Remember! Before the next class….

Sign up for Github:

Github: https://github.com

Use your Chapman email address!

Send username to Dr. Waldrop

Accept invite to CS-510-Fall-2020 Course Organization page

Install git:

git download: https://git-scm.com/downloads

Put it in default directory

Activate in RStudio:

Go to Preferences > Git/SVN

Check “Enable version control interface for RStudio projects”

Lecture 3 – Version Control

Learning Objectives:

3. Learn the basic principles of software design.

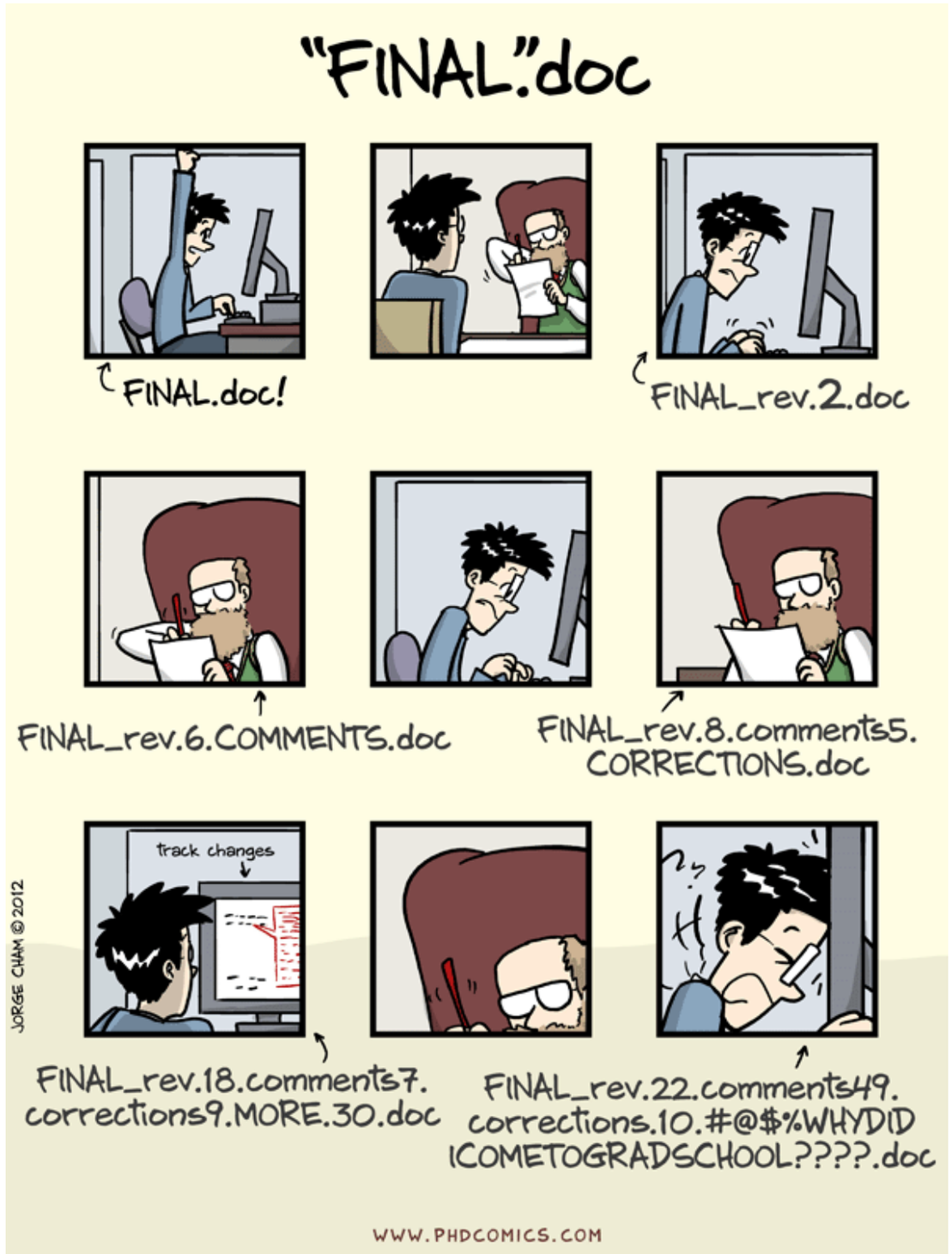
    3.1 Learn commands of git.

    3.2 Learn how to explore history of a repository.

    3.3 Learn how to create and use remote repositories.

5. Produce code that is reproducible and produces results that are replicable.

Why use version control?



http://www.phdcomics.com/

If you "break" your code, how do you get it back?

