Intro to git and GitHub

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Week 4, Class 2

UNIVERSITY OF OREGON

Agenda

- Questions
- Intro to *git*/*GitHub*
- Lab

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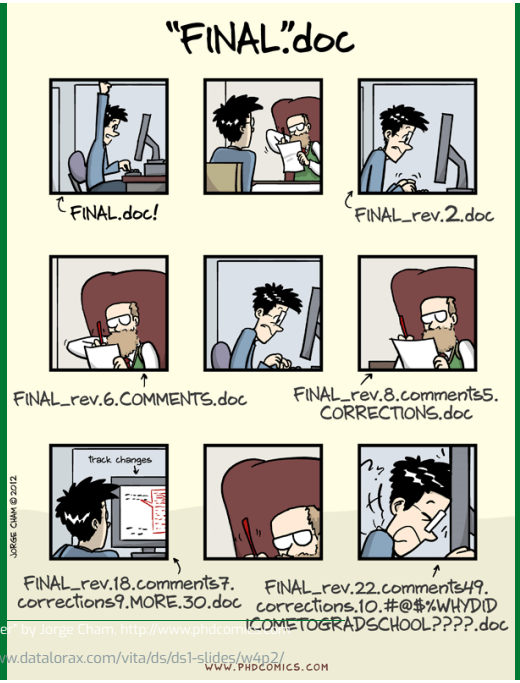
Learning objectives for today

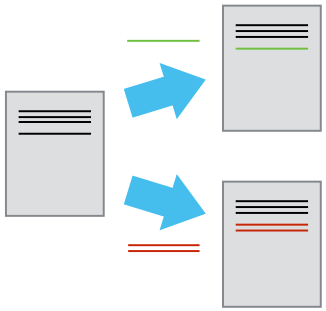
- Understand the basics of git and git vocabulary
- Be able to create repos, push projects, commit changes
- Begin collaborating on a project



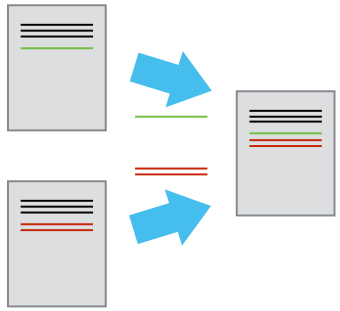
"Piled Higher and Deeper" by Jorge Cham, http://www.phdcomics.com/comics/archive/phd101212s.gif

From swcarpentry

We can think of the changes as separate from the document



This means there are many possible versions of the same document



Unless there are conflicts, two changes from the same document can be merged together

How?

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- Actual method of completing the tasks is up to you
  - GUI? Command line? RStudio?

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- Get you to understand the structure of git
- Actual method of completing the tasks is up to you
  - GUI? Command line? RStudio?
- If you go with a GUI, I'd recommend GitKraken
  - In fact, I'd recommend everybody download/use it, even if for merge conflicts alone.

Some basic terminology

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  - A tool to help us track changes. *git* is one such system (but there are others).

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When working with git

- Each collaborator has the *entire* repo on their local machine
- There is also a cloud-based server hosing the repo (that's GitHub)
- The online version of the repo is call the *remote*

Some key points

- Because *git* tracks the **entire** history of a project it is akin to unlimited "undo"
- *git* allows many people to work in parallel

Creating a repository

- A couple of different options...

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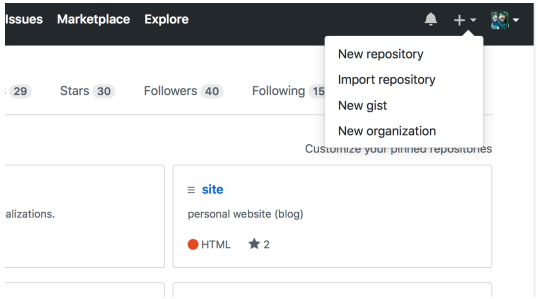
Rstudio

Let's focus on the RStudio version first.

