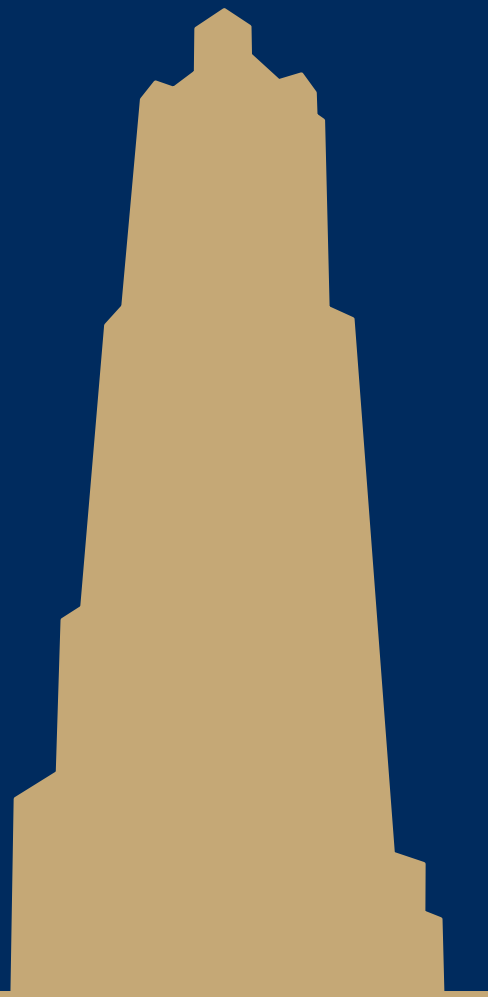
An introduction to version control systems with Git



