Week 1 - Introductions, Unix and Git

IBS 796 - Advanced Python Programming in Bioinformatics (Python)
8/29/2016
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Administrative Announcement

- No class next week.
- Next class is on September 12th.

Today’s Outline

1. Introductions
2. Goals/Overview of the Course
3. Getting Setup
4. Basic Unix Commands
5. Git/GitHub

Introductions

Around the Room

1. Who are you?
2. Coding Experience?
3. Hopes/goals for this class?

Goals/Overview of the Class

Goals of this Course

- Specifically
  - Make the terminal you most used application
  - Become a fellow Python developer!
  - Getting first hand experience in microbial genomics

- Broadly
  - Becoming comfortable as a developer
  - Properly setting up your problem
  - Efficiently scouring the infinite abyss of Google

What this course is (and is not)

- It is…
  - Python based
  - Application based
  - Comprehensive
  - An open forum

- It is not…
  - A computer science course
  - A bioinformatics course
  - Written in stone

Weekly Class Outline

- Class demonstrations of previous week's assignment
  - Volunteer based or random order

- **Short** set of slides helpful for next assignment

- A set of homework problems to work through

Weekly Assignments

- Multiple parts, progressive in difficulty

- Collaboration is strongly encouraged!
  - Be sure you can explain the code though!
  - GitHub is great for collaboration.

- Easily demonstrated to the class
  - Make sure laptop works with projector!

Expectations and Grading

- “Show up and do your best.” - Dave Cutler

Getting Setup

A few requirements...

- You will need:
  - A laptop
    - With admin privileges
  - Python
    - Version 2.7
    - Preferably in Unix
  - GitHub account

Mac and Linux Users

- You are set… just know how to get to your terminal!

- Verify Python 2.7 is default:

```
rpetit3-mac:~ rpetit$ python --version
Python 2.7.12
```

Windows 7 Onwards Users

- Windows 10
  - Use “Unix Services in Windows”
  - Git Bash/Console/cmder setup
- Windows 7, 8
  - Take advantage of free upgrade (if applicable)
  - Git Bash/Console/cmder setup
  - Set up a virtual machine
- Older Windows
  - Might be time to upgrade?

- If you haven’t figured it out yet, see me after class!

Text Editors

- Too each their own!
  - Pick one get comfortable with it.
  - Many to choose from
- GUI
  - Sublime Text 3 (cross platform)
  - Notepad++ (Windows)
  - TextWrangler (or BBedit) (Mac)
- Terminal
  - emacs
  - vim (vi)
  - nano

Basic Unix Commands

Basic Unix Commands

- ls
- cd
- pwd
- more & less
- head & tail
- cat & zcat
- chmod
- man
- curl/wget
- ssh
- scp
- screen
- python
- exit

