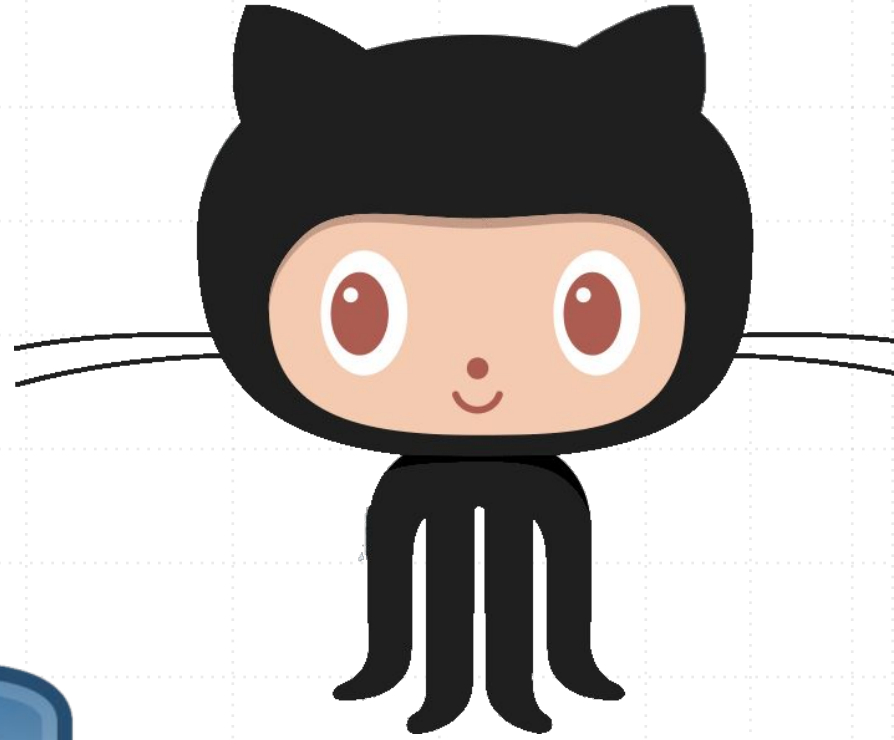
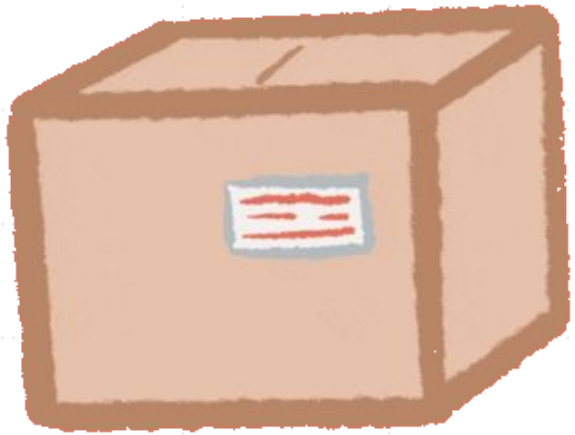
Introduction To Packages, Modules &Version Control(Git, GitHub)



Outline

- Introduction To Packages and Modules.
- Introduction To Version Control.
- Introduction To Git.
- Introduction To GitHub.

Introduction To Packages & Modules



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Outline:

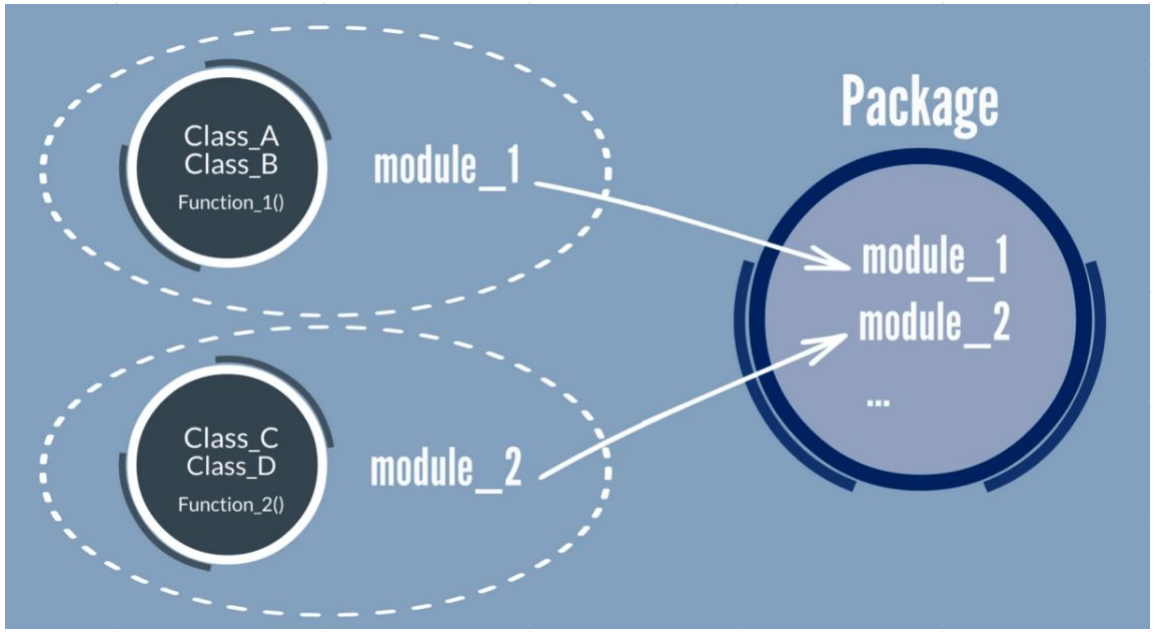
- The Importance of Packages and Modules
- What is a Module, Package, Library, & Framework.
- How To use Modules & Packages in Python.

Why we need packages and modules:

- Modular programming:
  - is the process of breaking a large programming task into separate, smaller, more manageable subtasks or modules.
- Individual modules can then be combined like Legos to create a larger app.
- There are several advantages to modularizing code:
  - ✔ Simplicity
  - ✔ Maintainability
  - ✔ Reusability
  - ✔ Scoping
- Functions, modules and packages are all constructs in Python that promote code modularization.

What is a Module, Package, Library, & Framework

- Module is a file which contains various Python functions and global variables.
- It is simply just .py extension file which has python executable code.
- Package is a collection of modules.
- Library is a collection of packages.
- Framework is a collection of libraries.



Naming convention for each:

01

Module/Library/Framework

- have short, all-lowercase names.
- Underscores can be used in the module name if it improves readability.

02

Python packages should also have short, all-lowercase names.

03

Class names should normally use the CapWords convention.

To install them in python:

- Use PIP to mange your packages:
- PIP is a package manager for Python packages, or modules.
- If you have Python version 3.4 or later, PIP is included by default.
- Open cmd and type: “pip --version” to check pip version.
- If you don’t have pip, go to https://pypi.org/project/pip/ and install it.
- To install a package, go to cmd and type “pip install <<package name>>”

```
C:\Users\marya>pip --version
pip 20.2.4 from C:\Users\marya\anaconda3\lib\site-packages\pip (python 3.8)

C:\Users\marya>pip install numpy
Requirement already satisfied: numpy in c:\users\marya\anaconda3\lib\site-packages (1.19.2)
```

Which of the following is not an advantage of using modules?

A) Provides a means of reuse of program code.

B) Provides a means of dividing up tasks.

C) Provides a means of reducing the size of the program.

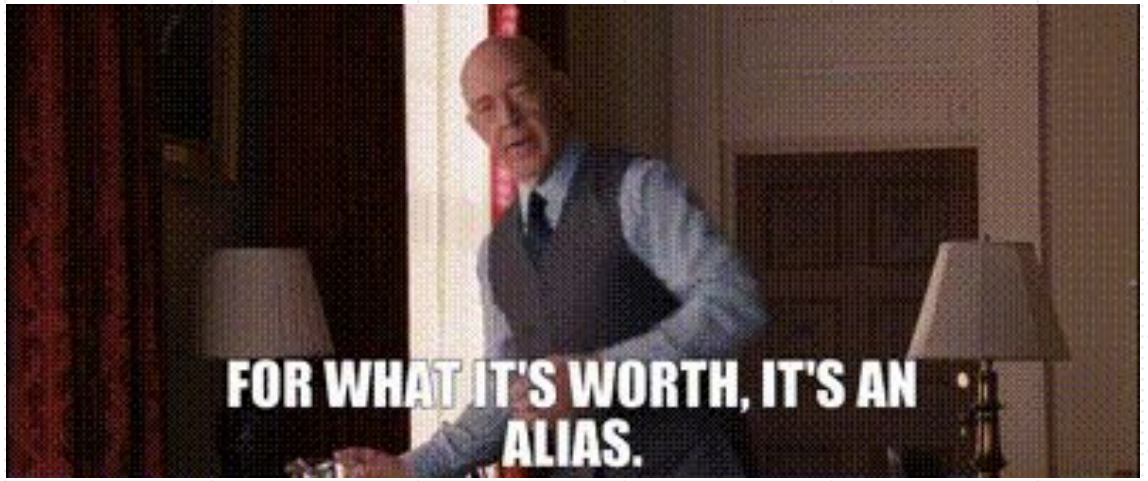
D) Makes it easier to maintain code.

Multiple Choice

How To use Them:

- Use Import statement:
  - Import <module_name> : imports all content of a module.
  - Import <module_name> as <alt_name> : imports all content of a module and give it an alias.
  - From <module_name> import <name(s)> : imports individual object from a module.
  - From <module_name> import <name> as <alt_name> : imports individual object from a module and gives them an alias to use in code.

