

# Introduction to Git



# Agenda

- Git
- GitHub
- Git CLI
- Git GUI



# Git

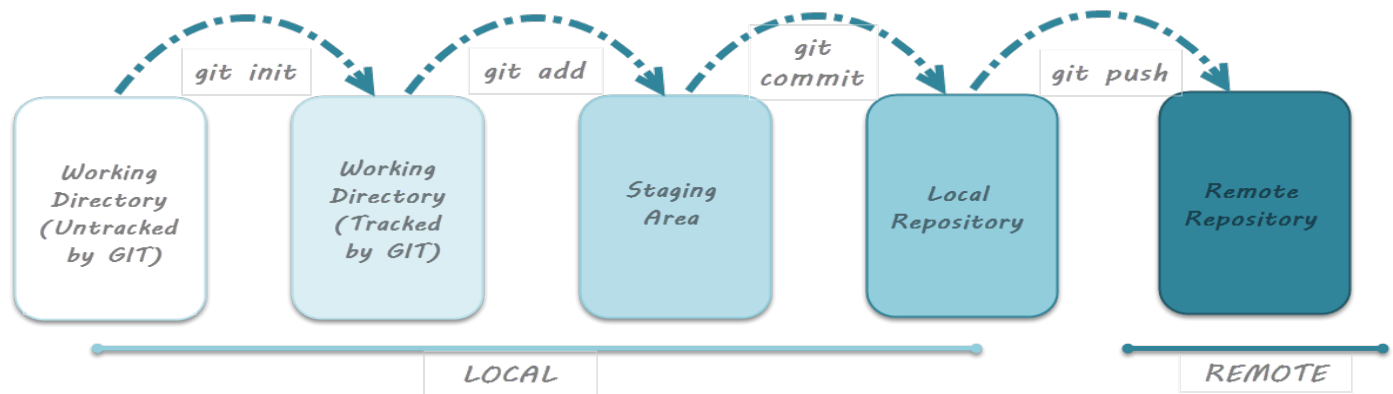
- What is Git?
  - Version Control System

# Git

- Why use Git?
  - Source Code Tracking
  - Team Work Development

# Git

- Git State
  - Untracked
  - Working Directory
  - Staged
  - Local Repository
  - Remote Repository

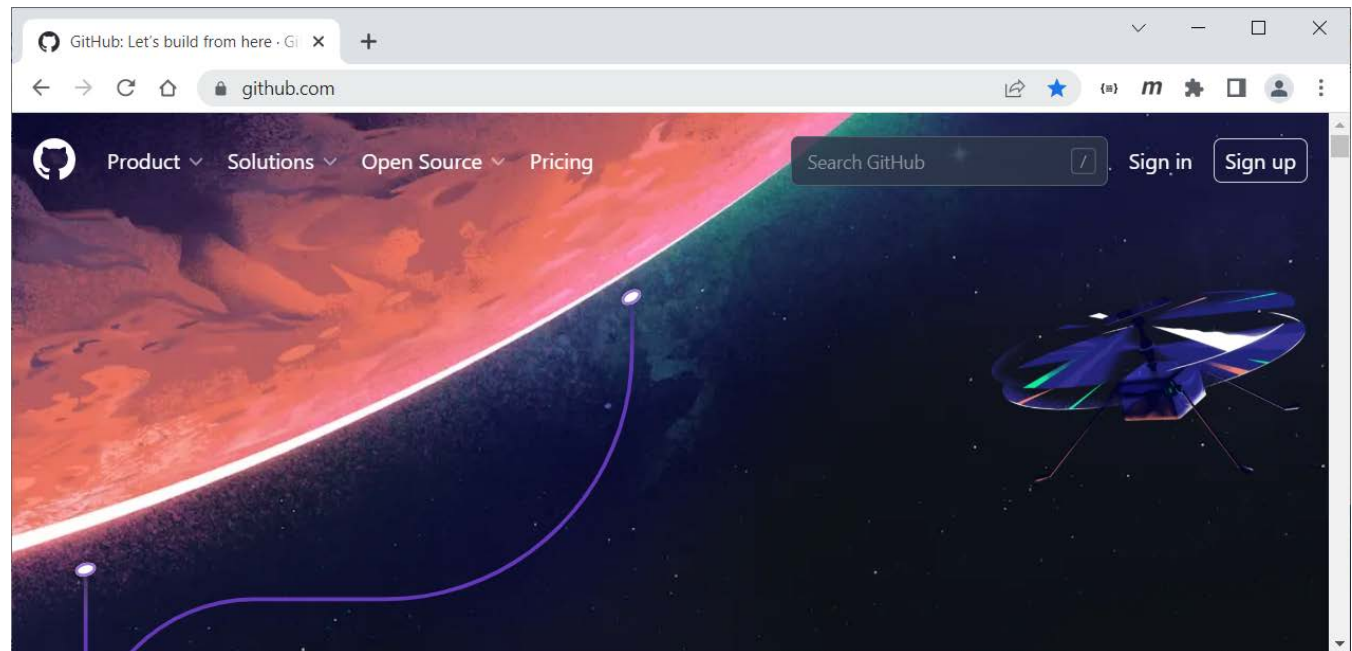


# GitHub

- What is GitHub?
  - Web site for Git
  - Control version repository

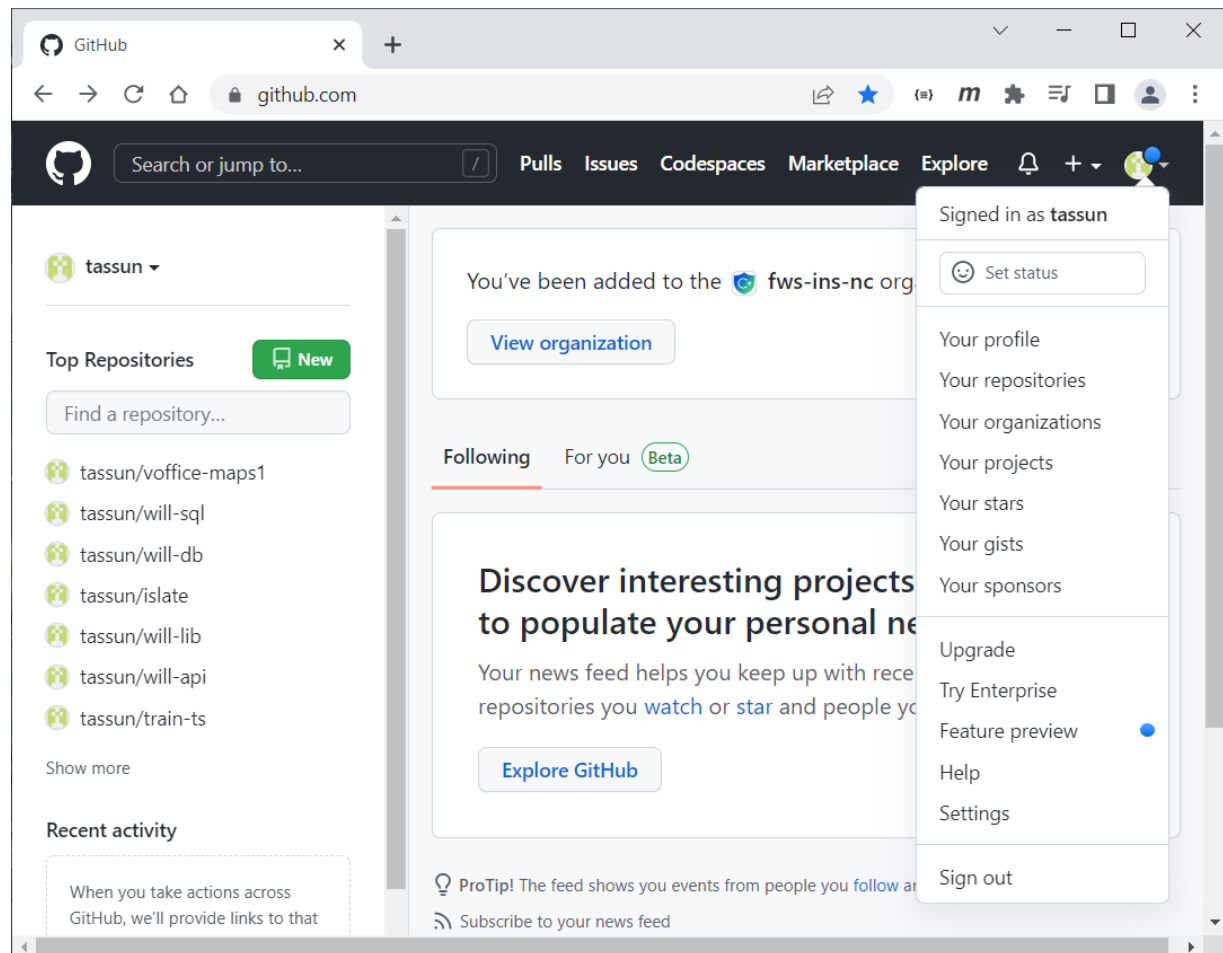
# GitHub

- How to use GitHub?
  - Go to <https://github.com>
  - Create account (Sign up)



# GitHub

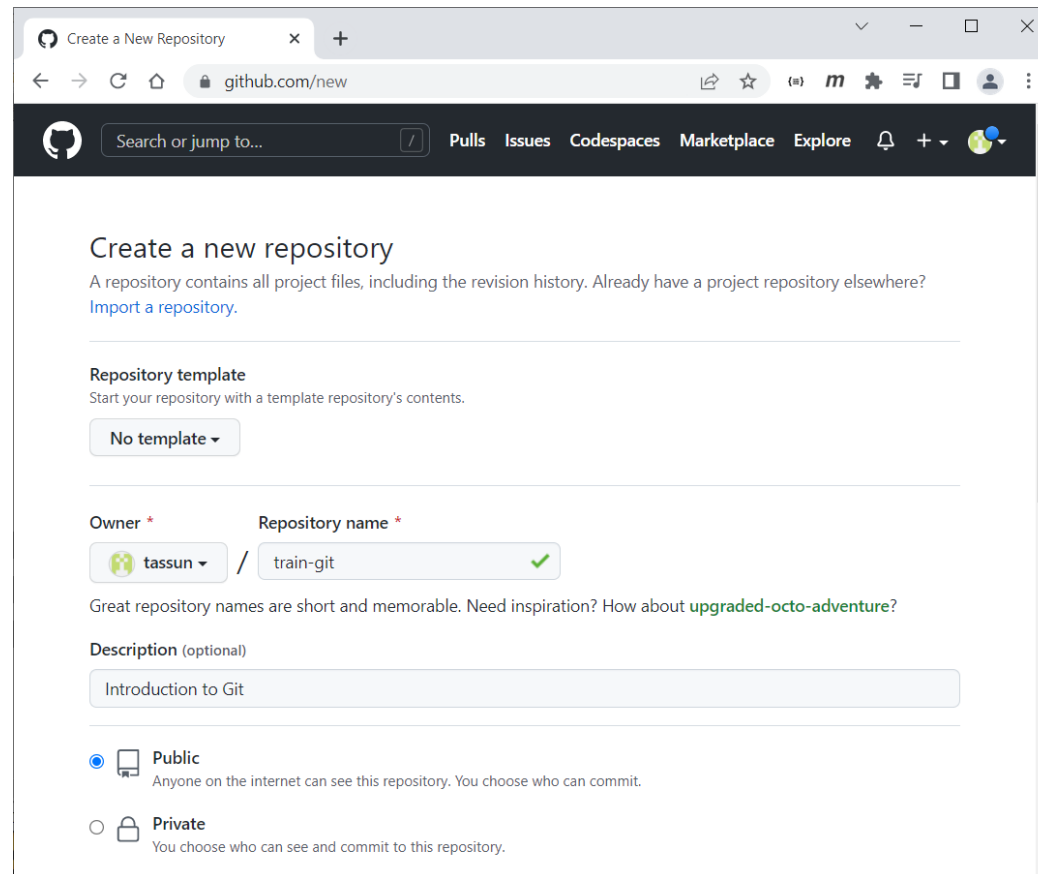
- How to use GitHub?





# GitHub

- How to use GitHub?
  - Create repository



The screenshot shows the GitHub 'Create a New Repository' page. The browser address bar shows 'github.com/new'. The page title is 'Create a new repository'. Below the title, it says 'A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)'. There is a section for 'Repository template' with a 'No template' dropdown. Below that, there are fields for 'Owner' (tassun) and 'Repository name' (train-git), which is marked with a green checkmark. A suggestion for repository names is provided: 'Great repository names are short and memorable. Need inspiration? How about [upgraded-octo-adventure?](#)'. There is a 'Description (optional)' field with the text 'Introduction to Git'. At the bottom, there are two radio buttons for 'Public' (selected) and 'Private'. The 'Public' option is described as 'Anyone on the internet can see this repository. You choose who can commit.' The 'Private' option is described as 'You choose who can see and commit to this repository.'

