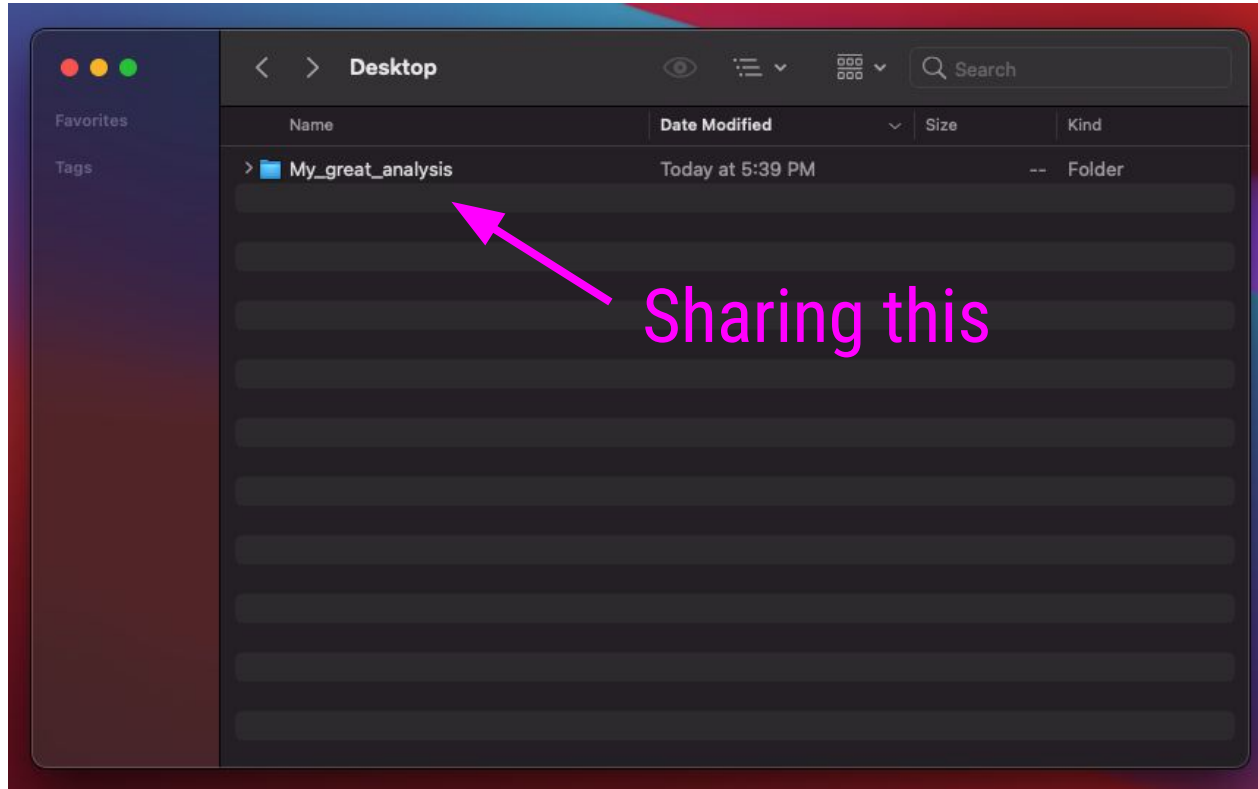
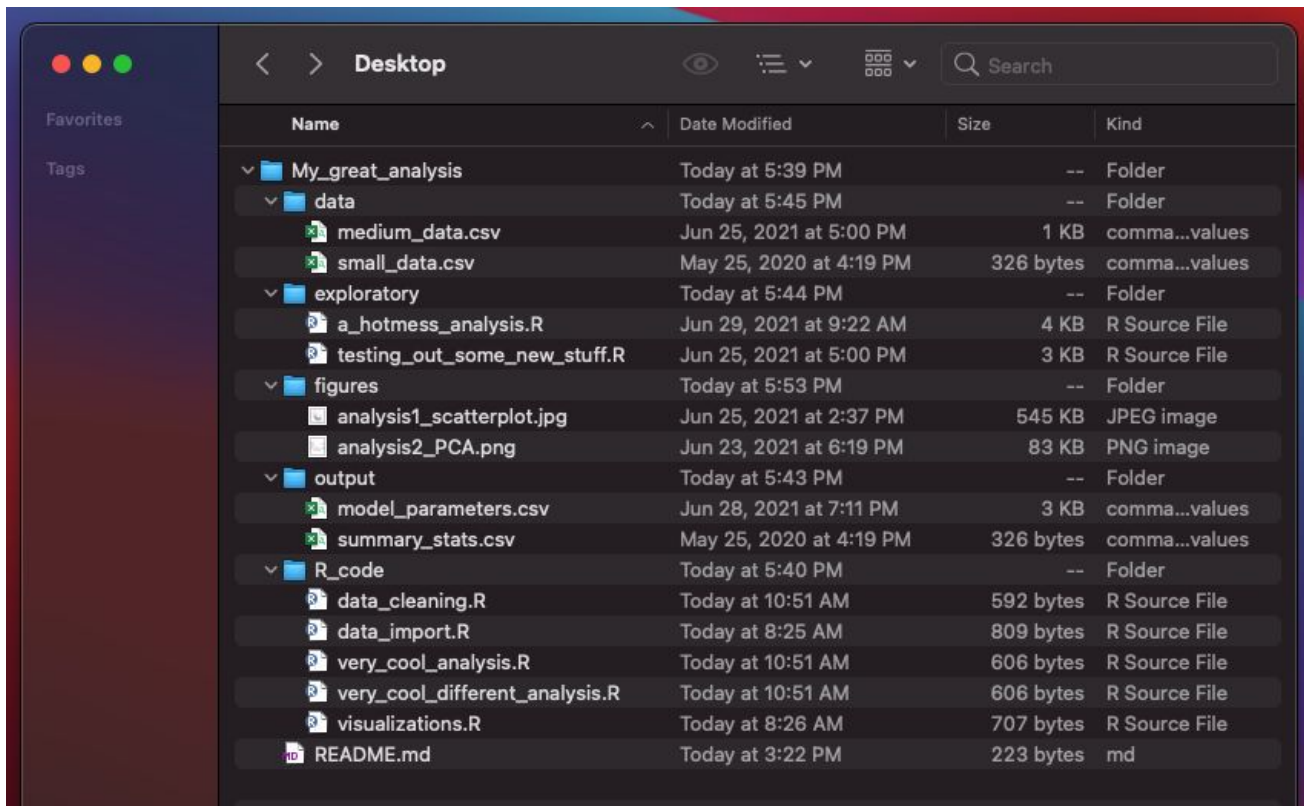


Version control with GitHub

What is the goal of making code?

