

Introduction to Git

Scott Chacon

Me

Scott Chacon



github
SOCIAL CODE HOSTING

git-scm.com



The Git User's Survey 2010 is up! Please devote a few minutes of your time to fill it out, so we can improve Git!

[Home](#) [About Git](#) [Documentation](#) [Download](#) [Tools & Hosting](#) [Wiki](#)

Git is...

Git is a free & open source, distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

Every Git clone is a full-fledged repository with complete history and full revision tracking capabilities, not dependent on network access or a central server. Branching and merging are fast and easy to do.

Git is used for version control of files, much like tools such as [Mercurial](#), [Bazaar](#), [Subversion](#), [CVS](#), [Perforce](#), and [Visual SourceSafe](#).

Projects using Git

- [Git](#)
- [Linux Kernel](#)
- [Perl](#)
- [Gnome](#)
- [Qt](#)
- [Ruby on Rails](#)
- [Android](#)
- [PostgreSQL](#)
- [Wine](#)
- [Fedora](#)
- [Debian](#)
- [X.org](#)

Download Git

The latest stable Git release is

v1.7.2.3

[release notes](#) (2010-09-03)



[Windows](#)

[Mac OSX](#)

[Source](#)

[Other Download Options](#)

[Git Source Repository](#)

Git Quick Start

Cloning and Creating a Patch

```
$ git clone git://github.com/git/hello-world.git
```

Creating and Committing

```
$ cd (project-directory)
```

Git Reference

[Reference](#) [About](#) § [Site Source](#)

Getting and Creating Projects

- [init](#)
- [clone](#)

Basic Snapshotting

- [add](#)
- [status](#)
- [diff](#)
- [commit](#)
- [reset](#)
- [rm, mv](#)

Branching and Merging

- [branch](#)
- [checkout](#)
- [merge](#)
- [log](#)
- [tag](#)

Sharing and Updating Projects

- [fetch, pull](#)

INTRODUCTION TO THE GIT REFERENCE

This is the Git reference site. This is meant to be a quick reference for learning Git commands. The commands are organized into sections of the type of options and commands needed to accomplish these common tasks.

Each section will link to the next section, so it can be used as a tutorial. Even as the official manual pages and relevant sections in the **Pro Git book**, so with thinking about source code management like Git does.

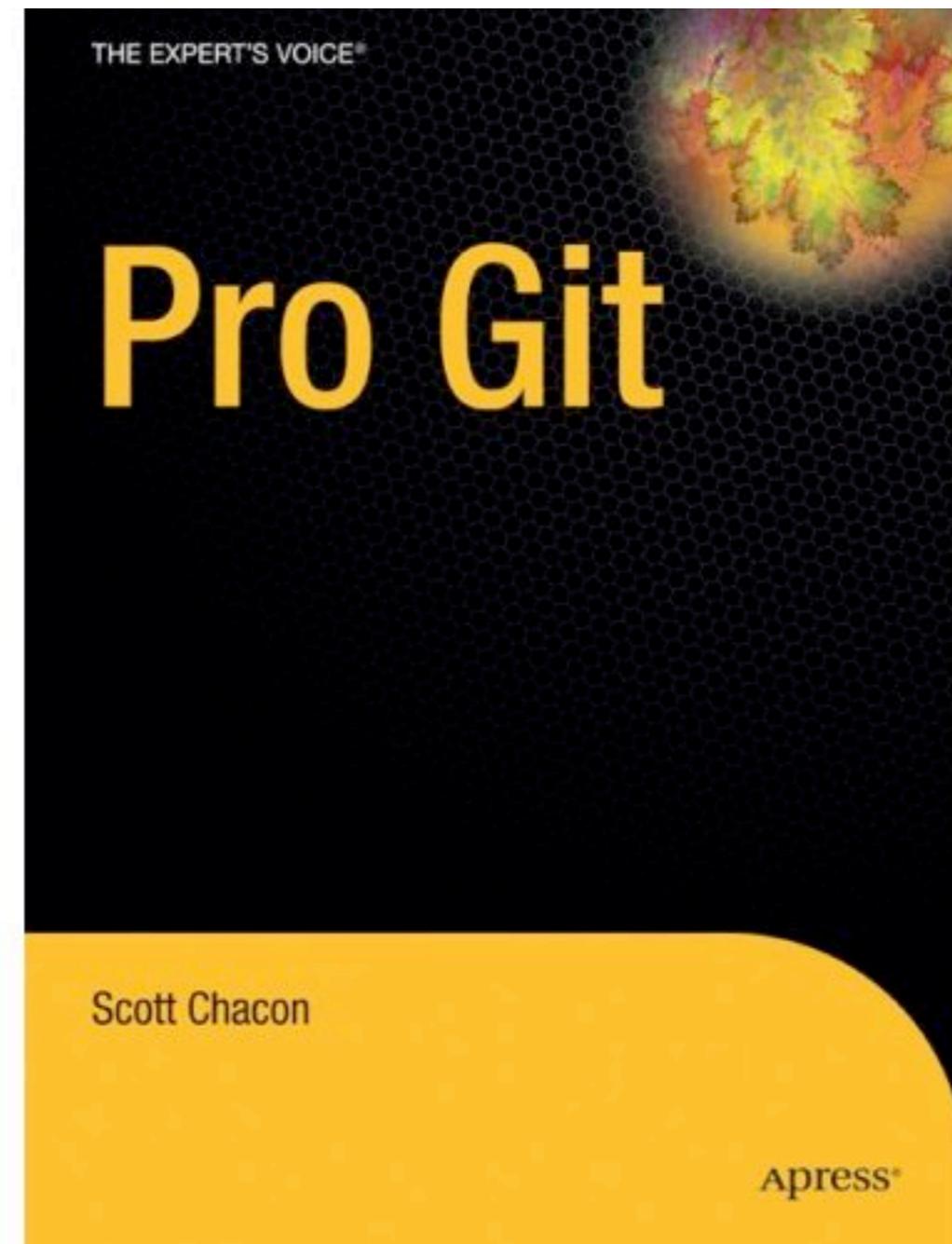
HOW TO THINK LIKE GIT

This first thing that is important to understand about Git is that it thinks about whatever SCM you may be used to. It is often easier to learn Git by trying to think about it in the Git way.

Let's start from scratch. Assume you are designing a new source code manager. What would you do? Chances are that you simply copied your project directory.

```
$ cp -R project project.bak
```

<http://gitref.org>



<http://progit.org>

Pro Git

professional version control

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Basic Branching and Merging

Let's go through a simple example of branching and merging with a workflow that you might use in the real world. You'll follow these steps:

1. Do work on a web site.
2. Create a branch for a new story you're working on.
3. Do some work in that branch.

At this stage, you'll receive a call that another issue is critical and you need a hotfix. You'll do the following:

1. Revert back to your production branch.
2. Create a branch to add the hotfix.
3. After it's tested, merge the hotfix branch, and push to production.
4. Switch back to your original story and continue working.

Basic Branching

First, let's say you're working on your project and have a couple of commits already (see Figure 3-10).

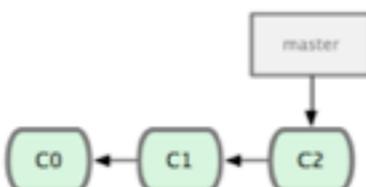


Figure 3-10. A short and simple commit history.

<http://progit.org>

schacon@gmail.com

@chacon

twitter

</me>

What is Git?

**Git is an open source,
distributed version control
system designed for speed
and efficiency**

**Git is an open source,
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git-scm.com

The screenshot shows the official website for Git (git-scm.com). The header features the word "git" in large letters with a small icon above it, followed by the tagline "the fast version control system". Below the header is a navigation bar with links for Home, About Git, Documentation, Download, Tools & Hosting, and Wiki. The main content area includes a section titled "Git is..." with text about Git's features and history, a list of projects using Git, and a download section for the latest stable release (v1.6.1.1). A pink circle highlights the "tar.bz2 (sign)" download link.

git the fast version control system

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- [X.org](#)
- [VLC](#)
- [Prototype](#)

Download Git

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[Release notes \(2009-01-25\)](#)

[tar.bz2 \(sign\)](#) [tar.gz \(sign\)](#)

[Other Download Options](#) [Source and History](#)

Git Quick Start

Git is an open source,
distributed version control
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Computer A

Checkout

File

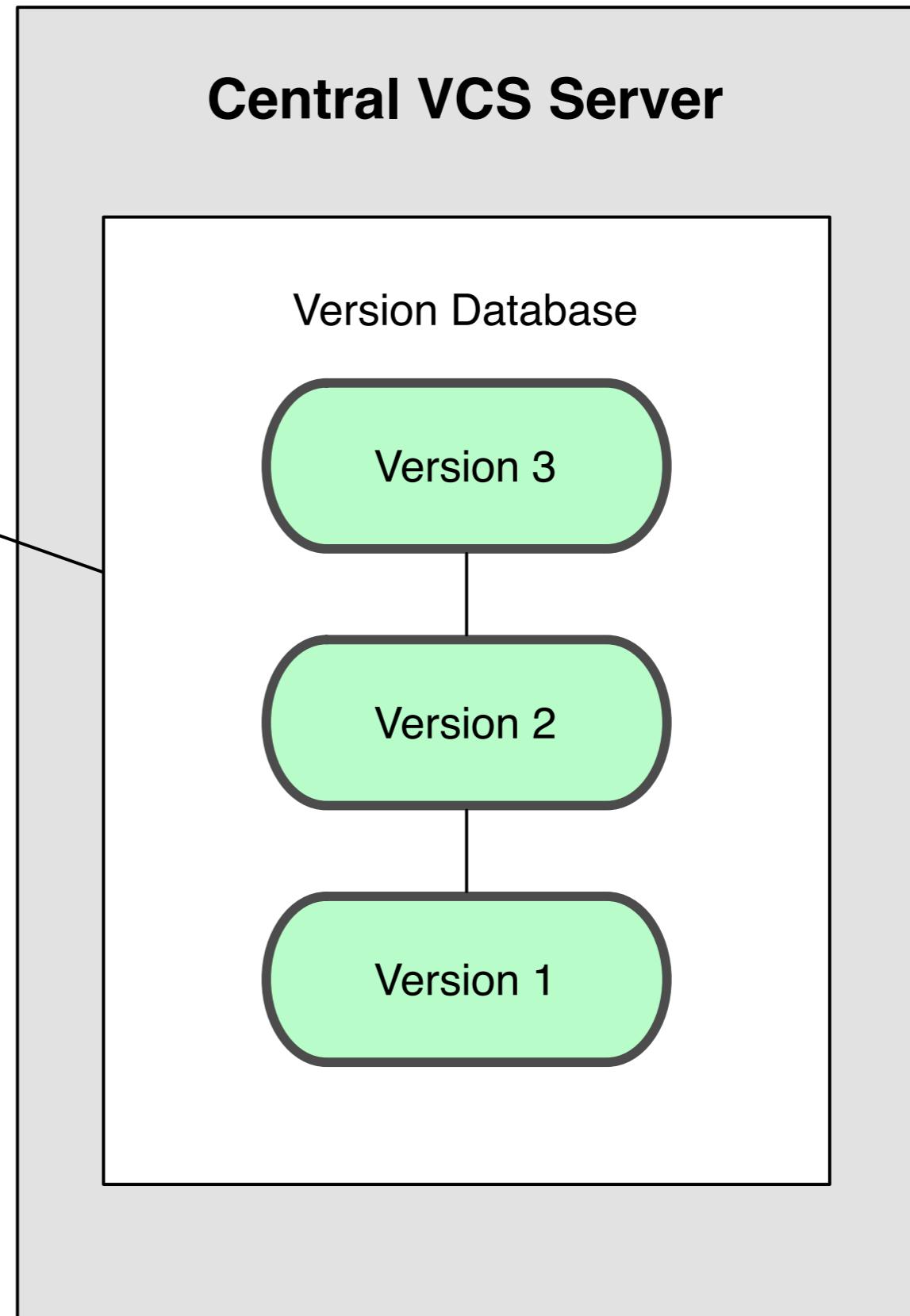
Central VCS Server

Version Database

Version 3

Version 2

Version 1



Computer A

Checkout

File

Computer B

Checkout

File

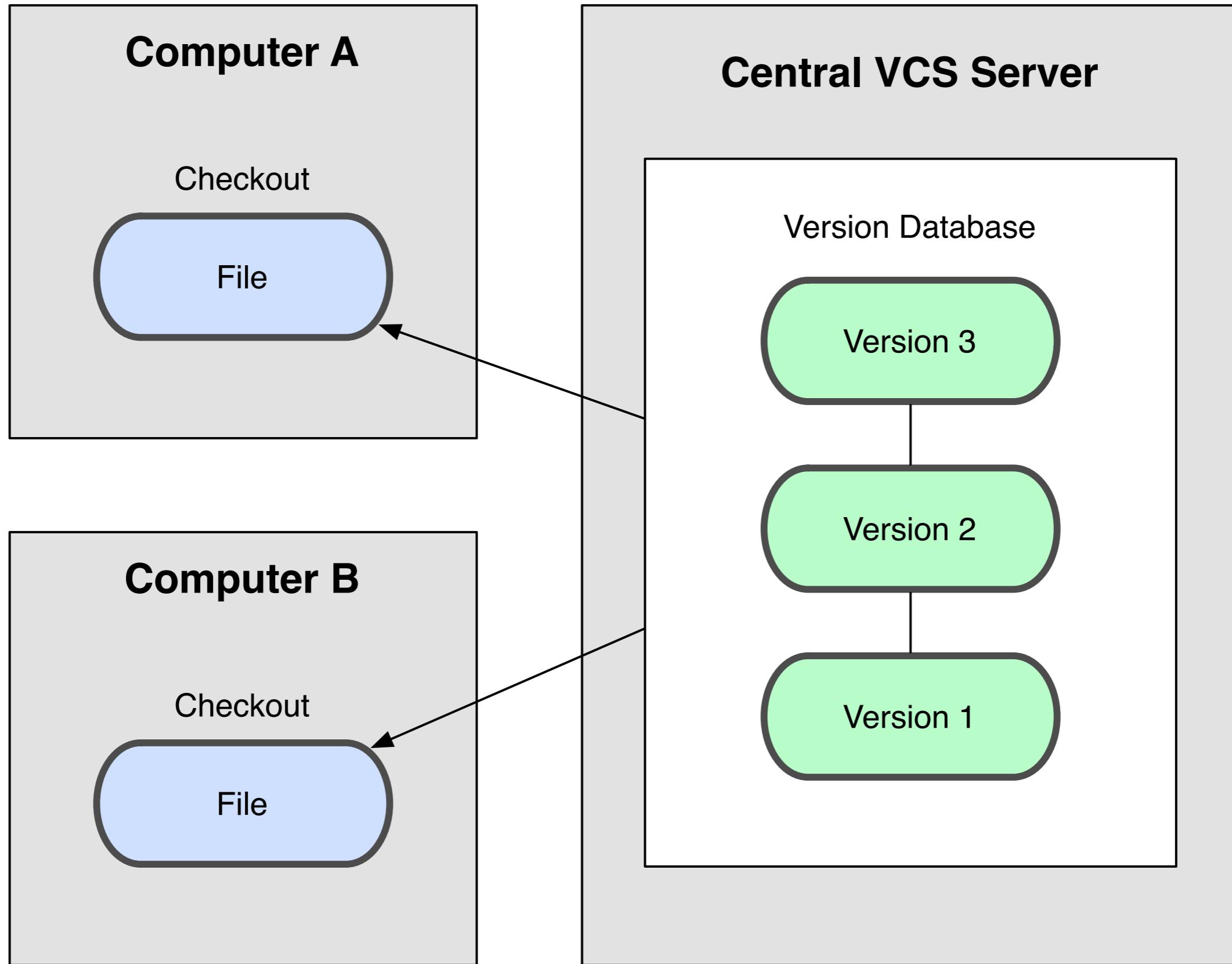
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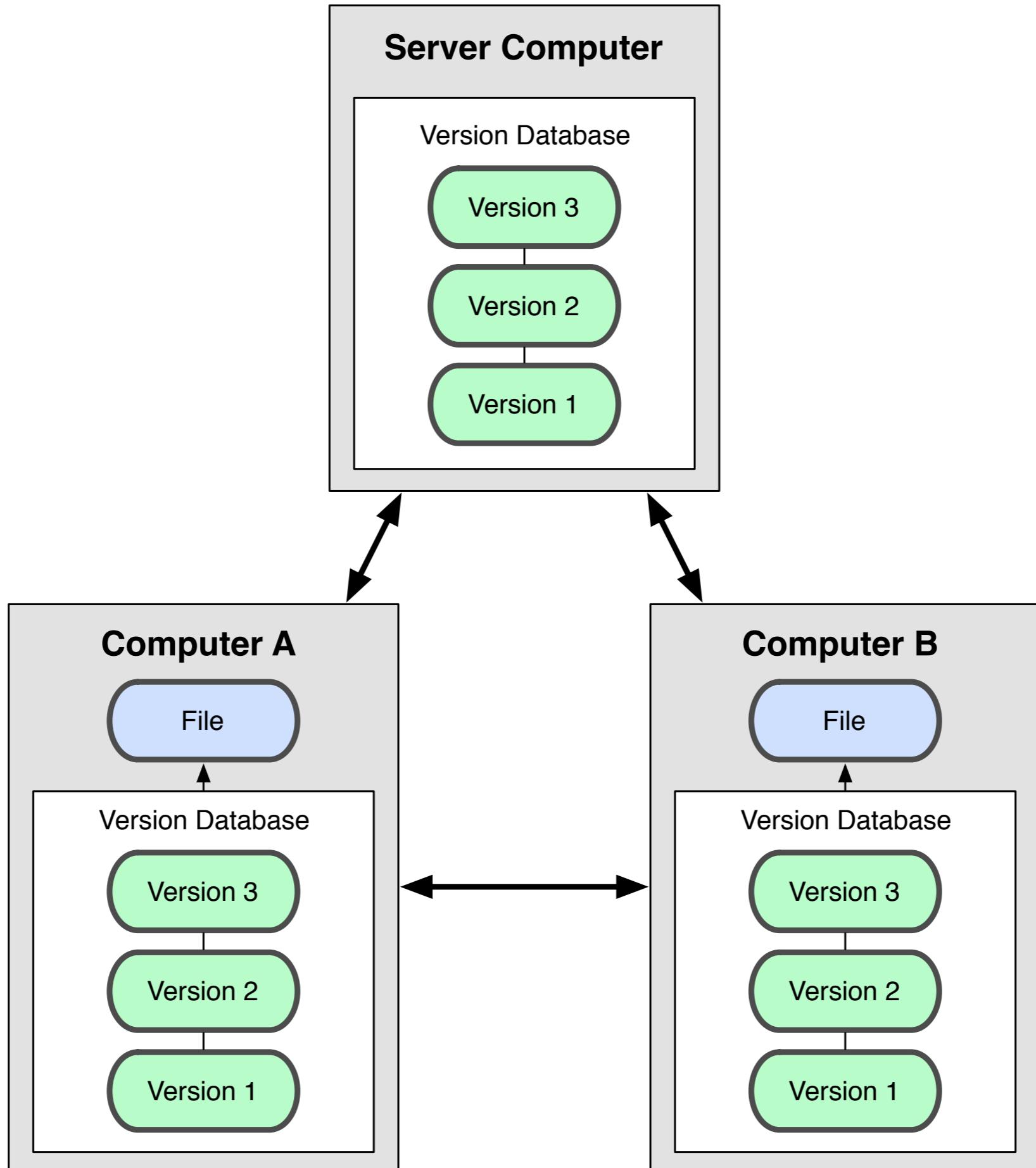
Version Database

Version 3

Version 2

Version 1





Fully Distributed

(almost) everything is local

which means

which means

everything is fast

which means

everything is fast

every clone is a backup

which means

everything is fast

every clone is a backup

work offline

No Network Needed

No Network Needed

Performing a diff

No Network Needed

Performing a diff

Viewing file history

No Network Needed

Performing a diff

Viewing file history

Committing changes

No Network Needed

Performing a diff

Viewing file history

Committing changes

Merging branches

No Network Needed

Performing a diff

Viewing file history

Committing changes

Merging branches

Obtaining other revisions of a file

No Network Needed

Performing a diff

Viewing file history

Committing changes

Merging branches

Obtaining other revisions of a file

Switching branches

No Network Needed

Performing a diff

Viewing file history

Committing changes

Merging branches

Obtaining other revisions of a file

Switching branches

Immutable

(almost) never removes data

Snapshots, not Patches

File Based Delta Storage

README.txt

```
This is Scott's  
Hello project.
```

```
Licensed under GPL.
```

hello.c

```
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Commit
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Commit
B

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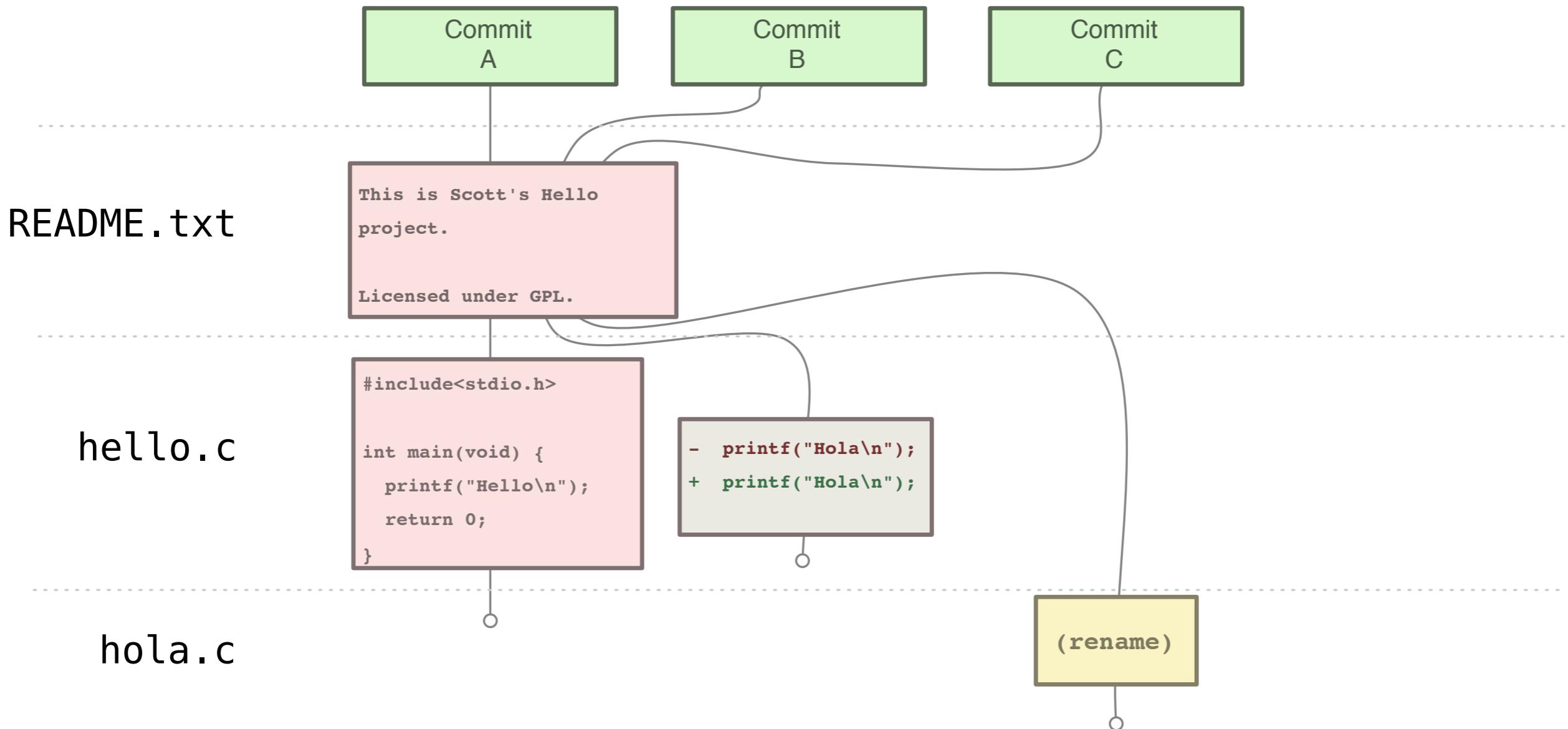
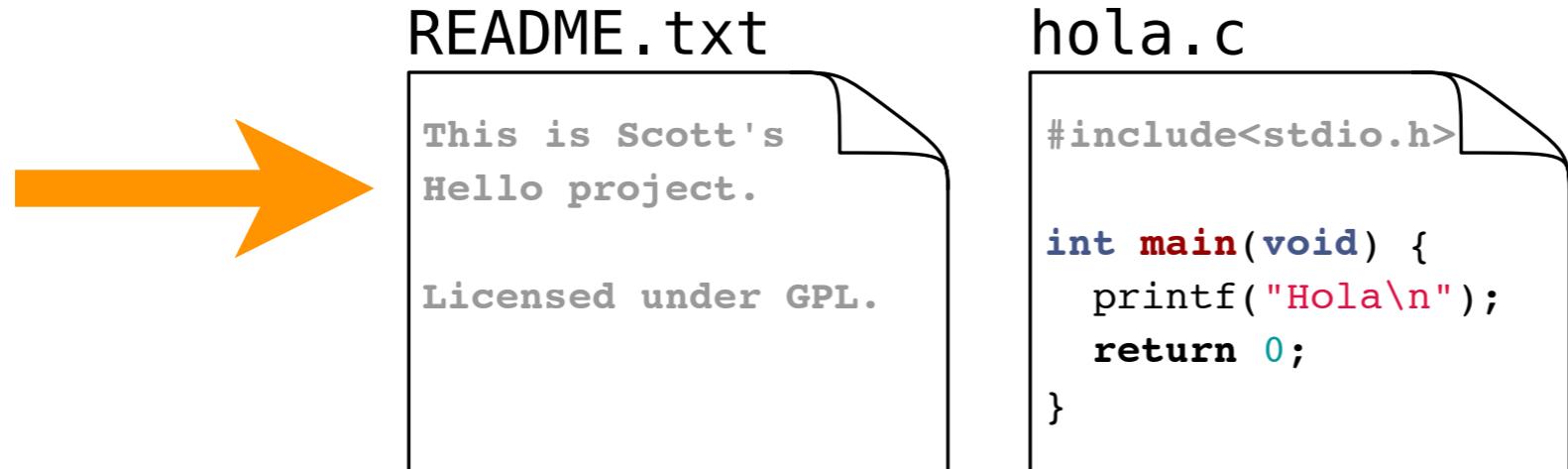
hello.c

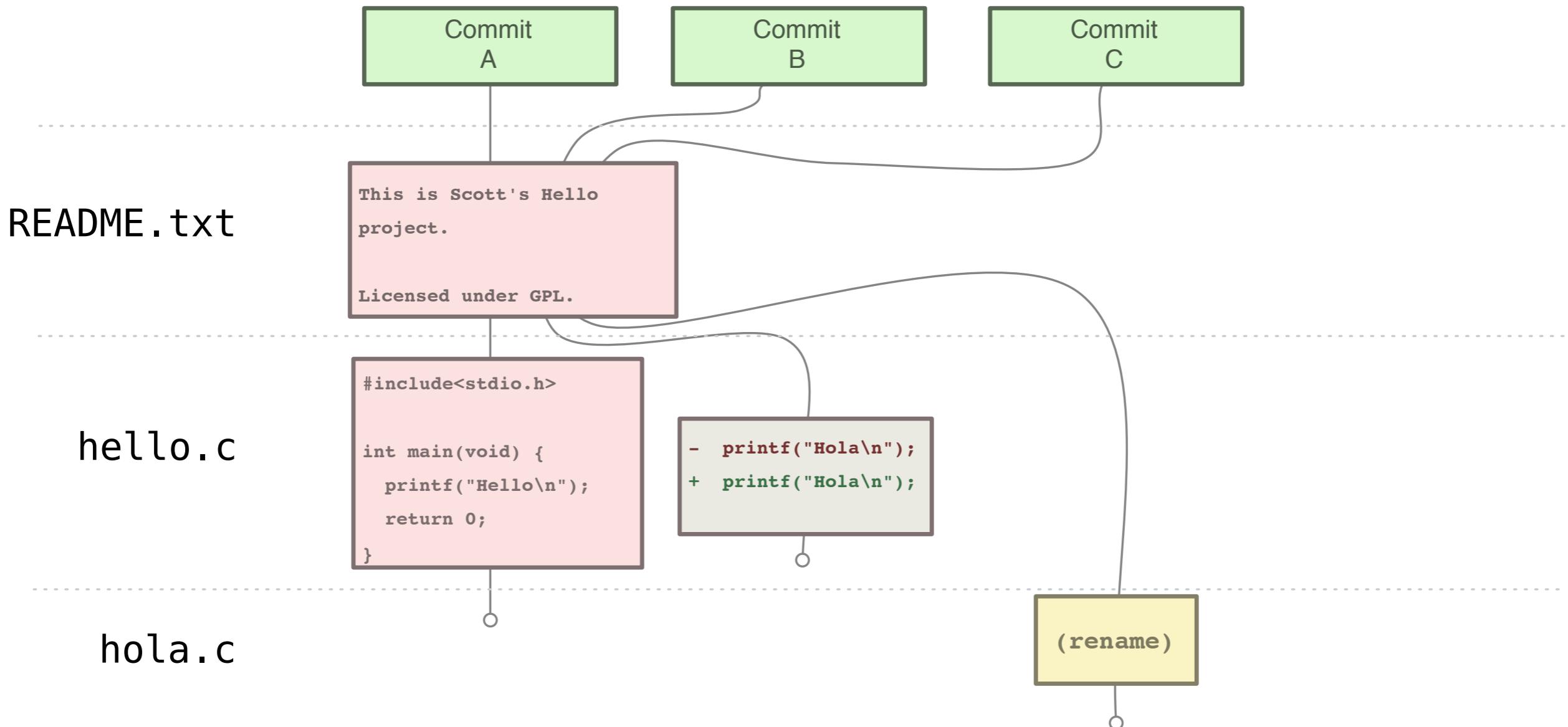
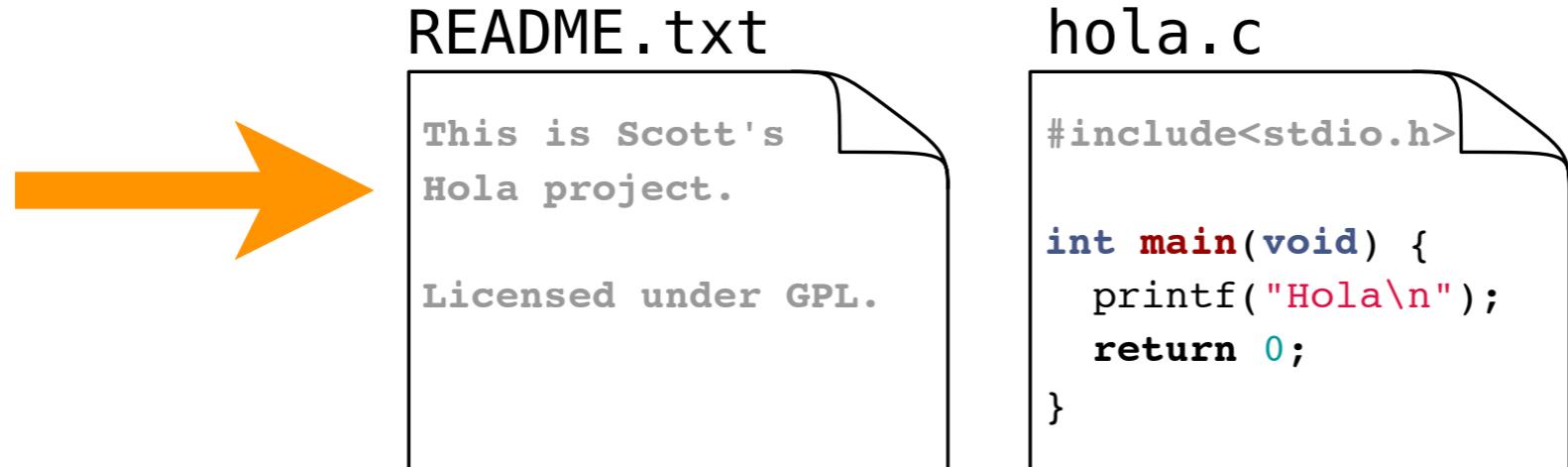
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hola.c

```
- printf("Hola\n");  
+ printf("Hola\n");
```

(rename)





README.txt

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(rename)



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(copy)

(rename)

Git Snapshots

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CHECKSUM

c3d

This is Scott's
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GPL.

f13

```
#include<stdio.h>

int main(void) {
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```

README.txt

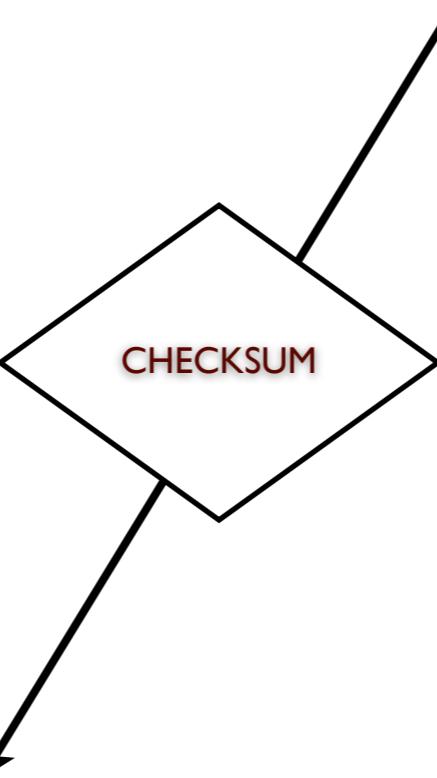
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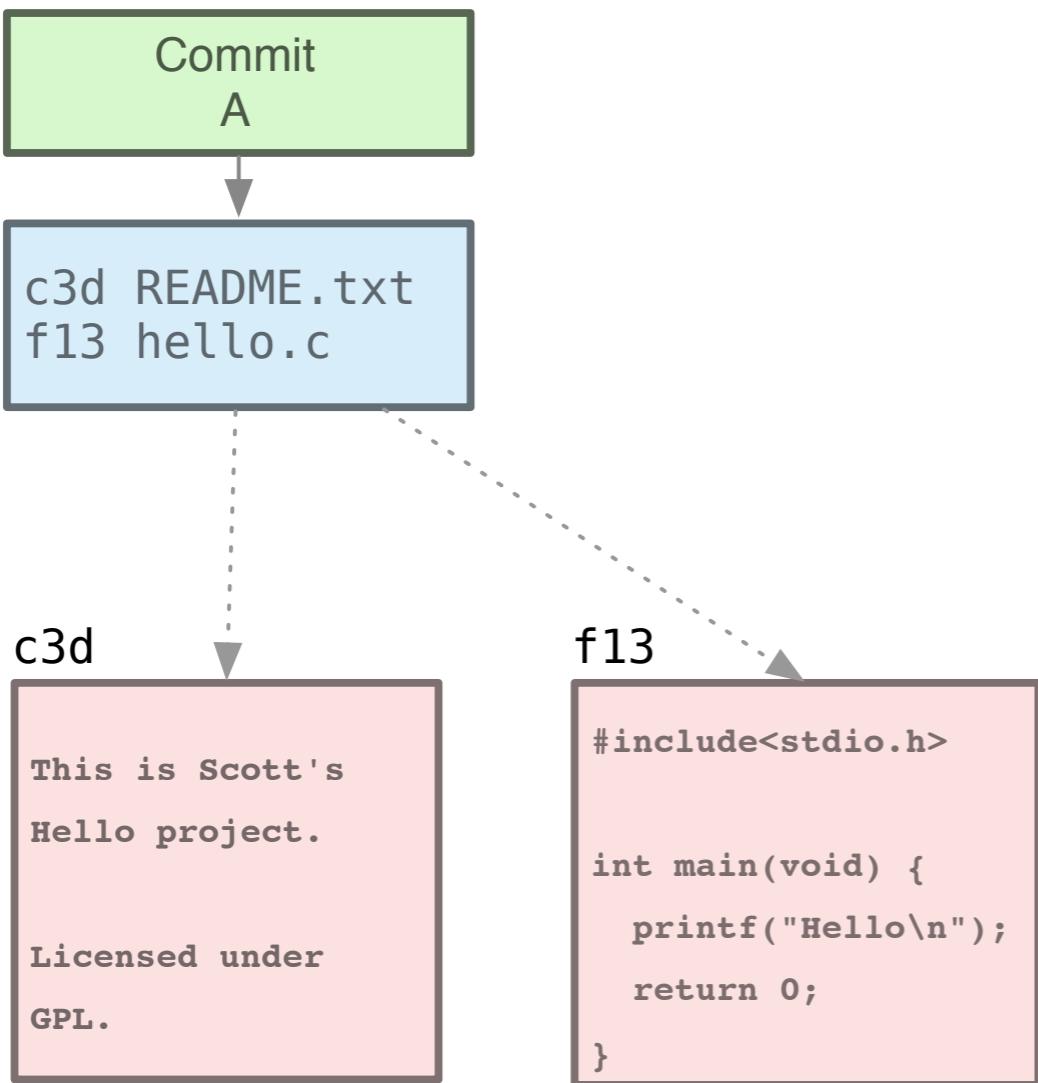
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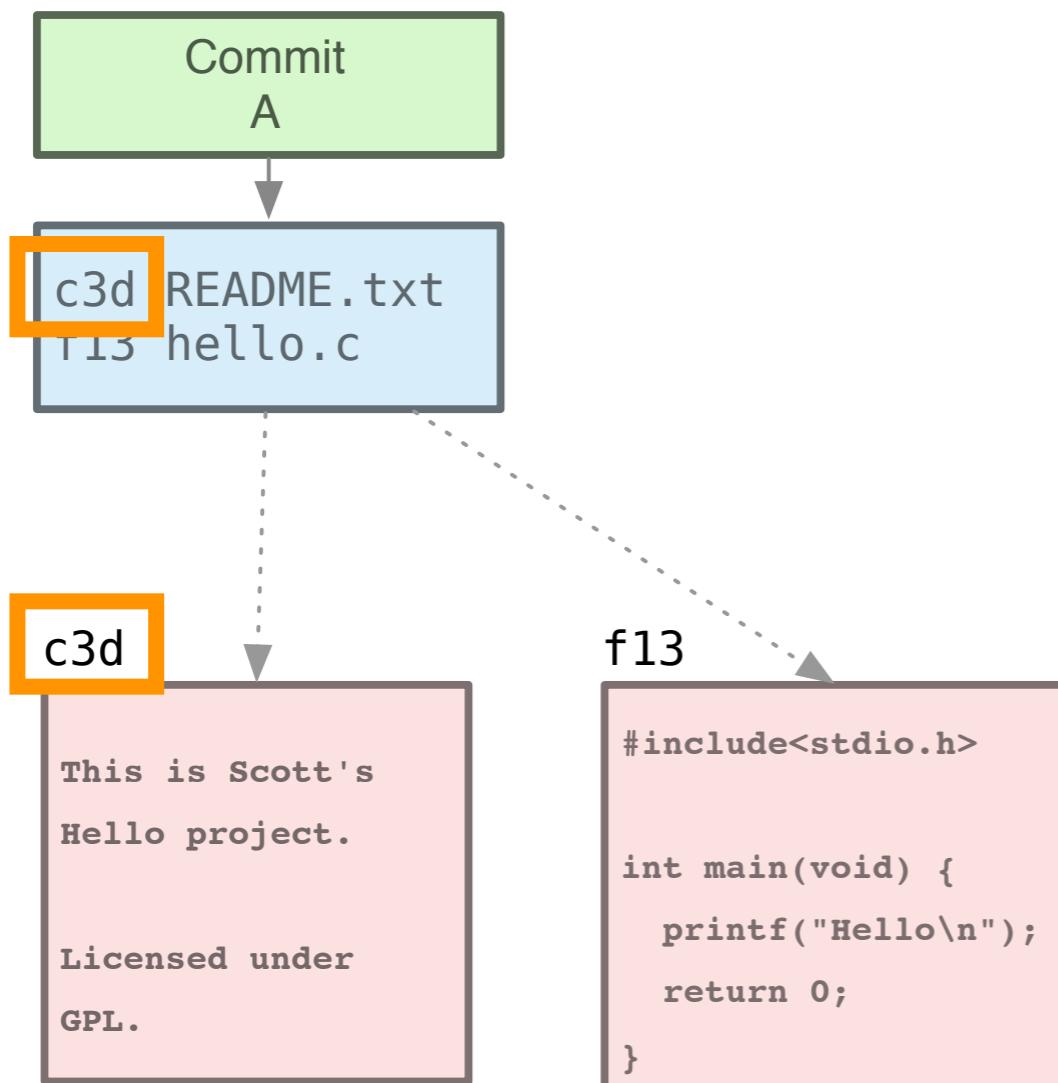
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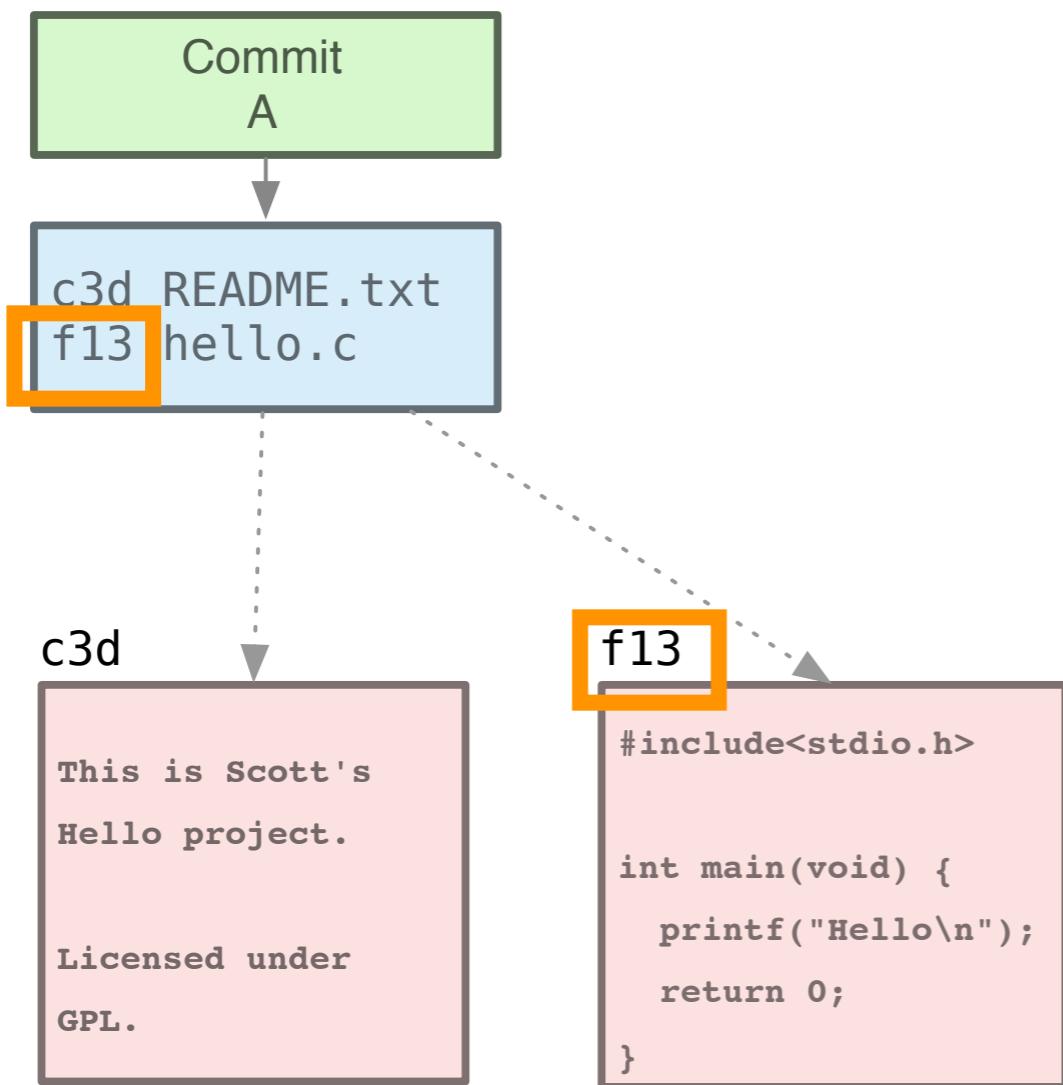
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c3d README.txt
f13 hello.c

c3d

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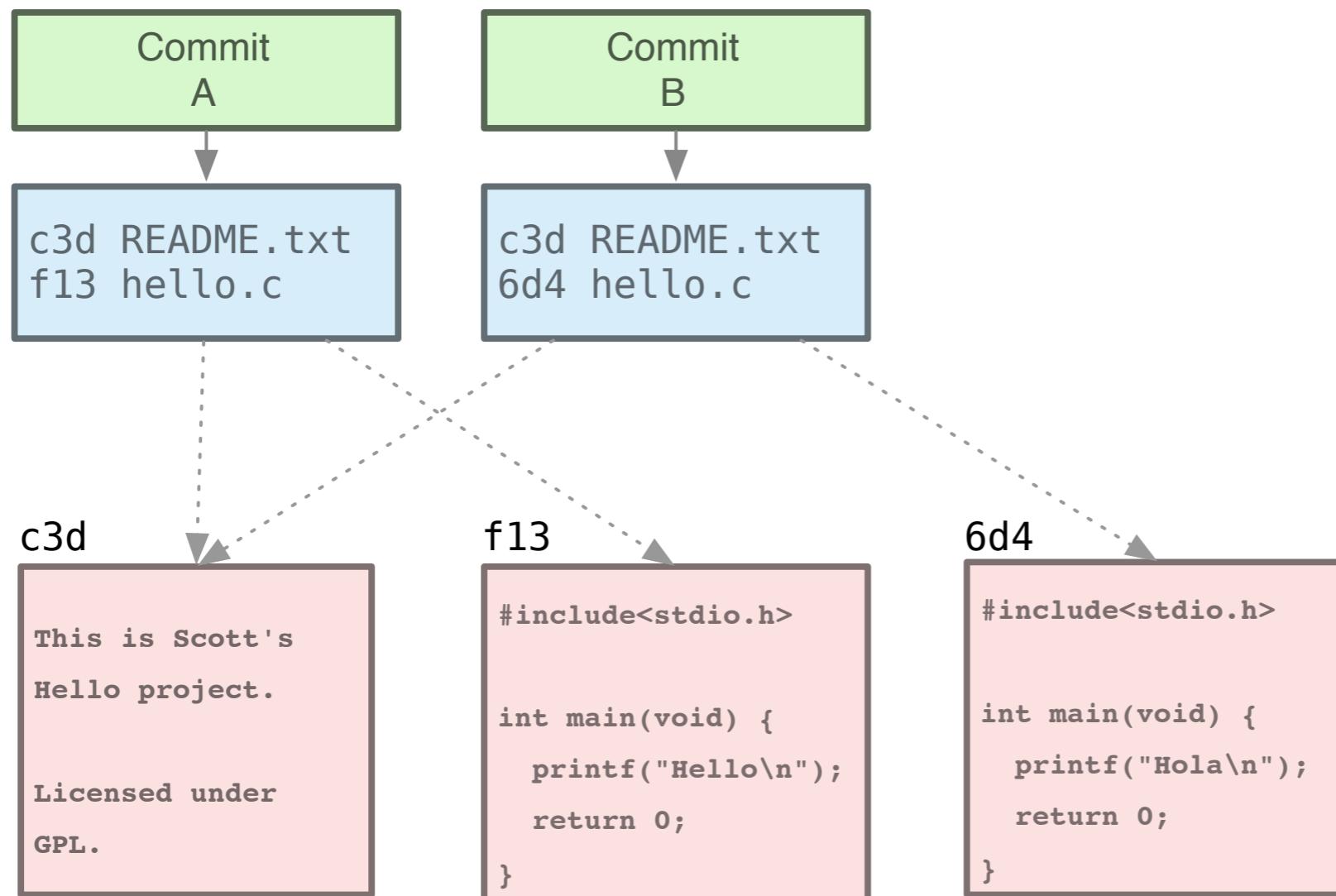
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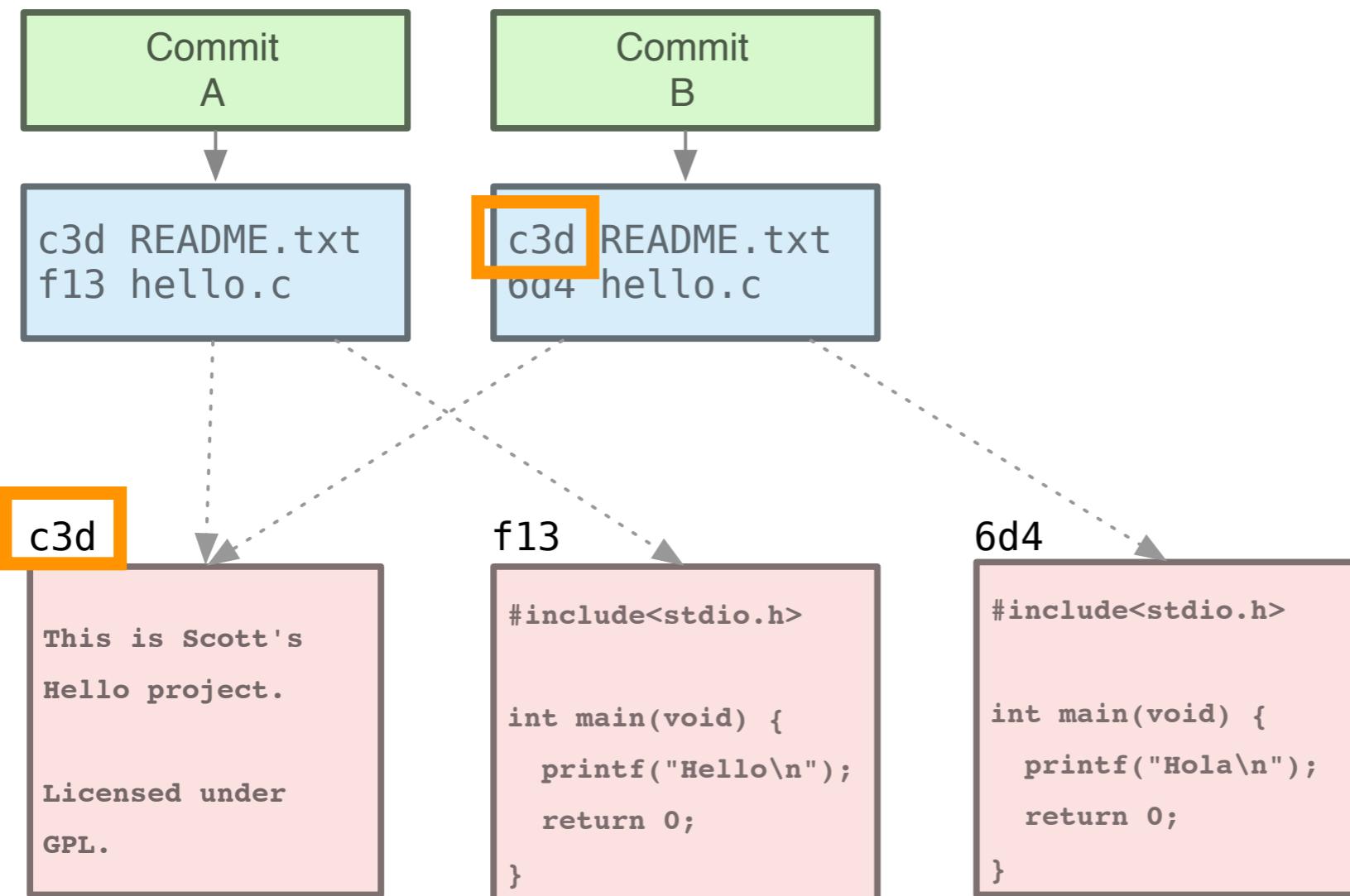
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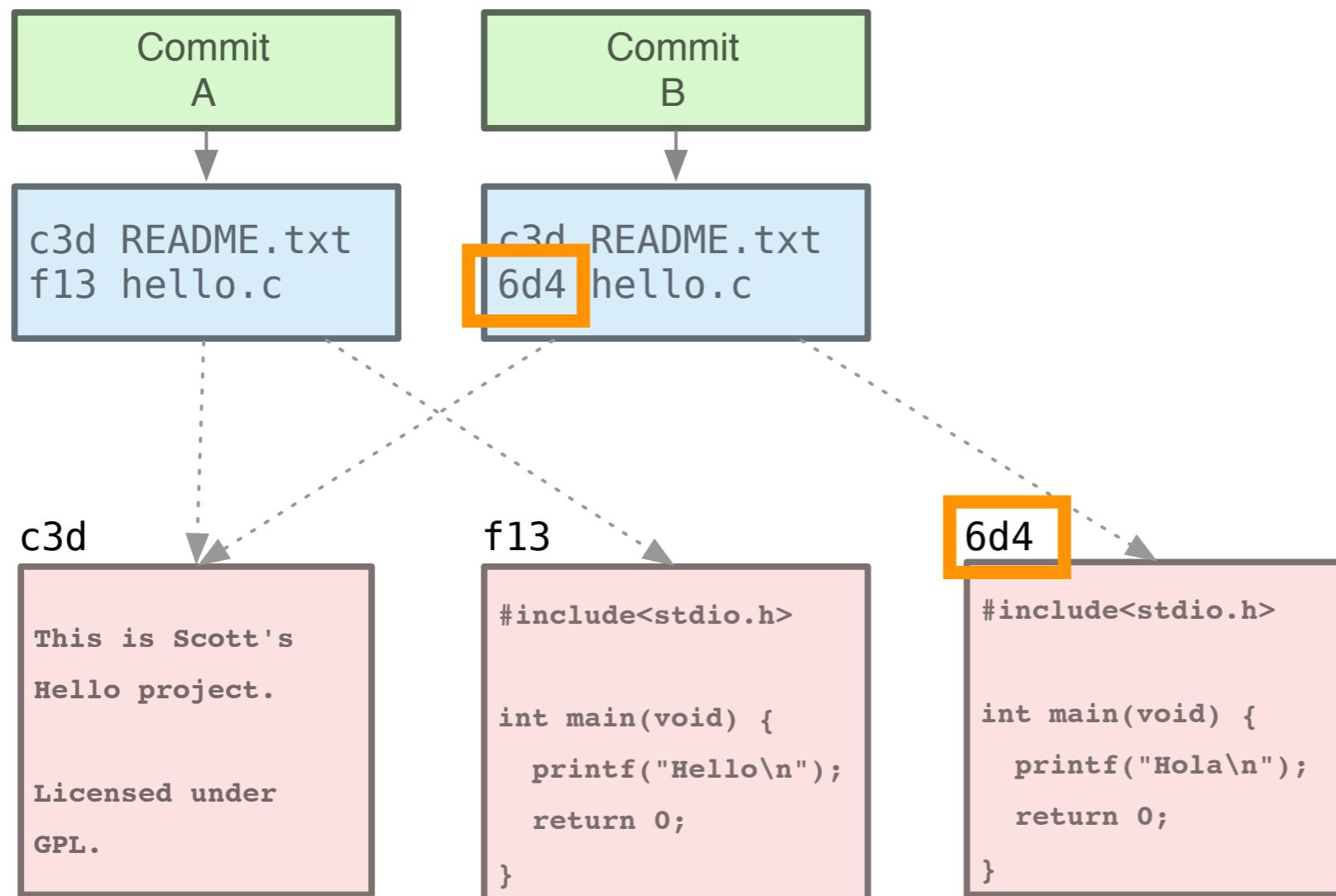
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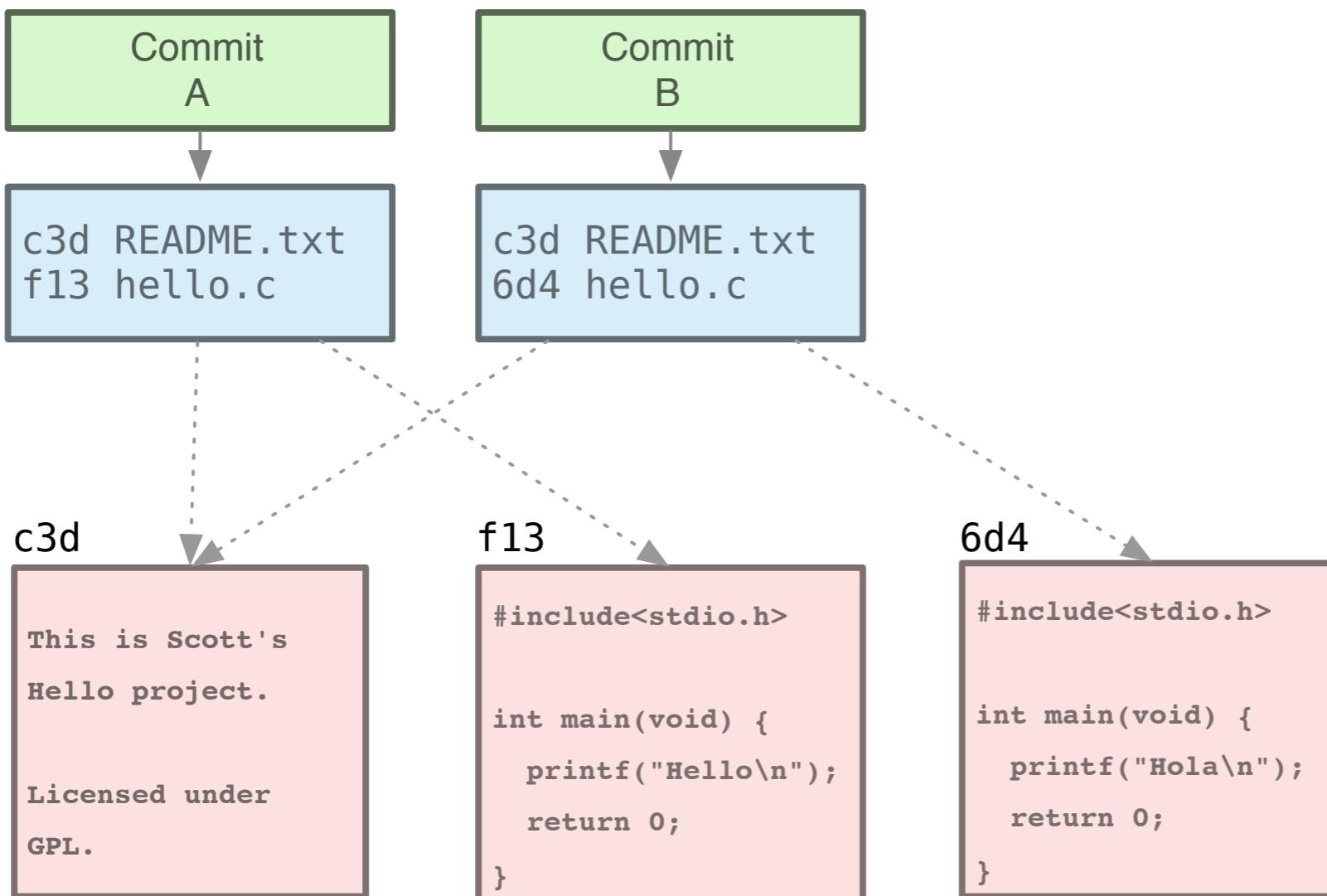
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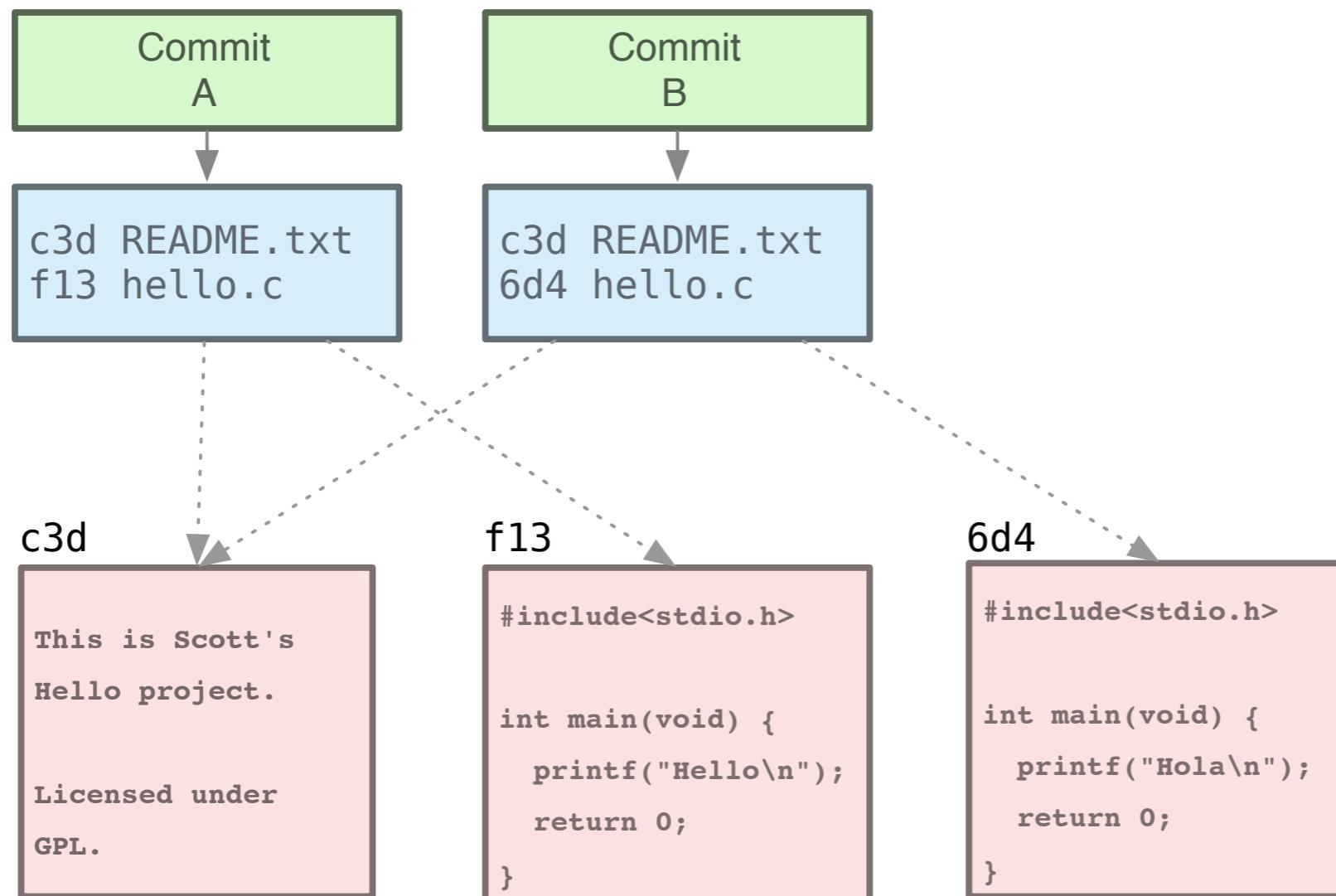
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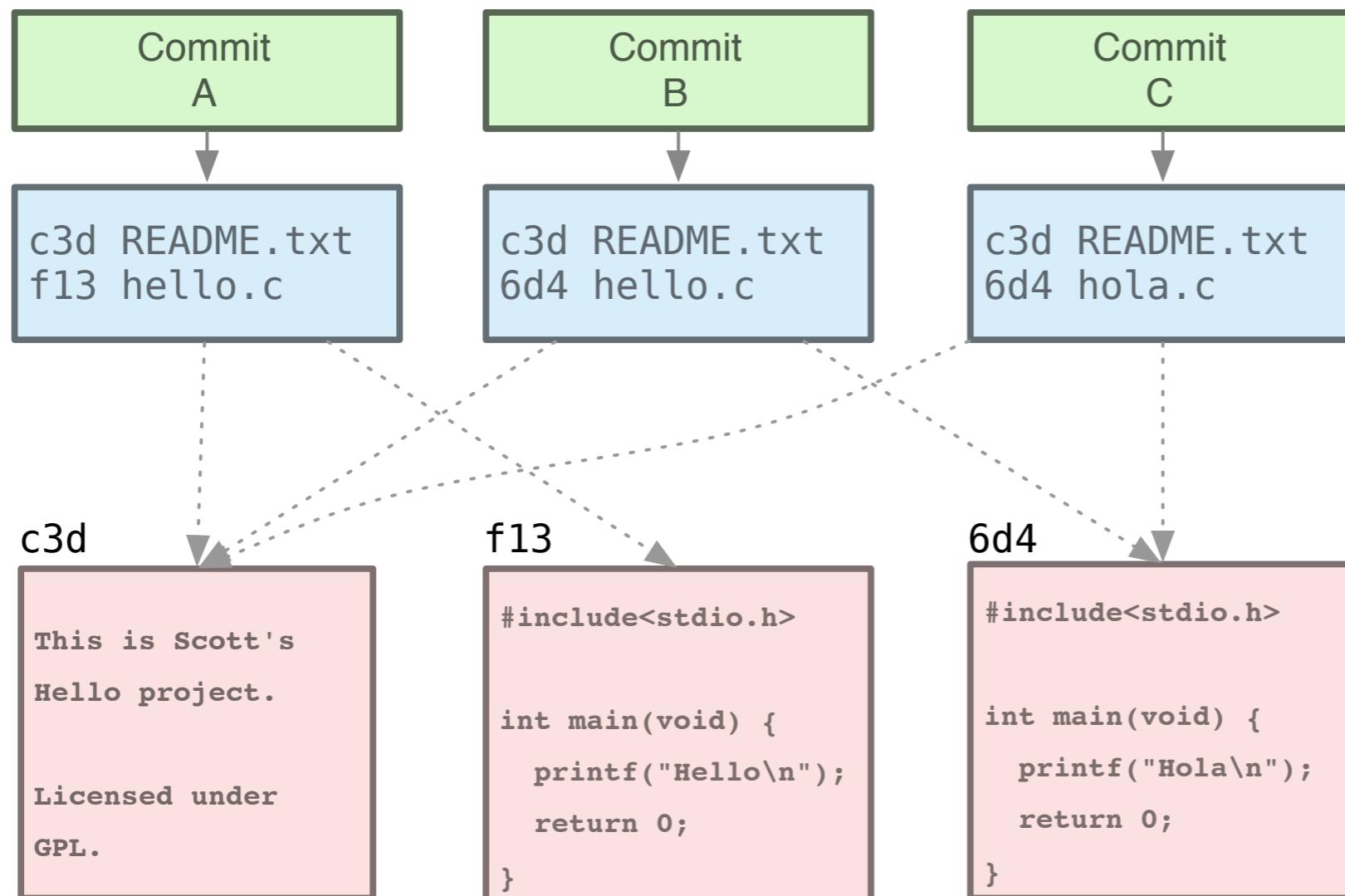
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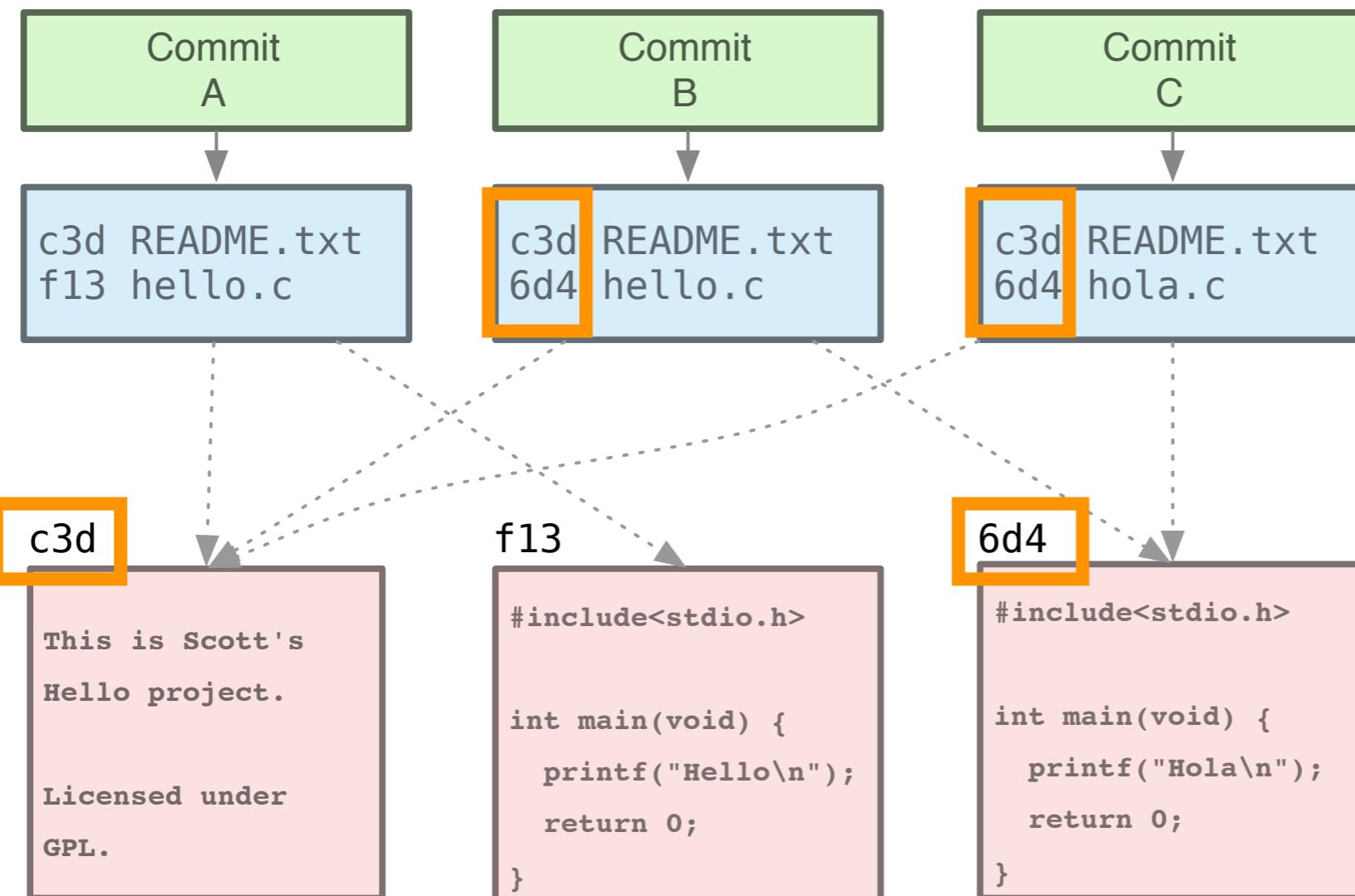
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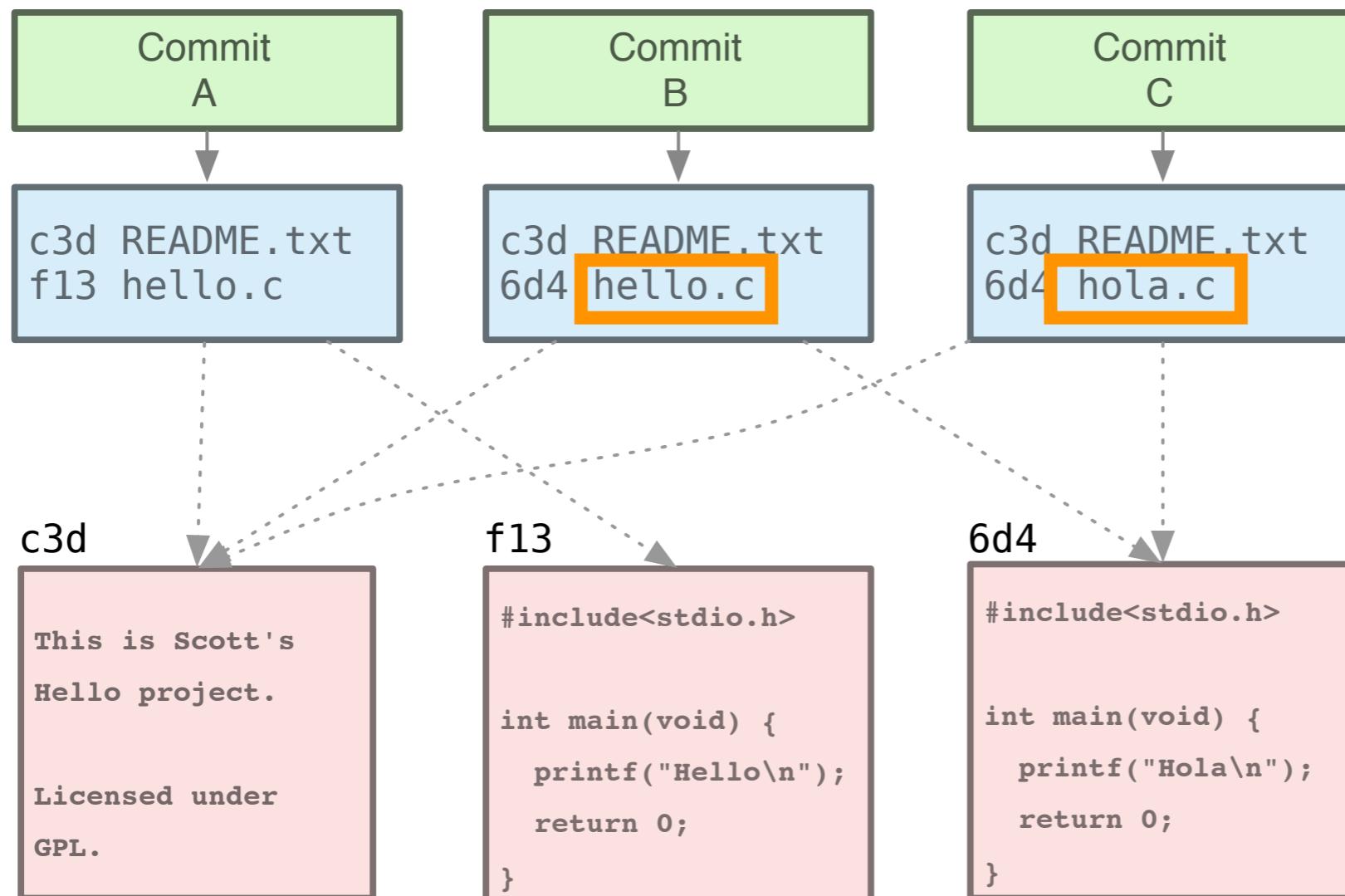
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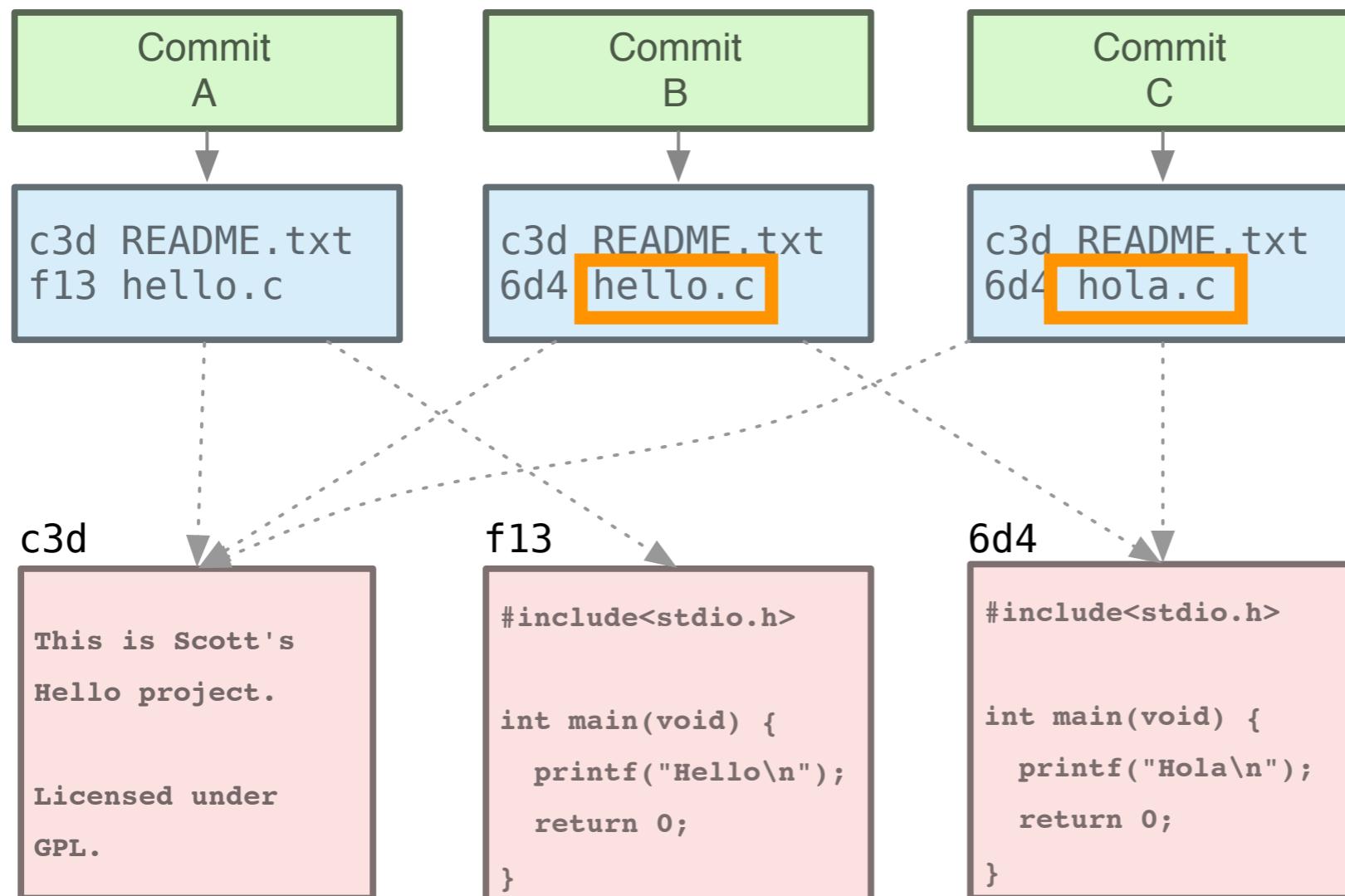
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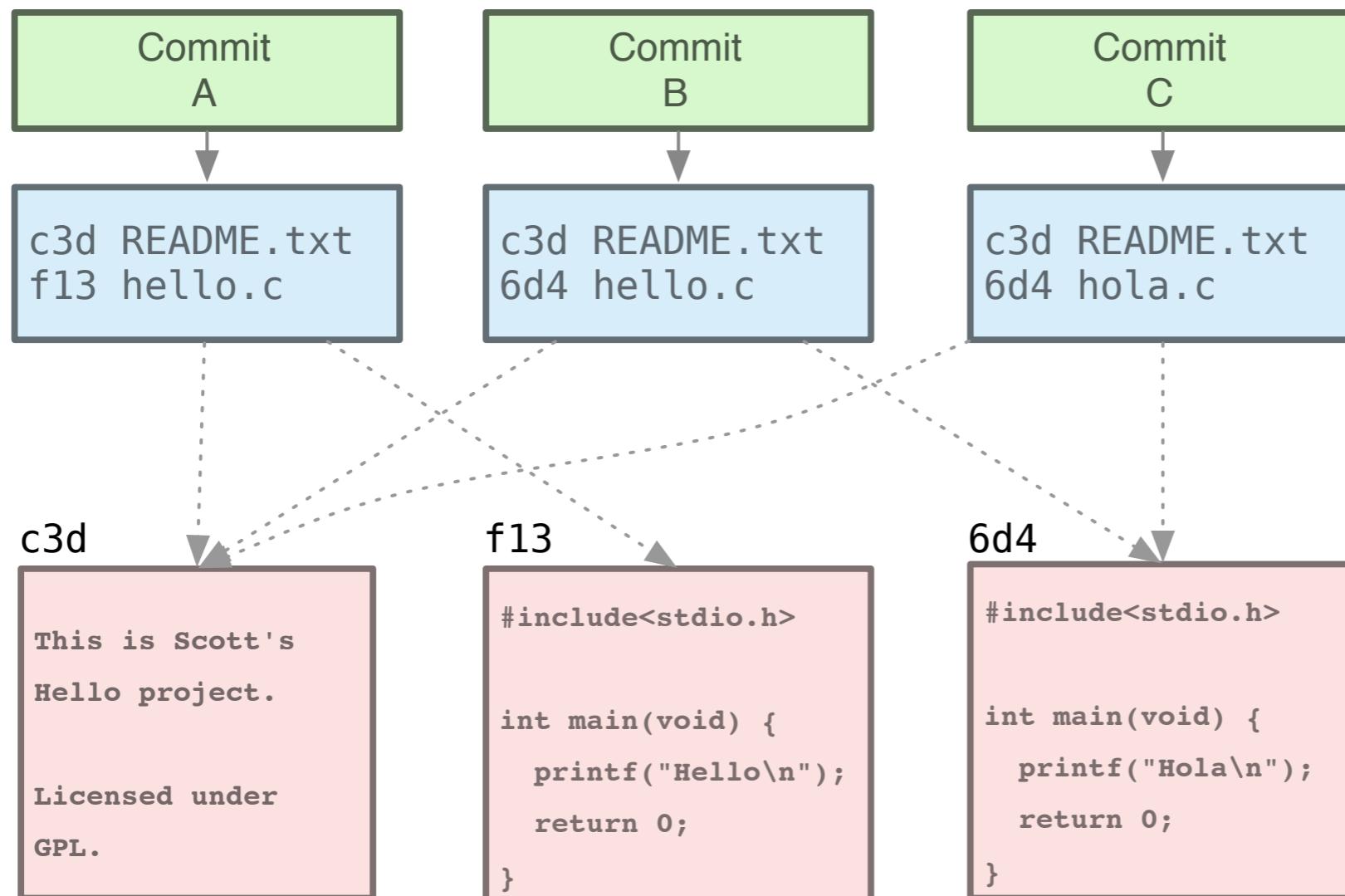
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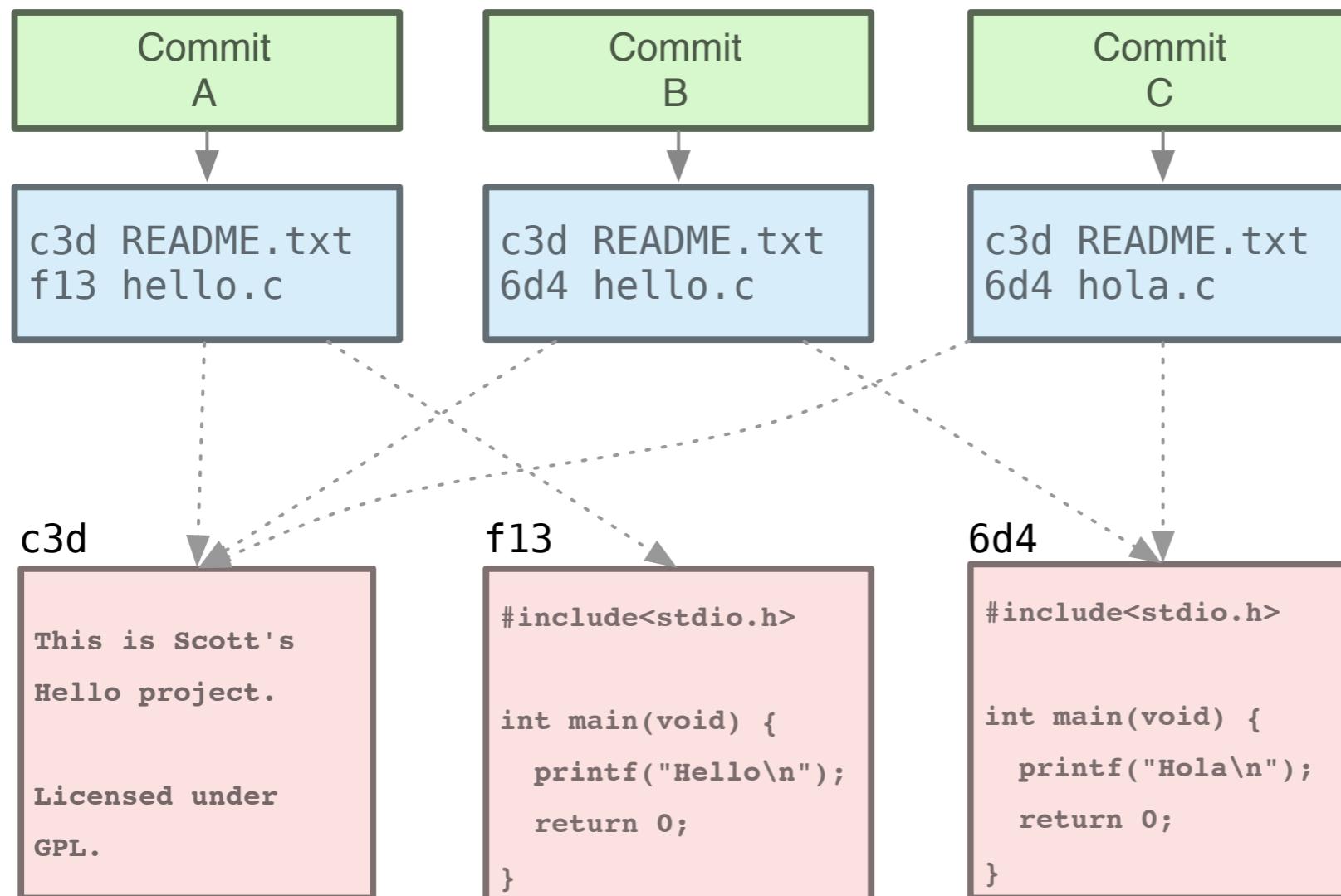
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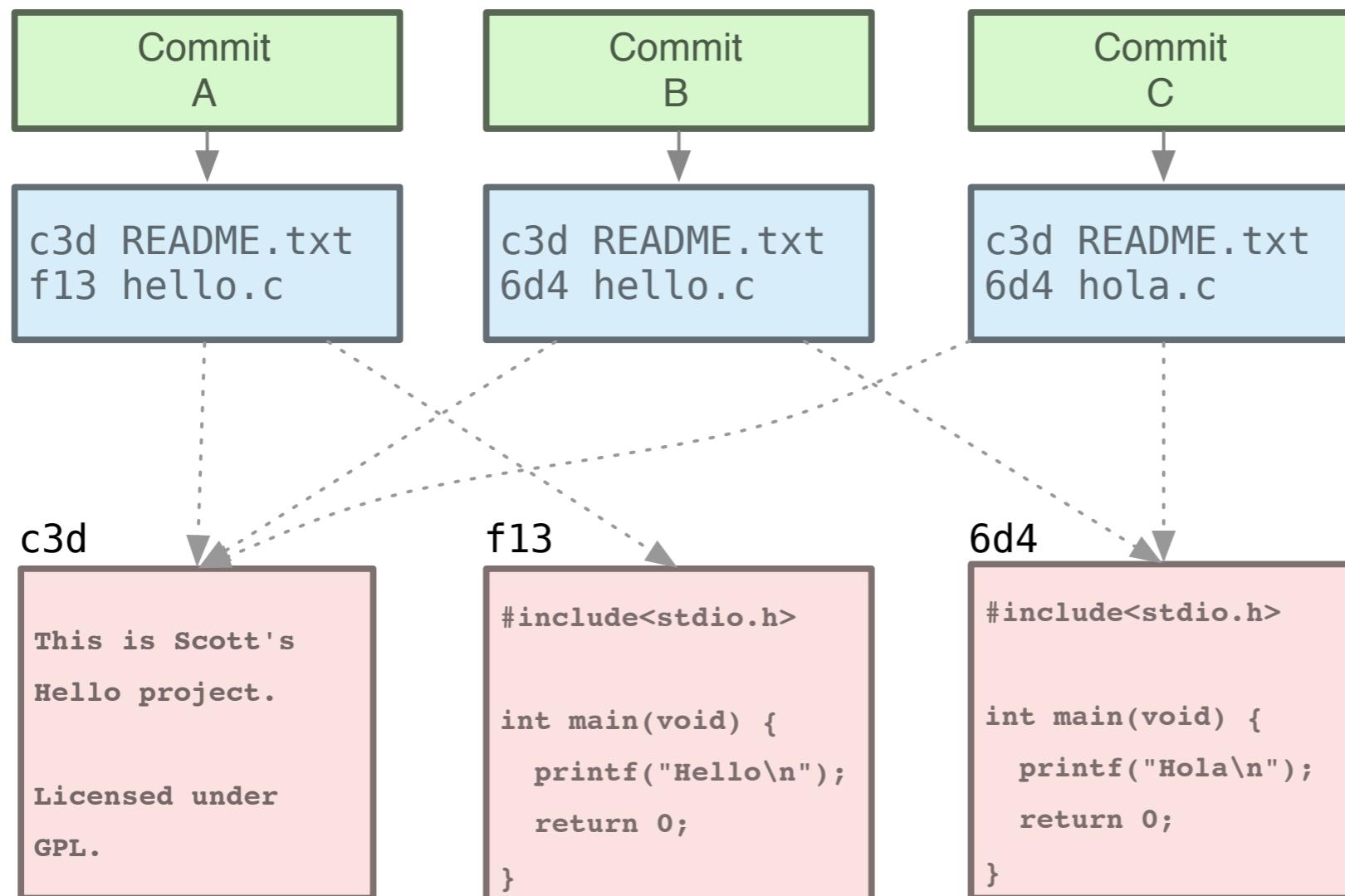
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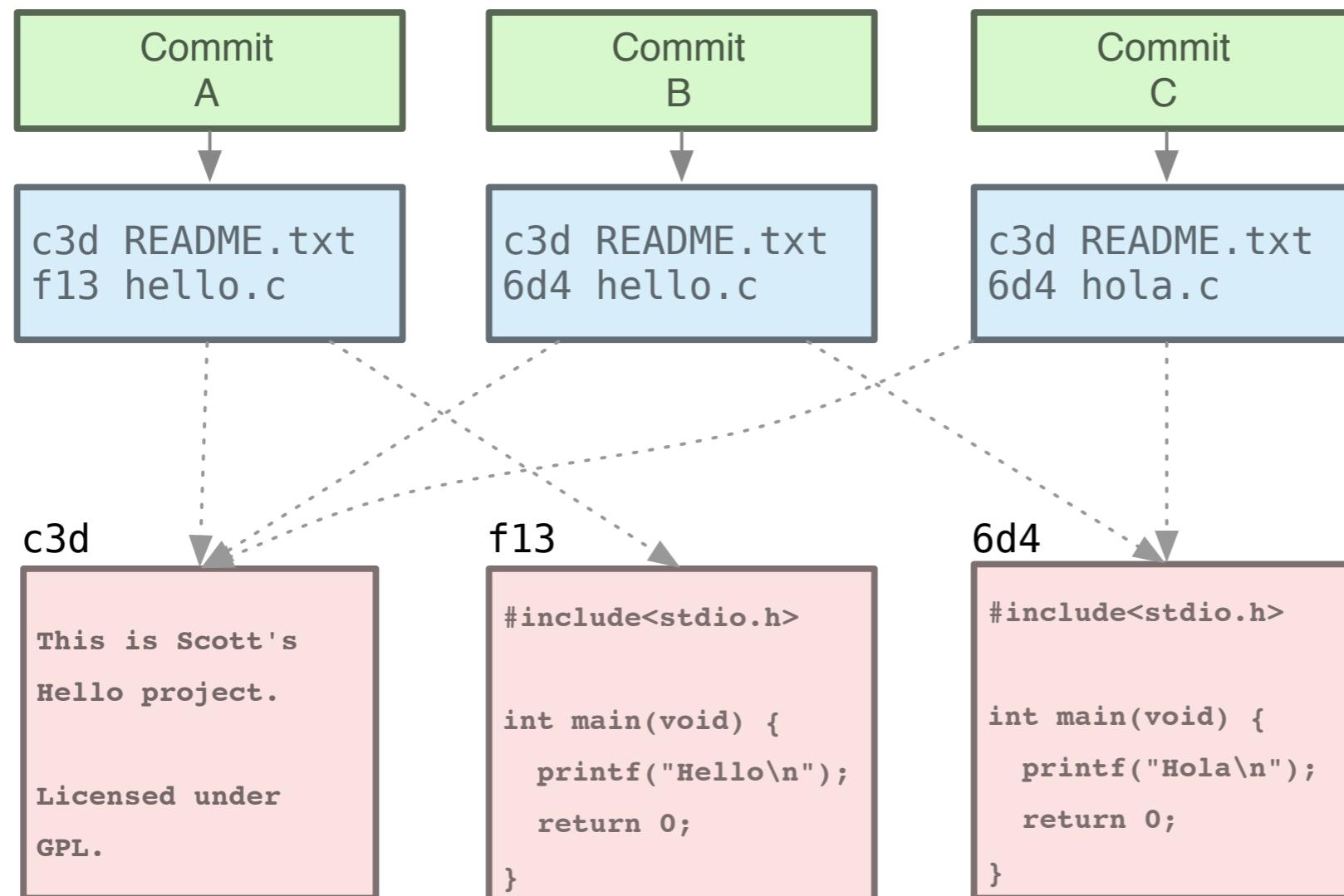
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    printf("Hello\n");
    return 0;
}
```



README.txt

```
This is Scott's  
Hola project.
```

```
Licensed under GPL.
```

hola.c

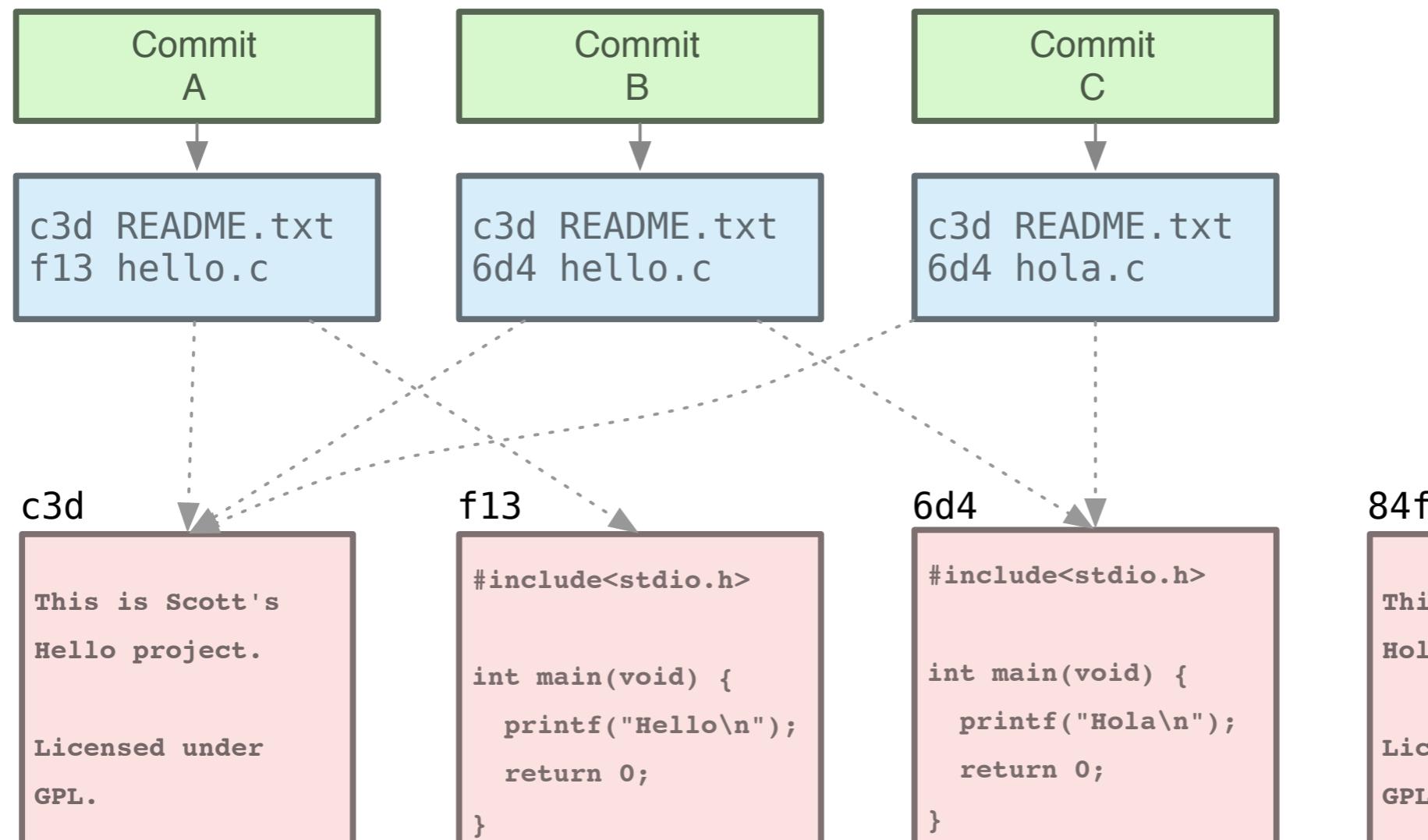
```
#include<stdio.h>

int main(void) {
    printf("Hola\n");
    return 0;
}
```

hello.c

```
#include<stdio.h>

int main(void) {
    printf("Hola\n");
    return 0;
}
```



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hola.c

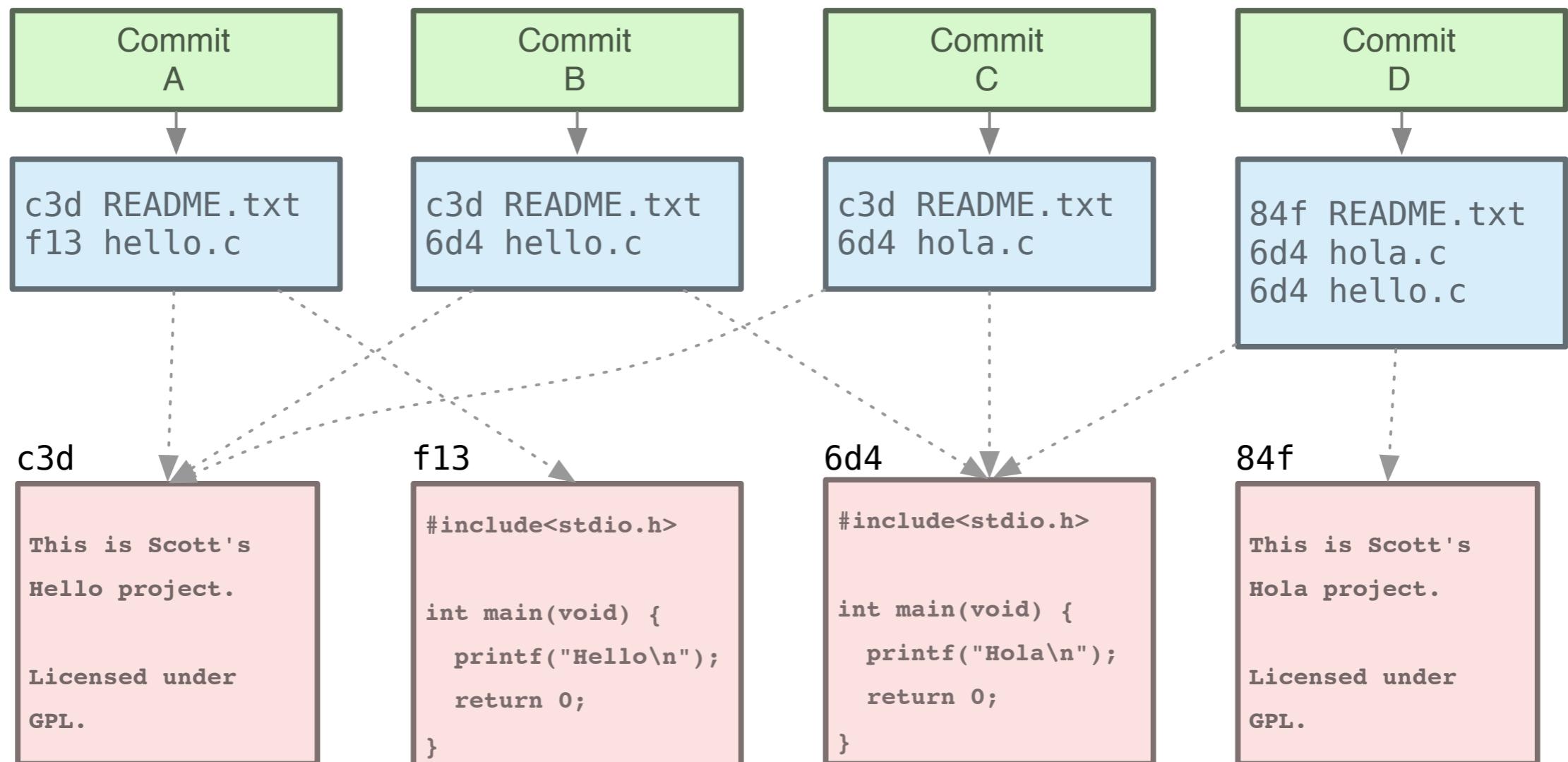
```
#include<stdio.h>

int main(void) {
    printf("Hola\n");
    return 0;
}
```

hello.c

```
#include<stdio.h>

int main(void) {
    printf("Hola\n");
    return 0;
}
```



README.txt

```
This is Scott's  
Hola project.
```

```
Licensed under GPL.
```

hola.c

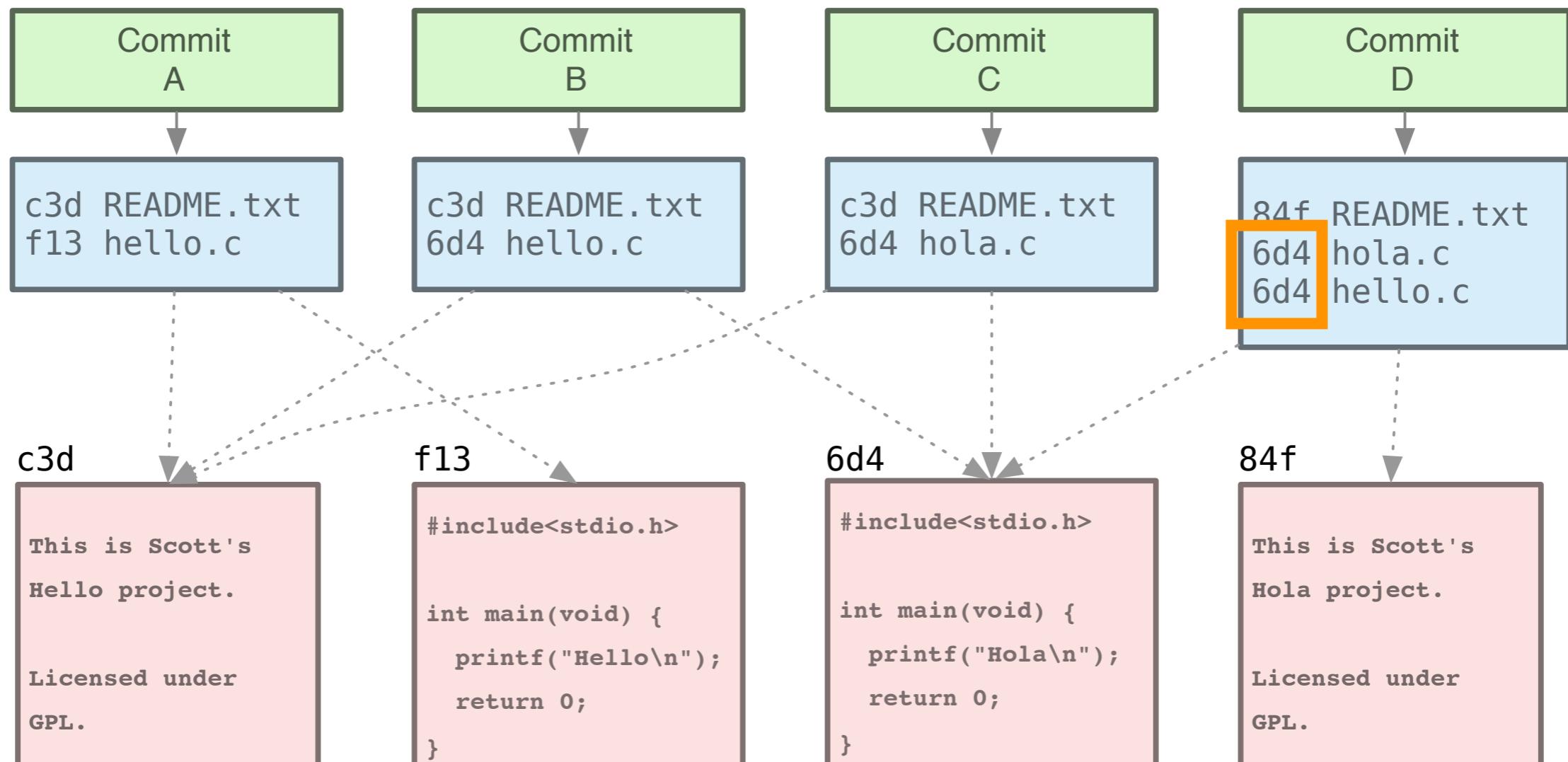
```
#include<stdio.h>

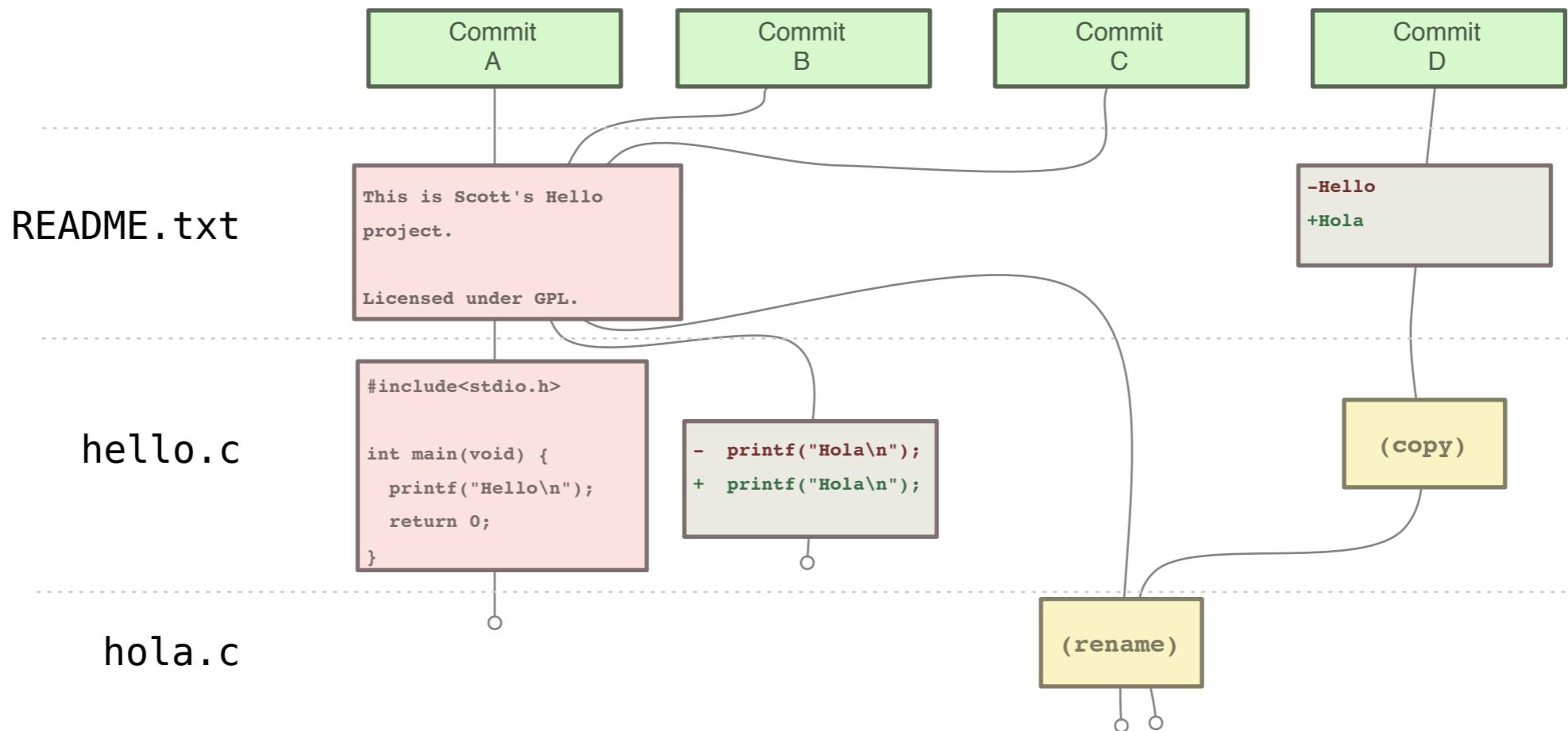
int main(void) {
    printf("Hola\n");
    return 0;
}
```

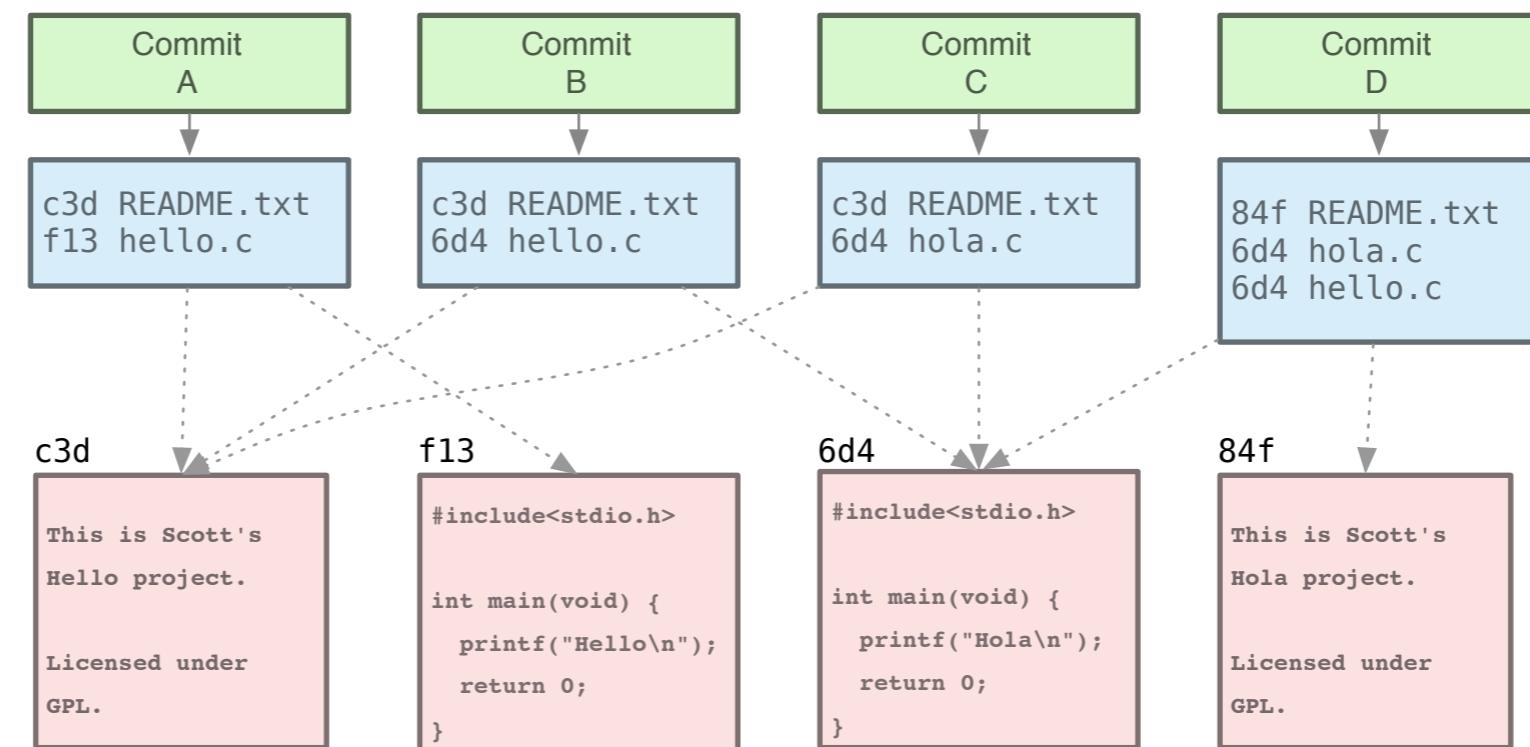
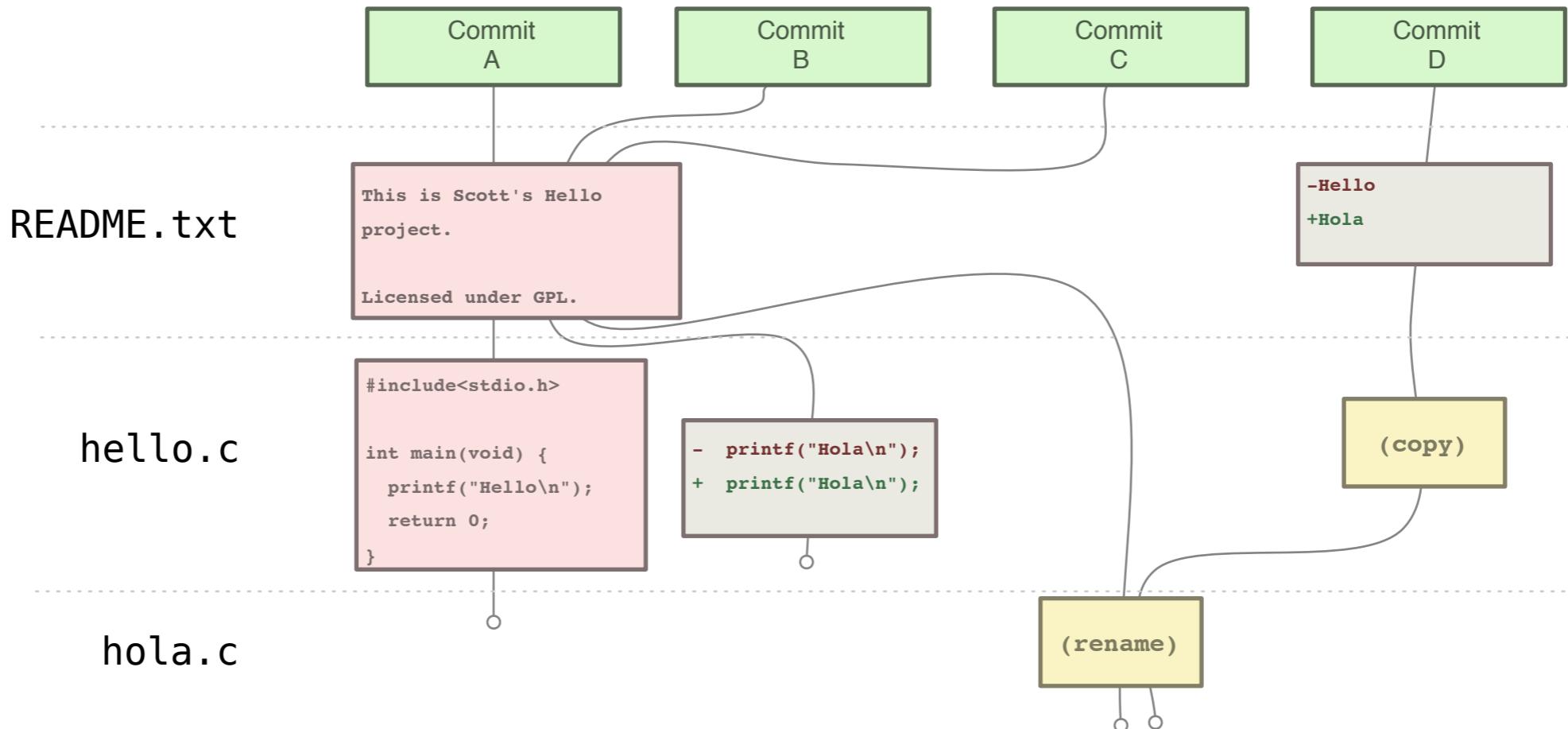
hello.c

```
#include<stdio.h>

int main(void) {
    printf("Hola\n");
    return 0;
}
```







First Steps

```
$ git config --global user.name "Scott Chacon"  
$ git config --global user.email "schacon@gmail.com"
```

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

Getting a Repo

Create One

git init

```
$ touch hello_world.rb
```

```
$ touch hello_world.rb  
$ git init
```

```
$ tree -a  
.  
|-- .git  
|   |-- HEAD  
|   |-- branches  
|   |-- config  
|   |-- description  
|   |-- hooks  
|   |   |-- post-commit.sample  
|   |   |-- post-receive.sample  
|   |   |-- ...  
|   |   |-- pre-rebase.sample  
|   |   `-- update.sample  
|   |-- info  
|   |   `-- exclude  
|   |-- objects  
|   |   |-- info  
|   |   `-- pack  
|   |-- refs  
|   |   |-- heads  
|   |   `-- tags  
|   `-- remotes  
`-- hello_world.rb
```

11 directories, 25 files

```
$ tree -a
```

```
.
|--- .git
|   |--- HEAD
|   |--- branches
|   |--- config
|   |--- description
|   |--- hooks
|   |   |--- post-commit.sample
|   |   |--- post-receive.sample
|   |   |--- ...
|   |   |--- pre-rebase.sample
|   |   `--- update.sample
|   |--- info
|   |   `--- exclude
|   |--- objects
|   |   |--- info
|   |   |--- pack
|   |--- refs
|   |   |--- heads
|   |   |--- tags
|   |--- remotes
`--- hello_world.rb
```

11 directories, 25 files

```
$ tree -a  
.  
|-- .git  
|   |-- HEAD  
|   |-- branches  
|   |-- config  
|   |-- description  
|   |-- hooks  
|   |   |-- post-commit.sample  
|   |   |-- post-receive.sample  
|   |   |-- ...  
|   |   |-- pre-rebase.sample  
|   |   `-- update.sample  
|   |-- info  
|   |   `-- exclude  
|   |-- objects  
|   |   |-- info  
|   |   `-- pack  
|   |-- refs  
|   |   |-- heads  
|   |   `-- tags  
|   `-- remotes  
`-- hello_world.rb
```

11 directories, 25 files

```
$ touch hello_world.rb  
$ git init  
$ git add .
```

```
$ touch hello_world.rb  
$ git init  
$ git add .  
$ git commit -m 'first commit'
```

```
$ tree -a
.
|-- .git
|   |-- COMMIT_EDITMSG
|   |-- HEAD
|   |-- branches
|   |-- config
|   |-- description
|   |-- hooks
|   |   |-- applypatch-msg.sample
|   |   `-- update.sample
|   |-- index
|   |-- info
|   |   '-- exclude
|   |-- logs
|   |   '-- HEAD
|   |   `-- refs
|   |       '-- heads
|   |           '-- master
|   '-- objects
|       '-- 32/09658ac8d80bc9726d3a33d77e3dfc5fe6035e
|       '-- 53/9cd7886a627841d525a78d45cbc6396be20b41
|       '-- e6/9de29bb2d1d6434b8b29ae775ad8c2e48c5391
|       '-- info
|           '-- pack
|   '-- refs
|       '-- heads
|           '-- master
|       '-- tags
|   '-- remotes
`-- hello_world.rb
```

17 directories, 33 files

```
$ tree -a
```

```
.
```

```
|- -- .git
|   |- -- COMMIT_EDITMSG
|   |- -- HEAD
|   |- -- branches
|   |- -- config
|   |- -- description
|   |- -- hooks
|       |- -- applypatch-msg.sample
|       `-- update.sample
|   |- -- index
|   |- -- info
|       `-- exclude
|   |- -- logs
|       |- -- HEAD
|       `-- refs
|           `-- heads
|               `-- master
|   |- -- objects
|       |- -- 32/09658ac8d80bc9726d3a33d77e3dfc5fe6035e
|       |- -- 53/9cd7886a627841d525a78d45cbc6396be20b41
|       |- -- e6/9de29bb2d1d6434b8b29ae775ad8c2e48c5391
|       |- -- info
|       `-- pack
|   |- -- refs
|       |- -- heads
|           `-- master
|       `-- tags
|   `-- remotes
`-- hello_world.rb
```

17 directories, 33 files

```
$ tree -a
.
|-- .git
|   |-- COMMIT_EDITMSG
|   |-- HEAD
|   |-- branches
|   |-- config
|   |-- description
|   |-- hooks
|   |   |-- applypatch-msg.sample
|   |   `-- update.sample
|   |-- index
|   |-- info
|   |   '-- exclude
|   |-- logs
|   |   '-- HEAD
|   |   `-- refs
|   |       '-- heads
|   |           '-- master
|   '-- objects
|       '-- 32/09658ac8d80bc9726d3a33d77e3dfc5fe6035e
|       '-- 53/9cd7886a627841d525a78d45cbc6396be20b41
|       '-- e6/9de29bb2d1d6434b8b29ae775ad8c2e48c5391
|       '-- info
|           '-- pack
|-- refs
|   '-- heads
|       '-- master
|       `-- tags
`-- remotes
`-- hello_world.rb
```

17 directories, 33 files

Clone One

git clone

```
$ git clone git://github.com/schacon/ticgit.git
```

```
$ git clone git://github.com/schacon/ticgit.git
Initialized empty Git repository in /private/tmp/ticgit/.git/
remote: Counting objects: 591, done.
remote: Compressing objects: 100% (267/267), done.
remote: Total 591 (delta 253), reused 587 (delta 252)
Receiving objects: 100% (591/591), 73.05 KiB, done.
Resolving deltas: 100% (253/253), done.
$
```

```
$ git clone git://github.com/schacon/ticgit.git
Initialized empty Git repository in /private/tmp/ticgit/.git/
remote: Counting objects: 591, done.
remote: Compressing objects: 100% (267/267), done.
remote: Total 591 (delta 253), reused 587 (delta 252)
Receiving objects: 100% (591/591), 73.05 KiB, done.
Resolving deltas: 100% (253/253), done.
$ cd ticgit/
$
```

```
$ git clone git://github.com/schacon/ticgit.git
Initialized empty Git repository in /private/tmp/ticgit/.git/
remote: Counting objects: 591, done.
remote: Compressing objects: 100% (267/267), done.
remote: Total 591 (delta 253), reused 587 (delta 252)
Receiving objects: 100% (591/591), 73.05 KiB, done.
Resolving deltas: 100% (253/253), done.
$ cd ticgit/
$ ls
.git  LICENSE      Rakefile  examples  note
ticgit.gemspec    README     bin       lib      spec
$
```

Recording a Snapshot

A Basic Workflow

A Basic Workflow

Edit files

vim / emacs / etc

A Basic Workflow

Edit files

`vim / emacs / etc`

Stage the changes

`git add (file)`

A Basic Workflow

Edit files

`vim / emacs / etc`

Stage the changes

`git add (file)`

Review your changes

`git status / git diff`

A Basic Workflow

Edit files

`vim / emacs / etc`

Stage the changes

`git add (file)`

Review your changes

`git status / git diff`

Commit the changes

`git commit`

A Basic Git Workflow

Edit files

`vim / emacs / etc`

Stage and Commit

`git commit -a`

What's going on here?

```
$ git commit
```

```
Created commit 77d3001: descriptive commit message  
2 files changed, 4 insertions(+), 2 deletions(-)
```

```
$ git commit
```

```
Created commit 77d3001: descriptive commit message  
2 files changed, 4 insertions(+), 2 deletions(-)
```

77d3001

77d3001

77d3001a1de6bf8f5e431972fe4d25b01e595c0b

77d3001a1de6bf8f5e431972fe4d25b01e595c0b

77d3001a1de6bf8f5e431972fe4d25b01e595c0b

77d3001a1de6bf8f5e431972fe4d25b01e595c0b

| commit | size |
|--|-------|
| tree | c4ec5 |
| parent | a149e |
| author | Scott |
| committer | Scott |
| my commit message goes here and it is really, really cool | |

77d3001a1de6bf8f5e431972fe4d25b01e595c0b

```
tree c4ec543b0322744e55c5efc9b6c4e449d398dbff
parent a149e2160b3f7573768cdc2fce24d0881f3577e1
author Scott Chacon <schacon@gmail.com> 1223402504 -0700
committer Scott Chacon <schacon@gmail.com> 1223402504 -0700
```

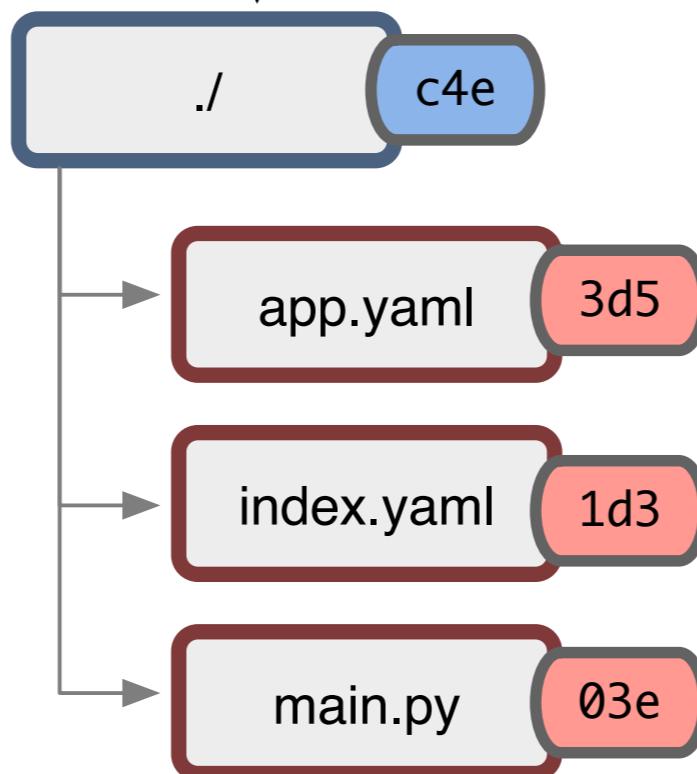
descriptive commit message

77d3001a1de6bf8f5e431972fe4d25b01e595c0b

| commit | size |
|--|-------|
| tree | c4ec5 |
| parent | a149e |
| author | Scott |
| committer | Scott |
| my commit message goes here and it is really, really cool | |

77d3001a1de6bf8f5e431972fe4d25b01e595c0b

| commit | size |
|--|-------|
| tree | c4ec5 |
| parent | a149e |
| author | Scott |
| committer | Scott |
| my commit message goes here and it is really, really cool | |



77d3001a1de6bf8f5e431972fe4d25b01e595c0b

| commit | size |
|--|-------|
| tree | c4ec5 |
| parent | a149e |
| author | Scott |
| committer | Scott |
| my commit message goes here and it is really, really cool | |



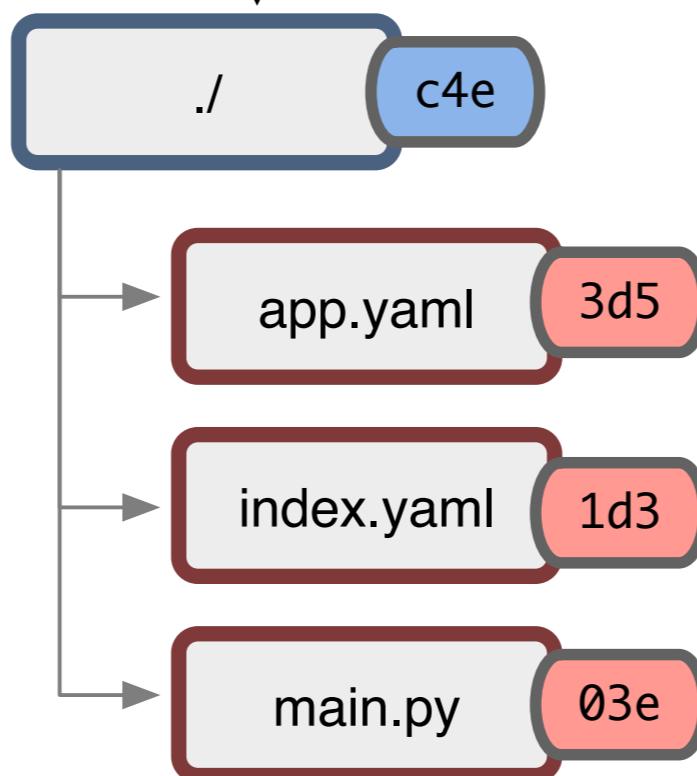
./ c4e

