

Introduction to Git



Agenda

- Git
- GitHub
- Git CLI
- Git GUI



Git

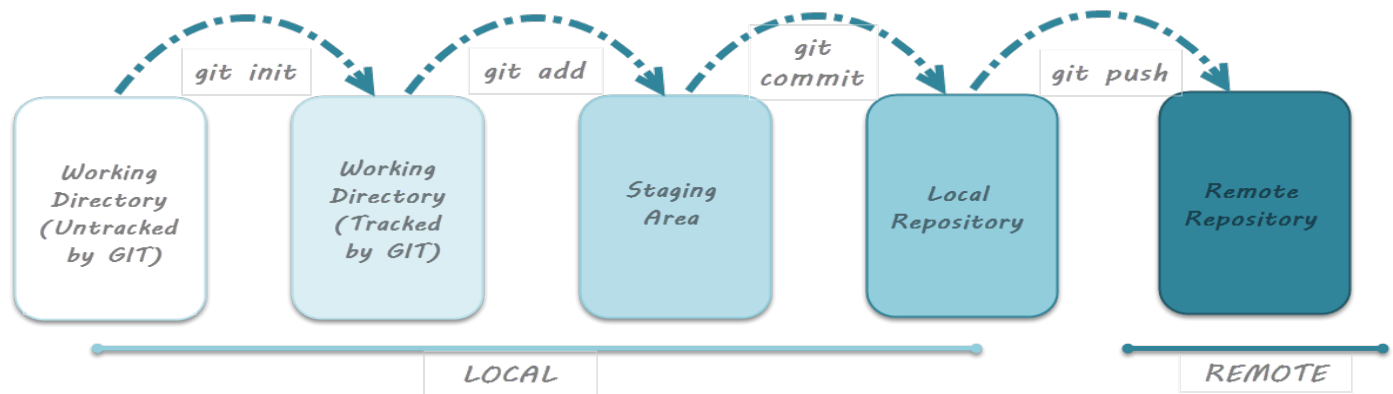
- What is Git?
 - Version Control System

Git

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

Git

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

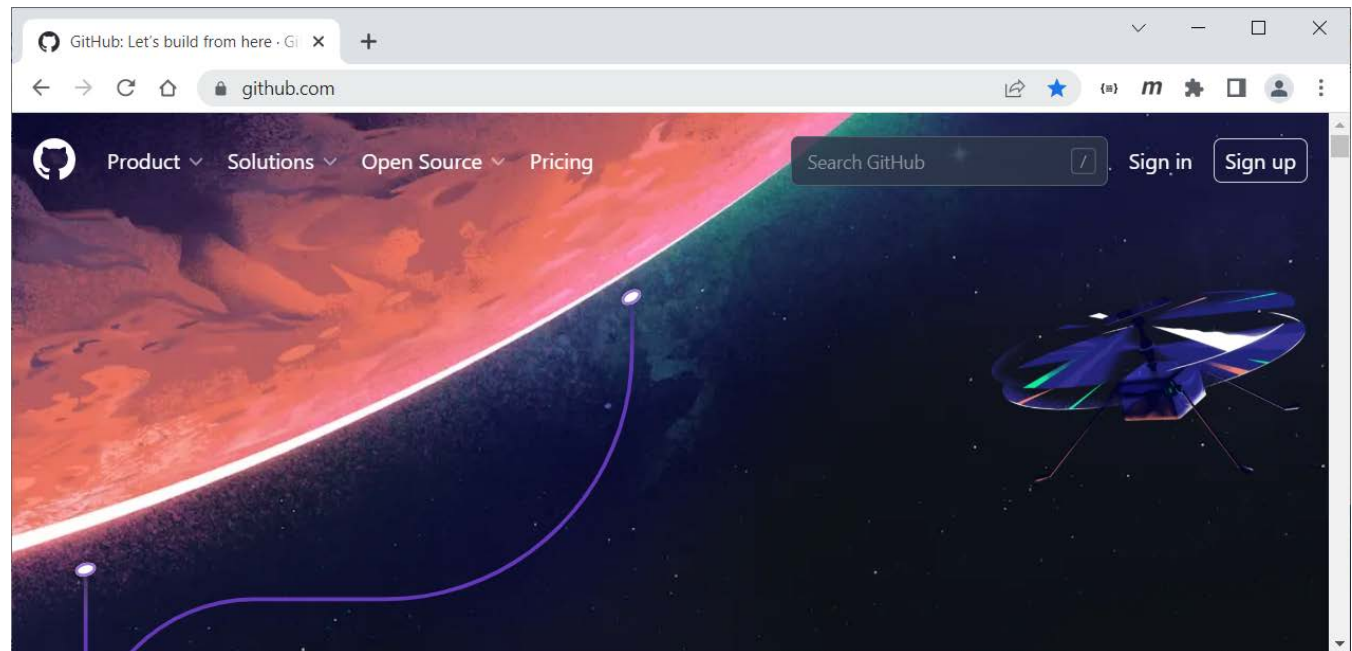


GitHub

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

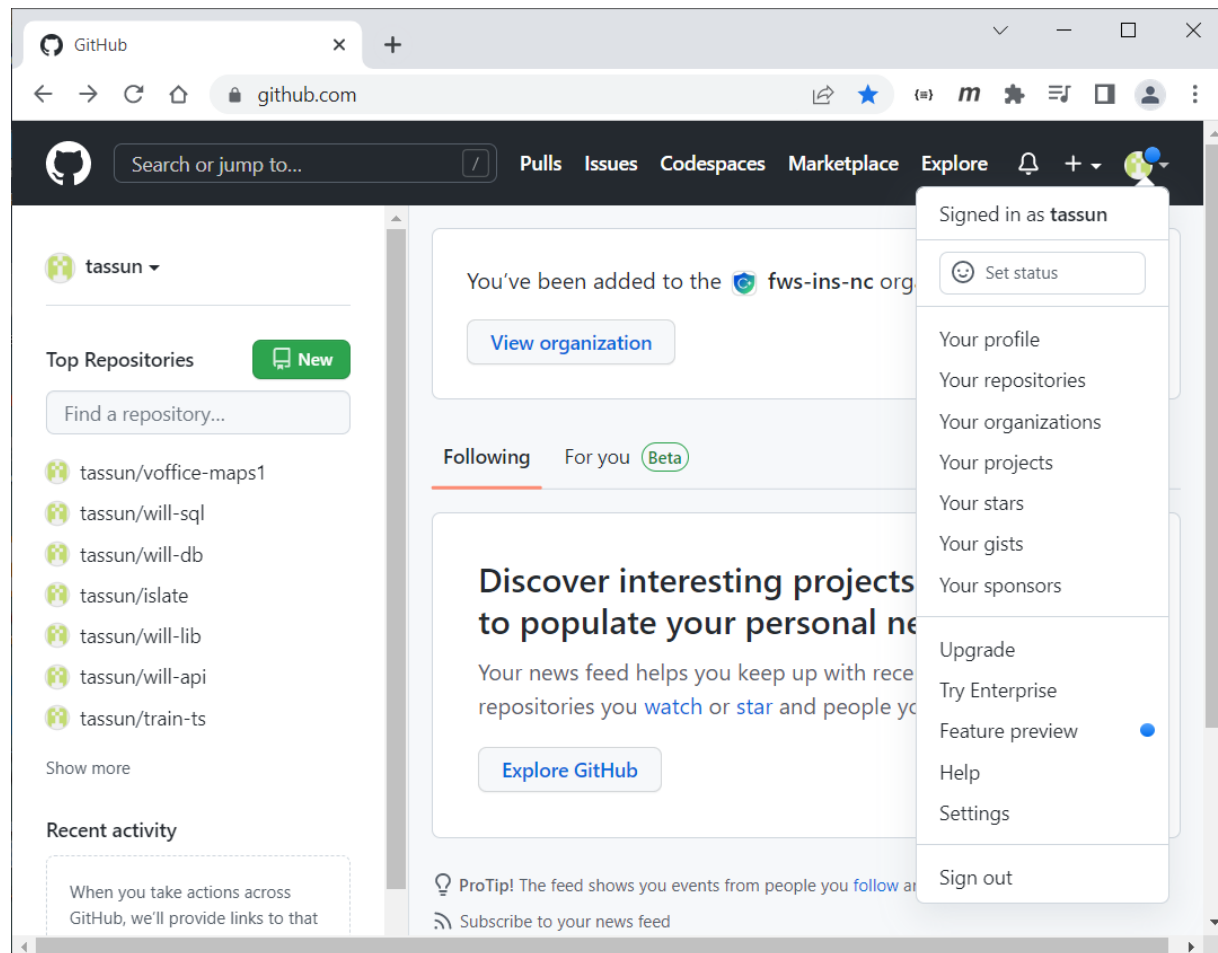
GitHub

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



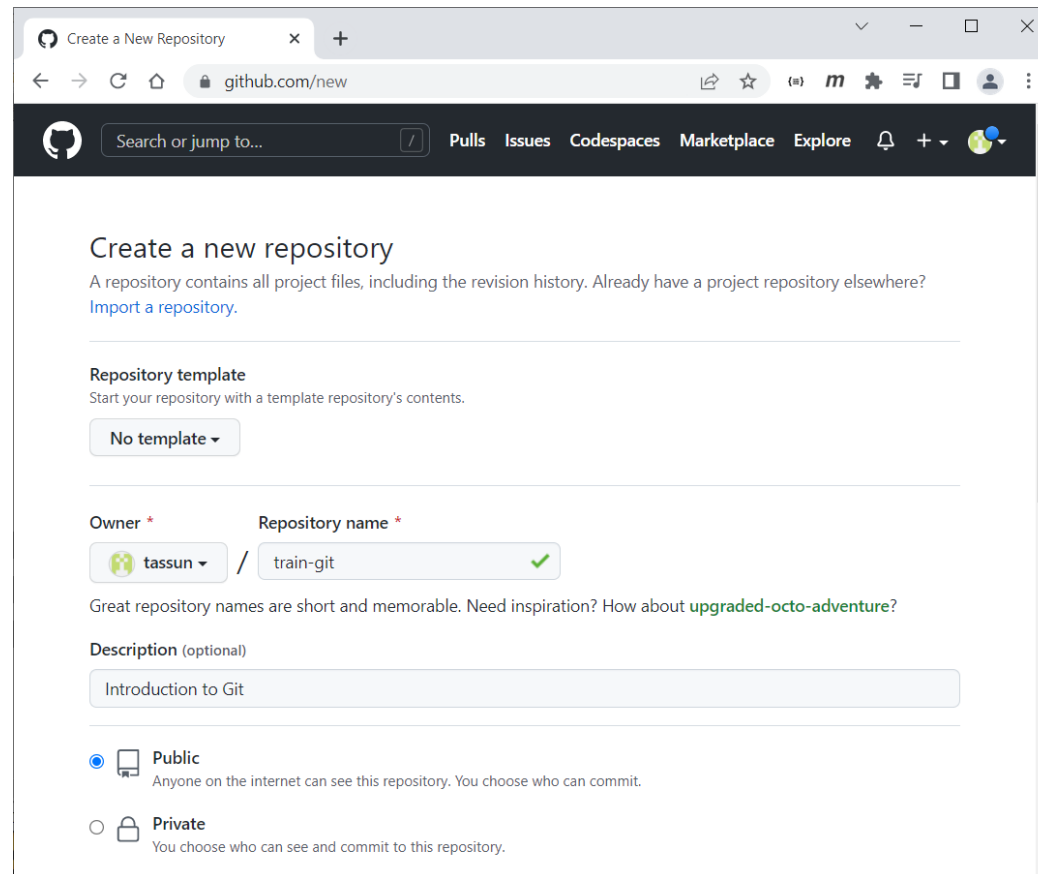
GitHub

- 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' button. 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'.