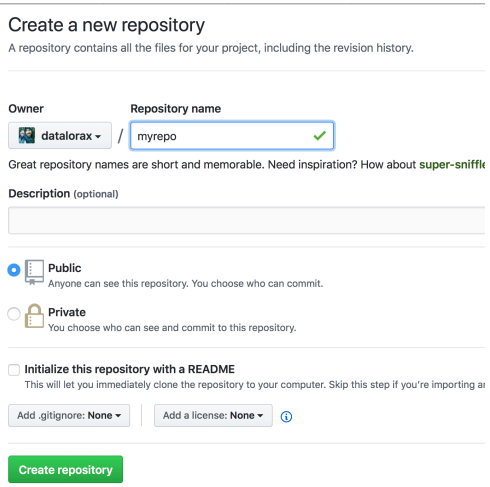
GitHub

Go to GitHub

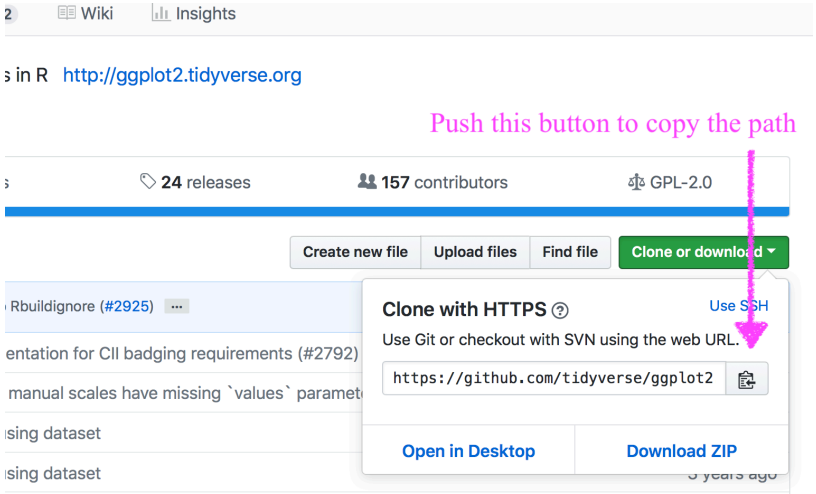
- Select drop down by your profile, then "New Repository"
- I'd suggest also adding the R .gitignore and a README



