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1. Bash, Regular Expressions, and Version Control

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In order to record a change to a file in a repository, you use the command

git record 0%

git add 0%

git repo 0%

git change 0%

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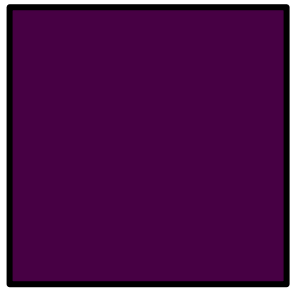
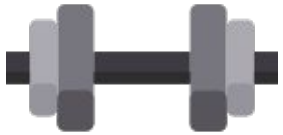
Welcome

About Me

- My name is Philana
  (means Lover of Mankind)





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My Background

xerox

BOEING

CENTRAL INTELLIGENCE AGENCY
UNITED STATES OF AMERICA

LinkedIn

yearup™
BAY AREA

Microsoft

amazon

zynga

Meta

Google

????

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My Background

INTech

MLT

TEACHERS aide

#YES WE CODE

black girls CODE imagine. build. create.

girls who code

TAF ACADEMY

MORGAN STATE UNIVERSITY
GROWING THE FUTURE LEADING THE WORLD

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Summer Series Culture

Openness - We will strive to create an environment where all will feel voices are welcomed, heard, and acknowledged.

Perseverance - We will always give the best effort intellectually and behaviorally; we will never give up, even if it gets tough.

Compassion - We will strive to support others in their successes and exemplify empathy when working to achieve a common goal.

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Tools for this summer series

Codio - accessing and submitting deliverables, demos, writing code, etc.

PollEverywhere - For quizzing (NOT quizzes), session openers, Q & A, and gauging understanding

Pen and Paper (Device and Stylus?) - To draw out concepts to improve understanding

Random Name Picker - To anonymize my calling on names for responses

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Let’s Begin!

Tools you will need for today:

- extra screen (your phone works!)
- pencil and scratch paper (8.5” x 11” ish)

  … or screen and stylus

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Today's Objectives:

- Define technical jargon:
  - Bash, shell, command line, terminal, prompt
- Use the shell to navigate and do basic tasks
- Write regular expressions
- Setup and use git with Github for version control

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What definitions do you know?

- Terminal
- Shell
- Bash
- Command line
- Prompt

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When opening the _____, the _____ loads. _____ is the shell Linux/Unix OS uses. The user operates the _____ by typing a command after the _____.

command line, shell, bash, terminal, prompt	0%
shell, terminal, command line, Bash, prompt	0%
terminal, shell, Bash, command line, prompt	0%
terminal, command line, shell, Bash, prompt	0%
terminal, shell, Bash, prompt, command line	0%

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Definitions

Terminal – What a shell is run on; connects UI to computing resource

- Used to be dedicated hardware back in the day
- Now it's a software application

Shell – software that is a command line interpreter; it differs by OS

- Example: Windows is called Command Prompt

Bash – Bourne Again SHell – shell usually used by Linux and Unix operating systems (OS)

- Windows uses PowerShell instead of Bash

Command line (interface) – describes navigating through a computer through the interface which includes the terminal, shell, and prompt. the CLI is usually compared against Graphical User Interface (GUI)

