

LAB 1

Nhóm 09

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B.1 Quản lý phiên bản phần mềm với Git

YÊU CẦU 1

Minh chứng cho thấy Git đã tìm thấy 1 tập tin mới nhưng chưa giám sát?

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git status
On branch master

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)
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

Minh chứng cho thấy Git thấy file mới README.MD trên stage?

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git add README.MD
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git status
On branch master

No commits yet

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

ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

Minh chứng cho thấy Git đã thấy các thay đổi mới chưa được commit?

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git status
On branch master
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)
    modified:   README.MD

no changes added to commit (use "git add" and/or "git commit -a")
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

Git đưa ra các output như thế nào để hiển thị các thay đổi trong tập tin vừa commit

```
no changes added to commit (use "git add" and/or "git commit -a")
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git add README.MD
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git commit -m "Nhom9 Added additional line to file"
[master 77abd99] Nhom9 Added additional line to file
 1 file changed, 2 insertions(+), 1 deletion(-)
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

Cho biết thông tin về commit vừa thực hiện: Commit ID, thời gian commit, thông điệp commit?

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git log
commit 7f224b3b98c7e912c752ae34cfcc2e1ee1296b9c7 (HEAD -> master)
Author: anhkiet1227 <anhkiet1227@gmail.com>
Date:   Tue Sep 20 08:36:18 2022 +0700

    Committing README.MD from Nhom9 to begin tracking changes

commit 77abd9956409c917a8cac565bc46af5c4a53e7df
Author: anhkiet1227 <anhkiet1227@gmail.com>
Date:   Tue Sep 20 08:32:06 2022 +0700

    Nhom9 Added additional line to file

commit 99464de58da498b784d87e376504e88a2ad320a3
Author: Nhom 09 <20520648@gm.uit.edu.vn>
Date:   Tue Sep 20 08:23:57 2022 +0700

    Committing README.MD from NhomX to begin tracking
    changes
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

- Commit ID: 7f224b3
- Thời gian commit: Tue Sep 20 08:36:18 2022
- Thông điệp commit: Committing README.MD from Nhom9 to begin tracking changes

Sinh viên thử so sánh 2 commit đã tạo, giải thích ngắn gọn ý nghĩa các ký hiệu trong output?

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git diff 7f224b3 77abd99
diff --git a/README.MD b/README.MD
index 2257195..dff89d 100644
--- a/README.MD
+++ b/README.MD
@@ -1,4 +1,4 @@
-Nhom 9
+Nhom 09
Nguyen Binh Thuc Tram 20520815
Nguyen Bui Kim Ngan 20520648
Vo Anh Kiet 20520605
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

- Có 2 version của cùng 1 file README.MD: a kí hiệu phiên bản đầu (cũ), b kí hiệu cho phiên bản hai (mới)
- index ... : so sánh 2 hàm băm đầu tiên liên quan đến 2 file. 100644 là mã định danh file nội bộ
- - đại diện phiên bản a và + đại diện phiên bản b
- -Nhom 9 +Nhom09: show sự khác biệt trong 2 bản
- -1,4 cho biết file a giải nén 4 dòng từ dòng 1, +1,4 cho biết file b giải nén 4 dòng từ dòng 1

Dấu hiệu nào cho thấy đã chuyển sang nhánh mới là feature? => Có dấu sao ở trước branch mình đang ở

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git branch feature
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git branch
  feature
* master
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git checkout feature
Switched to branch 'feature'
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git branch
* feature
  master
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

Sinh viên thực hiện và báo cáo các bước:

- Thêm một đoạn text mới dạng “... from branch feature” vào tập tin README.MD.
- Stage tập tin vừa thay đổi trong branch feature.
- Kiểm tra trạng thái repository sau khi stage tập tin.

```

ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ echo "Nhóm 9 add text from branch feature" >> README.MD
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ cat README.MD
Nhóm 9
Nguyễn Bình Thục Trâm 20520815
Nguyễn Bùi Kim Ngan 20520648
Võ Anh Kiet 20520605
Tôi đang bắt đầu học Git
Nhóm 9 add text from branch feature
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git add README.MD
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git status
On branch feature
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    modified:   README.MD

ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █

```

- Commit tập tin trong branch feature với thông điệp “Added a third line in feature branch”.
- Xem lịch sử các commit đã thực hiện, minh chứng cho thấy có 1 commit tại nhánh feature

```

Added: command not found
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ 
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git commit -m "Added a third line in feature branch"
[feature 274db95] Added a third line in feature branch
 1 file changed, 1 insertion(+)
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git log
commit 274db95dfc9996287be479d144f235d0db98b36a (HEAD -> feature)
Author: anhkiet1227 <anhkiet1227@gmail.com>
Date:   Tue Sep 20 08:58:51 2022 +0700

    Added a third line in feature branch

commit 7f224b3b98c7e912c752ae34cfce1296b9c7 (master)
Author: anhkiet1227 <anhkiet1227@gmail.com>
Date:   Tue Sep 20 08:36:18 2022 +0700

    Committing README.MD from Nhom9 to begin tracking changes

commit 77abd9956409c917a8cac565bc46af5c4a53e7df
Author: anhkiet1227 <anhkiet1227@gmail.com>
Date:   Tue Sep 20 08:32:06 2022 +0700

    Nhóm 9 Added additional line to file

commit 99464de58da498b784d87e376504e88a2ad320a3
Author: Nhóm 09 <20520648@dm.uit.edu.vn>
Date:   Tue Sep 20 08:23:57 2022 +0700

    Committing README.MD from NhomX to begin tracking

    changes
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █

```

Báo cáo kết quả thực hiện câu lệnh merge branch feature về branch master?

```

ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git checkout master
Switched to branch 'master'
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ cat README.MD
Nhóm 9
Nguyễn Bình Thục Trâm 20520815
Nguyễn Bùi Kim Ngan 20520648
Võ Anh Kiet 20520605
Tôi đang bắt đầu học Git
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git merge feature
Updating 7f224b3..274db95
Fast-forward
 README.MD | 1 +
 1 file changed, 1 insertion(+)

```

Mở tập tin README.MD, so sánh nội dung của nó với kết quả sau lần thay đổi cuối ở branch master ở phần Bước 2

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ cat README.MD
Nhom 9
Nguyen Binh Thuc Tram 20520815
Nguyen Bui Kim Ngan 20520648
Vo Anh Kiet 20520605
I am beginning to understand Git
Nhom 9 add text from branch feature
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

- Thêm: Nhom 9 add... feature

Xóa branch feature và kiểm tra lại branch này còn tồn tại không

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git branch
  feature
* master
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git branch -d feature
Deleted branch feature (was 274db95).
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git branch
* master
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

Giải thích ý nghĩa của dòng lệnh trên? Minh chứng sự thay đổi trước và sau khi chạy dòng lệnh

=> Lệnh sed ở đây có nghĩa là replace các “feature” => “test”

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git branch test
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git checkout test
Switched to branch 'test'
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ sed -i 's/feature/test/' README.MD
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git branch
* test
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ cat README.MD
Nhom 9
Nguyen Binh Thuc Tram 20520815
Nguyen Bui Kim Ngan 20520648
Vo Anh Kiet 20520605
I am beginning to understand Git
Nhom 9 add text from branch test
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ █
```

Nội dung tập tin README.MD thay đổi như thế nào?

