Version control using Git

https://github.com/nih-fmrif/git-training

Session 3

12/19/2019

Data Science and Sharing Team
NIMH

Logistics

Today:

- Lecture - Review, branching, merging, pulling
- Examples: Branching and merging (non-interactive)
- Discussion - github organizations
- Exercise - merge conflicts and working on the same repo

Please share your GitHub usernames: https://tinyurl.com/tqooqmv

https://github.com/nih-fmrif/git-training

Review: repository

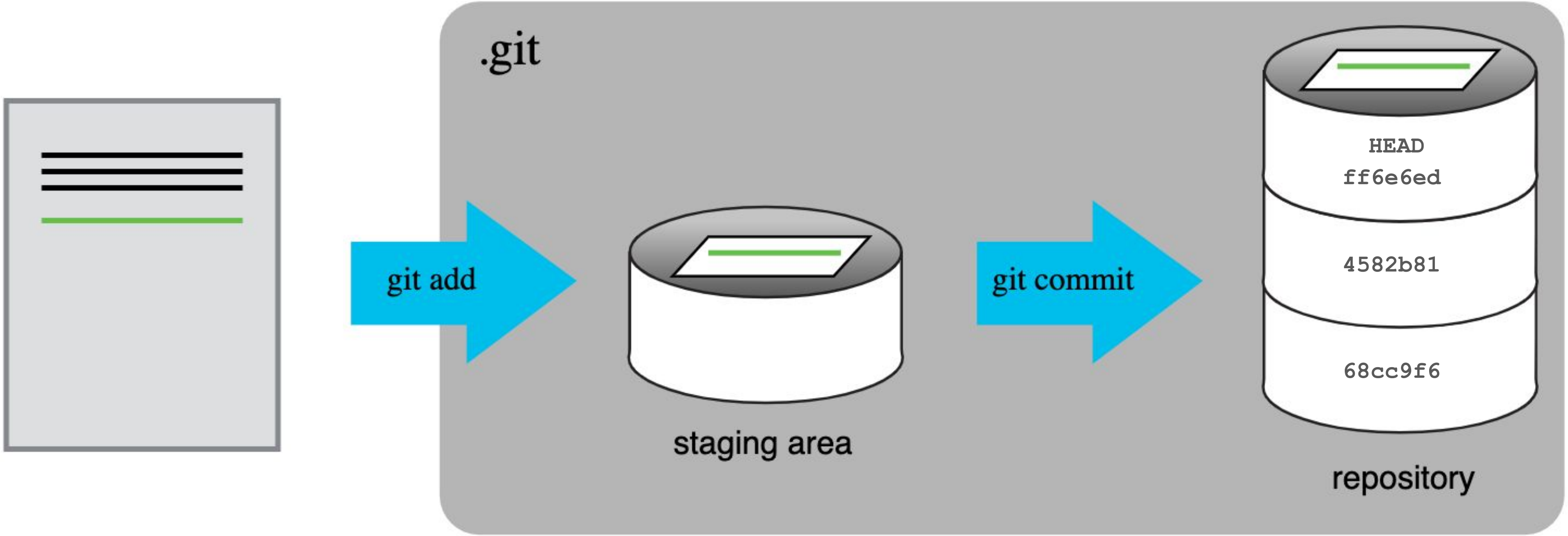


Image from: http://swcarpentry.github.io/git-novice/04-changes/index.html

Review: repository

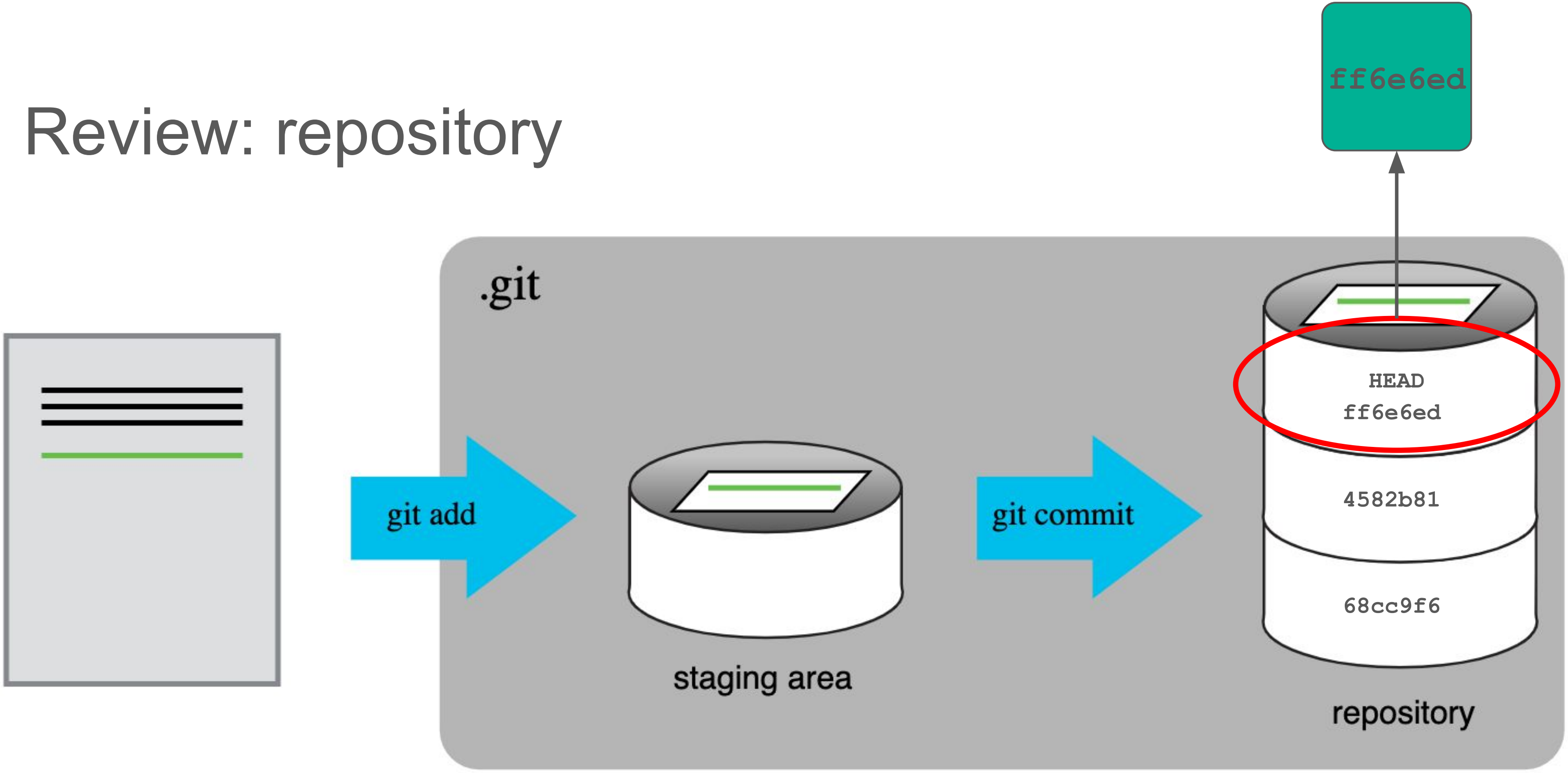


Image from: http://swcarpentry.github.io/git-novice/04-changes/index.html

Review: repository

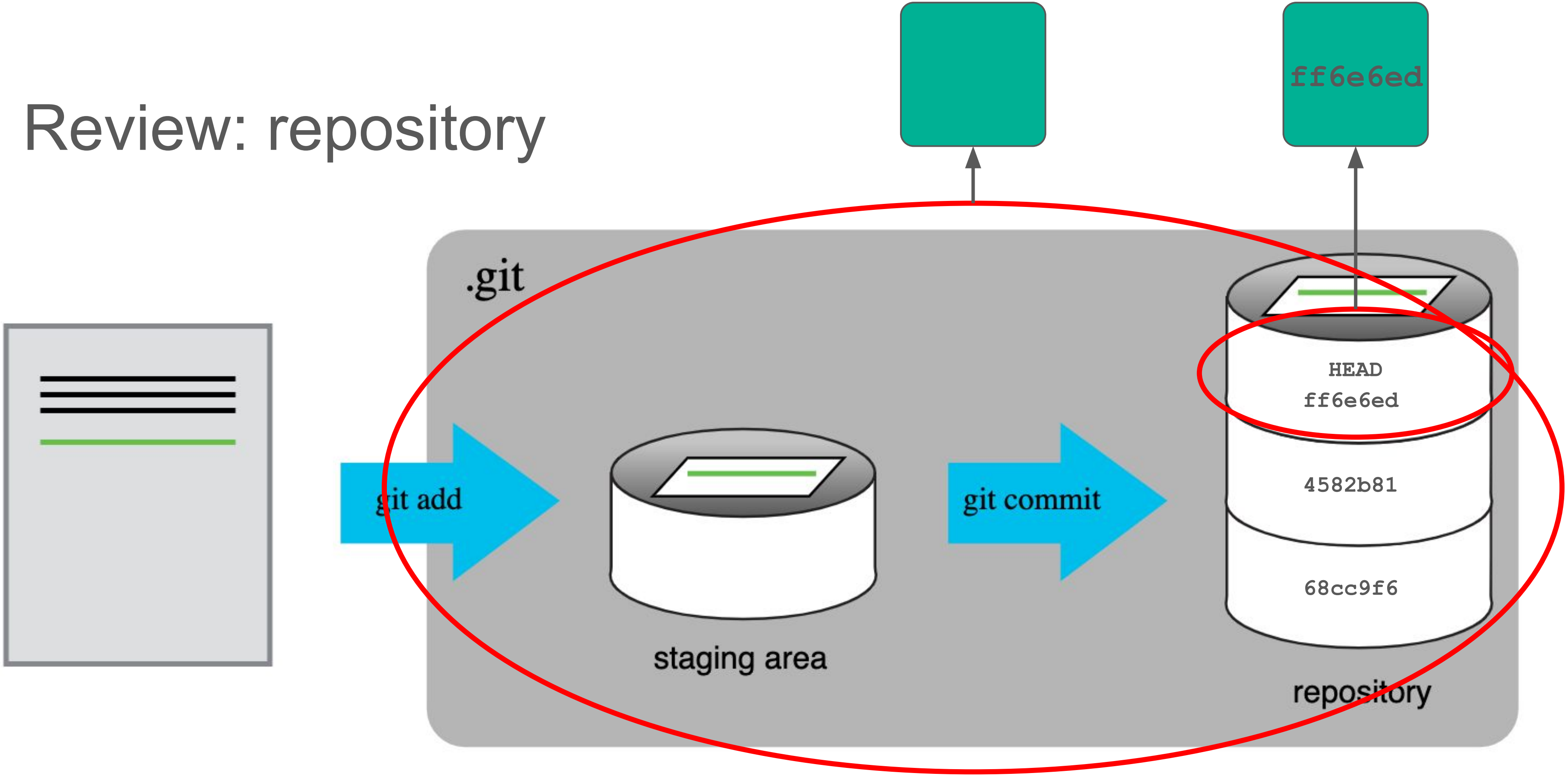
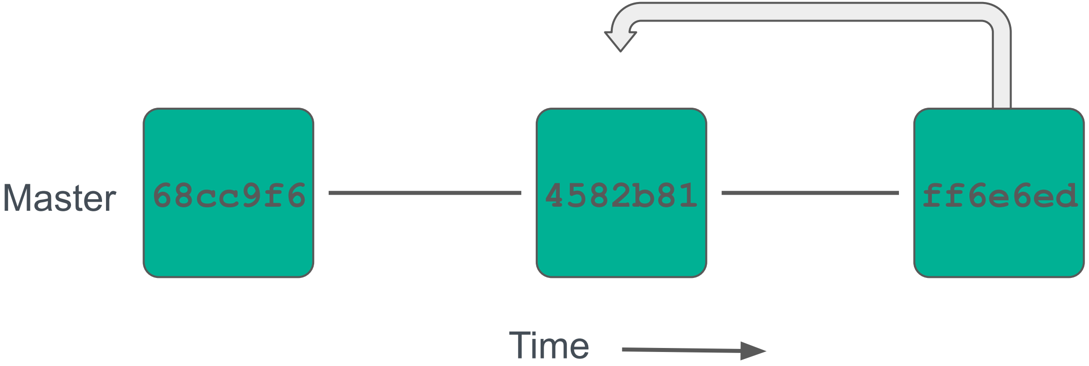
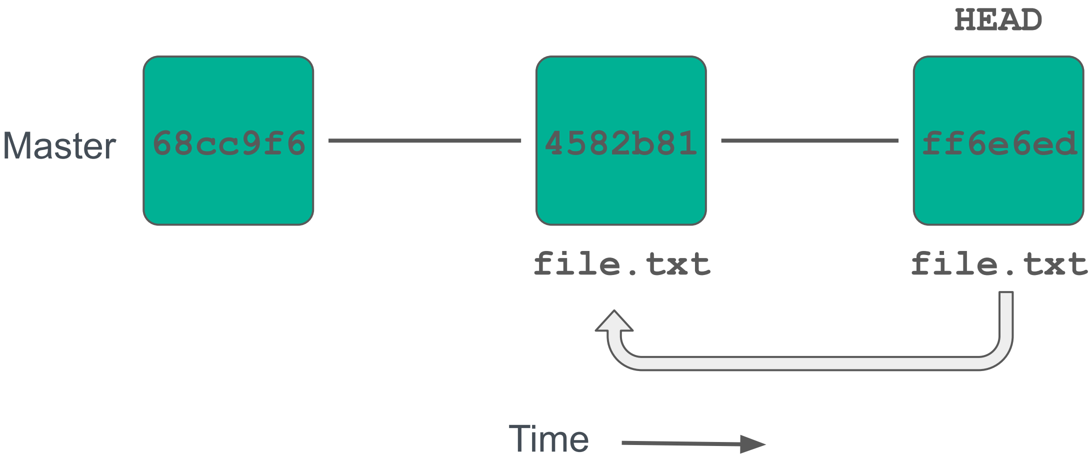


