Getting Started with Git & GitHub: A Practical Guide for Non-Technical Users

Version 1.0 | February 2026

Purpose: This guide teaches you the minimal Git and GitHub knowledge needed to use Project Creator independently. You'll learn to clone repositories, make changes, commit your work, and collaborate—without needing to become a Git expert.

Who this is for: Non-technical professionals (product managers, executives, strategists) who need to manage project files and collaborate via GitHub.

Time commitment: 2-3 hours for initial setup and learning. Daily workflow takes 2-5 minutes once established.

Table of Contents

Part 1: Understanding Git & GitHub (Concepts)

Before diving into commands, let's build a mental model. Think of Git like organizing photo albums:

The Photo Album Analogy

Repository = Photo Album with History

- A repository (or "repo") is like a photo album that tracks every version of every page
- You can flip back to see how things looked last week, last month, or last year
- Each page represents a snapshot in time

Working Directory = Photos on Your Desk

- When you open files on your computer, you're working with "photos on your desk"
- You can rearrange them, edit them, or add new ones
- Nothing is permanent until you decide to glue them into the album

Staging Area = Photos Selected to Add

- Before gluing photos to a page, you select which ones you want to include
- This is the "staging area"—it lets you organize what goes into the next snapshot
- You might have 10 changed files but only want to save 3 of them together

Commit = Gluing Photos to a Page Permanently

- A "commit" is when you permanently add your selected photos to the album
- You write a caption explaining what the page shows ("Family vacation, July 2025")
- Once committed, this snapshot is preserved in history forever

Remote (GitHub) = Backup Album at Safe Location

- GitHub is like storing a backup copy of your album at a secure facility
- If your house burns down (computer crashes), the album is safe
- Multiple people can access the same backup album to collaborate

Push = Sending Your New Pages to the Backup

- "Pushing" uploads your new commits (album pages) to GitHub
- Now everyone with access can see your latest changes

Pull = Getting Someone Else's New Pages

- "Pulling" downloads commits that others have made
- You're syncing your album with the latest version on GitHub

Why This Matters

Understanding these concepts makes commands feel less mysterious:

- git status = "What photos are on my desk?"
- git add file.md = "Select this photo for the next page"
- git commit -m "message" = "Glue selected photos to a page with this caption"
- git push = "Send my new pages to the backup album"

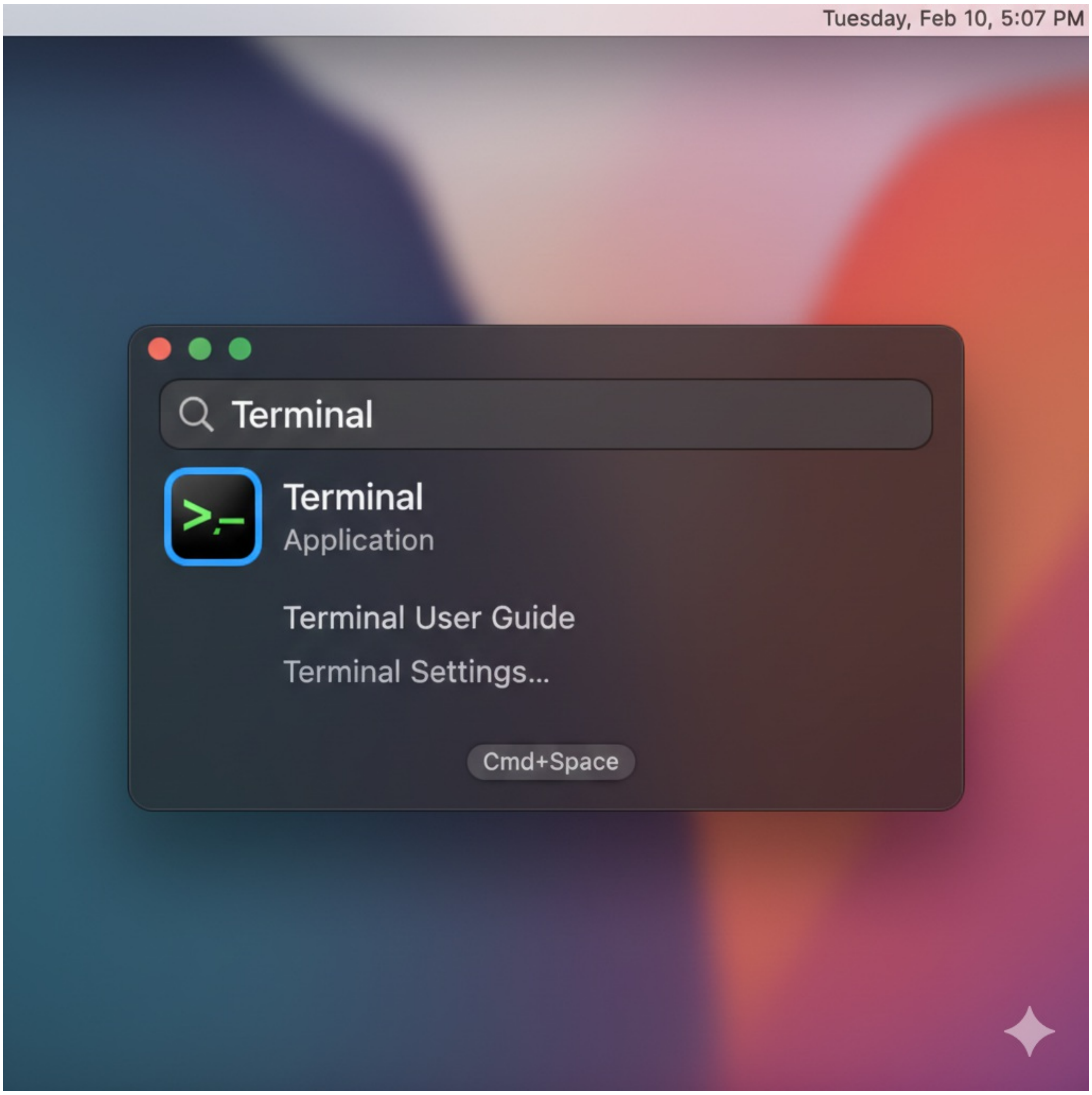
Key insight: Git is about capturing snapshots of your work over time, not just syncing files like Dropbox. Every commit is a deliberate checkpoint you can return to.

Part 2: Mac Terminal Basics

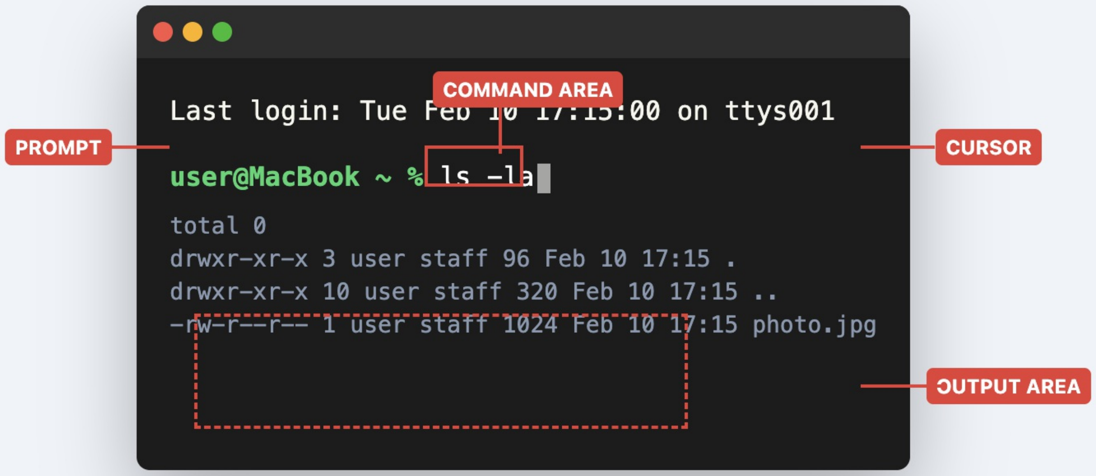
Git works through the command line (Terminal). Don't worry—you only need a handful of commands.

Opening Terminal

1. Press Cmd + Space to open Spotlight
2. Type "Terminal"
3. Press Enter



Understanding the Terminal Window



```
Last login: Tue Feb 10 17:15:00 on ttys001
user@MacBook ~ % ls -la
total 0
drwxr-xr-x 3 user staff 96 Feb 10 17:15 .
drwxr-xr-x 10 user staff 320 Feb 10 17:15 ..
-rw-r--r-- 1 user staff 1024 Feb 10 17:15 photo.jpg
```

*The **Prompt** signals the computer is ready. The **Command Area** is where you type. The **Cursor** shows your position, and the **Output Area** displays the results.*

Parts of the Terminal:

- **Prompt**: Shows your username, computer name, and current directory (e.g., sonjaya@Macbook ~ %)
- **Command**: What you type (e.g., git status)
- **Output**: What the computer responds with
- **Cursor**: Blinking indicator showing where text will appear

Copy-Paste Basics

- **Copy**: Cmd + C (in Terminal, use Cmd + C to copy selected text)
- **Paste**: Cmd + V
- **Tip**: You can copy commands from this guide and paste them directly into Terminal

You Don't Need to Master Navigation

This guide uses **full paths** (complete addresses like /Users/yourname/dev/project-creator) so you don't need to learn complex directory navigation. We'll tell you exactly what to type.

Part 3: Installation & Setup

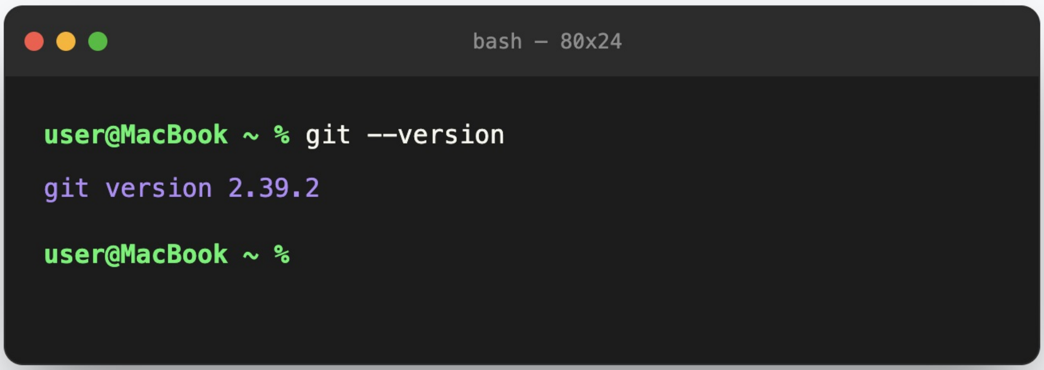
3.1 Check If Git Is Already Installed

Open Terminal and type:

```
git --version
```

If you see something like git version 2.39.2: Git is installed! Skip to section 3.3.

