

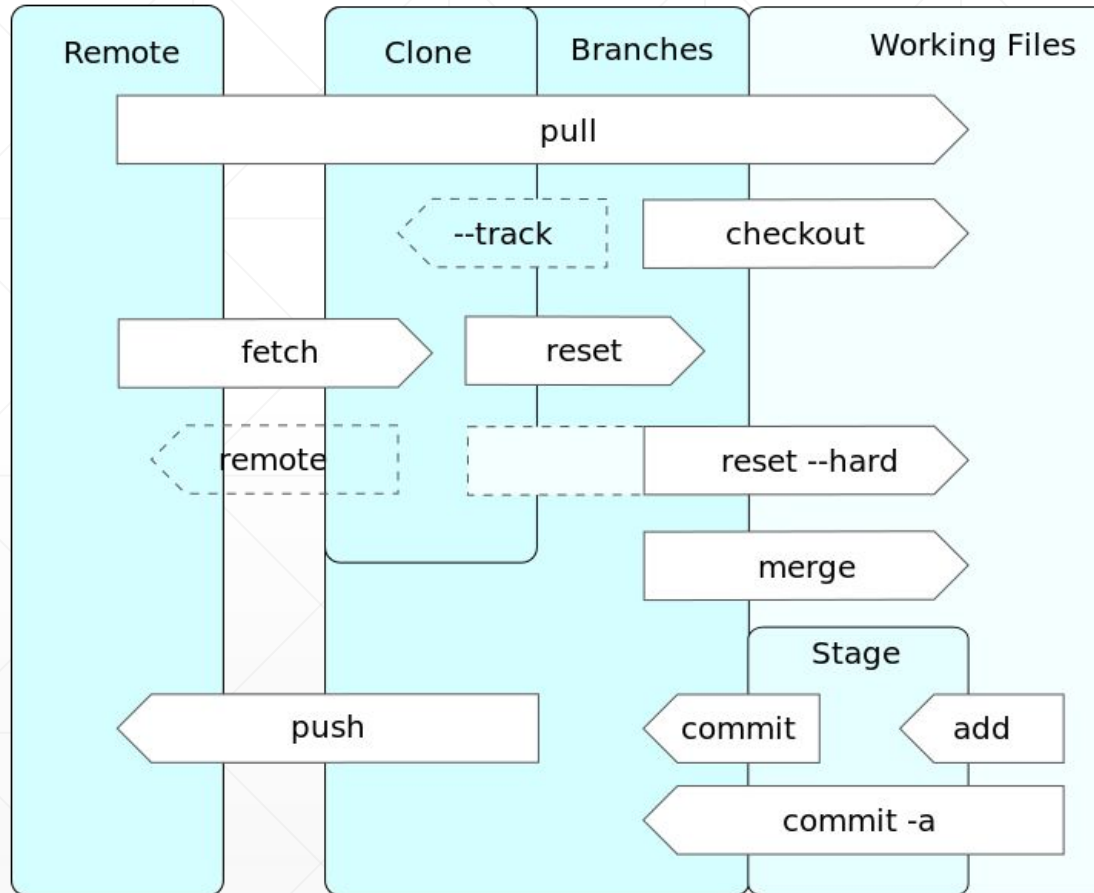
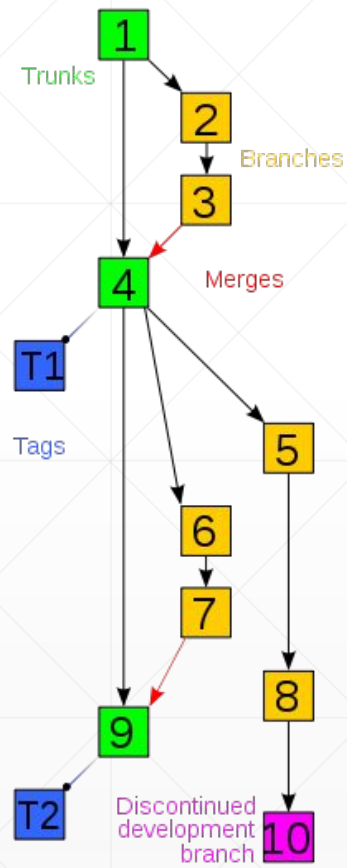
GEOG-312
First Steps in GIS Programming

Introduction to GitHub

Instructor: Qiusheng Wu, Ph.D.
Department of Geography
University of Tennessee
<https://wetlands.io>

What is Git?

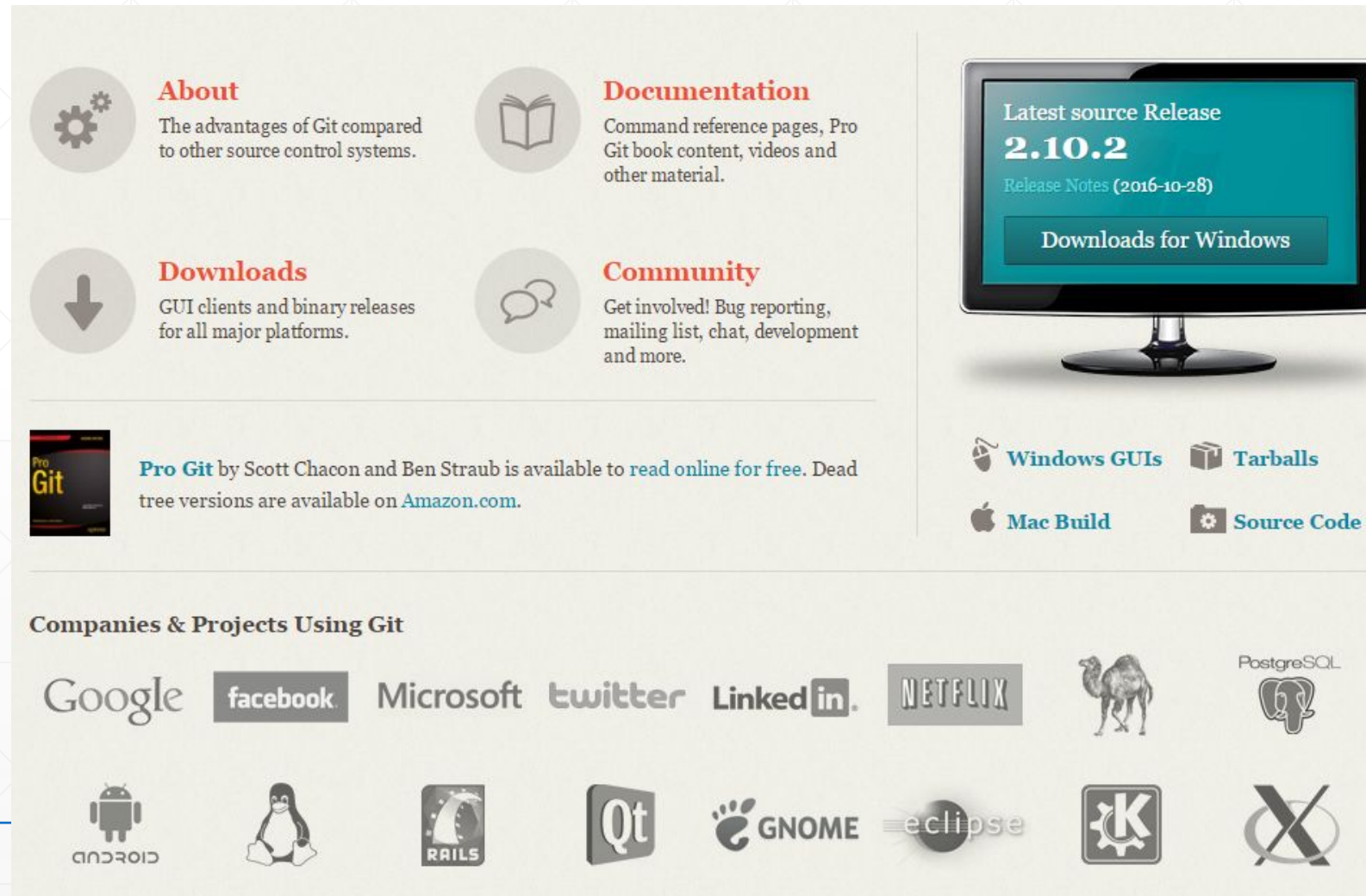
- Git is a distributed version control system (VCS)



