

哈尔滨工业大学 计算学部

2024 年秋季学期《开源软件开发实践》

Lab4：开源软件开发中的 DevOps

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[文档全部完成之后，请更新上述区域]

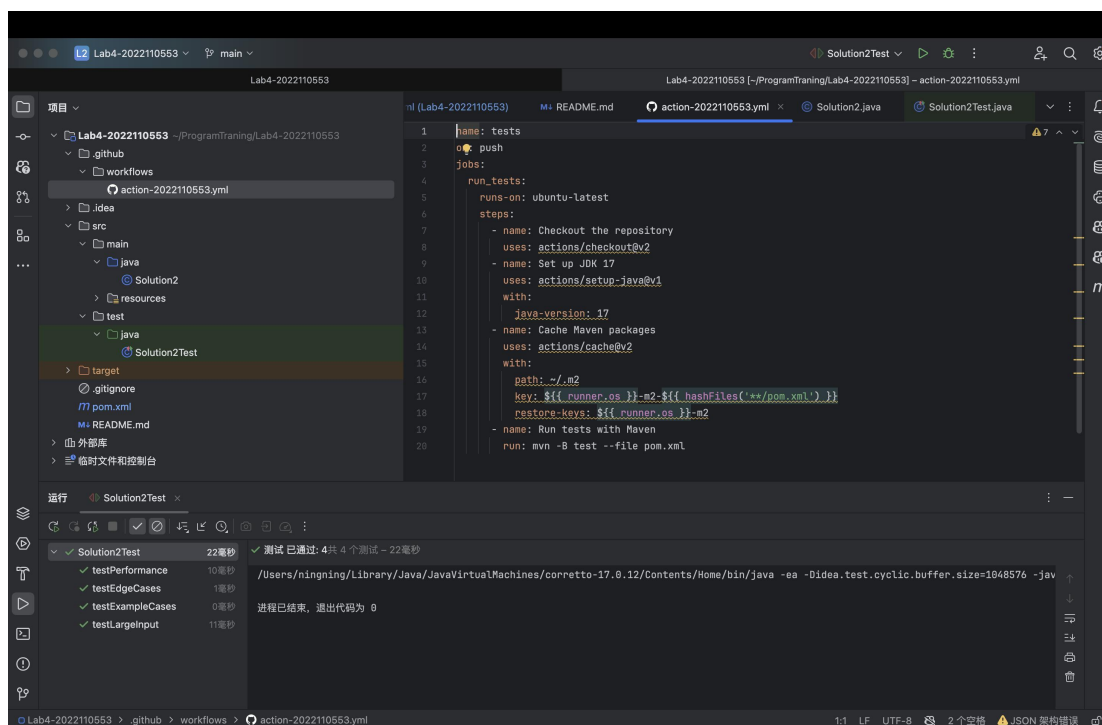
1 实验要求

本次实验训练开源软件开发中的基本 DevOps 操作，具体来说：

- 掌握开源软件开发中的基本 DevOps 流程和工具的使用
- 熟悉利用 Github Actions 进行 DevOps
- 熟悉利用 Jenkins 进行 DevOps

