

98-174 F17

Modern Version Control with Git



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<https://www.andrew.cmu.edu/course/98-174/>

Why should you take this course?



9. Know Git well.

I realize that Git is more prevalent in some development communities over others, but Git is more than just a VCS (version control system). Because of its efficiencies in branching, it enables a very effective new flow that can be leveraged by both individuals and teams.

“Version control software is an essential part of the every-day of the modern software team's professional practices.”

-- Atlassian Git Tutorial

Why should you take this course?

From a 2013 Fox News report:

"THE GITHUB DICTIONARY"

- ▶ repository: 'repos' are big chunks of code that can be edited by Github members
- ▶ "forked"--the term for code editing
- ▶ "pull request"-- e-note sent to the original code writer requesting edit rights

LIVE 10:43 APT **3 DAYS IN THE VALLEY**

WSJ PUT THE VALUATION OF GITHUB AT \$750 MILLION AFTER SERIES-A ROUND

▶ DOW ALERT 15,329.67

▶ FOX 50 CHEVRON (CVX) 124.24 ▲ 0.32

FOXBUSINESS NATIONAL INSTRS (NATI) 100@30.31 ▲ 0.31 | HN S&P 1686.88

HILTON FILES IPO OF UP TO \$1.25 BILLION NAS 3725.46

Git ≠ Github



git

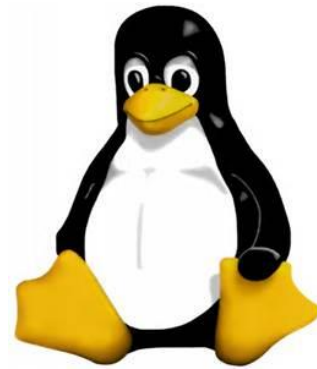
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GitHub



What this course isn't

- For seasoned Linuxbeards



What this course isn't

- A crashcourse on git commands

let me  that for you

git cheatsheet

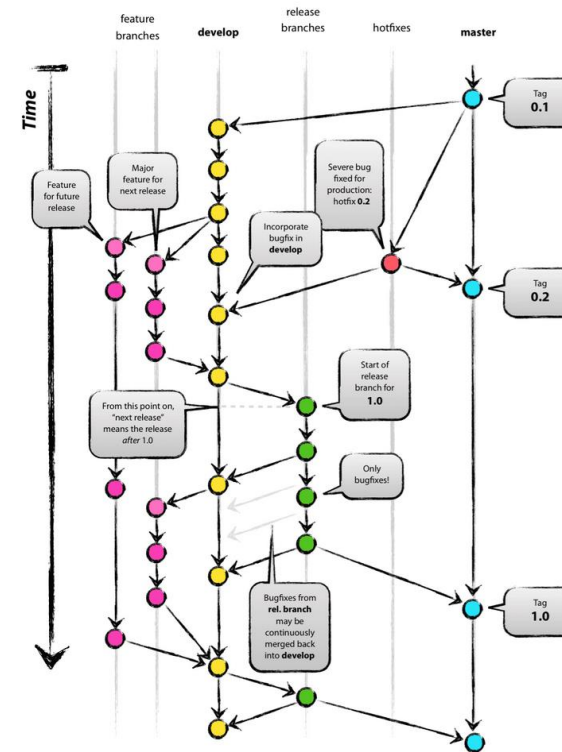
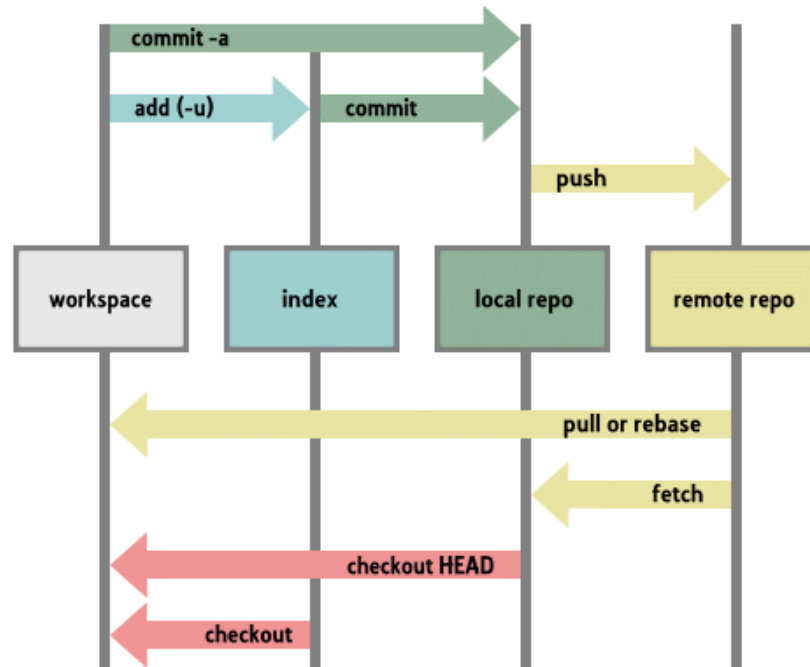
Google Search

I'm Feeling Lucky

Was that so hard?

