Lab: Git code versioning

Sprint 1 - Week 2

INFO 9023 - Machine Learning Systems Design

2024 H1

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Introduction

This tutorial is designed for absolute beginners with Git.

If you're already familiar with Git, this tutorial may not be useful for you.

final_code.py
final_code_v2.py
final_code_last_modif.py
real_final_code.py
ready_to_submit_code.py

Installation

Requirements to make connection with GitHub work

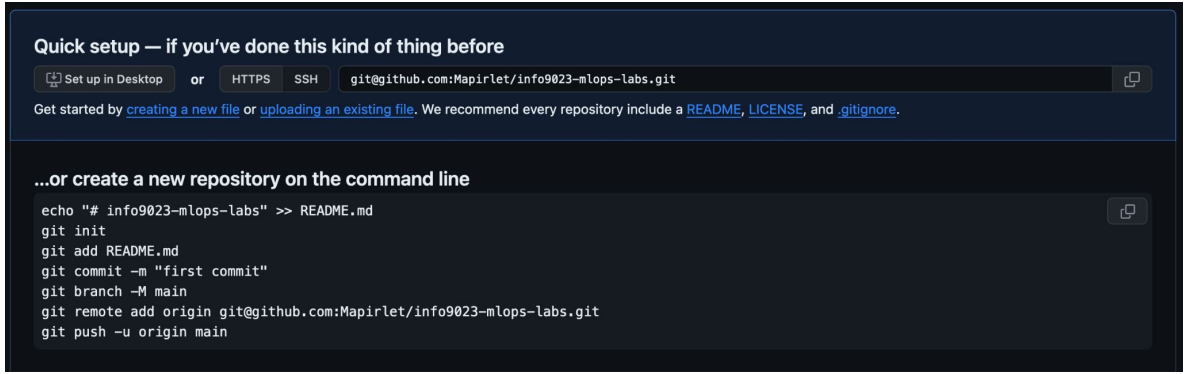
1. Download and install “Git” from https://git-scm.com/
2. Check the installation by running “git --version” in your terminal
3. Create your GitHub account on https://github.com/
4. Set Up GitHub SSH Key (mandatory to access and write data in repositories on GitHub.com)
    a. following this tutorial: https://docs.github.com/en/authentication/connecting-to-github-with-ssh

Start a new repository and publish it on GitHub

1. Open “Terminal”
2. Go to your newly created folder where you will put your codes, data, … , e.g.

```
cd /Users/Username/Desktop/Projects/GitHub/info9023-mlops-labs
```

3. On GitHub create a new repository e.g., “info9023-mlops-labs”
4. In this repository, you should see the following:



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Start a new repository and publish it on GitHub (1)

5. Select SHS and not HTPPS and then copy and paste the given commands:

```
echo #info9023-mlops-labs”>>README.md
git init
git add README.md
git commit -m “Add first commit”
git branch -M main
git remote add origin git@github.com:Username/info9023-mlops-labs.git
git push -u origin main
```

