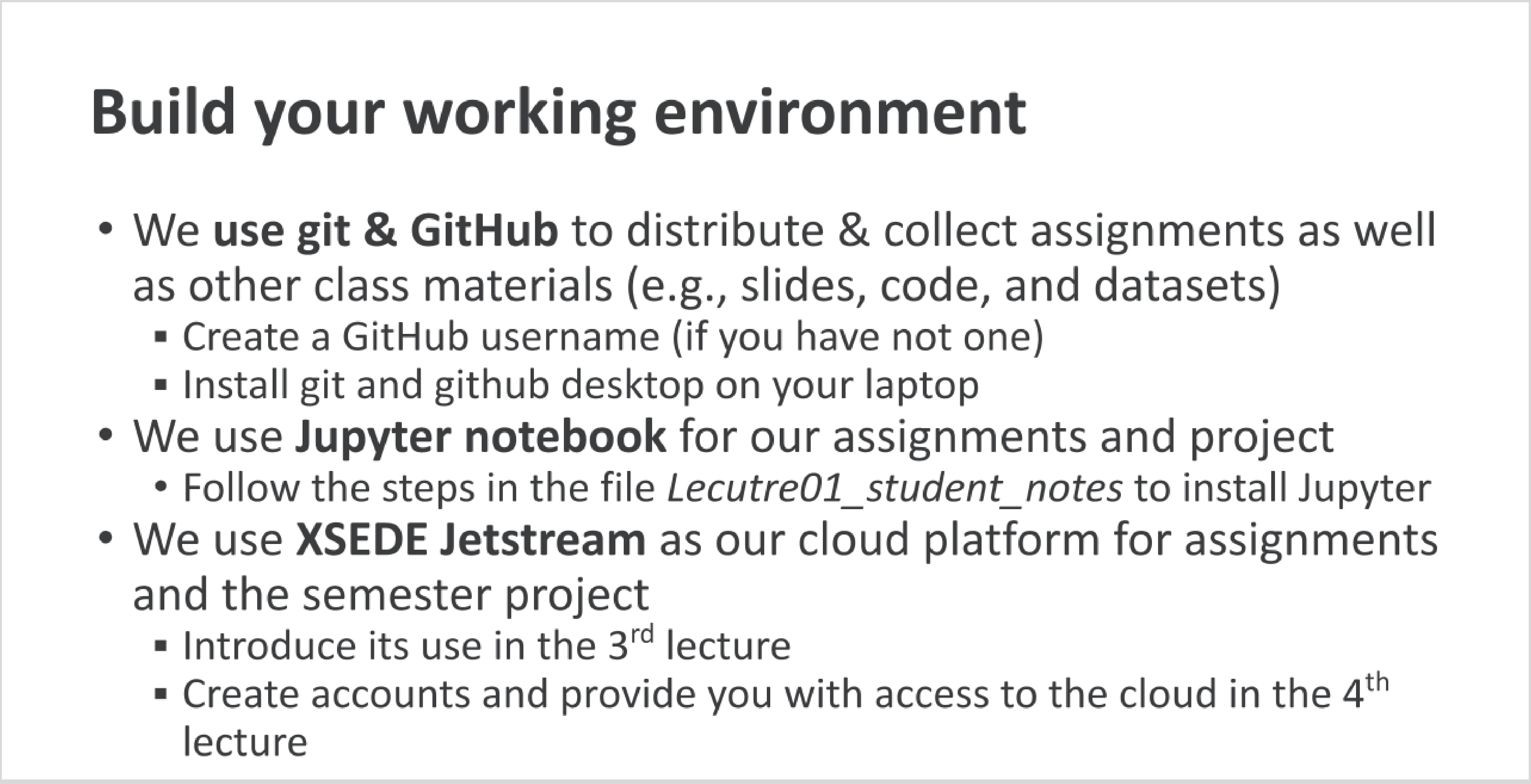
General Github and Git, sources include

https://github.com/rogerdudler/git-guide	https://github.com/MarkLodato/visual-git-guide	https://kbroman.org/github_tutorial/

1 of 2: Get started on Github and Git

1	Install Git on your computer: First, download and install Git on your computer if it's not already installed. You can download Git from the official Git website.
2	Create a GitHub account: If you don't have a GitHub account, create one by visiting the GitHub website.
3	Initialize a Git repository: Open a terminal or command prompt and navigate to the directory where you want to create a Git repository. Use the "git init" command to initialize a new repository.
4	Create a new branch: Create a new branch with the "git branch" command. This allows you to work on changes without affecting the main branch.
5	Make changes to your code: Modify the files in your repository as needed.
6	Stage changes: Use the "git add" command to stage the changes you made to your files. This prepares them to be committed.
7	Commit changes: Use the "git commit" command to commit your changes with a message explaining what you did.
8	Push changes to GitHub: Use the "git push" command to push your changes to your GitHub repository. This makes your changes available to others and allows for collaboration.
9	Pull changes from GitHub: Use the "git pull" command to pull changes made by others on GitHub into your local repository.
10	Merge branches: Use the "git merge" command to merge changes from one branch into another.

2 of 2: Slide Mash

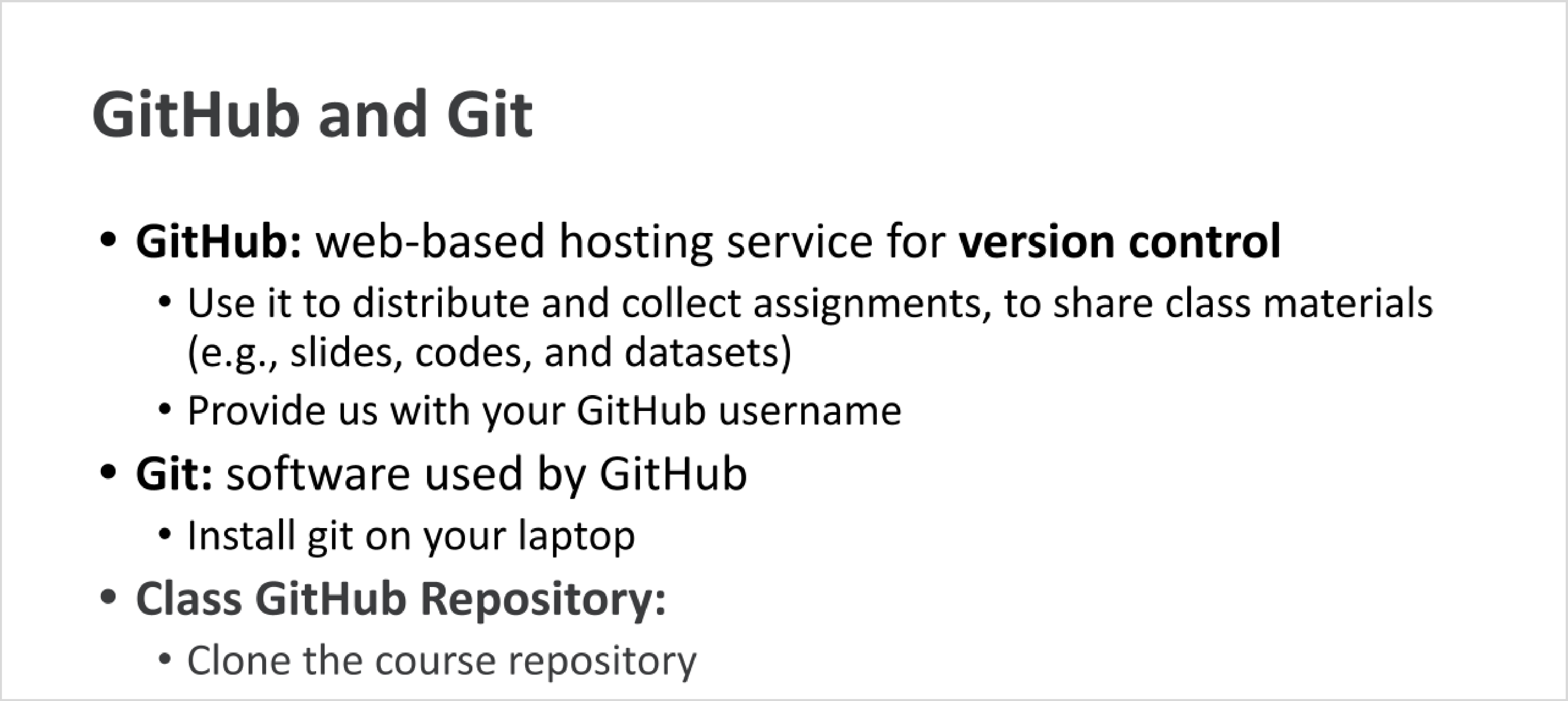


Build your working environment

- We **use git & GitHub** to distribute & collect assignments as well as other class materials (e.g., slides, code, and datasets)
  - Create a GitHub username (if you have not one)
  - Install git and github desktop on your laptop
- We use **Jupyter notebook** for our assignments and project
  - Follow the steps in the file *Lecutre01_student_notes* to install Jupyter
- We use **XSEDE Jetstream** as our cloud platform for assignments and the semester project
  - Introduce its use in the 3rd lecture
  - Create accounts and provide you with access to the cloud in the 4th lecture

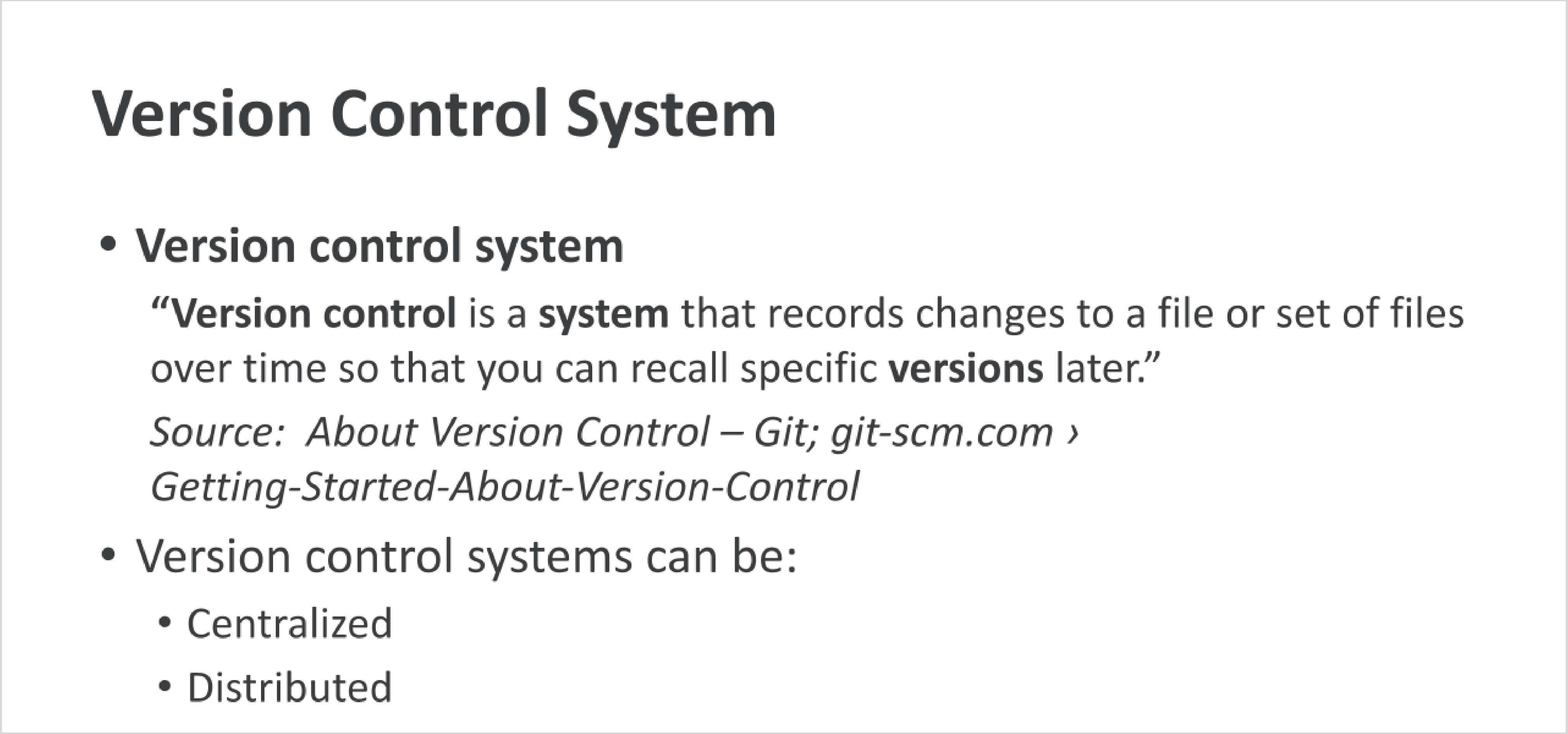
General Github and Git, sources include

https://github.com/rogerdudler/git-guide	https://github.com/MarkLodato/visual-git-guide	https://kbroman.org/github_tutorial/



GitHub and Git

- **GitHub:** web-based hosting service for **version control**
  - Use it to distribute and collect assignments, to share class materials (e.g., slides, codes, and datasets)
  - Provide us with your GitHub username
- **Git:** software used by GitHub
  - Install git on your laptop
- **Class GitHub Repository:**
  - Clone the course repository