=> Replace “feature” => “master”

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git checkout master
Switched to branch 'master'
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ sed -i 's/feature/master/' README.MD
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ cat README.MD
Nhom 9
Nguyen Binh Thuc Tram 20520815
Nguyen Bui Kim Ngan 20520648
Vo Anh Kiet 20520605
I am beginning to understand Git
Nhom 9 add text from branch master
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$
```

Khi merge lại thì đã xảy ra xung đột:

```
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git merge test
Auto-merging README.MD
CONFLICT (content): Merge conflict in README.MD
Automatic merge failed; fix conflicts and then commit the result.
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git log
commit 8266d4337708582ccb1d5b5db9978c9470908ff (HEAD -> master)
Author: anhkiet1227 <anhkiet1227@gmail.com>
Date:   Tue Sep 20 09:10:14 2022 +0700

    change feature to master
```

Sửa file để không xảy ra xung đột nữa:

```
Nhom 9
Nguyen Binh Thuc Tram 20520815
Nguyen Bui Kim Ngan 20520648
Vo Anh Kiet 20520605
I am beginning to understand Git
Nhom 9 add text from branch master
~
~
~
~
~
~
~
```

Kết quả commit? Kiểm tra log commit của branch master

=> Đã commit thành công. Log commit cũng đã xuất hiện hành động commit thành công.

```
"README.MD" 6L, 156C written
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git add README.MD
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git commit -a -m "Manually merged from test branch"
[master 191c249] Manually merged from test branch
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eeece9-vm:~/Nhom9/git-intro$ git log
commit 191c2499c661dbc18bb3e955fa0ea32ce6b40e98 (HEAD -> master)
Merge: 8266d43 aa4e7c2
Author: anhkiet1227 <anhkiet1227@gmail.com>
Date:   Tue Sep 20 09:20:25 2022 +0700

