Software Version Control

- Also known as Revision Control or Source Control
- Version Control Software (Open Source)
  - CVS - Concurrent Version System
    - The grandfather of open source version control system
  - SVN - Subversion
  - Git
    - Initially developed by Linux Torvalds for his Linux kernel project
    - A distributed version control system (CVS and SVN both are centralized source code manage systems)
- github / gitlab - A web-based git repository hosting service

  We will use **gitlab** as the class assignment repository
- gitlab vs github

  https://about.gitlab.com/2019/01/07/github-offering-free-private-repos-for-up-to-three-collaborators

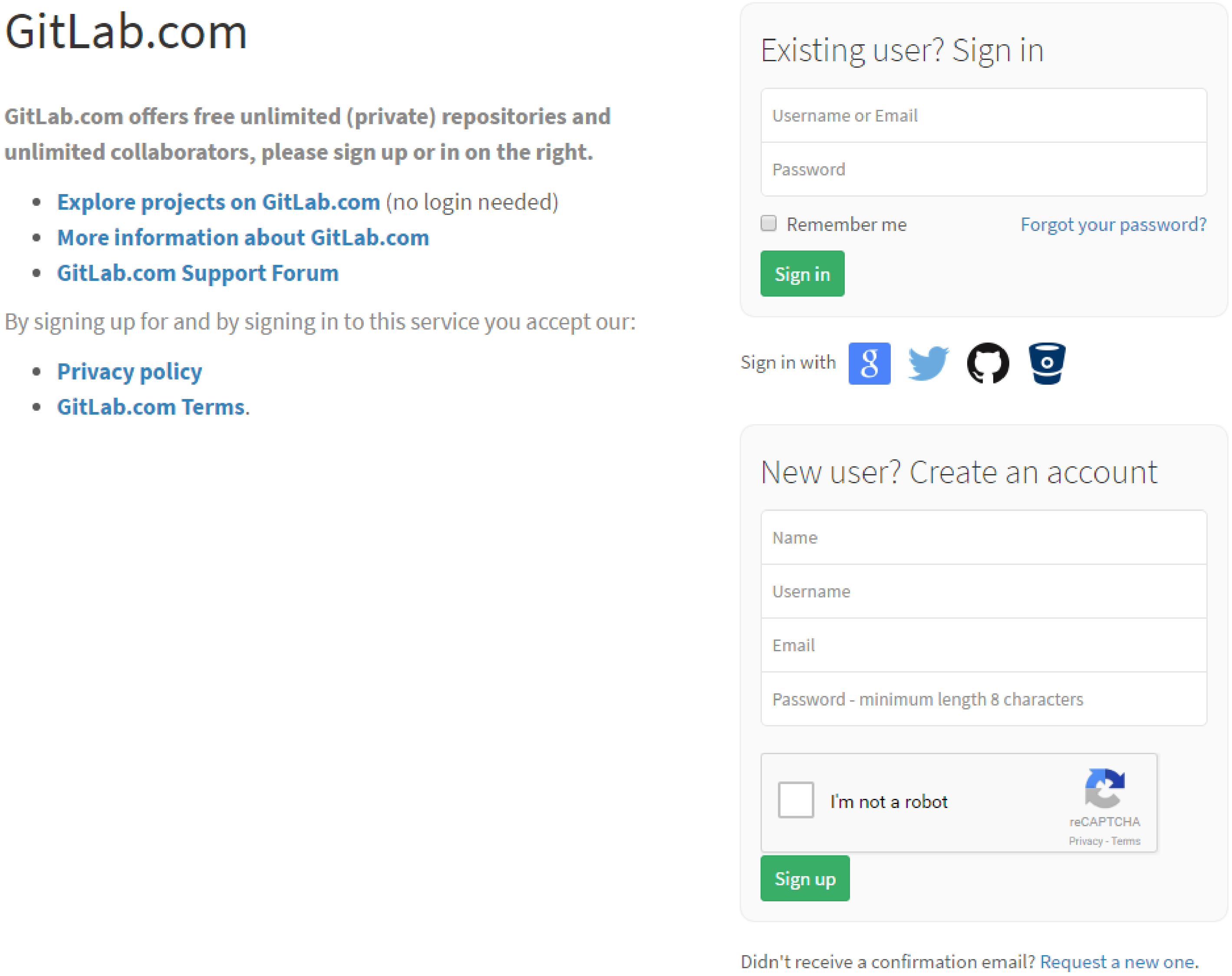
A Short History of Git

- Linux kernel was maintained by patches and archives from 1991 to 2002
- In 2002, the Linux kernel project began using a proprietary DVCS system called BitKeeper.
- In 2005, the relationship between the community that developed the Linux kernel and the commercial company that developed BitKeeper broke down, and the tool's free-of-charge status for Linux Kernel development was revoked.
- This prompted the Linux development community (and in particular Linus Torvalds, the creator of Linux) to develop their own tool based on some of the lessons they learned while using BitKeeper.

Key Features of git

- Some of the goals of this new system
  - Speed
  - Simple design
  - Strong support for non-linear development (thousands of parallel branches)
  - Fully distributed
  - Able to handle large projects like the Linux kernel efficiently (speed and data size)
- Since its birth in 2005, git has evolved and matured to be easy to use and yet retain these initial qualities
  - incredibly fast
  - very efficient with large projects
  - has an incredible branching system for non-linear development

http://www.gitlab.com



GitLab.com

GitLab.com offers free unlimited (private) repositories and unlimited collaborators, please sign up or in on the right.

- **Explore projects on GitLab.com** (no login needed)
- **More information about GitLab.com**
- **GitLab.com Support Forum**

By signing up for and by signing in to this service you accept our:

- **Privacy policy**
- **GitLab.com Terms**.

Existing user? Sign in

Username or Email

Password

□ Remember me Forgot your password?

