

FireBears FRC - 2846

Git and GitHub: What, Why, and How?

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What is Git?

Git is a “Distributed Version Control” system.

Version Control: System for managing changes to source code over time.

Repository: Collection of source code for a single application.

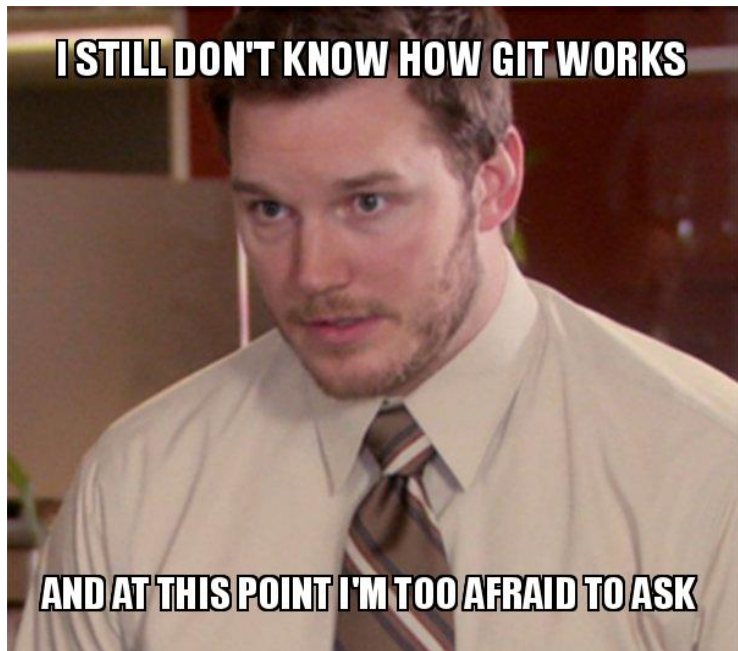
Branch: container for making specific changes to a repository.

Commit: Record changes to a branch at a specific point in time.

Git runs locally on a developer’s computer, tracks changes (Commits) to local Branches, and syncs changes with a central Repository (GitHub, in our case).

So complex it has its own category of memes.

Created by probable cyborg Linus Torvalds.



```
brandon@brandon-desktop:~$ git --help
usage: git [--version] [--help] [-C <path>] [-c <name>=<value>]
        [--exec-path[=<path>]] [--html-path] [--man-path] [--info-path]
        [-p | --paginate | -P | --no-pager] [--no-replace-objects] [--bare]
        [--git-dir=<path>] [--work-tree=<path>] [--namespace=<name>]
        [--super-prefix=<path>] [--config-env=<name>=<envvar>]
        <command> [<args>]
```

These are common Git commands used in various situations:

start a working area (see also: `git help tutorial`)

clone	Clone a repository into a new directory
init	Create an empty Git repository or reinitialize an existing one

work on the current change (see also: `git help everyday`)

add	Add file contents to the index
mv	Move or rename a file, a directory, or a symlink
restore	Restore working tree files
rm	Remove files from the working tree and from the index

examine the history and state (see also: `git help revisions`)

bisect	Use binary search to find the commit that introduced a bug
diff	Show changes between commits, commit and working tree, etc
grep	Print lines matching a pattern
log	Show commit logs
show	Show various types of objects
status	Show the working tree status

grow, mark and tweak your common history

branch	List, create, or delete branches
commit	Record changes to the repository
merge	Join two or more development histories together
rebase	Reapply commits on top of another base tip
reset	Reset current HEAD to the specified state
switch	Switch branches
tag	Create, list, delete or verify a tag object signed with GPG

collaborate (see also: `git help workflows`)

fetch	Download objects and refs from another repository
pull	Fetch from and integrate with another repository or a local branch
push	Update remote refs along with associated objects

'`git help -a`' and '`git help -g`' list available subcommands and some concept guides. See '`git help <command>`' or '`git help <concept>`' to read about a specific subcommand or concept. See '`git help git`' for an overview of the system.

```
brandon@brandon-desktop:~$ █
```

What is GitHub?



Company started in 2007, now owned by Microsoft.

Provides version control, issue tracking, task management, and integration/builds as a service.

Companies use GitHub to plan, coordinate, and organize their software development with developers across the world.

94 million users, 330 million repositories.

Home to most open source projects.

Who uses GitHub? **90%** of the Fortune 100



Mercedes-Benz




Spotify®




The New York Times

...and thousands more.



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[Code](#) [Issues](#) [Pull requests](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#)

[main](#) [8 branches](#) [2 tags](#)

[Go to file](#) [Add file](#) [Code](#)

 **KieranMusser** Merge pull request #4 from firebears-frc/tom_branch ... dcd8f8f 10 days ago 199 commits

 .vscode	Initial Commit	9 months ago
 .wpilib	Initial Commit	9 months ago
 gradle/wrapper	Initial Commit	9 months ago
 img	Updated controller diagram	8 months ago
 src/main	remove unused imports and variables	10 days ago
 vendordeps	Merged vendordeps	11 days ago
 .gitignore	Update gitignore for IntelliJ	9 months ago
 BSD_License_for_WPILib_code.txt	Initial Commit	9 months ago
 README.md	Updated image diagram	8 months ago
 build.gradle	Updated to latest WPILib. Removed redundant line in Shooter.	9 months ago
 gradlew	Updated Imports	9 months ago
 gradlew.bat	Initial Commit	9 months ago
 settings.gradle	Initial Commit	9 months ago

README.md

FB2022

FireBears' robot code for RAPID REACT 2022

About

No description, website, or topics provided.

[Readme](#) [2 stars](#) [5 watching](#) [1 fork](#)

Releases

2 tags


[Create a new release](#)

Packages

No packages published

[Publish your first package](#)

Contributors 11



Languages

Java 100.0%

Topics

What we're going to cover:

- Issues
- Pull Requests
- Branches
- Clone
- Fetch
- Pull
- Commit
- Push

What we're not going to cover:

- Epics
- Forking
- Wiki
- Pages
- Merge Conflicts
- Tags
- Roles
- Dependabot
- Graph
- Rebase
- Squash
- Log
- Reset
- Diff
- Blame
- Stash
- Patch
- Cherry-pick
- Tag
- Submodule

Why?