<https://en.wikipedia.org/wiki/Git>

Install Git

➤ Download Git from <https://git-scm.com/>



The screenshot shows the Git website homepage with a light beige background. At the top, there are four circular icons with corresponding text: 'About' (gears), 'Documentation' (book), 'Downloads' (downward arrow), and 'Community' (speech bubbles). To the right, a monitor displays the 'Latest source Release 2.10.2' and a 'Downloads for Windows' button. Below the monitor are links for 'Windows GUIs', 'Tarballs', 'Mac Build', and 'Source Code'. At the bottom, a section titled 'Companies & Projects Using Git' features logos for Google, Facebook, Microsoft, Twitter, LinkedIn, Netflix, a camel (Android), PostgreSQL, and various open-source projects like Android, Linux, Rails, Qt, GNOME, Eclipse, K, and X.

About
The advantages of Git compared to other source control systems.

Documentation
Command reference pages, Pro Git book content, videos and other material.

Downloads
GUI clients and binary releases for all major platforms.

Community
Get involved! Bug reporting, mailing list, chat, development and more.

Pro Git by Scott Chacon and Ben Straub is available to [read online for free](#). Dead tree versions are available on [Amazon.com](#).

Latest source Release
2.10.2
[Release Notes \(2016-10-28\)](#)
[Downloads for Windows](#)

[Windows GUIs](#) [Tarballs](#)
[Mac Build](#) [Source Code](#)

Companies & Projects Using Git

Google facebook Microsoft twitter LinkedIn NETFLIX camel PostgreSQL

ANDROID Linux RAILS Qt GNOME eclipse K X

What is GitHub?

➤ GitHub is a web-based Git repository hosting service.

- GitHub: <https://github.com/>
- GitHub Desktop: <https://desktop.github.com/>

Simple collaboration from your desktop

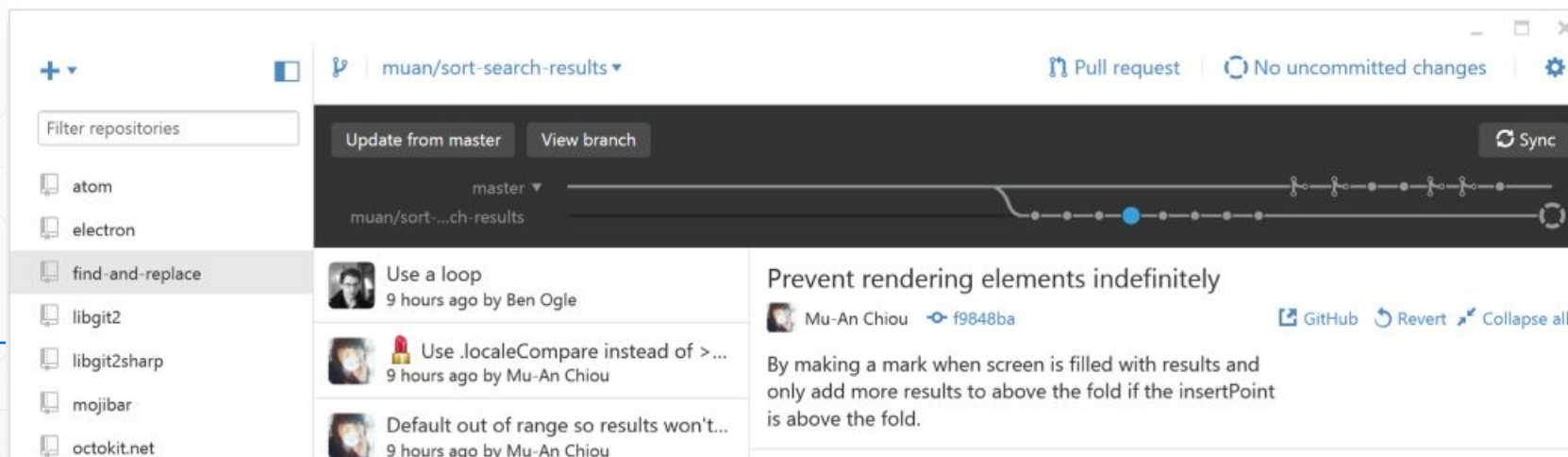
GitHub Desktop is a seamless way to contribute to projects on GitHub and GitHub Enterprise.

Available for Mac and [Windows](#)

Download GitHub Desktop

Windows 7 or later

By clicking the Download button you agree to the End-User License Agreement





Sign up a GitHub account


➤ <https://github.com/join>

Join GitHub

The best way to design, build, and ship software.

**Step 1:**
Set up a personal account

**Step 2:**
Choose your plan

**Step 3:**
Tailor your experience

Create your personal account

Username

This will be your username — you can enter your organization's username next.

Email Address

You will occasionally receive account related emails. We promise not to share your email with anyone.

Password

Use at least one lowercase letter, one numeral, and seven characters.

By clicking on "Create an account" below, you are agreeing to the [Terms of Service](#) and the [Privacy Policy](#).

