LECTURE 40

GIT AND GITHUB

MCS 275 Spring 2023
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LECTURE 40: GIT AND GITHUB

Reminders and announcements:

- Please **complete your course evaluations**.

- Project 4 autograder is open

- Upload Project 4 as a ZIP file if you need subdirectories

LAST TIME

We discussed enough of the version control system **git** to allow a *solo* project to maintain a *documented*, *linear*, history of changes.

WORKFLOW

- Initial setup: `git init`
- Work session:
  - Make and test changes
  - `git status` (optional)
  - `git add file1`
  - `git add file2`
  - `git status` (optional)
  - `git commit`
- View history: `git log`
- View other file versions: `git show COMMIT:FILE`

WHAT'S A GOOD COMMIT?

A set of changes with a single purpose.

Usually that means a small number of changes.

(If several things changed, `git add --patch` will let you stage just *part* of the changes.)

TODAY

- How to host a copy of a repo **remotely** (e.g. on GitHub) and interact with it
- Complications arising when collaborating
- Improving the workflow

GITHUB

Launched in 2008 (≈3 years after git released).

By 2013, hosted 5 million repositories.

Google's competitor (Google Code) shut down in 2015.

GitHub acquired by Microsoft in 2018.

Over 370 million repositories as of January 2023.

GitHub hosts official repositories (or mirrors) for

- linux
- Python
- VS Code

REMINDER

Monoculture can be dangerous.

GitHub is becoming a single point of failure in software development.

But of course I want to teach the tools people use!

GITHUB STEPS

Suppose you want to host a local[*] git repo on GitHub.

- One time only: Make an account at github.com
- Once per machine: Create an SSH key and add it to your GitHub account
- Once per project:
  - Create repo on github.com (named, unlike git repos). Can be public or private.
  - `push` from local repository to GitHub

