

Introduction to Linux Systems

Version Control System: Git

Lab2: Create your Git account and first project

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Courtesy of XXX



Lab

- Register the GitHub account
- Fork a repository and clone it to the local
- Practice the GitHub flow

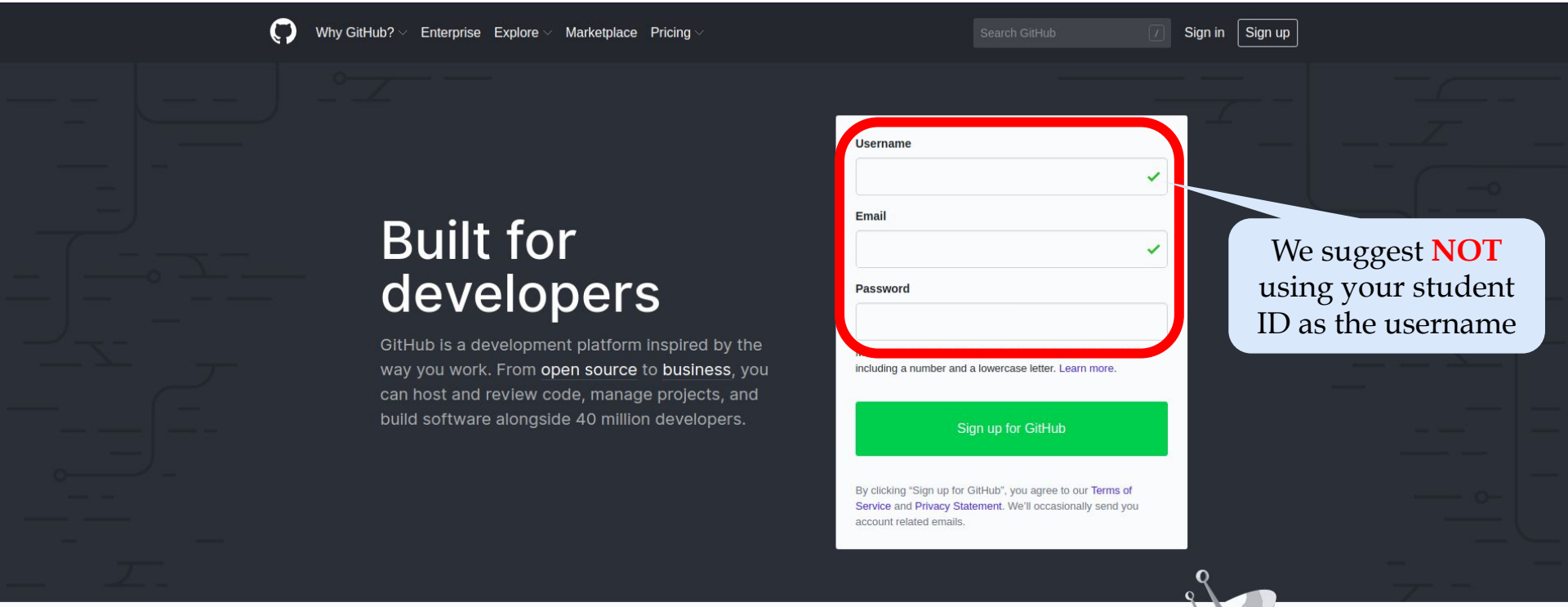


Install git on Linux

$ sudo apt install git

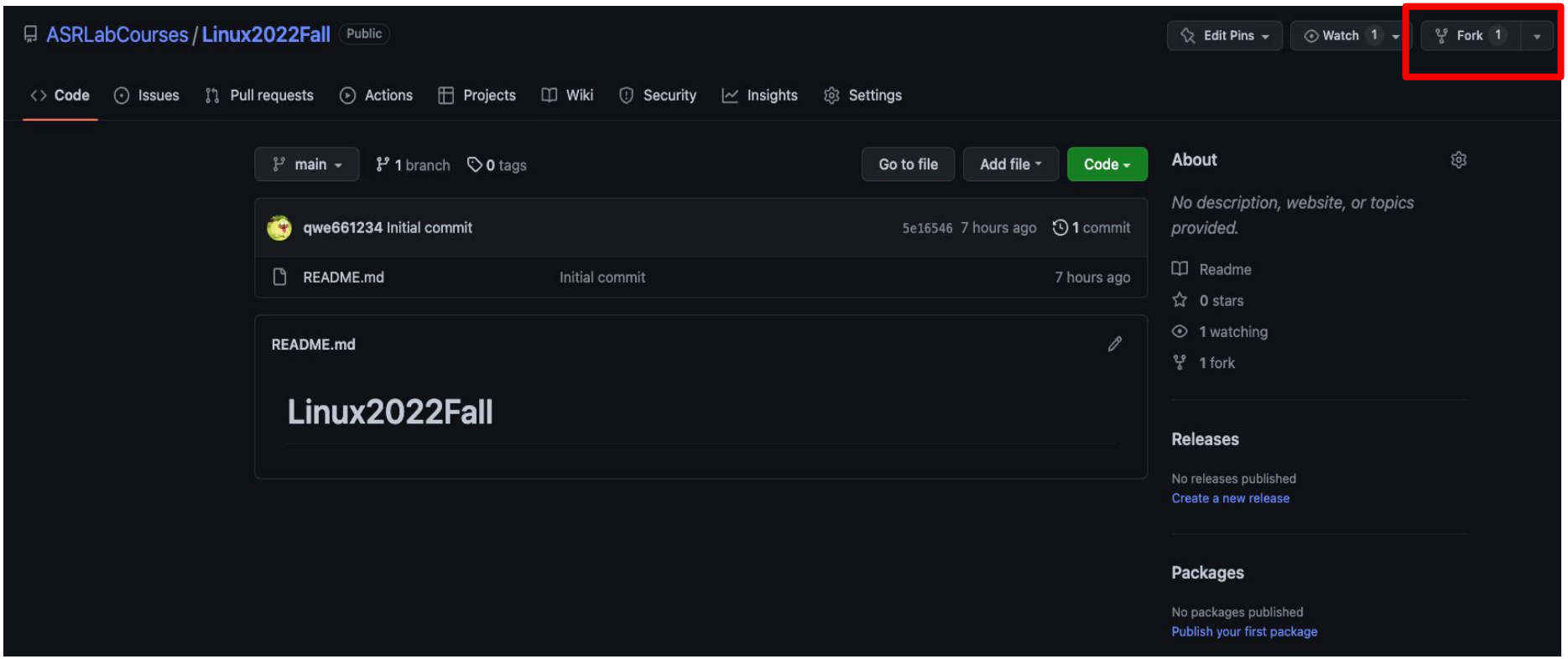


Register an account on GitHub (https://github.com/)





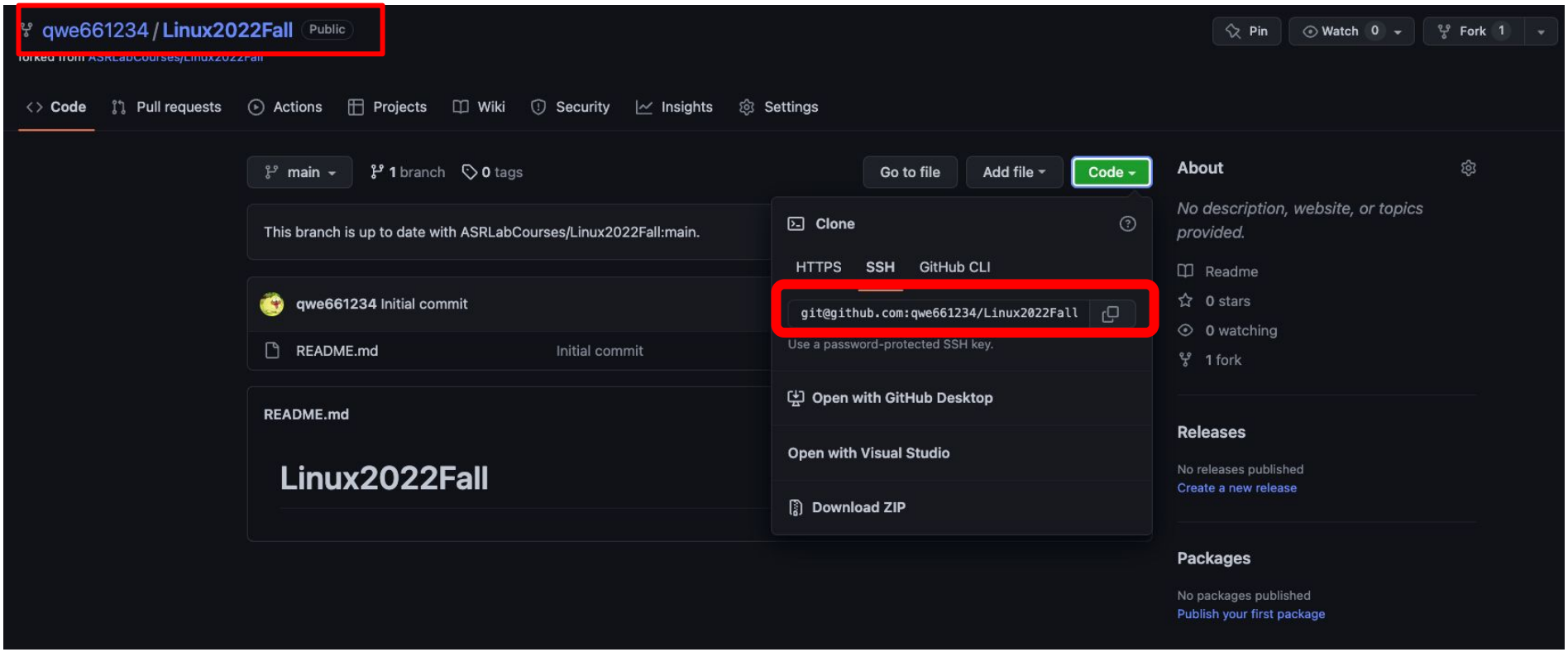
Fork a repository from "https://github.com/ASRLabCourses/Linux2022Fall"





Copy the URL of forked repo

fork 後的 repo 會是 username / Linux2022Fall



注意！是要複製剛剛 fork 的 repo.，而非 https://github.com/ASRLabCourses/Linux2022Fall.git



Clone forked repo to the local

$ git clone https://github.com/<Your username>/Linux2022Fall.git

$ cd Linux2022Fall/



Configure personal information

```
$ git config --global user.name "your_github_username"
$ git config --global user.email "your_github_email"
$ git config -l
```

