FAIR Bioinfo 2023
Introduction to Git, GitHub/Gitlab

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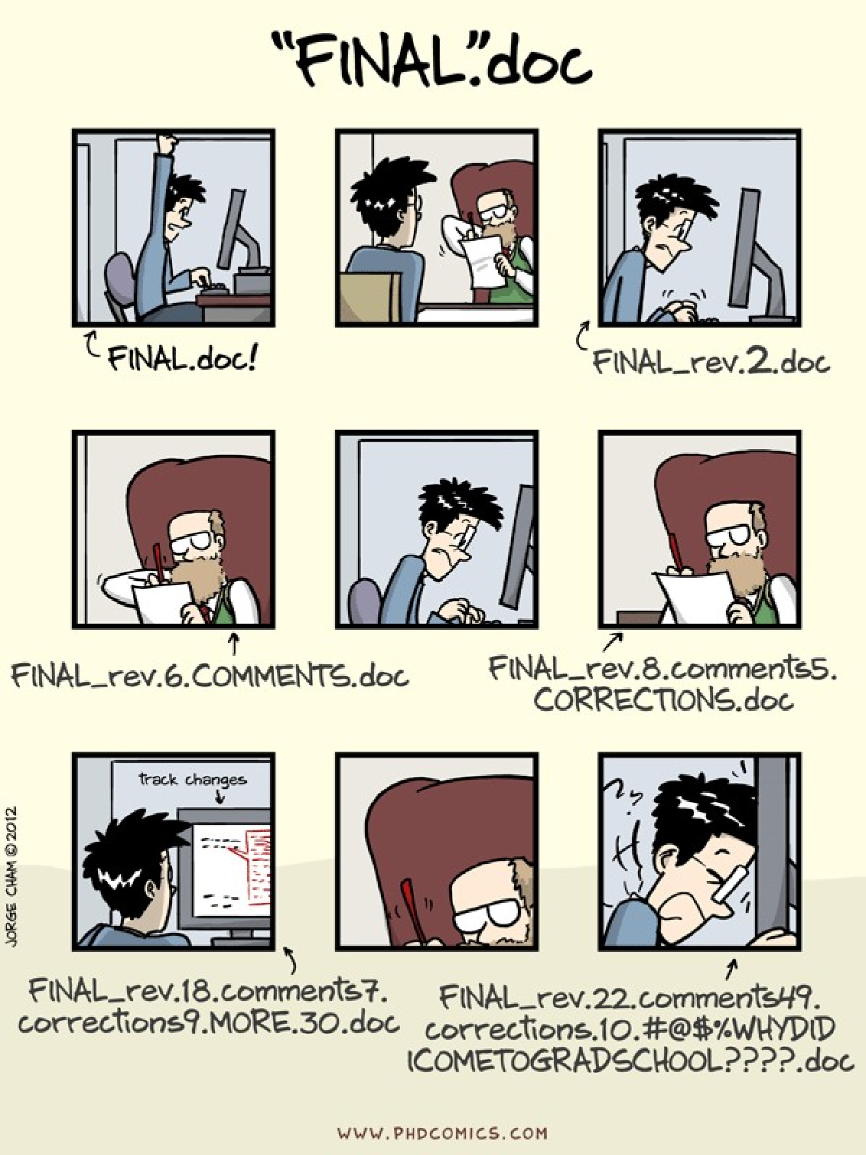
Université Clermont Auvergne, AuBi, Mésocentre

du 10 juillet au 17 juillet 2023

Sharing code



Git, GitHub, Gitlab

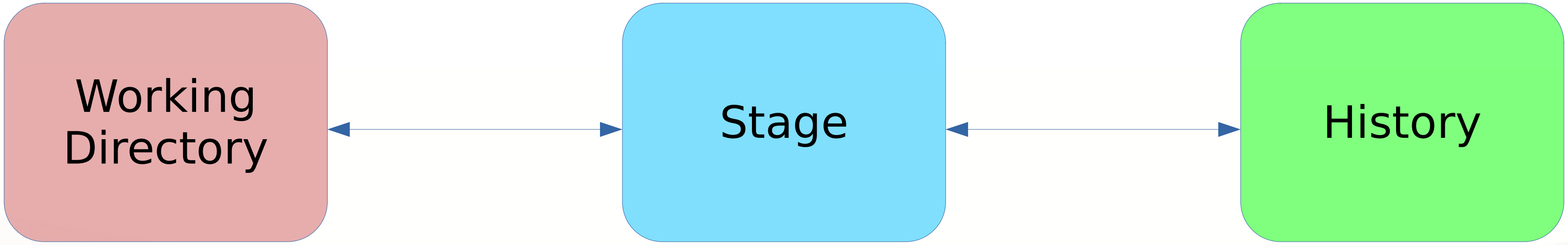
Version control system

Online hosting service
for software base on git

Git

- Git is a free and open source distributed version control system.
- Handle any type of project, fast and efficiency.
- Created in 2005 by Linus Torvalds

Git a version control system



Local files

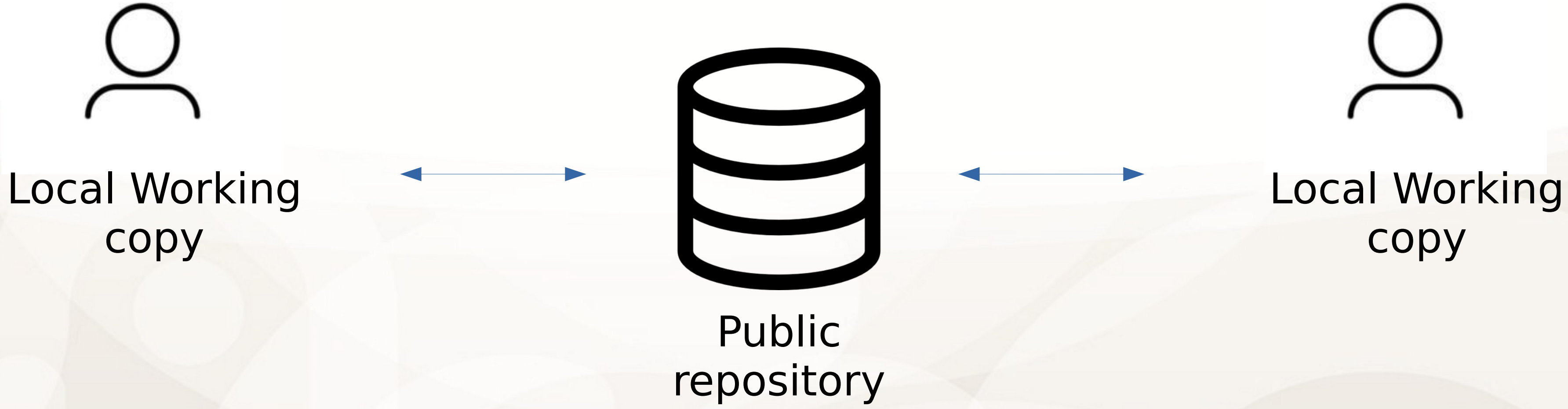
Git file modification mechanism

Modification save through list of commit

Centralized version control

One central repository and developers can only commit on it.

