# Git 與 Github

#### |Git

Git 是個版本控制系統(Version Control System, 簡稱 VCS) Git 是由 Linux 之父林納斯·托瓦茲(Linus Torvalds)開發 開發的目的就是用來管理 Linux 的程式碼

版本控制系統,顧名思義,就是能控制版本 每筆提交(commit)都會被紀錄下來,隨時可檢視和復原(revert) 也可以建立分支(branch),進行獨立修改 並在必要時將分支合併(merge)

#### Git

#### Git 的第一版 README(讀我) 中寫道:



GIT - the stupid content tracker

"git" can mean anything, depending on your mood.

random three-letter combination that is pronounceable,
 and not actually used by any common UNIX command.
 The fact that it is a mispronounciation of "get" may or may not be relevant.
 stupid. contemptible and despicable. simple. Take your pick from the dictionary of slang.

- "global information tracker": you're in a good mood, and it actually works for you.
  - Angels sing, and a light suddenly fills the room.
  - "goddamn idiotic truckload of sh\*t": when it breaks

This is a stupid (but extremely fast) directory content manager.

It doesn't do a whole lot, but what it \_does\_ do is track directory contents efficiently.

- Linus Torvalds

#### Github

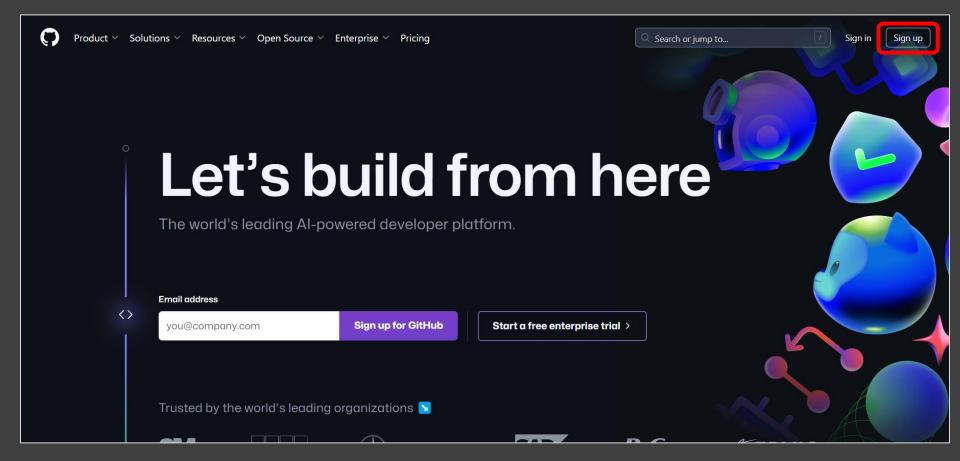
使用 Git 時,需要有地方可以存放檔案 而當今最常見的就是 Github,網站為 https://github.com Github 除了提供數據庫(repository,簡稱 repo)供檔案存取 還提供了問題(issue)、動作(action)、維基(wiki) 分叉(fork)、拉取請求(pull request,簡稱 PR)等服務 使用 Github 相比直接使用 Git 更著重在一個網路上的第三者參與或貢獻(contribute)該數據庫 而數據庫擁有者(owner)則可以很方便的管理他人貢獻

# Github 帳號註冊

Github 帳號註冊非常簡單

只要在 <u>https://github.com</u> 首頁右上方選擇 "Sign up"

接著依照指示即可完成註冊

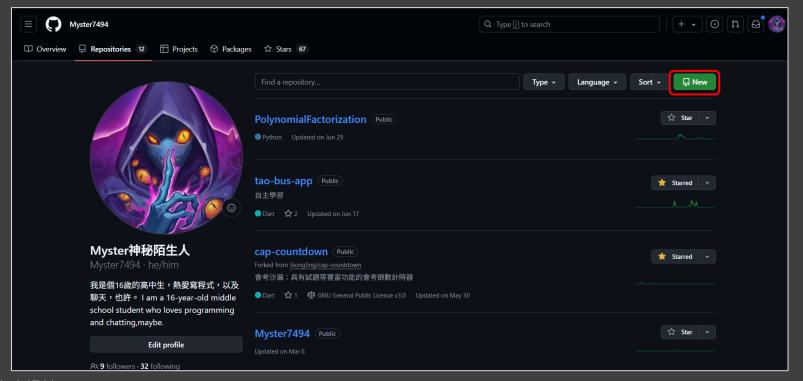


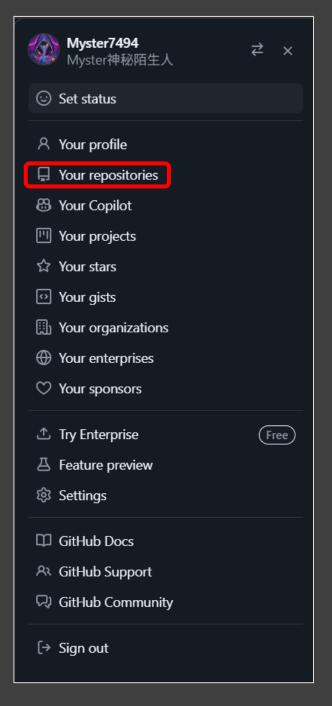
# 數據庫

點選右上方頭像即會出現右方導覽欄從右方導覽欄點選 "Your repositories"

