

# GIT: Getting Confident

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# Assumptions

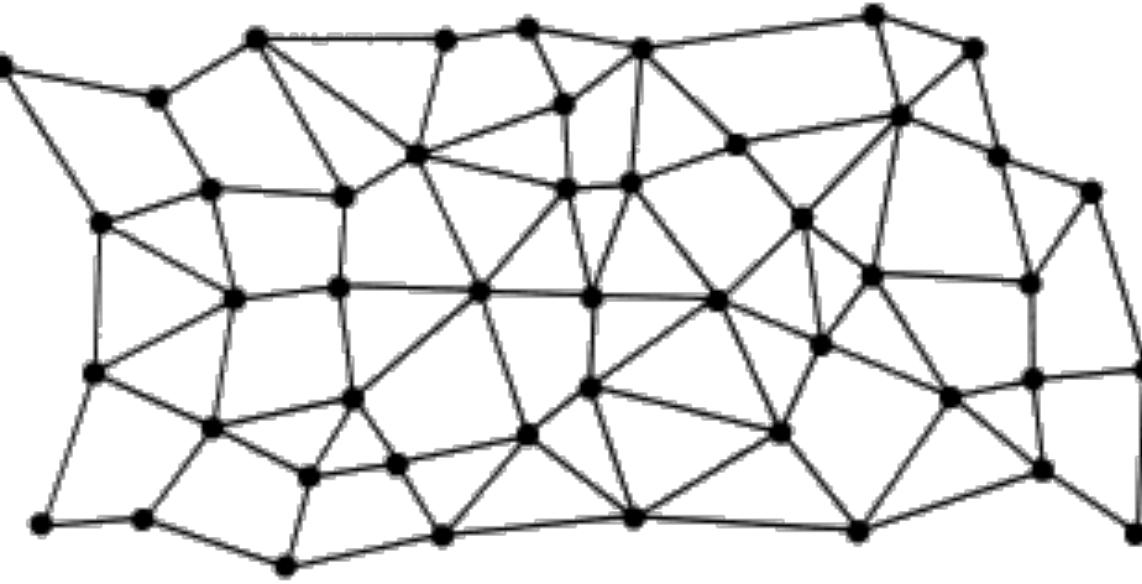
- What is a repository
- How to:
  - Create a new repository `git init`
  - Clone `git clone <path.to.git.repository>`
  - Pull `git pull`
  - Commit `git commit`
  - Push `git push`

# You're about to learn about

- DVCS
- Git Config
- Git Terminology
  - Commits
  - Head
  - Workspace & Staging area
- Undoing Changes: git reset
- Feature Branch workflow

# DVCS

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**Git is a distributed version  
control system**

# DVCS

- **A Git repository in your machine is a first-class repo in its own right.**
- **In comparison to Centralized version control systems:**
  - Performing actions is extremely fast  
(because the tool only needs to access the hard drive, not a remote server.)
  - Committing can be done locally without anyone else seeing them. Once you have a group of changesets ready, you can push all of them at once.
  - Everything (but pushing and pulling) can be done without an internet connection.

# DVCS

- To be able to collaborate with Git, you need to manage your remote repositories.
- `git remote` allows you to add or remove repositories (other than the one on your local disk) which you can push & pull.

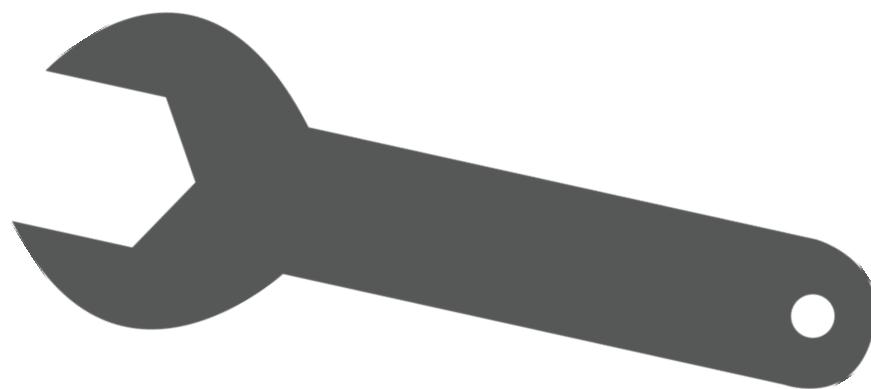
# DVCS

- ◎ **What is Github (and similar services)?**

- A repository hosting service.
- Usually used as the project's central repository for collaboration (all the developers add as remote to push/pull their changes)
- Provides project management & collaboration tools, such as forking & PRs, issue tracking, wikis etc.

# Configuring git

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# Configuring git

- Git is configured through .gitconfig text files.
- The git config command is a convenience function to set Git configuration values on a global or local project level.

```
git config <level> <configuration> <value>
```

# Configuring git - Levels

Local	<p>Default option. Local level is applied to the current repository git config gets invoked in. Stored in a file that can be found in the repo's .git directory: .git/config</p>
Global	<p>Applied to an user in the operating system user. Stored at ~/ .gitconfig (on unix systems).</p>
System	<p>System-level configuration: covers all users on an operating system. Stored at the system root path. \$(prefix)/etc/gitconfig (on unix).</p>

Thus the order of priority for configuration levels is: local, global, system. This means when looking for a configuration value, Git will start at the local level and bubble up to the system level.

# Configuring git - Common options

Identity:

```
$ git config --global user.name "John Doe"  
$ git config --global user.email johndoe@example.com
```

Editor:

```
git config --global core.editor "code --wait"
```

# Configuring git - Common options

Colors:

```
git config --global color.ui true
```

Autocorrect:

```
$ git config --global help.autocorrect 1
```

# Configuring git - Aliases

- Custom shortcuts that expand to longer or combined commands.
- Stored in Git configuration files. (you can use the `git config` command to configure aliases)

```
git config --global alias.ci commit  
git config --global alias.co checkout  
git config --global alias.st status
```

*Lab*

# Git Terminology

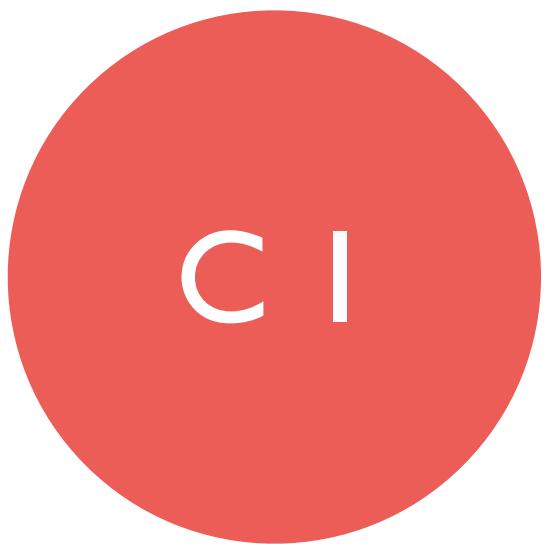
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*Commit • Head • Workspace & Staging Area*



**Commits: Git is structured like  
a “singly” linked list**

```
> git commit -m "initial commit"
```



```
> git commit -m "second commit"
```



```
> git commit -m "third commit"
```

