

Workflow basics, RMarkdown, git/Github

Cleaning up

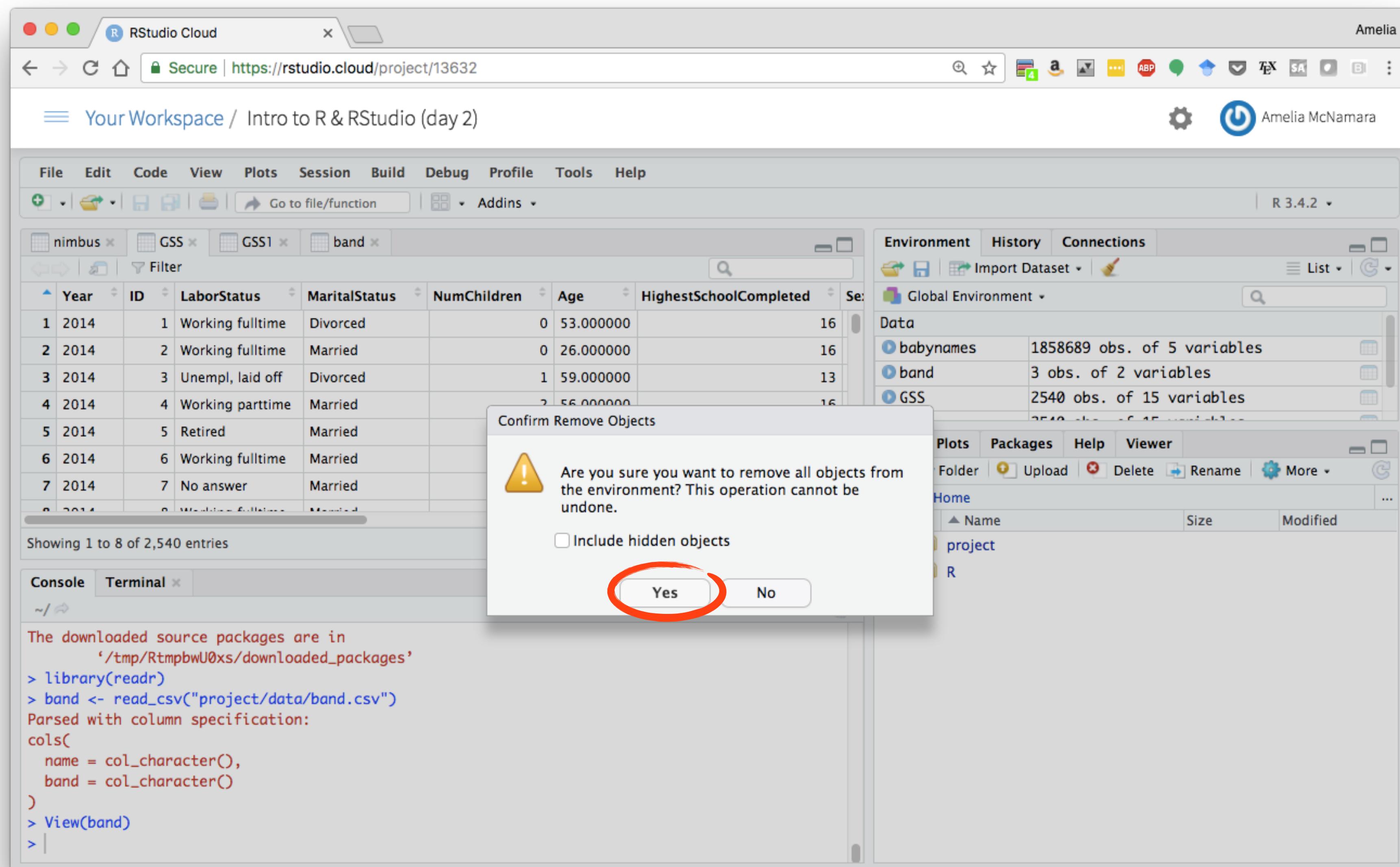
Cleaning up

The screenshot shows the RStudio Cloud interface with the following components:

- Header:** RStudio Cloud, Secure connection to https://rstudio.cloud/project/13632, User: Amelia McNamara.
- Left Sidebar:** Your Workspace / Intro to R & RStudio (day 2).
- Data View:** A data frame viewer titled "nimbus" showing columns: Year, ID, LaborStatus, MaritalStatus, NumChildren, Age, HighestSchoolCompleted. The data consists of 8 rows from 2014, with values like "Working fulltime", "Divorced", "0", "53.000000", "16".
- Environment Tab:** Shows the Global Environment with objects: babynames (1858689 obs. of 5 variables), band (3 obs. of 2 variables), GSS (2540 obs. of 15 variables), and GSS1 (2540 obs. of 15 variables). An "Import Dataset" button is highlighted with a red circle.
- Files Tab:** Shows the project structure with "project" and "R" folders.
- Console:** Displays R code and output:

```
The downloaded source packages are in
  '/tmp/RtmpbwU0xs/downloaded_packages'
> library(readr)
> band <- read_csv("project/data/band.csv")
Parsed with column specification:
cols(
  name = col_character(),
  band = col_character()
)
> View(band)
> |
```

Cleaning up



Cleaning up

The screenshot shows the RStudio Cloud interface with the following details:

- Header:** RStudio Cloud, Secure connection to https://rstudio.cloud/project/13632, User: Amelia McNamara.
- File Menu:** New File, Open File..., Recent Files, Import Dataset, Save, Save As..., Save All, Print..., Close, Close All (highlighted with a red circle), Close All Except Current.
- Data View:** A data grid titled "band" showing columns: MaritalStatus, NumChildren, Age, HighestSchoolCompleted. The data includes rows for Divorced (Age 53, 16), Married (Age 26, 16), Divorced (Age 59, 13), Married (Age 56, 16), Married (Age 74, 17), Married (Age 56, 17), Married (Age 63, 12), and Married (Age 24, 17).
- Environment Tab:** Shows "Environment is empty".
- Files Tab:** Shows a "project" folder and an "R" folder.
- Console:** Displays R code and output:

```
The downloaded source packages are in
  '/tmp/RtmpbwU0xs/downloaded_packages'
> library(readr)
> band <- read_csv("project/data/band.csv")
Parsed with column specification:
cols(
  name = col_character(),
  band = col_character()
)
> View(band)
> |
```

Cleaning up

The screenshot shows the RStudio Cloud interface with the following components:

- Header:** RStudio Cloud, Secure connection to https://rstudio.cloud/project/13632, User: Amelia McNamara.
- Console:** Shows R session output. A red circle highlights the "Clear Console" option in the Edit menu.
- Environment:** Global Environment pane showing "Environment is empty".
- Files:** Home directory listing "project" and "R" folders.
- Plots:** Not visible in the screenshot.

Console Output (highlighted area):

```
tryin
Content
=====
downl
* ins
** pa
** R
*** da
*** m
** preparing package for lazy loading
** help
*** installing help indices
** building package indices
** testing if installed package can be loaded
* DONE (nycflights13)

The downloaded source packages are in
  '/tmp/RtmpbwU0xs/downloaded_packages'
> library(readr)
> band <- read_csv("project/data/band.csv")
Parsed with column specification:
cols(
  name = col_character(),
  band = col_character()
)
> View(band)
>
```

Cleaning up

A screenshot of the RStudio Cloud interface. The title bar says "RStudio Cloud" and the user is "Amelia". The URL is "https://rstudio.cloud/project/13632". The sidebar shows "Your Workspace / Intro to R & RStudio (day 2)". The main window has a menu bar with File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help. Below the menu is a toolbar with various icons. The console tab is selected, showing a command line with a prompt ">". To the right of the console is the History tab of the Environment panel, which contains the following R code:

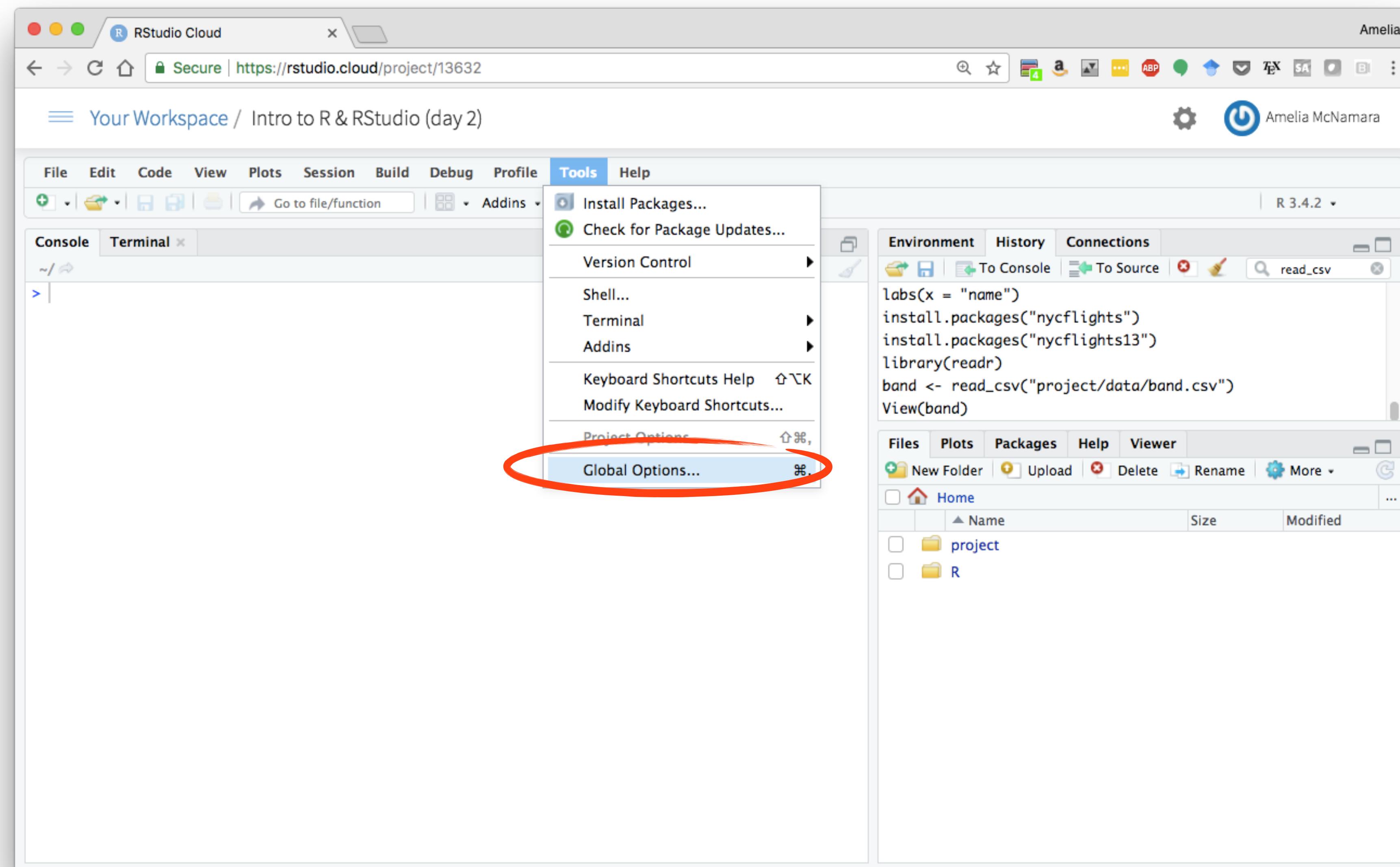
```
labs(x = "name")
install.packages("nycflights")
install.packages("nycflights13")
library(readr)
band <- read_csv("project/data/band.csv")
View(band)
```

A red circle highlights the History tab and the code within it. At the bottom of the RStudio window, there is a file browser with a "Home" folder containing "project" and "R".