New user? Create an account

Name

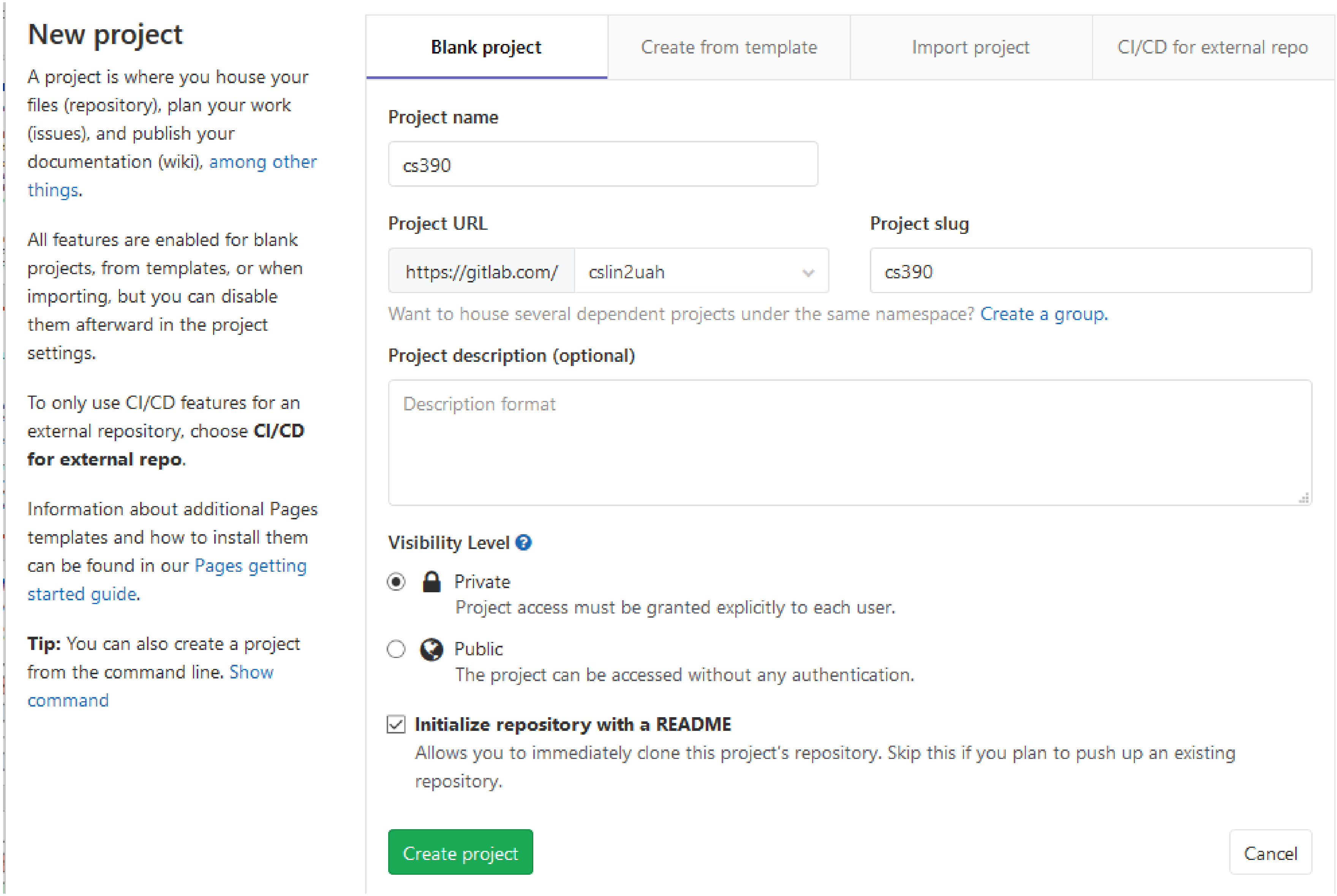
Username

Email

Password - minimum length 8 characters

□ I'm not a robot

Didn't receive a confirmation email? Request a new one.



New project

A project is where you house your files (repository), plan your work (issues), and publish your documentation (wiki), among other things.

All features are enabled for blank projects, from templates, or when importing, but you can disable them afterward in the project settings.

To only use CI/CD features for an external repository, choose **CI/CD for external repo**.

Information about additional Pages templates and how to install them can be found in our Pages getting started guide.

Tip: You can also create a project from the command line. Show command

Project name: cs390

Project URL: https://gitlab.com/ cslin2uah

Project slug: cs390

Want to house several dependent projects under the same namespace? Create a group.

Project description (optional)