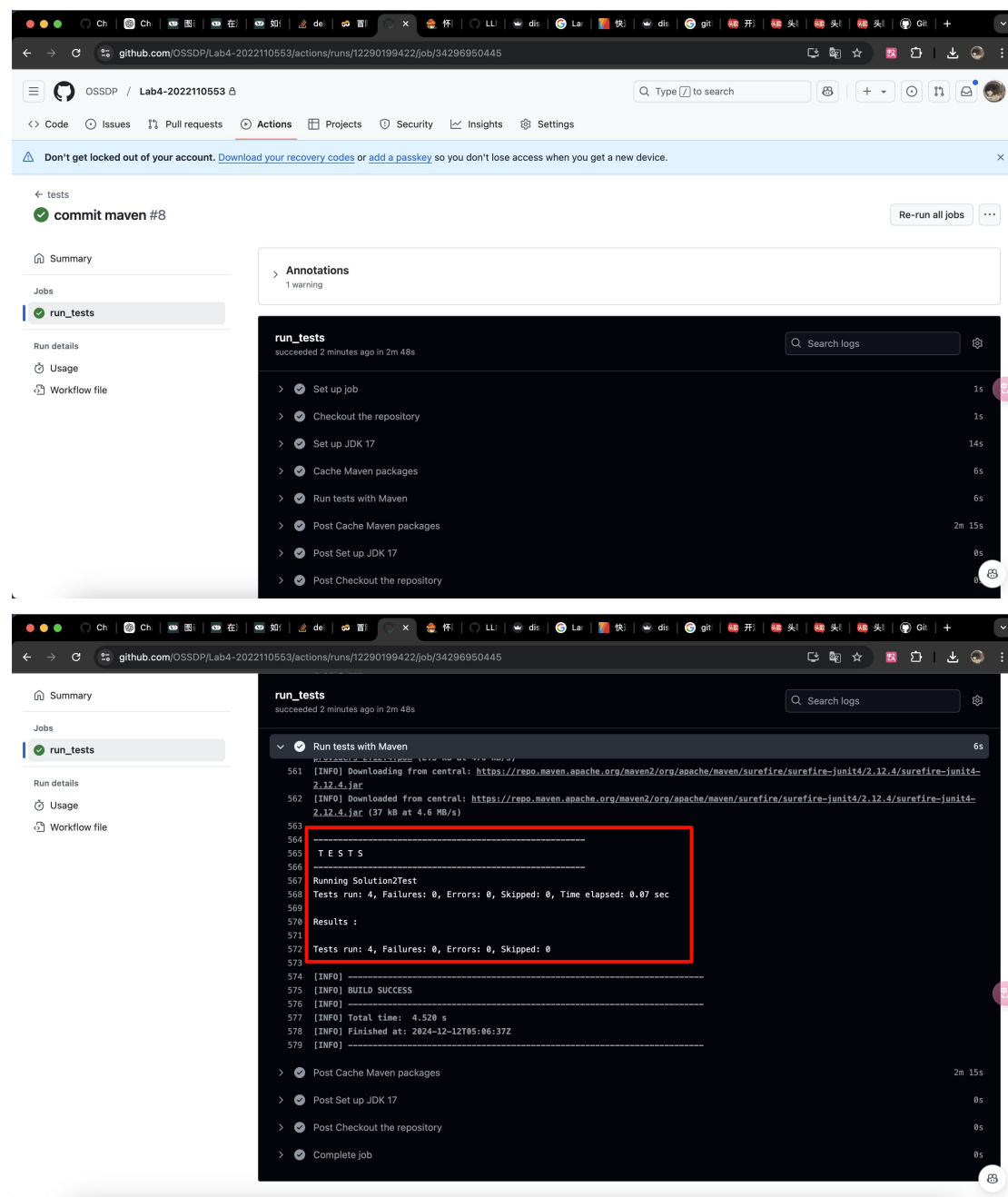
2 实验内容 1 Github Actions DevOps 实践

- 给出项目的目录结构截图，文件管理器或编程 IDE 的界面均可。



- Github 中的 Actions 的若干界面，包括：执行自动化测试成功界面、执行自动化测试失败界面、执行具体信息等，类似实验指导书中的示例界面，以证明完成了实验。

首先是正确通过测试的截图



然后是修改为错误测试后的截图

The top screenshot shows the GitHub Actions workflow run summary for 'commit error test #9'. The status is 'Failure' and the total duration is '39s'. The workflow file is 'action-2022110553.yml'. The job 'run_tests' failed with an exit code of 1.

The bottom screenshot shows the 'run_tests' job details. The job failed now in 30s. The error message is:

```
Run tests with Maven 3s
75 at org.apache.maven.surefire.booter.ForkedBooter.runSuitesInProcess(ForkedBooter.java:115)
76 at org.apache.maven.surefire.booter.ForkedBooter.main(ForkedBooter.java:75)
77
78 Results :
79
80 Failed tests: testEdgeCases(Solution2Test): expected:<abc[]> but was:<abc[def]>
81
82 Tests run: 4, Failures: 1, Errors: 0, Skipped: 0
83
84 [INFO] BUILD FAILURE
85 [INFO] Total time: 1.989 s
86 [INFO] Finished at: 2024-12-12T05:13:32Z
87
88 Error: Failed to execute goal org.apache.maven.plugins:maven-surefire-plugin:2.12.4:test (default-test) on project Lab4-2022110553:
89 There are test failures.
90
91 Error:
92 Please refer to /home/runner/work/Lab4-2022110553/Lab4-2022110553/target/surefire-reports for the individual test results.
93
94 Error: -> [Help 1]
95
96 Error: To see the full stack trace of the errors, re-run Maven with the -e switch.
97 Error: Re-run Maven using the -X switch to enable full debug logging.
98
99 Error: For more information about the errors and possible solutions, please read the following articles:
100 Error: [Help 1] http://wiki.apache.org/confluence/display/MAVEN/MojoFailureException
101
102 Error: Process completed with exit code 1.
```