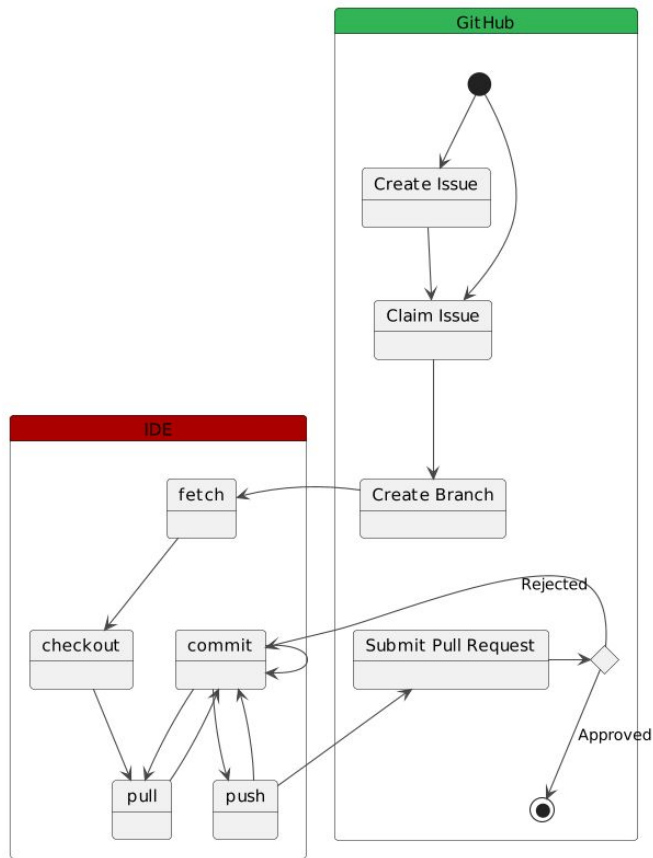
Why are we doing this to ourselves?

Answer: It's worth it!

- Organize work around issues, discuss the next best thing to work on, keep track of what you want and what you need.
- Freedom to tinker: Test out your own ideas without breaking things for someone else. Did you break something? Reset to a working commit and try again.
- Who has the working code? Everyone!
- Where did that come from? Every line of code can be traced back to when and why it was added.
- Work together, whenever, wherever.

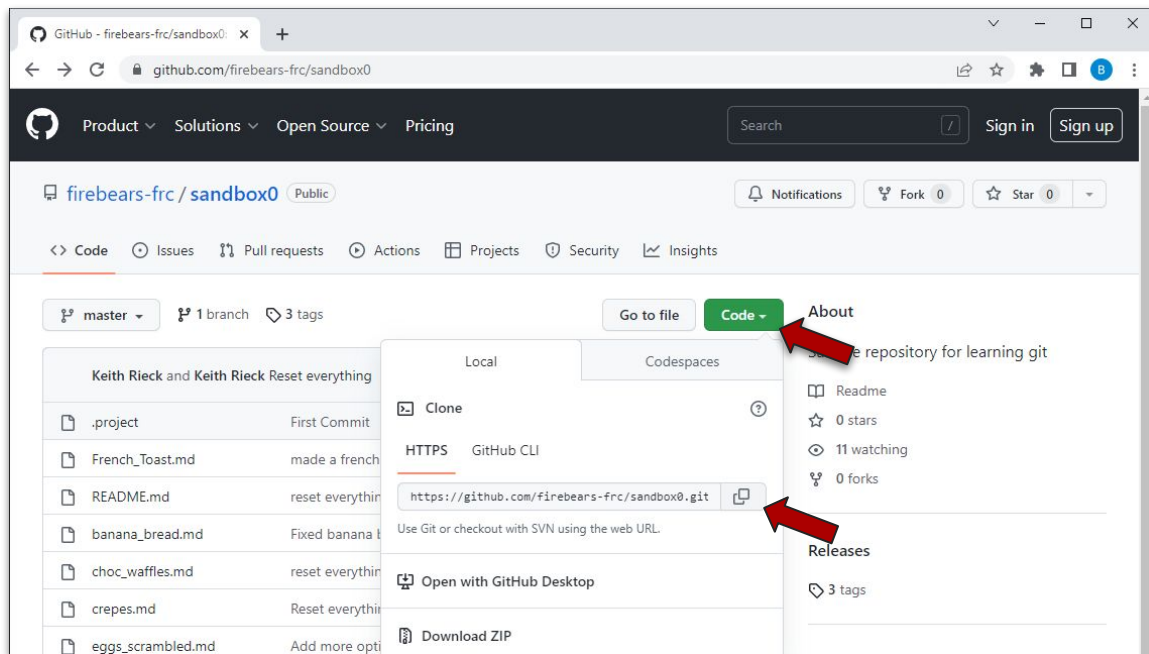
How?