    Manually merged from test branch
```

YÊU CẦU 2:

B1 + B2: Đăng ký, đăng nhập

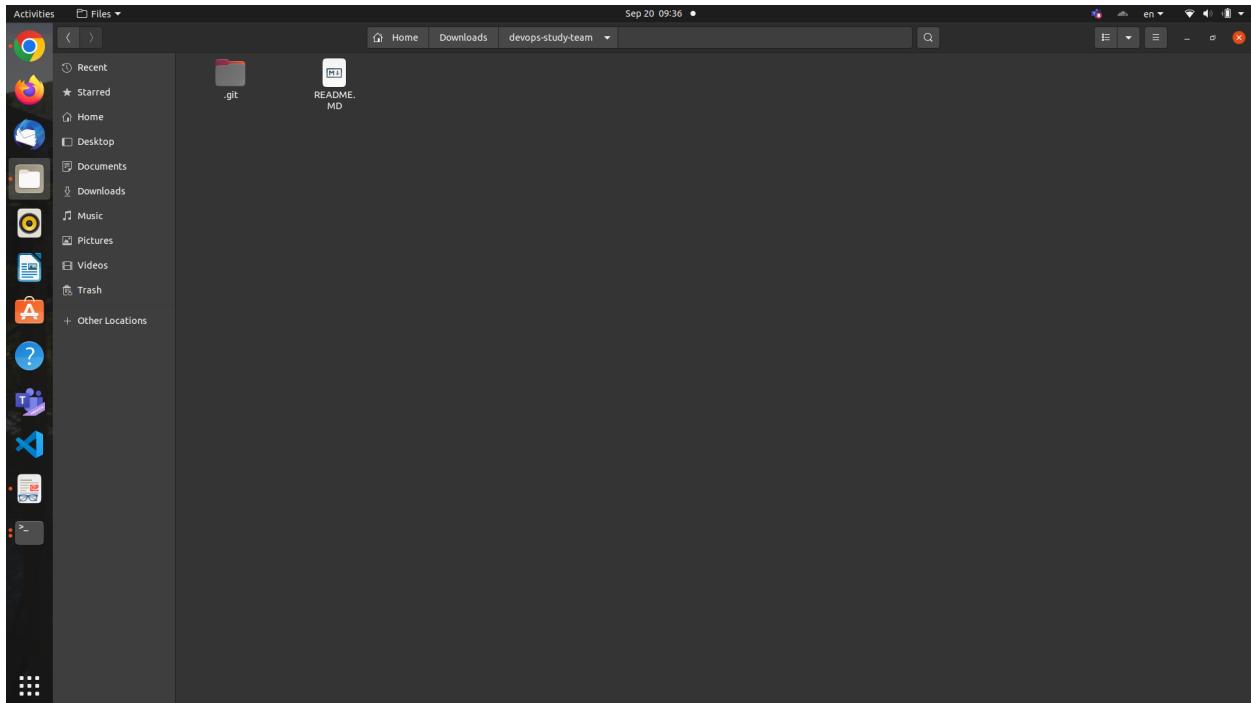
The screenshot shows a GitHub profile page for the user 'anhkiet1227'. The profile picture is a portrait of a man. The bio says: 'Only you can see your full profile (Beta). You have marked your profile as private, which limits what activity other people can see. Update profile settings.' A message box says: 'You unlocked new Achievements with private contributions! Show them off by including private contributions in your Profile in settings.' Below the bio, there are sections for 'Pinned' projects: 'OOP-UIT' (Public), 'NT106_Basic-Network-Programming_Exercise' (Public), 'NT106_Basic-Network-Programming_Project' (Public), and 'NT219_Cryptography_Exercise' (Public). The 'Achievements' section shows one achievement: 'Sugar' (anhkiet1227) is on the mic. The 'Highlights' section shows one highlight: 'anhkiet1227' (Beta). The 'Contributions' section shows a grid of squares representing contributions from September to September of the following year, with a note: 'This is your contribution graph. Your first square is for joining GitHub and you'll earn more as you make additional contributions. More'.

B3: Tạo Repository ché độ public (vì private cô không kiểm tra được)

The screenshot shows a GitHub repository page for the repository 'devops-study-team' owned by 'anhkiet1227'. The repository is public. The README file contains the text: 'Nhóm 9 Nguyễn Bình Thúc Trâm 20520815 Nguyễn Bùi Kim Ngân 20520648 Vo Anh Kiet 20520605 I am beginning to understand Git Nhóm 9 add text from branch master'. The repository has 1 branch, 0 tags, and 1 commit. The commit was made by 'anhkiet1227' and added the repository to the 'devasc-study-team'. The repository has 0 stars, 1 watching, and 0 forks. It has no releases or packages published.

B4: tạo folder

B5 sao chép



B6: Chạy lệnh git init sau đó chạy lệnh git status để kiểm tra

Sử dụng vs code đăng nhập github lấy phiên và sử dụng terminal trên vs code tạo Token và login

Personal access tokens

Generate new token Revoke all

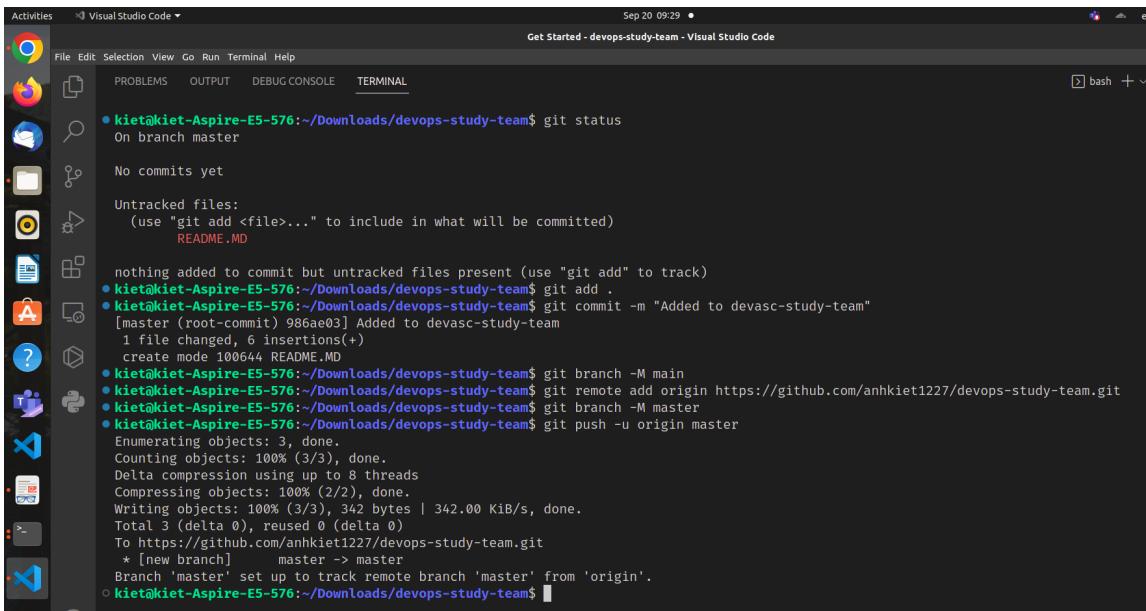
Tokens you have generated that can be used to access the GitHub API.

Make sure to copy your personal access token now. You won't be able to see it again!

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.

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B7 B8 B9 B10:



Sep 20 09:29 • Get Started - devops-study-team - Visual Studio Code

File Edit Selection View Go Run Terminal Help

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

bash +

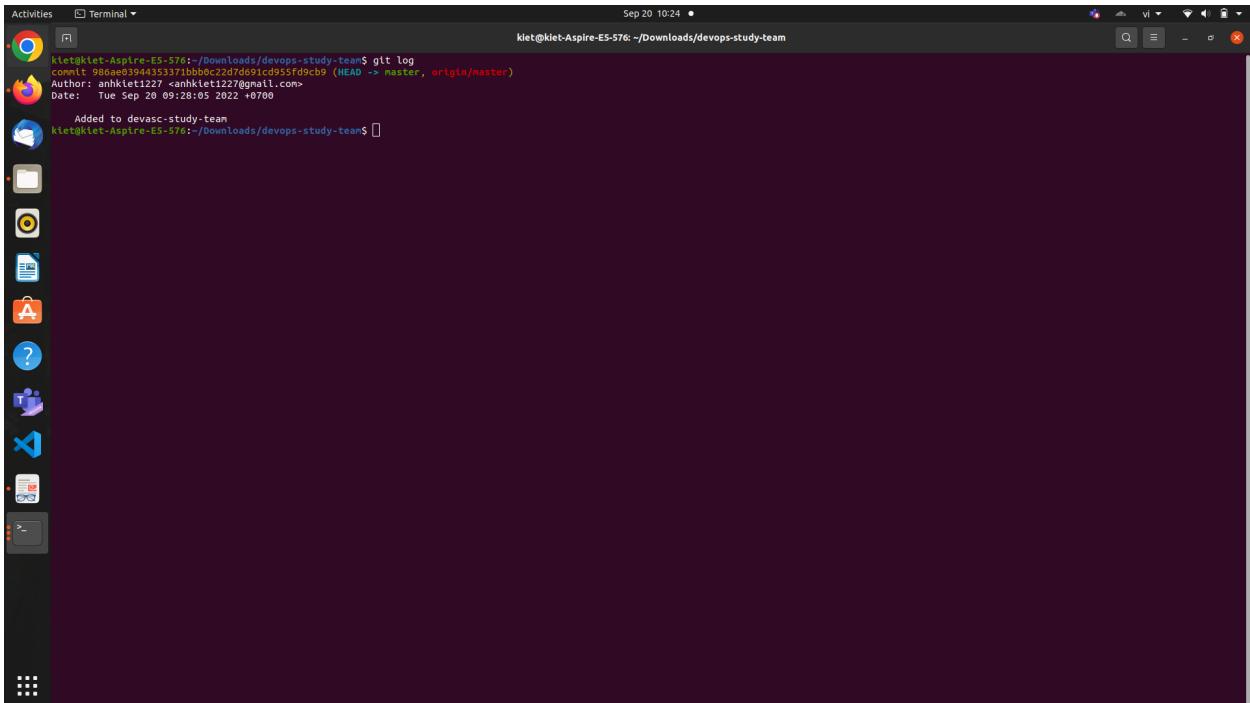
```
* kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$ git status
On branch master

