Workshop git + Github

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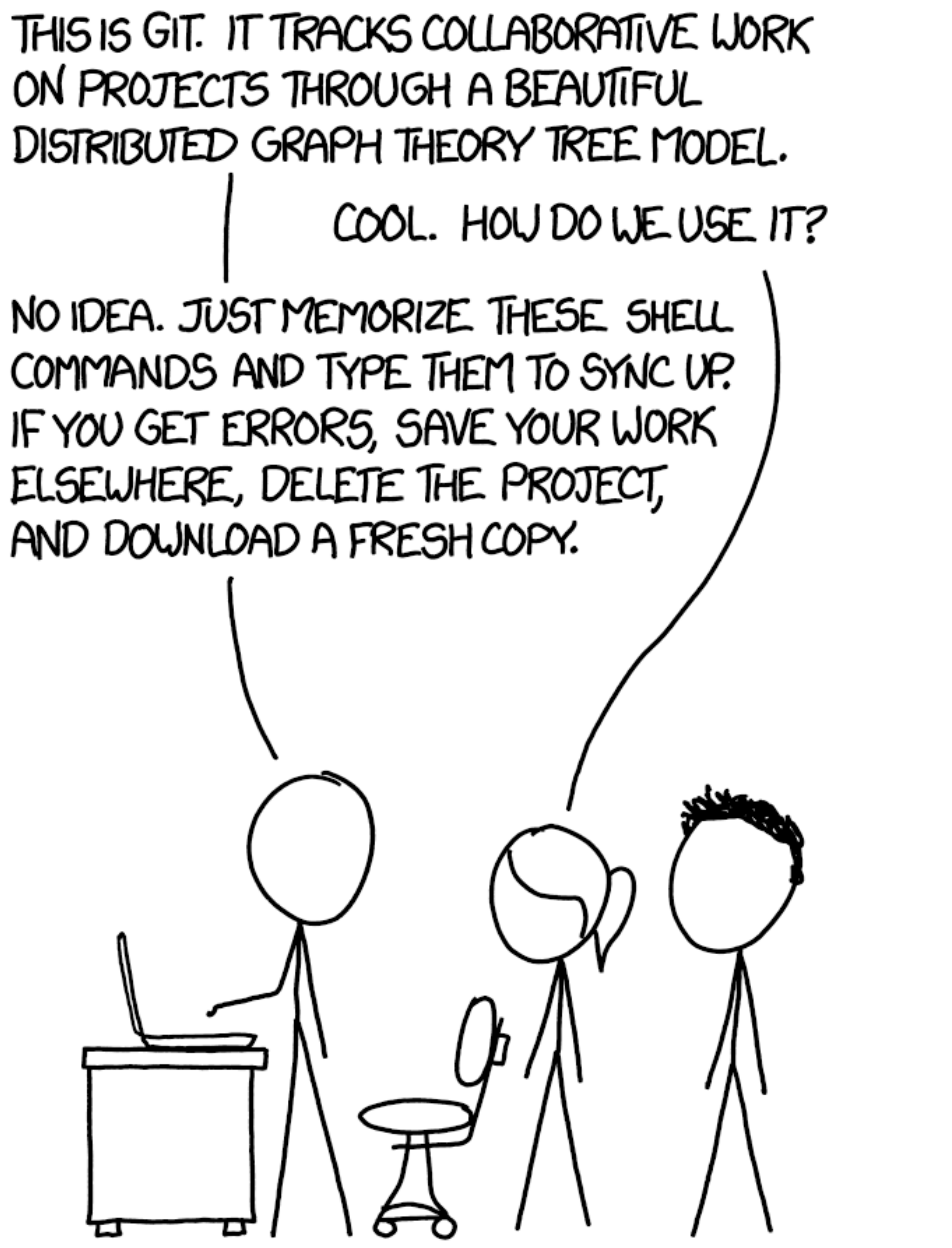
22 November 2018

github.com/tammojan/gitcourse


THIS IS GIT. IT TRACKS COLLABORATIVE WORK ON PROJECTS THROUGH A BEAUTIFUL DISTRIBUTED GRAPH THEORY TREE MODEL.
COOL. HOW DO WE USE IT?
NO IDEA. JUST MEMORIZE THESE SHELL COMMANDS AND TYPE THEM TO SYNC UP. IF YOU GET ERRORS, SAVE YOUR WORK ELSEWHERE, DELETE THE PROJECT, AND DOWNLOAD A FRESH COPY.

If that doesn't fix it, git.txt contains the phone number of a friend of mine who understands git. Just wait through a few minutes of 'It's really pretty simple, just think of branches as...' and eventually you'll learn the commands that will fix everything.

