Introduction to Git and GitHub

**What is Git?**

Git is a **distributed version control system** used to track changes in source code during software development. It lets multiple developers work on a project at the same time, without overwriting each other’s work.

**Key Concepts:**

* **Repository (repo):** A project tracked by Git. It can be local (on your machine) or remote (like on GitHub).
* **Commit:** A snapshot of your project at a given point. You commit to save changes and write a message explaining what you changed.
* **Branch:** A parallel version of your code. Useful for adding features or fixing bugs without affecting the main codebase.
* **Merge:** Combining changes from different branches.
* **Staging Area:** A buffer between your working directory and your commit. You "stage" changes you want to include in the next commit.

**What is GitHub?**

GitHub is a **cloud-based hosting platform for Git repositories**. It adds collaboration features like pull requests, issue tracking, code reviews, and team management.

**GitHub = Git + Collaboration + Cloud**

You can:

* Store your code online
* Collaborating with teammates
* Contribute to open-source projects
* Use GitHub Actions to automate CI/CD workflows

**Typical Git Workflow (Local to GitHub):**

git init # Initialize a local repo

git clone <repo-url> # Clone a remote GitHub repo

git status # Check what's changed

git add <file> # Stage a file for commit

git commit -m "Message" # Save the snapshot

git push origin main # Push changes to GitHub

git pull origin main # Get latest changes from GitHub

**Example Scenario:**

You’re working on a web app. You create a new branch called feature/login, develop the login page, commit your changes, and push to GitHub. Then, you create a **pull request** to merge your changes into the main branch after review.

**Final Thoughts**

* Git is for version control.
* GitHub is for collaboration.
* Together, they form the backbone of modern software development and DevOps.

# Visual Diagram of Git

