

# AGEC 652 - Lecture 1.2

**Best practices: reproducibility, organization & version control**

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# What we will cover today

- How to start and maintain computational research projects in a less "chaotic" way
  - Why? Because it saves time! For your future self and everyone else that needs to work with you now or in the future
- We'll review best practices on Gentzkow & Shapiro (2014)

# Gentzkow & Shapiro's "*Code and Data for the Social Sciences*"

- Economists are not the first to deal with code, data, and a bunch of other stuff in complex projects
  - People in IT, Engineering, and Sciences have learned their lessons. We can learn from them
- This guide is a great starting point to set you on a good path
  - But there's a lot more to learn
  - Some things you'll learn by reading, others by observation, others only by trial-and-error

# Gentzkow & Shapiro's "*Code and Data for the Social Sciences*"

Four categories of advice

- A. Reproducibility
  - *Automation* (section 2), *Documentation* (7)
- B. Organization
  - *Directories* (4), *Keys* (5)
- C. Project management
  - *Version Control* (3), *Management* (8)
- D. Coding
  - *Abstraction* (6), *Documentation* (7), *Code Style* (appendix)

We'll go over A--C today

# Reproducibility

# Reproducibility

## Why should we care?

- Because journals are interested in that these days. Yes, but why?
- Because it is a **fundamental principle of the scientific method**
  - With enough instructions, someone else can *verify* your experimental results and claims
  - It lends credibility to the scientific process

# Reproducibility

The term can have different meanings and (quasi) synonyms depending on the field

We'll borrow terminology from CS<sup>1</sup>

- **Repeatability**: same team, same experimental setup
- **Replicability**: *different* team, same experimental setup
- **Reproducibility**: *different* team, *different* experimental setup

<sup>1</sup> Association for Computing Machinery (2021). *Artifact Review and Badging – Version 2.0*

# Reproducibility

- Reproducibility is the higher scientific goal
- For the projects we develop, we look for **replicability**
- We make it easy for someone else to run our analysis and get the same results



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AEA Data Editor

The AEA Data Editor's mission is to design and oversee the AEA journals' strategy for archiving and curating research data and promoting reproducible research.

Twitter

GitHub

## Preparing your files for verification

Published: April 08, 2021

This document describes how to best **prepare a replication package** for an AEA journal. Much of the guidance here is not specific to our journals - in fact, the document links to other websites for tutorials, best practices, etc. The best moment to do the preparation described here is, in fact, when you start the project, not once you have had your manuscript conditionally accepted. However, all steps here can and have been successfully performed at the point of conditional acceptance.

## Describing the contents of your replication package

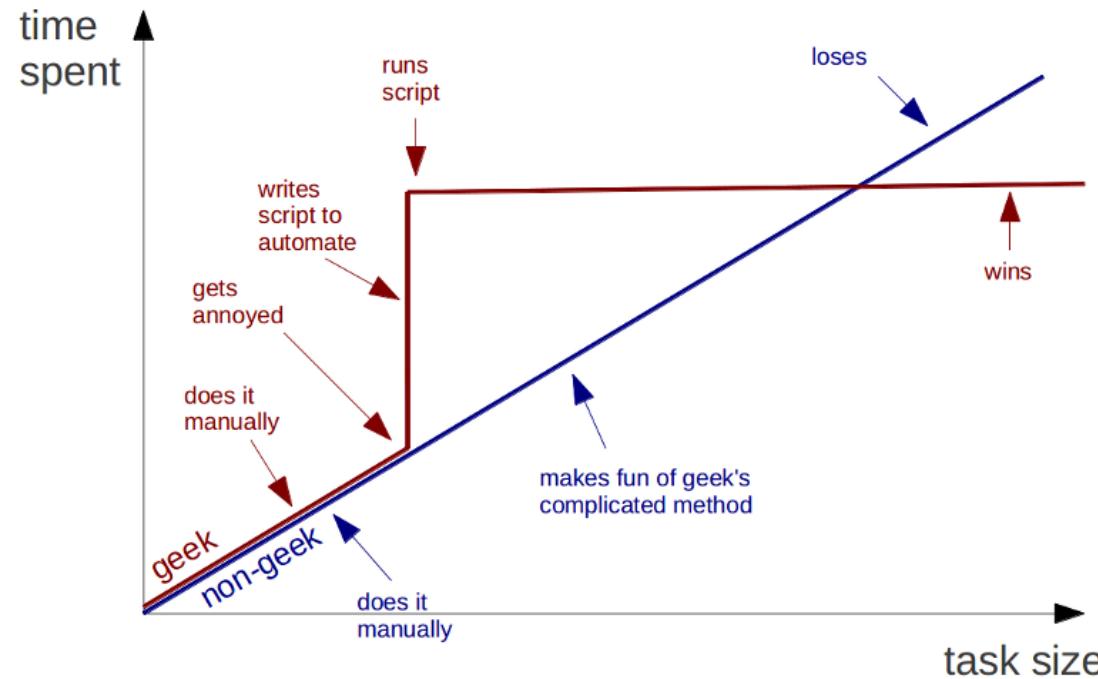
Every replication package requires a document outlining where the data comes from, what data is provided, what requirements are needed to run the code in the replication package, how to run the code, what results to expect, and where to find the results. This is conventionally called the "README".

- The AEA requires that the README follow a prescribed schema. Please use the [template README for social science replication packages](#).

# Automation

Automate everything that can be automated

Geeks and repetitive tasks



# Automation

## Automate everything that can be automated

Scripts are great because they:

- Save time for repeated tasks
- Document step by step what you are doing
- Can usually be reused/adapted for similar tasks in the same or other projects

Manual tasks (with files or in Excel) are difficult to replicate unless you take detailed notes at every step

Rule-of-thumb: *if you are doing a lot of clicking for repeated task, think about writing a script for that*

# Automation

## Automate everything that can be automated

My advice: *get comfortable with UNIX shell*

- You can do so much with basic shell scripting
  - You'll most likely need it if your research needs High-Performance Computing (HPC)
- You can learn that in a couple of hours with Software Carpentry lessons
- Works in any OS
  - Mac: shell environment built in
  - Linux: you probably needed that already
  - Windows 10+: there's WSL2 and it works great (really!)

# Automation

**Write a single script that executes all code from beginning to end**

It's the ideal goal for *replication packages*

Have a script like this from the beginning of the project and increment it as you go

But don't obsess over it. Sometimes it can't be done

- E.g.: you are running part of your code on an external server

# Automation + replicability

## An extra rule: **Keep track of your dependencies**

- We often use many external packages
- Popular packages get updated often. Sometimes it breaks things...
  - The syntax you used doesn't work anymore
  - The function you called doesn't exist anymore
- Keep note (and copies) of the versions you use
- There are many tools to help you with that
  - Some are simpler and just track that info for you (e.g.: Dr. Watson for Julia)
  - Others create a stand-alone environment with everything you need to run (e.g.: Docker)

# Organization

# Directories

**Separate directories by function**

**Separate files into inputs and outputs**

These are quite intuitive: they make it easy for you (your code) and anyone else to find things

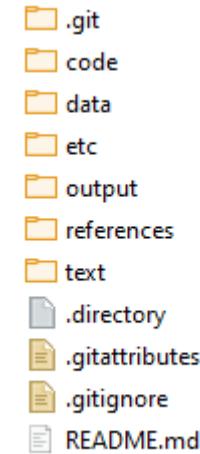
Separating inputs, intermediate outputs (temp), and final outputs is crucial for storing the right things

- We normally don't use version control for intermediate calculations

# Directories

Have separate folders for

- Code
- Data
- Output
  - I also use separate sub-folders for tables, figures, & maps
- Text (e.g. LaTeX files)



^ This is from my job market paper

# Directories

For long scripts that do many steps in sequence, like building a data set, it is also a good practice to number your scripts

- ④ 0.1\_download\_db1b\_data.R
- ④ 0.2\_download\_EIA\_data.R
- ④ 0.3\_download\_Quandl\_data.R
- ④ 0.4\_download\_BEA\_data.R
- ④ 0.5\_download\_CPI.R
- ④ 0.6\_extract\_CORSIA\_appendix\_c.R
- ④ 0.7\_download\_shapefiles.R
- ④ 1.1\_calculate\_products\_DB1B\_data.R
- ④ 1.2\_calculate\_airport\_distance\_matrix.R
- ④ 1.3\_calculate\_fuel\_use\_and\_casm\_by\_aircraft\_T2\_P52\_data.R
- ④ 1.4\_calculate\_fuel\_use\_and\_casm\_by\_segment\_T100\_data.R
- ④ 1.5\_calculate\_fuel\_price\_paid\_P12a\_data.R
- ④ 1.6\_match\_market\_fips.R
- ④ 1.7\_calculate\_delay\_data.R
- ④ 2.1\_merge\_cleaned\_data.R

# Directories

## Make directories portable

In other words: **use relative paths**. Or don't hard-code your paths

Instead of

C:/User/me/my\_research/data/my\_data\_file.csv

use a relative path like this

data/my\_data\_file.csv

# Directories

It's not always possible to have relative paths everywhere

In that case, you can define all the paths in one single place and read it from there every time

# Project management

\*This part borrows extensively from course materials from Grant McDermott's *Data Science for Economists* (Oregon) and Ivan Rudik's *Dynamic Optimization* (Cornell)

# Before we continue...

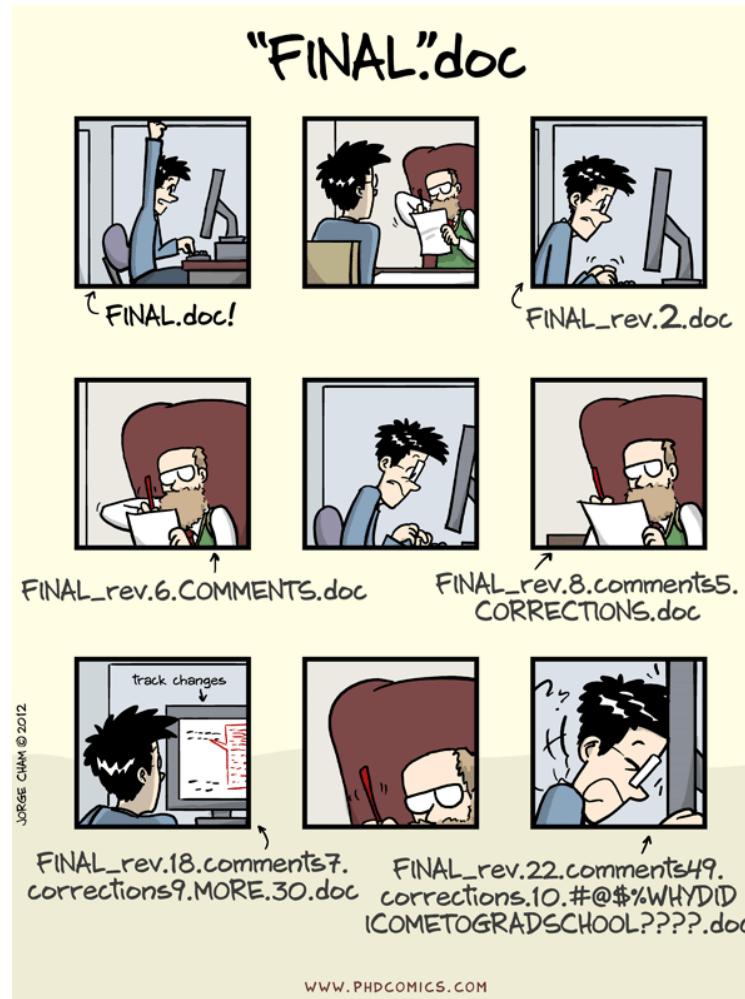
By now you hopefully have

1. GitHub Desktop installed on your laptop
2. A GitHub account

After class, please:

- Send me an e-mail with your GitHub username
- Watch out for an invitation for our GitHub Classroom repository
- Accept the invitation

# Version Control: why bother?



# Git

- Git is a *distributed version control system*
  - Imagine if Dropbox and the "Track changes" feature in MS Word had a baby. Git would be that baby
- In fact, it's even better than that because Git is optimized for the things that economists spend a lot of time working on (e.g. code)
- It gives you an easy way to test out experimental changes (e.g. new specifications, additional model states) and not have them mess with your main code

# GitHub

## Git ≠ GitHub

- GitHub hosts a bunch of online services we want when using Git
  - Hosts a copy of your repository online
  - Allows for people to suggest changes to your project
  - Keeps track of team communication on tasks
  - And even let's you host some related content (like these slides!)
- It's also the main location for non-base Julia (and R) packages to be stored and developed

# The differences

**Git** is the software infrastructure for versioning and merging files

**GitHub** provides an online service to coordinate working with Git repositories

- And adds some additional features for managing projects
  - Stores the project on the cloud, allows for task management, creation of groups, etc

# Why Git(Hub)?

## Selfish reasons

- The private benefits of having well-versioned code in case you need to go back to previous stages
- Your directories will be super clean
- Makes it **MUCH** easier to collaborate on projects

# Why Git(Hub)?

## Semi-altruistic reasons

- The external benefits of open science, collaboration, etc
- These external benefits also generate some downstream private reputational benefits
  - You must be confident in your code to make it public
- Can improve future social efficiency
  - You commit to post future code (if you don't, it'll look shady)

# Git basics

Everything on Git is stored in something called a **repository** or *repo* for short. This is the directory for a project

- **Local**: a directory with a `.git` subdirectory that stores the history of changes to the repository
- **Remote**: a website, e.g. see the GitHub repo for the **Optim** package in Julia

# Git basics

JuliaNLSolvers / Optim.jl Public

Code Issues 52 Pull requests 14 Actions Projects Wiki Security Insights

master 79 branches 74 tags Go to file Add file Code

pkofod Update Project.toml 2 cdebfc 20 days ago 842 commits

.github/workflows Update TagBot.yml 10 months ago

docs check for nothing with `==!/==` instead of `==!/=` (#961) 2 months ago

joss Fix minor bugs (#815) 2 years ago

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README.md

## Optim.jl

Univariate and multivariate optimization in Julia.

Optim.jl is part of the [JuliaNLSolvers](#) family.

About

Optimization functions for Julia

optimization julia optim

optimisation unconstrained-optimization

unconstrained-optimisation

Readme View license Cite this repository 804 stars 33 watching 187 forks

Releases 61

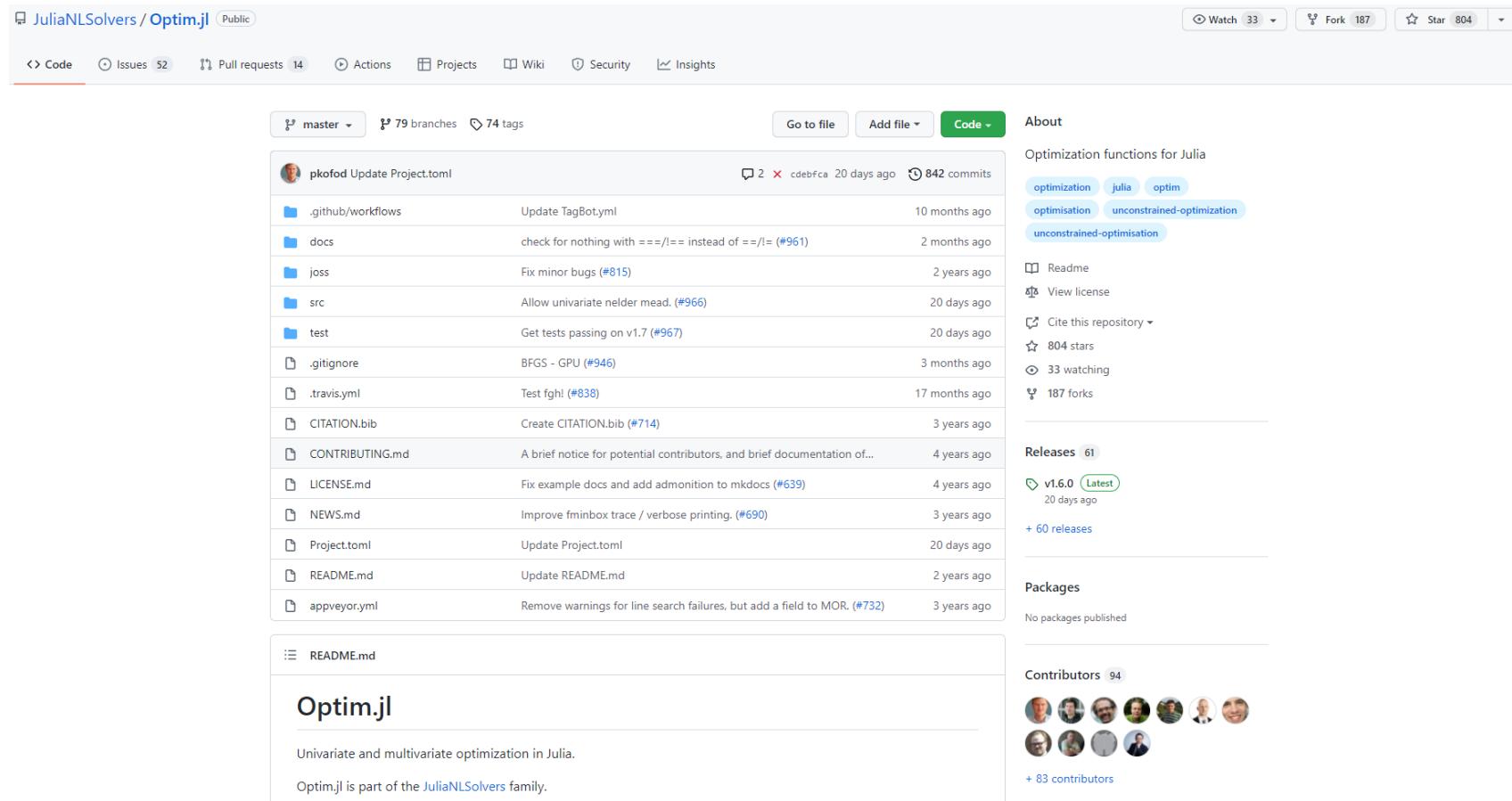
v1.6.0 Latest 20 days ago + 60 releases

Packages

No packages published

Contributors 94

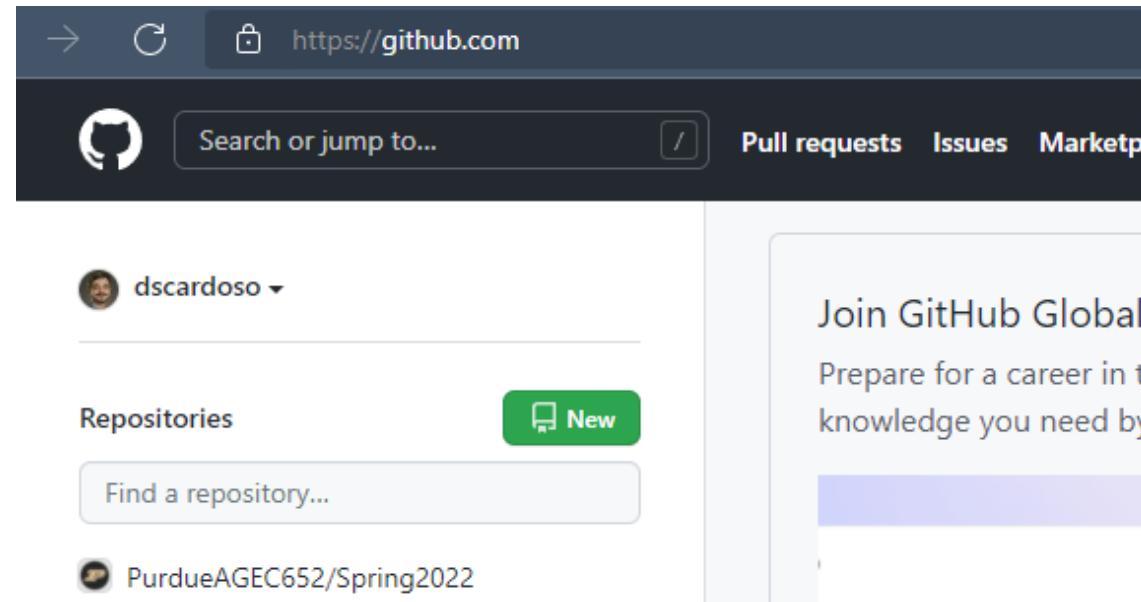
+ 83 contributors



# Creating a new repo on GitHub

## Let's create a new repo

Easy from GitHub website: just click on that green **New** button from the launch page



# Creating a new repo on GitHub

Next steps:

1. Choose a name
2. Choose a description
3. Choose whether the repo is public or private
4. Choose whether you want to add a `README.md` (yes), or a `.gitignore` or a `LICENSE.md` file (more next slide)

# Creating a new repo on GitHub

## Create a new repository

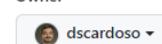
A repository contains all project files, including the revision history. Already have a project repository elsewhere?  
[Import a repository.](#)

### Repository template

Start your repository with a template repository's contents.

No template ▾

Owner \*



Repository name \*

agec652\_example\_repo



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

Description (optional)



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](#).

