Git and GitHub

INFO 201

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Winter 2017

https://slides.com/joelross/info201w17-git/live

Today's Objectives

- Feel comfortable with the **command-line** and **markdown**.
- Understand the purpose of **version control systems**
- Manage code using **git**
- Save code to the cloud using **GitHub**

RECALL

Command-Line

Lets you type **commands** to control your machine.

```
# list all files in the current folder
ls -l

# change to a folder
cd ~/Desktop

# make a directory
mkdir my-folder

# go back to the *parent* directory
cd ..

# open a file (in current folder) for viewing
less README.md
```

Note the -l option!

~ is shortcut for "home" directory

.. means "parent folder"

Use up/down arrows to scroll.
Type q to quit.

Efficient CLI Usage

- Use `tab` to automatically fill in the names of files and folders
- Use `up/down` arrows to access previously entered commands

Some Fun Commands

Action	**Syntax**
Make your computer speak [Mac]	`say "Text to say"`
Do the same thing again	`!!`
Watch Star Wars	`telnet towel.blinkenlights.nl` (use `ctrl-]` then `quit` to exit)
Download a web page	`curl -s URL`

Redirects

```
>
```

Put output in file instead of display

```
echo "Hello World" > hello.txt
```

```
>>
```

Append to end of file

```
echo "Goodbye :)" >> hello.txt
```

```
|
```

Take output and "pipe" (send) to next command

```
cat hello.txt | wc
```

word count

Pipes

The **pipe operator** (**|**) takes the ***output*** of one command and uses it as the ***argument*** to the next.

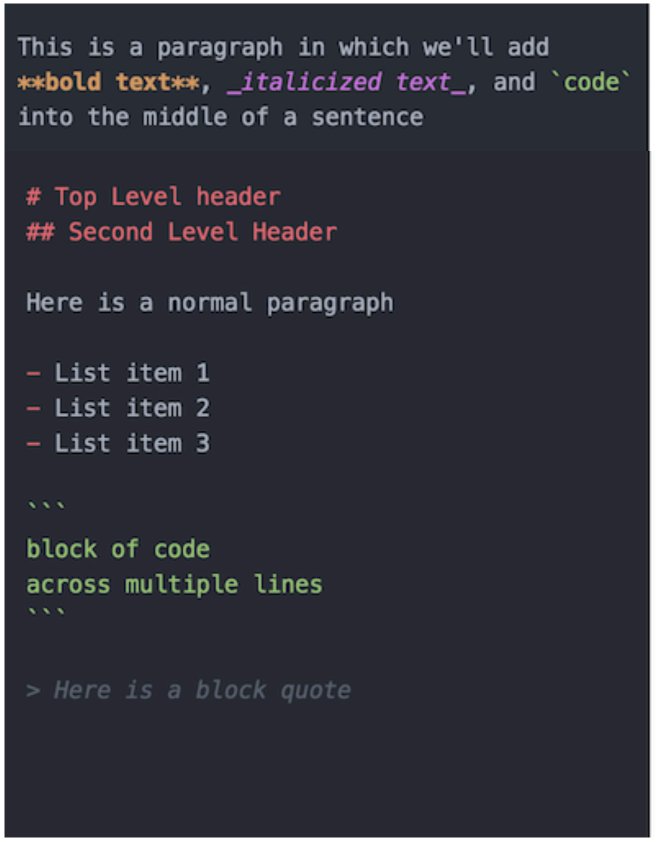
We will see more of this in a few weeks, but for now…

```
# Name some dinosaurs!
curl -s http://dinoipsum.herokuapp.com/api/?format=text | say
```

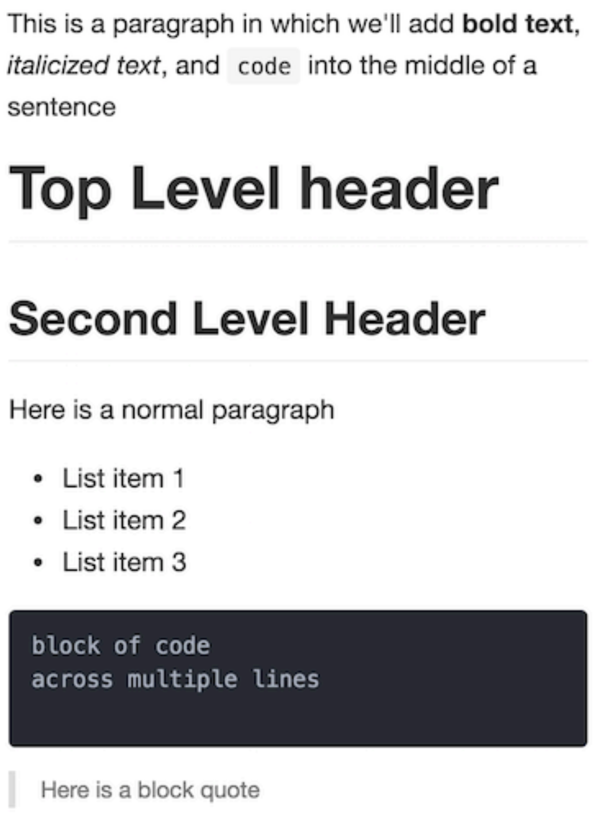
RECALL

Markdown

Markdown is a simple **syntax** for specifying how plain text should be formatted.



```
This is a paragraph in which we'll add
**bold text**, _italicized text_, and `code`
into the middle of a sentence

# Top Level header
## Second Level Header

Here is a normal paragraph

- List item 1
- List item 2
- List item 3

```
block of code
across multiple lines
```

> Here is a block quote
```



This is a paragraph in which we'll add **bold text**, *italicized text*, and `code` into the middle of a sentence

Top Level header

Second Level Header

Here is a normal paragraph

- List item 1
- List item 2
- List item 3

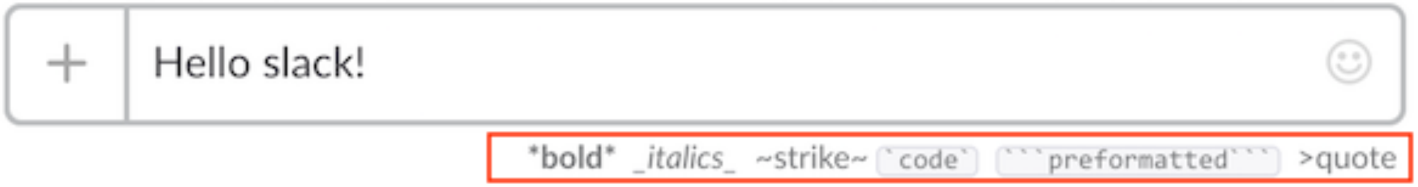
```
block of code
across multiple lines
```

> Here is a block quote

module 3

Module 3 exercise-3

Use Markdown in Slack!



Hello slack!

bold _italics_ ~strike~ `code` ```preformatted``` >quote

We expect questions to be clearly formatted with

~~~
```
code blocks
```
~~~

or even `` `inline code` `` when appropriate!