Create an account

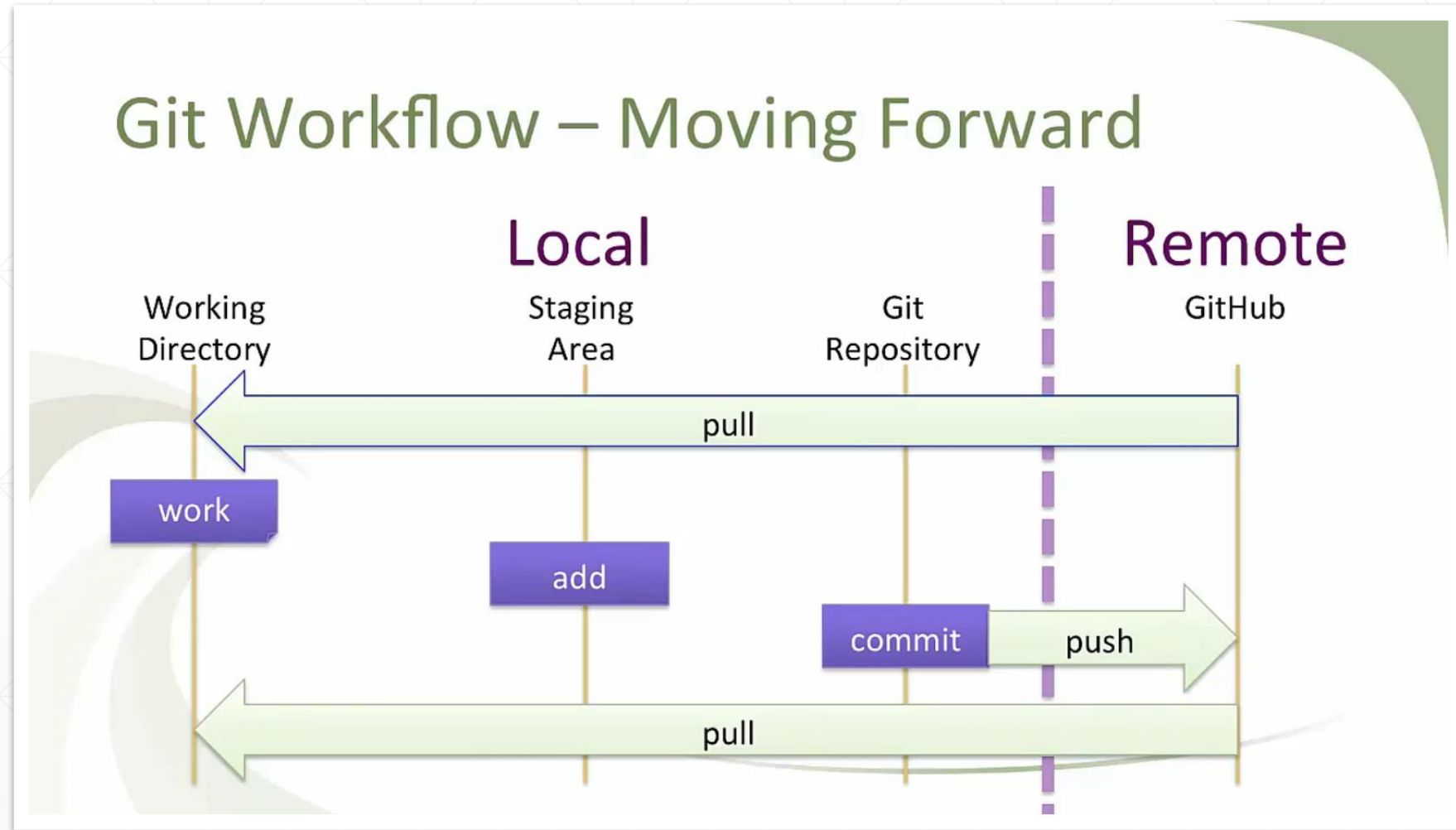
You'll love GitHub

- Unlimited collaborators
- Unlimited public repositories
- ✓ Great communication
- ✓ Frictionless development
- ✓ Open source community

Key Git concepts

- Repository contains files, history, config managed by Git
 - Three States of Git
 - Working directory
 - Staging area – pre-commit holding area
 - Commit – Git Repository (history)
 - Remote repository (GitHub)
 - Master branch
-

Git Workflow



Create a new repository

➤ <https://github.com/new>

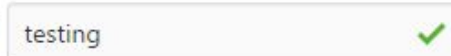
Create a new repository

A repository contains all the files for your project, including the revision history.

Owner



Repository name



Great repository names are short and memorable. Need inspiration? How about **reimagined-robot**.

Description (optional)

This is a testing repo

☒  **Public**

Anyone can see this repository. You choose who can commit.

☐  **Private**

You choose who can see and commit to this repository.

☒ **Initialize this repository with a README**

This will let you immediately clone the repository to your computer. Skip this step if you're importing an existing repository.

