Using Git & GitHub

/* an introduction */

What Are They?

- Version Control Systems

- **Git** is a software development tool that tracks development of code and uses repositories

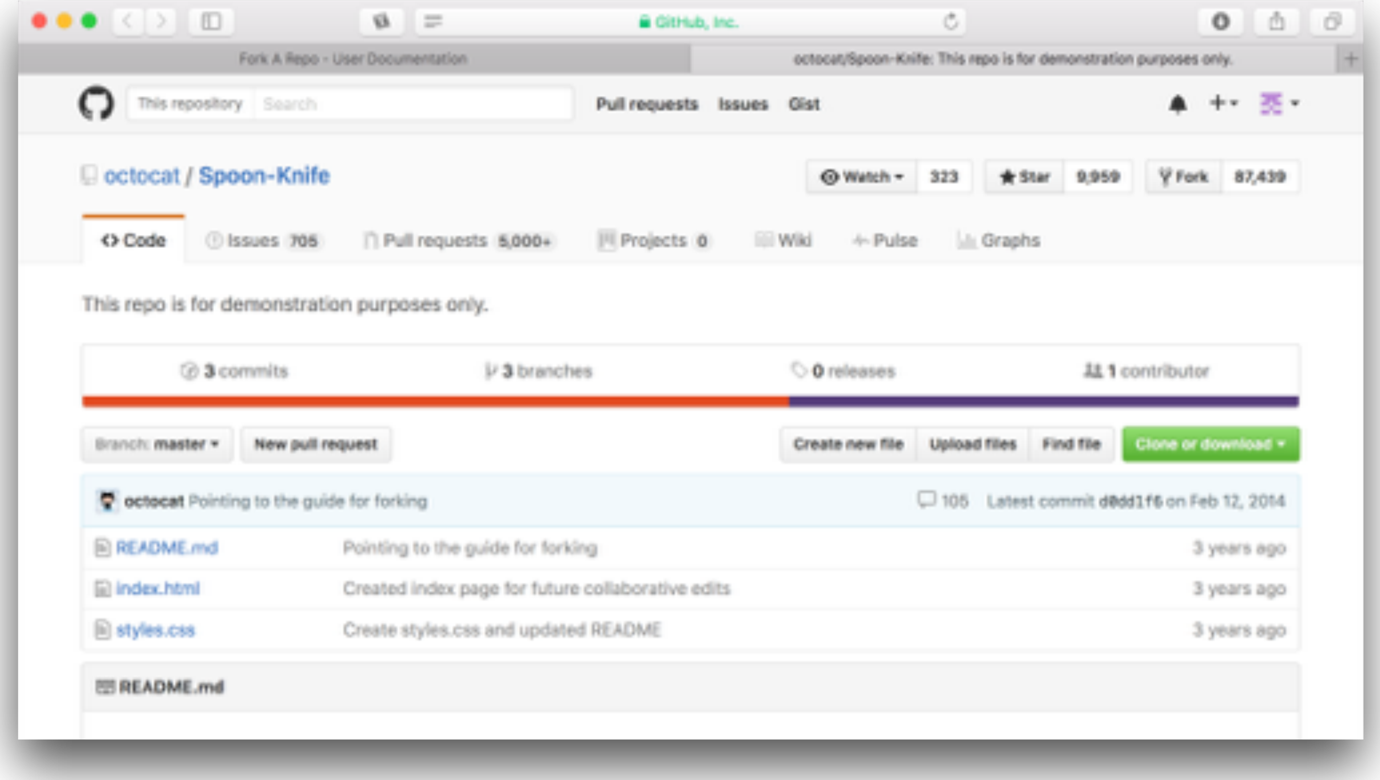
- **GitHub** is an online repository platform that allows you to store your code on their servers

- Provides a good framework for…
  - sharing your code
  - collaborating with others on code
  - updating or editing code

About Repositories

- **Repositories** (“repos”) are where you store your code and files related to it.

- This can include programs, documentation, directories, and even pictures!



This repo is for demonstration purposes only.

octocat Pointing to the guide for forking   105   Latest commit d0dd1f6 on Feb 12, 2014

README.md	Pointing to the guide for forking	3 years ago
index.html	Created index page for future collaborative edits	3 years ago
styles.css	Create styles.css and updated README	3 years ago

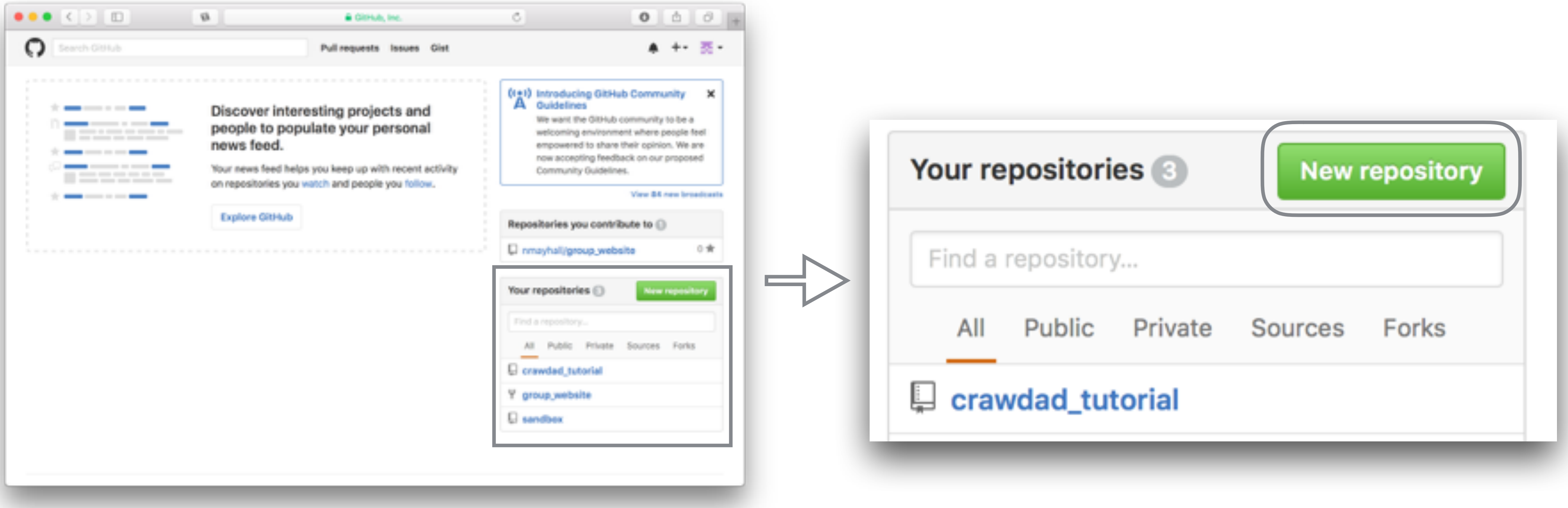
README.md

Creating Repositories

- Using Git (command line):

```
$ git init [directory path]
```

- Using the GitHub website:



Discover interesting projects and people to populate your personal news feed.

Your news feed helps you keep up with recent activity on repositories you watch and people you follow.

Introducing GitHub Community Guidelines

We want the GitHub community to be a welcoming environment where people feel empowered to share their opinion. We are now accepting feedback on our proposed Community Guidelines.