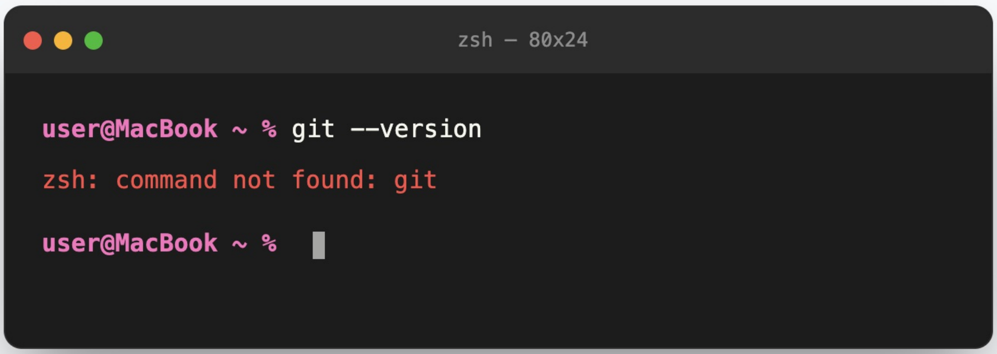
If you see command not found: Git is not installed. Continue to 3.2.



```
user@MacBook ~ % git --version
git version 2.39.2
user@MacBook ~ %
```

✓ **What you're seeing:**

This confirms Git is correctly installed on your system. If you see `git version x.x.x`, you're ready to start using Git commands!



```
user@MacBook ~ % git --version
zsh: command not found: git
user@MacBook ~ %
```

⚠ **What this means:**

The computer doesn't recognize the word `git`. This usually means Git hasn't been installed yet, or your "PATH" isn't set up correctly. If you see this, proceed to the installation steps.

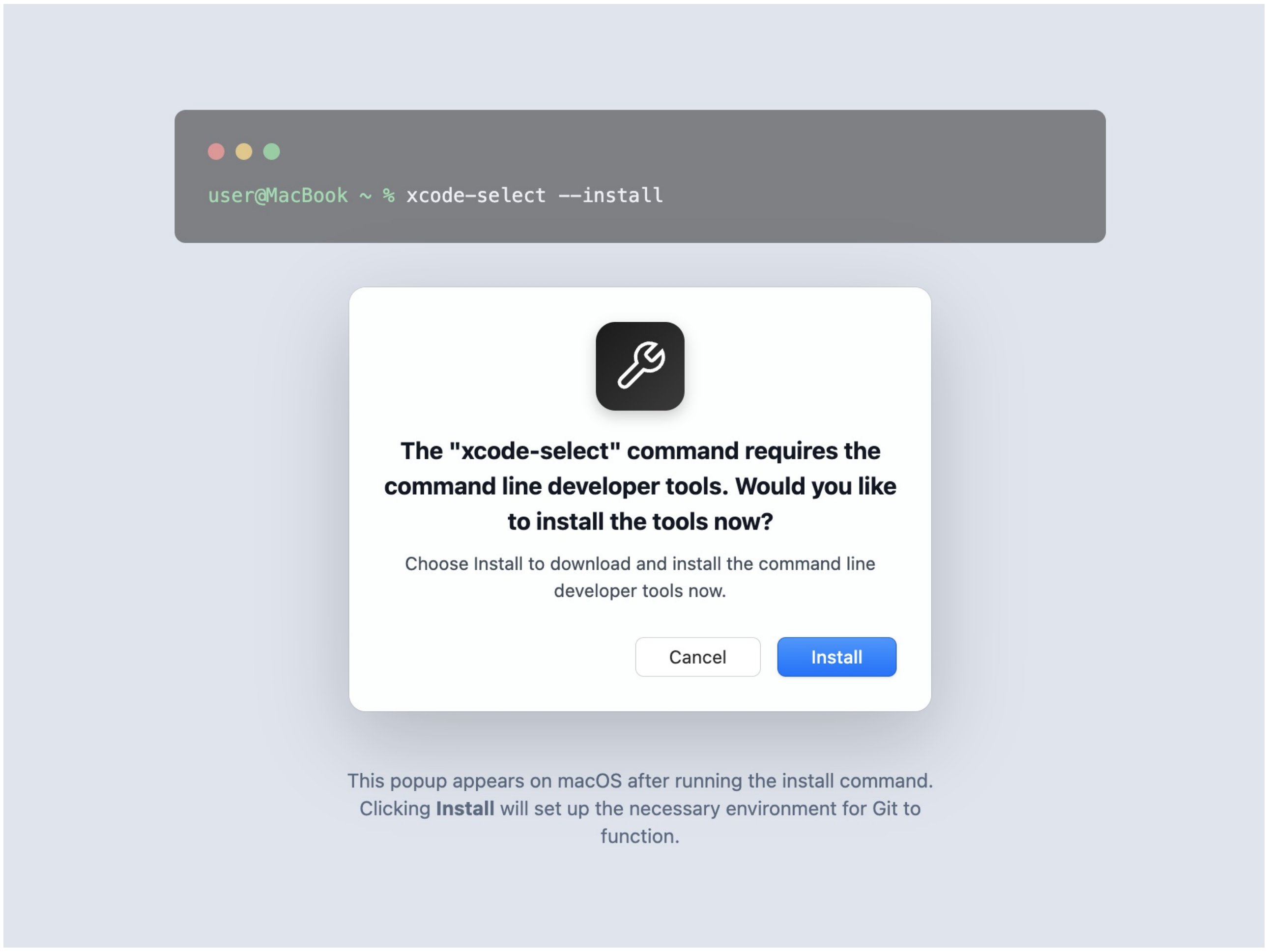
3.2 Install Git (Recommended: Xcode Command Line Tools)

The easiest way to install Git on Mac is through Apple's official developer tools:

```
xcode-select --install
```

What happens:

1. A dialog box appears asking if you want to install the tools
2. Click "Install"
3. Accept the license agreement
4. Wait 5-10 minutes for download and installation
5. When complete, run git --version to verify



```
user@MacBook ~ % xcode-select --install
```

The "xcode-select" command requires the command line developer tools. Would you like to install the tools now?

Choose Install to download and install the command line developer tools now.

This popup appears on macOS after running the install command. Clicking **Install** will set up the necessary environment for Git to function.

Why this method?

- Official Apple approach
- Includes other useful developer tools
- Auto-updates with macOS updates
- No manual downloads needed

Common issues:

Problem	Solution
"Can't install the software because it is not currently available"	You may need to agree to Xcode license: sudo xcodebuild -license
Installation fails on older macOS	Download Git manually from git-scm.com (https://git-scm.com/download/mac)
Already have Xcode installed	Git is already available; just verify with git --version

3.3 Configure Git (Tell Git Who You Are)

Git needs to know your name and email for commit records. Run these commands (replace with your actual information):

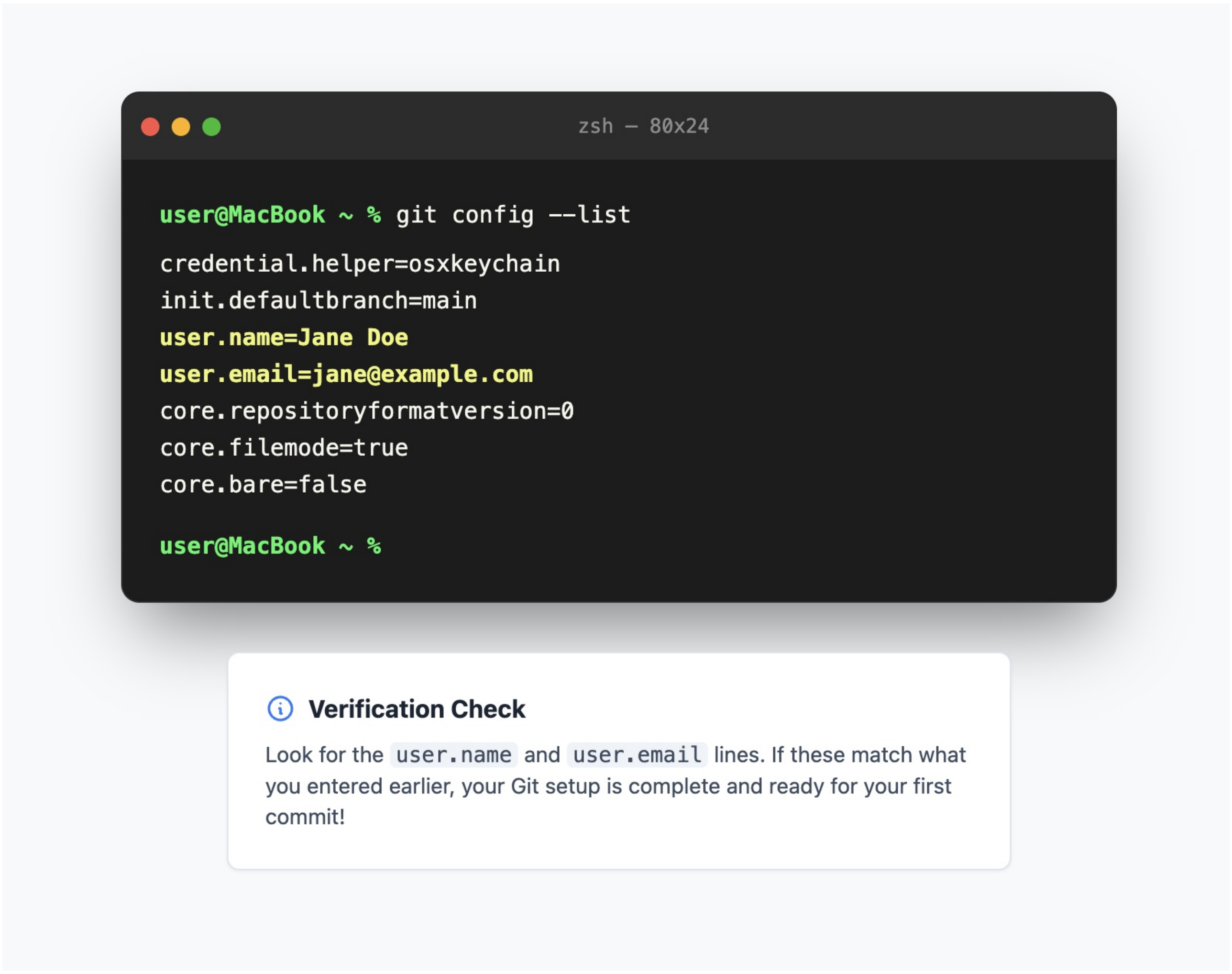
```
git config --global user.name "Dayne Bosson"
git config --global user.email "dayne@imaginesports.com"
```

Verify your configuration:

```
git config --list
```

You should see:

```
user.name=Dayne Bosson
user.email=dayne@imaginesports.com
```



```
user@MacBook ~ % git config --list
credential.helper=osxkeychain
init.defaultbranch=main
user.name=Jane Doe
user.email=jane@example.com
core.repositoryformatversion=0
core.filemode=true
core.bare=false

user@MacBook ~ %
```

Verification Check

Look for the `user.name` and `user.email` lines. If these match what you entered earlier, your Git setup is complete and ready for your first commit!

Why this matters: Every commit you make will be labeled with this name and email. Use your professional email and real name.

Part 4: GitHub Account & Organization Setup

4.1 Create a GitHub Account

1. Go to github.com (https://github.com)
2. Click "Sign up"
3. Choose a **professional username** (e.g., dayne-bosson, not coolkid123)
4. Use your **work email**
5. Create a strong password
6. Complete verification
7. **Enable two-factor authentication** (Settings → Password and authentication → Two-factor authentication)

Why 2FA? GitHub will require it for organizations soon. Enable it now to avoid access issues later.

4.2 Personal vs Organization Repositories

Personal repositories: Stored under your username (github.com/dayne-bosson/my-project)

- Good for: Individual experiments, personal notes
- Limitation: Tied to your account; access issues if you change roles

Organization repositories: Stored under organization name (github.com/imaginesports/game-hub)

- Good for: Professional work, team collaboration, client projects
- Advantages:
    - Professional appearance
    - Survives personnel changes
    - Granular access control
    - Centralized billing

For Project Creator work, always use organization repositories.

4.3 Create a GitHub Organization

Prerequisites: You must have a GitHub account and be logged in.

