CS 106S Week 6

Open Source & Web Software ⛅

Ben Yan, Spring 2025 🌸

cs106s.stanford.edu

Stanford | ENGINEERING
Computer Science

It’s Week 6!

Wellness check – how are you doing?

🌱🌷

Spring

Start of Spring

Add/Drop Deadline 😱

Weather machine: OFF ☔🥶

CS106B/ 107/109 Midterm

Midterms over! unless Math, Chem, Bio, Psych, CS, … :(

🌊🏖️

Summer!

Agenda for Today

1. **What is this all about?**

   What is open-source software and how is it relevant to web applications?

2. **How do I do it?**

   Tooling and technicalities. Your first pull request. Code review & merging.

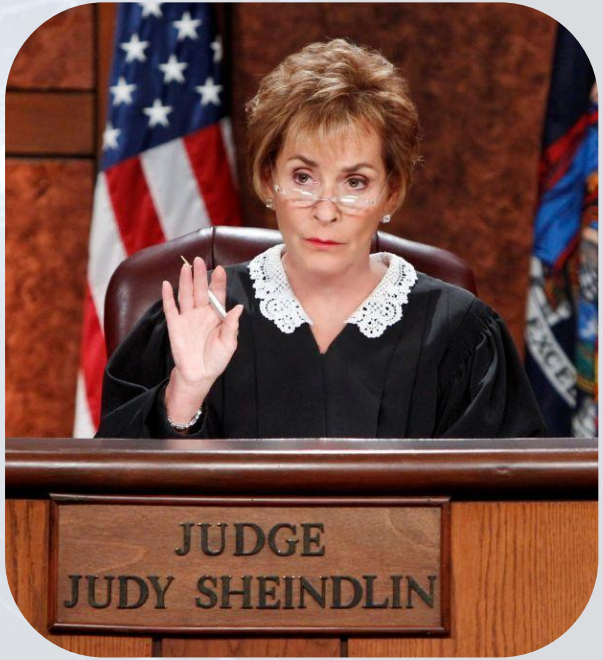
3. **How should I do it?**

   Conventions and etiquette. Open source licensing. Licensing case studies.

What is this all about?

What is Open Source Software?

"Open-source software (OSS) is computer software that is released under a license in which the copyright holder grants users the **rights to use, study, change, and distribute the software and its source code** to anyone and for any purpose. Open-source software may be developed in a collaborative public manner."



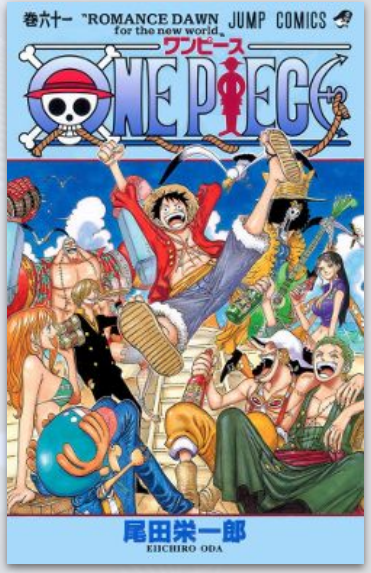
Is this all just about copyright?

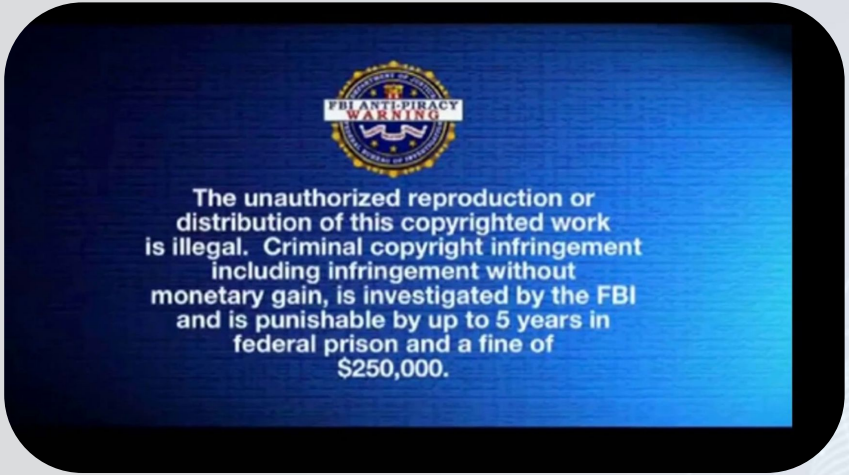
Freedom to...

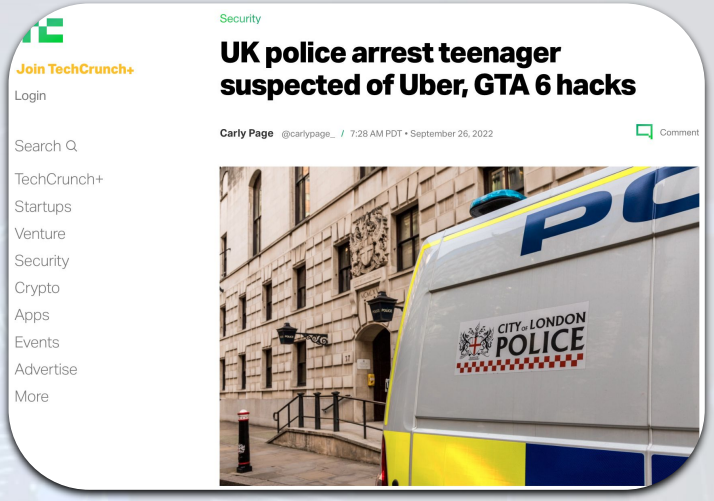
1. **run** it
2. **inspect** it
3. **change** it
4. **share** it

Usually that's piracy!

(Modified version of the FSF's "four freedoms.")




FBI ANTI-PIRACY WARNING
The unauthorized reproduction or distribution of this copyrighted work is illegal. Criminal copyright infringement including infringement without monetary gain, is investigated by the FBI and is punishable by up to 5 years in federal prison and a fine of $250,000.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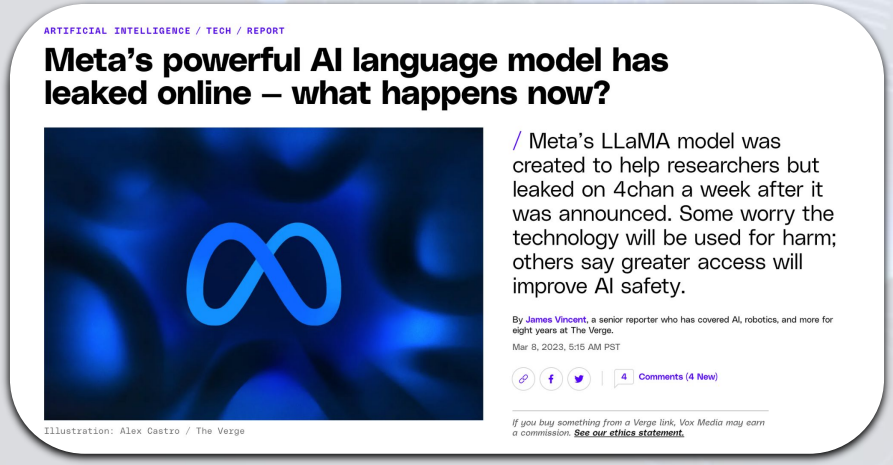
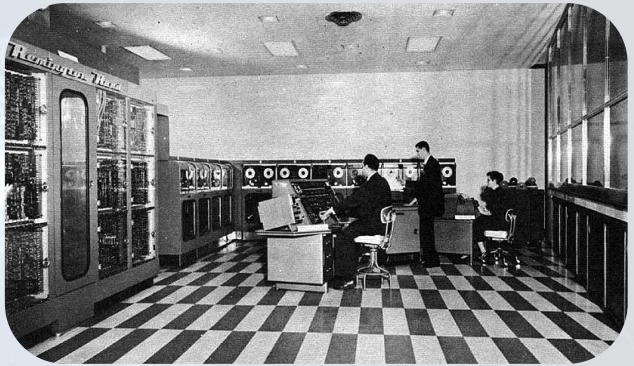
Comment
CITY OF LONDON POLICE


ARTIFICIAL INTELLIGENCE / TECH / REPORT
Meta's powerful AI language model has leaked online – what happens now?
/ Meta's LLaMA model was created to help researchers but leaked on 4chan a week after it was announced. Some worry the technology will be used for harm; others say greater access will improve AI safety.
By James Vincent, a senior reporter who has covered AI, robotics, and more for eight years at The Verge.
Mar 8, 2023, 5:15 AM PST
4 Comments (4 New)
Illustration: Alex Castro / The Verge
If you buy something from a Verge link, Vox Media may earn a commission. See our ethics statement.

