

# % \$ ☆ ! ~ & @

# OH SHIT, GIT!

RECIPES FOR GETTING OUT OF A GIT MESS



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# what's this?

If you find git confusing, don't worry! You're not alone. People who've been using it every day for years still make mistakes and aren't sure how to fix them. A lot of git commands are confusingly named (why do you create new branches with `git checkout`?) and there are 20 million different ways to do everything.



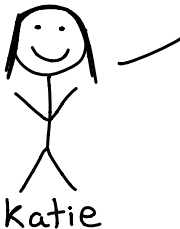
actual  
man page

## \$ man git reset

In the first and second form, copy entries from <tree-ish> to the index. In the third form, set the current branch head (HEAD) to <commit>, optionally modifying index and working tree to match. The <tree-ish>/<commit> defaults to HEAD in all forms.

is this even  
English?

This zine explains some git fundamentals in plain English, and how to fix a lot of common git mistakes.

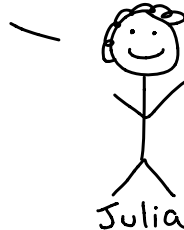


katie

creator of

<https://ohshitgit.com>

we're here  
to help!



Julia

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# A SHA always refers to the same code

Let's start with some fundamentals! If you understand the basics about how git works, it's WAY easier to fix mistakes. So let's explain what a git commit is!

Every git commit has an id like `3f29abcd233fa`, called a SHA ("Secure Hash Algorithm"). A SHA refers to both:

-  the changes that were made in that commit see them with 'git show'
-  a snapshot of the code after that commit was made

No matter how many weird things you do with git, checking out a SHA will always give you the exact same code. It's like saving your game so that you can go back if you die ☺

You can check out a commit like this:

```
git checkout 3f29ab
```

SHAs are long, but you can just use the first 6 characters

This makes it way easier to recover from mistakes!

10 am



ok, let's commit, that's 3f29ab



I really screwed up this file, let's go back to the version from

3f29ab

# A branch is a pointer to a commit

A branch in git is a pointer to a commit SHA:

```
main → 2e9fab  
awesome-feature → 3bafea  
fix-typo → 775f06
```

Here's some proof! In your favourite git repo, run this command:

```
$ cat .git/refs/heads/main
```

↑  
this is a text file  
containing "2e9fab..."

Understanding what a branch is will make it MUCH easier to fix your branches when they're broken: you just need to figure out how to get your branch to point at the right commit again!

3 main ways to change the commit a branch points to:

- ★ `git commit` will point the branch at the new commit
- ★ `git pull` will point the branch at the same commit as the remote branch
- ★ `git reset COMMIT_SHA` will point the branch at COMMIT\_SHA

# HEAD is the commit you have checked out

In git you always have some commit checked out. `HEAD` is a pointer to that commit and you'll see `HEAD` used a lot in this zine. Like a branch, `HEAD` is just a text file. Run `cat .git/HEAD` or `git status` to see the current `HEAD`.

Examples of how to use `HEAD`:

→ show the diff for the current commit:

```
git show HEAD
```

→ UNDO UNDO UNDO UNDO: reset branch to 16 commits ago

```
git reset --hard HEAD~16
```


HEAD~16 means  
16 commits ago

→ show what's changed since 6 commits ago:

```
git diff HEAD~6
```

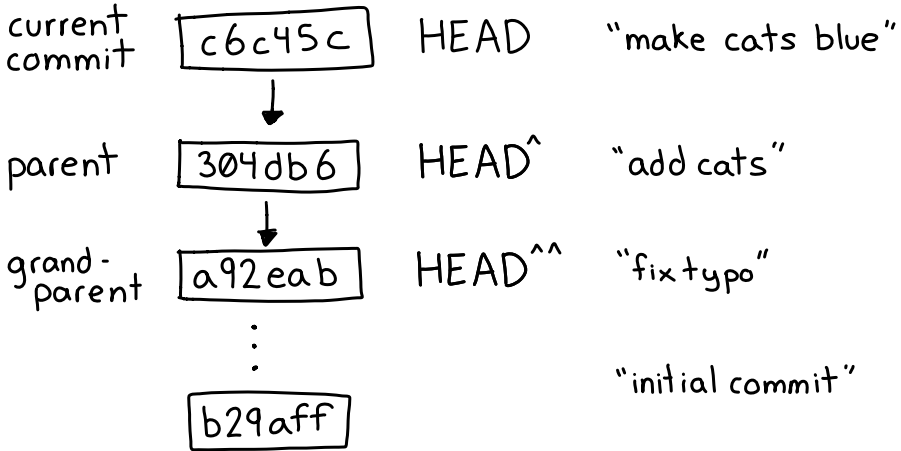
→ squash a bunch of commits together

```
git rebase -i HEAD~8
```

