



Using Git and GitHub with R

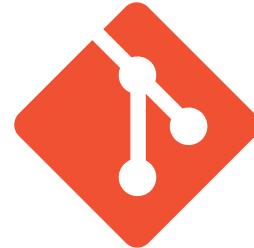


Introduction to Git and GitHub

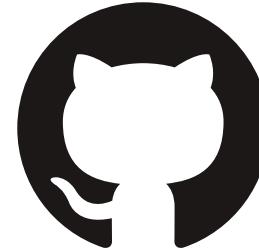


What is Git? What is GitHub

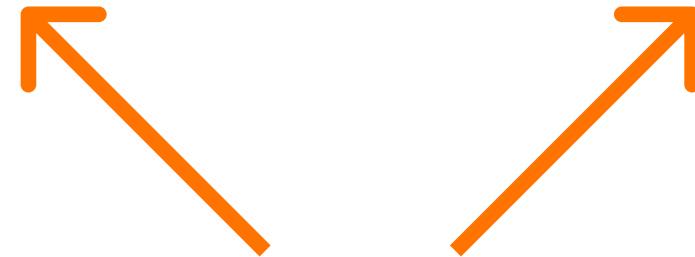




git



GitHub



Not the same thing



Git

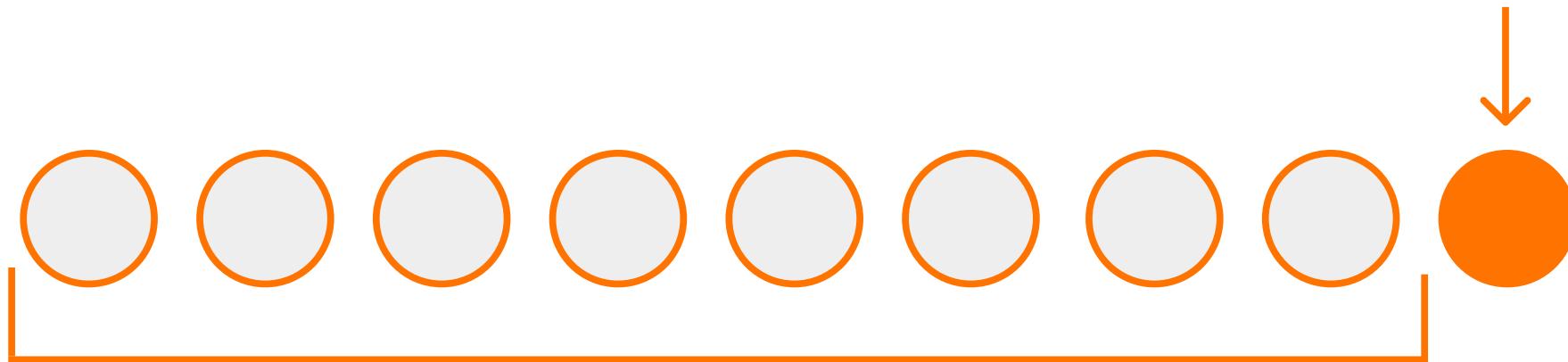
Version control system **on your local computer**