A Brief History of Open-Source

- Software used to be included with hardware
- Expectation of **“knowledge sharing”** in academia **(sharing is caring).**
- First example: A-2 system by UNIVAC (1953)
    - Compiler-related tool (program linker) for converting subroutines → executable machine code.
- 1960s: **free software in decline**



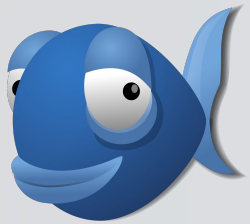
A Briefer History of Open-Source

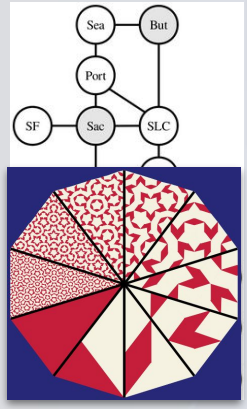
- “Illegal” sharing of **proprietary** software in the 80’s.
- **GNU Project** to write completely free operating system launches (1983)
    - **G**NU’s **N**ot **U**nix!
- Linux initially released (1991)
- **“Open source”** becomes a term (1998)
- Git created for Linux (2005)

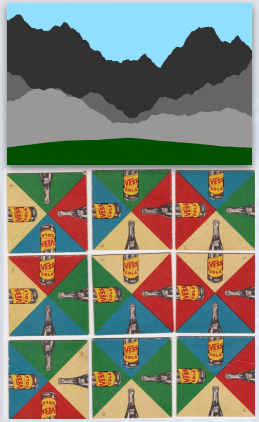
Latest messages

Borislav Petkov	Re: [PATCH 1/5] x86/mce/inject: Check if a bank is...
Christophe JAILLET	[PATCH] media: mtk-vpu: Remove redundant 'flush_wo...
Rob Herring	Re: [PATCH 1/2] Add ADV7610 support for adv7604 dr...
Dmitry Torokhov	Re: [PATCH] input&tty: Fix the keyboard led light ...
Florian Weimer	Re: [RFC PATCH] LKMM: Add ctrl_dep() macro for con...
Fox Chen	RE: [PATCH 5.10 00/22] 5.10.74-rc1 review
"Darrick J. Wong"	Re: [PATCH v7 5/8] fsdax: Introduce dax_lock_mappi...
Rob Herring	Re: [PATCH v2 2/3] dt-bindings: phy: phy-stm32-usb...
Christophe JAILLET	[PATCH] media: mtk-vcodec: Remove redundant 'flush...
Shuah Khan	[PATCH] module: fix elf_validity_check() warns see...
"Gustavo A. R. Silva"	Re: [gustavoars:for-next/cast-function 1/3] kernel...
Prasad Malisetty	Re: [PATCH v1] arm64: dts: qcom: sc7280: Add pcie ...
Christophe JAILLET	[PATCH] mtip32xx: Remove redundant 'flush_workqueu...
Mark Rutland	Re: [PATCH 6/7] arch: __get_wchan || STACKTRACE_SU...
Prasad Malisetty	[PATCH v2] arm64: dts: qcom: sc7280: Add pcie cloc...

Open Source Software Today

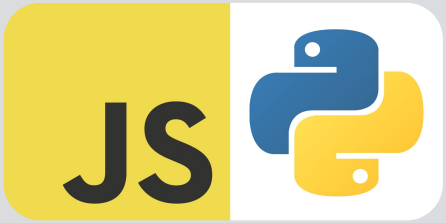






ubuntu

Most Stanford CS assignments ...



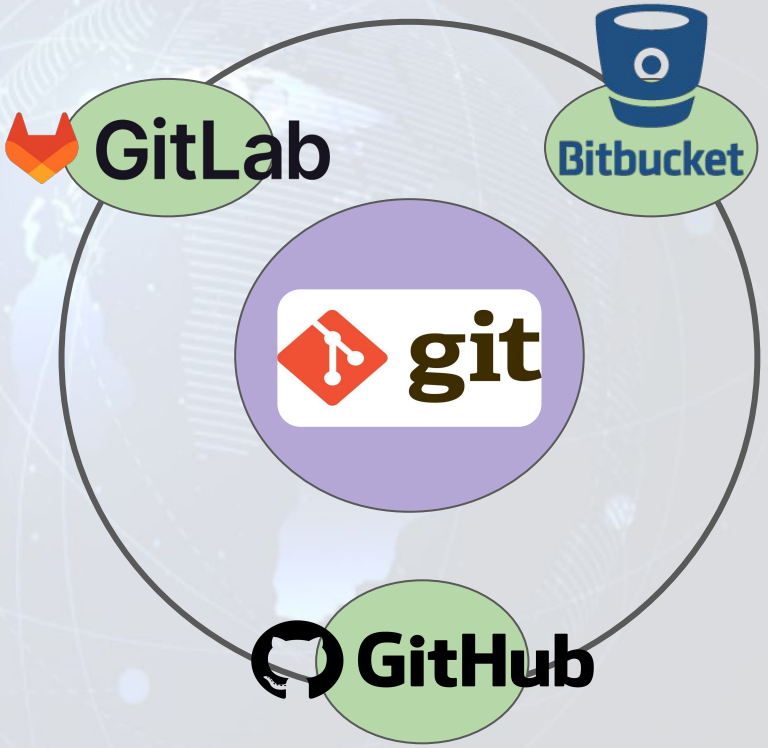
(*Chromium, not Google Chrome)

Why is open source *good?*

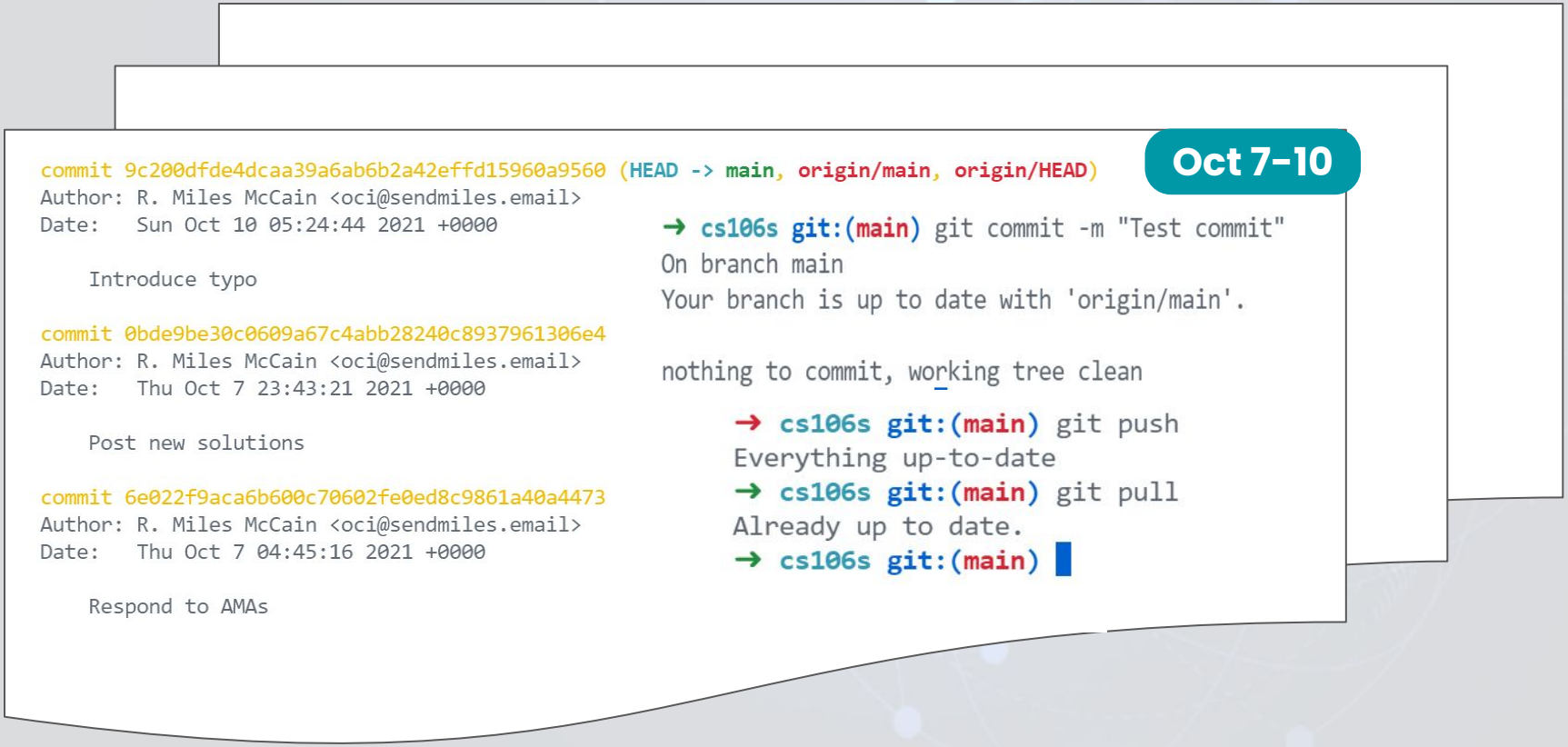
How can I do it?