Repositories you contribute to

nmayhall/group_website 0

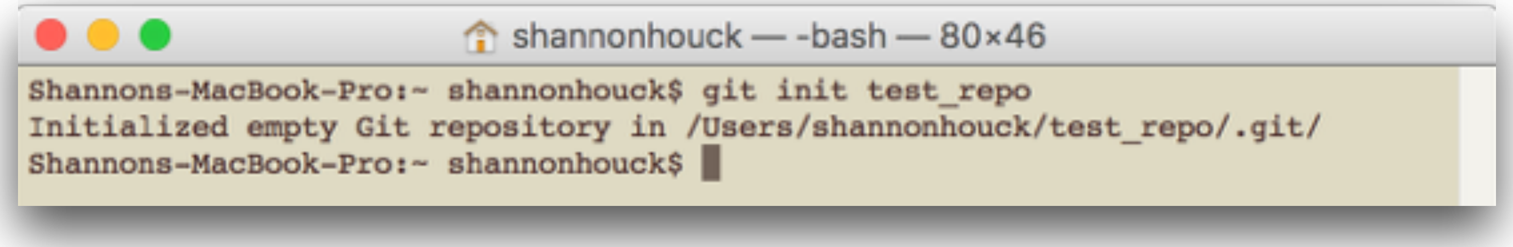
Your repositories 3

crawdad_tutorial

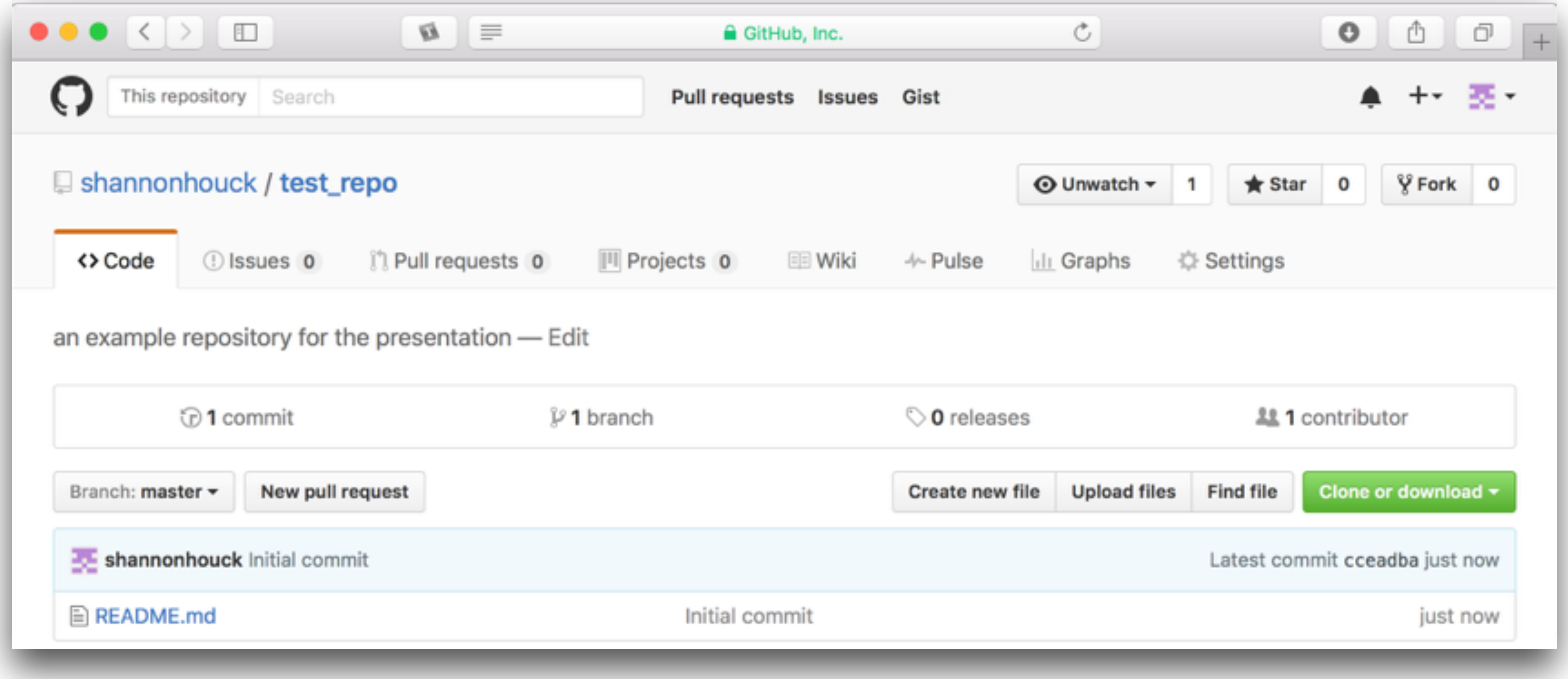
group_website

sandbox

Repository (Results)



```
Shannons-MacBook-Pro:~ shannonhouck$ git init test_repo
Initialized empty Git repository in /Users/shannonhouck/test_repo/.git/
Shannons-MacBook-Pro:~ shannonhouck$ 
```



an example repository for the presentation — Edit

1 commit 1 branch 0 releases 1 contributor

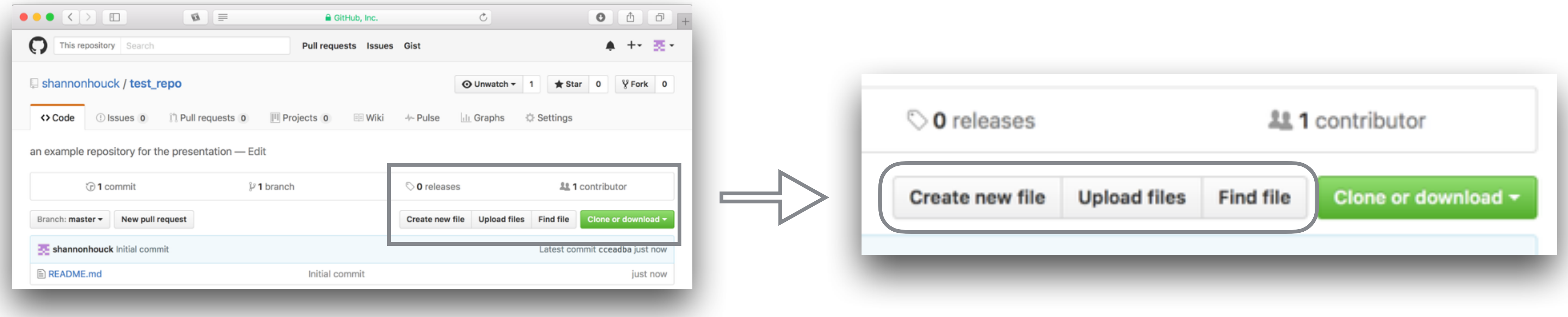
shannonhouck Initial commit Latest commit cceadba just now

README.md	Initial commit	just now

Adding

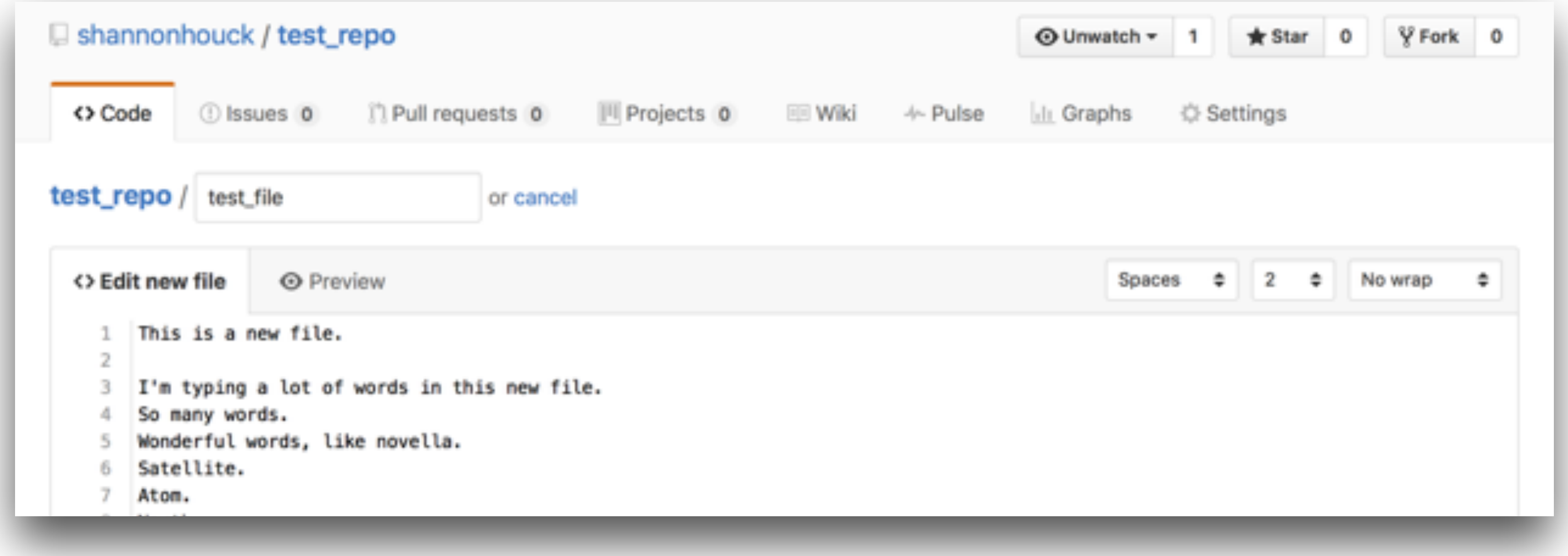
- On GitHub, it’s fairly easy. Make a file…

(1)



an example repository for the presentation — Edit

(2)



test_repo / test_file

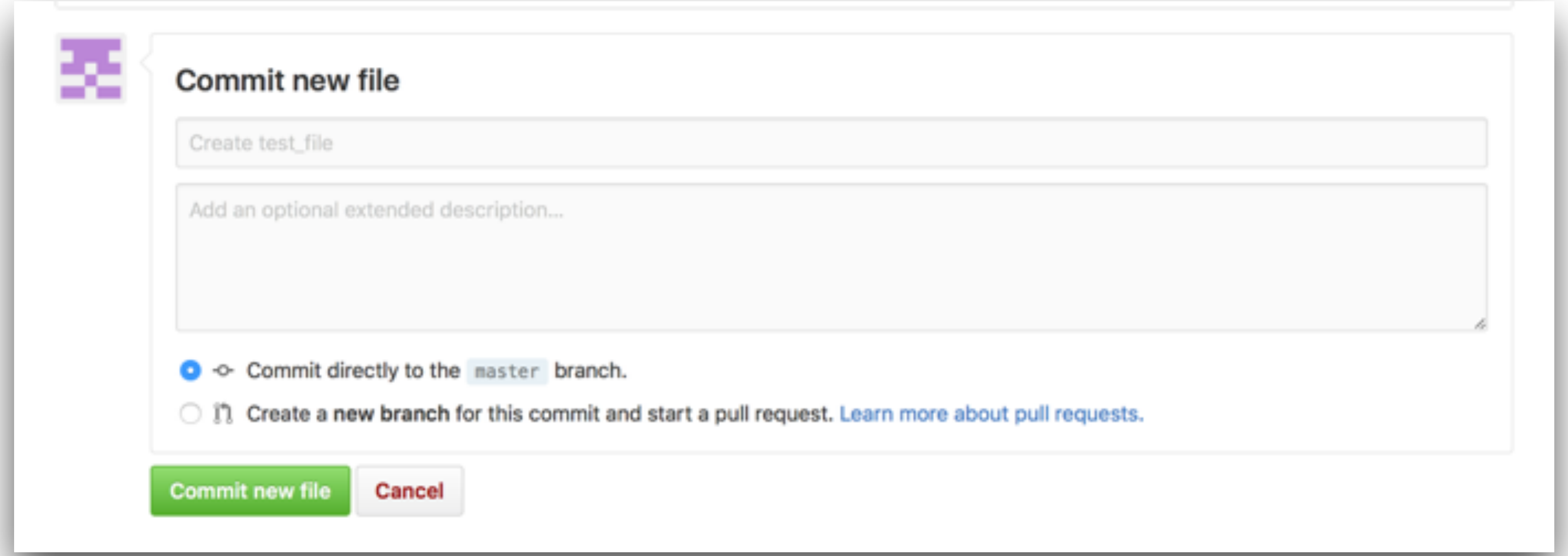
```
This is a new file.

I'm typing a lot of words in this new file.
So many words.
Wonderful words, like novella.
Satellite.
Atom.
```