 this opens an editor,  
use "fixup" to squash  
commits together

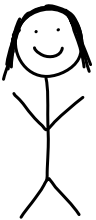
# every commit has a parent

Every commit (except the first one!) has a parent commit!  
You can think of your git history as looking like this:



**HEAD** always refers to the current commit you have checked out, and **HEAD^** is its parent. So if you want to go look at the code from the previous commit, you can run

git checkout **HEAD^**



commits don't always have 1 parent. Merge commits actually have 2 parents!

git log shows you all the ancestors of the current commit, all the way back to the initial commit

# mistakes you can't fix

Most mistakes you make with git can be fixed. If you've ever committed your code, you can get it back. That's what the rest of this zine is about!

Here are the dangerous git commands: the ones that throw away uncommitted work.



git reset --hard COMMIT

- ① Throws away uncommitted changes
- ② Points current branch at COMMIT

Very useful, but be careful to commit first if you don't want to lose your changes!



git clean

Deletes files that aren't tracked by git.



git checkout BRANCH FILE <sup>← or directory</sup>

Replaces FILE with the version from BRANCH.  
Will overwrite uncommitted changes.





I need to change the message  
on my last commit!

No problem! Just run:

```
git commit --amend
```

Then edit the commit message & save!

`git commit --amend` will replace the old commit with  
a new commit with a new SHA, so you can always  
go back to the old version if you really need to.



if you run 'git commit' but change your  
mind, you can always abort by deleting  
the commit message, saving, and quitting.  
Or quit without saving!



I committed but I need to make one small change!

- ① Make your change
- ② Add your files with `git add`
- ③ Run:

```
git commit --amend --no-edit
```



this usually happens to me when I forget to run tests / linters before committing!

You can also add a new commit and use `git rebase -i` to squash them but this is about a million times faster.



I accidentally committed to the wrong branch!

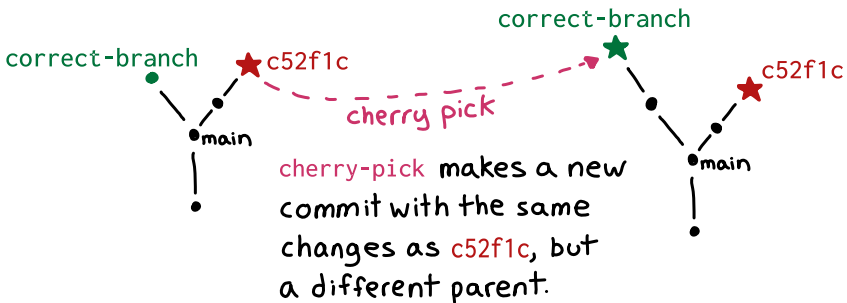
- ① Check out the correct branch

```
git checkout correct-branch
```

- ② Add the commit you wanted to it

```
git cherry-pick c52f1c
```

use 'git show wrong-branch'  
to find this



- ③ Delete the commit from the wrong branch

```
git checkout wrong-branch
```

```
⚠ git reset --hard HEAD^
```



be careful when running 'git reset --hard'!  
I always run 'git status' first to check  
for uncommitted changes



I committed something to main that should have been on a brand new branch!

① Make sure you have `main` checked out:

```
git checkout main
```

② Create the new branch:

```
git branch my-new-branch
```

③ Remove the unwanted commit from main:

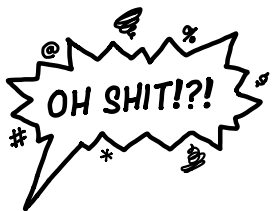
```
git status  
▽ git reset --hard HEAD~  
careful!
```

④ Check out the new branch!

```
git checkout my-new-branch
```



'git branch' and 'git checkout -b' both create a new branch. The difference is 'git checkout -b' also checks out the branch



I tried to run a diff but nothing happened?



did you know there are 3 ways to diff?!