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)

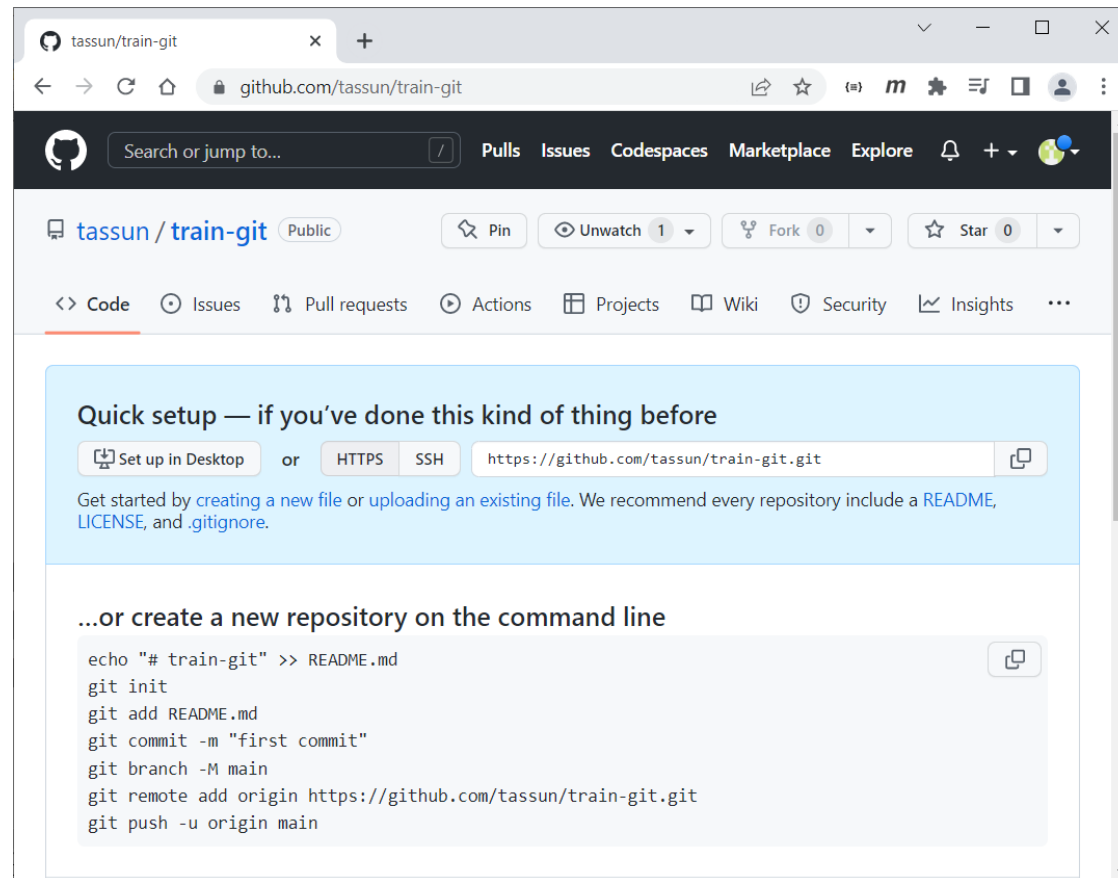
Introduction to Git

☒ **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.

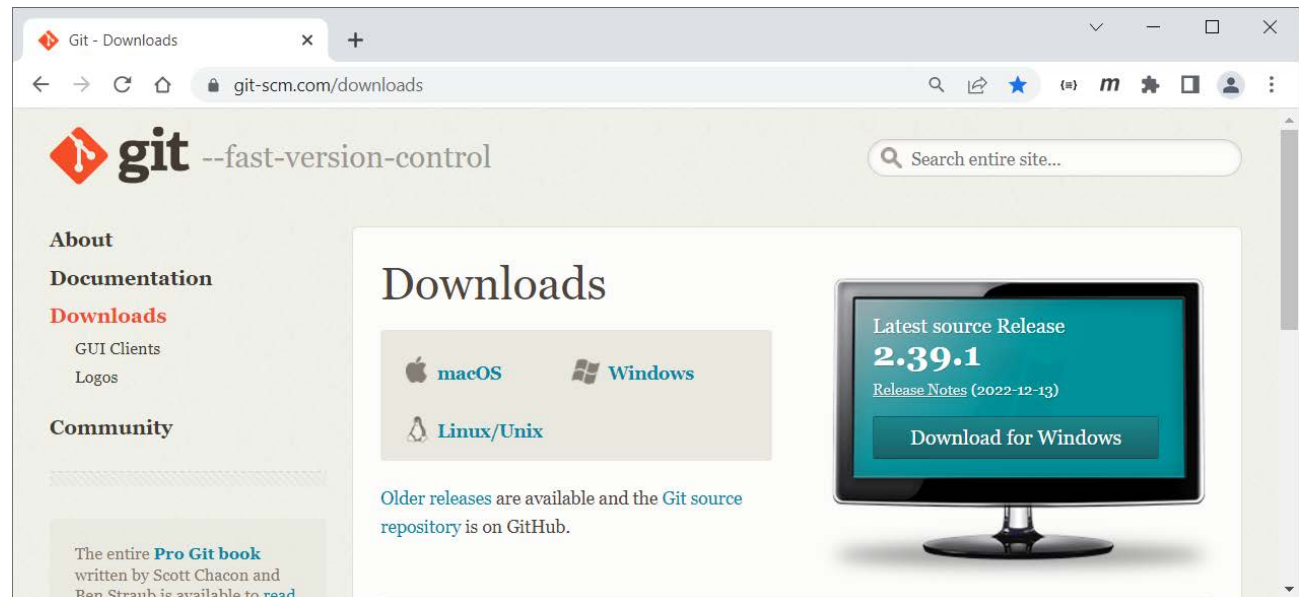
GitHub

- How to use GitHub?
 - Create repository



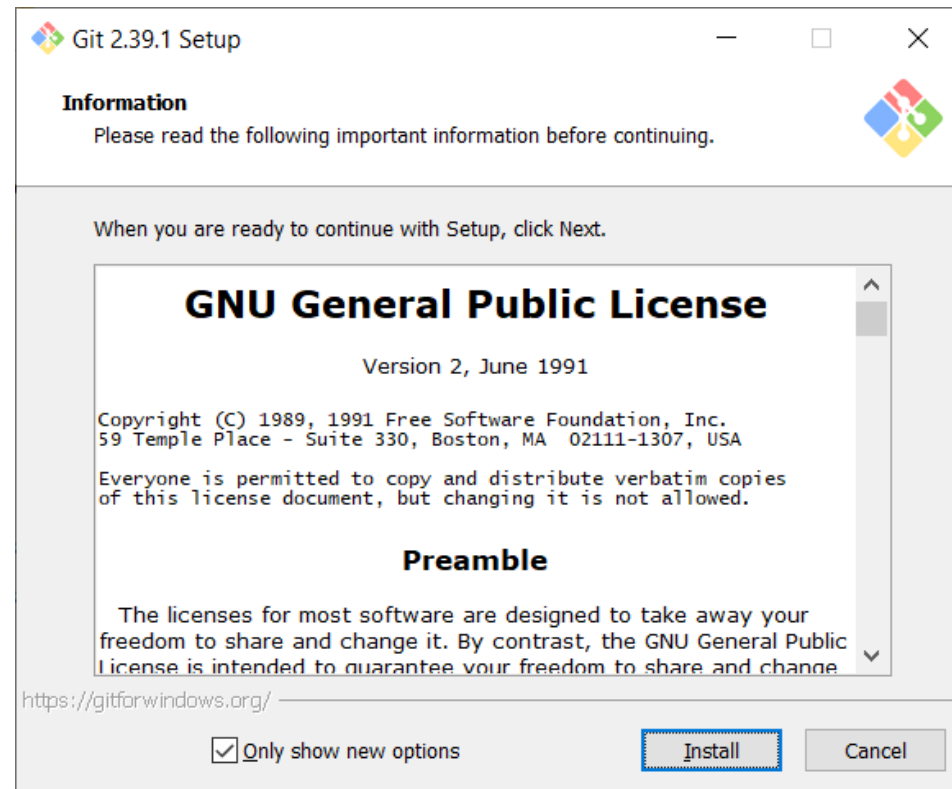
Git CLI

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



Git CLI

- Git Installation
 - windows



Git CLI

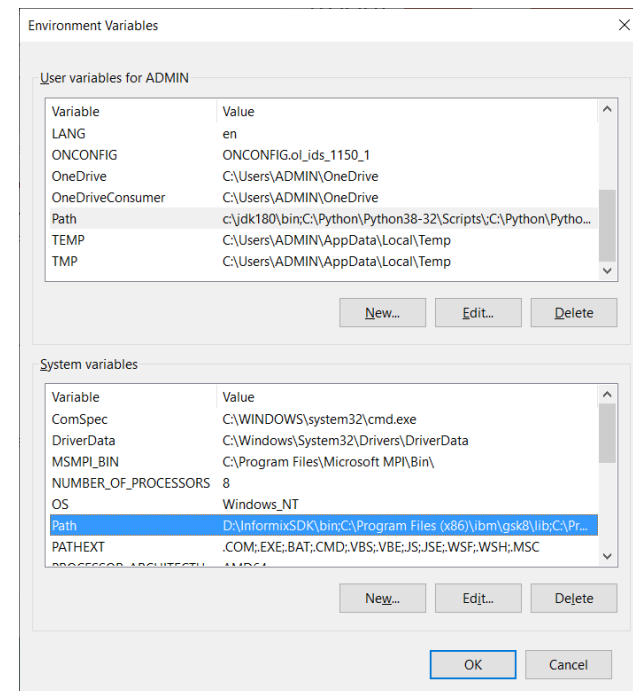
- Git Installation

- windows portable

- Settings -> Advanced system settings

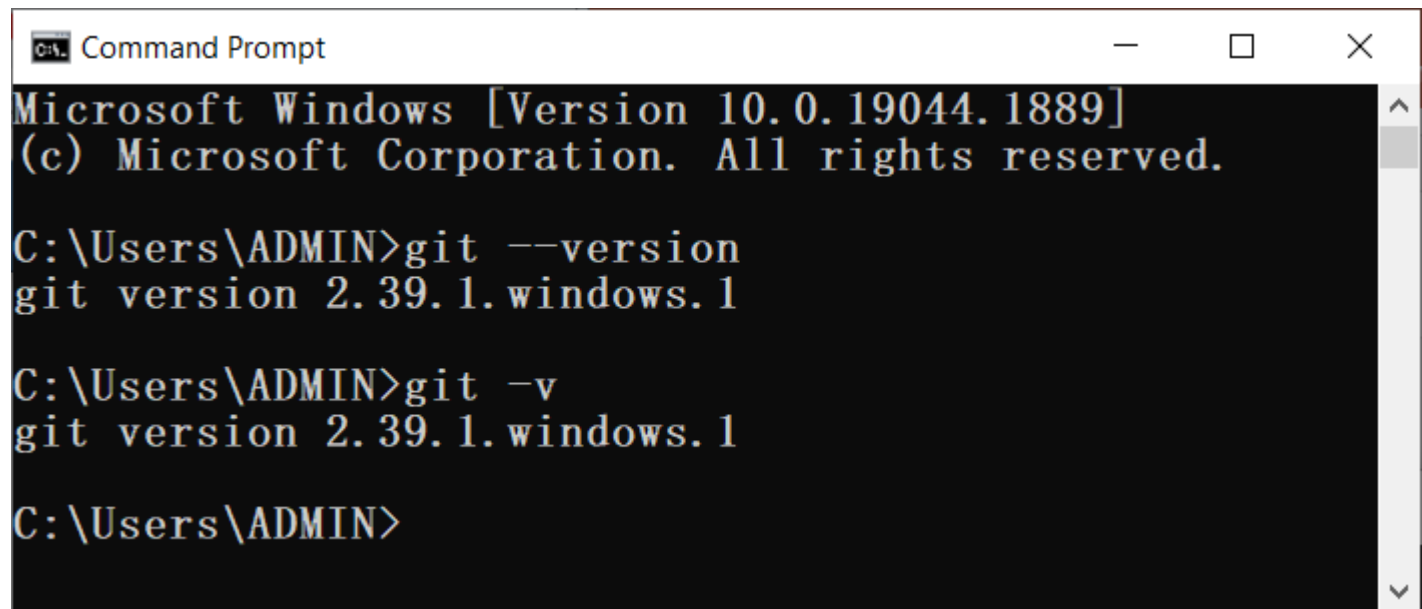
- System Properties -> Advanced -> Environment Variables