Prompt – The shell's signal it is ready for a command

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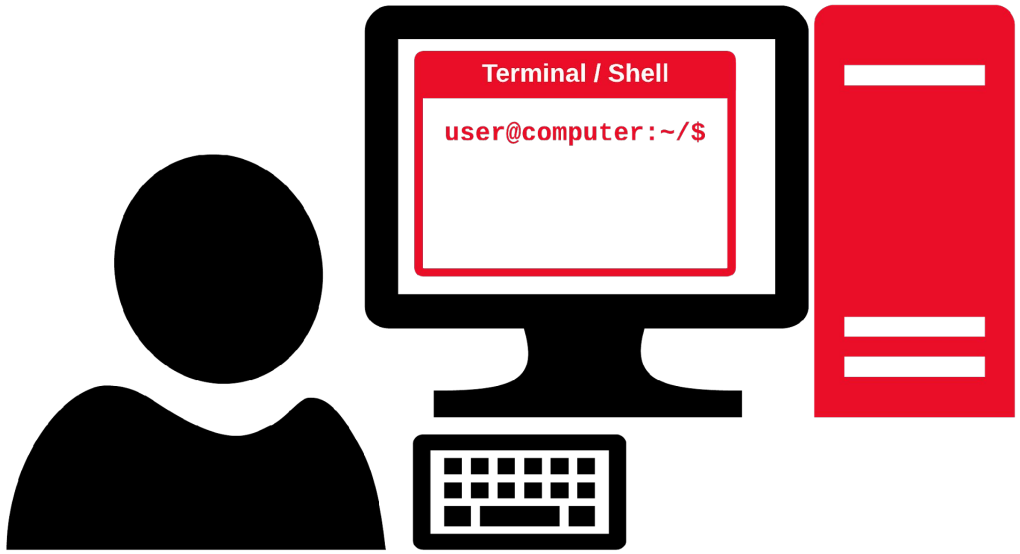
How we interact with computers

1. You open the **terminal** which starts the **shell**. Some terminals allow you to open multiple shells.
2. The **shell** loads and starts printing information.
3. When you see the **prompt** (generally in the format `user@computer:~/location/$`) the system is ready for a command; and you're ready to "use **command line**".



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Navigating with CLI vs. GUI

Command Line Interface (CLI)

Graphical User Interface (GUI)

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Bash is a type of :

Operating System 0%

Command 0%

Party 0%

Shell 0%

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Shell is:

an Operating System 0%

Software 0%

a Command 0%

a Terminal 0%

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Bash

Basic Bash Navigation Commands

- **Where am I?**
  - `pwd` – path to working directory
- **What is here?**
  - `ls` – list files in current folder
  - `ls -a` – list files in current folder (including hidden)
  - `ls -R` – list all files (including those in nested folders)
- **Go to folder/directory**
  - `cd name-of-folder` – go to named folder
  - `cd ..` – go to parent folder
  - `cd /` – go to root directory

`ls`	`-R`
command	flag or option

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Basic Bash File and Variable Commands

Directories and Files

- `mkdir folder-name` – creates directory
- `rmdir folder-name` – removes directory
- `rm file-name` – removes file
- `touch file-name` – creates file
- `nano file-name` – opens file in editor

Variables

- `NAME="SEO Tech Developer"` – assign variable value with "="
- `echo $NAME` – access variable value with $

Environment Variables

- `env` – print all environment variables
  - If you already know the variable name, you can print environment variables using echo
- `export VARIABLE_NAME=9999` – creates environment variable
  - export only sets the environment variable for that shell. *What happens if you try to see it in a different shell?*

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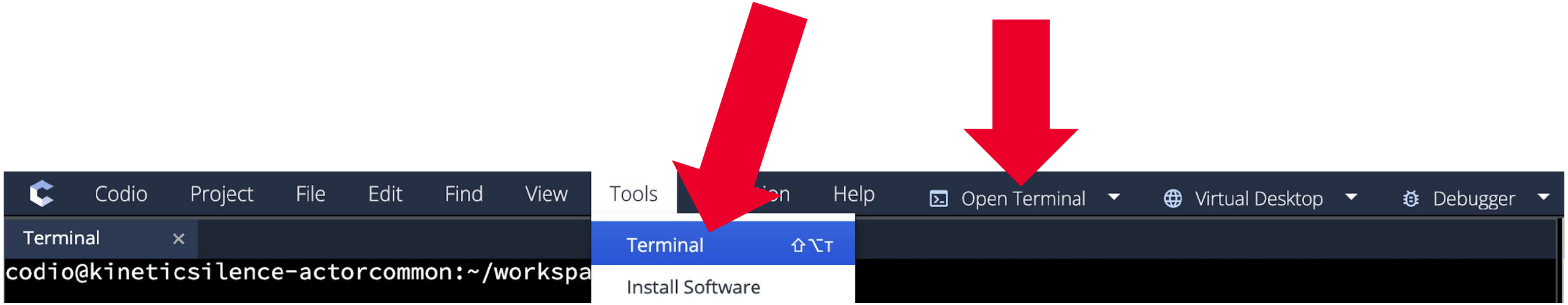
Click here for a list of more commands