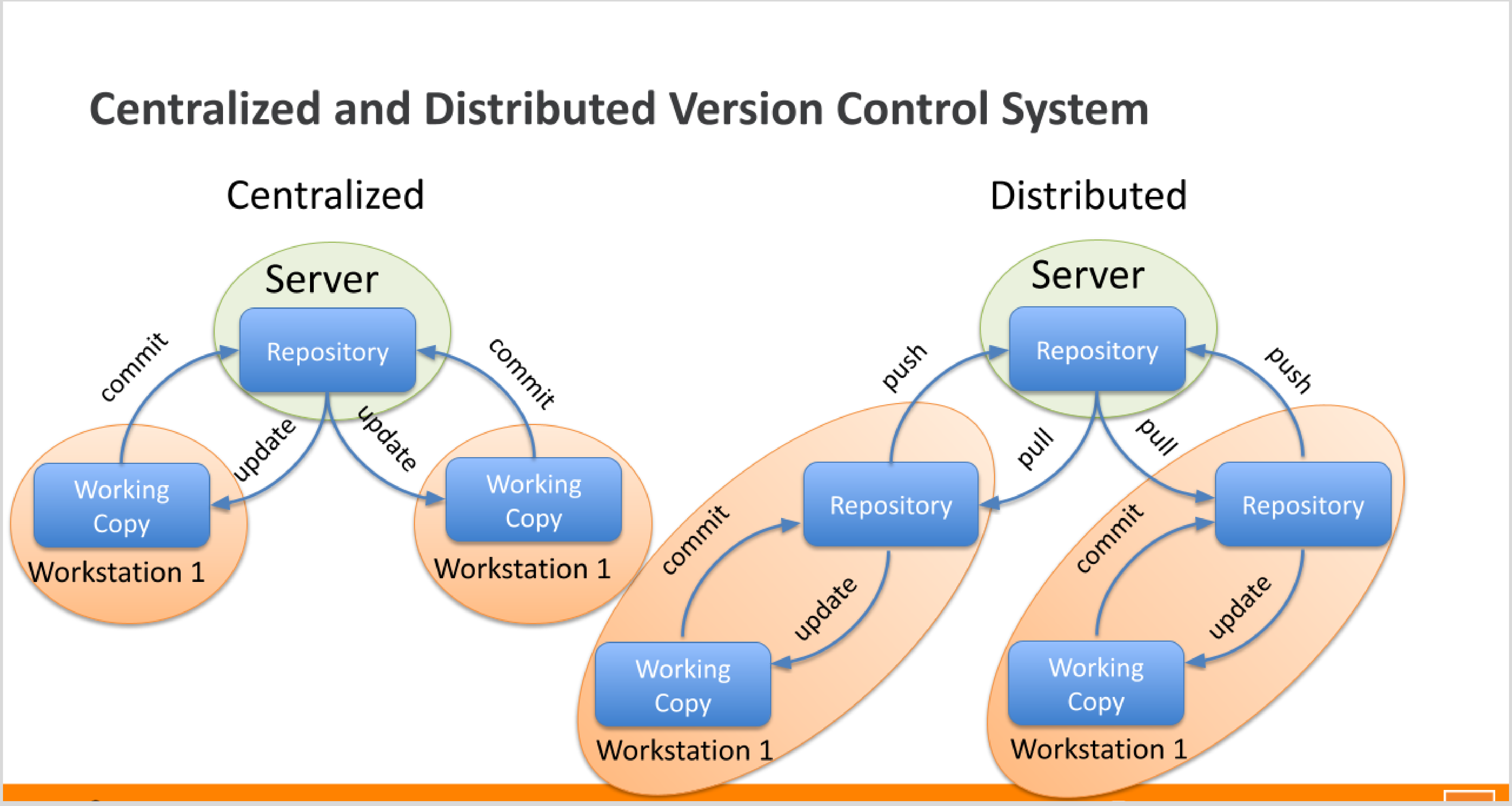


Version Control System

- **Version control system**

  "**Version control** is a **system** that records changes to a file or set of files over time so that you can recall specific **versions** later."

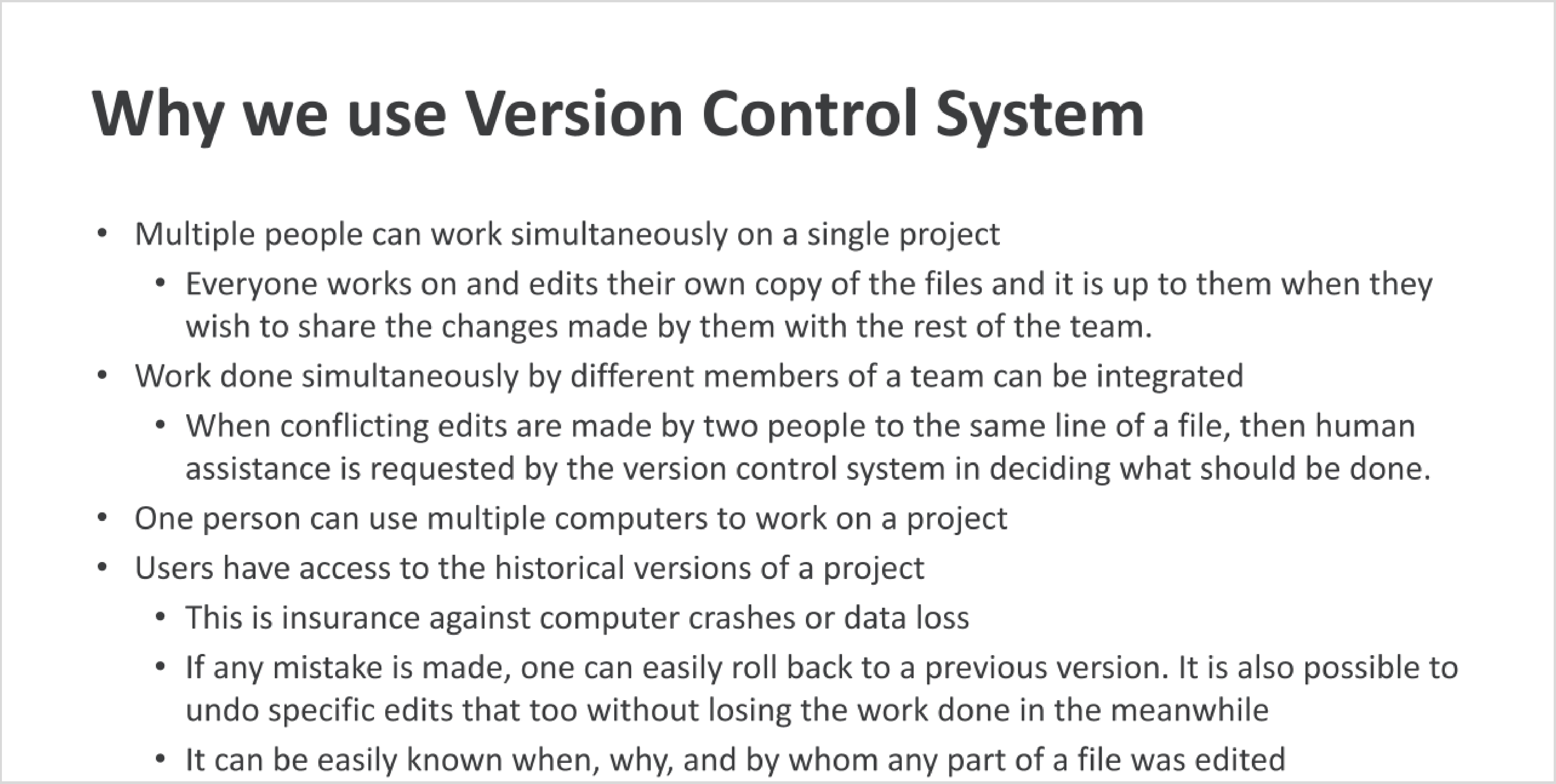
  Source: About Version Control – Git; git-scm.com › Getting-Started-About-Version-Control
- Version control systems can be:
  - Centralized
  - Distributed



Centralized and Distributed Version Control System

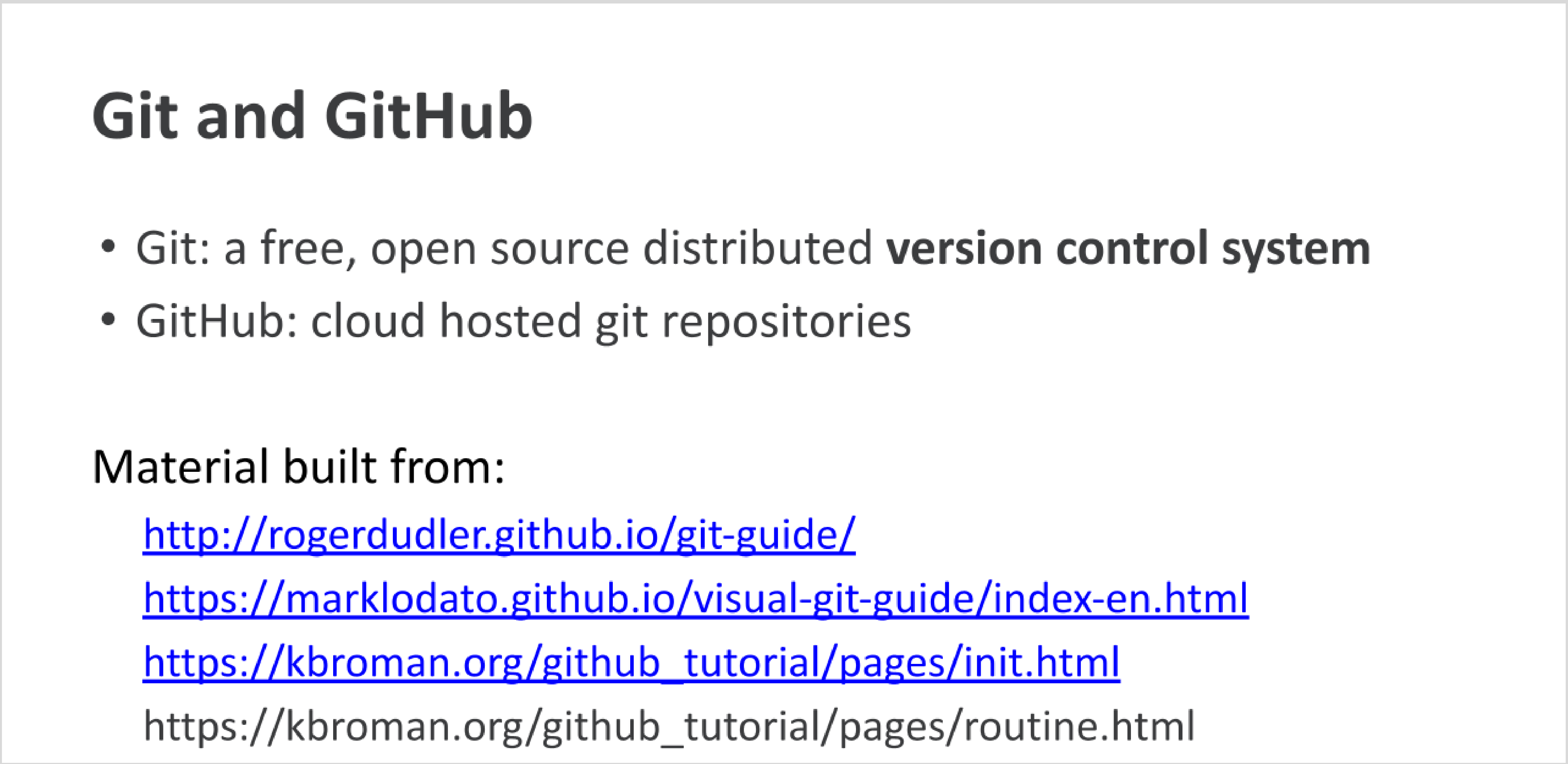
General Github and Git, sources include

https://github.com/rogerdudler/git-guide	https://github.com/MarkLodato/visual-git-guide	https://kbroman.org/github_tutorial/



Why we use Version Control System

- Multiple people can work simultaneously on a single project
    - Everyone works on and edits their own copy of the files and it is up to them when they wish to share the changes made by them with the rest of the team.
- Work done simultaneously by different members of a team can be integrated
    - When conflicting edits are made by two people to the same line of a file, then human assistance is requested by the version control system in deciding what should be done.
- One person can use multiple computers to work on a project
- Users have access to the historical versions of a project
    - This is insurance against computer crashes or data loss
    - If any mistake is made, one can easily roll back to a previous version. It is also possible to undo specific edits that too without losing the work done in the meanwhile
    - It can be easily known when, why, and by whom any part of a file was edited

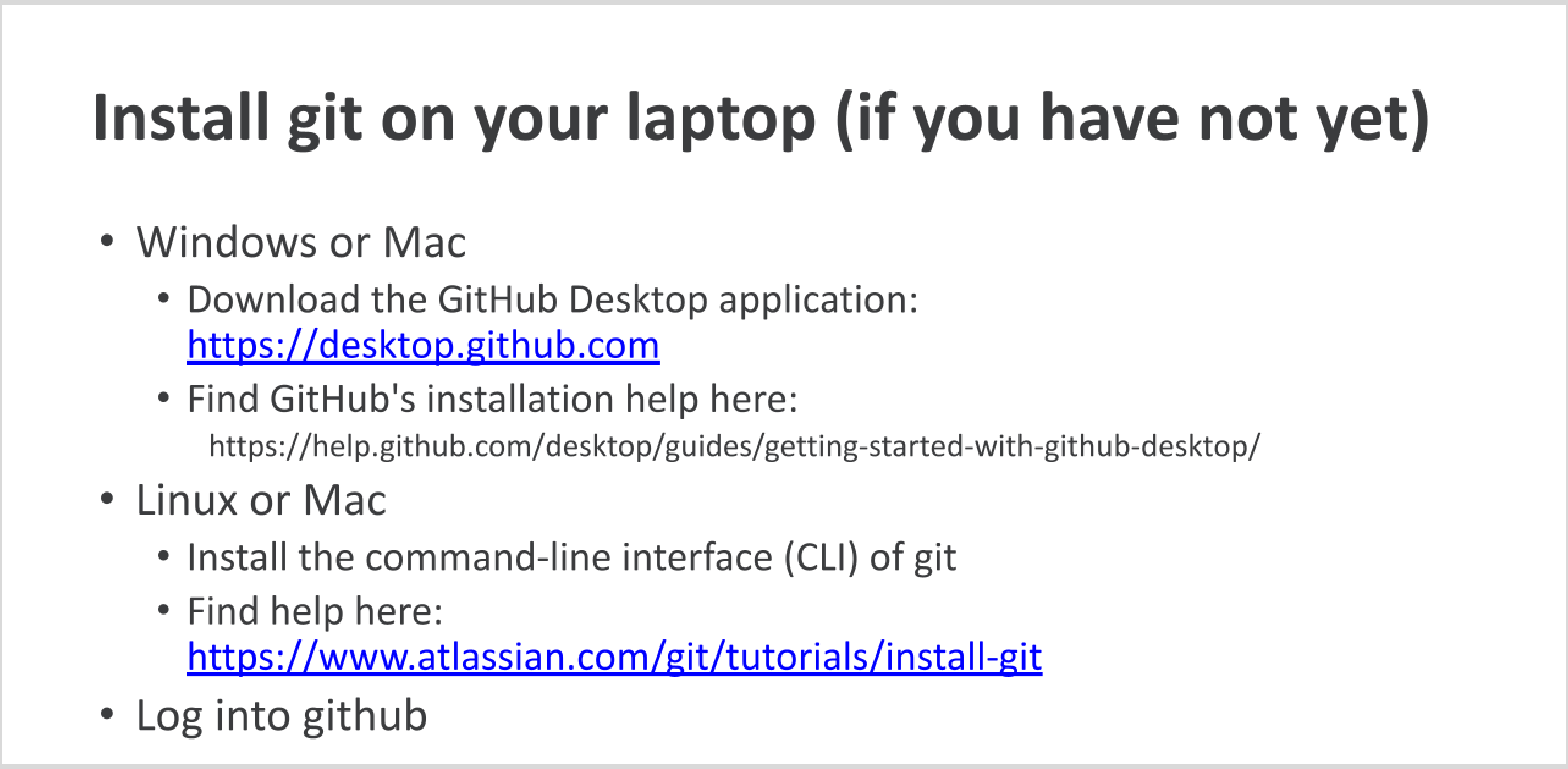


Git and GitHub

- Git: a free, open source distributed **version control system**
- GitHub: cloud hosted git repositories