What this course is about

- Forming a **mental model** for how git interacts with versions of files
- Understanding how to use git (and a bit of Github) in a collaborative setting



Course Website

<https://www.andrew.cmu.edu/course/98-174/>

Last semester's schedule: <https://www.andrew.cmu.edu/course/98-174/s17/>

Grade Breakdown

Pass/No Credit, like every StuCo. To pass, get 70% out of:

- 20% Weekly Lecture Attendance
(Tuesdays 6:30PM – 7:20PM, Baker Hall 140F)
- 30% Submitted work (often in-class)
- 20% Midterm (Date TBA)
- 30% Final (Date TBA)

More Course Details

- No prerequisites
- 3 Free Elective credits
- No official textbook, but we recommend Pro Git by Scott Chacon (free, online)
- No office hours unless specifically requested
 - Email Aaron (aperley@andrew.cmu.edu) if you have questions
- Slides and lecture notes posted online

Course Policy

- By StuCo Policy, students with more than 2 unexcused absences must be given a No Pass in the course. Thus, email us if you're going to miss class for a legitimate reason, and you might get an excused absence.
- More than 15 minutes late = unexcused absence. Don't be late.
- Academic integrity applies. Don't cheat.
- No late homework.

Waitlist

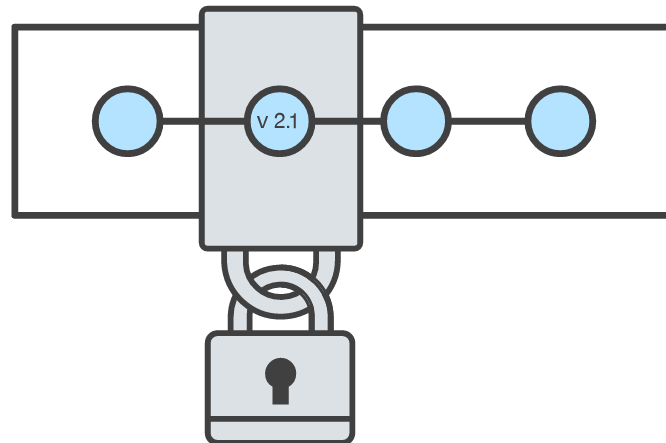
- If you are on the waitlist, please keep coming to class.
- There is a 99.9% chance you will be able to get in off the waitlist

What is Version Control?

```
Aaron@HELIOS ~/112_term_project
$ ls
termproject_actually_final  termproject_v10  termproject_v3
termproject_final          termproject_v11  termproject_v4
termproject_handin         termproject_v12  termproject_v5
termproject_old_idea       termproject_v13  termproject_v6
termproject_superfrogger   termproject_v14  termproject_v7
termproject_temp           termproject_v15  termproject_v8
termproject_this_one_works termproject_v16  termproject_v9
termproject_v1             termproject_v2
```

Goals of Version Control

- Be able to search through revision history and retrieve previous versions of any file in a project
- Be able to share changes with collaborators on a project
- Be able to confidently make large changes to existing files



