

哈尔滨工业大学 计算学部

2023 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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目 录

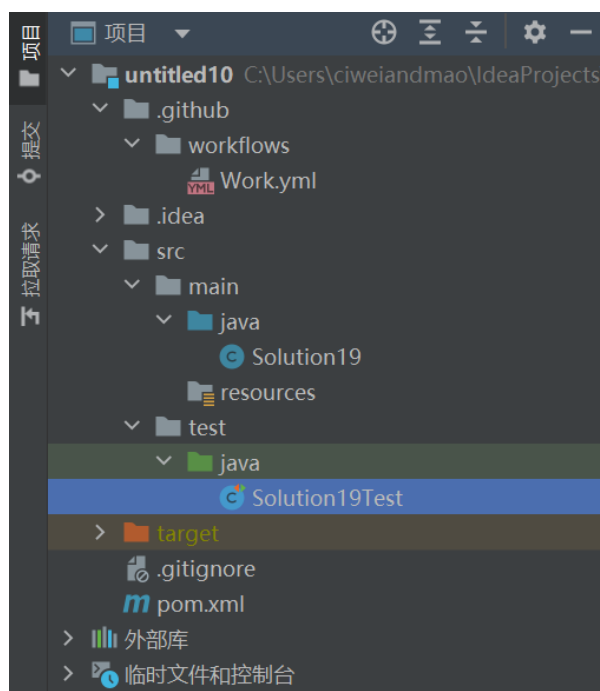
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1 实验要求

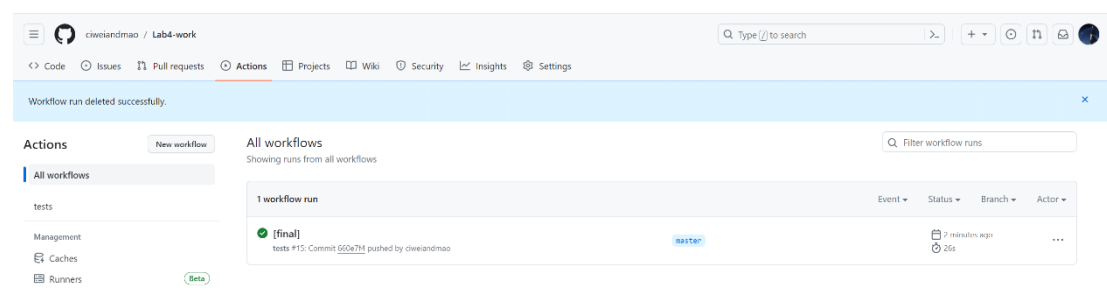
本次实验训练开源软件开发中的基本 DevOps 操作
掌握开源软件开发中的基本 DevOps 流程和工具的使用
熟悉利用 Github Actions 进行 DevOps
熟悉利用 Jenkins 进行 DevOps