.gitignore template: Julia ▾

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**

# Creating a new repo on GitHub

Repos come with some common files in them

- `.gitignore`: lists files/directories/extensions that Git shouldn't track (raw data, restricted data, those weird LaTeX files). This is usually a good idea
- `README.md`: a Markdown file that is basically the welcome content on repo's GitHub website. You should generally initialize a repo with one of these
- `LICENSE.md`: describes the license agreement for the repository

# Repo of Optim.jl again

JuliaNLSolvers / Optim.jl Public

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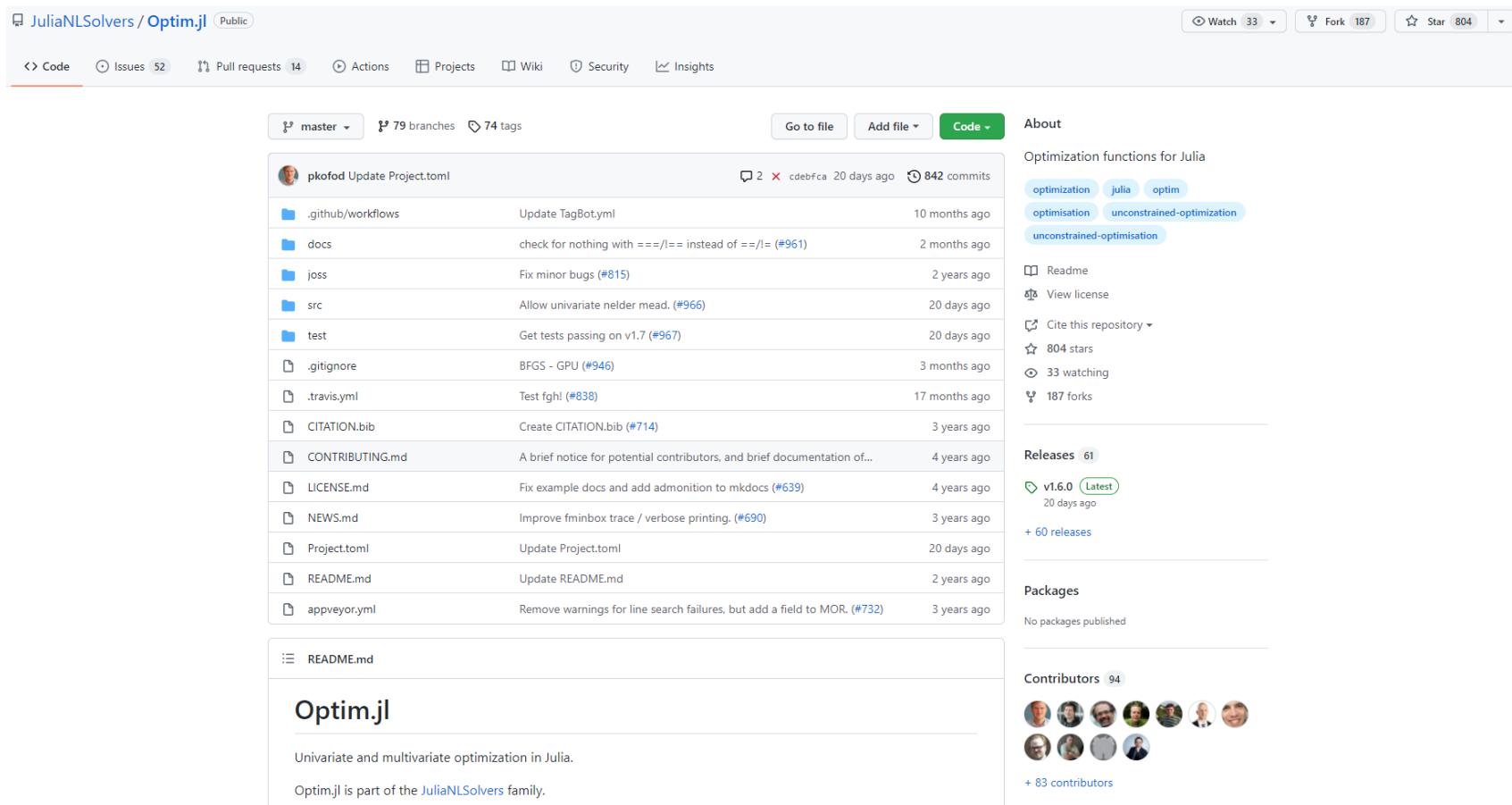
v1.6.0 Latest 20 days ago + 60 releases

Packages

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Contributors 94

+ 83 contributors



# Creating a new repo on GitHub

You can find the repo at [https://github.com/discardoso/agec652\\_example\\_repo](https://github.com/discardoso/agec652_example_repo)

The screenshot shows the GitHub repository page for 'discardoso / agec652\_example\_repo'. The repository is public, has 1 branch (main), and 0 tags. It contains one commit from 'discardoso' labeled 'Initial commit' made 29d8775 ago. The repository has 0 stars, 1 watching, and 0 forks. The README.md file contains the text 'agec652\_example\_repo'. The page also includes sections for About, Releases, and Packages, both of which are currently empty.

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

main 1 branch 0 tags

discardoso Initial commit 29d8775 now 1 commit

.gitignore Initial commit now

README.md Initial commit now

README.md

agec652\_example\_repo

About

No description, website, or topics provided.

Readme

0 stars

1 watching

0 forks

Releases

No releases published

Create a new release

Packages

No packages published

Publish your first package

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# How do I get a repo on GitHub onto on my computer?

## Clone

To get the repository on your local machine you need to **clone** the repo

Key thing: this will **link** your local repository to the remote

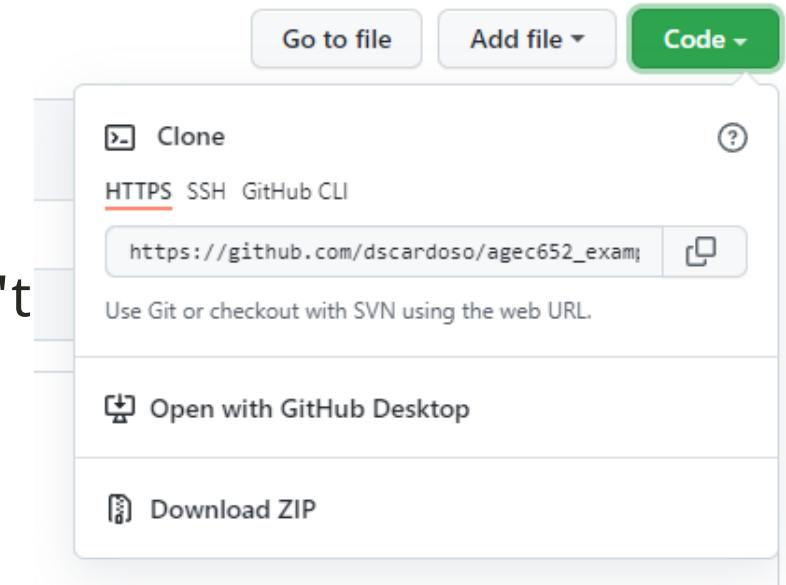
- You'll be able to update your local when the remote is changed

# Cloning

Click on

- Code > Open with GitHub Desktop

You can also use git command line for that (we won't cover it here)



# Your turn!

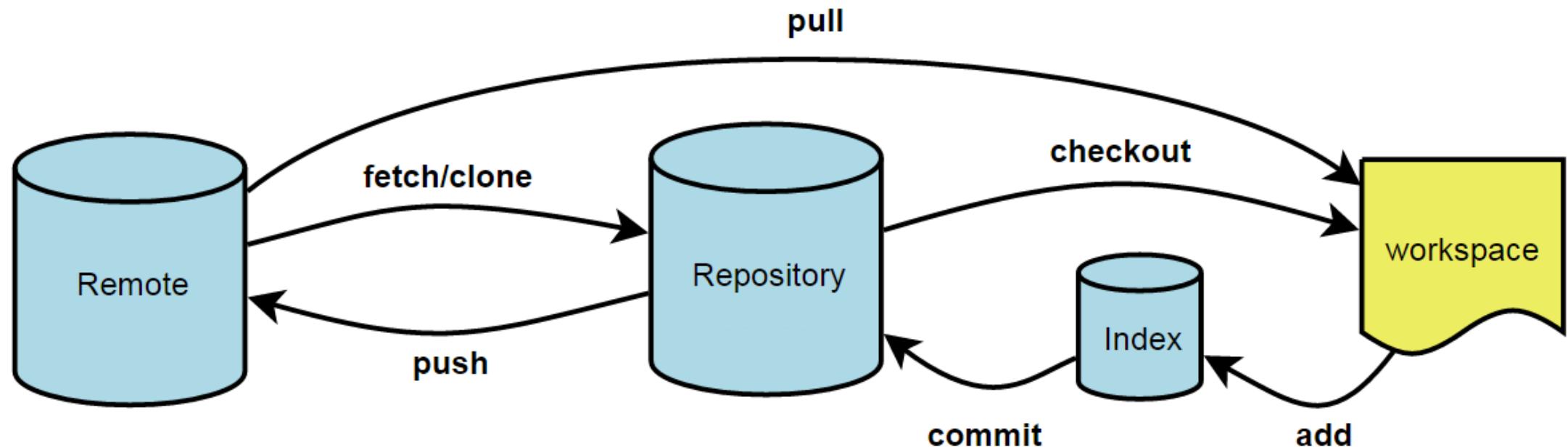
Create and clone your own repository on GitHub and initialize it with a `README.md` file

# Git workflow

Workspace: actual files on your computer

Repository/local: your saved local history of changes to the files in the repository

Remote/origin: remote repository on GitHub that allows for sharing across collaborators



# Using Git

There are only a few basic Git operations you need to know for versioning solo economics research efficiently

**Add/Stage:** Add files & modifications to the index

- Take a snapshot of the changes you want updated/saved in your local repository (i.e. your computer)

**Commit:** Record the changes to your local repository

- This requires a short message to record what was done or changed

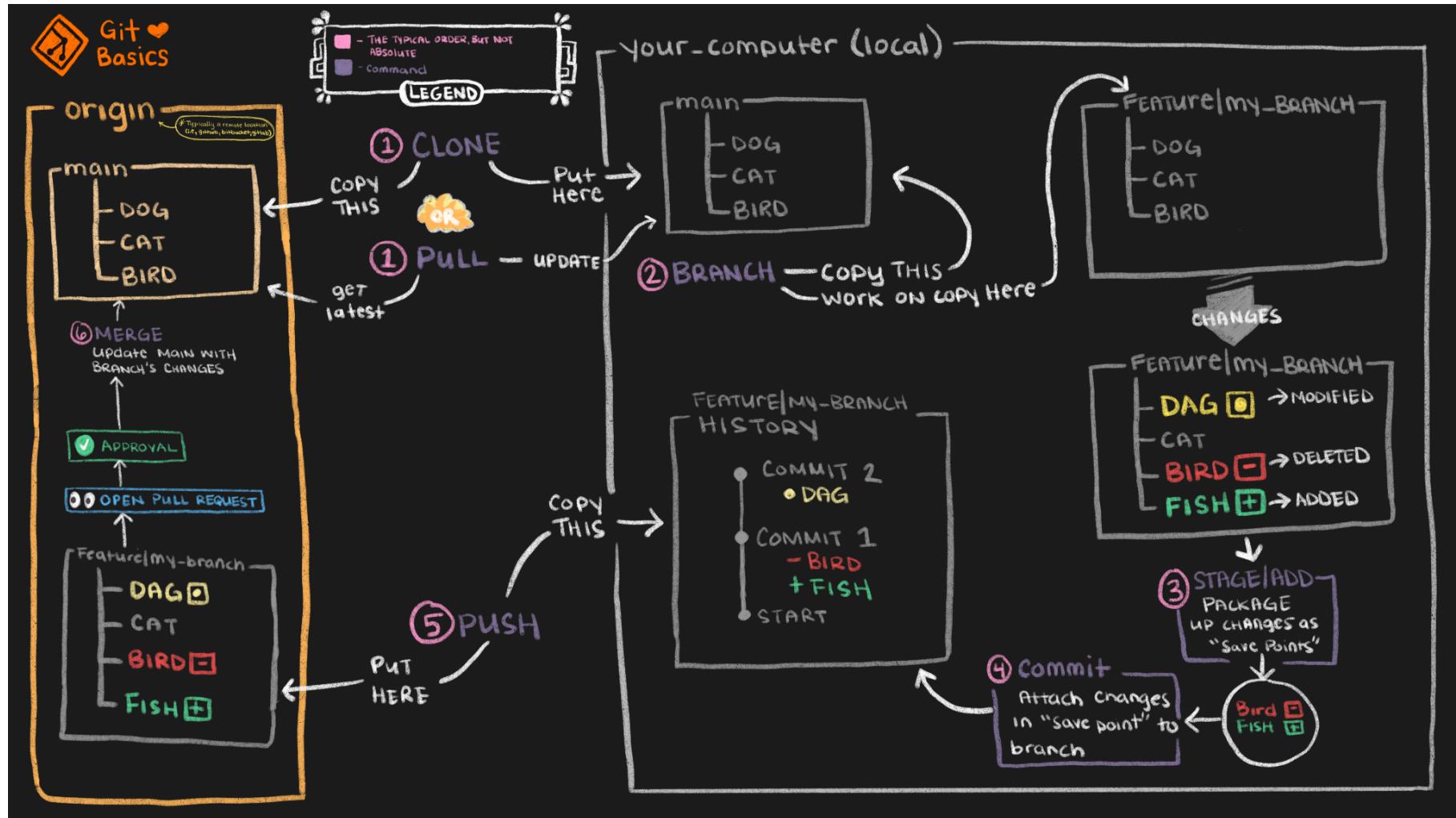
# Using Git

**Push:** Send the changes you committed in the local repository to the remote repository (i.e. GitHub)

**Pull:** Take changes on the remote and integrate them with the local repository

- Technically two operations: `fetch` and `merge`

# Git workflow: a sequence



# Your turn!

In your own repository do the following:

1. Open `README.md` in some text editor and insert the following code: `# Hello World!`
2. Save `README.md`
3. Add the changes to `README.md` to the index
4. Commit the changes to your local repo with the message: "First `README.md` edit."
5. Push the changes to your remote

Did the changes show up your repo's GitHub page?