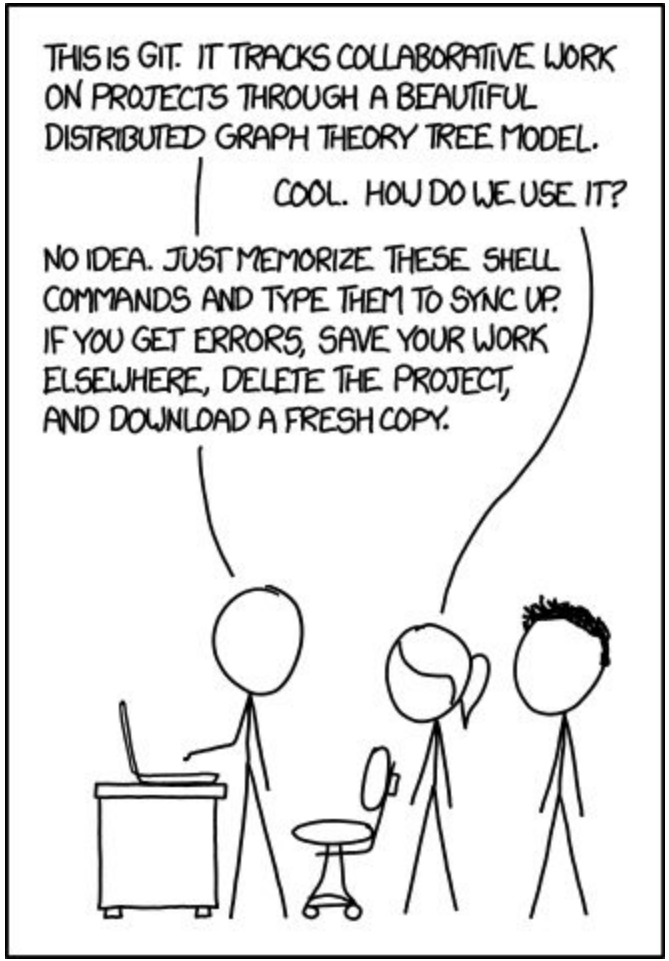
Git and GitHub

Git (/gɪt/) is a version control system that is used for software development and other version control tasks. As a distributed revision control system it is aimed at speed, data integrity, and support for distributed, non-linear workflows.

- Wikipedia (https://en.wikipedia.org/wiki/Git_(software))

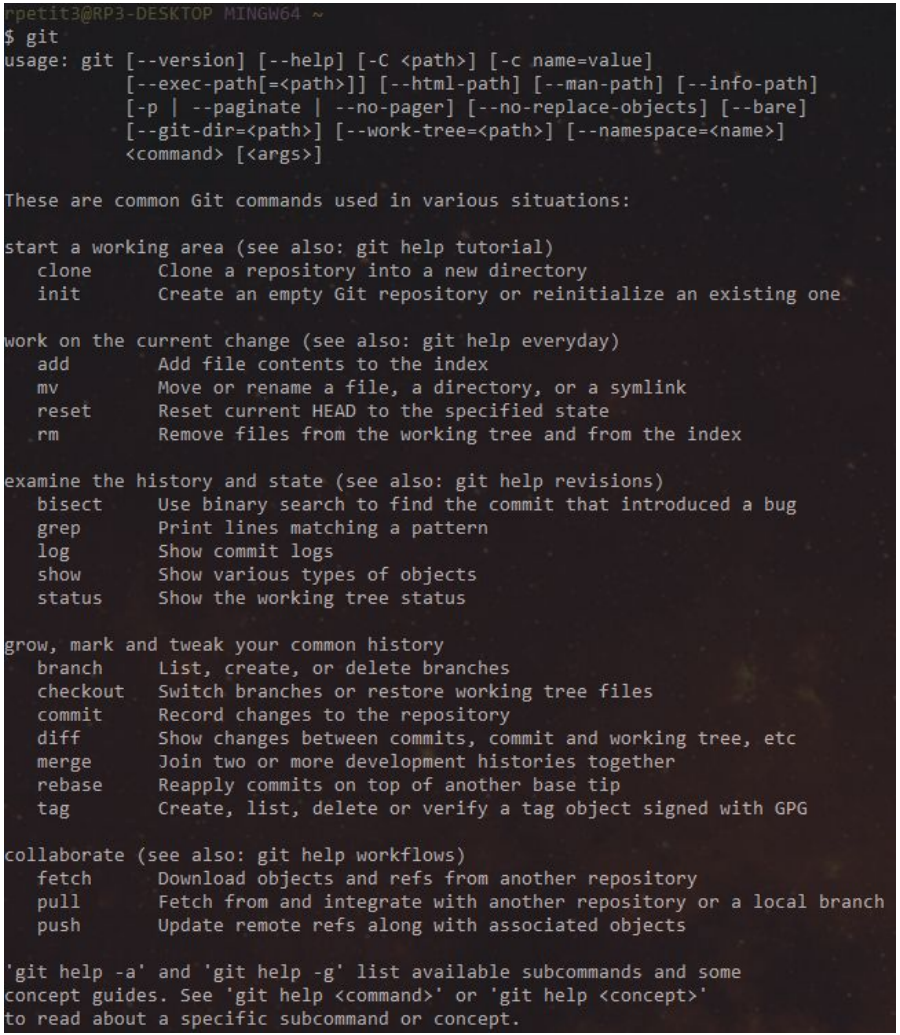
```
The name "git" was given by Linus Torvalds when he wrote the very
first version. He described the tool as "the stupid content tracker"
and the name as (depending on your mood):

 - random three-letter combination that is pronounceable, and not
   actually used by any common UNIX command.  The fact that it is a
   mispronunciation of "get" may or may not be relevant.
 - stupid. contemptible and despicable. simple. Take your pick from the
   dictionary of slang.
 - "global information tracker": you're in a good mood, and it actually
   works for you. Angels sing, and a light suddenly fills the room.
 - "goddamn idiotic truckload of sh*t": when it breaks
```



Source XKCD (https://xkcd.com/1597/)

Those Shell Commands...



