Computer Systems Organization Recitation

CSCI-UA 0201-007

R01: Introduction & Environment Setup

Many slides are based on John Westhoff's Fall 2019 CSO recitation

Before we get started

- Go to https://nyu-cso.github.io/labs/ and start the download for the version of VirtualBox relevant to you
- Start the download for the class VM image

Logistics

Important things you should know

What is this recitation for?

- Help you better understand the course contents, including but not limited to:
  - Reinforce this week's lecture content
  - Review previous week's assessment
  - Some exercises meant to help with the labs/assessments
- Make us all suffer by forcing us out of bed early

Where we release course materials

- Course website
  - https://nyu-cso.github.io/
  - Recitation slides also on the course schedule page
- NYU Classes
  - Zoom links/recording
- CampusWire
  - It’s your responsibility to read Instructor’s Note on Campuswire
  - You are encouraged to ask questions on Campuswire
- GitHub
  - All labs are released on GitHub
  - You will submit all labs on both GitHub and Gradescope
- Gradescope
  - Weekly mini-quiz on Gradescope

How to contact us

- Don't be afraid to ask questions!
- If you have general questions about course contents or labs
  - Ask on Campuswire
  - Come to office hours
  - Register the in-person recitation

If you want more personal tutorial or question answering

- If you want to send us a private message
  - Email cso-staff mailing list at cso-staff@cs.nyu.edu
    - Include your name, your GitHub username, and your NYU NetID

How are we going to proceed?

- For the first two weeks, we will focus on environment setups, usage of basic tools, etc.
  - Today we will cover environment related setups
  - Next recitation will cover programming tools (6 labs, bonus)
- From the third week
  - We will review weekly assessment, reinforce some course contents, exercises to prepare for your labs
- Weekly assessments will be due Friday 9pm EST
  - Done on Gradescope, do it early
  - No late submission

Academic Integrity

- All work must be your own – do not copy or even look at assignments done by others
  - Don't ask StackOverflow or Chegg for help - if you need it, ask us!
  - Don't hire someone to do your work for you
- We reserve the right to use software plagiarism detection tools such as Moss
- It's not worth the risk, just don't cheat and make us sad

Getting Started

Important things you must do

Today’s Topics

- Setting up your virtual machine
- Setting up your git repositories
- Basic Unix commands
- Program development
  - Editor (Sublime)
  - Version control (Git)

Today’s Goal

- By the end of today’s recitation, your should
  - Have the class virtual machine installed
  - Have GitHub ready for you to submit work
    - An account
    - Lab-1 repository
    - Know how to submit assignments

Basic virtual machine setup

- Follow https://nyu-cso.github.io/labs/ instructions to
  - Download VirtualBox 6.0.10
  - Download our VirtualBox image
  - Launch VirtualBox and import the image
  - Launch Lubuntu Linux
    - Username “lab”, password “lab12345”

Advanced VM setup

- After finishing the basic setup, you are good to go
- But if you want to
  - Resize the VM window to full screen nicely
  - Copy and paste between the VM and your laptop
  - Move files between your laptop and the VM
- Then check our the Lab instruction page!
  - https://nyu-cso.github.io/labs/
  - Recommend it!

Attention: You MUST test your code in your class virtual machine

- We recommend you to do your labs in your virtual machine we provide to you, and test it before submission
- More tools are available for debugging in VM (gdb etc.)
- Gradescope runs the same test script
  - In general, there should be no surprises
- If you choose to do your labs outside of the class virtual machine, we will not provide any technical support should you encounter any OS-related issues in doing the labs

Open up a terminal

- Click the “LXterminal” icon on the desktop
- OR click start icon (the bottom left icon)
  - Click “System Tools” and then “LXterminal”
- OR use the keyboard shortcut
  - Ctrl + Alt+ T
- To copy paste in a terminal, you need to use
  - Ctrl + Shift + C to copy
  - Ctrl + Shift + V to paste
  - Or just right click

Basic Commands

- Some useful commands to know:
  - man
  - ls, cd, pwd, mkdir
  - cp, mv, rm
  - echo, cat
  - wc
  - grep
  - ctrl-c,ctrl-d, ctrl-z, fg, bg
  - |, >, <, >>
  - apt install/search
  - history, ctrl-r