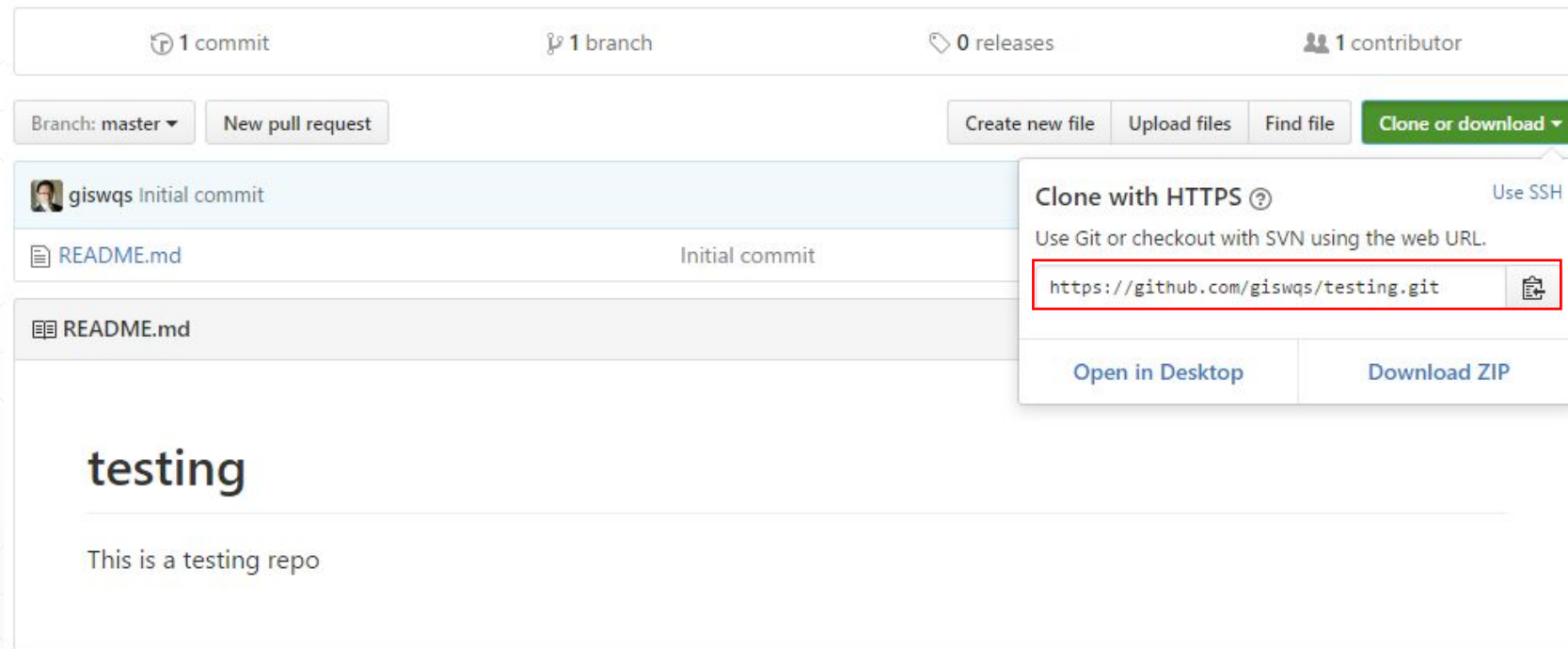
Add .gitignore: **None** ▼

Add a license: **None** ▼ 

Create repository

Clone a repository

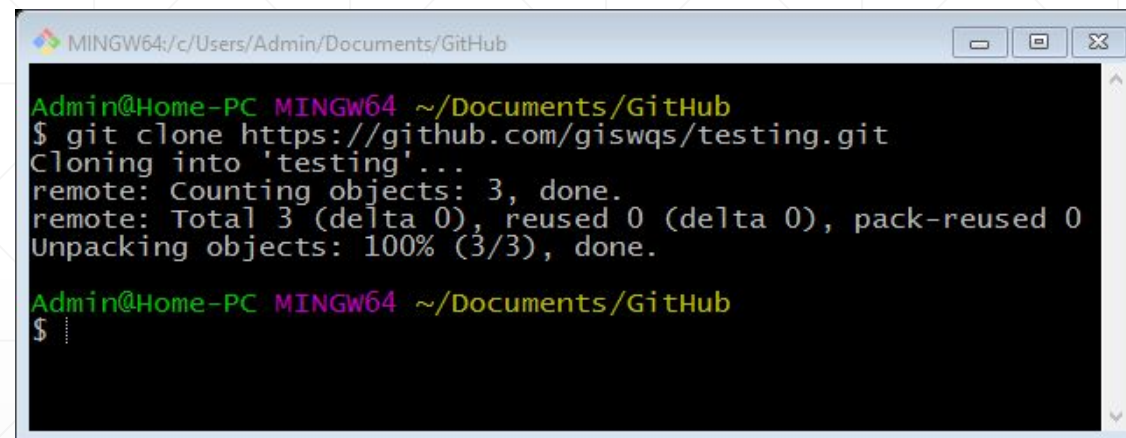
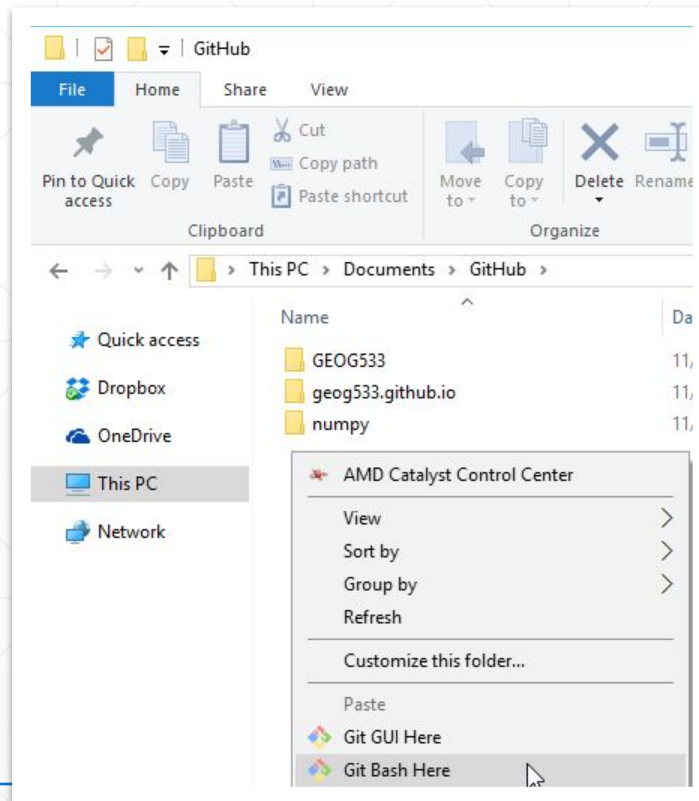
- Clone a repo from GitHub to your local computer



Clone a repository

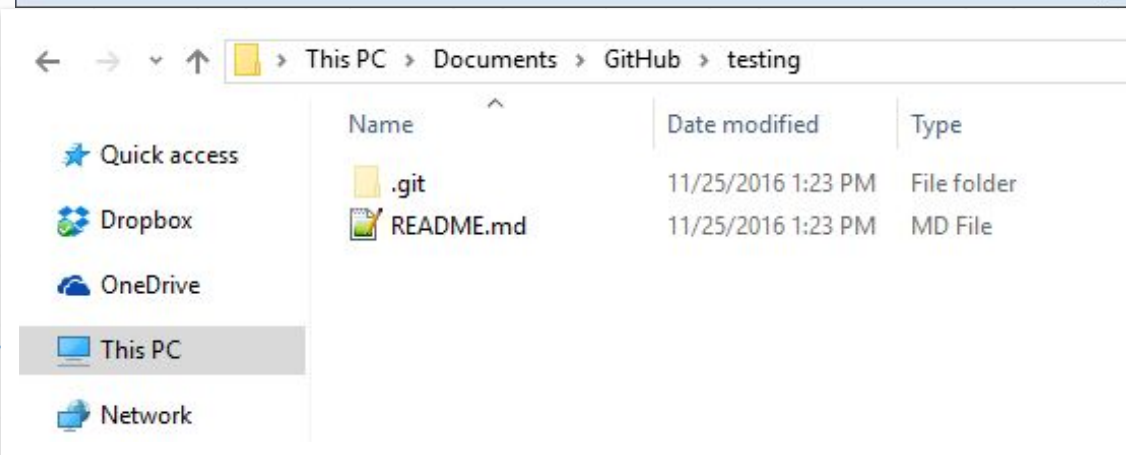
➤ Steps

- Open **Git Bash**
- Enter command: ***git clone https://github.com/giswqs/testing.git***



