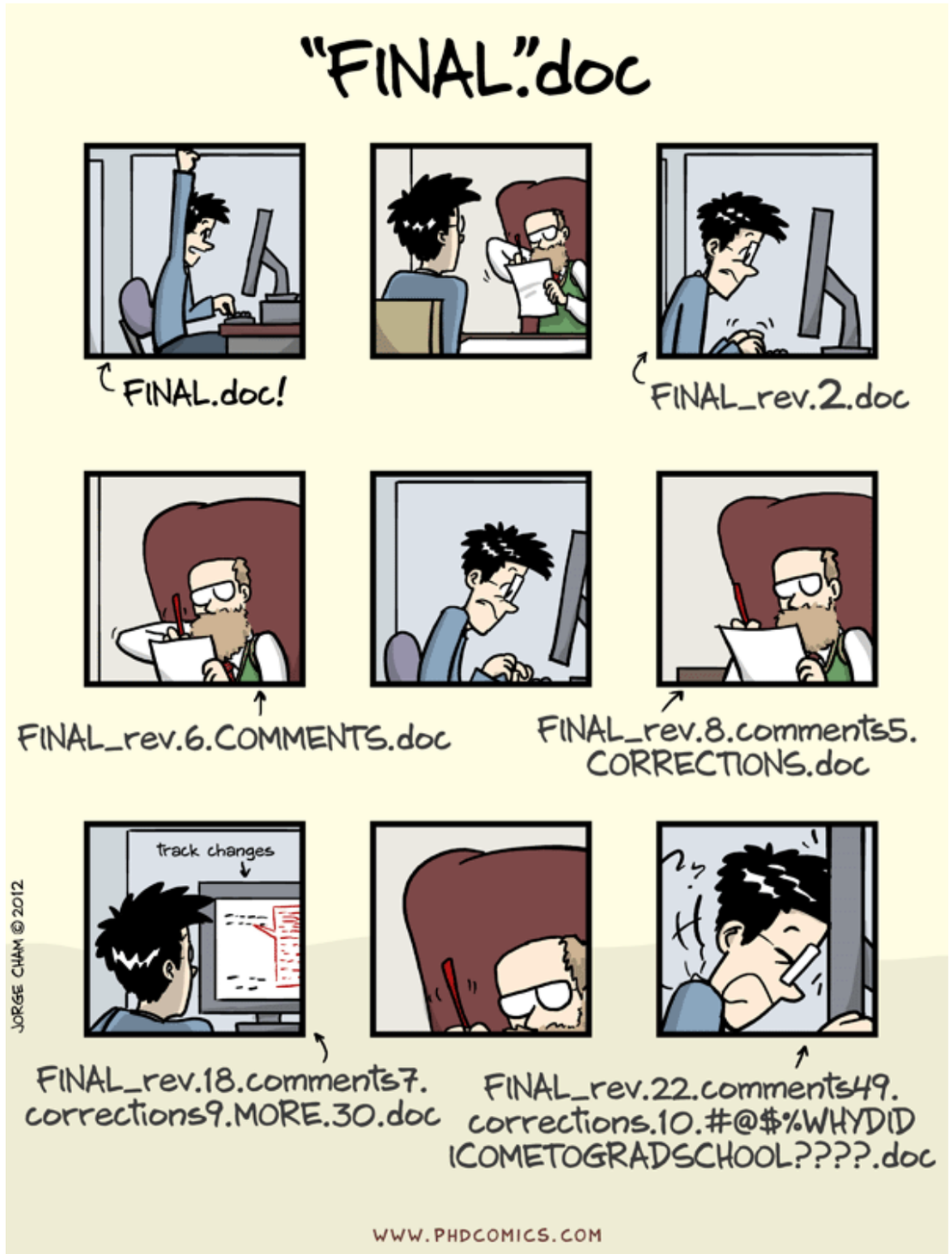
Version Control

- **Download and Install git:**

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

Put it in default directory

Why Bother with Version Control?



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

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

What if you are on a group project and people need to work on the same code at once?

https://swcarpentry.github.io/git-novice/01-basics/index.html

What is Automated Version Control?

- **Automated version control (VC)** is the process by which someone uses specialized software to keep track of changes made to a digital document.

    - Several different types of VC software, with a long history. (Classic example is track changes!)

    - For code, software like SVN and git are often used to track line-by-line changes.

- VC is like the ultimate undo button: you can undo or revert any change to a document that you've tracked.

- VC also allows multiple users to work on documents simultaneously, keeping only the best edits in the main document!

How Does Automated Version Control Work?

- VC works by keeping a record of changes to individual lines of a document.

