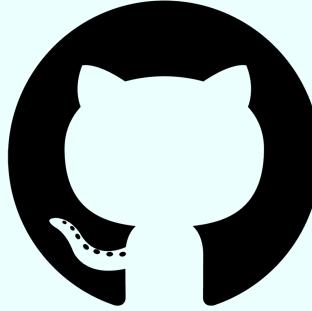


Git : Part 3

Collaborate on GitHub



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Année universitaire 2025/2026

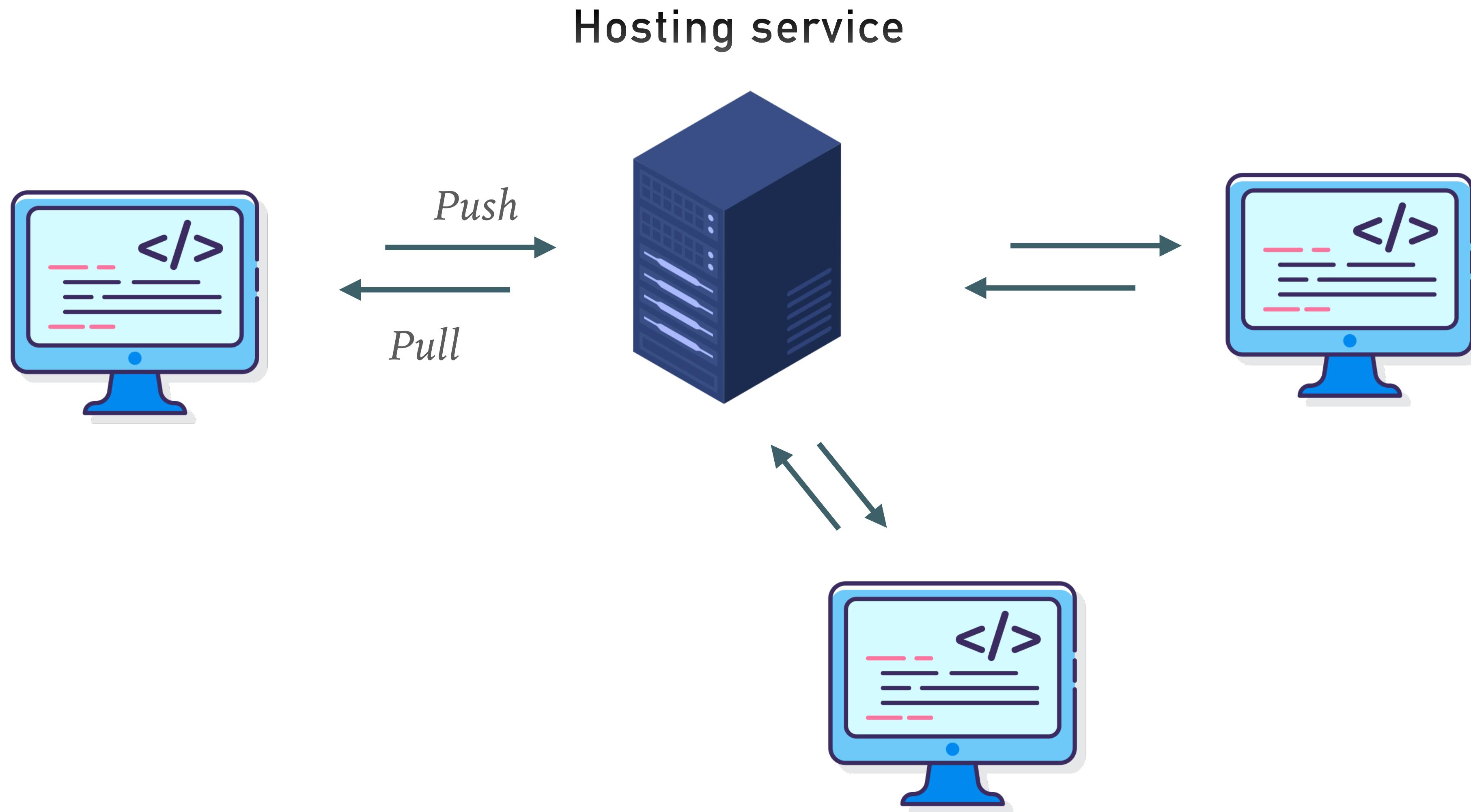
What is Github ?



