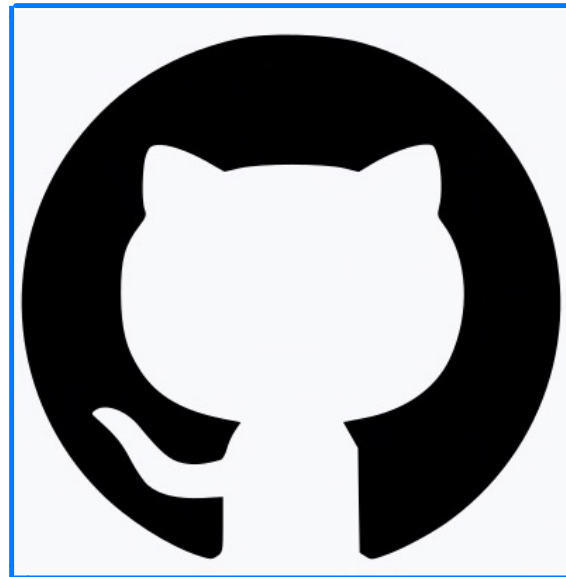


Proseminar on computer-assisted mathematics

Session 3 – Introduction to GIT



The GitHub "invertocat" logo

Florent Schaffhauser
Heidelberg University, Summer semester 2023

What Git is:

A distributed version control system originally authored by Linus Torvalds in 2005.

What Git does:

It tracks changes in computer files.

What Git is usually used for:

Coordinating work among people working collaboratively on a project.

What GitHub is:

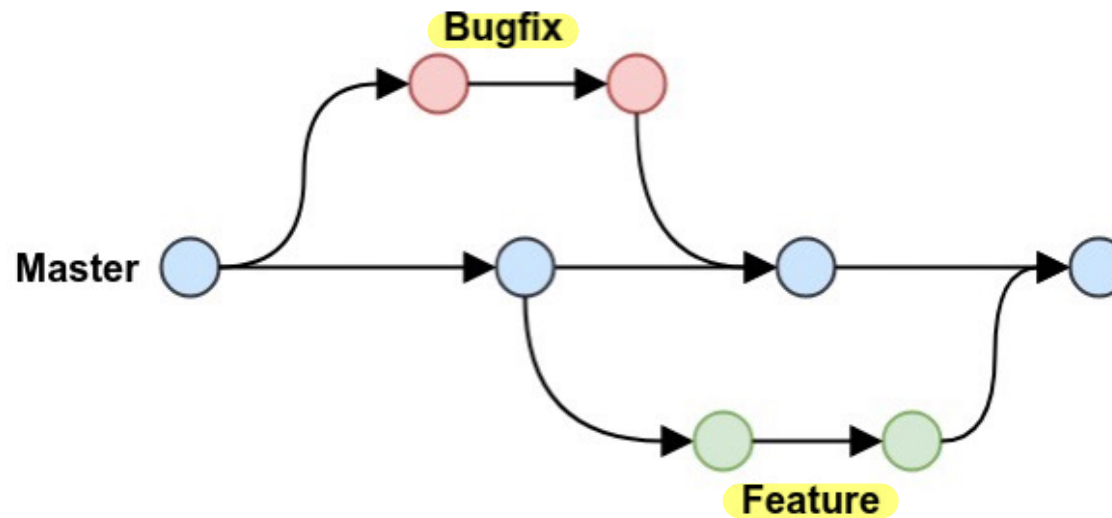
An Internet hosting service for software development and version control using Git. Created in 2008, it has been a subsidiary of Microsoft since 2018.

Other options: GitLab, Gitea.

Branches

A characteristic feature of Git is the existence of **branches**.

Branches allow for **distributed** and **parallel** workflows, that can later be **merged** back to the main workflow of the project:



Concretely, projects administered via Git are stored in a repository that can be cloned by anyone who wants to use it.

(*)

The screenshot shows the GitHub interface for the repository 'matematiflo / Comp_assisted_math'. At the top, there are navigation tabs: Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. Below these, there's a section for the repository's metadata, including a '2023_SoSe' branch selector, 'Go to file', 'Add file', 'Code', and 'Use this template' buttons. The main content area displays a list of files and folders: 'Sage' (Created Sage folder for code files, 2 weeks ago), 'src' (Updated src repo, 2 weeks ago), '.gitignore' (Updated repo, last week), 'README.md' (Create README.md, 3 weeks ago), and 'leanpkg.toml' (Updated toml file, last month). Below this list, the 'README.md' file is expanded, showing the title 'Comp_assisted_math' and the subtitle 'Computer assisted mathematics'. The main text of the README states: 'This is the GitHub repository for the Proseminar on computer-assisted mathematics held at the University of Heidelberg in Summer Semester 2023.' On the right side, there's an 'About' section with the description 'Computer assisted mathematics', 'sage' and 'lean' tags, 'Readme', '1 star', '1 watching', and '0 forks'. Below that, there's a 'Releases' section with 'No releases published' and a 'Create a new release' button. Further down, there's a 'Packages' section with 'No packages published' and a 'Publish your first package' button. At the bottom, there's a 'Languages' section showing a bar chart with 'Jupyter Notebook' at 67.4%.

matematiflo / Comp_assisted_math Public template

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

2023_SoSe Go to file Add file <> Code Use this template

matematiflo Updated repo 27d17f4 last week 26 commits

| | | |
|--------------|------------------------------------|-------------|
| Sage | Created Sage folder for code files | 2 weeks ago |
| src | Updated src repo | 2 weeks ago |
| .gitignore | Updated repo | last week |
| README.md | Create README.md | 3 weeks ago |
| leanpkg.toml | Updated toml file | last month |

README.md

Comp_assisted_math

Computer assisted mathematics

This is the GitHub repository for the Proseminar on computer-assisted mathematics held at the University of Heidelberg in Summer Semester 2023.