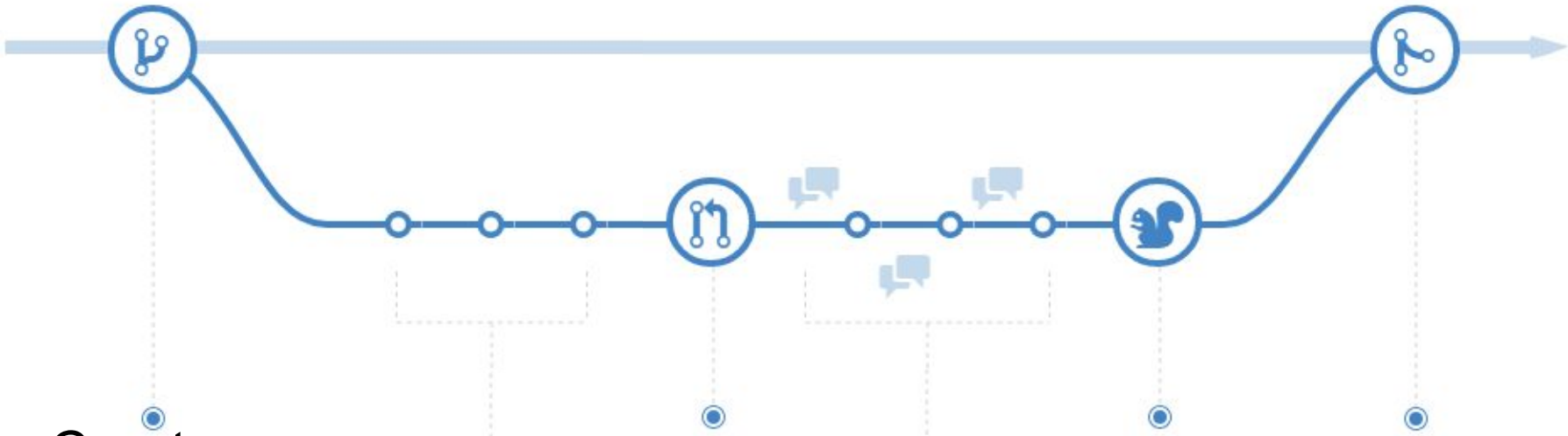
git config -l command 預期輸出

user.email=your_github_email

user.name=your_github_username



GitHub Flow



Create a branch

Add commits

Open a Pull Request

Discuss and code review

Deploy or testing

Merge to master
(Usually by the maintainer)

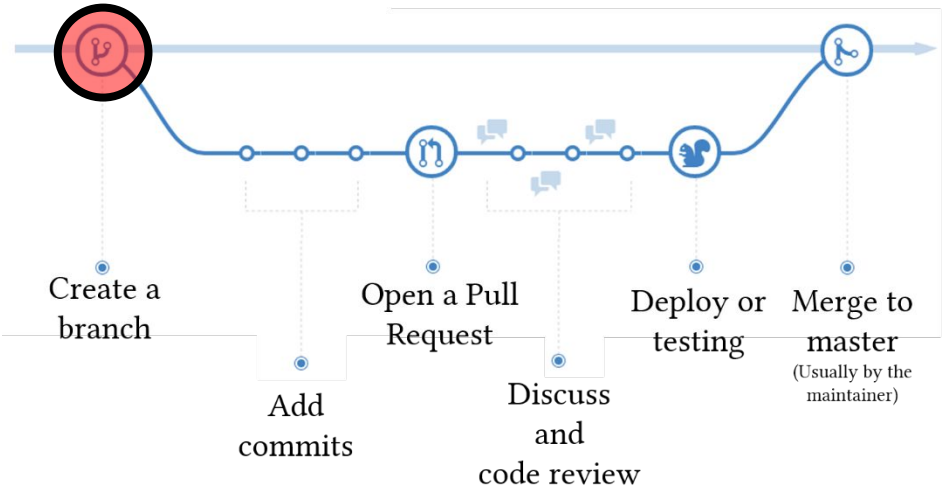
https://guides.github.com/introduction/flow/



Create a new branch

$ git checkout -b lab-2-git

可用 $ git branch 檢查有沒有成功創建新的 branch





Create a new file with content

```
$ mkdir -p f12345678/lab_2_git
$ cd f12345678/lab_2_git
$ echo "first text" > first.txt
```

Change f12345678 to your student ID

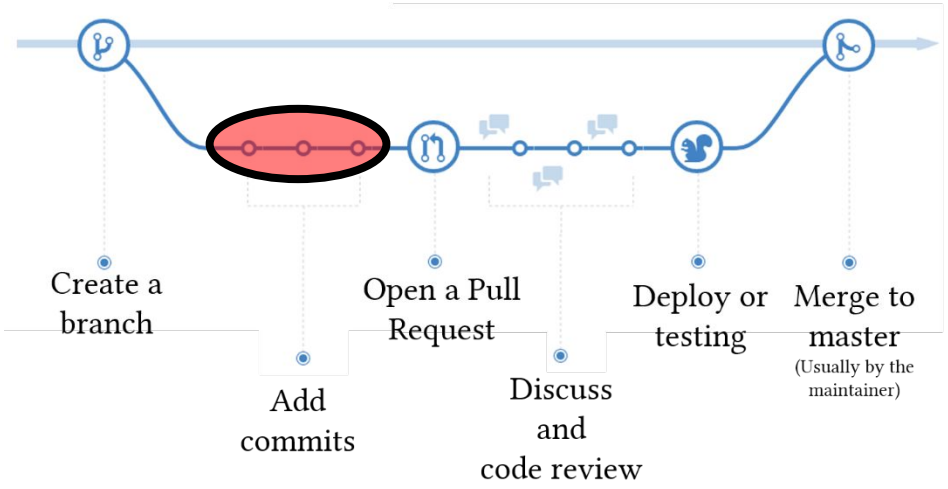


Track the modification

```
$ git add first.txt
$ git status
$ git commit -m "Add F12345678"
```

Check new file tracked

Set the **name** and **email** of the user first by git config before commit command.