Image from: http://swcarpentry.github.io/git-novice/04-changes/index.html

Review: going back in time

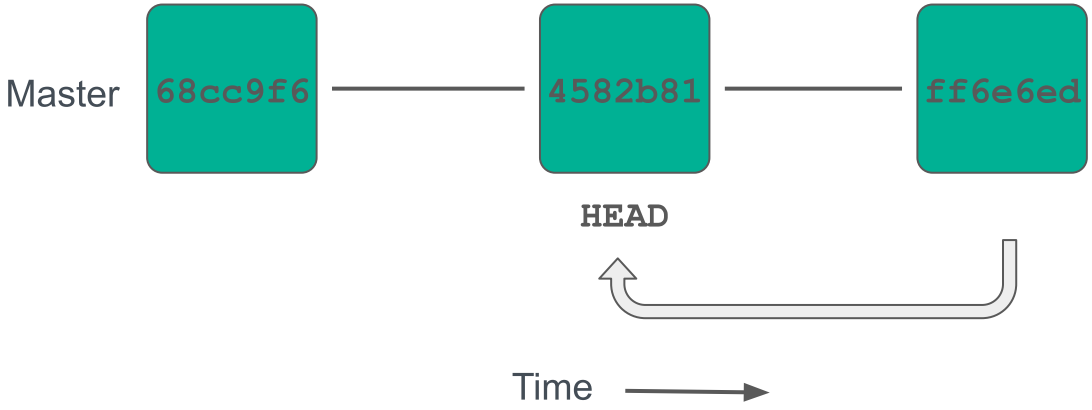


`git checkout 4582b81 <file>`



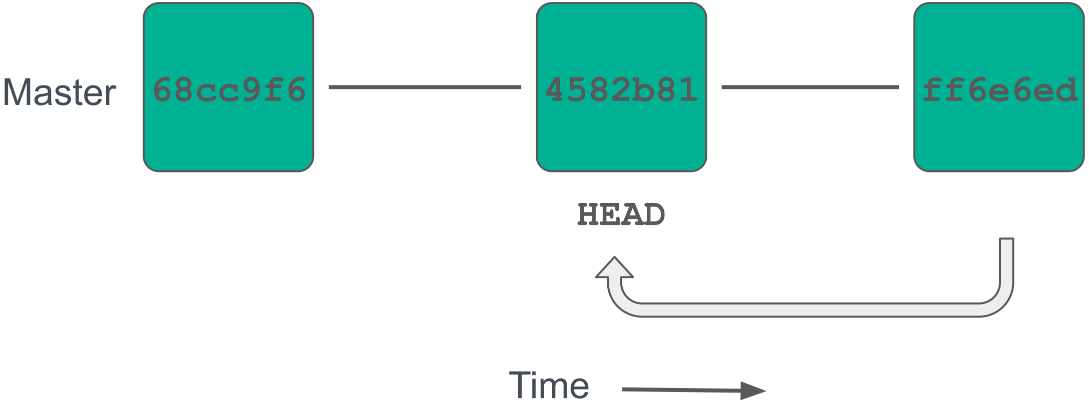
Revert `file.txt` to previous version

`git checkout 4582b81`



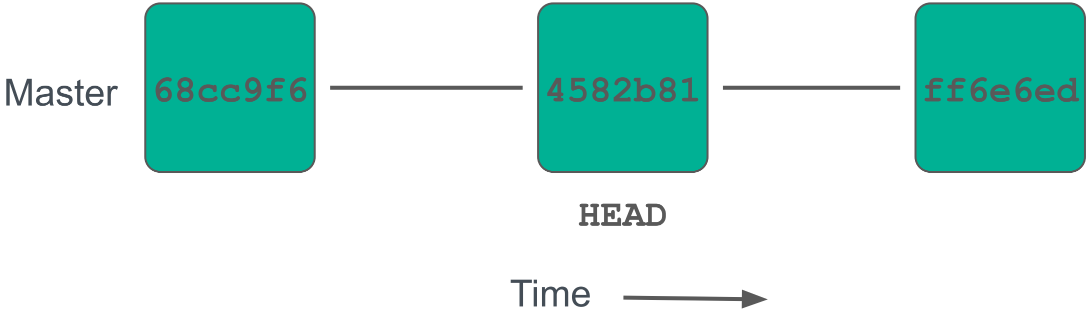
Changes `HEAD` to previous commit

`git checkout 4582b81`

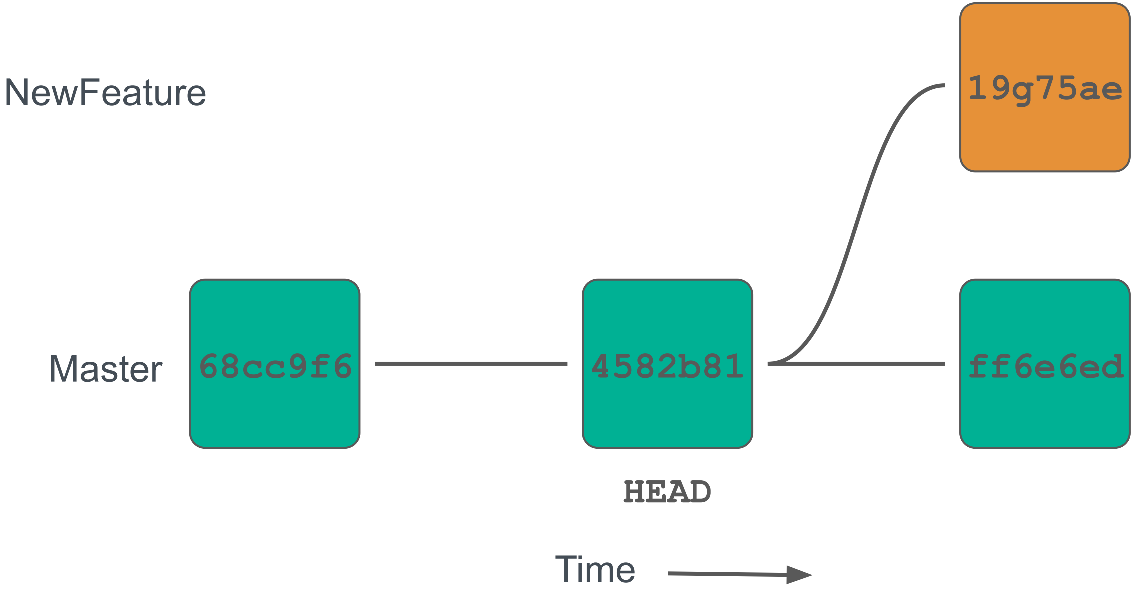


What happens if you want to change the files from a previous commit?