Git

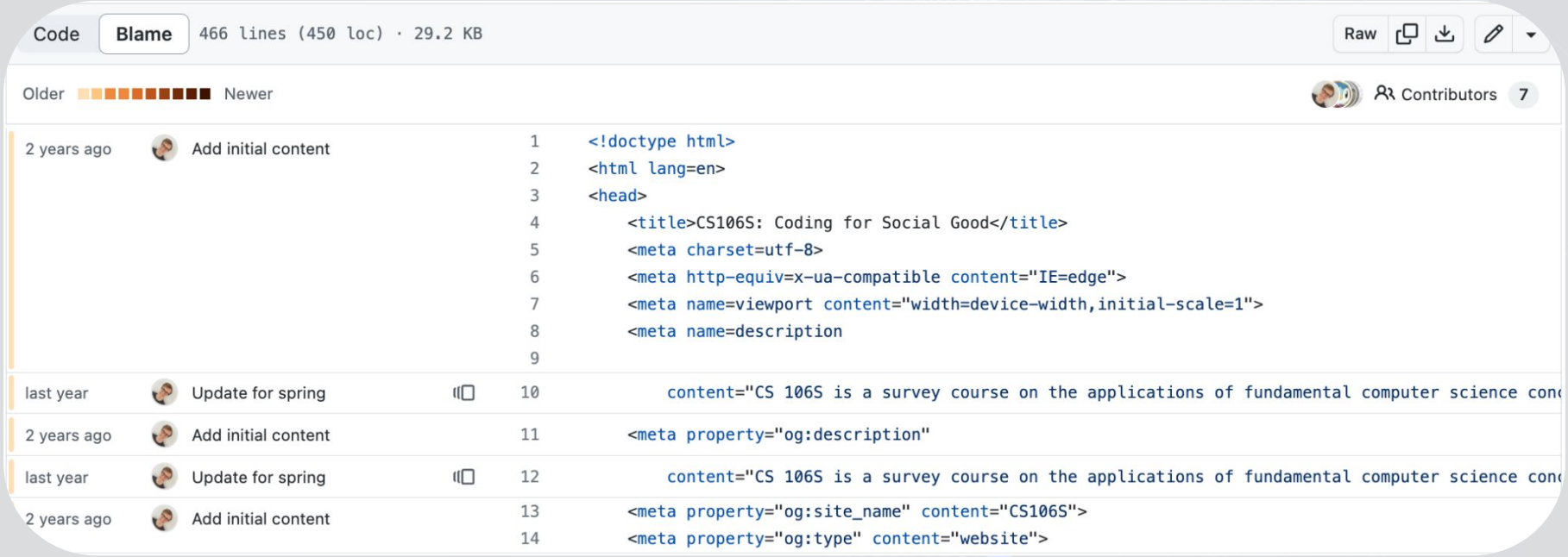
- **Version control** software
  - **Tracking and handling changes** across users and time.
- Everyone* uses it
- Created by Linus Torvalds to develop Linux.
- It’s also open source
- **Streamlines collaboration** (but not quite like Google Docs)