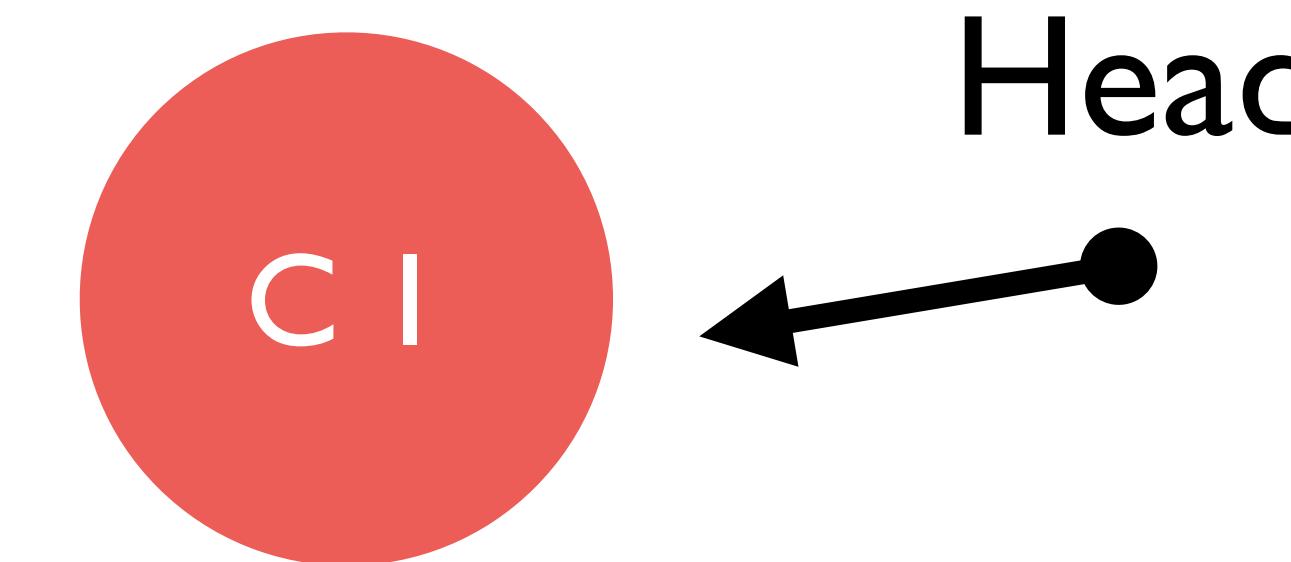


# Commits

- **Saves the current state of your project at that point in time**
- **Useful because**
  - you can always go back to a previous commit if you mess up
  - documents changes that happen over time
  - organizes changes in such a fashion that makes debugging convenient (i.e. “which commit introduced this bug”?)
- **Commit early and often!**

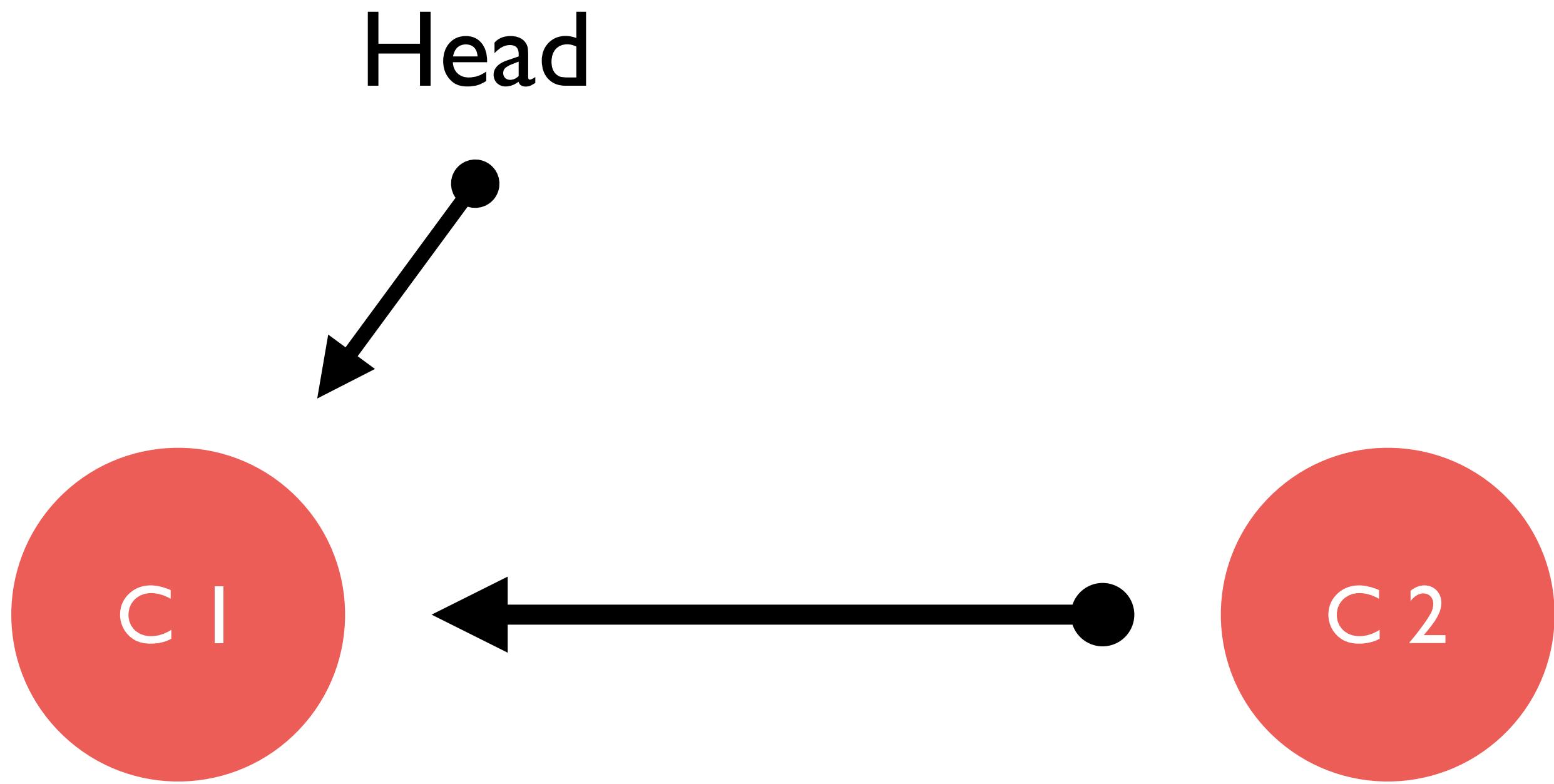
# Head

- ◎ HEAD is a reference to the last commit in the currently checked-out branch.
- ◎ We are calling this commit “CI”, but in real life commits are referenced after hashes, for example `fed2da64c0efc5293610bdd892f82a58e8cbc5d8`. That’s why references like Head are useful.