- 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

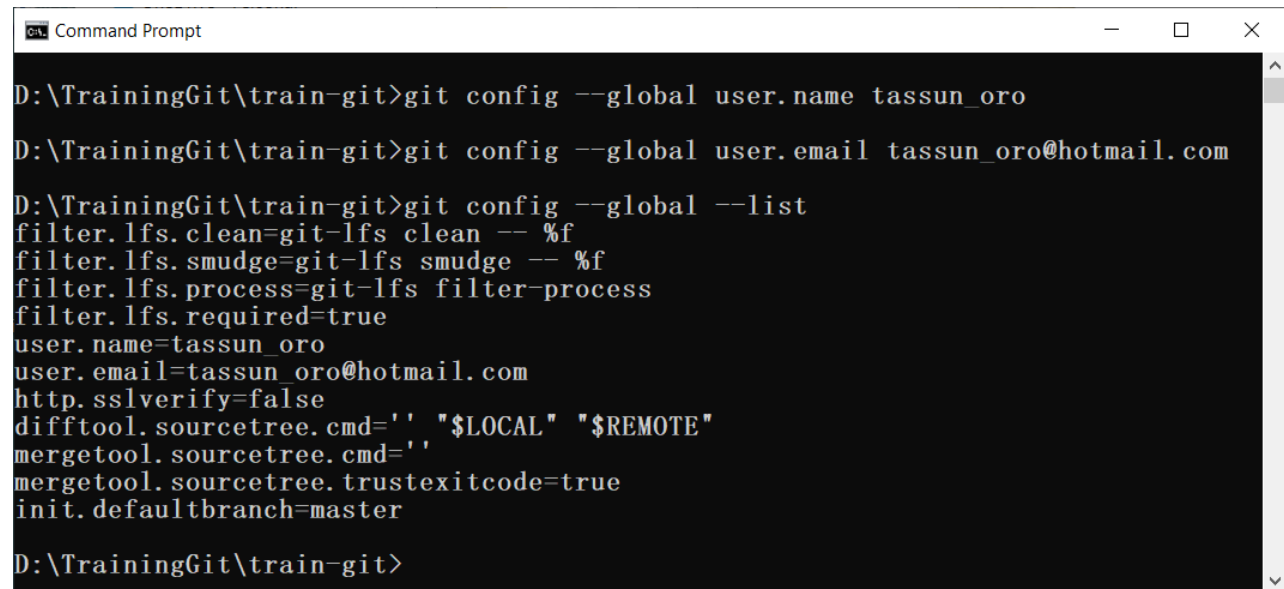
C:\Users\ADMIN>
```

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

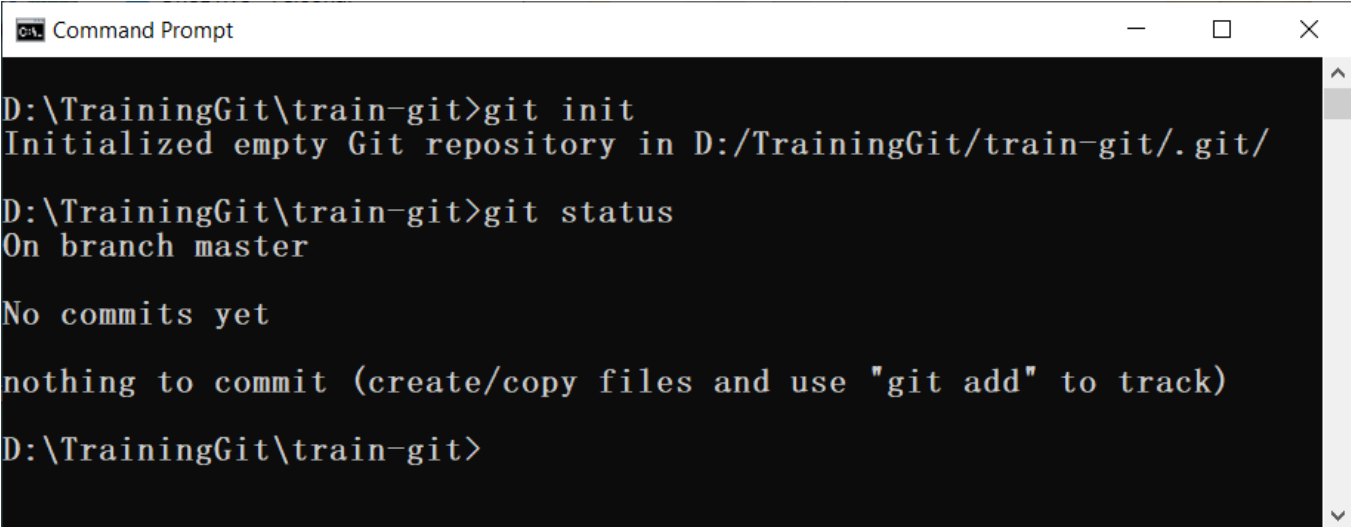
D:\TrainingGit\train-git>git config --global user.email tassun_oro@hotmail.com

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

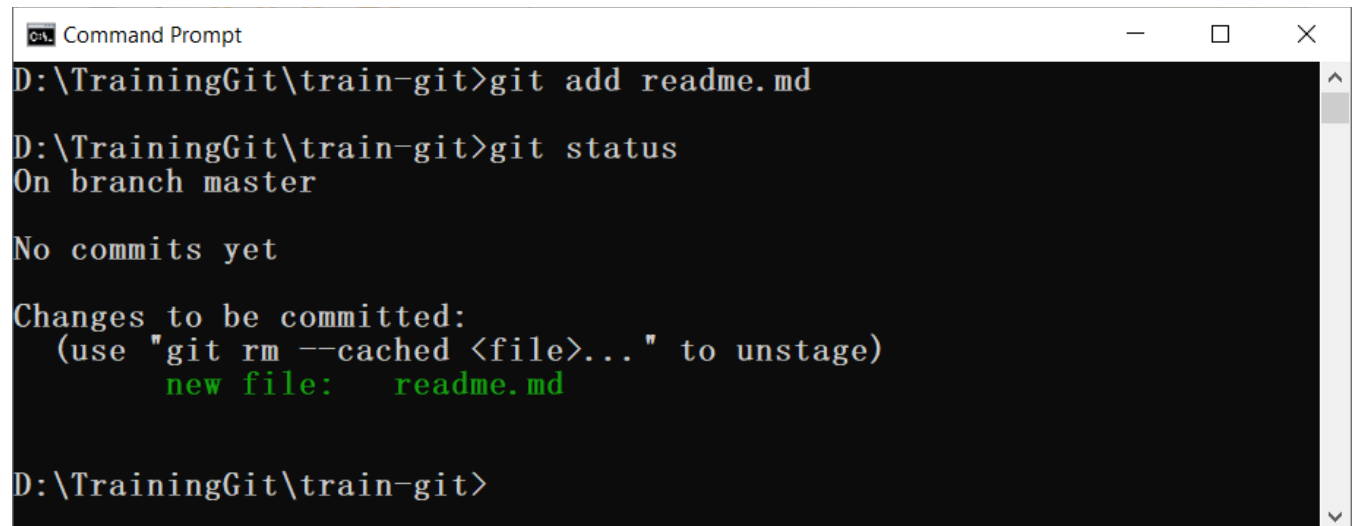
No commits yet

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

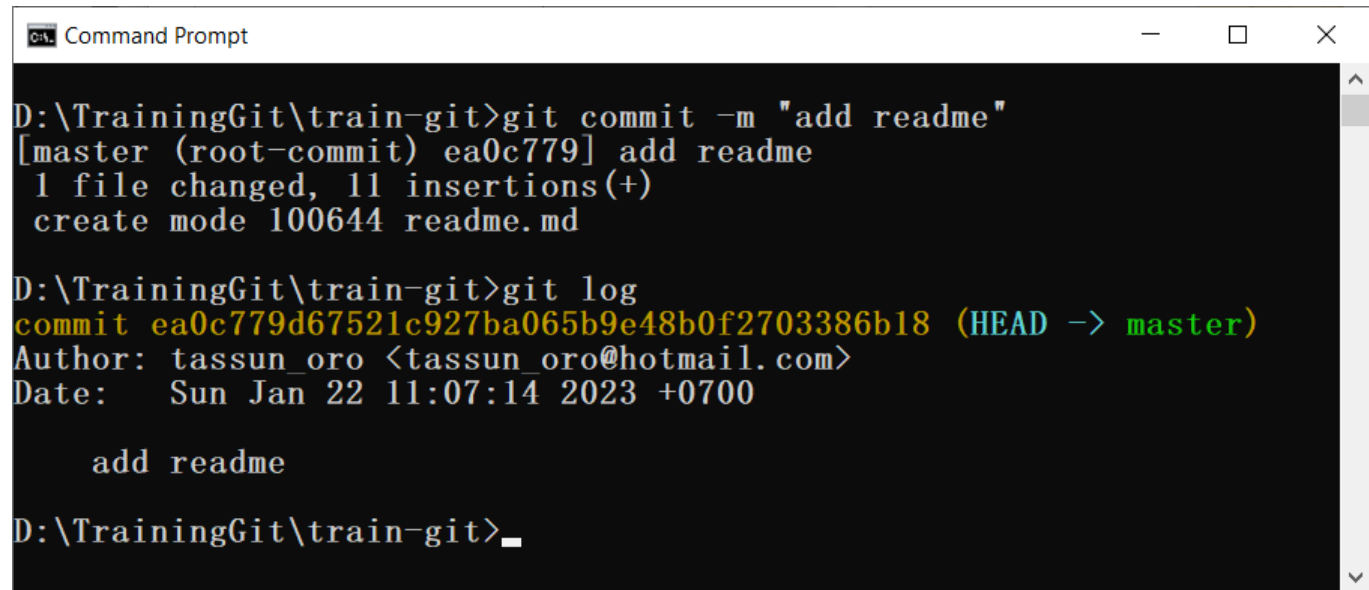
No commits yet

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

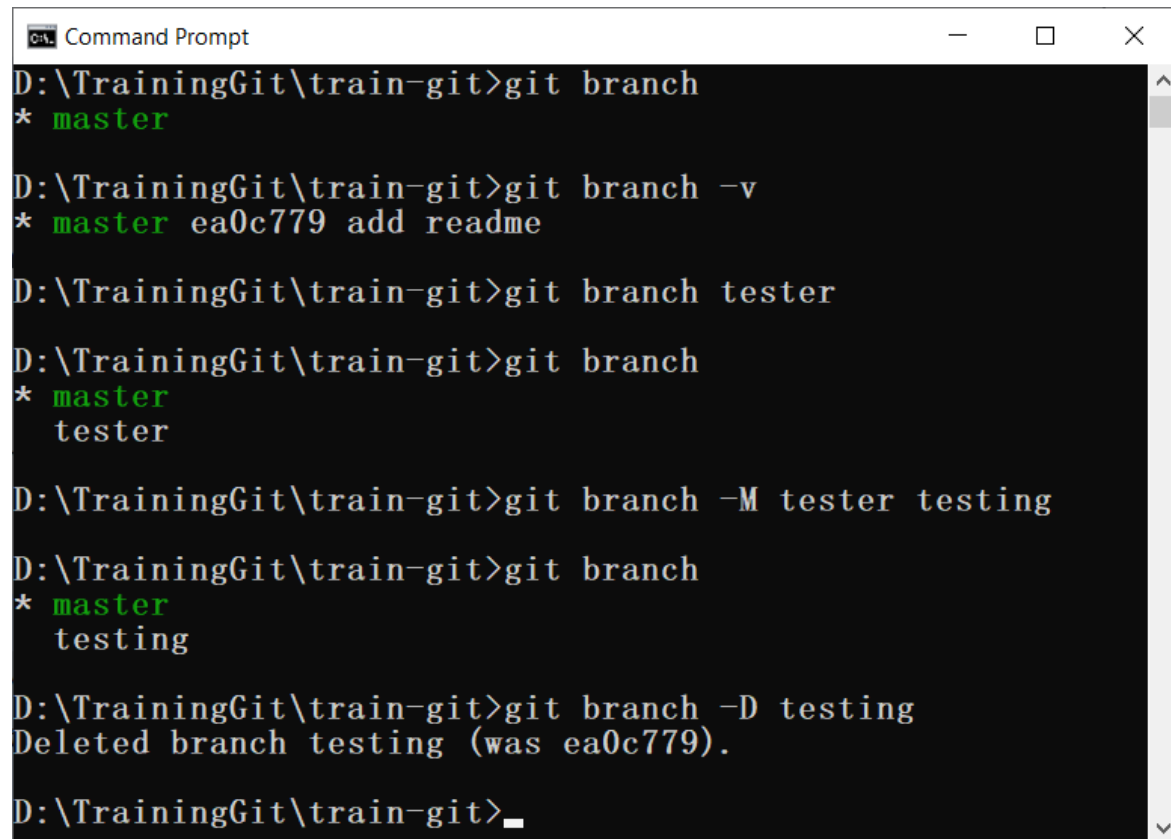
D:\TrainingGit\train-git>_
```