Git command: branch

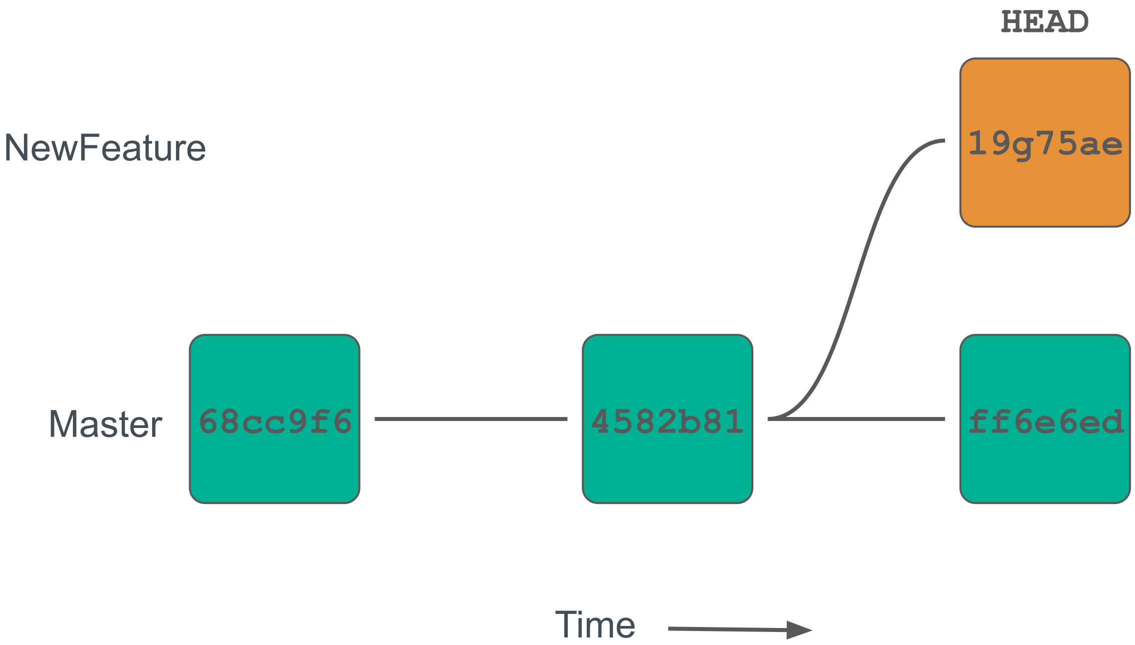


Git command: branch



```
git branch NewFeature
```

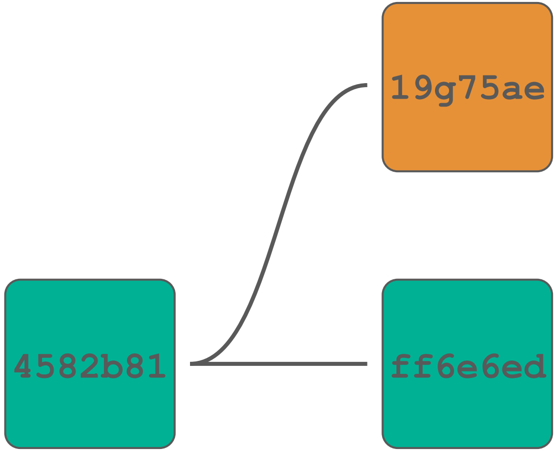
Pointing your HEAD to another branch



```
git checkout NewFeature
```

Best practices: branching

- Master branch only contains deployable code
- New branch for single item of development (eg new feature)
- Once work on branch is complete (and tested!)
  - Merge branch into master
  - Delete development branch



http://practicalseries.com/1002-vcs/02-04-concept.html#js--020402

Example

Branching
(non-interactive)

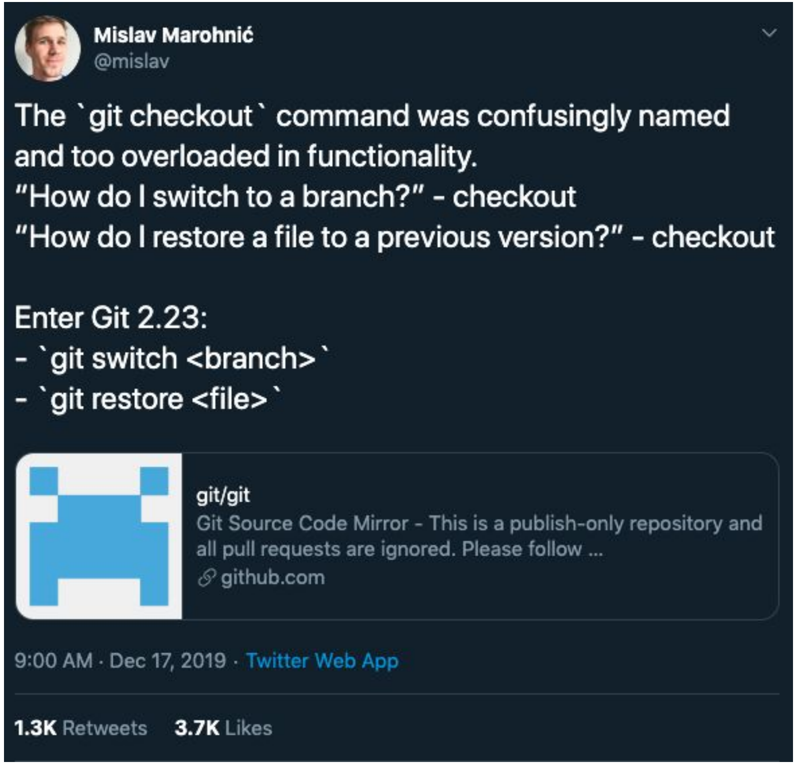
https://github.com/nih-fmrif/git-training/tree/master/session_3#branching-demo

Git command: checkout

- Revert file to different version
- Inspect other commits
- Change branches

Git command: checkout

- Revert file to different version
- Inspect other commits
- Change branches
- Confusing?



Mislav Marohnić
@mislav

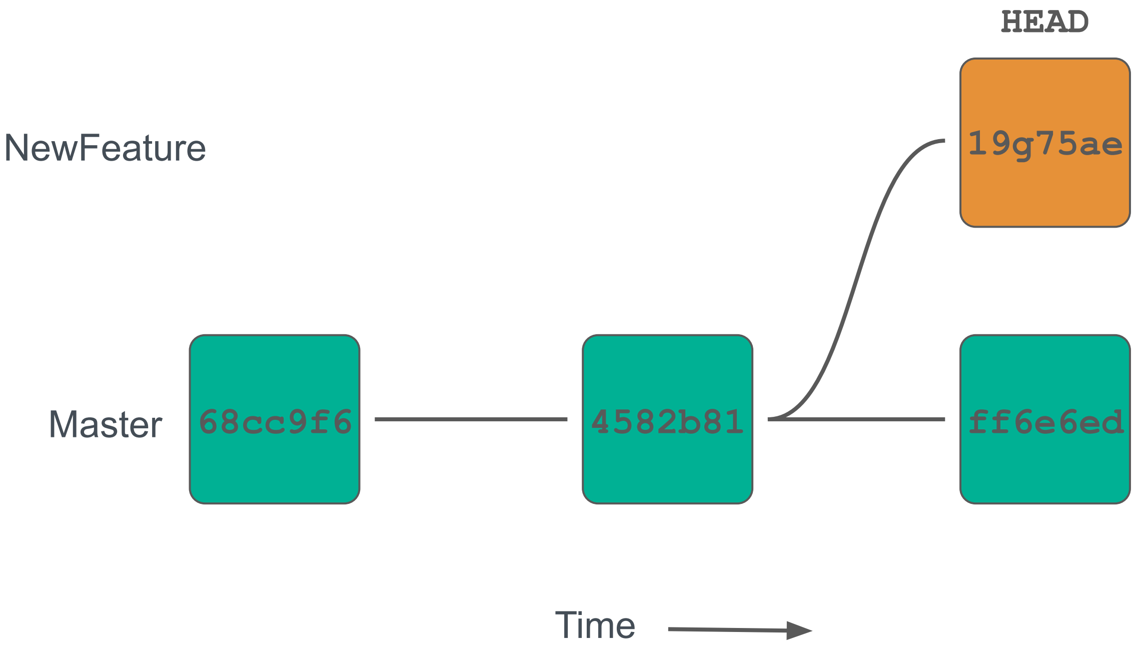
The `git checkout` command was confusingly named and too overloaded in functionality.
"How do I switch to a branch?" - checkout
"How do I restore a file to a previous version?" - checkout

Enter Git 2.23:
- `git switch <branch>`
- `git restore <file>`

git/git
Git Source Code Mirror - This is a publish-only repository and all pull requests are ignored. Please follow ...
github.com

9:00 AM · Dec 17, 2019 · Twitter Web App

1.3K Retweets 3.7K Likes



How to merge two timelines into one?