Example: Subversion, Team Foundation Server



Local Working copy

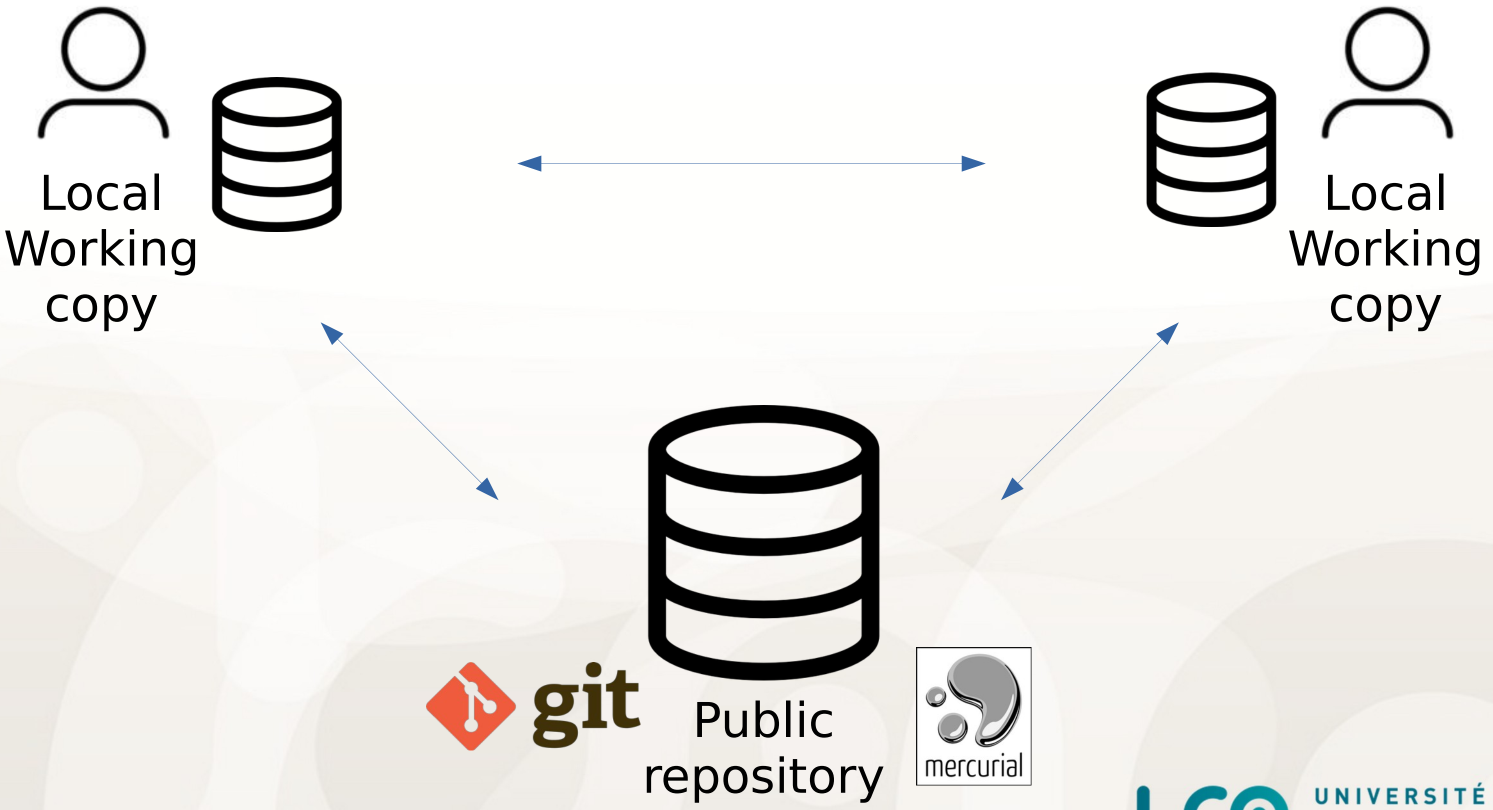
Public repository

Local Working copy

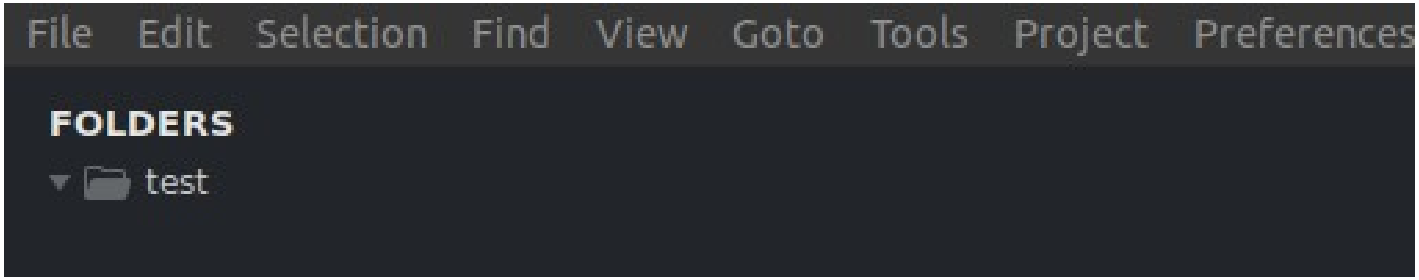
Distributed version control

All repositories are interconnected and can be edited at the same time.

Example: Git, Mercurial



Git: Initialization



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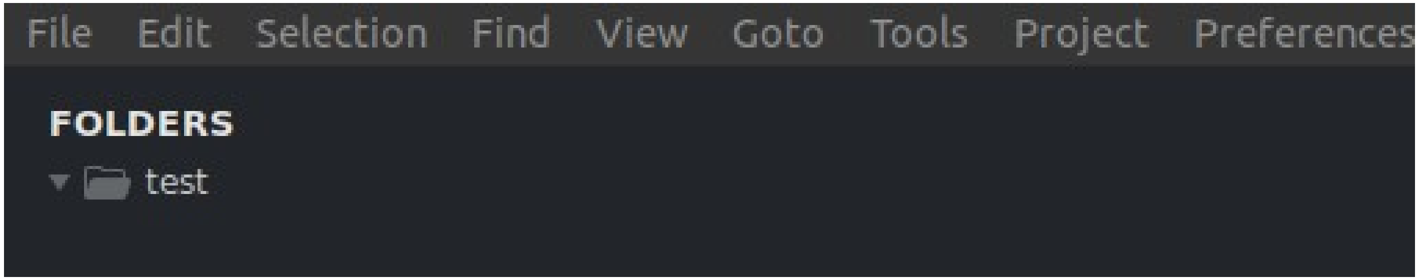
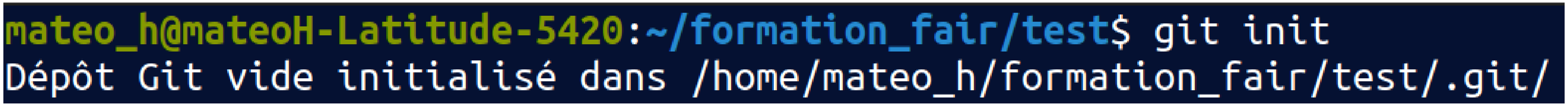


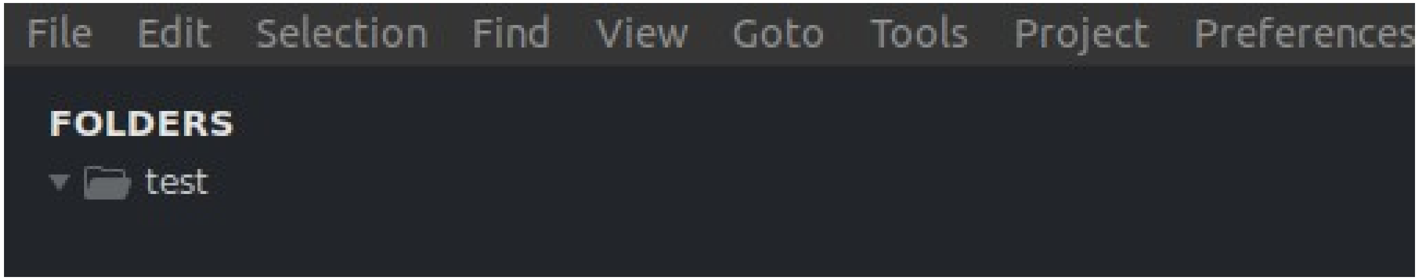


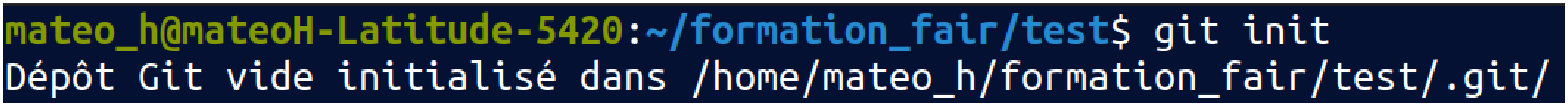
```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git init
Dépôt Git vide initialisé dans /home/mateo_h/formation_fair/test/.git/
```

“Git init “ to initialize a git repository in any folder

“Git clone” can also be used to import an existing repository

Git: Initialization





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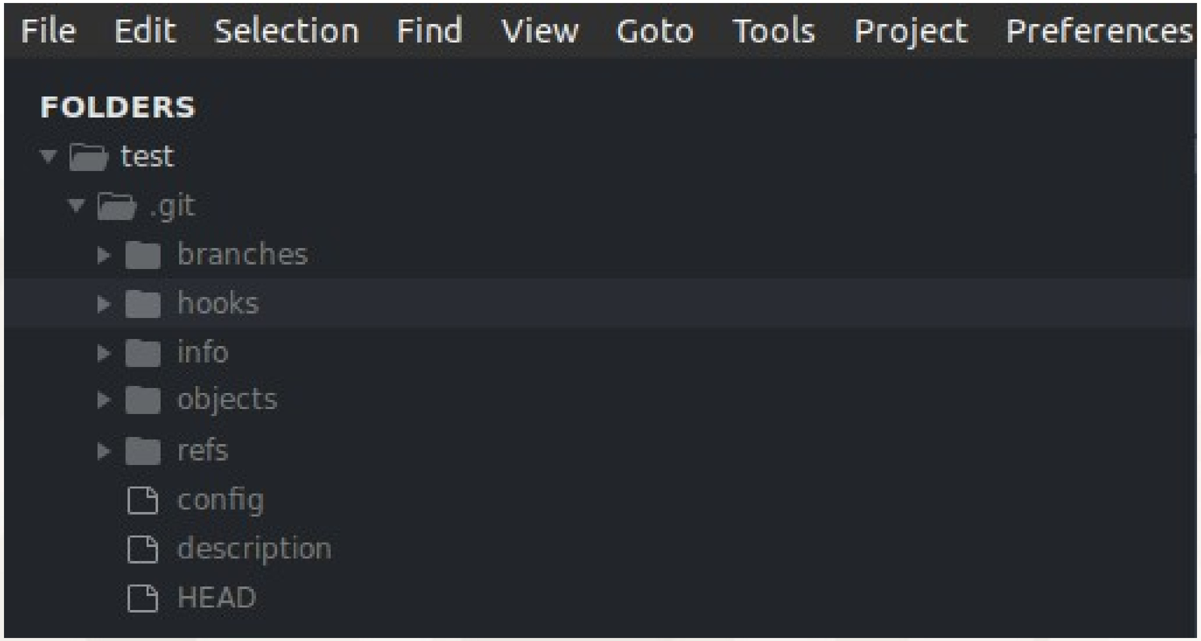
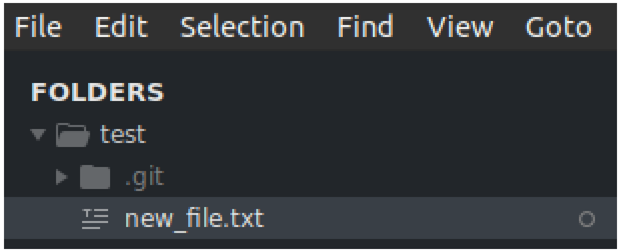


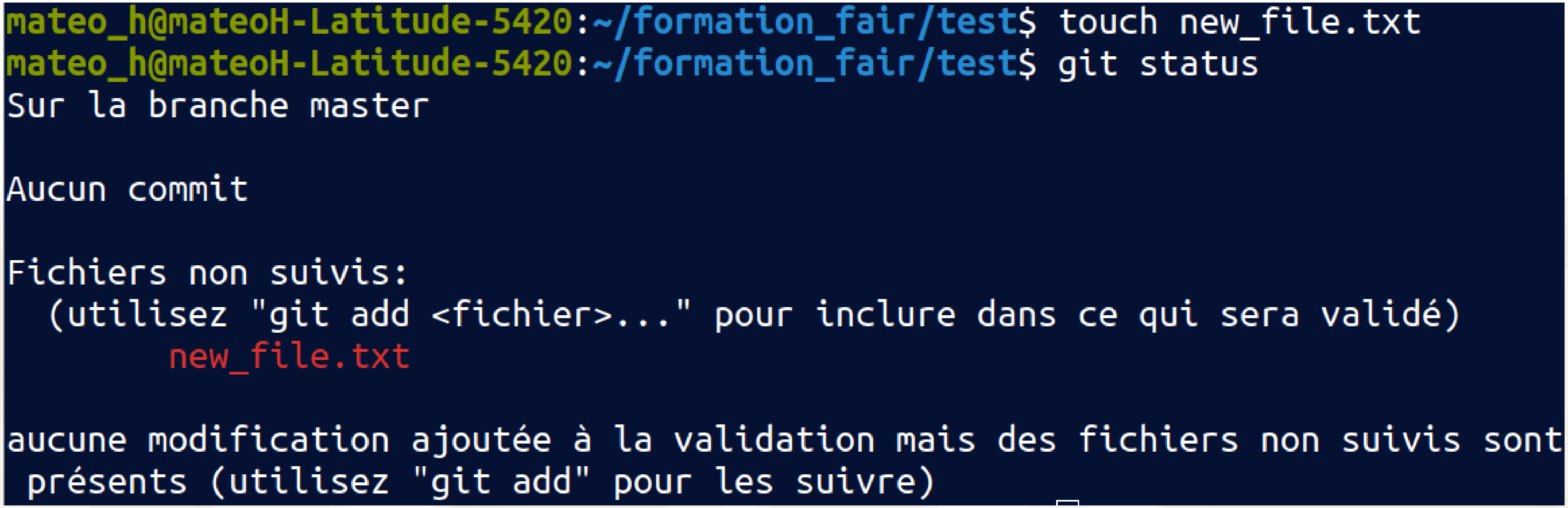
“Git init “ to initialize a git repository in any folder

