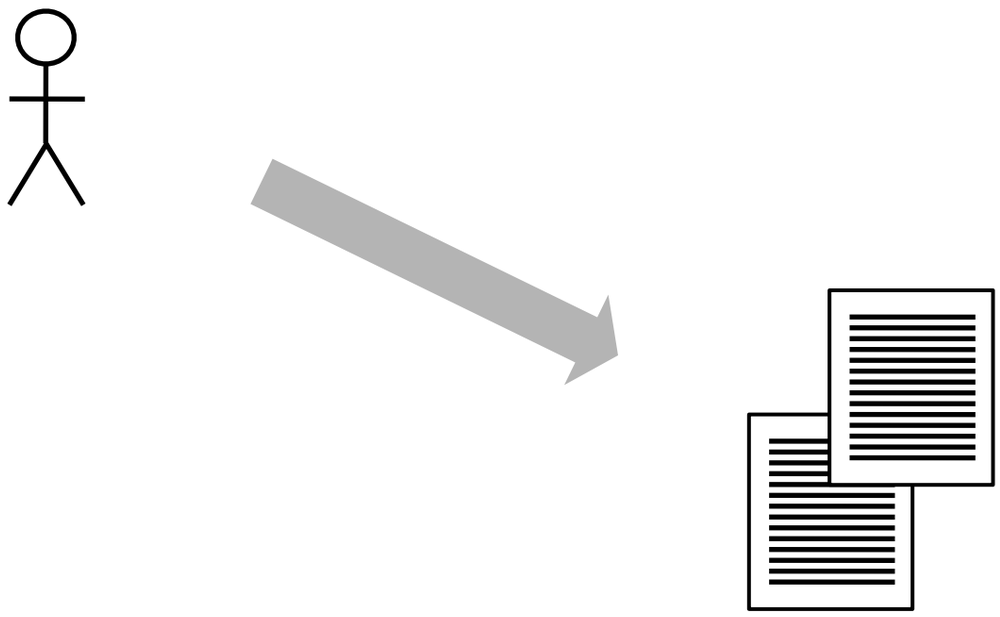
Distributed version control with git — a brief introduction

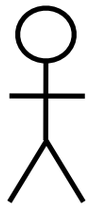
Oscar Nierstrasz

Why git?

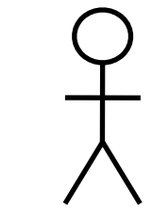
Bob

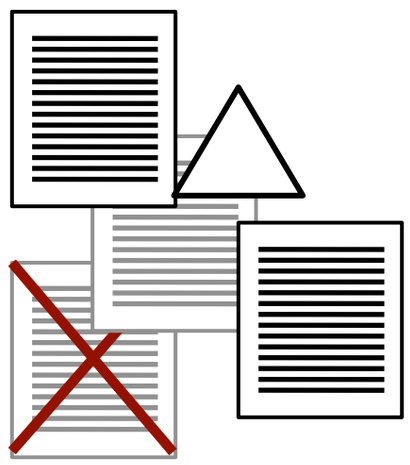


Bob



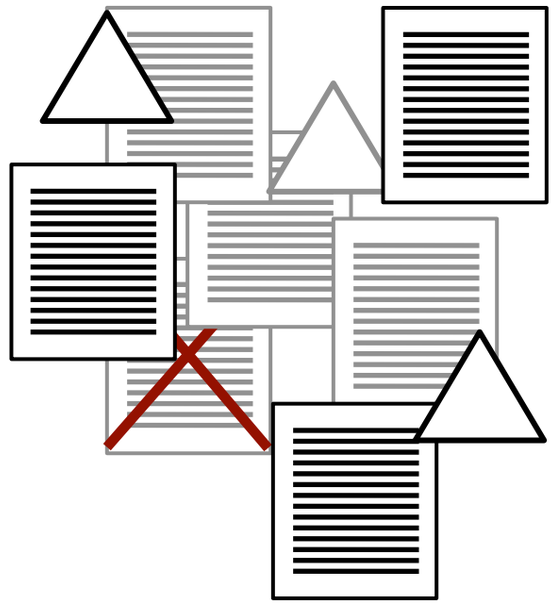
Carol





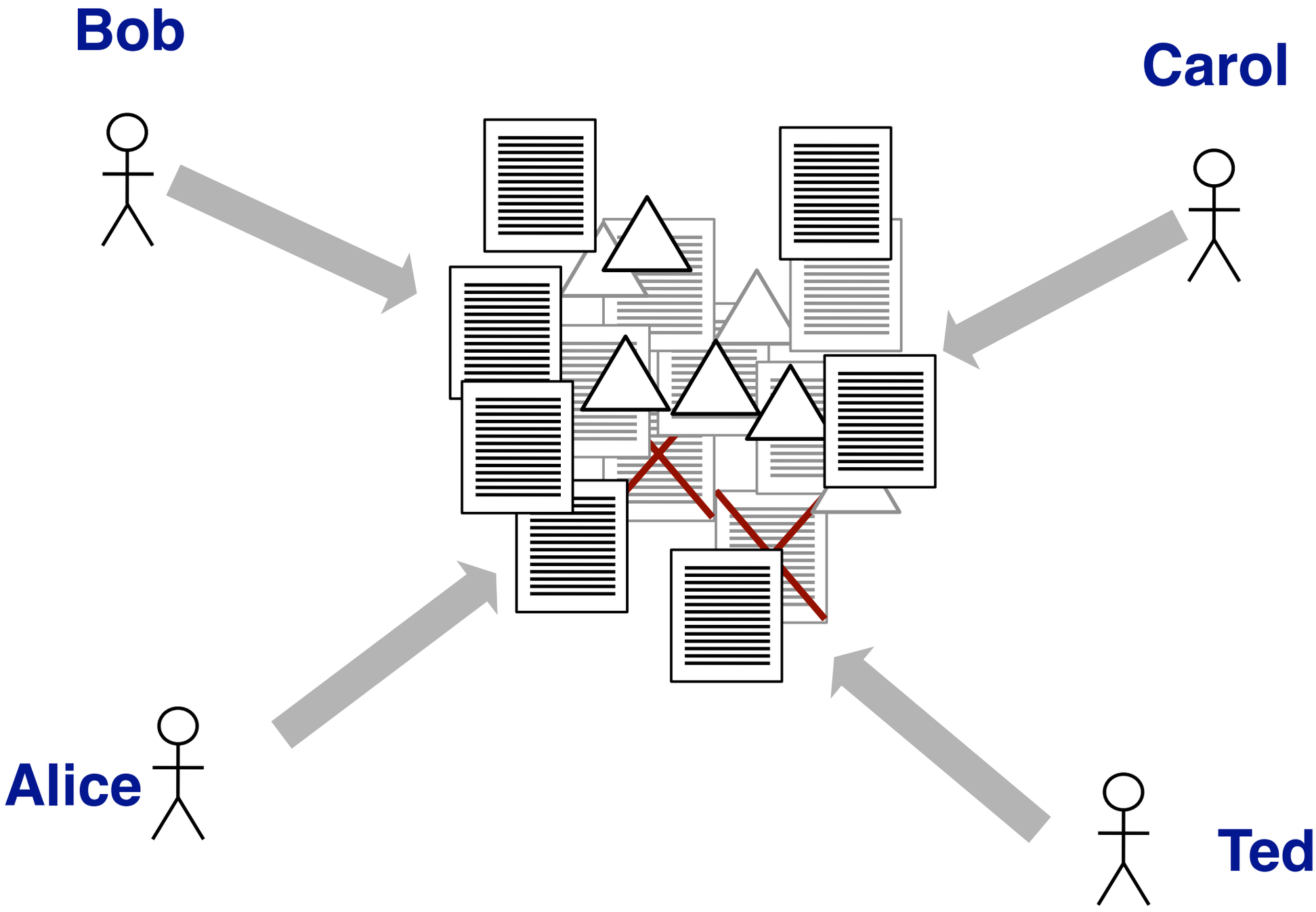
Bob

Carol



Alice

Ted



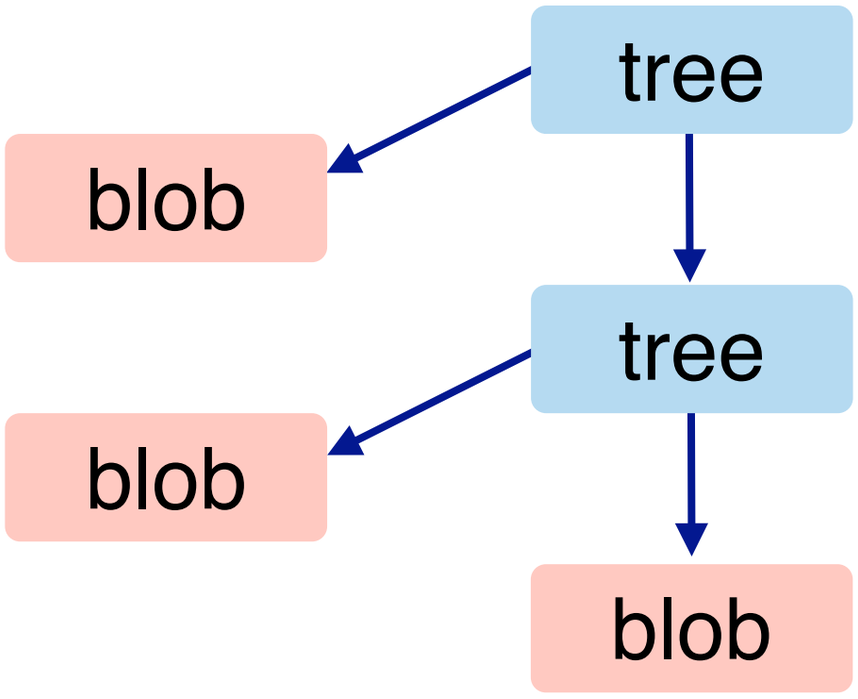
A recipe for disaster!

The git object model

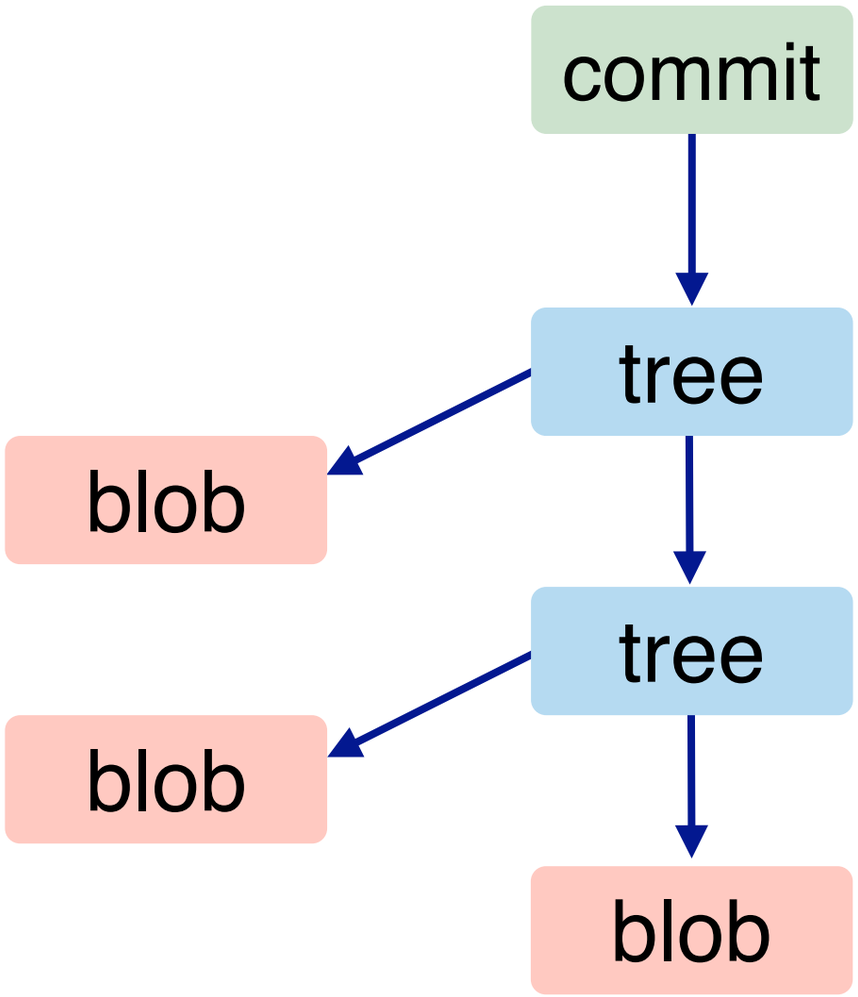
A “blob” is *content* under version control (a file)