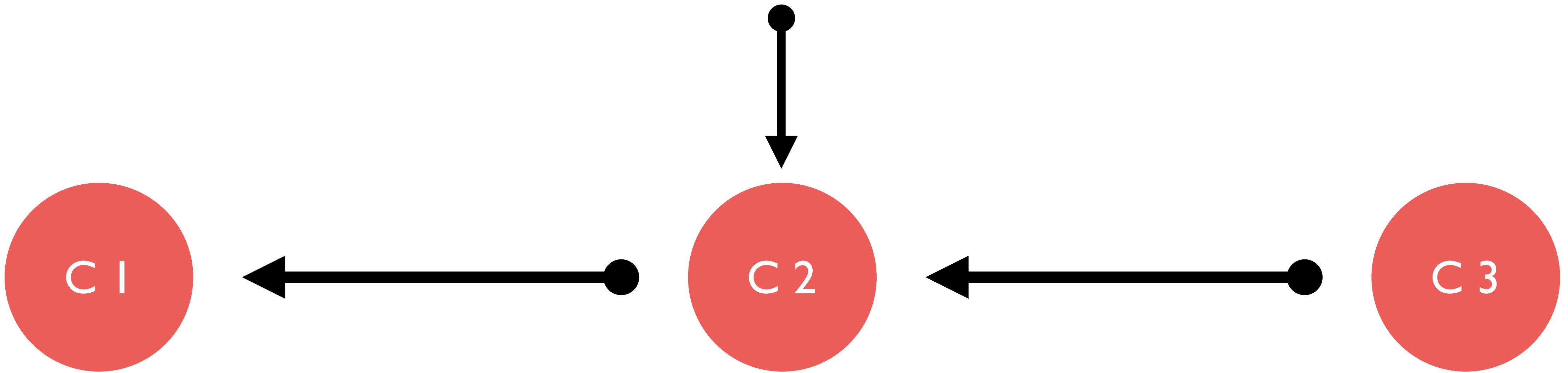
# Head





# Head

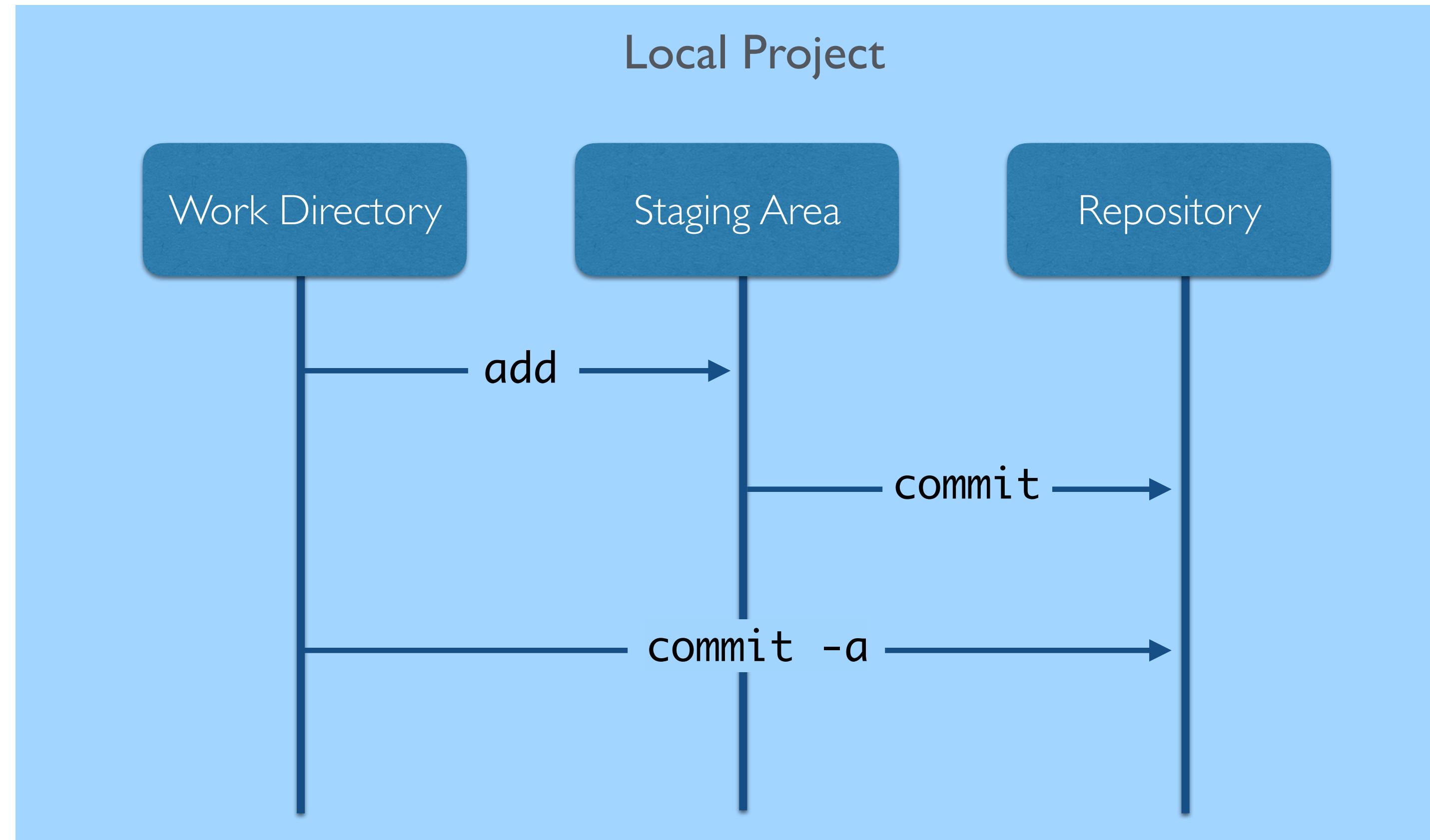
# Head



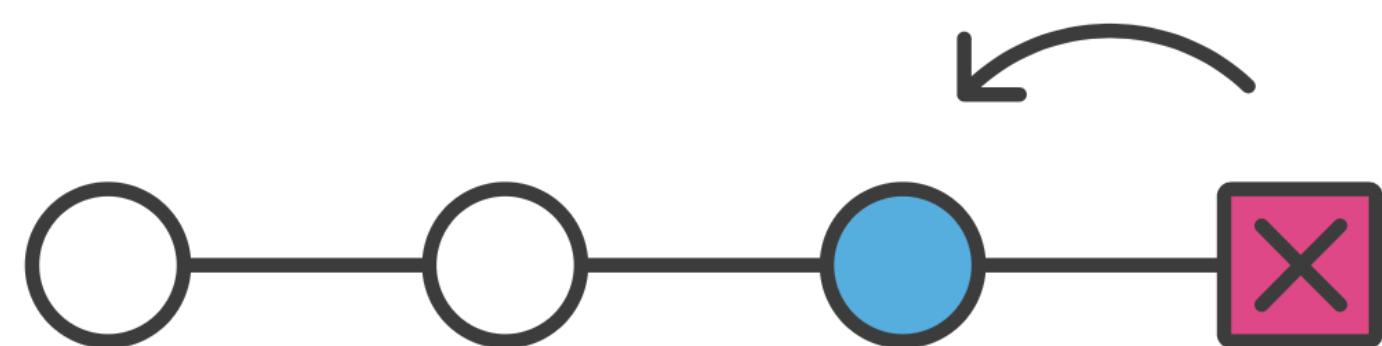
# Workspace & Staging area

- **Workspace:** Your local working directory (where you do your actual work). It contains tracked files, untracked files and a special directory “`.git`”.
- **Staging area:** Used for preparing commits. You can add files to the next commit.
- **The Repository itself** is the virtual storage of your project. It allows you to save versions of your code, which you can access when needed.

