

Workflow basics, RMarkdown, git/Github

Cleaning up

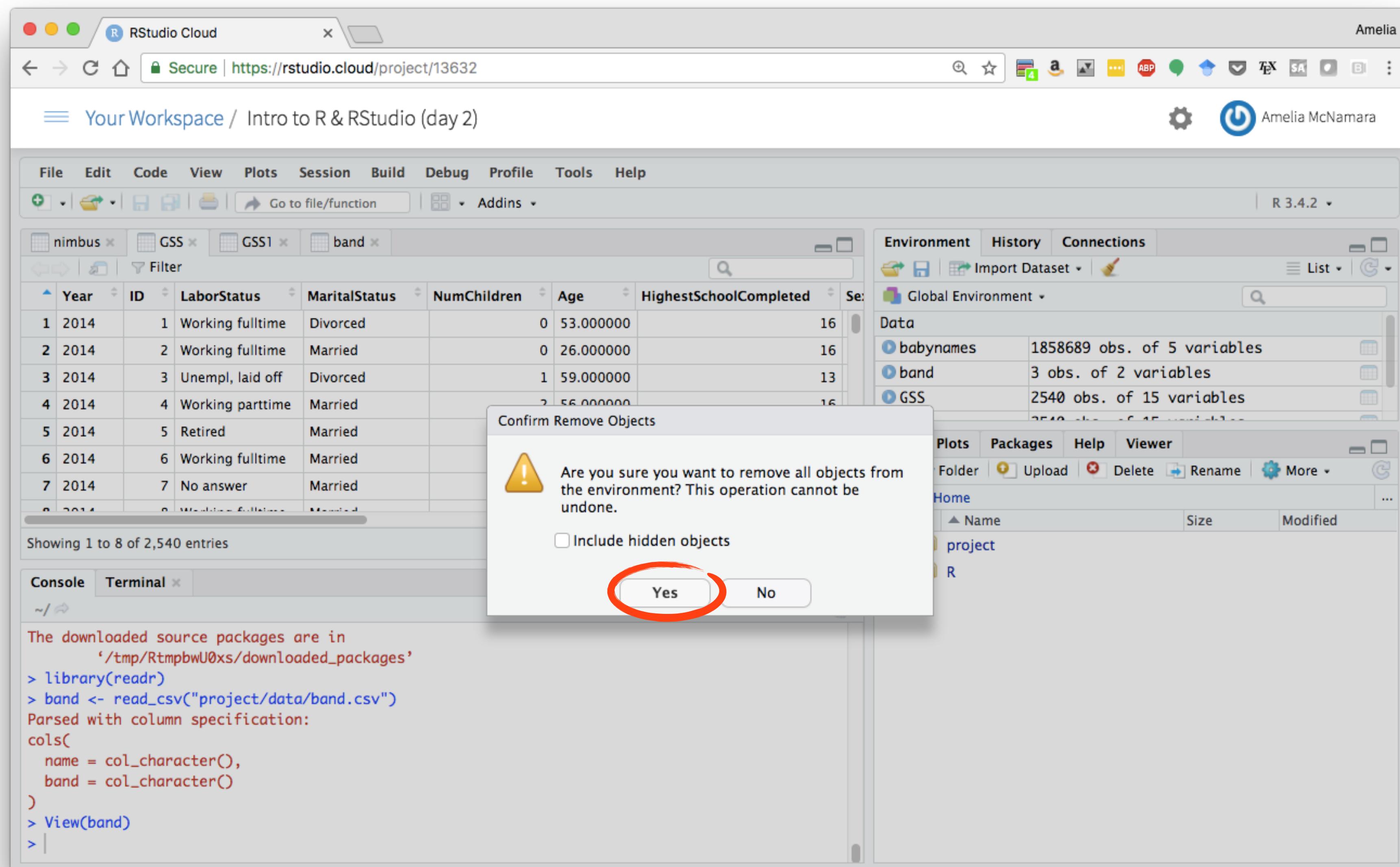
Cleaning up

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.
- Toolbar:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help; Go to file/function, Addins, R 3.4.2.
- 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 Global Environment with datasets: 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). The "Import Dataset" button is circled in red.
- Files Tab:** Shows a file browser with 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



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.
- Left Sidebar (File Menu):**
 - New File
 - Open File...
 - Recent Files
 - Import Dataset
 - Save
 - Save As...
 - Save All
 - Print...
 - Close** (highlighted with a red circle)
 - Close All** (highlighted with a red circle)
 - Close All Except Current
- Central Area:** A data grid titled "band" showing the following data:

MaritalStatus	NumChildren	Age	HighestSchoolCompleted
Divorced	0	53.000000	16
Married	0	26.000000	16
Divorced	1	59.000000	13
Married	2	56.000000	16
Married	3	74.000000	17
Married	1	56.000000	17
Married	2	63.000000	12
Divorced	2	24.000000	17

Showing 1 to 8 of 2,540 entries.

- Right Sidebar:**
 - Environment: Shows "Environment is empty".
 - Files: Shows a "project" folder and an "R" folder.
- Bottom:** Console tab active, showing R session 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 tabs for "Console" and "Terminal". A red circle highlights the "History" tab in the top right corner of the RStudio interface. The console area contains the following R code:

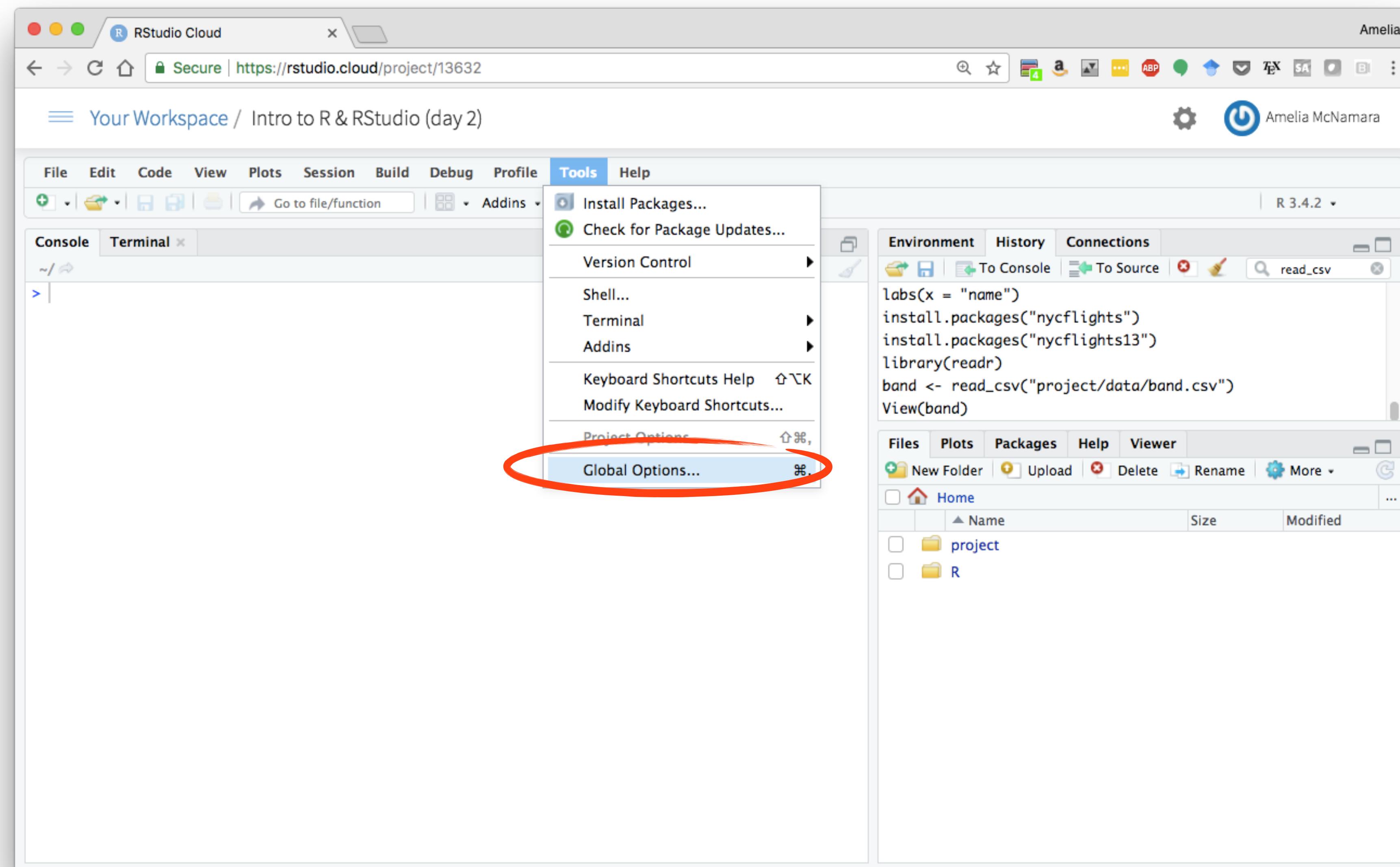
```
labs(x = "name")
install.packages("nycflights")
install.packages("nycflights13")
library(readr)
band <- read_csv("project/data/band.csv")
View(band)
```

The "History" tab is active, showing the command "read_csv". Below the console are tabs for "Files", "Plots", "Packages", "Help", and "Viewer". The "Files" tab is active, showing a list of files: "project" and "R".