blob

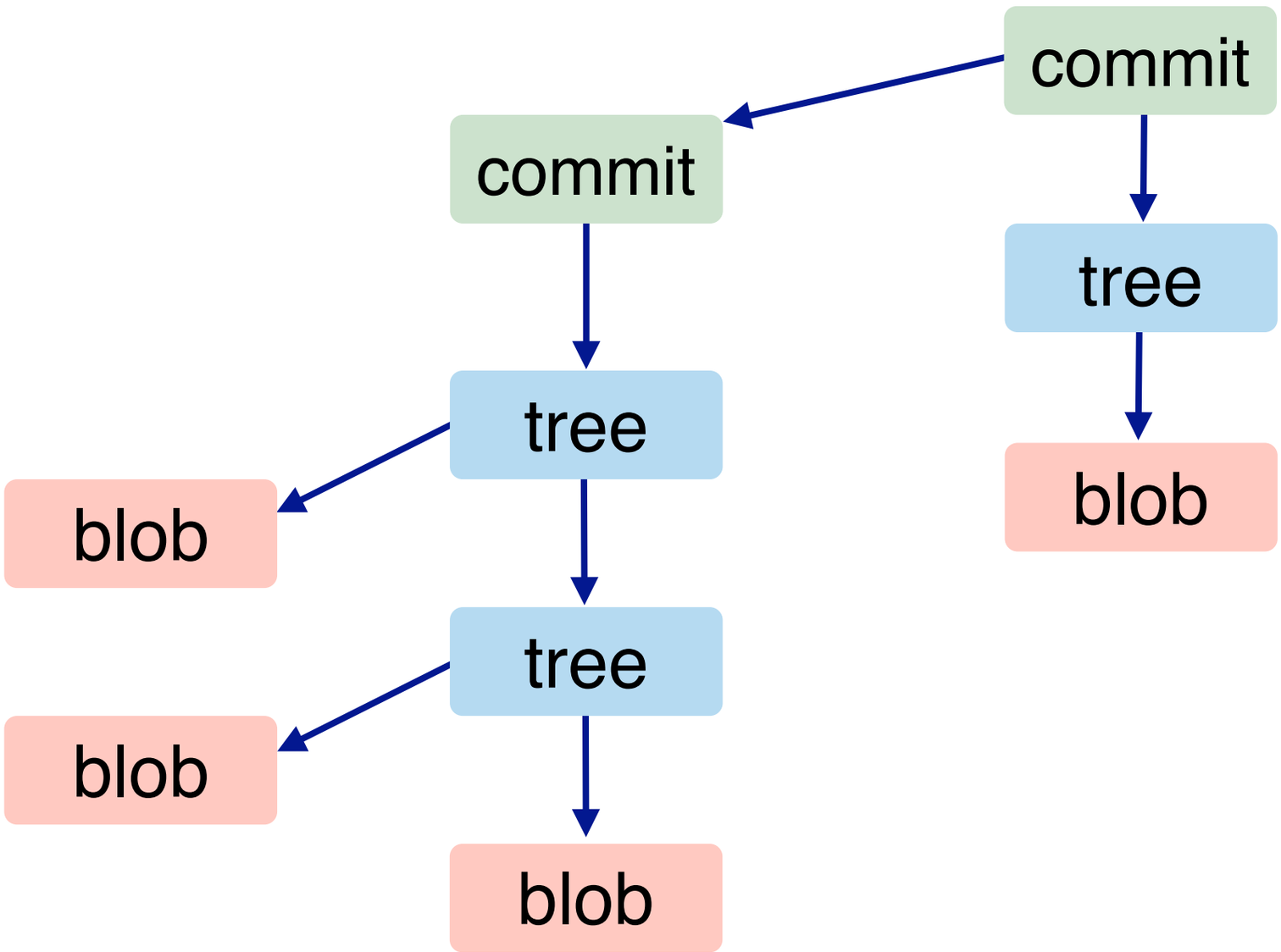
You can have *trees* of blobs
(directories of files)



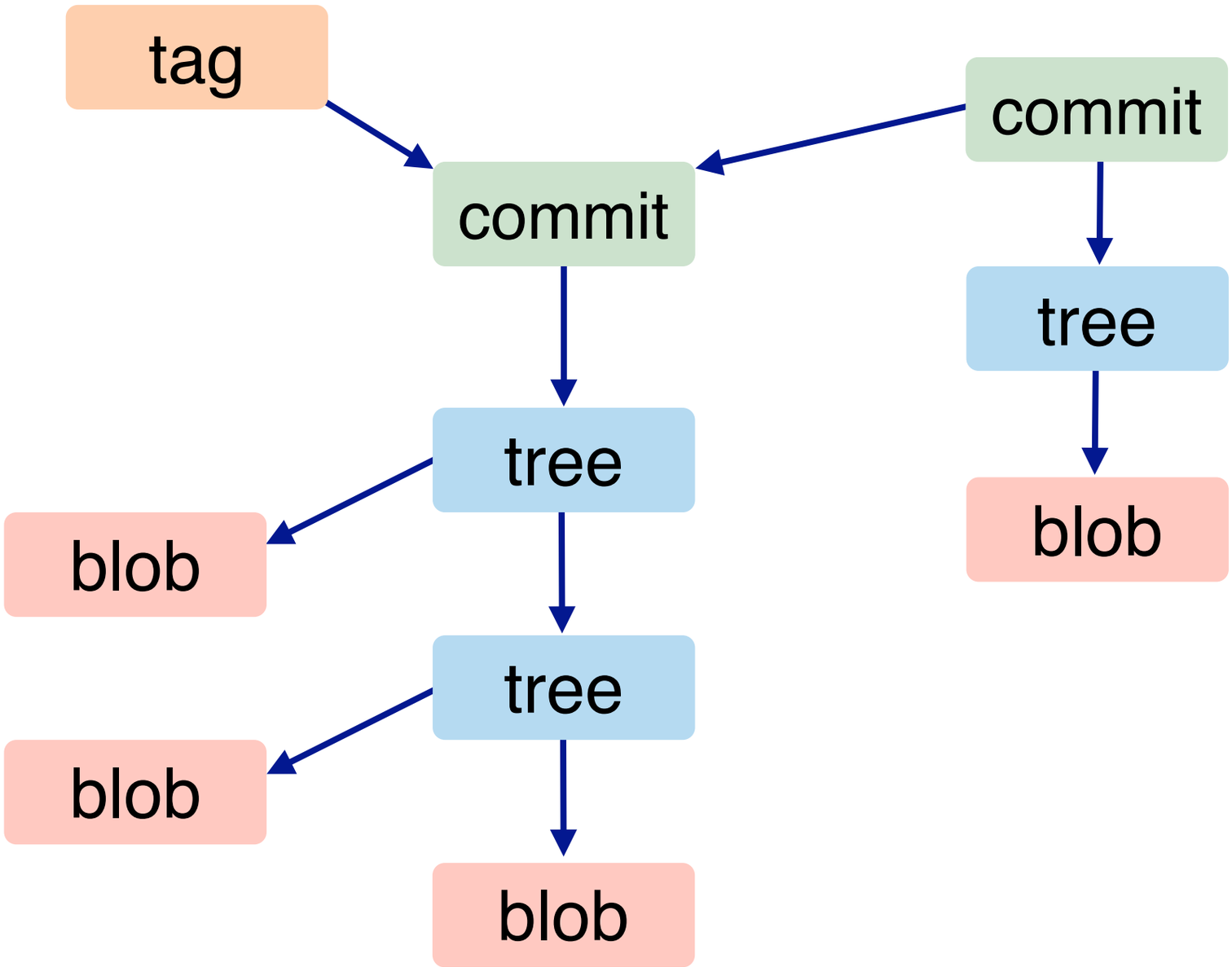
A “commit” is a tree of blobs (a set of changes)



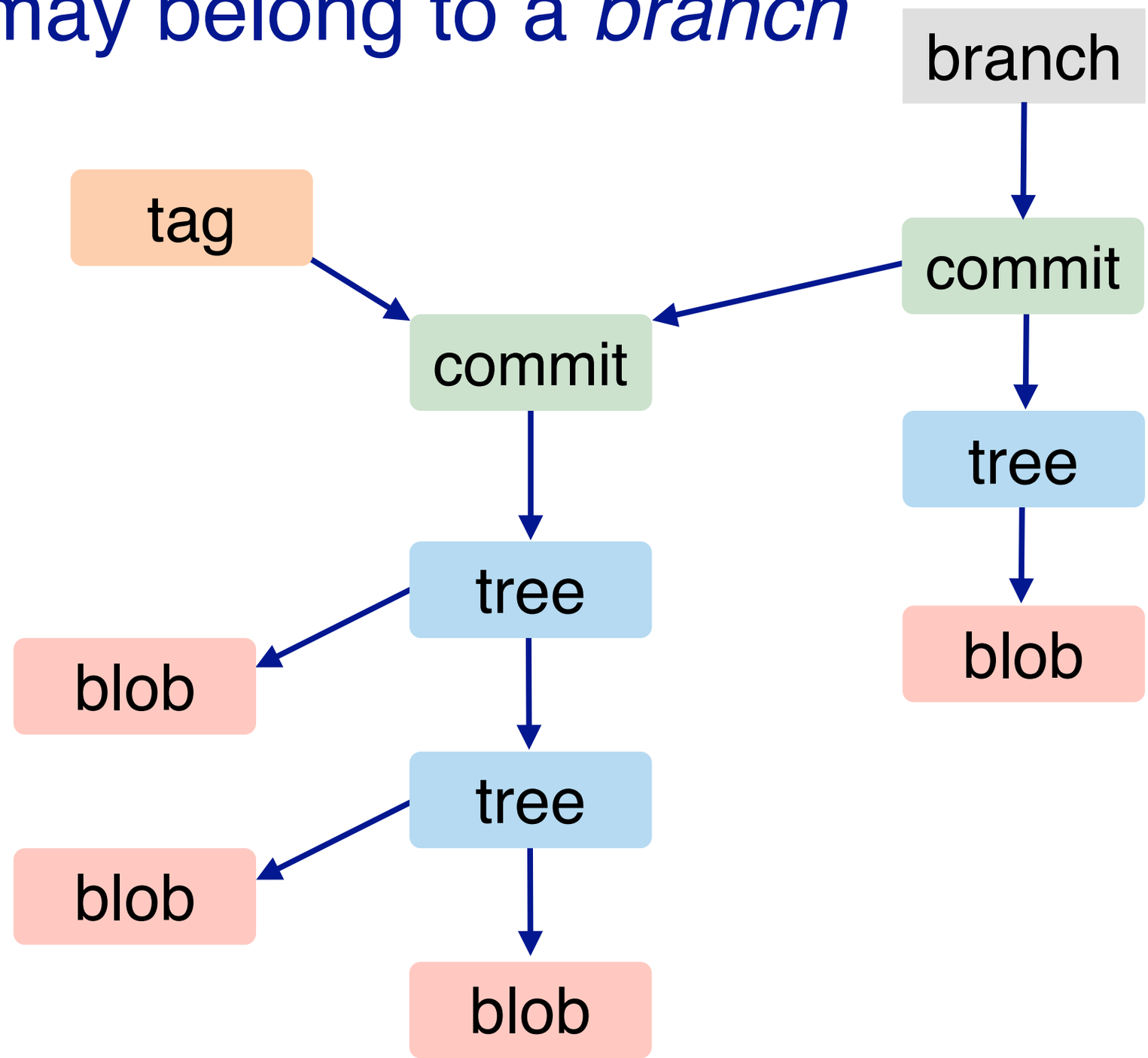
Most commits modify (or merge) earlier commits