# Workspace & Staging area



# Undoing Changes: git reset

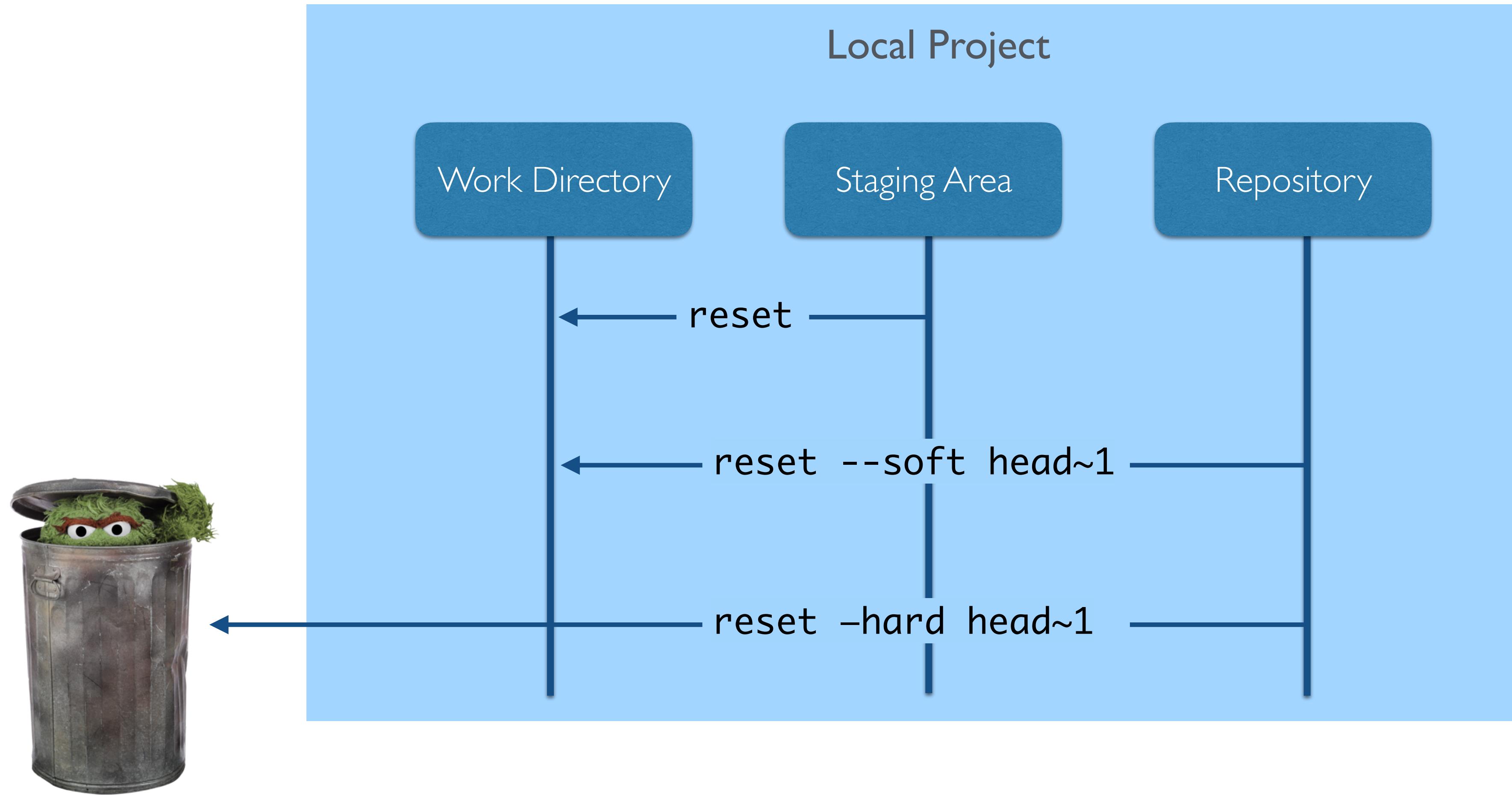


# git reset

- A complex and versatile tool for undoing changes:

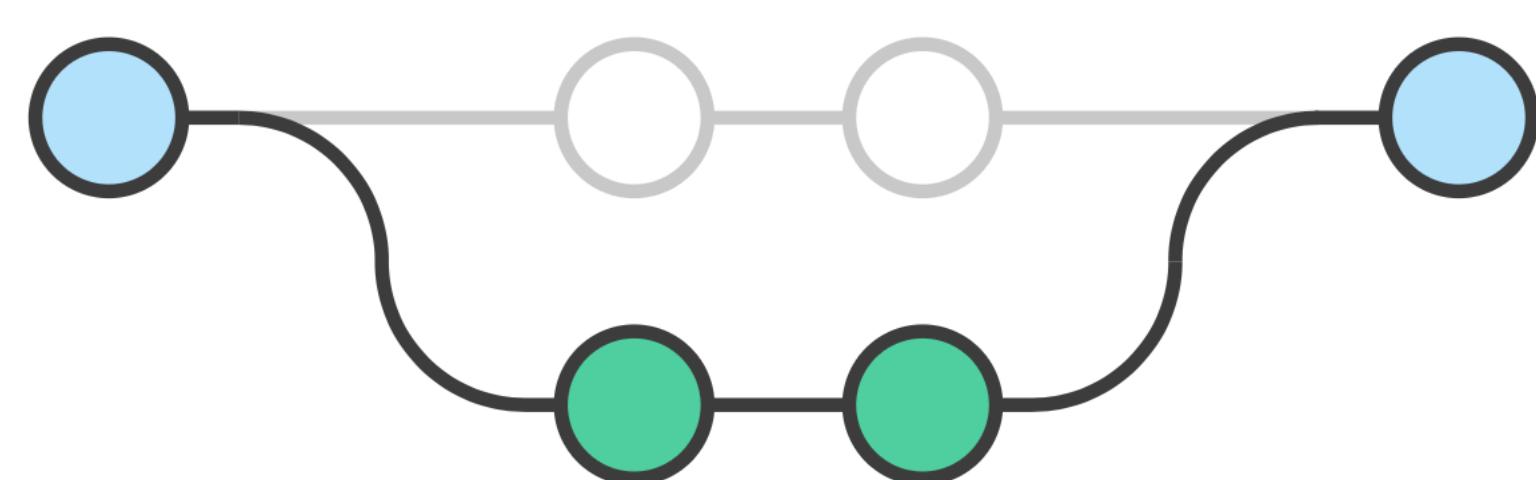
- Undo Staging: `git reset`
- Undo Commit (or Commits): `git reset <commit>`
  - **soft**: Keep changed files
  - **hard**: Delete changes files

# Undoing Changes: git reset



# Branches and Merging

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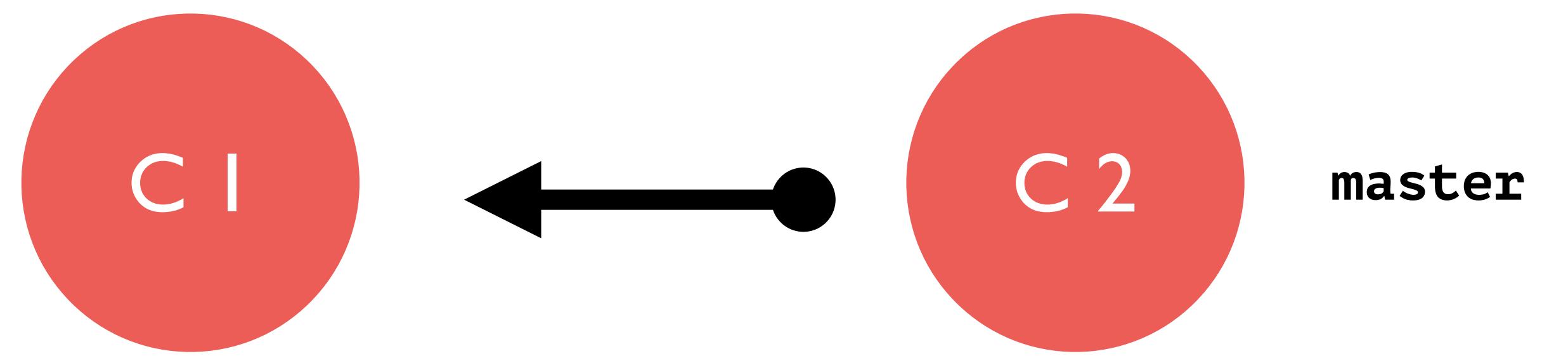
**Scenario: two people are  
working on a project**

# Problems

- How can I show what I've done in an efficient manner?
- If we don't like my work, how can I easily get back to where I was?
- If we do like my work, how can I integrate it together with your work?