“Git clone” can also be used to import an existing repository

Git: Commit

Create new file in project

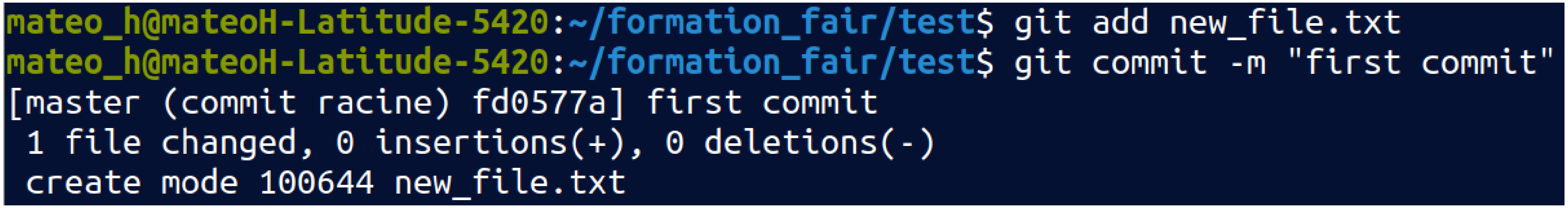




```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ touch new_file.txt
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git status
Sur la branche master

Aucun commit

Fichiers non suivis:
  (utilisez "git add <fichier>..." pour inclure dans ce qui sera validé)
        new_file.txt

aucune modification ajoutée à la validation mais des fichiers non suivis sont
 présents (utilisez "git add" pour les suivre)
```

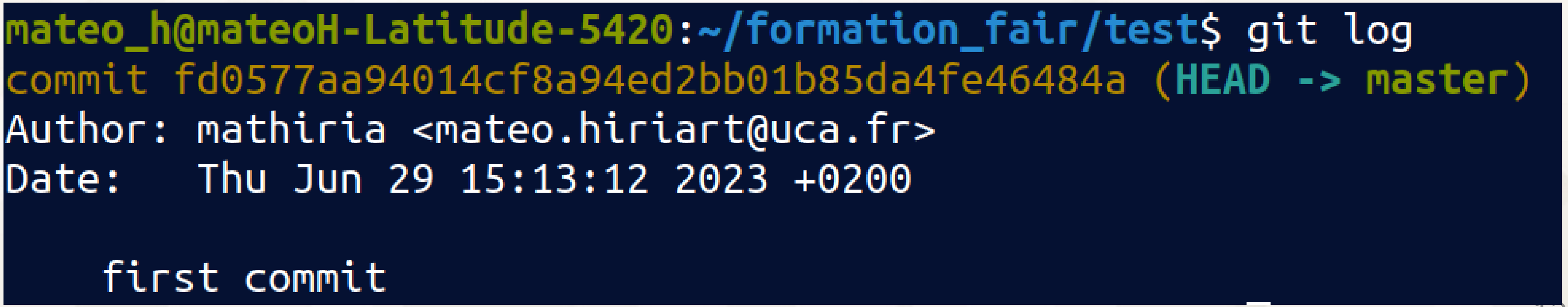
Git: Commit

1. Start adding file to the stage
2. Commit the modification and add a nice message to the comment
3. You can add more commentary by adding other -m “”.



```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git add new_file.txt
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git commit -m "first commit"
[master (commit racine) fd0577a] first commit
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 new_file.txt
```

- Commits are snapshots of your files (code)
- They all have an unique id and are linked to their parents
- Can always go back to previous commit.

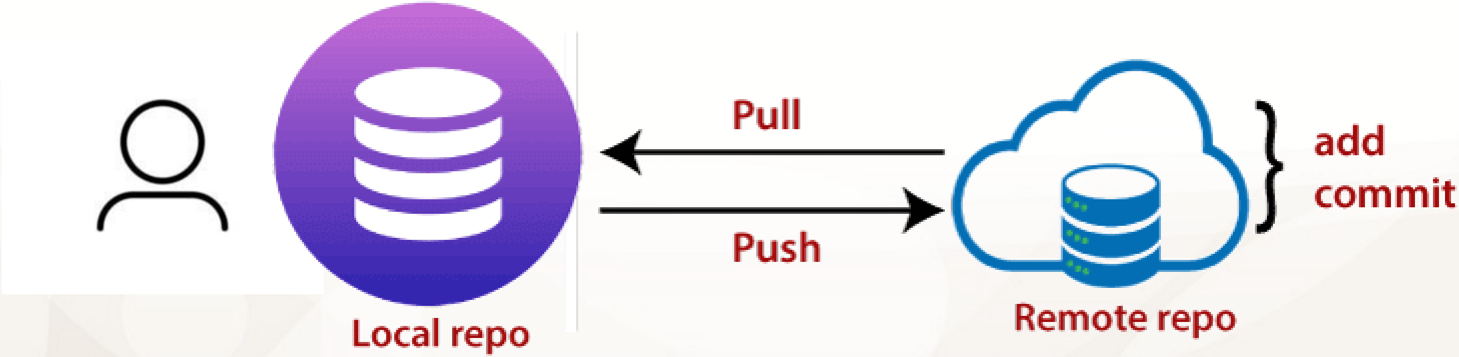


```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git log
commit fd0577aa94014cf8a94ed2bb01b85da4fe46484a (HEAD -> master)
Author: mathiria <mateo.hiriart@uca.fr>
Date:   Thu Jun 29 15:13:12 2023 +0200

    first commit
```

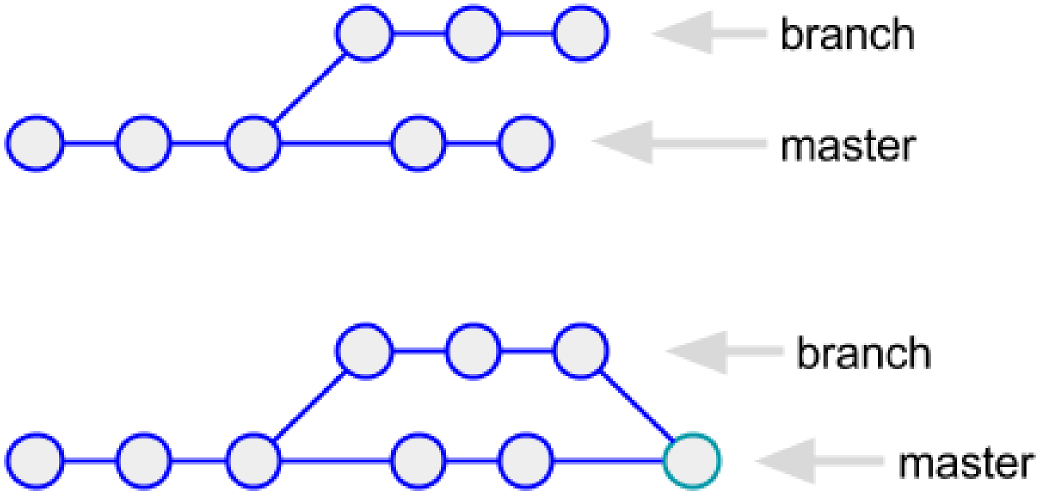
Git: Push and Pull

Git pull imports modifications from another repository if it has the same origin.

Git push exports modifications to another repository if it has same origin.



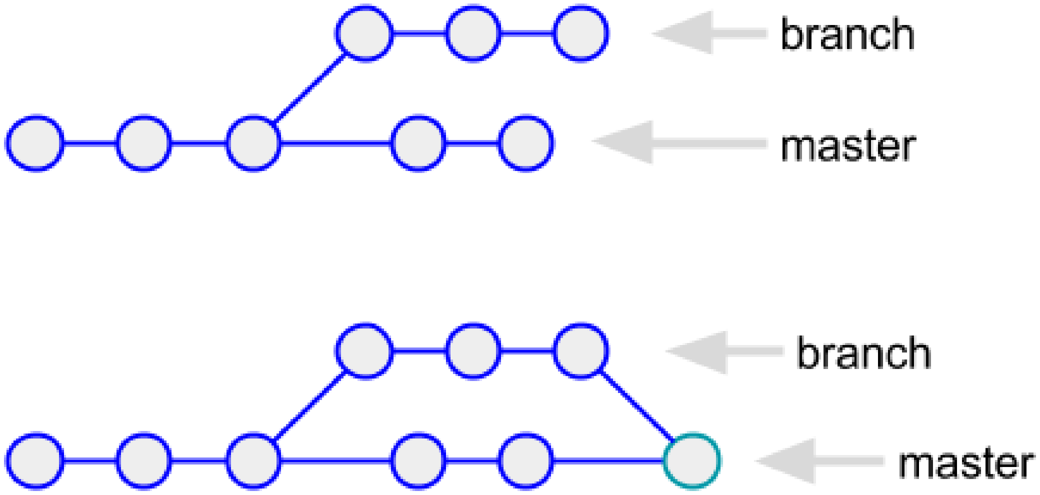
Git: branches



Git branch allows parallel development

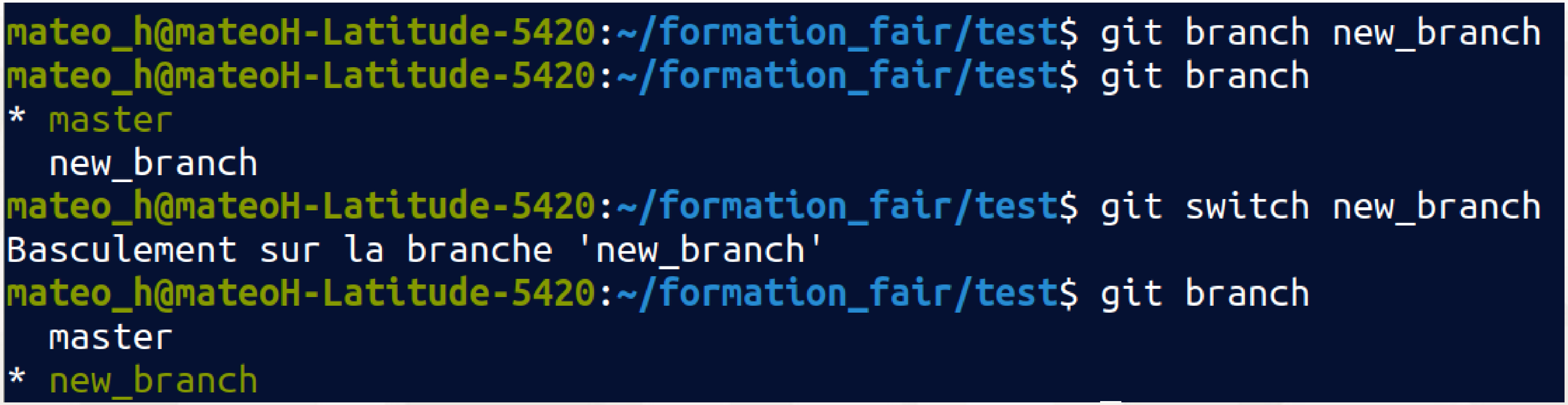
And still applies it latter with code control

