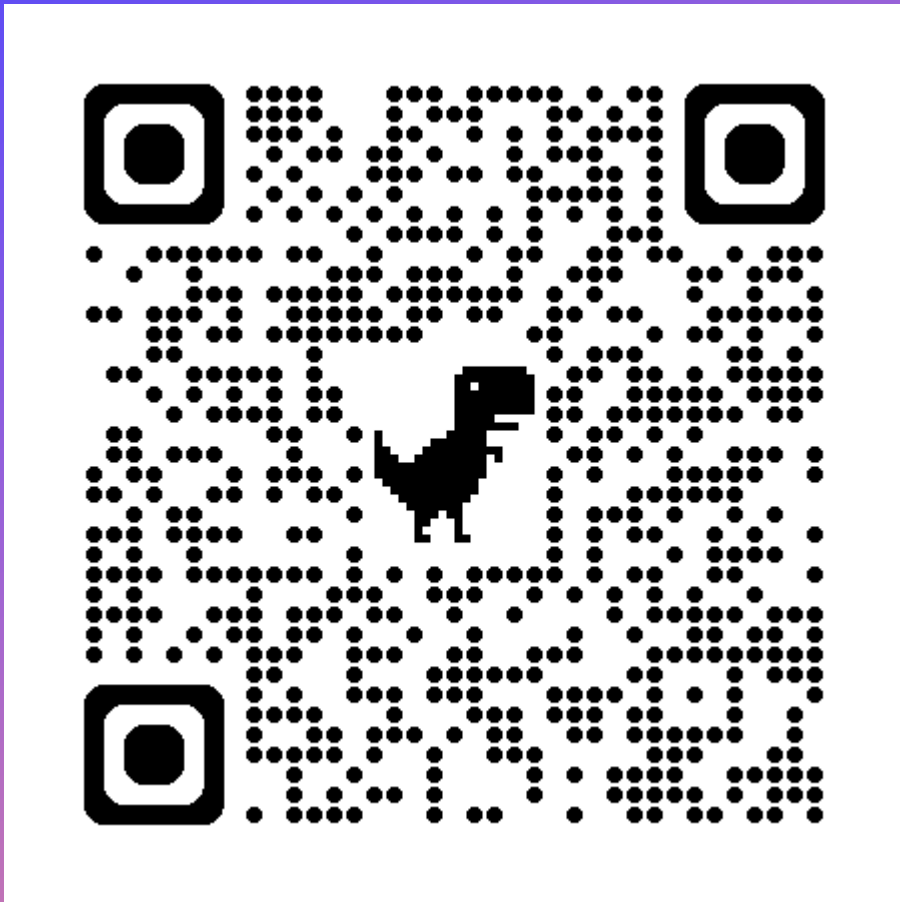


# INTRO TO GIT & GITHUB

<https://github.com/Abertay-University-SDI/Github>



Erin Michno Hughes  
Lecturer Games Tech and Mathematics



# AGENDA

Why?!?!

What is Git / Github

Installation(s) / student accounts

Create a repository

Push/Pull/Branch/Merge

Extras!

# Why are we talking source control? +

- Access anywhere (potentially) with distributed source control
- Track changes
- Prevent conflicts
- Protect/Backup source code
- Improve collaboration
- Improve development



# Don't trust me – verify!

- <https://www.freecodecamp.org/news/introduction-to-git-and-github/>
- <https://learn.microsoft.com/en-us/training/modules/introduction-to-github/>
- <https://product.hubspot.com/blog/git-and-github-tutorial-for-beginners>
- <https://github.com/skills/introduction-to-github>
- <https://docs.github.com/en/get-started/start-your-journey/hello-world>
- <https://github.com/education/students>
- <https://visualstudio.microsoft.com/vs/github/>
- <https://learn.microsoft.com/en-gb/visualstudio/version-control/git-with-visual-studio?view=vs-2022>
- <https://visualstudio.microsoft.com/vs/github/>
- <https://learn.microsoft.com/en-gb/visualstudio/version-control/git-resolve-conflicts?view=vs-2022>
- <https://www.datacamp.com/tutorial/github-and-git-tutorial-for-beginners>
- <https://www.datacamp.com/blog/what-is-github>

The screenshot shows a GitHub Pull Request interface for Pull Request #137691. The main content area displays a diff for the file `product-build.yml`. The diff shows a change on line 155, where the `vmImage` property is updated from `VS2017-Win2016` to `windows-latest`. The left sidebar shows the file explorer with `product-build.yml` selected. The bottom status bar indicates the current line is 155, column 1, with 2 spaces.

```

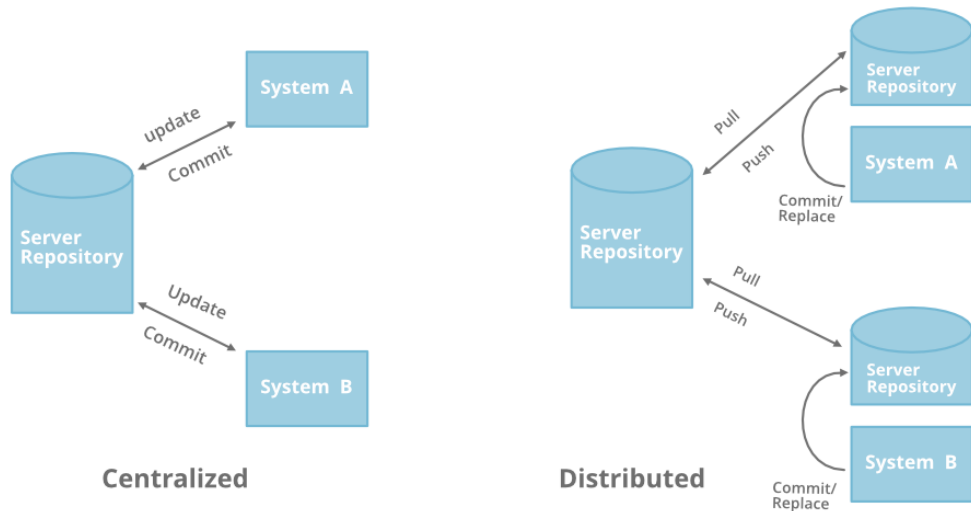
141 141 - stage: Compile
142 142   jobs:
143 143     - job: Compile
144 144       pool: vscode-1es
145 145       variables:
146 146         VSCODE_ARCH: x64
147 147       steps:
148 148         - template: product-compile.yml
149 149
150 150 - ${{ if and(eq(parameters.VSCODE_COMPILE_ONLY
151 151   - stage: Windows
152 152     dependsOn:
153 153       - Compile
154 154     pool:
155 155       vmImage: VS2017-Win2016
156 156       vmImage: windows-latest
157 156   jobs:
158 157     - ${{ if eq(parameters.VSCODE_BUILD_WI
159 158       - job: Windows
160 159         timeoutInMinutes: 90
161 160         variables:
162 161           VSCODE_ARCH: x64
163 162         steps:
164 163           - template: win32/product-build
165 164
166 165     - ${{ if and(eq(variables['VSCODE_CIBU
167 166       - job: Windows32
168 167         timeoutInMinutes: 90
169 168         variables:
170 169           VSCODE_ARCH: ia32
171 170         steps:
172 171           - template: win32/product-build
173 172
174 173   ${{ if and(eq(variables['VSCODE_CIBU

```



# GIT

Open Source Version Control



# Git

- Is a DVCS (Distributed Version Control System)
- Distributed (not Centralized) allows for offline work
- Open source
- 2005 Linus Torvalds
- Tracks changes of files and is specialised for code and software projects
- Similar to the software that tracks changes in a shared google document but with many more features
- Easily have "branches" or different versions of the in progress software "repository" or data structure that stores the project