About

Computer assisted mathematics

sage lean

Readme

1 star

1 watching

0 forks

Releases

No releases published

Create a new release

Packages

No packages published

Publish your first package

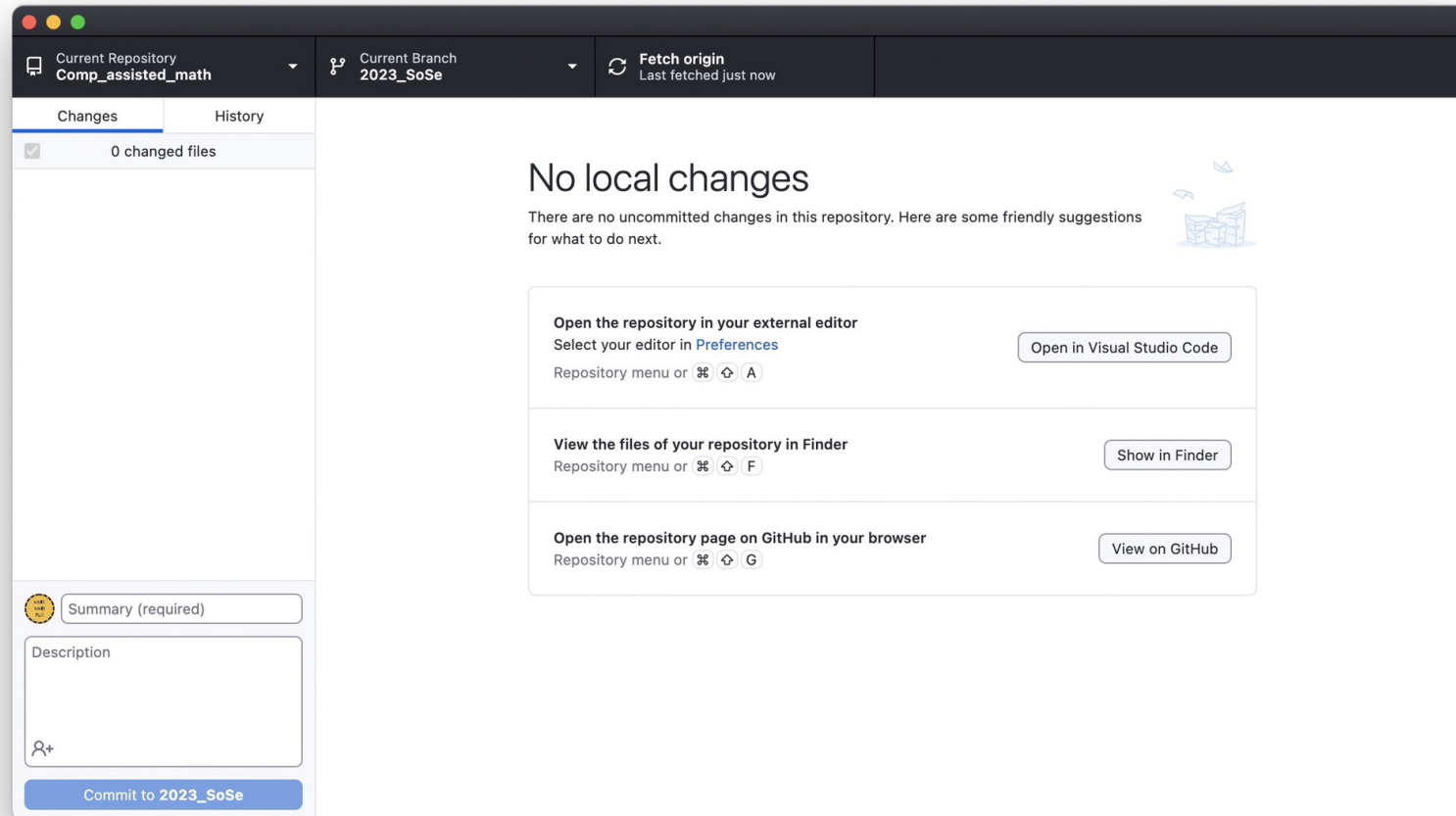
Languages

Jupyter Notebook 67.4%

The chosen branch

(*) The repository for our seminar

You can create repositories on your GitHub account, and manage them using **GitHub Desktop**:



Download it at desktop.github.com !

Assignment #1 (due on 15.05.2023)

Learn the basics of Git and create a short personal presentation file in Markdown format in the repository that will be created for you.

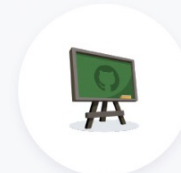
- 1 Team up and go to the Zulip channel to get the link for the assignment.
- 2 Follow the step-by-step from this file.

Step 1

Click on the link
and login to GitHub
Classroom using
your GitHub account.

You will need to enter
the name of your
team! Please use
something that I can
easily link to you :-)

Example: Flo-Teammate.



Sign in to GitHub
to continue to GitHub Classroom

Username or email address

Password

[Forgot password?](#)

Sign in

New to GitHub? [Create an account.](#)

This is what you should see next:

matematilab-seminar-on-comp-assisted-math-2023

Accept the group assignment — learn-the-basics-of-git

Before you can accept this assignment, you must create or join a team. Be sure to select the correct team as you won't be able to change this later.

Create a new team

Flo-Teammate

+ Create team



You have successfully created team: Flo-Teammate



matematilab-seminar-on-comp-assisted-math-2023

Accept the assignment — learn-the-basics-of-git

Once you accept this assignment, you will be granted access to the
`learn-the-basics-of-git-matematiflo` repository in the
[matematilab](#) organization on GitHub.

Accept this assignment

Hold on...



You accepted the assignment, **learn-the-basics-of-git** . We're configuring your repository now. **This may take a few minutes to complete.**
Refresh this page to see updates.

 Your assignment is due by **May 15, 2023, 15:00 CEST**

Note: You may receive an email invitation to join [matematilab](#) on your behalf. No further action is necessary.



You're ready to go — Flo-Teammate


You accepted the assignment, **learn-the-basics-of-git**.