Git: branches



Git branch allows parallel development

And still applies it latter with code control

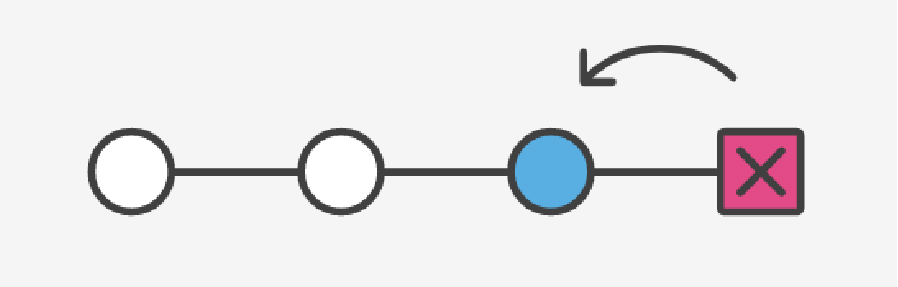


```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git branch new_branch
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git branch
* master
  new_branch
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git switch new_branch
Basculement sur la branche 'new_branch'
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git branch
  master
* new_branch
```

Git: Revert

Git reset: reset repository back to the specified commit

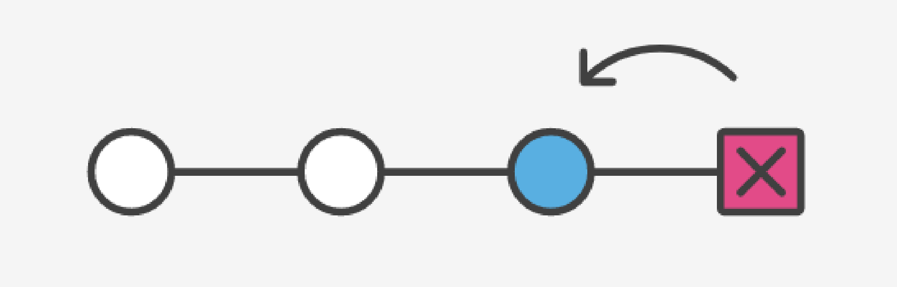
Git restore: reset current modification

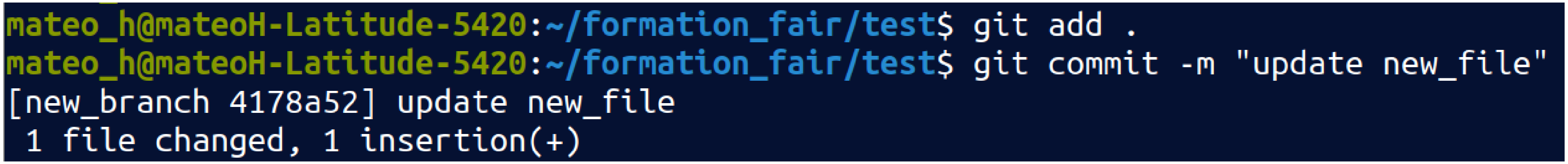


Git: Revert

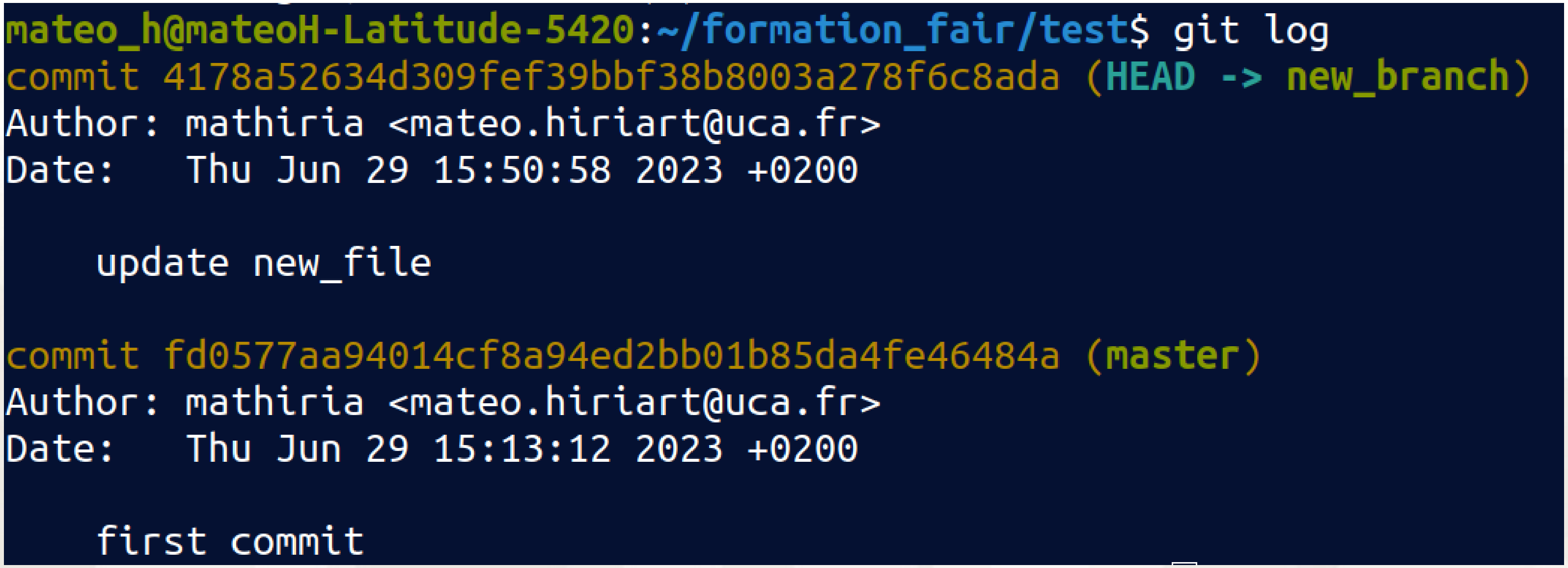
Git reset: reset repository back to the specified commit

Git restore: reset current modification



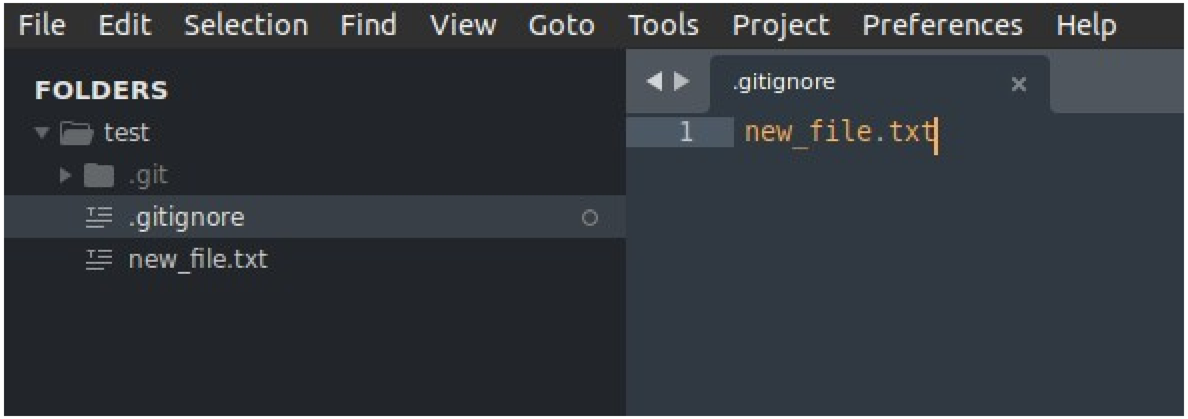


```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git add .
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git commit -m "update new_file"
[new_branch 4178a52] update new_file
 1 file changed, 1 insertion(+)
```



```
mateo_h@mateoH-Latitude-5420:~/formation_fair/test$ git log
commit 4178a52634d309fef39bbf38b8003a278f6c8ada (HEAD -> new_branch)
Author: mathiria <mateo.hiriart@uca.fr>
Date:   Thu Jun 29 15:50:58 2023 +0200

    update new_file

commit fd0577aa94014cf8a94ed2bb01b85da4fe46484a (master)
Author: mathiria <mateo.hiriart@uca.fr>
Date:   Thu Jun 29 15:13:12 2023 +0200

    first commit
```

Git: .gitignore



```
new_file.txt
```

Specific file that tells git to untrack any files listed inside.

Very useful especially with project that required other packages or if you have any file that stores sensitive data.

Git: Useful command

Git help: display multiple git command with a description

Git log: display commit history of the current branch

Git status: display current state off your local repository

Git diff: display code difference between current local repository and HEAD

Documentation link for git command:

https://git-scm.com/doc

https://docs.github.com/fr

Github and Gitlab

Public repository hosting server.

Both free version with pricing for enhance features.