Create a New Repository

github.com/new

Search or jump to...

Pulls Issues Codespaces Marketplace Explore

### Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

**Repository template**  
Start your repository with a template repository's contents.

No template

**Owner \*** **Repository name \***

tassun / train-git

Great repository names are short and memorable. Need inspiration? How about [upgraded-octo-adventure?](#)

**Description (optional)**

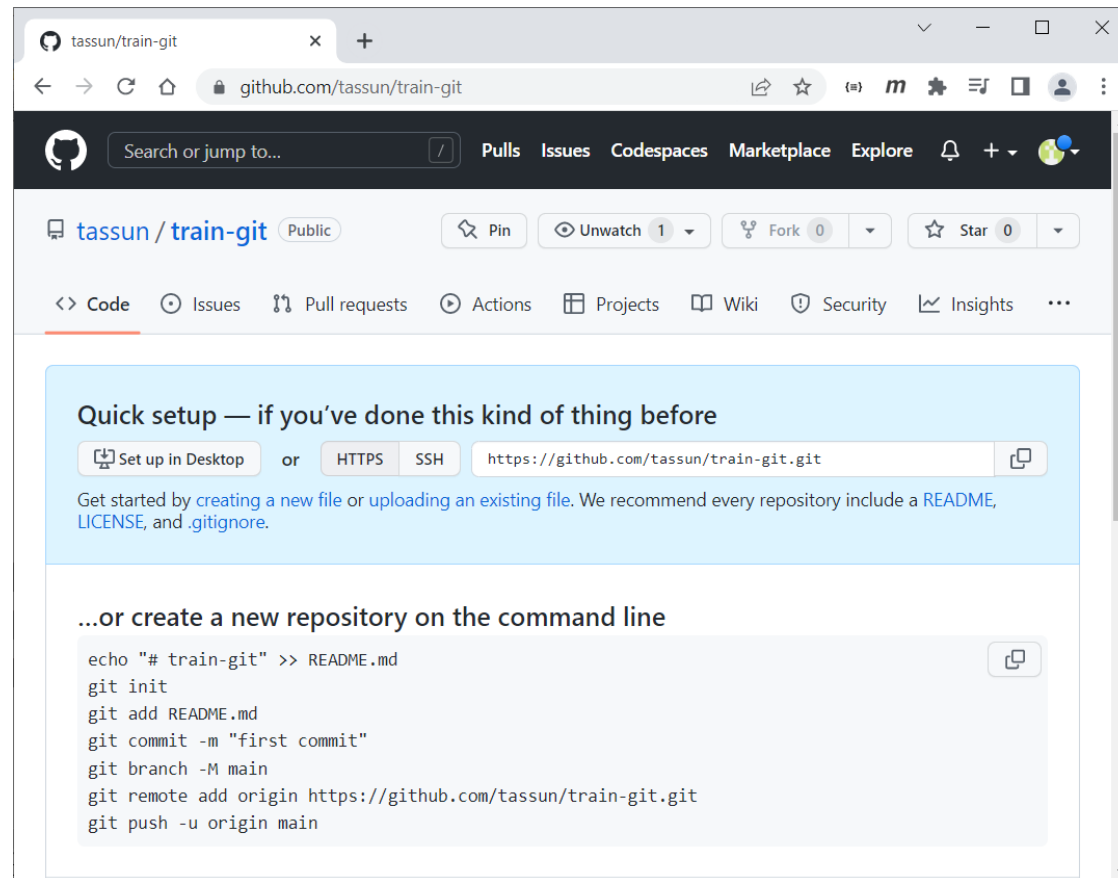
Introduction to Git

☒ **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.

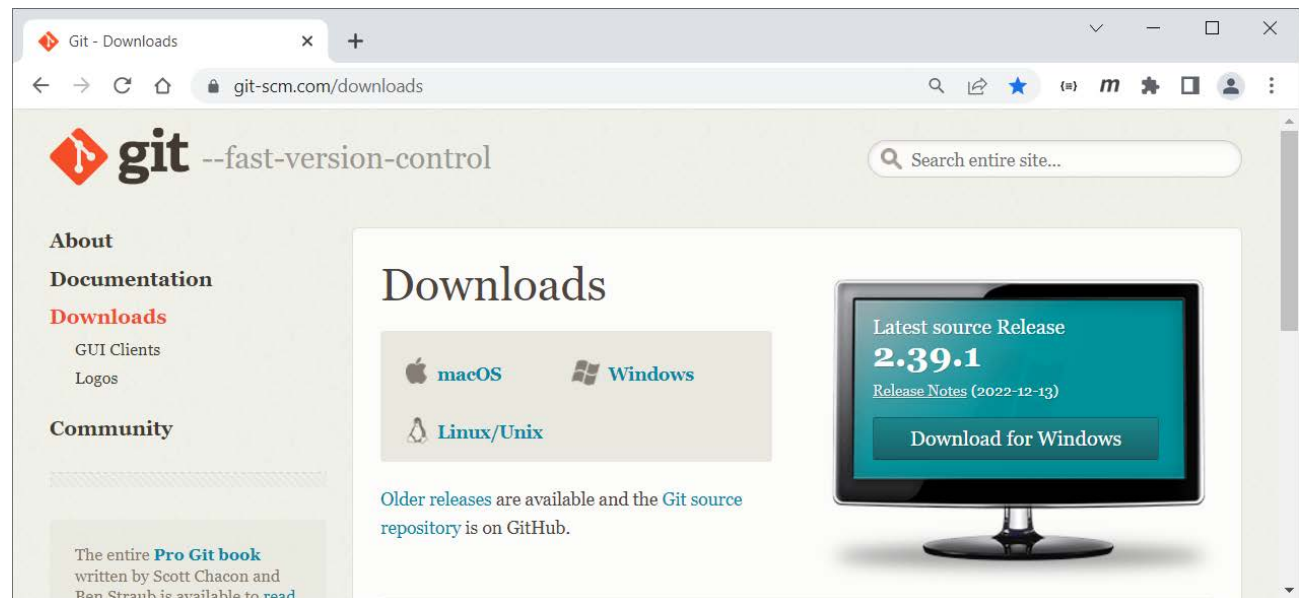
# GitHub

- How to use GitHub?
  - Create repository



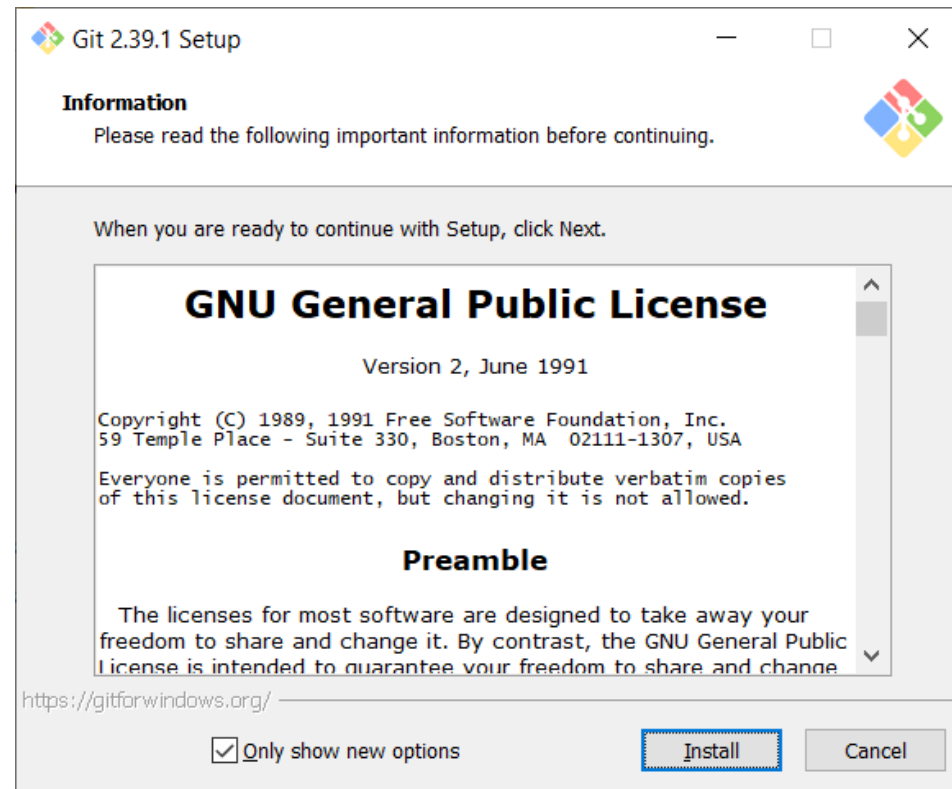
# Git CLI

- How to use Git?
  - Go to <https://git-scm.com/>
  - Download & Install
    - <https://git-scm.com/downloads>



# Git CLI

- Git Installation
  - windows



# Git CLI

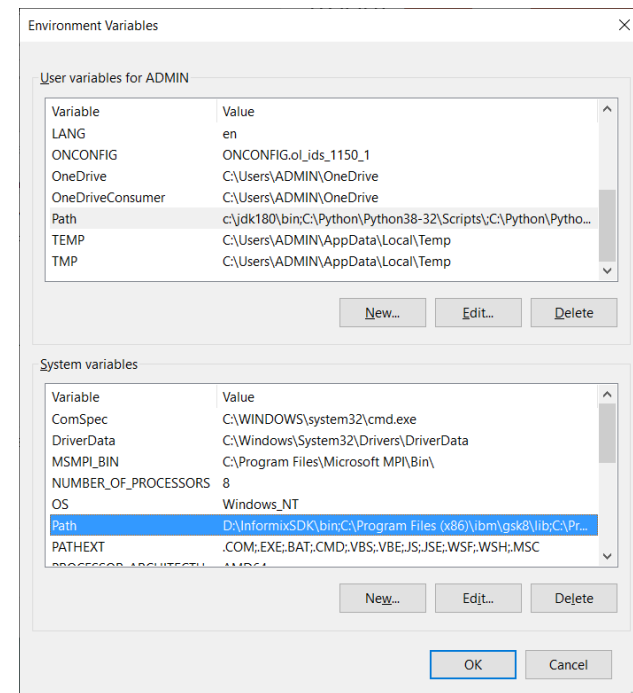
- Git Installation

- windows portable

- Settings -> Advanced system settings

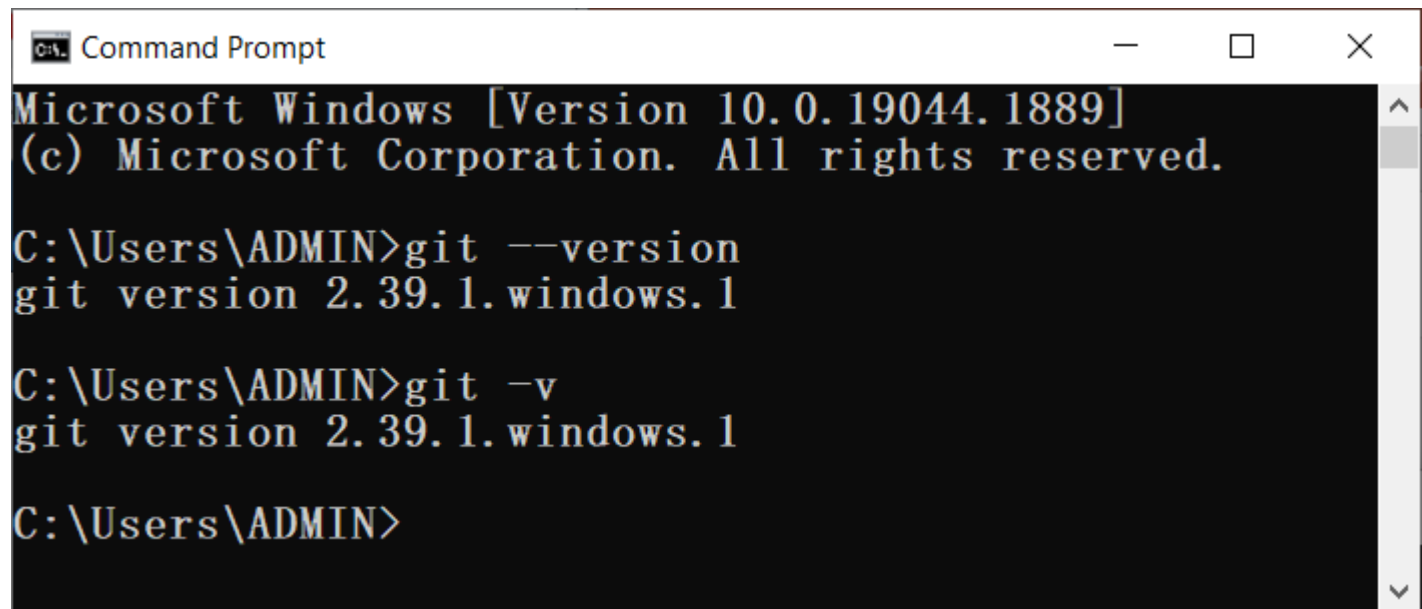
- System Properties -> Advanced -> Environment Variables

