



Git & GitHub

Quick introduction

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Goal

- What is Revision Control?
- What is Git?
- What is GitHub?
- How to access Revision Control with Git and GitHub from within Eclipse?
- What are the Eclipse workflows useful in this course?

Version Control Systems

Record changes to a file or a set of files over time so that you can recall specific versions later

- Three generations:
 - Local (RCS, SCCS)
 - Centralized (CVS, Subversion, Team Foundation Server)
 - Distributed (Git, Mercurial)

← NOW

Basic Concepts

- **Repository**

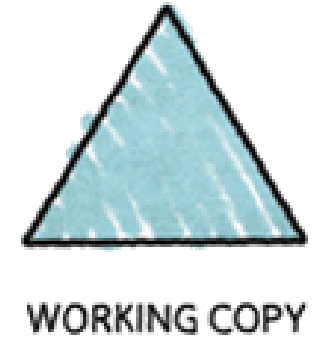
- place where you store all your work
- contains every version of your work that has ever existed
 - files
 - directories layout
 - history
- can be shared with the whole team



Basic Concepts

Working copy

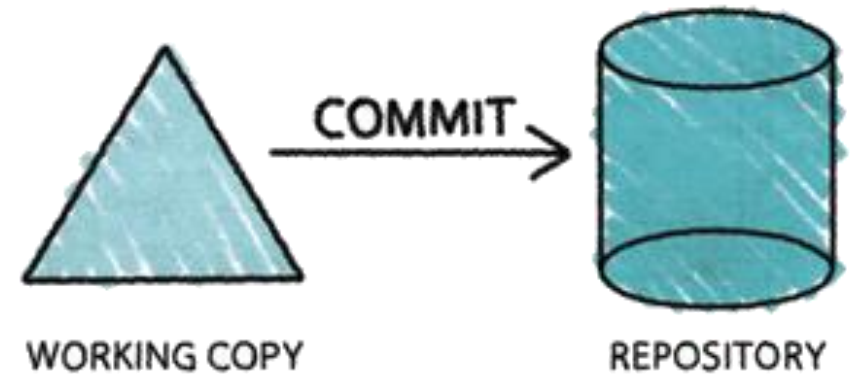
- a snapshot of the repository used for... working
- the place where changes happens
- private, not shared with the team
- it also contains some metadata so that it can keep track of the state of things
 - has a file been modified?
 - is this file new?
 - has a file been deleted?



Basic Concepts

Commit

- the operation that modifies the repository
 - the integrity of the repository is ensured
- atomically performed by modern version control tools
 - the integrity of the repository is ensured
- it is typical to provide a log message (or comment) when you commit
 - to explain the changes you have made
 - the message becomes part of the history of the repository