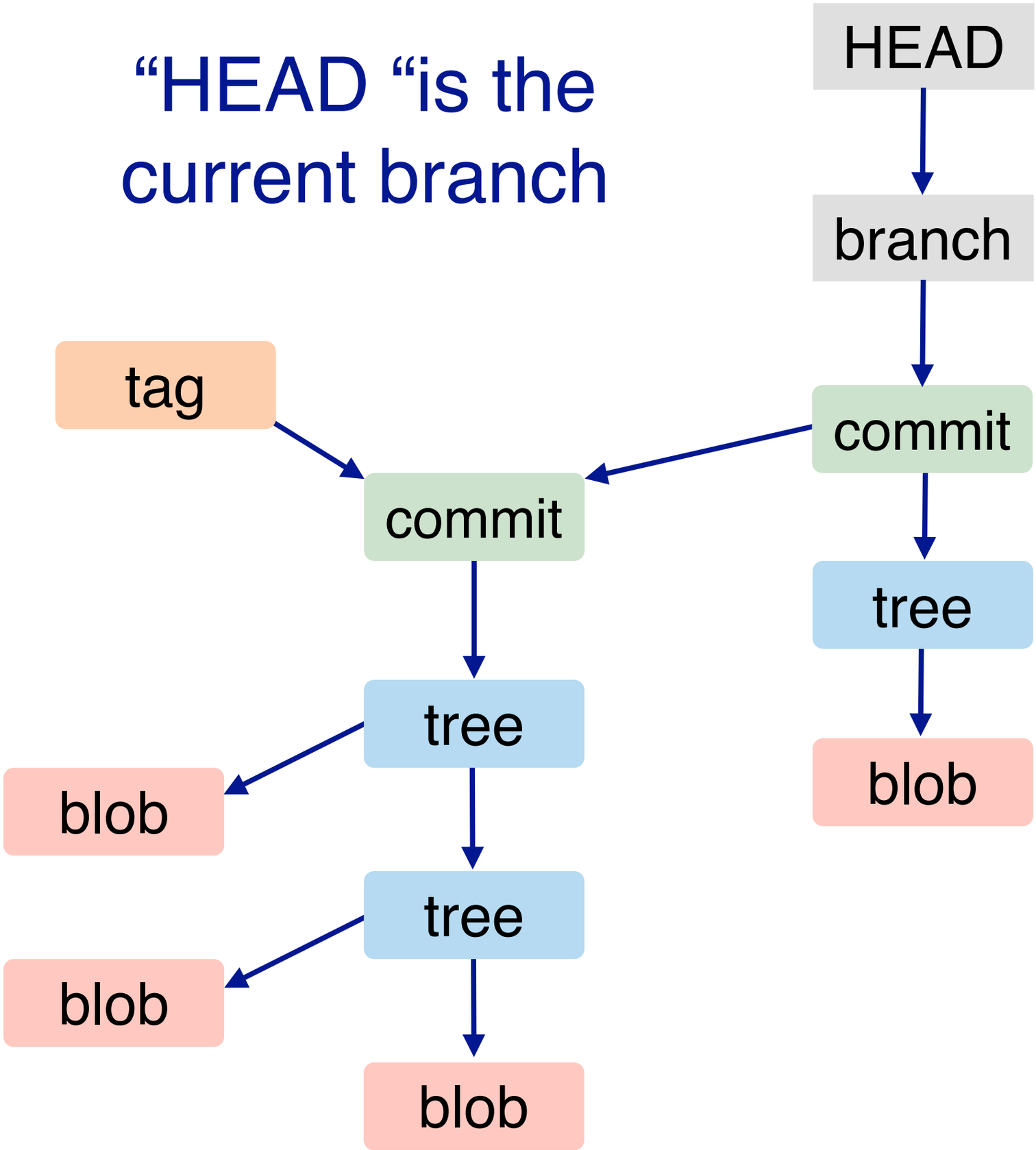
You can “tag” an interesting commit

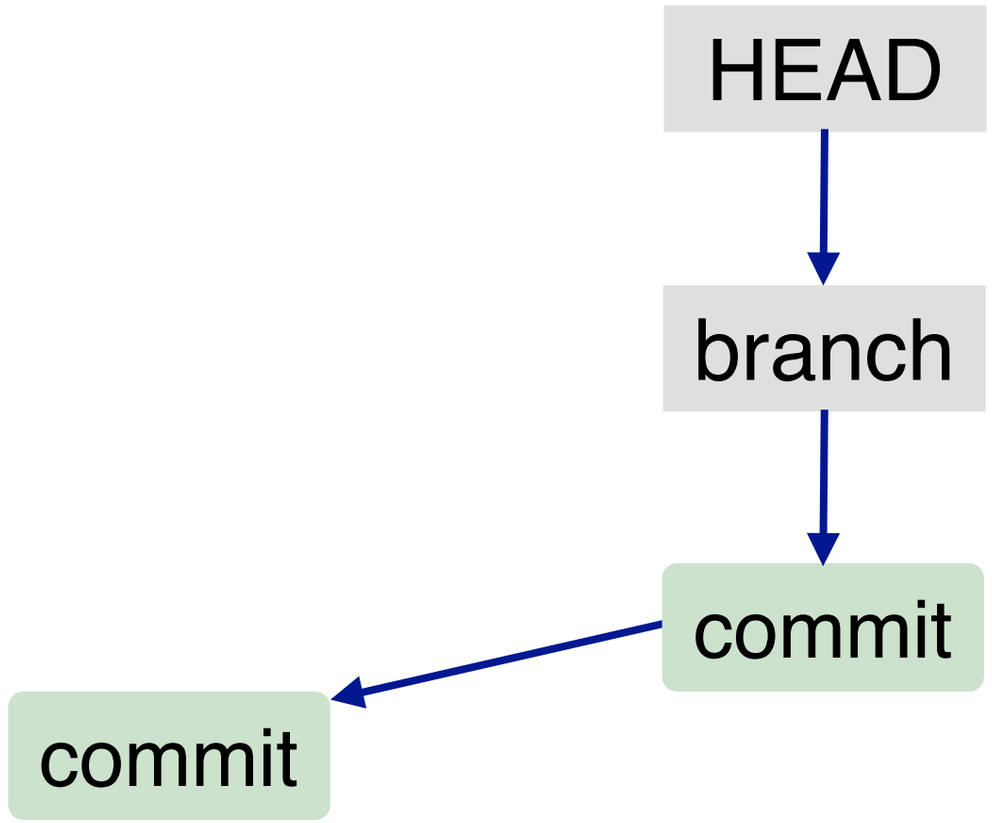


A graph of commits may belong to a *branch*



“HEAD “is the current branch



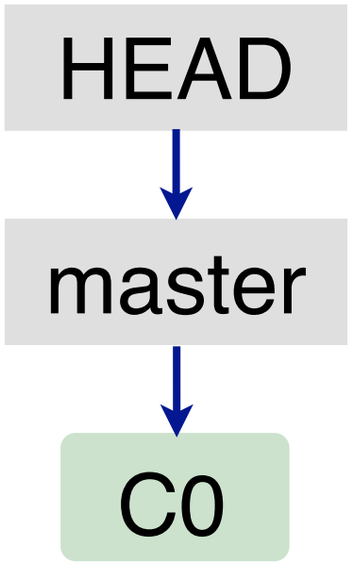


Let’s focus on *commits*
and *branches*

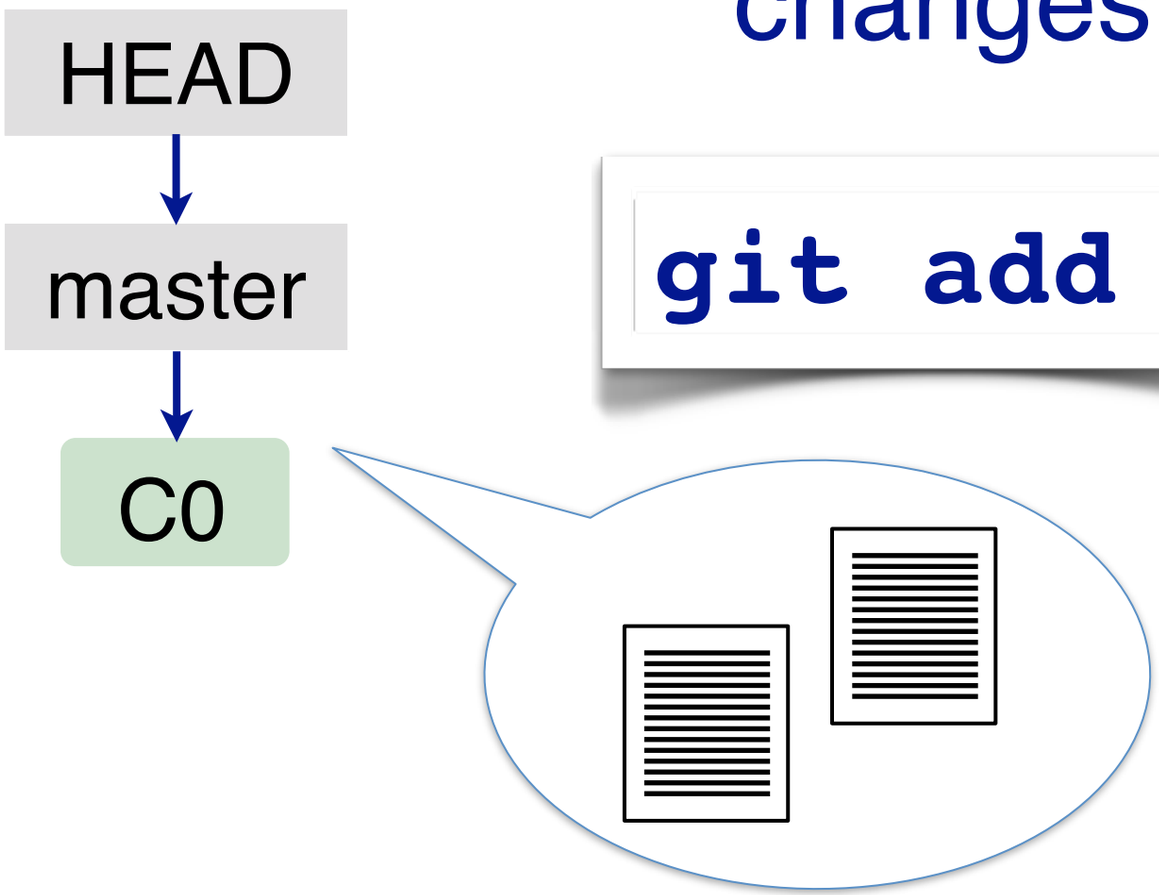
Basic git

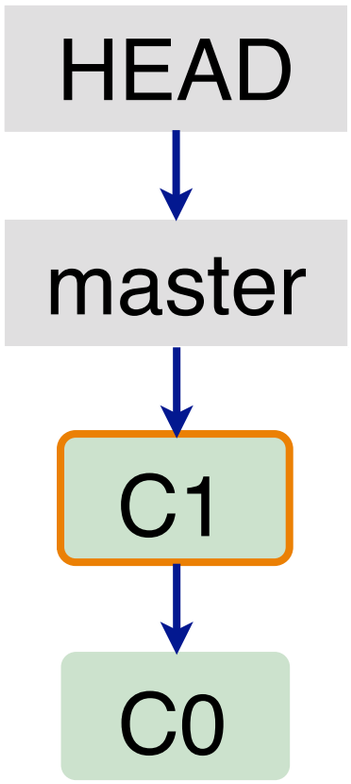
Create a git repo

```
mkdir repo
cd repo
git init
```



Tell git to “stage” changes

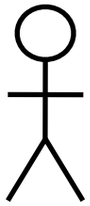




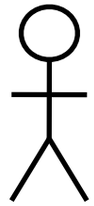
Commit your changes

```
git commit …
```

