

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)



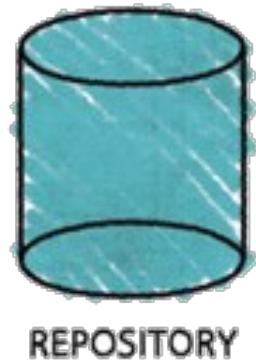
Basic Concepts

Repository: una sorta di database in cui ci sono tutti i file del progetto.

- **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

• La repository viene condivisa con tutto il team di lavoro!



Basic Concepts

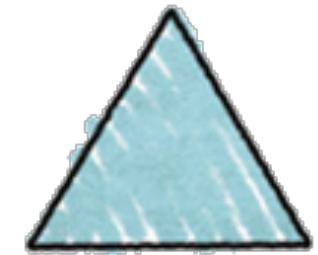
Working copy

- 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?

Copia di lavoro di TUTTI i file

↳ tiene traccia di tutte le modifiche che ho fatto sul file estratto dal repository!

↳ Modificando la working copy, non viene modificato anche il file nel repository; quando finisco di lavorare, posso salvare le modifiche al file nel repository con commit.



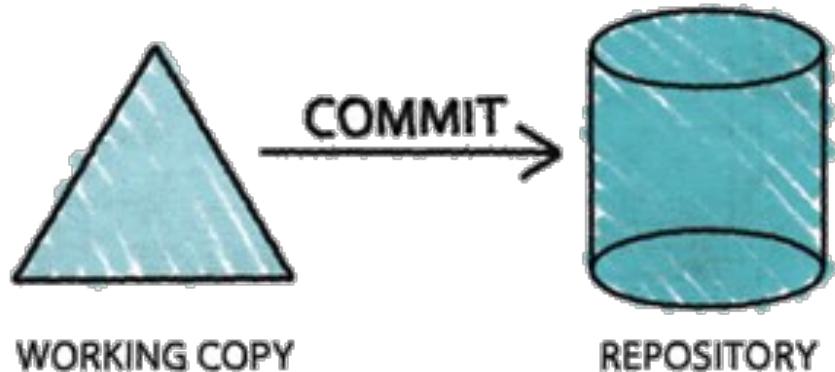
WORKING COPY

Basic Concepts

Commit

- the operation that modifies the repository
- 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

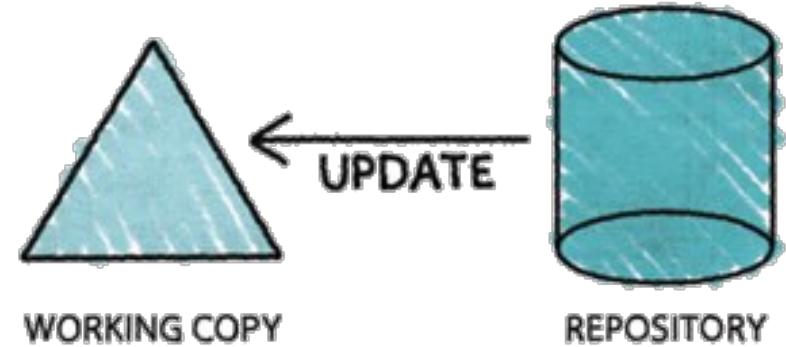
• Il **Commit** viene fatto x poter salvare le modifiche fatte sulla working copy nel file all'interno dello repository!



