CS5004, Spring 2022

Lab 2: Working with branches in GitHub

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Adapted from lab created by Abi Evans, Brian Cross

1. Summary

If you are new to Git, you have likely been working in the "main branch" of your Github repo. In industry, work is never carried out directly in the main branch. Instead, engineers will create a "topic branch" to work on their assigned tasks. When work is complete and thoroughly tested, the topic branch can be merged into main. For the rest of this semester, you will adopt this workflow, writing all your code in topic branches then requesting to merge into main when you're ready to submit your work.

In today's lab, we will practice:

- Creating and working in branches in Github.
- Submitting pull requests.
- Reviewing pull requests.
- Merging approved pull requests.

To complete this lab, you will use the Java project that you created in Lab1 (Copied into a folder named "Lab1"). You will create a Pull Request from a topic branch into the main branch of YOUR repo. You will assign the Pull Request to the TAs of the class. You can merge your branch once a TA has approved It. This Is how we will turn in our assignments.

2.Working with branches

2.1. Setup

You may have noticed a repo called "sandbox" on the course GitHub organization. Everyone involved in this class has write access to this repo. Today, you will use this repo to get some practice working with branches.

Once you are comfortable with the material in the lab. **In your OWN repo**, please copy your Lab1 java project (In a folder named Lab1) and submit a pull request to the TAs of the class.

Clone the repo to your machine by running:

```
git clone https://github.ccs.neu.edu/cs5004S2022EvenSEA/sandbox.git
```

2.2. Create a branch

Change into the directory created by the previous step:

```
cd sandbox
```

Create a branch in your local repo by running the following command, replacing `your_username` with your Khoury GitHub username for all occurrences below:

```
git checkout -b your_username
```

You will see a message along the lines of:

```
Switched to a new branch 'your_username'
```

Creating a new branch effectively creates a copy of the code in the branch you are in when you run the command. For your homework assignments, you will name your branches after the assignments e.g. assignment4. You most often want to be in the main branch when you create a new branch.

Run the command `git branch` to see a list of branches available in your local repo, as well as the currently selected branch. You will see output along the lines of:

```
*your_username
main
```

The asterisk (*) indicates the branch you are currently in.

The branch you created currently only exists in your local repo. **Push your branch to the remote repo** by running:

```
git push -u origin your_username
```

Open the sandbox repo in your browser. By default, the code listing shows the code contained in the main branch. Look for the dropdown menu that says "Branch: main", shown in the bottom left of the following screenshot.

Use the dropdown menu to switch to your branch. You haven't made any edits on your branch yet so it will contain the same code as the main branch.

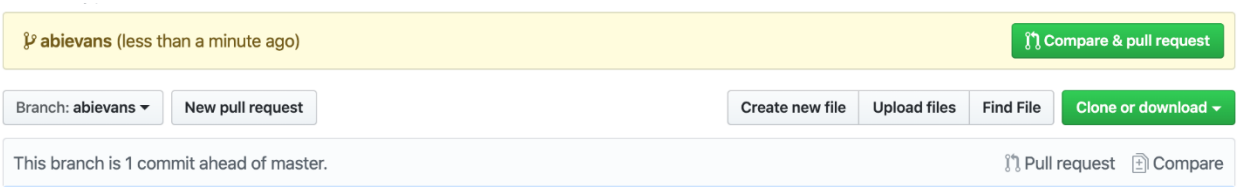
2.3. Add code to the branch

In your local copy of the sandbox repo, create a folder named after your branch name. Write some Java code in the folder you created. It doesn't matter what you write for this lab—it doesn't have to serve any particular purpose—but please remember that anything you post will be visible to everyone involved in the course. Do not post code related to assignments or other labs.

Commit and push your changes as you would do normally.

Open the sandbox repo in your browser and switch to your branch. If your branch is already selected, you may need to refresh the page to see your changes.

You should see something like the following:



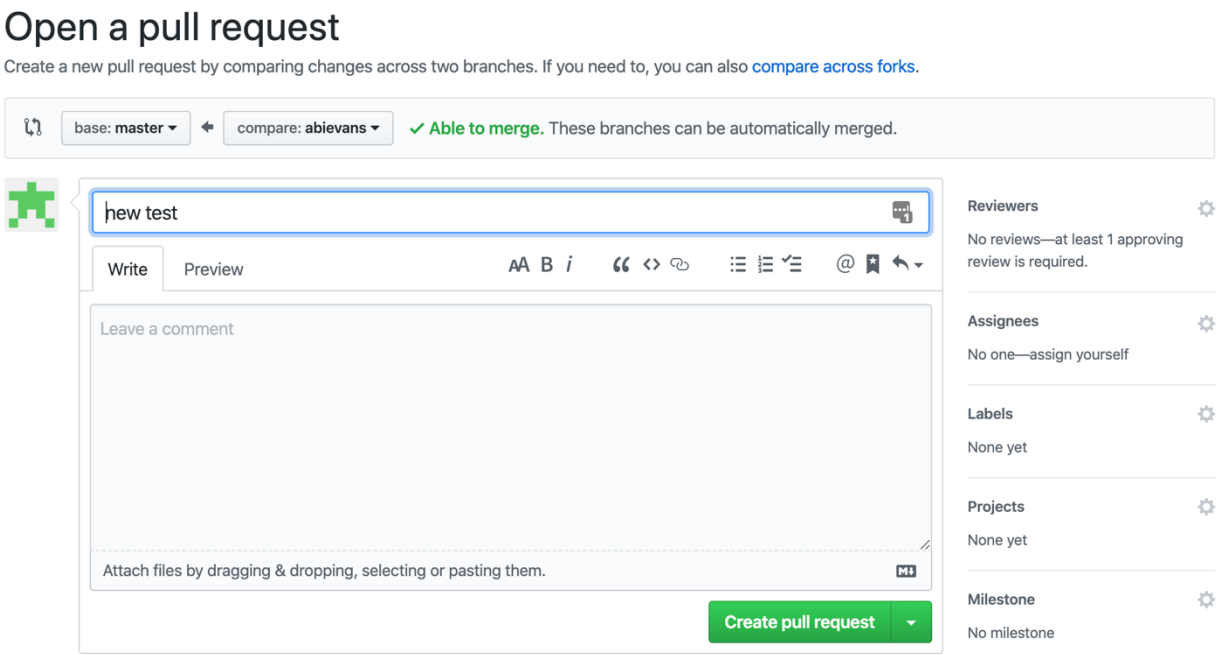
Note the new button, "Compare & pull request", and the message, "This branch is 1 commit ahead of main." The message means that your branch contains new code that is not in the main branch.