Plan for today

- Introduction / why revision control
- Create a temp git repository locally
- Create commits
- Work with branches / tags / merge
- Create a public github repository of your cool python script
- Merge conflicts
- Improve someone elses project through a pull request

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Why revision control

- Keep track of changes: who changed what, when, how, why
- Allow for collaborative development
- Go back to a previous state of the code, undo changes
- Bonus for github: publish / share your code

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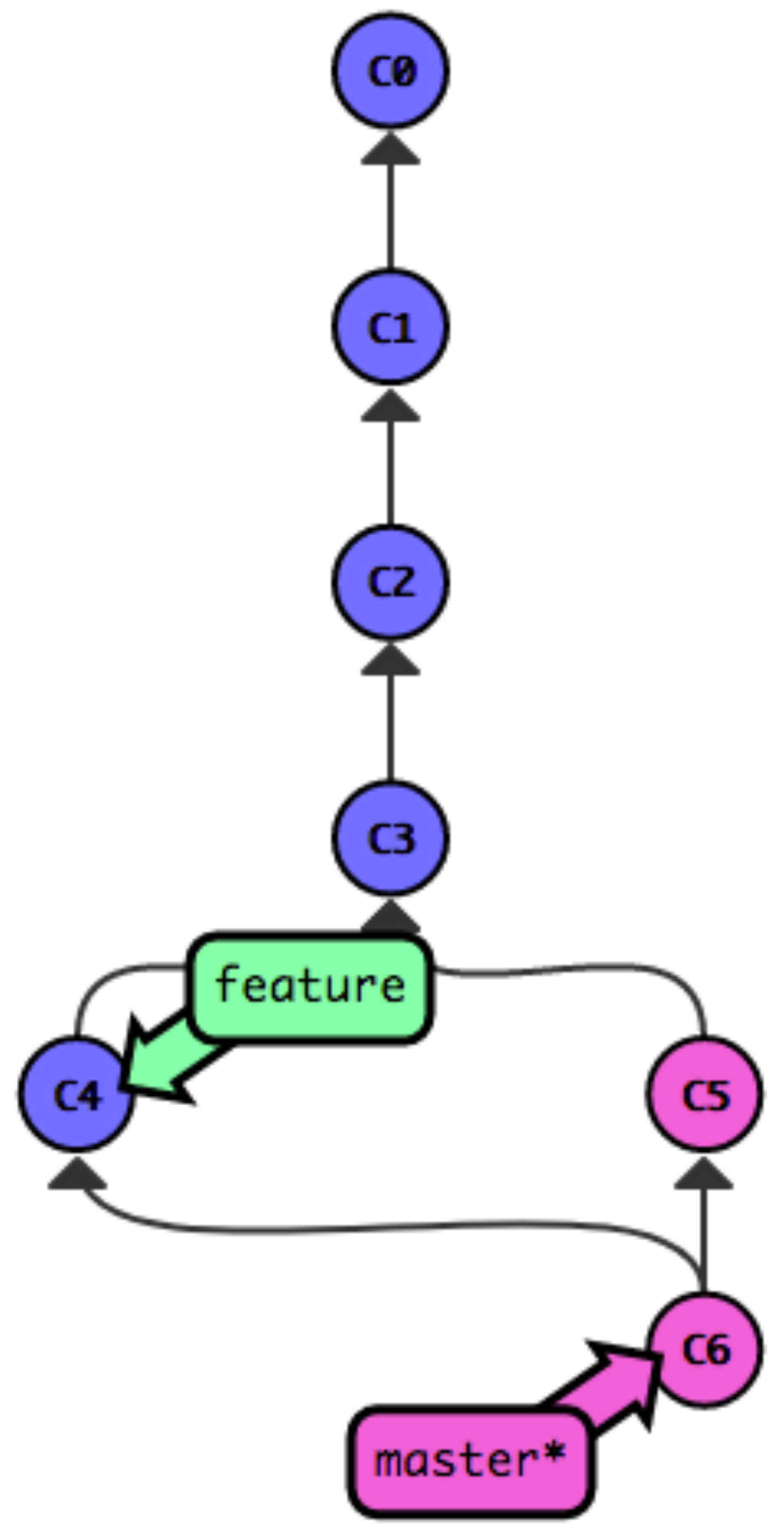
Example repository

- A *commit* represents a state of the repository (project)
- A commit consists of:
  - A pointer to the previous commit
  - Changes w.r.t. the previous commit
  - A commit message (more later)
- The history of the project is kept as a graph



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Tell git who you are

- Check if you've set a username before:
```
git config --list
```

- If you get no output for these commands, tell git who you are:
```
git config --global user.name "Tammo Jan Dijkema"
git config --global user.email "dijkema@astron.nl"
```

- Guideline: use your work e-mail for work projects.

- While we're at it: tell git your favorite editor:
```
git config --global core.editor vim
```

Create a git repository

- Github repositories do not need a git server

- On your laptop, create a temporary directory:
```
mkdir ~/gittemp
mkdir ~/gittemp
cd ~/gittemp
```

- Initialize a new git repository:
```
git init
```

- All history of this repository is now tracked in `~/gittemp/.git`

Making your first commit (1)

- In `~/gittemp` make a new file (`touch dummy.txt`)

- See what git thinks of the current state of the repository:
  `git status`

```
On branch master

Initial commit

Untracked files:
  (use "git add <file>..." to include in what will be committed)

    dummy.txt

nothing added to commit but untracked files present (use "git add" to track)
```

Making your first commit (2)