The more common ones

- clone
  - Makes a local copy of a repository
- add
  - Marks a file to be included in the repository
- pull
  - Updates the repository to the latest changes
- commit
  - Creates a checkpoint (or version) of changes
- push
  - Updates the remote repository

GitHub

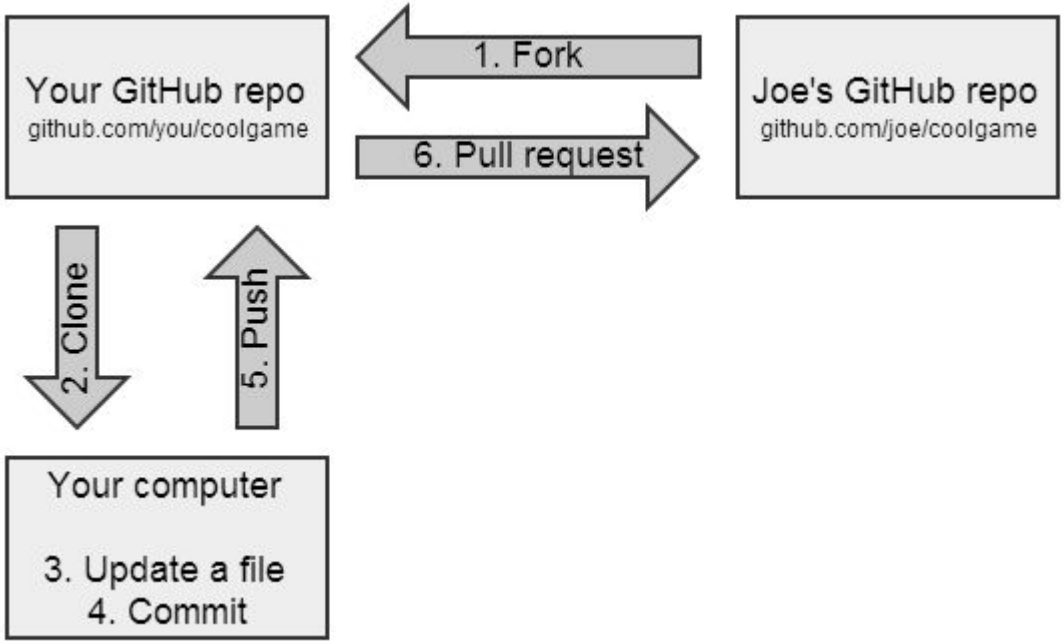
- git repository hosting site
- Most “social” of the git sites
  - Watch, Star, Comments, Issue Tracking, etc…
  - Individuals vs Organizations
- Pro-open source
  - Public repos are free
  - Private repos cost money
- GitHub Desktop
  - Utility to help visualize working with git

GitHub - Terminology

- GitHub allows collaborative coding, which is not necessarily built into git

- Fork
  - Makes a personal copy of some else’s repository
- Pull Request
  - Allows you to submit changes back to another person’s repository

Clone/Push vs Fork/Pull Request



Source dataschool.io (http://www.dataschool.io/simple-guide-to-forks-in-github-and-git/)

GitHub Education

- Allows free discounts to GitHub services
  - Mostly access to private repos
- Applicable to students and researchers
  - Students (individual) get renewable 2 year discount
  - Researchers (organization) get free for life discount for their lab
- Access to the GitHub Education Pack
- Request Your Discount!

Next Week's Assignment

- Play with git
  - Create a new repo on GitHub
  - clone, commit, push, pull, add, etc...
    - BROWNIE POINTS: Investigate setting up your .gitconfig
- Create a personal GitHub Page
  - Read about GitHub Pages
  - Create repo to act as your accounts GitHub page
  - Clone locally
    - BROWNIE POINTS: Investigate setting up SSH-keys
  - Make some changes, commit them and push them
  - Be ready to show it all off September 12th!
    - Page and commit history
- Explore GitHub
  - Fork a repo you are interested in
    - Can be anything
  - BROWNIE POINTS: Submit a pull request fixing an issue