Material built from:

http://rogerdudler.github.io/git-guide/
https://marklodato.github.io/visual-git-guide/index-en.html
https://kbroman.org/github_tutorial/pages/init.html
https://kbroman.org/github_tutorial/pages/routine.html

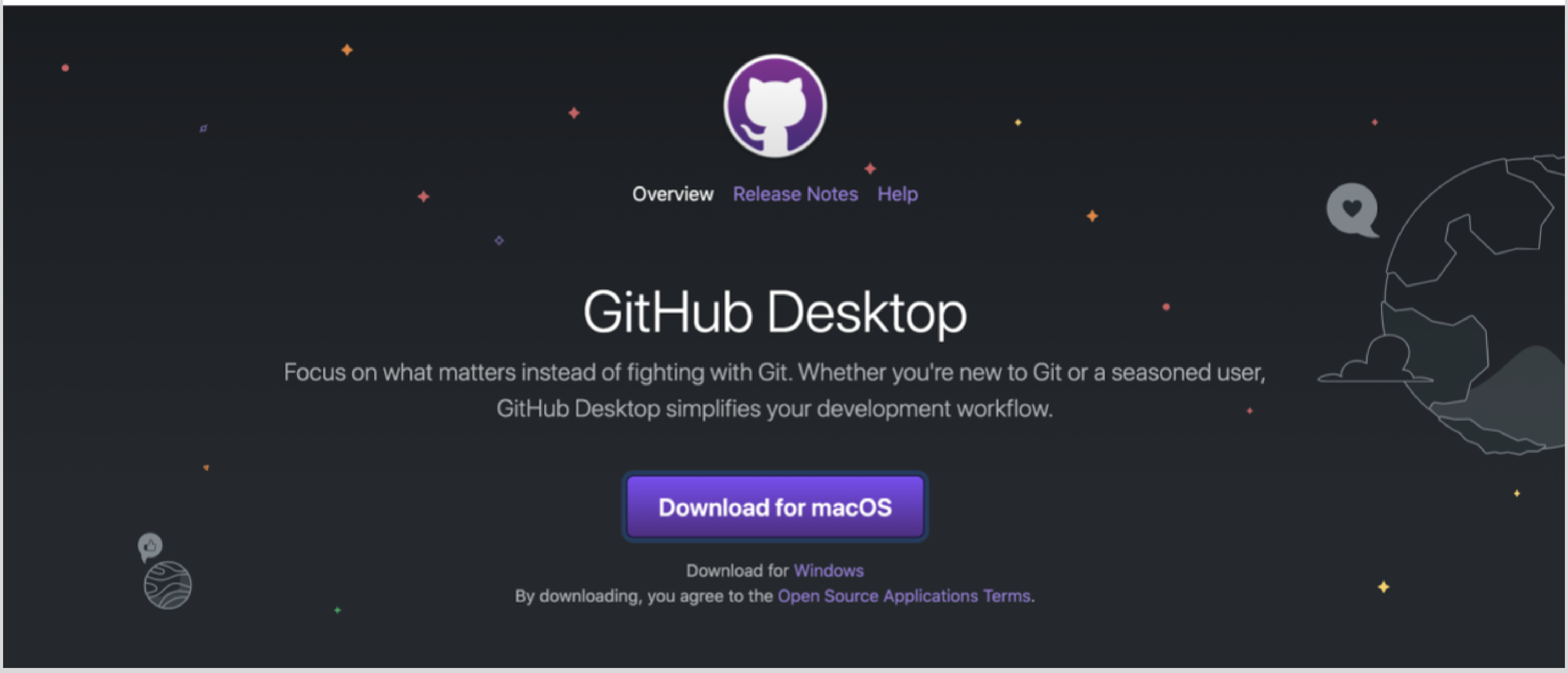


Install git on your laptop (if you have not yet)

- Windows or Mac
    - Download the GitHub Desktop application: https://desktop.github.com
    - Find GitHub's installation help here:
      https://help.github.com/desktop/guides/getting-started-with-github-desktop/
- Linux or Mac
    - Install the command-line interface (CLI) of git
    - Find help here: https://www.atlassian.com/git/tutorials/install-git
- Log into github

General Github and Git, sources include

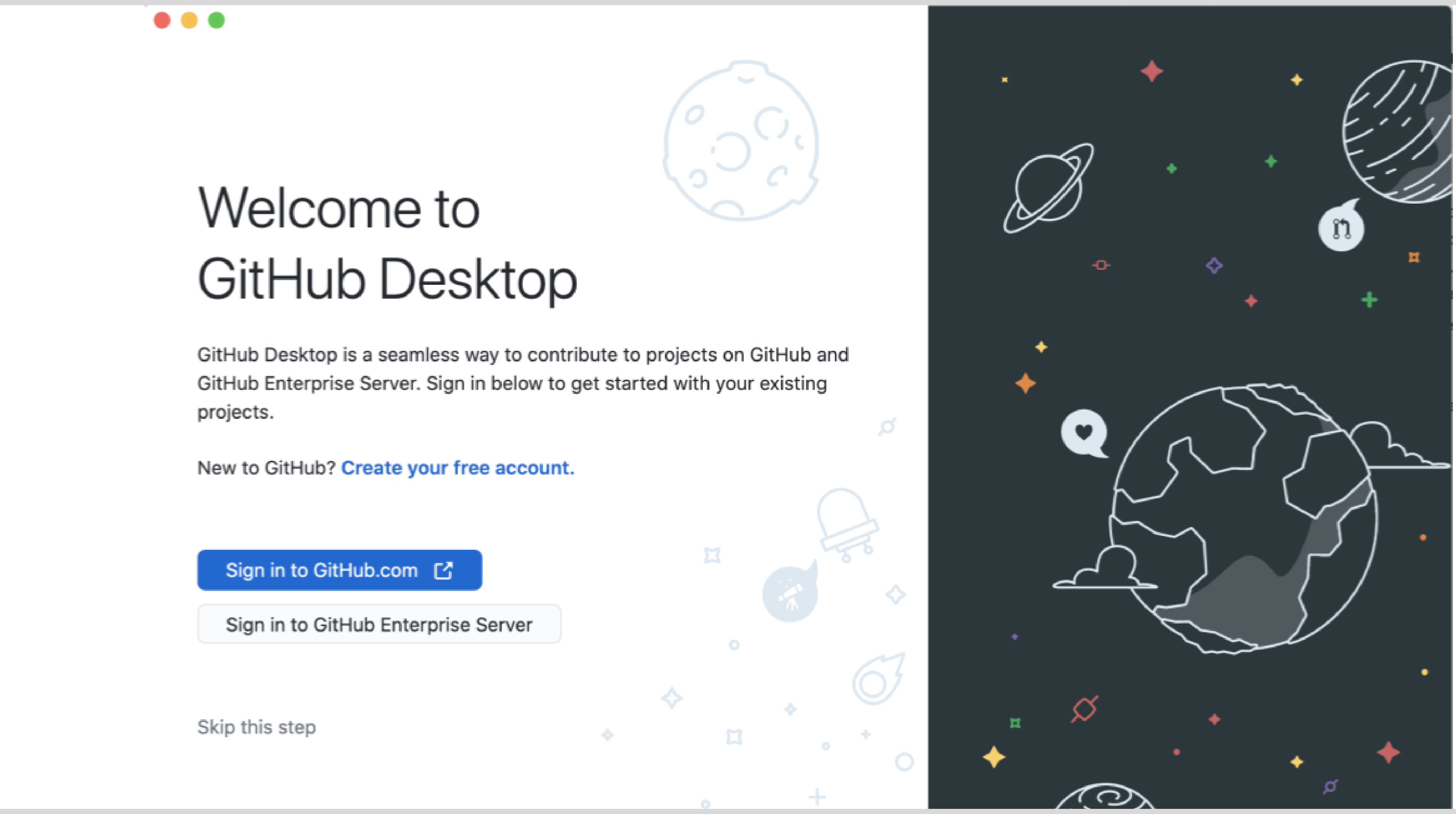
https://github.com/rogerdudler/git-guide	https://github.com/MarkLodato/visual-git-guide	https://kbroman.org/github_tutorial/



GitHub Desktop

Focus on what matters instead of fighting with Git. Whether you're new to Git or a seasoned user, GitHub Desktop simplifies your development workflow.

Download for Windows
By downloading, you agree to the Open Source Applications Terms.



Welcome to GitHub Desktop

GitHub Desktop is a seamless way to contribute to projects on GitHub and GitHub Enterprise Server. Sign in below to get started with your existing projects.

New to GitHub? Create your free account.

Connect new repos to github

- Go to github
- Log in to your account

You don't have a github account?

- Get a github account
  - Go to the GitHub Sign Up page https://github.com/join
  - Create a free account
- Share your github account with us:
  - Complete form **https://forms.gle/c2w4vUeY4nC4uRvNA**

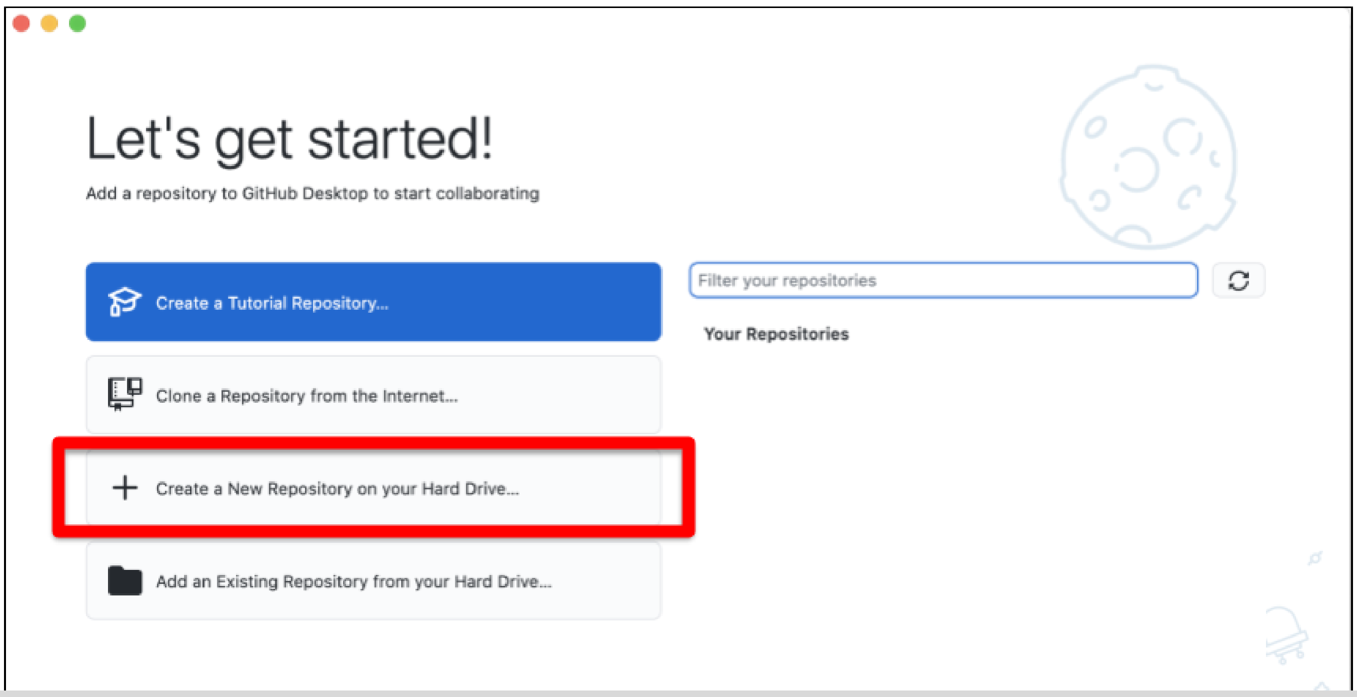
General Github and Git, sources include

https://github.com/rogerdudler/git-guide	https://github.com/MarkLodato/visual-git-guide	https://kbroman.org/github_tutorial/

Use git and GitHub

- The routine use of git involves just a few commands:
  - initiate a repository
  - add and commit
  - push and pull
  - status
  - diff
- You can deal with git and github via:
  - GitHub Desktop (GUI)
  - Command Line (CLI)