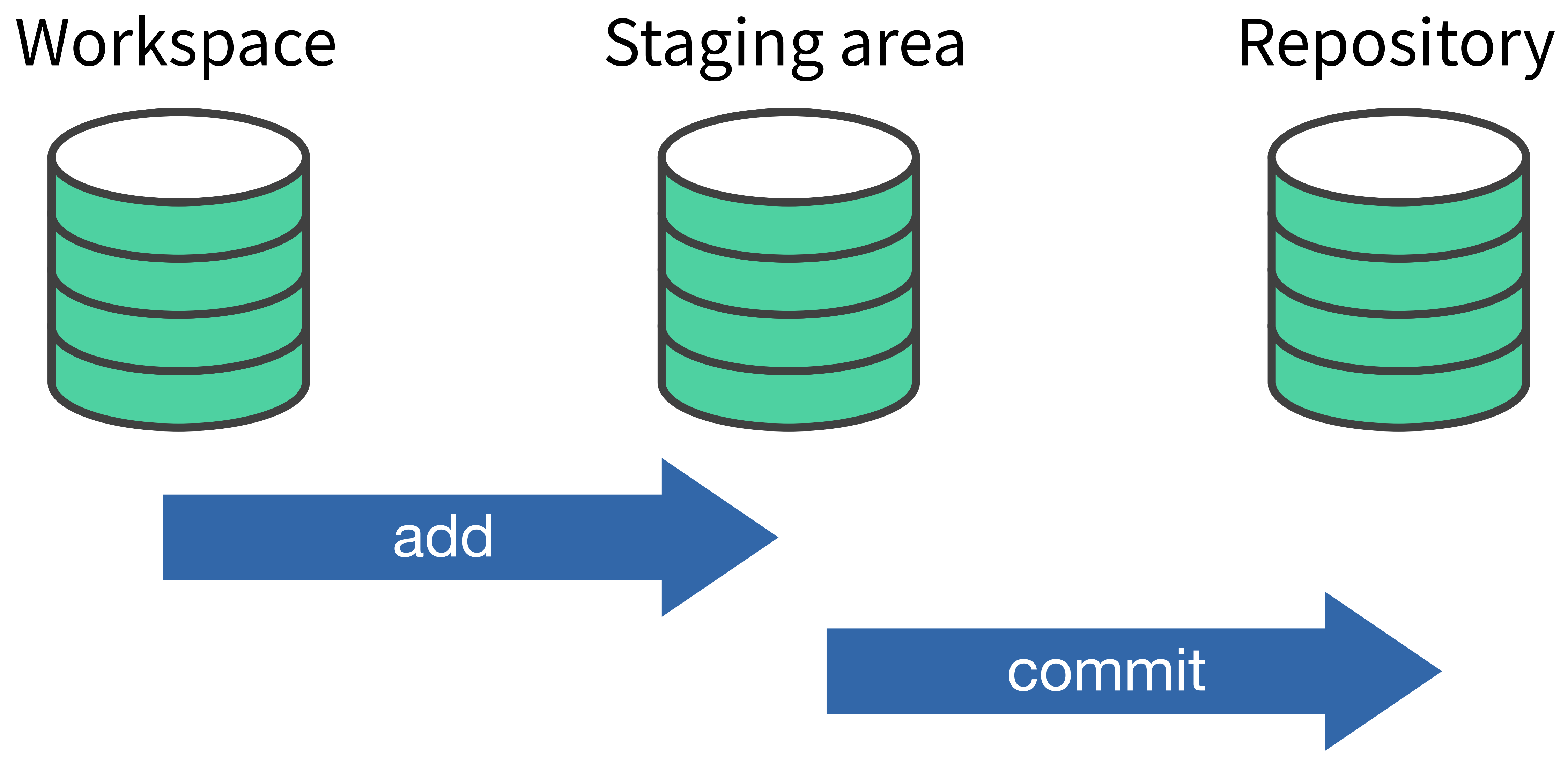
- Git says an untracked file is present, let's tell git to track it:
  `git add dummy.txt`

- See what git thinks of the current state of the repository:
  `git status`

```
On branch master

Initial commit

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)

    new file:   dummy.txt
```

- Nothing has been committed yet!

The staging area



Making your first commit (3)

- Commit the changes (this will commit what git status says will be committed):
  `git commit`

- This gets you your favorite editor to type a commit message. Make one up (e.g. `add dummy.txt`) and type `:wq` to exit your favorite editor.

- Congratulations on your first commit. What is the status now?
  `git status`

```
On branch master
nothing to commit, working tree clean
```