- set PATH



# Git CLI

- Git Command
  - `git --version` or `git -v`
  - `git help` , `git help <command>`



```
Command Prompt
Microsoft Windows [Version 10.0.19044.1889]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ADMIN>git --version
git version 2.39.1.windows.1

C:\Users\ADMIN>git -v
git version 2.39.1.windows.1

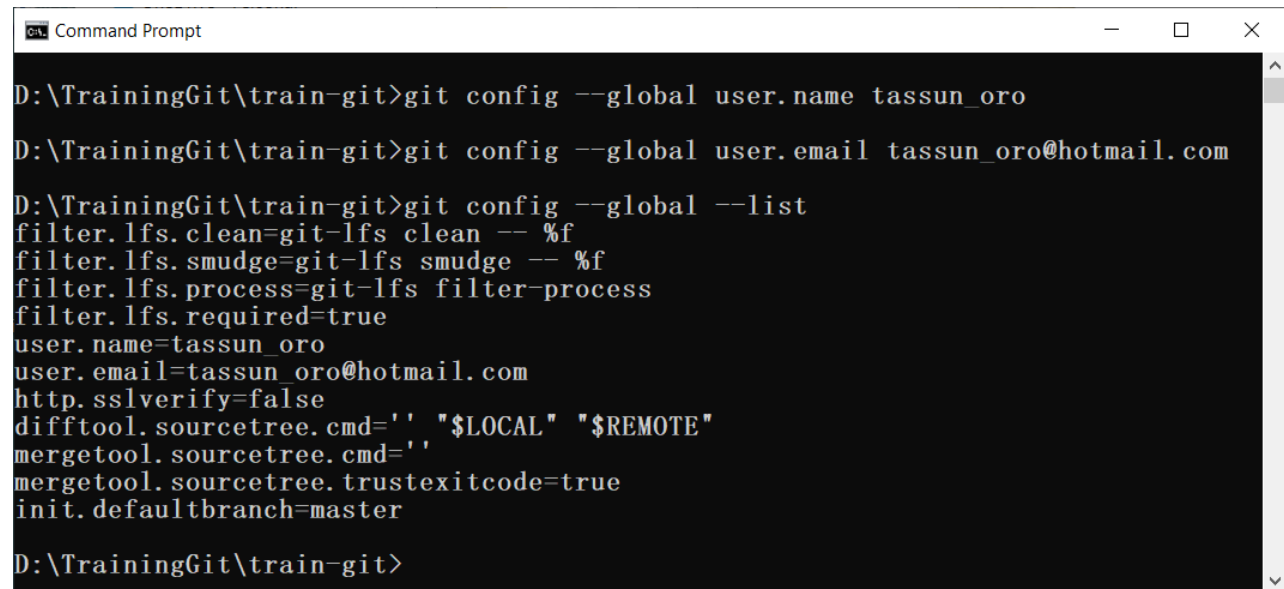
C:\Users\ADMIN>
```

# Git CLI

- Git Command

- git config

- git config --global user.name your-name
    - git config --global user.email your-email
    - git config --global --list



```
Command Prompt

D:\TrainingGit\train-git>git config --global user.name tassun_oro

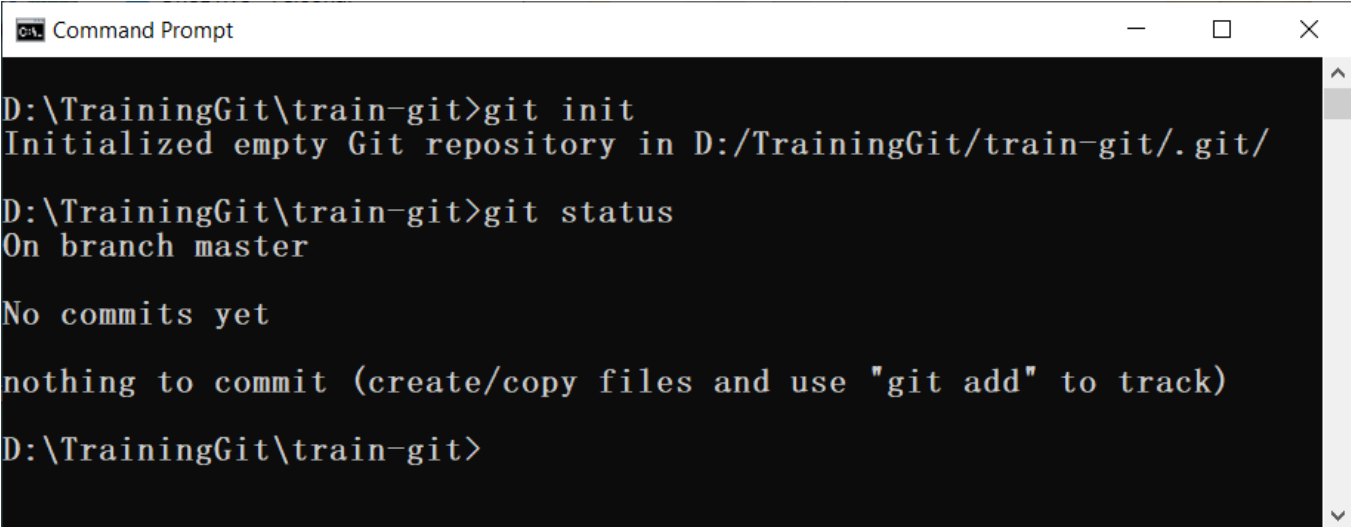
D:\TrainingGit\train-git>git config --global user.email tassun_oro@hotmail.com

D:\TrainingGit\train-git>git config --global --list
filter.lfs.clean=git-lfs clean -- %f
filter.lfs.smudge=git-lfs smudge -- %f
filter.lfs.process=git-lfs filter-process
filter.lfs.required=true
user.name=tassun_oro
user.email=tassun_oro@hotmail.com
http.sslverify=false
difftool.sourcetree.cmd='' "$LOCAL" "$REMOTE"
mergetool.sourcetree.cmd=''
mergetool.sourcetree.trustexitcode=true
init.defaultbranch=master

D:\TrainingGit\train-git>
```

# Git CLI

- Git Command
  - git init
    - create .git folder store local changed
  - git status



```
Command Prompt

D:\TrainingGit\train-git>git init
Initialized empty Git repository in D:/TrainingGit/train-git/.git/

D:\TrainingGit\train-git>git status
On branch master

No commits yet

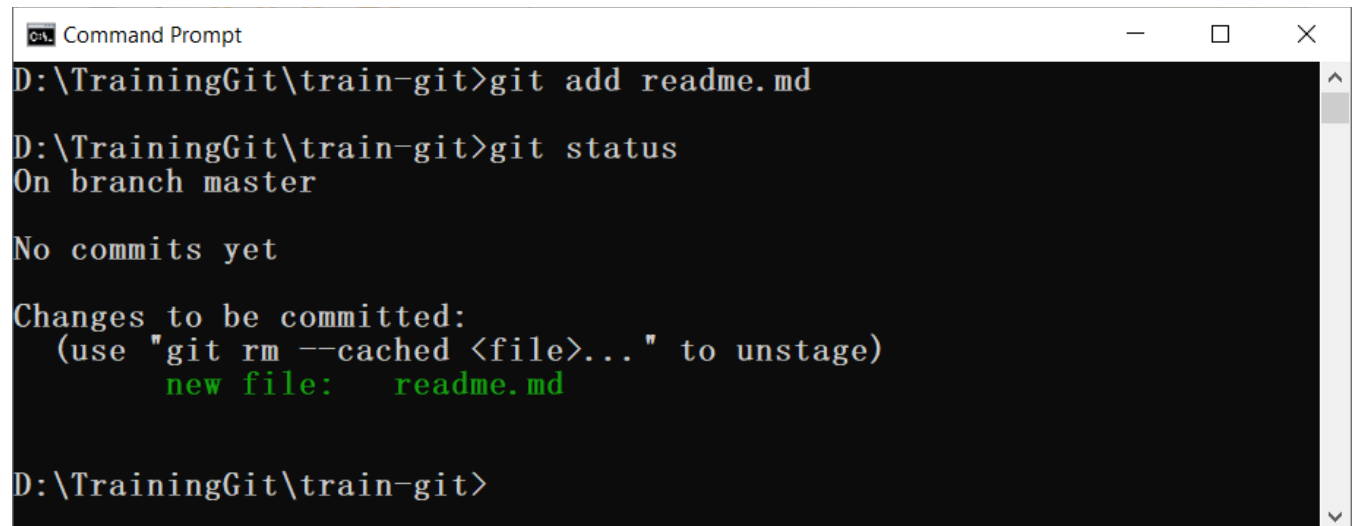
nothing to commit (create/copy files and use "git add" to track)

D:\TrainingGit\train-git>
```



# Git CLI

- Git Command
  - git add
    - git add file-name
    - git add . or git add \*.txt
  - git status



```
Command Prompt
D:\TrainingGit\train-git>git add readme.md

D:\TrainingGit\train-git>git status
On branch master

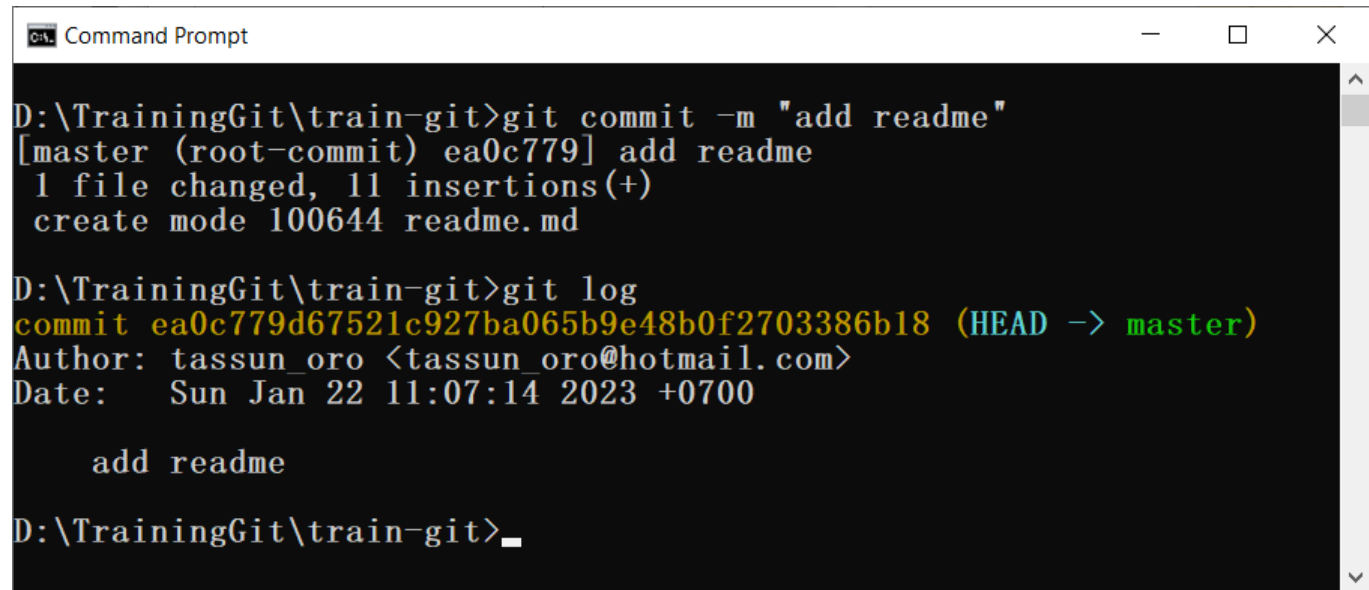
No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   readme.md

D:\TrainingGit\train-git>
```