GitHub Desktop Application: Let’s start

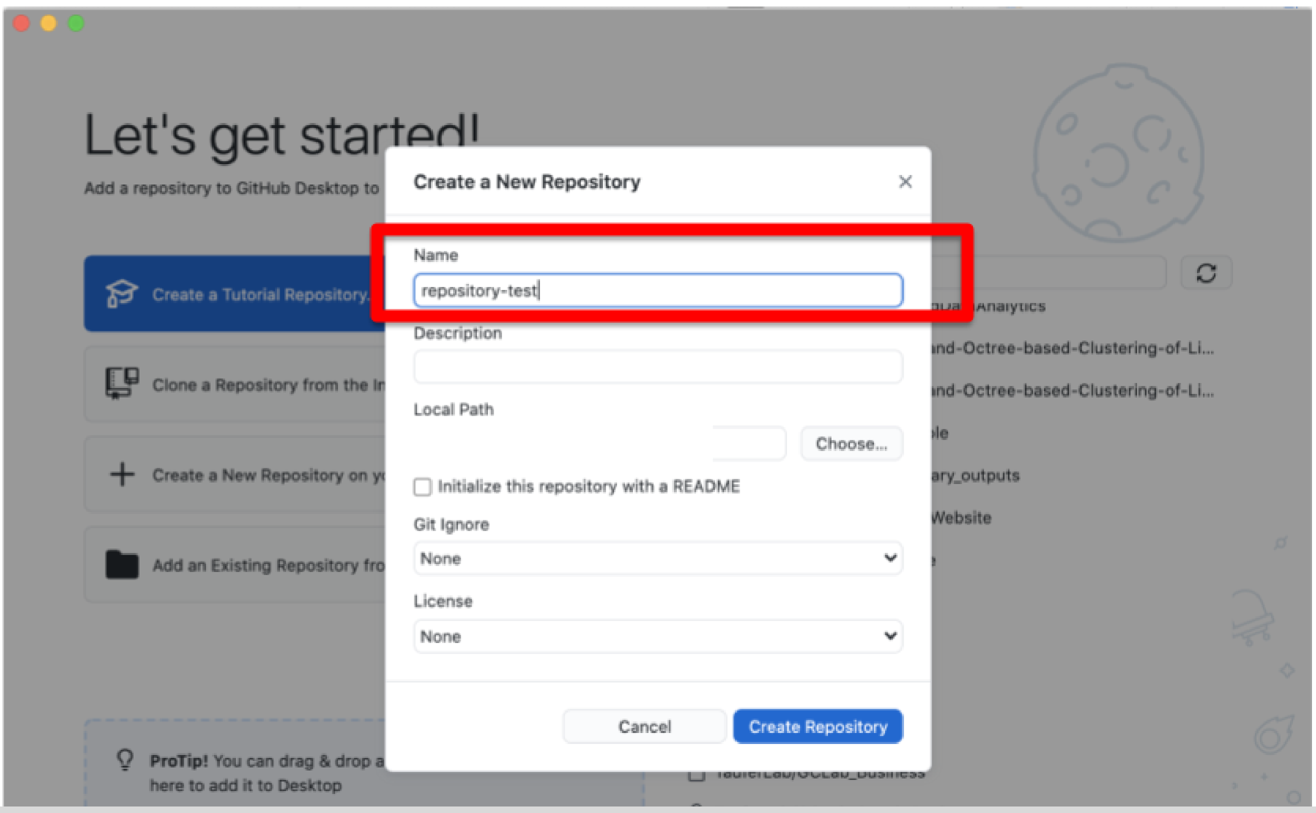


Let's get started!

Add a repository to GitHub Desktop to start collaborating

Create a Tutorial Repository...
Clone a Repository from the Internet...
Create a New Repository on your Hard Drive...
Add an Existing Repository from your Hard Drive...
Filter your repositories
Your Repositories

Create a Repository (II)



Create a New Repository

Name: repository-test

Description

Local Path

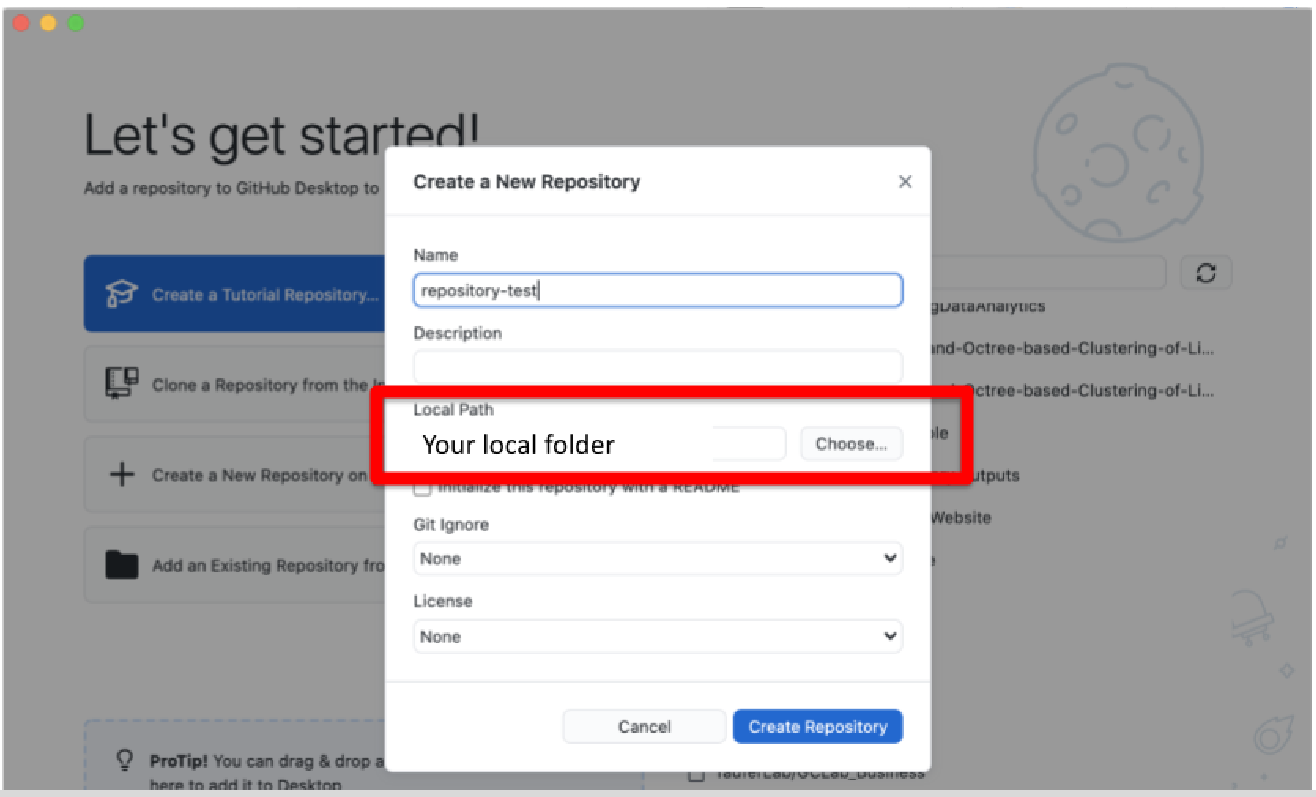
☐ Initialize this repository with a README

Git Ignore: None

License: None

Let's get started!
Add a repository to GitHub Desktop to
Create a Tutorial Repository...
Clone a Repository from the In
Create a New Repository on y
Add an Existing Repository fro
ProTip! You can drag & drop a
here to add it to Desktop
Choose...
Cancel
Create Repository
nd-Octree-based-Clustering-of-Li...
nd-Octree-based-Clustering-of-Li...
ary_outputs
Website

Create a Repository (III)



Let's get started!

Add a repository to GitHub Desktop to

Create a New Repository

Name: repository-test

Description:

Local Path: Your local folder

Choose...

□ Initialize this repository with a README

Git Ignore: None

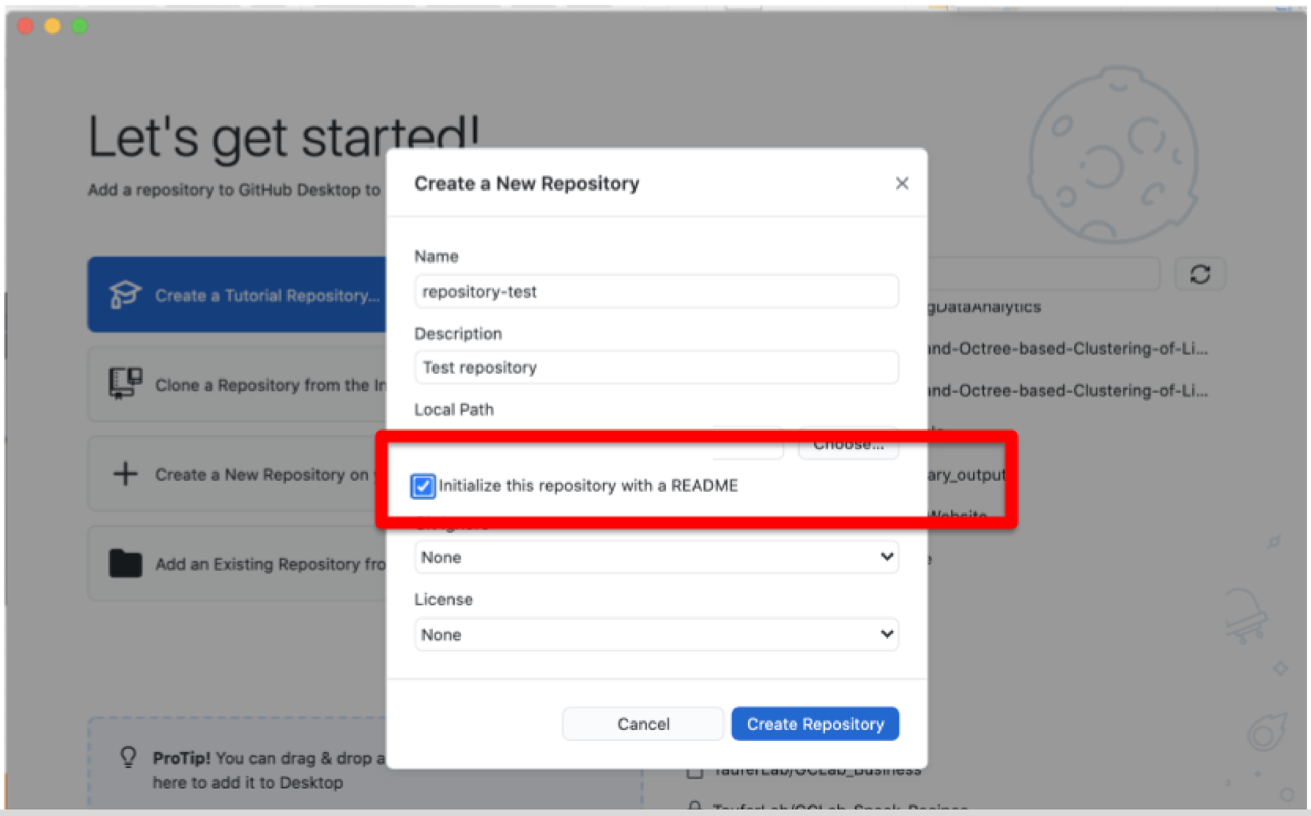
License: None

Cancel

Create Repository

Create a Tutorial Repository...
Clone a Repository from the In
Create a New Repository on
Add an Existing Repository fro
ProTip! You can drag & drop a
here to add it to Desktop

Create a Repository (IV)



Let's get started!

Add a repository to GitHub Desktop to

Create a New Repository

Name: repository-test

Description: Test repository

Local Path:

Choose...

☑ Initialize this repository with a README

None

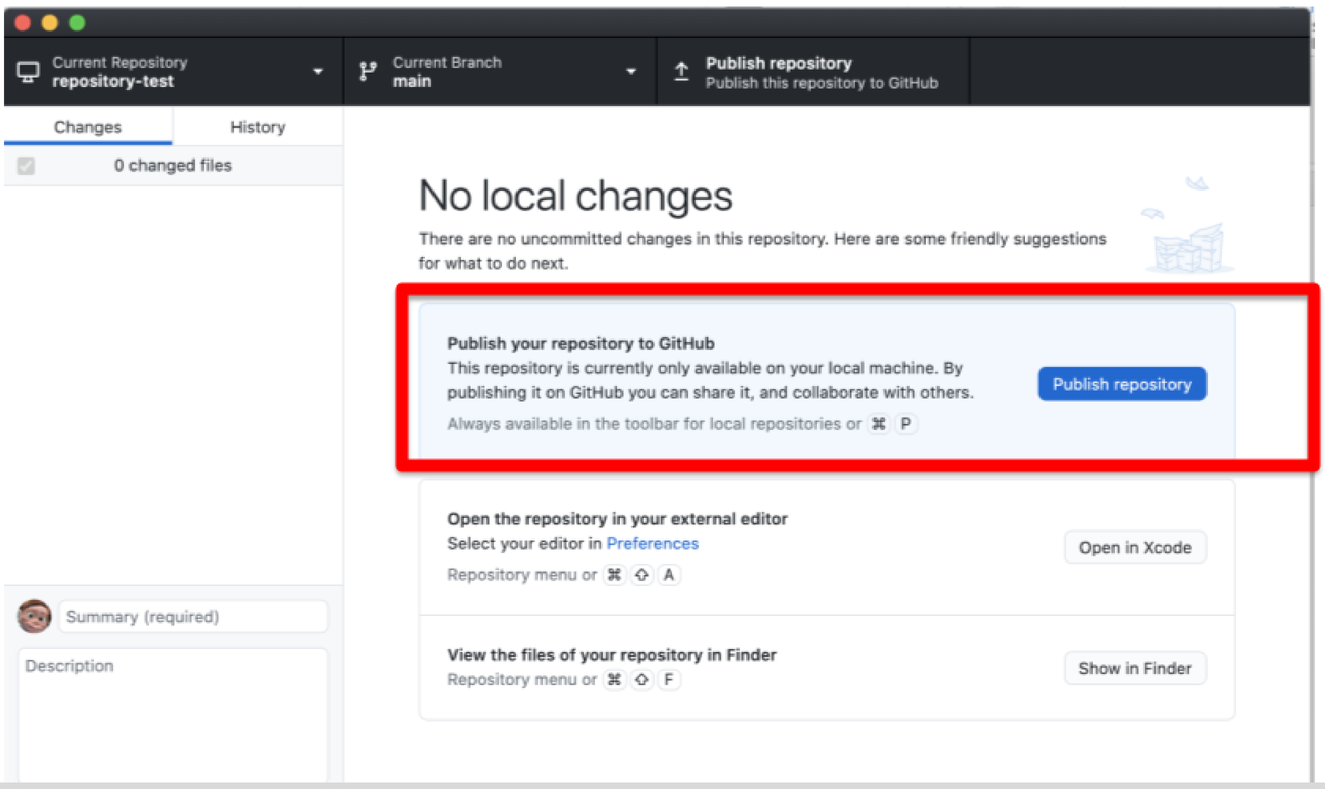
License: None

Cancel

Create Repository

Create a Tutorial Repository...
Clone a Repository from the In
Create a New Repository on
Add an Existing Repository fro
ProTip! You can drag & drop a
here to add it to Desktop