Basic Concepts

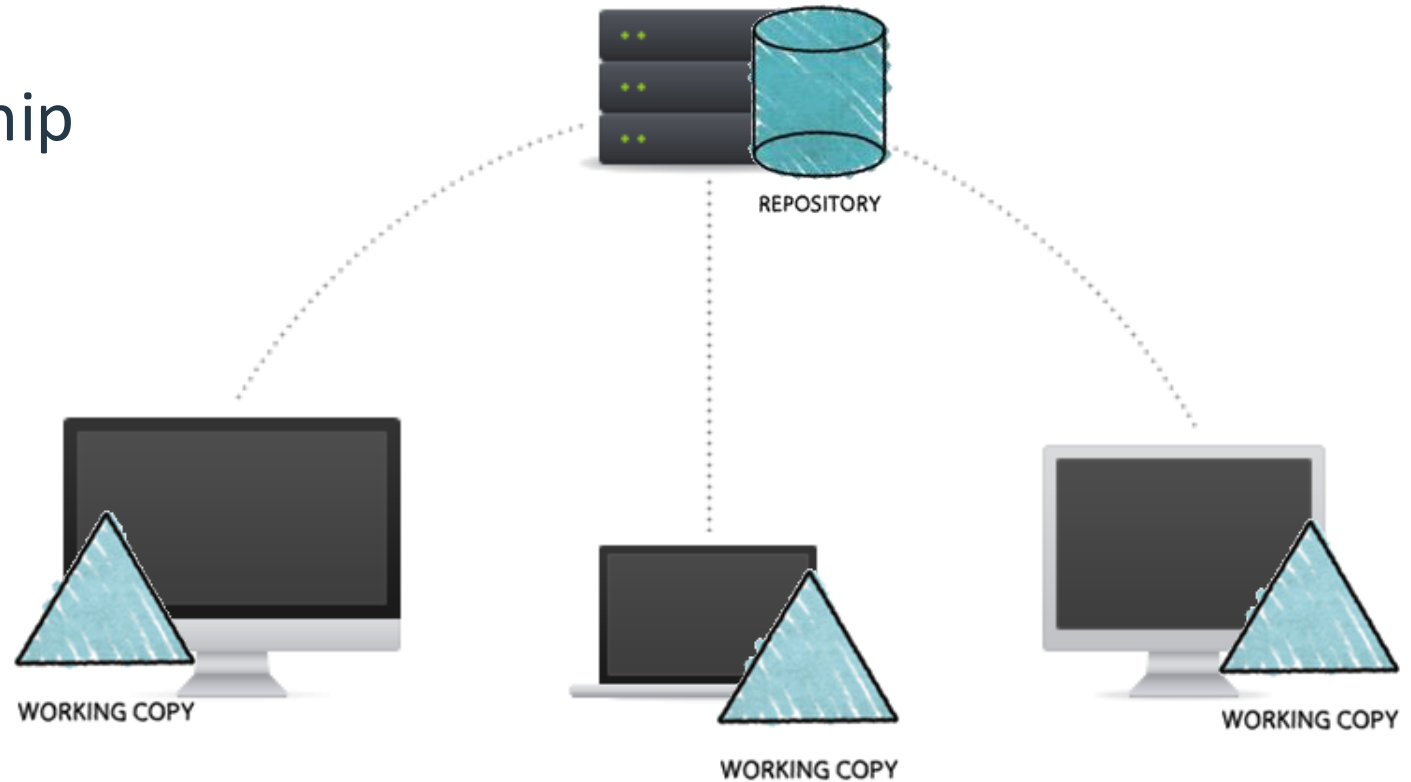
Update

- update the working copy with respect to the repository
 - apply changes from the repository
 - merge such changes with the ones you have made to your working copy, if necessary