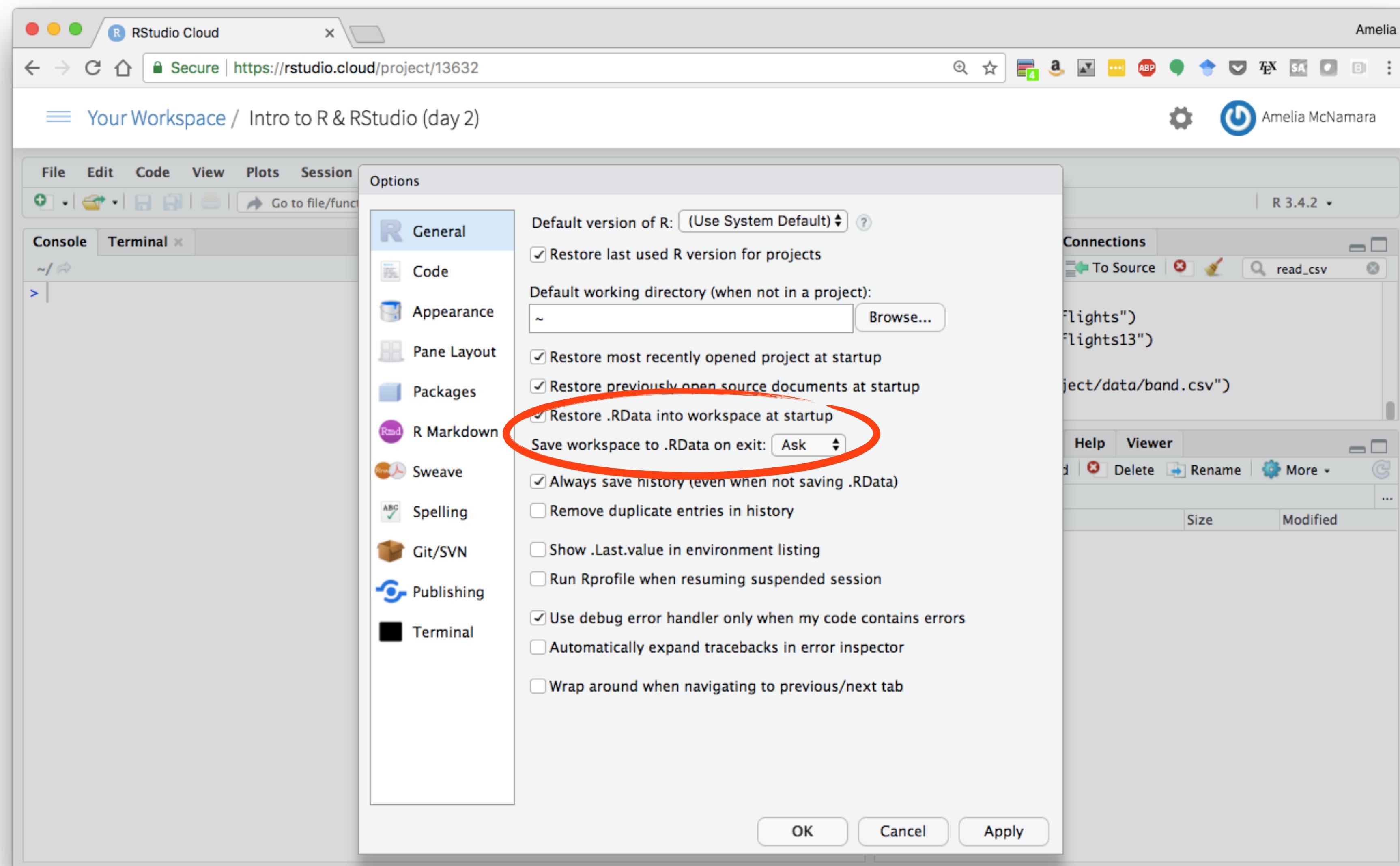
Don't worry,
your history is
preserved

Settings

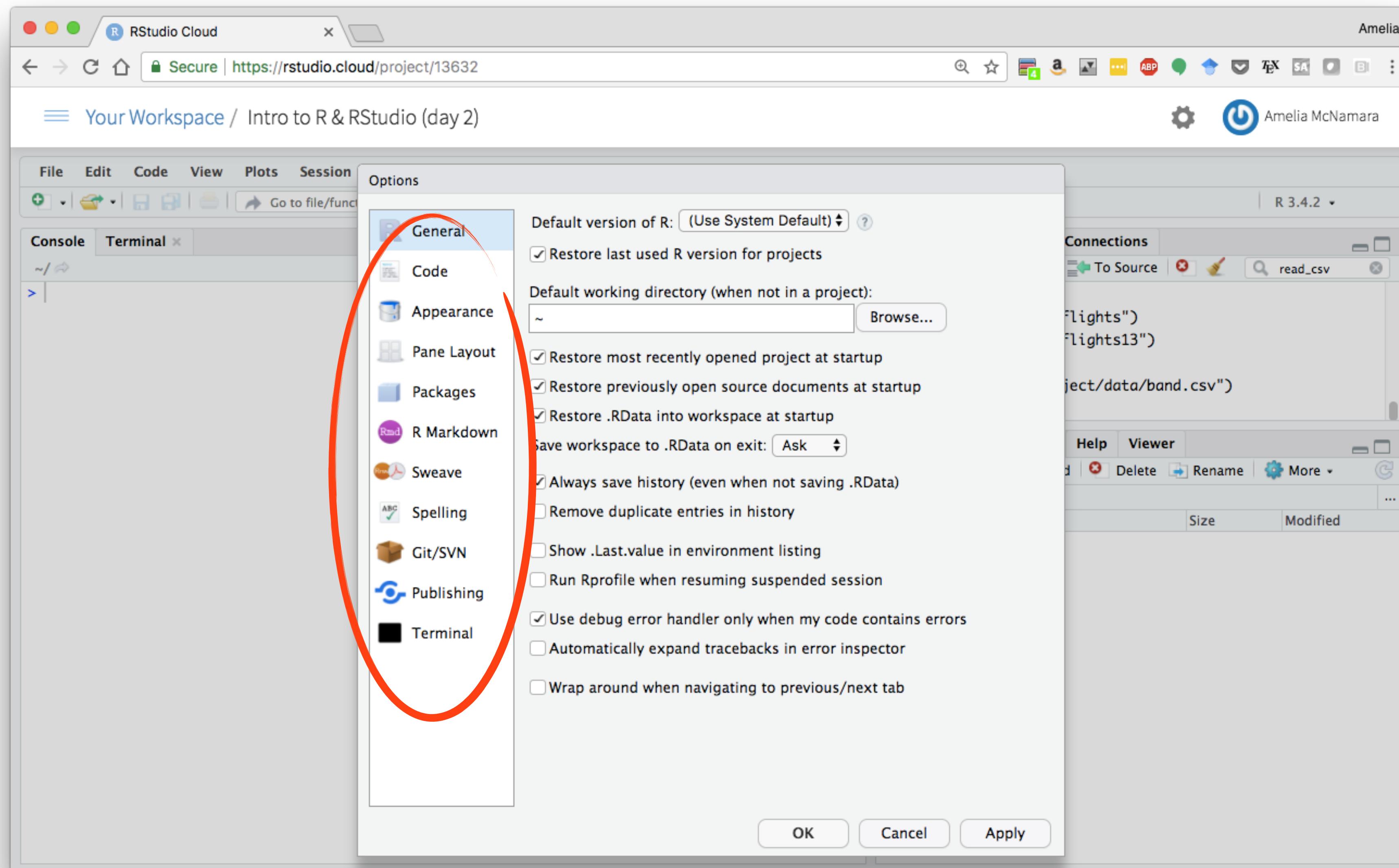
Cleaning up



Cleaning up



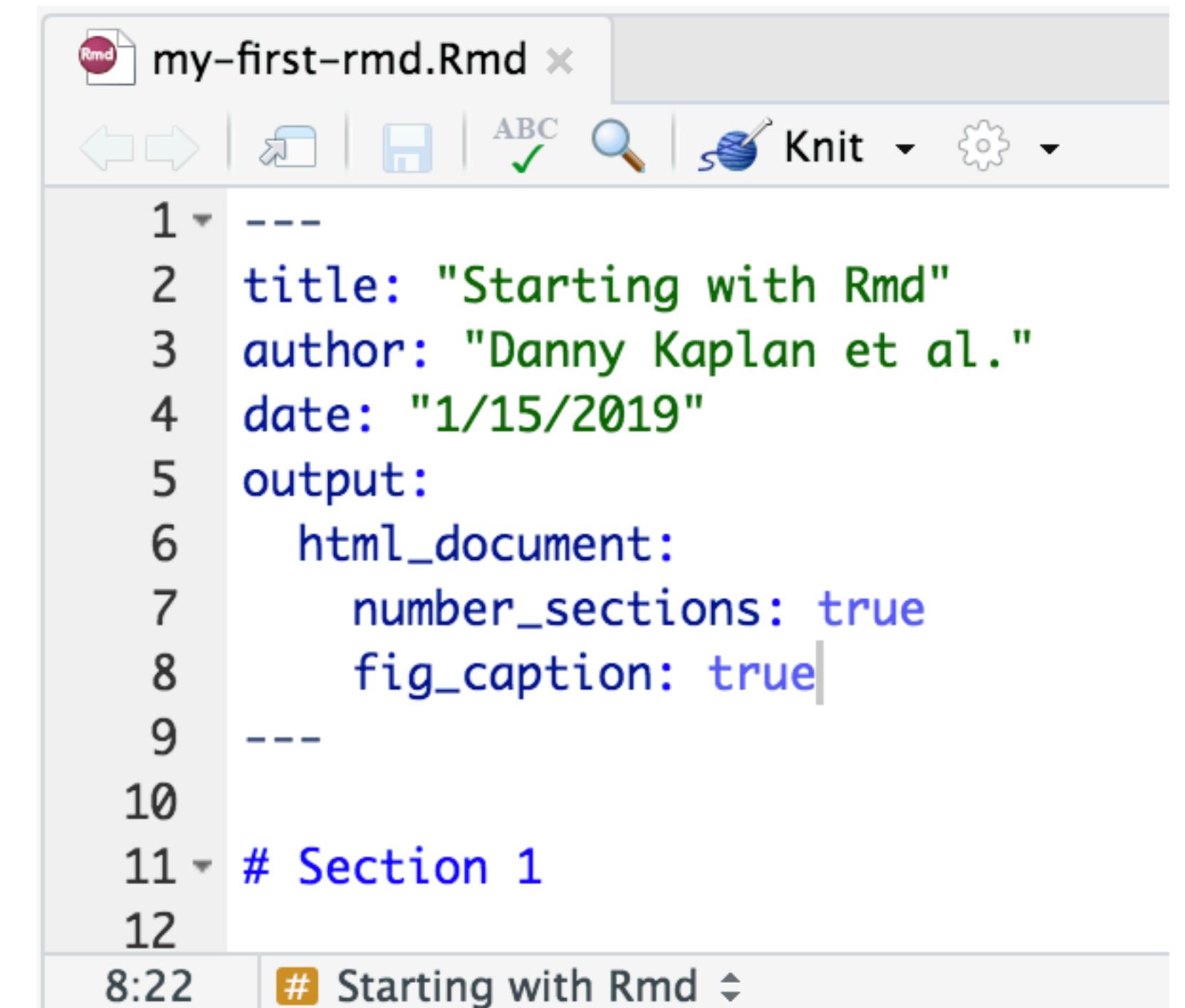
Lots more options!



RMarkdown

Structure of an Rmd file

- ▶ ***Minimum requirement:*** *File name ends with .Rmd*
- ▶ ***A little richer: first several lines are YAML markup***
 - Connect to other systems, e.g. Shiny, blowdown, book down
 - Set style and document output format



The screenshot shows the RStudio interface with a file named "my-first-rmd.Rmd" open. The code editor displays the following YAML configuration:

```
1 ---  
2 title: "Starting with Rmd"  
3 author: "Danny Kaplan et al."  
4 date: "1/15/2019"  
5 output:  
6   html_document:  
7     number_sections: true  
8     fig_caption: true  
9 ---  
10  
11 # Section 1  
12  
8:22 # Starting with Rmd
```



Text and headers

- ▶ **Text can be plain text or decorated as **italic** or ****bold******
- ▶ **Headers use #s**

Header 1

Header 2

Header 3



Markdown Quick Reference

In RStudio: Help ➔ Markdown Quick Reference

Markdown Quick Reference

R Markdown is an easy-to-write plain text format for creating dynamic documents and reports.
See [Using R Markdown](#) to learn more.

Emphasis

```
*italic* **bold**  
italic __bold__
```

Headers

```
# Header 1  
## Header 2  
### Header 3
```

Lists

Unordered List

```
* Item 1  
* Item 2  
  + Item 2a  
  + Item 2b
```



Numbered sections



The image shows the RStudio interface with two panels. The left panel displays an R Markdown file named "my-first-rmd.Rmd". The code includes YAML front matter with "number_sections: true" and several section headers: "# Section 1", "## Section 1.1", "## Section 1.2", "### Section 1.2.1", and "### Section 1.2.2". The right panel shows the generated HTML output. The title is "Starting with Rmd" by "Danny Kaplan et al." on "1/15/2019". The content is organized into sections: "1 Section 1", "1.1 Section 1.1", "1.2 Section 1.2", "1.2.1 Section 1.2.1", and "1.2.2 Section 1.2.2".

```
my-first-rmd.Rmd
---
title: "Starting with Rmd"
author: "Danny Kaplan et al."
date: "1/15/2019"
output:
  html_document:
    number_sections: true
---
# Section 1
##
## Section 1.1
##
## Section 1.2
###
### Section 1.2.1
###
### Section 1.2.2
R Markdown
```

Starting with Rmd
Danny Kaplan et al.
1/15/2019

1 Section 1

1.1 Section 1.1

1.2 Section 1.2

1.2.1 Section 1.2.1

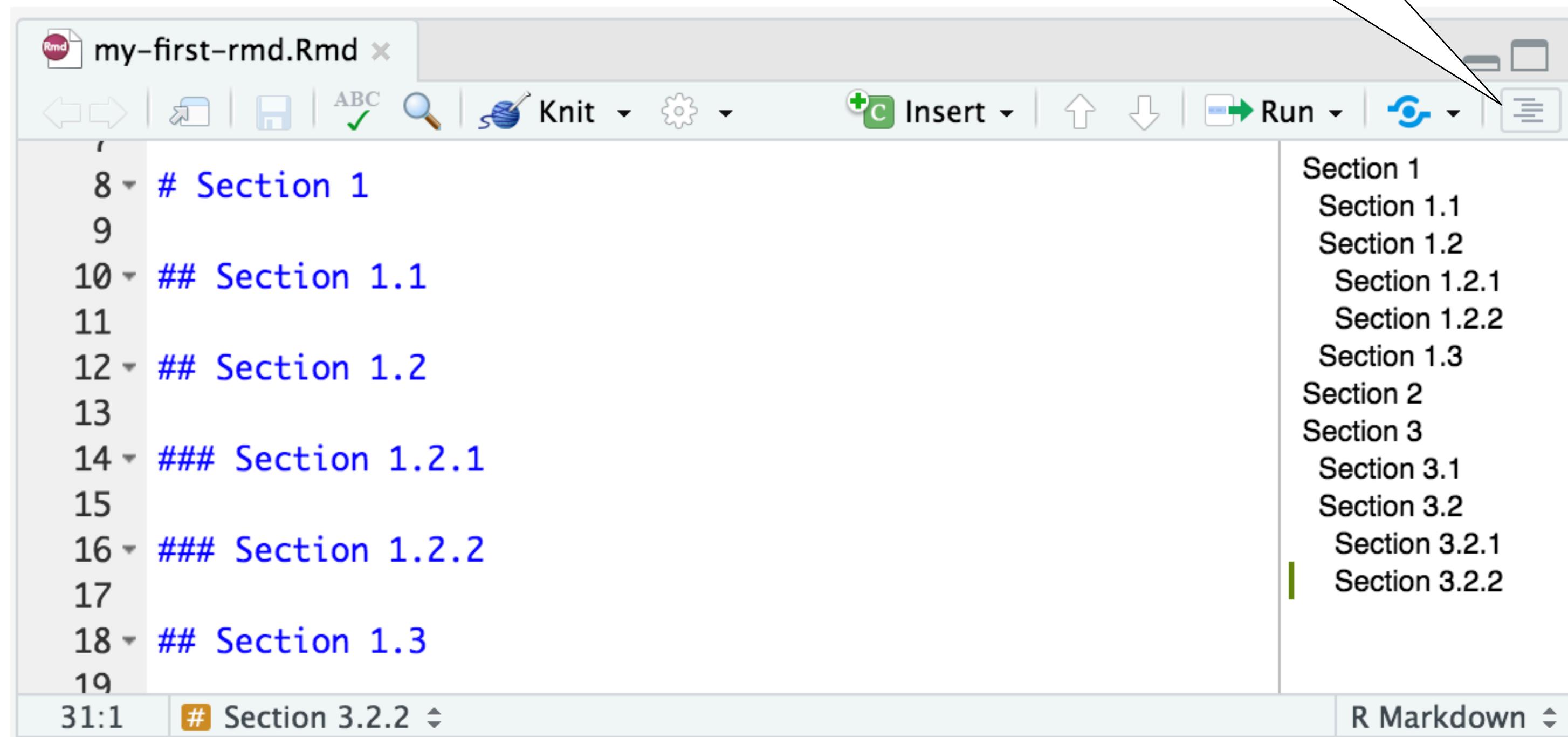
1.2.2 Section 1.2.2



CC BY Danny Kaplan

Tips

Show / hide
document
outline

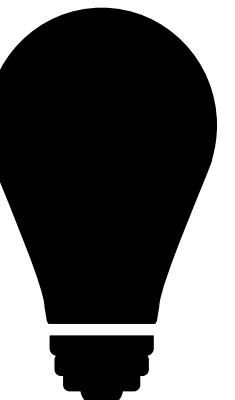


The screenshot shows the RStudio interface with a document titled "my-first-rmd.Rmd". The code editor pane contains the following R Markdown code:

```
8 # Section 1
9
10 ## Section 1.1
11
12 ## Section 1.2
13
14 ### Section 1.2.1
15
16 ### Section 1.2.2
17
18 ## Section 1.3
19
31:1 # Section 3.2.2
```

To the right of the code editor is a vertical document outline pane. It lists the following sections:

- Section 1
 - Section 1.1
 - Section 1.2
 - Section 1.2.1
 - Section 1.2.2
 - Section 1.3
- Section 2
- Section 3
 - Section 3.1
 - Section 3.2
 - Section 3.2.1
 - Section 3.2.2



Links

- ▶ A *link can be a plain http address or can underlie a phrase:*
 - <http://rmarkdown.rstudio.com/>
 - [R Markdown website](<http://rmarkdown.rstudio.com/>)
- ▶ Long URLs with, e.g. query parameters, work just as well.