Authentication

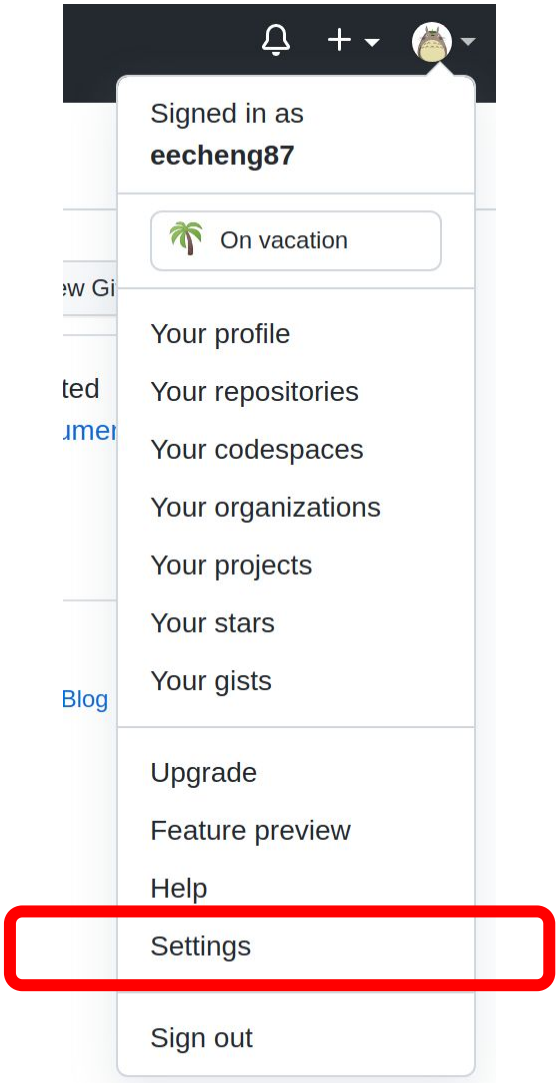
1. Personal Access Token
2. SSH Key
   - Generate ssh key
   - Add ssh key to Github

Personal access token

Settings -> Developer Settings

-> Personal Access Token

-> Generate new token





Personal access token (cont.)

New personal access token

Personal access tokens function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to authenticate to the API over Basic Authentication.

Note

What's this token for?

Expiration *

30 days — The token will expire on Mon, Oct 25 2021

Select scopes

Scopes define the access for personal tokens. Read more about OAuth scopes.

repo	Full control of private repositories
repo:status	Access commit status
repo_deployment	Access deployment status
public_repo	Access public repositories
repo:invite	Access repository invitations
security_events	Read and write security events
workflow	Update GitHub Action workflows
write:packages	Upload packages to GitHub Package Registry
read:packages	Download packages from GitHub Package Registry



Personal access token (cont.)

☐	read:user	Read ALL user profile data
☐	user:email	Access user email addresses (read-only)
☐	user:follow	Follow and unfollow users
☐	**delete_repo**	Delete repositories
☐	**write:discussion**	Read and write team discussions
☐	read:discussion	Read team discussions
☐	**admin:enterprise**	Full control of enterprises
☐	manage_billing:enterprise	Read and write enterprise billing data
☐	read:enterprise	Read enterprise profile data
☐	**admin:gpg_key**	Full control of public user GPG keys (Developer Preview)
☐	write:gpg_key	Write public user GPG keys
☐	read:gpg_key	Read public user GPG keys

Generate token Cancel

接著畫面會跳轉，會出現類似一串

`ghp_sFhFsSHhTzMDreGRLjmks4Tzuzgthdvfsrta`

的 token, 記得保存好，因為它只會出現一次



Push the branch to GitHub (Personal Access Token)

$ git push origin lab-2-git

remote

branch

分別輸入你的帳號和剛剛得到的 token

```
[qwe661234@qwe661234-linux-2022:~/Linux2022Fall/f12345678/lab_2_git$ git push origin lab-2-git
[Username for 'https://github.com': qwe661234
[Password for 'https://qwe661234@github.com':
Enumerating objects: 6, done.
Counting objects: 100% (6/6), done.
Delta compression using up to 64 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (5/5), 380 bytes | 380.00 KiB/s, done.
Total 5 (delta 0), reused 0 (delta 0)
remote:
remote: Create a pull request for 'lab-2-git' on GitHub by visiting:
remote:      https://github.com/qwe661234/Linux2022Fall/pull/new/lab-2-git
remote:
To https://github.com/qwe661234/Linux2022Fall.git
 * [new branch]      lab-2-git -> lab-2-git
```



SSH Key - Generate ssh key

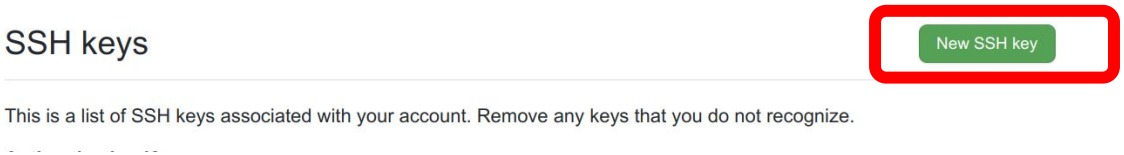
$ ssh-keygen
$ cat ~/.ssh/id_rsa.pub
預期會得到 ssh-rsa XXXXXXX (一串token)，接著請複製這串 token（ ssh-rsa XXXXXXX)