Committing

- After editing, commit the changes!

- A **commit** finalizes the changes that you've made to your document; before the commit, the previous document (if there is one) is still the "official" version.



Commit new file

● Commit directly to the `master` branch.

○ Create a **new branch** for this commit and start a pull request. Learn more about pull requests.

Add With Git

- In Git, you can create a new file in the repository the same way you would in any other directory:

  ```
  $ touch [filename]
  ```

- Problem: New files aren’t part of the repository until you tell Git to pay attention to them!
- Solution: `$ git add [filename]`
- This only needs to be done once!

Commit With Git

- You can edit a tracked file with vim, as usual:

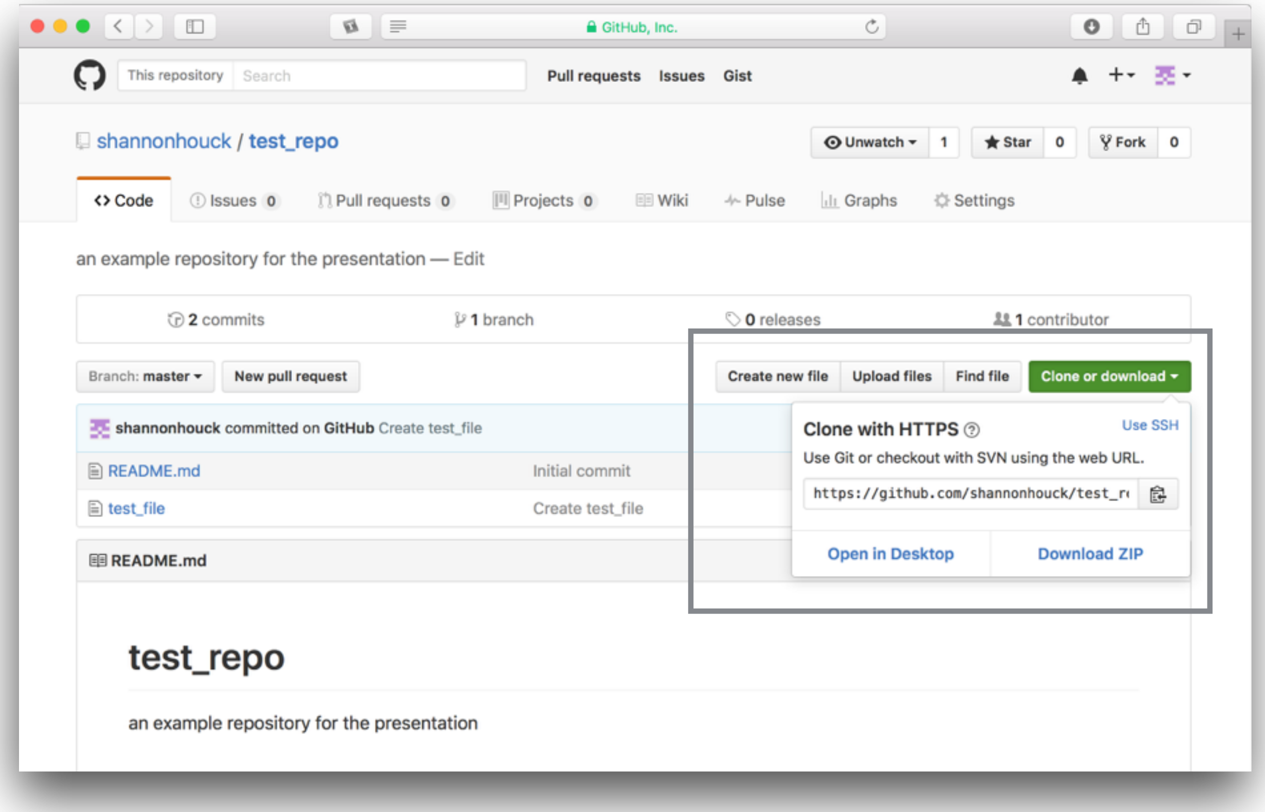
  ```
  $ vim [filename]
  ```

- Problem: Changes aren't committed by default!
- Solution: `$ git commit [filename]`
- You can add the `-a` flag to commit all tracked files at once, or use a wildcard to commit a subset.

Cloning

- **Cloning** a repository allows you to download a copy to your local machine

```
$ git clone [GitHub URL]
```



an example repository for the presentation — Edit

shannonhouck committed on GitHub Create test_file

README.md	Initial commit
test_file	Create test_file

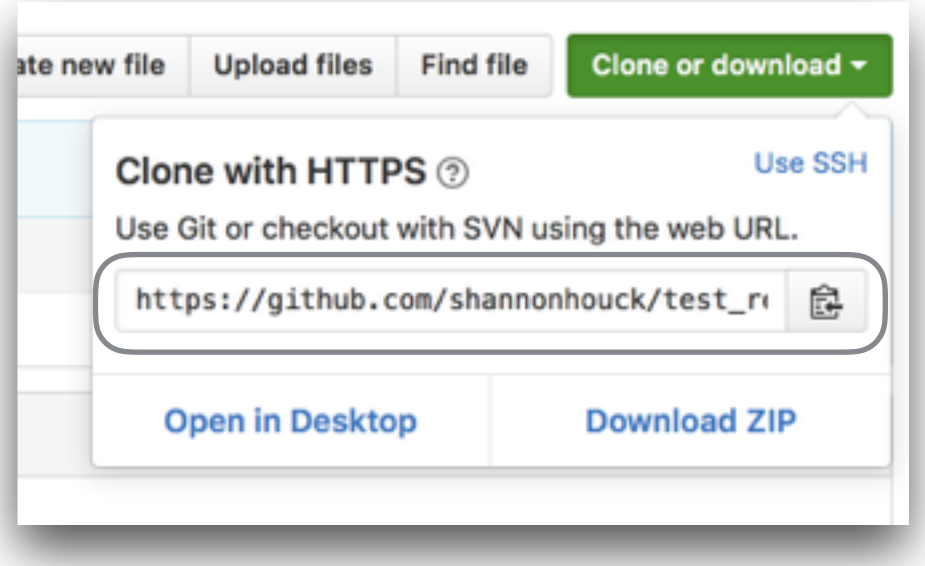
Clone with HTTPS

Use Git or checkout with SVN using the web URL.

https://github.com/shannonhouck/test_re

test_repo

an example repository for the presentation



Clone with HTTPS

Use Git or checkout with SVN using the web URL.

https://github.com/shannonhouck/test_re

Cloning

- You can edit the clone on your own machine just like you would a normal repository- add files, commit changes, and so on.

- When you commit changes, though, they only change the repo on your local machine…

- Solution? Pushing!