Allows you to take **snapshots** of your code as it progresses

Allows you to view the **history of your code over time**



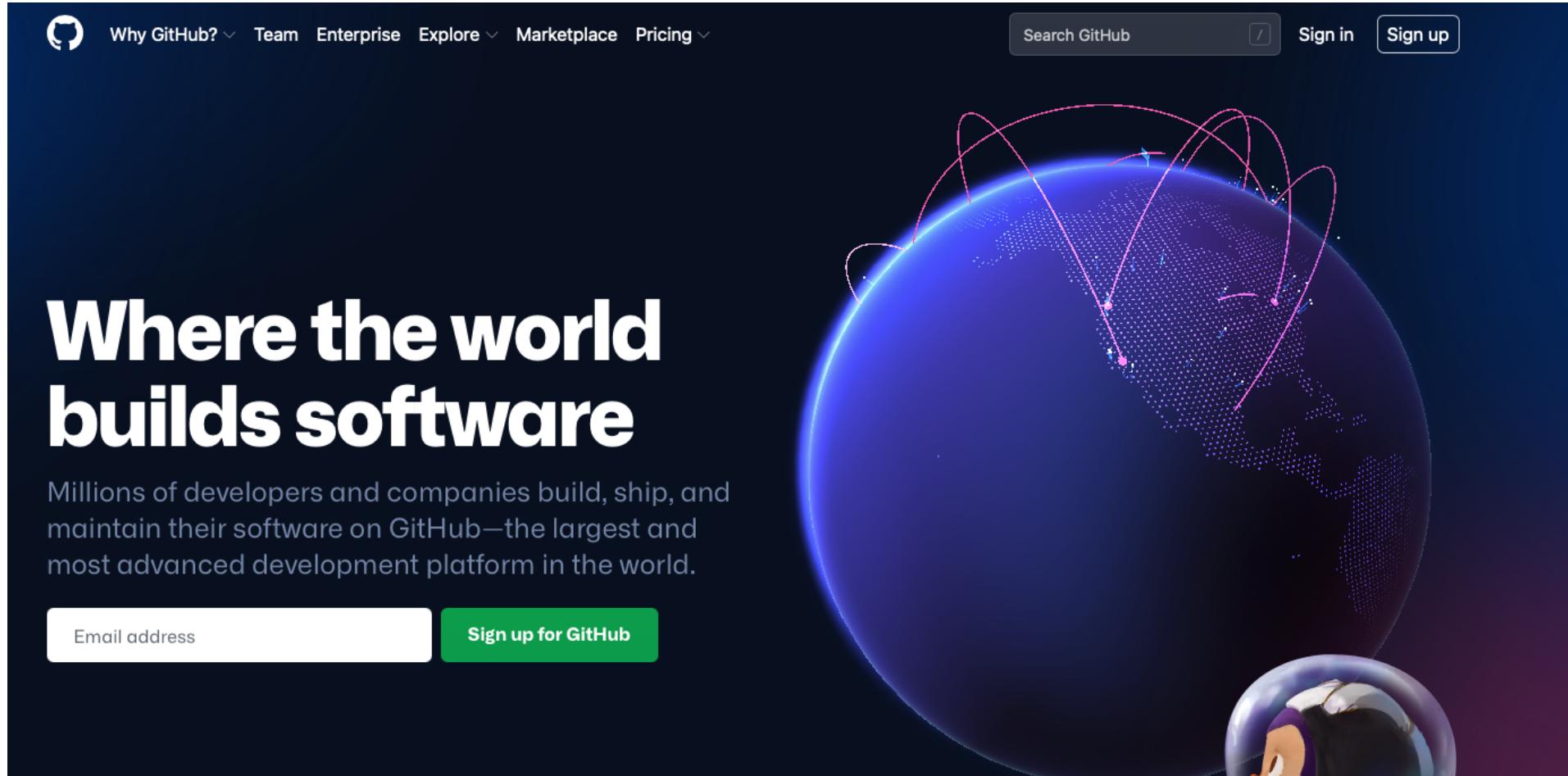
**Current Version
of Your Code**



Past Versions of Your Code



GitHub



The image shows a screenshot of the GitHub homepage. At the top, there is a navigation bar with links for "Why GitHub?", "Team", "Enterprise", "Explore", "Marketplace", and "Pricing". To the right of the navigation bar are "Search GitHub", "Sign in", and "Sign up" buttons. The main visual is a large, glowing blue Earth with a network of pink lines representing global connections. In the bottom right corner of the globe, there is a small, semi-transparent image of a person's head wearing a VR headset. On the left side of the page, there is a large white text area containing the headline "Where the world builds software" and a descriptive paragraph about GitHub being the largest development platform. Below this text is a form with an "Email address" input field and a green "Sign up for GitHub" button.

Why GitHub? Team Enterprise Explore Marketplace Pricing

Search GitHub Sign in Sign up

Where the world builds software

Millions of developers and companies build, ship, and maintain their software on GitHub—the largest and most advanced development platform in the world.

Email address

Sign up for GitHub

R for the Rest of Us



GitHub Alternatives



GitHub Alternatives

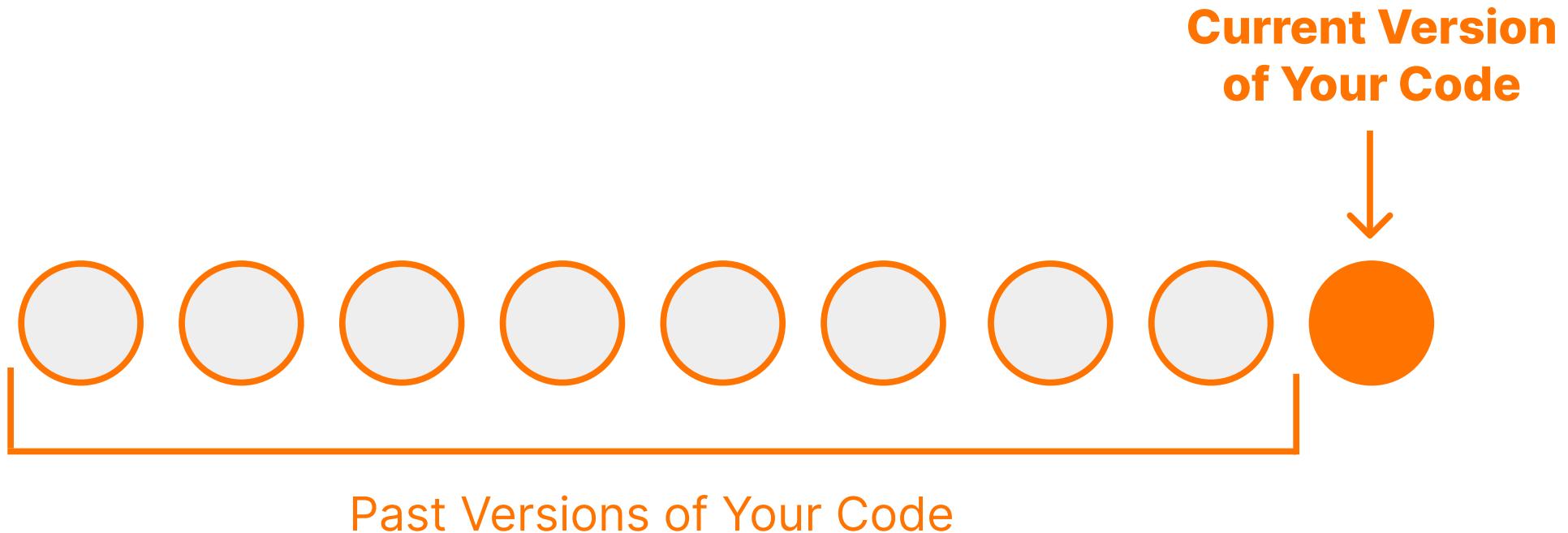


Why Should You Learn to Use Git and GitHub?