* I recommend you always make a repo locally before putting it on GitHub.
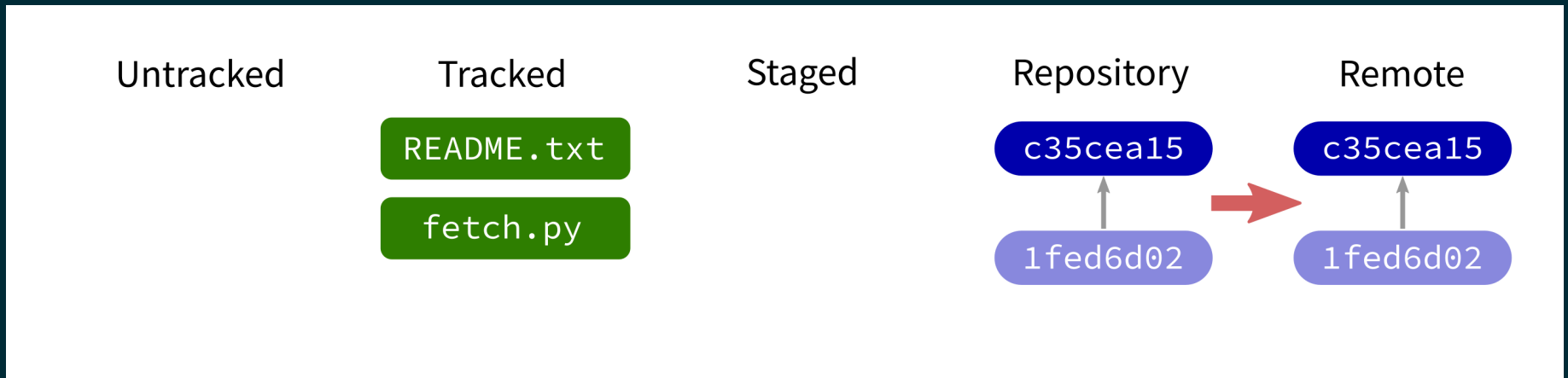
git push
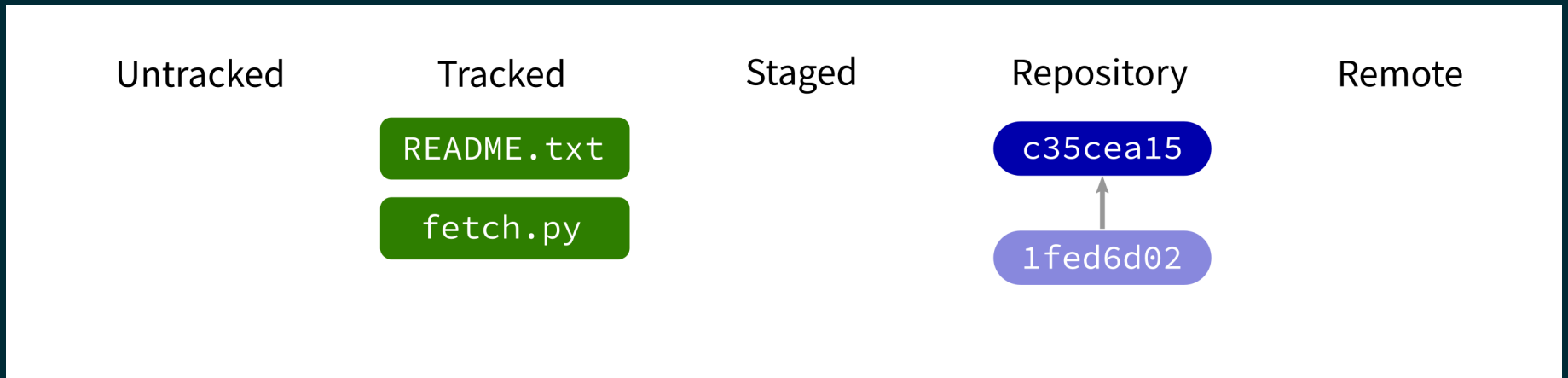
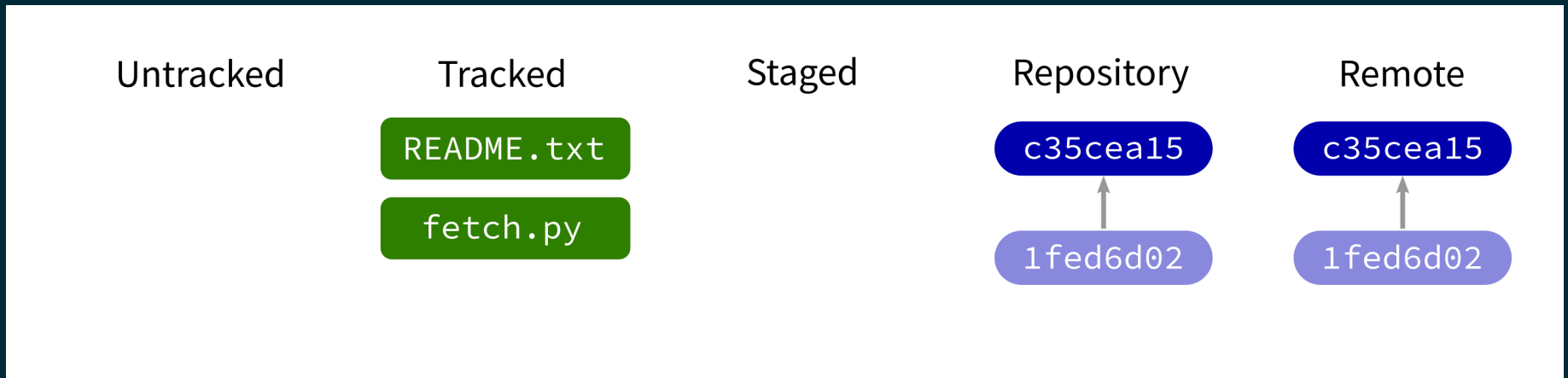| Untracked	Tracked	Staged	Repository	Remote
	`README.txt`		`c35cea15`	
	`fetch.py`		`1fed6d02`	

Contact a remote repository and send it commits that are in our database but not theirs.