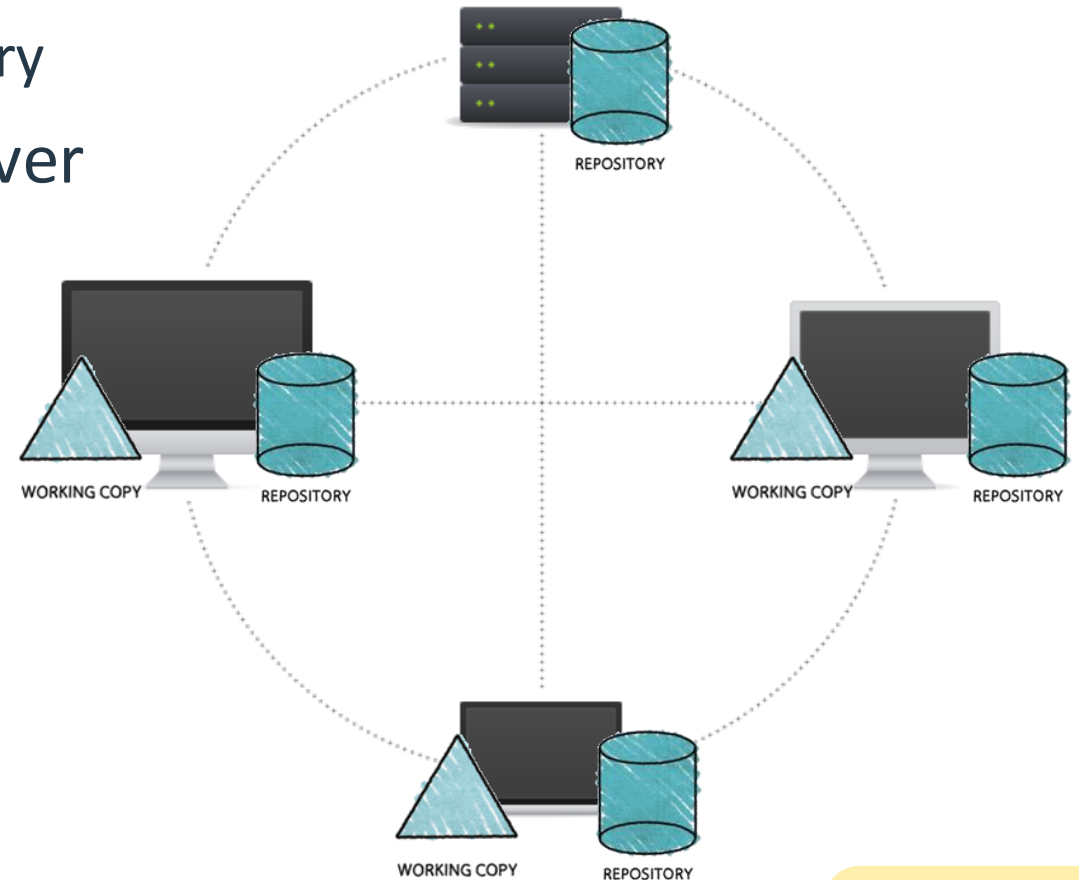
Centralized Version Control

- one central repository
- client-server relationship



Distributed Version Control

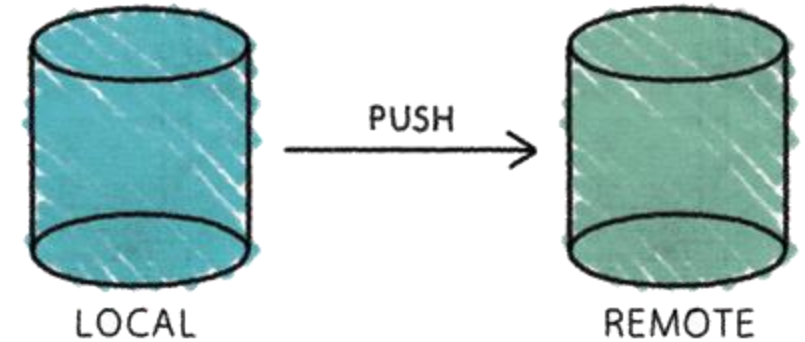
- clients and server have the full copy of the repository
 - local repositories 'clone' a remote repository
- it is possible to have more than one server



More Basic Concepts

Push

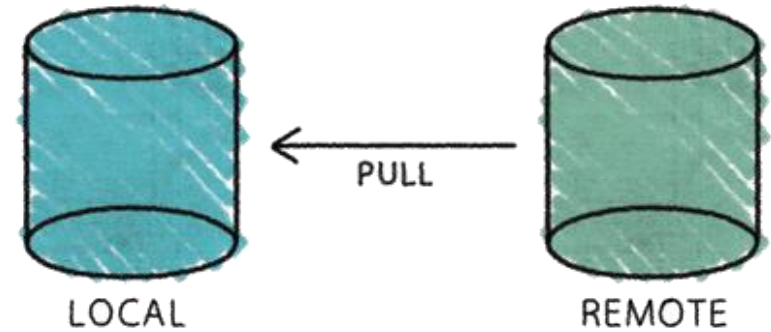
- copy changesets from a local repository instance to a remote one
 - synchronization between two repository instances



More Basic Concepts

Pull

- copy changesets from a remote repository instance to a local one
 - synchronization between two repository instances



Introducing... Git

- Distributed Version Control System
- Born
 - on 2005 for the Linux kernel project
 - to be used via command line
- Website: <http://git-scm.com>
- Highlights:
 - free and open source
 - strong support for non-linear development
 - fully distributed
 - efficient handling of large projects
 - cryptographic authentication of history



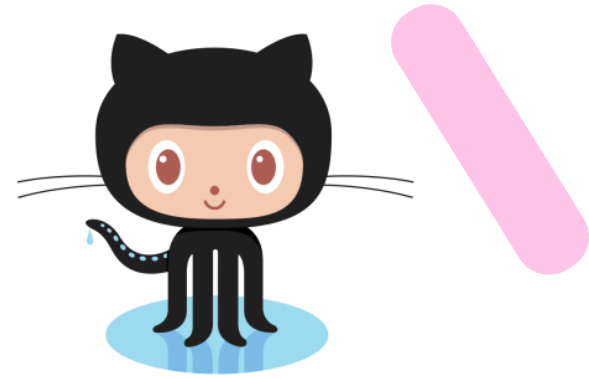
Getting started with Git

- Standard installations
 - <http://git-scm.com/downloads>
- Available for all the platform
- Git Graphical Applications
 - <http://git-scm.com/downloads/guis>
 - Suggestion: GitExtensions, SourceTree, Fork
- For this course, Git is
 - integrated in PyCharm

Hosted Git

- To have (at least) one remote repository
 - alternative: set up your own Git server!
- Most popular:
 - **GitHub**, <https://github.com/>
 - Bitbucket, <https://bitbucket.org/>
 - GitLab, <https://about.gitlab.com/gitlab-com/>

GitHub



- Slightly different than other code-hosting sites
 - instead of being primarily based on the project, it is user-centric
 - social coding
- Owned by Microsoft
 - free account to host as many open source project as you want
 - free plans for students
 - <https://education.github.com>

For Labs

- Create a personal GitHub account
 - You will have “education” discounts if you use your University e-mail
 - <https://education.github.com>
- Try Git!
 - <http://try.github.io/>
 - 15 minutes tutorial