# Using Git: branching

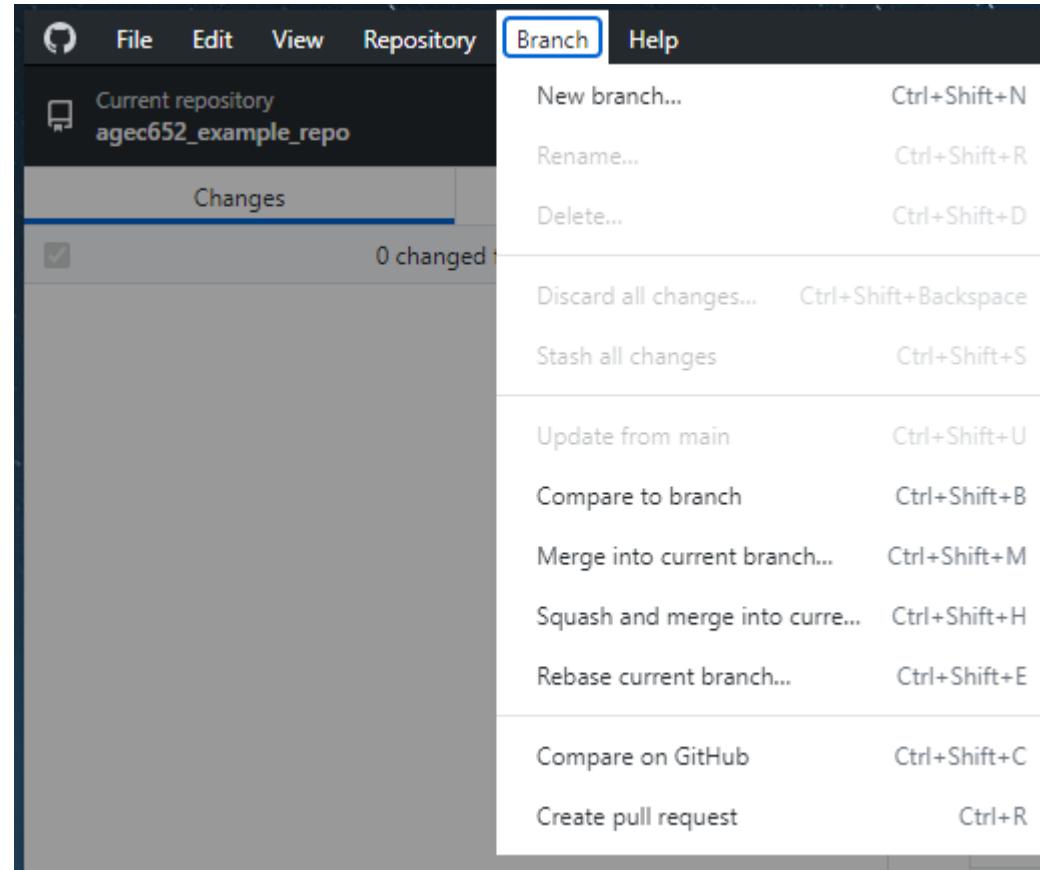
Some more (but not very) advanced operations relate to **branching** and **pull requests**

Branching creates different, but parallel, versions of your code

- If you want to test out a new feature of your model but don't want to contaminate your `main` branch, create a new branch and add the feature there
- If it works out, you can bring the changes back into `main`
- If it doesn't, just delete it

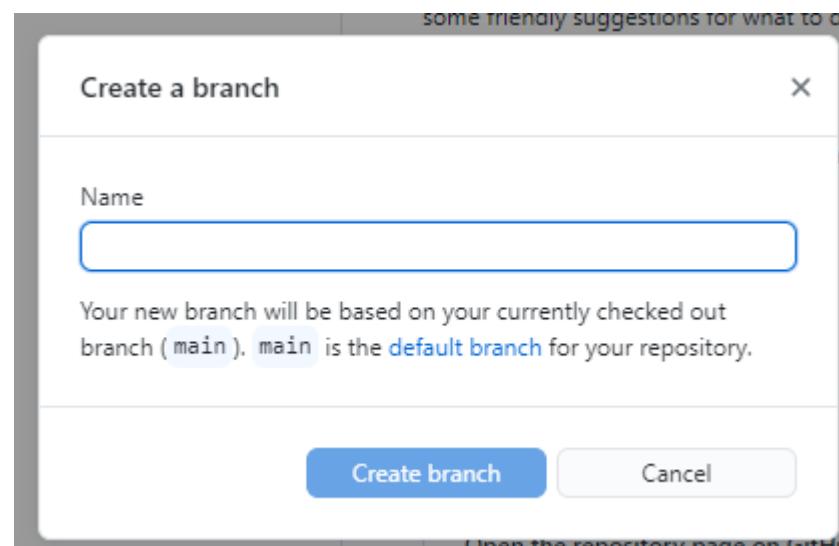
# Using Git: branching

It is easy to create a branch on GitHub Desktop



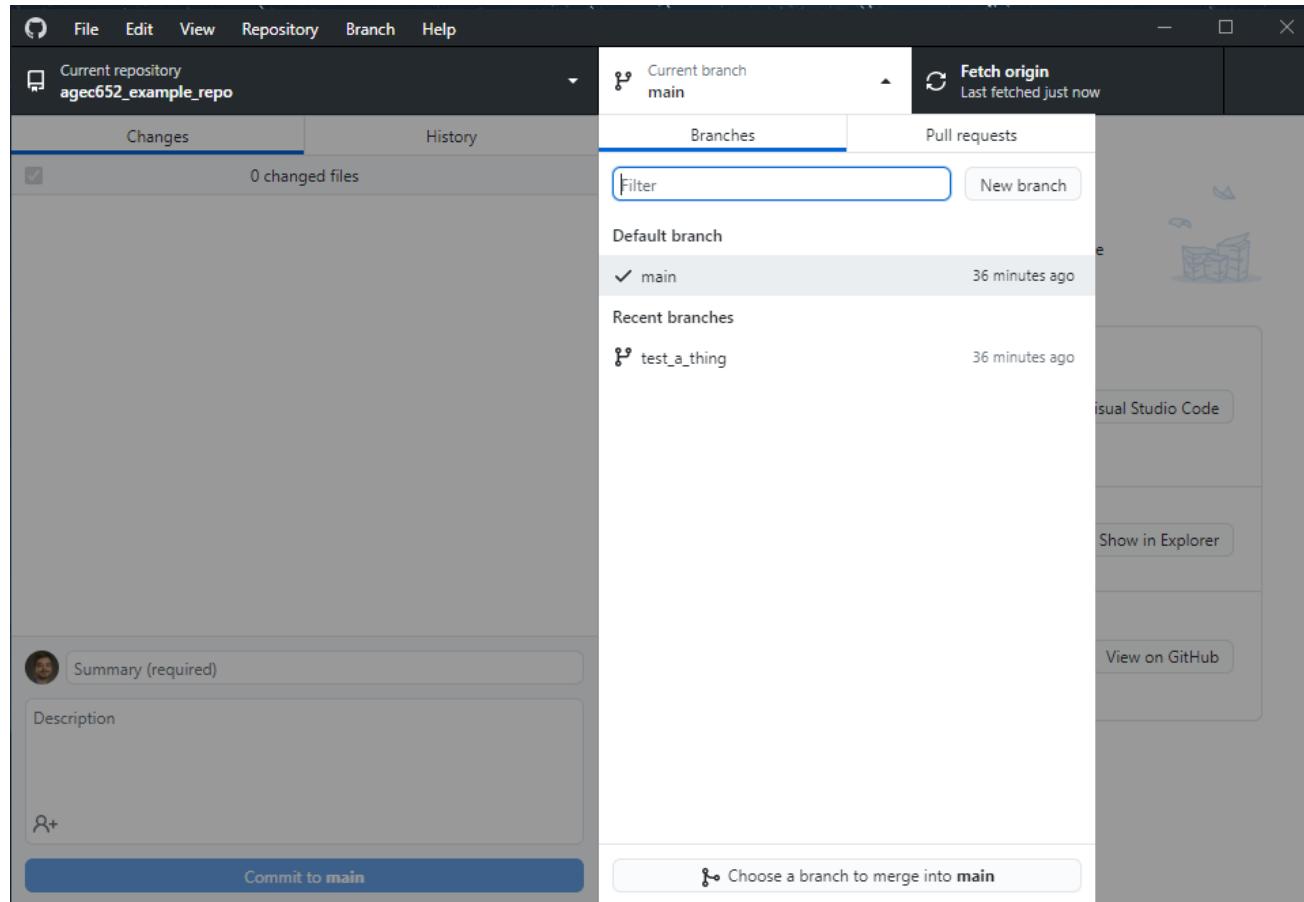
# Using Git: branching

It is easy to create a branch on GitHub Desktop



# Using Git: branching

And also to switch and merge your branch into the main



# Your turn!

In your own repository do the following:

1. Create a new branch called `test-branch`
2. Edit `README.md` and add the following code: `## your_name_here`
3. Save `README.md`
4. Add the changes to `README.md` to the index
5. Commit and push the changes with the message: "Test change to `README.md`."
6. Switch to the `main` branch
7. Choose your `test-branch` to merge into the `main` branch
8. Push the changes to your remote
9. Check your repo's GitHub page

# Pull requests

- The branch + merge we just did is the standard workflow if you are working alone
- When you are working with collaborators, before merging it is *best to announce first* that you have finished the branch or completed a new feature
- This is done with a **pull request**
- In practice, this is also a way to group a bunch of commits into a single new feature and let others know about it

# Pull requests

Once you have committed and pushed changes to a branch, you create a new pull request on GitHub Desktop...

# Pull requests

...or on the GitHub website

The screenshot shows the GitHub interface for managing pull requests. At the top, there is a navigation bar with tabs: Code, Issues, Pull requests (which is the active tab), Actions, Projects, Wiki, Security, and an ellipsis (...). Below the navigation bar are several search and filter options: 'Filters' with a dropdown arrow, a search bar containing 'is:pr is:open', a 'Labels' button with the number '9', a 'Milestones' button with the number '0', and a green 'New pull request' button. Underneath these, there are two status indicators: '0 Open' and '1 Closed'. A large search results area below contains a single icon of a pull request and the text 'There aren't any open pull requests.' It also includes a note: 'You could search [all of GitHub](#) or try an [advanced search](#)'. At the bottom of the page, there is a 'ProTip!' message: 'Follow long discussions with [comments:>50](#)'.