# GITHUB

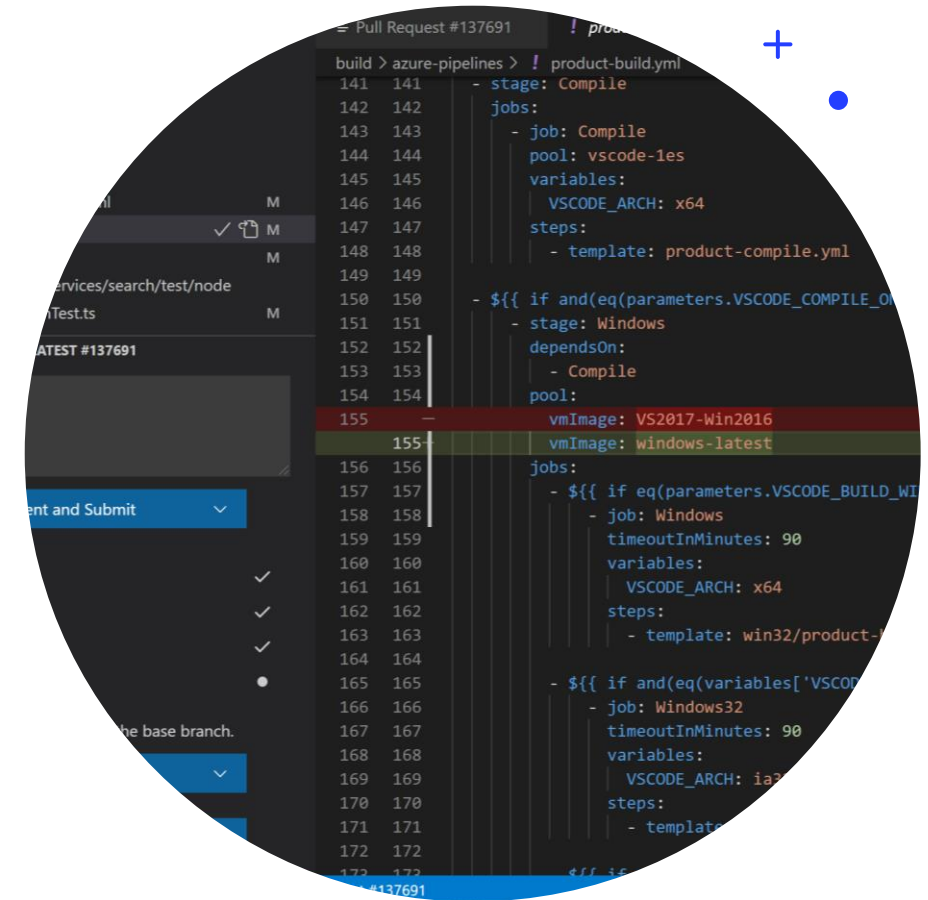
Website / Hosting Service / Microsoft





# Github

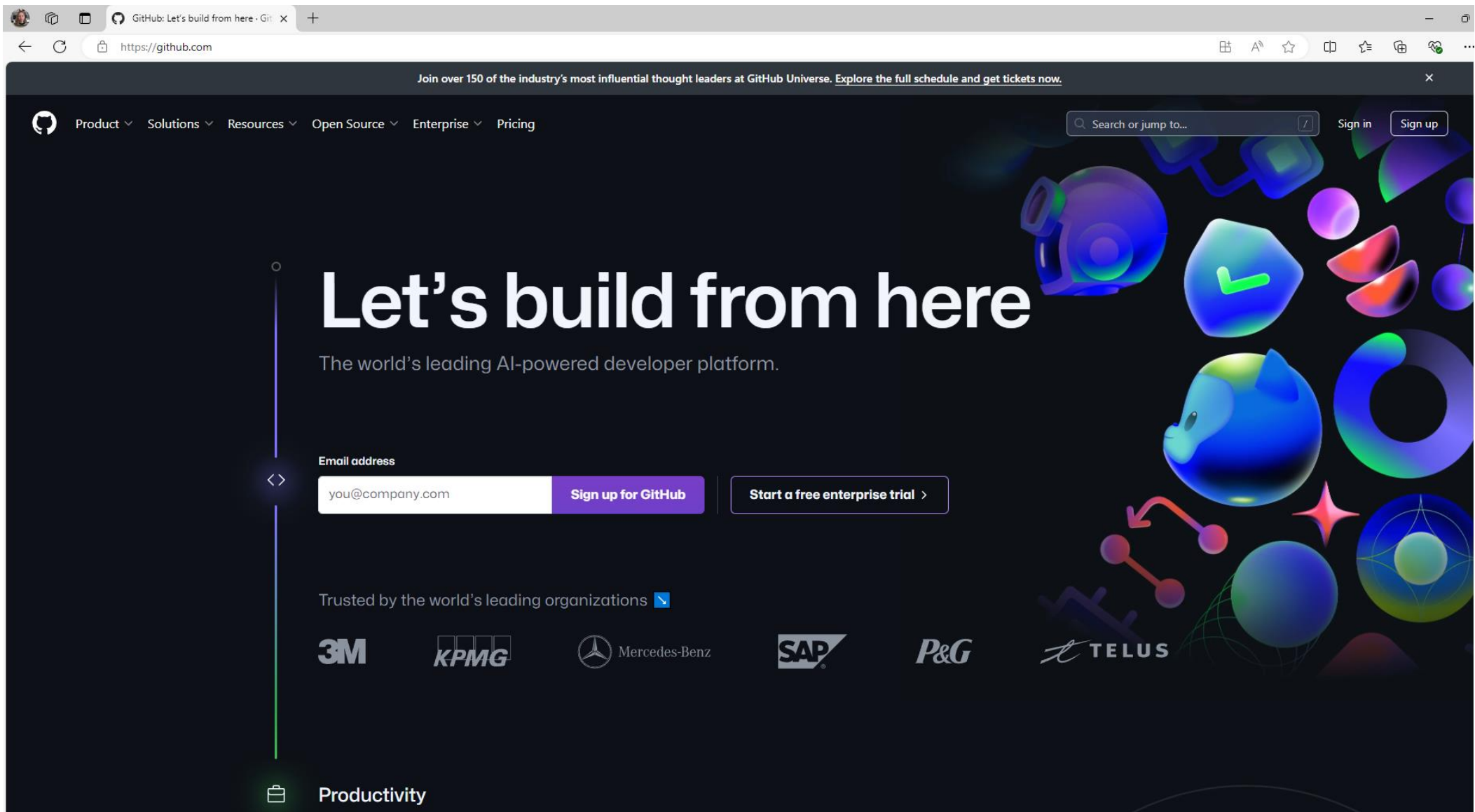
- “a cloud-based platform”
- “allows users to store, share, and collaborate on code”
- “a developer platform to share code”
- It’s a website, with user accounts where you can upload code projects and share them or edit – not just your projects but other users too
- Think YouTube for code projects, but it’s not just the final project it’s the whole timeline of progress with edit privileges







- If you do not have an existing account
- Create one
- If you HAVE an existing account
- Think if you might want to have a “uni” based account that is linked to your student number / email and will be a clean portfolio



### Create your first project

Ready to start building? Create a repository for a new idea or bring over an existing repository to keep contributing to it.

Create repository

Import repository

### Join GitHub Education!

GitHub Education opens doors to new skills, tools, and a collaborative community eager to drive innovation. Join us and build a foundation for your future in technology.

Free and discounted services for teachers and students.

Join GitHub Education

Simple cloud hosting, built for developers



Copilot

Turn natural language prompts into coding suggestions



Heroku

Build, run, and operate applications entirely in the cloud.



Microsoft Azure

Access to Microsoft Azure cloud services and learning resources

### Explore repositories

seaweedfs / seaweedfs

SeaweedFS is a fast distributed storage system for blobs, objects, files, and data lake, for billions of files! Blob store has O(1) disk seek, cloud tiering. Filer supports Cloud Drive, cross-DC ac...

22.2k

Go

home-assistant / core

Open source home automation that puts local control and privacy first.

71.1k

Python

nuxt / nuxt

The Intuitive Vue Framework.

54k

TypeScript

Explore more

### Home

Send feedback

Filter

Start writing code

#### Start a new repository for AbertayEEH

A repository contains all of your project's files, revision history, and collaborator discussion.

##### Repository name \*

name your new repository...

Public

Anyone on the internet can see this repository

Private

You choose who can see and commit to this repository

#### Introduce yourself with a profile README

Share information about yourself by creating a profile README, which appears at the top of your profile page.

AbertayEEH / README.md

Create

```
1 - 🙋 Hi, I'm @AbertayEEH
2 - 🤖 I'm interested in ...
3 - 🌱 I'm currently learning ...
4 - 📧 I'm looking to collaborate on ...
5 - 📺 How to reach me ...
6 - 🗨 Pronouns: ...
```


## Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere?

[Import a repository.](#)

Required fields are marked with an asterisk (\*).

Owner \*

 AbertayEEH ▾

Repository name \*

FirstRepo

✓ FirstRepo is available.

Great repository names are short and memorable. Need inspiration? How about **sturdy-potato** ?

Description (optional)

my test repo

☒  **Public**

Anyone on the internet can see this repository. You choose who can commit.

☐  **Private**

You choose who can see and commit to this repository.

Initialize this repository with:

☒ **Add a README file**

This is where you can write a long description for your project. [Learn more about READMEs.](#)

Add .gitignore


.gitignore template: VisualStudio ▾

Choose which files not to track from a list of templates. [Learn more about ignoring files.](#)

Choose a license

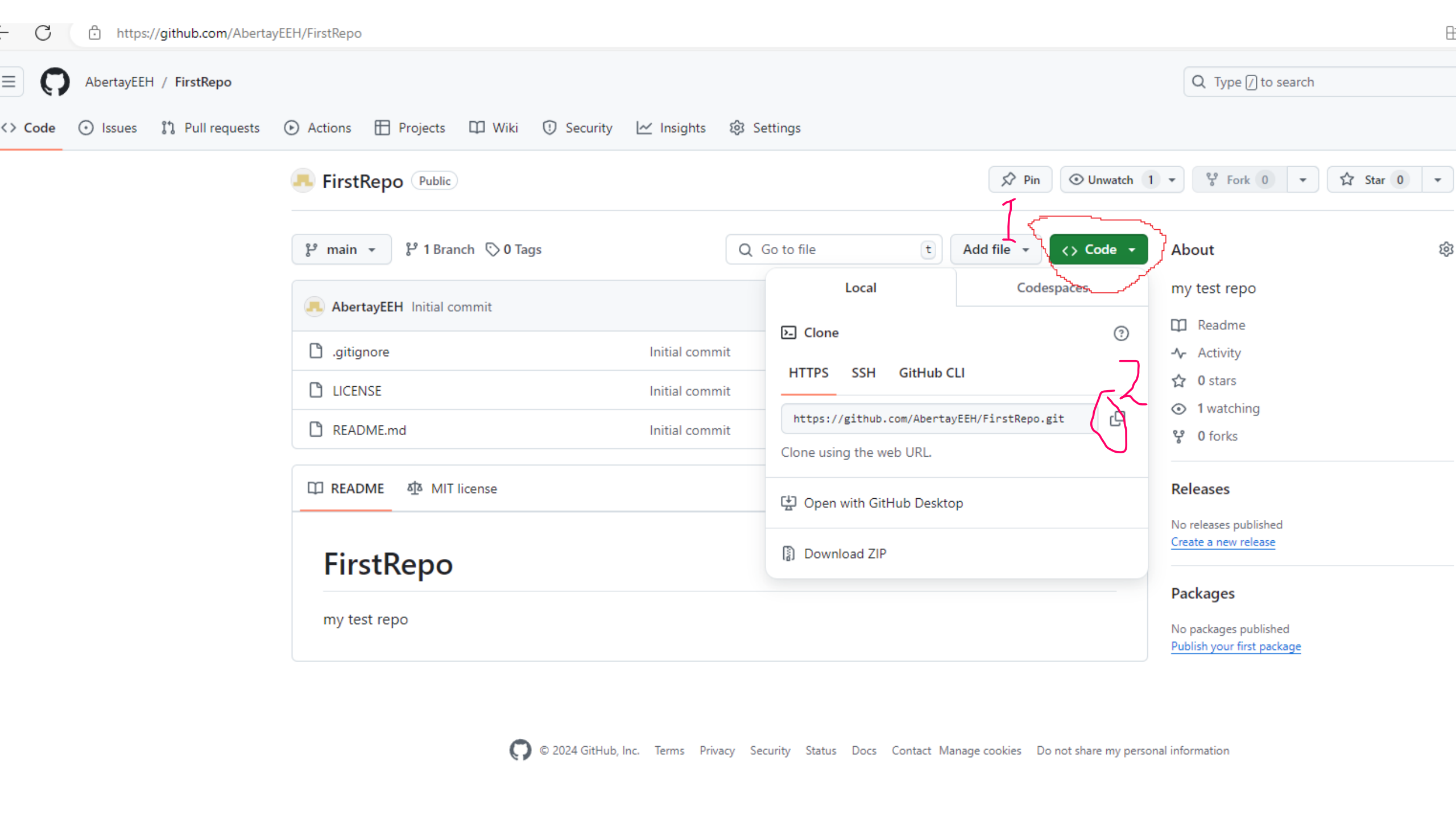
License: MIT License ▾

A license tells others what they can and can't do with your code. [Learn more about licenses.](#)

This will set  main as the default branch. Change the default name in your [settings](#).