If your computer crashes, how do you get back your code?

If you update your code, how do you know which version you used for a particular analysis/graph?

If you work on multiple machines or between multiple people, how do you know what's going on?

Configure git:

Go to command line…

- MAC: Applications > Other > Terminal

- Windows: Start button > Search > “cmd”

Enter the following commands:

```
$  git config --global user.name yourusernamefromgithub
$  git config --global user.email youremail@chapman.edu
```

Exit command line.

Start a git repository:

Make a new directory:

```
$  mkdir airplanes
```

Enter that directory:

```
$  cd airplanes
```

Initialize the repository:

```
$  git init
```

Create a file!

```
$  touch ilikeairplanes.txt
```

Add text to the file.

Basics of Operating git

Your computer

Saved!

```
Your code
New code
New code
```

You add some new code.

git add filename

Staged!

```
Your code
New code
New code
```

Changes to scripts recorded and catalogued.

git commit

Your git repository

```
* 8ffc40d - Tue, 1 Sep 2020 15:35:33 -0700 (25 minutes ago)
|          Updating link to Github in syllabus - lindsaywa
* d3b60a5 - Tue, 1 Sep 2020 14:33:23 -0700 (87 minutes ago)
|          Adding Lecture 02 Bash files - lindsaywaldrop
* abef621 - Mon, 31 Aug 2020 11:33:49 -0700 (28 hours ago)
|          Adding 01-Intro lecture slides - lindsaywaldrop
* 66ad4be - Thu, 27 Aug 2020 07:24:59 -0700 (5 days ago)
|          Adding coding standards - lindsaywaldrop
* de83348 - Wed, 26 Aug 2020 10:20:11 -0700 (6 days ago)
|          Updating readme - Lindsay Waldrop
* d135eed - Tue, 25 Aug 2020 10:57:47 -0700 (7 days ago)
|          Adding current Syllabus and Schedule - lindsayw
* 796cae6 - Tue, 25 Aug 2020 10:53:42 -0700 (7 days ago)
|          Updating readme files with additional instructi
* 0afa70a - Mon, 10 Aug 2020 15:23:26 -0700 (3 weeks ago)
           Initial commit - Lindsay Waldrop
CPSC-WALDROP-MBP:CourseInfoFall2020 waldrop$
```

Staged changes added to history

Check status of files in repository: `git status`

Move file back to unstaged: `git reset filename`

See differences since last commit:

```
git diff
git diff --staged
```

Remove a tracked file: `git rm filename`

Examining Repository History

Check your repository history: `git log`

History of a single file: `git log filename`

See differences between specific commits:

```
git diff HEAD~2
git diff HEAD~2 filename
git diff commitid
```

See a single file from a past commit: `git checkout commitid filename`

Revert unstaged changes: `git checkout -- filename`

Undo a commit: `git revert commitid`

Examining Repository History — Don't lose your HEAD!

See the repository from a past commit: `git checkout commitid`

Entering 'Detached HEAD mode'!

```
* 8ffc40d - Tue, 1 Sep 2020 15:35:33 -0700 (86 minutes ago) (origin/master, origin/HEAD, master)
|          Updating link to Github in syllabus - lindsaywaldrop
* d3b60a5 - Tue, 1 Sep 2020 14:33:23 -0700 (2 hours ago)
|          Adding Lecture 02 Bash files - lindsaywaldrop
* abef621 - Mon, 31 Aug 2020 11:33:49 -0700 (29 hours ago)
|          Adding 01-Intro lecture slides - lindsaywaldrop
* 66ad4be - Thu, 27 Aug 2020 07:24:59 -0700 (5 days ago) (HEAD)
|          Adding coding standards - lindsaywaldrop
* de83348 - Wed, 26 Aug 2020 10:20:11 -0700 (6 days ago)
|          Updating readme - Lindsay Waldrop
* d135eed - Tue, 25 Aug 2020 10:57:47 -0700 (7 days ago)
|          Adding current Syllabus and Schedule - lindsaywaldrop
* 796cae6 - Tue, 25 Aug 2020 10:53:42 -0700 (7 days ago)
|          Updating readme files with additional instructions - Lindsay Waldrop
* 0afa70a - Mon, 10 Aug 2020 15:23:26 -0700 (3 weeks ago)
           Initial commit - Lindsay Waldrop
```

HEAD ← Pointer to where you currently are in repository history

Master: original/default branch created when you started the repository

Origin: status of your remote repository (i.e. your stuff on Github)

Get back to most current version: `git checkout master`

```
* 8ffc40d - Tue, 1 Sep 2020 15:35:33 -0700 (89 minutes ago) (HEAD -> master, origin/master, origin/HEAD)
|          Updating link to Github in syllabus - lindsaywaldrop
```

Basics of Operating git/Github

Your computer

Saved!