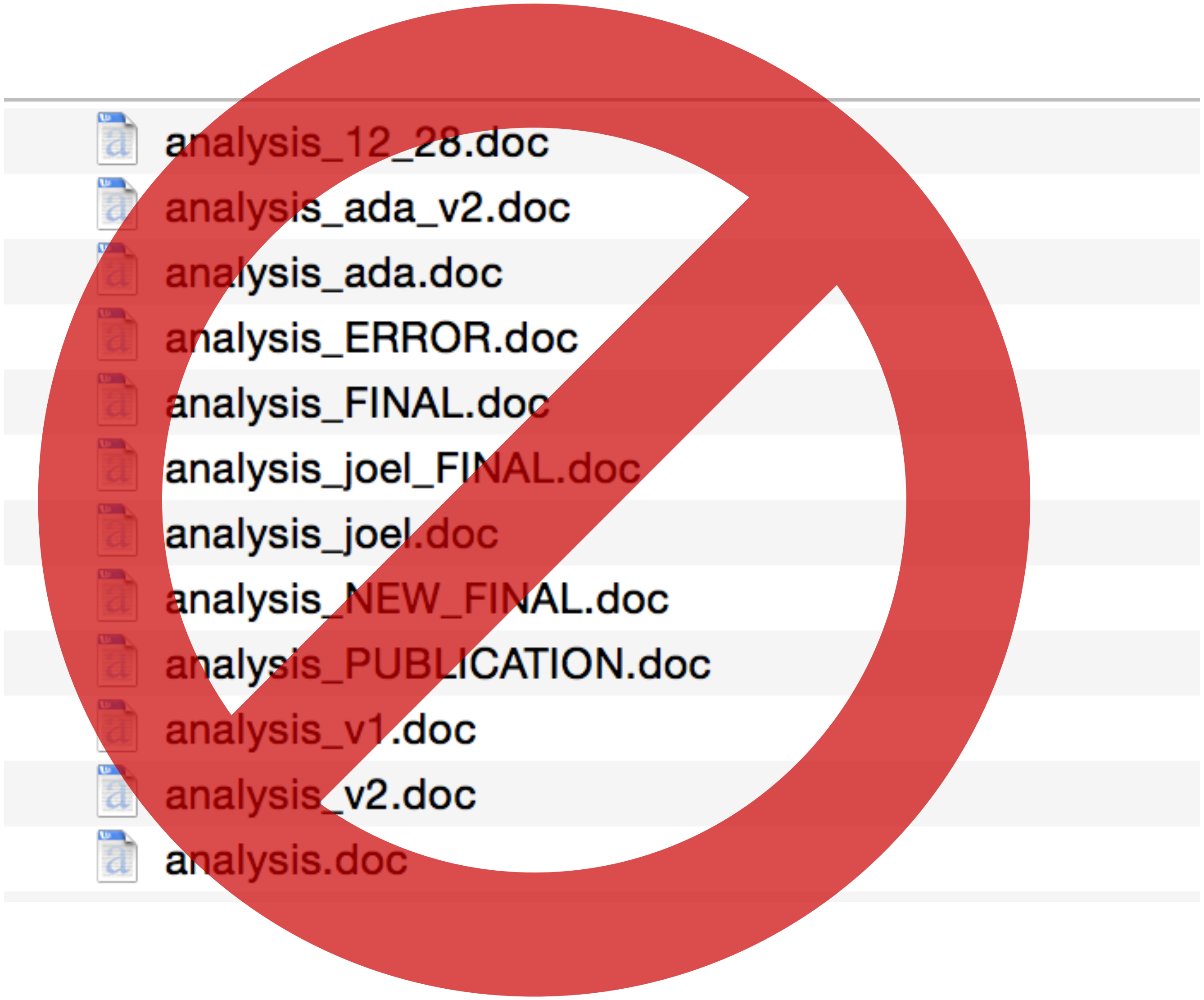
Version Control

Some Scary Data

88% of the class has "*moderate*" or "*lots*" of experience programming...

but only **24%** have used version control more than "*a few times*". (n = 121)

Brainstorm 3 reasons why would you want to keep track of different ***versions*** of your code.



analysis_12_28.doc
analysis_ada_v2.doc
analysis_ada.doc
analysis_ERROR.doc
analysis_FINAL.doc
analysis_joel_FINAL.doc
analysis_joel.doc
analysis_NEW_FINAL.doc
analysis_PUBLICATION.doc
analysis_v1.doc
analysis_v2.doc
analysis.doc

git

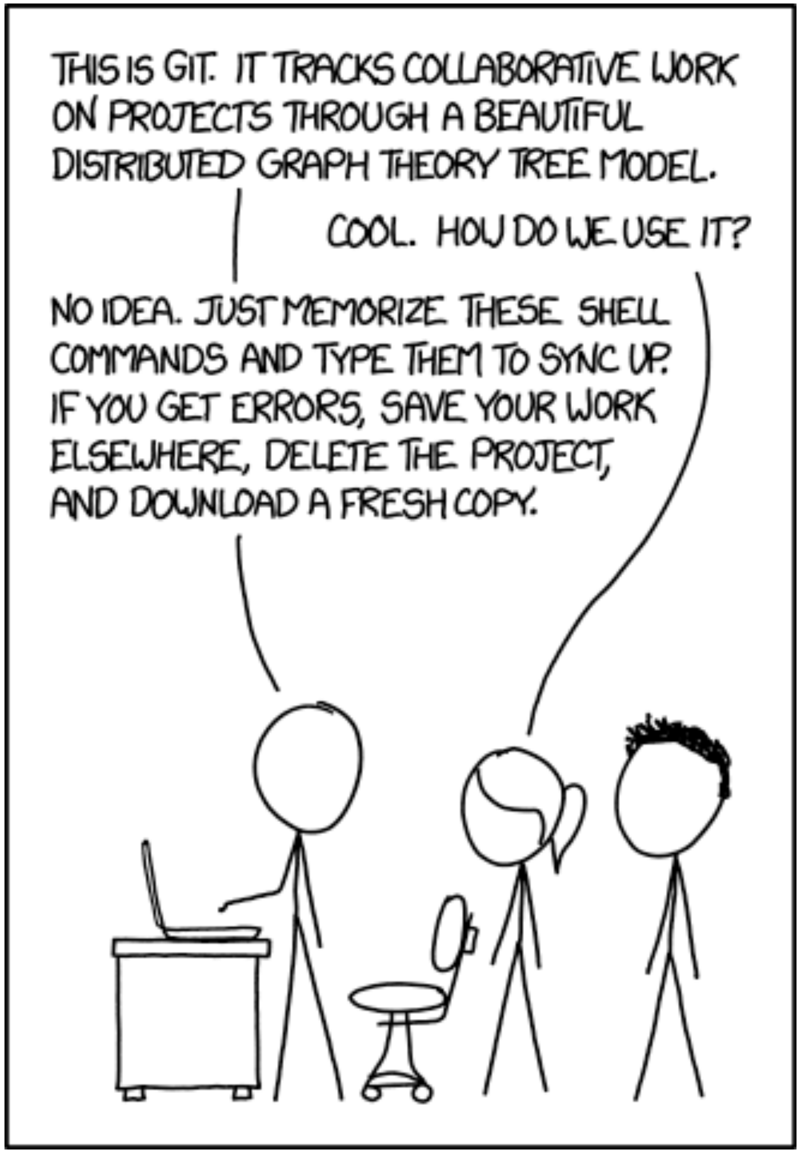
Version Control

"A version control system (VCS) is a tool for managing a collection of program code that provides you with three important capabilities: reversibility, concurrency, and annotation.