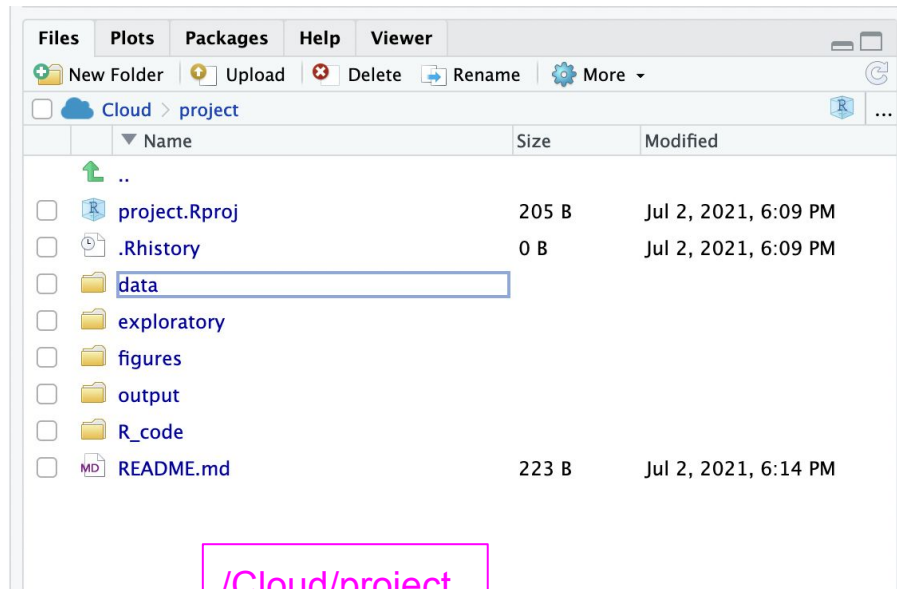
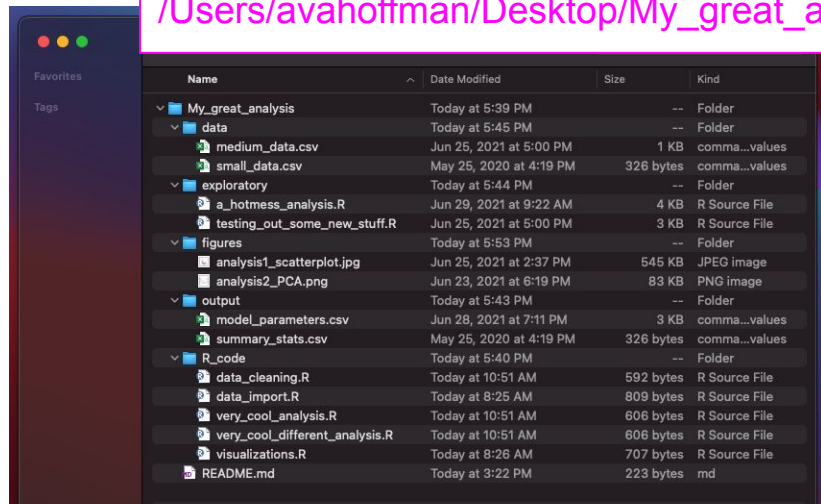


What is the goal of making code?



But first.. Where are we?

/Users/avahoffman/Desktop/My_great_analysis



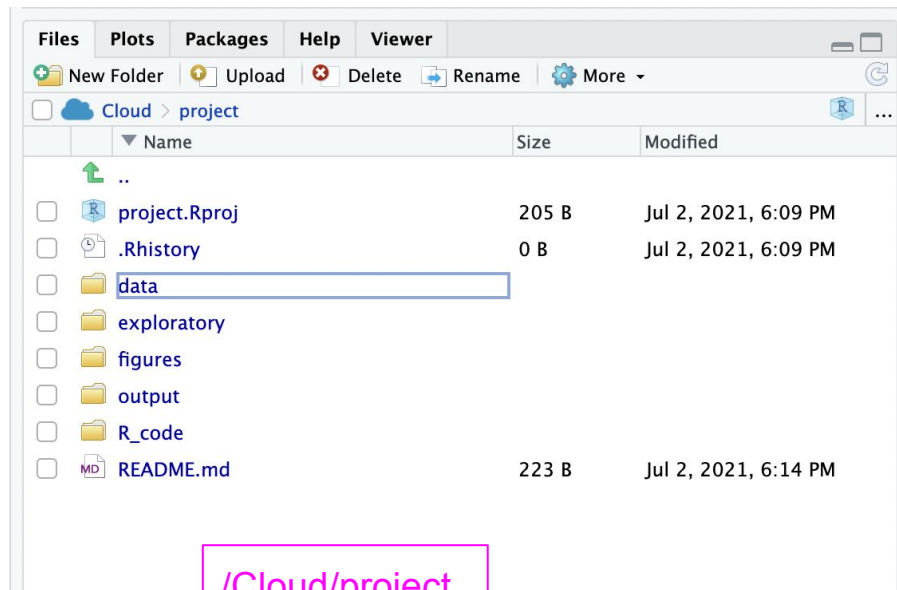
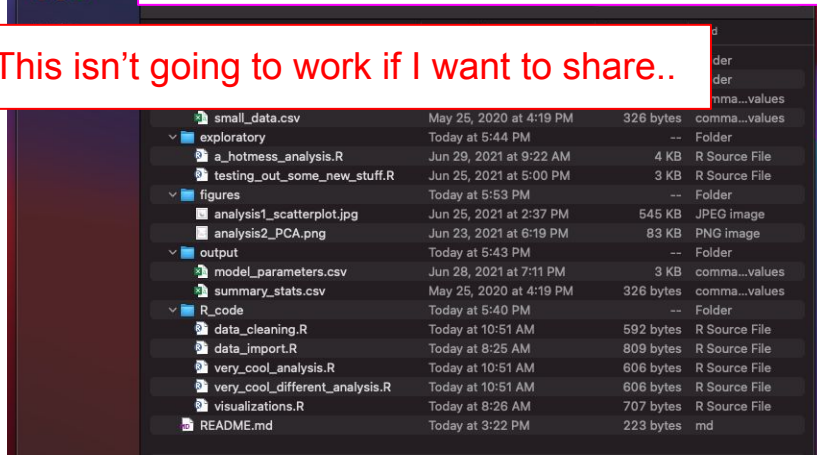
Absolute path Starts at
the root directory: /

/Cloud/project

But first.. Where are we?

/Users/avahoffman/Desktop/My_great_analysis

This isn't going to work if I want to share..

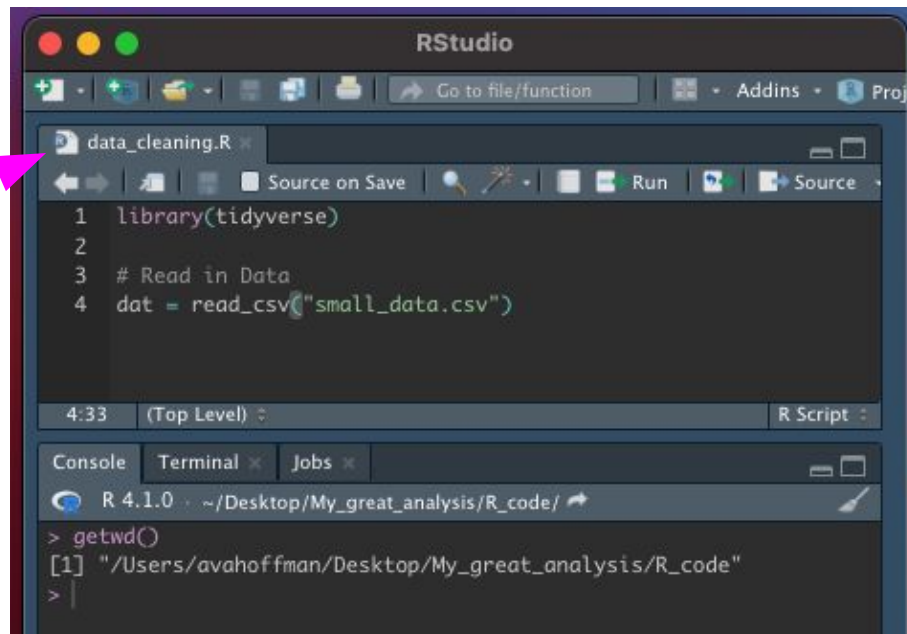
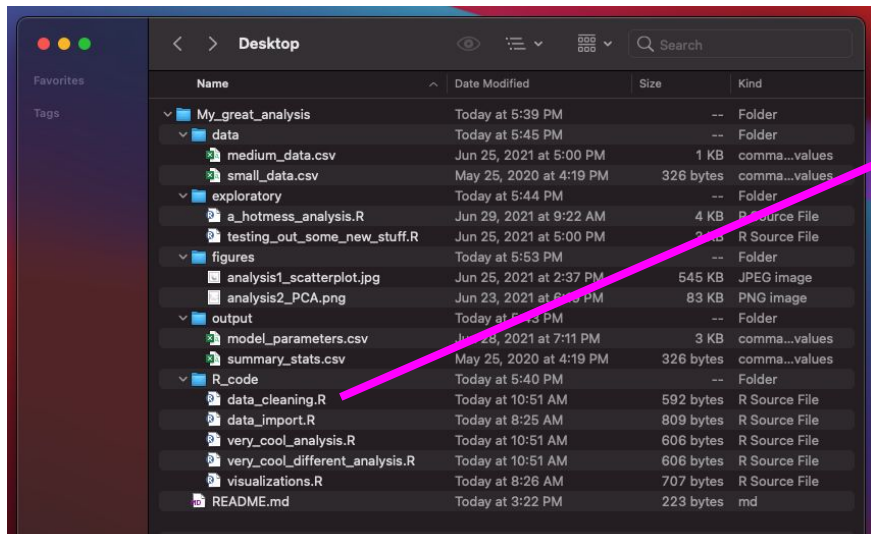


