Using Git & Github for Collaborative Development

Recitation 1, CMU 17-313, Fall 2022

Overview
After this recitation, the students should be able to use Git and GitHub for their teamwork in this course and other projects. Students should know about the GitFlow workflow and how to collaborate with other developers in their projects.

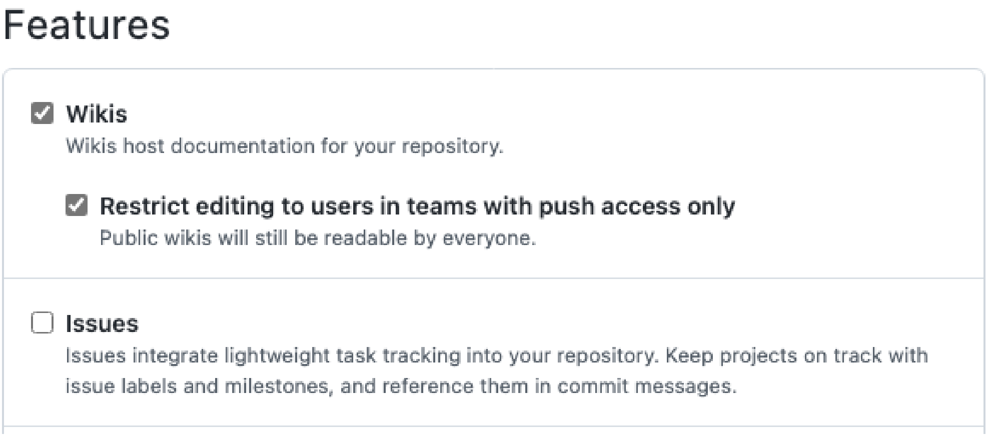
Prerequisites

- You have a GitHub account
- You have Git installed
- You have Python 3 installed
- You know Git Basics

You would be doing the activities as pairs! Find a partner. Unless specified, each step is to be done by both people.

Activity 1a: Forking a repo and adding a collaborator

- You or your partner forks this repository, then add the other person as a collaborator on GitHub. You can do so by clicking on **Settings**, then **Collaborators**
- Under the **General** tab in Settings, check the "Issues" checkbox in the "Features" section to enable the issues pane for your repository



Features

☑ Wikis
Wikis host documentation for your repository.

☑ Restrict editing to users in teams with push access only
Public wikis will still be readable by everyone.

□ Issues
Issues integrate lightweight task tracking into your repository. Keep projects on track with issue labels and milestones, and reference them in commit messages.

- Clone the repository on your local machine

Activity 1b: Run a GitHub Action Workflow

- Under **Actions**, select the "Python Application" workflow
- Click on the "Run workflow" dropdown, then the "Run workflow" button (leave Branch to be at main). This runs the GitHub workflow that uses pytest to test the function Fibonacci in `fib.py` using `test_fib.py`

- Click into the workflow that was just run, then select “build” to see if there are any issues. There should be test cases failing

Our test cases suggest that the main branch is broken![1] Let’s walk through the process to fix these errors.

Activity 2: Setting up Kanban board and creating issues

- Click through the build output and take a look at which test cases are failing
- On GitHub, under the **Project** tab, have one person create a new project with the “Board” template. Make sure to set the project to public, invite your partner as a collaborator, then add the project board to the repository
- Under the **Issues** tab, have the other person create an issue for each failing test case
- Assign yourselves to both issues, one for each person
- Add the two issues to the project Kanban board under the Todo column

Activity 3: Branching, committing, and pushing

- In your local machine, create a new branch with a relevant name to the issue you are addressing (e.g. *“fix-header-sizing-issue”, “fix-multiple-dialog-bug”, “add-sorting-feature”)*
- Fix the issue that you were assigned to, then add and commit the changes
    - Commits should start with a verb, and what it does to the codebase (e.g. *“Remove faulty condition from getCustomerDetails”, “Fix failing CompositeTestCase”, “Fix issue #21”)*
- Push the branch to remote

    -
      ```
      git push --set-upstream origin <your-branch-name>
      ```

Activity 4: Writing pull requests

- On GitHub, create a pull request to merge the changes from the branch you have just pushed to the main branch
    - **Make sure it is to the main of your own forked repository! By default, Github selects the original repository instead of your own forked repository**
    - Name your pull request appropriately
    - In the description, describe what changes has been made to address the issue, and how has the changes been tested
    - Notice that the GitHub action workflow runs automatically when you create the pull request! You should check that the relevant test case to your fix now passes
- Assign the issue you created to the pull request
- Request your partner for a code review

Activity 5a: Doing code reviews and resolving merge conflicts

[1] In practice, you should **not** merge a branch into the main branch that could cause main to fail. This way, we can ensure that all the code on main is our most recent working product

- Review your partner’s code (use the review change button). Approve changes if it looks good
- Once your PR has been reviewed, merge your changes! Resolve any merge conflicts that arises accordingly
- Return to the Kanban board. If everything was set up correctly, the issue should automatically move into the Done column

Activity 5b: Check GitHub actions

- Click on the Actions tab. If you have resolved all the issues correctly, the tests should now pass, and a green check should show

Remember to do Recitation Quiz 1 on Canvas! Please only open it after you have done your recitation.