GENERAL ASSEMBLY

DATA SCIENCE
GIT AND GITHUB

I. INTRODUCTION TO VERSION CONTROL
II. EXPLORING GITHUB
III. USING GIT WITH GITHUB
IV. PULLING FROM GITHUB
V. GISTS
VI. BONUS CONTENT

DATA SCIENCE

I. INTRODUCTION TO VERSION CONTROL

Why learn version control?

- Version control is useful when you write code, and data scientists write code
- Allows you to keep different “versions” of your code
- Enables teams to easily collaborate on the same codebase
- Enables you to contribute to open source projects
- Attractive skill for employment

What is Git?

- Version control system that allows you to track files and file changes in a repository (“repo”)
- Primarily used by software developers
- Most widely used version control system
  - Alternatives: Mercurial, Subversion, CVS
- Runs from the command line (usually)
- Can be used alone or in a team

What is GitHub?

- A website, not a version control system
- Allows you to put your Git repos online
  - Largest code host in the world
  - Alternative: Bitbucket
- Benefits of GitHub
  - Backup of files
  - Visual interface for navigating repos
  - Makes repo collaboration easy
- "GitHub is just Dropbox for Git"
- Note: Git does not require GitHub

Git can be challenging to learn

- Designed (by programmers) for power and flexibility over simplicity
- Hard to know if what you did was right
- Hard to explore since most actions are “permanent” (in a sense) and can have serious consequences
- We’ll focus on the most important 10% of Git

II. EXPLORING GITHUB

GitHub setup

- Create an account at github.com
- There's nothing to install
  - —"GitHub for Windows" & "GitHub for Mac" are GUI clients (alternatives to command line)

Navigating a GitHub repo (1 of 2)

- Example repo: https://github.com/justmarkham/DAT5
- Account name, repo name, description
- Folder structure
- Viewing files:
  - Rendered view (with syntax highlighting)
  - Raw view
- README.md:
  - Describes a repo
  - Automatically displayed
  - Written in Markdown

Navigating a GitHub repo (2 of 2)

- Commits:
  - One or more changes to one or more files
  - Revision highlighting
  - Commit comments are required
  - Most recent commit comment shown by filename
- Profile page

Creating a repo on GitHub

- Click “Create New” (plus sign):
  - Define name, description, public or private
  - Initialize with README (if you’re going to clone)
- Notes:
  - Nothing has happened to your local computer
  - This was done on GitHub, but GitHub used Git to add the README.md file

Basic Markdown

- Easy-to-read, easy-to-write markup language
- Usually (always?) rendered as HTML
- Many implementations (aka “flavors”)
- Let’s edit README.md using GitHub!

Basic Markdown

- Common syntax:
  - ## Header size 2
  - *italics* and **bold**
  - [link to GitHub](https://github.com)
  - * bullet
  - `inline code` and ```code blocks```
- Valid HTML can also be used within Markdown

III. USING GIT WITH GITHUB

Git installation and setup

- Installation: tiny.cc/installgit
- Open Git Bash (Windows) or Terminal (Mac/Linux):
  - git config --global user.name “YOUR FULL NAME”
  - git config --global user.email “YOUR EMAIL”
- Use the same email address you used with your GitHub account
- Generate SSH keys (optional): tiny.cc/gitssh
  - More secure that HTTPS
  - Only necessary if HTTPS doesn’t work for you

Preview of what you're about to do

- Copy your new GitHub repo to your computer
- Make some file changes locally
- Save those changes locally ("commit" them)
- Update your GitHub repo with those changes

Cloning a GitHub repo

- Cloning = copying to your local computer
  - Like copying your Dropbox files to a new machine
- First, change your working directory to where you want the repo you created to be stored: cd
- Then, clone the repo: git clone <URL>
  - Get HTTPS or SSH URL from GitHub (ends in .git)
  - Clones to a subdirectory of the working directory
  - No visual feedback when you type your password
- Navigate to the repo (cd) then list the files (ls)

Checking your remotes

- A “remote alias” is a reference to a repo not on your local computer
  - —Like a connection to your Dropbox account
- View remotes: git remote -v
- “origin” remote was set up by “git clone”
- Note: Remotes are repo-specific

Making changes, checking your status

- Making changes:
  - Modify README.md in any text editor
  - Create a new file: touch <filename>
- Check your status:
  - git status
- File statuses (possibly color-coded):
  - Untracked (red)
  - Tracked and modified (red)
  - Staged for committing (green)
  - Committed

Committing changes

- Stage changes for committing:
  - Add a single file: git add <filename>
  - Add all changes: git add -A
- Check your status:
  - Red files have turned green
- Commit changes:
  - git commit -m “message about commit”
- Check your status again!
- Check the log: git log

Pushing to GitHub

- Everything you've done to your cloned repo (so far) has been local
- You've been working in the "master" branch
- Push committed changes to GitHub:
  - Like syncing local file changes to Dropbox
  - git push <remote> <branch>
  - Often: git push origin master
- Refresh your GitHub repo to check!

Quick recap of what you've done

- Created a repo on GitHub
- Cloned repo to your local computer (git clone)
  - —Automatically sets up your "origin" remote
- Made two file changes
- Staged changes for committing (git add)
- Committed changes (git commit)
- Pushed changes to GitHub (git push)
- Inspected along the way (git remote, git status, git log)

Let's do it again!

