Git and GitHub

1. **What is Git?**
    - A distributed version control system.
    - Allows multiple people to work on a project simultaneously.
    - Tracks changes in files and coordinates work among programmers.
2. **What is GitHub?**
    - A web-based hosting service for version control using Git.
    - Provides access control and several collaboration features such as bug tracking, feature requests, task management, and wikis for every project.

Setting Up Git

1. **Install Git**
    - Download and install Git from git-scm.com.
    - Verify the installation by running **git --version** in your terminal.
2. **Configure Git**
    - Set your username and email:
    - `git config --global user.name "Your Name"`
    - `git config --global user.email "your.email@example.com"`

Basic Git Commands

1. **Initialize a Git Repository**
    - Navigate to your project directory and initialize a new Git repository:
    - cd your-project-directory
    - `git init`
2. **Add Files to the Repository**
    - Add files to the staging area: `git add filename`
    - Add all files in the directory: `git add .`
3. **Commit Changes**
    - Commit the staged changes with a descriptive message: `git commit -m "Initial commit"`
4. **Check the Status**
    - Check the status of your repository: `git status`
5. **View Commit History**
    - View the commit history: `git log`

Working with Branches

1. **Create a New Branch**
    - Create a new branch: `git branch feature-branch`
    - Switch to the new branch: `git checkout feature-branch`
    - Or create and switch to a new branch in one command: `git checkout -b feature-branch`
2. **Merge Branches**
    - Switch back to the main branch: `git checkout main`
    - Merge the feature branch into the main branch: `git merge feature-branch`

Using GitHub

1. **Create a GitHub Account**
    - Sign up for a GitHub account at github.com.
2. **Create a New Repository**
    - Click on the "+" icon in the top right corner and select "New repository."
    - Fill in the repository name, description, and other details, then click "Create repository."
3. **Push Local Repository to GitHub**
    - Add the remote repository URL:

```
git remote add origin https://github.com/your-username/your-repository.git
```

    - Push the local repository to GitHub: `git push -u origin main`
4. **Clone a Repository**
    - Clone an existing repository from GitHub:

```
git clone https://github.com/your-username/your-repository.git
```

Collaboration on GitHub

1. **Fork a Repository**
    - Fork a repository to create a copy under your own GitHub account.
2. **Create a Pull Request**
    - Make changes in your forked repository and push them to GitHub.
    - Go to the original repository and click on "Pull requests," then "New pull request."
    - Select the branch you want to merge with and create the pull request.
3. **Review and Merge Pull Requests**
    - Review the pull request, discuss changes, and merge it into the main branch if approved.

Additional Resources

- Git Documentation: git-scm.com/doc
- GitHub Guides: guides.github.com
- Interactive Git Tutorial: try.github.io