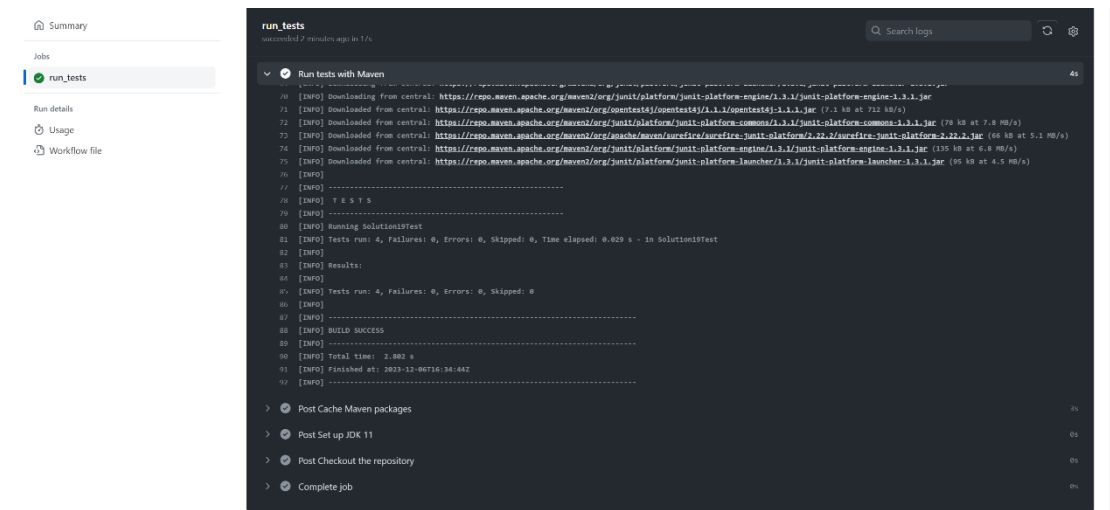
2 实验内容 1 Github Actions DevOps 实践

项目的目录结构截图如下：

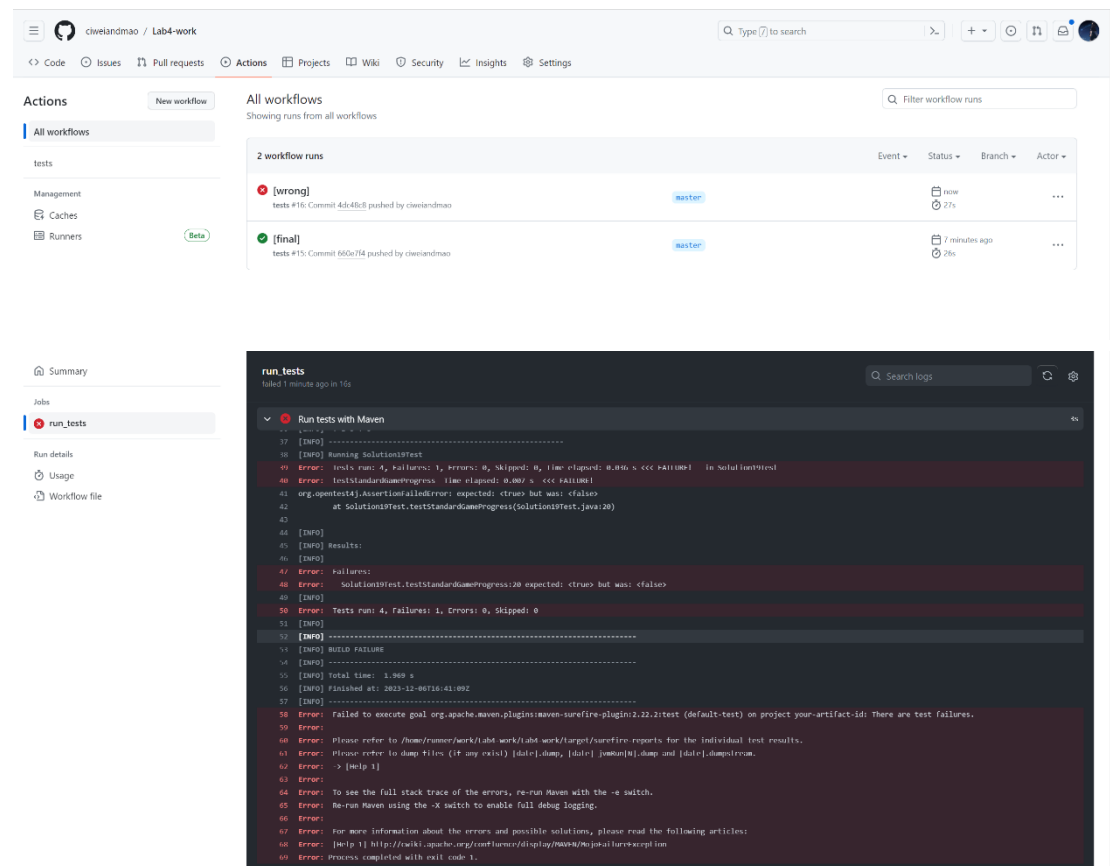


自动化执行成功页面与运行步骤：





自动化执行失败页面与运行步骤：



针对步骤 8 的 YAML 代码如下：

```
name: tests
on:
  pull_request:
    branches:
      - main
jobs:
  run_tests:
    runs-on: ubuntu-latest
    steps:
      - name: Checkout the repository
        uses: actions/checkout@v2

      - name: Set up JDK 11
        uses: actions/setup-java@v1
        with:
          java-version: 11

      - name: Cache Maven packages
        uses: actions/cache@v2
        with:
          path: ~/.m2
          key: ${runner.os}-${hashFiles('**/pom.xml')}
          restore-keys: ${runner.os}-${hashFiles('**/pom.xml')}

      - name: Run tests with Maven
        run: mvn -B test --file pom.xml

      - name: Merge PR on success
        if: success()
        run: |
          TOKEN="${{ secrets.GITHUB_TOKEN }}"
          REPO="${{ github.repository }}"