Publish your new Repository (I)



No local changes

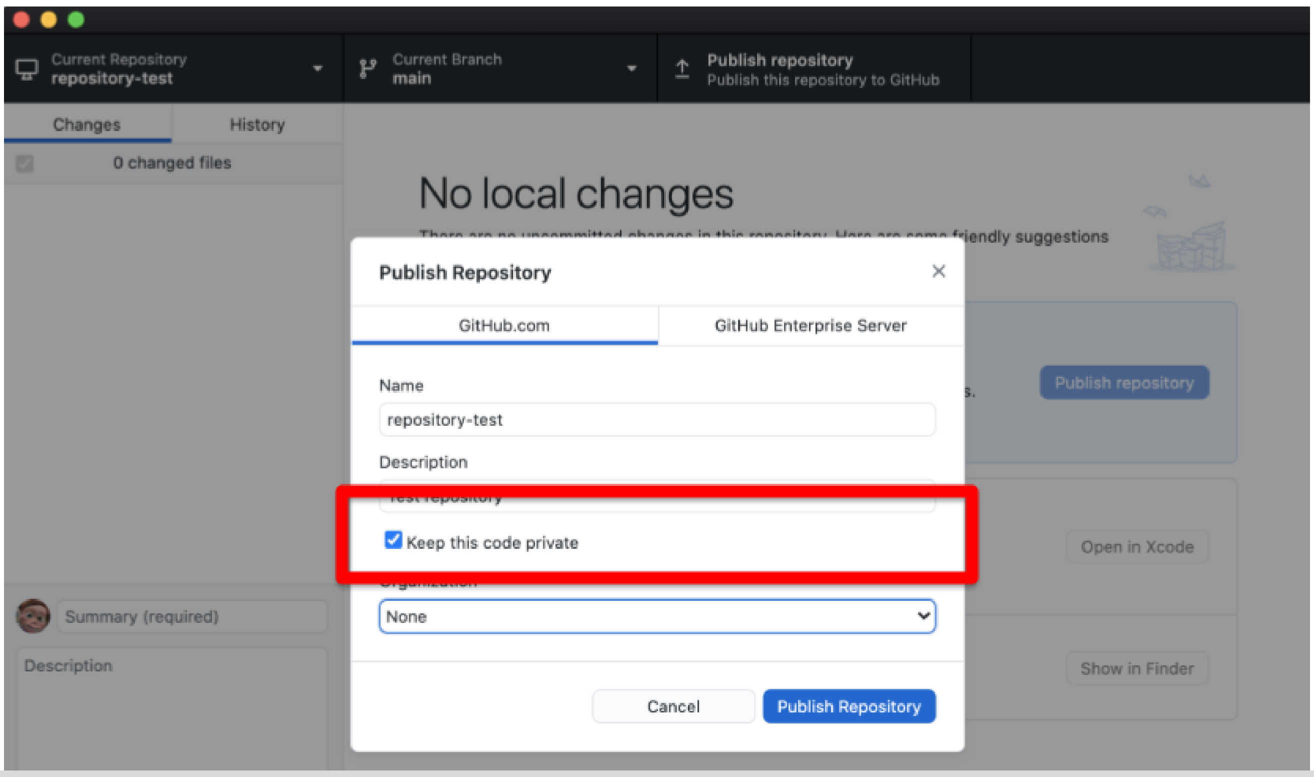
There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

Publish your repository to GitHub
This repository is currently only available on your local machine. By publishing it on GitHub you can share it, and collaborate with others.
Always available in the toolbar for local repositories or ⌘ P

Open the repository in your external editor
Select your editor in Preferences
Repository menu or ⌘ ⇧ A

View the files of your repository in Finder
Repository menu or ⌘ ⇧ F

Publish your new Repository (II)



Publish Repository

GitHub.com | GitHub Enterprise Server

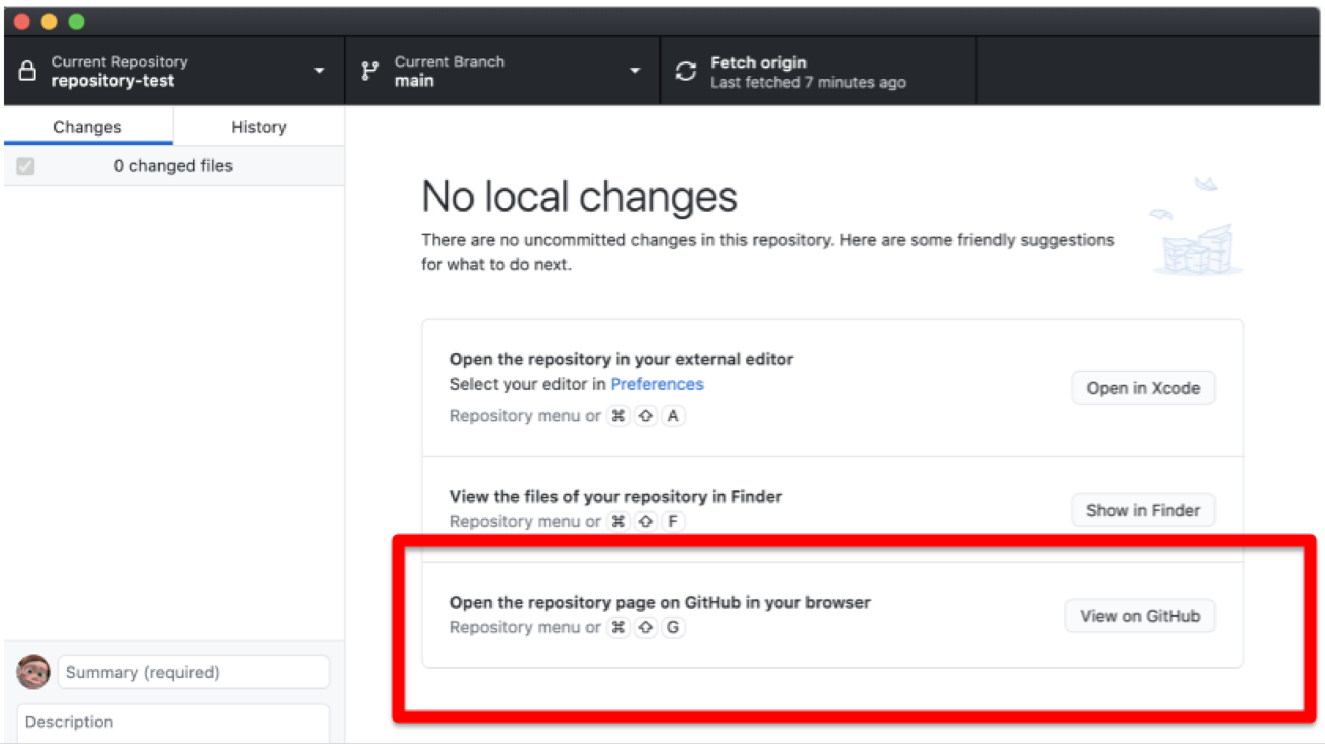
Name: repository-test

Description

☑ Keep this code private

Organization: None

Publish your new Repository (III)



No local changes

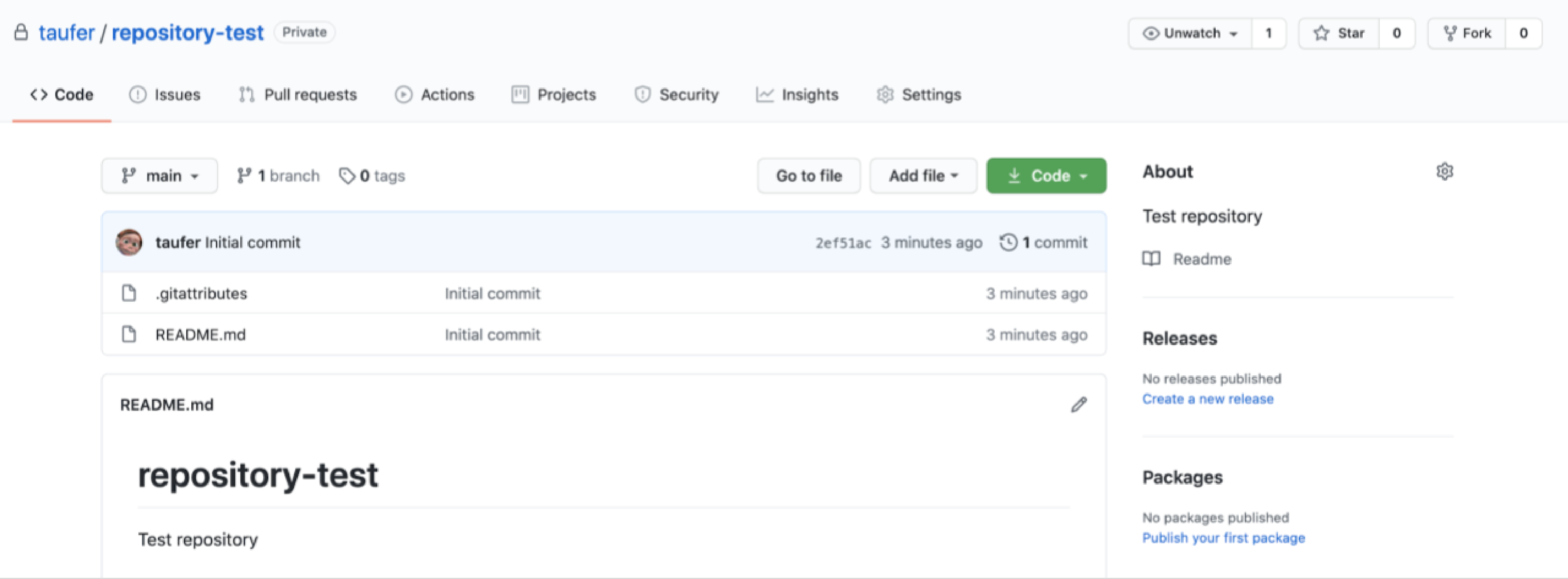
There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

Open the repository in your external editor
Select your editor in Preferences
Repository menu or ⌘ ⇧ A

View the files of your repository in Finder
Repository menu or ⌘ ⇧ F

Open the repository page on GitHub in your browser
Repository menu or ⌘ ⇧ G

Publish your new Repository (IV)



taufer Initial commit 2ef51ac 3 minutes ago 1 commit

.gitattributes	Initial commit	3 minutes ago
README.md	Initial commit	3 minutes ago

README.md

repository-test

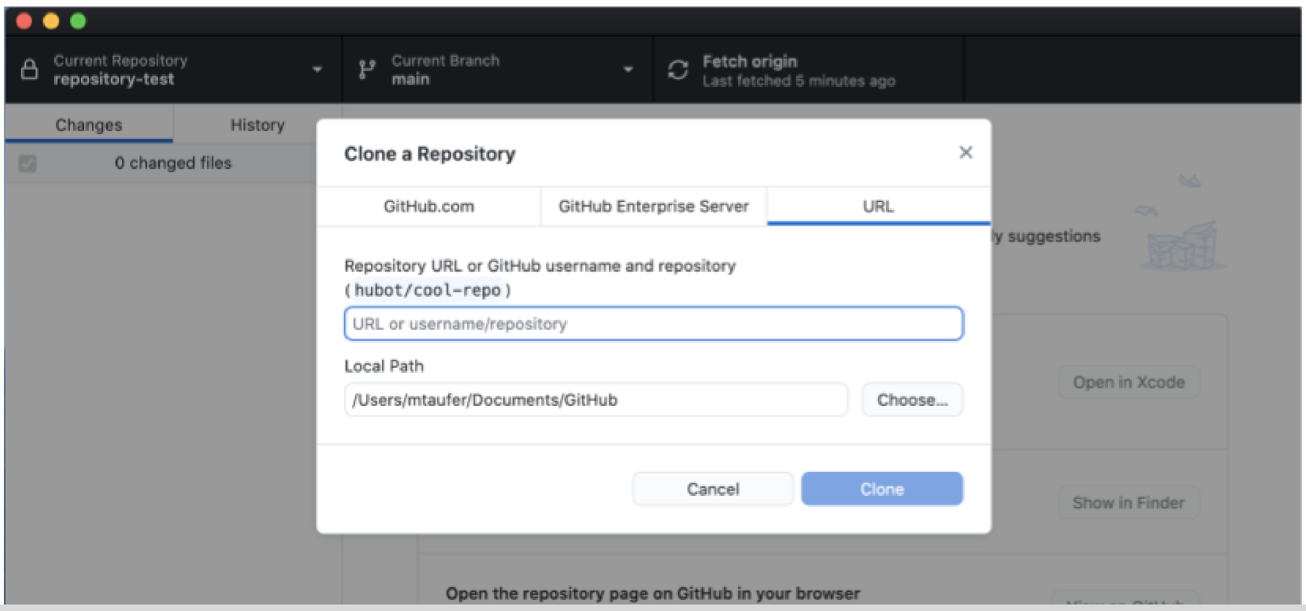
Test repository

About: Test repository

Releases: No releases published. Create a new release

Packages: No packages published. Publish your first package

Clone the Course Repository (II)