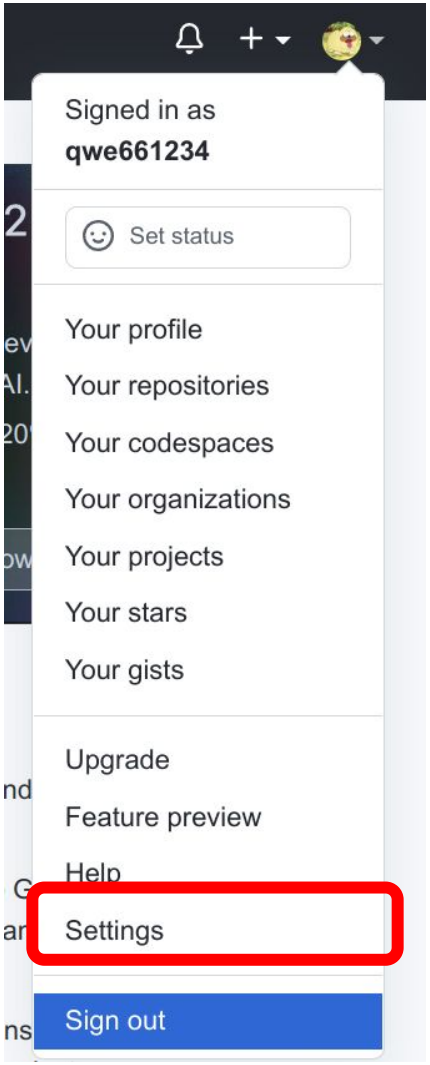


SSH Key - Add ssh key to Github

Settings -> SSH and GPG keys

-> New SSH key







SSH Key - Add ssh key to Github

SSH keys / Add new

自定義 ssh key 的 title

Title

Key type

Authentication Key

貼上剛剛複製的那串 ssh token

Key

Begins with 'ssh-rsa', 'ecdsa-sha2-nistp256', 'ecdsa-sha2-nistp384', 'ecdsa-sha2-nistp521', 'ssh-ed25519', 'sk-ecdsa-sha2-nistp256@openssh.com', or 'sk-ssh-ed25519@openssh.com'

Add SSH key

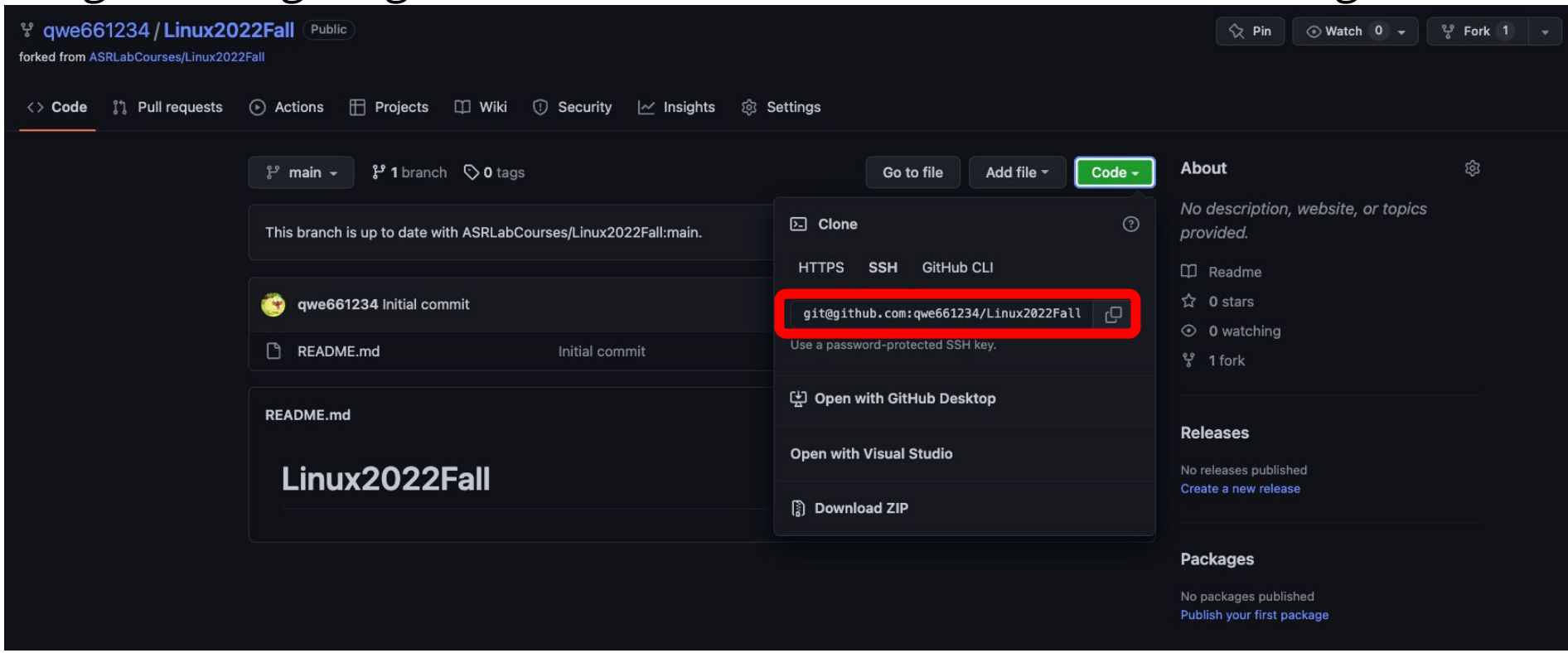
新增成功後 SSH keys 會新增剛剛輸入的 Title 的 Authentication Keys



SSH Key - clone repo.