```
100644 blob 3d5cd3e1fc4424472ea247d1bb5fcfc3809aadab app.yaml
100644 blob 1d31bf2dba611ba0de871320b4d73cdc39cc862b index.yaml
100644 blob 03e68c28b73e2650bee34763369faf6e029d5053 main.py
```

main.py 03e

77d3001a1de6bf8f5e431972fe4d25b01e595c0b

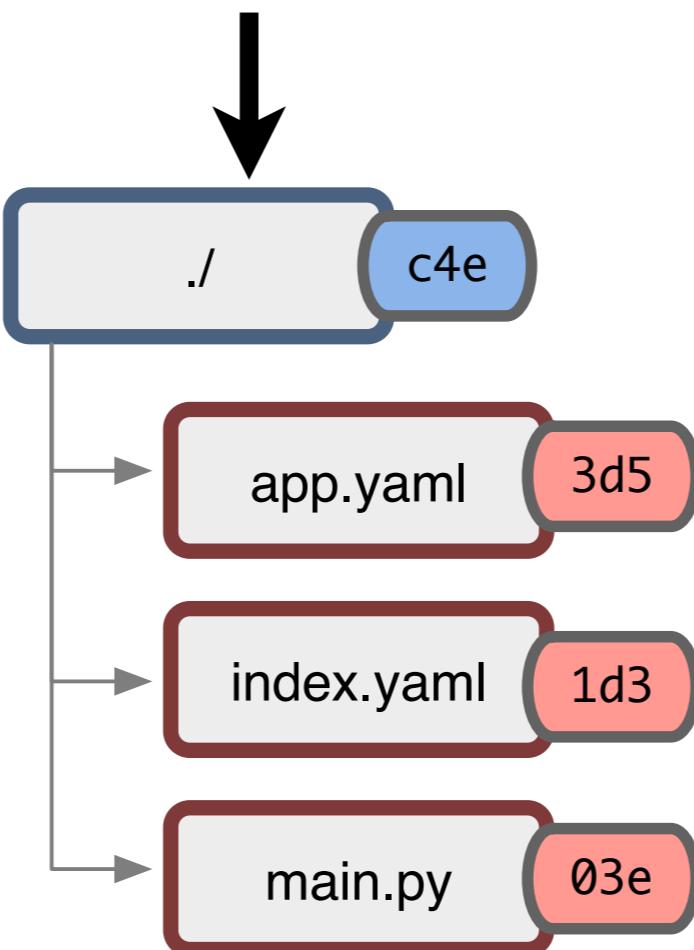
| commit | size |
|--|-------|
| tree | c4ec5 |
| parent | a149e |
| author | Scott |
| committer | Scott |
| my commit message goes here and it is really, really cool | |



| commit | size |
|--|-------|
| tree | 2de54 |
| parent | 38def |
| author | Scott |
| committer | Scott |
| this is the previous commit and I am very proud of it | |

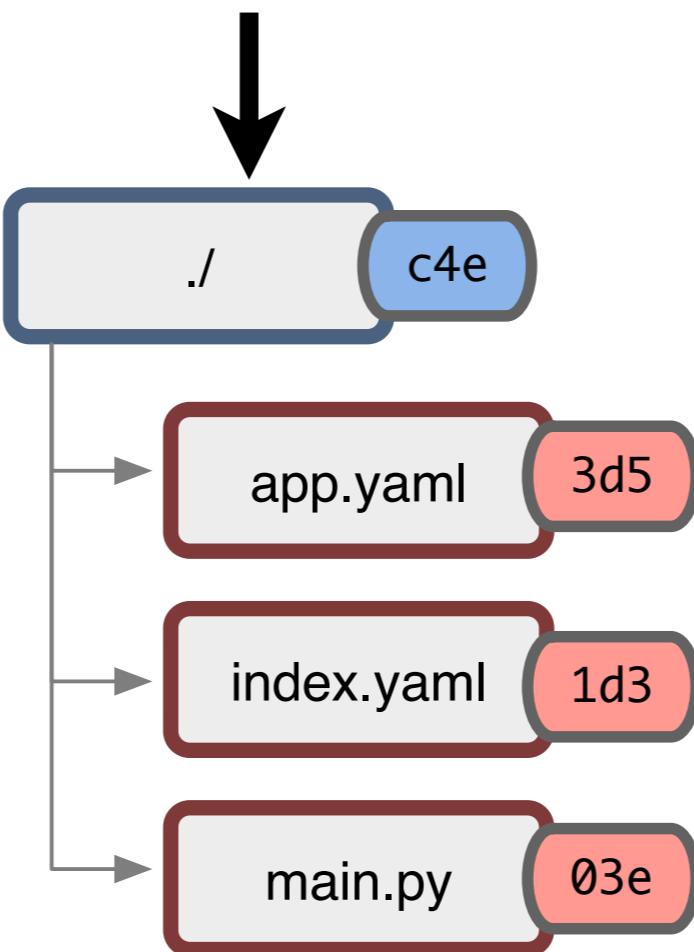
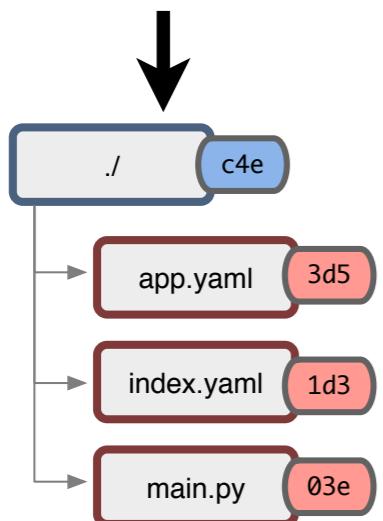
←

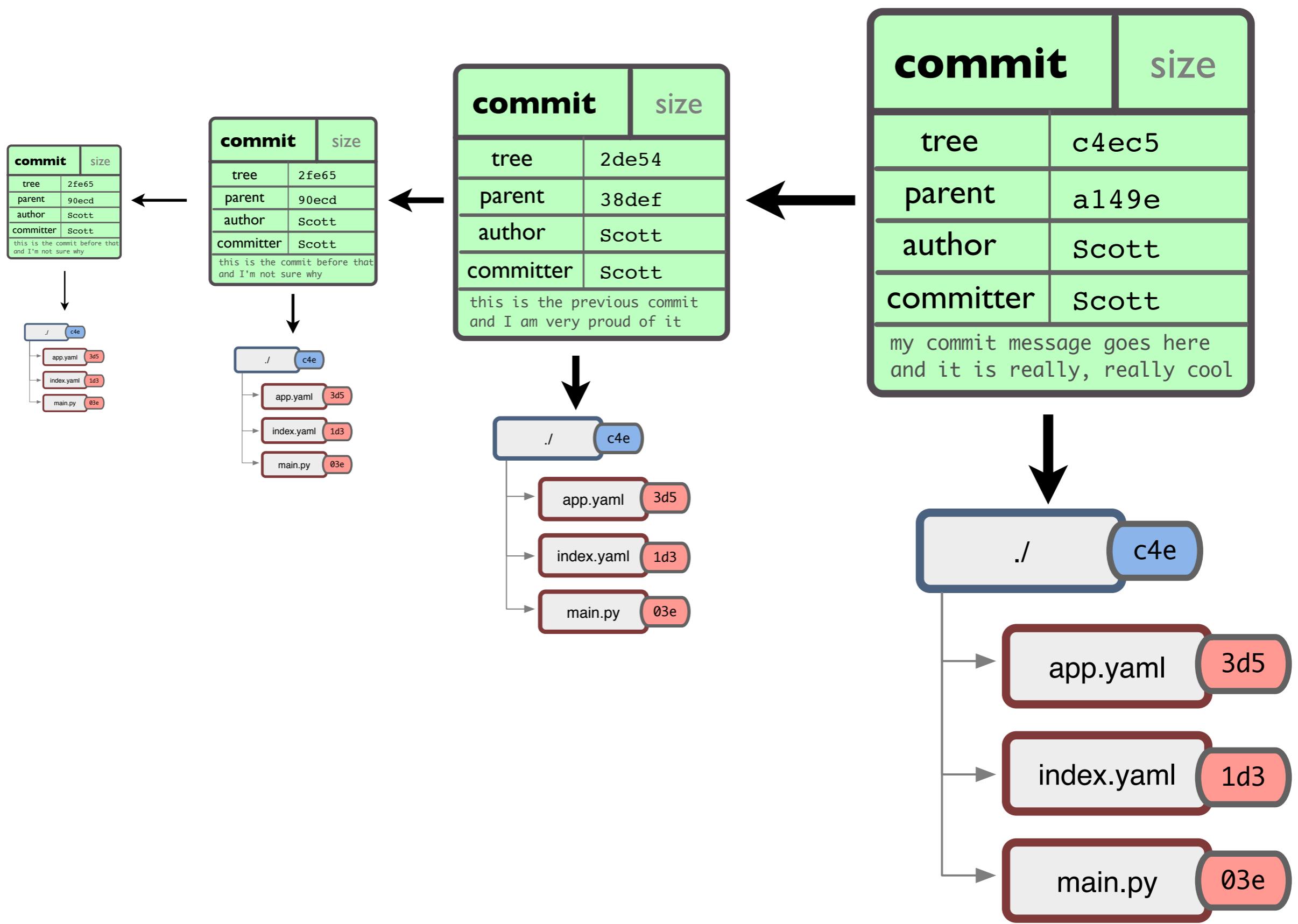
| commit | size |
|--|-------|
| tree | c4ec5 |
| parent | a149e |
| author | Scott |
| committer | Scott |
| my commit message goes here and it is really, really cool | |

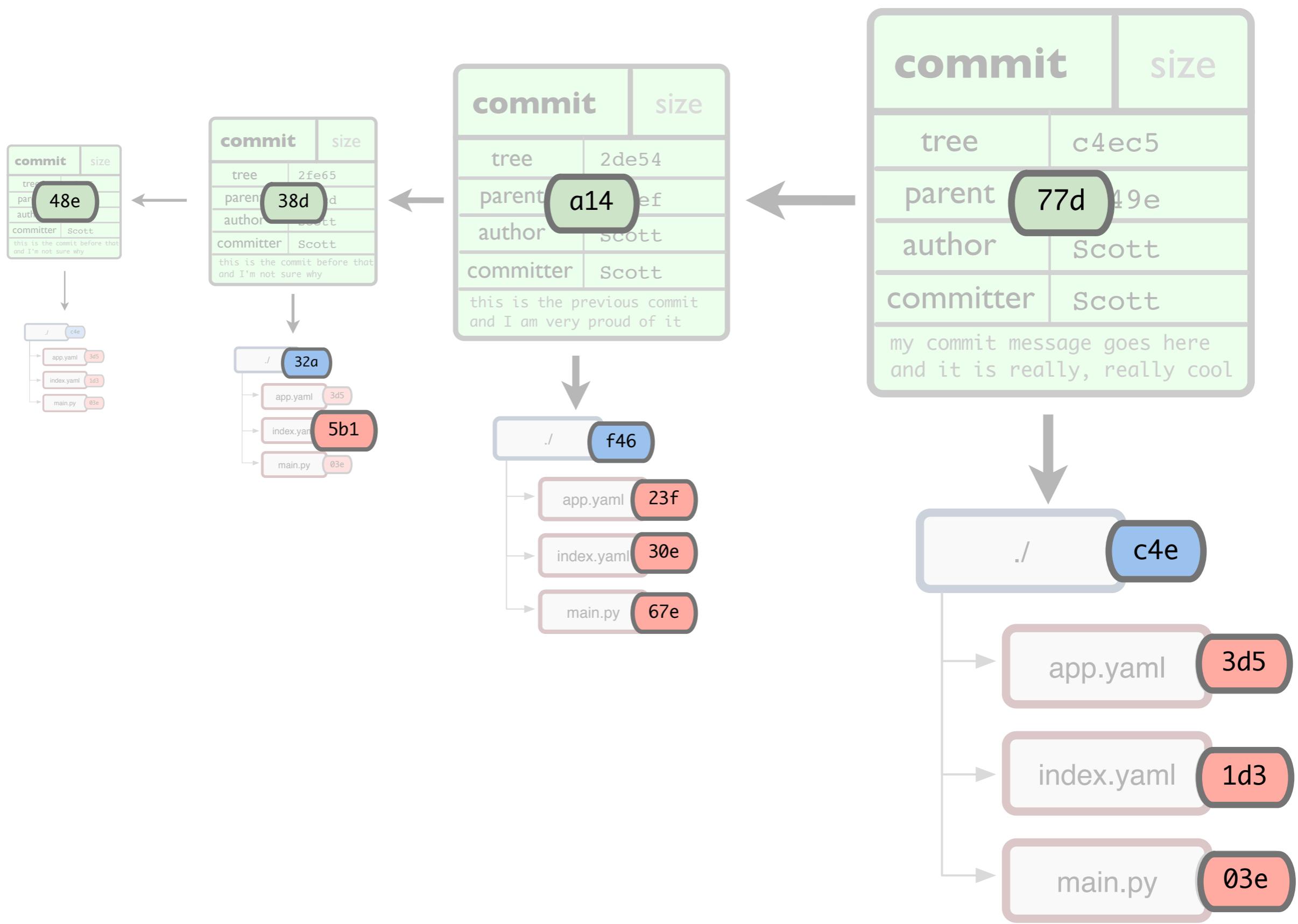


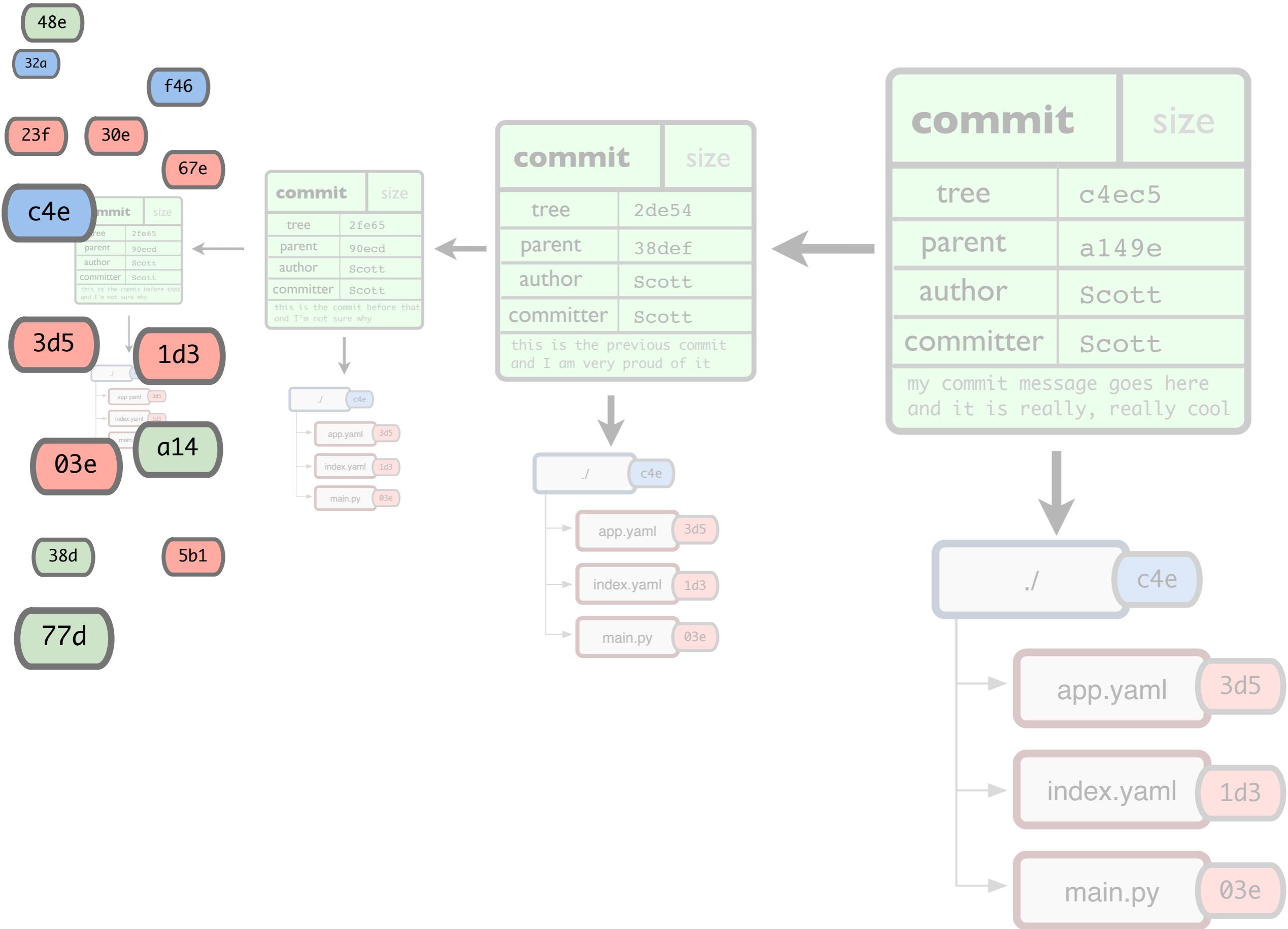
| commit | size |
|--|-------|
| tree | 2de54 |
| parent | 38def |
| author | Scott |
| committer | Scott |
| this is the previous commit and I am very proud of it | |

| commit | size |
|--|-------|
| tree | c4ec5 |
| parent | a149e |
| author | Scott |
| committer | Scott |
| my commit message goes here and it is really, really cool | |









Repository

| | | |
|-----|-----|-----|
| 5b1 | 32a | c36 |
| 1d3 | f46 | 3d4 |
| ffe | 6fe | ae6 |
| 38d | 23f | 03e |
| 254 | 30e | 5b1 |
| a14 | 67e | 1d3 |
| 3d5 | 735 | d23 |
| c4e | c4e | 48e |
| 77d | de3 | 2d3 |

Repository

| | | |
|-----|-----|-----|
| 5b1 | 32a | c36 |
| 1d3 | f46 | 3d4 |
| ffe | 6fe | ae6 |
| 38d | 23f | 03e |
| 254 | 30e | 5b1 |
| a14 | 67e | 1d3 |
| 3d5 | 735 | d23 |
| c4e | c4e | 48e |
| 77d | de3 | 2d3 |

git checkout branch

Repository

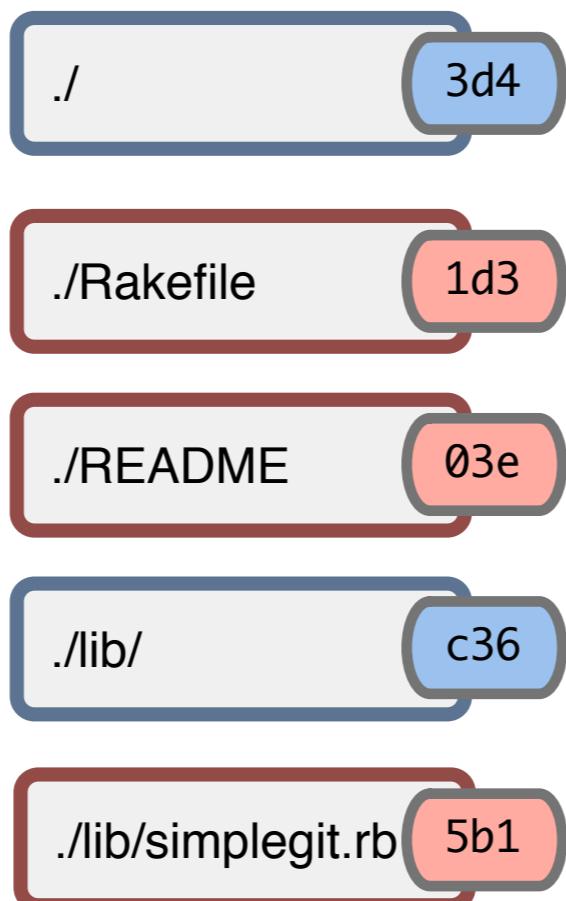


git checkout branch

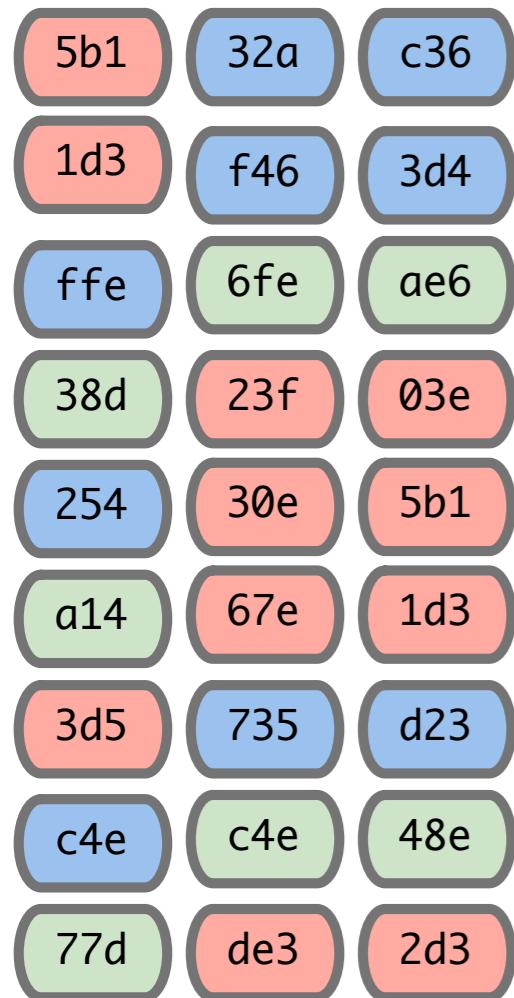
Repository



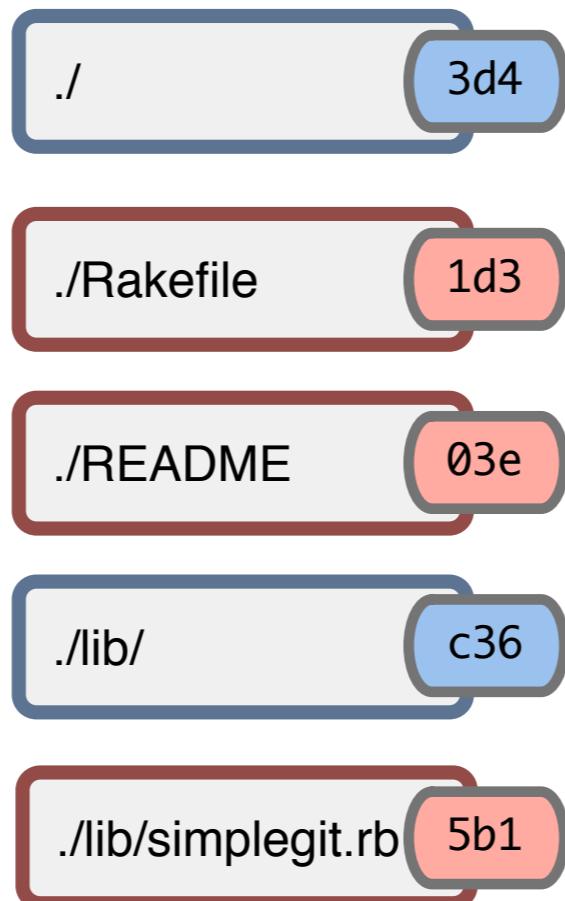
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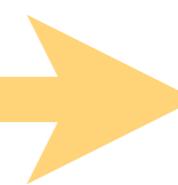
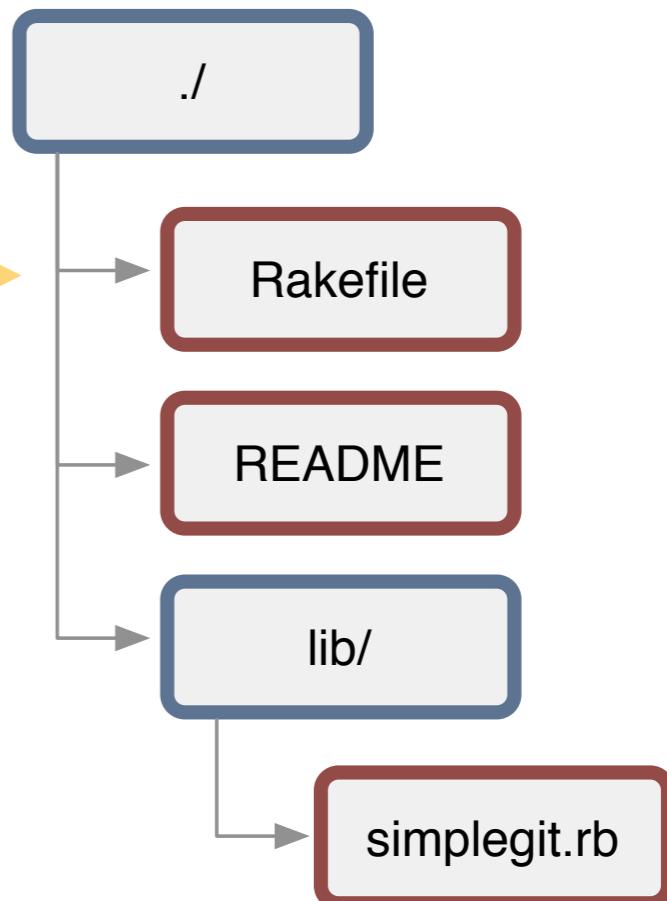
Repository



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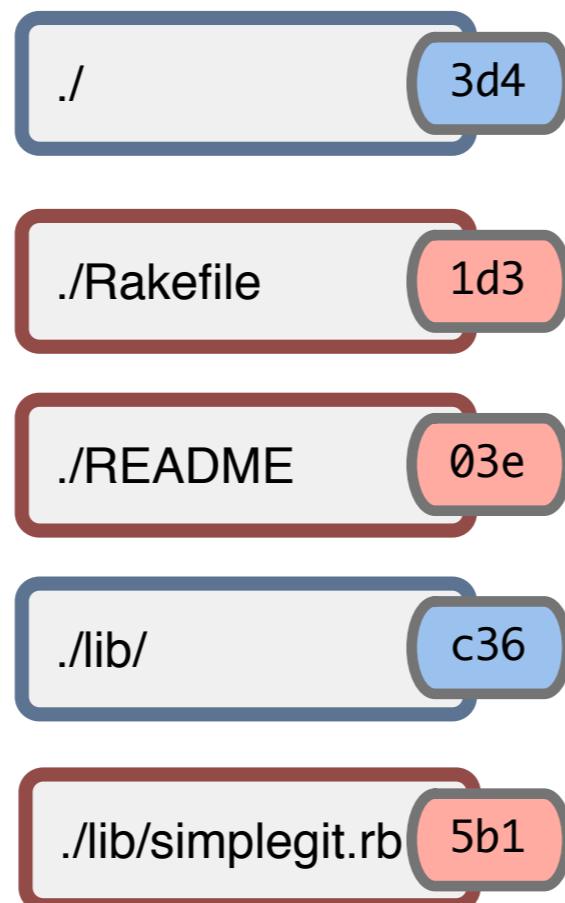
Working Directory



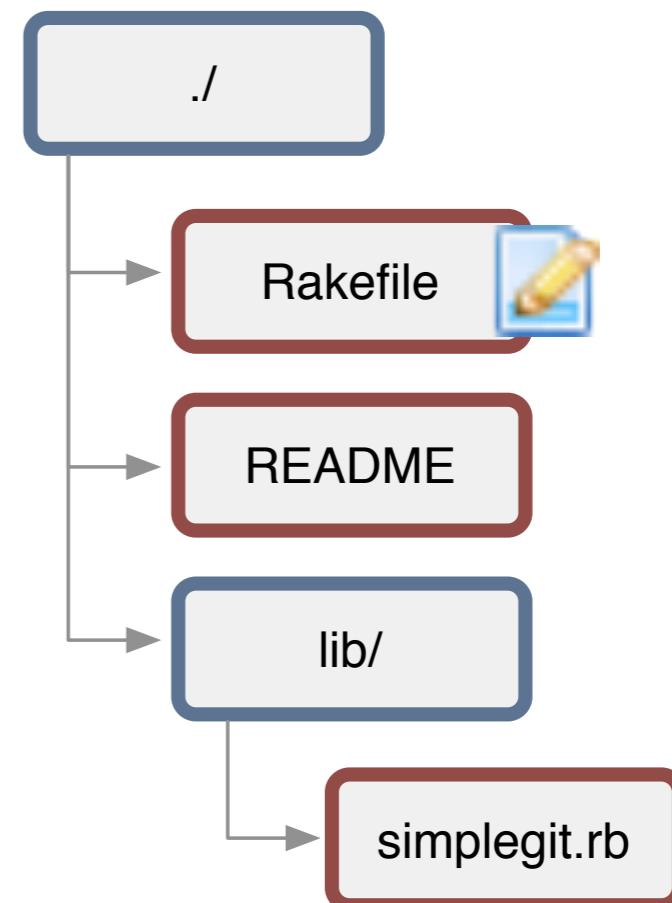
Repository



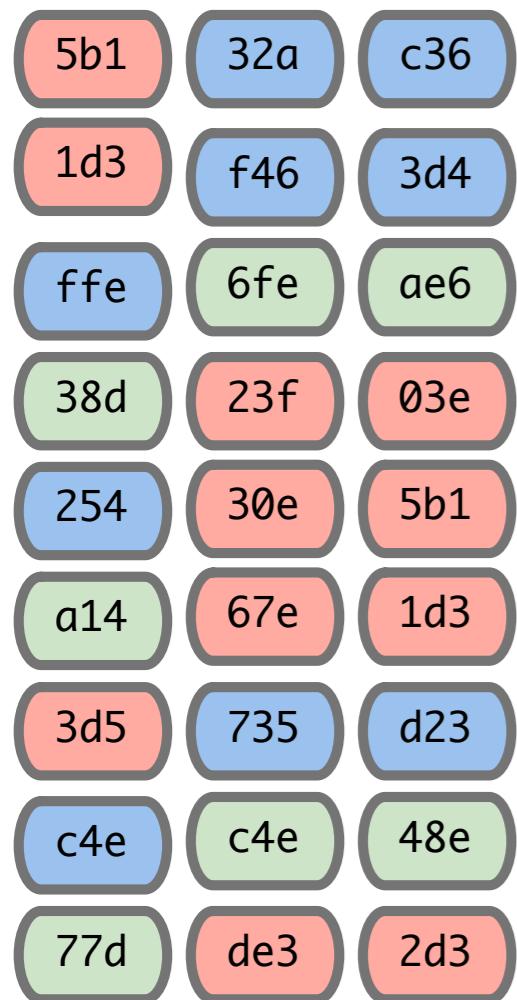
Index



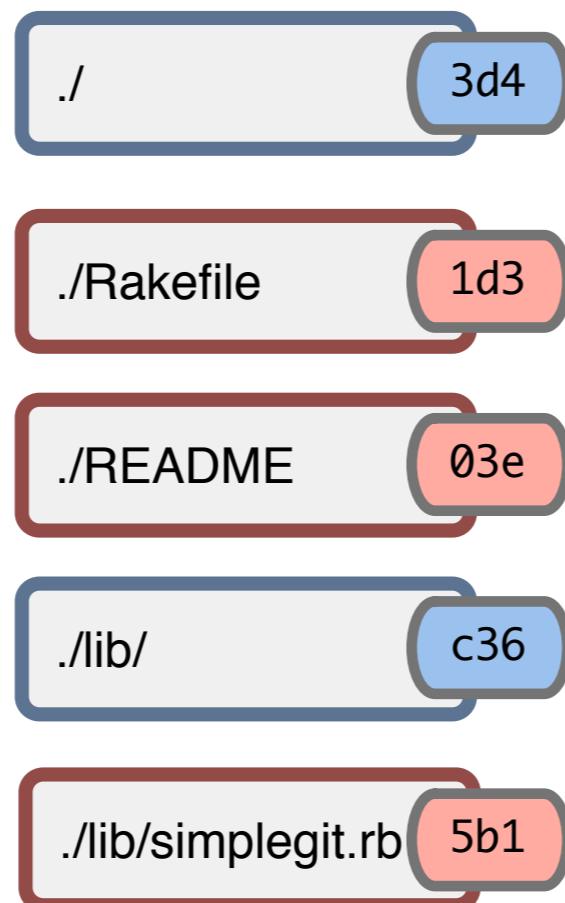
Working Directory



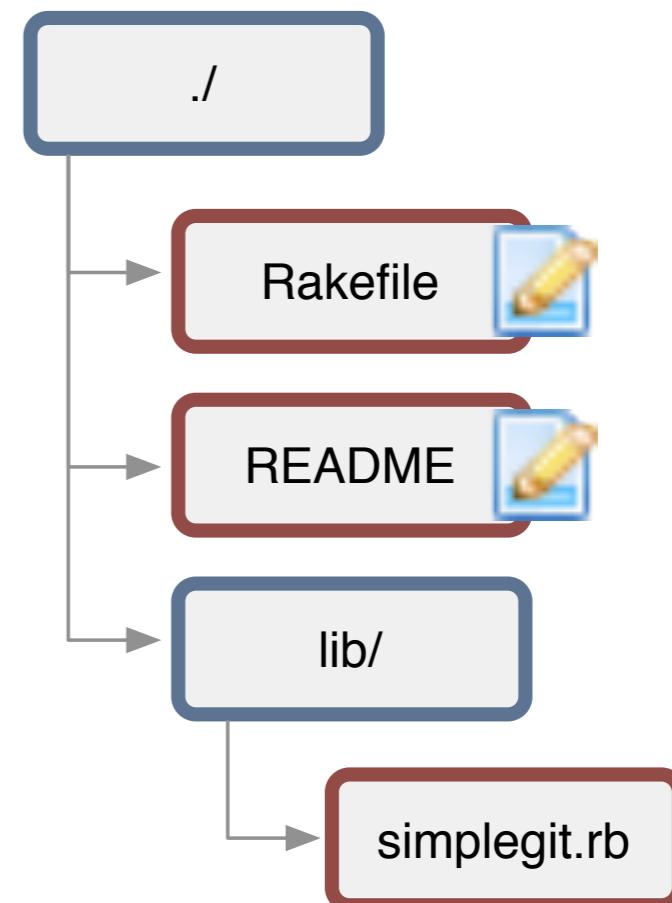
Repository



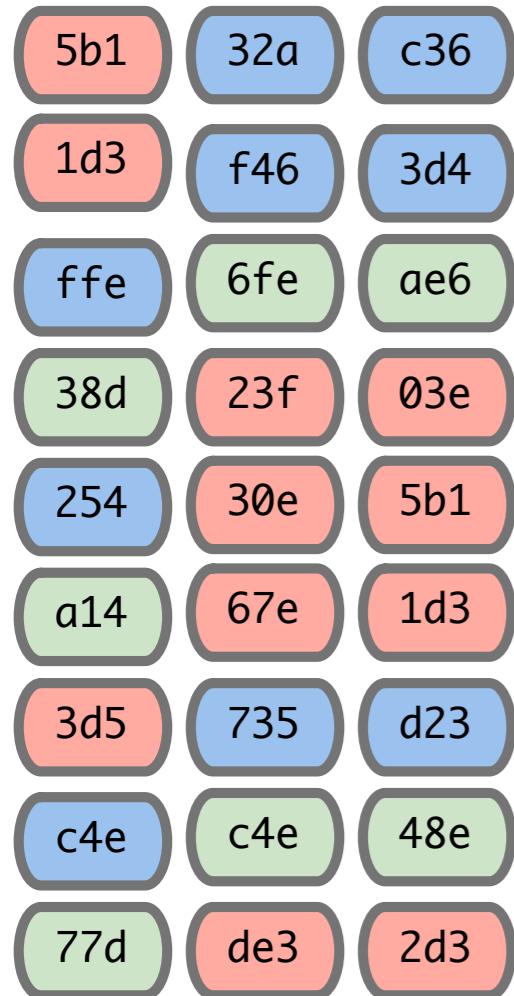
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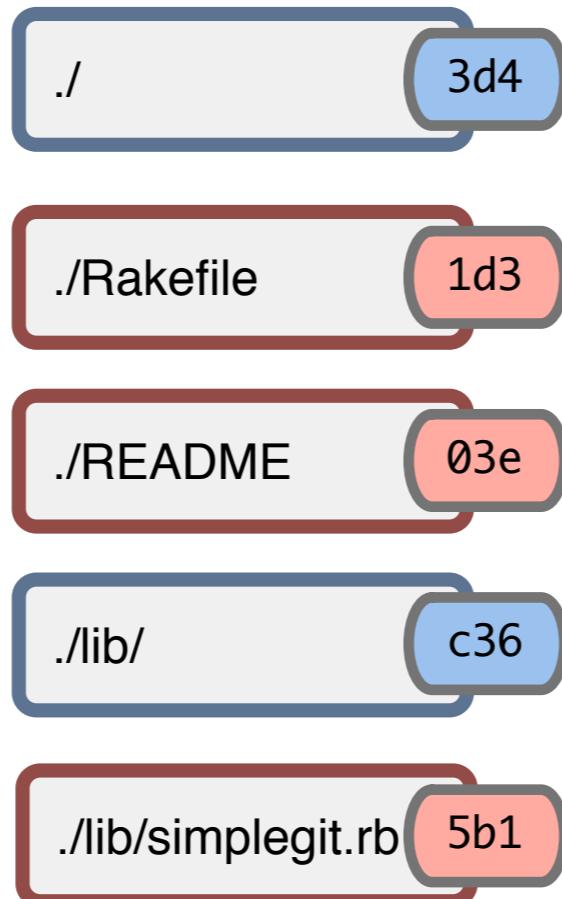
Working Directory



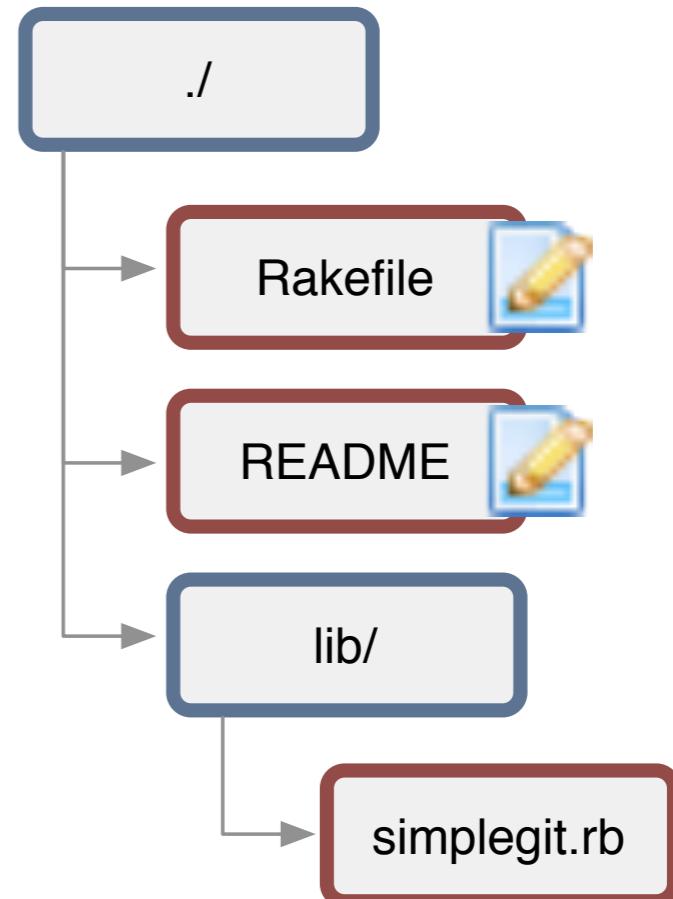
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Index

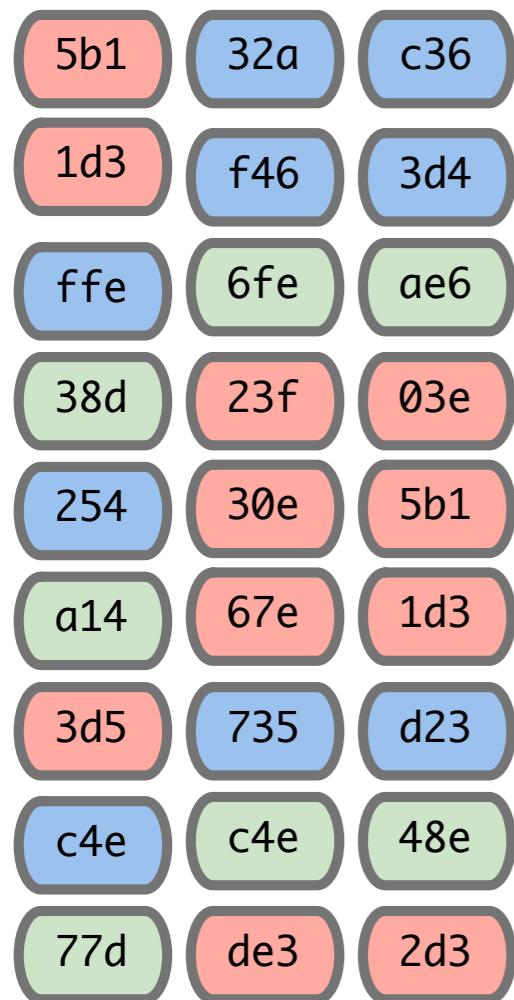


Working Directory

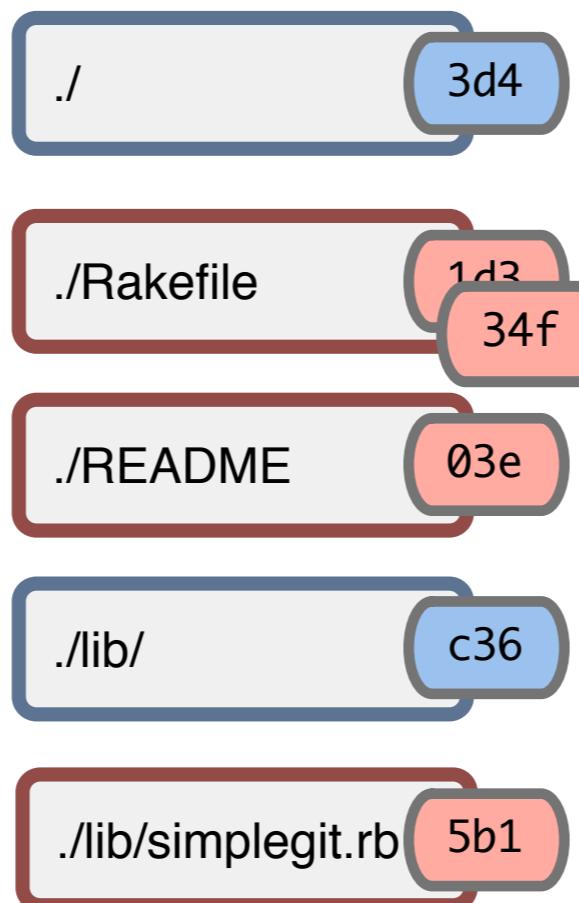


git add

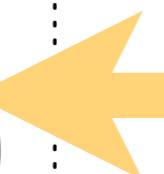
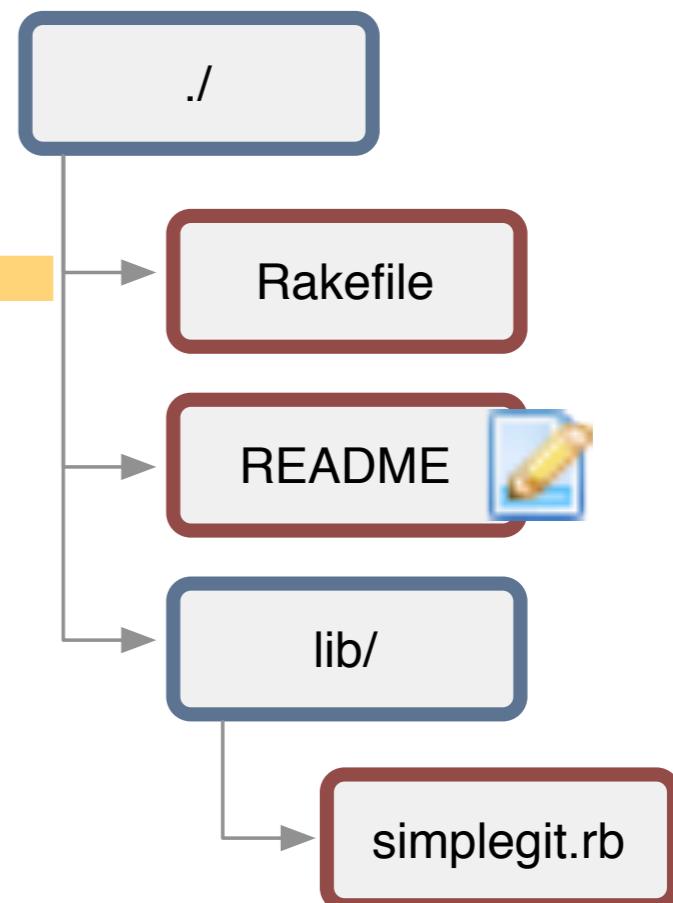
Repository



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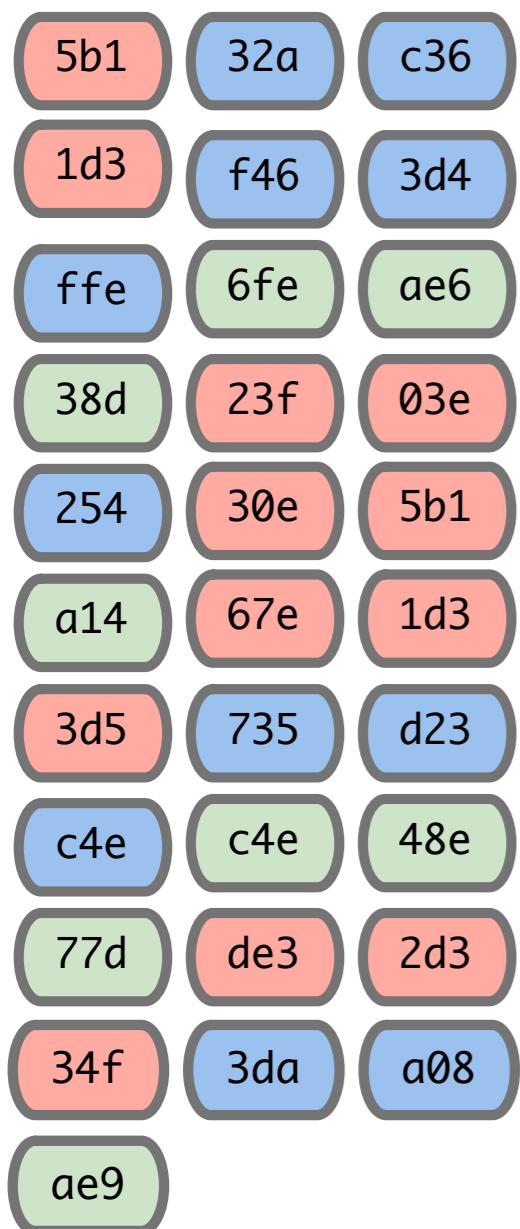


Working Directory

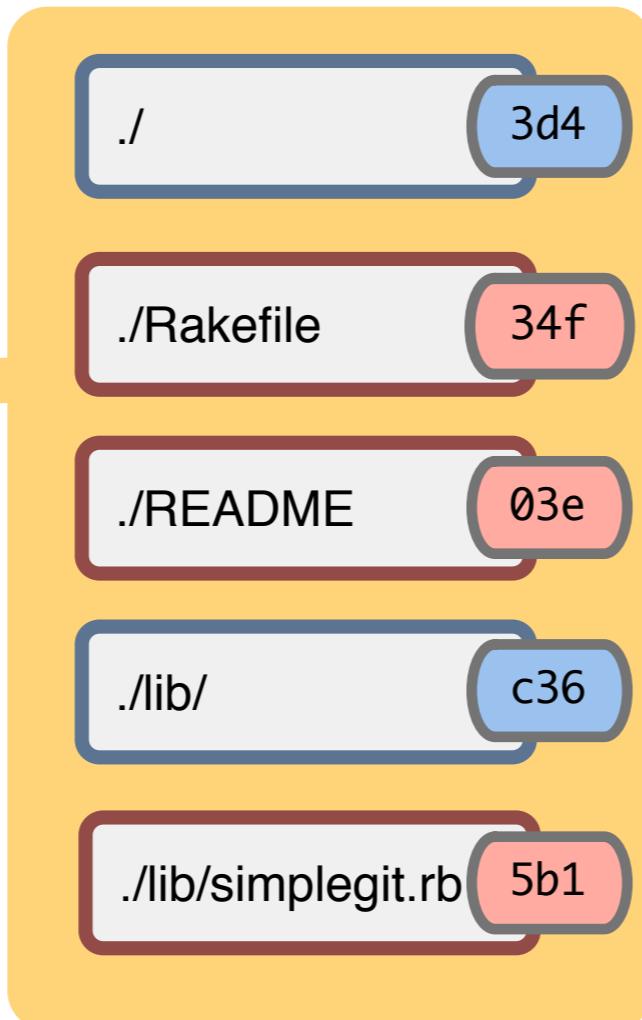


git add

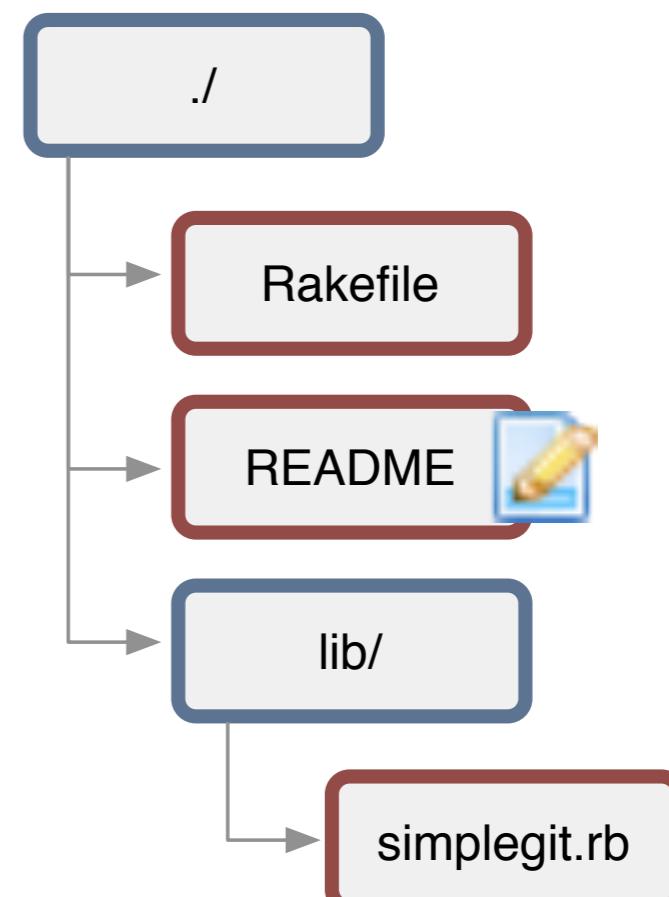
Repository



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Working Directory

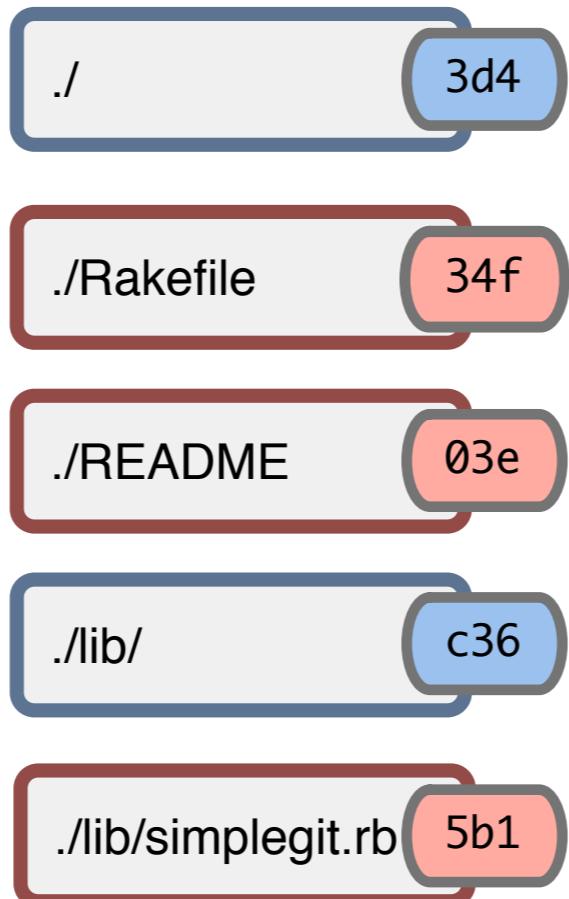


git commit

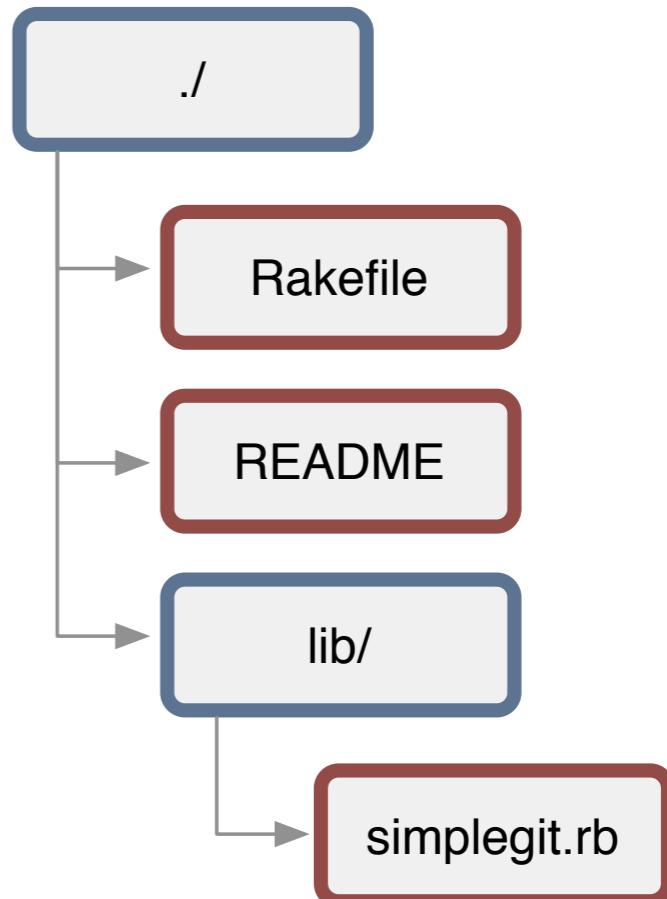
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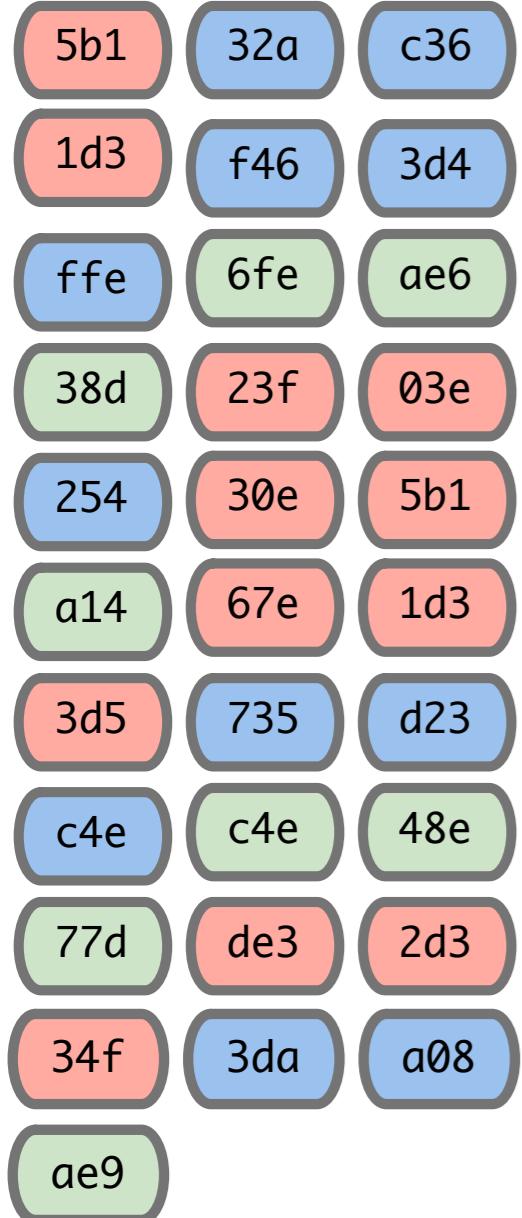
Index



Working Directory



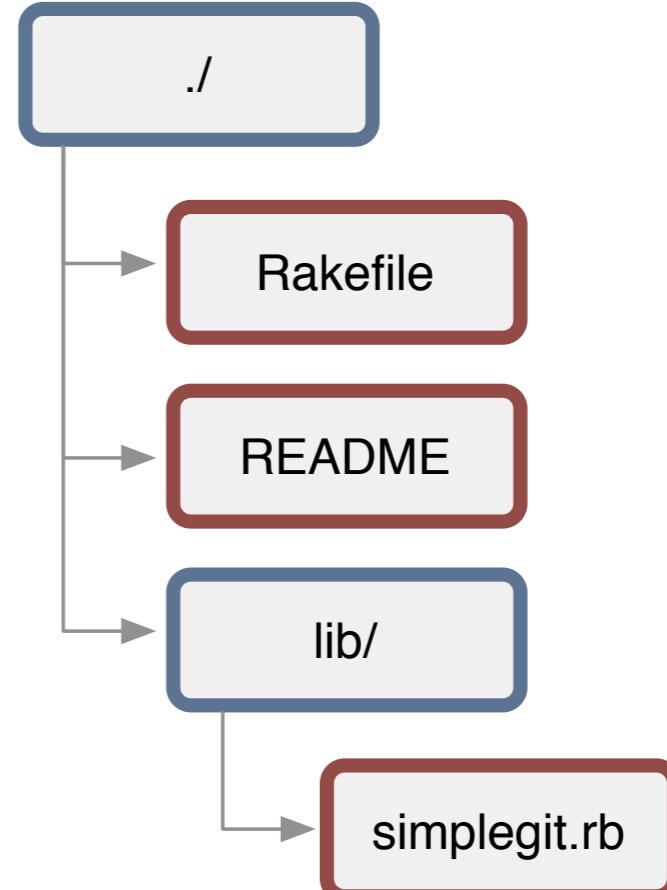
Repository



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Working Directory

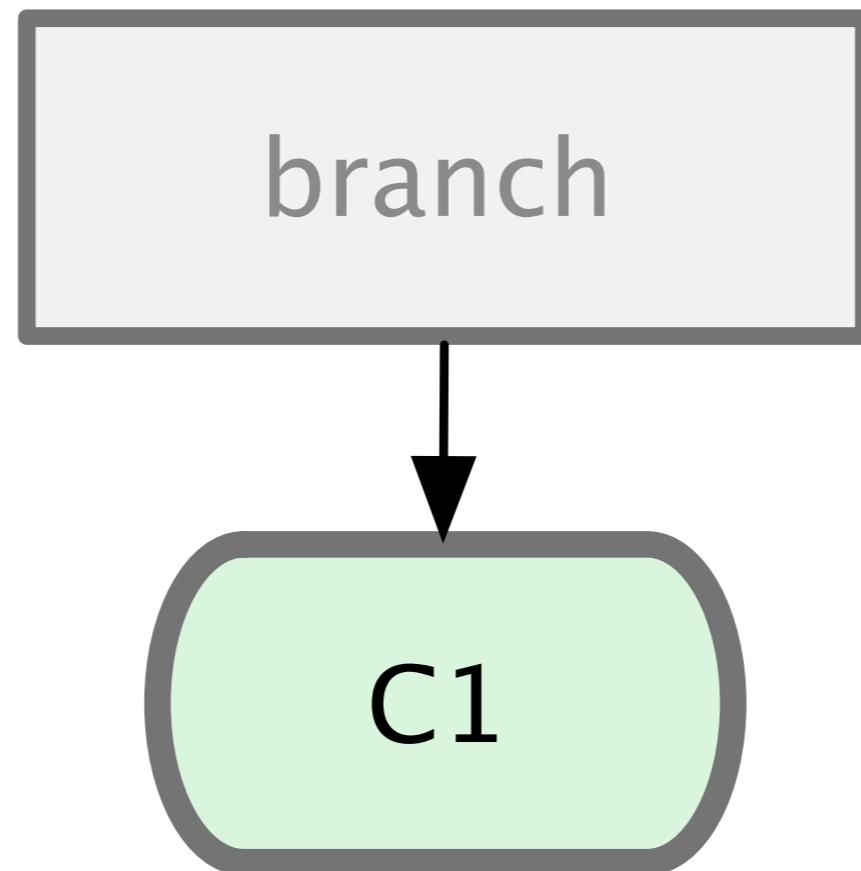


Branching and Merging

branches

branches

lightweight, movable
pointers to a commit



branching

git branch

git checkout

Commit
98ca9

c3d README.txt
f13 hello.c

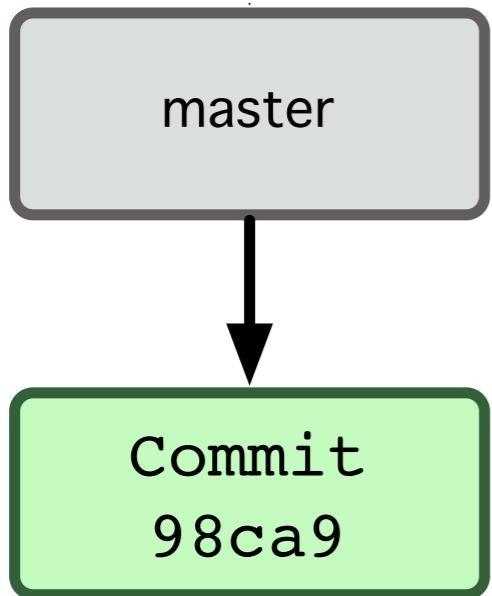
This is Scott's
Hello project.

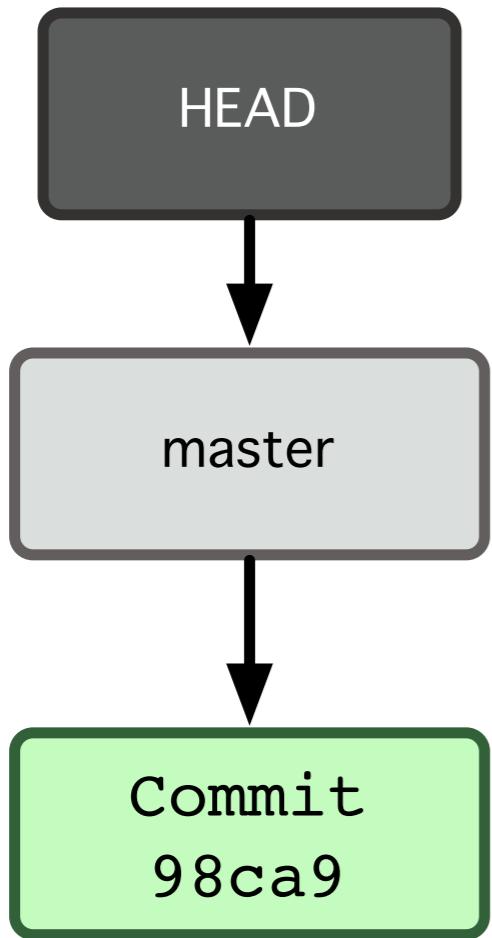
Licensed under
GPL.

```
#include<stdio.h>

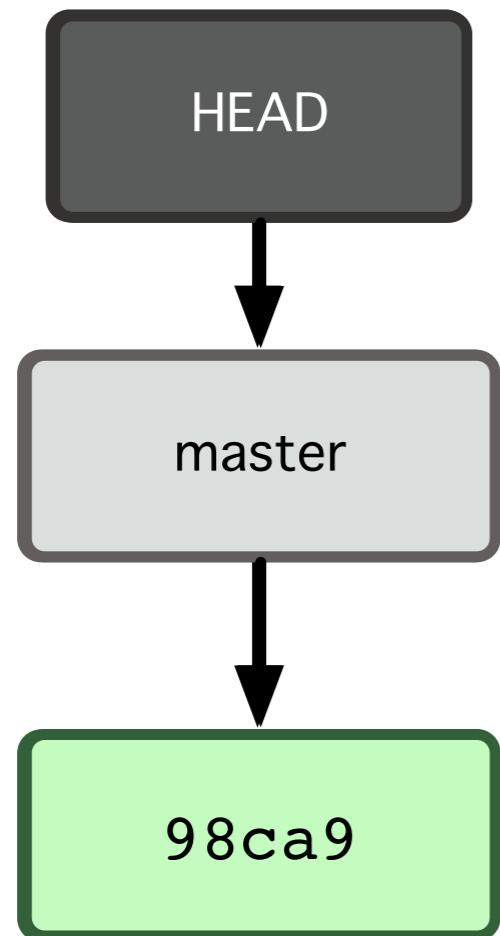
int main(void) {
    printf("Hello\n");
    return 0;
}
```

Commit
98ca9

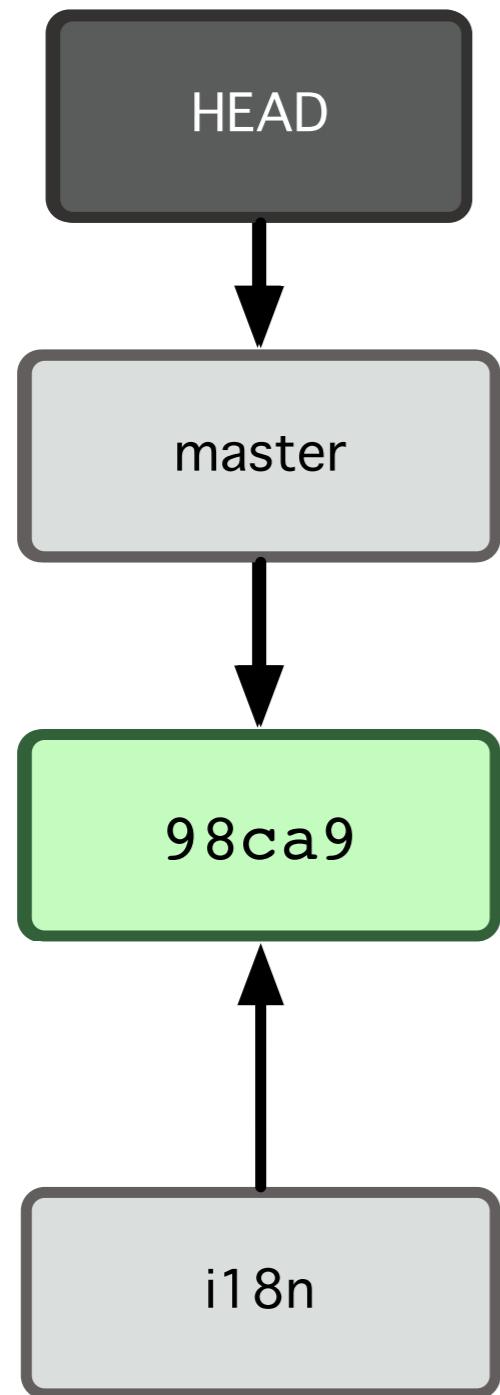




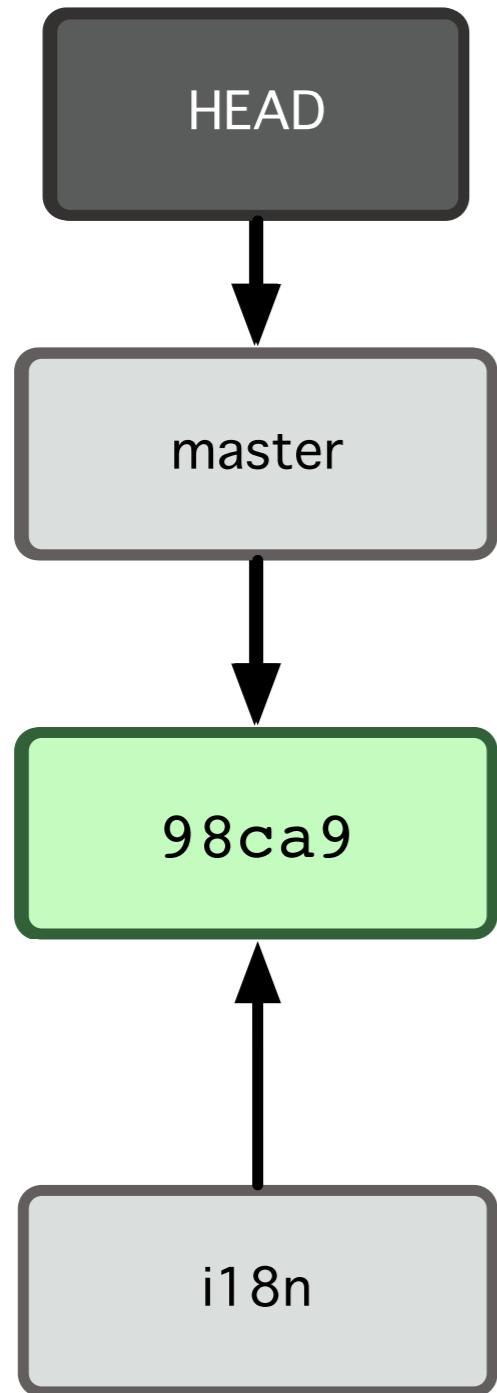
git branch i18n



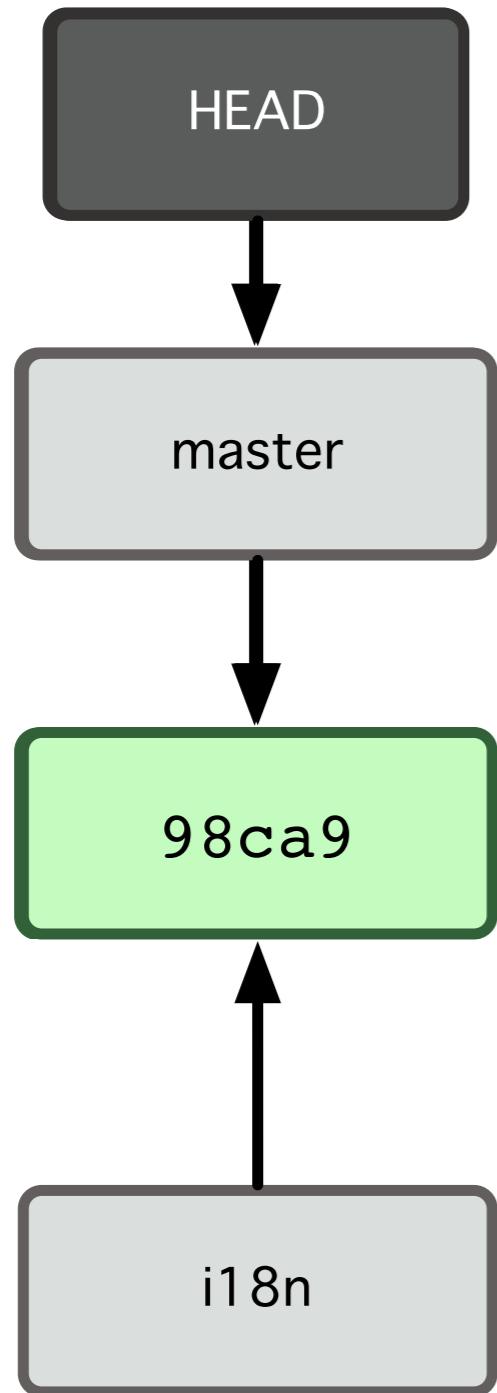
git branch i18n



git branch



git branch



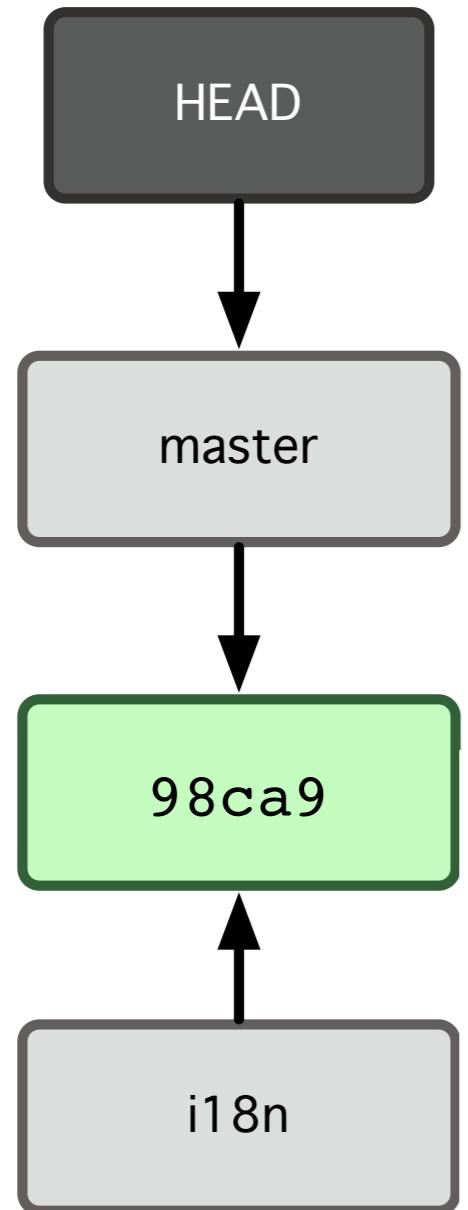
```
$ git branch  
* master  
  i18n
```

```
$ find .git/refs
```

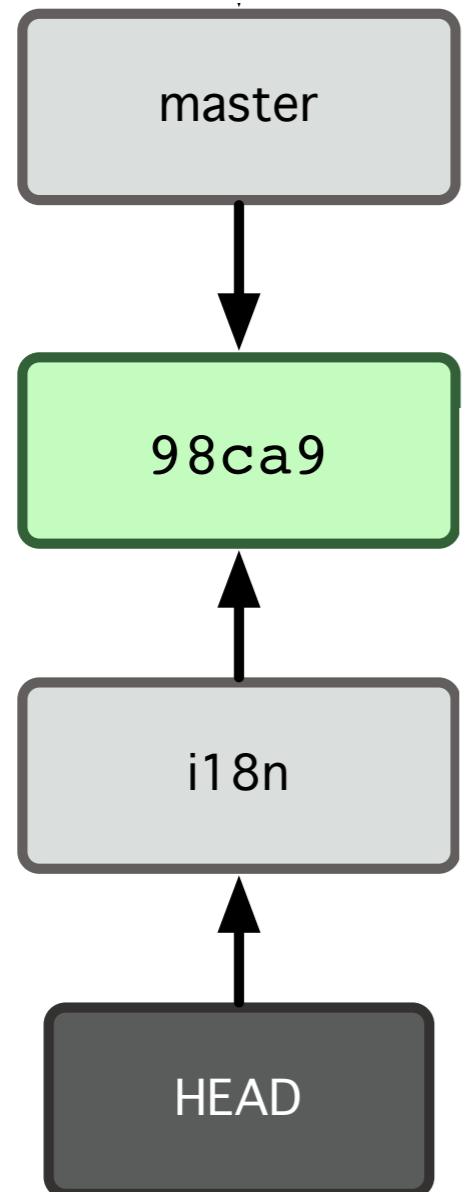
```
$ find .git/refs  
.git/refs  
.git/refs/heads  
.git/refs/heads/master  
.git/refs/heads/i18n
```

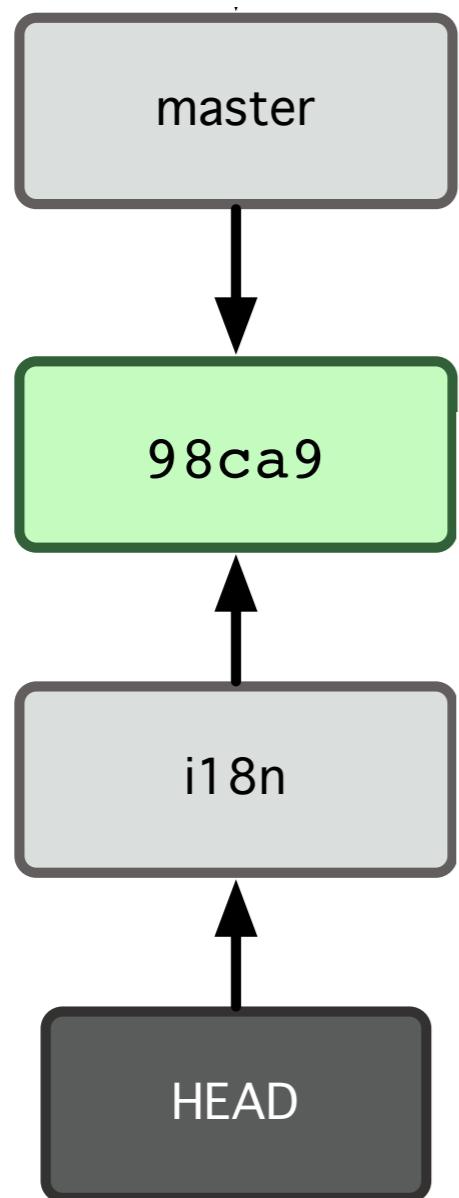
```
$ find .git/refs  
.git/refs  
.git/refs/heads  
.  
git/refs/heads/master  
.git/refs/heads/i18n
```

```
$ cat .git/refs/heads/master  
98ca909dc9e38af91565082bdf93577ff555489e
```

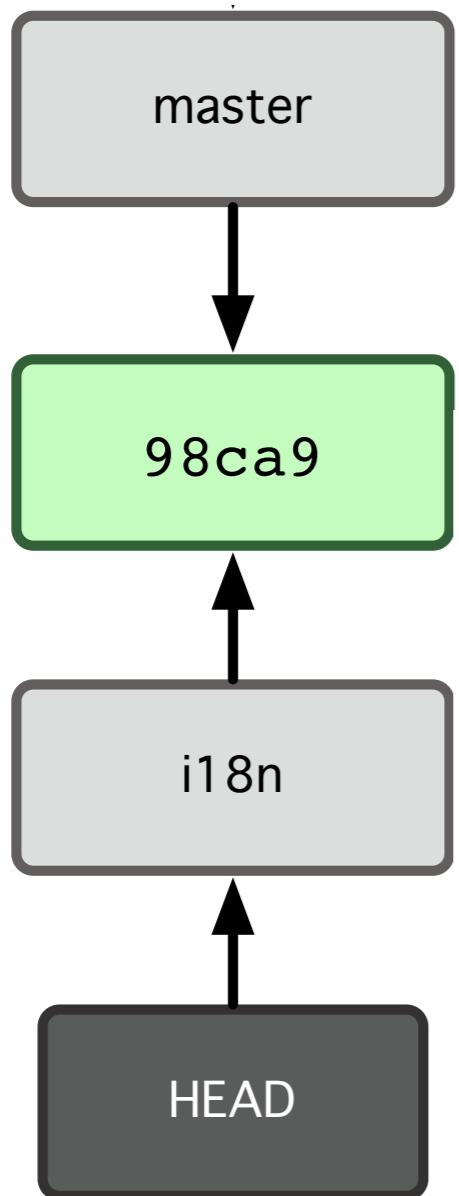


git checkout i18n

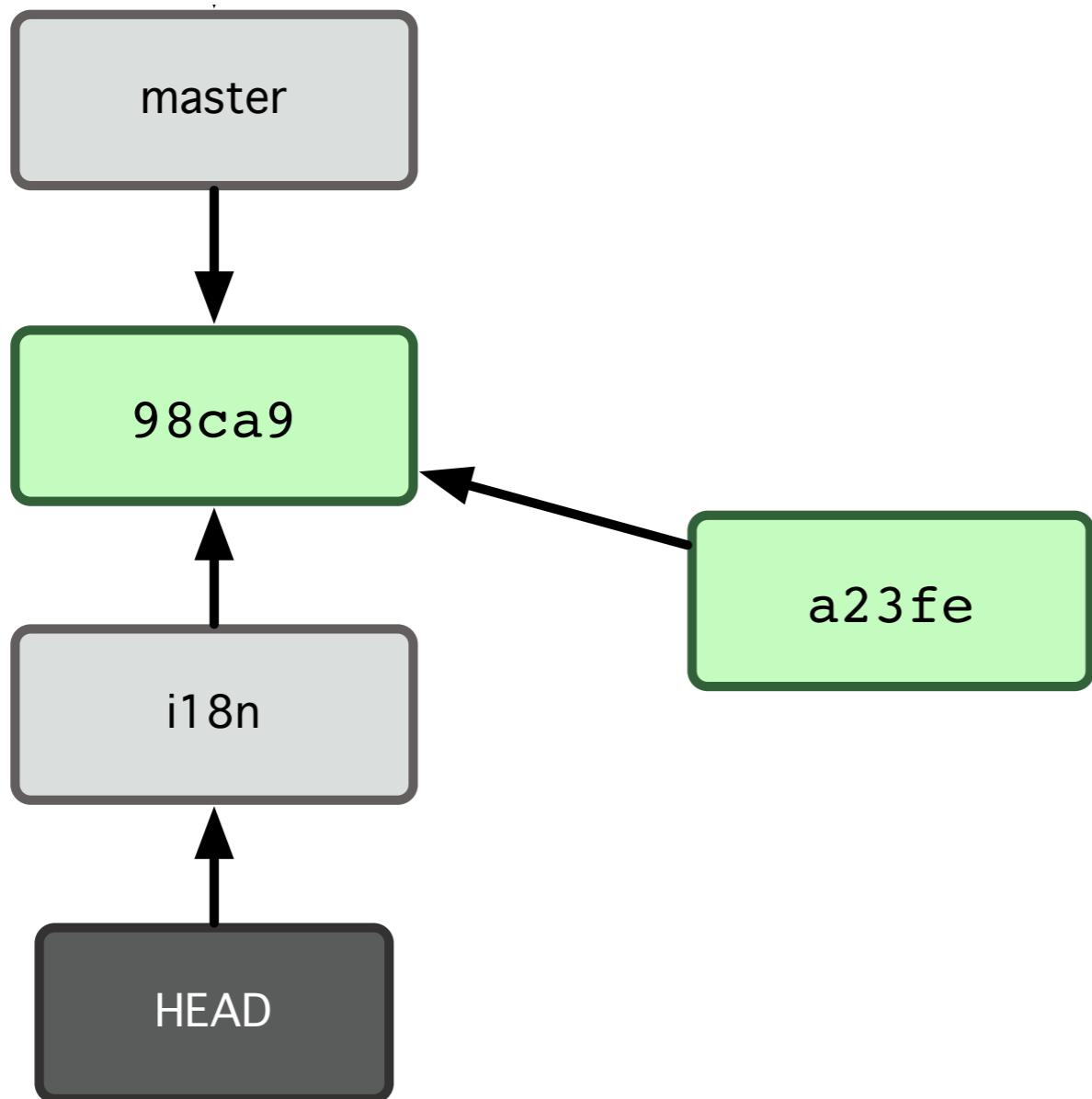




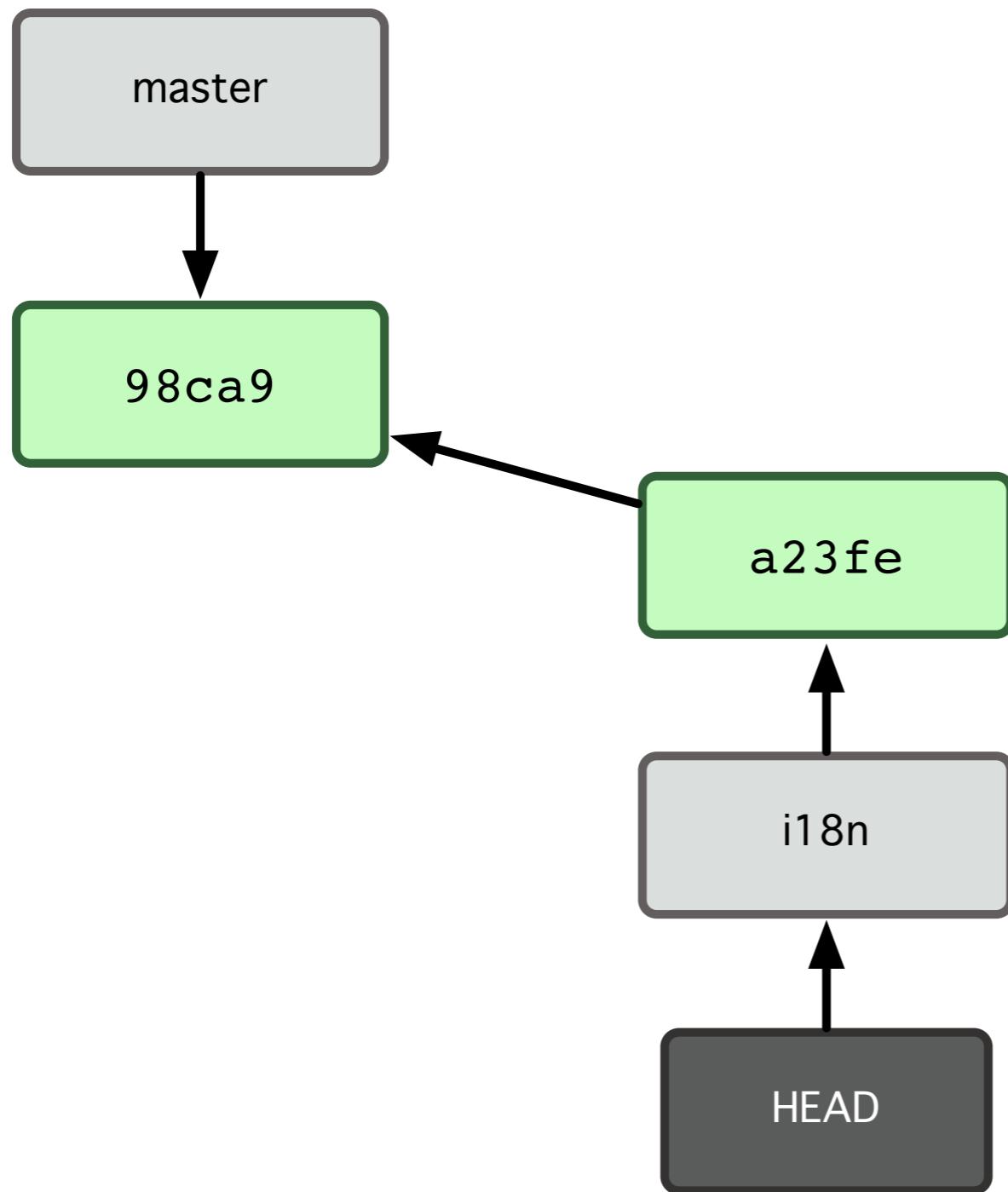
git commit

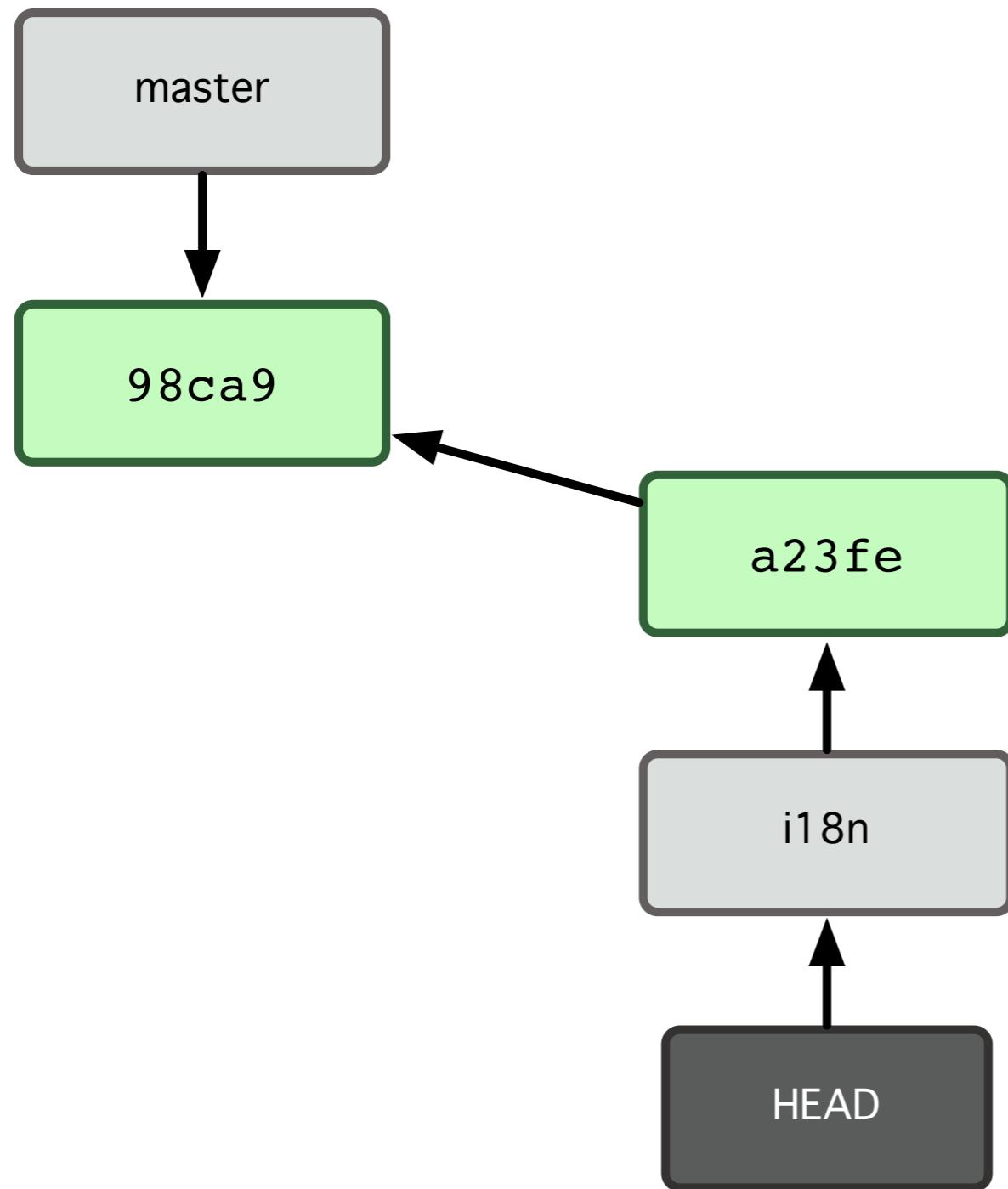


git commit

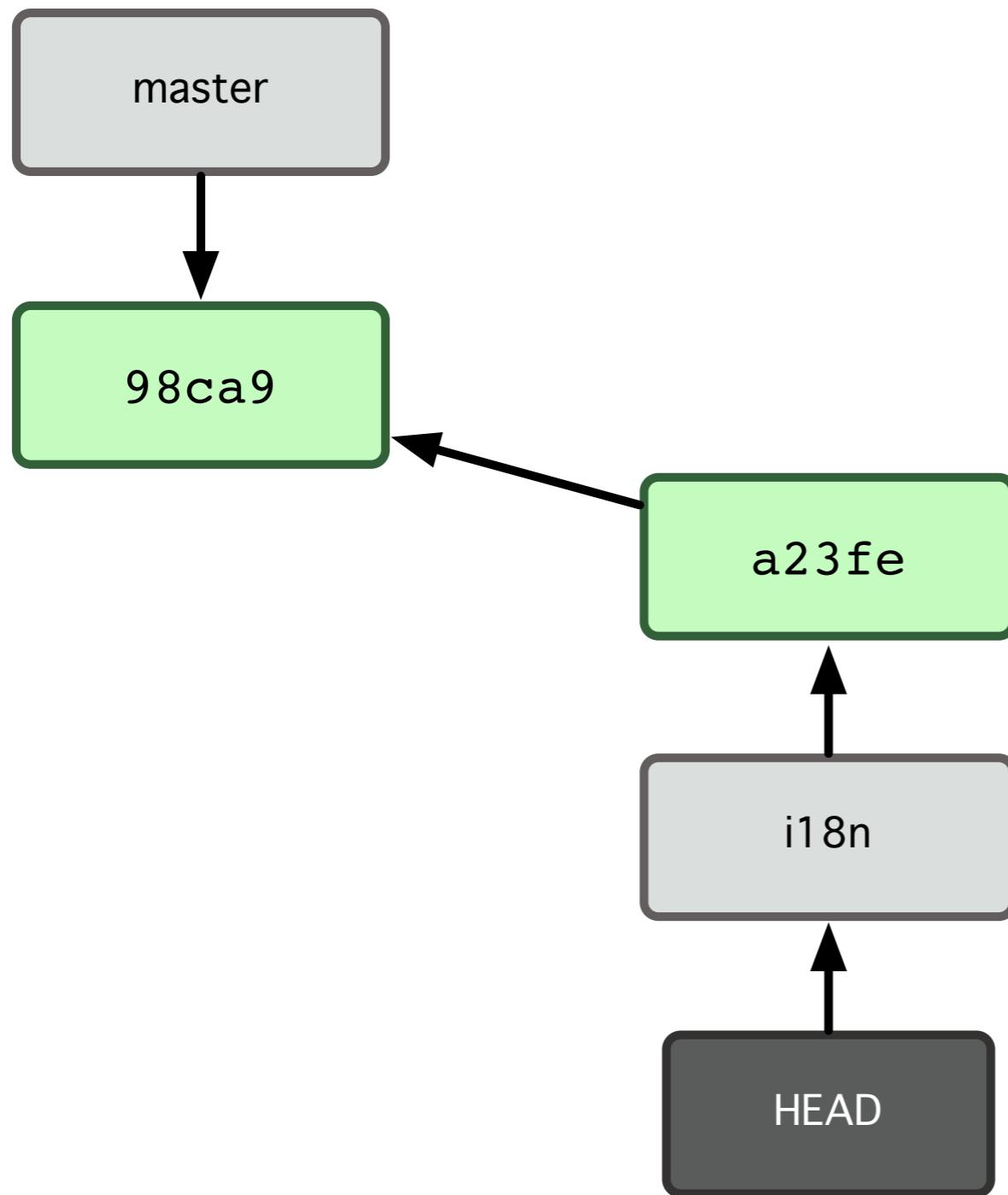


git commit

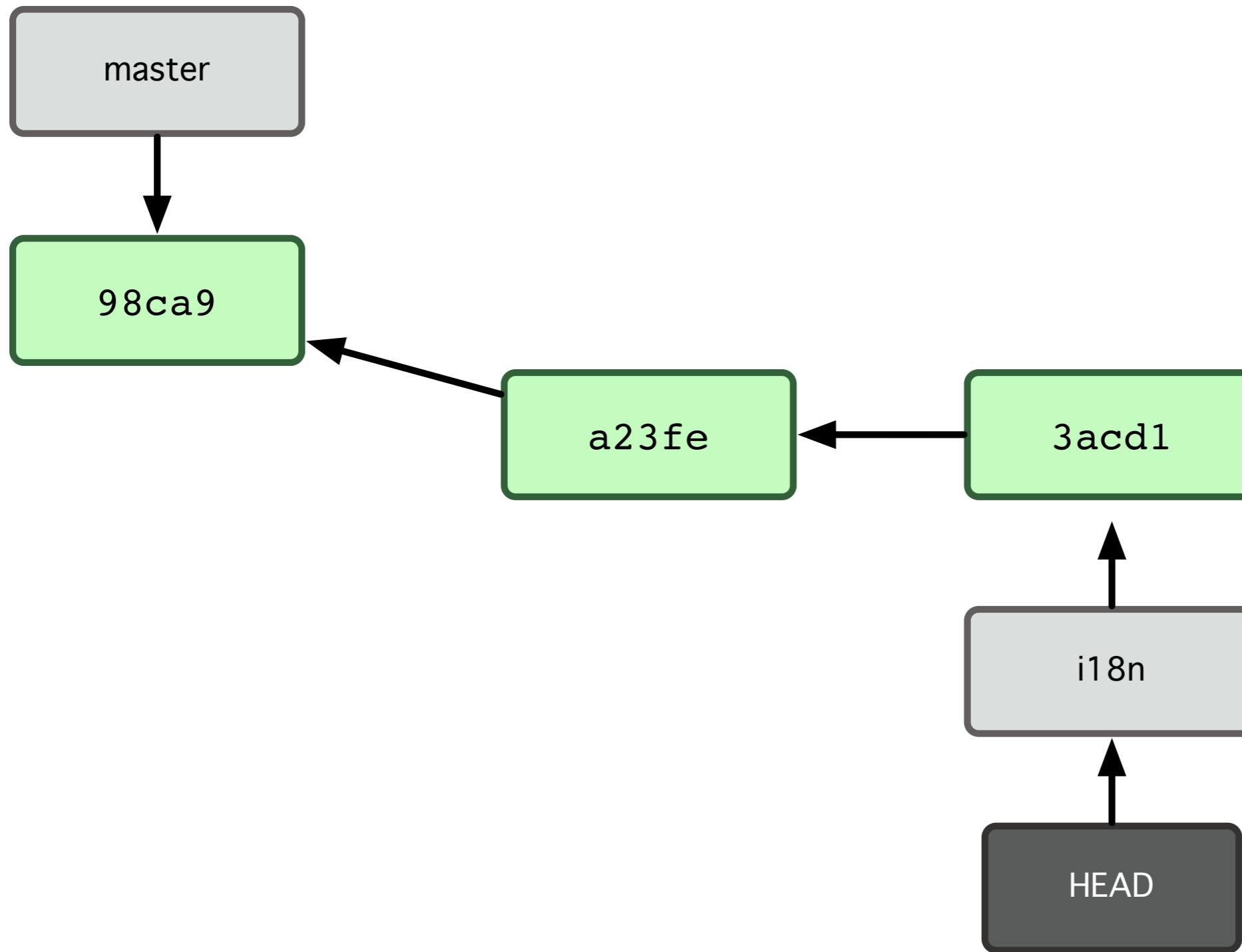


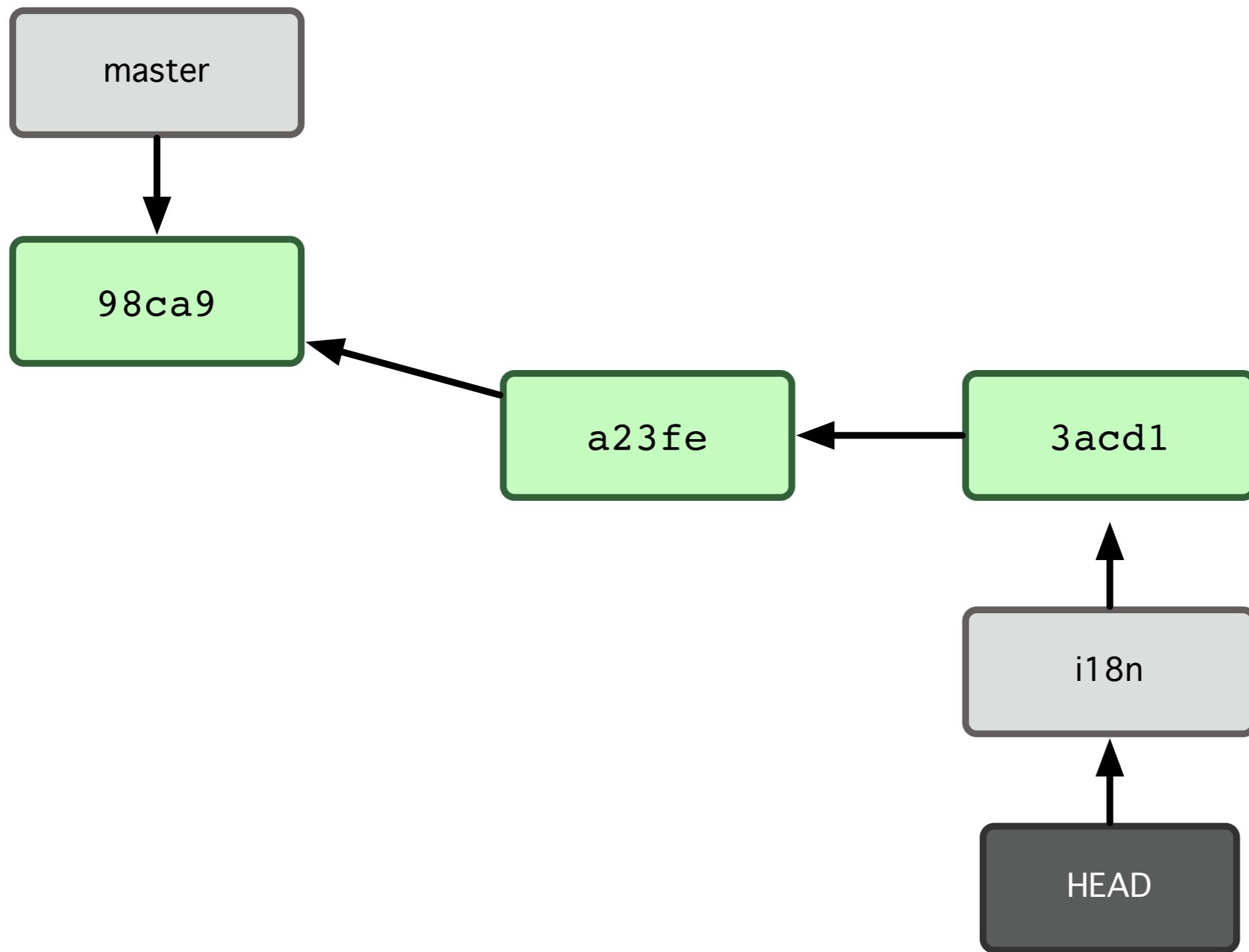


git commit

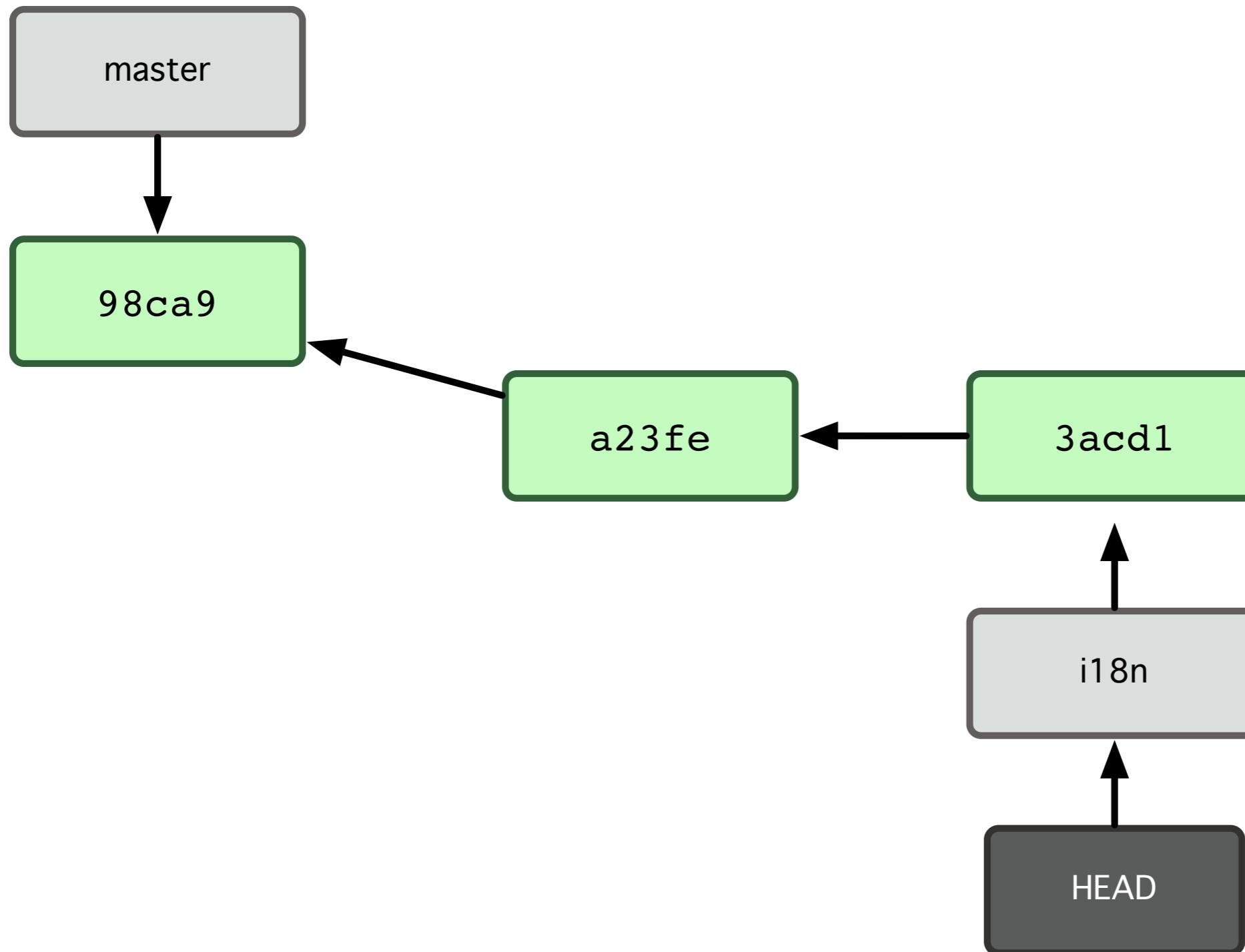


git commit

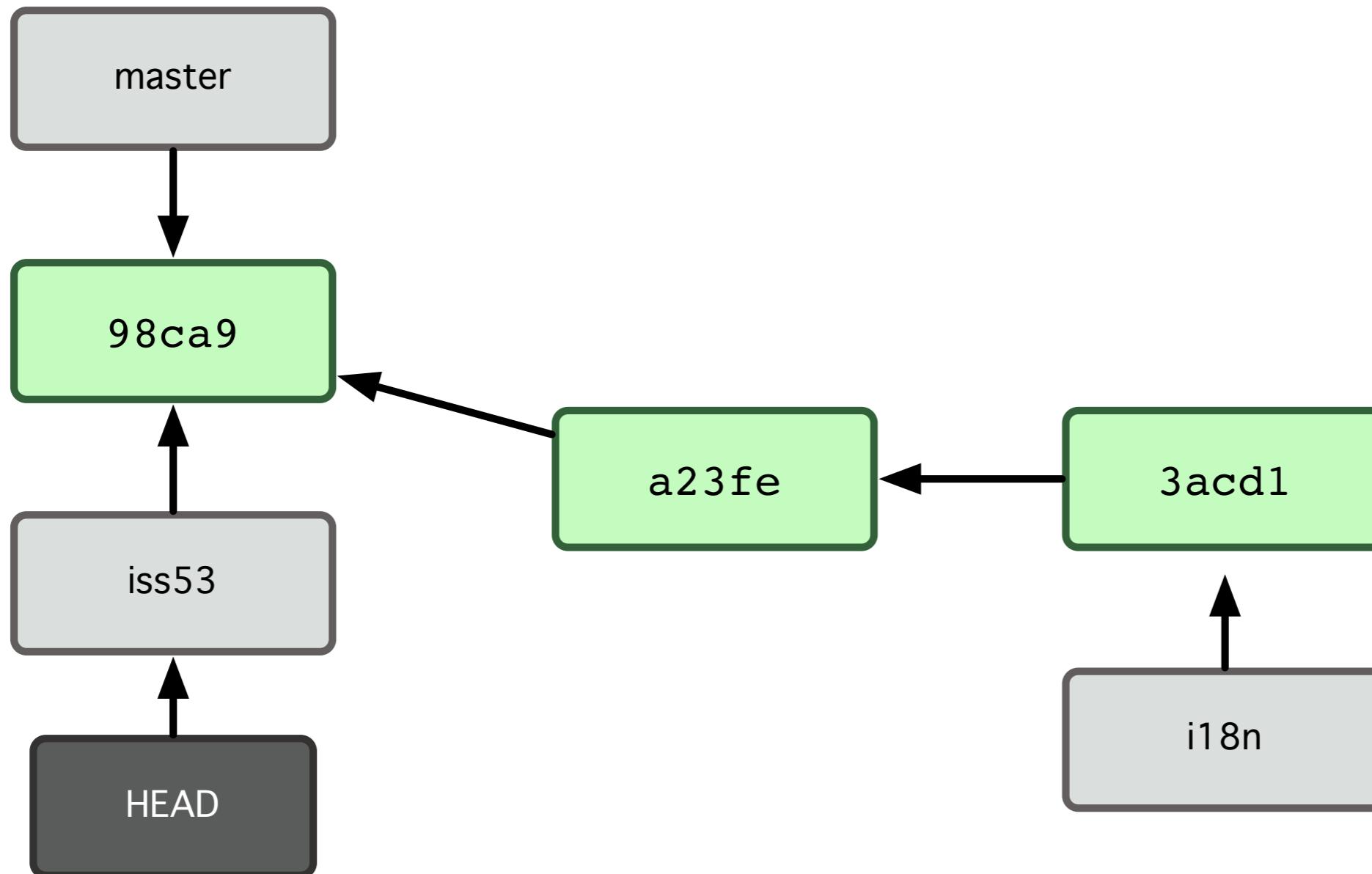




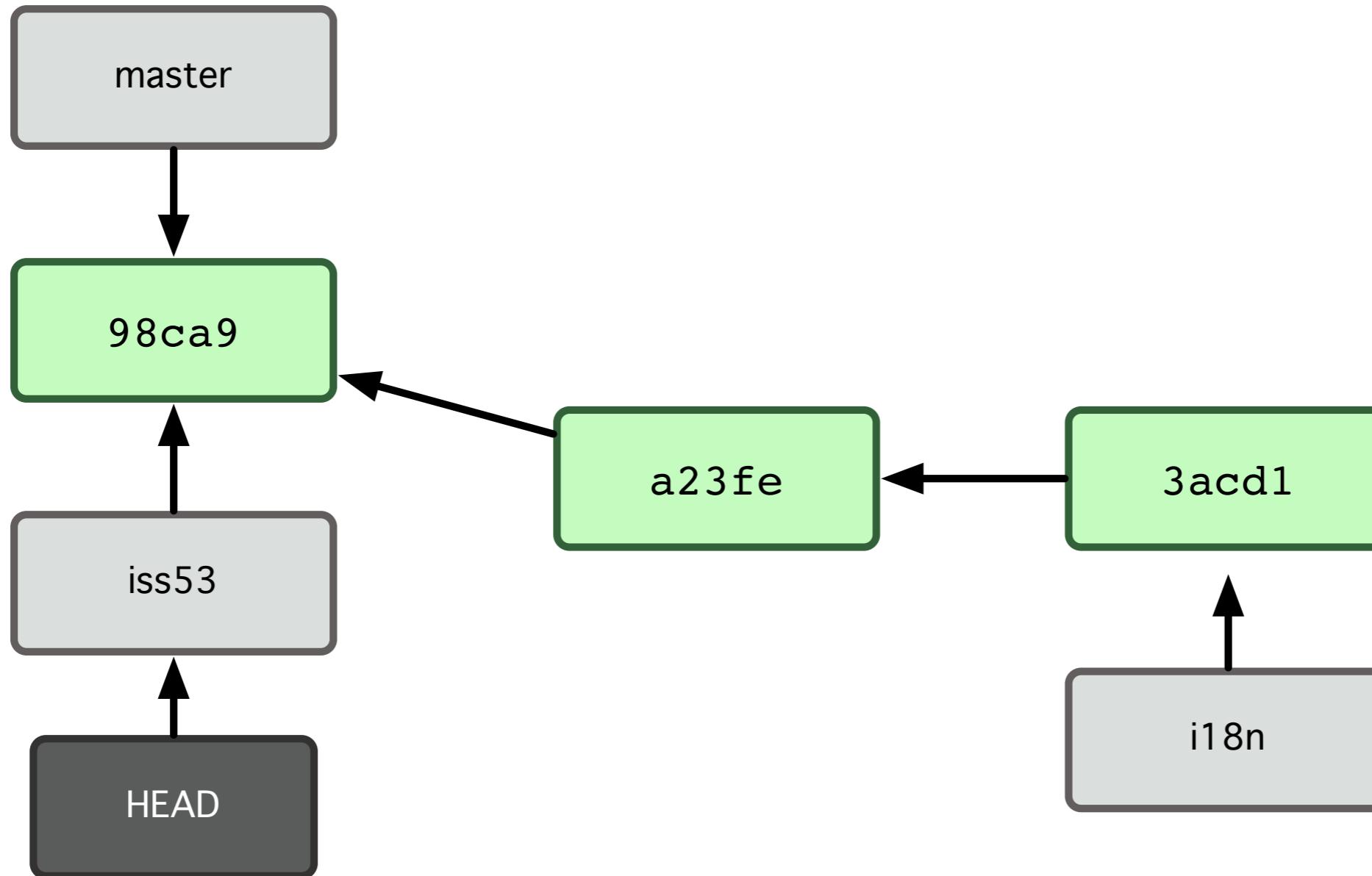
```
git checkout -b iss53 master
```



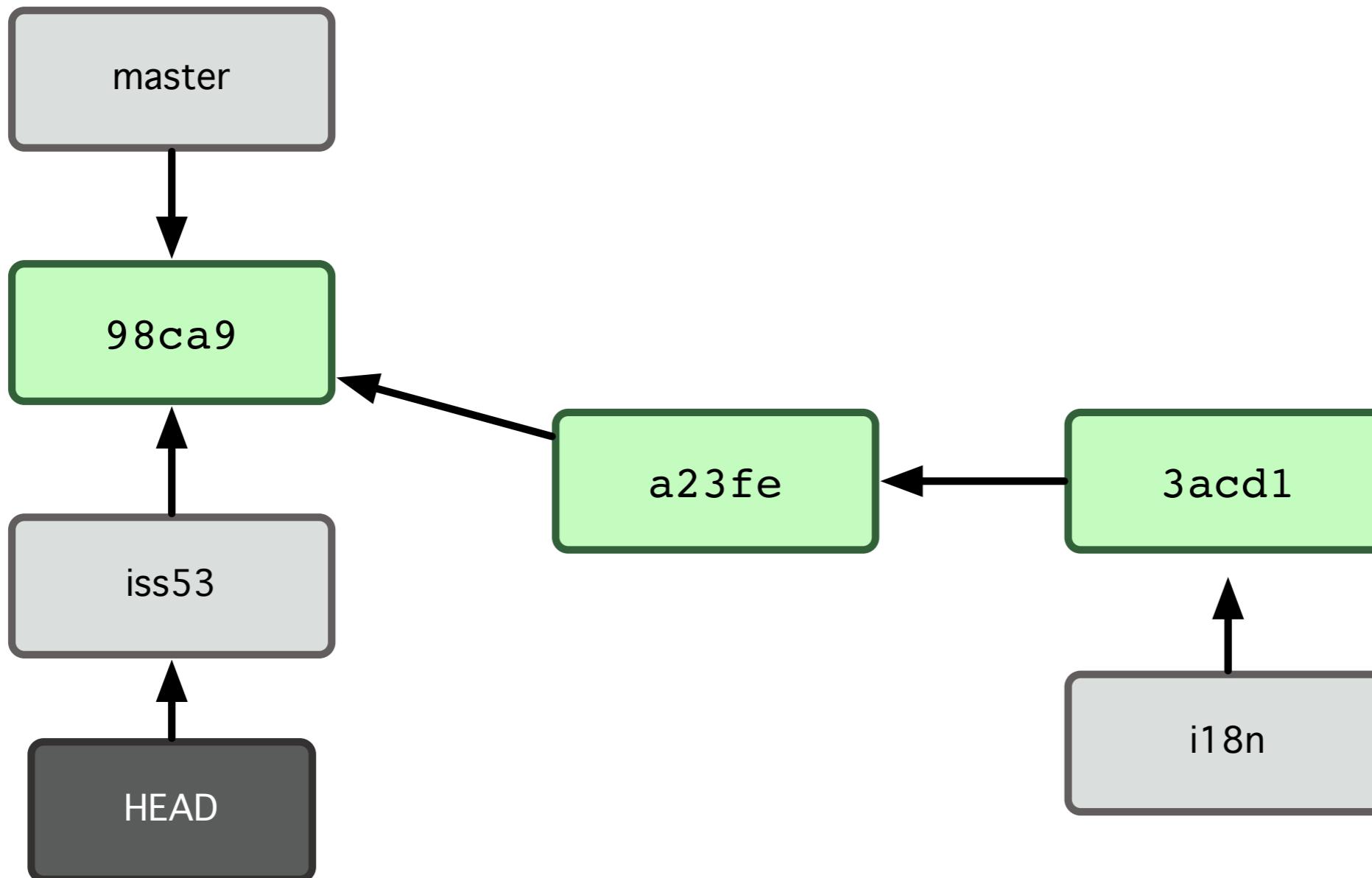
git checkout -b iss53 master



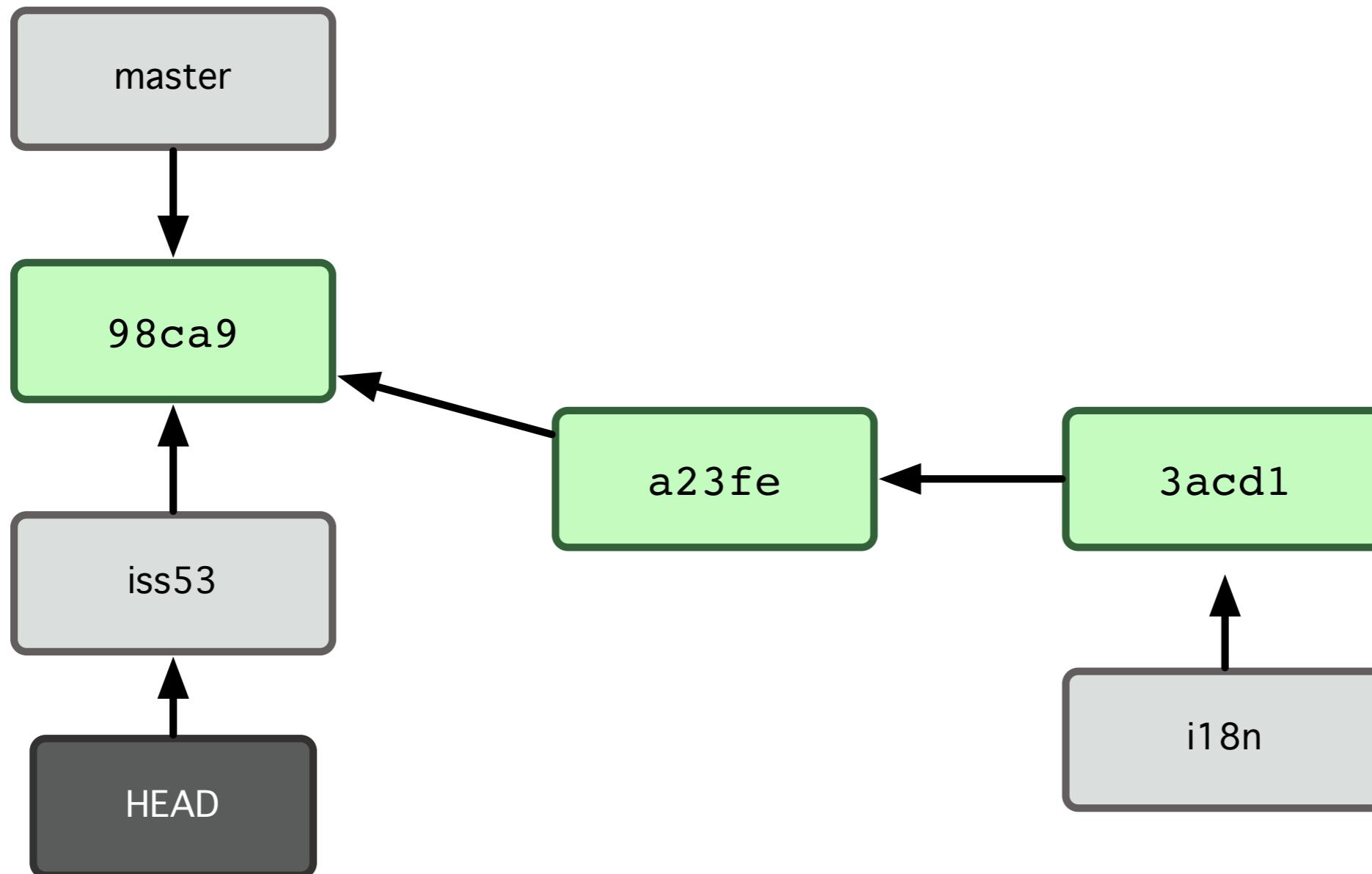
```
git checkout master;  
git checkout -b iss53
```

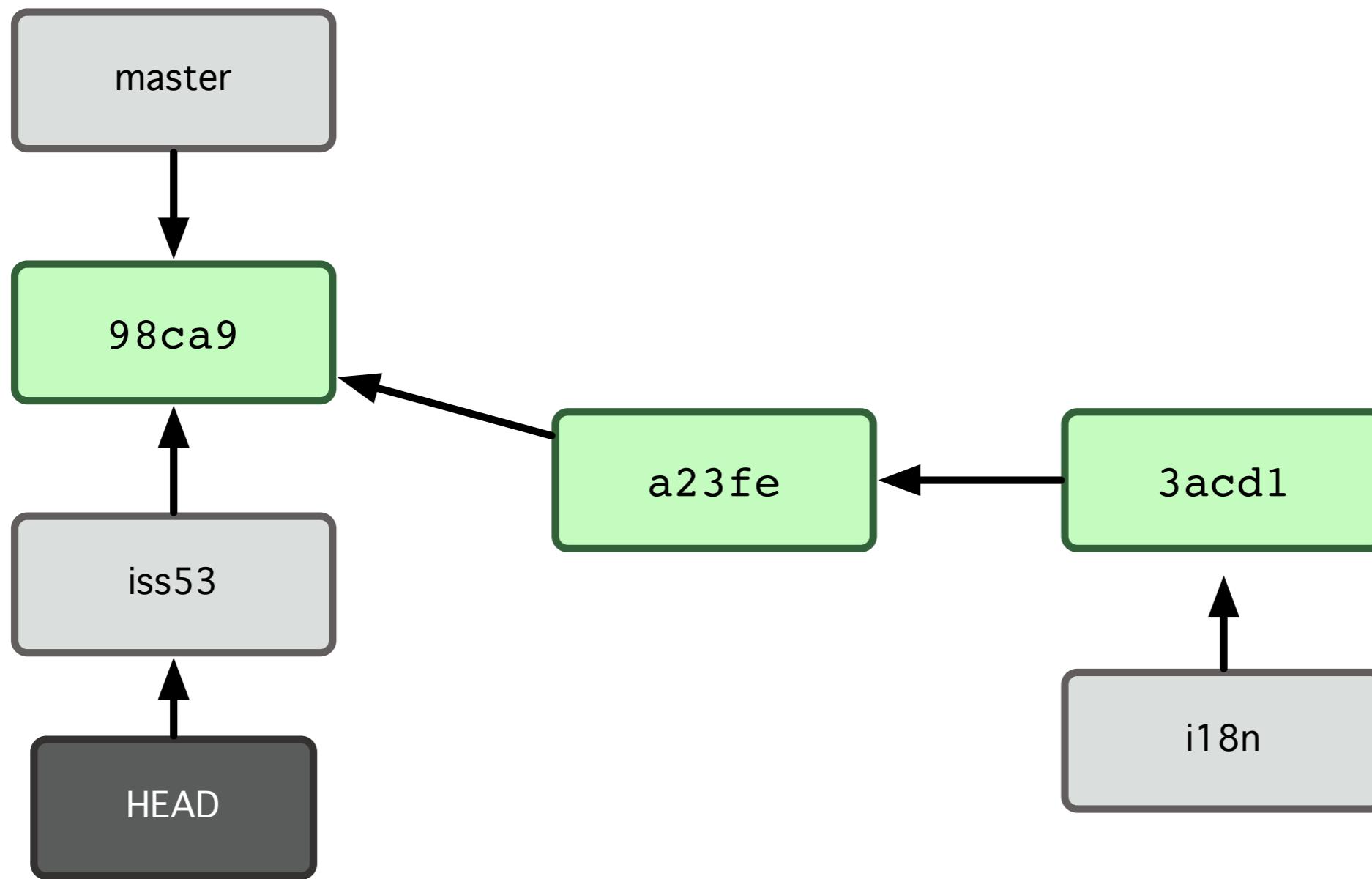