Absolute path Starts at
the root directory: /

/Cloud/project

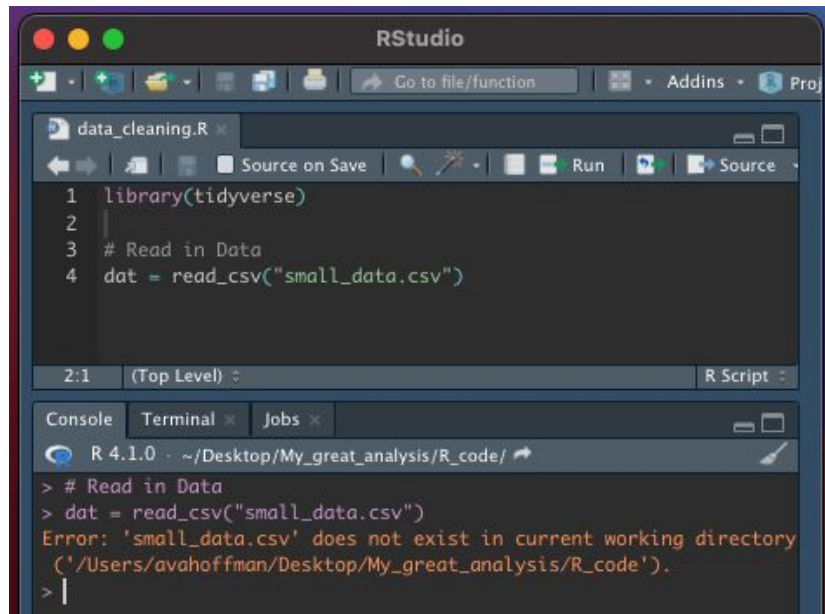
Enter the *relative* path!

Launch “data_cleaning.R”



R looks in /Users/avahoffman/Desktop/My_great_analysis/R_code

Enter the *relative* path!



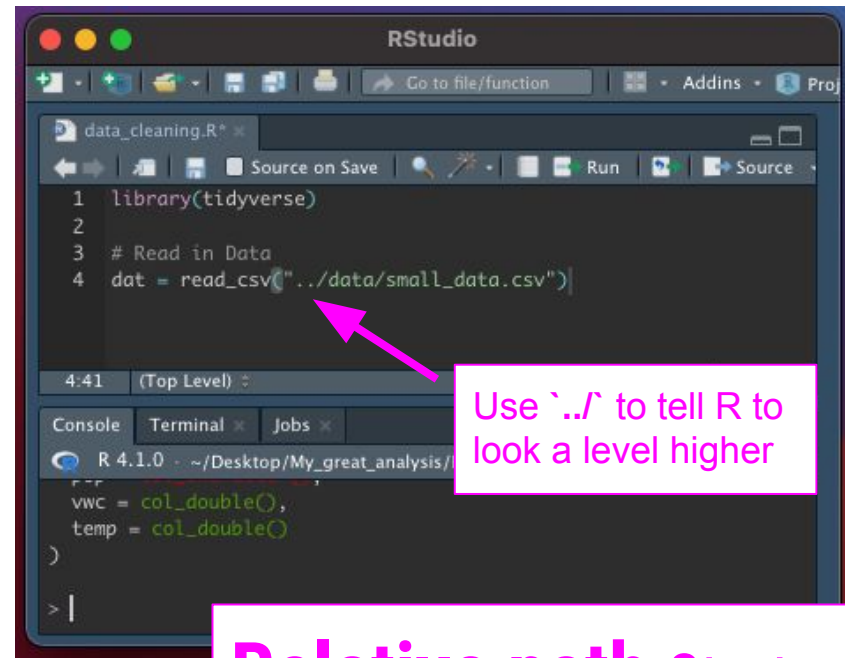
A screenshot of the RStudio interface. The script editor shows a file named 'data_cleaning.R' with the following code:

```
1 library(tidyverse)
2
3 # Read in Data
4 dat = read_csv("small_data.csv")
```

The console at the bottom shows the execution of the code and an error message:

```
> # Read in Data
> dat = read_csv("small_data.csv")
Error: 'small_data.csv' does not exist in current working directory
('/Users/avahoffman/Desktop/My_great_analysis/R_code').
> |
```

The data isn't in
/Users/avahoffman/Desktop/My_great_analysis/R_code !



A screenshot of the RStudio interface showing the same script editor with the corrected code:

```
1 library(tidyverse)
2
3 # Read in Data
4 dat = read_csv("../data/small_data.csv")
```

The console shows the execution of the code and the start of a new script:

```
R 4.1.0 - ~/Desktop/My_great_analysis/
vwc = col_double(),
temp = col_double()
)
> |
```

A pink arrow points from a text box to the relative path in the code.

Use `../` to tell R to
look a level higher

Relative path Starts
relative to another file

Enter the *relative* path + .Rproj

The screenshot shows the RStudio IDE interface. The script editor on the left contains the following code:

```
1 library(tidyverse)
2
3 # Read in Data
4 dat = read_csv("/data/small_data.csv")
5
6
```

The console at the bottom shows the R prompt and the current working directory: `R 4.0.3 · /cloud/project/`.

On the right, the 'Files' pane shows the project structure:

- ..
- .Rhistory (0 B)
- data
- exploratory
- figures
- output
- project.Rproj (205 B, Jul 2, 2021, 6:00)
- R_code
- README.md

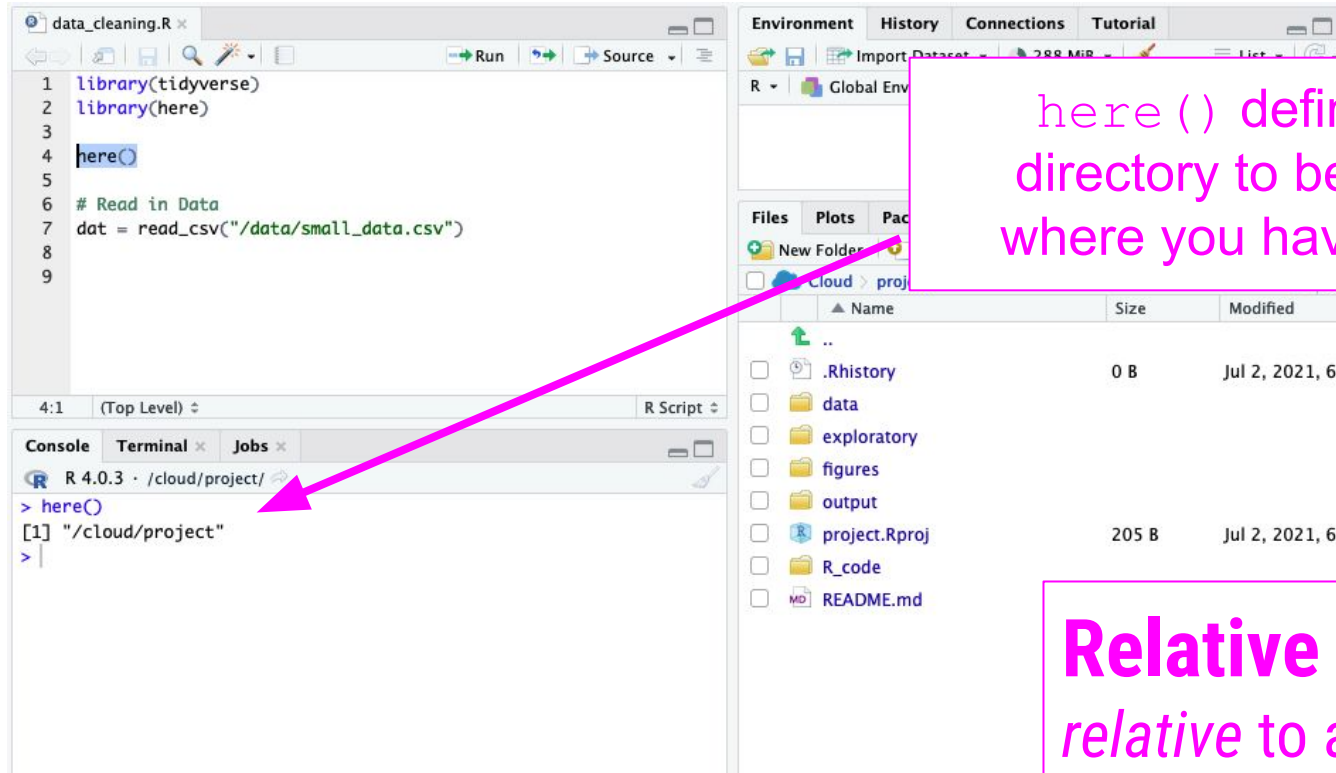
A pink arrow points from the `project.Rproj` file in the file explorer to the `project` folder in the file explorer.