如果選擇使用 ssh key，clone repo. 要選擇 ssh 而非 http

$ git clone git@github.com:<Your username>/Linux2022Fall.git





Push the branch to GitHub (SSH Key)

$ git push origin lab-2-git

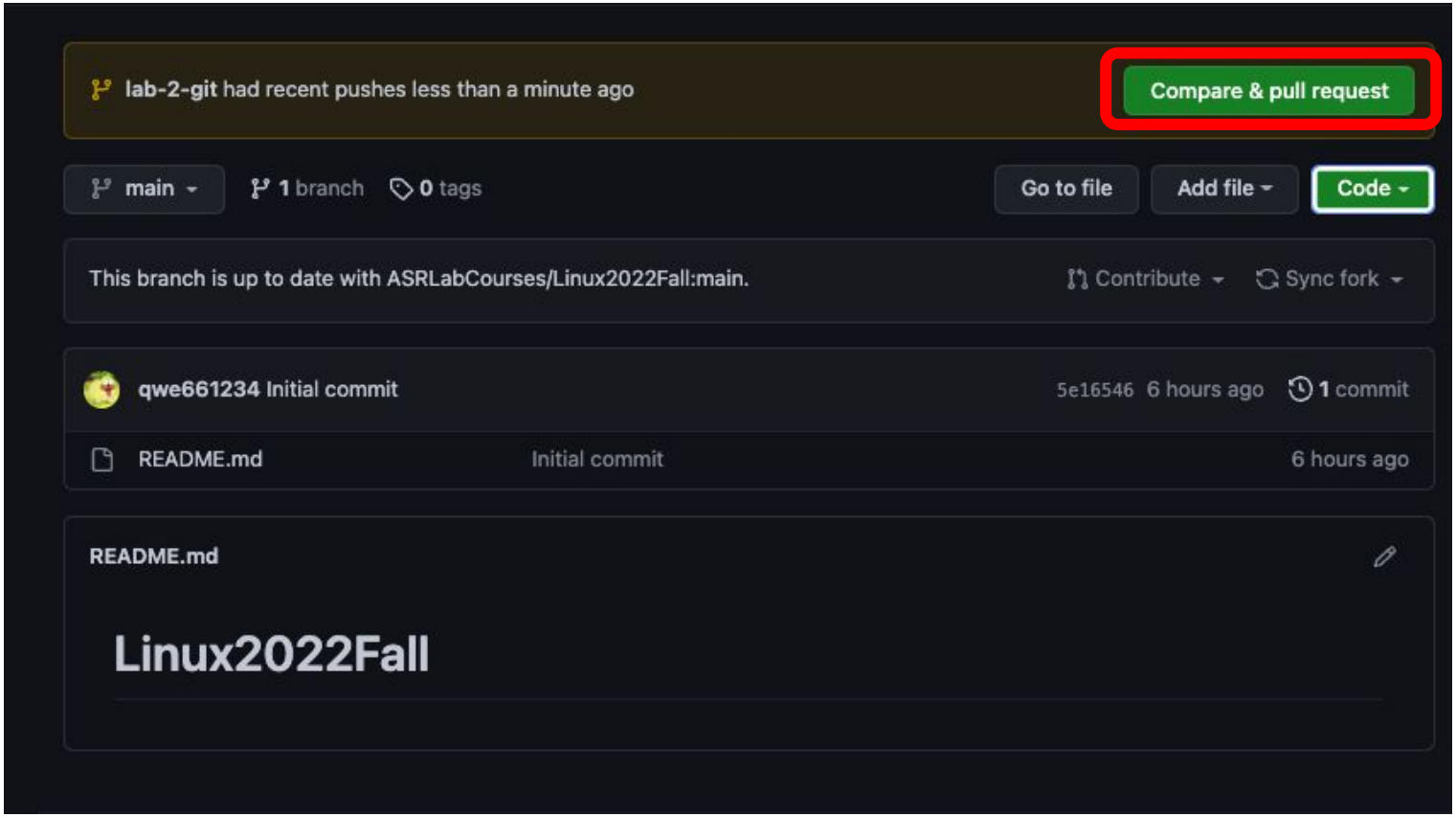
remote branch

```
[qwe661234@qwe661234-linux-2022:~/Linux2022Fall/f12345678$ git push origin lab-2-git

Enumerating objects: 5, done.
[Counting objects: 100% (5/5), done.
Delta compression using up to 64 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (4/4), 333 bytes | 333.00 KiB/s, done.
Total 4 (delta 0), reused 0 (delta 0)
remote:
remote: Create a pull request for 'lab-2-git' on GitHub by visiting:
remote:      https://github.com/qwe661234/Linux2022Fall/pull/new/lab-2-git
remote:
To github.com:qwe661234/Linux2022Fall.git
 * [new branch]      lab-2-git -> lab-2-git
```