Steps:

1. Click your profile picture (top-right corner)
2. Select "Your organizations"
3. Click "New organization"
4. Choose "Create a free organization"
5. **Organization name**: Choose carefully—this becomes part of all repository URLs
    - Good: imaginesports, 7tworld, acme-corp
    - Bad: my-org, test-org-123
6. **Contact email**: Your work email
7. **Organization belongs to**: "My personal account" (for now)
8. Click "Next"
9. **Add members** (optional now; we'll cover this in Part 8)
10. Click "Complete setup"

Verification: You should see your organization page at github.com/[your-org-name]

Part 5: SSH Keys (The Authentication Bridge)

SSH keys let you securely communicate with GitHub without typing your password constantly.

Why SSH Keys?

The problem: GitHub stopped accepting passwords for command-line operations in 2021.

The solution: SSH keys are like a secure handshake between your computer and GitHub:

- You generate a **key pair**: one private (stays on your Mac), one public (goes to GitHub)
- When you push/pull, GitHub verifies your identity using the key pair
- **One-time setup, automatic forever**

Mac advantage: macOS keychain integration means you won't type the passphrase repeatedly.

5.1 Generate an SSH Key

Open Terminal and run:

```
ssh-keygen -t ed25519 -C "your.email@example.com"
```

Replace your.email@example.com with your actual GitHub email.

Prompts you'll see:

```
Generating public/private ed25519 key pair.
Enter file in which to save the key (/Users/yourname/.ssh/id_ed25519):
```

Just press Enter (accept default location)

```
Enter passphrase (empty for no passphrase):
```

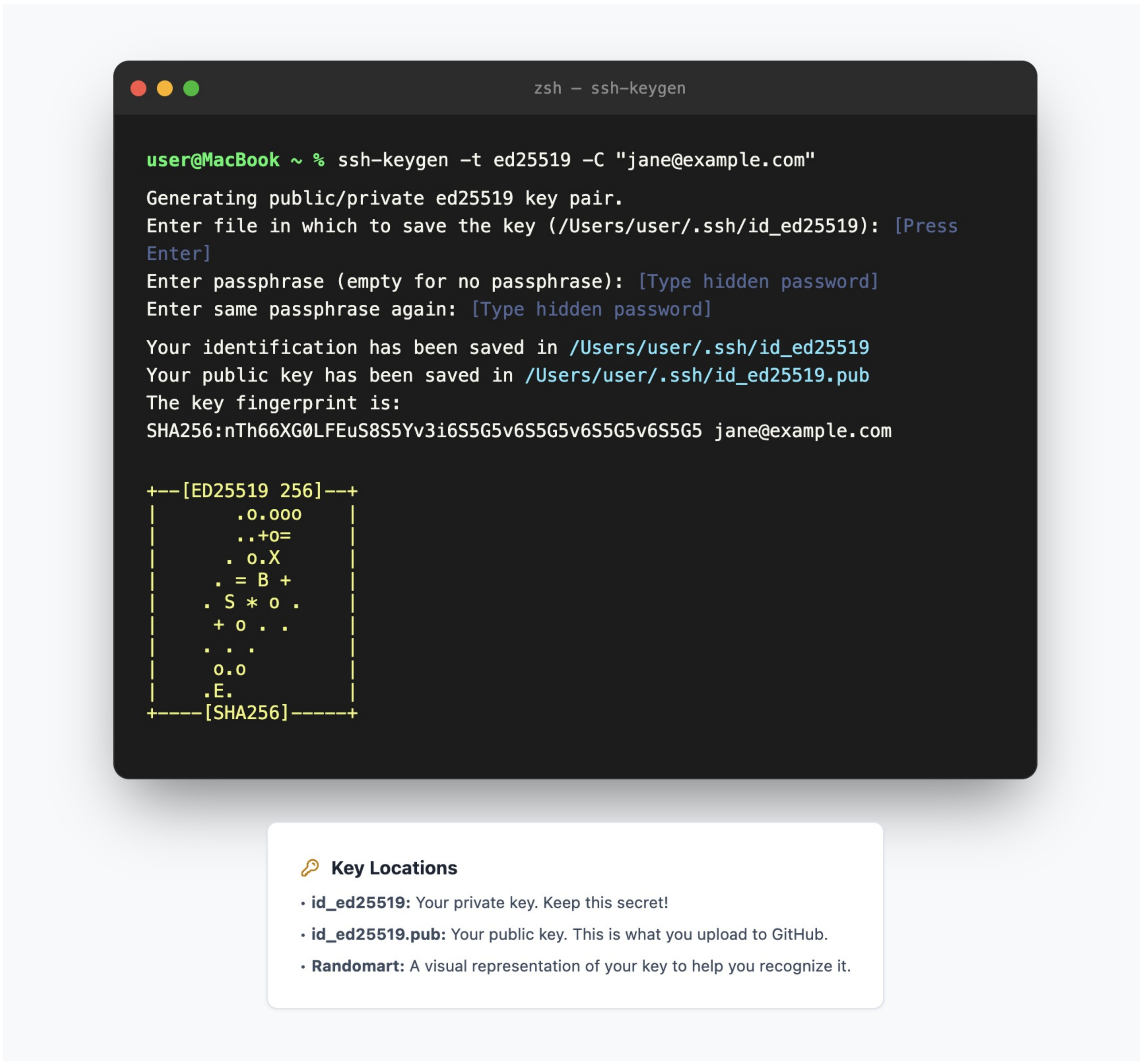
Type a passphrase (like a password for your key—choose something memorable but secure)

```
Enter same passphrase again:
```

Type it again

What just happened:

- Created ~/.ssh/id_ed25519 (private key—never share this)
- Created ~/.ssh/id_ed25519.pub (public key—safe to share)



```
zsh — ssh-keygen

user@MacBook ~ % ssh-keygen -t ed25519 -C "jane@example.com"
Generating public/private ed25519 key pair.
Enter file in which to save the key (/Users/user/.ssh/id_ed25519): [Press
Enter]
Enter passphrase (empty for no passphrase): [Type hidden password]
Enter same passphrase again: [Type hidden password]
Your identification has been saved in /Users/user/.ssh/id_ed25519
Your public key has been saved in /Users/user/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:nTh66XG0LFEuS8S5Yv3i6S5G5v6S5G5v6S5G5v6S5G5 jane@example.com

+--[ED25519 256]--+
|       .o.ooo    |
|       ..+o=     |
|      . o.X      |
|     . = B +     |
|    . S * o .    |
|     + o . .     |
|    . . .        |
|     o.o         |
|    .E.          |
+----[SHA256]-----+
```

Key Locations

- **id_ed25519:** Your private key. Keep this secret!
- **id_ed25519.pub:** Your public key. This is what you upload to GitHub.
- **Randomart:** A visual representation of your key to help you recognize it.

5.2 Add SSH Key to Mac Keychain

This stores your passphrase so you don't retype it constantly:

```
ssh-add --apple-use-keychain ~/.ssh/id_ed25519
```

Make keychain integration permanent: Create a config file:

```
cat >> ~/.ssh/config << 'EOF'
Host github.com
  AddKeysToAgent yes
  UseKeychain yes
  IdentityFile ~/.ssh/id_ed25519
EOF
```

What this does: Every time you interact with GitHub, your Mac automatically uses the keychain-stored passphrase.

5.3 Add Public Key to GitHub

Now we tell GitHub about your public key.

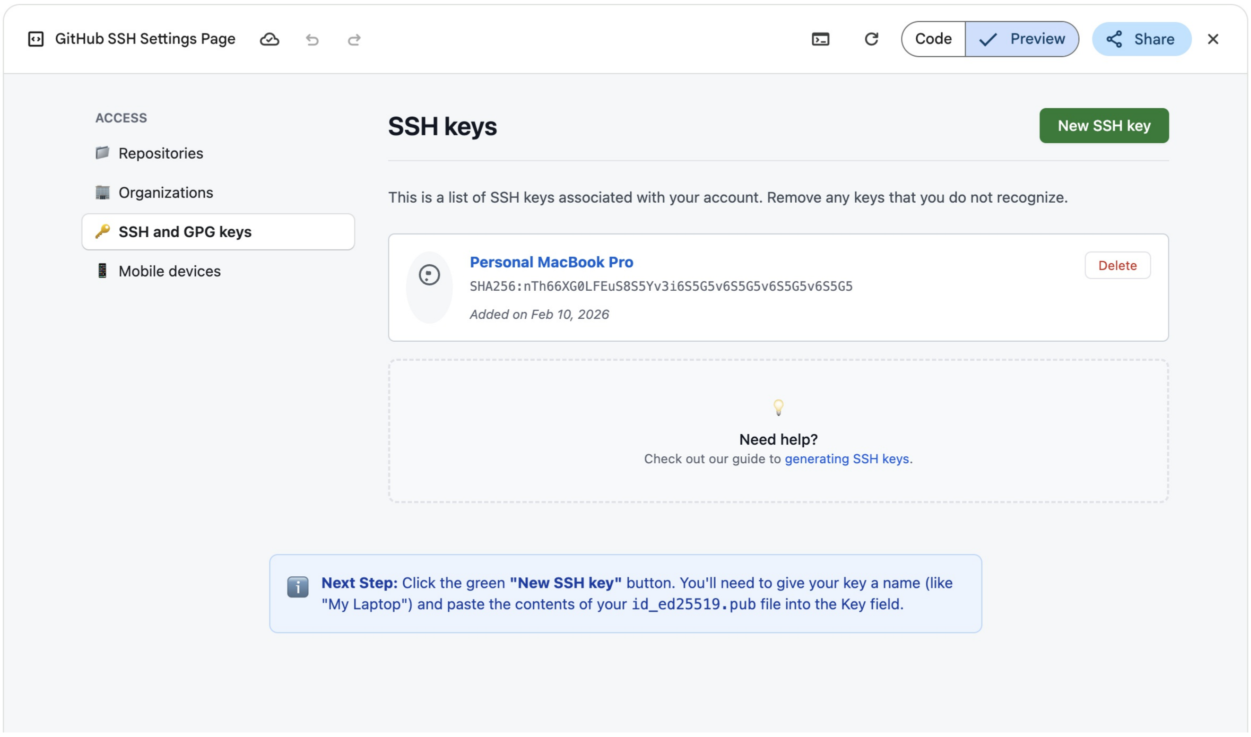
Step 1: Copy your public key to clipboard

```
cat ~/.ssh/id_ed25519.pub | pbcopy
```

(The public key is now copied—don't paste it anywhere yet!)

Step 2: Add to GitHub

1. Go to [github.com (https://github.com)](https://github.com) and log in
2. Click your profile picture → "Settings"
3. In left sidebar, click "SSH and GPG keys"
4. Click "New SSH key"
5. **Title**: Something descriptive (e.g., "Dayne's MacBook Pro")
6. **Key type**: "Authentication Key"
7. **Key**: Paste (Cmd + V) your public key
8. Click "Add SSH key"
9. Confirm with your GitHub password if prompted



SSH keys

This is a list of SSH keys associated with your account. Remove any keys that you do not recognize.

Personal MacBook Pro
SHA256:nTh66XG0LFEuS8S5Yv3i6S5G5v6S5G5v6S5G5v6S5G5
Added on Feb 10, 2026

Need help?
Check out our guide to generating SSH keys.

Next Step: Click the green **"New SSH key"** button. You'll need to give your key a name (like "My Laptop") and paste the contents of your `id_ed25519.pub` file into the Key field.