Version Control





Backup

**Repository on
GitHub**



**RStudio project on
your computer**





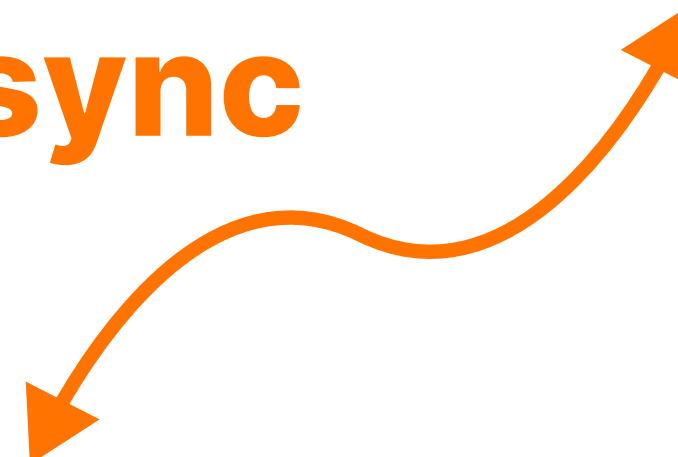
Backup

Repository on
GitHub



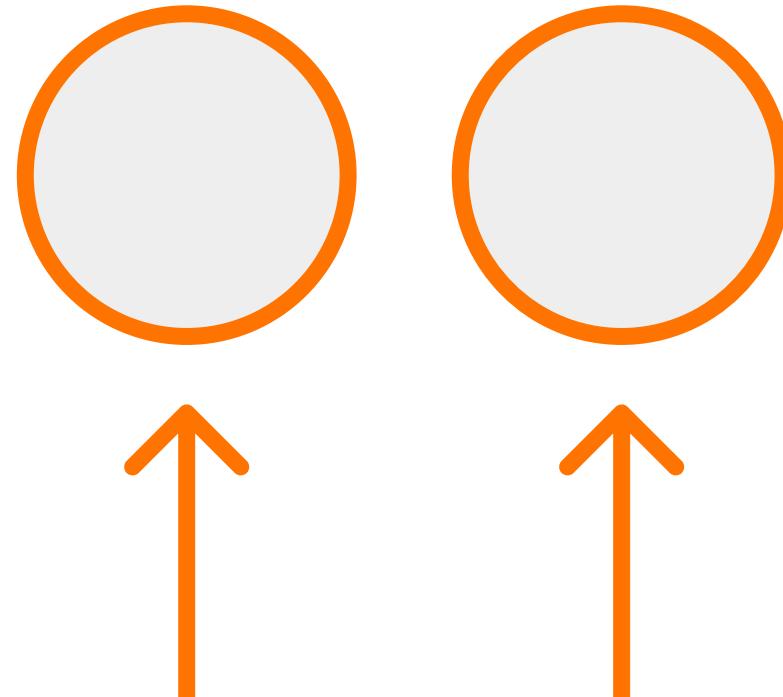
In sync

RStudio project on
your computer





Collaboration

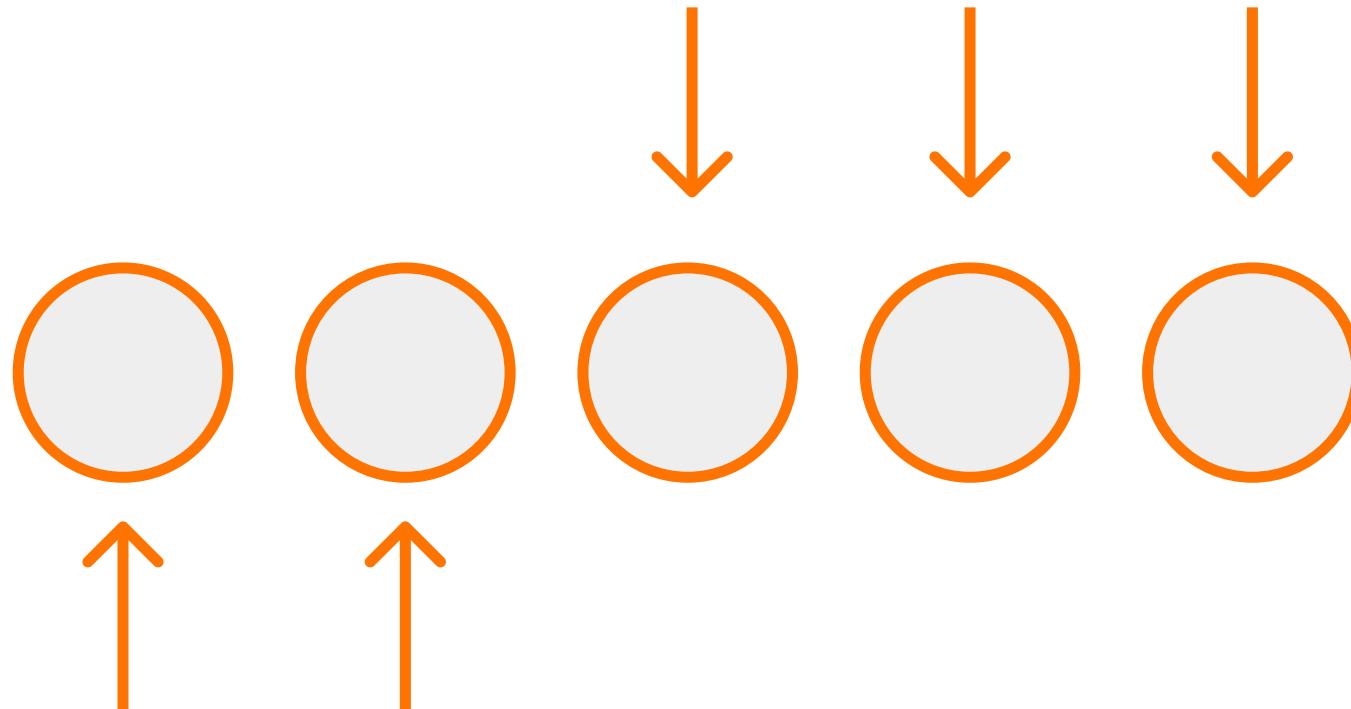


Gabriela made these changes



Collaboration

Mohammed made these changes

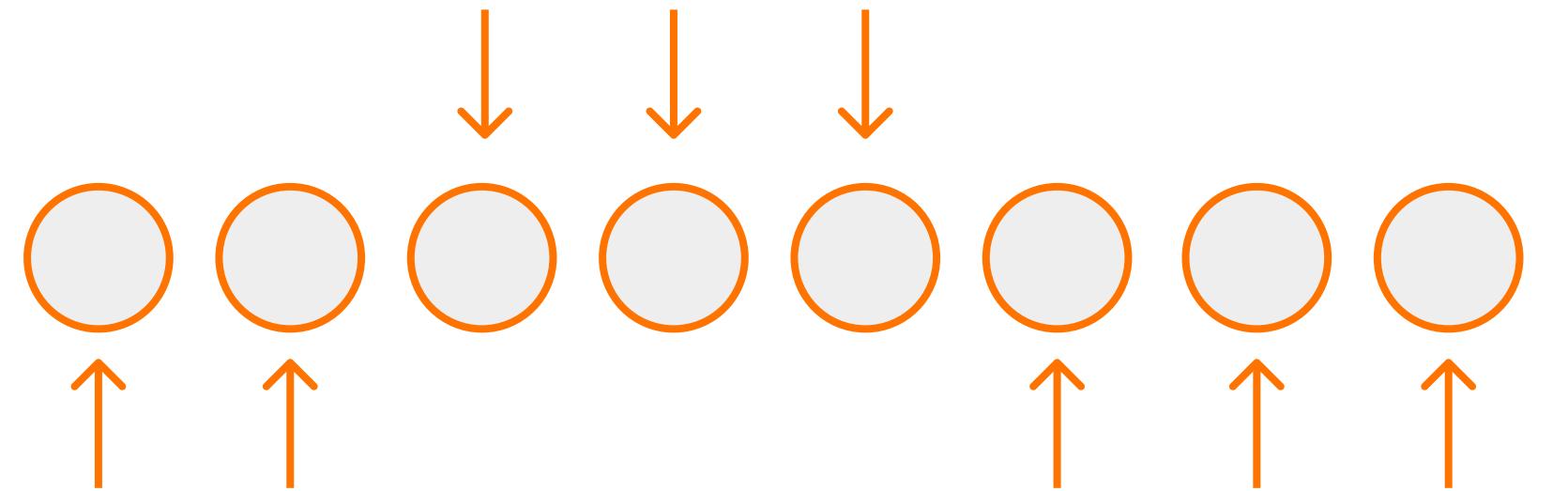


Gabriela made these changes



Collaboration

Mohammed made these changes

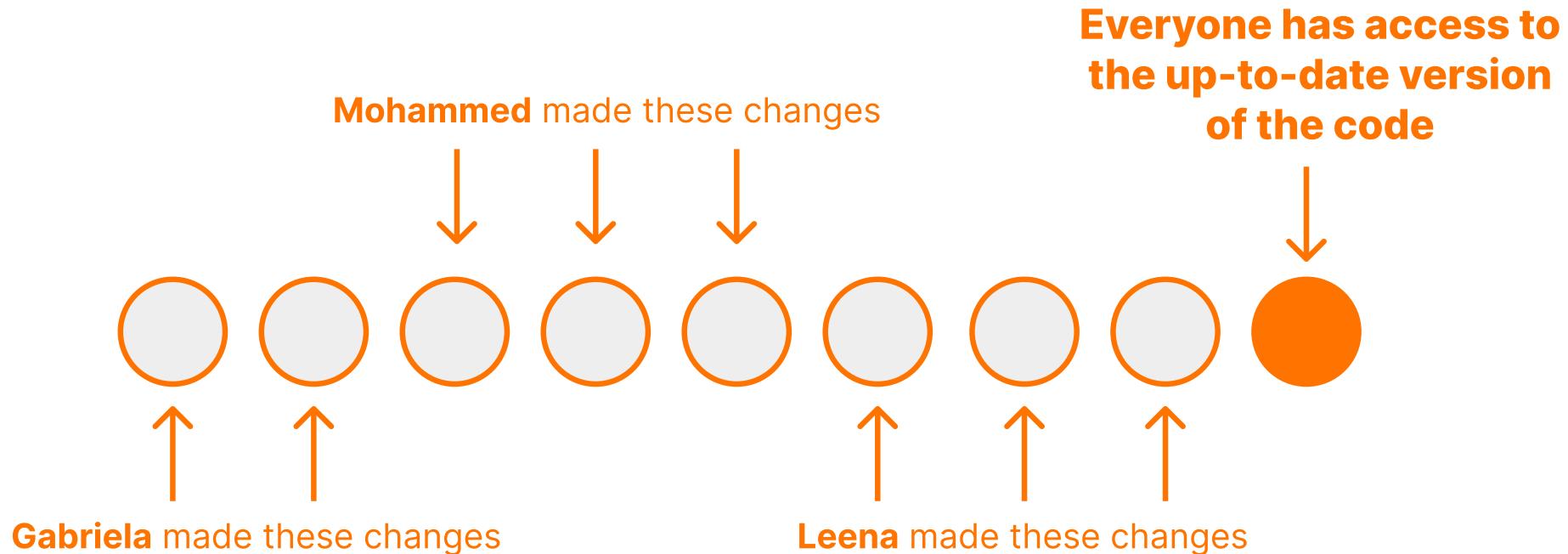


Gabriela made these changes

Leena made these changes



Collaboration





Update Everything





SETUP IS 90% OF THE WORK



Working on updates 27%

Don't turn off your PC. This will take a while.

Update Everything

Your PC will restart several times.



[CRAN](#)
[Mirrors](#)
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[R Homepage](#)
[The R Journal](#)

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[R Binaries](#)
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[FAQs](#)
[Contributed](#)

The Comprehensive R Archive Network

Download and Install R

Precompiled binary distributions of the base system and contributed packages, **Windows** and **Mac** users most likely want one of these versions of R:

- [Download R for Linux \(Debian, Fedora/Redhat, Ubuntu\)](#)
- [Download R for macOS](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2021-08-10, Kick Things) [R-4.1.1.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

Questions About R

- If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