Clone a Repository

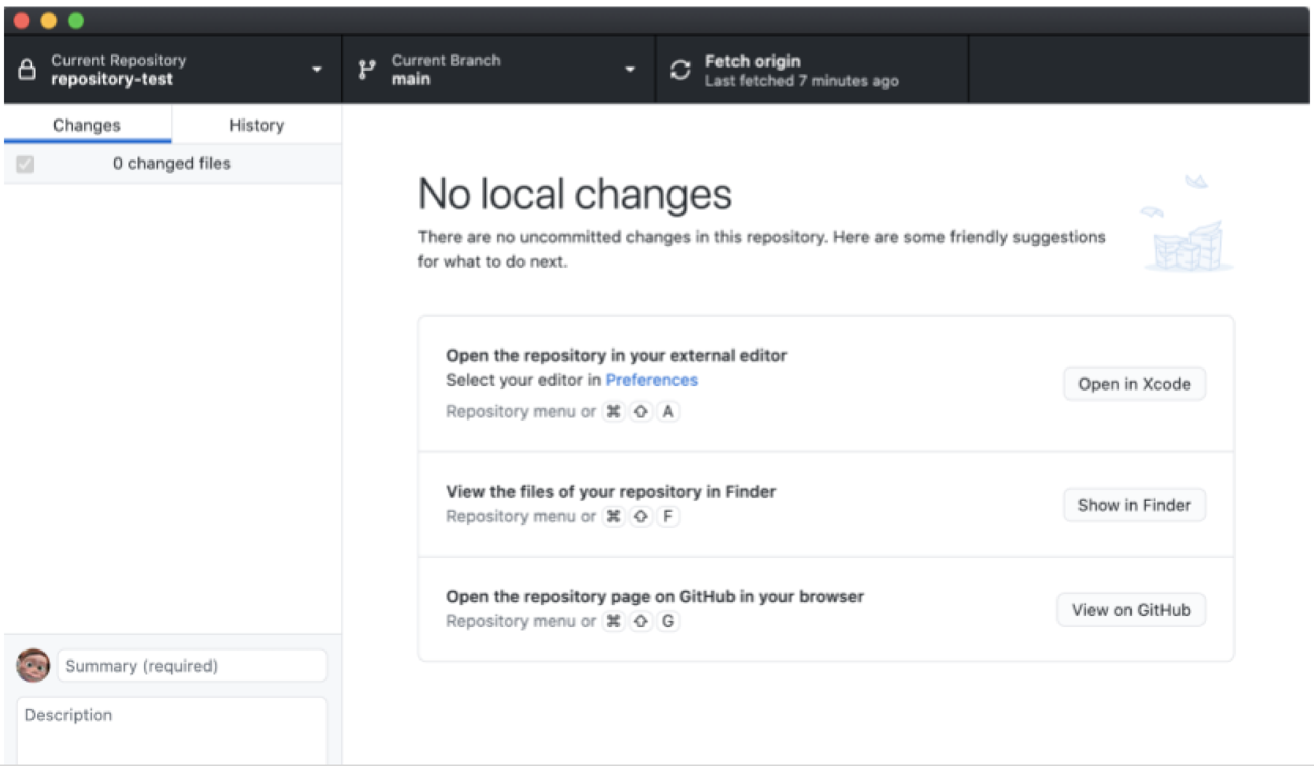
Repository URL or GitHub username and repository (hubot/cool-repo)

URL or username/repository

Local Path: /Users/mtaufer/Documents/GitHub

Open the repository page on GitHub in your browser

Committing Changes to a Repository (I)



No local changes

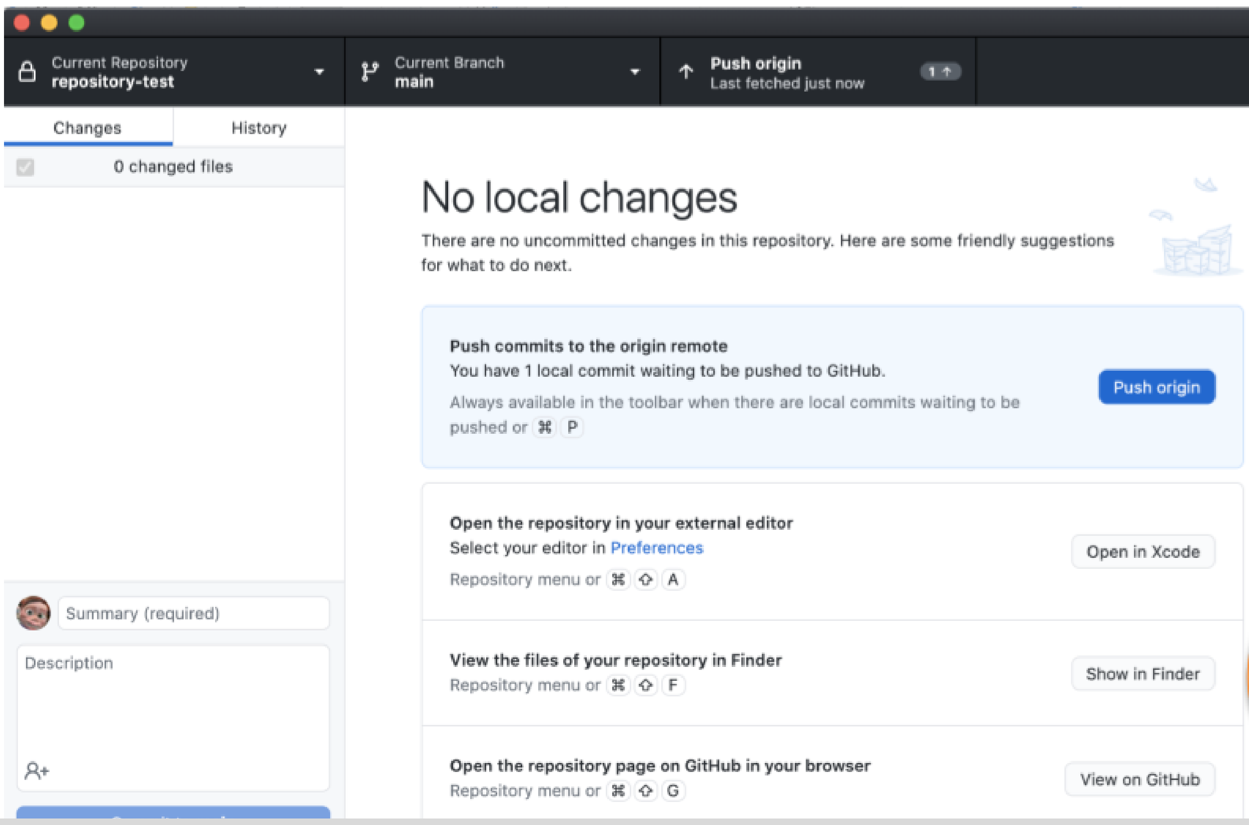
There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

Open the repository in your external editor
Select your editor in Preferences
Repository menu or ⌘ ⇧ A

View the files of your repository in Finder
Repository menu or ⌘ ⇧ F

Open the repository page on GitHub in your browser
Repository menu or ⌘ ⇧ G

Committing Changes to a Repository (V)



Current Repository
repository-test

Current Branch
main

Push origin
Last fetched just now

0 changed files

No local changes

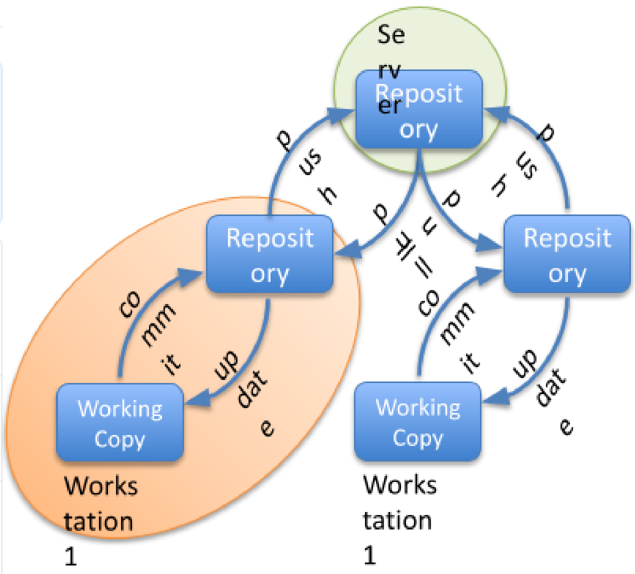
There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

Push commits to the origin remote
You have 1 local commit waiting to be pushed to GitHub.
Always available in the toolbar when there are local commits waiting to be pushed or ⌘ P

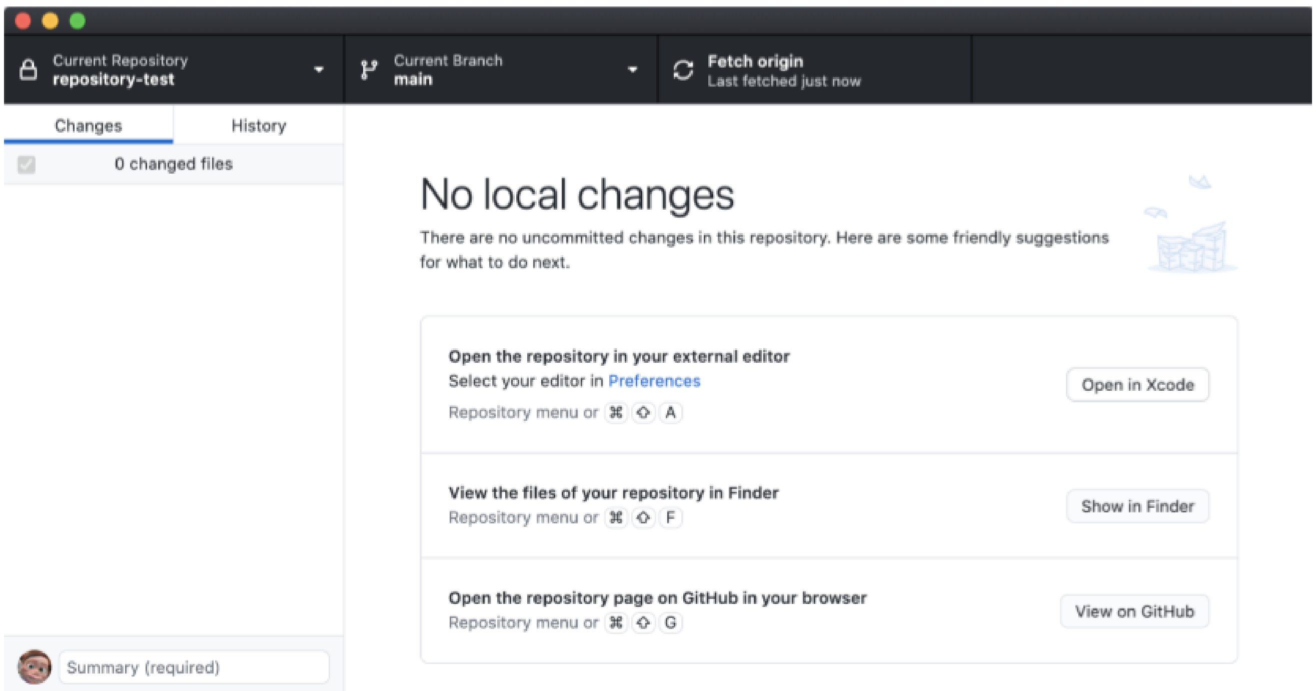
Open the repository in your external editor
Select your editor in Preferences
Repository menu or ⌘ ⇧ A

View the files of your repository in Finder
Repository menu or ⌘ ⇧ F

Open the repository page on GitHub in your browser
Repository menu or ⌘ ⇧ G



Committing Changes to a Repository (VI)



Current Repository
repository-test

Current Branch
main

Fetch origin
Last fetched just now

0 changed files

No local changes

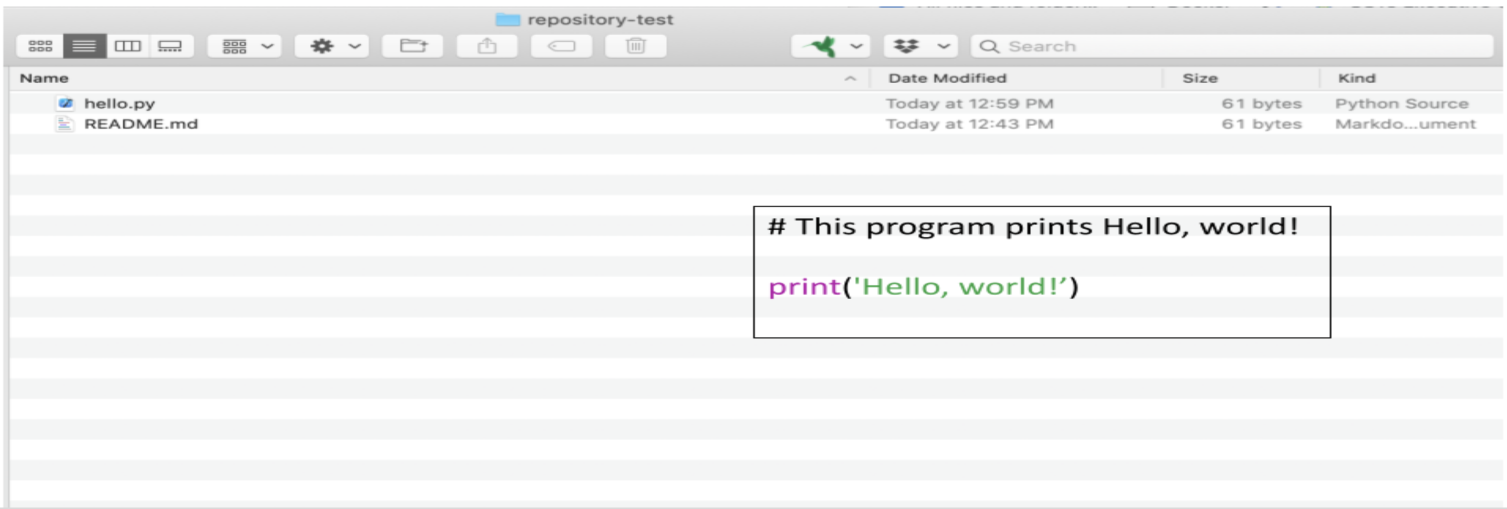
There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