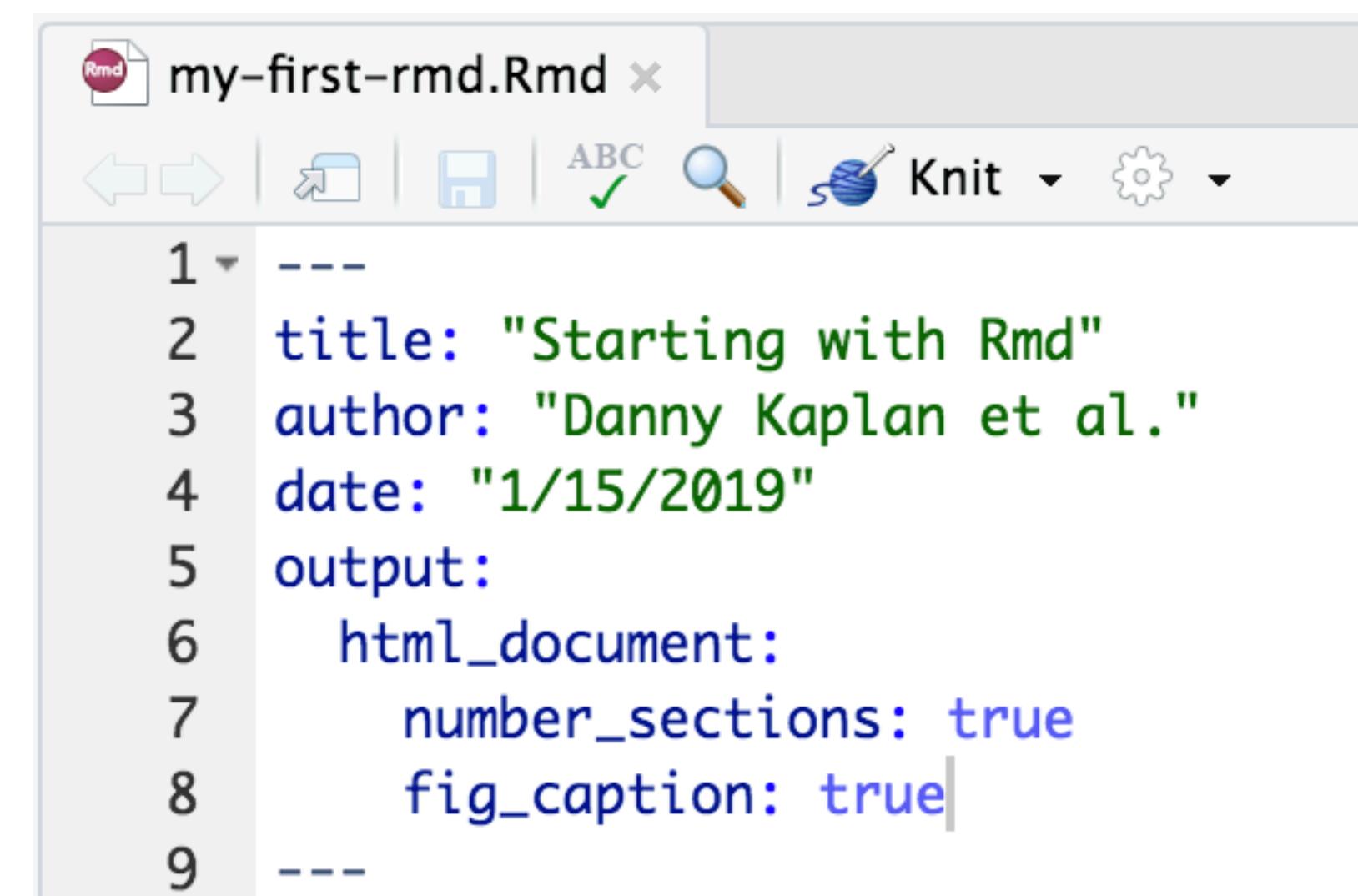
Images

- ▶ *Including an image is very similar to hyperlinking*
- ▶ *Images can be on the web:*
`! [RStudio logo] (https://www.rstudio.com/wp-content/uploads/2014/04/rmarkdown.png)`
- ▶ *Or they can be locally stored, e.g. in a directory "images"*
`! [RStudio logo] (images/rmarkdown.png)`



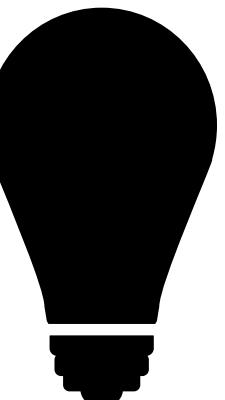
Tips

- ▶ To improve the accessibility of your document, always add *alt text* to your images.
- ▶ To print the *alt text* underneath the image as a caption,
 - use *fig_caption: true* in the YAML,
 - make sure there is a line break before the figure call.



The screenshot shows the RStudio interface with a file named "my-first-rmd.Rmd". The code editor displays the following YAML front matter:

```
1 ---  
2 title: "Starting with Rmd"  
3 author: "Danny Kaplan et al."  
4 date: "1/15/2019"  
5 output:  
6   html_document:  
7     number_sections: true  
8     fig_caption: true  
9 ---
```



Reference style links and images

► *Links*

- A *[linked phrase][id]*
- At the bottom of the document: *[id]: http://example.com/ "Title"*

► *Images*

- *![alt text][id]*
- At the bottom of the document: *[id]: figures/img.png "Title"*

► *Useful if you'll be linking to the same target/image multiple times throughout the document*



Math text

► *If you already know some LaTeX, you're good to go*

► *Equations can be inline:*

- $\bar{x} \sim N(\mu, \frac{\sigma}{\sqrt{n}})$

- Equations can be inline: $\bar{x} \sim N\left(\mu, \frac{\sigma}{\sqrt{n}}\right)$

► *And equations can be centered in a new line:*

```
$$\bar{x} \sim N(\mu, \frac{\sigma}{\sqrt{n}})$$
```

- And equations can be centered in a new line:

$$\bar{x} \sim N\left(\mu, \frac{\sigma}{\sqrt{n}}\right)$$



Tables

- ▶ *Tables are often a bit of a pain...*
- ▶ *Dashes separate the header row from content cells, and pipes separate the columns*
- ▶ *Colons can be used to align columns*

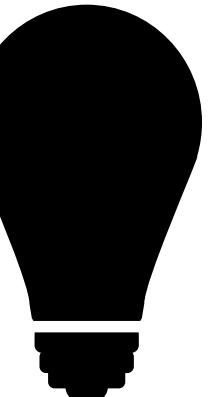
```
| Column A | Column B | Column C |  
|-----|:-----:|-----:|  
| left   | center  | right   |  
| aligned | aligned | aligned |  
| text   | text    | text    |
```



Column A	Column B	Column C
left	center	right
aligned	aligned	aligned
text	text	text

Tips

- ▶ The outer pipes (!) on a Markdown table are optional.
- ▶ You don't need to make the raw Markdown line up prettily.
- ▶ You can use *inline Markdown* within tables.
- ▶ For complicated tables, use R packages e.g. *kable* & *kableExtra*

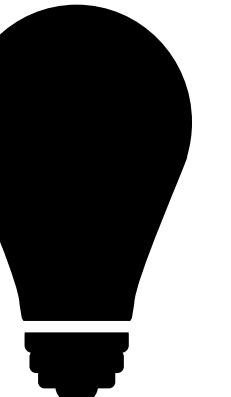


Tips

- ▶ Keep your text to max ~80 characters across, especially if you use a version control system (like git)
- ▶ Starting a list? Leave an empty line before the first item on your list
- ▶ Need to test out bits of markdown code without knitting the entire document, use another document with bits and pieces of code to test out

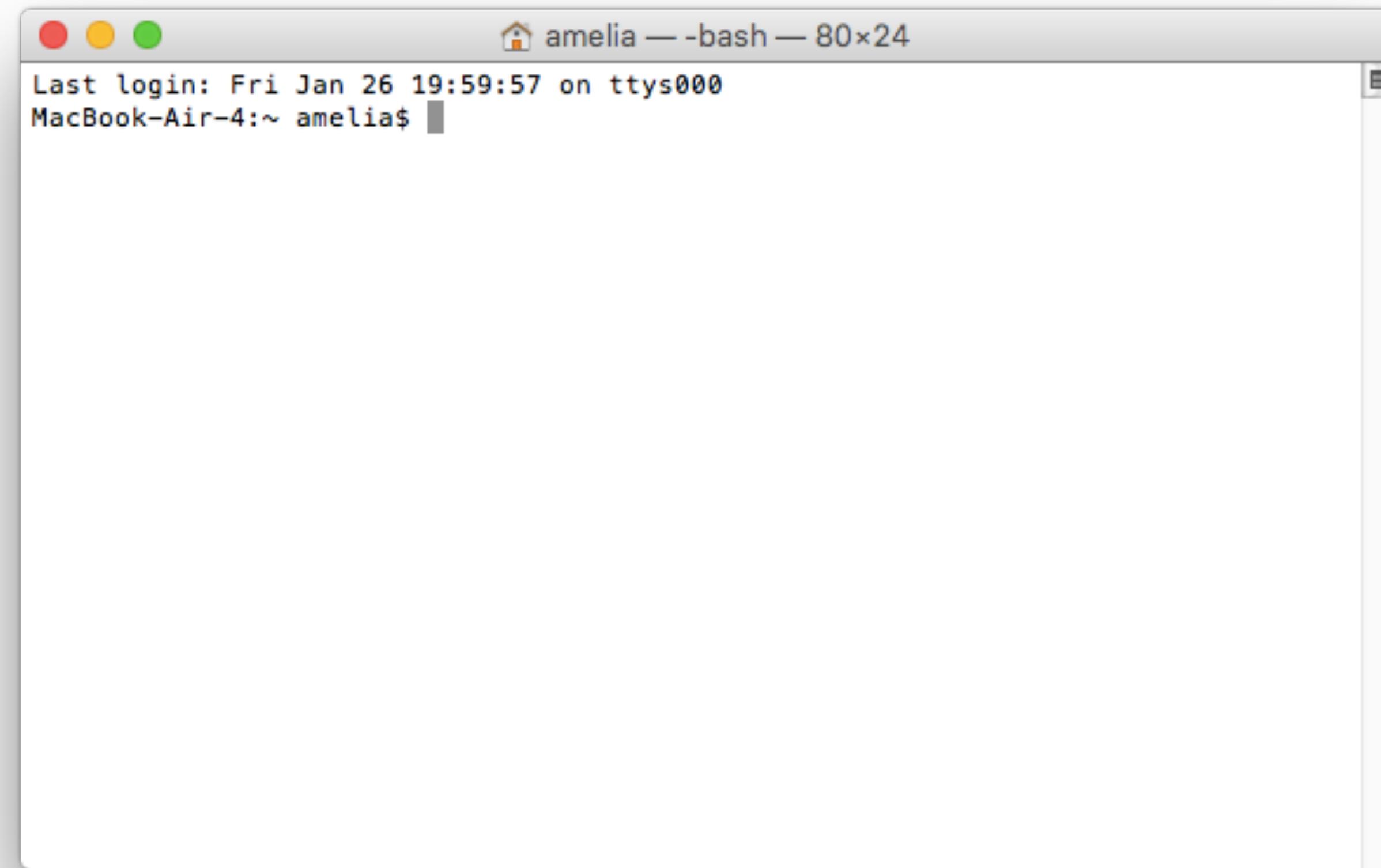


[CC BY Danny Kaplan](#)