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

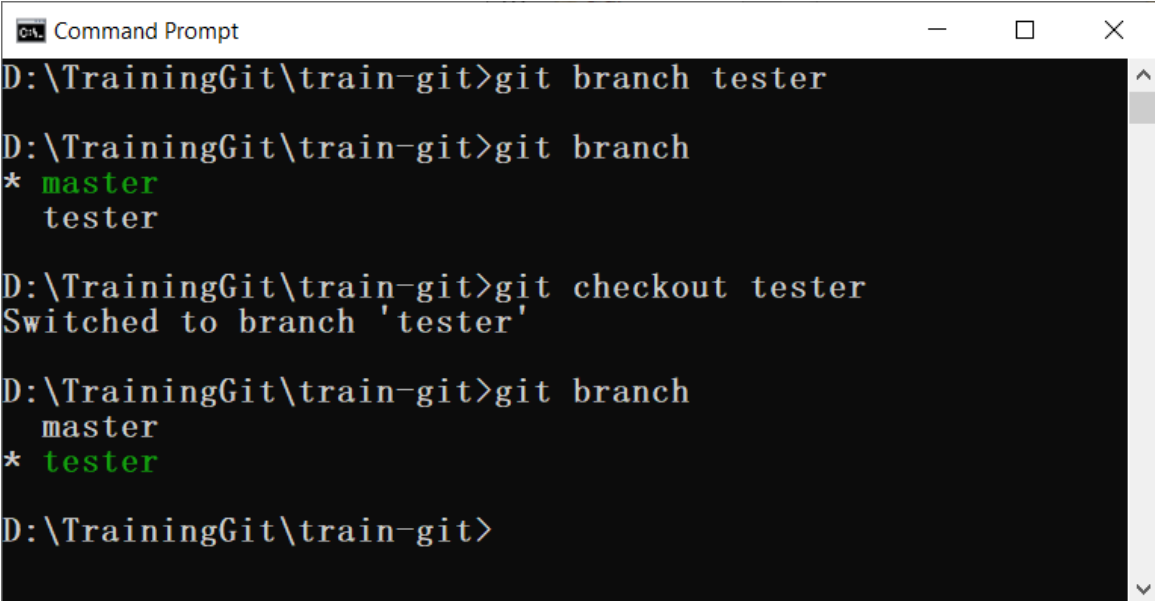
D:\TrainingGit\train-git>git branch
* master
  testing

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

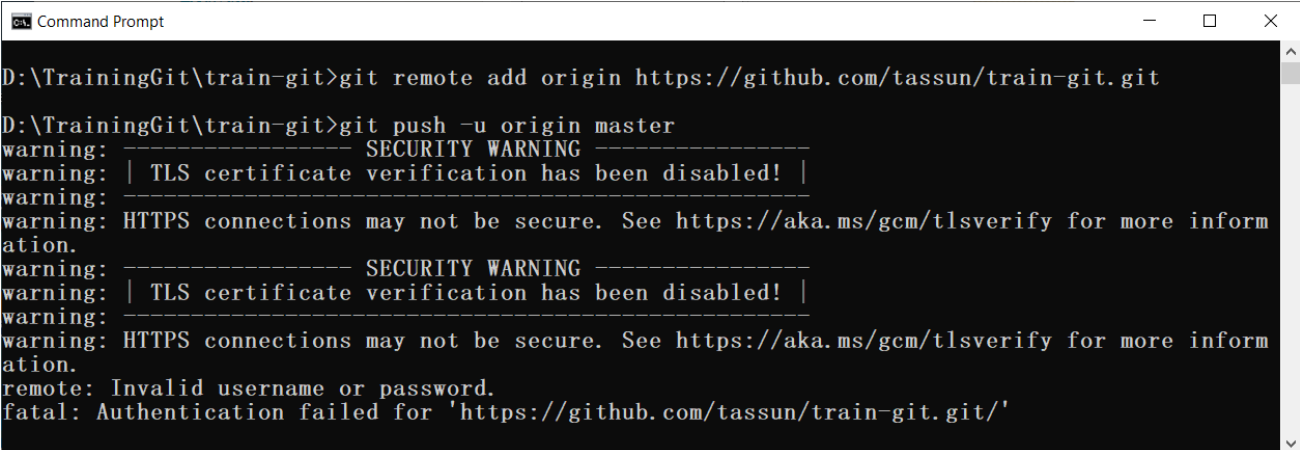
D:\TrainingGit\train-git>
```

Git CLI

- Git Command

- git push

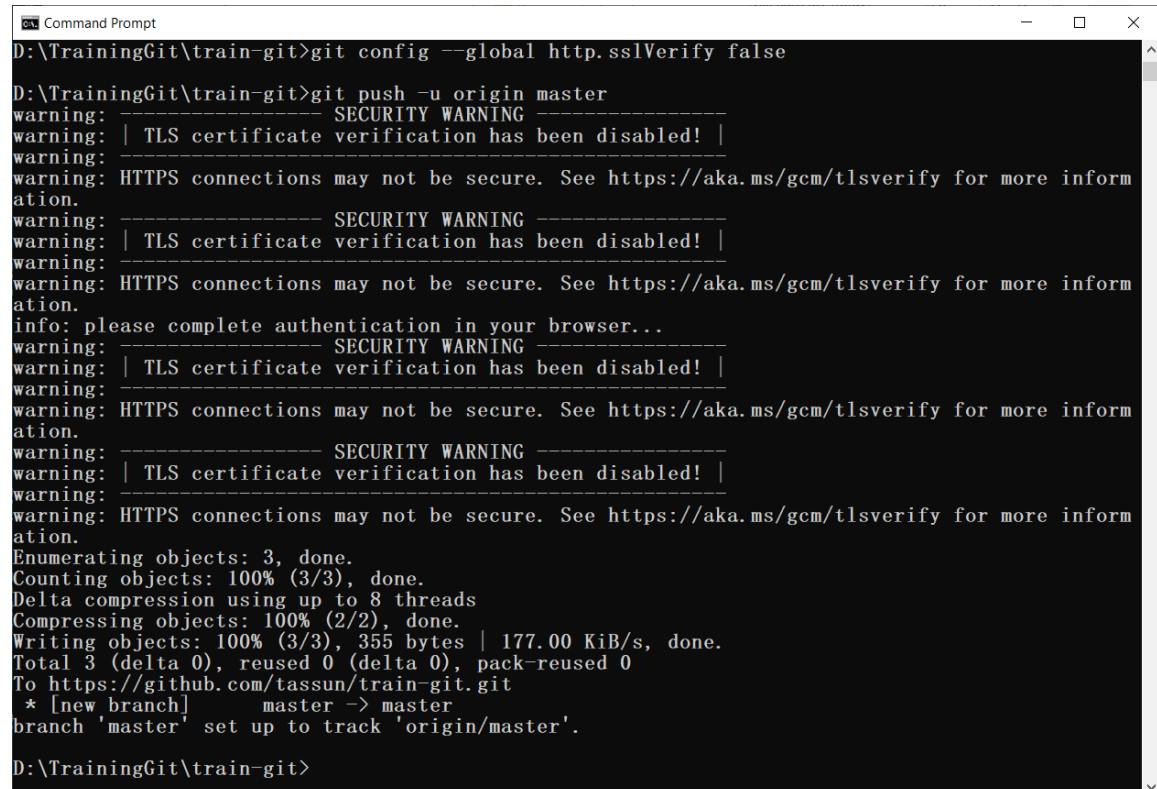
- git remote add origin <https://github.com/username/repo-name.git>
 - git push -u origin master