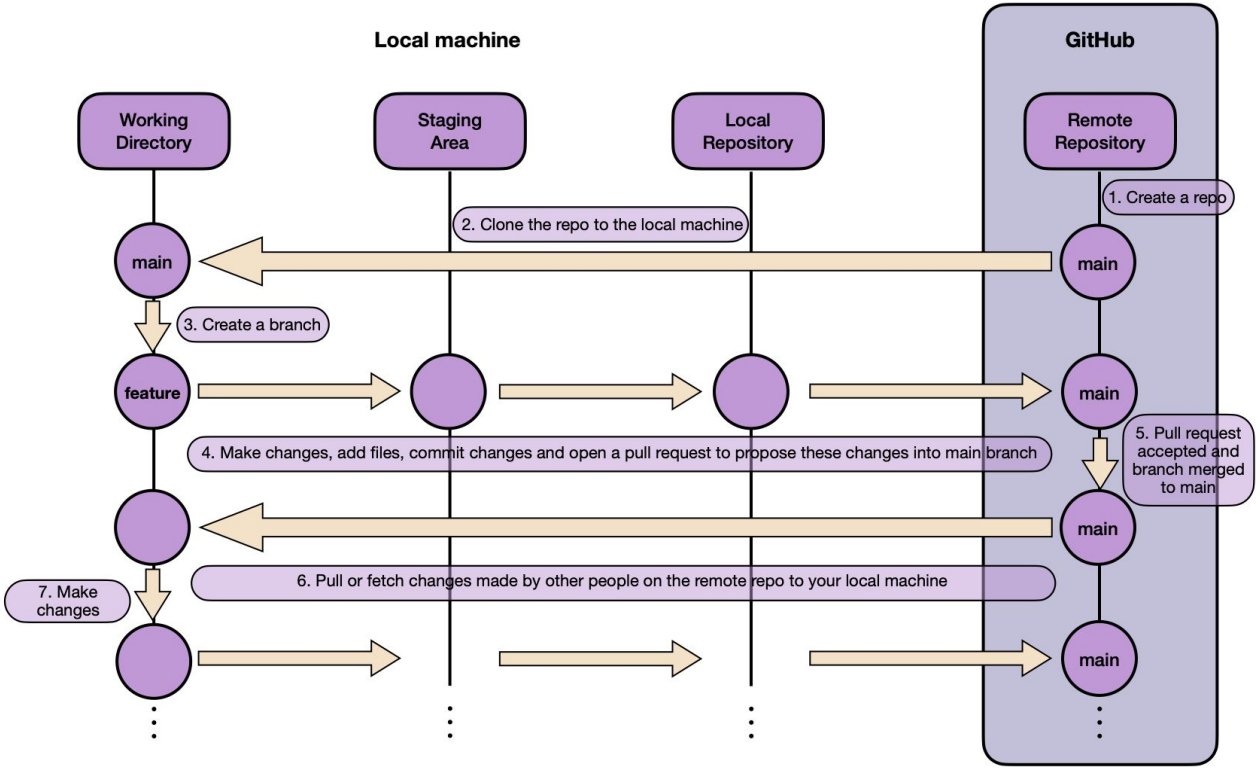

Guidelines for the commit messages: https://gist.github.com/robertpainsi/b632364184e70900af4ab688decf6f53

Contribute to an existing repository

1. Fork the project.
2. Clone this project to get it on your computer and be able to modify it.

```
git clone https://github.com/Username/repo.git
cd repo
git branch my-branch
git checkout my-branch
git add file1.md file2.md
git commit -m "my snapshot"
git push --set-upstream origin my-branch
```

3. Create a pull request to push your modifications on the project



Inspired from https://www.hostinger.co.uk/tutorials/git-tutorial

Basic Git commands

`git init` : initializes a brand-new Git repository (locally) and begins tracking an existing directory. It adds a hidden subfolder within the existing directory that houses the internal data structure required for version control (i.e., tracking every change in the different files).

`git clone` : this command creates a local copy of a project that already exists remotely. The clone includes all the project's files, history, and branches.

`git add` : stages a change. Git tracks changes to a developer's codebase, but it's necessary to stage and take a snapshot of the changes to include them in the project's history. This command performs staging, the first part of that two-step process. Any changes that are staged will become a part of the next snapshot and a part of the project's history. Staging and committing separately gives developers complete control over the history of their project without changing how they code and work.

`git commit` : saves the snapshot to the project history and completes the change-tracking process. This is the **second part** of the two-step process. In short, a commit functions like taking a photo. Anything that's been staged with `git add` will become a part of the snapshot with `git commit`.

Source : https://docs.github.com/en/get-started/using-git/about-git

Basic Git commands (1)

`git status` : shows the status of changes as untracked, modified, or staged.

`git branch` : shows the branches being worked on locally.

`git checkout` : switch to another branch and check it out into your working directory.

`git merge` : merges lines of development together. This command is typically used to combine changes made on two distinct branches. For example, a developer would merge when they want to combine changes from a feature branch into the main branch for deployment.

`git pull` : updates the local line of development with updates from its remote counterpart. Developers use this command if a teammate has made commits to a branch on a remote, and they would like to reflect those changes in their local environment.

`git push` : updates the remote repository with any commits made locally to a branch.

Source : https://docs.github.com/en/get-started/using-git/about-git

Basic Git commands (2)

`git rebase [base_branch]` : modifies the commit history to create a linear project history. It integrates changes from one branch into another while maintaining a clean and chronological sequence of commits. `git rebase [base_branch]` transfers changes from the current branch onto another branch (`base_branch`).

Useful for keeping the commit history clean and avoiding unnecessary merge commits to prepare a clean branch for a pull request.

Caution: Rewriting history can cause conflicts and should be used with care, especially in shared branches.

`git fetch` : retrieves changes from a remote repository without merging them into the local branch.When downloading content from a remote repo, `git pull` and `git fetch` commands are available to accomplish the task. You can consider `git fetch` the 'safe' version of the two commands.