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)
• kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$ git add .
• kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$ git commit -m "Added to devasc-study-team"
[master (root-commit) 986ae03] Added to devasc-study-team
  1 file changed, 6 insertions(+)
  create mode 100644 README.MD
• kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$ git branch -M main
• kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$ git remote add origin https://github.com/anhkiet1227/devops-study-team.git
• kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$ git branch -M master
• kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$ git push -u origin master
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), 342 bytes | 342.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To https://github.com/anhkiet1227/devops-study-team.git
 * [new branch]      master -> master
Branch 'master' set up to track remote branch 'master' from 'origin'.
○ kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$
```

Kiem tra git log

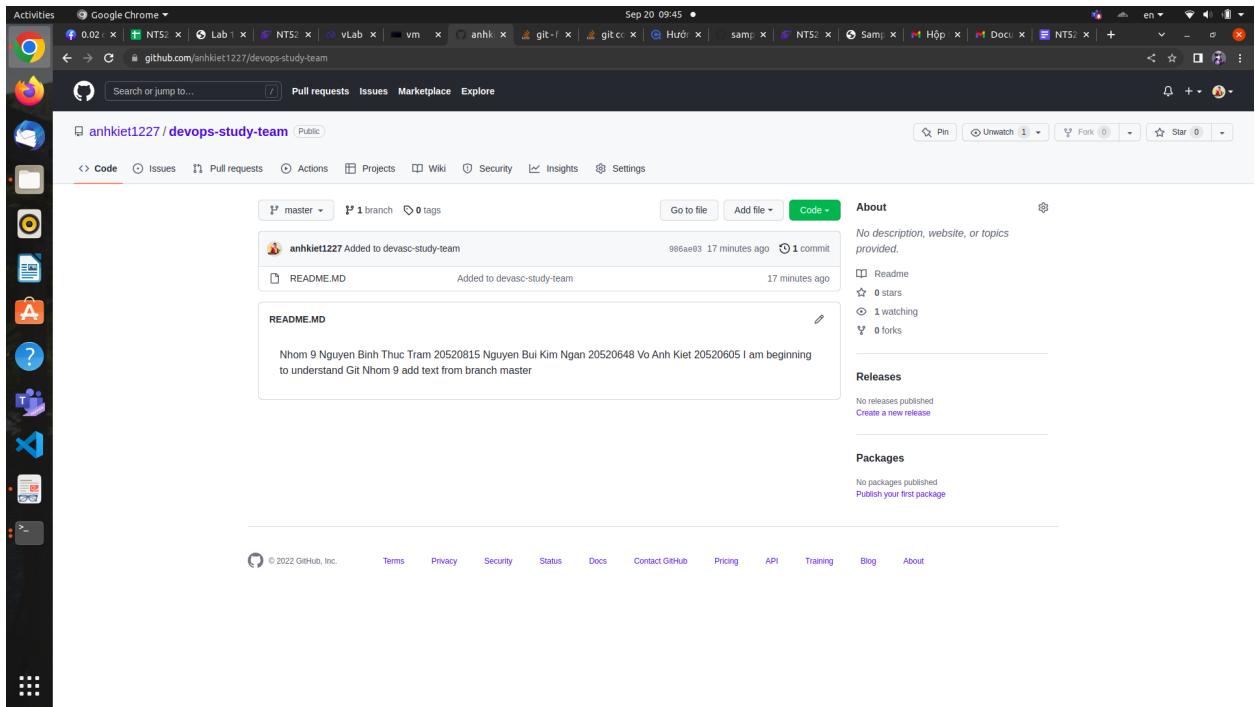


Sep 20 10:24 • kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team

```
kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$ git log
commit 986ae0194d53371bb0c22d7d691c1c955fd9cb9 (HEAD -> master, origin/master)
Author: anhkiet1227 <anhkiet1227@gmail.com>
Date: Tue Sep 20 09:28:05 2022 +0700

  Added to devasc-study-team
kiet@kiet-Aspire-E5-576:~/Downloads/devops-study-team$
```

B11:



Link github: <https://github.com/anhkiet1227/devops-study-team>

B.2 Xây dựng CI/CD Pipeline bằng Jenkins

YÊU CẦU 3:

Anhkiet1227 / sample-app Public

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

main 1 branch 0 tags

About

No description, website, or topics provided.

0 stars 1 watching 0 forks

Releases

No releases published Create a new release

Packages

No packages published Publish your first package

Languages

Shell 56.7% Python 24.5%
HTML 15.9% CSS 2.9%

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Sửa đổi file

```

sample_app.py 3
sample_app.py > ...
1 # Add to this file for the sample app lab
2 from flask import Flask
3 from flask import request
4 from flask import render_template
5
6 sample = Flask(__name__)
7
8 @sample.route("/")
9 def main():
10     return render_template("index.html")
11
12 if __name__ == "__main__":
13     sample.run(host="0.0.0.0", port=5050)
14

```

PROBLEMS 3 OUTPUT DEBUG CONSOLE TERMINAL

- kiet@kiet-Aspire-E5-576:~/Downloads/sample-app/sample-app\$ git push -u origin main
 Enumerating objects: 9, done.
 Counting objects: 100% (9/9), done.
 Delta compression using up to 8 threads
 Compressing objects: 100% (6/6), done.
 Writing objects: 100% (9/9), 1.50 KiB | 307.00 KiB/s, done.
 Total 9 (delta 0), reused 0 (delta 0)
 To https://github.com/anhkiet1227/sample-app.git
 * [new branch] main -> main
 Branch 'main' set up to track remote branch 'main' from 'origin'.
 kiet@kiet-Aspire-E5-576:~/Downloads/sample-app/sample-app\$

Ln 13, Col 41 Spaces: 4 UTF-8 LF Python 3.8.10 64-bit Go Live gpg (GnuPG) 2.2.19 Spell Prettier

The screenshot shows a Visual Studio Code interface with the following details:

- File Explorer:** Shows a project named "SAMPLE-APP" containing "static" (with "style.css"), "templates" (with "sample_app.py"), and "sample-app.sh".
- Code Editor:** Two tabs are open: "sample_app.py" (3, M) and "sample-app.sh" (M). The "sample-app.sh" tab contains the following shell script:

```
#!/bin/bash
mkdir tempdir
mkdir tempdir/templates
mkdir tempdir/static
cp sample_app.py tempdir/.
cp -r templates/* tempdir/templates/.
cp -r static/* tempdir/static/.
echo "FROM python" >> tempdir/Dockerfile
echo "RUN pip install flask" >> tempdir/Dockerfile
echo "COPY ./static /home/myapp/static/" >> tempdir/Dockerfile
echo "COPY ./templates /home/myapp/templates/" >> tempdir/Dockerfile
echo "COPY sample_app.py /home/myapp/" >> tempdir/Dockerfile
echo "EXPOSE 5050" >> tempdir/Dockerfile
echo "CMD python /home/myapp/sample_app.py" >> tempdir/Dockerfile
cd tempdir
docker build -t sampleapp .
docker run -t -d -p 5050:5050 --name samplerunning sampleapp
docker ps -a
```

- Terminal:** The terminal shows a git commit message and a command being run:

```
Compressing objects: 100% (6/6), done.
Writing objects: 100% (9/9), 1.50 KiB | 307.00 KiB/s, done.
Total 9 (delta 0), reused 0 (delta 0)
To https://github.com/anhkiet1227/sample-app.git
 * [new branch]      main -> main
Branch 'main' set up to track remote branch 'main' from 'origin'.
kiet@kiet-Aspire-E5-576:~/Downloads/sample-app/sample-app$
```
- Status Bar:** Shows "Ln 21, Col 30" and other standard status bar information.

Build và kiểm tra sample-app

The screenshot shows a Linux desktop environment with two windows open:

- Visual Studio Code (Top Window):** The title bar says "sample_app.py - sample-app - Visual Studio Code". The terminal tab is active, displaying the command "sudo bash ./sample-app.sh" being run in a Docker container. The output shows the Docker daemon pulling the "python:latest" image and then installing dependencies like Flask, itsdangerous, click, Jinja2, and Werkzeug.
- Google Chrome (Bottom Window):** The title bar says "Google Chrome". The address bar shows "localhost:5050". The page content displays the message "You are calling me from 172.17.0.1".

YÊU CẦU 4: commit và push lên github

The screenshot shows a terminal session in Visual Studio Code. The command history includes:

- git status
- git add sample_app.py
- git commit -m "change port"
- git push

The terminal output shows the commit message "change port" was successful, with 6 files changed, 57 insertions(+), and 6 deletions(-). The push was also successful, with 9 objects enumerated and 6 objects written.