5.4 Test SSH Connection

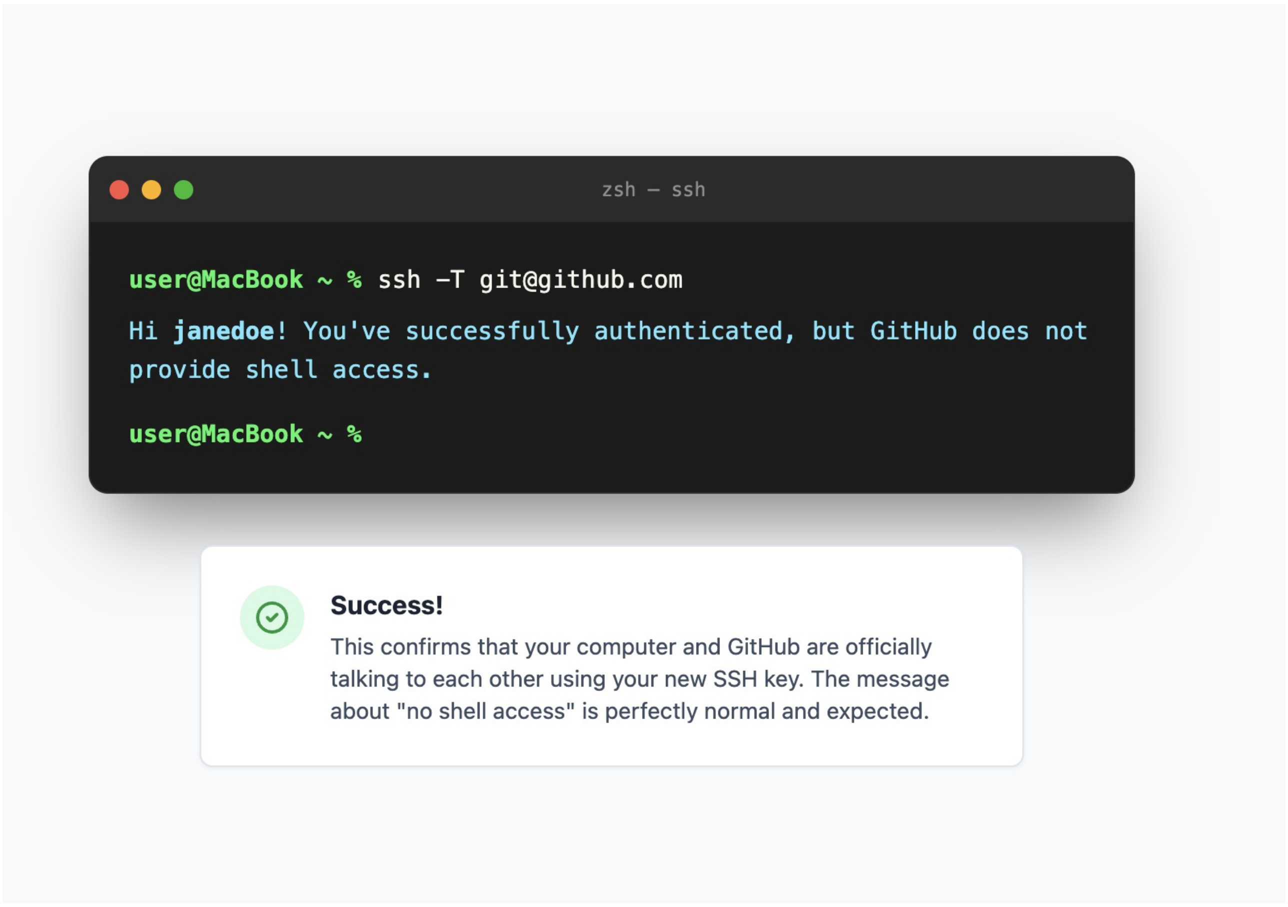
Verify everything works:

```
ssh -T git@github.com
```

First time: You'll see a warning about authenticity. Type yes and press Enter.

Success looks like:

```
Hi yourname! You've successfully authenticated, but GitHub does not provide shell access.
```



```
user@MacBook ~ % ssh -T git@github.com
Hi janedoe! You've successfully authenticated, but GitHub does not
provide shell access.

user@MacBook ~ %
```

Success!
This confirms that your computer and GitHub are officially talking to each other using your new SSH key. The message about "no shell access" is perfectly normal and expected.

Troubleshooting:

Error	Cause	Fix
"Permission denied (publickey)"	Key not added to GitHub or wrong key	Repeat 5.3, verify key matches
"Could not resolve hostname"	No internet connection	Check WiFi
"Host key verification failed"	Corrupted known_hosts	Run rm ~/.ssh/known_hosts and retry

---

Part 6: Cloning Project Creator

Now you're ready to download (clone) the Project Creator repository.

6.1 Choose a Location

We recommend ~/dev/ for all development work:

- **Consistent**: Always know where projects live
- **Professional**: Industry standard
- **Simple**: Easy to remember and navigate

6.2 Clone the Repository

```
mkdir -p ~/dev
cd ~/dev
git clone git@github.com:Consortium-team/project-creator.git
```

What each line does:

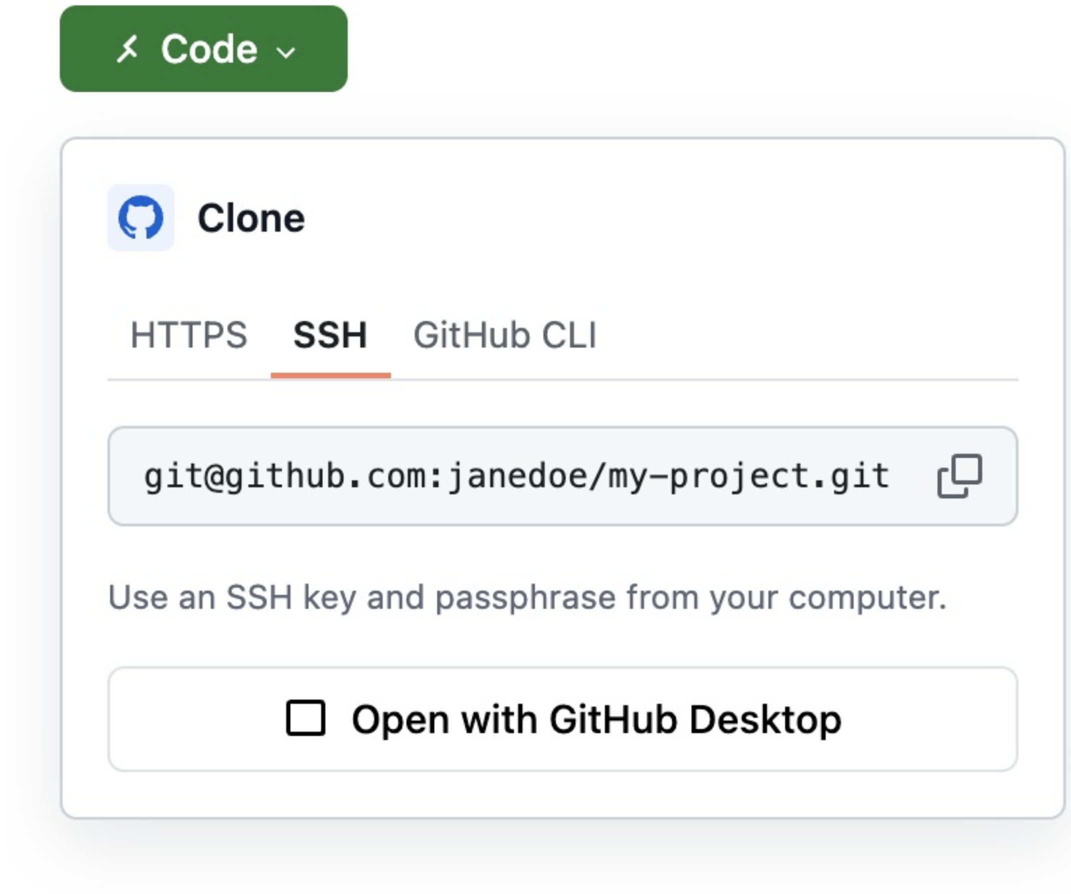
1. mkdir -p ~/dev — Create the dev folder (if it doesn't exist)
2. cd ~/dev — Move into that folder
3. git clone git@github.com:... — Download Project Creator

What you'll see:

```
Cloning into 'project-creator'...
remote: Enumerating objects: 245, done.
remote: Counting objects: 100% (245/245), done.
remote: Compressing objects: 100% (178/178), done.
remote: Total 245 (delta 95), reused 180 (delta 45), pack-reused 0
Receiving objects: 100% (245/245), 89.34 KiB | 2.23 MiB/s, done.
Resolving deltas: 100% (95/95), done.
```

Understanding the URL:

- git@github.com — Protocol (SSH)
- Consortium-team — Organization name
- project-creator.git — Repository name



```
git@github.com:janedoe/my-project.git
```

Use an SSH key and passphrase from your computer.

⚠️ **Important:** Always ensure the **SSH** tab is selected before copying. URLs starting with `https://` will prompt for a password instead of using your SSH key.