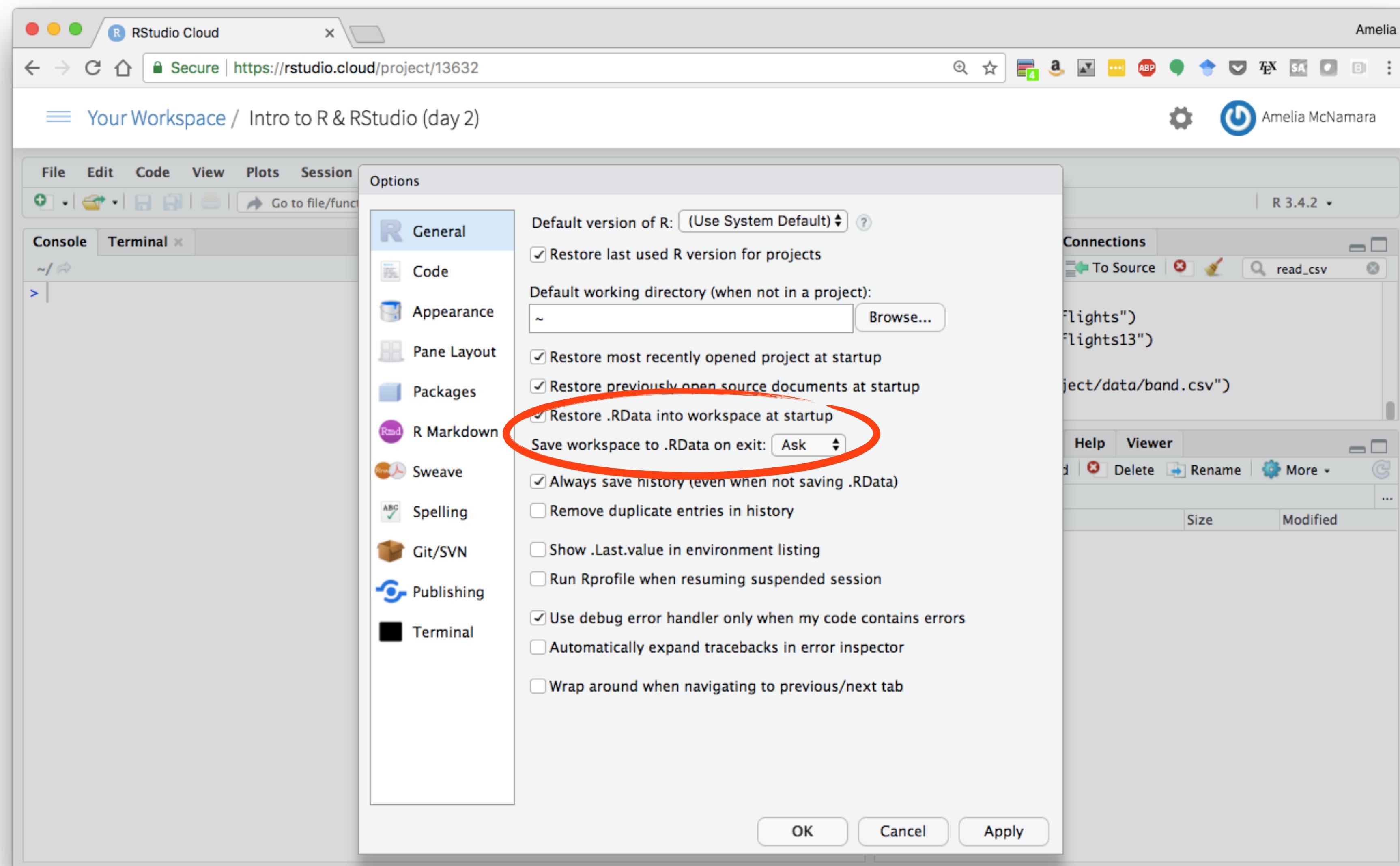
Don't worry,
your history is
preserved

Settings

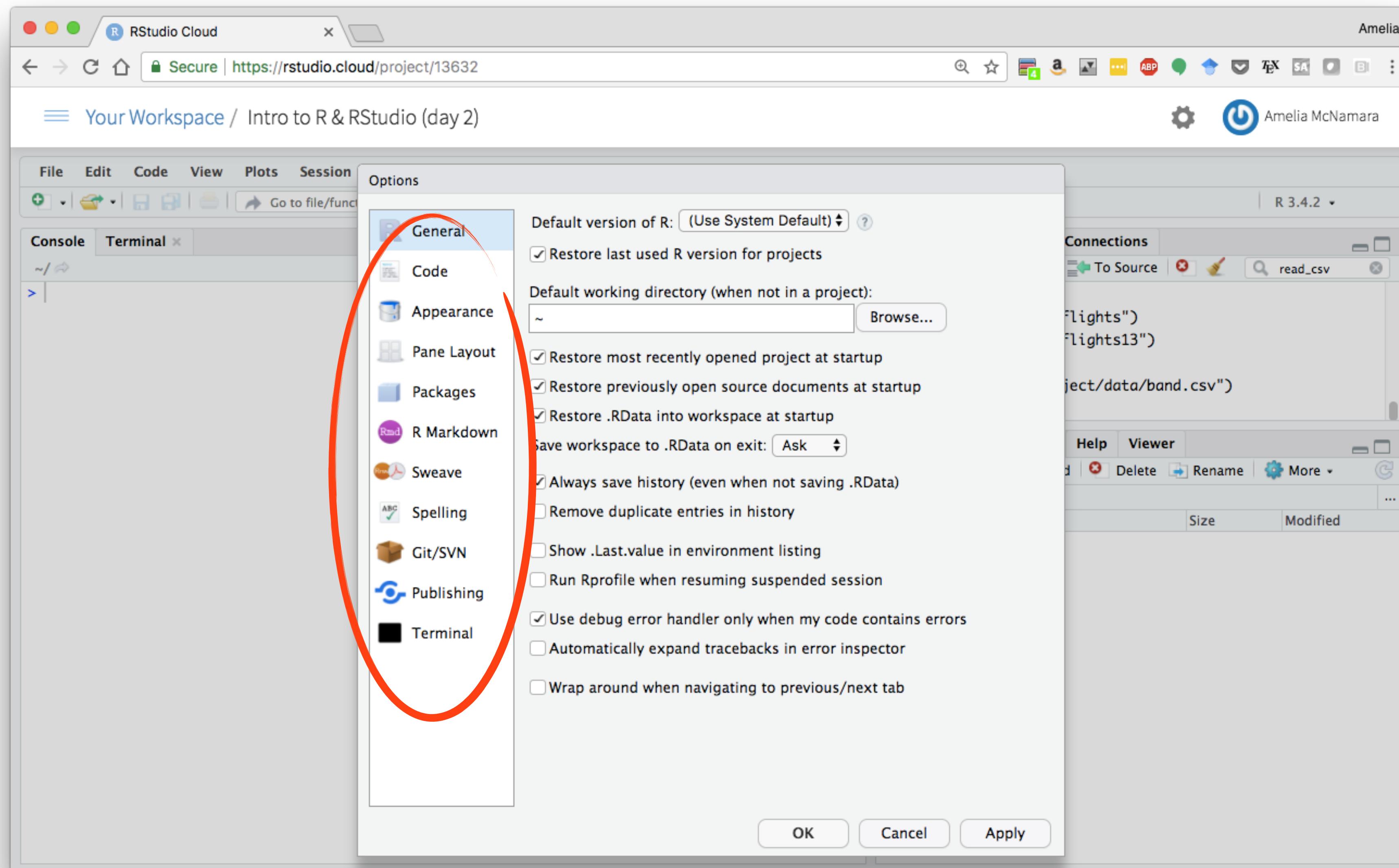
Cleaning up



Cleaning up



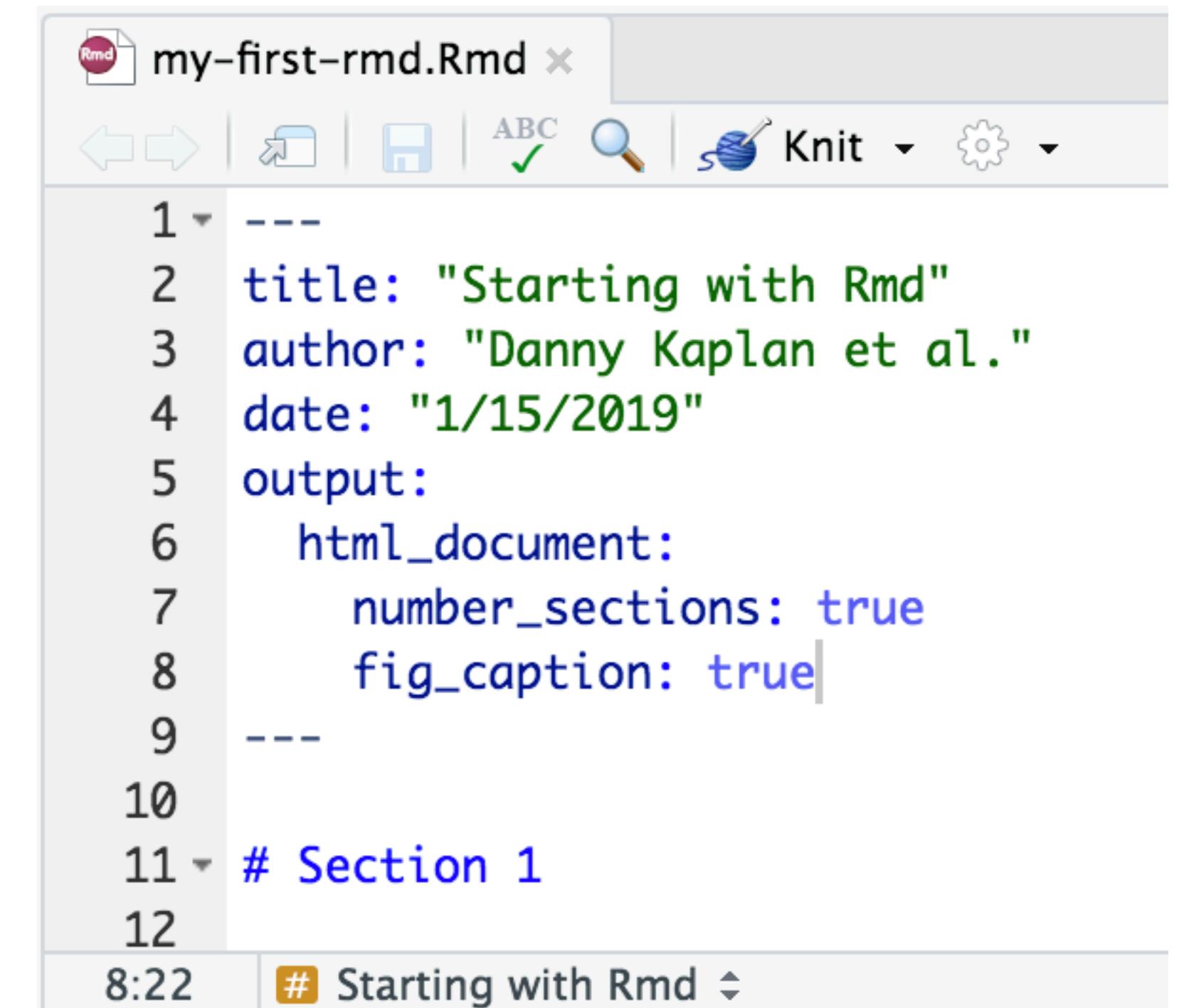
Lots more options!



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. The right panel shows the generated HTML output with numbered sections. A large red arrow points from the "# Section 1" line in the code to the "1 Section 1" heading in the output.

my-first-rmd.Rmd

```
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 ---  
9  
10 # Section 1  
11  
12 ## Section 1.1  
13  
14 ## Section 1.2  
15  
16 ### Section 1.2.1  
17  
18 ### Section 1.2.2  
19
```

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

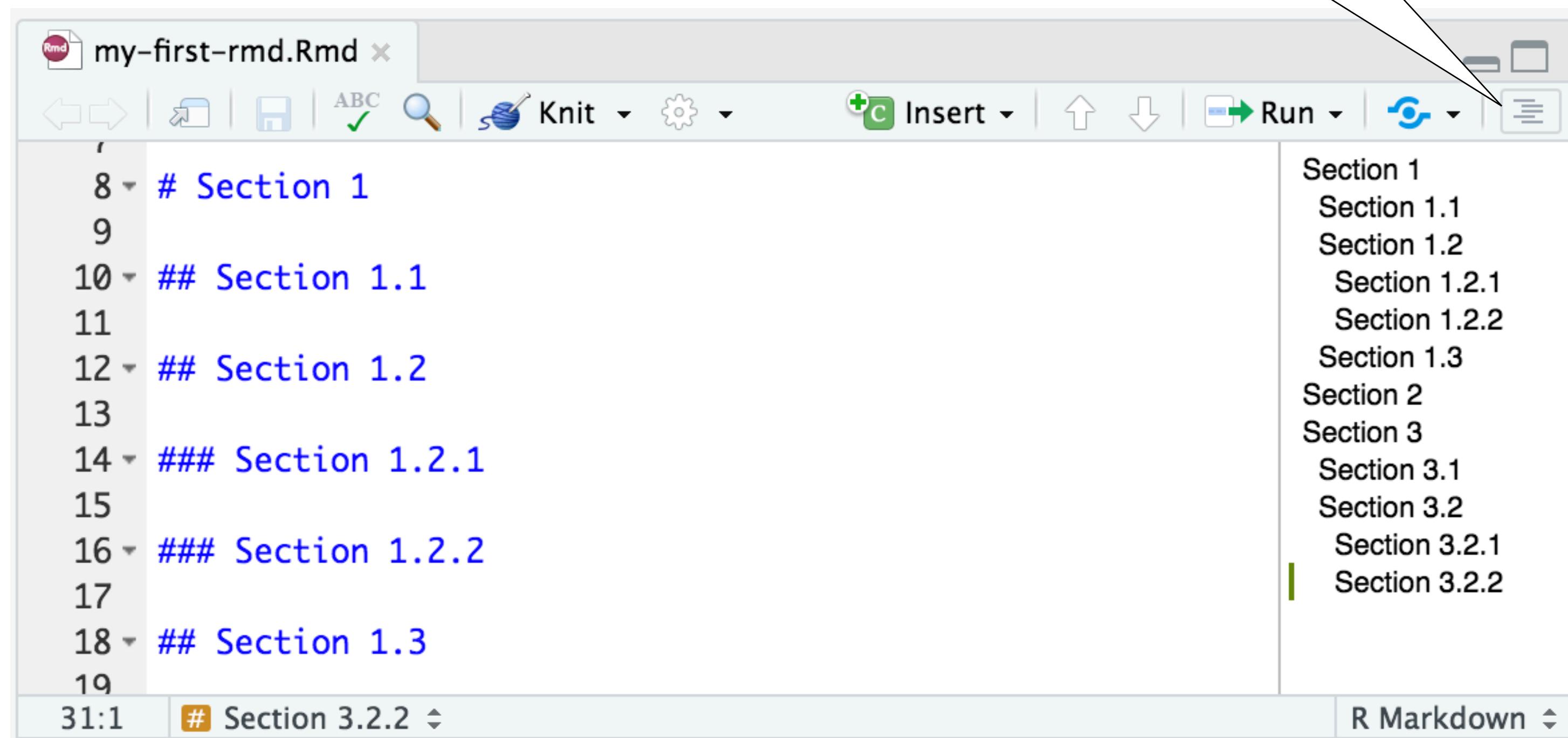
1.2.2 Section 1.2.2



CC BY Danny Kaplan

Tips

Show / hide
document
outline



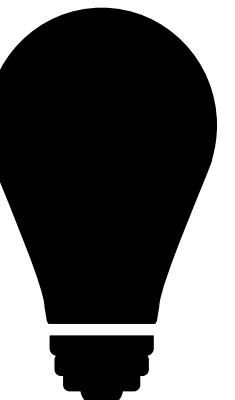
The screenshot shows the RStudio interface with a document titled "my-first-rmd.Rmd". The code editor pane contains the following R Markdown code:

```
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
```

A callout bubble from the text "Show / hide document outline" points to the "Outline" icon in the top toolbar, which is a list icon.

The right margin displays the hierarchical document outline:

- 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.