```
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



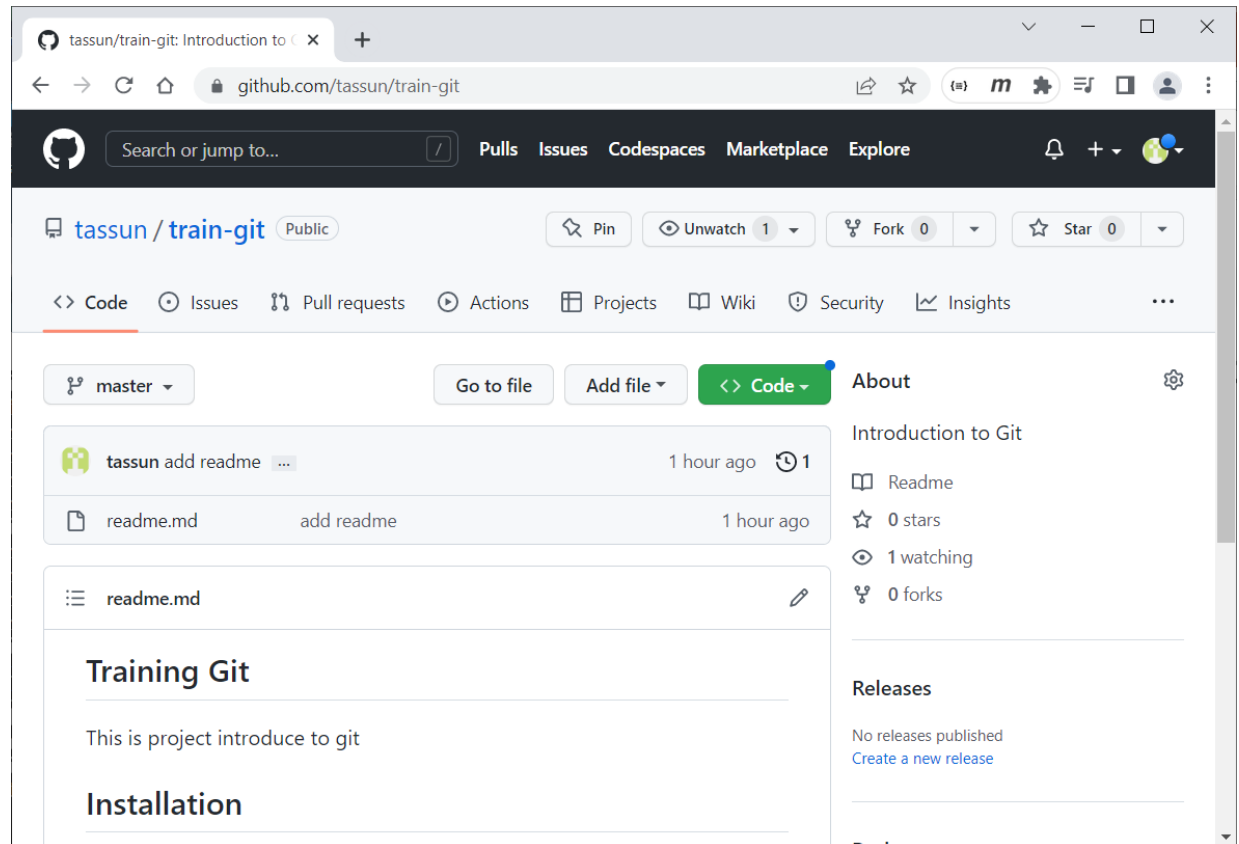
```
Command Prompt
D:\TrainingGit\train-git>git config --global http.sslVerify false

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

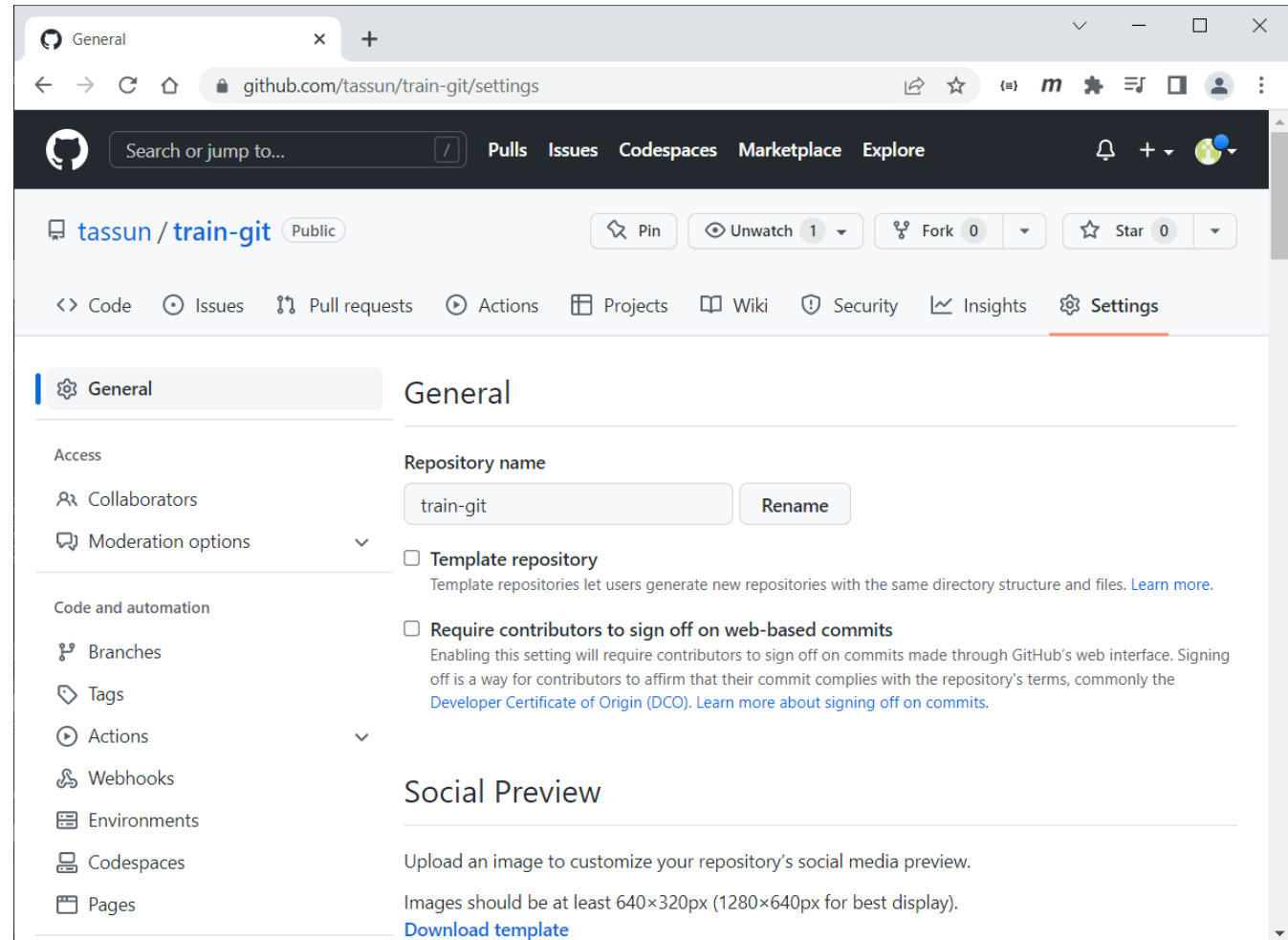
- Git Command
 - git clone
 - git clone https://github.com/user-name/repo-name.git



```
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>_
```

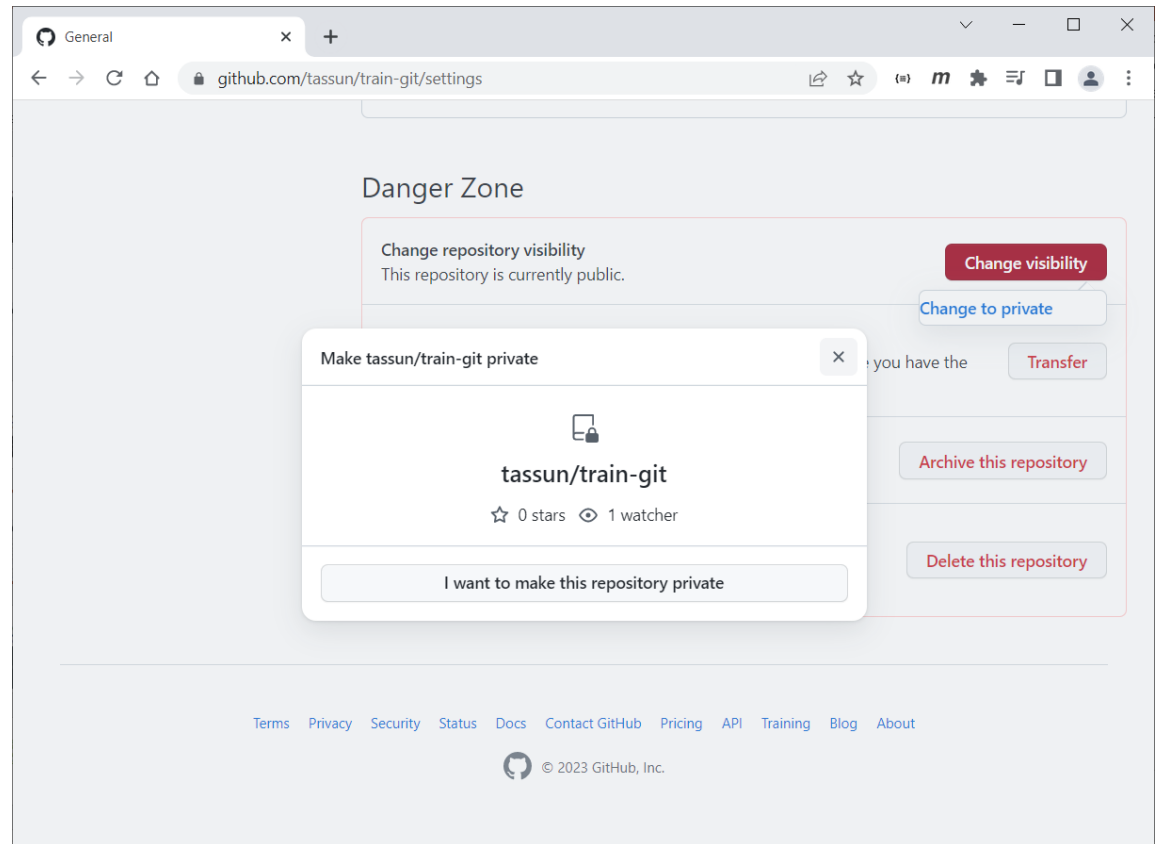
Git CLI

- GitHub Setting



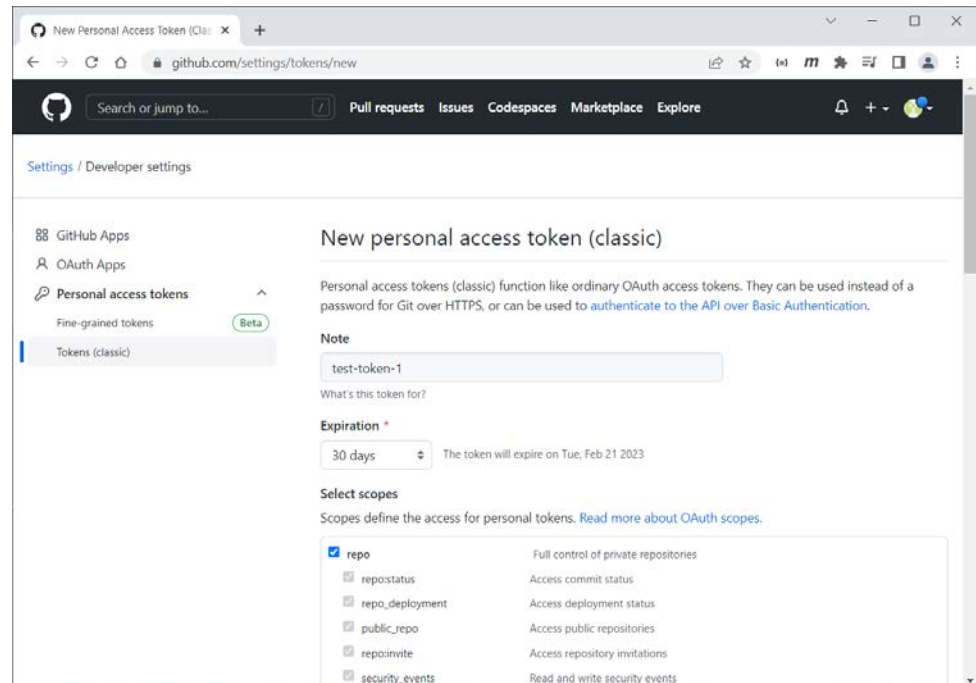
Git CLI

- GitHub Setting
 - try to change repository private/public



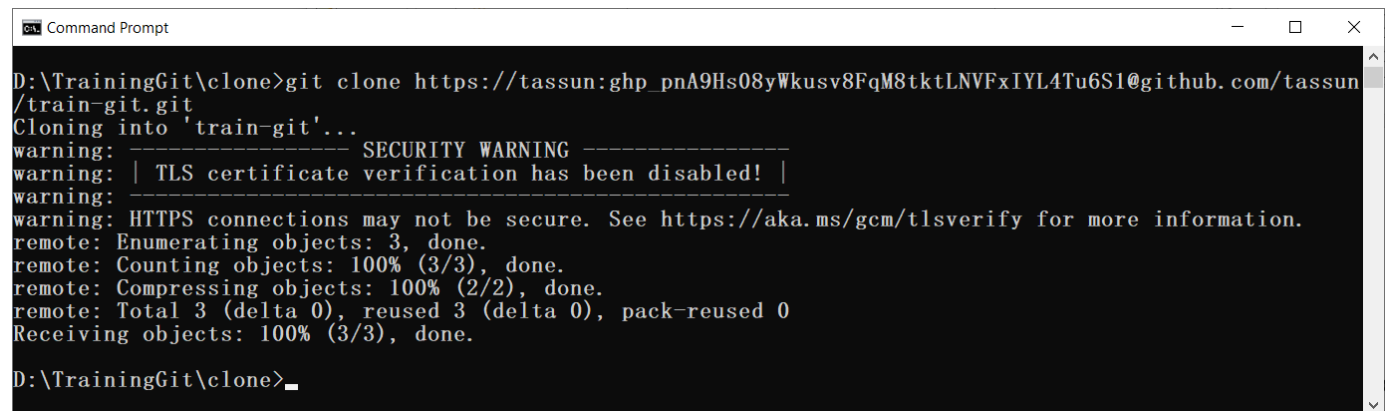
Git CLI

- 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.

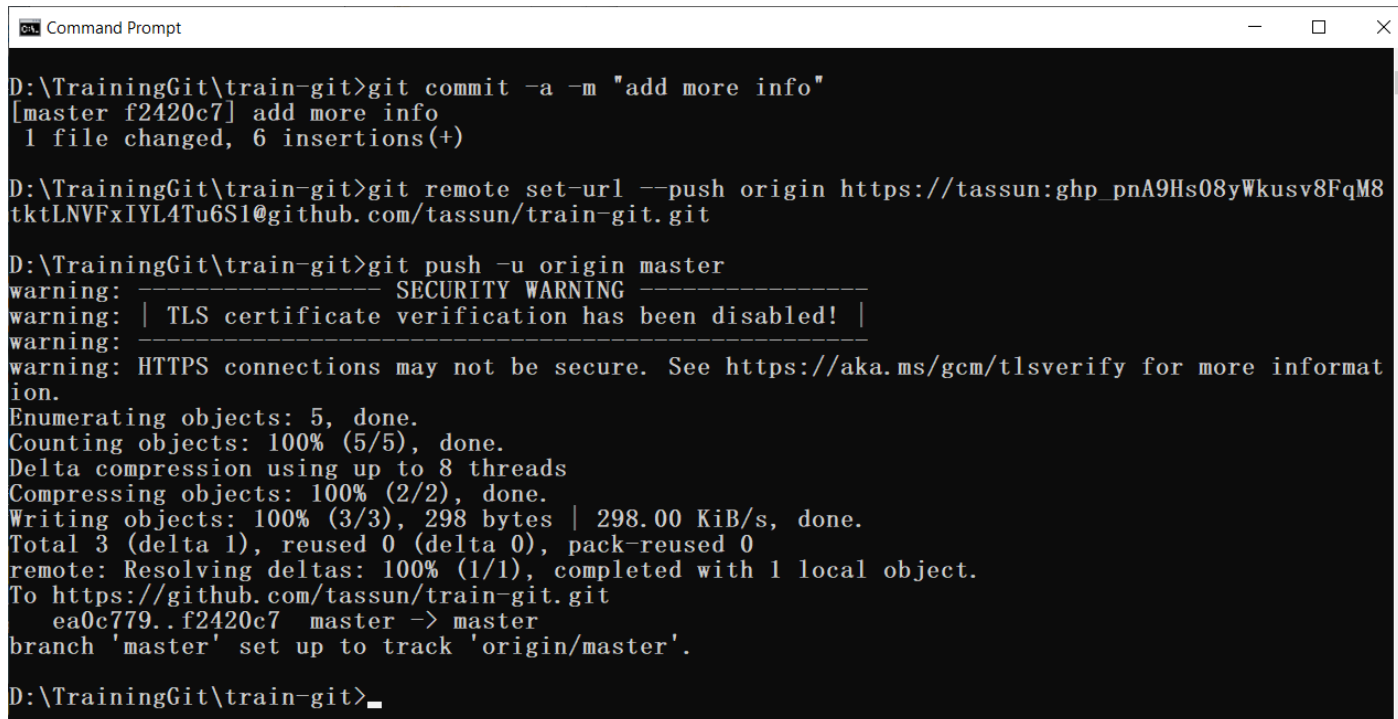
D:\TrainingGit\clone>
```