Opening the Terminal in Codio

There are a few ways to open the terminal from the top menu



In the terminal, try typing `echo "Hello shell!”` and press Enter/Return

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DEMO Using Bash

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Regular Expressions (RegEx)

Regular Expressions: Character Patterns

- Regular expressions define patterns of characters
- You have probably seen regular expressions – for example:
  - `'*.py'` – all files with extension .py
  - `'[0-9]'` – a single digit number
  - `'[Hh]ello'` – hello or Hello
- Regular expressions are used in Bash and many different languages including python and Javascript
  - RegEx syntax is similar across languages
  - RegEx can be used to search for files or validate input from a user!

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RegEx Basics and Quantifiers Syntax

Character	Description
`.`	Match one character of any type
`\d`	Match one number in range 0–9
`\D`	Match non-number
`\w`	Match one “word” (including letters, digits, and _)
`\W`	Match one non-word character
`\s`	Match one whitespace character (space, tab, newline)
`[list]`	Match one character of a defined set
`[0-9]`	Match one integer within a range

Character	Description
`?`	Match zero or one instances of the preceding character
`+`	Match one or more instances of the preceding character
`*`	Match zero or more instances of the preceding character
`{5}`	Match a specific number of instances of the preceding character
`{,5}`	Match 0 to 5 instances of the preceding character
`{5,}`	Match 5 or more instances of the preceding character
`{2,5}`	Match at least 2 or at most 5 instances of the preceding character

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RegEx Example: Email Addresses

People build web crawlers which collect people's email addresses.

What is a RegEx that would capture a wide variety of email addresses?

- help@codio.com
- Nikki.Susca@seo-usa.org
- akinwand@mtl.mit.edu

What issues do you potentially see with this?

[a-zA-z\.-]+@[a-zA-z-]+\.(com|org|edu|net|co.uk)

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RegEx Example: Phone Number

Say we want validate user input for the phone number field in the form via the following format:

- ### -

What is RegEx for a phone number with this format?

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RegEx Example: Phone Number

- ### -

What is RegEx for a phone number with this format?

[0-9]{3}-[0-9]{3}-[0-9]{4}

Character	Description
`.`	Match one character of any type
`\d`	Match one number in range 0−9
`\w`	Match one “word” (including letters, digits, and _)
`\W`	Match one non-word character
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Char	Description
`+`	Match 1+ instances of the preceding character
`*`	Match 0+ instances of the preceding character
`{5}`	Match a specific # of instances of preceding char
`{,5}`	Match 0 to 5 instances of the preceding character
`{2,5}`	Match min 2 to max 5 instances of preceding char

Regular Expressions: Utilities

- To use regular expressions in Bash, you will need to use a utility to interpret them. Some common ones are:
  - `grep`
  - `sed`
  - `awk`
  - `expr`
- You can read a summary of each on their manual page. Use the `man` command to open the manual – for example: `man grep`

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Regular Expressions: Example

- An example of how to use `grep`:
  - `grep -E '[Yy]ou' greeneggs.txt`
    - Matches both 'You' and 'you'

```
You do not like
Could you, would you,
Would you, could you,
Not in a car! You let me be!
You do not like them. So you say.
Try them! Try them! And you may.
```

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General Definitions

Version Control - a way to manage and record the changes to data

Version Control System - software whose core use is to implement version control

Source Control (System) - software used to keep track of changes to *only* code files

- It is a subset of version control

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DEMO Using RegEx

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Version Control

Look Familiar?