When a project is open, R knows to look relative to the **.Rproj** file

Click **File > New Project...** on your local machine if you need one

Relative path Starts *relative* to another file

Enter the *relative* path + .Rproj



The screenshot displays the RStudio environment. The script editor on the left contains the following code:

```
1 library(tidyverse)
2 library(here)
3
4 here()
5
6 # Read in Data
7 dat = read_csv("/data/small_data.csv")
8
9
```

The console at the bottom shows the execution of `here()`:

```
> here()
[1] "/cloud/project"
```

The file explorer on the right shows the project structure:

	Name	Size	Modified
	..		
	.Rhistory	0 B	Jul 2, 2021, 6:
	data		
	exploratory		
	figures		
	output		
	project.Rproj	205 B	Jul 2, 2021, 6:
	R_code		
	README.md		

A pink arrow points from the `here()` function call in the console to the `here()` function call in the script editor.

here () defines your base directory to be the directory where you have a .Rproj file

Relative path Starts *relative* to another file

Enter the *relative* path + .Rproj

The screenshot displays the RStudio environment with three main panels. The top-left panel shows a script named 'data_cleaning.R' with the following code:

```
1 library(tidyverse)
2 library(here)
3
4 small_dat_path = here("data", "small_data.csv")
5
6 # Read in Data
7 dat = read_csv(small_dat_path)
8
9
```

The bottom-left panel shows the R console output:

```
R 4.0.3 · /cloud/project/
> small_dat_path = here("data", "small_data.csv")
> small_dat_path
[1] "/cloud/project/data/small_data.csv"
>
```

The right panel shows the 'Files' pane with a directory structure:

- Cloud > project > data
 - ..
 - medium_data.csv (1.2 KB, Jul 2, 2021, 6:)
 - small_data.csv (326 B, Jul 2, 2021, 6:)

Two pink arrows highlight the relationship between the code and the file system. One arrow points from the `here("data", "small_data.csv")` line in the script to the `small_dat_path` variable in the console. The other arrow points from the same line in the script to the `small_data.csv` file in the 'Files' pane.

here () can then be used to create absolute paths to files

Relative path Starts *relative* to another file

Absolute path

MAPQUEST.

Your house → Dinner → Movie Theater

- Very specific and helpful but only to **YOU**
- What happens if you move??



.Rproj + here()

Relative path

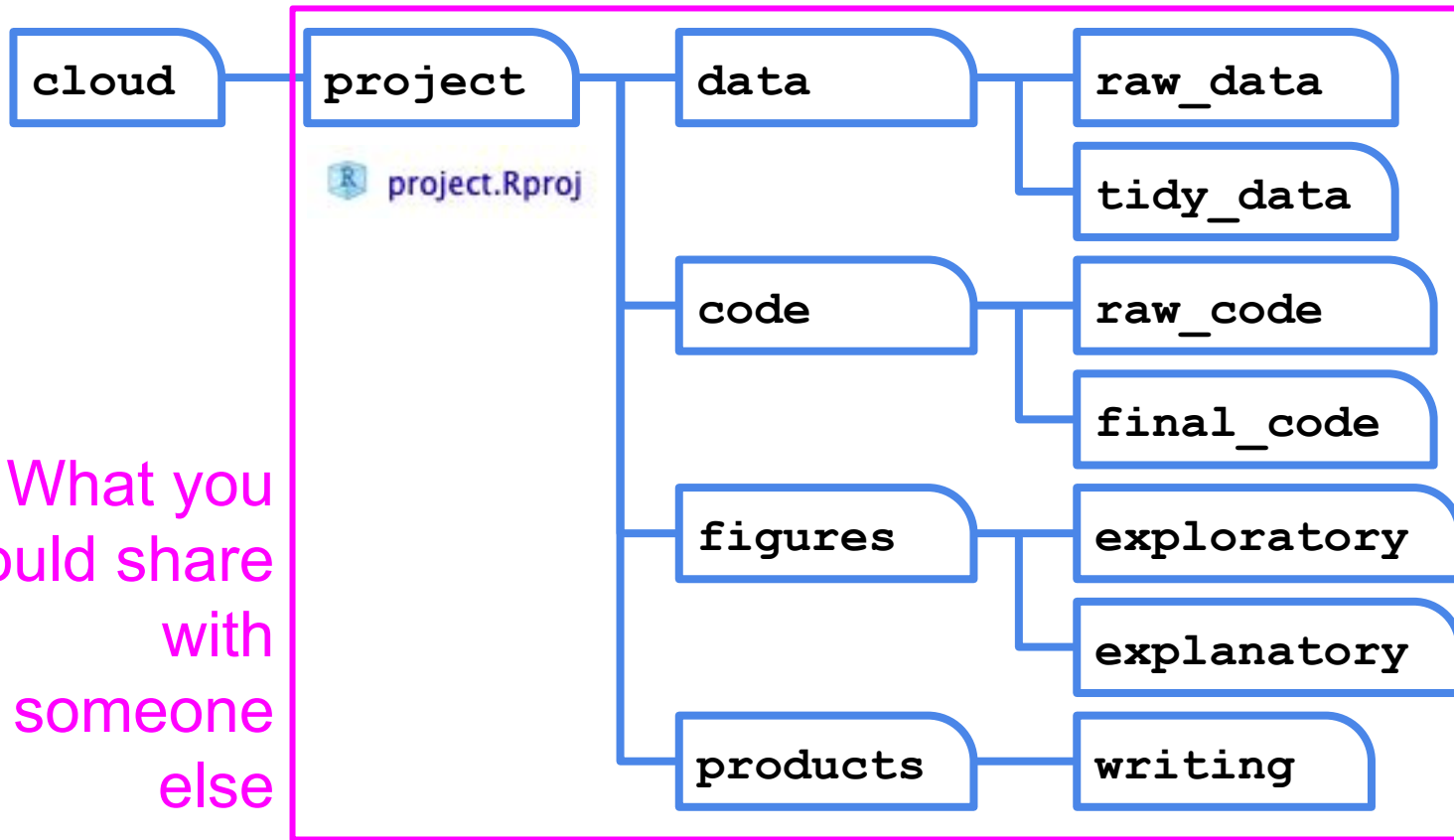
Dinner → Movie Theater

- Useful to many people
- But you need to know where you're starting

Your GPS!

- Navigate from your current location

What you
would share
with
someone
else



All paths in your code should be relative to `/cloud/project`

So how do you efficiently share projects or folders structured like this with other people?

GitHub!

Unfortunate truth

<https://twitter.com/mtrc/status/617075570761965568>



Michael Cook

@mtrc

 **Follow**

"Version control is a truly vital concept that has unfortunately been implemented by madmen." Amen.

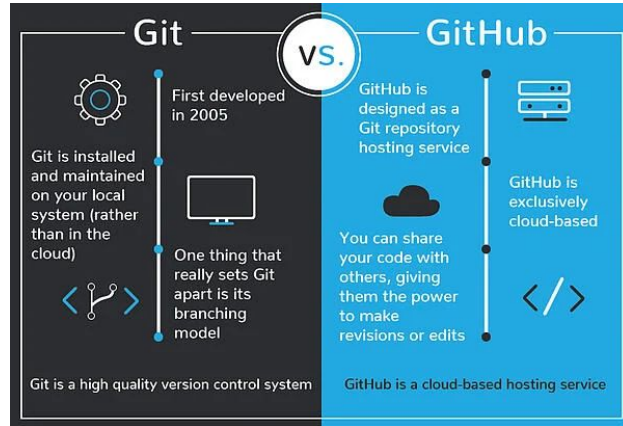
[twitter.com/Pentadact/stat...](https://twitter.com/Pentadact/status/617075570761965568)

5:00 PM - 3 Jul 2015

  9  11

Git commands have convenience
in mind, not intuition

What's the difference between Git and GitHub?