Named Folders Approach

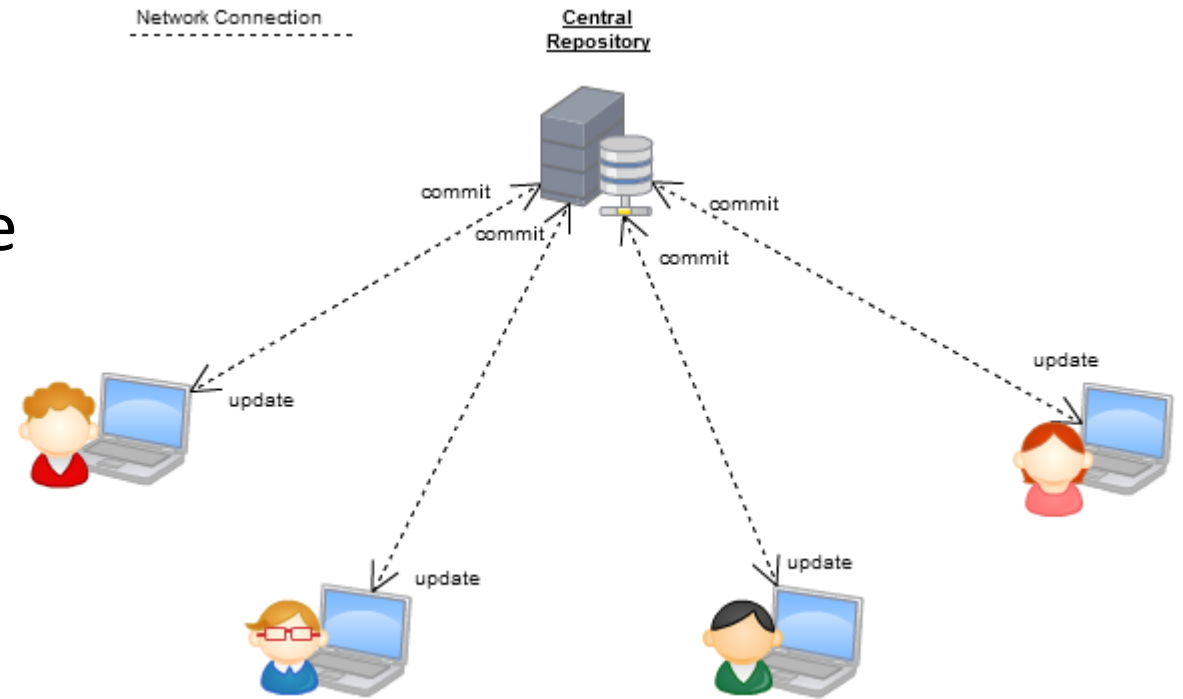
- Easy
- Familiar
- ...

```
Aaron@HELIOS ~/112_term_project
$ ls
termproject_actually_final  termproject_v10  termproject_v3
termproject_final          termproject_v11  termproject_v4
termproject_handin         termproject_v12  termproject_v5
termproject_old_idea       termproject_v13  termproject_v6
termproject_superfrogger   termproject_v14  termproject_v7
termproject_temp           termproject_v15  termproject_v8
termproject_this_one_works termproject_v16  termproject_v9
termproject_v1             termproject_v2
```

- Can be hard to track
- Memory-intensive
- Can be slow
- Hard to share
- No record of authorship

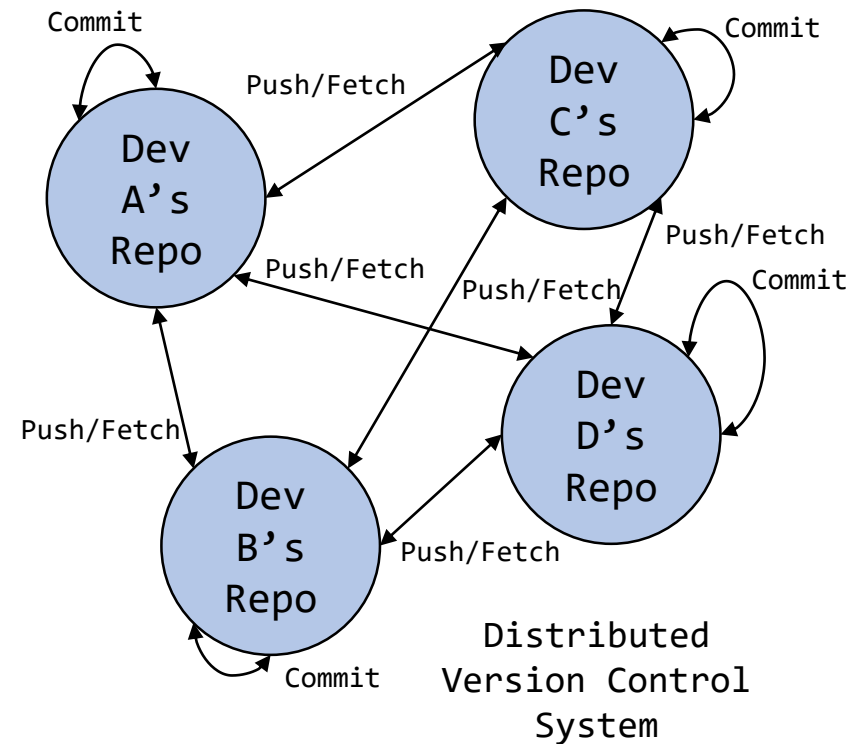
Centralized Version Control Systems

- A central repository determines the **order** of versions of the project
- Collaborators “push” changes to the files to the repository
- Any new changes must be compatible with the most recent version of the repository. If it isn't, somebody must “merge” it in.
- Examples: SVN, CVS, Perforce



Distributed Version Control Systems (DVCS)

- No central repository, each developer has their own copy
- Developers work on their own copy of the repository locally and sync changes with others
- Examples: Git, Mercurial