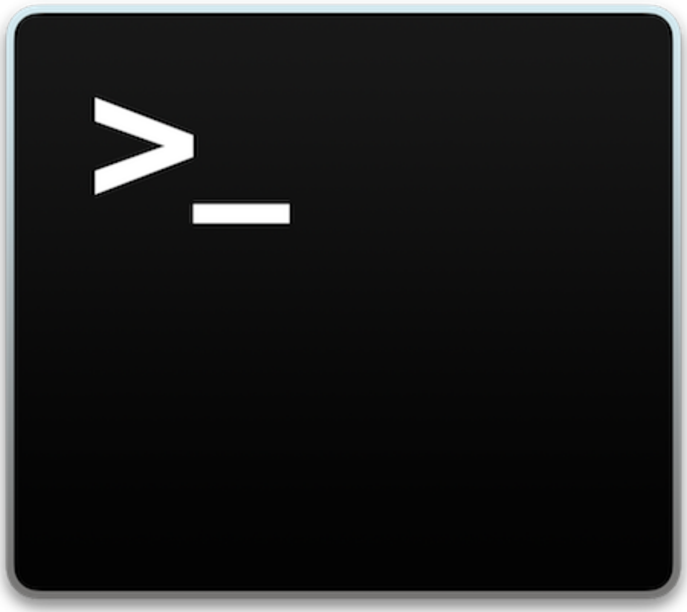
— Eric Raymond

git *vs.*

- Line-by-line change tracking
- Simultaneous, off-line editing
- Detailed history and "undo" capabilities


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.

xkcd.com/1597/



Install git

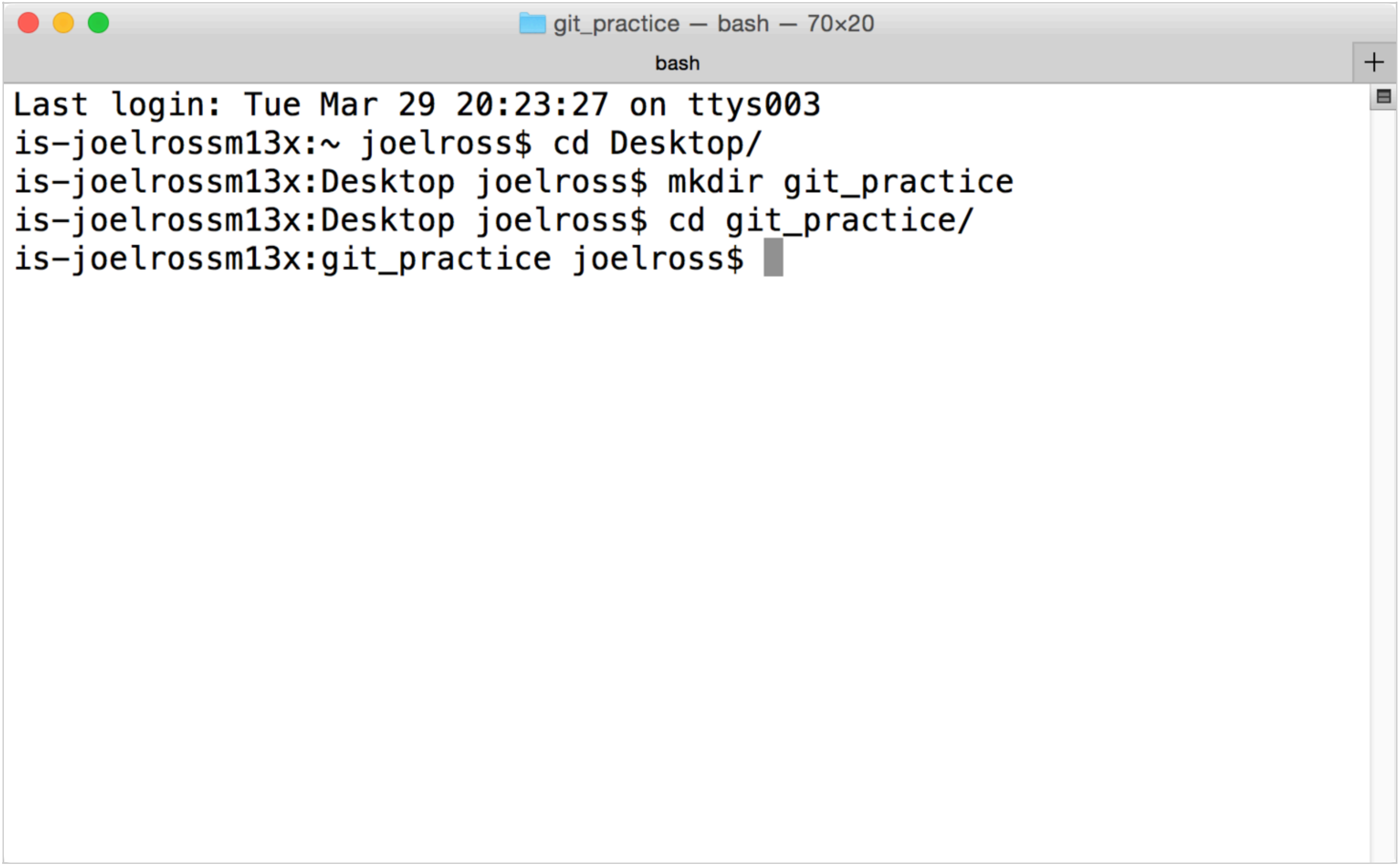
http://git-scm.com/downloads

(see module 1)

Configure git

```
#do this just once per machine!

git config --global user.email "your-email-address"

git config --global user.name "your-full-name"
```

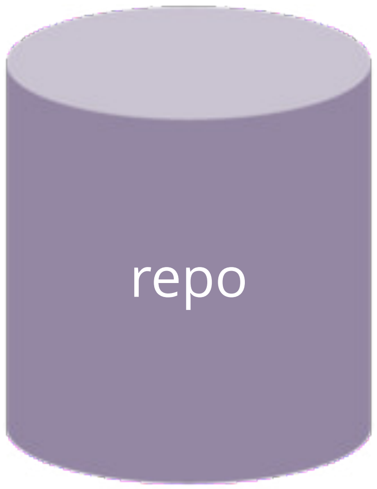
email you signed up for GitHub with



```
Last login: Tue Mar 29 20:23:27 on ttys003
is-joelrossm13x:~ joelross$ cd Desktop/
is-joelrossm13x:Desktop joelross$ mkdir git_practice
is-joelrossm13x:Desktop joelross$ cd git_practice/
is-joelrossm13x:git_practice joelross$ 
```

Repository

(or "repo")