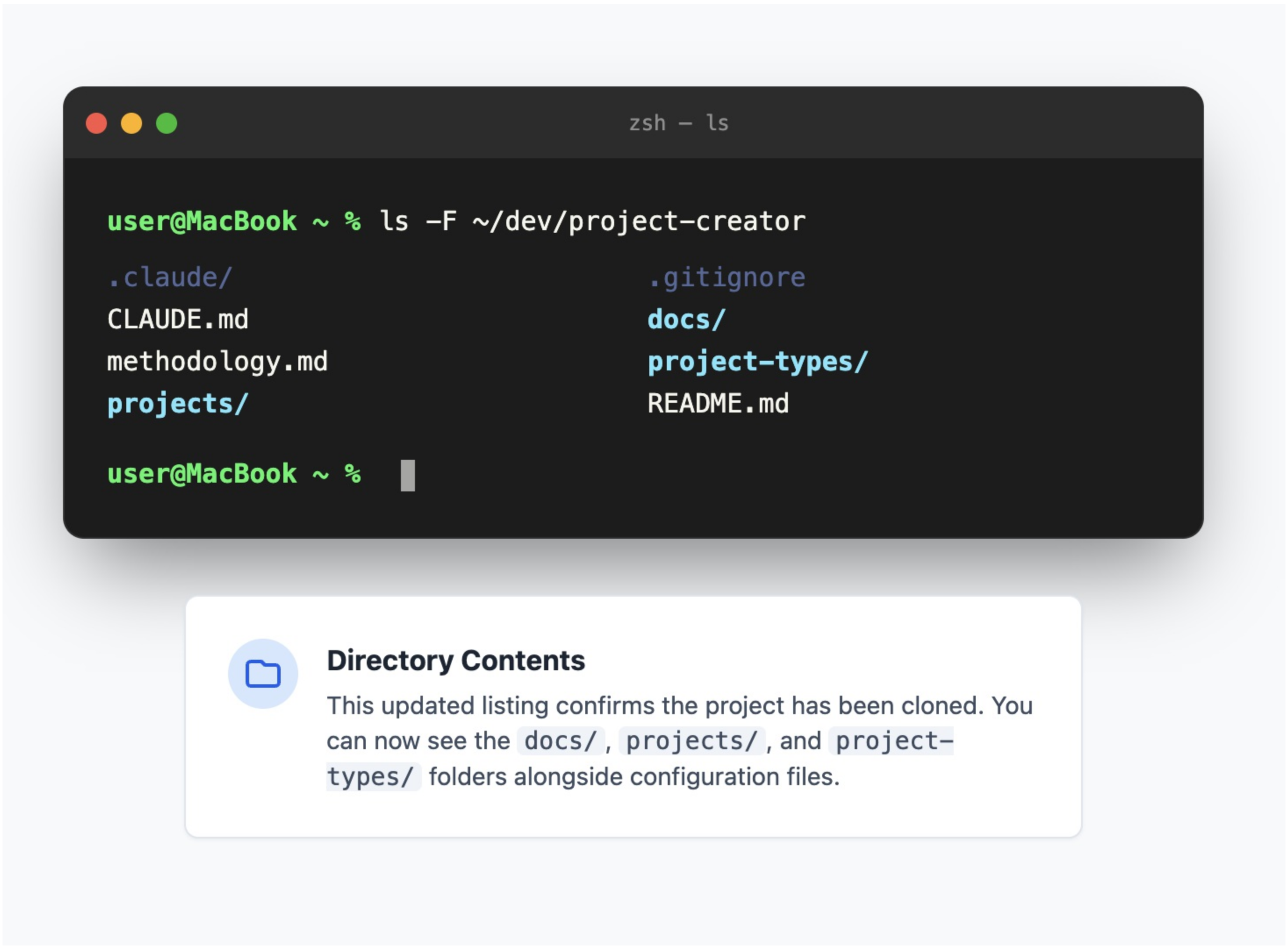
6.3 Verify the Clone

Check that files downloaded correctly:

```
ls ~/dev/project-creator
```

You should see:

```
CLAUDE.md         methodology.md     tracking/
README.md          project-types/     .claude/
.gitignore        templates/        projects/
```



```
user@MacBook ~ % ls -F ~/dev/project-creator
.claude/                              .gitignore
CLAUDE.md                             docs/
methodology.md                        project-types/
projects/                             README.md

user@MacBook ~ %
```

Directory Contents
This updated listing confirms the project has been cloned. You can now see the `docs/`, `projects/`, and `project-types/` folders alongside configuration files.

Congratulations! You now have a local copy of Project Creator.

Part 7: Basic Git Hygiene

Daily Git workflow is simple once you understand the pattern.

7.1 When to Commit

Commit changes when:

- **End of work session** — Always commit before closing your computer
- **After logical chunk of work** — Completed a client profile, finished intake questions
- **Before risky changes** — About to try something experimental
- **Daily minimum** — Even if work isn't "done," commit progress

Don't wait for:

- "Perfect" work — Commits are checkpoints, not final versions
- "Complete" features — Incremental progress is good
- End of the week — Too infrequent; you'll forget what changed

7.2 Writing Good Commit Messages

A commit message should complete this sentence:
"This commit will..."

Good examples:

- "Add initial client profile for ImagineSports"
- "Update Dayne's contact email and retainer terms"
- "Capture constraints from 2/5 strategy session"
- "Fix typo in intake questions"

Bad examples:

- "Updated stuff" — Too vague; what stuff?
- "WIP" — Work-in-progress is obvious; say what the work IS
- "asdf" — Lazy; future you won't understand this
- "Fixed it" — Fixed what? How?

Template: [Action] [What] [Optional context]

- Action: Add, Update, Fix, Remove, Refactor, Document
- What: Be specific about files or features
- Context: Why, if not obvious

7.3 Daily Workflow (The Core Loop)

Navigate to your project:

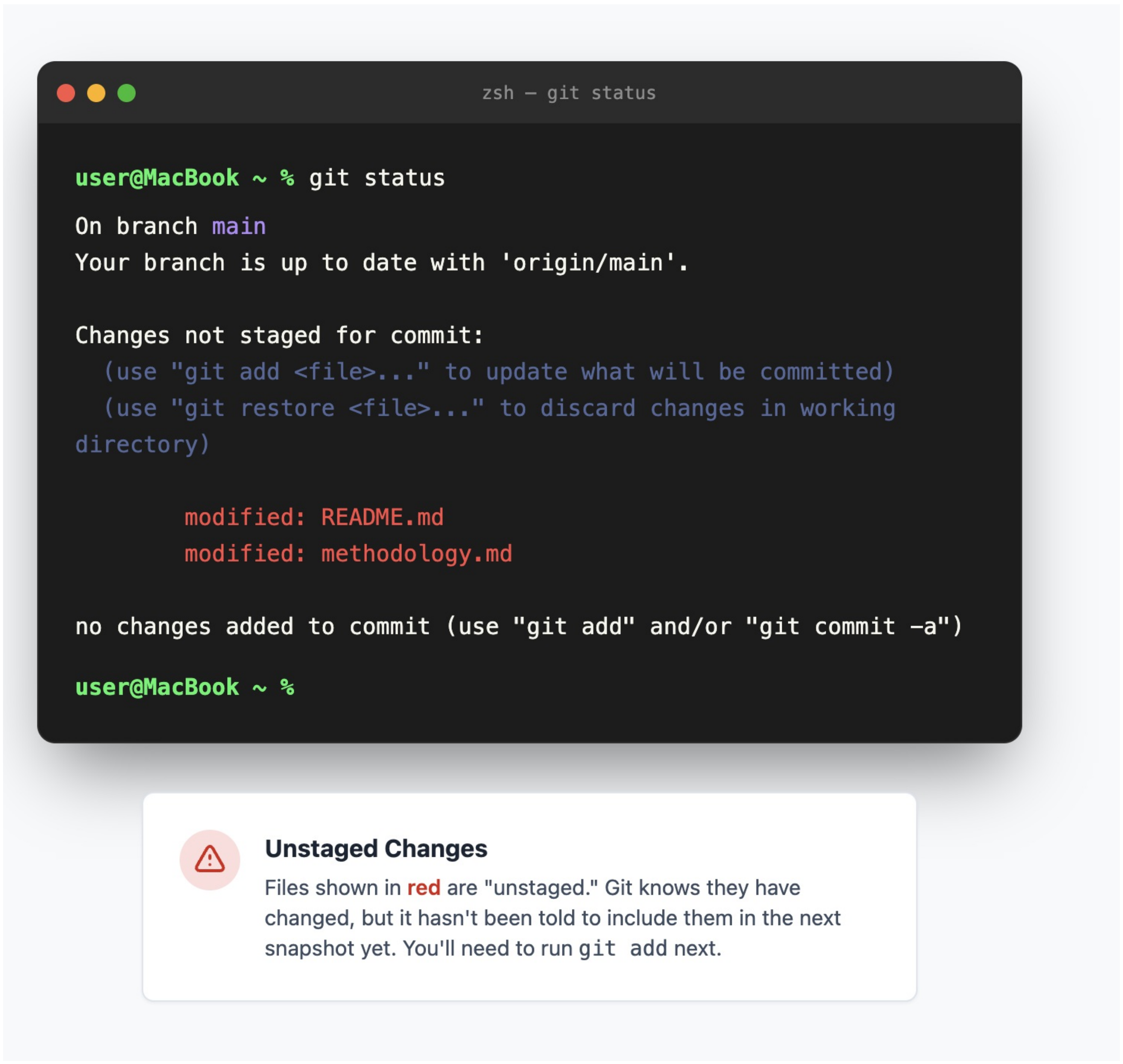
```
cd ~/dev/project-creator
```

Step 1: See what changed

```
git status
```

Output shows:

- **Untracked files**: New files Git doesn't know about yet
- **Modified files**: Files you changed since last commit
- **Staged files**: Files selected for next commit



```
user@MacBook ~ % git status
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working
directory)

        modified: README.md
        modified: methodology.md

no changes added to commit (use "git add" and/or "git commit -a")
user@MacBook ~ %
```

Unstaged Changes

Files shown in **red** are "unstaged." Git knows they have changed, but it hasn't been told to include them in the next snapshot yet. You'll need to run `git add` next.

Step 2: Review changes

```
git diff
```

Shows line-by-line what changed (press q to exit).

Step 3: Stage files for commit

Option A: Stage specific file

```
git add projects/imaginesports/intake/requirements.md
```

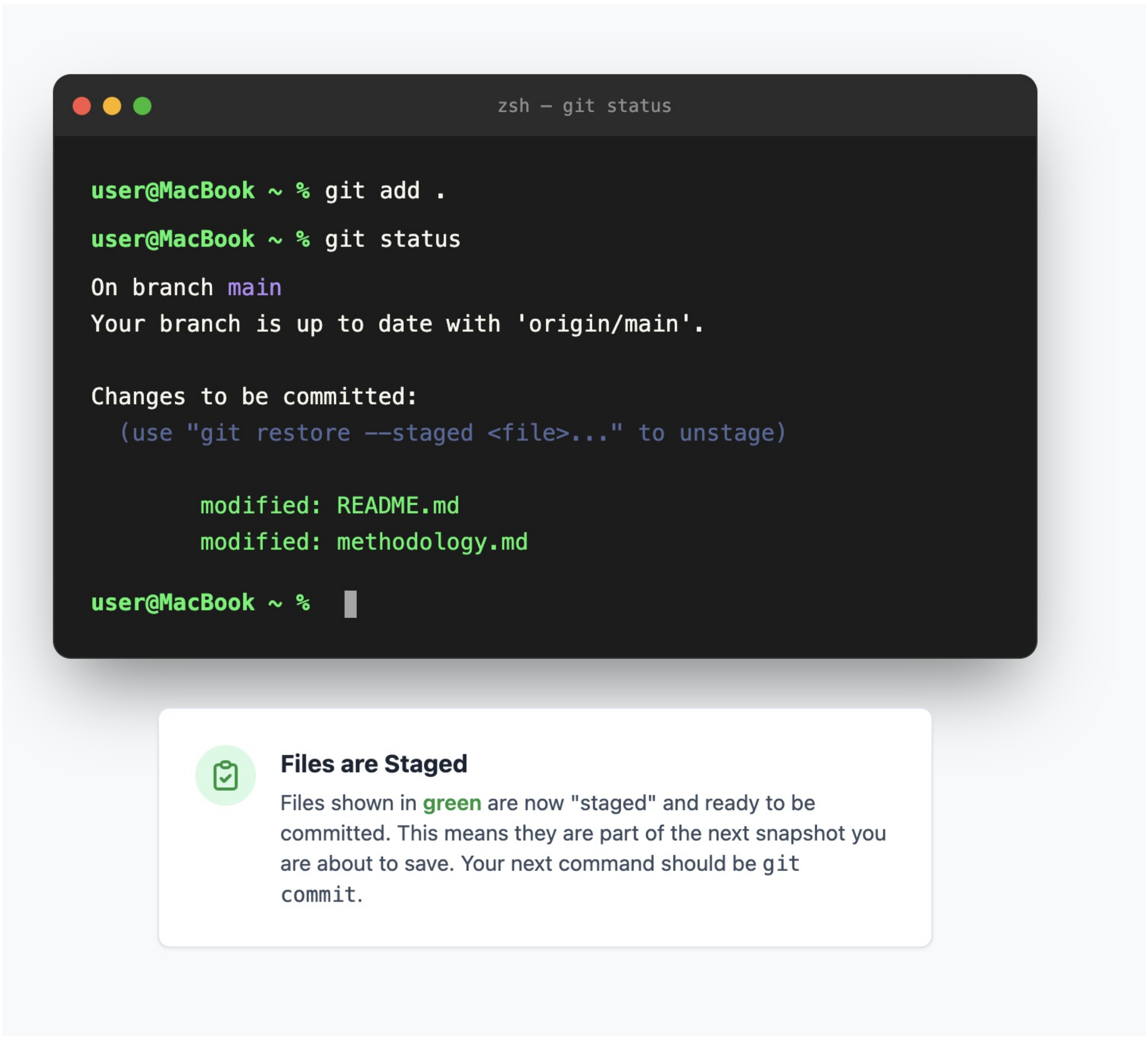
Option B: Stage all changes

```
git add .
```

