Git and GitHub

The world of version control and open source

What is Git

- A distributed version control system
- History of git
- Classically, a command line tool
- Git alternatives

What is GitHub

- What is GitHub
- How is it related to git
- Features
- Alternatives to GitHub

Git vs GitHub

- GitHub is a online platform (Web App).
- Git is a CLI tool (installed on system)
- GitHub is used to host and collaborate git repositories.
- Git is used to manage the local repositories and push changes to online platforms like GitHub to allow collaboration.

Git - Basics

Installation

- It’s got a website https://git-scm.org also available with all linux package managers (linuxbrew, apt, pacman).
- It’s a CLI tool. You need a command line application for this. (Terminal, cmd, powershell, git-bash, iTerm)
- GUI wrapper Applications are also available (GitHub Desktop, SourceTree, GitKraken, etc)

Initializing a repo

- Meaning of initialization
- git init
- What does initialization do?

Creating a readme file

- Why add a readme file to a project?
- What is markdown - Syntax for writing docs.
- Basic markdown
  - GitHub flavored markdown (GHFM)
  - Headings
  - Text
  - Links
  - lists

staging files

- Meaning of staging Area
- git add readme.md
- git add .
- git add *.cpp
- Stage only selected changes in a file, using `-p` flag.

Status

- git status
- Untracked files
- Staged changes, unstaged changes.
- Remote branch tracking
  - *K* Commits ahead
  - *K* Commits behind
  - *N* Commits ahead *M* Commits behind
  - Even

Committing Changes

- meaning of commits
- git commit
- git commit -m “hello”

Checking the commit logs

- git log
- git log --oneline
- git log --all --oneline

What is a commit hash?

- A unique identifier for commits
- These commit hashes are 40 digits long
- Commit hashed are formed by a combination of several things including -
  - The parent commit sha1
  - The author info
  - The committer info (right, those are different!)
  - The commit message
  - Details can be found here

Untracked files

- Meaning of tracking
- Create a few more files
- Make second commit, but leave out a few files
- Now these are untracked files
- Git doesn't track these files, as if they don't exist for git

.gitignored files

- Meaning of .gitignore
- Difference between unstaged, untracked files, and gitignored files
- Which files must be gitignored
- Creating a .gitignore
- Adding a file to gitignore after already committing it does not remove it from the repo (IMPORTANT)
    - Either create a commit to delete it first
    - Or rebase the root commit to remove that file

Branches

- create new branch
- Set branch to track another remote branch (--set-upstream-to , and --track)
- Switching branches (essentially moving HEAD -> git checkout)
- Pushing to specific branch (git push origin local:remote)

Merging

- git merge

Revision - git basics

- git init
- git add
- git status
- git commit
- git log
- git branch

- staging
- staged files
- untracked file
- gitignored files

Github - Basics

Creating a new empty repo

- On github website
- repo.new
- github.new

Attaching this new repo to a local git repo

- git remote add origin https://github.com/<username>/<repo_name>
- git push -u origin master
- significance of -u flag?

Understanding remote and origin

- remote is where you push or pull from
- Origin is just its name
- Can have multiple remotes

Pushing and Pulling to github

- git pull
- git fetch
- git merge

Cloning

- git clone https://github.com/<username>/<repo_name>
- Upstream, remote, origin already present
- Commit history already present
- Difference between cloning & downloading zip of that repo from github

Revision - github basics

- Create, rename, delete a repo
- Attach a local repo to github repo
- Cloning a repo
- Pulling and pushing data to github

Github Features

- Nice clean GUI for commits
- Following different users -> Feed
- Open Source Collaboration
- Issues
- PRs
- Stars
- Forks
- Exploring other repositories
- Watching other repos

Github Pages

- Quickly serve a static website
- enable in settings
- _config.yml
- Jekyll at the backend
- Static site generators
- How is the website served at the backend
    - Add content
    - Jekyll build
    - Serve dist

Git - Beyond the basics

Vim editor

- `i` to insert mode
- `dd` to delete a line
- `:wq` to write and exit
- `:q!` exit without saving changes
- Changing the default editor for git

Stashing

- git stash
- Simply save changes made
- git stash save "my_stash"
- git stash list
- git stash apply
- Git stash pop

- Stash vs patch files
- # save your working copy changes
  git diff > some.patch
- # re-apply it later
  git apply some.patch

Rebasing

- With great power comes great responsibility.
- Usually called a Destructive action
- git rebase -i HEAD~6
- Interactive rebasing
- A quick demo

Amending commits

- Rewording commit messages
- Adding more files
- Writing commit messages on a new page

Squashing commits

- Melding commits into one another
- To clean git history
- To logically meld consecutive minor commits to a meaningful commit
- A quick demo

Force push

- Overwrite git history at remote
- A quick demo
- When is it required?

Revision - git beyond the basics

- Amending
- Branches
- Merging
- Stashing
- Rebasing
- Squashing
- Force Push

Github - Beyond the basics

Collaboration and Pull request

- The flow to follow when contributing to a github repo

Ways to merge a PR

- 3 ways to merge a PR on github

Merge conflict

- What is it
- Why does it occur
- When does it occur

Tags and releases

- Annotated tag
- What is a release

Revision

- Issue
- PR
- Merge conflict

That’s all