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from collections import defaultdict
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import accuracy_score, f1_score, r2_score
from sklearn.ensemble import RandomForestRegressor, AdaBoostClassifier,
from sklearn.linear_model import LinearRegression
```



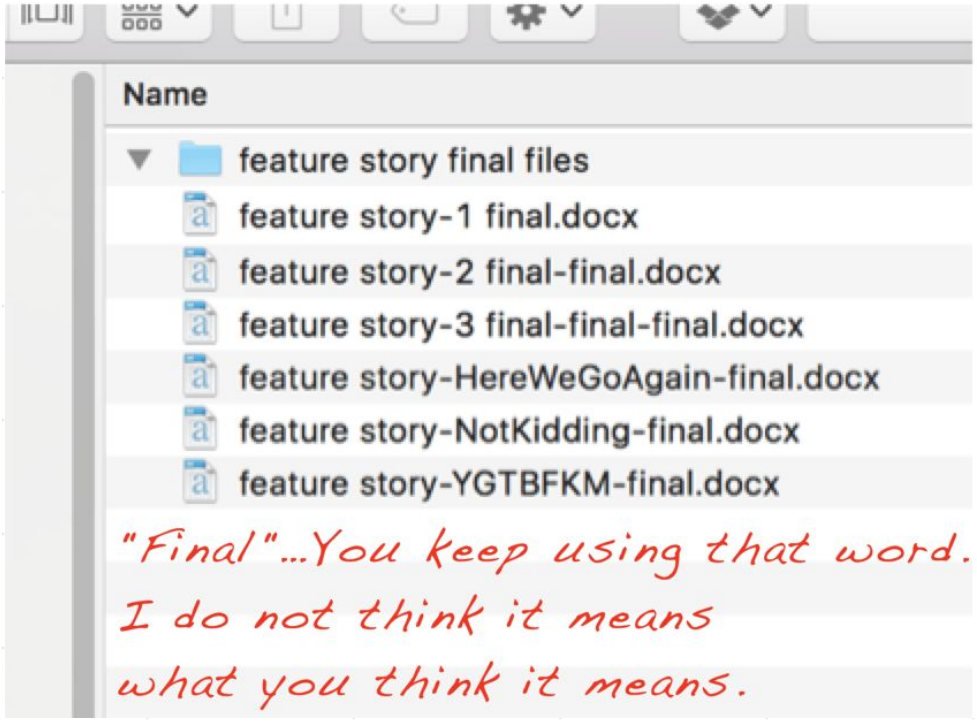
Introduction To Version Control Systems VCS

Outline:

- Why we need Version Control.
- What is Version Control & Who Can Benefit From using It.
- Types of Version Control:
- Introduction To Git & GitHub.

When Working on a Project:

- Many people copy files into another directory (perhaps a time-stamped directory, if they're clever).
- This approach is very common because it is so simple, but it is error prone.
- It is easy to forget which directory you're in and accidentally write to the wrong file or copy over files you don't mean to.
- It's not efficient when working with others on the same project.



The Importance of (VCS)

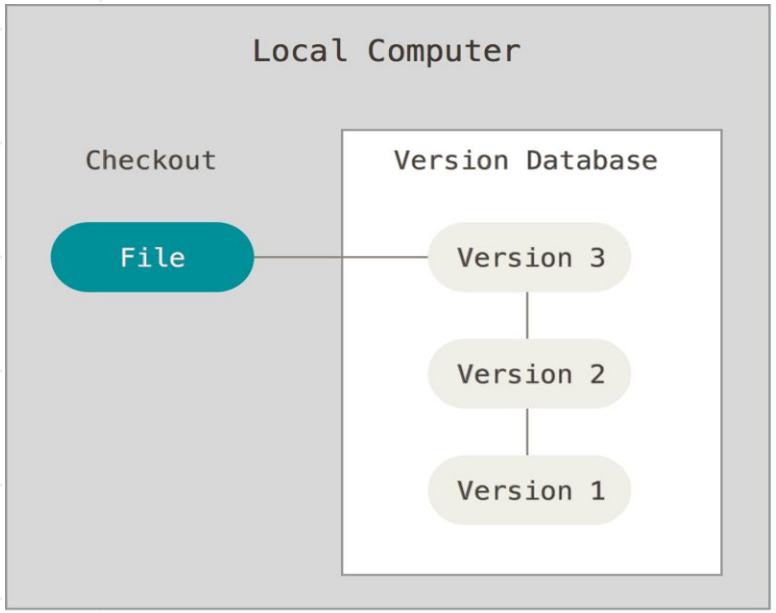
- It allows you to revert selected files back to a previous state.
- Revert the entire project back to a previous state.
- Compare changes over time.
- See who last modified something that might be causing a problem.
- See who introduced an issue and when, and more.
- Using a VCS means that if you screw things up or lose files, you can easily recover.

VCS is:

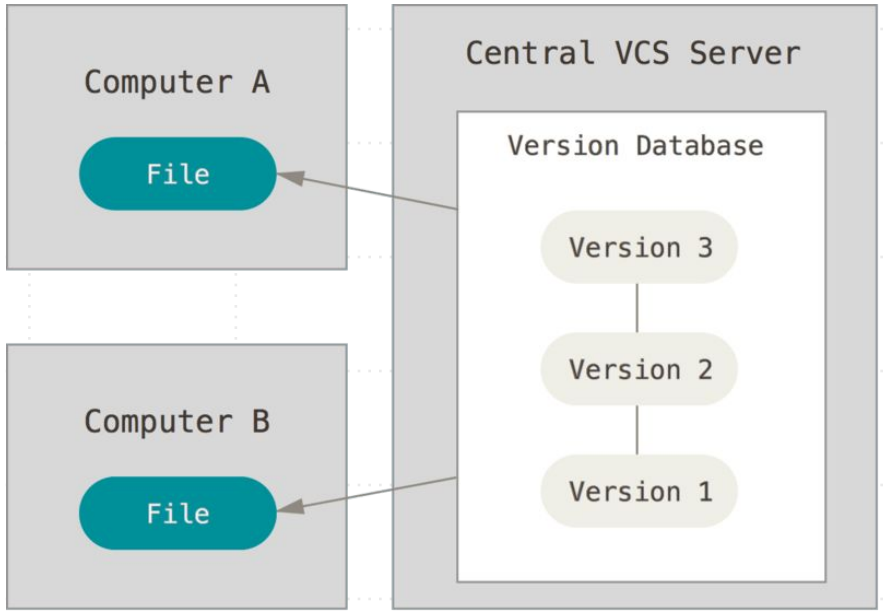
- System that records changes to a file or set of files over time so that you can recall specific versions later.
- Graphic, web designer, programmers, data scientist….etc. who want to keep every version of an image, layout, or a project or anyone that works with computer files can benefit from using Version Control.

There are 3 types of VCS:

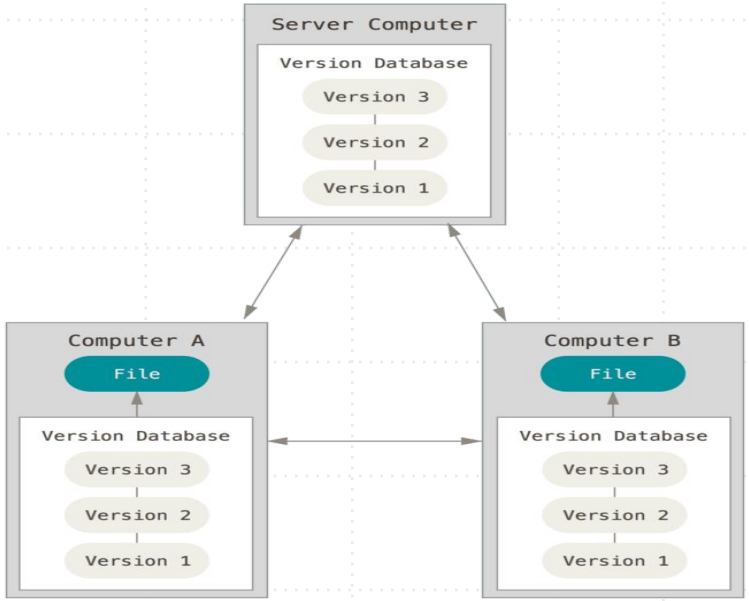
Local VCS



Centralized VCS



Distributed VCS



What is full form of VCS?

A. Version Configuration System.

B. Version Consolidated Solutions.

C. Version Configuration Solutions.

D. Version Control System.

Multiple Choice

Introduction To Git

Outline:

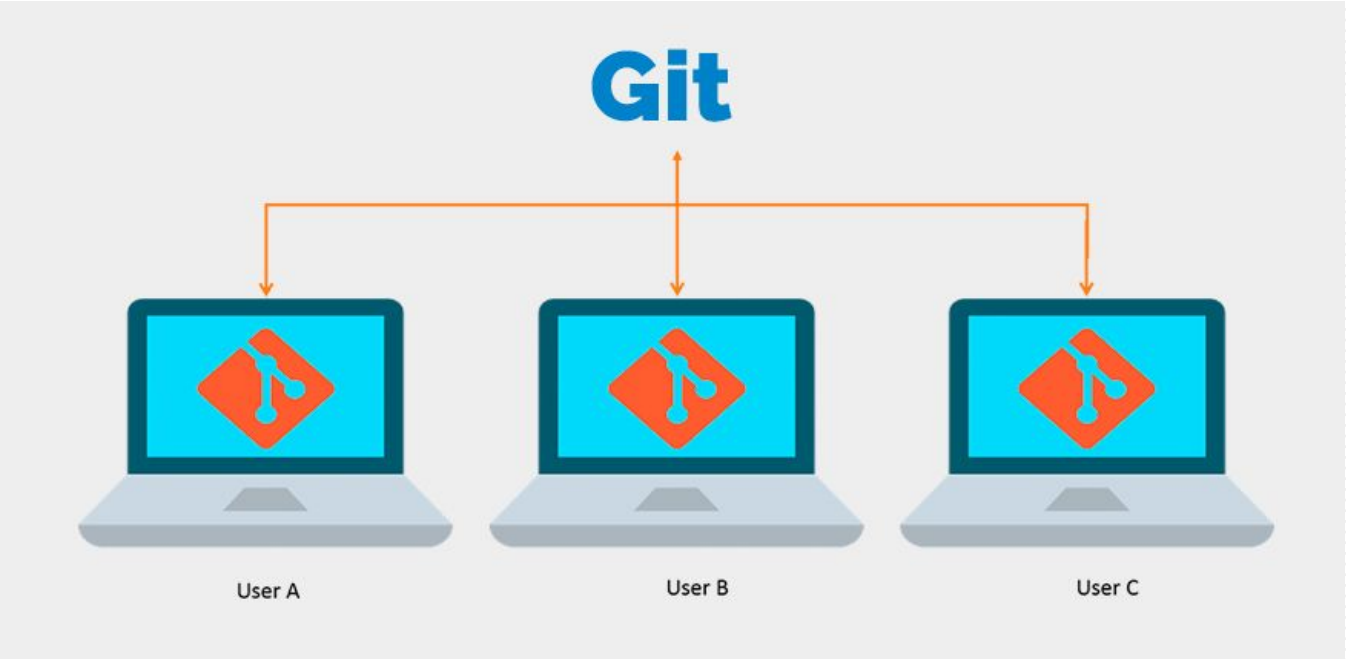
- What is Git.
- Why use Git.
- Installation and basic commands.

What is Git?

- Git is a popular version control system.
- It is used for:
  - Tracking code changes
  - Tracking who made changes
  - Coding collaboration

Why Git?

- Over 70% of developers use Git!
- Developers can work together from anywhere in the world.
- Developers can see the full history of the project.
- Developers can revert to earlier versions of a project.



Installation:

```
git --version
git version 2.30.2.windows.1
```

- First, check if Git installed:
  - Open a Terminal/Command Prompt and try running
  - If it outputs a version number, skip ahead.
- If it didn’t output a version number download it from:
  - https://www.git-scm.com/

Configure Git:

- Now, tell Git who you are.
- This is crucial for version control systems, because each Git commit relies on it.
- You can specify Git configuration settings with the “git config” command

```
$ git config --global user.name "John Doe"
$ git config --global user.email johndoe@example.com
```

Creating Git Folder:

- You can Create new folder with “mkdir” command followed by the folder name.
- “cd” command changes the current working directory (folder).

```
mkdir myproject
cd myproject
```

Initialize Git:

- After navigating to the correct folder.
- Initialize Git on that folder with “git init” command to create your first repository.


```
git init
Initialized empty Git repository in /Users/user/myproject/.git/
```

Note: A software repository, or “repo” for short, is a storage location for software projects

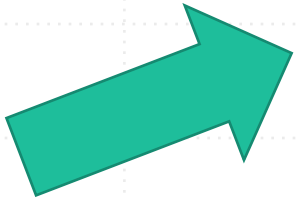
New Files:

- Create any kind of file then added it to the repo folder (here it is an html file called index).
- Use “ls“ Command to list the files in the directory(folder).
- Use “git status” command to see if the new file is a part of your repo.

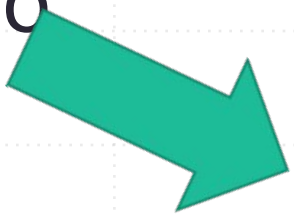
```
ls
index.html

git status
On branch master

No commits yet

Untracked files:
  (use "git add ..." to include in what will be committed)
    index.html

nothing added to commit but untracked files present (use "git add" to track)
```

Note: Git is aware of the file but has not added it the repo we need to “Stage it” as it is “Untracked file”.

There are 2 possible states for a file in a Git repo folder:



Tracked: files that Git knows about and are added to the repository.



Untracked: files that are in your working directory, but not added to the repository

Note: Files first added to an empty repository are all untracked

Git Staging:

- One of the core functions of Git is the concept of staging files.
- Staging files mean:
- files that are ready to be committed to a repository when you reach a milestone or finish a task.
- To stage a file:
  - Use “git add ‘filename’ “ command to add one file.
  - Use “git add - -all“ command to add more than one file at once.
  - Check the status.

```
git add index.html
```

```
git add --all
```

```
git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached ..." to unstage)
    new file: index.html
```

Git Commit:

- After staging we need to commit our changes
- A commit is a point in the project you can go back to "save point".
- You can add a message to each commit
- By adding clear messages to each commit, it is easy for yourself (and others) to see what has changed and when.
  - Use “git commit -m “message“” command to commit after staging.
  - Use “git commit -a -m “message”” command to commit without staging.

