Lecture 06: Version control with git and github

Drew Steen

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This lecture borrows heavily from Chacon (2014) Pro Git, which is also the source of the figures except as noted.

Version control: Why

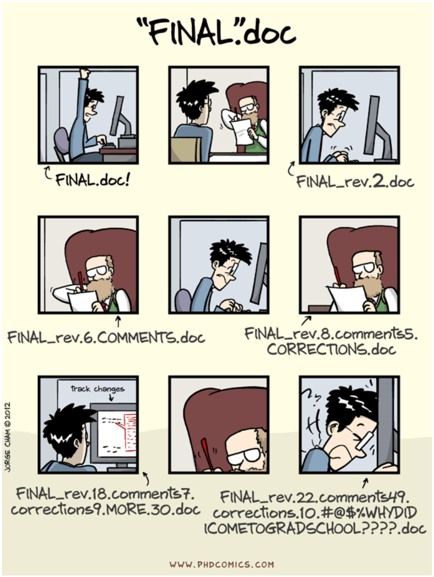


Figure 1: final.doc

Version control: Why

- Collaboration: like Word's 'track changes' for code (or anything else)
- *Unlike* Word's 'track changes', easily roll back to any former state.
  - Particularly useful for code, where a change can break your code in ways that can be tough to understand
- git + github: easy remote backup for your project
- issue tracking tool built into github is handy for fixing bugs as well as organizing work that needs to be done

Git: What

- A set of files and directories under version control is called repository or *repo* - must all be within the same master directory
- Based on 'commits'
- 'Snapshots' of the state of your
- All this information lives in the `.git` directory - this is the actual repo

Git: What

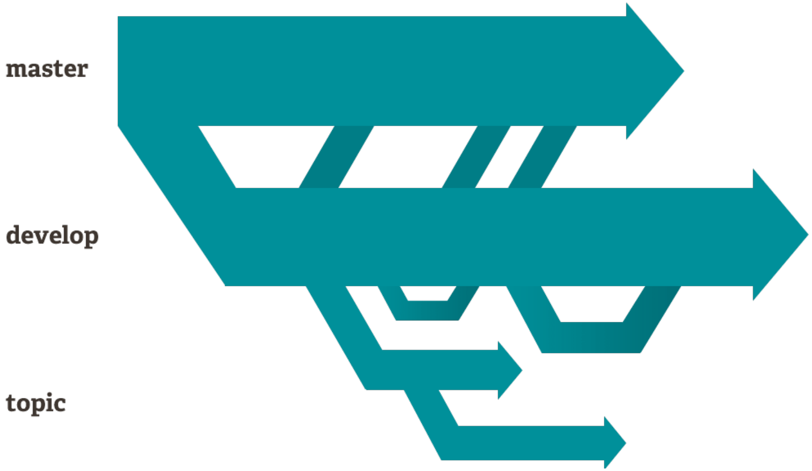
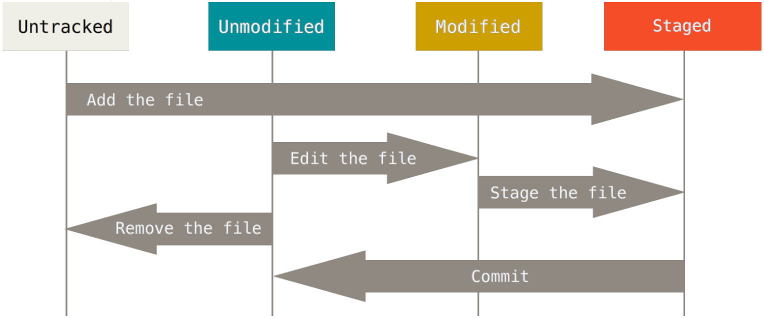


Figure 2: branching in git

Git: How

The Three States of Git

- The three states: Working directory, staging area, and git repository:



Git: How

- Three key commands
  - `git add`: move files in the working directory to the staging area: `git add myscript.R`. This means *add to the next commit* not *add to the project*.
  - `git commit`: move files from the staging area to the repo: `git commit -m "corrected normalization procedure"`
  - `git rm --cached [filename]`: Removes file from git repository (i.e. stops tracking) without deleting file from disk
- Check the state and history of your repo:
  - `git status`
  - `git log`

Git: How

- Working with remotes:
  - `clone`: get a total local copy of a remote repo (generally do it just once at the start of a project)
  - `fetch`: get any data from remote project that you don't yet have
  - `pull`: get any data from remote project and also merge it to the specified branch
  - `push`: send the specified branch to the remote, e.g. `git push origin master`
- Branching
  - `git branch [branchname]`: create new branch [branchname].
  - `get checkout [branchname]`: moves **HEAD** to point to [branchname]. **Note what this does to the files you see in your file browser!**
  - `git merge [branchname]`: merge changes from [branchname] into current branch (wherever HEAD is pointing)

A very simple workflow

(Images are Fig 26 and 27 from Chacon Chapter 3.4)

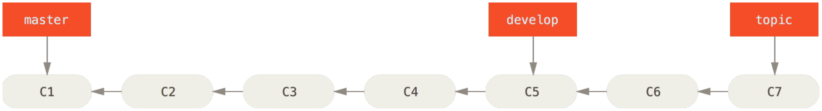


Figure 3: A simple workflow, v1

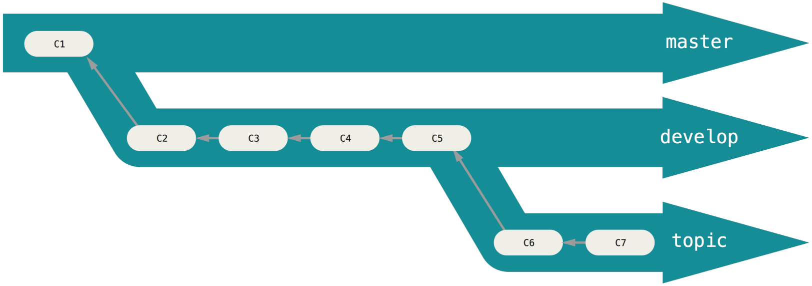


Figure 4: A simple workflow, v2