 You are creating a public repository in your personal account.



Create repository







# Visual Studio 2022

## Open recent

### Today

-  **github-fundamentals-erinmichno** 10/09/2024 11:27  
C:\Users\Erin Hughes\Source\Repos
-  **welcome2024\_25-github\_fundamentals-github-starter-c...** 10/09/2024 11:22  
C:\Users\Erin Hughes\Source\Repos

### This month

-  **mpiSendRecv.sln** 02/09/2024 10:42  
C:\Users\Erin Hughes\source\repos\mpiSendRecv
-  **NVENC\_ABM\_BASE.sln** 22/08/2024 14:34  
C:\Users\Erin Hughes\source\repos\erinmichno\NVENC\_ABM\_BASEGIT\source
-  **Samples\_VS2019.sln** 22/08/2024 14:20  
C:\Users\Erin Hughes\source\repos\cuda-samples12
-  **CudaRuntime12.sln** 22/08/2024 14:19  
C:\Users\Erin Hughes\source\repos\CudaRuntime12

## Get started



### Clone a repository

Get code from an online repository like GitHub or Azure DevOps



### Open a project or solution

Open a local Visual Studio project or .sln file



### Open a local folder



Navigate and edit code within any folder



### Create a new project

Choose a project template with code scaffolding to get started

[Continue without code →](#)

Do you like this start window?  

## Clone a repository

### Enter a Git repository URL


Repository location


`https://github.com/AbertayEEH/FirstRepo.git`

Path

`C:\Users\Erin Hughes\Source\Repos\FirstRepo`

### Browse a repository

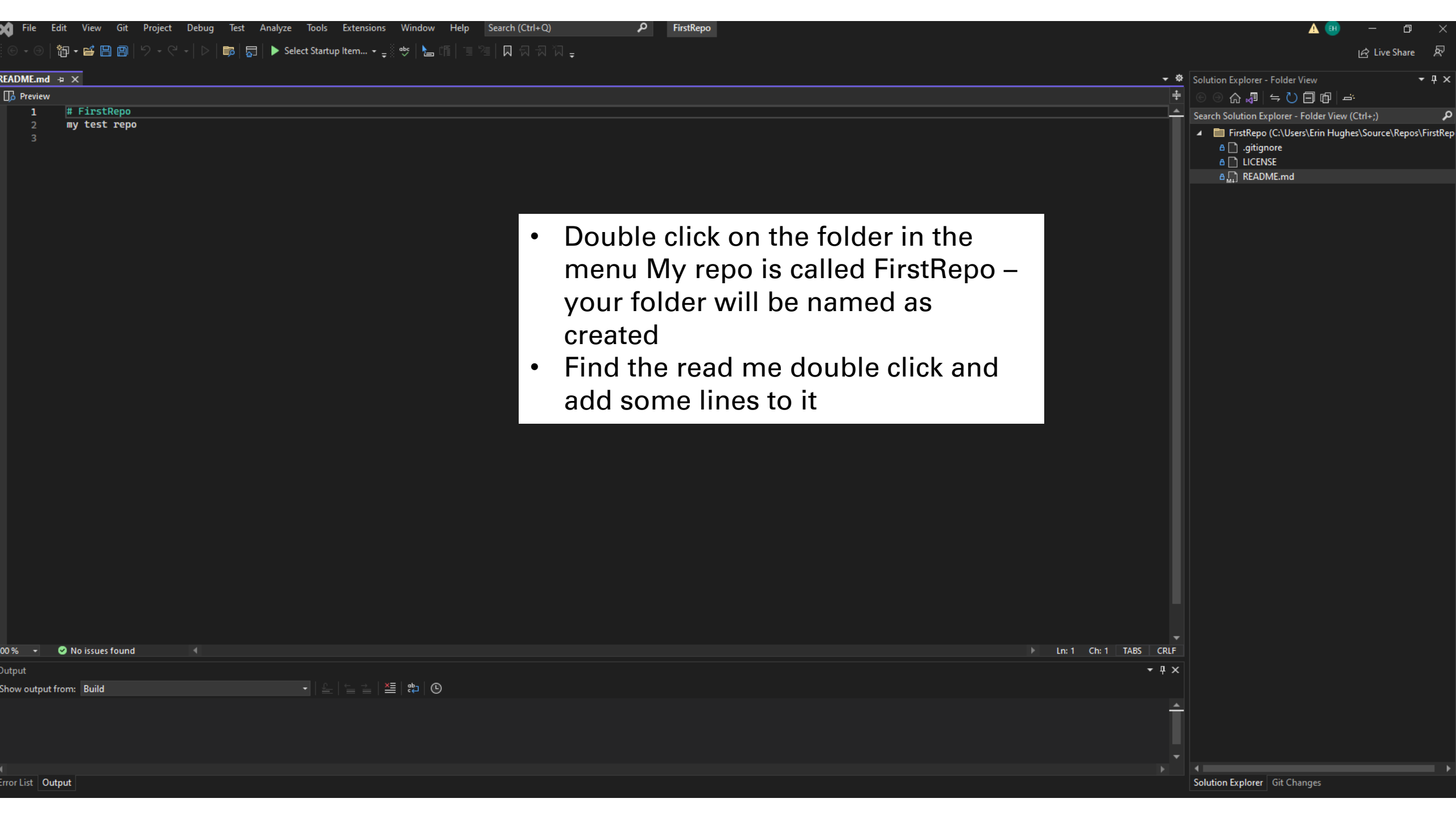
 Azure DevOps

 GitHub

Back

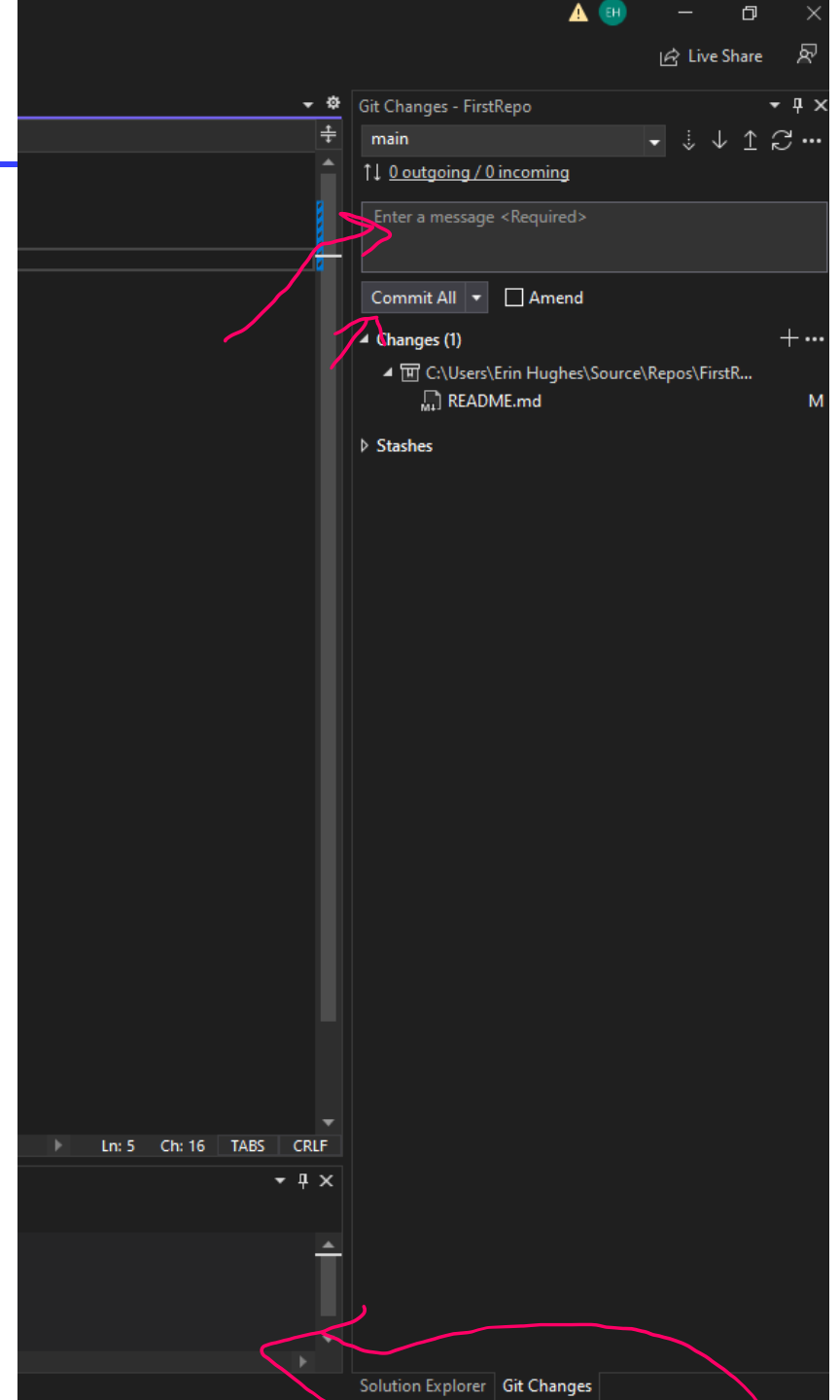
Clone





- Double click on the folder in the menu My repo is called FirstRepo – your folder will be named as created
- Find the read me double click and add some lines to it