- 给出针对步骤八的 YML 代码（如果完成了）


```
name: CI and Auto Merge PR
on:
  push:
    branches:
      - main
  pull_request:
    types:
      - opened
      - synchronize
      - reopened
      - ready_for_review
      - labeled
      - unlabeled
      - edited
      - unlocked

jobs:
  run_tests:
    runs-on: ubuntu-latest
    steps:
      - name: Checkout the repository
        uses: actions/checkout@v3
      - name: Set up JDK 17
        uses: actions/setup-java@v3
        with:
          java-version: 17
          distribution: 'temurin'
      - name: Cache Maven packages
        uses: actions/cache@v3
        with:
          path: ~/.m2
          key: ${{ runner.os }}-m2-${{ hashFiles('**/pom.xml') }}
          restore-keys: |
            ${{ runner.os }}-m2
      - name: Run tests with Maven
        run: mvn -B test --file pom.xml





  auto_merge:
    needs: run_tests
    if: ${{ github.event_name == 'pull_request' && needs.run_tests.result == 'success' }} # 仅在测试成功后触发
    runs-on: ubuntu-latest
    steps:
      - name: Auto-merge PR
        uses: pascalgn/automerge-action@v0.16.3
        env:
          GITHUB_TOKEN: ${{ secrets.GITHUB_TOKEN }}
          MERGE_METHOD: "merge" # 按需调整; 可为 "merge", "squash", 或 "rebase"
          MERGE_COMMIT_MESSAGE: "automatic"
          MERGE_FORKS: "true"
          MERGE_RETRIES: "50"
          MERGE_RETRY_SLEEP: "10000"
          UPDATE_METHOD: "rebase"
```

3 实验内容 2 Jenkins DevOps 实践

- 给出实验步骤六和步骤七的操作截图
- 给出实验中各步骤结果的截图
- 步骤一
本人电脑装过 java 和 maven 环境，安装 Github CLI 即可
- 步骤二，安装成功 Jenkins，创建非管理账户

**Jenkins**

Q 查找 (CTRL+K) ?








Dashboard > Jenkins' own user database

用户列表 2

+ Create User

这些用户能够登录到Jenkins。这是列表的子集，也包括那些只是提交了代码到某些项目但是从未登录Jenkins而自动创建的用户。

User ID ↓	名称	
 admin	admin	
 user	User	 

[Jenkins 中文社区](#) Jenkins 2.479.2

- 步骤三，创建 token

The screenshot shows the GitHub Developer Settings page for 'Personal access tokens (classic)'. The left sidebar contains links to 'GitHub Apps', 'OAuth Apps', and 'Personal access tokens'. Under 'Personal access tokens', there are two options: 'Fine-grained tokens' (with a 'Preview' button) and 'Tokens (classic)' (which is selected). The main content area is titled 'Personal access tokens (classic)' and includes a 'Generate new token' button. Below the title, a message states: 'Tokens you have generated that can be used to access the [GitHub API](#).' A blue alert box says: 'Make sure to copy your personal access token now. You won't be able to see it again!'. A list of generated tokens is shown, with the first one highlighted in green. The token is 'ghp_y...'. To its right is a 'Delete' button. Below the token, the text 'IntelliJ IDEA GitHub integration plugin' is shown, followed by 'Last used within the last 8 months' and another 'Delete' button. The scopes for this token are listed: 'admin:enterprise, admin:gpg_key, admin:org, admin:org_hook, admin:public_key, admin:repo_hook, admin:ssh_signing_key, audit_log, codespace, copilot, delete:packages, delete_repo, gist, notifications, project, repo, user, workflow, write:discussion, write:packages'. The expiration date is 'Expired on Mon, May 13 2024.'. A note at the bottom explains that classic tokens function like ordinary OAuth access tokens and can be used instead of a password for Git over HTTPS or to authenticate to the API over Basic Authentication. The footer contains links for 'Terms', 'Privacy', 'Security', 'Status', 'Docs', 'Contact', 'Manage cookies', and 'Do not share my personal information', followed by the GitHub logo and '© 2024 GitHub, Inc.'.