Your team's assignment repository has been created:

 <https://github.com/matematilab/learn-the-basics-of-git-flo-teammate>

We've configured the repository associated with this assignment (update).



 Your assignment is due by **May 15, 2023, 15:00 CEST**

Click
here



You can ignore this.

Use this address later to
go back to your repository.
My advice: **copy-paste it
somewhere!**

Step 2

Add a bookmark for the webpage you are at and start exploring your repository.

You will need to protect your branch (See instructions below).

Next, open Codespaces, modify the README.md file and then save it (see instructions below).

Finally, create a personal-presentation.md file and write something in it!

Protect your (main) branch

matematilab / **learn-the-basics-of-git-flo-teammate** Private
generated from matematilab/github-starter-course

Edit Pins Unwatch 1 Fork 0 Star 0 Checklist

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

main 2 branches 0 tags Go to file Add file Code

Your main branch isn't protected
Protect this branch from force pushing or deletion, or require status checks before merging. [Learn more](#) **Protect this branch** ×

github-classroom[bot] Add assignment deadline url 89a4963 10 minutes ago 3 commits

README.md Add assignment deadline url 10 minutes ago

README.md

Review the assignment due date Open in Visual Studio Code

The Basics of GitHub

About
learn-the-basics-of-git-flo-teammate created by GitHub Classroom
Readme 0 stars 1 watching 0 forks

Releases
No releases published
[Create a new release](#)

Packages
No packages published
[Publish your first package](#)

⚙️ General

Access

👤 Collaborators and teams

Code and automation

🔗 Branches

📁 Tags

📋 Rules

Beta

 ▾

🎬 Actions ▾

🔗 Webhooks

📁 Environments

💻 Codespaces

📄 Pages

Security

🔍 Code security and analysis

🔑 Deploy keys

🔒 Secrets and variables ▾

Branch protection rule



Protect your most important branches

[Branch protection rules](#) define whether collaborators can delete or force push to the branch and set requirements for any pushes to the branch, such as passing status checks or a linear commit history.

Branch name pattern *

Protect matching branches

☐ Require a pull request before merging

When enabled, all commits must be made to a non-protected branch and submitted via a pull request before they can be merged into a branch that matches this rule.

☐ Require status checks to pass before merging

Choose which [status checks](#) must pass before branches can be merged into a branch that matches this rule. When enabled, commits must first be pushed to another branch, then merged or pushed directly to a branch that matches this rule after status checks have passed.

Before

After

Protect matching branches

☒ Require a pull request before merging

When enabled, all commits must be made to a non-protected branch and submitted via a pull request before they can be merged into a branch that matches this rule.

☒ Require approvals

When enabled, pull requests targeting a matching branch require a number of approvals and no changes requested before they can be merged.

Required number of approvals before merging: 1 ▾

☐ Dismiss stale pull request approvals when new commits are pushed

New reviewable commits pushed to a matching branch will dismiss pull request review approvals.

☐ Require review from Code Owners

Require an approved review in pull requests including files with a designated code owner.

☐ Restrict who can dismiss pull request reviews

Specify people, teams, or apps allowed to dismiss pull request reviews.

☐ Allow specified actors to bypass required pull requests

Specify people, teams, or apps who are allowed to bypass required pull requests.

☐ Require approval of the most recent reviewable push

Whether the most recent reviewable push must be approved by someone other than the person who pushed it.

Scroll to the bottom and click on "Create".

this rule.

☐ **Lock branch**
Branch is read-only. Users cannot push to the branch.

☐ **Do not allow bypassing the above settings**
The above settings will apply to administrators and custom roles with the "bypass branch protections" permission.

☐ **Restrict who can push to matching branches**
Specify people, teams, or apps allowed to push to matching branches. Required status checks will still prevent these people, teams, and apps from merging if the checks fail.

Rules applied to everyone including administrators

☐ **Allow force pushes**
Permit force pushes for all users with push access.

☐ **Allow deletions**
Allow users with push access to delete matching branches.

Create

Branch protection rule created.

matematilab / learn-the-basics-of-git-flo-teammate Private

generated from matematilab/github-starter-course

Edit Pins

Unwatch 1

Fork 0

Star 0

Checklist

Code

Issues

Pull requests

Actions

Projects

Wiki

Security

Insights

Settings

General

Access

Collaborators and teams

Code and automation

Branches

Tags

Rules

Beta

Actions

Webhooks

Environments

Branch protection rules

Add rule

main

Currently applies to 1 branch

Edit

Delete

It's done!

Start reading the README.md file

Table of contents

README.md

Filter headings

The Basics of GitHub

- 🧐 Course overview and learning outcomes
- 🐙 Git and GitHub
- 🐙 Understanding the GitHub flow
- Repositories
- Cloning
- Committing and pushing
- 📖 GitHub terms to know

Git and GitHub

Git is a **distributed Version Control System (VCS)**, which means it is a useful tool for easily tracking changes to your code, collaborating, and sharing. With Git you can track the changes you make to your project so you always have a record of what you've worked on and can easily revert back to an older version if need be. It also makes working with others easier—groups of people can work together on the same project and merge their changes into one final source!

GitHub is a way to use the same power of Git all online with an easy-to-use interface. It's used across the software world and beyond to collaborate and maintain the history of projects.

[Open in Visual Studio Code](#)

Link at the bottom of the README file.

Resources

- [A short video explaining what GitHub is](#)
- [Git and GitHub learning resources](#)
- [Understanding the GitHub flow](#)
- [How to use GitHub branches](#)
- [Interactive Git training materials](#)
- [GitHub's Learning Lab](#)
- [Education community forum](#)
- [GitHub community forum](#)

Modifying the README file

Click on "Code", then on "Codespaces", and finally on "Create codespace on main"

The screenshot shows the GitHub repository page for `matematilab / learn-the-basics-of-git-flo-teammate`. The repository is private and generated from `matematilab/github-starter-course`. The top navigation bar includes links for Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. The repository's main branch is `main`, with 2 branches and 0 tags. The repository description is "learn-the-basics-of-git-flo-teammate created by GitHub Classroom". The repository statistics show 0 stars, 1 watching, and 0 forks. The repository has no releases published, and a link to "Create a new release" is provided. The repository also has no packages. The repository's README file is visible, showing the title "The Basics of GitHub" and the subtitle "Course overview and learning outcomes". The repository's README file is also visible, showing the title "The Basics of GitHub" and the subtitle "Course overview and learning outcomes".