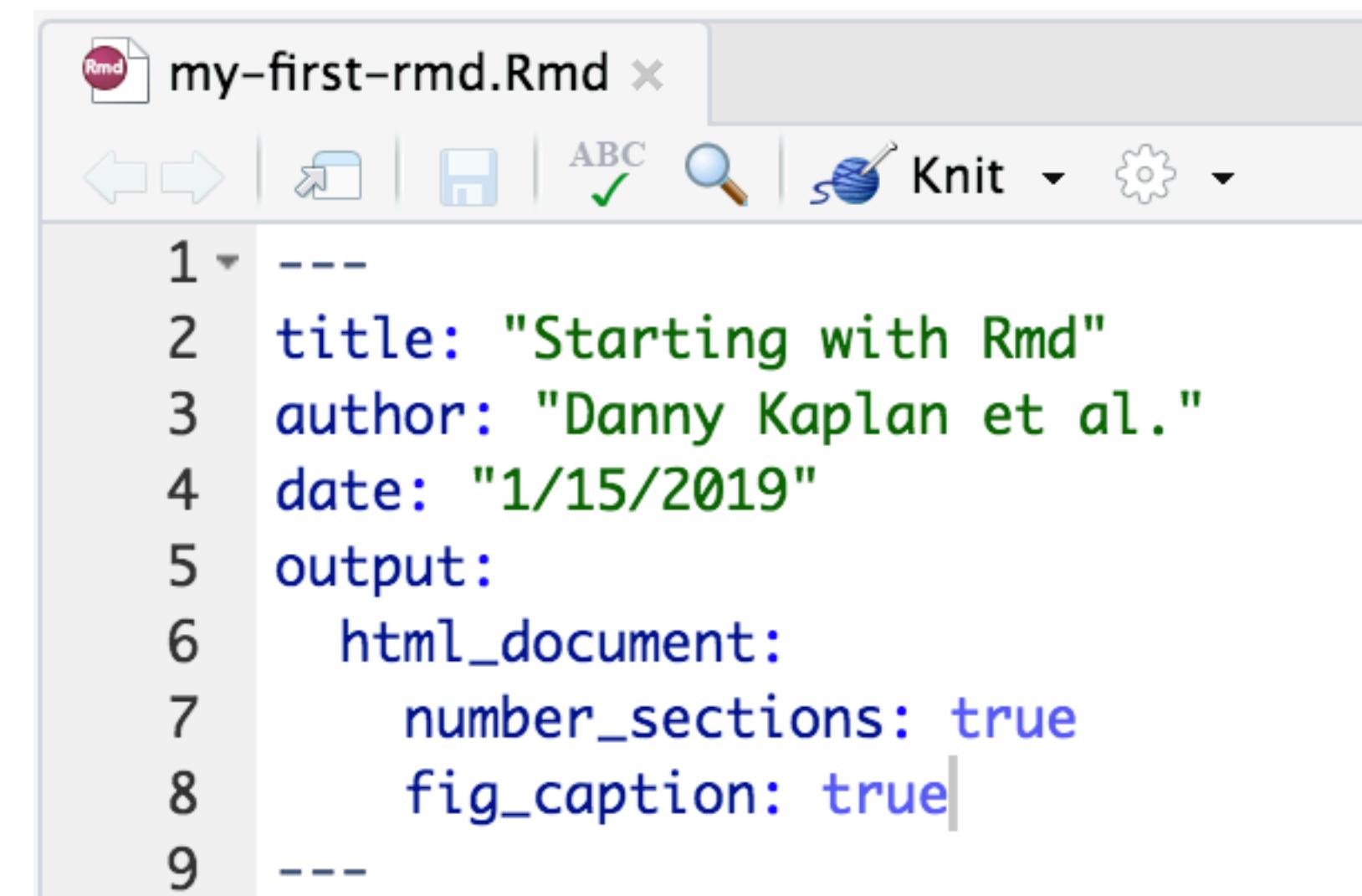
Images

- ▶ *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)`



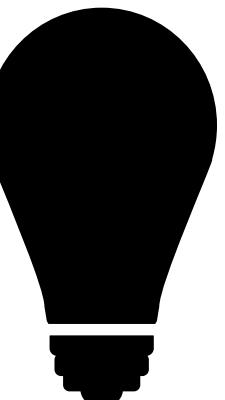
Tips

- ▶ 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" open. 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*

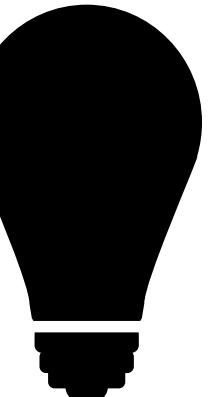
```
| Column A | Column B | Column C |  
|-----|:-----:|-----:  
| left   | center | right  |  
| aligned | aligned | aligned |  
| text   | text   | text   |
```



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*

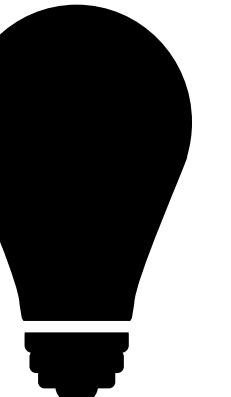


Tips

- ▶ 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

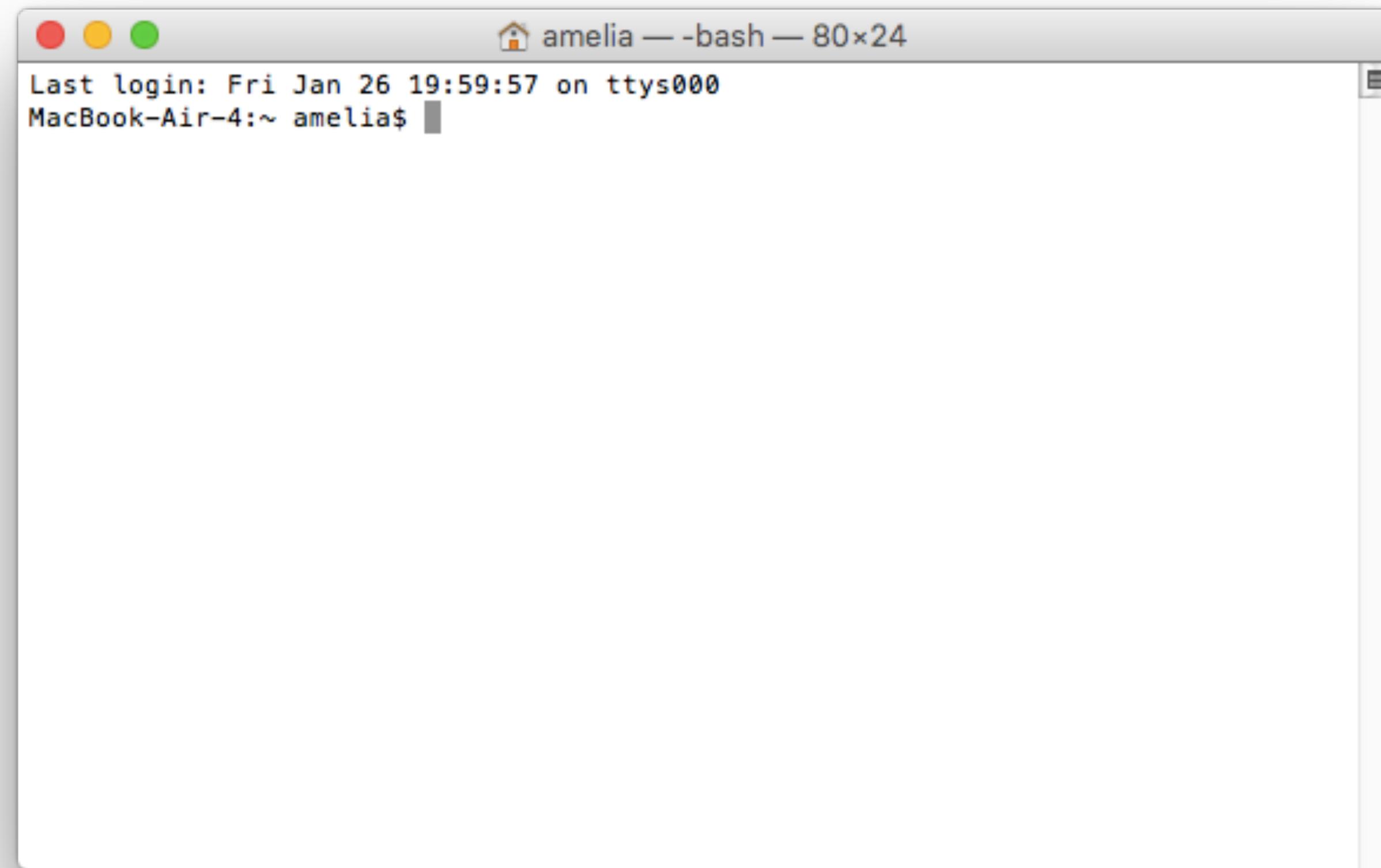


[CC BY Danny Kaplan](#)