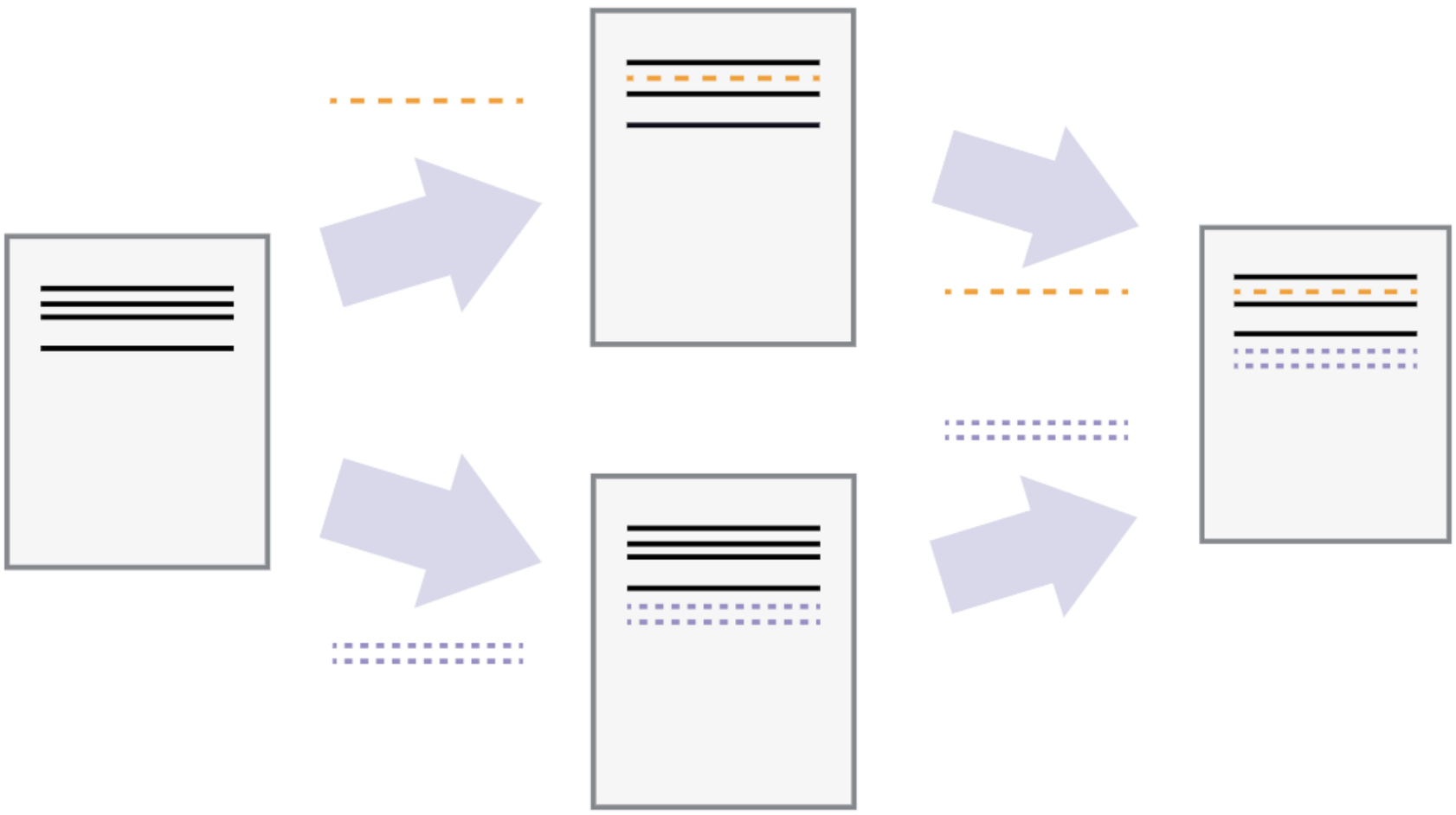
    - Changes are made by one user to an original document, and *how the document has changed* is recorded.

- Note: this does not mean it makes a full copy of the original (like you might if you had two separate versions saved on your computer). **It only tracks what has changed!**

https://swcarpentry.github.io/git-novice/01-basics/index.html

How Does Automated Version Control Work?

- If two people are working on the same document, VC will keep track of these changes separately.



- Later, VC allows the user to combine the changes back into the original document.

https://swcarpentry.github.io/git-novice/01-basics/index.html

How Does Automated Version Control Work?

- Why not use Track Changes or Google Docs for doing code?

  - MS Word (and other word-processing programs) are complex editors that introduce many “hidden” characters into files, as well as formatting/typesetting code (again, hidden).

  - This extra, hidden code often messes up code meant to run in a different language. Scripts need to edited in a script editor (to prevent these sorts of issues).

I heavily advise against trying to edit/copy code from any word processing documents!
USE R STUDIO!!!

About git

- git is a popular VC software for coding that supports nearly all document types.

    - It has a simple interface through RStudio we can use to track our code.

    - git easily integrates with Github, a website for collective management of software projects.

- **Download and Install git:**

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

Put it in default directory

Online Code Repositories

- Why put your code online?

  - Backs up your code in case of computer crash. (private & public)

  - Makes collaborations easier. (private & public)

  - Makes code available to others who wish to replicate your work or use your code. (public)

  - Shows off your projects and skills to future employers! (public)