Description format

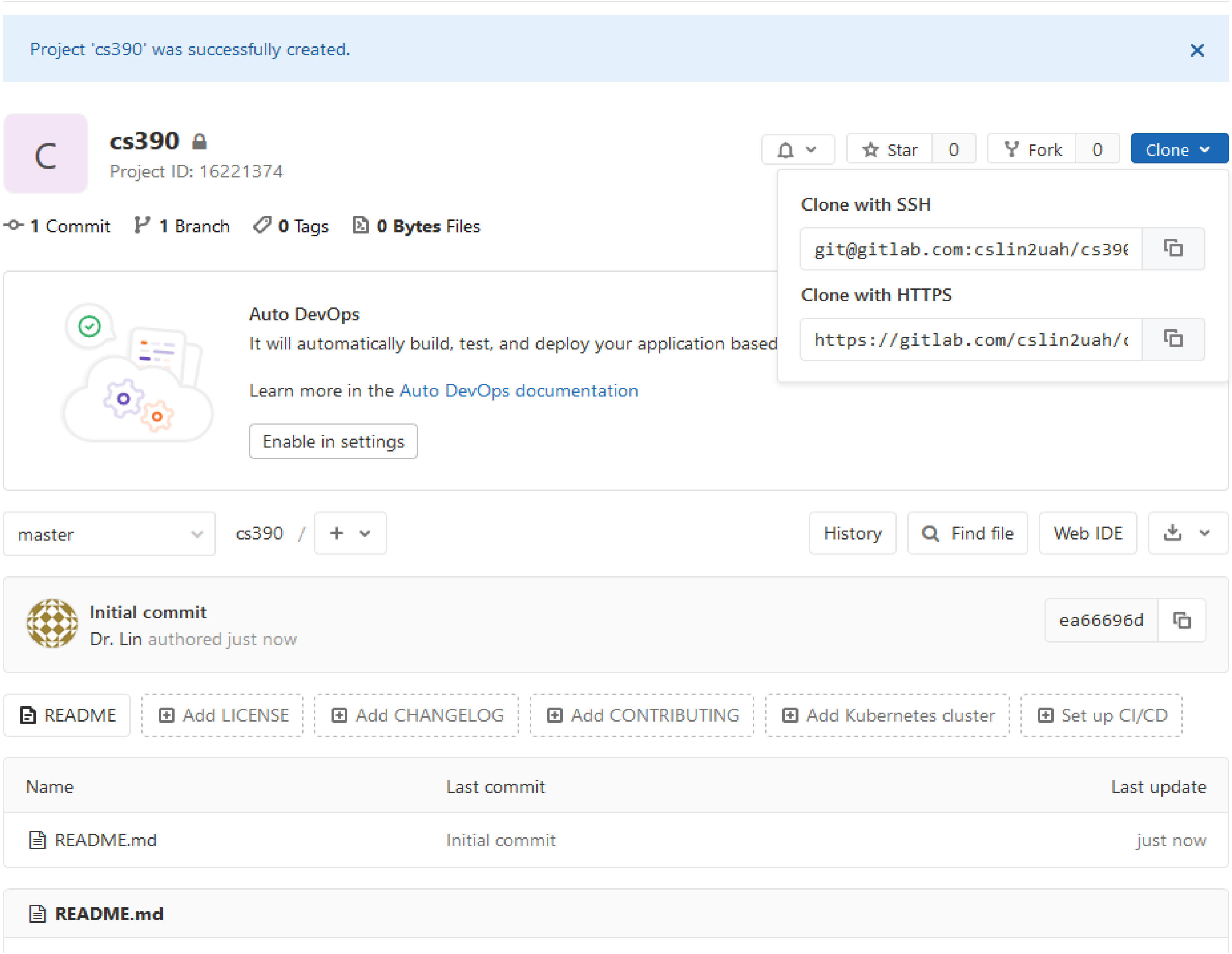
Visibility Level

● Private
Project access must be granted explicitly to each user.

○ Public
The project can be accessed without any authentication.

☑ **Initialize repository with a README**
Allows you to immediately clone this project's repository. Skip this if you plan to push up an existing repository.

- Please name your project as cs390
- Make sure check "Private" and initialize repository with a READMEfor your work



Project 'cs390' was successfully created.