A close-up photograph of bare tree branches against a blue sky. The branches are light-colored and textured, creating a complex web-like pattern. Some small, dark, irregular shapes are visible on the branches, possibly insect eggs or damage. The background is a soft-focus blue.

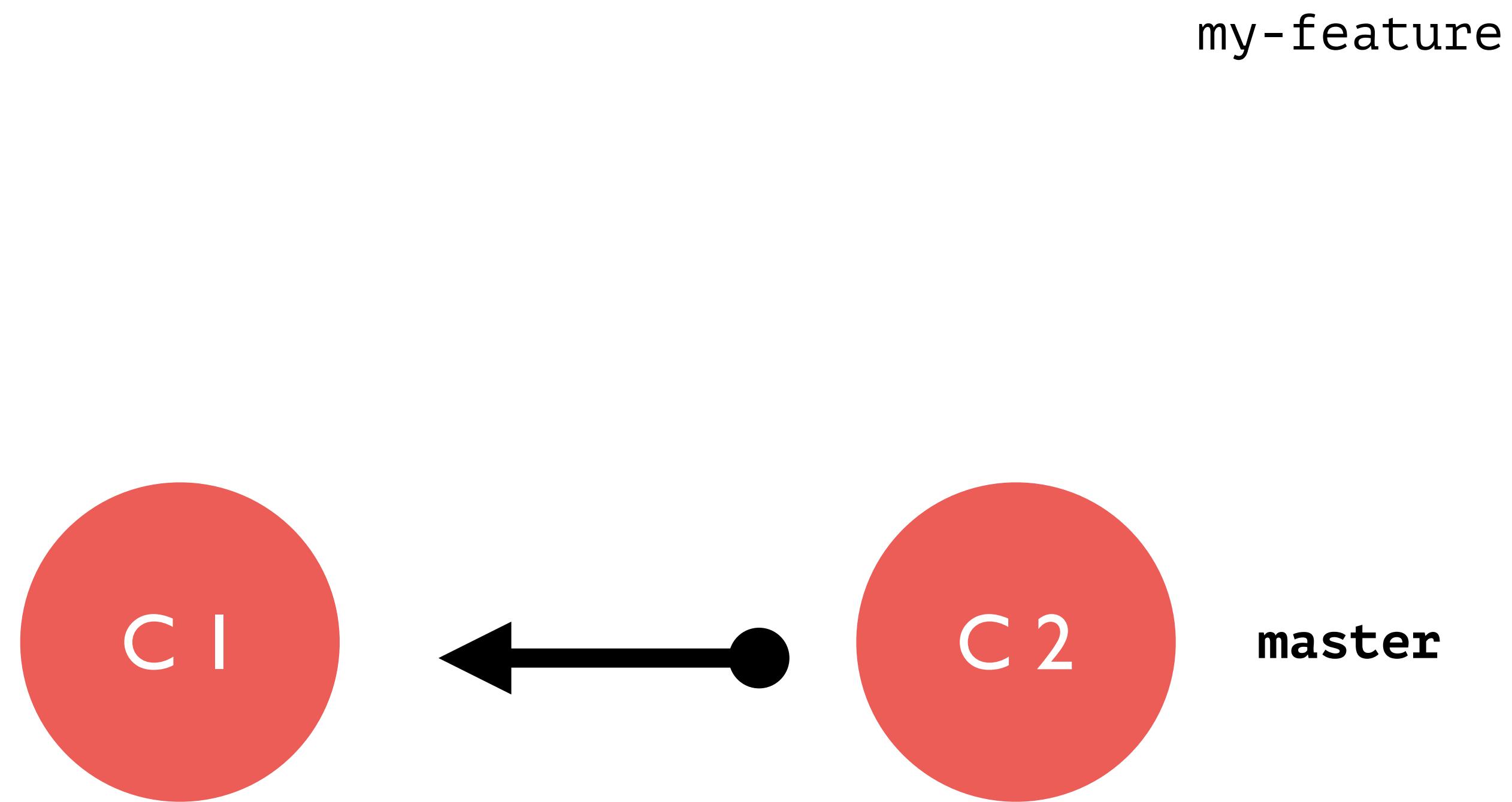
**BRANCHES**



HEAD: master

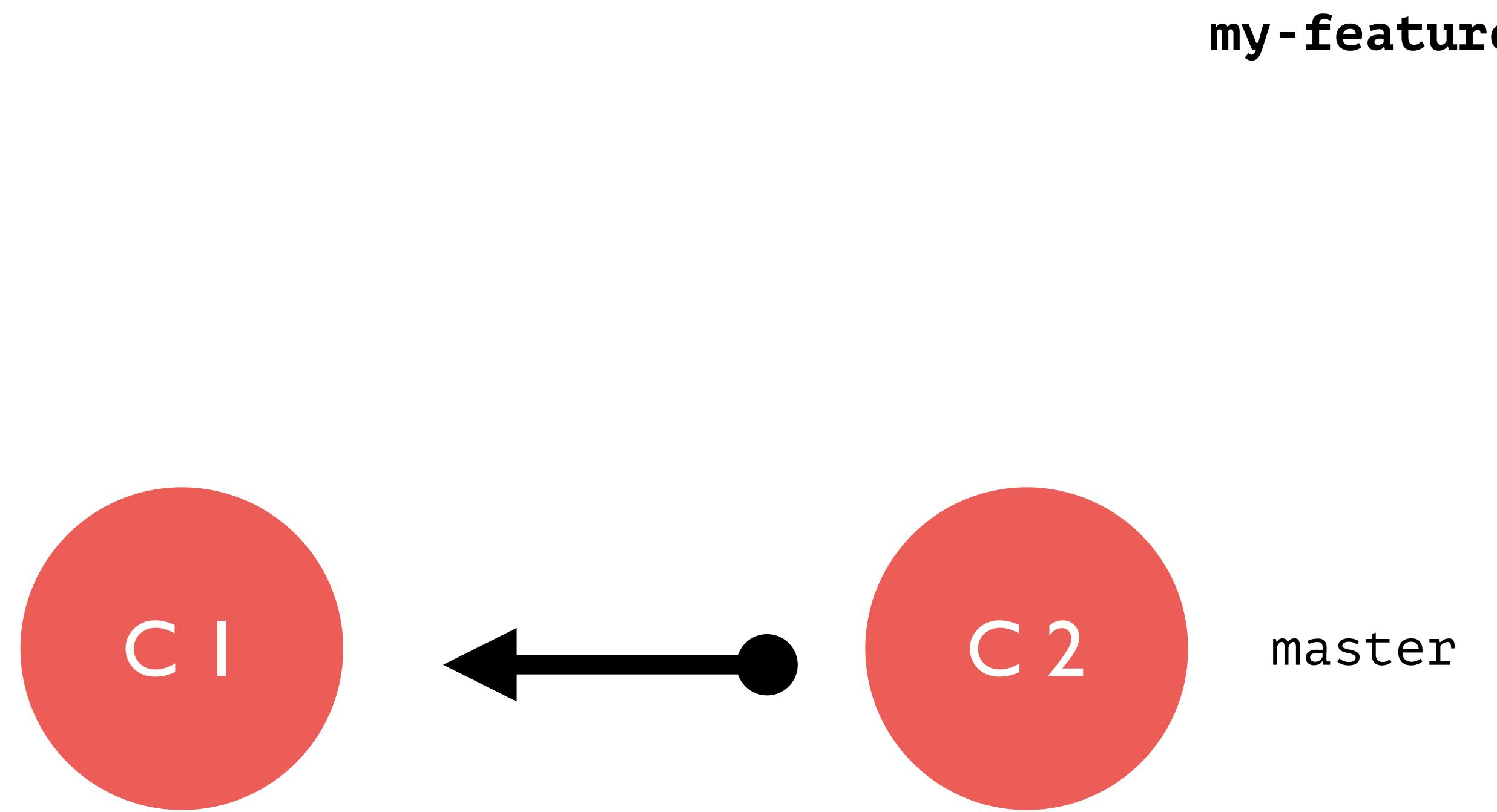
master

>



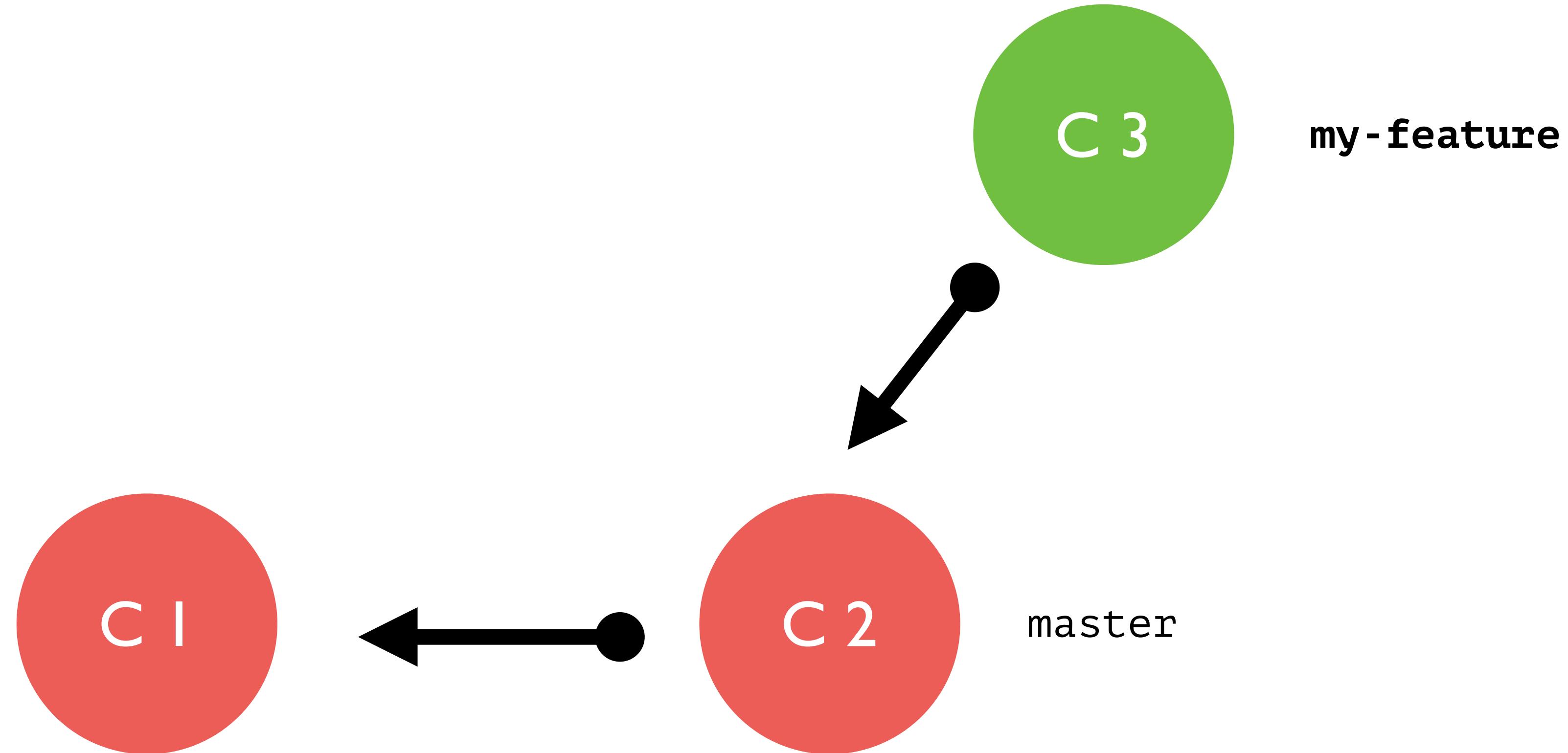
HEAD: master

```
> git branch my-feature
```



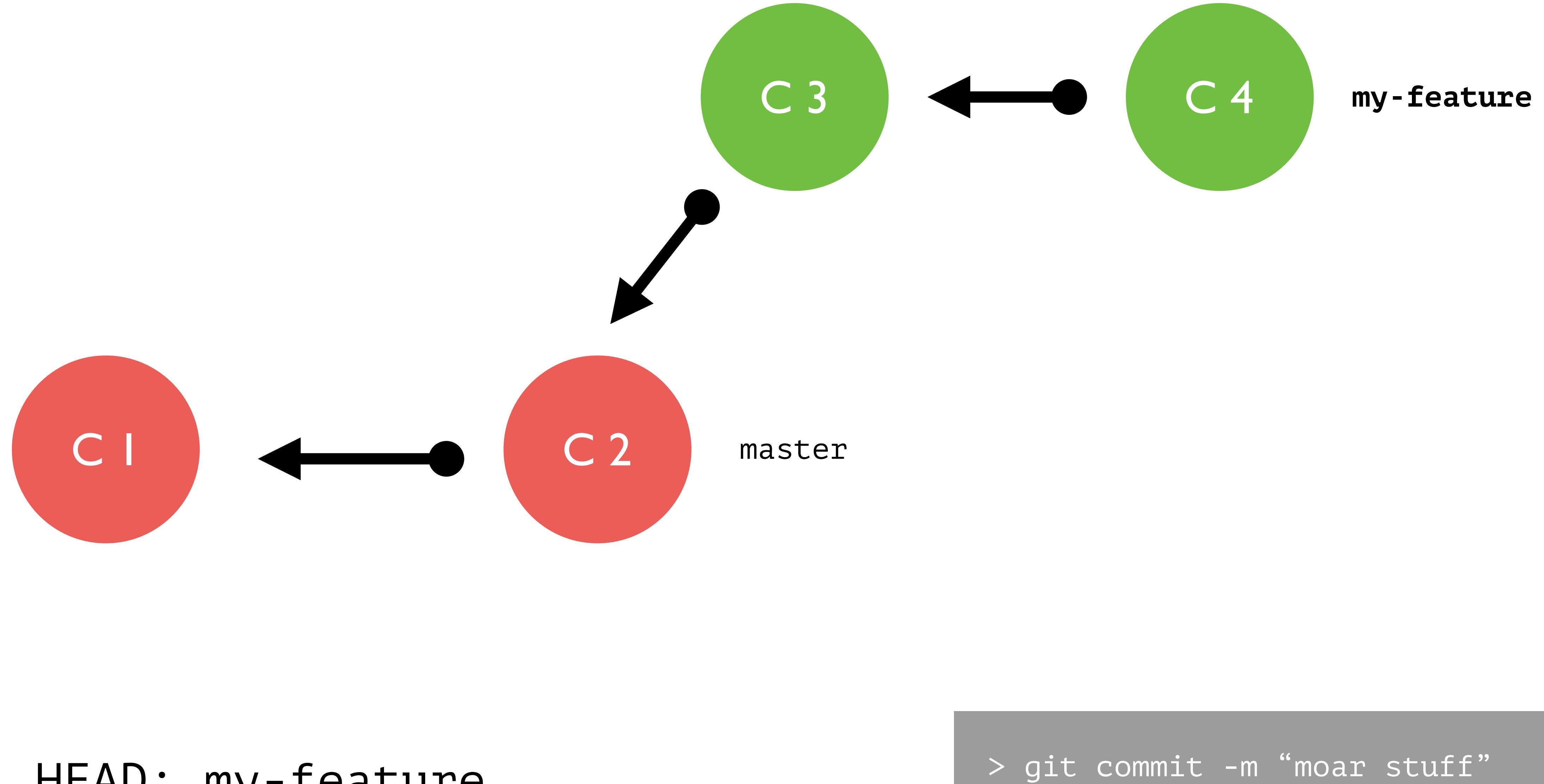
HEAD: my-feature

```
> git checkout my-feature
```