Basic Commands

- Whenever you want to find out how to do something using command line, ask Google first
- Here is a link contains useful command, for both beginners and experienced users:
    - https://github.com/jlevy/the-art-of-command-line

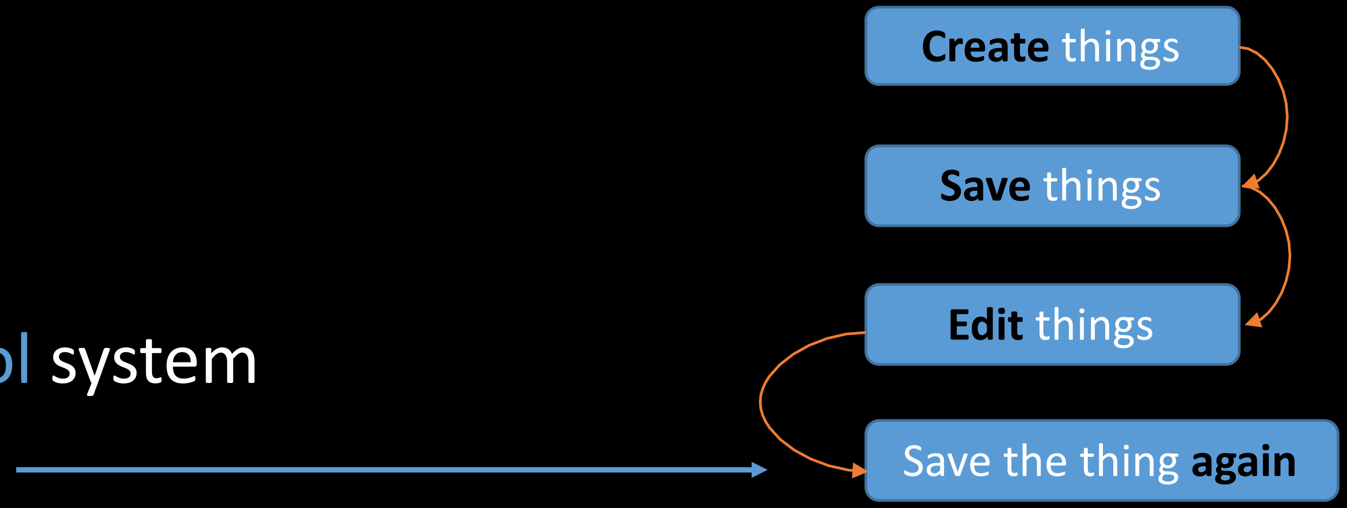
Editor

- You need a good editor to code with for productivity
- Popular editors used by programmers:
  - vim
  - emacs
  - vscode
  - sublime
- We recommend you use Sublime Text
  - Which should be already installed on the VM image

Setup GitHub/lab1 repo

- Create a GitHub account if you don’t have one
- We have created for you a corresponding private lab repository on Github.com
- Enroll yourself in the GitHub classroom
  - Create your lab-1 repository by clicking the link below
    - https://classroom.github.com/a/RvmnAdGI
    - Select your NYU NetID
      - Very important!
    - Don’t select someone else’s NetID!
- If you cannot find your NetID, let me know!

Git Overview



- Distributed version control system
- What is version control?
  - Manages *changes* to documents, source files and other collections of information
- Why is version control indispensable?
  - History tracking: track code changes
  - Roll back to older version
  - Collaborate with others (*collaborative history tracking*)
- We are going to use the popular "Git" as our version control system

You need to config git first!