Source : https://docs.github.com/en/get-started/using-git/about-git

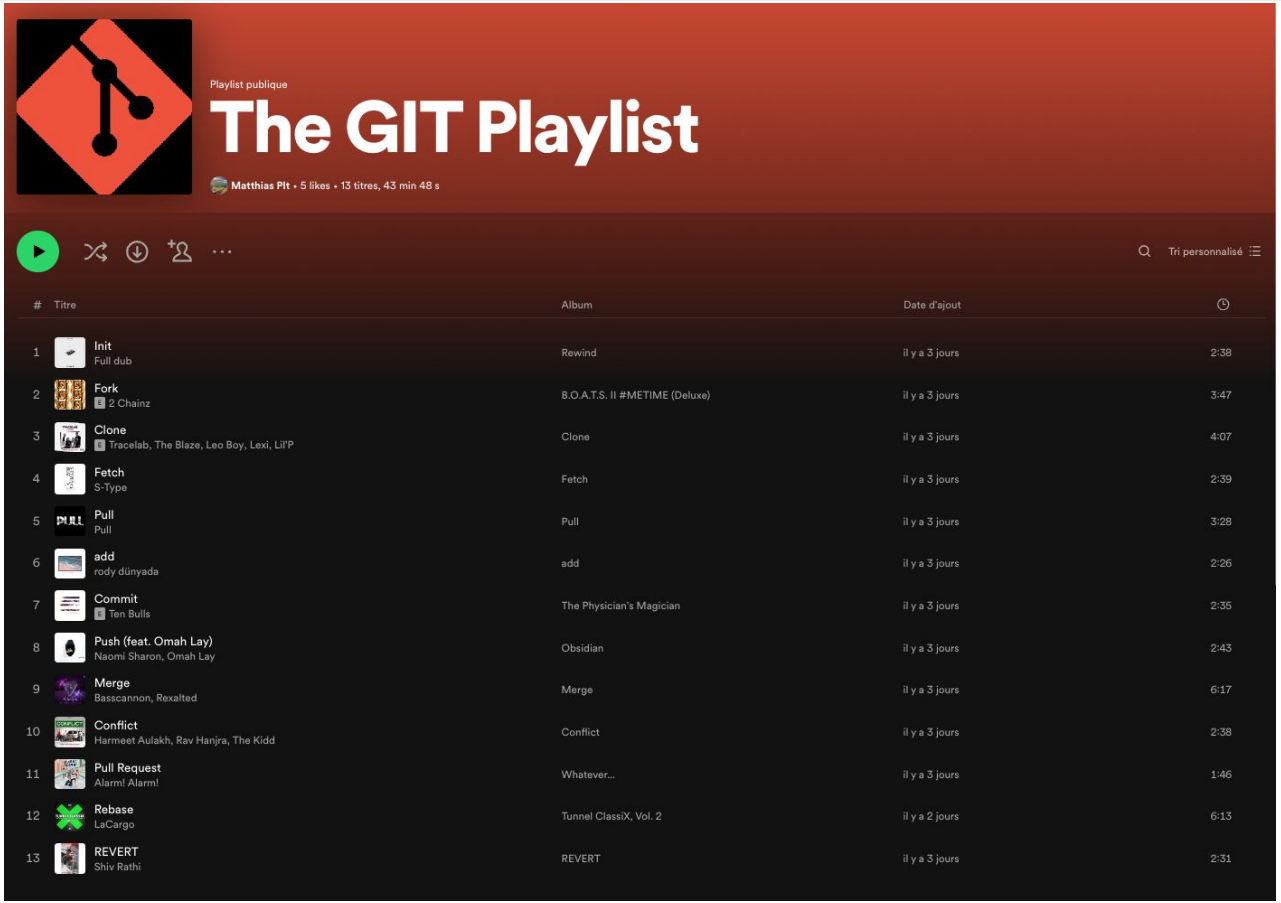
Basic Git commands (3)

`pull request` : A pull request (PR) is a mechanism for proposing changes to a codebase hosted on platforms like GitHub, GitLab, or Bitbucket. This facilitates collaboration and code review in a distributed development environment. The workflow is the following:

1. Developer forks the repository or creates a branch.
2. Developer makes changes in their branch.
3. Developer opens a pull request to propose the changes.
4. Team members review the changes, discuss, and suggest modifications.
5. Once approved, changes are merged into the target branch.