After staging:

```
git status
```

Files now appear under "Changes to be committed"



```
zsh — git status

user@MacBook ~ % git add .
user@MacBook ~ % git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)

        modified: README.md
        modified: methodology.md

user@MacBook ~ %
```

Files are Staged

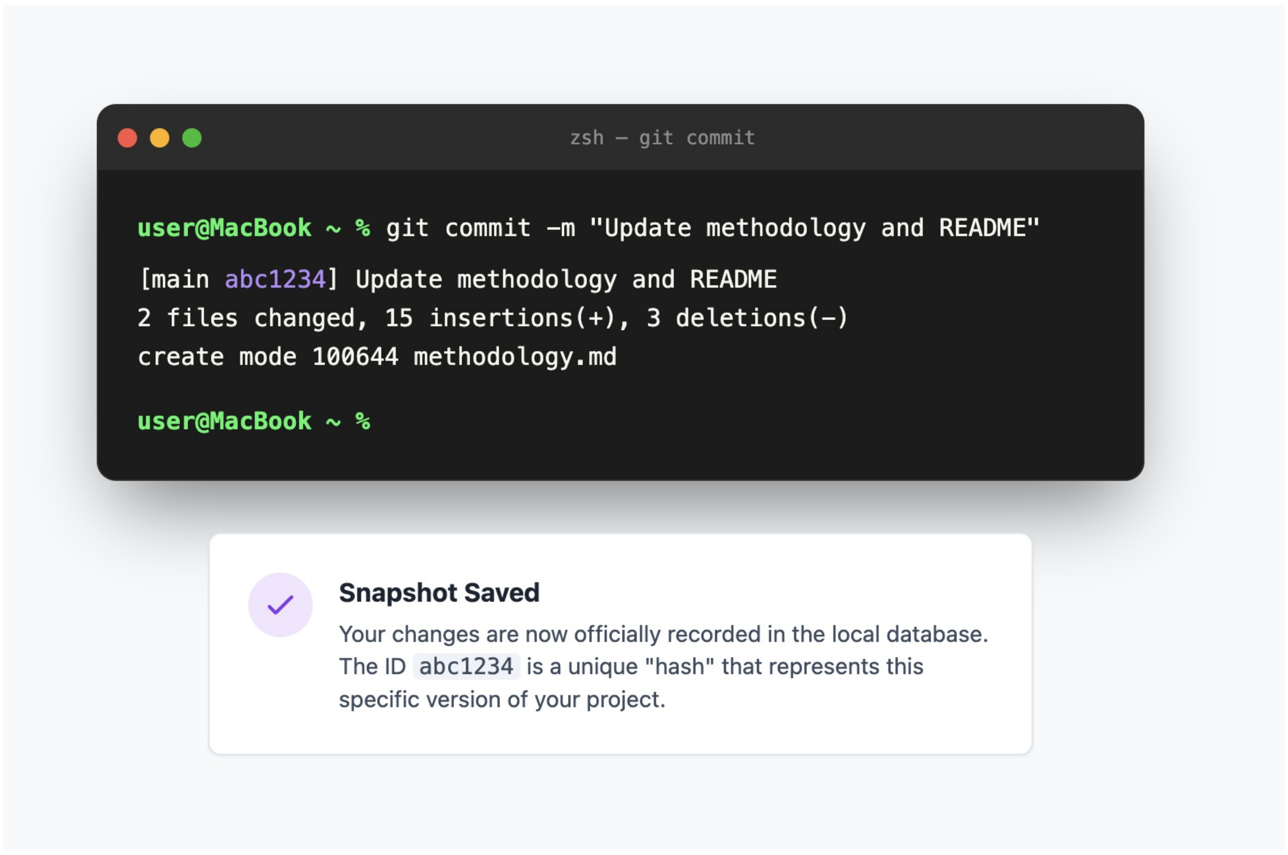
Files shown in **green** are now "staged" and ready to be committed. This means they are part of the next snapshot you are about to save. Your next command should be `git commit`.

Step 4: Commit staged changes

```
git commit -m "Add initial requirements from ImagineSports intake session"
```

Success looks like:

```
[main 3f8a2c1] Add initial requirements from ImagineSports intake session
 1 file changed, 45 insertions(+)
 create mode 100644 projects/imaginesports/intake/requirements.md
```



```
zsh — git commit

user@MacBook ~ % git commit -m "Update methodology and README"
[main abc1234] Update methodology and README
2 files changed, 15 insertions(+), 3 deletions(-)
create mode 100644 methodology.md

user@MacBook ~ %
```

Snapshot Saved

Your changes are now officially recorded in the local database. The ID `abc1234` is a unique "hash" that represents this specific version of your project.

Step 5: Push to GitHub

```
git push
```

What you'll see:

```
Enumerating objects: 7, done.
Counting objects: 100% (7/7), done.
Delta compression using up to 8 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (5/5), 1.23 KiB | 1.23 MiB/s, done.
Total 5 (delta 2), reused 0 (delta 0), pack-reused 0
To github.com:Consortium-team/project-creator.git
   a3f9d12..3f8a2c1  main -> main
```

Verification: Visit github.com/[your-org]/[your-repo] to see your commit listed.

7.4 Common Mistakes to Avoid

Mistake	Why It's Bad	Better Practice
Lazy commit messages ("update", "fix")	Can't find changes later; unclear history	"Update ImagineSports retainer terms to $5k/month"
Committing secrets (API keys, passwords)	Exposed publicly if repo is public; hard to remove from history	Use .gitignore, environment variables, or config files excluded from Git
Giant commits (50+ files changed)	Hard to review; difficult to revert if something breaks	Commit logical chunks (related changes together)
Not pulling before pushing	Creates merge conflicts	Always git pull before starting work

Working directly on main branch	Risky; mistakes affect everyone	Use branches for experiments (advanced topic)

Part 8: Collaborator Management

Once your organization and repository are set up, you can invite others to collaborate.

8.1 Permission Levels

GitHub has three main permission levels:

Level	Can Do	Use For
Read	View files, clone repository, create issues	Observers, clients reviewing work
Write	Read + push commits, create branches, manage issues	Collaborators actively working on project
Admin	Write + manage settings, add/remove collaborators, delete repository	Project owners, trusted leads

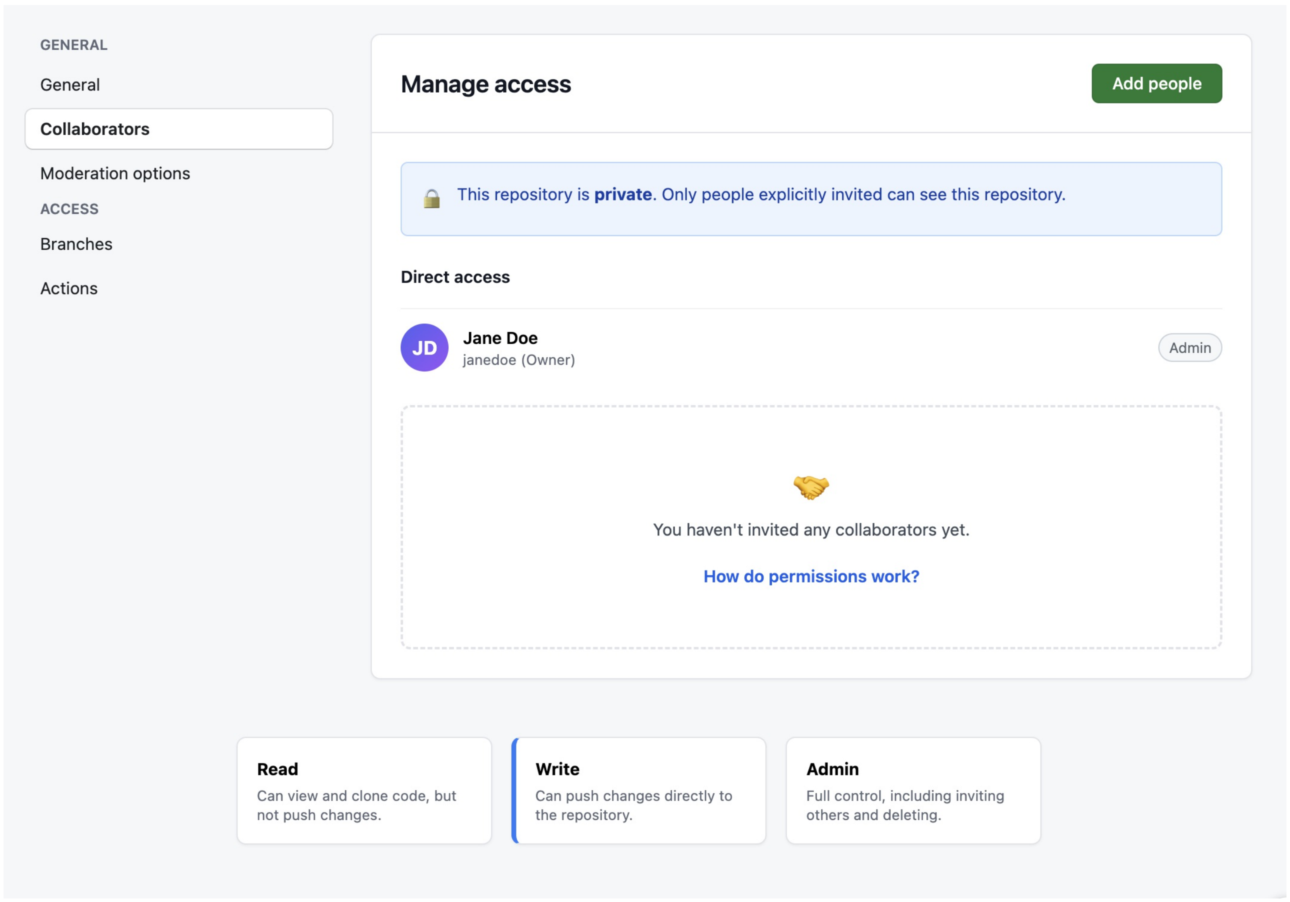
Start conservative: Give "Write" access initially. Upgrade to "Admin" only when needed.

8.2 Add Collaborator to Repository

Steps:

1. Go to your repository on GitHub (github.com/[org]/[repo])
2. Click "Settings" tab (top navigation)
3. In left sidebar, click "Collaborators and teams"
4. Click "Add people"
5. Enter collaborator's GitHub username or email
6. Select permission level (Read, Write, or Admin)
7. Click "Add [username] to this repository"

They'll receive an email invitation. Once accepted, they can clone and contribute.


GENERAL

General

Collaborators

Moderation options

ACCESS

Branches

Actions

Manage access

Add people

This repository is **private**. Only people explicitly invited can see this repository.

Direct access

JD Jane Doe
janedoe (Owner) Admin

You haven't invited any collaborators yet.

How do permissions work?

Read
Can view and clone code, but not push changes.

Write
Can push changes directly to the repository.

Admin
Full control, including inviting others and deleting.

8.3 Add Collaborator to Organization

For ongoing collaboration across multiple repositories:

1. Go to your organization page (github.com/[org])
2. Click "People" tab
3. Click "Invite member"
4. Enter their GitHub username or email
5. Choose role:
    - **Member**: Can see organization repos you grant access to
    - **Owner**: Full control (equivalent to Admin everywhere)
6. Click "Send invitation"

Best practice: Add as Member, then grant Write access per-repository.