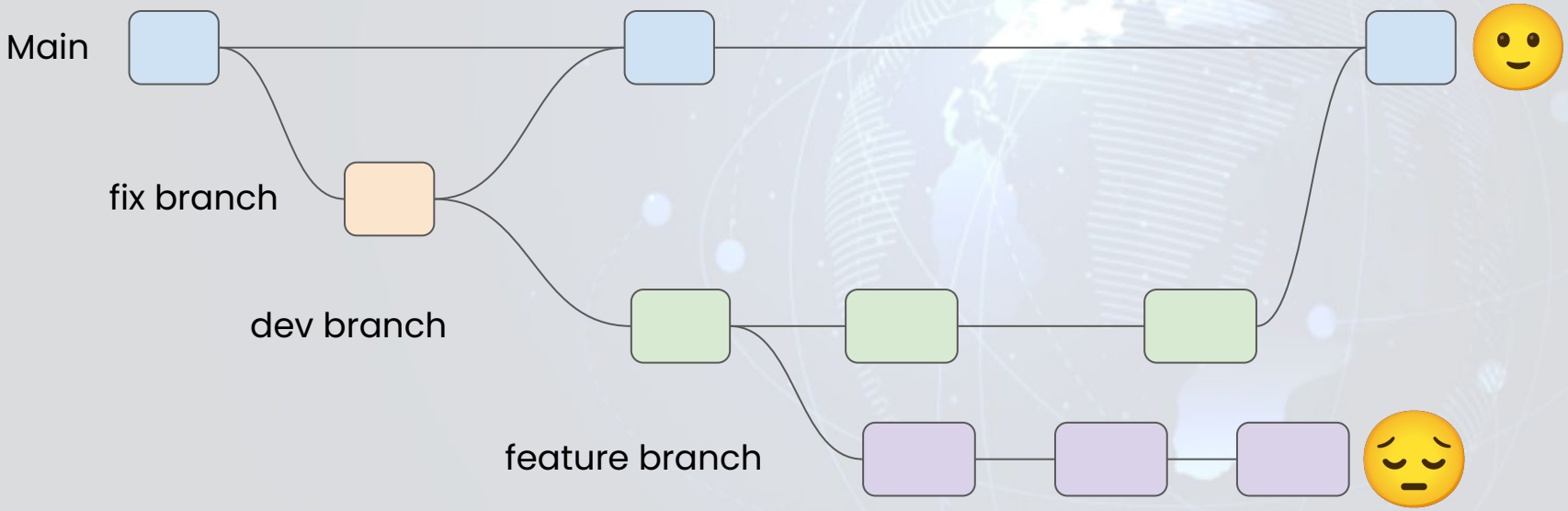
Git: Tracking Changes



Git Blame: Whodunit



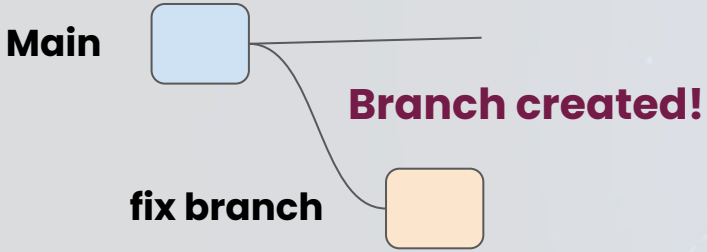
Git Version Control



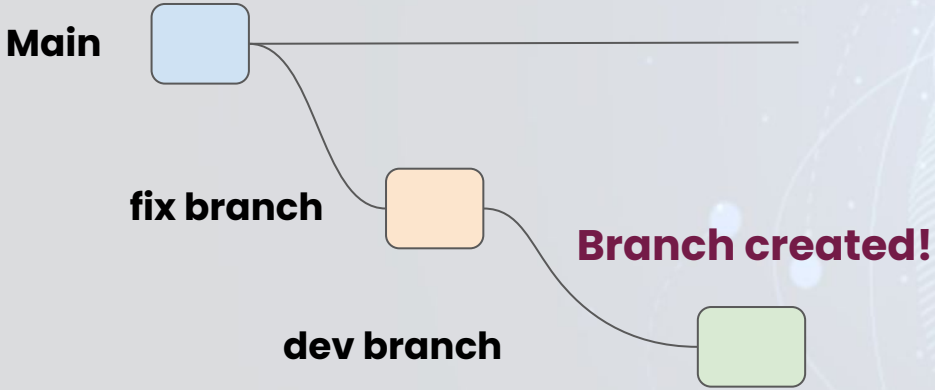
Git Version Control

Main

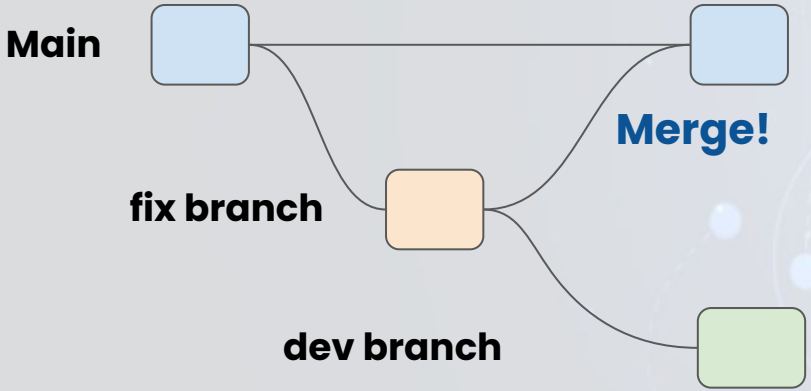
Git Version Control