Annotations on the screenshot:

1. The **Code** button in the top navigation bar.
2. The **Codespaces** tab in the repository's header.
3. The **Create codespace on main** button in the Codespaces section.

A Visual Studio Code workspace will open in your browser:

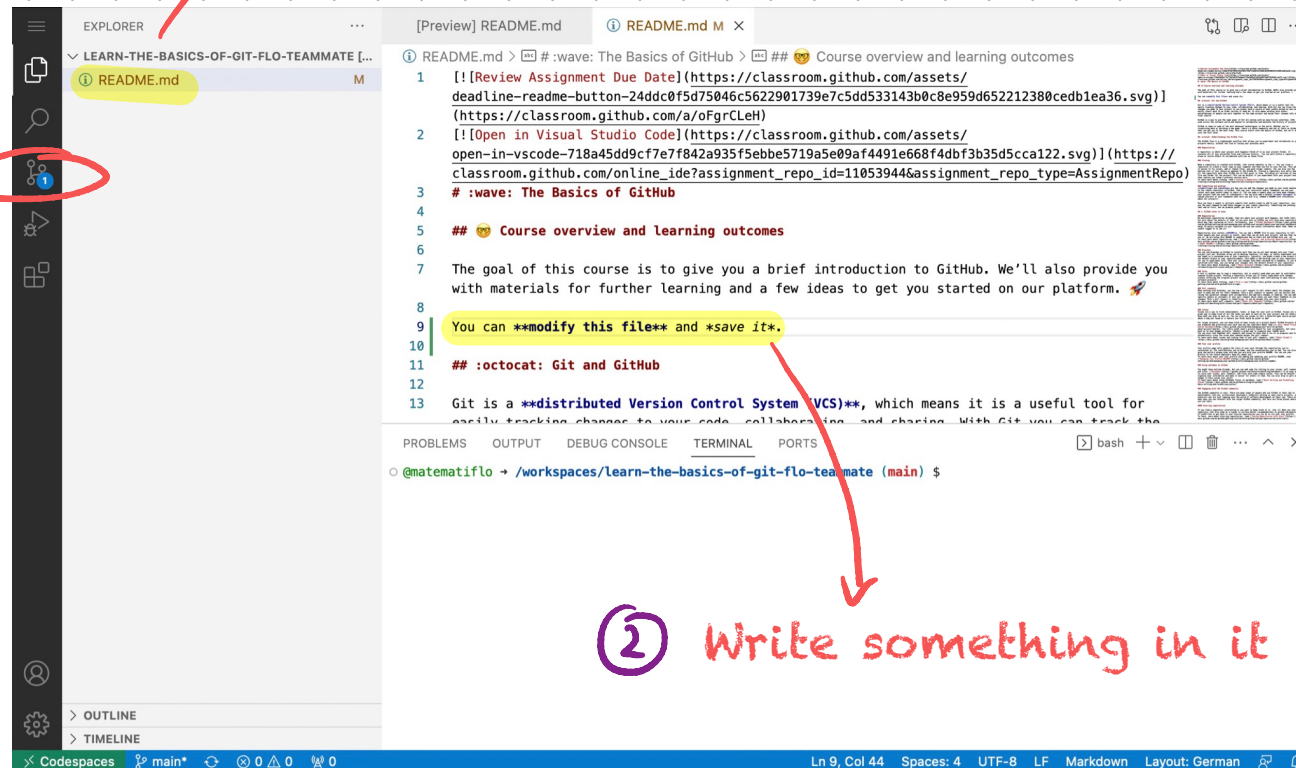
The screenshot displays a Visual Studio Code workspace in a browser. The interface is divided into several sections:

- EXPLORER:** Shows the workspace structure with a folder named "LEARN-THE-BASICS-OF-GIT-FLO-TEAMMATE" containing a "README.md" file.
- Editor:** Displays the "README.md" file content. The title is ":wave: The Basics of GitHub". The content includes a section for "Course overview and learning outcomes" and another for ":octocat: Git and GitHub".
- Terminal:** Shows a terminal window with the following text:

```
bash + v [ ] [ ] ... ^ x
Welcome to Codespaces! You are on our default image.
- It includes runtimes and tools for Python, Node.js, Docker, and more. See the full list here: https://aka.ms/gh
cs-default-image
- Want to use a custom image instead? Learn more here: https://aka.ms/configure-codespace
To explore VS Code to its fullest, search using the Command Palette (Cmd/Ctrl + Shift + P or F1).
Edit away, r [ ] Focus folder in explorer (cmd + click) automatically make it available for you to access.
@matematiflo → /workspaces/learn-the-basics-of-git-flo-teammate (main) $
```
- Footer:** Shows the status bar with "Codespaces", "main", and "Layout: U.S.".

