

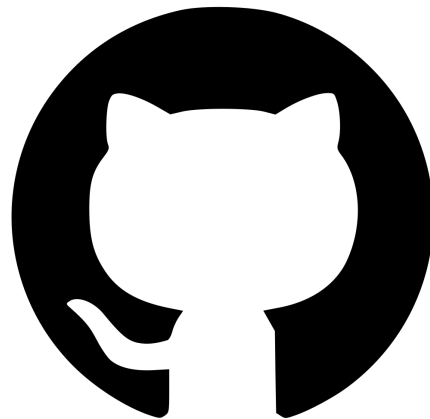


Git & GitHub Bootcamp 2024

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- Introduction to Version Control
- Why Git is Essential for Developers
- GitHub for Collaboration and Sharing Code

https://github.com/kevinwing/git_bootcamp_2024

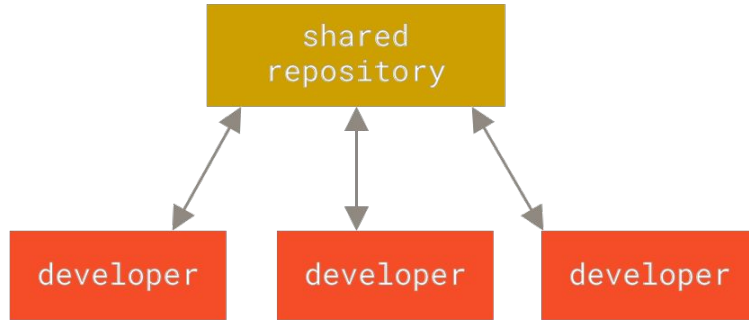




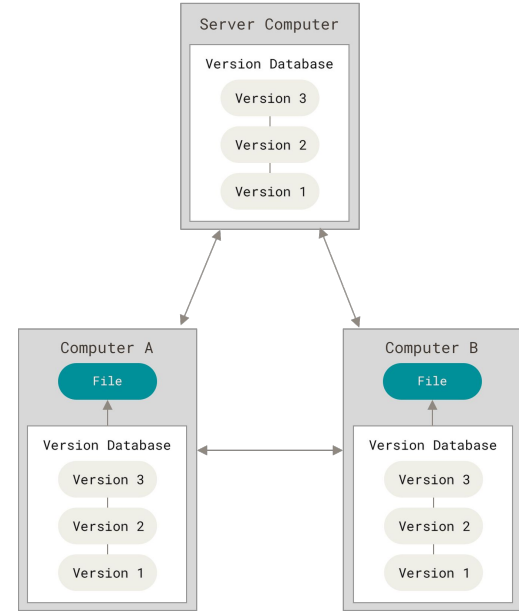
What is Git?

- Git is a distributed version control system (VCS)
- Tracks changes in your code
- Maintains codebase integrity
- Allows for multiple developers to work together

Centralized Vs. Distributed



Centralized



Distributed



Why is it called git?

git

Noun *British Slang*

1. A contemptible person
 - Collins Dictionary

"I'm an egotistical bastard, and I name all my projects after myself. First 'Linux', now 'git'."

- Linus Torvalds (Creator of the Linux kernel and git)

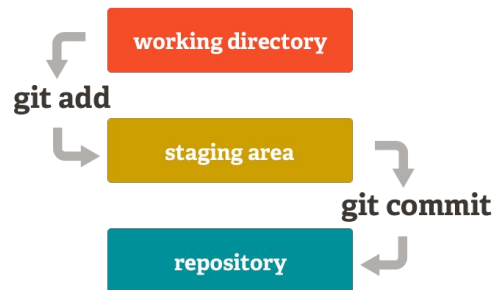


Basic Git Concepts

- Repository (repo)
- Working Directory (where your edits are made)
- Staging Area
- Commit (snapshot)
- Branch (a copy to make some change on)
- Merge (joining branches)
- Merge Conflicts (sounds scary, but really isn't)