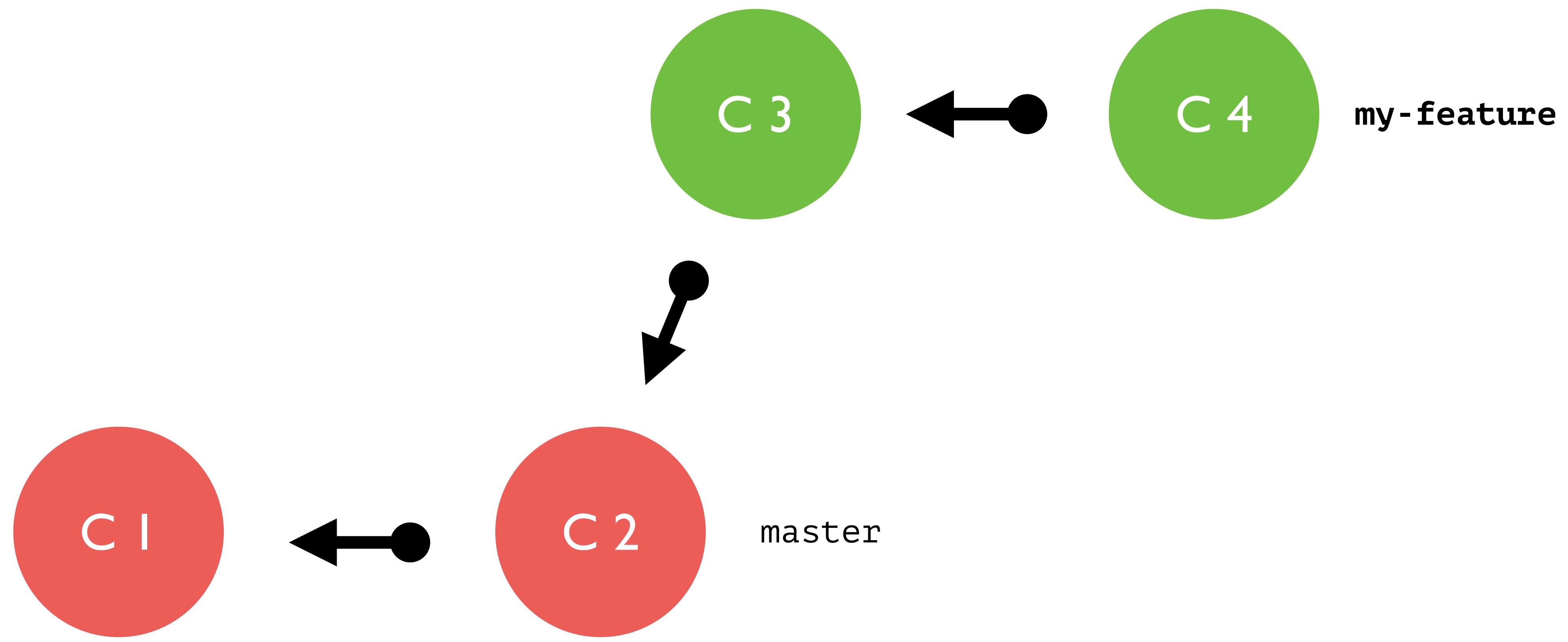
HEAD: my-feature

```
> git commit -m "add stuff"
```