What are R and CRAN?

R is ‘GNU S’, a freely available language and environment for statistical computing and graphics which provides a wide variety of statistical and graphical techniques: linear and nonlinear modelling, statistical tests, time series analysis, classification, clustering, etc. Please consult the [R project homepage](#) for further information.

CRAN is a network of ftp and web servers around the world that store identical, up-to-date, versions of code and documentation for R. Please use the CRAN [mirror](#) nearest to you to minimize network load.



DOWNLOAD SUPPORT DOCS COMMUNITY

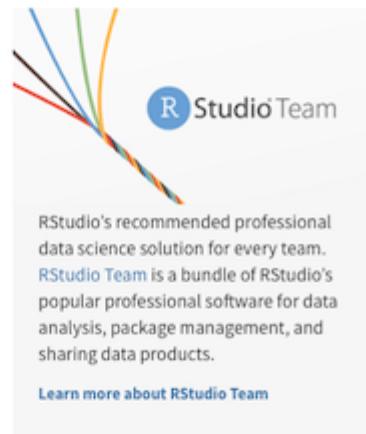
Products Solutions Customers Resources About Pricing

Download the RStudio IDE

Choose Your Version

The RStudio IDE is a set of integrated tools designed to help you be more productive with R and Python. It includes a console, syntax-highlighting editor that supports direct code execution, and a variety of robust tools for plotting, viewing history, debugging and managing your workspace.

[LEARN MORE ABOUT THE RSTUDIO IDE](#)



[Learn more about RStudio Team](#)

RStudio Desktop

Open Source License

Free

RStudio Desktop Pro

Commercial License

\$995

/year

RStudio Server

Open Source License

Free

RStudio Workbench

Commercial License

\$4,975

/year

(5 Named Users)

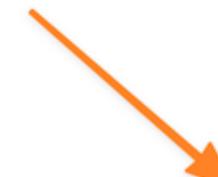
[DOWNLOAD](#)

[BUY](#)

[DOWNLOAD](#)

[BUY](#)

R for the Rest of Us





| | Package | Installed | Available | NEWS |
|--------------------------|-------------|-----------|-----------|------|