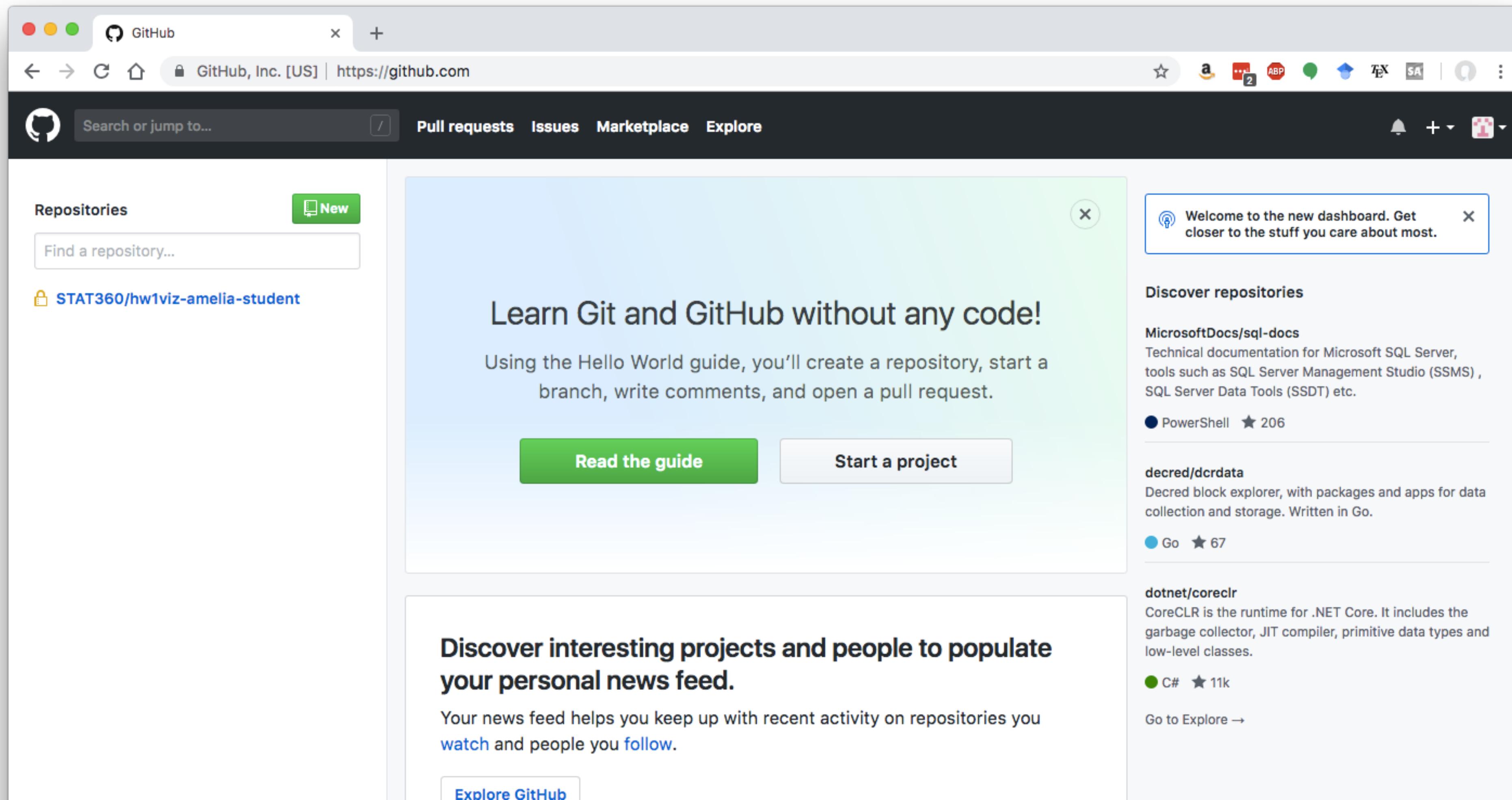


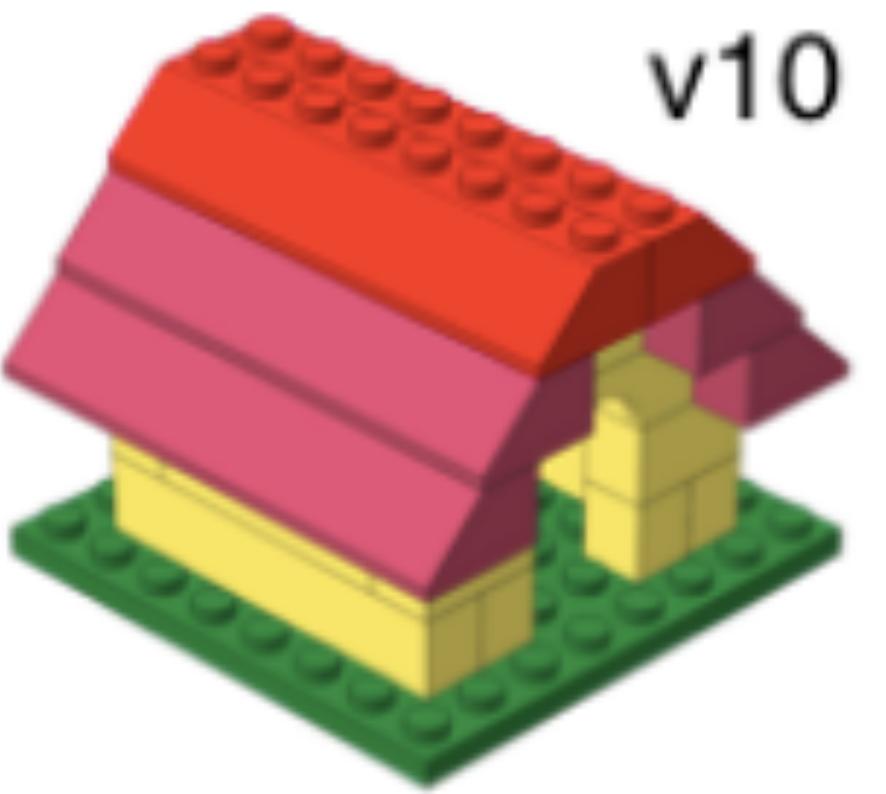
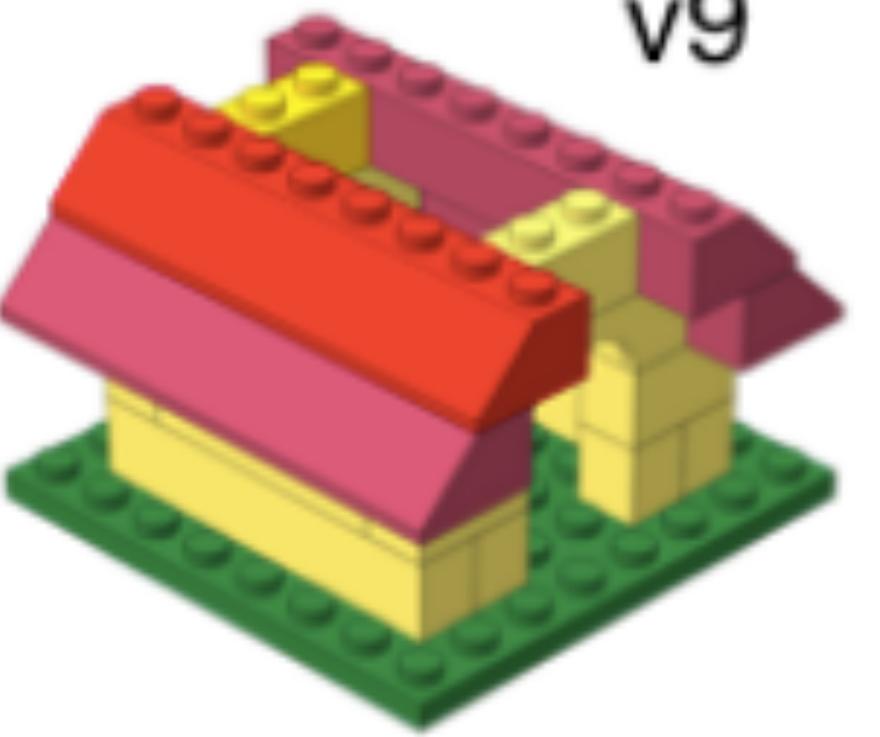
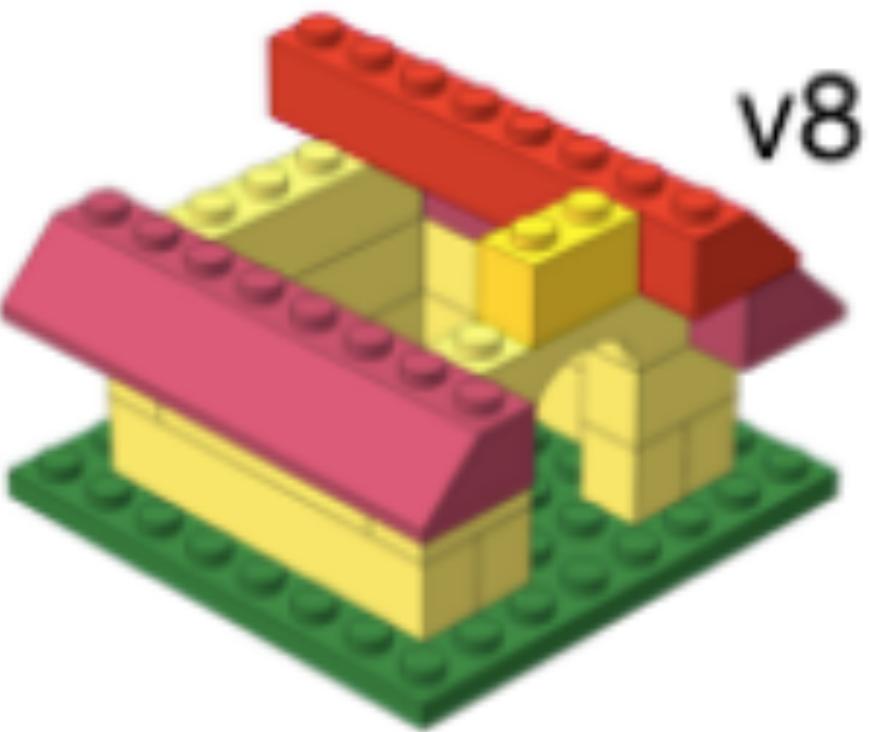
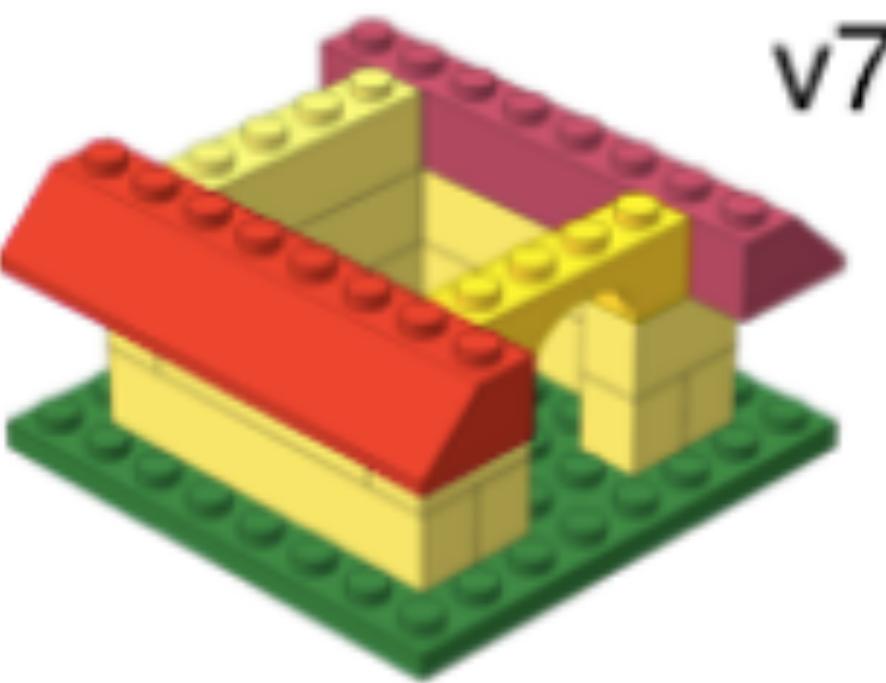
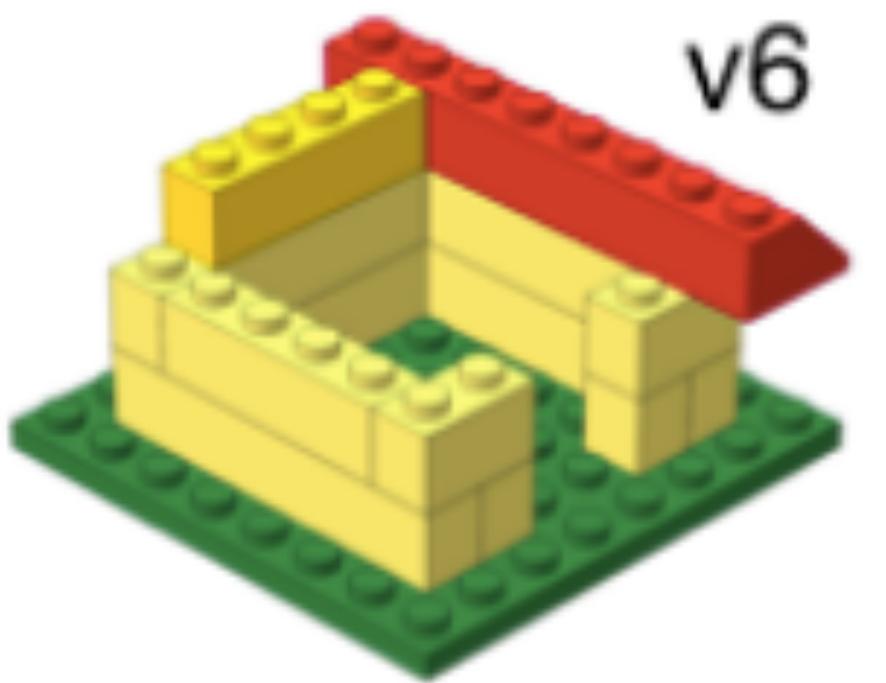
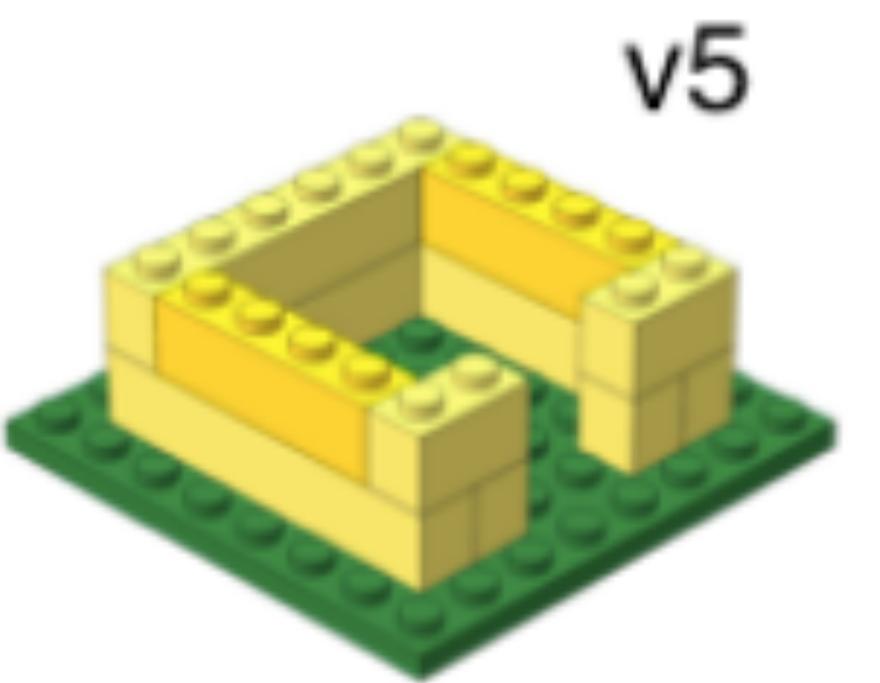
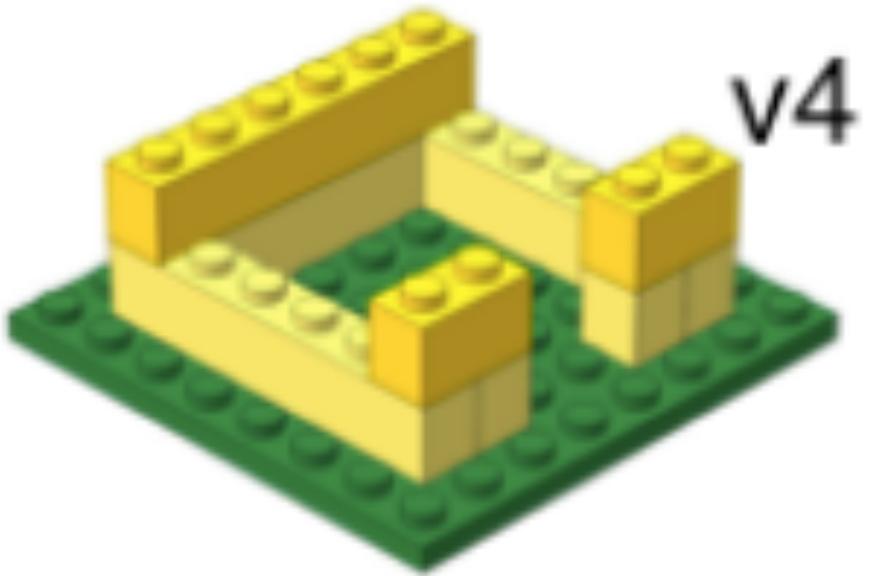
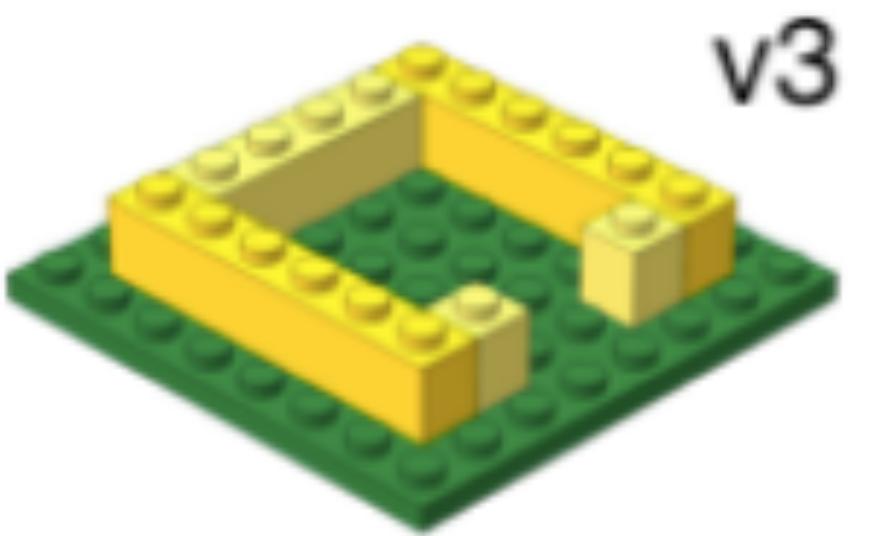
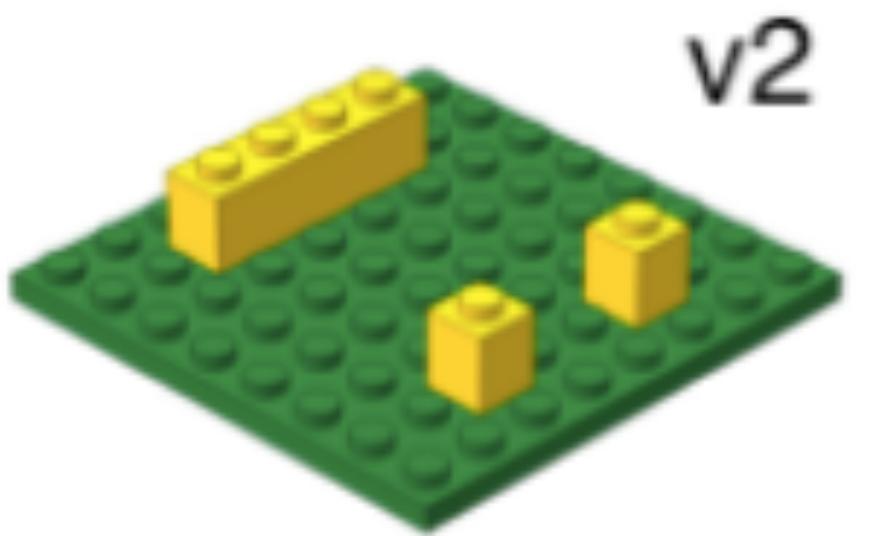
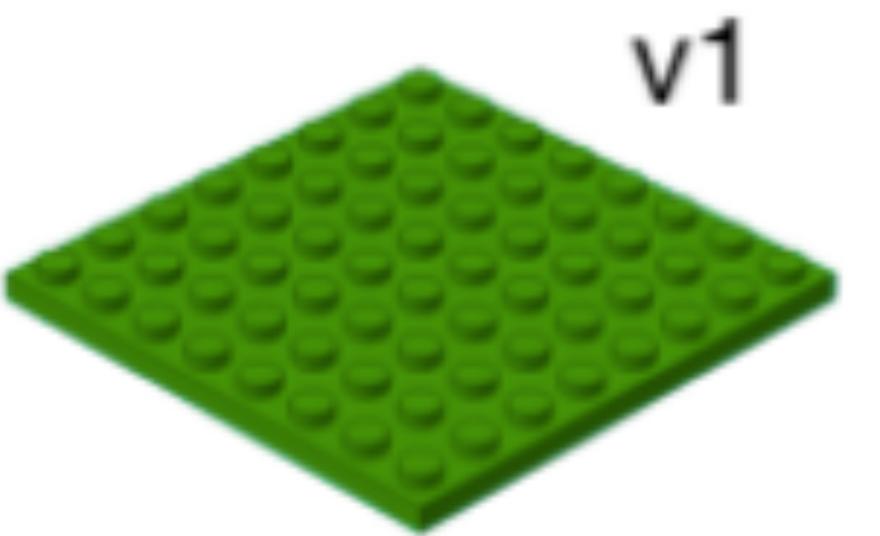
git and Github