- Modify or add a file, then git status
- git add -A, then git status
- git commit -m "message"
- git push origin master
- Refresh your GitHub repo

IV. PULLING FROM GITHUB

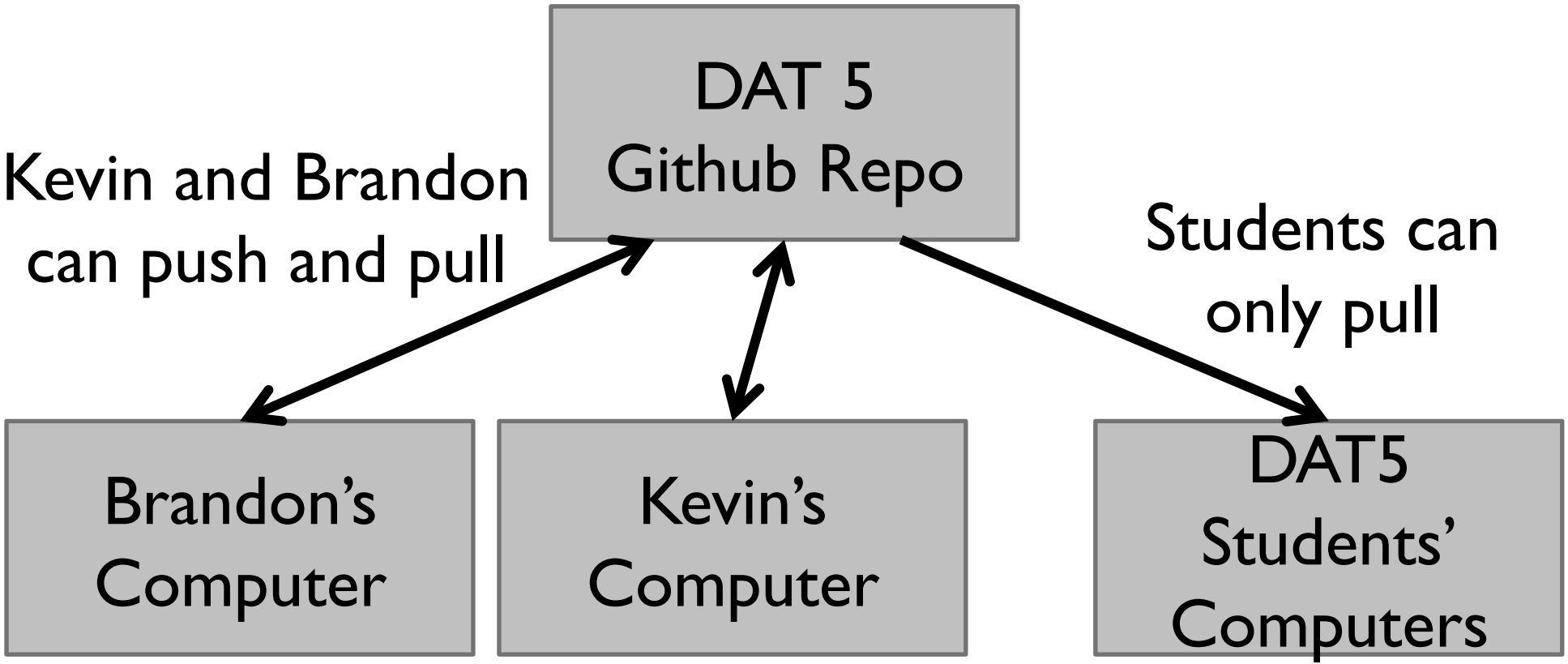
Pulling from Github

- You've added to and pushed changes to your own repo.
- But how do you get new updates from the DAT5 repo?
- You pull down the new changes! Or git pull origin master
- git pull is shorthand for git fetch, followed by git merge

Pulling from Github

- git pull is shorthand for git fetch, followed by git merge
- It goes to the repository on Github (the “cloud”), fetches new the changes made to files and folders, and merges them into your local repository (on your computer).
- **Note**: This does not go to Kevin’s or Brandon’s personal computers.

Pulling from Github



File conflicts

- There can be errors in the “merge” part.
- If there are “conflicting” files, the pull request will fail.
- What causes conflicts? Overriding edits made to files in the repo on your local machine.
- How do I fix this? Rename your edited file. This will allow the pull request to pull down the original, unedited file.
- Alternatively, create a different folder (not within the DAT5 repo on your computer) for edited files.

V. GISTS

Gists: lightweight repos

- You have access to Gist: gist.github.com
- Add one or more files
- Supports cloning, forking, commenting, committing
- Can be public or secret (not private)
- Useful for snippets, embedding, IPython nbviewer, etc.

VI. BONUS CONTENT

Two ways to initialize Git

- Initialize on GitHub:
  - Create a repo on GitHub (with README)
  - Clone to your local machine
- Initialize locally:
  - Initialize Git in existing local directory: git init
  - Create a repo on GitHub (without README)
  - Add remote: git remote add origin <URL>

Deleting or moving a repo

- Deleting a GitHub repo:
  - —Settings, then Delete
- Deleting a local repo:
  - —Just delete the folder!
- Moving a local repo:
  - —Just move the folder!

Excluding files from a repo

- Create a ".gitignore" file in your repo: touch .gitignore
- Specify exclusions, one per line:
  - Single files: pip-log.txt
  - All files with a matching extension: *.pyc
  - Directories: env/
- Templates: github.com/github/gitignore

Useful to learn next

- Working with branches
- Rolling back changes
- Resolving merge conflicts
- Fixing LF/CRLF issues