| <input type="checkbox"/> | audio | 0.1-7 | 0.1-8 | |
| <input type="checkbox"/> | bayestestR | 0.9.0 | 0.11.0 | |
| <input type="checkbox"/> | beeswarm | 0.3.1 | 0.4.0 | |
| <input type="checkbox"/> | BiocManager | 1.30.15 | 1.30.16 | |
| <input type="checkbox"/> | blob | 1.2.1 | 1.2.2 | |
| <input type="checkbox"/> | blogdown | 1.3 | 1.5 | |
| <input type="checkbox"/> | bookdown | 0.22 | 0.24 | |
| <input type="checkbox"/> | broom | 0.7.6 | 0.7.9 | |
| <input type="checkbox"/> | bslib | 0.2.5.1 | 0.3.0 | |
| <input type="checkbox"/> | cachem | 1.0.5 | 1.0.6 | |

[Select All](#) [Select None](#) [Install Updates](#) [Cancel](#)



Your Turn

1. Update R
2. Update RStudio
3. Update all of your R packages



origin/dynamic-directive-arguments

feat: dynamic args for

perf: improve scoped slots change detection accuracy (971)

test: test cases for v-on/v-bind dynamic arguments

refactor: v-bind dynamic arguments use bind helper

test: fix tests, resolve helper conflict

fix: fix middle modifier

feat: handle dynamic argument for v-bind.sync

origin/slot-optimization

perf: improve scoped sl

feat: dynamic directive arguments for v-bind and v-

refactor: extend dom-props update skip to more

fix: fix checkbox event edge case in Firefox



Install Git

 **git** --distributed-even-if-your-workflow-isnt

[About](#)

[Documentation](#)

[Downloads](#)

- GUI Clients
- Logos

[Community](#)

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

Downloads

 [macOS](#)  [Windows](#)

 [Linux/Unix](#)

Older releases are available and the [Git source repository](#) is on GitHub.