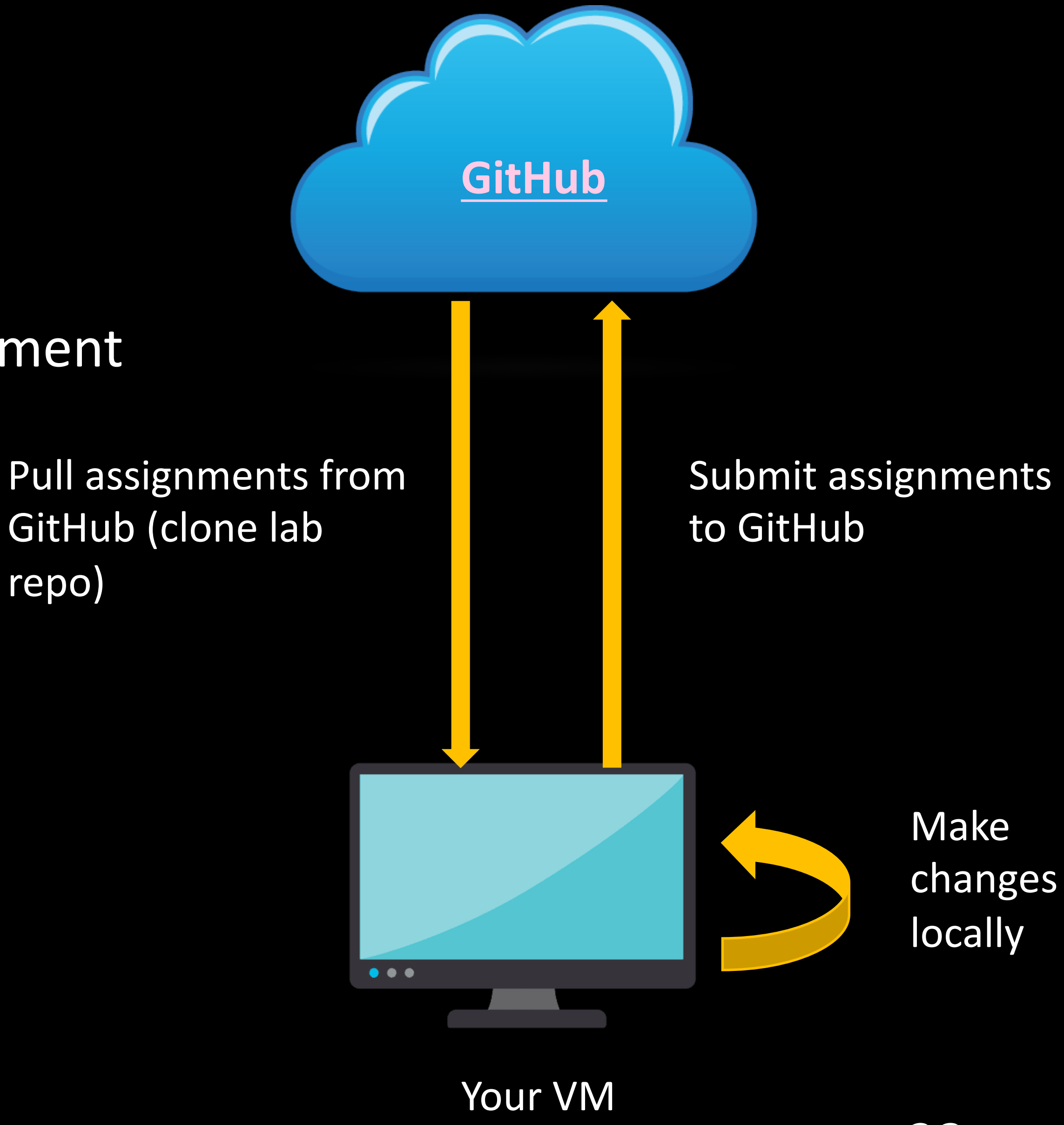
- git config --global user.email “<Your Email>”
- git config --global user.name “<Your Name>”
- You can issue “git config --list” to check your configuration
- Here, the <Your Email> should be the one associated with your GitHub account

A list of git commands you need

- git clone
- git status
- git remote
- git add <file name>
- git commit -m <commit messages>
- git push origin master
- git pull upstream master

Git Overview

- GitHub:
  - provides hosting for software development and version control using Git.