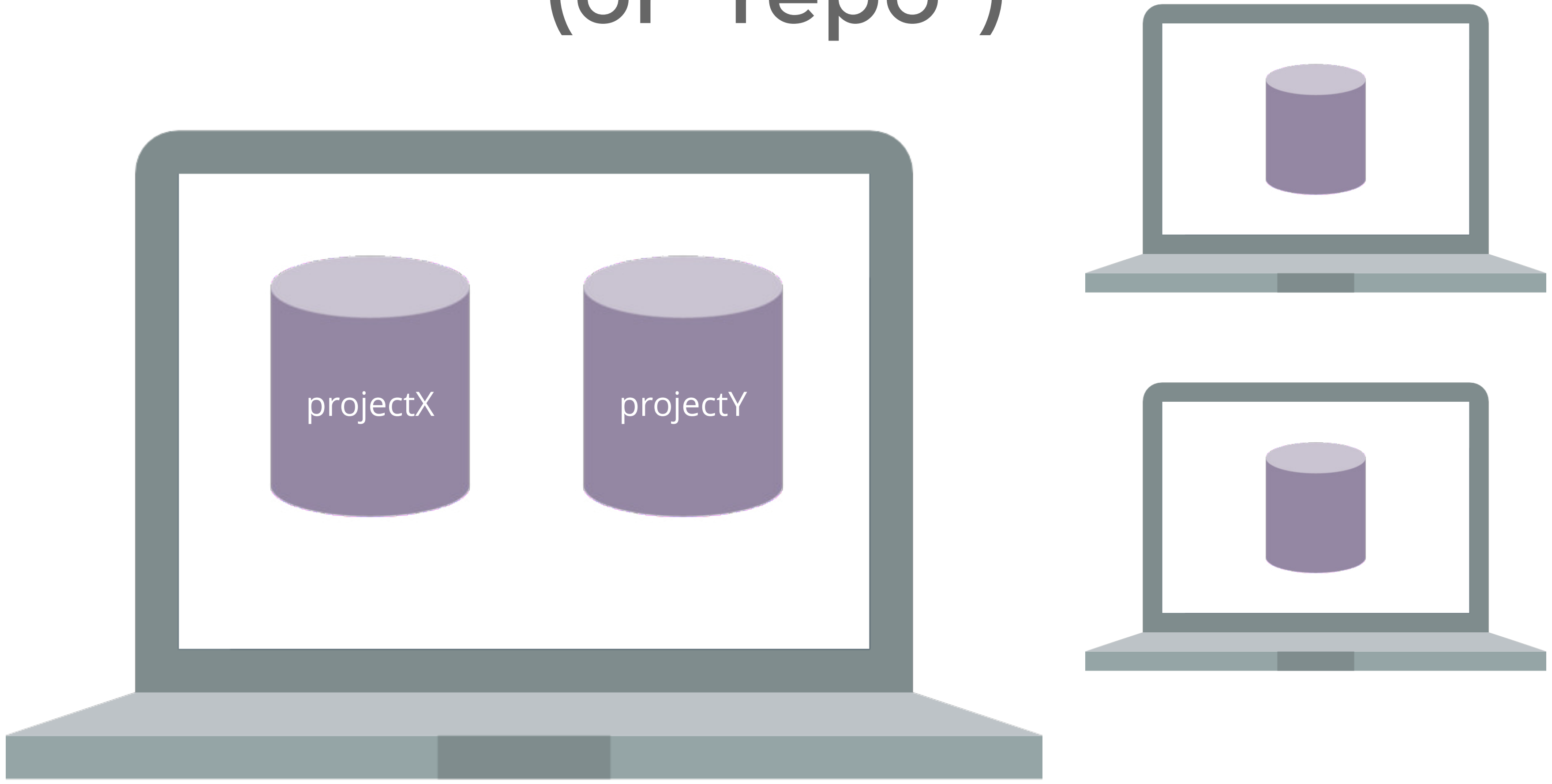


`repo/.git`

```
# run IN directory of project
git init
```

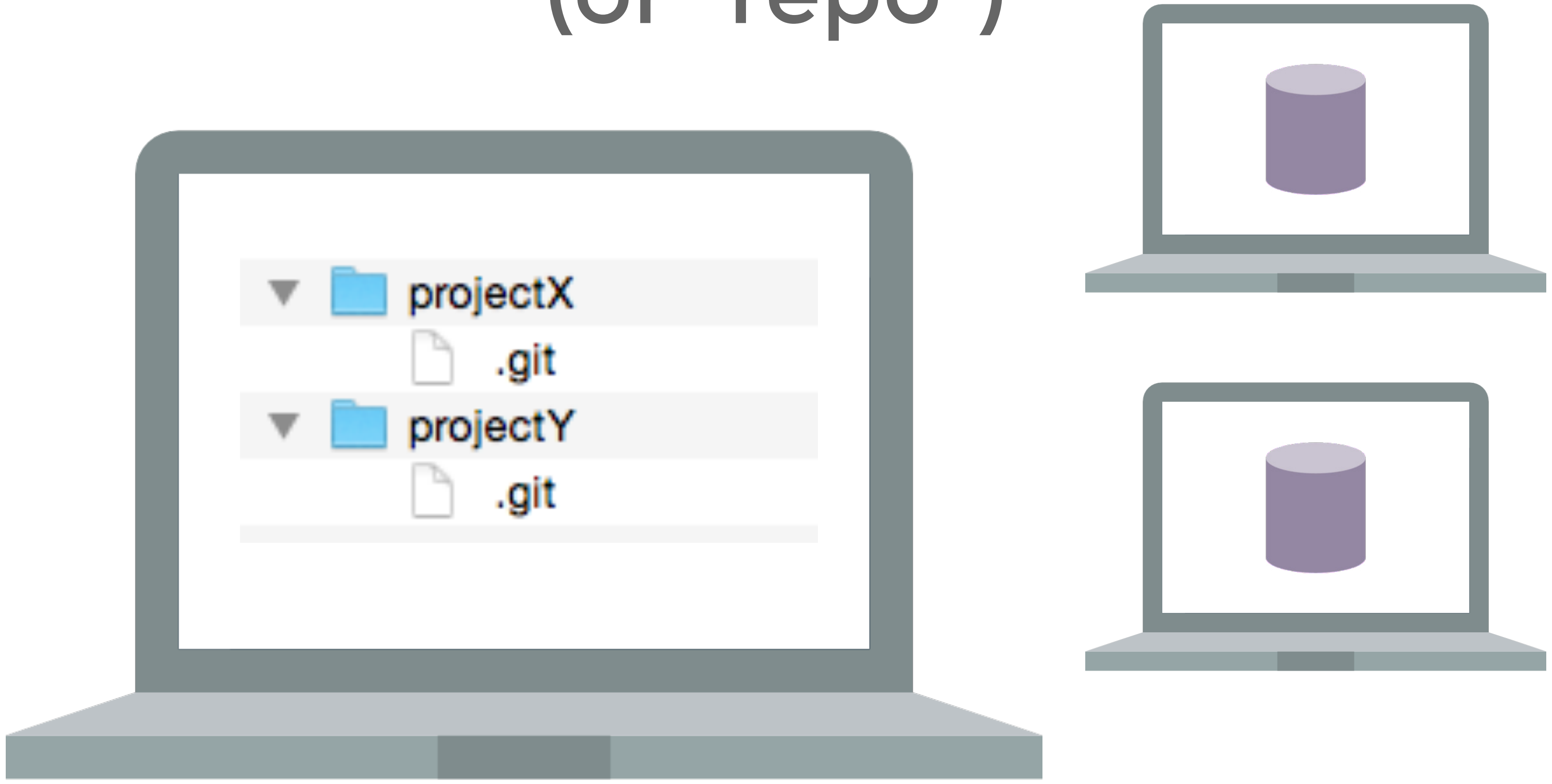
Repository

(or "repo")



Repository

(or "repo")