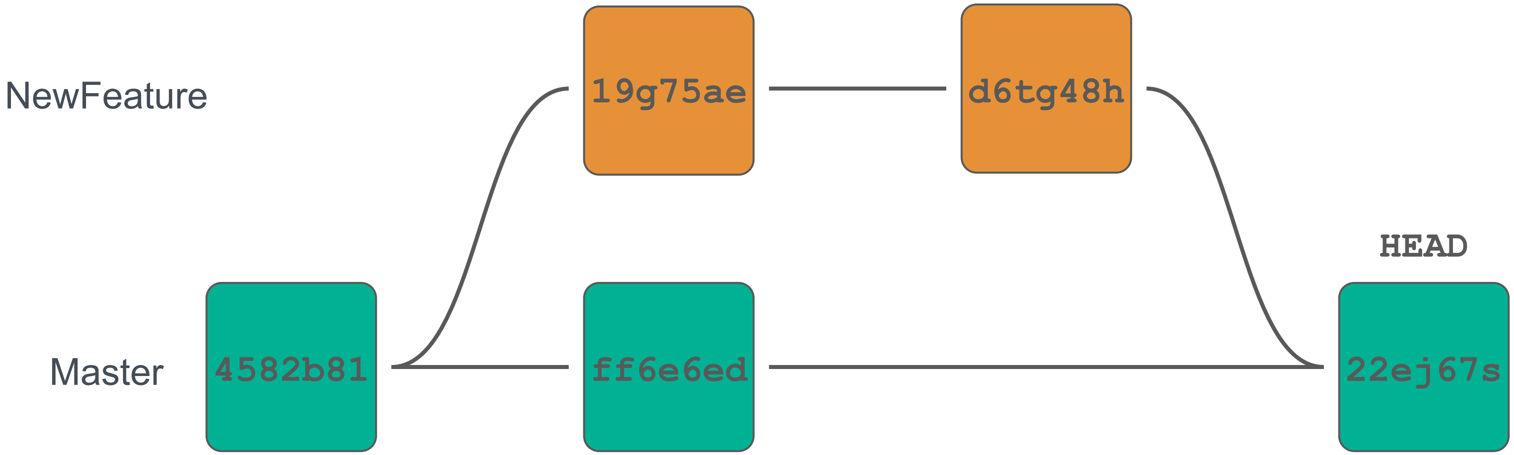
Git command: merge

Integrates independent lines of development created by `git branch` into a single branch

- Merge external branch into current branch
- Combines sequence of commits into one history
- `merge` creates a new commit

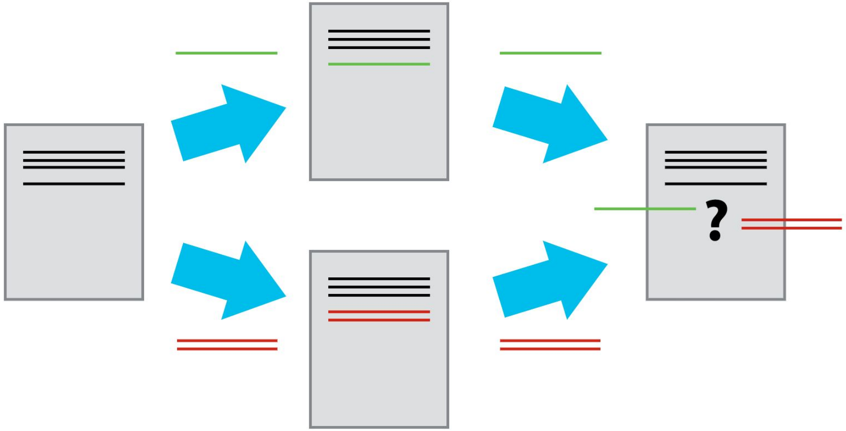
```
git merge NewFeature
```

Git command: merge



```
git checkout master
git merge NewFeature
```

Conflicts and merging



Conflicts can occur:

- Working on your own files
    - Out of sync local and remote
    - Conflicts between branches when trying to merge
- Collaborating on the same remote

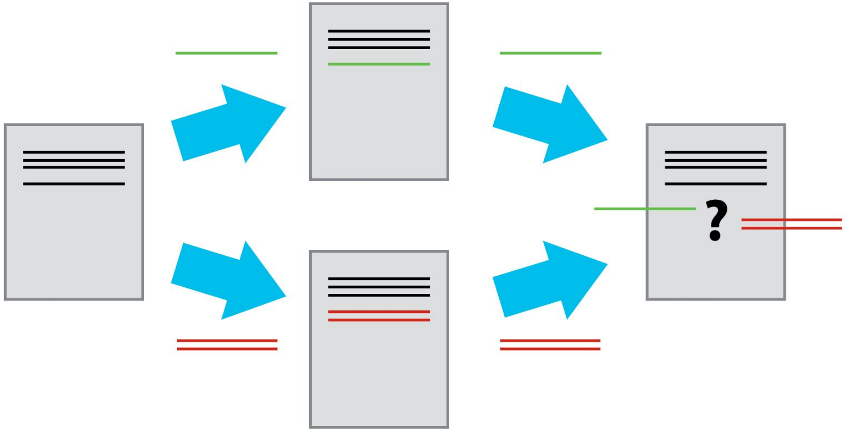
Git will try to auto resolve conflicts, however, if the *same line* differs between both changes:

- Git will add conflict markers to the conflicting file
- Decisions have to be made

Image from: https://swcarpentry.github.io/git-novice/09-conflict/index.html

Conflict markers

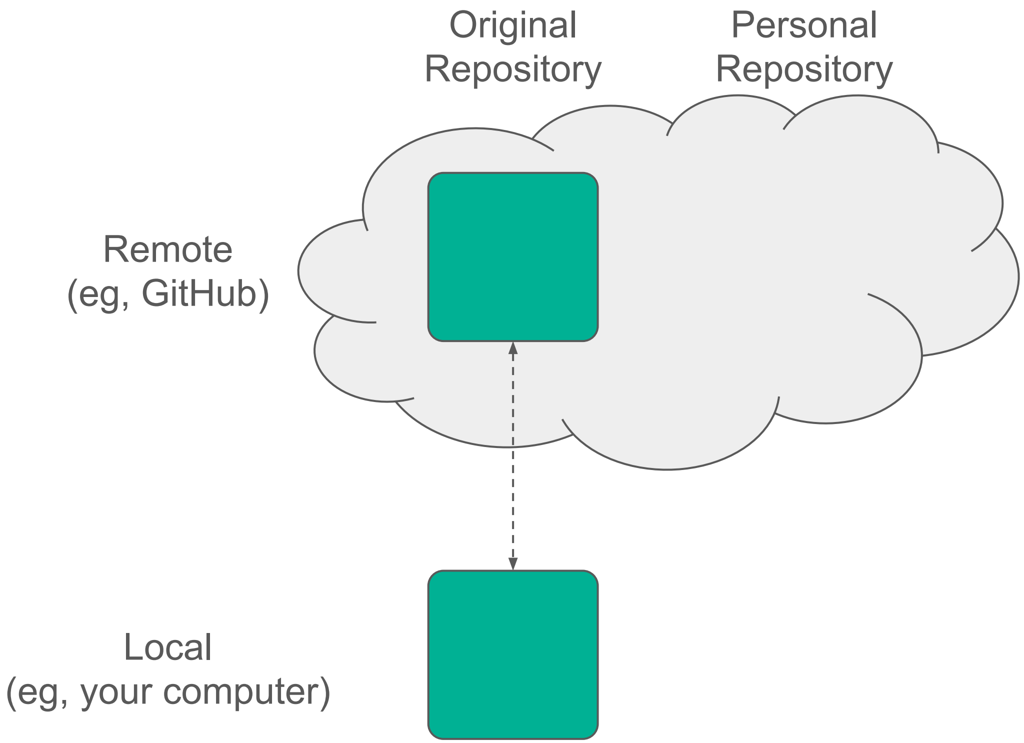
```
<<<<<<< HEAD

    (lines in HEAD)

=======

    (lines in merging branch)

>>>>>>> commitID
```



The decision of which changes to keep or how to resolve the conflict must be done manually