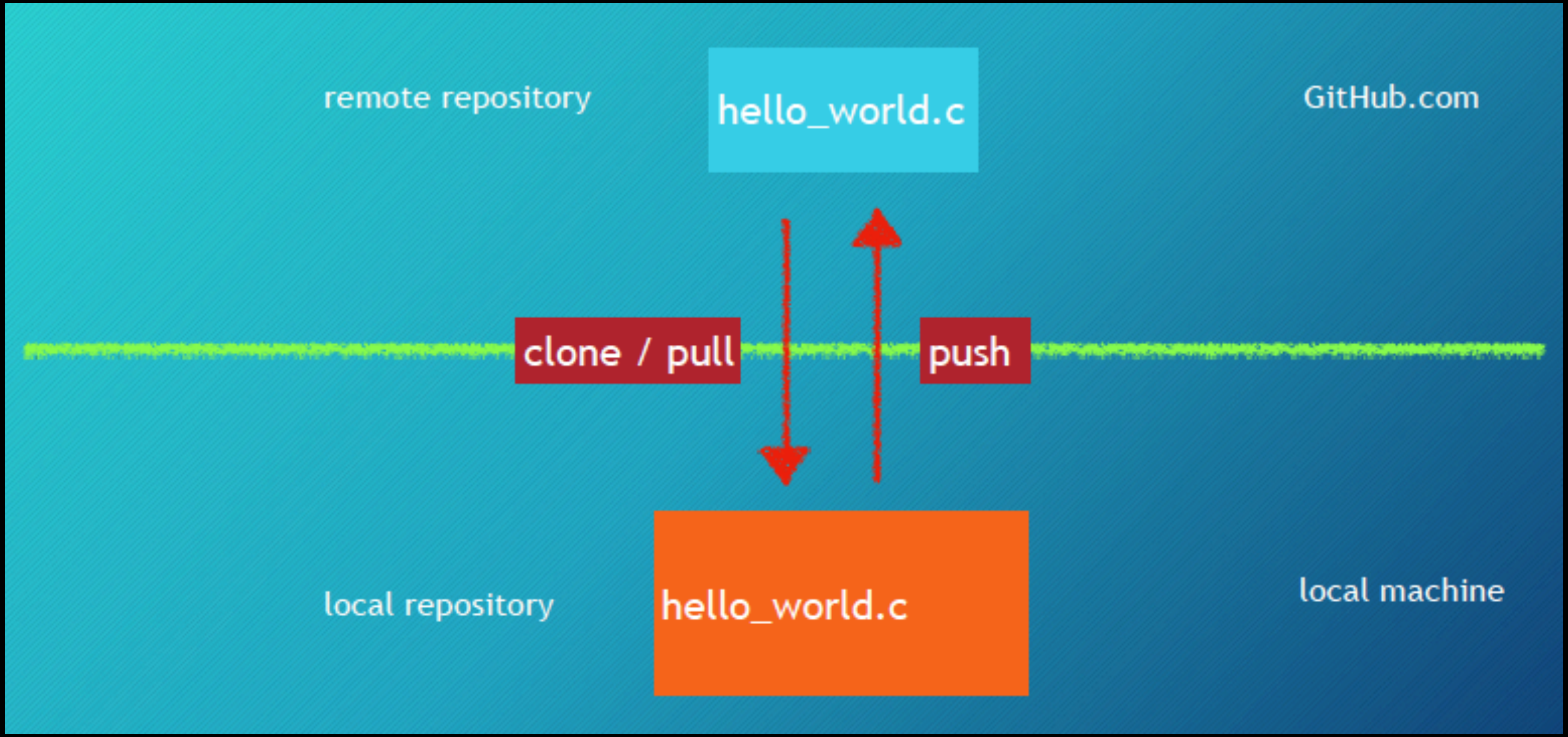

GitHub
Pull assignments from GitHub (clone lab repo)
Submit assignments to GitHub
Make changes locally
Your VM