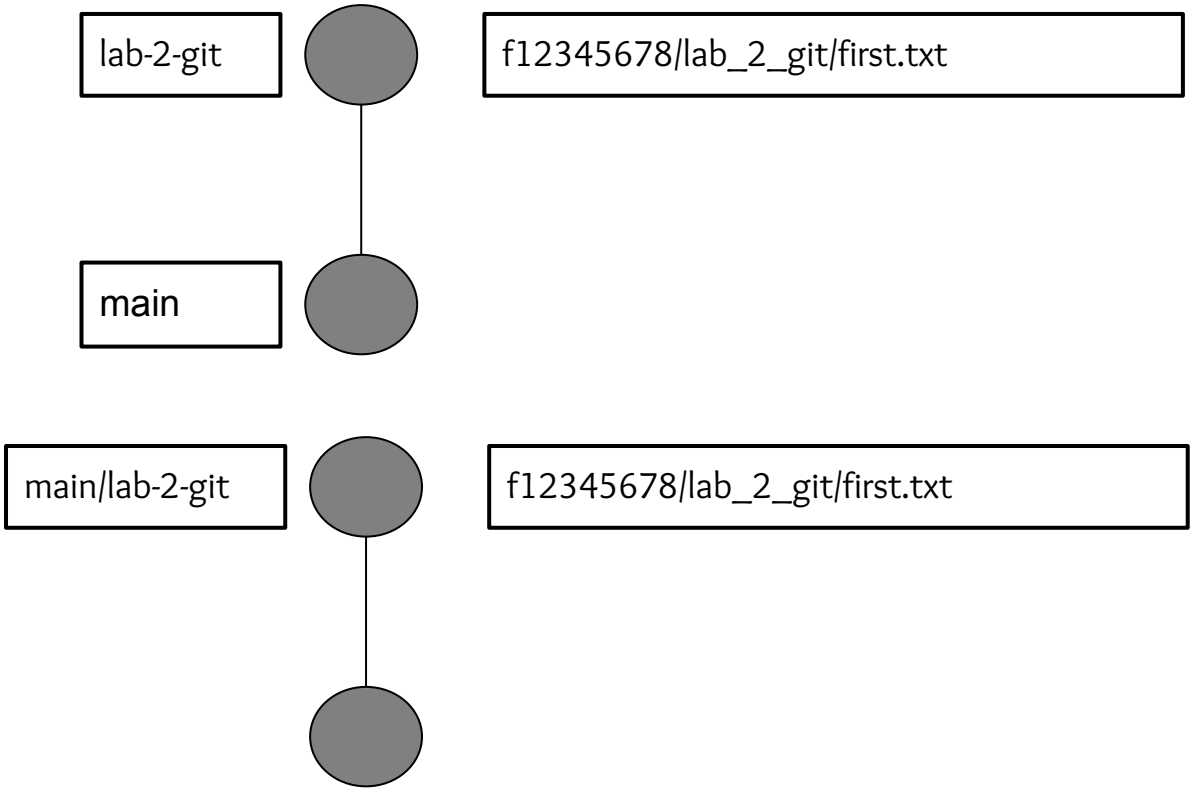


Create pull-request on the web UI (optional)





Merge your branch in local and push to remote





Merge your branch in local and push to remote

$ cd ../..
$ git checkout main
$ git branch

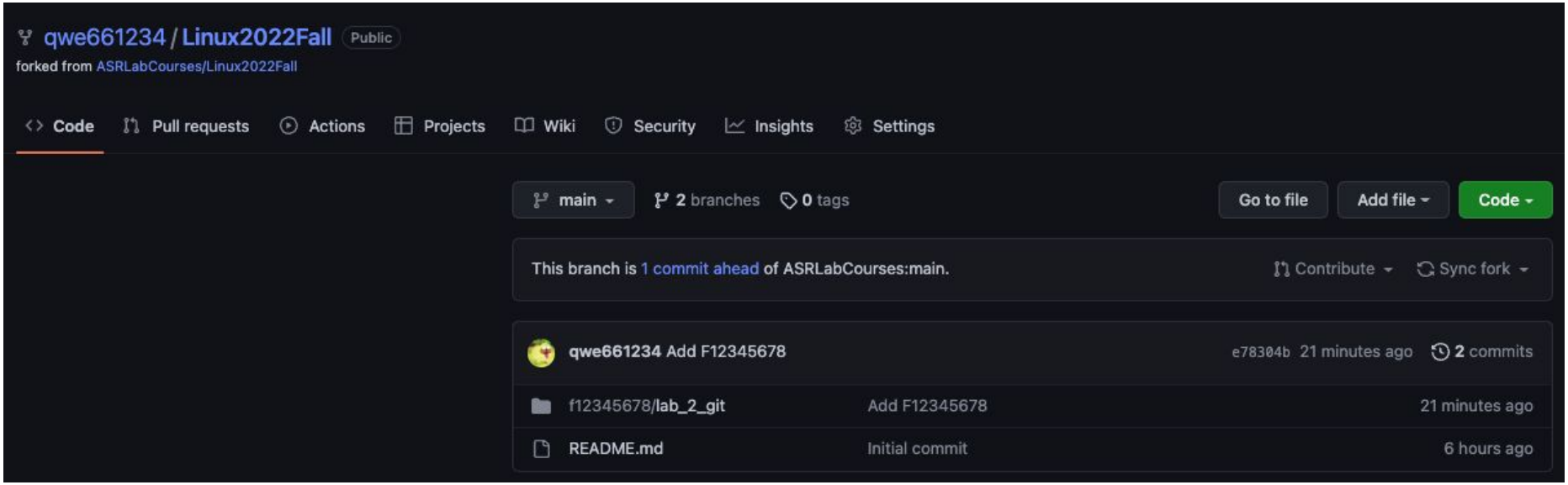
```
  lab-2-git
* main
```

$ git merge lab-2-git
$ git push



Open

https://github.com/<Your username>/Linux2022Fall/tree/main/<Your student ID>/lab_2_git