Basic Concepts

Update

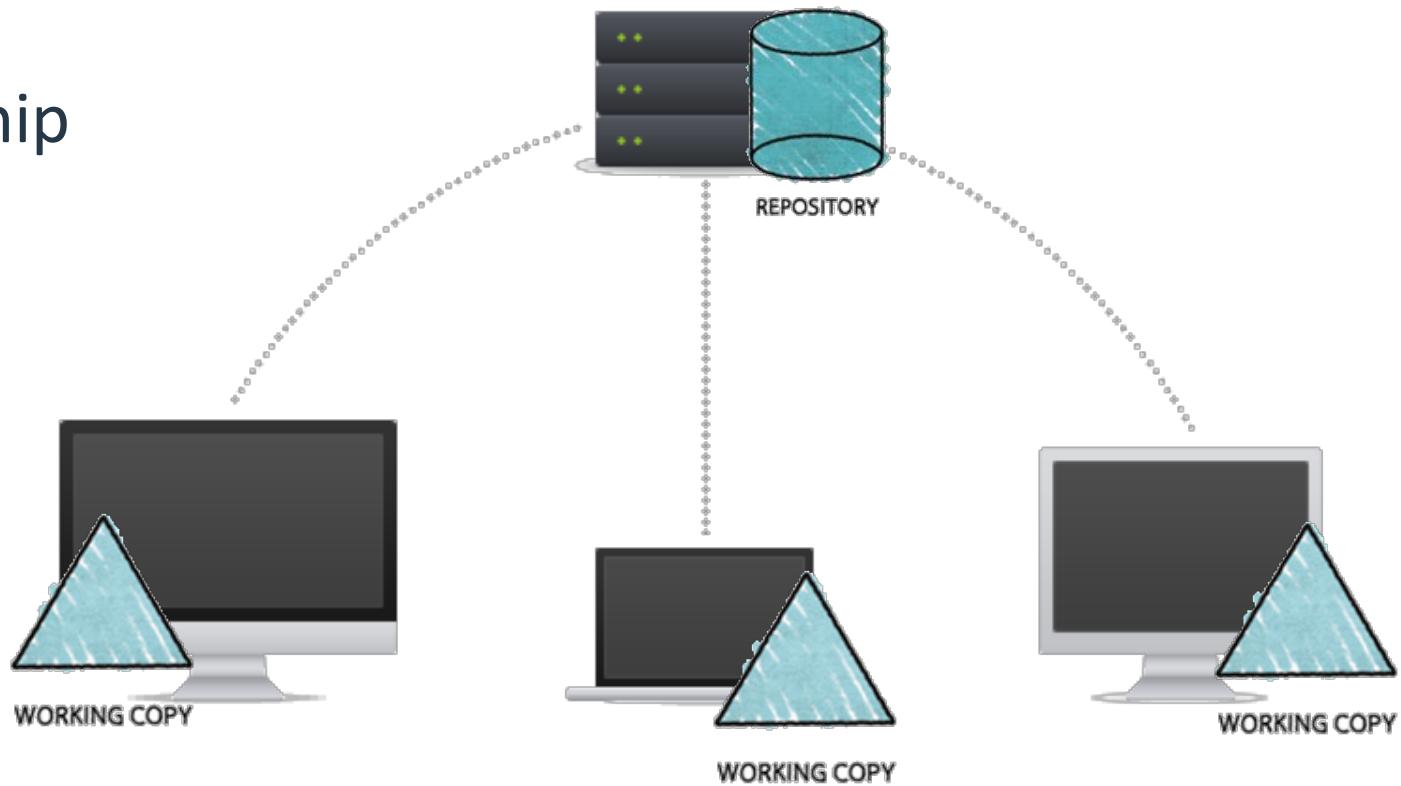
- update the working copy with respect to the repository
 - apply changes from the repository
 - merge such changes with the ones you have made to your working copy, if necessary



Centralized Version Control

- one central repository
- client-server relationship

• Le working copy stanno nei nostri computer!
• Le repository sono in un server centralizzato