          NUMBER="${{ github.event.number }}"
          MERGE_COMMIT_TITLE="Automatically Merged by GitHub Actions"

          # Set up Git configuration
          git config --global user.email "actions@github.com"
          git config --global user.name "GitHub Actions"

          # Fetch the pull request branch
          git fetch origin pull/${NUMBER}/head:pr-${NUMBER}
          git checkout pr-${NUMBER}

          # Merge with the main branch
          git merge --no-ff origin/main -m "${MERGE_COMMIT_TITLE}"

          # Push the changes back to the pull request branch
          git push origin pr-${NUMBER}

          # Create a pull request to merge the changes
          gh pr merge ${{NUMBER}} --squash --title "${MERGE_COMMIT_TITLE}" --body "Automatically merged by GitHub Actions" --reviewer <REVIEWER_USERNAME>

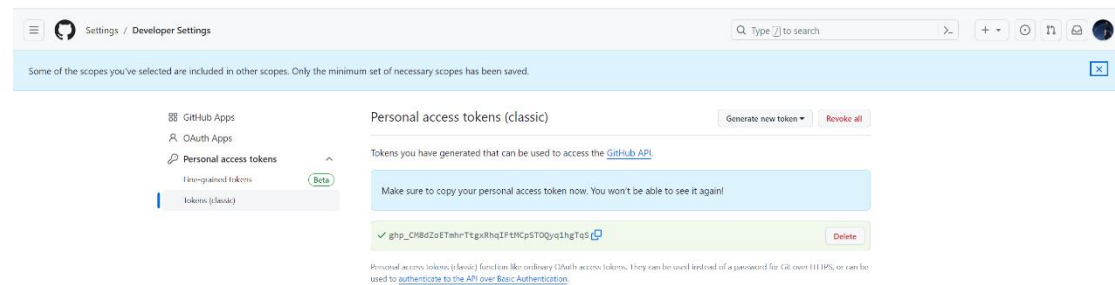
env:
  GITHUB_TOKEN: ${secrets.GITHUB_TOKEN}
```