即會顯示自己的所有數據庫

點擊右上方 "New" 即可開始創建新數據庫





# 創建數據庫

按照說明填寫即可星號(\*)表示必填

這些欄位或選項 在創建數據庫後也可以更改 唯獨數據庫名稱須謹慎填寫 創建後再更改數據庫名稱 可能會造成一些問題



### 創建數據庫

同樣按照說明填寫即可

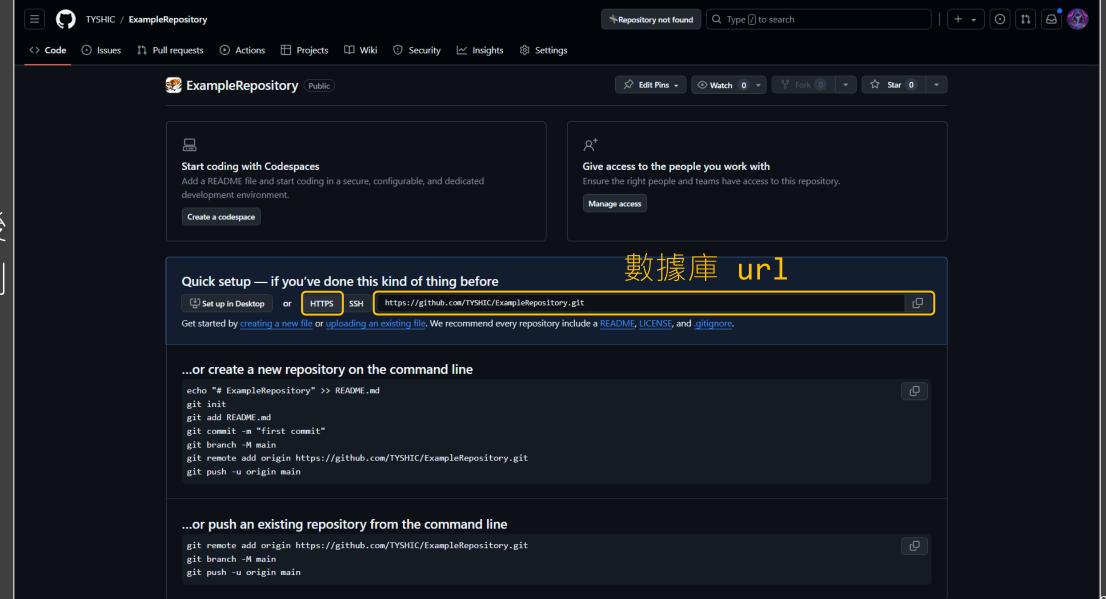
內容填寫完成後 點擊右下角

"Create repository"

即完成創建數據庫



# 創建數據庫



創建好後 會跳轉到 該頁面

#### Git

有了數據庫之後,我們便可以開始上傳檔案 但要使用 **Git** 上傳檔案之前 電腦需要先與

在 **Github** 上的遠端數據庫(remote repo)建立連線使用 **Git** 指令建立連線最簡單的方式就是:

- 1. 複製(clone)遠端數據庫到本地(local)
- 2. 進入複製下來的本地數據庫(local repo)
- 3. 直接連線遠端數據庫

# 複製遠端數據庫

欲使用 Git 複製遠端數據庫,須使用該 Git 指令:

#### git clone 數據庫url

bash



使用該指令後會在

工作目錄(working directory)

出現一個新資料夾(folder)

名稱與數據庫相同

即為本地數據庫



### 進入本地數據庫

欲進入本地數據庫,須在本地數據庫內開啟新的 bash 或在剛剛的 bash 中使用該 Windows / Unix 指令該指令會切換當前 bash 的工作目錄至指定資料夾

#### cd 資料夾名稱

bash

#### 

PS C:\Users\jacky\Desktop\tyic\repositories> git clone https://github.com/TYSHIC/ExampleRepository.git Cloning into 'ExampleRepository'...

warning: You appear to have cloned an empty repository.