- **Sign up for Github:**

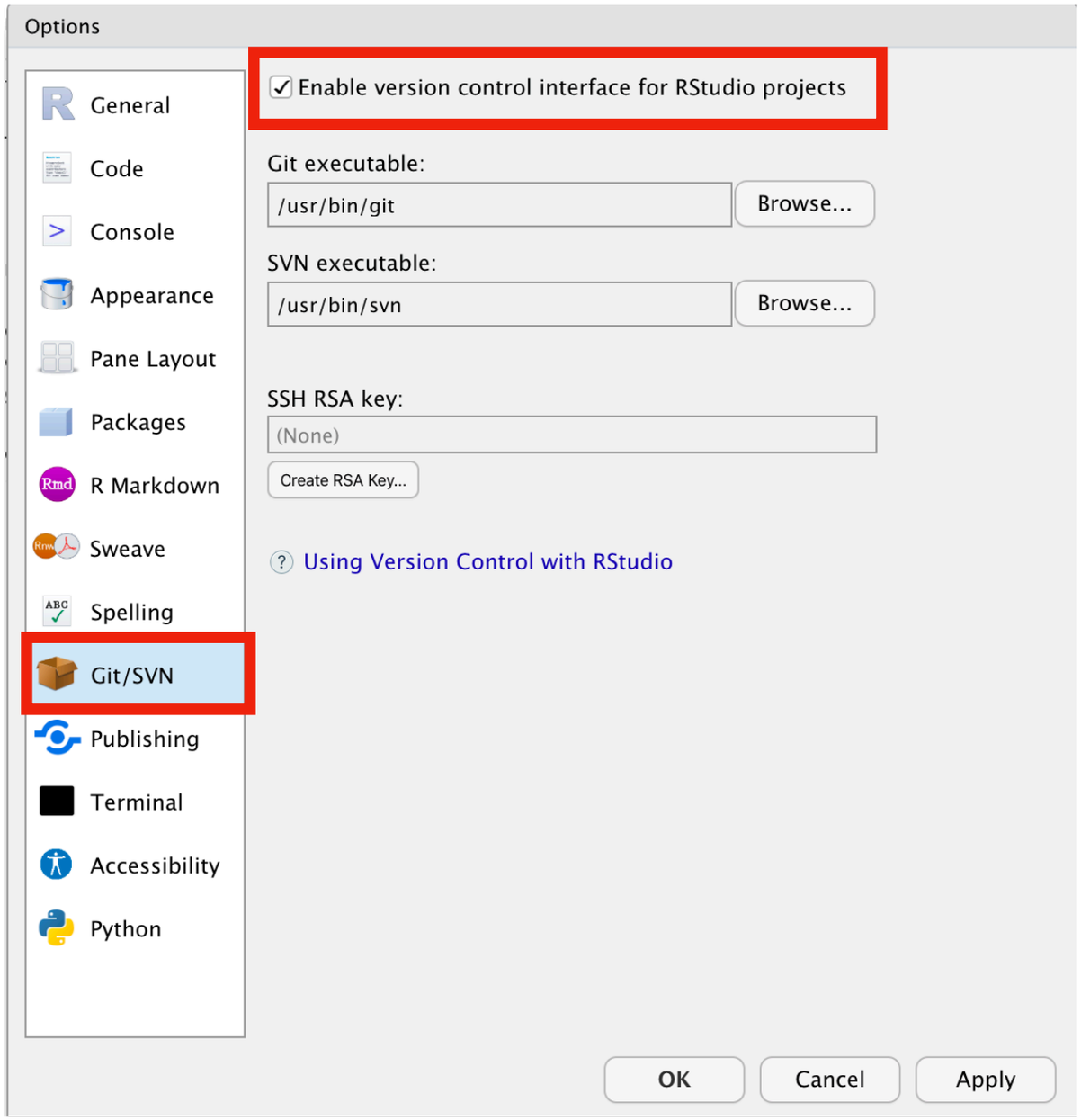
  Github: https://github.com

  Use your Chapman email address!

  Send username to Dr. Waldrop

Version Control in RStudio

- RStudio has built-in support for git when using RProjects!
  - Activate VC by going to “Preferences…”
  - Select “Git/SVN”
  - Check box that says “Enable version control interface”



Obtaining a Personal Access Token

- Personal Access Tokens (PATs) are like passwords but more secure. You can select specific administrative rights and access for each PAT you generate.

  - Generate a PAT:
    - Install **`usethis`** package in RStudio
    - Run the line: **`usethis::create_github_token()`**
    - Click “generate token” and WRITE IT DOWN!

  - Save the PAT in RStudio:
    - Install **`gitcreds`** package in RStudio
    - Run the line: **`gitcreds::gitcreds_set()`**
    - Respond to the prompt by entering your PAT.

Start a New Project in RStudio

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).

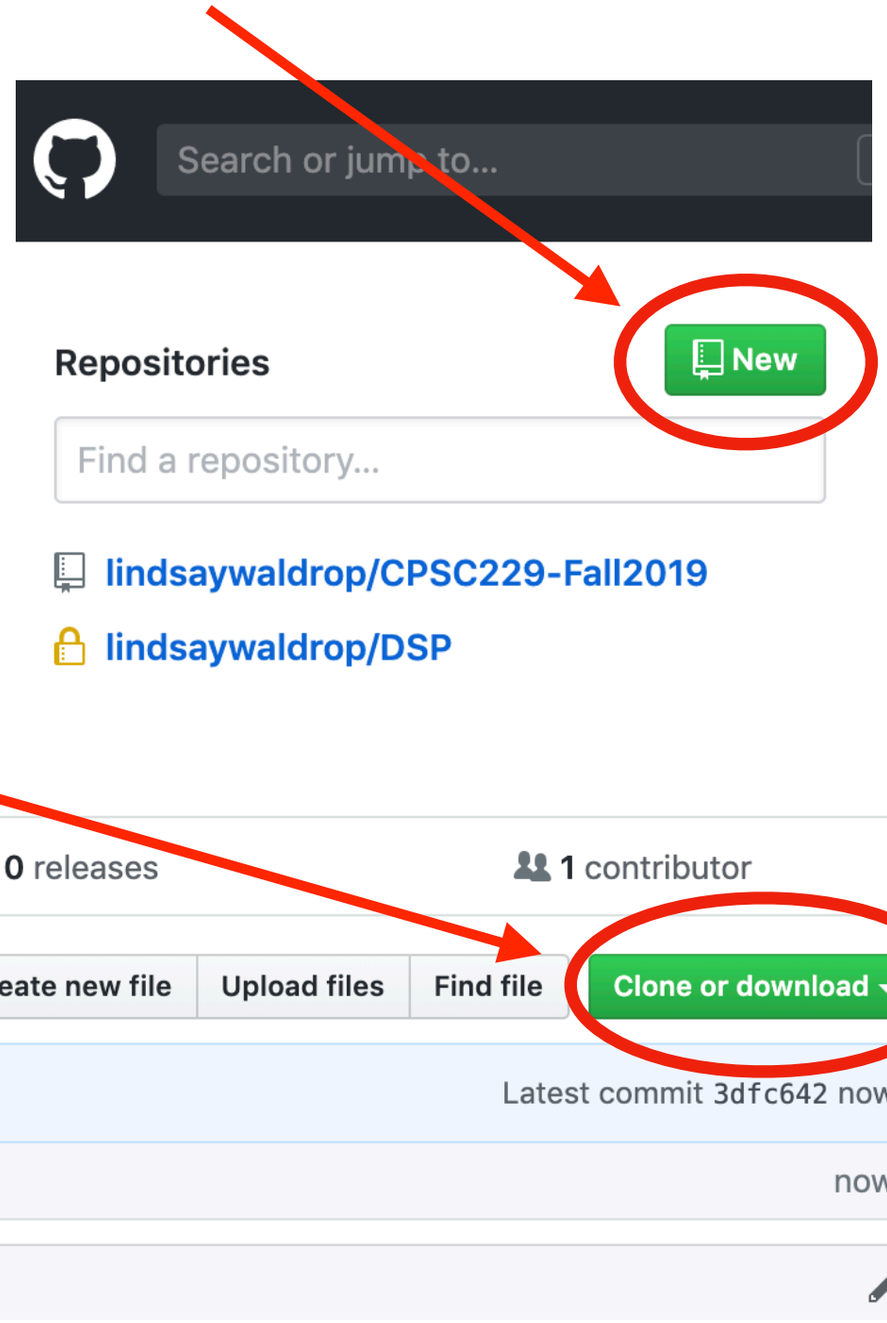
Click "Initialize this repository with a README file" then "Create Repository"