Git Workflow

- Working Directory
- Staging Area
- Commit History
- Pushing and Pulling from Remotes repos



```
commit a598f915985fadbc8f63c7235faacc4ca5228 (HEAD -> kevinwing-feature-add_ML362LMS_dendrometer)
Author: Kevin Ming <kevinwing@gmail.com>
Date: Thu Aug 29 13:38:31 2024 -0700

    added manual/instructions for dendrometer

commit 9b0fa32ac18c440ab6d9951dffb0c72f6c7bc79 (origin/kevinwing-feature-add_ML362LMS_dendrometer)
Author: Kevin Ming <kevinwing@gmail.com>
Date: Thu Aug 22 14:05:40 2024 -0700

    added some comments to SensorFactory.hpp and AnalogSensor.hpp

commit 10f1214bdcf5cc4776461a12a74e996e93b518cd
Author: Kevin Ming <kevinwing@gmail.com>
Date: Wed May 8 15:46:18 2024 -0700

    implemented SensorFactory in scheduler

commit f16a5dc3bdc6437bf98a38a8ca8094e074ca
Author: Kevin Ming <kevinwing@gmail.com>
Date: Wed May 8 15:45:33 2024 -0700

    Initial implementation of the SensorFactory

commit 156898003b1bd6bf5803bfbf051e4bf9b3776972
Author: Kevin Ming <kevinwing@gmail.com>
Date: Wed May 8 15:44:58 2024 -0700

    implemented AnalogSensor parent class on VMSensor

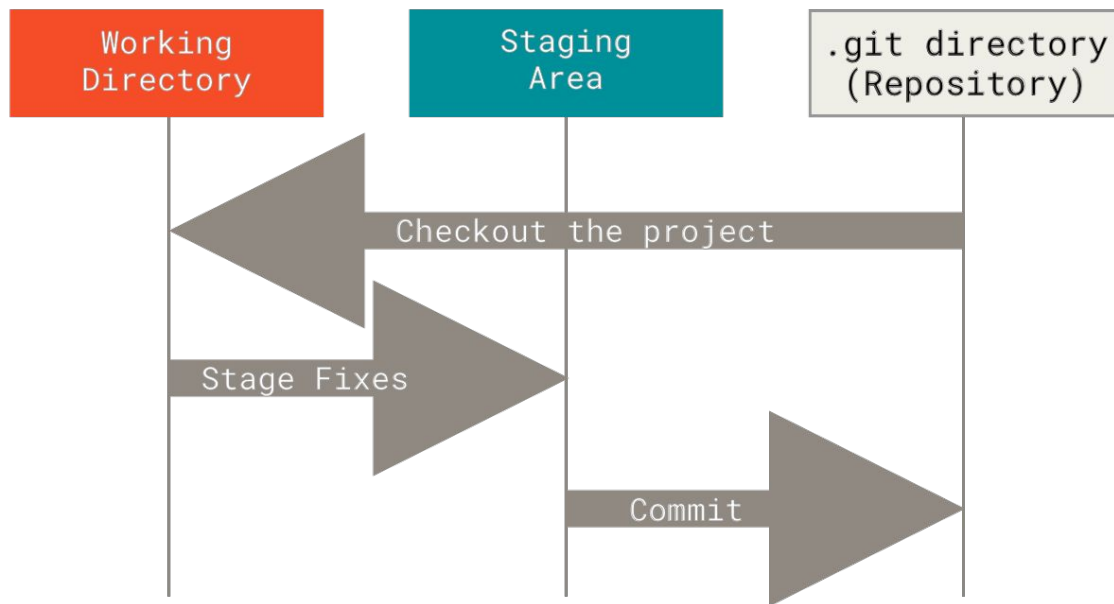
commit cdf8bca3f18d1e4222b14cab28e7ee5daf3fa7313
Author: Kevin Ming <kevinwing@gmail.com>
Date: Wed May 8 15:44:04 2024 -0700

    added AnalogSensor to replace DendroSensor

commit 94a4369058f32942559f1fcb0a30a813033da410
Author: Kevin Ming <kevinwing@gmail.com>
Date: Wed May 8 15:41:24 2024 -0700

    modified dendrometer lib to allow for autogeneration
```

A Better Visual





Common Git Commands

- `git init`
- `git add`
- `git commit`
- `git status`
- `git log`
- `git push`
- `git pull`
- `git clone`
- `git config`



What is GitHub?