PS C:\Users\jacky\Desktop\tyic\repositories> cd .\ExampleRepository\

PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository>

### 連線遠端數據庫

在複製的本地數據庫中

輸入下方 Git 指令即可直接連線遠端數據庫:

git remote bash

PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git remote origin

PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository>

#### Git 檔案狀態

Git 將檔案分為四種狀態:未追蹤(untrack)

未修改(unmodified)、未暫存(modified)、已暫存(staged)

可通過下方 Git 指令來查看當前的檔案狀態:

git status bash

提交時只會提交已暫存的檔案,且已暫存檔案提交後會變回未修改 而欲將未追蹤或未暫存的檔案變為已暫存,須使用下方 **Git** 指令:

特定資料夾或檔案: git add 資料夾或檔案 bash

所有檔案: git add -A bash 所有已修改檔案: git add -u bash

#### Git 檔案狀態

```
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
On branch main
No commits yet
nothing to commit (create/copy files and use "git add" to track)
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> echo "# 範例倉庫" > README.md
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
On branch main
No commits yet
Untracked files:
  (use "git add <file>..." to include in what will be committed)
        README.md
nothing added to commit but untracked files present (use "git add" to track)
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git add .\README.md
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
On branch main
No commits yet
Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file: README.md
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository>
```

### 提交與推送

提交就是將本地數據庫的變更變為新版本

每個提交都有一個編號

使用下方 Git 指令進行提交:

git commit -m "提交訊息"

bash

提交只會儲存在本地數據庫,不會自動推送(push)到遠端數據庫要推送提交到遠端數據庫,須使用下方 Git 指令:

git push

bash

Git 小遊戲 🥏



### 提交與推送

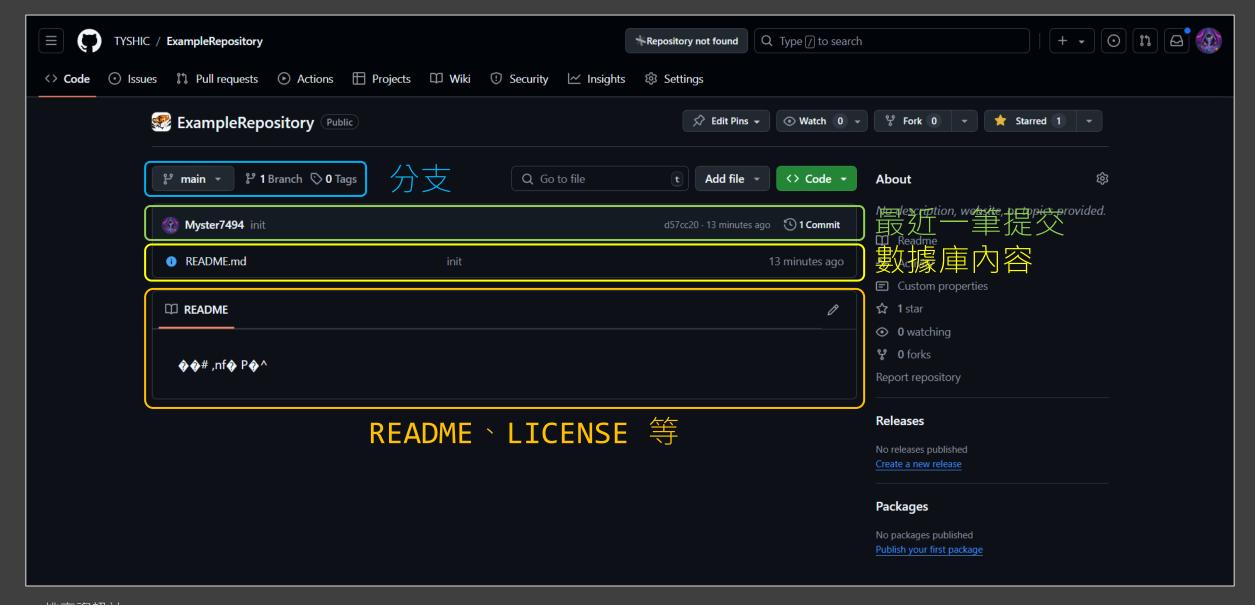
```
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git commit -m "init"
[main (root-commit) d57cc20] init
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 README.md
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git push
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Writing objects: 100% (3/3), 232 bytes | 232.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/TYSHIC/ExampleRepository.git
 * [new branch] main -> main
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
On branch main
Your branch is up to date with 'origin/main'.
nothing to commit, working tree clean
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository>
```

#### 提交訊息

提交訊息最好要寫清楚該提交到底做了什麼但也必須保持精簡常見的寫法是 "提交種類: 簡單說明"提交種類有:feat(feature,新功能)、fix(修復錯誤)docs(documentation,更新說明)、style(格式變更)refactor(重構)、chore(雜項)、revert(撤回提交)等但在首次提交,常常使用 "init" 或 "initial commit"