- After adding some text to the Readme save it
- See how the lock symbol has changed to a red check – this means changes have been made
- Find the git changed tab or from the top menu View->Git Changes
- Also check out View->Git Repository
- We SHOULD see that readme file is in the change list
- Write a small message to let yourself and others know what the change is in the message box such as “edited readme file”
- Then click commit all button



# Link!

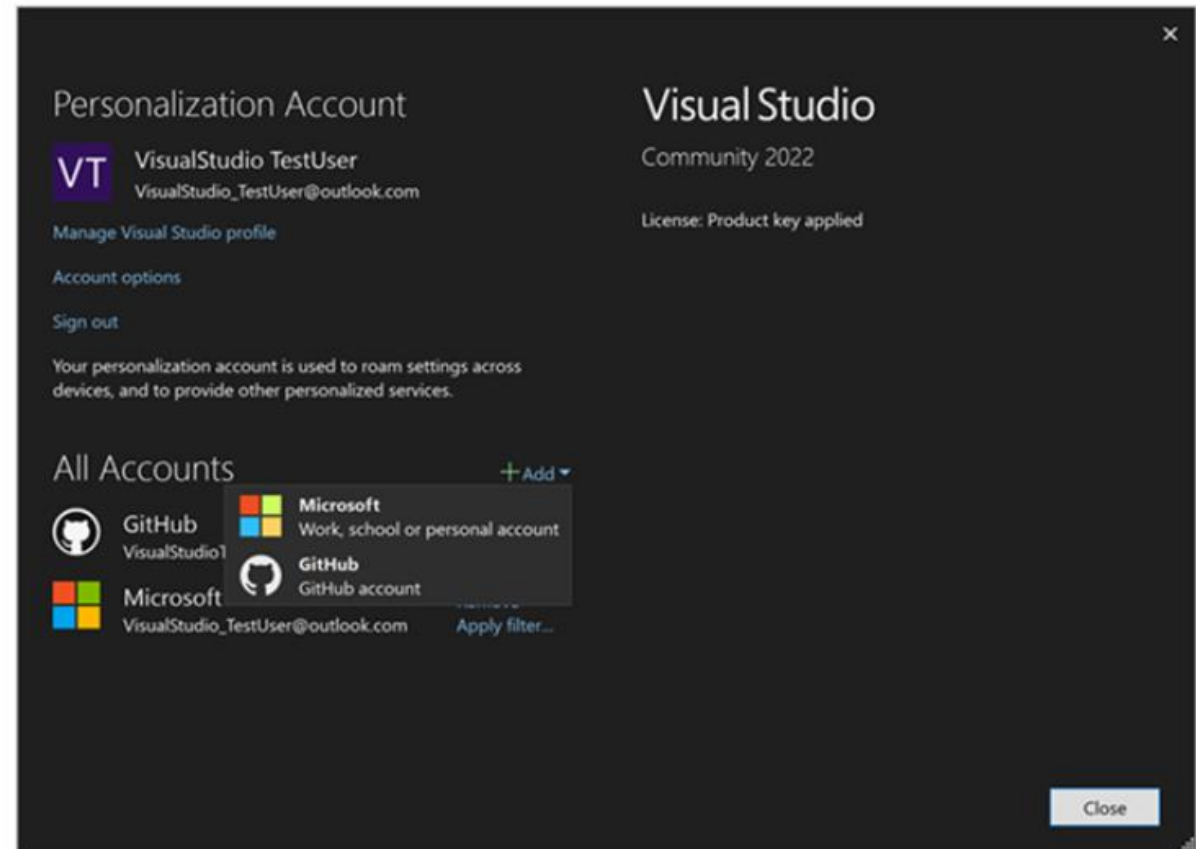
- <https://learn.microsoft.com/en-us/visualstudio/ide/work-with-github-accounts?view=vs-2022>
- You will need to add your account to push your work up to your account on github.com

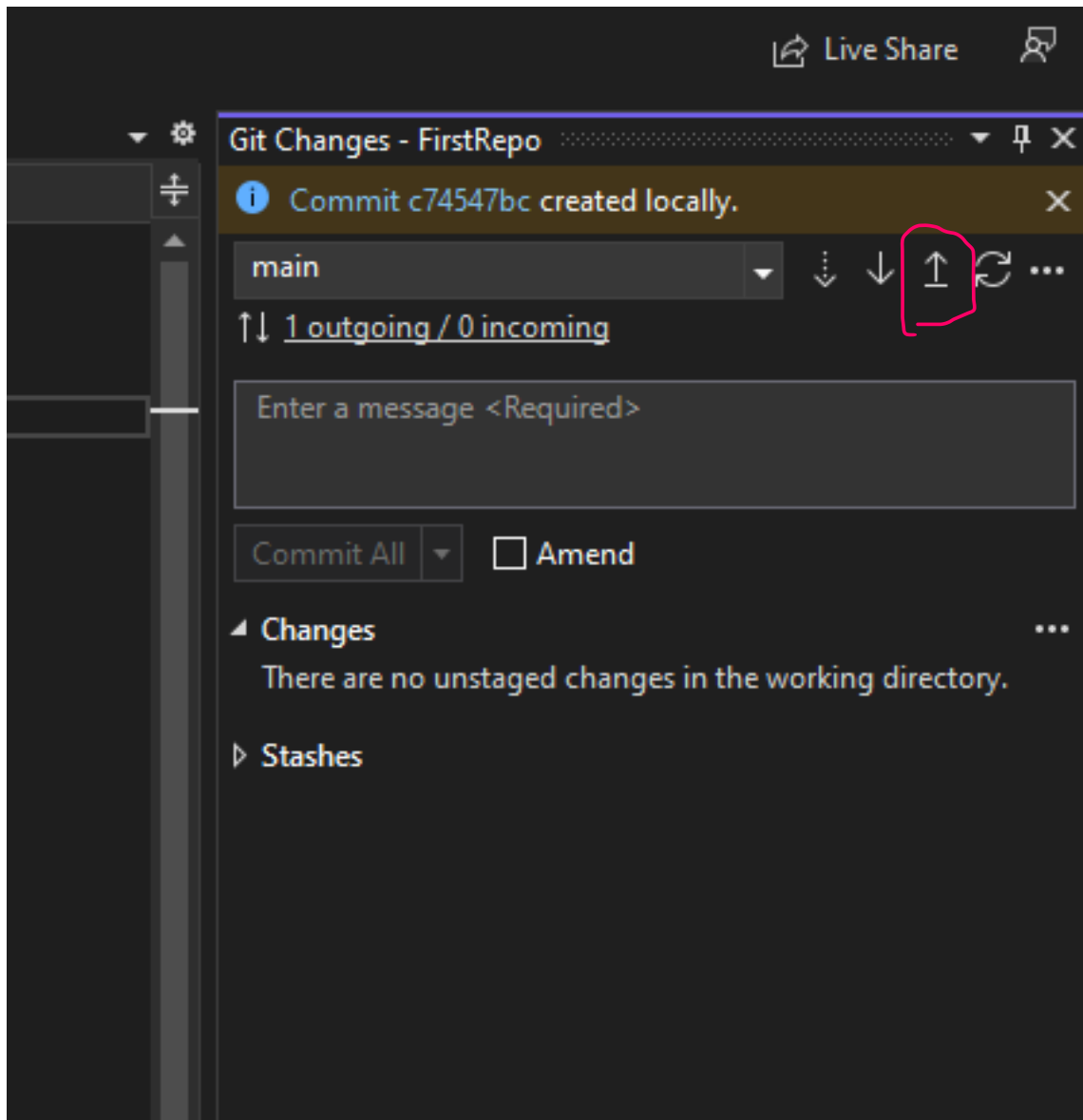
## Adding public GitHub accounts

You can add your public GitHub account at any point, even if you haven't signed into Visual Studio with a Microsoft account, work account, or school account.

Add a GitHub account from the Account settings dialog:

1. Open the Account Settings dialog by going to **File > Account Settings....**
2. From the **All Accounts** submenu, select **+ Add** to add an account, and then select **GitHub**.





- Notice the new information
- A “commit” or snapshot has been created locally
- Locally means only on the current machine – it’s not up on the server yet
- We need to push it to the server
- In our case github.com is our server
- Find the push button (up arrow with a ground line) and push your code change up so it is available to anyone with the repo link
- Follow up – find the symbols for fetch, pull and sync search the resources to see what/when/why to use these commands
- Go to github.com page to check if it’s uploaded!