Name ↑	Owner
**** FINAL PAPER 1	me
Copy of Paper 1 Draft	me
Final Paper 1	me
Paper 1	me
Paper 1 Draft	me
Paper 1 Draft 2	me
Paper 1 Final	me
Paper 1 Final Draft	me

... This is an example of version control!

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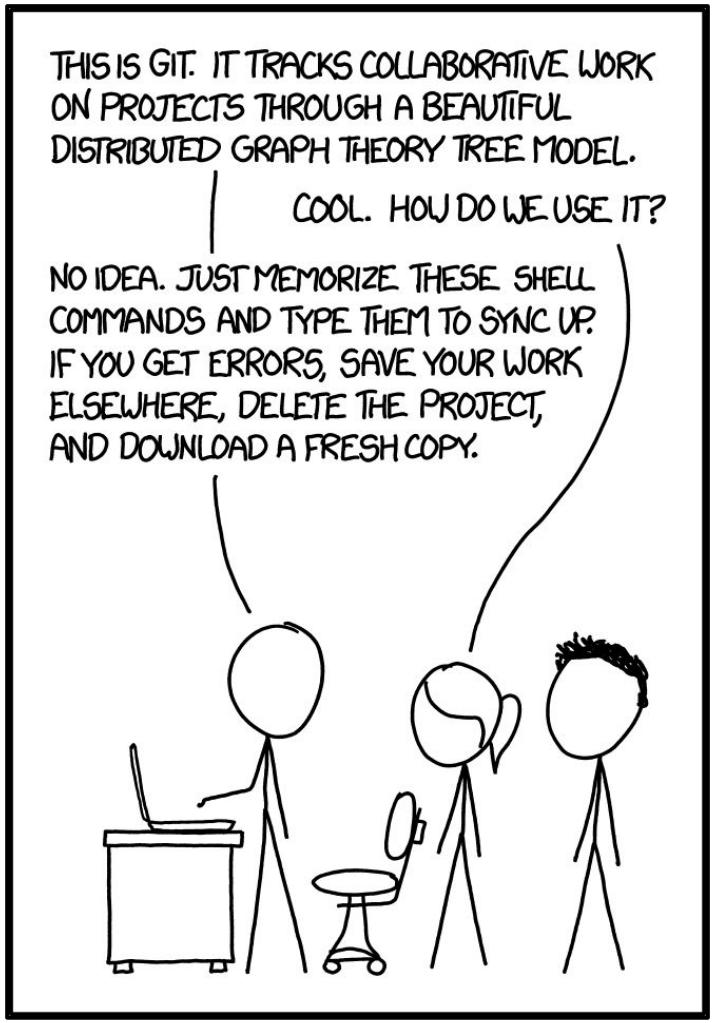
What is Version Control?

- You already use version control:
  - Save points in a video game
  - Multiple drafts of an essay
  - GoogleDocs version history



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Check all examples of source control systems:

Git 0%

GitHub 0%

Mercurial 0%

Subverison 0%

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What is Git

- Is software that…
  - …helps manage changes to a set of tracked code files (AKA repository) via a series of commands
    - Example of changes: editing, deleting, add files
  - …is usually accessed via command line
  - …Is not really simple to use
    - Especially if you don't understand how it works
    - Even if you understand the commands

We'll be using Git because it is one of the most popular source control systems in use today.

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Version Control Definitions

repository – the changes and versions of a set of files (documents, code, etc)

commit – represents a record of a change in 1 (or more) files in the system

tracked file – file means that your version control acknowledges it exists. Your VCS will actively monitor changes for you.

untracked file – file means that your version control does not acknowledge its existence. Your VCS will not monitor any changes.

staging file – tell version control which files to record changes on your next commit (ex untracked files, edited files, deleted files etc.)