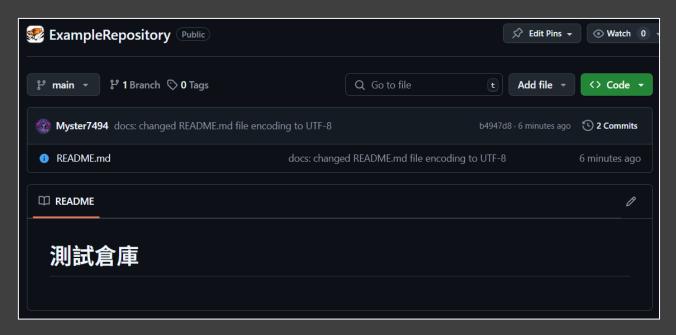
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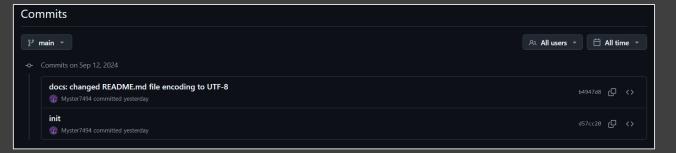
# 提交與推送



# 提交與推送

```
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
On branch main
Your branch is up to date with 'origin/main'.
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
no changes added to commit (use "git add" and/or "git commit -a")
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git add -u
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
On branch main
Your branch is up to date with 'origin/main'.
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git commit -m
"docs: changed README.md file encoding to U
TF-8"
[main b4947d8] docs: changed README.md file encoding to UTF-8
1 file changed, 0 insertions(+), 0 deletions(-)
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git push
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Writing objects: 100% (3/3), 296 bytes | 296.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/TYSHIC/ExampleRepository.git
  d57cc20..b4947d8 main -> main
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository>
```