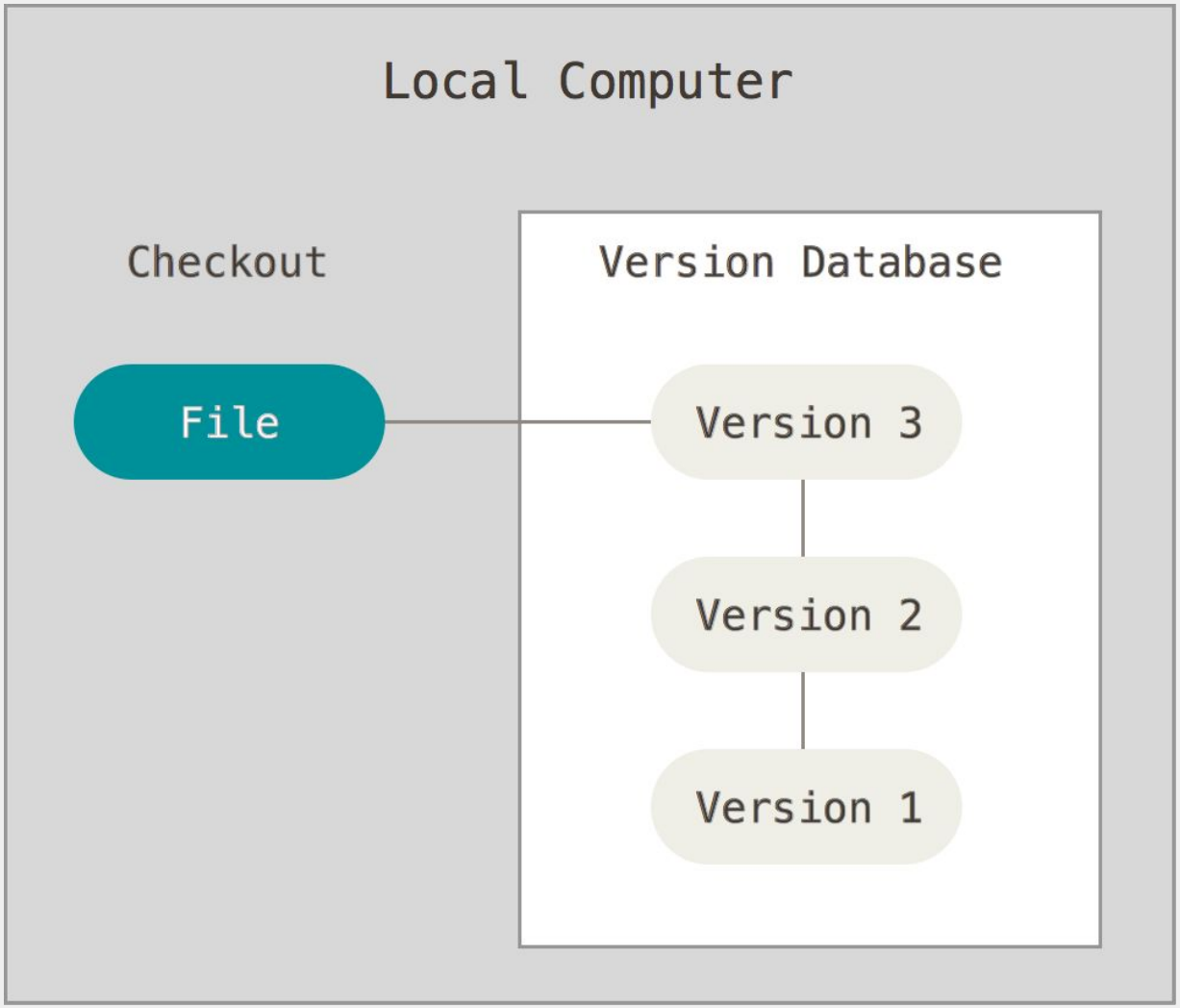
Version control systems

- Version control systems record changes to a file or set of files over time so that you can recall specific versions later