```
sample_app.py - sample-app - Visual Studio Code
Sep 20 09:13 •
File Edit Selection View Go Run Terminal Help
EXPLORER PROBLEMS 3 OUTPUT DEBUG CONSOLE TERMINAL
sample_app.py - sample-app - Visual Studio Code
kiet@kiet-Aspire-E5-576:~/Downloads/sample-app/sample-app$ 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)
    modified:   sample-app.sh
    modified:   sample_app.py

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    tempdir/

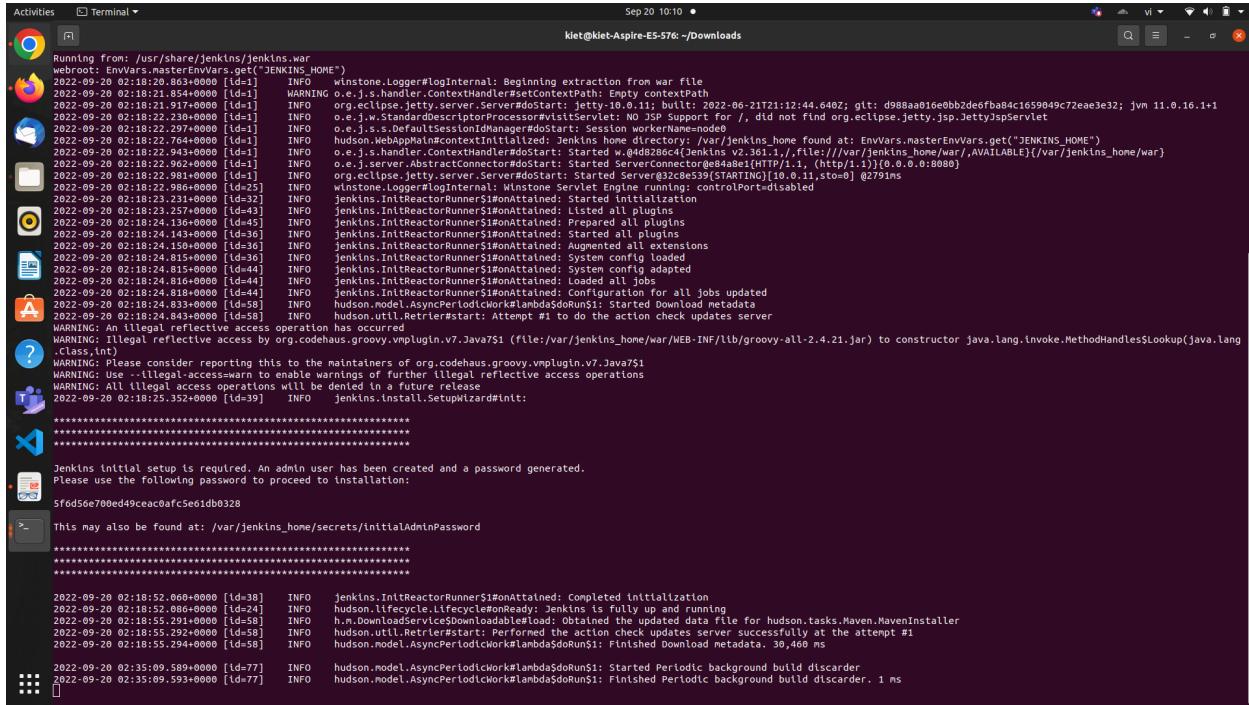
no changes added to commit (use "git add" and/or "git commit -a")
kiet@kiet-Aspire-E5-576:~/Downloads/sample-app/sample-app$ git add .
kiet@kiet-Aspire-E5-576:~/Downloads/sample-app/sample-app$ git commit -m "change port"
[main 671ef2a] change port
 6 files changed, 57 insertions(+), 6 deletions(-)
 create mode 100644 tempdir/Dockerfile
 create mode 100644 tempdir/sample_app.py
 create mode 100644 tempdir/static/style.css
 create mode 100644 tempdir/templates/index.html
kiet@kiet-Aspire-E5-576:~/Downloads/sample-app/sample-app$ git push
Enumerating objects: 9, done.
Counting objects: 100% (9/9), done.
Delta compression using up to 8 threads
Compressing objects: 100% (6/6), done.
Writing objects: 100% (6/6), 768 bytes | 384.00 KiB/s, done.
Total 6 (delta 3), reused 0 (delta 0)
remote: Resolving deltas: 100% (3/3), completed with 2 local objects.
To https://github.com/anhkiet1227/sample-app.git
 dd7b0da..671ef2a main -> main
kiet@kiet-Aspire-E5-576:~/Downloads/sample-app/sample-app$
```

Kiểm tra lại trên github

The screenshot shows a GitHub repository page for "anhkiet1227/sample-app". The commit history shows a single commit from "anhkiet1227" titled "change port" made 1 hour ago. The commit message is "change port". The code content of the file "sample_app.py" is displayed:

```
sample_app.py
1 # Add to this file for the sample app lab
2 from flask import Flask
3 from flask import request
4 from flask import render_template
5
6 sample = Flask(__name__)
7
8 @sample.route("/")
9 def main():
10     return render_template("index.html")
11
12 if __name__ == "__main__":
13     sample.run(host="0.0.0.0", port=5050)
```

Tải và thiết lập chạy Jenkins Docker Image



The screenshot shows a terminal window titled "Sep 20 10:10" with the command "Running from: /usr/share/jenkins/jenkins.war". The logs detail the startup process of Jenkins, including the extraction of the war file, initialization of the web server, and the loading of various configurations and plugins. It also shows the creation of an admin user and the generation of a password. The log ends with a warning about illegal reflective access.