WARNING

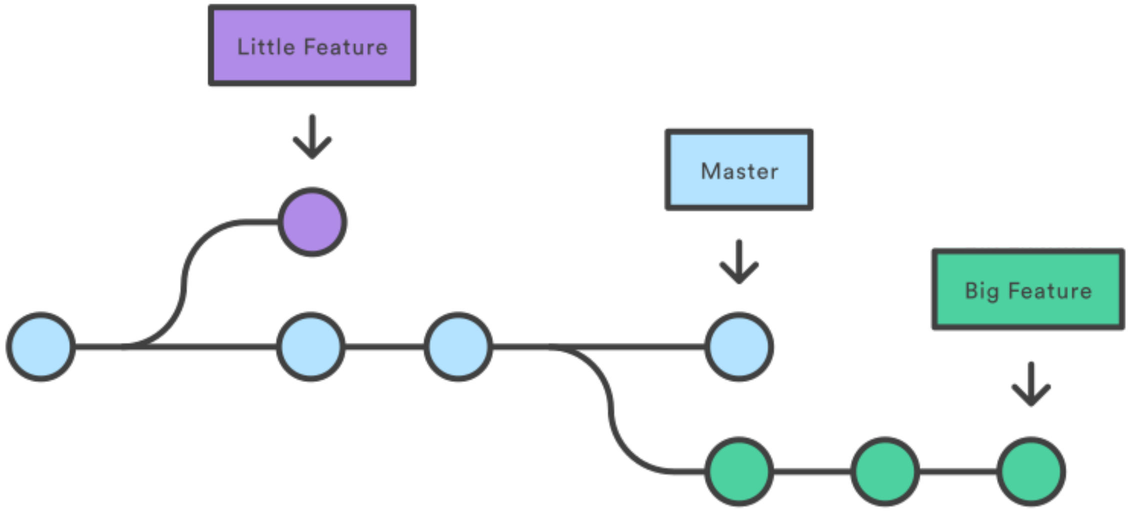
DO NOT PUT ONE REPO INSIDE OF ANOTHER!!

Git Commands

`git init`	Create new repo in folder
`git status`	Check status of repo

Branches

Branches allow for **non-linear development** and for naming different versions of code in the same repo.



more on this later in the quarter!

Make Some Changes!

Create a new file `places.md` inside the repo directory.

This document should include a Markdown-formatted **list** of **3** places you would like to visit.

How do we "save" our changes?

The Staging Area

Put changes in temporary storage before committing.

```
git add file
```

Add file to staging area

```
git add .
```

Add everything in directory

Git Commands

`git init`	Create new repo in folder
`git status`	Check status of repo
`git add file`	Add file to staging area

Committing Changes

Store current snapshot of files in repository!

```
git commit -m "message"
```

Commit changes

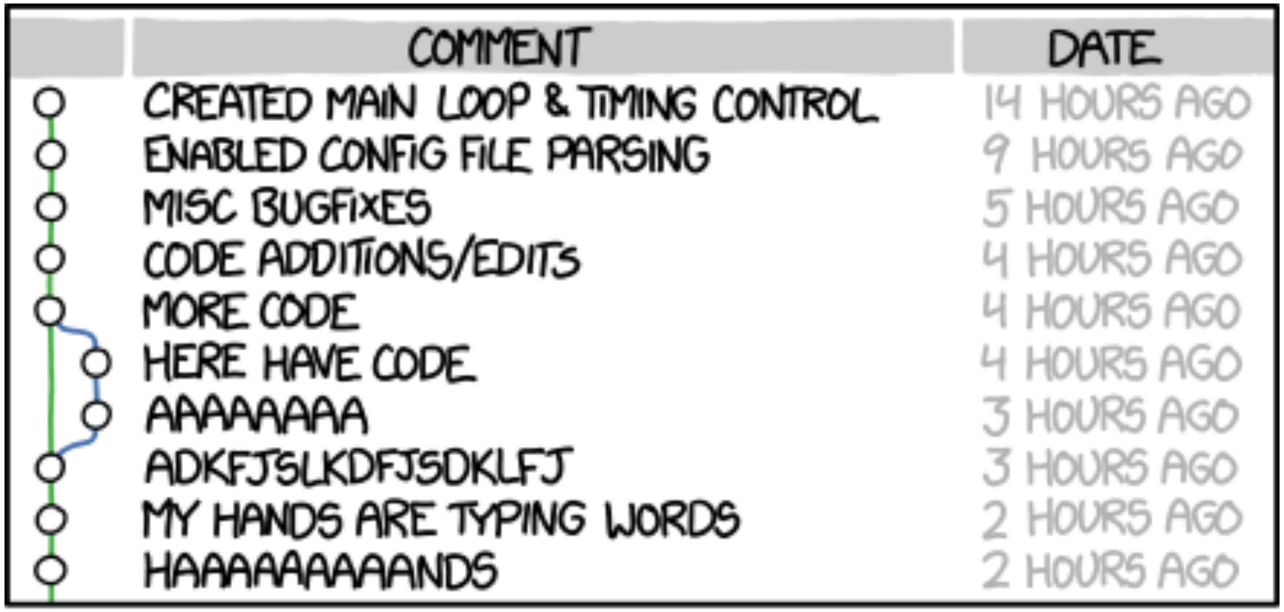
If you forget the **-m** option,
use **:q** (colon then q) to quit *vi*

Commit Message Etiquette

- Detail what change the commit is making
- Use **imperative** mood ("Add feature", not "added feature")
  - *"If applied, this commit will {your subject line}"*
- 50 character limit for first line
  - Can add more details after a blank line

See also: http://chris.beams.io/posts/git-commit/

Be Informative!