Collaborating



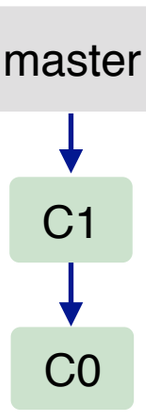
John



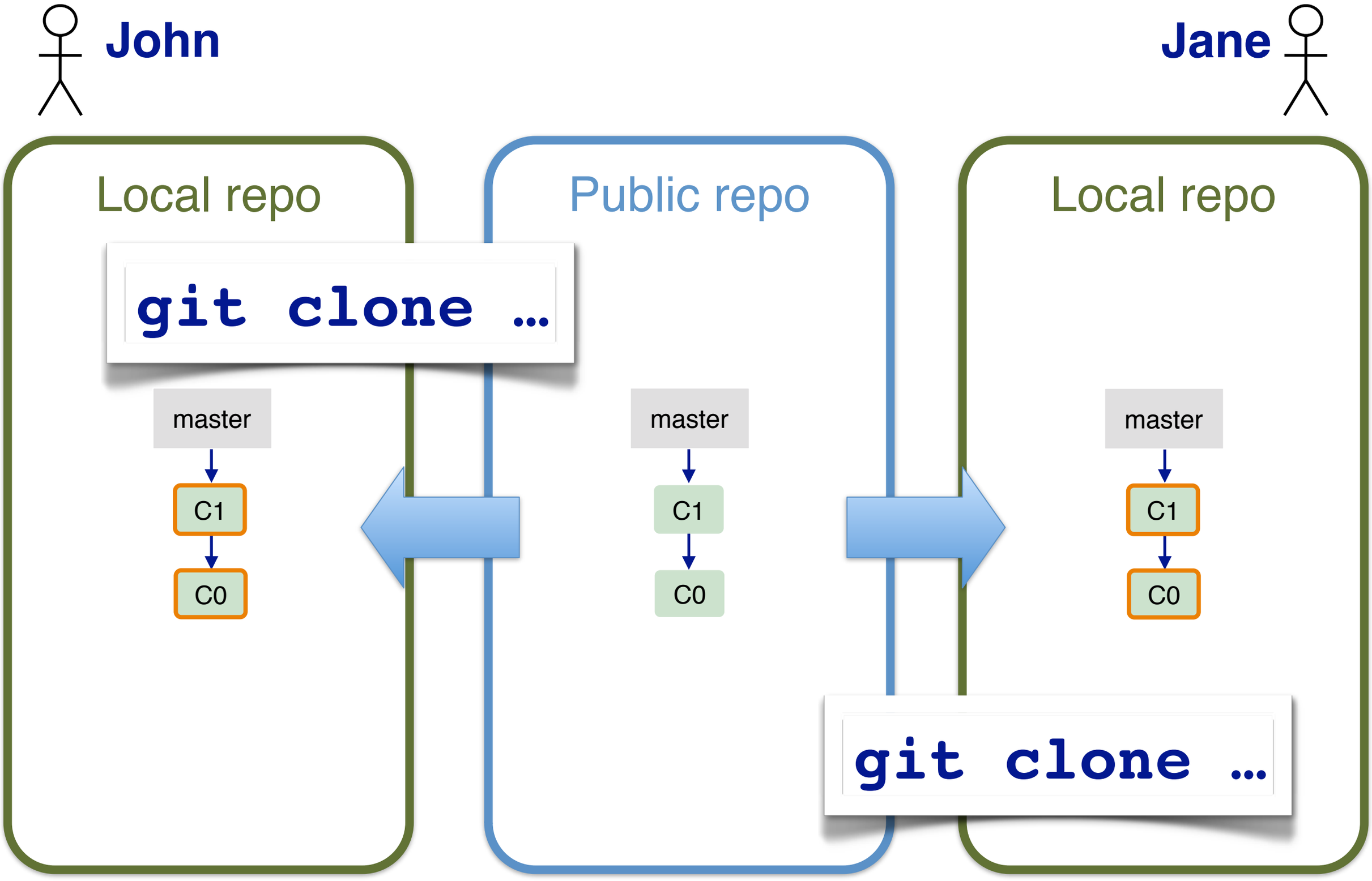
Jane

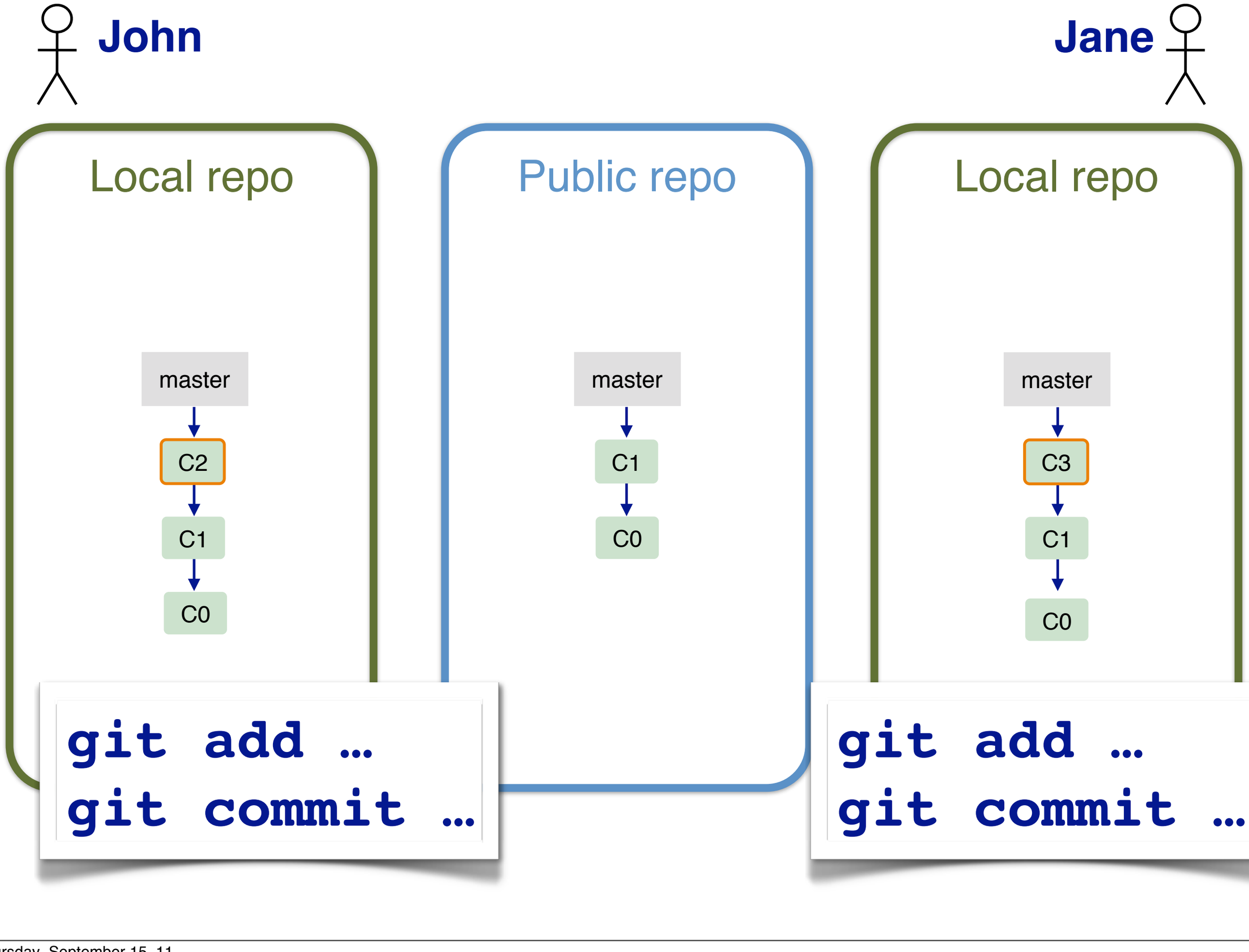
Local repo

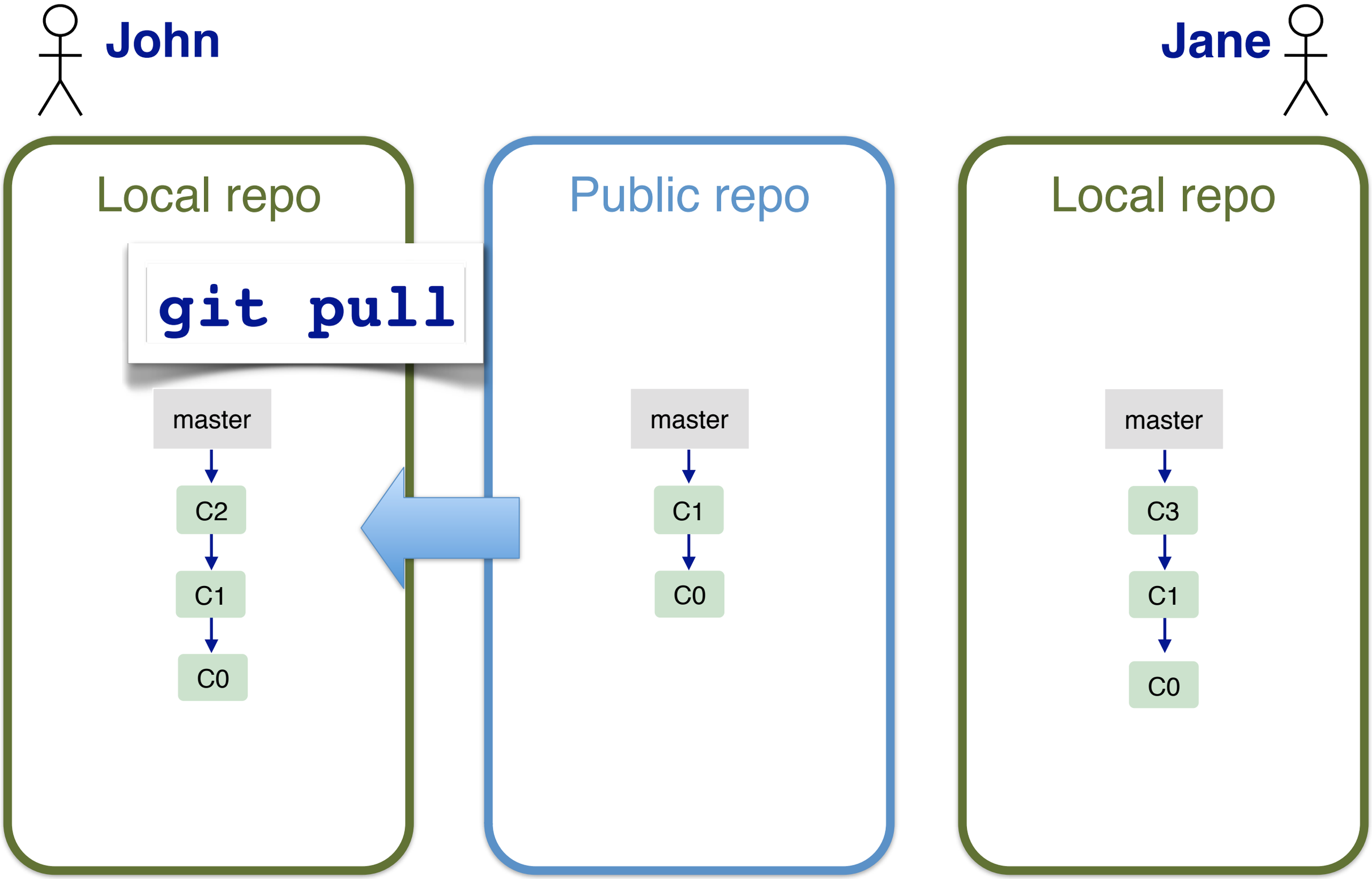
Public repo



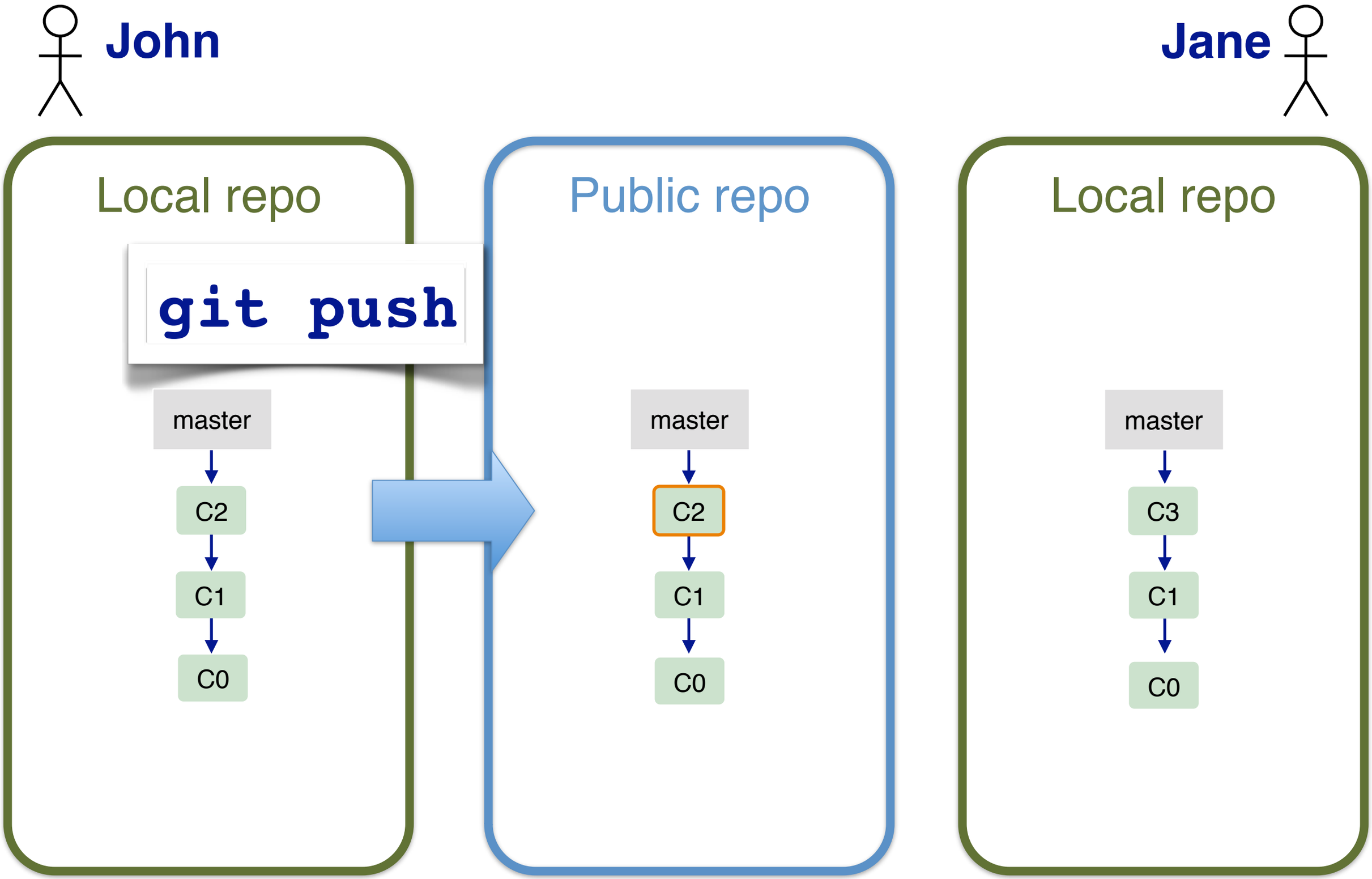
Local repo

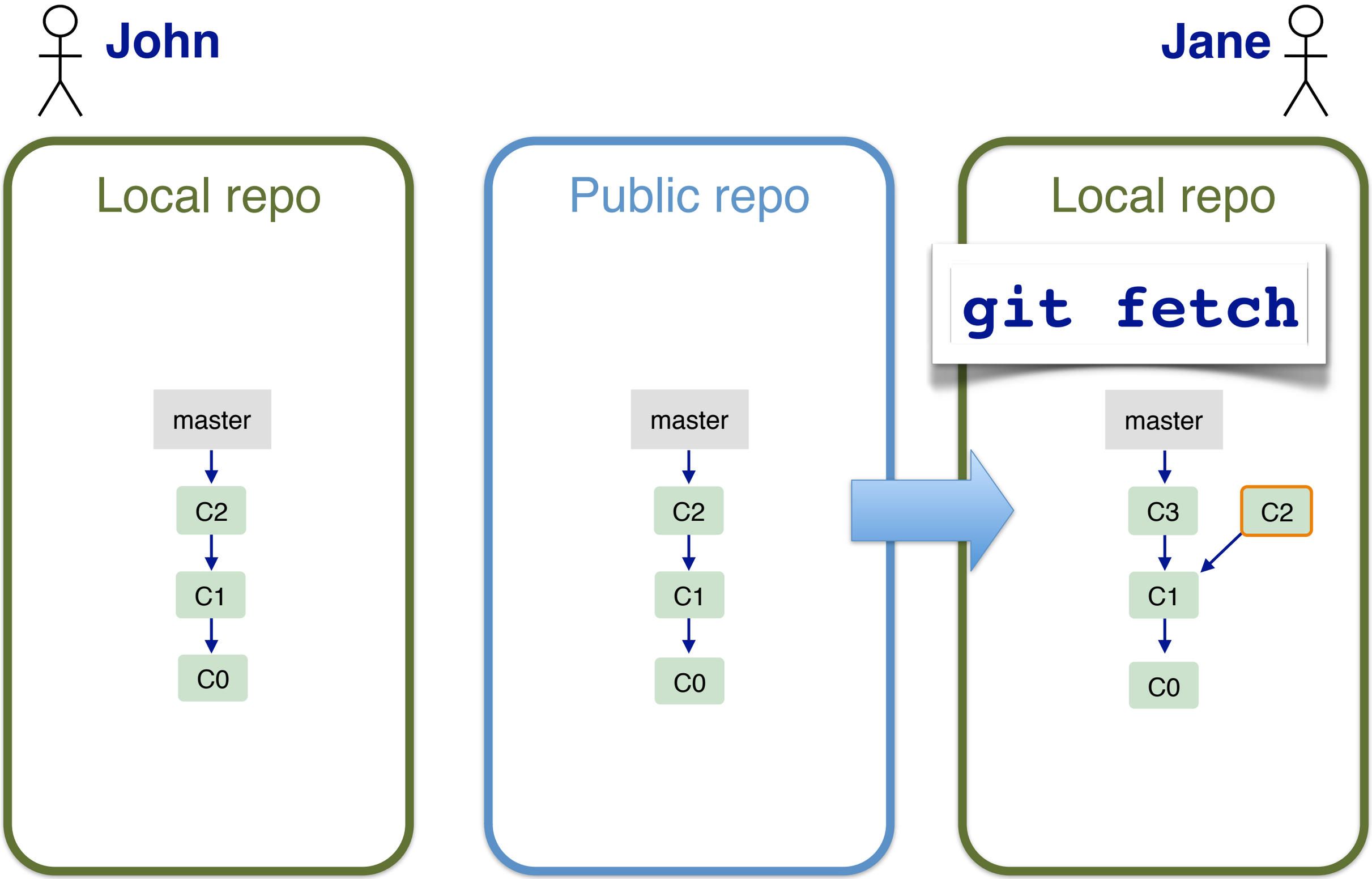

John
Jane
Local repo