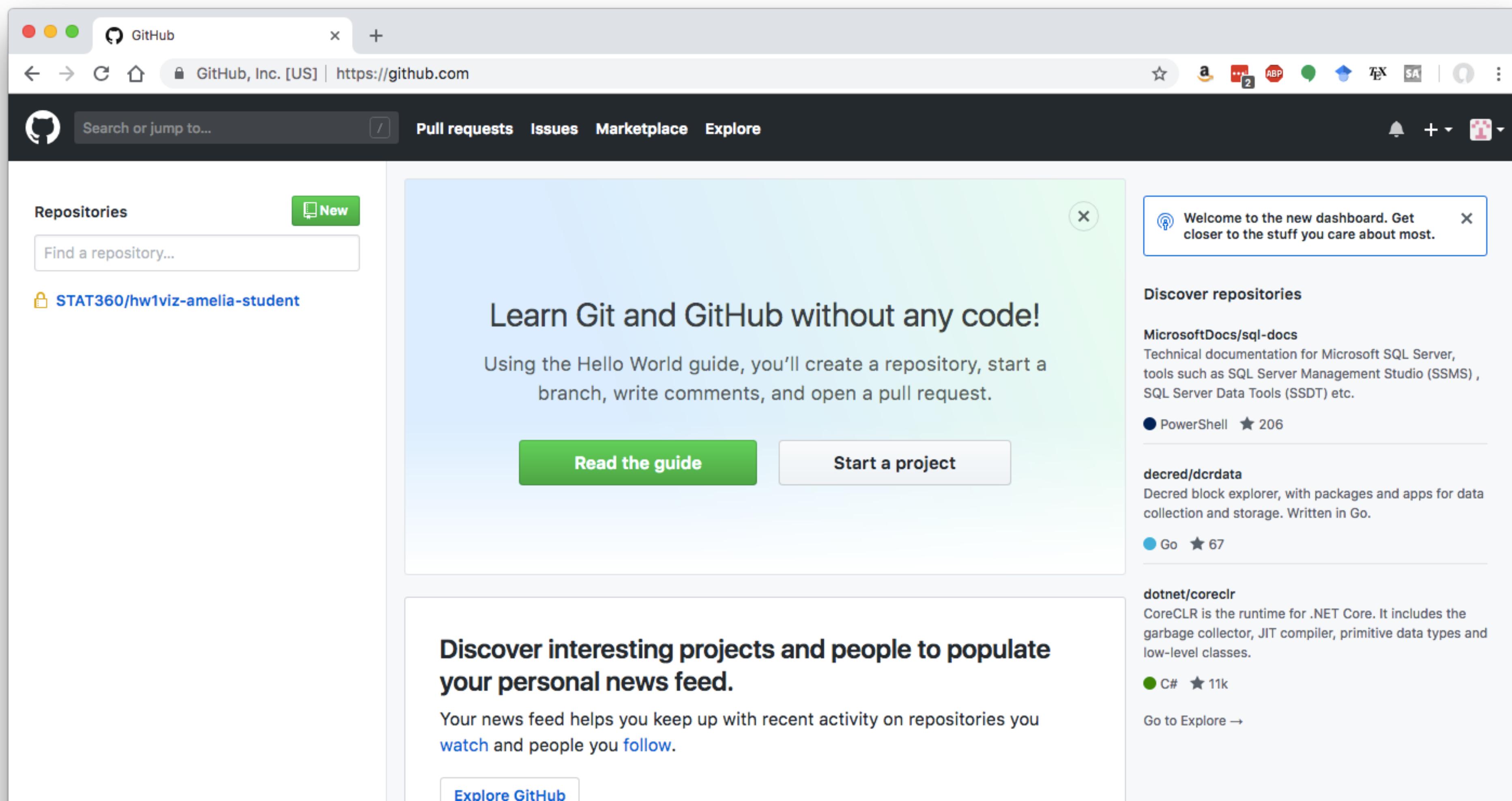


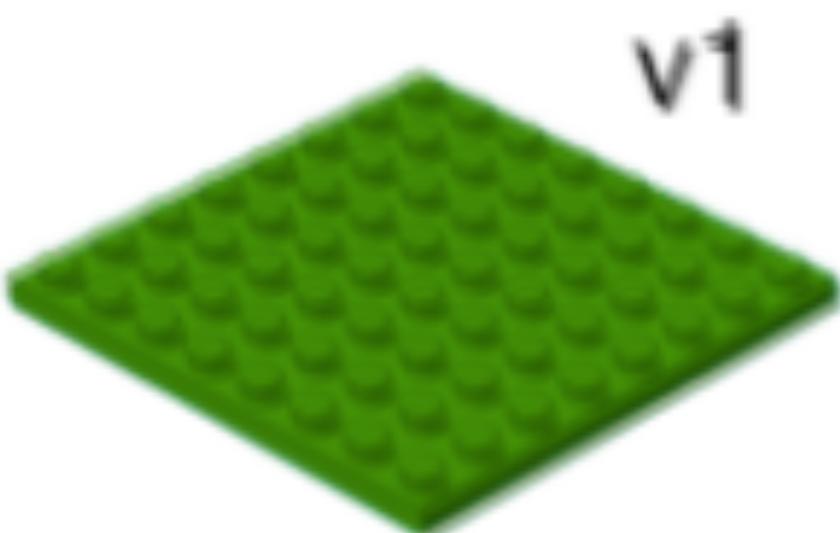
git and Github

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



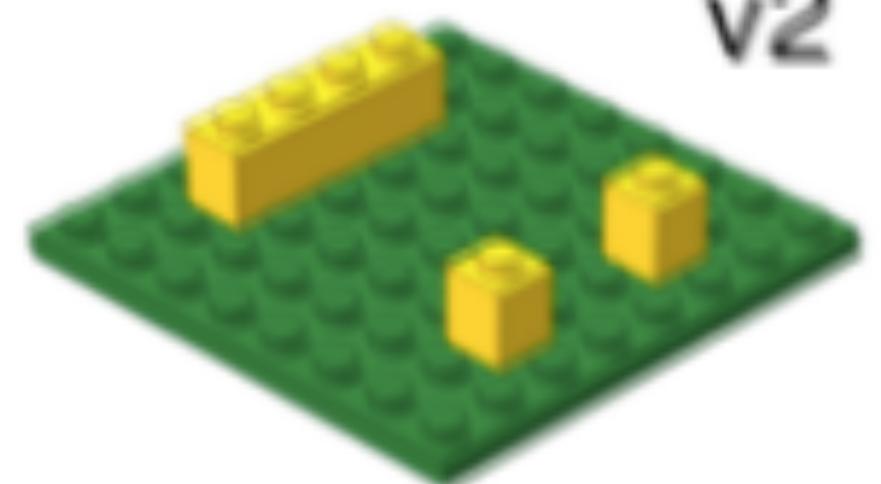
Github: a site to host code (kind of like Dropbox, but better)