GitHub

Released in 2008

Owned by microsoft

Fast, more popular

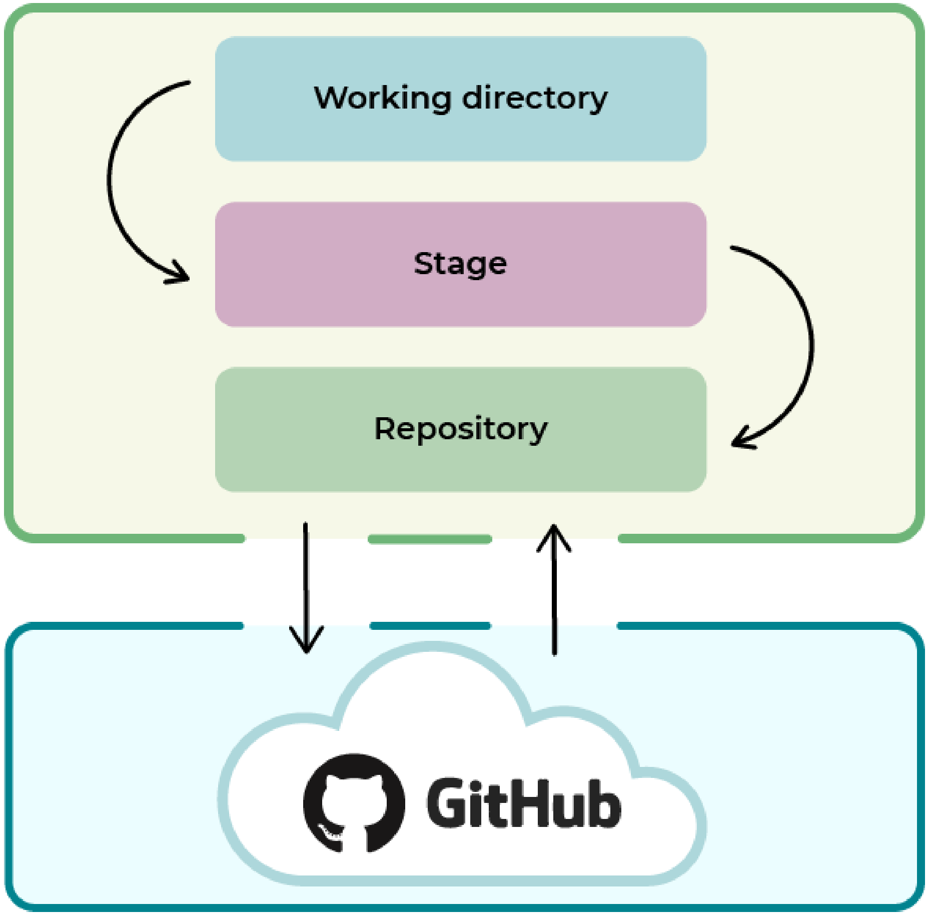
GitLab

Released in 2014

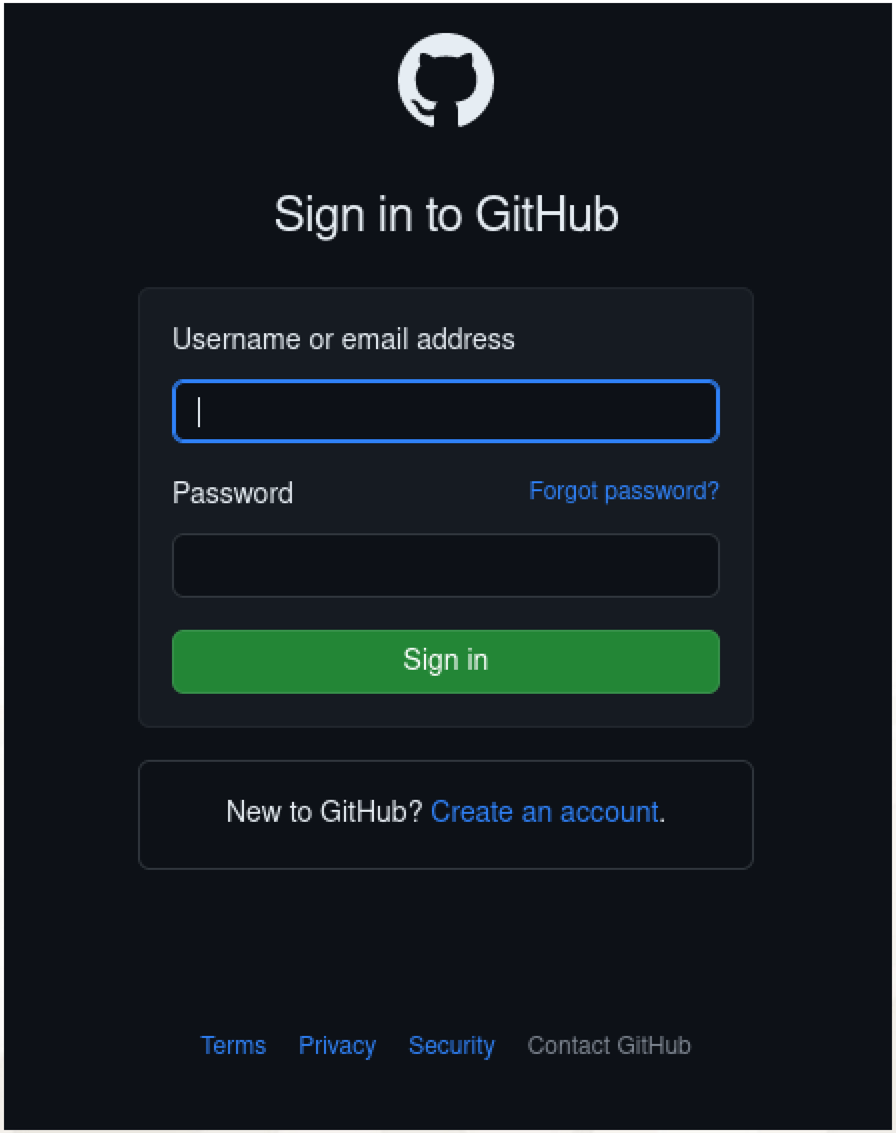
Open source

Built-in CI/CD, Less restriction in free version

Github and Gitlab



Github/Gitlab: Basics



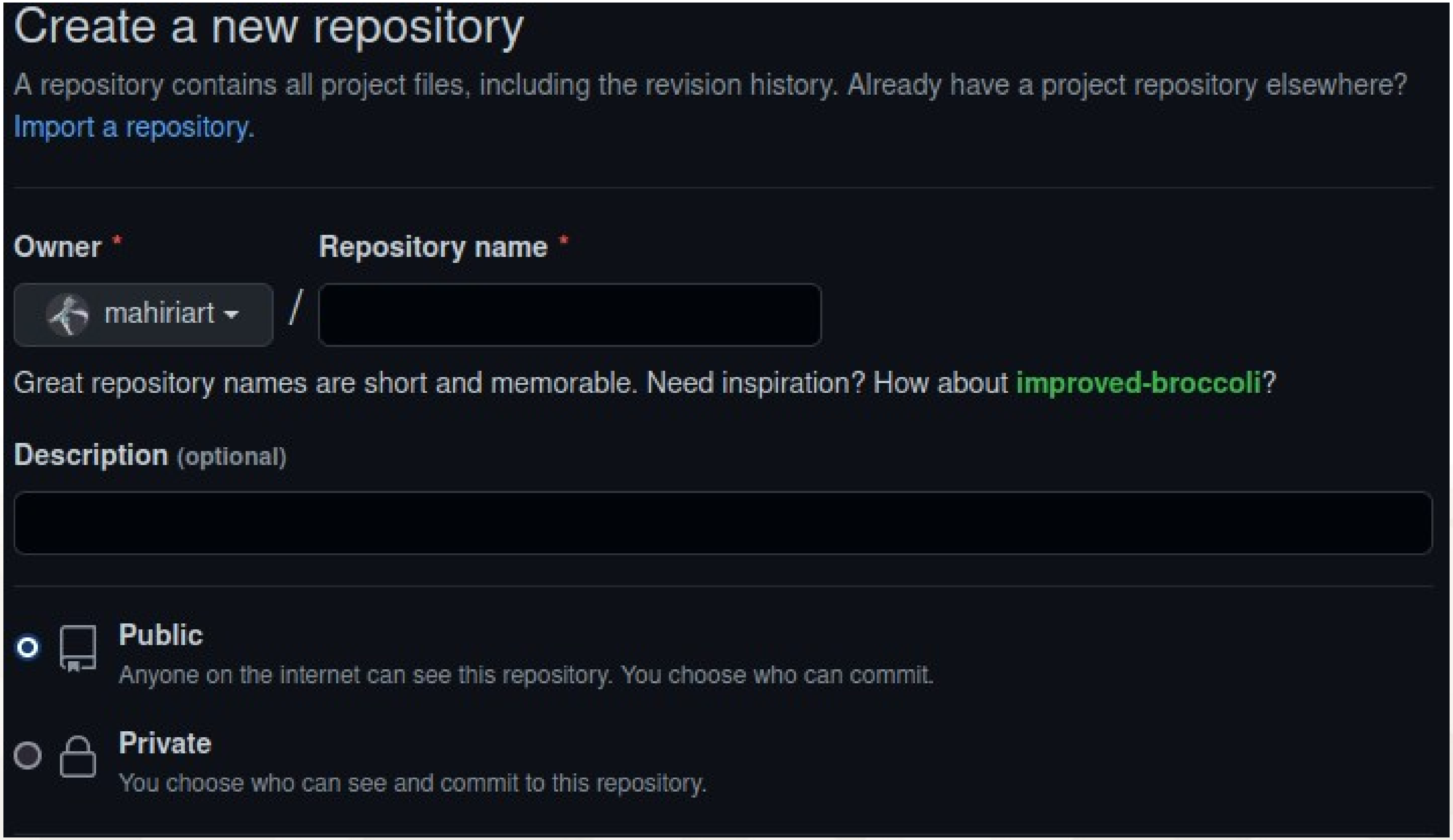
Sign in to GitHub

Username or email address

Password

New to GitHub? Create an account.

Create your own repository



Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? Import a repository.

Owner * mahiriart / Repository name *

Great repository names are short and memorable. Need inspiration? How about improved-broccoli?