Settings / Developer Settings

Don't get locked out of your account. [Download your recovery codes](#) or [add a passkey](#) so you don't lose access when you get a new device.

Some of the scopes you've selected are included in other scopes. Only the minimum set of necessary scopes has been saved.

GitHub Apps

OAuth Apps

Personal access tokens

Fine-grained tokens [Preview](#)

Tokens (classic)

Personal access tokens (classic) [Generate new token](#)

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!

✓ ghp_y... [Delete](#)

IntelliJ IDEA GitHub integration plugin — Last used within the last 8 months [Delete](#)

admin:enterprise, admin:gpg_key, admin:org, admin:org_hook,
admin:public_key, admin:repo_hook, admin:ssh_signing_key, audit_log, codespace, copilot,
delete:packages, delete_repo, gist, notifications, project, repo, user, workflow,
write:discussion, write:packages

Expired on Mon, May 13 2024.

Personal access tokens (classic) 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](#).

[Terms](#) [Privacy](#) [Security](#) [Status](#) [Docs](#) [Contact](#) [Manage cookies](#) [Do not share my personal information](#)

© 2024 GitHub, Inc.

- 步骤四、五:

The screenshot shows a GitHub repository page for 'Lab4-2022110553'. The repository is private and was created by 'Ch1ldKing'. The main branch is 'main'. The repository contains several files and folders, including '.github/workflows', '.idea', 'src', '.gitignore', 'README.md', and 'pom.xml'. The 'README' file is currently selected, showing a message: 'Review the assignment due date'. The right sidebar contains information about the repository, including the number of stars (0), forks (0), and releases (0). The language statistics show 100.0% Java.

Don't get locked out of your account. [Download your recovery codes](#) or [add a passkey](#) so you don't lose access when you get a new device.

Lab4-2022110553 Private

Watch 0 Fork 0 Star 0

main Go to file + <> Code

Ch1ldKing commit correct test ✓ 7109b97 · 4 hours ago

File/Folder	Commit	Time
.github/workflows	commit correct test	4 hours ago
.idea	commit maven	4 hours ago
src	commit correct test	4 hours ago
.gitignore	commit maven	4 hours ago
README.md	commit maven	4 hours ago
pom.xml	commit correct test	4 hours ago

README

Review the assignment due date

About

Lab4--Ch1ldKing created by GitHub Classroom

- Readme
- Activity
- Custom properties
- 0 stars
- 0 watching
- 0 forks

Releases

No releases published
[Create a new release](#)