```
git checkout master;  
git branch iss53;  
git checkout iss53
```

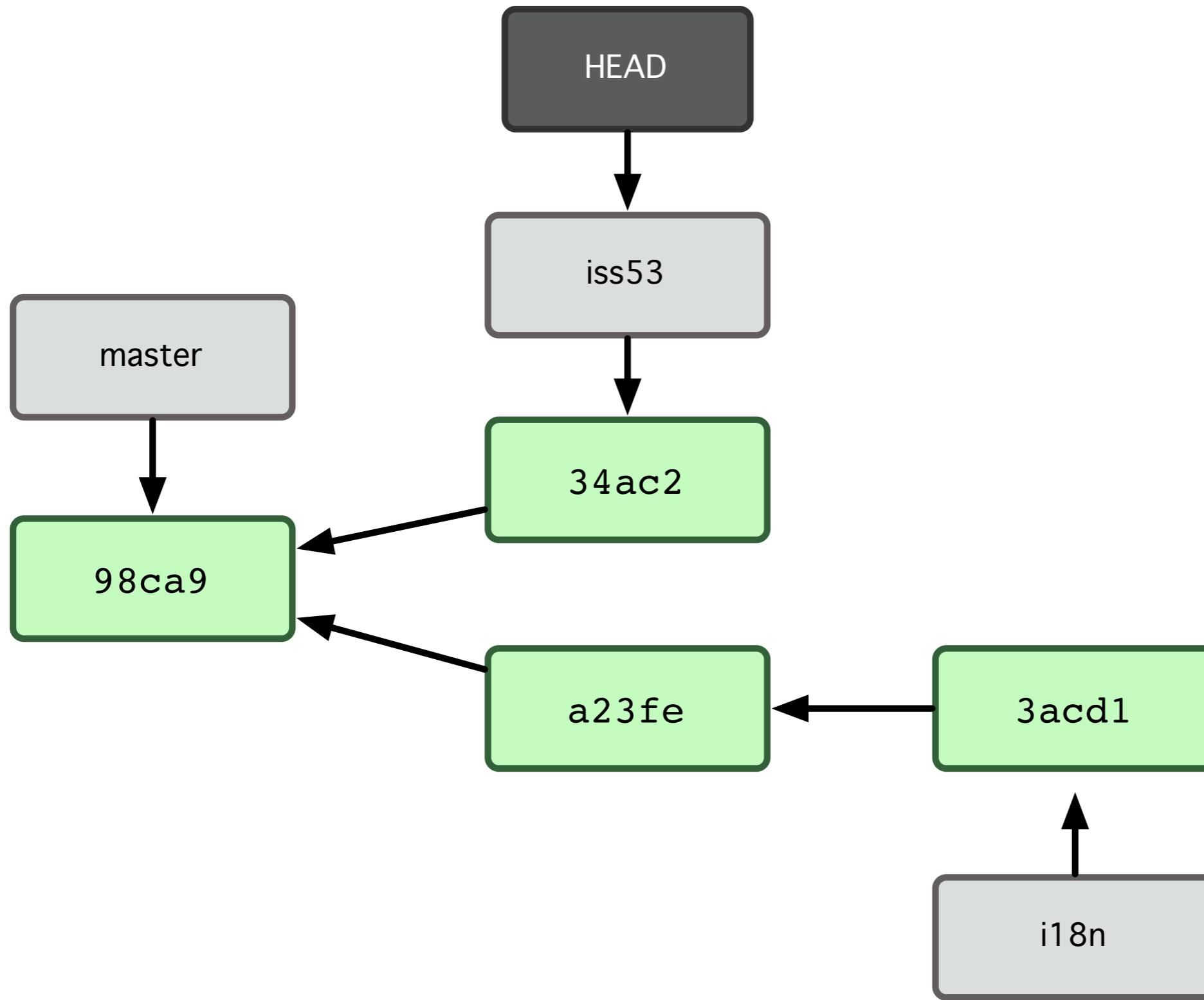


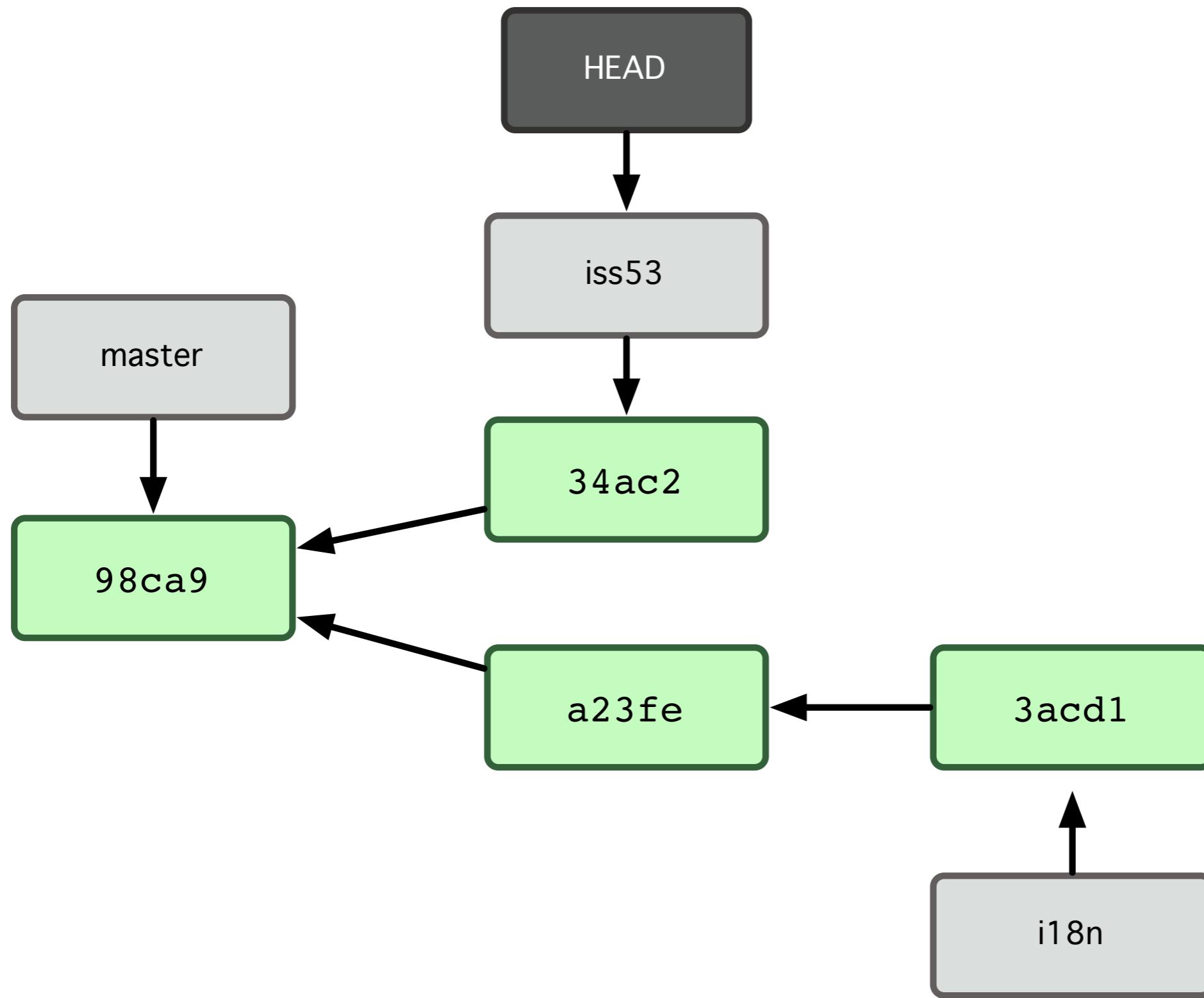
git checkout -b iss53 master



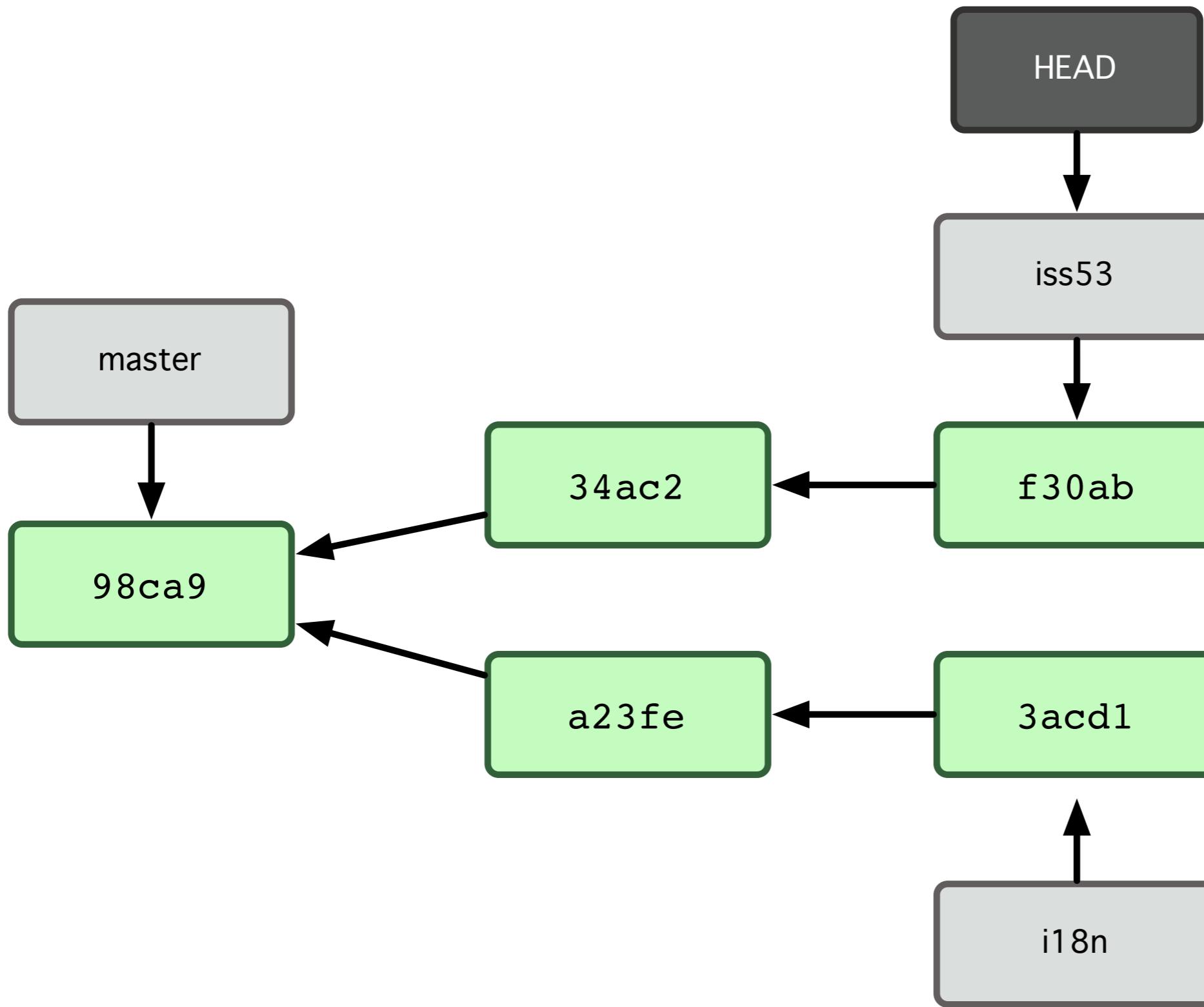


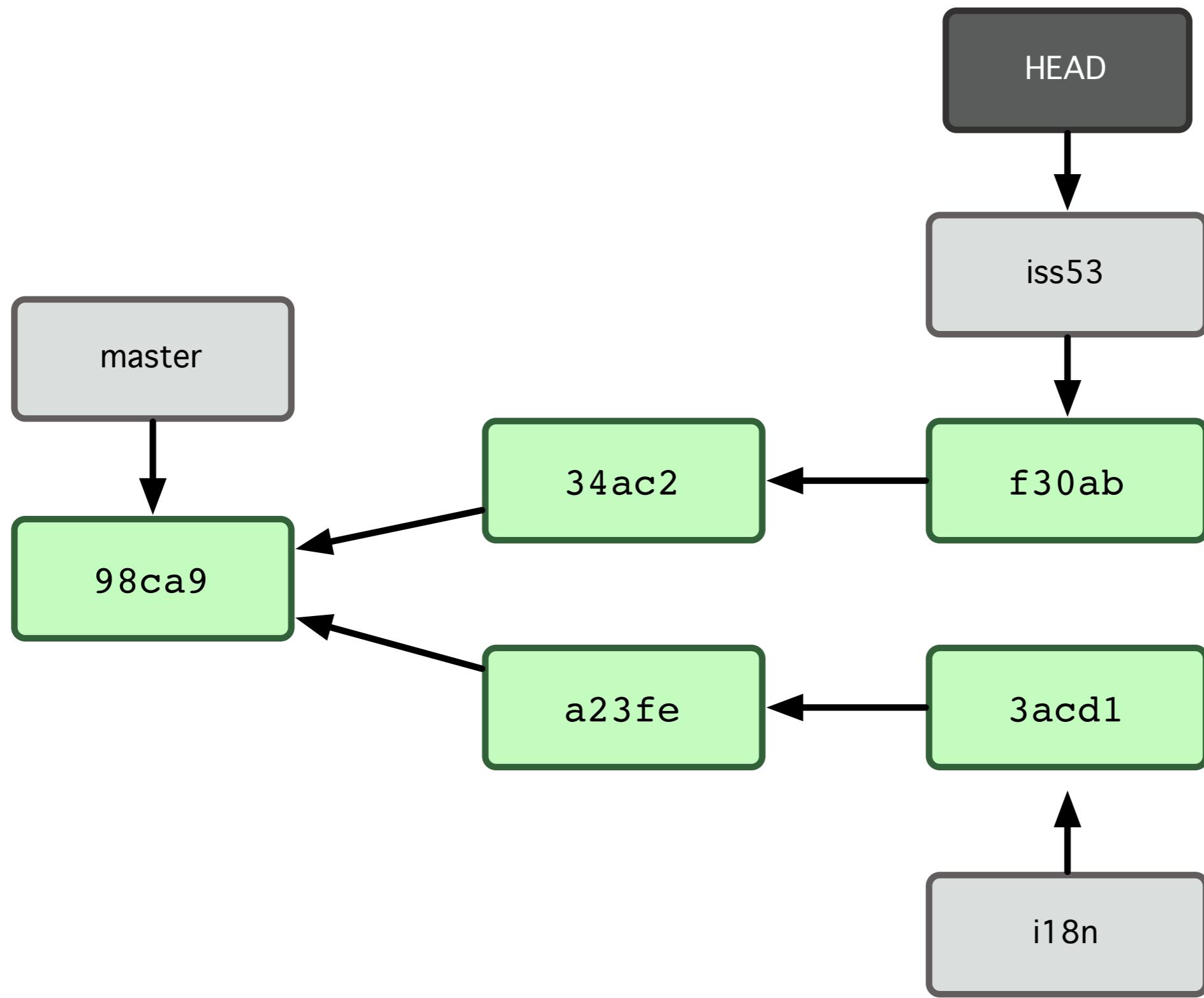
git commit

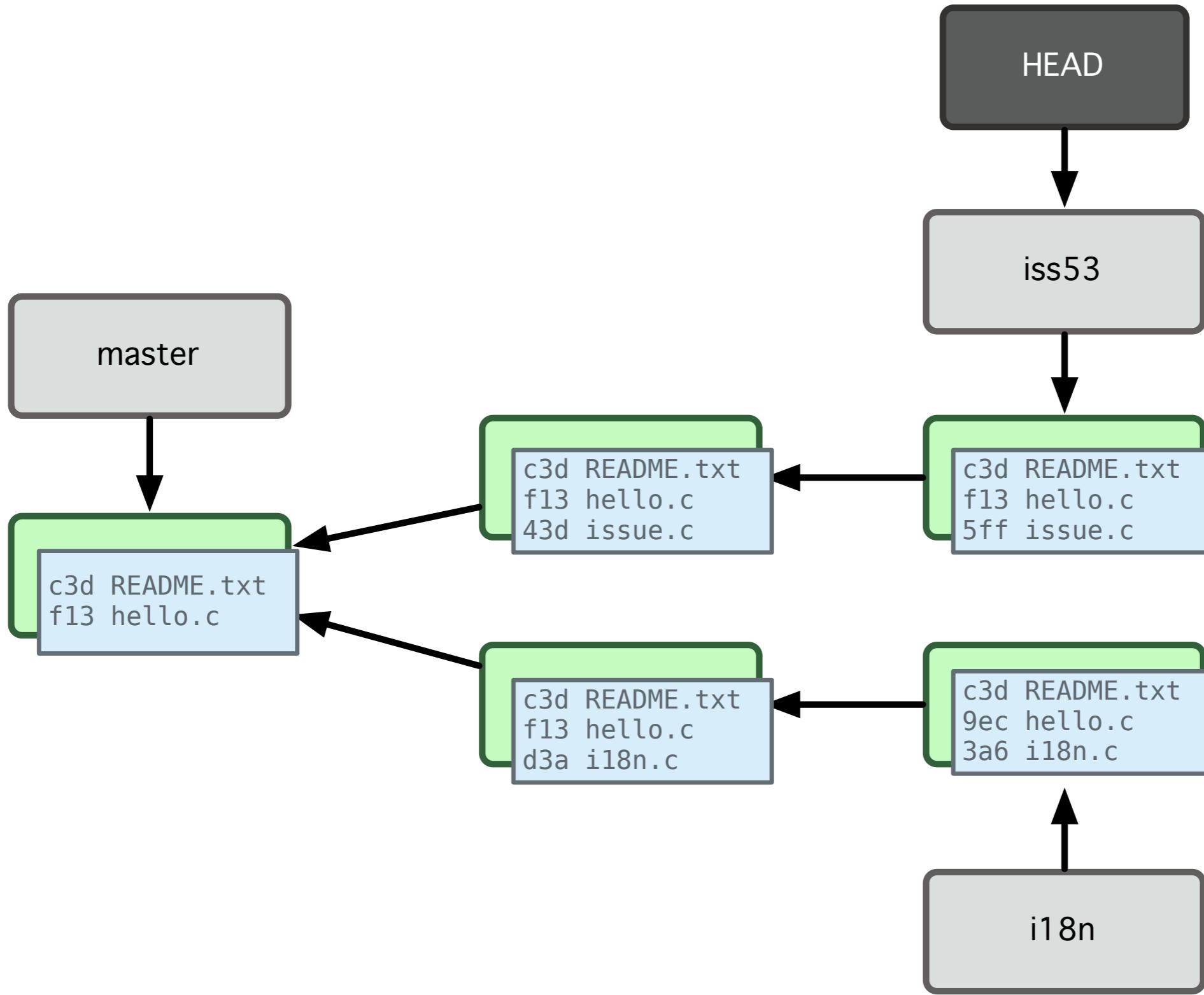


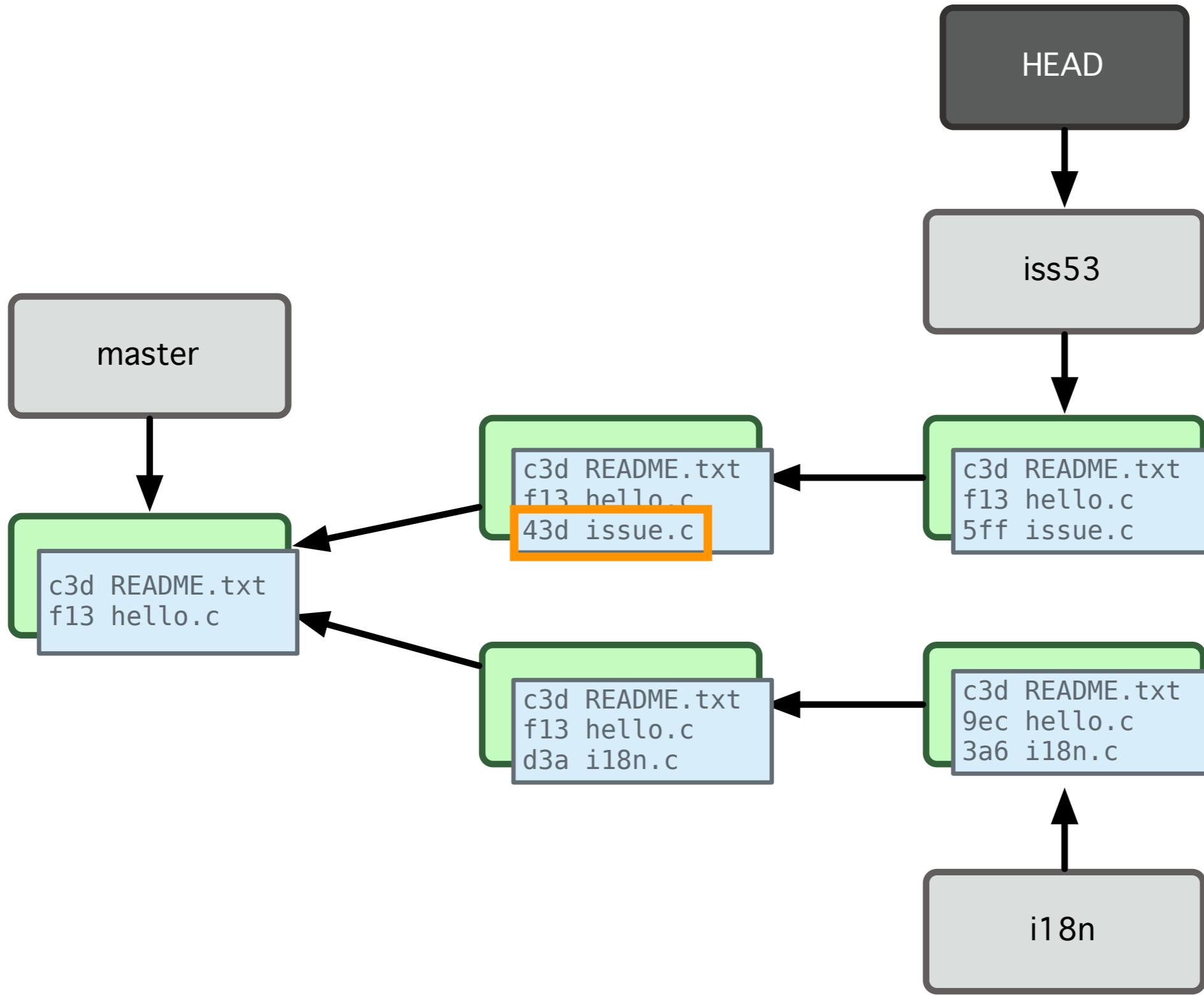


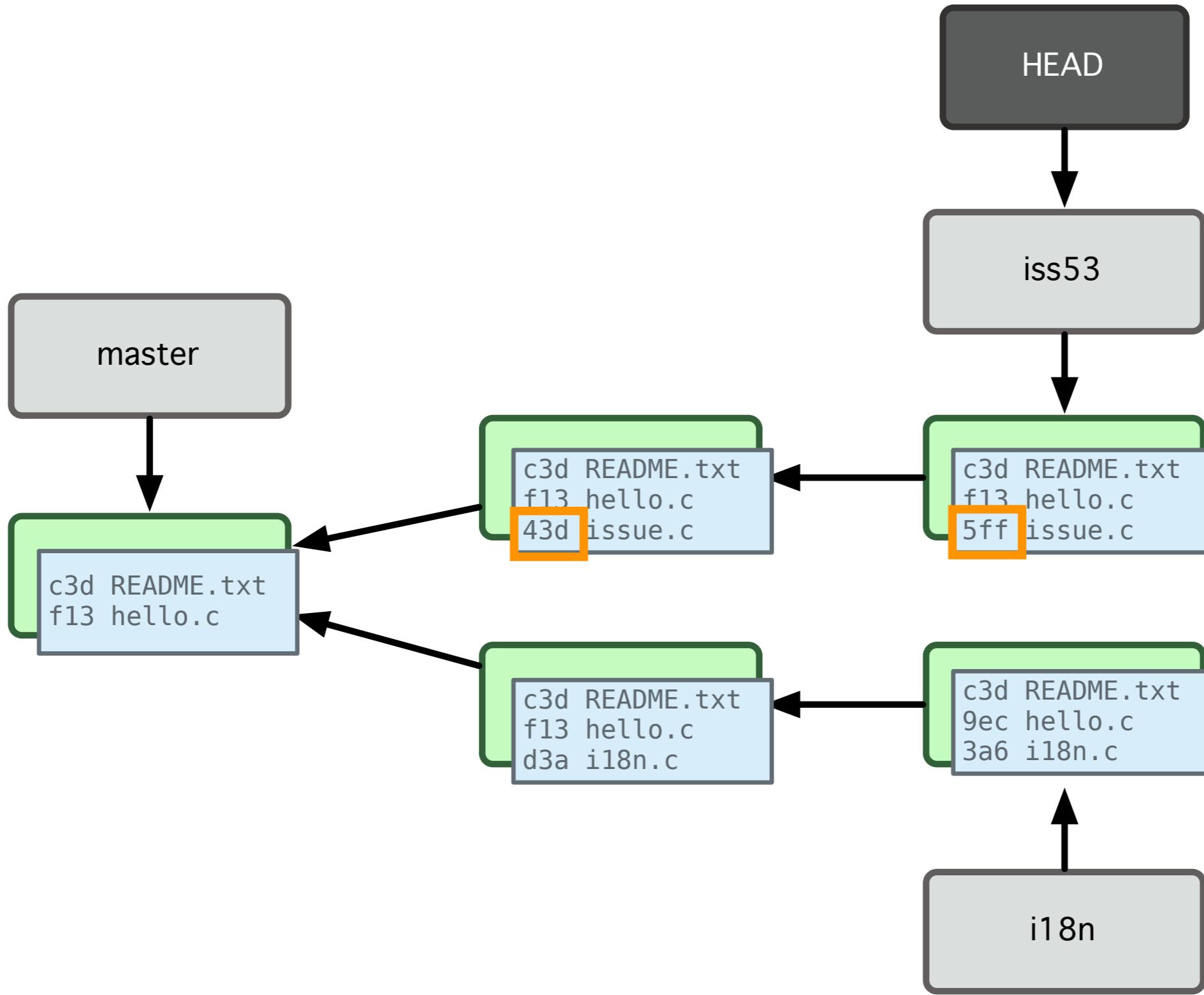
git commit

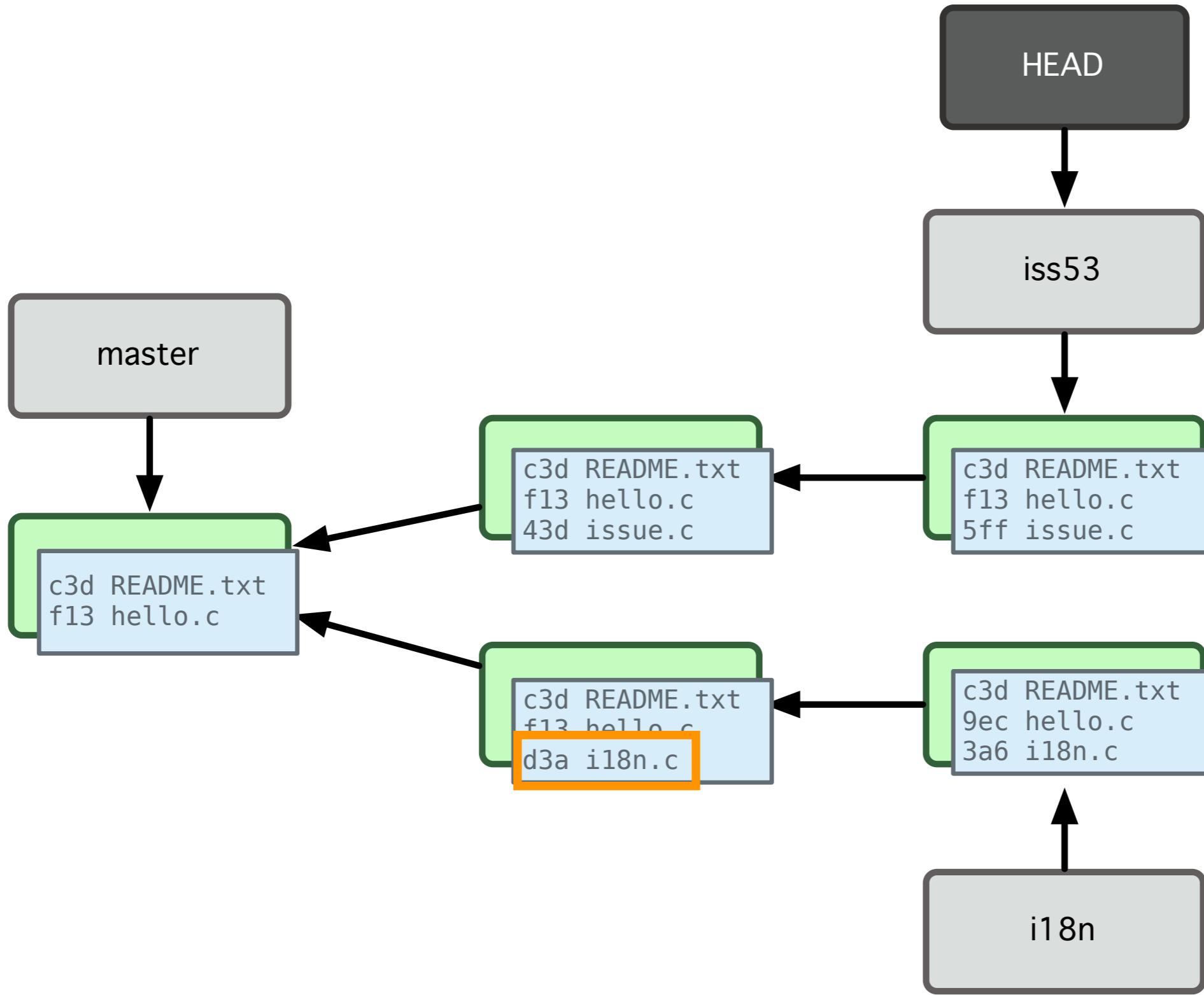


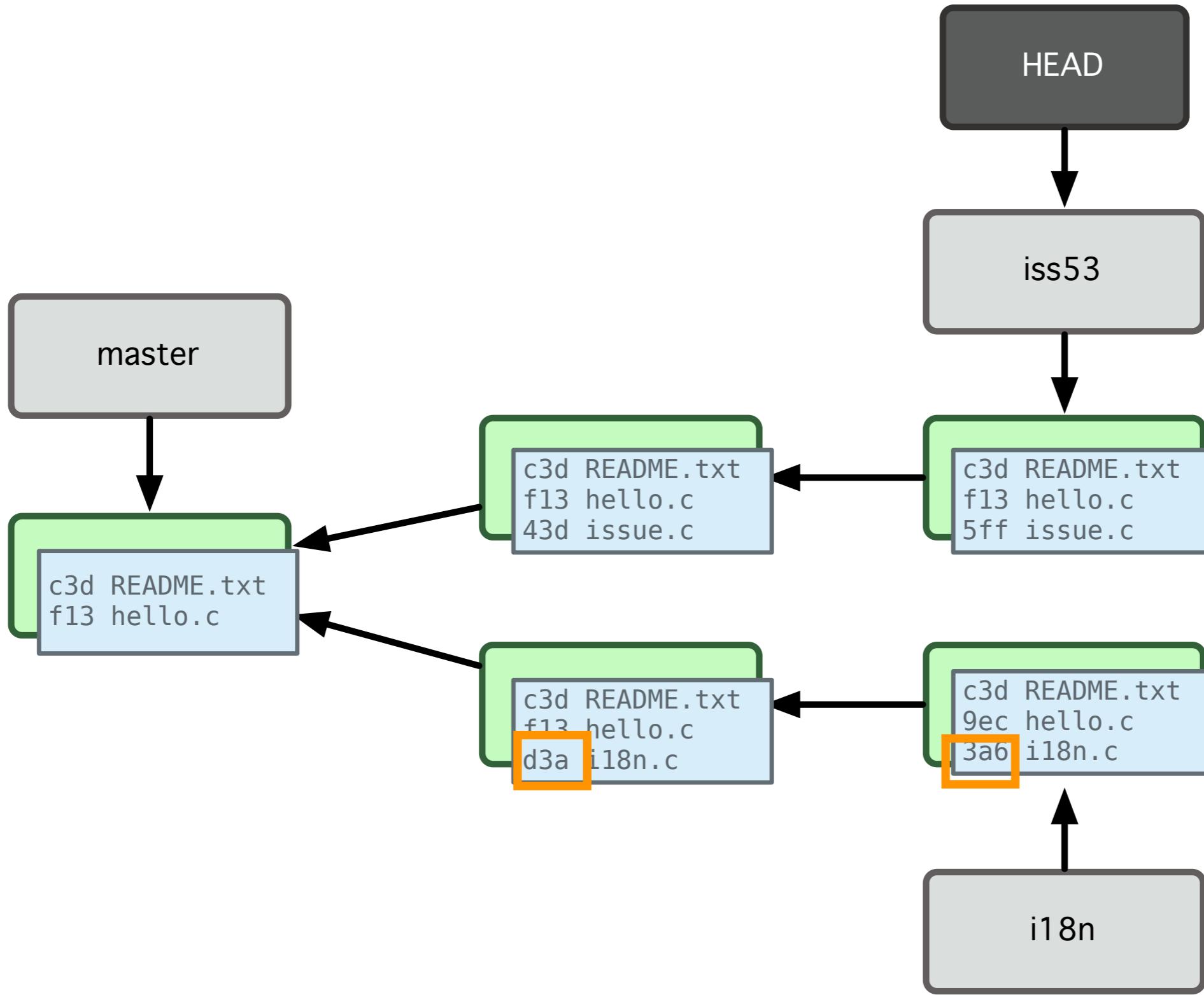


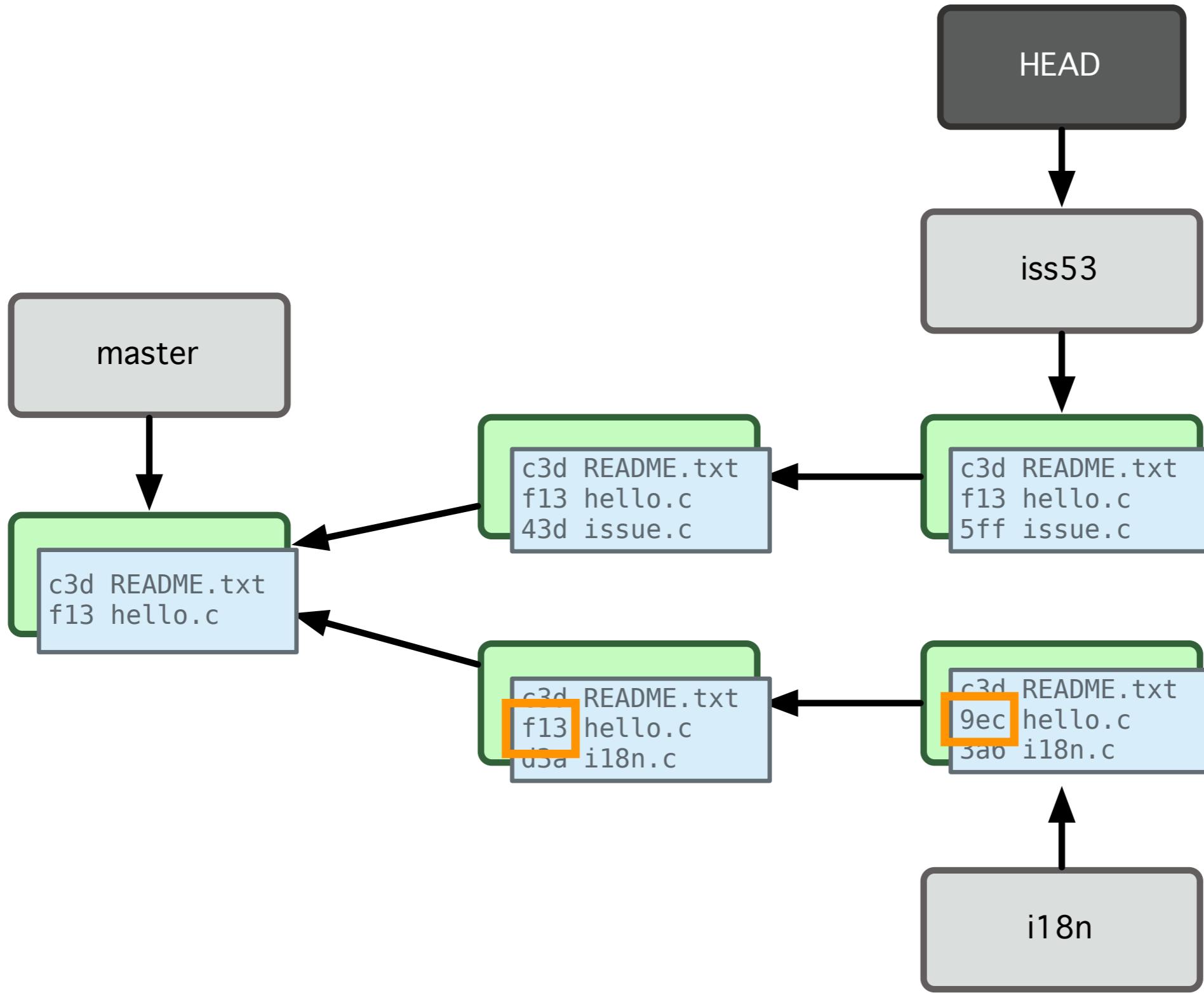


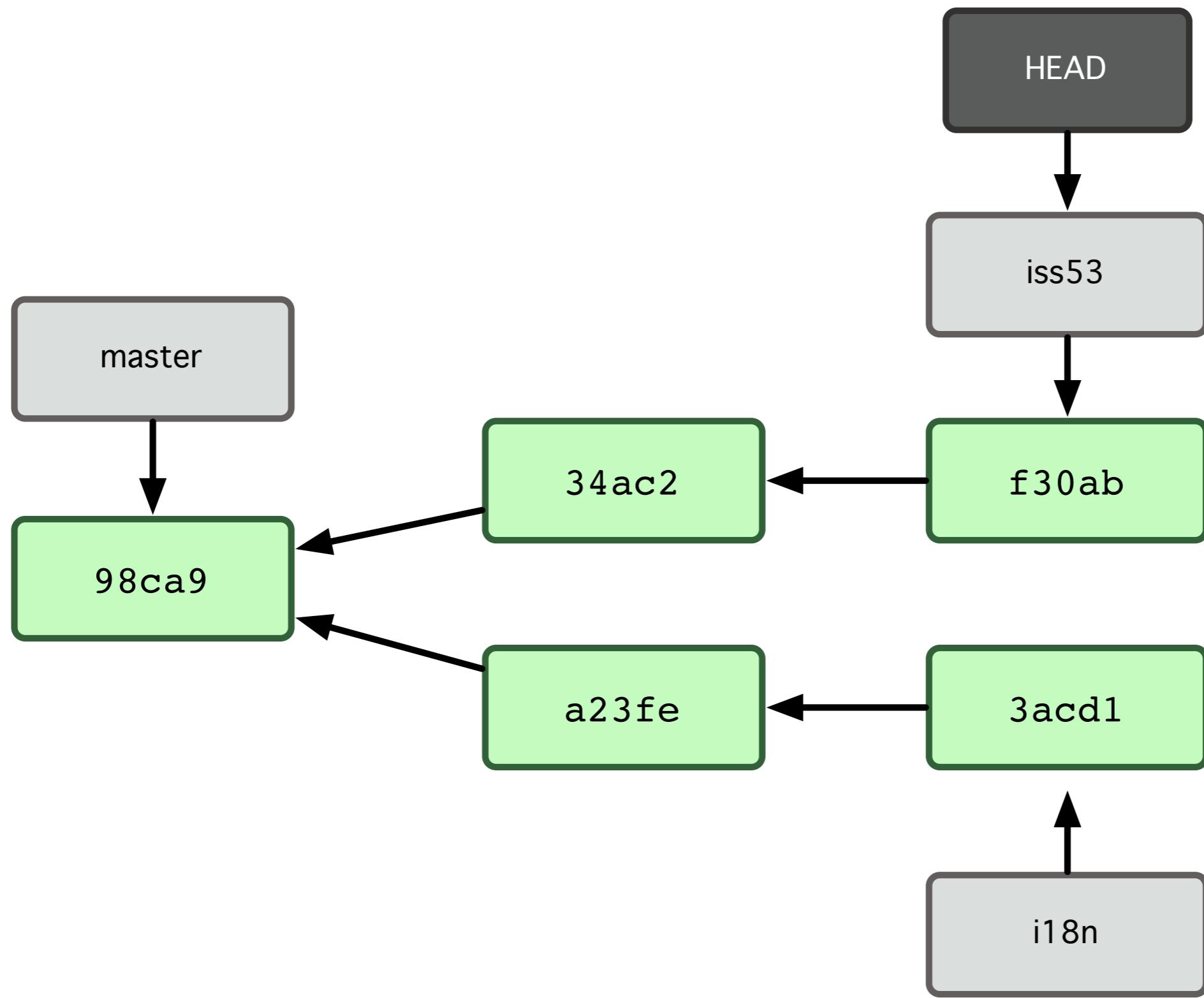






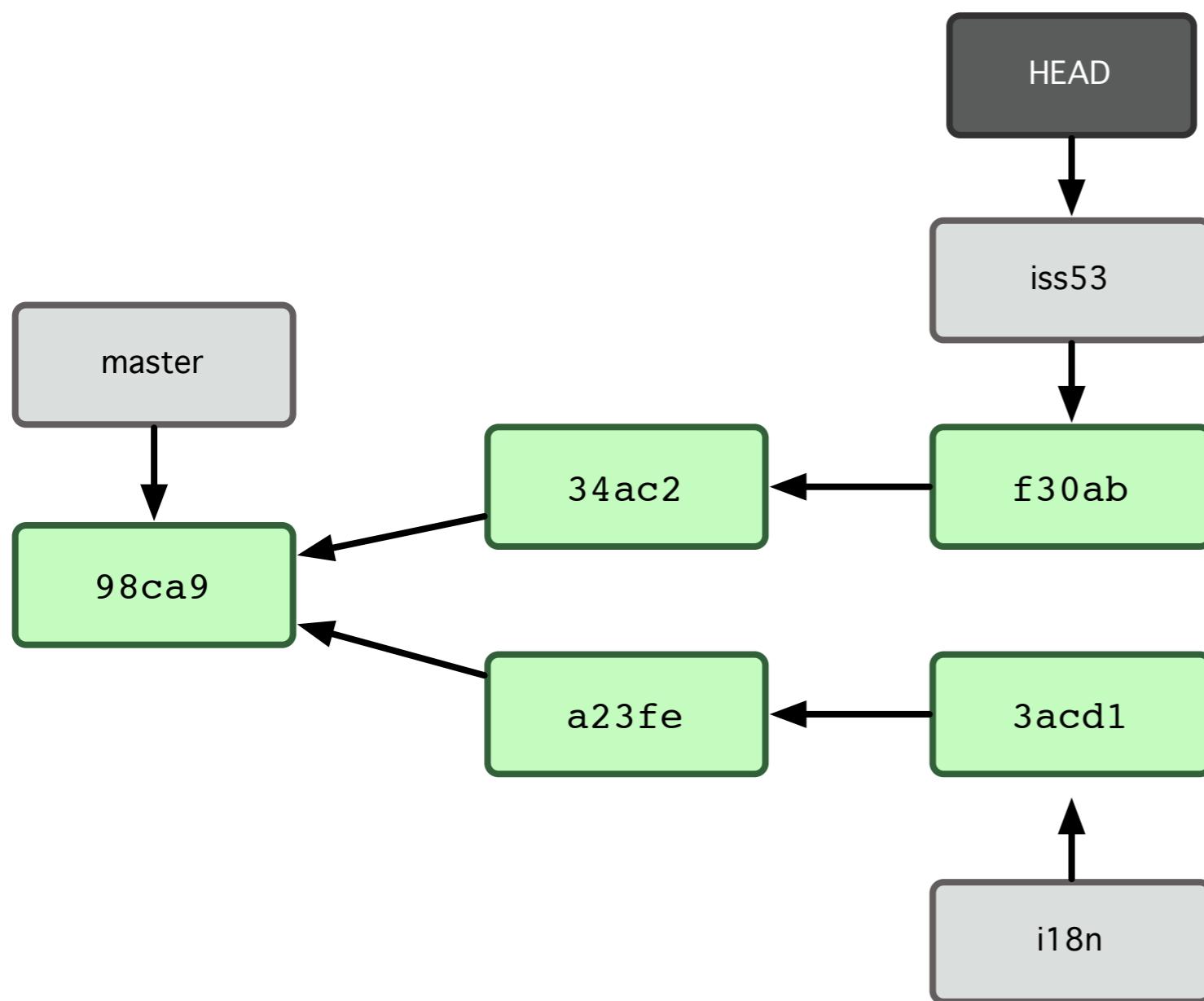




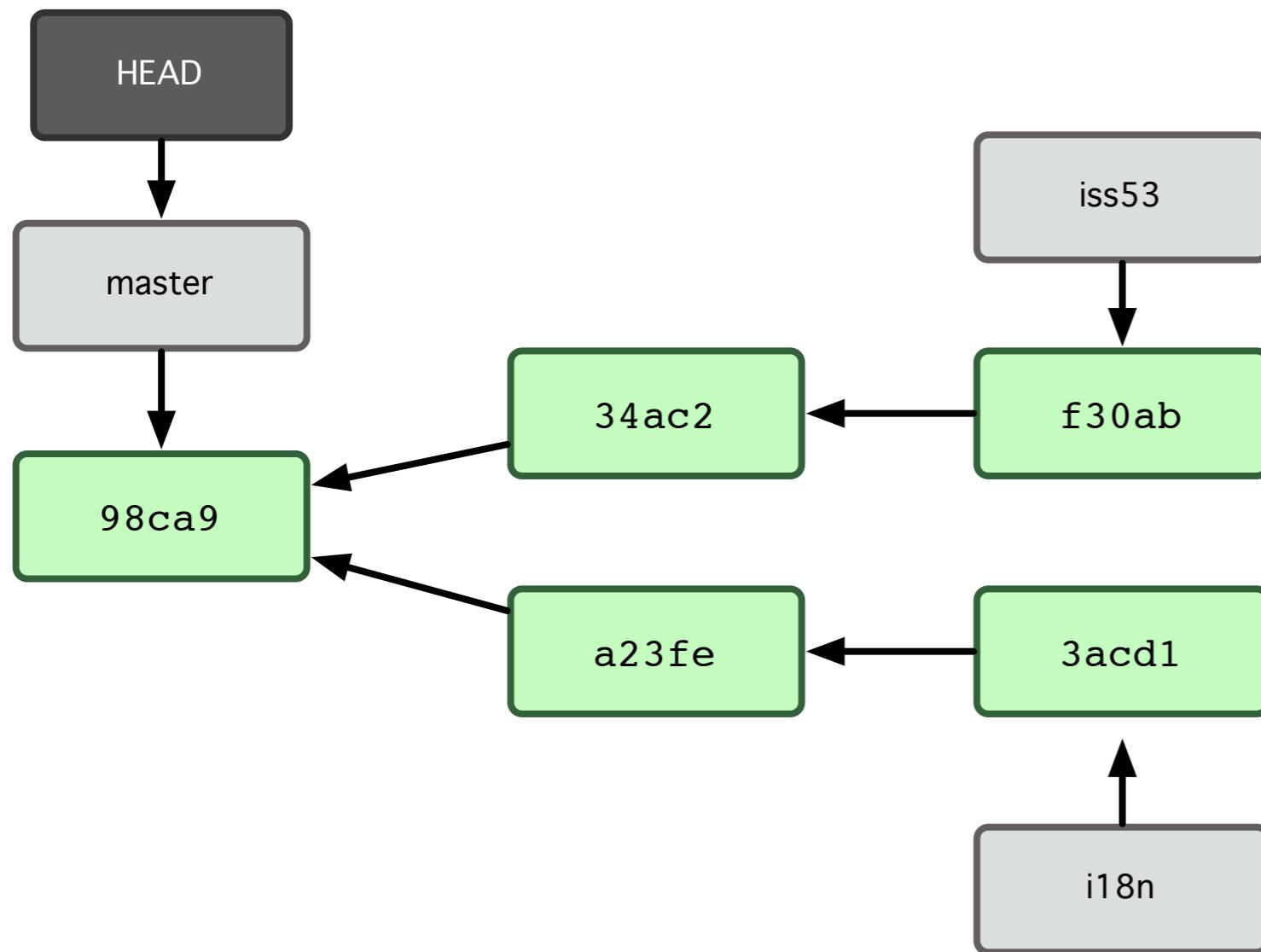


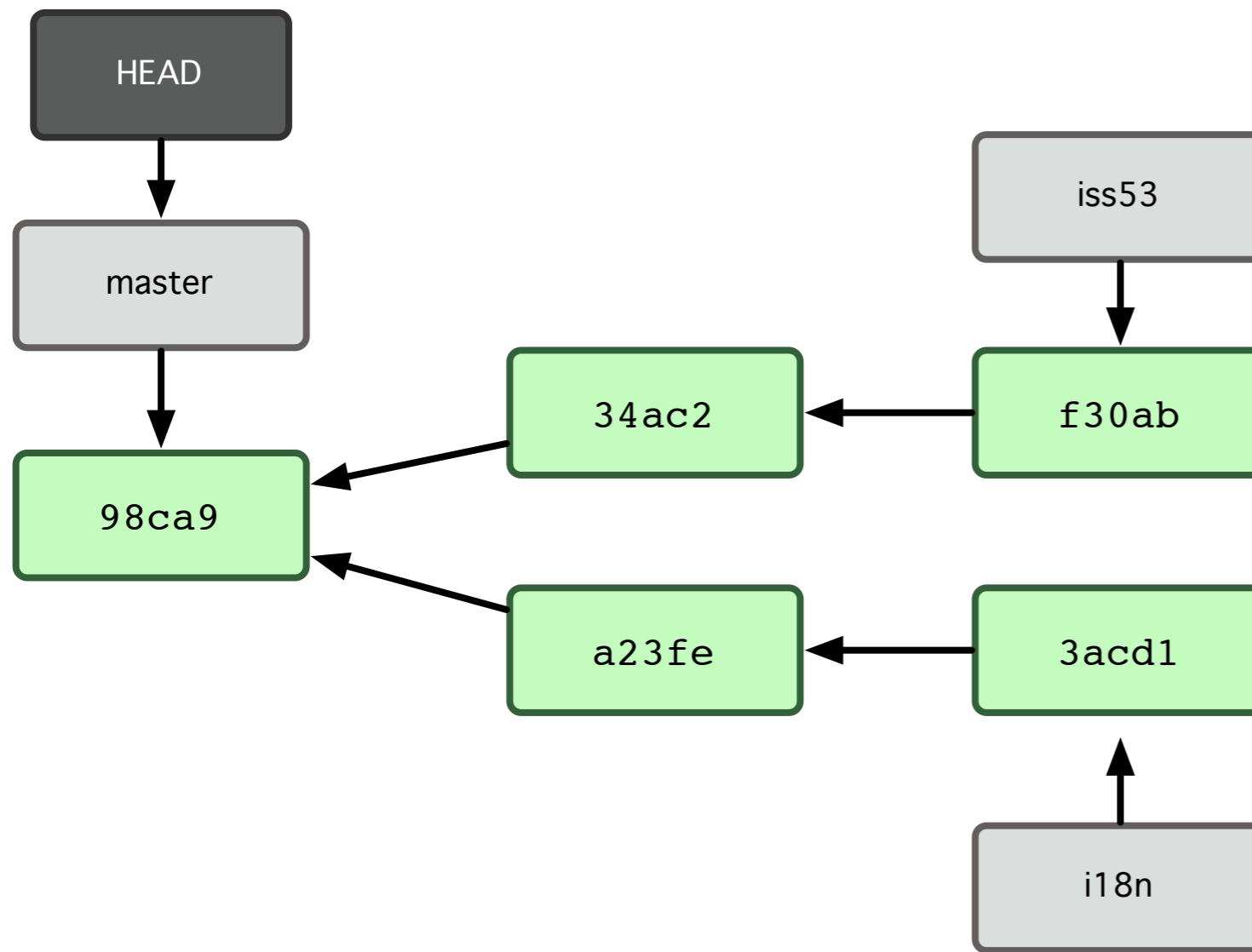
merging

git merge

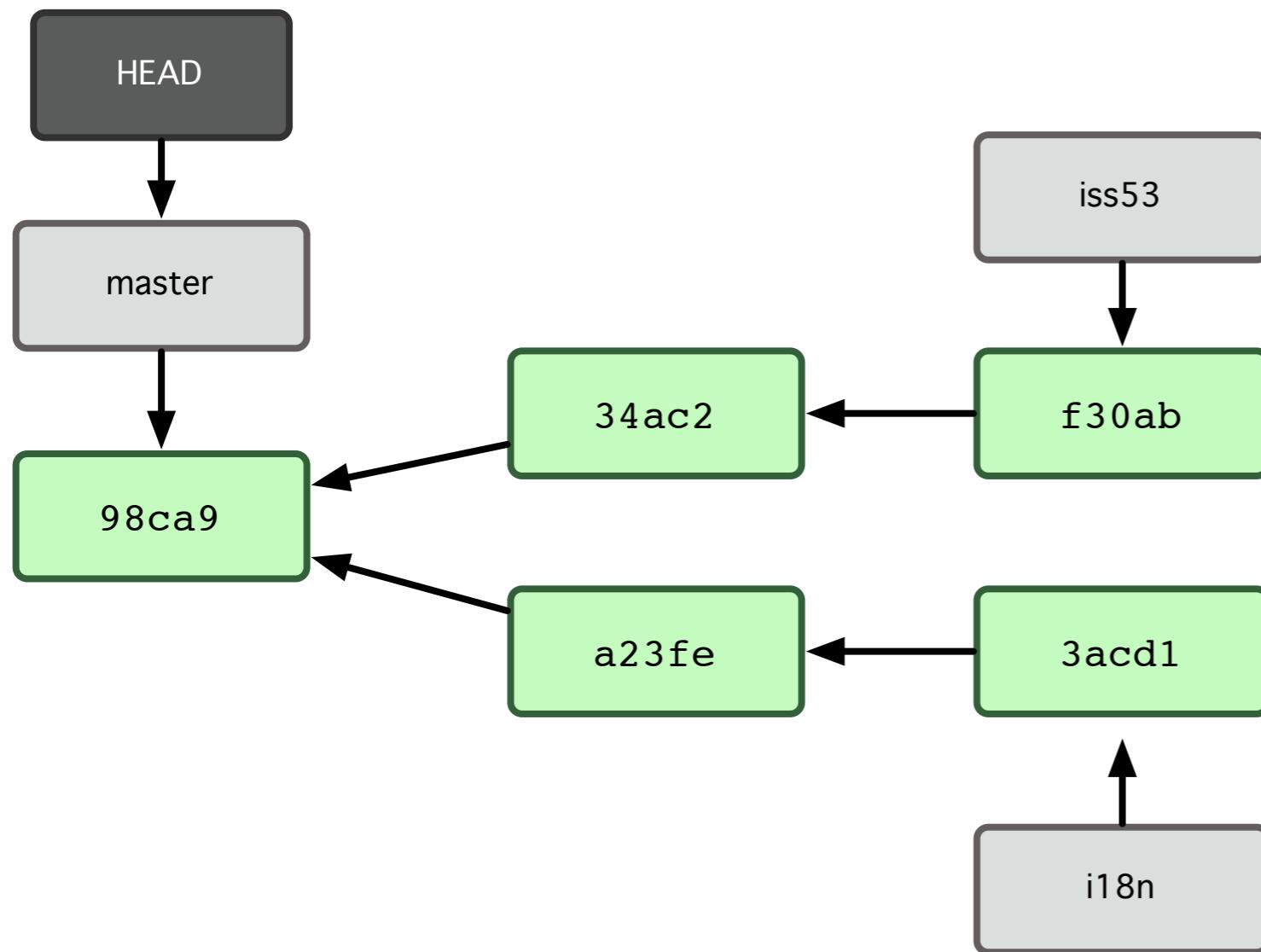


git checkout master

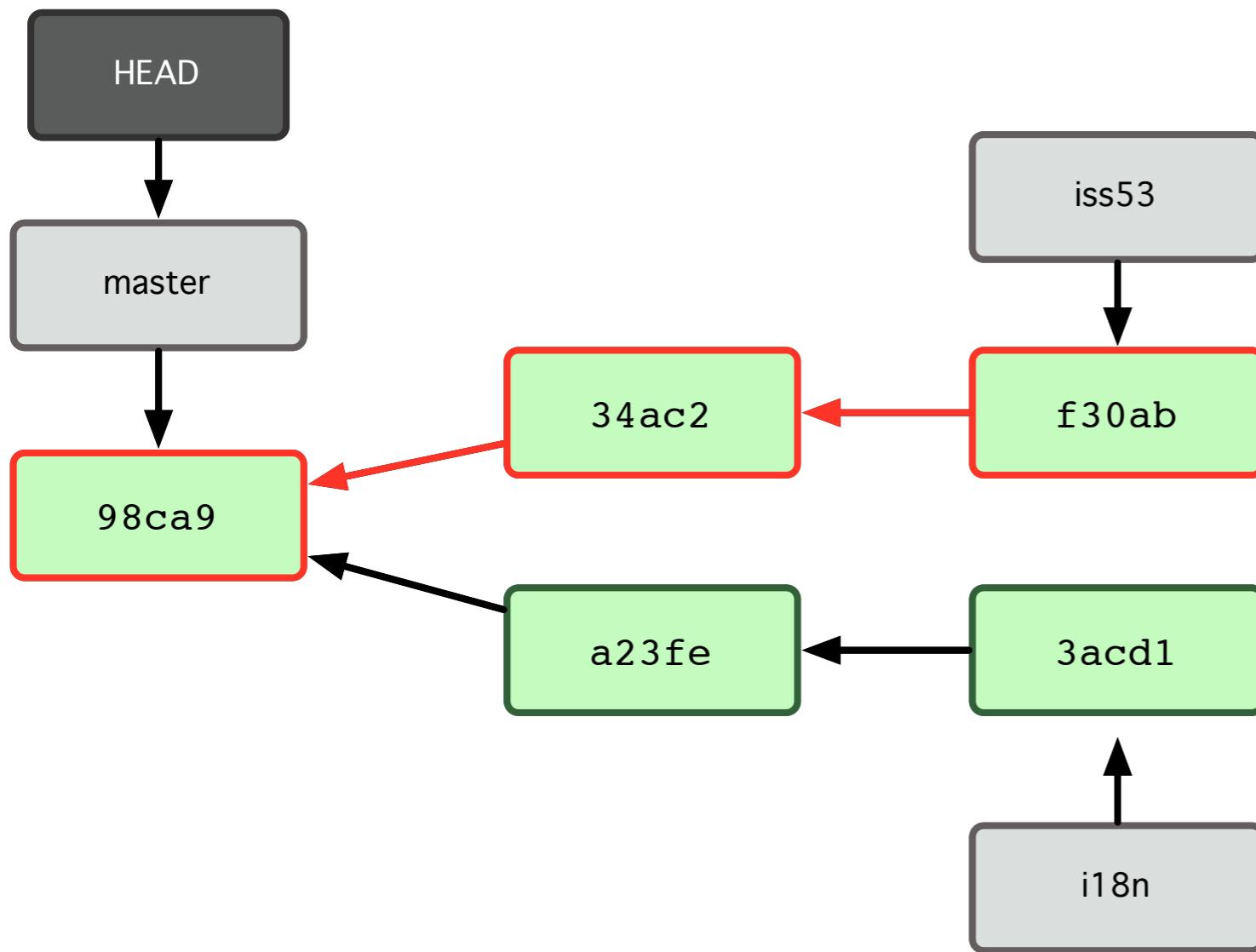




git merge iss53

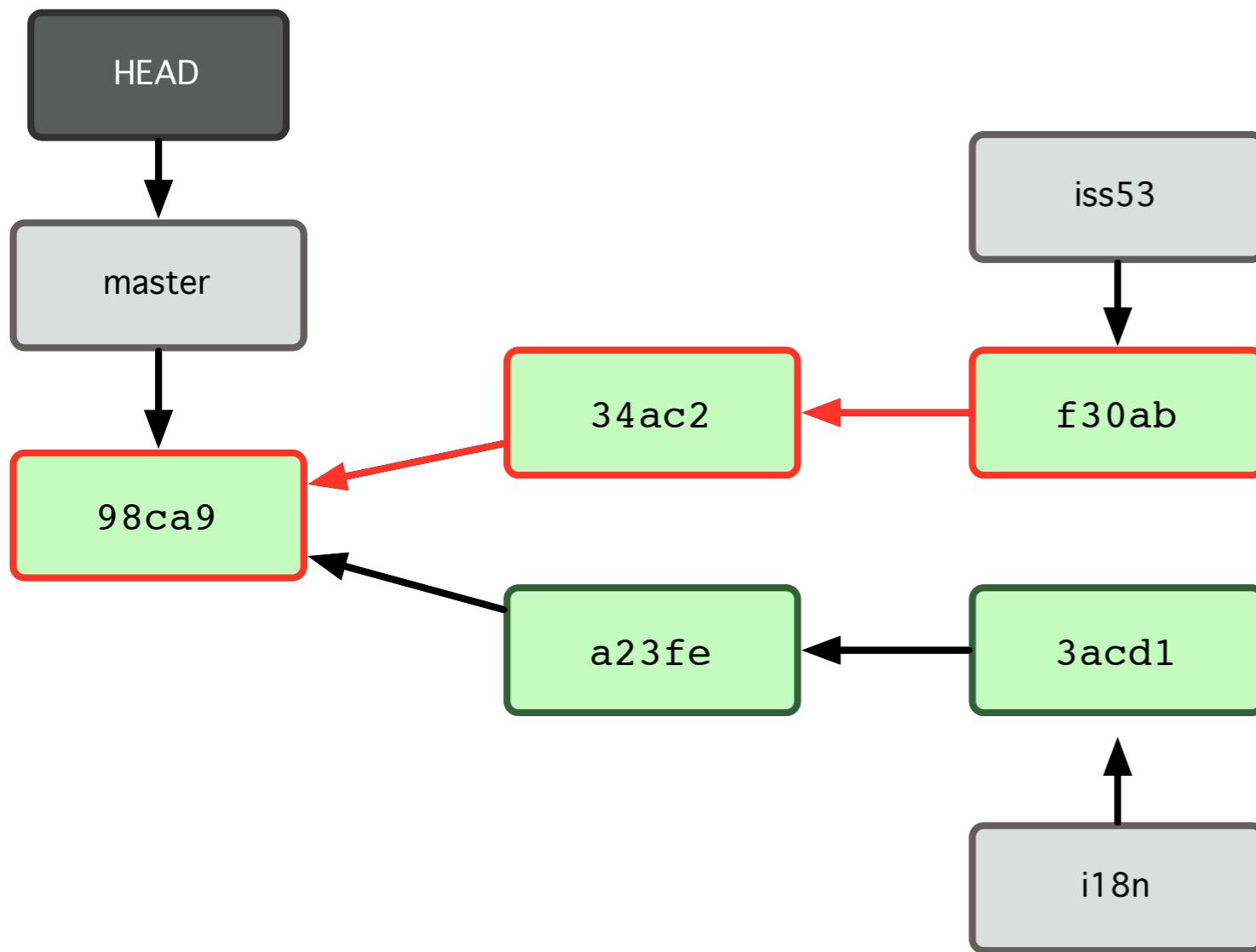


git merge iss53

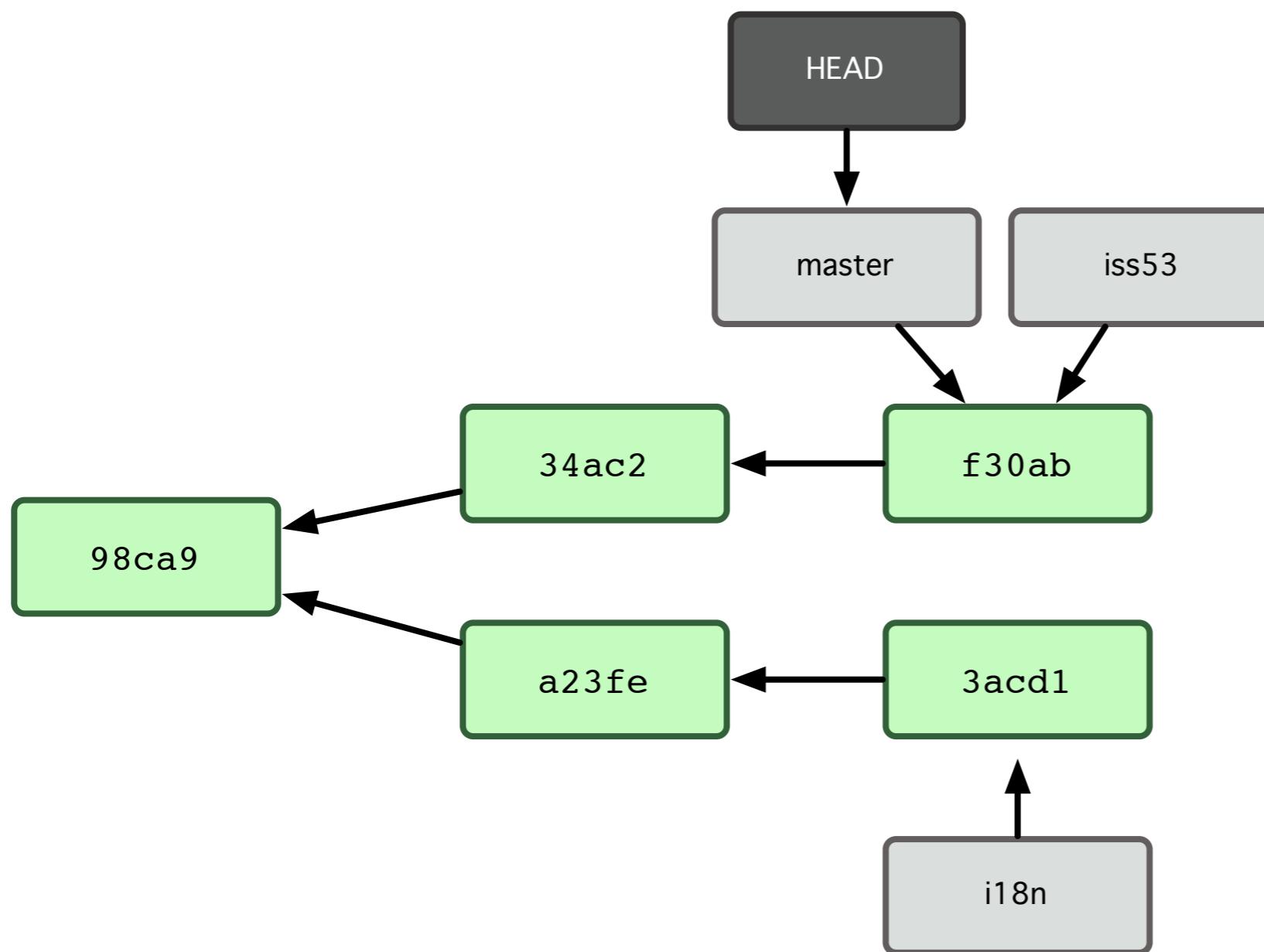


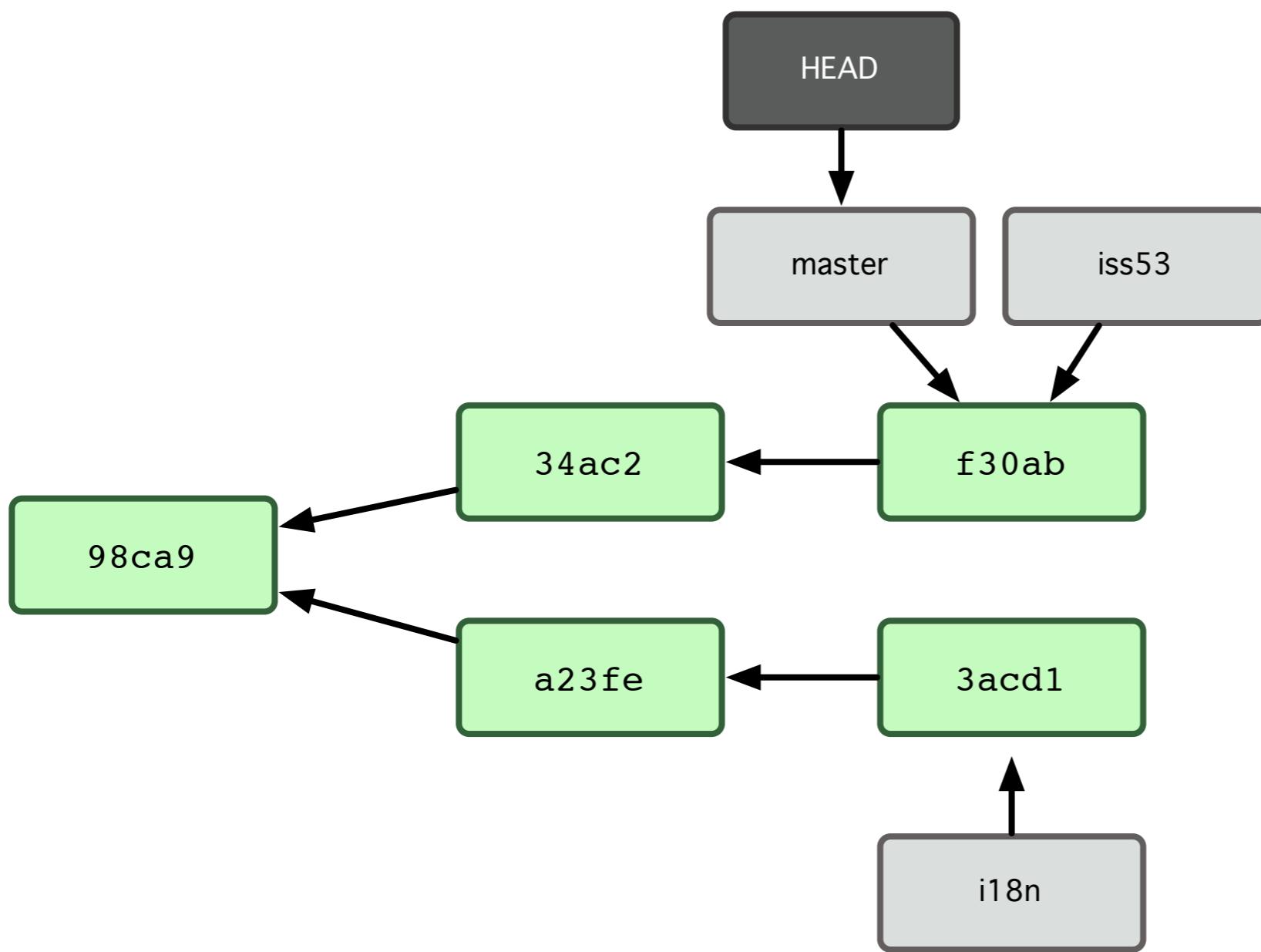
fast-forward merge

git merge iss53

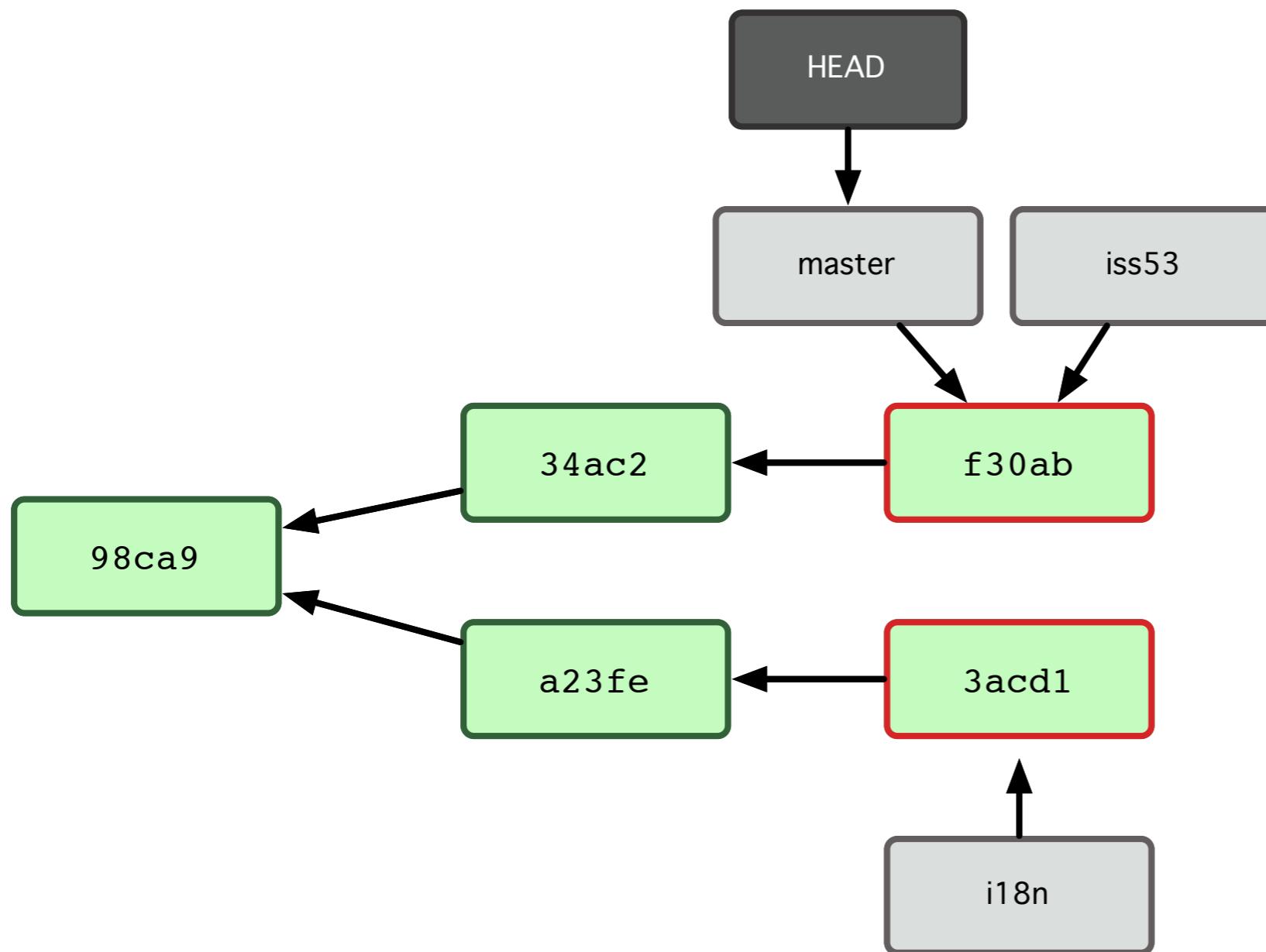


git merge iss53



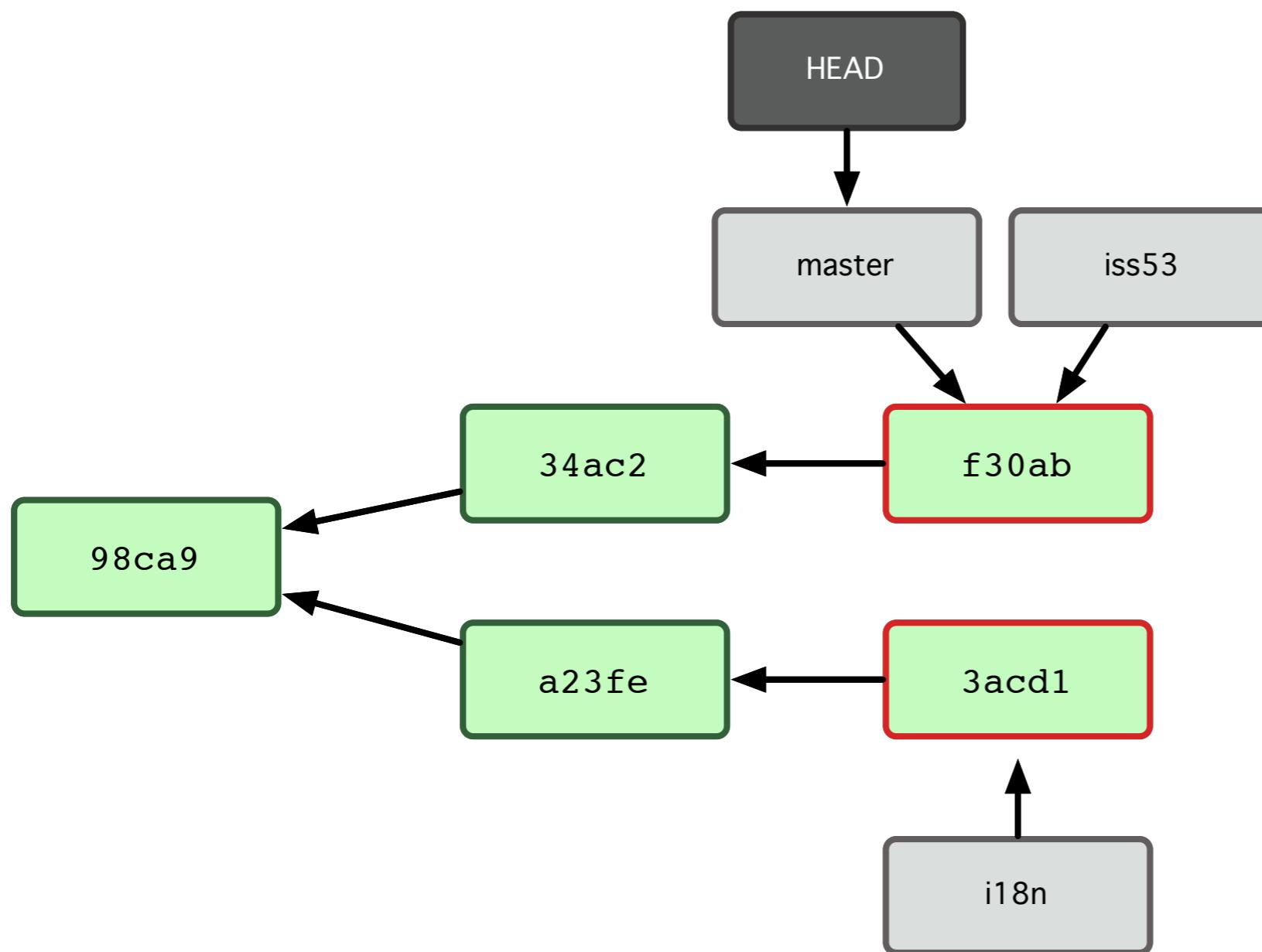


git merge i18n

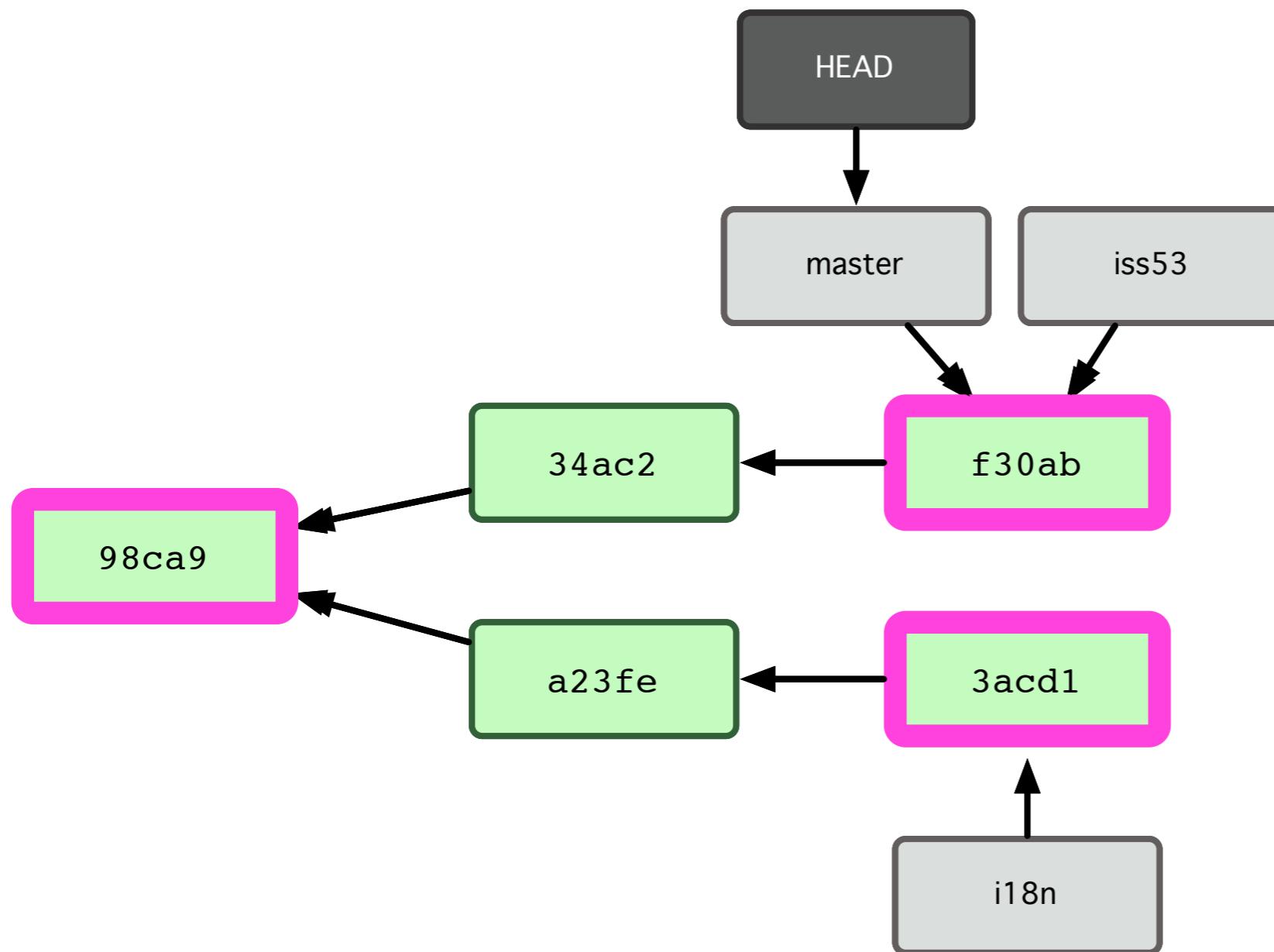


non fast-forward merge

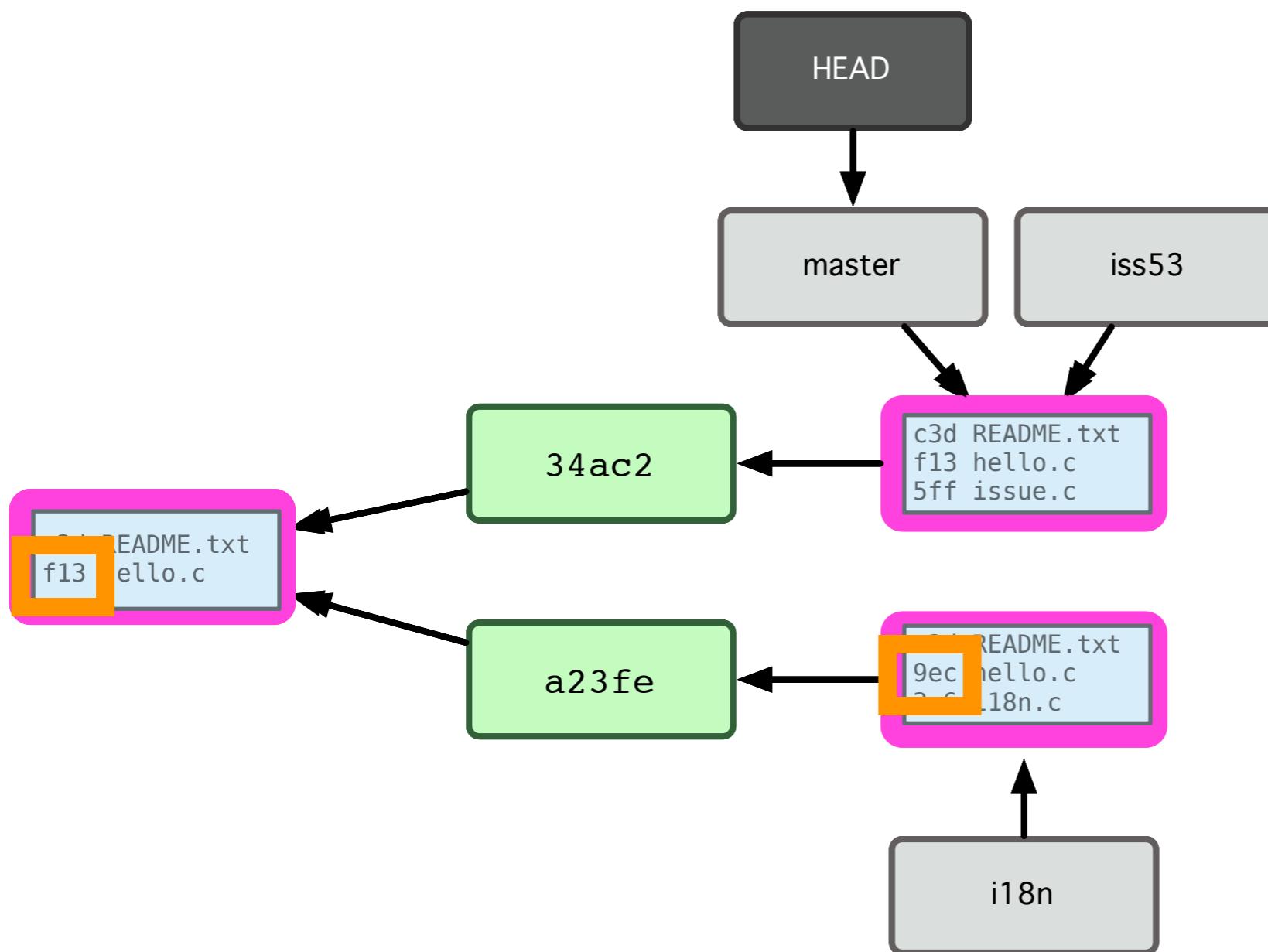
git merge i18n



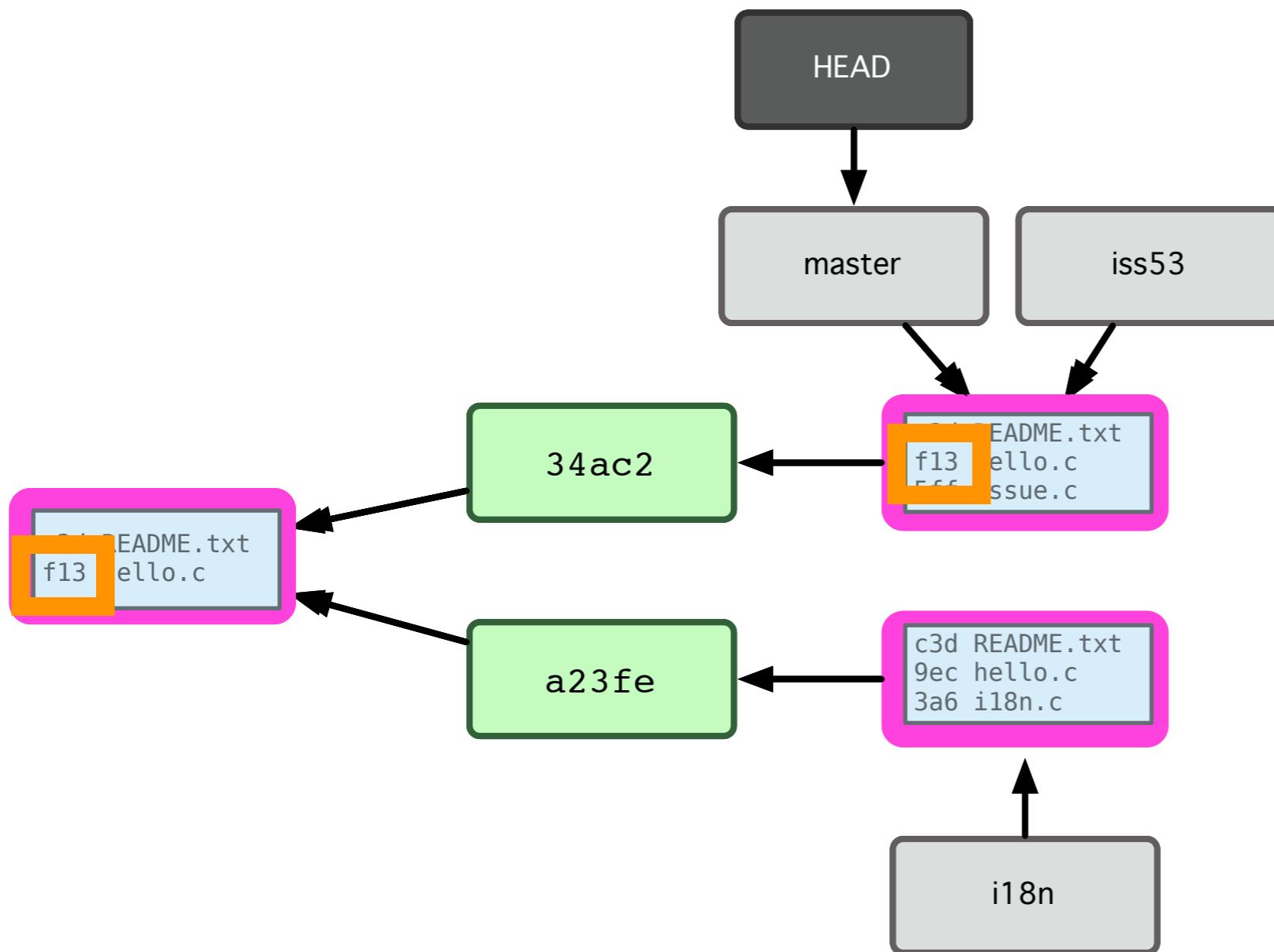
git merge i18n



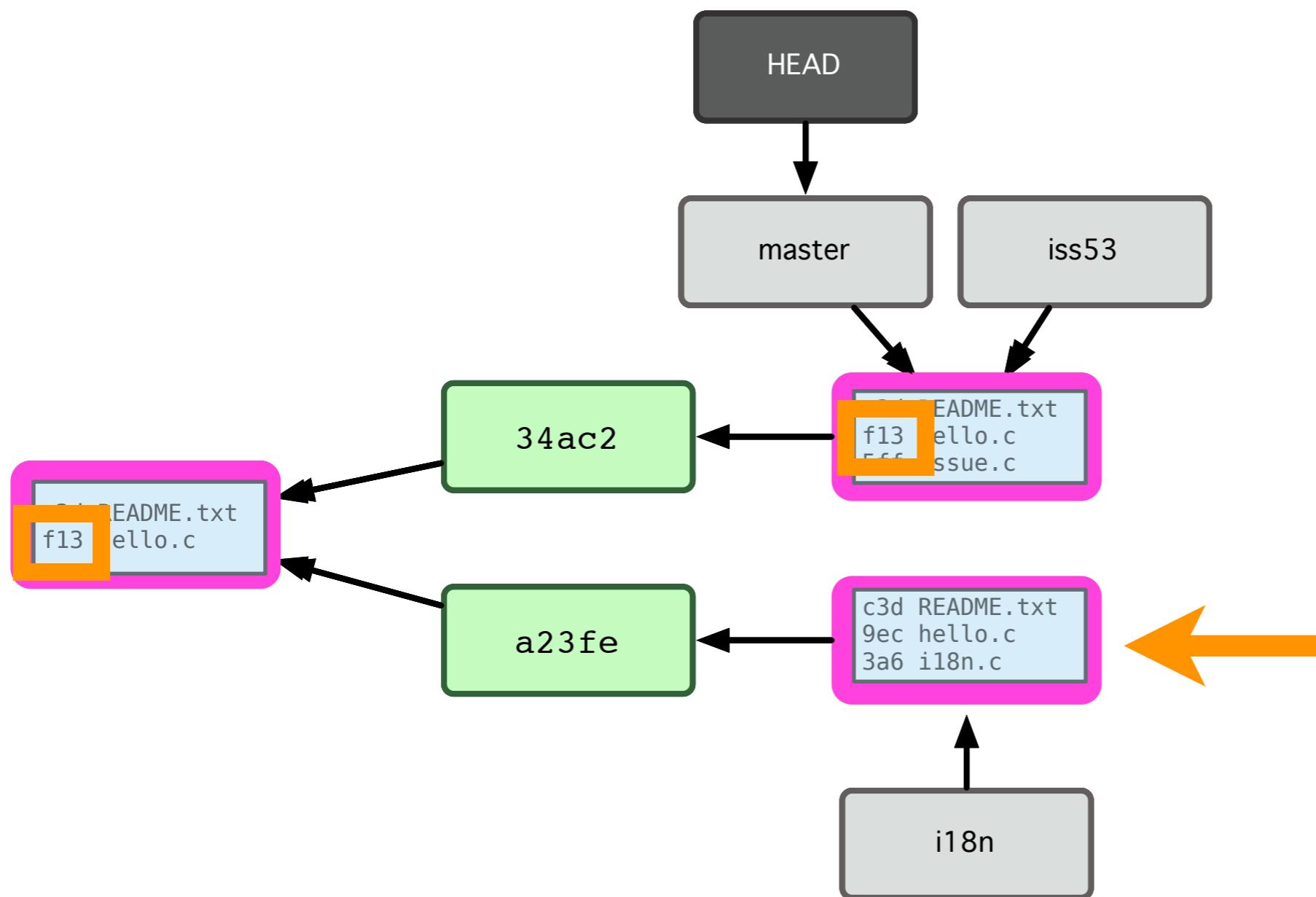
git merge i18n



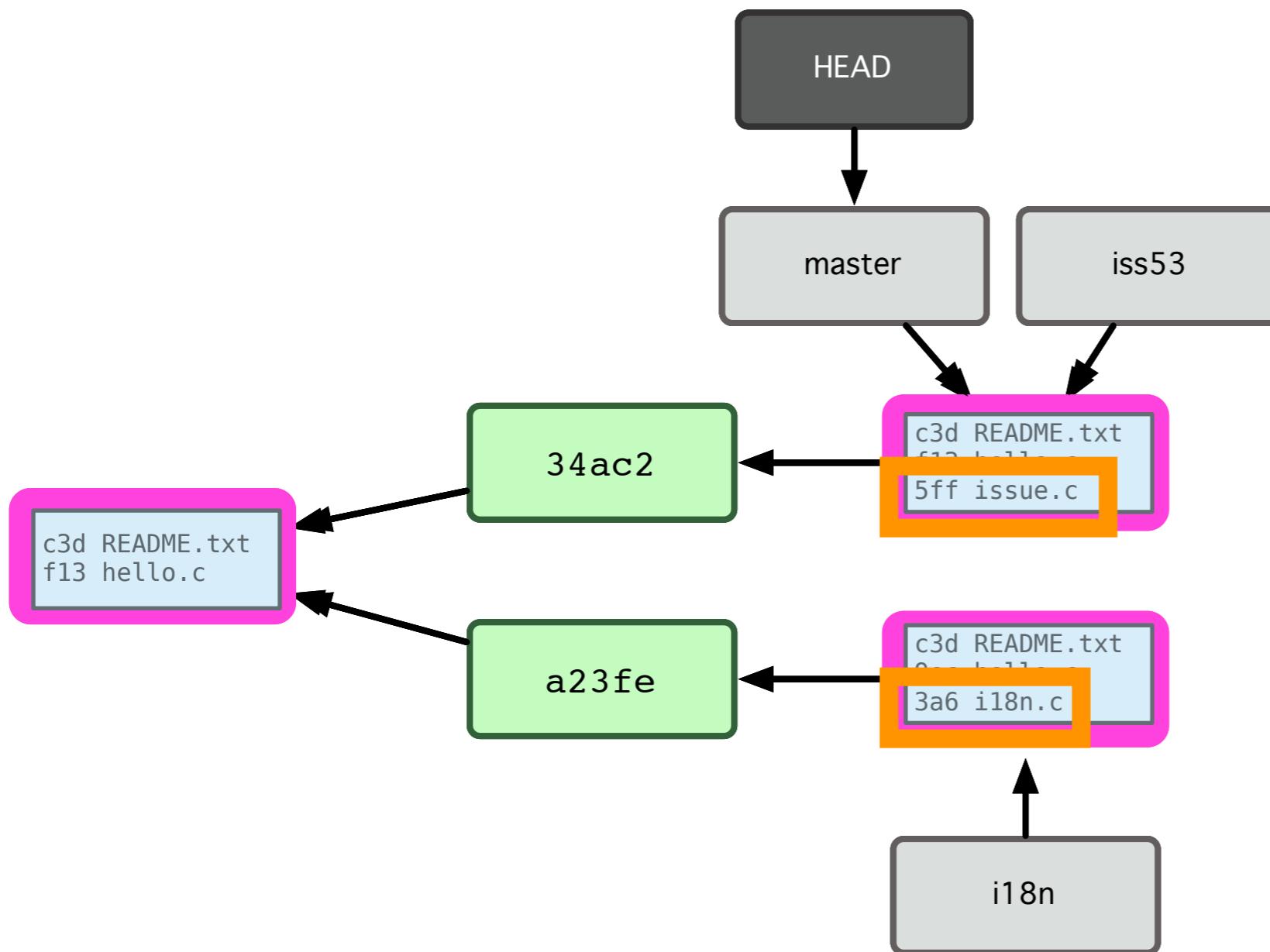
git merge i18n



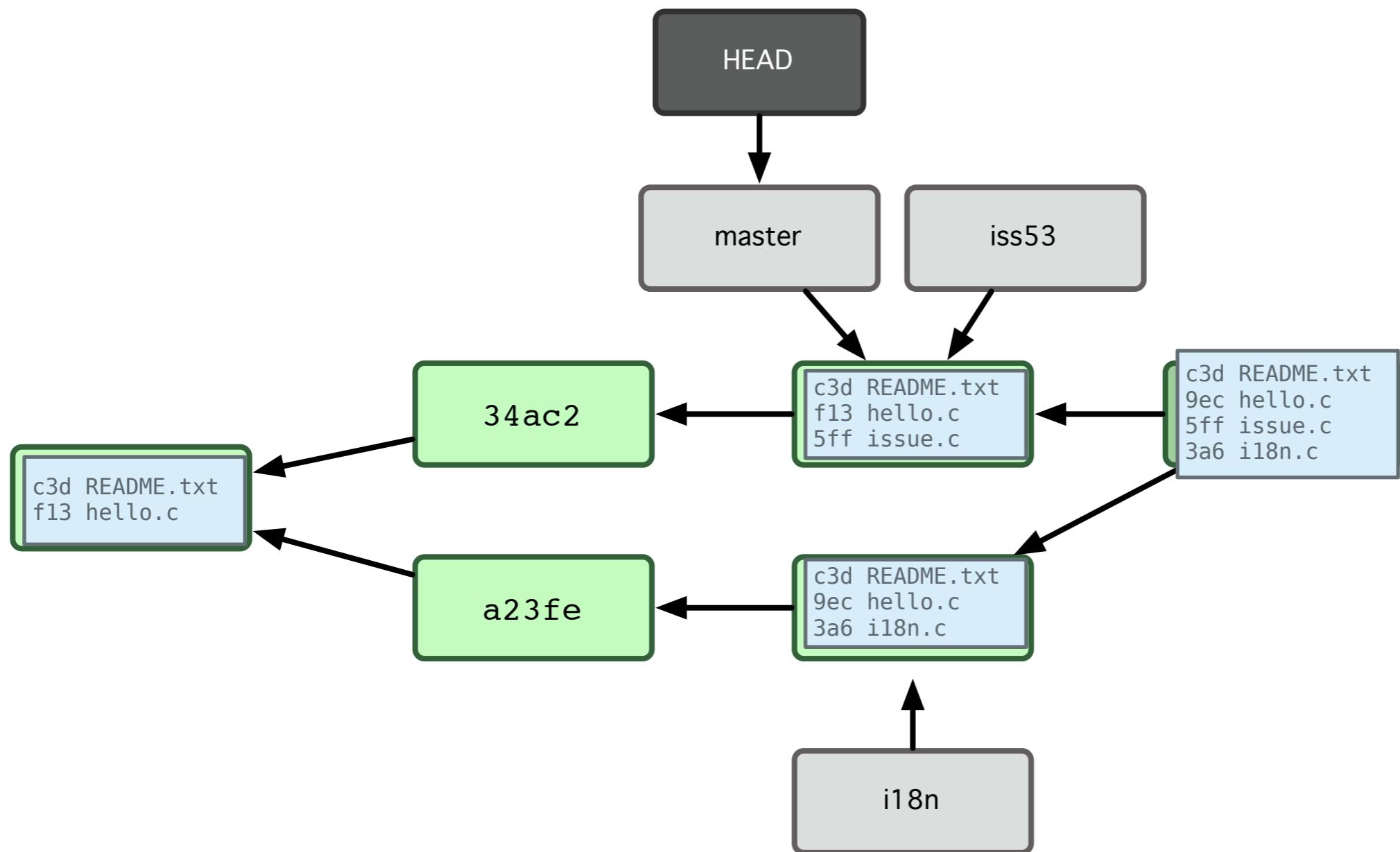
git merge i18n



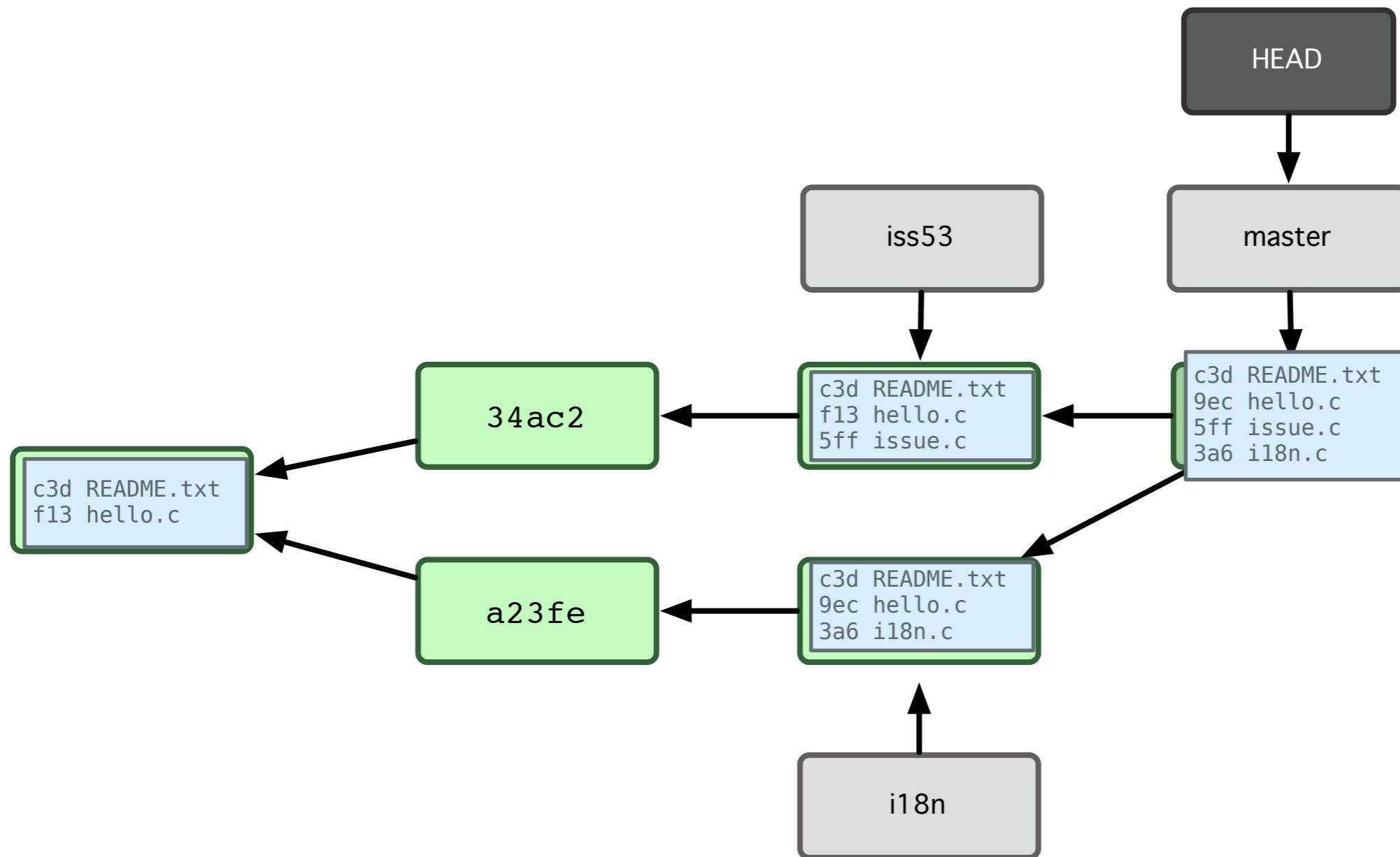
git merge i18n

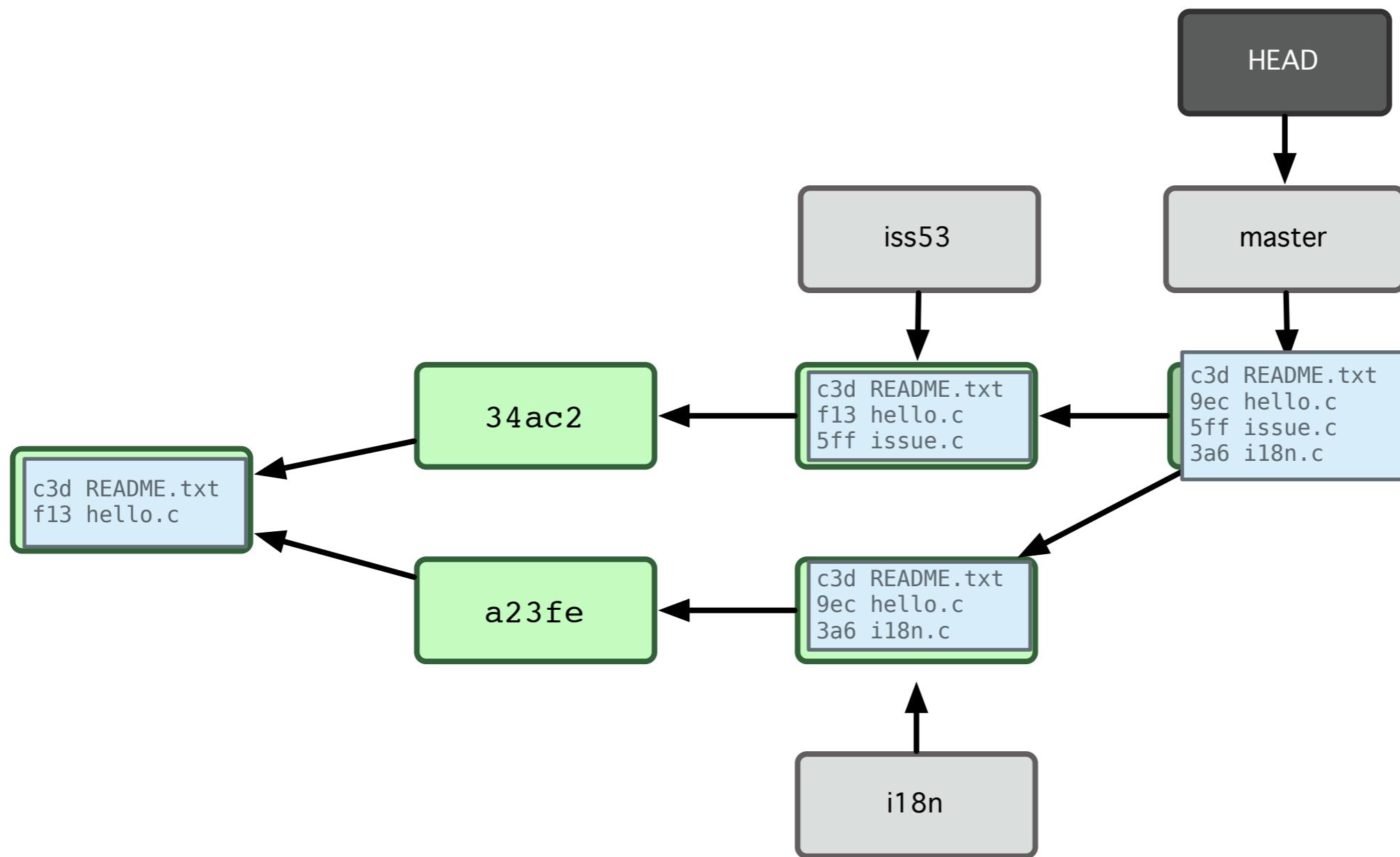


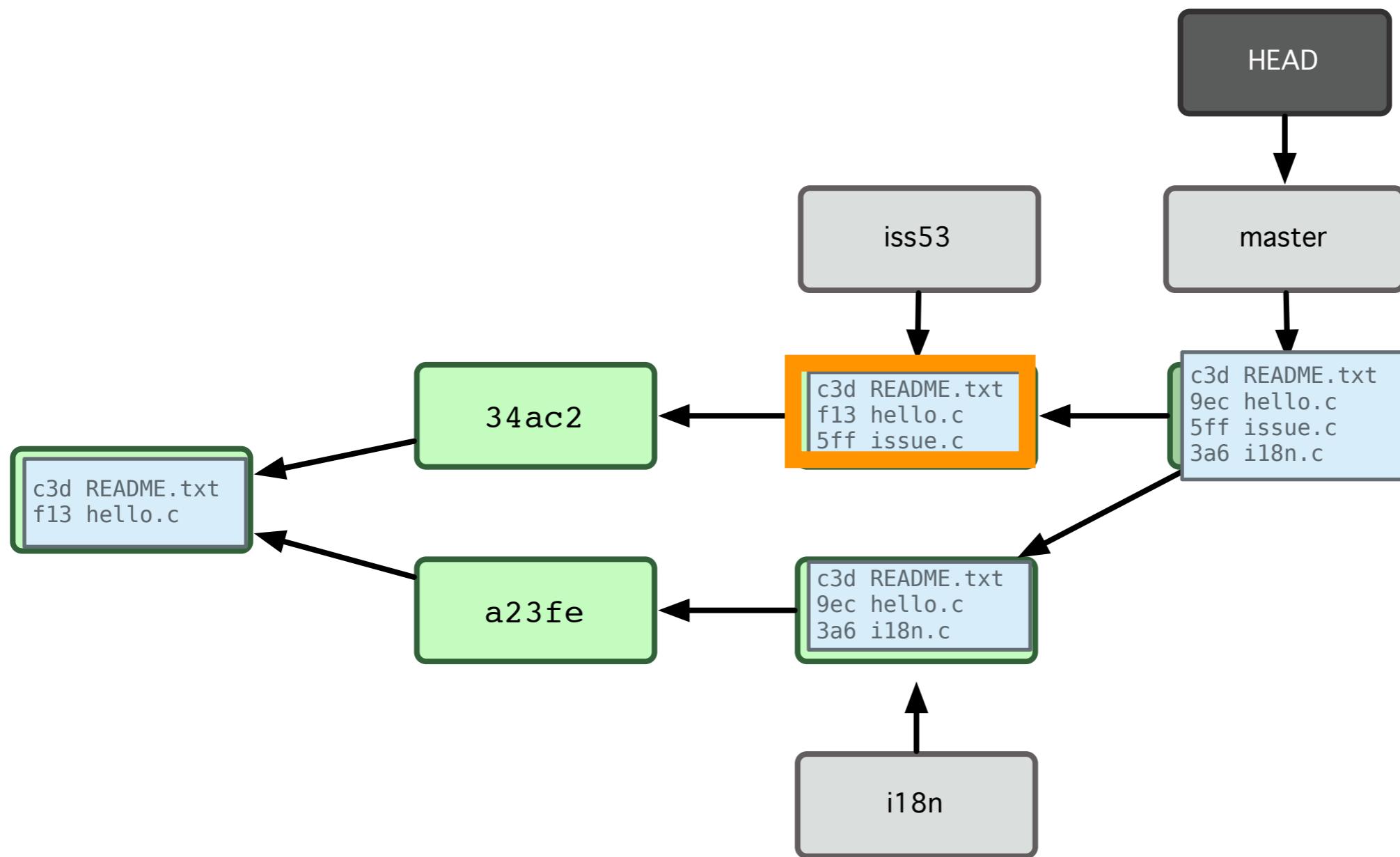
git merge i18n

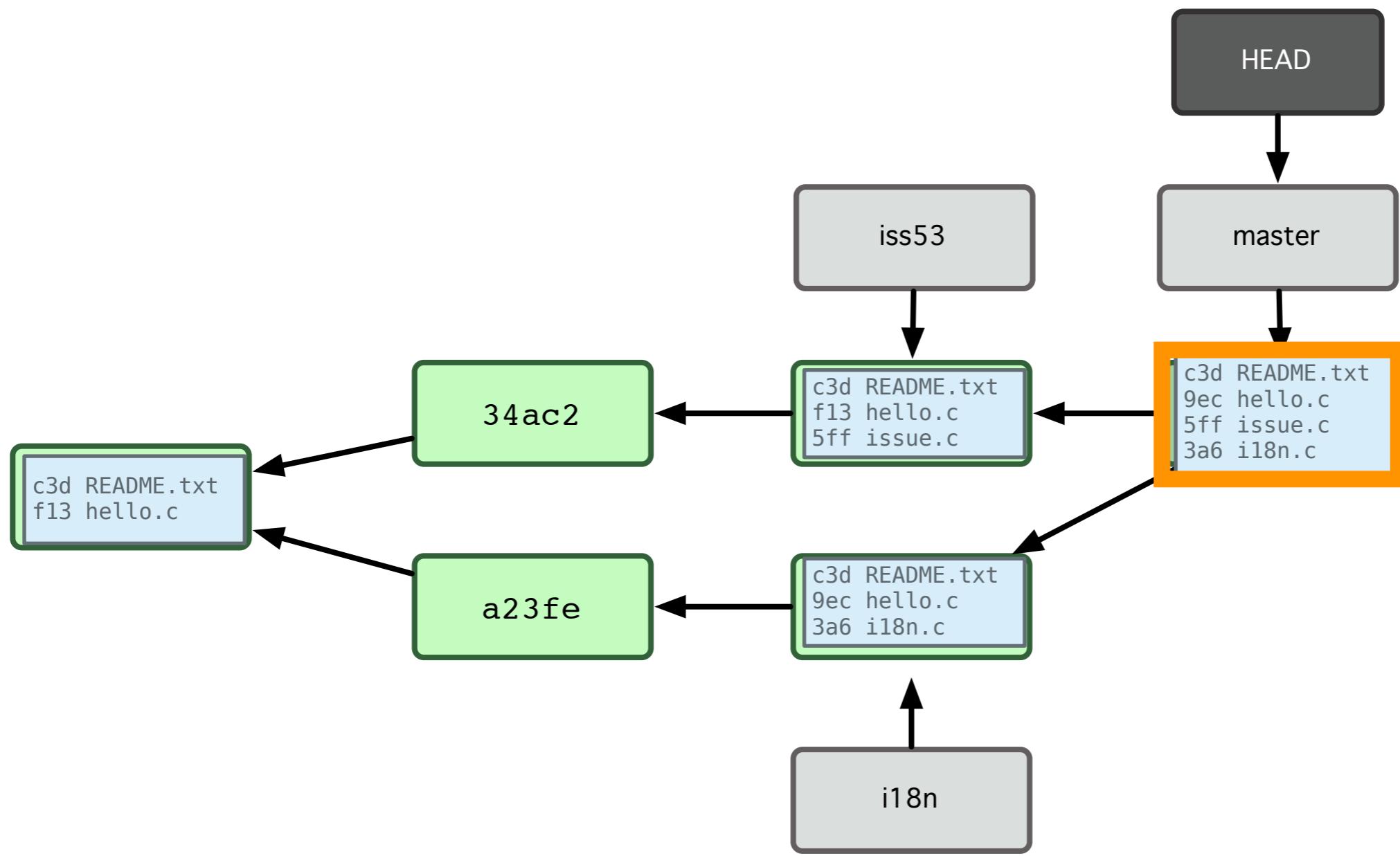


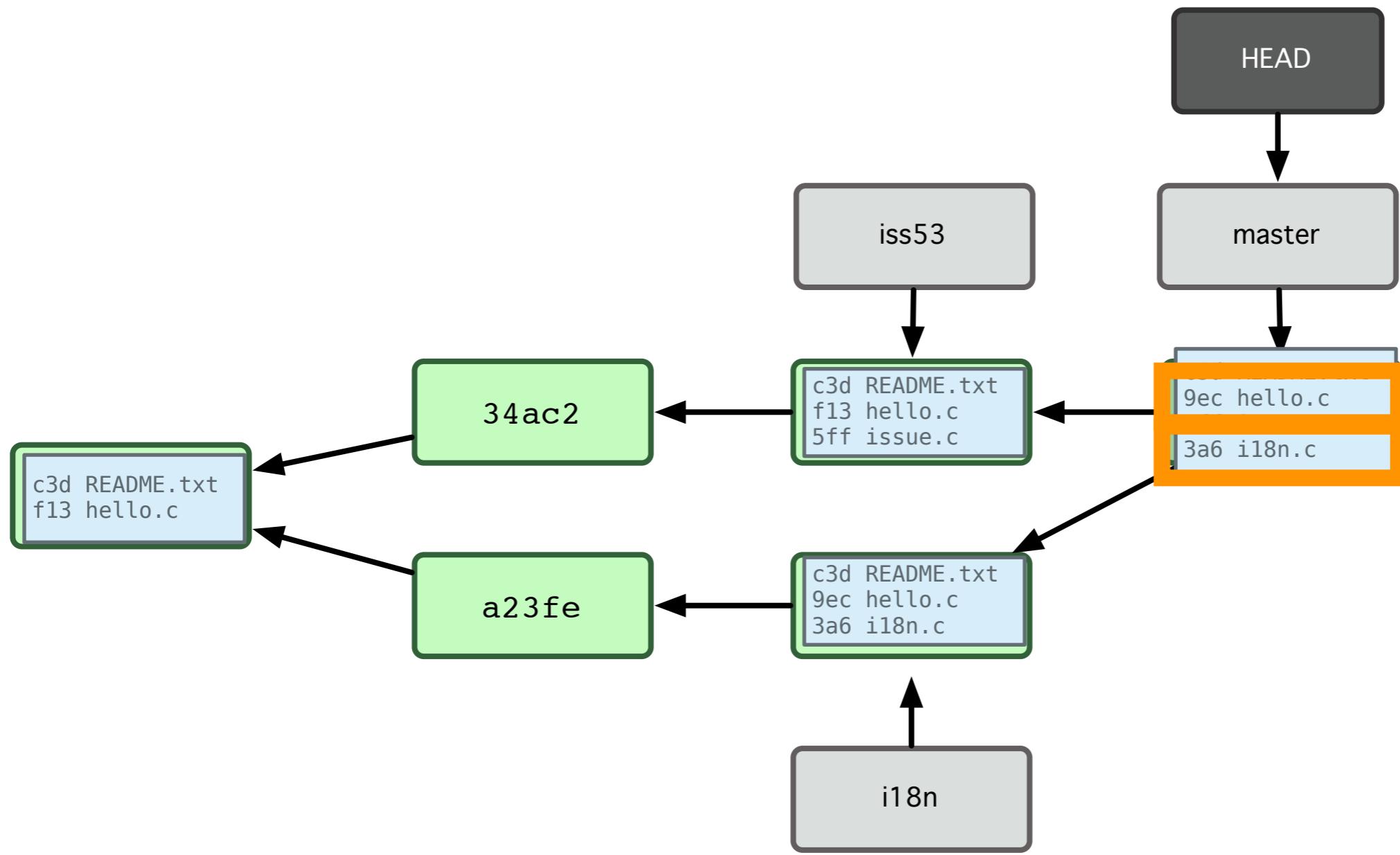
git merge i18n

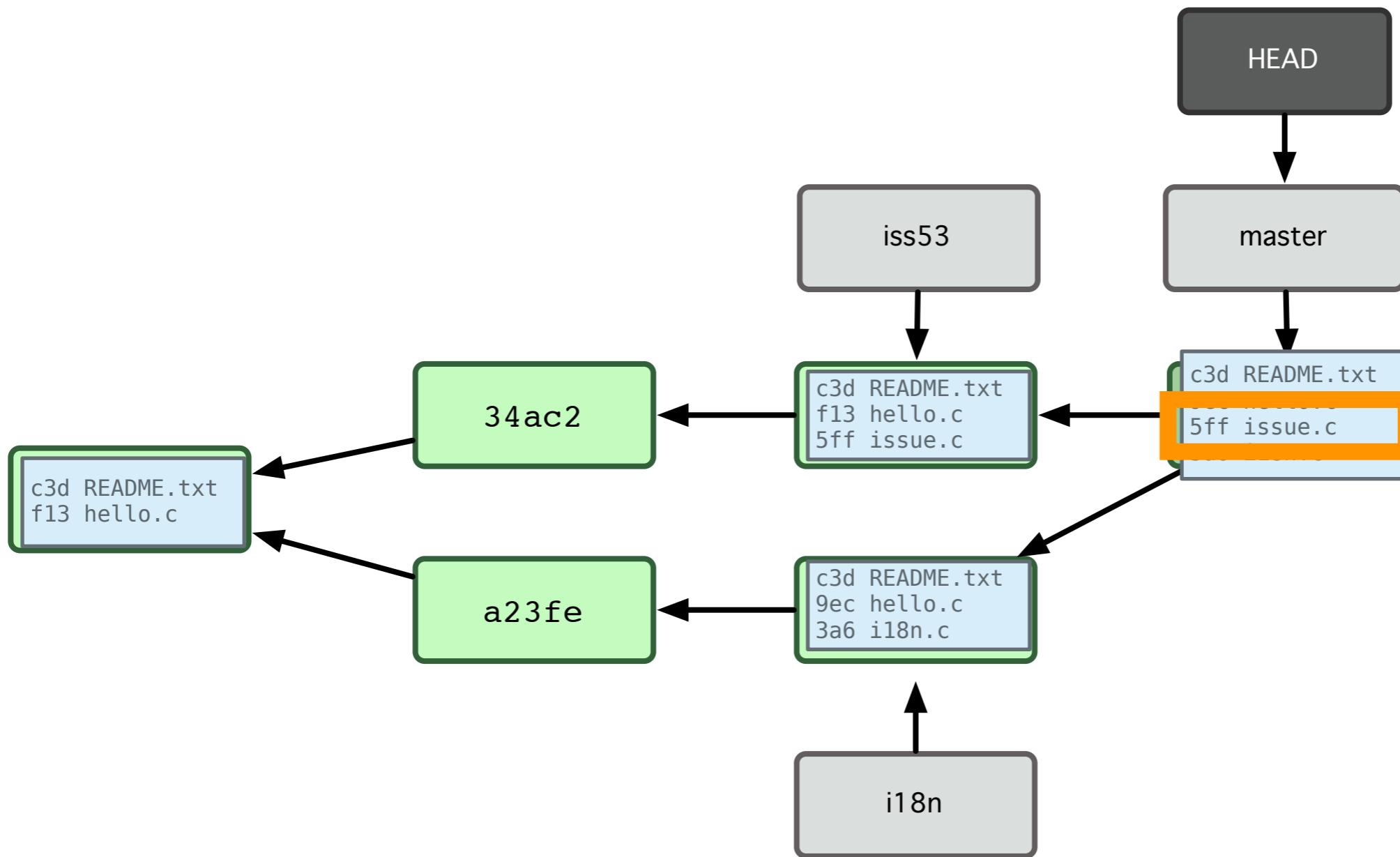


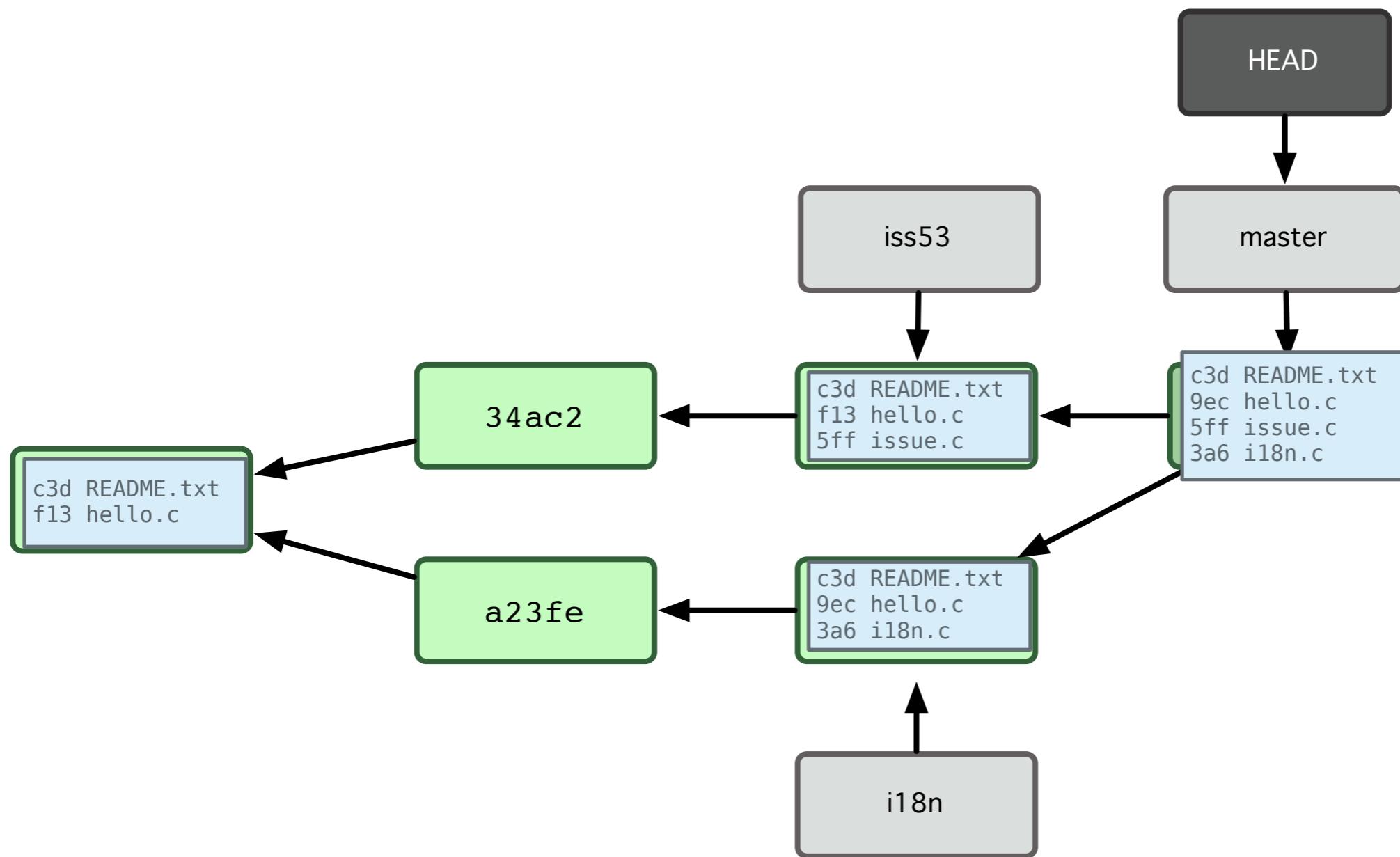


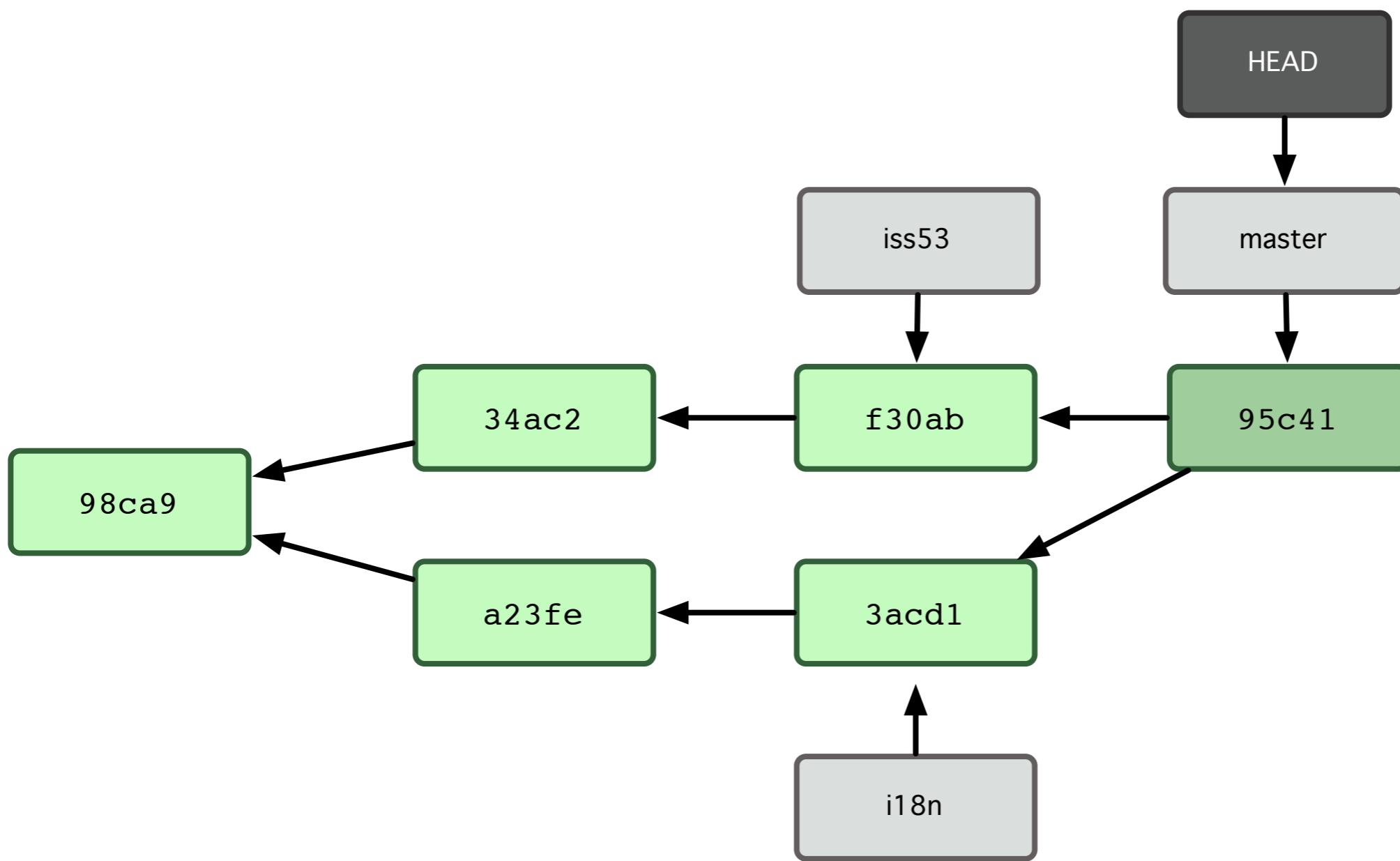












merge conflicts

```
$ git merge iss53
Auto-merging index.html
CONFLICT (content): Merge conflict in index.html
Automatic merge failed; fix conflicts and then commit the result.
```

```
$ git merge iss53
Auto-merging index.html
CONFLICT (content): Merge conflict in index.html
Automatic merge failed; fix conflicts and then commit the result.
```

```
$ git merge iss53
Auto-merging index.html
CONFLICT (content): Merge conflict in index.html
Automatic merge failed; fix conflicts and then commit the result.
```

```
$ git status
index.html: needs merge
# On branch master
# Changed but not updated:
#   (use "git add <file>..." to update what will be committed)
#   (use "git checkout -- <file>..." to discard changes in
working directory)
#
# unmerged:    index.html
#
```

```
<<<<< HEAD:index.html
<div id="footer">contact :
email.support@github.com</div>
=====
<div id="footer">
  please contact us at support@github.com
</div>
>>>>> iss53:index.html
```

```
$ git add [file]
```

```
$ git status
# On branch master
# Changes to be committed:
#   (use "git reset HEAD <file>..." to unstage)
#
# modified:   index.html
#
```

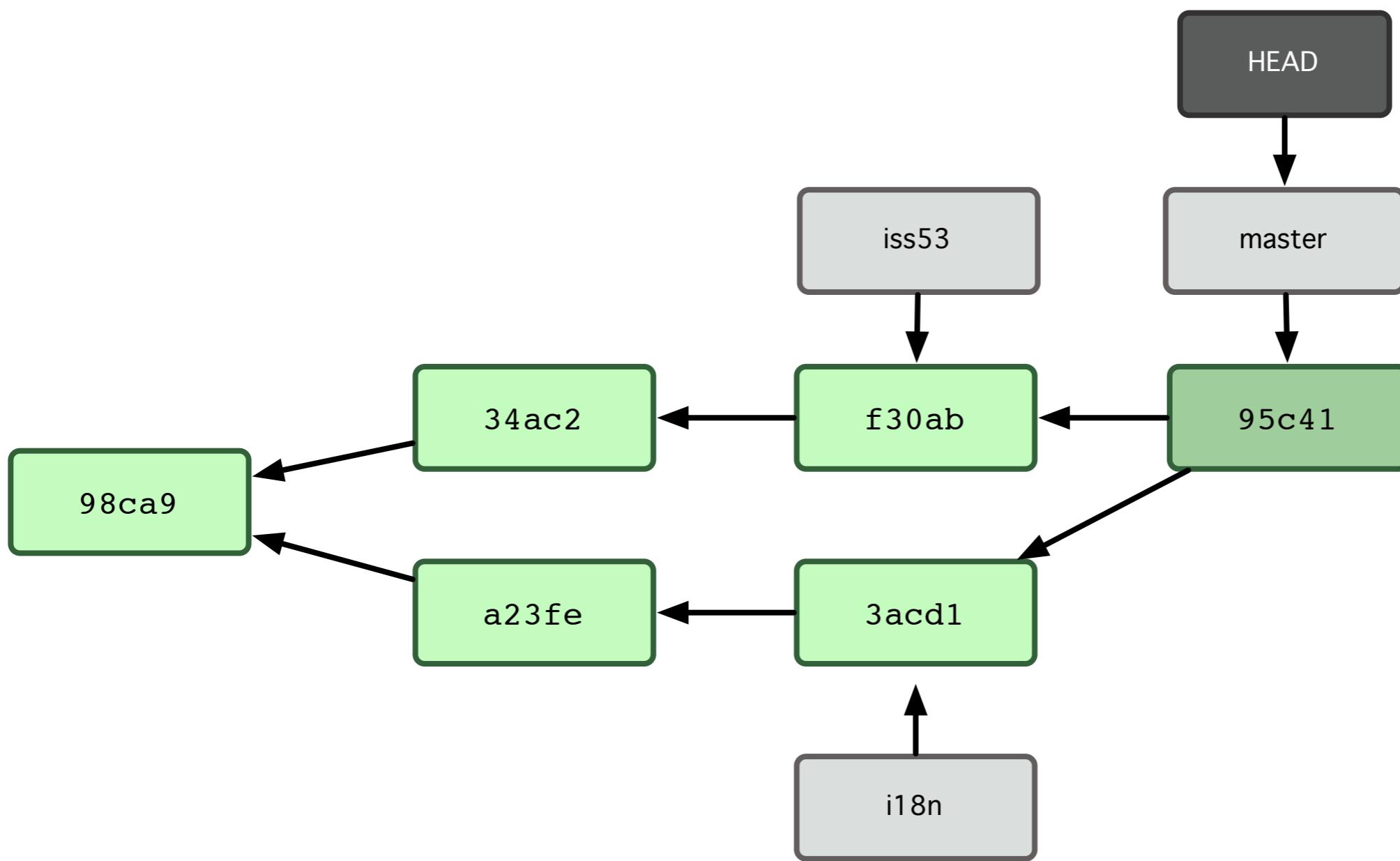
git mergetool

```
$ git mergetool
merge tool candidates: kdiff3 tkdiff xxdiff meld gvimdiff opendiff
emerge vimdiff
Merging the files: index.html

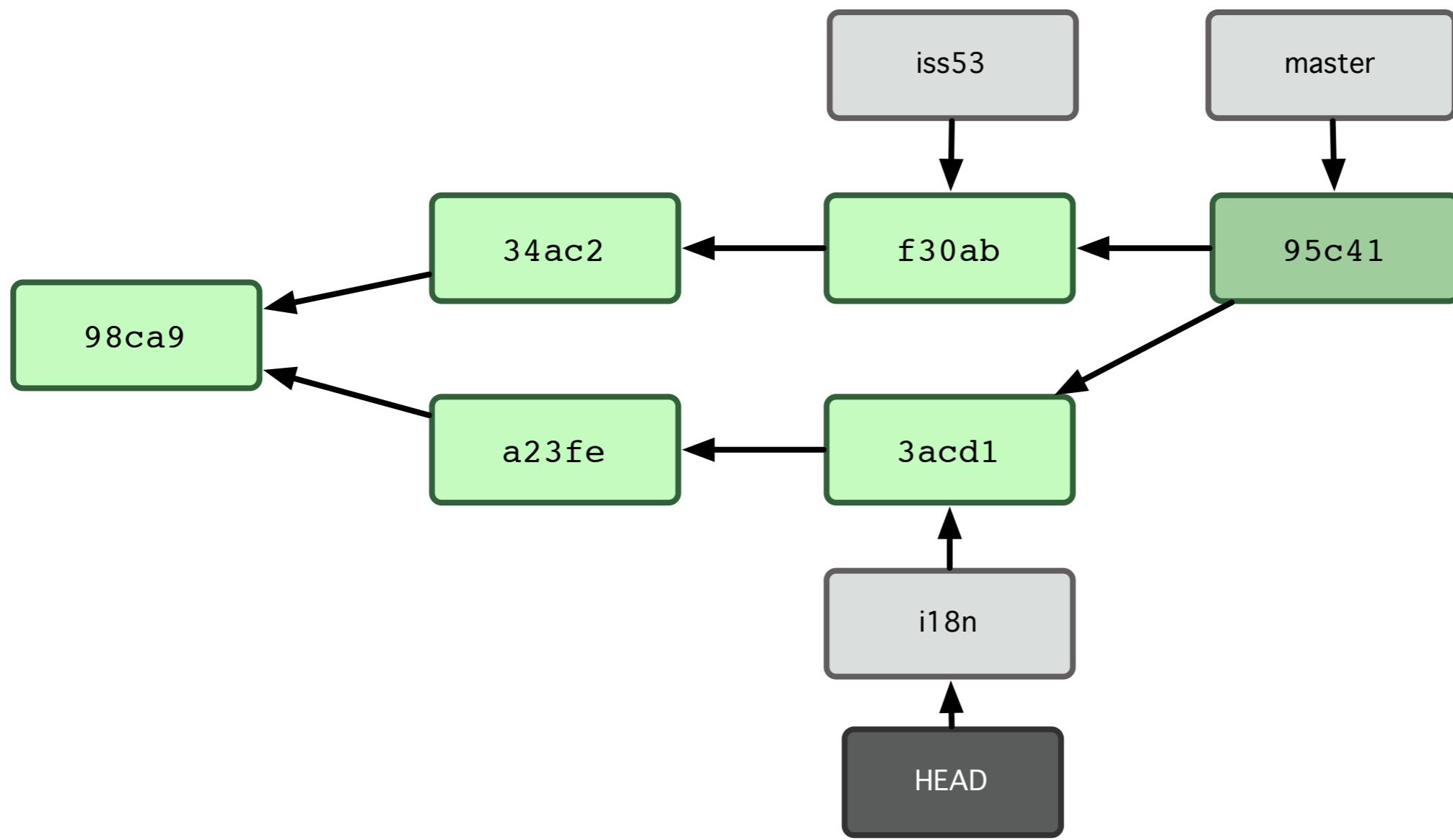
Normal merge conflict for 'index.html':
{local}: modified
{remote}: modified
Hit return to start merge resolution tool (opendiff):
```

```
$ git commit
```

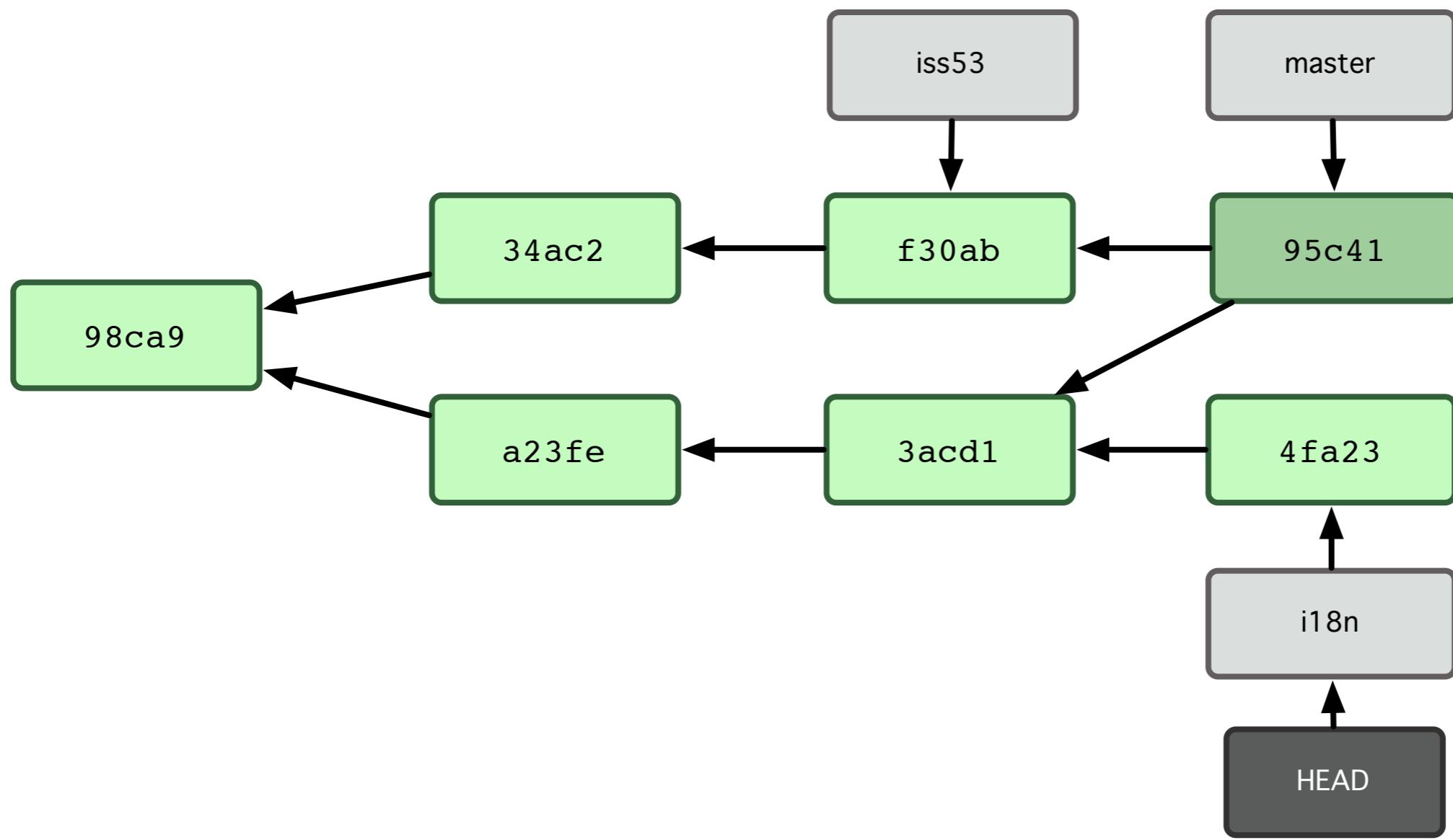
reintegration merges



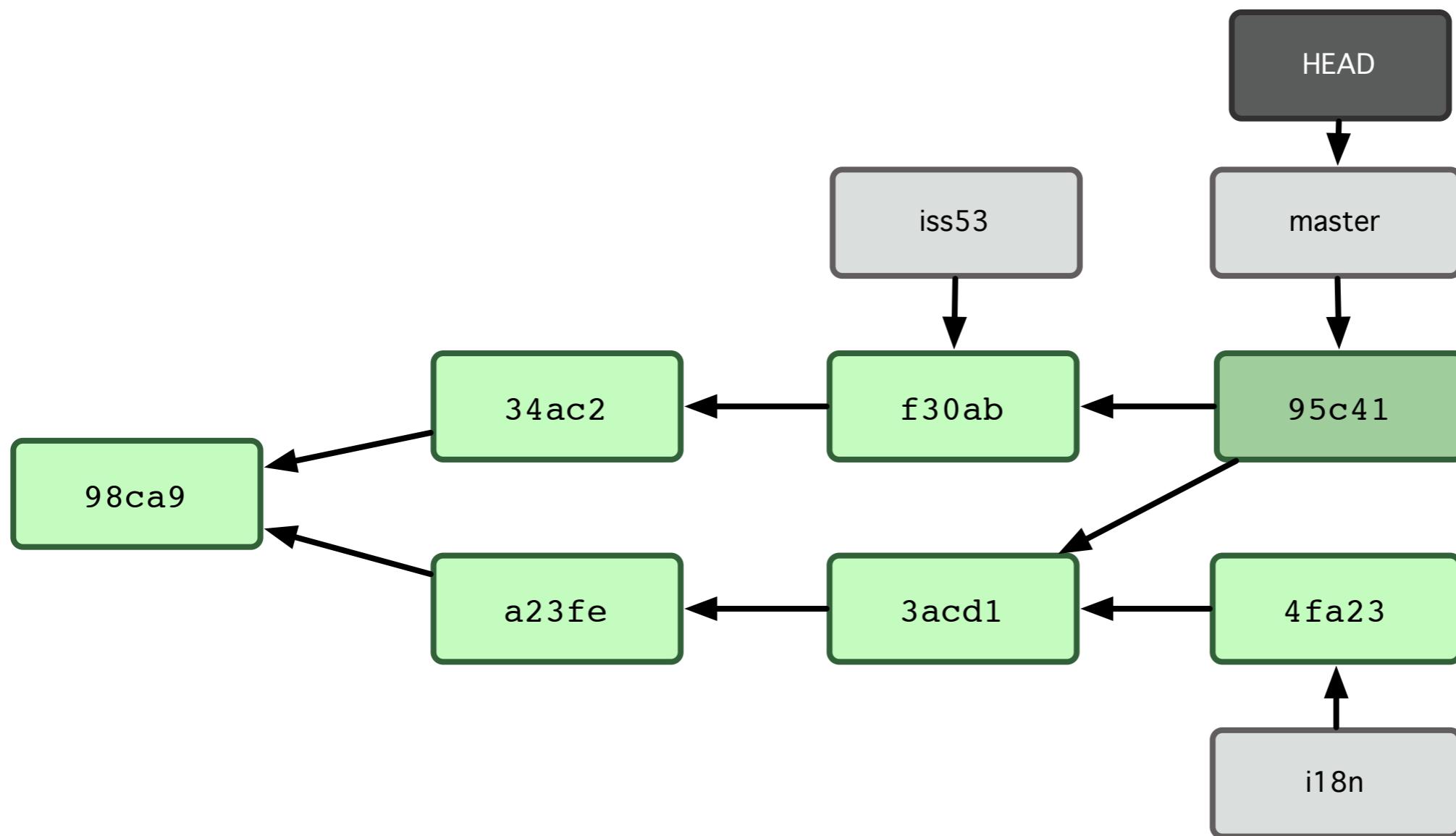
git checkout i18n



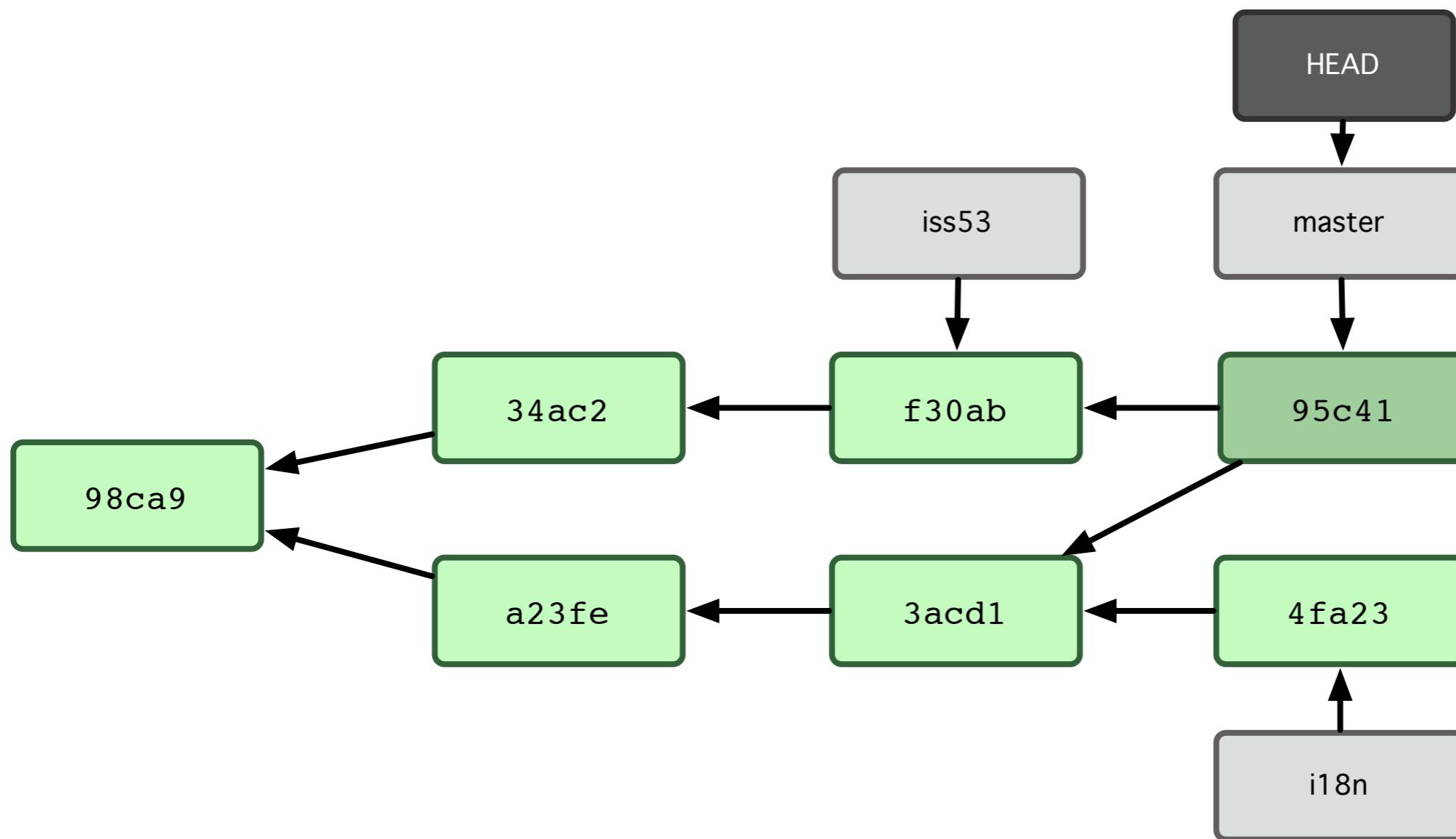
git commit



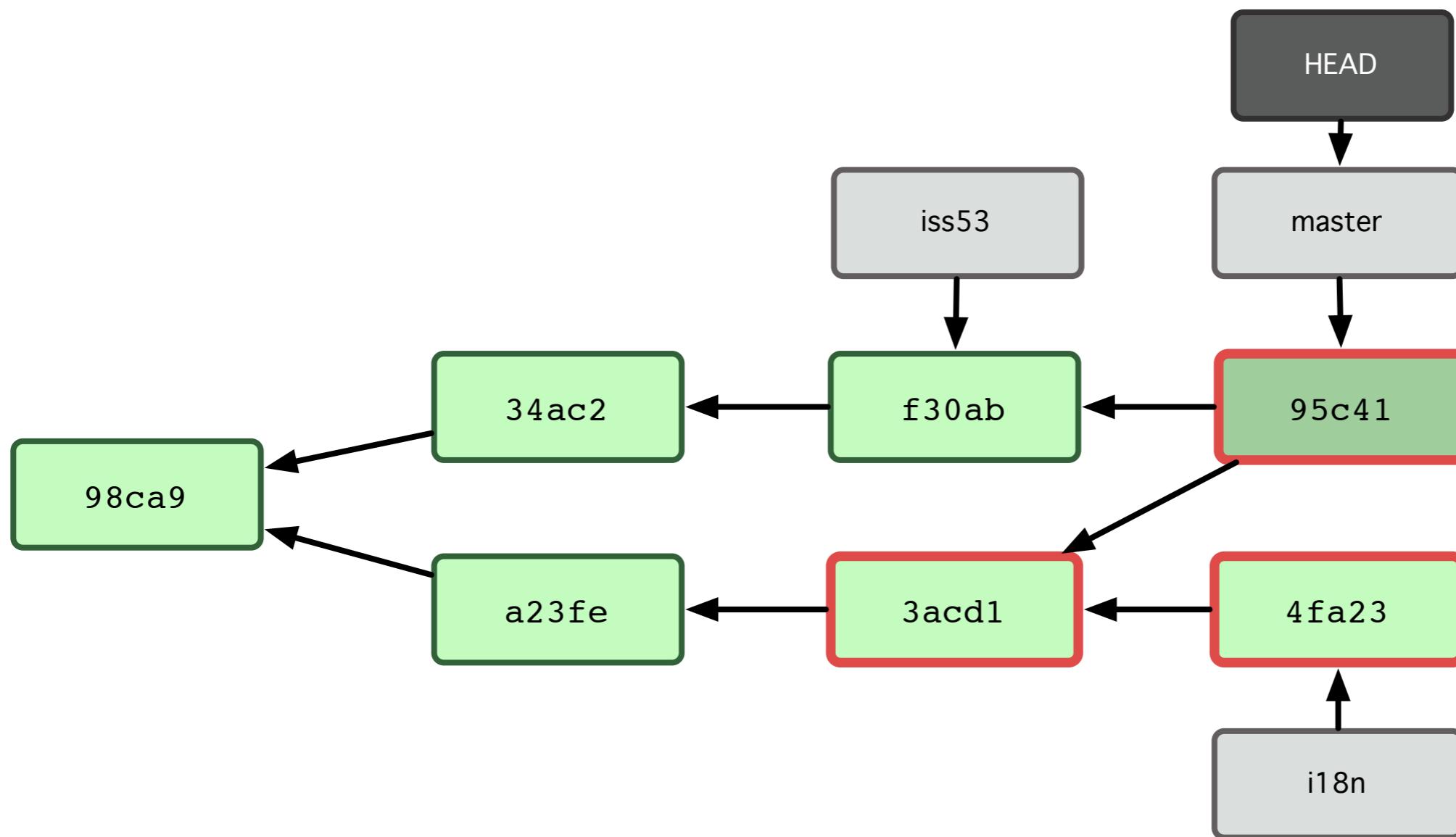
git checkout master



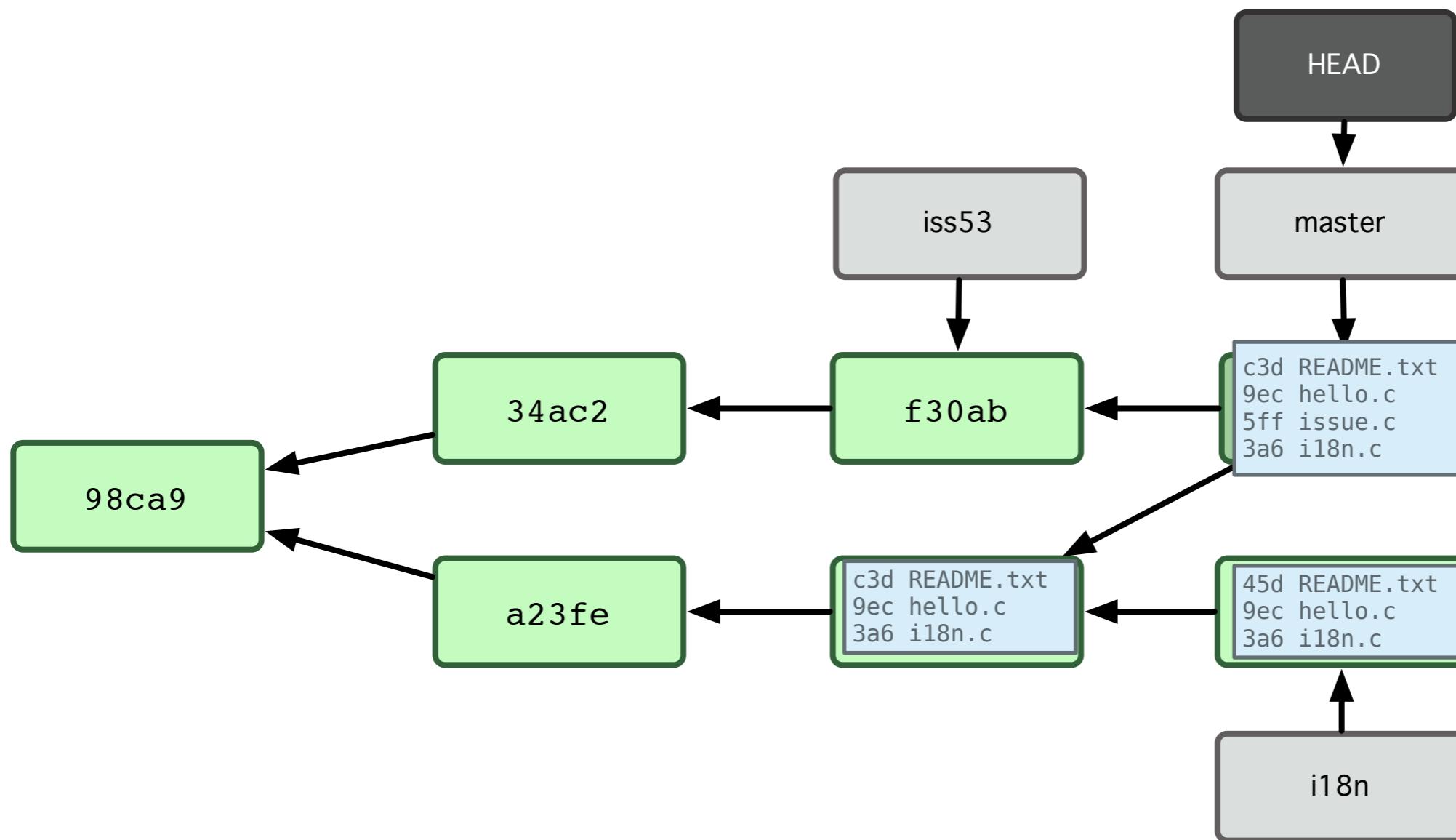
git merge i18n



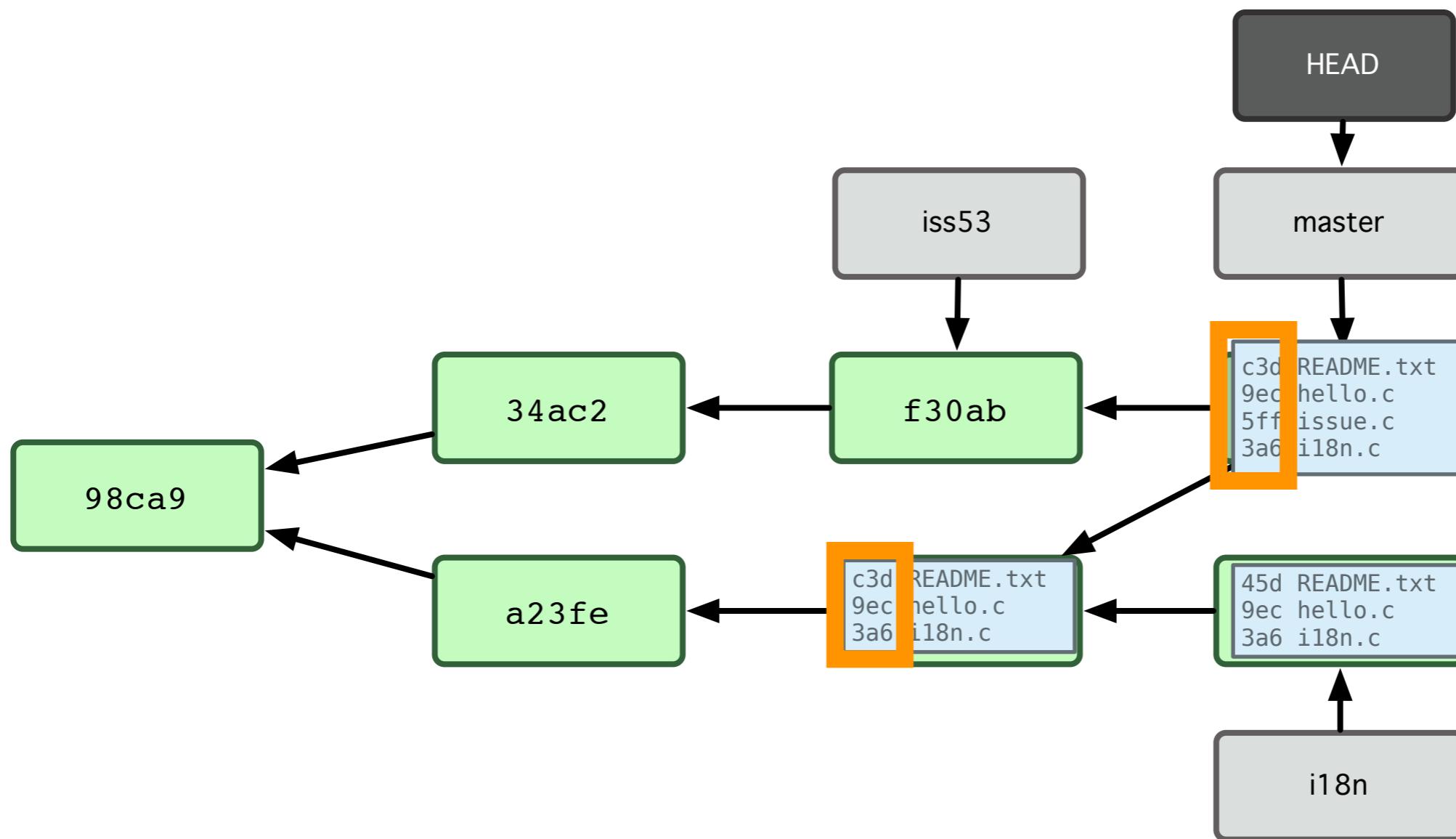
git merge i18n



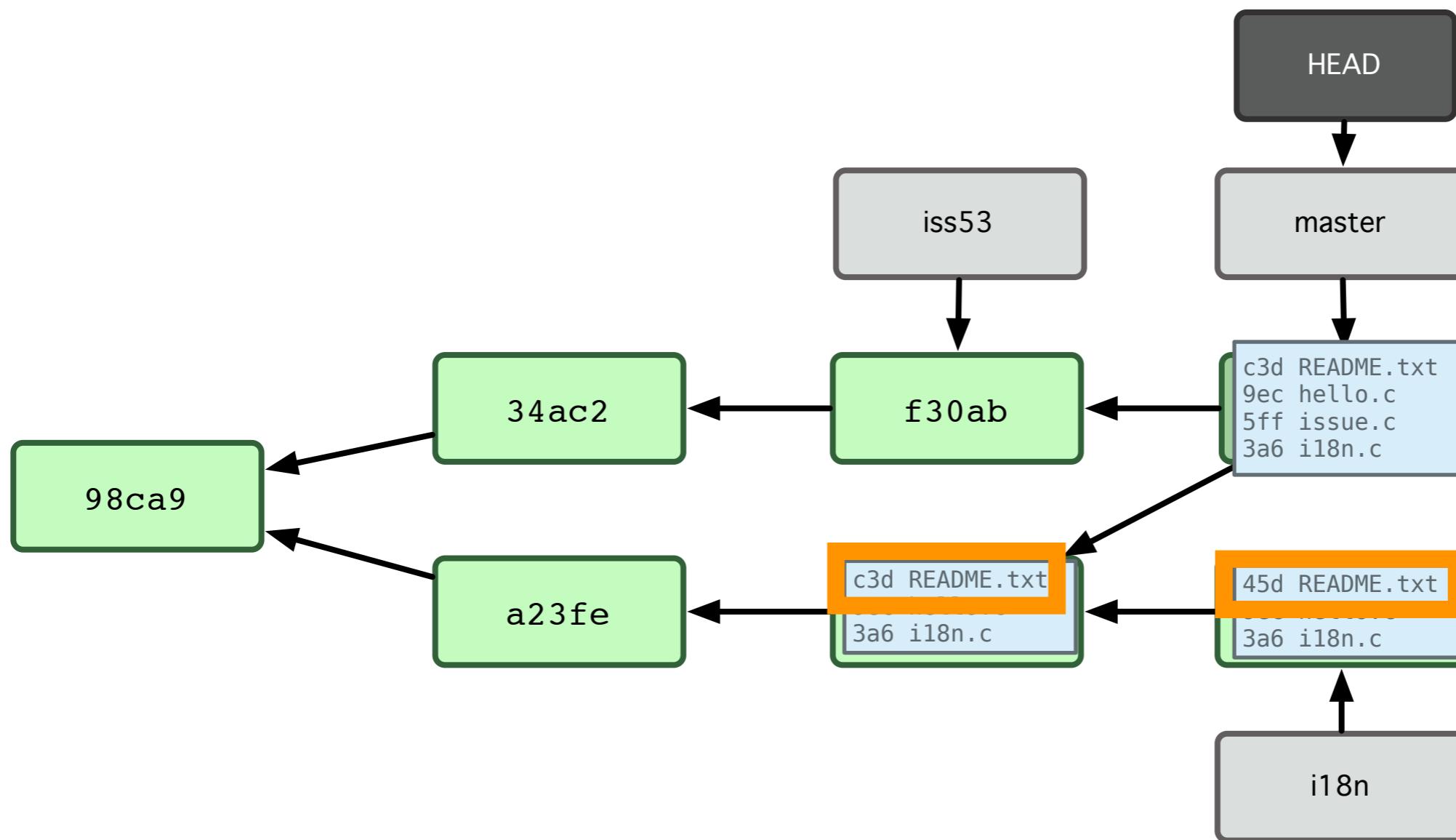
git merge i18n



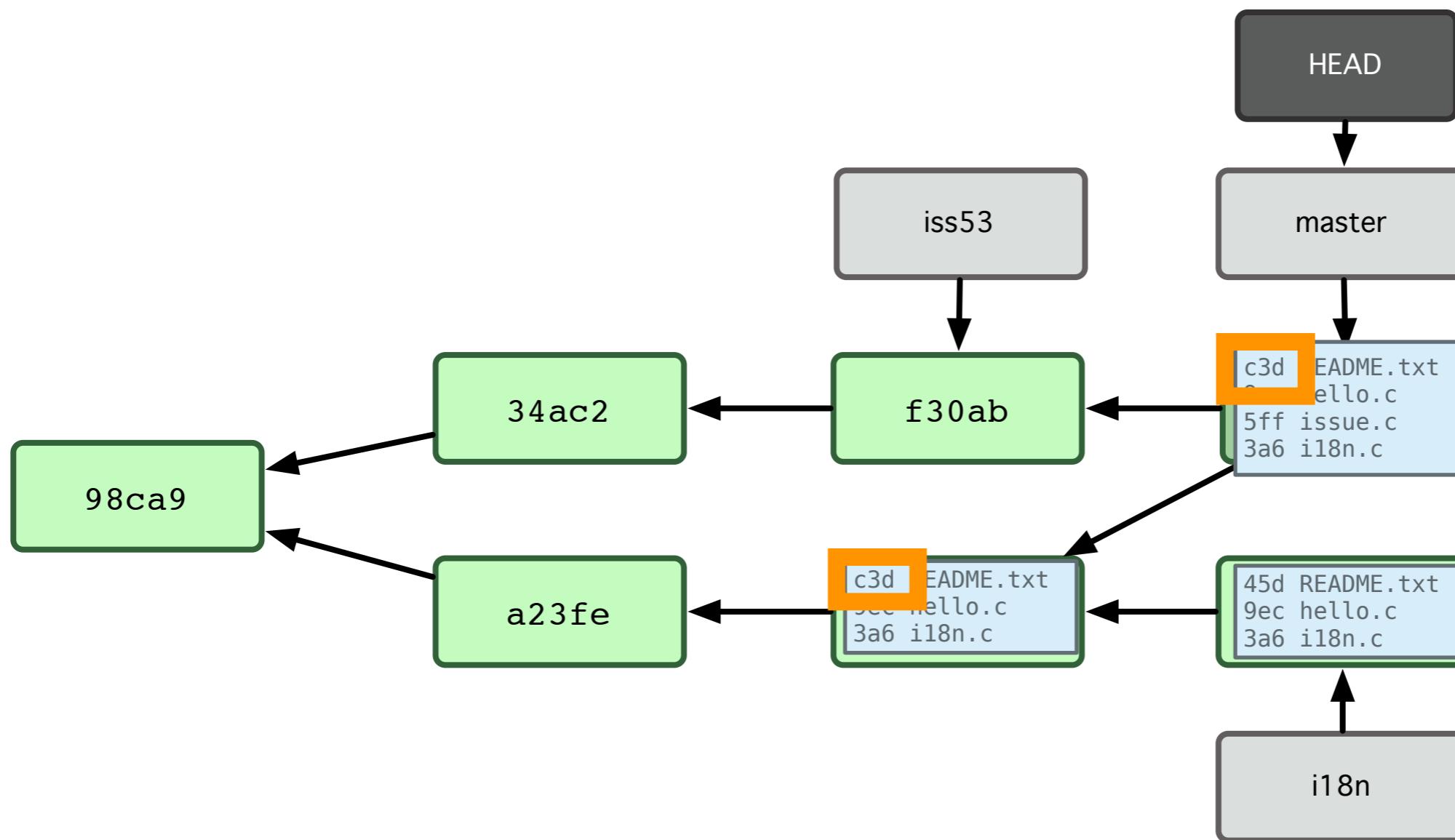
git merge i18n



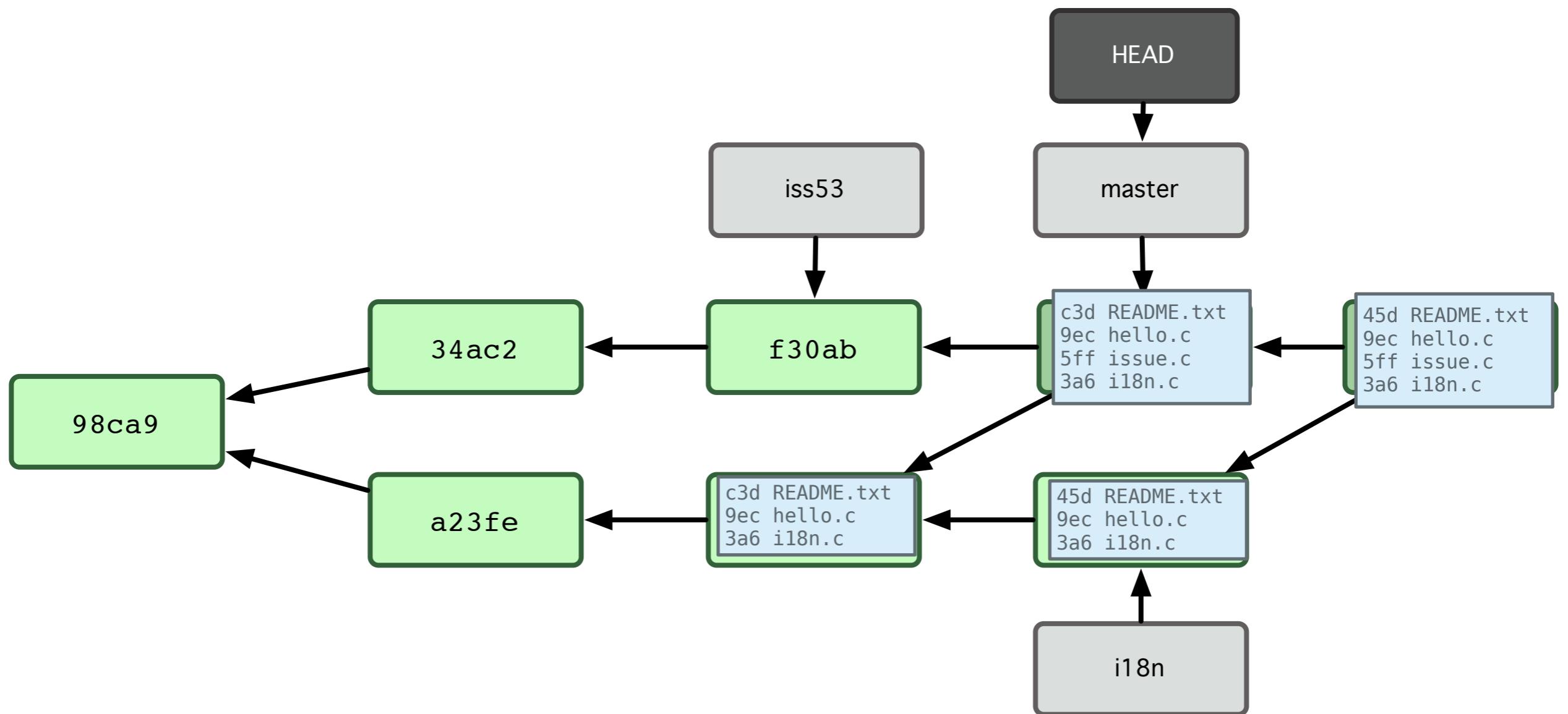
git merge i18n



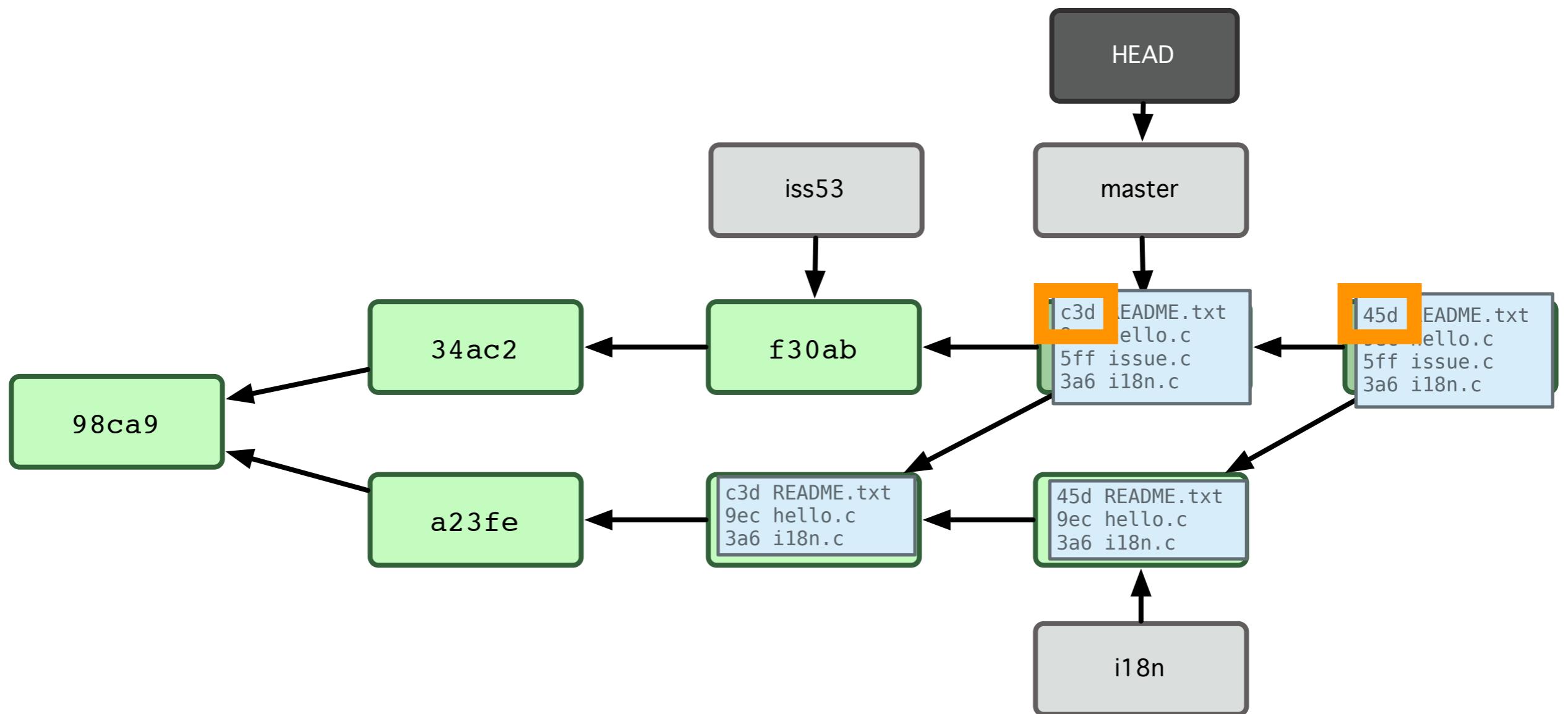
git merge i18n



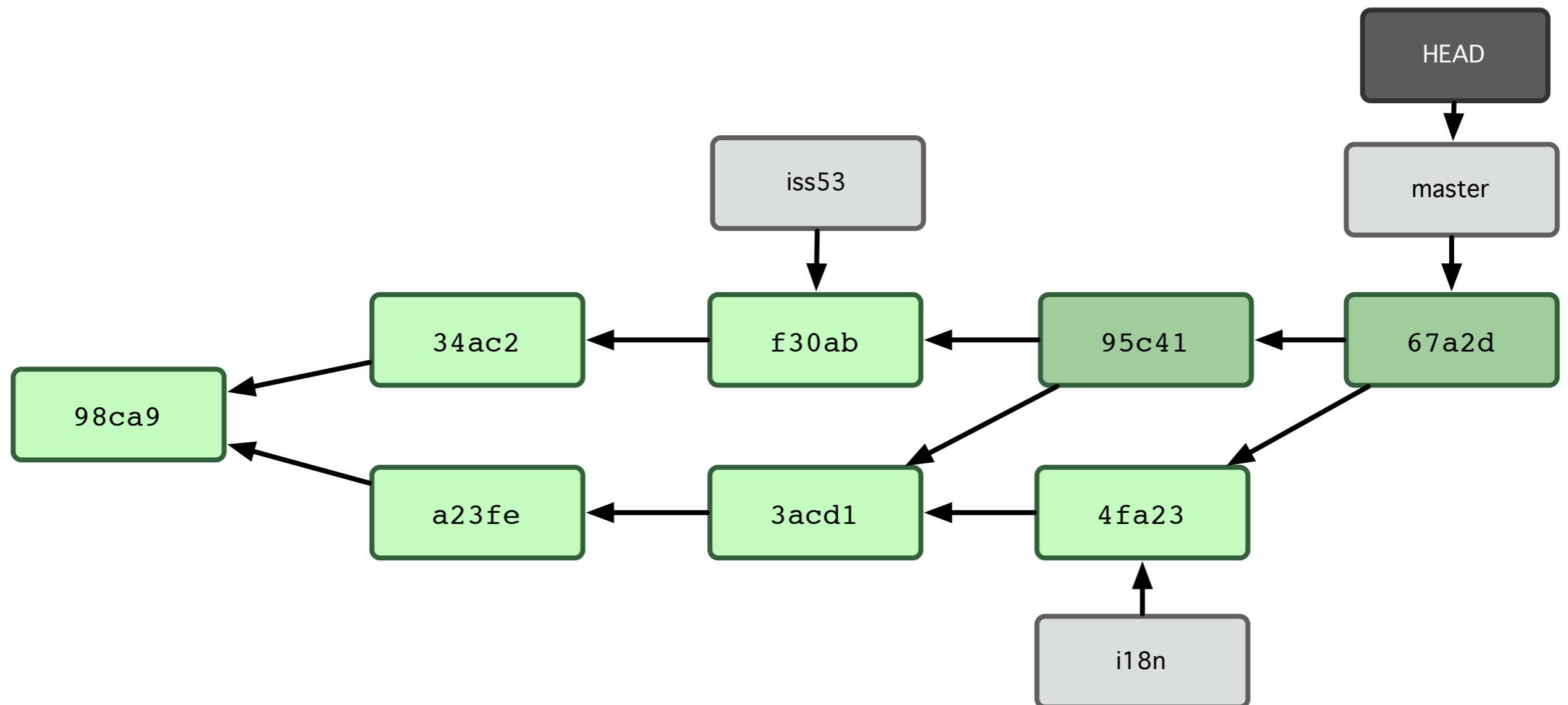
git merge i18n



git merge i18n



git merge i18n



Why is this cool?

try out an idea

isolate work units

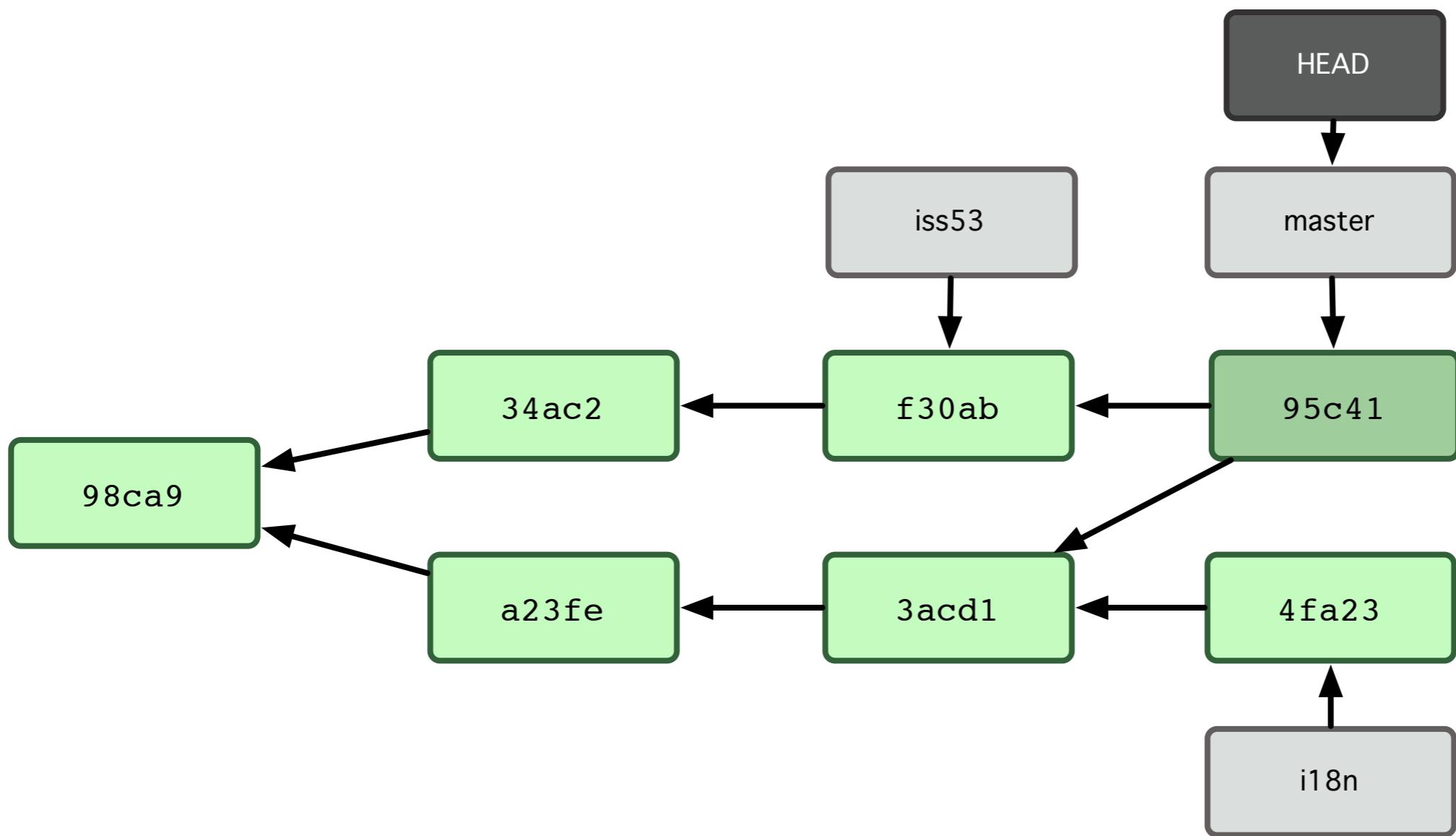
long running topics

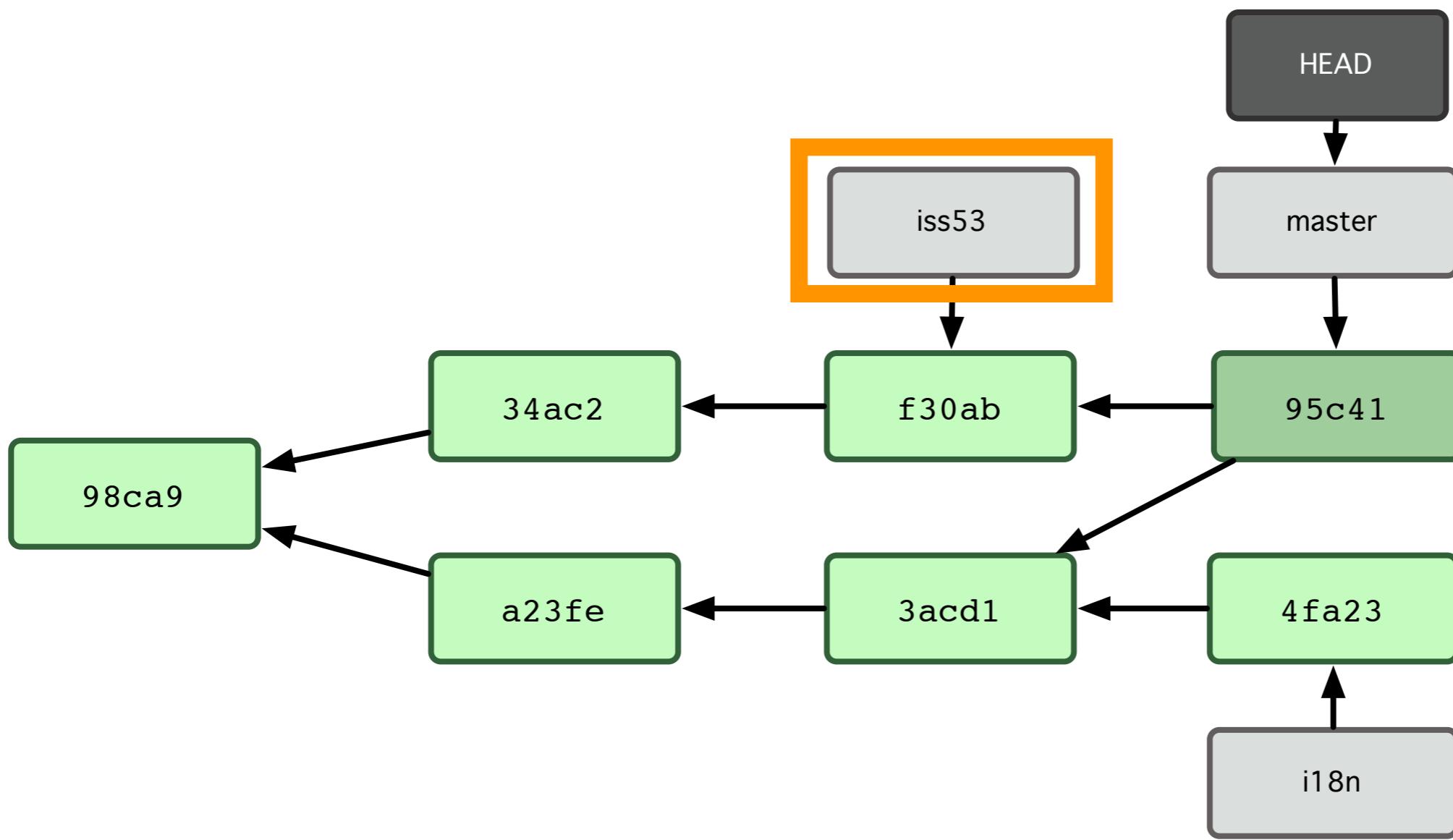
long running topics

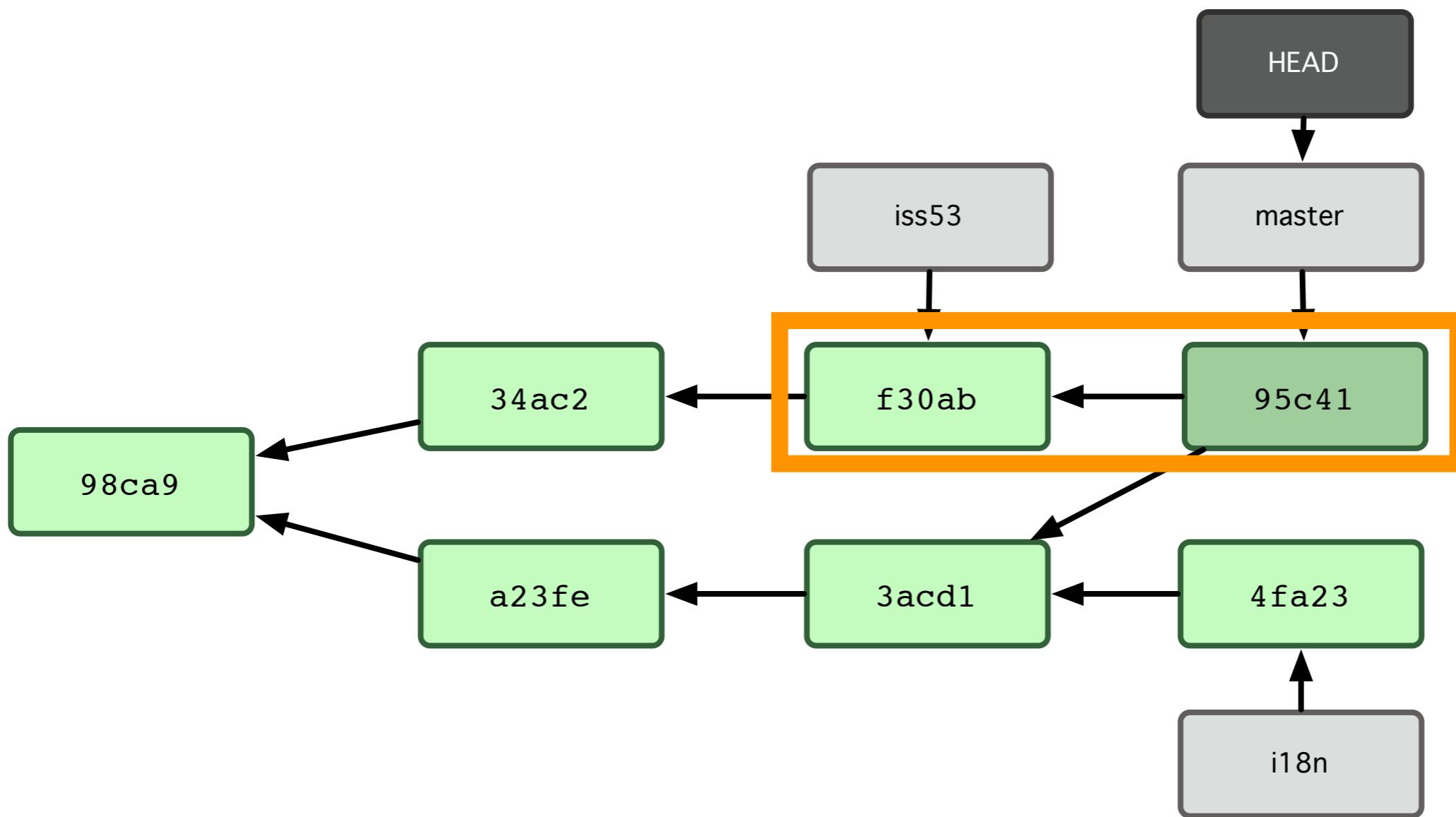
continuous merging

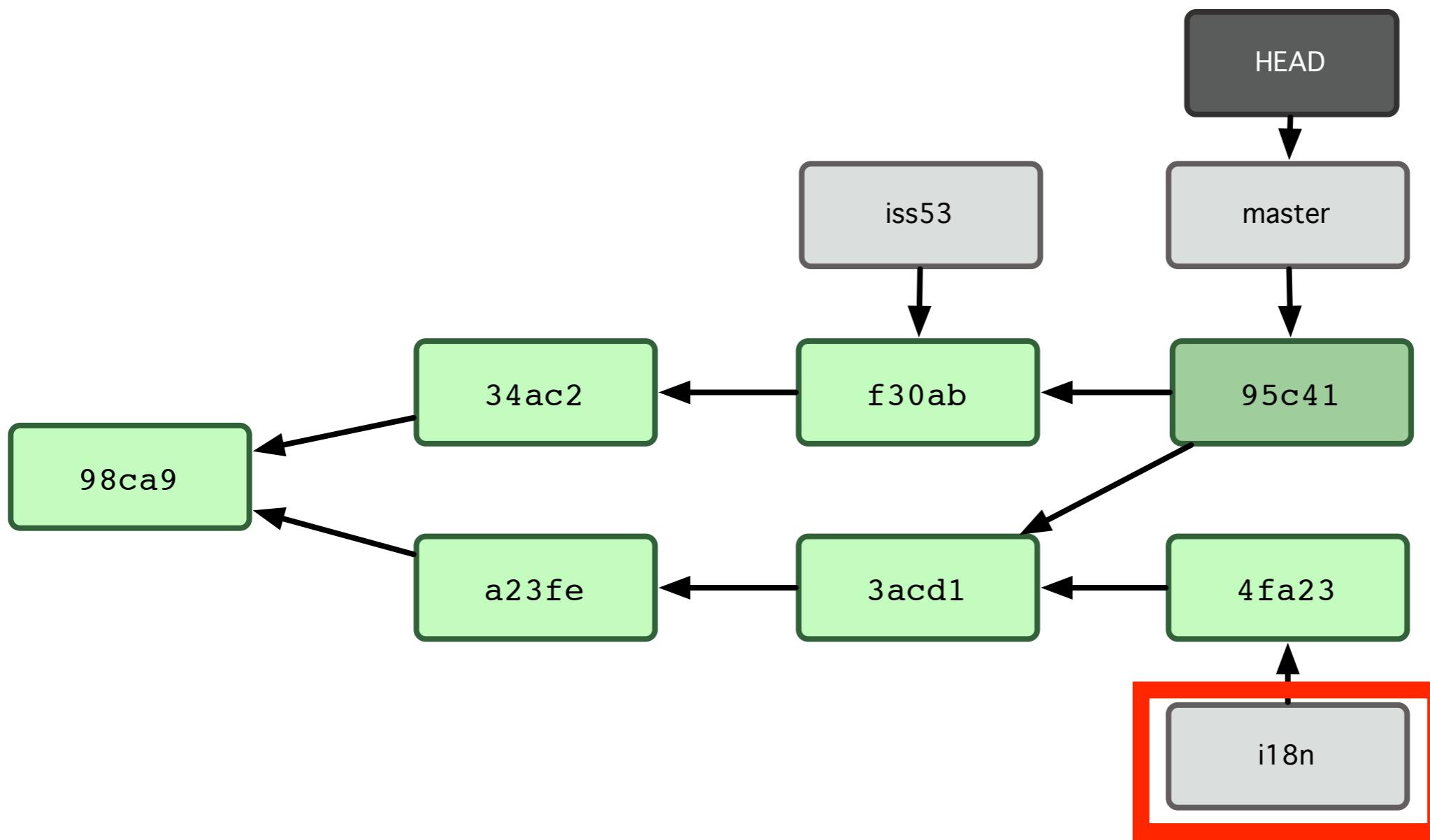
Deleting Branches

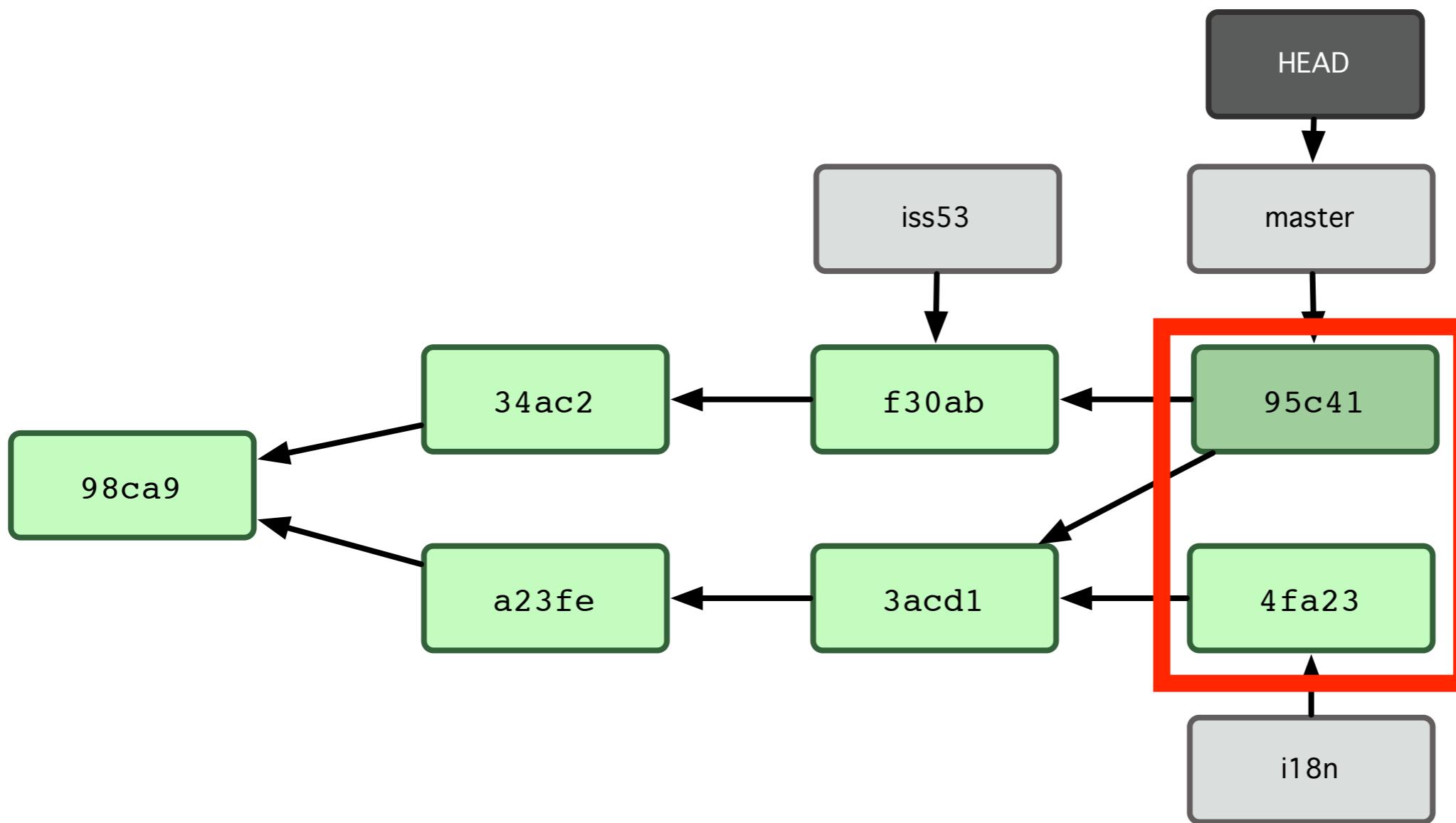
```
git branch -d branch
```









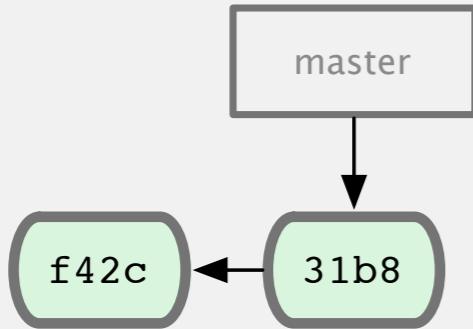


git branch -D branch

Collaborating

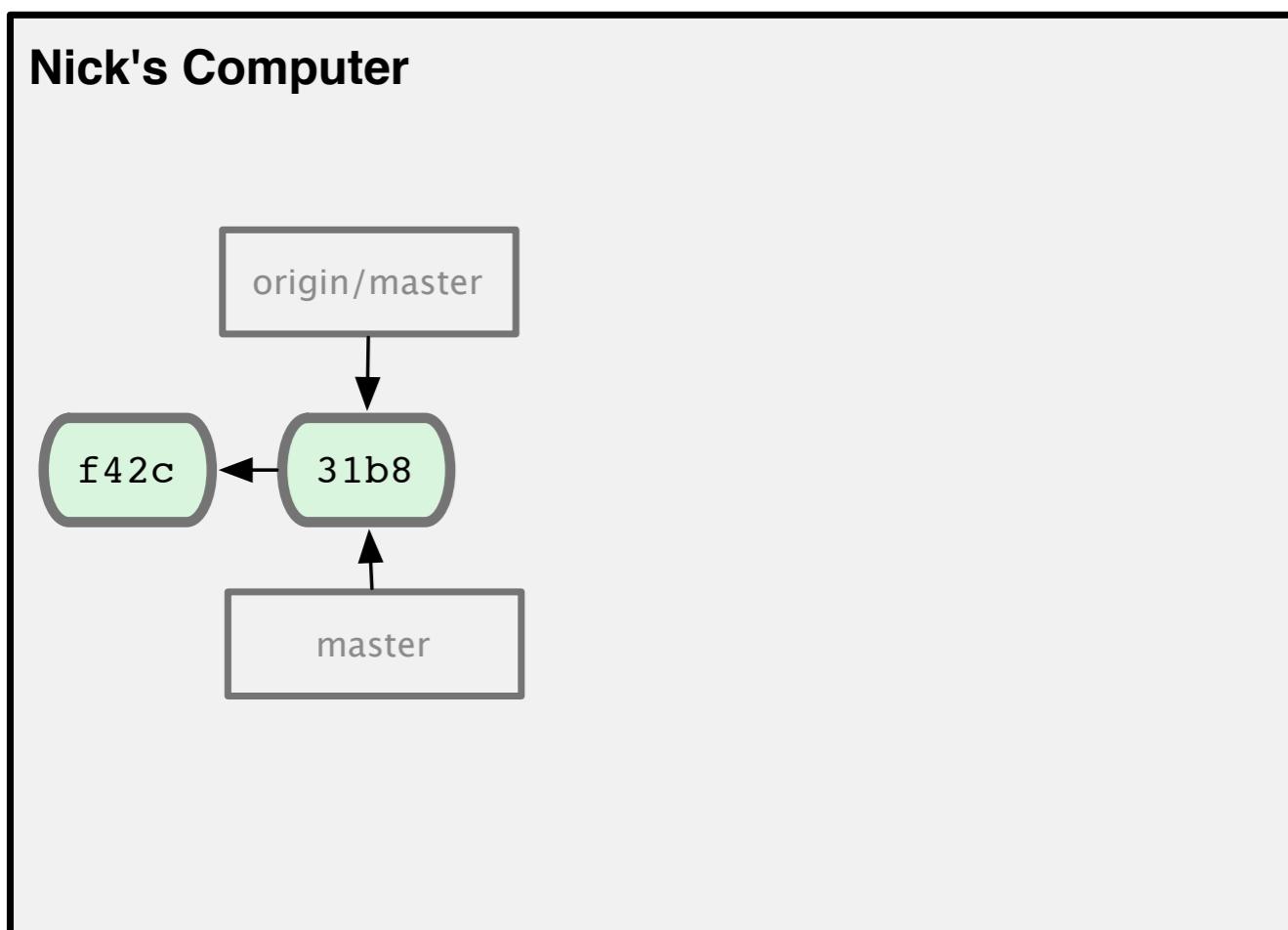
remotes

git.ourcompany.com



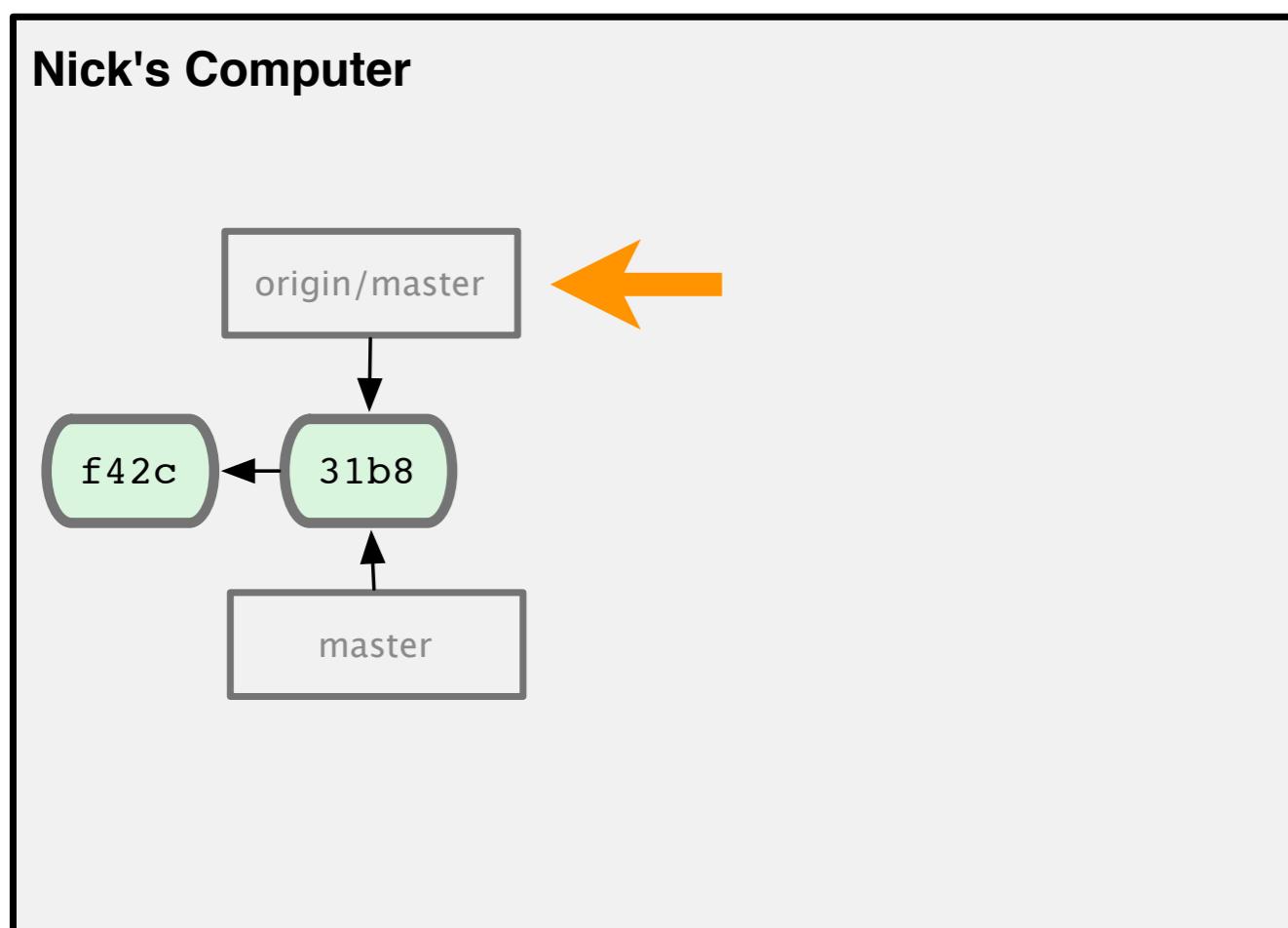


 `git clone nick@git.ourcompany.com:project.git`



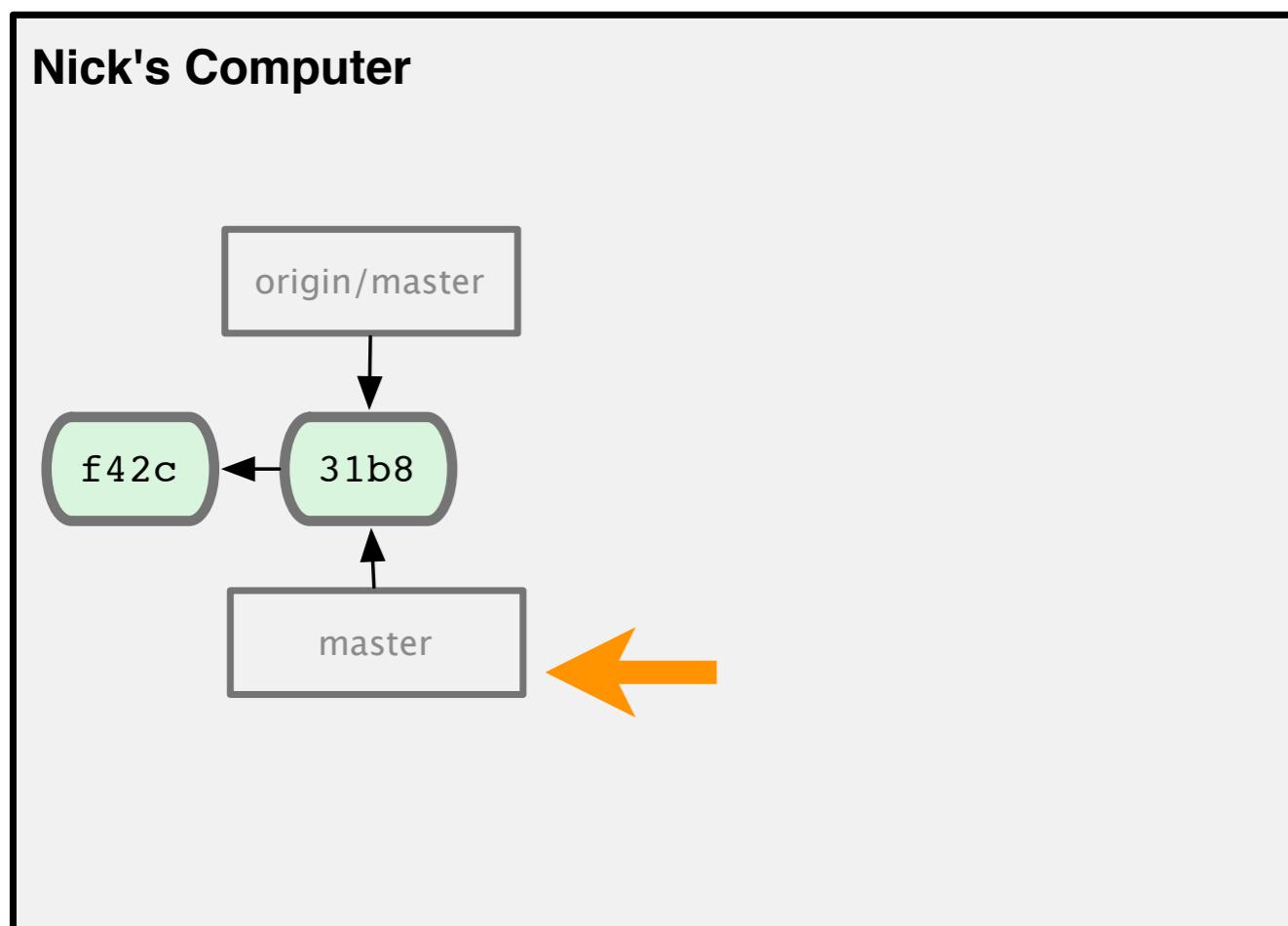