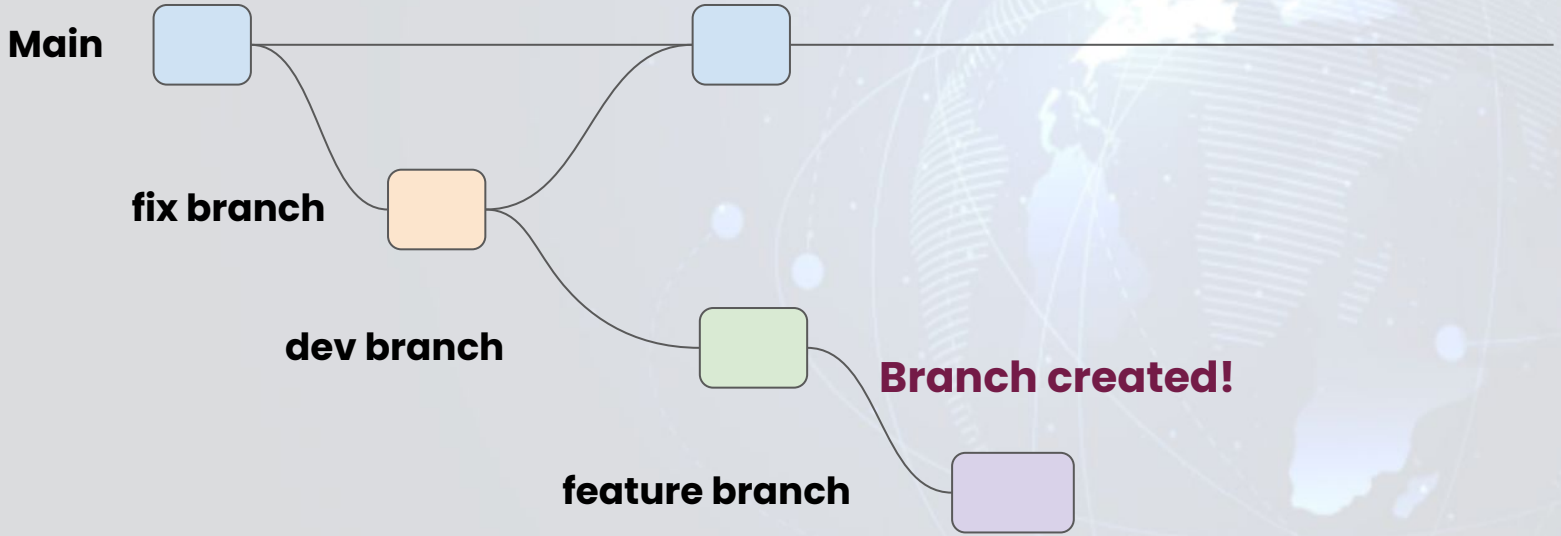
Git Version Control



Git Version Control



Git Version Control



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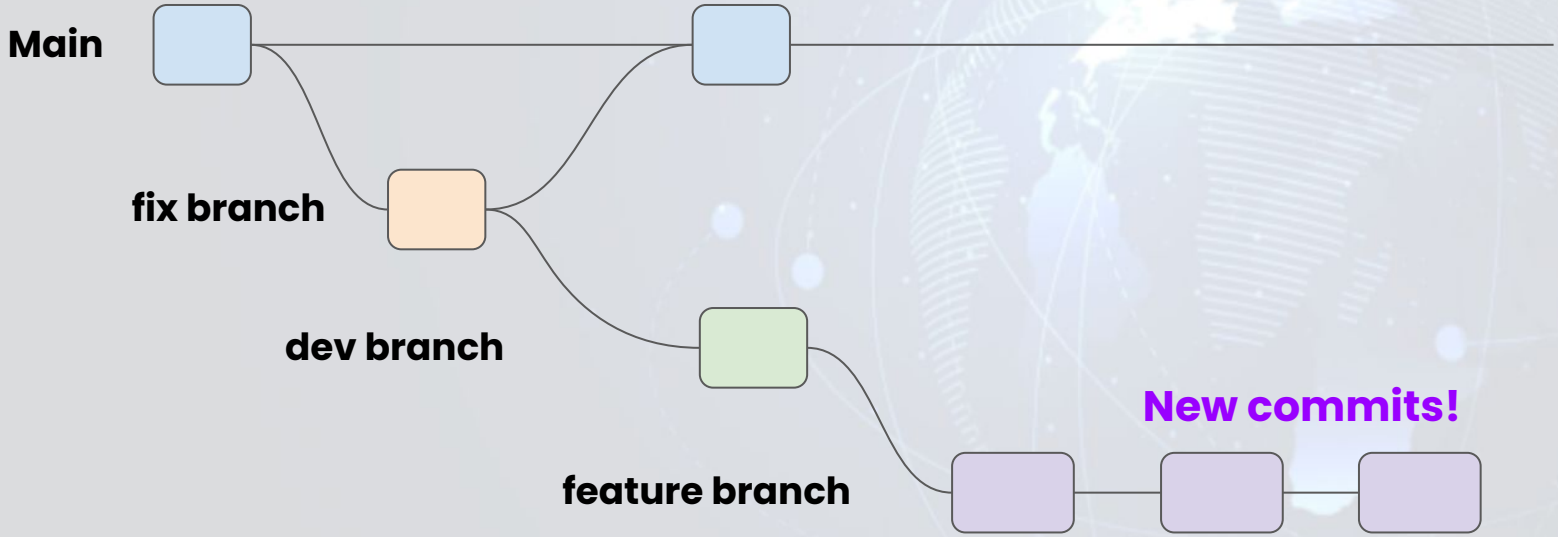
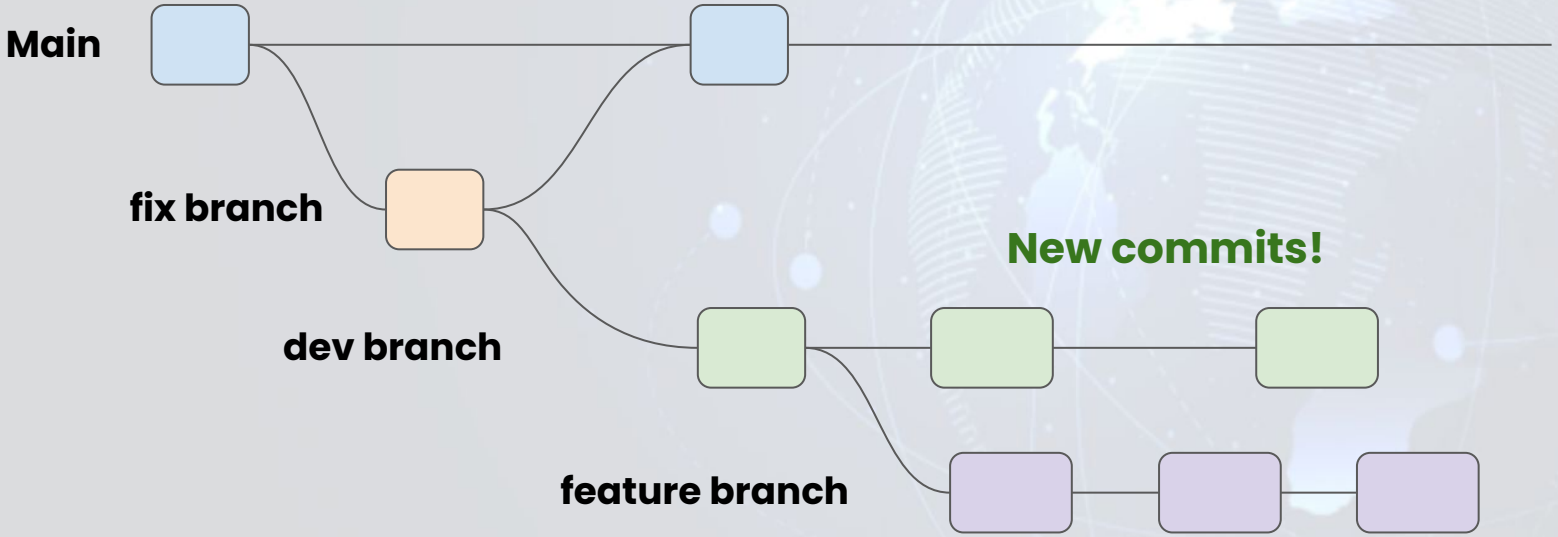
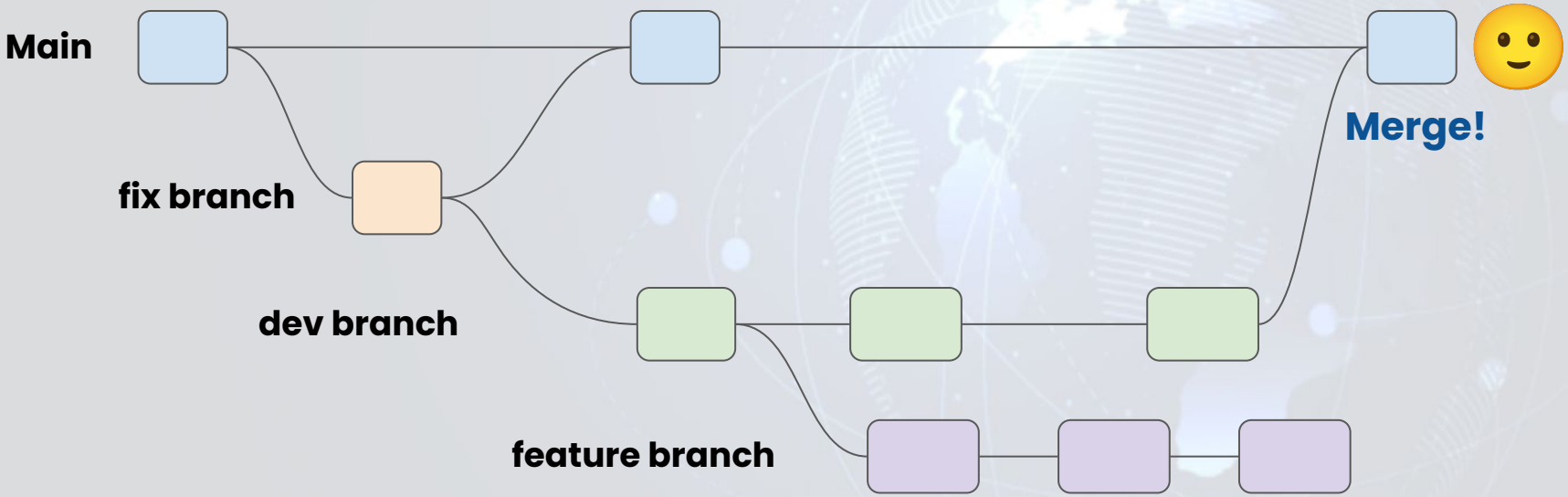


