**Version Control (Git/GitHub)**

**Common Terms**

* VCS – Managing source code changes over time.
* Repository – Collection of a project’s files; code & history changes are stored. (Local/Remote)
* Commit – Immutable snapshot of a project. Normally identified with a hash, author and a commit message.
* Branch – A movable commit reference representing development line.
* Merging – Combining different branches.
* Staging Area – Changes are collected before being recorded in a commit.
* Cloning – Creating a local copy of a remote repository
* Pull & Push – Fetching updates & Sending local Changes to remote repository.
* Pull Request – Formal request to merge changes from a branch
* Forking – Creating a server-side copy of an existing repo in GitHub.

**File States**

1. Working Directory – Project folder changes here aren’t tracked.
2. Staging Area – Changes to be included in the commit are listed here.
3. Repository (.git) – Commits are stored here.

**Repository Lifecycle**

1. Creation – Local Initialization/Cloning Remote
2. Active Development – Committing, Branching, Merging, PR
3. Maintenance – Conflict Resolution, Housekeeping & Versioning
4. Archival – Final Snapshot, Archiving (GitHub), Deletion

**CLI Commands**

|  |  |
| --- | --- |
| Action | Git Command |
| Set your identity (name & email) | git config --global user.name "Name"git config --global user.email you@example.com |
| Initialize a new repository locally | git init |
| Copy an existing GitHub repository to local | git clone <url> |
| See what has changed / staged / unstaged | git status |
| Stage changes to prepare for commit | git add <file> / git add . |
| Save a snapshot of staged changes | git commit -m "message" |
| Show commit history | git log |
| Show changes between working directory and last commit | git diff |
| Show changes staged for commit | git diff --staged |
| List branches | git branch |
| Switch to an existing branch | git switch main |
| Merge another branch into current branch | git merge <branch-name> |
| Rebase current branch on top of another (optional advanced) | git rebase main |
| Show remote repositories | git remote -v |
| Add a new remote | git remote add origin <url> |
| Push branch to remote | git push -u origin <branch-name> |
| Fetch updates from remote | git fetch origin |
| Pull latest changes and merge into current branch | git pull |
| Delete a remote branch | git push origin --delete <branch-name> |
| Unstage a file | git restore --staged <file> |
| Discard changes in working directory | git restore <file> |
| Revert a specific commit | git revert <commit> |
| Stashing Changes | git stash push -m "message" |
| List stashes | git stash list |