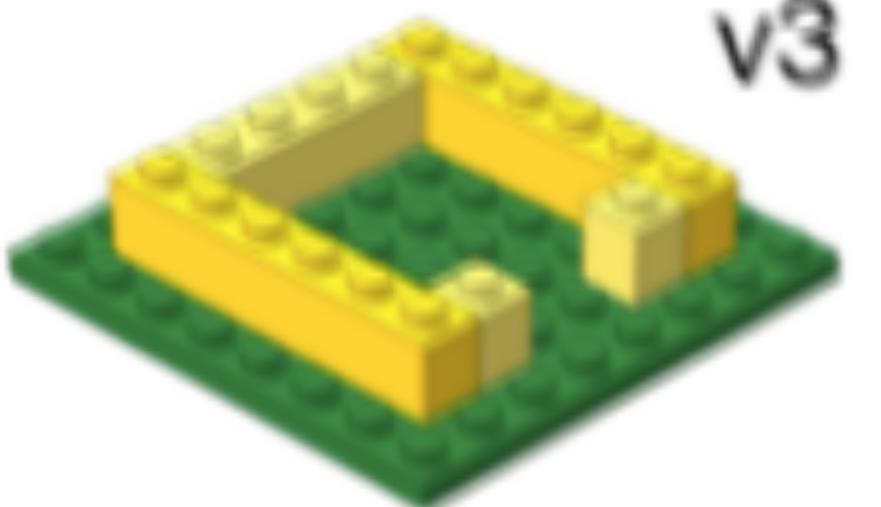
v1

First commit



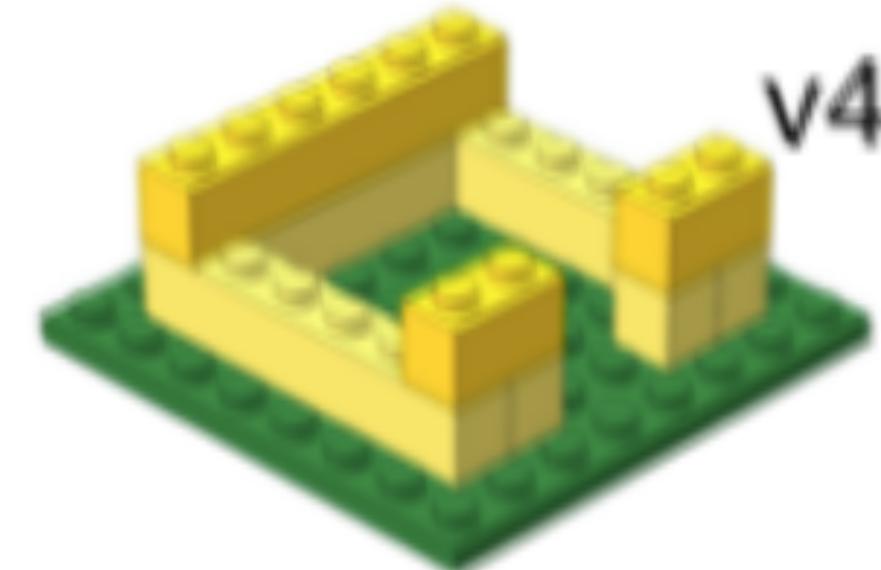
v2

Built back and front of base



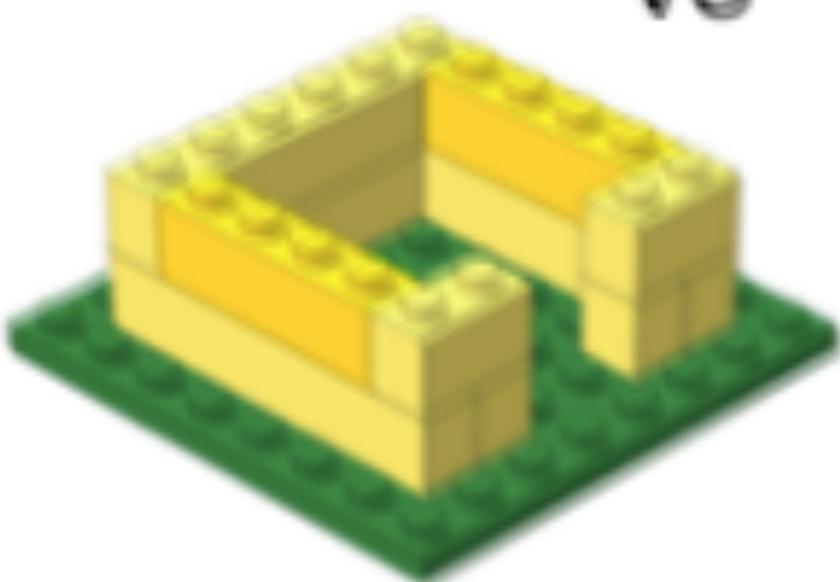
v3

Finished building base



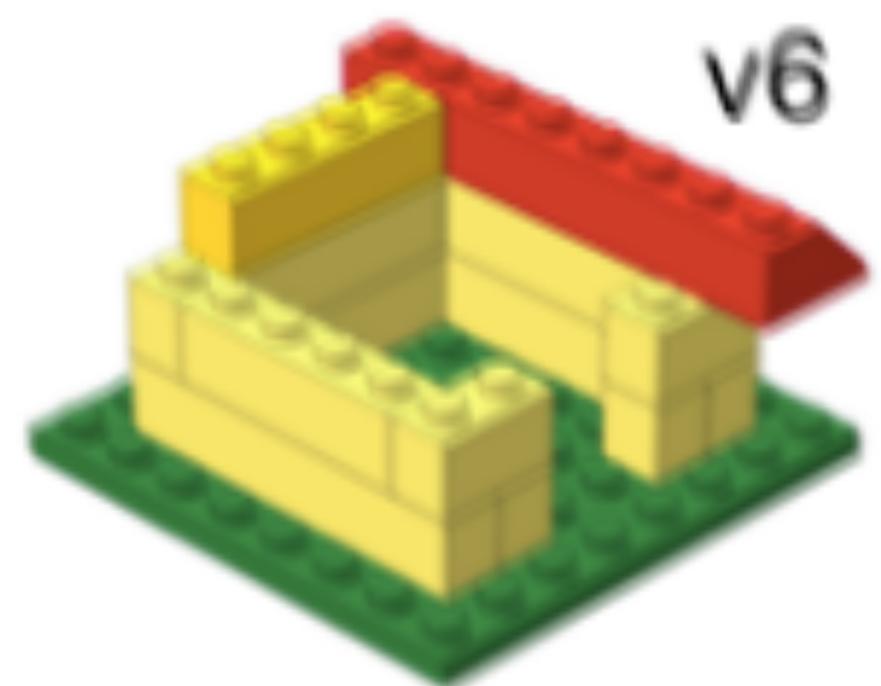
v4

Second floor back and front



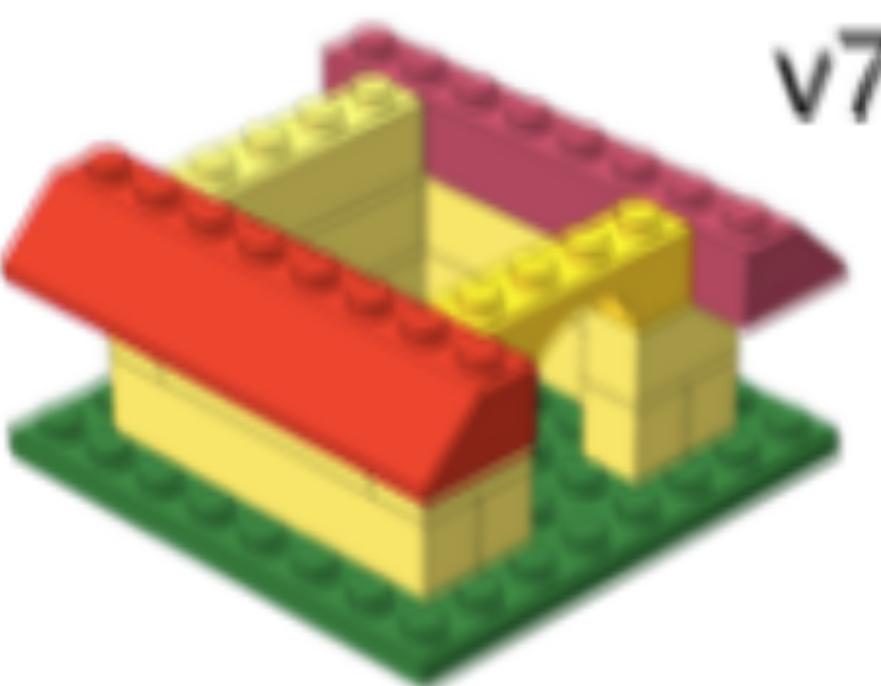
v5

Finished second floor



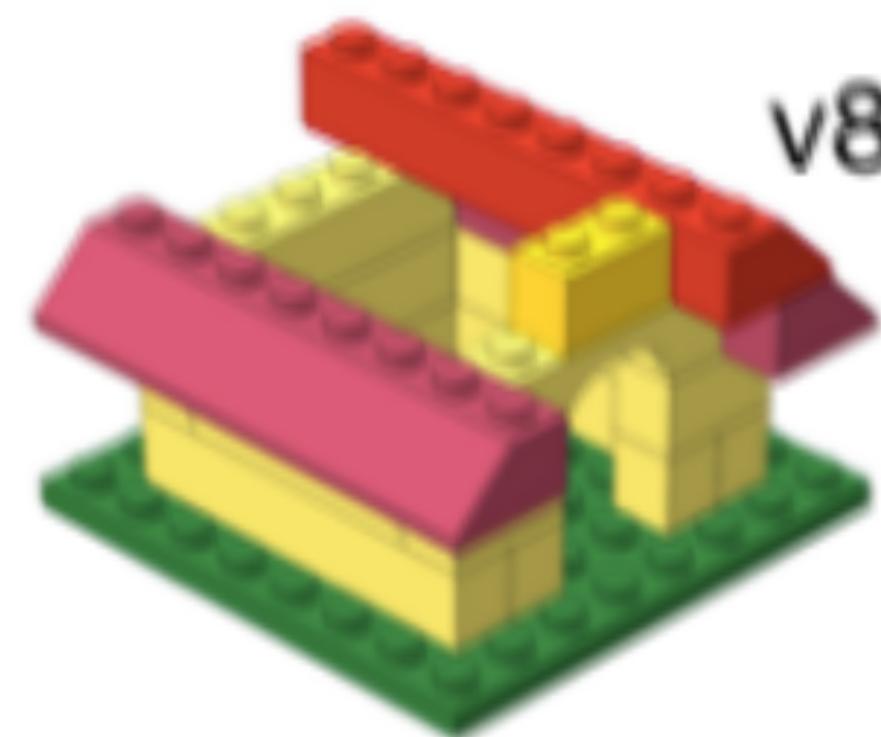
v6

Started on the roof



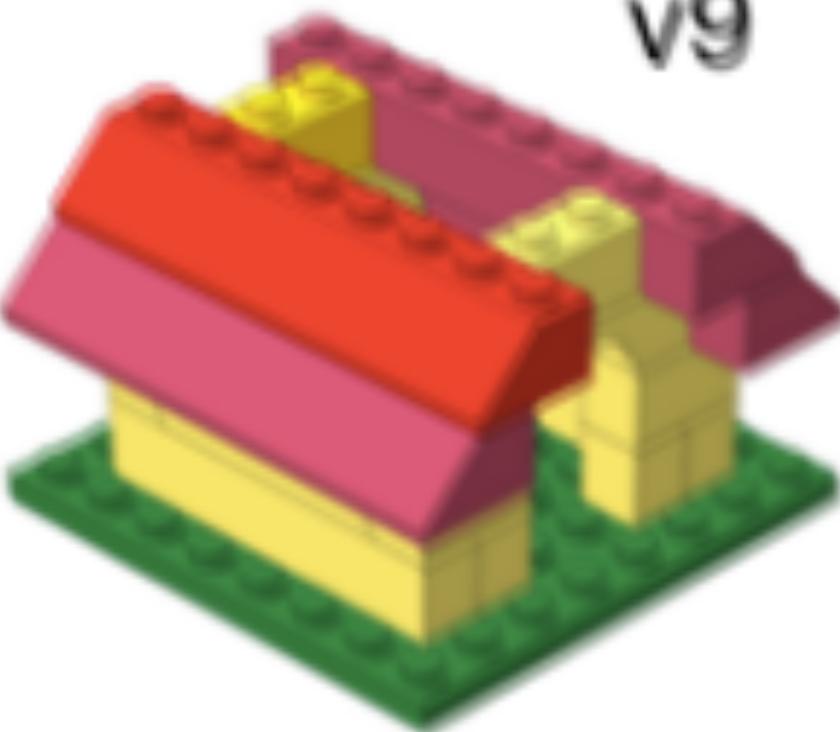
v7

Roofwork and archway



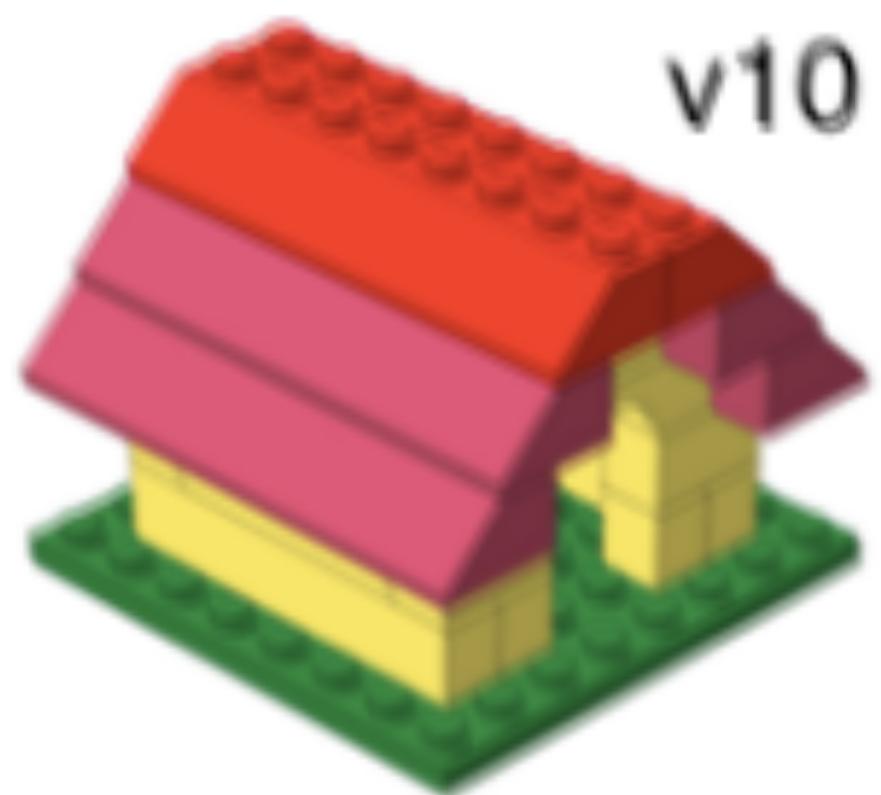
v8

Building up the roof



v9

Starting to close up the roof



v10

All but top of roof built



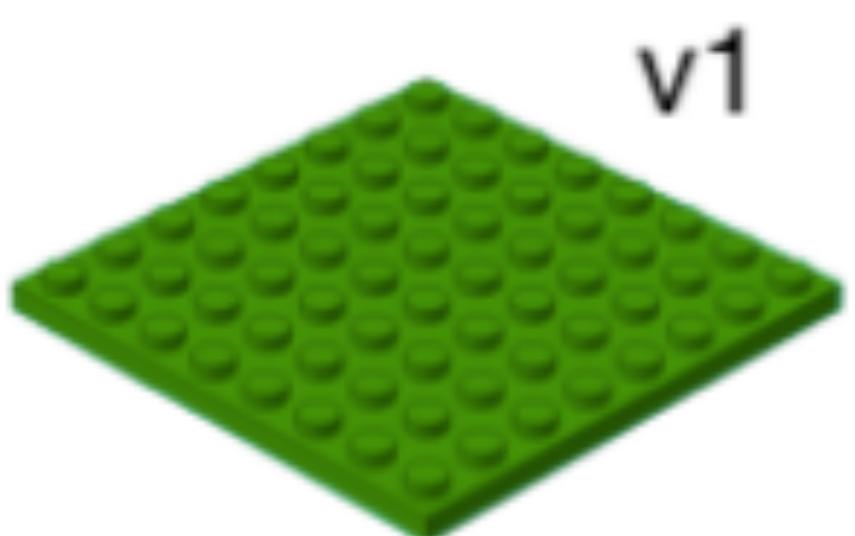
v11

Still needs final shingles

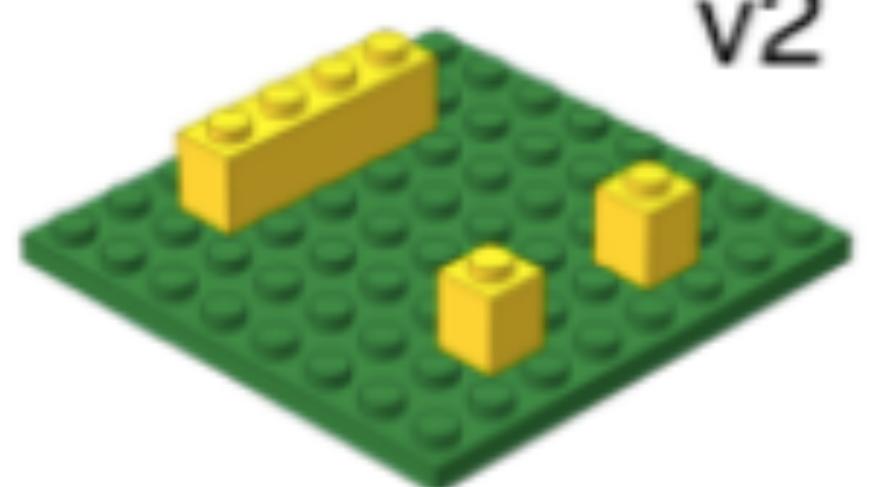


v12

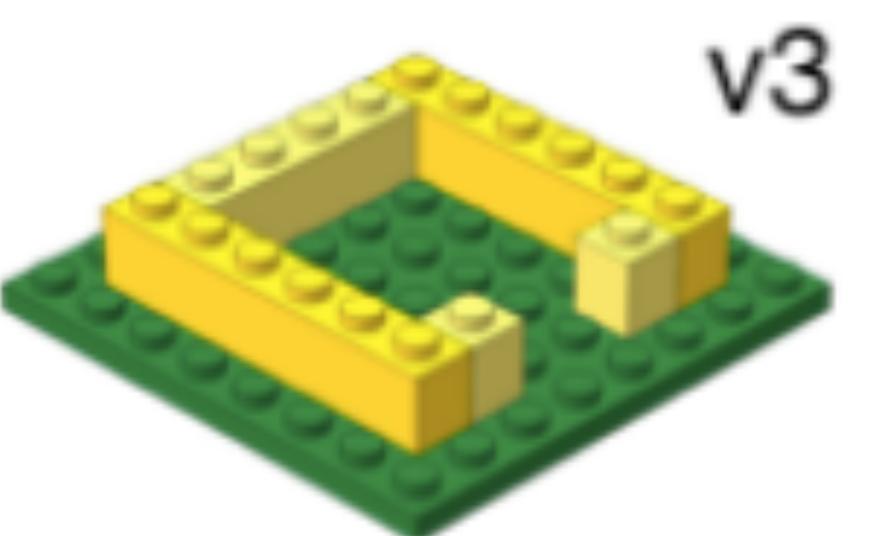
Done!!!