Quick introduction to Git & GitHub

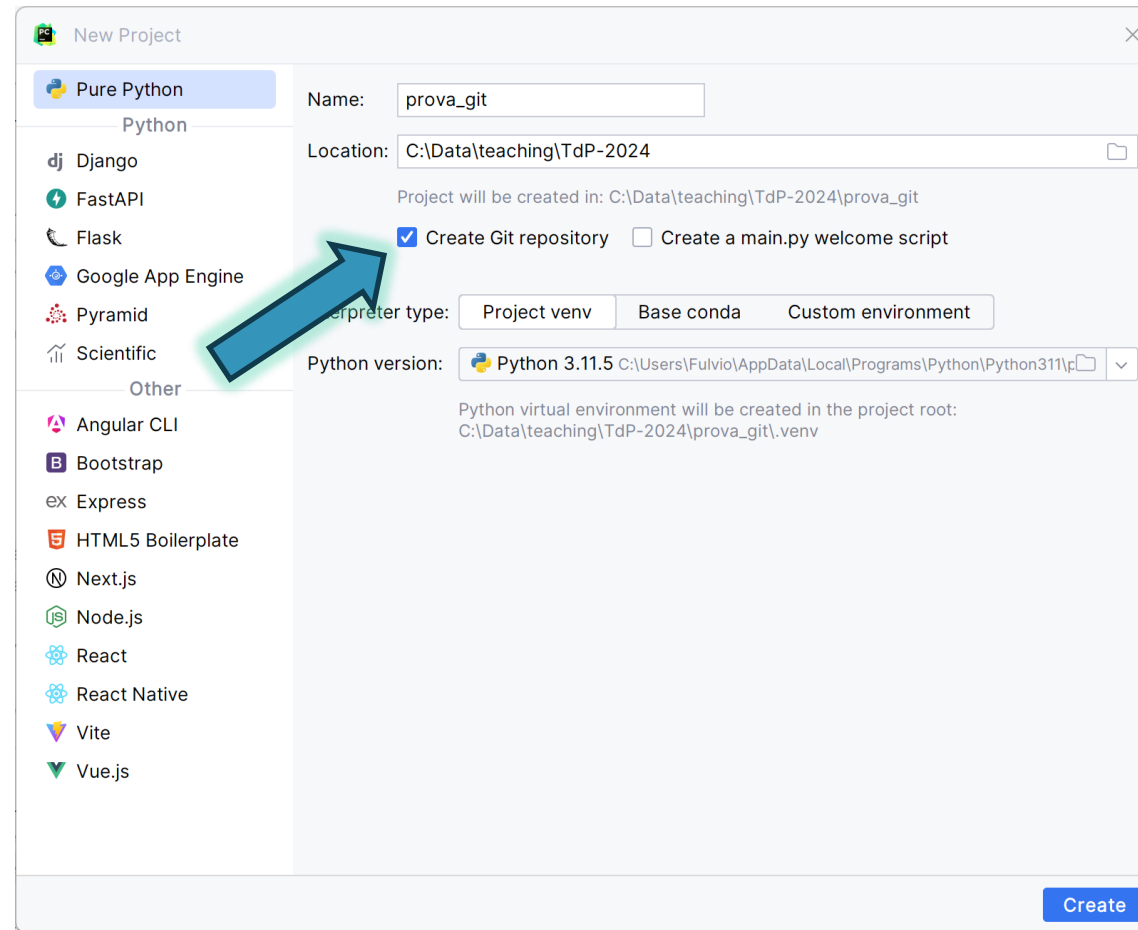


GITHUB-BASED WORKFLOWS

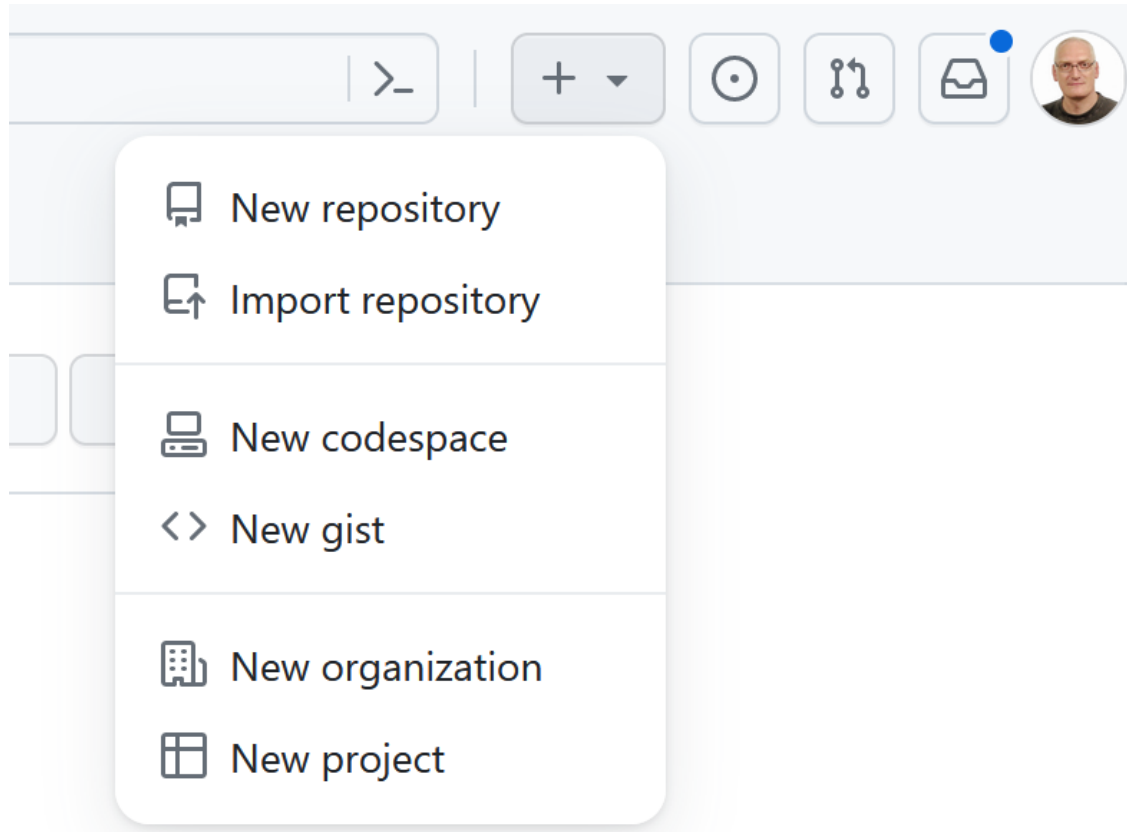
Workflow 1: “Create new project”

