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Git and GitHub

Version Control

- Purposes - undo, backup, history
- Centralized vs. decentralized - CVS, Subversion, Git, Mercurial
- In this course we will use Git and GitHub to manage our source code
- First lab assignment will be about using Git and GitHub

What is Git?

- Command line program (although GUIs can be helpful)
- Decentralized - you can work offline without depending on connection to central repository
- Distributed - everyone has a copy of the repository's complete history
- Fast - can clone the entire Linux kernel in only a few minutes
- More or less the de facto standard today (circa 2017) for version control

Some basic git commands

- `git init` - creates a brand new repository from scratch
- `git clone` - copies a repo from one location to another
- `git status` - displays the state of the repo and current branch
- `git checkout` - switches to another branch and updates the working directory
- `git add` - stages changes to be committed
- `git commit` - updates the repo with the changes and makes them part of the history
- `git log` - displays the commit history for the current branch
- `git pull` - copies the current changes from another repo into your repo
- `git push` - copies your changes to another repo

What is GitHub?

- Company formed in 2007 to make collaborating using Git easier and fun
- A web-based code hosting platform for git
- Used for many open source projects and software libraries
- Has many additional features useful for developing software in teams
- A sort of social network for software developers

How we will use GitHub in this course

- There is a central repo for everything related to CSCI 301. The repo is named `csci-301-fall-2017` and is read-only for students.
- Each student will fork this repo and then clone their fork and set the original as the upstream remote
- As you work on assignments you will push your local changes to your fork
- The instructor will be able to test and grade your code by cloning your fork
- Students update their forks with the latest assignments pushed by the instructor by first pulling from their upstream and then pushing to their fork

Additional Resources

- Git Book - <https://git-scm.com/book/en/v2>
- Atlassian Git Tutorial -
<https://www.atlassian.com/git/tutorials/what-is-version-control>
- Git Extensions (GUI client) - <https://gitextensions.github.io/>
- GitHub - <https://github.com/>
- GitHub cheat sheet -
<https://education.github.com/git-cheat-sheet-education.pdf>