Flow



Clone a GitHub Repository

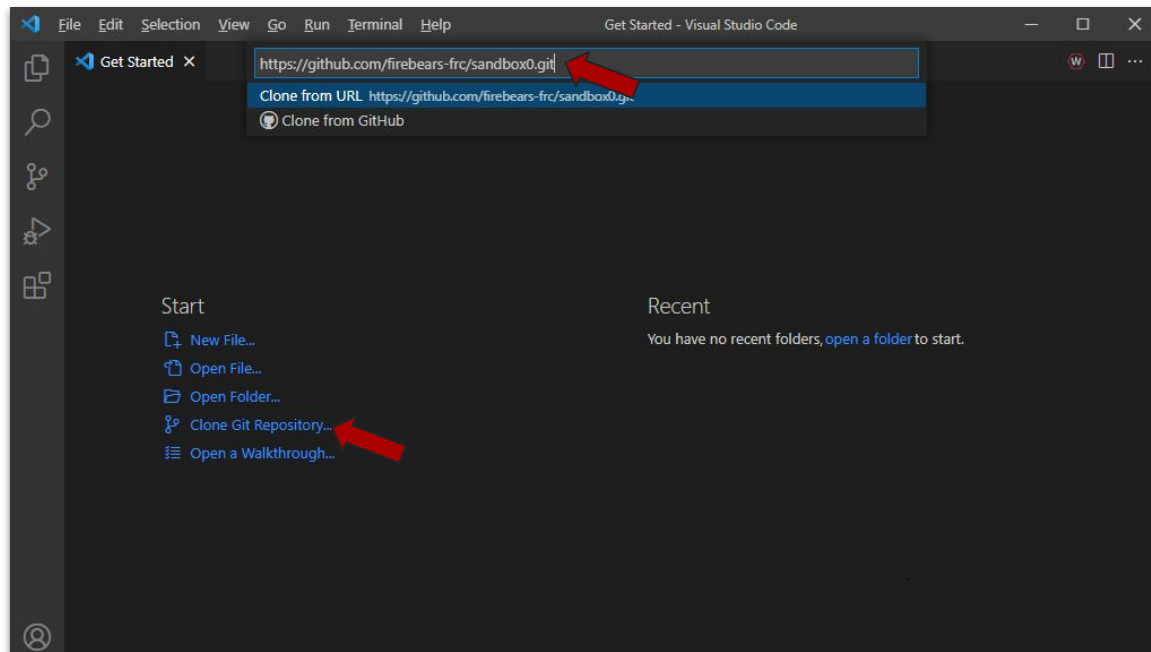
From the Code menu in GitHub, copy the HTTPS URL of the repository.



Clone a GitHub Repository

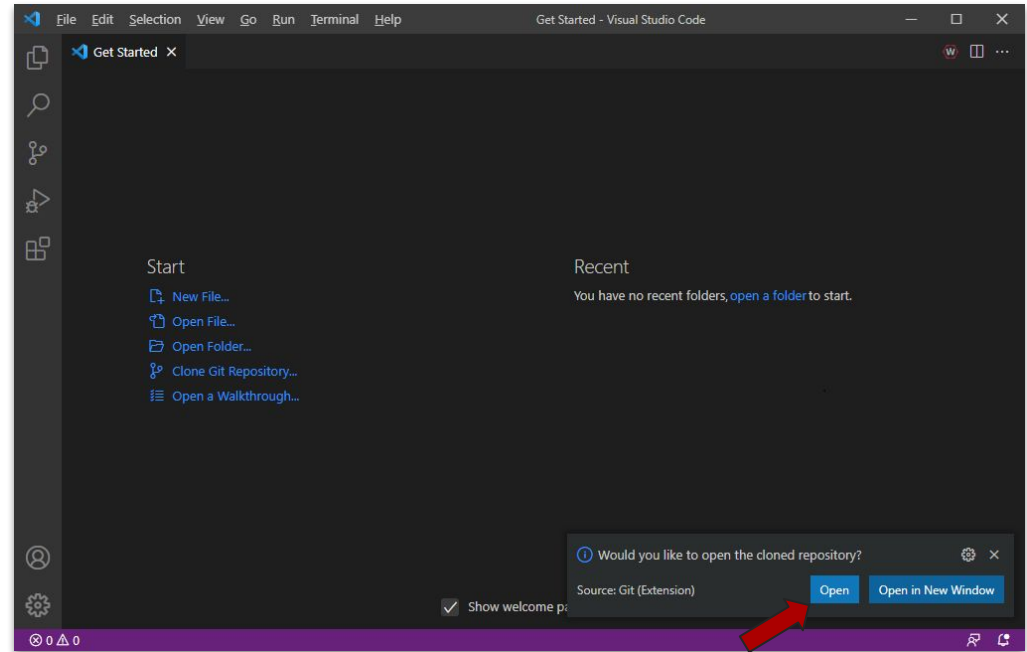
In VS Code, click Clone Git Repository, and paste the repository URL.

Selection a location to save the project files.



Clone a GitHub Repository

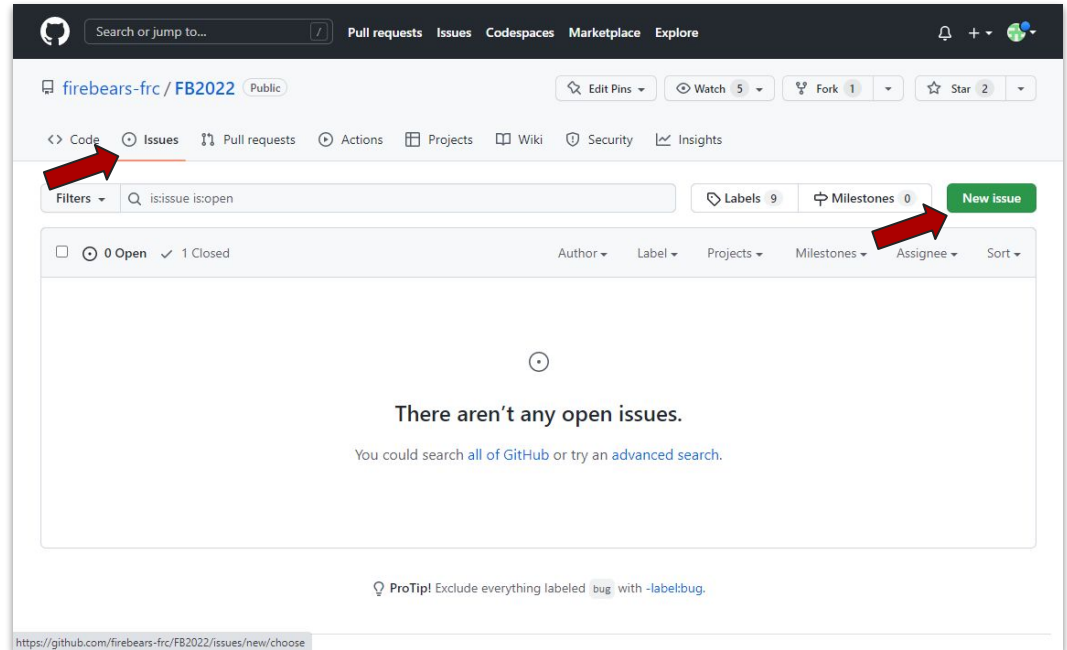
When asked if you want to open the cloned repository, click open.