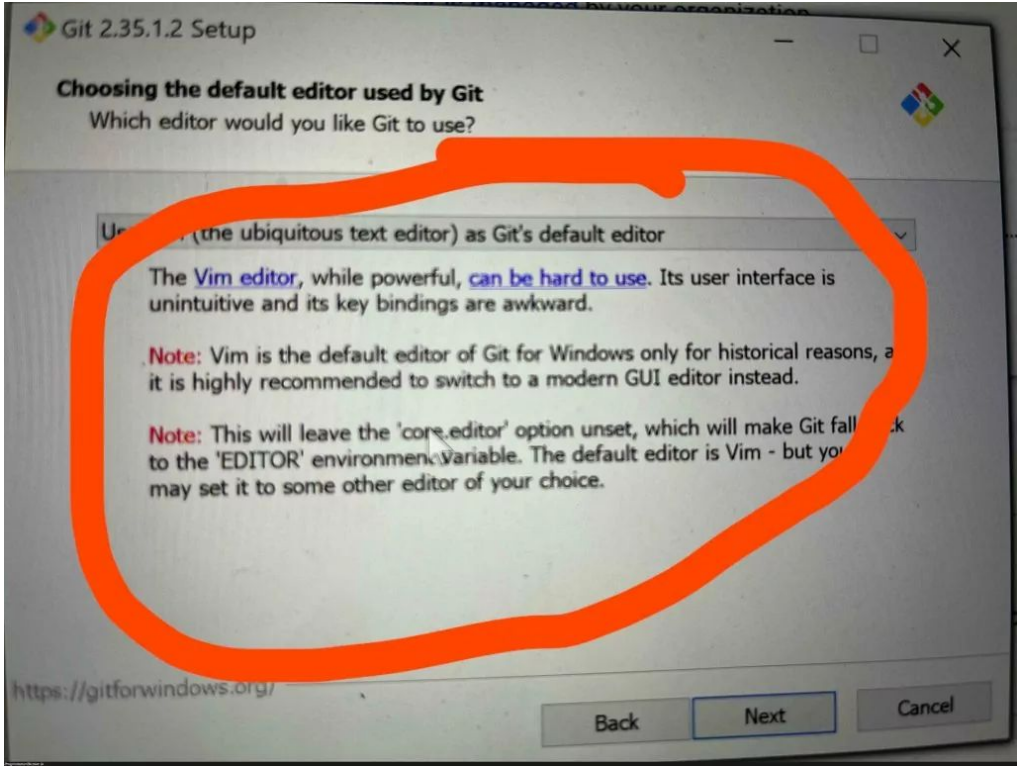
Cheat sheet: https://education.github.com/git-cheat-sheet-education.pdf

Source : https://docs.github.com/en/get-started/using-git/about-git



https://open.spotify.com/playlist/1wNirTC24xxOGVDAKf9sXu?si=ff946034ee364e5e

Git UIs



https://programmerhumor.io/linux-memes/installing-git-offended-me-today/

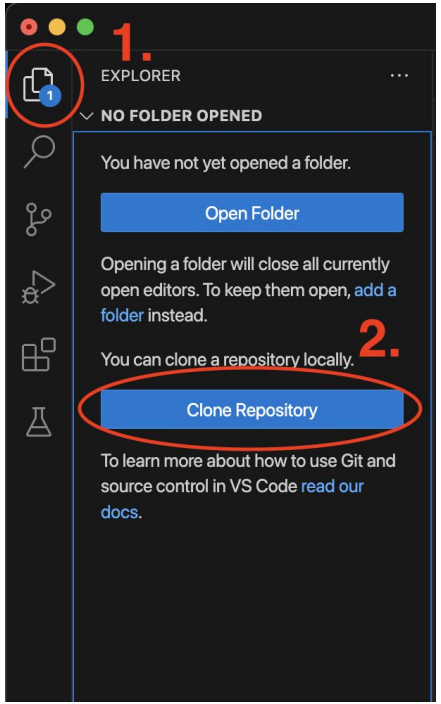
Git UIs

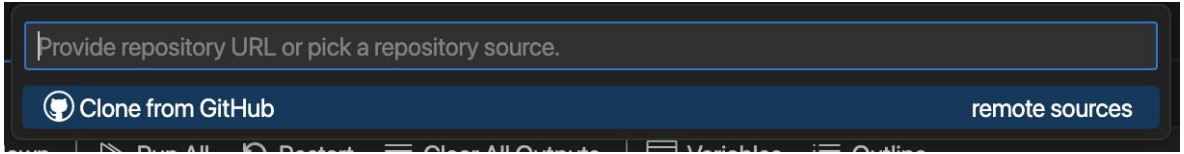
https://desktop.github.com/

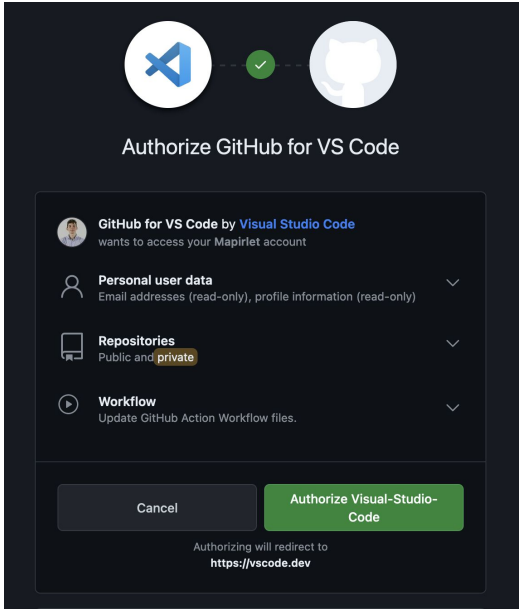
PyCharm for code versioning with GitHub:
https://www.jetbrains.com/help/pycharm/manage-projects-hosted-on-github.html

