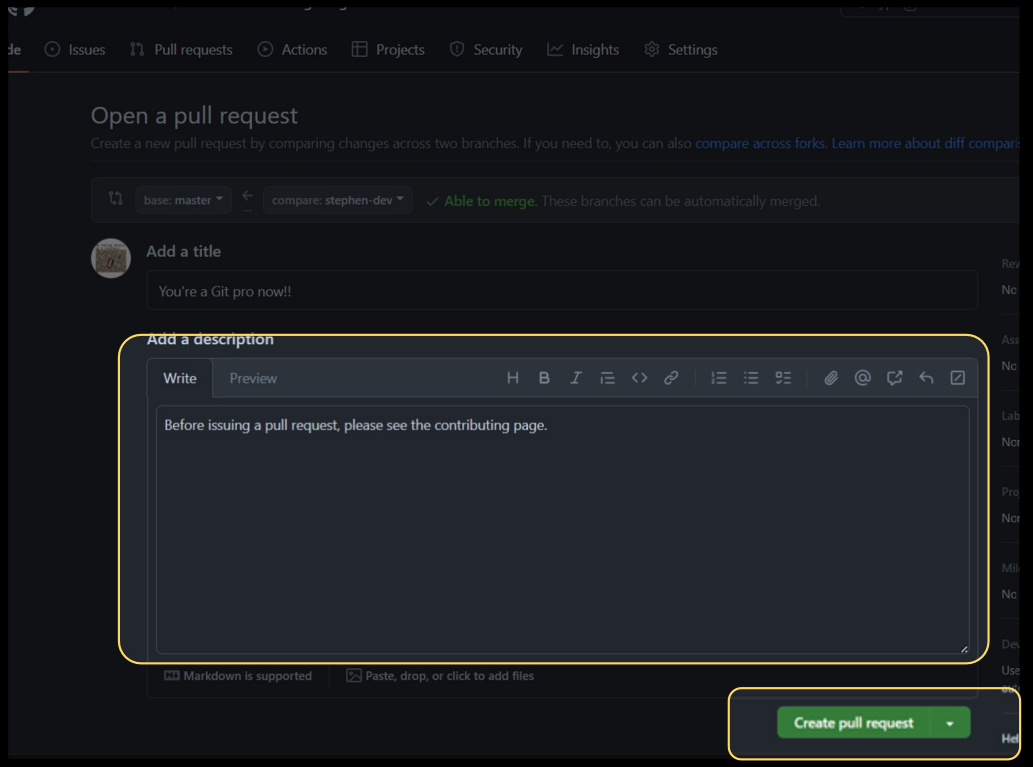
Creating a **Pull Request**

- If you want, you can leave a brief message for the repo collaborators.
- At last, press “Create pull request”.

Sit back and relax! The officers and/or other collaborators will try to merge your request. If you’re interested in learning how this merging process works, you can ask us!



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Section 6: Bonus Challenge

Give it a try if you've finished everything so far!

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Bonus Challenge [BROKEN] :<<

- Congrats, you've made it this far already! This challenge will give you a sneak peek at what's to come.
- Objective: code the robot to **move forward**. That's it! Doesn't matter how far or for how long (we will stop the robot if it is about to crash).
- Your only hint is this link.
- Please create a pull request in this repository with your completed opmode. The officers will merge your request and test it on the robot!
- Each team that successfully completes this challenge will be rewarded +1  Point!

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