Demo

```
qwe661234@qwe661234-linux-2022:~/Linux2022Fall$ git merge lab-2-git
Updating 5e16546..e78304b
Fast-forward
 f12345678/lab_2_git/first.txt | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 f12345678/lab_2_git/first.txt
```

截圖檢查項目共四項

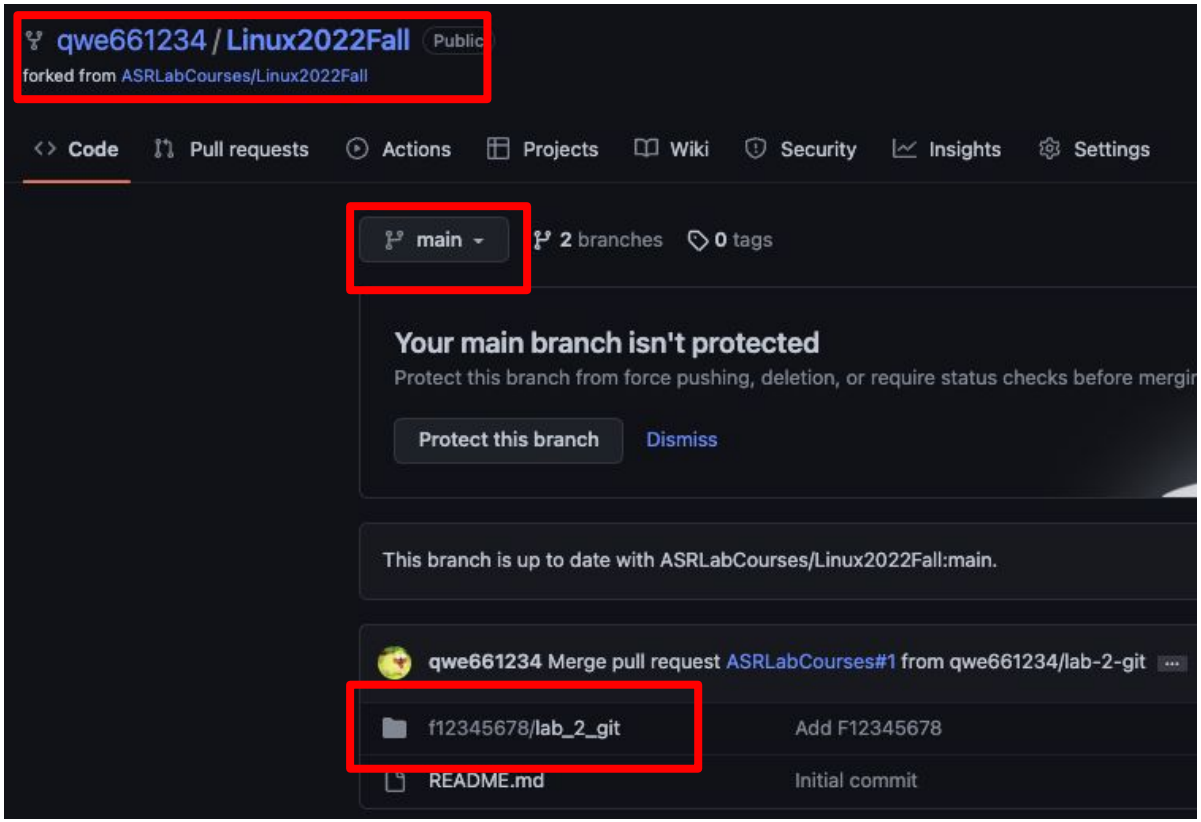
1. git merge
2. git log - - graph
3. 為 fork 的 repo.
4. 為 main 分支且 repo. 內有檔案

```
qwe661234@qwe661234-linux-2022:~/Linux2022Fall$ git log --graph
* commit e78304ba2a55837f7531e9144070e9a77816f210 (HEAD -> main, origin/main, origin/lab-2-git, origin/HEAD, lab-2-git)
| Author: qwe661234 <qwe661234@gmail.com>
| Date:   Mon Sep 19 21:20:29 2022 +0800
|
|     Add F12345678
|
* commit 5e16546d91784e4b52e36d38839b7f3884dba46b
  Author: waysimdrop <48278026+qwe661234@users.noreply.github.com>
  Date:   Mon Sep 19 15:44:16 2022 +0800

      Initial commit
```



Demo



僅供參考

截圖檢查項目共四項

1. git merge
2. git log - - graph
3. 為 fork 的 repo.
4. 為 main 分支且 repo. 內有檔案

繳交方式：截圖上傳至 moodle，須包含以上四項檢查項目



Ref.

- Reusing a merged branch, good practice?
- Why Delete Old Git Branches?
- How can I save username and password in Git?

- SSH key tutorial: https://ithelp.ithome.com.tw/articles/10205988
- Step by step: https://aben20807.github.io/posts/20190421-github-flow-2/



QUESTIONS