# Git CLI

- Git Command
  - git commit
    - git commit -m your-messages
  - git log



```
Command Prompt

D:\TrainingGit\train-git>git commit -m "add readme"
[master (root-commit) ea0c779] add readme
1 file changed, 11 insertions(+)
create mode 100644 readme.md

D:\TrainingGit\train-git>git log
commit ea0c779d67521c927ba065b9e48b0f2703386b18 (HEAD -> master)
Author: tassun_oro <tassun_oro@hotmail.com>
Date:   Sun Jan 22 11:07:14 2023 +0700

    add readme

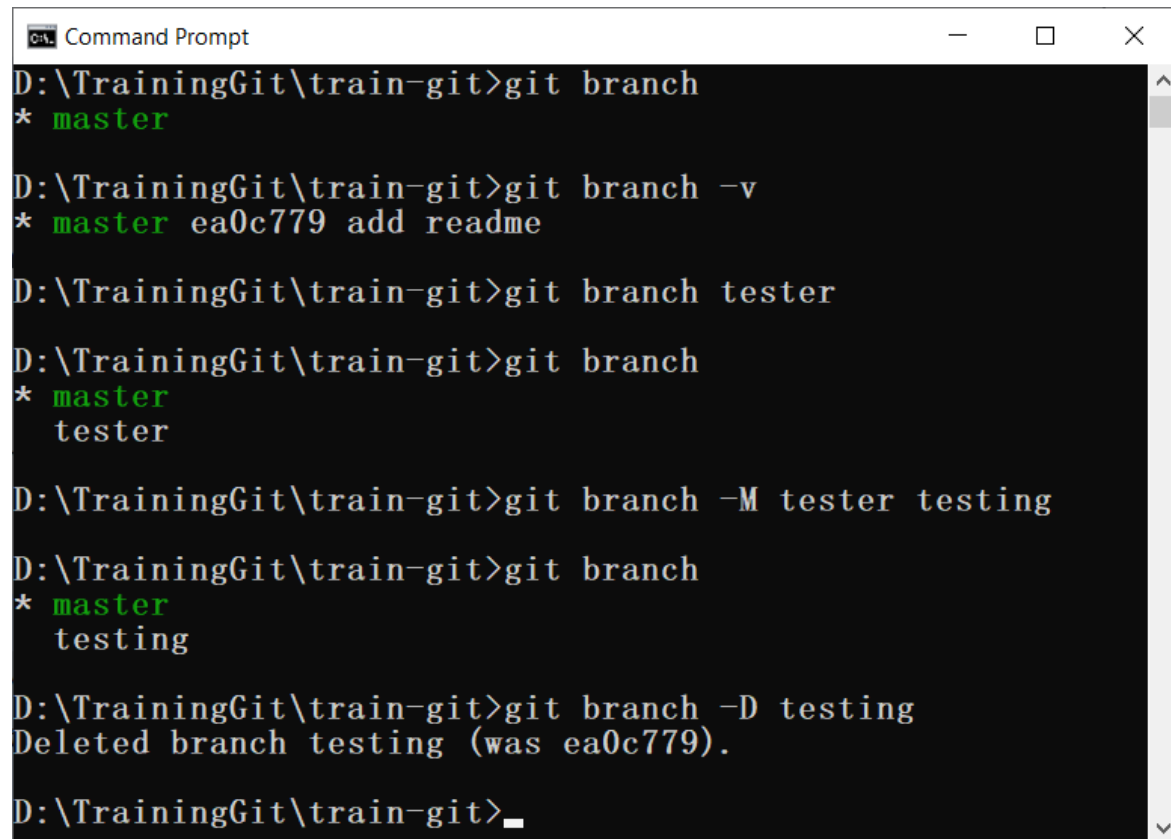
D:\TrainingGit\train-git>_
```

# Git CLI

- Git Command
  - git branch
    - create
      - git branch branch-name
    - move/rename
      - git branch -M new-branch-name
    - delete
      - git branch -D branch-name
    - switch/change
      - git checkout branch-name

# Git CLI

- Git Command
  - git branch



```
Command Prompt
D:\TrainingGit\train-git>git branch
* master

D:\TrainingGit\train-git>git branch -v
* master ea0c779 add readme

D:\TrainingGit\train-git>git branch tester

D:\TrainingGit\train-git>git branch
* master
  tester

D:\TrainingGit\train-git>git branch -M tester testing

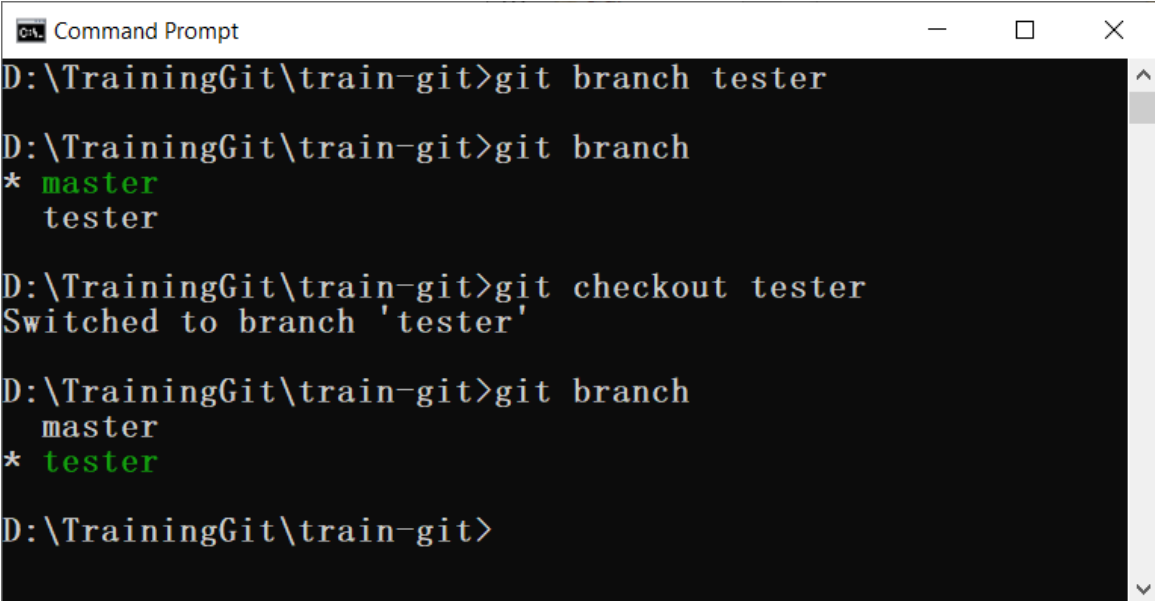
D:\TrainingGit\train-git>git branch
* master
  testing

D:\TrainingGit\train-git>git branch -D testing
Deleted branch testing (was ea0c779).

D:\TrainingGit\train-git>
```

# Git CLI

- Git Command
  - git branch



```
Git_ Command Prompt
D:\TrainingGit\train-git>git branch tester

D:\TrainingGit\train-git>git branch
* master
  tester

D:\TrainingGit\train-git>git checkout tester
Switched to branch 'tester'

D:\TrainingGit\train-git>git branch
  master
* tester

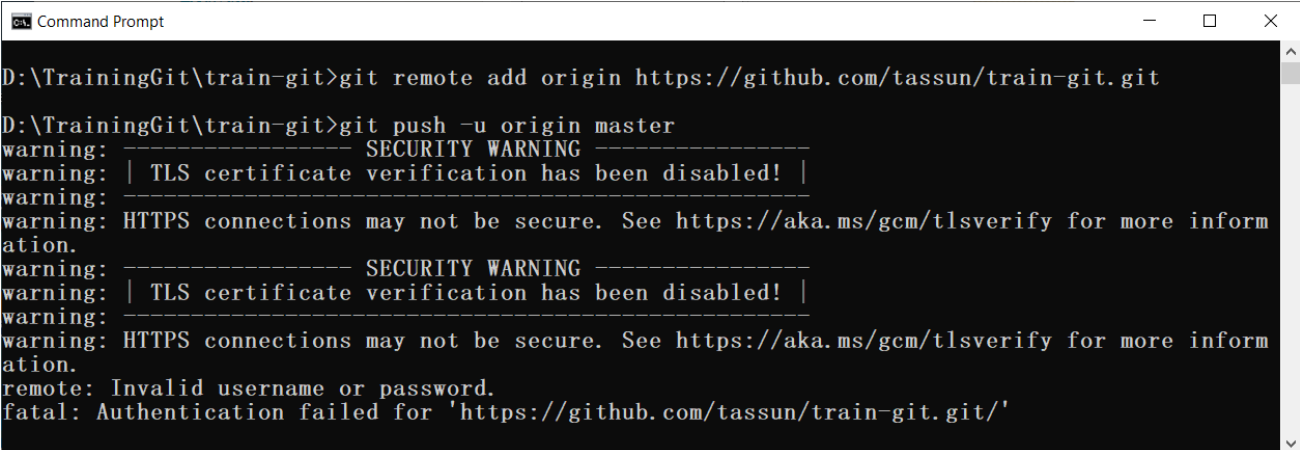
D:\TrainingGit\train-git>
```

# Git CLI

- Git Command

- git push

- git remote add origin <https://github.com/username/repo-name.git>
    - git push -u origin master



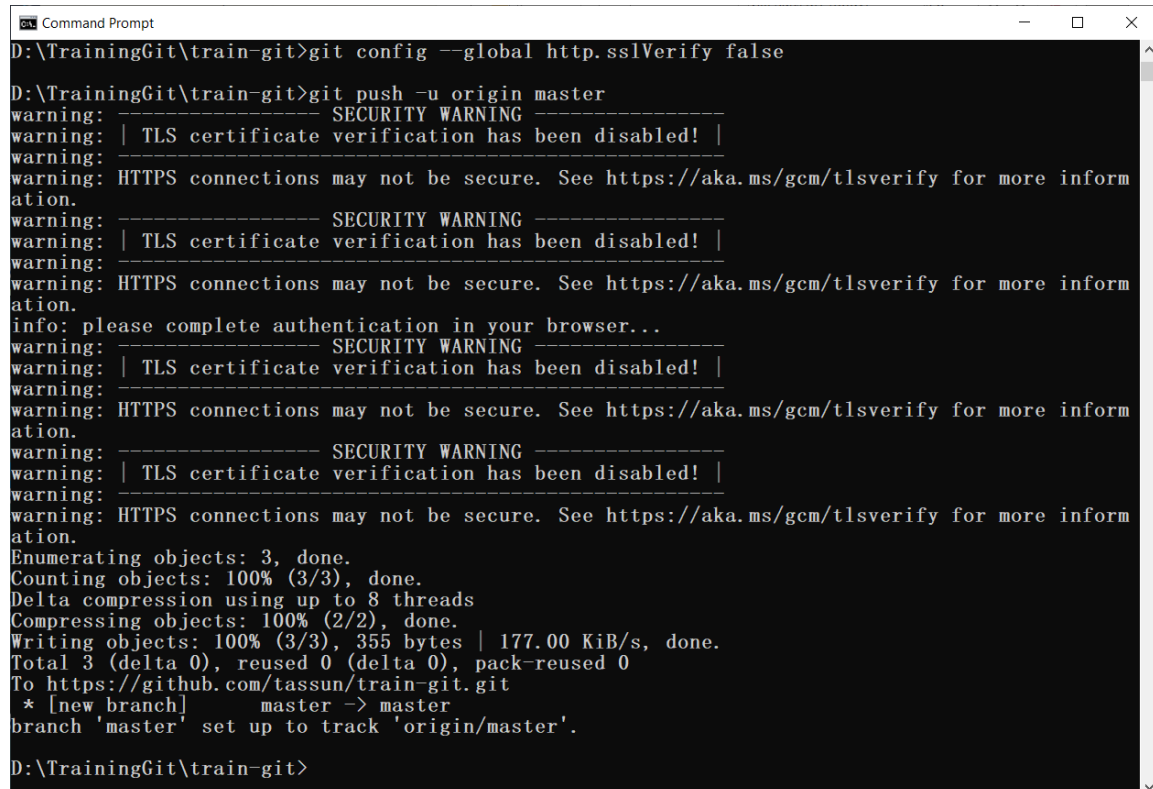
```
Command Prompt
D:\TrainingGit\train-git>git remote add origin https://github.com/tassun/train-git.git
D:\TrainingGit\train-git>git push -u origin master
warning: SECURITY WARNING
warning: | TLS certificate verification has been disabled! |
warning: -----
warning: HTTPS connections may not be secure. See https://aka.ms/gcm/tlsverify for more information.
warning: SECURITY WARNING
warning: | TLS certificate verification has been disabled! |
warning: -----
warning: HTTPS connections may not be secure. See https://aka.ms/gcm/tlsverify for more information.
remote: Invalid username or password.
fatal: Authentication failed for 'https://github.com/tassun/train-git.git/'
```