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!



Basics of Operating git

Your computer

Saved!

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

add filename

Staged!

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

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$
```

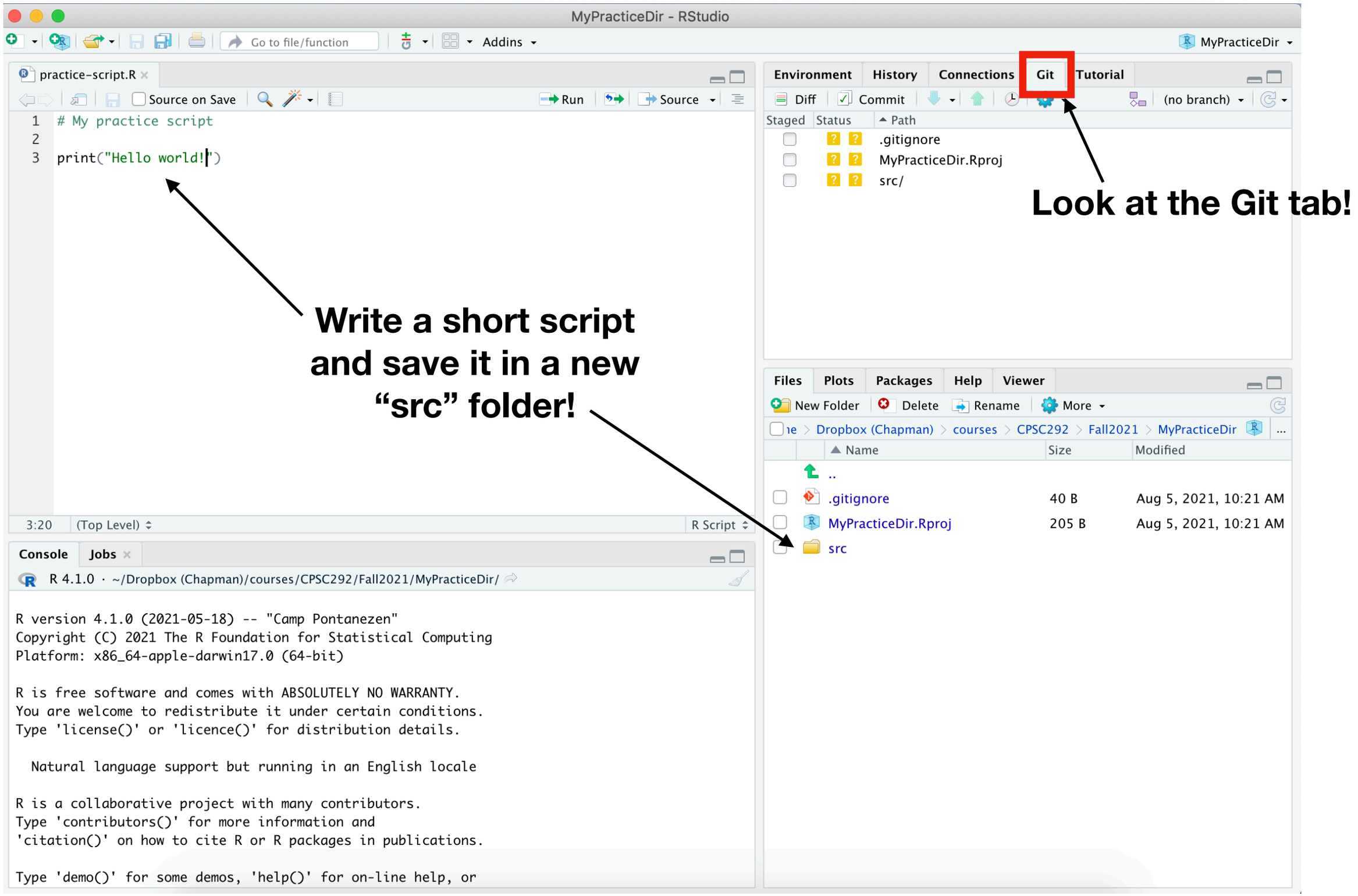
You add some new code.

Changes to scripts recorded and catalogued.

Staged changes added to history

Basics of Operating git in RStudio

1. Save files to your project.

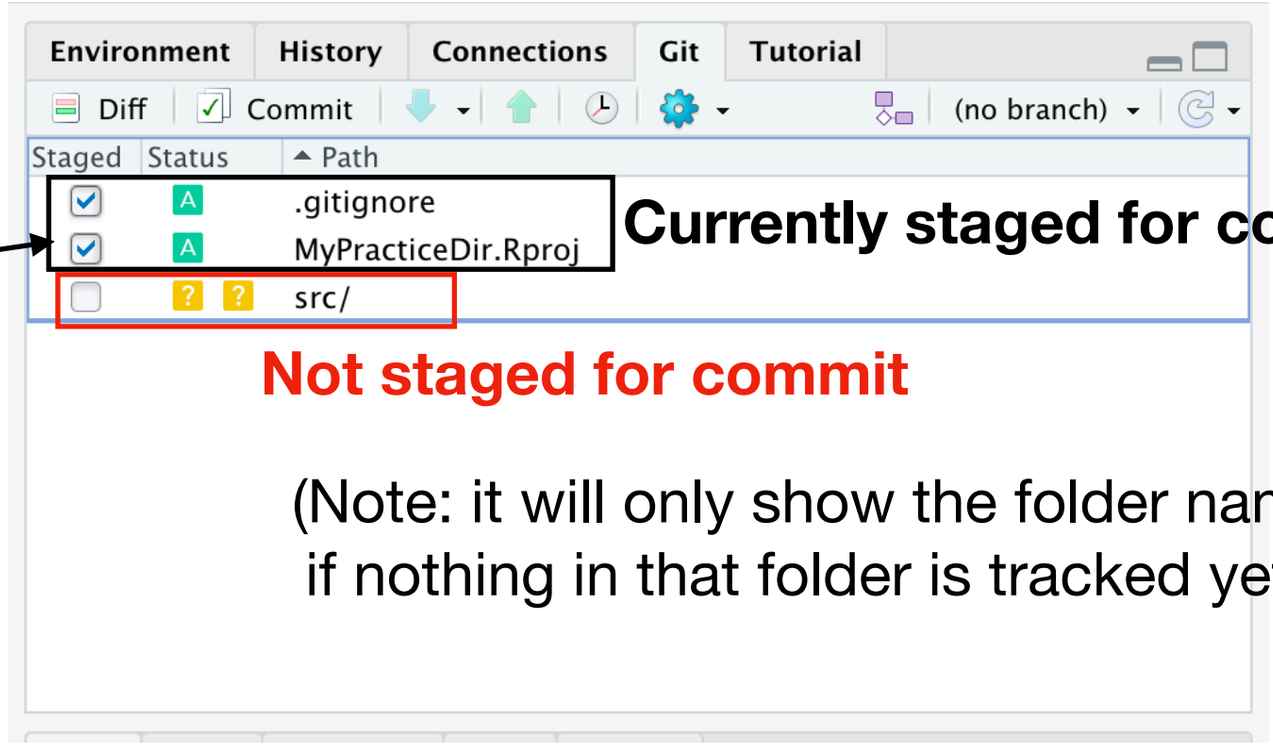