Create an Issue

Click the Issues link on the repository page.

Click New Issue



Create an Issue

Give the issues a short, but descriptive title.

Add labels that are relevant to the issue.

If you're creating a bug, describe what happens, how to reproduce the bug, and what should happen if things were working right.

If you're creating an enhancement, describe the new feature functionality.

No need to include a solution here.

Bonus points: Use Markdown

The screenshot shows the GitHub 'Create new issue' interface. A red arrow points to the issue title field, which contains the text 'Creating two ADXRS450_Gyro devices hangs the robot'. Another red arrow points to the 'bug' label in the 'Labels' section. A third red arrow points to the 'Submit new issue' button at the bottom right. The form includes sections for 'Describe the bug', 'To Reproduce' (with a code block), 'Expected behavior', and 'Additional context'. The 'To Reproduce' section contains a terminal output snippet. The 'Expected behavior' section contains a description of the error. The 'Additional context' section contains a note about simulation behavior. The right sidebar shows 'Assignees' (No one—assign yourself), 'Labels' (bug), 'Projects' (None yet), 'Milestone' (No milestone), 'Development' (Shows branches and pull requests linked to this issue), and 'Helpful resources' (GitHub Community Guidelines).

Code Issues 3 Pull requests 1 Actions Wiki Security Insights Settings

Creating two ADXRS450_Gyro devices hangs the robot

Write Preview

Describe the bug

Creating 2 ADXRS450_Gyro devices in simulation hangs the robot program.

To Reproduce

```
$ python
Python 3.10.1 (main, Dec 7 2021, 00:00:00) [GCC 11.2.1 20210728 (Red Hat 11.2.1-1)] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import wpilib
>>> wpilib.ADXRS450_Gyro()
<wpilib._wpilib.ADXRS450_Gyro object at 0x7fbf28f091d0>
>>> wpilib.ADXRS450_Gyro()
^C^C^C^C^C^C
[1]+  Stopped                  python
```

Expected behavior

An exception saying "device already exists" or something to that effect.

Additional context

Obviously this falls under the category of "Well don't do that"... but I wonder whether there are other difficult to diagnose bugs in places where the simulation behavior hinges on whether (bool)simDevice is true?

Styling with Markdown is supported

Submit new issue

Assignees
No one—assign yourself

Labels
bug

Projects
None yet

Milestone
No milestone

Development
Shows branches and pull requests linked to this issue.

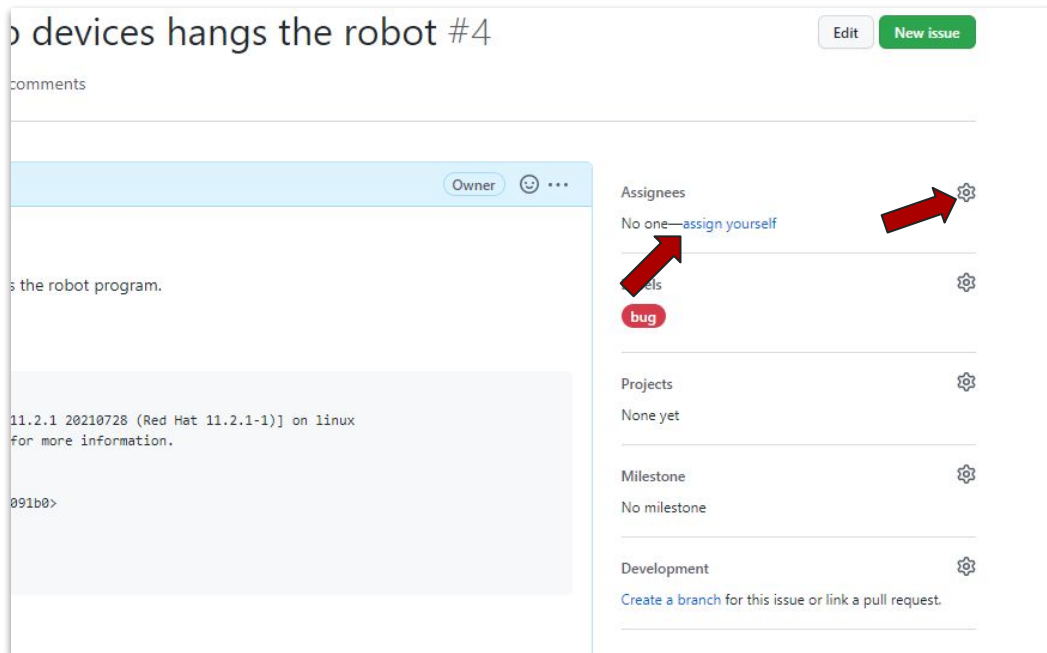
Helpful resources
[GitHub Community Guidelines](#)

Claim Issue

On the Issue page, click assign yourself to claim the issue.

Add anyone else you are working on this issue with using the gear menu, or add yourself to someone else's issue.

You now own this issue, and no one else should be working on this.