# Git CLI

- Git Command

- git push

- git config --global http.sslVerify false



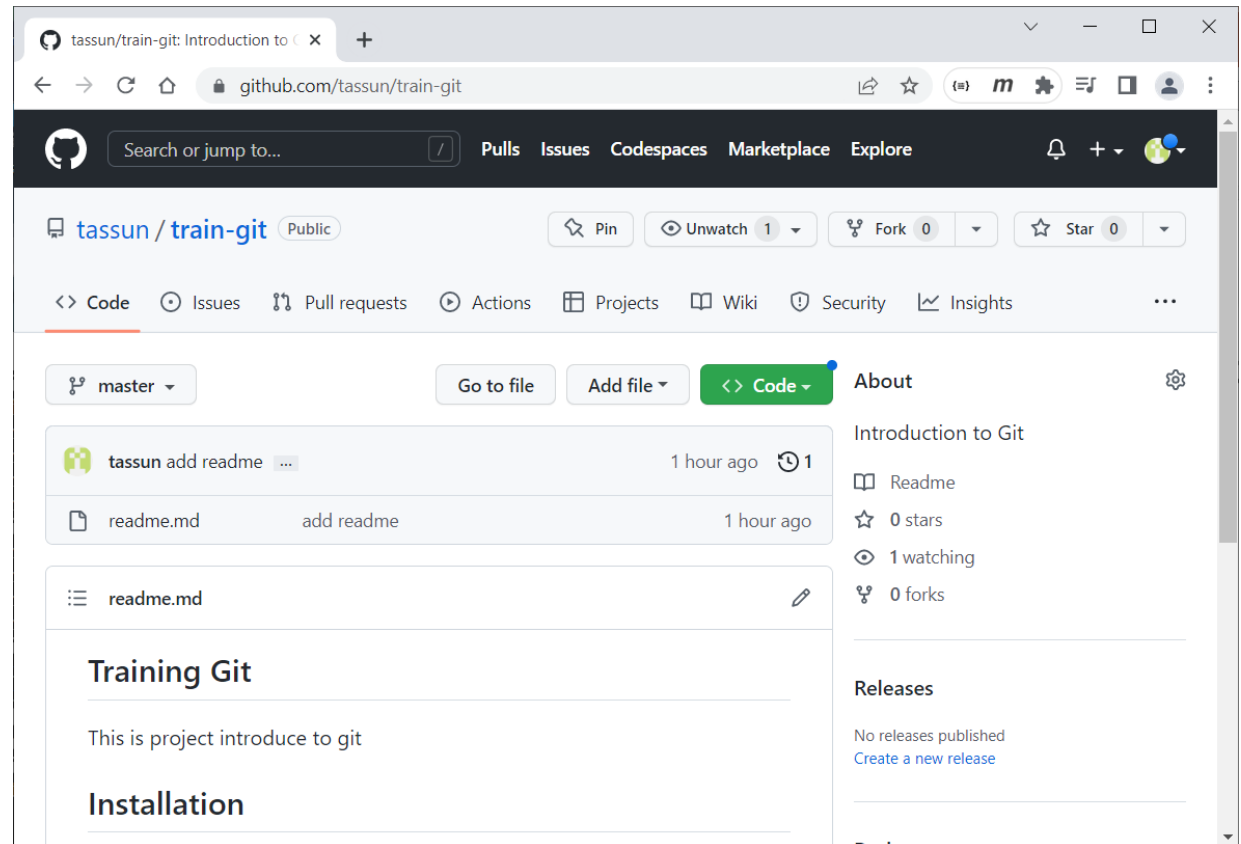
```
Command Prompt
D:\TrainingGit\train-git>git config --global http.sslVerify false

D:\TrainingGit\train-git>git push -u origin master
warning: SECURITY WARNING
warning: | TLS certificate verification has been disabled! |
warning:
warning: HTTPS connections may not be secure. See https://aka.ms/gcm/tlsverify for more inform
ation.
warning: SECURITY WARNING
warning: | TLS certificate verification has been disabled! |
warning:
warning: HTTPS connections may not be secure. See https://aka.ms/gcm/tlsverify for more inform
ation.
info: please complete authentication in your browser...
warning: SECURITY WARNING
warning: | TLS certificate verification has been disabled! |
warning:
warning: HTTPS connections may not be secure. See https://aka.ms/gcm/tlsverify for more inform
ation.
warning: SECURITY WARNING
warning: | TLS certificate verification has been disabled! |
warning:
warning: HTTPS connections may not be secure. See https://aka.ms/gcm/tlsverify for more inform
ation.
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 355 bytes | 177.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/tassun/train-git.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.

D:\TrainingGit\train-git>
```

# Git CLI


- Git Command
  - git push





# Git CLI

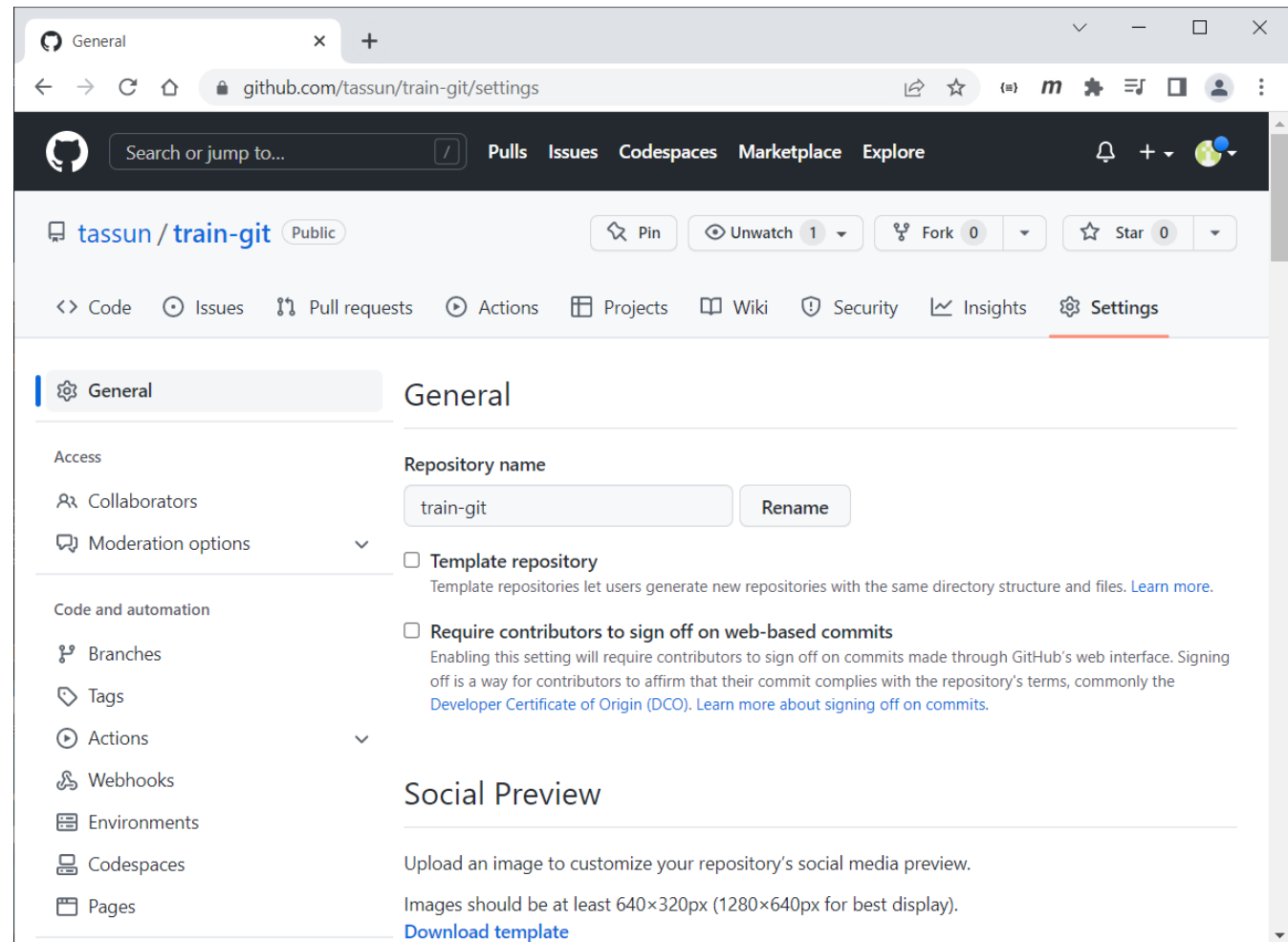
- Git Command
  - git clone
    - git clone https://github.com/user-name/repo-name.git



```
Git Command Prompt
D:\TrainingGit\clone>git clone https://github.com/tassun/train-git.git
Cloning into 'train-git'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 3 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.
D:\TrainingGit\clone>_
```