Public repo
Local repo
git clone …
master
C1
C0
master
C1
C0
master
C1
C0
git clone …

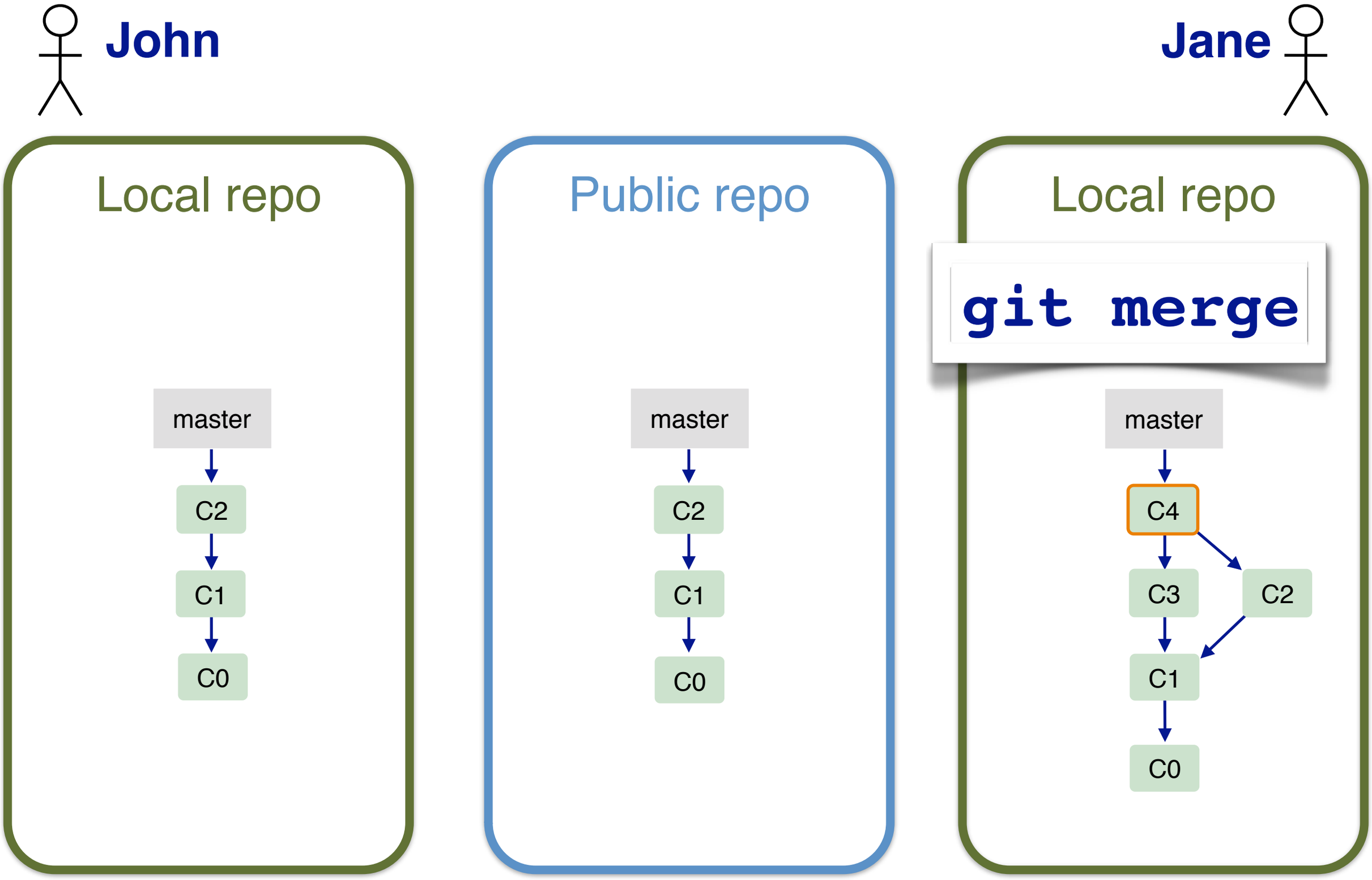

John
Jane
Local repo
Public repo
Local repo
master
C2
C1
C0
master
C1
C0
master
C3
C1
C0
git add …
git commit …
git add …
git commit …



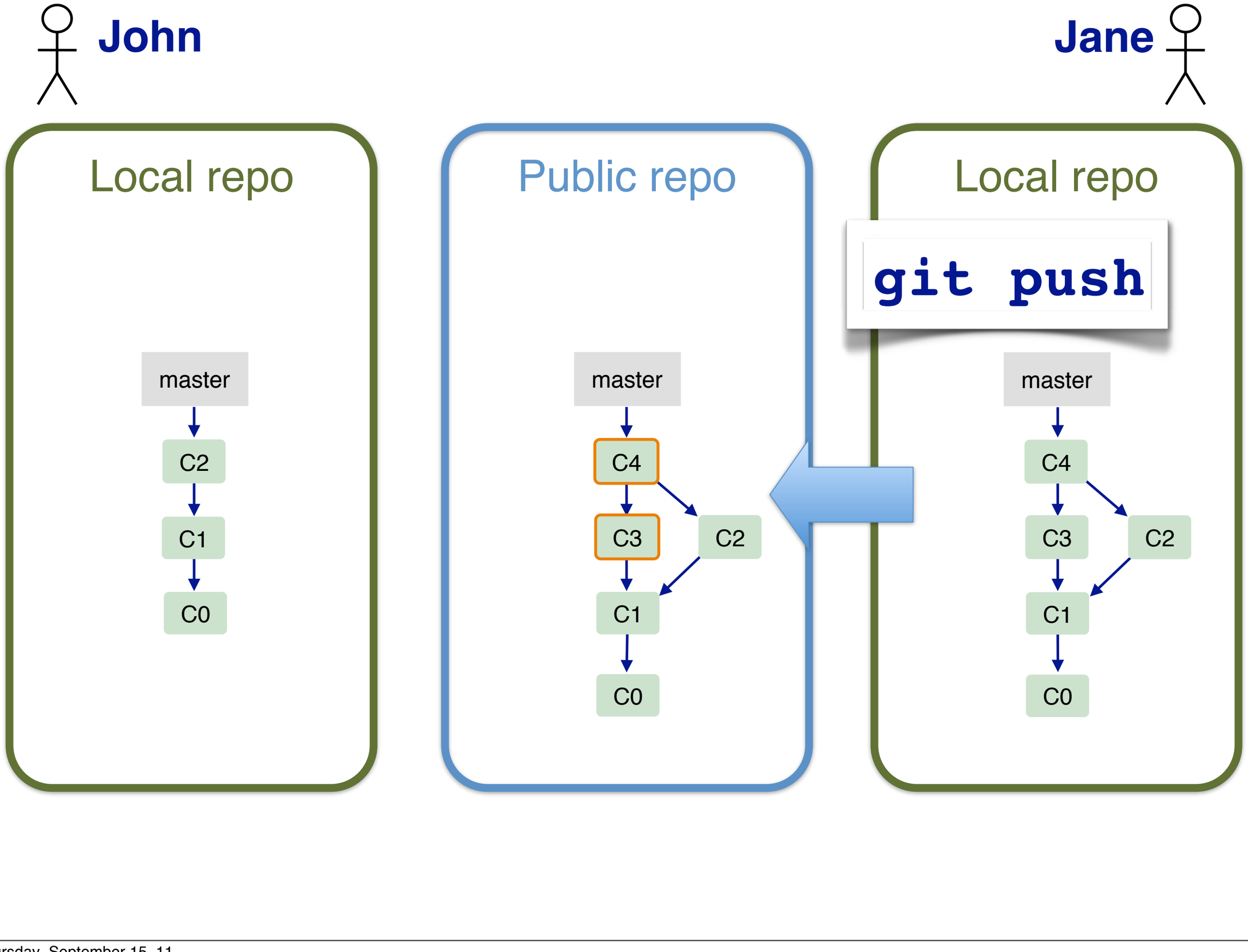
(nothing new to pull)