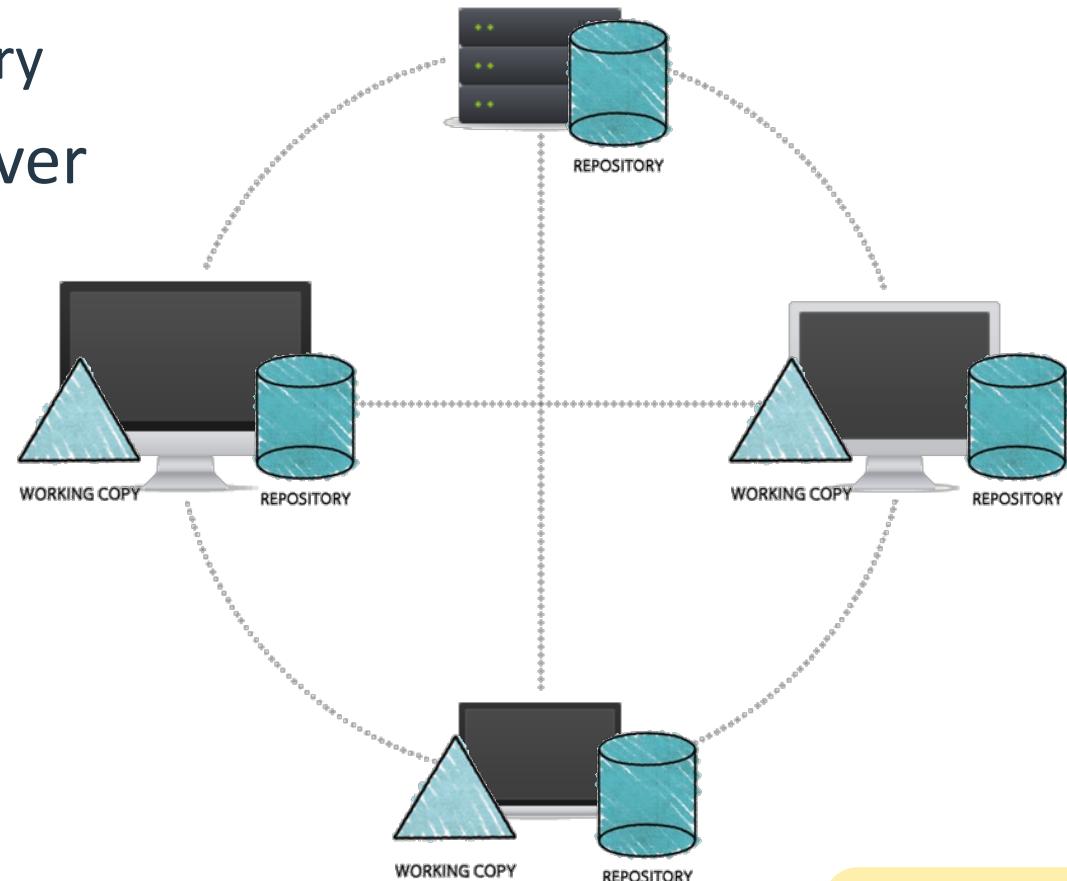
Distributed Version Control

↳ Ormai vengono usate versioni **distribuite!**

- 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

• Ora, sul mio computer, avrò sia la working copy che una copia della repository!

Il repository remoto viene modificato con le modifiche fatte sui repository locali!

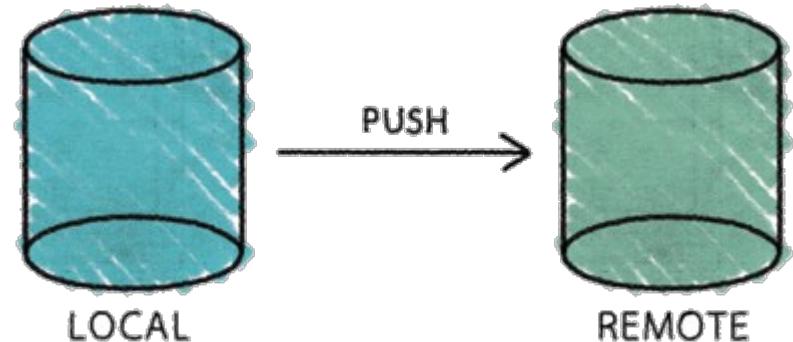


More Basic Concepts

Push

Il **PUSH** viene fatto x modificare
il repository remoto da quello locale!

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

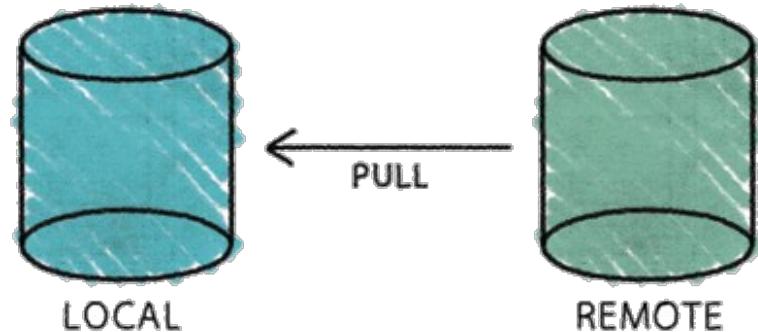


More Basic Concepts

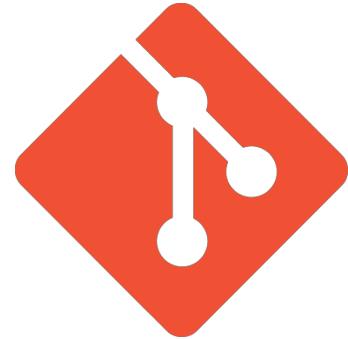
Pull

Il PULL viene fatto x modificare il repository locale
a partire da questo remoto!

- 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>
 - Git ci permette di gestire i repository locali!
- 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