```
git commit -m "First release of Hello World!"
[master (root-commit) 221ec6e] First release of Hello World!
 3 files changed, 26 insertions(+)
 create mode 100644 README.md
 create mode 100644 bluestyle.css
 create mode 100644 index.html
```

```
git commit -a -m "Updated index.html with a new line"
[master 09f4acd] Updated index.html with a new line
 1 file changed, 1 insertion(+)
```

Not recommended: can sometimes make you include unwanted changes

Other useful command:

- “git log” to view the history of commits for a repository.
- “git command name –help” to see all the available options for the specific command
- “git help –all” to see all possible commands.

```
git log
commit 09f4acd3f8836b7f6fc44ad9e012f82faf861803 (HEAD -> master)
Author: w3schools-test
Date:   Fri Mar 26 09:35:54 2021 +0100

    Updated index.html with a new line
```

```
git commit -help
usage: git commit [] [--] ...

    -q, --quiet           suppress summary after successful commit
    -v, --verbose         show diff in commit message template
```

The files that can be committed are always present in git

Multiple Choice

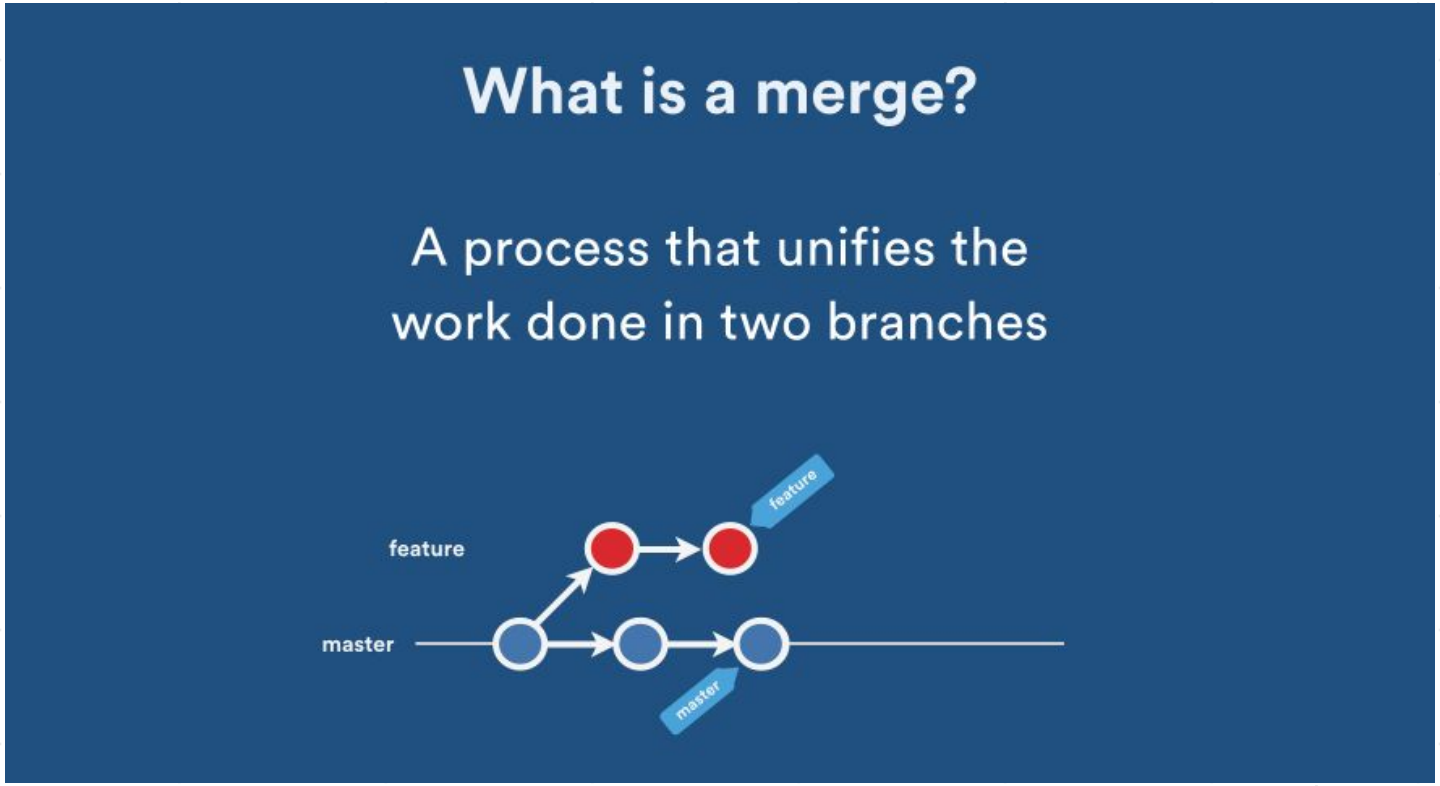
Git Branches

- In Git, a branch is a new/separate version of the main repository.
- Branches allow you to work on different parts of a project without impacting the (main/master) default branch.
- With Git, you can switch between branches and edit different projects without them interfering with each other.
- Use “git checkout –b <<branch_name>>” to switch to it from your current branch.
- You can now repeat previous steps and commit with the new branch

```
git checkout -b emergency-fix
Switched to a new branch 'emergency-fix'
```

Git Branch Merge:

- We need to merge branches so that all changes done aren't done to original branch(can't be viewed by all other branches)
- Merging is when we combine project branches.



Git Branch Merge:

- Before merging two branches:
  - Make sure that you did at least a commit on both.
  - Use command “git branch –a” to see all branches viewed by git.
- Now you can merge both by:
  - Change to the master branch (the branch you want to merge to)
  - Use command “git merge <<branch-name>>” to merge them.
  - If there is a conflict between 2 branches which you are merging to the master branch merge will fail.

Note : when working with git it is better to work on a separate branch then merge to the master branch.


```
git merge emergency-fix
Updating 09f4acd..dfa79db
Fast-forward
 index.html | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)
```

Which of the following commands used to return to the master branch?

A. git checkout origin

B. git checkout -b master

C. git checkout master

D. git checkout branche.

Multiple Choice

Introduction to GitHub

Outline:

- Why People use GitHub.
- What Is GitHub.
- How To Use it.

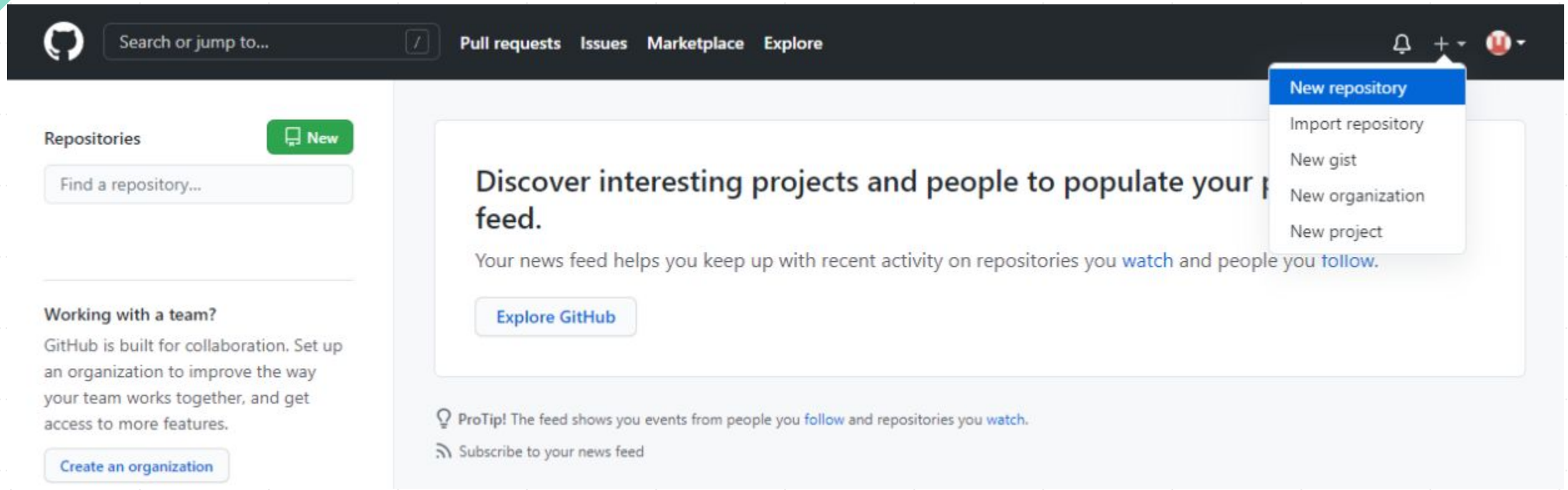
What Is GitHub &Why People use GitHub:

- GitHub is a web-based interface that uses Git.
- Allows for real-time collaboration.
- GitHub encourages teams to work together to build and edit their shared projects.
- GitHub allows multiple developers to work on a single project at the same time.
- Reduces the risk of duplicative or conflicting work and can help decrease production time.
- With GitHub, developers can build code, track changes, and innovate solutions to problems that might arise during the development process simultaneously.


Go to : https://github.com/ &
sign up to GitHub world.

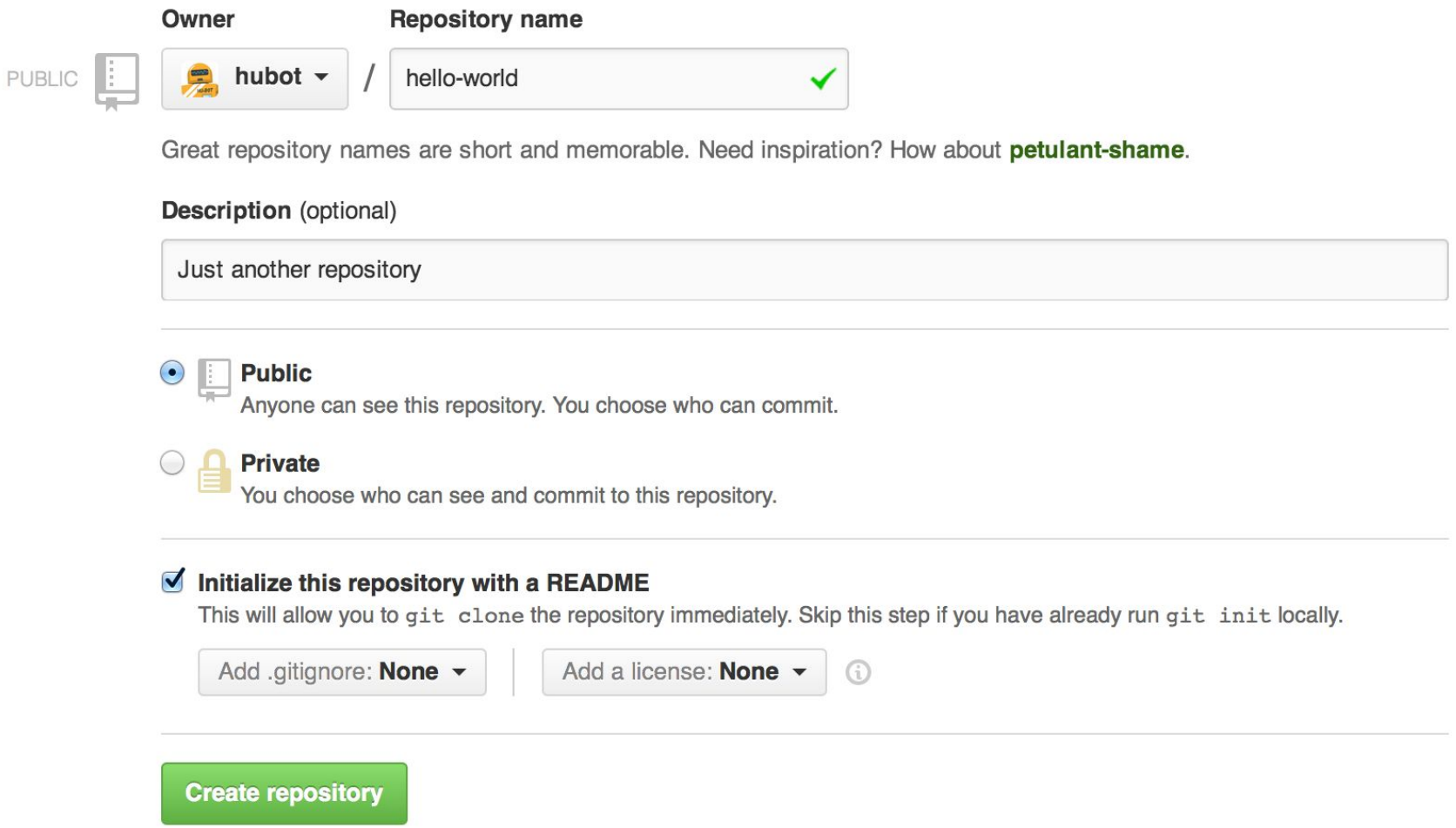
How to use it:

- After you have made a GitHub account, sign in, and create a new Repo.



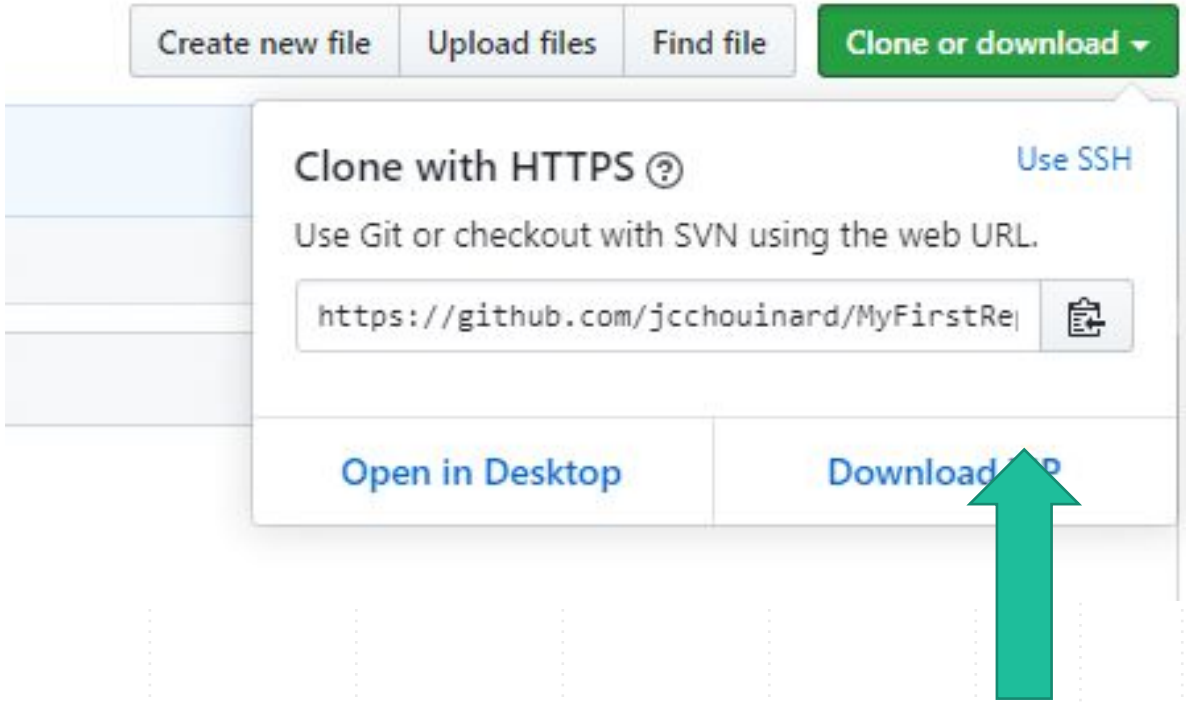
How to use it:

- And fill in the relevant details, & choose public:



How to use it:

- After setting up a local Git repo, we are going to push that to GitHub.
- Copy the URL, or click the clipboard pointed to in the image.
- Paste link the following command:
  - “git remote add origin <<URL>>”
  - This command specifies that you are adding a remote repository, with the specified URL, as an origin to your local Git repo.