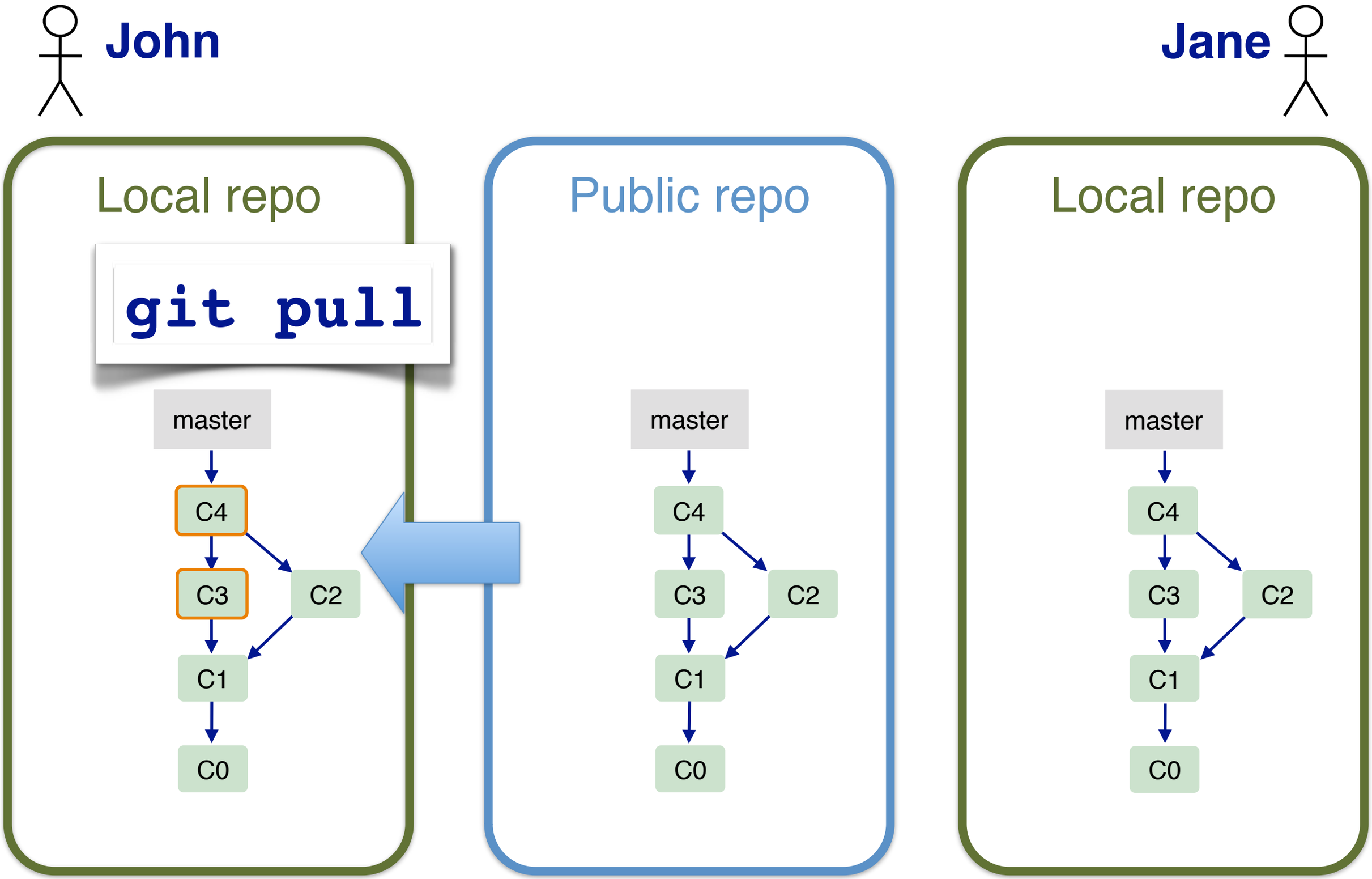

John
Jane
Local repo
Public repo
Local repo
git push
master
C2
C1
C0
master
C2
C1
C0
master
C3
C1
C0


John
Jane
Local repo
Public repo
Local repo
git fetch
master
C2
C1
C0
master
C2
C1
C0
master
C3
C2
C1
C0



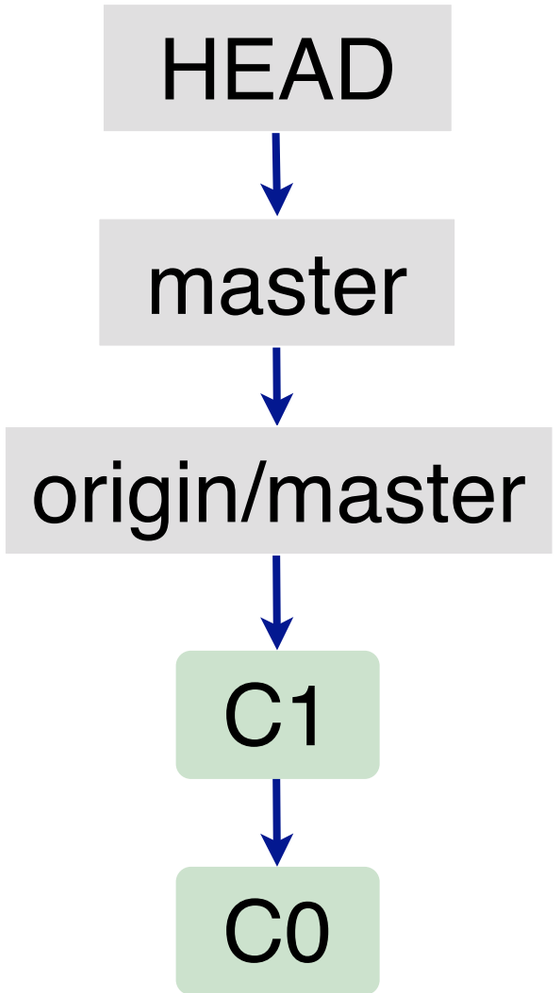
NB: **`git pull`** = fetch + merge

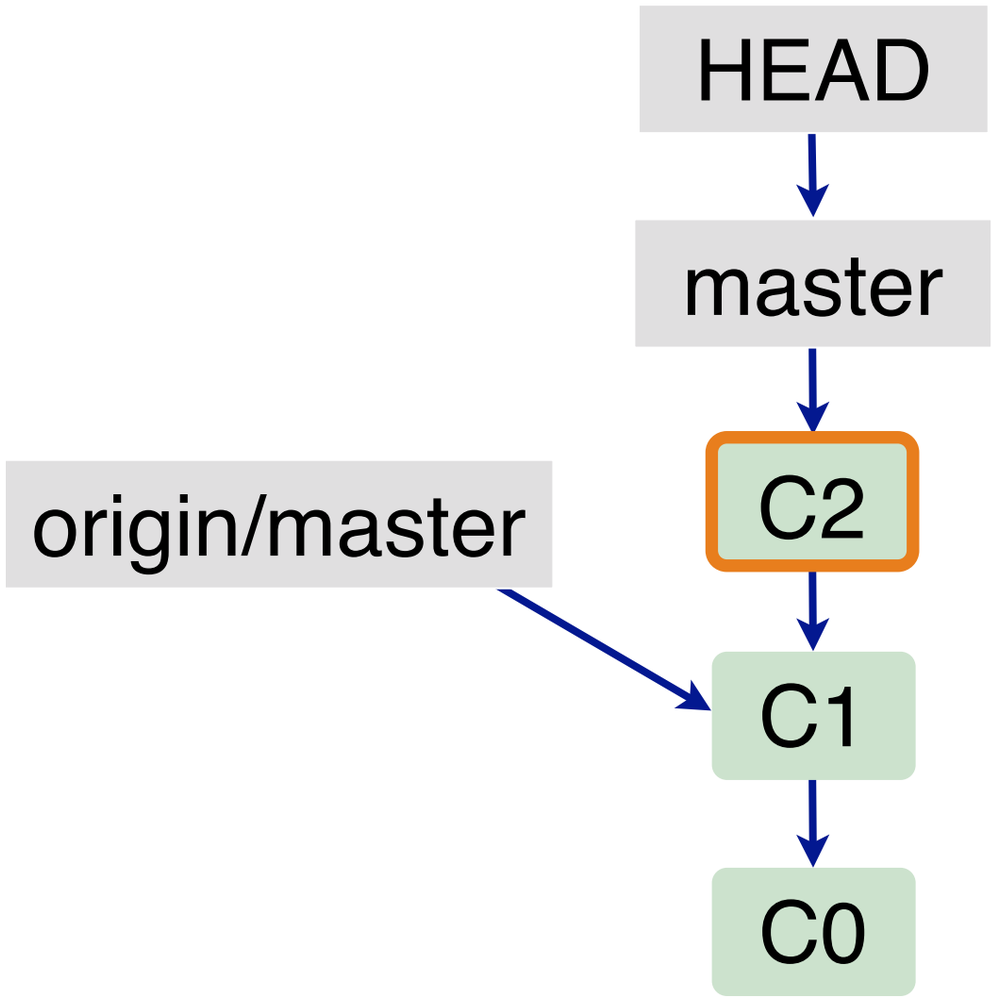

John
Jane
Local repo
Public repo
Local repo
git push
master
C2
C1
C0
master
C4
C3
C2
C1
C0
master
C4
C3
C2
C1
C0


John
Jane
Local repo
Public repo
Local repo
git pull
master
C4
C3
C2
C1
C0
master
C4
C3
C2
C1
C0
master
C4
C3
C2
C1
C0