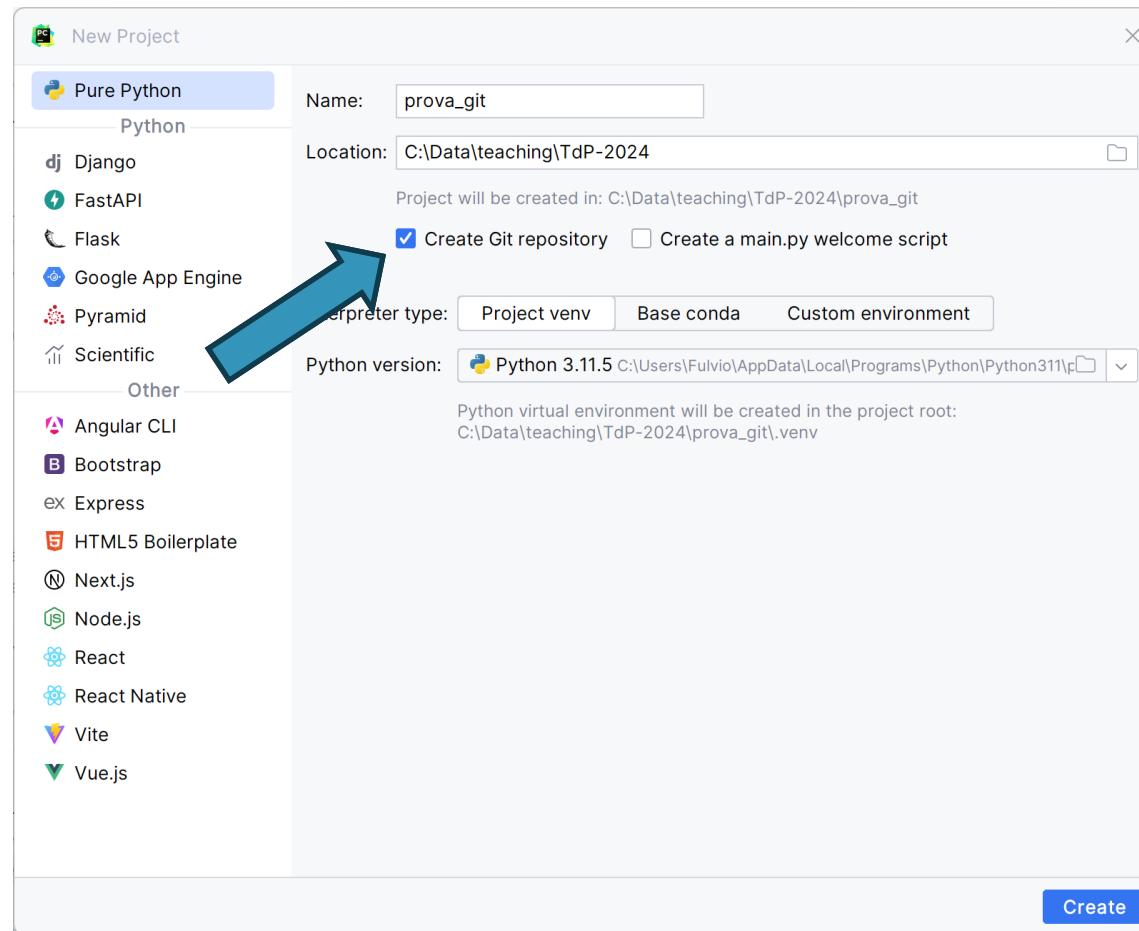
Quick introduction to Git & GitHub

GITHUB-BASED WORKFLOWS

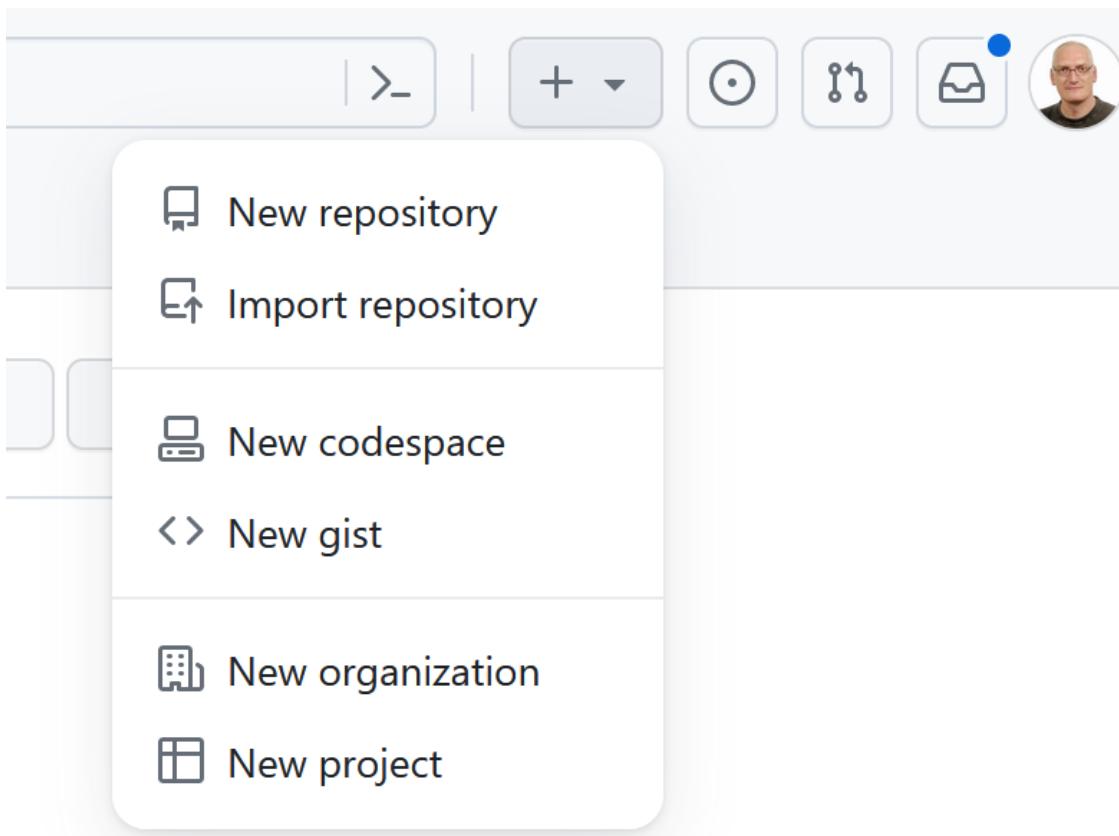
Workflow 1: “Create new project”