	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

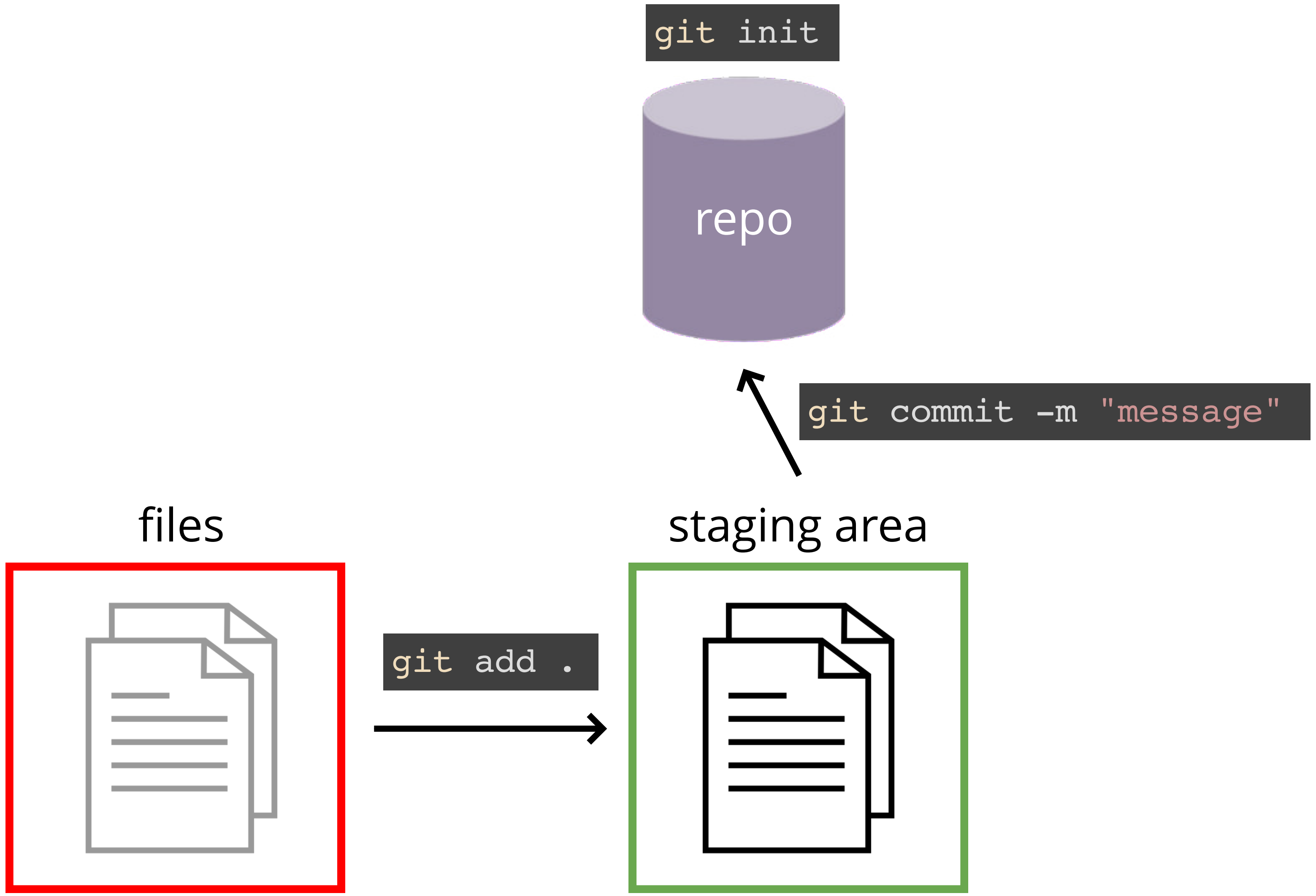
AS A PROJECT DRAGS ON, MY GIT COMMIT MESSAGES GET LESS AND LESS INFORMATIVE.

xkcd.com/1296/

Git Commands

`git init`	Create new repo in folder
`git status`	Check status of repo
`git add file`	Add file to staging area
`git commit -m "message"`	Commit changes
`git log [--oneline]`	View commit history

Local Process



Practice!

1. **Edit** your document to include a *second* list with 2 places you've already visited.

2. **Add** the changes to the staging area.

3. **Commit** the changes to the repository.

github
SOCIAL CODING

git *is to* github SOCIAL CODING

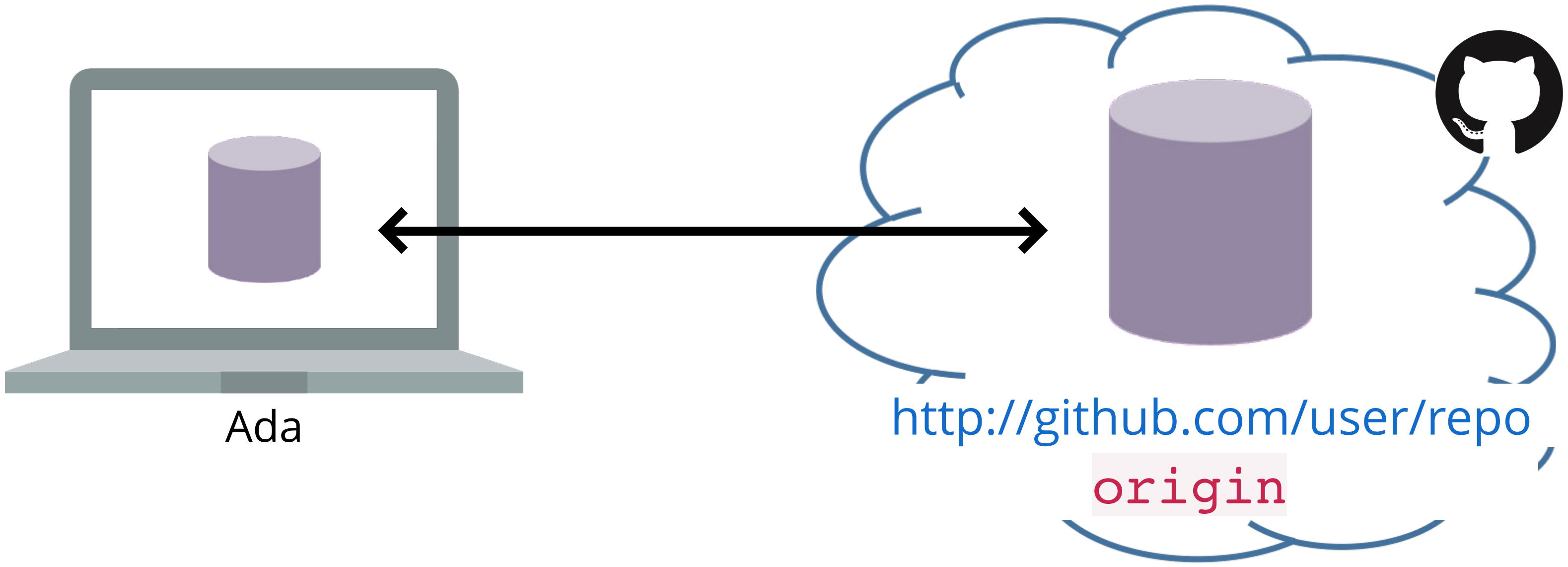
as

is to imgur

Remotes

A **remote** is a repository *on another machine* that a repository can upload and download code from.

Git gives each remote a name (an "alias") to easily refer to it. By convention, the "primary" remote (where you cloned from) is named `origin`

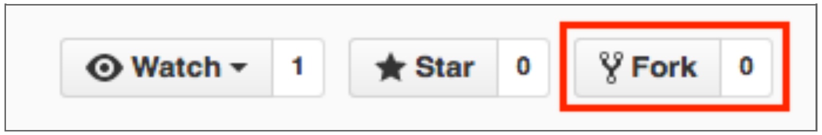


Forking

Forking creates a **copy** of a repo ***on GitHub's computers***.

Forking

https://github.com/joelwross/github_practice



Git Commands II

```
git clone url
```

Copy repo to local machine

Only need to do this once per machine!

Ch-ch-changes

1. **Edit** the README to include your name

2. **Add** the changes to the staging area.

3. **Commit** the changes to the repository.