Basics of Operating git in RStudio

2. Stage files for commit by adding.

All new files will have the ?? icons.

Add files by clicking the "Staged" checkbox!

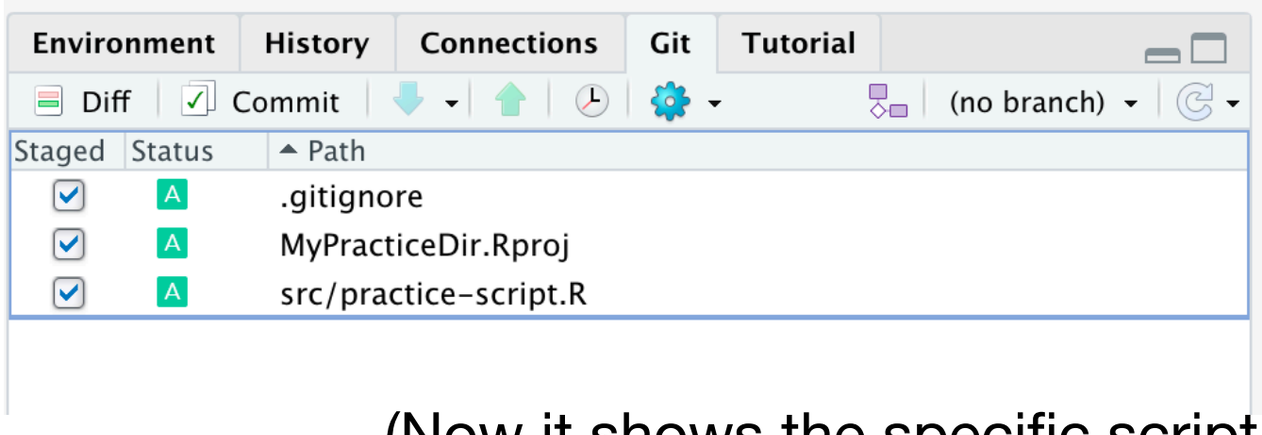


Currently staged for commit

Not staged for commit

(Note: it will only show the folder name if nothing in that folder is tracked yet!)

Now everything is staged!

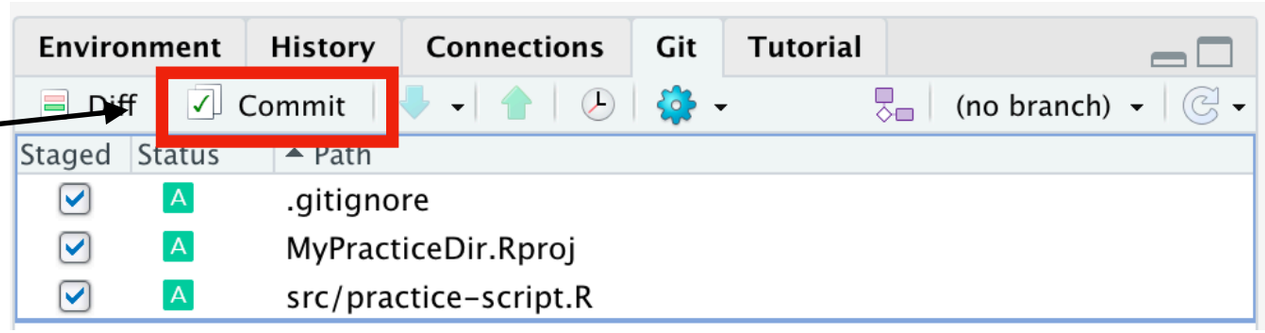


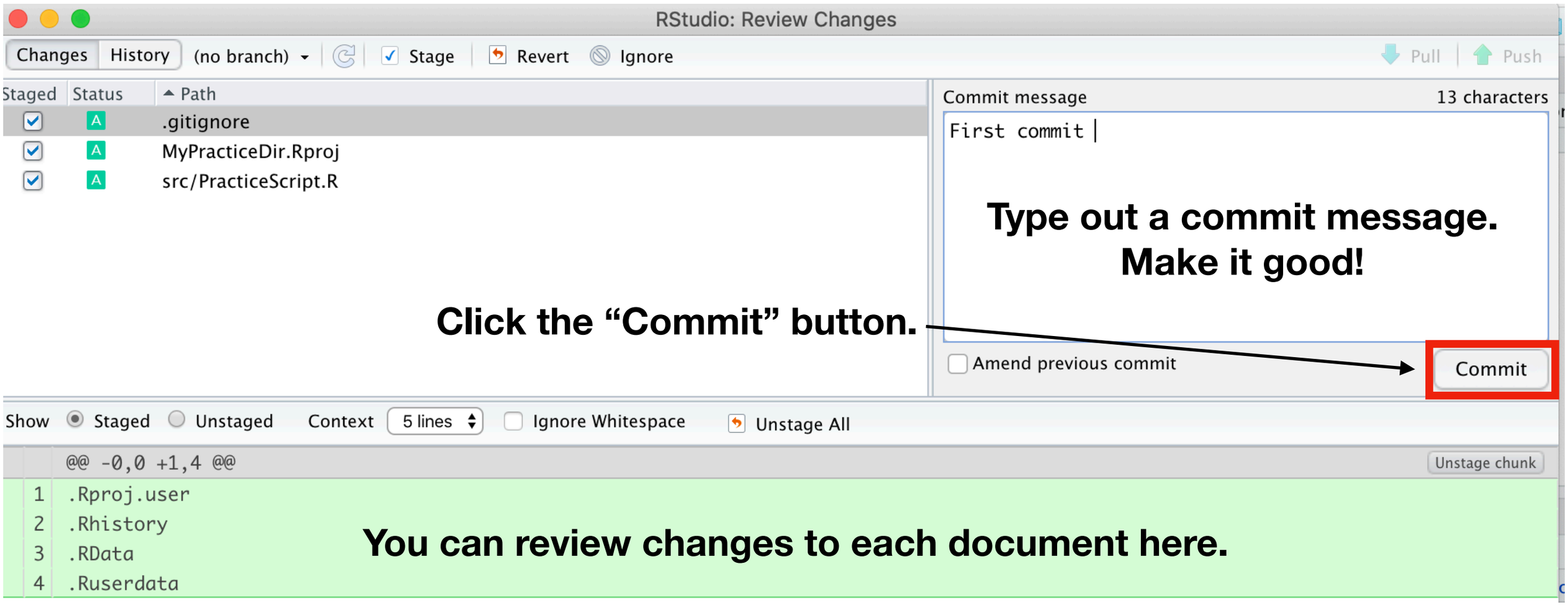
(Now it shows the specific script!)

Basics of Operating git in RStudio

3. Commit your changes.