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



Search: 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: Start your repository with a template repository's contents.

Owner *: / Repository name *: 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: Choose which files not to track from a list of templates. [Learn more about ignoring files](#).

Choose a license: A license tells others what they can and can't do with your code. [Learn more about licenses](#).

Copy the Repository URL

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

 Set up in Desktop

or

HTTPS

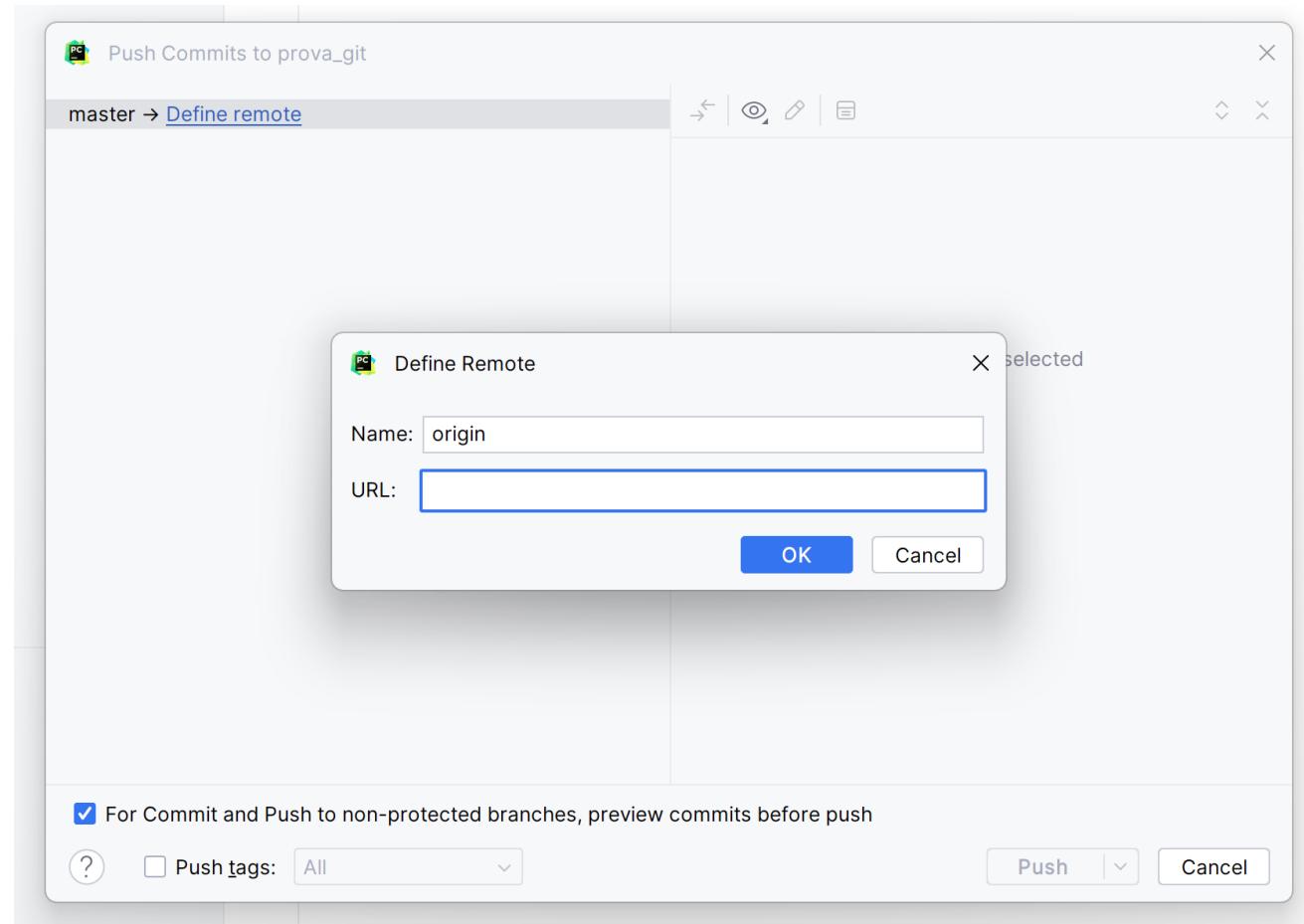
SSH

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



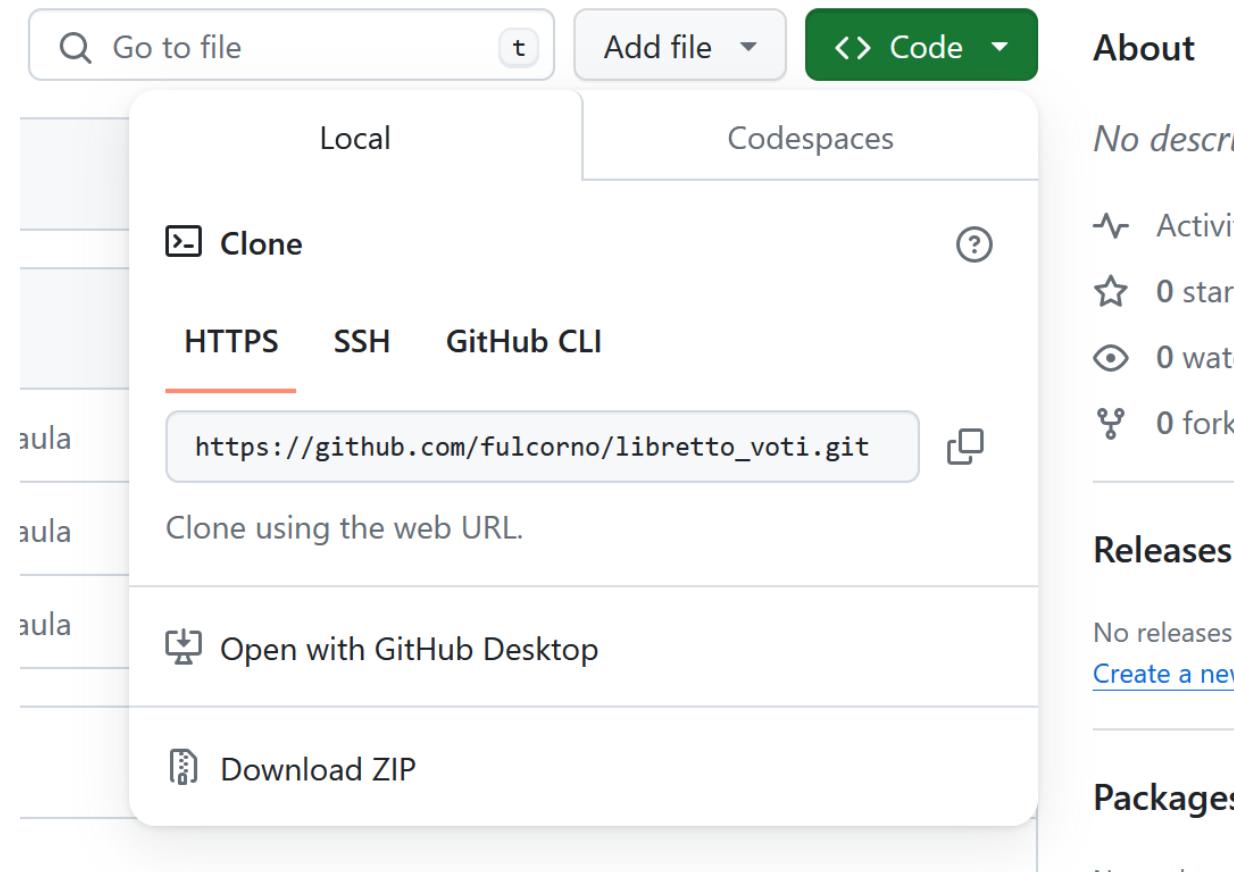
Workflow 2: “Work on a project”

- Con **Fork** copio un progetto da un repository ≠ al mio repository in remoto
x poi copiarlo nel mio repository locale con **clone**!
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
- Con **clone** prendo un repository in remoto
e lo copio nel mio repository locale!