Push to GitHub

Upload commits to the GitHub cloud repo.

```
git push origin master
```

Upload to the **origin** remote, **master** branch

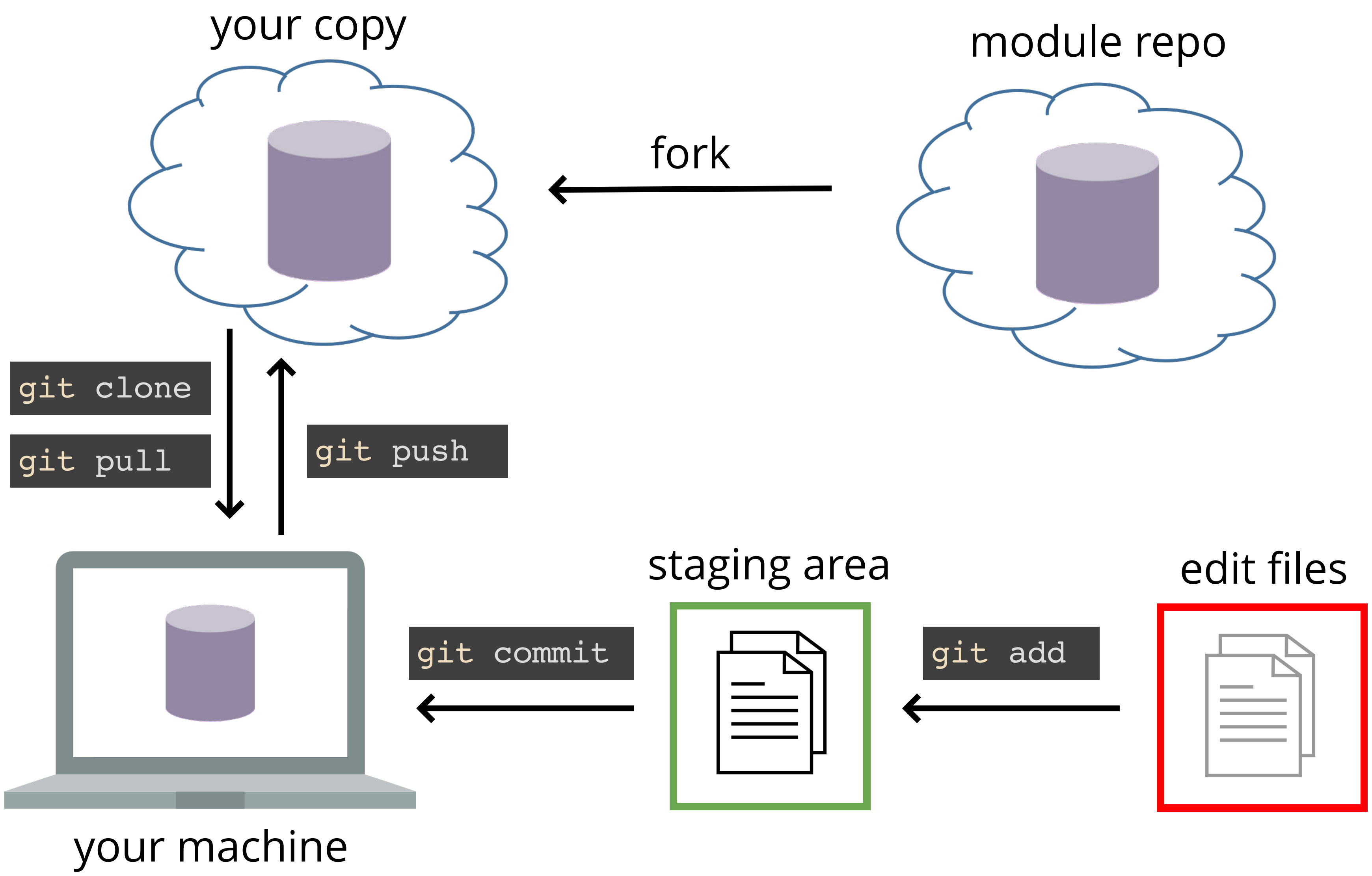
Git Commands II

`git clone url` Copy repo to local machine

`git push [origin master]` Upload commits

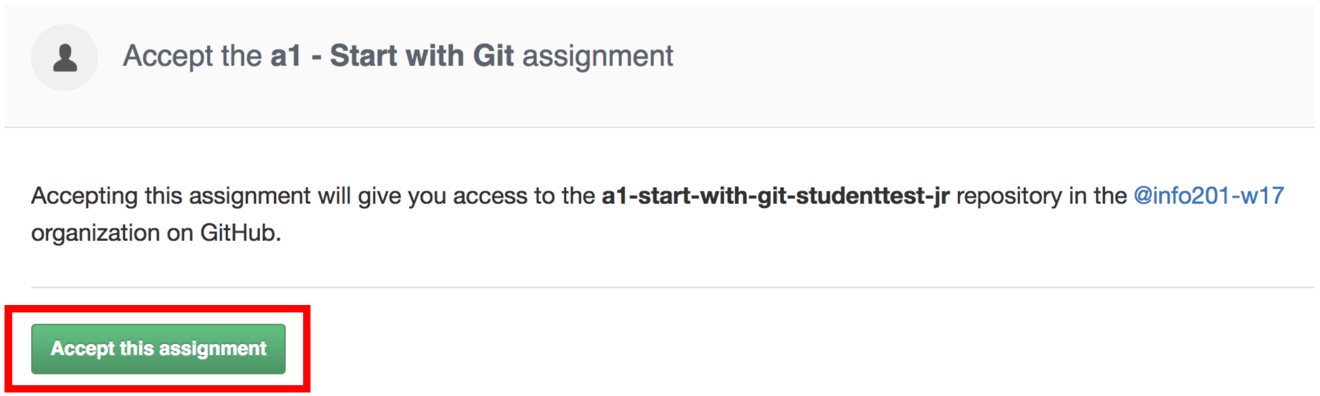
`git pull` Downloads and *merges* commits