Image from: https://swcarpentry.github.io/git-novice/09-conflict/index.html

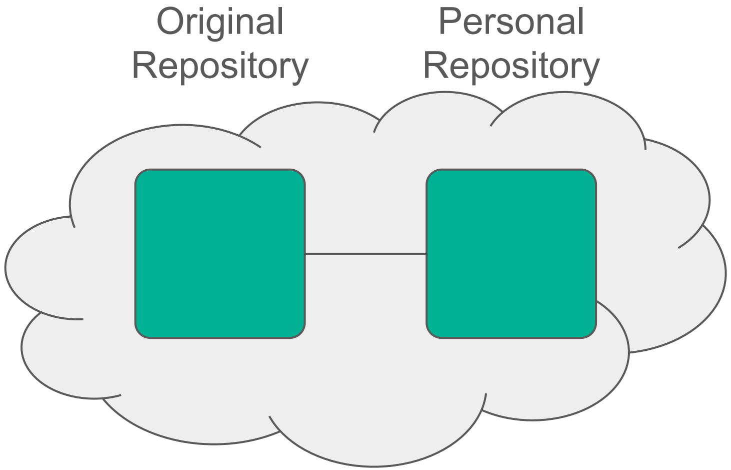
Review: Clone versus Fork



Git operation

Clone

Review: Clone versus Fork



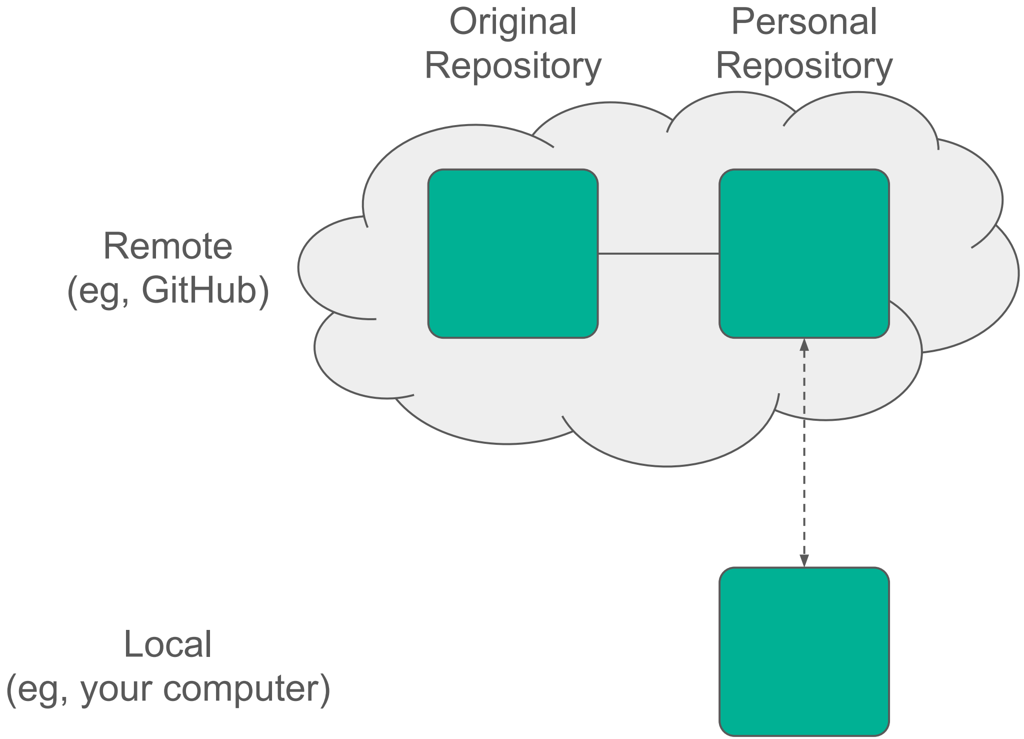
Remote
(eg, GitHub)

Local
(eg, your computer)