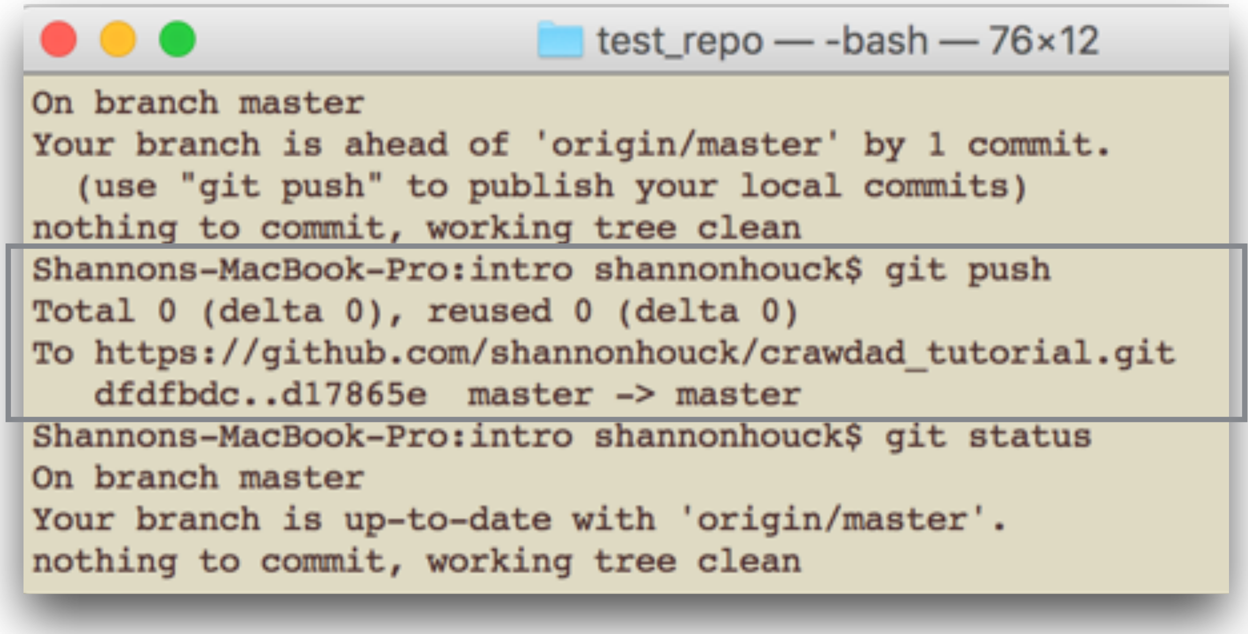
Pushing

- **Pushing** lets you “push” all of your committed local changes to the remote repository

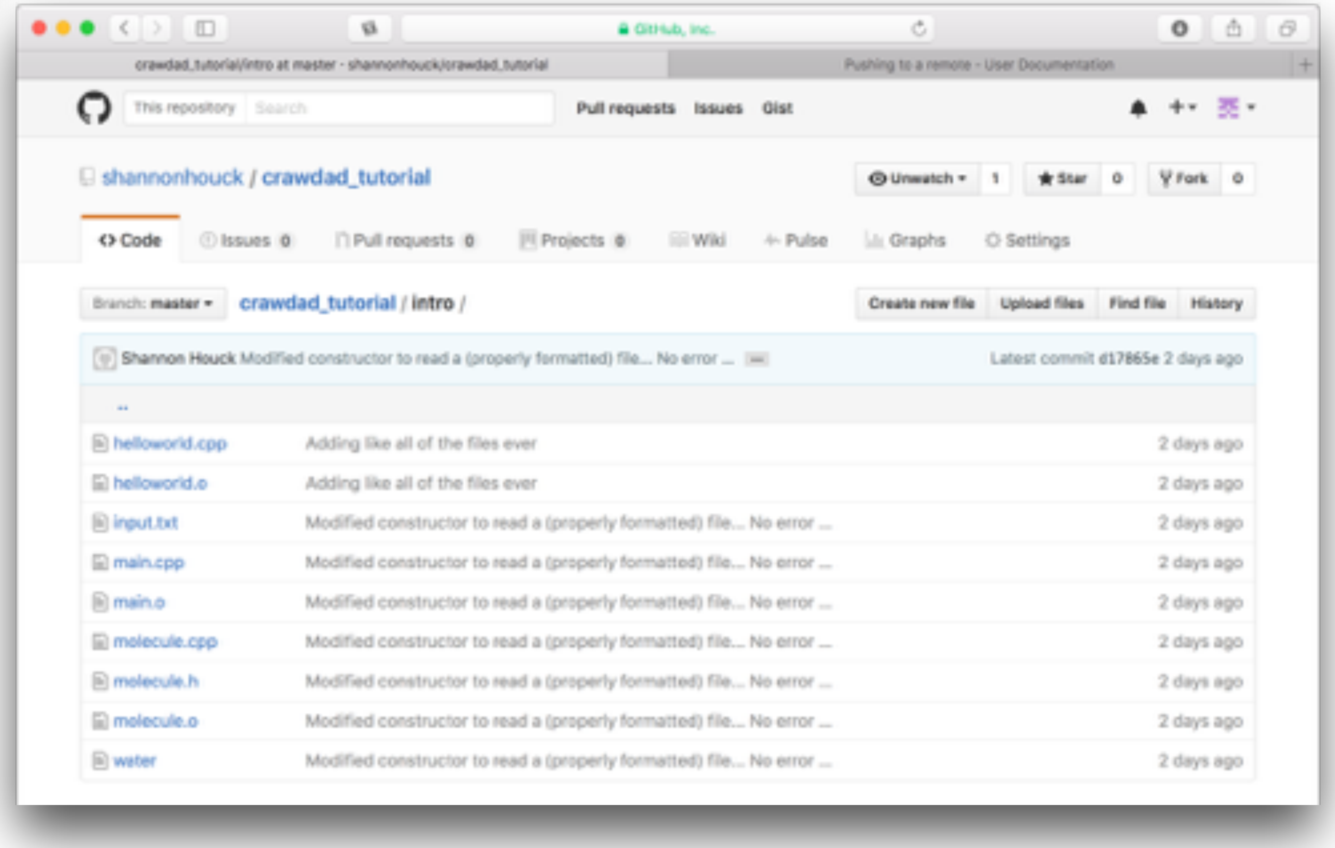
```
$ git push [repo name] [branch]
```

- If the two fields are left blank, it defaults to “origin” and the branch you cloned from. (It won’t push if you’re not authorized to change a repository!)

Pushing (Results)



```
On branch master
Your branch is ahead of 'origin/master' by 1 commit.
  (use "git push" to publish your local commits)
nothing to commit, working tree clean
Shannons-MacBook-Pro:intro shannonhouck$ git push
Total 0 (delta 0), reused 0 (delta 0)
To https://github.com/shannonhouck/crawdad_tutorial.git
   dfdfbdc..d17865e  master -> master
Shannons-MacBook-Pro:intro shannonhouck$ git status
On branch master
Your branch is up-to-date with 'origin/master'.
nothing to commit, working tree clean
```

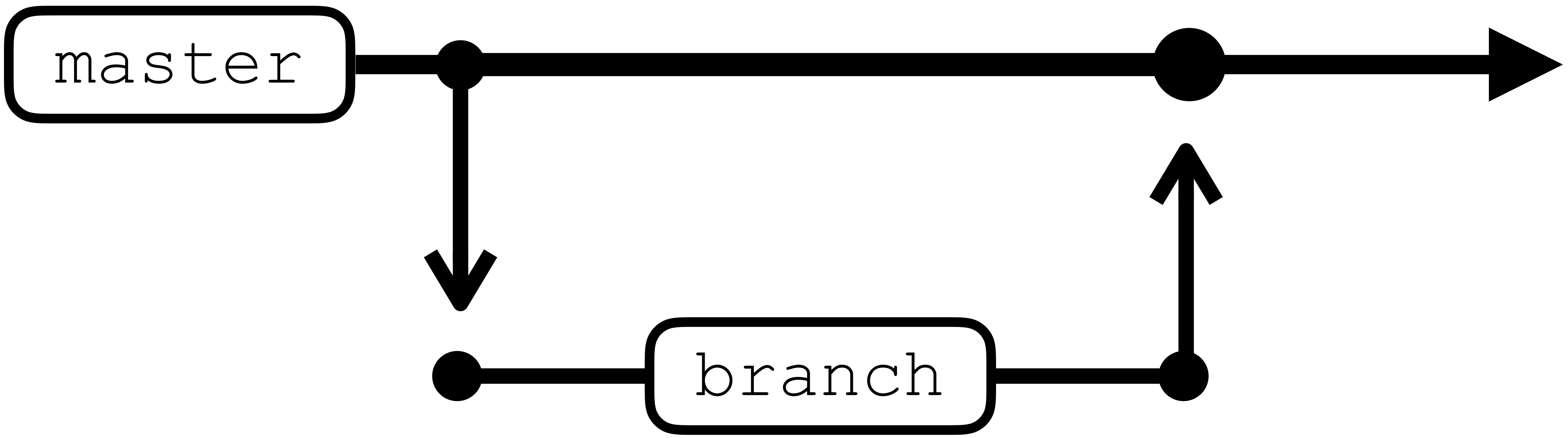


Shannon Houck Modified constructor to read a (properly formatted) file... No error ... Latest commit d17865e 2 days ago

..		
helloworld.cpp	Adding like all of the files ever	2 days ago
helloworld.o	Adding like all of the files ever	2 days ago
input.txt	Modified constructor to read a (properly formatted) file... No error ...	2 days ago
main.cpp	Modified constructor to read a (properly formatted) file... No error ...	2 days ago
main.o	Modified constructor to read a (properly formatted) file... No error ...	2 days ago
molecule.cpp	Modified constructor to read a (properly formatted) file... No error ...	2 days ago
molecule.h	Modified constructor to read a (properly formatted) file... No error ...	2 days ago
molecule.o	Modified constructor to read a (properly formatted) file... No error ...	2 days ago
water	Modified constructor to read a (properly formatted) file... No error ...	2 days ago