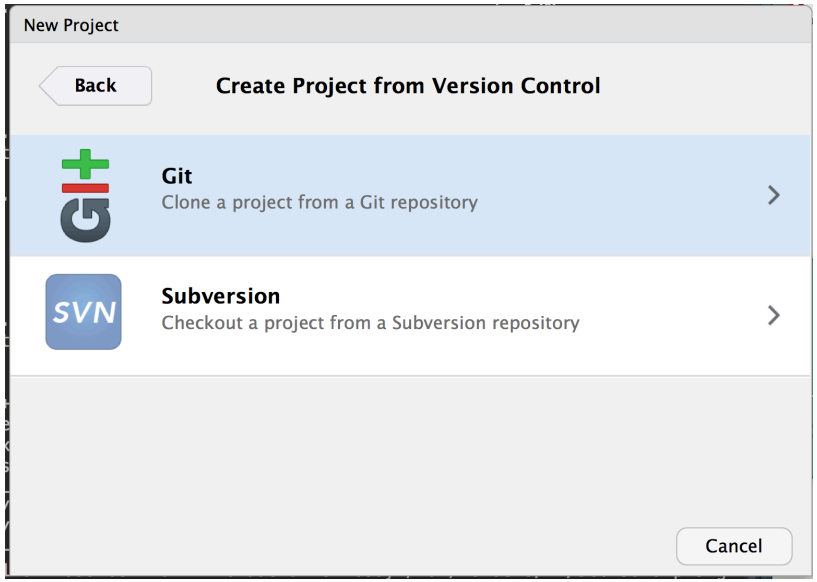
Name it

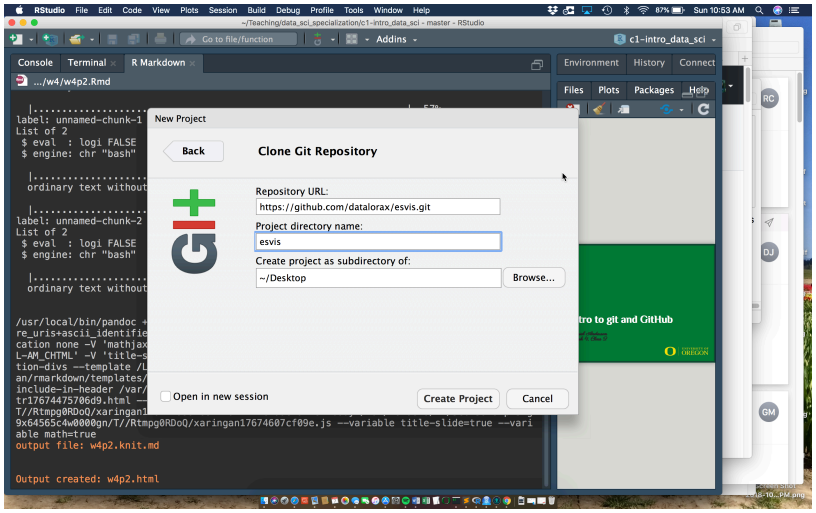


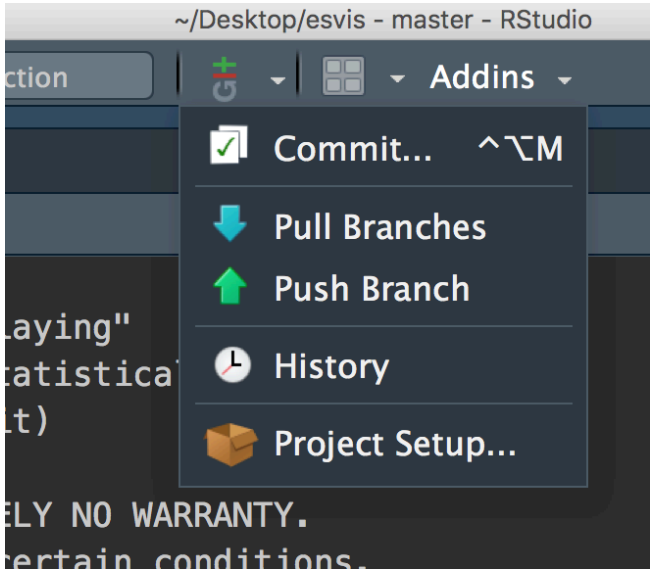
Copy path



Create a new RStudio Project







[demo]

Let's look atthe git plugin

Tracking

Notice the hidden `.git` folder

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On mac, show hidden files with

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cmd + shift + .
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(Note, I have hidden files shown all the time)

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- As long as that folder exists, the **entire** folder will be tracked.
  - **Do not create repos inside of repos**
  - If you want a folder to show up, there needs to be something in it (e.g., a `README.md`)

Ignoring Files

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- The `.gitignore` file tells the repo not to track certain files
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Probably not super important for now, but if you need to ignore a file in your repo for whatever reason, just put the name of the file in the `.gitignore`

Adding a file

- Let's create an R Markdown file and put it in our repo.
- Open terminal, type `git status`. What do you see?
- Use the RStudio `git` plugin. What do you see?

Staging

- When you add files to a repo you are *staging* them for tracking.

(demo gitkraken & RStudio staging)

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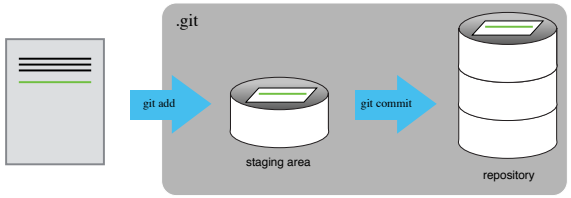
Command line version is `git add <file>`

Commits

After staging, you *commit* changes to the file



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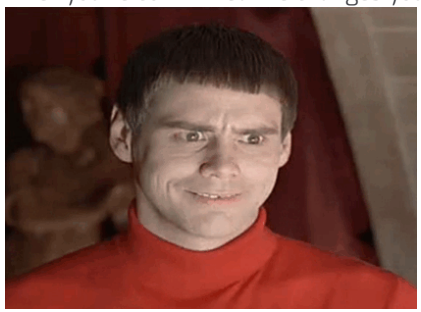

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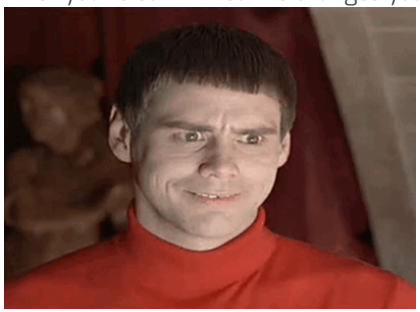