In Simple Terms

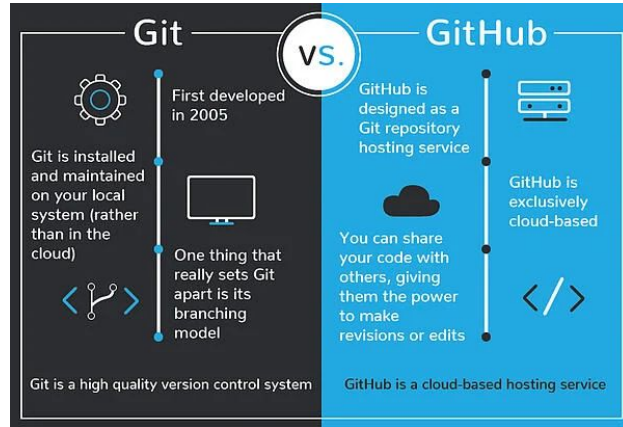
Git

is a version control system that lets you manage and keep track of your source code history

Git
Hub

is a cloud-based hosting service that lets you manage Git repositories

What's the difference between Git and GitHub?



In Simple Terms

Git

is a version control system that lets you manage and keep track of your source code history

Git
Hub

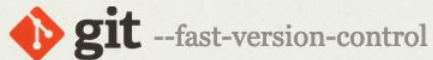
is a cloud-based hosting service that lets you manage Git repositories

Git

→ Your entire work history

GitHub

→ LinkedIn®



Git is a **free and open source** distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

Git is **easy to learn** and has a **tiny footprint with lightning fast performance**. It outclasses SCM tools like Subversion, CVS, Perforce, and ClearCase with features like **cheap local branching**, convenient **staging areas**, and **multiple workflows**.



About

The advantages of Git compared to other source control systems.



Documentation

Command reference pages, Pro Git book content, videos and other material.



Downloads

GUI clients and binary releases for all major platforms.



Community

Get involved! Bug reporting, mailing list, chat, development and more.



Pro Git by Scott Chacon and Ben Straub is available to **read online for free**. Dead tree versions are available on [Amazon.com](#).



Mac GUIs



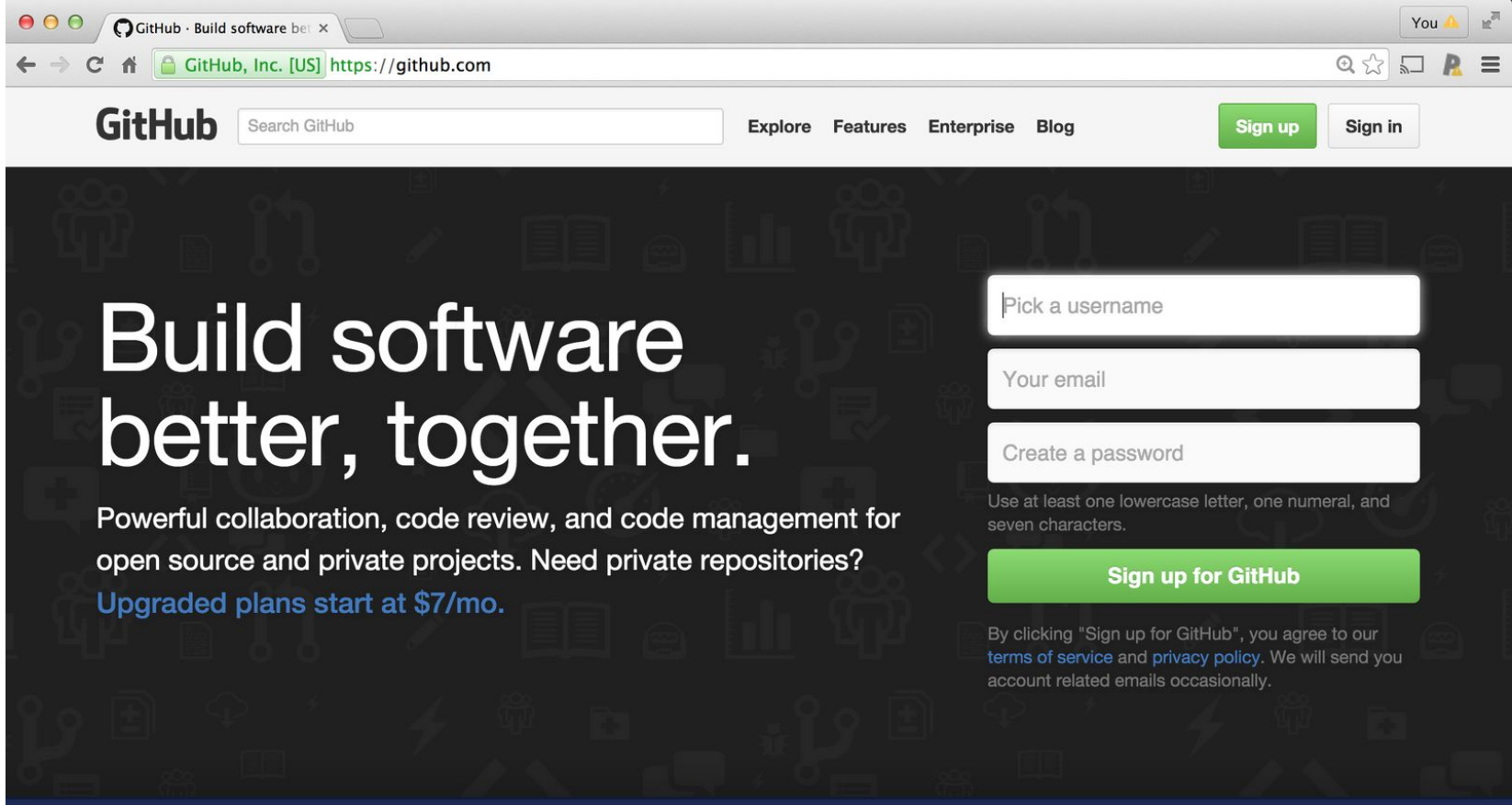
Tarballs



Windows Build



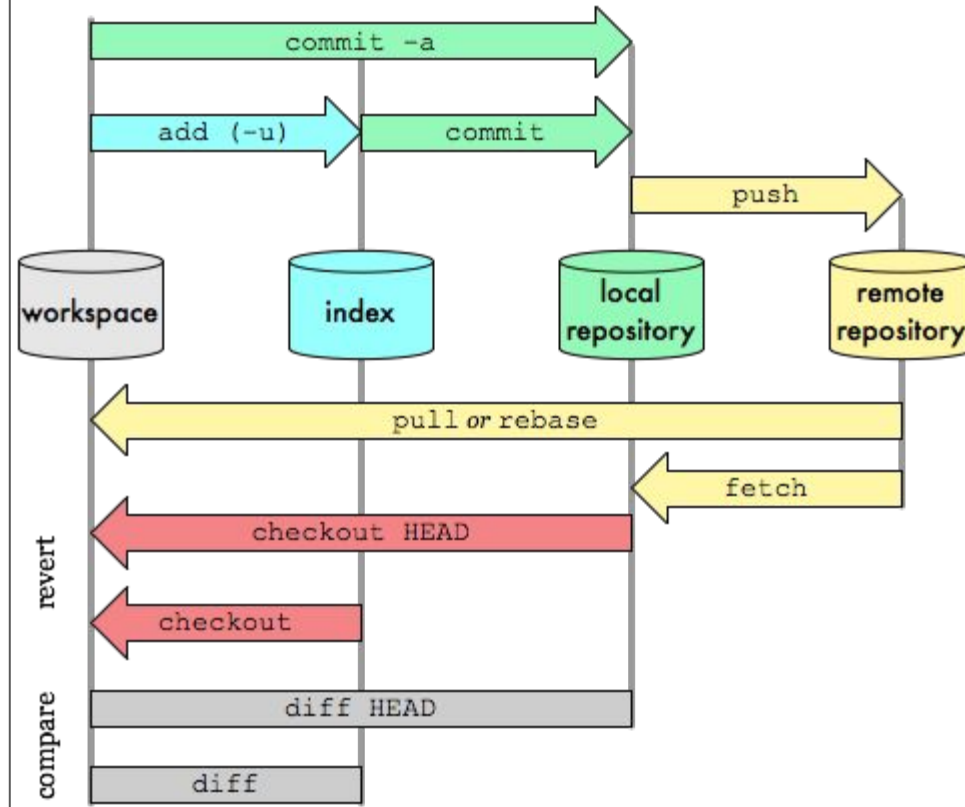
Source Code



<https://github.com/>

Git Data Transport Commands

<http://osteele.com>



<http://gitready.com/beginner/2009/01/21/pushing-and-pulling.html>

Basic use

- ▶ Change some files
- ▶ See what you've changed

```
git status  
git diff  
git log
```