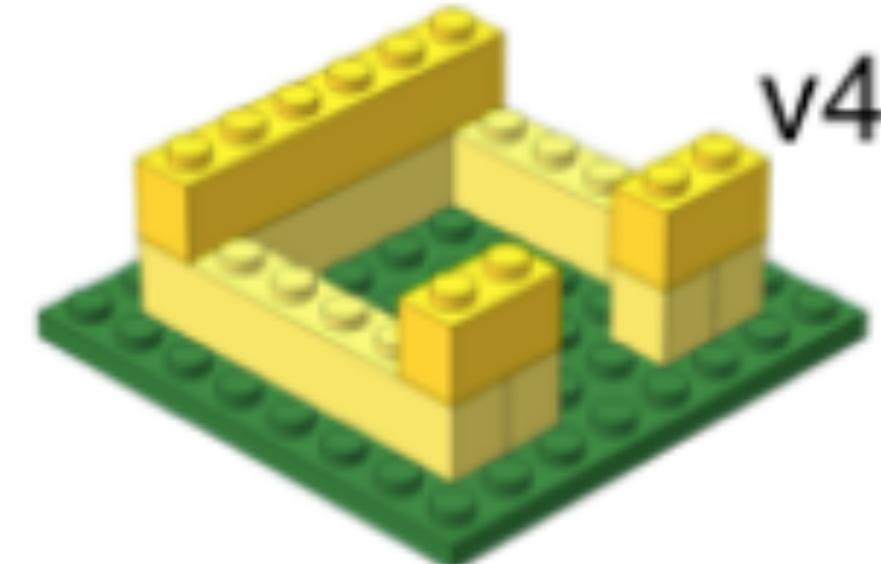
First commit



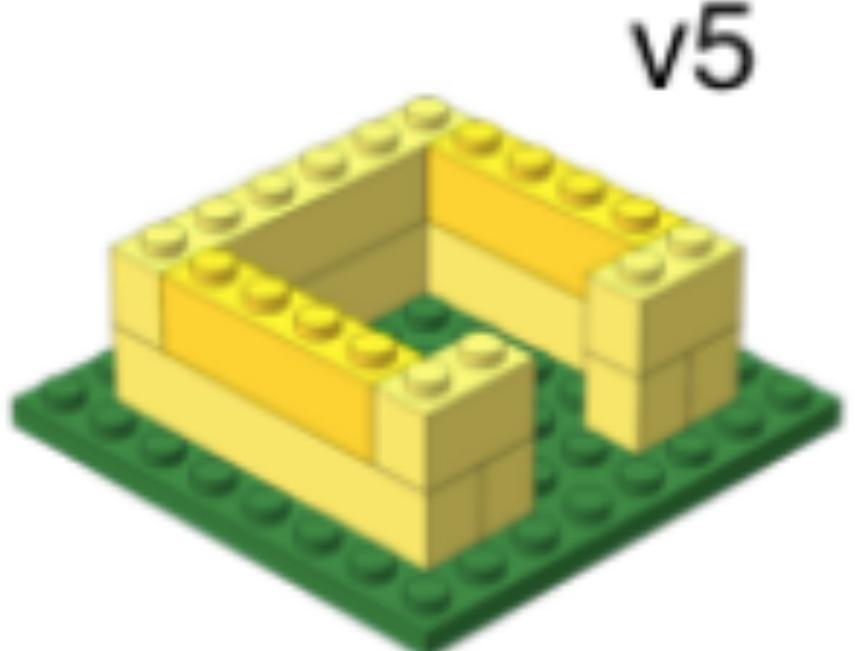
Built back and front of base



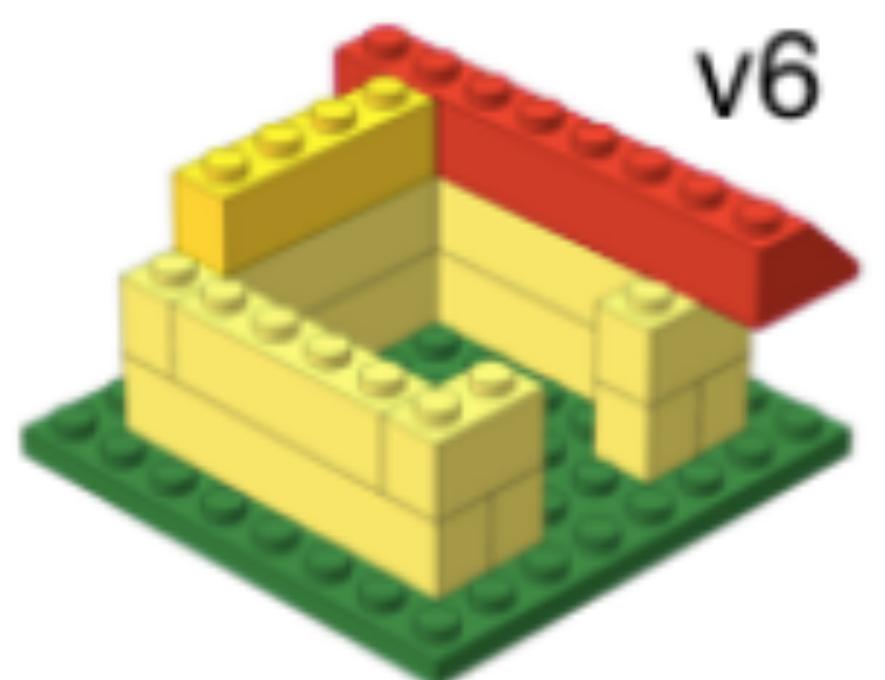
Finished building base



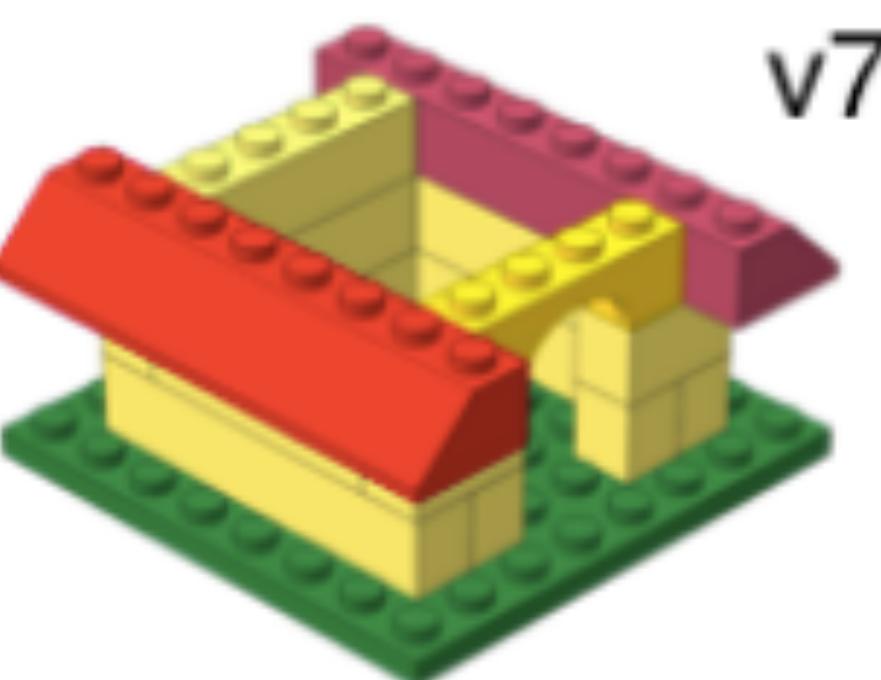
Second floor back and front



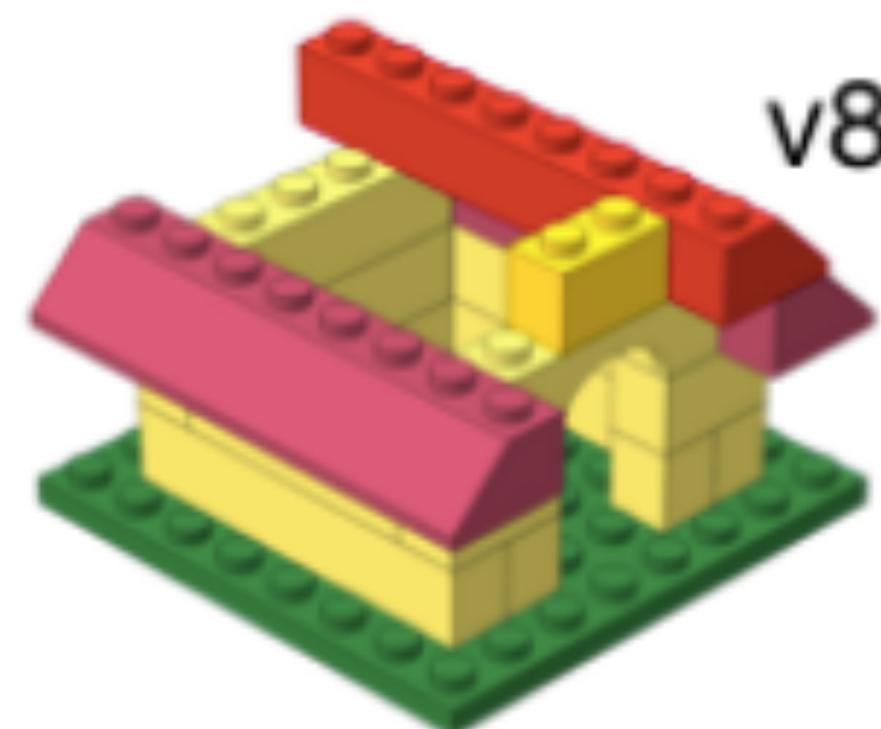
Finished second floor



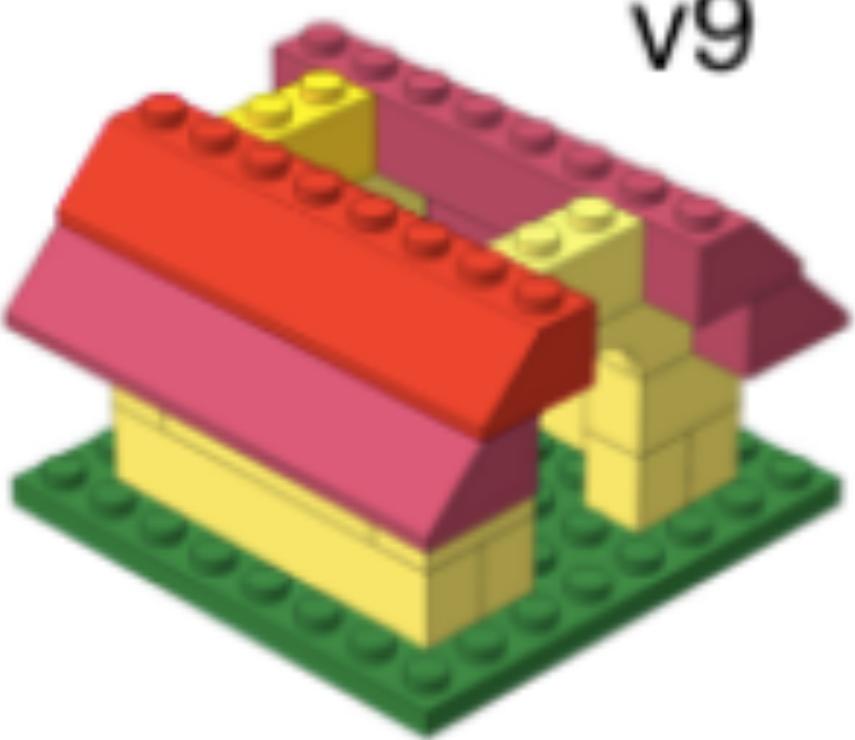
Started on the roof



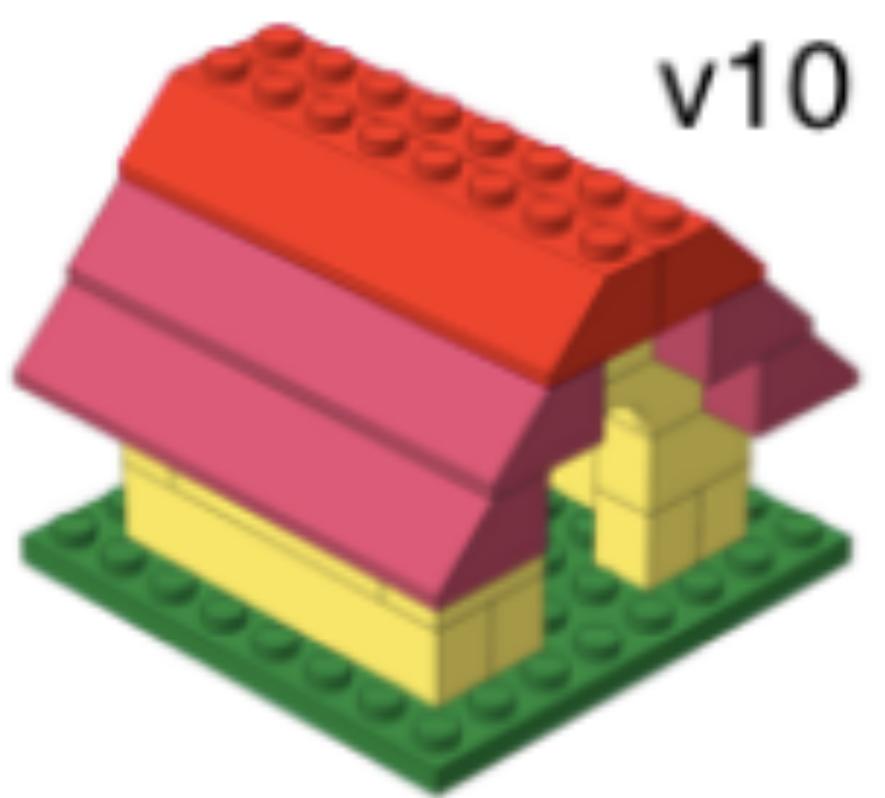
Roofwork and archway



Building up the roof



Starting to close up the roof



All but top of roof built



Still needs final shingles



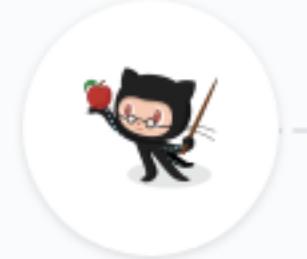
Done!!!

Steps:

1. *Join Github classroom for STAT360*
2. *Make a copy of assignment (fork)*
3. *Make a new project in RStudio Cloud "from git repo"*
4. *Introduce yourself to git*

Authorize application

GitHub, Inc. [US] | https://github.com/login/oauth/authorize?client_id=64a051cf1598b9f0658f&redirect_uri=https%3A%2F%2Fcl...