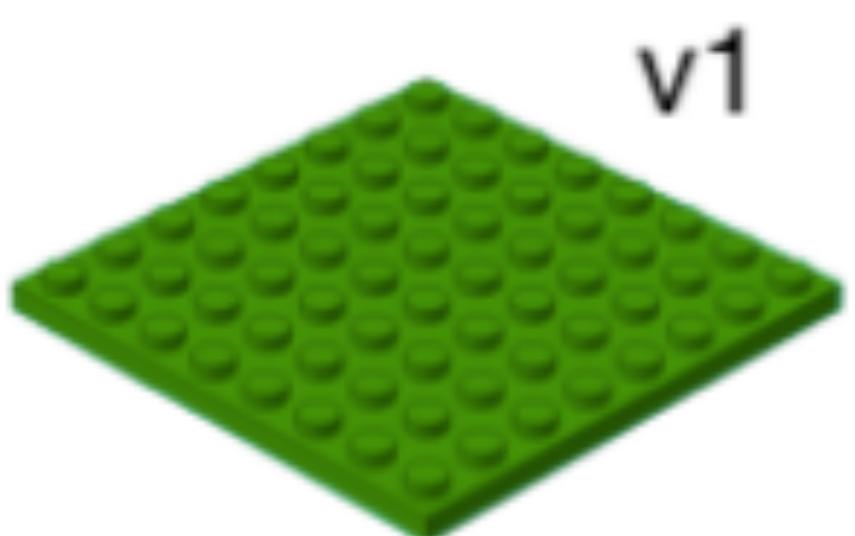
git: a version control system (almost like a programming language)



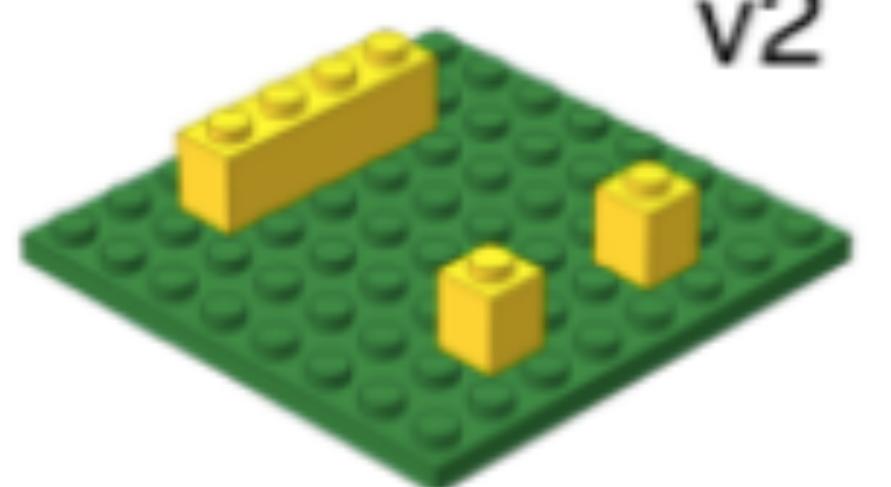
Github: a site to host code (kind of like Dropbox, but better)