8.4 Verify Collaborator Access

Have the collaborator test:

1. Accept invitation email
2. Visit repository on GitHub (should see it under "Your repositories")
3. Clone repository:

```
git clone git@github.com:[org]/[repo].git
```

4. Make a test commit:

```
cd [repo]
echo "Test from [name]" >> test.md
git add test.md
git commit -m "Test commit to verify access"
git push
```

5. Check GitHub to see their commit appear

Troubleshooting:

Issue	Likely Cause	Fix
Can't see repository	Invitation not accepted	Check email spam; resend invitation
"Permission denied" on push	SSH key not set up	Follow Part 5 on their machine
Clone works but push fails	Read-only access	Upgrade to Write permissions

---

Part 9: Claude Code Integration

Claude Code can handle Git operations via natural language, reducing complexity.

9.1 When to Use Claude Code for Git

Good use cases:

- **Creating GitHub repositories** — "Create a private repository called 'imaginesports-game-hub' in the imaginesports organization"
- **Complex operations** — "Revert the last commit but keep my changes unstaged"
- **Commit message suggestions** — Claude can analyze your changes and suggest descriptive messages

When to use manual Git (during learning phase):

- **Daily commits** — Practice makes permanent; build muscle memory
- **Understanding what happened** — Running commands yourself reveals how Git works
- **Debugging issues** — Easier to troubleshoot when you know what commands ran

After 2-3 weeks of manual practice, shift to Claude Code for routine operations.

9.2 Creating a Remote Repository via Claude Code

Open Claude Code in your project directory:

```
cd ~/dev/project-creator/projects/imaginesports/game-hub
claude
```

Prompt Claude:

```
Create a private GitHub repository called 'game-hub'
in the 'imaginesports' organization and push my work to it.
```

Claude will:

1. Use gh (GitHub CLI) or API to create the repository
2. Add the remote to your local Git configuration

3. Push your commits

Verify: Visit github.com/imaginesports/game-hub to see your repository.

9.3 Commit Message Suggestions

Instead of manually writing commit messages:

```
cd ~/dev/project-creator/projects/imaginesports/game-hub
git add .
claude
```

Prompt:

```
Review my staged changes and suggest a descriptive commit message.
```

Claude analyzes your diffs and suggests something like:

```
"Add user authentication flow with JWT tokens and password reset"
```

If you approve:

```
git commit -m "Add user authentication flow with JWT tokens and password reset"
git push
```

9.4 Automating Routine Git Tasks

Example Claude Code prompts:

- "Commit all my changes with an appropriate message and push to GitHub"
- "Show me what I changed today"
- "Create a new branch called 'feature/new-intake-questions'"
- "Merge my feature branch into main"

Remember: Claude Code executes Git commands on your behalf. You can always ask "What Git commands would you run for this?" to learn the underlying mechanics.

Part 10: Troubleshooting & Getting Help

10.1 Common Errors & Fixes

Error Message	What It Means	How to Check	How to Fix
"fatal: not a git repository"	You're not inside a cloned repository	pwd (print working directory)	cd ~/dev/project-creator to navigate to repo
"Permission denied (publickey)"	SSH key not recognized by GitHub	ssh -T git@github.com	Re-add public key to GitHub (Part 5.3)
"refusing to merge unrelated histories"	Your local and remote repos have different starting points	git log to see commits	Usually safe: git pull --allow-unrelated-histories
"Your branch is behind 'origin/main'"	Someone else pushed changes you don't have yet	git status	git pull to download their changes

"Your branch is ahead of 'origin/main'"	You have commits not yet pushed	git status	git push to upload your changes
"Merge conflict in [file]"	You and someone else changed the same lines	git status shows conflicted files	Edit files to resolve conflicts, then git add and git commit
"fatal: remote origin already exists"	Trying to add remote that's already configured	git remote -v to see remotes	Use git remote set-url origin [new-url] if changing
"Nothing to commit, working tree clean"	No changes since last commit (not an error!)	git status	Continue working; this is normal

10.2 How to Ask for Help Effectively

When you encounter an issue, provide:

1. **What you were trying to do** — "I was trying to push my commits to GitHub"
2. **The exact command you ran** — git push origin main
3. **The complete error message** — Copy entire output from Terminal
4. **What you've tried** — "I verified SSH key is added to GitHub"
5. **Output of git status** — Shows current state

Example help request:

```
I'm trying to push my commits but getting an error.

Command I ran:
git push

Error message:
fatal: The current branch main has no upstream branch.
To push the current branch and set the remote as upstream, use
    git push --set-upstream origin main

What I've tried:
- Verified I'm in the correct directory (~/dev/project-creator)
- Checked that GitHub repository exists

Output of git status:
On branch main
Your branch is ahead of 'origin/main' by 2 commits.
  (use "git push" to publish your local commits)
nothing to commit, working tree clean
```

This gives helpers everything needed to diagnose the problem.

10.3 Self-Help Strategies

Before asking for help:

1. **Read the error message carefully** — Git often suggests the fix
   - Example: "use git push --set-upstream origin main" → Try that command
2. **Check Git status** — git status reveals 80% of issues
   - Shows what branch you're on

    - Lists changed files
    - Indicates if you're ahead/behind remote

3. **Verify basic assumptions**:

```
pwd                   # Am I in the right directory?
git remote -v         # Is my remote configured?
ssh -T git@github.com  # Does SSH work?
```

4. **Google the exact error** — Add "git" + your error message

    - Likely someone else solved this on Stack Overflow

5. **Ask Claude Code** — Paste error into Claude and ask for interpretation

10.4 Quick Reference Card

Print or bookmark this:

Task	Command
See what changed	git status
Review line-by-line changes	git diff
Stage specific file	git add file.md
Stage all changes	git add .
Commit with message	git commit -m "Your message"
Push to GitHub	git push
Pull latest changes	git pull
See commit history	git log
See remotes	git remote -v
Clone repository	git clone git@github.com:org/repo.git
Check Git version	git --version
Test SSH to GitHub	ssh -T git@github.com

Daily workflow (most common):

```
cd ~/dev/project-creator    # Navigate to repository
git status                  # See what changed
git add .                   # Stage all changes
git commit -m "Description"  # Commit with message
git push                    # Upload to GitHub
```

10.5 Further Learning

Once you're comfortable with basics:

- **Branches** — Isolate experimental work from main code
- **Pull Requests** — Formal review process before merging
- **.gitignore** — Exclude files from Git tracking
- **Merge conflicts** — Resolving when two people change the same lines
- **Reverting commits** — Undoing mistakes safely

Resources:

- [GitHub's Git Handbook (https://guides.github.com/introduction/git-handbook/)](https://guides.github.com/introduction/git-handbook/) — Comprehensive guide
- [Oh Shit, Git!?! (https://ohshitgit.com/)](https://ohshitgit.com/) — Fixes for common mistakes (humorous but practical)
- [Visual Git Reference (https://marklodato.github.io/visual-git-guide/index-en.html)](https://marklodato.github.io/visual-git-guide/index-en.html) — Diagrams of Git operations

Claude Code as tutor: Ask Claude to explain any Git concept or command in plain language.

Appendix A: Command Quick Reference

Essential Daily Commands

```
# Navigation
cd ~/dev/project-creator         # Go to project directory
pwd                              # Print current directory

# Checking status
git status                       # What files changed?
git diff                         # Line-by-line changes
git log                          # Commit history

# Staging and committing
git add file.md                  # Stage specific file
git add .                        # Stage all changes
git commit -m "Message"          # Commit staged files

# Syncing with GitHub
git pull                         # Download latest changes
git push                         # Upload your commits

# SSH verification
ssh -T git@github.com            # Test GitHub connection
```

Setup Commands (One-Time)

```
# Install Git (via Xcode tools)
xcode-select --install

# Configure Git
git config --global user.name "Your Name"
git config --global user.email "your.email@example.com"

# Generate SSH key
ssh-keygen -t ed25519 -C "your.email@example.com"

# Add SSH key to keychain
ssh-add --apple-use-keychain ~/.ssh/id_ed25519

# Copy public key to clipboard
cat ~/.ssh/id_ed25519.pub | pbcopy

# Clone repository
git clone git@github.com:org/repo.git
```

Troubleshooting Commands

```
# Check configuration
git config --list
git remote -v

# See more details
git status -v
git log --oneline --graph --all

# Undo (use carefully)
git reset HEAD file.md           # Unstage file (keep changes)
git checkout -- file.md          # Discard changes to file
git revert HEAD                  # Undo last commit (safe)
```

Appendix B: Glossary

Branch: An independent line of development. main is the default branch.

Clone: Download a complete copy of a repository from GitHub to your computer.

Commit: A snapshot of your project at a specific point in time. Includes changes and a message.

Diff: The differences between two versions of a file (what changed).

Fork: A personal copy of someone else's repository on GitHub (for contributing to open source).

Hash: A unique identifier for each commit (e.g., 3f8a2c1).

HEAD: A pointer to the current commit you're working from.

Local: On your computer (as opposed to remote/GitHub).

Merge: Combining changes from different branches or commits.

Origin: The default name for the remote repository on GitHub.

Pull: Download commits from GitHub and merge them into your local branch.

Pull Request (PR): A request to merge your changes into someone else's repository (formal review process).

Push: Upload your local commits to GitHub.

Remote: A repository hosted on GitHub (or other server).

Repository (Repo): A project folder tracked by Git, including all history.

Staging Area: Where you prepare files before committing (the "selected photos" in our analogy).

SSH Key: A secure credential pair (public + private) for authenticating with GitHub without passwords.

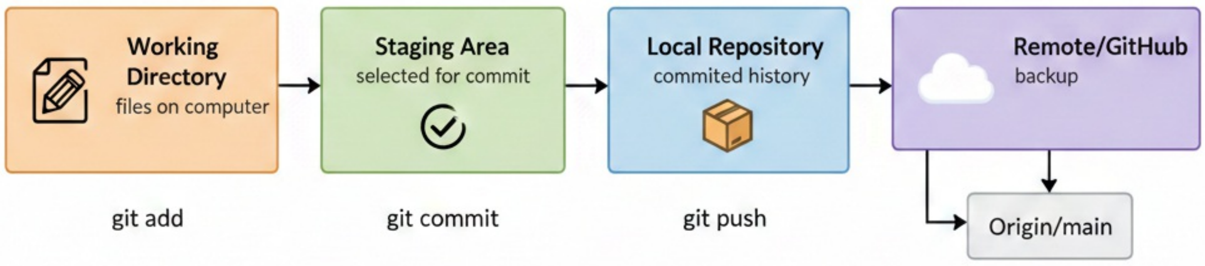
Upstream: The original repository you forked from (advanced concept).

Working Directory: The current state of files on your computer (not yet committed).