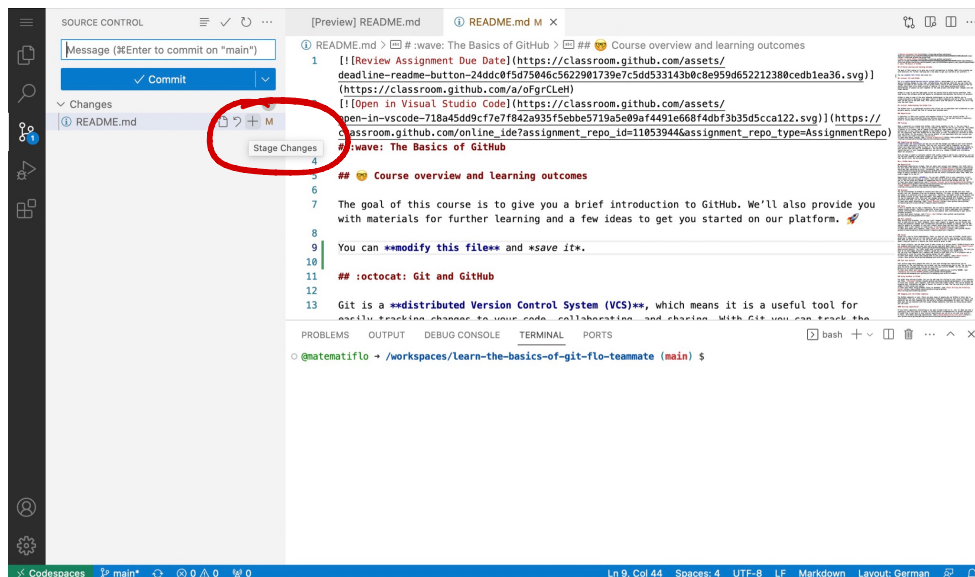
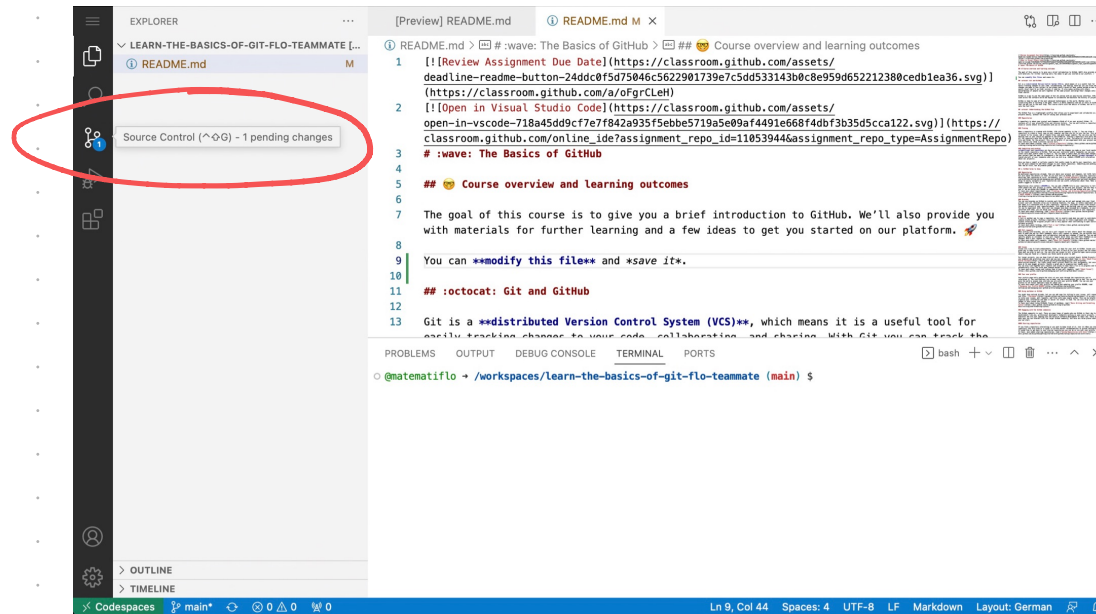
There, you will be able to open the README file, modify it and save it to your repository. Try it!

① Open the file



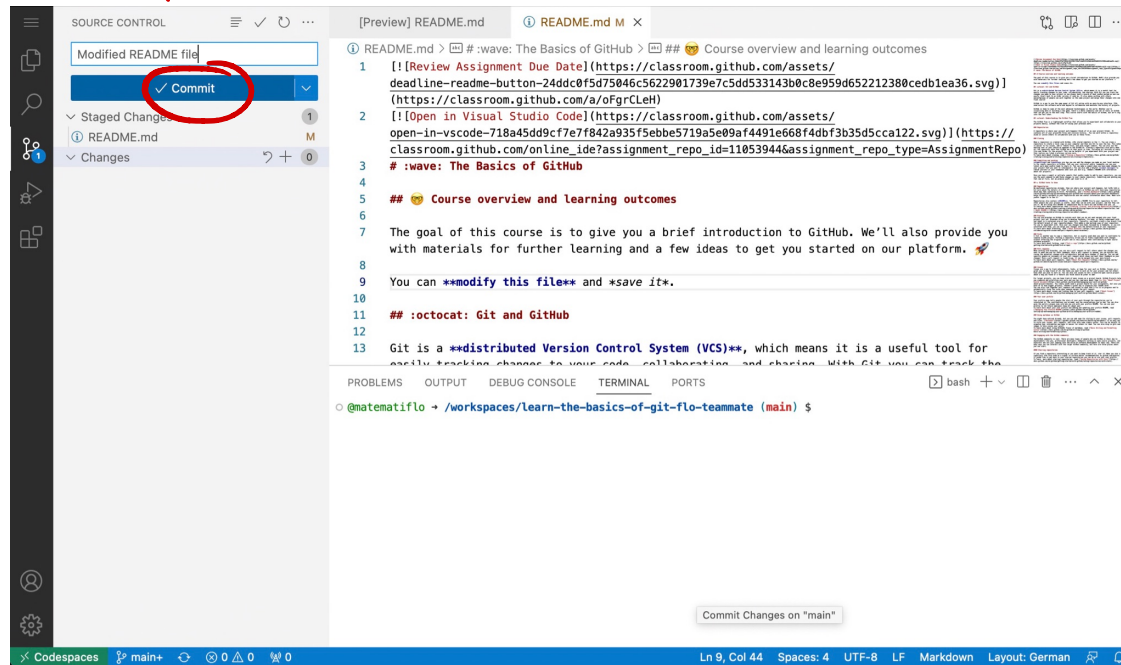
Saving your changes and updating your repository