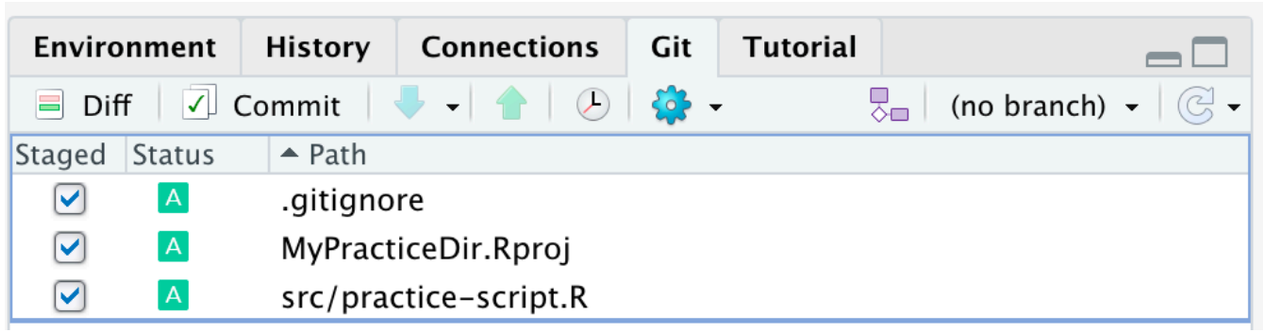
Click the "Commit" button.





Basics of Operating git in RStudio

3. Commit your changes.

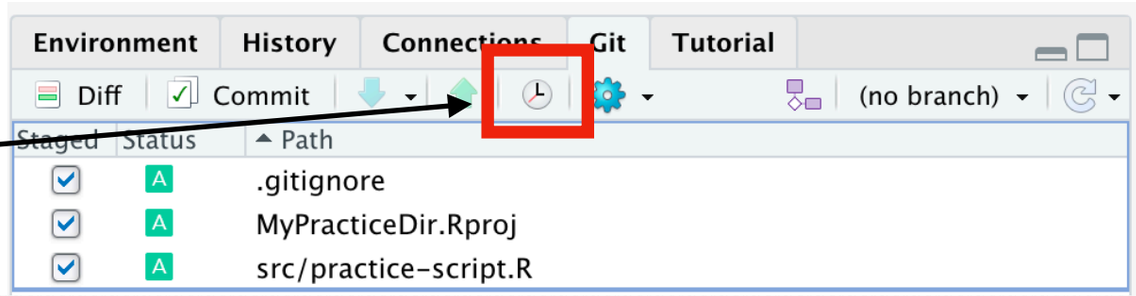


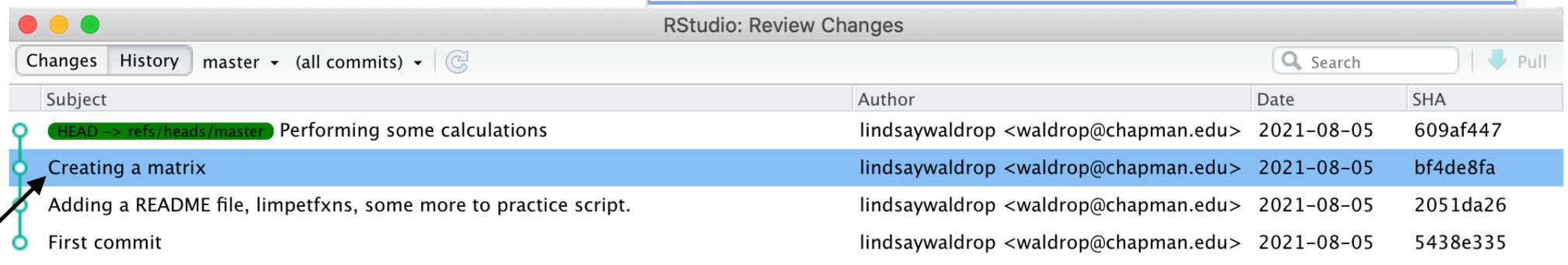
Check Your Understanding

Create a few more files, and make at least two more commits to your repository!

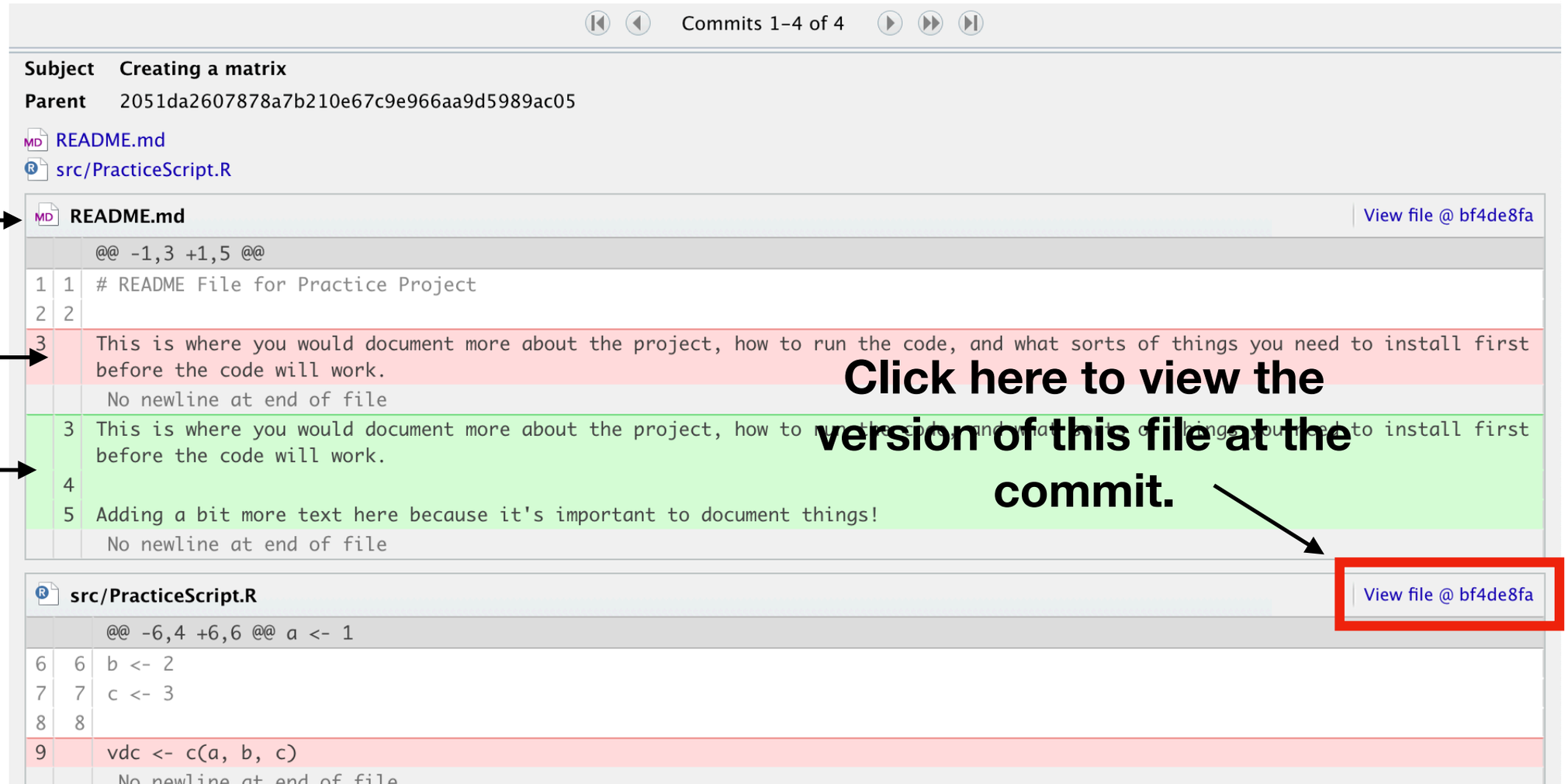
Examining Your Commit History

- Access your commit history by clicking the clock.





Click on different commits to view history.



Filename

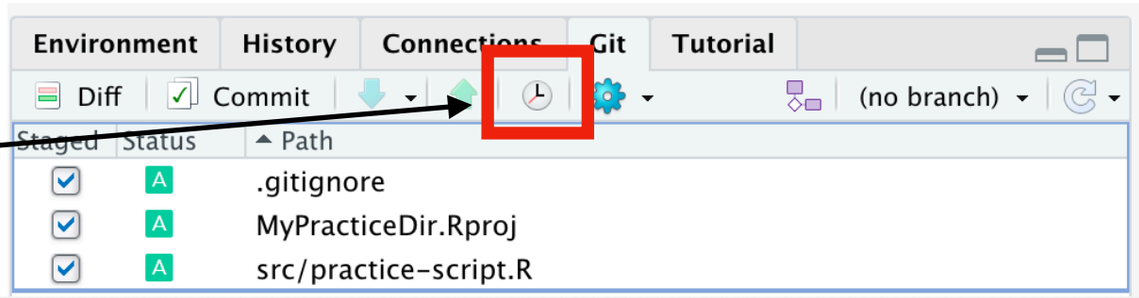