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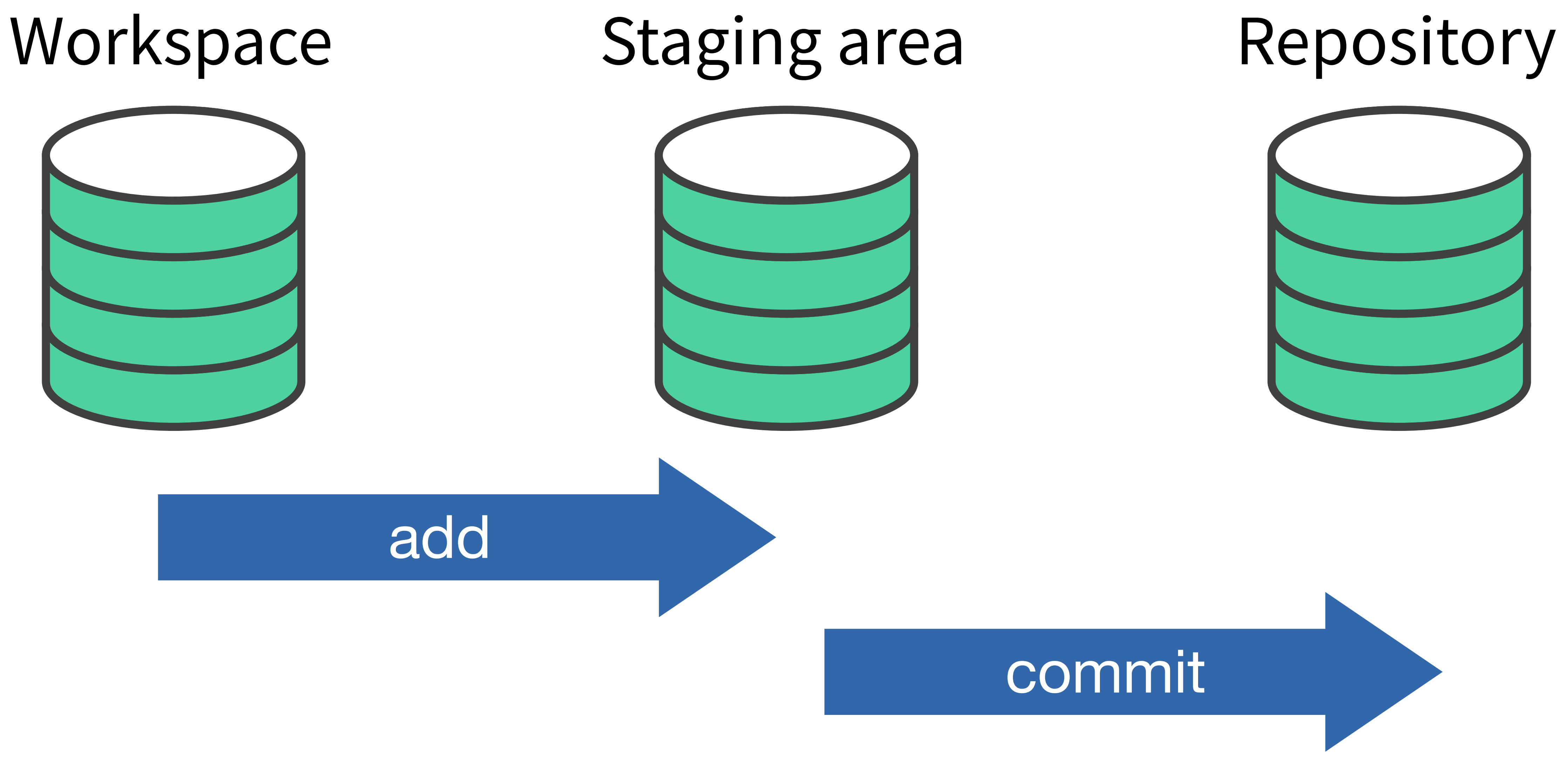
The staging area

- The staging area shows what will be committed when you do `git commit`

  (This prevents accidental commits of stuff in your working directory.)



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Learn this!

- `git status`

  show the staging area, which branch you’re on, etc

- `git add`

  add a change to the staging area

- `git commit`

  commit the changes in the staging area

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Practice in ~/gittemp

- Change a file, what does it do to `git status`?
- Read the output of `git status` and undo the change.
- Change the file again, and `add` it to the staging area.
- Make some more changes, `add` them to the staging area.
- Commit your changes.
- Check `git log`

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  show the staging area, which branch you're on, etc

- `git add`

  add a change to the staging area

- `git commit`

  commit the changes in the staging area

- `git log`

  see the history (try `--graph` or `--oneline -n 3`)

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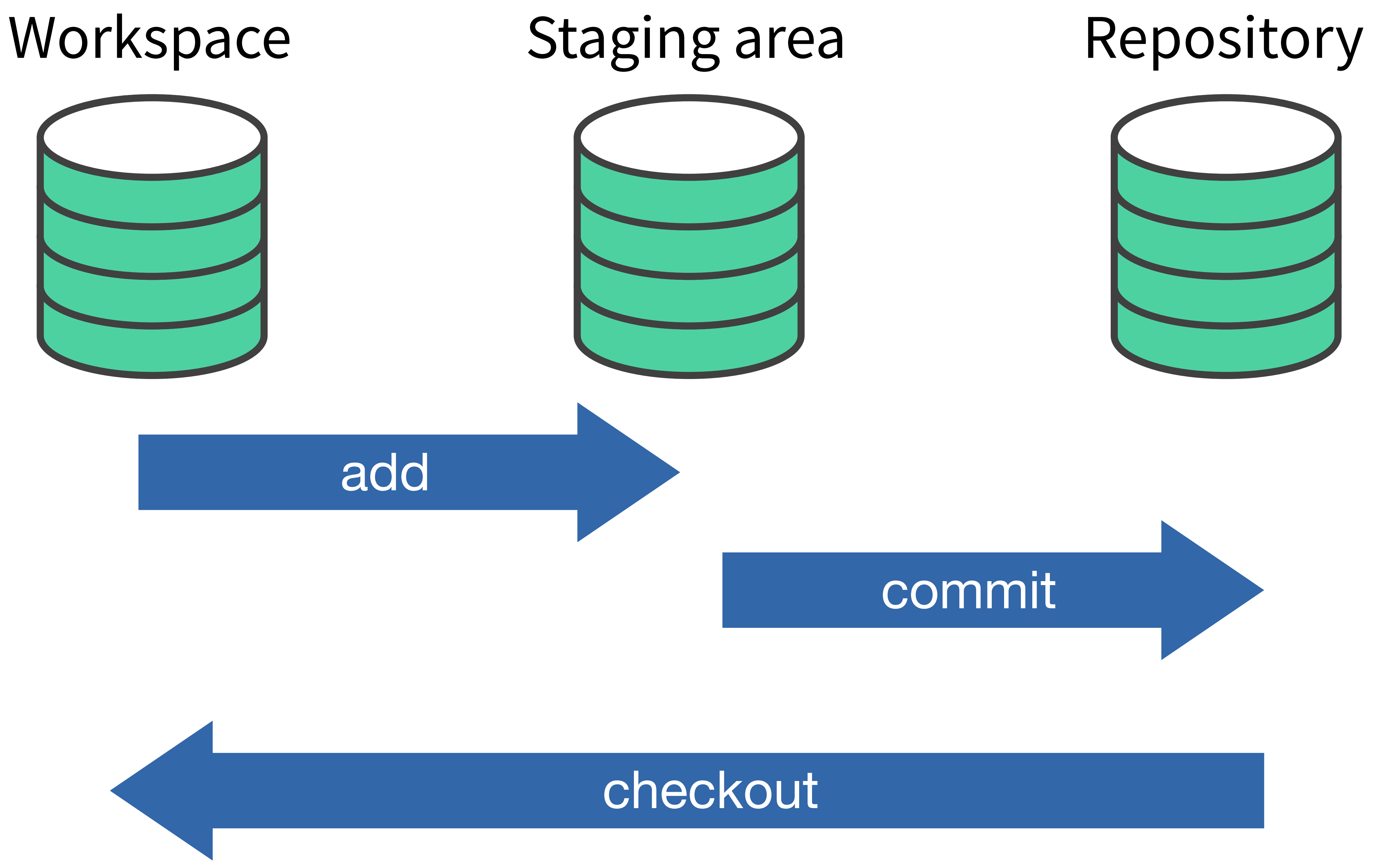
Navigating around