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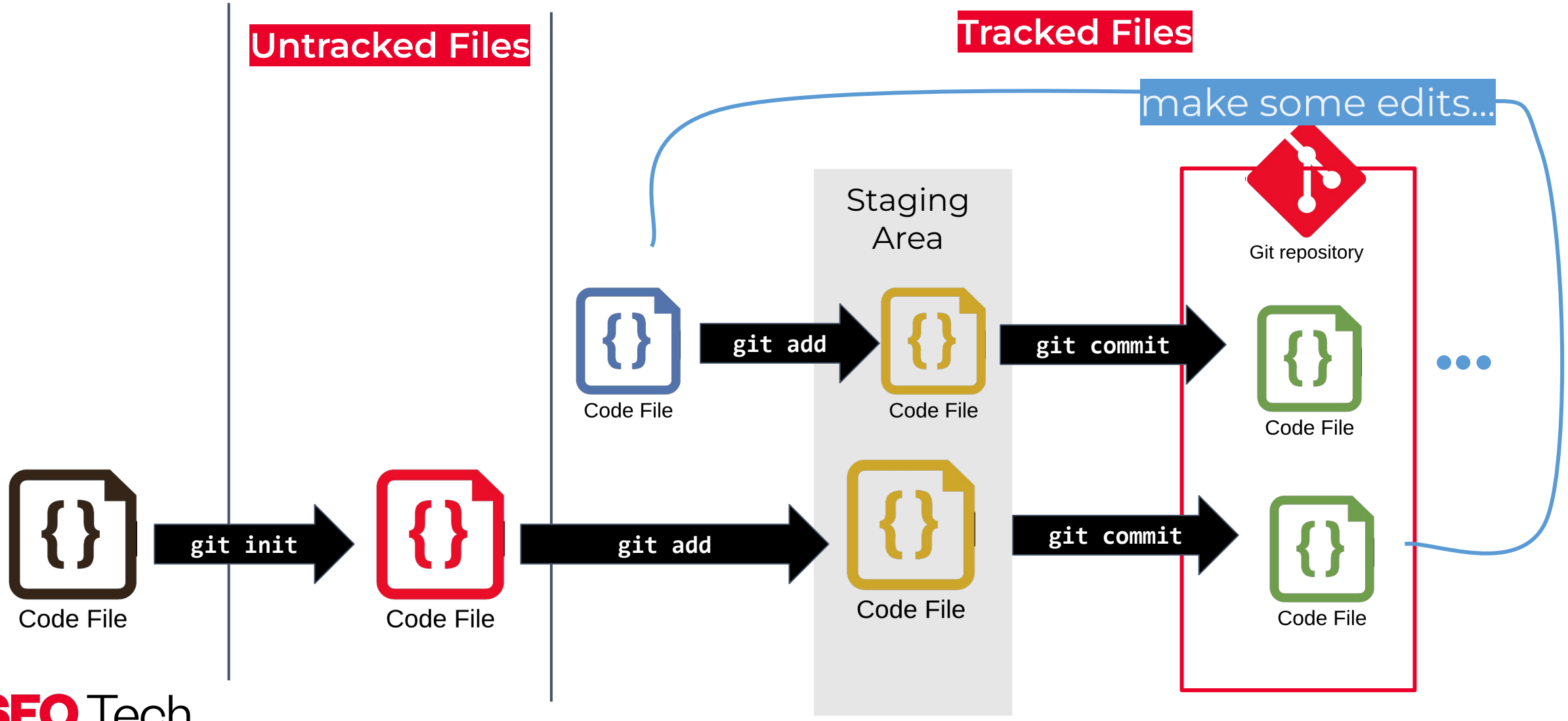
Let’s draw this out.