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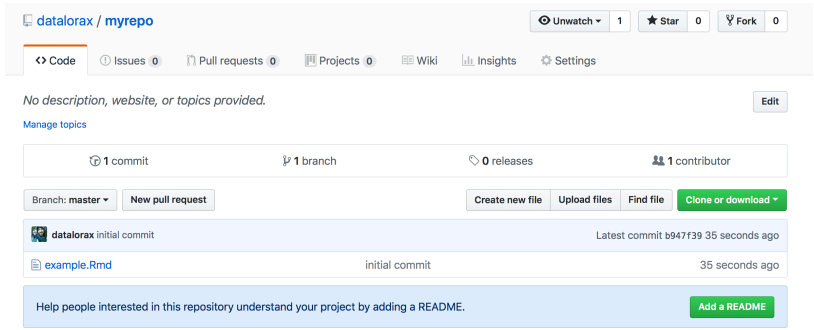
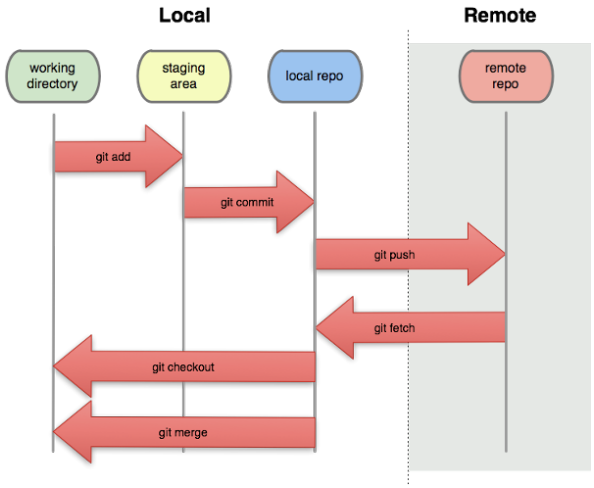
The cloud-based repo

Refresh the repo



An overall view



Revisiting some vocabulary

- stage
- commit
- push
- pull
- clone

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At least half the difficulty with *git* is all the weird words

Simple git through command line

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Slides available at:http://www.datalorax.com/vita/ds/ds1-slides/w4p2/ 30 / 43

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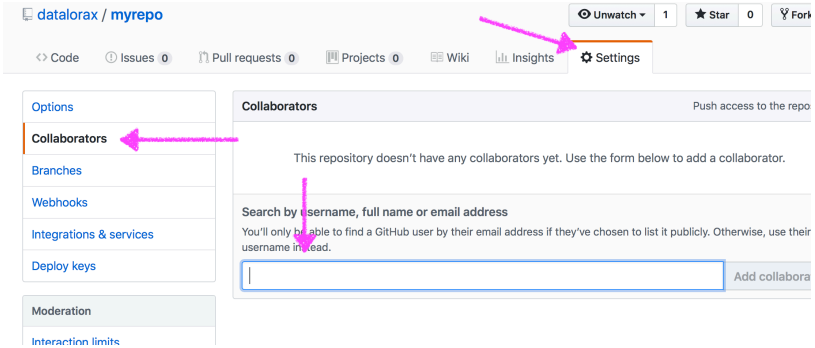
- `git push`
  - Pushes the changes you've made from your local repo to the remote
- `git status`
  - Gives you an update on your local repo (what files still need to be added, what changes have been made since last commit, etc.)

Collaborating

Need to get proper permissions. Two methods:

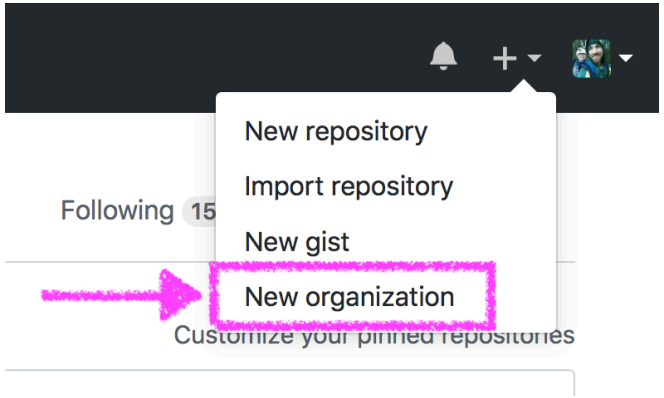
- Add users to a repo: Settings => Collaborators => add user w/ username