Packages

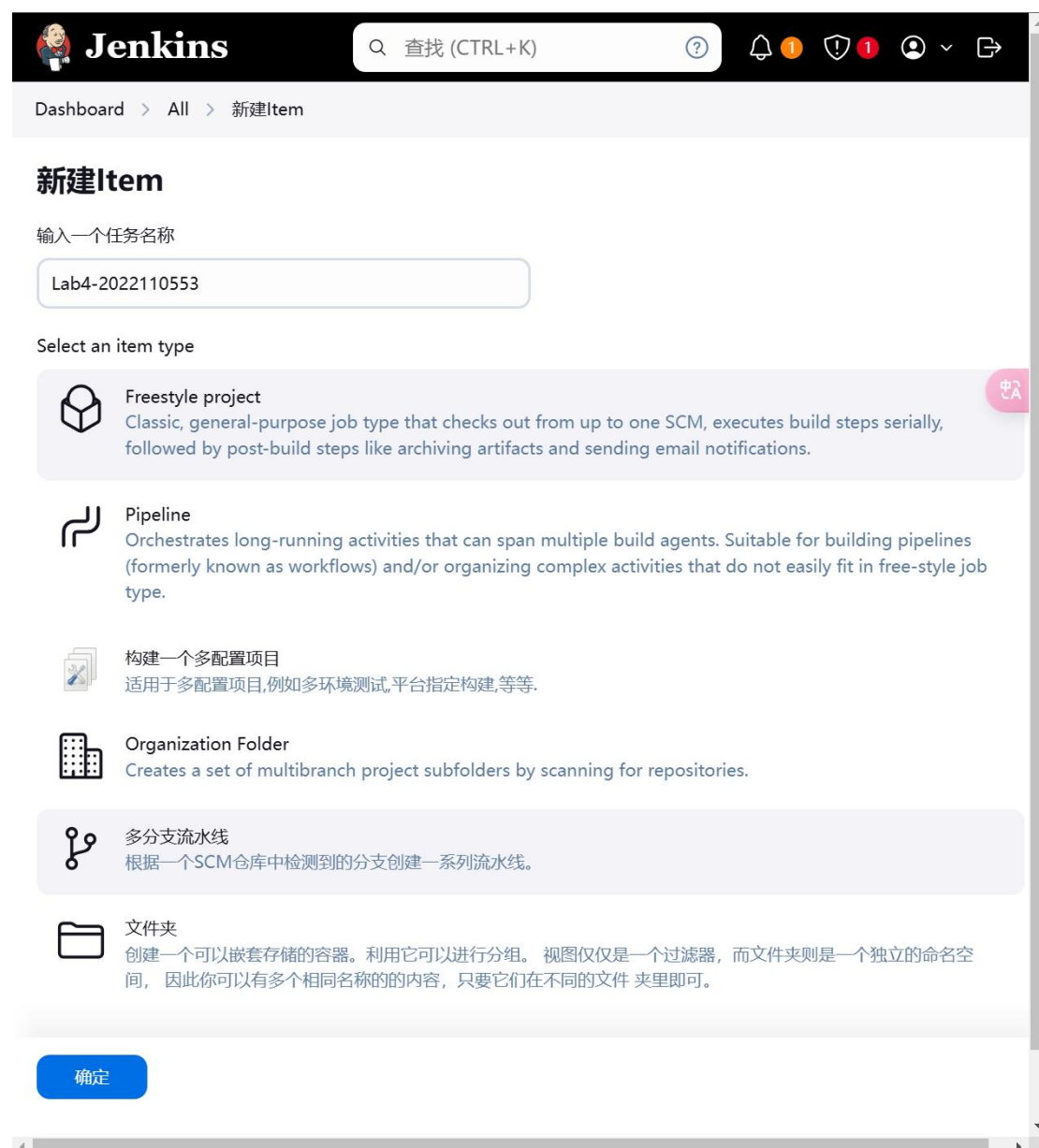
No packages published
[Publish your first package](#)

Languages

Java 100.0%

● 步骤六:

1. 新建 Item



2. 源码管理, 本人出现 ed25519 错误, 使用 HTTP 进行链接

Dashboard > Lab4-2022110553 > Configuration

源码管理

☐ 无

☒ Git ?

Repositories ?

Repository URL ?

https://github.com/OSSDP/Lab4-2022110553.git

Credentials ?

Ch1ldKing (Github私钥)

+ 添加

高级 ▾

Add Repository

Branches to build ?

指定分支（为空时代表any） ?

*/main

Add Branch

源码库浏览器 ?

(自动)

保存 应用

3. 构建触发器

Dashboard > Lab4-2022110553 > Configuration

新增

构建触发器

☐ 触发远程构建 (例如,使用脚本) ?

☐ Build after other projects are built ?

☐ Build periodically ?

☐ GitHub hook trigger for GITScm polling ?

☒ Poll SCM ?

日程表 ?

H/3 * * * *

Would last have run at 2024年12月12日星期四 中国标准时间 下午6:23:20; would next run at 2024年12月12日星期四 中国标准时间 下午6:26:20.

☐ 忽略钩子 post-commit ?

构建环境

☐ Delete workspace before build starts

☐ Use secret text(s) or file(s) ?

☐ Add timestamps to the Console Output

☐ Inspect build log for published build scans

☐ Terminate a build if it's stuck

☐ With Ant ?

Build Steps

保存

应用

4. 配置构建步骤

Dashboard > Lab4-2022110553 > Configuration

Execute Windows batch command ?

命令

参阅 [可用环境变量列表](#)

```
mvn validate
```

高级 ▾

Execute Windows batch command ?

命令

参阅 [可用环境变量列表](#)

```
mvn test
```

高级 ▾

Execute Windows batch command ?