Branching and merging

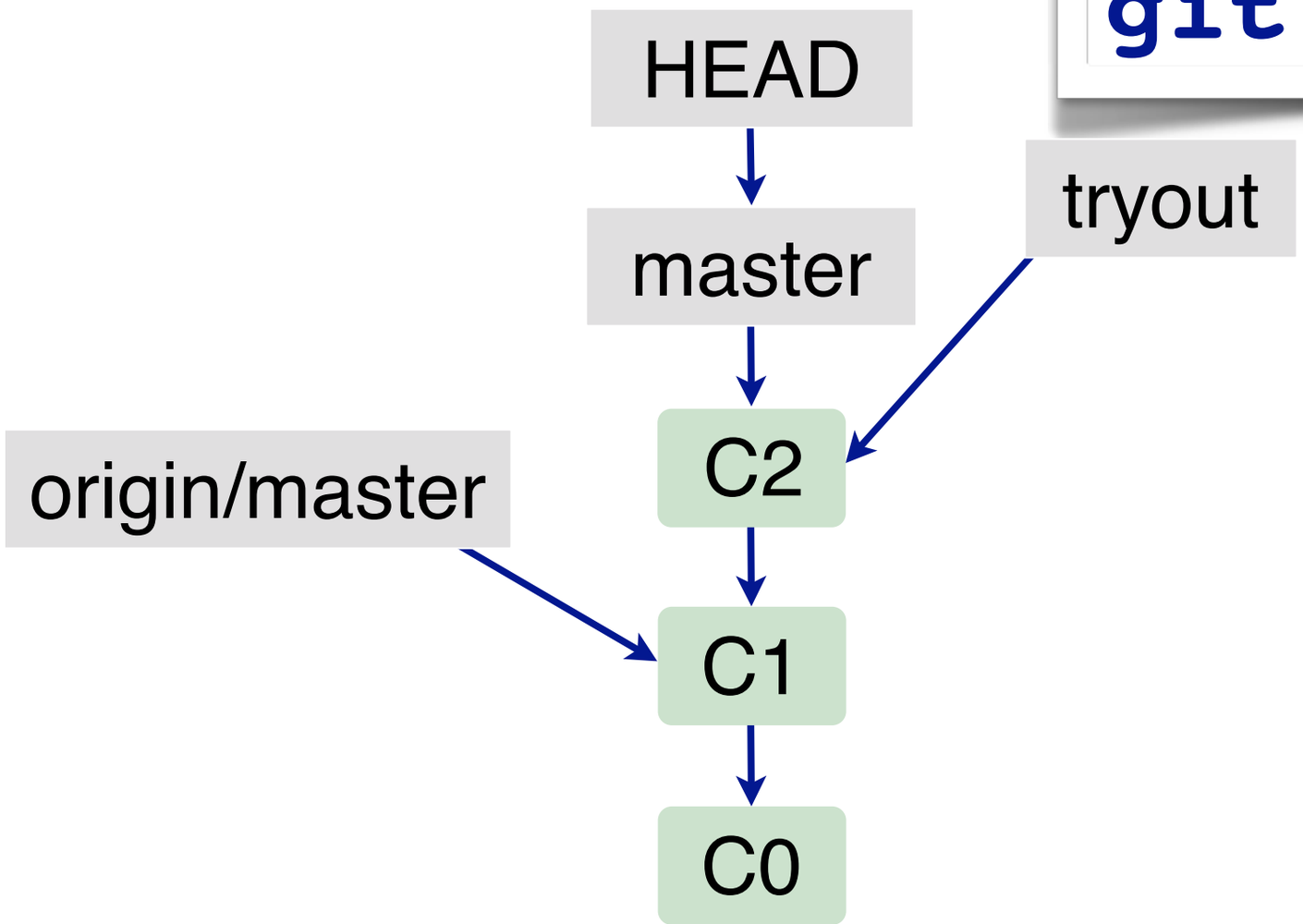
“origin” refers to the remote repo



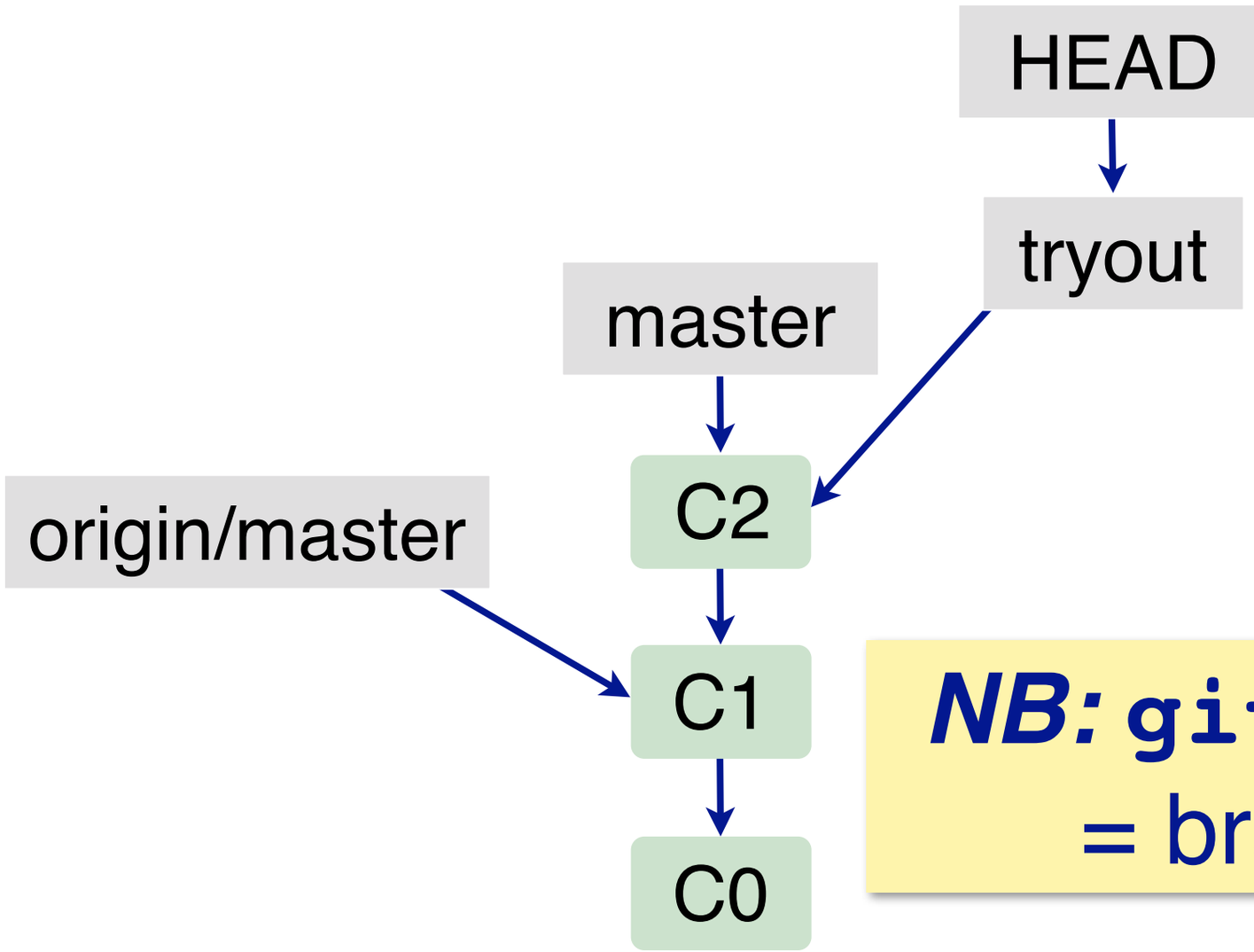



```
…
git commit …
```

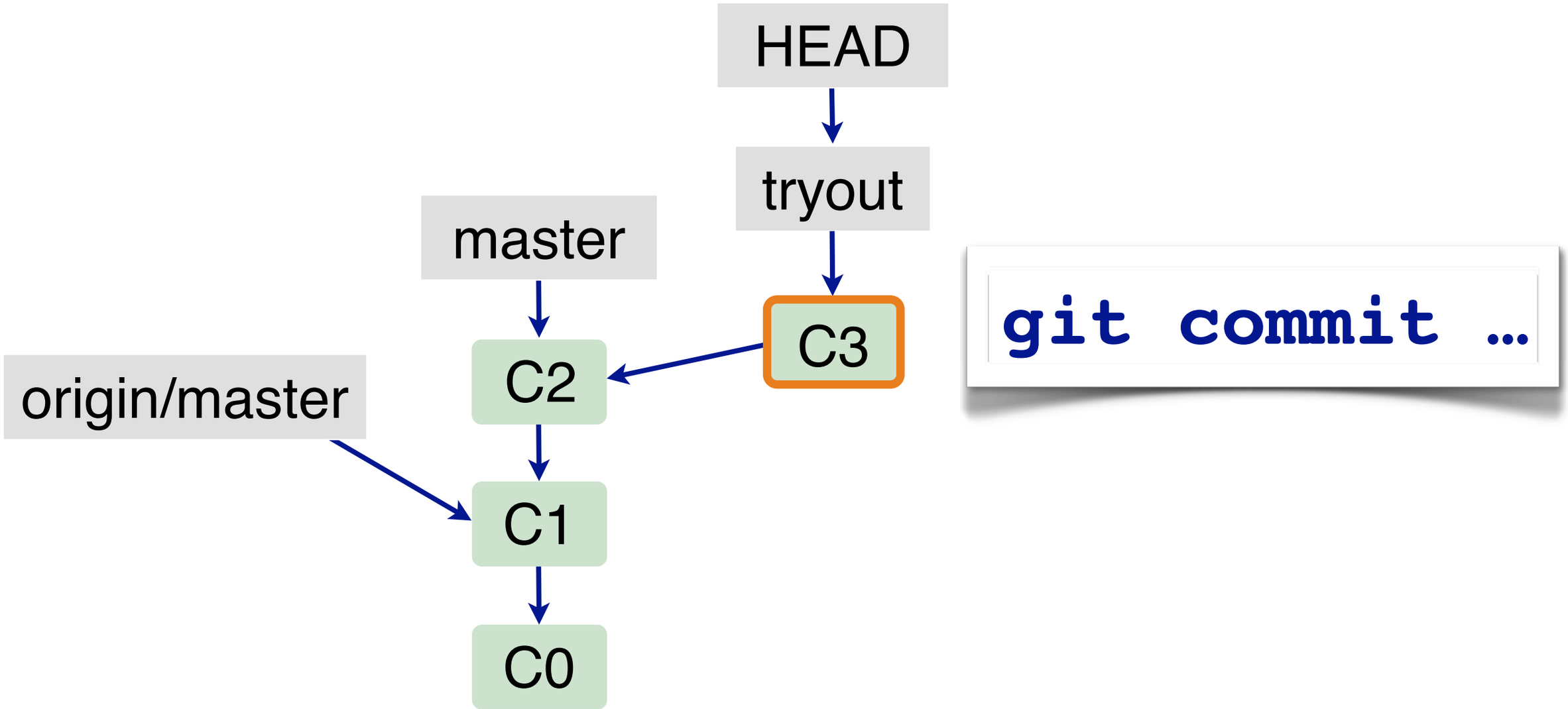
```
git branch tryout
```

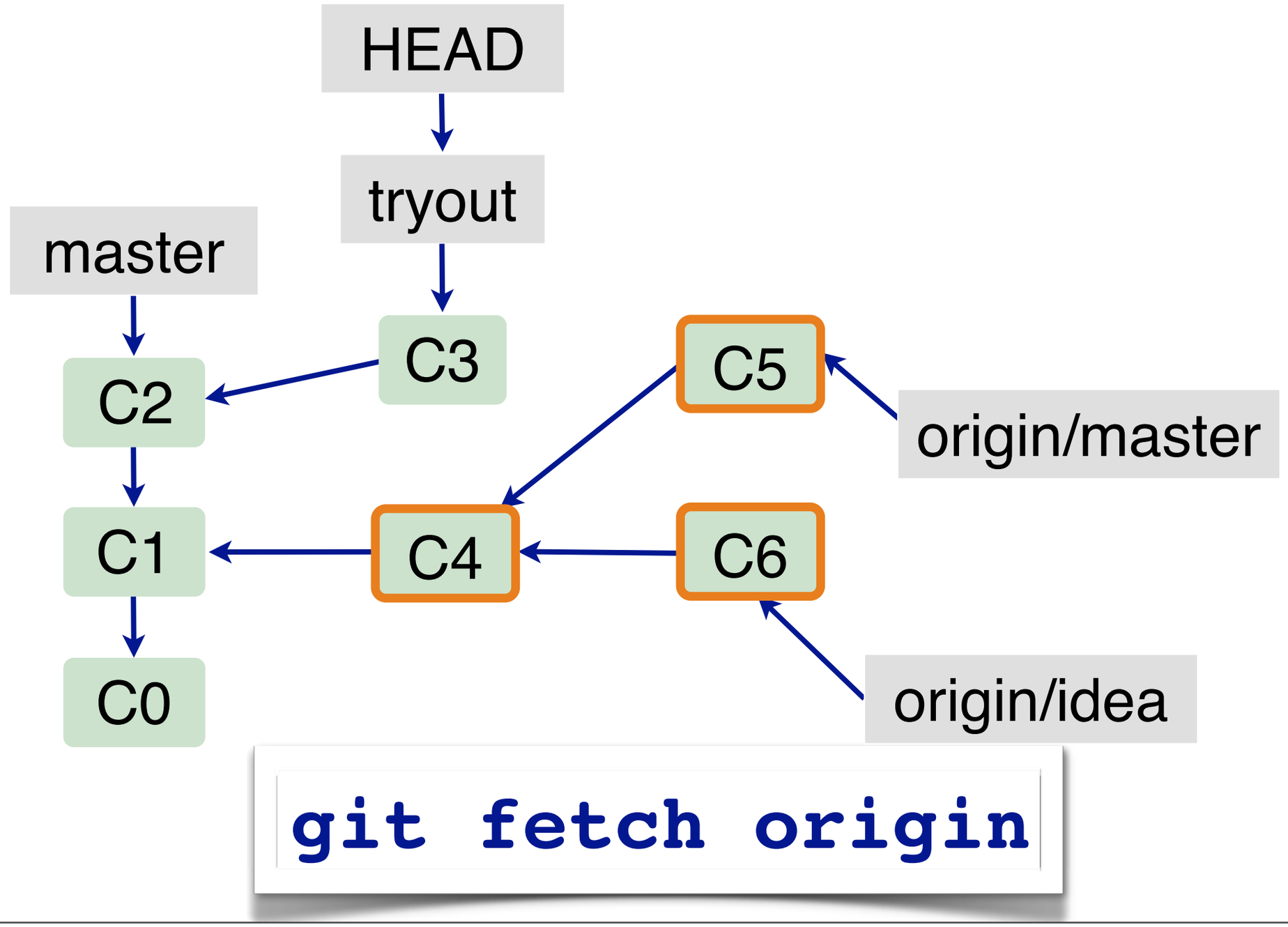


```
git checkout tryout
```

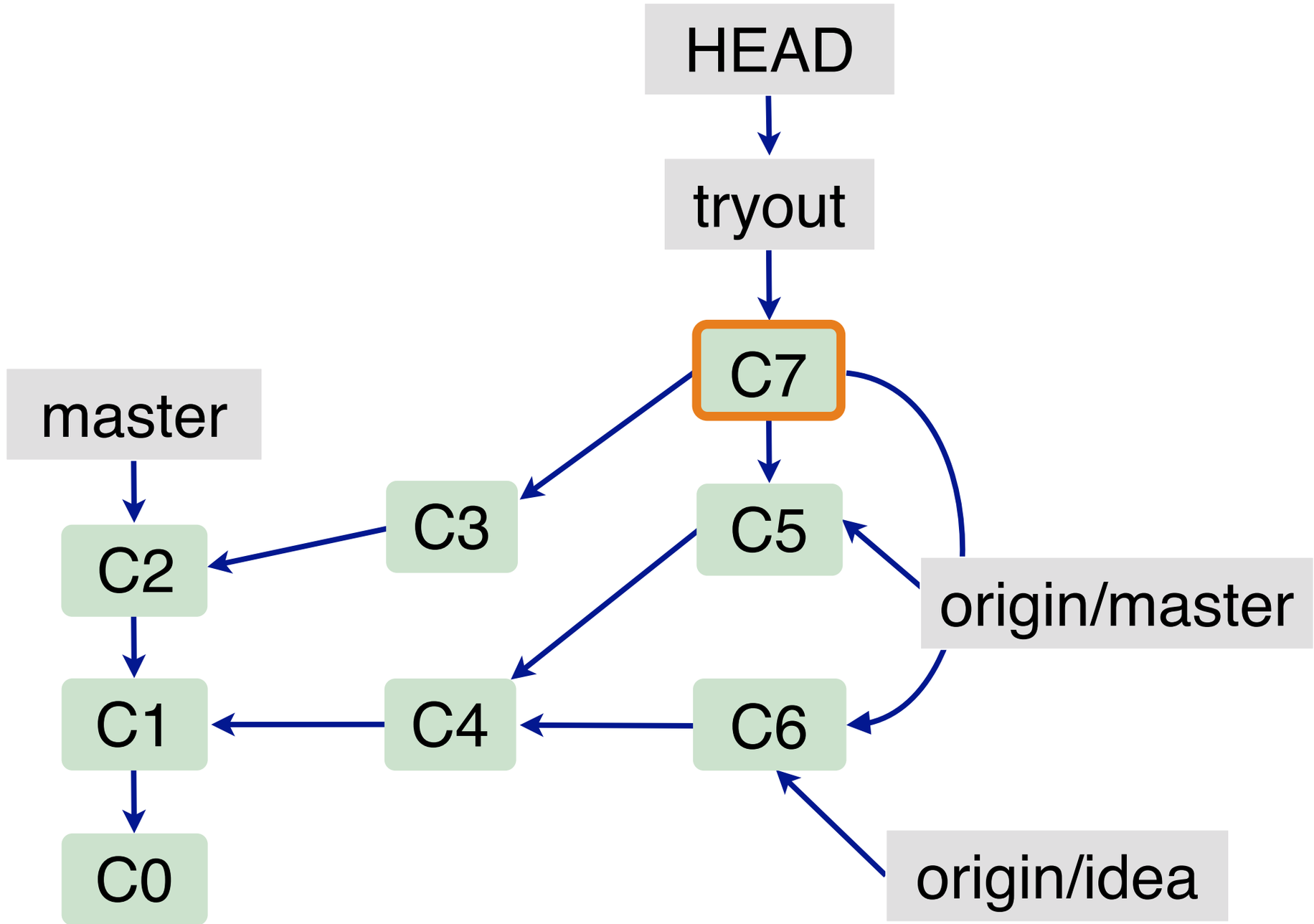


NB: **`git checkout –b …`**
= branch + checkout

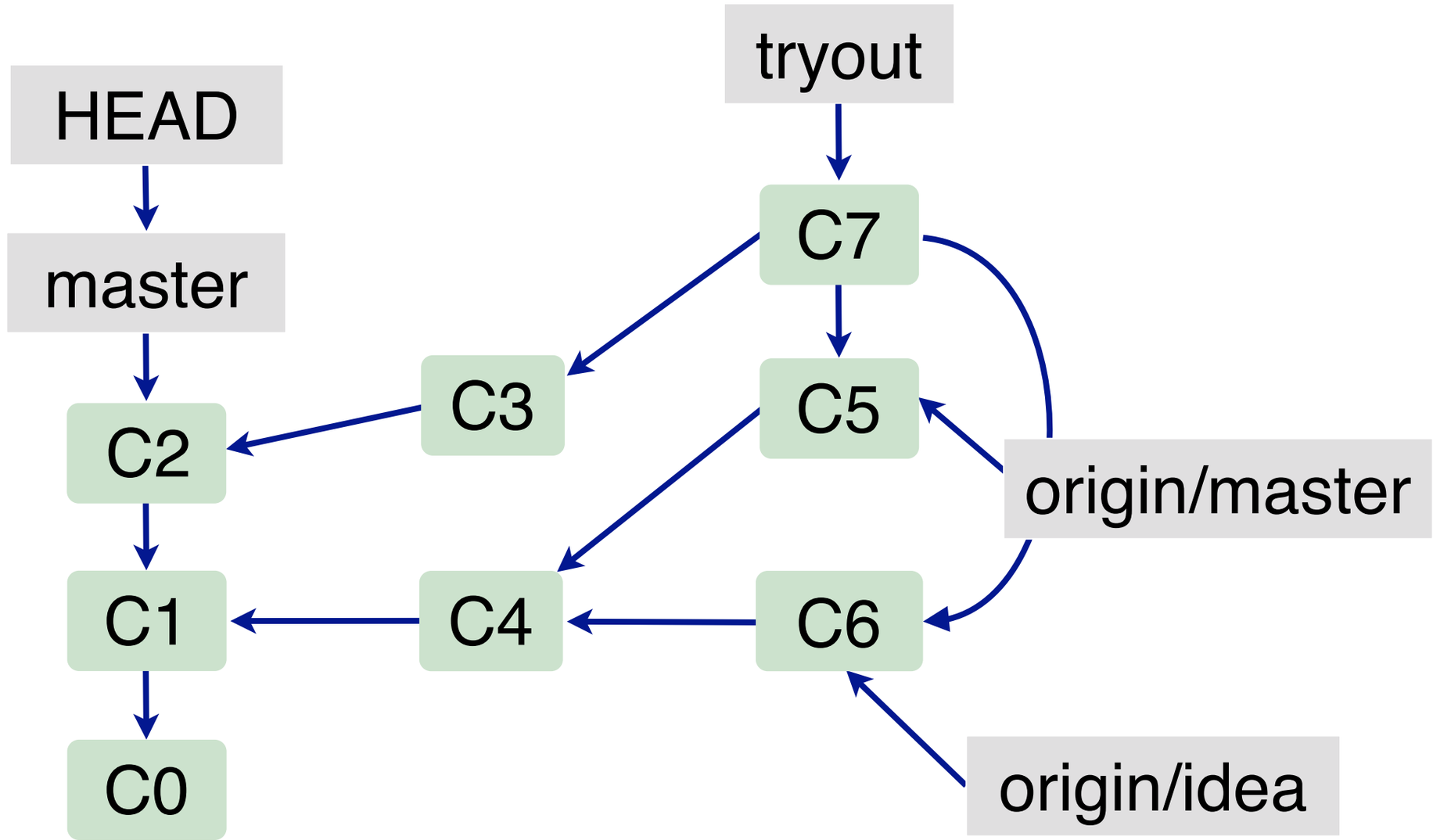

HEAD
tryout
master
C3
C2
origin/master
C1
C0
git commit …


HEAD
tryout
master
C3
C2
C5
origin/master
C1
C4
C6
C0
origin/idea
git fetch origin

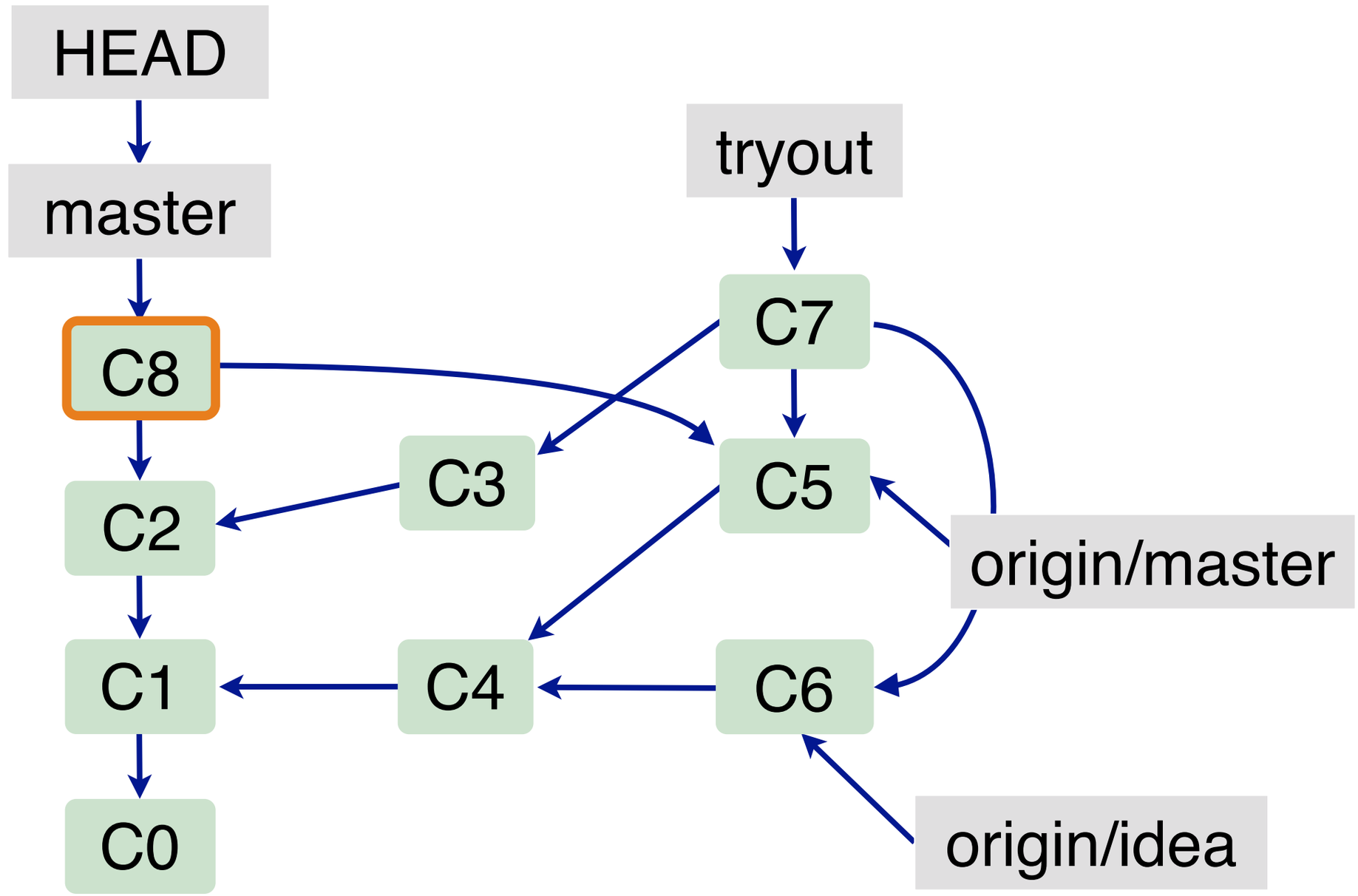
`git merge origin/master origin/idea`



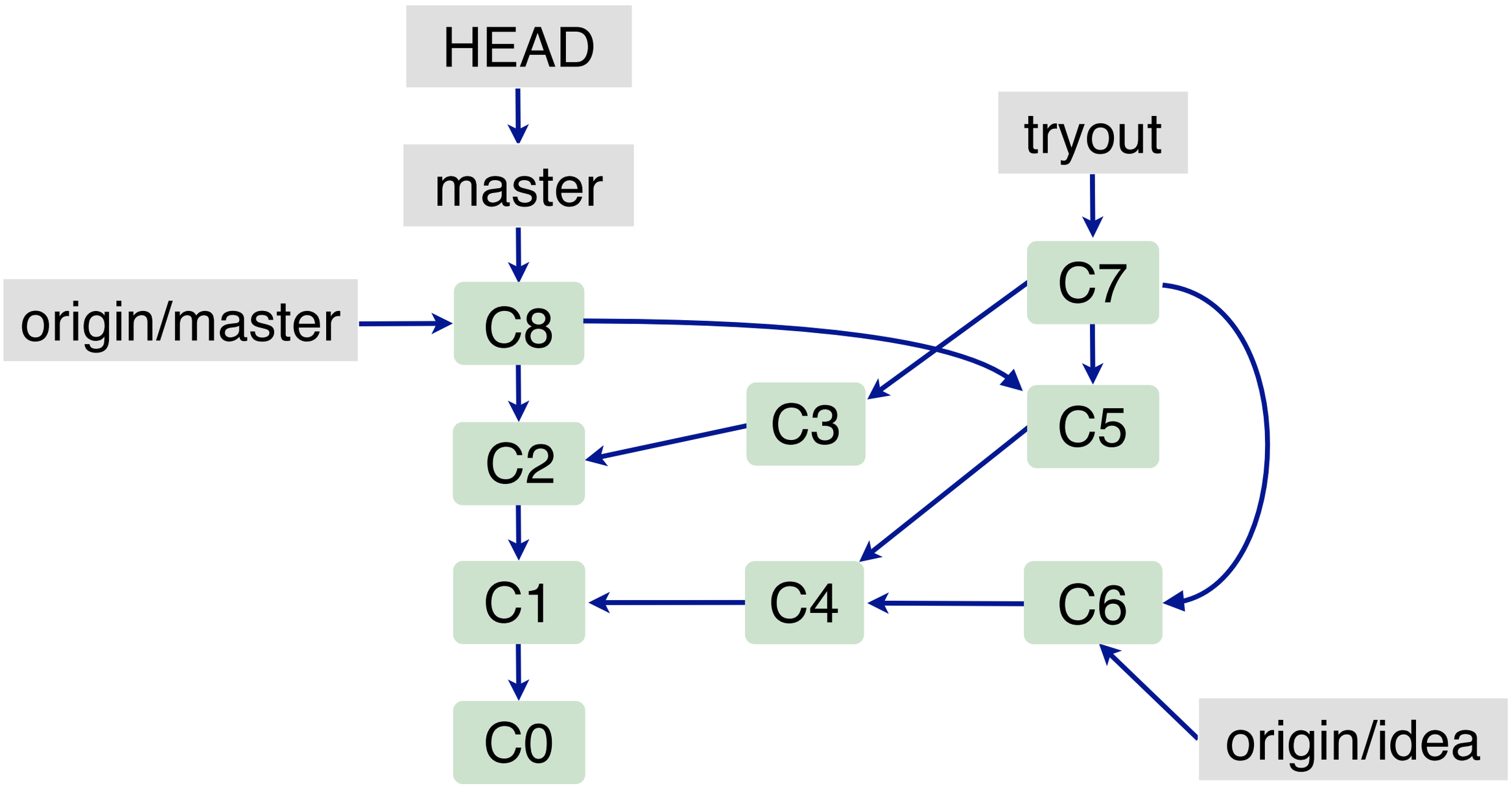
```
git checkout master
```



`git merge`


HEAD
master
C8
C2
C1
C0
C3
C4
tryout
C7
C5
C6
origin/master
origin/idea

`git push`


HEAD
master
origin/master
C8
C2
C1
C0
C3
C4
tryout
C7
C5
C6
origin/idea

More to git

More to git …

- Merging and mergetool
- Squashing commits when merging
- Resolving conflicts
- User authentication with ssh
- gitx and other graphical tools
- git configure — remembering your name
- git remote — multiple remote repos
- github — an open source public repo
- …

Resources

http://git-scm.com/

http://book.git-scm.com/index.html

http://www.slideshare.net/chacon/getting-git

https://github.com/

http://oreilly.com/

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