1. Create a project in PyCharm
 1. File/New Project...
 2. Select “Create Git Repository”
2. Create and edit Python files
3. Create a new (empty) project in GitHub
 1. Copy the Project URL
4. Push changes (**Commit&push**)
 1. The first time, you must Define Remote

Create new project in PyCharm



Create Repository in GitHub



Q Type to search

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Required fields are marked with an asterisk ().*

Repository template
No template ▾
Start your repository with a template repository's contents.

Owner * Choose an owner ▾ / **Repository name *** prova_git

Great repository names are short and memorable. Need inspiration? How about [effective-tribble](#) ?

Description (optional)

Please choose an owner to see the available visibility options.

Initialize this repository with:
☐ **Add a README file**
This is where you can write a long description for your project. [Learn more about READMEs.](#)

Add .gitignore
.gitignore template: None ▾
Choose which files not to track from a list of templates. [Learn more about ignoring files.](#)


Choose a license
License: None ▾
A license tells others what they can and can't do with your code. [Learn more about licenses.](#)

Create repository

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Copy the Repository URL

Quick setup — if you've done this kind of thing before

 Set up in Desktop

or

HTTPS

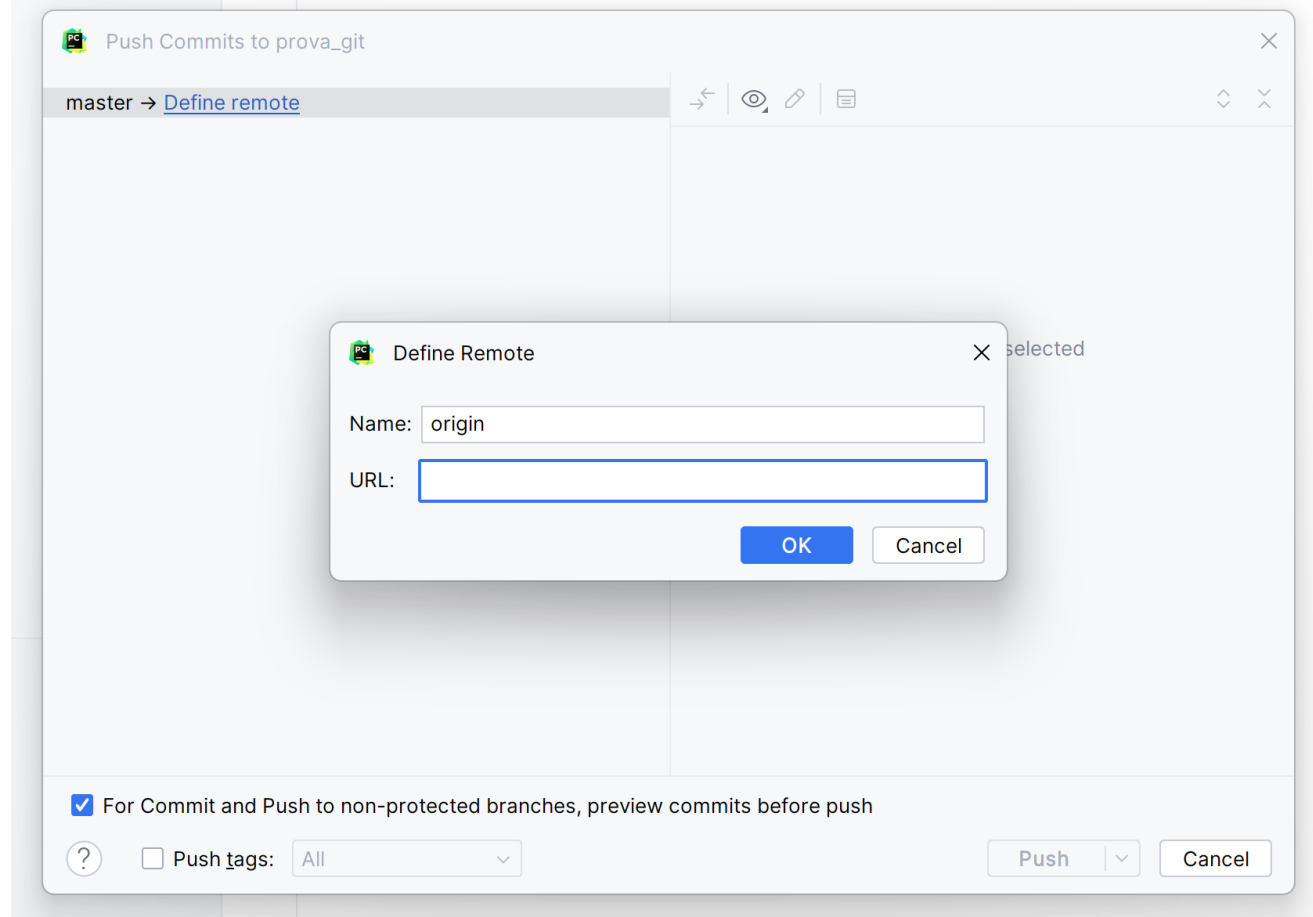
SSH

`https://github.com/fulcorno/prova_git.git`



Get started by [creating a new file](#) or [uploading an existing file](#). We recommend every repository include a [README](#), [LICENSE](#), and [.gitignore](#).

Defining remote to push



Workflow 2: “Work on a project”

1. “**Fork**” the project in GitHub (you make a copy in your repository)
2. **Clone** your project in PyCharm
3. Work on the project
4. **Commit** and **Push** the changes

Forking the project

TdP-2024 / libretto_voti

Type to search

<> Code Issues Pull requests Actions Projects Wiki Security Insights Settings

libretto_voti Public

Edit Pins Watch 1 Fork 0 Star 0

Fork your own copy of TdP-2024/libretto_voti

master 1 Branch 0 Tags

Go to file Add file <> Code

fulcorno versione in aula f0a1c3a · 8 hours ago 1 Commits

.idea	versione in aula	8 hours ago
.gitignore	versione in aula	8 hours ago
libretto.py	versione in aula	8 hours ago

README

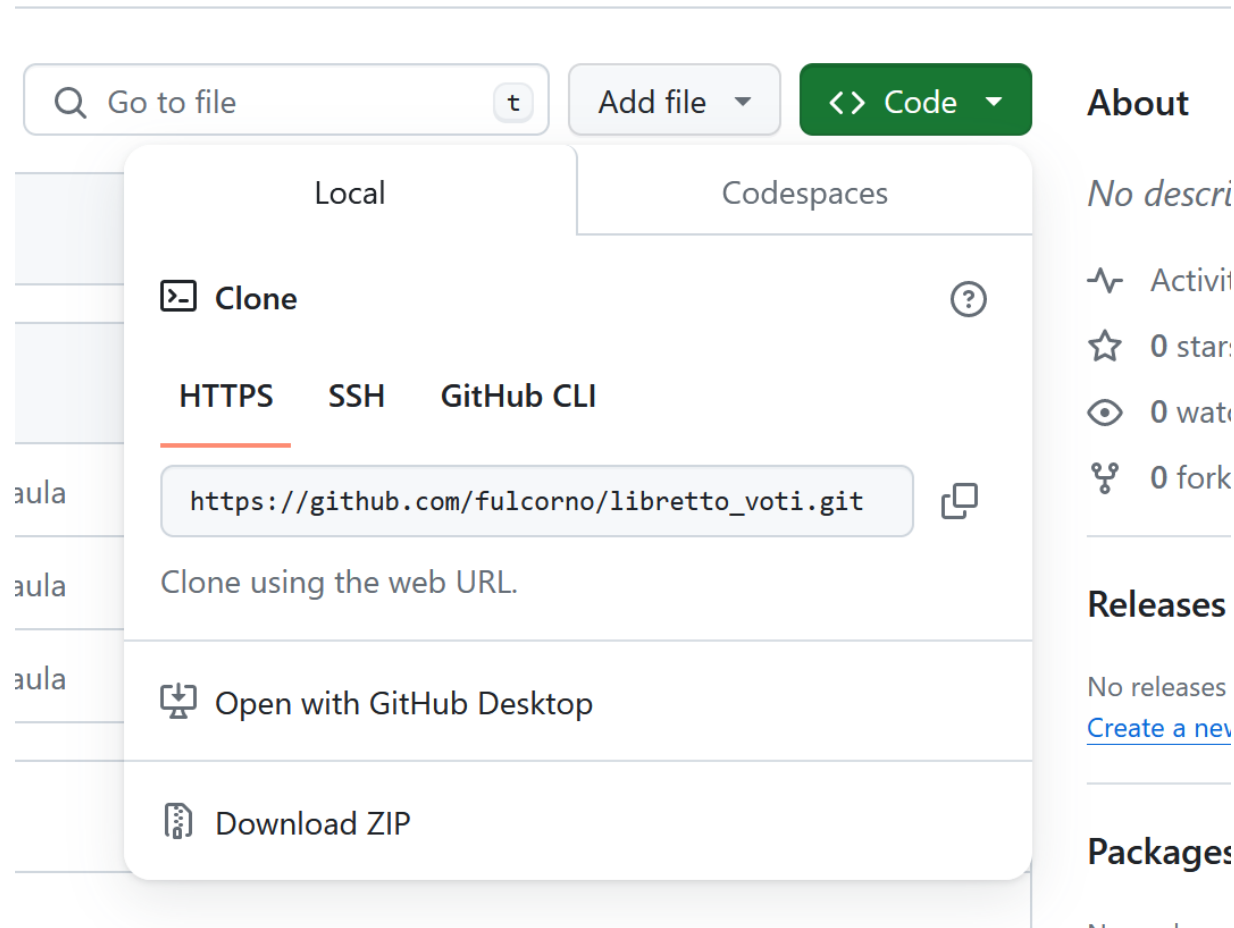
About

No description, website, or topics provided.