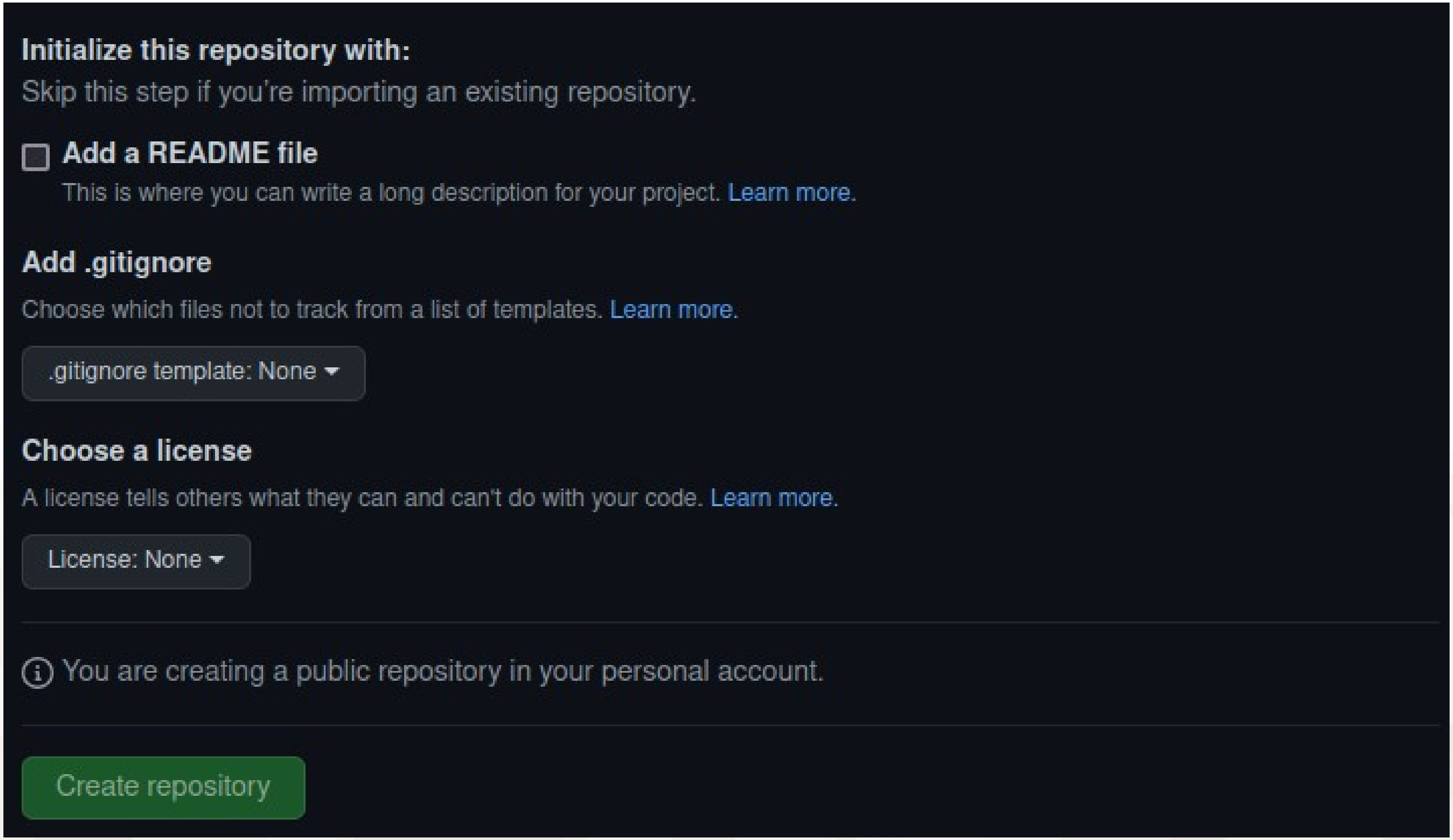
Description (optional)

● Public
Anyone on the internet can see this repository. You choose who can commit.

○ Private
You choose who can see and commit to this repository.

Github/Gitlab: Basics

Create your own repository, with base features



Initialize this repository with:

Skip this step if you're importing an existing repository.

□ **Add a README file**

This is where you can write a long description for your project. Learn more.

Add .gitignore

Choose which files not to track from a list of templates. Learn more.

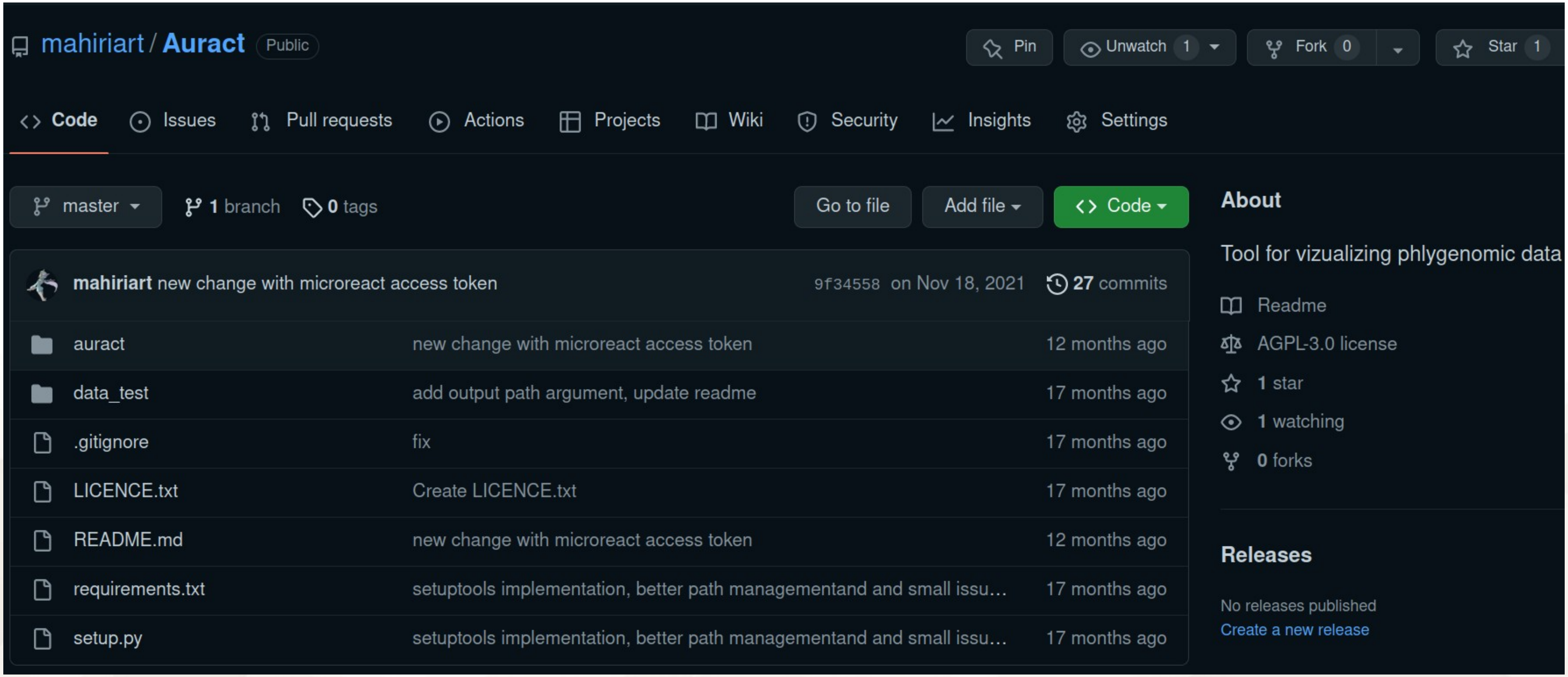
Choose a license

A license tells others what they can and can't do with your code. Learn more.

ⓘ You are creating a public repository in your personal account.

Github/Gitlab: Basics

Main page of a repository



mahiriart new change with microreact access token 9f34558 on Nov 18, 2021 **27** commits

auract	new change with microreact access token	12 months ago
data_test	add output path argument, update readme	17 months ago
.gitignore	fix	17 months ago
LICENCE.txt	Create LICENCE.txt	17 months ago
README.md	new change with microreact access token	12 months ago
requirements.txt	setuptools implementation, better path managementand and small issu…	17 months ago
setup.py	setuptools implementation, better path managementand and small issu…	17 months ago

About

Tool for vizualizing phlygenomic data

Readme

AGPL-3.0 license

1 star

1 watching

0 forks

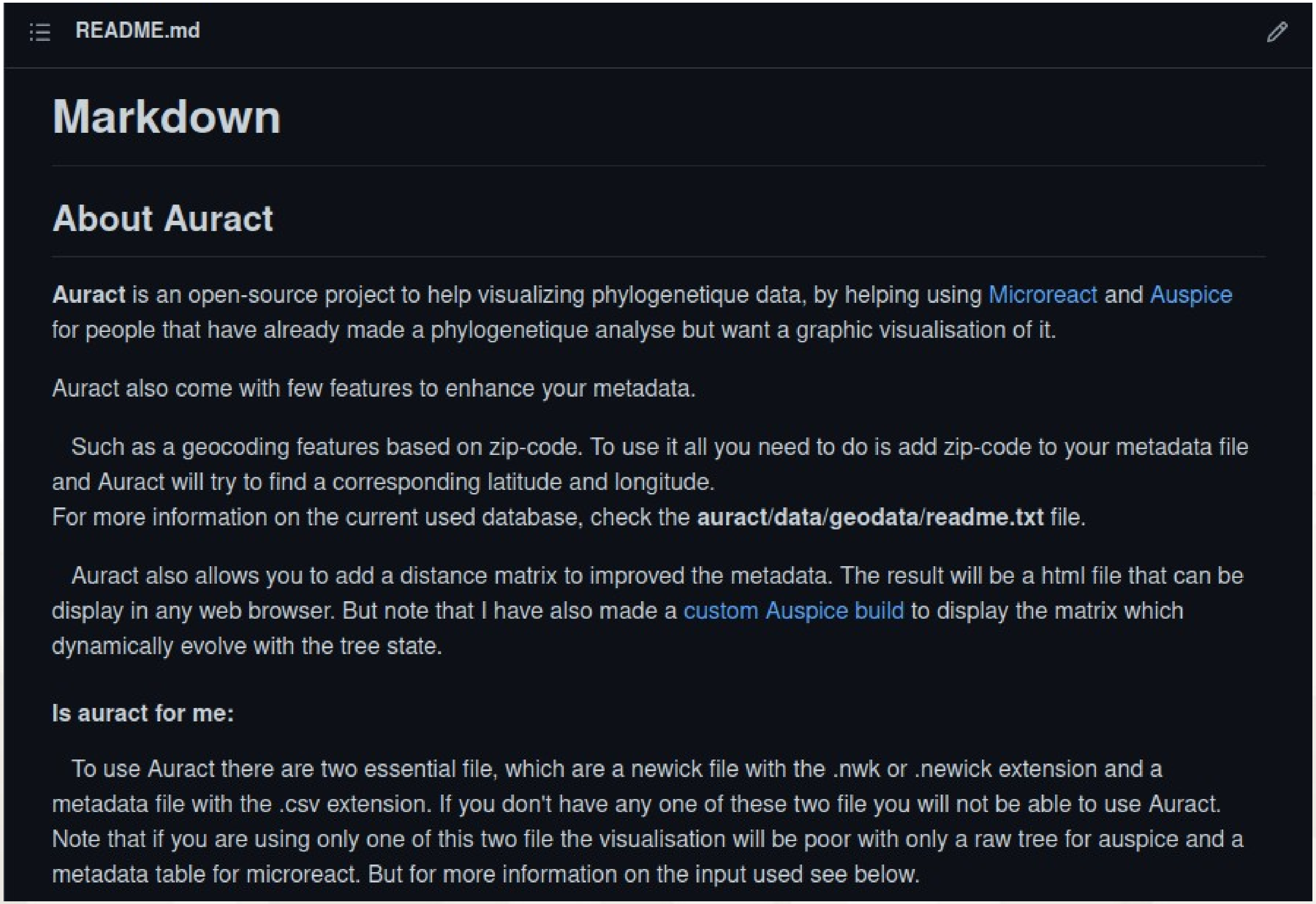
Releases

No releases published

Create a new release

Github/Gitlab: Improvement

Readme usually presents the repository and also has documentation or guide on installation and usage.