Appendix C: Visual Workflow Diagrams

Basic Workflow: Edit → Stage → Commit → Push

```
┌─────────────────┐
│ Working         │  (Files on your computer)
│ Directory       │  git status shows "modified"
└────────┬────────┘
         │ git add file.md
         ▼
┌─────────────────┐
│ Staging         │  (Selected for next commit)
│ Area            │  git status shows "to be committed"
└────────┬────────┘
         │ git commit -m "message"
         ▼
┌─────────────────┐
│ Local           │  (Committed to history)
│ Repository      │  git log shows commit
└────────┬────────┘
         │ git push
         ▼
┌─────────────────┐
│ Remote          │  (Uploaded to GitHub)
│ (GitHub)        │  Visible on github.com
└─────────────────┘
```



Git and GitHub Relationship

```
┌──────────────────────────────────────────────┐
│       Your Computer (Local)          │
│                                 │
│  ┌────────────────────────────────────────┐  │
│  │   Working Directory          │  │
│  │ (Files you edit)               │  │
│  └────────────────────────────────────────┘  │
│           │                  │
│           ▼                  │
│  ┌────────────────────────────────────────┐  │
│  │   Git Repository             │  │
│  │ (.git folder with history)   │  │
│  └────────────────────────────────────────┘  │
│           │                  │
└─────────────────────┼────────────────────────┘
          │
          │ git push / git pull
          ▼
┌───────────────────────────────────────────────┐
│       GitHub (Remote)                │
│                                 │
│  ┌────────────────────────────────────────┐  │
│  │   Remote Repository           │  │
│  │ (Backup + collaboration)      │  │
│  └────────────────────────────────────────┘  │
└───────────────────────────────────────────────┘
```

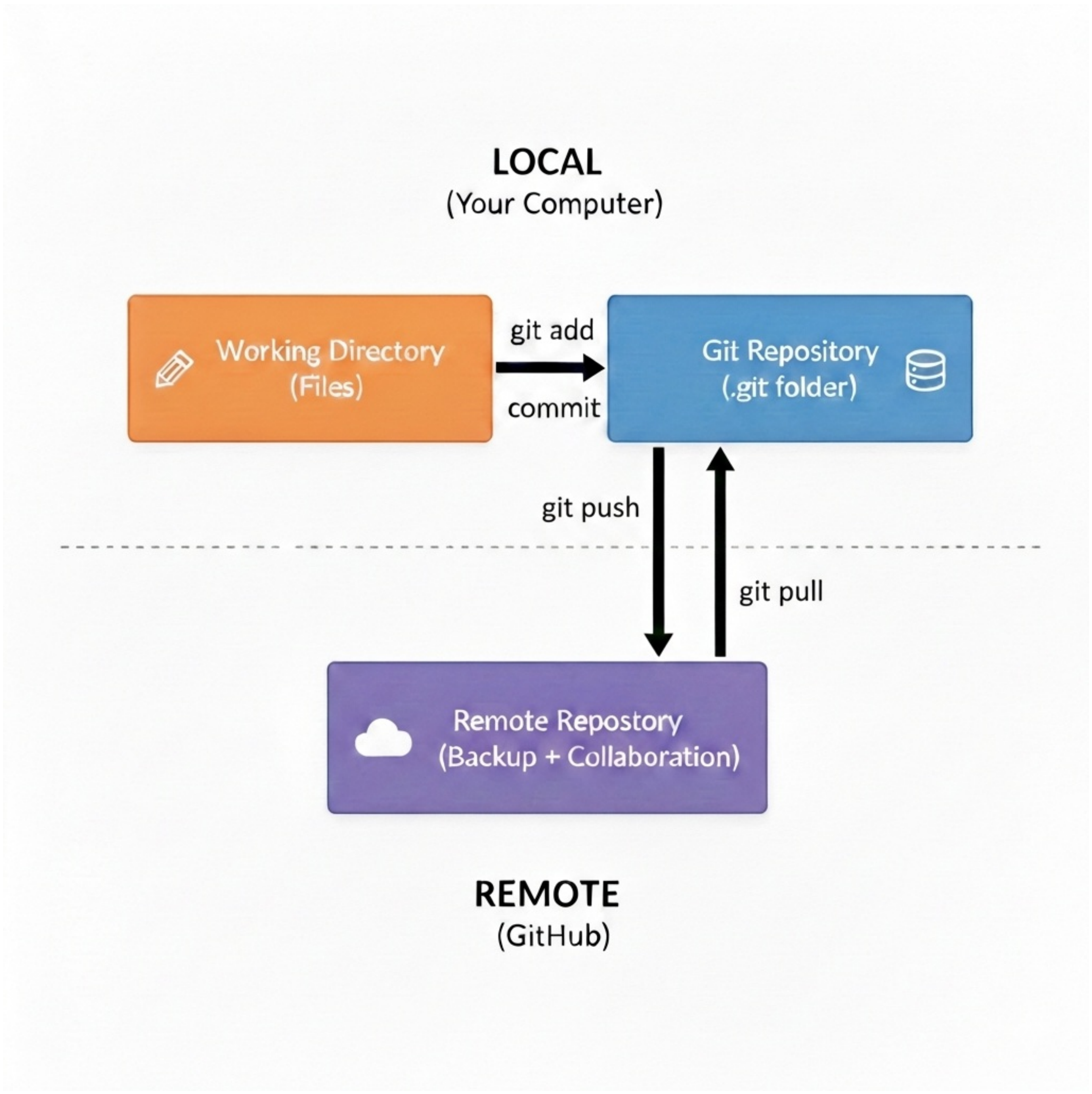
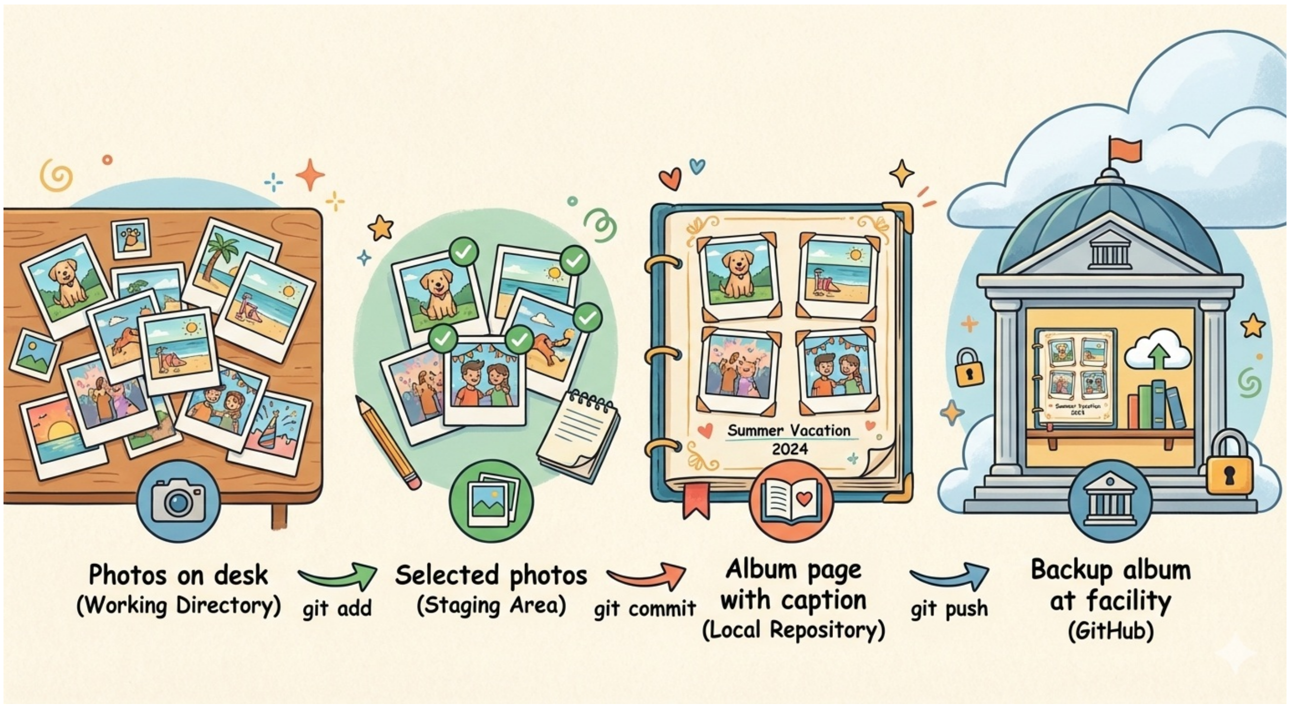


Photo Album Analogy (Visual)

```
┌──────────────────────────────────────────────────────────────┐
│ Photos scattered on desk              │ ← Working Directory
│ (your files being edited)             │
│     profile.md     todo.md     notes.md   │
└──────────────────────┬───────────────────────────────────────┘
            │
            │ git add (select photos)
            ▼
┌──────────────────────────────────────────────────────────────┐
│ Photos selected for album page          │ ← Staging Area
│     profile.md     todo.md              │
└──────────────────────┬───────────────────────────────────────┘
            │
            │ git commit (glue to page)
            ▼
┌──────────────────────────────────────────────────────────────┐
│ Page in album with caption              │ ← Local Repository
│ "Feb 10, 2026: Updated client profiles"  │
│     [profile.md, todo.md]               │
└──────────────────────┬───────────────────────────────────────┘
            │
            │ git push (send to backup)
            ▼
┌──────────────────────────────────────────────────────────────┐
│ Backup album at safe location           │ ← GitHub
│     github.com/yourorg/yourrepo          │
└──────────────────────────────────────────────────────────────┘
```



Appendix D: Further Resources

Official Documentation

- Git Documentation (https://git-scm.com/doc) — Comprehensive reference
- GitHub Guides (https://guides.github.com/) — Tutorials for all skill levels
- GitHub CLI Manual (https://cli.github.com/manual/) — For gh command

Interactive Learning

- Learn Git Branching (https://learngitbranching.js.org/) — Visual, interactive tutorial
- GitHub Skills (https://skills.github.com/) — Hands-on courses in real repositories
- Git Immersion (http://gitimmersion.com/) — Step-by-step lab exercises

Quick References

- Git Cheat Sheet (GitHub) (https://education.github.com/git-cheat-sheet-education.pdf) — PDF summary
- Visual Git Cheat Sheet (https://ndpsoftware.com/git-cheatsheet.html) — Interactive visualization
- Oh Shit, Git!?! (https://ohshitgit.com/) — Fixes for common mistakes

Video Tutorials

- Git & GitHub for Beginners (FreeCodeCamp) (https://www.youtube.com/watch?v=RGOj5yH7evk) — Comprehensive 1-hour video
- GitHub Training & Guides (YouTube) (https://www.youtube.com/githubguides) — Short, focused videos

Books

- *Pro Git* by Scott Chacon (free online: git-scm.com/book (https://git-scm.com/book)) — Definitive guide
- *Git Pocket Guide* by Richard Silverman — Quick reference for daily use

Community Support

- Stack Overflow: Git Questions (https://stackoverflow.com/questions/tagged/git) — Search before asking; likely already answered
- GitHub Community Forum (https://github.community/) — Official support forum
- r/git (Reddit) (https://www.reddit.com/r/git/) — Friendly community for questions

Tools to Explore Later

- GitHub Desktop (https://desktop.github.com/) — Graphical interface (alternative to command line)
- GitKraken (https://www.gitkraken.com/) — Advanced visual Git client
- SourceTree (https://www.sourcetreeapp.com/) — Free Git GUI for Mac

---

Conclusion

You now have everything you need to:

- Install and configure Git
- Set up GitHub authentication via SSH
- Clone repositories
- Make commits with descriptive messages
- Push your work to GitHub

- Manage collaborators
- Integrate with Claude Code for automation

Next steps:

1. Follow Part 3 to install Git (if needed)
2. Complete Part 5 to set up SSH keys
3. Clone Project Creator (Part 6)
4. Practice daily workflow (Part 7) for 2-3 weeks to build muscle memory
5. Gradually shift routine tasks to Claude Code (Part 9)

Remember: Git has a learning curve, but the core daily workflow is just:

```
git status → git add . → git commit -m "message" → git push
```

Everything else builds on this foundation.

Questions? Use Part 10's troubleshooting guide, or ask Claude Code for help.

Version: 1.0
Last Updated: February 10, 2026
Maintained By: Sonjaya Tandon (Consortium.team)
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