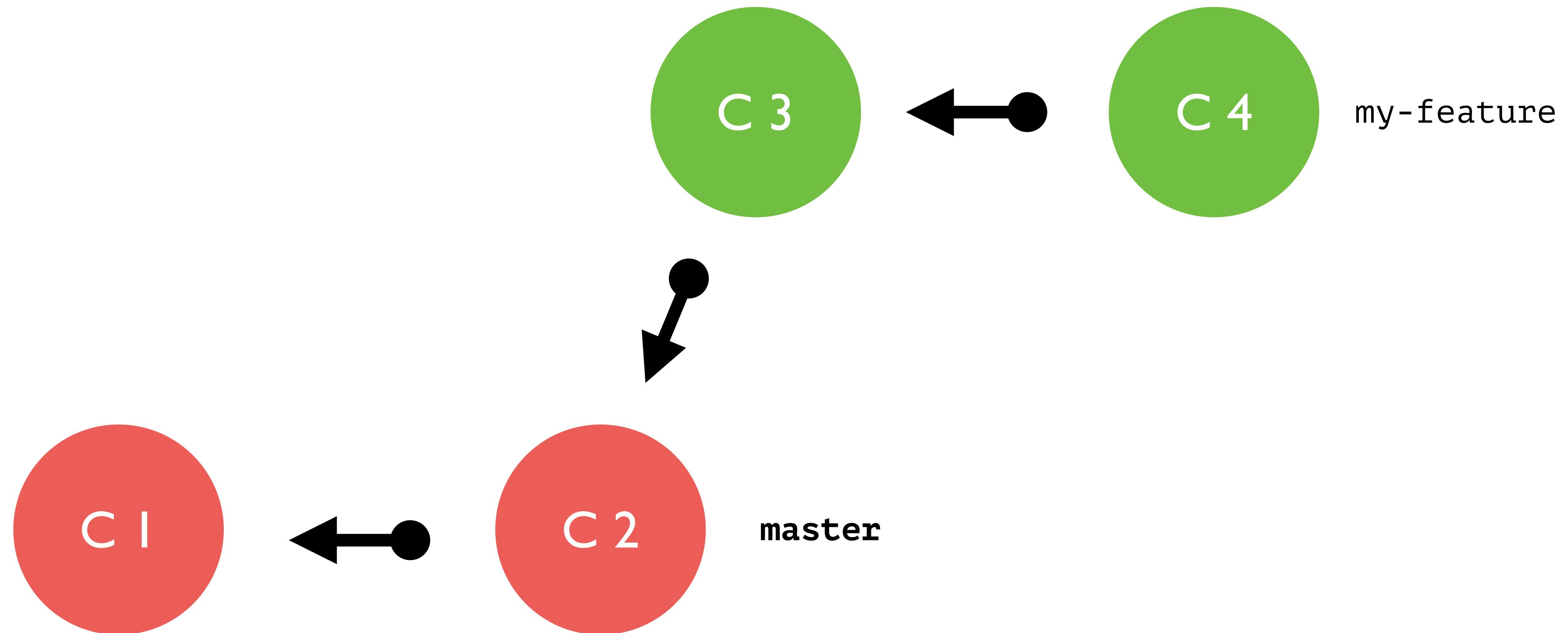


MERGING



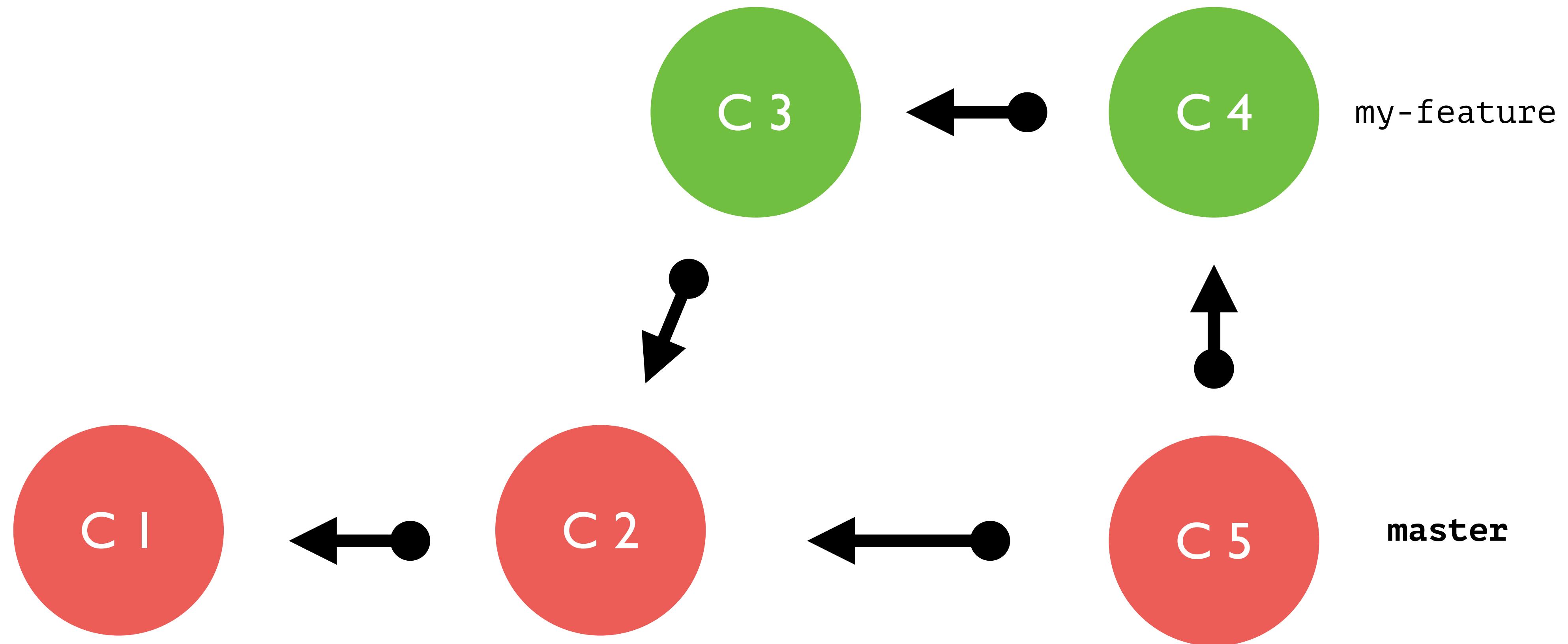
HEAD: my-feature

>



HEAD: master

```
> git checkout master
```



HEAD: master

```
> git merge my-feature
```

A photograph of two dogs, likely Golden Retrievers, playing tug-of-war with a large, textured dog bone toy. The dog on the left is light-colored with a red collar and a black tag. The dog on the right is also light-colored with a red collar and a black tag. They are both pulling on the toy, which has orange and grey rope ends. The background is a green grassy field.

PULL REQUESTS

# Pull Requests

- Merging a branch on the remote, plus some ceremony (ex. code review by another team member)
- Feature of Github, not explicitly part of Git

```
> git push origin cool-branch
```

HEAD: cool-branch

 [collin / example](#)

 Unwatch ▾ 1

 Star 0

 Fork 0

 Code

 Issues 0

 Pull requests 0

 Projects 0

 Wiki

 Insights

 Settings

No description, website, or topics provided.

 Edit

[Add topics](#)

 1 commit

 1 branch

 0 releases

 1 contributor

Your recently pushed branches:

 cool-branch (less than a minute ago)

 Compare & pull request

# Open a pull request

Create a new pull request by comparing changes across two branches. If you need to, you can also [compare across fork](#)

base: master ▾ ← compare: cool-branch ▾ ✓ Able to merge. These branches can be automatically merged

 adds a cool file

Write Preview AA B i “ <> ↻ ≡ 1≡ ≡ ↺ @ ⬧

A very detailed description.

Attach files by dragging & dropping, [selecting them](#), or pasting from the clipboard.

 Styling with Markdown is supported Create pull request

# adds a cool file #1

 Open

collin wants to merge 1 commit into master from cool-branch

 Conversation 0

 Commits 1

 Files changed 1



collin commented just now

Owner



A very detailed description.



adds a cool file

Verified

4c66333

Add more commits by pushing to the **cool-branch** branch on **collin/example**.



**This branch has no conflicts with the base branch**

Merging can be performed automatically.

**Merge pull request**



You can also [open this in GitHub Desktop](#) or view command line instructions.

```
> git checkout master
```

HEAD: master

```
> git pull origin master
```

HEAD: master



MERGE CONFLICT

# Merge conflicts

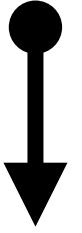
- Fairly common: not the end of the world
- Happens when Git can't automatically resolve two commits into one - needs a human to decide what version to keep
- Makes sure someone else's work doesn't overwrite another's unintentionally

## **script.js - master**

```
console.log('hello world')
```

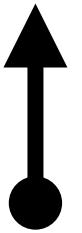
script.js - f/howdy

```
console.log('howdy world')
```



script.js - master

```
console.log('hello world')
```



script.js - f/goodbye

```
console.log('goodbye world')
```

script.js - f/howdy

```
console.log('howdy world')
```

script.js - master

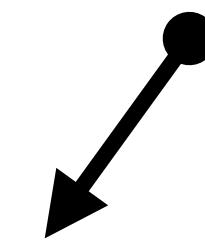
```
console.log('hello world')
```

**script.js - master**

```
console.log('goodbye world')
```

script.js - f/goodbye

```
console.log('goodbye world')
```



script.js - f/howdy

```
console.log('howdy world')
```



script.js - master

```
console.log('hello world')
```



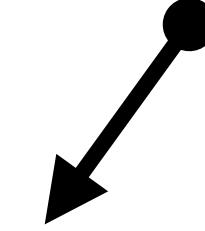
**script.js - master**

```
console.log('goodbye world')
```



script.js - f/goodbye

```
console.log('goodbye world')
```



```
<<<<< HEAD (current version)
console.log('goodbye world')
=====
console.log('howdy world')
>>>>> howdy (incoming change)
```