```
git clone nick@git.ourcompany.com:project.git
```



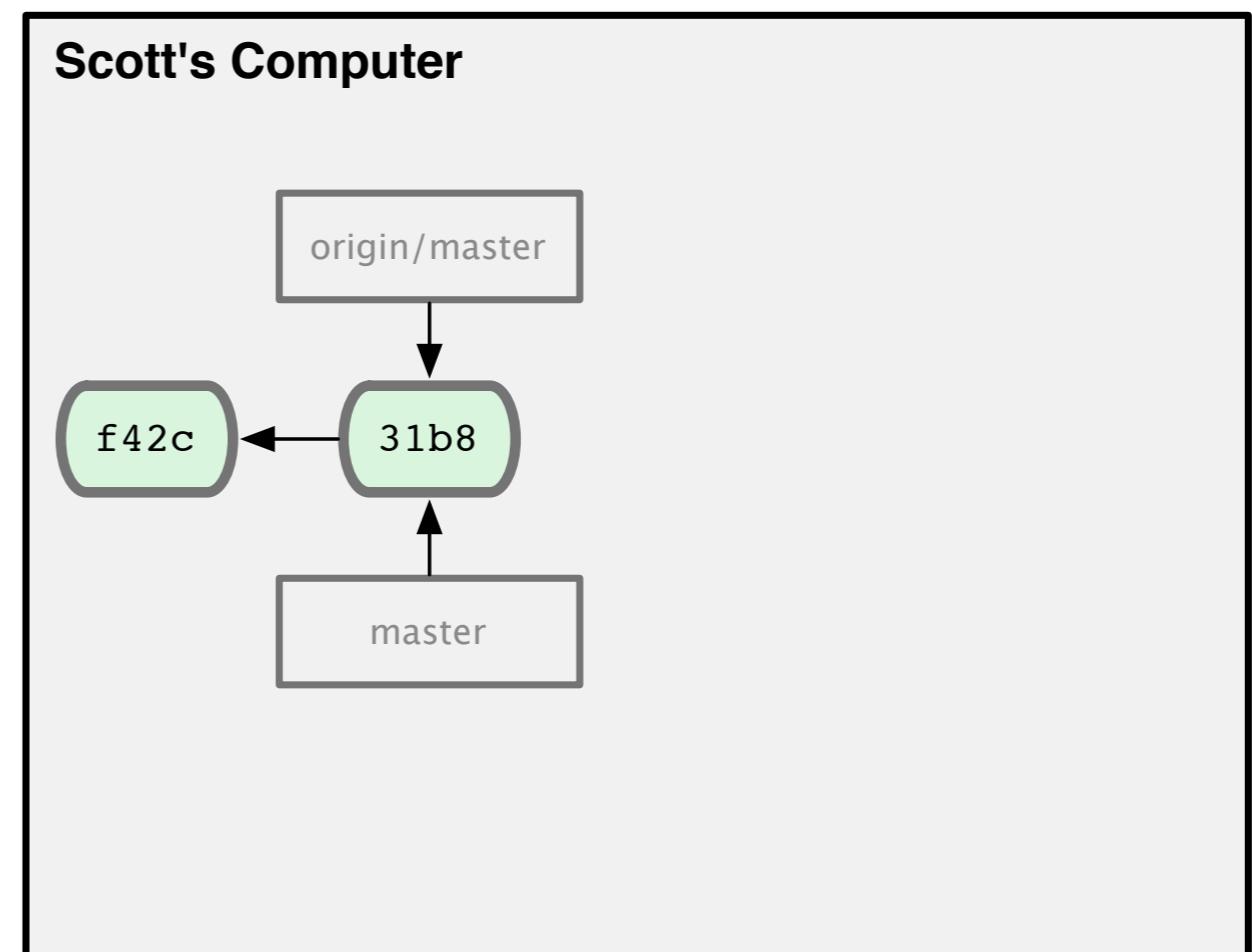
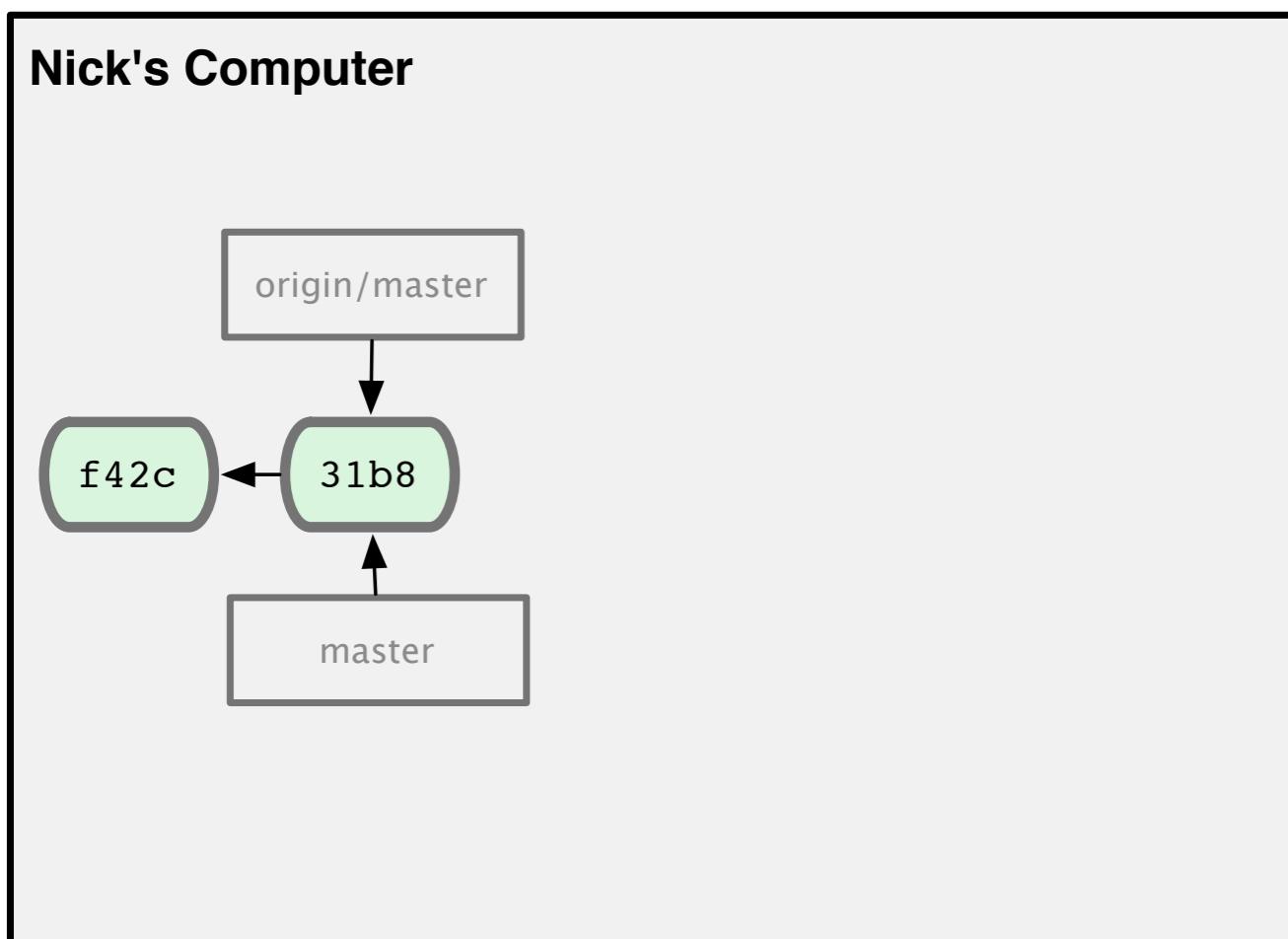