Markdown

About Auract

Auract is an open-source project to help visualizing phylogenetique data, by helping using Microreact and Auspice for people that have already made a phylogenetique analyse but want a graphic visualisation of it.

Auract also come with few features to enhance your metadata.

Such as a geocoding features based on zip-code. To use it all you need to do is add zip-code to your metadata file and Auract will try to find a corresponding latitude and longitude.
For more information on the current used database, check the **auract/data/geodata/readme.txt** file.

Auract also allows you to add a distance matrix to improved the metadata. The result will be a html file that can be display in any web browser. But note that I have also made a custom Auspice build to display the matrix which dynamically evolve with the tree state.

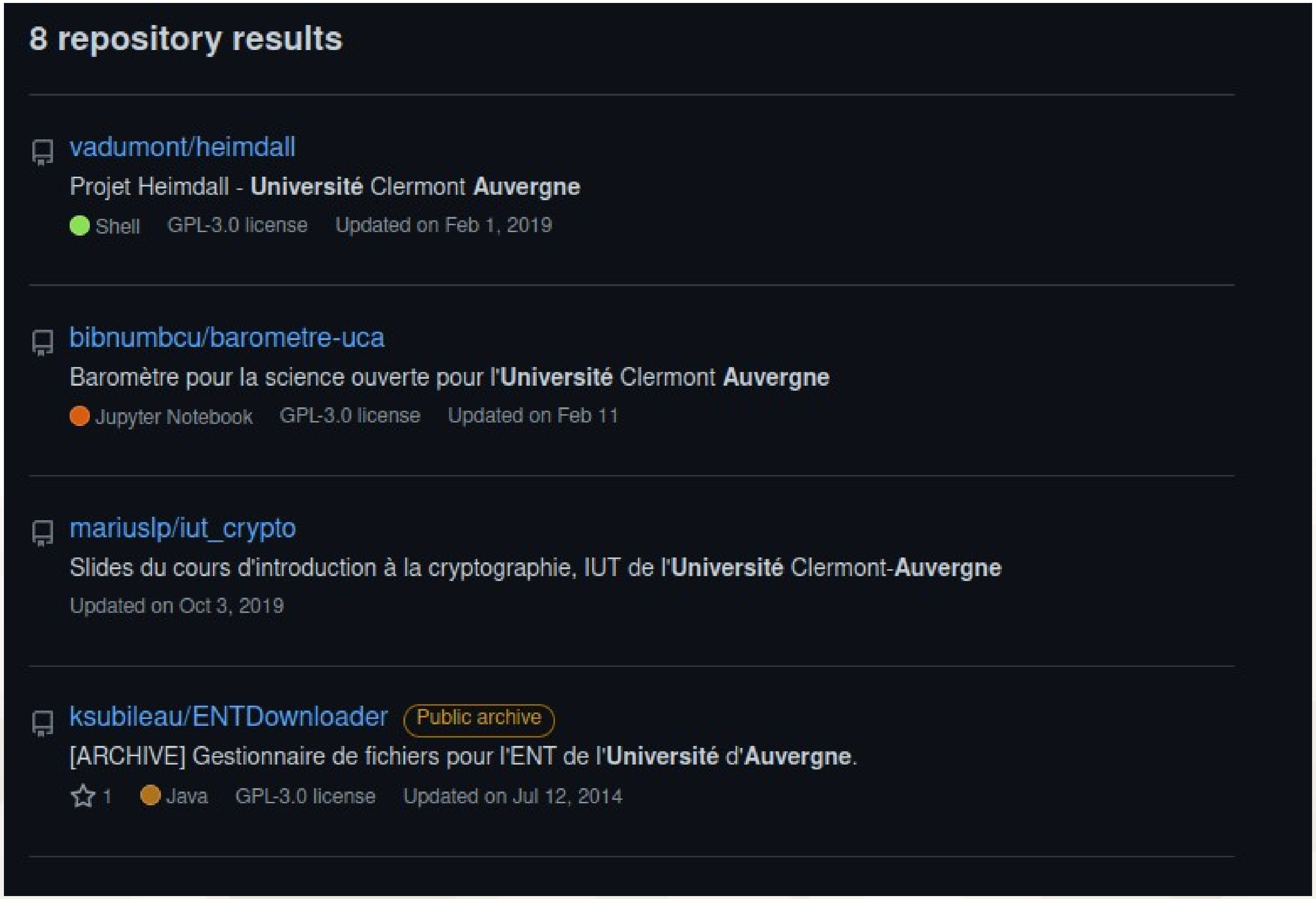
Is auract for me:

To use Auract there are two essential file, which are a newick file with the .nwk or .newick extension and a metadata file with the .csv extension. If you don't have any one of these two file you will not be able to use Auract. Note that if you are using only one of this two file the visualisation will be poor with only a raw tree for auspice and a metadata table for microreact. But for more information on the input used see below.

Github/Gitlab: Open source project

Find open source project and publish yours

Worldwide interactive development



8 repository results

vadumont/heimdall

Projet Heimdall - **Université** Clermont **Auvergne**

● Shell GPL-3.0 license Updated on Feb 1, 2019

bibnumbcu/barometre-uca

Baromètre pour la science ouverte pour l'**Université** Clermont **Auvergne**

● Jupyter Notebook GPL-3.0 license Updated on Feb 11

mariuslp/iut_crypto

Slides du cours d'introduction à la cryptographie, IUT de l'**Université** Clermont-**Auvergne**

Updated on Oct 3, 2019

ksubileau/ENTDownloader Public archive

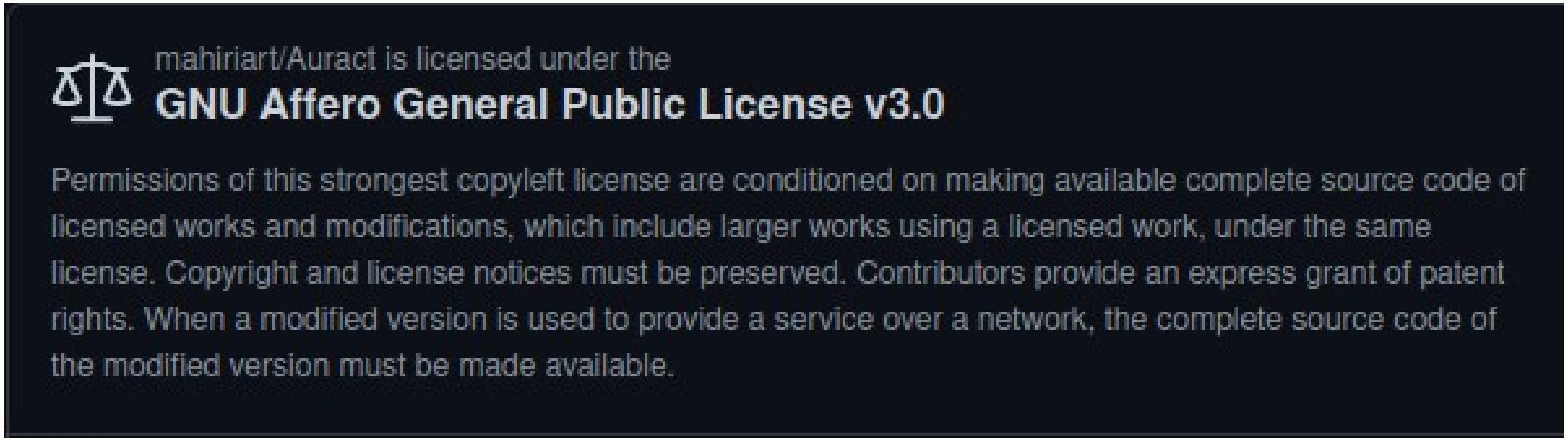
[ARCHIVE] Gestionnaire de fichiers pour l'ENT de l'**Université** d'**Auvergne**.

☆ 1 ● Java GPL-3.0 license Updated on Jul 12, 2014

Github/Gitlab: Licenses

Key element for public repository, allow then to truly be open source.

Allow others to freely use, change and distribute your code.



mahiriart/Auract is licensed under the

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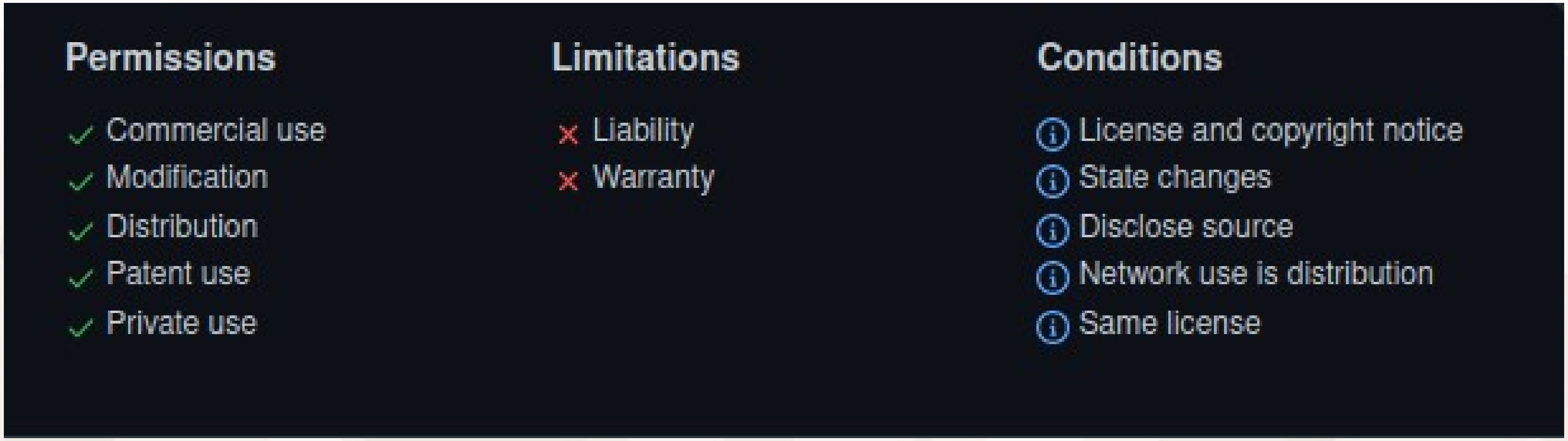