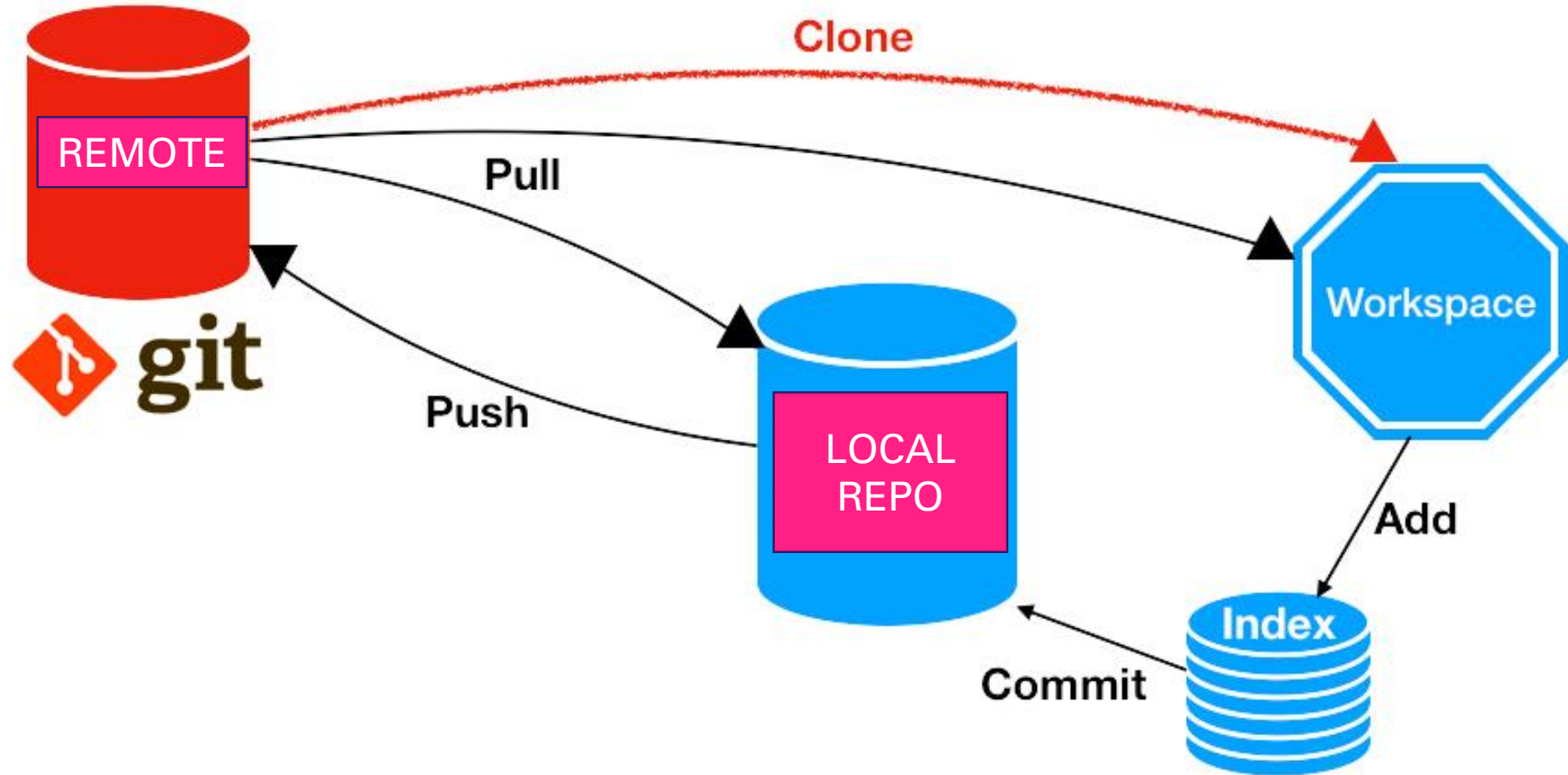


**Success!**

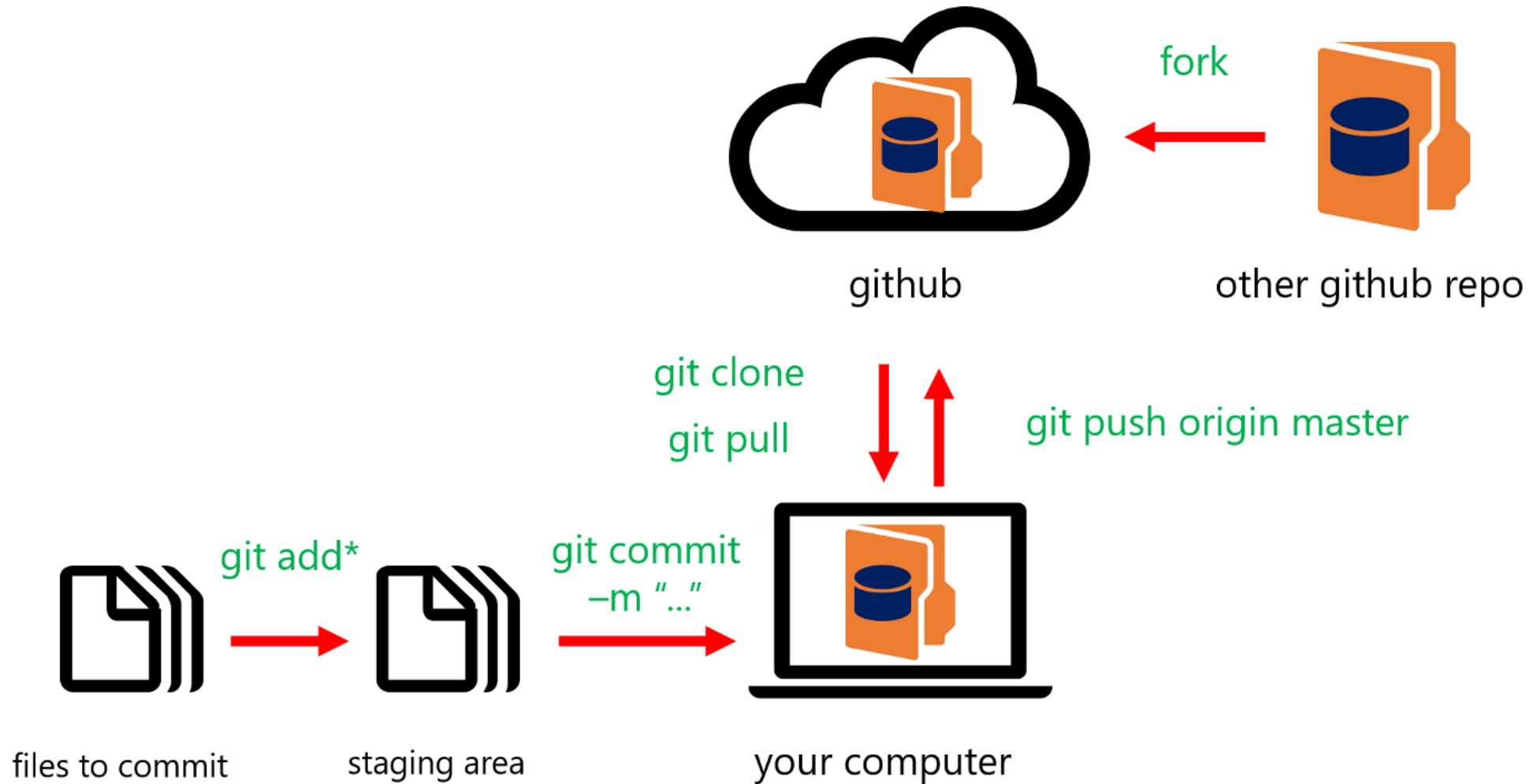
Your authorization was successful. You can now return to Visual Studio.



# Why commit and push?



# Why commit and push?

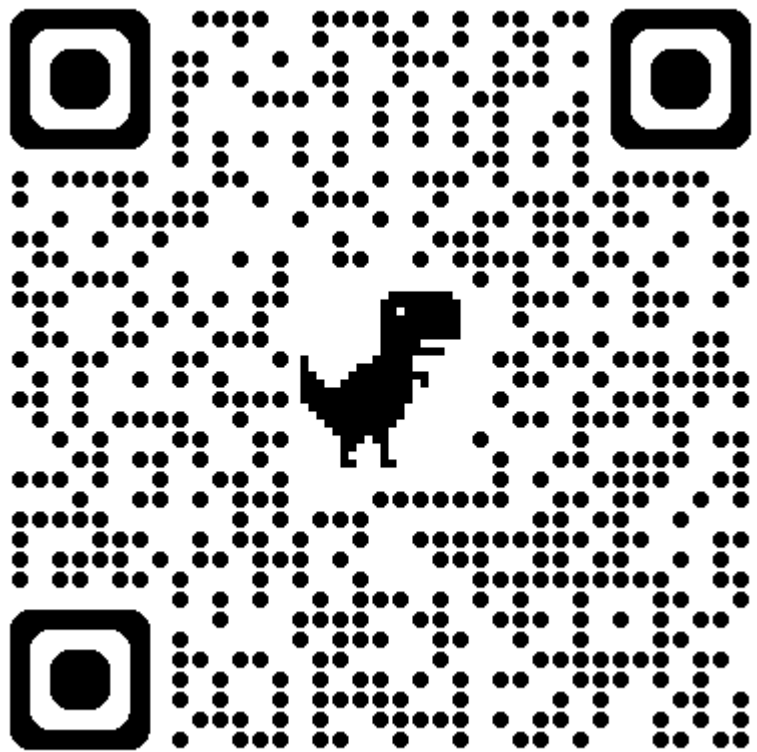




# Cheat sheet!

- There are lots of commands and we will practice a few more
- But: <https://education.github.com/git-cheat-sheet-education.pdf> has a great list
- You should have a physical print out of this to take away

# GITHUB CLASSROOM LINK



<https://classroom.github.com/a/4qllgOjW>

**github-fundamentals-erinmichno**
Public

[forked from Abertay-University-SDI/welcome2024\\_25-github\\_fundamentals-github-starter-course](#)

Edit Pins
Watch 0
Fork 0
Star 0

main
3 Branches
0 Tags

Add file
<> Code

This branch is 7 commits ahead of [Abertay-University-SDI/welcome2024\\_25-github\\_fundamentals-github-starter-course:main](#).