- ▶ Indicate what changes to save

```
git add
```

- ▶ Commit to those changes

```
git commit
```

- ▶ Push the changes to GitHub

```
git push
```

- ▶ Pull changes from your collaborator

```
git pull
```

It's like a shared Dropbox folder that you have to sync yourself, on each of your computers, in specific orders

Why not just use Dropbox?

A screenshot of a web browser displaying the commit history of a GitHub repository. The browser's address bar shows the URL `https://github.com/jtleek/jtleek.github.io/commits/master?page=2`. The repository name in the browser tab is `Commits · jtleek/jtleek.github.io`. The commit history is organized by date, with sections for May 8, 2015, May 4, 2015, May 1, 2015, and April 30, 2015. Each commit entry includes a profile picture, a commit message, the committer's name, the date, a file icon, a commit hash, and a diff icon. Three pink arrows are drawn on the image: one points to the commit message "Fix typo on papers.md" by hammer, another points to the commit message "region report paper" by jtleek, and a third points to the commit hash "83d1130".

Commits · jtleek/jtleek.github.io

← → ↻ ⌂ **GitHub, Inc. [US]** `https://github.com/jtleek/jtleek.github.io/commits/master?page=2` ☆ 📶 P

Apps Inbox Simply Statistics simplystats Google Scholar Google Music datastyle Biostat-spreadsheet

jtleek committed on May 8, 2015

updated papers with rail
jtleek committed on May 8, 2015

Commits on May 4, 2015

Merge pull request #14 from hammer/patch-1 ...
jtleek committed on May 4, 2015

Fix typo on papers.md ←
hammer committed on May 4, 2015

Commits on May 1, 2015

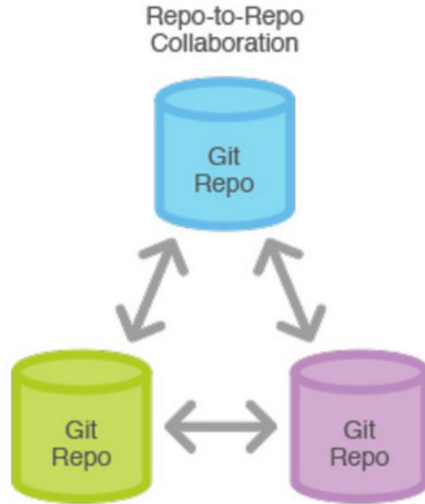
region report paper
jtleek committed on May 1, 2015

Commits on Apr 30, 2015

added boosting lecture
jtleek committed on Apr 30, 2015

polyester paper
jtleek committed on Apr 30, 2015

possible, in theory



more typical

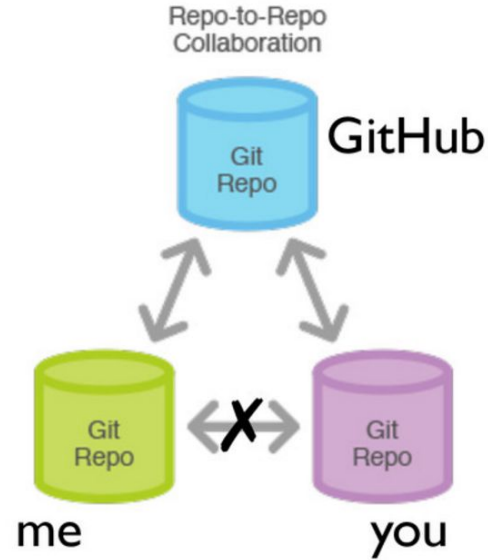







Image from <https://www.atlassian.com/git/tutorial/git-basics#clone>



[Pull requests](#)
[Issues](#)
[Marketplace](#)
[Explore](#)







[SISBID / Data-Wrangling](#)

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13
[Star](#)
51
[Fork](#)
76

[Code](#)
[Issues](#)
[Pull requests](#)
[Actions](#)
[Projects](#)
[Wiki](#)
[Security](#)
[Insights](#)

gh-pages
11 branches
1 tag
Go to file
Add file
Code


carriewright11 Merge pull request #35 from SISBI...

✓ faef211
 5 hours ago
 338 commits

data	all pdfs may be created	12 months ago
labs	Merge pull request #36 from SISBID/data_cleaning	5 hours ago
lecture_notes	Merge pull request #36 from SISBID/data_cleaning	5 hours ago
.gitignore	addeed token	12 months ago
.nojekyll	updated license, added webpage	6 years ago
Google_Doc_Syll.url	updating data io lab	12 months ago
LICENSE	updated license, added webpage	6 years ago
Module1.Rproj	smaller repo	12 months ago
README.md	Update README.md	9 days ago
all_the_packages.txt	all the packages added	12 months ago
download_pdfs.R	updated index and the pdfs	12 months ago
index.Rmd	fixing links for subsetting lab from 2 to 1	2 days ago
index.html	fixing links for subsetting lab from 2 to 1	2 days ago
list_all_packages.R	all the packages added	12 months ago

About

Teaching material for Summer Institute in Statistics for Big Data Module 1.

[Readme](#)

[View license](#)


Releases 1

2019 Final SISBID ... Latest
on Jun 30, 2020


Packages

No packages published
[Publish your first package](#)




Contributors 8




<https://github.com/SISBID/Data-Wrangling>



[Pull requests](#) [Issues](#) [Marketplace](#) [Explore](#)


  

 **SISBID / Data-Wrangling**


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[Code](#) [Issues](#) [Pull requests](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#) [...](#)

[gh-pages](#) [11 branches](#) [1 tag](#) [Go to file](#) [Add file](#) [Code](#)









 **carriewright11** Merge pull request #35 from SISBI... [...](#) ✓ faef211 5 hours ago **338 commits**

data	all pdfs may be created	12 months ago
labs	Merge pull request #36 from SISBID/data_cleaning	5 hours ago
lecture_notes	Merge pull request #36 from SISBID/data_cleaning	5 hours ago
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on Jun 30, 2020

Packages
No packages published
[Publish your first package](#)

Contributors [8](#)
    
  

<https://github.com/SISBID/Data-Wrangling>



Jenny Bryan

@JennyBryan



Following

I have my own ideas about what makes a good commit message.



`.travis.yml`

if this works, it will be a miracle

RETWEETS

7

LIKES

28



2:54 AM - 11 Jul 2016



7



28



<https://twitter.com/JennyBryan/status/752440799149846528>

RStudio Cloud already has Git
installed.

Install Git/Github Locally
(for later)

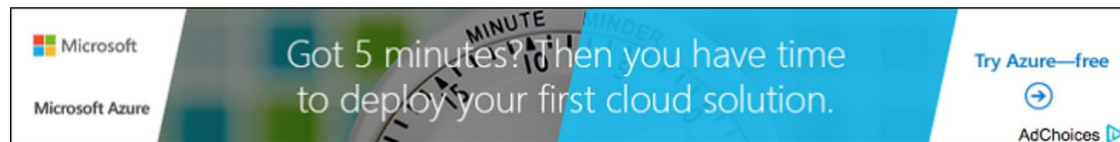
<http://happygitwithr.com/install-git.html>

and

<https://try.github.io/levels/1/challenges/1>

How the pros git/github

How to keep the local file or the remote file during merge using Git and the command line?



asked 5 years ago

viewed 31361 times

active 17 days ago



75



33

I know how to merge modification using vimdiff, but, assuming I just know that the entire file is good to keep or to throw away, how do I do that?