Fails if remote has changed since our last push!

git push

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	fetch.py		↑	↑
			1fed6d02	1fed6d02

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VIEWING ON GITHUB

GitHub main interface shows file/dir list and renders any README.md (or README.txt).

Has syntax highlighting, can render `.ipynb` files, ...

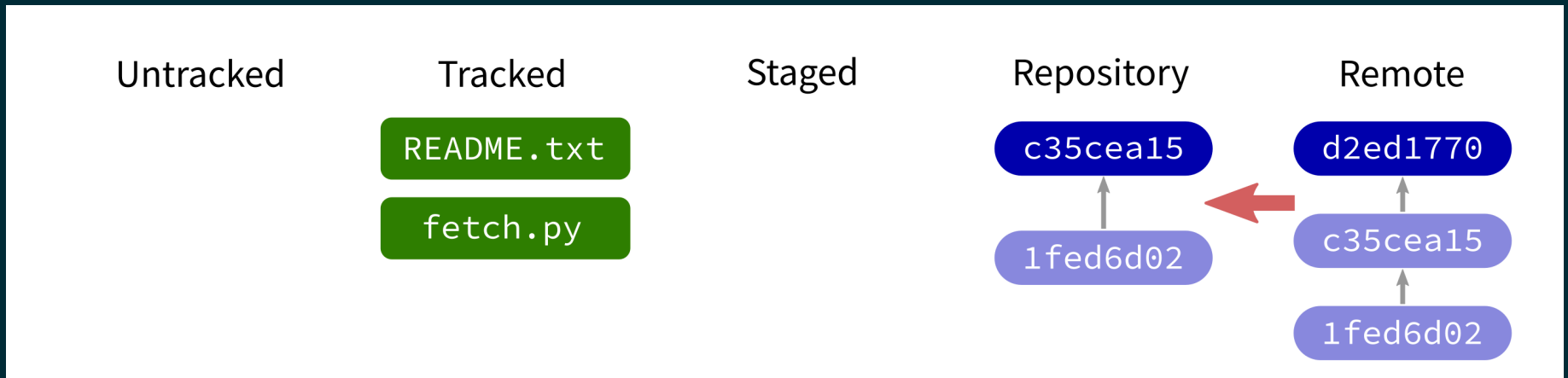Can browse commits, view repo at previous state, ...

EDITING ON GITHUB

It is possible to add/edit files directly on GitHub.

These actions create new commits.