Authorize GitHub Classroom

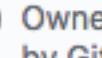
 GitHub Classroom by [github](#)
wants to access your amelia-student account

 Personal user data
Email addresses (read-only)

 Repositories

[Authorize github](#)

Authorizing will redirect to
<https://classroom.github.com>

 Owned & operated
by GitHub

 Created
4 years ago

 More than 1K
GitHub users

[Learn more about OAuth](#)

 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](#)

Your copy (fork)

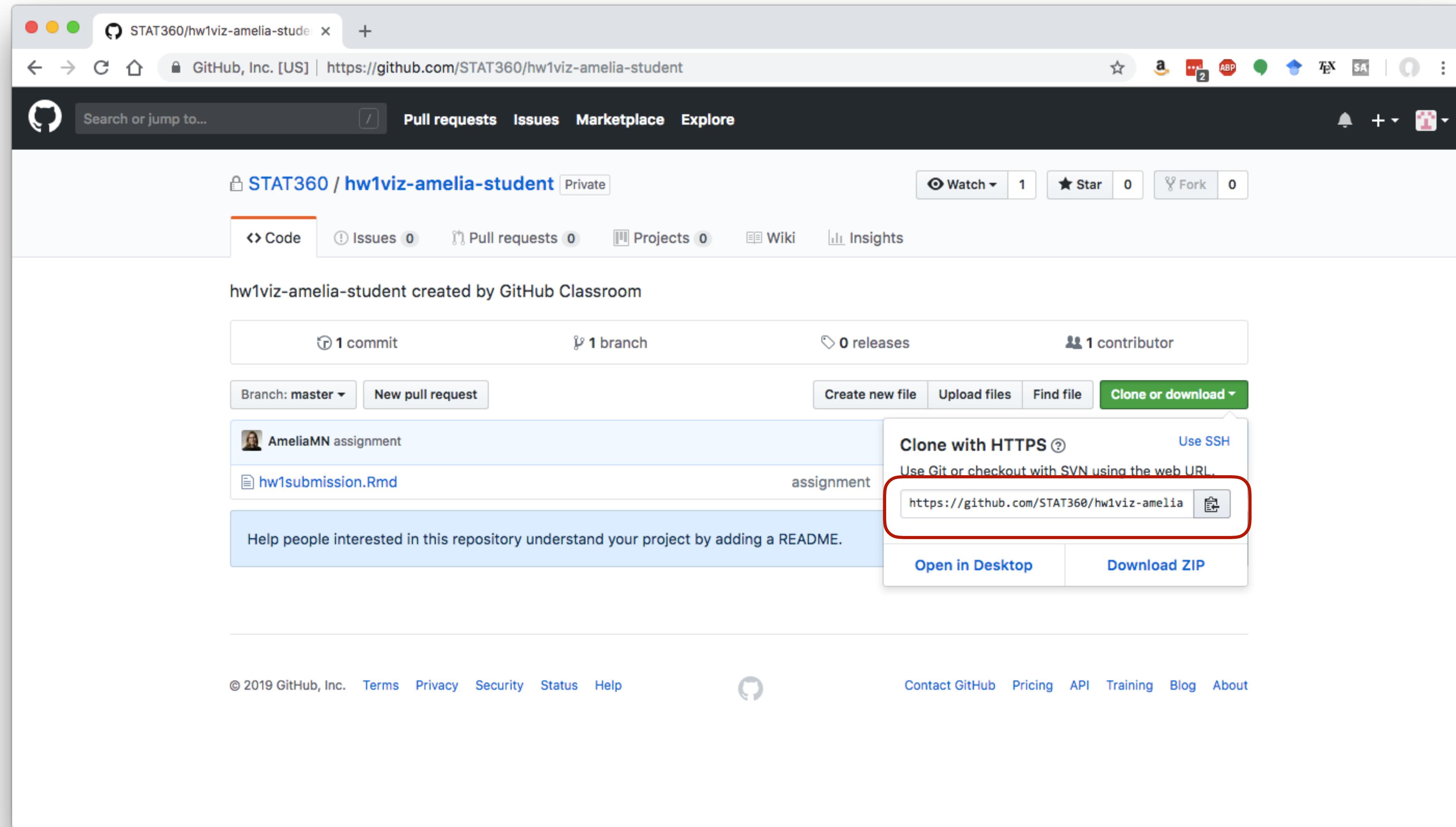
The screenshot shows a GitHub repository page for 'STAT360 / hw1viz-amelia-student'. The repository is private, as indicated by the 'Private' link next to the repository name. A red box highlights the repository name 'STAT360 / hw1viz-amelia-student'. The page includes standard GitHub navigation links: Pull requests, Issues, Marketplace, and Explore. Below the header, there are tabs for Code, Issues (0), Pull requests (0), Projects (0), Wiki, and Insights. The main content area displays the following information:

- hw1viz-amelia-student created by GitHub Classroom
- 1 commit
- 1 branch
- 0 releases
- 1 contributor
- Branch: master
- New pull request
- Create new file
- Upload files
- Find file
- Clone or download
- AmeliaMN assignment (latest commit 2603baa 5 days ago)
- hw1submission.Rmd (assignment, 5 days ago)

A blue bar at the bottom encourages adding a README with the text "Help people interested in this repository understand your project by adding a README." and a "Add a README" button.

At the bottom of the page, there are links for GitHub's terms of service, privacy policy, security information, status, help, contact, pricing, API, training, blog, and about.

Copy this URL



New RStudio Cloud Project from Git Repo

The screenshot shows the RStudio Cloud interface for a project named "STAT 360". The "Projects" tab is selected. On the left, there are two projects listed:

- Hw1_visualization** (Amelia Student): Created Feb 10, 2019 4:08 PM, derived from "Hw1_visualization" by Amelia McNamara. A "CONTINUE" button is visible.
- Untitled Project** (Amelia Student): Created Feb 12, 2019 12:41 PM, locked.

A context menu is open over the first project, with the "New Project from Git Repo" option highlighted by a red box. Other options in the menu include "New Project" and "New Project from Git Repo".

On the right side of the interface, there are several sections:

- Options**: Includes a search bar labeled "Search Projects" and a "List Projects" section with radio buttons for "All", "Shared with everyone", and "Yours".
- Sort Projects**: Includes radio buttons for "By name" and "By date created".

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.

Introduce yourself to git

```
git config --global user.name 'Jane Doe'  
git config --global user.email 'jane@example.com'  
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

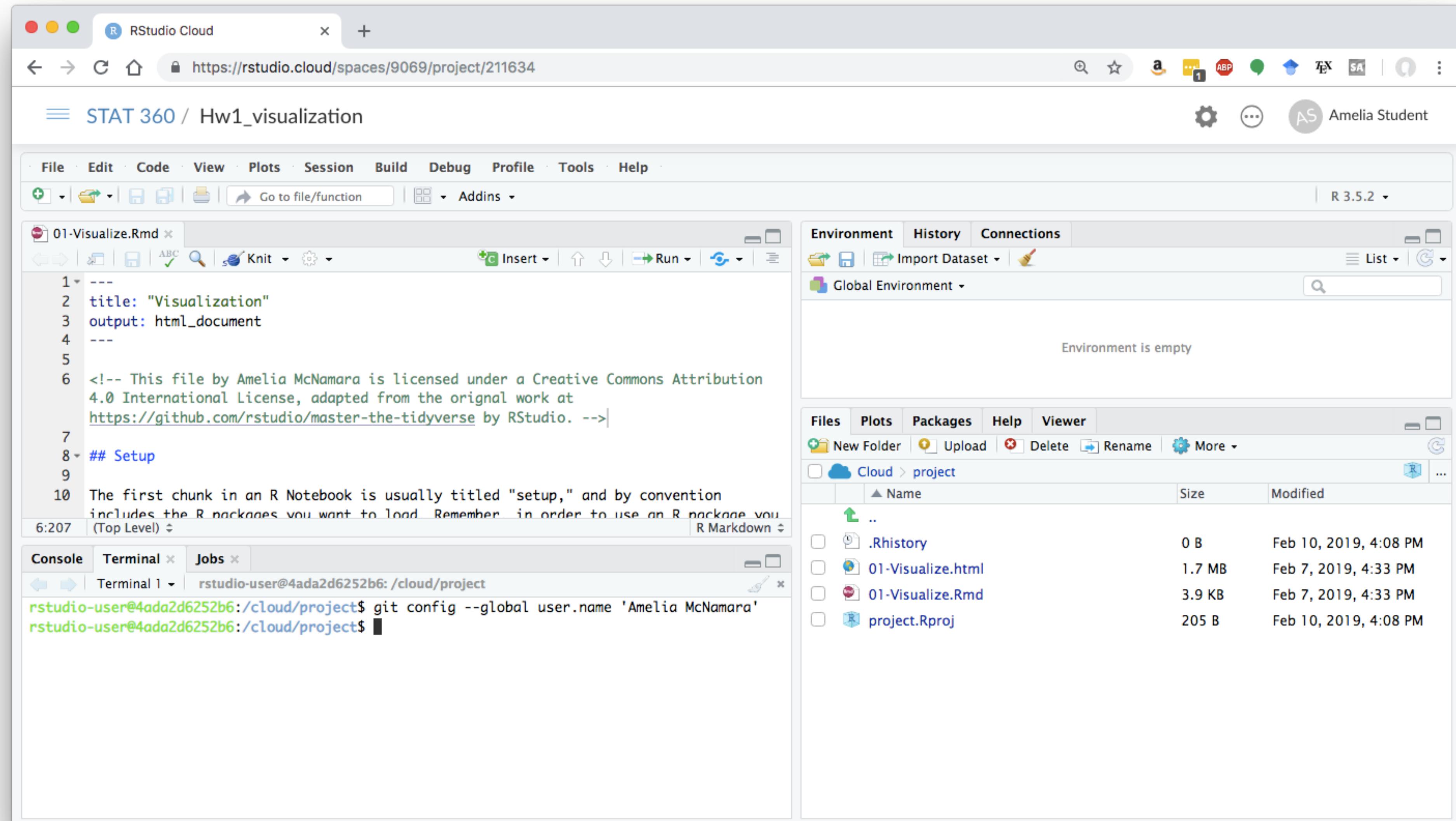
Console Terminal x Jobs x

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

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

```
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2 title: "Visualization"  
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5  
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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'



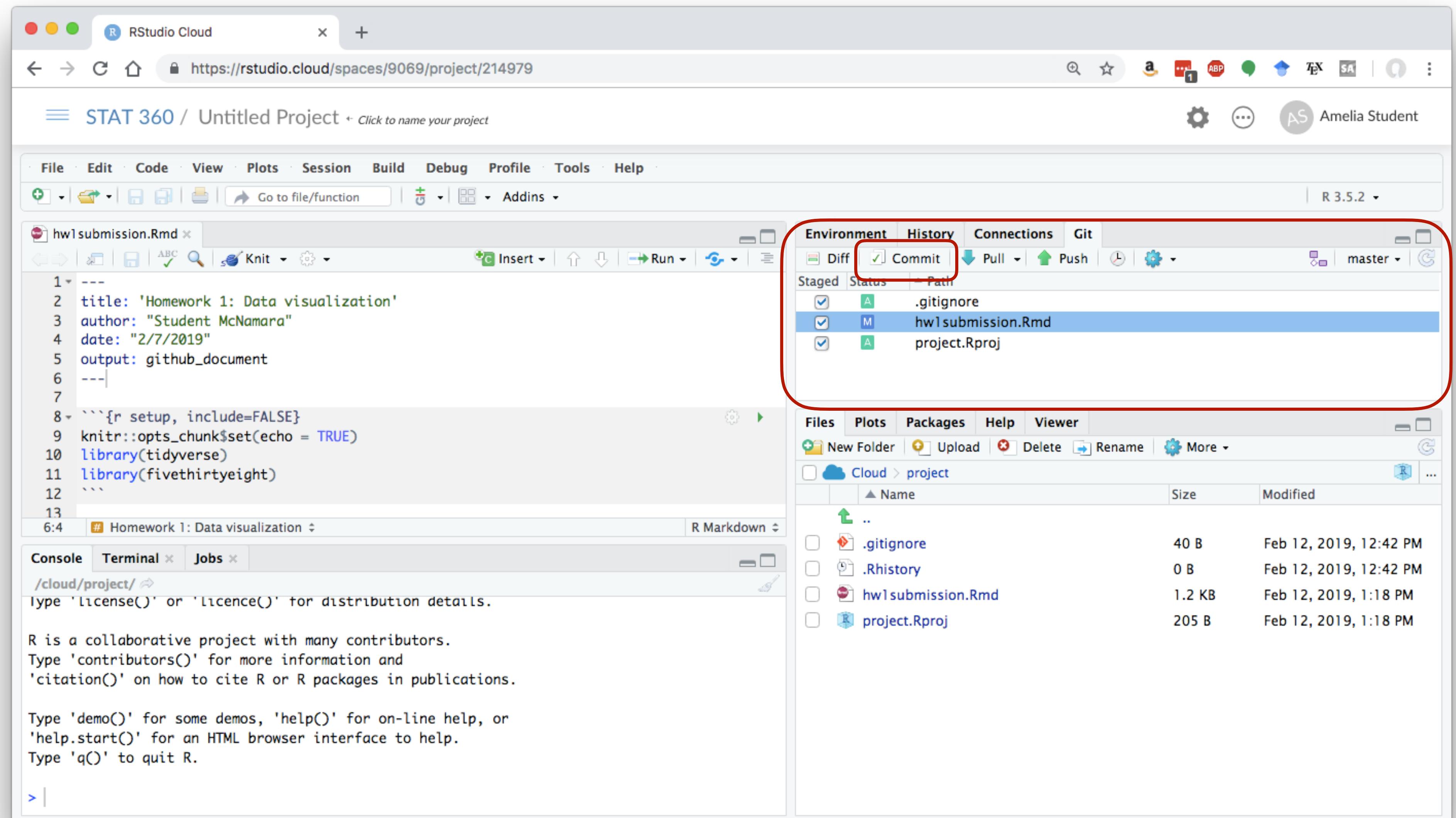
git config --global user.email 'jane@example.com'