Contribute
Sync fork

**erinmichno**
 added another line of code
 a7c72a2 · 3 hours ago
8 Commits

.vs	merging from branch into main	3 hours ago
README.md	add deadline	4 hours ago
test.txt	added another line of code	3 hours ago

README

Review the assignment due date

## The Basics of GitHub

## Course overview and learning outcomes

The goal of this course is to give you a brief introduction to GitHub. We'll also provide you with materials for further learning and a few ideas to get you started on our platform. 🚀

## Git and GitHub

Git is a distributed Version Control System (VCS), which means it is a useful tool for easily tracking changes to your code, collaborating, and sharing. With Git you can track the changes you make to your project so you always have a record of what you've worked on and can easily revert back to an older version if need be. It also makes working with

**About**

welcome2024\_25-github\_fundamentals-github-starter-course created by GitHub Classroom

Readme
Activity
Custom properties

0 stars
 0 watching
 0 forks

Report repository

**Releases**

No releases published

Create a new release

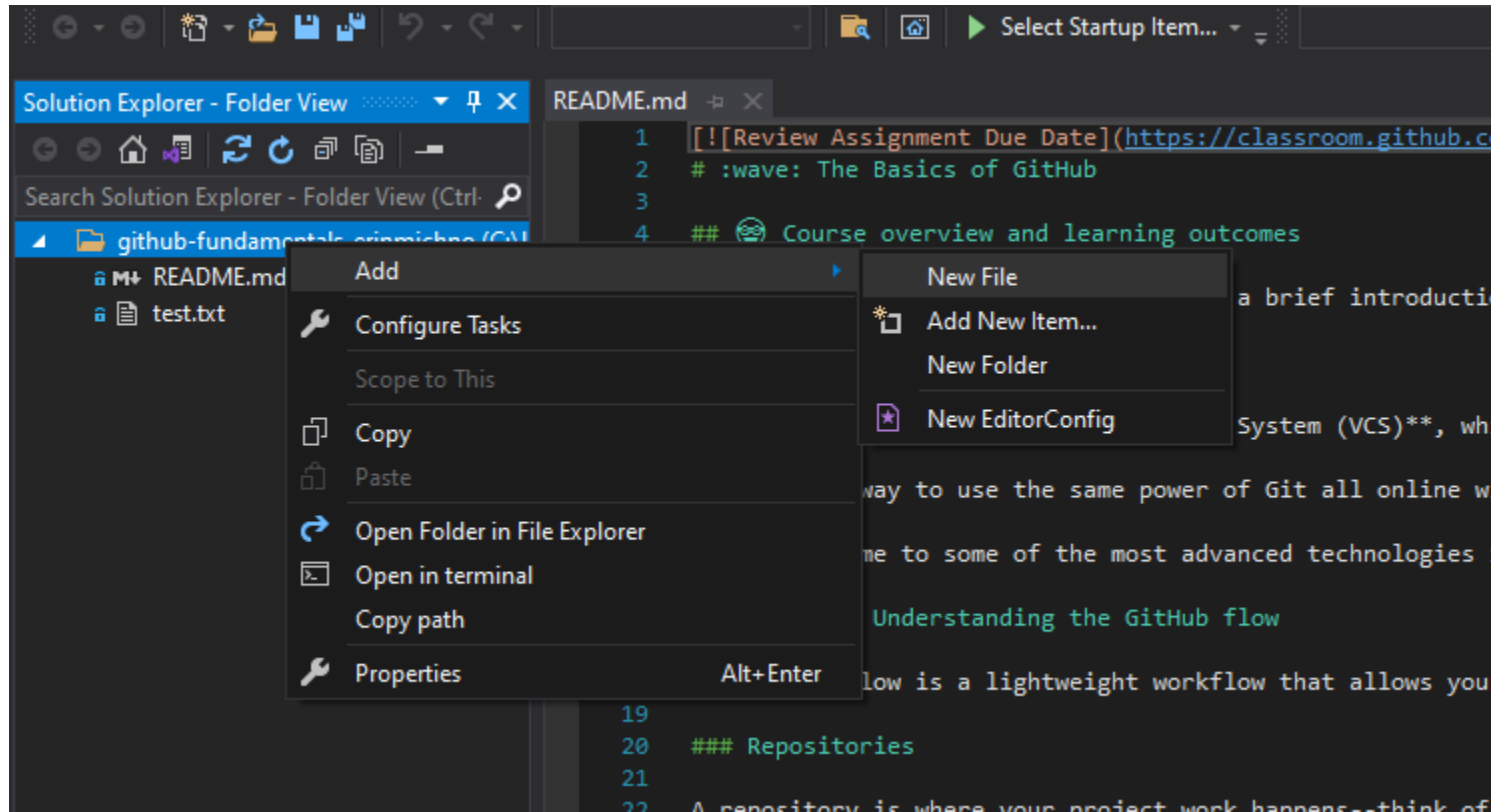
**Packages**

No packages published

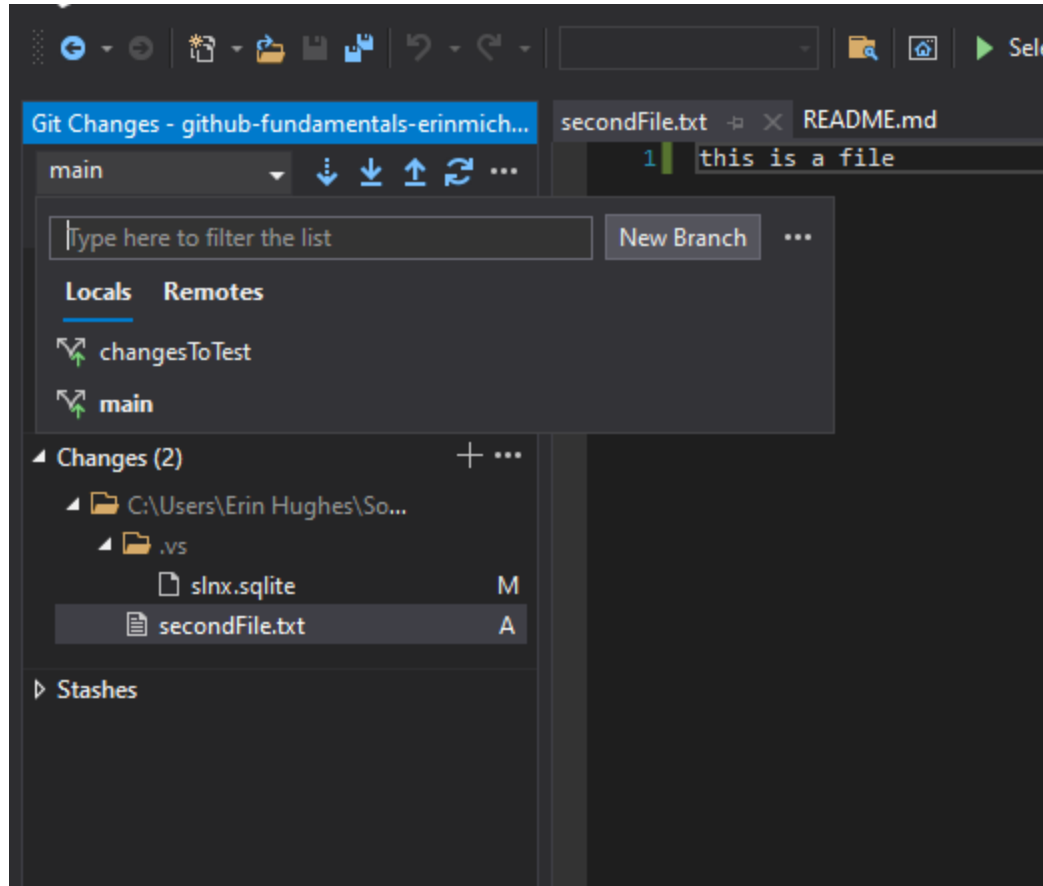
Publish your first package

- Add your student id to the list if it is not there
- Accept the assignment
- Read the ReadMe it has the basics of Github right there!
- Click on the green code button and copy the repo git location as we did before or select open with visual studio

# Add a new file – add some text



# Create a branch



- Find the “main” drop down text – this is the branch you are working on at first there is only one
- Create a new branch – this is a new timeline
- Commit and push the new file and new work to this new branch
- Check it is there on github.com
- See if you can see both branches

# On server – after commit and PUSH!

github.com/Abertay-University-SDI/github-fundamentals-erinmichno



github-fundamentals-erinmichno Public

Edit Pins

forked from [Abertay-University-SDI/welcome2024\\_25-github\\_fundamentals-github-starter-course](#)

main

3 Branches 0 Tags

Go to file

t

Add file

Switch branches/tags



Find or create a branch...

Branches

Tags

✓ main

default

changesToTest

erinmichno-patch-1

View all branches

Abertay-University-SDI/welcome2024\_25-github\_fundamentals-github-starter-course:main