💡 ProTip! Follow long discussions with [comments:>50](#).

# Pull requests

Enter a description and assign any reviewers

# Pull requests

Once you and your collaborators are happy with it, just go ahead and merge pull request

# Pull requests

And you're done!

Create new\_feature.jl #2

Merged dscardoso merged 1 commit into main from test now

Conversation 0 Commits 1 Checks 0 Files changed 1 +1 -0

dscardoso commented 3 minutes ago Just a test, really

dscardoso commented 1 minute ago So I'll just go ahead and merge

dscardoso merged commit cfcb7d9 into main now Revert

Pull request successfully merged and closed You're all set—the test branch can be safely deleted. Delete branch

Reviewers No reviews

Assignees No one—assign yourself

Labels None yet

Projects None yet

Milestone No milestone

Linked issues Successfully merging this pull request may close these issues.

None yet

The screenshot shows a GitHub pull request titled "Create new\_feature.jl #2". A purple "Merged" button indicates the merge has been completed. The pull request has 1 commit from the "test" branch into the "main" branch. The conversation shows two comments from the user "dscardoso": one saying "Just a test, really" and another saying "So I'll just go ahead and merge". The pull request is successfully merged, and a message at the bottom says "Pull request successfully merged and closed". The right side of the screen displays settings for reviewers, assignees, labels, projects, milestones, and linked issues, all of which are currently empty or set to "None yet".

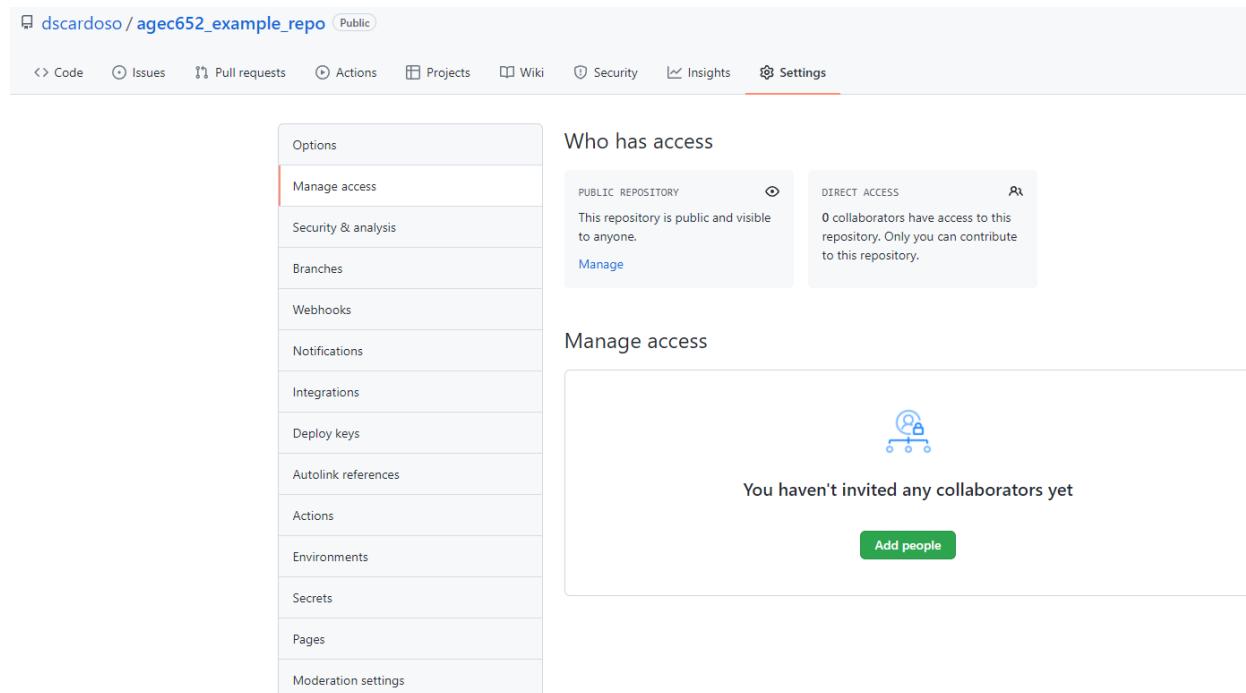
# Your turn!

In your own repository do the following:

1. Switch back to `test-branch`
2. Create a new file called `new_feature.jl` and write anything in it
3. Commit and push the changes with the message "Adding new feature"
4. Create a pull request and add "New feature" as a description
  - (Here is where you and collaborators would discuss/agree)
5. Go ahead and "Merge pull request"

# Team up

1. Find a partner for this next piece
2. One of you invites the other to collaborate on the project: GitHub page > Settings > Manage access > invite a collaborator



# Team up

If you were the one being invited, accept the invite, and clone the repo to your local

Now do the following:

1. Each of you edit the `# Hello World!` line of code to be something else and different from each other
2. Commit the changes to your local
3. Have the repo creator push their changes
4. Have the collaborator push their changes

# Can't push changes when you aren't updated

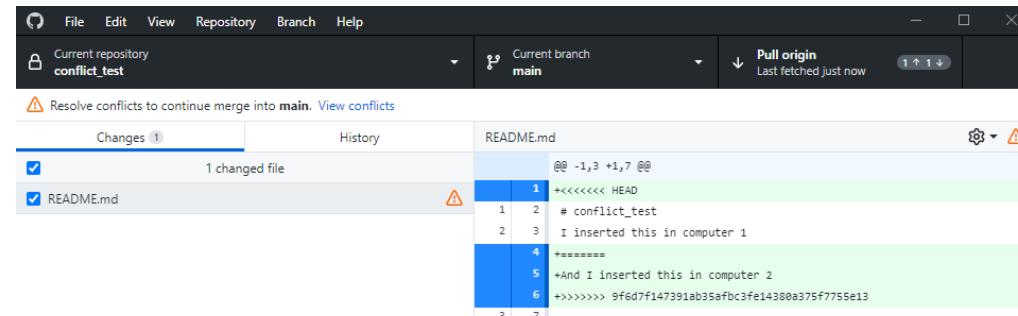
It turns out that the second person can't push their local changes to the remote

The second person is pushing their history of changes

But the remote is already one commit ahead because of the first person, so the second person's changes can't be pushed

# Update by pulling after you commit local changes

You need to pull the remote changes first. But then you try to pull your commit and you get a **merge conflict** in `README.md`



The screenshot shows a Git interface with the following details:

- Repository:** conflict\_test
- Branch:** main
- Pull origin:** Last fetched just now
- Changes:** 1 changed file (`README.md`)
- Content of README.md:**

```
@@ -1,3 +1,7 @@
+<<<< HEAD
1 # conflict_test
2 I inserted this in computer 1
3
4 =====
5 +And I inserted this in computer 2
6 +>>>> 9f6d7f147391ab35afbc3fe14380a375f7755e13
```
- Commit Dialog:** A modal window titled "Update README.md" with a "Commit to main" button.

# Merge conflicts

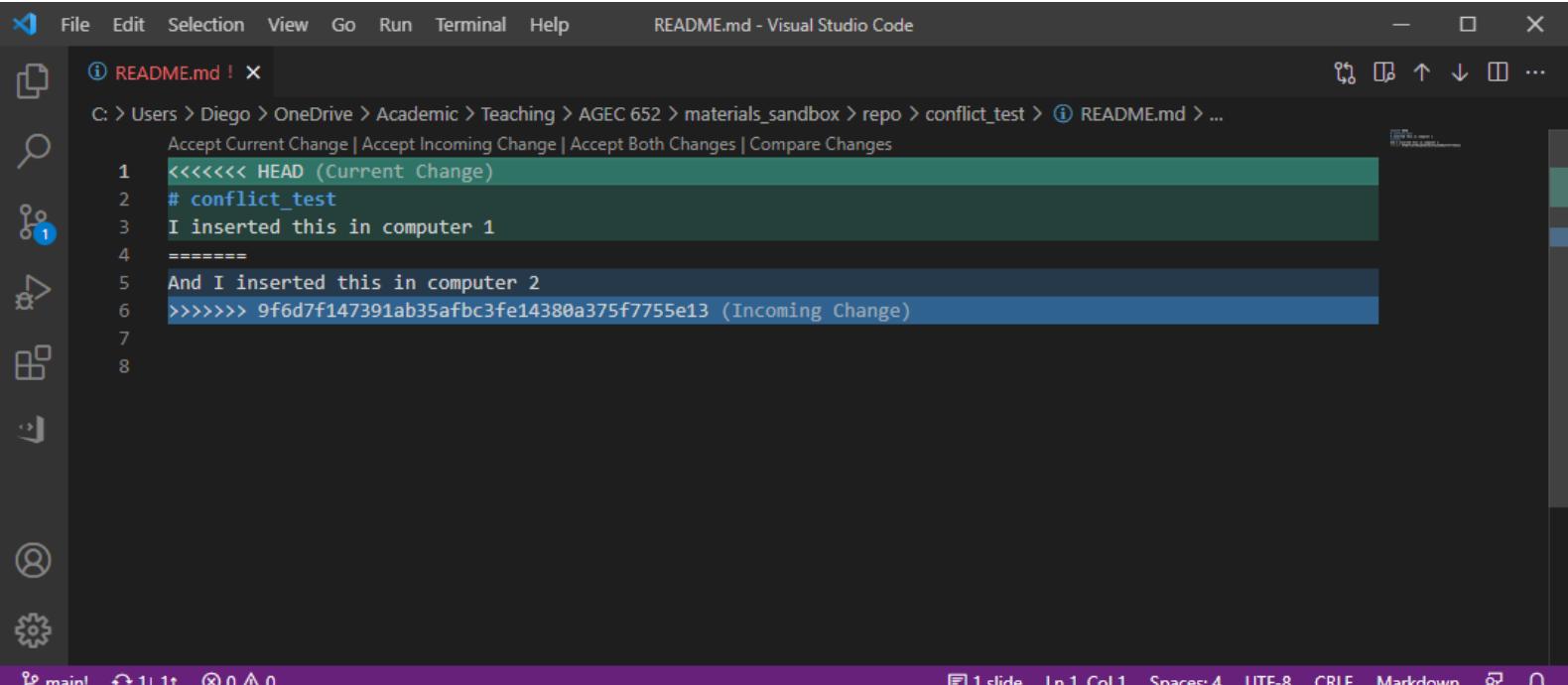
This means there were differences between the remote and your local that conflicted

Sometimes there will be conflicts between two separate histories

- E.g. if you and your collaborator edited the same chunk of code separately on your local repos
- When you try to merge these histories by pushing to the remote, Git will throw a **merge conflict**

# Merge conflicts

Good code editors (like Visual Studio Code) "understand" git and will show you nicely where the conflict is



The screenshot shows a Visual Studio Code window with the file `README.md` open. The status bar at the bottom indicates it's the main branch. The code editor displays the following content:

```
1 <<<< HEAD (Current Change)
2 # conflict_test
3 I inserted this in computer 1
4 =====
5 And I inserted this in computer 2
6 >>>> 9f6d7f147391ab35afbc3fe14380a375f7755e13 (Incoming Change)
```

The first two lines are highlighted in green, representing the current change. The last two lines are highlighted in blue, representing the incoming change. A status bar at the bottom right shows the file has 1 slide, is at line 1, column 1, with 4 spaces, using UTF-8 encoding, and is in Markdown mode.