- GitHub is a Cloud-Based Platform for Hosting Git Repositories
- Collaboration Tool for Developers
- Additional Features: Issues, Pull Requests, GitHub Actions

GitHub



GitHub Workflow

- Fork and/or Clone a Repository
- Make Changes Locally (commit)
- Push Changes to your Fork
- Submit a Pull Request



Setting Up GitHub

- Create account
- Setup SSH key
- Configure Git on Local Machine
- Basic GitHub Settings



GitHub Features

- Pull Requests (PR) and Code Reviews
- Issues and Project Management
- GitHub Actions
- GitHub Pages



GitHub Workflow Demo

- Fork a Repository
- Create a branch and Make a Change
- Submit a PR
- Merge a PR



Pull Requests (The Magic of GitHub)

What is a Pull Request (PR)

- A request to merge changes into another branch or repository

Why Use PRs?

- Enables code review and feedback before merging
- Ensures quality and consistency in the codebase

Common Workflow

- Fork or clone a repository
- Create a new branch for changes
- Push changes to your branch/fork
- Open a PR to the original repo or main/master branch

Merging PRs

- Can be merged once reviewed and approved
- Can resolve conflicts during the merge process

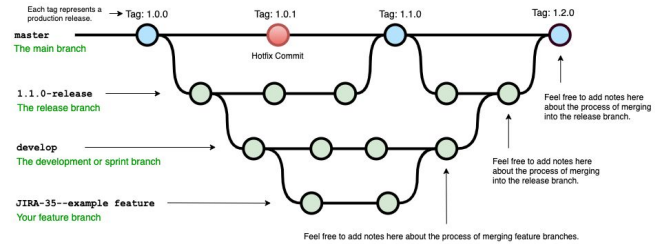
Git Branching

- Creating and Switching Branches
- Merging Branches
- Handling Conflicts

Example Git Branching Diagrams

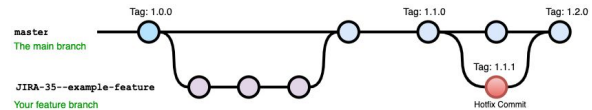
Example diagram for a workflow similar to "Git-flow" :

See: <https://nvie.com/posts/a-successful-git-branching-model/>



Example diagram for a workflow with a simpler branching model:

See: <https://gist.github.com/jenisee6c9ac48068889b0912> or <https://www.endoflineblog.com/oneflow-a-git-branching-model-and-workflow>





Best Practices for Git & GitHub

- Commit Often with Meaningful Messages
- Keep Branches Organized
- Use PRs for Code Review
- Sync Local Branches with Remotes Regularly



With Great Power...

- `git reset`: **Can rewrite history, be careful**
- `git checkout - - <file>`: **Discards changes permanently**
- `git push - -force`: **Can overwrite remote history**
- `git rebase`: **Rewrites commit history, use with caution**
- `git clean`: **Deletes untracked files permanently**



Q & A

- What is something we did not go over that you would like to know more about?
- Any issues with setup?



Final Thoughts

- Git and GitHub are Essential for Software Development
- Keep Practicing
- Plenty of Resources
 - <https://git-scm.org/doc>
 - <https://docs.github.com>
 - etc.



References

Wikipedia contributors. "Git." *Wikipedia, The Free Encyclopedia*. Wikipedia, The Free Encyclopedia, 5 Sep. 2024. Web. 24 Sep. 2024.

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www.bryanbraun.com/2020/04/24/drawing-git-branching-diagrams.