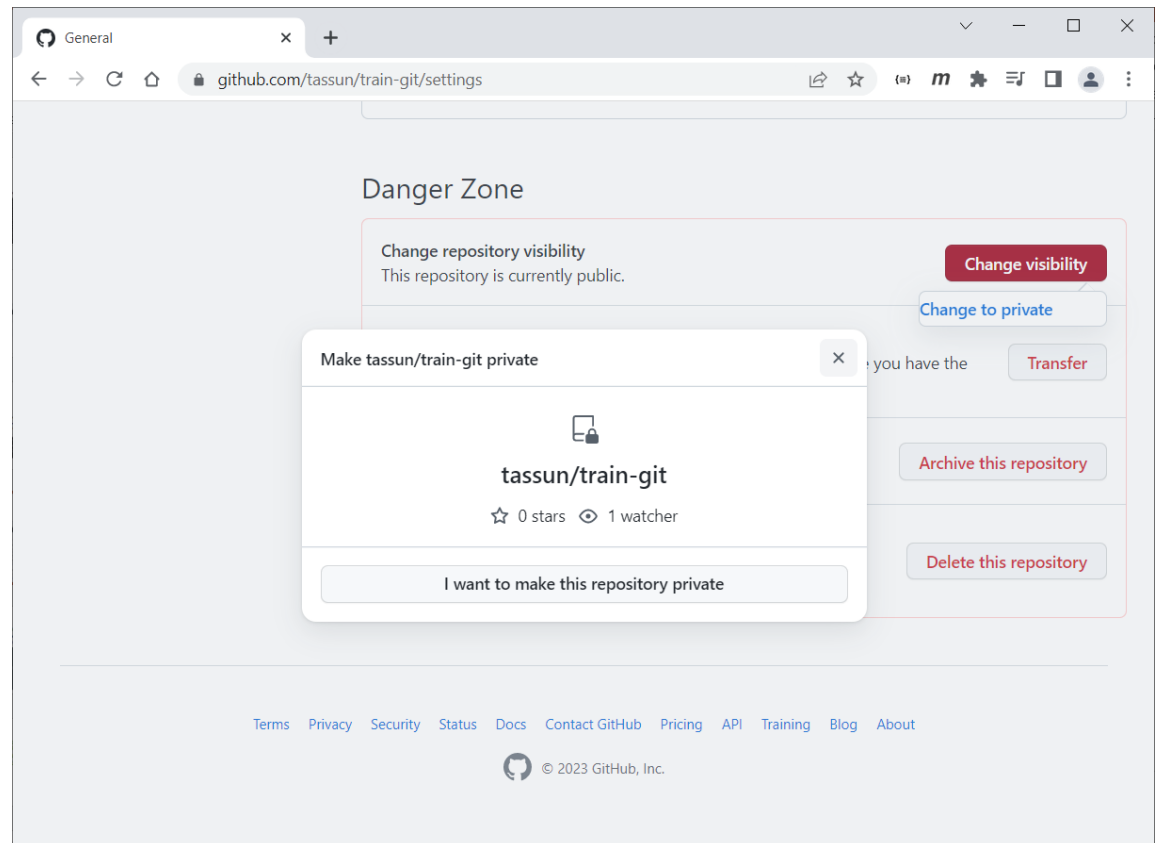
# Git CLI

- GitHub Setting



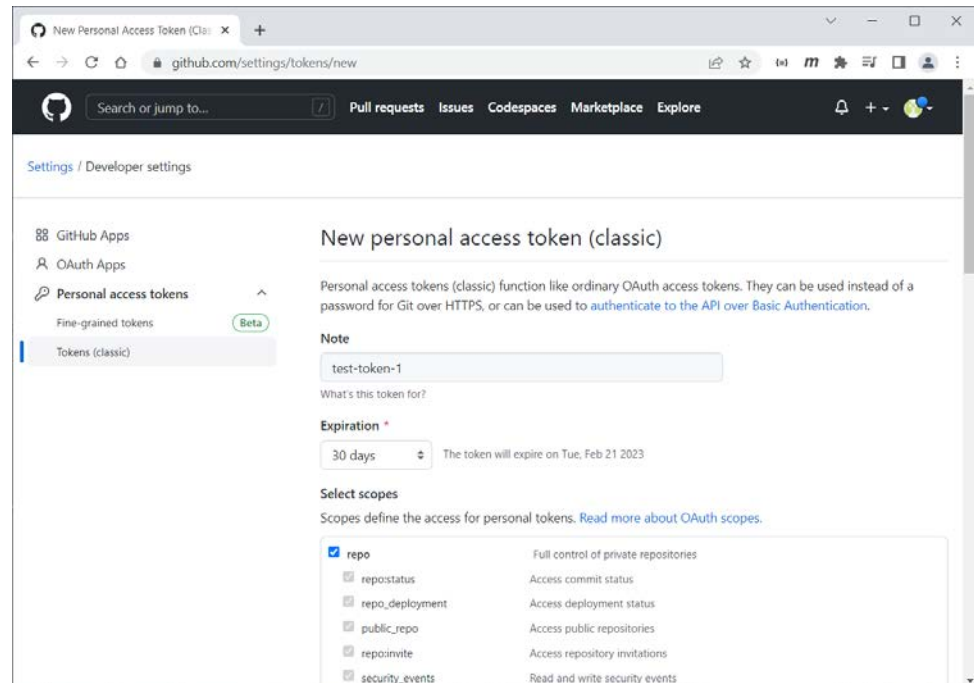
# Git CLI

- GitHub Setting
  - try to change repository private/public



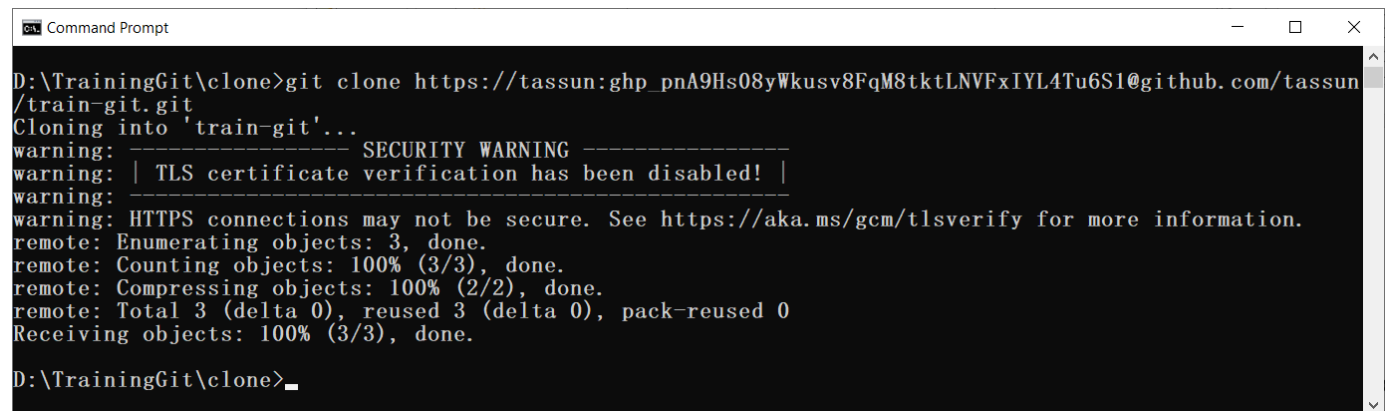
# Git CLI

- Create Personal Access Token on GitHub
  - Settings -> Developer Settings
    - Personal access tokens -> Tokens (classic)
      - Generate new token



# Git CLI

- Git Command
  - git hub token
    - git clone https://user-name:github-token@github.com/user-name/repo-name.git



```
Command Prompt
D:\TrainingGit\clone>git clone https://tassun:ghp_pnA9Hs08yWkusv8FqM8tkLNVFxiYL4Tu6S1@github.com/tassun
/train-git.git
Cloning into 'train-git'...
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled! |
warning: -----
warning: HTTPS connections may not be secure. See https://aka.ms/gcm/tlsverify for more information.
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 3 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.

D:\TrainingGit\clone>
```

# Git CLI

- Git Command
  - git hub token
    - try to edit readme.md then commit & push changed

```
Command Prompt

D:\TrainingGit\train-git>git commit -a -m "add more info"
[master f2420c7] add more info
1 file changed, 6 insertions(+)

D:\TrainingGit\train-git>git remote set-url --push origin https://tassun:ghp_pnA9Hs08yWkusv8FqM8
tktLNVFxiYL4Tu6S1@github.com/tassun/train-git.git

D:\TrainingGit\train-git>git push -u origin master
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled! |
warning: -----
warning: HTTPS connections may not be secure. See https://aka.ms/gcm/tlsverify for more informat
ion.
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 298 bytes | 298.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/tassun/train-git.git
   ea0c779..f2420c7  master -> master
branch 'master' set up to track 'origin/master'.

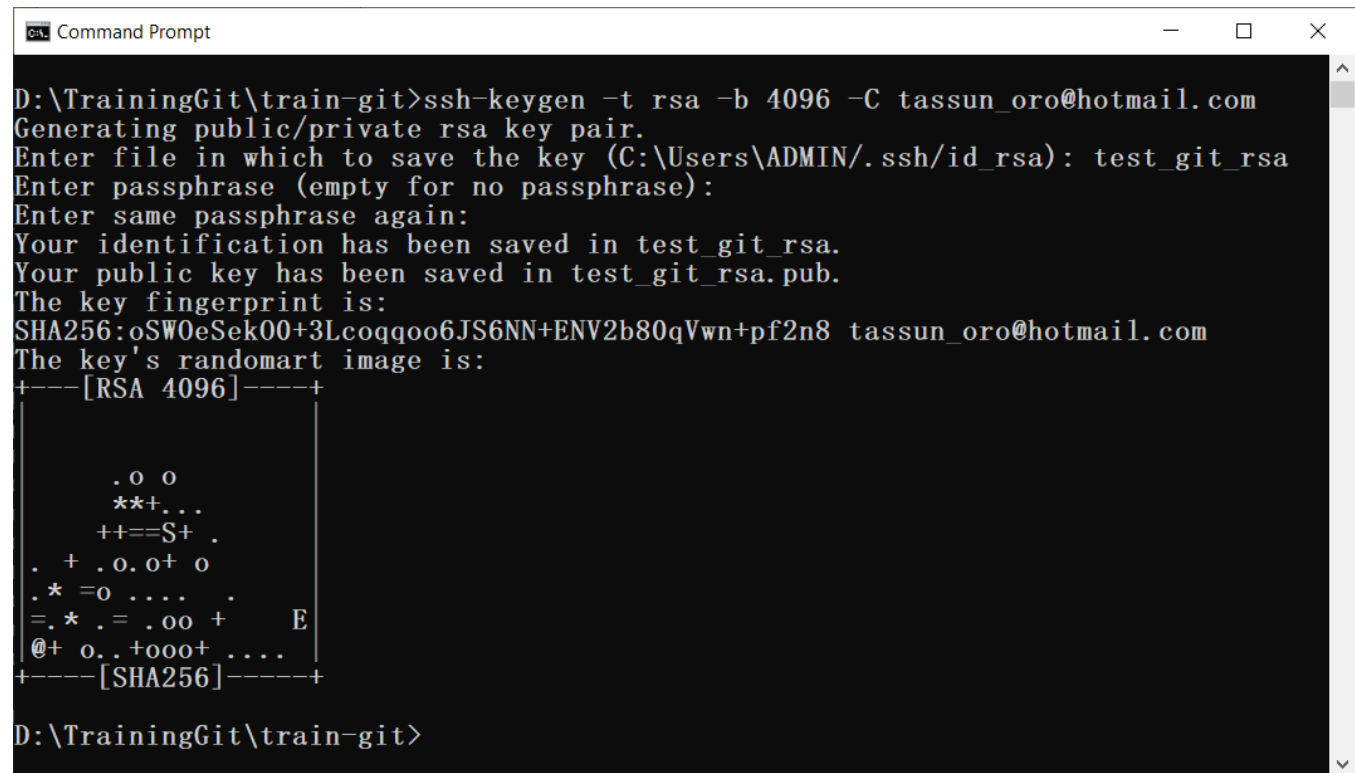
D:\TrainingGit\train-git>_
```

# Git CLI

- Git Command

- git ssh key

- ssh-keygen -t rsa -b 4096 -C "email@example.com"



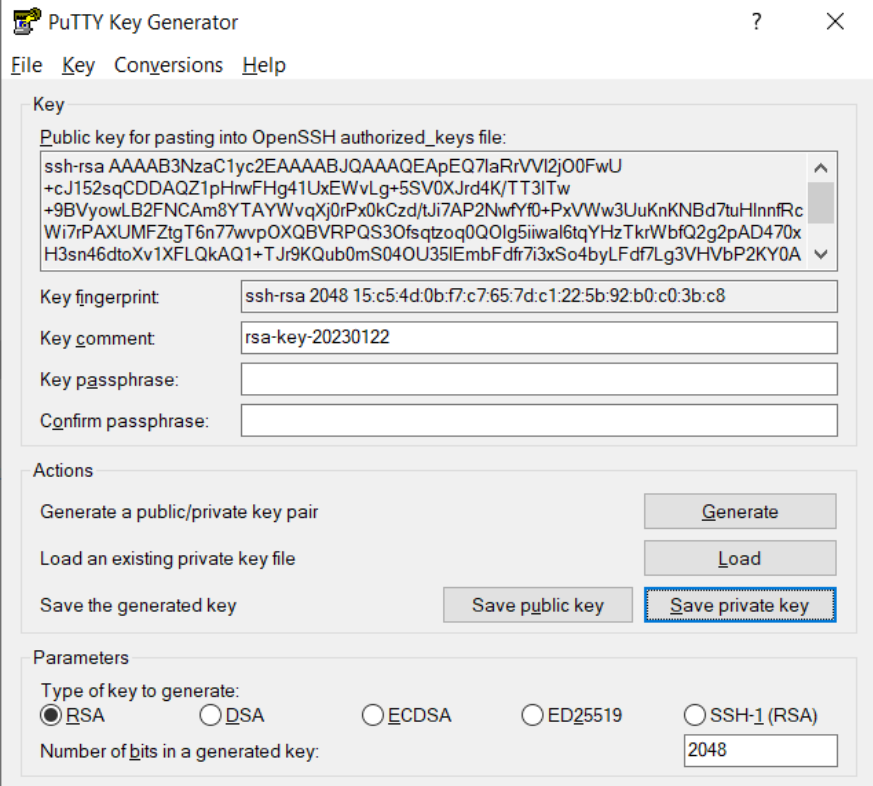
```
Command Prompt

D:\TrainingGit\train-git>ssh-keygen -t rsa -b 4096 -C tassun_oro@hotmail.com
Generating public/private rsa key pair.
Enter file in which to save the key (C:\Users\ADMIN\.ssh\id_rsa): test_git_rsa
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in test_git_rsa.
Your public key has been saved in test_git_rsa.pub.
The key fingerprint is:
SHA256:oSW0eSek00+3Lcoqqoo6JS6NN+ENV2b80qVwn+pf2n8 tassun_oro@hotmail.com
The key's randomart image is:
+---[RSA 4096]---+
|
|      . O O
|     **+...
|    ++==S+ .
|   . + .o.o+ o
|  . * =o ....
| =. * . = .oo +   E
| @+ o..+ooo+ ....
+---[SHA256]---+

D:\TrainingGit\train-git>
```

# Git CLI

- Git Command
  - git ssh key
    - putty key generator



The screenshot shows the PuTTY Key Generator application window. The 'Key' section displays a generated SSH key in the 'Public key for pasting into OpenSSH authorized\_keys file:' text area. Below this, the 'Key fingerprint' is shown as 'ssh-rsa 2048 15:c5:4d:0b:f7:c7:65:7d:c1:22:5b:92:b0:c0:3b:c8'. The 'Key comment' is 'rsa-key-20230122'. The 'Key passphrase' and 'Confirm passphrase' fields are empty. In the 'Actions' section, the 'Generate' button is disabled, while the 'Load' and 'Save private key' buttons are active. The 'Parameters' section shows 'Type of key to generate:' set to 'RSA' (selected) and 'Number of bits in a generated key:' set to '2048'.