Click here



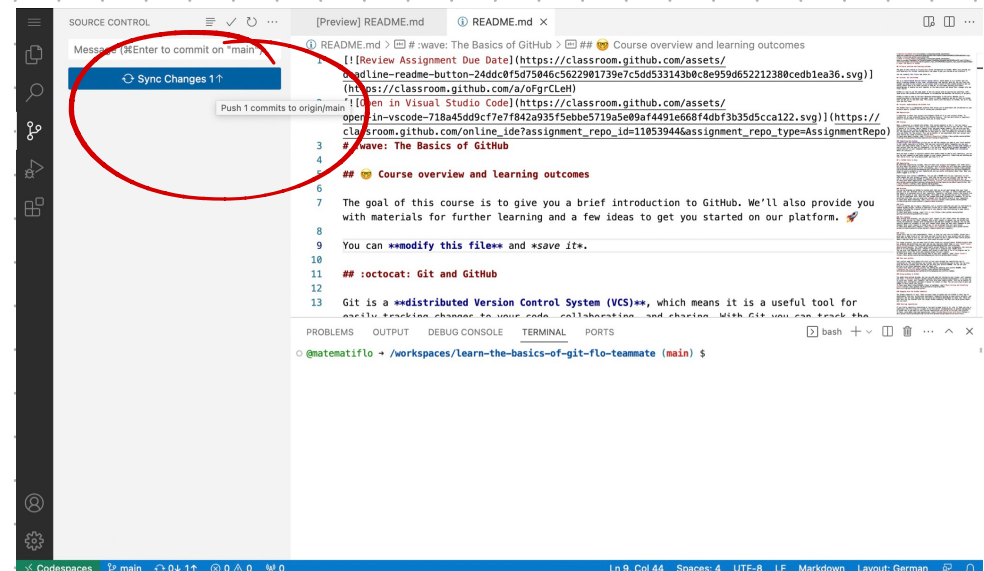
Then here to "stage" your changes (= tell Git you will update these files)

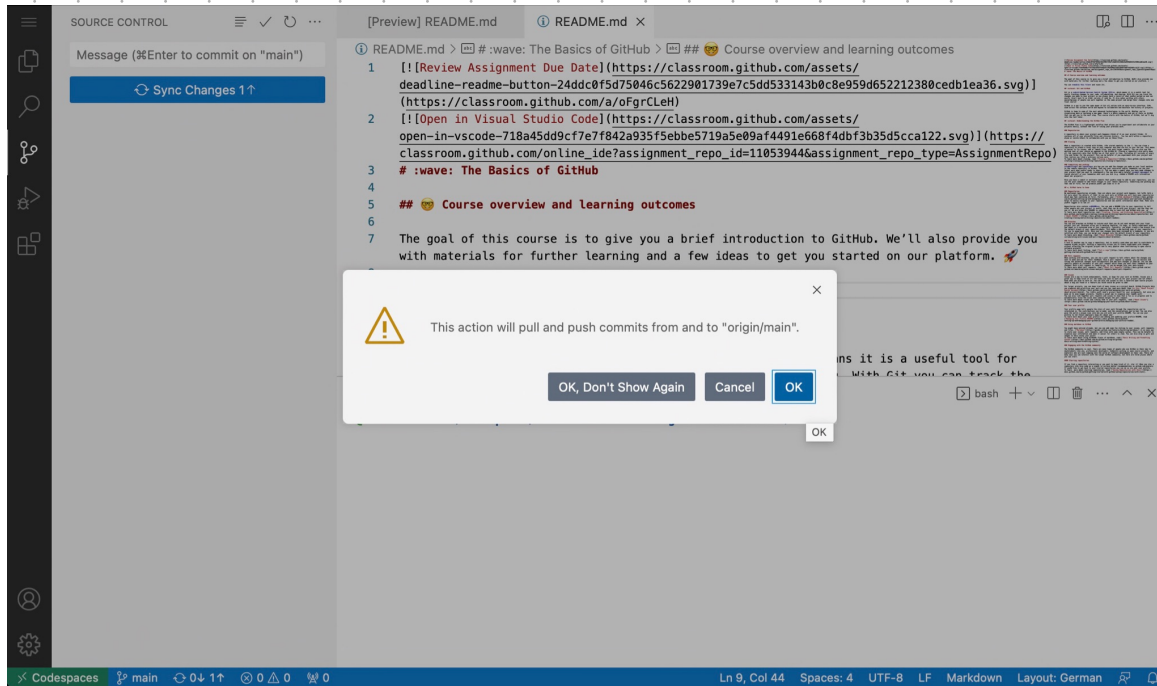
① You must add a message (saying briefly what changes you have made)



② Then click on "Commit"

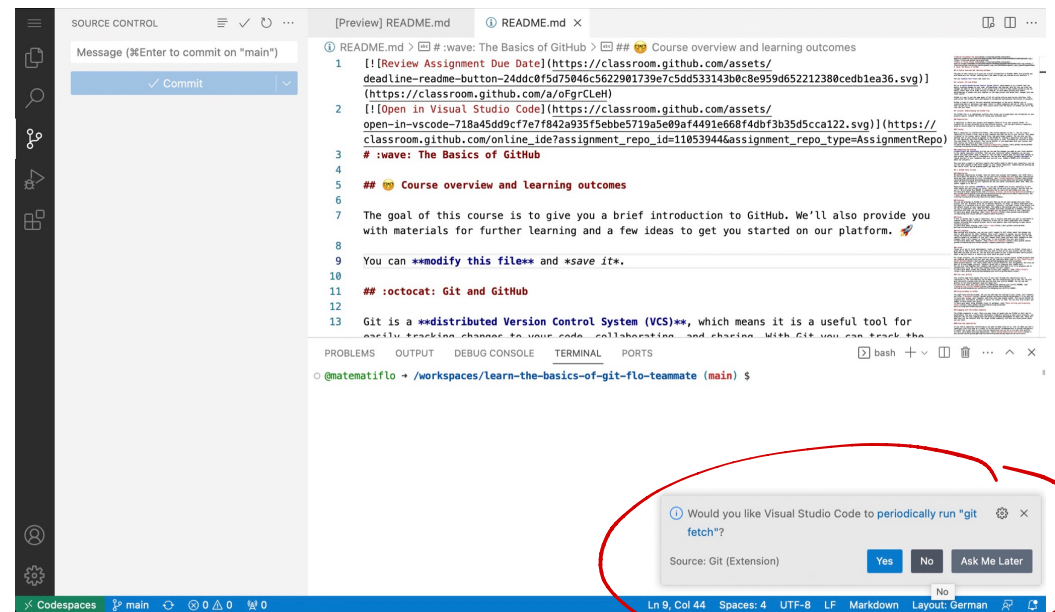
③ Finally, you can sync your changes and update your repo (you will get a warning message; see next page of this file)