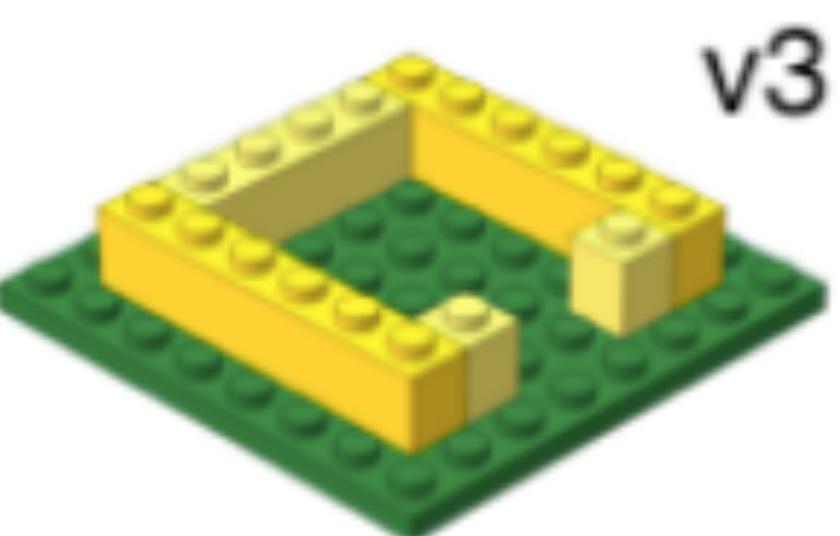




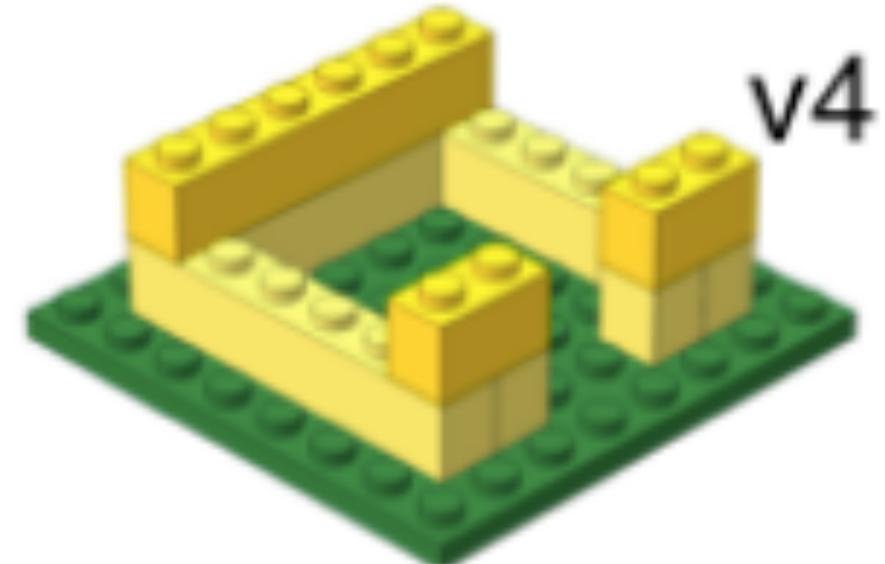
First commit



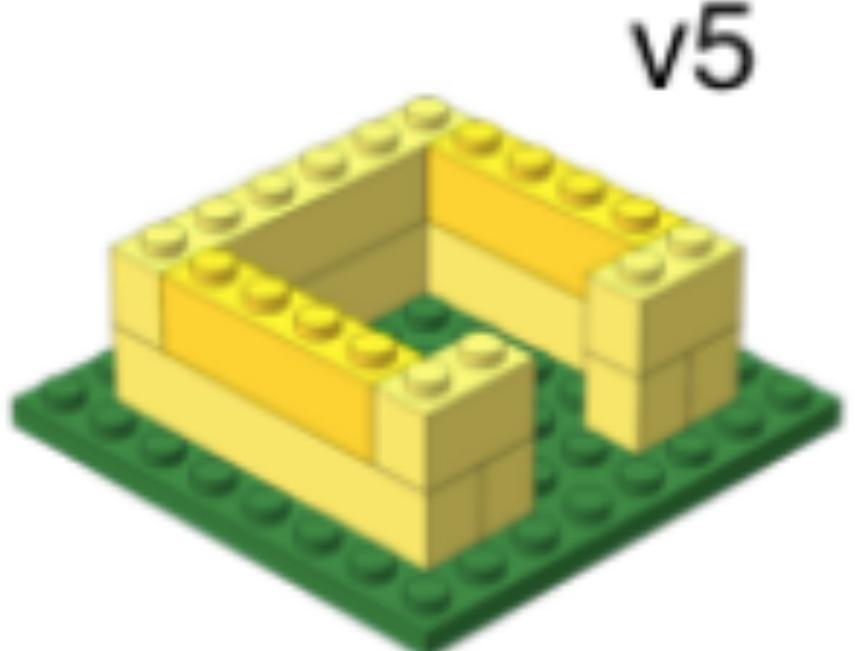
Built back and front of base



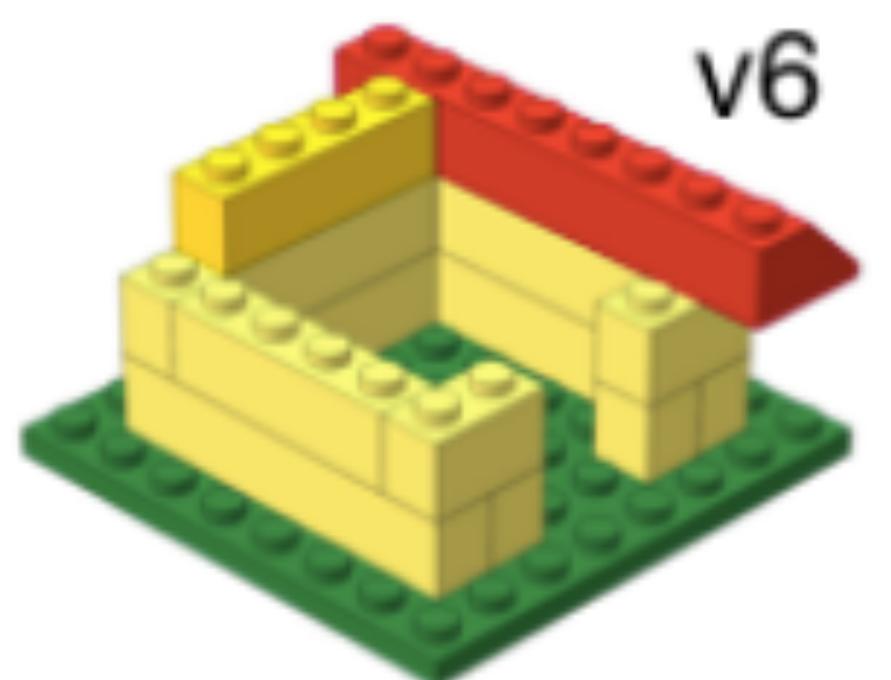
Finished building base



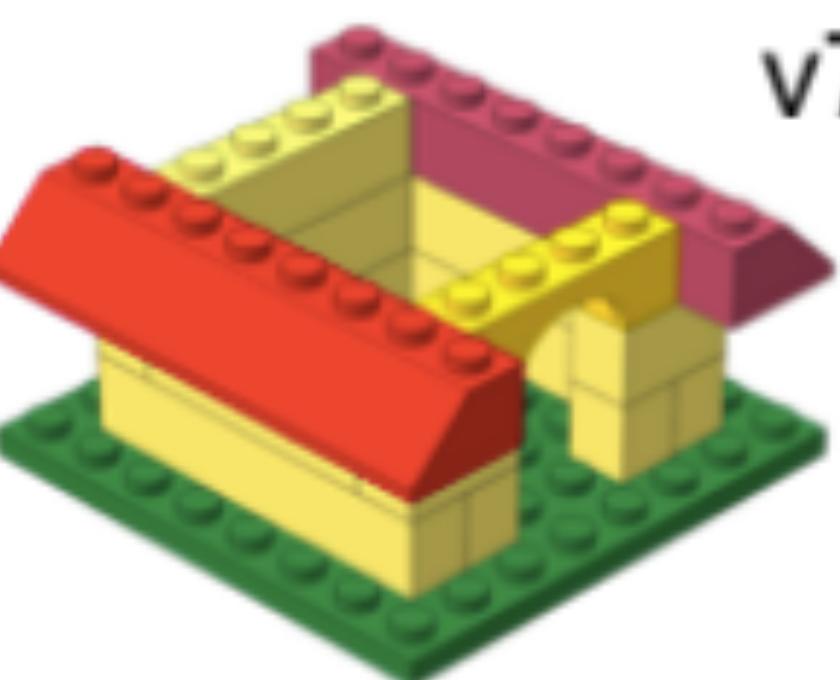
Second floor back and front



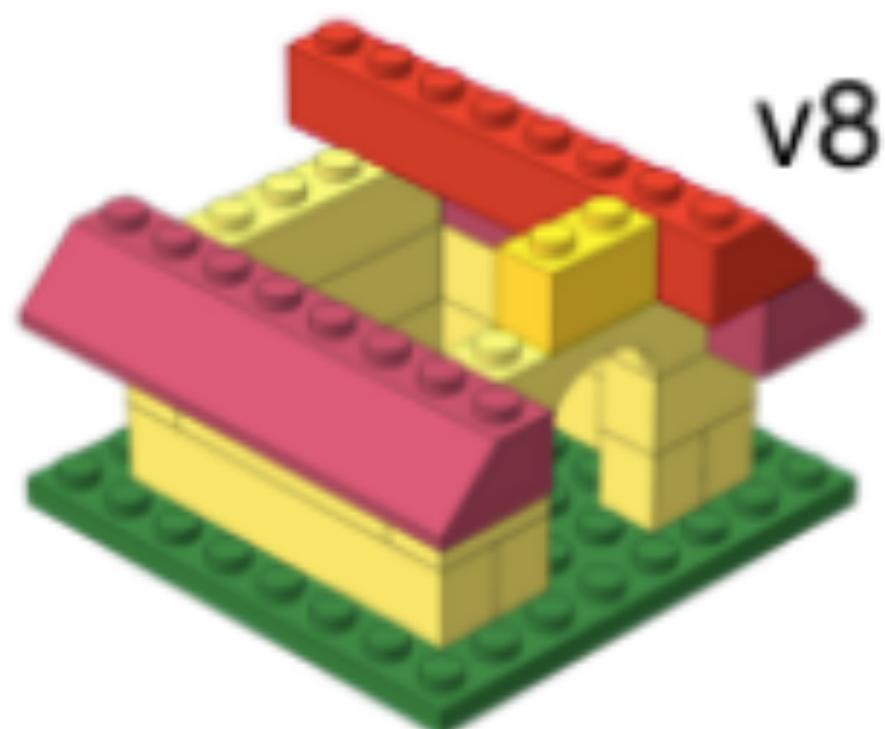
Finished second floor



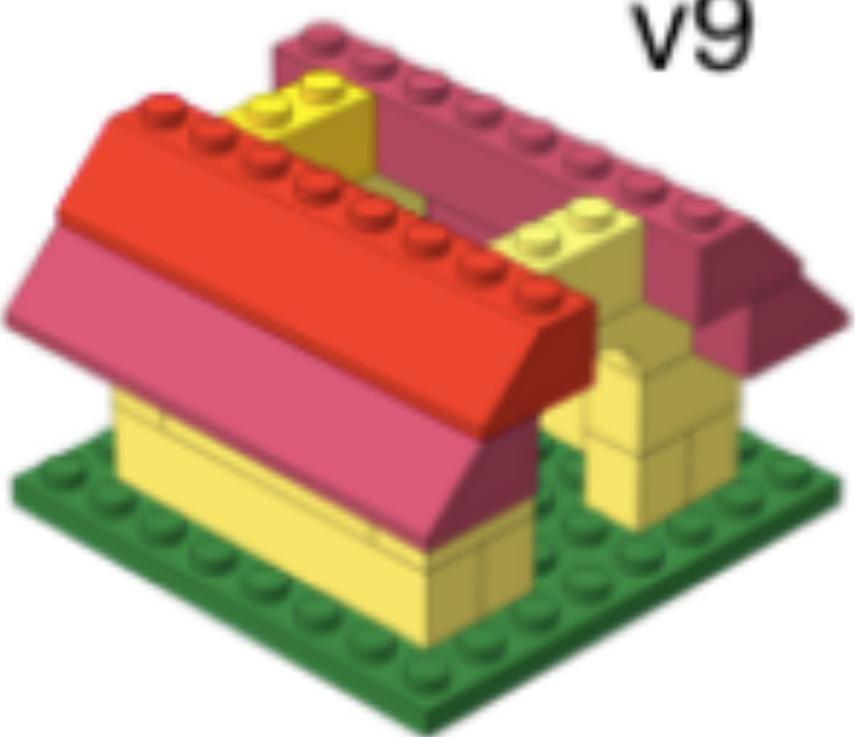
Started on the roof



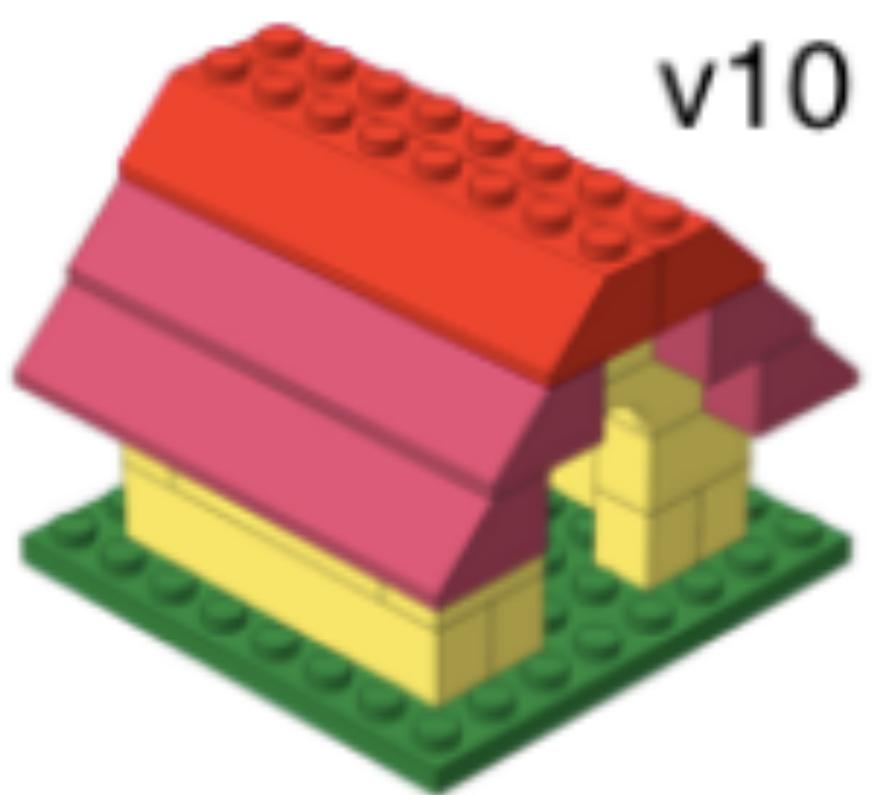
Roofwork and archway



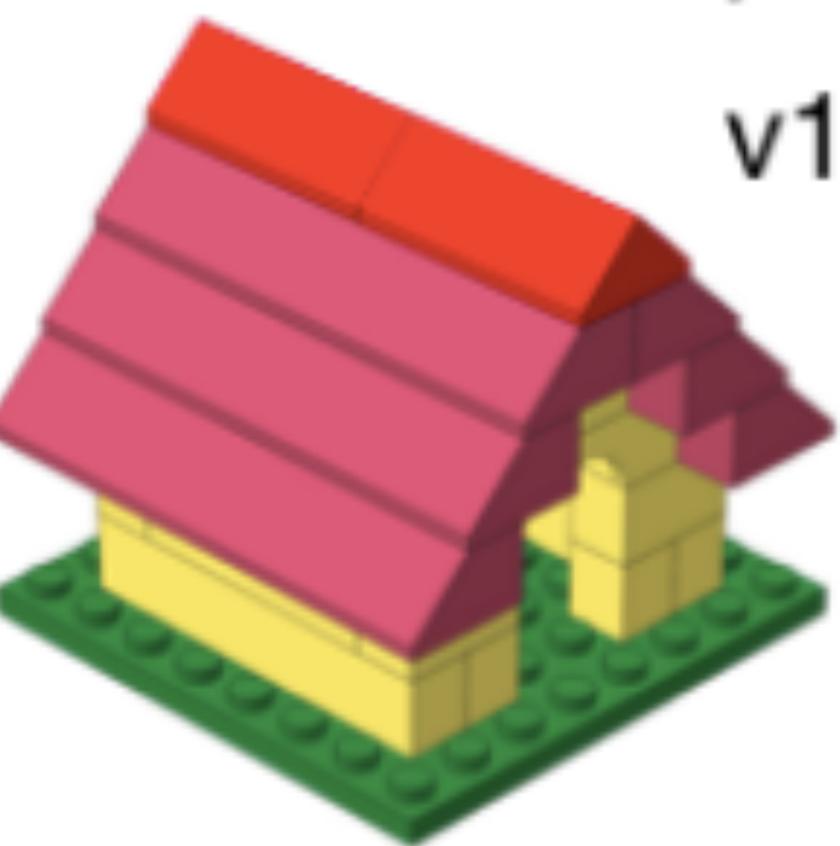
Building up the roof



Starting to close up the roof



All but top of roof built



Still needs final shingles

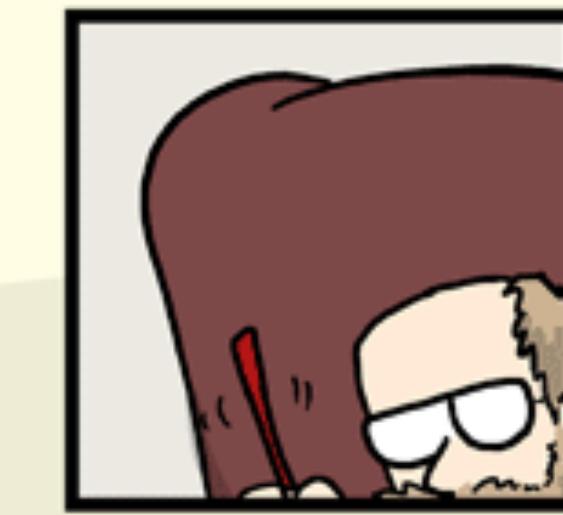
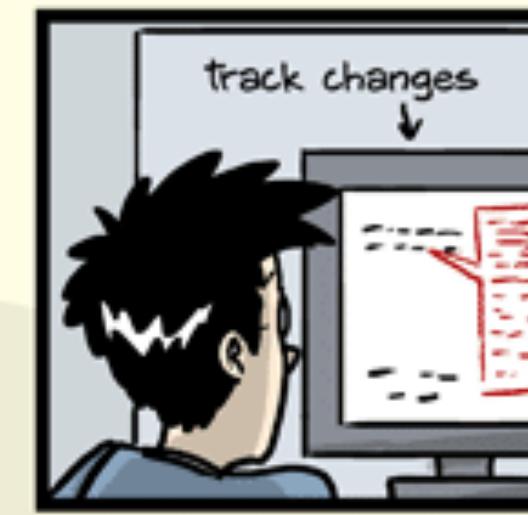


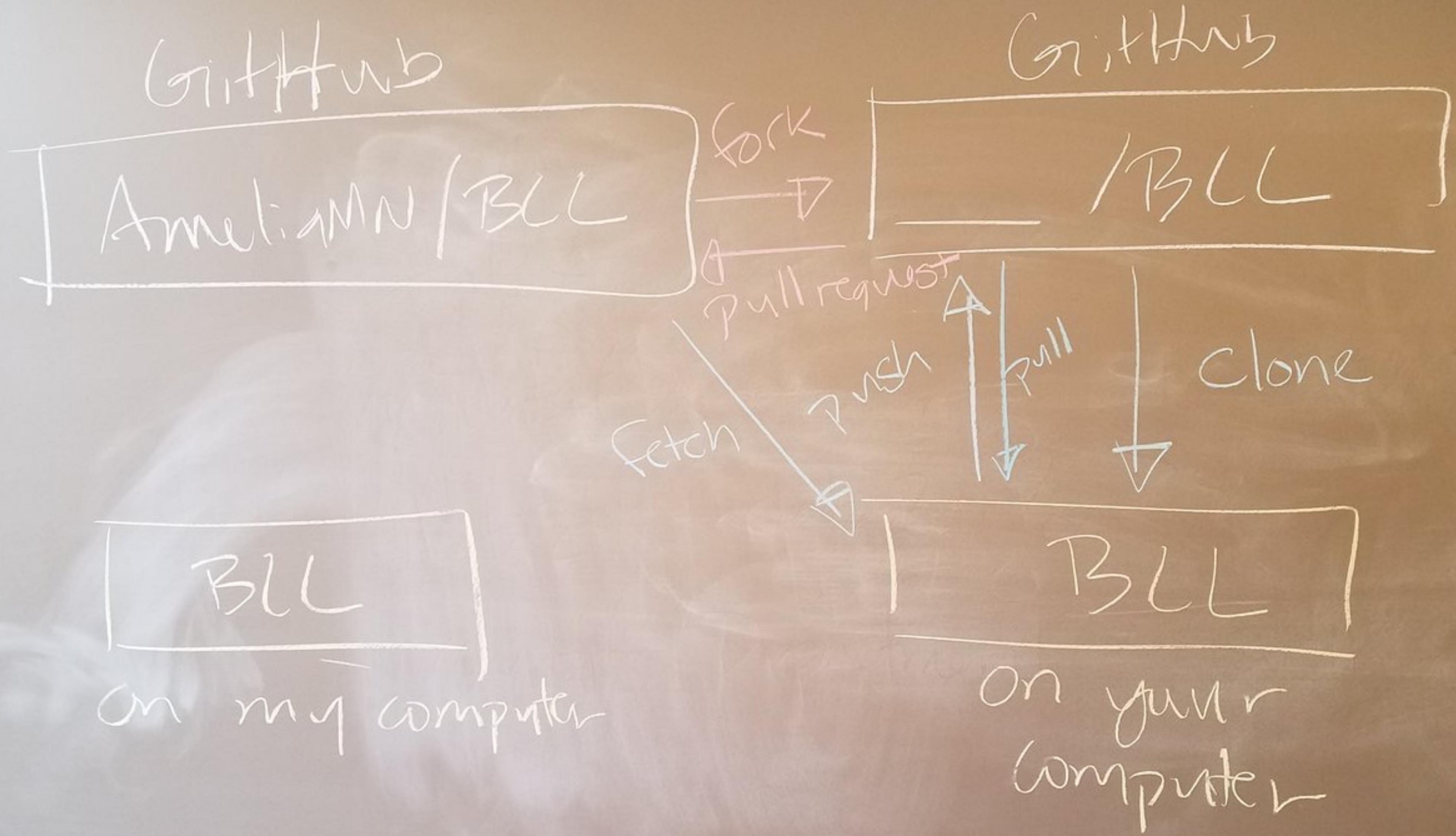
Done!!!

"FINAL".doc



JORGE CHAM © 2012

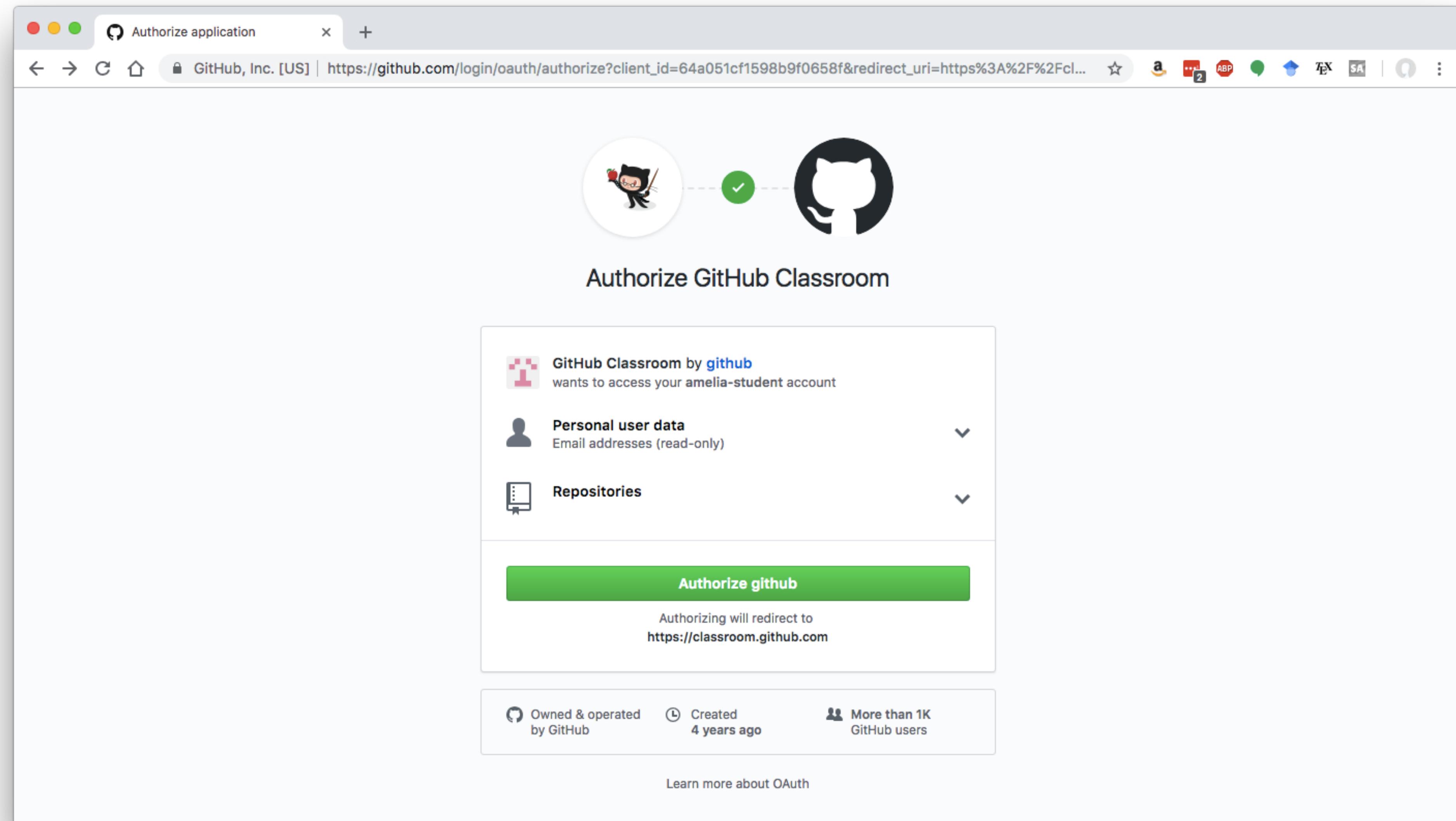




Steps:

1. Join Github classroom for STAT360 → *This may require you to verify your email (check your spam filter)*
2. Make a copy of assignment (*fork*) → *This should be done automatically when you complete step 1*
3. Make a new project in RStudio Cloud "from git repo"
4. Introduce yourself to git
5. Make changes to RMarkdown
6. Commit + push changes
7. Check online to make sure it worked

1. Join Github classroom



 GitHub Classroom

<https://classroom.github.com/assignment-invitations/070b729e5f3f4e408d8f02e3b5fbed21?roster=ignore>

