Introduction to git

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Where to find this presentation

Find the presentation at https://tinyurl.com/y8pr4mvq.

On this page click on 'Download' to get a copy of the presentation.

https://xkcd.com/1597/

Some commentary...

https://stevebennett.me/2012/02/24/10-things-i-hate-about-git/

Purpose of presentation

- I don't want to teach you how to use git.
- Rather I want to illustrate (part of) git's 'internal model' and to define certain key git terminology so that you will be better prepared to teach yourself git.

Why is git so hard to come to terms with?

- It's not your fault.

- The internal model is complicated.
- The interface is inconsistent.
- The documentation is unhelpful.
- Several key ideas have been given misleading names.
- It uses a 'distributed' model whereas what you usually want is a 'client/server' model. So you tend to be 'fighting against the paradigm'...

Source control

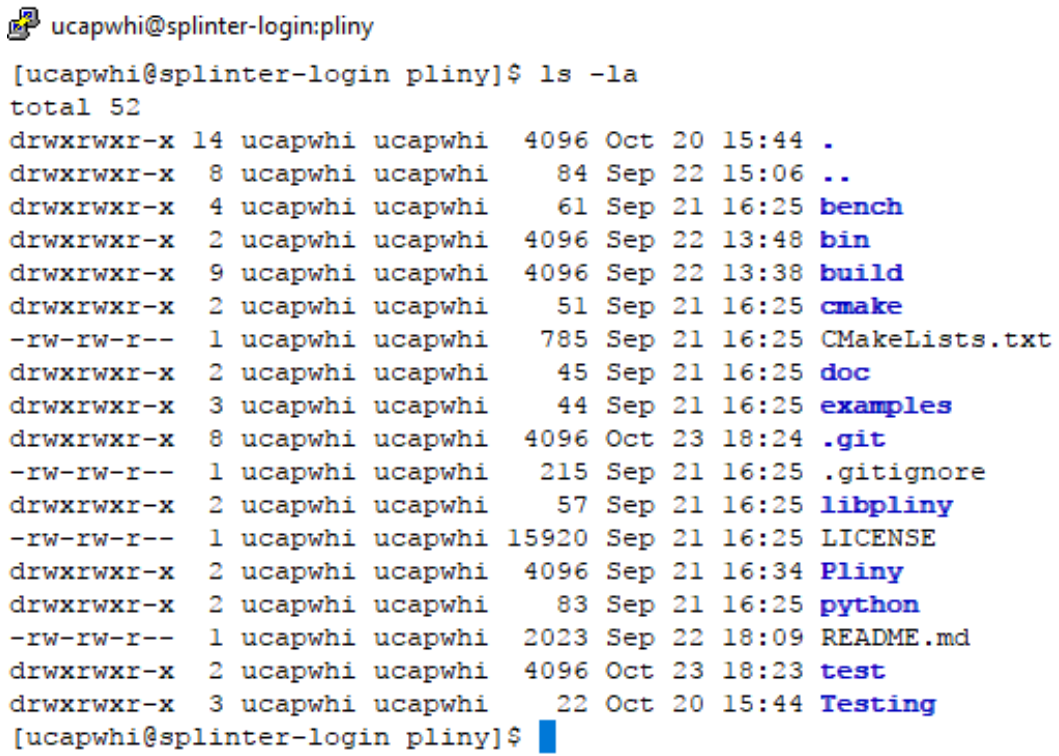
- Source control is software to 'keep track of' (i.e. store) successive versions as we edit a collection of *source* files (computer code, LaTeX documents, etc.)
- Works best if the source is text, not binary. Intermediate files are usually not kept track of. Output files might be - your choice.
- Any serious project should be under source control.

Working directory and repository

- You need a *working directory* and a *repository*.
- The working directory and its subdirectories contain the actual files that you are editing.
- The repository is some sort of database containing all previous versions.
- One model would be to put the repository on the Internet or Intranet where everyone can see it...

Location of git repositiory

- ... But in git the repository is **next to** the working directory, in a hidden subdirectory (called .git) of the top-level working directory.

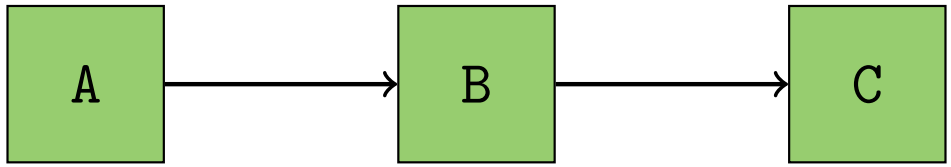


This has consequences...

- You therefore need to have a git repository next to your working directory on your local directory (where you are doing the actual editing).
- But typically you will also need one on the internet (for backup and for collaboration and sharing).
- So you will typically be dealing with **two** git repositories (and dealing with the issues of keeping them in synch.