Using this feature is rare in most projects.
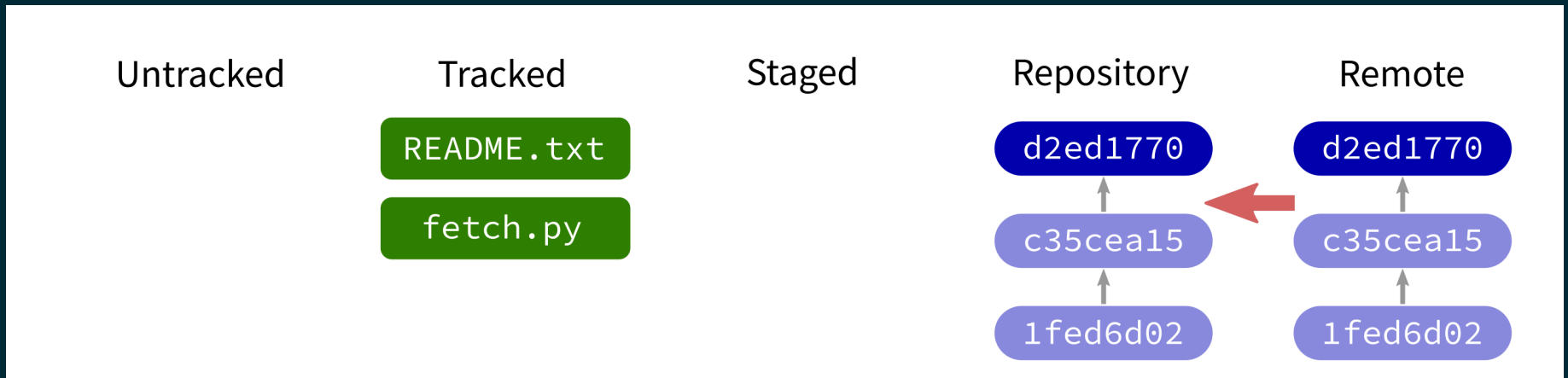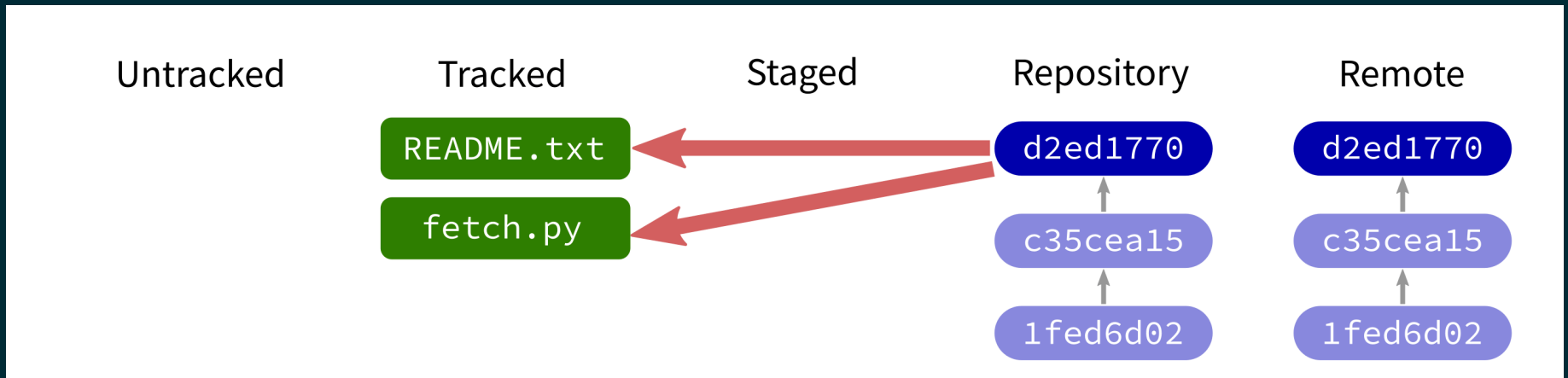
git pull

Contact a remote repository and get commits from its database that are not yet in ours.