3 实验内容 2 Jenkins DevOps 实践

步骤二：完成 JenKins 安装与环境配置

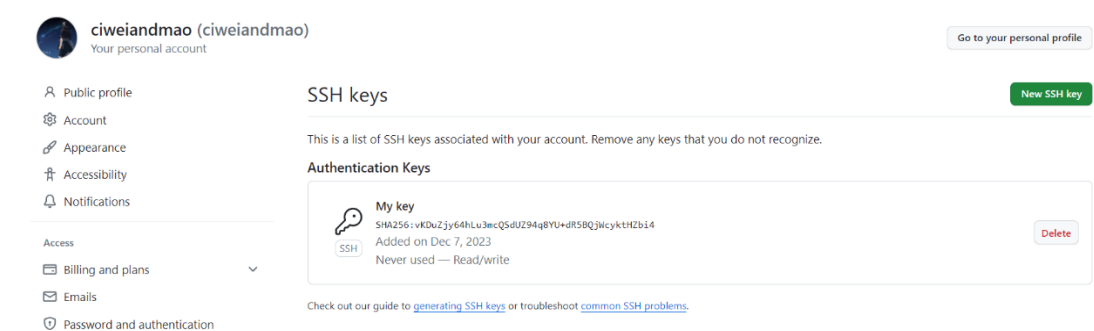
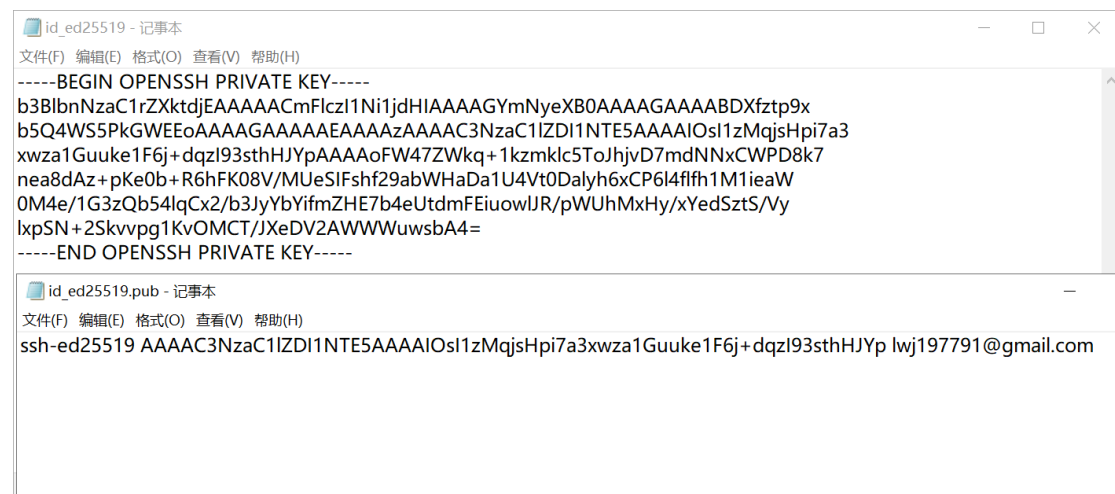


步骤三：在 github 上生成 token

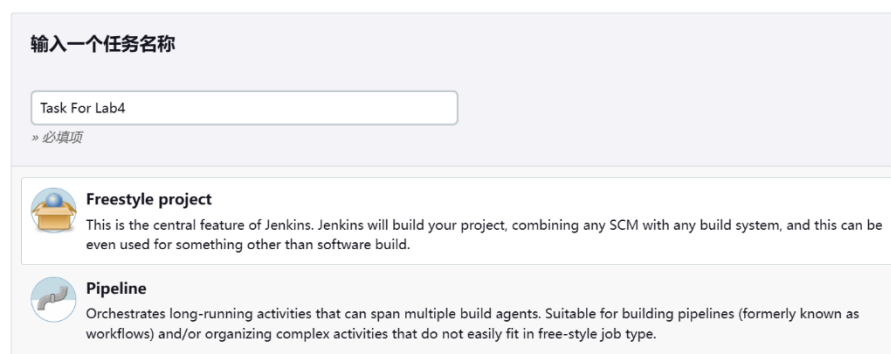


步骤六操作过程：

生成 SSH 秘钥导入秘钥：



编辑 Jenkins 任务配置



源码管理

☐ 无☒ Git ?

Repositories ?

Repository URL ?

Credentials ?

高级 ▾

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 ?

Would last have run at 2023年12月7日星期四 中国标准时间 19:15:04; would next run at 2023年12月7日星期四 中国标准时间 19:18:04.

☐ 忽略钩子 post-commit ?

Execute Windows batch command ?

命令

参阅 [可用环境变量列表](#)

高级 ▾

Execute Windows batch command ?

命令

参阅 [可用环境变量列表](#)

高级 ▾

Execute Windows batch command ?