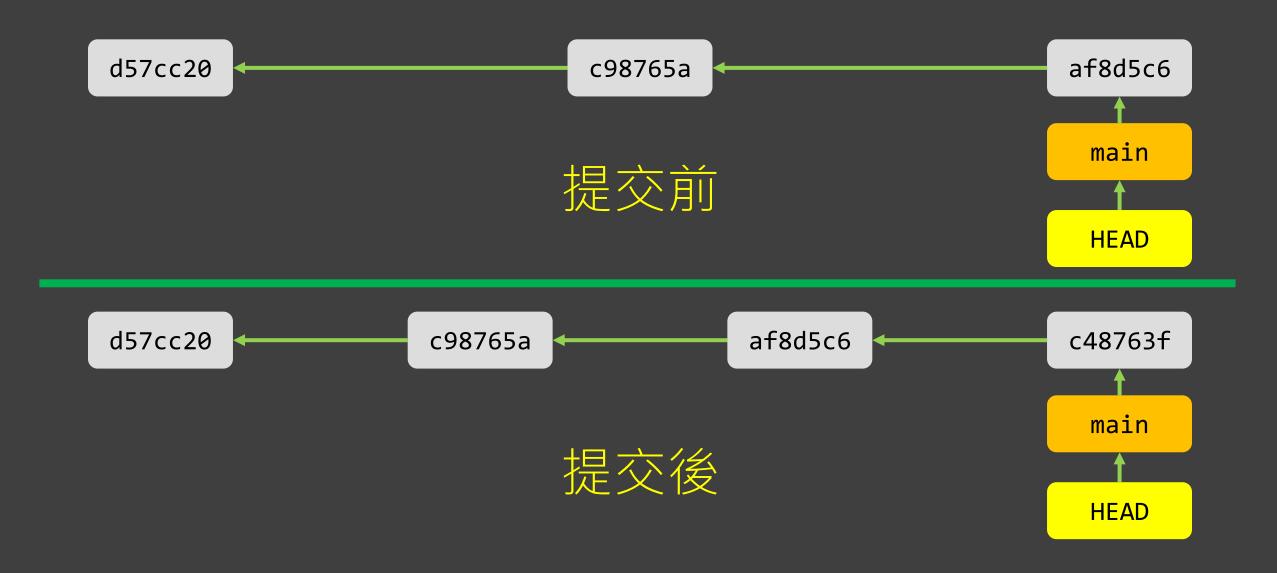


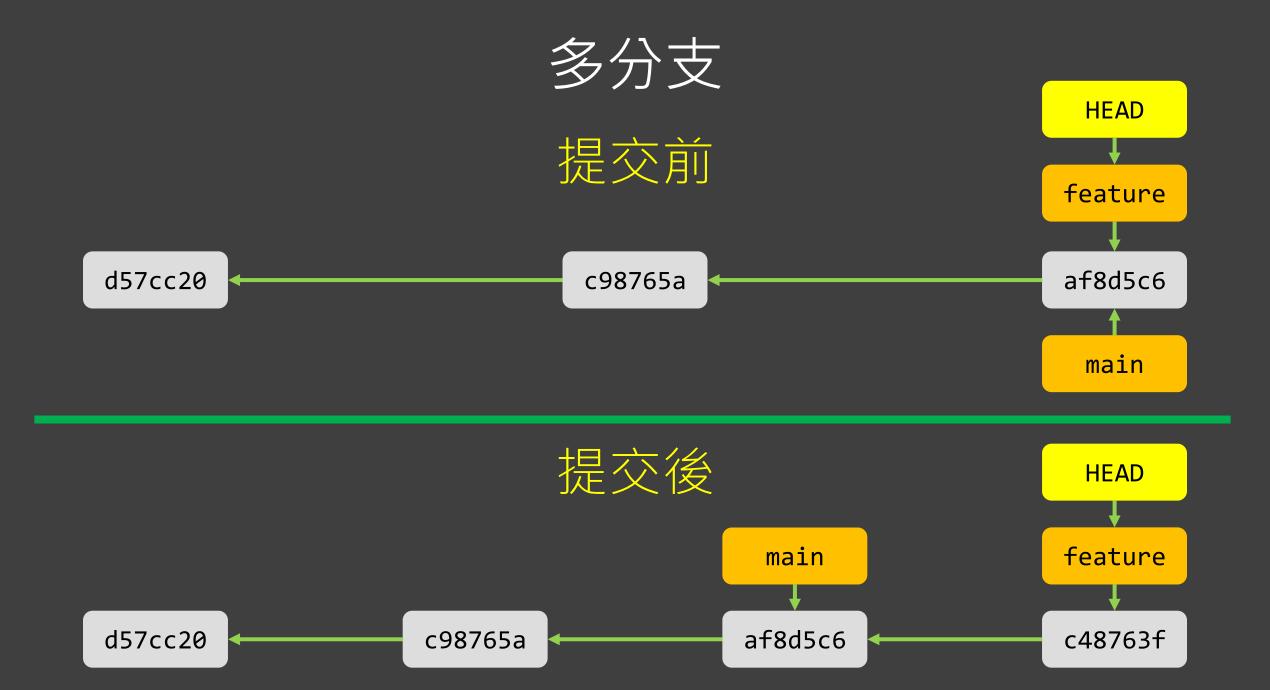
#### 分支

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分支是一個指標,指向某個提交(版本) 在某個分支上做的修改和提交不會影響到其他分支 每個數據庫至少要一個分支 通常名稱為 "main" 或 "master" 在分支出現新提交後,分支會指向新提交 "HEAD" 是一個指標,指向某個分支 指向的分支即成為當前分支 提交只會提交到當前分支上

# 單分支





### 新建與切換分支

欲新建分支,須使用下方 Git 指令:

git branch 新分支名稱

bash

該指令會新建一個分支,且指向當前分支指向的提交

HEAD 不會自動指向新分支,即新分支不會自動成為當前分支

欲使 HEAD 指向某個分支,即讓某個分支成為當前分支

也就是切換分支,須使用下方 Git 指令:

git checkout 目標分支名稱 bash 或 git switch 目標分支名稱 bash

切換分支之後,資料夾內的檔案都會被替換成該分支的檔案

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### 推送與刪除分支

在推送本地數據庫的未追蹤的分支或新分支到遠端數據庫時需在推送時加上 "-u" 引數:

git push -u origin 分支名稱

bash

這會使得本地數據庫的分支追蹤遠端數據庫的分支 若在遠端數據庫上沒有此分支,則會在遠端數據庫上創建該分支

若要刪除分支,須切換到其他分支,並使用下方 Git 指令:

git branch -d 分支名稱

bash

# 分支

```
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
Your branch is up to date with 'origin/main'.
nothing to commit, working tree clean
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> dir
   目錄: C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository
                    LastWriteTime
Mode
                                          Length Name
             2024/9/12 下午 11:32
                                              16 README.md
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git branch feature
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git switch feature
Switched to branch 'feature'
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> dir
   目錄: C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository
                    LastWriteTime
                                          Length Name
Mode
             2024/8/15 下午 02:05
                                             326 Main.java
             2024/9/12 下午 11:32
                                              16 README.md
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git add Main.java
PS C:\Users\jacky\Desktop\tvic\repositories\ExampleRepository> git commit -m "feat: add Main.java"
[feature 5c95fd8] feat: add Main.java
1 file changed, 11 insertions(+)
create mode 100644 Main.java
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git push -u origin feature
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 20 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 538 bytes | 134.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature' on GitHub by visiting:
            https://github.com/TYSHIC/ExampleRepository/pull/new/feature
remote:
remote:
To https://github.com/TYSHIC/ExampleRepository.git
* [new branch]
                    feature -> feature
branch 'feature' set up to track 'origin/feature'.
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository>
```