GitHub Classroom GitHub Education

STAT360: Advanced Statistical Software

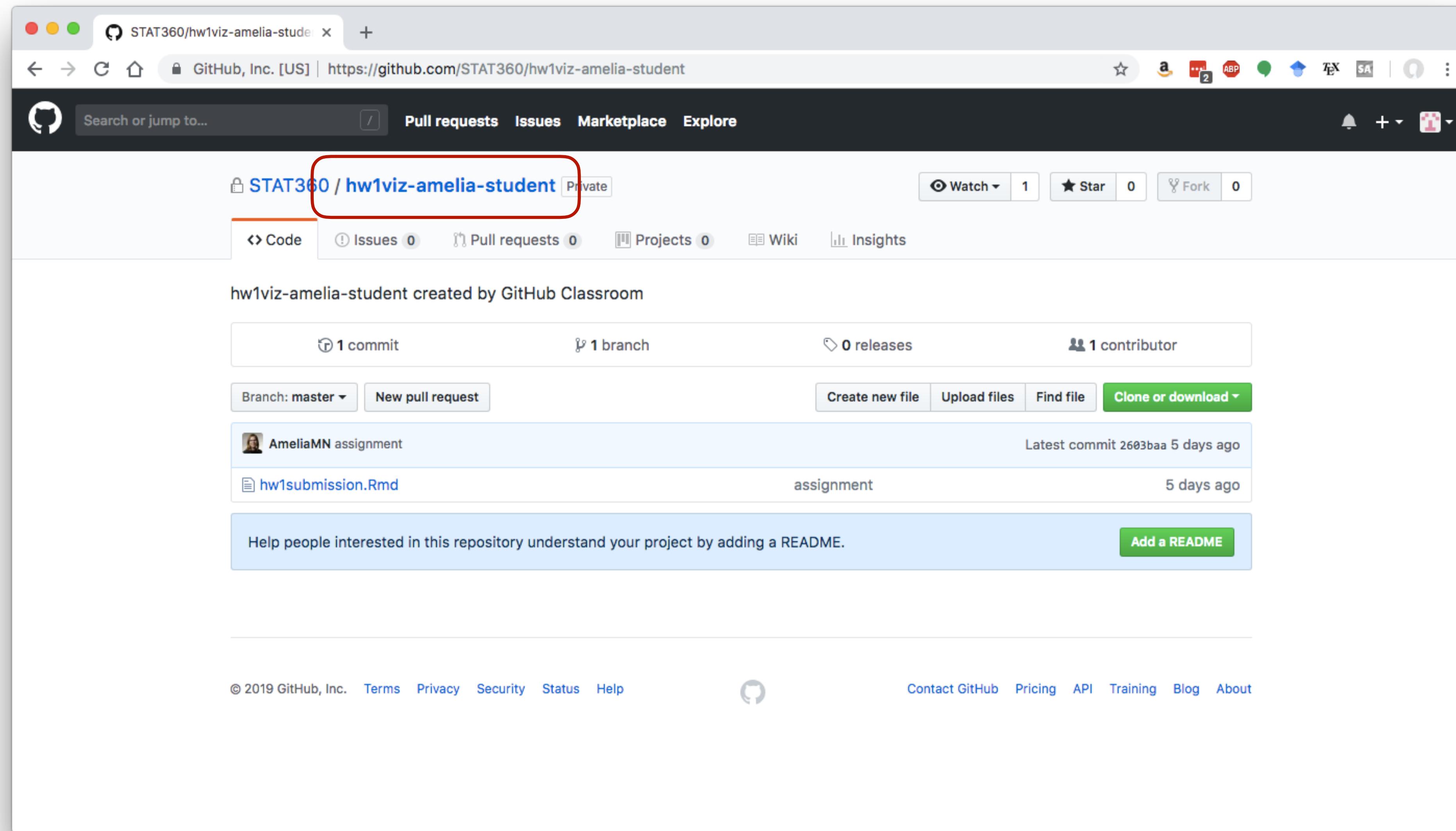
@STAT360

 Accept the Hw1Viz assignment

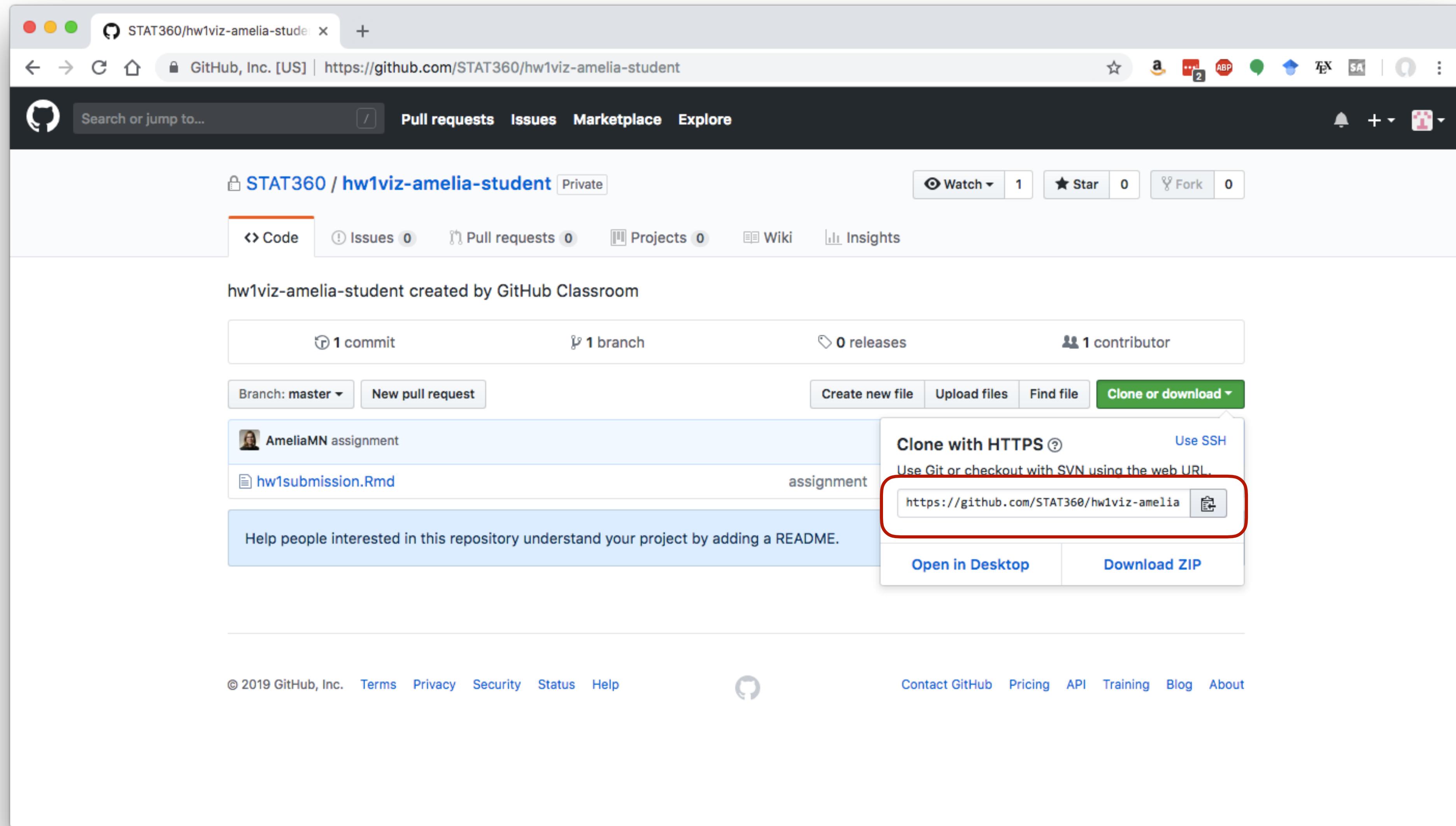
Accepting this assignment will give you access to the **hw1viz-amelia-student** repository in the [@STAT360](#) organization on GitHub.

[Accept this assignment](#)

2. Copy assignment— should be made automatically



Copy this URL



3. Make a new RStudio Cloud Project "from Git Repo"

The screenshot shows the RStudio Cloud interface for a workspace named "STAT 360". The "Projects" tab is selected. A modal window titled "New Project" is open, with a red box highlighting the "New Project from Git Repo" option. The main content area displays two existing projects: "Hw1_visualization" (created by Amelia Student on Feb 10, 2019) and "Untitled Project" (created by Amelia Student on Feb 12, 2019). On the right side, there are filtering options for "List Projects" (All, Shared with everyone, Yours) and "Sort Projects" (By name, By date created), along with a "Delete" and "Move" button.

RStudio Cloud

https://rstudio.cloud/spaces/9069/projects

STAT 360 Projects Members Info

All Projects

Hw1_visualization

Amelia Student

Created Feb 10, 2019 4:08 PM

Derived from: Hw1_visualization by Amelia McNamara

CONTINUE Hw1_visualization

AM Amelia McNamara

Created Feb 5, 2019 11:43 AM View 1 derived project ...

Untitled Project

AS Amelia Student

Created Feb 12, 2019 12:41 PM

New Project

+ New Project

New Project from Git Repo

Options

Search Projects

List Projects

All

Shared with everyone

Yours

Sort Projects

By name

By date created

Delete Move

RStudio Cloud

https://rstudio.cloud/spaces/9069/projects

STAT 360 Projects Members Info

All Projects

Hw1_visualization
Amelia Student
Created Feb 10, 2019 4:08 PM
Derived from: Hw1_visualization
CONTINUE Hw1_visualization
Amelia McNamara
Created Feb 5, 2019 11:43 AM View 1 derived project ...

New Project from Git Repo

URL of your Git repository

`https://github.com/STAT360/hw1viz-amelia-student.git`

Packages

Add packages from the base project

OK

Options

Search Projects

List Projects

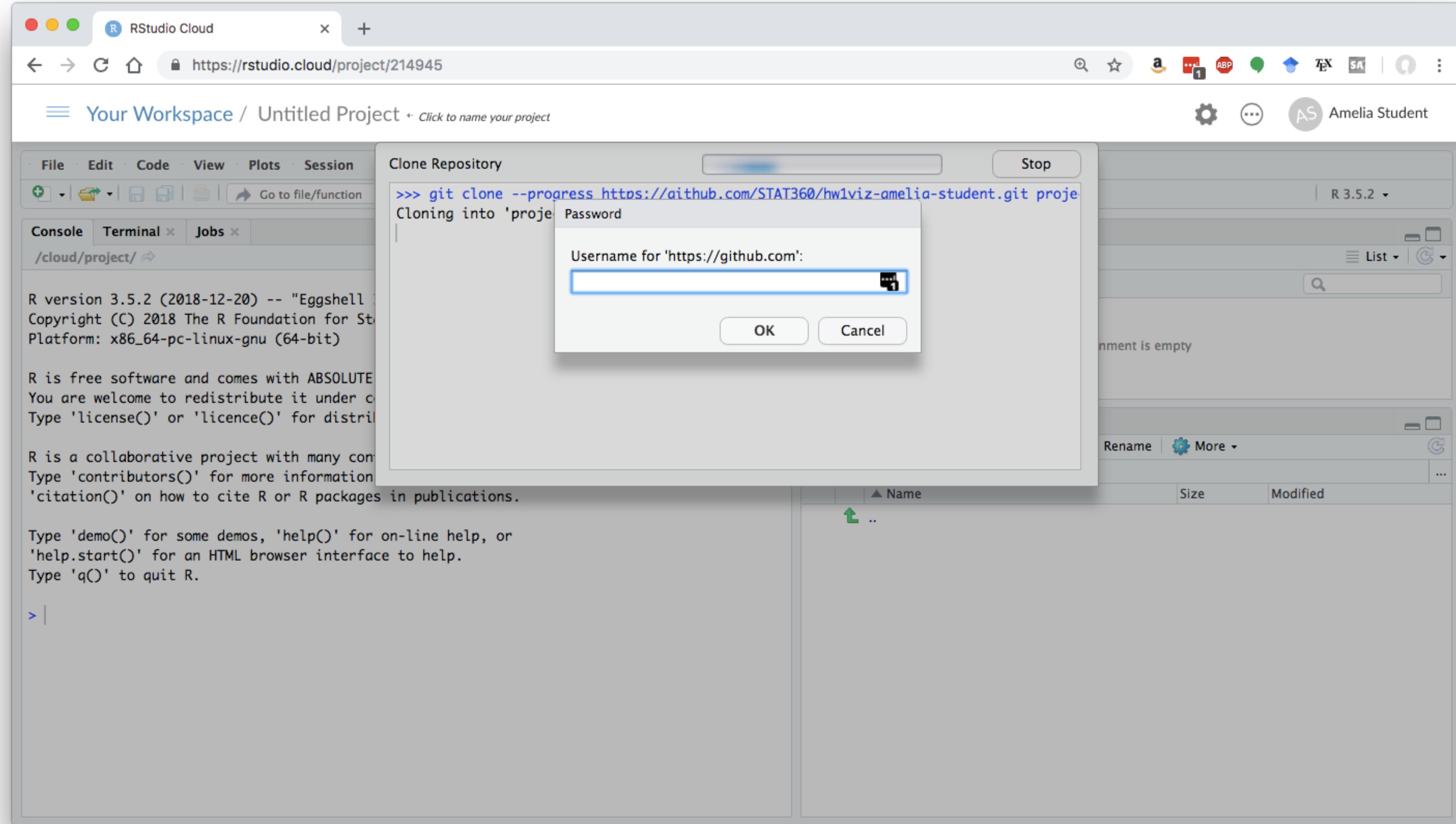
All Shared with everyone Yours

Sort Projects

By name By date created

This screenshot shows the RStudio Cloud interface for managing projects. A modal window titled 'New Project from Git Repo' is open, prompting for a Git repository URL. The URL 'https://github.com/STAT360/hw1viz-amelia-student.git' is entered in the input field. Below the URL, there's a checkbox for adding packages from the base project, which is checked. An 'OK' button is at the bottom right of the modal. In the background, the main 'Projects' tab is selected, showing a list of existing projects: 'Hw1_visualization' (created by Amelia Student on Feb 10, 2019) and another 'Hw1_visualization' (created by Amelia McNamara on Feb 5, 2019). The interface includes standard browser navigation and search tools.

Probably— enter Github credentials



4. Introduce yourself to git

```
git config --global user.name 'Jane Doe'  
git config --global user.email 'jane@example.com'  
git config --global credential.helper 'cache --timeout 3600'  
git config --global --list
```

RStudio Cloud

https://rstudio.cloud/spaces/9069/project/211634

STAT 360 / Hw1_visualization

File Edit Code View Plots Session Build Debug Profile Tools Help

01-Visualize.Rmd x

```
1 ---  
2 title: "Visualization"  
3 output: html_document  
4 ---  
5  
6 <!-- This file by Amelia McNamara is licensed under a Creative Commons Attribution  
7 4.0 International License, adapted from the original work at  
8 https://github.com/rstudio/master-the-tidyverse by RStudio. -->  
9  
10 The first chunk in an R Notebook is usually titled "setup," and by convention  
includes the R packages you want to load. Remember to use an R package you  
want to use in your code.
```

Environment History Connections

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Upload Delete Rename More

Cloud > project

Name	Size	Modified
.Rhistory	0 B	Feb 10, 2019, 4:08 PM
01-Visualize.html	1.7 MB	Feb 7, 2019, 4:33 PM
01-Visualize.Rmd	3.9 KB	Feb 7, 2019, 4:33 PM
project.Rproj	205 B	Feb 10, 2019, 4:08 PM

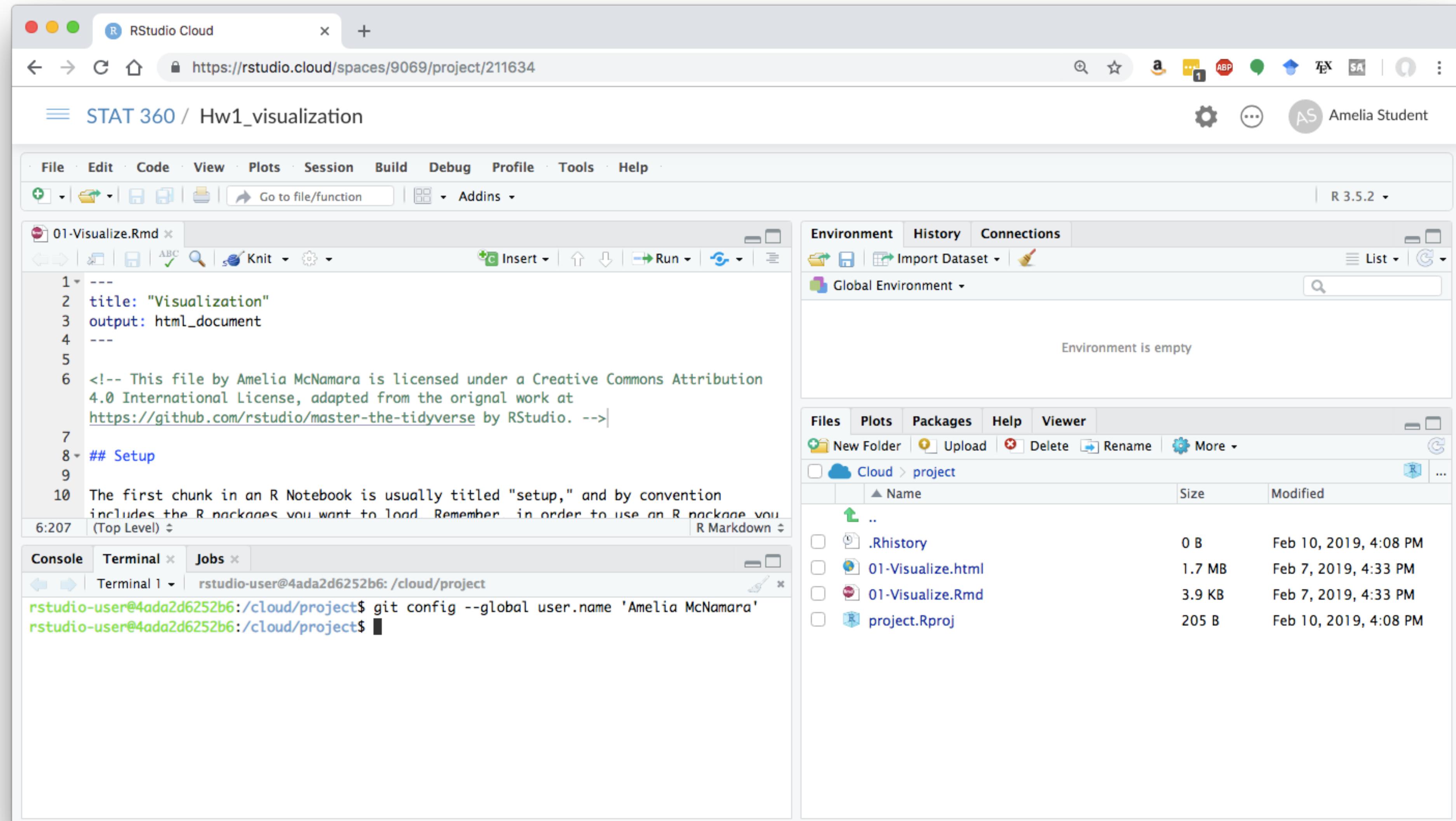
Console Terminal x Jobs x

Terminal 1 rstudio-user@4ada2d6252b6:/cloud/project

rstudio-user@4ada2d6252b6:/cloud/project\$

```
1 ---  
2 title: "Visualization"  
3 output: html_document  
4 ---  
5  
6 <!-- This file by Amelia McNamara is licensed under a Creative Commons Attribution  
7 4.0 International License, adapted from the original work at  
8 https://github.com/rstudio/master-the-tidyverse by RStudio. -->  
9  
10 The first chunk in an R Notebook is usually titled "setup," and by convention  
includes the R packages you want to load. Remember to use an R package you  
want to use in your code.
```

git config --global user.name 'Jane Doe'



git config --global user.email 'jane@example.com'