- Many systems have risen to popularity over the years
  - RCS
  - CVS
  - Subversion
- We will focus on Git

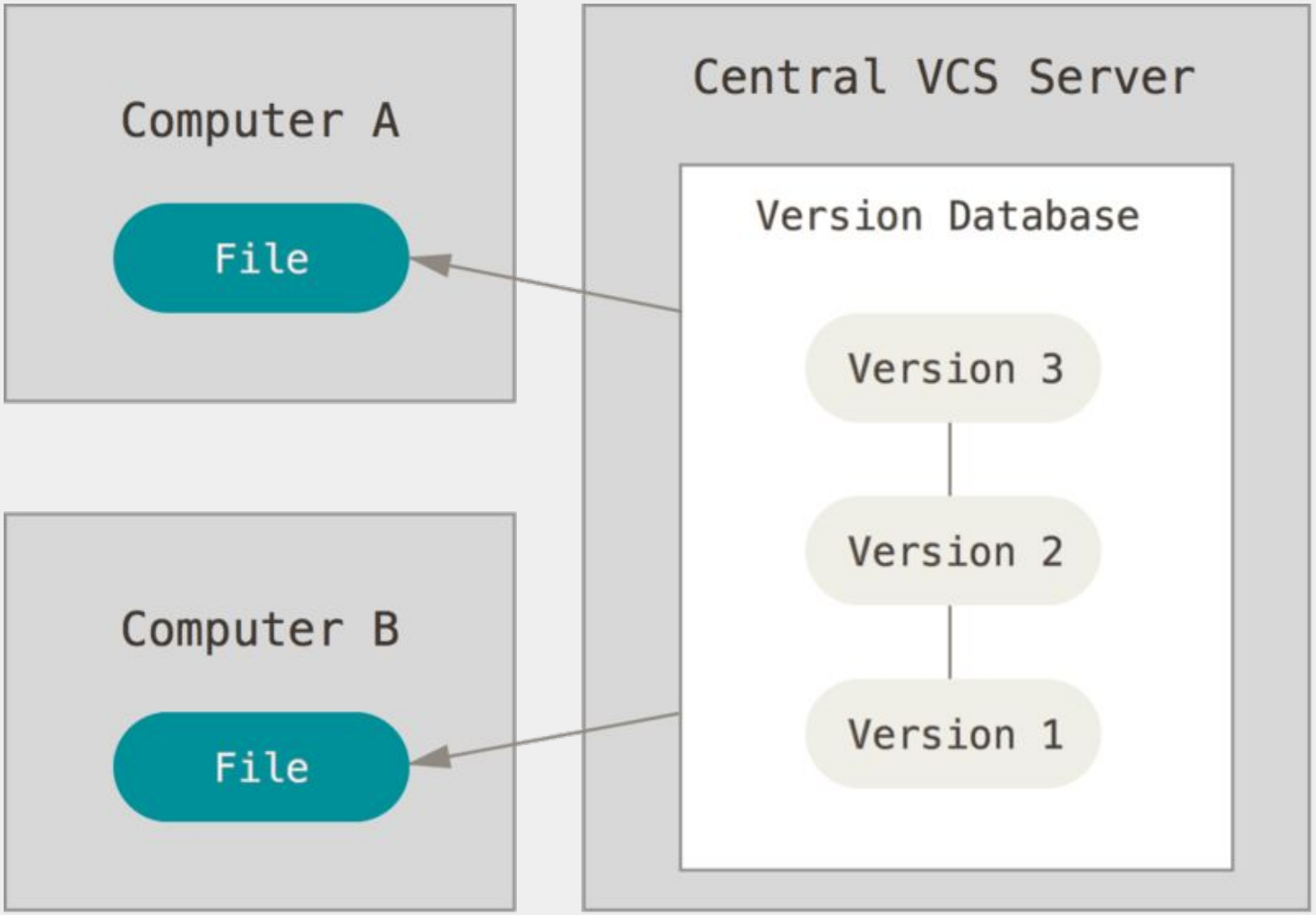
Why use version control?