```
git remote add origin https://github.com/MaryamGKK/hello.git
```

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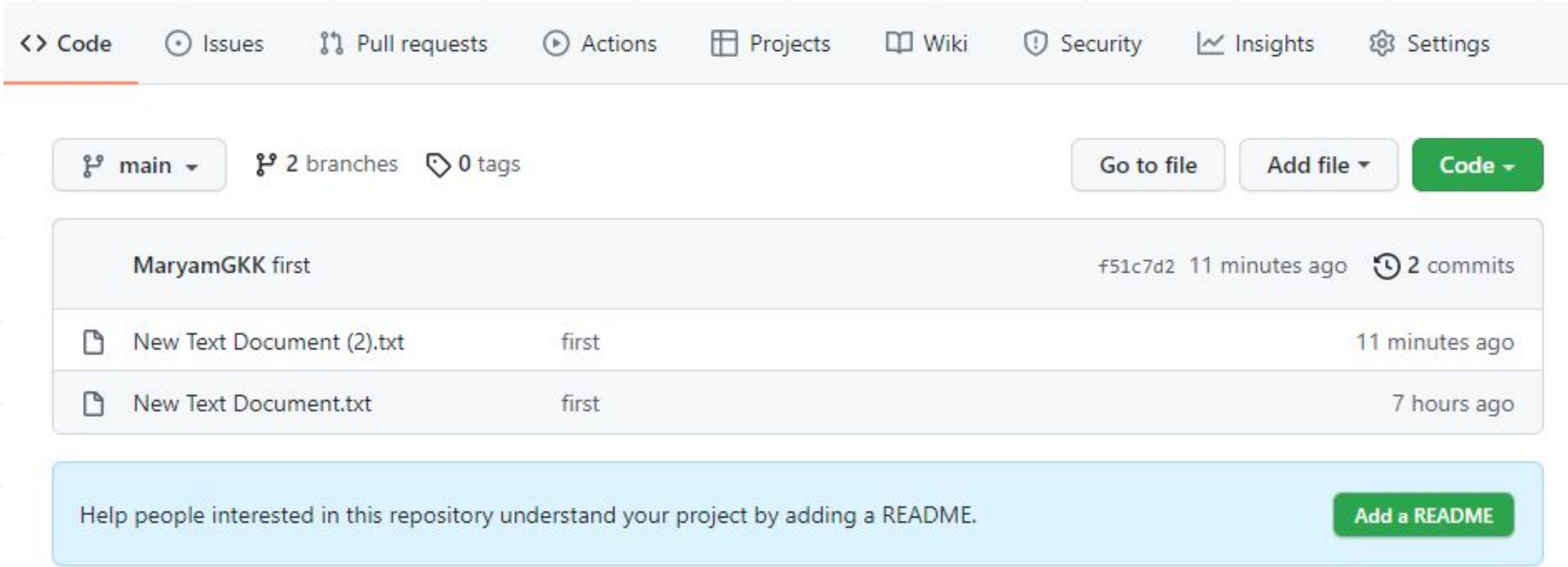
How to use it:

- Now we are going to push our master branch to the origin URL.
- Then set it as the default remote branch:
  - Use command “git push --set-upstream origin main”