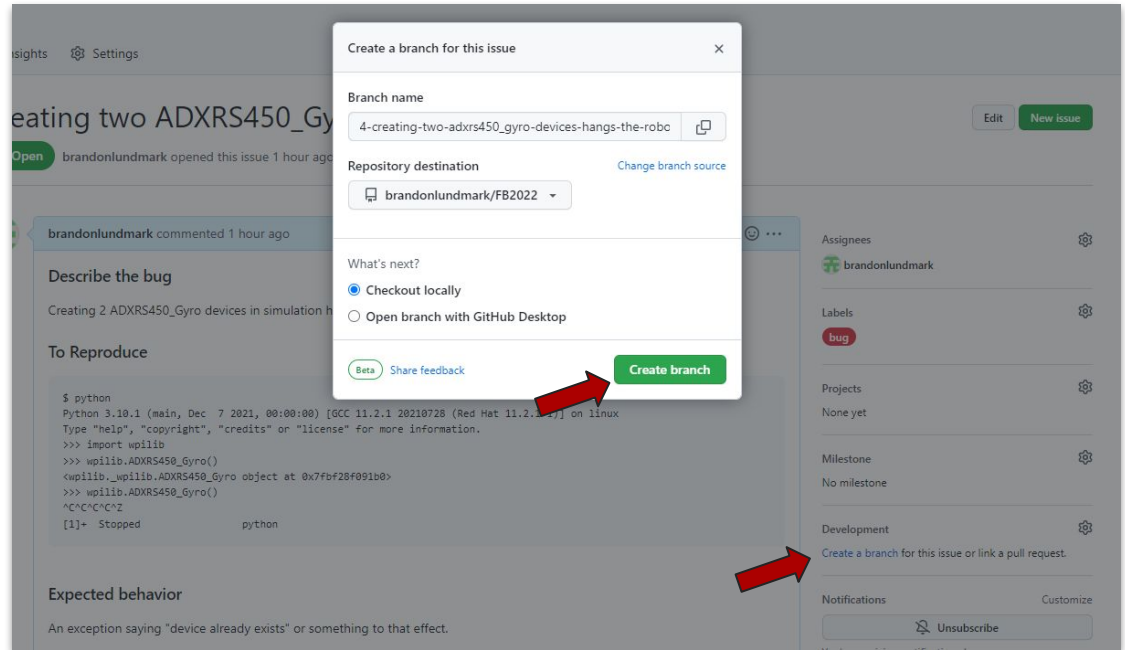


Create a Branch

On the Issue page, click
Create a Branch.

In the popup, the Branch
name will pre populate with
the issue number preceding
the issue name.

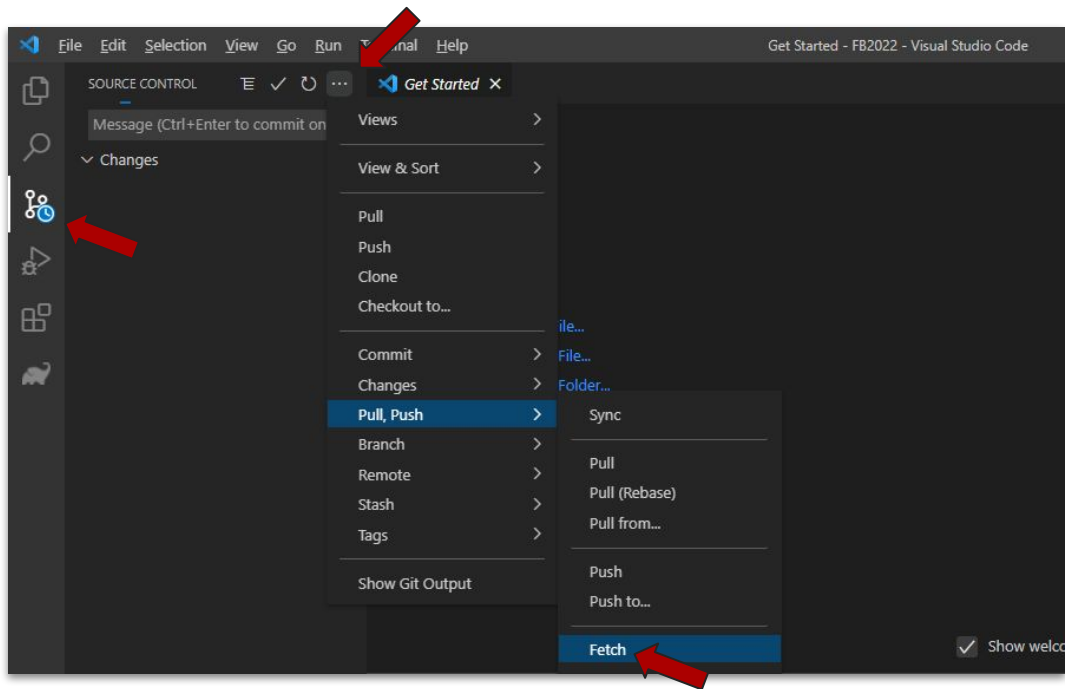
Click Create branch.



Fetch

In VS Code, click on the Source Control view in the Activity Bar.

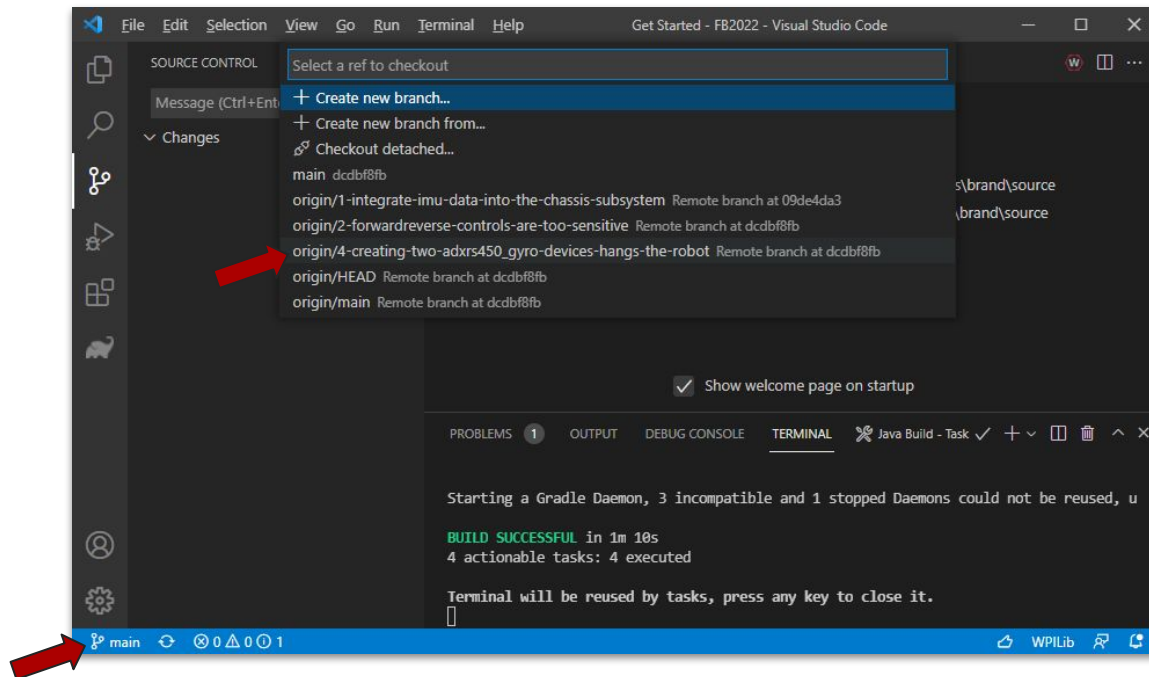
In the Source Control ellipsis menu, click on Fetch under the Pull, Push menu.