Git Version Control

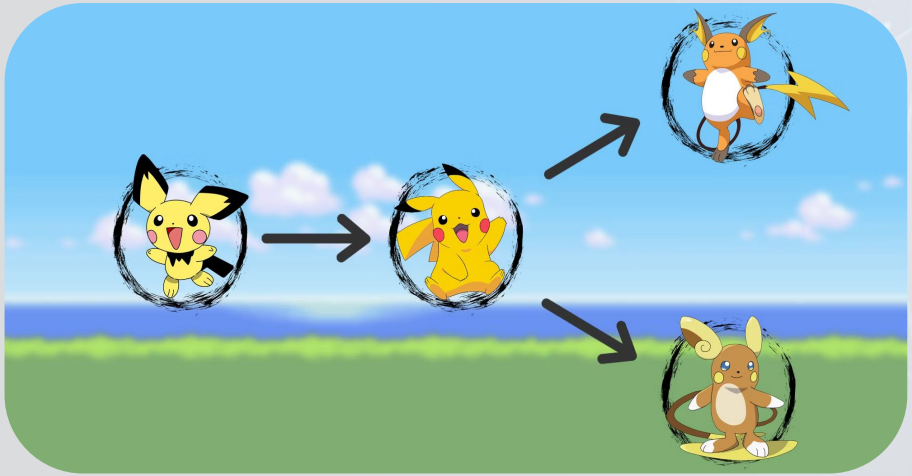


Git Version Control



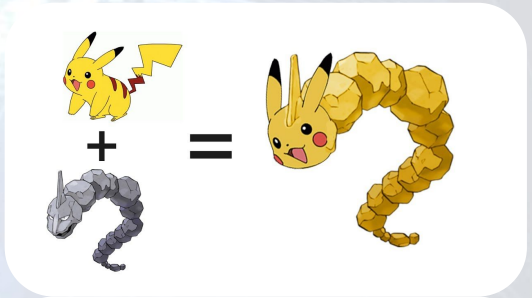
Version Control Metaphors

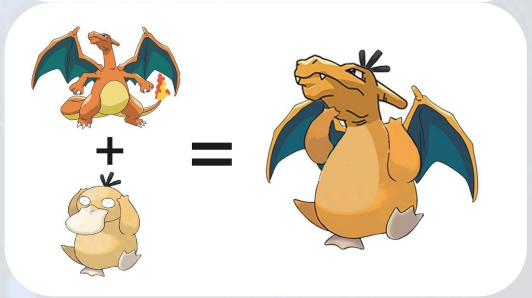
Branches + Commits



Version Control Metaphors

Merge (Fusion) Request!

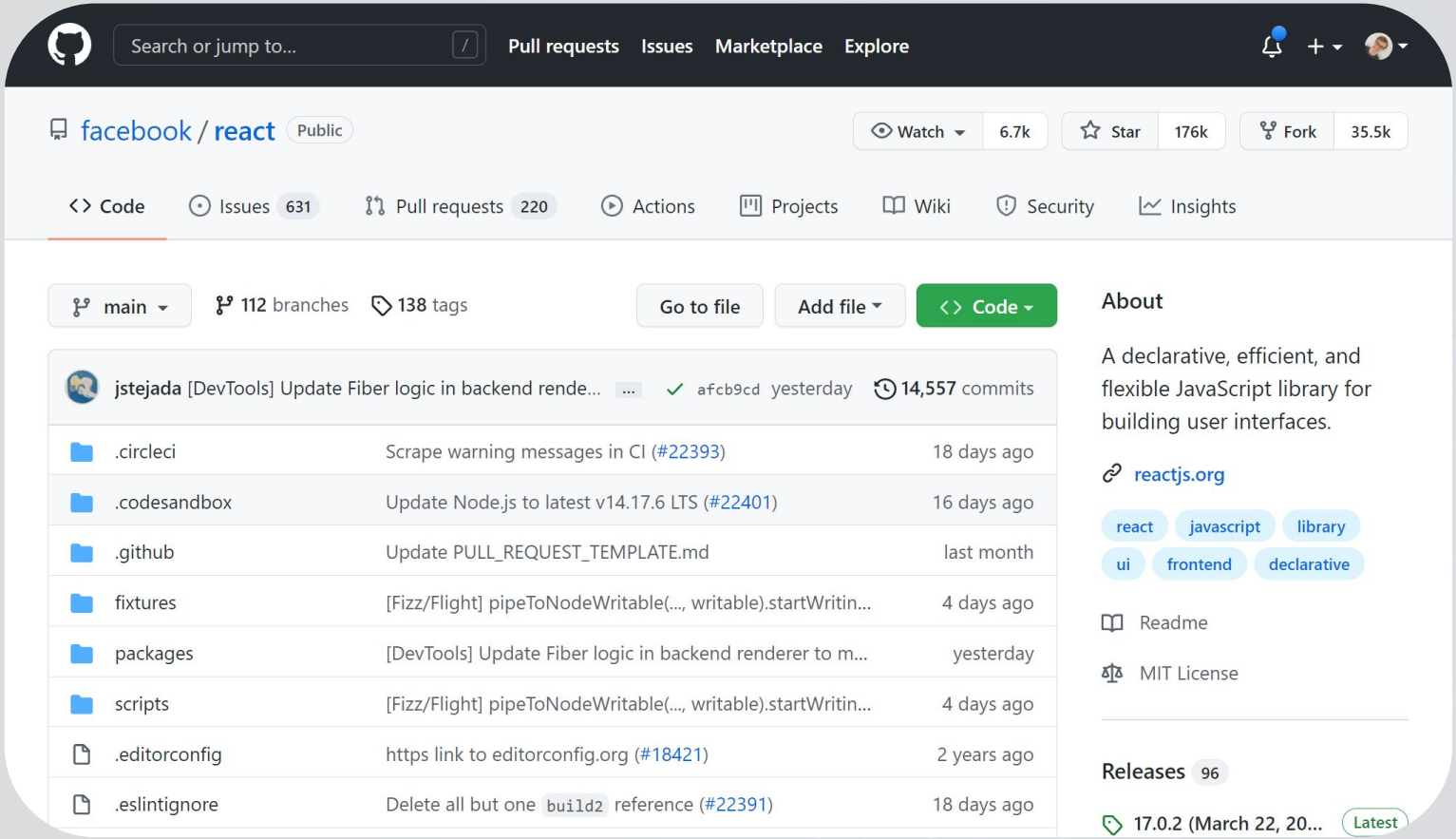




This doesn’t actually exist but …

GitHub

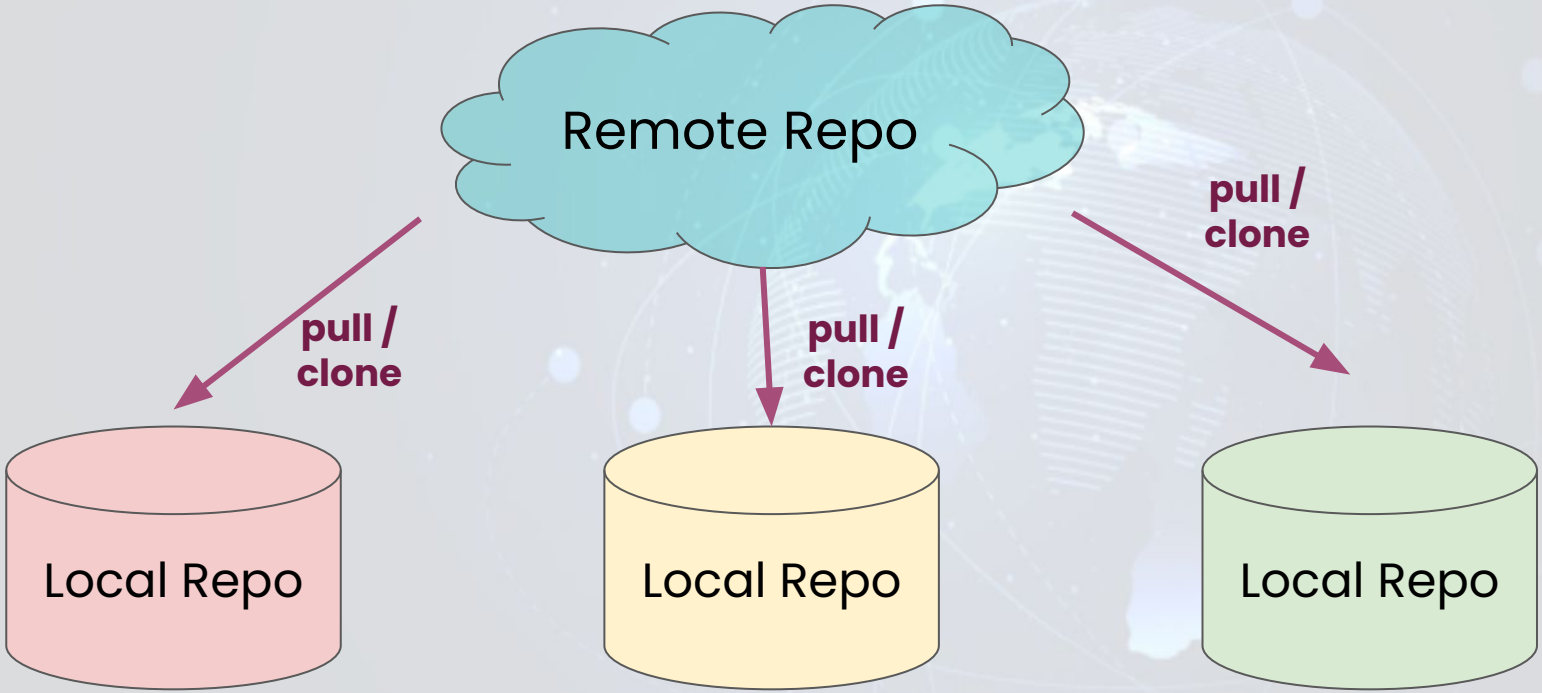
- **Website that hosts Git repositories**
  - Public or private folders (with hidden **Git** files).
- Has additional features like *pull requests* and *issues*
- Not open source itself lol :(



