Branching and merging with Git

Branches in Git

We've said before that Git enables collaboration but we haven't really got into how.

Branches are one of the features of Git that makes collaboration easier.

Branches in Git

You can think of a **branch** as a trajectory of work in the project.

When you `git status`, you may have noticed the mention of a branch called **master**:

```
$ git status
On branch master
```

Branches in Git

The `master` branch is created by default and, by convention, represents the main line for work in the project.

As you may have guessed, that means that they can be more than one simultaneous line of work in the project. All you have to do is create a new branch.

Creating a branch

You can create a new branch with the `git branch` command:

```
$ git branch newstuff
```

Creating a branch

You can then run `git branch` without the branch's name to list all the branches:

```
$ git branch newstuff

$ git branch
*master
newstuff
```

Creating a branch

```
$ git branch newstuff

$ git branch
*master
newstuff
```

Notice that `*` before the `master` branch. Even though we created the new branch, our repo is still on the the `master` branch.

Switching to a branch

To switch to the `newstuff` branch we use the `git checkout` command:

```
$ git checkout newstuff
Switched to branch newstuff

$ git branch
master
*newstuff
```

Switching to a branch

You can switch back and forth between branches at will.

```
$ git checkout master
Switched to branch 'master'

$ git checkout newstuff
Switched to branch 'newstuff'
```

The nature of a branch

But what is a branch really? Well, a branch is a **reference** to a specific commit.

Using the `--verbose` option, we can see this more clearly when we list the branches:

```
$ git branch --verbose
  master   90180bf Add important README
* newstuff 90180bf Add important README
```

The nature of a branch

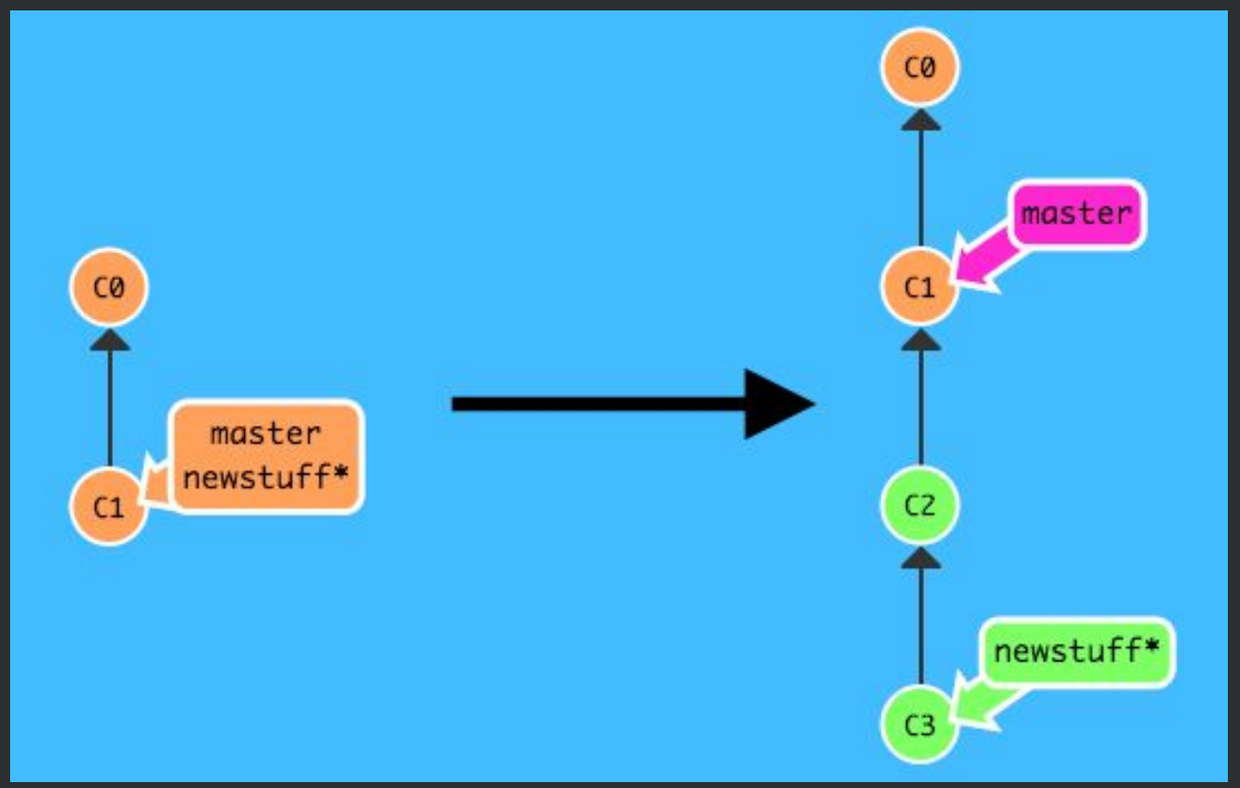
```
$ git branch --verbose
  master   90180bf Add important README
* newstuff 90180bf Add important README
```