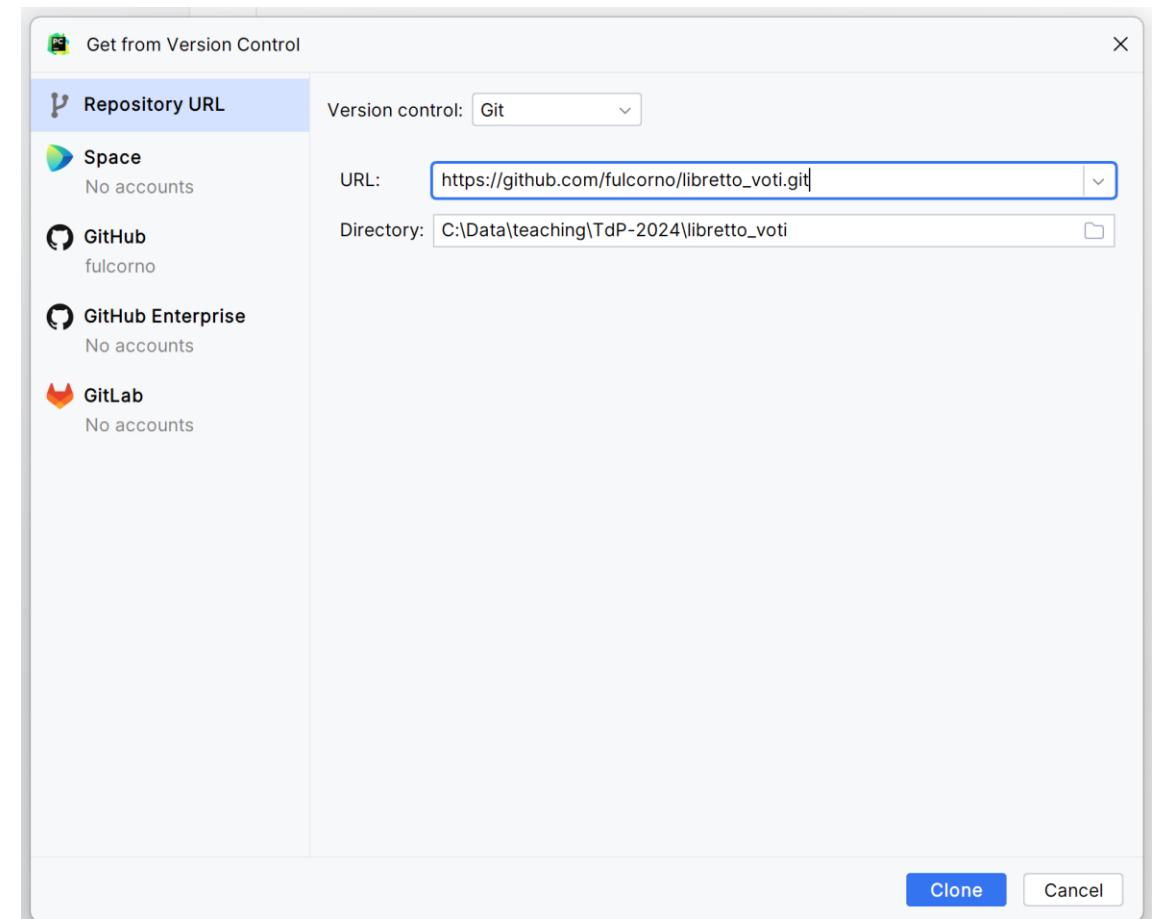
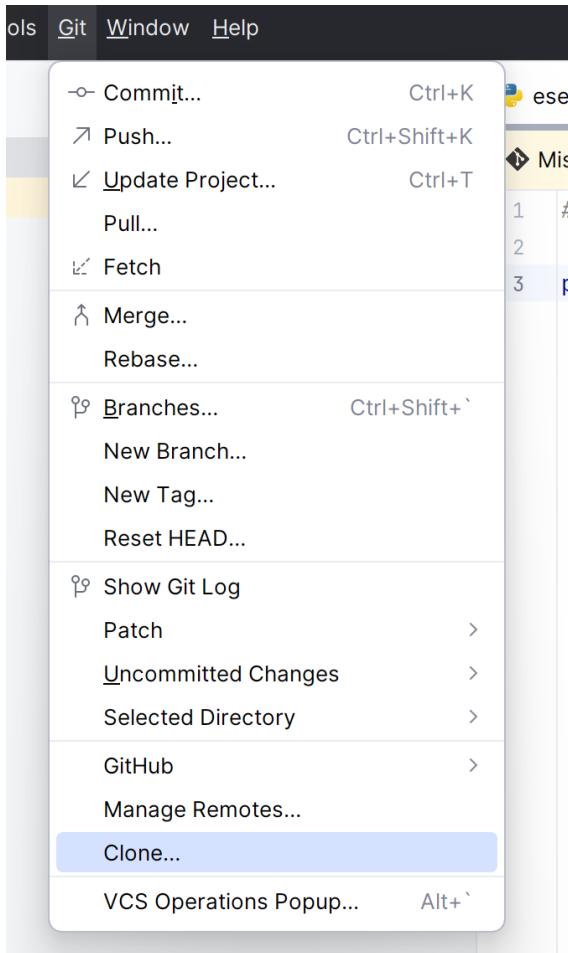
Forking the project