Removals

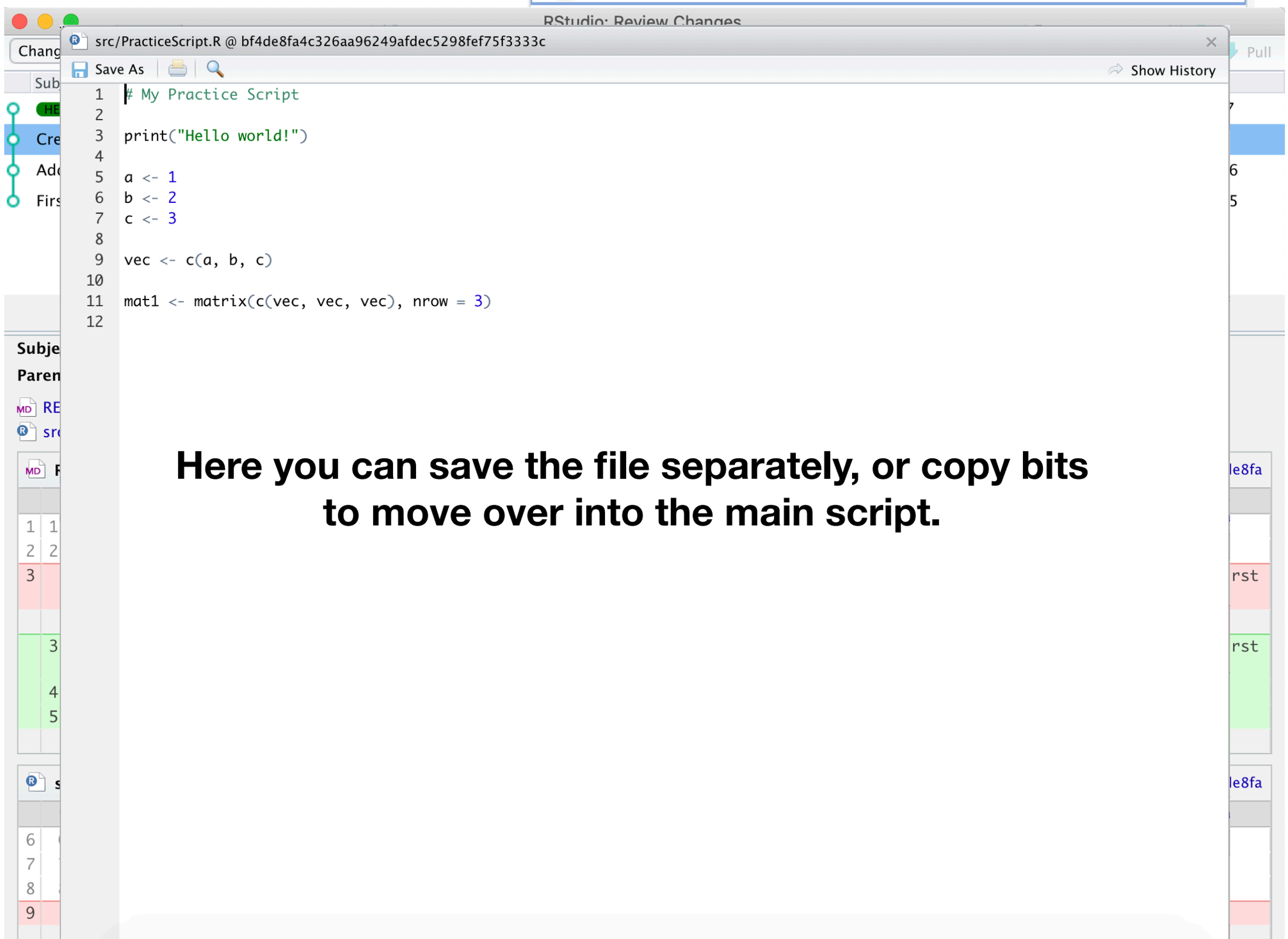
Additions

Click here to view the version of this file at the commit.

Examining Your Commit History

- Access your commit history by clicking the clock.





Here you can save the file separately, or copy bits to move over into the main script.

Check Your Understanding

Can you access the first version of your practice script through history?

Basics of git and Github Online Repositories

Your computer

Saved!

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

You add some new code.

add filename

Staged!

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

Changes to scripts recorded and catalogued.

commit

Your git repository

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           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

Push Changes to Github through RStudio

- RStudio will warn you that your branch is not the same as origin/master (Github).

- Look for the push/pull icons in the git window or review changes window!

- Click the Push button to put your local changes onto Github!