命令


参阅 [可用环境变量列表](#)

步骤七操作过程：（此处仓库建立了新的分支，实现自动 PR）


```
管理员: Windows PowerShell
To https://github.com/ciweiandmao/Lab4-work
c19b6d0..b10064b master -> master
branch 'master' set up to track 'origin/master'.
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git add "src/test/java/Solution19Test.java"
warning: in the working copy of 'src/test/java/Solution19Test.java', LF will be replaced by CRLF the next time Git touches it
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git commit -m [tset]
[master 2b1ce2] [tset]
1 file changed, 1 insertion(+), 1 deletion(-)
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git push -u origin master
Enumerating objects: 11, done.
Counting objects: 100% (11/11), done.
Delta compression using up to 12 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (6/6), 458 bytes | 458.00 KiB/s, done.
Total 6 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/ciweiandmao/Lab4-work
b10064b..2b1ce2 master -> master
branch 'master' set up to track 'origin/master'.
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git push -u origin Other
Everything up-to-date
branch 'Other' set up to track 'origin/Other'.
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git add "src/test/java/Solution19Test.java"
warning: in the working copy of 'src/test/java/Solution19Test.java', LF will be replaced by CRLF the next time Git touches it
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git commit -m [tset]
[master 8d66585] [tset]
1 file changed, 1 insertion(+), 1 deletion(-)
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git push -u origin master
fatal: unable to access 'https://github.com/ciweiandmao/Lab4-work/': Failed to connect to github.com port 443 after 2105
5 ms: Couldn't connect to server
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git push -u origin Other
fatal: unable to access 'https://github.com/ciweiandmao/Lab4-work/': Failed to connect to github.com port 443 after 2106
6 ms: Couldn't connect to server
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git add "src/test/java/Solution19Test.java"
warning: in the working copy of 'src/test/java/Solution19Test.java', LF will be replaced by CRLF the next time Git touches it
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git commit -m [tset]
[master dee6edb] [tset]
1 file changed, 1 insertion(+), 1 deletion(-)
PS C:\Users\ciweiandmao\IdeaProjects\untitled10> git push -u origin master
Enumerating objects: 17, done.
Counting objects: 100% (17/17), done.
Delta compression using up to 12 threads
Compressing objects: 100% (8/8), done.
Writing objects: 100% (12/12), 886 bytes | 886.00 KiB/s, done.
Total 12 (delta 4), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (4/4), completed with 2 local objects.
To https://github.com/ciweiandmao/Lab4-work
```


提交改动以后自动 PR 构建成功的截图如下

🟢 #17 (2023年12月7日 19:03:09)


**Changes**

1. [tset] ([details](#) / [githubweb](#))