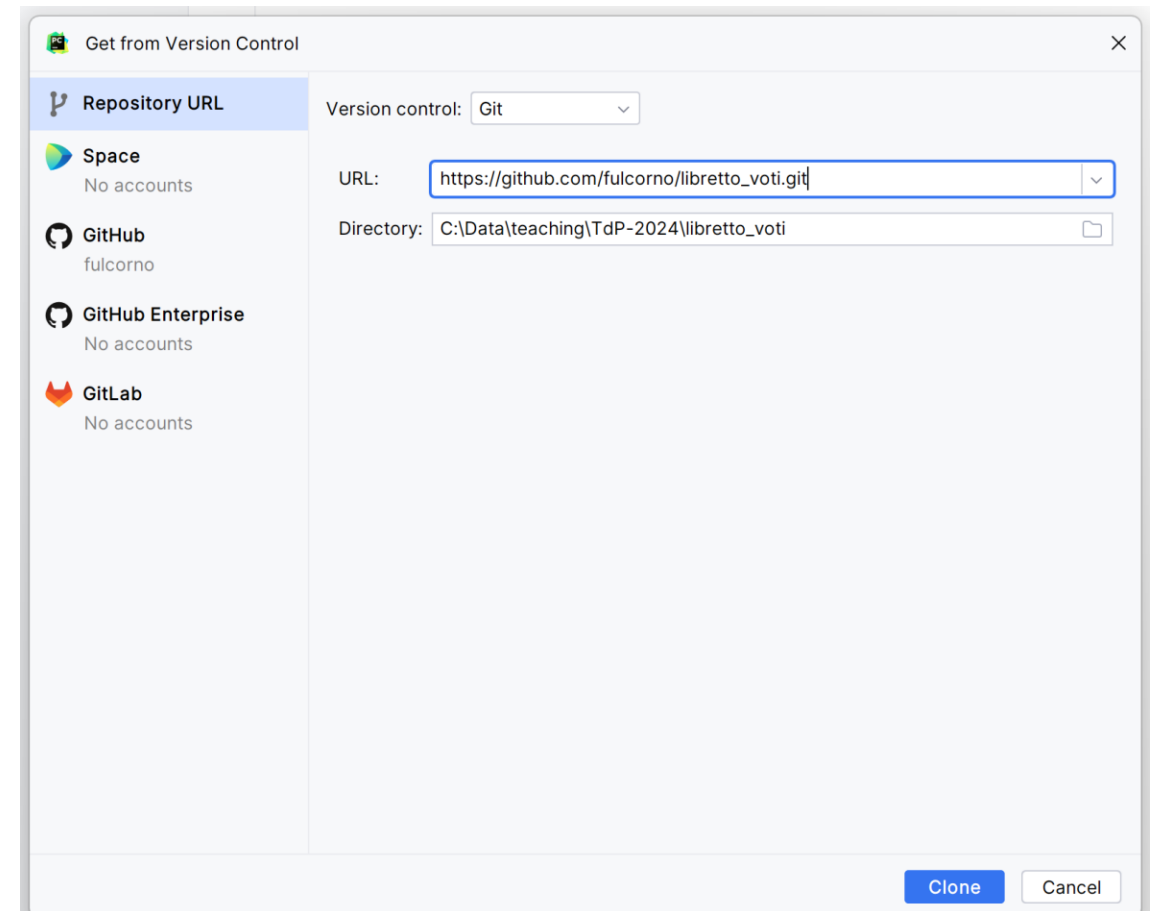
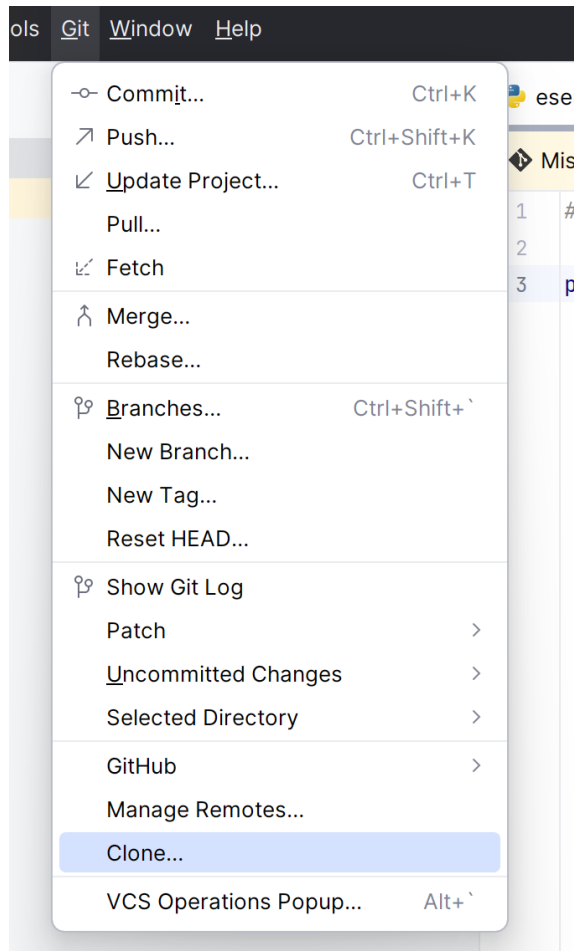
- Activity
- Custom properties
- 0 stars
- 1 watching
- 0 forks