Open the repository in your external editor
Select your editor in Preferences
Repository menu or ⌘ ⇧ A

View the files of your repository in Finder
Repository menu or ⌘ ⇧ F

Open the repository page on GitHub in your browser
Repository menu or ⌘ ⇧ G

Add and Create new Files in a Repository (I)



repository-test

Name	Date Modified	Size	Kind
hello.py	Today at 12:59 PM	61 bytes	Python Source
README.md	Today at 12:43 PM	61 bytes	Markdo...ument

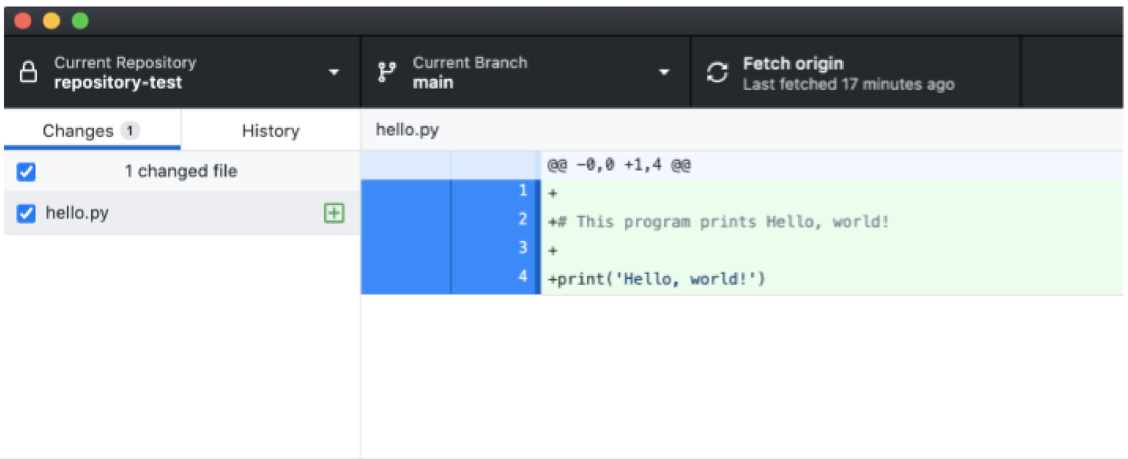
```
# This program prints Hello, world!

print('Hello, world!’)
```

General Github and Git, sources include

https://github.com/rogerdudler/git-guide	https://github.com/MarkLodato/visual-git-guide	https://kbroman.org/github_tutorial/

Add and Create new Files in a Repository (II)



Current Repository
repository-test

Current Branch
main

Fetch origin
Last fetched 17 minutes ago

Changes 1 | History

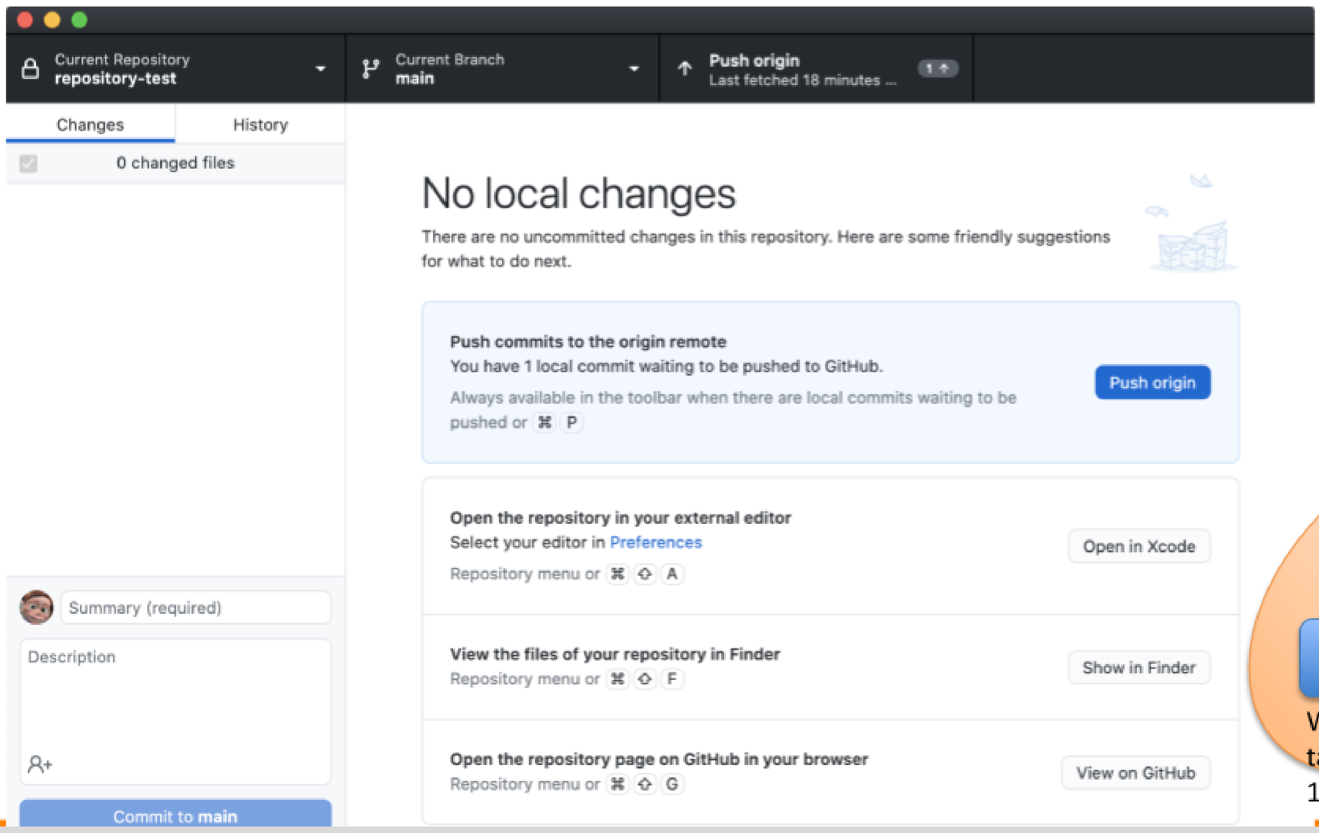
☑ 1 changed file

☑ hello.py

hello.py

```
@@ -0,0 +1,4 @@
+
+# This program prints Hello, world!
+
+print('Hello, world!')
```

Add and Create new Files in a Repository (I)



Current Repository
repository-test

Current Branch
main

Push origin
Last fetched 18 minutes ... 1 ↑

Changes | History

☑ 0 changed files

No local changes

There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

Push commits to the origin remote
You have 1 local commit waiting to be pushed to GitHub.
Always available in the toolbar when there are local commits waiting to be pushed or ⌘ P

Push origin

Open the repository in your external editor
Select your editor in Preferences
Repository menu or ⌘ ⇧ A

Open in Xcode

View the files of your repository in Finder
Repository menu or ⌘ ⇧ F

Show in Finder

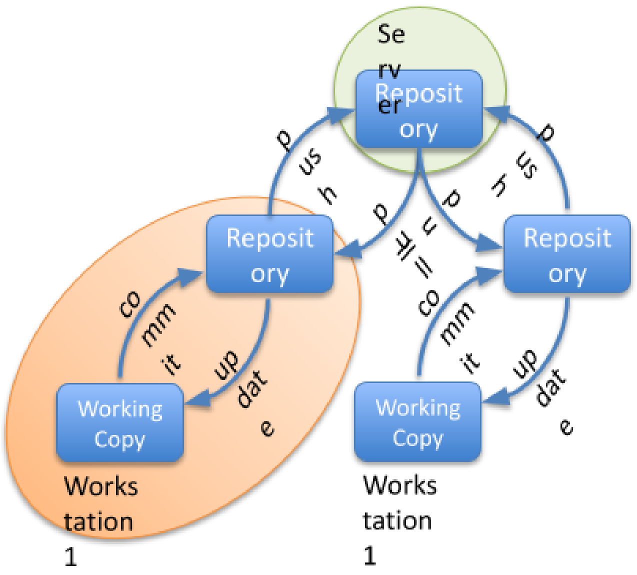
Open the repository page on GitHub in your browser
Repository menu or ⌘ ⇧ G

View on GitHub

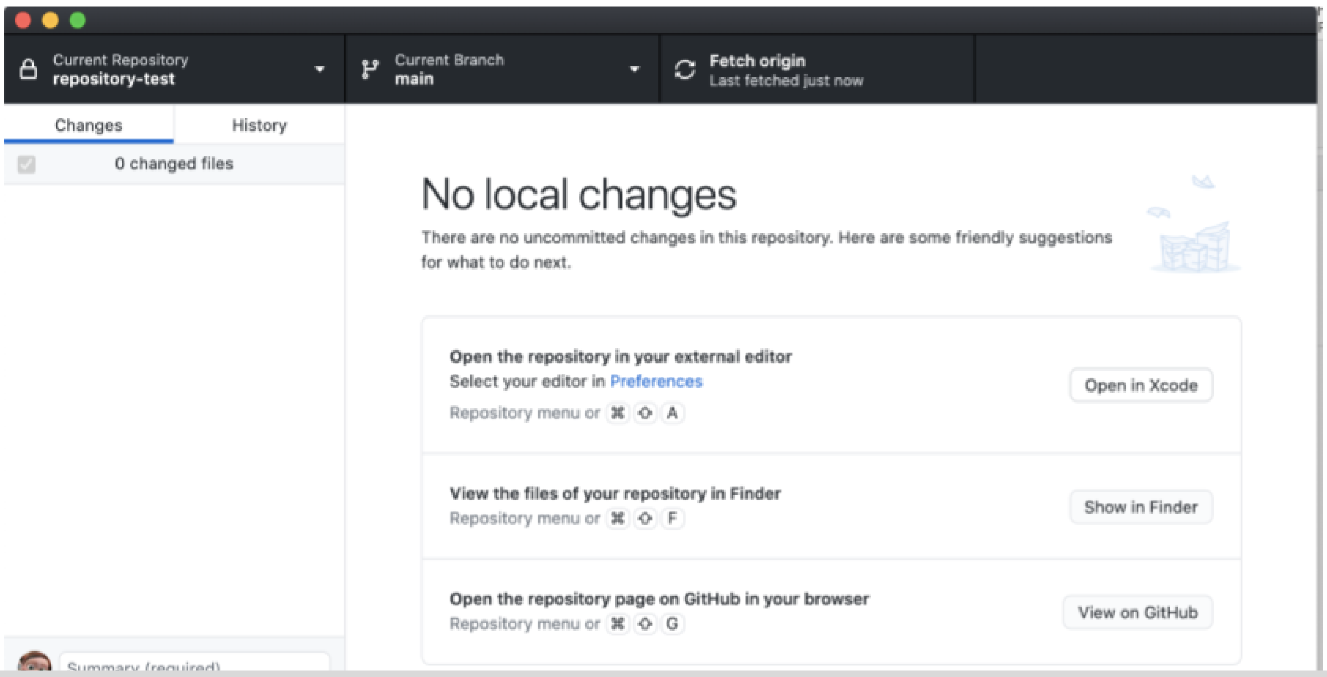
Summary (required)

Description

Commit to **main**



Add and Create new Files in a Repository (I)



Current Repository
repository-test

Current Branch
main

Fetch origin
Last fetched just now

Changes | History

☑ 0 changed files

No local changes

There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

Open the repository in your external editor
Select your editor in Preferences
Repository menu or ⌘ ⇧ A