```
marya@DESKTOP-5QOTAAH MINGW64 ~/OneDrive/          /New folder (main)
$ git push -f origin main
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (2/2), 260 bytes | 260.00 KiB/s, done.
Total 2 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/MaryamGKK/hello.git
 + 0660fd6...f51c7d2 main -> main (forced update)
```

How to use it:

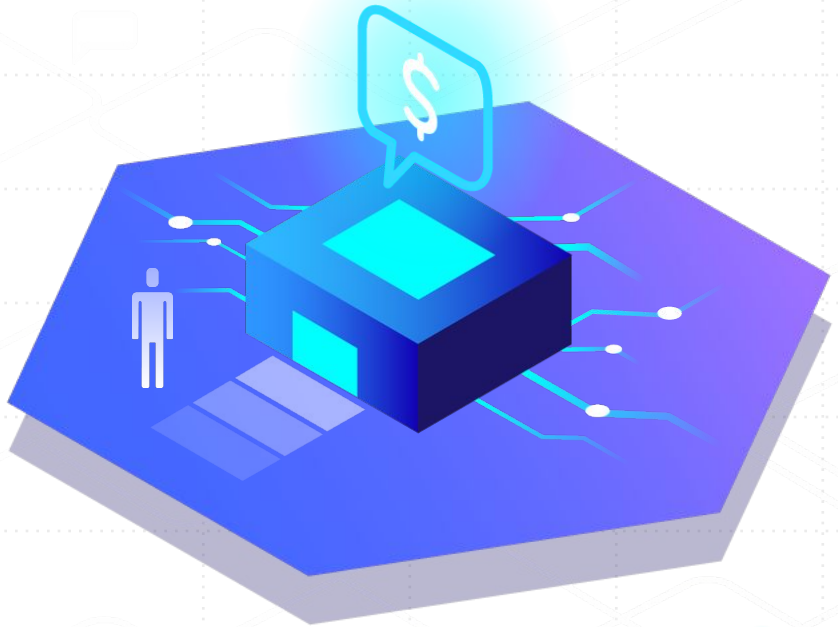
- Now, go back into GitHub and see that the repository has been updated:



GitHub is:

Multiple Choice

Project 3 - Thanos.py >_



Introduction to GitKraken

Outline:

- What Is GitKraken?
- How To Use it?

What is GitKraken?

- It is a GUI Git client that facilitates efficient and reliable usage of Git on a desktop and offer most of the command line operations.
- It can be easily integrated with your GitHub, Bitbucket, and GitLab accounts.
- Most of the actions done by Git can by done by GitKraken with just one click like undo, redo, commit, etc..

How to use it?

- Download Gitkraken from its website (https://www.gitkraken.com/git-client/try-free)
- Press (GitKraken Client) then (Download for free)