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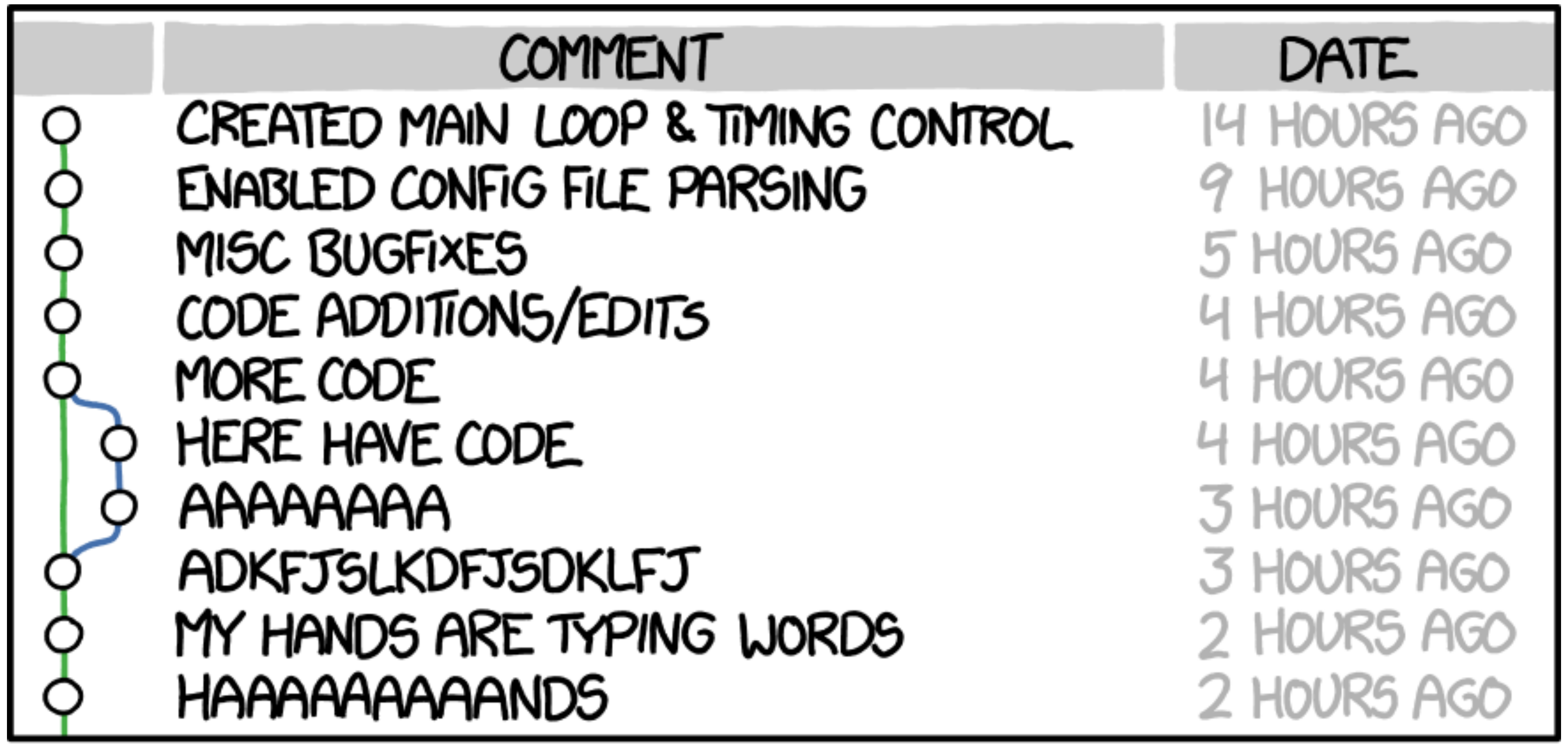
How to write a commit message

- Reader will be ‘future you’!
- Subject line < 50 characters
- If necessary: blank line, then long message (wrapped at 72)
- Subject line: capital, no period
- In long message, explain why, not how