Report repository

Copy the new project URL



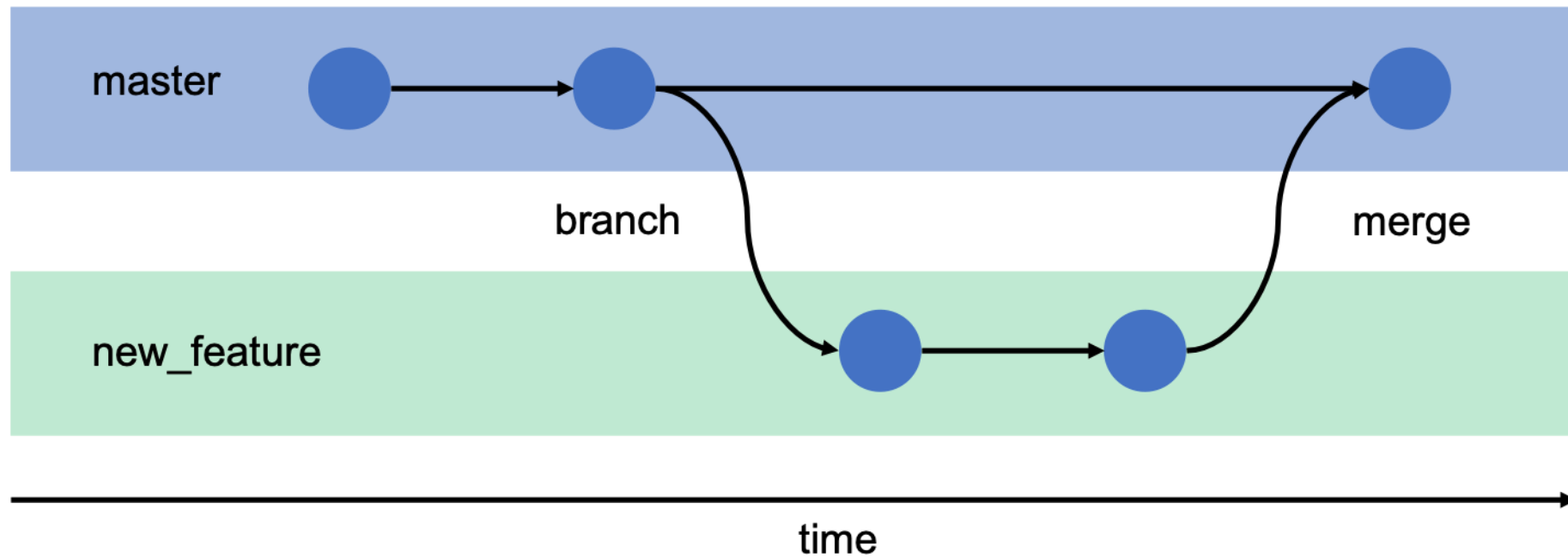
Clone the project





MORE ADVANCED GIT

Branches



Branches... in brief

- used to develop features isolated from each other
- the *main* (or *master*) branch is the “default” branch when you create a repository
 - you should use other branches for development and merge them back to the master branch upon completion
- Branches can be local (your local repo) or may be pushed to GitHub



LINKS AND REFERENCES

References

- Git Reference
 - <http://gitref.org/>
- Git - the simple guide
 - <http://rogerdudler.github.io/git-guide/>
- Git Documentation
 - <http://git-scm.com/docs>
- Pro Git (online book)
 - <http://git-scm.com/book>
- Version Control by Example (online book)
 - <http://www.ericsink.com/vcbe/>

References

- Try Git!
 - <http://try.github.io/>
- Various Git resources
 - <https://help.github.com/articles/what-are-other-good-resources-for-learning-git-and-github>
- A successful Git branching model
 - <http://nvie.com/posts/a-successful-git-branching-model/>
- Some Git (graphical) clients
 - <http://git-scm.com/downloads/guis>

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