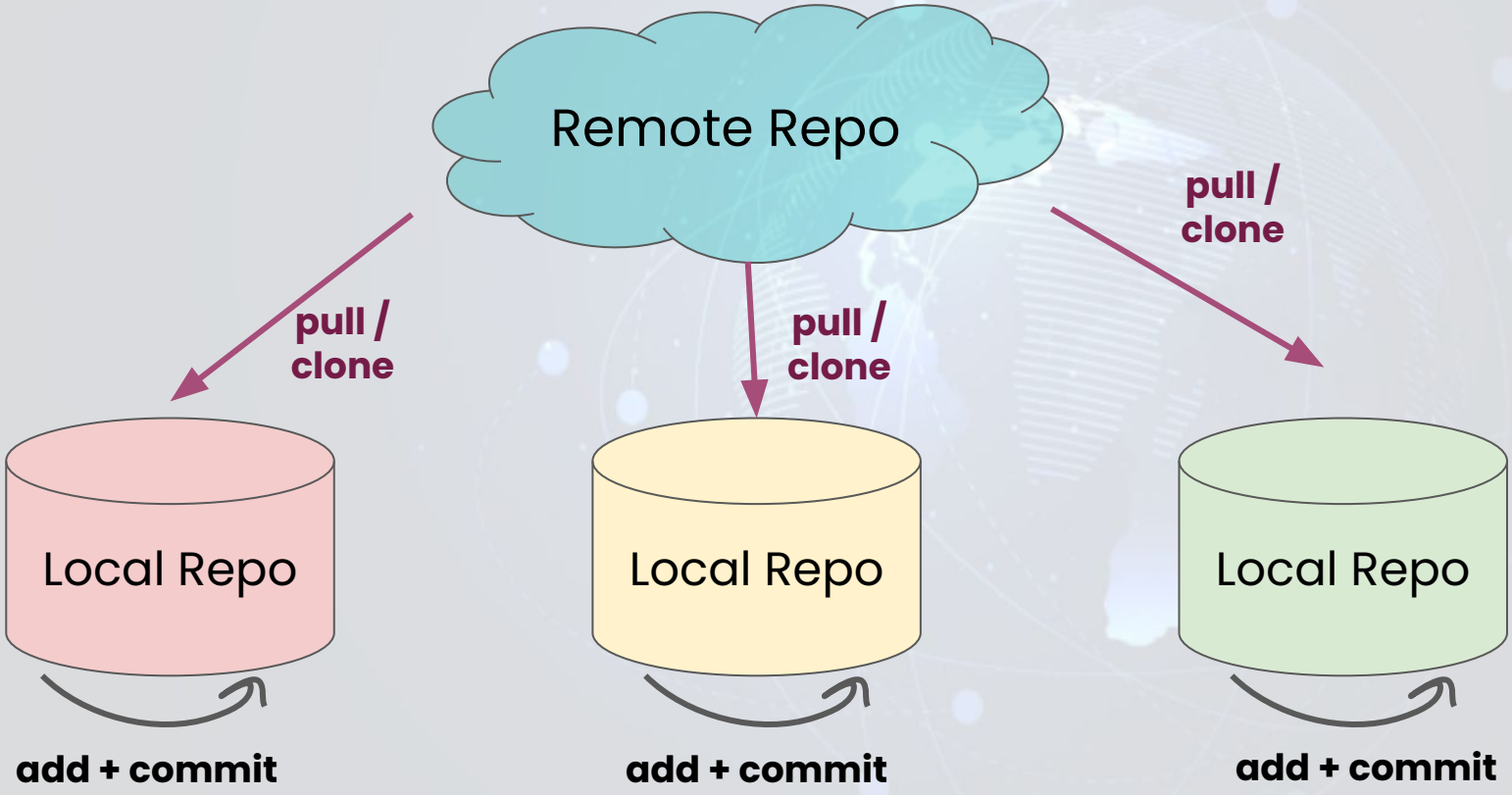
https://github.com/facebook/react

Managing Local and Remote Repos

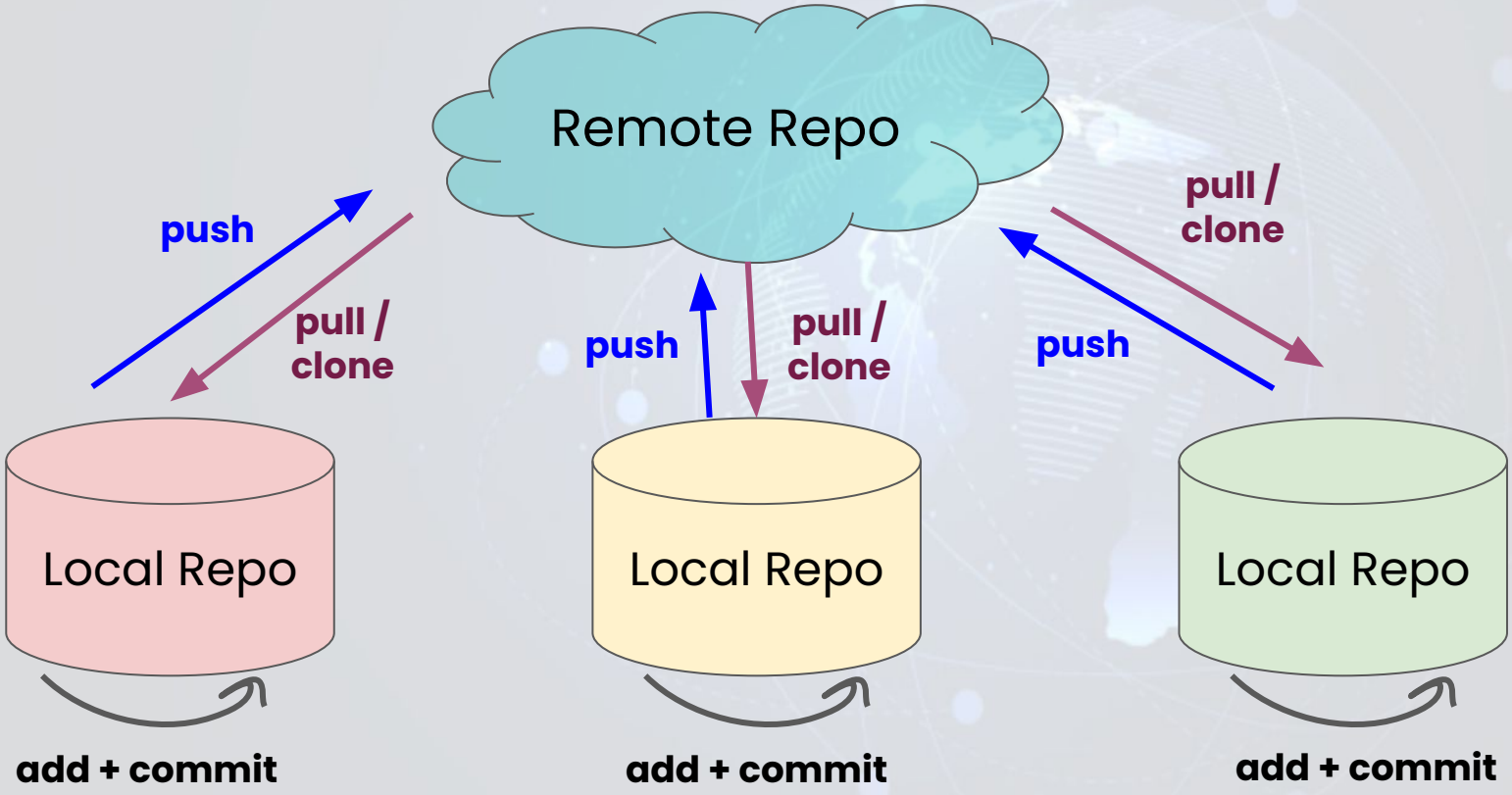
Managing Local and Remote Repos



Managing Local and Remote Repos



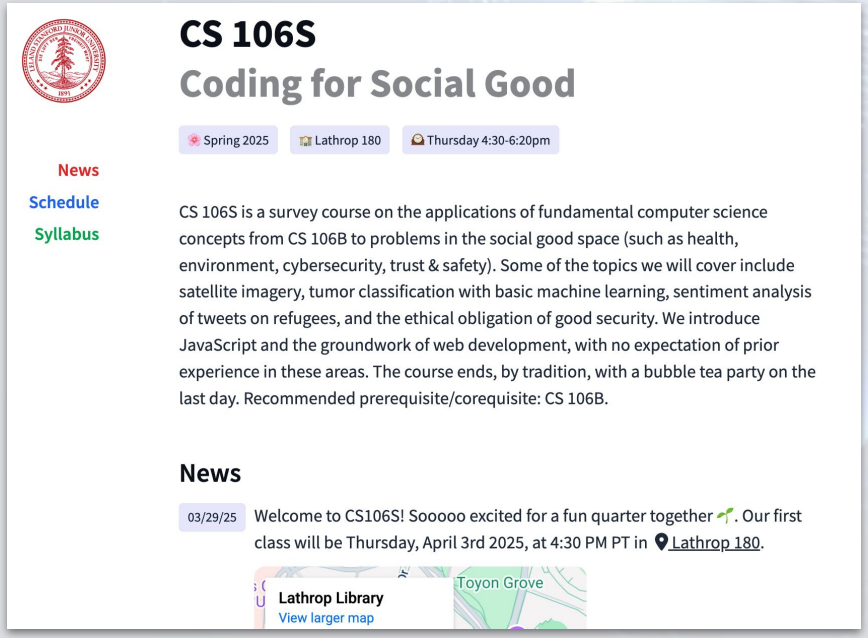
Managing Local and Remote Repos



CS 106S Website

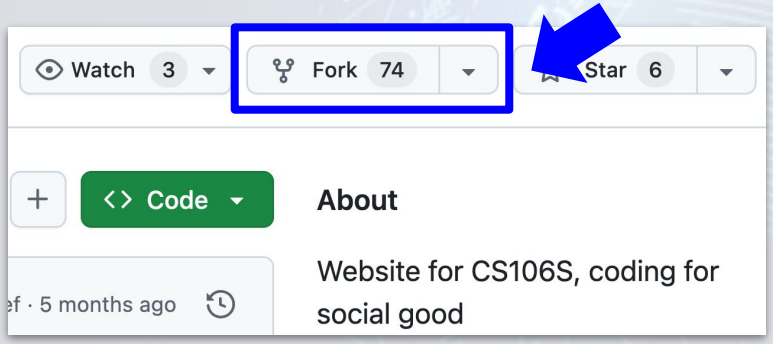
Our website is open source!

Let's look at the code...

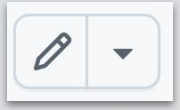


Your First Task ✏️

- Create a **GitHub account**, if you don't already have one
- Find our course website's GitHub page (link on previous slide), and make a fork (i.e. your own copy) of it.



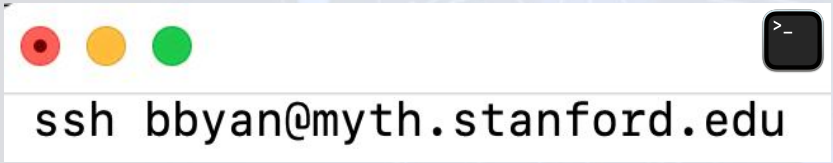
- Do your best to fix the issues in the **index.html** file
  - **Use the editor on GitHub** (click file, then pencil symbol)



- Submit a **pull request**

🌐 Stanford WWW

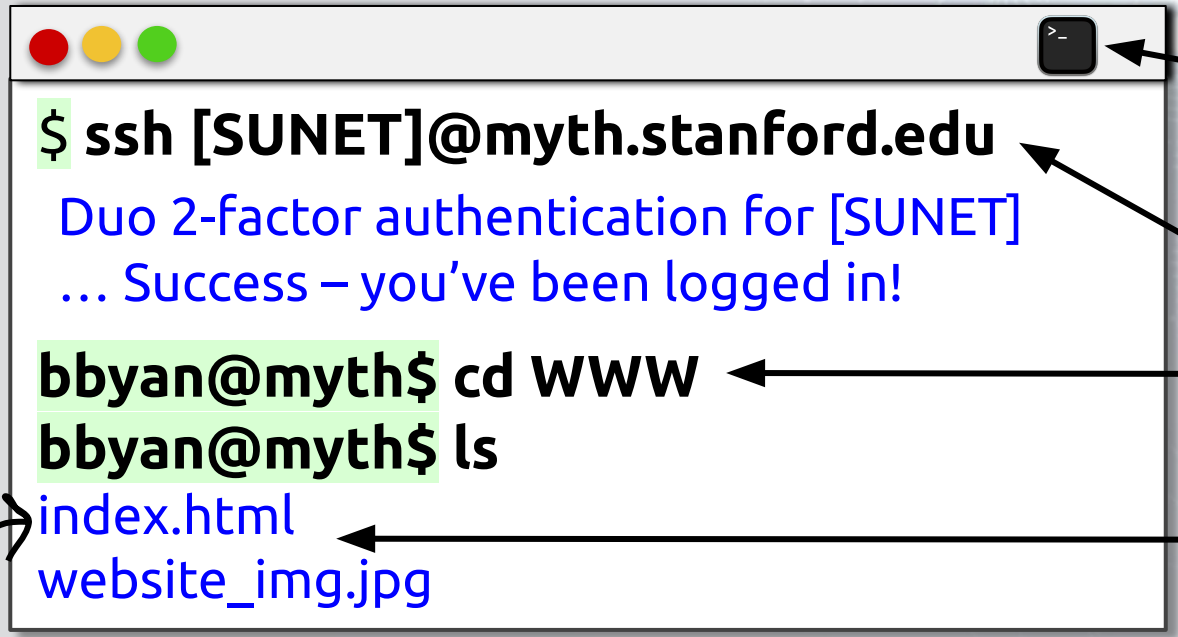
- **Everyone with a SUNET has a Stanford webpage** at ***https://stanford.edu/~[SUNET]***, though you may not have configured it yet.
- To access it, you can use your computer's **Terminal,** and log into the myth machine (used in CS 107/111!)



- There's a folder inside named **WWW**, which can store an **index.html** for your webpage, along with any ancillary HTML / CSS / JavaScript files.

🌐 Stanford WWW

Optional Demo: To access, use your computer's Terminal, and log into the myth machine



Open Terminal! 🚀 (usually in Applications folder)

Login into myth … may have to authenticate! 🔐

Via Unix commands (more here!), enter ***WWW*** folder

I recommend making the website files locally first, then copying them here.

This `index.html` file displays directly at **stanford.edu/~[SUNET]**!

benjaminyan — bbyan@myth61: ~/WW...

```
1 <!DOCTYPE html>
2 <html>
3 <body>
4 <h1>Hello World</h1>
5 <p>Hi! My name is Ben, and graphic
  design is my passion.</p>
6 <img src = "that_was_fun.jpg" width
   = 400>
7 </body>
8 </html>
```