VSCode for code versioning with GitHub: https://vscode.github.com/

VSCode: clone a project







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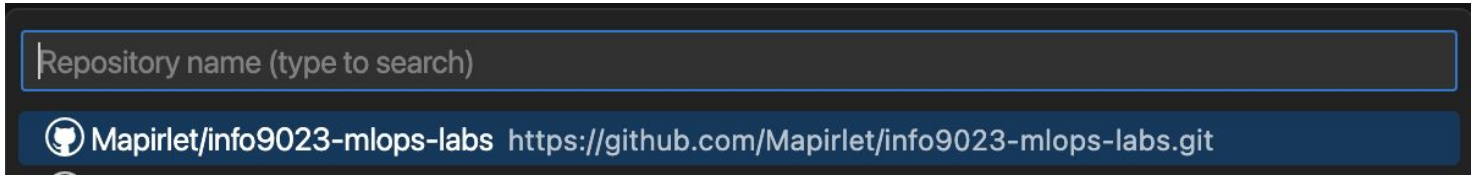
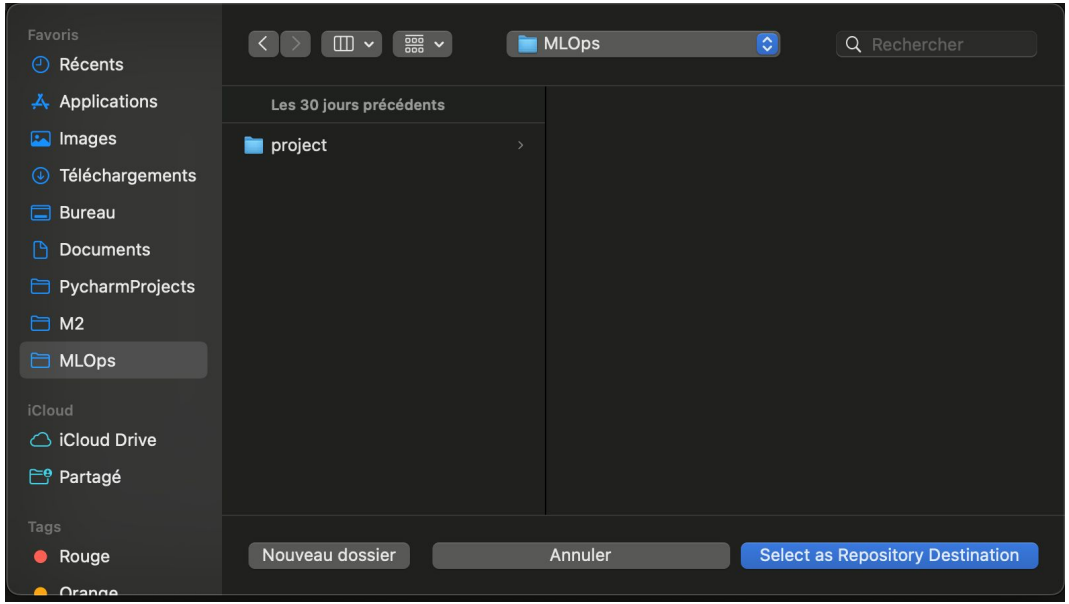
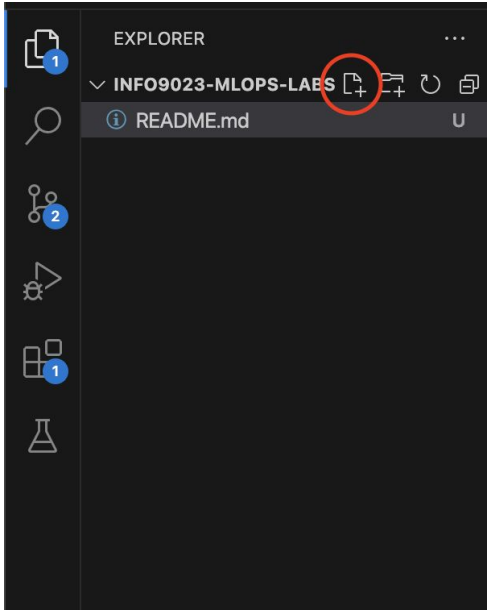
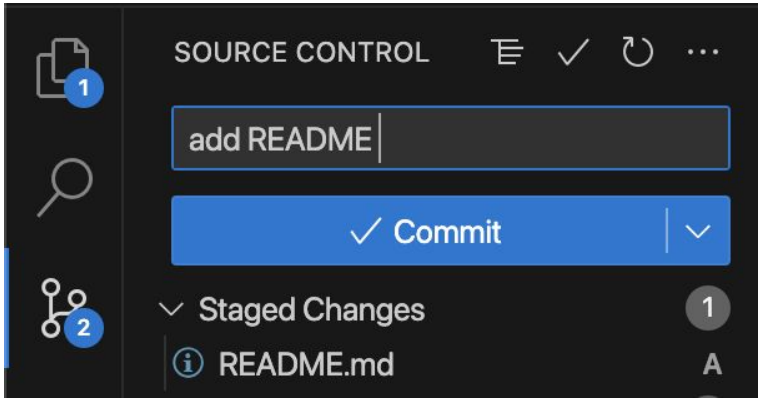
VSCode: clone a project (1)