Open in Xcode

View the files of your repository in Finder
Repository menu or ⌘ ⇧ F

Show in Finder

Open the repository page on GitHub in your browser
Repository menu or ⌘ ⇧ G

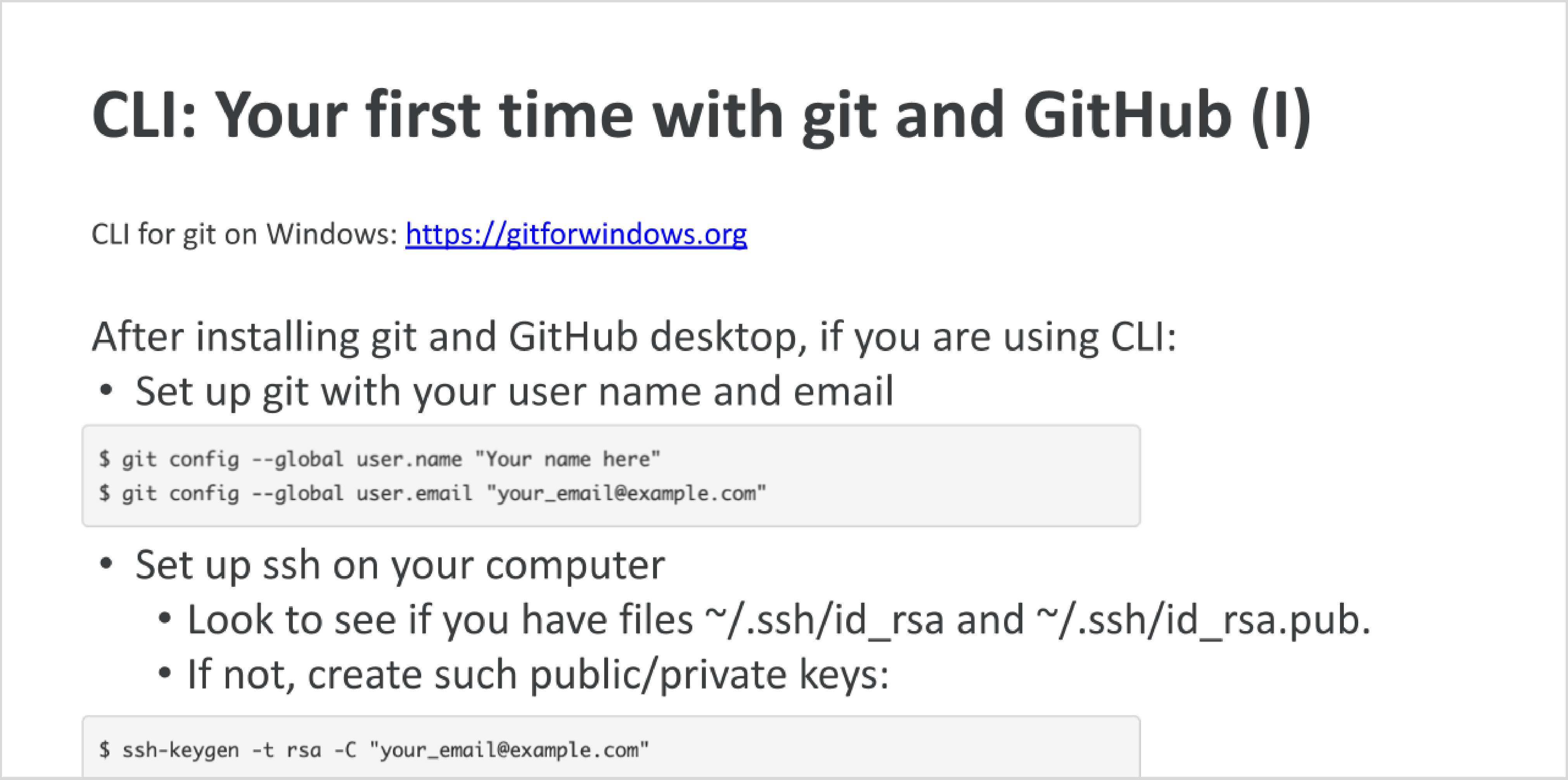
View on GitHub

Summary (required)

Command-line interface (CLI)
This set of slides assumes that
you have already intalled git

General Github and Git, sources include

https://github.com/rogerdudler/git-guide	https://github.com/MarkLodato/visual-git-guide	https://kbroman.org/github_tutorial/



CLI: Your first time with git and GitHub (I)

CLI for git on Windows: https://gitforwindows.org

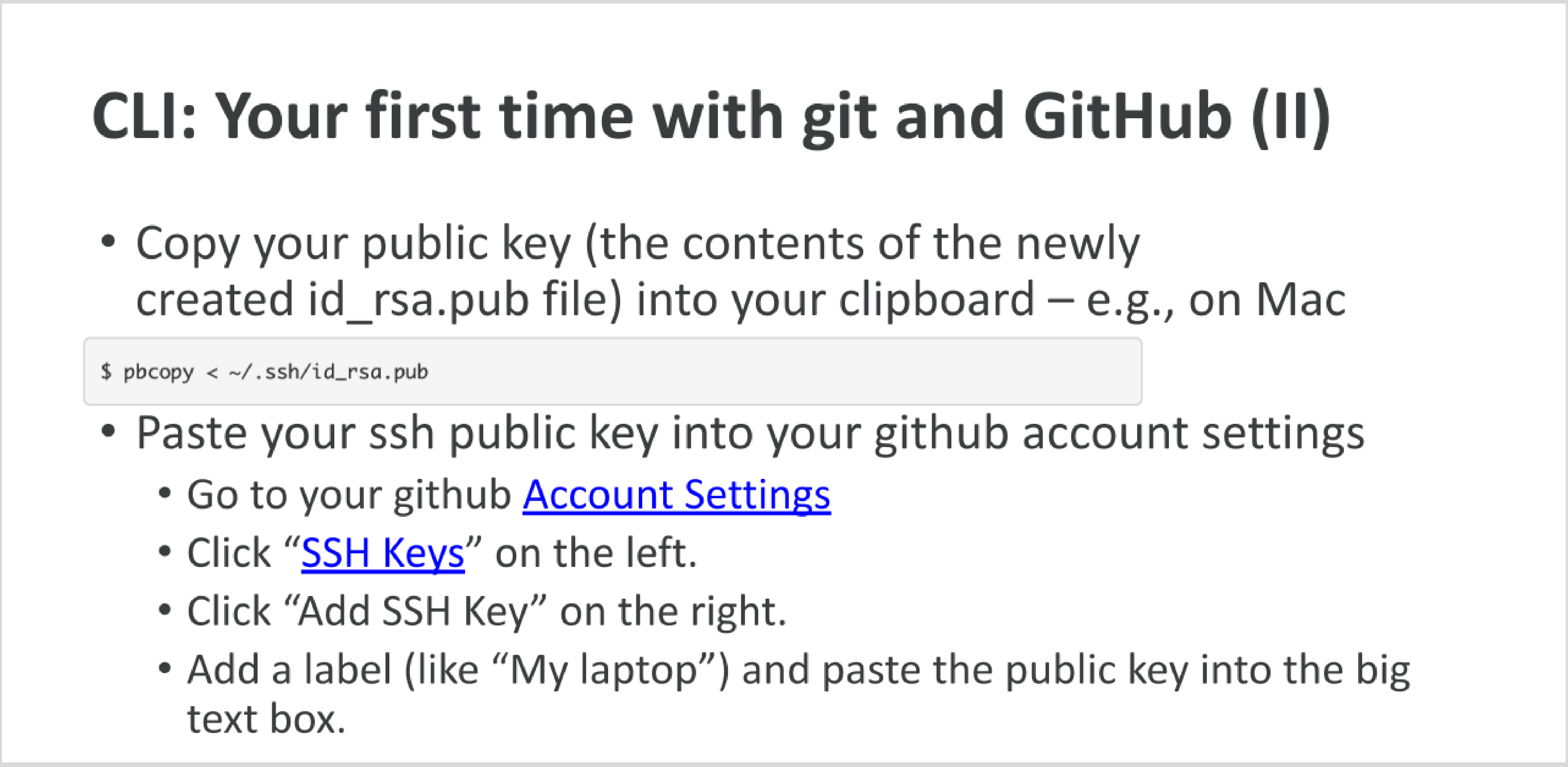
After installing git and GitHub desktop, if you are using CLI:

- Set up git with your user name and email

```
$ git config --global user.name "Your name here"
$ git config --global user.email "your_email@example.com"
```

- Set up ssh on your computer
  - Look to see if you have files ~/.ssh/id_rsa and ~/.ssh/id_rsa.pub.
  - If not, create such public/private keys:

```
$ ssh-keygen -t rsa -C "your_email@example.com"
```

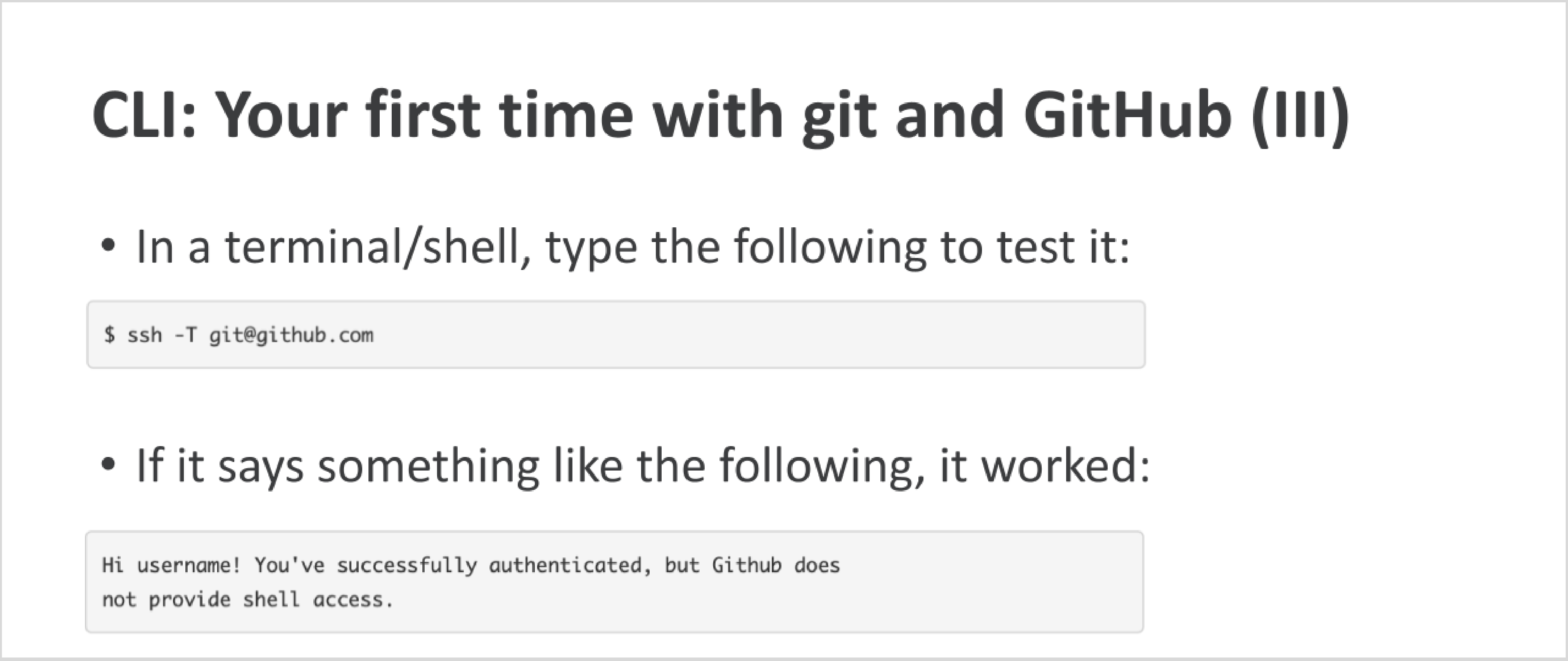


CLI: Your first time with git and GitHub (II)

- Copy your public key (the contents of the newly created id_rsa.pub file) into your clipboard – e.g., on Mac

```
$ pbcopy < ~/.ssh/id_rsa.pub
```

- Paste your ssh public key into your github account settings
  - Go to your github Account Settings
  - Click “SSH Keys” on the left.
  - Click “Add SSH Key” on the right.
  - Add a label (like “My laptop”) and paste the public key into the big text box.



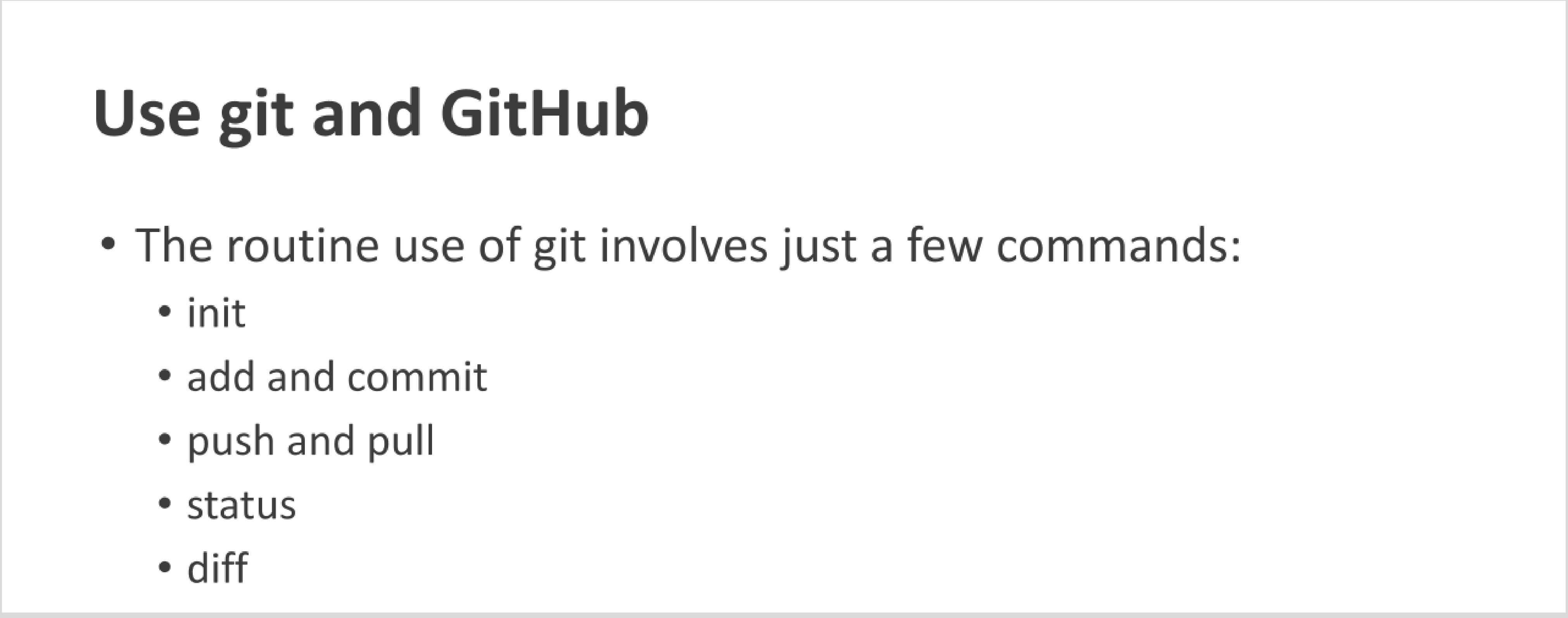
CLI: Your first time with git and GitHub (III)

- In a terminal/shell, type the following to test it:

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

- If it says something like the following, it worked:

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



Use git and GitHub

- The routine use of git involves just a few commands:
  - init
  - add and commit
  - push and pull
  - status
  - diff