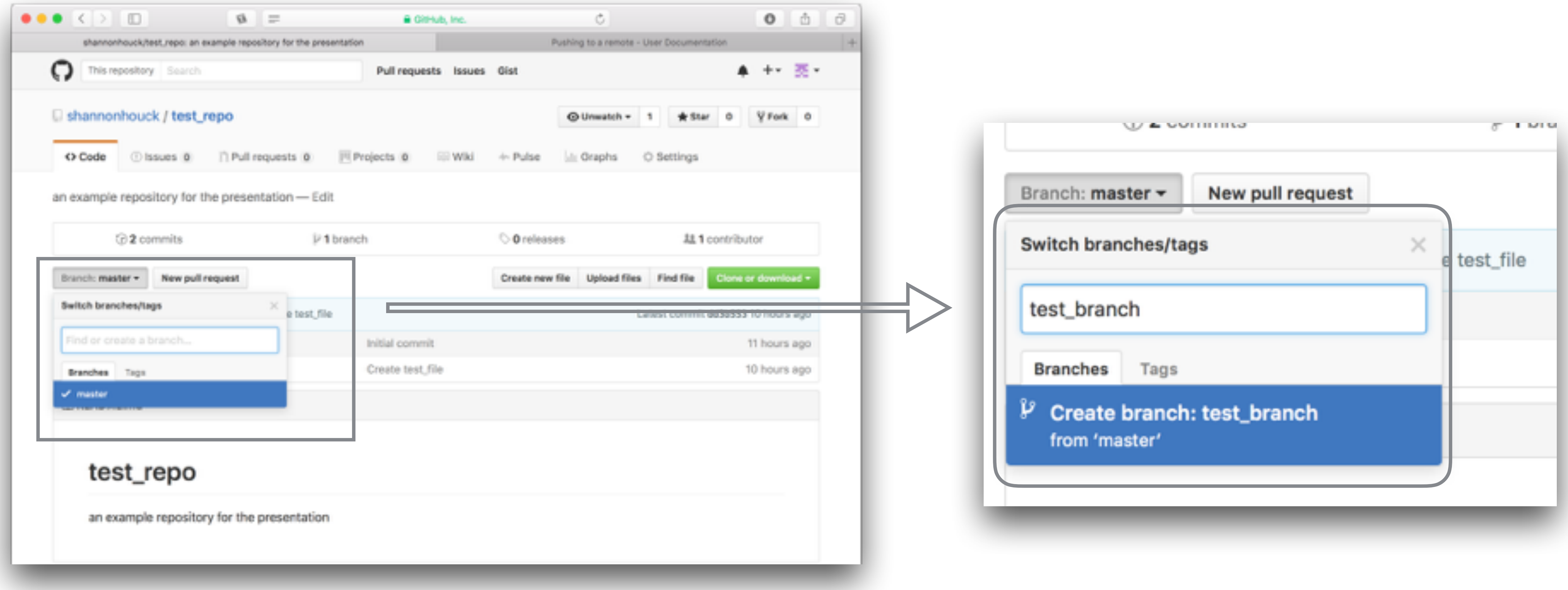
Branching

- **Branching** lets you edit code (and make commits) without messing up the original code. You make a branch, edit it, and **merge** it back into the master branch at the end!



Branching (GitHub)

- As usual, the GUI makes things easy to find…



Branching (Git)

- Creating a new branch from the command line

```
$ git branch [branch name]
```

- To change from your current branch to a different branch, use the `checkout` command

```
$ git checkout [branch name]
```

Merging

- After you're satisfied with your changes, you can **merge** a branch back in. Change to the branch you want to merge the changed branch to, and…

```
$ git merge [branch to merge]
```

- Now, all of your commits in the given branch have been merged with the branch you're on!

- After merging, you can delete the branch:

```
$ git branch -d [branch name]
```

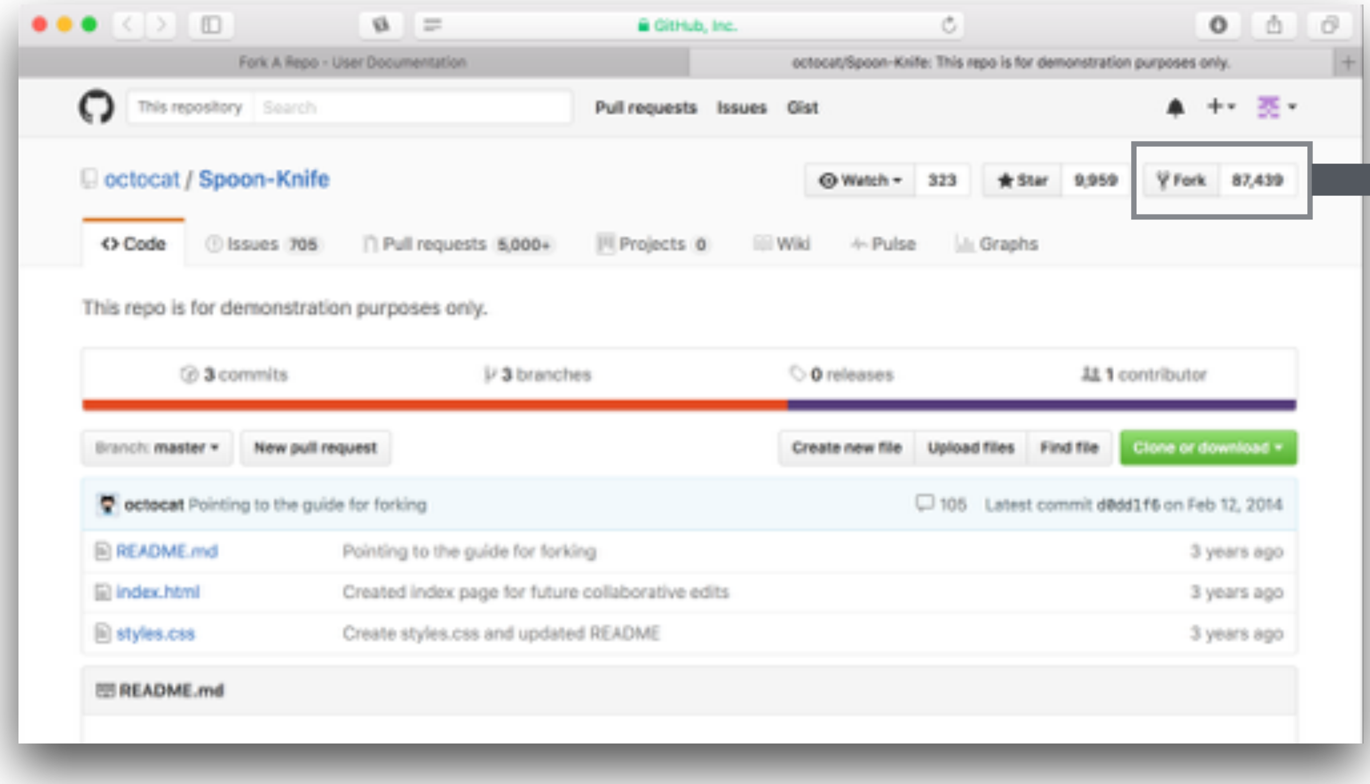
Forking

- **Forking** is similar to branching in that you create a copy based on another project, but in this case the original repo belongs to someone besides you

- Like branching, it lets you mess with code without worrying about ruining the original project

Forking

- To create the original fork, use GitHub…



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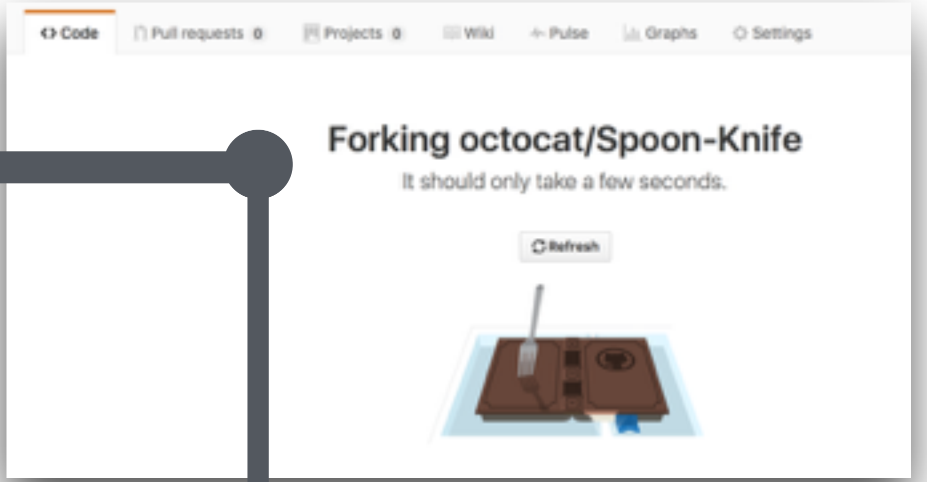
octocat Pointing to the guide for forking — 105 — Latest commit d0dd1f6 on Feb 12, 2014