Permissions

- ✓ Commercial use
- ✓ Modification
- ✓ Distribution
- ✓ Patent use
- ✓ Private use

Limitations

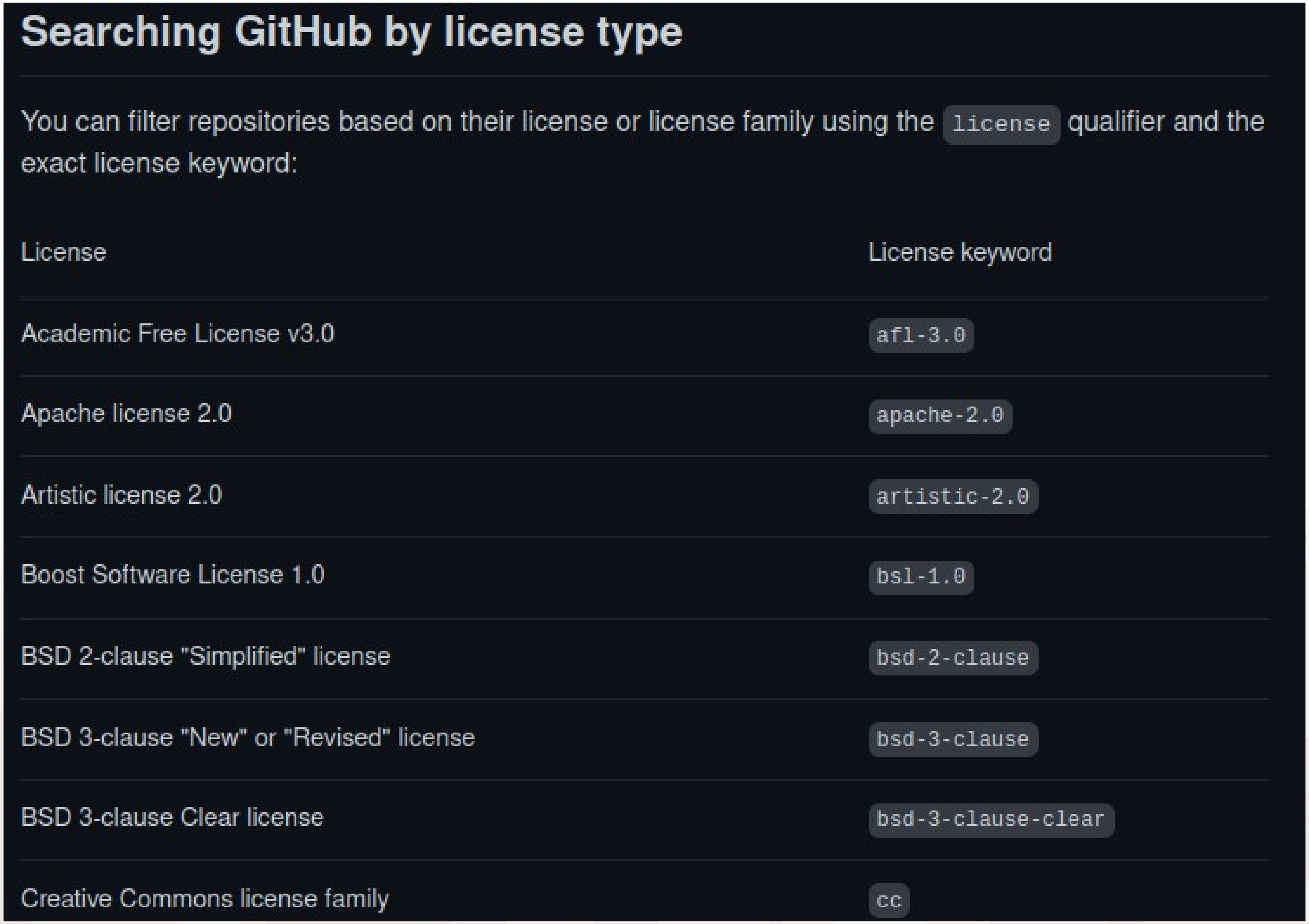
- ✗ Liability
- ✗ Warranty

Conditions

- ⓘ License and copyright notice
- ⓘ State changes
- ⓘ Disclose source
- ⓘ Network use is distribution
- ⓘ Same license

Github/Gitlab: Licenses

Many licences available



Searching GitHub by license type

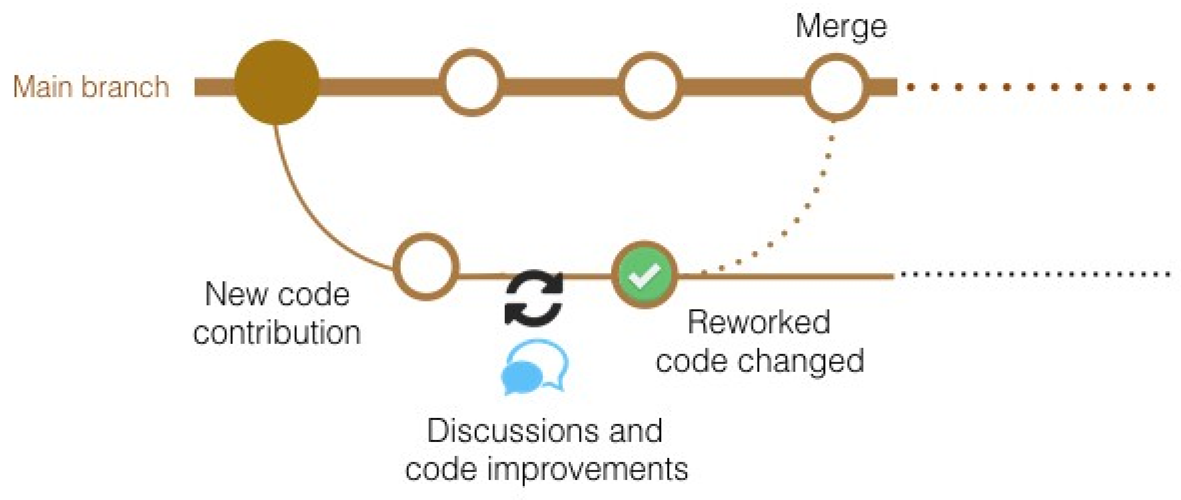
You can filter repositories based on their license or license family using the `license` qualifier and the exact license keyword:

License	License keyword
Academic Free License v3.0	`afl-3.0`
Apache license 2.0	`apache-2.0`
Artistic license 2.0	`artistic-2.0`
Boost Software License 1.0	`bsl-1.0`
BSD 2-clause "Simplified" license	`bsd-2-clause`
BSD 3-clause "New" or "Revised" license	`bsd-3-clause`
BSD 3-clause Clear license	`bsd-3-clause-clear`
Creative Commons license family	`cc`

Github/Gitlab: Issues and merge request

Issues are features to point out problem in code or possible enhancement.
Usually solved in a pull request.

Pull requests are code contributions in a review state.



Simplified Pull Request process

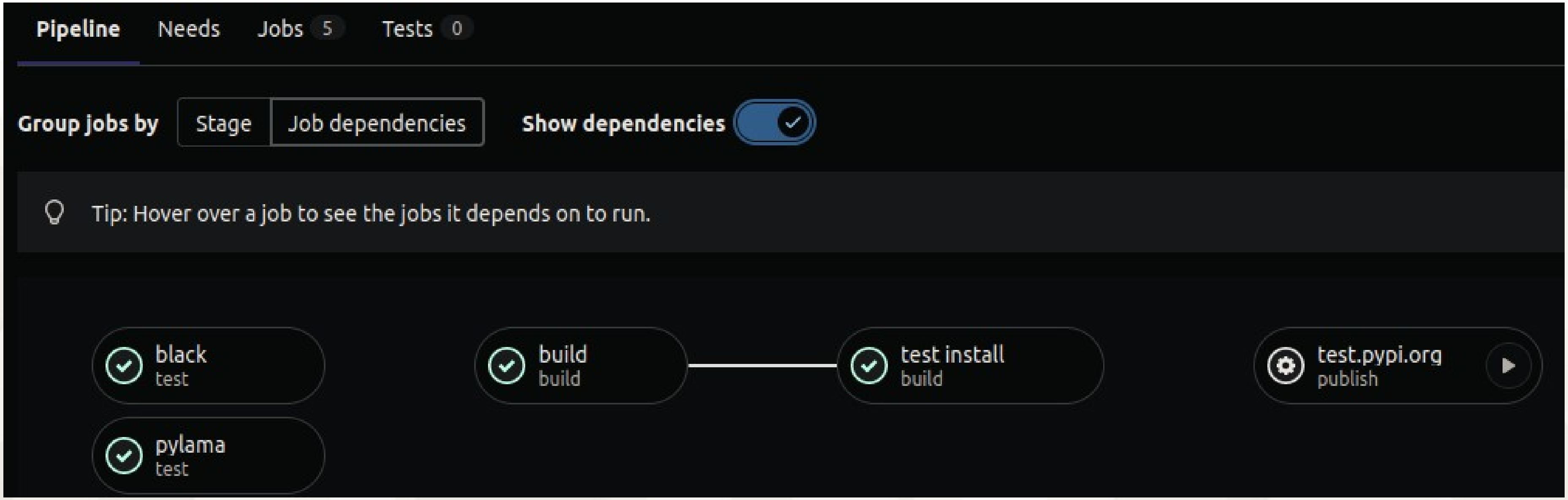
Github/Gitlab: Pipeline CI/CD

Continuous Integration (CI)

Continuous Delivery (CD)

Can automatically build, test, deploy, and monitor your applications

Example of CI pipeline



Tip: Hover over a job to see the jobs it depends on to run.

Github/Gitlab: Pages

Easily build own web site for your project. To highlight your work.

Hosted by Github or Gitlab.

Multiple templates can be found. https://git.mesocentre.uca.fr https://github.com/mesocentre-clermont-auvergne/formation_fair_2022/tree/main/fair_git

https://git.mesocentre.uca.fr