May trigger a **merge** if there have been changes to both local and remote since we last pulled.
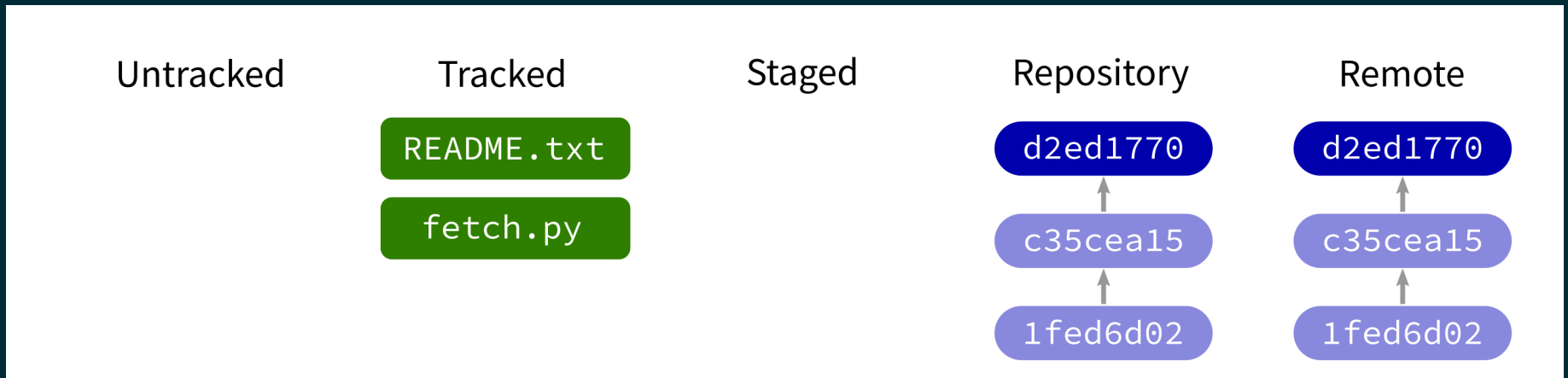
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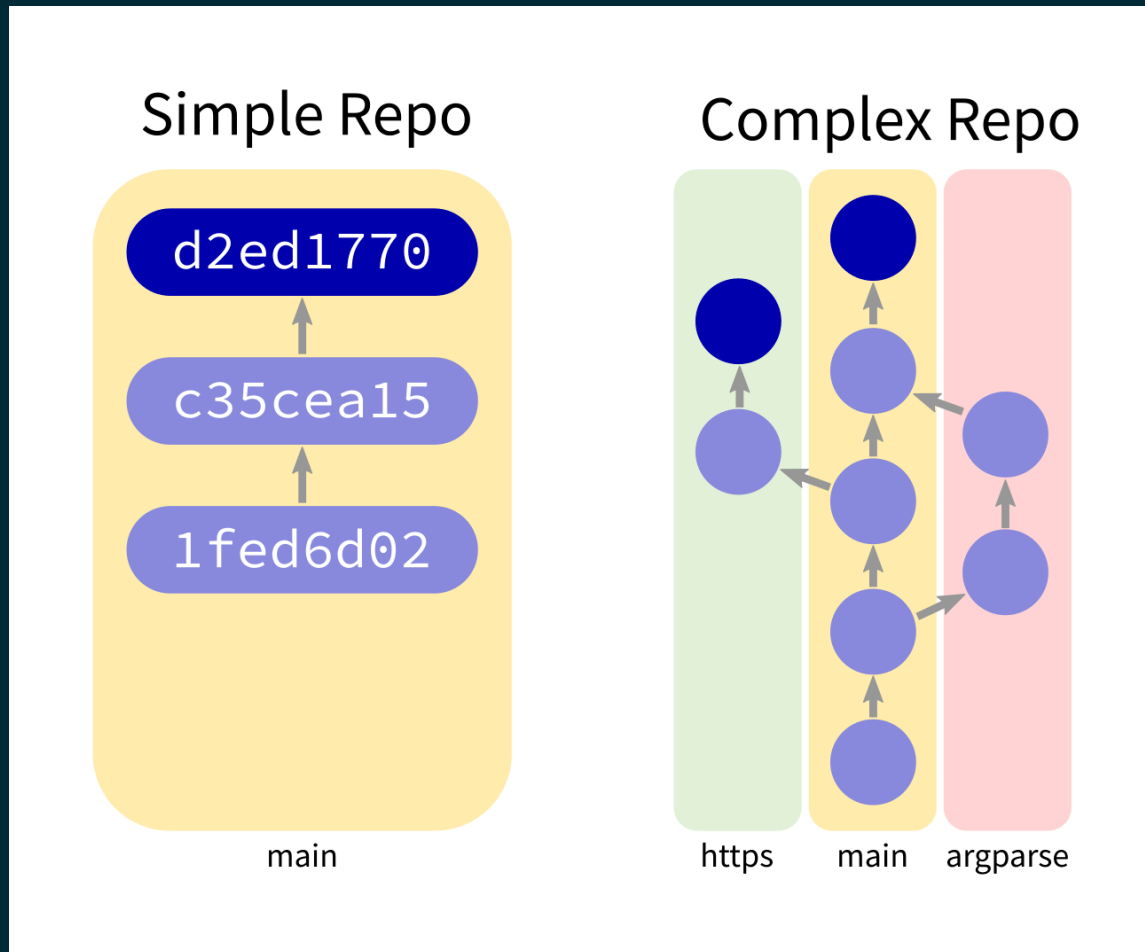
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NEXT TIME

Branching workflow.

REFERENCES

- git home page

- Official git documentation (includes tutorial videos, Pro Git book)

- git - the simple guide (nice practical introduction, with mild profanity)

REVISION HISTORY

- 2023-04-25 Initial publication.