Your code

New code

New code

You add some new code.

git add filename

Staged!

Your code

New code

New code

Changes to scripts recorded and catalogued.

git commit

Your git repository

```
* 8ffc40d - Tue, 1 Sep 2020 15:35:33 -0700 (25 minutes ago)
|          Updating link to Github in syllabus - lindsaywa
* d3b60a5 - Tue, 1 Sep 2020 14:33:23 -0700 (87 minutes ago)
|          Adding Lecture 02 Bash files - lindsaywaldrop
* abef621 - Mon, 31 Aug 2020 11:33:49 -0700 (28 hours ago)
|          Adding 01-Intro lecture slides - lindsaywaldrop
* 66ad4be - Thu, 27 Aug 2020 07:24:59 -0700 (5 days ago)
|          Adding coding standards - lindsaywaldrop
* de83348 - Wed, 26 Aug 2020 10:20:11 -0700 (6 days ago)
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* d135eed - Tue, 25 Aug 2020 10:57:47 -0700 (7 days ago)
|          Adding current Syllabus and Schedule - lindsayw
* 796cae6 - Tue, 25 Aug 2020 10:53:42 -0700 (7 days ago)
|          Updating readme files with additional instructi
* 0afa70a - Mon, 10 Aug 2020 15:23:26 -0700 (3 weeks ago)
           Initial commit - Lindsay Waldrop
CPSC-WALDROP-MBP:CourseInfoFall2020 waldrop$
```

Staged changes added to history

PULL

PUSH

Github

Someone else's PUSH

Commits on Sep 1, 2020

Updating link to Github in syllabus
lindsaywaldrop committed 27 minutes ago

Adding Lecture 02 Bash files
lindsaywaldrop committed 1 hour ago

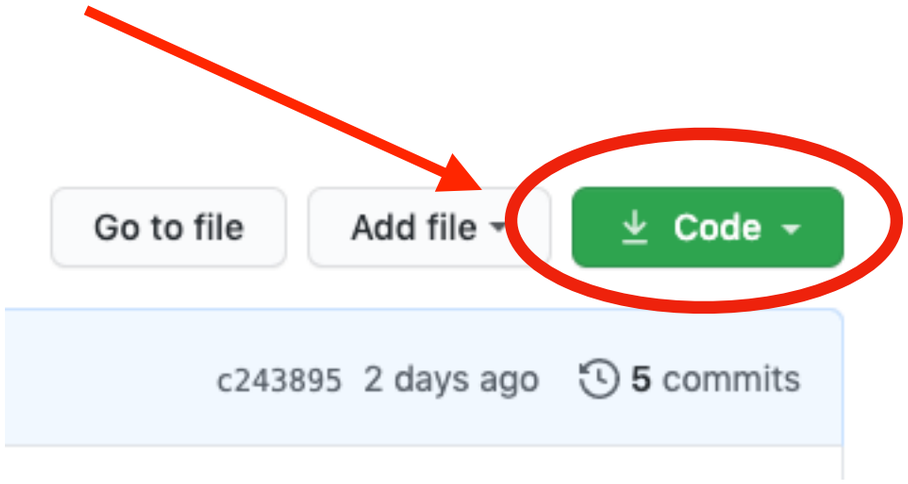
Commits on Aug 31, 2020

Adding 01-Intro lecture slides

Cloning a Repository on Github

Go to the directory that you want the repository folder to be placed in

Go to the repository's Github page and click "Code", copy the URL to your clipboard.



Clone the practice repository:

```
$  git clone COPIED URL
```

Git will download the repository, create a folder, and place all of the code inside of that folder.

Start a New Project in RStudio (Method 1 — Easiest)

Go to Github and in "Repositories" click the green "New Repository" button.

Pick a unique repository name (this will also be a folder name on your computer).