The screenshot shows the RStudio Cloud interface with a project titled "STAT 360 / Hw1_visualization". The main area displays an R Markdown file named "01-Visualize.Rmd". The code in the file includes a header for a visualization, a license notice, and a setup chunk. In the terminal pane, the user runs two commands to set their global Git configuration:

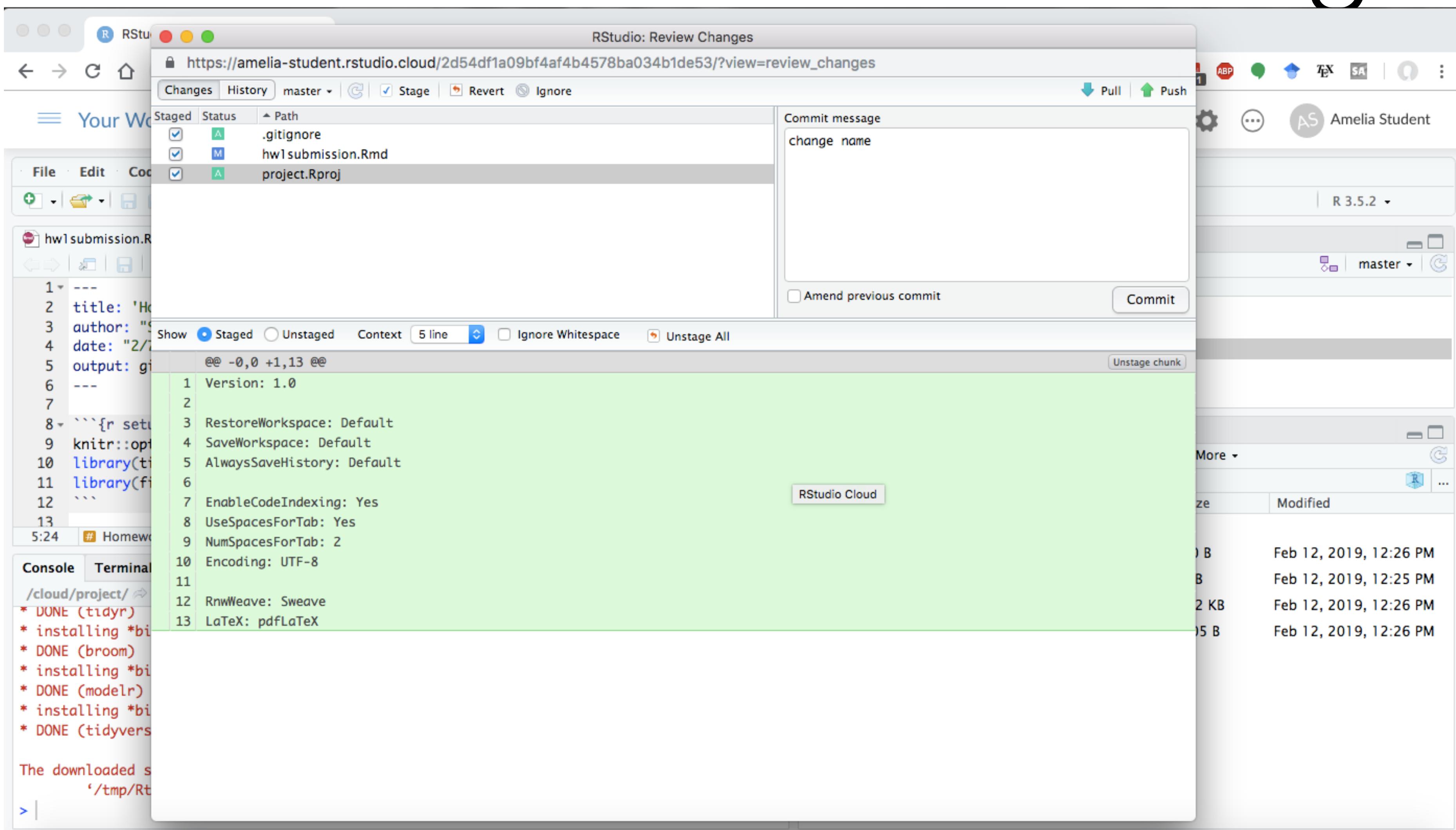
```
rstudio-user@4ada2d6252b6:/cloud/project$ git config --global user.name 'Amelia McNamara'  
rstudio-user@4ada2d6252b6:/cloud/project$ git config --global user.email 'amelia.mcnamara@stthomas.edu'  
rstudio-user@4ada2d6252b6:/cloud/project$
```

The RStudio interface also shows the Global Environment (empty), the Cloud project files (including .Rhistory, 01-Visualize.html, 01-Visualize.Rmd, and project.Rproj), and the R version R 3.5.2.

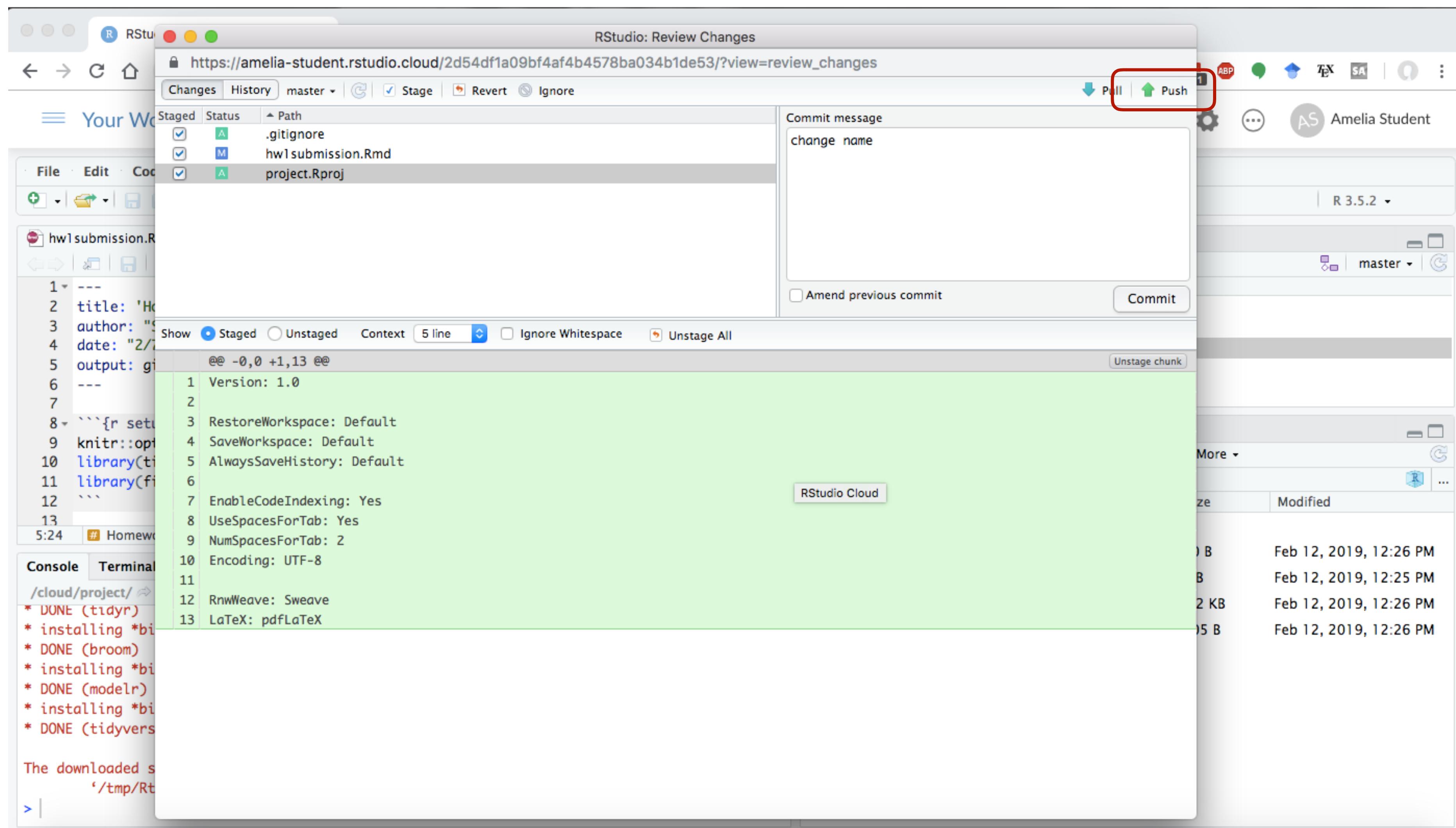
make a change and commit



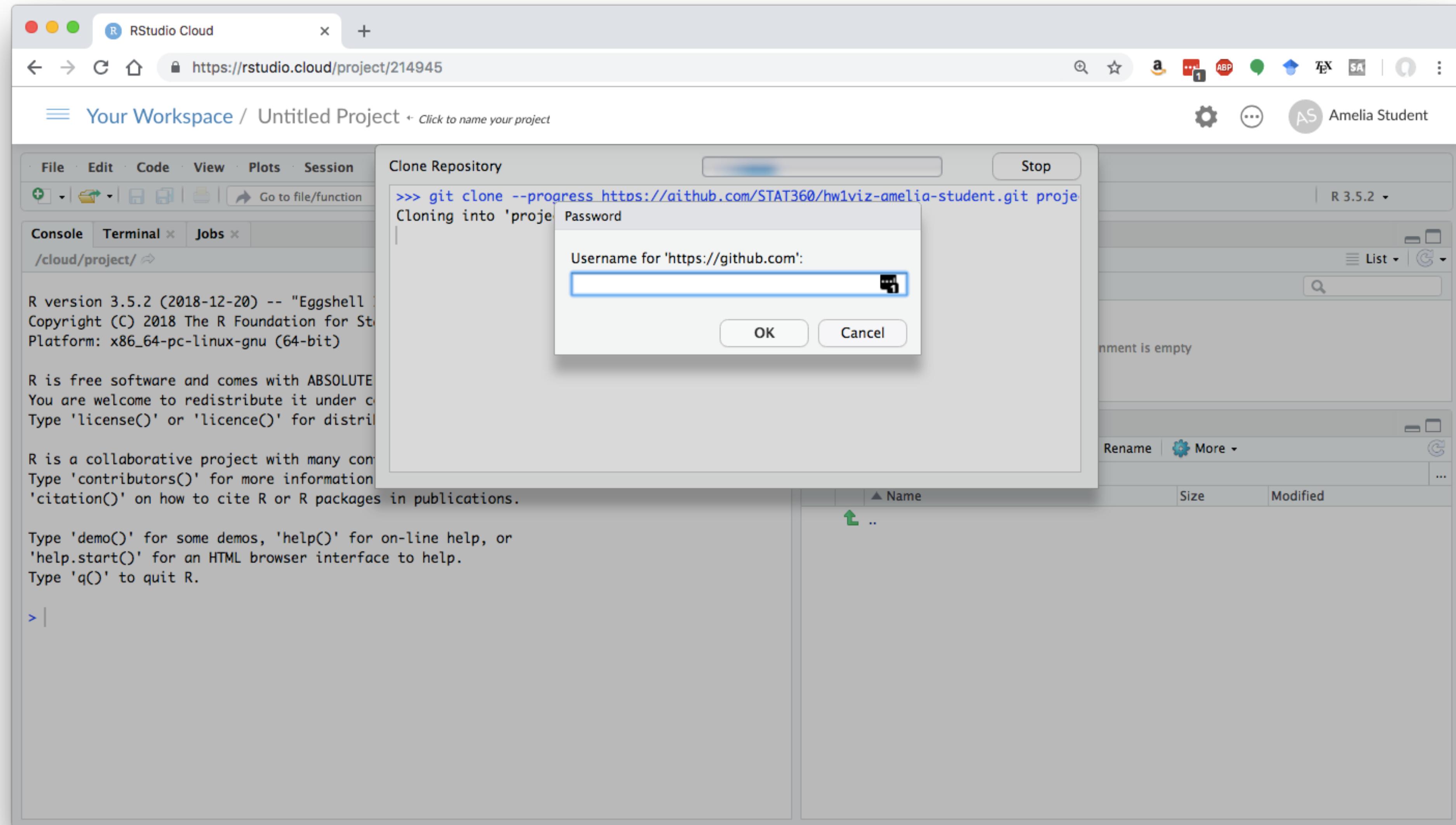
Commit— write a message



Push



Github credentials



Go check online