Working Directory



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Git: Saving file changes in a local repository

1. Create a local repository in a specified folder using `git init` (if it doesn't already exist)
2. Make a change to a file (or files), so Git has something to record.
   a. In other words, add, remove, delete, or edit files
3. Next, use `git add` command to add current change(s) to a staging area, so Git knows which file(s) edits to remember for the next commit /record
   a. (Replace $name_of_file with the actual file name)
4. Use `git commit` command to record/save the staged files

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Git: A close up on commits

- To create a commit or save point:
  - `git add filename` vs `git add .`
  - `git commit –m “commit message”`

- Make sure to use good labels/messages for your versions!

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DEMO Using Git

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In order for Git to monitor the changes to a file, it must be _____.

tracked

0%

untracked

0%

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So... I understand Git, but how is different than GitHub?

Git versus GitHub

GIT	GITHUB
Git is a distributed version control system which tracks changes to source code over time.	GitHub is a web-based hosting service for Git repository to bring teams together.
Git is a command-line tool that requires an interface to interact with the world.	GitHub is a graphical interface and a development platform created for millions of developers.
It creates a local repository to track changes locally rather than store them on a centralized server.	It is open-source which means code is stored in a centralized server and is accessible to everybody.
It stores and catalogs changes in code in a repository.	It provides a platform as a collaborative effort to bring teams together.
Git can work without GitHub as other web-based Git repositories are also available.	GitHub is the most popular Git server but there are other alternatives available such as GitLab and BitBucket.

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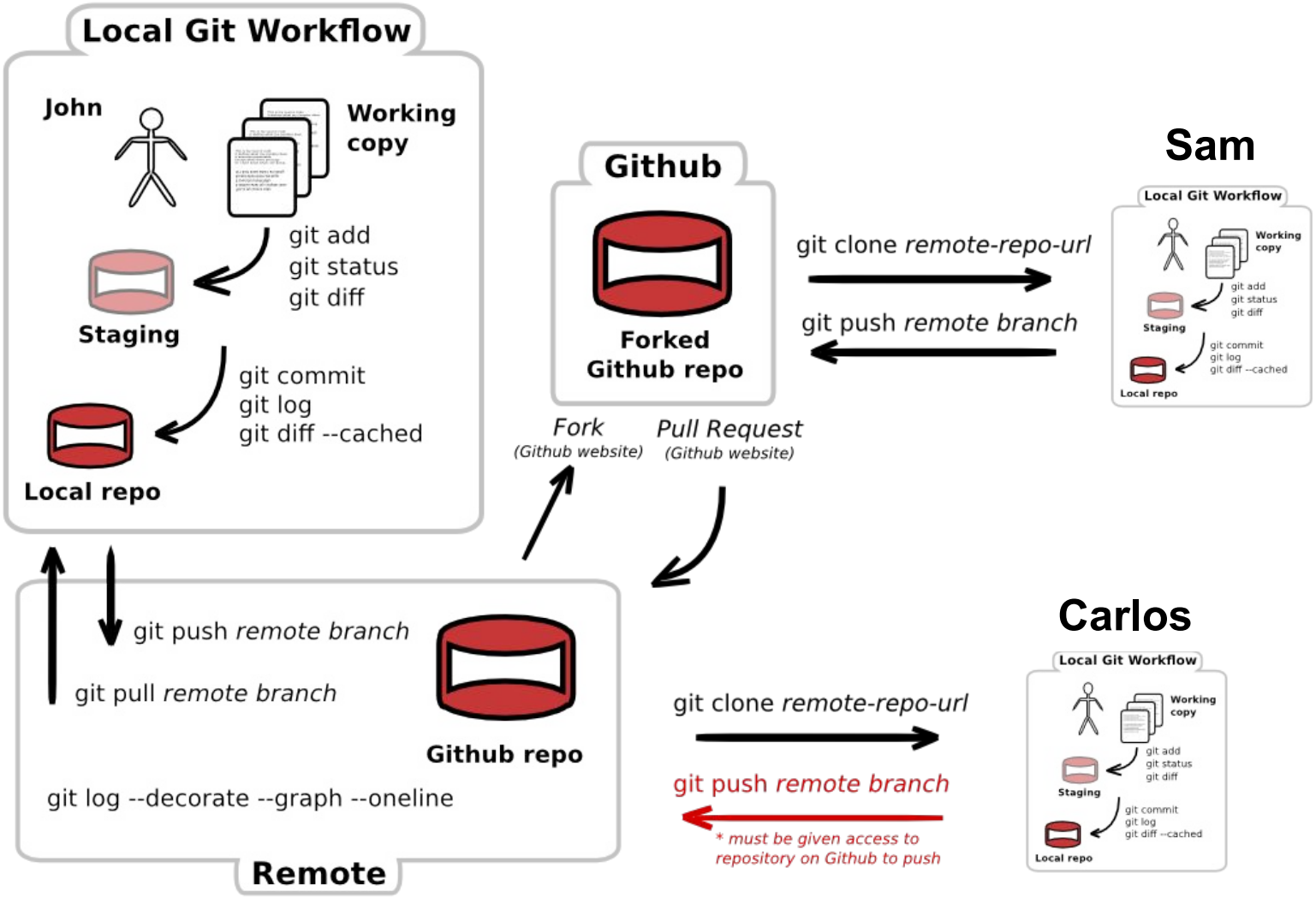
Using GitHub: A Diagram