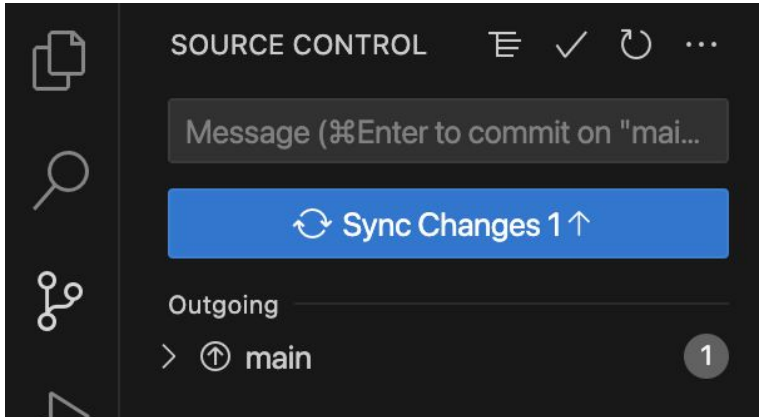




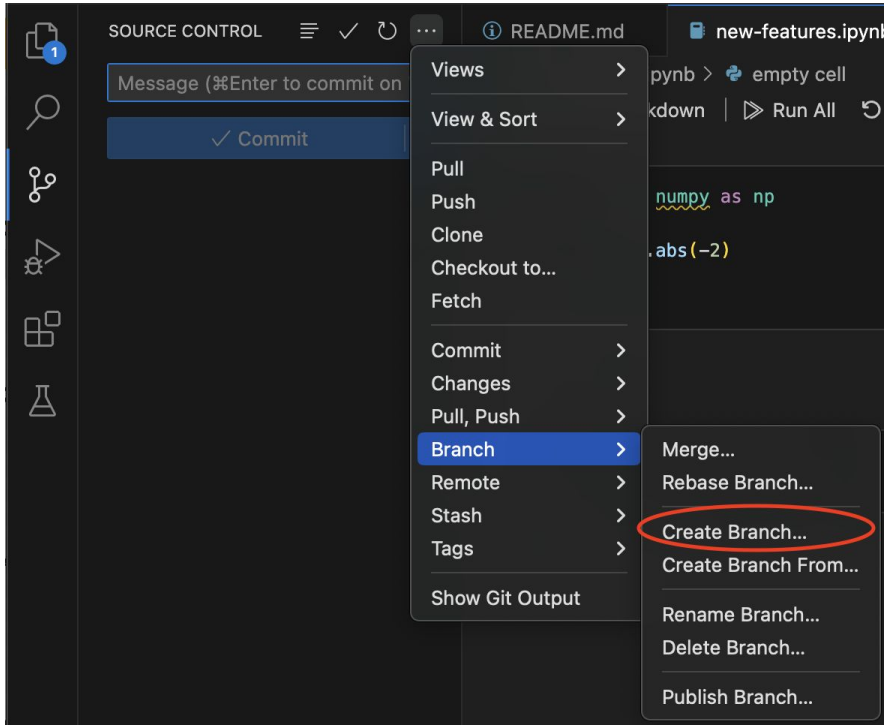
VSCode: clone a project (2)