An example **`index.html`** file 💅🔥

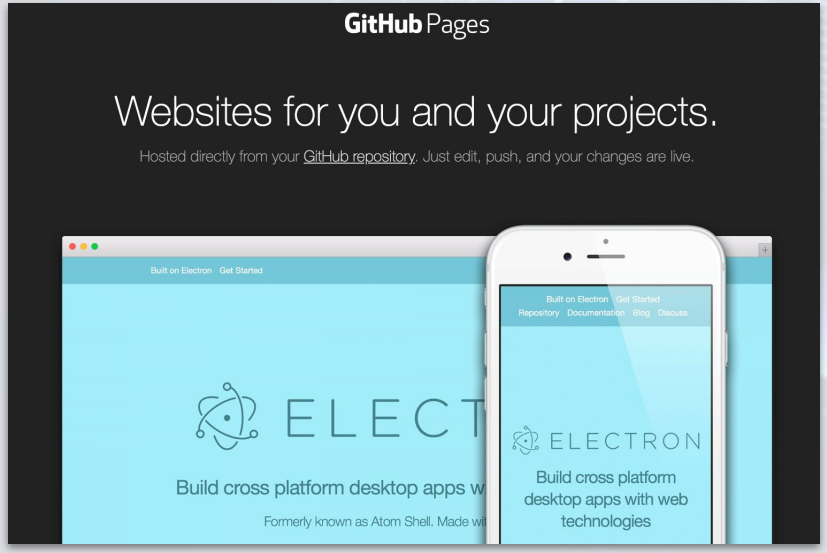
stanford.edu/~bbyan/

Hello World

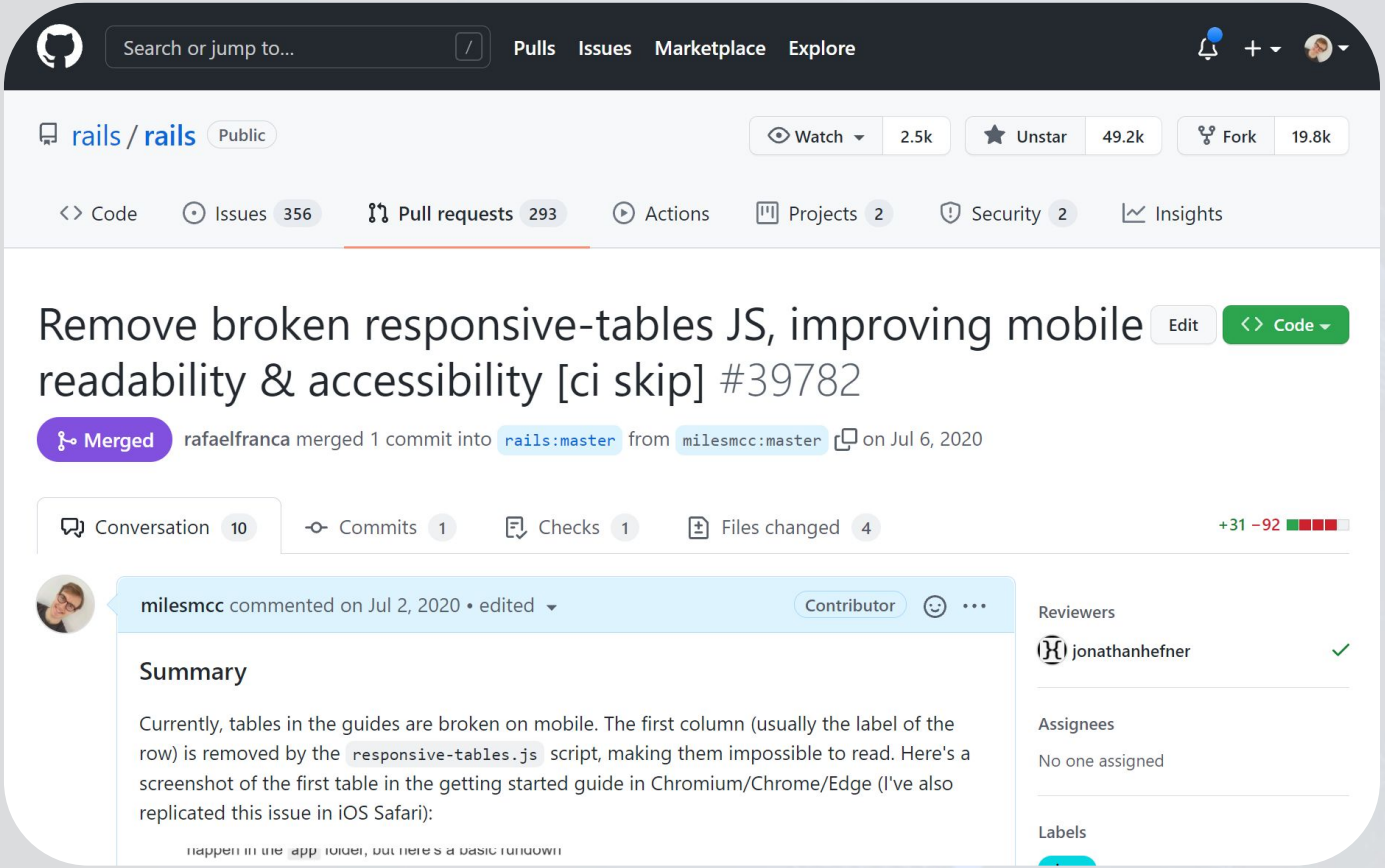
Hi! My name is Ben, and graphic design is my passion.

🌐 GitHub Pages

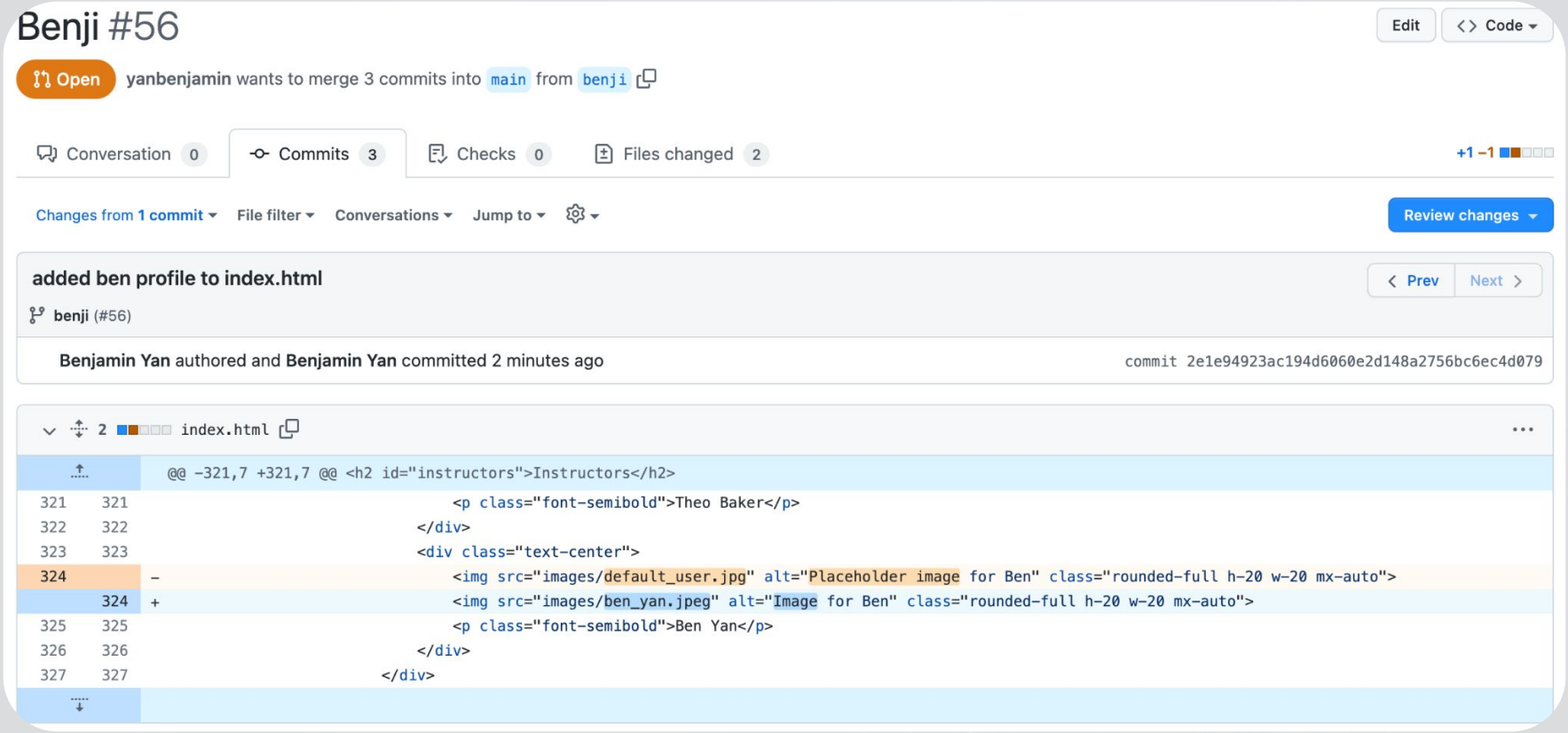
- Another way (non-Stanford) to **deploy a web-page or mini web app directly from a GitHub repository** is through **GitHub Pages.** **Link here** for more details if you're interested!



Code Review & Merge



https://github.com/rails/rails/pull/39782



https://github.com/milesmcc/cs106s/pull/56

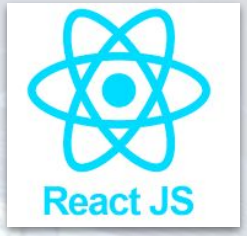
How should I do open-source code?

Conventions / Etiquette

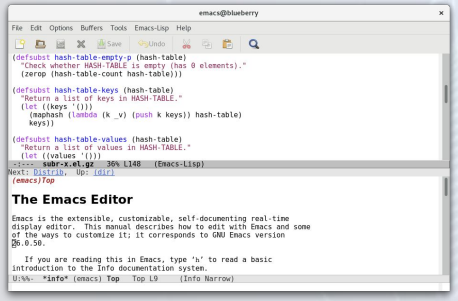
- **Be respectful!** You're dealing with real people!
- **Maintainers are volunteers.** They don't owe us anything.
- **Ask before you do.** Before making a big PR, check with the maintainers.
- **Report bugs!** But be descriptive and understanding in your bug reports.
- **Respect the license.** Licensing is a core part of open source software.

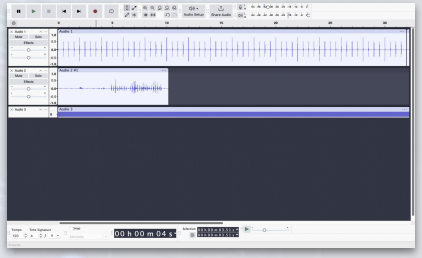
Licenses!

The MIT License



GPL v2/v3





Apache 2.0

The MIT License (yes, really, the whole thing)

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Comparison of Major Licenses

License	Use allowed in closed-source projects?	Explicit patent grant?	Liability protection?	Commercial use allowed?
MIT				
GPL v2/v3				
Apache 2.0				

Case Study #1

You're building an **open source note taking app** designed for people with visual impairments.

You want to make sure that your project is free to everyone. No one should be make their own version of it that isn't open source.

Which license do you choose?

Discuss!

MIT

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Use allowed in closed-source projects?	✗
Explicit patent grant?	✓
Commercial use allowed?	!

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Case Study #2

You're building a **tool for sentiment analysis** in order to help detect hate speech. Your tool is designed to be used inside other projects.

You want as many people — and companies — as possible to use your tool.

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MIT / Apache

Before Departure: Check-Off Form

Fill out this week's attendance form on the website! (Week 6)

ON CALL
LATE NIGHT CAFÉ
STANFORD, CALIFORNIA
EST 2023

Tysm!! And best wishes for your midterms!