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'.

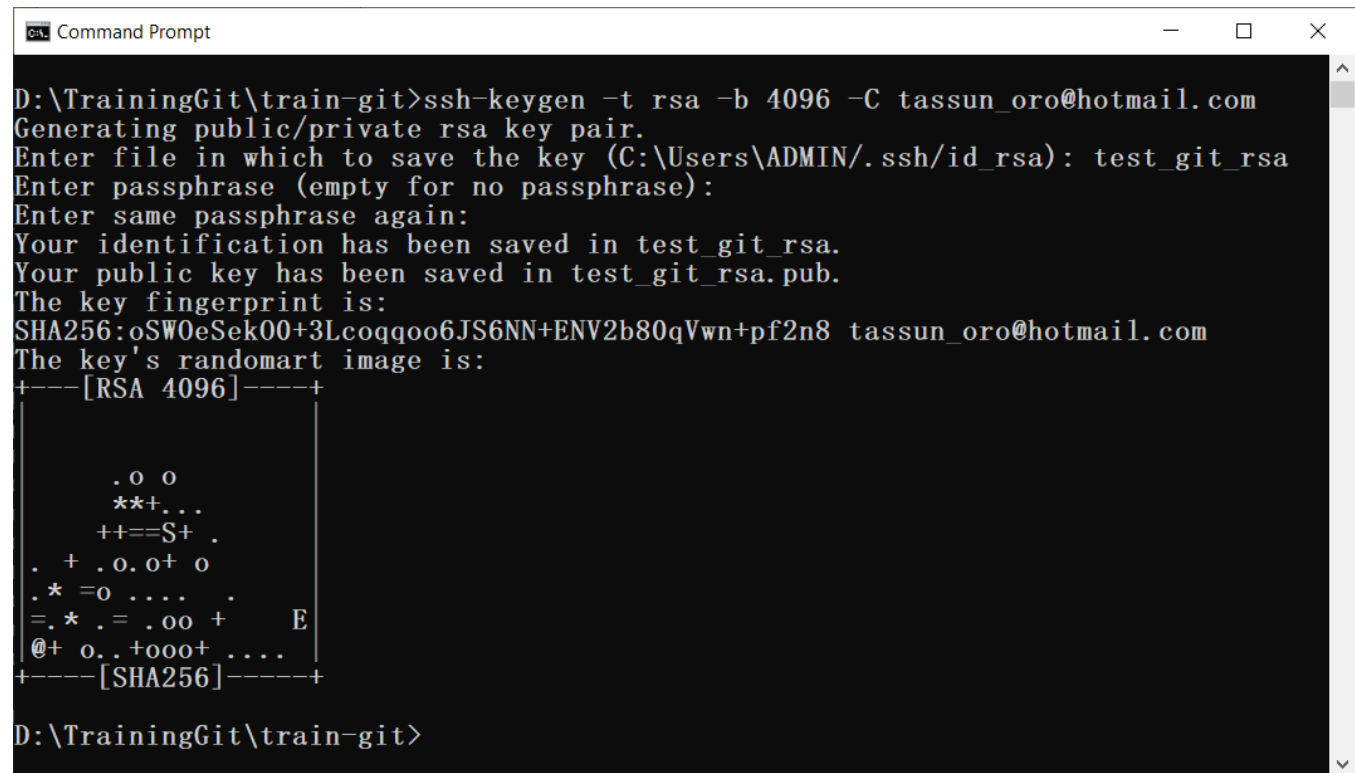
D:\TrainingGit\train-git>_
```

Git CLI

- Git Command

- git ssh key

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



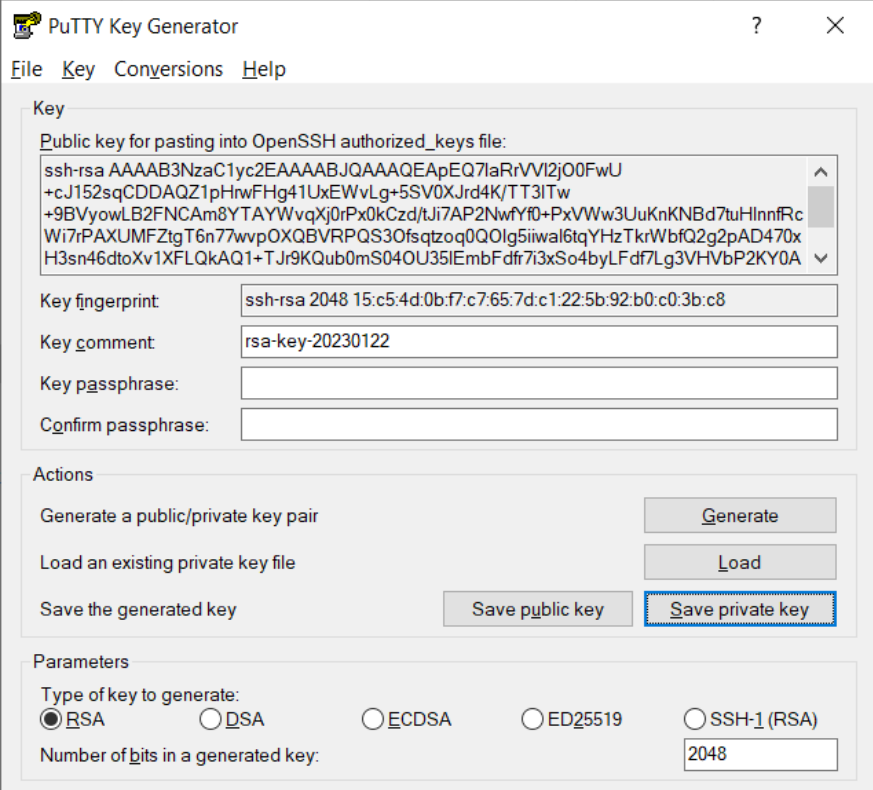
```
Command Prompt

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 the public key for pasting into the OpenSSH authorized_keys file. The 'Actions' section includes buttons for 'Generate', 'Load', 'Save public key', and 'Save private key'. The 'Parameters' section shows the type of key to generate (RSA selected) and the number of bits in a generated key (2048).