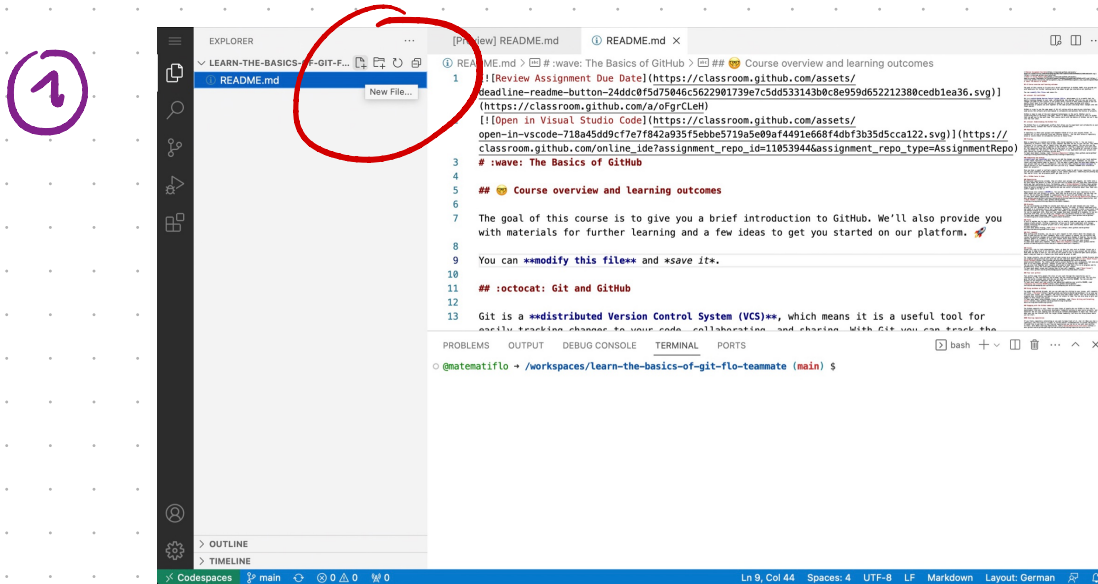


Yes, it's ok!

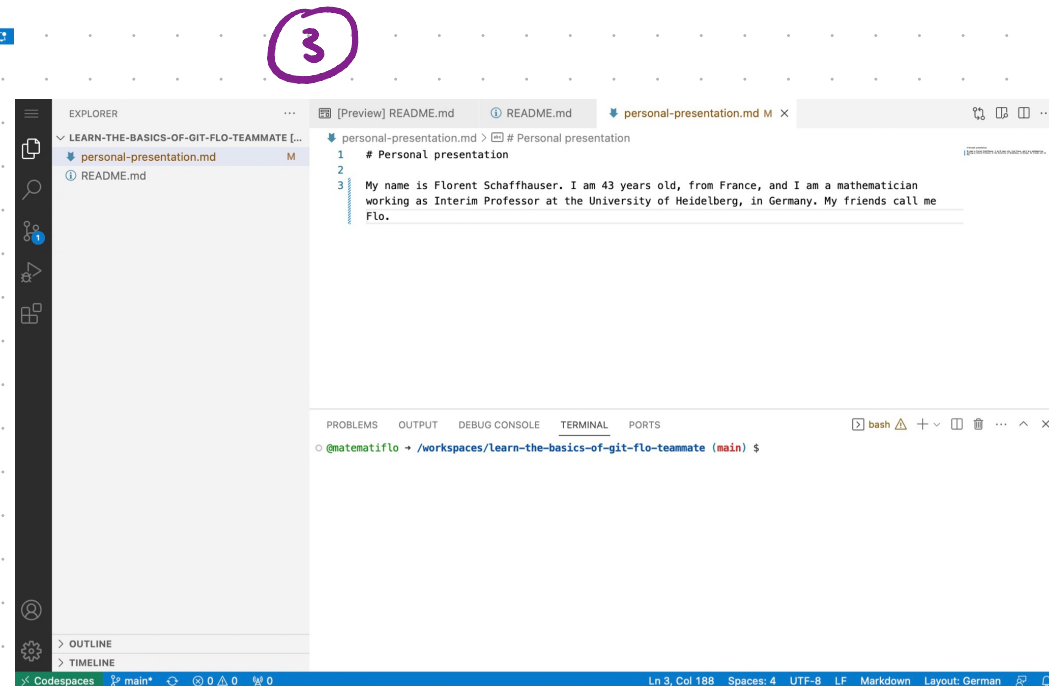
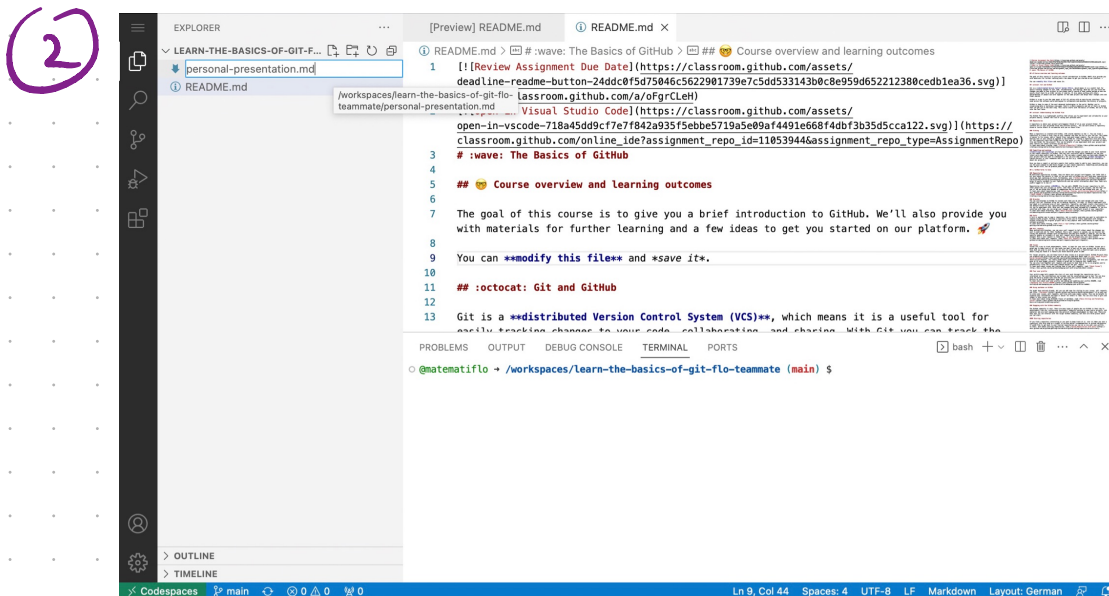
No need