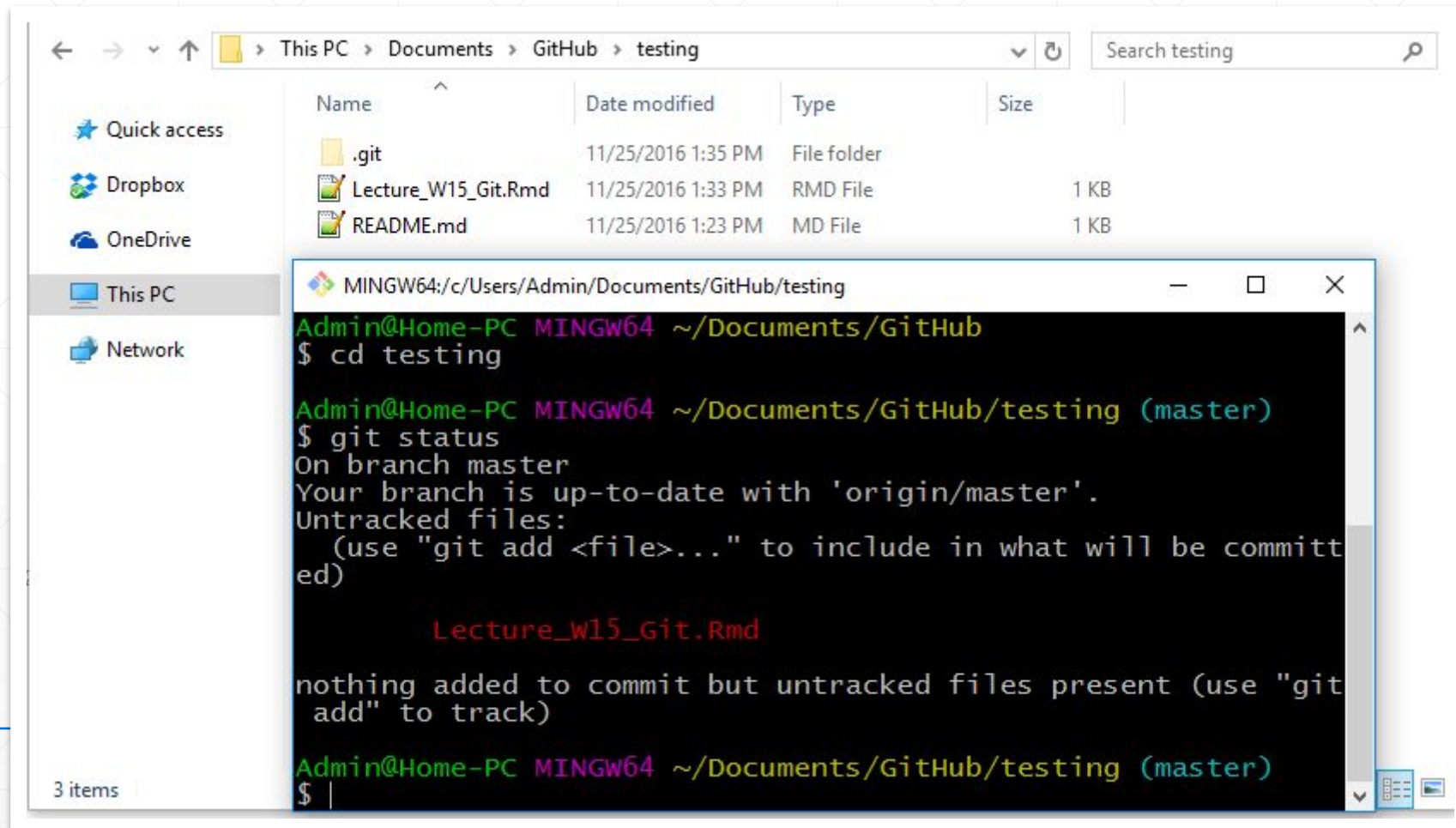
```
Admin@Home-PC MINGW64 ~/Documents/GitHub
$ git clone https://github.com/giswqs/testing.git
Cloning into 'testing'...
remote: Counting objects: 3, done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), done.

Admin@Home-PC MINGW64 ~/Documents/GitHub
$
```



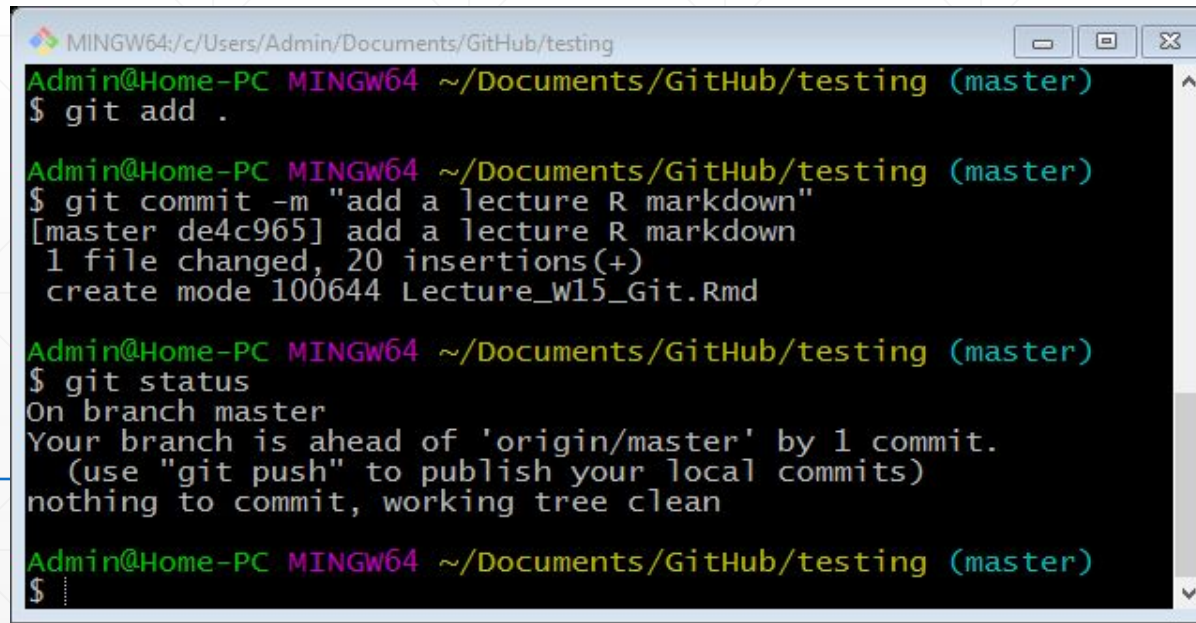
Add files to local repo

- Add any files to the local repo folder
- Use command ***git status*** to check changes



Commit the changes

- Add files to Git staging area
 - ***git add .*** or ***git add "[filename]"***
- Commit the staged content as a new commit snapshot
 - ***git commit -m "[descriptive message]"***
- Check status
 - ***git status***