Clone your lab repo locally

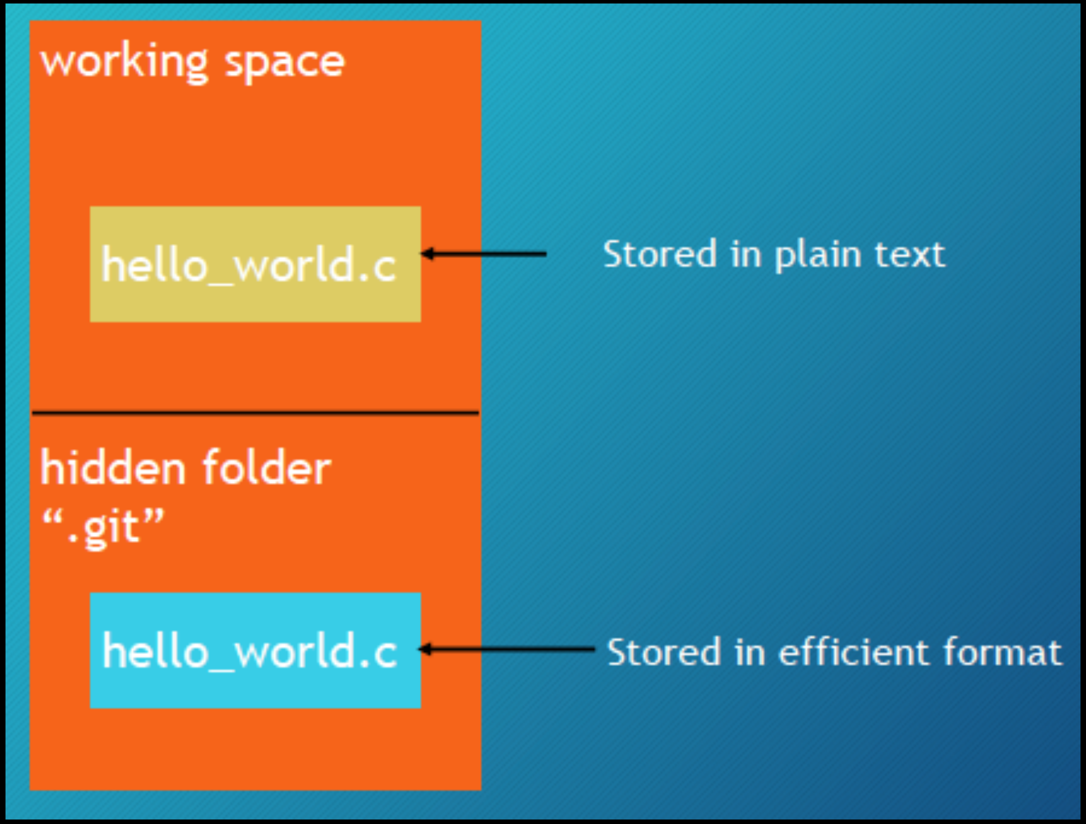
- In command line, type:
  - mkdir cso-labs
  - cd cso-labs
  - git clone https://github.com/nyu-cso-fa20/clab-part1-<YourGithubUsername>.git lab1
    - If you copy the above command to command line, don't let the line break
    - Replace <Your GitHub Username> (including the angle brackets) with your GitHub username.
  - cd lab1

Git Setup

The remote copy is stored in
some efficient format



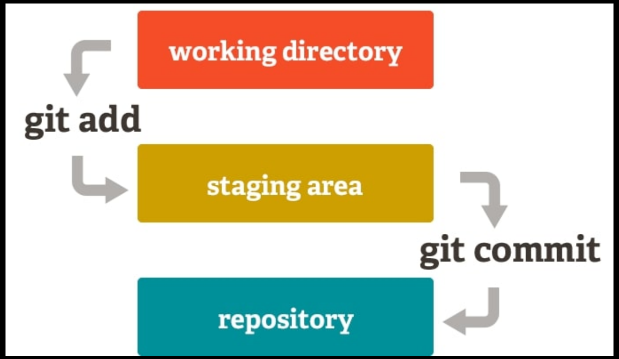
A closer look at your local repository

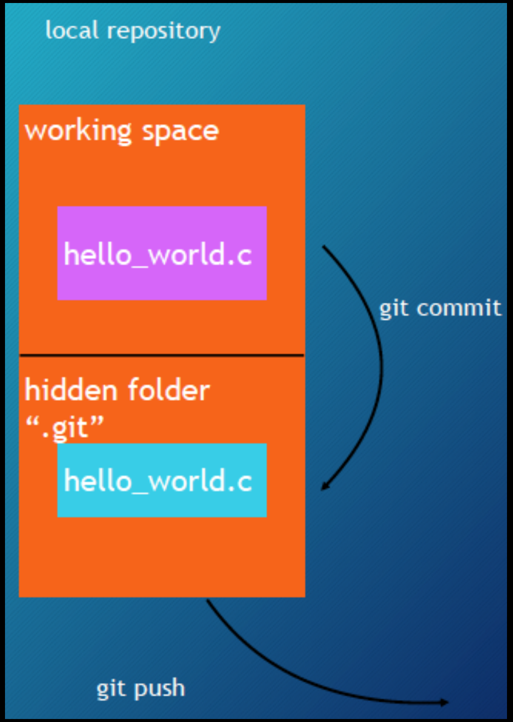


Local repository

How to interact with Git

- git add hello_world.c
  - Tell git to track changes to hello_world.c
- git commit
  - Store tracked file to .git
- git push origin master
  - Submit commits to your remote repository