Creating a personal presentation file



Click here and create a file called personal-presentation.md then write something in it



Save the file to your repo
(same procedure as for
the README file) then go
back to the repo, you
should see your
presentation file there

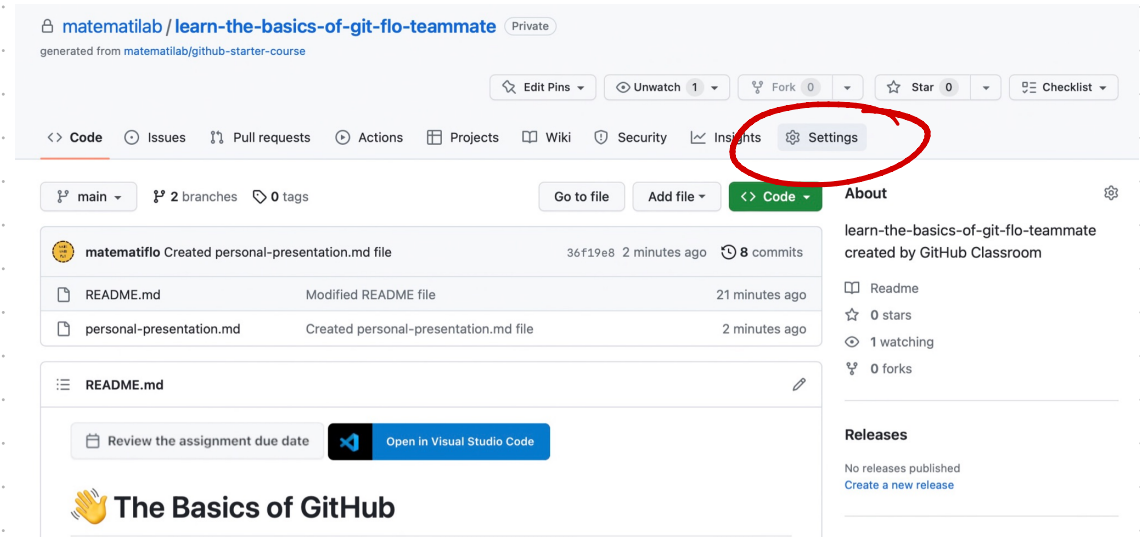
The screenshot shows the GitHub repository interface for 'matematilab/learn-the-basics-of-git-flo-teammate'. The repository is marked as 'Private' and 'generated from matematilab/github-starter-course'. The top navigation bar includes links for Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. Below this, there are buttons for 'main' branch, '2 branches', and '0 tags'. A file list shows 'personal-presentation.md' as the latest commit, 'README.md' as modified 19 minutes ago, and 'personal-presentation.md' as created. A 'Code' button is highlighted. The right sidebar shows repository statistics: 0 stars, 1 watching, and 0 forks. The main content area displays the 'README.md' file, which includes a section titled 'The Basics of GitHub'.

The screenshot shows the GitHub file view for 'personal-presentation.md'. The file was created by 'matematiflo' and is the latest commit (36f19e8) from 1 minute ago. It has 1 contributor. The file statistics show 3 lines (2 sloc) and 212 Bytes. The file content is displayed in a code editor with tabs for 'Raw', 'Blame', and 'Diff'. The content of the file is as follows:

```
Personal presentation  
  
My name is Florent Schaffhauser. I am 43 years old, from France, and I am a mathematician working as Interim Professor at the University of Heidelberg, in Germany. My friends call me Flo.
```

You can view the
file within GitHub
by clicking on it,
thanks to the fact
that it is a .md file
(Markdown)

You can check that your repo is private by clicking on "Settings" and scrolling down to the "Danger Zone"



Danger Zone

Change repository visibility

This repository is currently private.

Change visibility

Disable branch protection rules

Disable branch protection rules enforcement and APIs

Disable branch protection rules

Transfer ownership

Transfer this repository to another user or to an organization where you have the ability to create repositories.

Transfer

Archive this repository

Mark this repository as archived and read-only.

Archive this repository

Delete this repository

Once you delete a repository, there is no going back. Please be certain.

Delete this repository

Step 3

Go back to your repo and, in the README file, learn more about the basics of GIT.

Optional: If you feel comfortable, try cloning the repository of the seminar (see Page 4 of this file) in your personal GitHub account. If you try it, I recommend to do it using GitHub Desktop.

You have until 15.05.2023 to complete as much as you can of this assignment! If you experience some trouble, ask for help in the Zulip channel :-)