Suppose you've edited 2 files:

```
$ git status
```

```
On branch main
```

```
Changes to be committed:
```

```
modified: staged.txt
```

← staged changes  
(added with 'git add')

```
Changes not staged for commit:
```

```
modified: unstaged.txt
```

← unstaged  
changes

Here are the 3 ways git can show you a diff for these changes:

- `git diff`: unstaged changes
- `git diff --staged`: staged changes
- `git diff HEAD`: staged+unstaged changes

A couple more diff tricks:

- `git diff --stat` gives you a summary of which files were changed & number of added/deleted lines
- `git diff --check` checks for merge conflict markers & whitespace errors



I have a  
?! merge conflict?!

Suppose you had `main` checked out and ran  
`git merge feature-branch`.

If that causes a merge conflict, you'll see something like this in the files with conflicts:

```
<<<<<<< HEAD
if x == 0:
    return false
=====
if y == 6:
    return true
elif x == 0:
    return false
>>>>>>> d34367
```

} code from `main`

} code from `feature-branch`

To resolve the conflict:

- ① Edit the files to fix the conflict
- ② `git add` the fixed files
- ③ `git diff --check`: check for more conflicts.
- ④ `git commit` when you're done. ← or `git rebase --continue` if you're rebasing!



You can use a GUI to visually resolve conflicts with 'git mergetool'. Meld ([meldmerge.org](http://meldmerge.org)) is a great choice!



I committed a file that should be ignored!

Did you accidentally commit a 1.5GB file along with the files you actually wanted to commit? We've all done it.

① Remove the file from Git's index:

```
git rm --cached FILENAME
```

This is safe: it won't delete the file

② Amend your last commit:

```
git commit --amend
```

③ (optional) Edit your `.gitignore` so it doesn't happen again



now your coworkers won't be stuck downloading a HUGE git commit!



I started rebasing and now I have 10000000 conflicts to fix!

This can happen when you're rebasing many commits at once.

① Escape the rebase of doom:

```
git rebase --abort
```

② Find the commit where your branch diverged from main:

```
git merge-base main my-branch
```

③ Squash all the commits in your branch together:

```
git rebase -i $SHA_YOU_FOUND
```

④ Rebase on main:

```
git rebase main
```

↑ output of  
git merge-base  
goes here



alternatively, if you have 2 branches with many conflicting commits, you can just merge!





I want to split my commit into 2 commits!

- ① Stash any uncommitted changes (so they don't get mixed up with the changes from the commit):

```
git stash
```

- ② Undo your most recent commit:

```
git reset HEAD^
```



safe: this points your branch at the parent commit but doesn't change any files

- ③ Use `git add` to pick and choose which files you want to commit and make your new commits!

- ④ Get your uncommitted changes back:

```
git stash pop
```



You can use `git add -p` if you want to commit some changes to a file but not others!



I want to undo something from 5 commits ago!

If you made a mistake but want to keep all of the commits since then, `git revert` is your friend!

`git revert` will create a reverse patch for the changes in a commit and add it as a new commit.

- ① Find the commit SHA for the commit you want to undo.
- ② Run:  

```
git revert $SHA_YOU_FOUND
```
- ③ Enter a commit message for the revert commit.

Now all of the changes you made in that commit are undone!



this is super useful if you push a bad commit to a shared repository and need to undo it!



I did something terribly wrong, does git have a magic time machine?

Yes! It's called `git reflog` and it logs every single thing you do with git so that you can always go back.

Suppose you ran these git commands:

- ① `git checkout my-cool-branch`
- ② `git commit -am "add cool feature"`
- ③ `git rebase main`

Here's what `git reflog`'s output would look like. It shows the most recent actions first:

```
                :
③ rebase:      245fc8d HEAD@{2} rebase -i (start)
② commit:     b623930 HEAD@{3} commit
① checkout:   01d7933 HEAD@{4} checkout
                :
```

If you really regret that rebase and want to go back, here's how:

```
git reset --hard b623930
git reset --hard HEAD@{3}
```

↙ ↘ 2 ways to refer to that commit before the rebase



love this?  
<https://ohshitgit.com>