For each new assignment

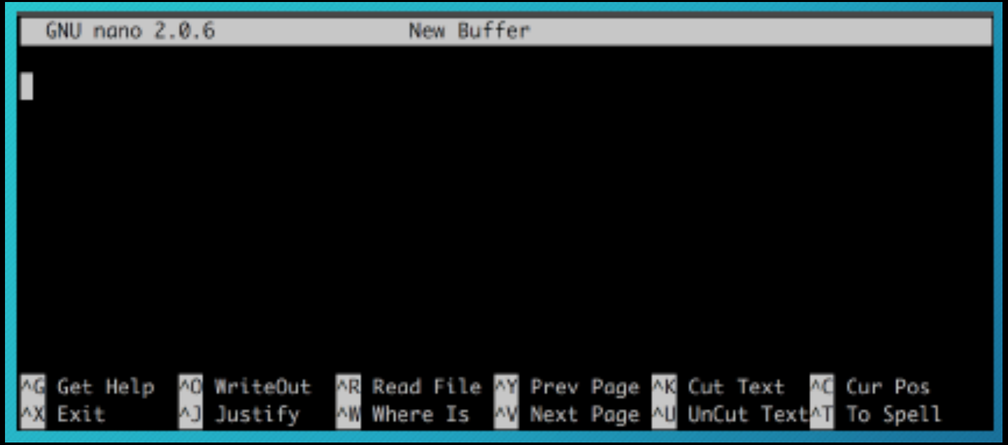
- Create lab repo on GitHub (click link, select yourself)
- Clone your lab repo locally
  - cd cso-labs
  - git clone https://github.com/nyu-cso-fa20/clab-part1-<YourGithubUsername>.git lab1
- Then make changes locally in the VM
- Tell git to track changes
  - git add filenames
- Commit your changes
  - git commit -m "commit messages"
- Submit to your remote repository (on GitHub)
  - git push origin master

Git commit

- When you issue “git commit”, you need to provide a message which is a short description of the changes you made
- You can use “-m” option to provide the commit message
    - E.g.: git commit -m “my first commit”
- If you don’t use “-m” option, an command line editor will pop up for you to edit the commit message
    - By default, nano

How to get out of Nano Editor

- The default editor is called Nano



```
  GNU nano 2.0.6                New Buffer





^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text^T To Spell
```

- To add a commit message from nano
  - First type in some commit message
  - Hit Ctrl+O to save your commit message (^ means Ctrl)
  - Hit Ctrl+X to exit

Double check with “git status”

- Sometimes, you might forget to do some (or all) of
  - git add, git commit, git push
- It’s always good to check the status of your repository
- git status tells you
  - What files are going to commit
  - What files are not tracked
  - Whether you forget to push commits to remote

Triple check with GitHub

- Still not sure/confident about whether assignment was submitted properly?
- Go to github.com, then go to your repo
- Manually check if every file contains the up-to-date information

Git is much powerful than that

- Our git introduction only covers a small part of Git
- Git tutorial:
  - https://www.atlassian.com/git/tutorials/what-is-versioncontrol
  - https://try.github.io/levels/1/challenges/1

All the git commands you need for CSO

- For beginners, it’s super easy to mess up Git
- After setting lab repository, you ONLY need to use the follwing git commands:
    - git add filenames
    - git commit -m “commit message”
    - git push origin master
    - git clone your-lab-repo lab
    - git status

Warning: unless you know what you are doing, do not use any other git commands or git command flags

Ask the staff for help

- If you really cannot fix conflicts or other git problems, you should ask course staff for help
  - You need to email the staff or attend office hours
    - Online makes things harder..
  - You should start your lab earlier
- Don’t randomly issue commands to further mess things up

Things you should NEVER do

- Don’t use git add *, git add .
  - Instead, you should always specify the file names you want to commit
  - Please don’t add complied programs to git
- Don’t modify any file using GitHub website
  - Instead, you should always make changes locally on your laptop and then push commits to GitHub
  - Otherwise, there will be conflicts, which will lead to sadness