GUI Clients

Git comes with built-in GUI tools (`git-gui`, `gitk`), but there are several third-party tools for

Logos

Various Git logos in PNG (bitmap) and EPS (vector) formats are available for use in online



Latest source Release
2.33.0
[Release Notes \(2021-08-16\)](#)
[Download for Mac](#)

R for the Rest of Us



Your Turn

1. Install Git
2. Confirm that you installed Git correctly by going to your terminal in RStudio and typing `git --version` (you should have version 2.3 or later)



Configure Git

Let's tell Git who we are!

```
install.packages("usethis") # Only if usethis is not installed
library(usethis)
use_git_config(user.name = "Jane Doe", user.email = "jane@example.org")
```



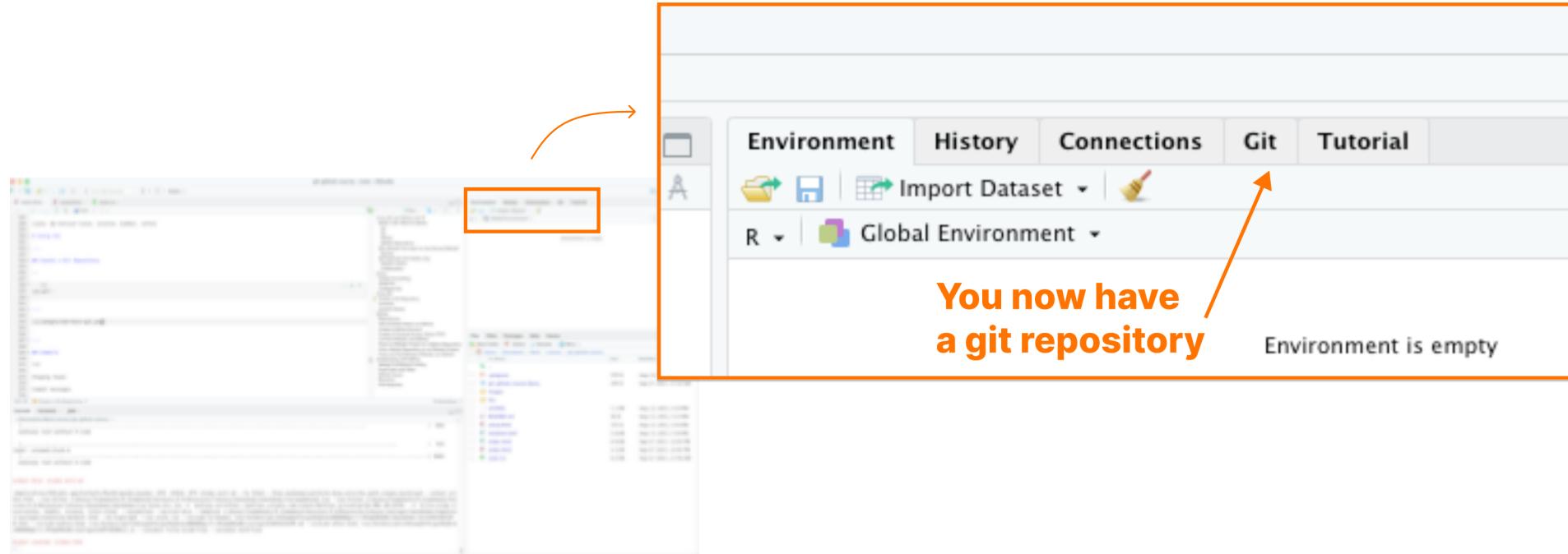
Your Turn

1. Configure Git by adding a user name and email to your profile



Create a Local Git Repository

```
use_git()
```





Your Turn

1. Create a new RStudio project called local-first
2. Add a new Git repository to your project
3. Make sure the Git tab shows up in the top right panel



Commits

R for the Rest of Us



Commits Have Two Parts

Part 1: Files you **stage** (i.e. include)

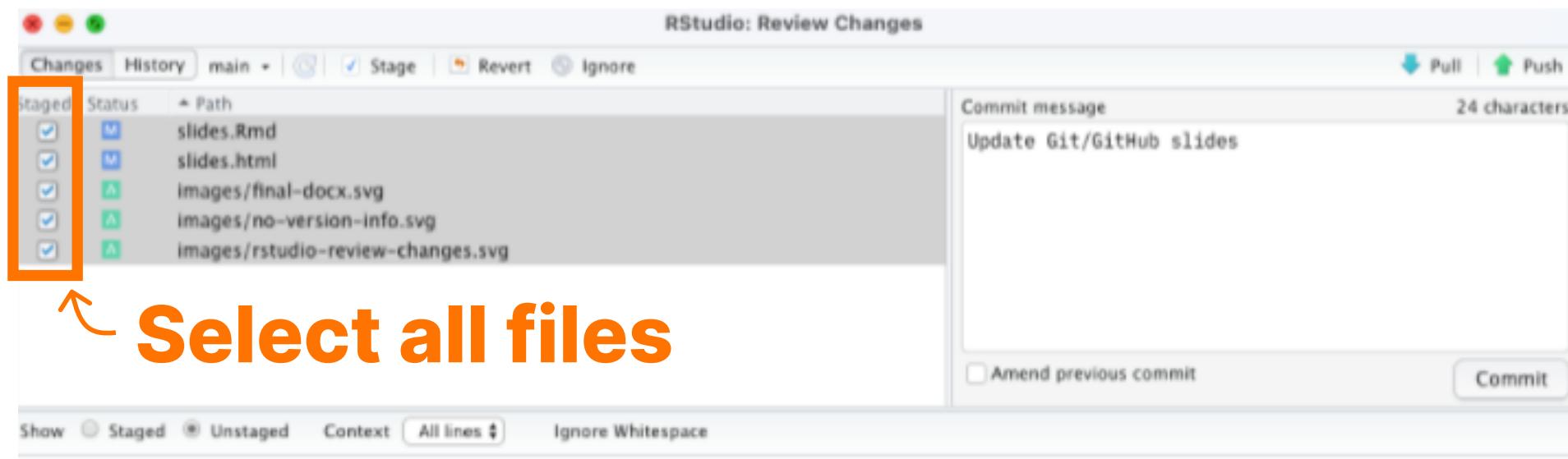
Part 2: A **commit message** that tells you what has changed since the last commit