PuTTY Key Generator

File Key Conversions Help

Key

Public key for pasting into OpenSSH authorized_keys file:

```
ssh-rsa AAAAB3NzaC1yc2EAAAABJQAAAAQEApcEQ7laRrVVI2jO0FwU
+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

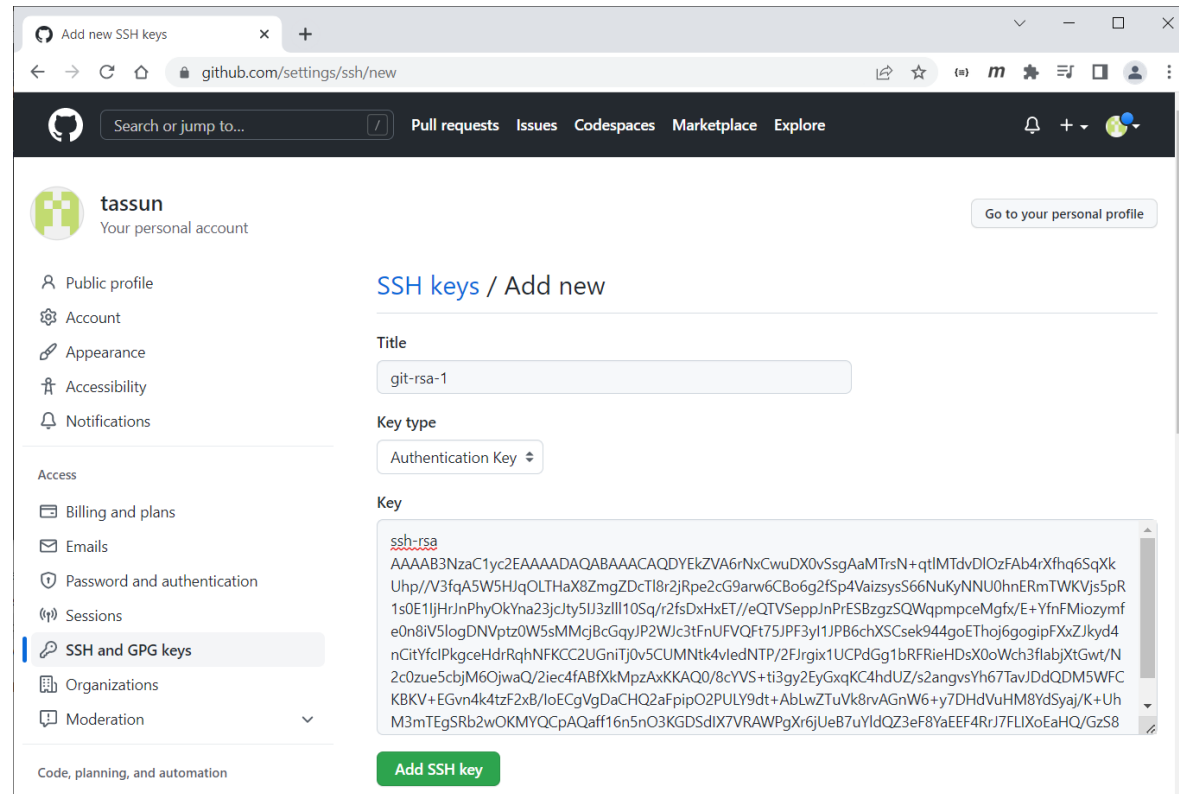
Type of key to generate:

☒ 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 shows 'github.com/settings/ssh/new'. The page title is 'Add new SSH keys'. The user's profile 'tassun' is visible on the left. The left sidebar contains navigation links: Public profile, Account, Appearance, Accessibility, Notifications, Access, Billing and plans, Emails, Password and authentication, Sessions, SSH and GPG keys (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 'Key' containing a long RSA key string. A green 'Add SSH key' button is at the bottom right.

Add new SSH keys

github.com/settings/ssh/new

Search or jump to...

Pull requests Issues Codespaces Marketplace Explore

tassun
Your personal account

Go to your personal profile

Public profile
Account
Appearance
Accessibility
Notifications

Access

Billing and plans
Emails
Password and authentication
Sessions

SSH and GPG keys

Organizations
Moderation

Code, planning, and automation

SSH keys / Add new

Title
git-rsa-1

Key type
Authentication Key

Key
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAQADYEkZVA6rNxCwuDX0vSsgAaMTTrN+qtIMTdvdIOzFAB4rXfhq6SqXkUhp//V3fqA5W5HJqOLTHaX8ZmgZDcTl8r2jRpe2cG9arw6CBo6g2fSp4VaizsysS66NuKyNNU0hnERmTWKVjs5pR1s0E1ljHrJnPhyOkYna23jcty5lJ3zlll10Sqr/2fsDxHxET//eQTVSeppJnPrESBzgzSQWqmpceMgFx/E+YfnFMiozymfe0n8iV5logDNVptz0W5sMMcJBcGqyJP2WJc3tFnUFVQFt75JPF3y11JPB6chXSCsek944goEThoj6gogipFXxZJkyd4nCitYfcIPkgceHdRqhNFKCC2UGniTj0v5CUMNtk4vledNTP/2FJrgix1UCPdGg1bRFRieHDSX0oWch3flabjXtGwt/N2c0zue5cbjM6OjwaQ/2iec4fABfXkMpzAxKKAQ0/8cYVS+ti3gy2EyGxqKC4hdUZ/s2angvsYh67TavjDdQDM5WFCBKV+EGvn4k4tzF2xB/loECgVgDaCHQ2aFpipO2PULY9dt+AbLwZTuVk8rvAGnW6+y7DHDdVuHM8YdSyaj/K+Uhm3mTEgSRb2wOKMYQCpAQaff16n5nO3KGDSDlX7VRAWPgXr6jUeB7uYldQZ3eF8YaEEF4Rrj7FLIXoEaHQ/GzS8

Add SSH key

Git CLI

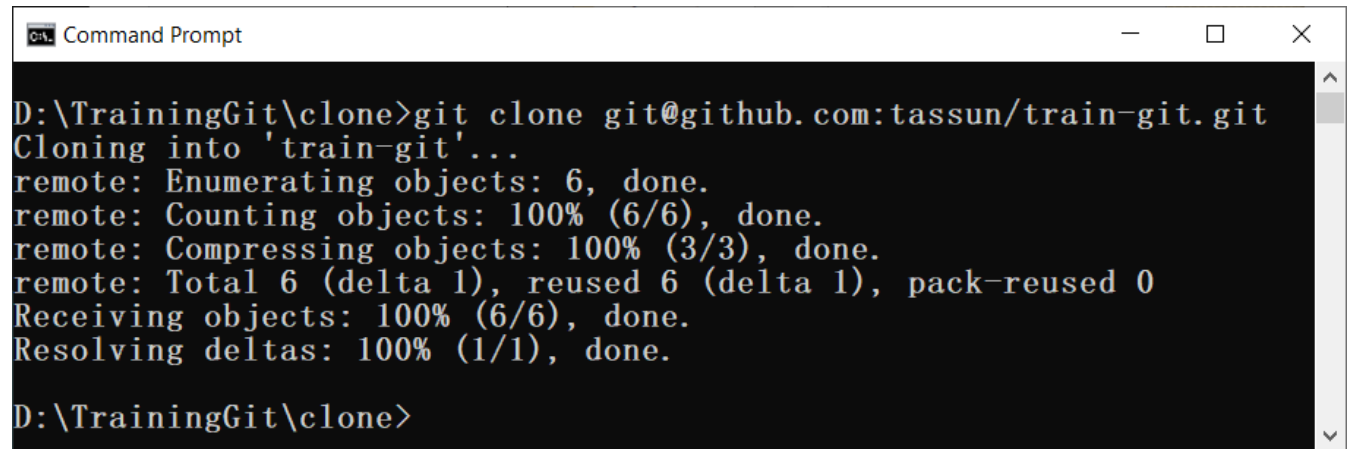
- Git Command
 - git ssh key testing

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 user is in the directory "D:\TrainingGit\train-git". They have 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

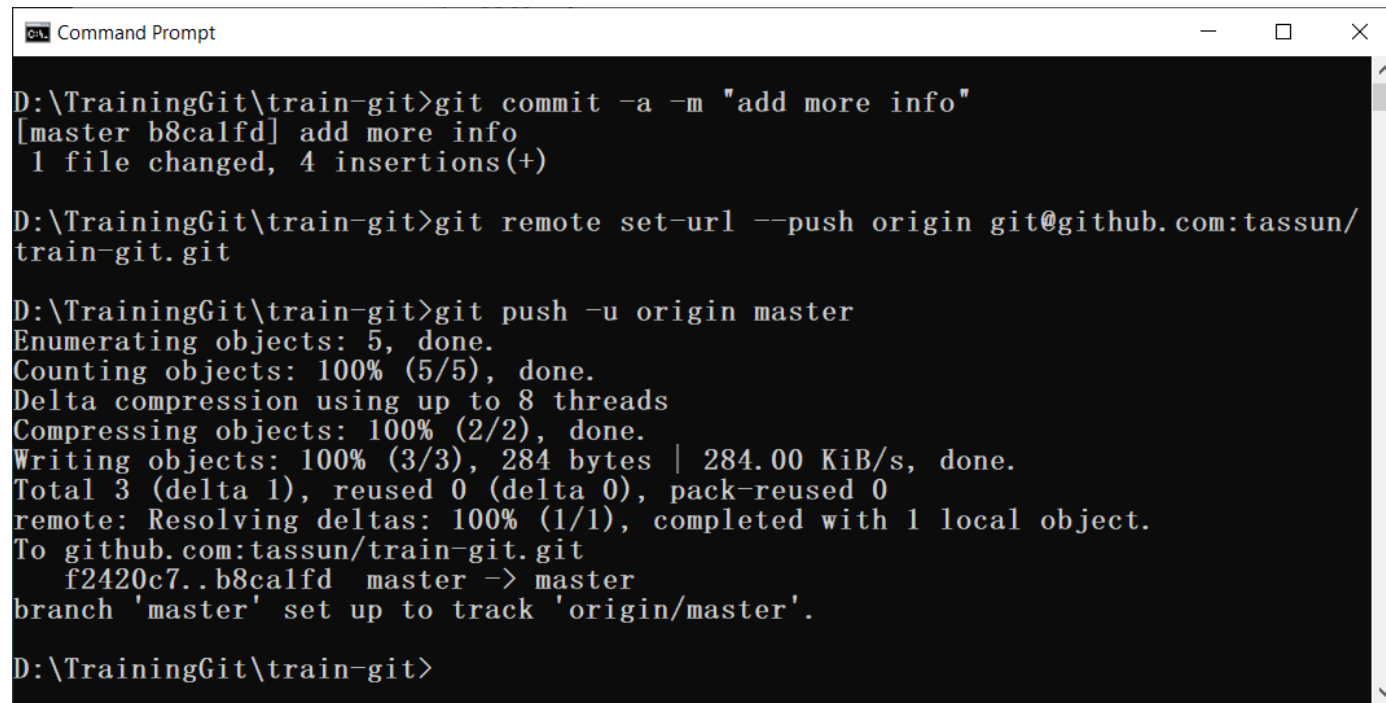


```
Command Prompt
D:\TrainingGit\clone>git clone git@github.com:tassun/train-git.git
Cloning into 'train-git'...
remote: Enumerating objects: 6, done.
remote: Counting objects: 100% (6/6), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 6 (delta 1), reused 6 (delta 1), pack-reused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

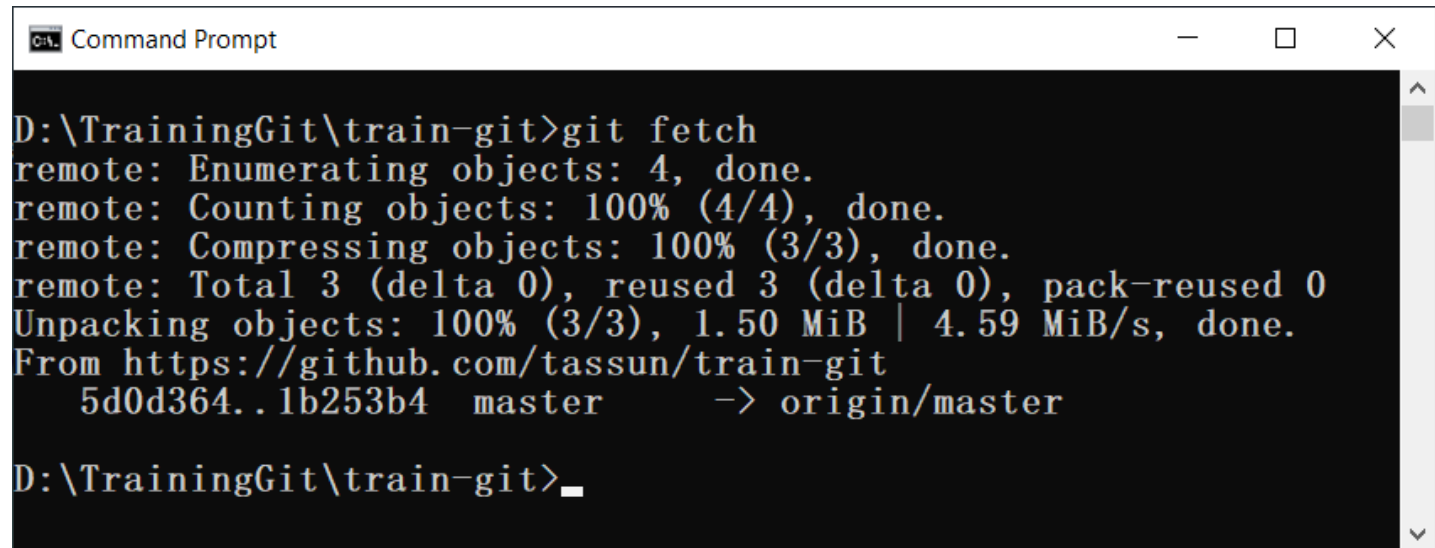
D:\TrainingGit\train-git>git remote set-url --push origin git@github.com:tassun/
train-git.git