- These systems help with:
  - Tracking changes
  - Short and long term undo
  - Backup and restore
  - Synchronization
  - Collaboration

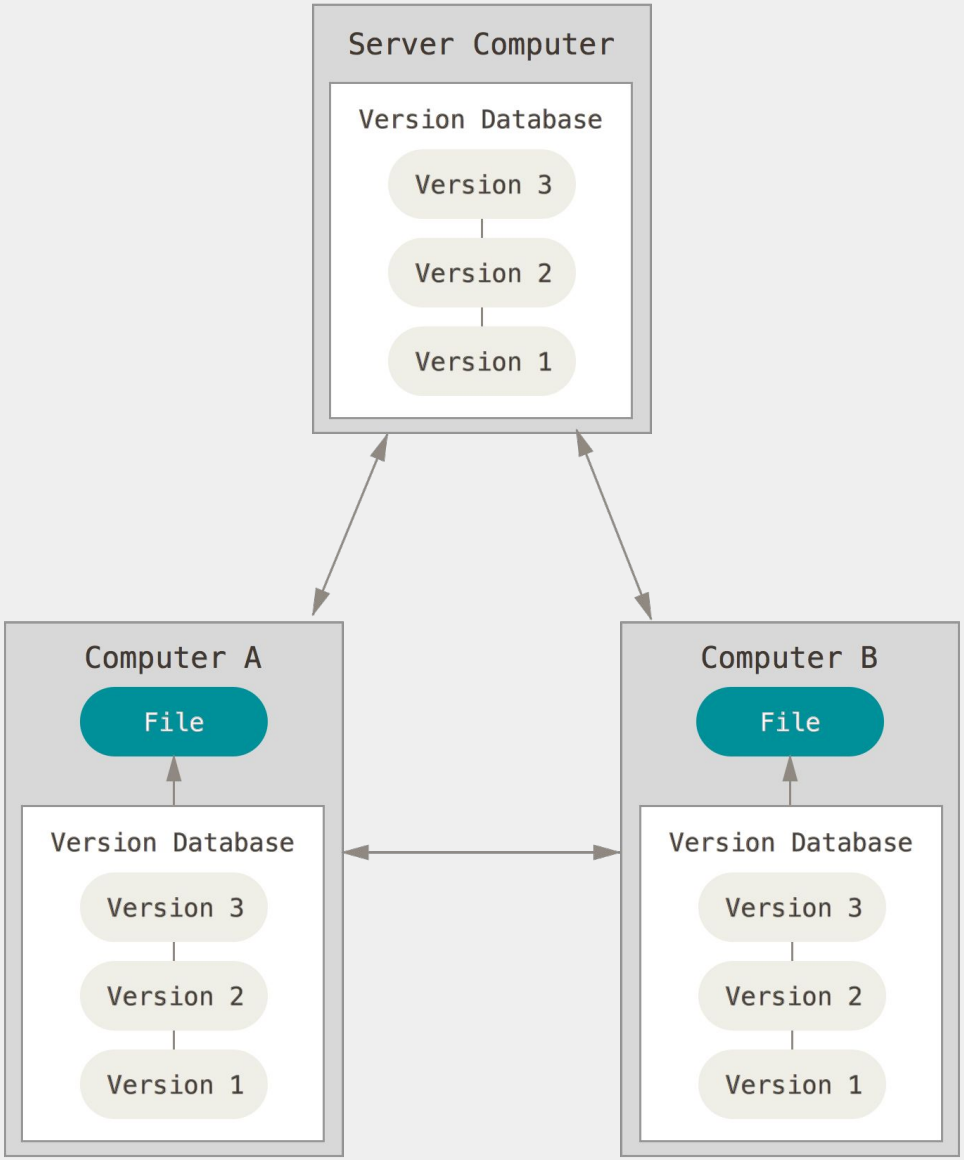
Local version control systems



Centralized version control systems

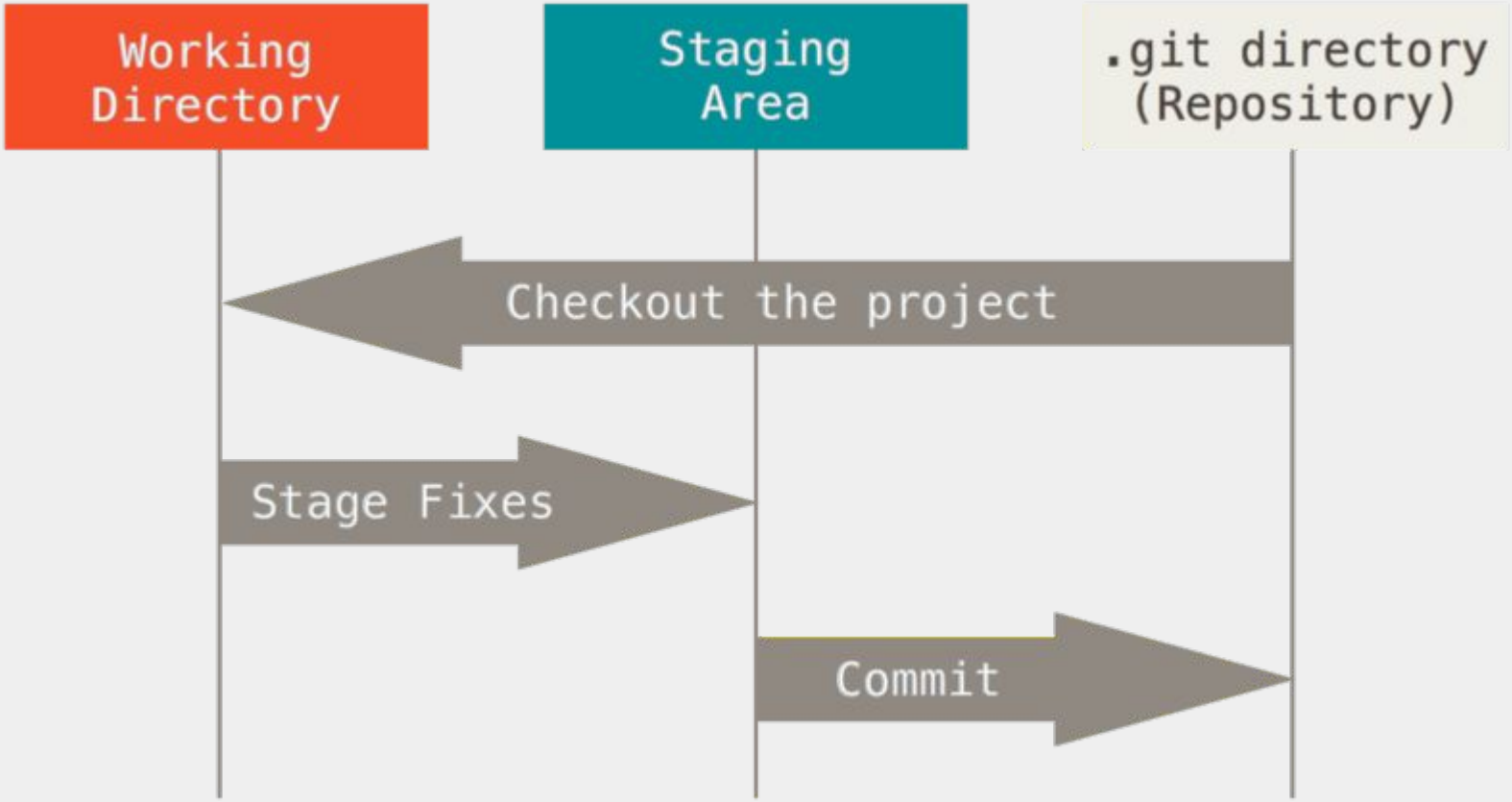