Staging Files

Which files do you want to include in this commit?

Include all files for now





Commit Messages



Final-v2-for-real-final-v4.docx



**WHAT CHANGES ARE IN THIS VERSION
COMPARED TO OTHER VERSIONS?**



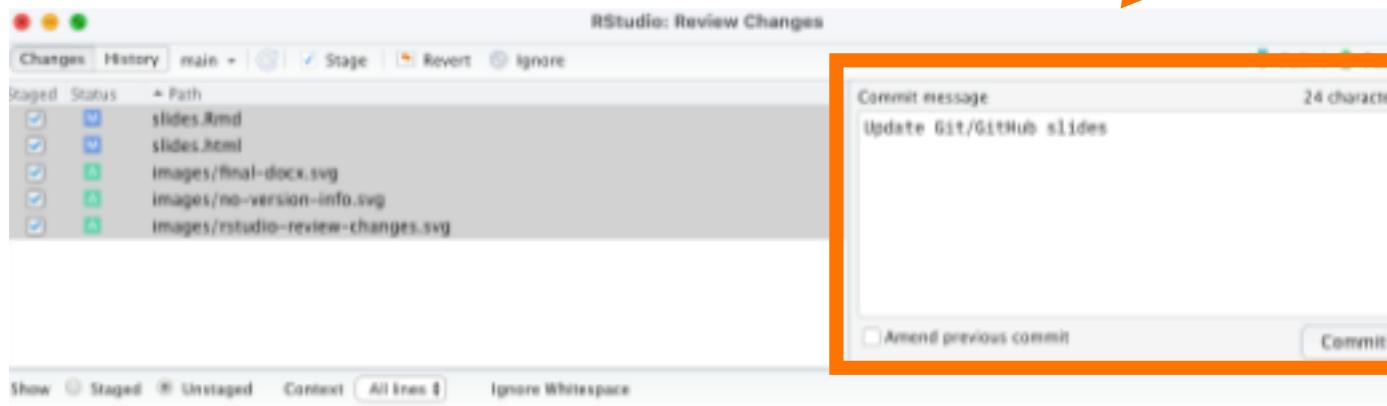
Final-v2-for-real-final-v4.docx



Commit Messages Tell Us What Changes Were
Made



This is what has changed since the last commit





Your Turn

1. Create a new R file called README.md in your local-first project and add text
2. Go to the Git tab and hit the commit button
3. Check the staged button next to your new README.md file (and any other modified files)
4. Add a commit message (e.g. "Add README file")
5. Click the commit button



Commit History



R for the Rest of Us



Your Turn

1. Hit the history button under the Git tab
2. View the history of your repository
3. Make sure you understand the commit history (top section) and the diff (bottom section)



Search or jump to...

GitHub



GitHub Repositories

aka "repo"

One repository for each project



Search or jump to... / Pull requests Issues Marketplace Explore

Unwatch 1 Star 0 Fork 0

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

main 1 branch 0 tags Go to file Add file Code

dgkeyes Nearly complete draft of slides 38360aa yesterday 7 commits

images Nearly complete draft of slides yesterday

libs Work on slides 5 days ago

.gitignore Initial commit 2 months ago

LICENSE Initial commit 2 months ago

README.md Update readme 2 months ago

git-github-course.Rproj Update readme 2 months ago

setup.Rmd Start on slides 2 months ago

skeleton.html Start on slides 2 months ago

slides.Rmd Nearly complete draft of slides yesterday

slides.html Nearly complete draft of slides yesterday

style.css More work on slides 2 days ago

README.md

About
No description, website, or topics provided.

Readme

MIT License

Releases
No releases published [Create a new release](#)

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

Languages



GitHub Commit History

- o Commits on Sep 27, 2021
 - More work on slides
 dgkeyes committed 17 hours ago🔗 8effb39 <>
 - More work on slides
 dgkeyes committed 19 hours ago🔗 03e924a <>
- o Commits on Sep 24, 2021
 - Work on slides
 dgkeyes committed 4 days ago🔗 e30b79e <>
- o Commits on Aug 11, 2021
 - Start on slides
 dgkeyes committed on Aug 11🔗 99daae9 <>
 - Update readme
 dgkeyes committed on Aug 11🔗 5b92af2 <>
 - Initial commit
 dgkeyes committed on Aug 11Verified 🔗 0c6cde4 <>