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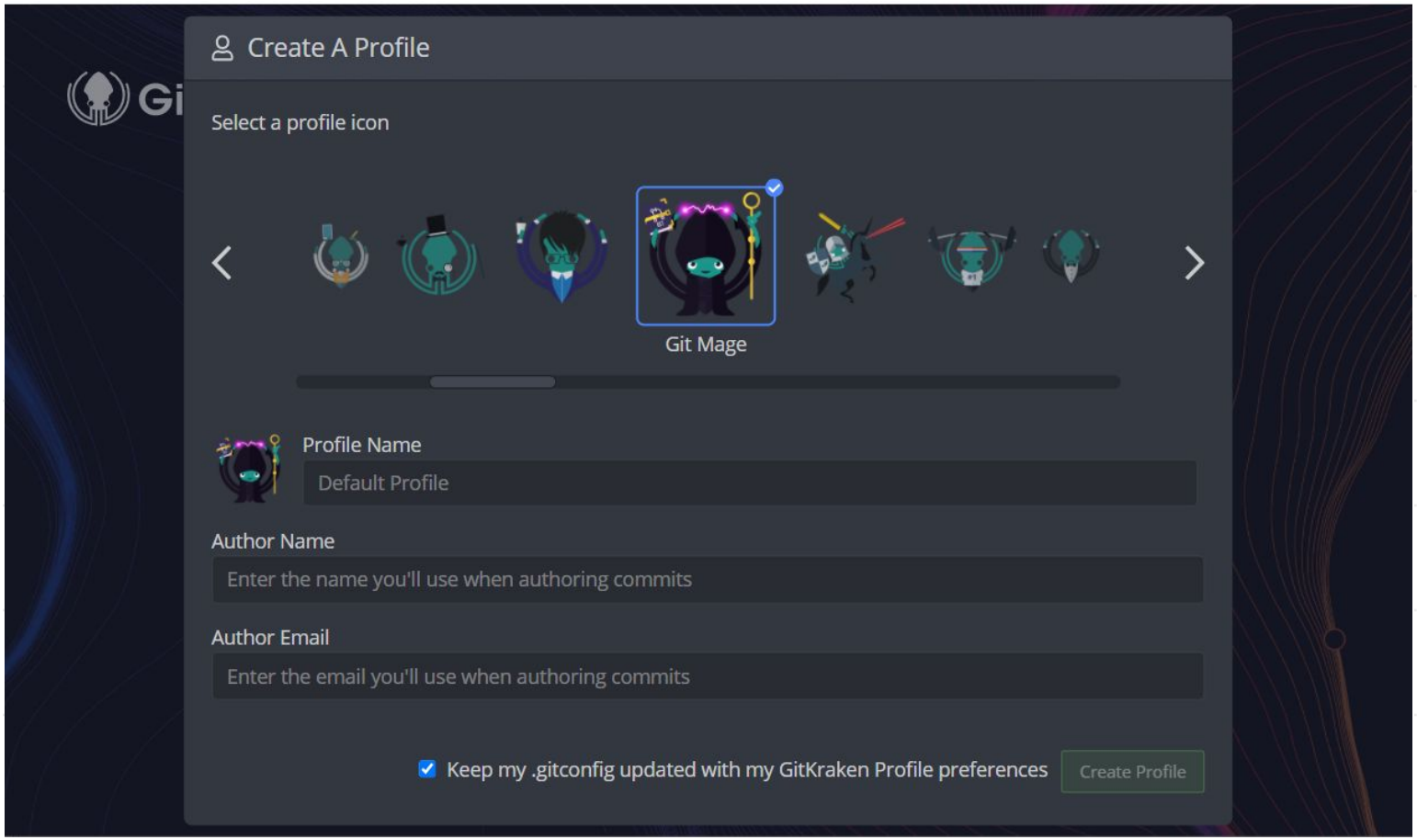
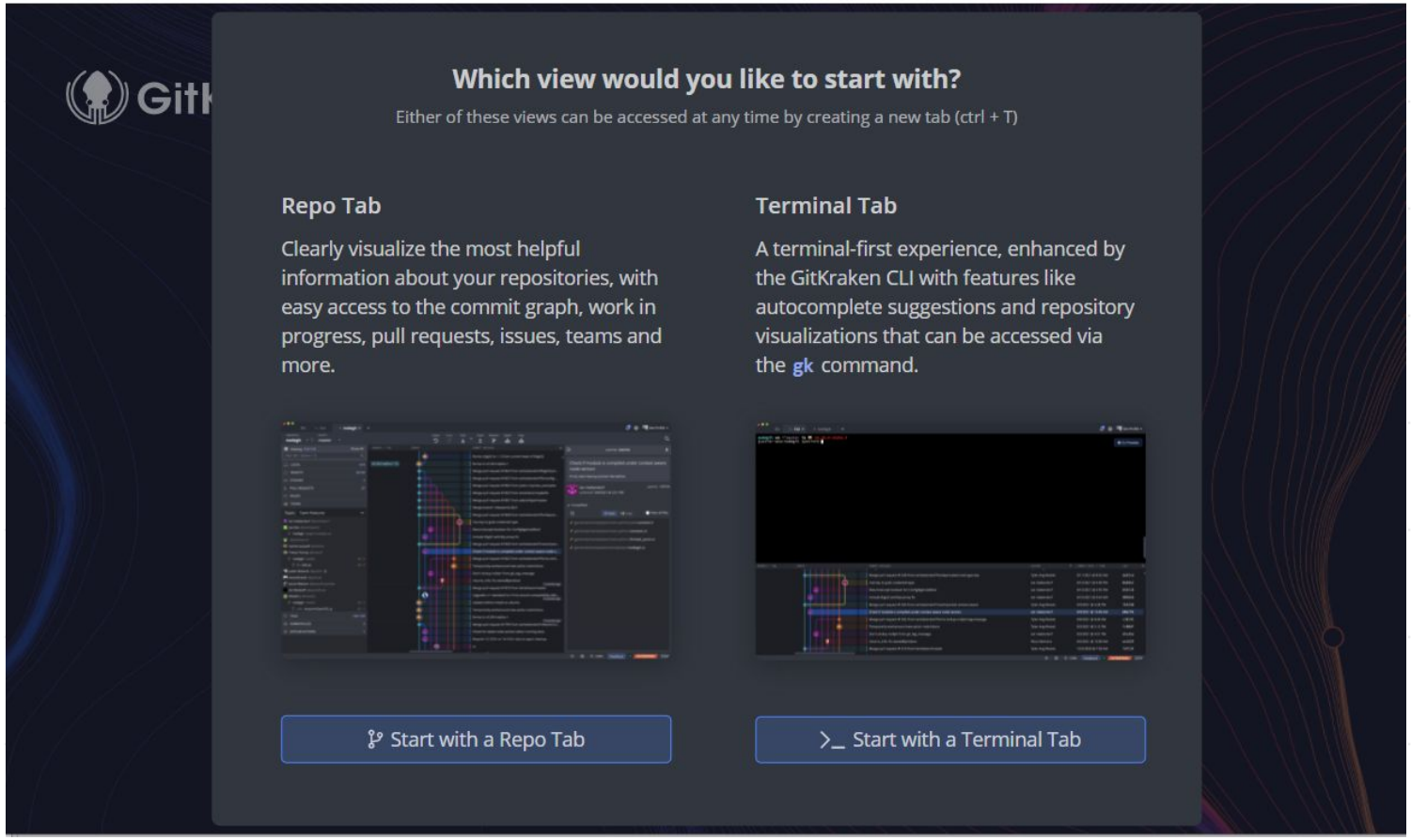
How to use it?

- After the setup, you could create your profile



How to use it?

- Let’s start with the (Repo tab)
- We will not choose terminal tab for now, because it provides CLI and we want GUI to be easy for usage



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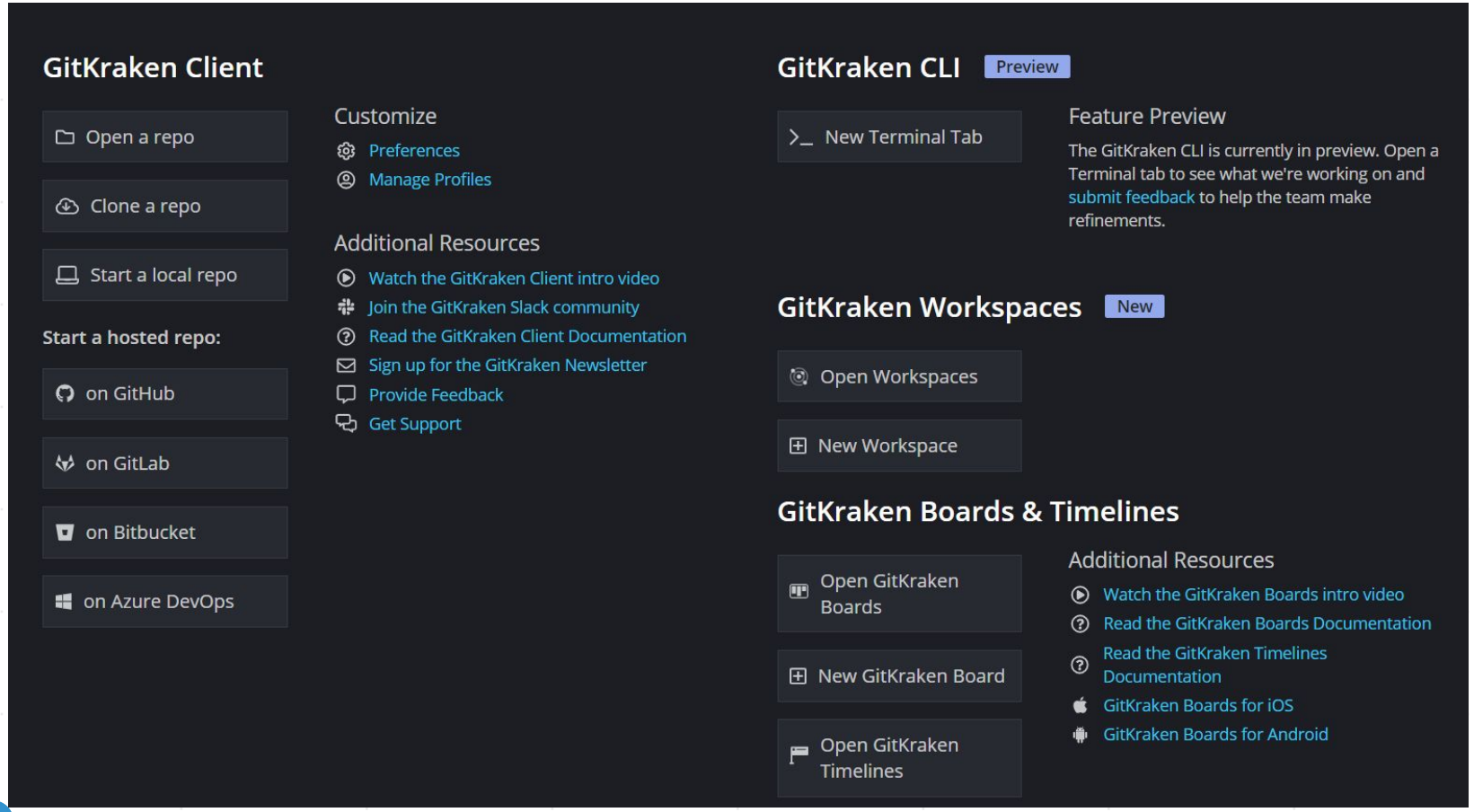
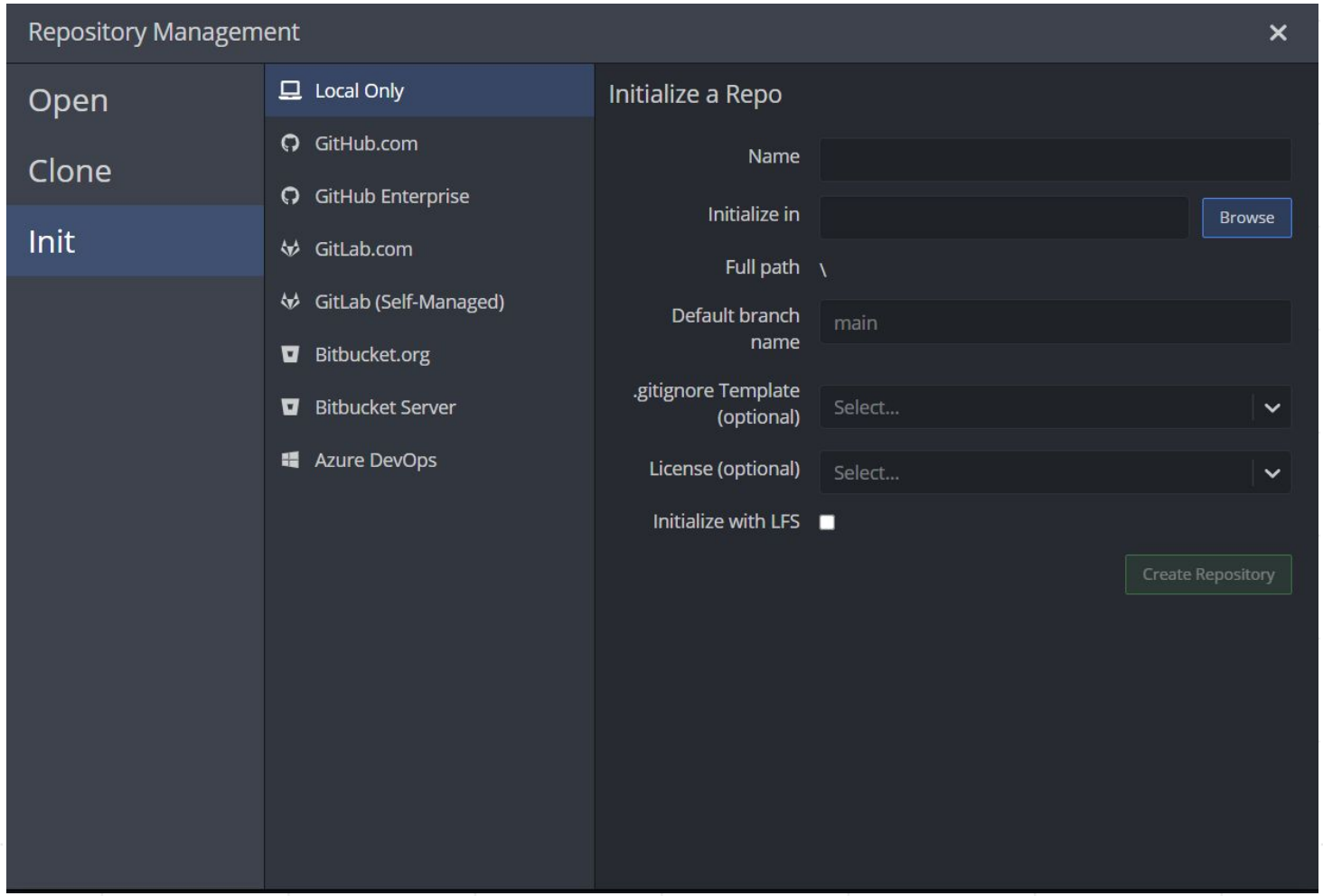
How to use it?

- You can start a local repo by pressing (start a local repo) button



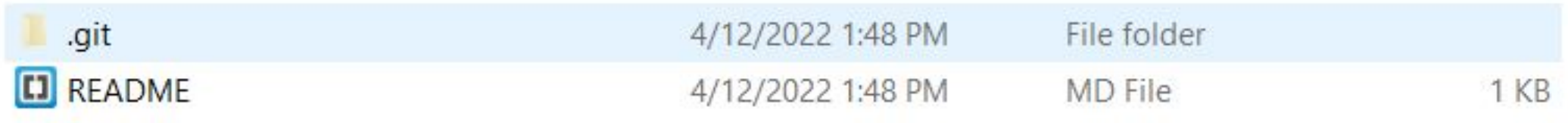
How to use it?

- Choose the name and path of your repository



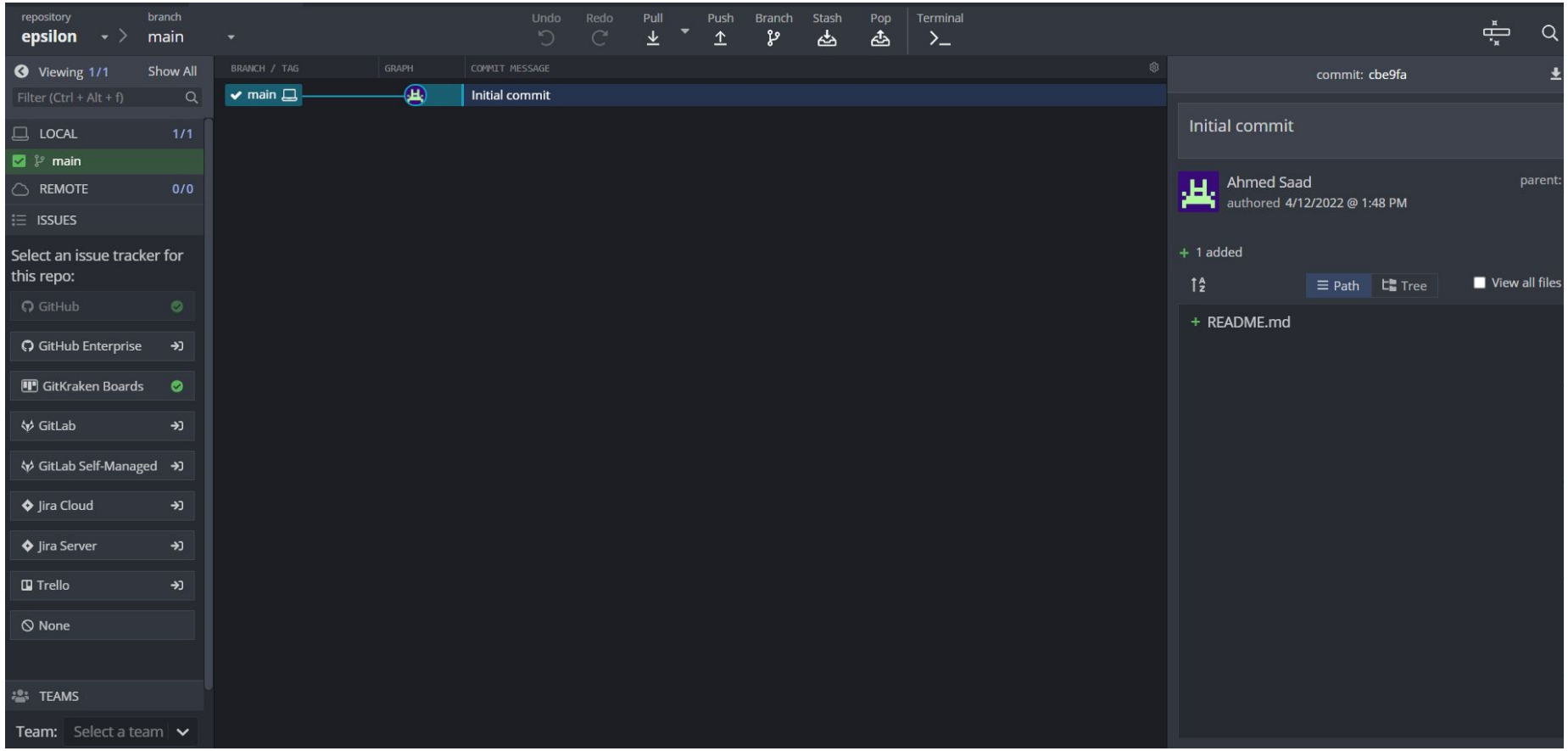
How to use it?

- Gitkraken has created a folder for you with default readme file and (.git) folder on the specified directory



How to use it?

- Main page of the repo
- It contains a graph for your commits and branches.



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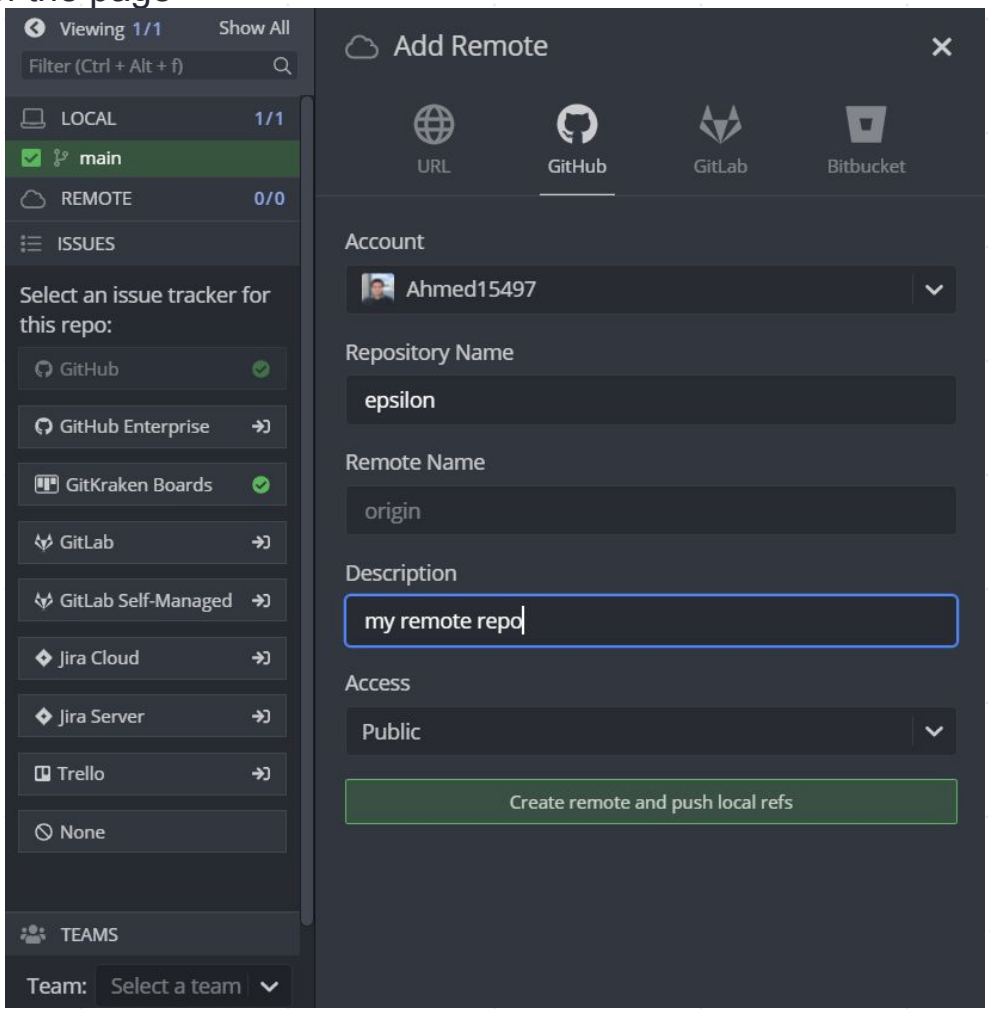
How to use it?