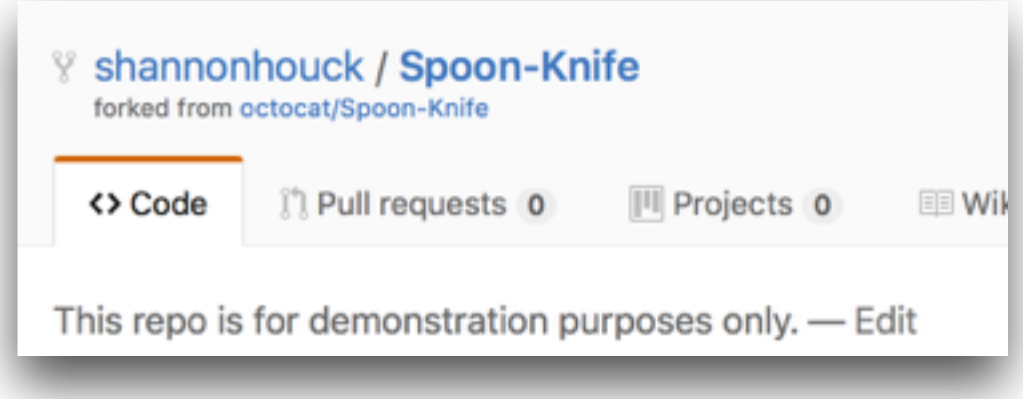
README.md	Pointing to the guide for forking	3 years ago
index.html	Created index page for future collaborative edits	3 years ago
styles.css	Create styles.css and updated README	3 years ago

README.md



Forking octocat/Spoon-Knife

It should only take a few seconds.



forked from octocat/Spoon-Knife

This repo is for demonstration purposes only. — Edit

Forking

- Now, you have two options:

    1. Clone forked repo to your workstation
    2. Edit forked repo directly on GitHub

- You can use the same techniques introduced earlier to make commits, push changes, branch, and so on, just like with a normal repository

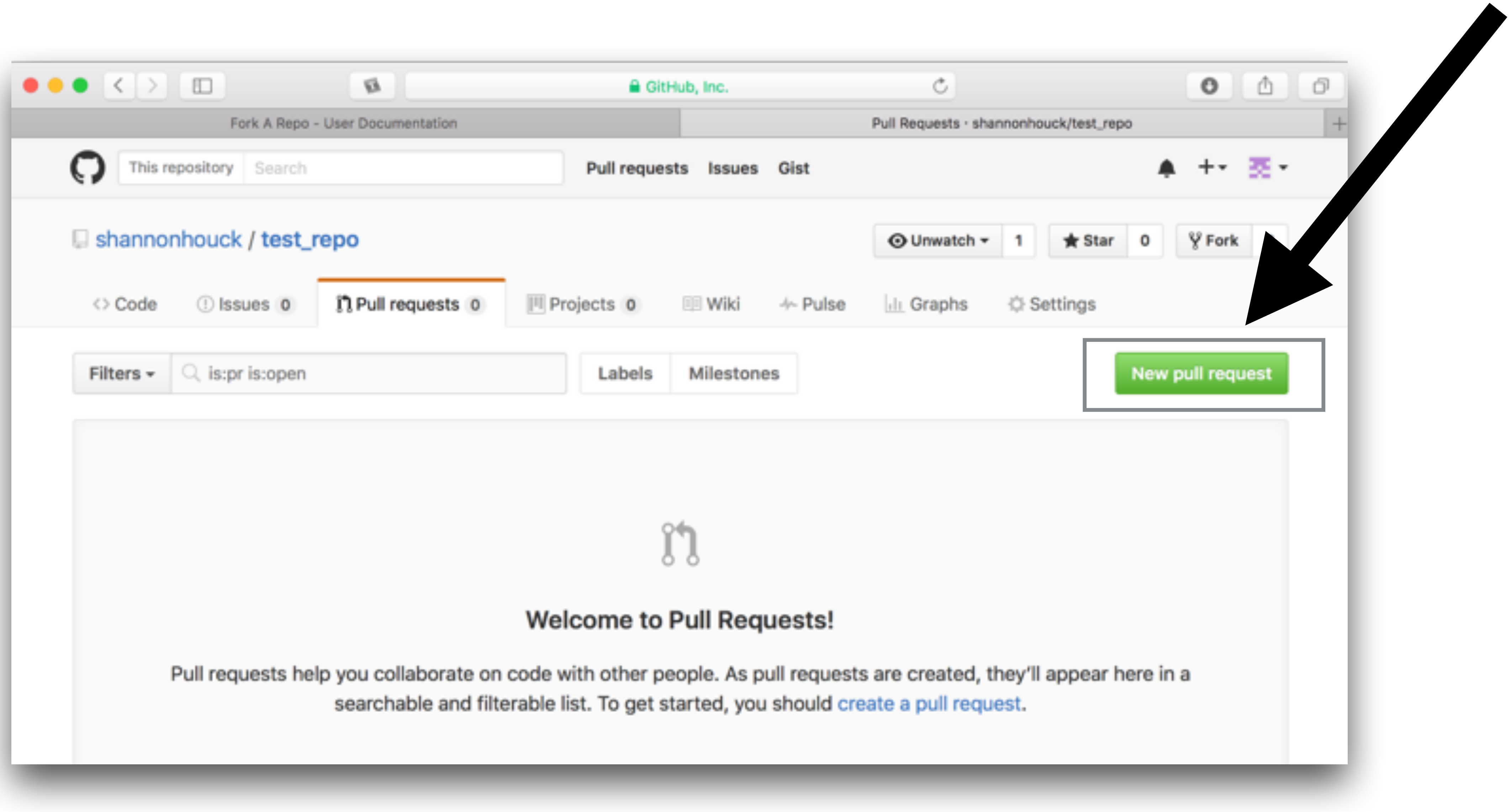
- How to merge the fork back into the original repository…?

Pull Requests

- A **pull request** asks that the master version of the repo be updated with the commits you've made to a different version (branch, fork, etc.)
- You need a pull request to merge changes from a forked branch back into the original repo
- You also need it to merge branches on GitHub
- You do *not* need to make a pull request if you're just working on the command line!

Pull Requests

- From your repository, go to Pull Requests and click the “New pull request” button

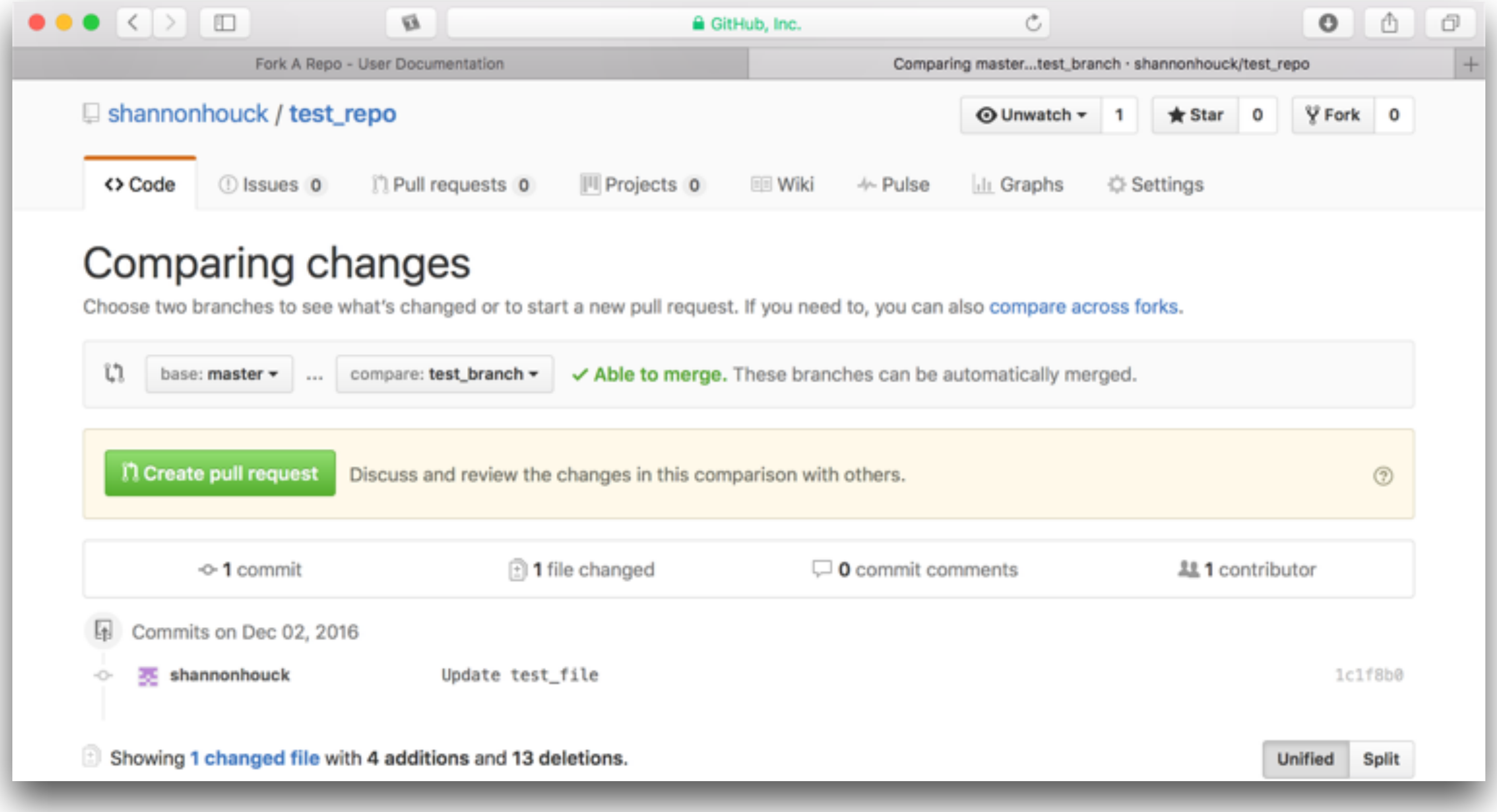


Welcome to Pull Requests!