cs390

Project ID: 16221374

1 Commit 1 Branch 0 Tags 0 Bytes Files

Clone with SSH

```
git@gitlab.com:cslin2uah/cs39
```

Clone with HTTPS

```
https://gitlab.com/cslin2uah/c
```

Auto DevOps

It will automatically build, test, and deploy your application based

Learn more in the Auto DevOps documentation

master cs390 /

Initial commit

Dr. Lin authored just now

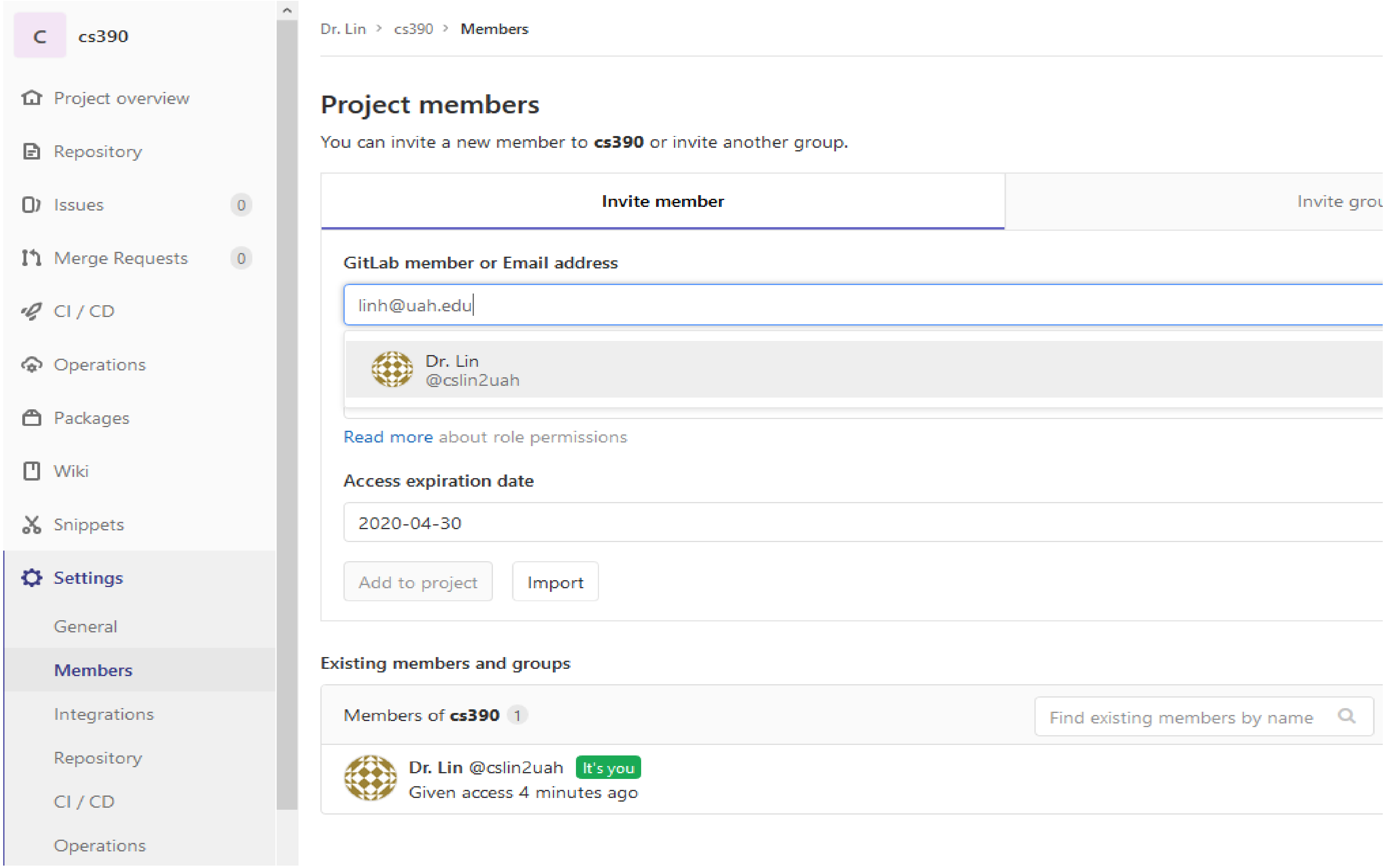
ea66696d

Name	Last commit	Last update
README.md	Initial commit	just now

README.md

Share your git repository (cs390) with linh@uah.edu

Under project cs390, from left panel, click “Settings -> Members



Project members

You can invite a new member to **cs390** or invite another group.