We can see that both branches are currently pointing to the same commit:

```
$ git status
```

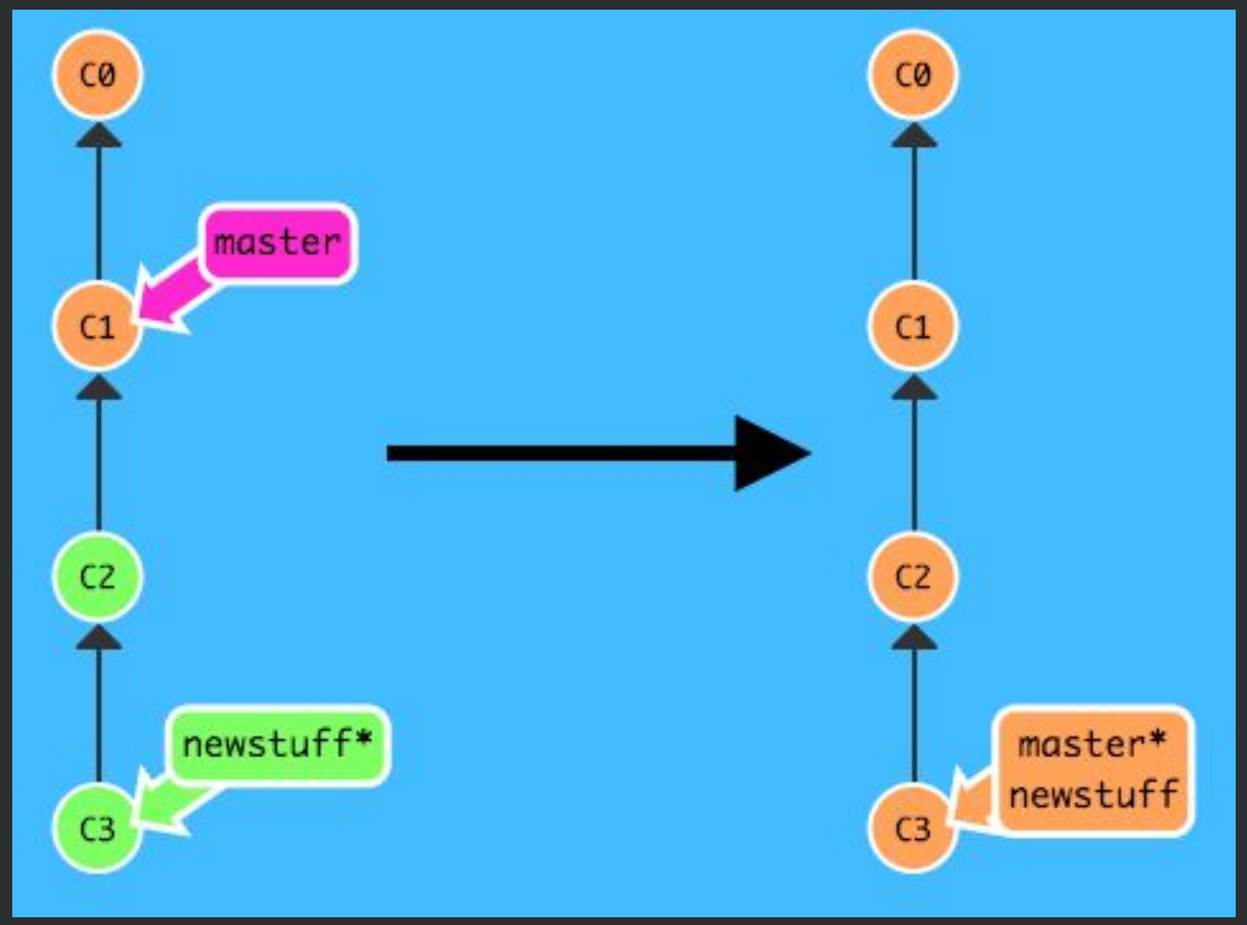
The nature of a branch

Now that we have two different branches, we can make changes to the `newstuff` branch independently of the `master` branch.