Distributed version control systems



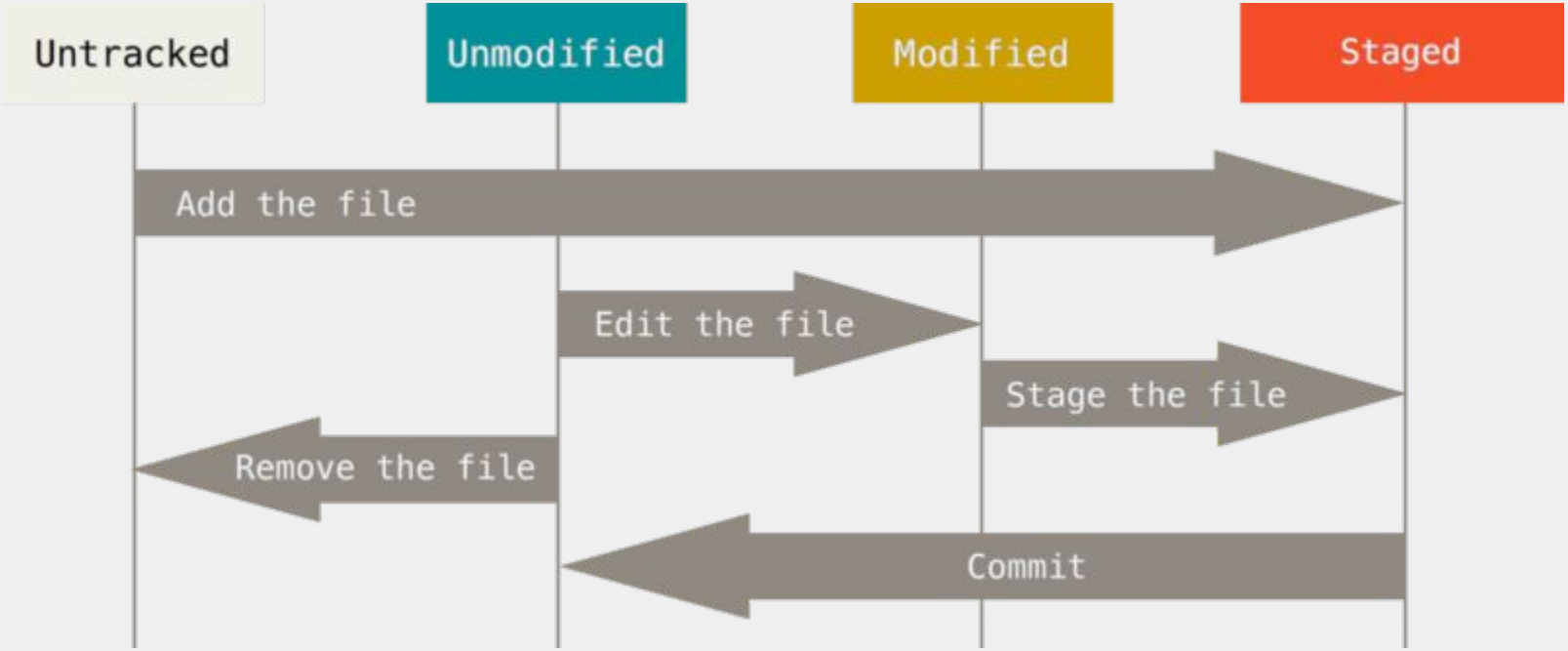
The basic Git workflow

- **Modify** files in your *working directory*
- **Stage** the files, adding snapshots to your *staging area*
- **Commit** your changes to your local copy of the *repository*