With your branch selected, you will see the code you pushed. However, if you switch to the main branch, note that the code you just pushed is not there. Code written on one branch will not exist in another branch until the two branches are merged.

2.4. Create a pull request

To merge the code on your branch to main, you will initiate a "pull request". This has to be done from the browser. **Click the green "Compare & pull request" button**.

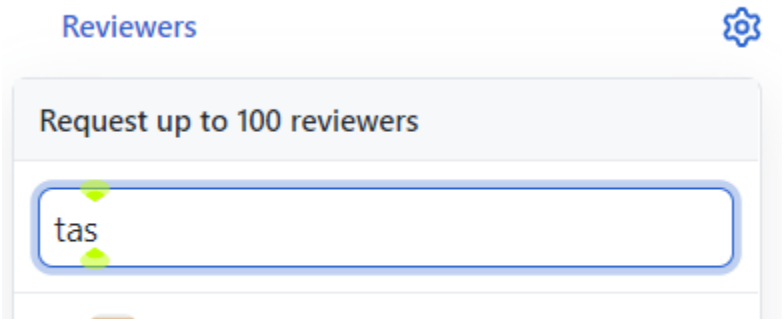
This will take you to a new page that looks something like this:



By default, the title of the pull request will be whatever message you provided with your most recent commit. It Is best to choose a title that best represents the changes being made In the pull request.

Assign a reviewer by clicking the settings icon next to "Reviewers" in the right sidebar. Search for a reviewer by their username then click on their username to assign them to your pull request. For assignments, you will tag our class TAs. You can do that by choosing **cs5004S2022EvenSEA/TAs** TAs team. For practice in this lab in the sandbox repo, you may tag a friend in the course if you prefer.

For the final "turn-In" of this lab, in **your own repo**, create a pull request and you can assign a reviewer to the **cs5004S2022EvenSEA/Tas** team. Type "tas" and you'll see the team in the drop-down. Click the group in the drop-down and It will be added as a reviewer.



Click "Create pull request". The assigned reviewer will be notified.

If you receive a review request from someone else, open up the review link, approve the merge and optionally leave them a comment.

2.5. Merge the branch into main

You will be notified when your pull request has been reviewed. Assuming the request was approved, you can **click the "Merge pull request" button, followed by the "Confirm merge" button.**

At this stage, you can delete the `your_username` branch if you wish. Note that the button "delete branch" on the browser UI for Github only deletes the remote version of the branch. To delete your local branch, switch to the main branch by running `git checkout main`, then run `git branch -D your_username`. (using - capital 'D' will delete a local branch without any checks of whether It has merged Into Its parent branch or not. - lower 'd' will warn you otherwise).

With the repo open in your browser, switch to the main branch. You should now see all your code in the main branch.

2.6. Get the latest version of the main branch

In your local repo, switch to the main branch:

```
git checkout main
```

At this point, you won't see your recently merged code because you haven't updated your local version of the main branch... **use the pull command to get the latest version of the branch**:

```
git pull
```

At this point you should now see your merged code.

3. Avoiding merge conflicts

If you experience a merge conflict, consult p17 of the GITrefresher PDF posted under “labs” on Piazza.

The best way to avoid merge conflicts is to ensure that you never work on code that belongs to another branch. Always check you are working on the correct branch before you begin a work session or after you have taken a break by running `git branch`. If you need to switch branches, you can do so by running `git checkout branch_name`, replacing `branch_name` with the name of the branch you want to switch to.

Before creating a new branch, ensure that any outstanding local changes are pushed to the remote repo. Then, run `git pull` from the `main` branch. This ensures that your local repo is up to date with the remote repo.

4.That's It!

Don’t forget that to complete Lab2, you need to turn in your Lab1:
In your OWN repo, create a topic branch (named "Lab1"), copy your Lab1 java project (Into a folder named Lab1) and submit a pull request to the TAs of the class. Once a TA approves the lab, you may merge It into main.

If you have any questions or problems with git, please don’t hesitate to ask a question on Piazza. Commit early and often. You are working in your own branch. The commits are largely for you. Whenever you get to a milestone (big or small), make a commit. Use good titles for your commits and you’ll be able to go back in time if you ever need to. After you make a commit, make sure you push your changes to the server. This will not only backup your work in the case of a computer failure but will allow the instructors and TAs to help you if you are having problems with the assignments (or git). Once you start working in groups, committing often can help with integrating your code with your team.