A screenshot of a Windows terminal window titled 'MINGW64; c:/Users/Admin/Documents/GitHub/testing'. The window shows a series of Git commands and their outputs. The first command is 'git add .' which is executed successfully. The second command is 'git commit -m "add a lecture R markdown"', which results in a commit with hash 'de4c965' and a message 'add a lecture R markdown'. The output indicates that 1 file changed with 20 insertions and a new file 'Lecture_w15_Git.Rmd' was created. The third command is 'git status', which shows that the branch 'master' is ahead of 'origin/master' by 1 commit and that the working tree is clean. The terminal text is as follows:

```
MINGW64; c:/Users/Admin/Documents/GitHub/testing
Admin@Home-PC MINGW64 ~/Documents/GitHub/testing (master)
$ git add .

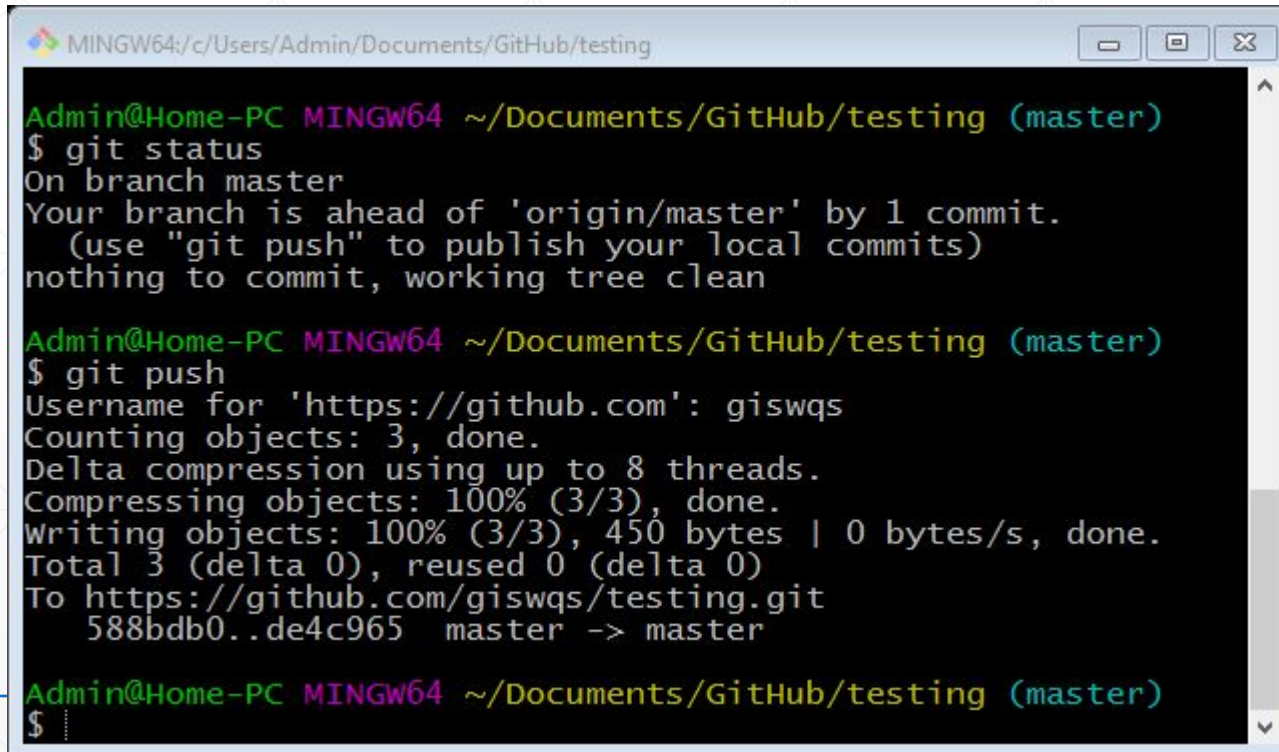
Admin@Home-PC MINGW64 ~/Documents/GitHub/testing (master)
$ git commit -m "add a lecture R markdown"
[master de4c965] add a lecture R markdown
1 file changed, 20 insertions(+)
create mode 100644 Lecture_w15_Git.Rmd

Admin@Home-PC MINGW64 ~/Documents/GitHub/testing (master)
$ git status
On branch master
Your branch is ahead of 'origin/master' by 1 commit.
(use "git push" to publish your local commits)
nothing to commit, working tree clean

Admin@Home-PC MINGW64 ~/Documents/GitHub/testing (master)
$
```

Push changes to GitHub

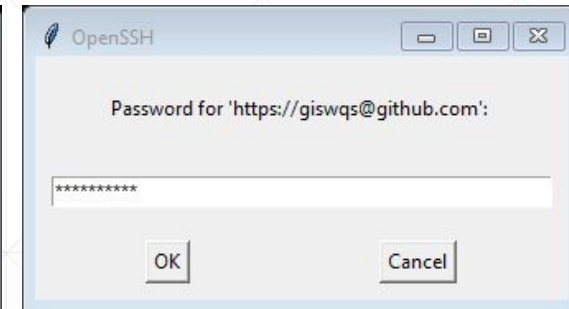
- Push changes to GitHub
 - ***git push***
 - Optional: ***git config credential.helper store*** (no need to enter GitHub username and password every time)



```
Admin@Home-PC MINGW64 ~/Documents/GitHub/testing (master)
$ git status
On branch master
Your branch is ahead of 'origin/master' by 1 commit.
(use "git push" to publish your local commits)
nothing to commit, working tree clean

Admin@Home-PC MINGW64 ~/Documents/GitHub/testing (master)
$ git push
Username for 'https://github.com': giswqs
Counting objects: 3, done.
Delta compression using up to 8 threads.
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 450 bytes | 0 bytes/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To https://github.com/giswqs/testing.git
588bdb0..de4c965  master -> master

Admin@Home-PC MINGW64 ~/Documents/GitHub/testing (master)
$
```



Check changes on GitHub

➤ <https://github.com/giswqs/testing>

The screenshot shows the GitHub interface for the repository 'giswqs/testing'. At the top, there's a navigation bar with tabs for Code, Issues (0), Pull requests (0), Projects (0), Wiki, Pulse, Graphs, and Settings. Below this, a message says 'This is a testing repo — Edit'. A summary bar shows '2 commits', '1 branch', '0 releases', and '1 contributor'. Below the summary bar are buttons for 'Branch: master', 'New pull request', 'Create new file', 'Upload files', 'Find file', and a green 'Clone or download' button. The commit history is shown below, with the latest commit 'giswqs add a lecture R markdown' (commit de4c965) from 14 minutes ago. A red box highlights the commit 'Lecture_W15_Git.Rmd' (add a lecture R markdown) from 14 minutes ago. Below the commit history, there's a section for 'README.md' which contains the text 'testing' and 'This is a testing repo'.