**Started by an SCM change**

**Revision:** 3997d2a582a46eebf18892f934bc456ea6486a4a
Repository: <https://github.com/ciweiandmao/Lab4-work.git>

• refs/remotes/origin/master

**Jenkins**

Dashboard > Task for Lab4 > #17 > 控制台输出

📄 状态

📄 变更记录

📄 控制台输出

📄 文本方式查看

📄 编辑输出信息

📄 跳转到#17

📄 Polling Log

📄 Git Build Data

📄 上一次构建

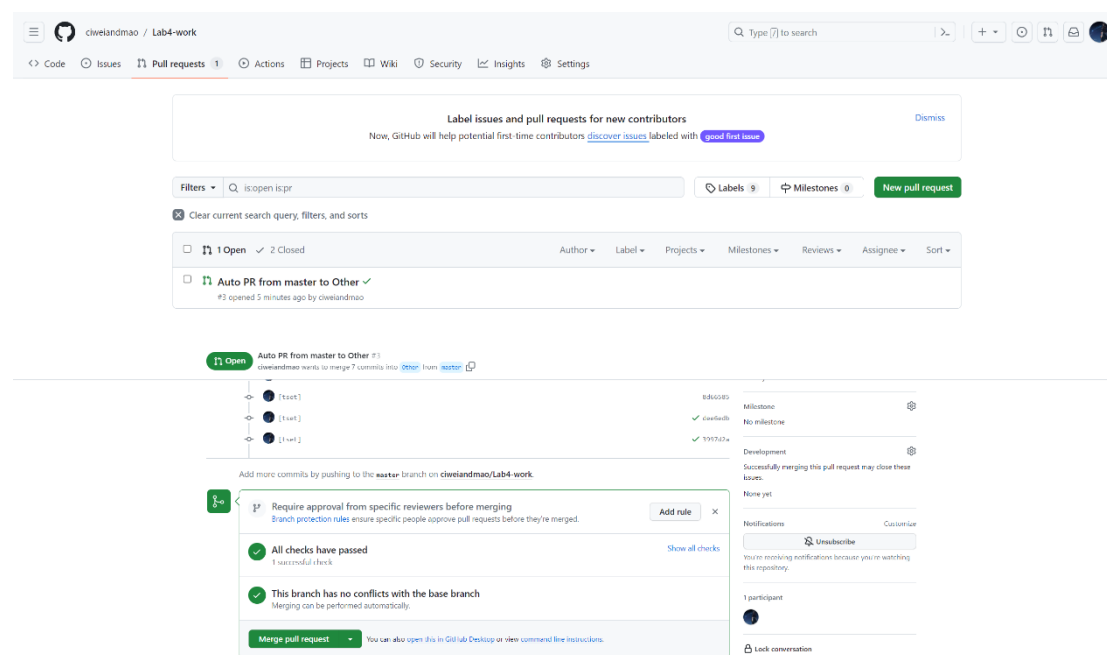
🟢 控制台输出

Started by an SCM change
Running as SYS-INT
Building in workspace C:\ProgramData\jenkins\jenkins\workspace\Task for Lab4
The recommended git tool is: NONE
using credential 7dbccf66-8238-4660-93fa-3579a1bcb78a
> git.exe rev-parse --resolve-git-dir C:\ProgramData\jenkins\jenkins\workspace\Task for Lab4\git # timeout=10
Fetching changes from the remote Git repository
> git.exe config remote.origin.url https://github.com/ciweiandmao/Lab4-work.git # timeout=10
Fetching upstream changes from https://github.com/ciweiandmao/Lab4-work.git
> git.exe --version # timeout=10
> git --version # "git version 2.42.0.windows.2"
using GIT_ASKPASS to set credentials
> git.exe fetch --tags --force --progress -- https://github.com/ciweiandmao/Lab4-work.git refs/heads/*:refs/remotes/origin/* # timeout=10
> git.exe rev-parse --format=%H:refs/remotes/origin/master [commit] # timeout=10
Checking out Revision 3997d2a582a46eebf18892f934bc456ea6486a4a (refs/remotes/origin/master)
> git.exe config core.sparsecheckout # timeout=10
> git.exe checkout -f 0991d2a2a24eefb18892f934bc456ea6486a4a # timeout=10
Commit message: "[tset]"
> git.exe rev-list --no-walk de0dbf478b728b9573b078b0e7f905290e7 # timeout=10
[Task for Lab4] \$ cmd /c call C:\Windows\TEMP\jenkins188683991778804106.bat

C:\ProgramData\jenkins\jenkins\workspace\Task for Lab4\bin validate
[INFO] Scanning for projects...
[INFO]
[INFO] < com.example.your-artifact-id >
[INFO] Building your-artifact-id 1.0-SNAPSHOT
[INFO] from pom.xml
[INFO] [jar]
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 0.076 s
[INFO] Finished at: 2023-12-07T19:03:13+08:00

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仓库中自动 PR 的成功显示：



4 小结

本次实验经历了千辛万苦完成，个人在 bug 调试方面和日志查找方面有了长足进展，学会利用 github 文档工具解决配置不成功的困难。具体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 与 熟悉利用 Jenkins 进行 DevOps，本次实验让人受益匪浅