Git operation

Fork

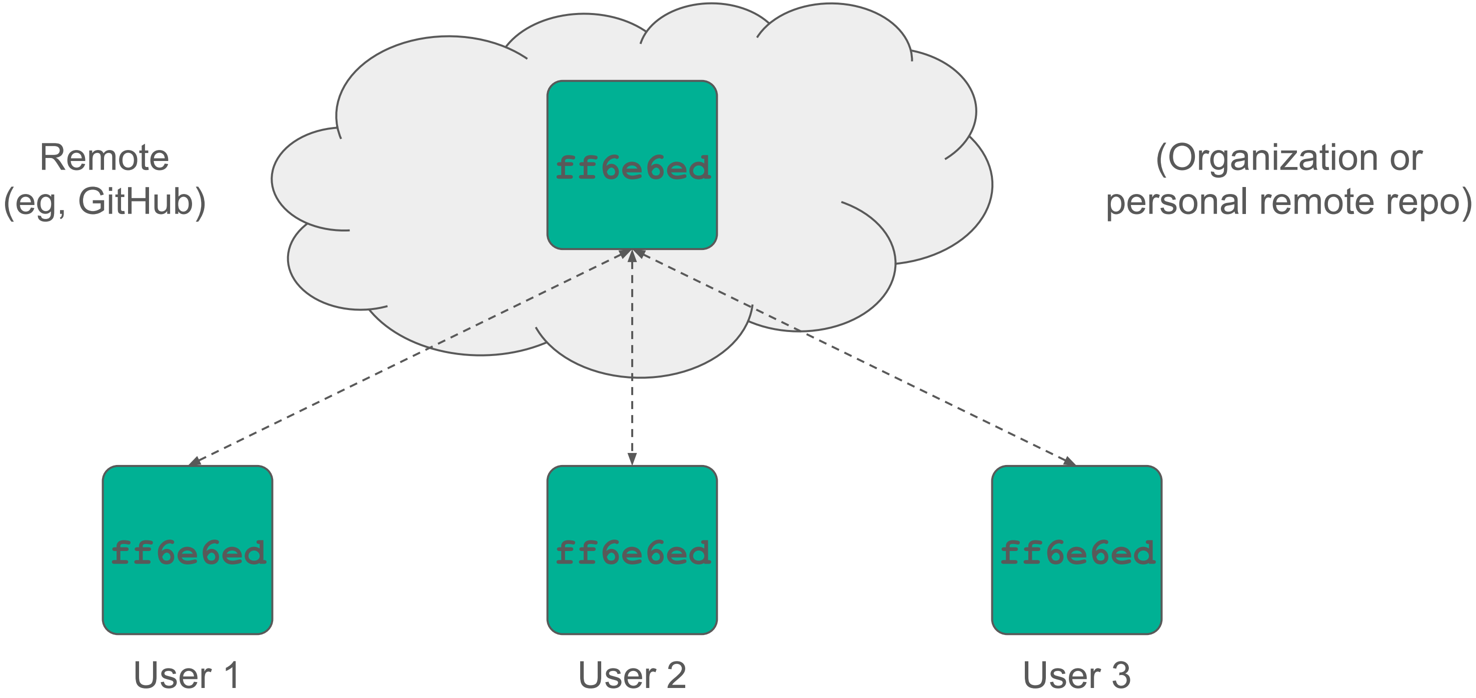
Review: Clone versus Fork



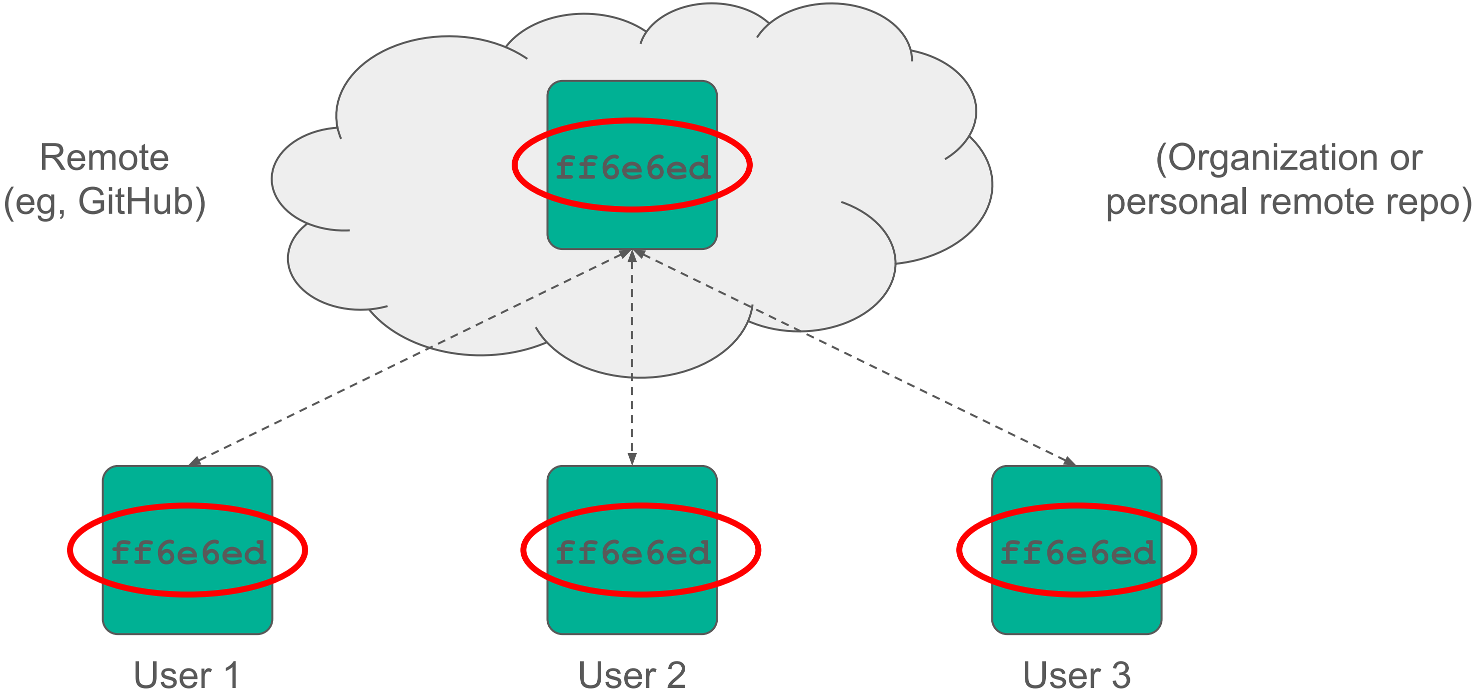
Git operation

Fork
Clone

Collaboration using same remote repo



Collaboration using same remote repo



*Same commit ID

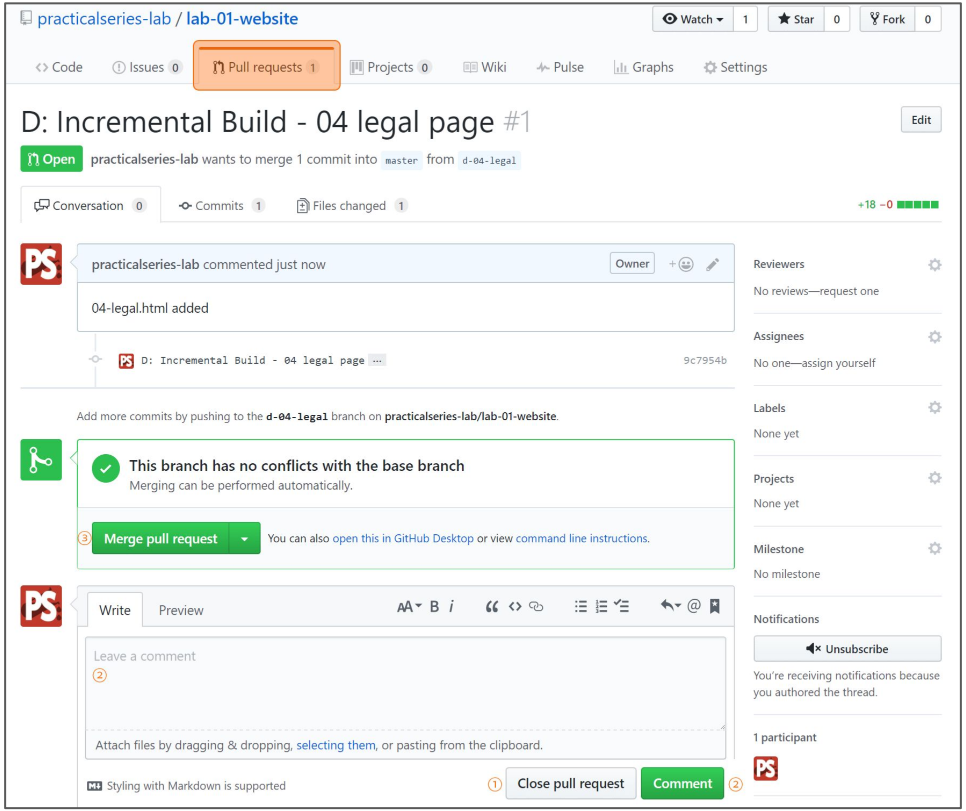
Git concept: pull request

Alerts owner of a repo that someone has made a modification and that they are *requesting* that you *pull* their modification into the repository.

- Nothing happens except the opening of the request
  - No changes to the files
- The owner has options
  - Reject
  - Discuss
  - Accept
- Pull requests can also be used to merge branches

http://practicalseries.com/1002-vcs/09-05-github.html#js--090503

Git concept: pull request



D: Incremental Build - 04 legal page #1

Open practicalseries-lab wants to merge 1 commit into `master` from `d-04-legal`

practicalseries-lab commented just now

04-legal.html added

`D: Incremental Build - 04 legal page` 9c7954b

Add more commits by pushing to the **d-04-legal** branch on **practicalseries-lab/lab-01-website**.

This branch has no conflicts with the base branch

Merging can be performed automatically.

You can also open this in GitHub Desktop or view command line instructions.

Leave a comment

Attach files by dragging & dropping, selecting them, or pasting from the clipboard.

Styling with Markdown is supported

Reviewers: No reviews—request one

Assignees: No one—assign yourself

Labels: None yet

Projects: None yet

Milestone: No milestone

You're receiving notifications because you authored the thread.