	COMMENT	DATE
○	CREATED MAIN LOOP & TIMING CONTROL	14 HOURS AGO
○	ENABLED CONFIG FILE PARSING	9 HOURS AGO
○	MISC BUGFIXES	5 HOURS AGO
○	CODE ADDITIONS/EDITS	4 HOURS AGO
○	MORE CODE	4 HOURS AGO
○	HERE HAVE CODE	4 HOURS AGO
○	AAAAAAAA	3 HOURS AGO
○	ADKFJSLKDFJSDKLFJ	3 HOURS AGO
○	MY HANDS ARE TYPING WORDS	2 HOURS AGO
○	HAAAAAAAANDS	2 HOURS AGO

AS A PROJECT DRAGS ON, MY GIT COMMIT MESSAGES GET LESS AND LESS INFORMATIVE.

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Branches

- Make a branch (for a single feature!) if:
  - You’re not sure you’ll use it
  - It breaks the existing functionality temporarily

- Branches should be merged to the master as soon as possible

- Demo: https://learngitbranching.js.org/?NODEMO

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- `git add`

  add a change to the staging area

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  commit the changes in the staging area

- `git log`

  see the history (try `--graph` or `--oneline -n 3`)

- `git checkout`

  navigate to another commit

- `git checkout -b`

  create a new branch from the commit you're at now

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Github

- Github contains a copy of your repository.

- On github, people can ‘fork’ your project and work on their own version of it.

- Challenge is to keep these copies in sync with your local copy.
  (But that’s what git was made for.)

- Many extra features:
  - Pull requests
  - Issue tracker
  - Wiki
  - Web pages
  - Continuous integration

Github

- Create a new github repository for the script you brought
  Initialize with a README

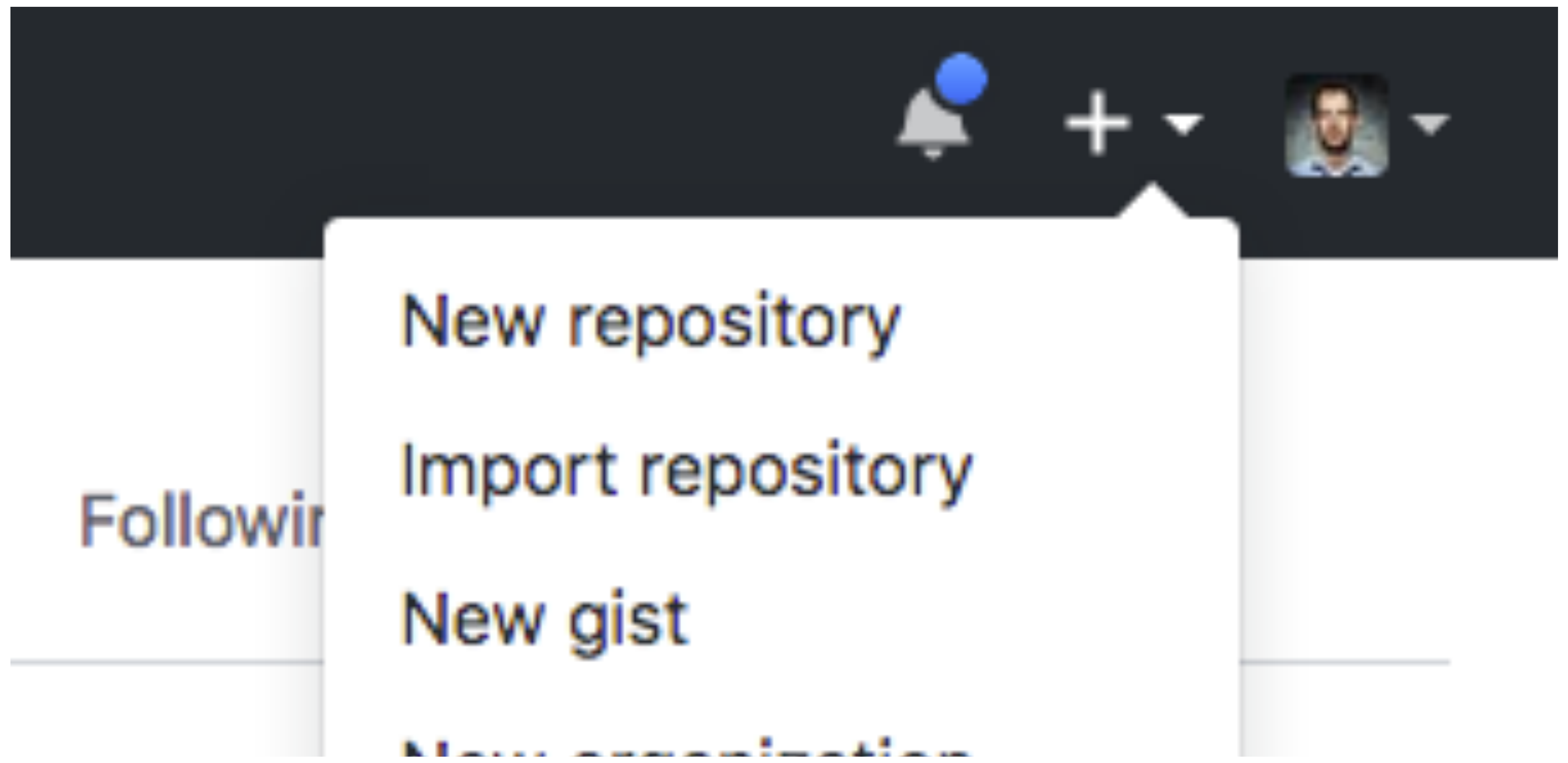
- Clone the repository on your laptop:
  `git clone https://github.com/…`