```
git clone nick@git.ourcompany.com:project.git
```

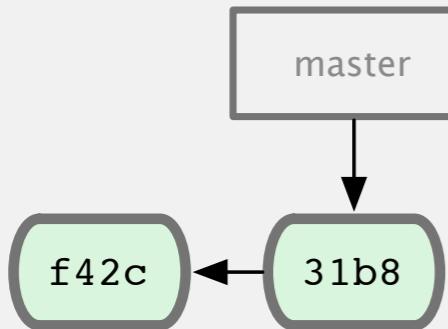




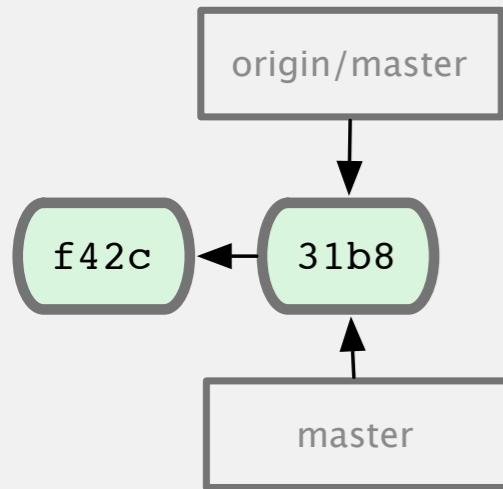
git clone scott@git.ourcompany.com:project.git



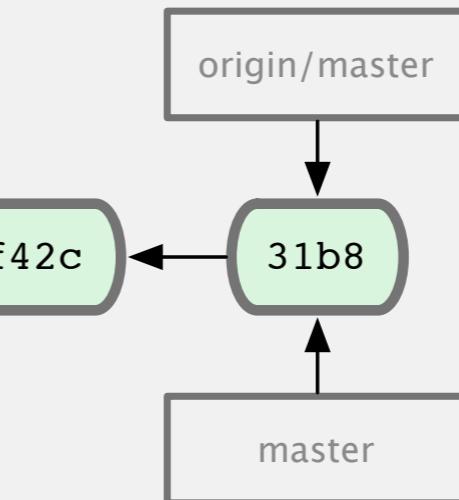
git.ourcompany.com



Nick's Computer

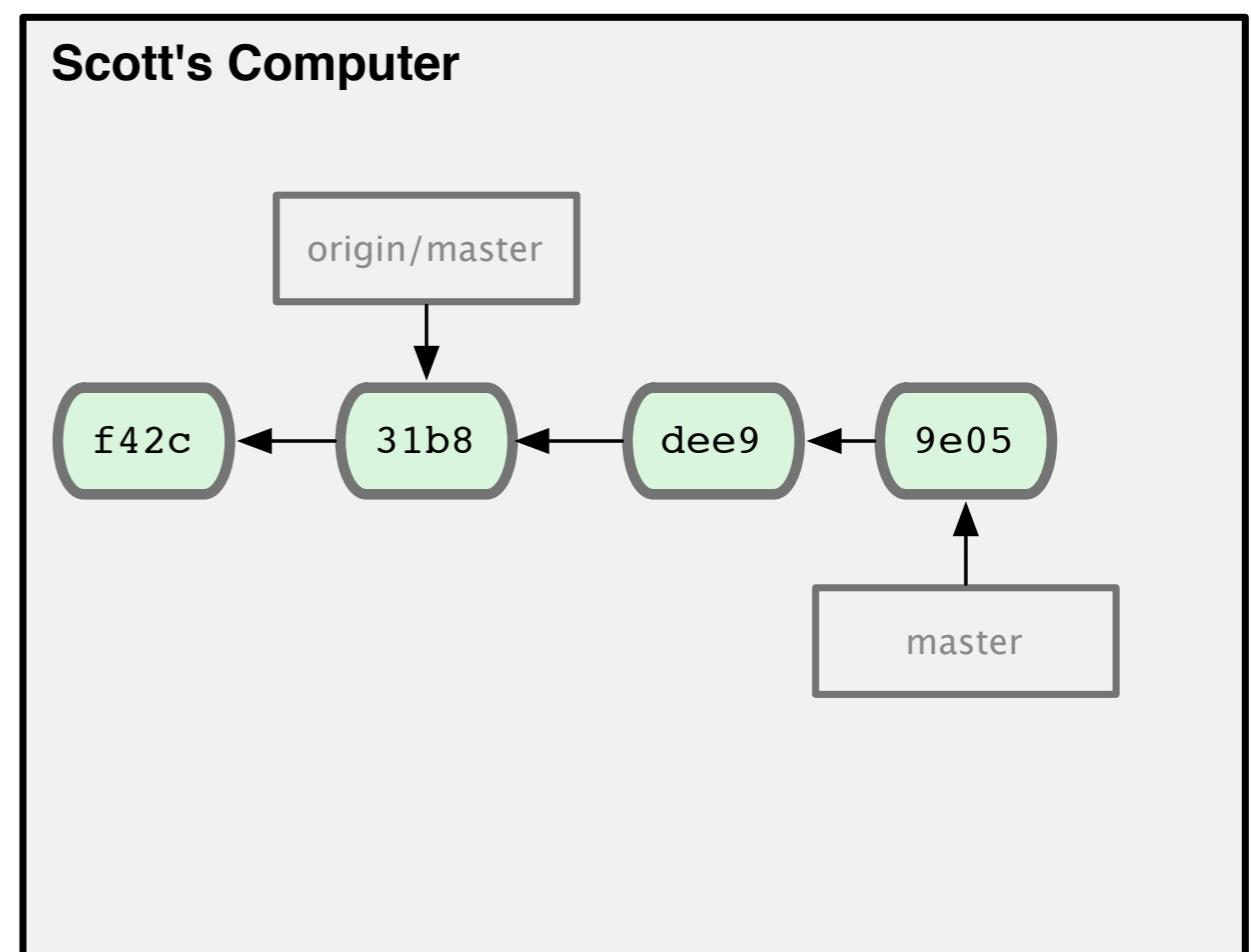
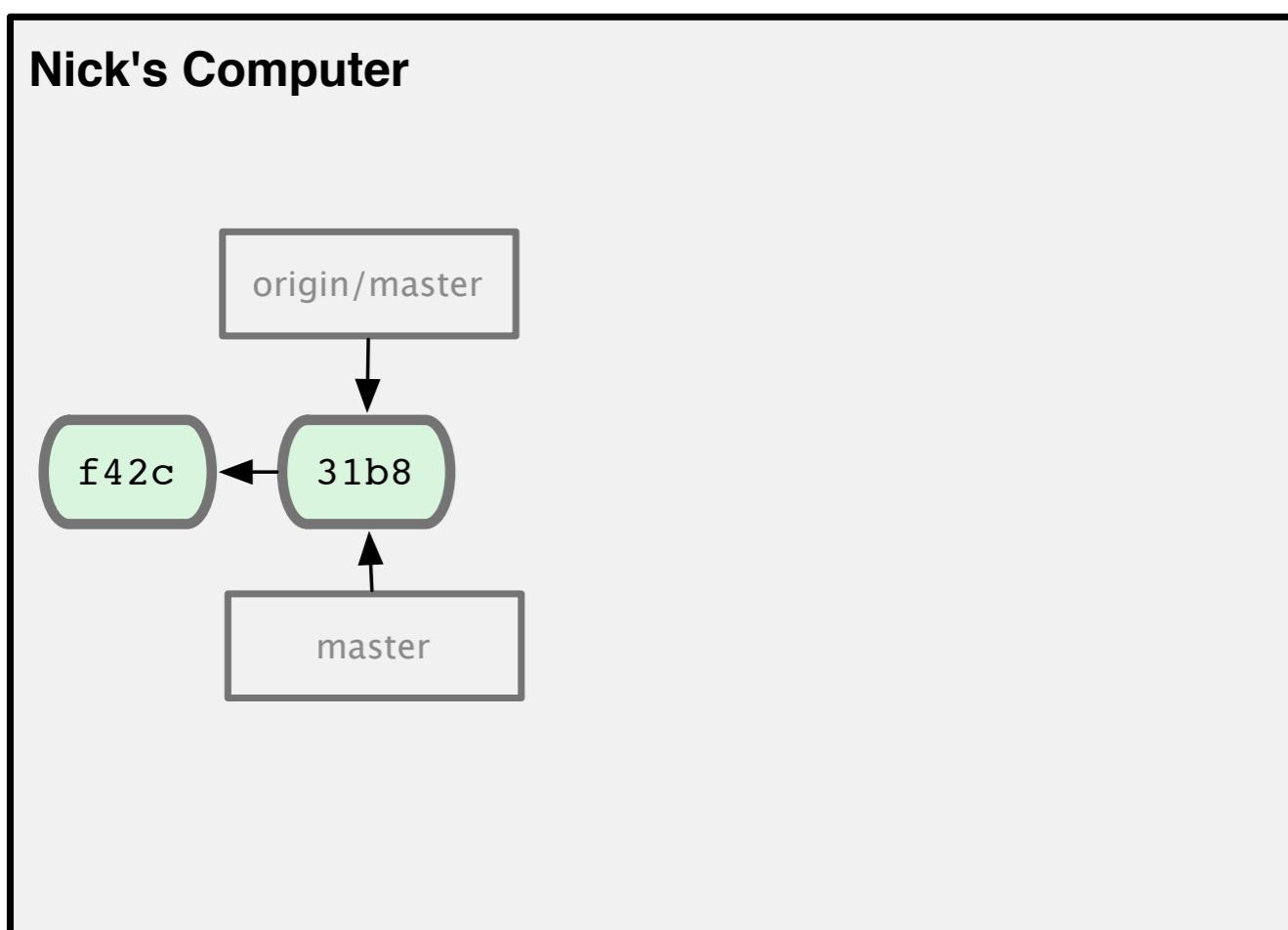


Scott's Computer



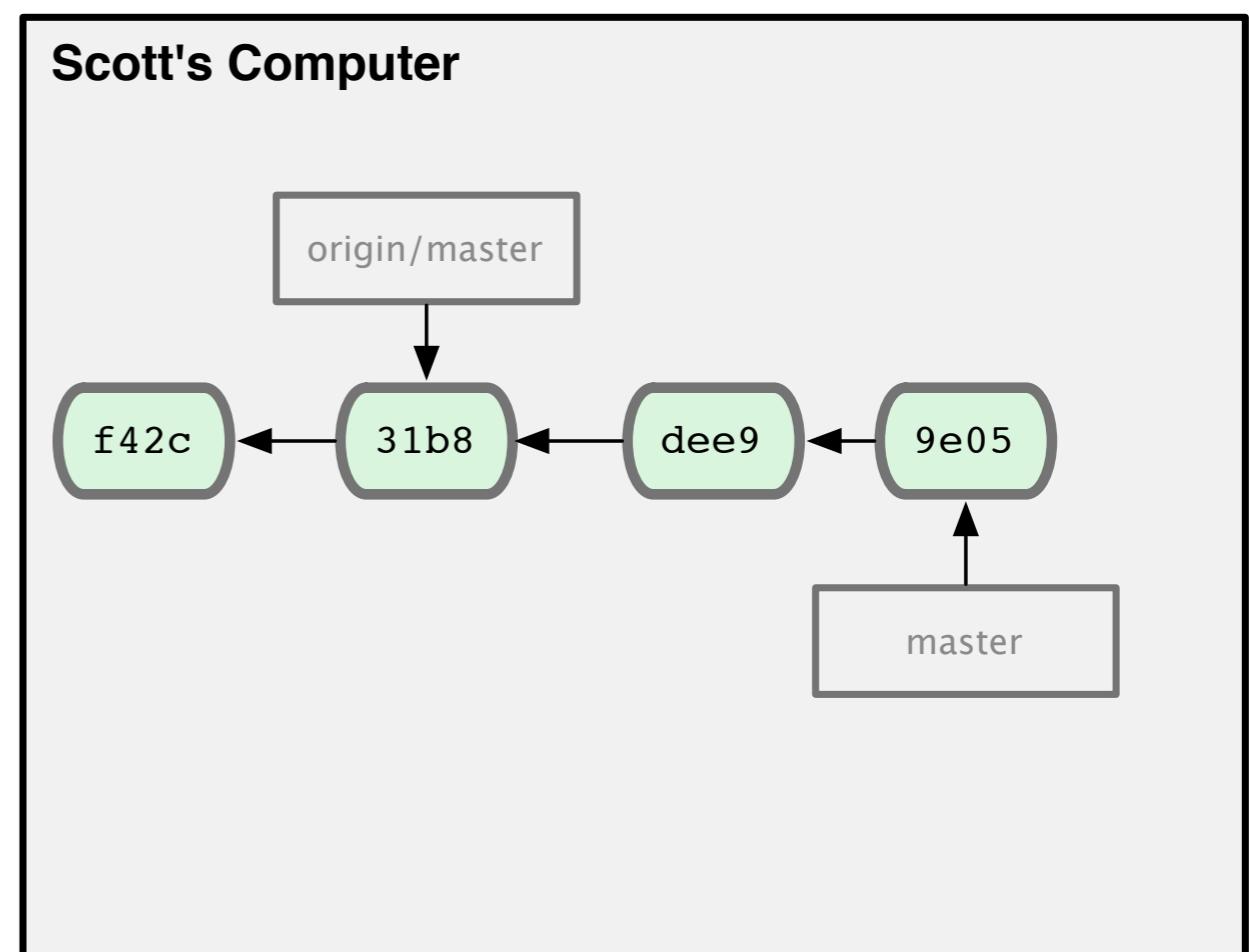
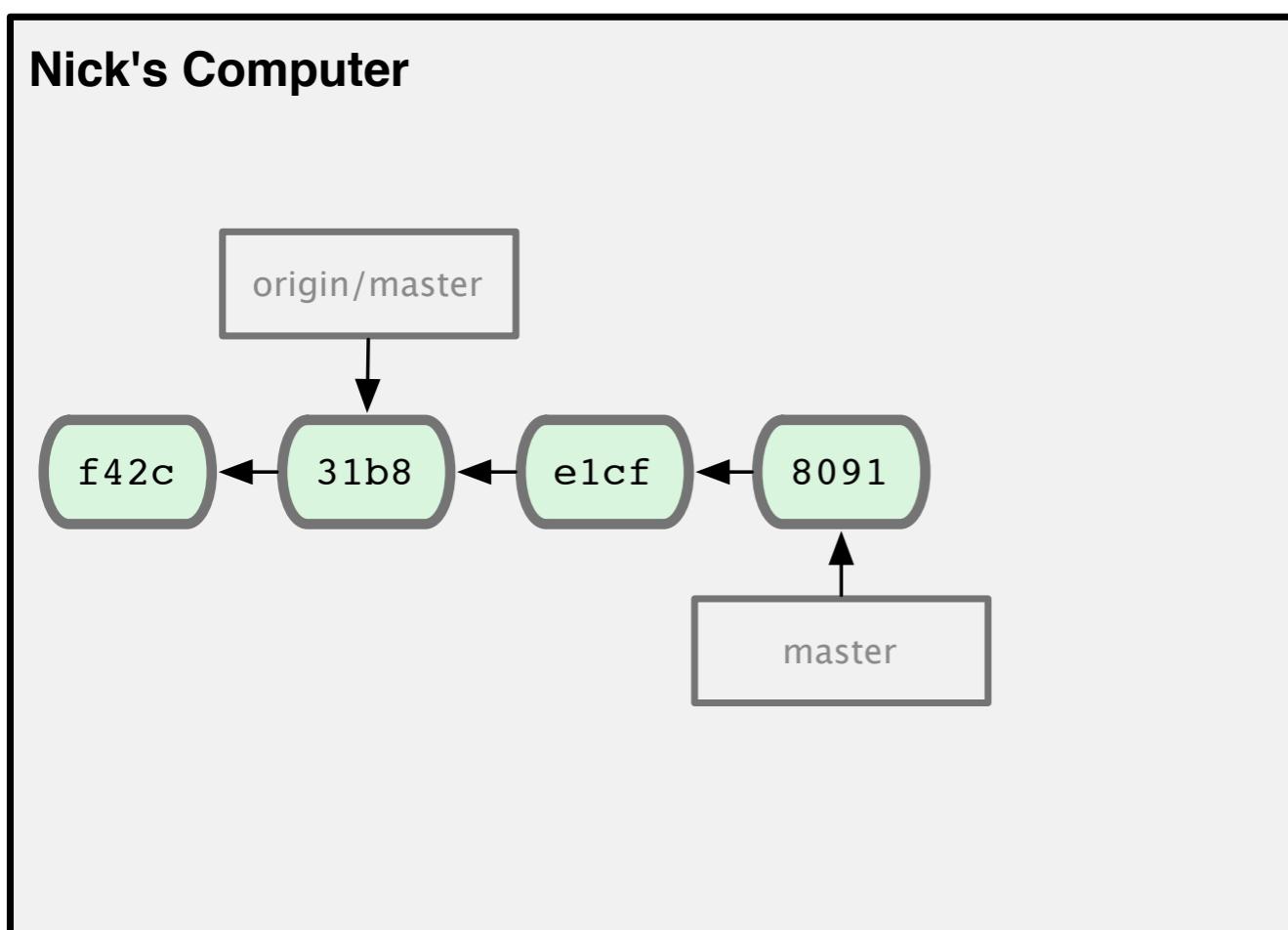


git commit





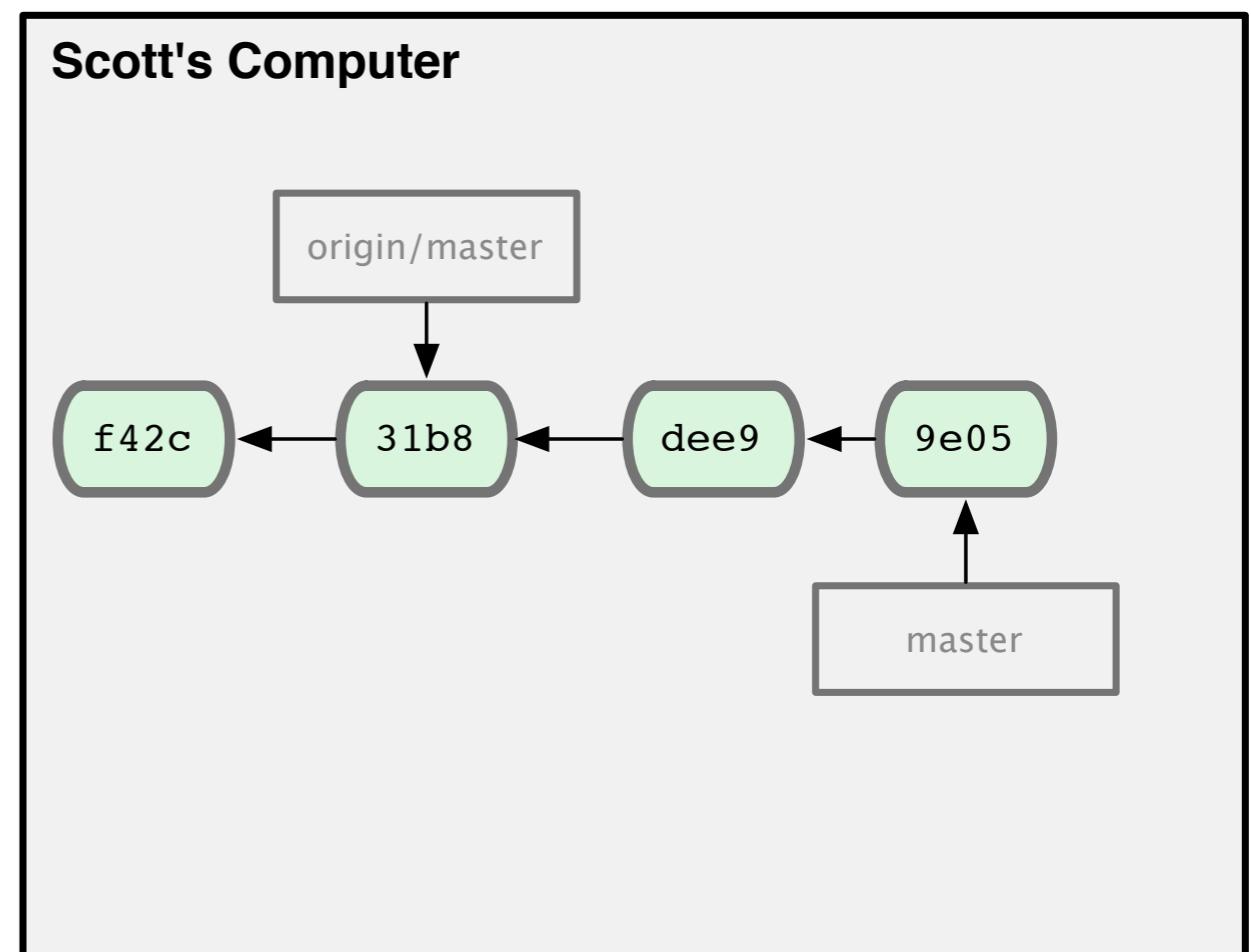
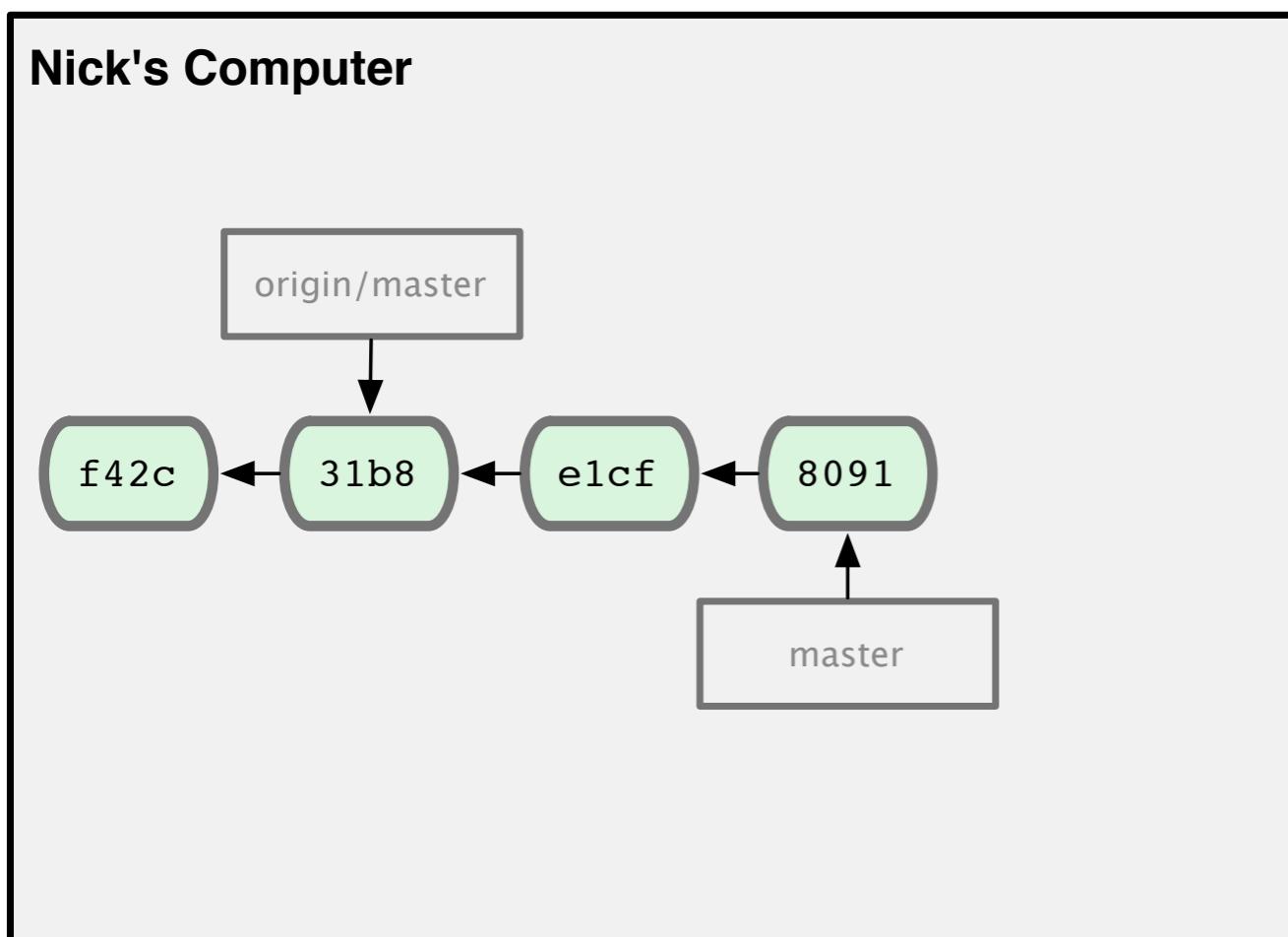
git commit



git push

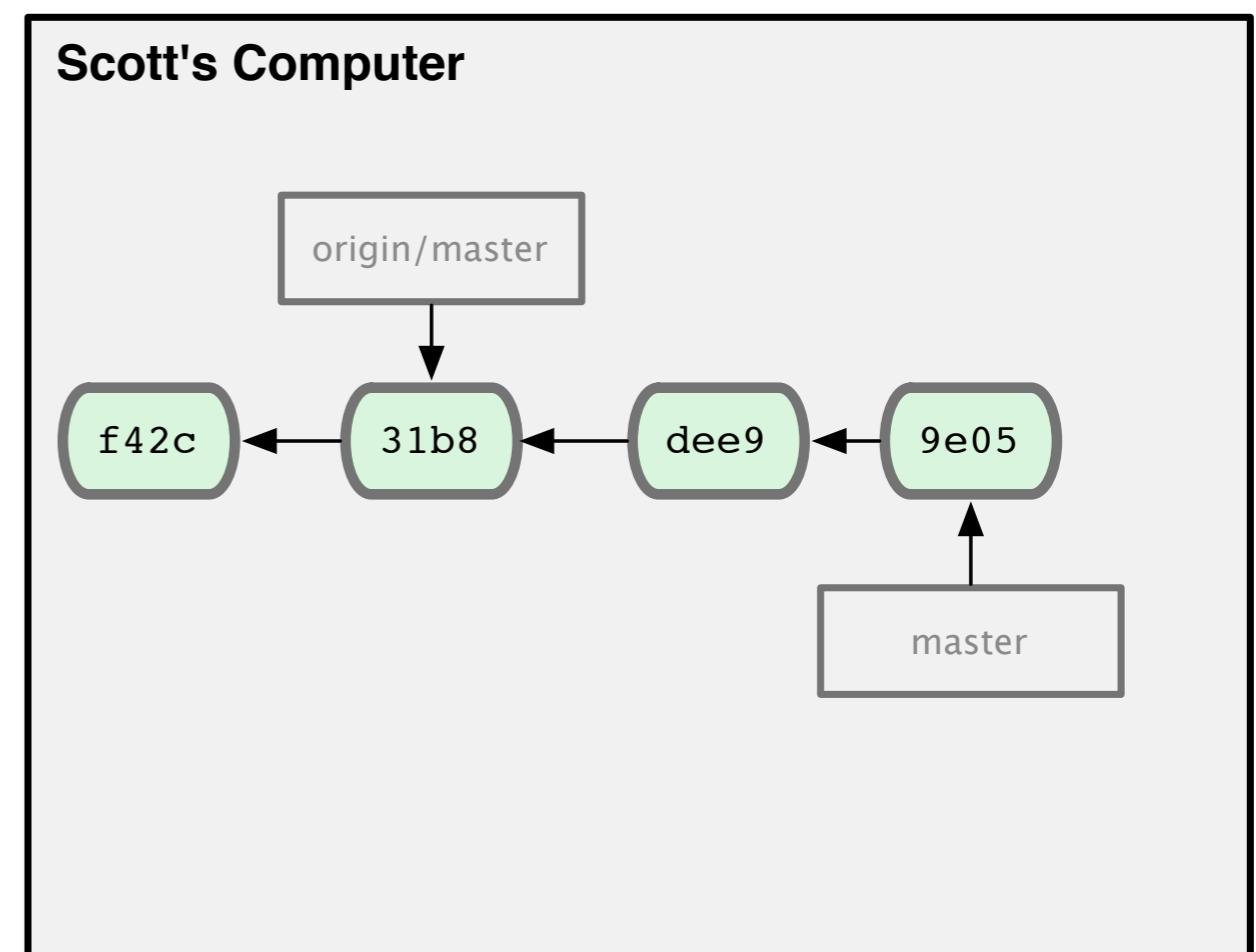
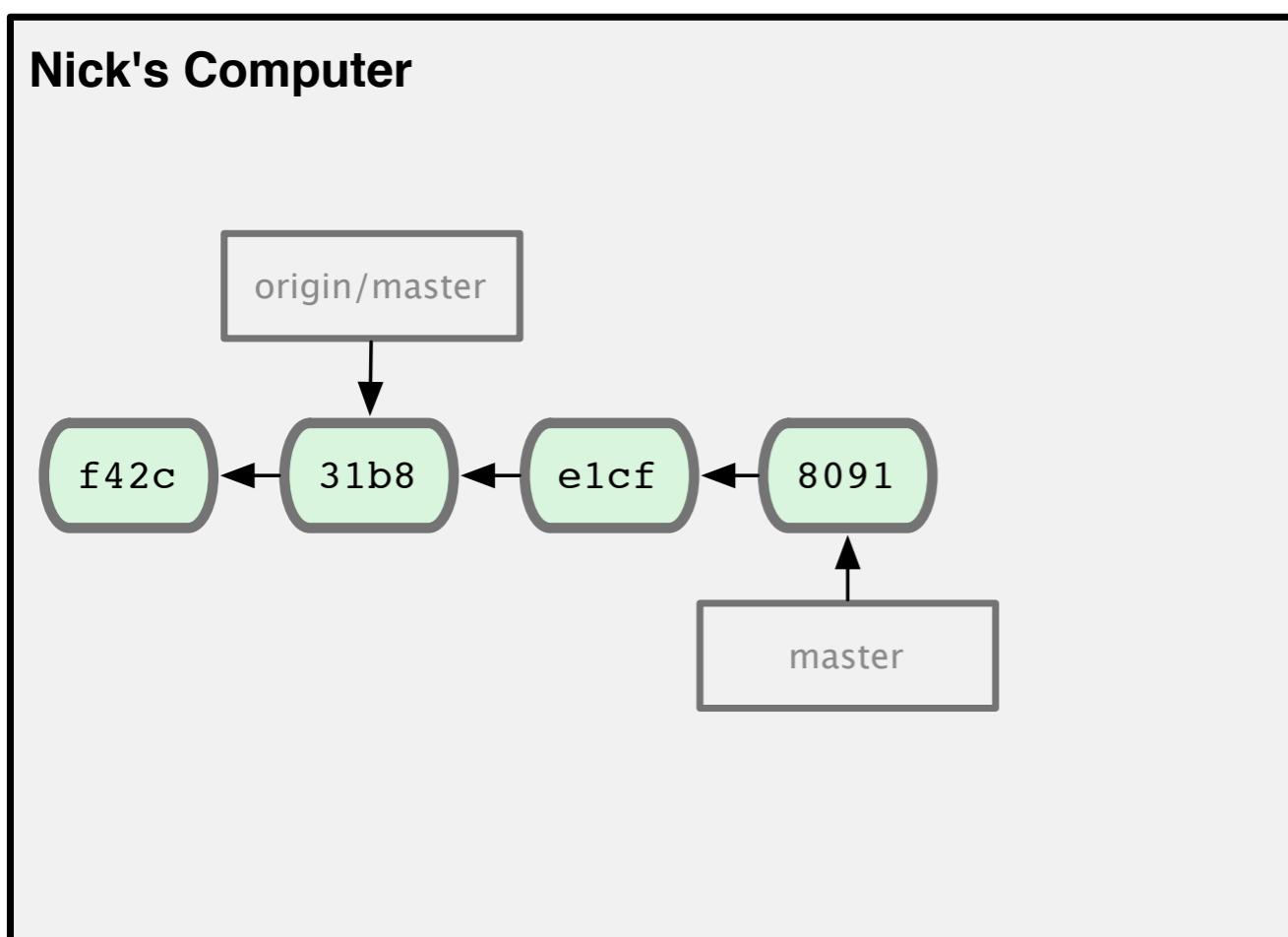


git push origin master



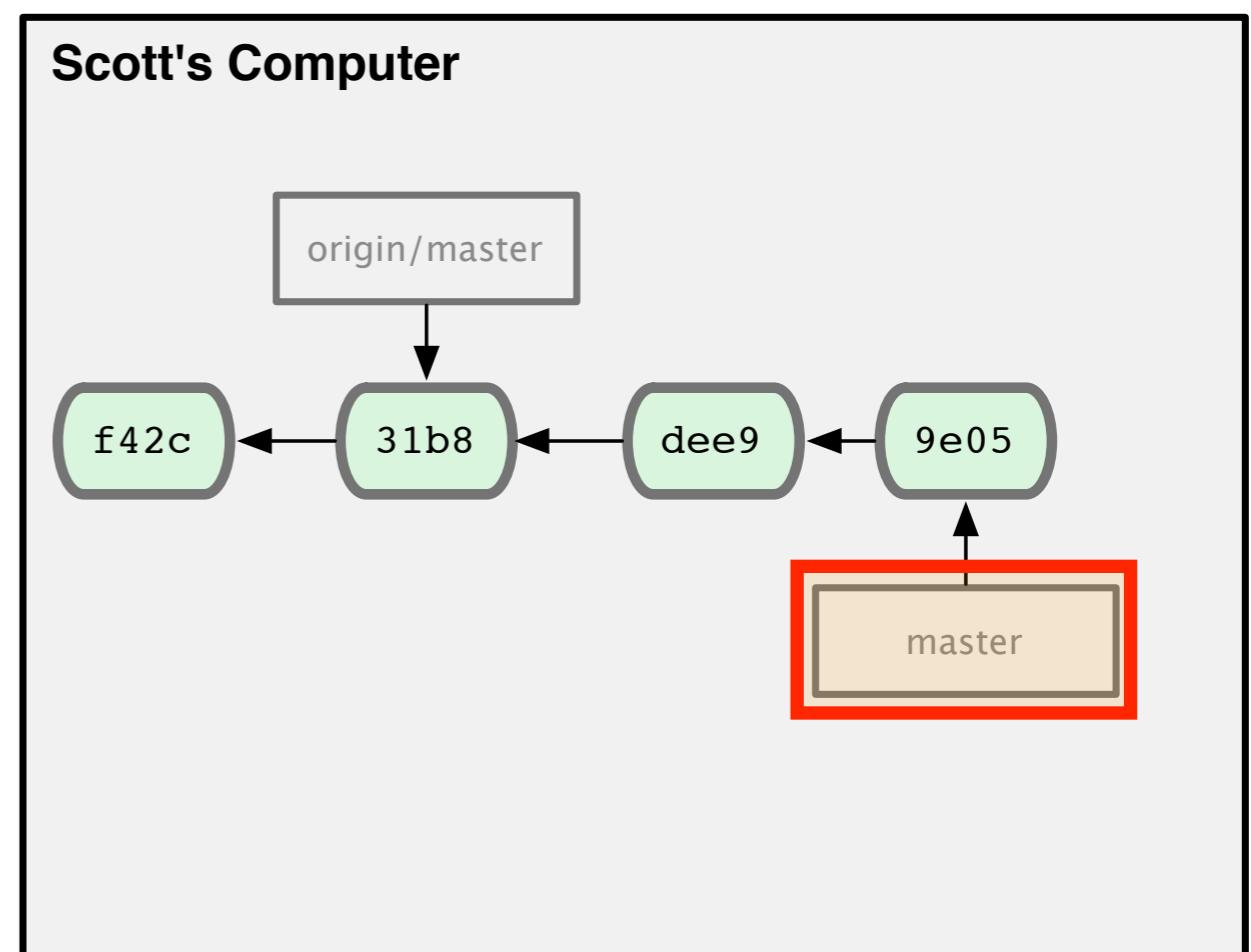
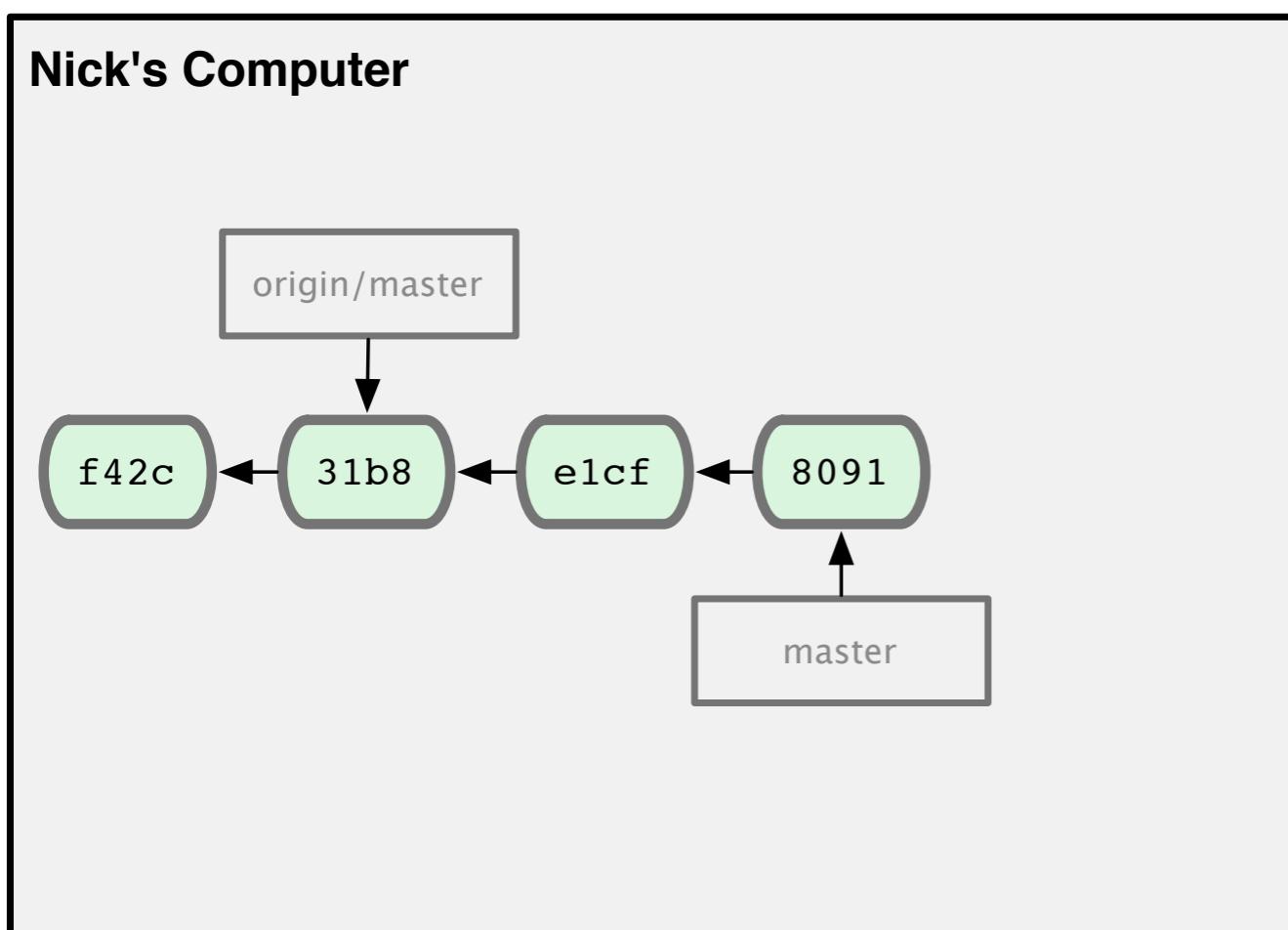


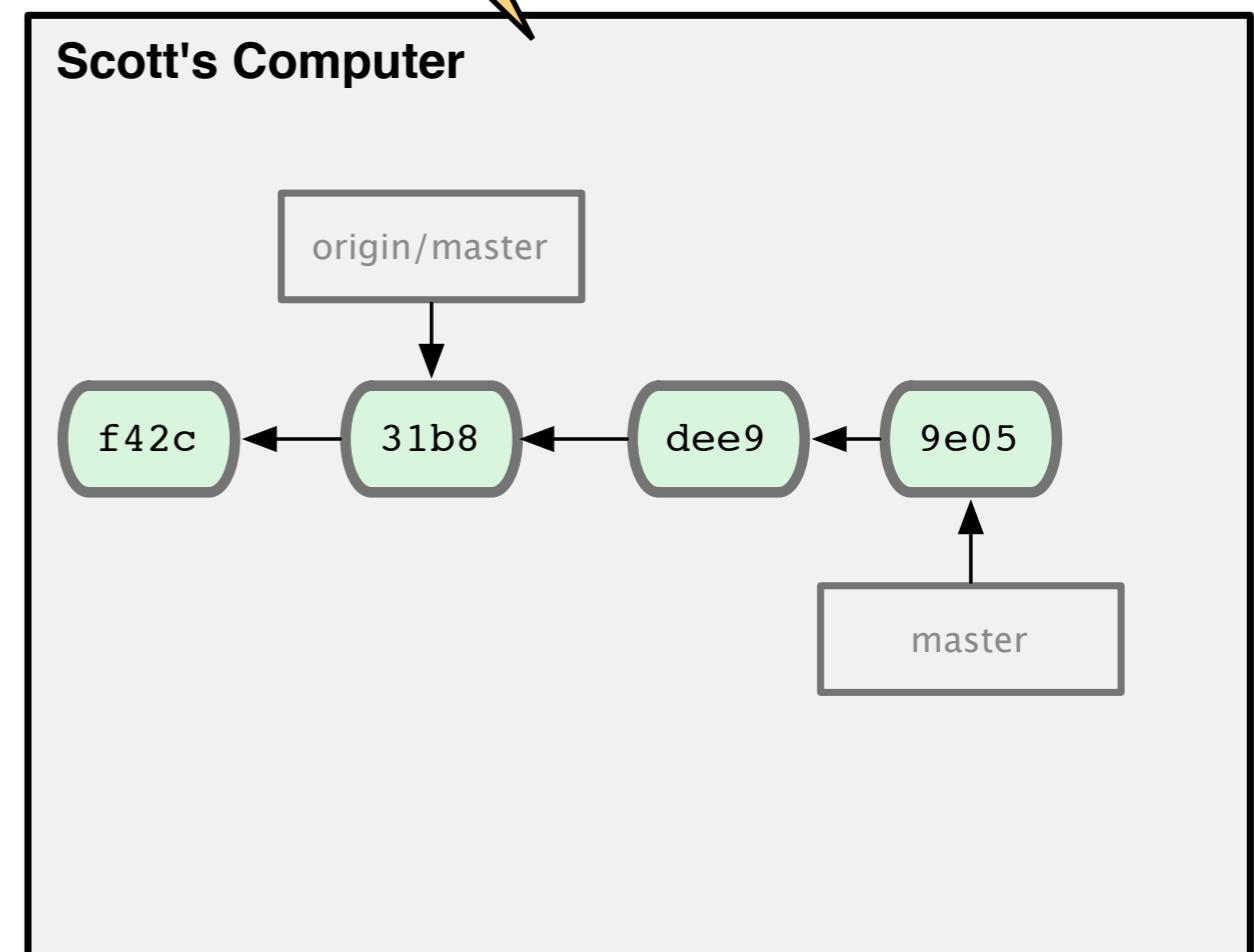
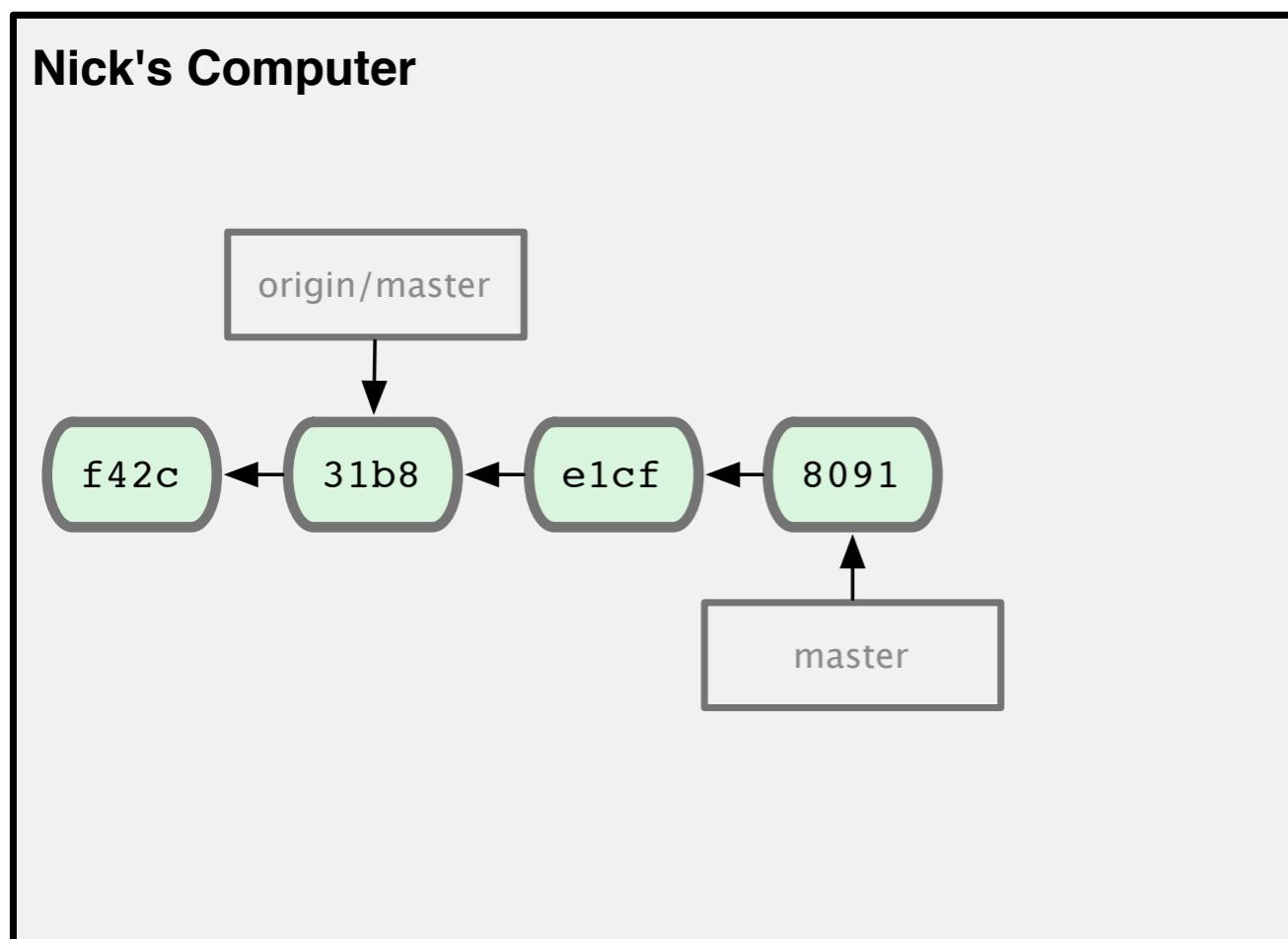
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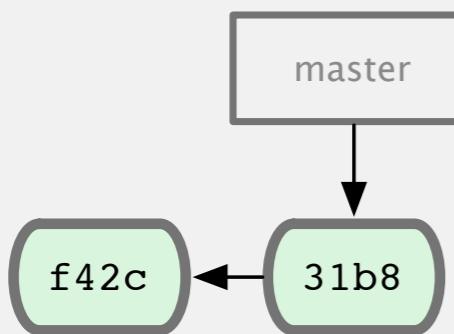


git push origin master



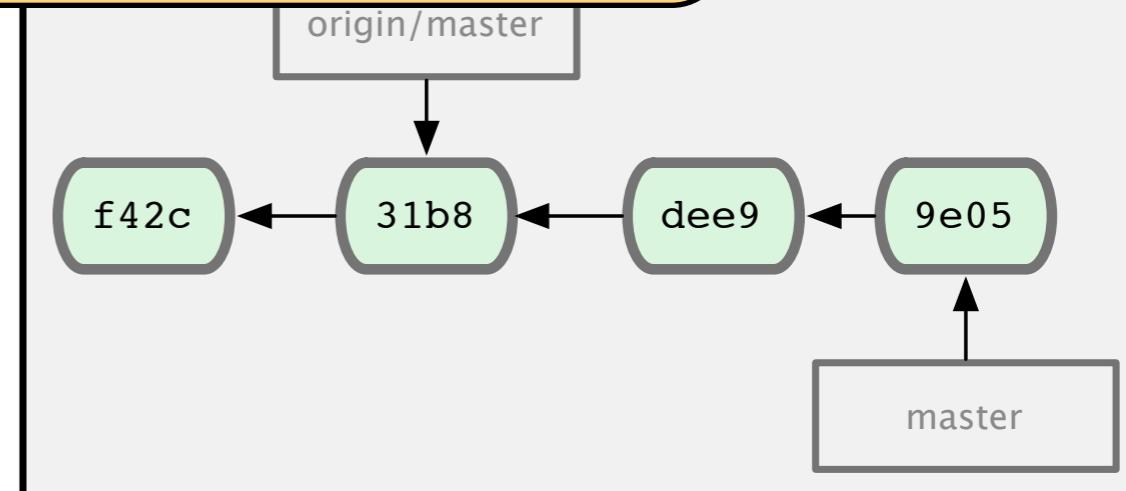
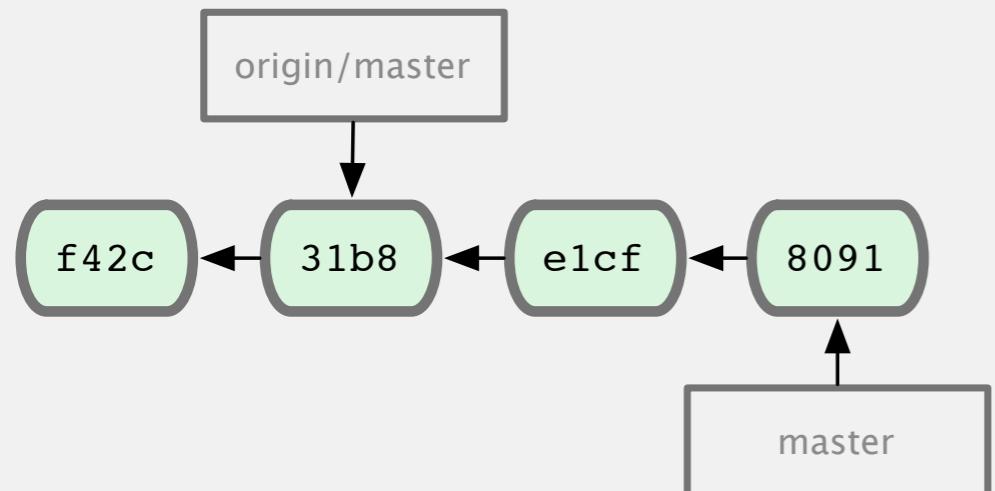


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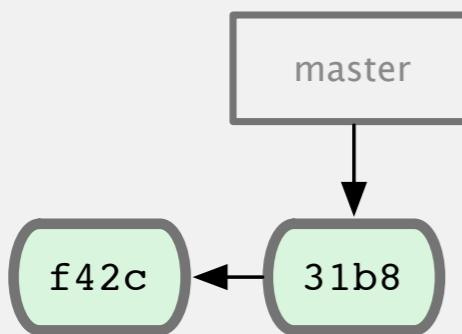


i've got master
at 31b8

Nick's Computer



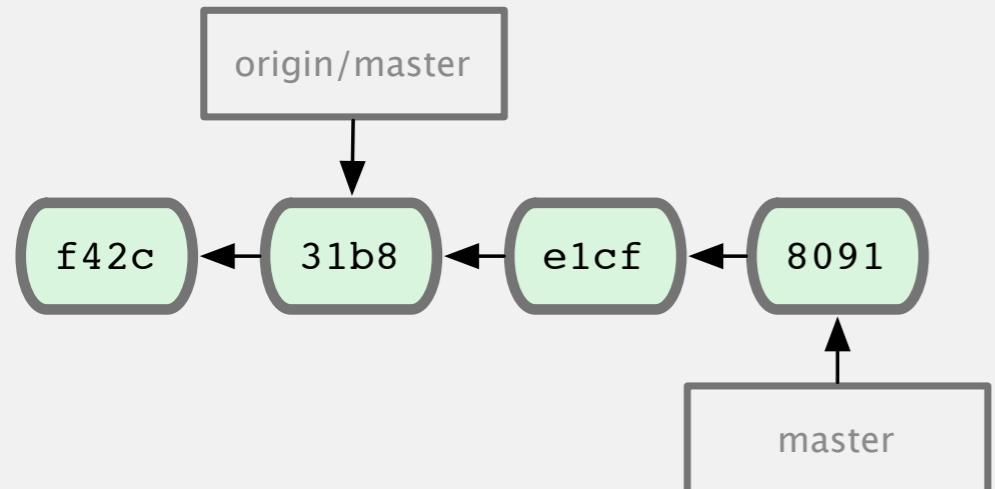
git.ourcompany.com



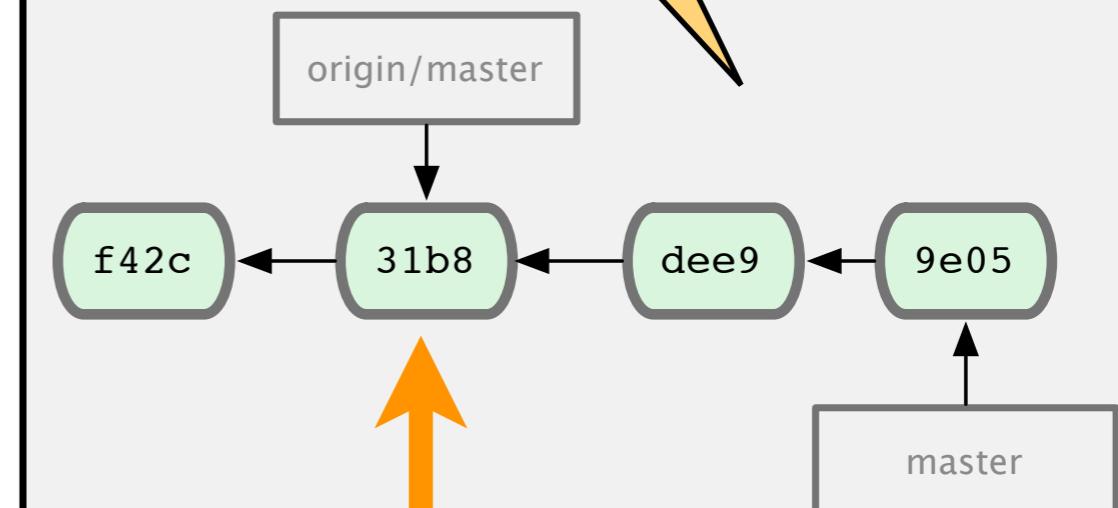
cool, i see that in
the history of what i
want to push

igin master

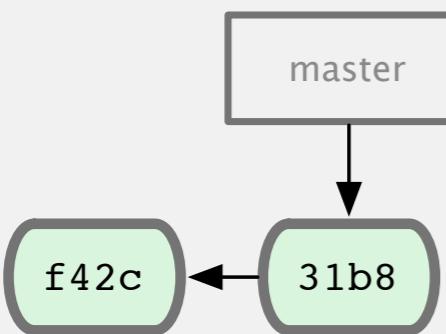
Nick's Computer



Scott's Computer



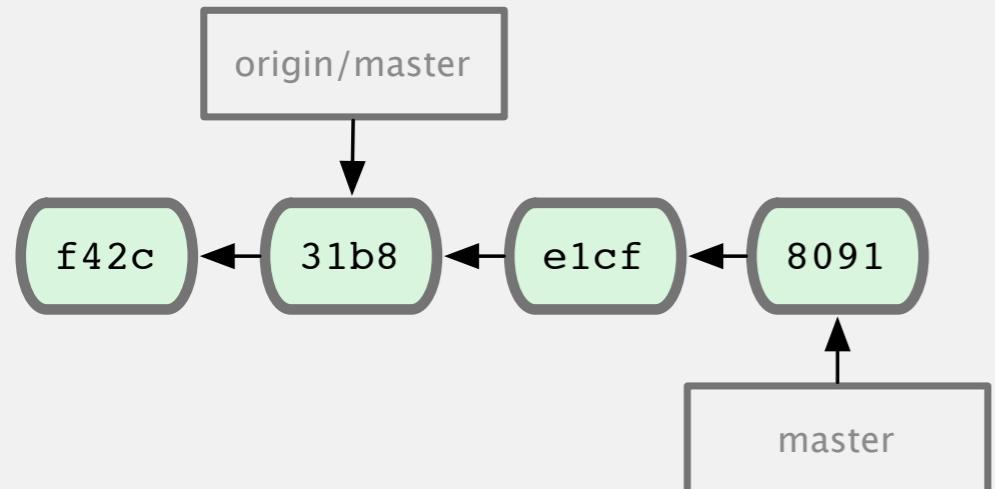
git.ourcompany.com



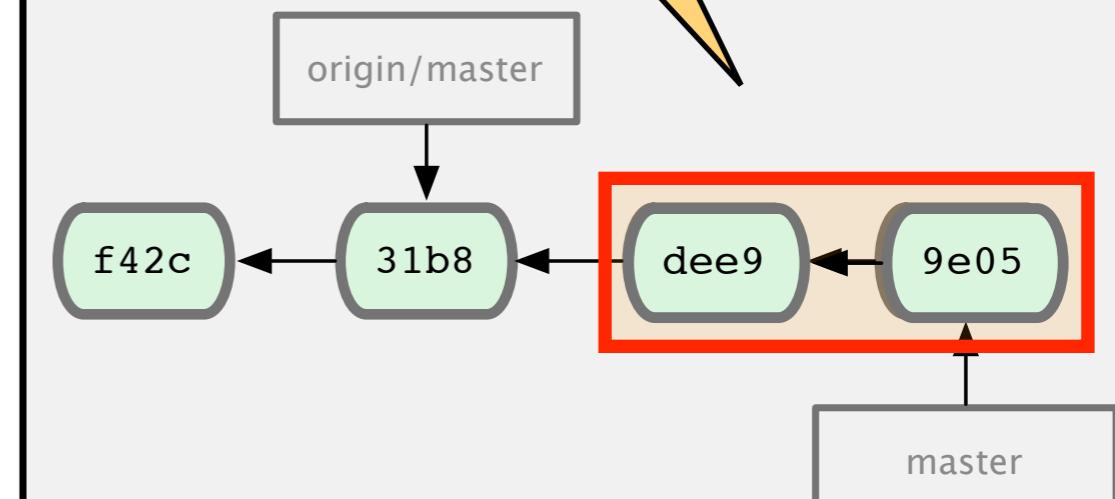
here's the difference

in master

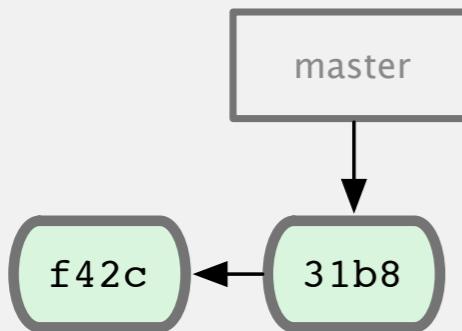
Nick's Computer



Scott's Computer

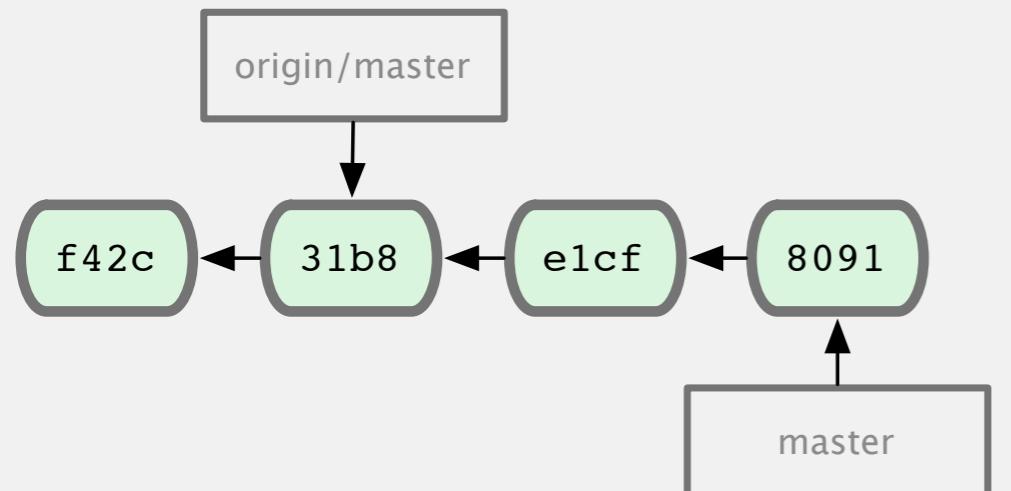


git.ourcompany.com

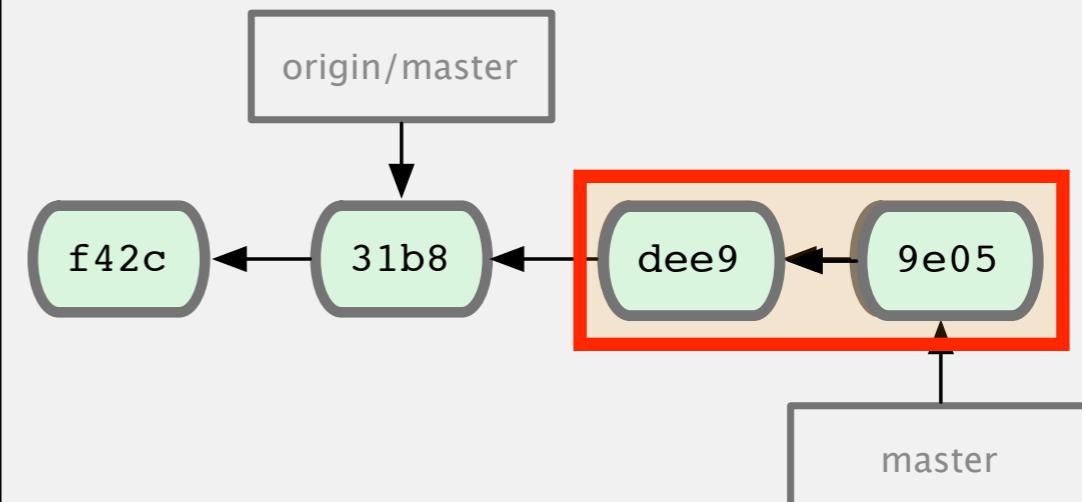


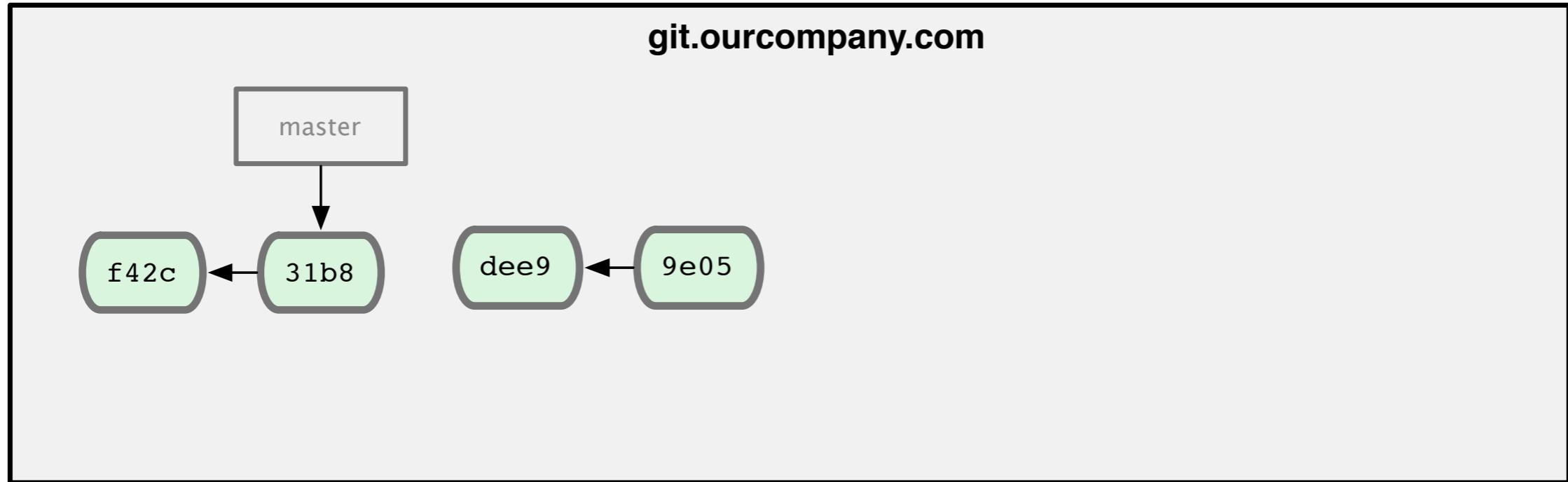
git push origin master

Nick's Computer

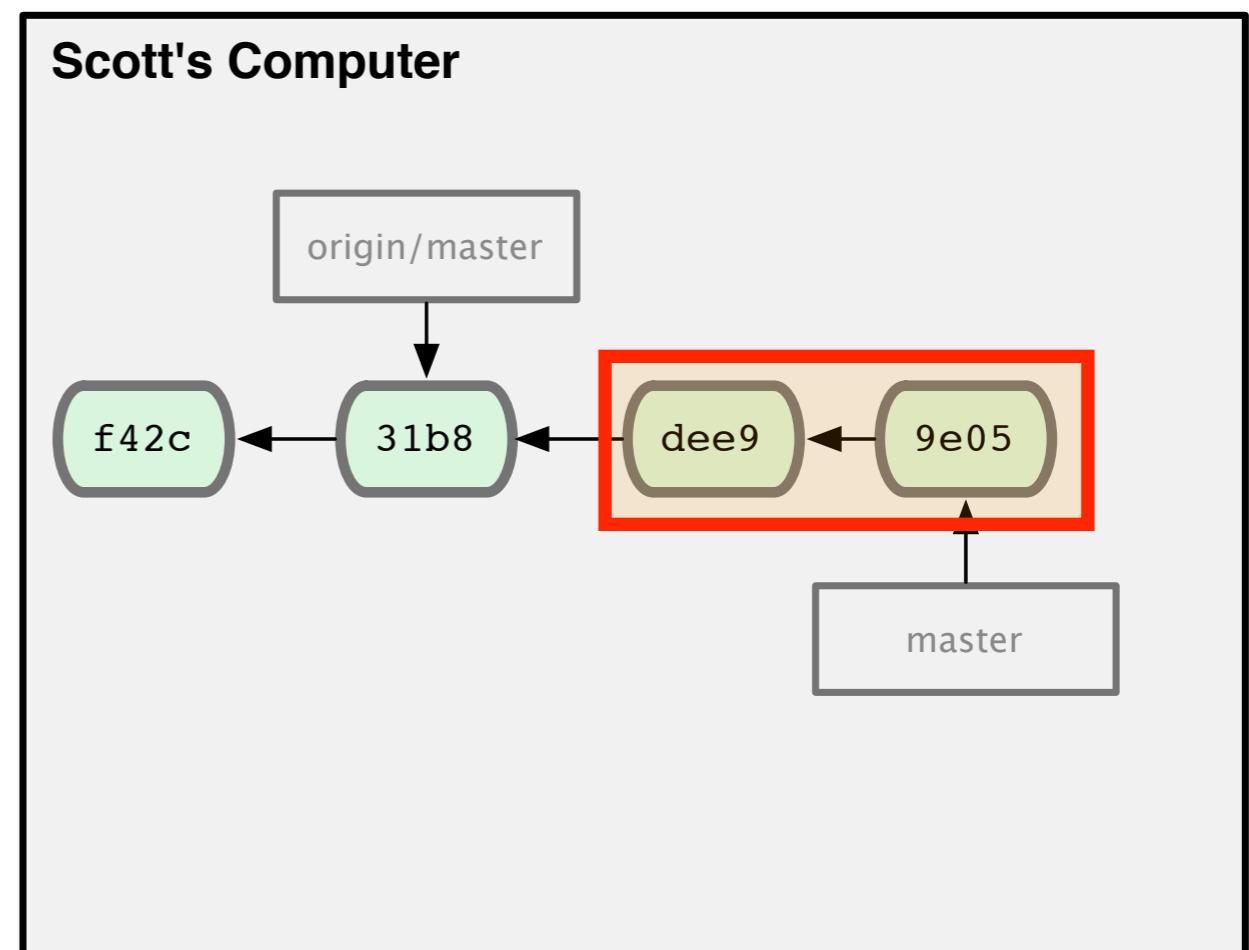
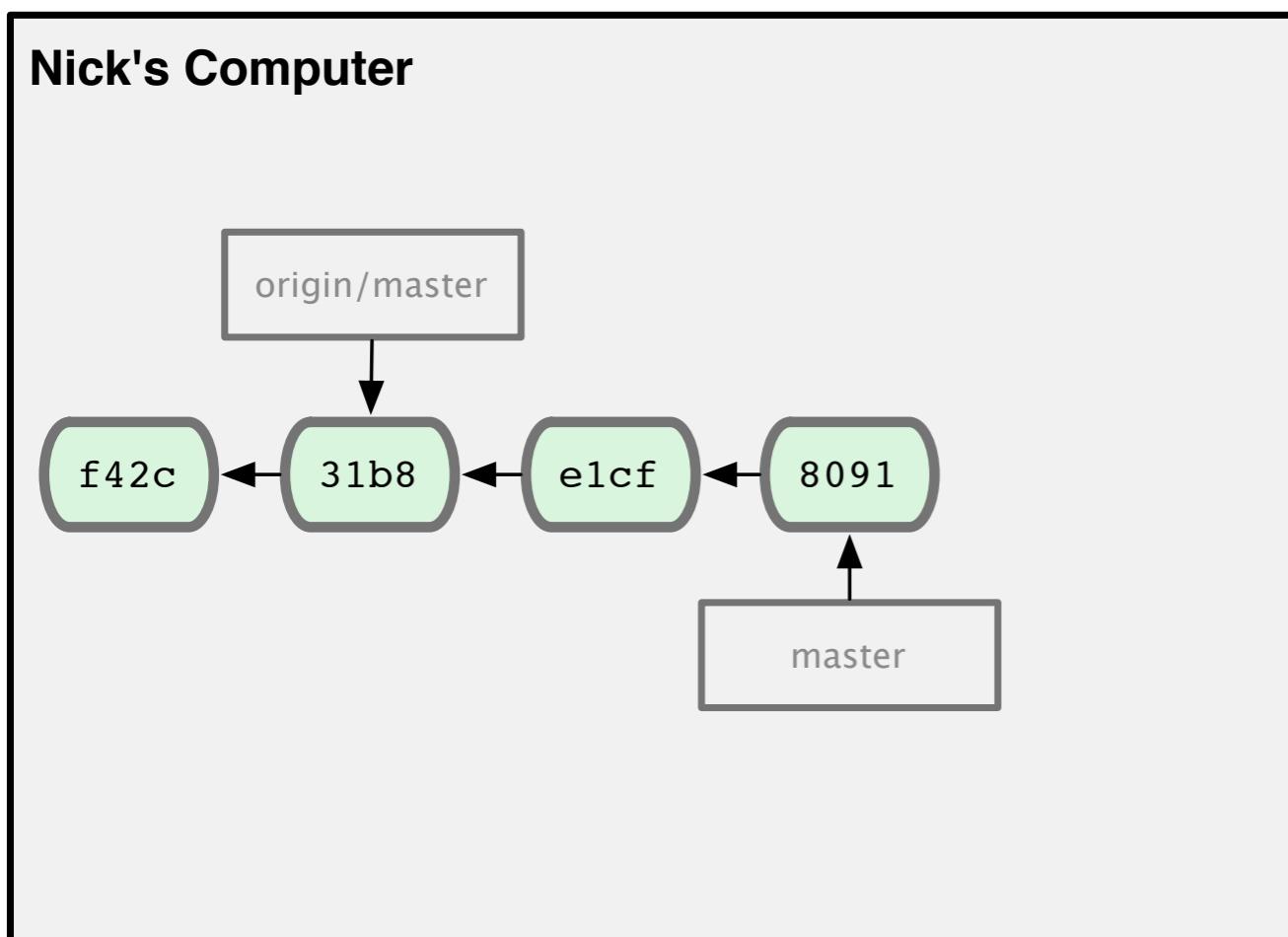


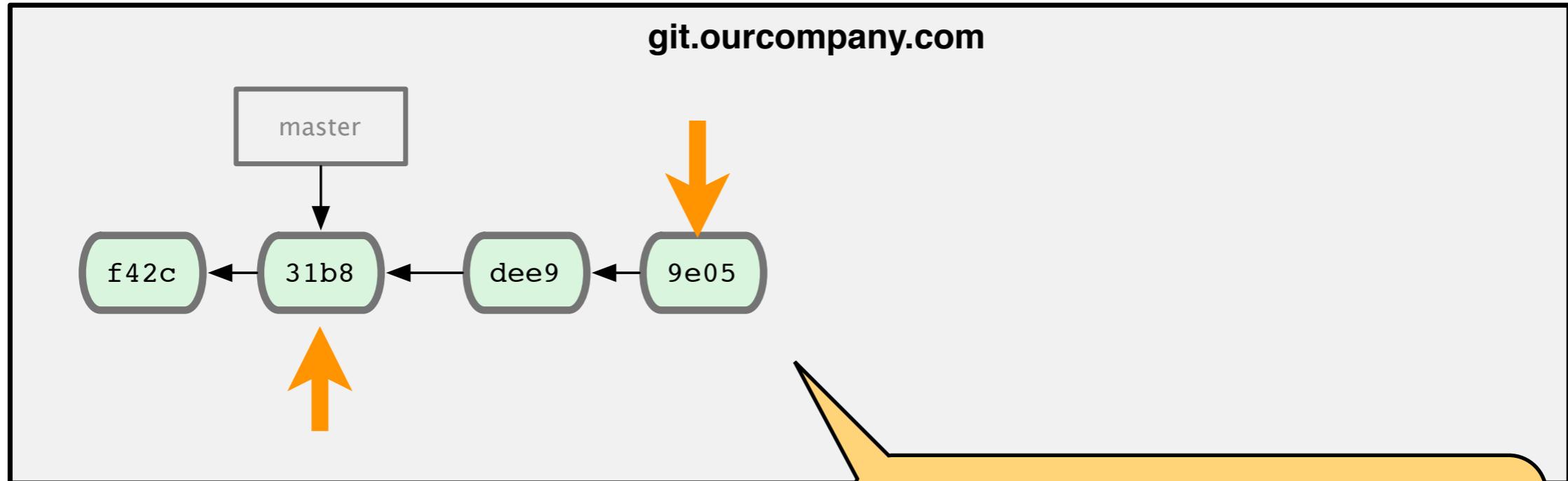
Scott's Computer



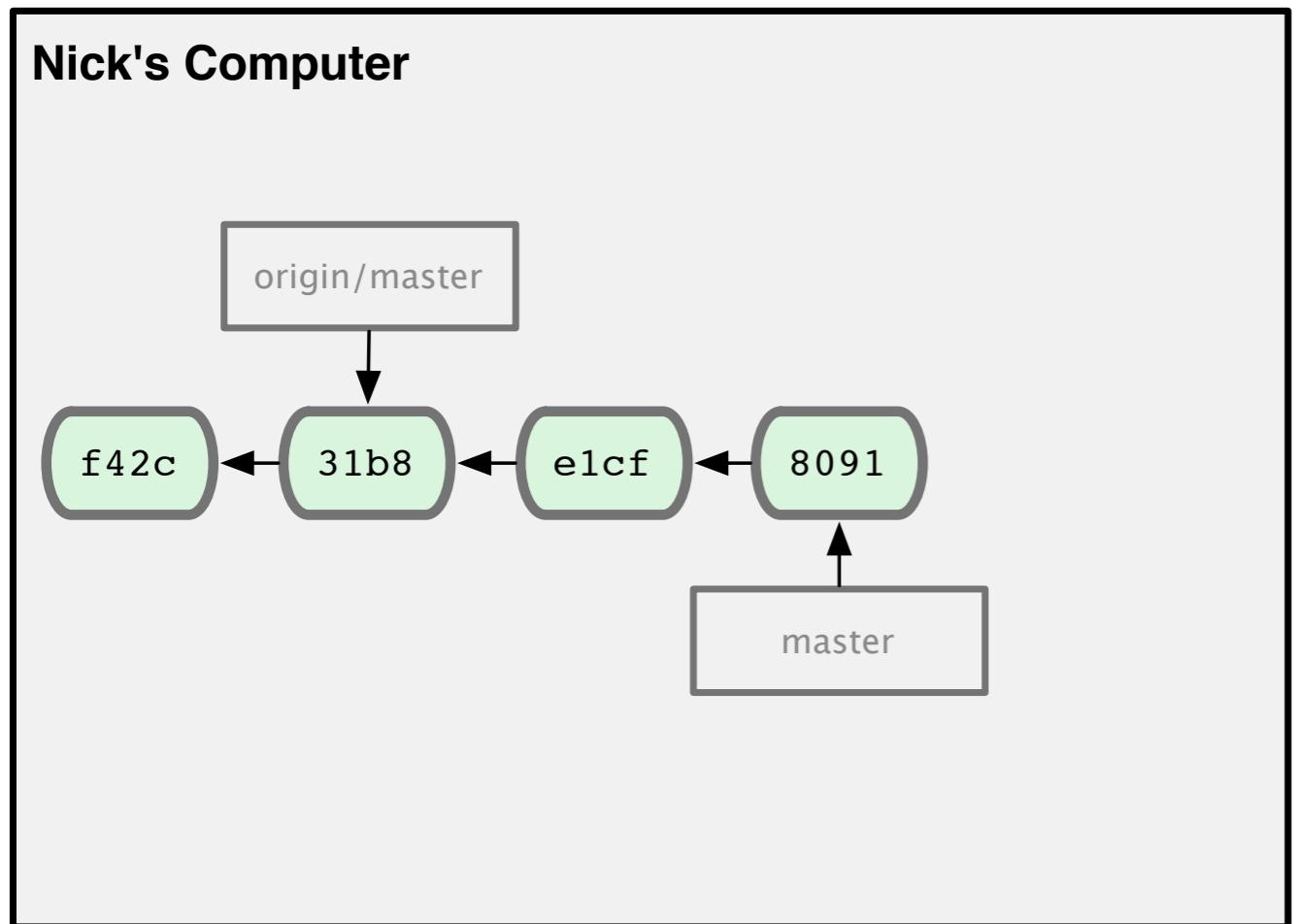


git push origin master

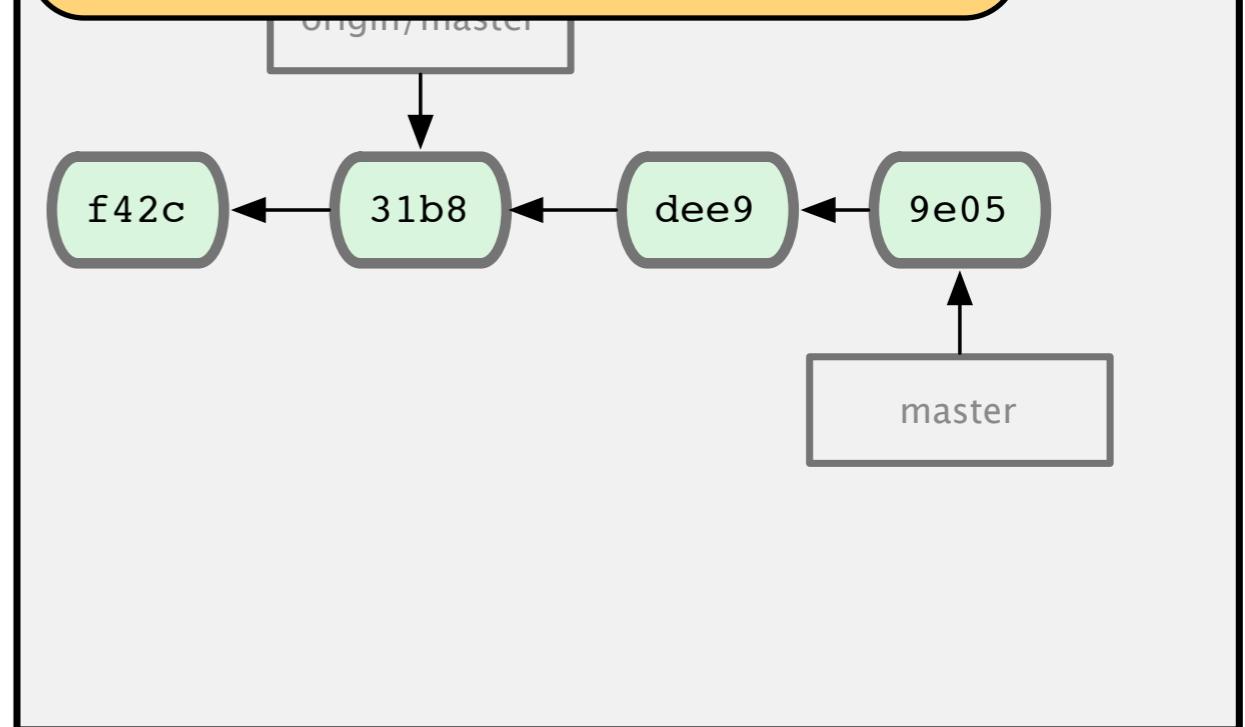


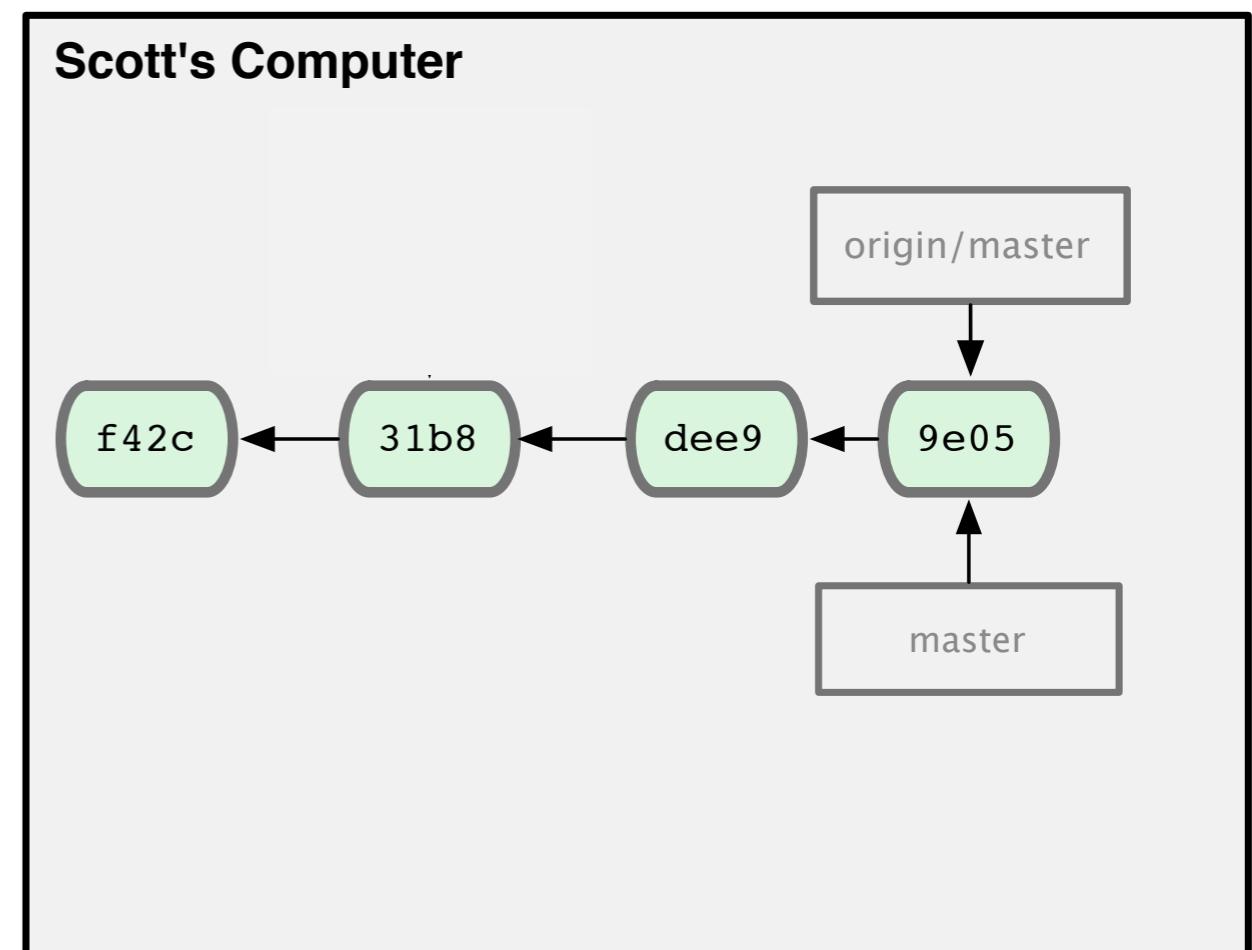
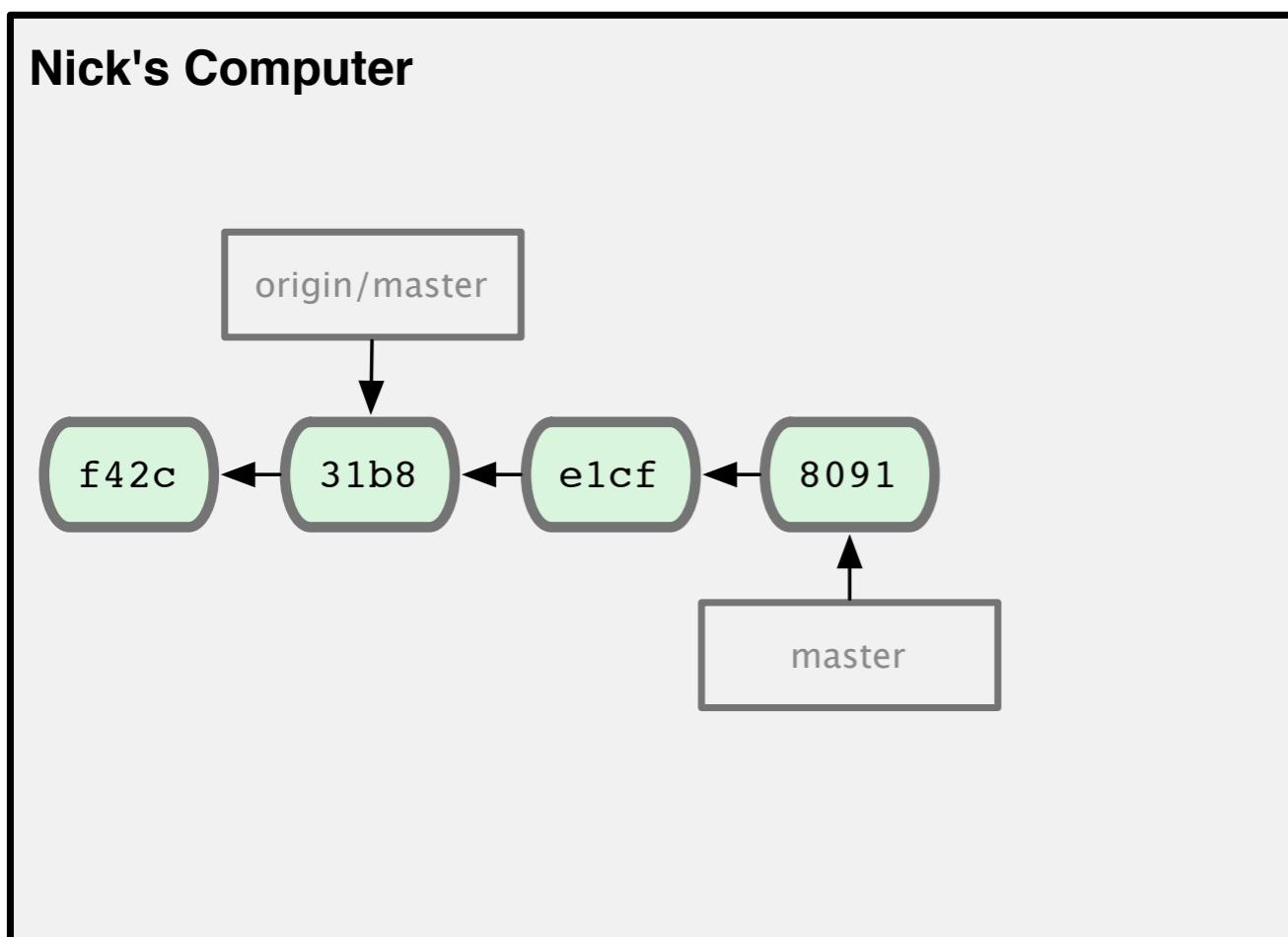
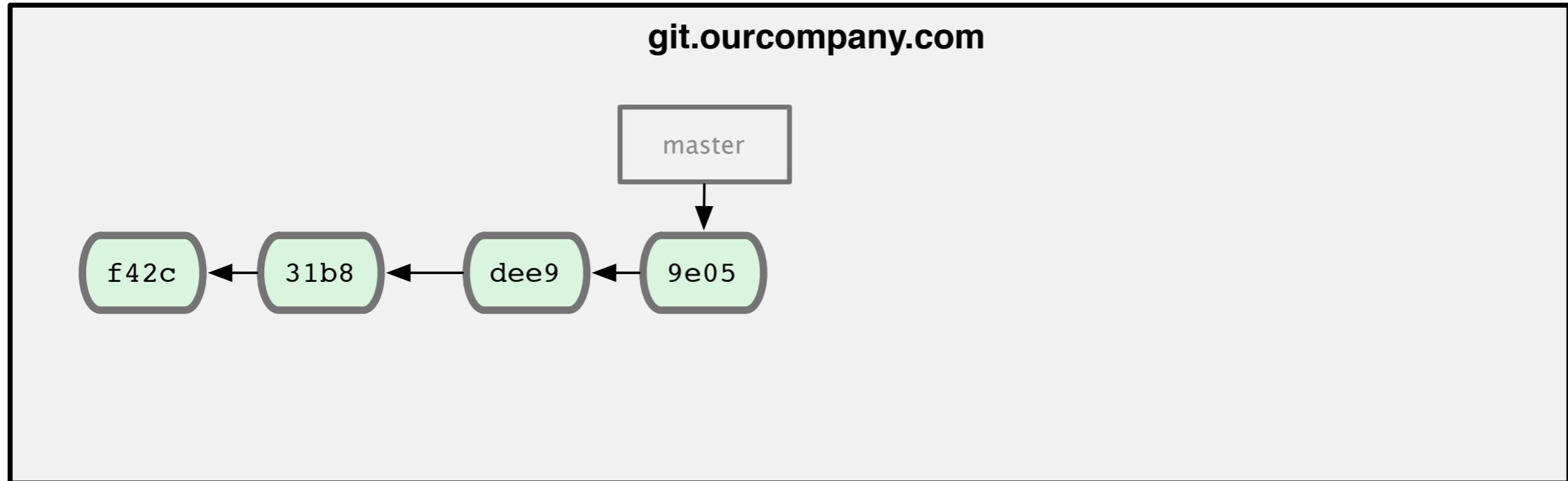


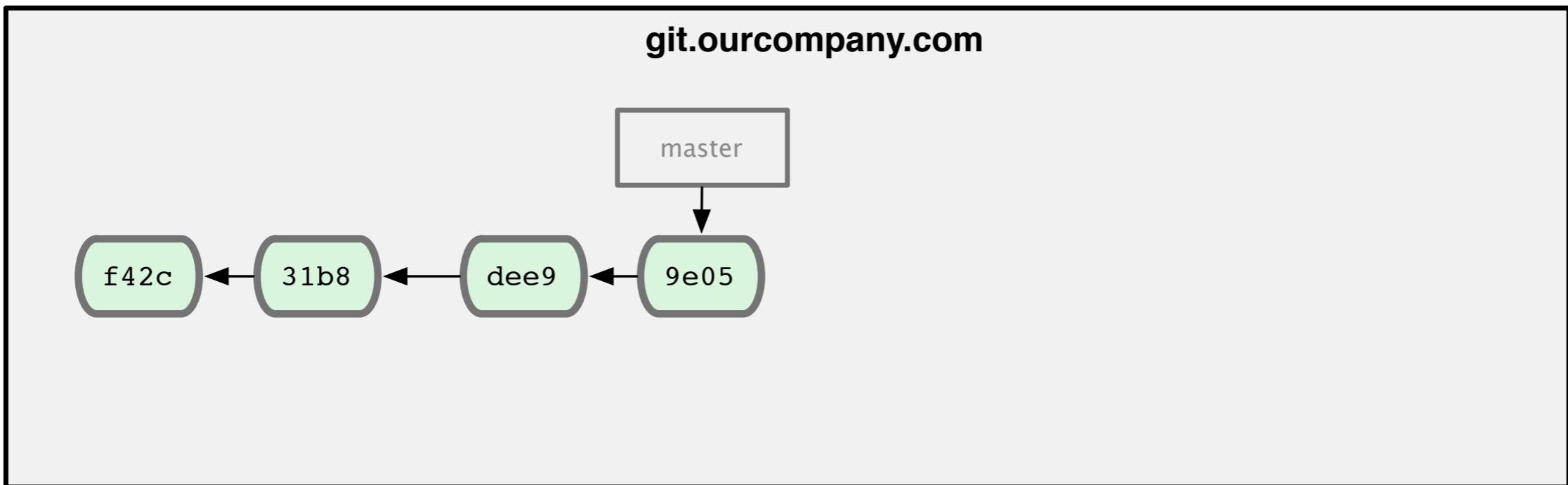
Nick's Computer



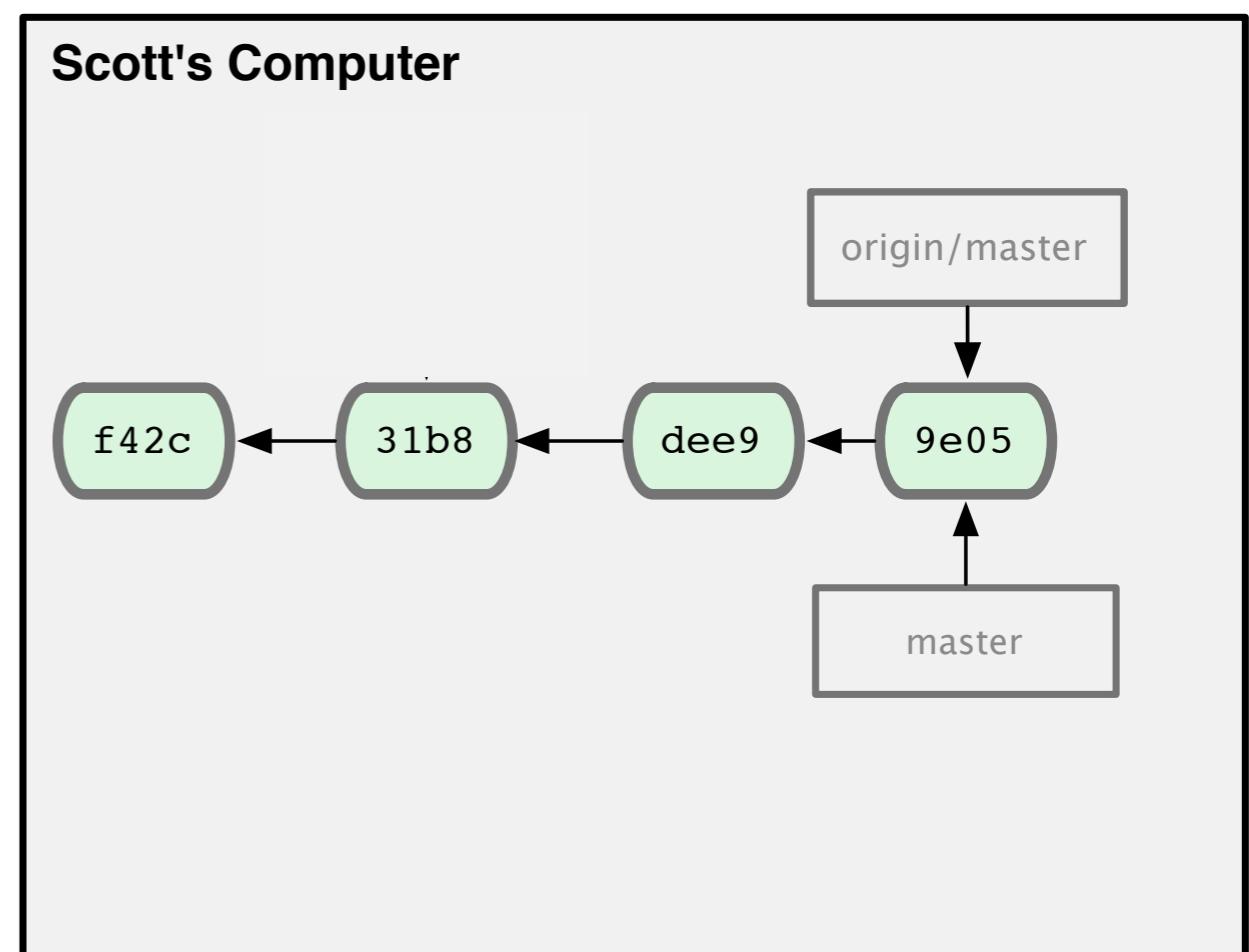
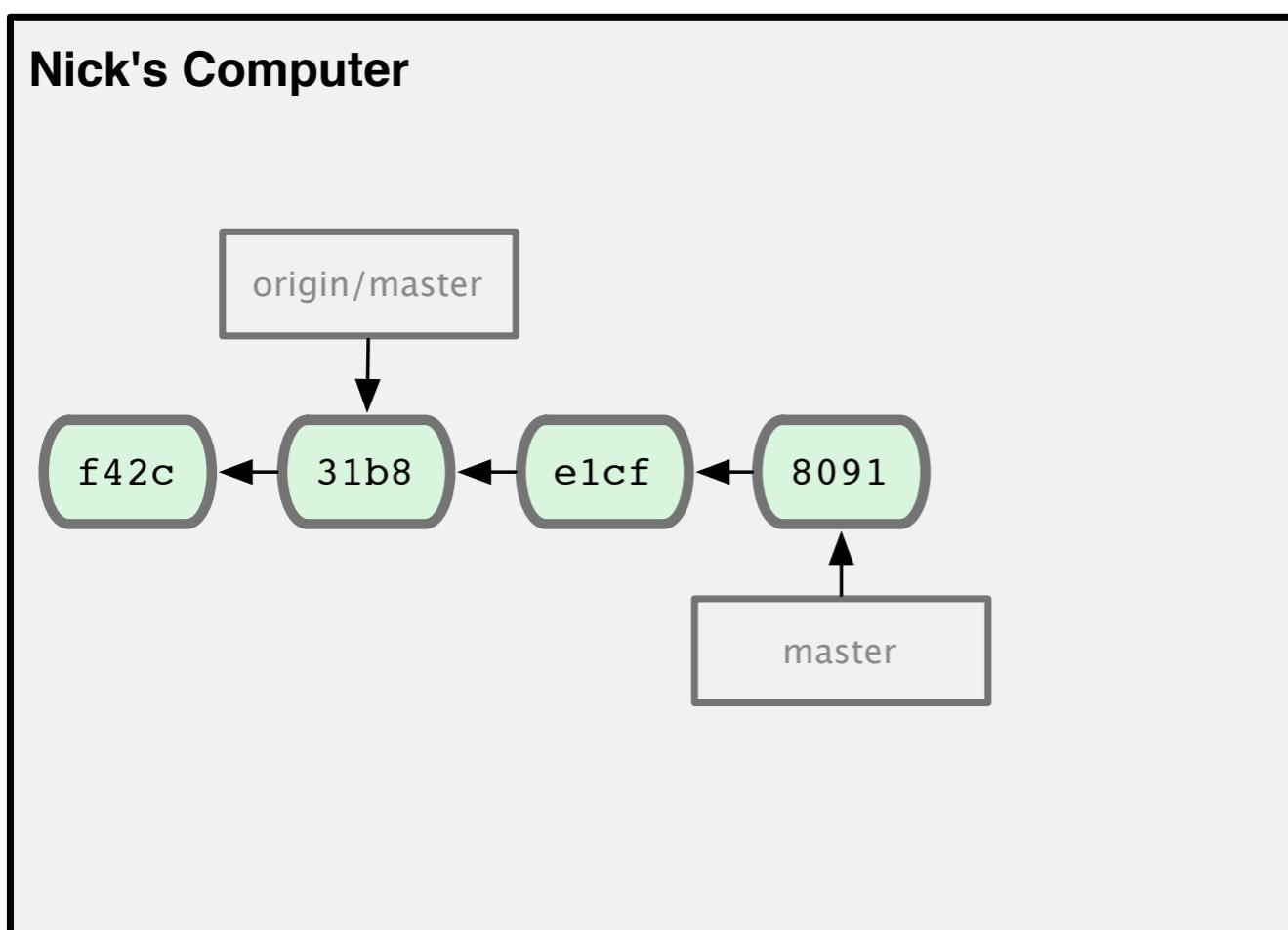
ok, everything
looks good.





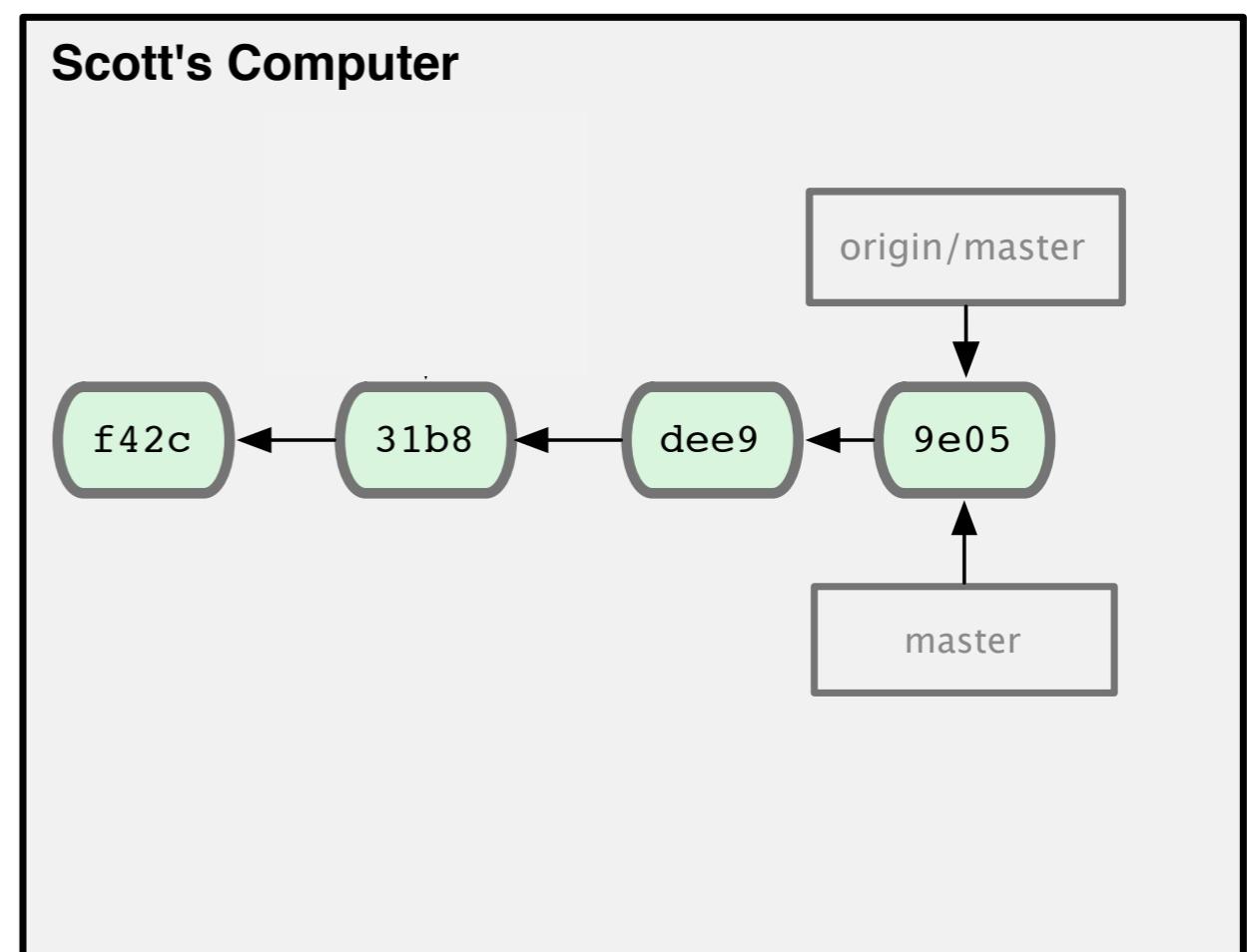
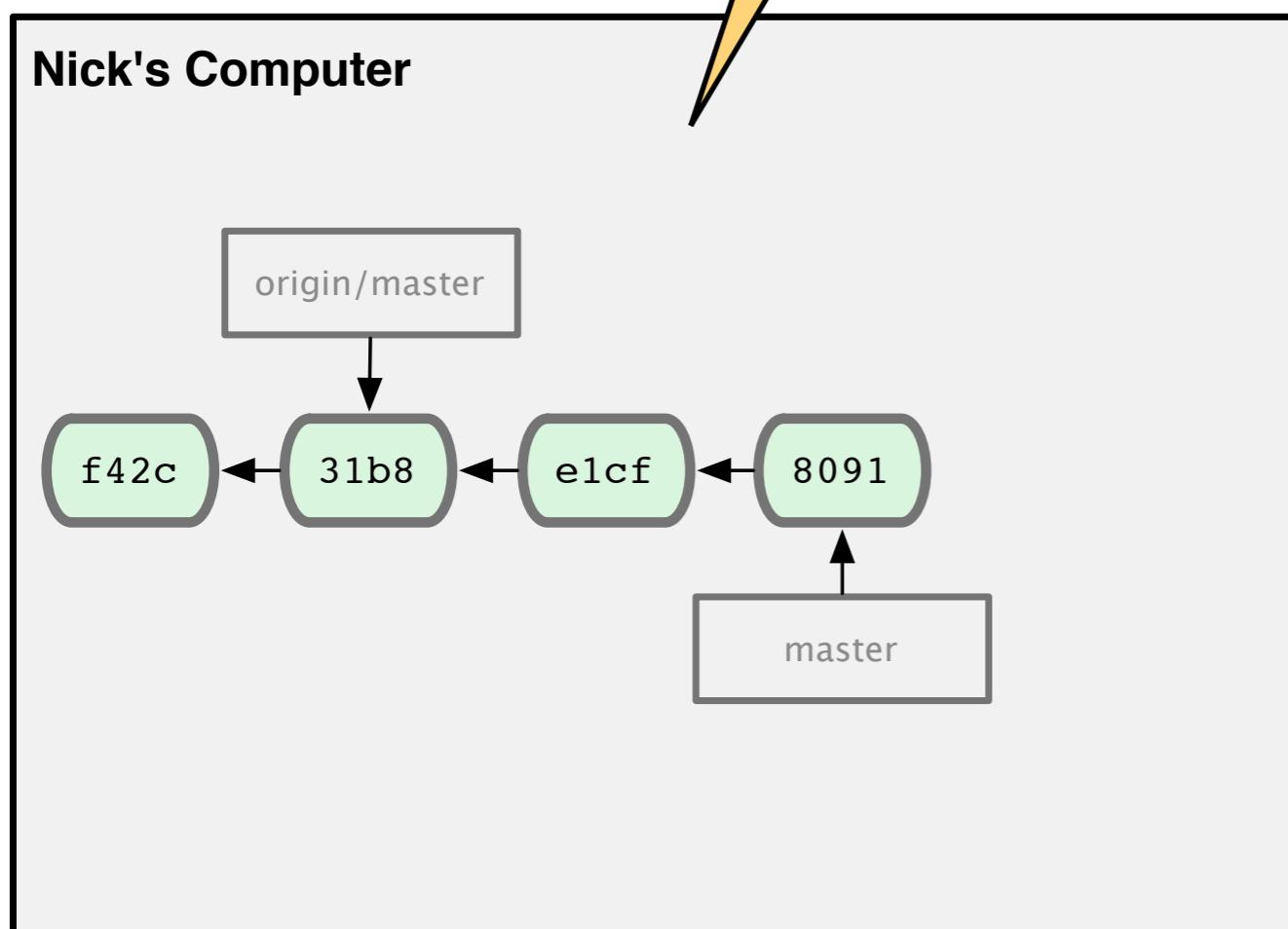


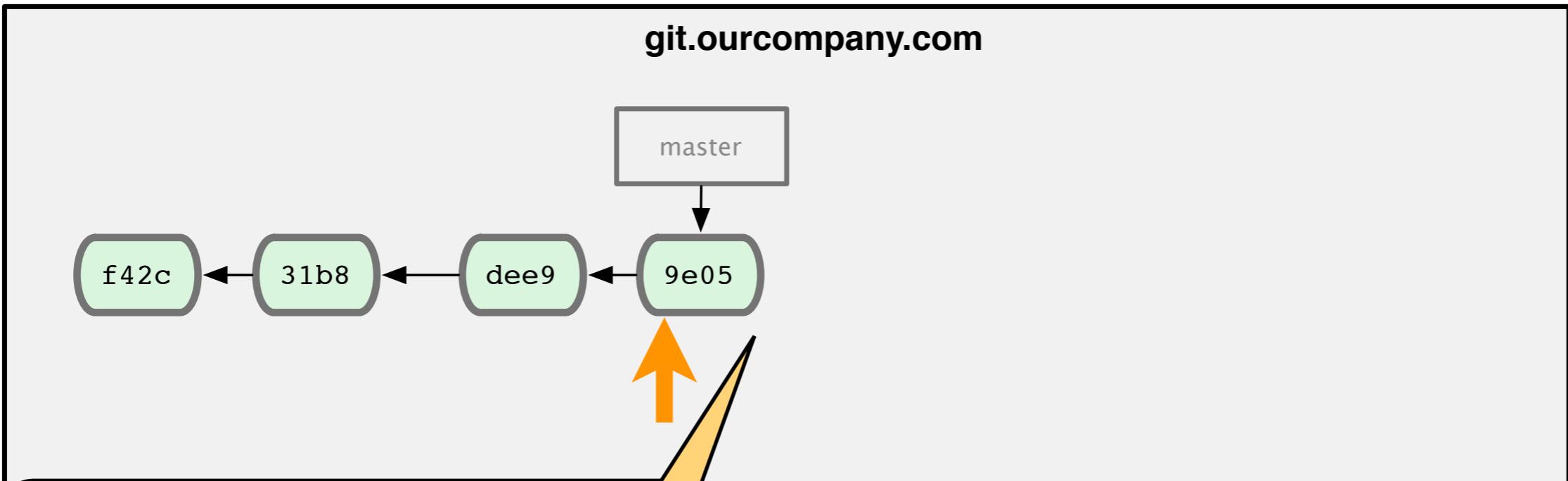
git push origin master





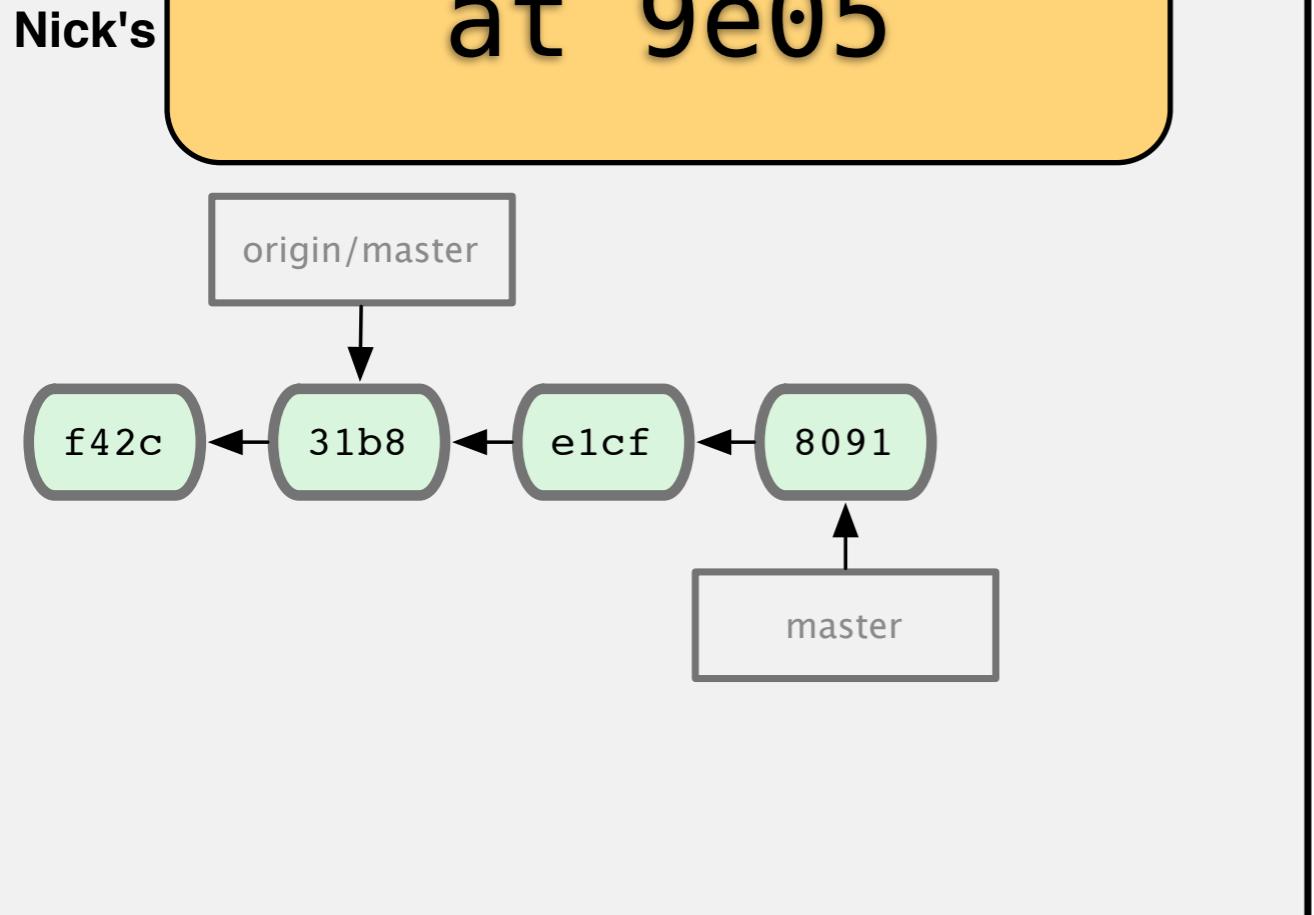
`git push origin master`



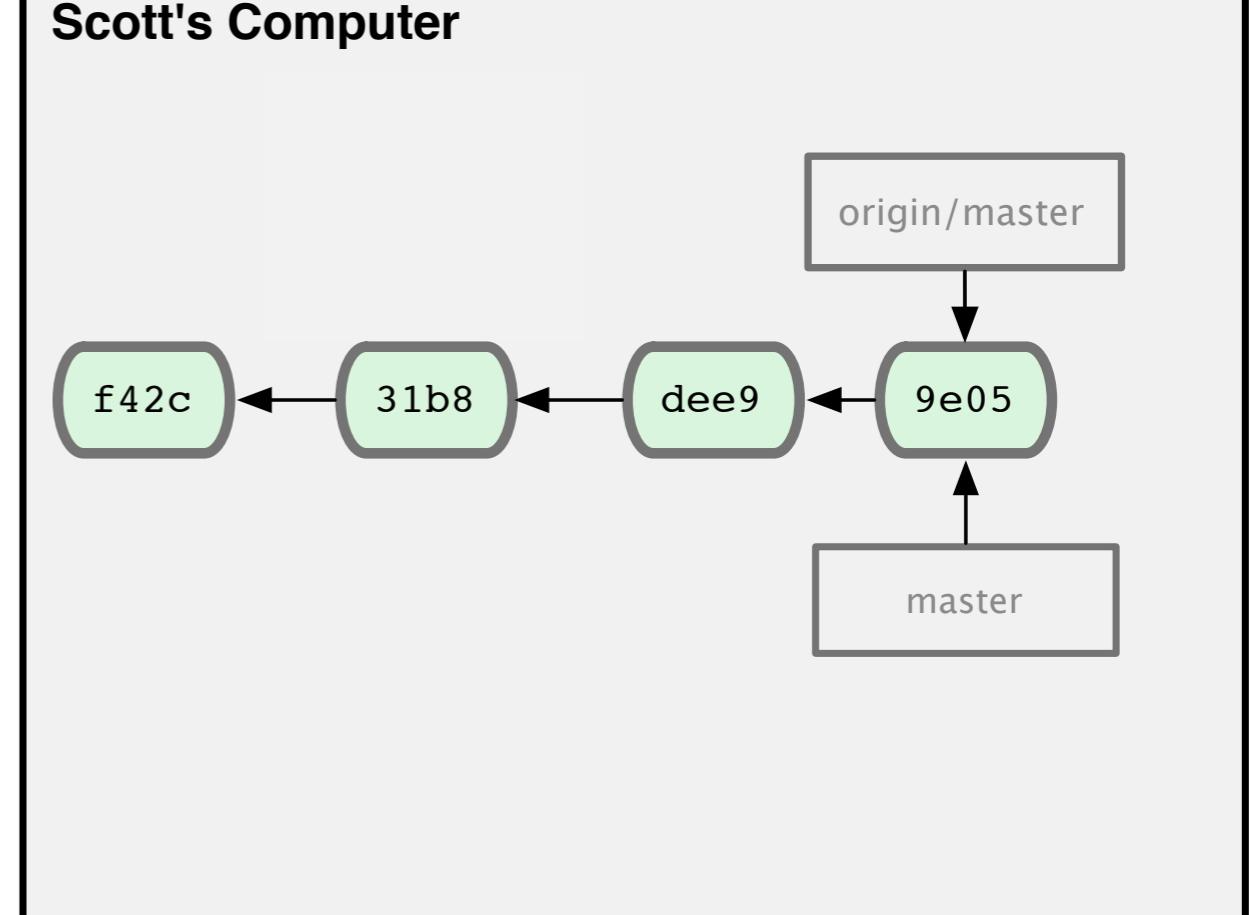


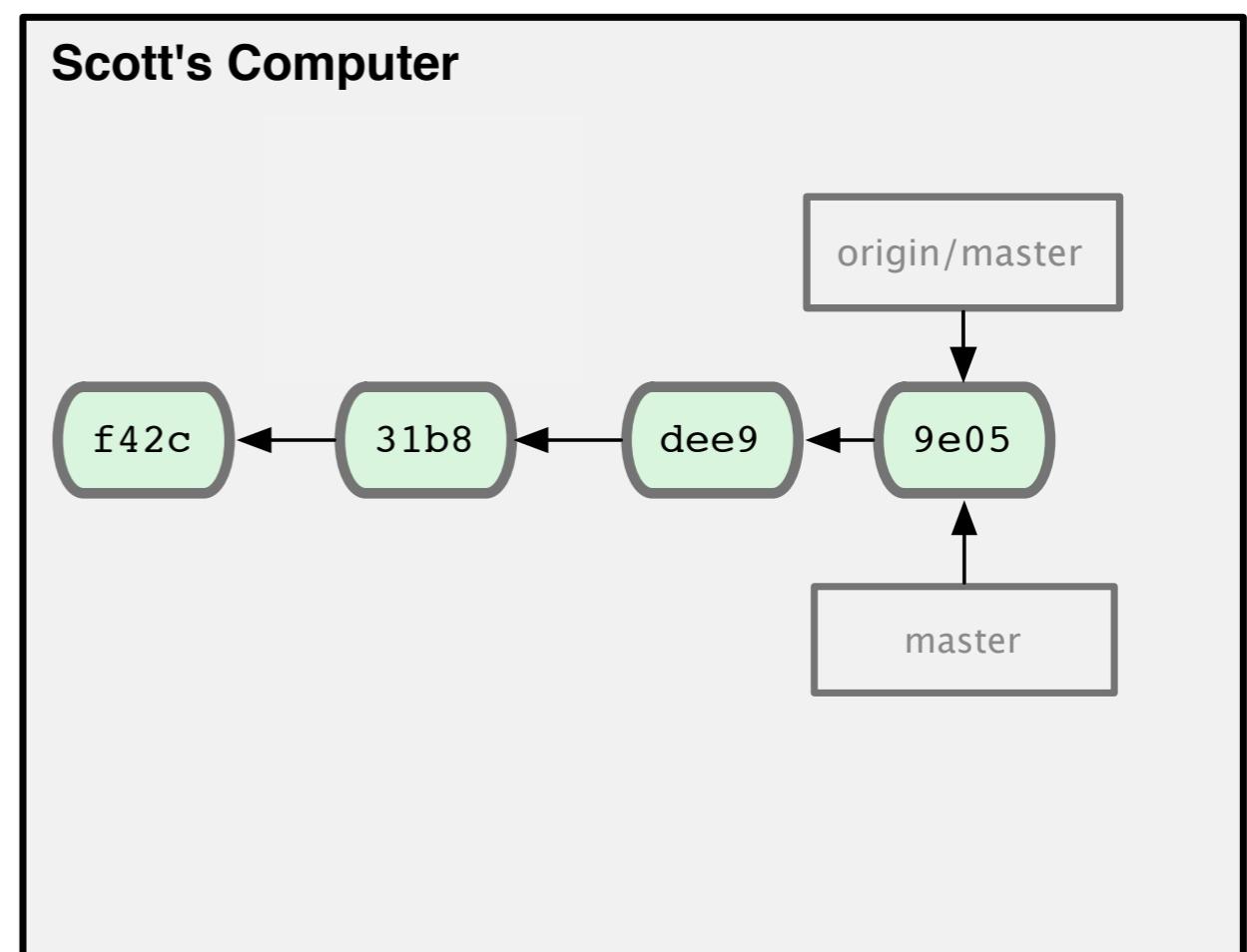
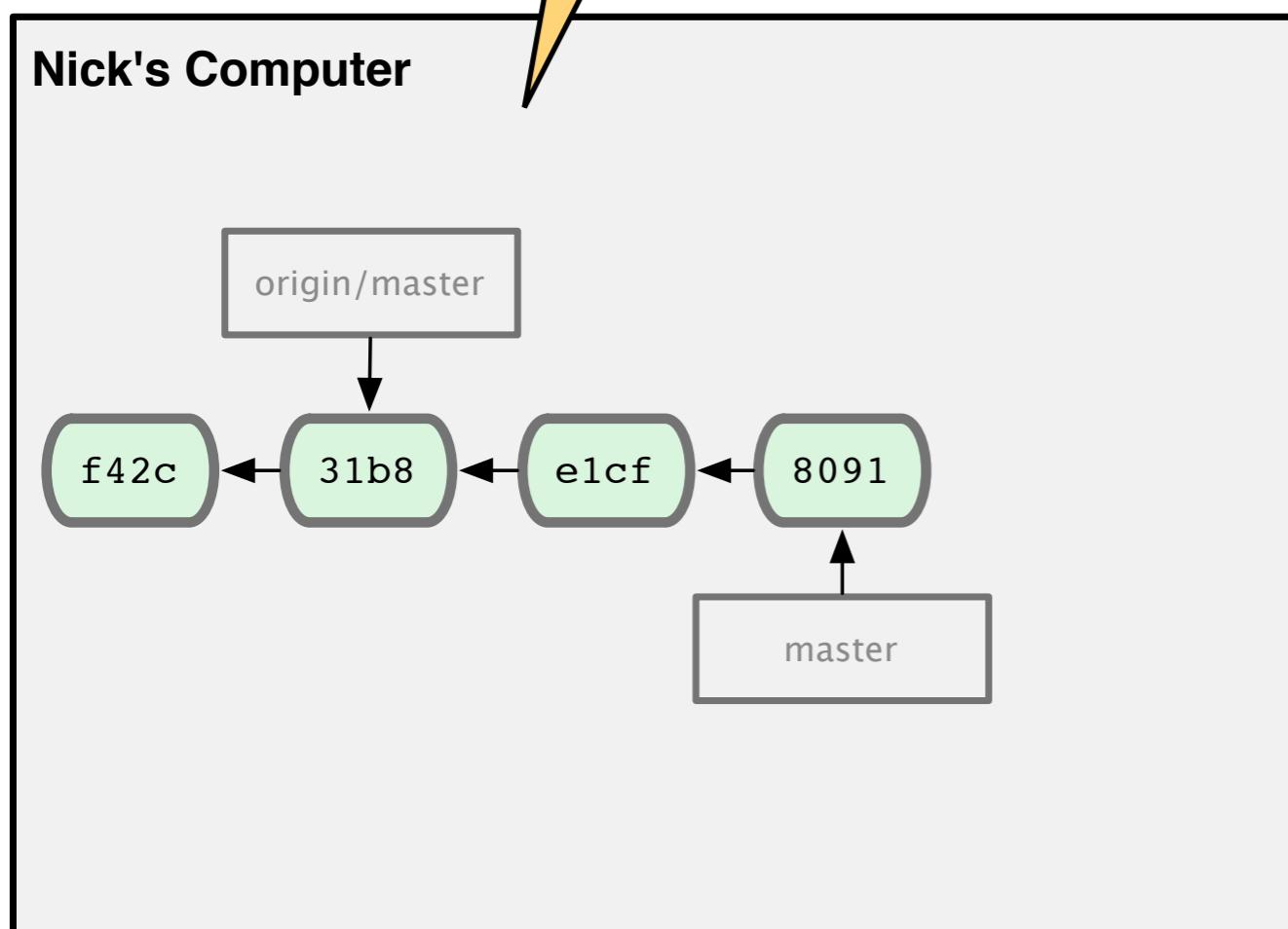
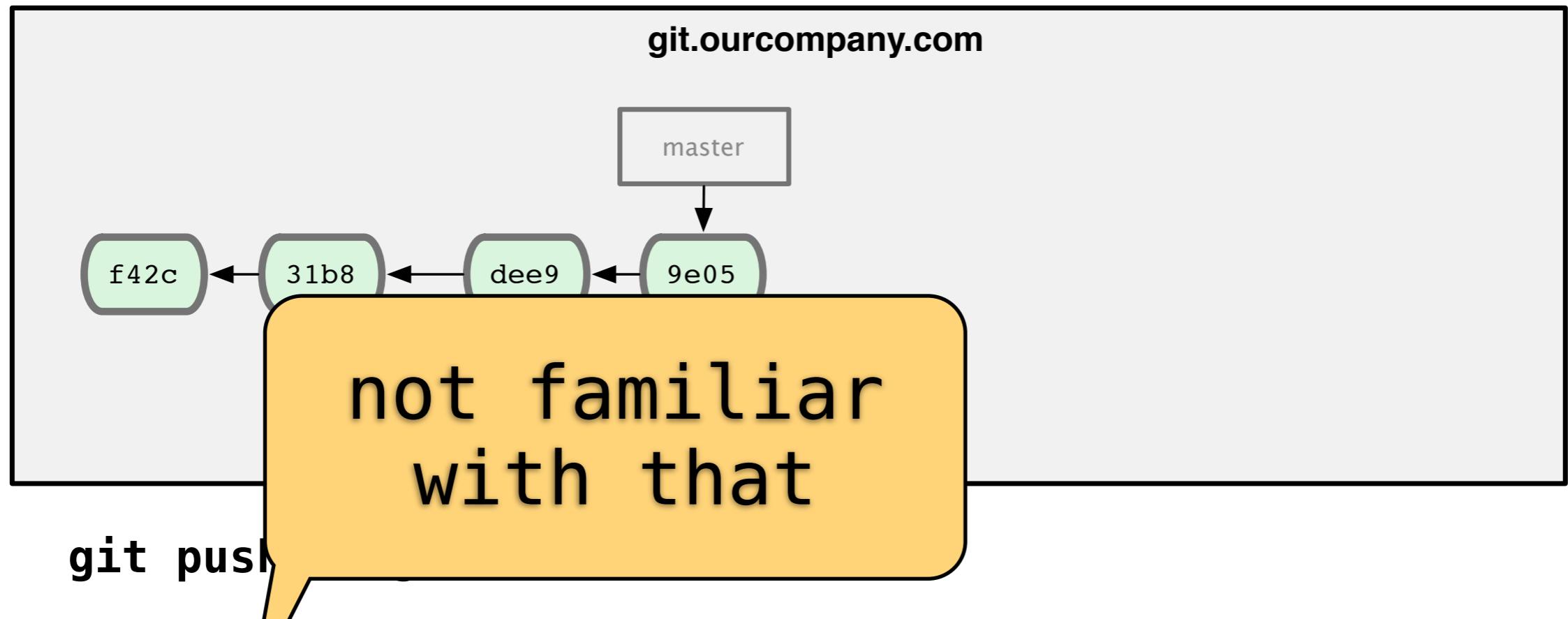
Nick's

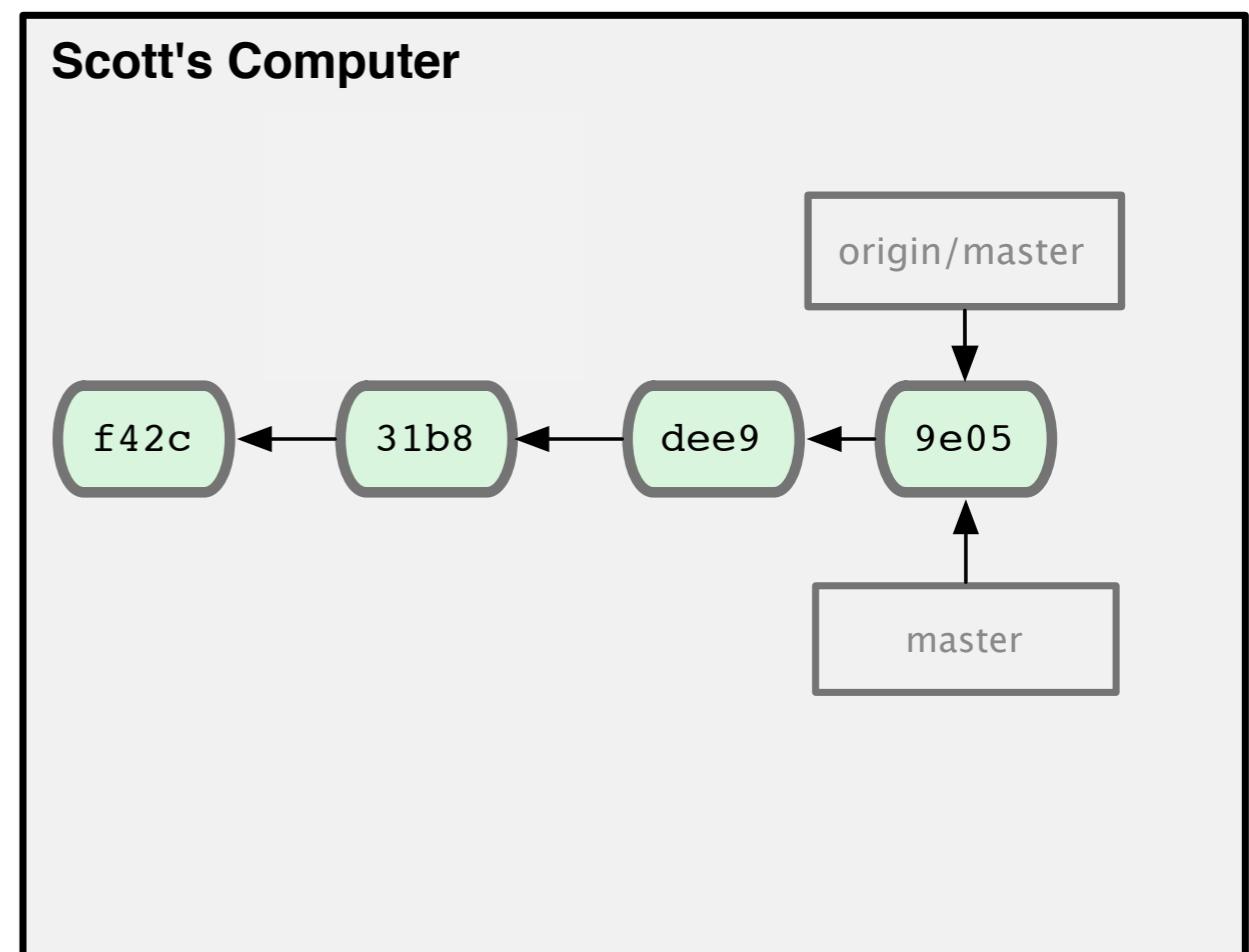
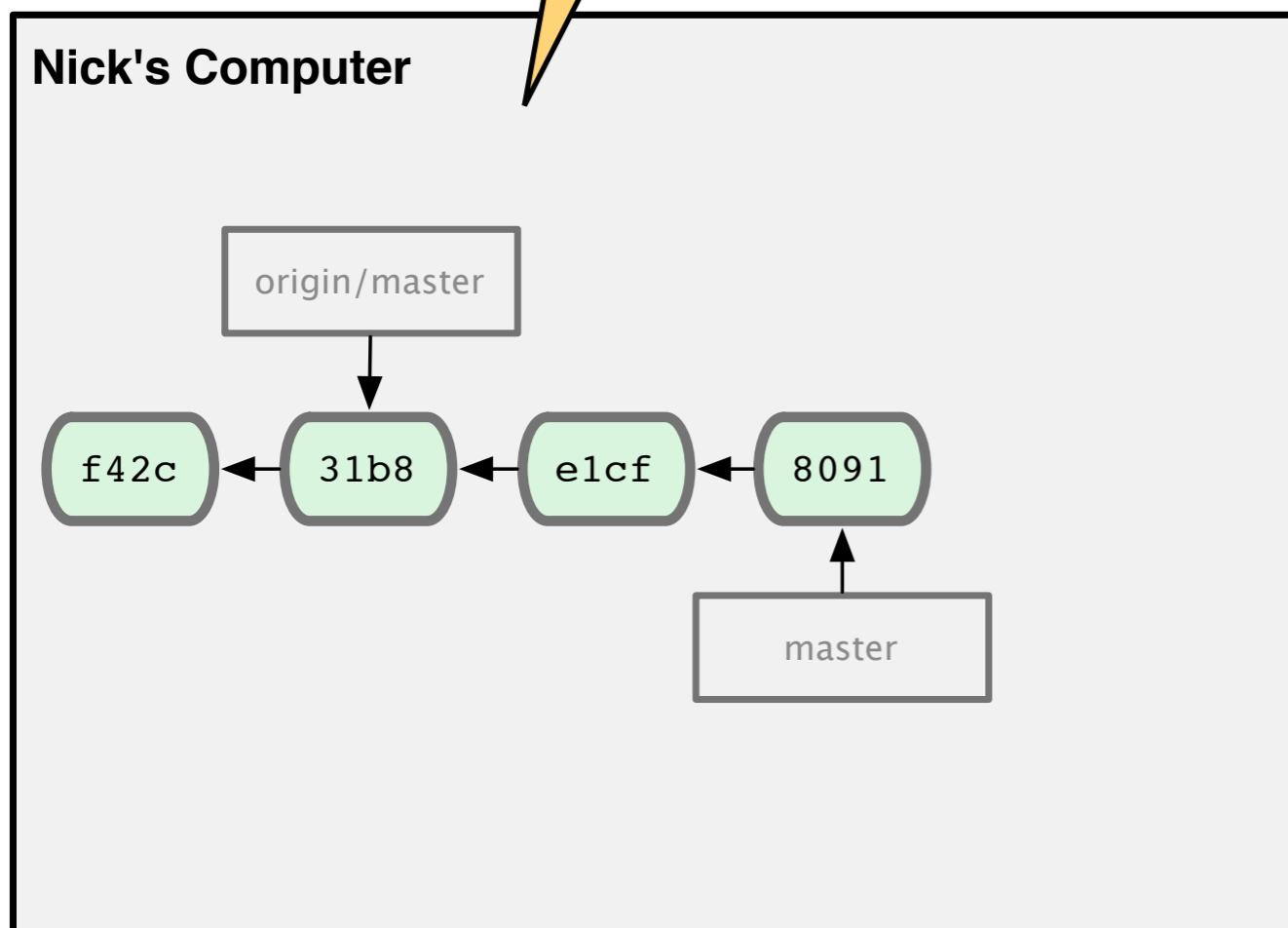
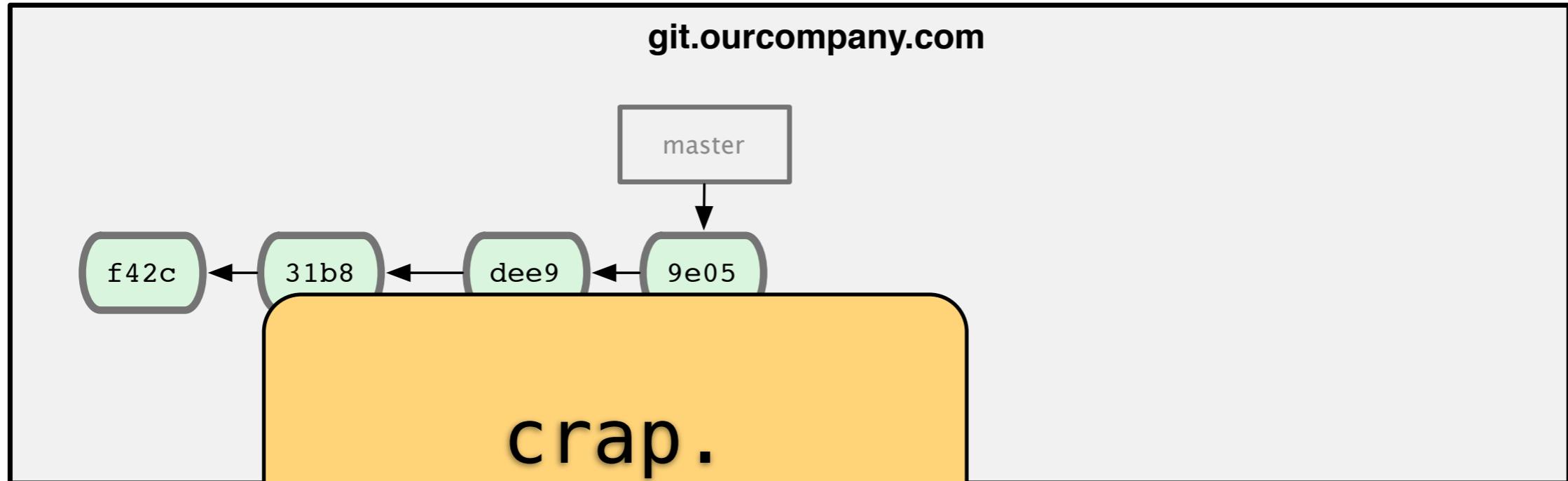
i've got master
at 9e05

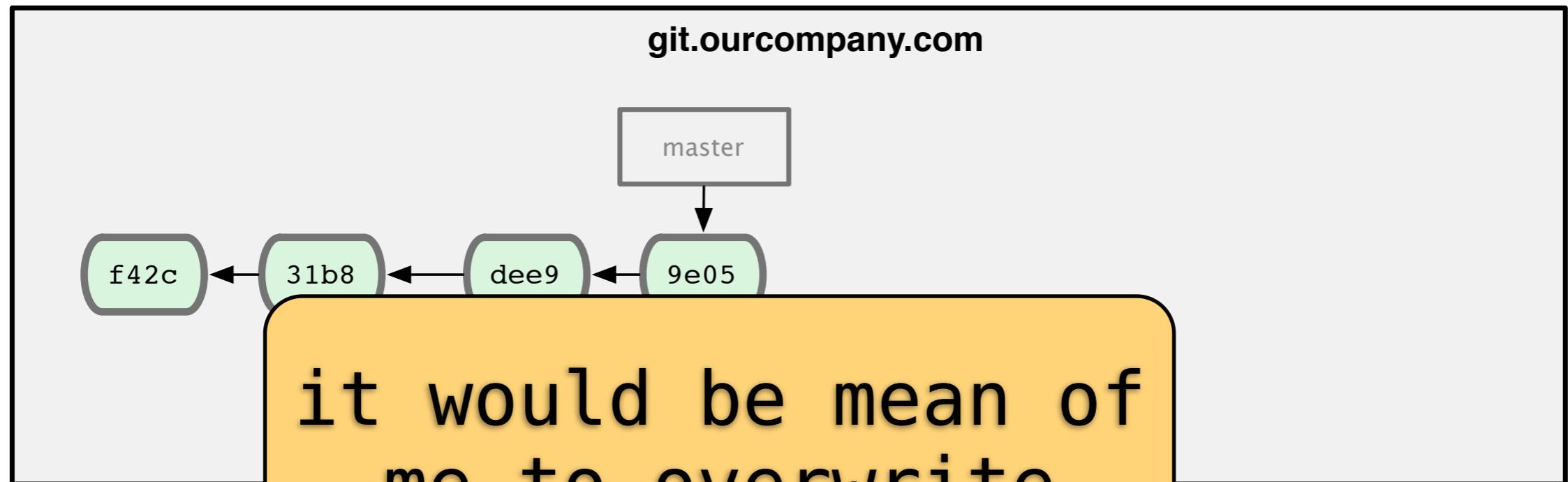


Scott's Computer





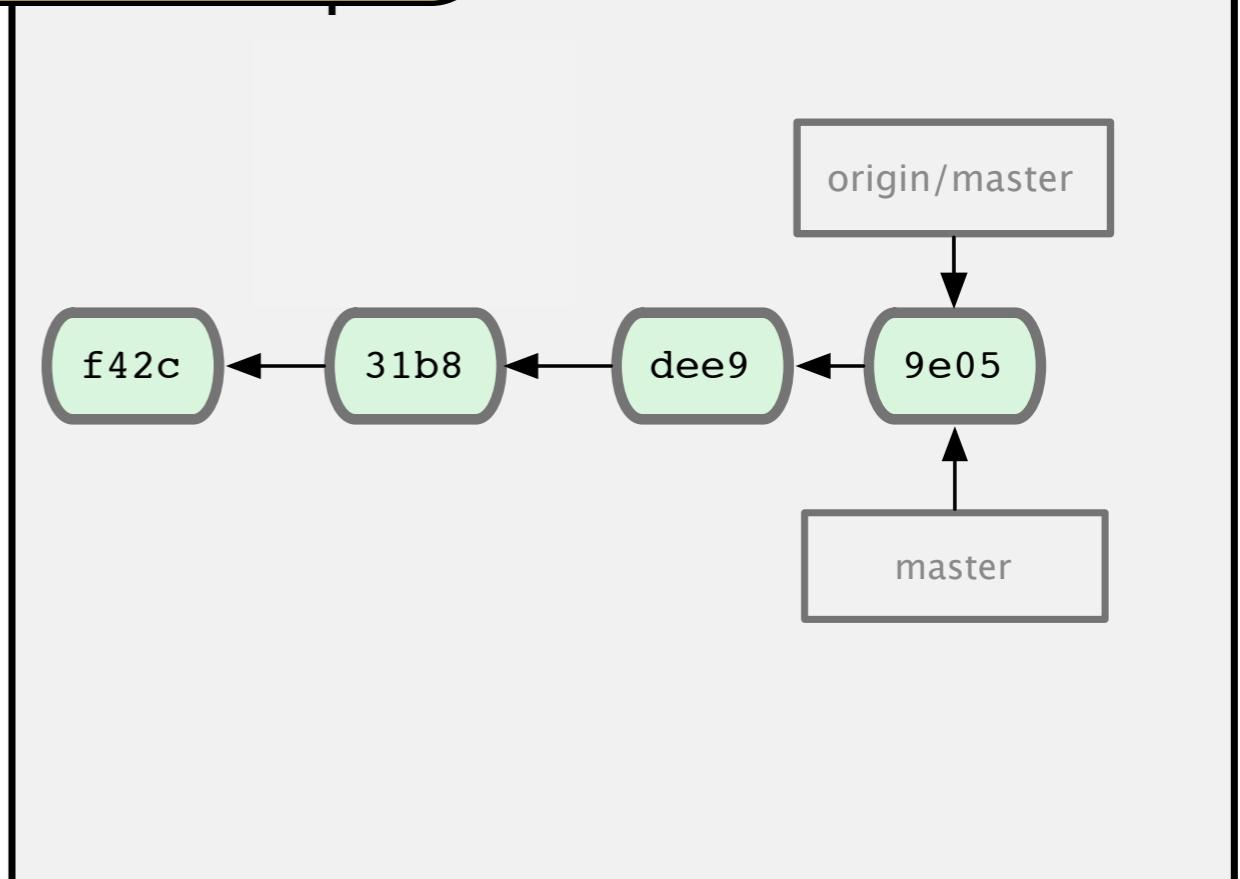
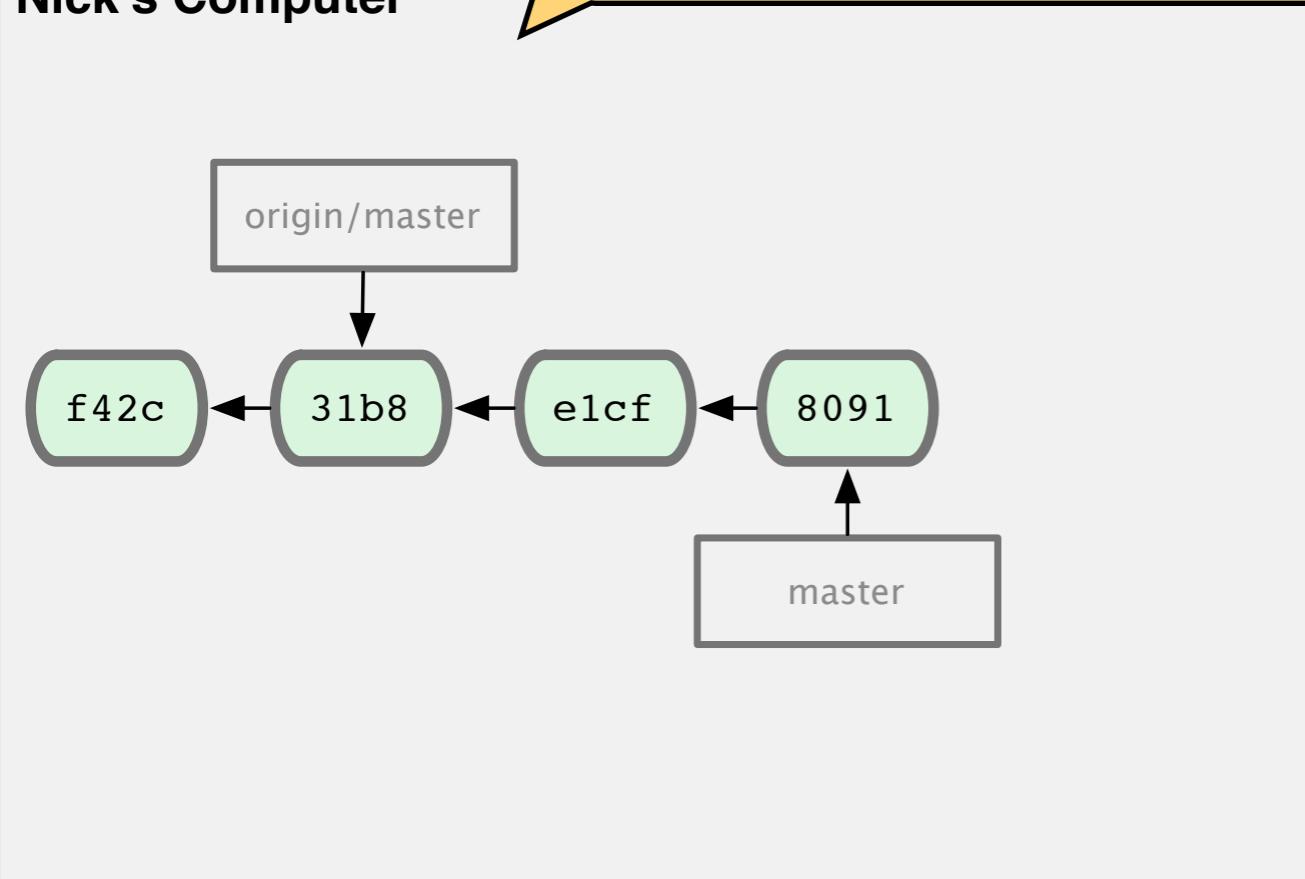


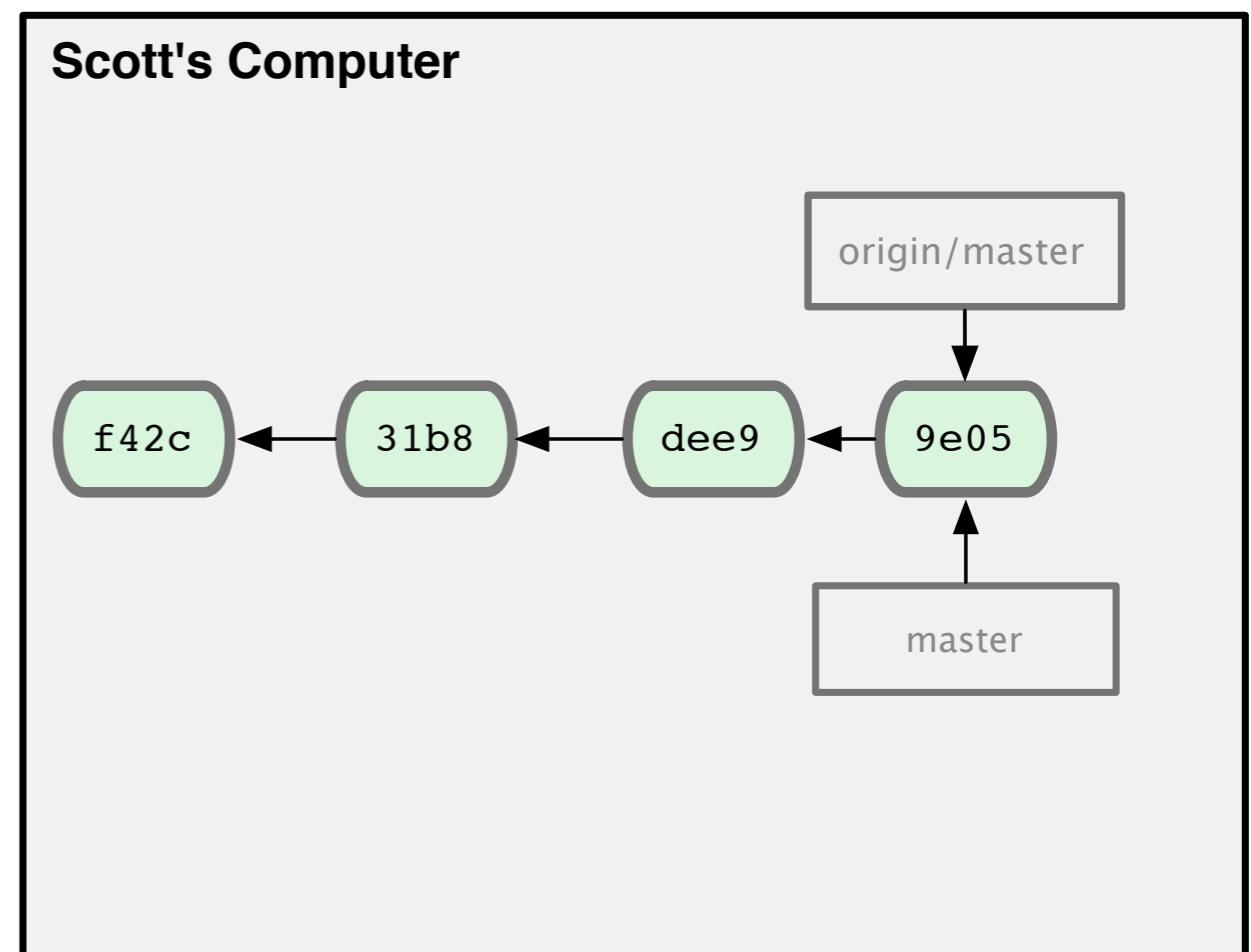
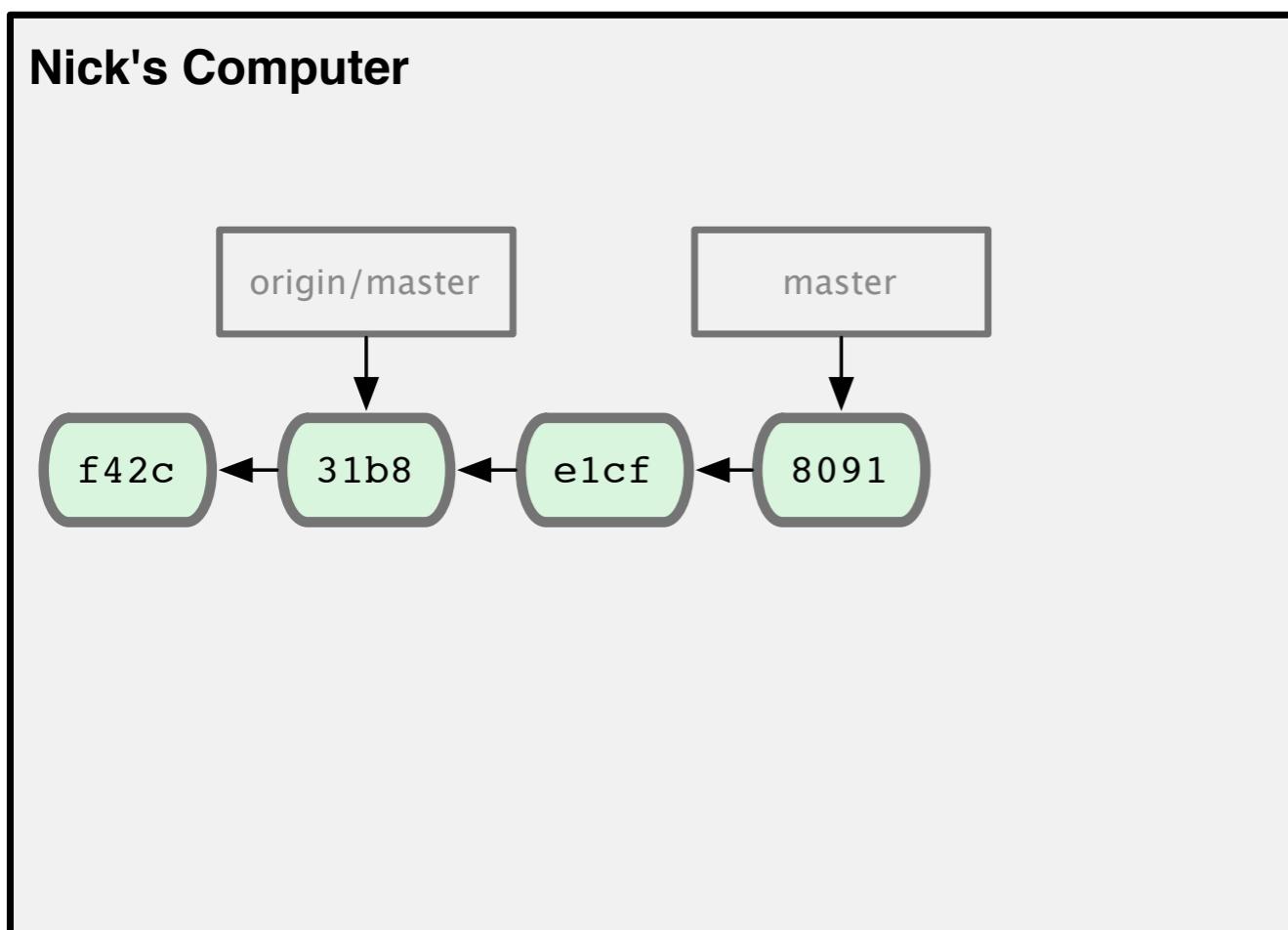
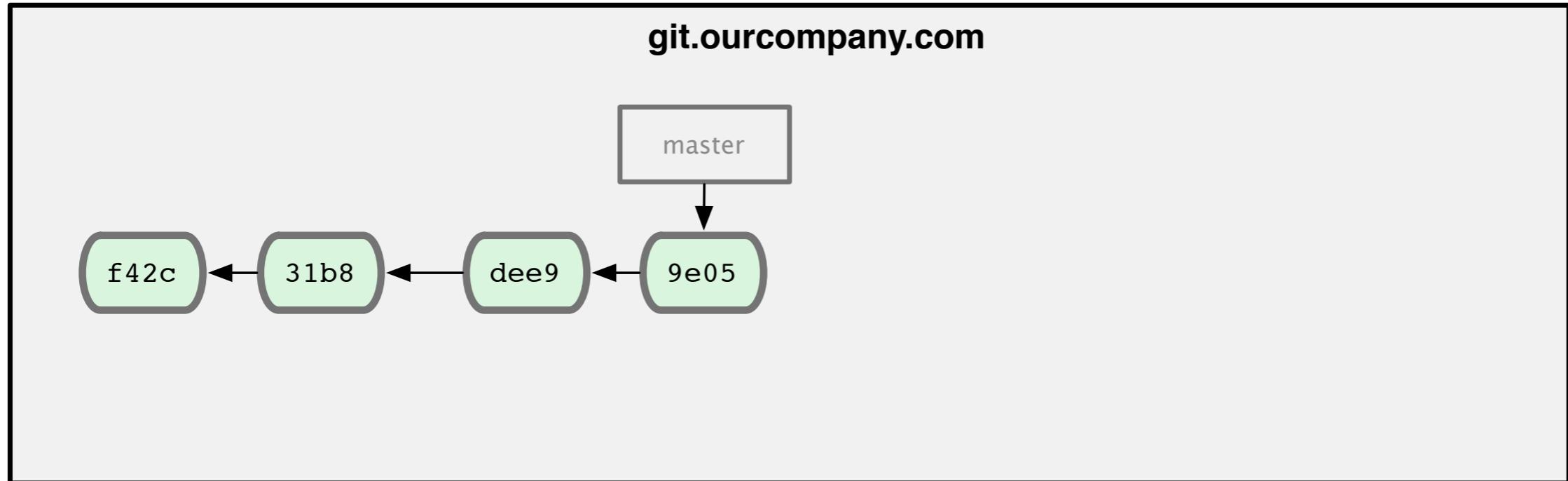


git push

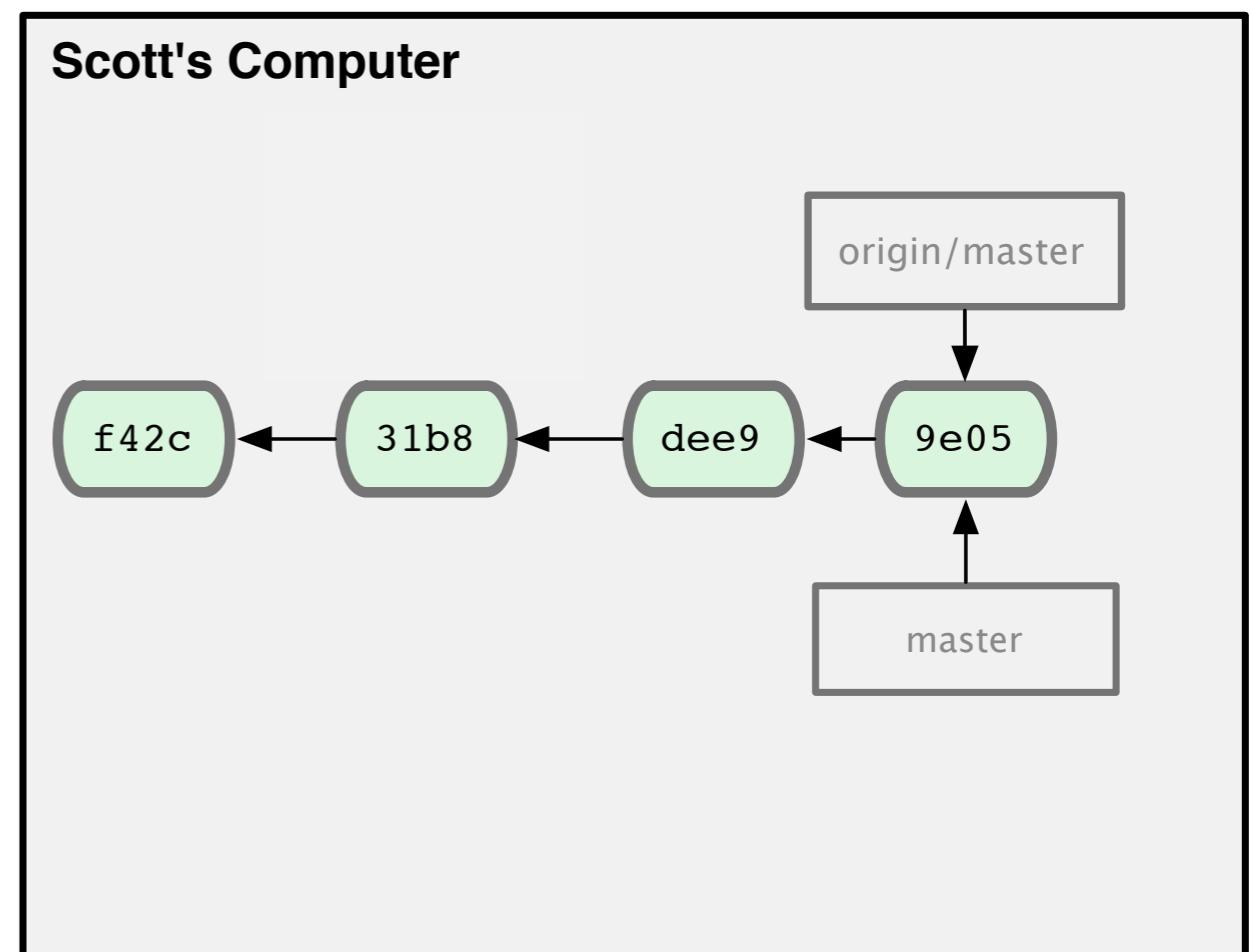
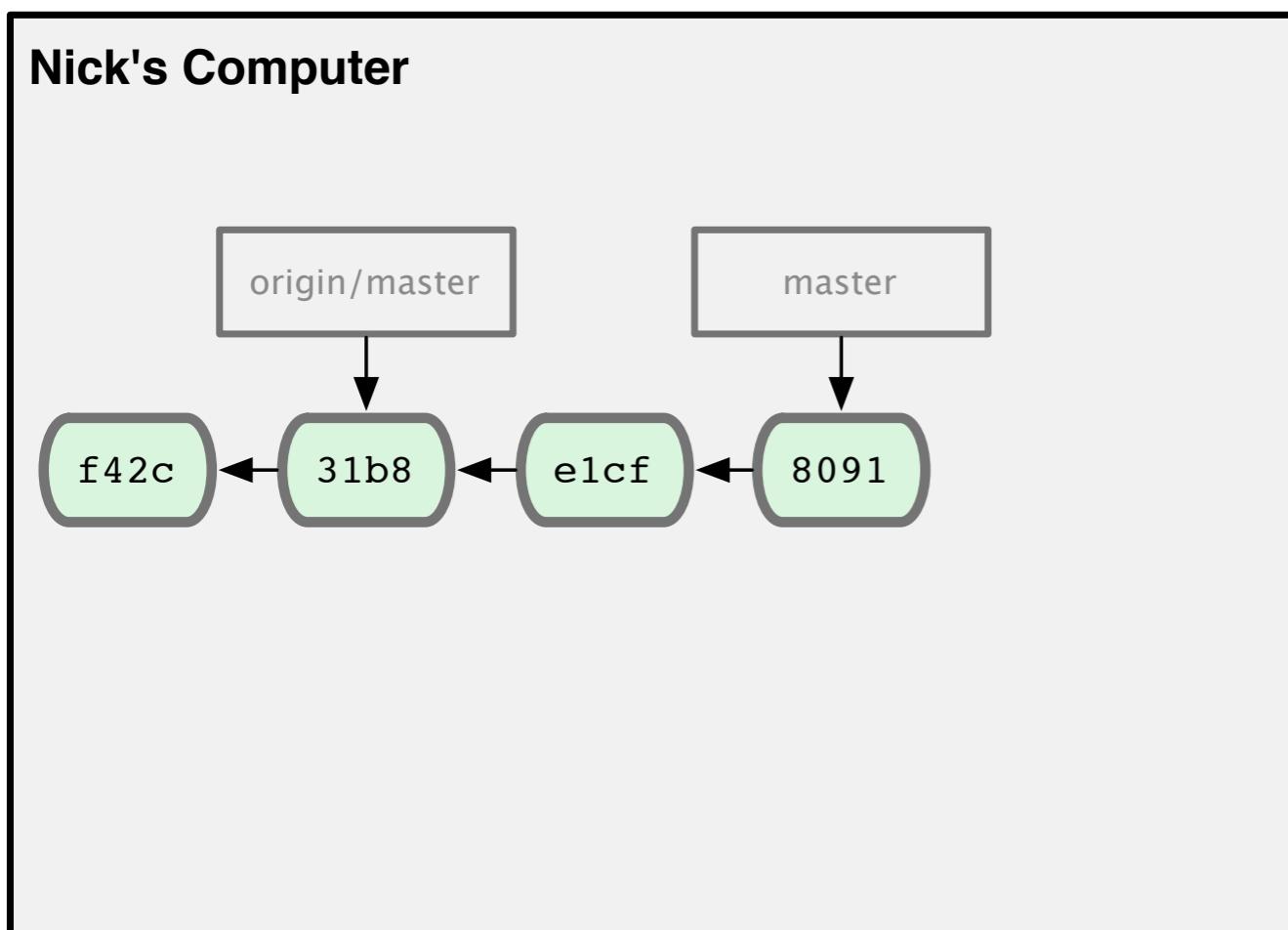
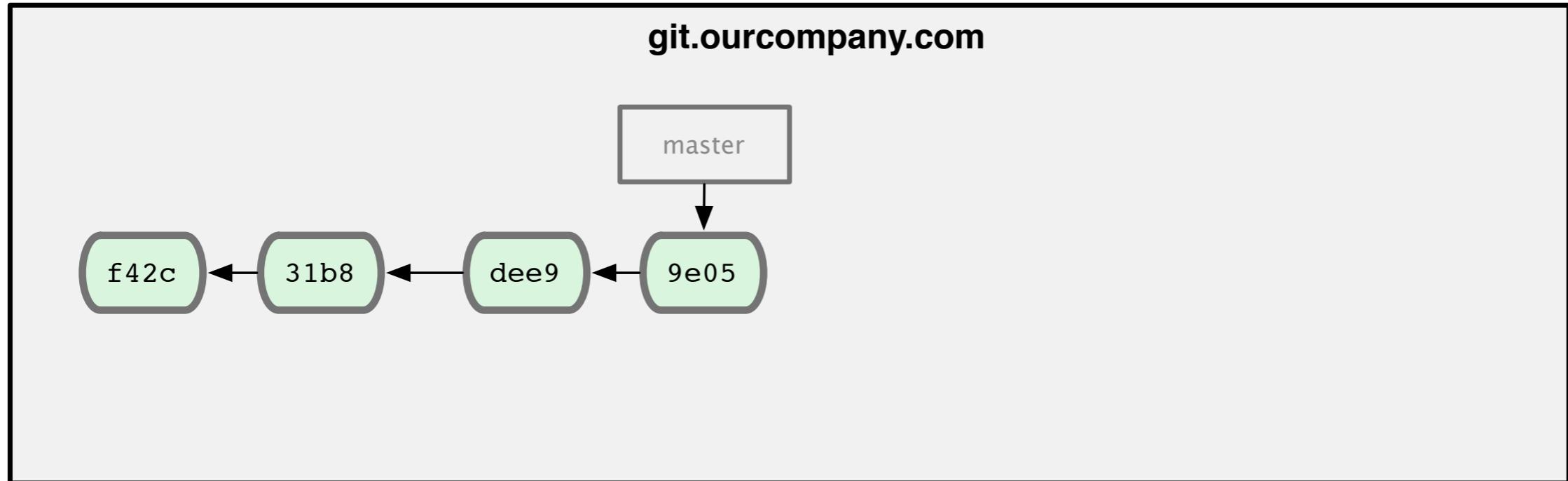
it would be mean of
me to overwrite
scott's changes...

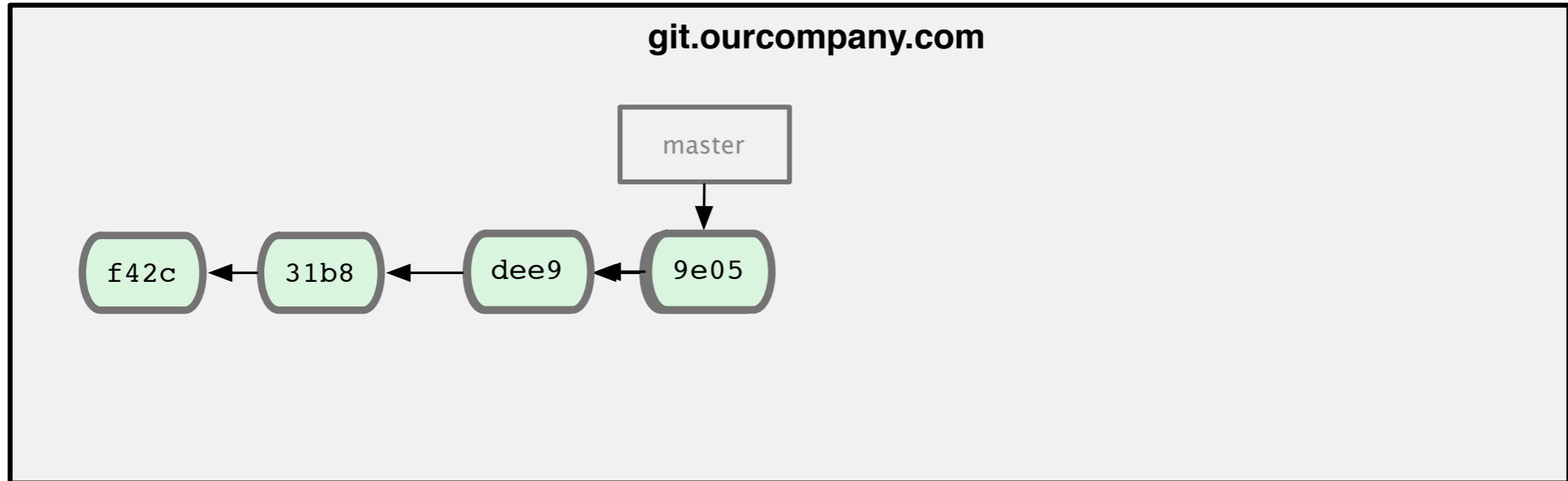
Nick's Computer



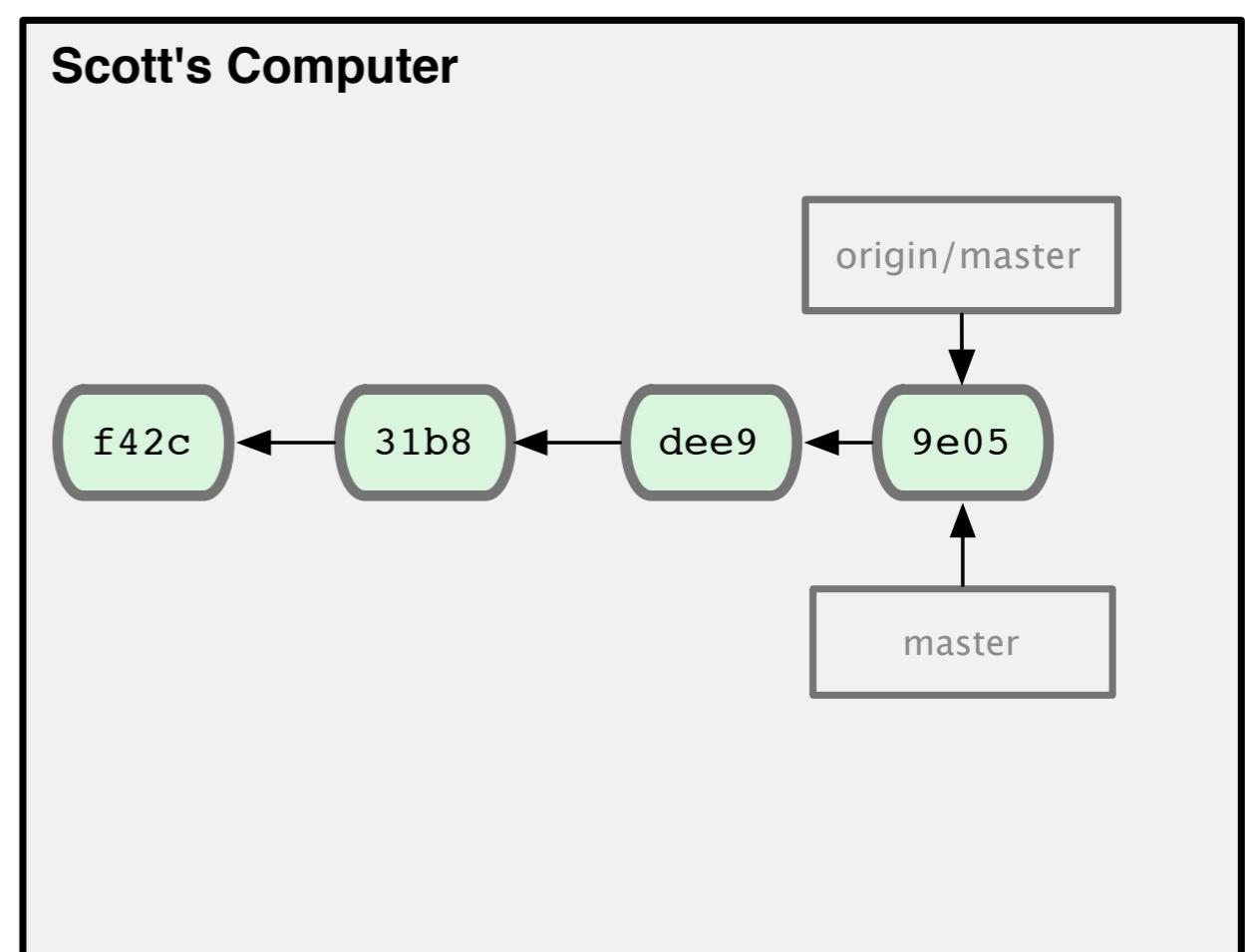
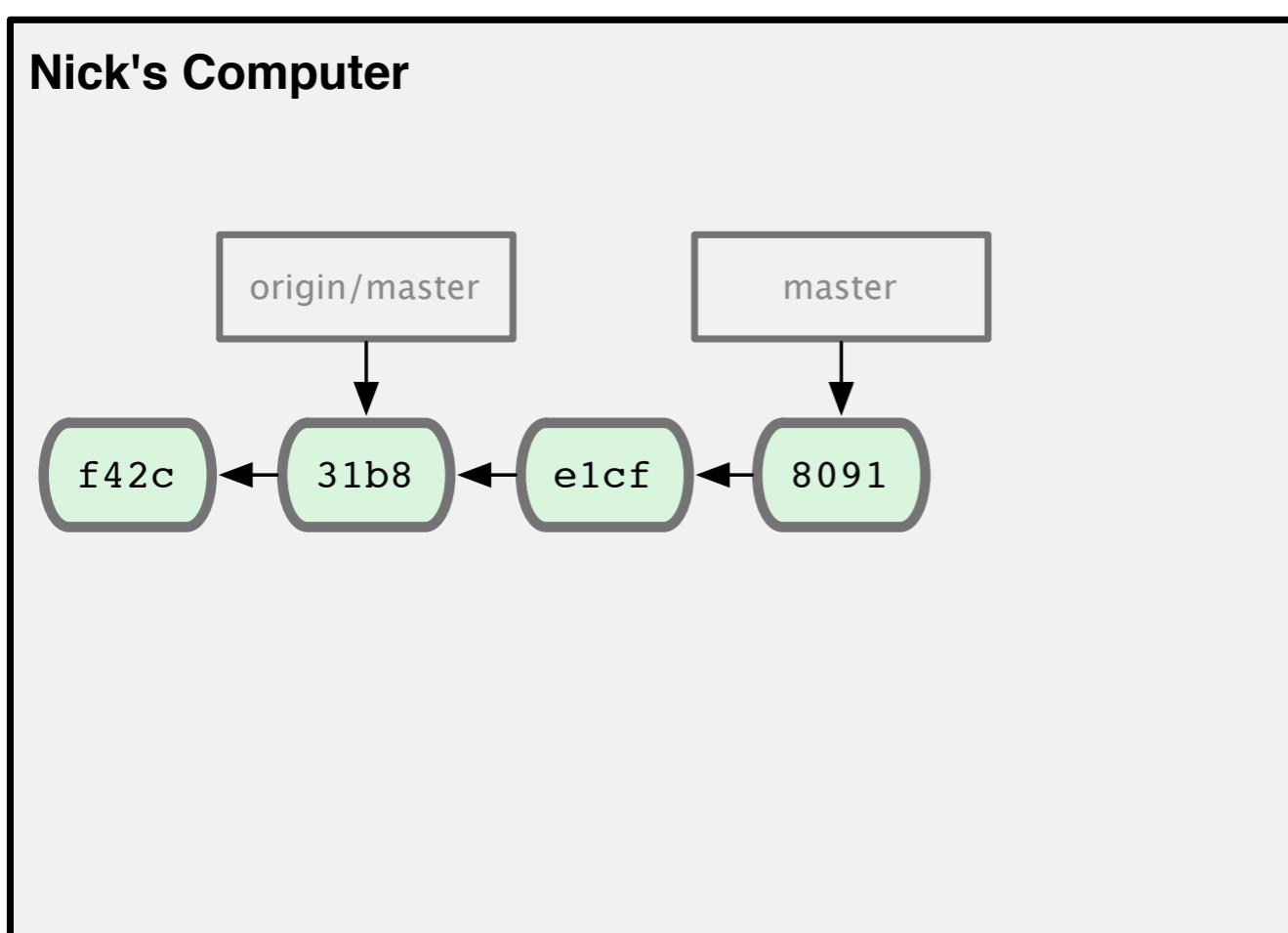


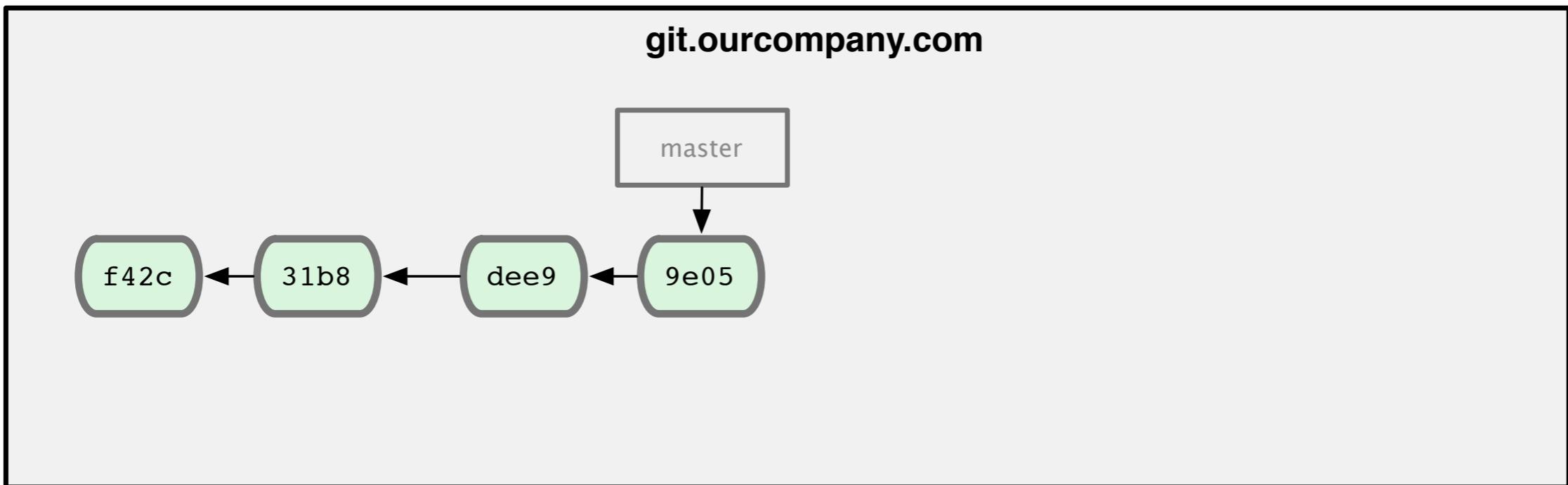
git fetch



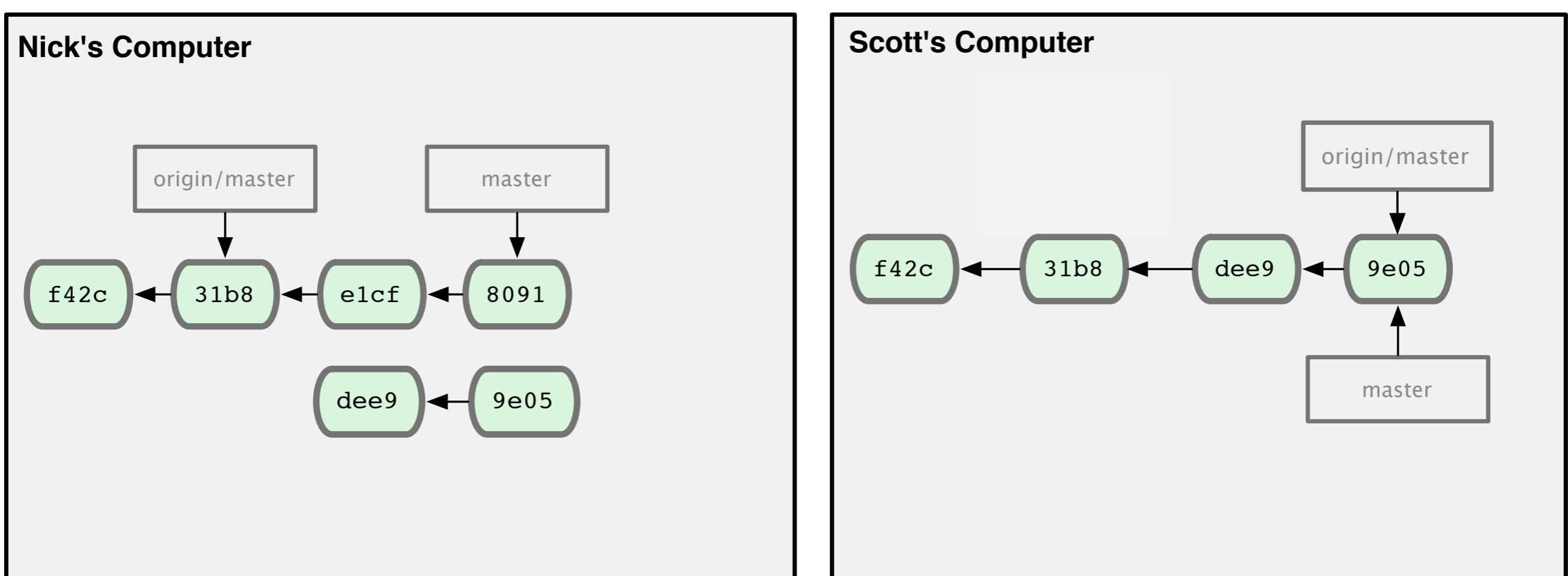


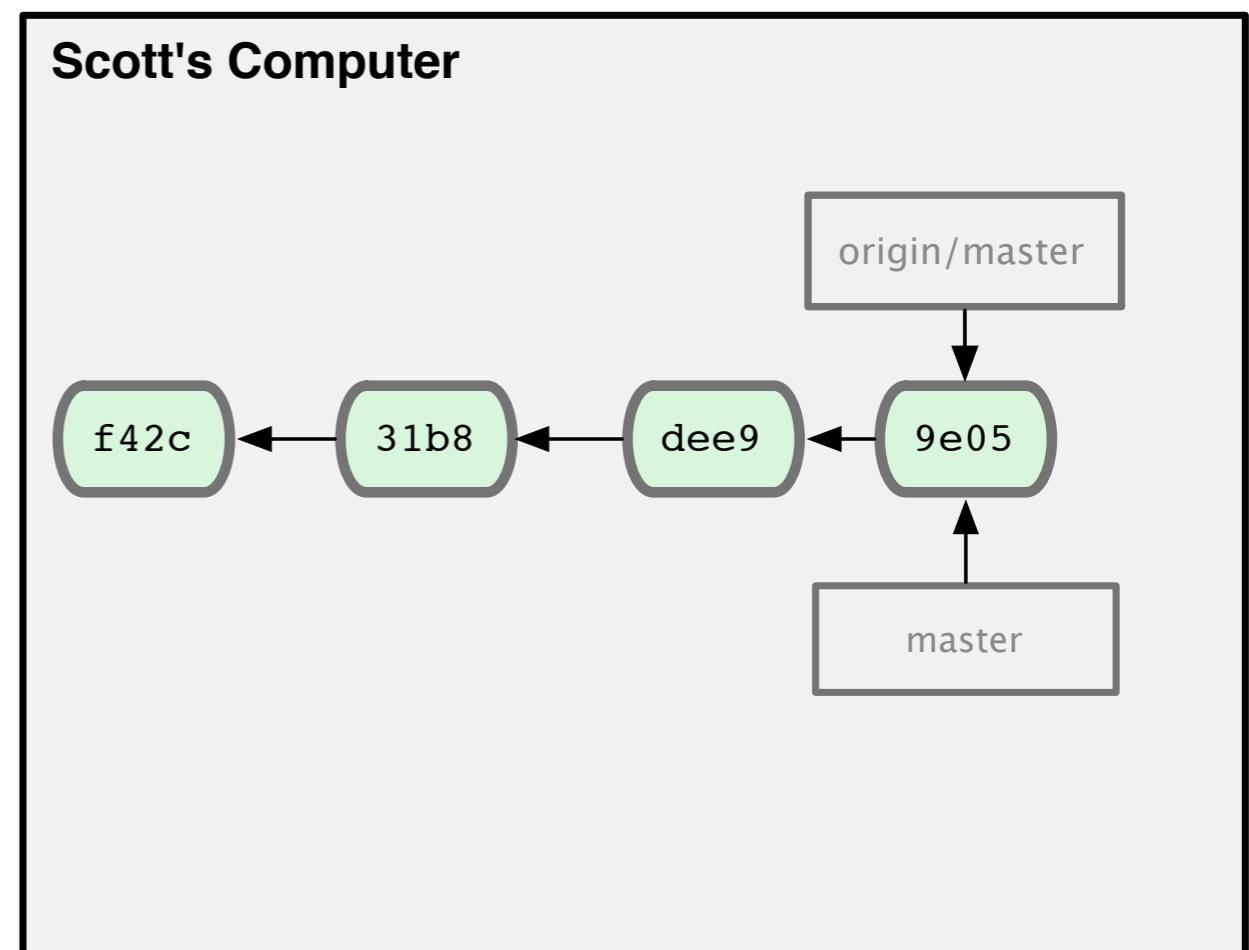
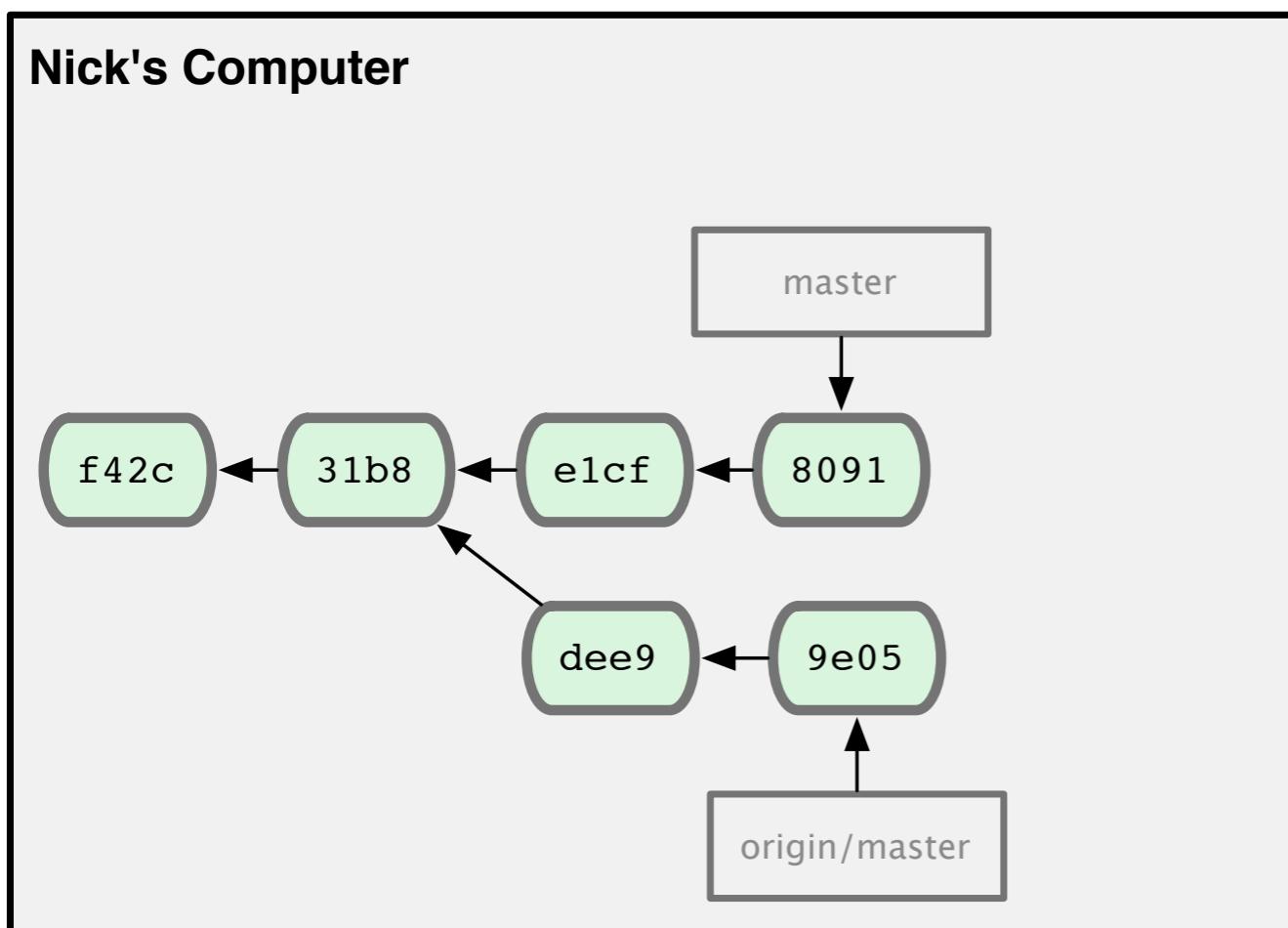
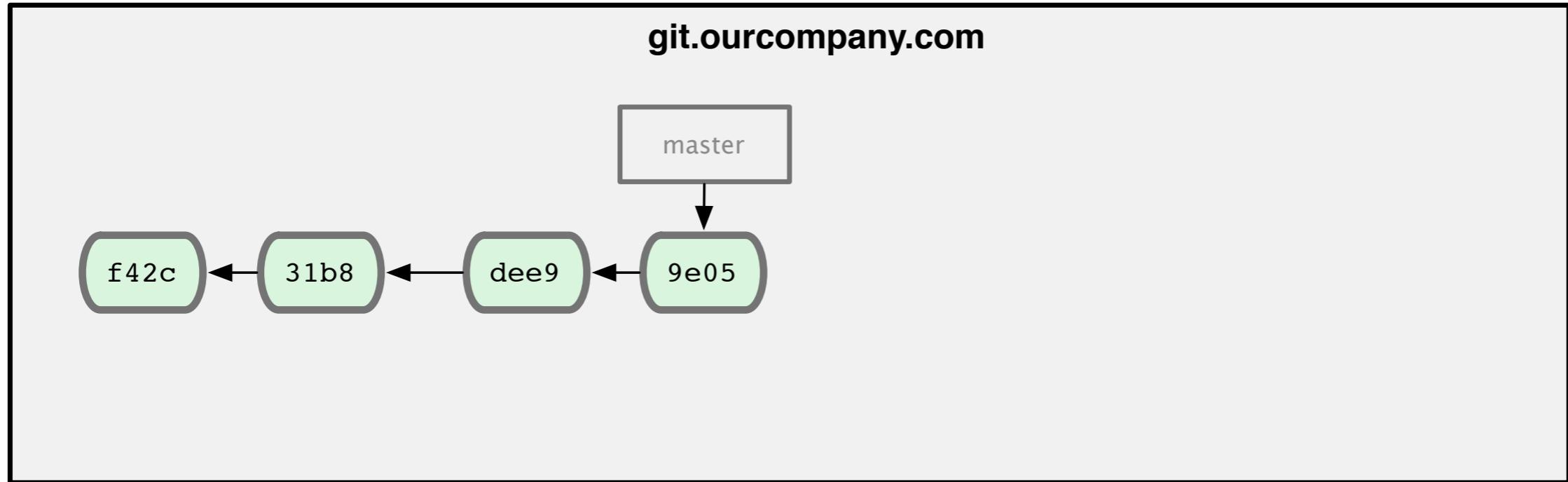
git fetch

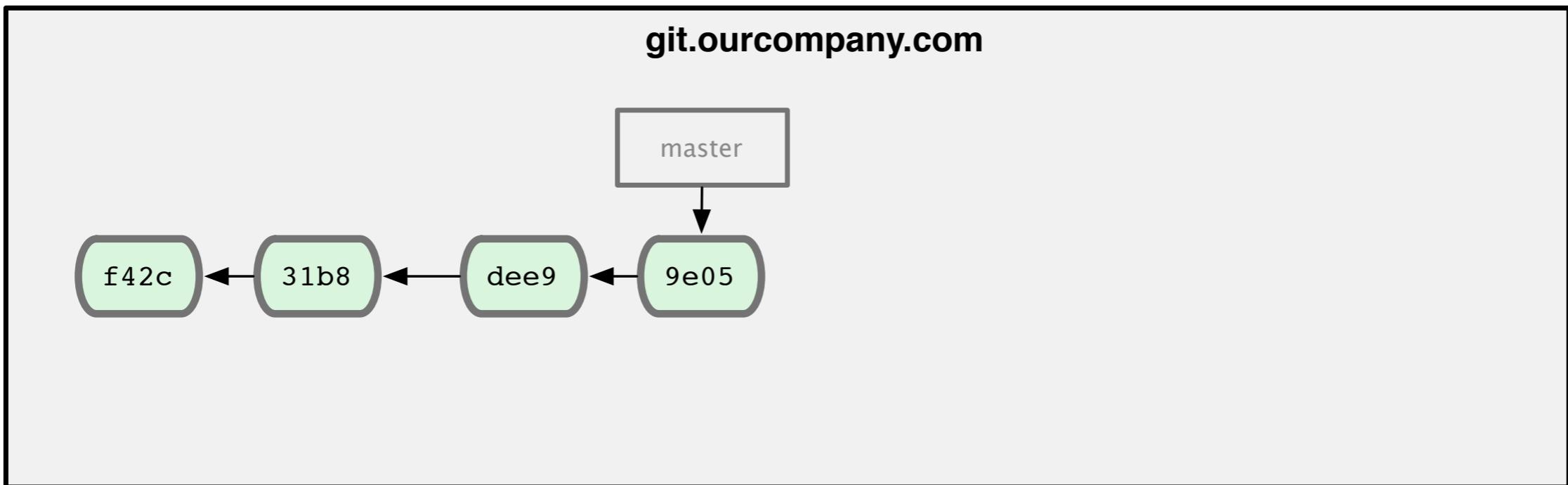




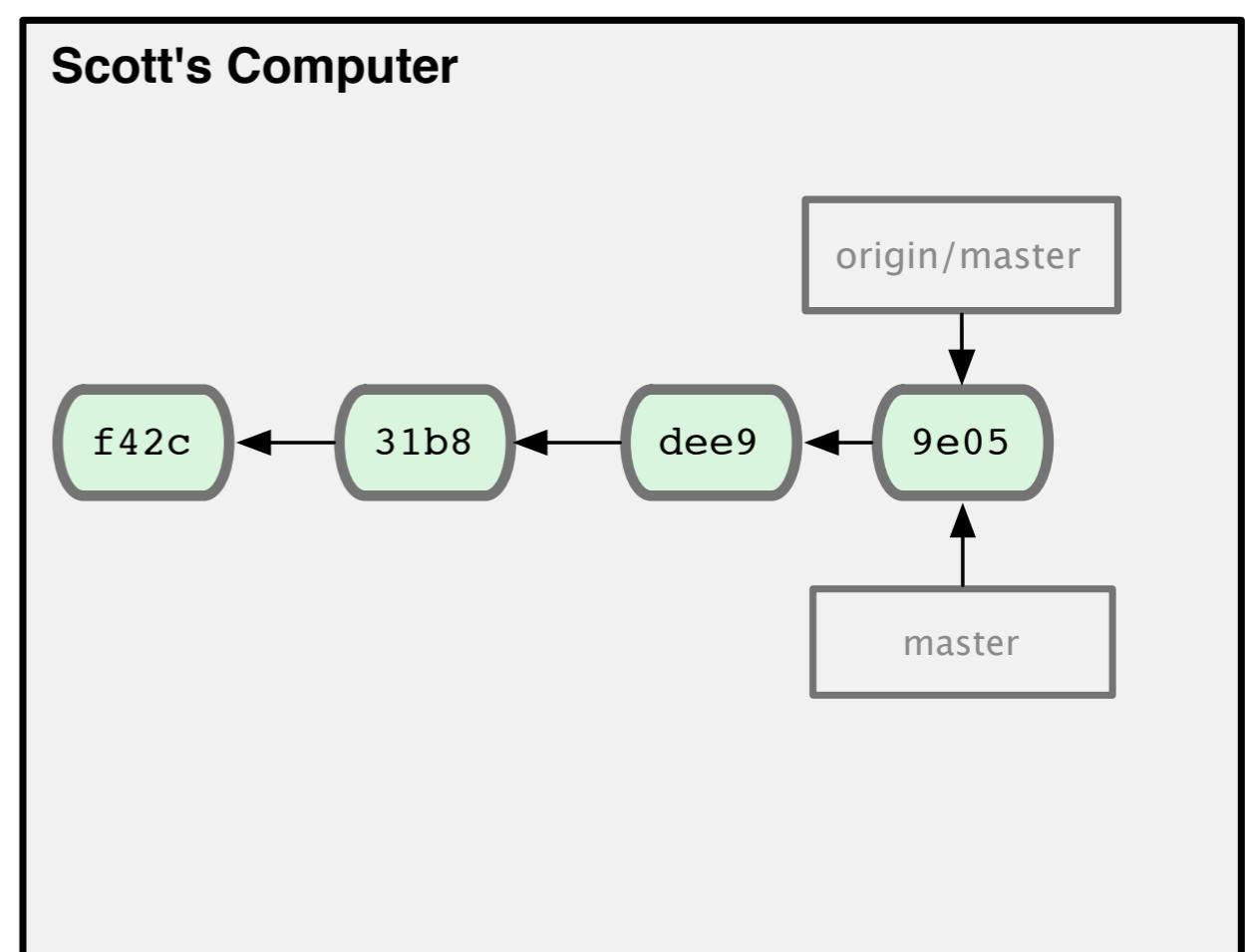
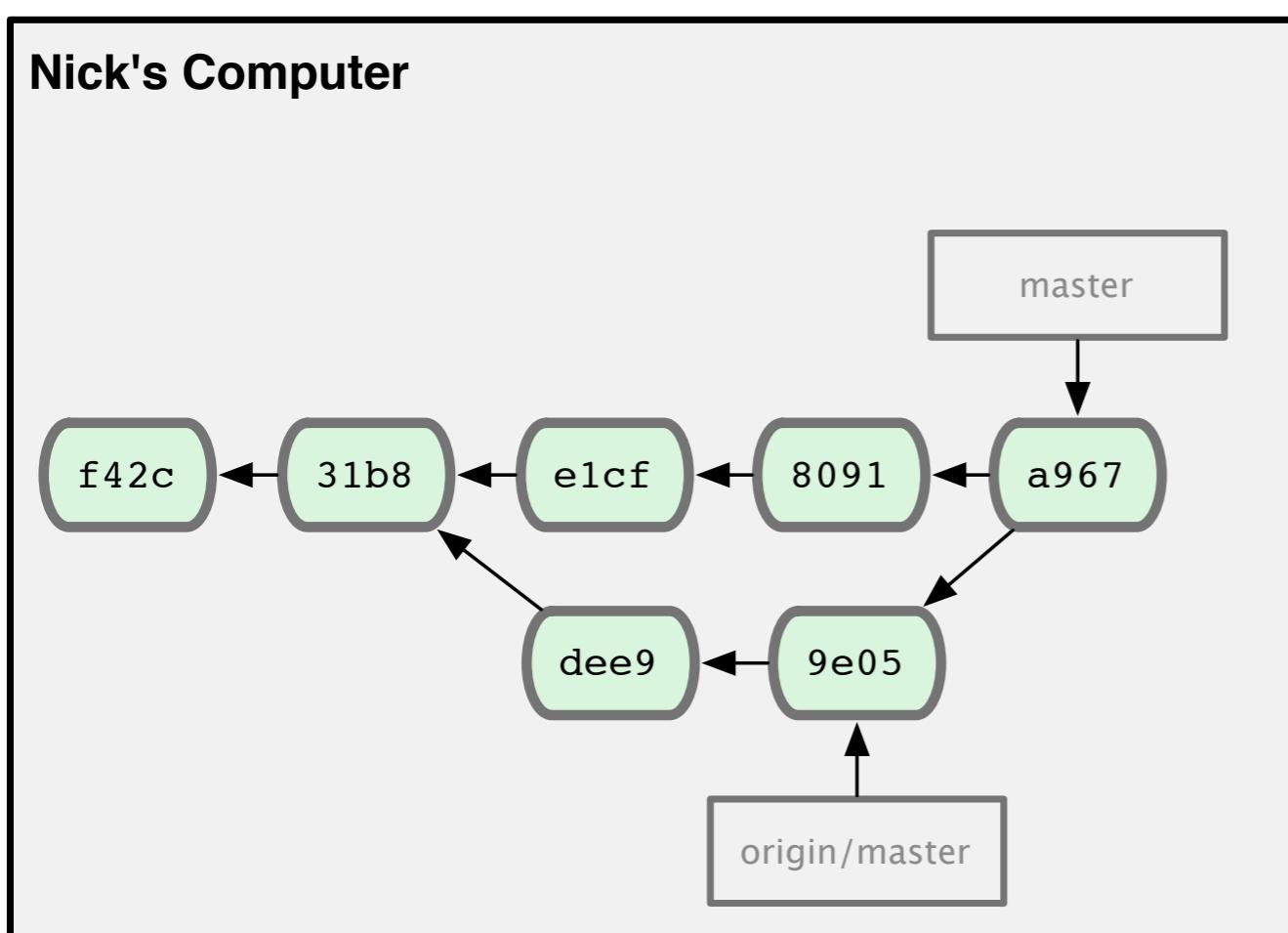
git fetch

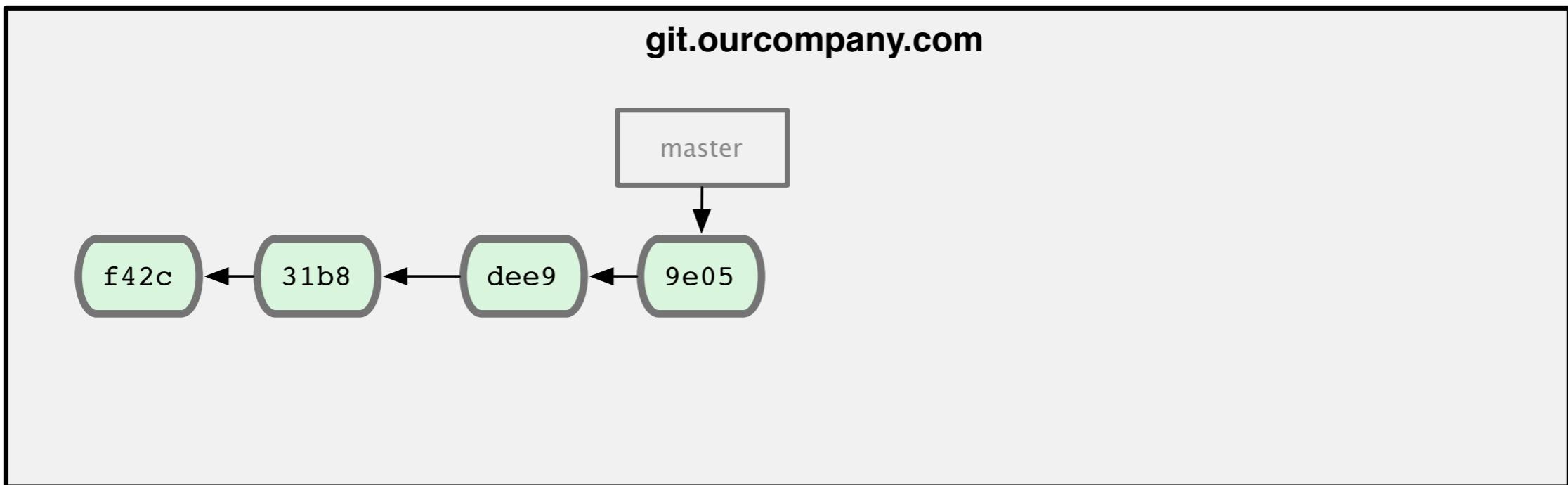




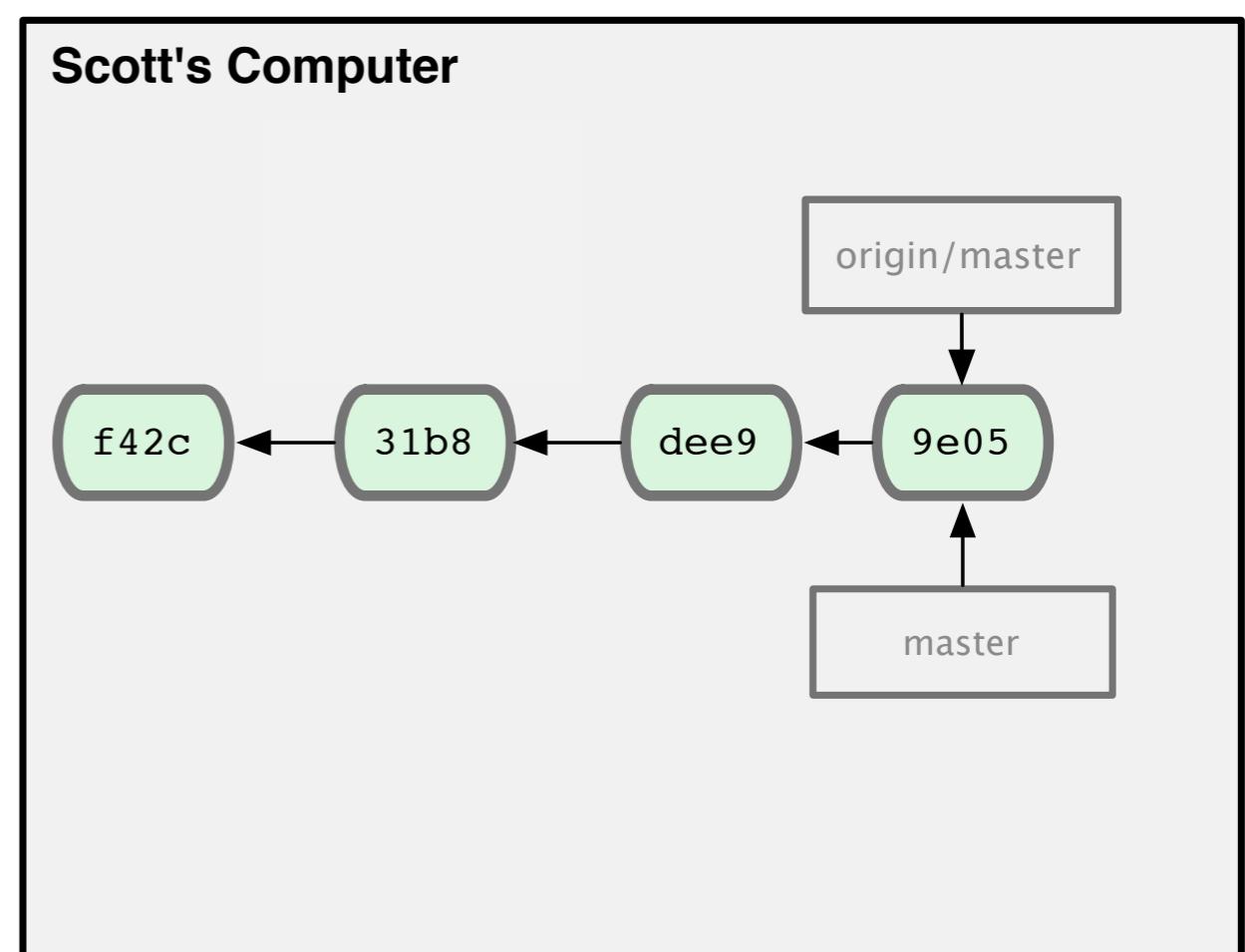
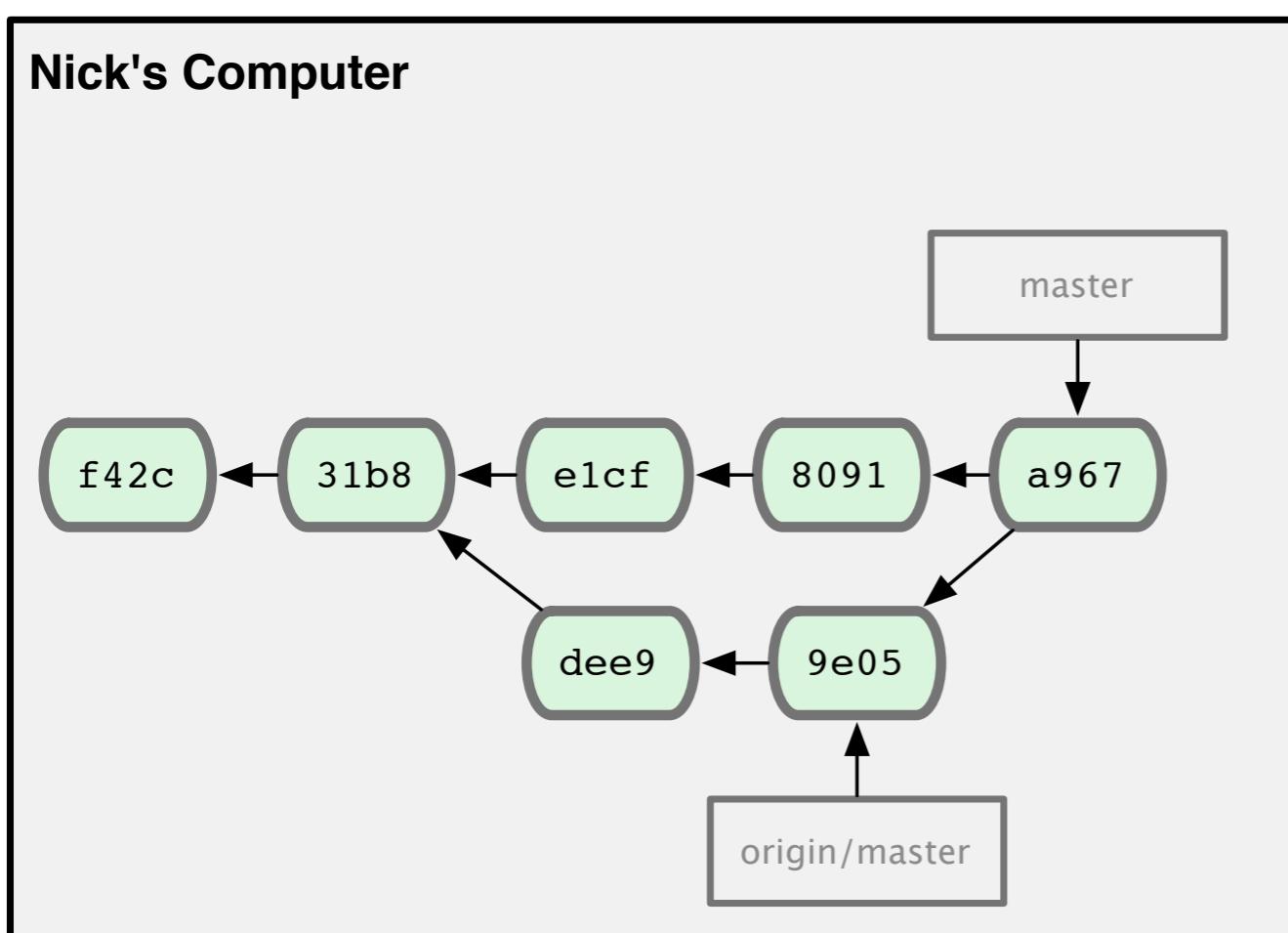


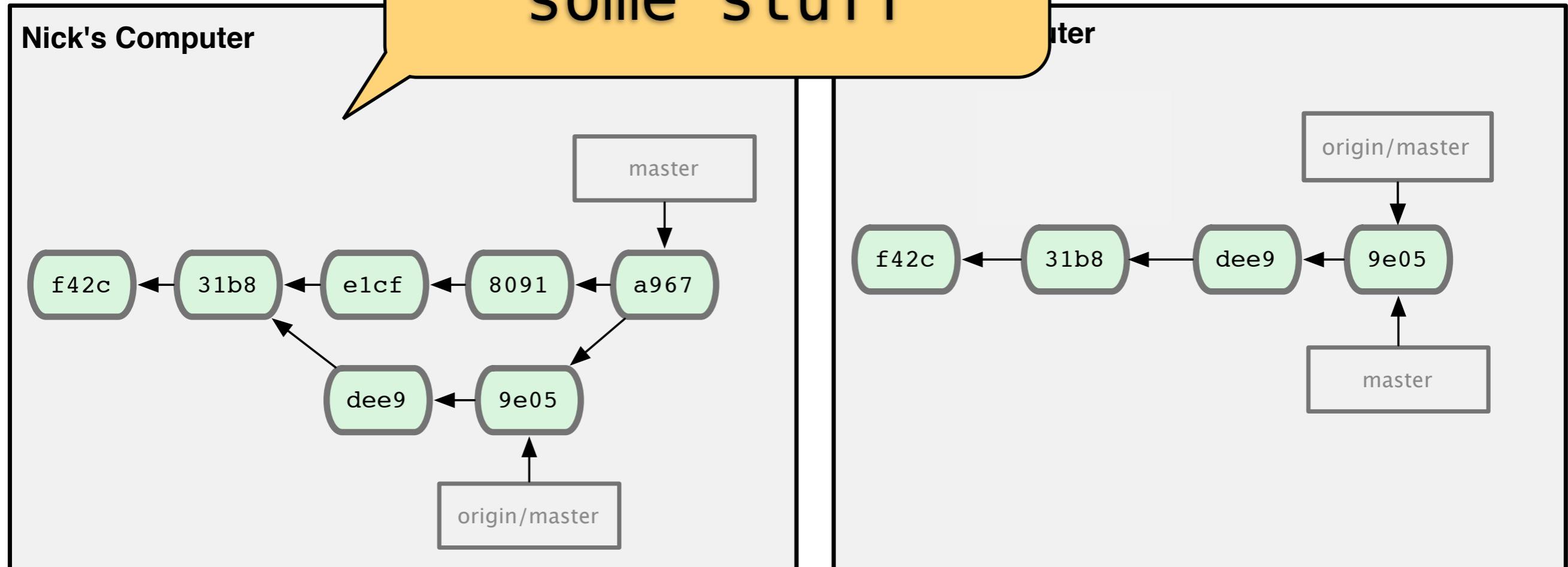
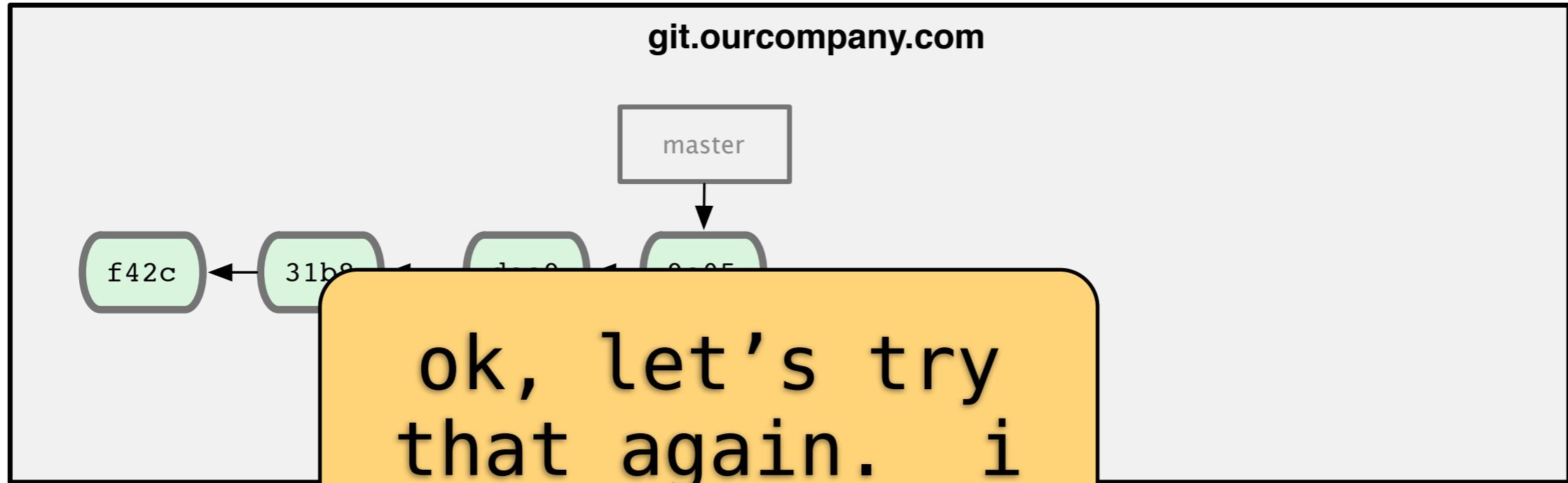
git merge origin/master

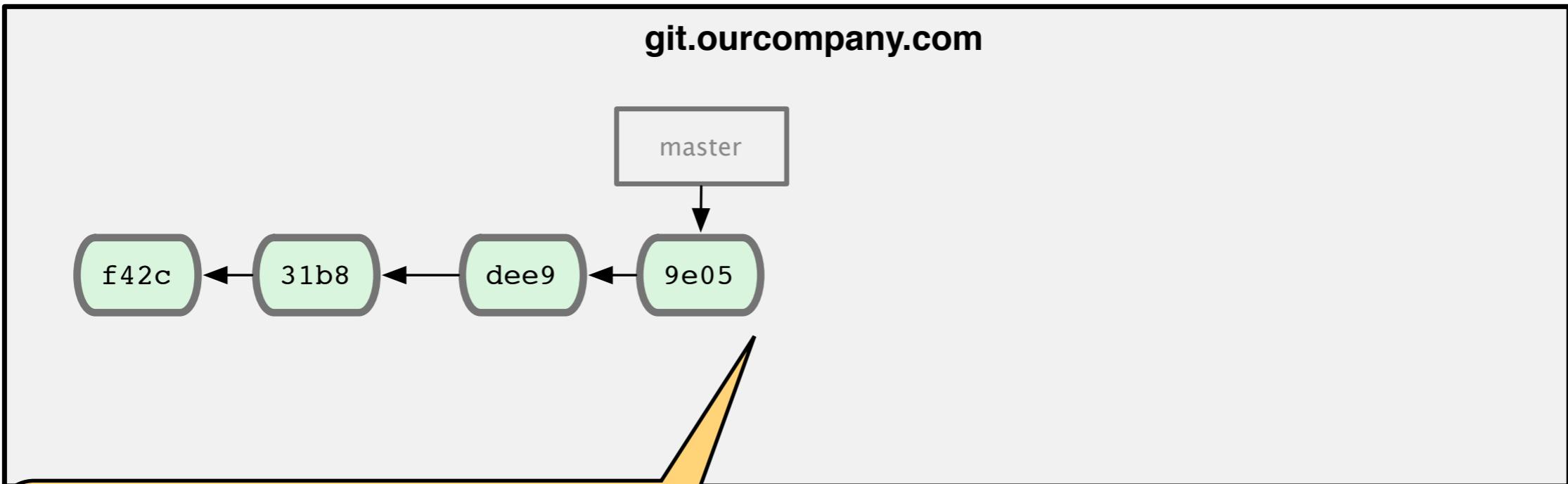




git push origin master

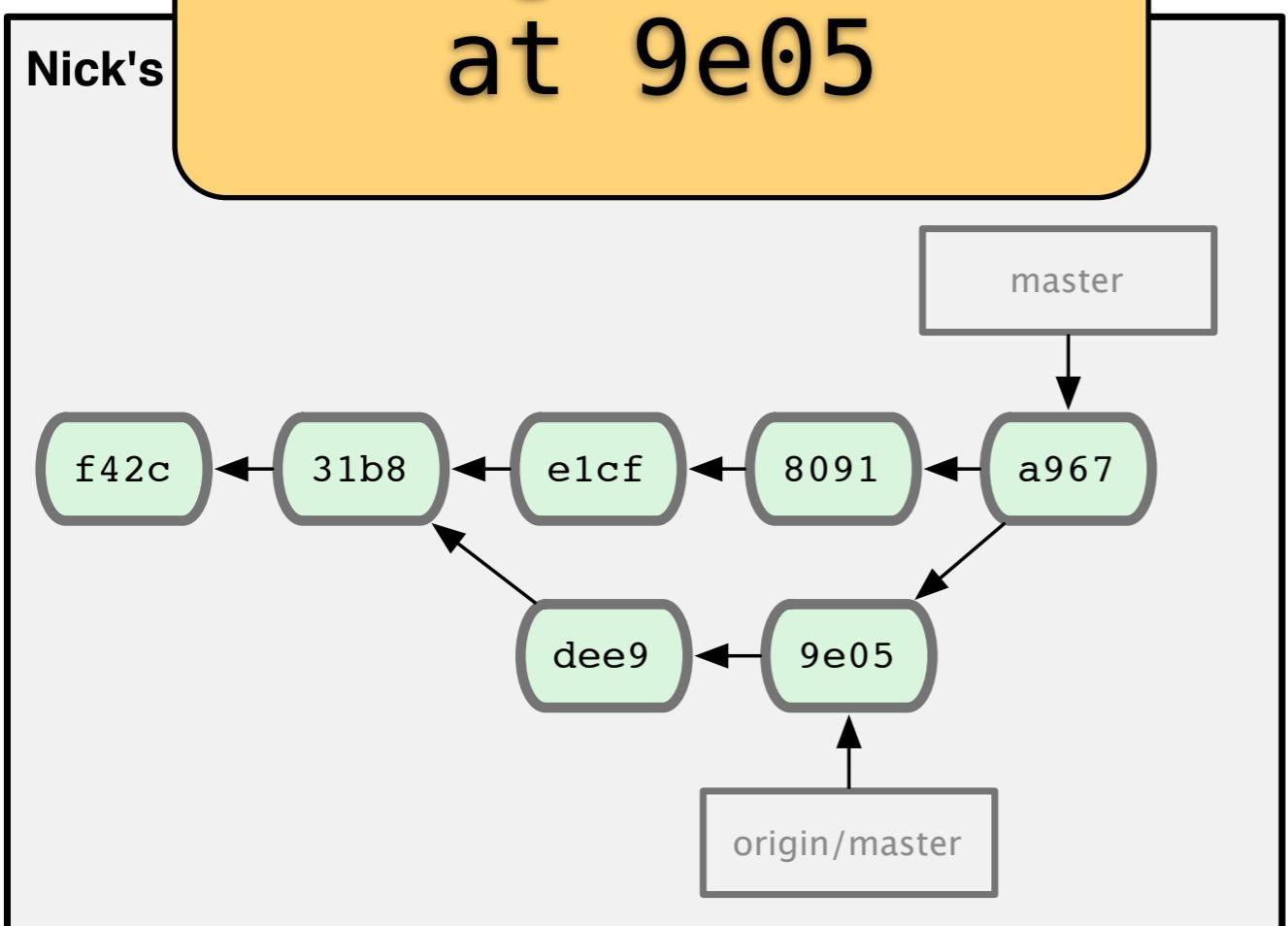




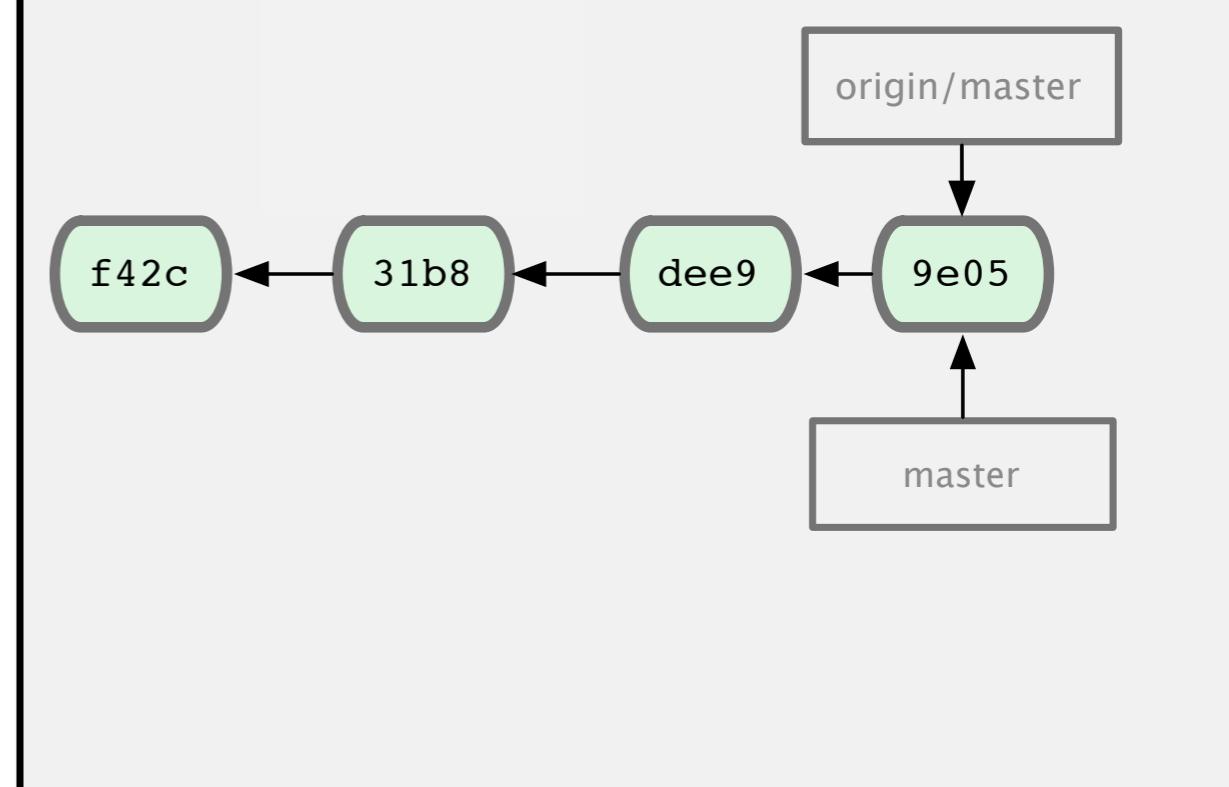


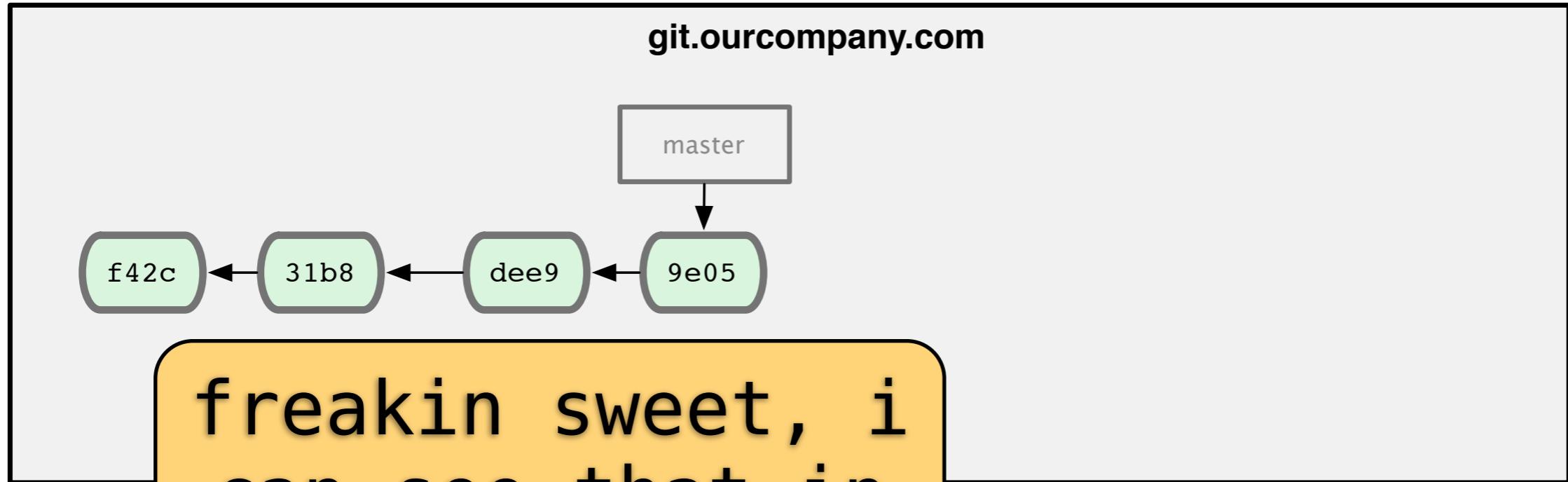
Nick's

i've got master
at 9e05



Scott's Computer

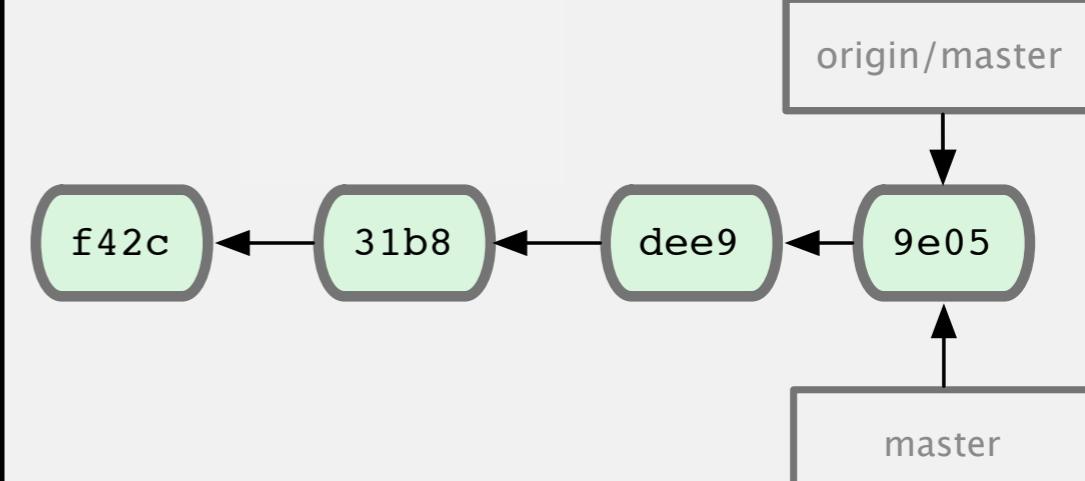
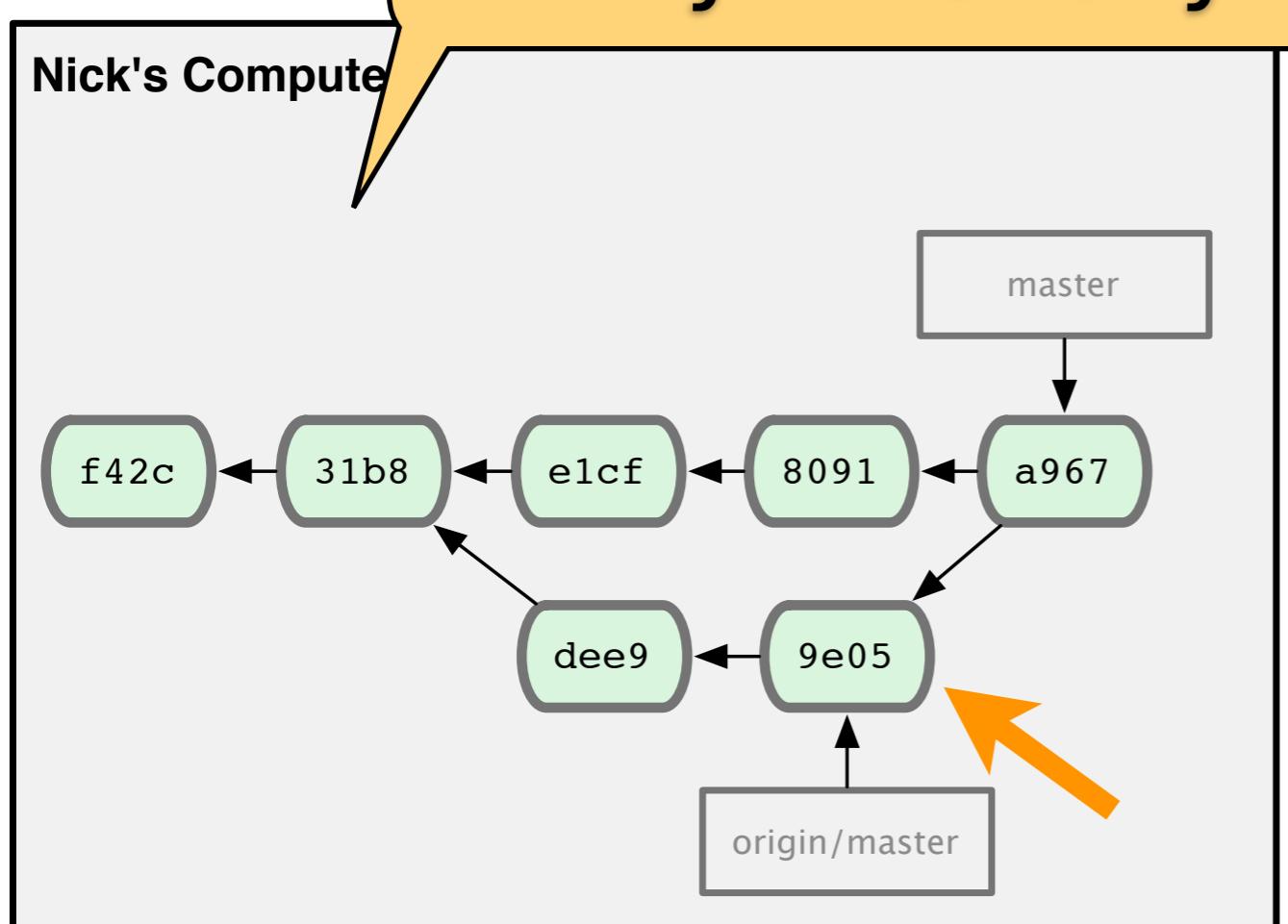


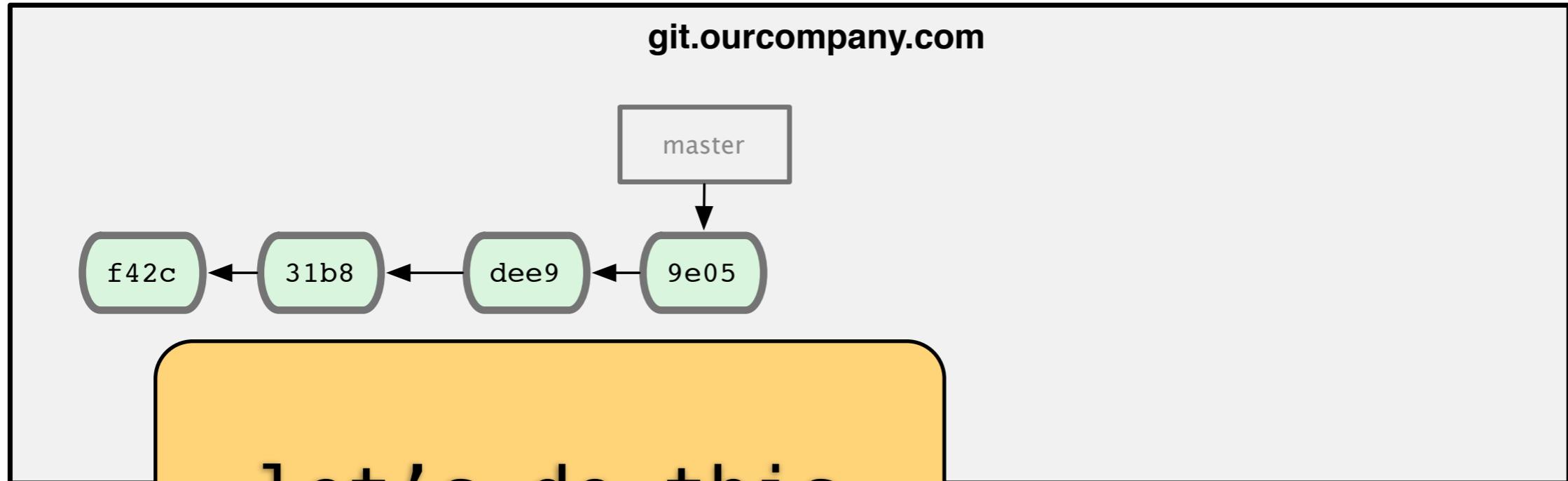


git

Nick's Computer

Scott's Computer



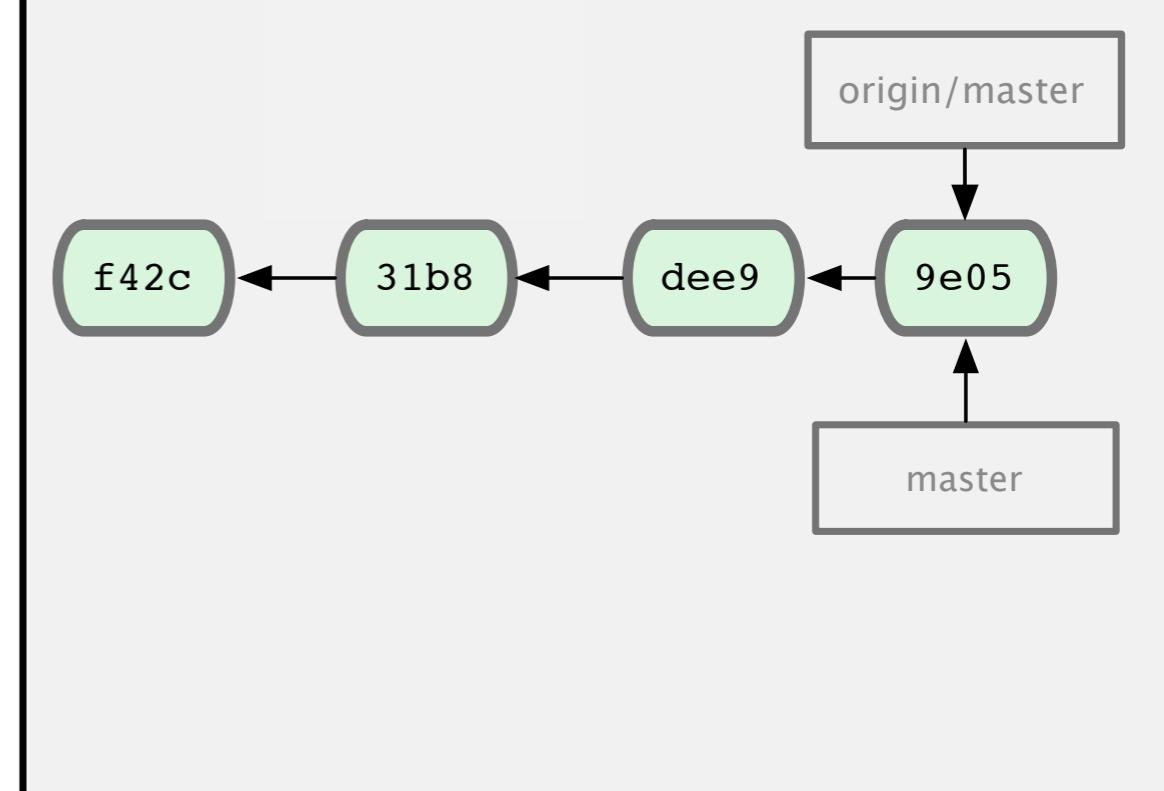
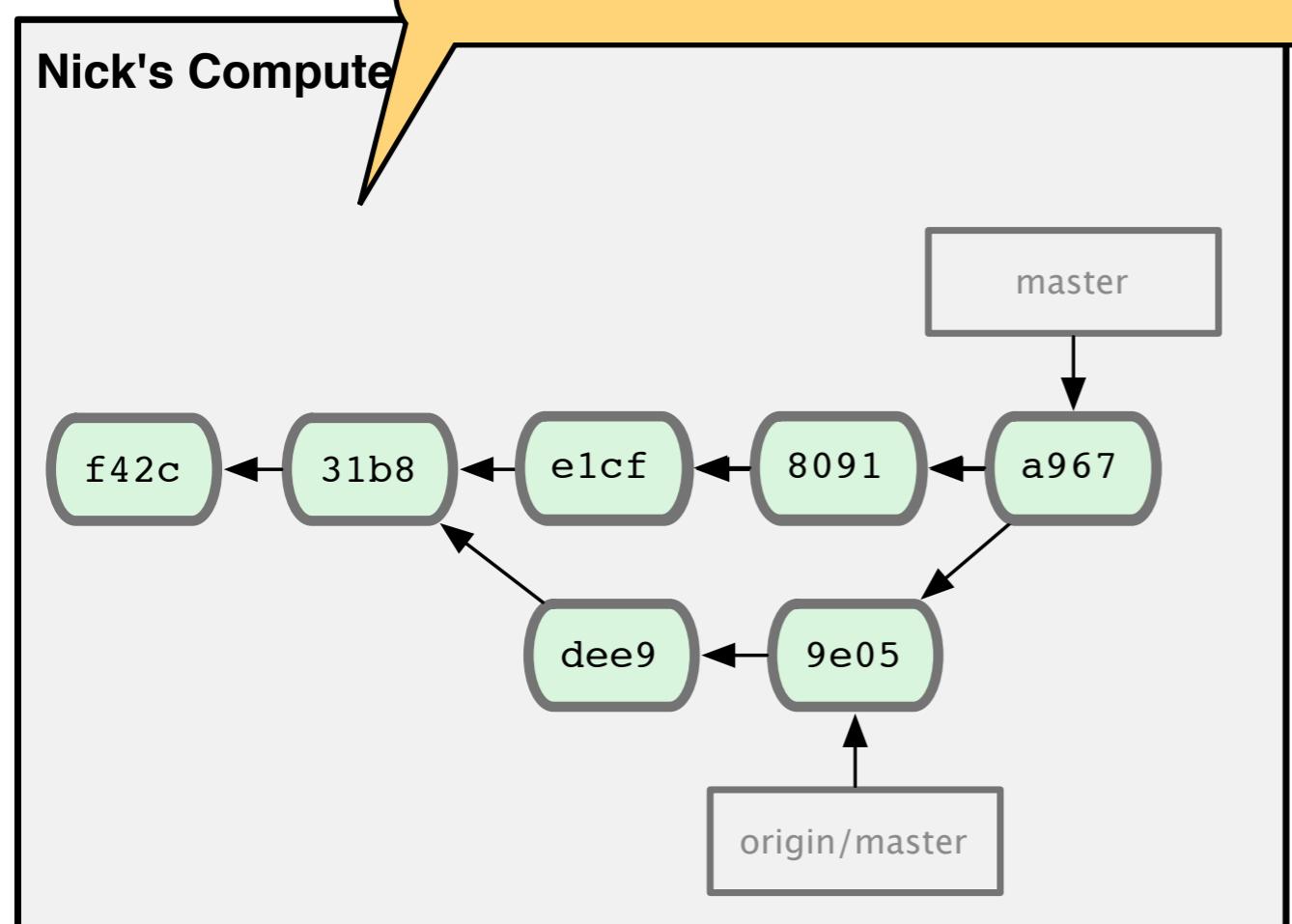


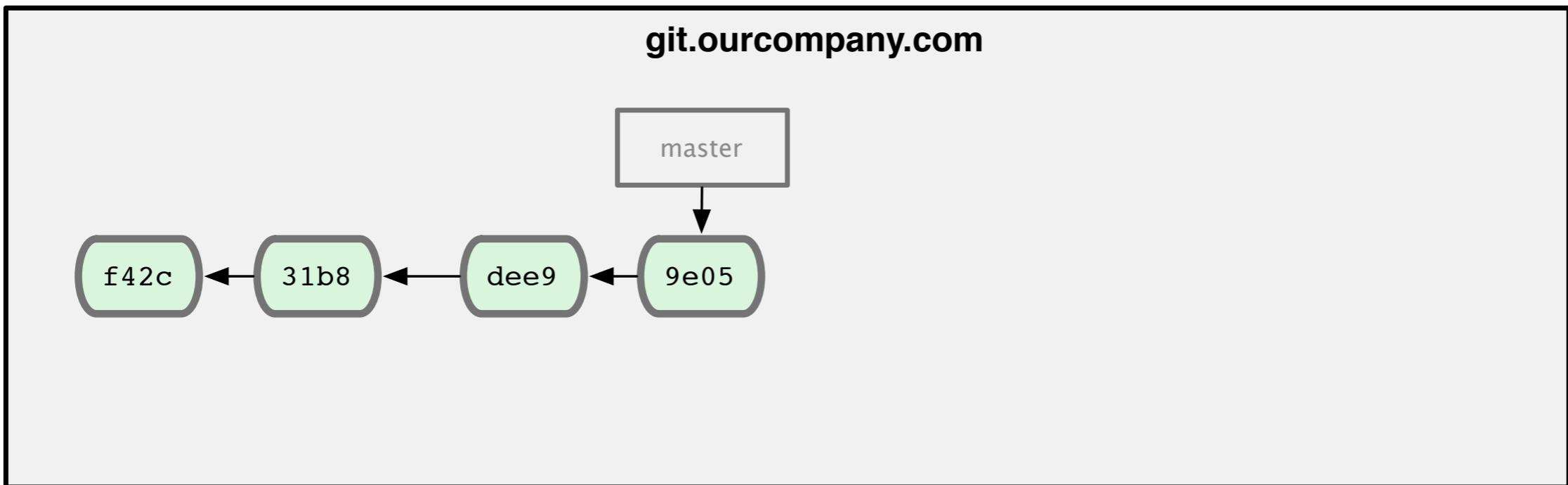
let's do this

git

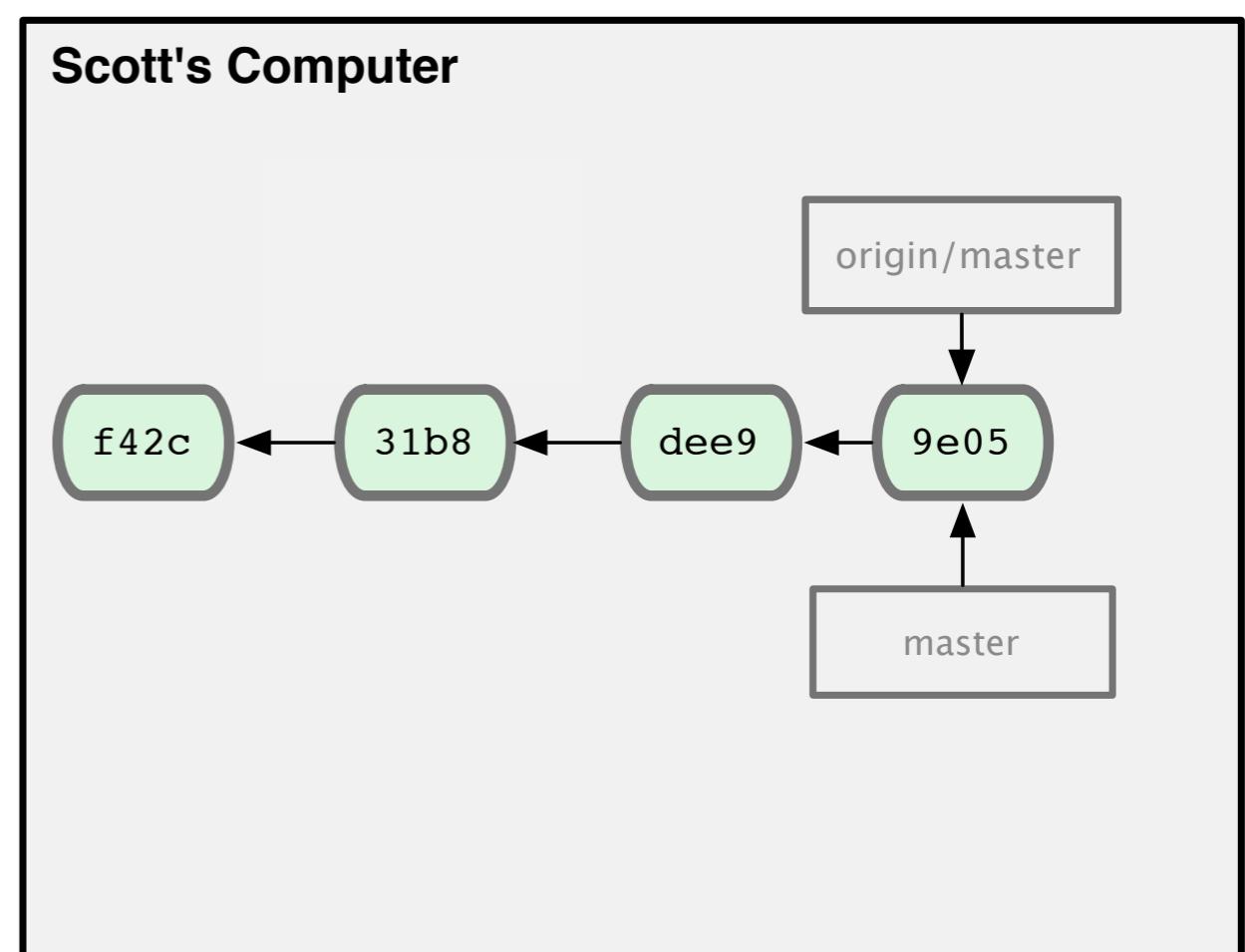
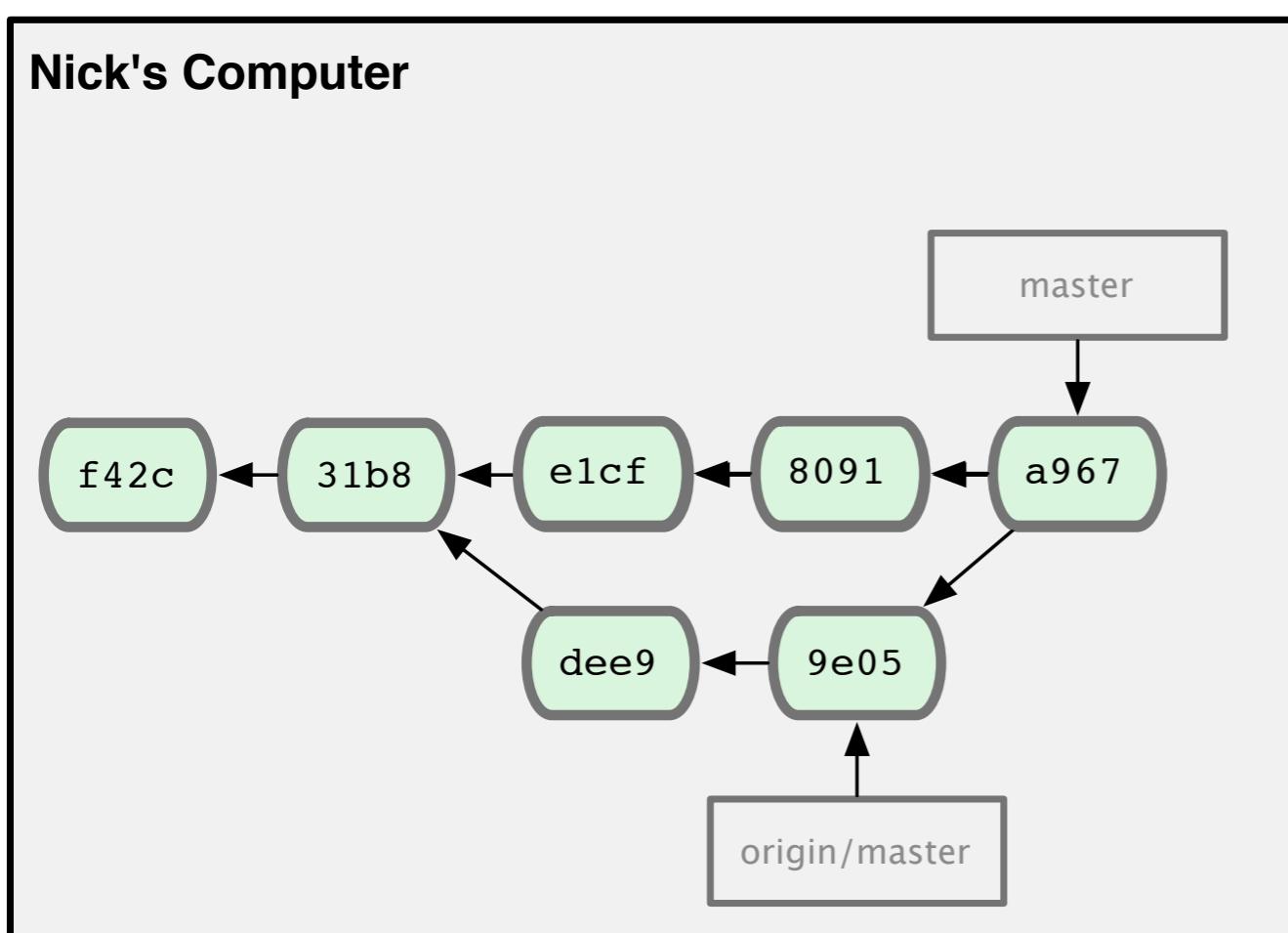
Nick's Computer

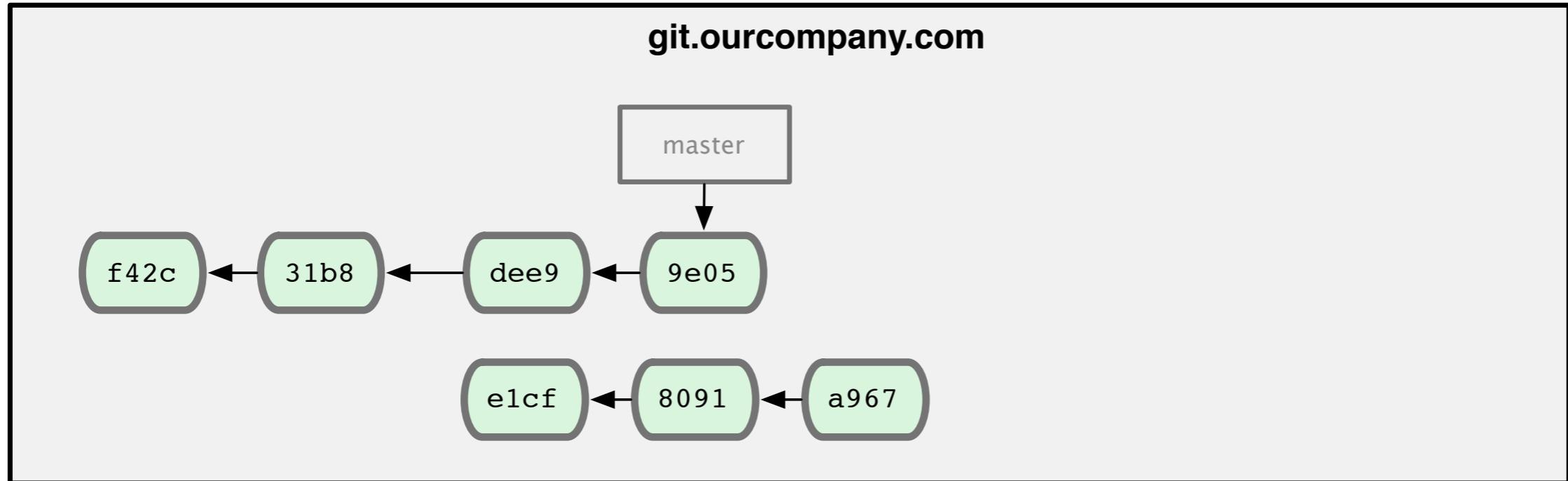
Scott's Computer



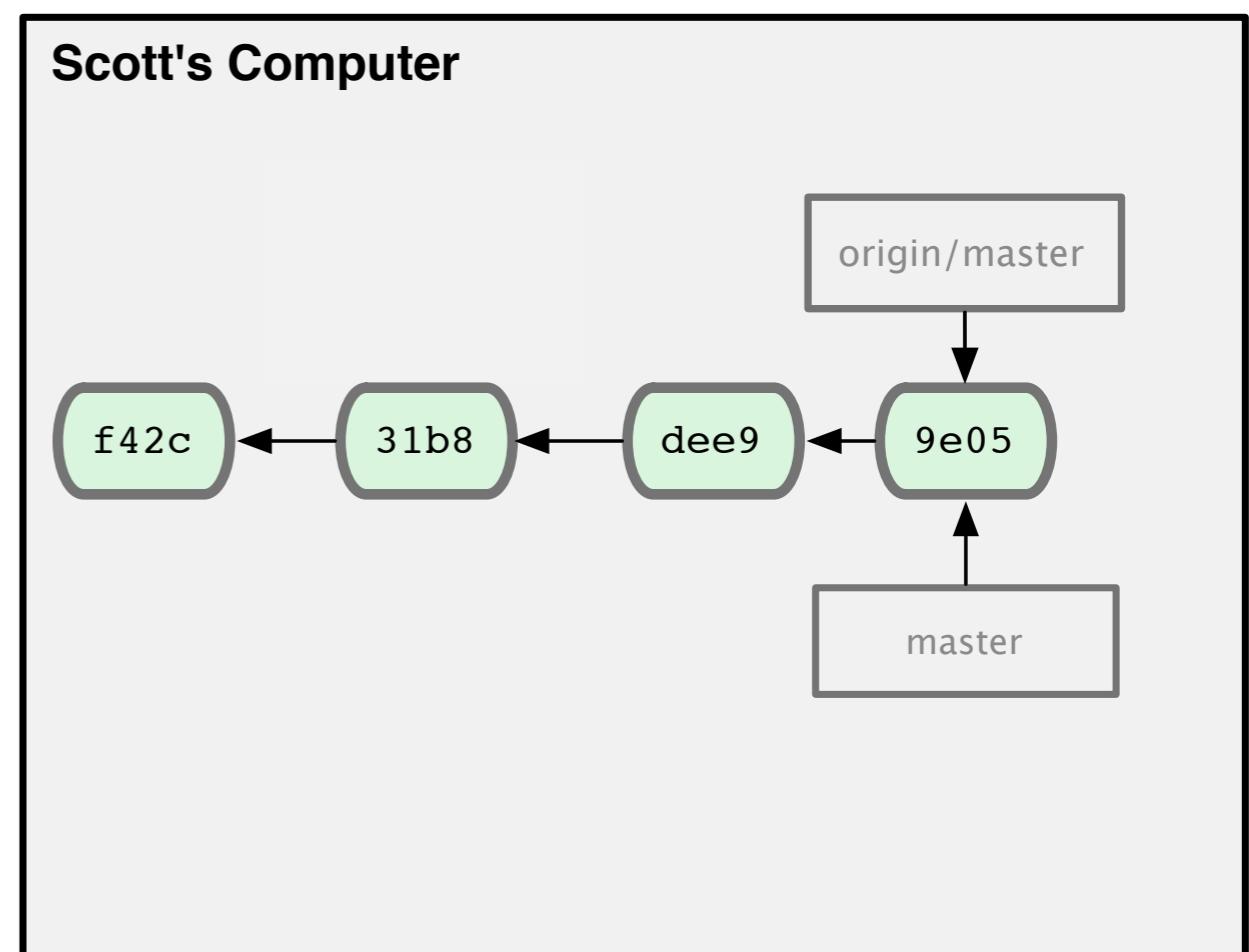
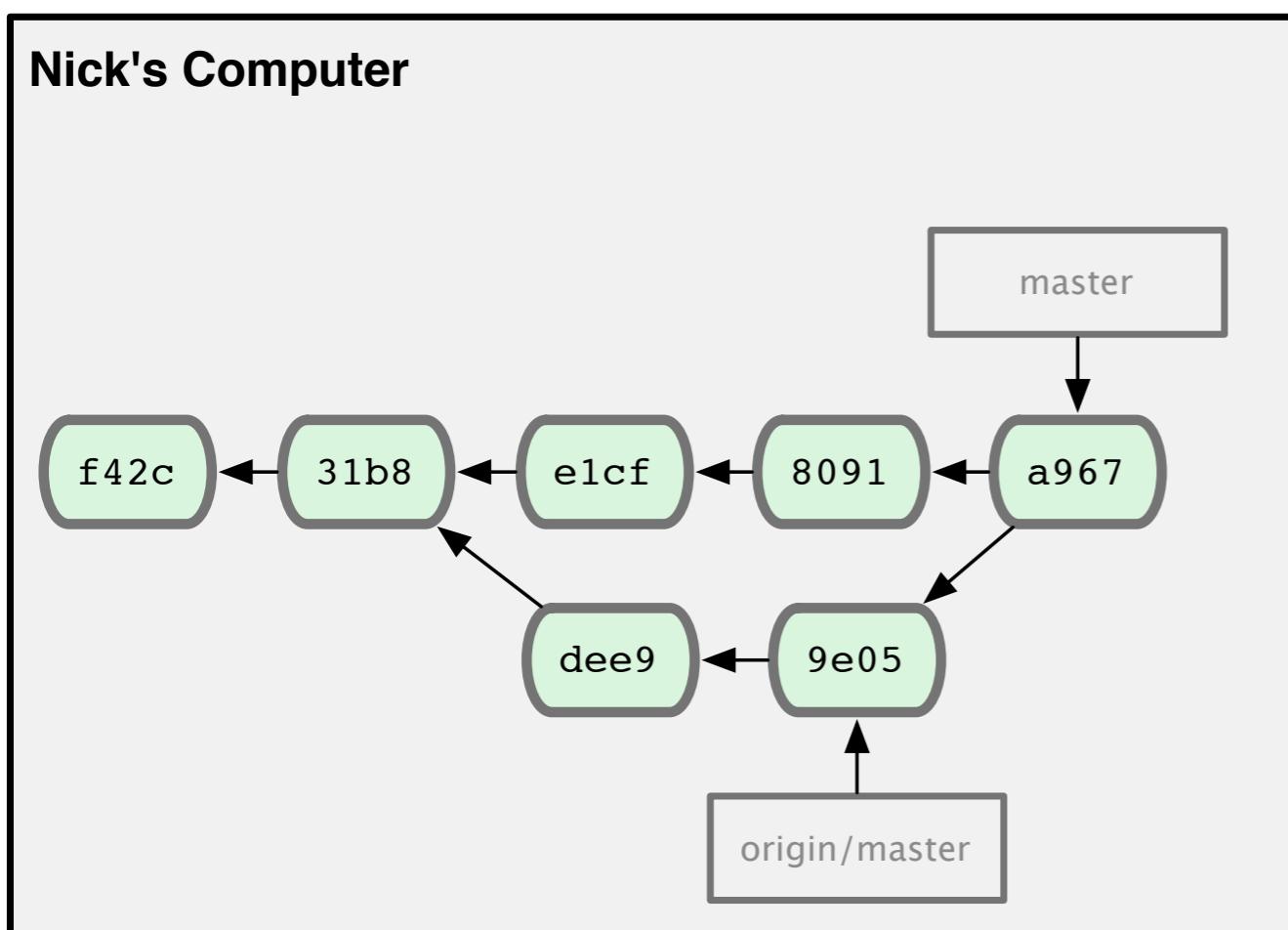


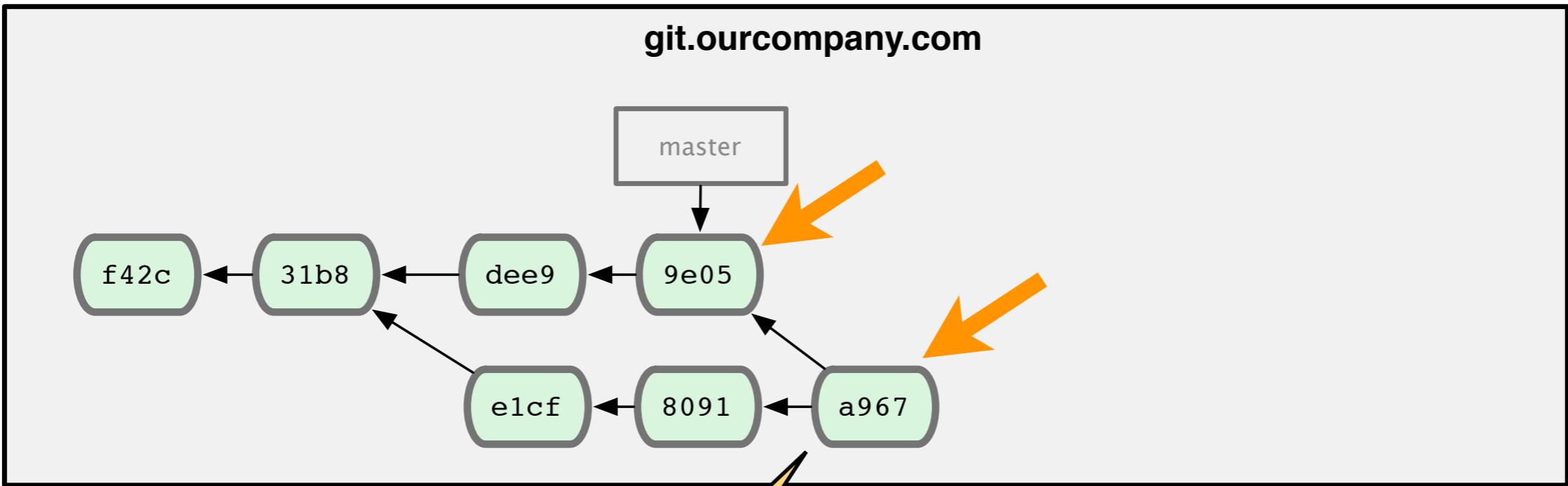
git push origin master





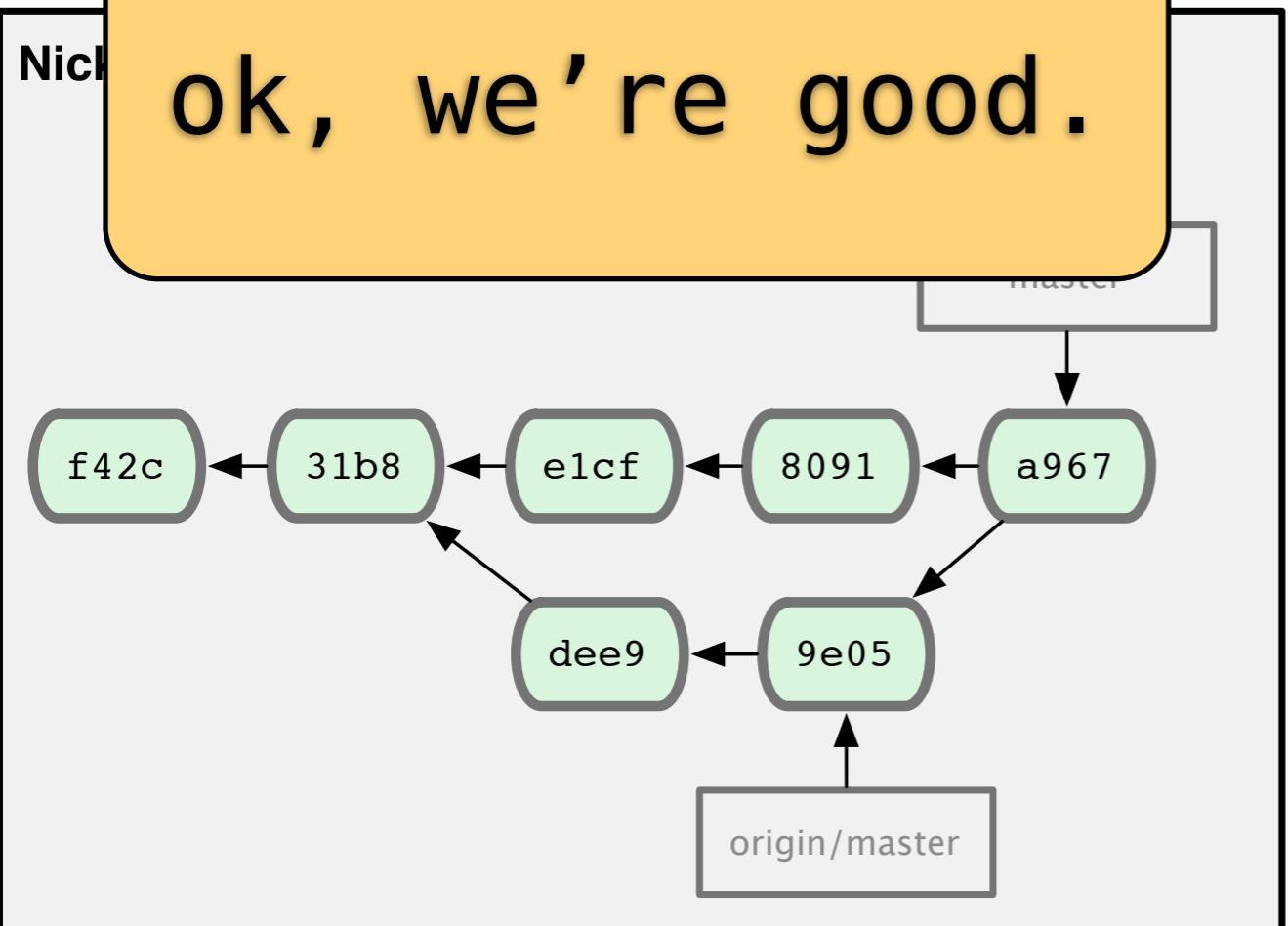
git push origin master



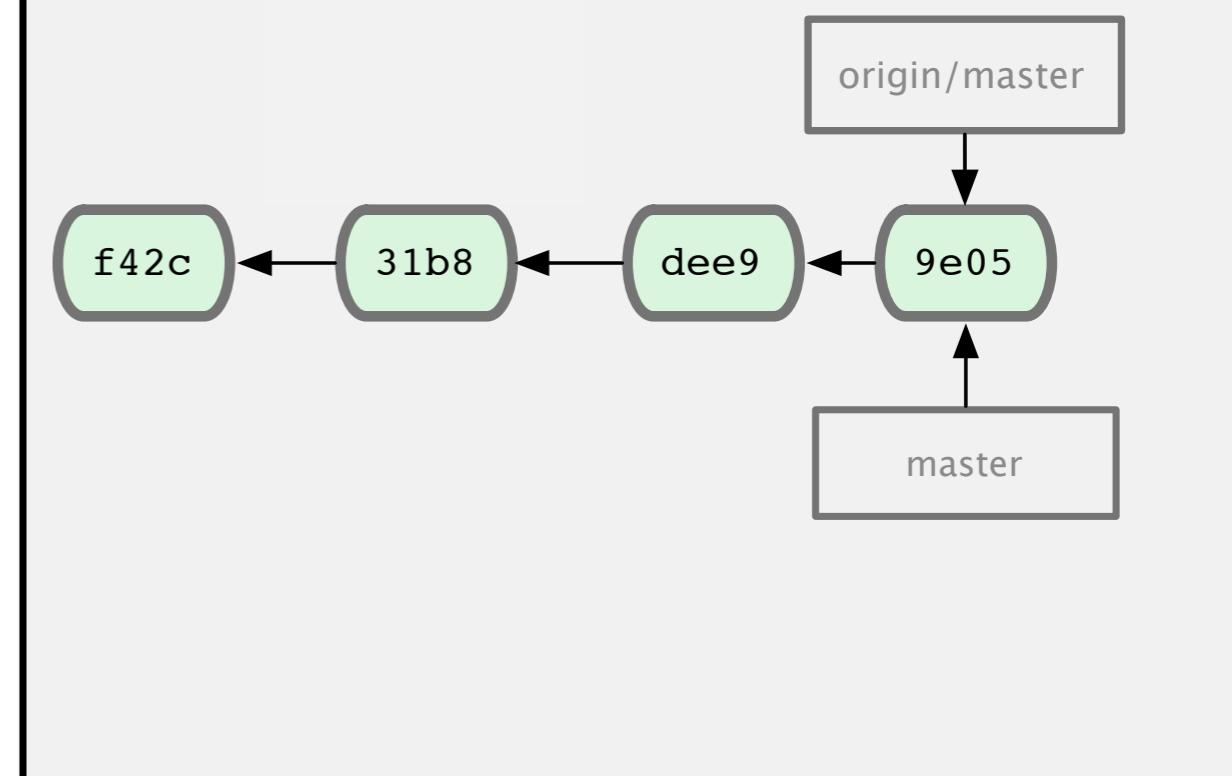


Nick

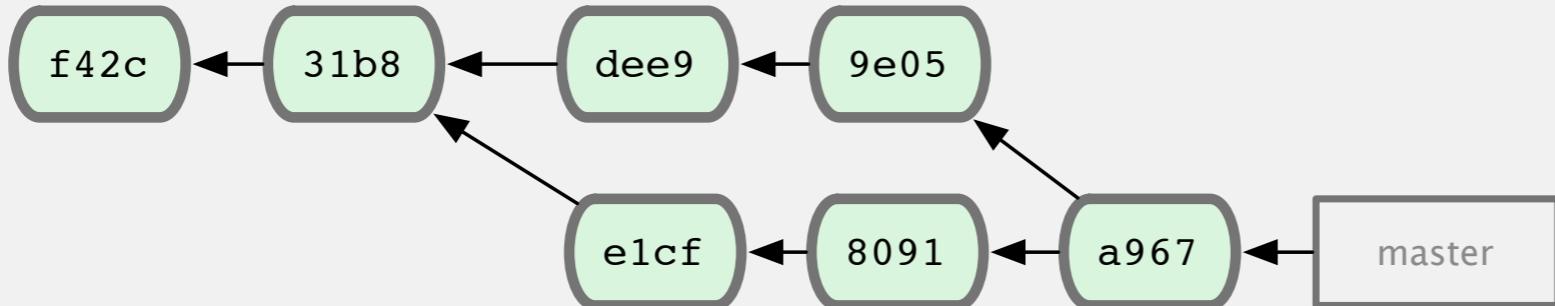
ok, we're good.



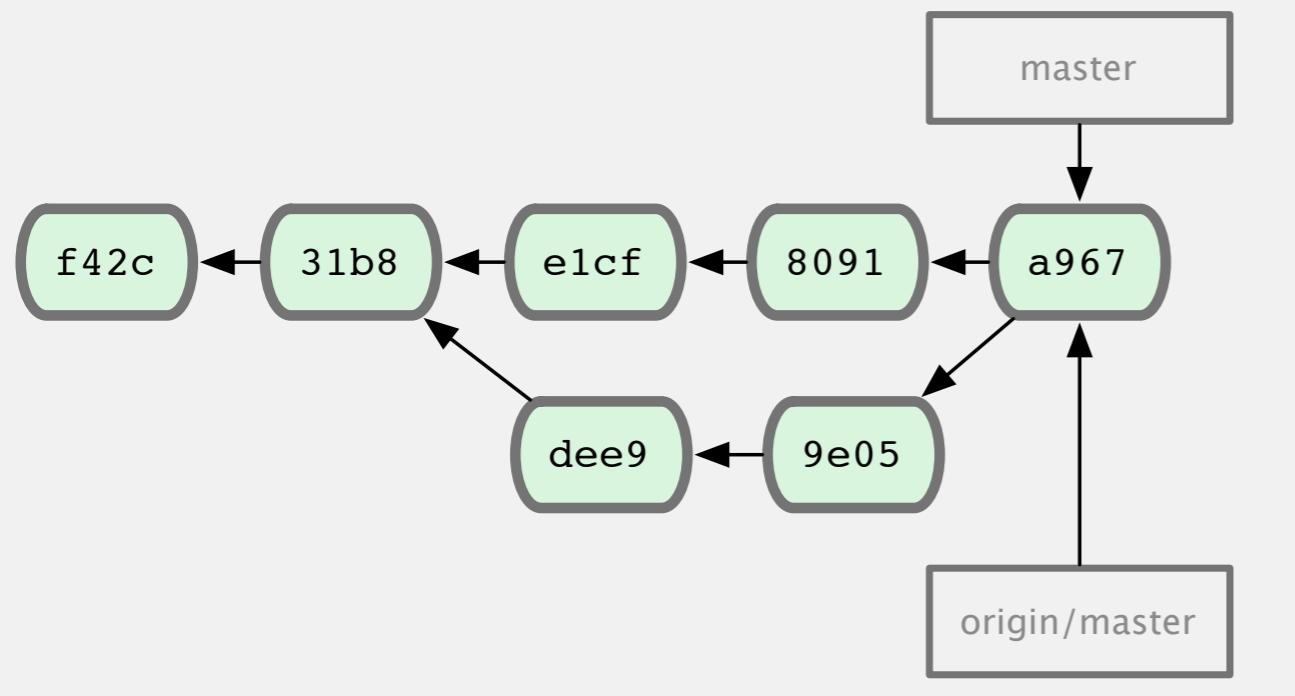
Scott's Computer



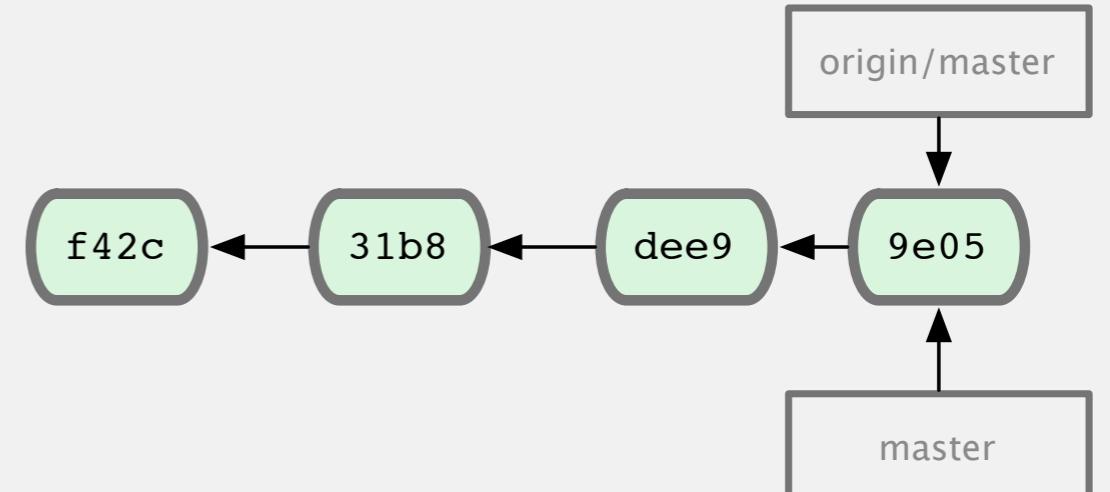
git.ourcompany.com



Nick's Computer

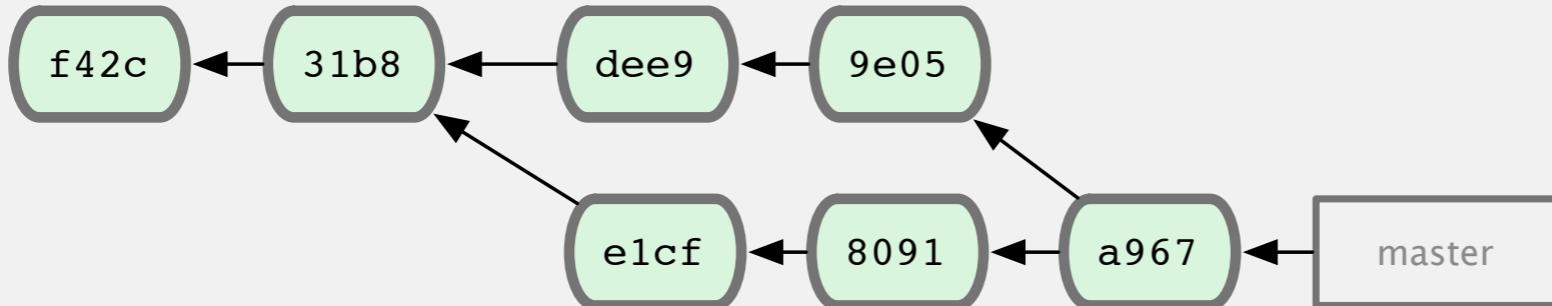


Scott's Computer

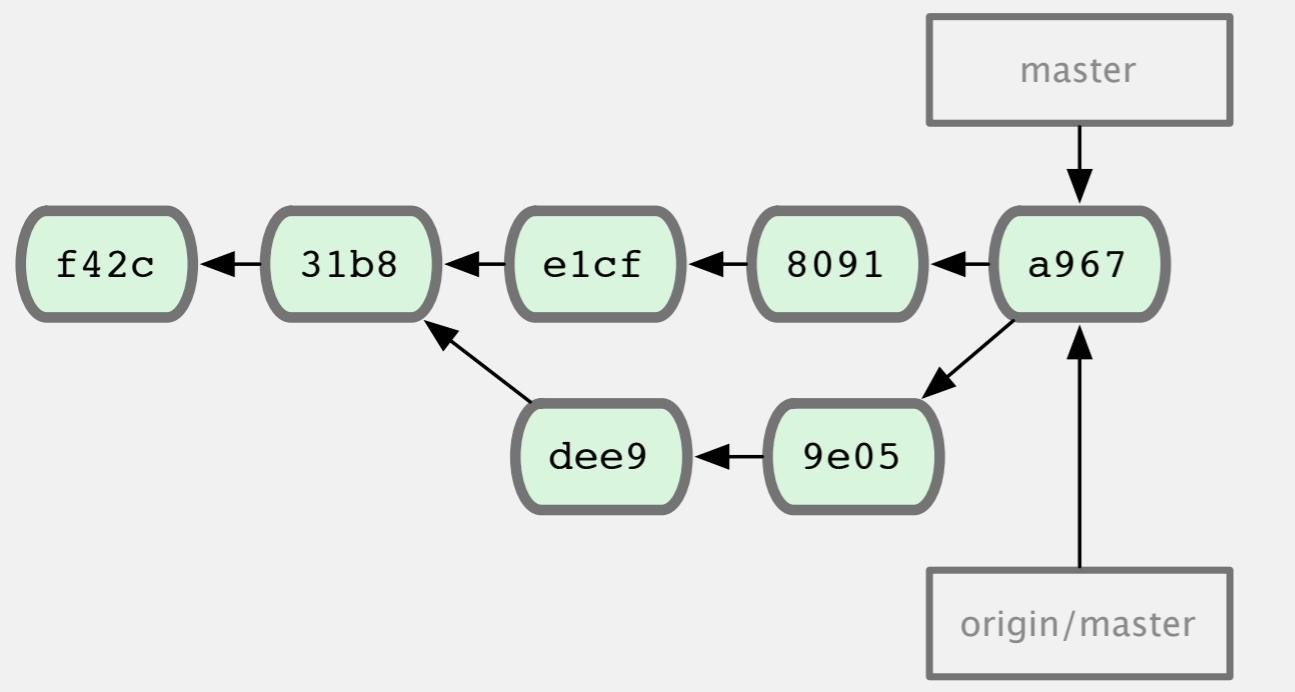


pushing other branches

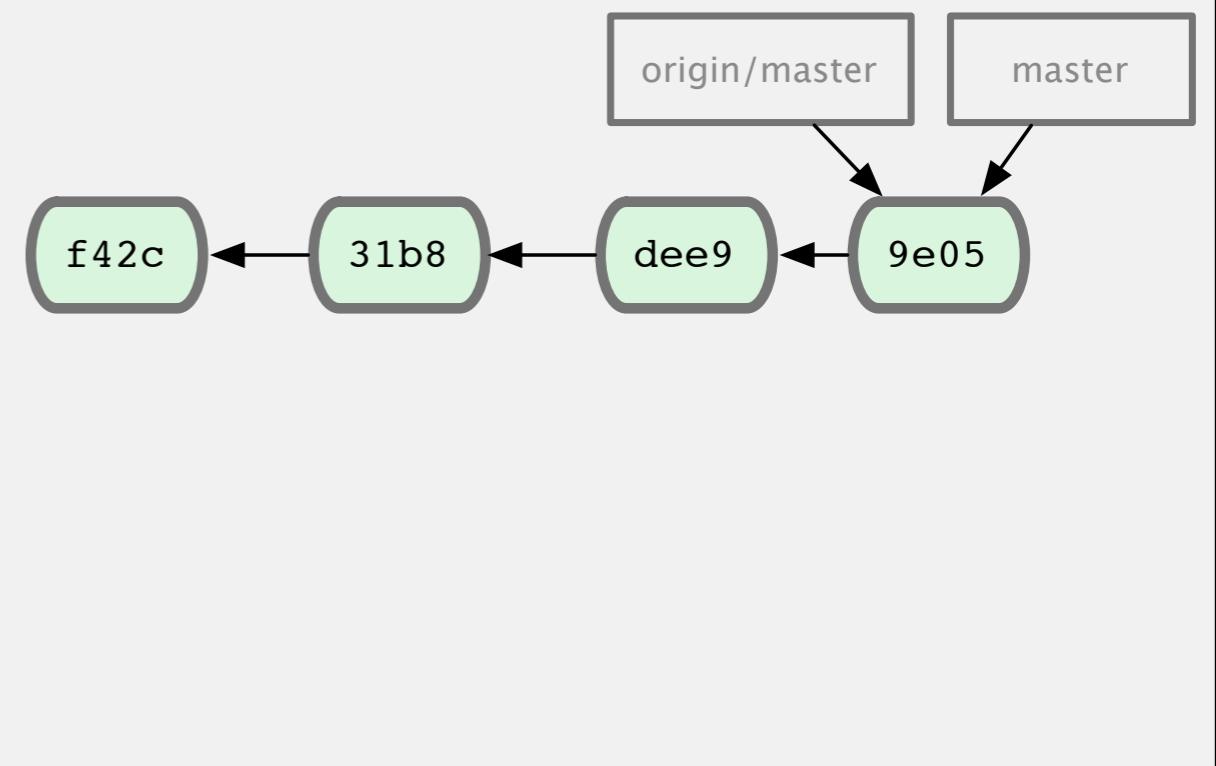
git.ourcompany.com

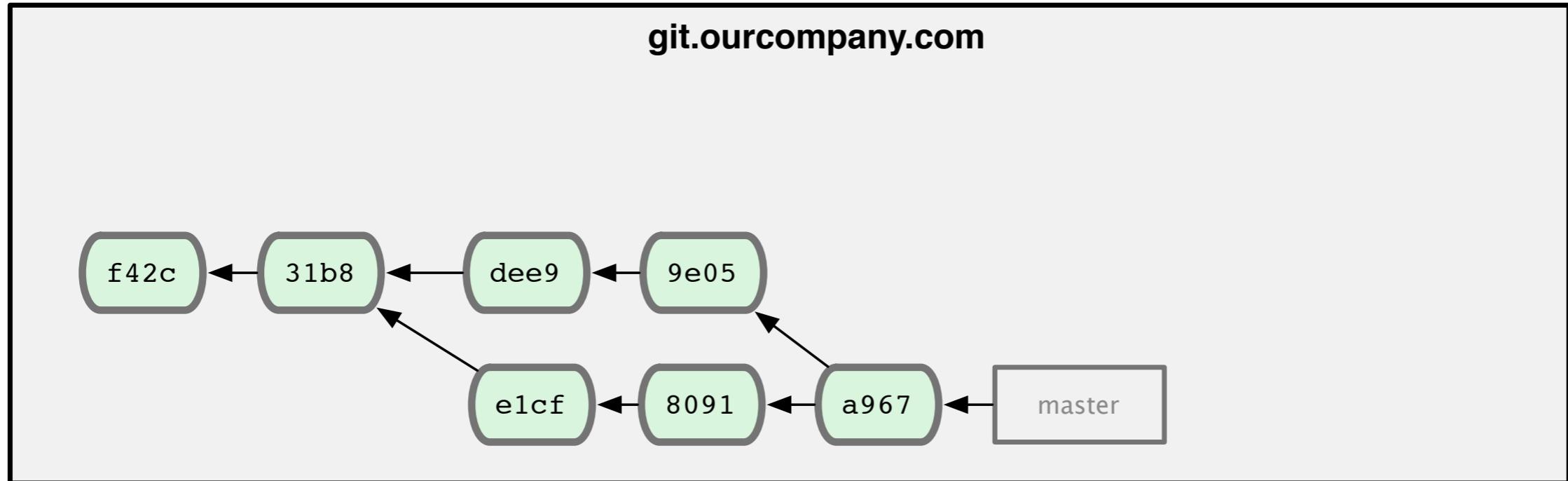


Nick's Computer

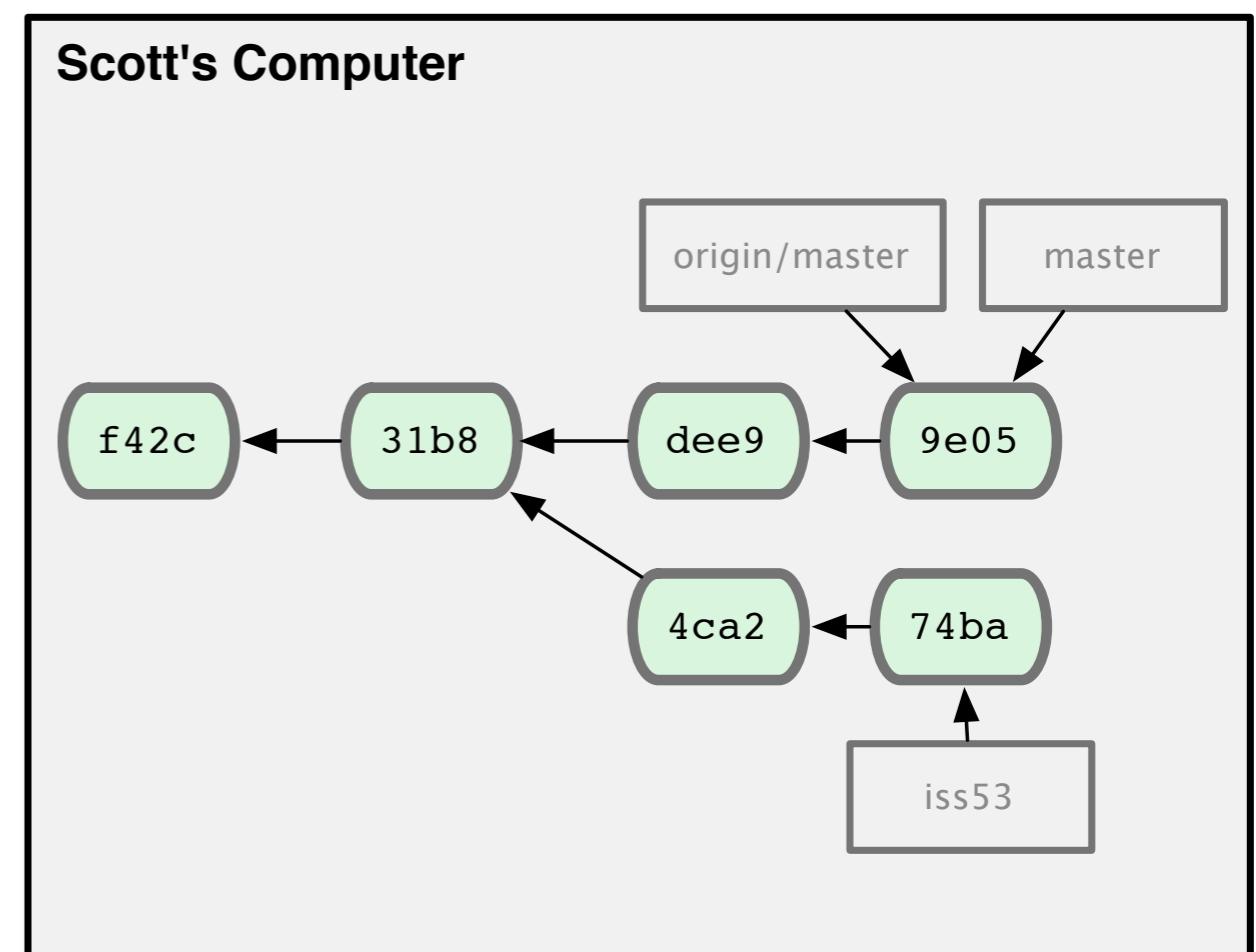
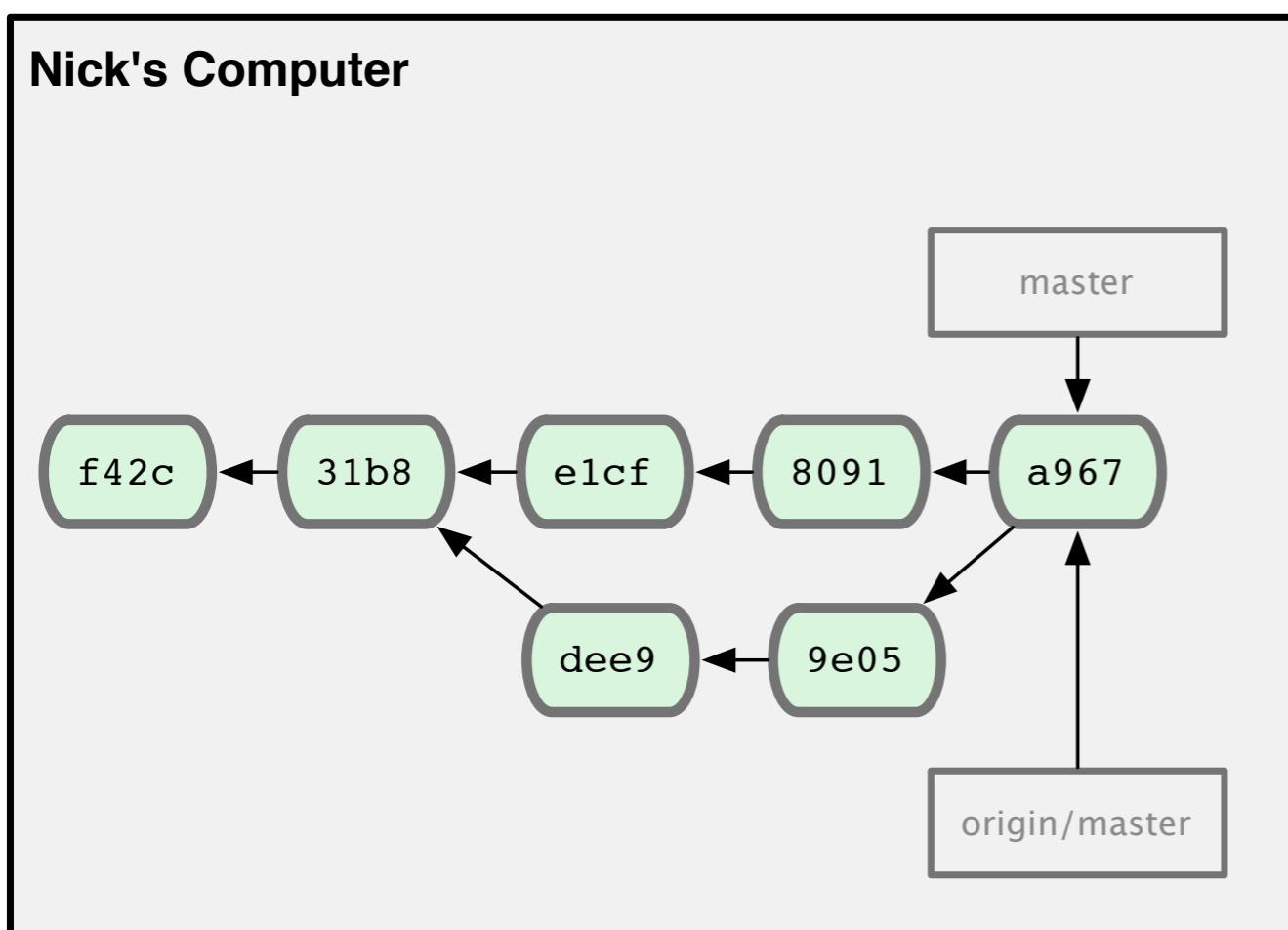


Scott's Computer

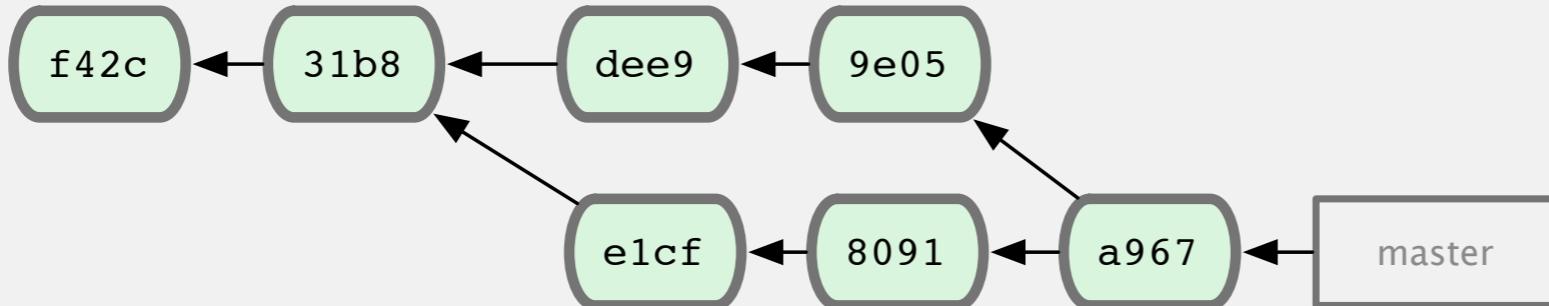




git checkout -b iss53 31b8; git commit; git commit

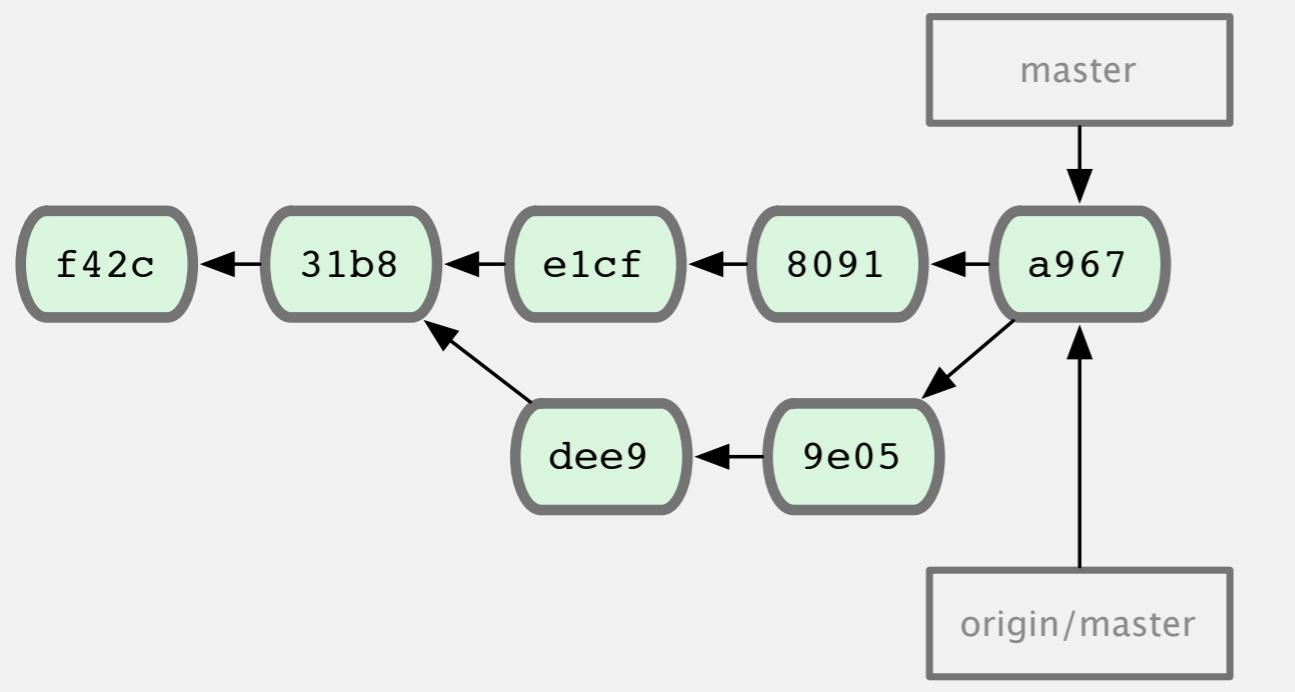


git.ourcompany.com

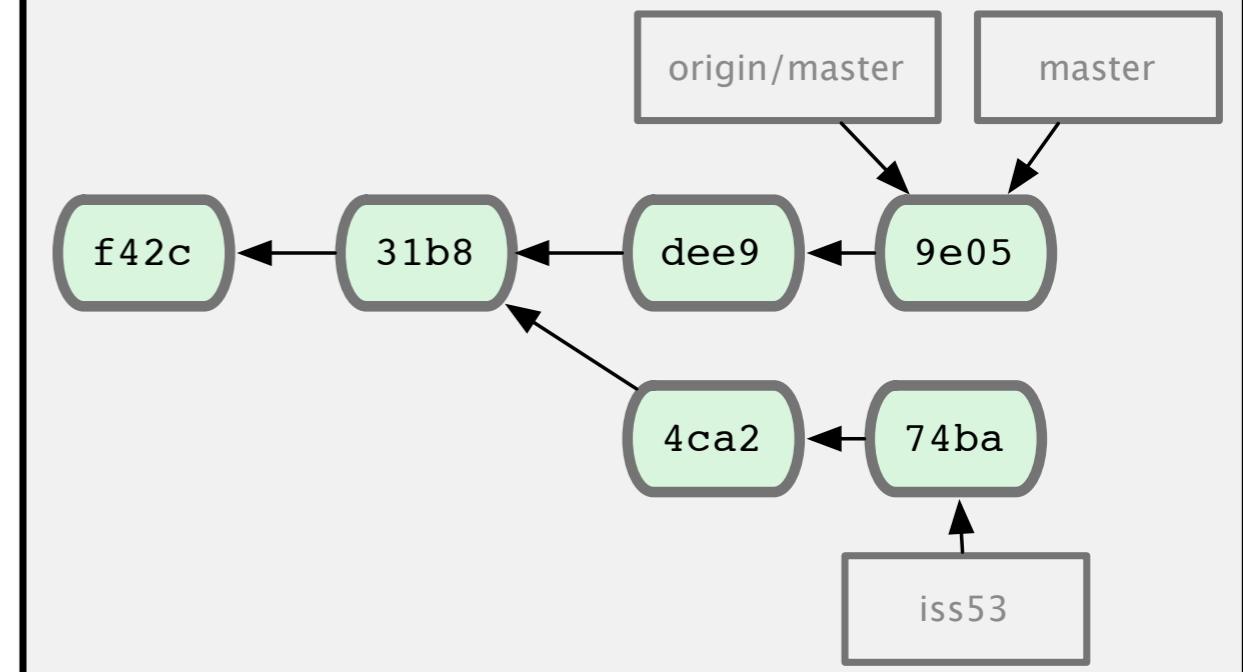


git push origin iss53

Nick's Computer



Scott's Computer

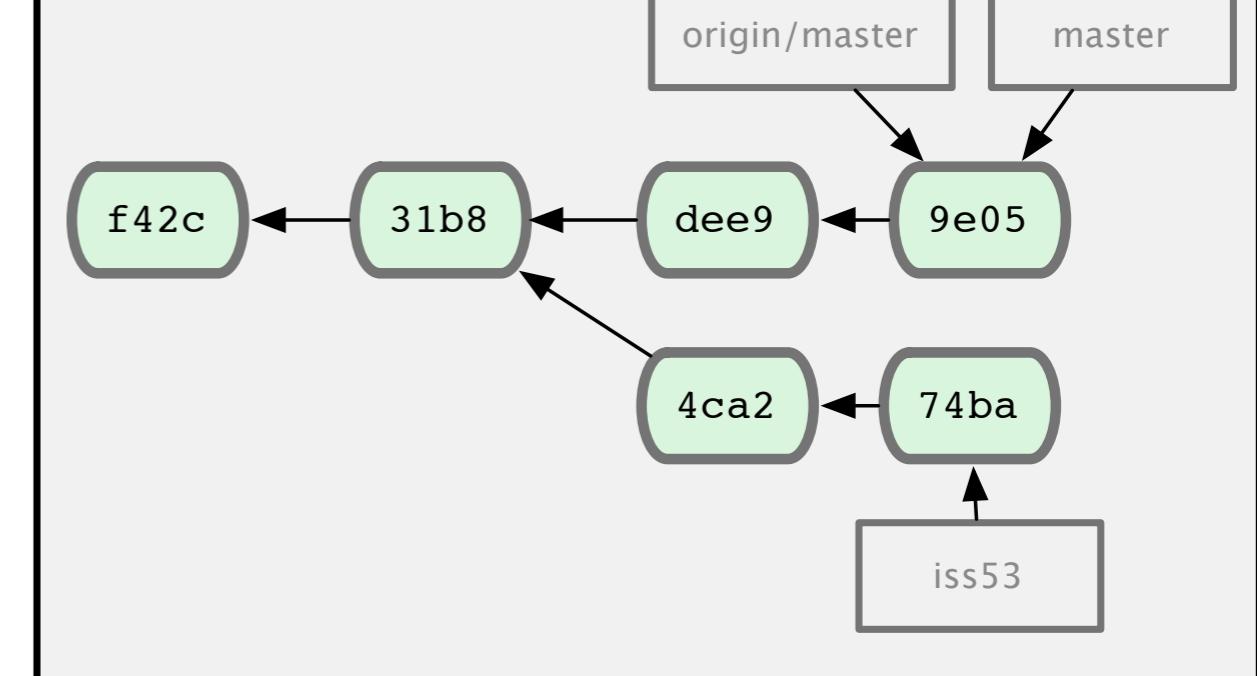
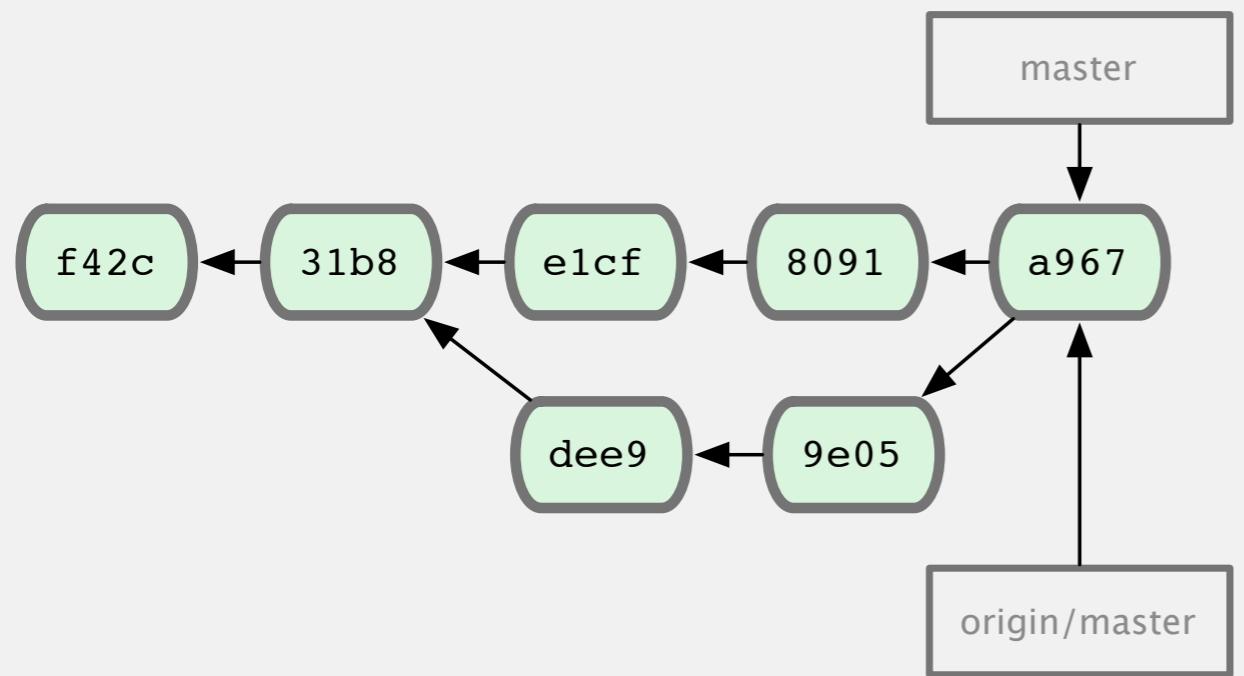


`git.ourcompany.com`

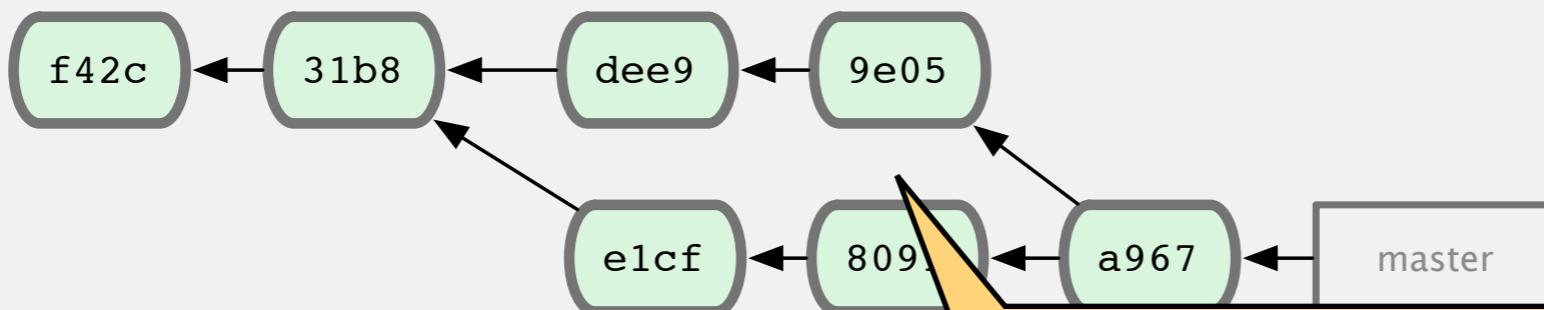
i want to push
some stuff

`iss53`

Nick's Computer

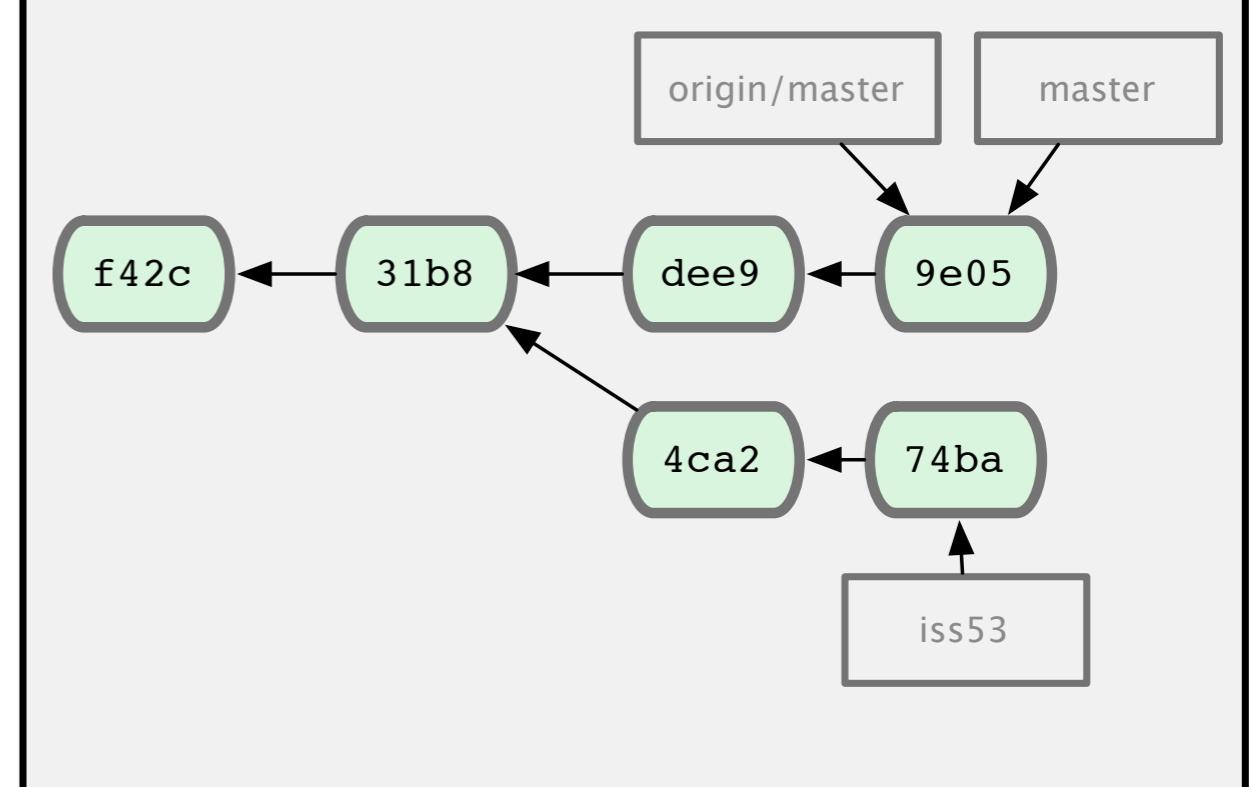
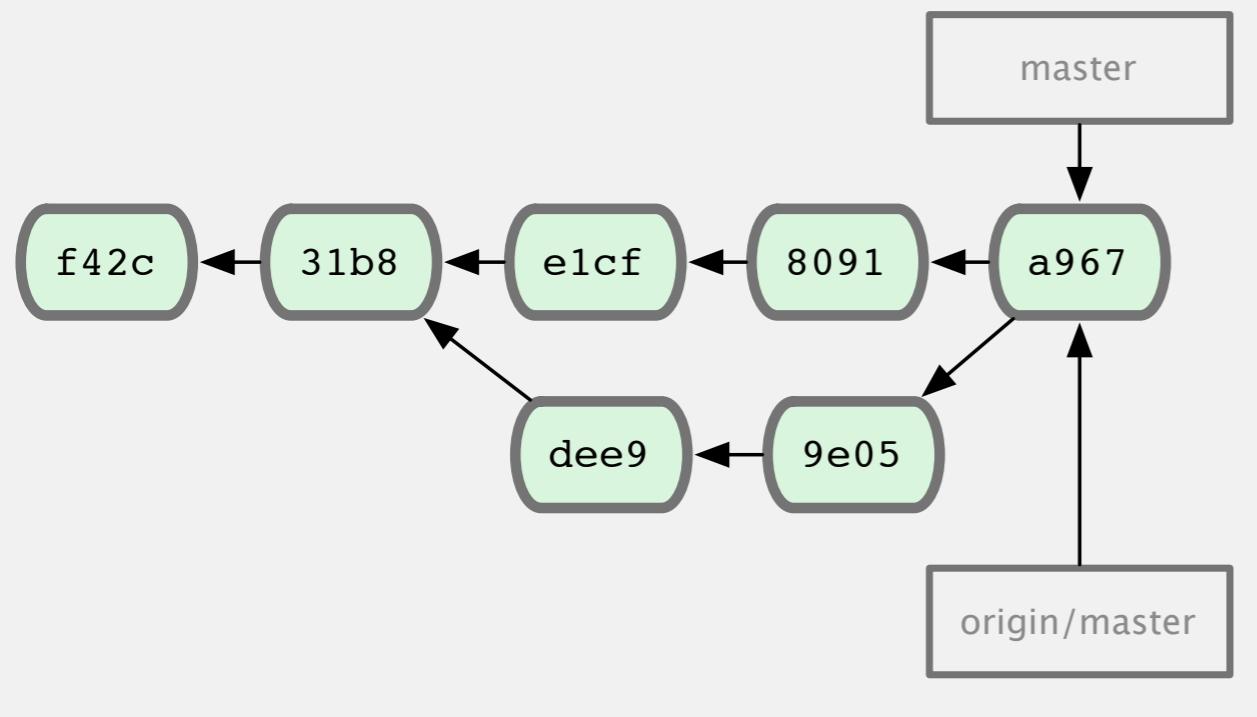


git.ourcompany.com

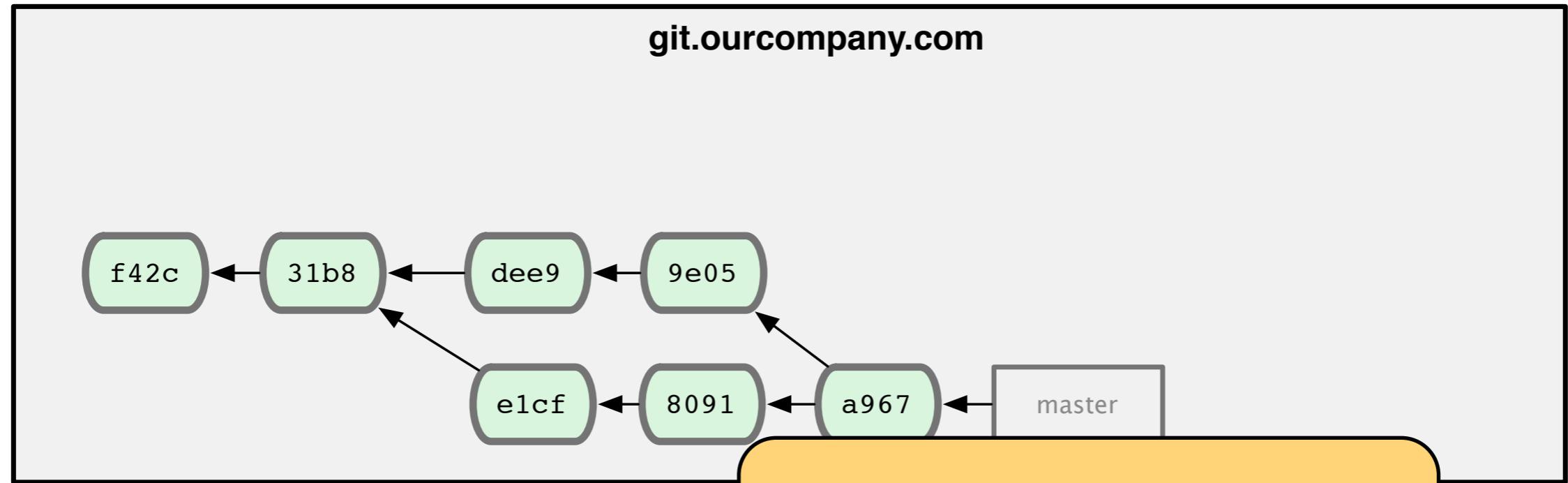


i've got master