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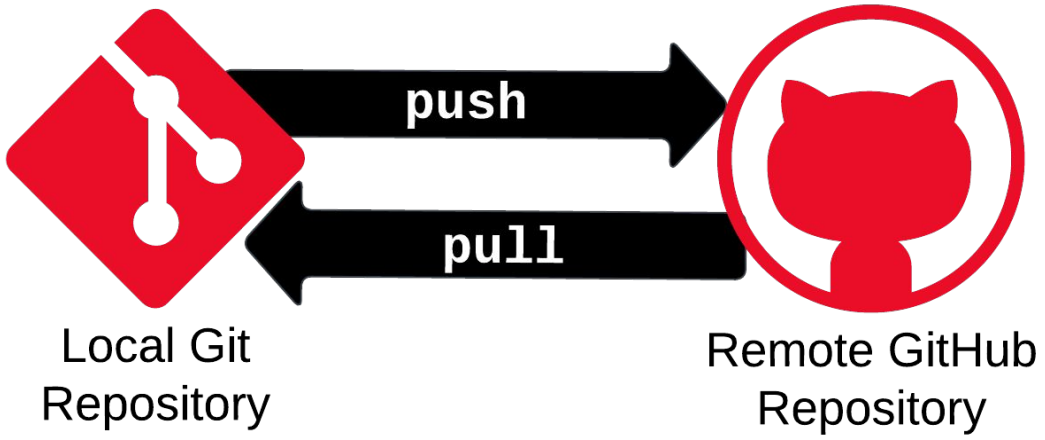
Remote Repositories: Github

- Often you are collaborating on code and want a central repository. This won't be on someone's laptop (aka local) but instead in the cloud (aka remote).
  - Github is one of the most popular tools for remote repositories
- `pull` or `push` code between a local and remote repository:
  - `git push`
  - `git pull`



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DEMO

Using Version Control

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Other Git Commands

- `git status` – to see which files have been staged, not staged, etc.
- `git log` – to see a list of your save points (AKA your commits)
- `git clone` – create a copy of a remote repository to your local repository (must do this when accessing rep for the first time).
- `git stash` – saves a set of modified tracked files to apply for later use

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Reminders

- Check your Google Calendars for this week's events!

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Q & A

* Differentiating jargon: Bash, shell, command line, terminal, prompt
* Using the shell to navigate and do basic tasks
* Writing regular expressions
* Setting up and using git with Github for version control

Nobody has responded yet.

Hang tight! Responses are coming in.

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Thank you!