Checkout

In the bottom left of the VS Code window, click on the Branch icon.

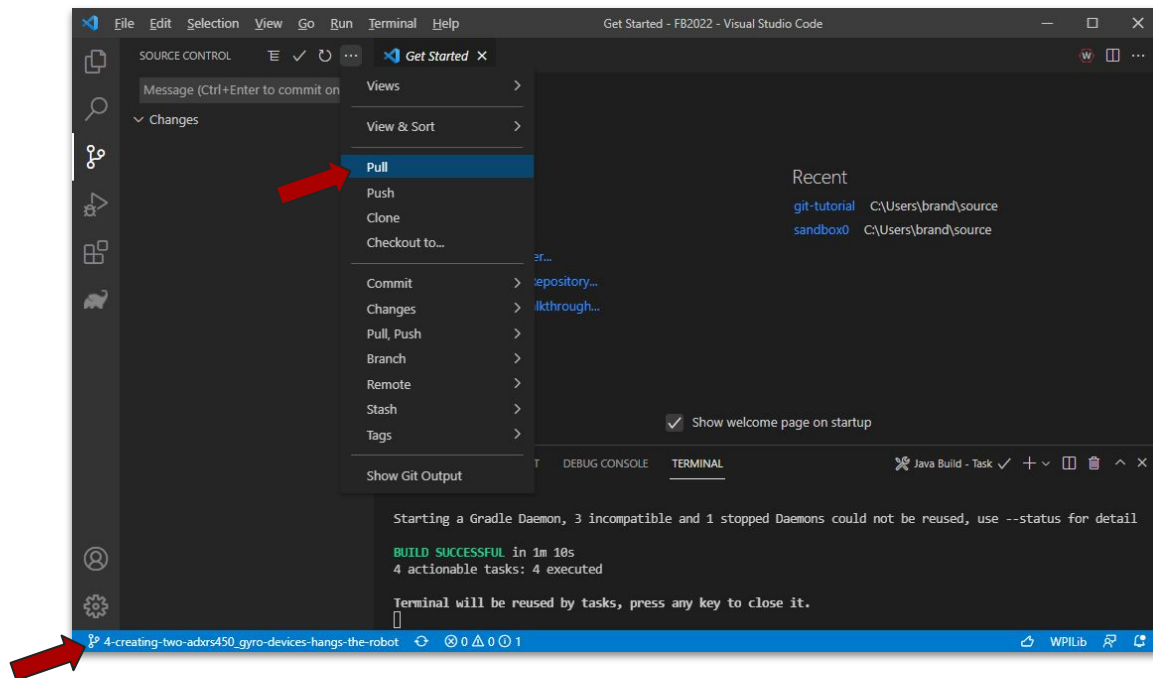
Select the branch created from the Issue in GitHub.



Pull

In the ellipsis menu, click Pull.

Notice that the branch that you checked out is now in the bottom left of the VS Code window.



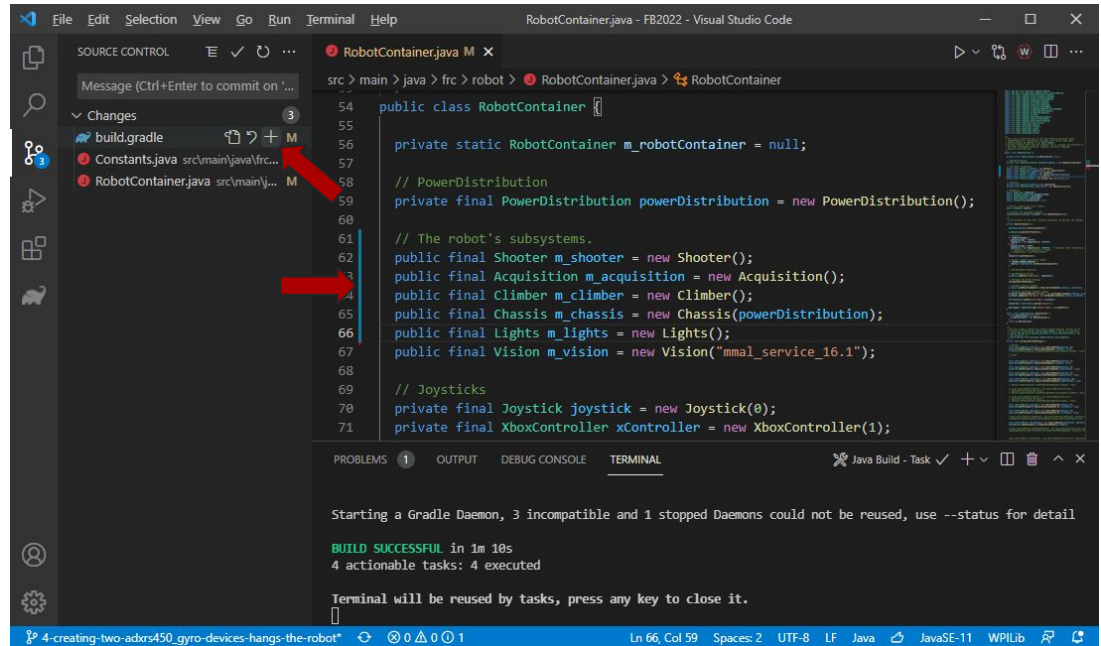
Commit

Make your changes to your files.