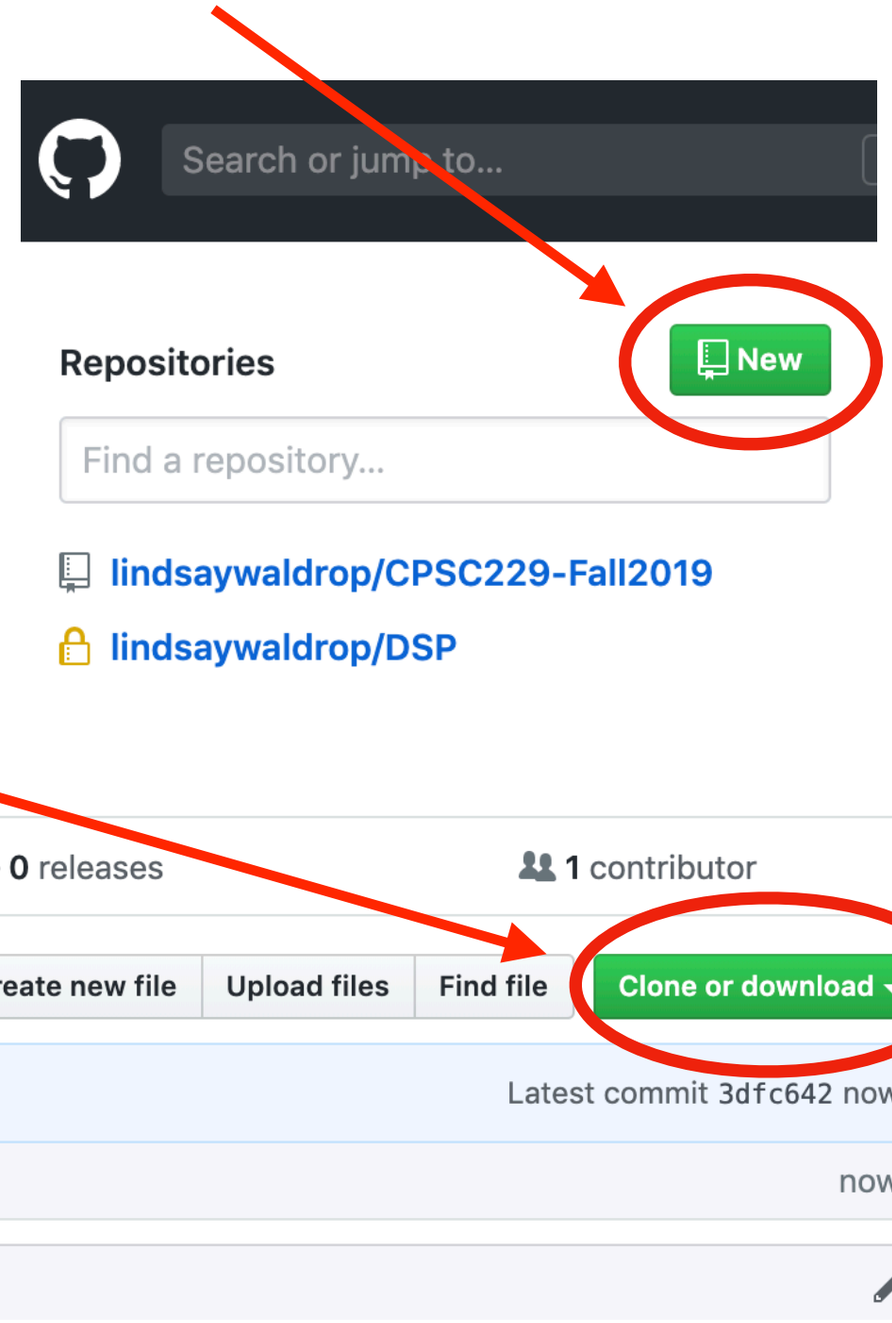
Click "Initialize this repository with a README file" then "Create Repository"

Click the "Clone or download" button and copy the URL to your clipboard.

Return to RStudio and from Files select "New Project…"

Select "Version Control" option and then "git"

Copy the URL from Github into the repository URL box and then click through to create a new project!



Start a New Project in RStudio (Method 2 — Harder)

From RStudio and from Files select “New Project…” and then “New Directory” and “New Project”.

Be sure to select “Create a git repository”. Click through to start your new project.

Add some code/files. Commit these changes.

Go to Github and in “Repositories” click the green “New Repository” button.

Give your repository on Github THE SAME NAME as your RStudio project (this will help sync them).

UNSELECT “Initialize this repository with a README file” then “Create Repository.”

Click the “Clone or download” button and copy the URL to your clipboard.

Return to RStudio and click the little cog under the “Git” tab, select “Shell.”

Click the “Clone or download” button and copy the URL to your clipboard.

Enter the following commands:

```
$   git remote add origin URLYOUCOPIED
$   git remote -v
$   git push --set-upstream origin master
```

Now you can push to and pull from Github!