1 participant

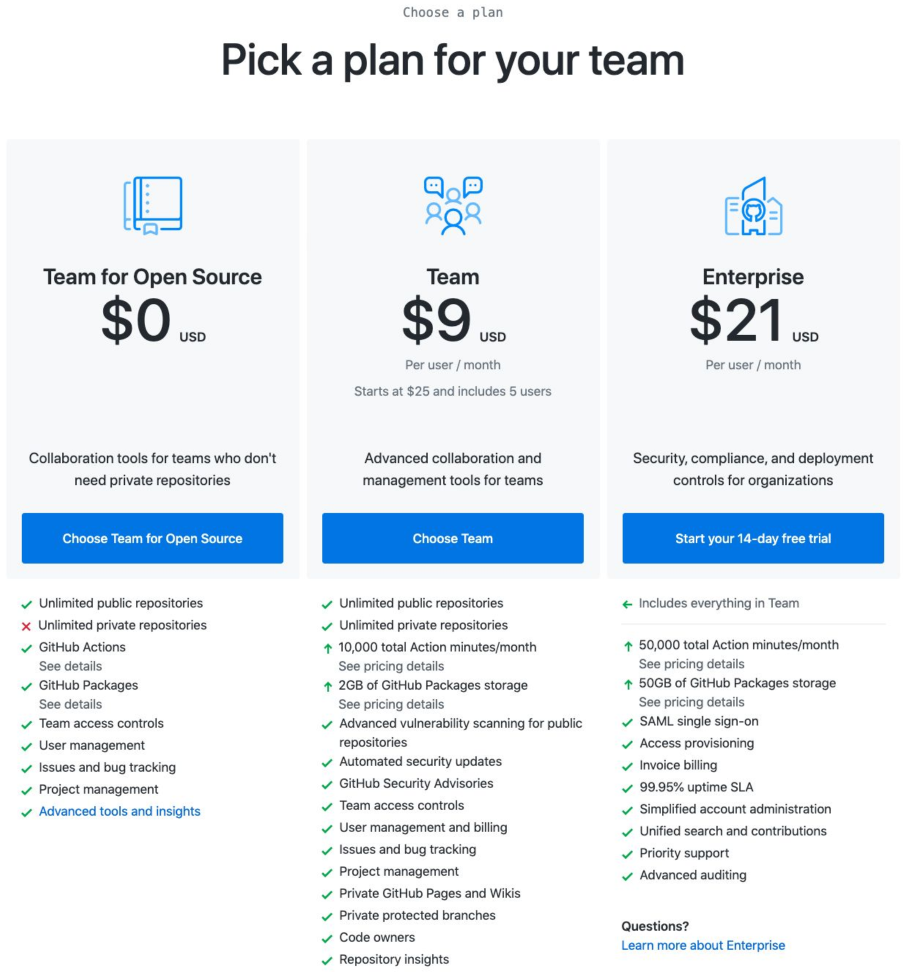
http://practicalseries.com/1002-vcs/09-05-github.html#js--090503

Example

Pull request to merge branches (non-interactive)

https://github.com/nih-fmrif/git-training/tree/master/session_3#pull-request-demo

Organizations on GitHub



Choose a plan

Pick a plan for your team

Team for Open Source

$0 USD

Collaboration tools for teams who don't need private repositories

Choose Team for Open Source

- ✓ Unlimited public repositories
- ✗ Unlimited private repositories
- ✓ GitHub Actions
  See details
- ✓ GitHub Packages
  See details
- ✓ Team access controls
- ✓ User management
- ✓ Issues and bug tracking
- ✓ Project management
- ✓ Advanced tools and insights

Team

$9 USD

Per user / month

Starts at $25 and includes 5 users

Advanced collaboration and management tools for teams

Choose Team

- ✓ Unlimited public repositories
- ✓ Unlimited private repositories
- ↑ 10,000 total Action minutes/month
  See pricing details
- ↑ 2GB of GitHub Packages storage
  See pricing details
- ✓ Advanced vulnerability scanning for public repositories
- ✓ Automated security updates
- ✓ GitHub Security Advisories
- ✓ Team access controls
- ✓ User management and billing
- ✓ Issues and bug tracking
- ✓ Project management
- ✓ Private GitHub Pages and Wikis
- ✓ Private protected branches
- ✓ Code owners
- ✓ Repository insights

Enterprise

$21 USD

Per user / month

Security, compliance, and deployment controls for organizations

Start your 14-day free trial

- ← Includes everything in Team
- ↑ 50,000 total Action minutes/month
  See pricing details
- ↑ 50GB of GitHub Packages storage
  See pricing details
- ✓ SAML single sign-on
- ✓ Access provisioning
- ✓ Invoice billing
- ✓ 99.95% uptime SLA
- ✓ Simplified account administration
- ✓ Unified search and contributions
- ✓ Priority support
- ✓ Advanced auditing

Questions?
Learn more about Enterprise

Organizations: relevant examples

FMRIF: https://github.com/nih-fmrif

ThomasYeoLab: https://github.com/ThomasYeoLab

BIDS-standard: https://github.com/bids-standard

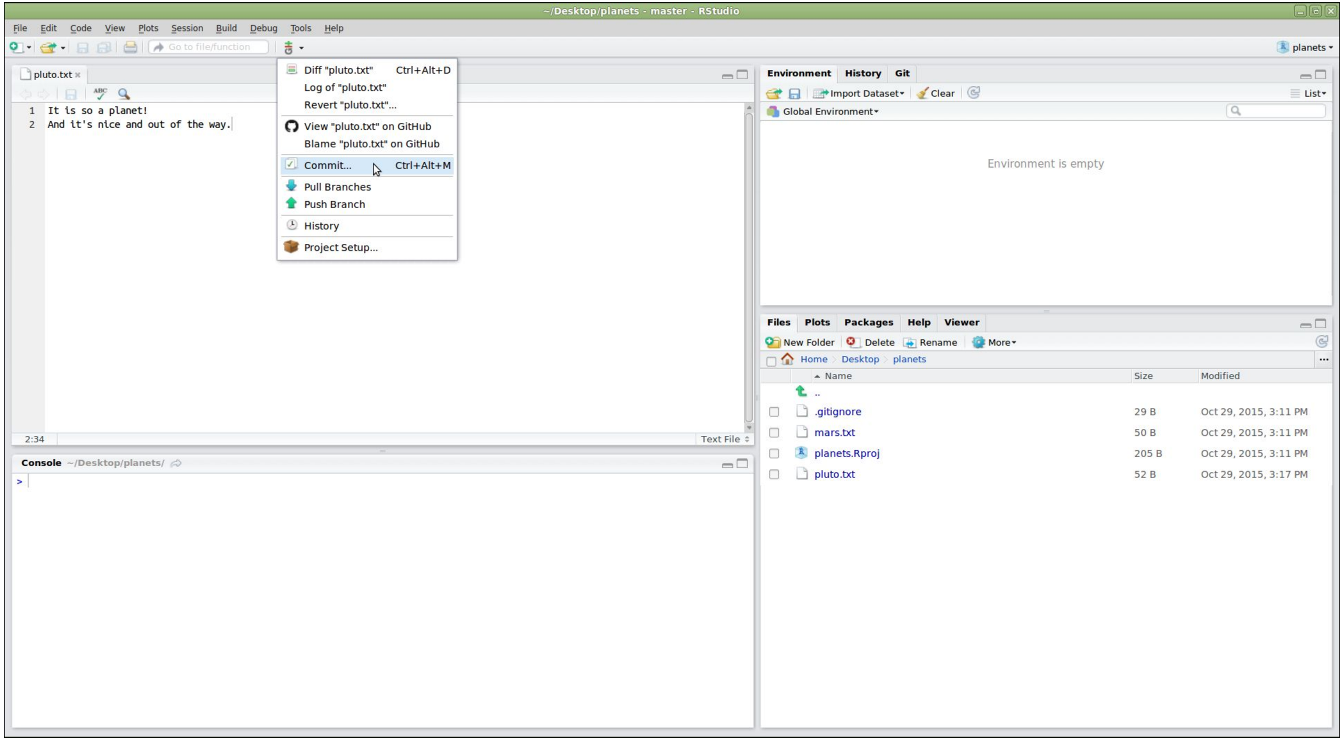
Example

Walk through collaboration and merging (interactive)

https://github.com/nih-fmrif/git-training/tree/master/session_3#merge-conflicts-walkthrough

Supplemental: Using Git from RStudio

Tools > Global Options > Git/SVN



```
It is so a planet!
And it's nice and out of the way.
```

Environment is empty

Name	Size	Modified
..		
.gitignore	29 B	Oct 29, 2015, 3:11 PM
mars.txt	50 B	Oct 29, 2015, 3:11 PM
planets.Rproj	205 B	Oct 29, 2015, 3:11 PM
pluto.txt	52 B	Oct 29, 2015, 3:17 PM

```
>
```

https://swcarpentry.github.io/git-novice/14-supplemental-rstudio/index.html