# Solving merge conflicts

```
<<<<< HEAD
```

Indicates the start of the conflicted code

```
=====
```

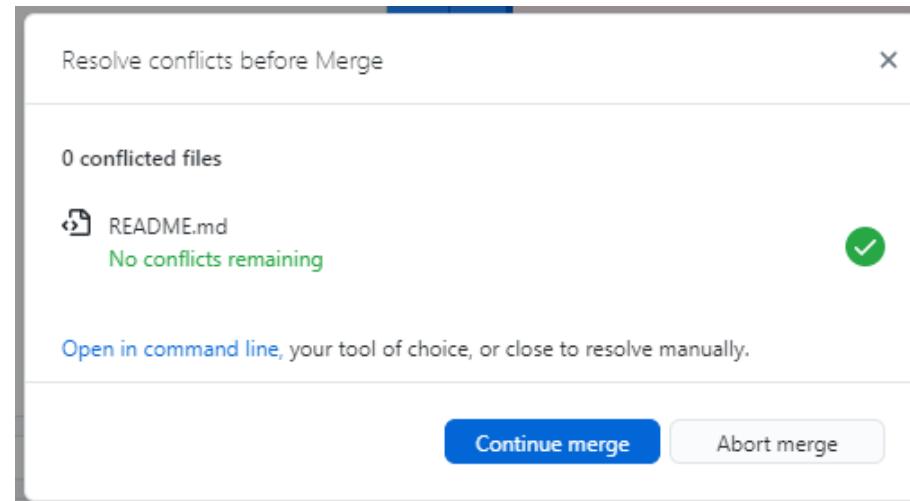
Separates the two different conflicting histories

```
>>>>> lots of numbers and letters
```

Indicates the end of the conflicted code and the hash (don't worry about it) for the specific commit

# Fixing a merge conflict

Merge conflicts can be fixed by directly editing the file. Then Continue merge on GitHub Desktop. Fixed!



Let's get back to Gentzkow and Shapiro's  
rules

# Version control

## Store code and data under version control

- Now you know how to do that with Git(Hub)
- But I don't recommend using it for large data sets
  - Might actually be impossible because GitHub sets a strict size limit of 100 MB per file
  - For large data, use Dropbox/OneDrive/Box

## Run the whole directory before checking it back in

- In other words: *avoid committing a version with bugs or that breaks other code in your project*

# Management

**Manage tasks with a task management system**

**E-mail is not a task management system**

- You can do that in GitHub!
  - With the added benefit that you can easily link changes to tasks (we'll talk about that in a bit)
- But there are many other tools
  - Some examples: Asana, Trello, Notion, and even Outlook tasks

# Managing tasks and workflow with GitHub

GitHub is also very useful for task management in solo or group projects using **issues** and **pull requests**

**Issues:** task management for you and your collaborators

- It should be able to completely replace email
  - With the added benefit of organizing your discussions and decisions by topic

Let's look at the issues for the **Optim** package in Julia

# Issues

- The issues tab reports a list of 56 open issues (286 closed, i.e., task or problem has been solved)
- Each issue has its own title
- Let's one example of issue

The screenshot shows the GitHub Issues page for the repository `JuliaNLSolvers/Optim.jl`. The page has a header with repository statistics: Watch 33, Fork 187, Star 804, and Insights. Below the header, there is a message encouraging contributors to read the contributing guidelines before opening an issue. The main content area displays a list of 52 open issues. A search bar at the top allows filtering by issue status (isissue isopen). The list includes several issues related to optimization algorithms like L-BFGS, SparseMatrixCSC, and SAMIN, along with API documentation and convergence messages.

Issue Title	Opened By	Opened On	Comments
L-BFGS moves away from minimum?!	steven	14 days ago	8
Output sparsity pattern of SparseMatrixCSC depends on autodiff option (finite, forward, backward/flux)	lemling-chip	Dec 7, 2021	5
Newton with trust regions questions / issues	NittanyLion	Nov 19, 2021	1
No API docs for the callback arguments	theogf	Nov 9, 2021	1
misleading convergence message for SAMIN	mcnel	Nov 7, 2021	1
Support user-specified inverse Hessian initialization with L-BFGS	ethanen	Oct 25, 2021	1
Fminbox incompatible with ParticleSwarm and SimulatedAnnealing	ValentinKaisermayer	Oct 19, 2021	1

# Issues

One person reported issues with the documentation of a function, which does not match the actual function

Someone else has responded with some feedback

The screenshot shows a GitHub issue page for the repository `JuliaNLSSolvers / Optim.jl`. The issue is titled "incoherent documentation for SimulatedAnnealing #925". The first comment is from `etiennedeg` on Jun 2, 2021, stating:

Hi,  
From the documentation :  
The constructor takes 3 keywords:

- `neighbor = a!(x_proposed, x_current)`, a mutating function of the current `x`, and the proposed `x`
- `T = b(iteration)`, a function of the current iteration that returns a temperature
- `p = c(f_proposal, f_current, T)`, a function of the current temperature, current function value and proposed function value that returns an acceptance probability

In the implementation, `T` is denoted `temperature`, `p` is not implemented and it accept the key-word `keep_best` which is not documented.  
Should the `p` keyword be implemented ?

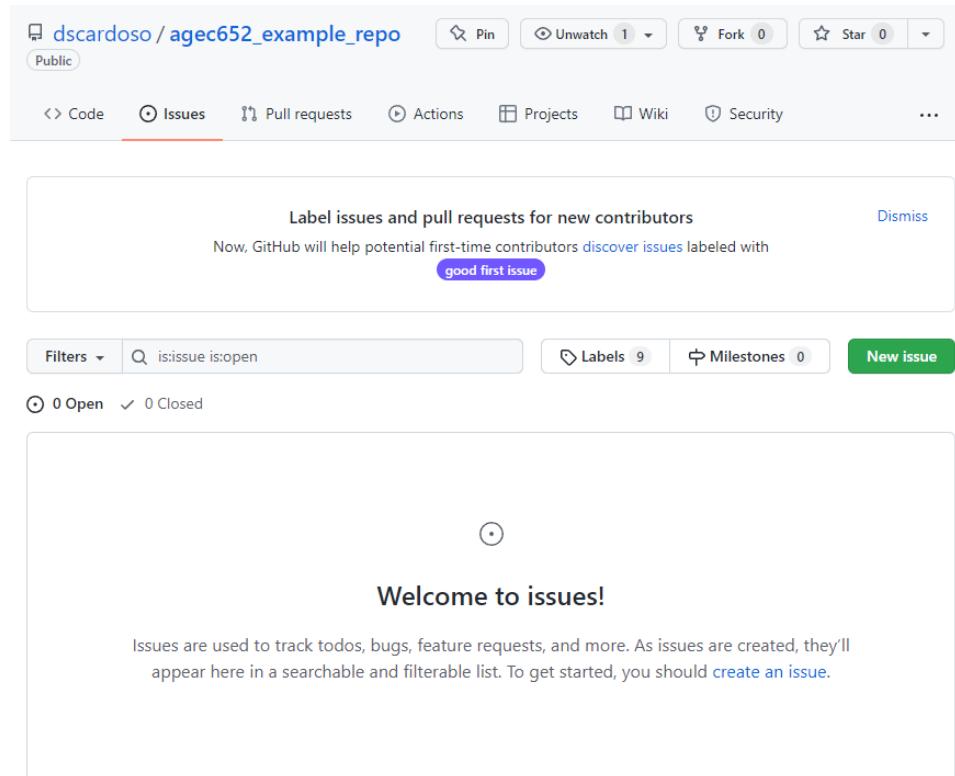
The second comment is from `pkofod` on Jun 8, 2021, replying:

Huh. I totally failed to see that in the original PR.  
<https://github.com/JuliaNLSSolvers/Optim.jl/pull/650/files>. You're right, it's a mess. `p` could be added yes, but it should be call `proposal` instead. Is it something you'd find useful? Would you want to take a stab at implementing it?

The GitHub interface includes standard navigation and repository statistics at the top.

# Issues

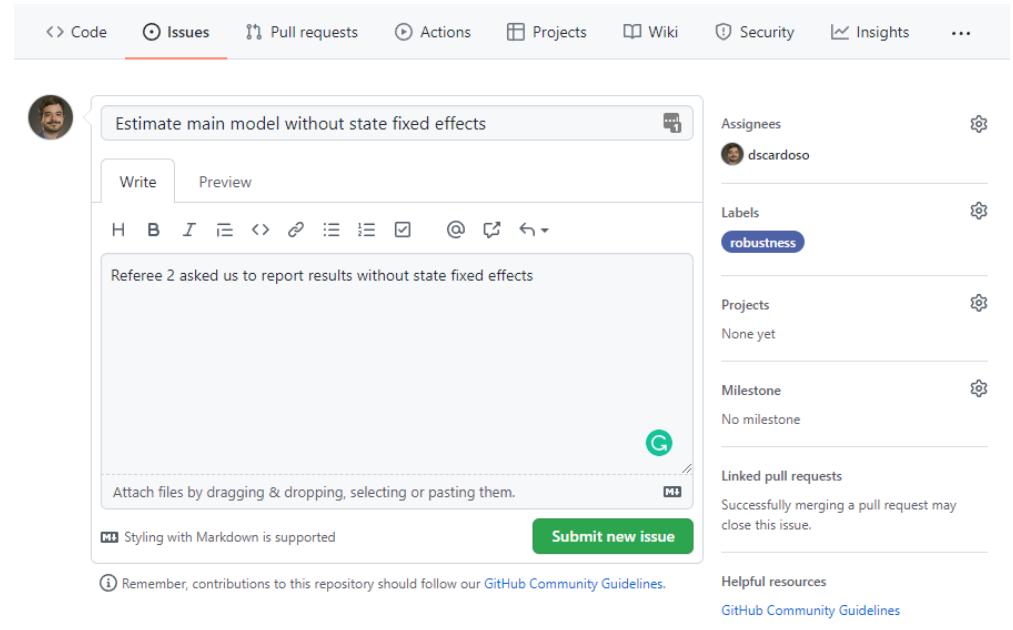
It is easy to creat a new task or *issue*: from the issues tab, click the green **new issue** button which takes you here



# Issues

Then you can

- Add a title
- Add a description
- Assign the task to a collaborator
- Add labels/tags



# Issues

The issue keeps track of the history of everything that's happened to it

Estimate main model without state fixed effects #1 [Edit](#) [New issue](#)

[Open](#) dscardoso opened this issue now · 0 comments

dscardoso commented now

Referee 2 asked us to report results without state fixed effects

dscardoso added the **robustness** label now

dscardoso self-assigned this now

Assignees

dscardoso

Labels

**robustness**

Projects

None yet

Milestone

No milestone

Linked pull requests

Successfully merging a pull request may close this issue.

None yet

Notifications

Customize

[Unsubscribe](#)

You're receiving notifications because you're watching this repository.

Write Preview

H B I  $\equiv$   $\leftrightarrow$   $\oplus$   $\ominus$   $\equiv$   $\equiv$   $\boxtimes$   $\boxdot$   $\boxleftarrow$   $\boxrightarrow$

Leave a comment

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

[Close issue](#) [Comment](#)

Remember, contributions to this repository should follow our [GitHub Community Guidelines](#).