<b>? feature</b> had recent pu	ushes 5 minutes ago		Compare & pull request
🐉 feature 🔻 🐉 2 Br	ranches 🛇 <b>0</b> Tags	Q Go to file	t Add file ▼
This branch is 1 commit a	head of main .		↑↑ Contribute ▼
Myster7494 feat: add	d Main.java		5c95fd8 · 5 minutes ago 3 Commits
■ Main.java	feat: add N	∕lain.java	5 minutes ago
README.md	docs: chan	ged README.md file encoding	to UTF-8 yesterday
PS C:\Users\jac Switched to bra Your branch is	ky\Desktop\tyic\reposit	ories\ExampleRepo /main'.	sitory> git switch mair
PS C:\Users\jac Switched to bra Your branch is PS C:\Users\jac	ky∖Desktop\tyic\reposit nch 'main' up to date with 'origin	ories\ExampleRepo /main'. ories\ExampleRepo	sitory> git switch mair sitory> dir

16 README.md

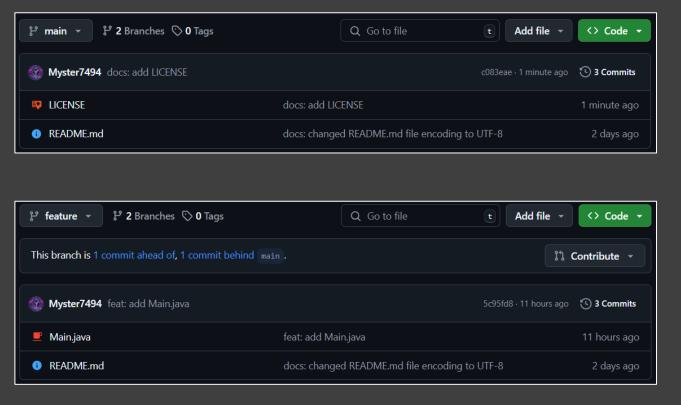
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2024/9/12 下午 11:32

PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository>

# 分支

```
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
On branch main
Your branch is up to date with 'origin/main'.
nothing to commit, working tree clean
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> dir
   目錄: C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository
                    LastWriteTime
Mode
                                           Length Name
             2024/9/12 下午 11:32
                                               16 README.md
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git add -A
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
On branch main
Your branch is up to date with 'origin/main'.
Changes to be committed:
 (use "git restore ---staged <file>..." to unstage)
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> qit commit -m "docs: add LICENSE"
[main c083eae] docs: add LICENSE
1 file changed, 32 insertions(+) create mode 100644 LICENSE
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git push
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 20 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 1.15 KiB | 1.15 MiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/TYSHIC/ExampleRepository.git
  b4947d8..c083eae main -> main
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository>
```



### 合併

bash

若想將兩個分支合在一起,可以考慮合併(merge) 使用下方 **Git** 指令進行合併:

```
git merge 合併分支名稱 -m "提交訊息"
這會將合併分支的修改添加到當前分支,並自動提交
若當前分支為合併分支的親代提交
則只會將當前分支指向合併分支,而不會進行產生新提交
但若合併的兩個分支對同一處都進行了修改
就會發生合併衝突(merge conflict),合併中止
需要手動修改有衝突的地方並手動提交,才能順利完成合併
```

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#### 合併衝突解決

在發生衝突時,打開發生衝突的檔案,會發現下方區段:

當前分支的衝突內容

======

合併分支的衝突內容

>>>>>> 合併分支:衝突檔案

text

將這整段文字刪除,並改為想要的內容

編輯完成後,再使用下方 Git 指令標記解決:

git add 衝突檔案

bash

解決衝突後再手動提交即可完成合併

# 合併

#### 合併 feature 到 main





### 合併

```
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git status
On branch main
Your branch is up to date with 'origin/main'.
nothing to commit, working tree clean
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git merge feature -m "Merge branch 'feature' into main"
Merge made by the 'ort' strategy.
Main.java | 11 +++++++++
1 file changed, 11 insertions(+)
create mode 100644 Main.java
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository> git push
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 20 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (2/2), 343 bytes | 343.00 KiB/s, done.
Total 2 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/TYSHIC/ExampleRepository.git
   c083eae..7f70e34 main -> main
PS C:\Users\jacky\Desktop\tyic\repositories\ExampleRepository>
```