I don't want to open vimdiff for each of them, I change want a command that says 'keep local' or 'keep remote'.

E.G: I got a merge with files marked as changed because somebody opened it under windows, changing the EOL, and then committed. When merging, I want to just keep my own version and discard his.

I'm also interested in the contrary: I screwed up big time and want to accept the remote file, discarding my changes.

git merge local

share improve this question

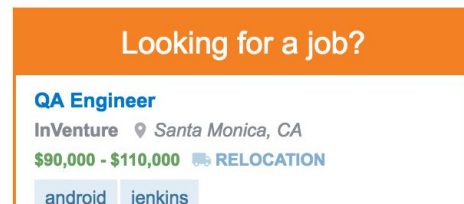
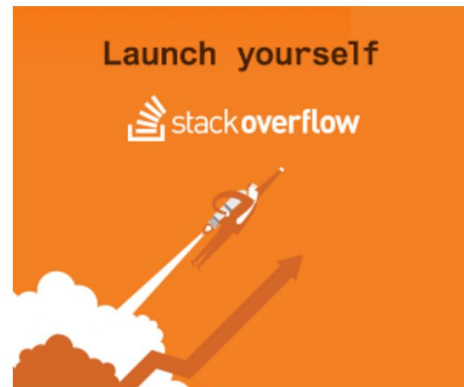
add a comment

asked Jul 11 '11 at 12:41



e-satis

238k 82 228 285



Reload th

4 Answers

active

oldest

votes

The amount of Git skillz
necessary to fix a borked repo is
an order of magnitude bigger
than to bork it.

<https://github.com/jennybc/happy-git-and-github-for-the-user/blob/master/happy-git-and-github-for-the-user.pdf>



BURN IT ALL DOWN

<https://github.com/jennybc/happy-git-and-github-for-the-user/blob/master/happy-git-and-github-for-the-user.pdf>

THIS IS GIT. IT TRACKS COLLABORATIVE WORK
ON PROJECTS THROUGH A BEAUTIFUL
DISTRIBUTED GRAPH THEORY TREE MODEL.


COOL. HOW DO WE USE IT?

NO IDEA. JUST MEMORIZE THESE SHELL
COMMANDS AND TYPE THEM TO SYNC UP.
IF YOU GET ERRORS, SAVE YOUR WORK
ELSEWHERE, DELETE THE PROJECT,
AND DOWNLOAD A FRESH COPY.







"If that doesn't fix it, git.txt contains
the phone number of a friend of
mine who understands git. Just wait
through a few minutes of 'It's really
pretty simple, just think of branches
as...' and eventually you'll learn the
commands that will fix everything."

Step 1: New repo on GitHub




[Pulls](#) [Issues](#) [Marketplace](#) [Explore](#)


  


 **avahoffman** ▾


Repositories


Find a repository...


 [SISBID/Data-Wrangling](#)


 [jhudsl/AnVIL_Book_Getting_Started](#)

 [avahoffman/blue-grama-gene-expression](#)

 [jhudsl/intro_to_r](#)


 [avahoffman/DESeq2-viz-demo](#)

 [jhudsl/jhudsl.github.io](#)


 [avahoffman/CV-and-resumes](#)

Show more


Recent activity


 Add Instructor checklist as...

All activity


 **carriewright11** pushed to **SISBID/Data-Wrangling** 5 hours ago

6 commits to [gh-pages](#)


 [98387ee](#) fixing links for subsetting lab from 2 to 1


 [faef211](#) Merge pull request [#35](#) from SISBID/subsetting_part2

4 more commits »


 **carriewright11** pushed to **SISBID/Data-Wrangling** 2 days ago

1 commit to [subsetting_part2](#)

 [98387ee](#) fixing links for subsetting lab from 2 to 1

 **KatherineCox** pushed to **jhudsl/AnVIL_Book_Getting_Started** 2 days ago

1 commit to [main](#)

 [00d7503](#) Render bookdown

<https://github.com/>

The screenshot shows the GitHub homepage. At the top, there is a dark navigation bar with the GitHub logo, a search bar labeled "Search or jump to...", and links for "Pulls", "Issues", "Marketplace", and "Explore". On the right side of the navigation bar, there is a bell icon for notifications, a plus icon in a square box, and a user profile icon. A pink rectangle highlights the plus icon, and a pink arrow points from it to a dropdown menu. The dropdown menu contains the following options: "New repository" (highlighted in blue), "Import repository", "New gist", "New organization", and "New project".

Below the navigation bar, the left sidebar shows the user profile for "avahoffman" and a list of repositories: "SISBID/Data-Wrangling", "jhudsl/AnVIL_Book_Getting_Started", "avahoffman/blue-grama-gene-expression", "jhudsl/intro_to_r", "avahoffman/DESeq2-viz-demo", "jhudsl/jhudsl.github.io", and "avahoffman/CV-and-resumes". There is a "New" button and a search bar for repositories.

The main content area shows "All activity" with a list of recent pushes. The first push is by "carriewright11" to "SISBID/Data-Wrangling" 5 hours ago, with 6 commits to "gh-pages". The second push is also by "carriewright11" to "SISBID/Data-Wrangling" 2 days ago, with 1 commit to "subsetting_part2". The third push is by "KatherineCox" to "jhudsl/AnVIL_Book_Getting_Started" 2 days ago, with 1 commit to "main".

<https://github.com/>

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository](#).

Repository template

Start your repository with a template repository's contents.

No template ▾

Owner *



avahoffman ▾

Repository name *

my_first_project ✓

Great repository names are short and memorable. Need inspiration? How about [fuzzy-pancake?](#)

Description (optional)

My first project files



Public

Anyone on the internet can see this repository. You choose who can commit.



Private

You choose who can see and commit to this repository.

Initialize this repository with:

Skip this step if you're importing an existing repository.



☒ Add a README file

This is where you can write a long description for your project. [Learn more](#).



☐ Add .gitignore

Choose which files not to track from a list of templates. [Learn more](#).



☐ Choose a license

A license tells others what they can and can't do with your code. [Learn more](#).

This will set `main` as the default branch. Change the default name in your [settings](#).

Create repository

<https://github.com/new>



Search or jump to...



Pulls

Issues

Marketplace

Explore



avahoffman / my_first_project

Unwatch ▾

1

Star

0

Fork

0

<> Code

⌚ Issues

🔗 Pull requests

⌚ Actions

📁 Projects

📖 Wiki

🛡 Security

📈 Insights

...

🔗 main ▾

Go to file

Add file ▾

📄 Code ▾



avahoffman Initial commit ...



README.md

Initial commit

README.md

my_first_project

My first project files

📄 Clone



HTTPS SSH GitHub CLI

https://github.com/avahoffman/my_first



Use Git or checkout with SVN using the web URL.



Open with GitHub Desktop



Download ZIP

About



My first project files



Readme

Releases

No releases published

[Create a new release](#)

Packages

No packages published

[Publish your first package](#)

Step 2: Create “local” link



Spaces

Your Workspace

New Space

Info

Learn

Feedback and Questions

Terms and Conditions

Your Projects

No Projects

1

New Project



New Project



New Project from Git Repo

2

Spaces

Your Workspace

+ New Space

Learn

🔗 Guide

! What's New

🔌 Primers

📄 Cheat Sheets

Help

📶 Current System Status

💬 RStudio Community

Info

Your Projects

Sort By name ▾

Data-Wrangling

Created Jul 8, 2021 4:32 PM



New Project from Git Repository



URL of your Git Repository ⓘ

OK

Step 3: Change stuff



File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

R 3.4.4

README.md

Preview

```
1 # my_first_project
2 My first project files
3
```

Environment History Connections Git

Import Dataset

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Upload Delete Rename More

cloud > project

	Name	Size	Modified
<input type="checkbox"/>	.gitignore	40 B	May 11, 2018, 2:34 PM
<input type="checkbox"/>	.Rhistory	0 B	May 11, 2018, 2:34 PM
<input type="checkbox"/>	project.Rproj	205 B	May 11, 2018, 2:34 PM
<input type="checkbox"/>	README.md	42 B	May 11, 2018, 2:34 PM

Console Terminal

/cloud/project/

Type 'license()' or 'licence()' for distribution details.