Code Issues 0 Pull requests 0 Projects 0 Wiki Pulse Graphs Settings

This is a testing repo — Edit

2 commits 1 branch 0 releases 1 contributor

Branch: master New pull request Create new file Upload files Find file Clone or download

giswqs add a lecture R markdown Latest commit de4c965 14 minutes ago

Lecture_W15_Git.Rmd	add a lecture R markdown	14 minutes ago
README.md	Initial commit	31 minutes ago

README.md

testing

This is a testing repo

Make changes on GitHub

➤ Create a new file

The screenshot displays the GitHub web interface for a repository. At the top, it shows repository statistics: 2 commits, 1 branch, 0 releases, and 1 contributor. Below this, there are buttons for 'Branch: master', 'New pull request', 'Create new file' (highlighted with a red box), 'Upload files', 'Find file', and 'Clone or download'. A commit history table follows, showing a commit by 'giswqs' titled 'add a lecture R markdown' with files 'Lecture_W15_Git.Rmd' and 'README.md'. Below the commit history, the file 'newfile.Rmd' is selected for editing. The editor shows the text 'Binghamton University <http://www.binghamton.edu>'. At the bottom, a 'Commit new file' dialog box is open, showing the file name 'Create newfile.Rmd' and a description field. It also has radio buttons for 'Commit directly to the master branch' (selected) and 'Create a new branch for this commit and start a pull request'. The 'Commit new file' button is green, and the 'Cancel' button is grey.

2 commits 1 branch 0 releases 1 contributor

Branch: master New pull request **Create new file** Upload files Find file Clone or download

giswqs add a lecture R markdown Latest commit de4c965 19 minutes ago

Lecture_W15_Git.Rmd	add a lecture R markdown	19 minutes ago
README.md	Initial commit	36 minutes ago

testing / newfile.Rmd or cancel

Edit new file Preview Spaces 2 No wrap

```
1 Binghamton University <http://www.binghamton.edu>
```

Commit new file

Create newfile.Rmd

Add an optional extended description...

☒ Commit directly to the master branch.

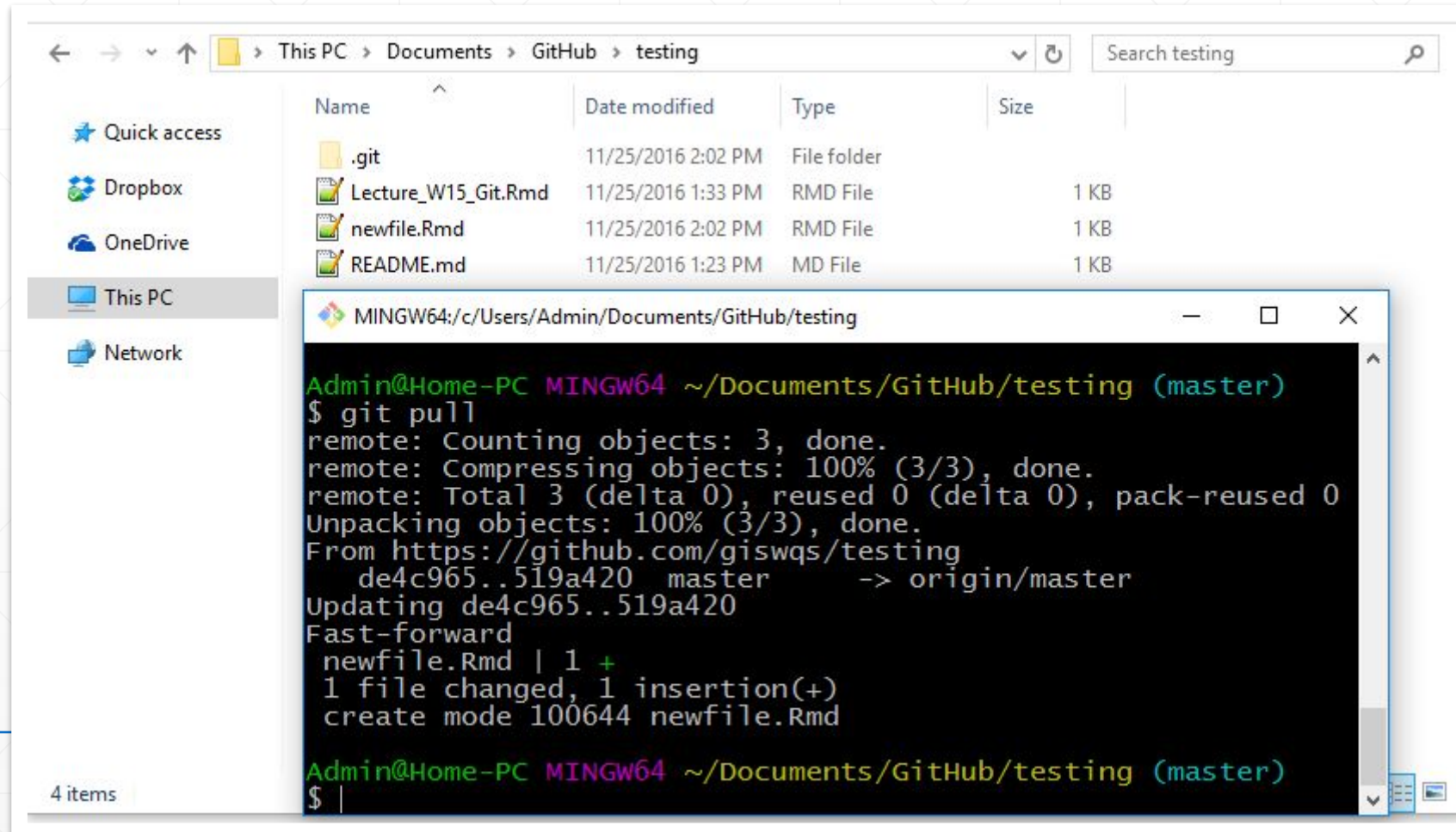
☐ Create a new branch for this commit and start a pull request. [Learn more about pull requests.](#)

Commit new file Cancel

Pull GitHub changes to local repo

➤ Pull GitHub changes to local repo

- *git pull*



GitHub Pages

- Create your website and host it on GitHub
 - <https://pages.github.com/>
- Create a new repo: ***[username].github.io***

Create a new repository

A repository contains all the files for your project, including the revision history.

Owner

 geog533 ▾

Repository name

geog533.github.io ✓

Great repository names are short and memorable. Need inspiration? How about **furry-octo-chainsaw**.

Description (optional)

This is the website repo

☒  **Public**

Anyone can see this repository. You choose who can commit.

☐  **Private**

You choose who can see and commit to this repository.

☒ **Initialize this repository with a README**

This will let you immediately clone the repository to your computer. Skip this step if you're importing an existing repository.