### 拉取

如果當前分支在遠端數據庫有了新提交本地數據庫就必須拉取(pull)當前分支的新提交使用下方 **Git** 指令來拉取新提交:

git pull bash

在當前分支未拉取前

無法將本地數據庫變更提交到遠端數據庫

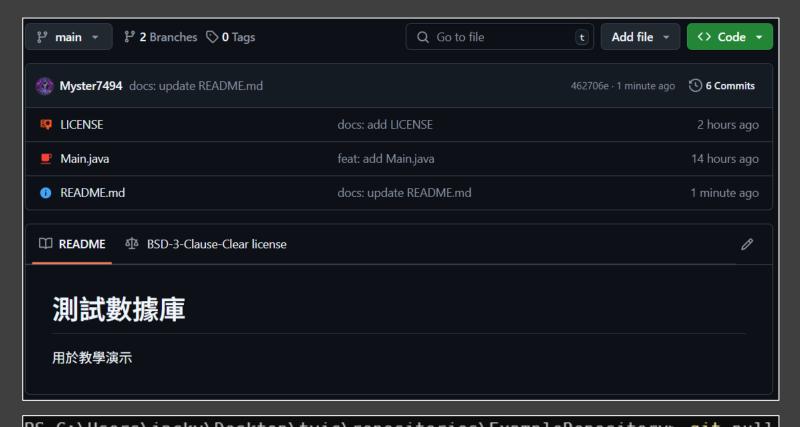
若本地數據庫已有新提交才進行拉取

則會將本地數據庫新提交的親代提交變為遠端數據庫的新提交

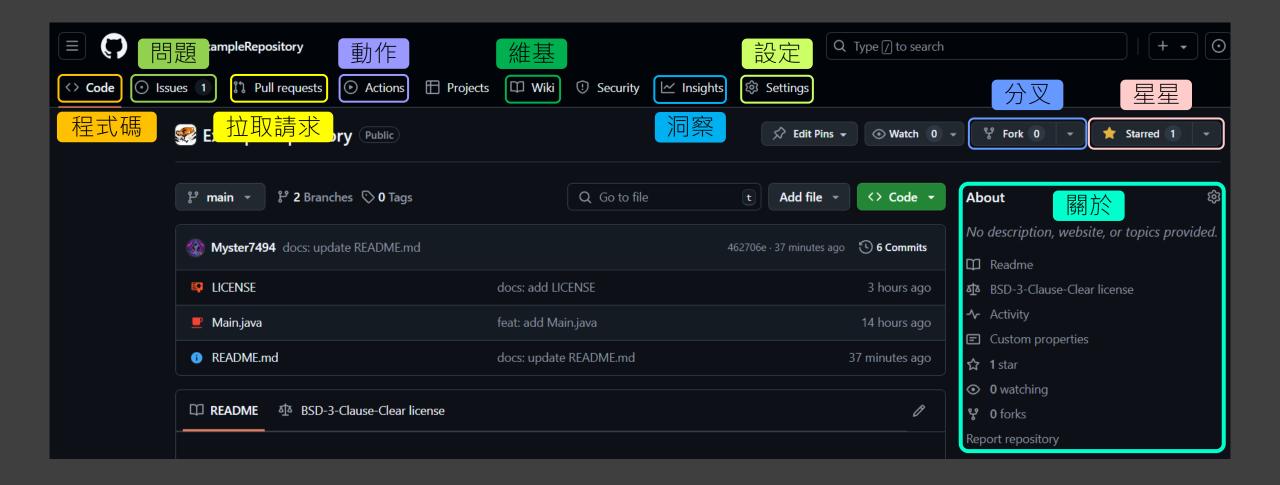
並且可能會出現合併衝突

#### 拉取

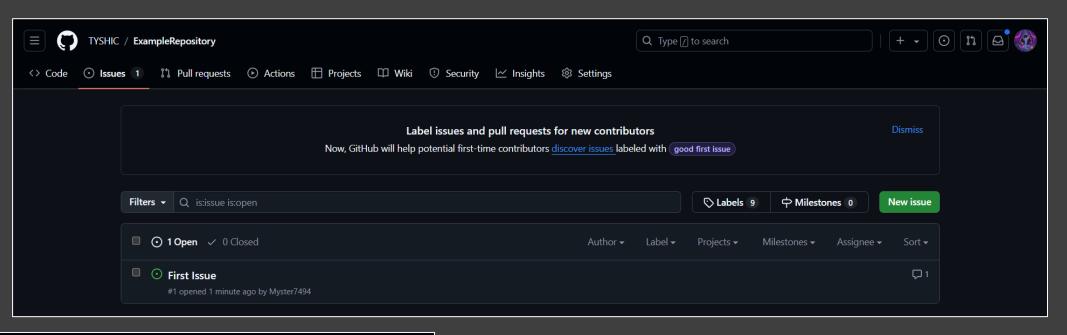
遠端數據庫 更改 README.md 本地數據庫 拉取該提交

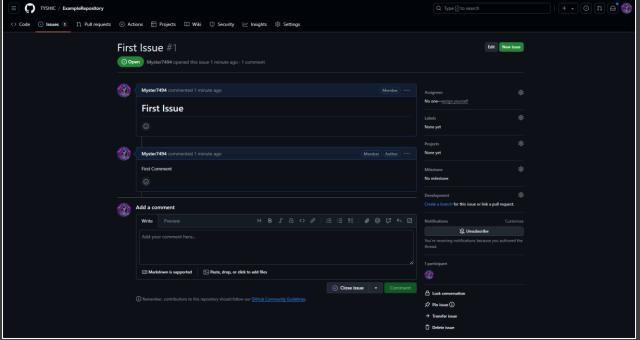


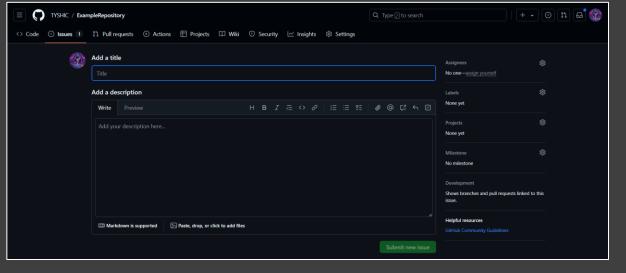