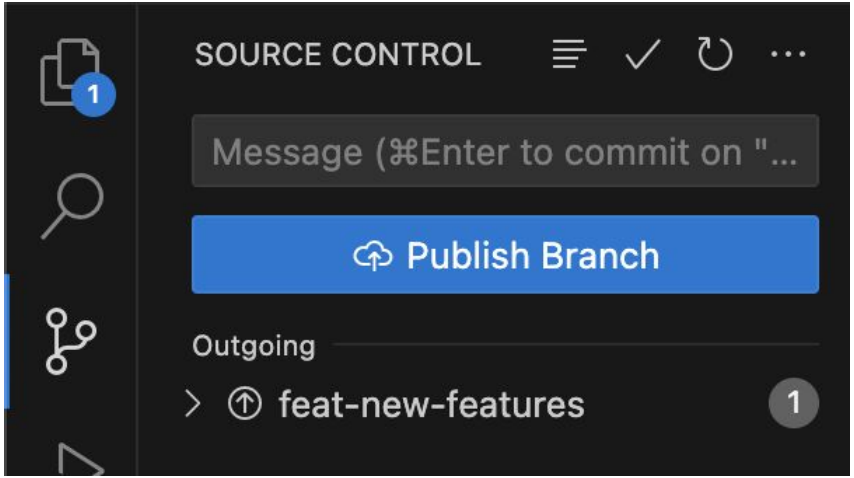




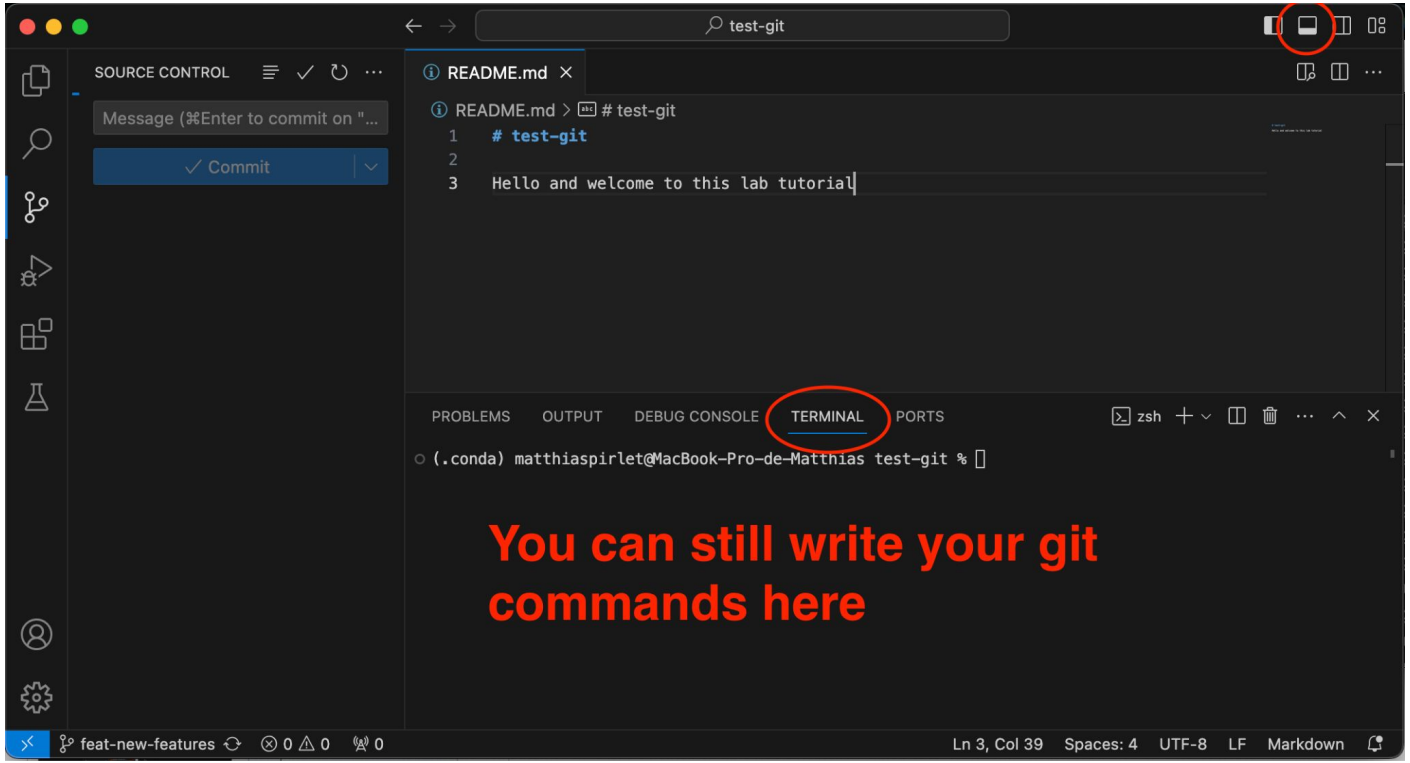


VSCode: create a new branch





VSCode: terminal and git commands



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In the event of false manipulation or error