PuTTY Key Generator

File Key Conversions Help

Key

Public key for pasting into OpenSSH authorized\_keys file:

```
ssh-rsa AAAAB3NzaC1yc2EAAAABJQAAAQEAPEQ7laRrVVI2jO0FwU
+cJ152sqCDDAQZ1pHrwFHg41UxEWvLg+5SV0XJrd4K/TT3ITw
+9BVyowLB2FNCAm8YTAYWvqXj0rPx0kCzd/tJi7AP2NwfYf0+PxVWw3UuKnKNBd7tuHlnnfRc
Wi7rPAXUMFZtgT6n77wvpOXQBVPRQS3Ofsqtoz0Q0Ig5iwal6tqYHzTkrWbfQ2g2pAD470x
H3sn46dtoXv1XFLQkAQ1+TJr9KQub0mS04OU35IEmbFdf7i3xSo4byLFdf7Lg3VHVbP2KY0A
```

Key fingerprint: ssh-rsa 2048 15:c5:4d:0b:f7:c7:65:7d:c1:22:5b:92:b0:c0:3b:c8

Key comment: rsa-key-20230122

Key passphrase:

Confirm passphrase:

Actions

Generate a public/private key pair Generate

Load an existing private key file Load

Save the generated key Save public key Save private key

Parameters

Type of key to generate:

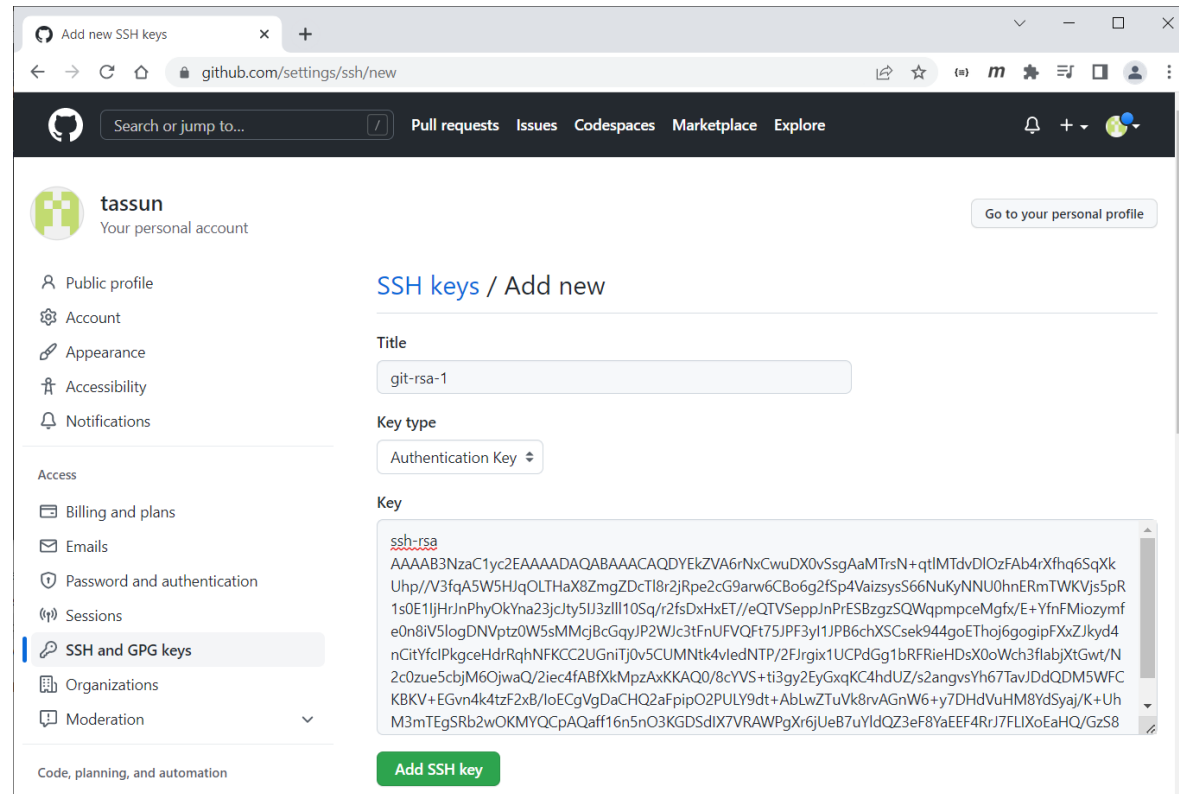
☒ RSA ☐ DSA ☐ ECDSA ☐ ED25519 ☐ SSH-1 (RSA)

Number of bits in a generated key: 2048



# Git CLI

- Add new SSH keys on GitHub
  - Settings -> SSH and GPG keys
    - SSH keys -> New SSH key



The screenshot shows the GitHub web interface for adding a new SSH key. The browser address bar indicates the URL is `github.com/settings/ssh/new`. The page header includes the GitHub logo, a search bar, and navigation links for Pull requests, Issues, Codespaces, Marketplace, and Explore. The user's profile is shown as 'tassun' with the description 'Your personal account'. A sidebar on the left contains navigation links for Public profile, Account, Appearance, Accessibility, Notifications, Access, Billing and plans, Emails, Password and authentication, Sessions, SSH and GPG keys (which is highlighted), Organizations, and Moderation. The main content area is titled 'SSH keys / Add new'. It contains three input fields: 'Title' with the value 'git-rsa-1', 'Key type' set to 'Authentication Key', and a large text area for the 'Key' containing a long SSH public key string starting with `ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQADYEkZVA6rNxCwuDX0vSsgAaMTTrN+qtIMTdvdIOzFAB4rXfhq6SqXk`. At the bottom right, there is a green button labeled 'Add SSH key'.

# Git CLI

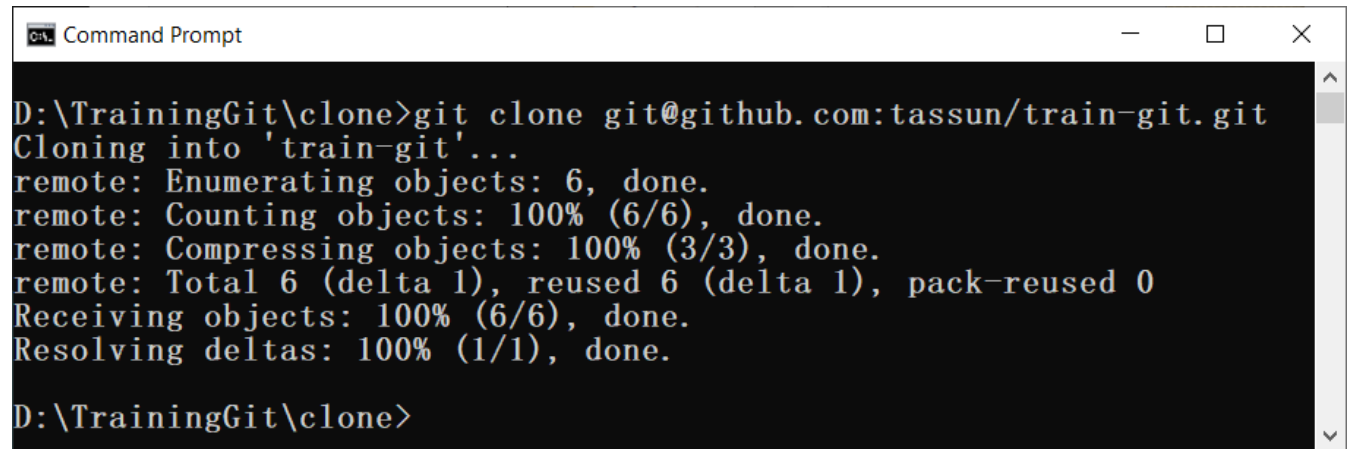
- Git Command
  - git ssh key testing

A screenshot of a Windows Command Prompt window titled "Git - Command Prompt". The window has a black background with white text. The command prompt shows the current directory as "D:\TrainingGit\train-git". The user has entered the command "ssh -T git@github.com". The output of the command is "Hi tassun! You've successfully authenticated, but GitHub does not provide shell access." The prompt is now waiting for the next command.

```
Git - Command Prompt
D:\TrainingGit\train-git>ssh -T git@github.com
Hi tassun! You've successfully authenticated, but GitHub does not
provide shell access.
D:\TrainingGit\train-git>_
```

# Git CLI

- Git Command
  - git ssh key
    - try to clone with ssh



```
Command Prompt
D:\TrainingGit\clone>git clone git@github.com:tassun/train-git.git
Cloning into 'train-git'...
remote: Enumerating objects: 6, done.
remote: Counting objects: 100% (6/6), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 6 (delta 1), reused 6 (delta 1), pack-reused 0
Receiving objects: 100% (6/6), done.
Resolving deltas: 100% (1/1), done.

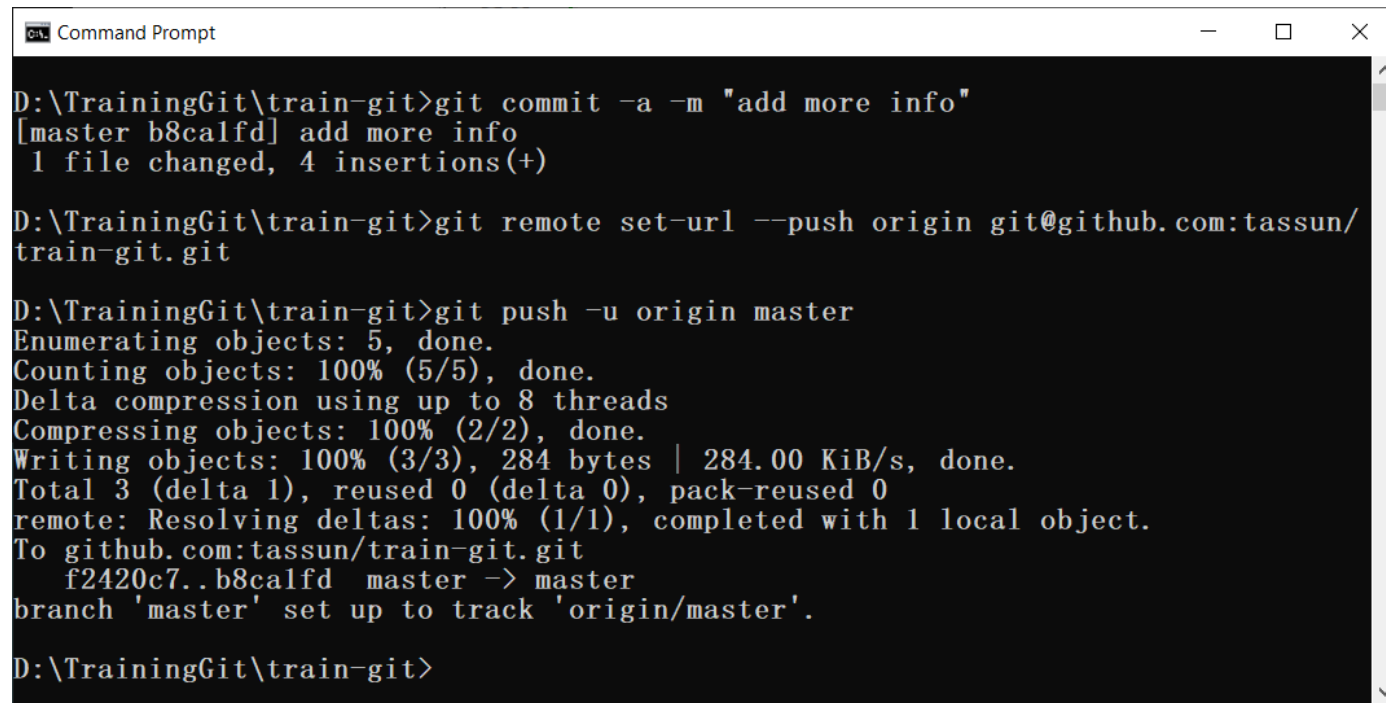
D:\TrainingGit\clone>
```