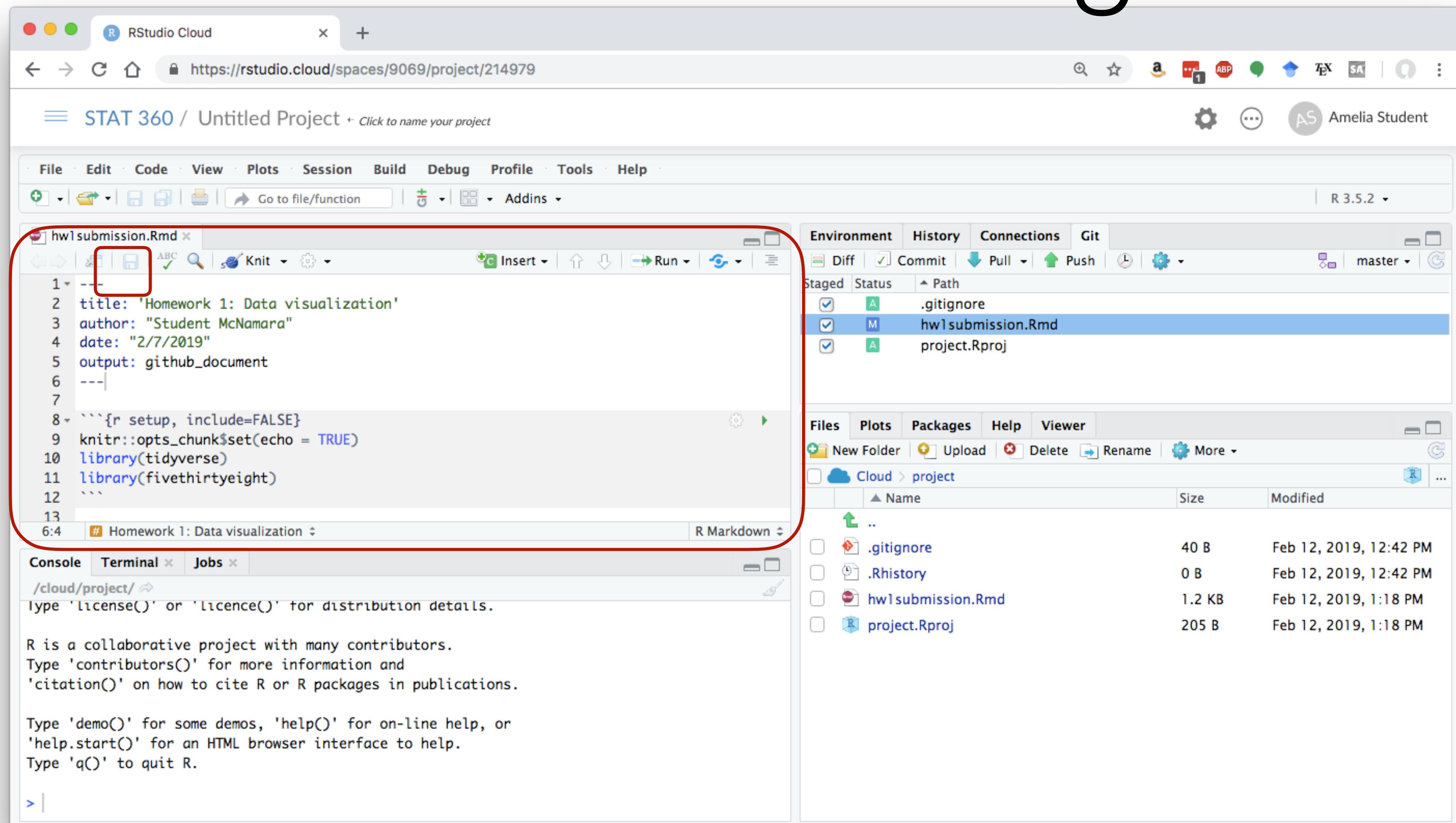
The screenshot shows the RStudio Cloud interface with a project titled "STAT 360 / Hw1_visualization". The terminal window displays the following command being run:

```
rstudio-user@4ada2d6252b6:/cloud/project$ git config --global user.name 'Amelia McNamara'  
rstudio-user@4ada2d6252b6:/cloud/project$ git config --global user.email 'amelia.mcnamara@stthomas.edu'  
rstudio-user@4ada2d6252b6:/cloud/project$
```

The environment pane shows that the Global Environment is empty. The files pane lists the contents of the project directory:

Name	Size	Modified
..	0 B	Feb 10, 2019, 4:08 PM
.Rhistory	1.7 MB	Feb 7, 2019, 4:33 PM
01-Visualize.html	3.9 KB	Feb 7, 2019, 4:33 PM
01-Visualize.Rmd	205 B	Feb 10, 2019, 4:08 PM
project.Rproj		

5. Make a change



6. Commit

The screenshot shows the RStudio Cloud interface for a project titled "STAT 360 / Untitled Project". The main area displays an R Markdown file named "hw1submission.Rmd" with the following content:

```
1 ---  
2 title: 'Homework 1: Data visualization'  
3 author: "Student McNamara"  
4 date: "2/7/2019"  
5 output: github_document  
6 ---  
7  
8 ```{r setup, include=FALSE}  
9 knitr::opts_chunk$set(echo = TRUE)  
10 library(tidyverse)  
11 library(fivethirtyeight)  
12 ...  
13  
6:4 # Homework 1: Data visualization
```

The R console below shows the command `/cloud/project/` and the message "Type 'license()' or 'licence()' for distribution details. R is a collaborative project with many contributors. Type 'contributors()' for more information and 'citation()' on how to cite R or R packages in publications. Type 'demo()' for some demos, 'help()' for on-line help, or 'help.start()' for an HTML browser interface to help. Type 'q()' to quit R."

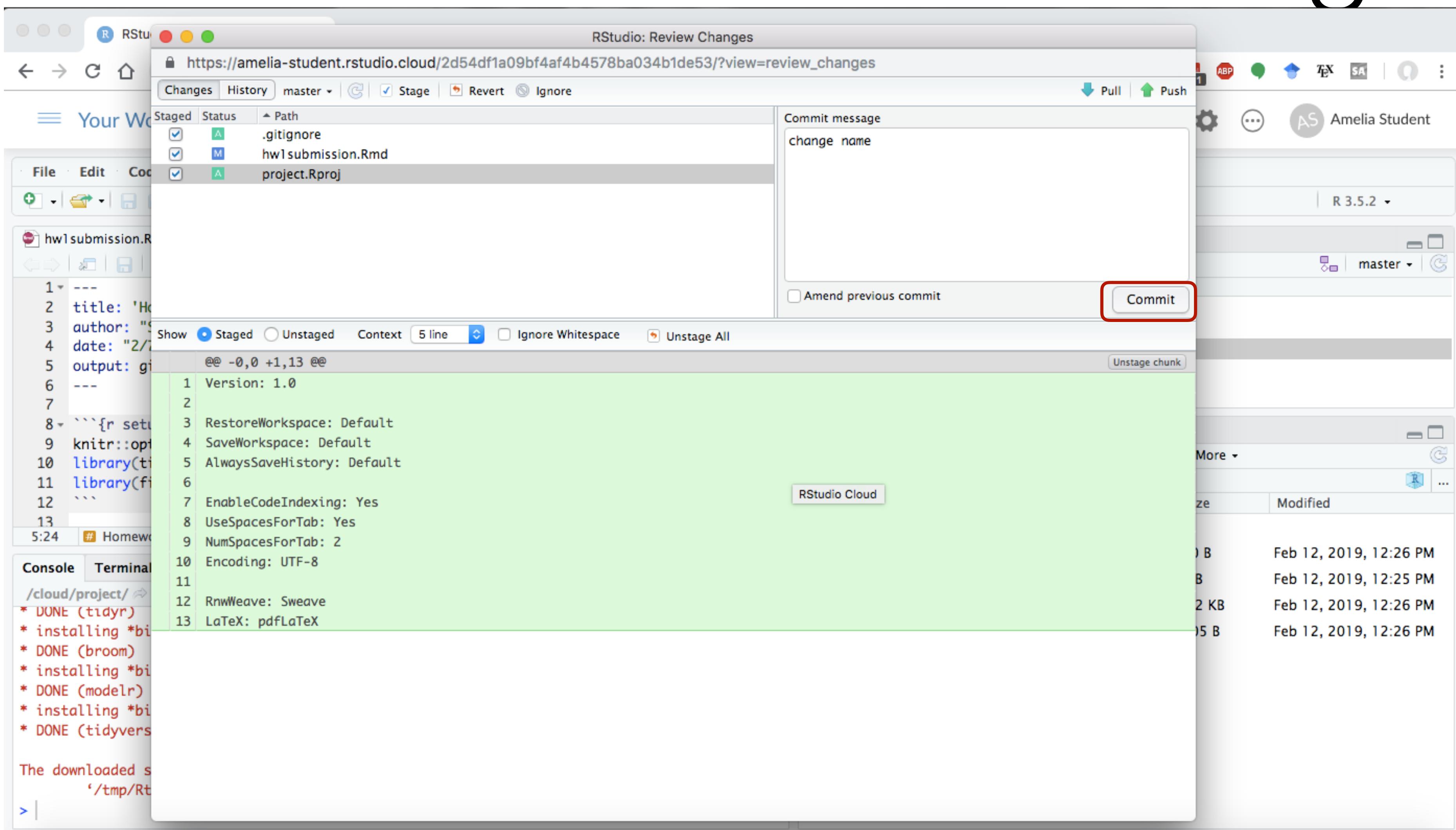
The top right corner of the interface features a Git tab bar with tabs for Environment, History, Connections, and Git. A red box highlights the "Commit" button in the Git tab bar. The Git panel shows the staged files:

Staged	Status	Path
<input checked="" type="checkbox"/>	A	.gitignore
<input checked="" type="checkbox"/>	M	hw1submission.Rmd
<input checked="" type="checkbox"/>	A	project.Rproj

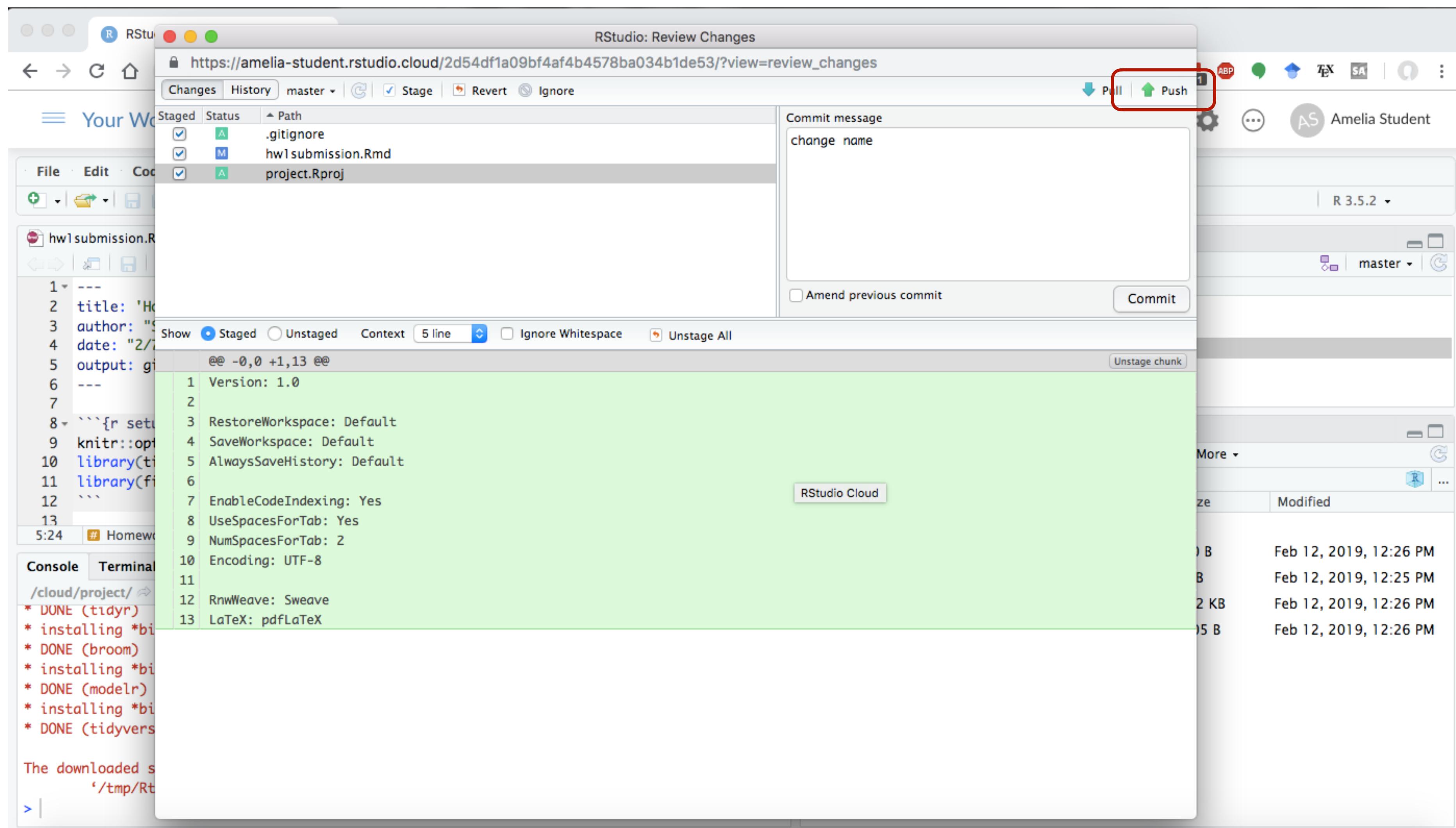
Below the Git panel is a file browser showing the contents of the "Cloud > project" directory:

Name	Size	Modified
..		
.gitignore	40 B	Feb 12, 2019, 12:42 PM
.Rhistory	0 B	Feb 12, 2019, 12:42 PM
hw1submission.Rmd	1.2 KB	Feb 12, 2019, 1:18 PM
project.Rproj	205 B	Feb 12, 2019, 1:18 PM

Commit— write a message



Push



7. Go check online

The screenshot shows a GitHub repository page for 'hw1viz-amelia-student'. The repository is private, has 3 commits, 1 branch, 0 releases, and 1 contributor. The latest commit was 32 minutes ago. The repository was created by GitHub Classroom.

File / Action	Description	Time
amelia-student first stab at a bar chart	Latest commit	32 minutes ago
hw1submission_files/figure-gfm	first stab at a bar chart	32 minutes ago
.gitignore	changed name and date	37 minutes ago
hw1submission.Rmd	first stab at a bar chart	32 minutes ago
hw1submission.md	first stab at a bar chart	32 minutes ago
project.Rproj	changed name and date	37 minutes ago

Help people interested in this repository understand your project by adding a README.

Add a README

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Homework (due next Tuesday 2/19, 1:30 pm)

- Finish the instructions in the .Rmd document
- Save, commit, push changes to Github
- I will be looking for a knitted .md document called hw1submission.md with a pretty visualization