Pull requests help you collaborate on code with other people. As pull requests are created, they'll appear here in a searchable and filterable list. To get started, you should create a pull request.

Pull Requests

- This opens a new pull request. Select branches.



GitHub, Inc.

Fork A Repo - User Documentation

Comparing master...test_branch · shannonhouck/test_repo

shannonhouck / test_repo

Unwatch 1 · Star 0 · Fork 0

Code · Issues 0 · Pull requests 0 · Projects 0 · Wiki · Pulse · Graphs · Settings

Comparing changes

Choose two branches to see what's changed or to start a new pull request. If you need to, you can also compare across forks.

base: master ... compare: test_branch ✓ Able to merge. These branches can be automatically merged.

Create pull request · Discuss and review the changes in this comparison with others.

1 commit · 1 file changed · 0 commit comments · 1 contributor

Commits on Dec 02, 2016

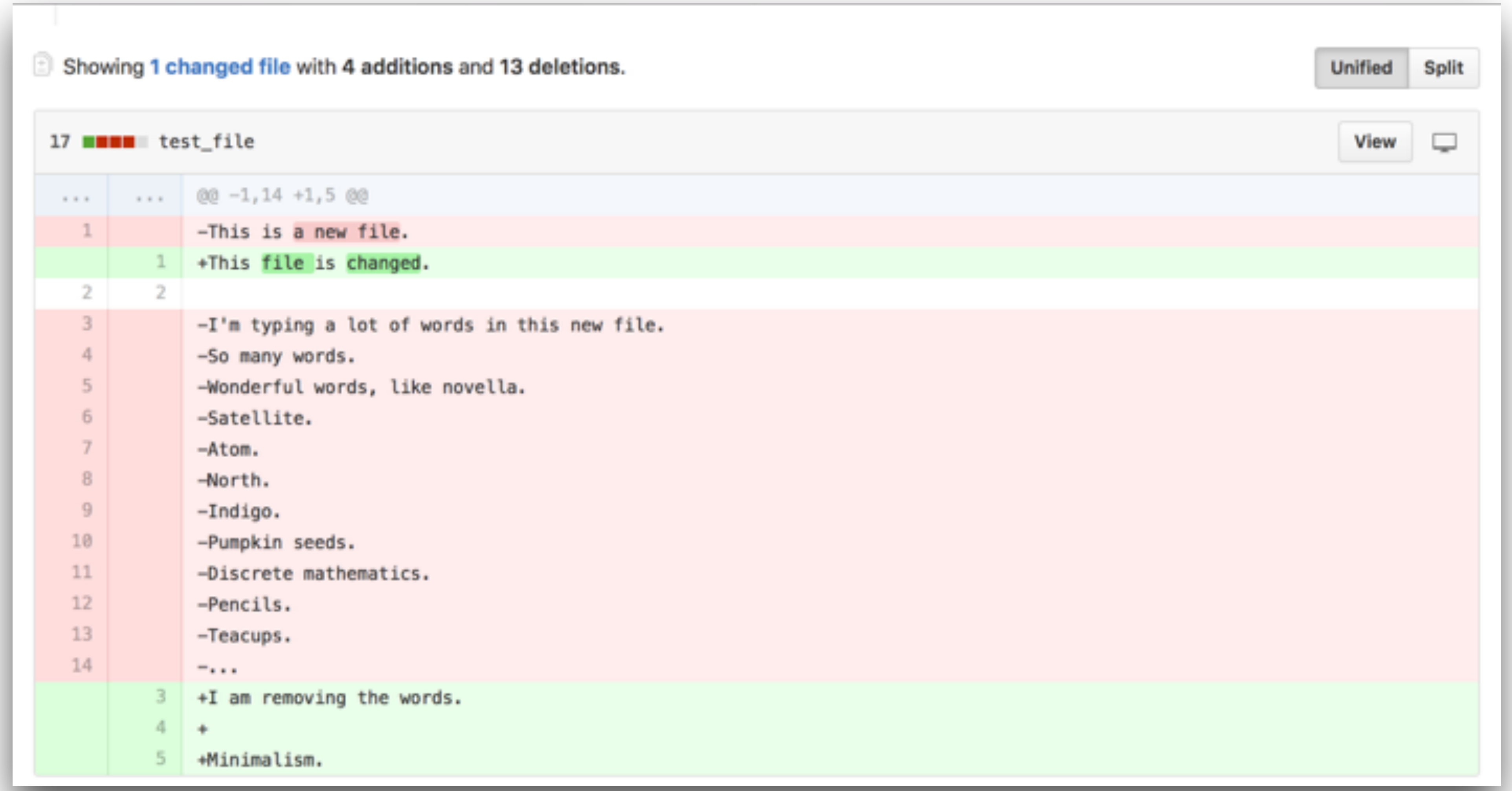
shannonhouck · `Update test_file` · 1c1f8b0

Showing 1 changed file with 4 additions and 13 deletions.

Unified · Split

Pull Requests

- Examine the changes before submitting it



Showing **1 changed file** with **4 additions** and **13 deletions.**

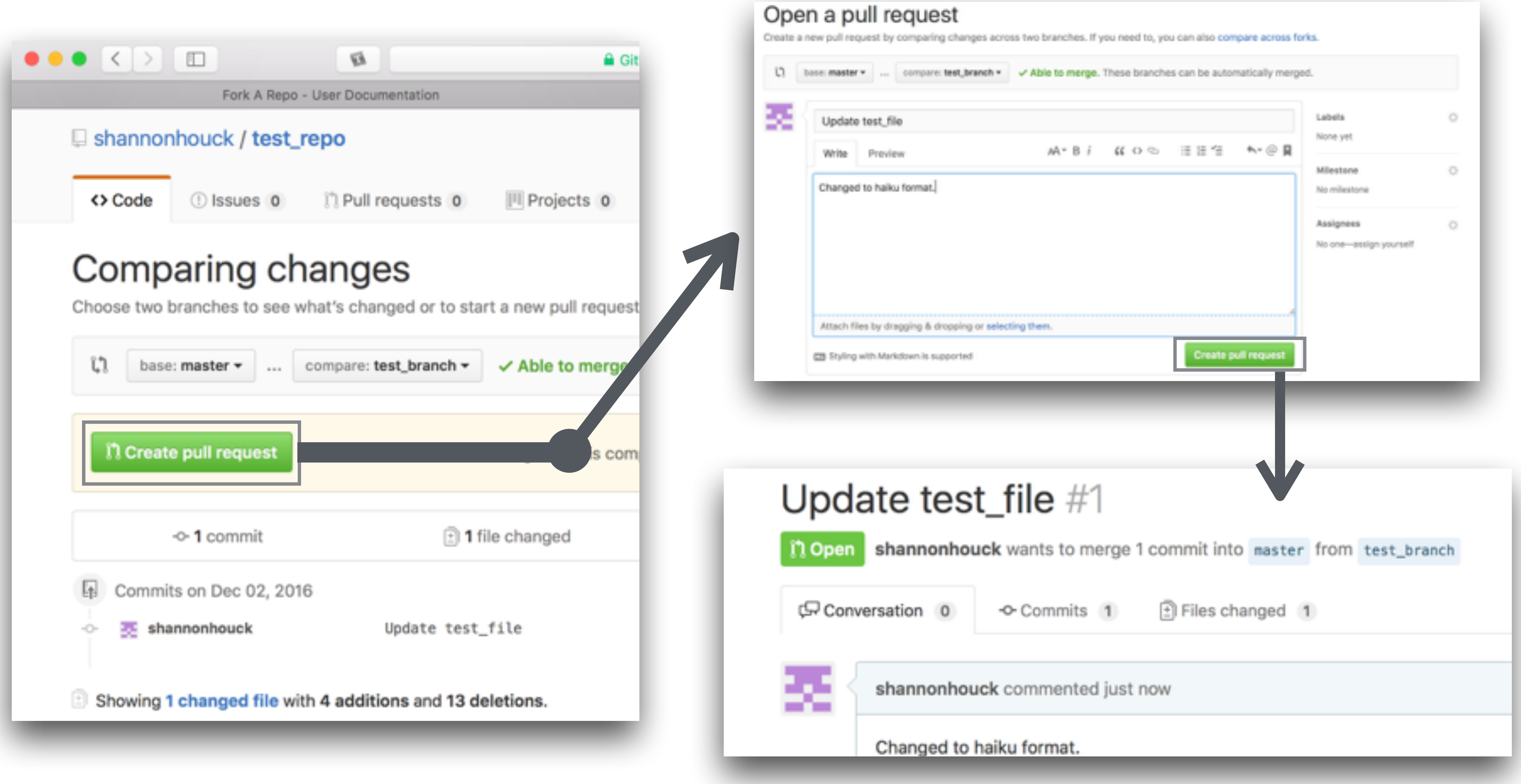
17 test_file

```
@@ -1,14 +1,5 @@
-This is a new file.
+This file is changed.

-I'm typing a lot of words in this new file.
-So many words.
-Wonderful words, like novella.
-Satellite.
-Atom.
-North.
-Indigo.
-Pumpkin seeds.
-Discrete mathematics.
-Pencils.
-Teacups.
-...
+I am removing the words.
+
+Minimalism.
```

Pull Requests

- Now, submit the request for review!