命令

参阅 [可用环境变量列表](#)

```
set GH_TOKEN=ghp_yRDJxoIo5pQOnNA0DxzY0maPuB60QG2KkwAB  
gh pr create --title "Auto PR from dev-Jenkins to main" --body "This is an auto PR from  
Jenkins." --base main --head dev --repo OSSDP/Lab4-2022110553
```

5. 推送代码到 dev 分支，等待测试结果

本人遇到了 mvn 环境变量问题，GBK 编码冲突问题，maven-compiler 版本问题，最终解决后构建通过

The image shows the Jenkins web interface for a specific build. At the top, the Jenkins logo and a search bar are visible. Below the navigation bar, the breadcrumb path is 'Dashboard > Lab4-2022110553 > #16'. A sidebar on the left contains links to '状态集', '变更记录', '控制台输出', '编辑编译信息', '删除构建 '#16'', 'Timings', 'Git Build Data', and '上一次构建'. The main content area displays build #16, which is green, indicating success. It shows the build name '#16 (2024年12月12日 下午9:44:02)' and buttons for 'Add description' and '永久保留这次编译'. Below this, a section titled '启动用户 User' shows the build started 3 min 49 sec ago and took 15 sec. A 'This run spent:' section lists: 7 ms waiting, 15 sec build duration, and 15 sec total from scheduled to completion. The 'git' section shows the revision '5b613c7382adafe7ef0022a47001dea4ab19cf1d' and repository 'git@github.com:OSSDP/Lab4-2022110553.git', with the branch 'refs/remotes/origin/dev'. Finally, the 'Changes' section shows '没有变化.' (No changes).

Jenkins

Dashboard > Lab4-2022110553 > #16

状态集

变更记录

控制台输出

编辑编译信息

删除构建 '#16'

Timings

Git Build Data

上一次构建

#16 (2024年12月12日 下午9:44:02) Add description 永久保留这次编译

启动用户 User Started 3 min 49 sec ago Took 15 sec

This run spent:

- 7 ms waiting;
- 15 sec build duration;
- 15 sec total from scheduled to completion.

git Revision: 5b613c7382adafe7ef0022a47001dea4ab19cf1d Repository: git@github.com:OSSDP/Lab4-2022110553.git

- refs/remotes/origin/dev

没有变化。

不过 PR 由于之前的一次错误测试，显示测试未通过，并且没有自动合并

Auto PR from dev-Jenkins to main #1

[Open](#) Ch1ldKing wants to merge 3 commits into `main` from `dev`

Conversation 0 Commits 3 Checks 2 Files changed 2 +3 -14

Ch1ldKing commented 4 minutes ago Collaborator

This is an auto PR from Jenkins.

Ch1ldKing and others added 3 commits 3 hours ago

- commit dev branch f10f942
- Update pom.xml Verified a8a8e18
- update pom 5b613c7

Some checks were not successful [Hide all checks](#)
1 failing and 1 skipped checks

- ✗ tests / run_tests (pull_request) Failing after 23s [Details](#)
- ⌚ tests / auto_merge (pull_request) Skipped [Details](#)

✓ **This branch has no conflicts with the base branch**
Merging can be performed automatically.

[Merge pull request](#)

You can also [open this in GitHub Desktop](#) or view [command line instructions](#).

Add a comment

Write Preview [@](#) [H](#) [B](#) [I](#) [≡](#) [<>](#) [🔗](#) ...

Add your comment here...

Reviewers
No reviews
Still in progress? [Convert to draft](#)

Assignees
No one—[assign yourself](#)

Labels
None yet

Projects
None yet

Milestone
No milestone

Development
Successfully merging this pull request may close these issues.
None yet

Notifications [Customize](#)
[Unsubscribe](#)
You're receiving notifications because you authored the thread.

1 participant

因此关闭这个 PR，修改代码后重新推送一次，可以看到自动提交了 PR，消解冲突后也实现了自动合并

⚠ Don't get locked out of your account. [Download your recovery codes](#) or [add a passkey](#) so you don't lose access when you get a new device.

Auto PR from dev-Jenkins to main #2

[Open](#) Ch1ldKing wants to merge 5 commits into `main` from `dev`


Conversation 0

Commits 5

Checks 0

Files changed 2

+4 -3



Ch1ldKing commented now

Collaborator

...

This is an auto PR from Jenkins.

😊

Ch1ldKing and others added 5 commits 3 hours ago

commit dev branch

f10f942

Update pom.xml

Verified a8a8e18

update pom

5b613c7

update pom

389902a

update pom

493e097

This branch has conflicts that must be resolved

Resolve conflicts

Use the [web editor](#) or the [command line](#) to resolve conflicts.