a7c72a2 · 3 hours ago



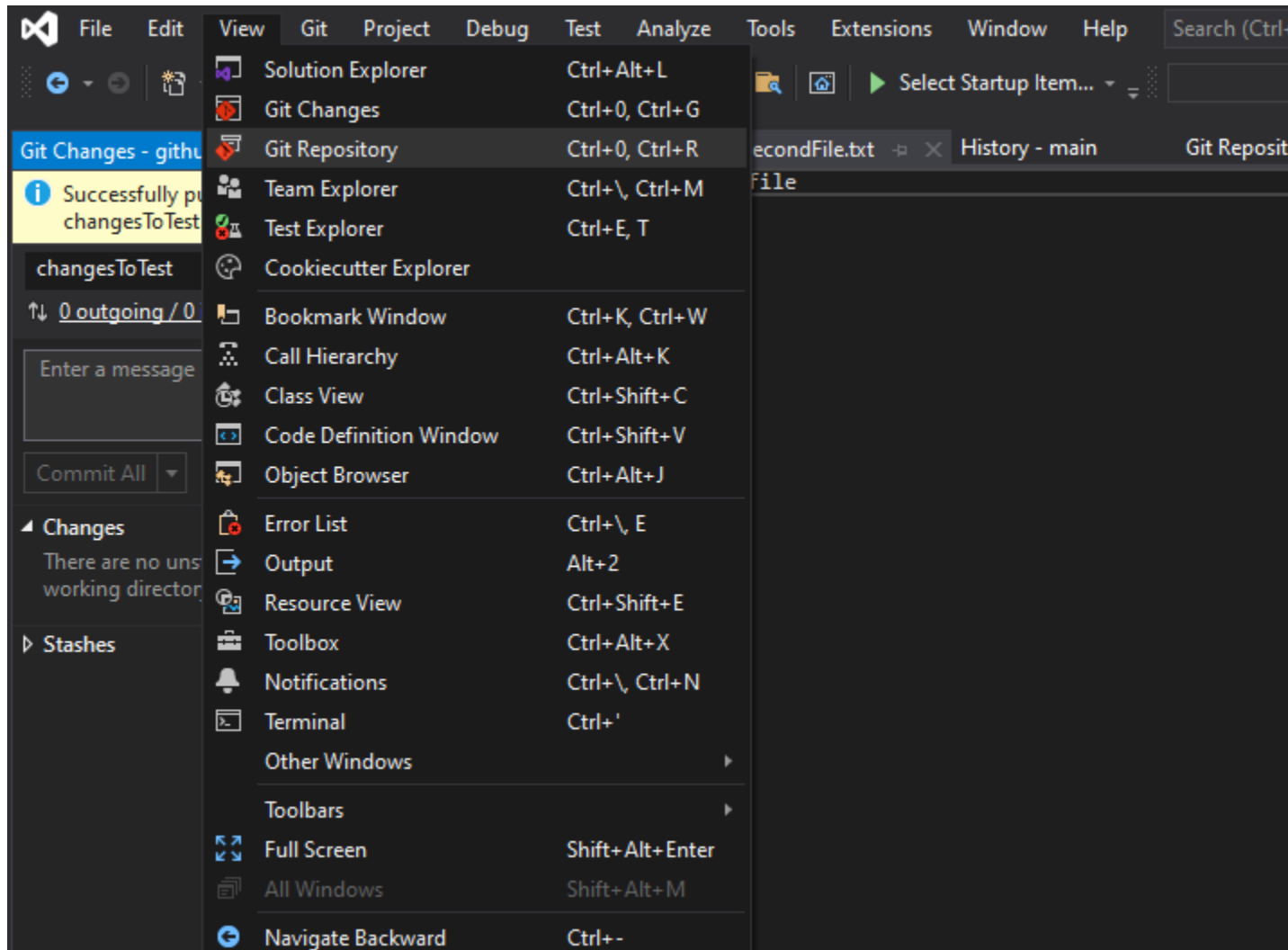
merging from branch into main

add deadline

added another line of code

# On Local machine VisualStudio

- Let's look at the branches on Git Repository view





# Timeline / History

The screenshot displays the Visual Studio Code interface with the Git extension. The 'Git Repository - g...amentals-erinmichno' view is active, showing the 'Timeline / History' of the repository. The interface is divided into several panels:

- Left Panel:** Contains the 'Git Changes' view, showing a notification 'Successfully pushed to origin/changesToTest. Create a Pull Request.' and a list of changes. Below this is the 'Commit' section with a message input field and buttons for 'Commit All' and 'Amend'.
- Middle Panel:** Displays the 'Branches' view, showing a tree structure of branches. The 'main' branch is selected and highlighted in blue. Other branches include 'changesToTest', 'remotes/origin', 'changesToTest', 'erinmichno-patch-1', and 'main'.
- Right Panel:** Shows the 'Local History' view, which includes a commit graph and a list of commits. The commits are listed in reverse chronological order, with the most recent commit at the top.

The commit list in the 'Local History' view includes the following information:

Commit Hash	Author	Date	Message
a7c72a20	erinmichno	10/09/202...	added another line of code
cbc17b92	erinmichno	10/09/202...	merging from branch into main
17af302d	erinmichno	10/09/202...	committing and pushing to the branch
19b2102d	erinmichno	10/09/202...	added file
3afe2d18	Erin Mich...	10/09/202...	Merge pull request #1 from Abertay-University-SDI/erinmichno-patch-1
42ab5681	Erin Mich...	10/09/202...	Create test.txt
fdf364e5	github-cl...	10/09/202...	add deadline
91f4cd78	github-cl...	10/09/202...	Initial commit

# Git -> Open In Command Prompt

The screenshot shows the Visual Studio Code interface with a Git repository open. The left sidebar displays the Explorer and Solution Explorer views. The main editor area shows the 'Git Repository' view for the repository 'github-fundamentals-erinmichno'. The 'Branches' panel lists 'changesToTest' and 'main'. The 'Local History' panel shows a commit history with messages like 'another commit', 'merge completed', 'added another line of code', 'merging from branch into main', 'added file', 'insert', and 'committing and pushing to the branch'. A command prompt window is open in the foreground, showing the current directory path: 'C:\Users\Erin Hughes\Source\Repos\github-fundamentals-erinmichno>'. The command prompt window title is 'C:\WINDOWS\SYSTEM32\cmd.exe'.

Microsoft Windows [Version 10.0.19045.4780]  
(c) Microsoft Corporation. All rights reserved.  
C:\Users\Erin Hughes\Source\Repos\github-fundamentals-erinmichno>

# git <command> <params>

```
C:\WINDOWS\SYSTEM32\cmd.exe
Microsoft Windows [Version 10.0.19045.4780]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Erin Hughes\Source\Repos\github-fundamentals-erinmichno>git branch
* changesToTest
  main

C:\Users\Erin Hughes\Source\Repos\github-fundamentals-erinmichno>git checkout main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.

C:\Users\Erin Hughes\Source\Repos\github-fundamentals-erinmichno>git merge changesToTest
Updating a7c72a2..fa237e2
Fast-forward
 .vs/VSSWorkspaceState.json      | 7 ++++++
 .vs/github-fundamentals-erinmichno/v16/.suo | Bin 0 -> 21504 bytes
 .vs/slnx.sqlite                 | Bin 90112 -> 90112 bytes
 secondFile.txt                  | 1 +
 test.txt                        | 1 +
 5 files changed, 9 insertions(+)
 create mode 100644 .vs/VSSWorkspaceState.json
 create mode 100644 .vs/github-fundamentals-erinmichno/v16/.suo
 create mode 100644 secondFile.txt

C:\Users\Erin Hughes\Source\Repos\github-fundamentals-erinmichno>git push origin main
Total 0 (delta 0), reused 0 (delta 0)
To https://github.com/Abertay-University-SDI/github-fundamentals-erinmichno.git
 a7c72a2..fa237e2  main -> main

C:\Users\Erin Hughes\Source\Repos\github-fundamentals-erinmichno>
```

Try a few commands from the command line

git branch

git checkout main

git merge MyOTHERbranch

git push origin

Most commands will have a button / visual counter part in VISUAL studio – but note all commands can be handled from command prompt and may be faster as you level up



# BRANCHING

Wait haven't we already made a branch?



# Branches

- In Git, a **branch** is a new/separate version of the main repository. It has all the dependencies and can switch between versions with a single command all while ensuring not files get muddled or missed and can keep feature development separate and safe!
- Branches allow you to develop features, fix bugs, or safely experiment with new ideas in a contained area of your repository.
- You always create a branch from an existing branch. Typically, you might create a new branch from the default branch of your repository.

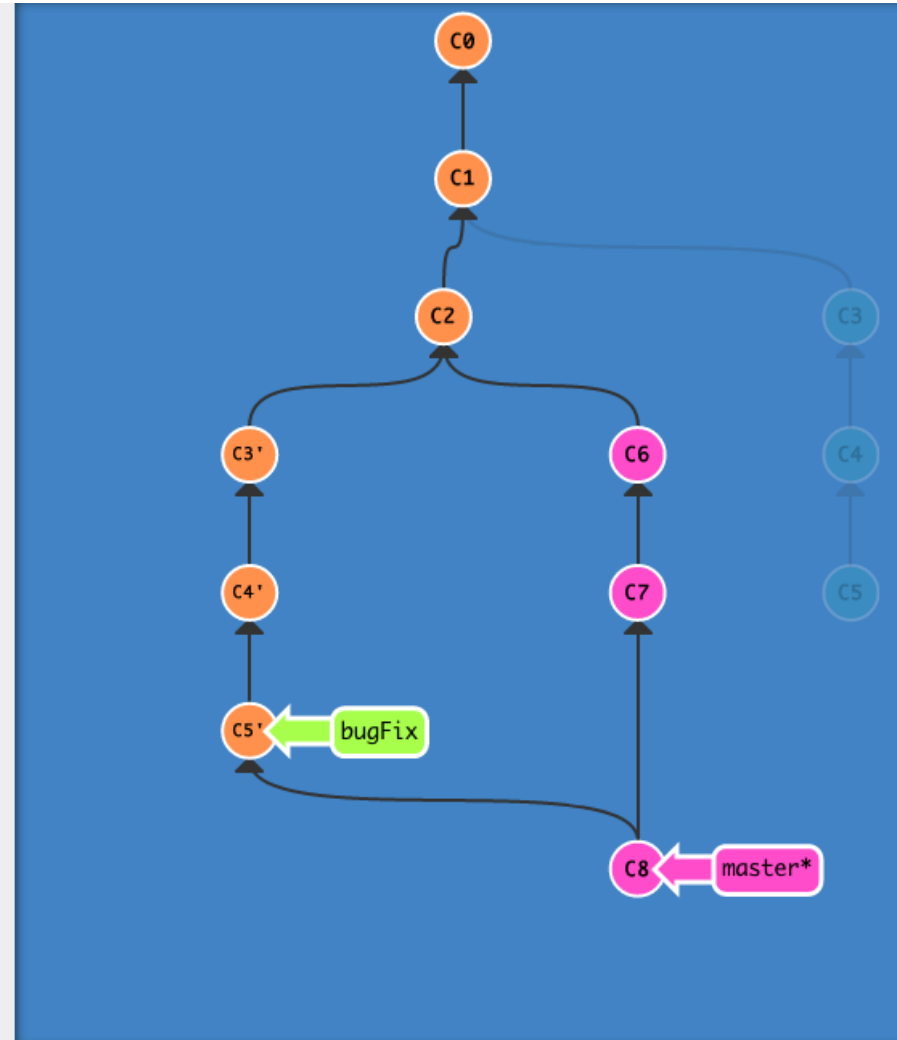
# LEARN GIT BRANCHING



<https://learngitbranching.js.org/>

# Try lots of combinations

```
Learn Git Branching
$ gc
$ git checkout HEAD~1
$ git commit
Warning!! Detached HEAD state
$ git checkout -b bugFix
$ gc
$ gc
$ git rebase master
$ git checkout master
$ gc
$ gc
$ git merge bugFix
```





# EXTRAS



INTRO TO GIT & GITHUB



# Diff Tools and Merge Conflicts

The screenshot shows a code editor with a merge conflict in a file named `base.py`. The editor is divided into three main sections: **LOCAL**, **Unresolved Conflict**, and **REMOTE**.

**LOCAL (Left Pane):** Shows the local version of the code. Lines 332-342 define the `afrom_texts` classmethod. Line 343 (highlighted in orange) defines the `as_retriever` method, which returns a `VectorStoreRetriever` instance. Lines 344-345 show the `VectorStoreRetriever` class definition and its initialization.