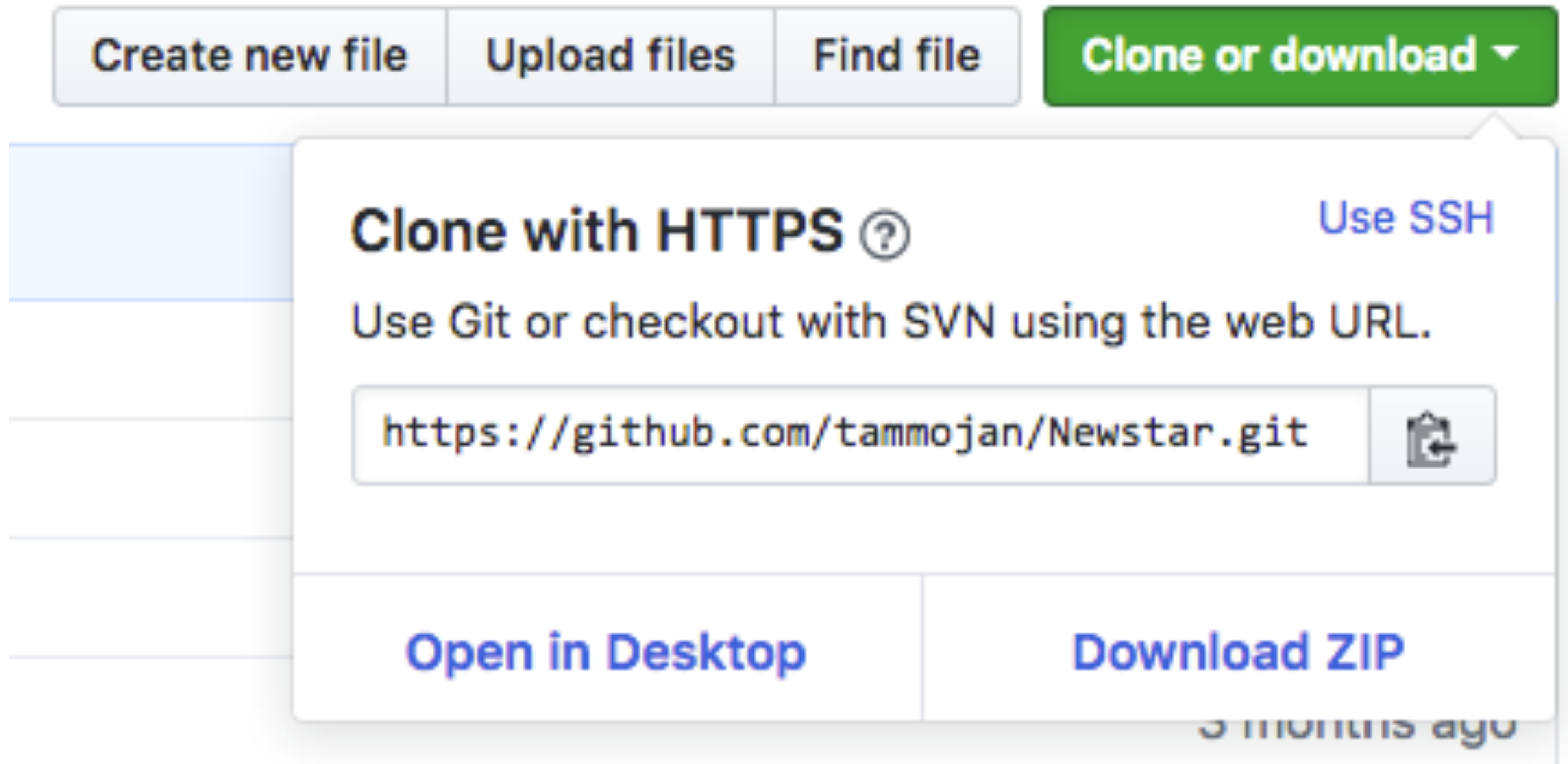
- Copy your script to the repository directory

- `git status`

- Add your script to the repository, commit it

- Bring the new commit to github:
  `git push origin master`





Use Git or checkout with SVN using the web URL.

```
https://github.com/tammojan/Newstar.git
```

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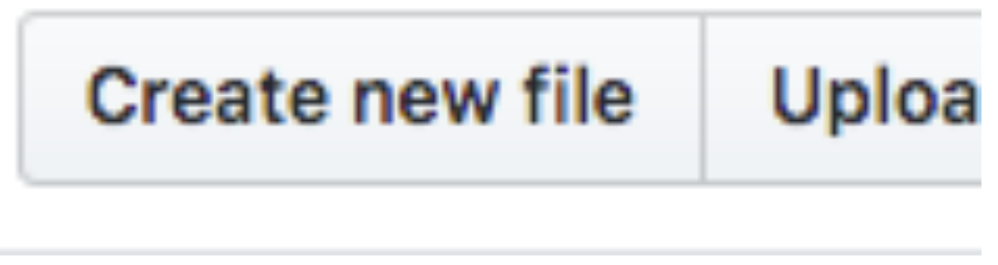
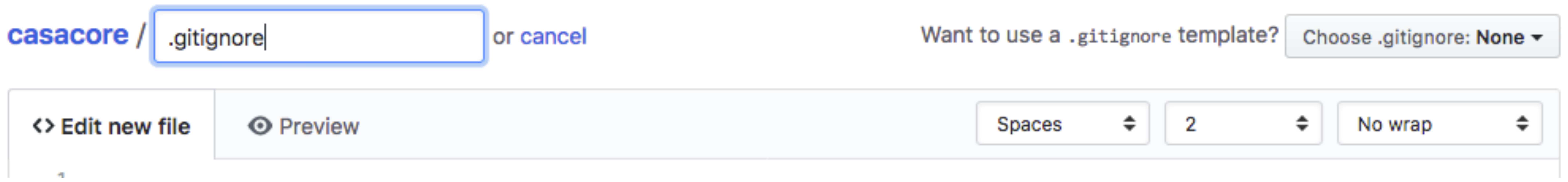
Github