View Commit History on RStudio or GitHub



A screenshot of the RStudio interface titled "Review Changes". The left sidebar shows a commit tree with the following branches: "origin/main" (selected), "origin/HEAD", and "More work on slides". The main pane displays a table of commits:

| Author | Date | SHA |
|--|------------|----------|
| David Keyes <david@fortherestofus.com> | 2021-09-27 | 03e924a5 |
| David Keyes <david@fortherestofus.com> | 2021-09-25 | e30b79ee |
| David Keyes <david@fortherestofus.com> | 2021-08-11 | 99daae98 |
| David Keyes <david@fortherestofus.com> | 2021-08-11 | 5b92af28 |
| David Keyes <david@fortherestofus.com> | 2021-08-11 | 0c6cde4f |

A screenshot of the GitHub interface showing commit history. The commits are grouped by date:

| |
|--|
| Commits on Sep 27, 2021 |
| More work on slides dkeyes committed 17 hours ago |
| More work on slides dkeyes committed 18 hours ago |
| Commits on Sep 24, 2021 |
| Work on slides dkeyes committed 4 days ago |
| Commits on Aug 11, 2021 |
| Start on slides dkeyes committed on Aug 11 |
| Update readme dkeyes committed on Aug 11 |
| Initial commit dkeyes committed on Aug 11 |





View Commit History on RStudio or GitHub

R Studio®
It's the same thing!
GitHub

The screenshot shows two side-by-side interfaces. On the left is the RStudio 'Review Changes' window, which displays a commit history for a file named 'slides.Rmd'. The commits are:

- Initial commit (David Keyes, 2021-08-11)
- Update readme (David Keyes, 2021-08-11)
- Start on slides (David Keyes, 2021-08-11)
- Work on slides (David Keyes, 2021-08-11)
- More work on slides (David Keyes, 2021-09-25)

On the right is the GitHub 'Commits' page for the same repository. It shows the same commit history:

- Initial commit (davidjfortherestofus, 2021-08-11)
- Update readme (davidjfortherestofus, 2021-08-11)
- Start on slides (davidjfortherestofus, 2021-08-11)
- Work on slides (davidjfortherestofus, 2021-08-11)
- More work on slides (davidjfortherestofus, 2021-09-25)

A large orange diagonal text overlay reads 'It's the same thing!'.



View Past Versions of Code

The screenshot shows the GitHub repository page for `rfortherestofus/git-github-course`. The main navigation bar includes links for Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. The Code tab is selected, and the main content area displays the commit history for the `main` branch. The commits are listed in reverse chronological order:

- Commits on Sep 29, 2021:
 - Add your turns etc
dgkeyes committed 2 hours ago
- Commits on Sep 28, 2021:
 - Nearly complete draft of slides
dgkeyes committed yesterday
- Commits on Sep 27, 2021:
 - More work on slides
dgkeyes committed 2 days ago
 - More work on slides
dgkeyes committed 2 days ago

An orange arrow points from the text "Click this and you'll see the code as it was at this point in time" to the commit message "Nearly complete draft of slides" on Sep 28, 2021.

Click this and you'll see the code as it was at this point in time



Your Turn

1. Open the [GitHub repository with the materials for this course](#)
2. Click on commits
3. Take a look through the commit history to see how the code changed over time



Keep RStudio and
GitHub in Sync



Connect RStudio and GitHub



Repository on
GitHub



In sync

RStudio project on
your computer





Create a GitHub Account



Why GitHub? ▾ Team Enterprise Explore ▾ Marketplace Pricing ▾

Search GitHub Sign in Sign up

Where the world builds software

Millions of developers and companies build, ship, and maintain their software on GitHub—the largest and most advanced development platform in the world.

Email address Sign up for GitHub

65+ million Developers 3+ million Organizations 200+ million Repositories 72% Fortune 500

R for the Rest of Us



Create a Personal Access Token (PAT)

```
create_github_token()
```



Connect RStudio and GitHub

```
install.packages("gitcreds") # Only if gitcreds is not installed
library(gitcreds)
gitcreds_set()
```



Your Turn

1. Create a GitHub account
2. Create a GitHub personal access token (PAT) using the `create_github_token()` function from the `usethis` package
3. Register your PAT using the `gitcreds_set()` function from the `gitcreds` package



Keeping RStudio and GitHub in Sync



Two Options





Push an RStudio Project to a GitHub Repository





Step 1: Initialize a local git repository in your RStudio project

```
use_git()
```



Step 2: Connect your local RStudio project to a remote GitHub repository

```
use_github()
```



Your Turn

1. Open the local-first project you created previously
2. Push your local-first project to GitHub using the `use_github()` function from the `usethis` package



Pull a GitHub Repository to an RStudio Project





Step 1: Create a New Repository on GitHub



R for the Rest of Us



Step 2: Create a New RStudio Project by Cloning a GitHub Repository

New Project Wizard

Back **Clone Git Repository**



Repository URL:

Project directory name:

Create project as subdirectory of: ~ /Documents /Work /projects

Open in new session



Your Turn

1. Create a new repository on GitHub called `github-first`
2. Create a new project in RStudio by cloning the `github-first` GitHub repository you just created



Pushing and Pulling Between RStudio and GitHub

1. Work in RStudio
2. Any time you make significant changes, stage and commit
3. Push your work to GitHub



Your Turn

1. Make some changes to the README.md in the github-first project
2. Stage this file (and any other modified files) and add a commit message
3. Hit commit
4. After you commit, push your changes to GitHub
5. Go to your GitHub repository and make sure you see your changes