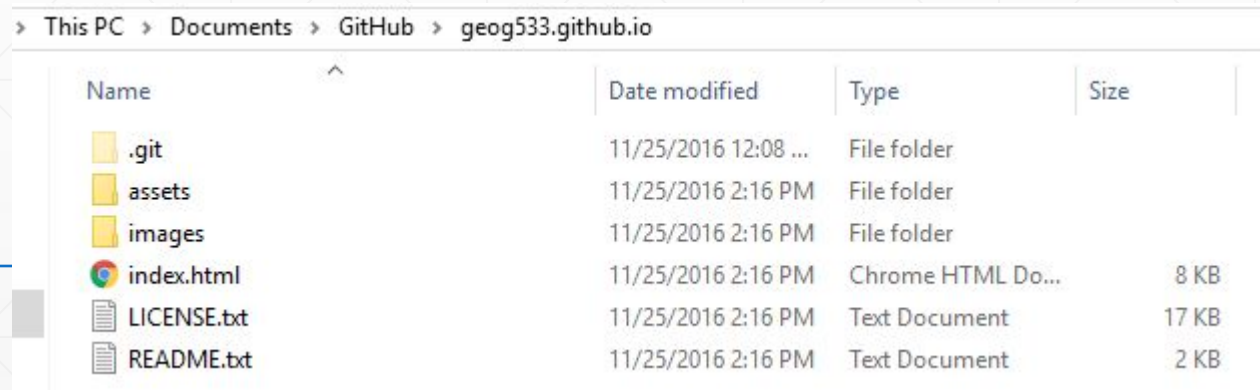
Add .gitignore: **None** ▾

Add a license: **None** ▾ ⓘ

Create repository

Website template

- Clone the GitHub repo to local PC
 - ***git clone https://github.com/geog-312/geog-312.github.io.git***
- Download a website template and copy files to the repo
 - <https://html5up.net/>
- Commit changes
 - ***git add .***
 - ***git commit -m "add website files"***
- Push changes to GitHub
 - ***git push***



Name	Date modified	Type	Size
.git	11/25/2016 12:08 ...	File folder	
assets	11/25/2016 2:16 PM	File folder	
images	11/25/2016 2:16 PM	File folder	
index.html	11/25/2016 2:16 PM	Chrome HTML Do...	8 KB
LICENSE.txt	11/25/2016 2:16 PM	Text Document	17 KB
README.txt	11/25/2016 2:16 PM	Text Document	2 KB

Preview the website

➤ <https://giswqs.github.io/geog-312>

geog533 / geog533.github.io
forked from giswqs/testing

Watch 0 Star 0 Fork 1

Code Pull requests 0 Projects 0 Wiki Pulse Graphs Settings

This is a testing repo — Edit

4 commits 1 branch 0 releases 1 contributor

Branch: master New pull request Create new file Upload files Find file Clone or download

This branch is even with giswqs:master. Pull request Compare

giswqs add website files Latest commit 6f3ecb4 3 minutes ago

assets	add website files	3 minutes ago
images	add website files	3 minutes ago
LICENSE.txt	add website files	3 minutes ago
README.txt	add website files	3 minutes ago
index.html	add website files	3 minutes ago

Git Cheat Sheet

➤ <https://education.github.com/git-cheat-sheet-education.pdf>

SETUP

Configuring user information used across all local repositories

```
git config --global user.name "[firstname lastname]"
```

set a name that is identifiable for credit when review version history

```
git config --global user.email "[valid-email]"
```

set an email address that will be associated with each history marker

```
git config --global color.ui auto
```

set automatic command line coloring for Git for easy reviewing

SETUP & INIT

Configuring user information, initializing and cloning repositories

```
git init
```

initialize an existing directory as a Git repository

```
git clone [url]
```

retrieve an entire repository from a hosted location via URL

STAGE & SNAPSHOT

Working with snapshots and the Git staging area

```
git status
```

show modified files in working directory, staged for your next commit

```
git add [file]
```

add a file as it looks now to your next commit (stage)

```
git reset [file]
```

unstage a file while retaining the changes in working directory

```
git diff
```

diff of what is changed but not staged

```
git diff --staged
```

diff of what is staged but not yet committed

```
git commit -m "[descriptive message]"
```

commit your staged content as a new commit snapshot

Git Cheat Sheet

➤ <https://education.github.com/git-cheat-sheet-education.pdf>

BRANCH & MERGE

Isolating work in branches, changing context, and integrating changes

git branch

list your branches. a * will appear next to the currently active branch

git branch [branch-name]

create a new branch at the current commit

git checkout

switch to another branch and check it out into your working directory

git merge [branch]

merge the specified branch's history into the current one

git log

show all commits in the current branch's history

SHARE & UPDATE

Retrieving updates from another repository and updating local repos

git remote add [alias] [url]

add a git URL as an alias

git fetch [alias]

fetch down all the branches from that Git remote

git merge [alias]/[branch]

merge a remote branch into your current branch to bring it up to date

git push [alias] [branch]

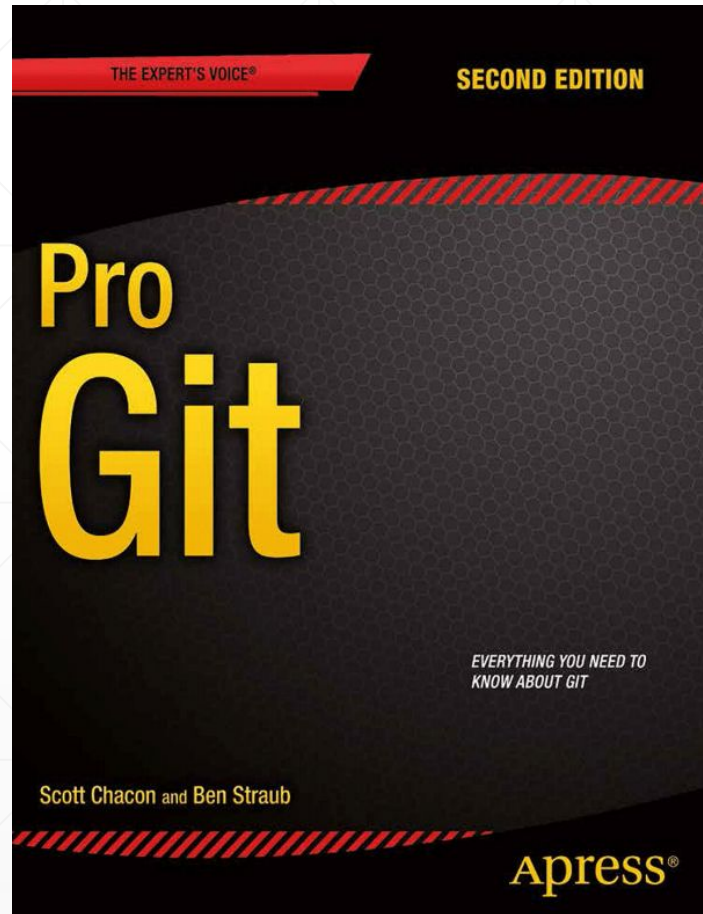
Transmit local branch commits to the remote repository branch

git pull

fetch and merge any commits from the tracking remote branch

Git book

➤ <https://git-scm.com/book/en/v2>



Try Git

➤ <https://try.github.io/>



1.1 · Got 15 minutes and want to learn Git?

Git allows groups of people to work on the same documents (often code) at the same time, and without stepping on each other's toes. It's a distributed version control system.

Our terminal prompt below is currently in a directory we decided to name "octobox". To initialize a Git repository here, type the following command:

➔ `git init`