- Add a LICENSE and .gitignore to your project through the web interface




casacore / .gitignore or cancel

Want to use a `.gitignore` template? Choose .gitignore: None

Spaces · 2 · No wrap

- Get the online changes back to your computer:

```
git fetch origin
```

  This only updates the branch origin/master, merge this branch:

```
git merge origin/master
```

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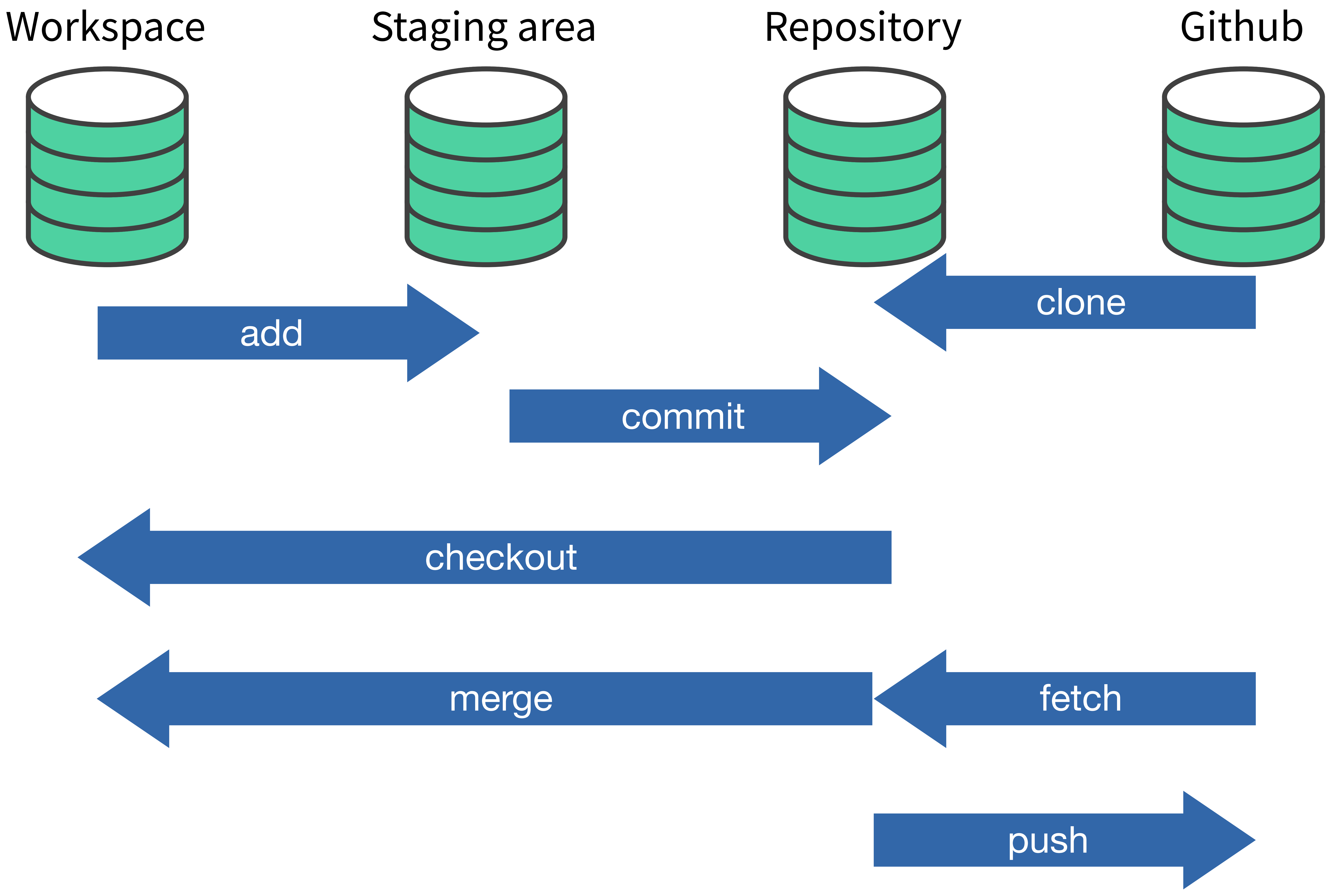
Working with remote repositories



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  see the history (try `--graph` or `--oneline -n 3`)
- `git checkout`
  navigate to another commit
- `git checkout -b`
  create a new branch from the commit you're at now
- `git clone`
  clone a remote repository to your laptop
- `git merge`
  merge a branch
- `git fetch`
  fetch changes from a remote repository
- `git push`
  push local changes to a remote repository

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