- Let’s create a remote repo on github and connect it to our local repo
- Press (Remote) button on the left of the page



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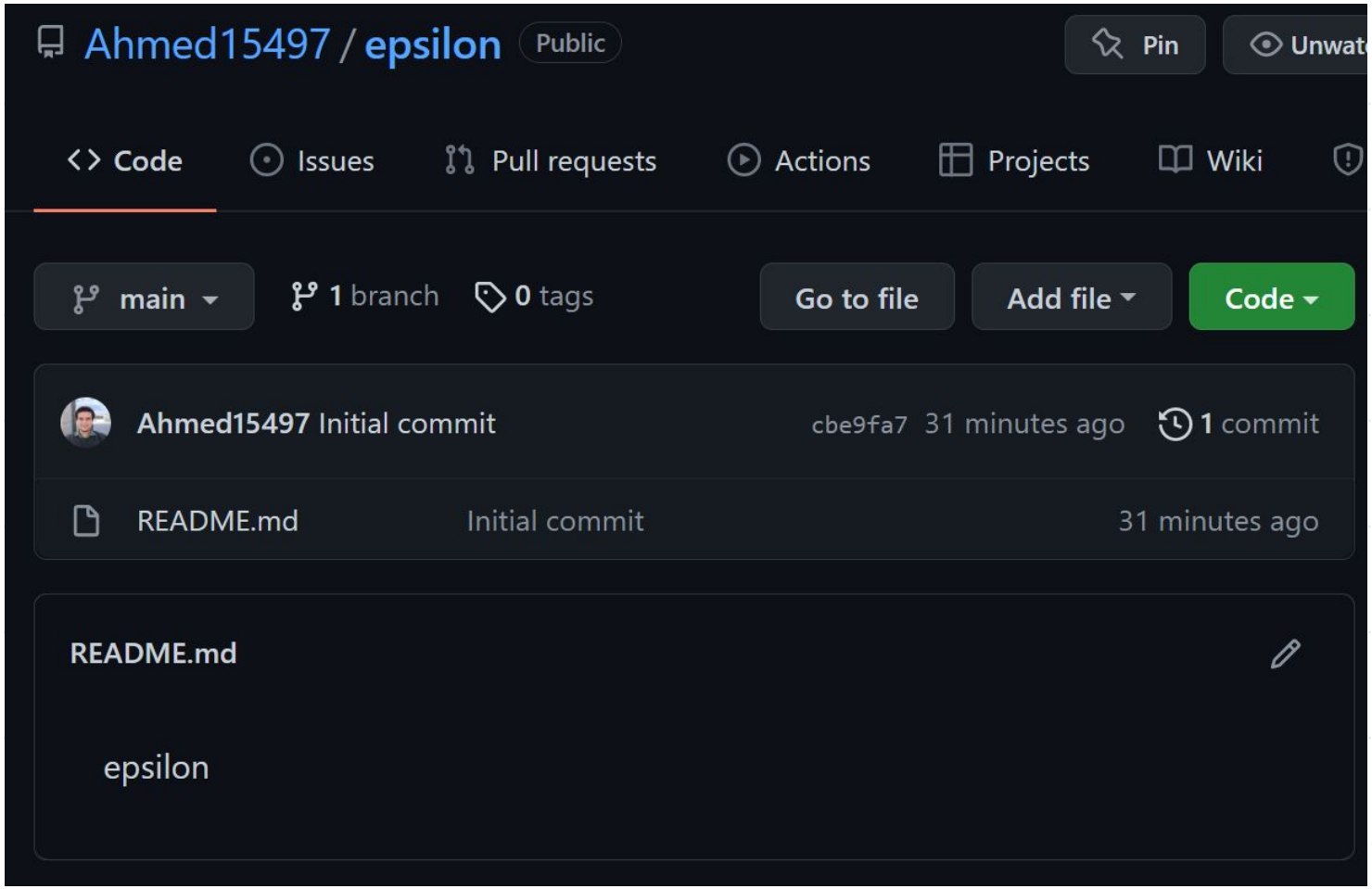
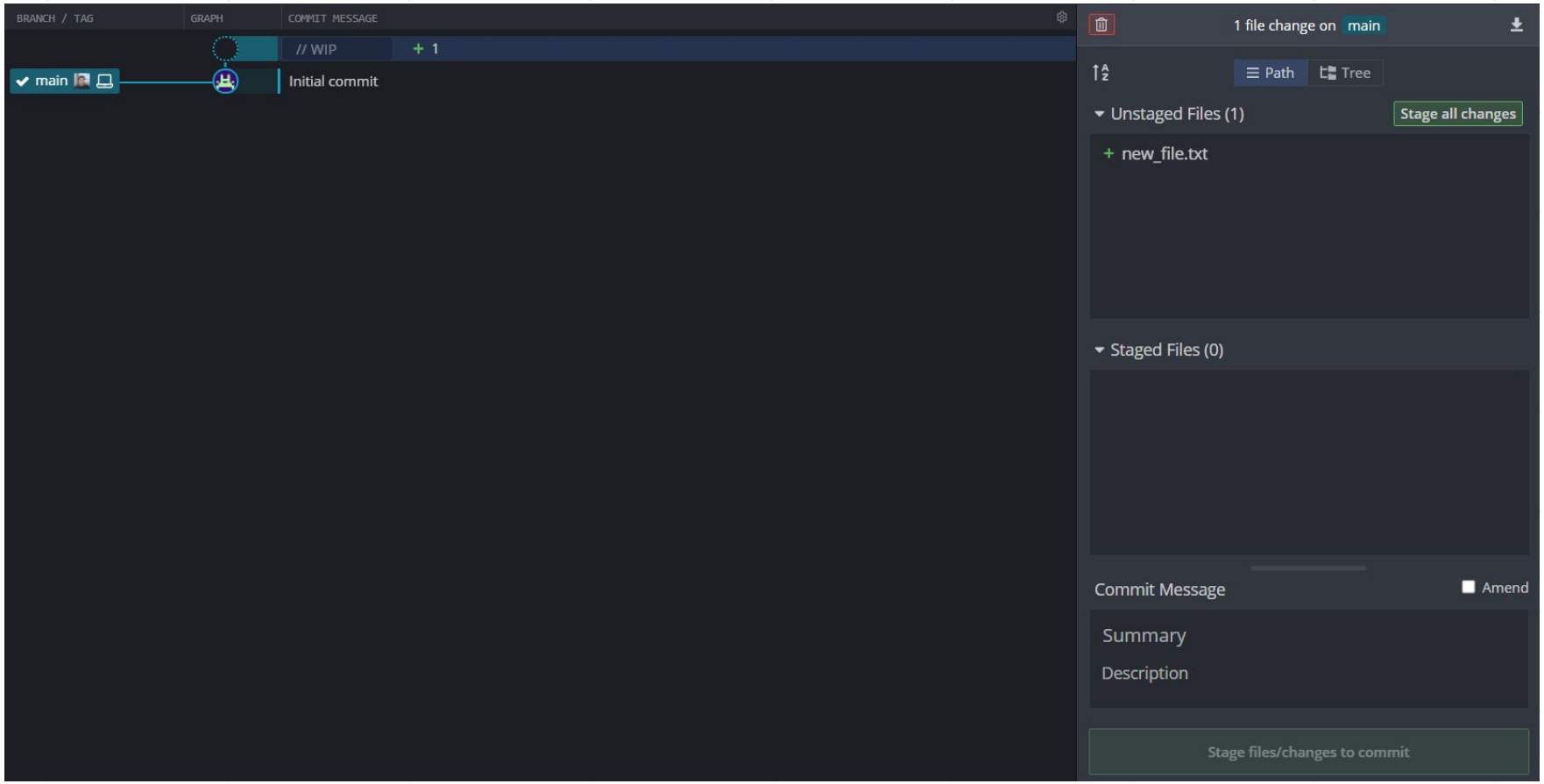
How to use it?

- The remote repo has been created on github



How to use it?

- If you create new file, it will be on the unstaged area on the right section of your main page



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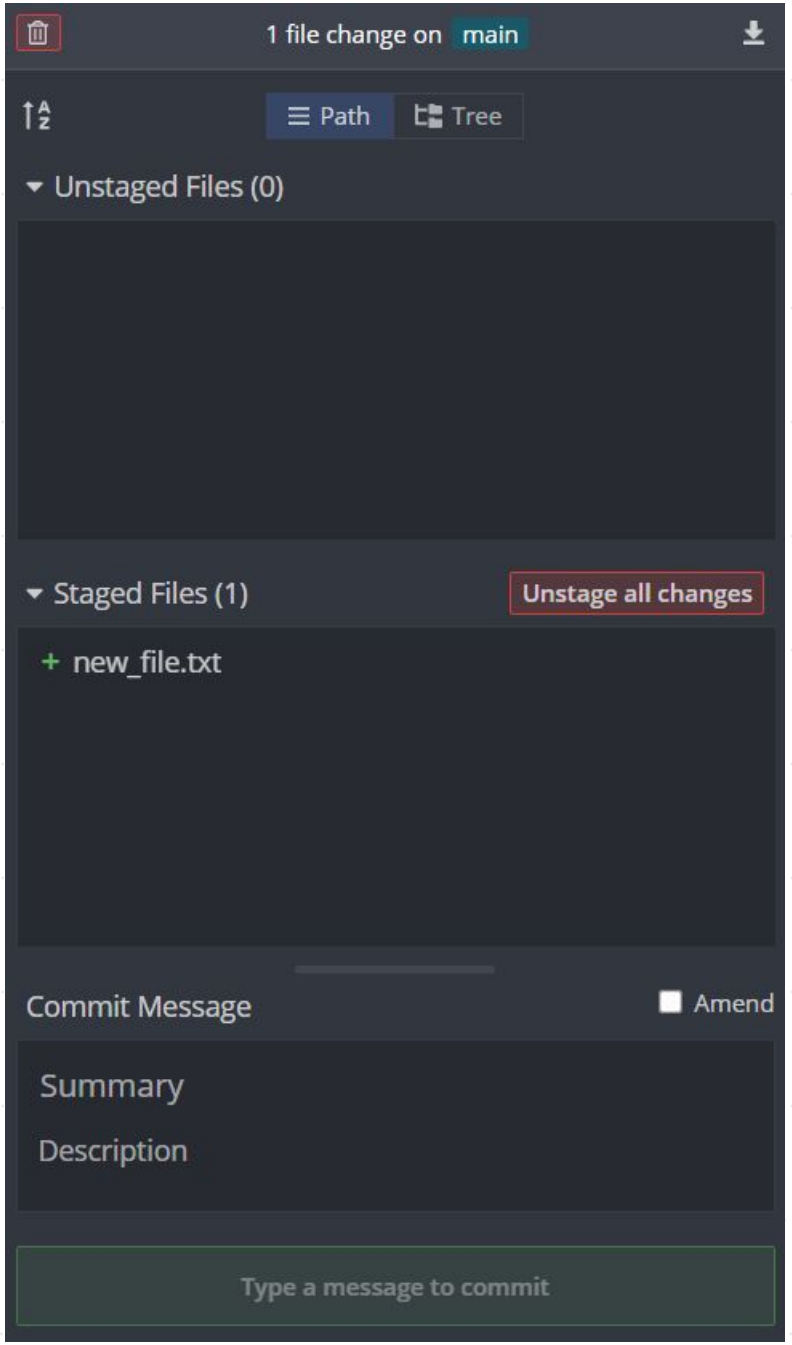
How to use it?

- To stage your changes,
  press stage all changes.



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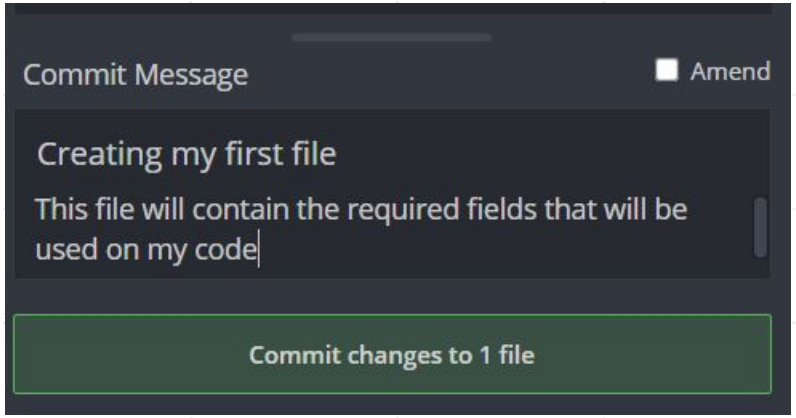
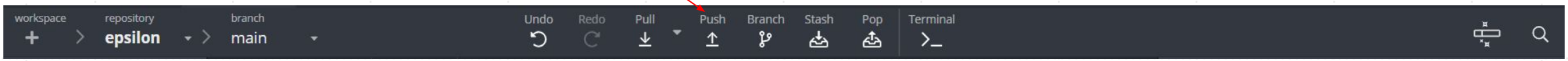
How to use it?

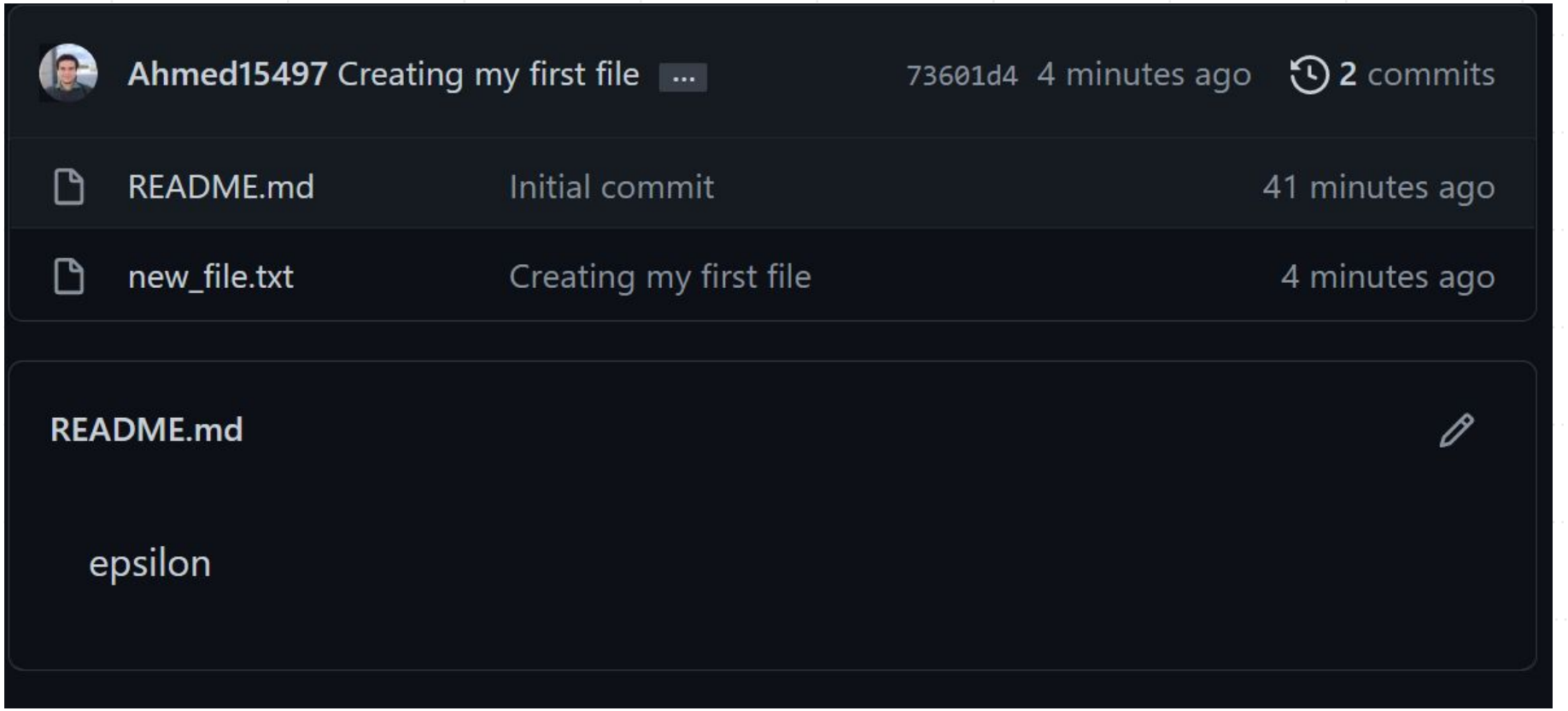
- Commit your changes by writing your commit message, then press commit changes button



How to use it?

- Push your changes to your remote repo by pressing the (Push) button on the upper bar of your page





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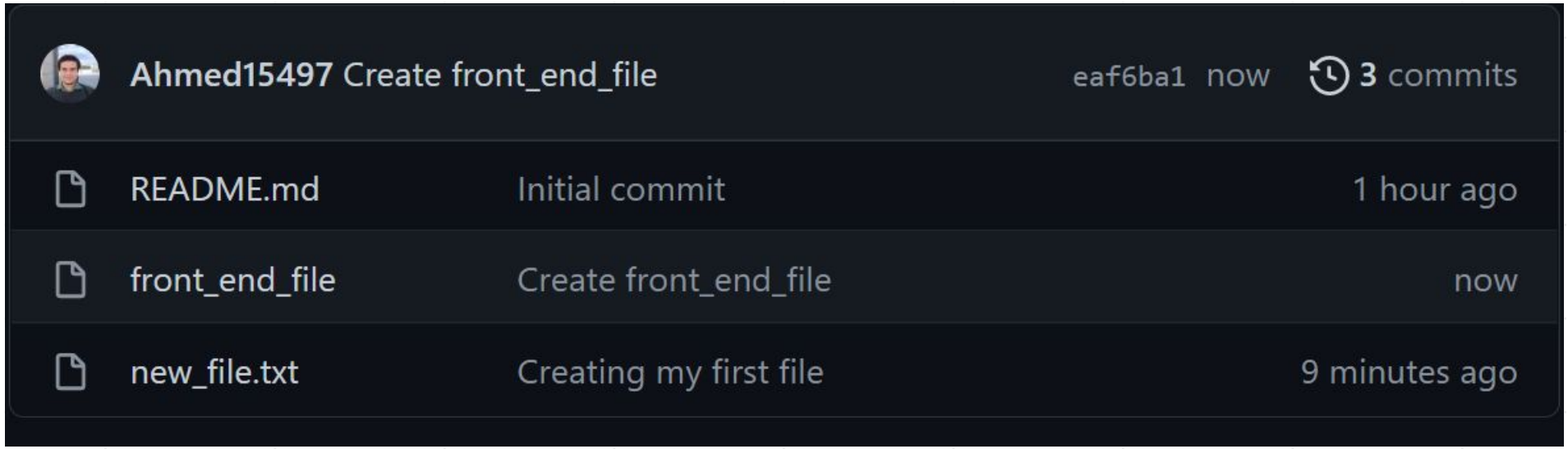