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

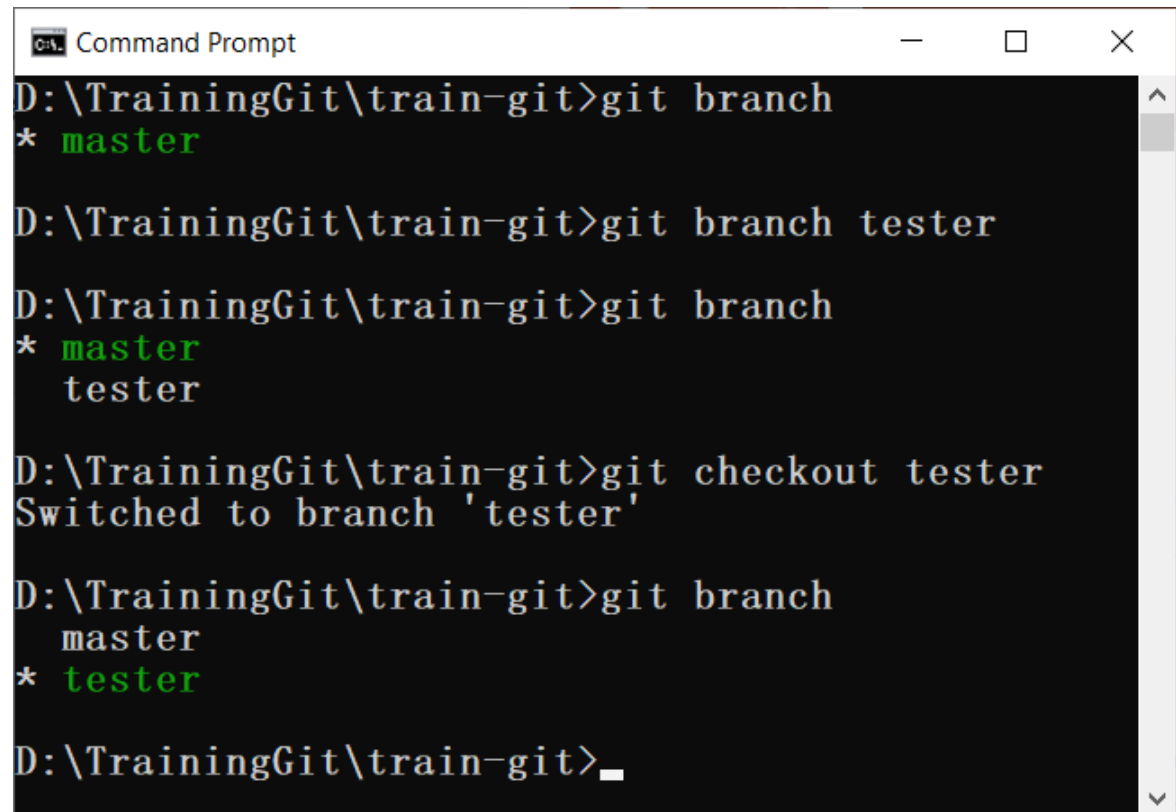
- Git Command
 - git fetch



```
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 merge



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

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 merge

```
Command Prompt
D:\TrainingGit\train-git>git add testme.txt

D:\TrainingGit\train-git>git commit -m "add test me"
[tester 8010551] add test me
1 file changed, 2 insertions(+)
create mode 100644 testme.txt

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

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

D:\TrainingGit\train-git>git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.

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

D:\TrainingGit\train-git>git merge tester
Updating 67bedb6..8010551
Fast-forward
 testme.txt | 2 ++
1 file changed, 2 insertions(+)
create mode 100644 testme.txt

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>
```

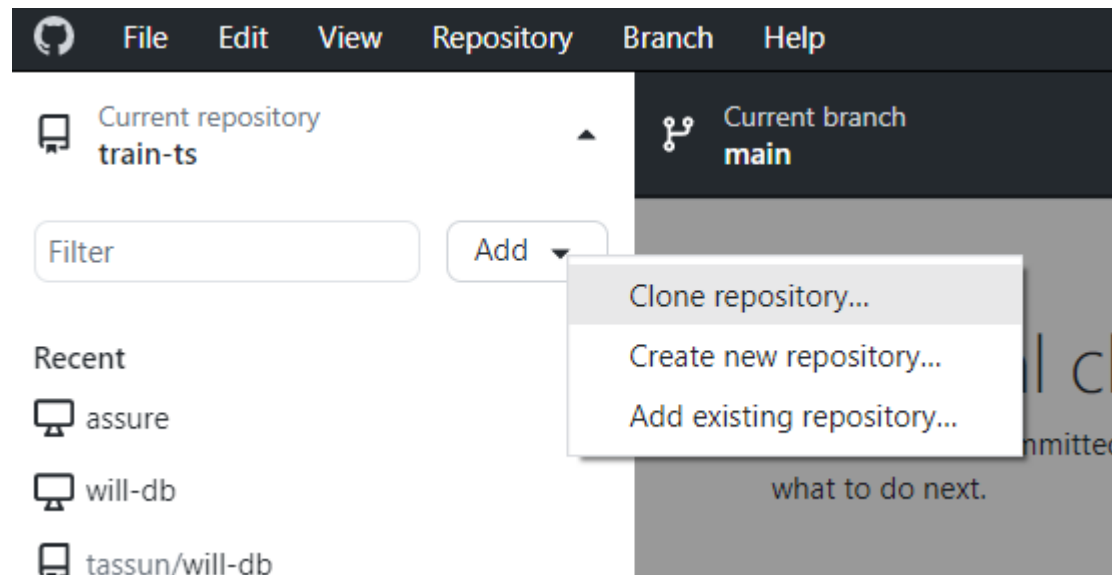

Git GUI

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



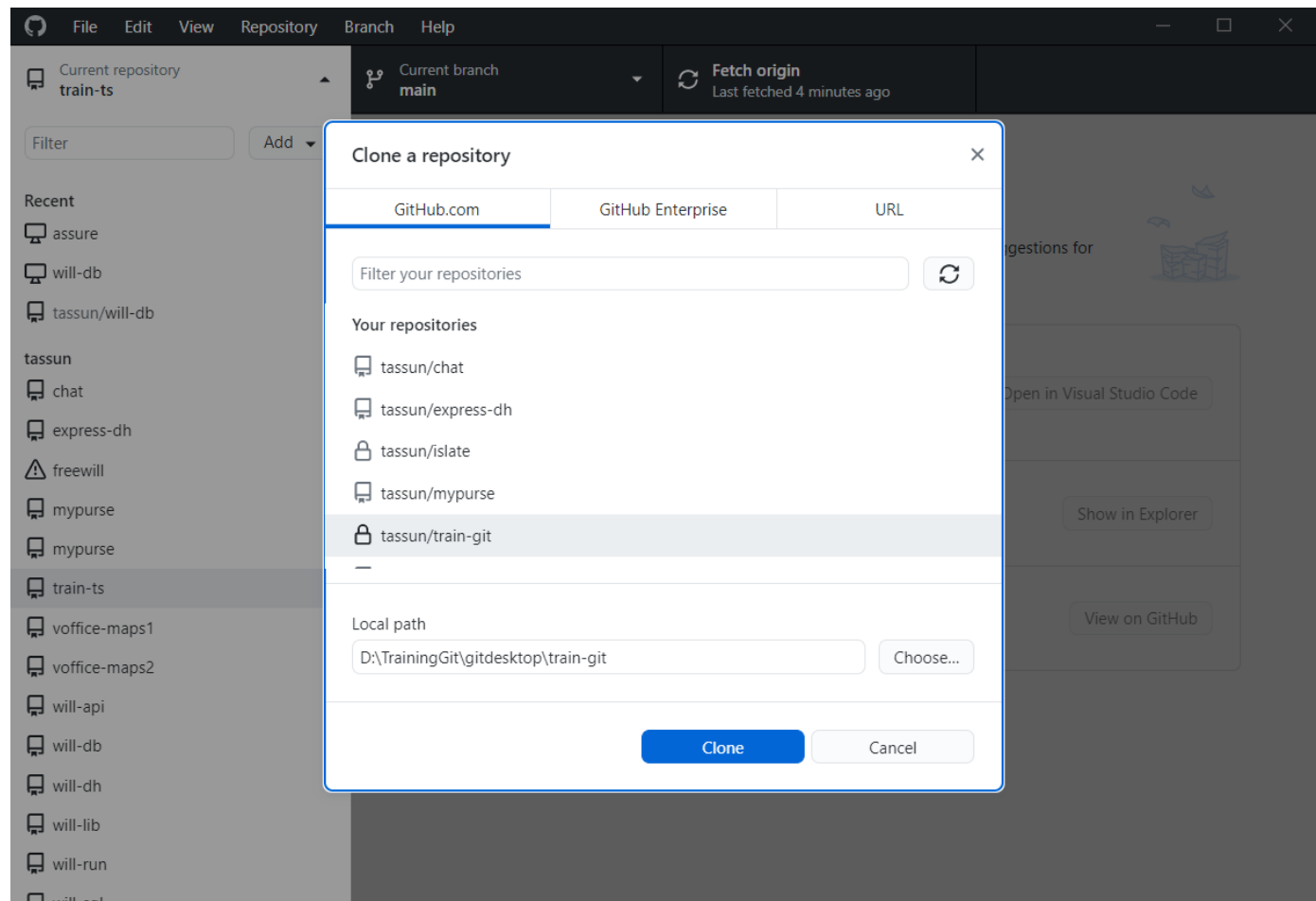
Git GUI

- Git Desktop



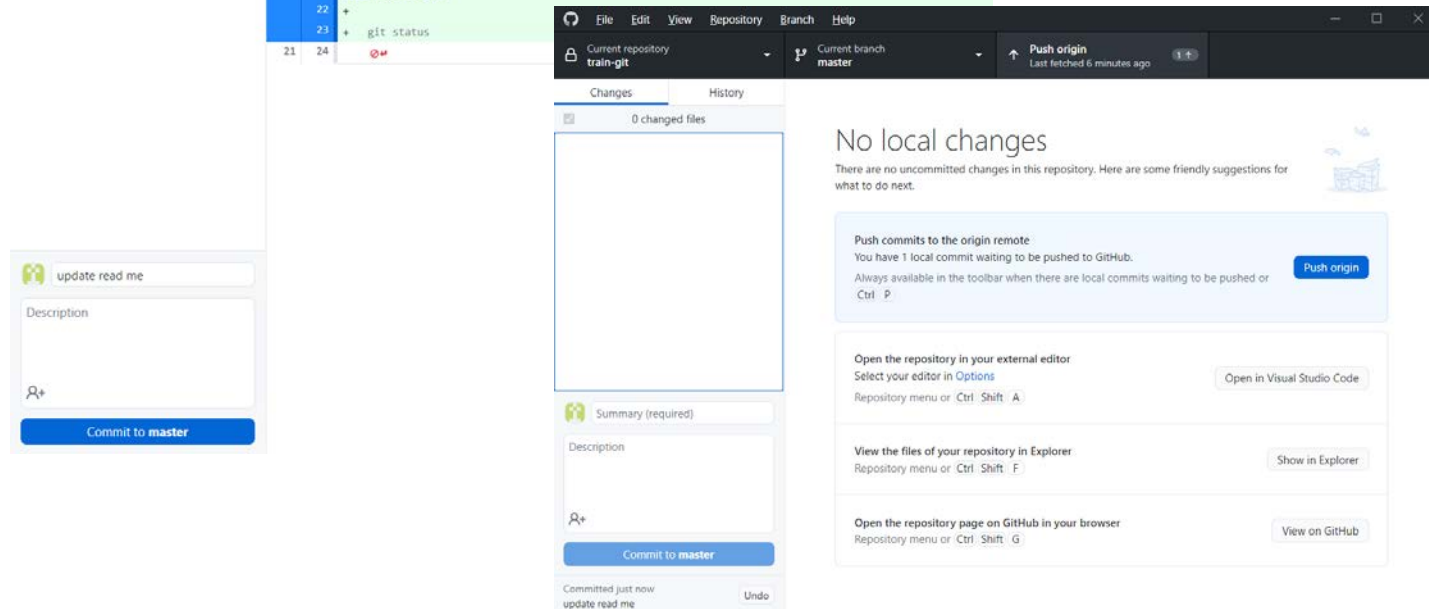
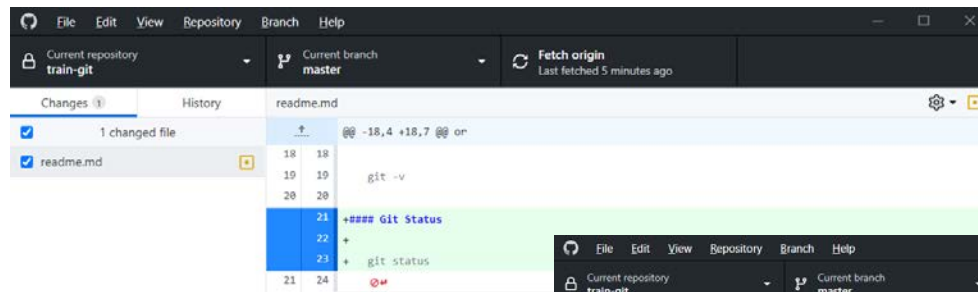
Git GUI

- 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