Each file you modify will populate in the Changes list.

If you really intended to change each file, click the + icon next to each file name to stage your changes, if not, you can revert your changes with the backward arrow icon.

Each line you modified will show a blue bar indicating it differs from the last commit.

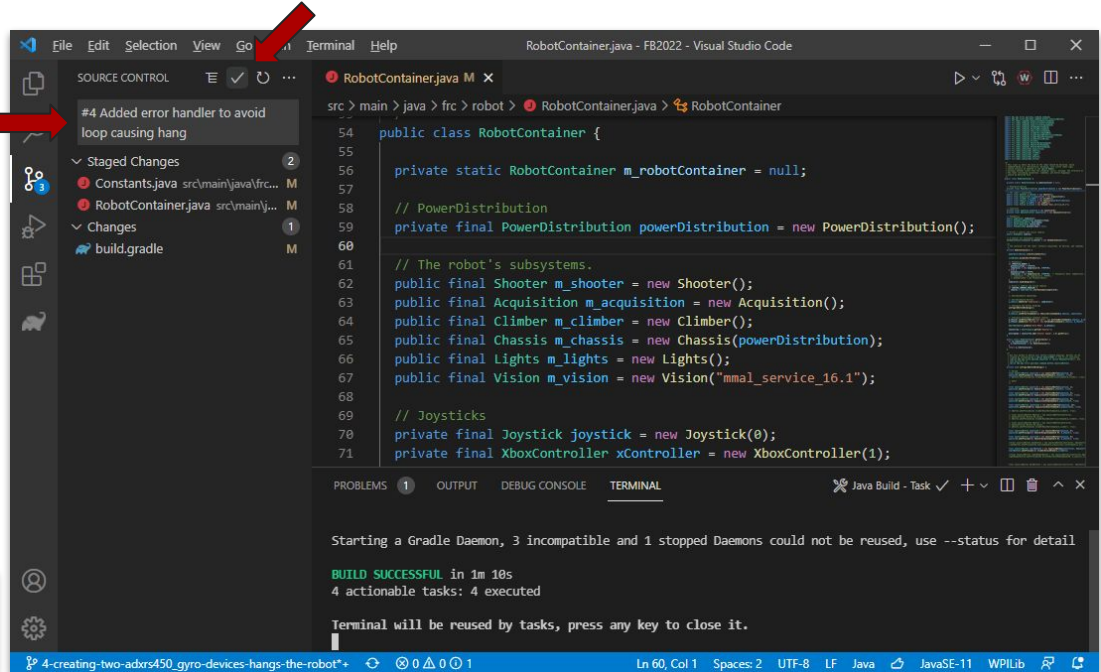
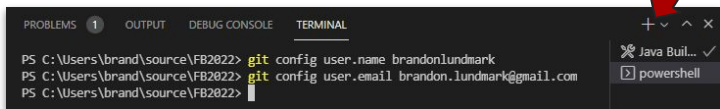
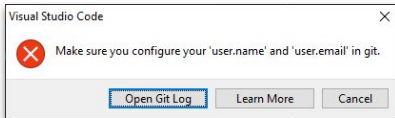


Commit

Add a message describing the changes you made. The files in Staged Changes will be included in the Commit.

Click the checkmark icon to commit your changes to your local branch.

If you get this error, run this command in a terminal window using your GitHub username and email and try again.

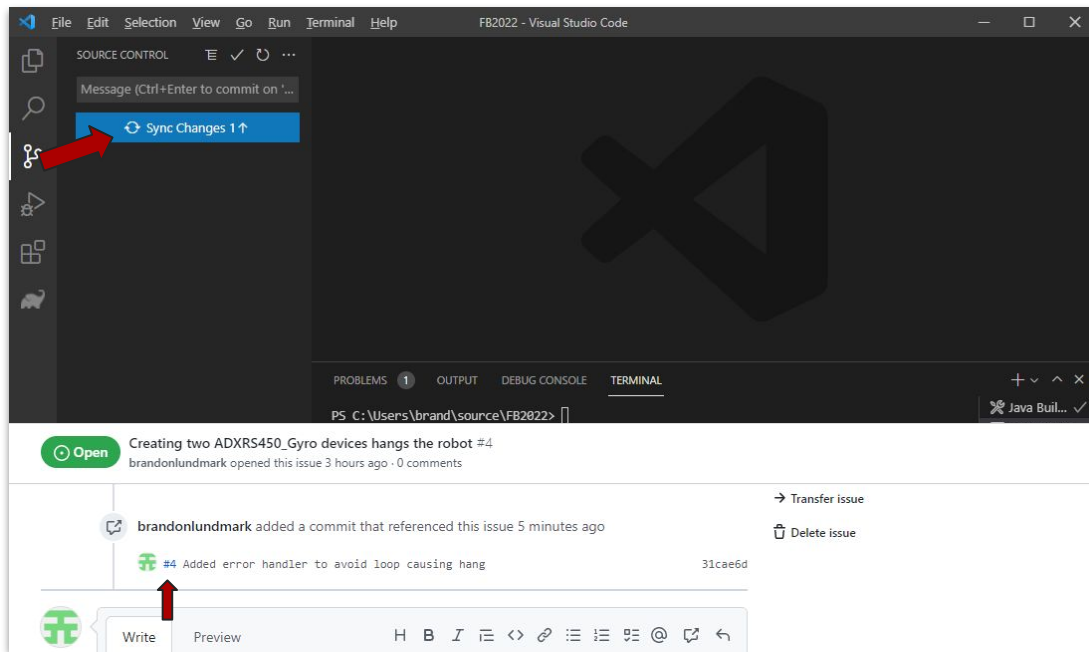


Push

Click Sync Changes to push your commits to the branch you created on GitHub.