#### Github 功能



# 問題







# 分叉



分叉(fork)就是

把別人的數據庫

複製一份變成自己的

點擊右上角

"Fork" 按鈕

即可分叉該數據庫



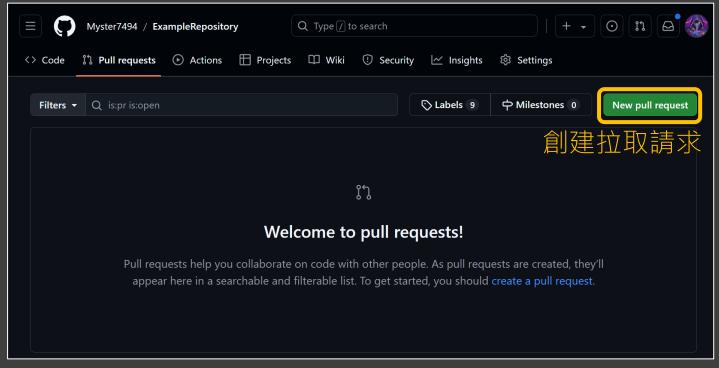
# 拉取請求

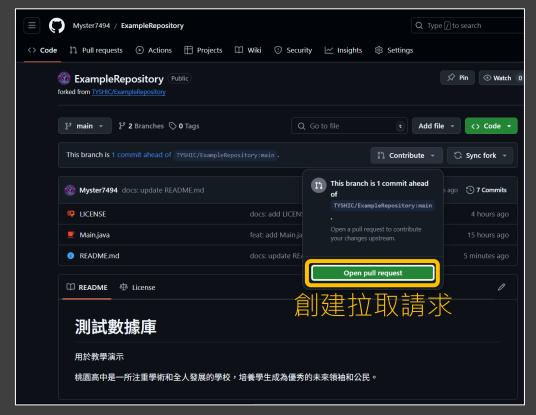
拉取請求(pull request,簡稱 PR)與拉取沒什麼大關係

實際上就是請求(request)數據庫擁有者合併某個分支

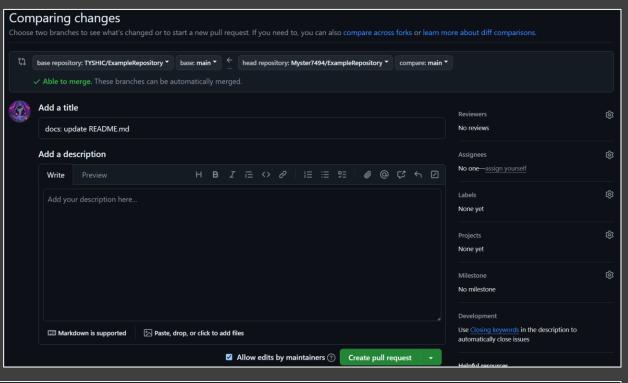
包括該數據庫的分支或是分叉數據庫的分支

可在拉取請求頁面或分支創建拉取請求





# 創建拉取請求





# 同意拉取請求

#### 創建拉取請求後

數據庫擁有者便可在拉取請求頁面

看到該拉取請求

並可選擇合併拉取請求或其他動作