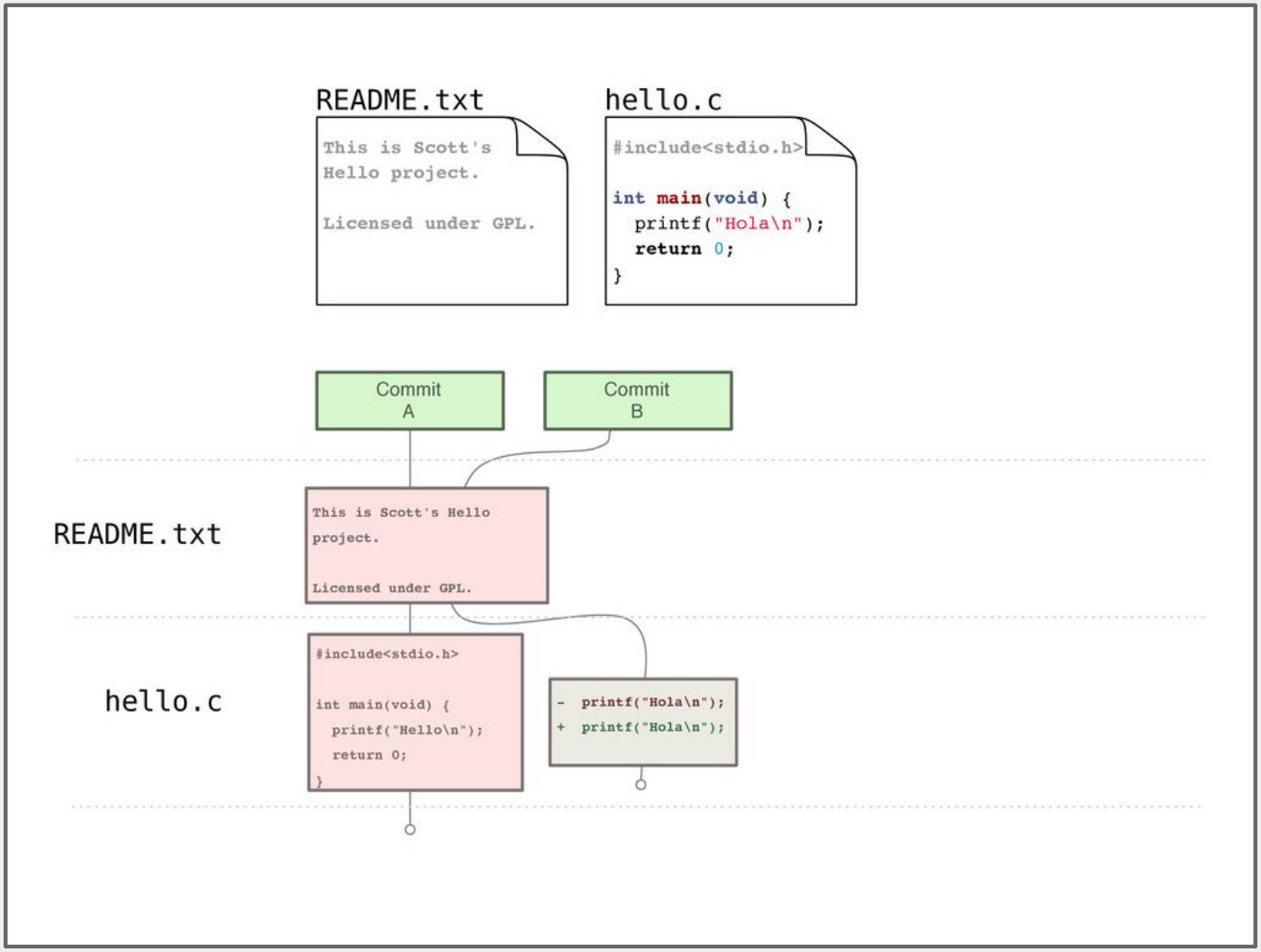


The lifecycle of a file in Git

- Git does not necessary keep track of all files in your working directory



Example repository



Gitting started

- Set your identity
  - `$ git config --global user.name "John Doe"`
  - `$ git config --global user.email jdoe@example.com`
- Set other configuration options
  - `$ git config --global color.ui true`
- Get help
  - `$ git help <verb>`

Creating a new repository

- `$ git init`
- Creates a new (empty) repository in the current directory

Copying a repository

- For this class, your instructor will create a repository for you, you will just need to copy it from GitHub to your computer using the following command:
- `$ git clone <repository>`
  - Creates a copy of `<repository>` in the current directory

Staging files

- As you work, you will create new files and modify existing files, when you are satisfied with your changes, you can stage them for commit with:
- `$ git add <file_pattern>`

Committing changes

- *Commits* create a new version in the repository
- Include a commit message describing the new version
- `$ git commit -m <msg>`

Checking working directory status

- `$ git status`
- Reports:
  - Files in the working directory that are not tracked
  - File modifications not yet staged for commit
  - File additions and modifications staged for commit

Overviewing commit history

- `$ git log`
- Lists commits made to the current repository

Git example (cloning via GitHub)

Handy command - comparing versions

- It may be handy to see exactly how files changed
- `$ git diff`
  - Shows modifications not yet staged for commit
- `$ git diff <commit_id>`
  - Show changes since the commit specified
- `$ git diff <commit_id1> <commit_id2>`
  - Show changes between two commits

What we've covered here...

- … presents only a brief overview of Git
  - Further topics:
    - branching
    - rebasing
    - tagging
    - …
- Further resources:
  - https://git-scm.com/book/en/v2
  - http://gitref.org/
  - http://gitimmersion.com/