```
Running from: /usr/share/jenkins/jenkins.war
webroot: EnvVars.masterEnvVars.get("JENKINS_HOME")
2022-09-20 02:18:28.803+0000 [id=1] INFO  winstone.Logger#logInternal: Beginning extraction from war file
2022-09-20 02:18:21.854+0000 [id=1] WARNING o.e.j.s.handler.ContextHandler#setContextPath: Empty contextPath
2022-09-20 02:18:21.854+0000 [id=1] INFO  org.eclipse.jetty.util.log:jetty-11.0.15.v2022-06-21T21:12:44+00Z; git: d988aa01e0bb2dc6fba84c1659049c72ea3e32; jvm 11.0.16.1+1
2022-09-20 02:18:22.230+0000 [id=1] INFO  o.e.j.s.StandardDescriptorProcessor#processServlet: NO JSP Support for /, did not find org.eclipse.jetty.jsp.JspServlet
2022-09-20 02:18:22.297+0000 [id=1] INFO  o.e.j.s.DefaultSessionIdManager#doStart: Session workerName=node0
2022-09-20 02:18:22.764+0000 [id=1] INFO  hudson.WebAppMain#contextInitialized: Jenkins home directory: /var/jenkins_home found at: EnvVars.masterEnvVars.get("JENKINS_HOME")
2022-09-20 02:18:22.943+0000 [id=1] INFO  o.e.j.s.handler.ContextHandler#doStart: Started w@jenkins v2.361.1,{file:///var/jenkins_home/war},EnvVars.masterEnvVars.get("JENKINS_HOME"){/var/jenkins_home/war}
2022-09-20 02:18:22.962+0000 [id=1] INFO  o.e.j.s.handler.ContextHandler#doStart: Started: Started ServerConnector@e84abe1[HTTP/1.1,(http/1.1)][0.0.0.0:8080]
2022-09-20 02:18:22.964+0000 [id=25] INFO  winstone.Logger#logInternal: Winstone Servlet Engine running; controlPort=disabled
2022-09-20 02:18:23.256+0000 [id=25] INFO  winstone.Logger#logInternal: Started initialization
2022-09-20 02:18:23.257+0000 [id=43] INFO  jenkins.InitReactorRunner$1#onAttained: Listed all plugins
2022-09-20 02:18:24.136+0000 [id=45] INFO  jenkins.InitReactorRunner$1#onAttained: Prepared all plugins
2022-09-20 02:18:24.143+0000 [id=36] INFO  jenkins.InitReactorRunner$1#onAttained: Started all plugins
2022-09-20 02:18:24.144+0000 [id=36] INFO  jenkins.InitReactorRunner$1#onAttained: Loaded all jobs
2022-09-20 02:18:24.815+0000 [id=36] INFO  jenkins.InitReactorRunner$1#onAttained: System config loaded
2022-09-20 02:18:24.815+0000 [id=44] INFO  jenkins.InitReactorRunner$1#onAttained: System config adapted
2022-09-20 02:18:24.816+0000 [id=44] INFO  jenkins.InitReactorRunner$1#onAttained: Loaded all jobs
2022-09-20 02:18:24.818+0000 [id=44] INFO  jenkins.InitReactorRunner$1#onAttained: Configuration for all jobs updated
2022-09-20 02:18:24.833+0000 [id=58] INFO  hudson.model.AsyncPeriodicWork$lambda$doRun$1: Started Download metadata
2022-09-20 02:18:24.834+0000 [id=58] INFO  hudson.util.Retrile$#start: Attempt #1 to do the action check updates server
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.codehaus.groovy.vnpugin.v7.Java7$1 (file:/var/jenkins_home/war/WEB-INF/lib/groovy-all-2.4.21.jar) to constructor java.lang.invoke.MethodHandles$Lookup(java.lang.Class,int)
WARNING: Please consider reporting this to the maintainers of org.codehaus.groovy.vnpugin.v7.Java7$1
WARNING: Use -illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
2022-09-20 02:18:25.352+0000 [id=39] INFO  jenkins.Install.setupWizard$init:
*****
***** Jenkins initial setup is required. An admin user has been created and a password generated.
***** Please use the following password to proceed to installation:
***** 5fdd56e708ed49ceacacaf5e01db0328
***** This may also be found at: /var/jenkins_home/secrets/initialAdminPassword
*****
***** 2022-09-20 02:18:52.060+0000 [id=38] INFO  jenkins.InitReactorRunner$1#onAttained: Completed initialization
***** 2022-09-20 02:18:52.086+0000 [id=24] INFO  hudson.lifecycle.Lifecycle$onReady: Jenkins is fully up and running
***** 2022-09-20 02:18:55.291+0000 [id=58] INFO  h.m.DownloadService$DownloadableLoad: Obtained the updated data file for hudson.tasks.Maven.MavenInstaller
***** 2022-09-20 02:18:55.292+0000 [id=58] INFO  hudson.util.Retrile$#start: Performed the action check updates server successfully at the attempt #1
***** 2022-09-20 02:18:55.294+0000 [id=58] INFO  hudson.model.AsyncPeriodicWork$lambda$doRun$1: Finished Download metadata. 30,468 ms
***** 2022-09-20 02:35:09.589+0000 [id=77] INFO  hudson.model.AsyncPeriodicWork$Lambda$doRun$1: Started Periodic background build discarmer
***** 2022-09-20 02:35:09.593+0000 [id=77] INFO  hudson.model.AsyncPeriodicWork$Lambda$doRun$1: Finished Periodic background build discarmer. 1 ms
```

YÊU CẦU 5:

Volumes are the preferred mechanism for persisting data generated by and used by Docker containers. While bind mounts are dependent on the directory structure and OS of the host machine, volumes are completely managed by Docker. Volumes have several advantages over bind mounts:

Volumes are easier to back up or migrate than bind mounts.

You can manage volumes using Docker CLI commands or the Docker API.

Volumes work on both Linux and Windows containers.

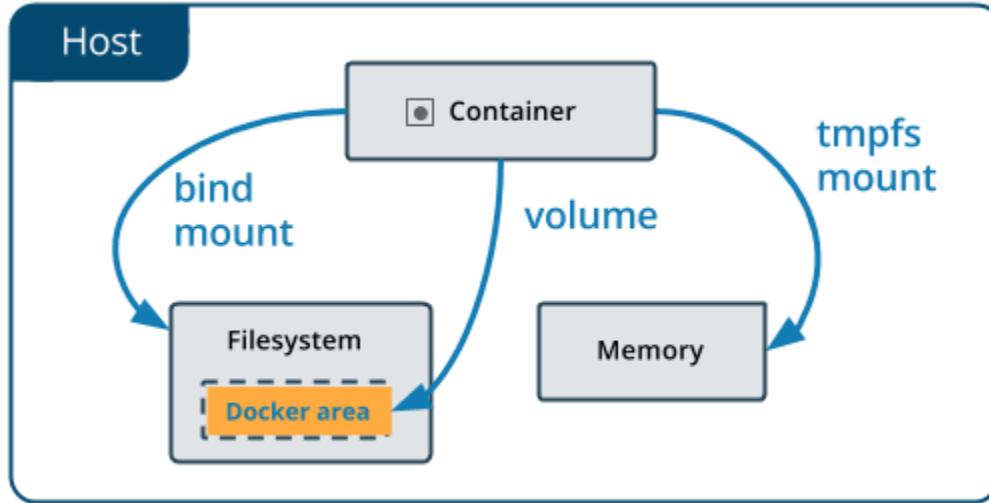
Volumes can be more safely shared among multiple containers.

Volume drivers let you store volumes on remote hosts or cloud providers, to encrypt the contents of volumes, or to add other functionality.

New volumes can have their content pre-populated by a container.

Volumes on Docker Desktop have much higher performance than bind mounts from Mac and Windows hosts.

In addition, volumes are often a better choice than persisting data in a container's writable layer, because a volume does not increase the size of the containers using it, and the volume's contents exist outside the lifecycle of a given container.



If your container generates non-persistent state data, consider using a tmpfs mount to avoid storing the data anywhere permanently, and to increase the container's performance by avoiding writing into the container's writable layer.

Volumes use rprivate bind propagation, and bind propagation is not configurable for volumes.

2.4

Cấu hình Jenkins

The screenshot shows the Jenkins dashboard. On the left is a sidebar with various icons for creating new items, managing people, build history, and views. The main area has a heading "Welcome to Jenkins!" with a sub-section "Start building your software project". It includes links to "Create a job", "Set up a distributed build", "Set up an agent", "Configure a cloud", and "Learn more about distributed builds". At the bottom right of the dashboard, there are links for "REST API" and "Jenkins 2.361.1".

The screenshot shows the Jenkins console output for a build step. The sidebar on the left shows the project navigation path: Dashboard > BuildAppJob > #5. The main area is titled "Console Output" with a green checkmark icon. It displays the command-line logs for the build process, starting with "Started by user admin" and "Running as SYSTEM". The logs show the execution of git commands to clone the repository, update branches, and run a script named "sample-app.sh". There are several "mkdir: cannot create directory" errors indicating that Jenkins is attempting to create temporary directories that already exist.