How to use it?

- The front end team have made some changes on your github repo and you need to pull these changes



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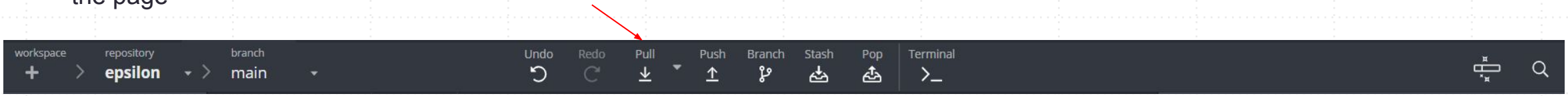
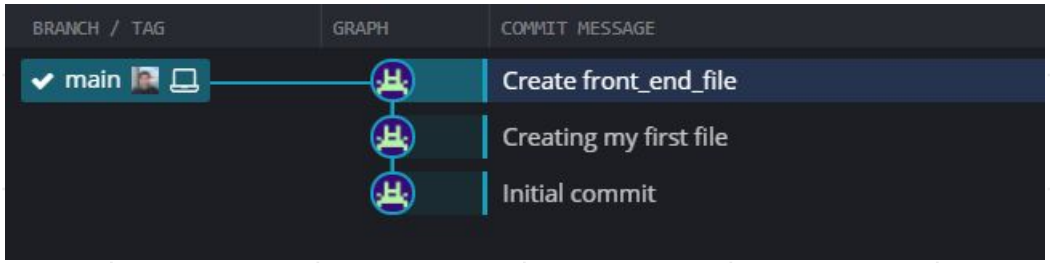
How to use it?

- Pull their changes from your remote repo by pressing the (Pull) button on the bar at the upper section of the page





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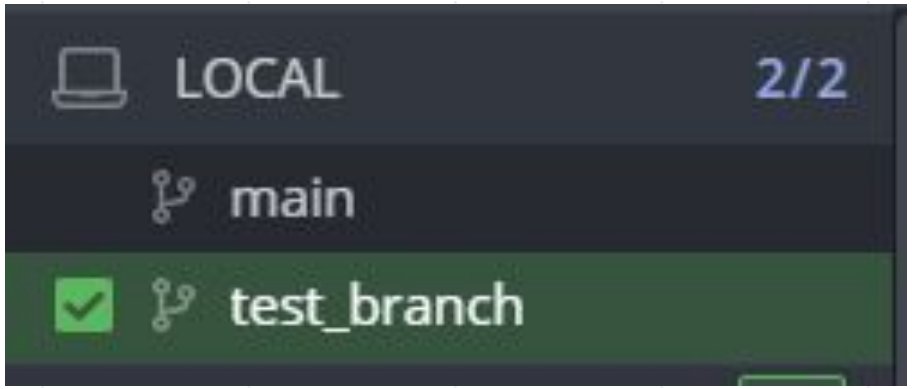
How to use it?

- Creating (test_branch) by pressing (Branch) button on the upper section of the page
- You can name your nerw branch now with (test_branch)



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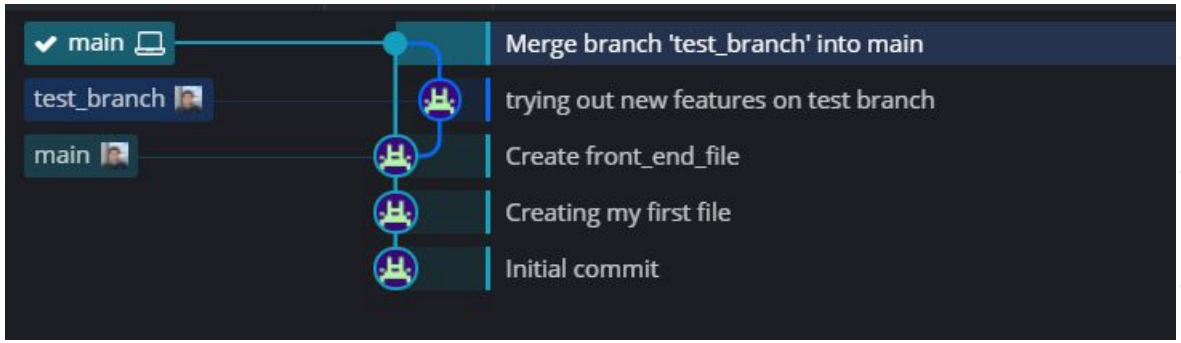
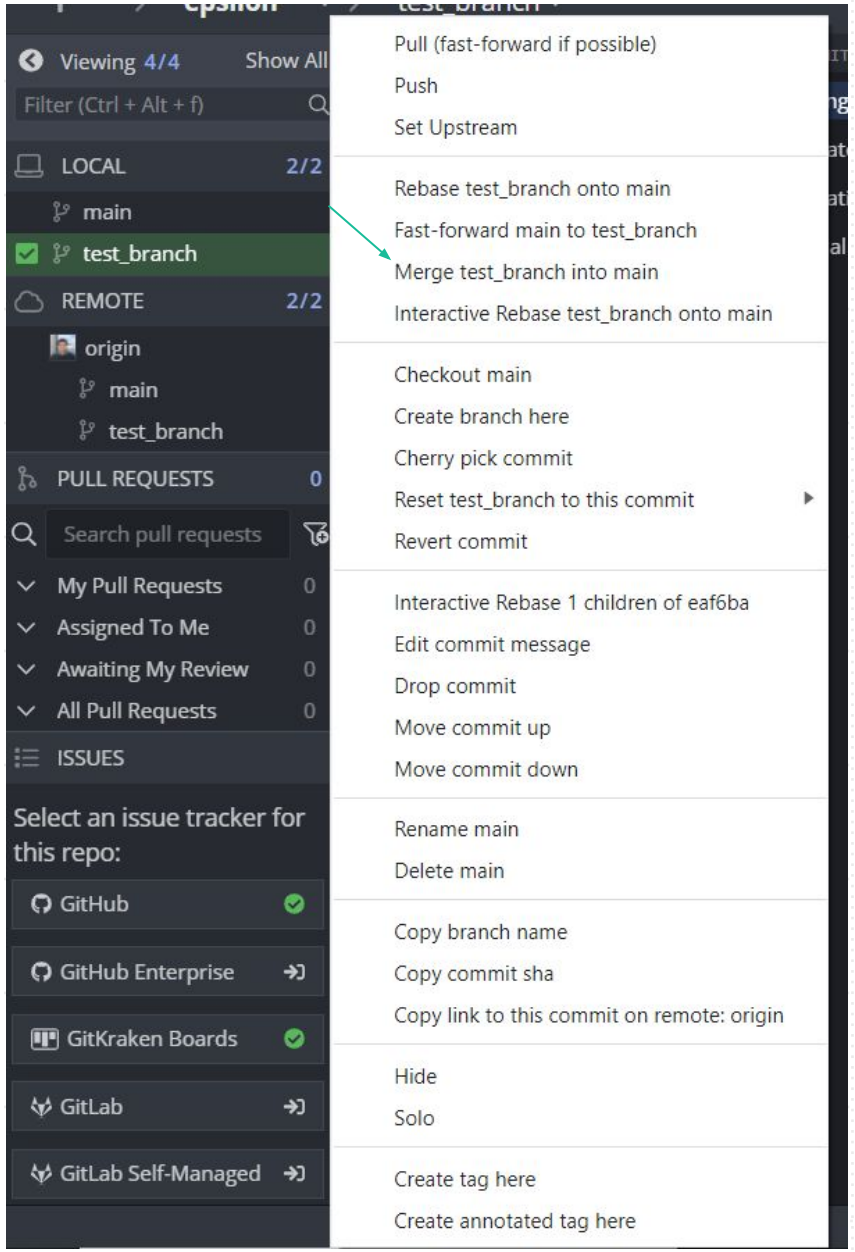
How to use it?

- Do some changes to some files, then merge with main
- Right click on the (main) branch, then choose (merge test_branch into main)
- As you can see the graph has been changed to reflect your merge





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