The screenshot shows a GitHub repository page for 'libretto_voti'. The top navigation bar includes links for Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. The 'Code' tab is selected. The repository name 'libretto_voti' is displayed as Public. The main content area shows a commit from user 'fulcorno' titled 'versione in aula' with hash f0a1c3a, made 8 hours ago. It lists three files: '.idea', '.gitignore', and 'libretto.py', all updated 8 hours ago. A 'README' file is also present. On the right, there are options to Edit Pins, Watch (1), Fork (0), and Star (0). A prominent button says 'Fork your own copy of TdP-2024/libretto_voti'. The 'About' section notes 'No description, website, or topics provided.' Below it are sections for Activity, Custom properties, and metrics (0 stars, 1 watching, 0 forks). A link to 'Report repository' is at the bottom.

Copy the new project URL



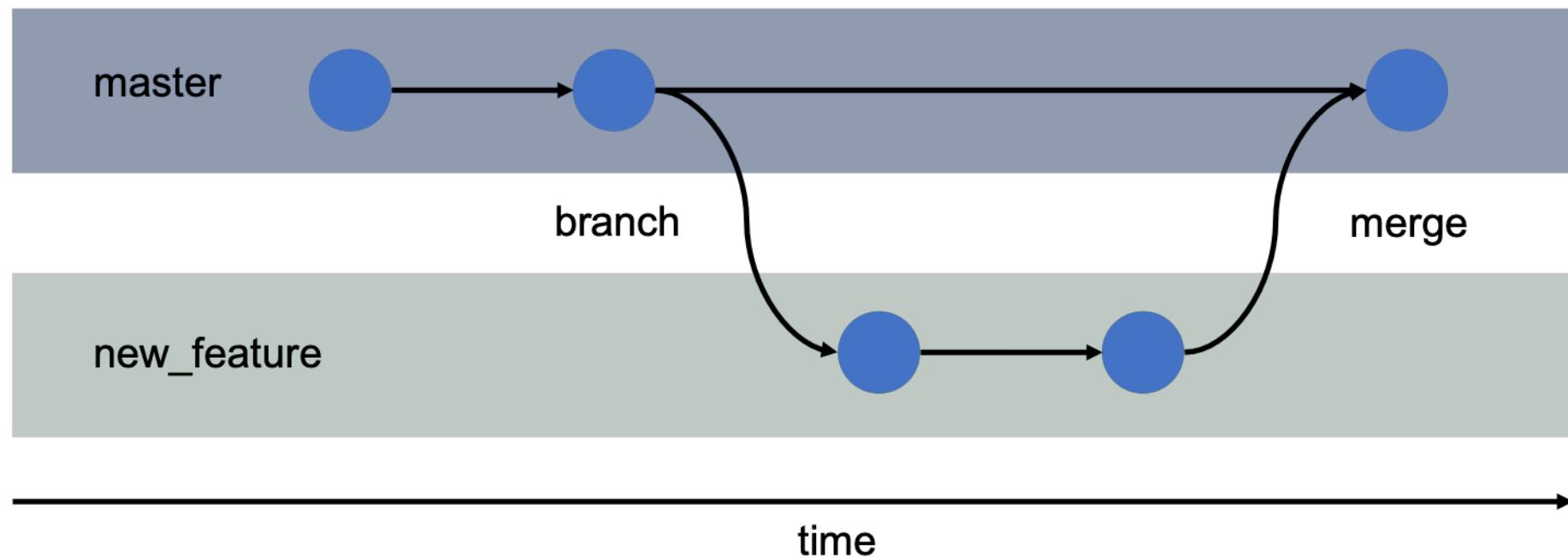
Clone the project





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



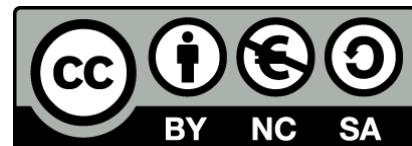
LINKS AND REFERENCES

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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