at a967

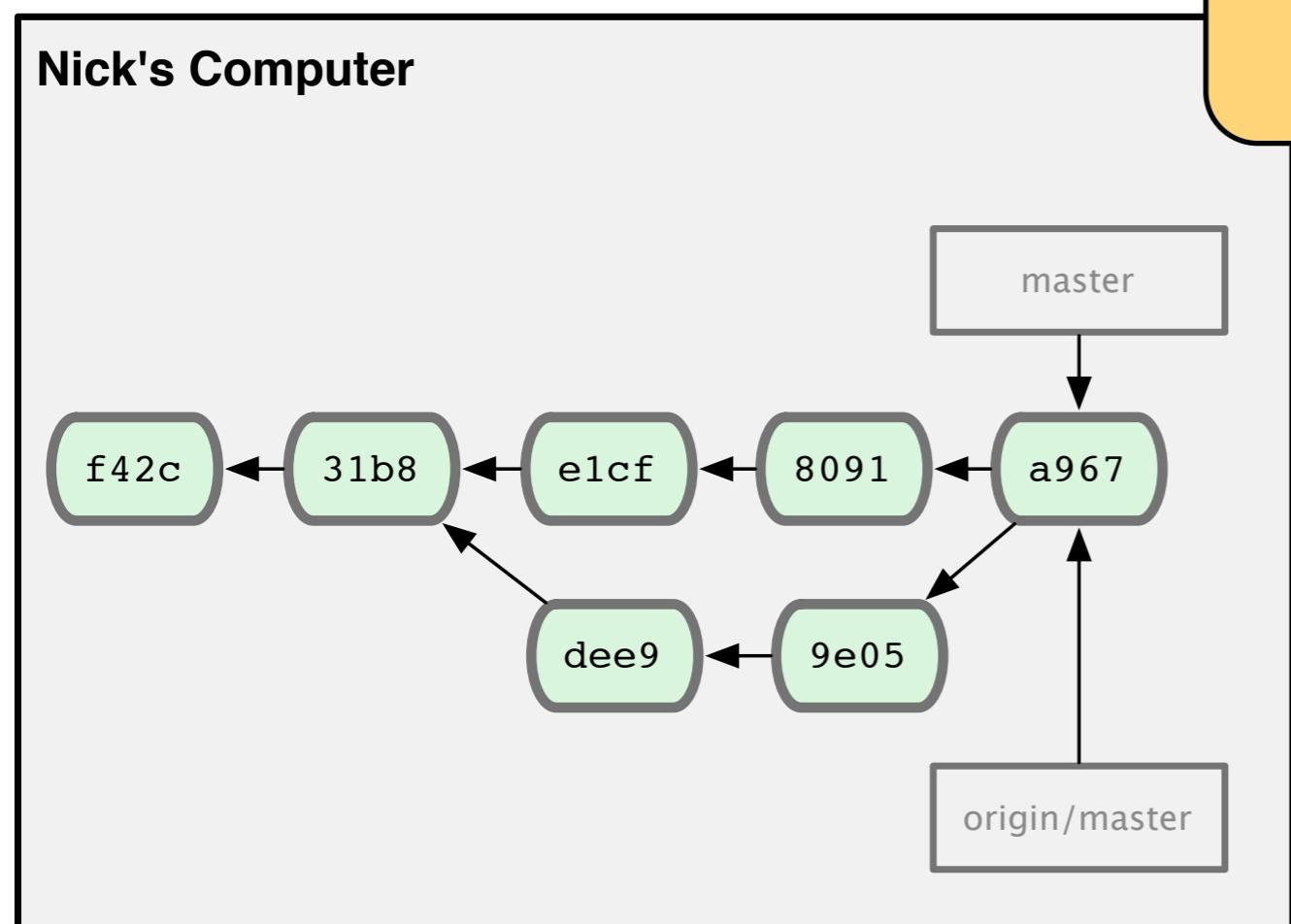
Nick's Computer



git.ourcompany.com

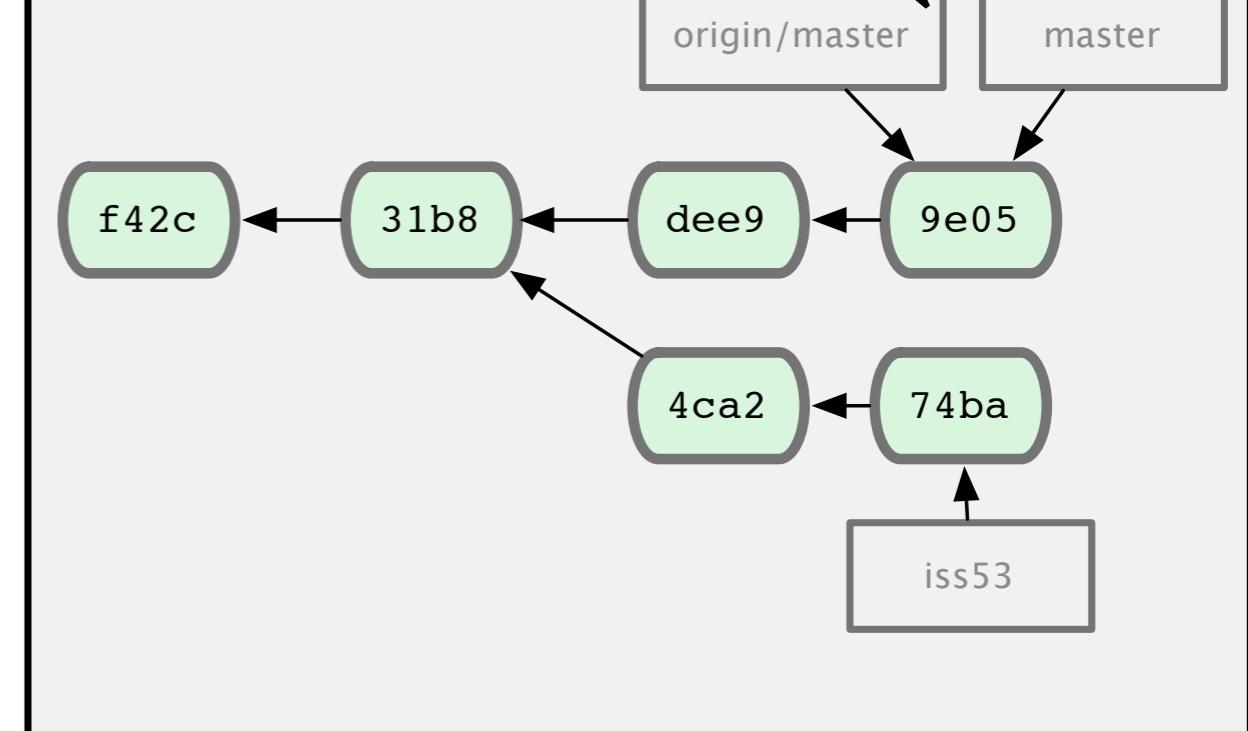


Nick's Computer

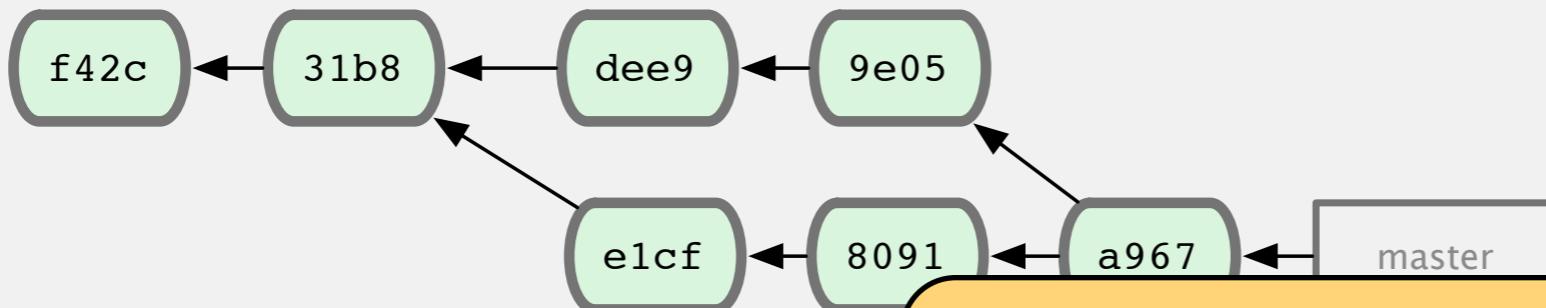


i don't care

iss53



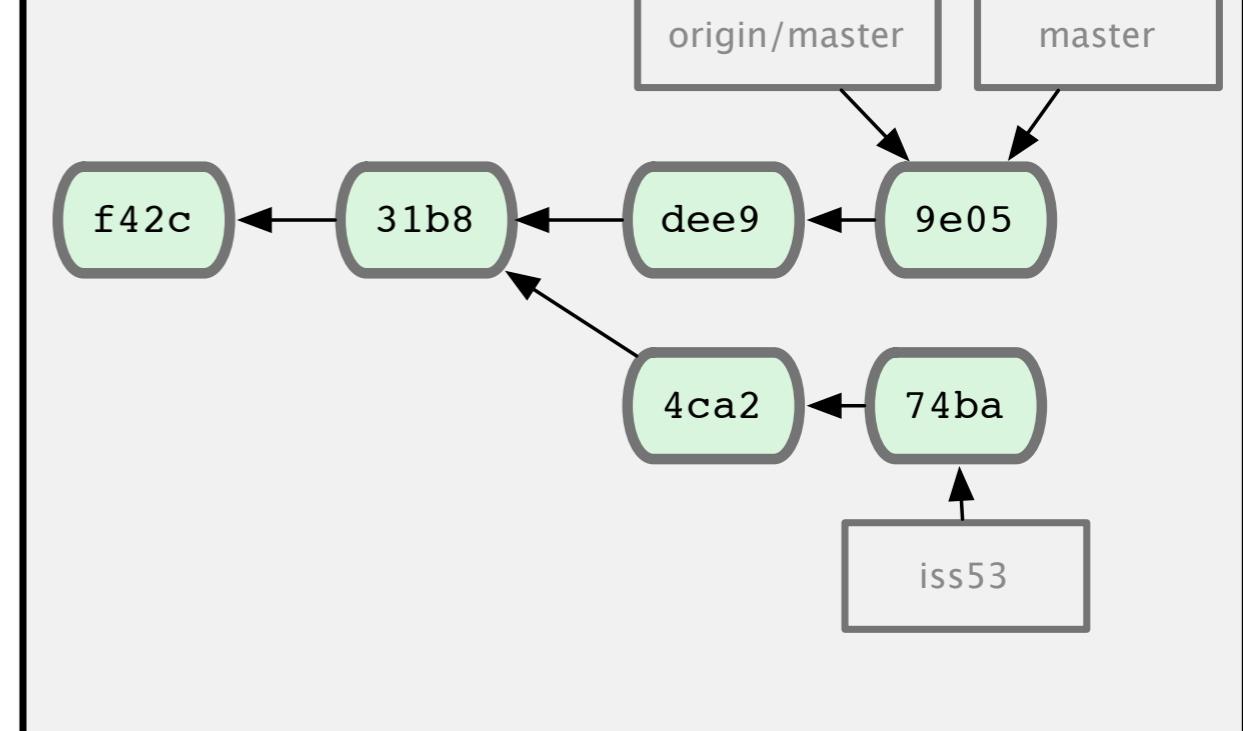
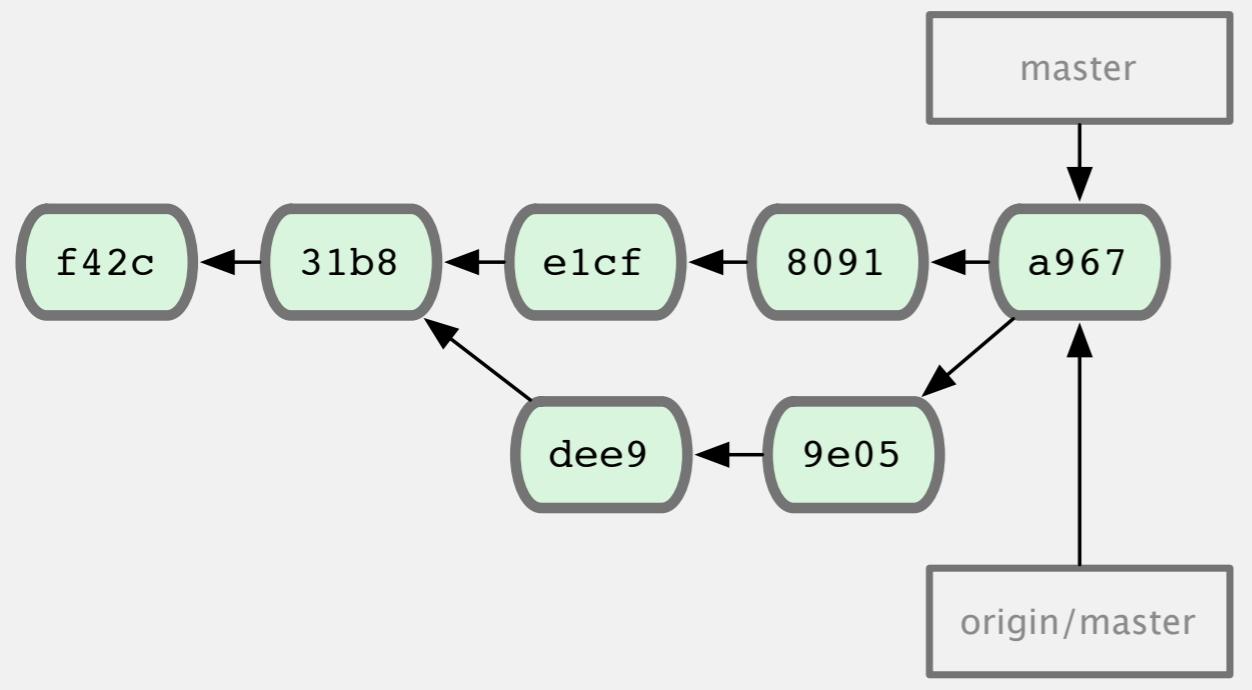
git.ourcompany.com

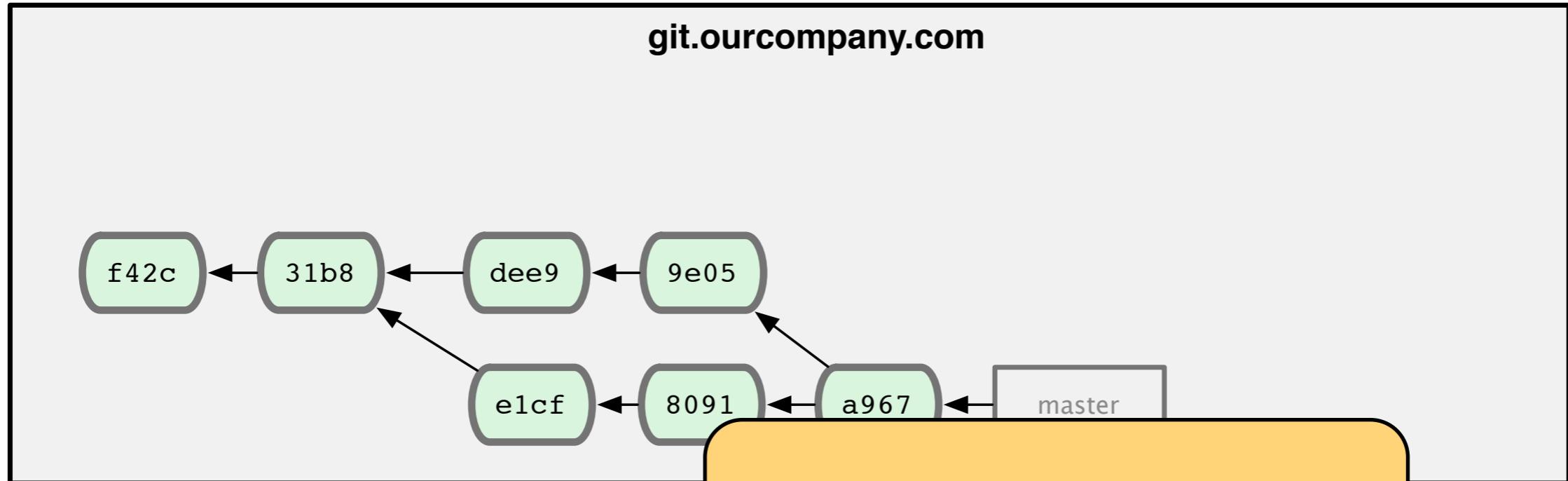


i'm trying to
push iss53

iss53

Nick's Computer

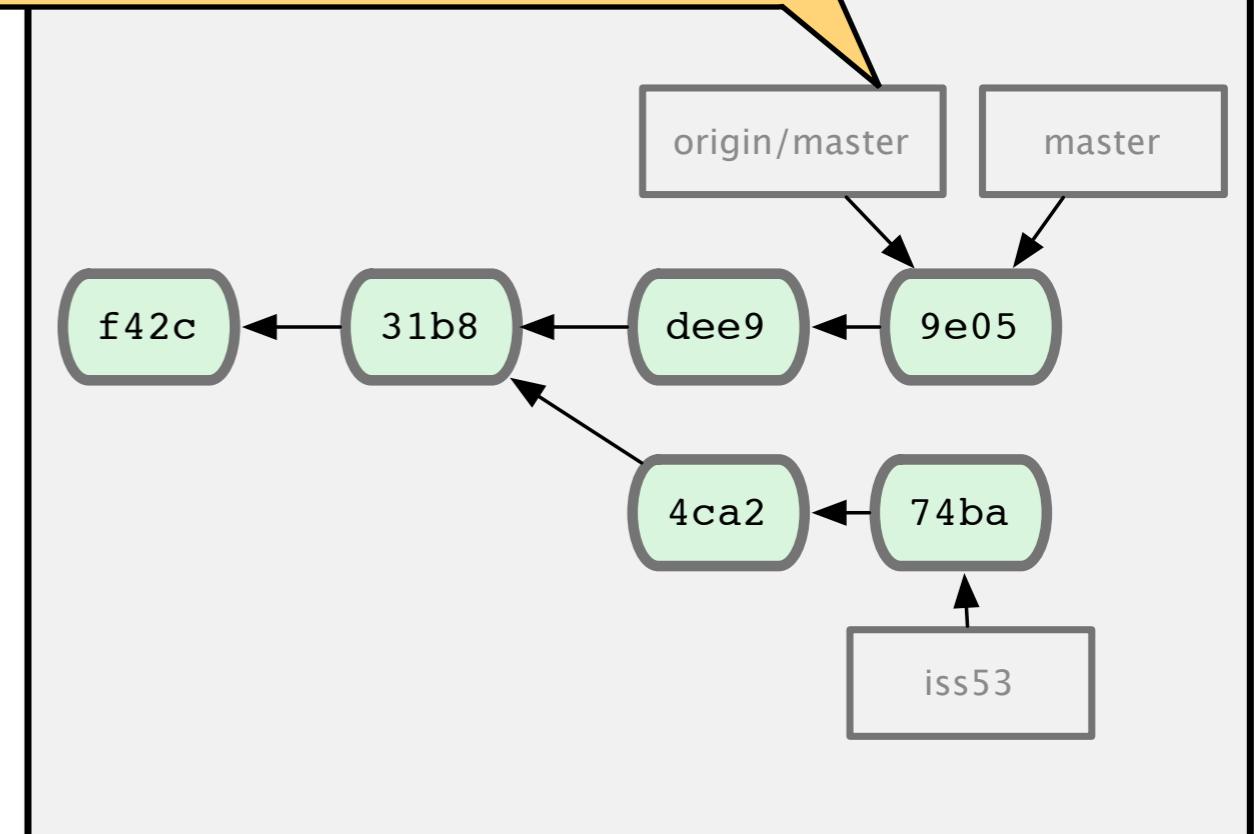
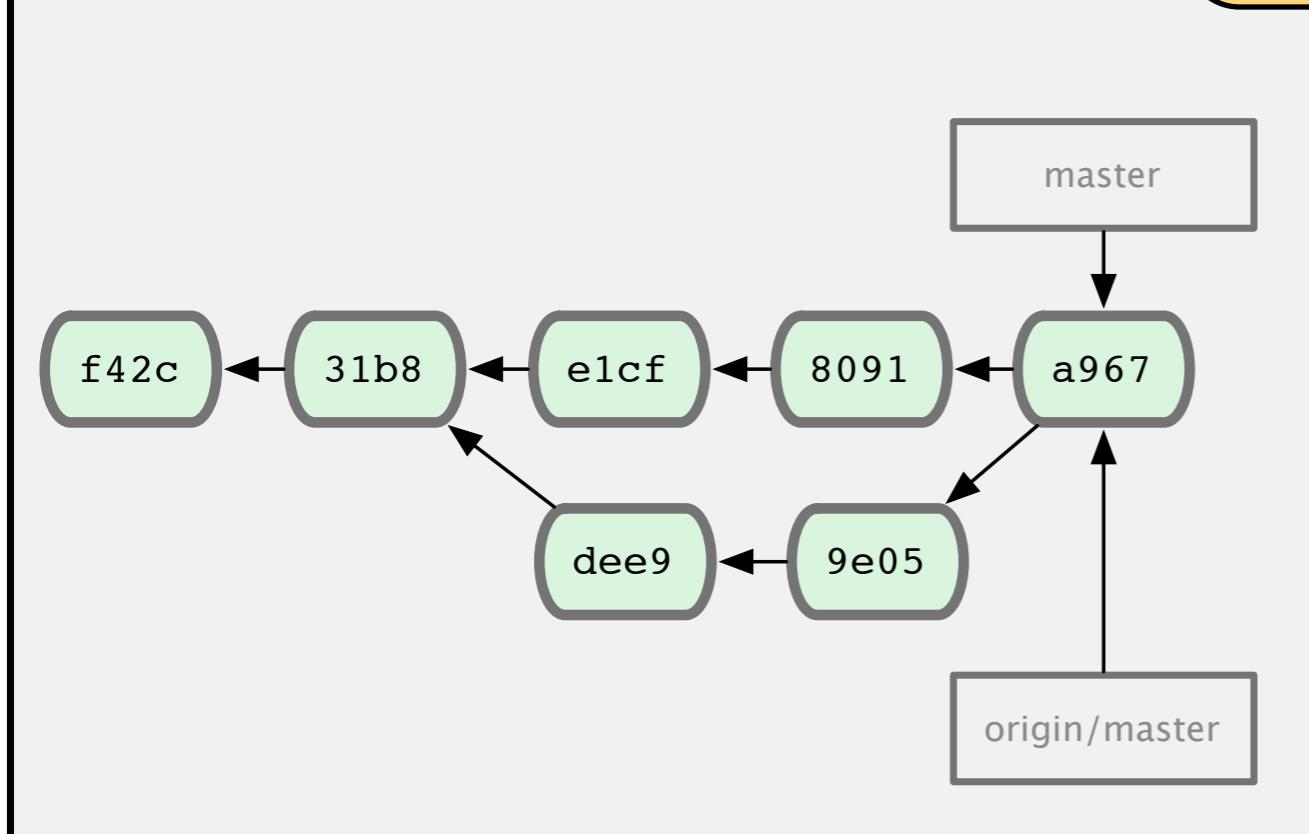




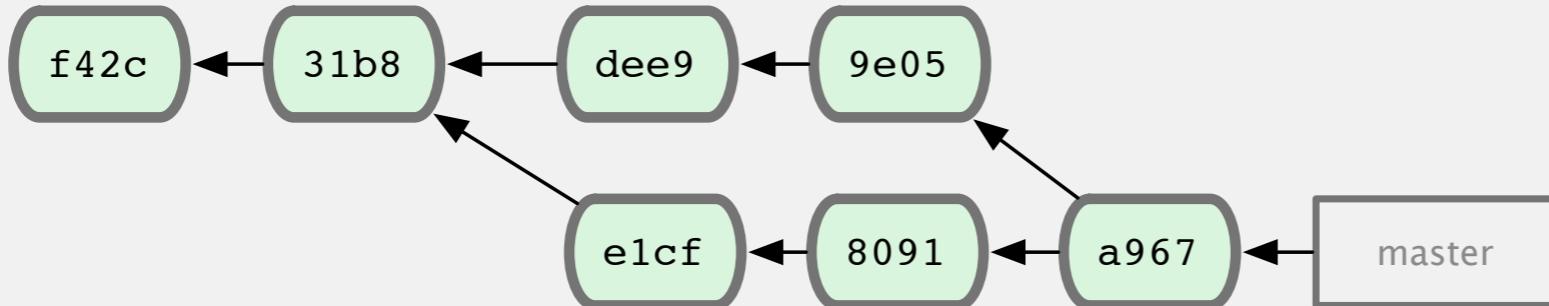
here you go

iss53

Nick's Computer

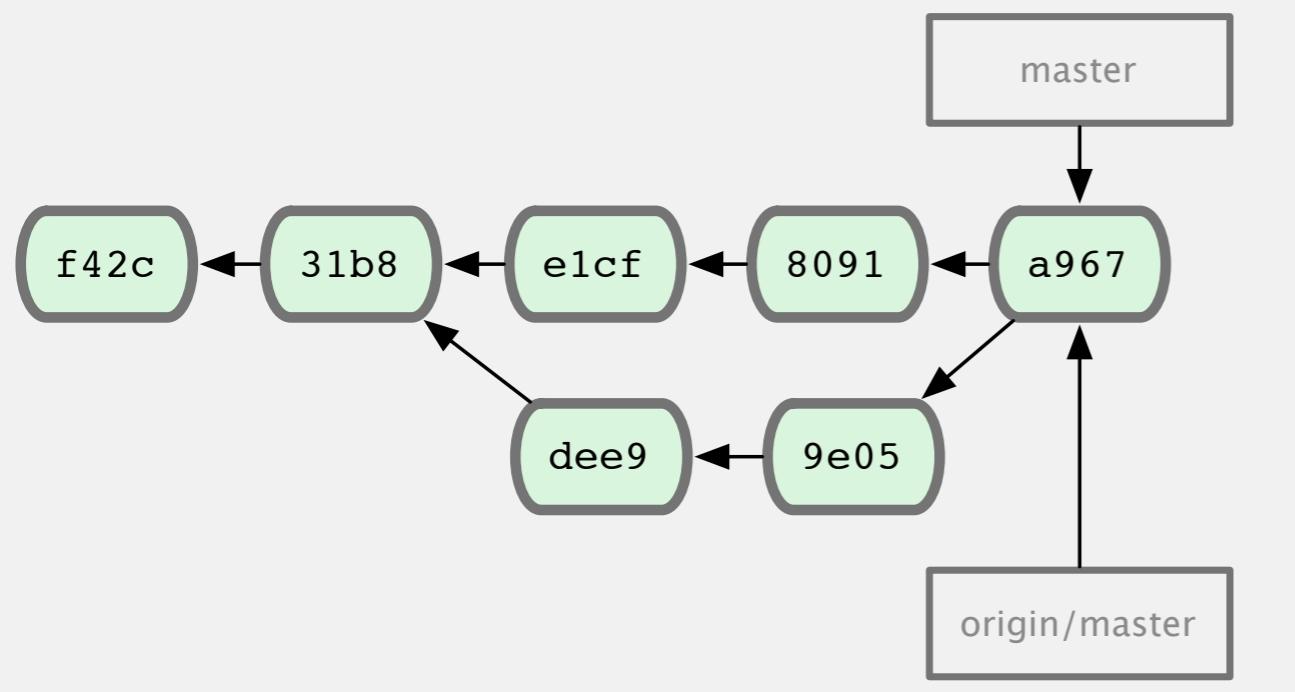


git.ourcompany.com

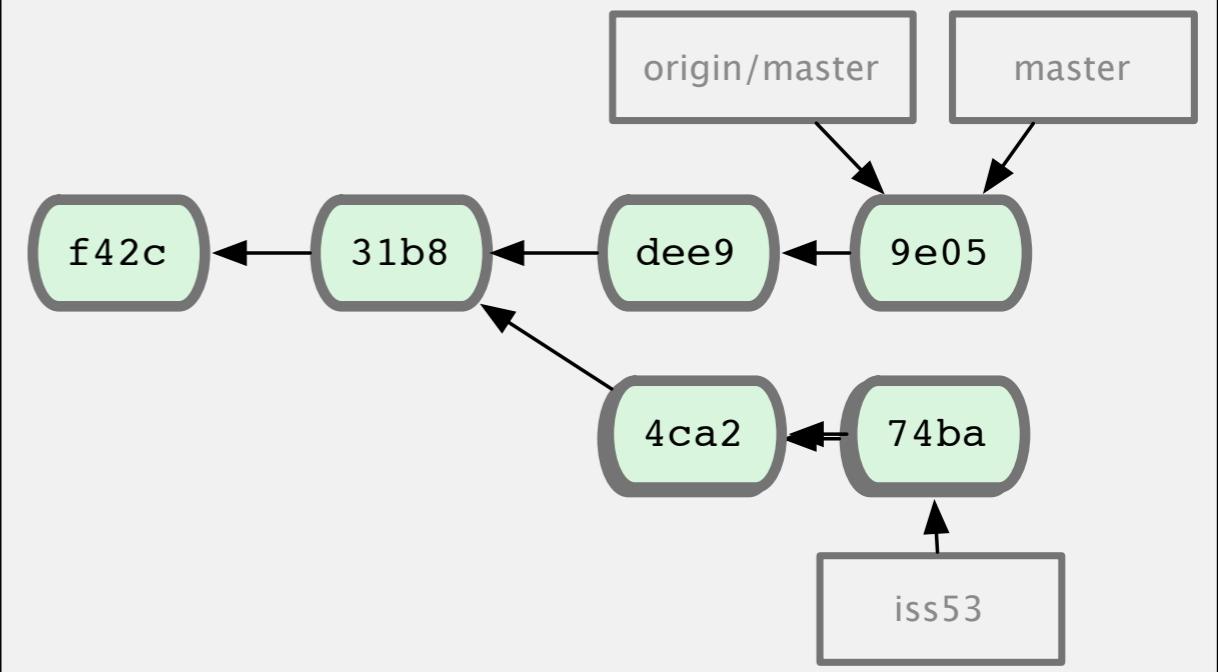


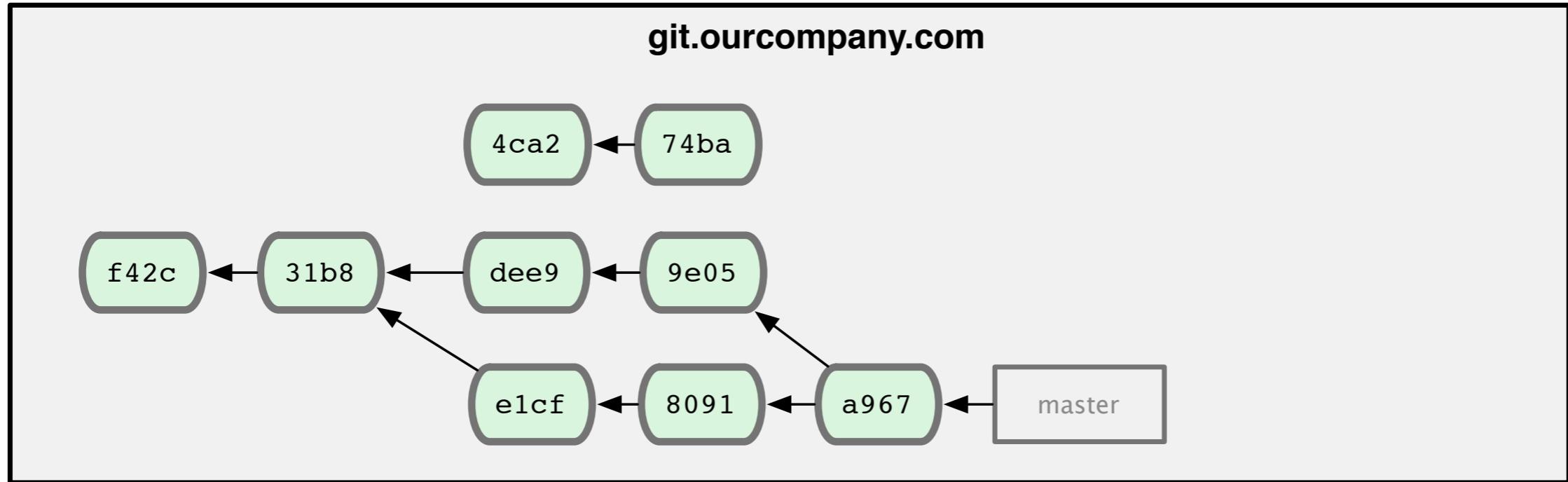
git push origin iss53

Nick's Computer

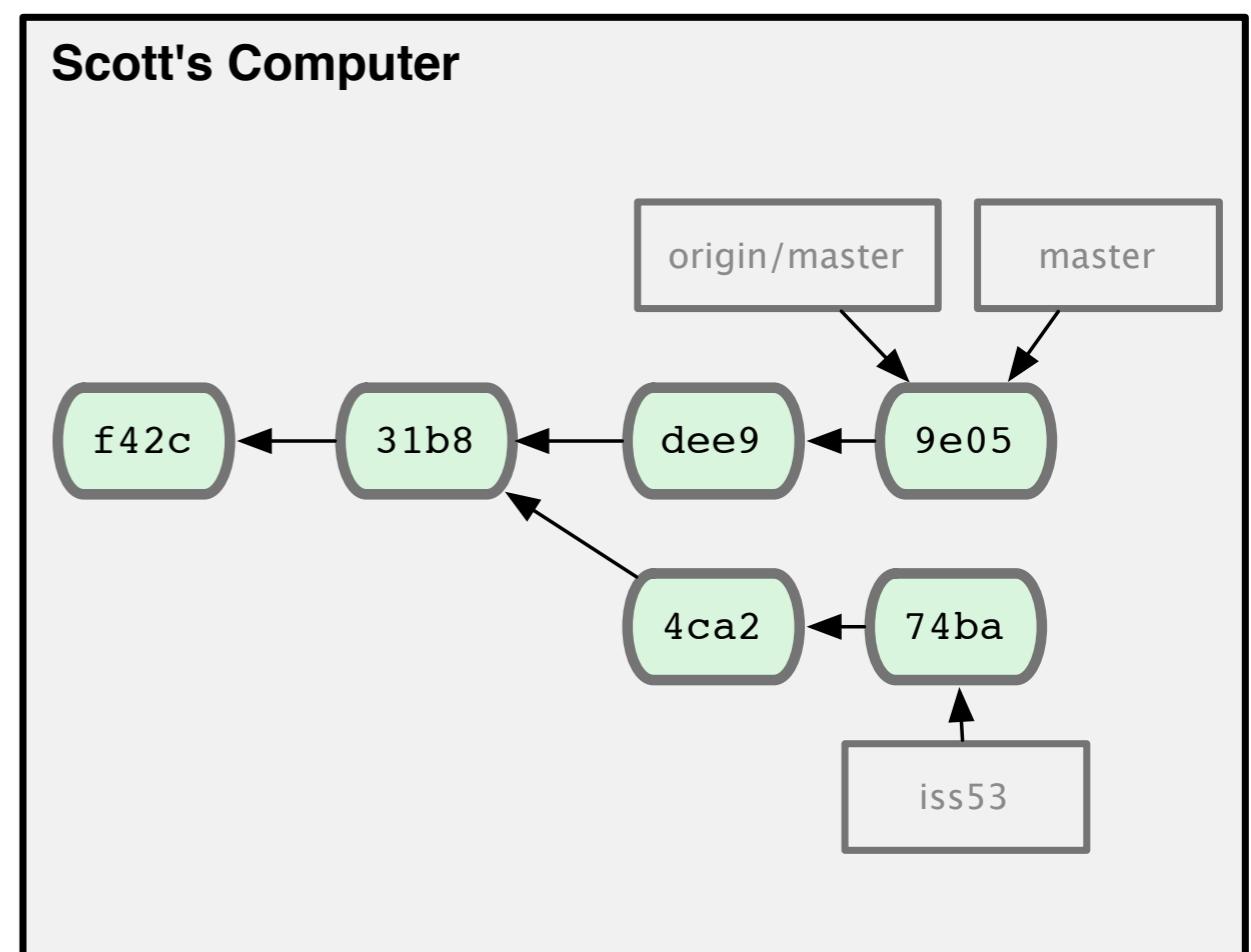
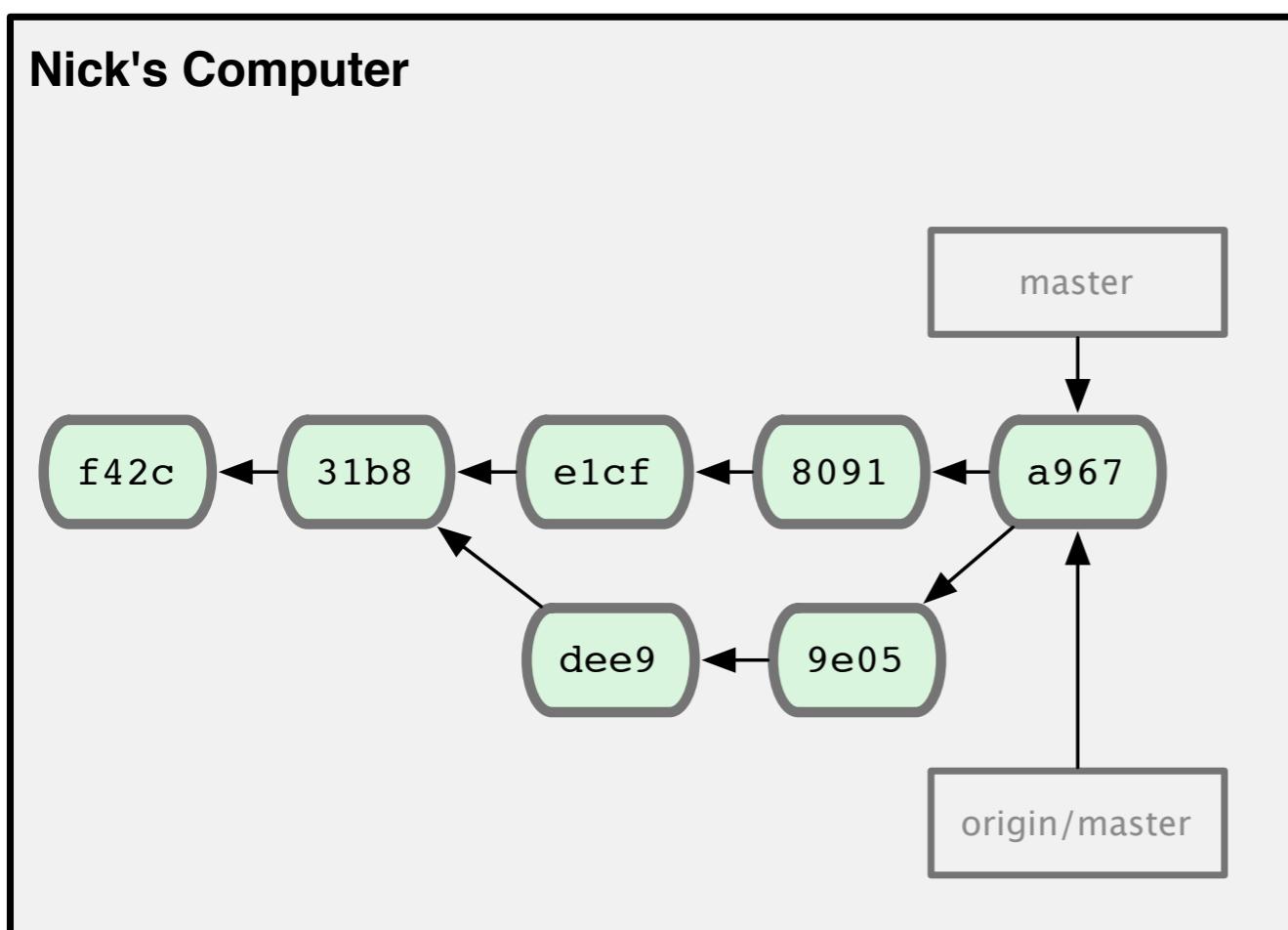


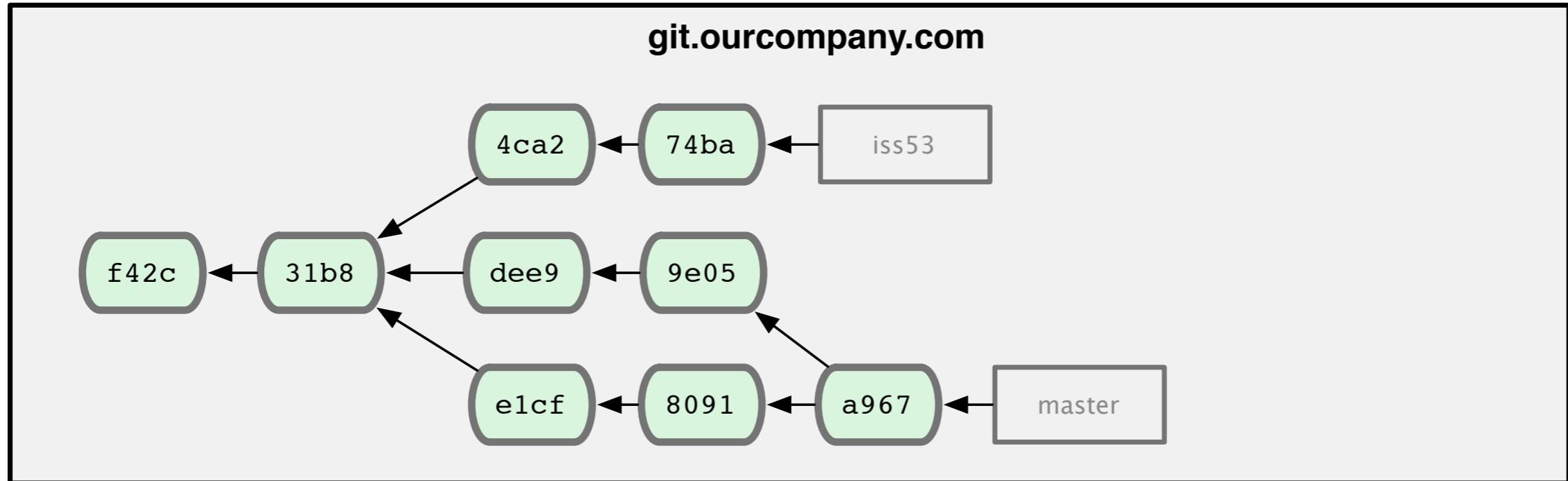
Scott's Computer



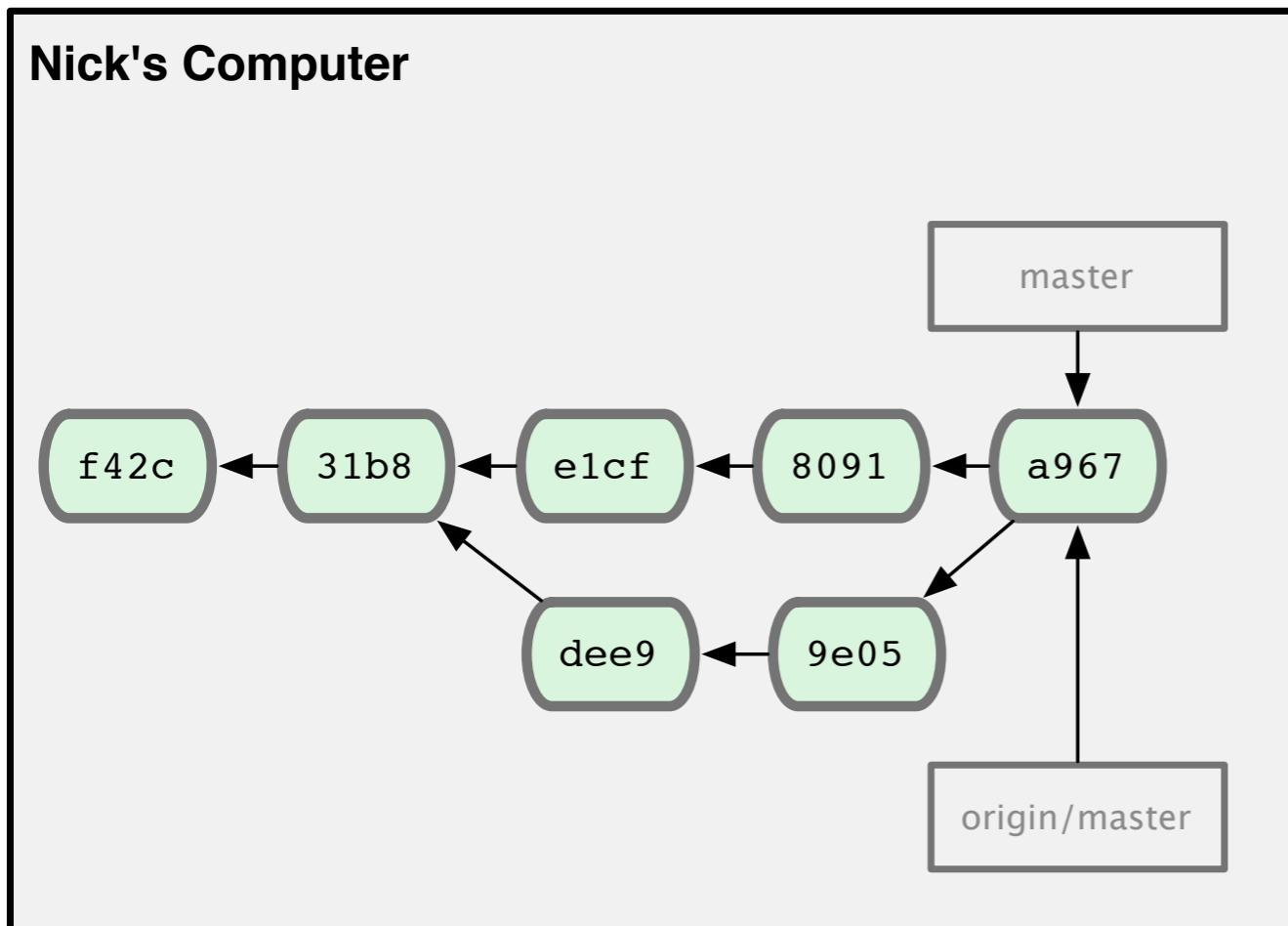


git push origin iss53

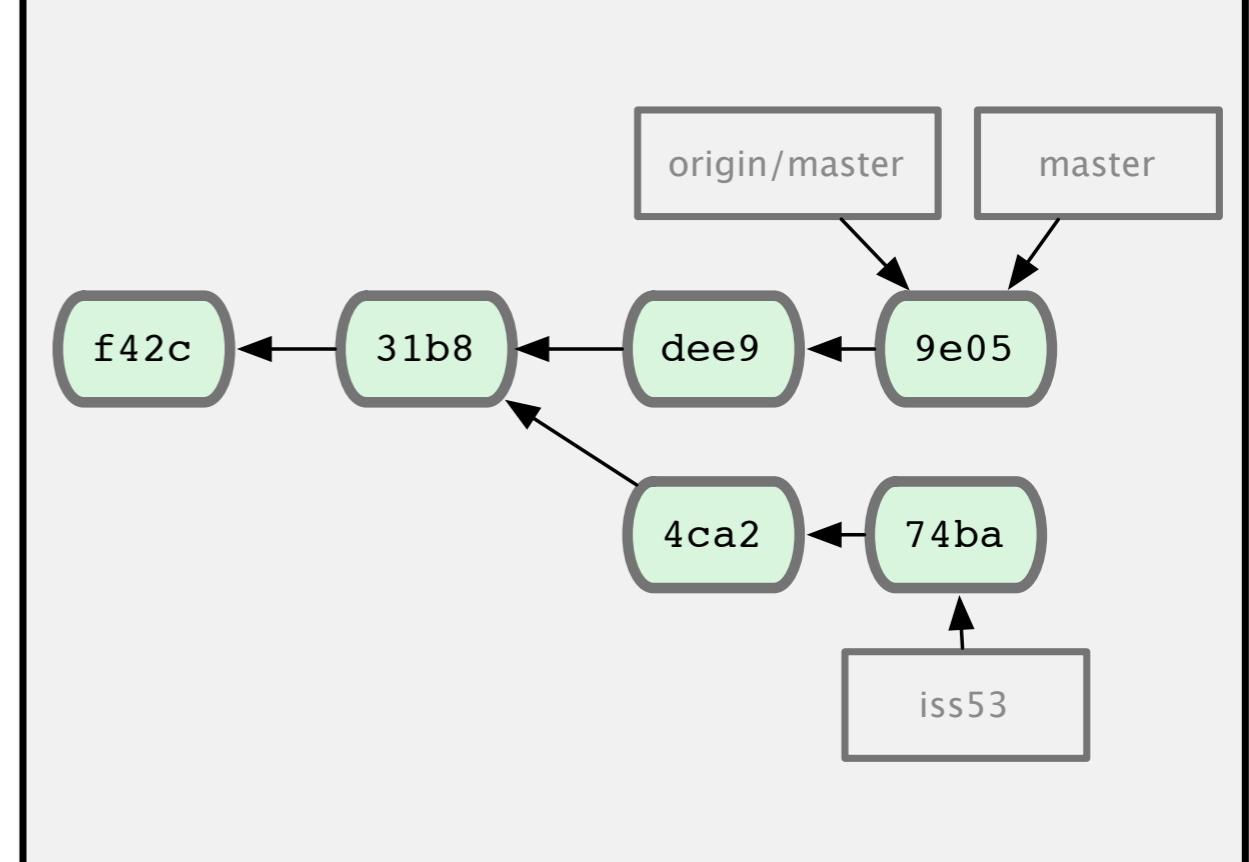


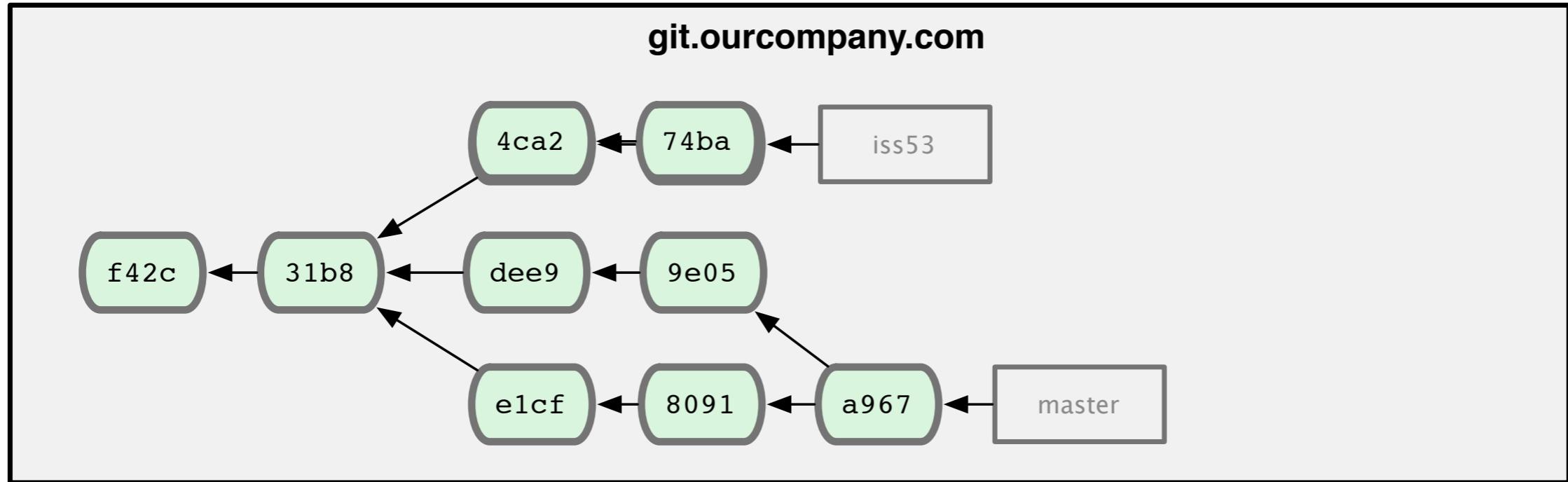


Nick's Computer

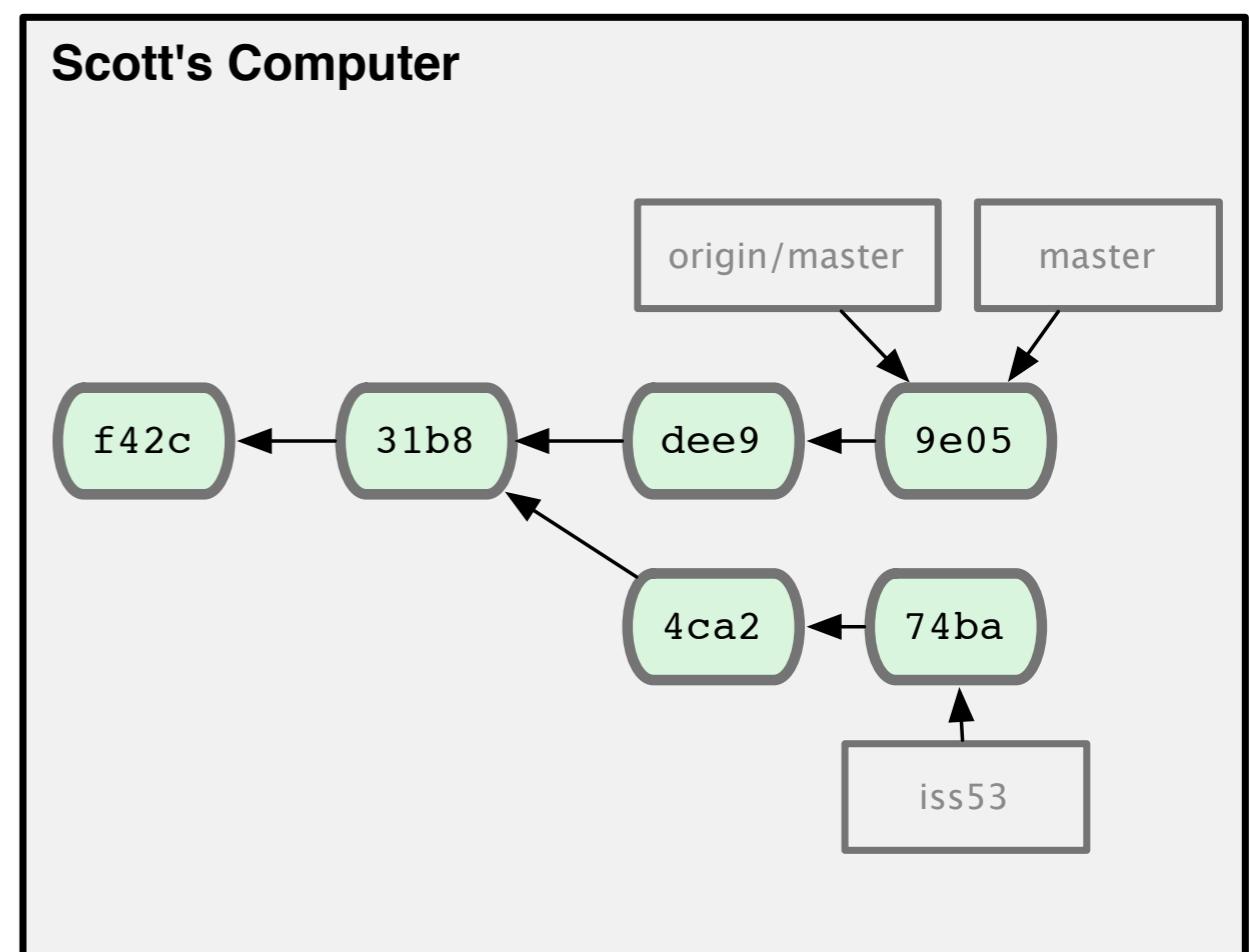
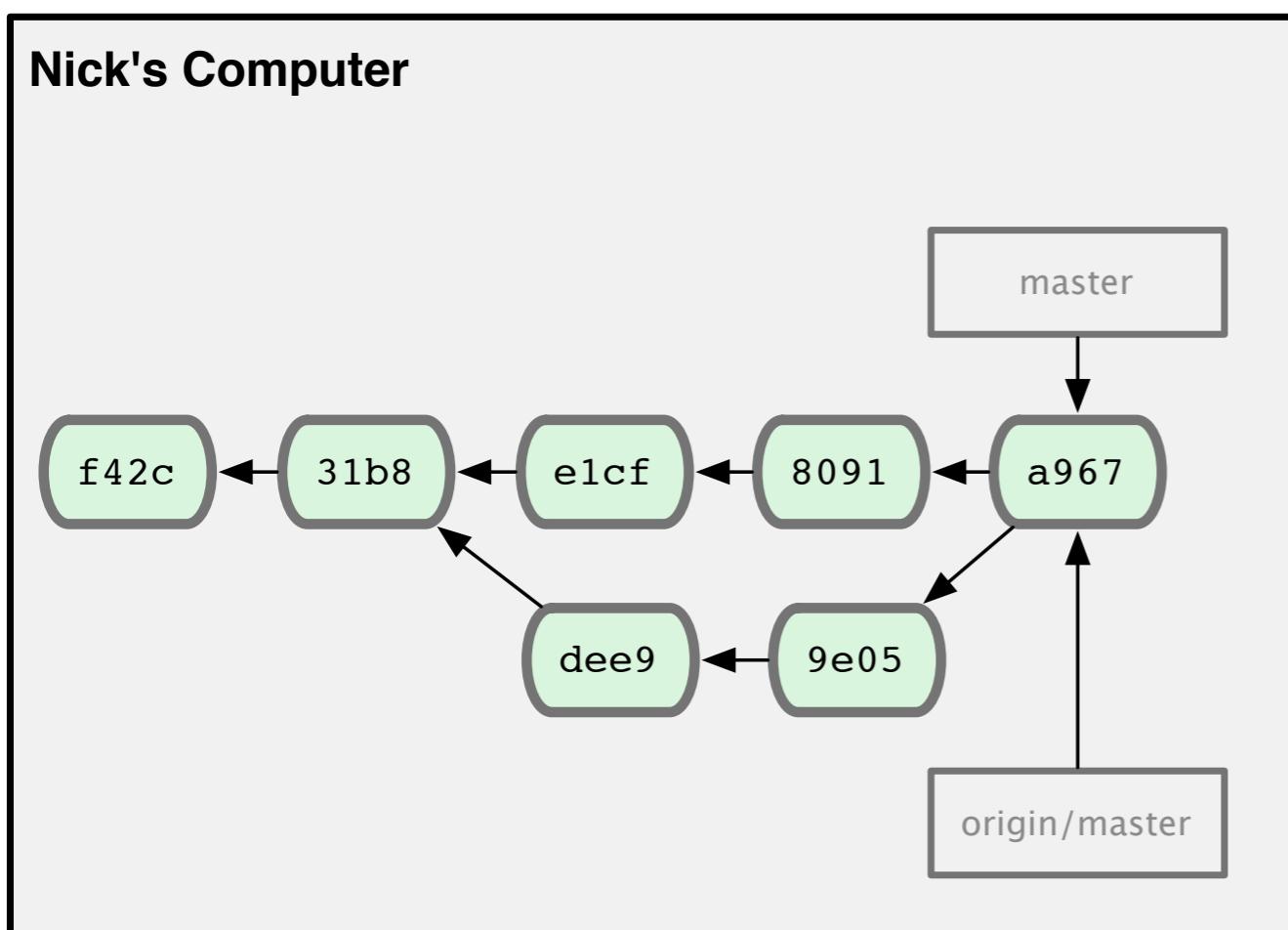


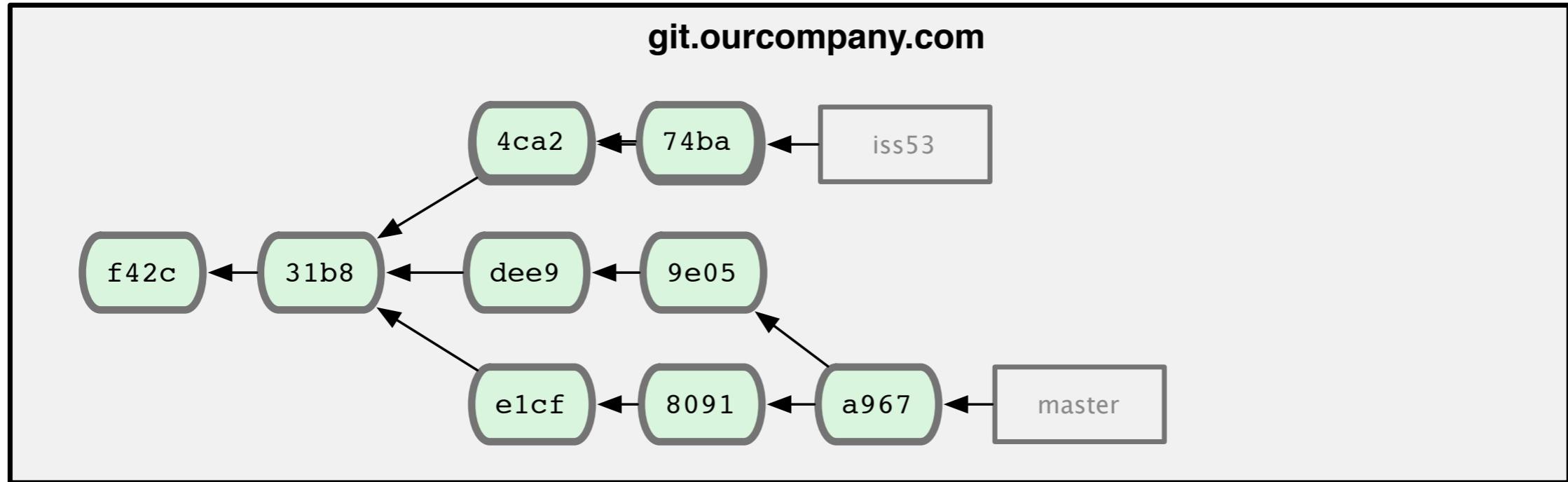
Scott's Computer



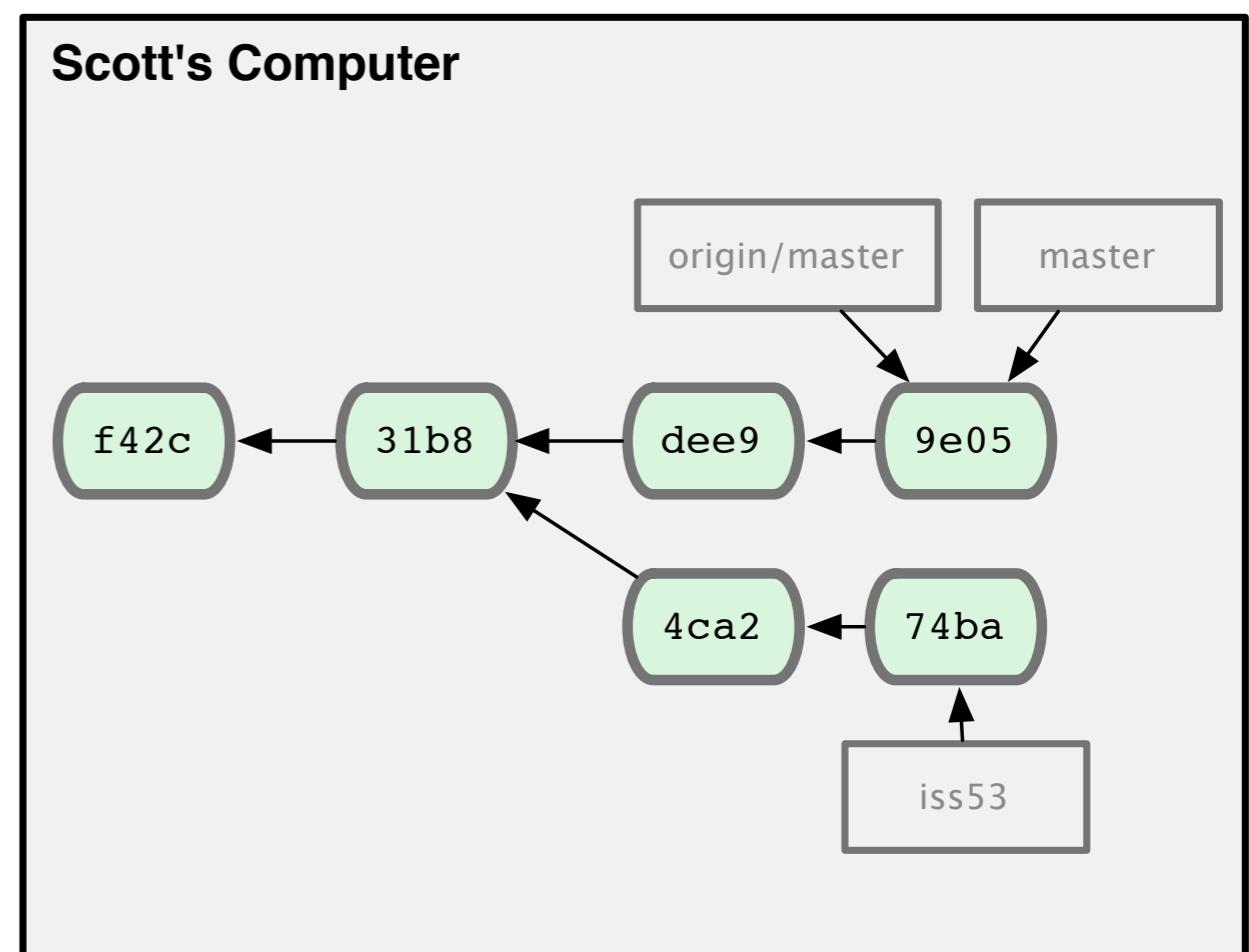
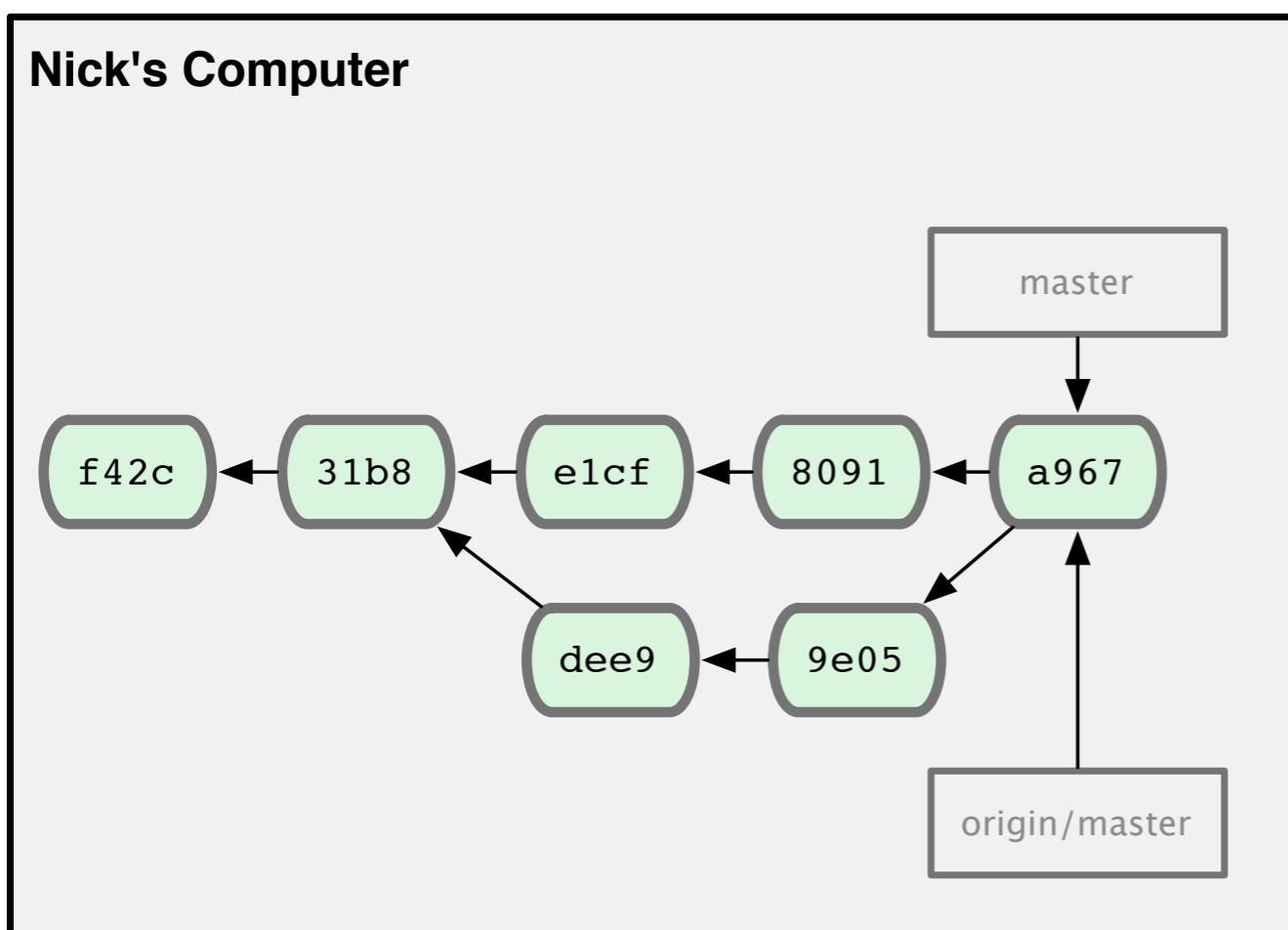


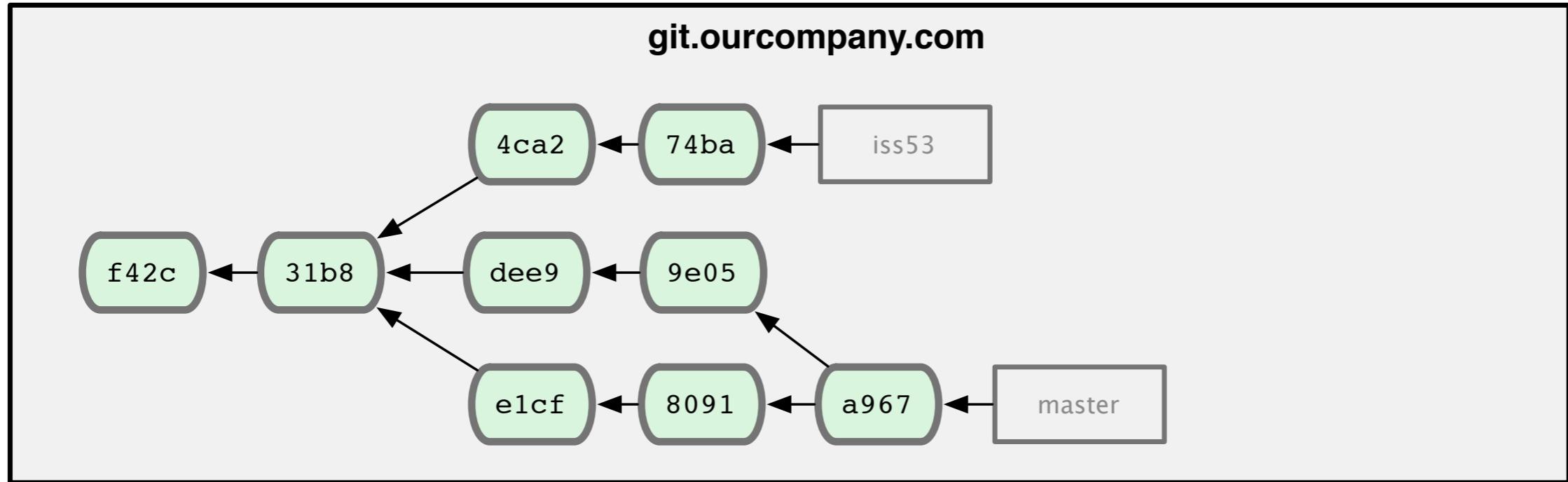
git fetch



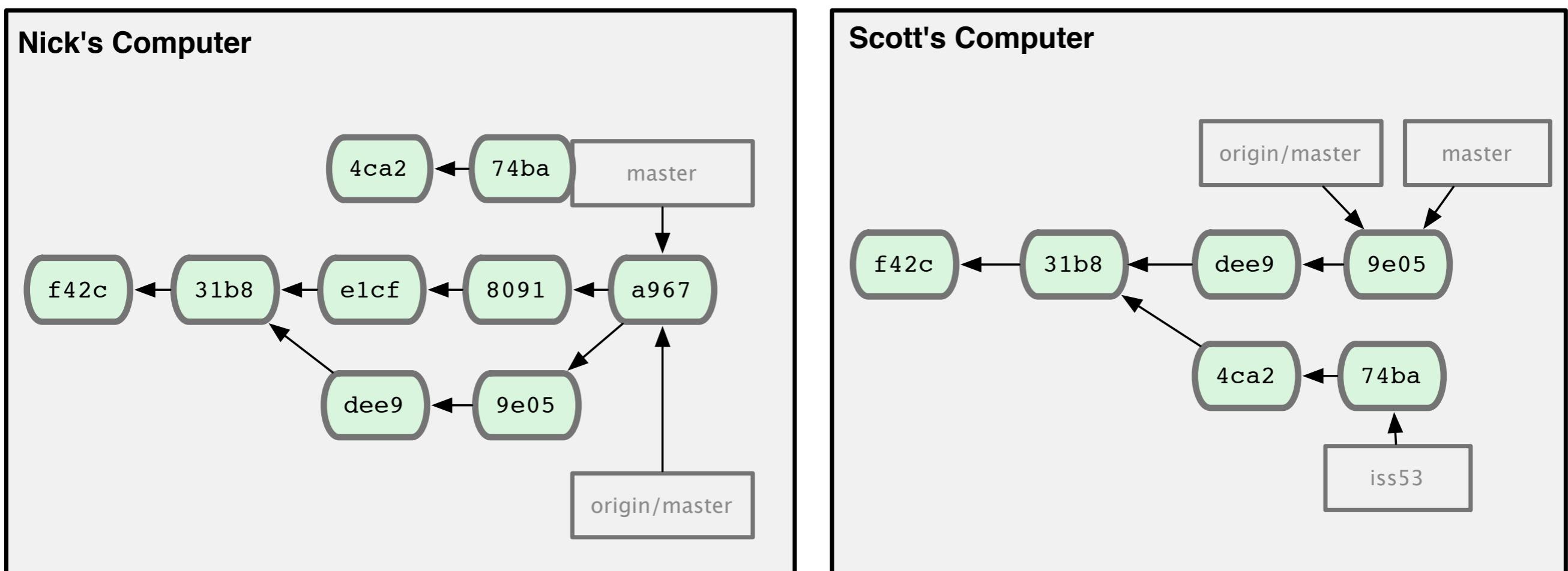


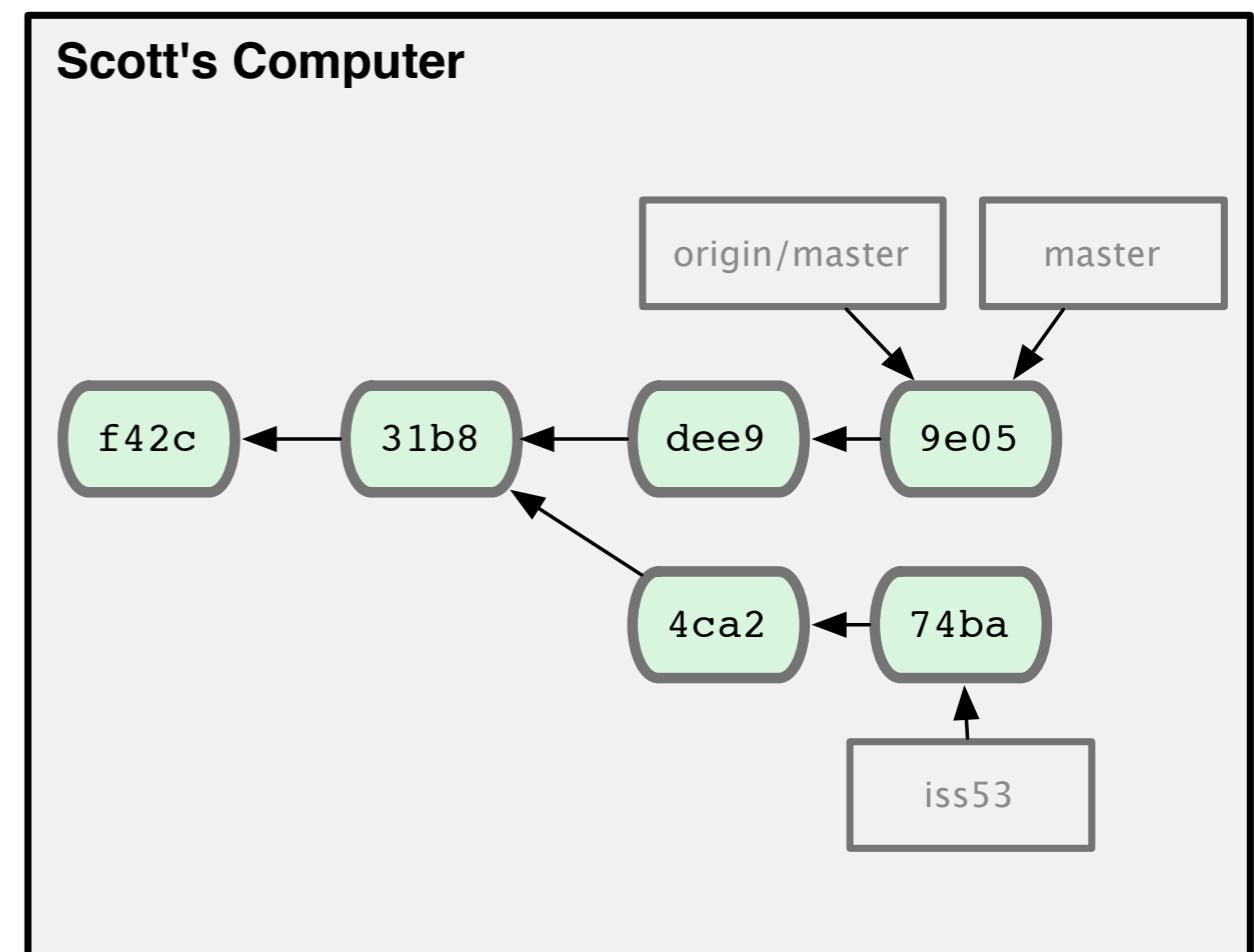
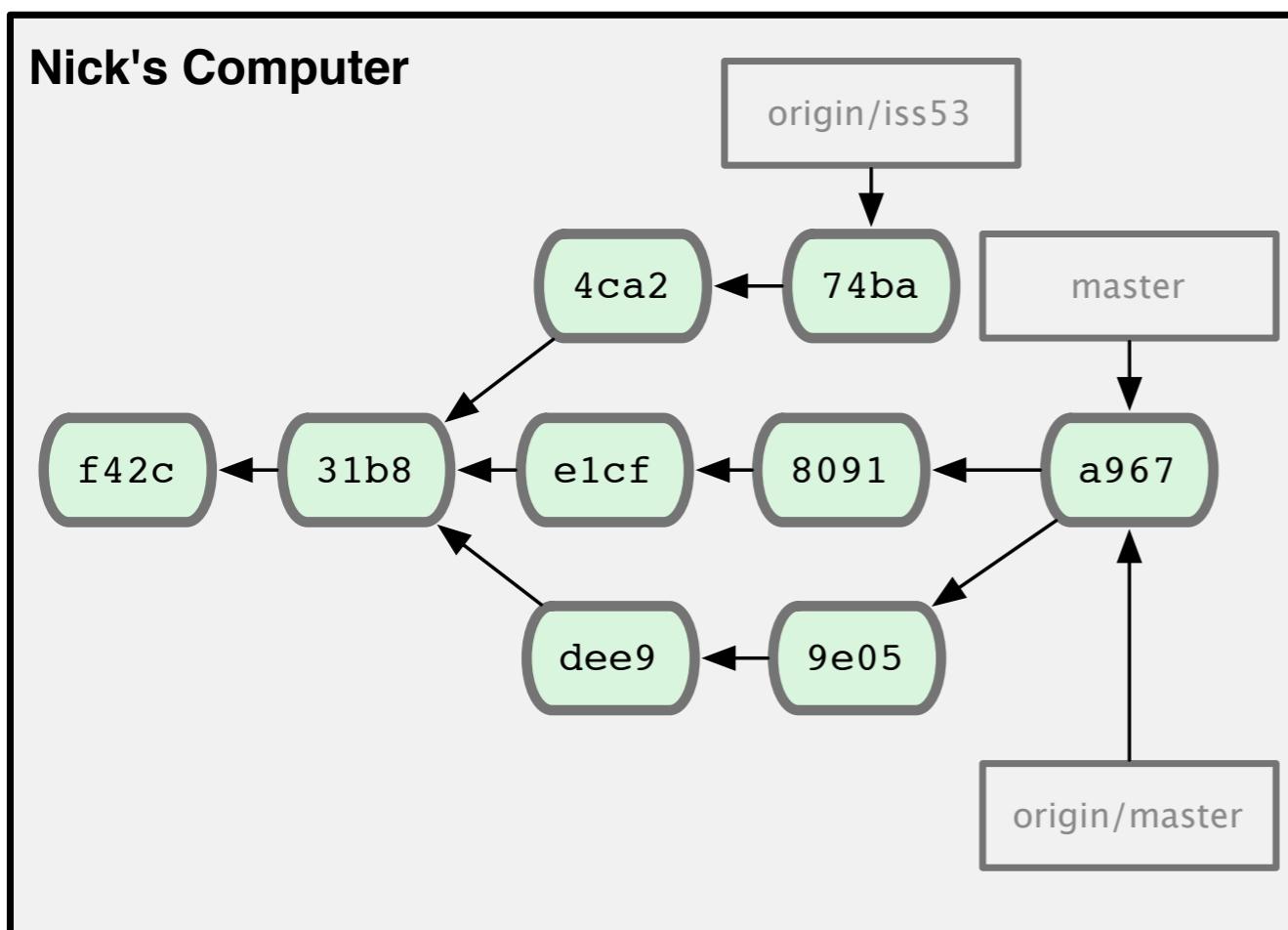
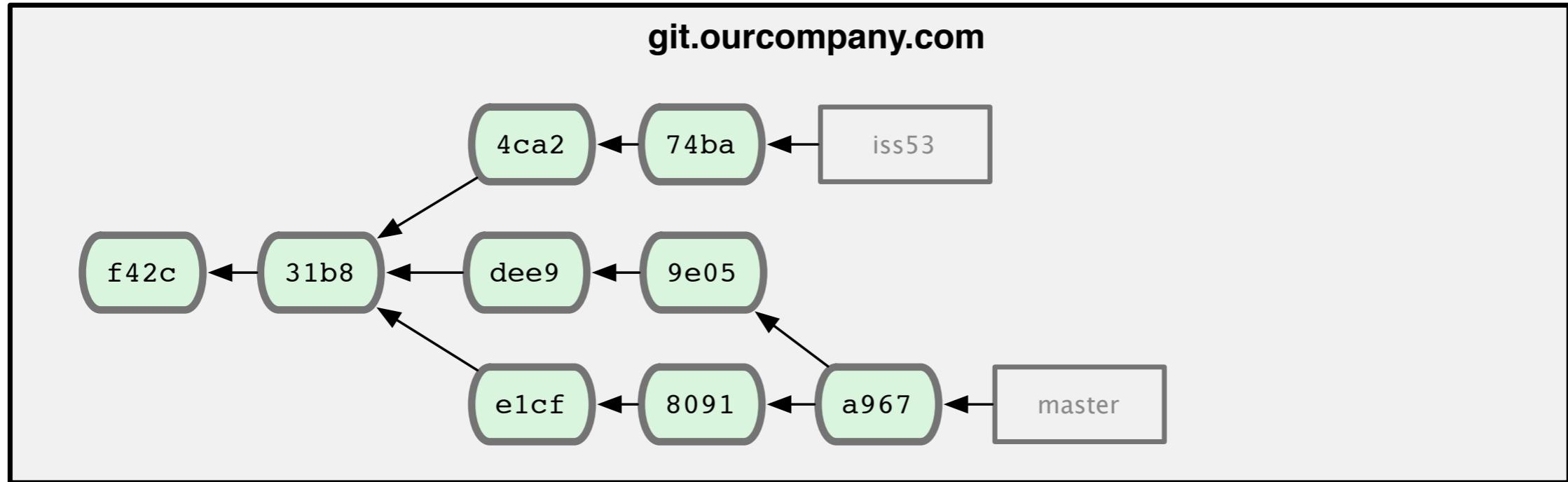
git fetch





git fetch





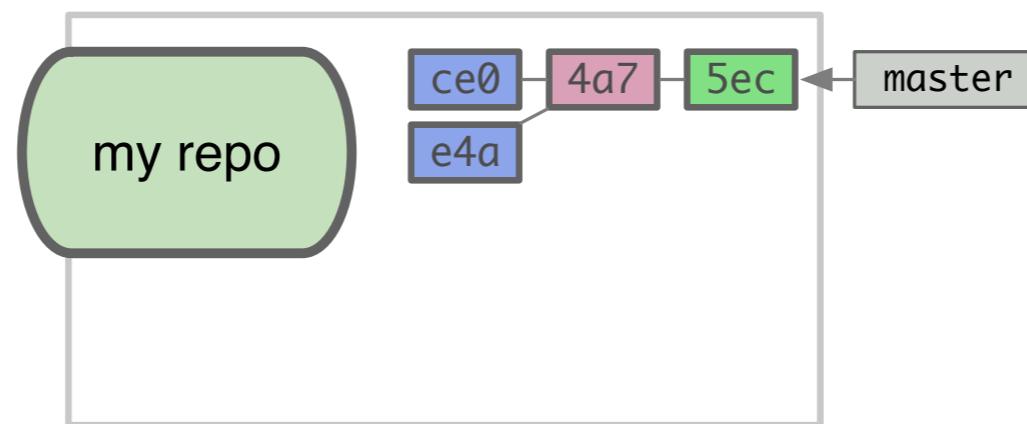
git pull

`pull == fetch + merge`

multiple remotes

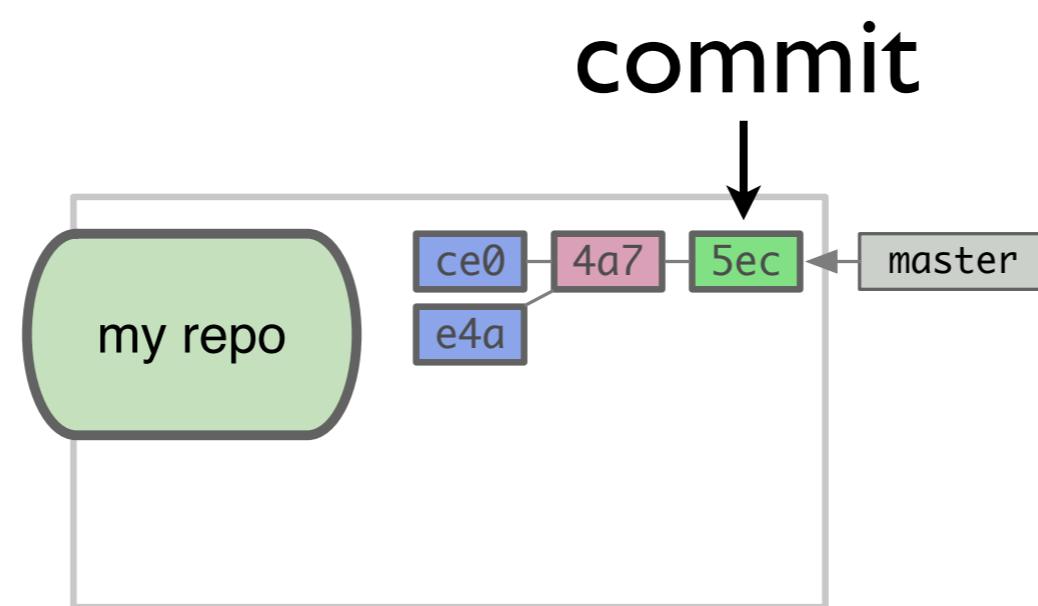
developer
nick

developer
jessica



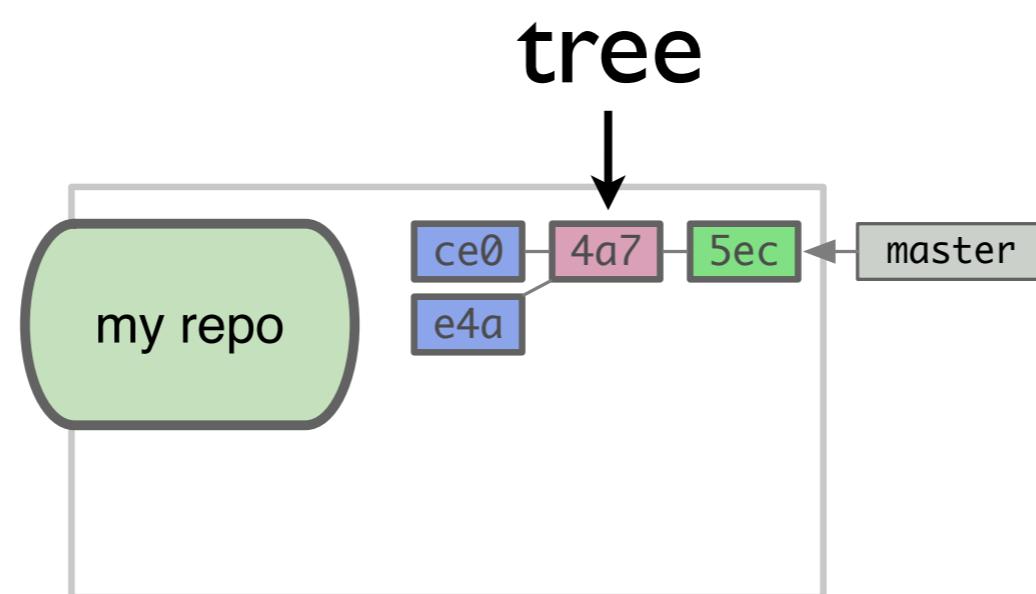
developer
nick

developer
jessica



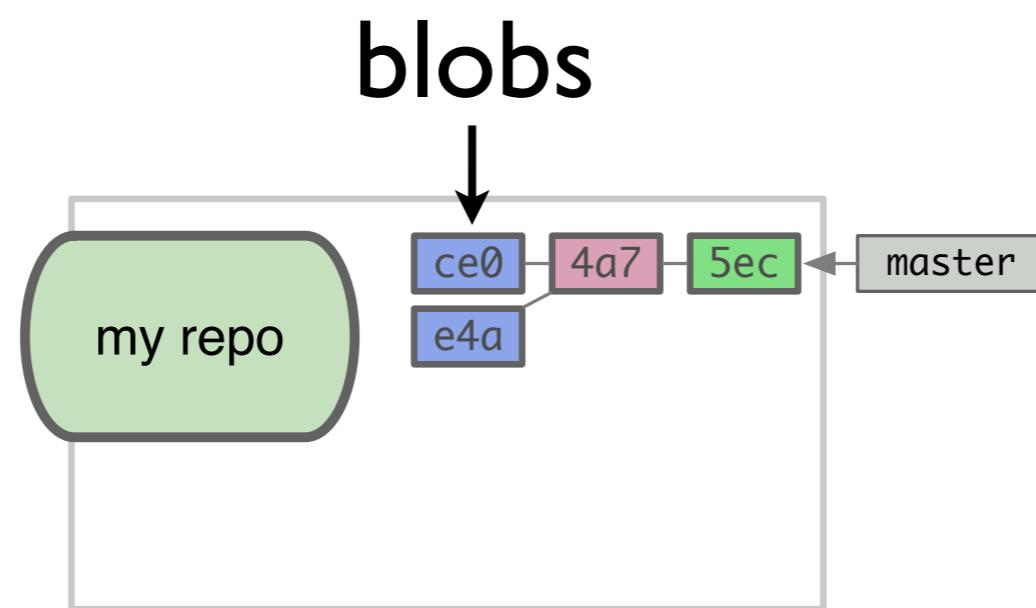
developer
nick

developer
jessica



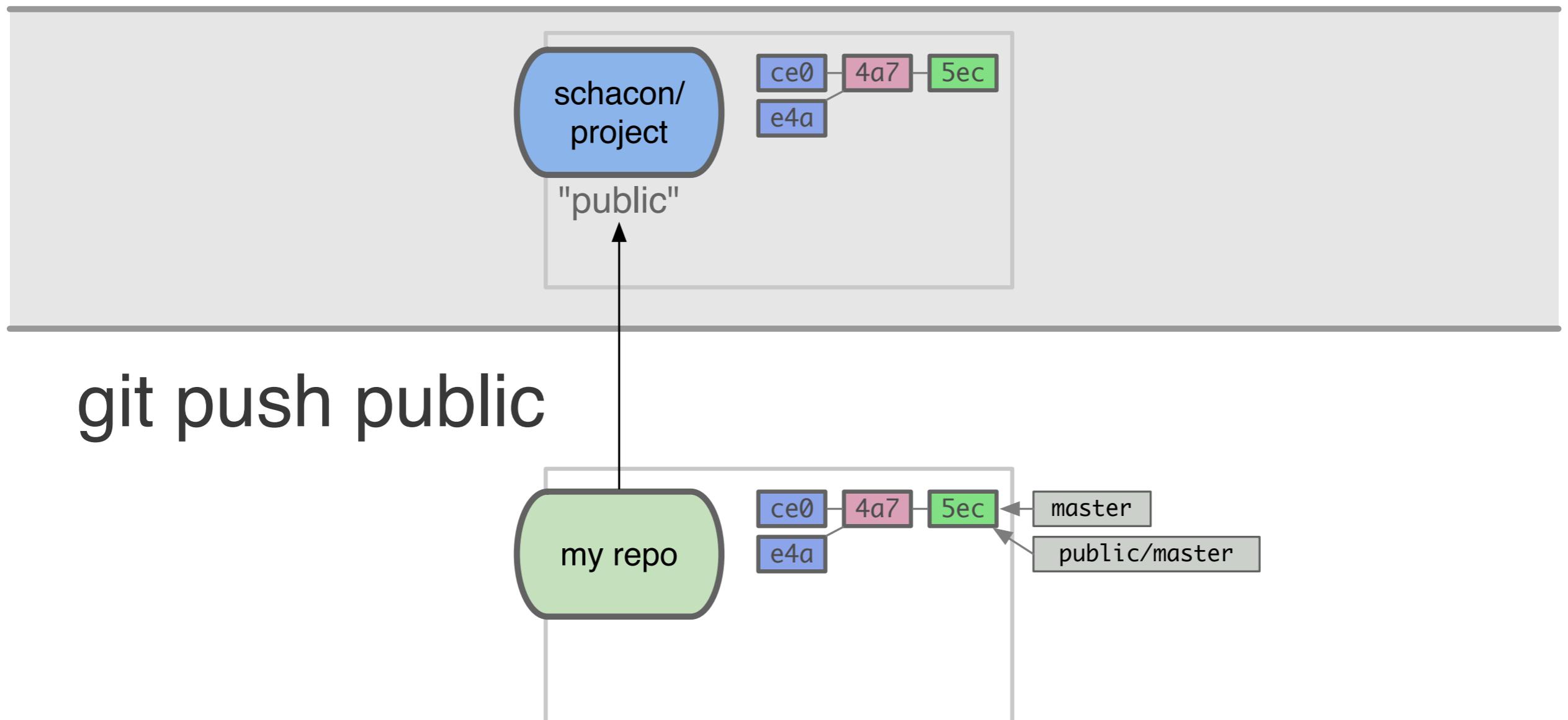
developer
nick

developer
jessica

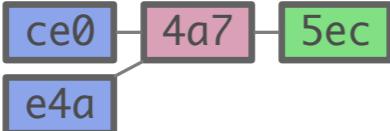


developer
nick

developer
jessica



developer
nick



developer
jessica

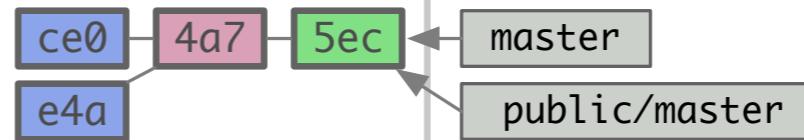
git clone (url)

schacon/
project

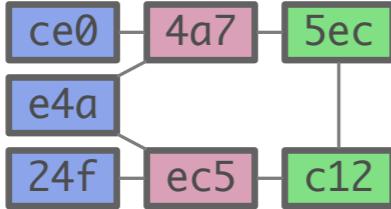
"public"



my repo



developer
nick



developer
jessica

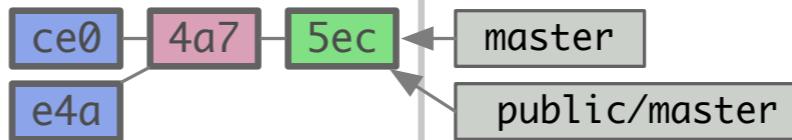
git commit

schacon/
project

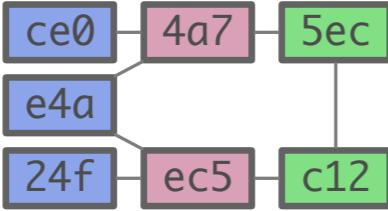
"public"



my repo

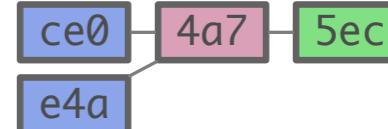


developer
nick



git clone (url)

developer
jessica

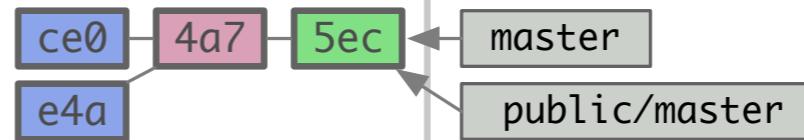


schacon/
project

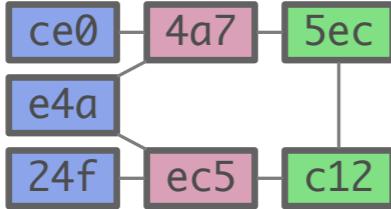
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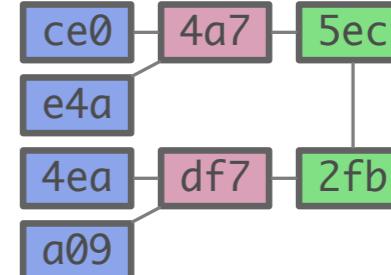
my repo



developer
nick



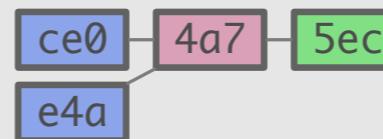
developer
jessica



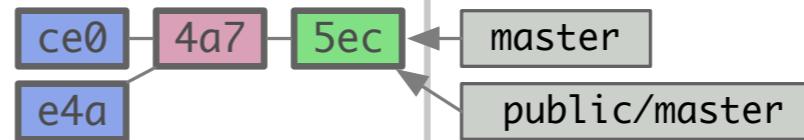
git commit

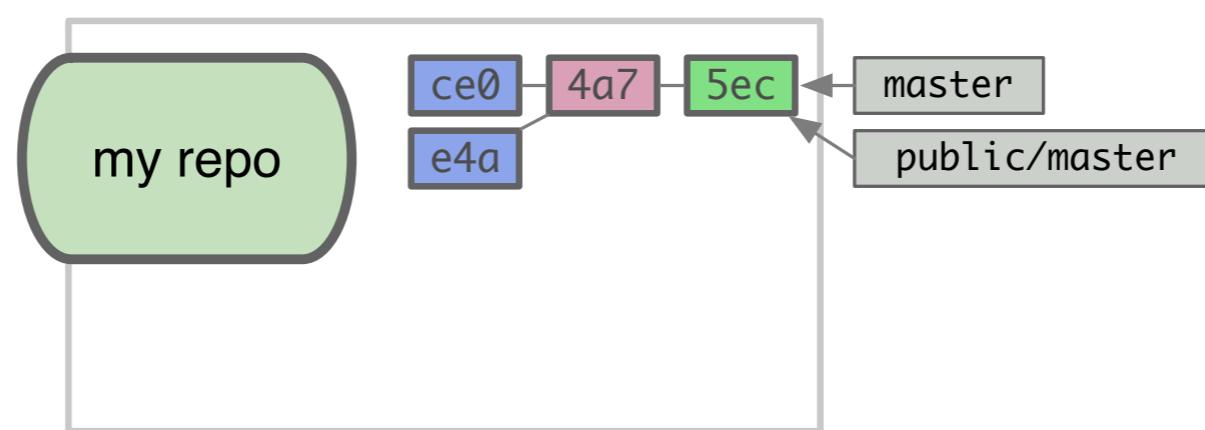
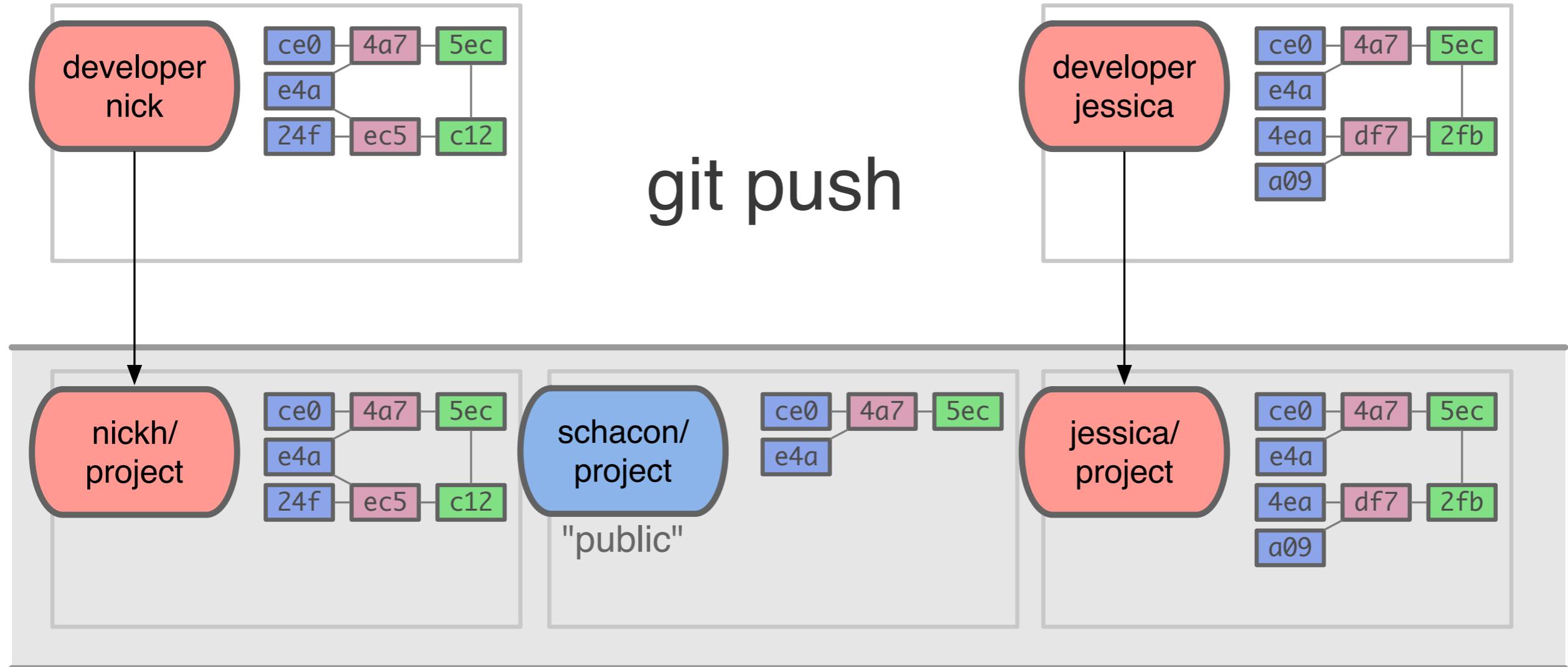
schacon/
project

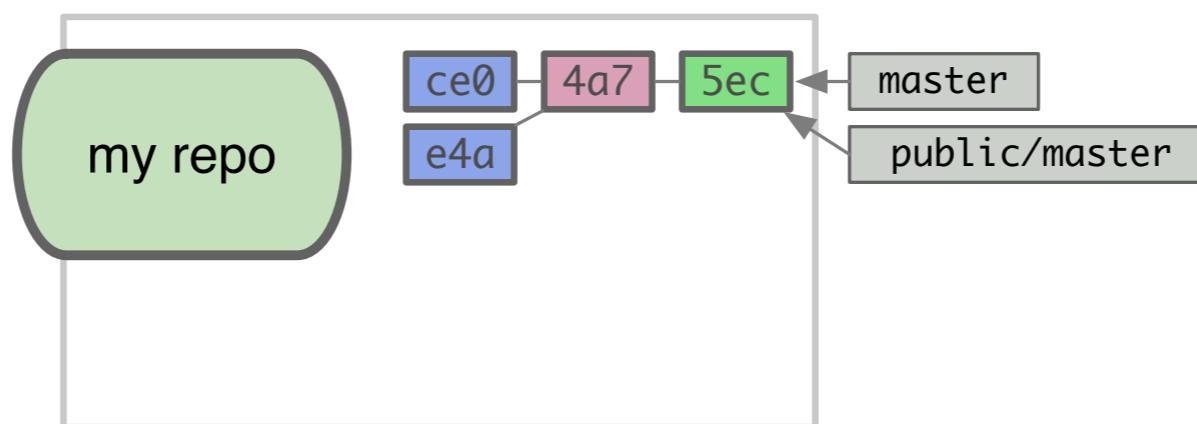
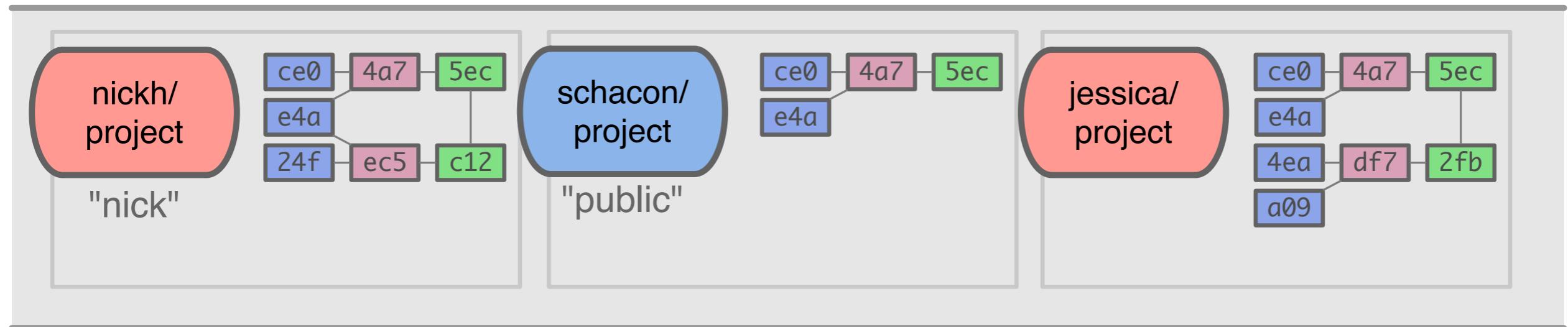
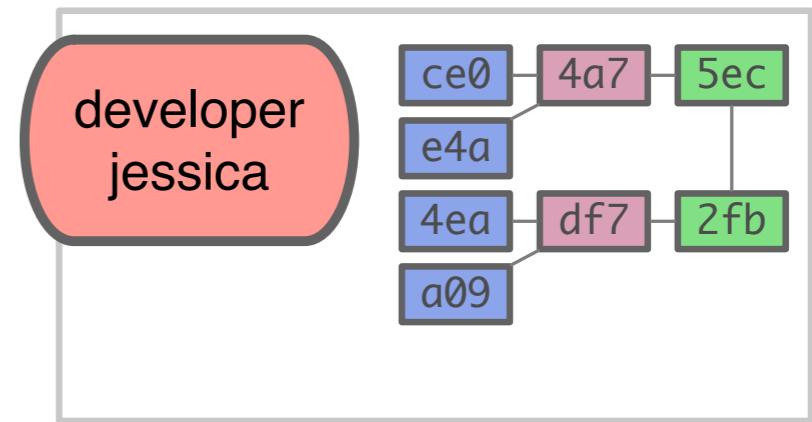
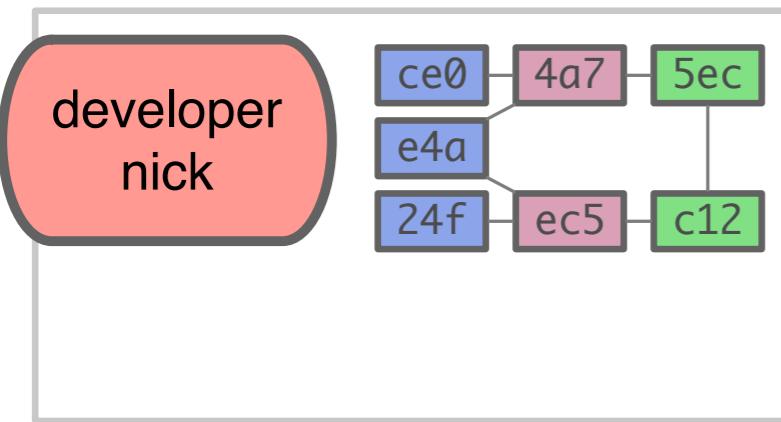
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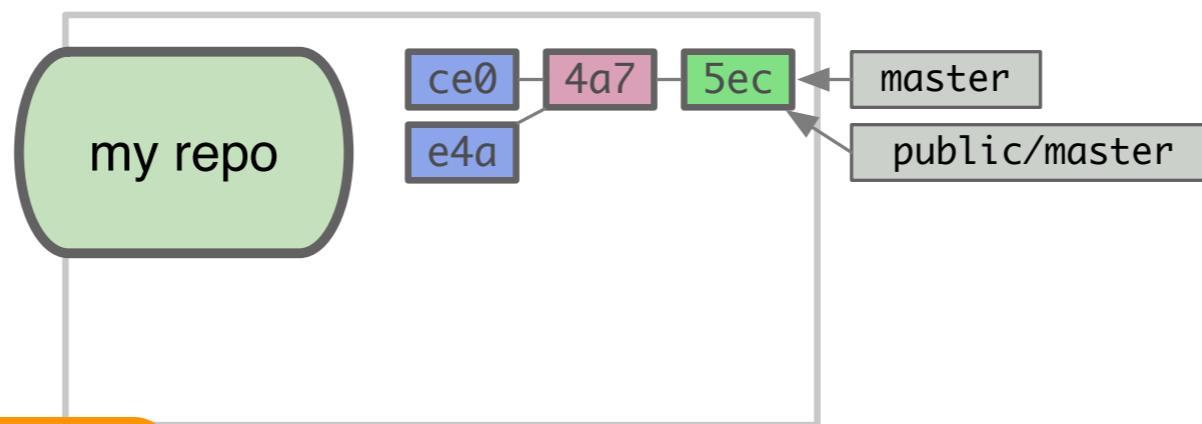
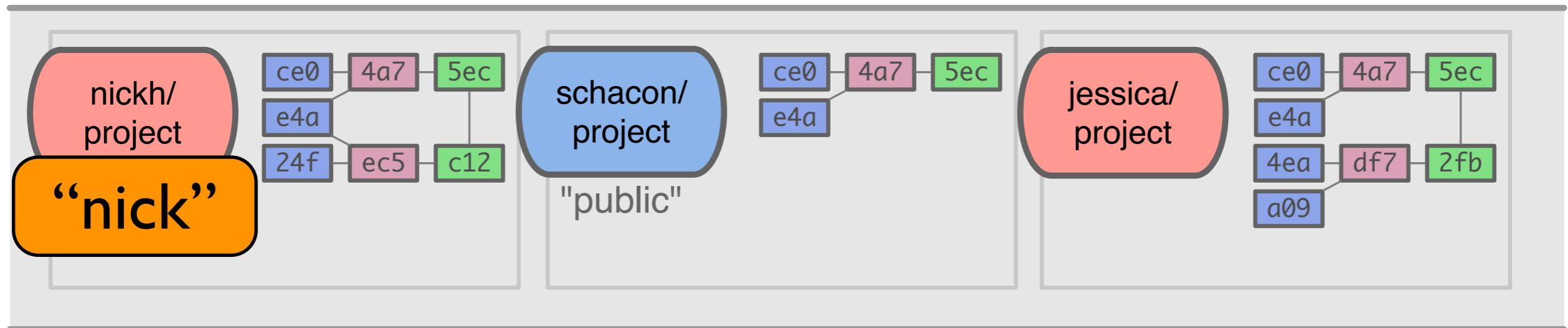
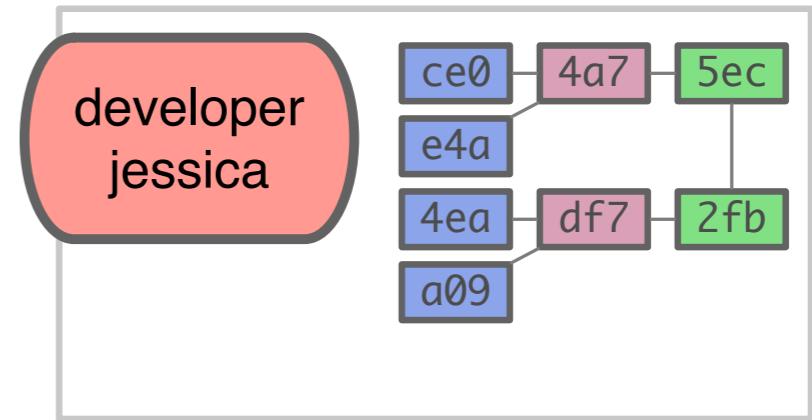
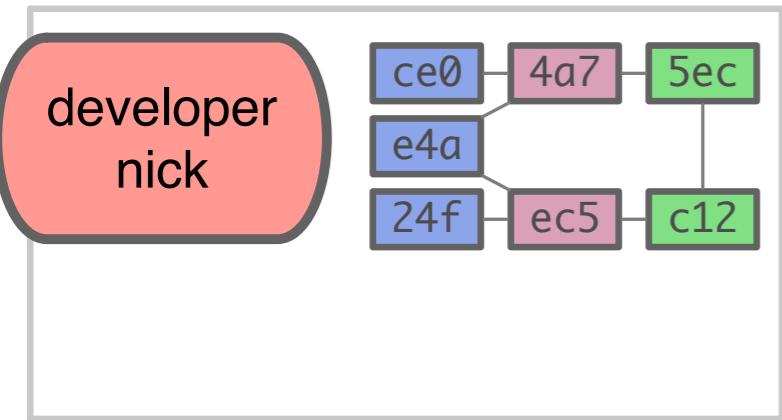
my repo



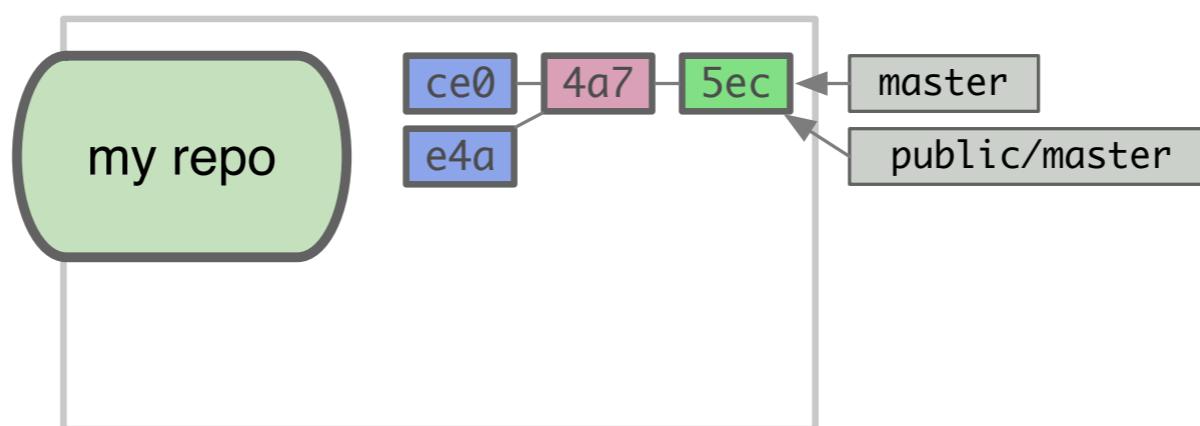
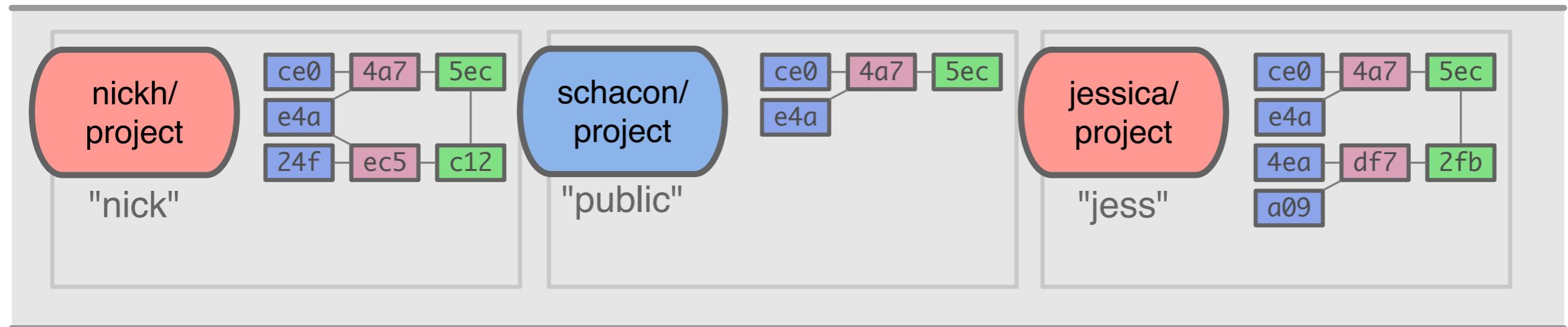
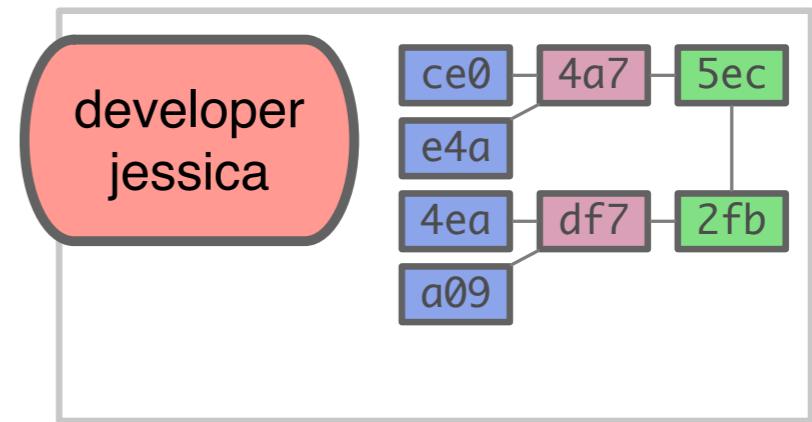
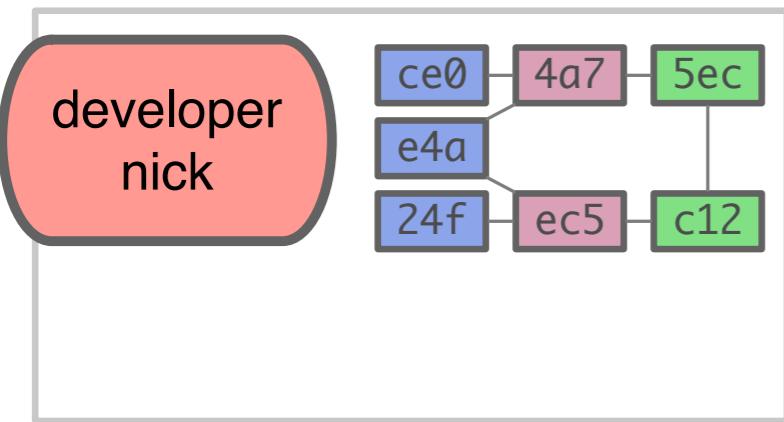




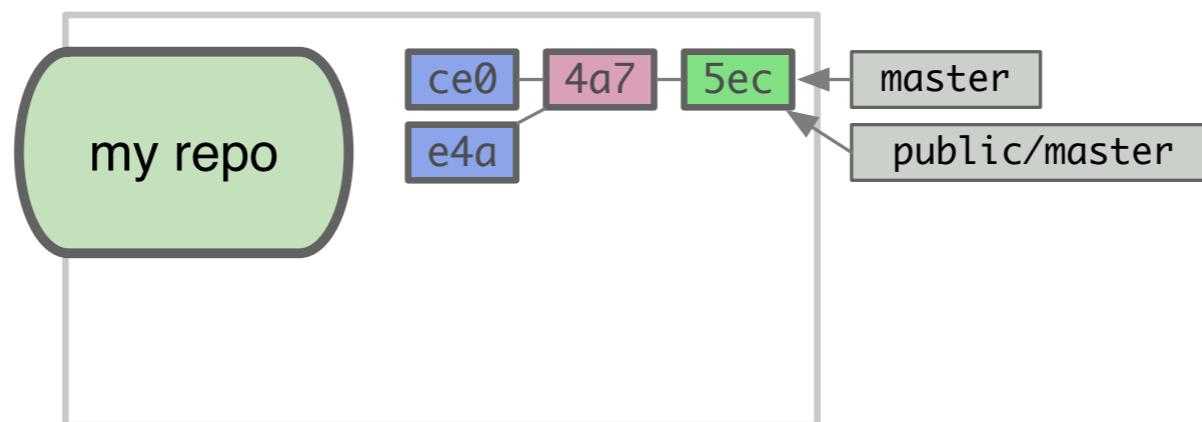
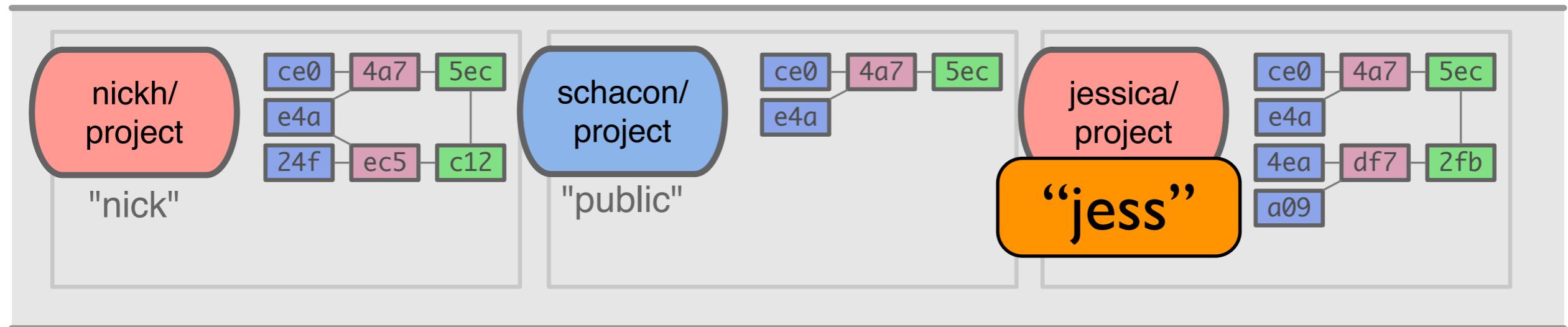
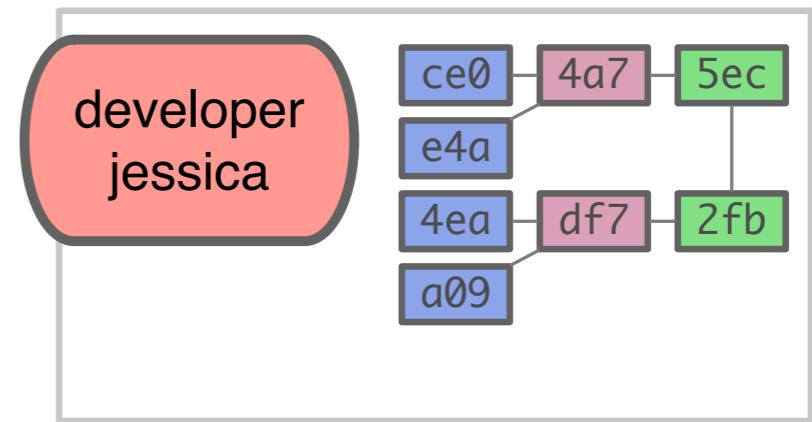
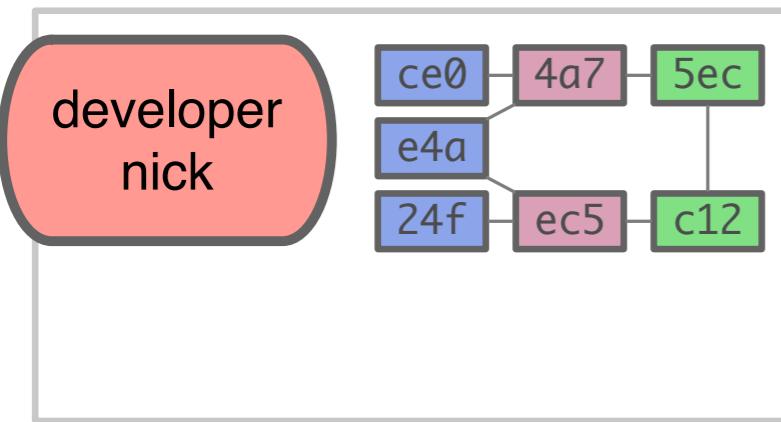
`git remote add nick git://github.com/nickh/project.git`



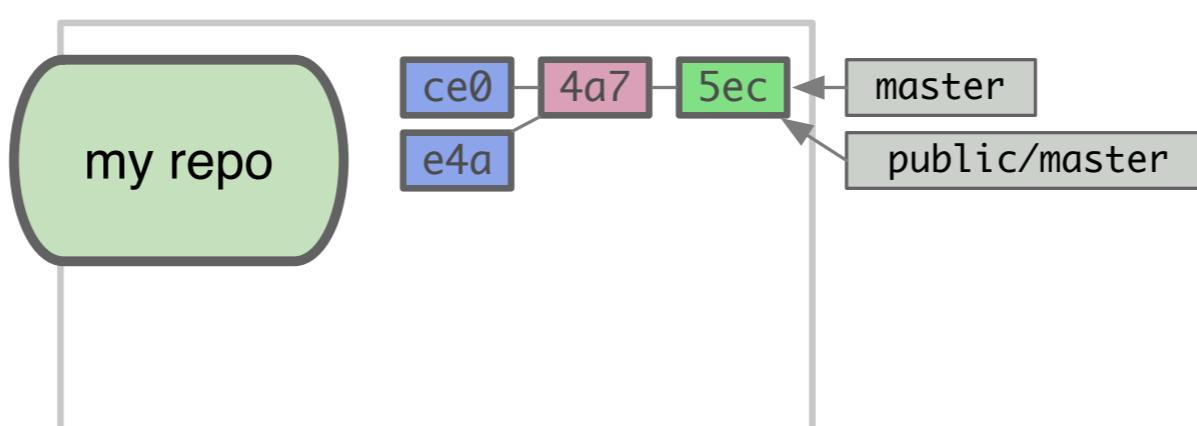
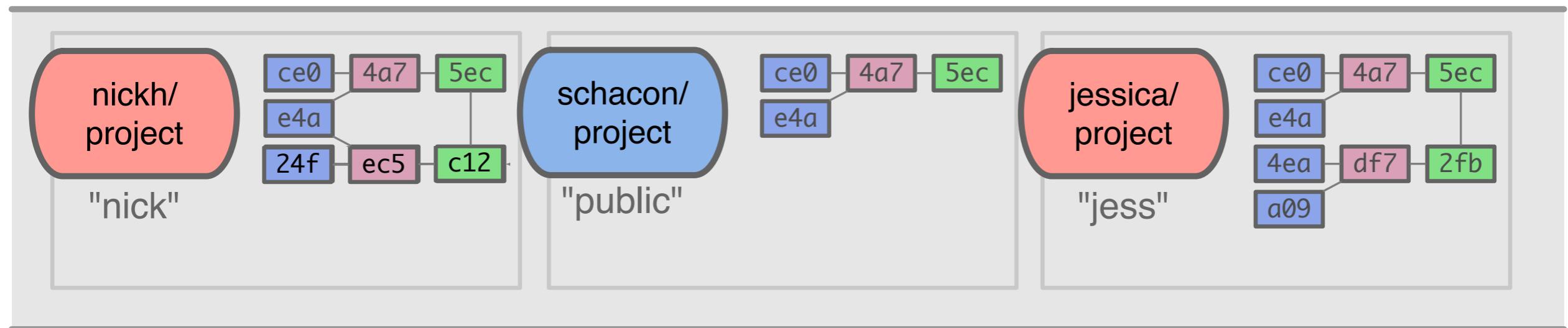
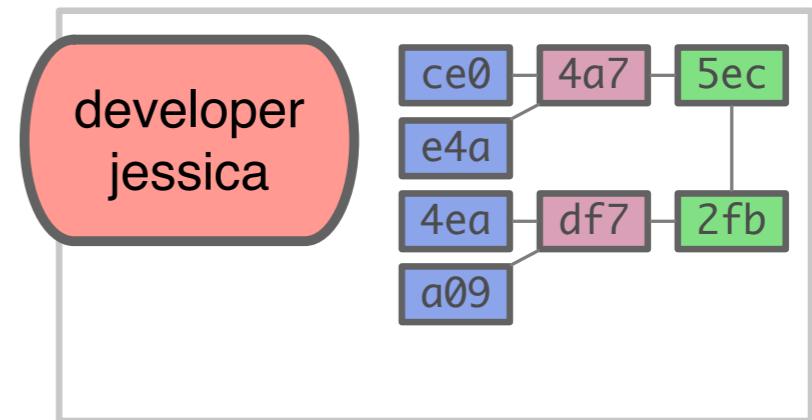
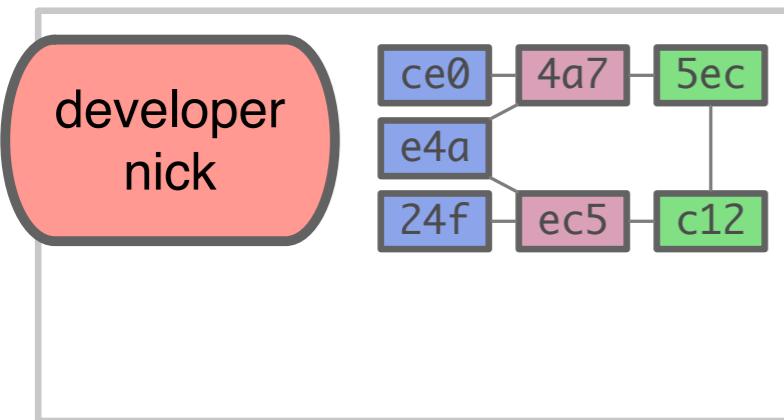
`git remote add nick git://github.com/nickh/project.git`



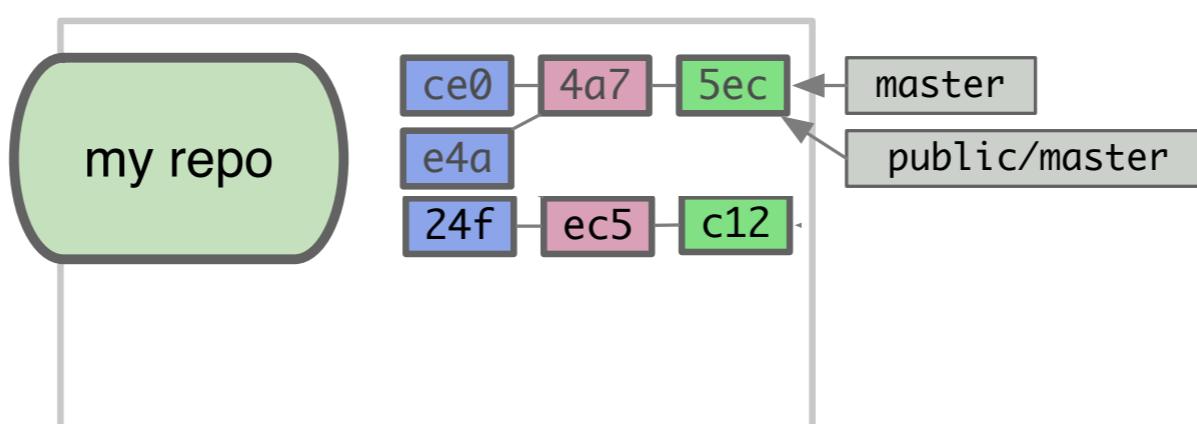
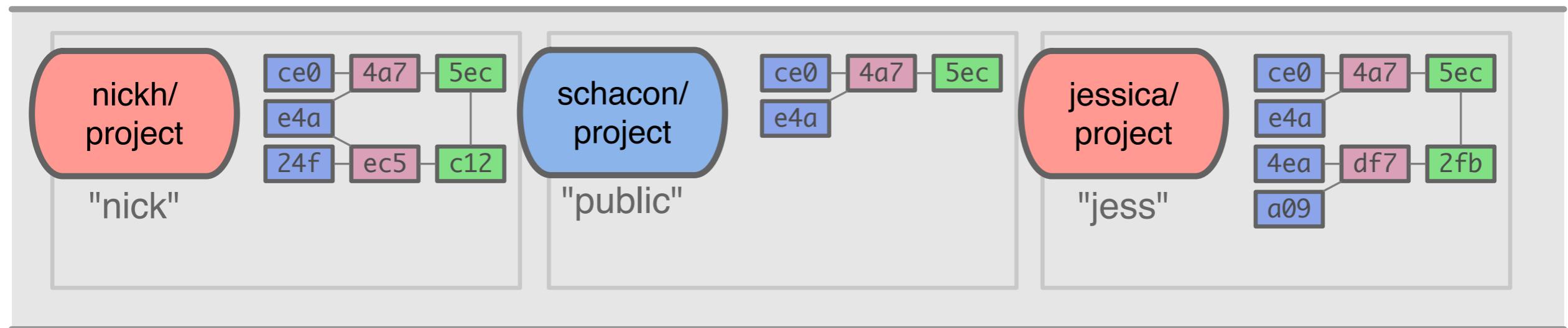
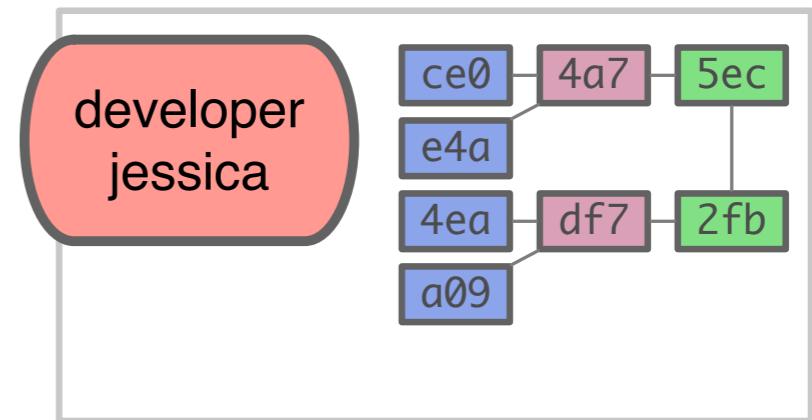
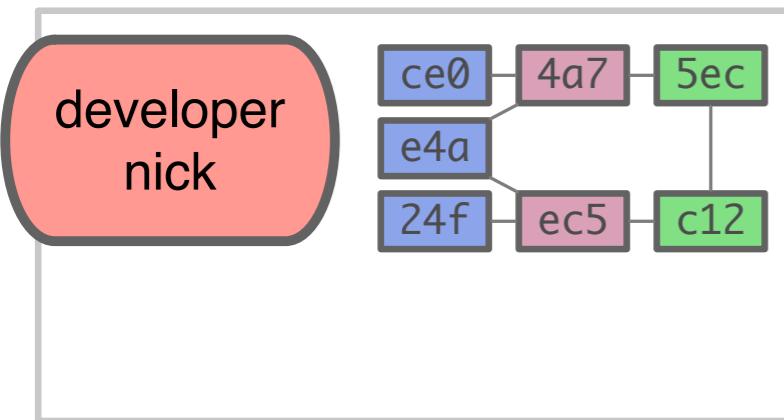
git remote add jess git://github.com/jessica/project.git



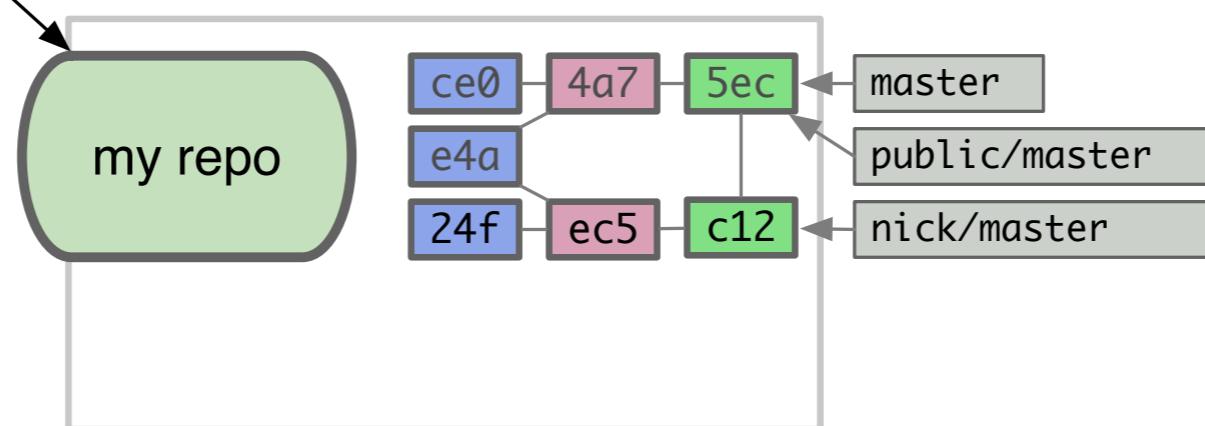
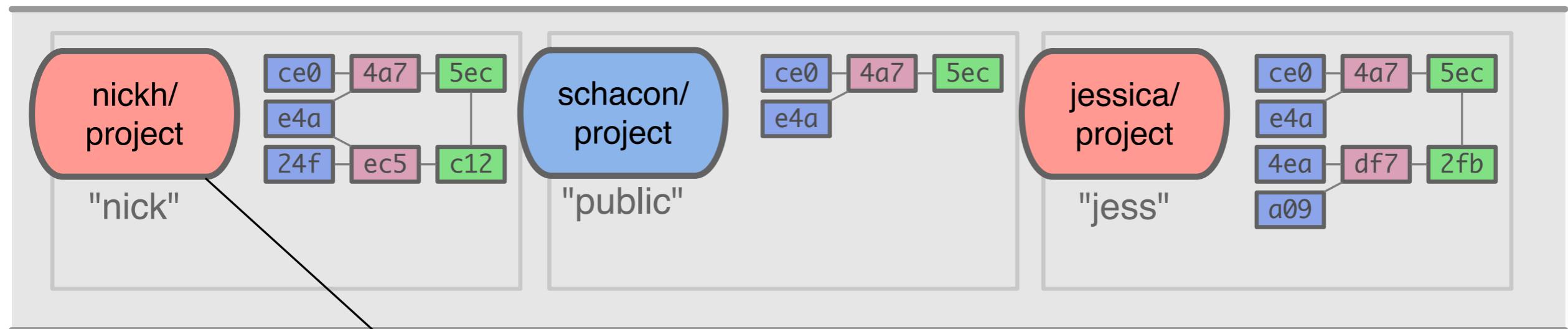
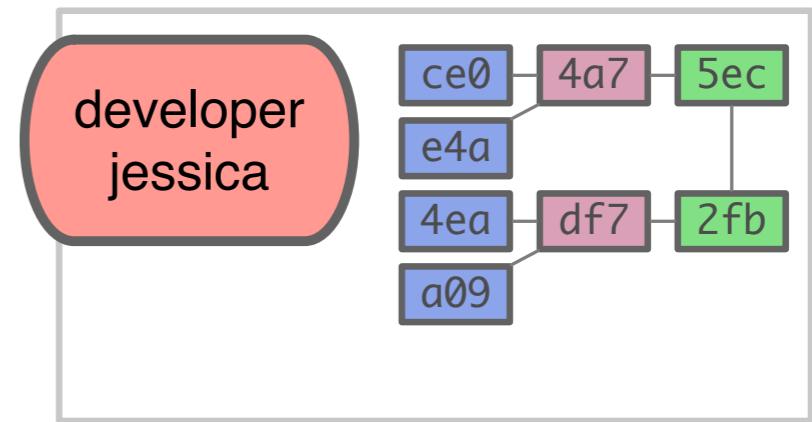
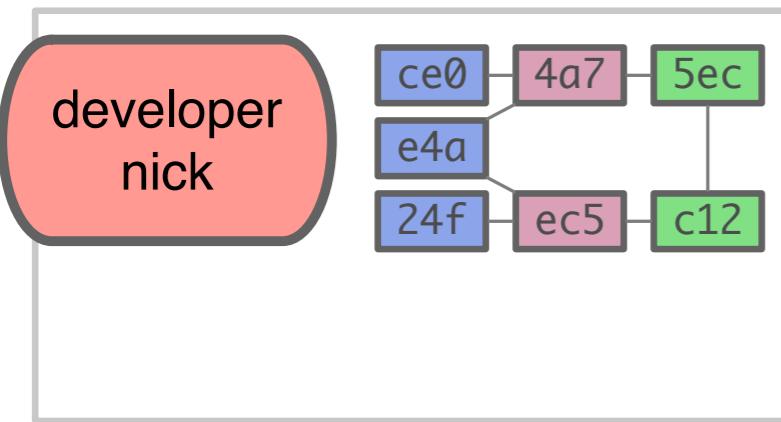
`git remote add jess git://github.com/jessica/project.git`

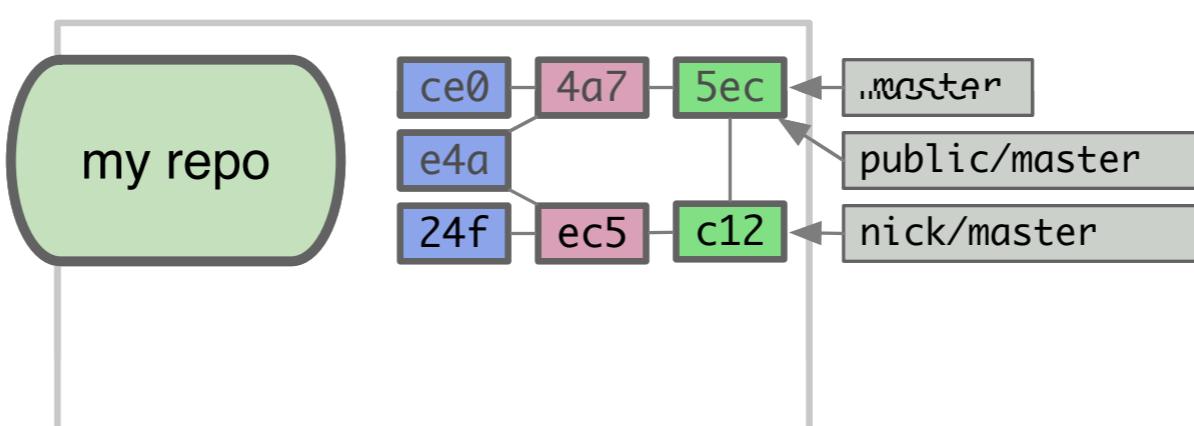
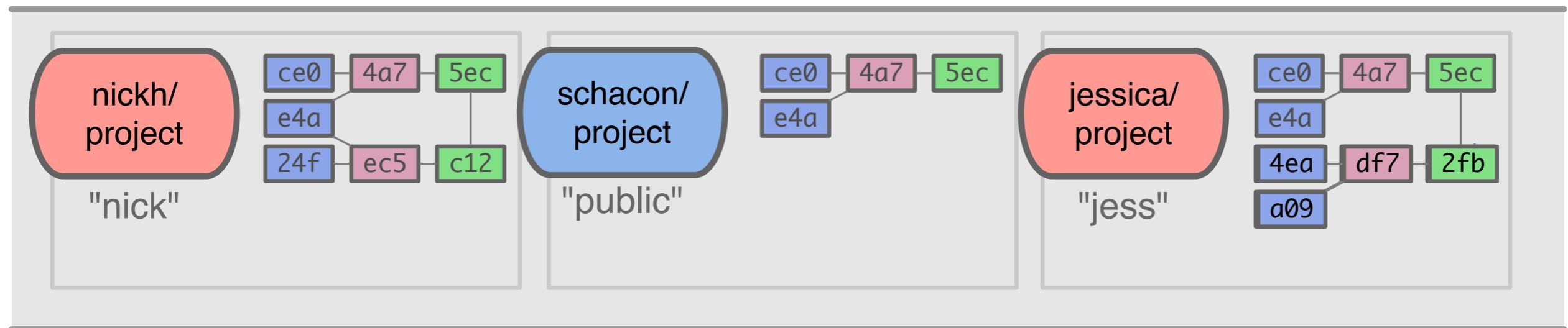
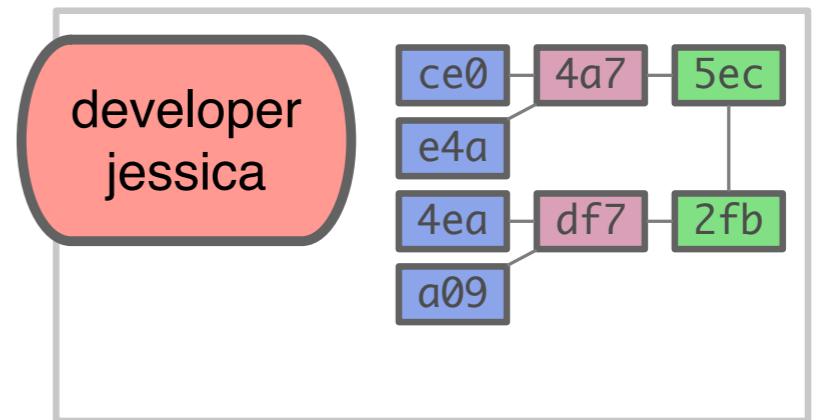
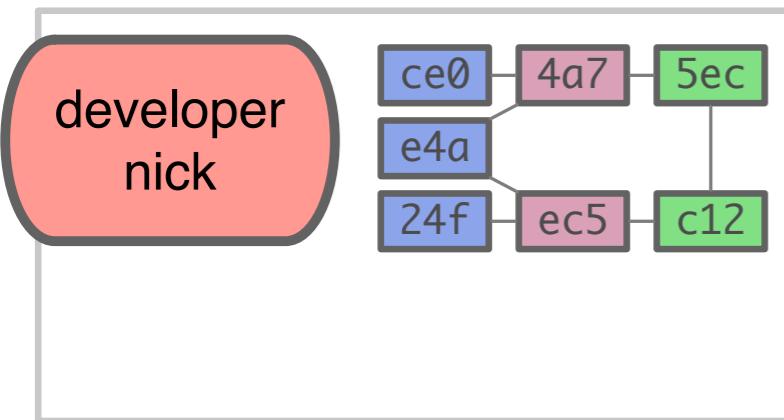


git fetch nick

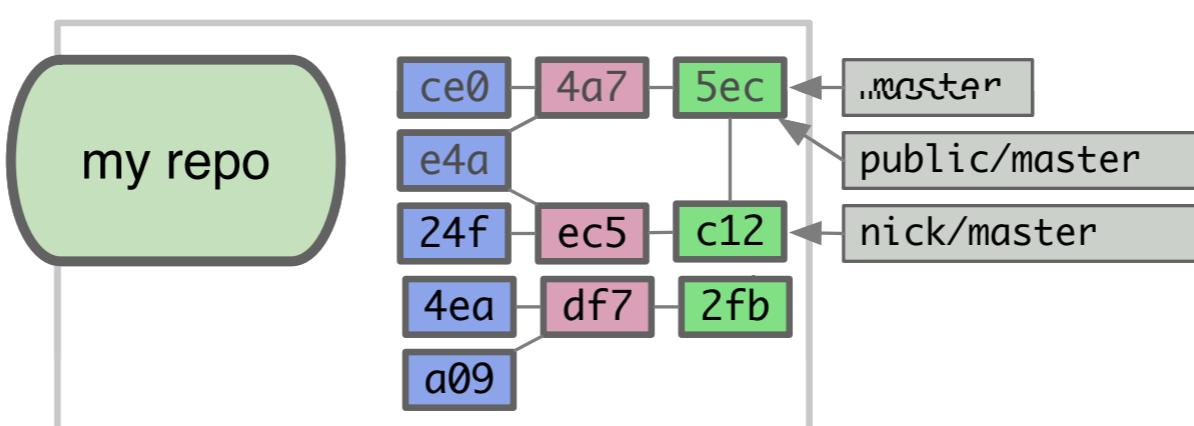
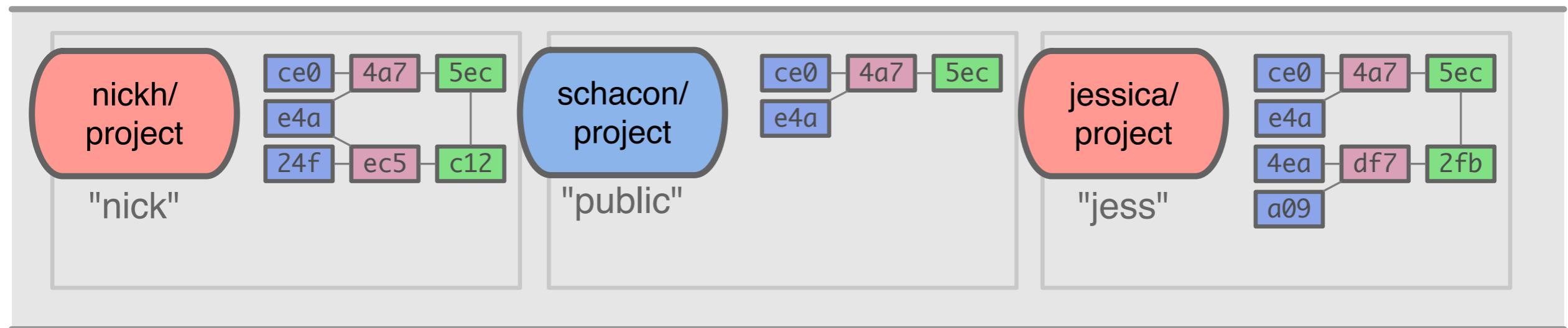
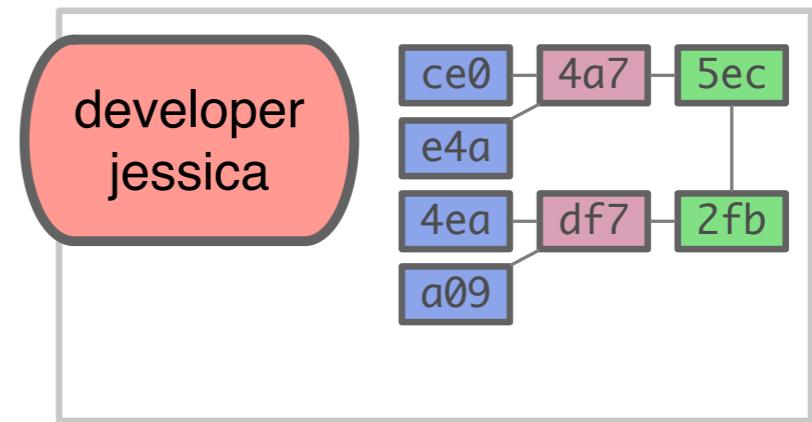
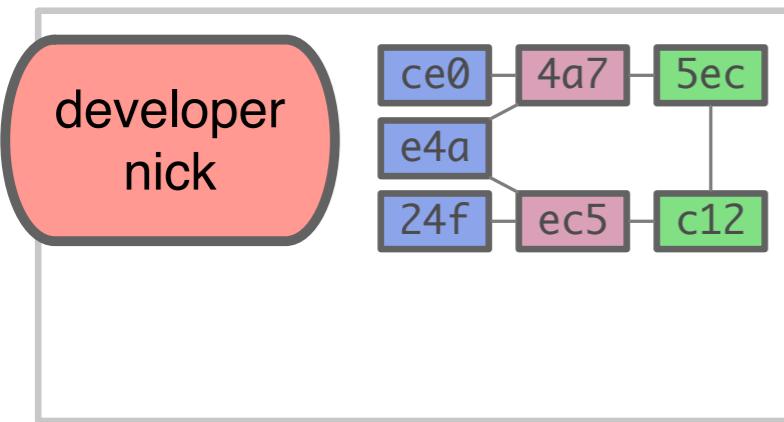


git fetch nick

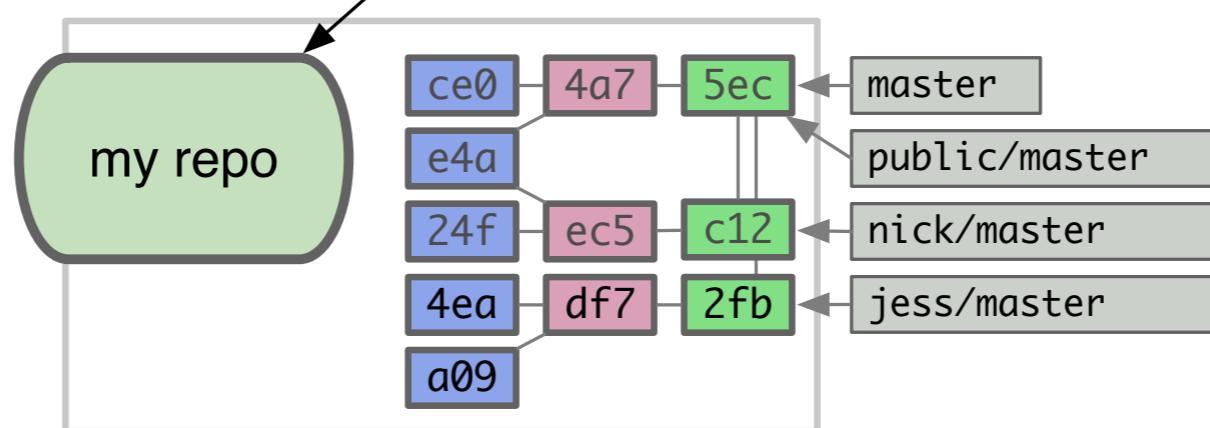
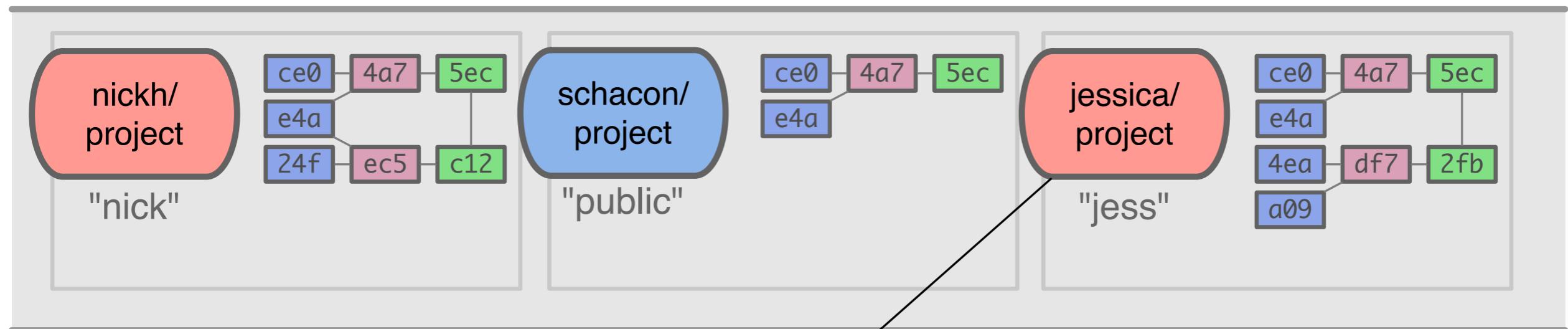
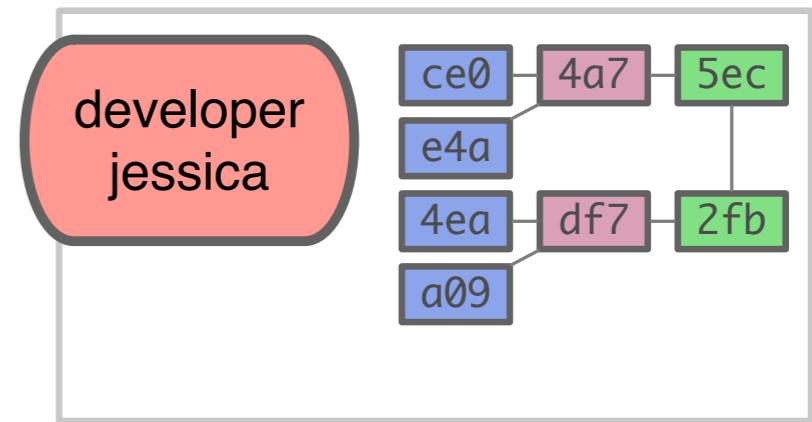
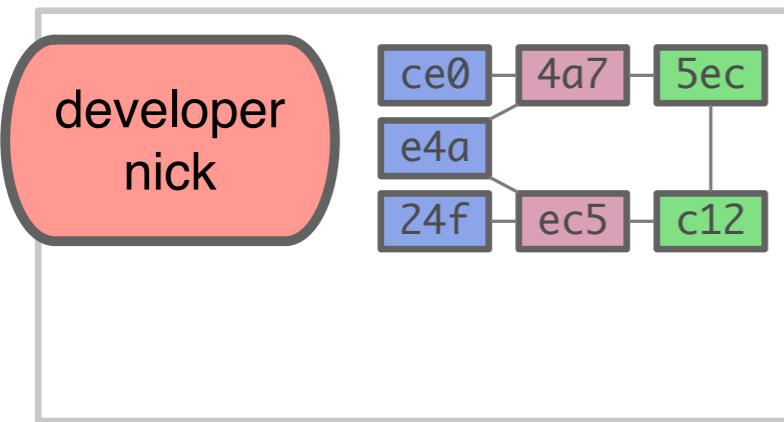


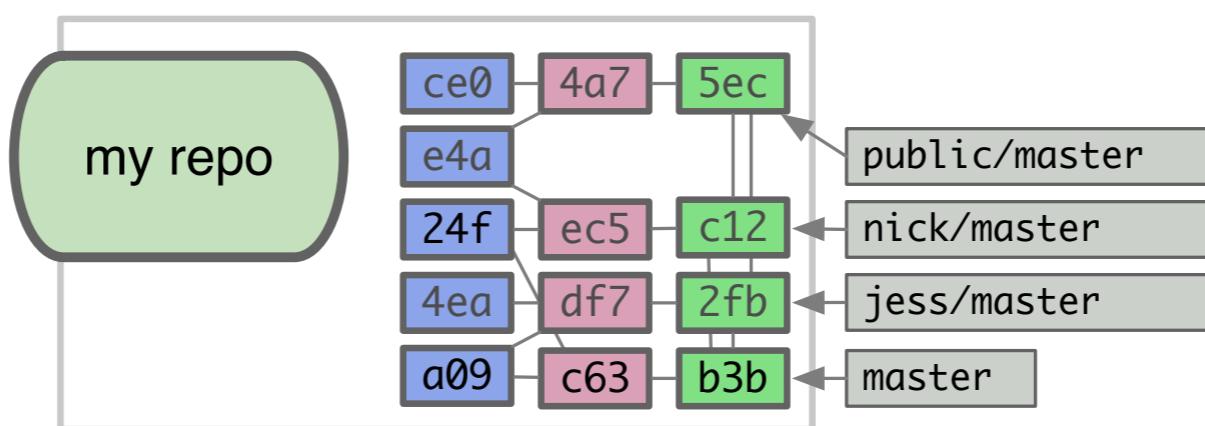
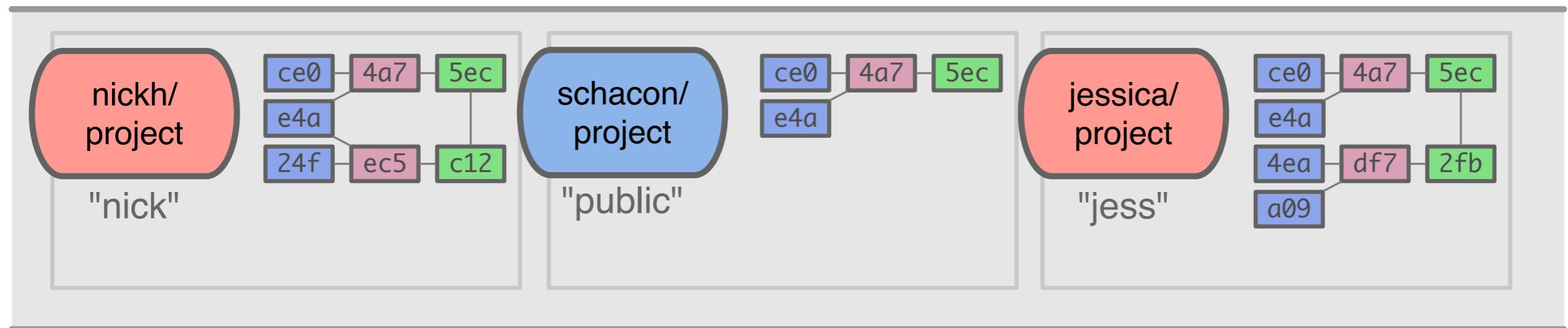
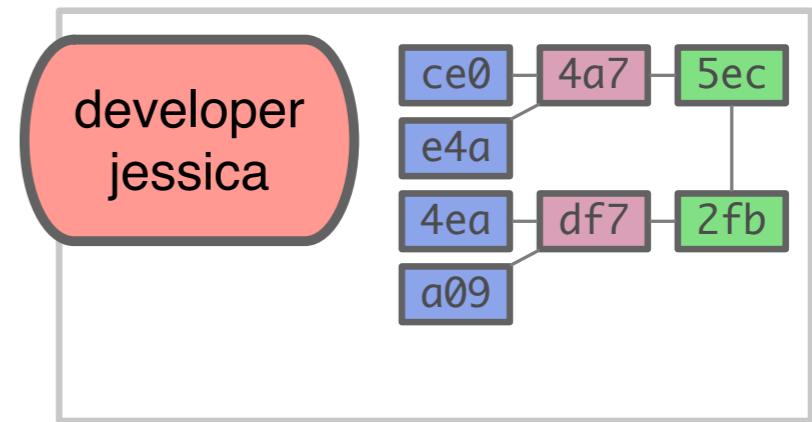
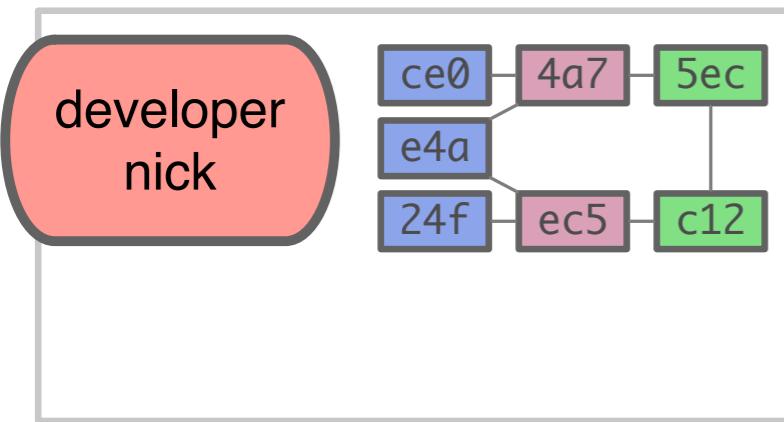


git fetch jess

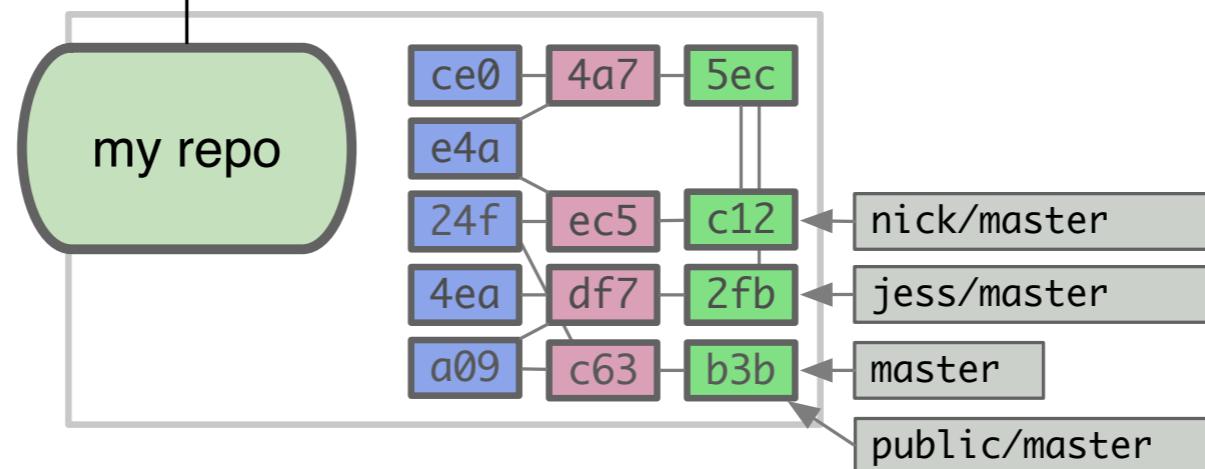
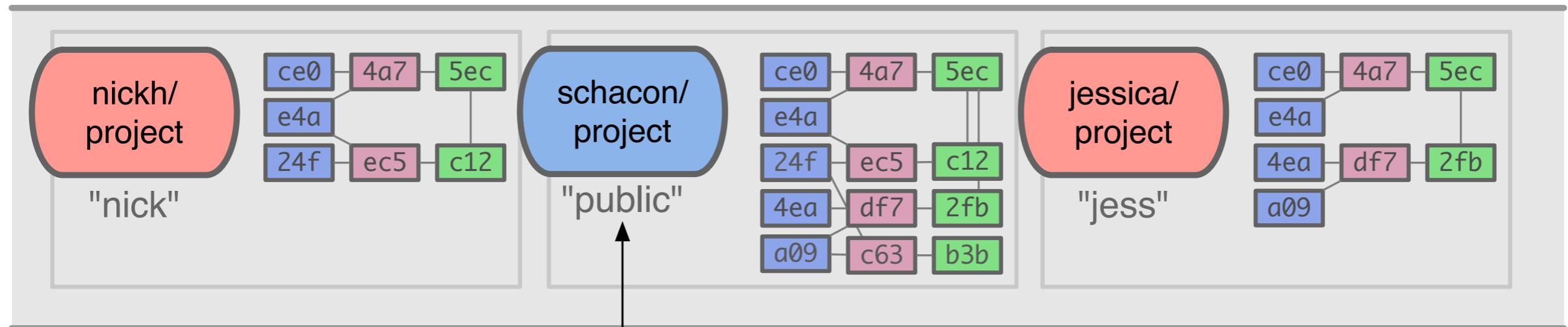
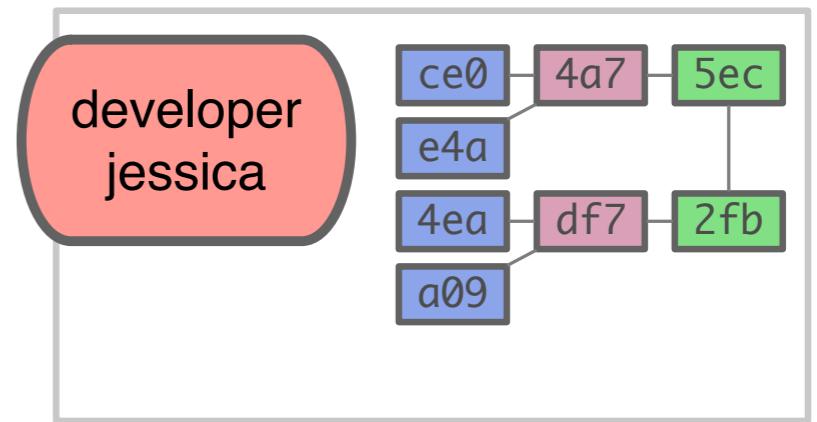
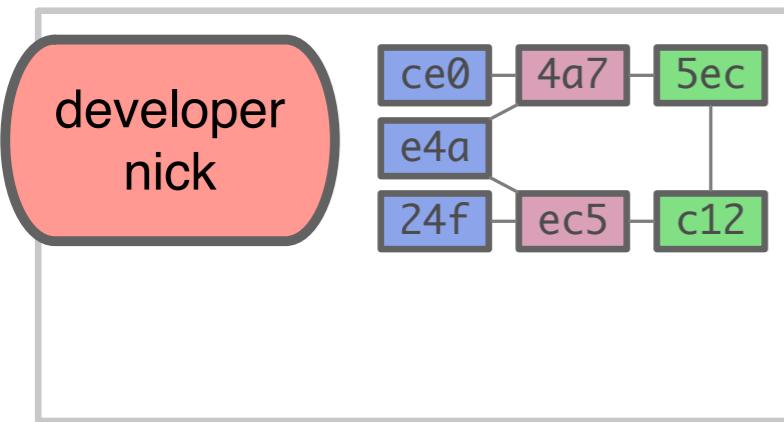


git fetch jess

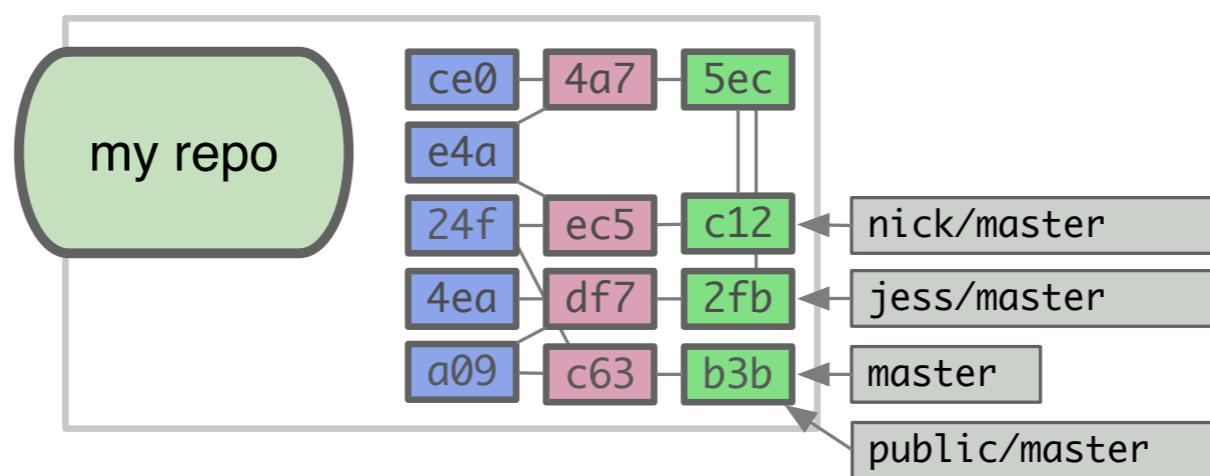
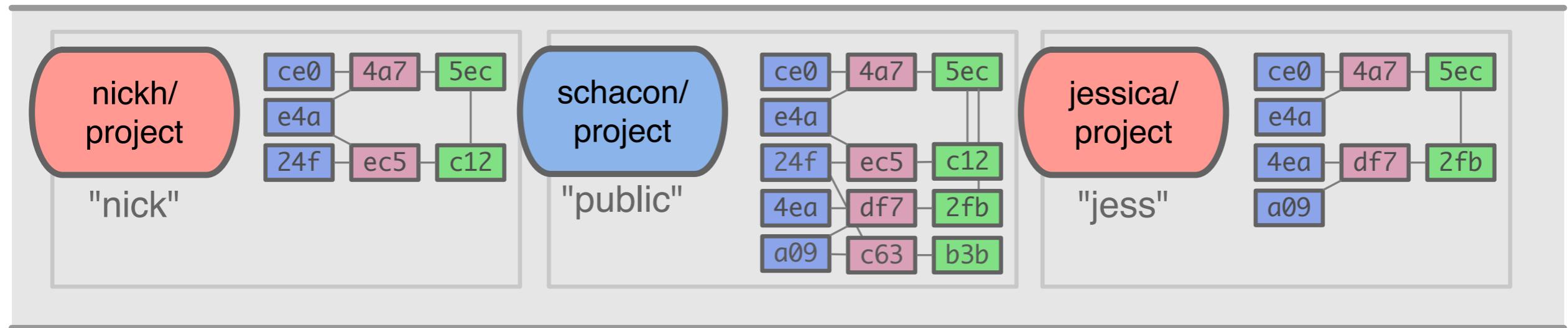
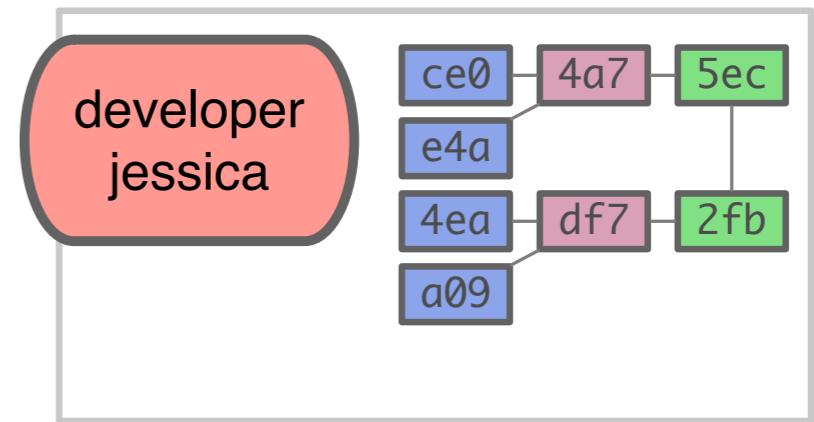
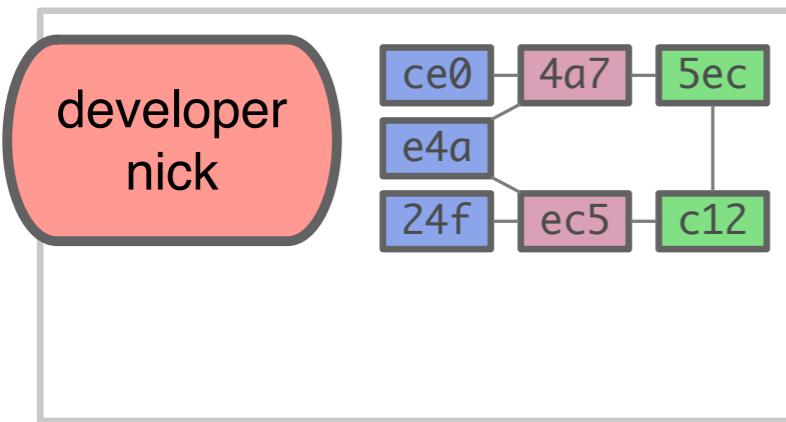


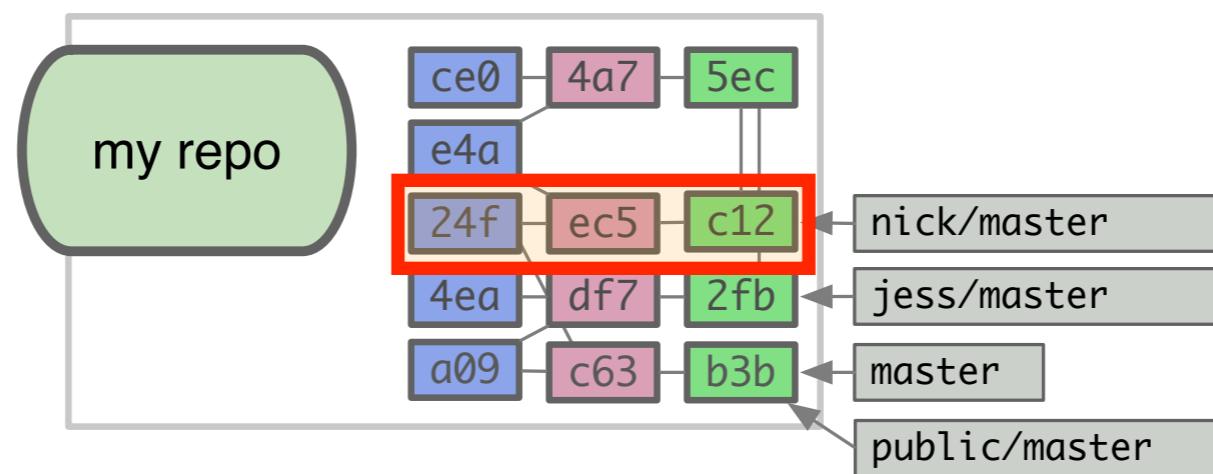
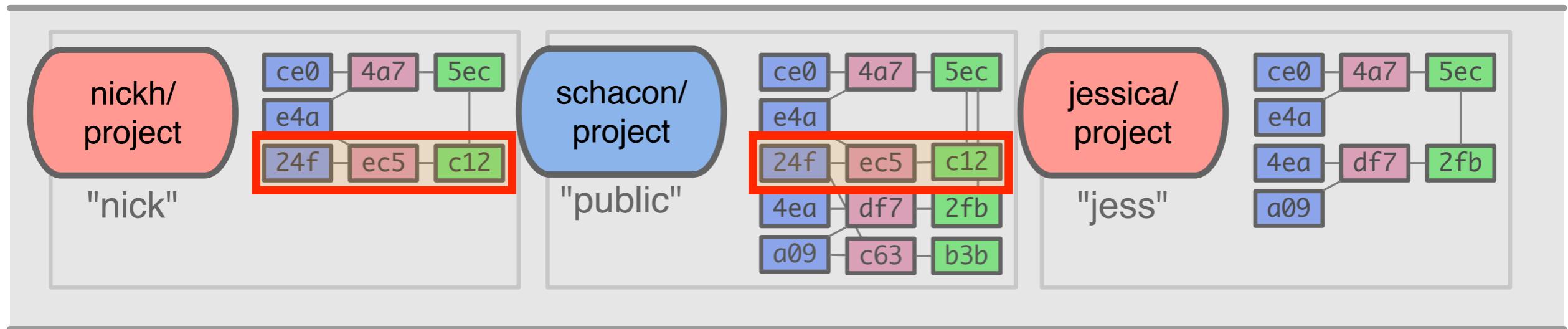
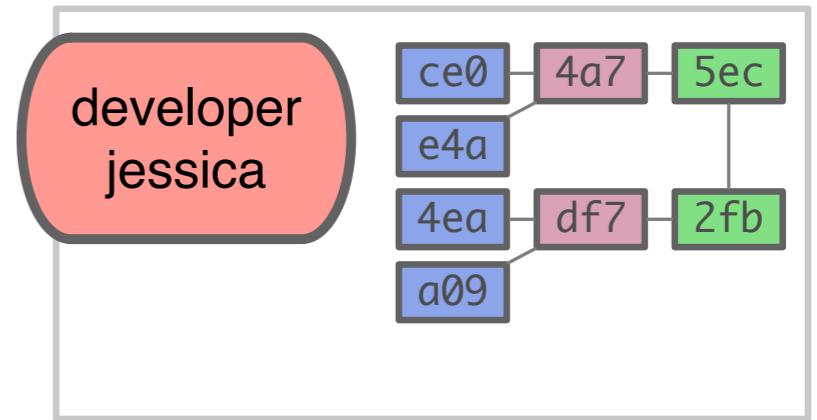
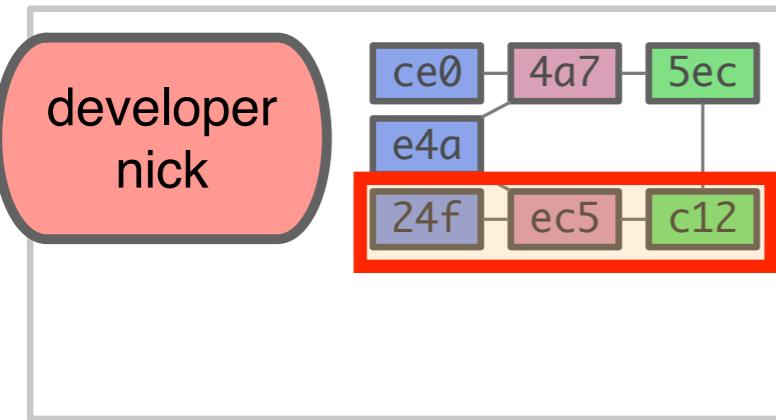


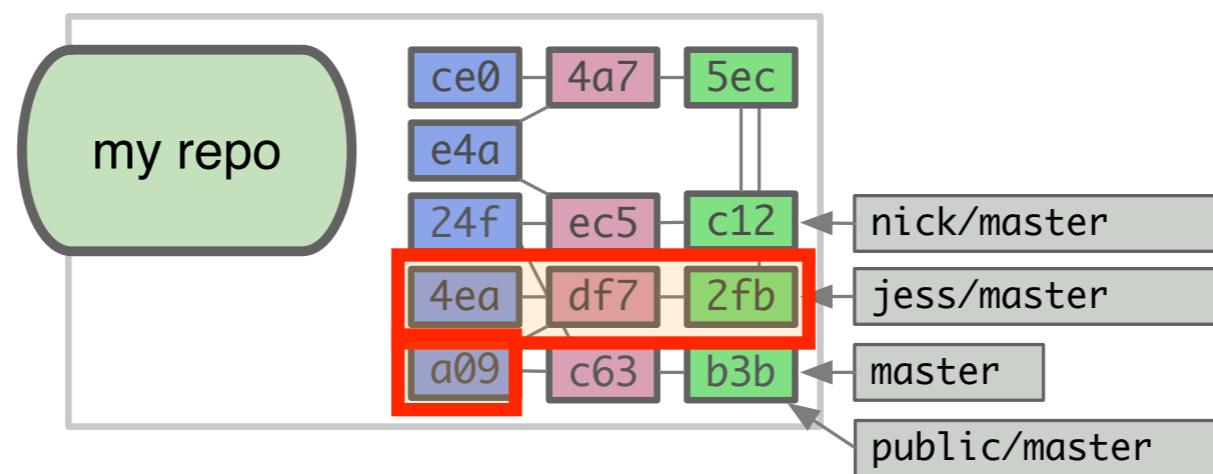
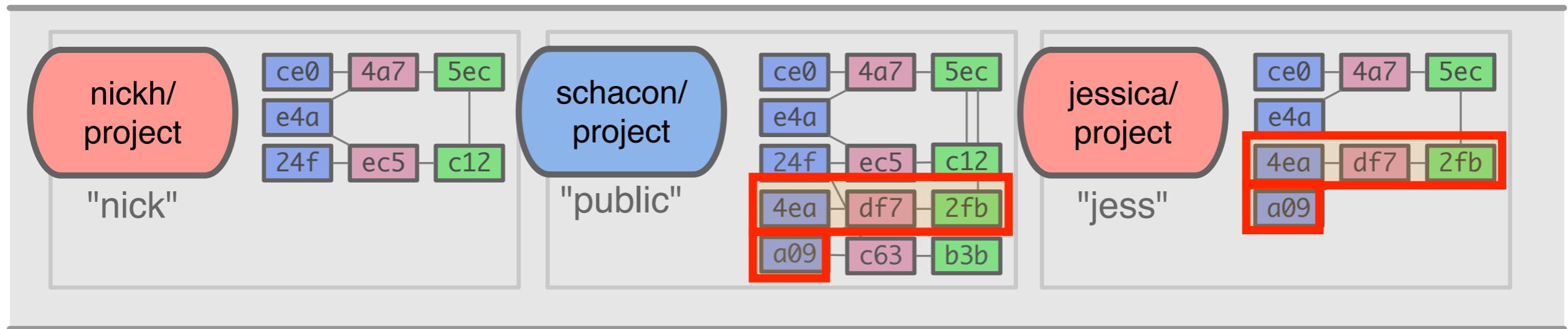
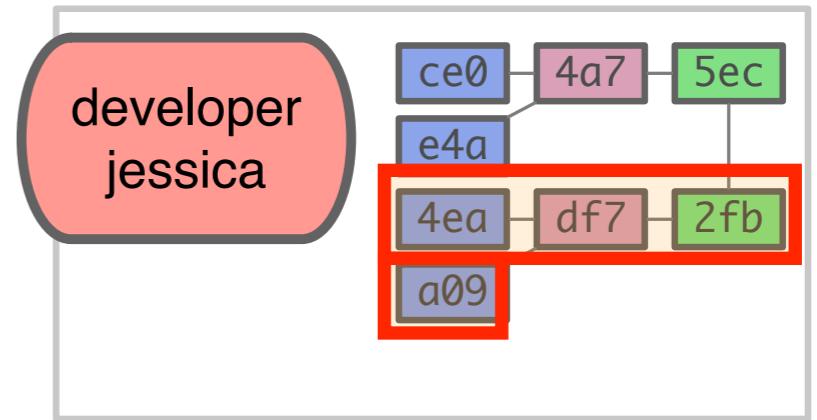
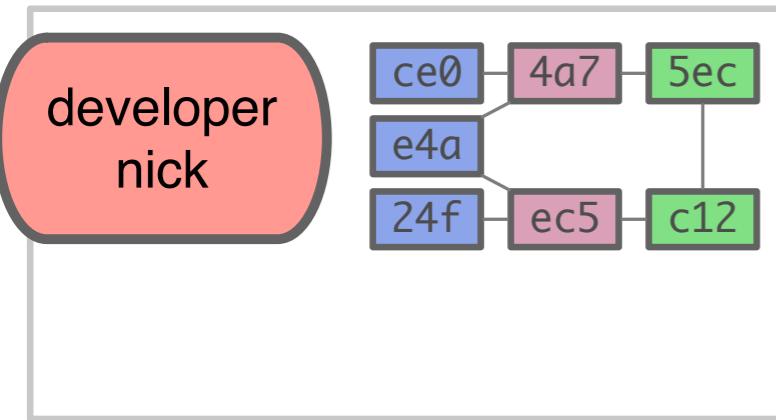
git merge nick/master jess/master

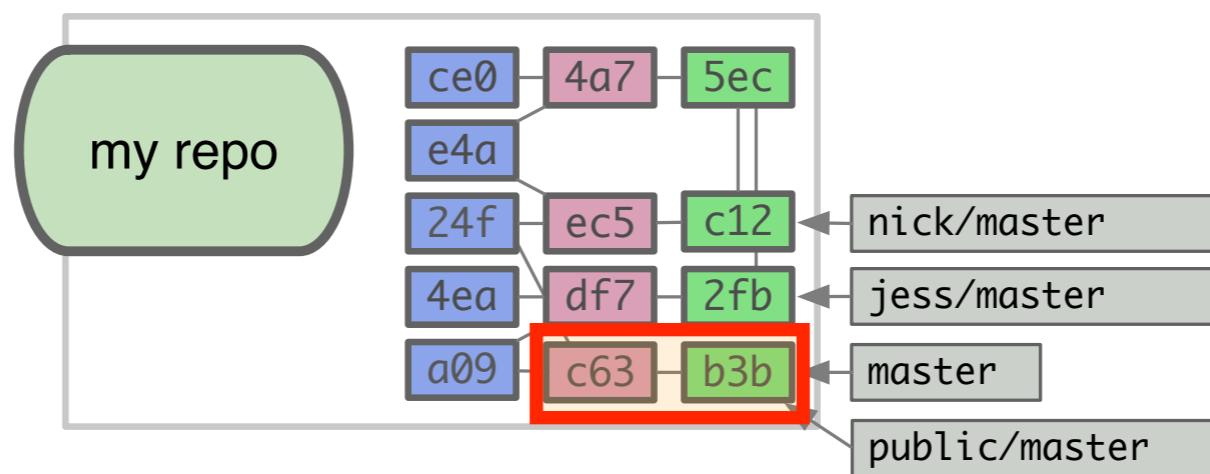
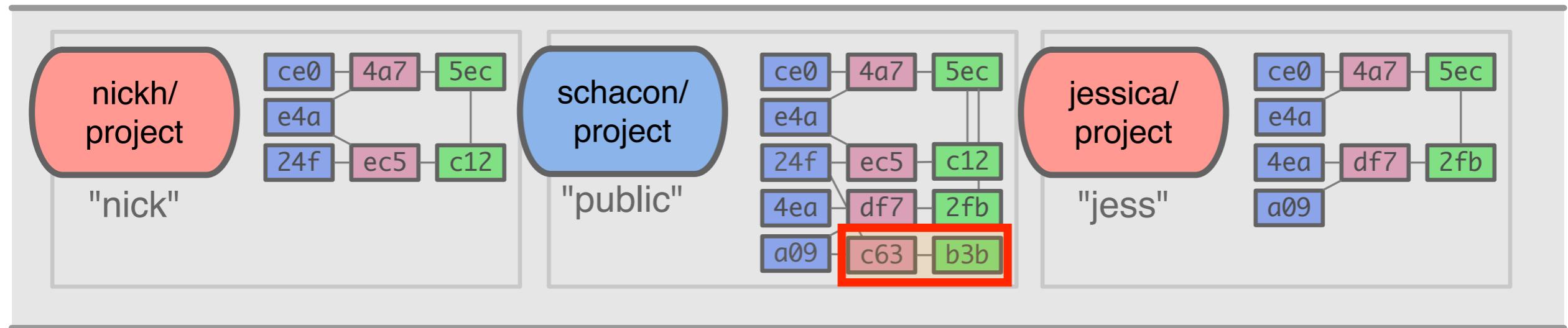
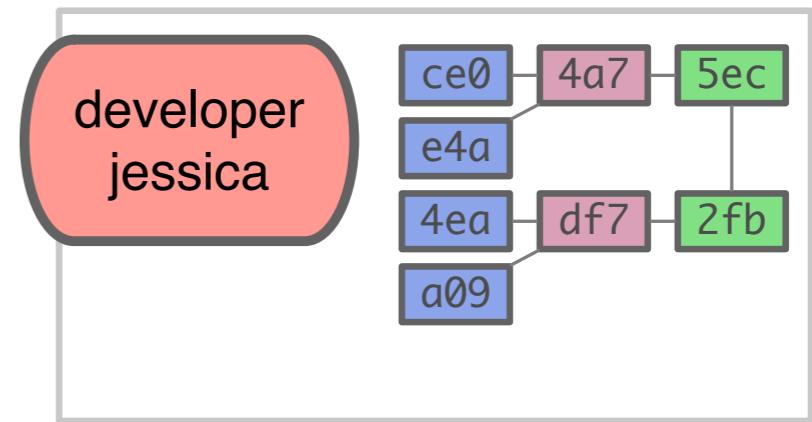
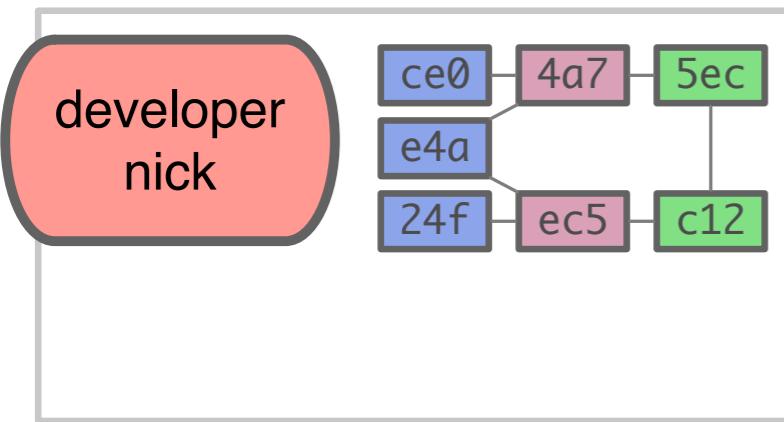


git push public





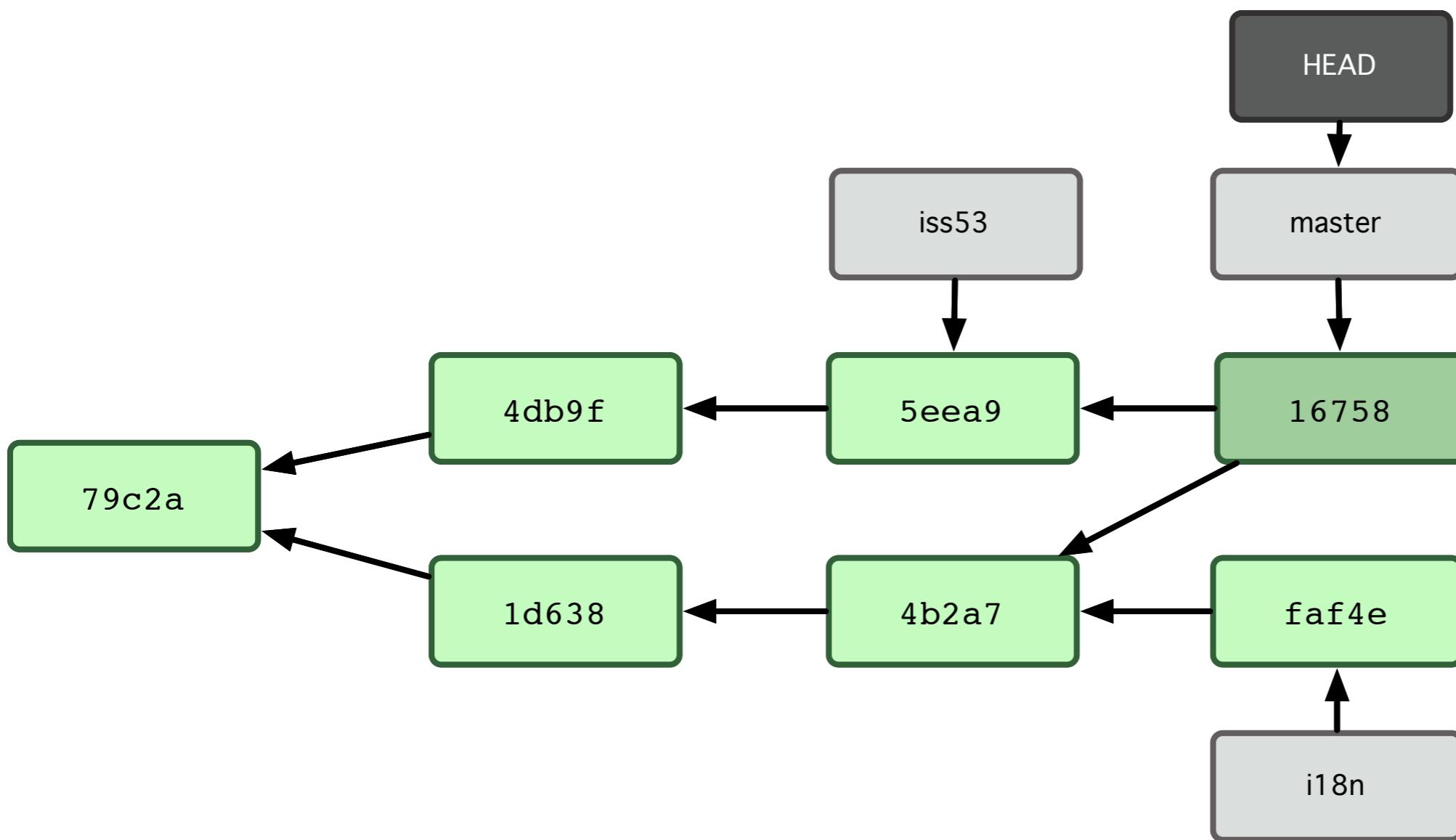




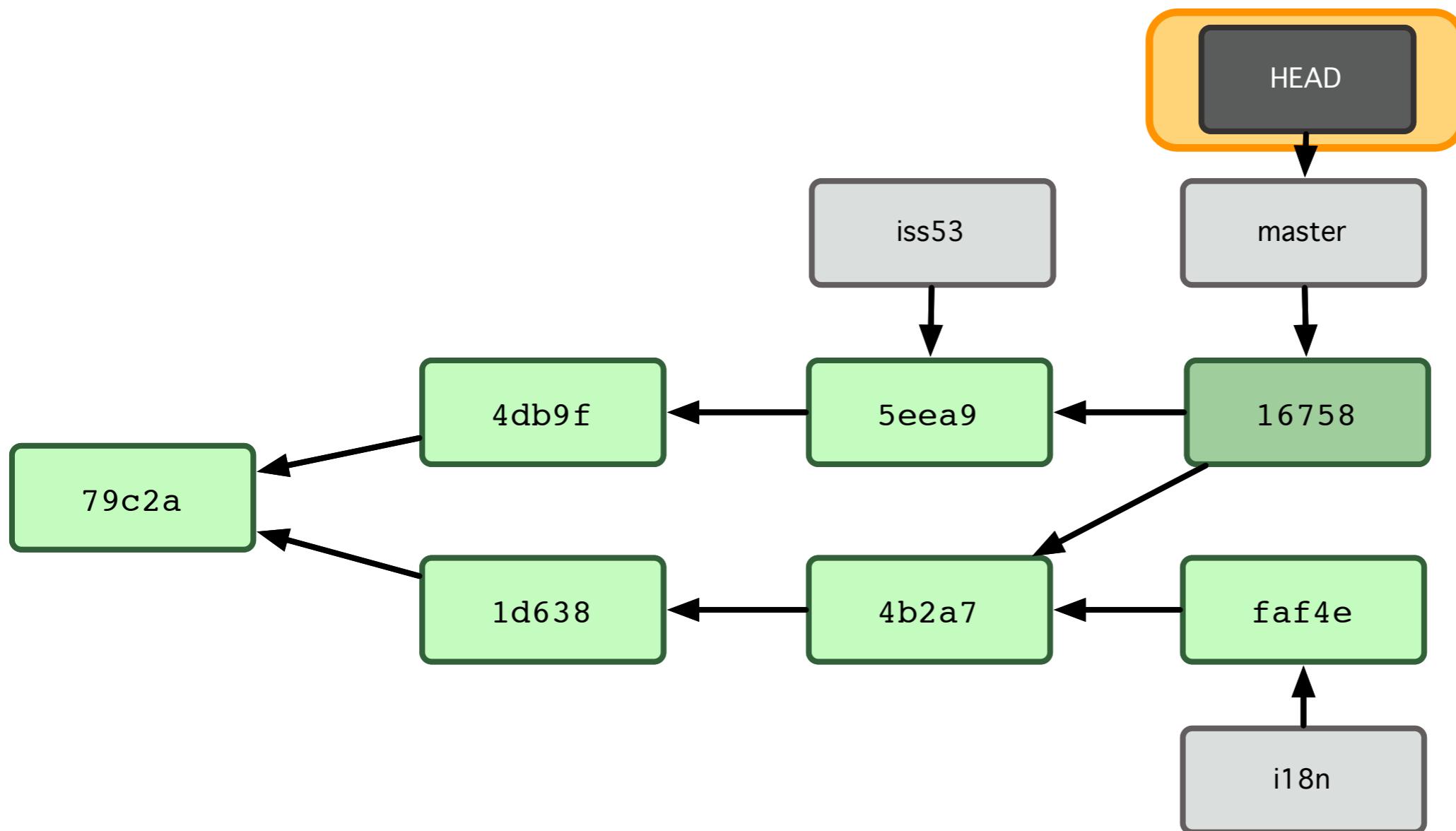
Looking Around

git log

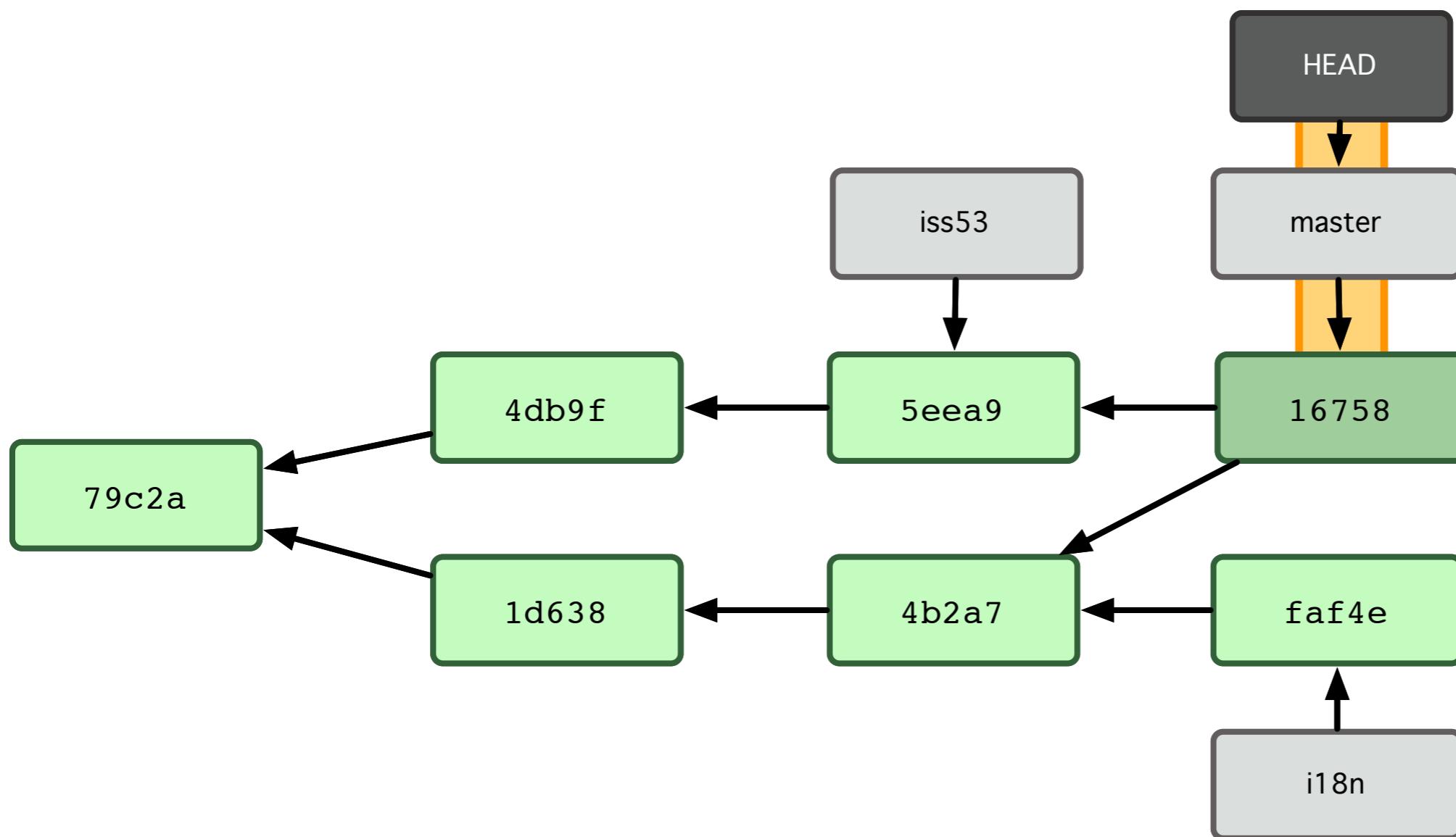
walking your commit
history



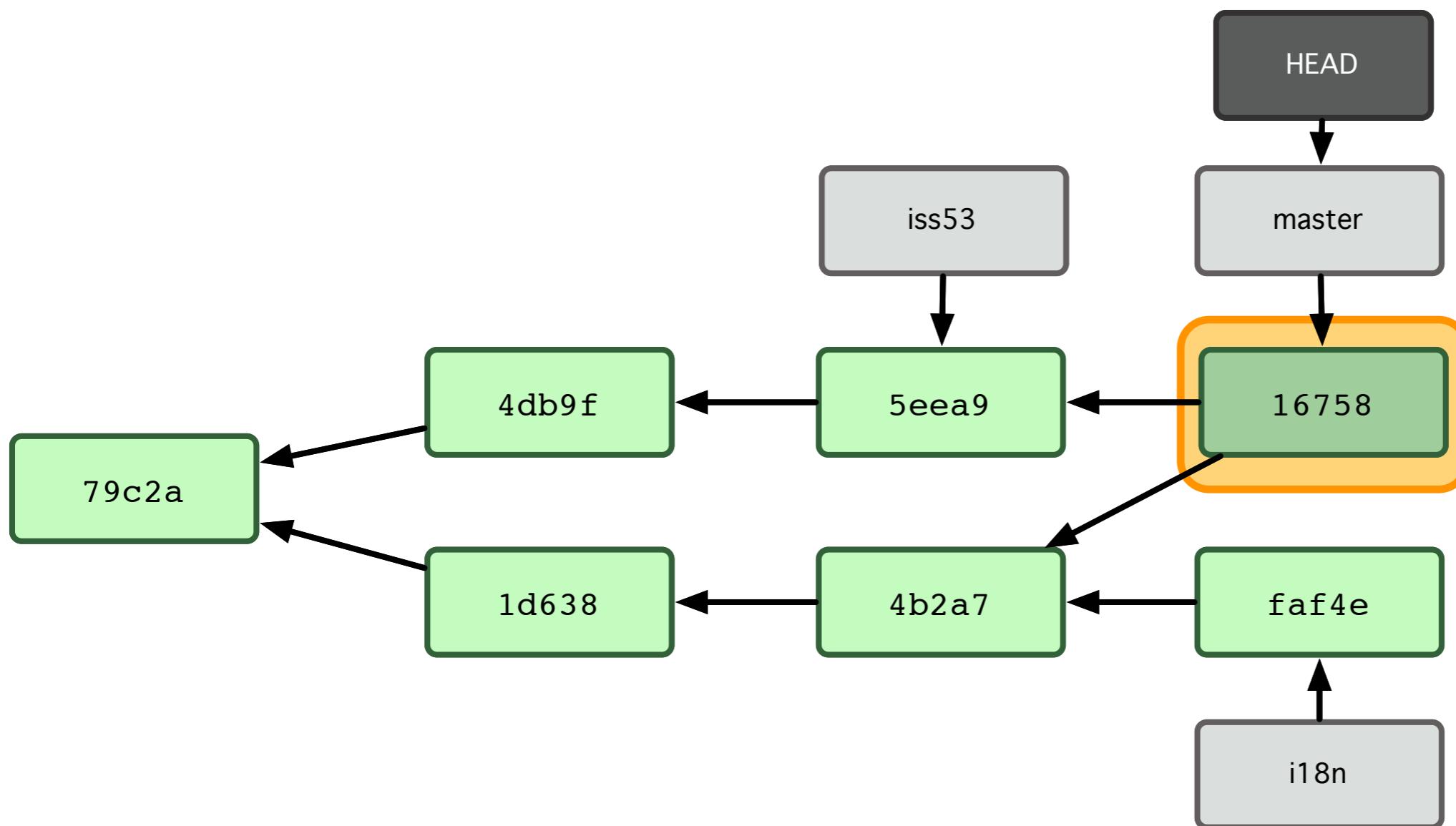
git log



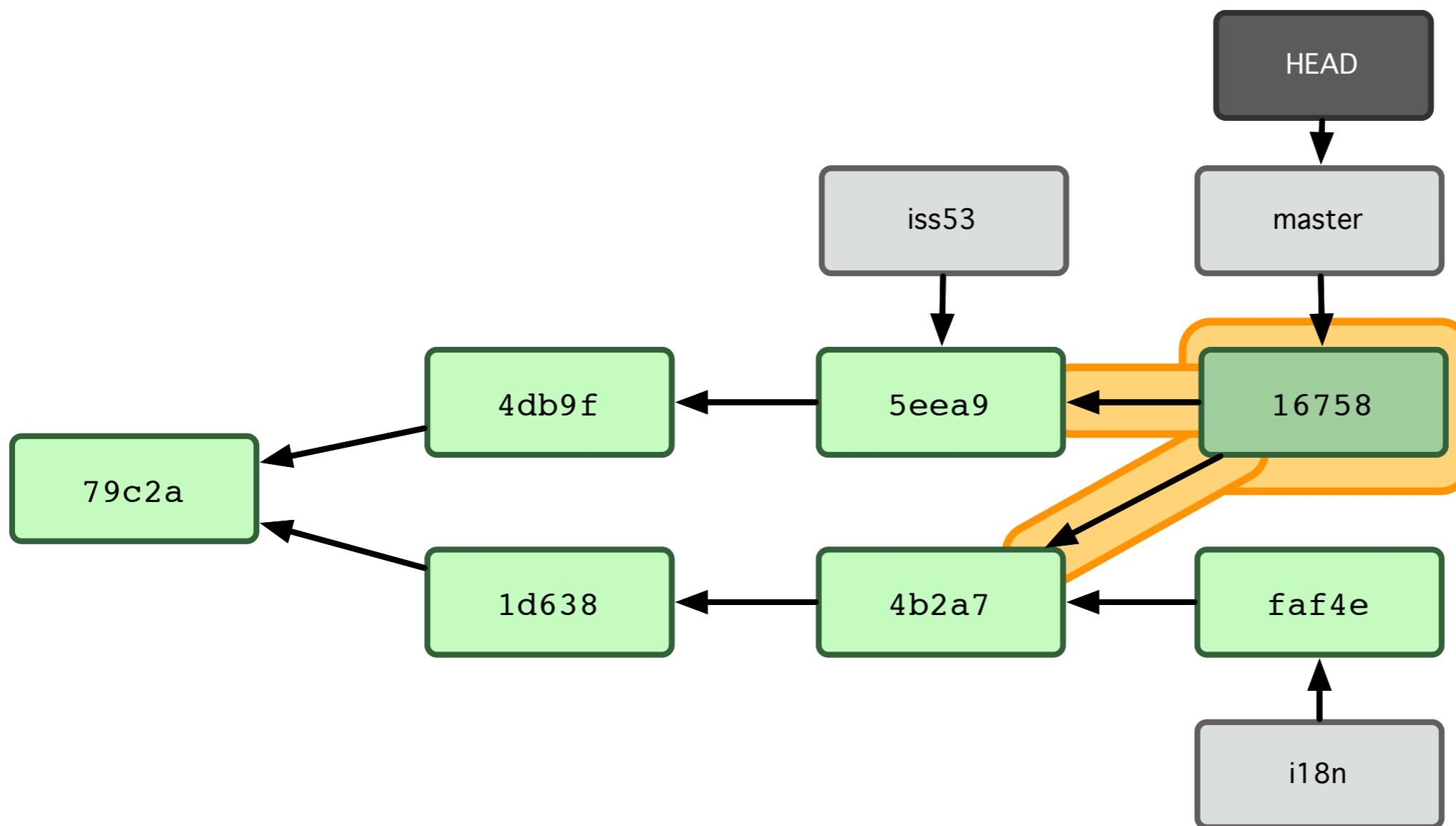
git log



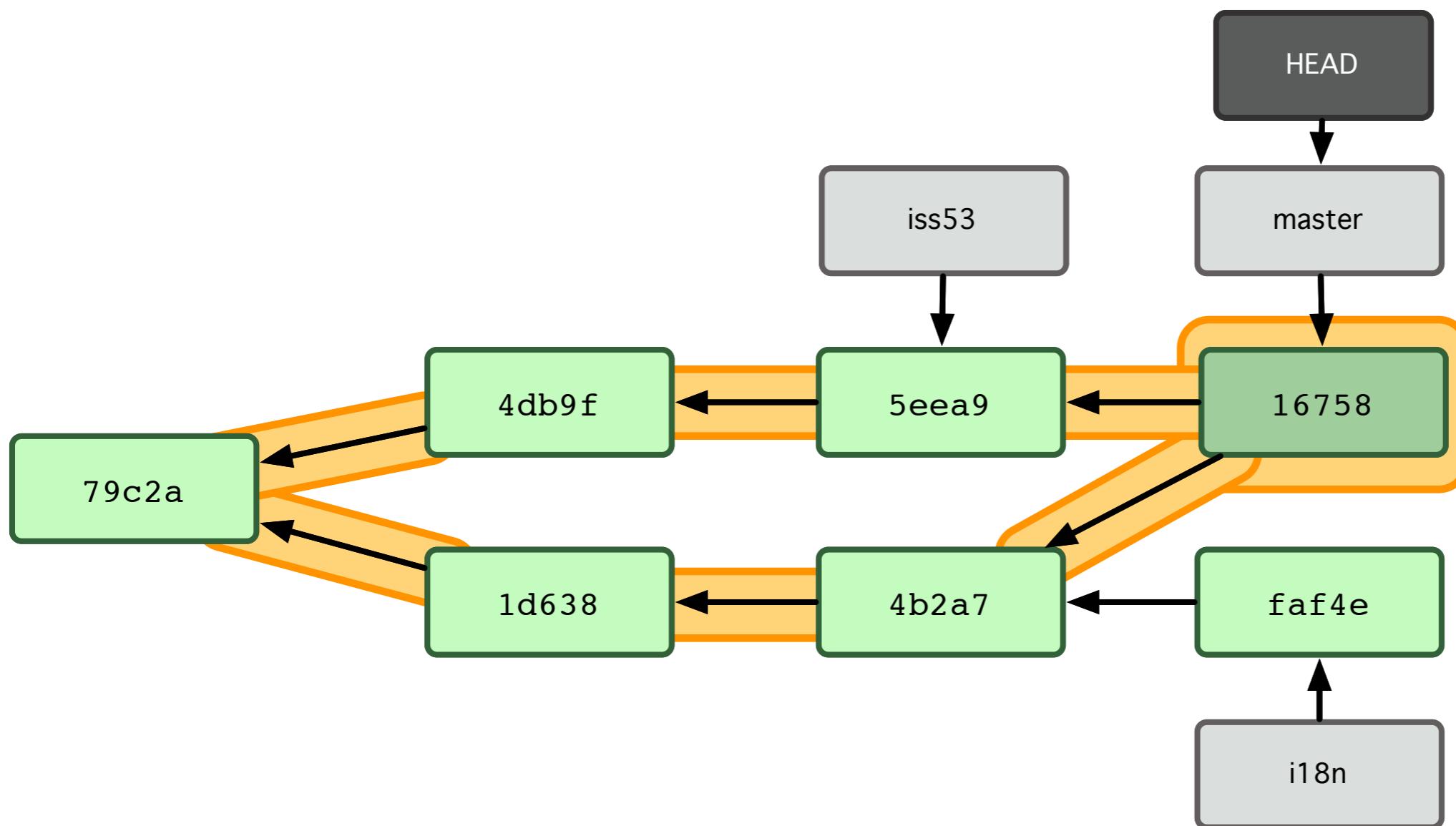
git log



git log



git log