# Issues

You can reference people with @ which brings up a dropdown menu of all collaborators on the project

Include robustness check regression tables in the appendix #2

Open discardoso opened this issue now · 0 comments

The screenshot shows a GitHub issue page for a pull request. A comment has been made by a user named 'discardoso'. Below the comment, there is a rich text editor interface. In the editor, the '@' symbol is typed, which triggers a dropdown menu showing a list of users starting with 'd'. One user, 'discardoso Diego S Cardoso', is highlighted in blue. To the right of the editor, there is a sidebar with various settings: Assignees (No one—assign yourself), Labels (None yet), Projects (None yet), Milestone (No milestone), Linked pull requests (Successfu...), Notifications (Customize), and an Unsubscribe button.

Include robustness check regression tables in the appendix #2

Open discardoso opened this issue now · 0 comments

discardoso commented now

Owner

...

Collect the table results generated from the new robustness checks and include them in the appendix Tex file

Assignees

No one—assign yourself

Labels

None yet

Projects

None yet

Milestone

No milestone

Linked pull requests

Successfully merging a pull request may close this issue.

Notifications

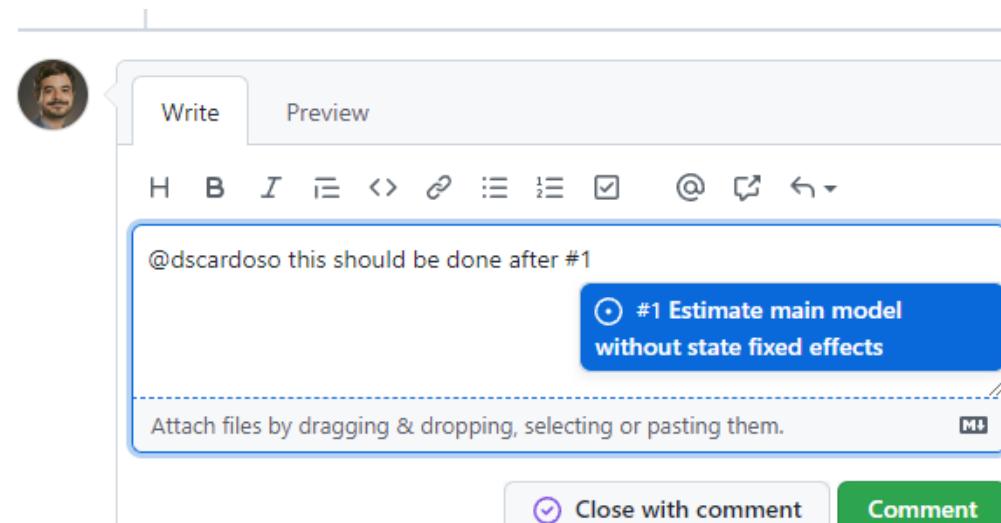
Customize

Unsubscribe

Remember, contributions to this repository should follow our [GitHub Community Guidelines](#).

# Issues

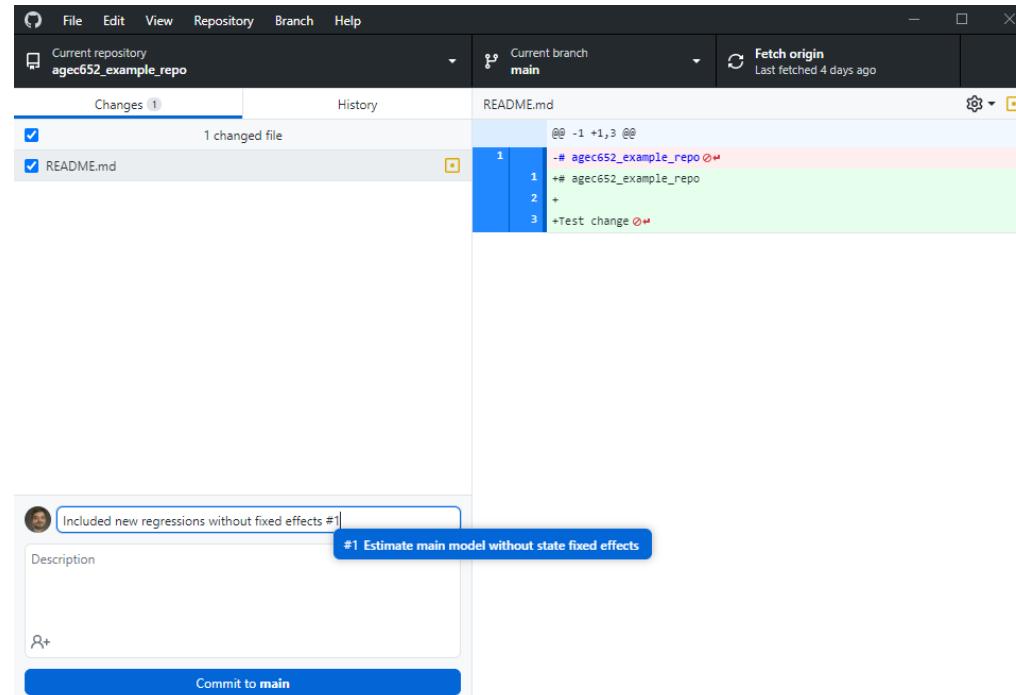
You can also reference *other issues* if they're related by using `#` which brings up a dropdown of all issues for your repository



ⓘ Remember, contributions to this repository should follow our [GitHub Community Guidelines](#).

# Issues

Issues can also be referenced in your commits to your project by adding `#issue_number_here` to the commit message



# Issues

Then those commits show up in your issue so you have a history of what code changes have been made

Estimate main model without state fixed effects #1 Edit New issue

Open discardoso opened this issue 12 minutes ago · 0 comments

discardoso commented 12 minutes ago

Referee 2 asked us to report results without state fixed effects

discardoso added the **robustness** label 12 minutes ago

discardoso self-assigned this 12 minutes ago

discardoso added a commit that referenced this issue 29 seconds ago

Included new regressions without fixed effects #1 825d134

discardoso mentioned this issue 12 seconds ago

Include robustness check regression tables in the appendix #2

Open

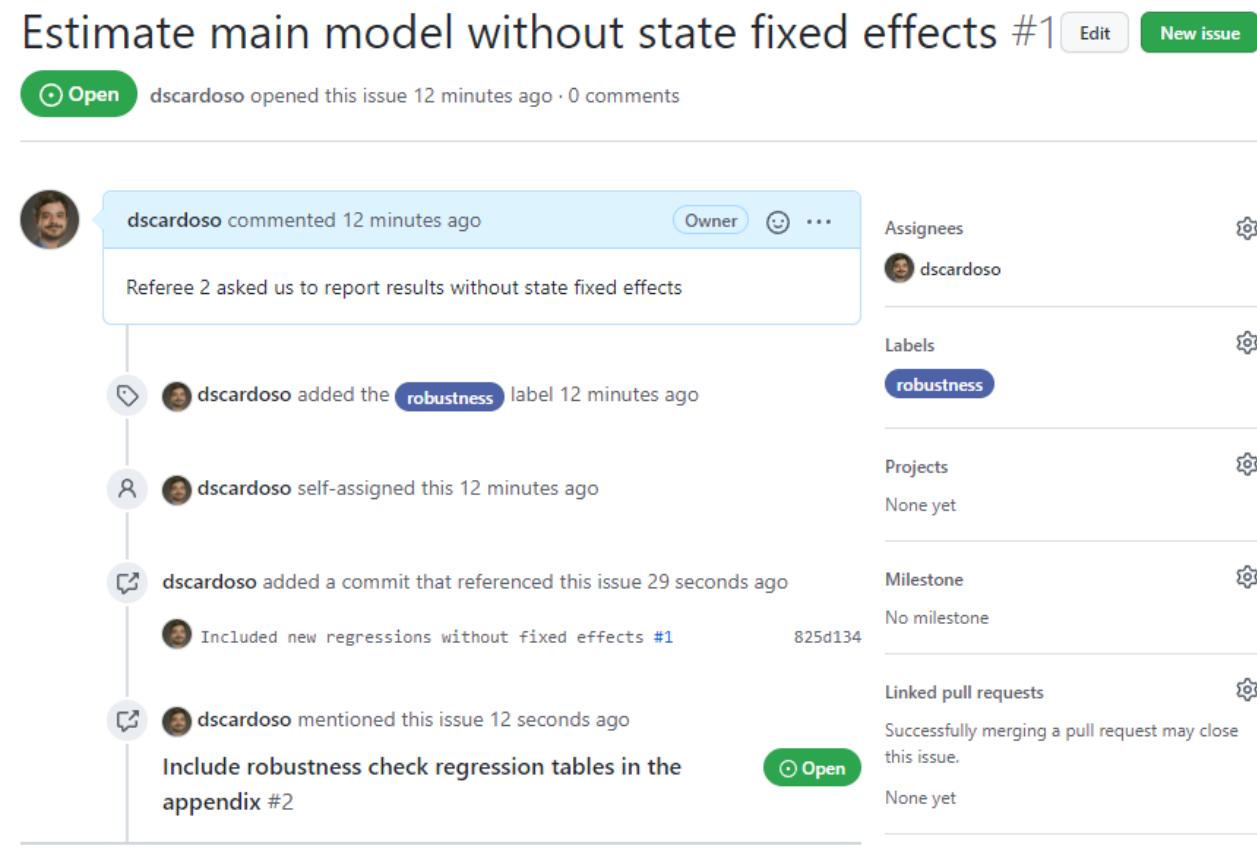
Assignees  
discardoso

Labels  
**robustness**

Projects  
None yet

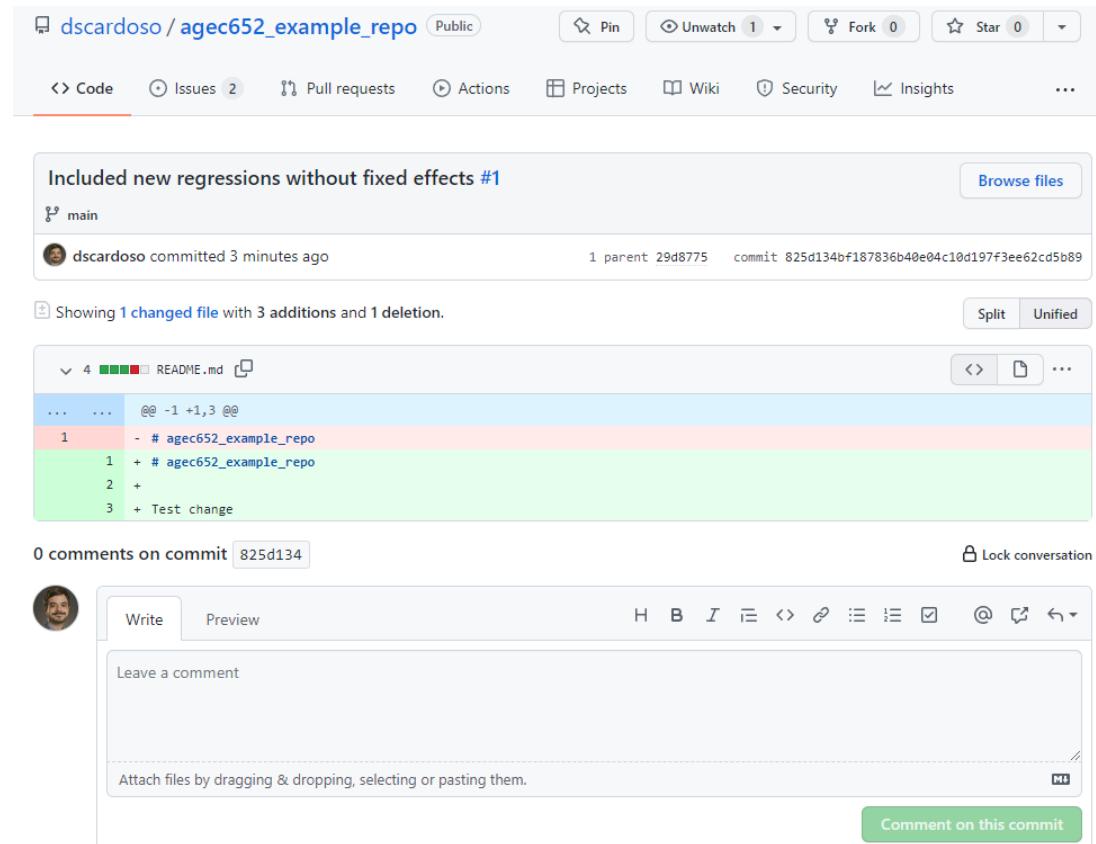
Milestone  
No milestone

Linked pull requests  
Successfully merging a pull request may close this issue.  
None yet