# Git CLI

- Git Command

- git ssh key

- try to edit readme.md then commit & push changed



```
C:\> Command Prompt

D:\TrainingGit\train-git>git commit -a -m "add more info"
[master b8calfd] add more info
1 file changed, 4 insertions(+)

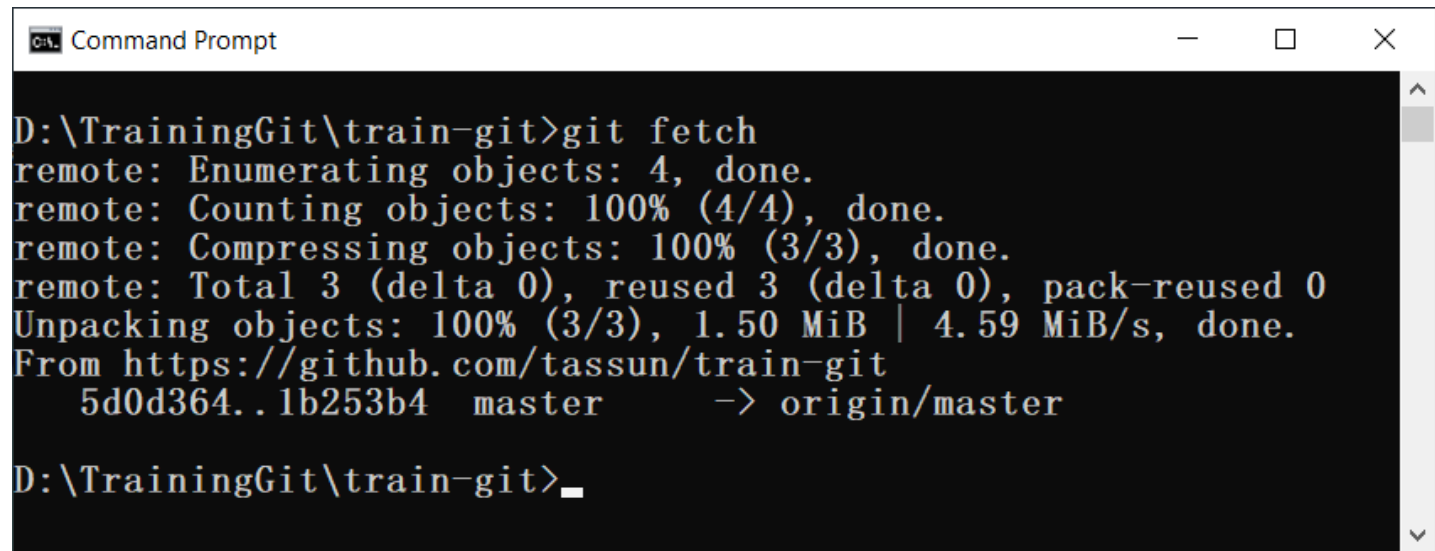
D:\TrainingGit\train-git>git remote set-url --push origin git@github.com:tassun/
train-git.git

D:\TrainingGit\train-git>git push -u origin master
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 284 bytes | 284.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To github.com:tassun/train-git.git
 f2420c7..b8calfd master -> master
branch 'master' set up to track 'origin/master'.

D:\TrainingGit\train-git>
```

# Git CLI

- Git Command
  - git fetch
  - git merge



```
Command Prompt
D:\TrainingGit\train-git>git fetch
remote: Enumerating objects: 4, done.
remote: Counting objects: 100% (4/4), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 3 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), 1.50 MiB | 4.59 MiB/s, done.
From https://github.com/tassun/train-git
    5d0d364..1b253b4  master    -> origin/master
D:\TrainingGit\train-git>_
```

# Git CLI

- Git Command
  - git pull (fetch + merge)

```
Command Prompt

D:\TrainingGit\train-git>git status
On branch master
Your branch is behind 'origin/master' by 2 commits, and can be fast-forwarded.
(use "git pull" to update your local branch)

nothing to commit, working tree clean

D:\TrainingGit\train-git>git pull
remote: Enumerating objects: 5, done.
remote: Counting objects: 100% (5/5), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 1), reused 3 (delta 1), pack-reused 0
Unpacking objects: 100% (3/3), 94.53 KiB | 620.00 KiB/s, done.
From https://github.com/tassun/train-git
   1b253b4..2ea9ed7  master    -> origin/master
Updating b8calfd..2ea9ed7
Fast-forward
 Introduction to Git.pdf | Bin 0 -> 1767462 bytes
 readme.md               | 3 +++
2 files changed, 3 insertions(+)
create mode 100644 Introduction to Git.pdf

D:\TrainingGit\train-git>
```

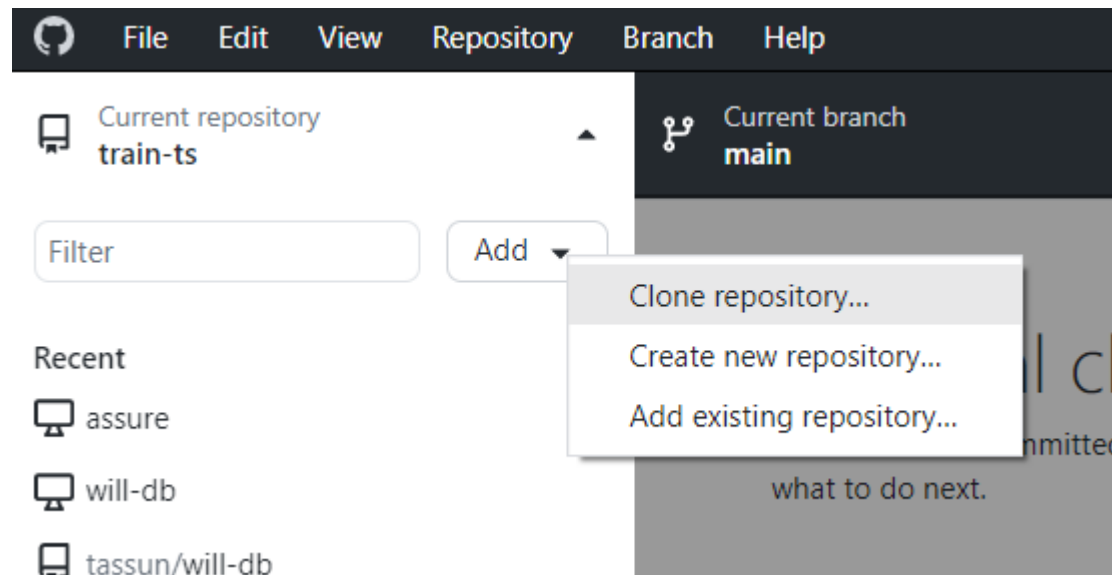
# Git GUI

- Git Desktop
  - Go to <https://desktop.github.com/>
  - Download & Install



# Git GUI

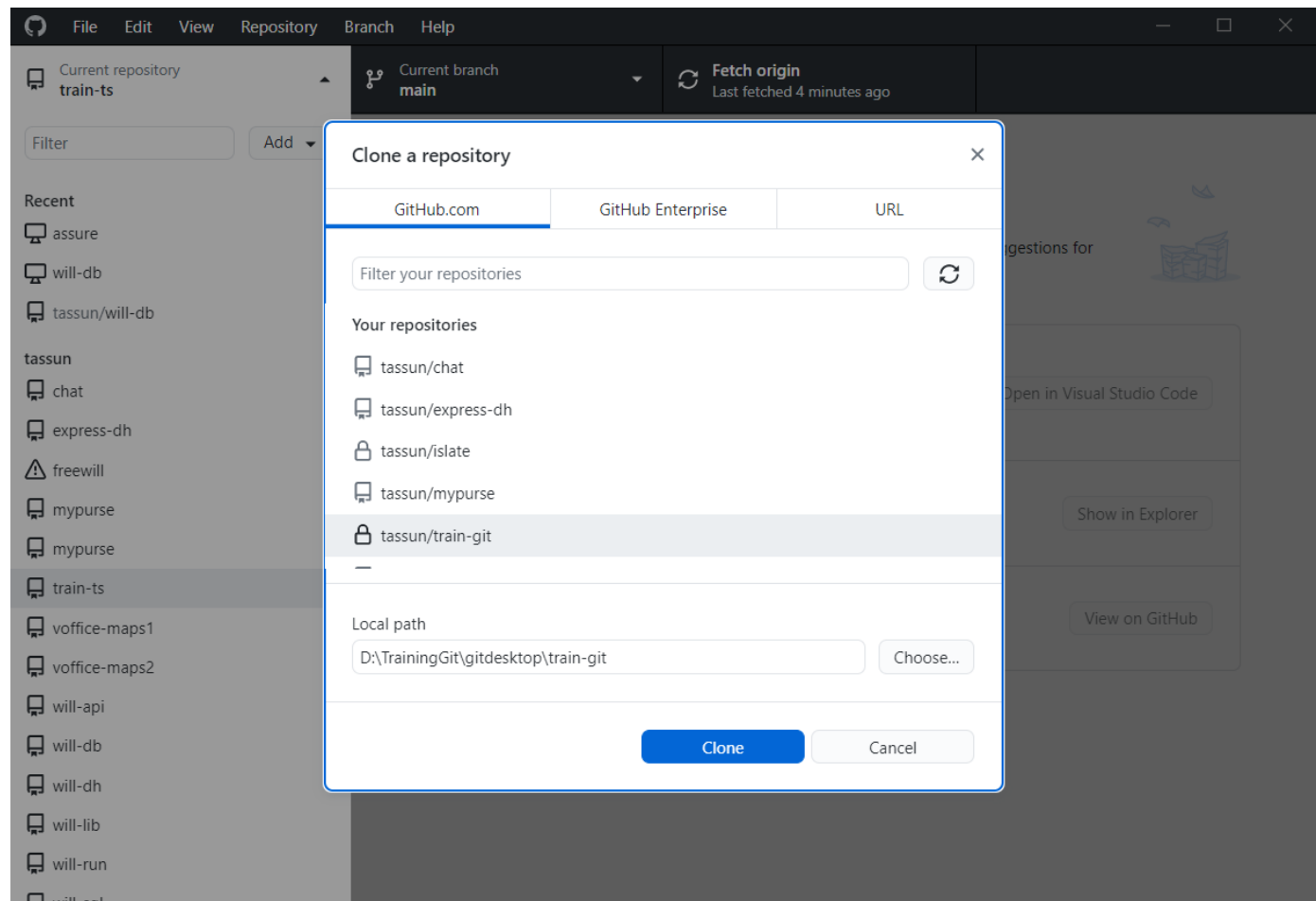
- Git Desktop





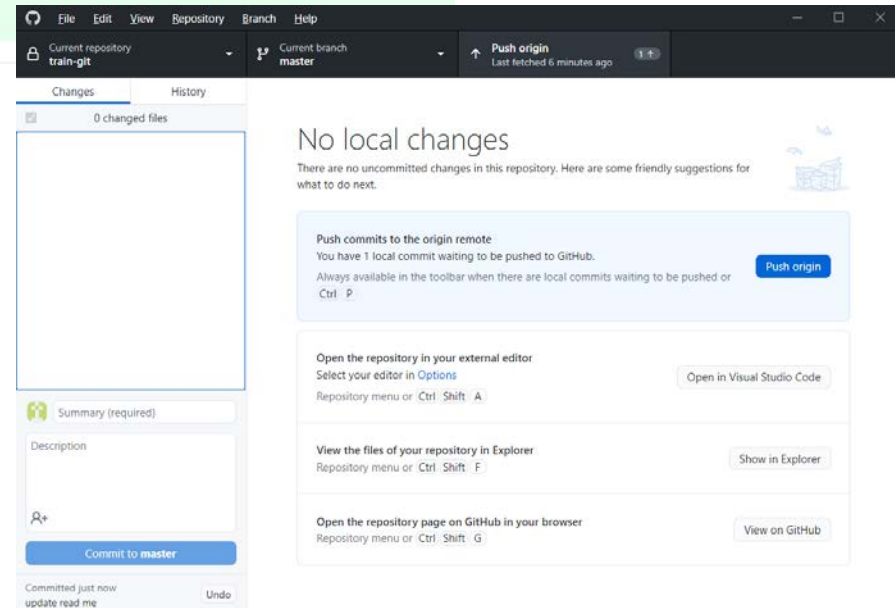
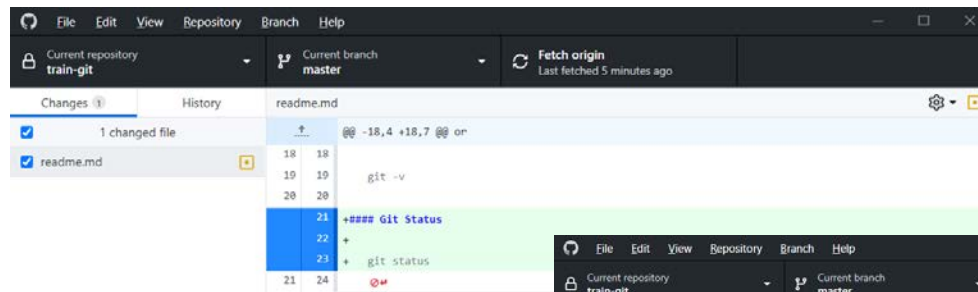
# Git GUI

- Git Desktop



# Git GUI

- Git Desktop
  - try to edit readme.md then commit & push



# Reference

- <https://devahoy.com/blog/2015/08/introduction-to-git-and-github>
- <https://km.cc.swu.ac.th/archives/3606>
- <https://saixiii.com/what-is-github/>
- <https://devahoy.com/blog/2017/12/how-to-show-verify-sign-with-gpg>
- <https://docs.github.com/en/authentication/connecting-to-github-with-ssh>



Q & A