# 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

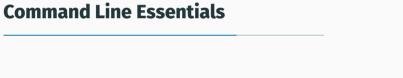
# Makefiles

# 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



#### **Linux Commands**

- 1s, cd, cat, grep, chmod
- Helpful for day-to-day developer tasks

#### **WSL for Windows Users**

- Use Linux tools on Windows
- Cross-platform compatibility



#### **Real-World Scenario**

- 1. Clone repo  $\rightarrow$  branch  $\rightarrow$  commit  $\rightarrow$  PR  $\rightarrow$  review  $\rightarrow$  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!**

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