# Issues

If you click on the commit, it takes you to the `git diff` which shows you any changes to files made in that commit



The screenshot shows a GitHub commit page for the repository `dcardoso / agec652_example_repo`. The commit is titled "Included new regressions without fixed effects #1". It was committed by `dcardoso` 3 minutes ago, with a commit hash of `825d134bf187836b40e04c10d197f3ee62cd5b89`. The commit message indicates changes to `README.md`, showing 3 additions and 1 deletion. The diff view highlights the changes:

```
diff --git a/README.md b/README.md
index 1234567..825d134 100644
--- a/README.md
+++ b/README.md
@@ -1 +1,3 @@
- # agec652_example_repo
+ # agec652_example_repo
+ +
+ + Test change
```

Below the diff, there are 0 comments on the commit, and a "Comment on this commit" button.

# Git FAQ

# FAQ

**Q: When should I commit (and push) changes?**

*A: Early and often*

- It's not quite as important as saving your work regularly, but it's a close second
- You should certainly push everything that you want your collaborators to see

# FAQ

**Q: Do I need branches if I am working on a solo project?**

*A: You don't really need them, but they offer big advantages in maintaining a sane workflow*

- Experiment without any risk to the main project!

# FAQ

## Q: What's the difference between cloning and forking a repo?

A: *Cloning directly ties your local version to the original repo, while forking creates a copy on your GitHub (which you can then clone)*

- Cloning makes it easier to fetch updates (and is often the best choice for new GitHub users), but forking has advantages too.

# FAQ

**Q: What happens when something goes wrong?**

*A: Look for help*

- Command line-based fixes: [ohshitgit.com](http://ohshitgit.com)
- Also, search on Stack Exchange

# FAQ

**Q: What happens when something goes *horribly wrong*? A: Burn it down and start again:** <http://happygitwithr.com/burn.html>

- This is a great advantage of Git's distributed nature:
  - If something goes horribly wrong, there's usually an intact version somewhere else



# Appendix

Submitting problem sets with GitHub Classroom

# Problem set submission

- We'll use our problem sets to get familiarized with GitHub workflow
- For each problem set, you will receive an invitation
- After you accept the invitation, GitHub will create a new private repository
  - Only you and Diego will be able to see its content
- GitHub will automatically create a *pull request* called **Feedback**
  - This is where I'll write any feedback I might have for your submission

# Problem set submission

This is what you should see after you accept an assignment invitation

The screenshot shows a GitHub Classroom interface. At the top, there's a dark header bar with the GitHub Classroom logo, 'GitHub Education' link, and user profile icons. Below the header, a large circular icon features a blue graduation cap with three stars. To its right, the text 'You're ready to go!' is displayed. Underneath, it says 'You accepted the assignment, **test-problem-set**'. It then states 'Your assignment repository has been created:' followed by a blue button with a link to the repository: <https://github.com/PurdueAGEC652/test-problem-set-discardoso>. Below this, it says 'We've configured the repository associated with this assignment (update)'. Further down, it indicates the assignment is due 'Your assignment is due by Jan 21, 2022, 23:59 EST'. A note at the bottom states: 'Note: You may receive an email invitation to join [PurdueAGEC652](#) on your behalf. No further action is necessary.' At the very bottom, there's a callout box with a backpack icon, the text 'Join the GitHub Student Developer Pack', and a description: 'Verified students receive free GitHub Pro plus thousands of dollars worth of the best real-world tools and training from GitHub Education partners — for free.' It includes a 'Learn more' link and an 'Apply' button.

# Problem set submission

Following the repository link, you'll see that it is pre-populated with any necessary files and instructions

The screenshot shows a GitHub repository page for 'test-problem-set-discardoso'. The repository is private and was generated from 'PurdueAGEC652/test-problem-set'. The main tab is 'Code'. The repository contains several files: 'solution.md', '.github', '.gitignore', 'README.md', and 'solve\_example\_2.jl'. The 'solution.md' file was updated 2 minutes ago. The '.github' folder was updated 1 hour ago. The '.gitignore' and 'README.md' files were both updated 1 hour ago. The 'solve\_example\_2.jl' file was updated 1 hour ago. The 'About' section indicates the repository was created by GitHub Classroom. It has 0 stars, 0 watching, and 0 forks. There are no releases published. The 'Languages' section shows 100.0% Julia. The 'Instructions' section provides guidance on how to submit the problem set.

PurdueAGEC652 / test-problem-set-discardoso Private generated from PurdueAGEC652/test-problem-set

Code Issues Pull requests Actions Projects Wiki Security ...

main Go to file Add file Code About

discardoso Update solution.md ... 2 minutes ago 5 .github GitHub Classroom Feedback 1 hour ago .gitignore Initial commit 1 hour ago README.md Initial commit 1 hour ago solution.md Update solution.md 2 minutes ago solve\_example\_2.jl Sending my solution 1 hour ago

AGEC 652 - Spring 2022

This is a an assignment for you to get familiarized with using GitHub to submit your problem sets.

Instructions

Once you set up your local repository, do the following:

- Locate the solve\_example\_2.jl file
- Edit the file so that it solves for  $q^* = 1.5$  and save
- Run the code and write down the answer in the solutions.txt file
- Commit changes and make a pull request

README.md

AGEC 652 - Spring 2022

This is a an assignment for you to get familiarized with using GitHub to submit your problem sets.

Instructions

Once you set up your local repository, do the following:

- Locate the solve\_example\_2.jl file
- Edit the file so that it solves for  $q^* = 1.5$  and save
- Run the code and write down the answer in the solutions.txt file
- Commit changes and make a pull request

test-problem-set-discardoso created by GitHub Classroom

Readme

0 stars

0 watching

0 forks

No releases published Create a new release

No packages published Publish your first package

Julia 100.0%

# Problem set submission

And this is what the **Feedback** pull request page will look like after your first commit

Feedback #1

[Edit](#) [Code](#)

[Open](#) github-classroom wants to merge 3 commits into [feedback](#) from [main](#)

Conversation 0 Commits 3 Checks 0 Files changed 2 +2 -2

github-classroom bot commented 1 hour ago • edited

💡 GitHub Classroom created this pull request as a place for your teacher to leave feedback on your work. It will update automatically. **Don't close or merge this pull request**, unless you're instructed to do so by your teacher. In this pull request, your teacher can leave comments and feedback on your code. Click the [Subscribe](#) button to be notified if that happens. Click the [Files changed](#) or [Commits](#) tab to see all of the changes pushed to [main](#) since the assignment started. Your teacher can see this too.

▶ Notes for teachers

Subscribed: [@dscardoso](#)

github-classroom bot and others added 3 commits 1 hour ago

Setting up GitHub Classroom Feedback (Verified) 1a7b690  
Sending my solution a894c2a  
Update solution.md 1e8f3be

Reviewers: No reviews. Still in progress? Convert to draft.

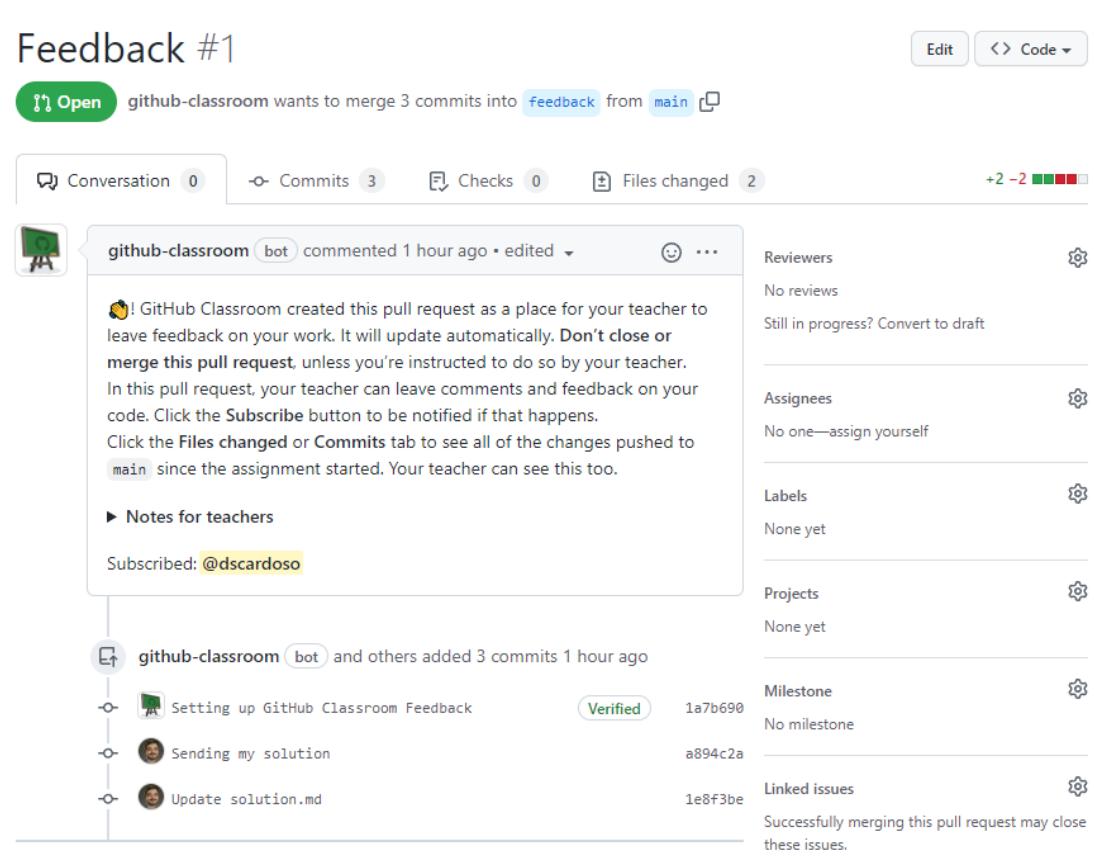
Assignees: No one—assign yourself.

Labels: None yet.

Projects: None yet.

Milestone: No milestone.

Linked issues: Successfully merging this pull request may close these issues.



# Next class

We'll jump into coding with Julia

**Before next class, please:**

1. Follow the instructions from [Quant Econ Lecture 1](#) to install Julia, Jupyter, and Visual Studio (VS) code on your laptop
2. Do a test run: follow the instructions on the "Test Problem Set" assignment on GitHub Classroom
  - Solve the equilibrium price for  $q^* = 1.5$
  - Write down the answer and commit/submit