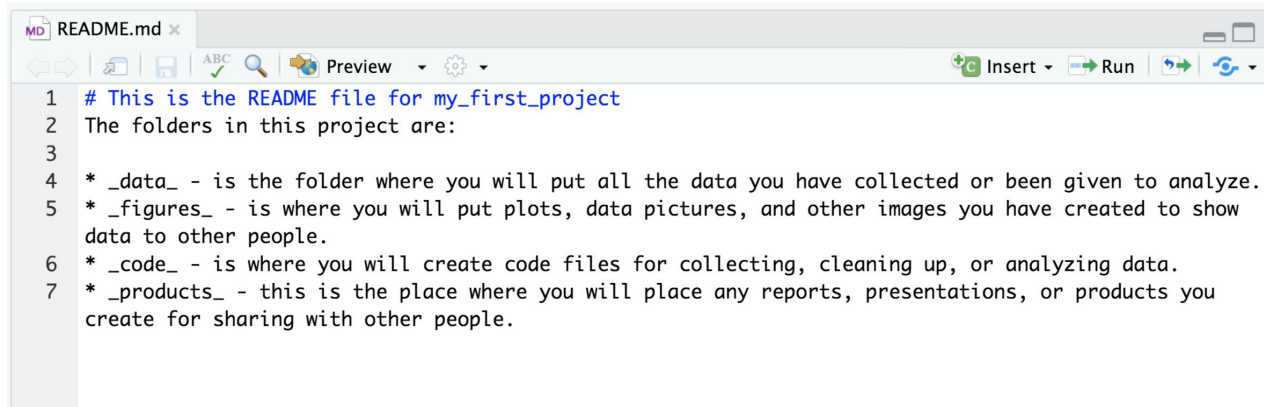
R is a collaborative project with many contributors.

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.

>

Make some changes...



The image shows a Jupyter Notebook interface with a single cell containing a README file. The toolbar at the top includes navigation icons, a search icon, a 'Preview' button, and a 'Run' button. The text in the cell is as follows:

```
1 # This is the README file for my_first_project
2 The folders in this project are:
3
4 * _data_ - is the folder where you will put all the data you have collected or been given to analyze.
5 * _figures_ - is where you will put plots, data pictures, and other images you have created to show
   data to other people.
6 * _code_ - is where you will create code files for collecting, cleaning up, or analyzing data.
7 * _products_ - this is the place where you will place any reports, presentations, or products you
   create for sharing with other people.
```

```
1 git add .  
2 git commit -m "changed readme file"  
3 git push
```

You might be prompted for more information

```
/cloud/project$ git commit -m "Update Readme file"
```

```
*** Please tell me who you are.
```

Run

```
git config --global user.email "you@example.com"  
git config --global user.name "Your Name"
```




to set your account's default identity.

Omit `--global` to set the identity only in this repository.

```
fatal: unable to auto-detect email address (got 'rstudio-user@application-4375491-deployment-10694007-tknc5.(none)')  
/cloud/project$ git config user.email "avamariehoffman@gmail.com"  
/cloud/project$ git config user.name "Ava Hoffman"
```

Use your GitHub email and
display name

```
/cloud/project$ git push
Enumerating objects: 7, done.
Counting objects: 100% (7/7), done.
Delta compression using up to 16 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (5/5), 552 bytes | 552.00 KiB/s, done.
Total 5 (delta 0), reused 0 (delta 0)
To https://github.com/avahoffman/my_first_project.git
   3e0caa0..5f96028  main -> main
/cloud/project$
```

 .gitignore	sdkfjsldf	22 hours ago
 README.md	new changes	22 seconds ago
 project.Rproj	sdkfjsldf	22 hours ago

README.md

This is the README file for my_first_project

The folders in this project are:

- *data* - is the folder where you will put all the data you have collected or been given to analyze.
- *figures* - is where you will put plots, data pictures, and other images you have created to show data to other people.
- *code* - is where you will create code files for collecting, cleaning up, or analyzing data.
- *products* - this is the place where you will place any reports, presentations, or products you create for sharing with other people.

Review

- You add/edit files in your RStudio cloud project or personal computer (your **local repository**).
- You publish/share these changes to a **remote repository** (GitHub) so that others may see them/incorporate them into their own work.
- Git commands
 - `git status`
 - `git add .`
 - `git commit -m "A message here"`
 - `git push`

Staging files and folders with git add

<code>git add file_or_folder</code>	stages specified file or folder
<code>git add .</code>	stages new and modified files
<code>git add -u</code>	stages modified and deleted files
<code>git add -A</code>	stages new, modified, and deleted files
<code>git add *.csv</code>	Stages any files with .csv extension
<code>git add *</code>	Use with caution: stages everything

Step 4: Incorporate other's
changes

avahoffman / my_first_project

Unwatch 1 Star 0 Fork 0

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

my_first_project / README.md in main

Cancel changes

Edit file Preview

Spaces 2 Soft wrap

```
1 # my_first_project
2 My first project files
3
4 Description of the analysis will go here
```

Attach files by dragging & dropping, selecting or pasting them.



Commit changes

Update README.md

Add an optional extended description...

- ☒ Commit directly to the `main` branch.
- ☐ Create a new branch for this commit and start a pull request. [Learn more about pull requests.](#)

Commit changes

Cancel

Updating the readme on remote
(on GitHub) - simulates changes
made by others

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

README.md

```
1 # my_first_project
2 My first project files
3
4 Description of the analysis will go here
5
```

Environment History Connections Git Tutorial

R Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Upload Delete Rename More

Cloud project

Name	Size
..	
.gitignore	40 B
.Rhistory	0 B
project.Rproj	205 B
README.md	84 B

Terminal

```
/cloud/project$ git pull
remote: Enumerating objects: 5, done.
remote: Counting objects: 100% (5/5), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), 756 bytes | 756.00 KiB/s, done.
From https://github.com/avahoffman/my_first_project
 5f96028..b9ee40c main -> origin/main
Updating 5f96028..b9ee40c
Fast-forward
 README.md | 3 ++
 1 file changed, 2 insertions(+), 1 deletion(-)
/cloud/project$
```

Changes are immediately visible

Git pull incorporates changes from remote repository

Shows files changed

Pulling

- Others have pushed changes to the remote repository.
- You want to incorporate those changes into your local repository.
- Git commands
 - `git pull`

Danger-free commands

<https://git-school.github.io/visualizing-git/>

git - the simple guide

<https://rogerdudler.github.io/git-guide/>

git cheat sheet

learn more about git the simple way at rogerdudler.github.io/git-guide/
cheat sheet created by Nara, jeschke of nimgit.com

create & clone

create new repository `git init`
clone local repository `git clone /path/to/repository`
clone remote repository `git clone username@host:/path/to/repository`

add & remove

add changes to INDEX `git add <filename>`
add all changes to INDEX `git add *`
remove/delete `git rm <filename>`

commit & synchronize

commit changes `git commit -m "Commit message"`
push changes to remote repository `git push origin master`
connect local repository to remote repository `git remote add origin <server>`
update local repository with remote changes `git pull`

branches

create new branch `git checkout -b <branch>`
e.g. `git checkout -b feature_x`
switch to master branch `git checkout master`
delete branch `git branch -d <branch>`
push branch to remote repository `git push origin <branch>`

merge

merge changes from another branch `git merge <branch>`
view changes between two branches `git diff <source_branch> <target_branch>`
e.g. `git diff feature_x feature_y`

tagging

create tag `git tag <tag> <commit ID>`
e.g. `git tag 1.0.0 1b2e1d63ff`
get commit IDs `git log`

restore

replace working copy with latest from HEAD `git checkout -- <filename>`



Tip

Want a simple but powerful
git-client for your mac?
Try Tower: www.git-tower.com/

https://rogerdudler.github.io/git-guide/files/git_cheat_sheet.pdf

Nice practice

<https://www.katacoda.com/courses/git>