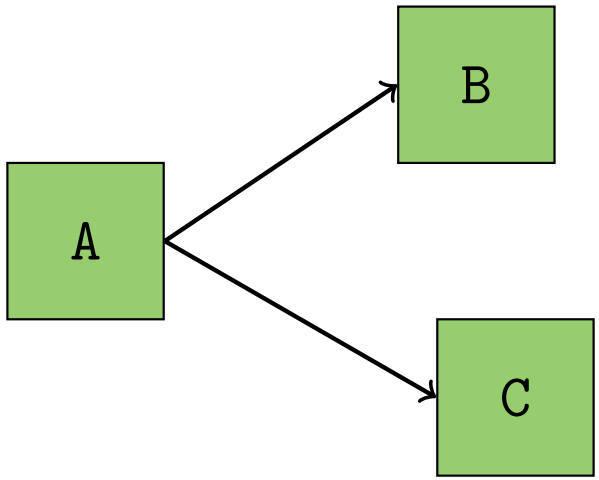
- The upside is that you can still do version control even if you are not connected to the Internet.

Example repository content



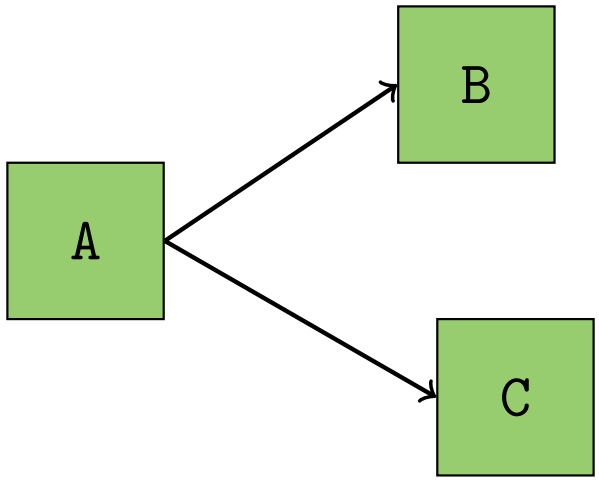
- This repository contains three successive versions of the files in the working directory (and its subdirectories).
- Each version is represented here as a *node* (in green).
- An initial set of files (version A) was comitted to the repository; the files were then edited and the new file set (version B) was comiitted; the files were then edited and comitted a third time (version C).

Another example



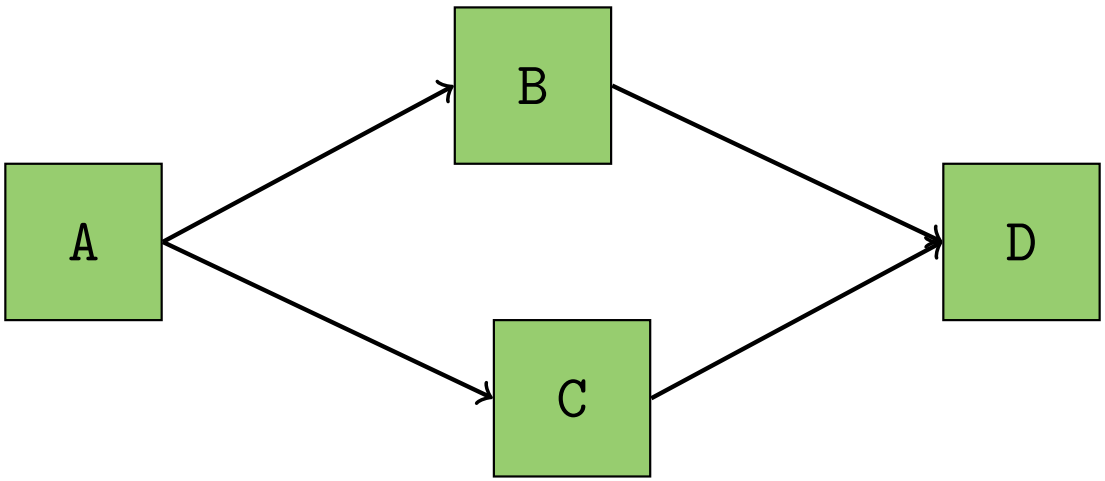
- Here we committed A...
- Then we edited A (to form B) and committed B...
- Then we went back to A, made a perhaps different set of edits (to form C) and committed C.

What do the arrows actually stand for?



- An arrow respects time (pointing from an earlier version to a later version), and indicates that a node was derived from an earlier node by editing.
- Q: There exists a set of edits that would take you from B to C, so why not show that arrow as well? A: It's an *itinerary* (showing the route we took), not a *map* of all possible routes.

Merging



- Here we combined the ‘A to B’ edits and the ‘A to C’ edits (to form D), which was committed.
- More on such *merging* later.