Git

- Created in 2005 by Linus Torvalds to maintain the Linux kernel.
Oh, and he created that too.
- Distributed VCS

<https://www.git-scm.com/>



Installing Git

https://www.andrew.cmu.edu/course/98-174/lecturenotes/installing_git.html

Git Init

Initializes a new git repository in an existing folder

- The folder is now called a git **repository**
- Changes to any files in the folder (and its subfolders) can be tracked by git
- Git stores its metadata in a hidden `.git` folder in the repository root

```
$ mkdir myrepo
```

```
$ cd myrepo
```

```
$ git init
```

Git Clone

- Download an existing repository (and all of its history!)

```
$ git clone https://github.com/autolab/Autolab.git
```

```
$ cd Autolab
```

Git Log

List the history of a repository

```
$ git log
```

Press 'q' to exit, use arrow keys (or j,k) to scroll

```
commit fad72e4a28f84f004718e57bfa3b7e21c8f4f8cf
Author: Devansh Kukreja <devanshkukreja1@gmail.com>
Date: Sun Jul 30 12:54:33 2017 -0400

    Fixed Add-To-Slack btn

commit 38be9f4a3a79d0c7e2a724da0be53cb4f194975f
Author: Devansh Kukreja <devanshkukreja1@gmail.com>
Date: Mon Jul 24 23:48:44 2017 -0400

    Updated main url

commit 630898d86ff4c6daf12c10ea08971f578995451e
Author: Devansh Kukreja <devanshkukreja1@gmail.com>
Date: Mon Jul 24 23:46:26 2017 -0400

    Begun rollout of our Slack and updated logo

commit 0acbffc74b16acdb802ac318834f6abbca97808
Author: Devansh Kukreja <devanshkukreja1@gmail.com>
Date: Fri May 19 17:11:30 2017 -0400

    Remove disabled fields in create course user datum (#877)

commit e21a4186cf5d60755417bc6abff05f7884907730
Merge: 2159d9b 79678fe
Author: Aatish Nayak <aatishn@andrew.cmu.edu>
Date: Thu May 4 01:49:47 2017 -0400

    Autolab Release v2.0.8

    Autolab Release v2.0.8

commit 79678fee0c7fed9aacb6614db5c031c0f2ac98c2
Merge: 73601bc 2159d9b
Author: Aatish Nayak <aatishn@andrew.cmu.edu>
Date: Thu May 4 01:44:27 2017 -0400

    Merge branch 'master' into develop

commit 73601bc3fee518b613352839aa21bf16f5e57aee
Author: Jacob Buckheit <jbman223@gmail.com>
Date: Thu May 4 01:42:48 2017 -0400

    Due date fix (#871)

commit 2159d9b2f6edad2684194ccbef28c1632d58c72
Author: Aatish Nayak <aatishn@andrew.cmu.edu>
Date: Tue May 2 12:11:35 2017 -0400

    Release v2.0.7 (#870)

    * Fixed Date time picker always displaying 12AM
    * move get child status to after moss command (#817)
    * Update .gitignore to ignore .vscode configs
    Namely address launch.json but also removes any additional vscode IDE-specific configurations
    * Hotfix tabs redirect (#824)
    * fixed problems page redirect
    * set up tab redirects by including a tag with each submit button
:|
```

What is fad72e4?

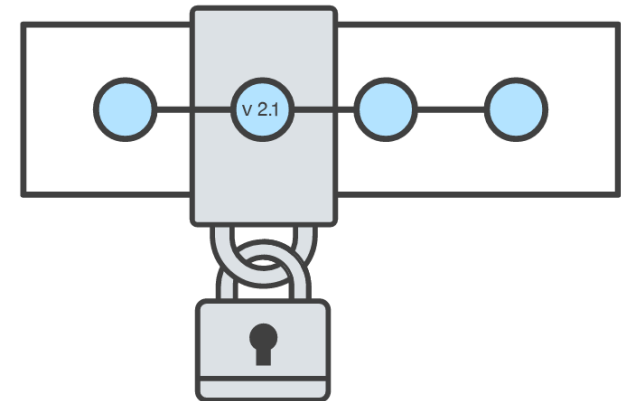
- Commits are uniquely represented by [SHA-1 hashes](#)
- The first 6-7 characters of a hash are usually enough to identify it uniquely from all the other commits in the repository
- This is called the **short hash**

Okay, so what is a commit?

1. A **snapshot** of all the files in a project at a particular time.
2. A **checkpoint** in your project you can come back to or refer to.

Anything else?

3. The **changes** a commit makes over the previous commit



Homework

- One hour or less a week
- Released on Tuesdays after class, due next Tuesday at beginning of class
- Posted on the course website
- Email me (aperley@andrew.cmu.edu) if you have questions, I'll be happy to help you out!