GitLab member or Email address

linh@uah.edu

Dr. Lin
@cslin2uah

Read more about role permissions

Access expiration date

2020-04-30

Existing members and groups

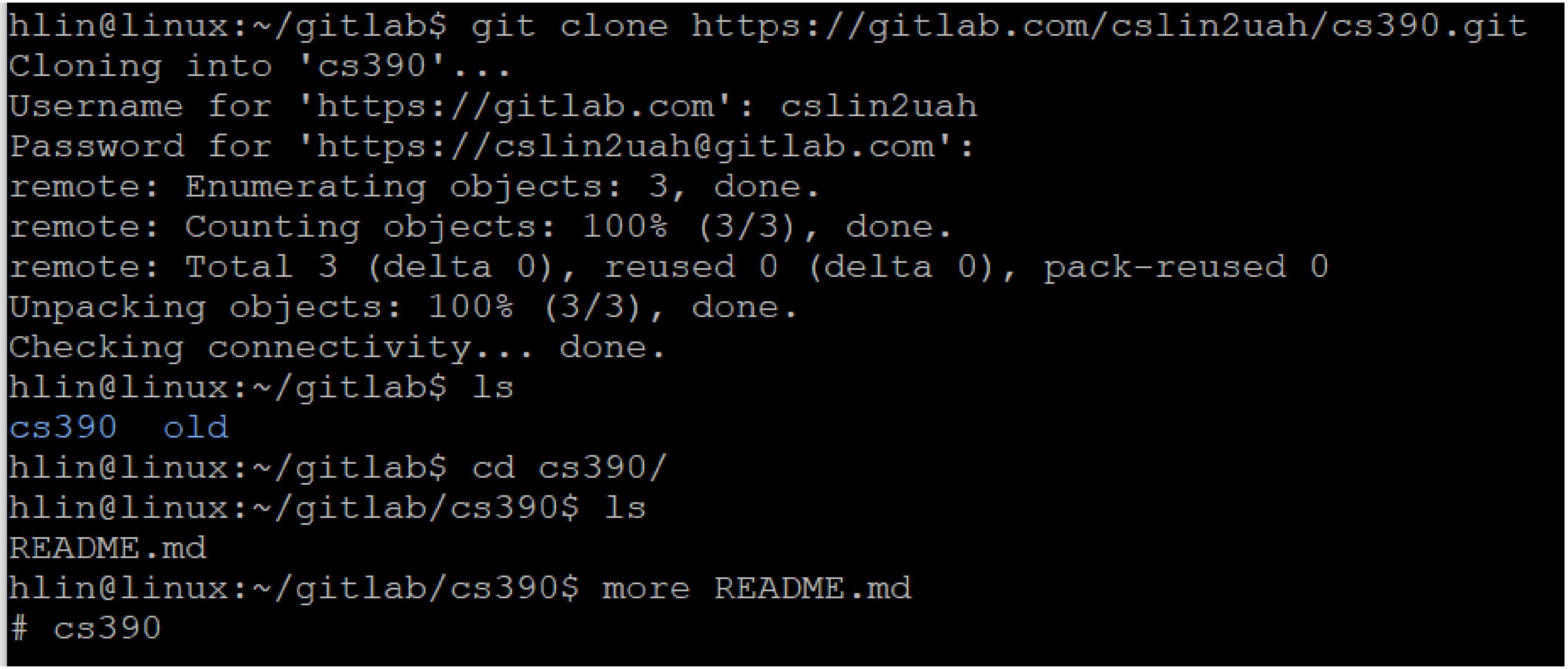
Members of **cs390** 1

Dr. Lin @cslin2uah
Given access 4 minutes ago

Local Working Directory Setup

Import (clone) source codes/directory from gitlab (remote repository)

- Clone with SSH
  - *git clone git@gitlab.com:cslin2uah/cs390.git <foldername>*
- Clone with HTTPS
  - *git clone https://gitlab.com/cslin2uah/cs390.git <foldername>*



```
hlin@linux:~/gitlab$ git clone https://gitlab.com/cslin2uah/cs390.git
Cloning into 'cs390'...
Username for 'https://gitlab.com': cslin2uah
Password for 'https://cslin2uah@gitlab.com':
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), done.
Checking connectivity... done.
hlin@linux:~/gitlab$ ls
cs390  old
hlin@linux:~/gitlab$ cd cs390/
hlin@linux:~/gitlab/cs390$ ls
README.md
hlin@linux:~/gitlab/cs390$ more README.md
# cs390
```

The Basics of git

- For this class
  - `git init`
  - `git clone`
  - `git config`
  - `git help`
  - `git status`
  - `git log`
  - `git commit`
  - `git push`
  - `git pull`
  - `git remote`
  - `git commit`

- Advanced Features
  - `git tag`: a snap shot of the repository
  - `git branch`
  - `git checkout`
  - `git merge`
  - etc …
- Online book git pro:
  https://git-scm.com/book/en/v2