GitHub & Git Concepts Learning Path

Level 1: Getting Started with Git

Assignment 1.1: Installation & Setup

- Install Git on your system
- Configure your global Git username and email
- Verify installation with `git --version`
- Create your GitHub account

Concepts Learned: Installation, basic configuration

Assignment 1.2: First Repository

- Initialize a local Git repository
- Create a simple README.md file
- Make your first commit with a meaningful message
- Create a repository on GitHub
- Push your local repository to GitHub

Concepts Learned: `git init`, `git add`, `git commit`, `git remote`, `git push`

Level 2: Core Git Workflow

Assignment 2.1: Basic Version Control

- Create a simple project (e.g., HTML page or Python script)
- Make several commits showing progress
- Use `git log` to view your commit history
- Create meaningful commit messages following best practices

Concepts Learned: Staging area, committing, commit messages, history

Assignment 2.2: Undoing Changes

- Experiment with:
    - `git restore <file>` to discard changes
    - `git reset HEAD <file>` to unstage
    - `git commit --amend` to fix last commit
    - `git revert <commit>` to undo a commit

Concepts Learned: Undoing changes, amending commits

Level 3: Branching & Merging

Assignment 3.1: Basic Branching

- Create a new branch for a feature
- Make changes in this branch
- Switch back to main branch
- Merge your feature branch into main using `git merge`
- Delete the feature branch

Concepts Learned: `git branch`, `git checkout`, `git merge`, branch lifecycle

Assignment 3.2: Merge Conflicts

- Create an intentional merge conflict
- Resolve the conflict manually
- Complete the merge with `git merge --continue`
- Document the resolution process

Concepts Learned: Conflict resolution, merge strategies

Level 4: Collaboration with GitHub

Assignment 4.1: Cloning & Forking

- Fork an existing repository on GitHub
- Clone your fork locally
- Make changes and push them to your fork
- Create a pull request to the original repository

Concepts Learned: Forking, cloning, pull requests

Assignment 4.2: Working with Remotes

- Add multiple remotes to a local repository
- Fetch changes from upstream with `git fetch`
- `git pull`
- Merge upstream changes with `git merge`
- Push to different remotes

Concepts Learned: Multiple remotes, `git fetch`, merging upstream changes