Git & GitHub Master Guide — Full eBook

Compiled & Explained for Bappa Saha

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Section 1: Git Basics

What is Git & GitHub

```
Git is a version control system that tracks code changes.
GitHub is a cloud platform to host Git repositories and collaborate.
```

Installation & Configuration

```
1. Download Git
2. git --version
3. git config --global user.name "Bappa Saha"
4. git config --global user.email "youremail@example.com"
```

Creating a Repository & First Commit

```
mkdir git-demo
cd git-demo
git init
echo 'Hello Git' > hello.txt
git add hello.txt
git commit -m 'First commit'
```

Section 2: Branching & Merging

Branches

```
git branch feature-login
git checkout feature-login
```

```
# make changes
git add .
git commit -m 'Add login feature'
git checkout main
git merge feature-login
```

Merge Conflicts

```
main ■■●■■●■■●
\
■■■●■■ feature-login
# Resolve conflicts manually
```

Section 3: Projects Walkthroughs

Project 1: ToDo App

```
1. mkdir todo-app
2. git init
3. echo 'print("Hello ToDo App")' > app.py
4. git add app.py
5. git commit -m 'Initial commit'

Branch: feature-ui
Add UI code → commit → merge to main
ASCII Diagram:
main ■■●■■●■■●
\
■■■●■■ feature-ui
```

Project 2: Portfolio Website

```
1. mkdir portfolio-site
2. git init
3. echo '' > index.html
4. git add .
5. git commit -m 'Initial commit'

Add JS functionality → commit
Branch contact-form → merge
Rebase demo
Deploy via GitHub Pages
```

Project 3: Open Source Contribution Simulation

```
1. Fork repo on GitHub
2. git clone
3. git checkout -b feature-fix
4. Make changes → commit
5. Push branch → PR
6. Demonstrate revert & cherry-pick
7. Merge after review
```

Section 4: GitHub Actions & CI/CD

Simple Workflow

```
Create .github/workflows/main.yml
Run tests & deploy automatically
Use secrets for sensitive data
```

Branch Protection

```
Require reviews before merging main
Enable status checks
```

Section 5: Quick Reference Cheat Sheet

Common Git Commands

```
git init, git clone, git add, git commit, git status, git log, git branch, git checkout, git merge, git rebase, git reset, git stash, git tag, git remote, git push, git pull
```