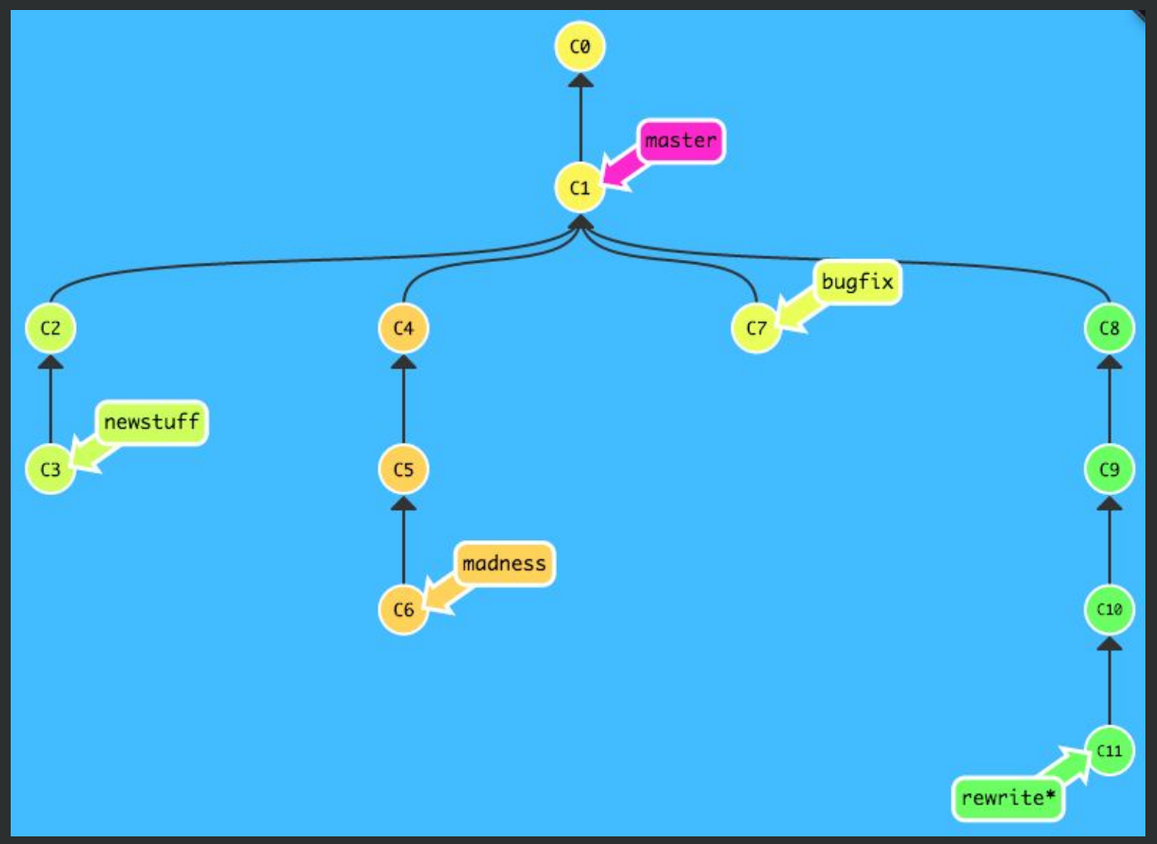
The nature of a branch

The idea is for that branch to eventually be reconciled back with `master` once the work on it is completed.