**Unresolved Conflict (Middle Pane):** Shows the conflicting versions side-by-side. It highlights the `as_retriever` method in both versions, indicating a conflict at line 343. A context menu is open over this conflict, offering the following options:   
- Choose A   
- Choose B   
- Choose Both (A First)   
- Choose Both (B First)

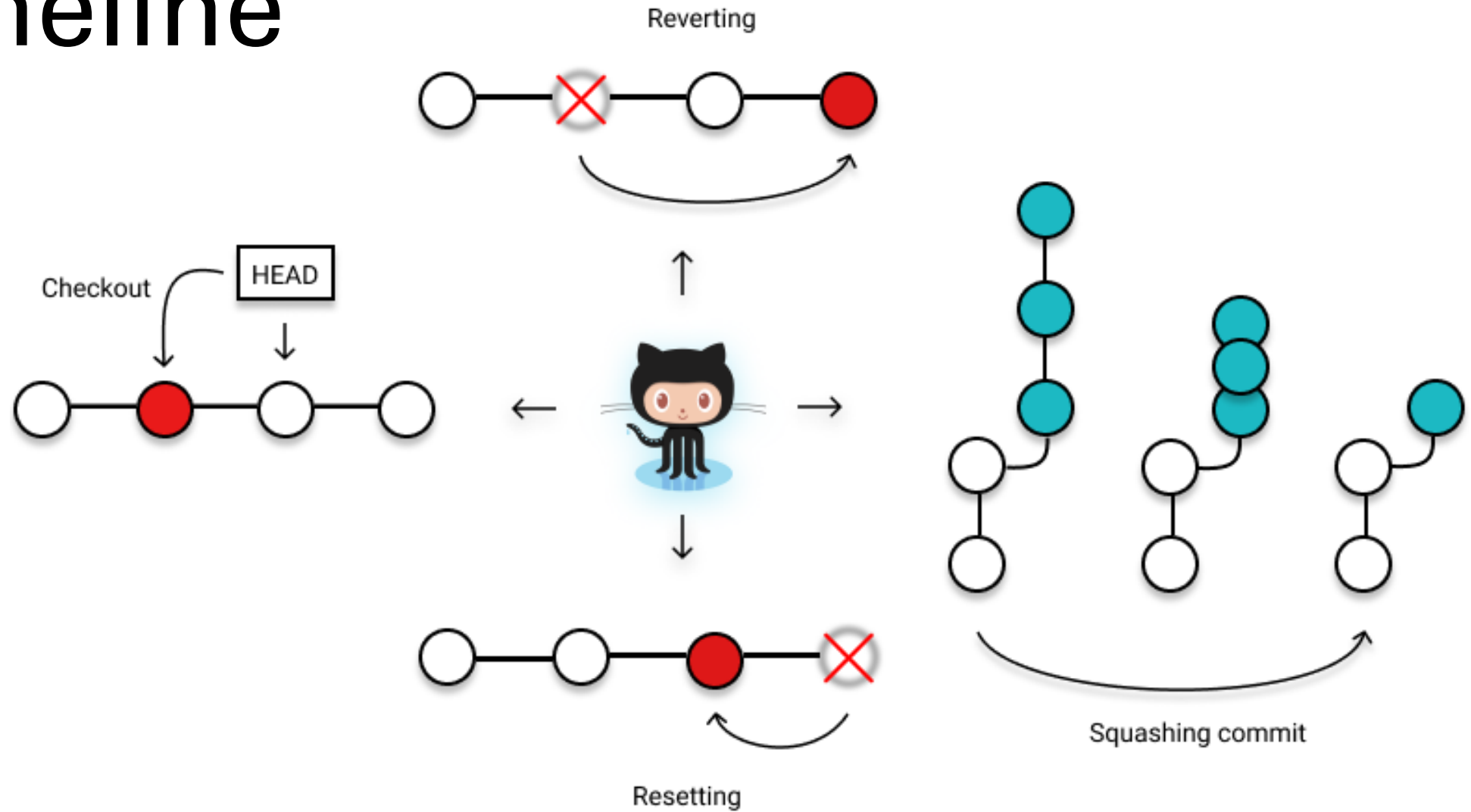
**REMOTE (Right Pane):** Shows the remote version of the code. Lines 332-342 define the `afrom_texts` classmethod. Line 343 (highlighted in orange) defines the `as_retriever` method, which returns a `BaseRetriever` instance. Lines 344-345 show the `VectorStoreRetriever` class definition and its initialization.

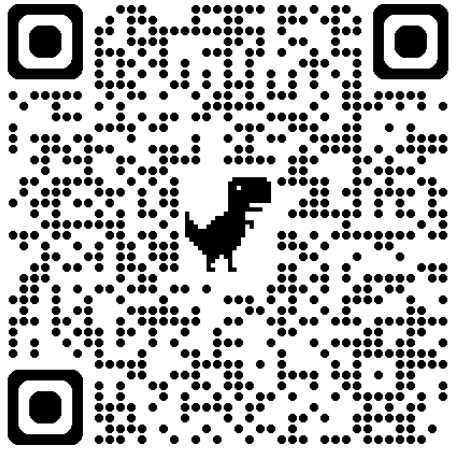
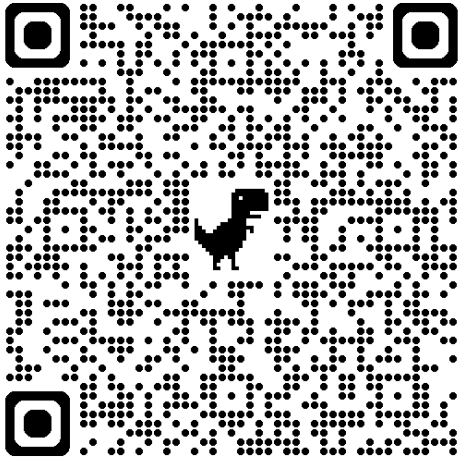
The bottom status bar indicates "Conflict 1 of 1".

# Undo Mistakes: Yours or others!

- Checkout different commits
- Revert changes that have already been committed
- Git reset HEAD will undo uncommitted changes
- Stash allows you to hide away stuff you're working on that might be not ready to commit so you can grab or show off other work then return the stash to your working code later

# Timeline

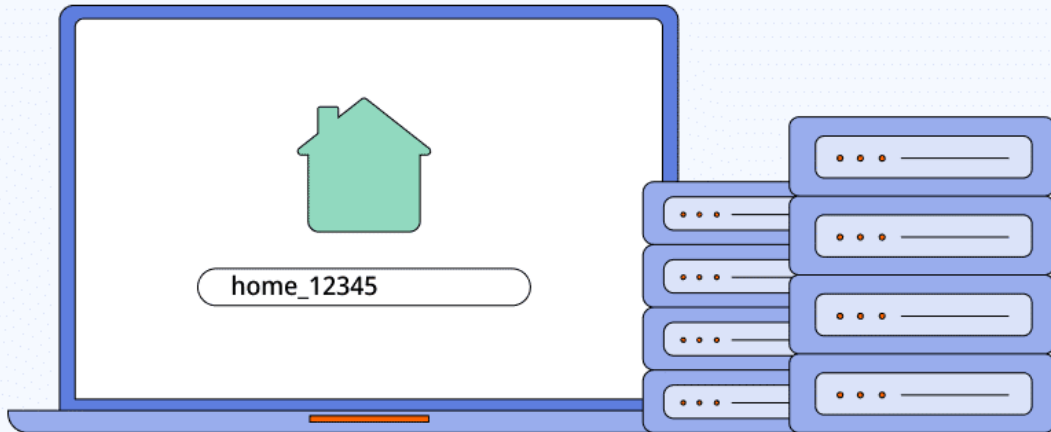




# Hosting

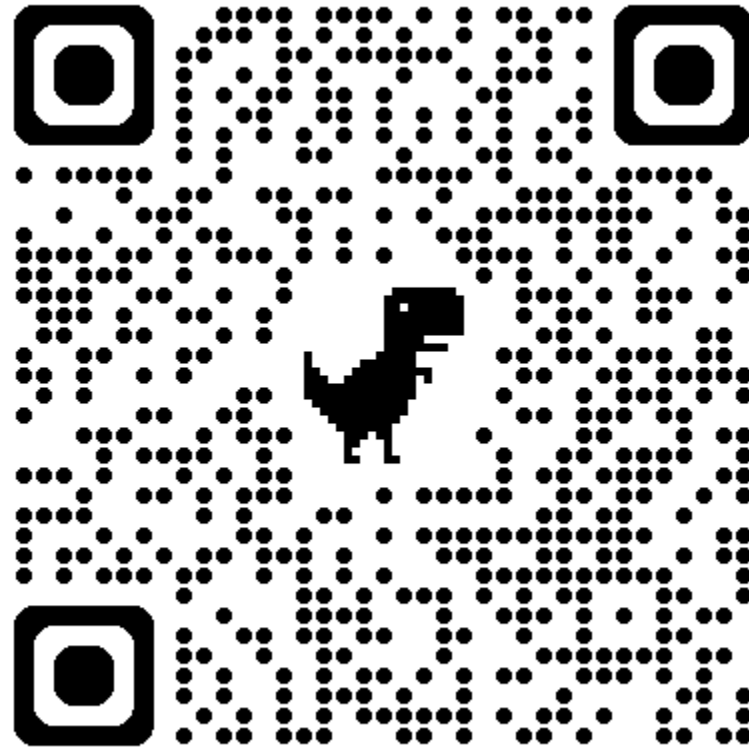
- You may not want to use a Microsoft based service to host your own code
- You might want to host your own code
- Upside: Unlimited Power/Control
- Downside: reliability / maintenance – knowledge base

- [https://github.com/PowerShell/Win32-OpenSSH/wiki/Setting-up-a-Git-server-on-Windows-using-Git-for-Windows-and-Win32\\_OpenSSH](https://github.com/PowerShell/Win32-OpenSSH/wiki/Setting-up-a-Git-server-on-Windows-using-Git-for-Windows-and-Win32_OpenSSH)
- <https://www.linuxfoundation.org/blog/blog/classic-sysadmin-how-to-run-your-own-git-server>



# Swag! Get free stuff

<https://education.github.com/pack>



# THANK YOU

Erin Michno Hughes  
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