```
$ git log  
commit 16758d868a4e97c9d4281940438b7ea1680cf0a  
Merge: 5eea9cf 4b2a7ae  
Author: Scott Chacon <schacon@gmail.com>  
Date: Wed Jul 28 16:29:23 2010 -0700
```

Merge branch 'i18n'

```
commit 4b2a7ae83bcbb213c7d88c6fada3700f77d43a2e  
Author: Scott Chacon <schacon@gmail.com>  
Date: Wed Jul 28 16:28:45 2010 -0700
```

fix spacing issues in both c files

```
commit 1d6389c30cf766daf3dcfe7cc1e3b7fdbfc5cc48  
Author: Scott Chacon <schacon@gmail.com>  
Date: Wed Jul 28 16:28:18 2010 -0700
```

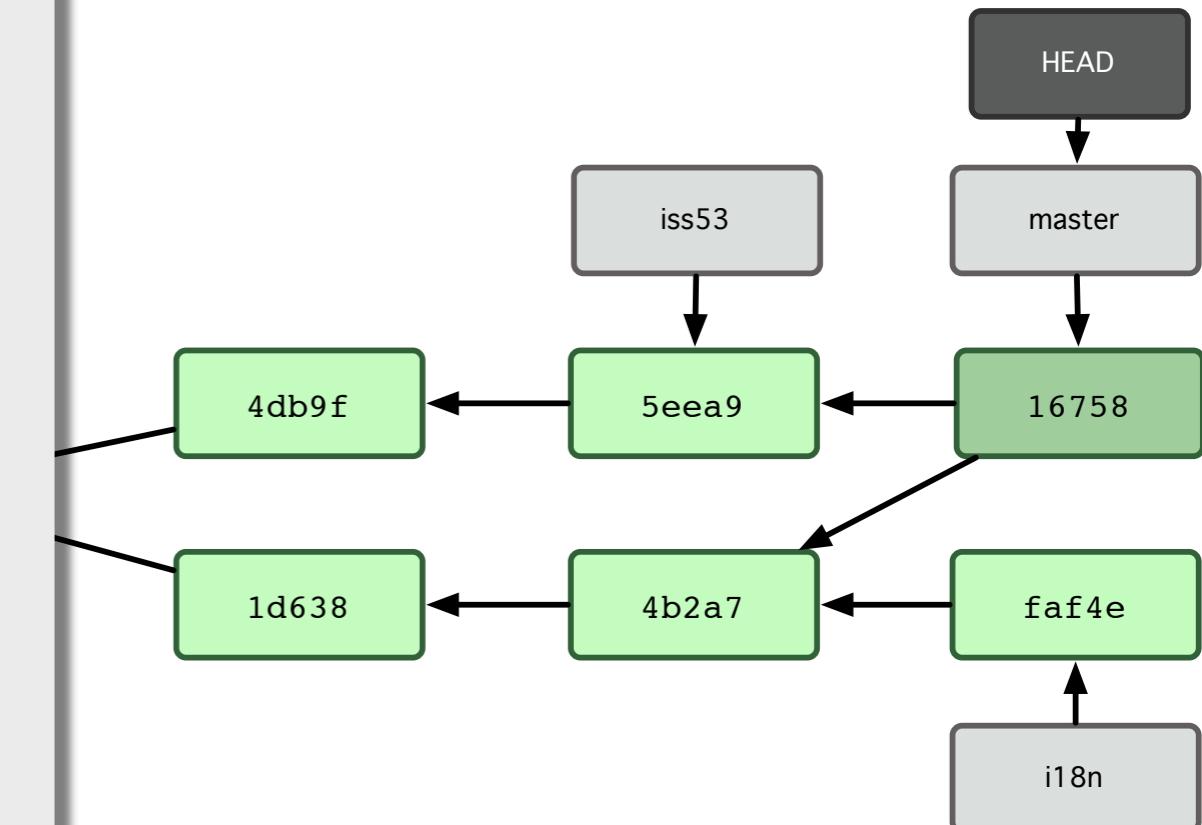
added i18n file

```
commit 5eea9cf450d5b200d7f134e4024d1c062cb5b341  
Author: Scott Chacon <schacon@gmail.com>  
Date: Wed Jul 28 16:27:35 2010 -0700
```

documented issue file

```
commit 4db9f5c2b4c3935ff787f0fa85e9265c3e306fca  
Author: Scott Chacon <schacon@gmail.com>  
Date: Wed Jul 28 16:27:10 2010 -0700
```

added issue file



```
$ git log
```

```
commit 16758d868a4e97c9d4281940438b7ea1680cf0a
```

```
Merge: 5eea9cf 4b2a7ae
```

```
Author: Scott Chacon <schacon@gmail.com>
```

```
Date: Wed Jul 28 16:29:23 2010 -0700
```

```
    Merge branch 'i18n'
```

```
commit 4b2a7ae05bcb215c7a00c01adas700177d45a2e
```

```
Author: Scott Chacon <schacon@gmail.com>
```

```
Date: Wed Jul 28 16:28:45 2010 -0700
```

```
    fix spacing issues in both c files
```

```
commit 1d6389c30cf766daf3dcfe7cc1e3b7fdbfc5cc48
```

```
Author: Scott Chacon <schacon@gmail.com>
```

```
Date: Wed Jul 28 16:28:18 2010 -0700
```

```
    added i18n file
```

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commit 5eea9cf450d5b200d7f134e4024d1c062cb5b341
```

```
Author: Scott Chacon <schacon@gmail.com>
```

```
Date: Wed Jul 28 16:27:35 2010 -0700
```

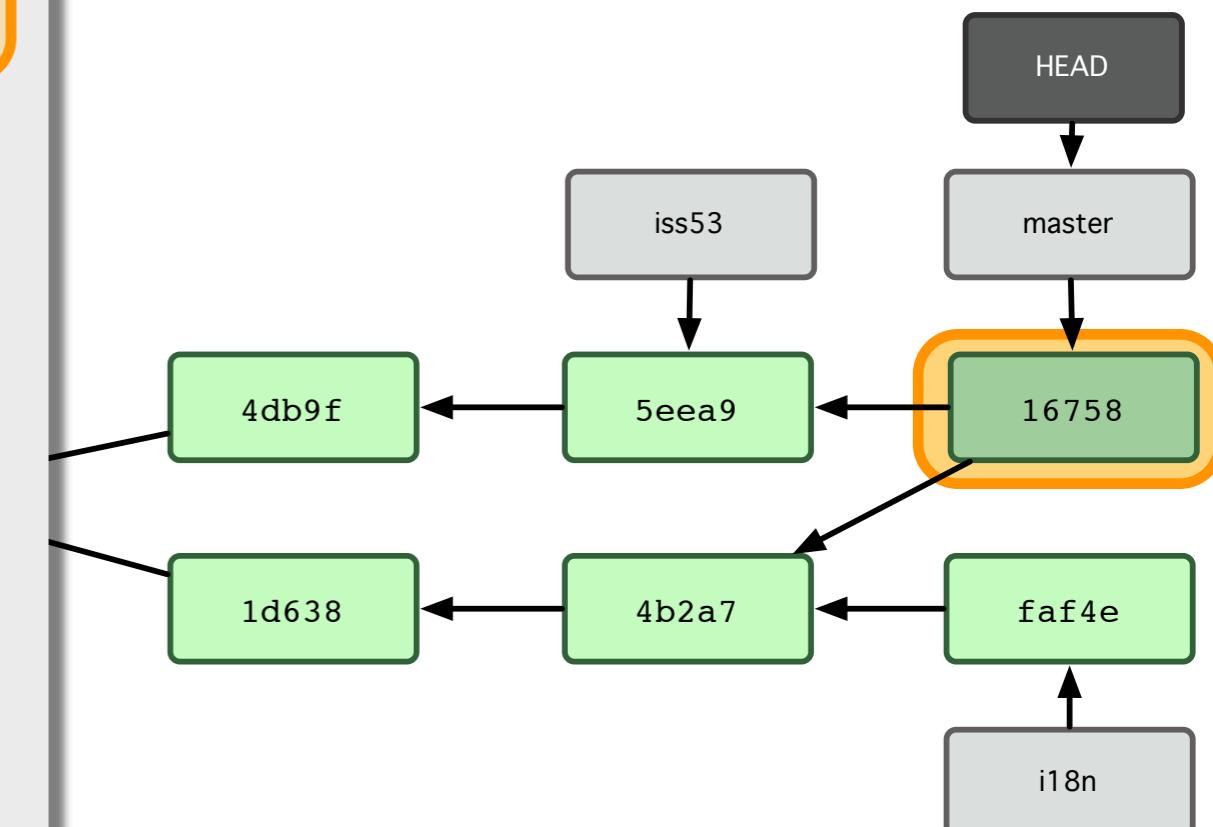
```
    documented issue file
```

```
commit 4db9f5c2b4c3935ff787f0fa85e9265c3e306fca
```

```
Author: Scott Chacon <schacon@gmail.com>
```

```
Date: Wed Jul 28 16:27:10 2010 -0700
```

```
    added issue file
```



```
$ git log  
commit 16758d868a4e97c9d4281940438b7ea1680cf0a  
Merge: 5eea9c1 4b2a7ae  
Author: Scott Chacon <schacon@gmail.com>  
Date: Wed Jul 28 16:29:23 2010 -0700
```

Merge branch 'i18n'

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commit 4b2a7ae83bcbb213c7d88c6fada3700f77d43a2e  
Author: Scott Chacon <schacon@gmail.com>  
Date: Wed Jul 28 16:28:45 2010 -0700
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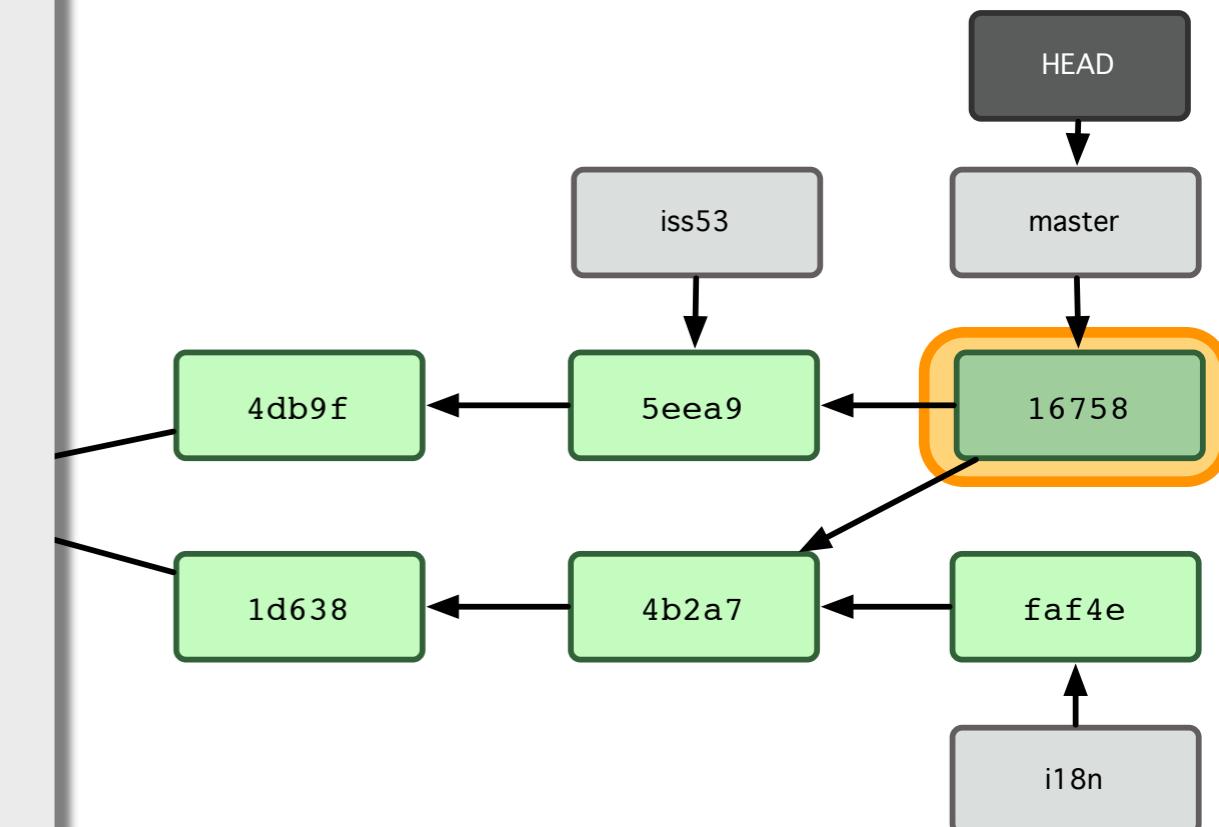
added i18n file