The nature of a branch

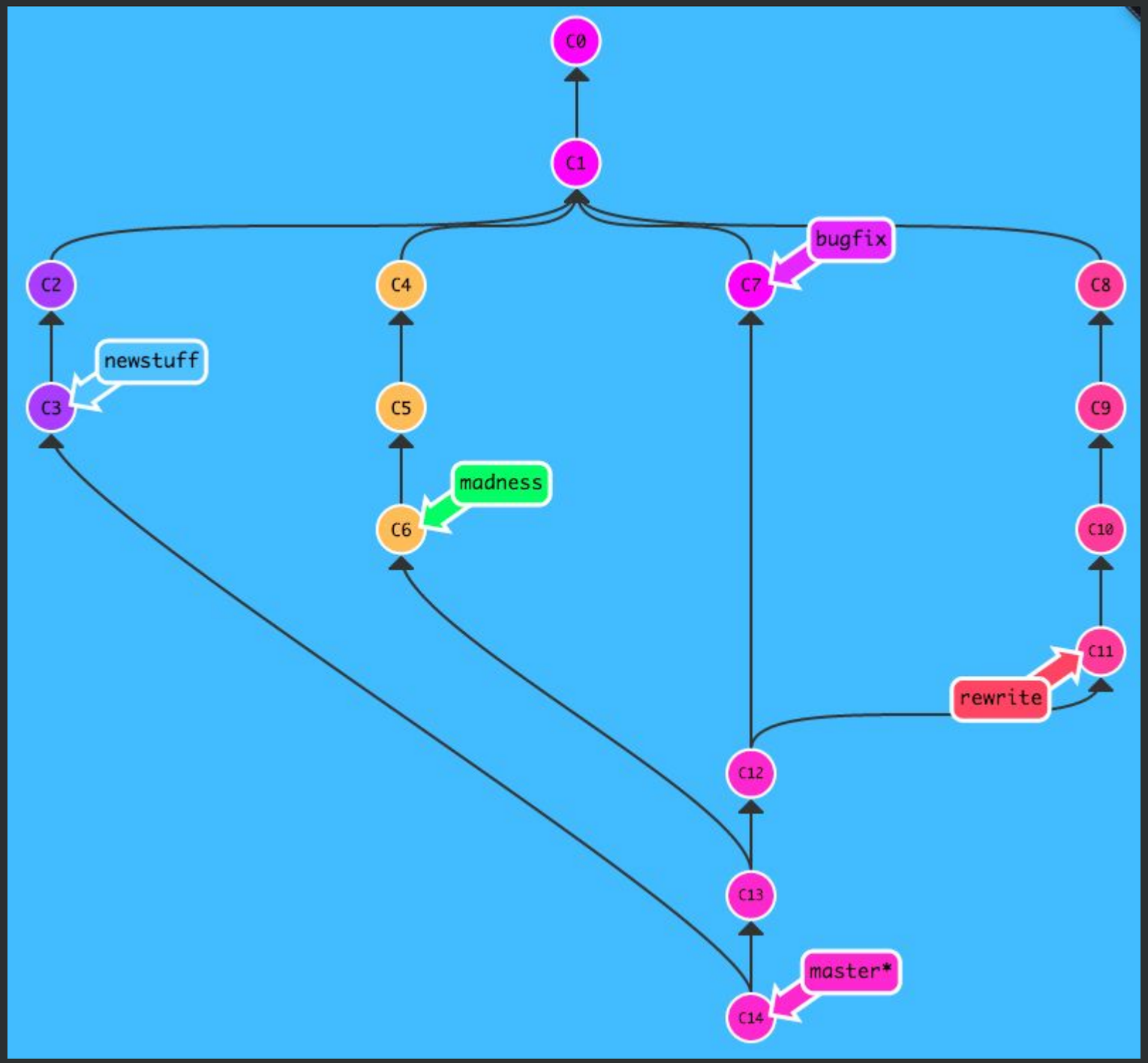
And there can be *a bunch* of branches going at a time. It's common for teams to do this to keep themselves organized.



The nature of a branch

At one point or another, all of them will be folded back into `master`.

The nature of a branch



Merging a branch

The way you reconcile is a branch with `master` is by **merging** the two branches.

Let's make some commits on the `newstuff` branch to then *merge* them into the `master` branch.

Developing on a branch

Let's add some more code to our `important_program.rb`:

```
  class ImportantThing
    def initialize(thing)
      @thing = thing
    end

    def thing
      return "You can't have '#{@thing}'. It's
too important."
    end
end

pizza = ImportantThing.new("pizza")
puts pizza.thing
```

Developing on a branch

Now add and commit those changes:

```
$ git add important_program.rb

$ git commit -m "Add ImportantThing class"
[newstuff 8149249] Add ImportantThing
class
 1 file changed, 13 insertions(+)
```

Developing on a branch

```
$ git add important_program.rb

$ git commit -m "Add ImportantThing class"
[newstuff 8149249] Add ImportantThing
class
 1 file changed, 13 insertions(+)
```

Notice how it mentions the `newstuff` branch in the commit result.

Developing on a branch

```
$ git add important_program.rb

$ git commit -m "Add ImportantThing class"
```

Now if we use the `--verbose` option (just `-v` for the lazy) to take a look at the branches again we see that they are now on different commits.

```
$ git branch -v
  master   90180bf Add important README
* newstuff 8149249 Add ImportantThing
class
```

Merging a branch

Now we are ready to merge our changes. First thing we need to do is switch to the branch that will receive the merge. In this case it's `master`.

```
$ git checkout master
```

Merging a branch

Now we can merge with `newstuff`:

```
$ git checkout master

$ git merge newstuff
Updating 90180bf..8149249
Fast-forward
 important_program.rb | 13 ++++++++++++++
 1 file changed, 13 insertions(+)
```

Notice that it says *Fast-forward*. We will talk about that in a bit.

Merging a branch

Let's take another look at the branches. They should both be pointing to the same commit again.

```
$ git branch -v
* master   8149249 Add ImportantThing
class
  newstuff 8149249 Add ImportantThing
class
```

Deleting a branch

Now that the branch is merged, it can safely be deleted. It's important to take this step so that old branches don't accumulate over time.

```
$ git branch --delete newstuff
Deleted branch newstuff (was 8149249).
```

Visualizing merges

Since this is hard to picture yourself, let's present branches and merges in a more interactive way.

Let's visit the Learn Git Branching Sandbox

More practice with branches

For more practice do some of the levels of Learn Git Branching

http://pcottle.github.io/learnGitBranching

Remember kids: **ABC**

ALWAYS BE COMMITTING