Fork A Repo - User Documentation

shannonhouck / test_repo

Comparing changes

Choose two branches to see what's changed or to start a new pull request

base: master ... compare: test_branch ✓ Able to merge

Create pull request

1 commit 1 file changed

Commits on Dec 02, 2016

shannonhouck Update test_file

Showing 1 changed file with 4 additions and 13 deletions.

Open a pull request

Create a new pull request by comparing changes across two branches. If you need to, you can also compare across forks.

base: master ... compare: test_branch ✓ Able to merge. These branches can be automatically merged.

Update test_file

Changed to haiku format.

Attach files by dragging & dropping or selecting them.

Styling with Markdown is supported

Labels: None yet

Milestone: No milestone

Assignees: No one—assign yourself

Create pull request

Update test_file #1

Open shannonhouck wants to merge 1 commit into `master` from `test_branch`

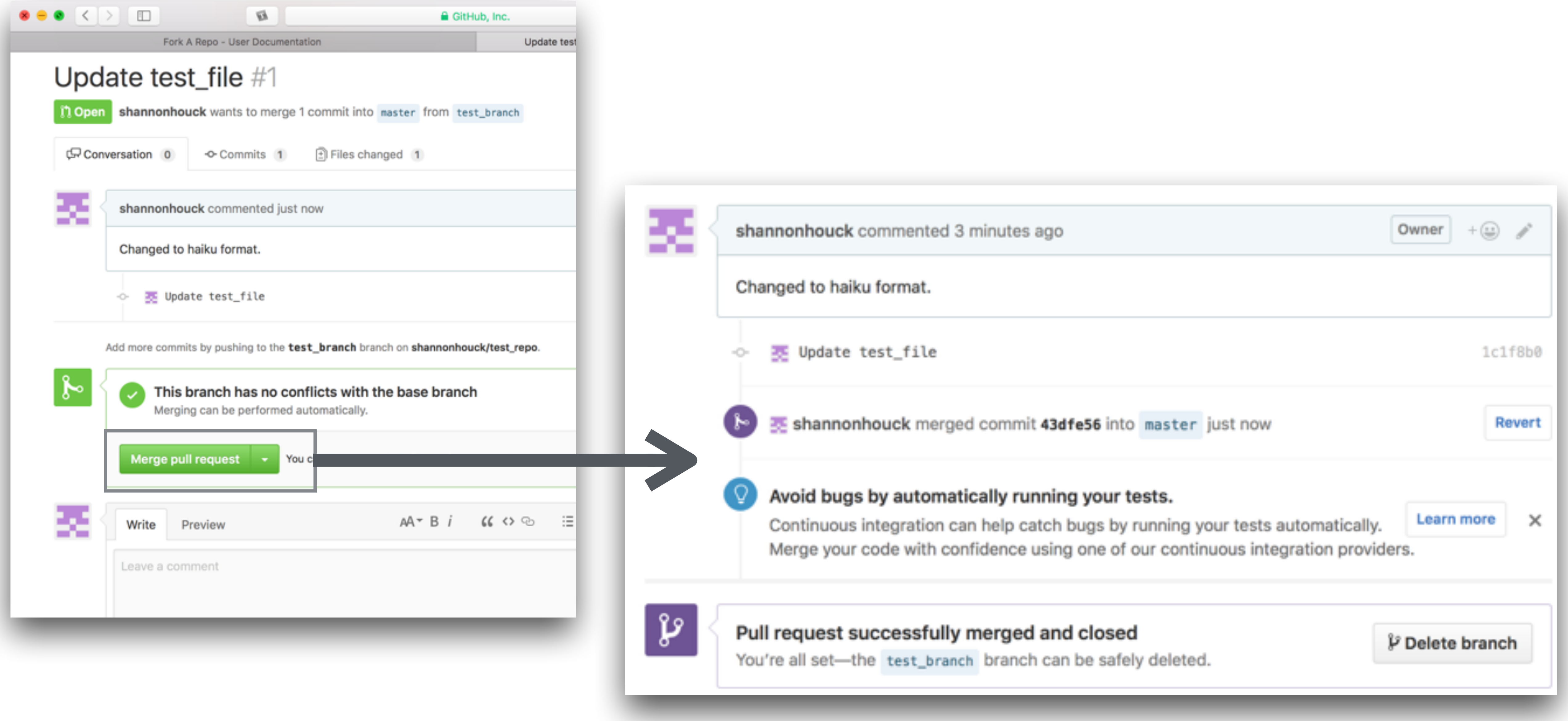
Conversation 0 Commits 1 Files changed 1

shannonhouck commented just now

Changed to haiku format.

Pull Requests

- Now that you’ve made a pull request, merge it!



GitHub, Inc.

Fork A Repo - User Documentation | Update test

Update test_file #1

Open **shannonhouck** wants to merge 1 commit into `master` from `test_branch`

Conversation 0 | Commits 1 | Files changed 1

shannonhouck commented just now

Changed to haiku format.

`Update test_file`

Add more commits by pushing to the **test_branch** branch on **shannonhouck/test_repo**.

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

shannonhouck commented 3 minutes ago

Changed to haiku format.

`Update test_file` 1c1f8b0

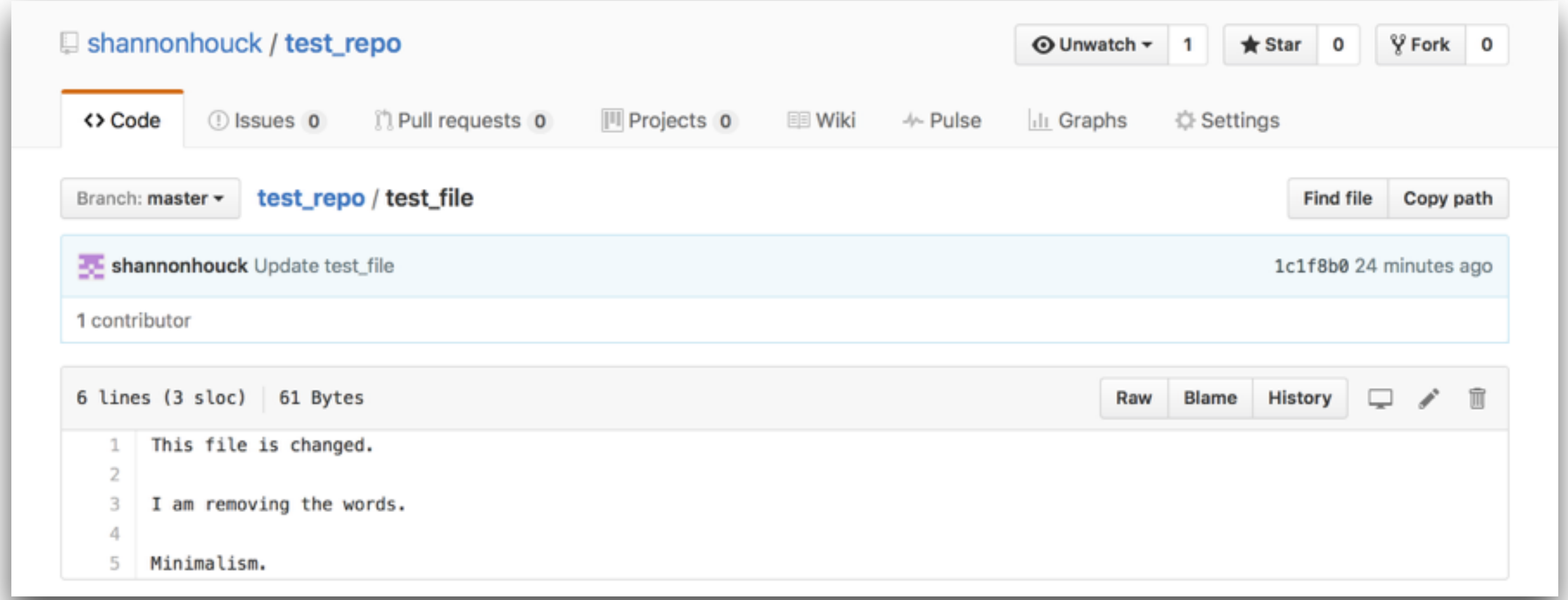
shannonhouck merged commit **43dfe56** into `master` just now

Avoid bugs by automatically running your tests.
Continuous integration can help catch bugs by running your tests automatically.
Merge your code with confidence using one of our continuous integration providers.

Pull request successfully merged and closed
You’re all set—the `test_branch` branch can be safely deleted.

Pull Requests

- Now, looking at the original repository, the file has been updated to match test_branch.



shannonhouck / test_repo

test_repo / test_file

shannonhouck Update test_file 1c1f8b0 24 minutes ago

1 contributor

6 lines (3 sloc) 61 Bytes

```
This file is changed.

I am removing the words.

Minimalism.
```

Other Useful Commands

- `$ git status`
  Prints the current branch and how many commits you have on the current branch that haven’t been pushed yet

- `$ git reset HEAD --hard`
  Restores last commit (i.e. changes all tracked files back to where they were at the last commit)

Any Questions?

```
/* thank you */
```