Using GitHub



GitHub Classroom

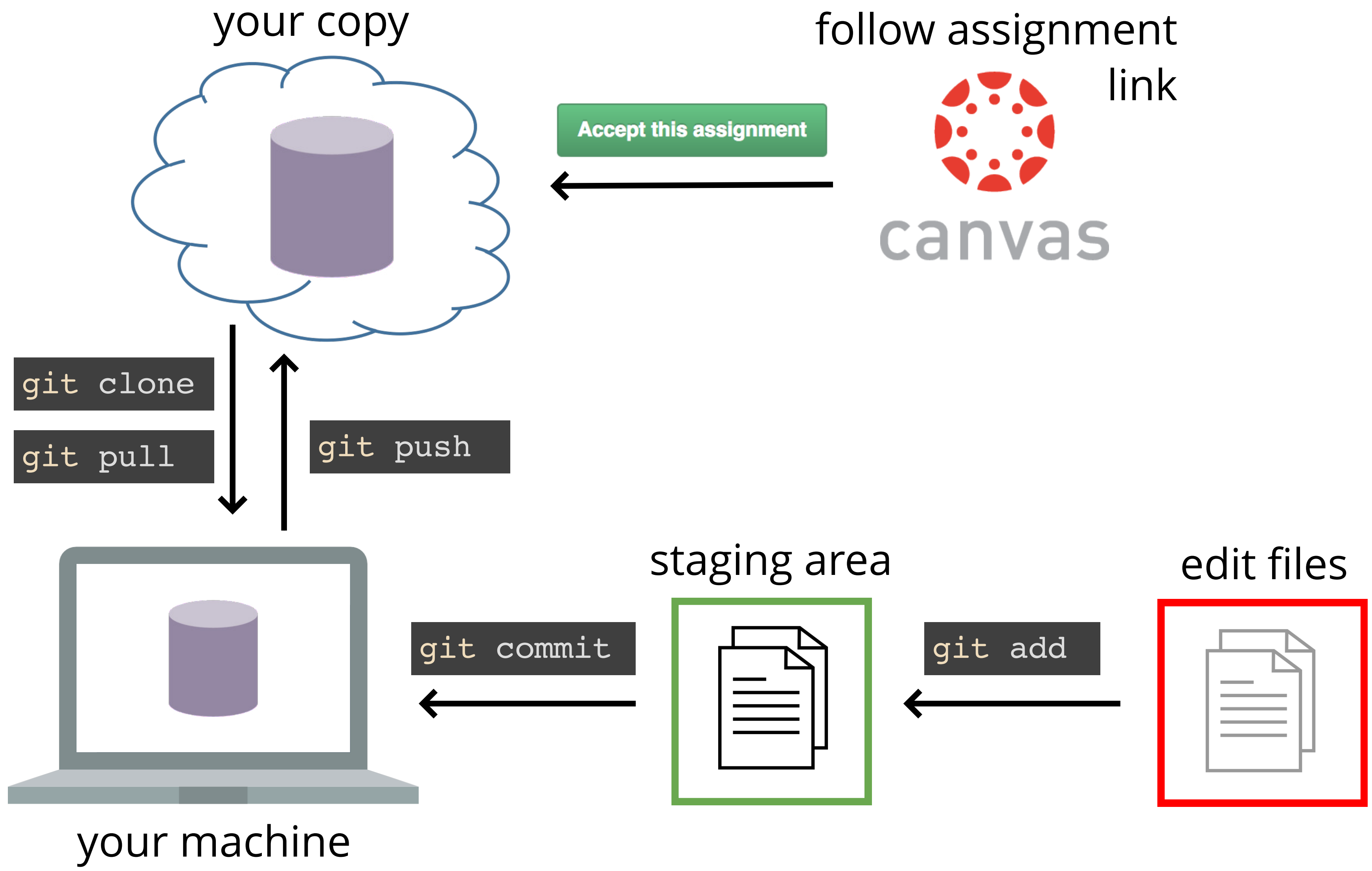
Assignments use a tool called GitHub Classroom to automatically create *private* repos for your homework.


Accept the **a1 - Start with Git** assignment

Accepting this assignment will give you access to the **a1-start-with-git-studenttest-jr** repository in the @info201-w17 organization on GitHub.

DO NOT FORK ASSIGNMENT REPOS

Using GitHub (Assignments)



Questions on Git?

Version Control

"A version control system (VCS) is a tool for managing a collection of program code that provides you with three important capabilities: reversibility, concurrency, and annotation.

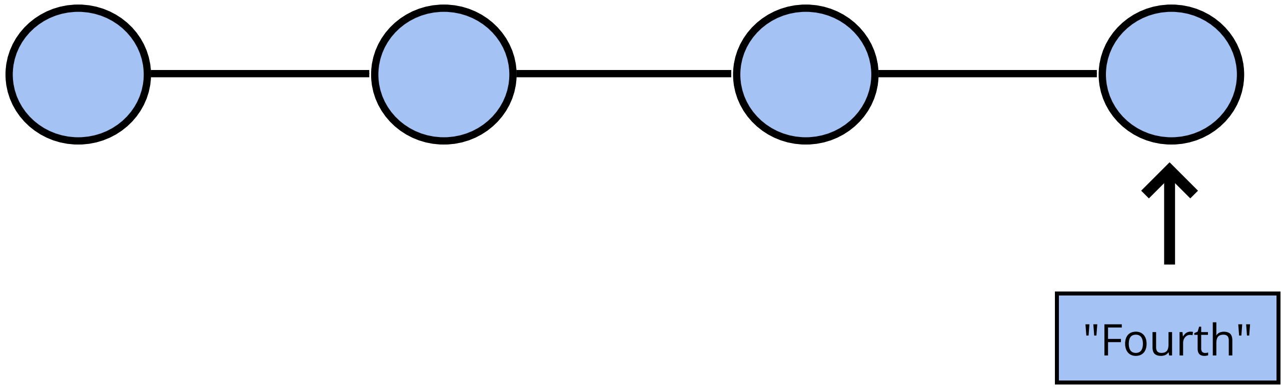
??

— Eric Raymond

Commit History

Git stores the **sequence** of commits that have been made.

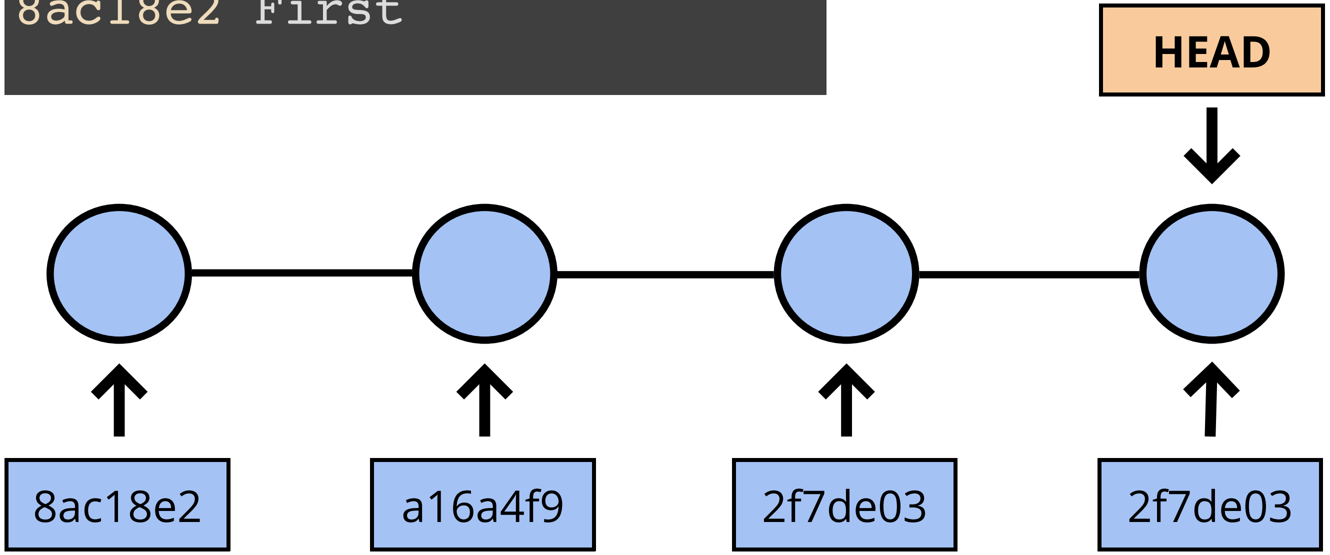
```
git commit -m "Fourth"
```



Commit IDs

Each commit has a unique **commit id** that refers to it

```
$ git log --oneline
2f7de03 Fourth
8417290 Third
a16a4f9 Second
8ac18e2 First
```



Undoing Things

```
git checkout [commit] [file]
```

Replace file with version from previous commit

```
git revert [commit]
```

Change files to undo commit and remove the changes it made (adding a new commit, preserving history)

See also: https://www.atlassian.com/git/tutorials/undoing-changes

What we did...

- Practiced with the command-line and markdown
- Saved file versions with git
- Push data to GitHub

Action Items!

- Be comfortable with **module 4** by Tues
- Assignment 1 due Wednesday night - start it now!

Tuesday: starting with R! (pre-read: **module 5**)