Conflicting files

pom.xml

Merge pull request

You can also [open this in GitHub Desktop](#) or view [command line instructions](#).

Reviewers

No reviews

Still in progress? [Convert to draft](#)

Assignees

No one—[assign yourself](#)

Labels

None yet

Projects

None yet

Milestone

No milestone

Development

Successfully merging this pull request may close these issues.

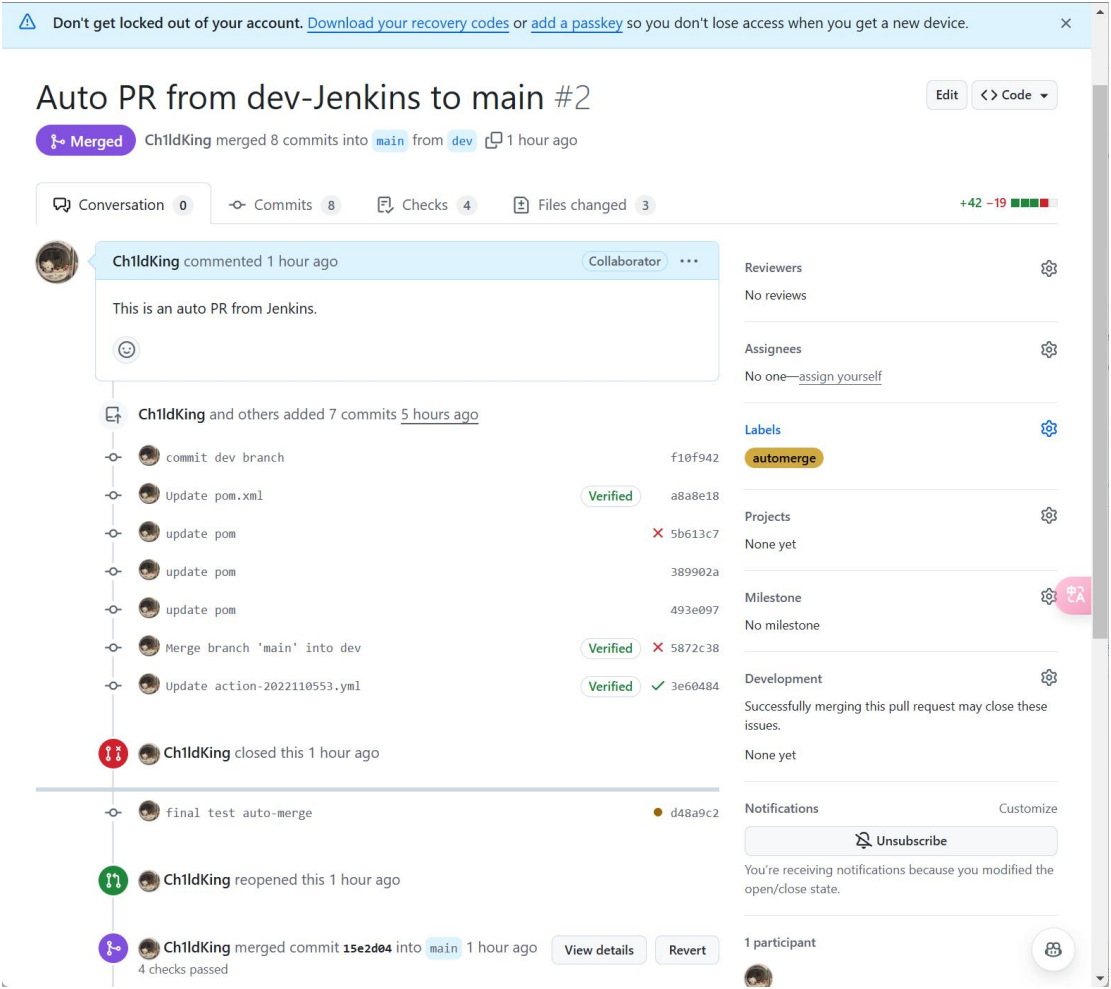
None yet

Notifications

Customize

Unsubscribe

You're receiving notifications because you authored the thread.



4 小结

自动化测试和自动化 PR 的作用可想而知,在真正的工程实践中他们可以极大的提高团队的开发效率,并在团队之间快速的传递项目的错误和更新信息,这不仅打破了团队中最重要的信息传递问题,而且提高了代码的质量,避免人为的错误