Git Pro: Beginners Guide to Git and GitHub

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Agenda

- Core Git Concepts
- GitHub Integration
- Branching & Merging
- Collaboration: Pull Requests
- Automation with GitHub Actions
- Makefiles for Automation
- Command Line Essentials
- Real-World Workflow
- Wrap-up & Q&A

Introduction

Why Version Control?

- Keep track of changes in your work
- Collaborate safely without overwriting each other’s files
- Example: Version chaos vs Git timeline

Core Git Concepts

What is Git? What is GitHub?

- Git: Local version control system
- GitHub: Remote hosting and collaboration
- Visual: Local vs Remote repo

Key Concepts

- Repository, Working Directory, Staging Area
- Commits & History
- Visual: Three-stage diagram

Essential Commands

- `git init`, `git add`, `git commit`
- `git status`, `git log`
- Example command output

GitHub Integration

Local to Remote

- Add remote: `git remote add origin`
- Push changes: `git push`
- Clone: `git clone`

Demo: Connect Local Repo

1. Create repo on GitHub
2. Link remote
3. Push first commit

Branching and Merging

Why Use Branches?

- Work on new features safely
- Visual: Branch tree diagram

Basic Commands

- `git branch`, `git checkout -b`
- `git merge`
- Resolving merge conflicts

Collaboration

Pull Requests

- Review and discuss code before merging
- Assign reviewers, track changes

Git Flow vs GitHub Flow

- Git Flow: Develop, feature, release, hotfix branches
- GitHub Flow: Simple, single main branch with feature branches
- Visual: Flow diagrams

Automation

Intro to CI/CD

- Continuous Integration & Continuous Deployment
- Automate testing, linting, deployment

GitHub Actions

- Workflows defined in YAML
- Trigger on push/pull request
- Example: Auto lint on push

Makefiles

Why Makefiles?

- Automate repeated tasks: build, test, clean
- Simple syntax: `target: dependencies`

Makefiles with GitHub Actions

- Call Makefile tasks in your workflow
- Example: `make test`

Command Line Essentials

Linux Commands

- `ls`, `cd`, `cat`, `grep`, `chmod`
- Helpful for day-to-day developer tasks

WSL for Windows Users

- Use Linux tools on Windows
- Cross-platform compatibility

Putting It All Together

Real-World Scenario

1. Clone repo → branch → commit → PR → review → merge
2. CI/CD runs automatically

Wrap-up

Key Takeaways

- Git for version control
- GitHub for collaboration
- Automate with Actions and Makefiles

Resources

- GitHub Learning Lab
- Official docs and cheat sheets
- Practice on real projects!

Thank You!

Questions?

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