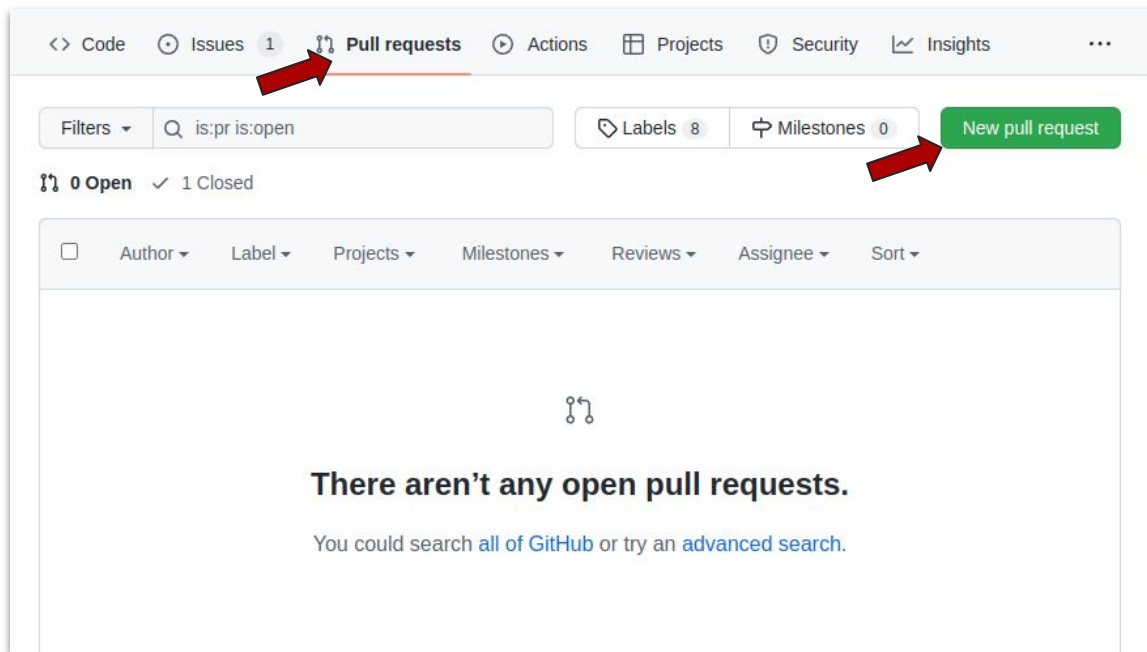
Your Issue in GitHub will now show your commit and commit message.

Including #<Issue ID> in your commit message will generate a link from the message to your issue. Slick!



Pull Request

In GitHub, click on Pull requests, then New pull request.

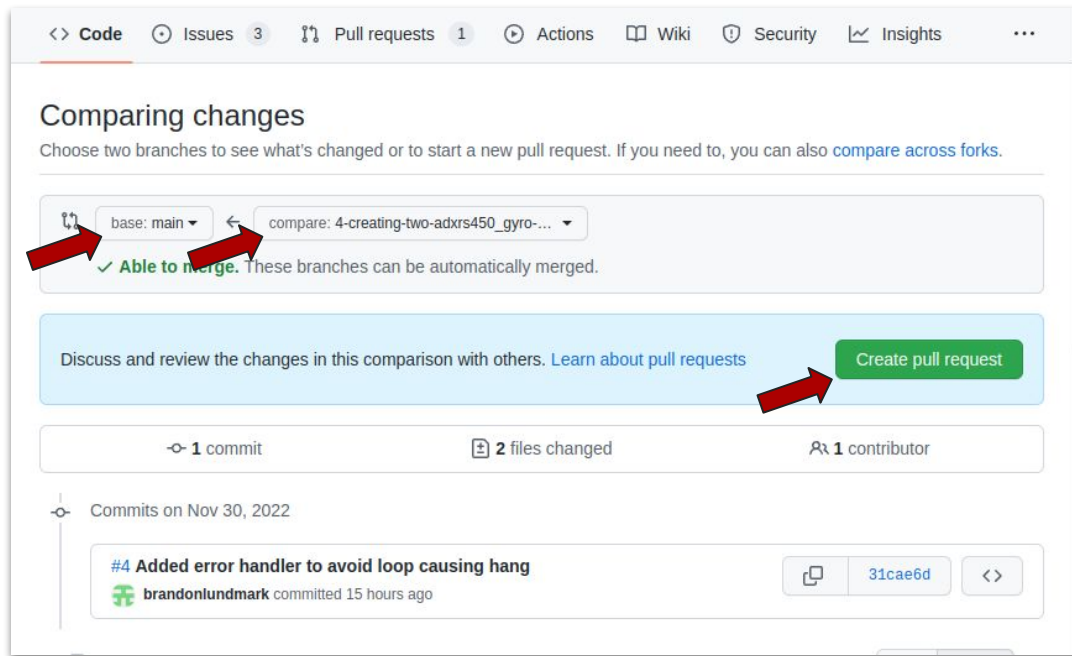


Pull Request

In the base branch drop down, pick the main branch of the project.

In the compare branch, select the branch you checked out and worked on.

Click Create pull request.



Pull Request

Enter any comments that might be helpful to the person reviewing the pull request.

Click Create pull request

Open a pull request

Create a new pull request by comparing changes across two branches. If you need to, you can also [compare across forks](#).

base: main ← compare: 4-creating-two-adxrs450_gyro-... ✓ Able to merge. These branches can be automatically merged.

#4 Added error handler to avoid loop causing hang

Write Preview

H B I @

Leave a comment

Attach files by dragging & dropping, selecting or pasting them.

Create pull request

Reviewers
No reviews

Assignees
No one—assign yourself

Labels
None yet

Projects
None yet

Milestone
No milestone

Development