Collaborating

Second method:

- Create an organization



Cloning

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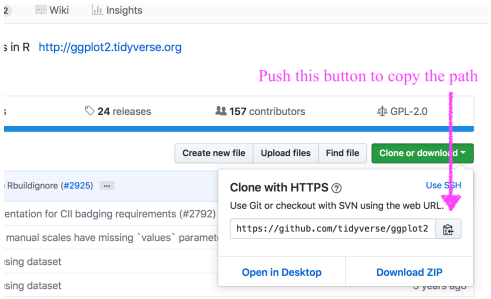

Merge conflicts

- Remember to always `git pull` first
- Let's create a merge conflict!

(Note the GUI from *gitkraken* is really nice for resolving them)

Merge conflict activity

1. Get a partner
2. Partner1 add Partner2 as a collaborator
3. Partner2 clone the repo
4. Partner1 make changes to the file in the repo, commit, and push
5. Partner2 make different changes to the same parts of the file. Commit the changes. Try to push. What happens? Why?
6. Open up the files - do you see some weird stuff that's been added?

Wait for next steps

Merge conflicts w/gitkraken

Some takeaways

Basic workflow is

- Create a repo
- Add collaborators
- Add files
- Commit changes
- Push changes to remote

Advice on avoiding merge conflicts

- Always `git pull` (or the GUI equivalent) before you start working
- Try to stay in communication and don't work on the **exact** same thing at the same time
- Use a GUI to help you manage what merge conflicts you do run into

Remember, today is an intro

We'll talk more about other `git` features later

- branching
- forking
- pull requests
- filing issues
- etc.

Lab

- For lab today, just submit a link to the repo you created
- If we still have time, work with your group to get a shared repo
  - Discuss organization
  - Maybe get your outline uploaded?
- Chat with me before you leave if you're still confused (note, I expect you to be at least a little confused)

Additional info

- Initializing a local repo through the command line

```
mkdir newrepo
cd newrepo
git init
```


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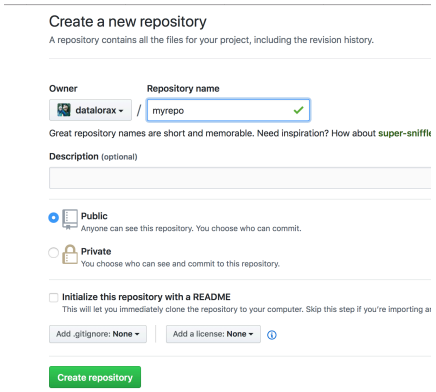
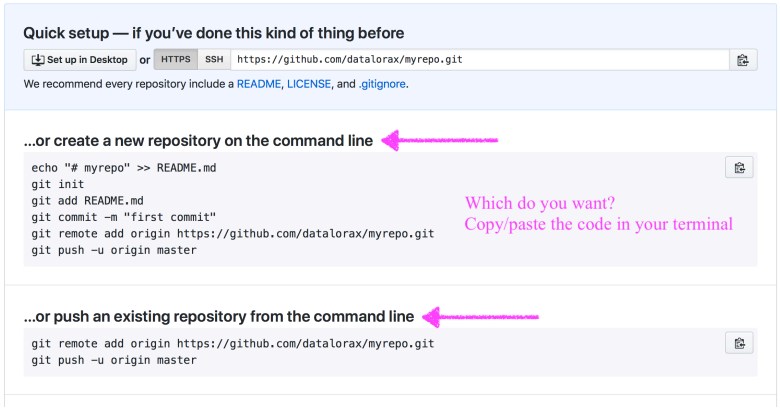
You should get a message similar to `Initialized empty Git repository in /Users/Daniel/newrepo/.git/`

Name it

Doesn't have to be the same name as the folder on your local, but probably a good idea.



Connect it


Quick setup — if you've done this kind of thing before
Set up in Desktop
or
HTTPS
SSH
https://github.com/datalorax/myrepo.git
We recommend every repository include a README, LICENSE, and .gitignore.
...or create a new repository on the command line
echo "# myrepo" >> README.md
git init
git add README.md
git commit -m "first commit"
git remote add origin https://github.com/datalorax/myrepo.git
git push -u origin master
Which do you want?
Copy/paste the code in your terminal
...or push an existing repository from the command line
git remote add origin https://github.com/datalorax/myrepo.git
git push -u origin master