```
Started by user admin
Running as SYSTEM
Building in workspace /var/jenkins_home/workspace/BuildAppJob
The recommended git tool is: NONE
using credential a8bedc22-5321-4611-86d3-841ba0800a4d
> git rev-parse --resolve-git-dir /var/jenkins_home/workspace/BuildAppJob/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/anhkiet1227/sample-app # timeout=10
Fetching upstream changes from https://github.com/anhkiet1227/sample-app
> git -v version # timeout=10
> git -version # 'git' version 2.30.2'
using GIT_ASKPASS to set credentials
> git fetch --tags --force --progress -- https://github.com/anhkiet1227/sample-app +refs/heads/*:refs/remotes/origin/*
> git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision e36fbfe4a1cb263b90c8a0e5e37a035051070162e (refs/remotes/origin/main)
> git config core.sparsecheckout # timeout=10
> git checkout -f e36fbfe4a1cb263b90c8a0e5e37a035051070162e # timeout=10
Commit message: "Update sample-app.sh"
First time build. Skipping changelog.
[BuildAppJob] $ /bin/sh -x /tmp/jenkins16010997656894093271.sh
+ bash ./sample-app.sh
mkdir: cannot create directory '/tmpdir': File exists
mkdir: cannot create directory '/tmpdir/templates': File exists
mkdir: cannot create directory '/tmpdir/static': File exists
Sending build context to Docker daemon 6.656kB

Step 1/35 : FROM python
--> e285995a3494
Step 2/35 : RUN pip install flask
--> Using cache

```

YÊU CẦU 6:

B1 B2 B3:

The screenshot shows the Jenkins configuration page for the job 'TestAppJob_Nhom9'. The 'General' section contains a description 'Nhom9's first Jenkins test'. Under 'Source Code Management', 'None' is selected. In the 'Build Triggers' section, 'Build after other projects are built' is checked, and 'BuildApp.job' is listed as a project to watch. Other trigger options like 'Trigger only if build is stable' are available but not selected.

The screenshot shows the Jenkins configuration page for the job 'TestAppJob_Nhom9'. The 'Build Steps' section contains a single step: 'Execute shell' with the command: `curl 127.0.0.1:8080 | grep h1 | awk 'End {if(length($0) == 0) exit 1; exit0;}'`. The 'Post-build Actions' section is empty, with a button 'Add post-build action'.

Configuration

Build Environment

- Delete workspace before build starts
- Use secret text(s) or file(s) ?
- Add timestamps to the Console Output
- Inspect build log for published Gradle build scans
- Terminate a build if it's stuck
- With Ant ?

Build Steps

Execute shell

Command

See [the list of available environment variables](#)

```
bash ./sample-app.sh
```

Advanced...

Save **Apply**

B4: Finish build BuildAppJob và TestAppJob_Nhom9

```

...
--> e285995a3494
Step 30/35 : RUN pip install flask
--> Using cache
--> faa22a70d1a0
Step 31/35 : COPY ./static /home/myapp/static/
--> Using cache
--> 059ef2f2f6105d
Step 32/35 : COPY ./templates /home/myapp/templates/
--> Using cache
--> 8dccb2509b58
Step 33/35 : COPY sample_app.py /home/myapp/
--> Using cache
--> f11730de6552
Step 34/35 : EXPOSE 5050
--> Using cache
--> b602ee1d3ff
Step 35/35 : CMD python /home/myapp/sample_app.py
--> Using cache
--> 53076a810e76
Successfully built 53076a810e76
Successfully tagged sampleapp:latest
docker: Error response from daemon: Conflict. The container name "/samplerunning" is already in use by container "03b8836c57b5eba503acb3341b931c56e0d3af146f93657dc79ef927b12cc652". You have to remove (or rename) that container to be able to reuse that name.
See 'docker run --help'.
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS
NAMES
693a47a69308        jenkins/jenkins:lts   "/usr/bin/tini -- /u_"
2 hours ago         Up 2 hours          0.0.0.0:8080->8080/tcp,
:::8080->8080/tcp, 50000/tcp   jenkins_server
03b8836c57b5        sampleapp           "/bin/sh -c 'python _"
5 hours ago        Exited (137) 3 hours ago
samplerunning
Triggering a new build of TestAppJob\_Nhom9
Finished: SUCCESS

```

The screenshot shows the Jenkins Build History page. On the left, there's a sidebar with icons for New Item, People, Build History (which is selected), Project Relationship, Check File Fingerprint, Manage Jenkins, and My Views. Below that is a Build Queue section indicating 'No builds in the queue.' The main area is titled 'Build History of Jenkins' and displays a timeline from Sep 18 to Sep 22. It lists several builds for 'BuildAppJob' and 'TestAppJob_Nhom9'. A detailed table below the timeline shows the status of four specific builds:

S	Build	Time Since	Status
1	TestAppJob_Nhom9 #2	3 min 51 sec	stable
2	BuildAppJob #6	4 min 1 sec	stable
3	TestAppJob_Nhom9 #1	4 min 6 sec	stable
4	BuildAppJob #5	50 min	back to normal

YÊU CẦU 7:

B1 B2:

The screenshot shows the Jenkins Pipeline configuration page for 'SamplePipeline_Nhom9'. The left sidebar includes icons for General, Advanced Project Options (which is selected), and Pipeline. The main area has tabs for Configuration and Advanced... The Configuration tab shows the Pipeline definition and a Groovy script editor. The script content is as follows:

```

1 node {
2   stage('Preparation') {
3     catchError(buildResult: 'SUCCESS') {
4       sh 'docker stop samplerunning'
5       sh 'docker rm samplerunning'
6     }
7   }
8   stage('Build') {
9     build 'BuildAppJob'
10 }
11 stage('Results') {
12   build 'TestAppJob_Nhom9'
13 }
14

```

Below the script, there's a checkbox for 'Use Groovy Sandbox' which is checked. At the bottom are 'Save' and 'Apply' buttons.

B3: Build thành công

Pipeline SamplePipeline_Nhom9

Stage View

Preparation	Build	Results
854ms	30ms	9s

Average stage times: (Average full run time: ~11s)

#1 Sep 20, 2022, 6:46 AM

[Atom feed for all](#) [Atom feed for failures](#)

Permalinks

B4:

```

Started by user admin
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/jenkins_home/workspace/SamplePipeline_Nhom9
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Preparation)
[Pipeline] catchError
[Pipeline] {
[Pipeline] sh
+ docker stop samplerunning
samplerunning
[Pipeline] sh
+ docker rm samplerunning
samplerunning
[Pipeline] }
[Pipeline] // catchError
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Build)
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Results)
[Pipeline] build (Building TestAppJob_Nhom9)
Scheduling project: TestAppJob_Nhom9
Starting building: TestAppJob_Nhom9 #3
[Pipeline] }
[Pipeline] // stage

```

Giải thích yêu cầu của đoạn mã ở bước 2:
Đoạn mã chia làm 3 giai đoạn

Giai đoạn chuẩn bị: Nếu kết quả build trước đó của pipeline thành công (một container sample running đang chạy) thì sẽ stop và xóa container

Giai đoạn build: Thực hiện build BuildJobApp

Giai đoạn result: Chạy TestJobApp để kiểm tra xem có build thành công hay không

B.3 Kiểm thử hàm Python với unittest

YÊU CẦU 8:

- Thông báo lỗi:

```
-----
Ran 3 tests in 0.001s

FAILED (failures=1)
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eece9-vm:~$ python3 -m unittest -v test_json_search.py
[]
test_is_a_list (test_json_search.json_search_test)
Should return a list ... ok
test_search_found (test_json_search.json_search_test)           is unreachable from controller. The device role is ACCESS. ,
key should be found, return list should not be empty ... FAIL
test_search_not_found (test_json_search.json_search_test)
key should not be found, should return an empty list ... ok

=====
=====
FAIL: test_search_found (test_json_search.json_search_test)
key should be found, return list should not be empty
-----
-----
Traceback (most recent call last):
  File "/home/ubuntu/test_json_search.py", line 10, in test_search_found
    self.assertTrue([]!=json_search(key1,data))
AssertionError: False is not true
-----
-----
Ran 3 tests in 0.001s

FAILED (failures=1)
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eece9-vm:~$ █
```

Sửa lỗi:

```

File Edit Selection View Go Run Terminal Help
RUN AND DEBUG ... Get Started test_json_search.py recursive_json_search.py x test_data.py
RUN
To customize Run and Debug create a launch.json file.
Show all automatic debug configurations.
RUN AND DEBUG
RUN and Debug
To customize Run and Debug create a launch.json file.
Show all automatic debug configurations.
unittest > recursive_json_search.py > json_search
5     ret_val = []
6     keyinput = ""
7
8     def json_search(key, input_object):
9         global ret_val, keyinput
10        if (keyinput != key):
11            ret_val.clear()
12            keyinput = key
13
14        if isinstance(input_object, dict): # Iterate dictionary
15            for k, v in input_object.items(): # searching key in the dict
16                if k == key:
17                    temp=(k,v)
18                    return(ret_val.append(temp))
19                if isinstance(v, dict): # the value is another dict so repeat
20                    json_search(key, v)
21                elif isinstance(v, list): # it's a list
22                    for item in v:
23                        if not isinstance(item, (str,int)): # if dict or list repeat
24                            json_search(key, item)
25                        else: # iterate a list because some APIs return JSON object in a list
26                            for val in input_object:
27                                if not isinstance(val, (str,int)):
28                                    json_search(key, val)
29
30    return ret_val
31
32 print(json_search("issueSummary", data))

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER
Python Debug Console + × × ×
[{'issueSummary': 'Network Device 10.10.20.82 Is Unreachable From Controller'}]
None
.None
...
-----
Ran 3 tests in 0.002s

BREAKPOINTS
None
None
User Uncaught Exceptions
• test_json_search.py:13

```

- Đặt ret_val làm biến global, để khi gọi đệ quy json_search, lần gọi sau có thể sử dụng tiếp kết quả ret_val của lần gọi trước. Thế nhưng nếu ret_val là biến cục bộ thì sau khi hoàn thành giá trị của trinh đệ quy cho 1 khóa, nó vẫn sẽ giữ nguyên giá trị dù hàm đệ quy đã kết thúc, trong khi chúng ta cần reset ret_val để có thể tiếp tục sử dụng đệ quy khóa khác.
- Vì vậy, em đã tạo thêm 1 biến keyinput để kiểm tra khóa đầu vào của quá trình đệ quy, nếu khóa này thay đổi - đồng nghĩa với việc bắt đầu một quá trình đệ quy cho 1 khóa mới - thì chúng ta sẽ reset biến ret_val.

Kết quả khi test thành công

```

Zalo Web https://vlab.uit.edu.vn/remote/#/client/dm0AYw8qc29u?token=F4E711563386C3E6875474812D8C6AFD5643641035E666813D08
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eece9-vm:~$ python3 test_json_search.py
[{'issueSummary': 'Network Device 10.10.20.82 Is Unreachable From Controller'}]
...
Ran 3 tests in 0.000s

OK
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eece9-vm:~$ python3 -m unittest -v test_json_search.py
[{'issueSummary': 'Network Device 10.10.20.82 Is Unreachable From Controller'}]
test_is_a_list (test_json_search.json_search_test)
Should return a list ... ok
test_search_found (test_json_search.json_search_test)
key should be found, return list should not be empty ... ok
test_search_not_found (test_json_search.json_search_test)
key should not be found, should return an empty list ... ok
...
Ran 3 tests in 0.000s

OK
ubuntu@s-c7f72d2a7e814ebb8213bf42c22eece9-vm:~$ 

```