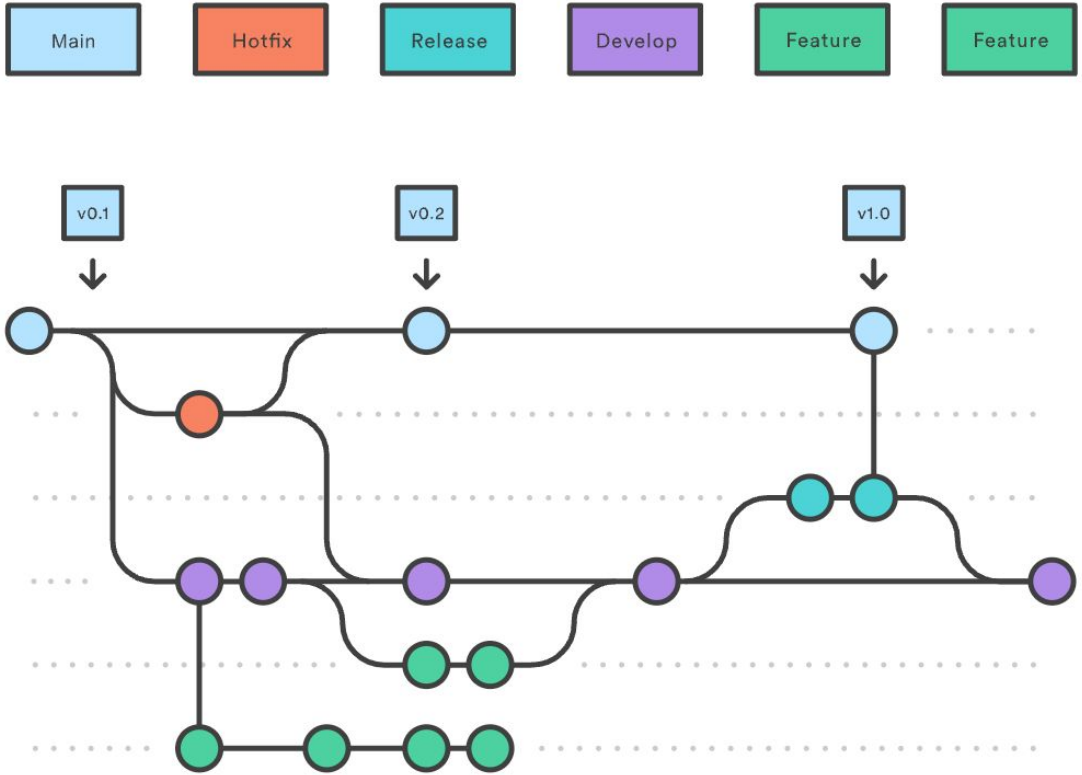
If you've done something you shouldn't have:

https://ohshitgit.com/

This is the solution to all your problems.

GitFlow

Reminder



GitFlow (1)

Installation

- Windows : already installed when you install latest version of Git.
- MacOS : `$ brew install git-flow`
- Linux : `$ apt-get install git-flow`

https://skoch.github.io/Git-Workflow/

GitFlow (2)

Initialization

Create your project in GitHub, create your local folder and

```
$ cd my/project
$ git init
$ git add .
$ git commit -am "Initial commit"
$ git remote add origin git@github.com:username/Project-Name.git
$ git push -u origin main
```

GitFlow (3)

Features

Prepare repository for development :

```
$ git checkout -b develop
```

```
$ git push -u origin develop
```

Setup Git Flow :

```
$ git flow init -d
```

Developing features :

```
$ git flow feature start my-feature
```

```
$ git commit -am "Pithy commit message"
```

GitFlow (4)

Release

When finished :

```
$ git flow feature finish my-feature
```

Releasing

Before releasing, check for the existence of known tags so you **know** what to name the release :

```
$ git fetch --tags
```

Start release :

```
$ git flow release start 1.0
```

GitFlow (5)

Release

Update README and commit using appropriate commit message

```
$ git commit -am "Bumped version number to 1.0"
```

Make any last minute updates/changes. NO FEATURE DEVELOPMENT!:

```
$ git flow release finish 1.0
```

Update remotes :

```
$ git push origin main
$ git push origin develop
$ git push --tags
```

GitFlow (6)

Hotfixes

If you need to make a fix on a live version

```
$ git flow hotfix start 1.0.1
```

Update the README file and commit:

```
$ git commit -am "Bumped version number to 1.0.1"
```

Fix the issue and commit those changes :

```
$ git commit -am "Fixed major issue with site!"
```

Finish the hotfix :

```
$ git flow hotfix finish 1.0.1
```

GitFlow (7)

Hotfixes

Finally, update the remotes :

```
$ git push origin main
$ git push origin develop
$ git push --tags
```