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commit 5eea9cf450d5b200d7f134e4024d1c062cb5b341  
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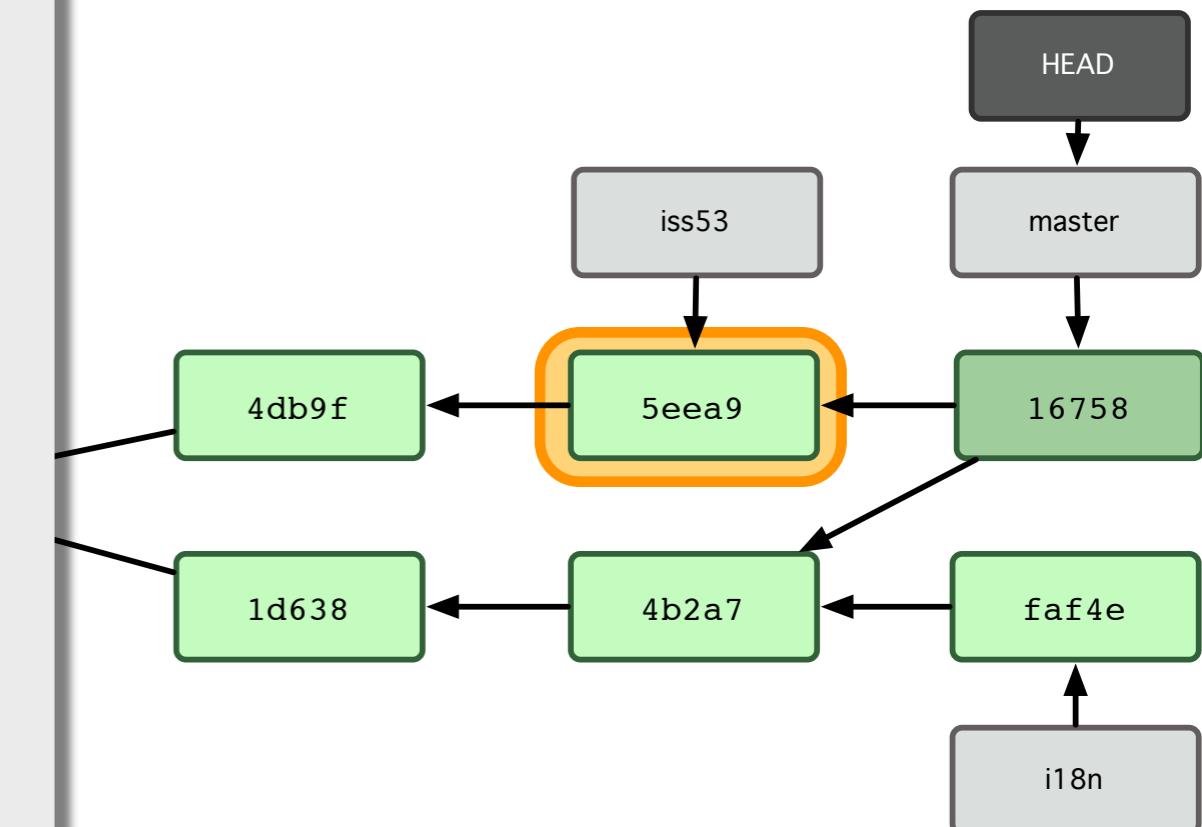
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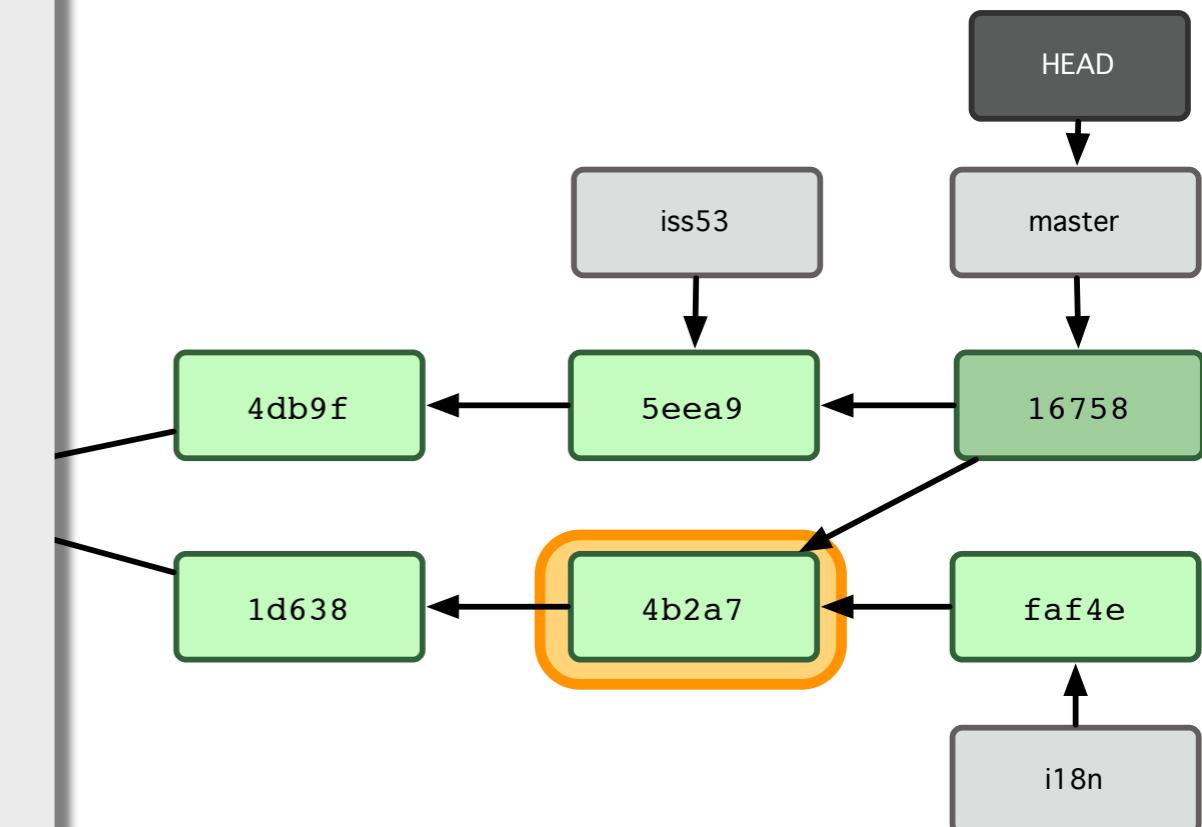
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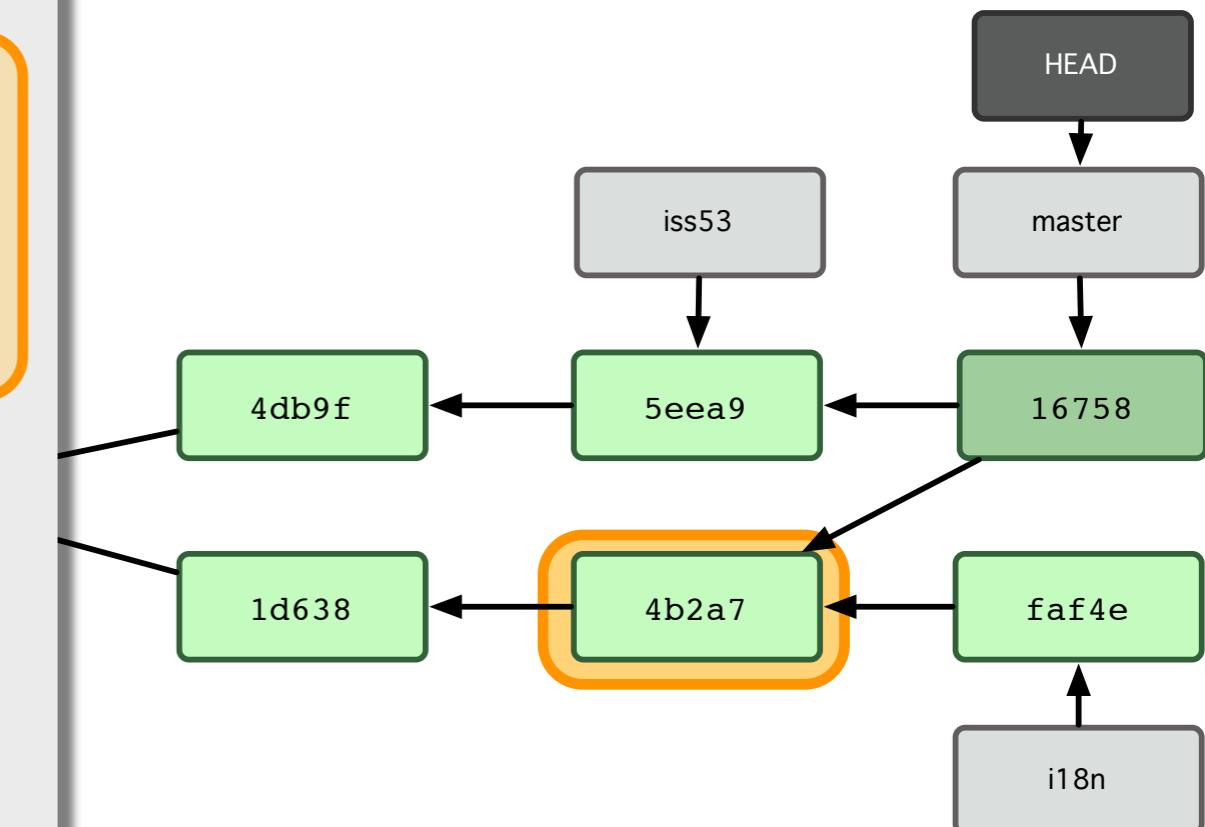
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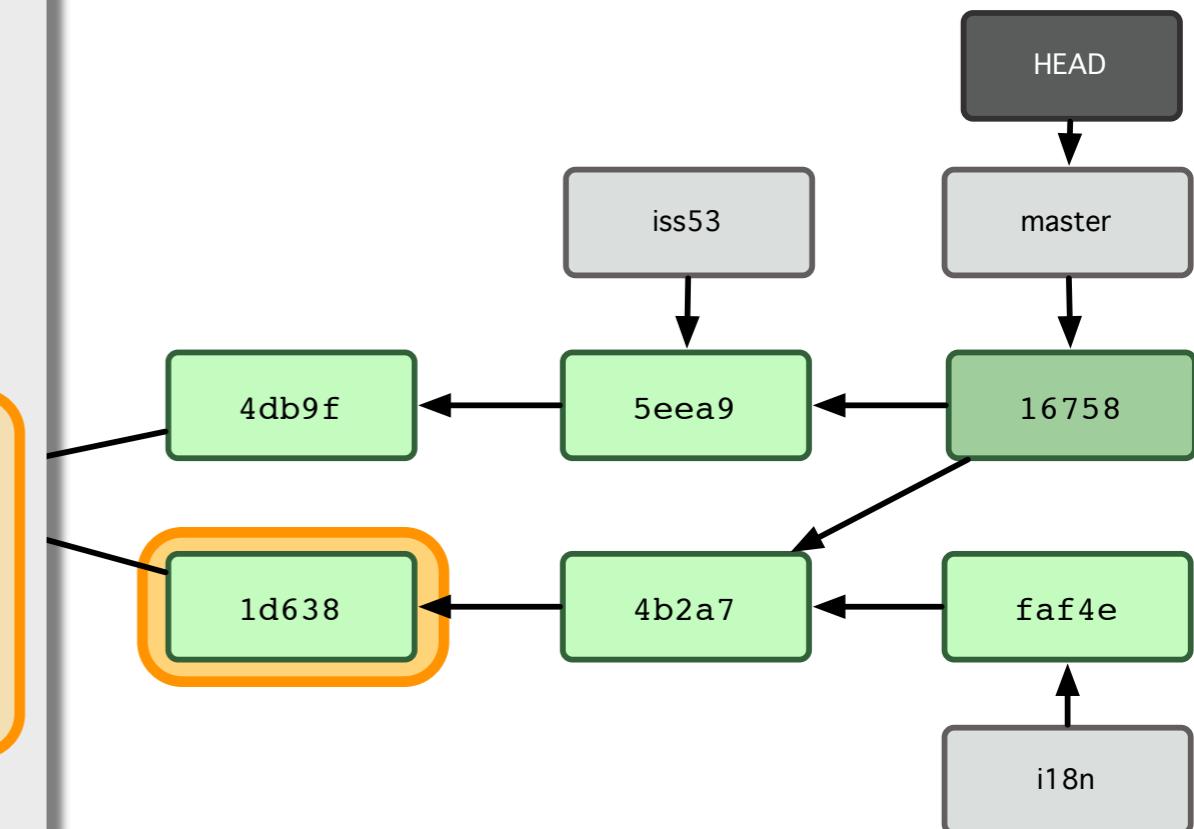
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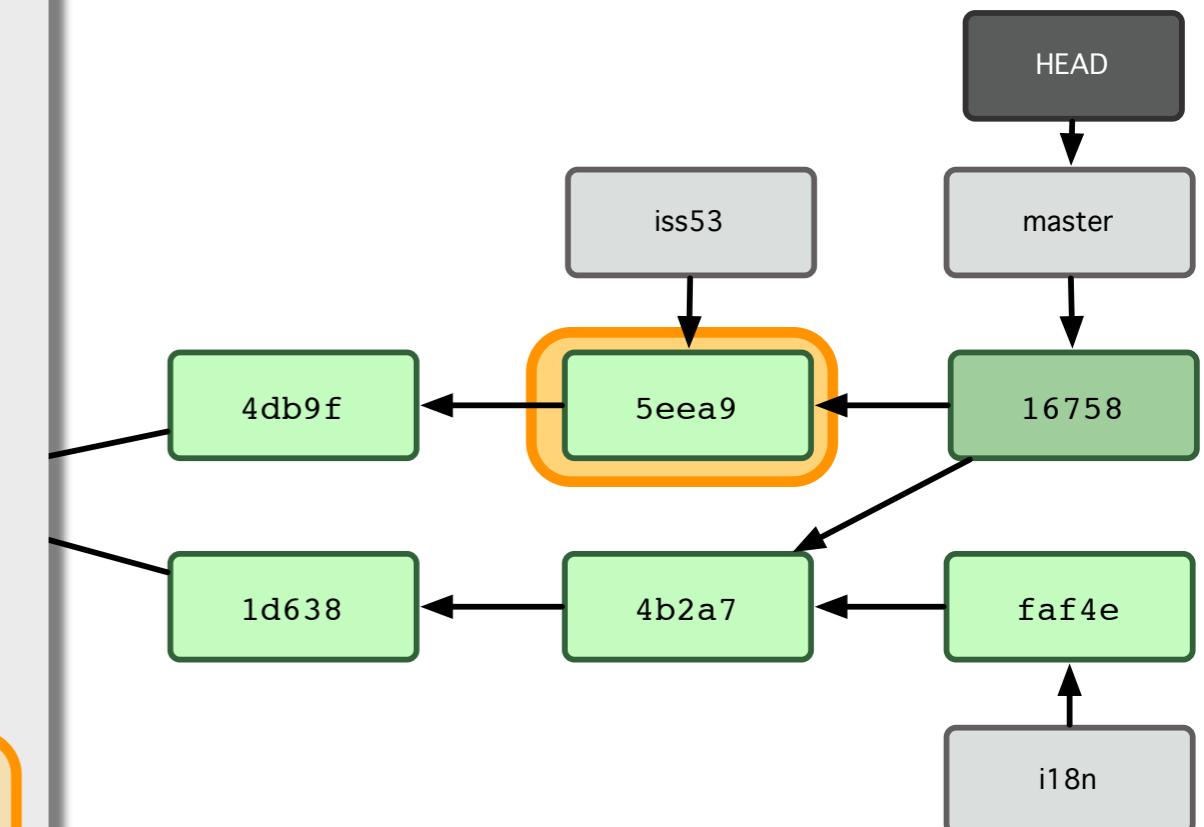
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Date:   Wed Jul 28 16:27:10 2010 -0700

    added issue file
```



```
$ git log
```

```
commit 16758d868a4e97c9d4281940438b7ea1680cf0a
Merge: 5eea9cf 4b2a7ae
Author: Scott Chacon <schacon@gmail.com>
Date:   Wed Jul 28 16:29:23 2010 -0700

    Merge branch 'i18n'

commit 4b2a7ae83bcbb213c7d88c6fada3700f77d43a2e
Author: Scott Chacon <schacon@gmail.com>
Date:   Wed Jul 28 16:28:45 2010 -0700

    fix spacing issues in both c files

commit 1d6389c30cf766daf3dcfe7cc1e3b7fdbfc5cc48
Author: Scott Chacon <schacon@gmail.com>
Date:   Wed Jul 28 16:28:18 2010 -0700

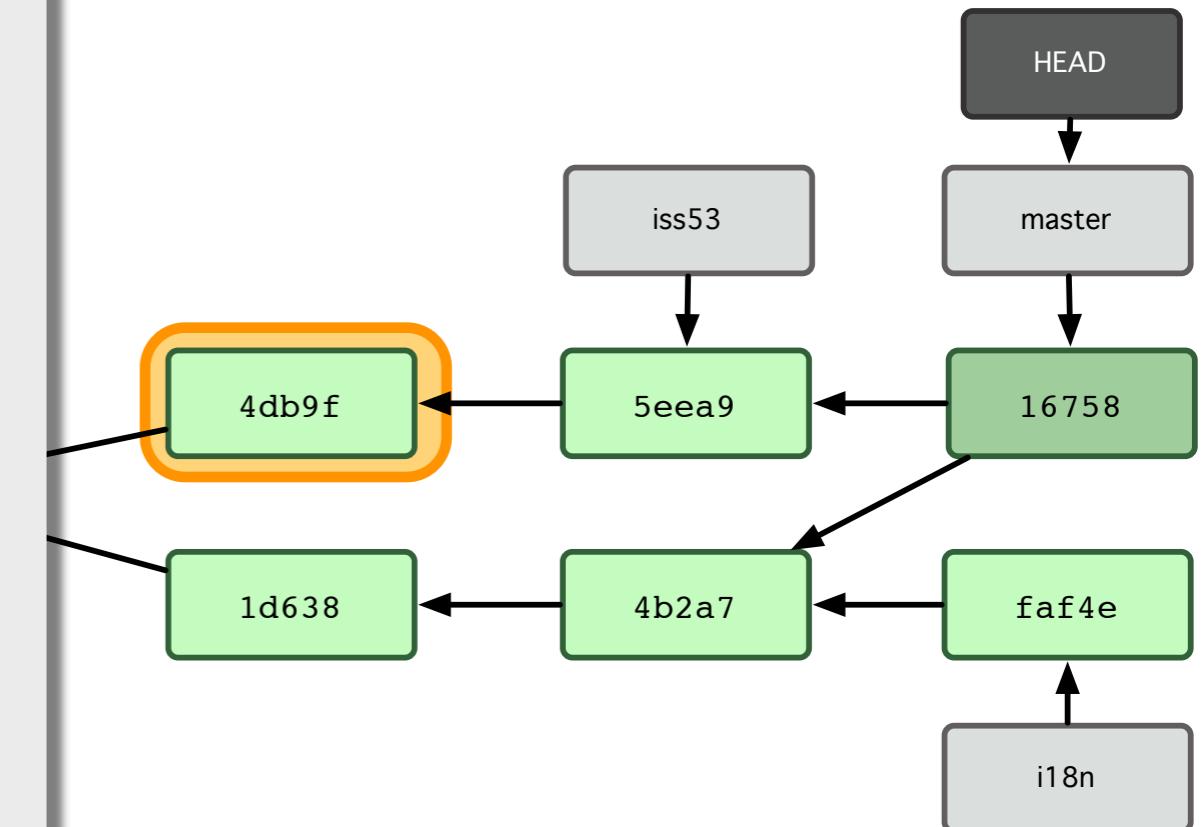
    added i18n file

commit 5eea9cf450d5b200d7f134e4024d1c062cb5b341
Author: Scott Chacon <schacon@gmail.com>
Date:   Wed Jul 28 16:27:35 2010 -0700

    documented issue file

commit 4db9f5c2b4c3935ff787f0fa85e9265c3e306fca
Author: Scott Chacon <schacon@gmail.com>
Date:   Wed Jul 28 16:27:10 2010 -0700

    added issue file
```



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```

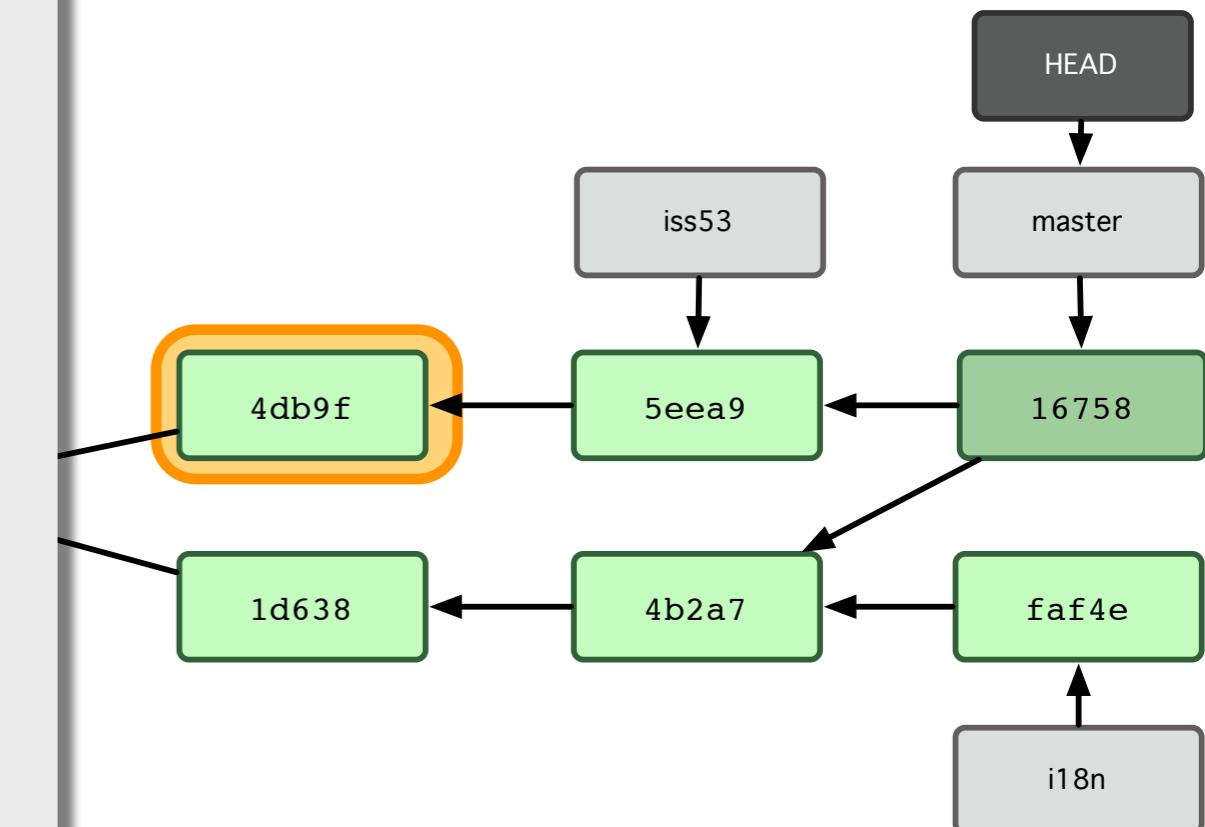
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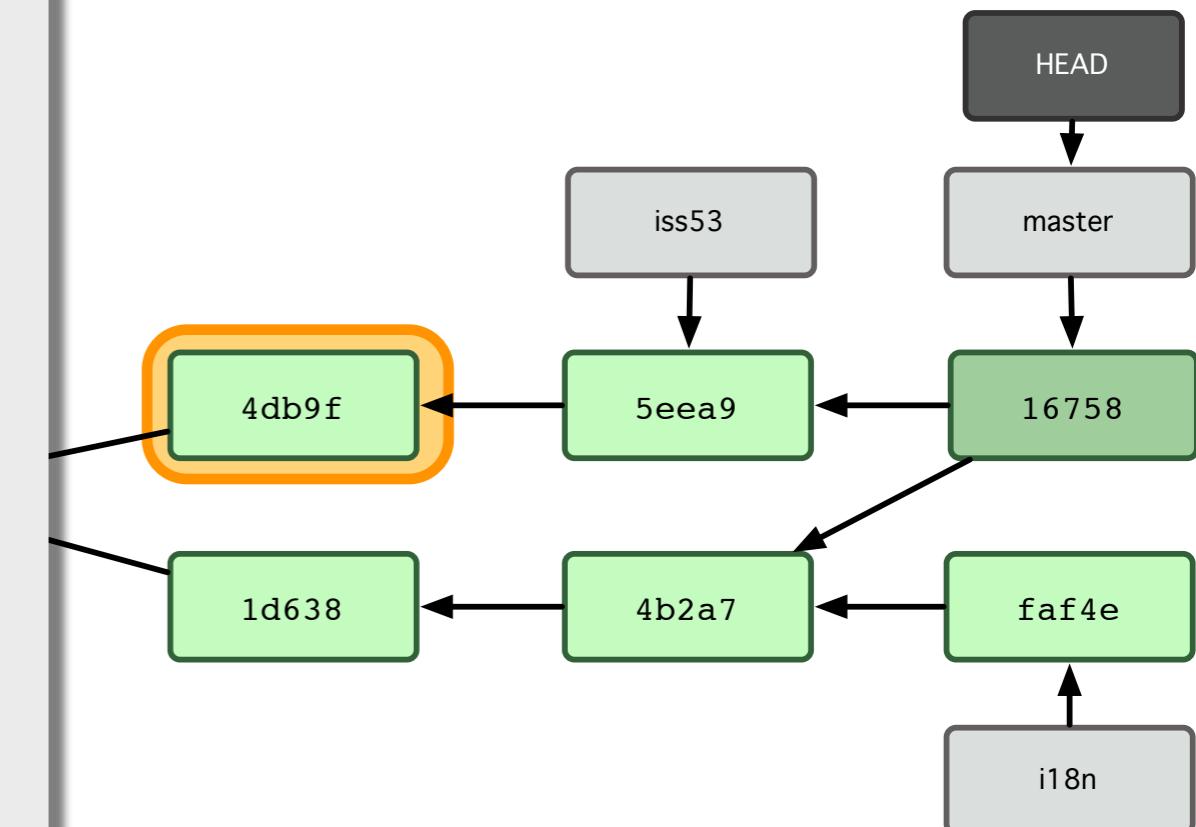
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Date: Wed Jul 28 16:28:18 2010 -0700

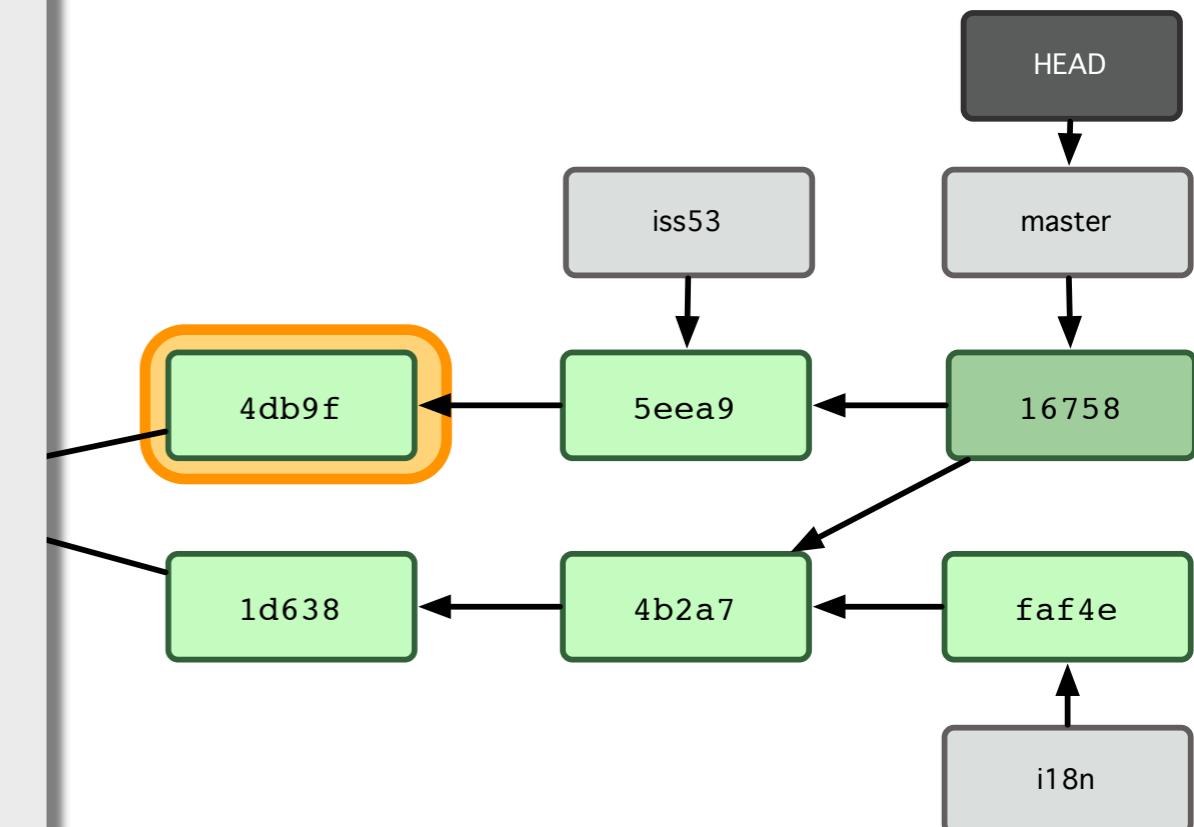
added i18n file

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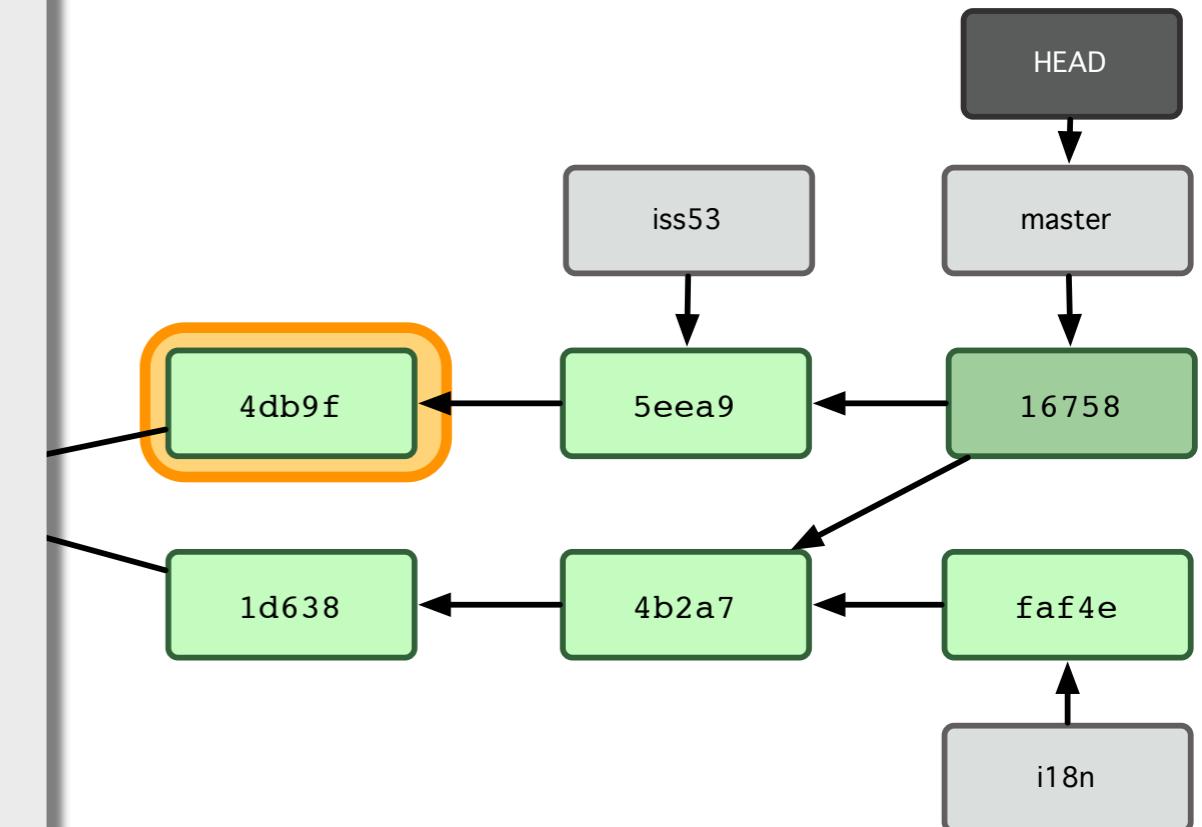
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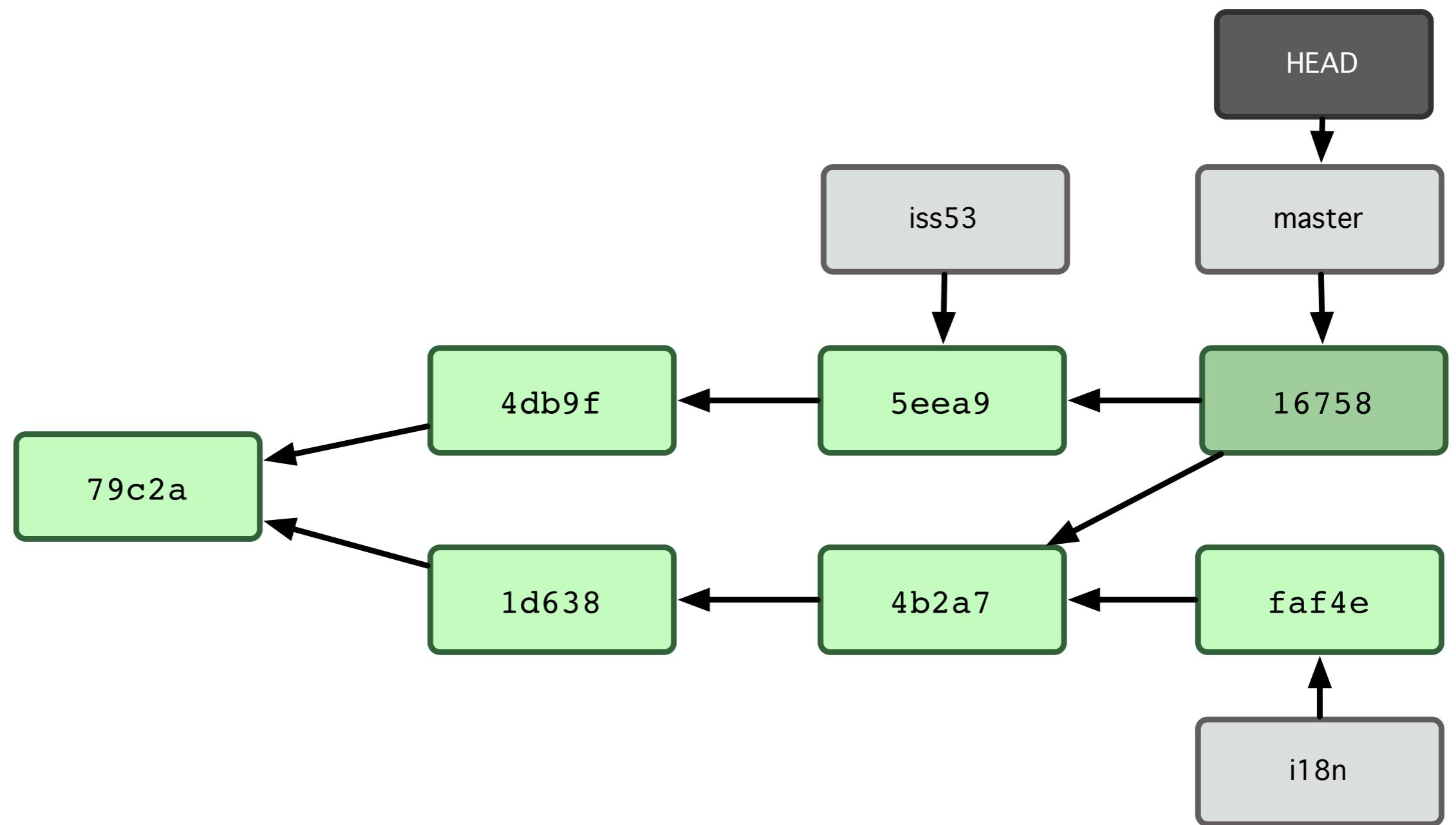
commit 4db9f5c2b4c3935ff787f0fa85e9265c3e306fca
Author: Scott Chacon <schacon@gmail.com>
Date:   Wed Jul 28 16:27:10 2010 -0700

    added issue file
```



log formatting

```
git log --oneline
```



```
$ git log --oneline
```

```
16758d8 Merge branch 'i18n'  
4b2a7ae fix spacing issues in both c files  
1d6389c added i18n file  
5eea9cf documented issue file  
4db9f5c added issue file  
79c2add initial project import
```

HEAD

master

iss53

16758

5eea9

4db9f

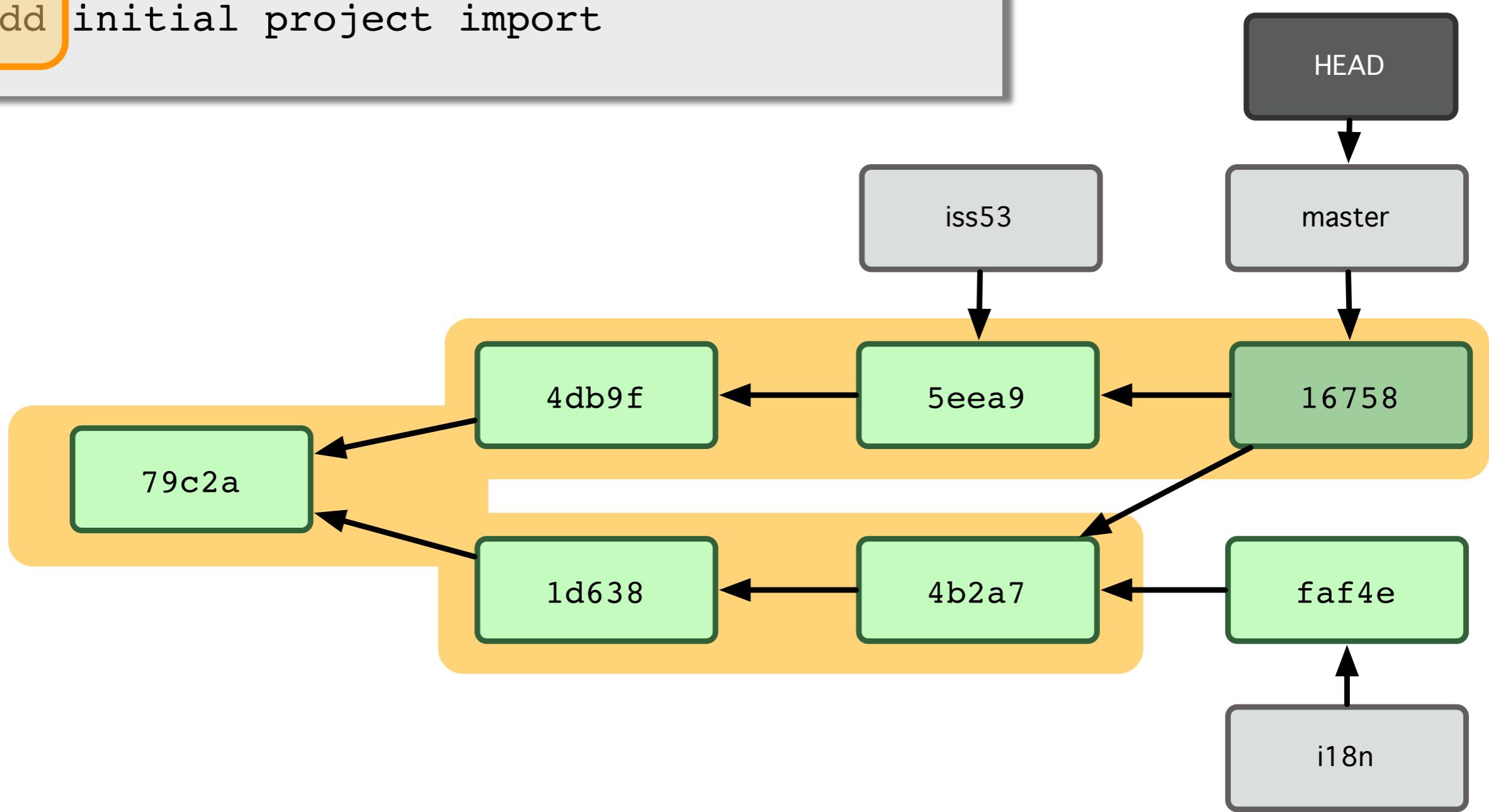
79c2a

1d638

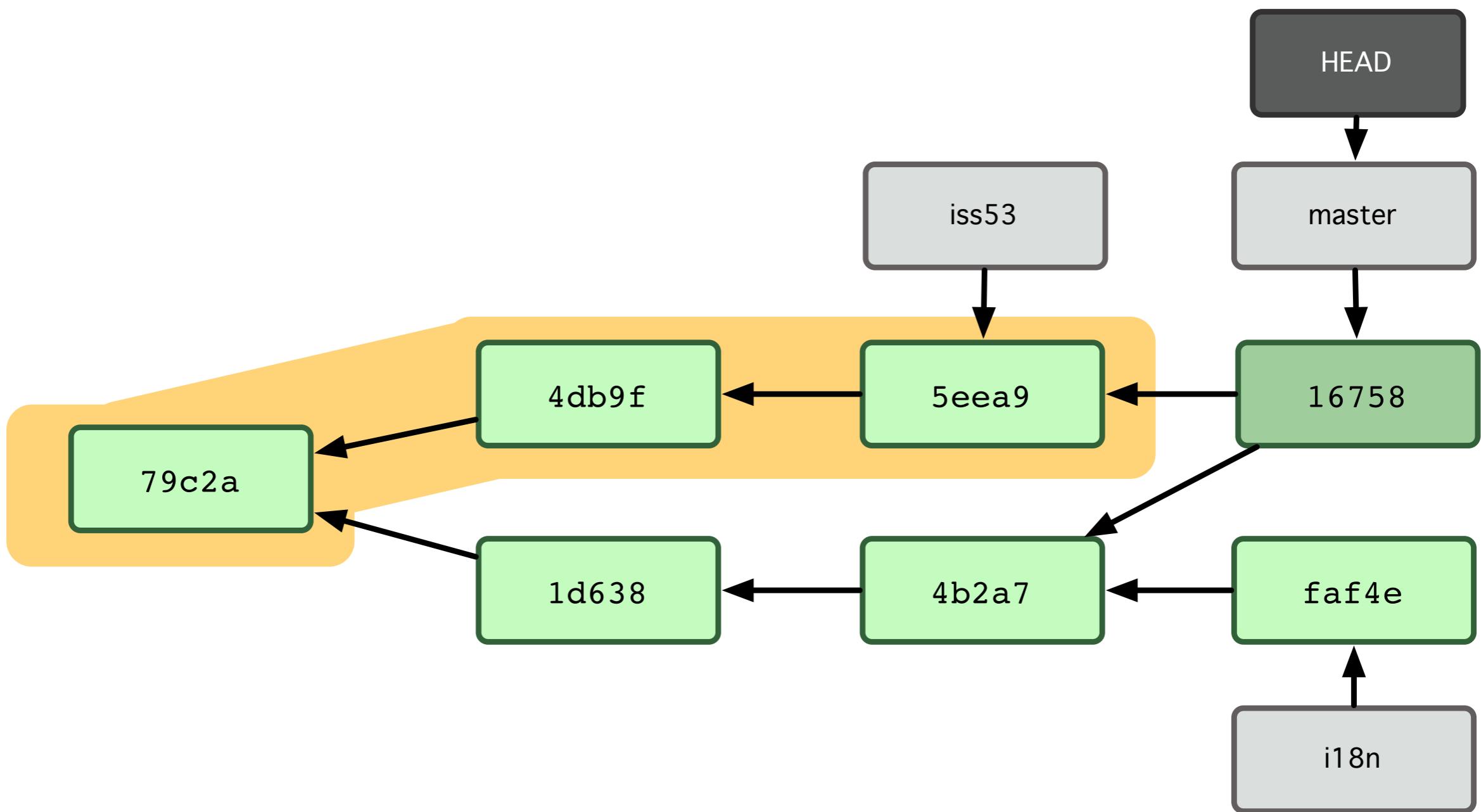
4b2a7

faf4e

i18n

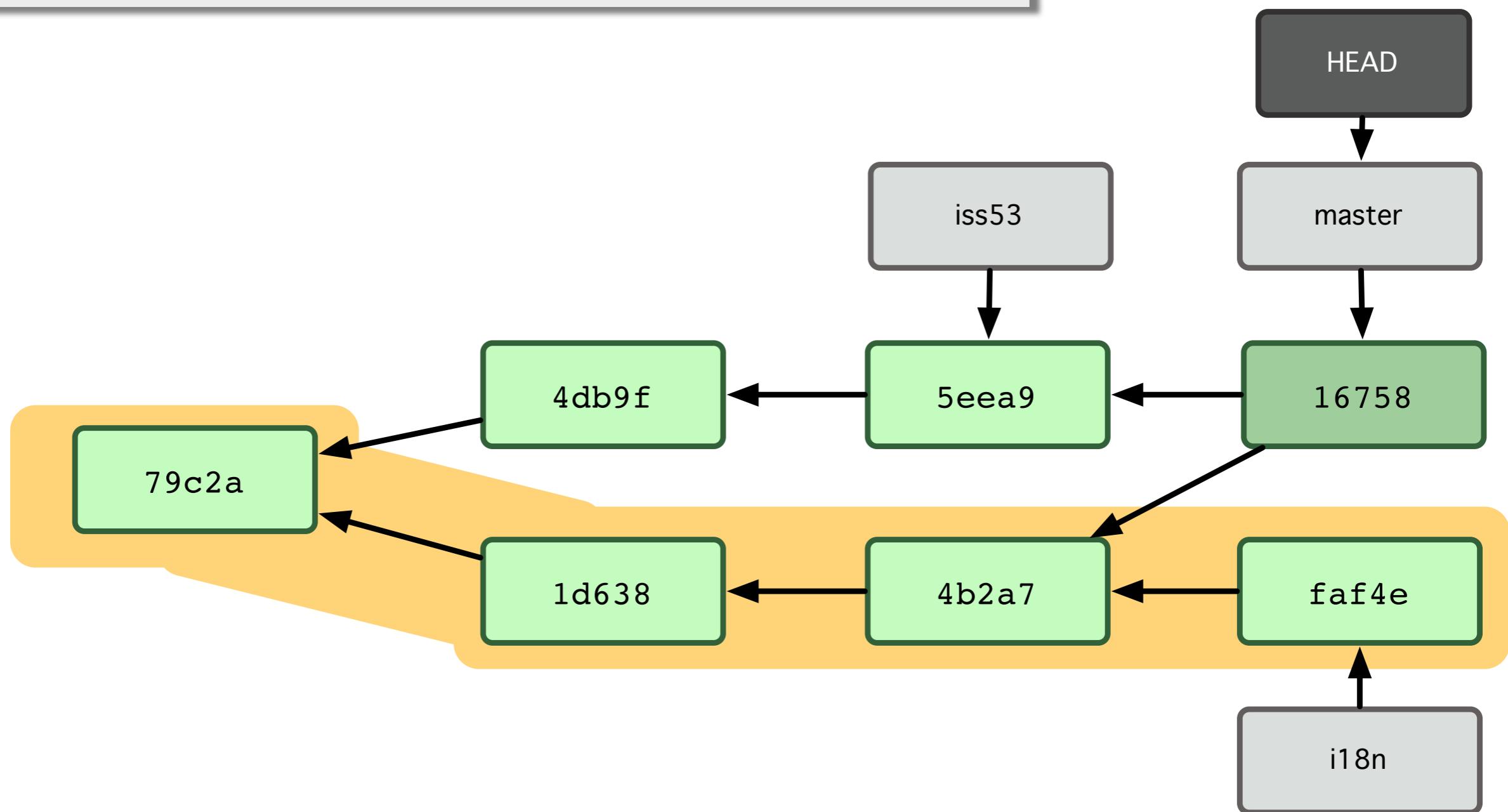


```
$ git log --oneline iss53
5eea9cf documented issue file
4db9f5c added issue file
79c2add initial project import
```



```
$ git log --oneline i18n
```

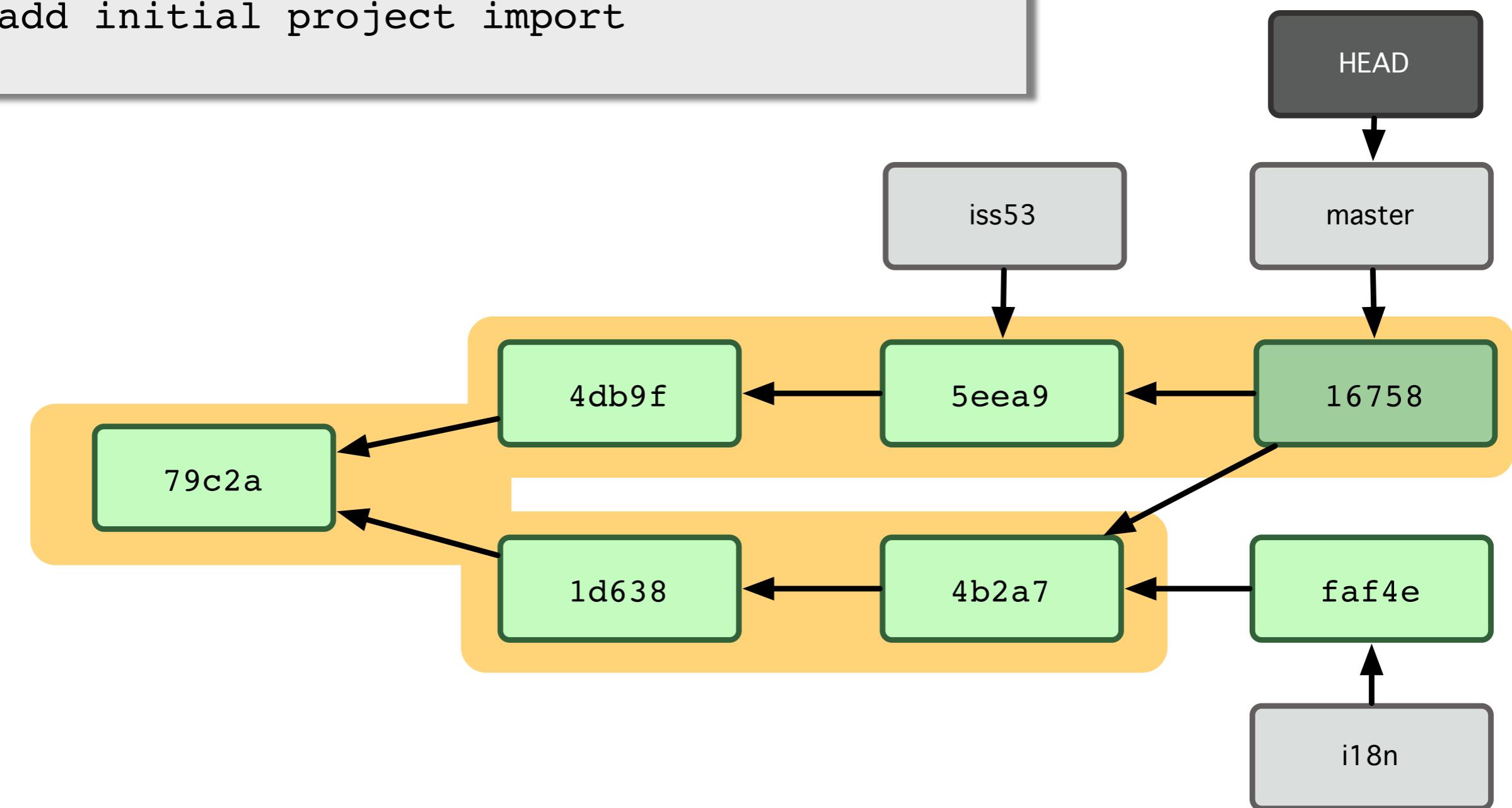
```
faf4ece update README to be more specific  
4b2a7ae fix spacing issues in both c files  
1d6389c added i18n file  
79c2add initial project import
```



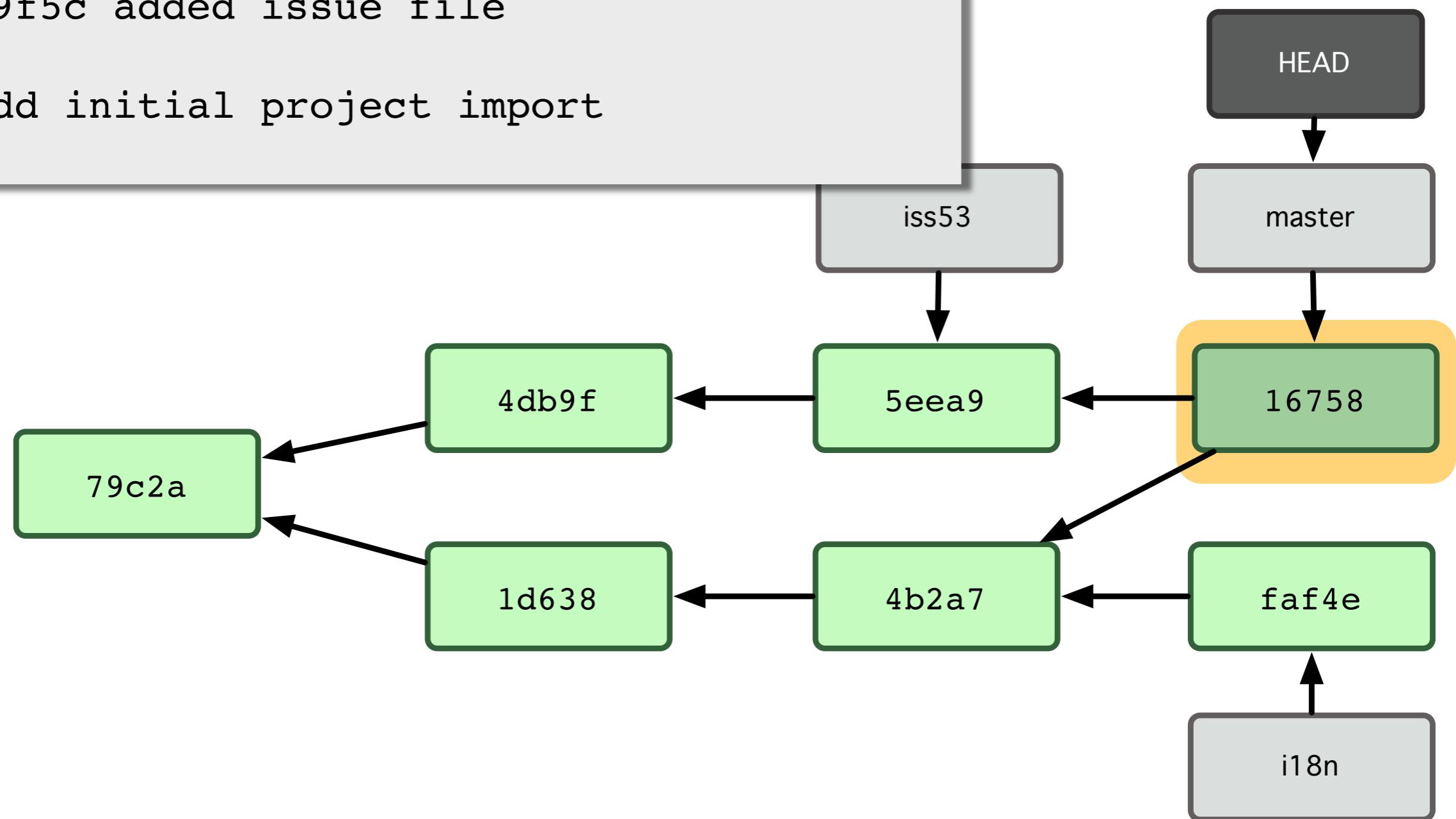
```
git log --graph
```

```
$ git log --oneline
```

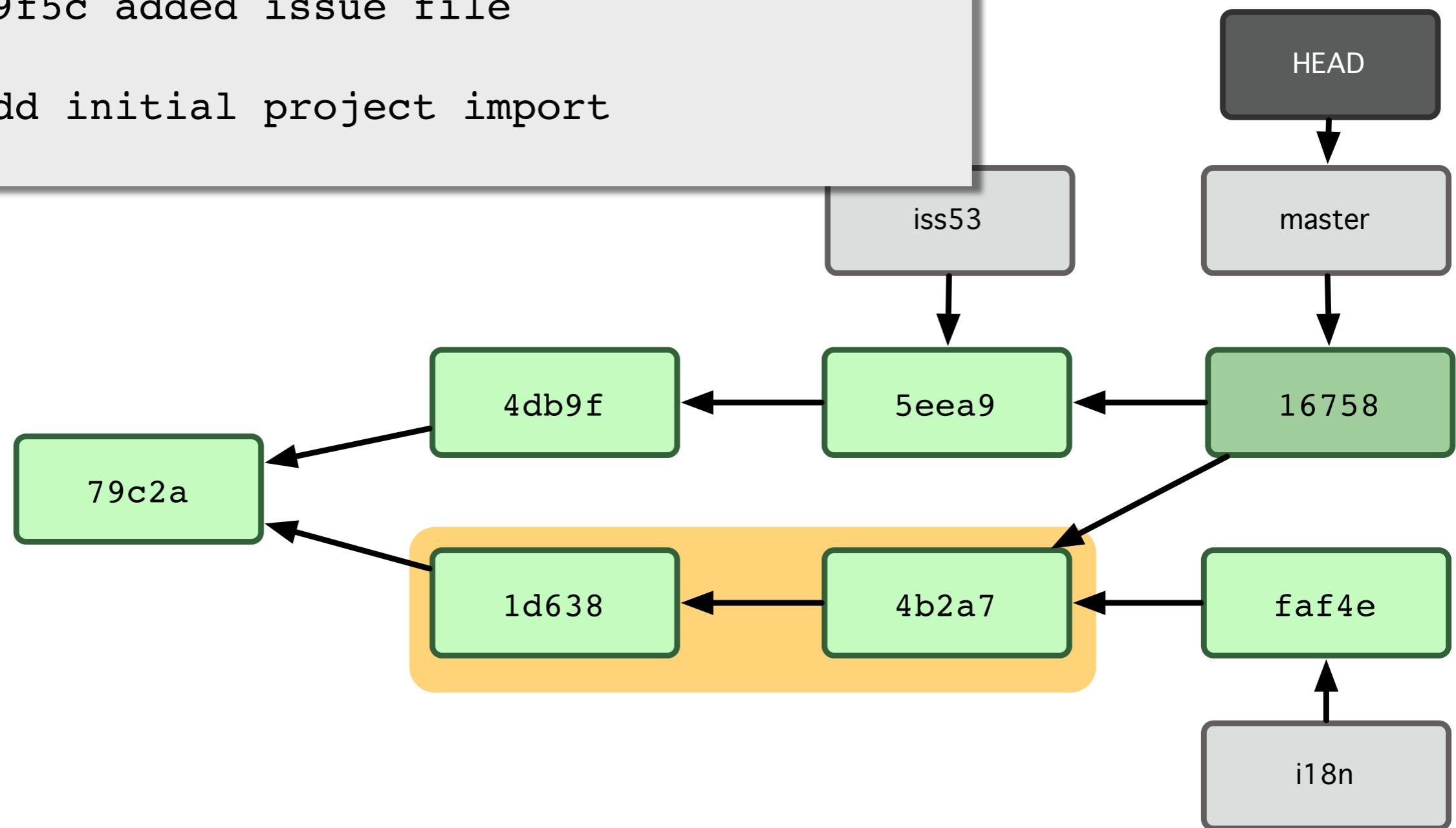
```
16758d8 Merge branch 'i18n'  
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```



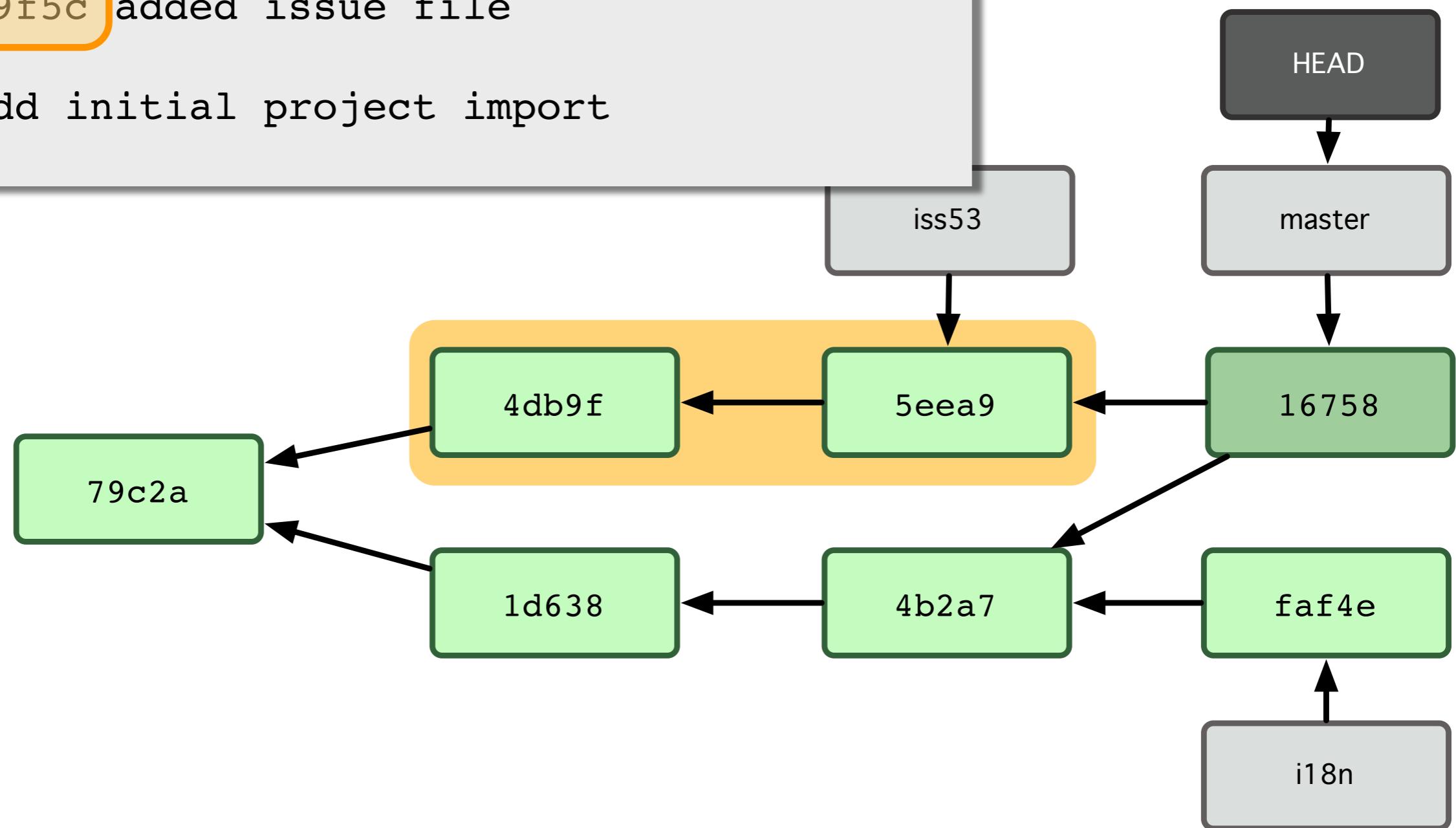
```
$ git log --oneline --graph
*   16758d8 Merge branch 'i18n'
|\ \
| * 4b2a7ae fix spacing issues in both c files
| * 1d6389c added i18n file
* | 5eea9cf documented issue file
* | 4db9f5c added issue file
| /
* 79c2add initial project import
```



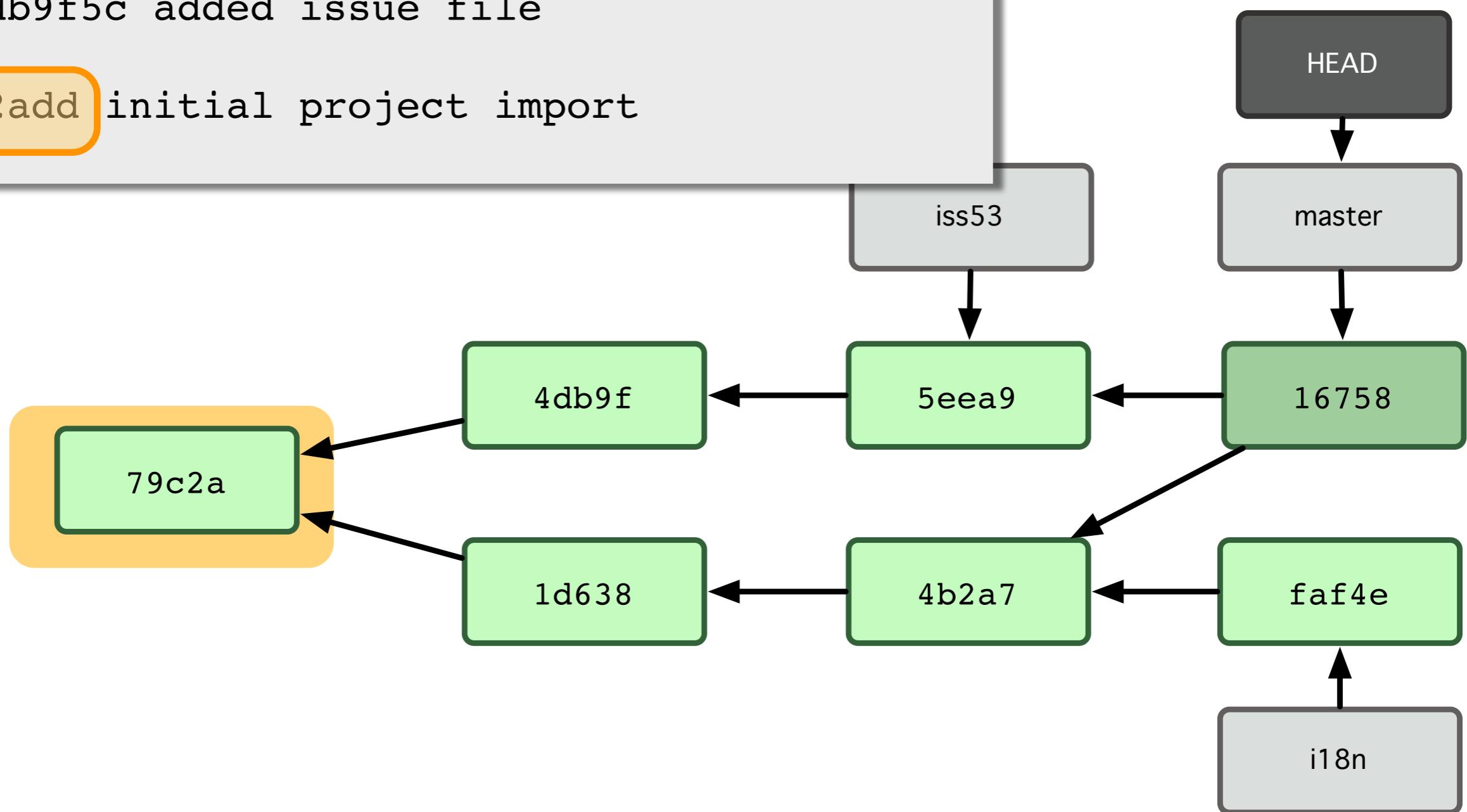
```
$ git log --oneline --graph
*   16758d8 Merge branch 'i18n'
| \
| * 4b2a7ae fix spacing issues in both c files
| * 1d6389c added i18n file
* | 5eea9cf documented issue file
* | 4db9f5c added issue file
| /
* 79c2add initial project import
```



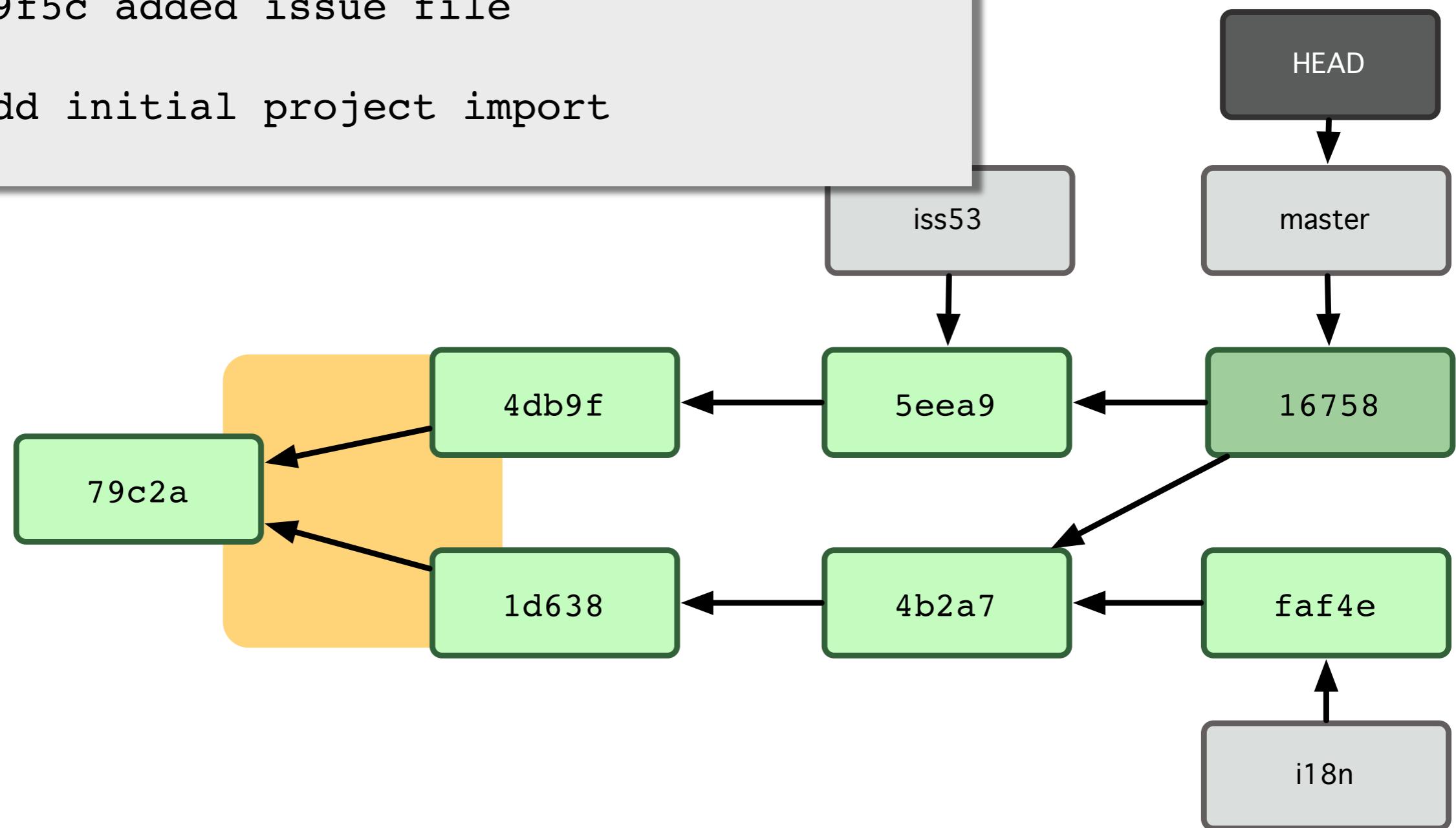
```
$ git log --oneline --graph
*   16758d8 Merge branch 'i18n'
| \
| * 4b2a7ae fix spacing issues in both c files
| * 1d6389c added i18n file
* | 5eea9cf documented issue file
* | 4db9f5c added issue file
| /
* 79c2add initial project import
```



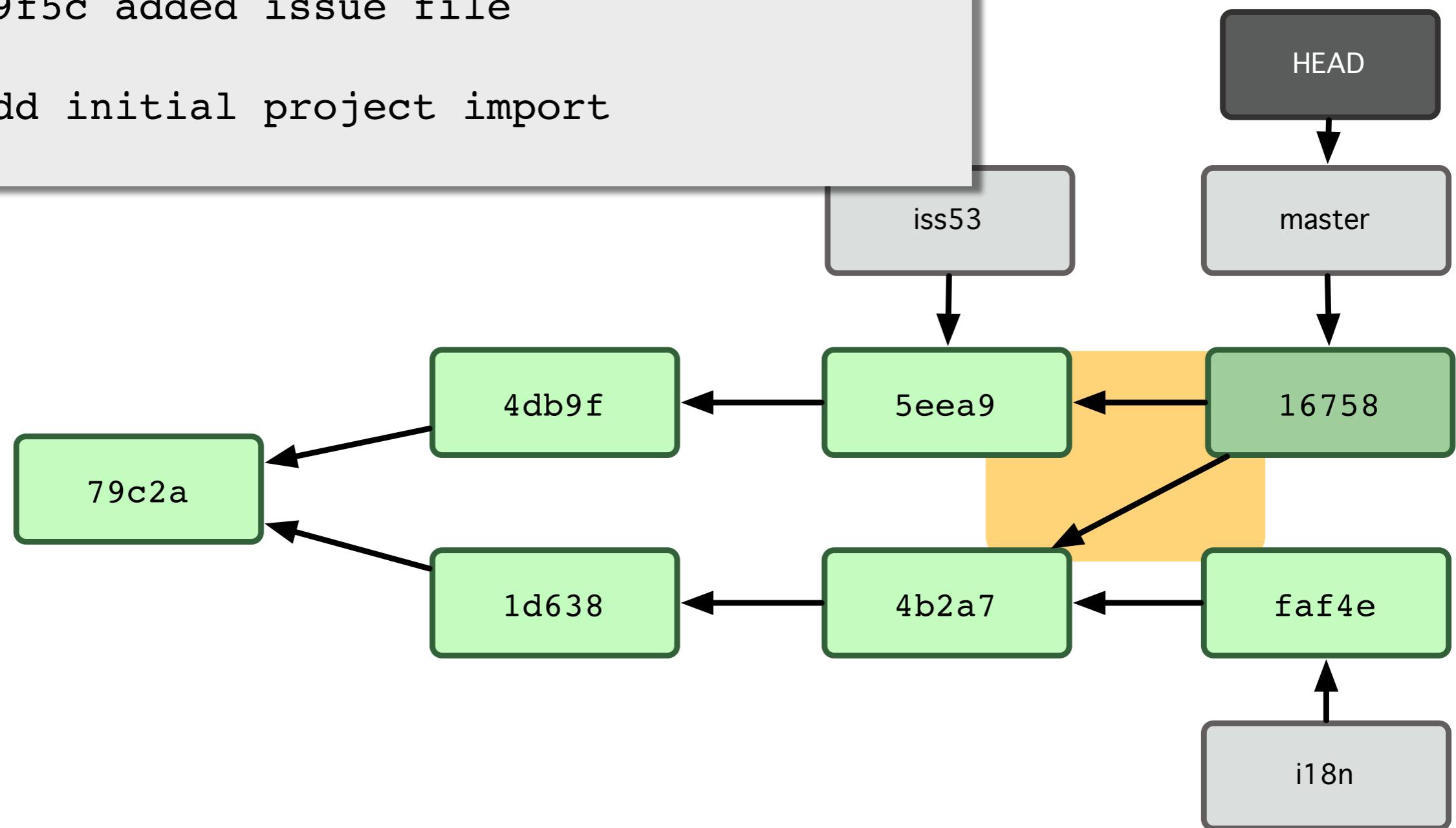
```
$ git log --oneline --graph
*   16758d8 Merge branch 'i18n'
| \
| * 4b2a7ae fix spacing issues in both c files
| * 1d6389c added i18n file
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* | 4db9f5c added issue file
| /
* 79c2add initial project import
```



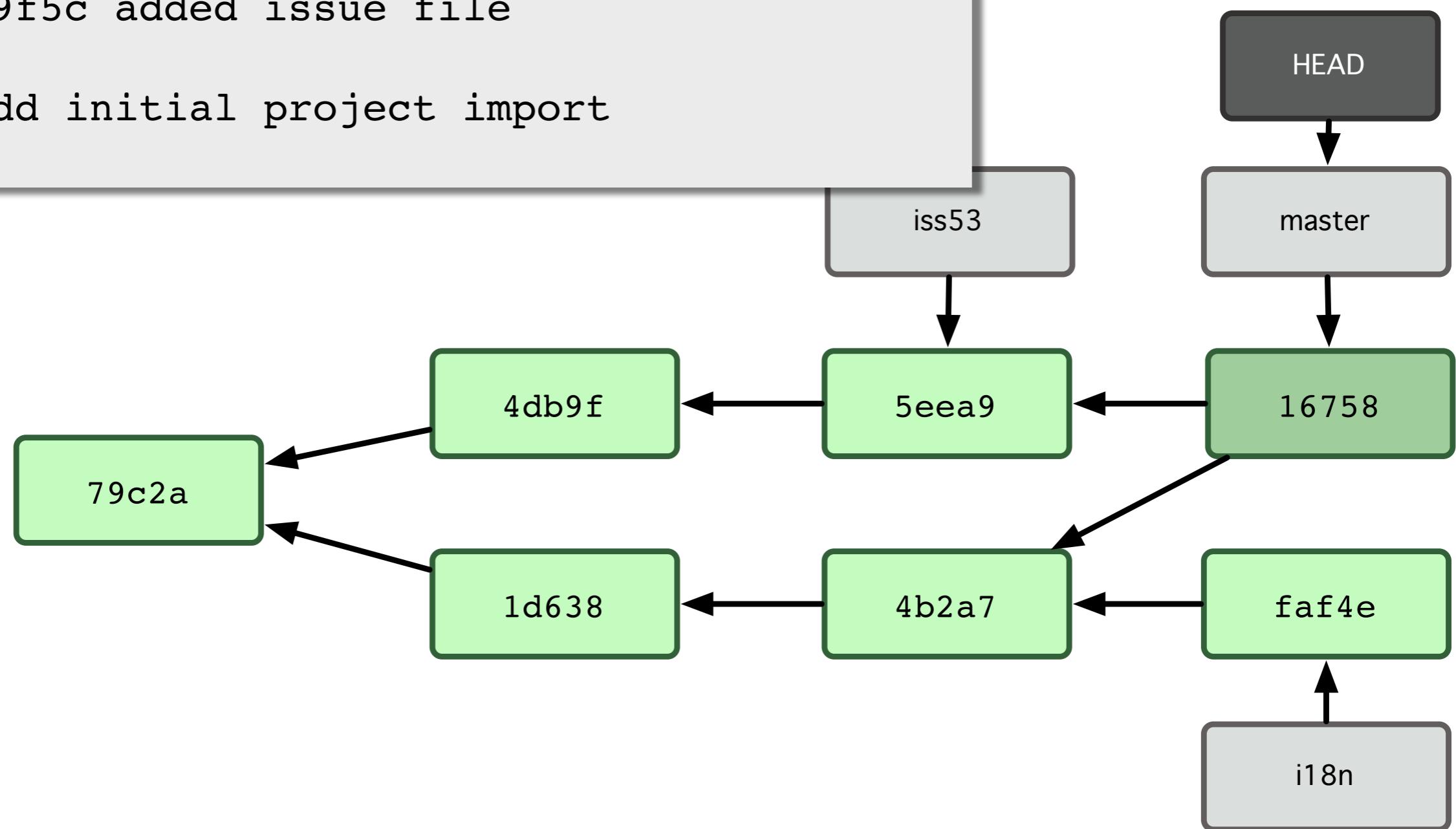
```
$ git log --oneline --graph
*   16758d8 Merge branch 'i18n'
| \
| * 4b2a7ae fix spacing issues in both c files
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```
$ git log --oneline --graph
*   16758d8 Merge branch 'i18n'
|\ \
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| *
| * 5eea9cf documented issue file
| *
| * 4db9f5c added issue file
| /
* 79c2add initial project import
```



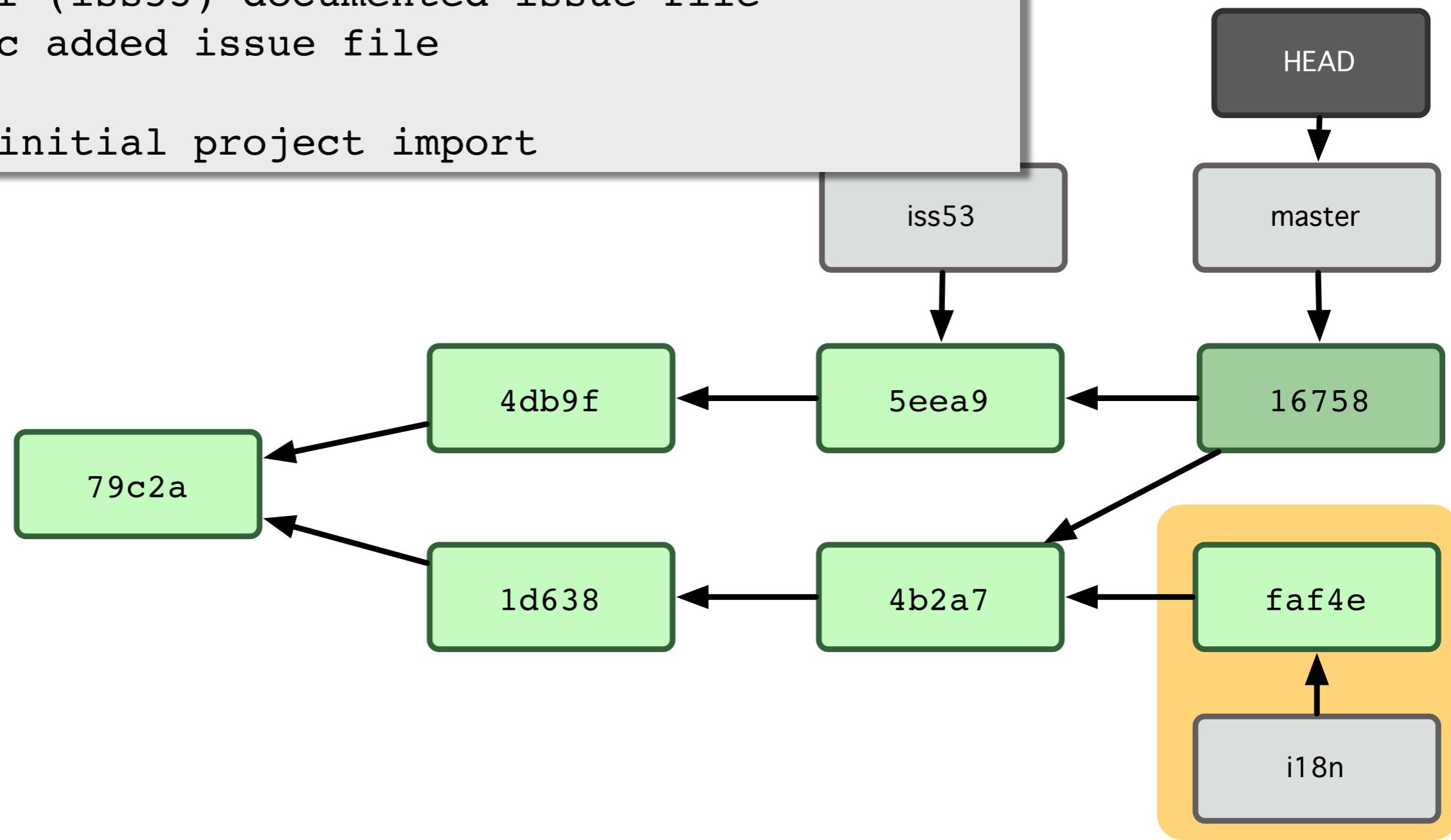
```
$ git log --oneline --graph
*   16758d8 Merge branch 'i18n'
| \
| * 4b2a7ae fix spacing issues in both c files
| * 1d6389c added i18n file
* | 5eea9cf documented issue file
* | 4db9f5c added issue file
| /
* 79c2add initial project import
```



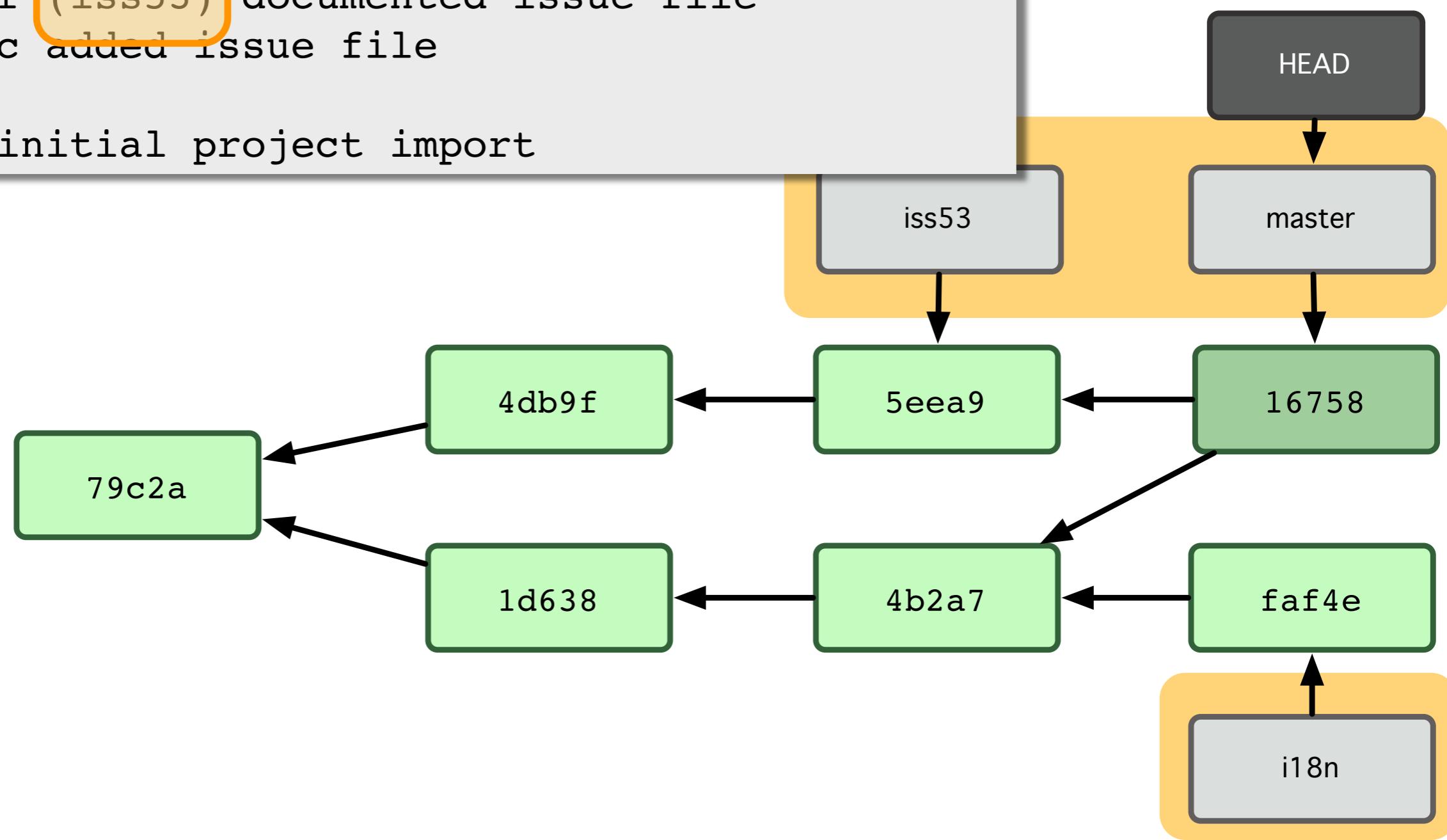
```
git log --all
```

```
git log --decorate
```

```
$ git log --oneline --graph --all --decorate
* faf4ece (i18n) update README to be more specific
| * 16758d8 (HEAD, master) Merge branch 'i18n'
| |
| / \
|   |
|   /
|   /
* | 4b2a7ae fix spacing issues in both c files
* | 1d6389c added i18n file
| *
| * 5eea9cf (iss53) documented issue file
| *
| * 4db9f5c added issue file
|
* 79c2add initial project import
```



```
$ git log --oneline --graph --all --decorate
*faf4ece (i18n) update README to be more specific
| * 16758d8 (HEAD, master) Merge branch 'i18n'
| \
| /
|
* 4b2a7ae fix spacing issues in both c files
* 1d6389c added i18n file
* 5eea9cf (iss53) documented issue file
* 4db9f5c added issue file
|
* 79c2add initial project import
```



```
git config --global  
alias.lol "log --oneline --graph --decorate"
```

```
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alias.lol "log --oneline --graph --decorate"
```

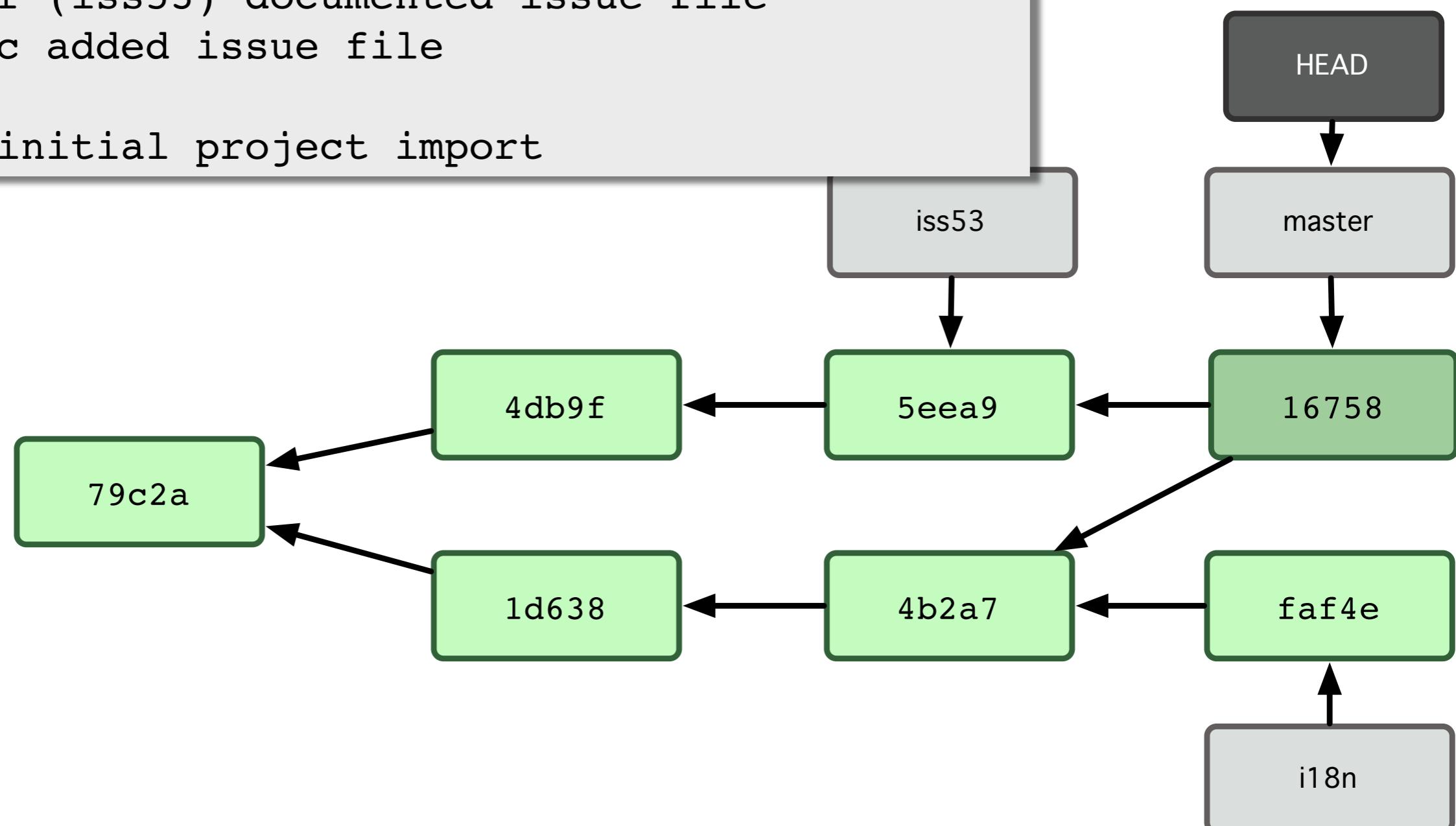
git lol

```
git config --global  
alias.lol "log --oneline --graph --decorate"
```

```
git lol
```

```
$ git lol --all
```

```
*faf4ece (i18n) update README to be more specific
| * 16758d8 (HEAD, master) Merge branch 'i18n'
|
| \
| /
|
* 4b2a7ae fix spacing issues in both c files
* 1d6389c added i18n file
* 5eea9cf (iss53) documented issue file
* 4db9f5c added issue file
|
* 79c2add initial project import
```



log subsets

```
git log branchA ^branchB
```

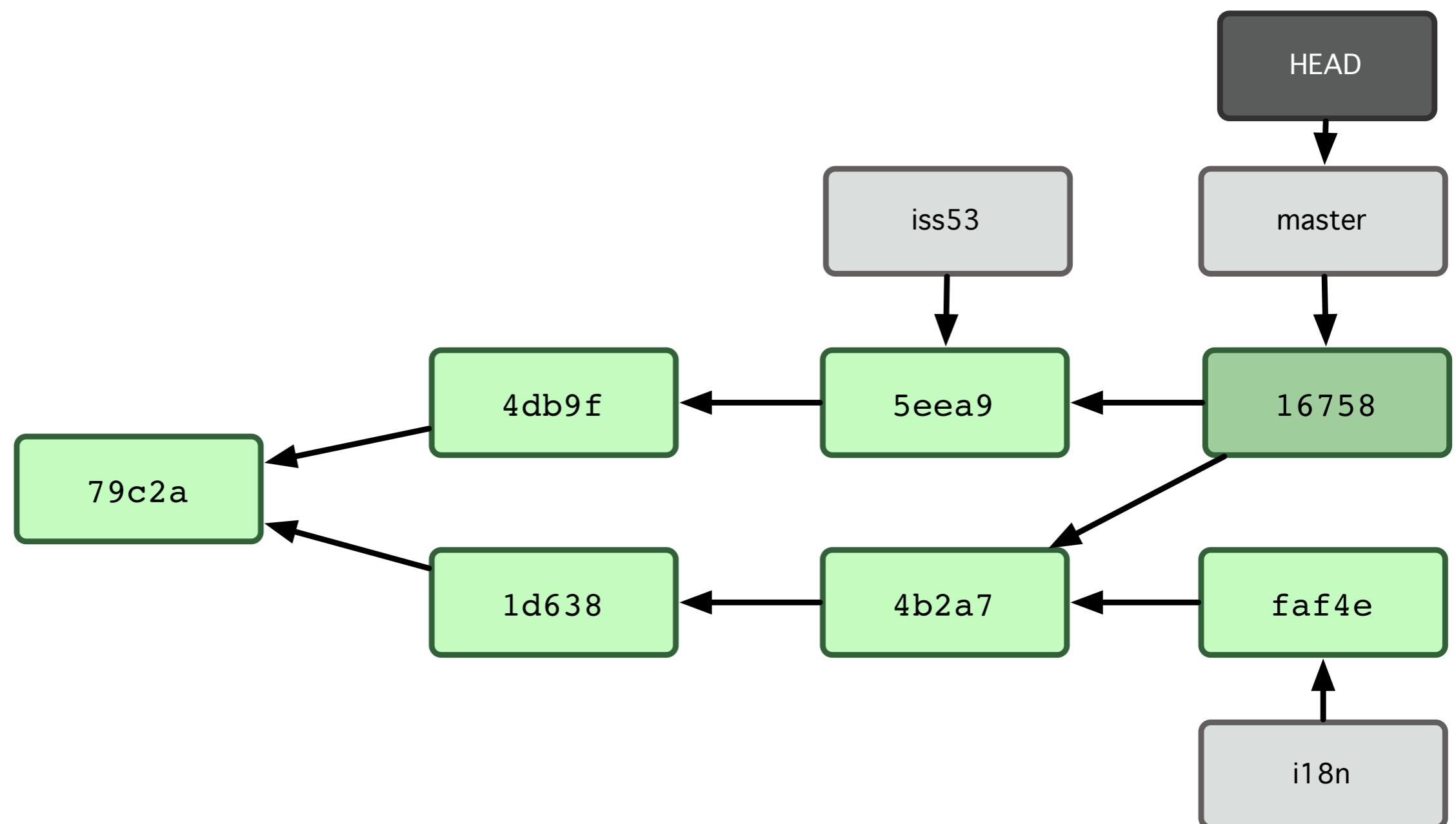
```
git log branchA ^branchB
```

show me commits reachable by branchA
that are not reachable by branchB

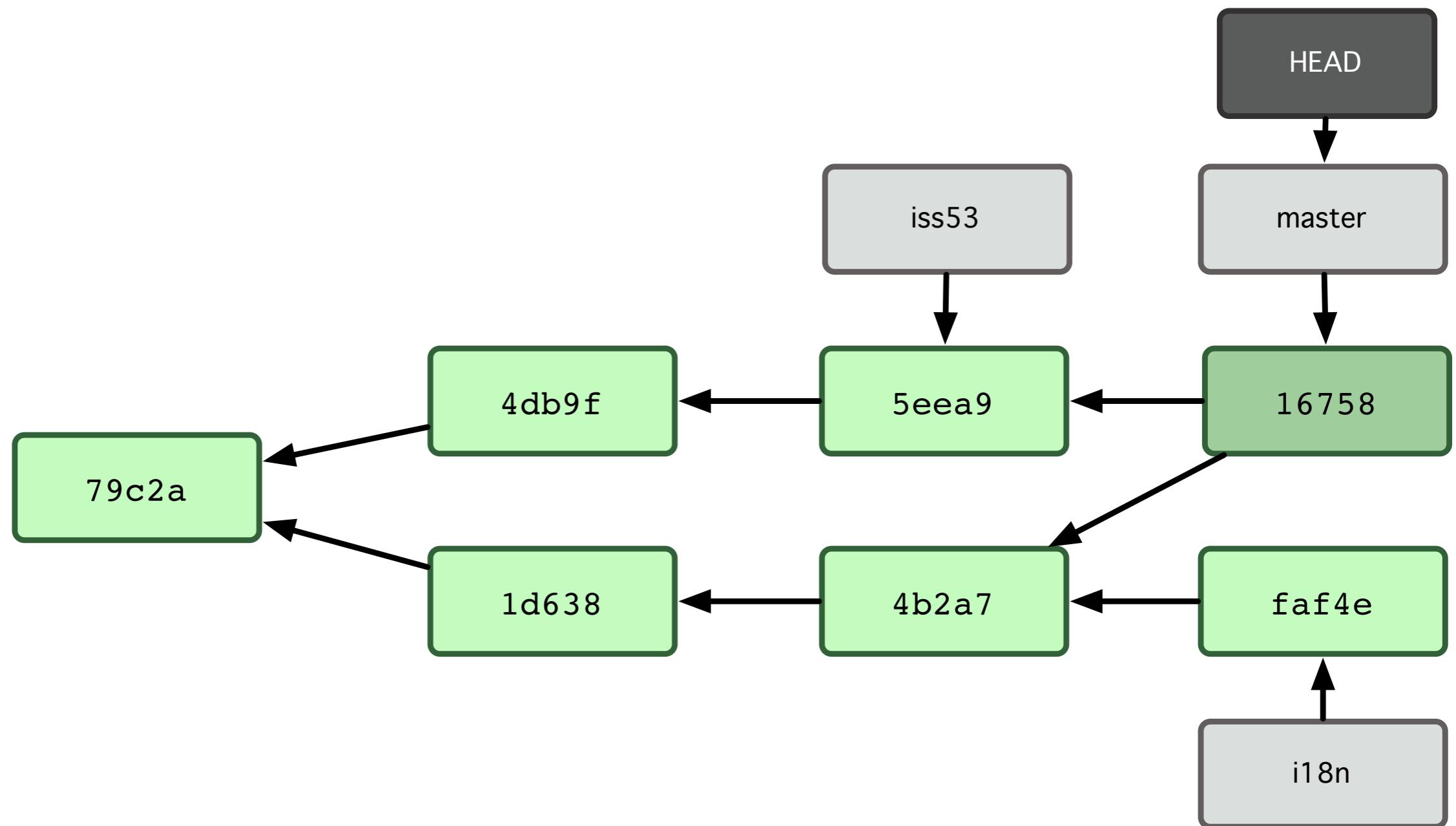
git log branchA ^branchB

git log branchA  branchB

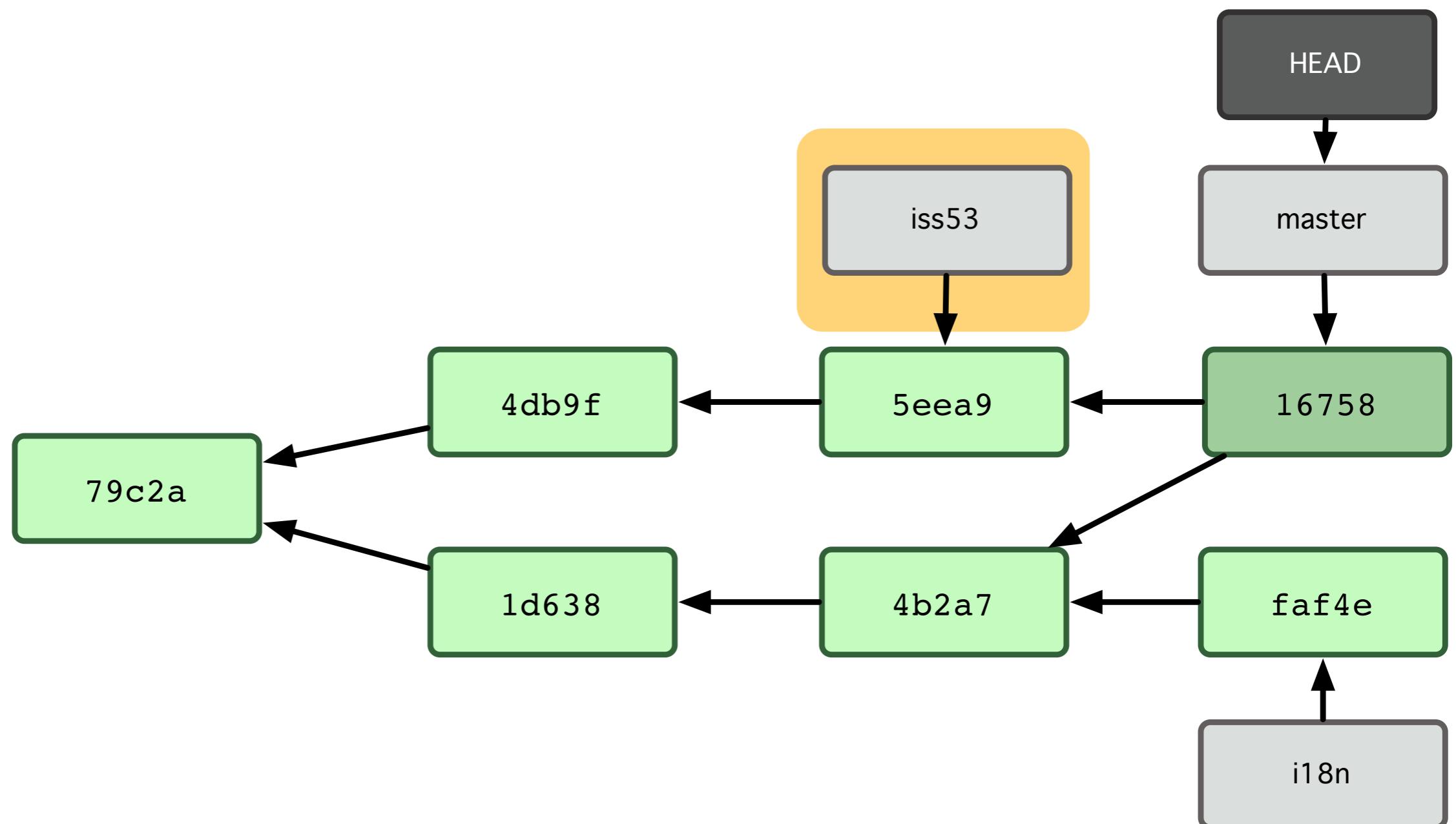
not reachable



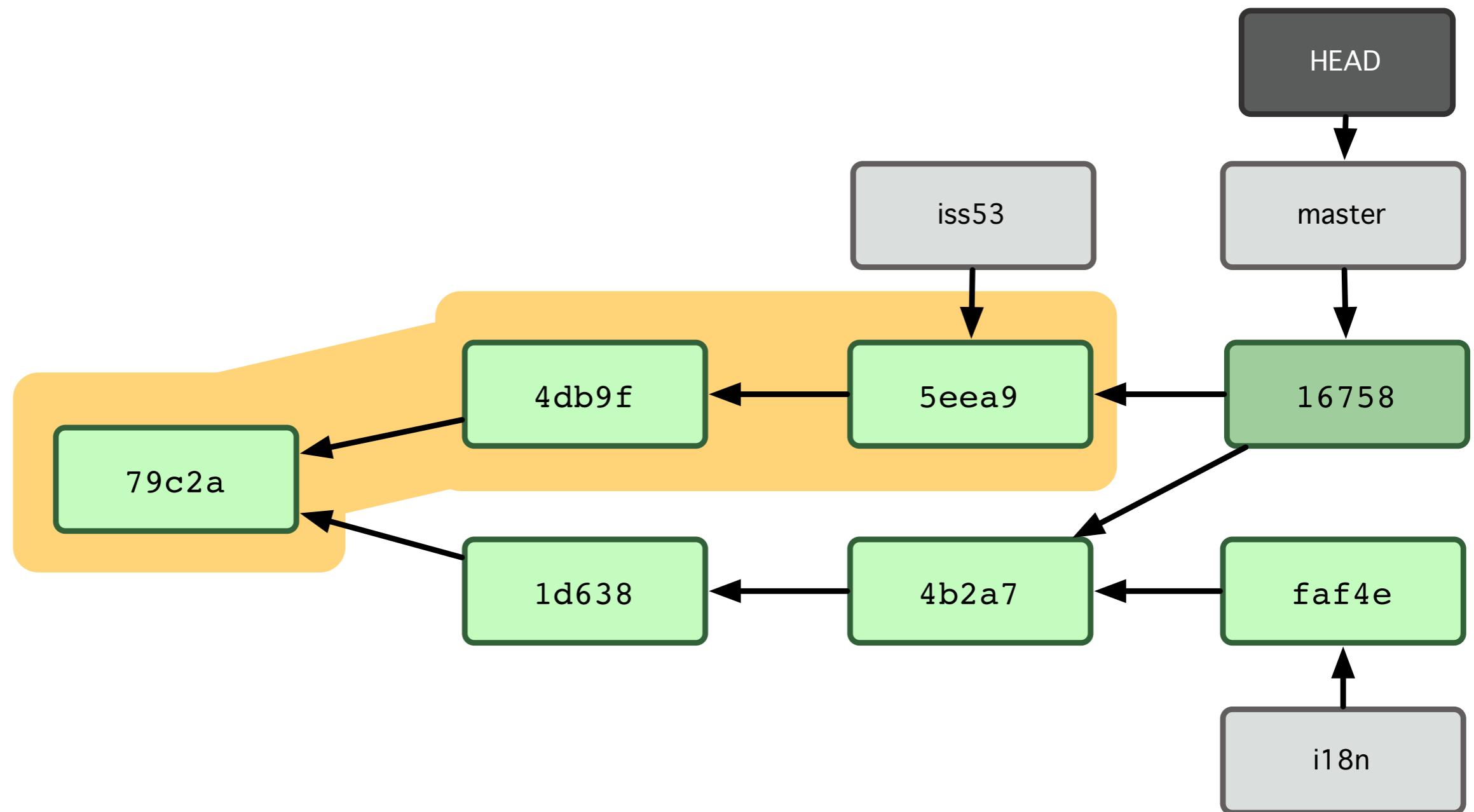
iss53 ^i18n



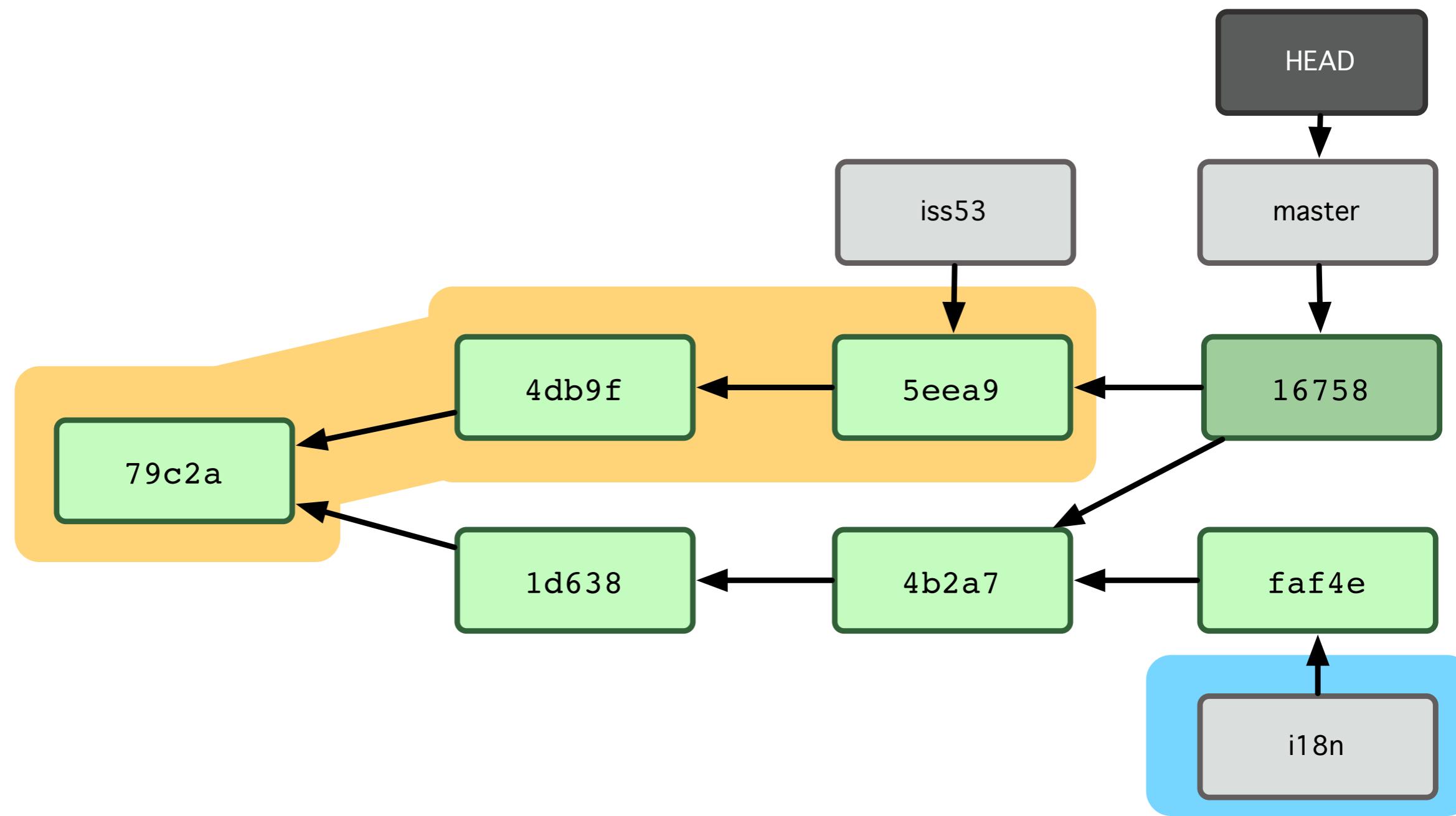
iss53 ^i18n



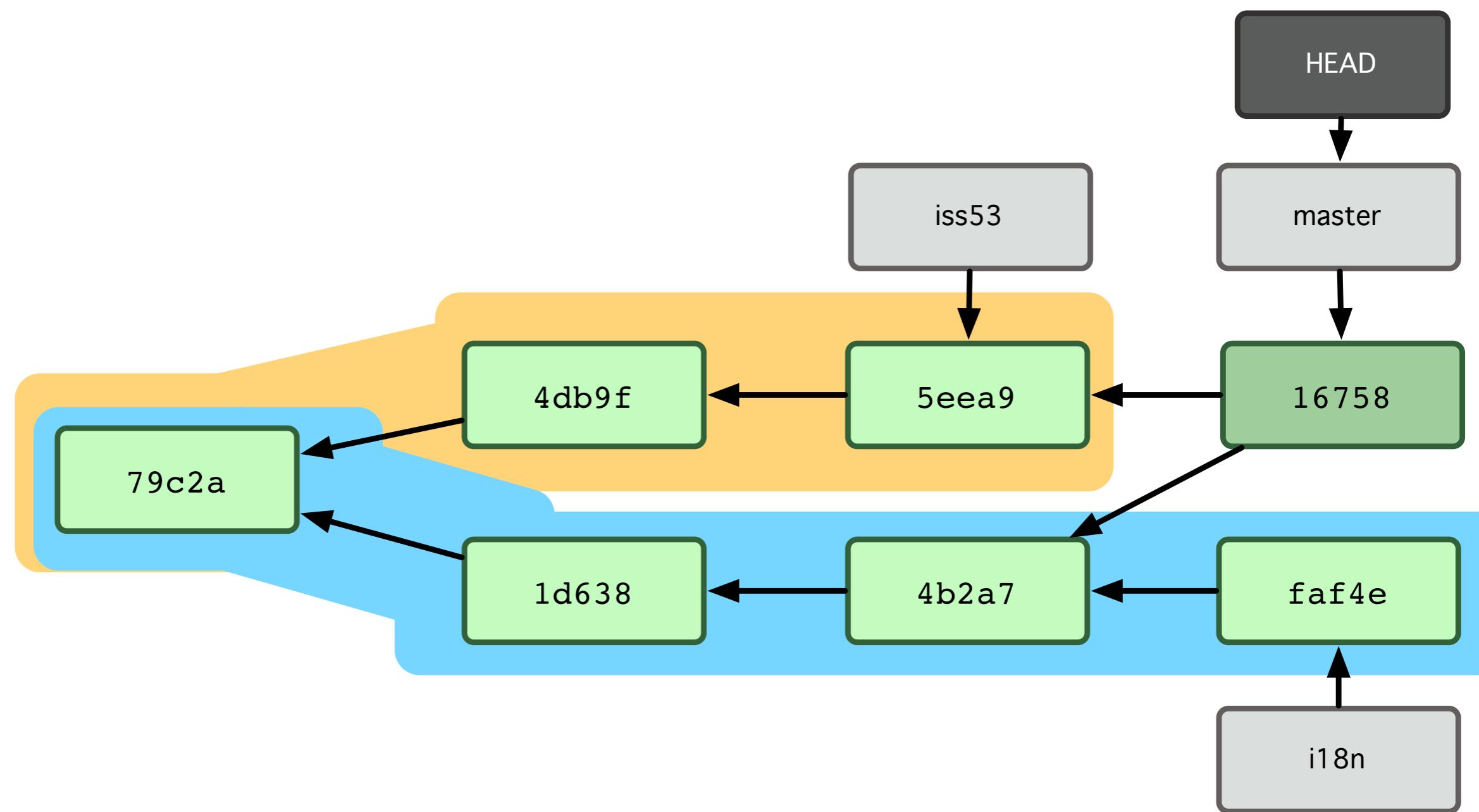
iss53 ^i18n



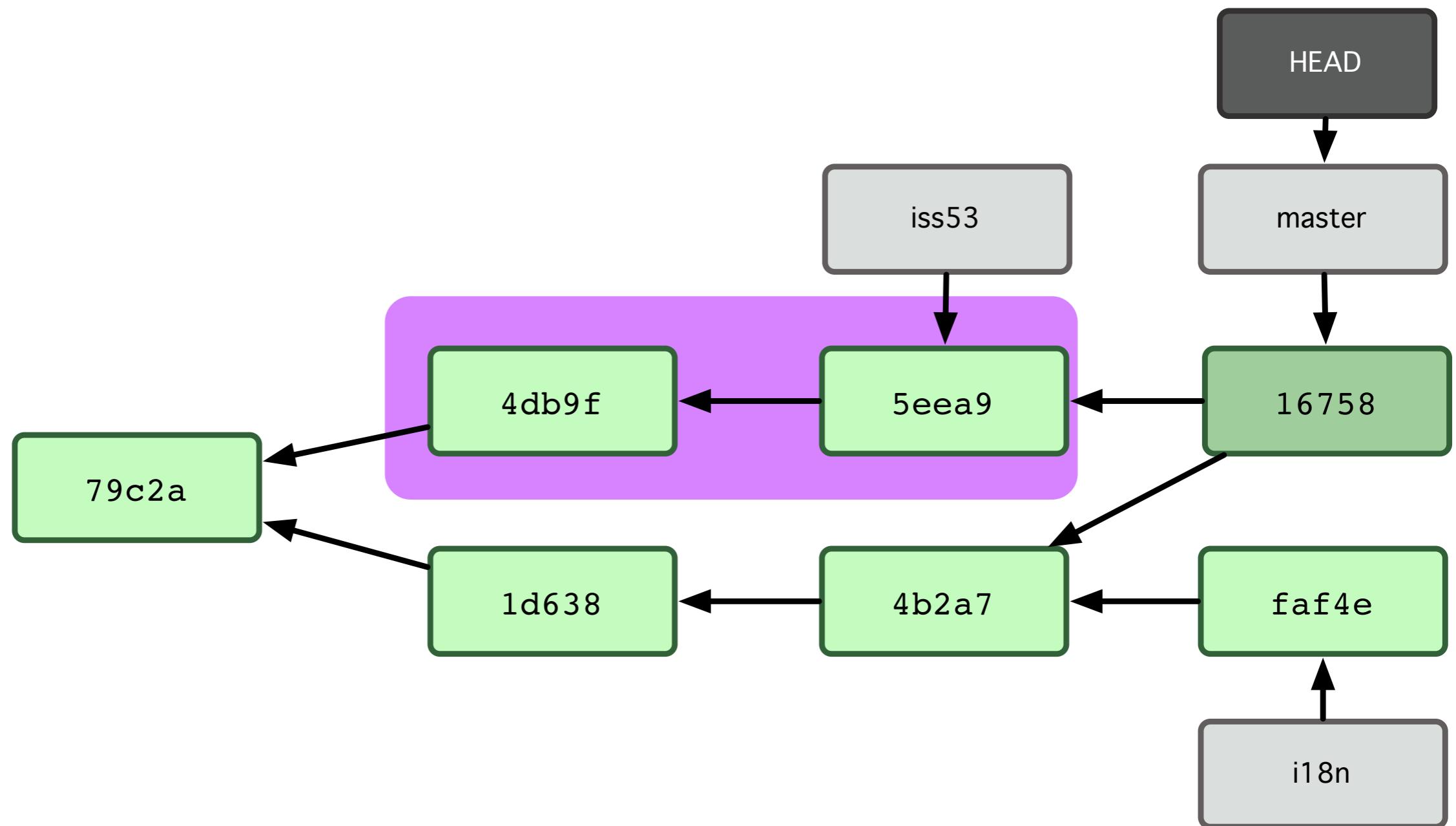
iss53 ^i18n



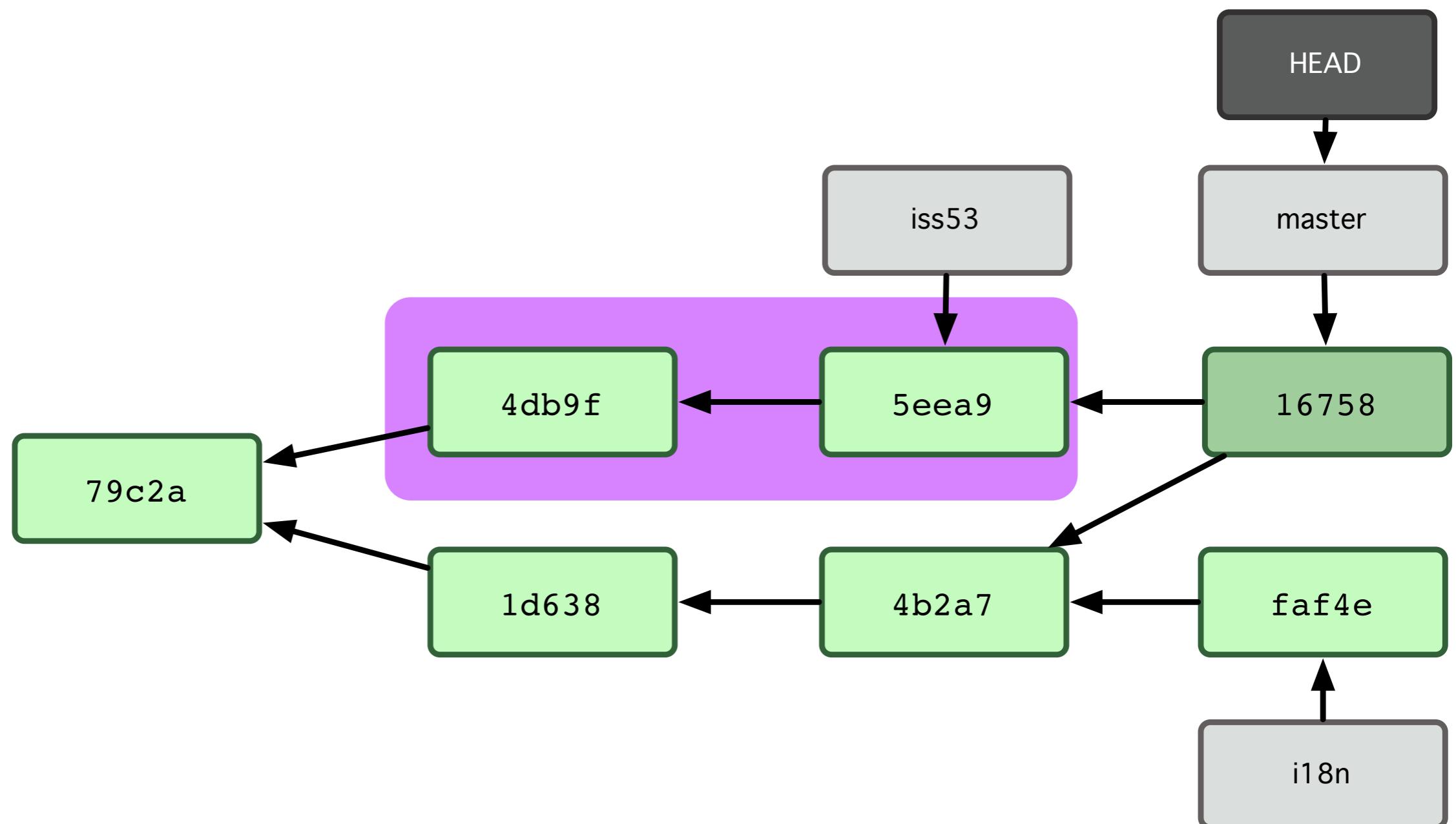
iss53 ^i18n



iss53 ^i18n

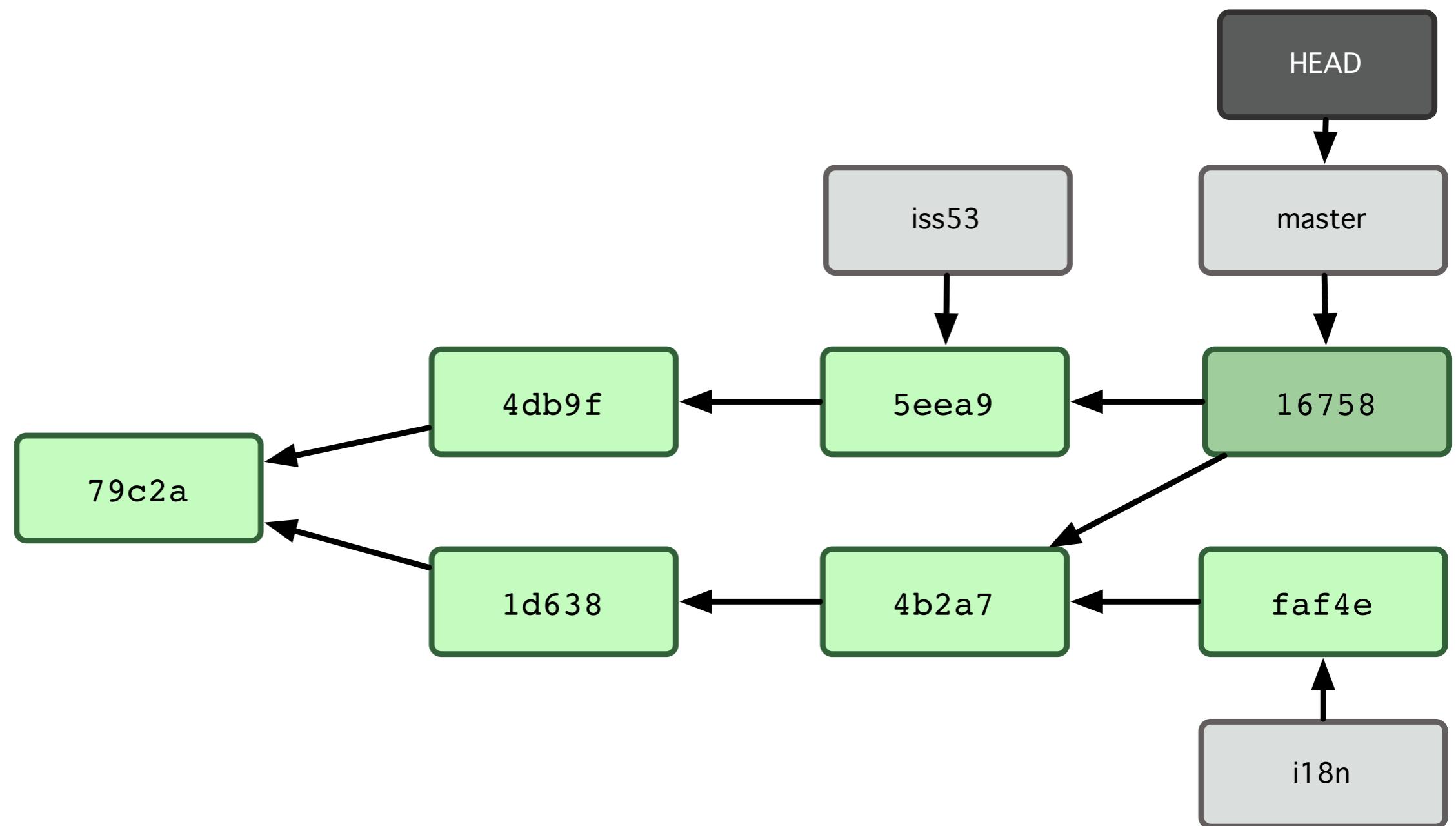


```
$ git lol iss53 ^i18n
* 5eea9cf (iss53) documented issue file
* 4db9f5c added issue file
```

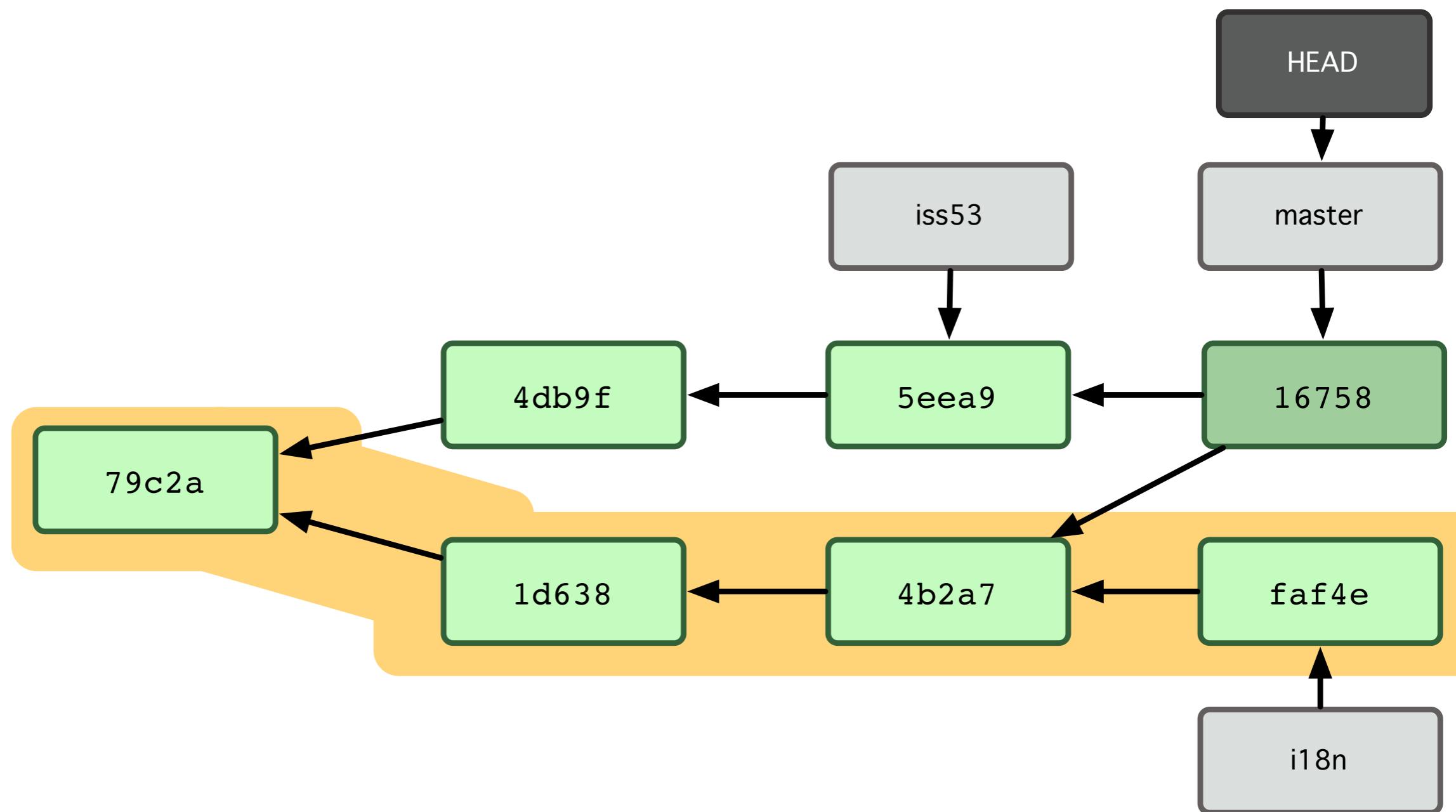


what work is in our i18n
branch that is not
merged into master yet?

i18n ^master

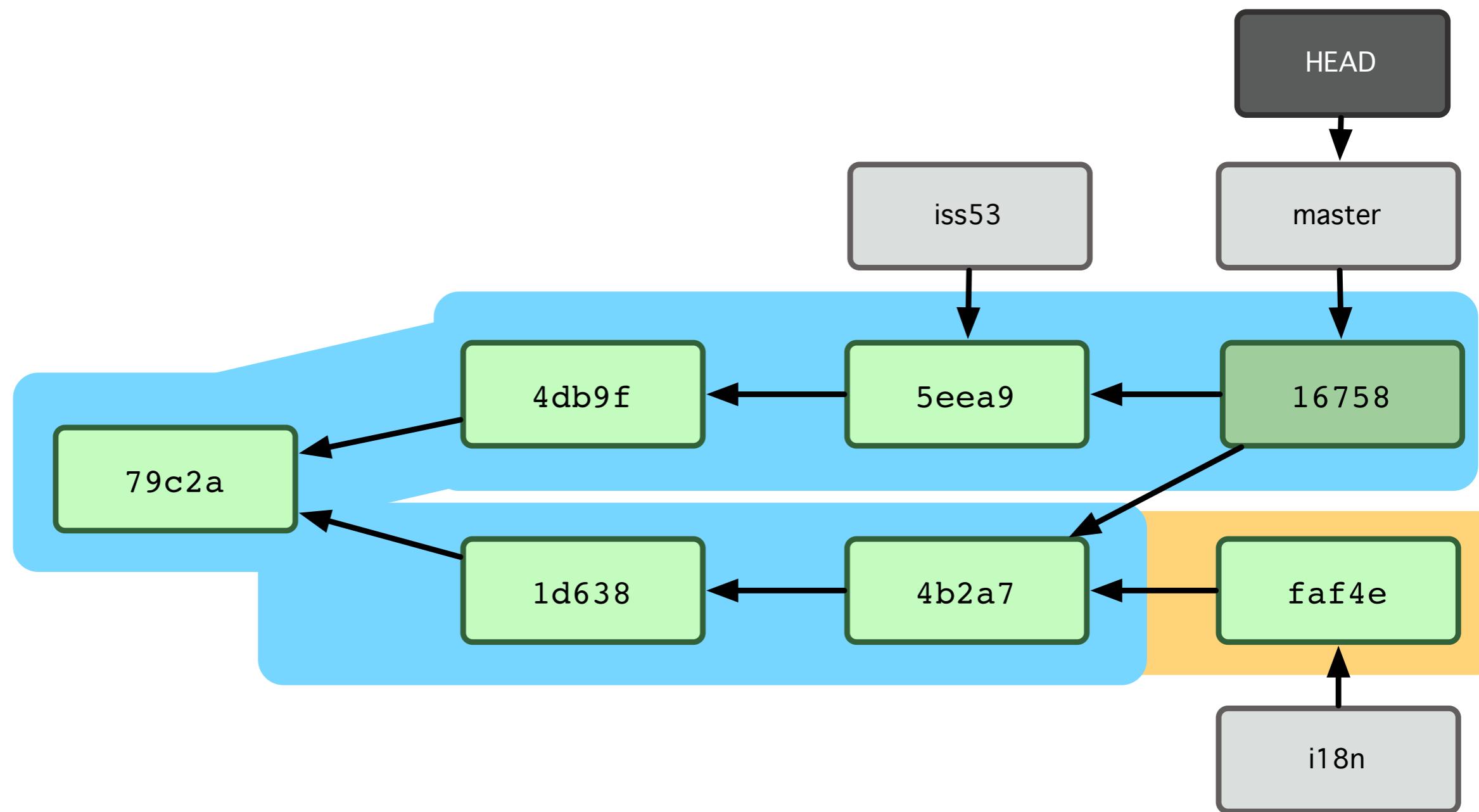


i18n ^master

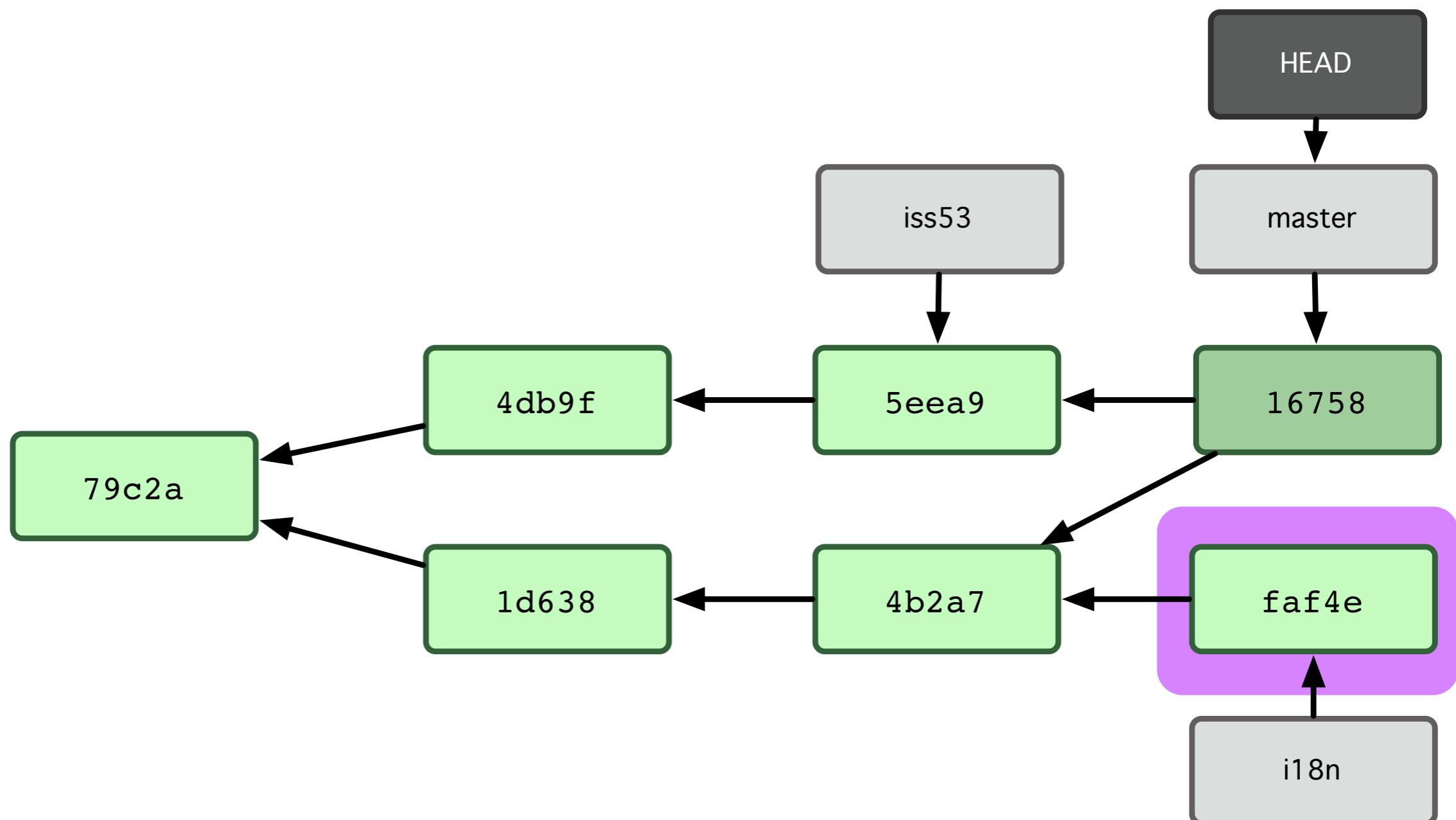


i18n

^master

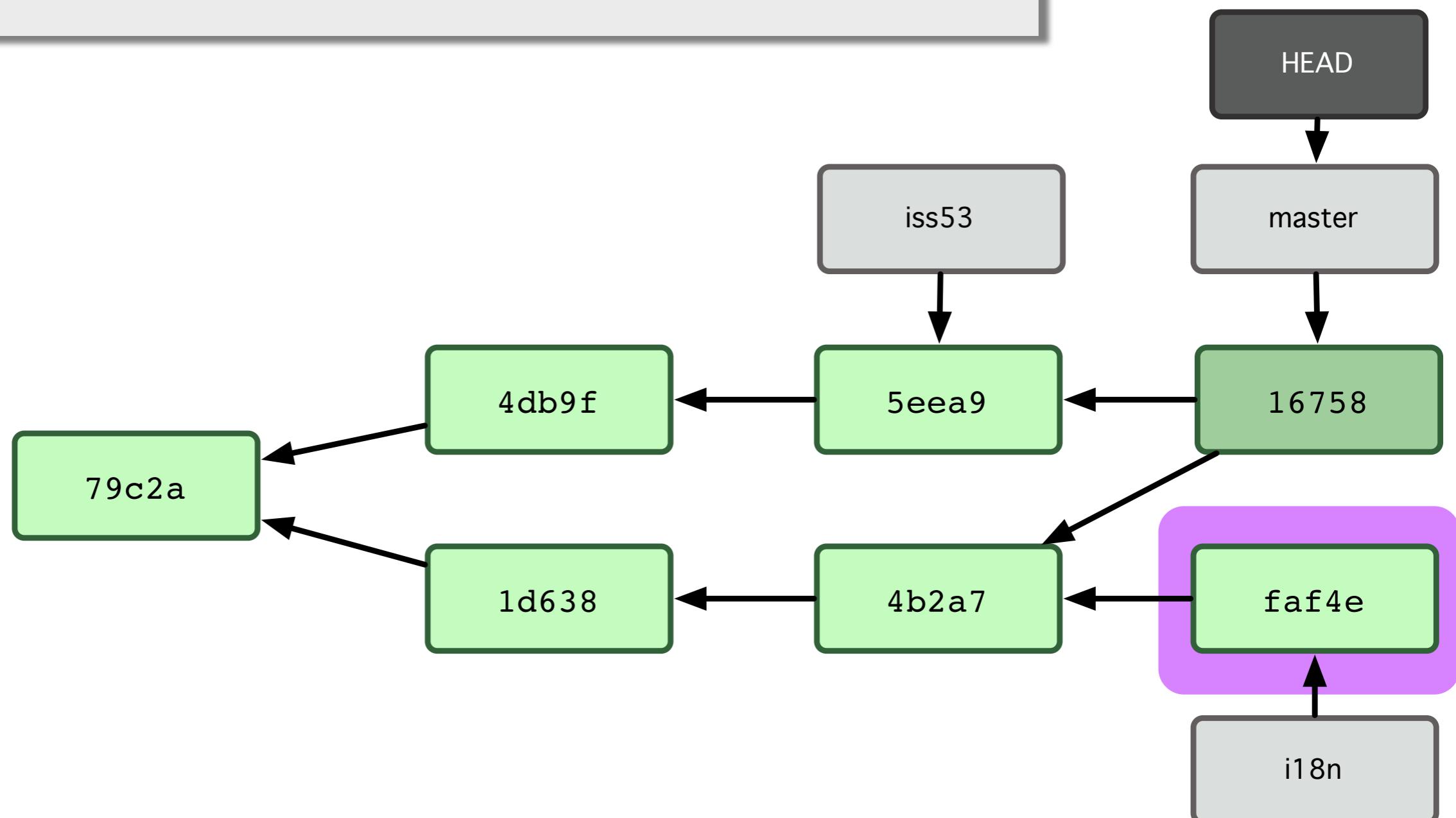


i18n ^master



```
$ git log i18n ^master
commitfaf4ecee82715967b07ff98e88796a311c8761fe
Author: Scott Chacon <schacon@gmail.com>
Date:   Wed Jul 28 16:30:00 2010 -0700

    update README to be more specific
$
```



quiz

```
git log origin/master ^master
```

```
git log master ^origin/master
```

Review

Review

git init

Review

git init

git clone

Review

git init

git clone

git add

Review

git init

git clone

git add

git status

Review

git init

git clone

git add

git status

git commit

Review

git init

git clone

git add

git status

git commit

git branch

Review

git init

git checkout

git clone

git add

git status

git commit

git branch

Review

git init

git checkout

git clone

git merge

git add

git status

git commit

git branch

Review

git init

git checkout

git clone

git merge

git add

git push

git status

git commit

git branch

Review

git init

git checkout

git clone

git merge

git add

git push

git status

git fetch

git commit

git branch

Review

git init

git checkout

git clone

git merge

git add

git push

git status

git fetch

git commit

git pull

git branch

Review

git init

git checkout

git clone

git merge

git add

git push

git status

git fetch

git commit

git pull

git branch

git log

Review

git init

git clone

git add

git status

git commit

git branch

git checkout

git merge

git push

git fetch

git pull

git log



2

Resources

git-scm.com

gitref.org

progit.com

schacon@gmail.com