- ◆ Web hosting service that hosts git projects on the cloud
- ◆ A platform for hosting and collaborating on Git repositories
- ◆ The most used ones are : Github, bitbucket and gitlab.
- ◆ **Github** is the most popular one, it was bought by Microsoft in 2018



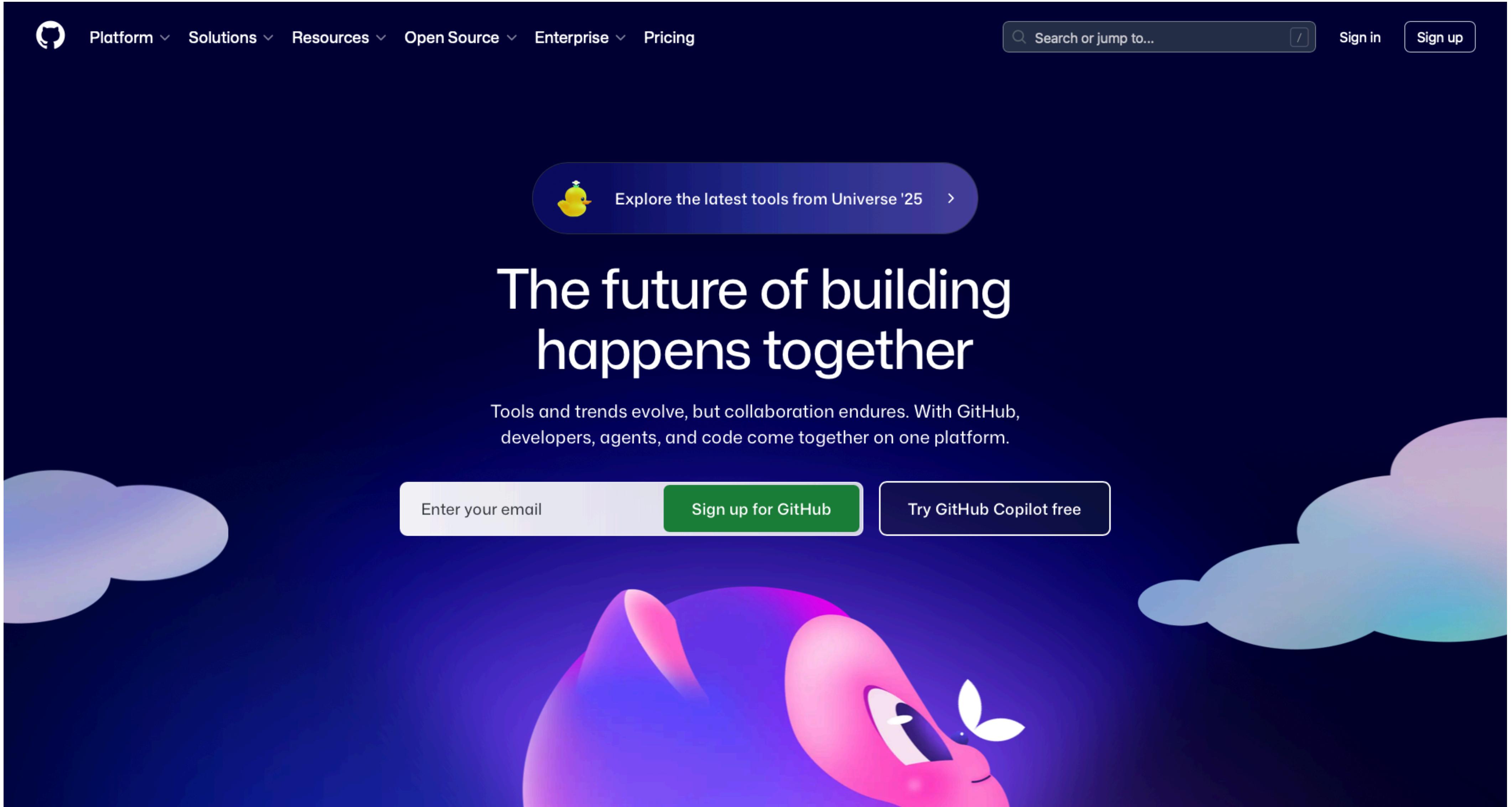
What is Github ?



GITHUB SETUP



Sign up to GitHub



The image shows the GitHub sign-up landing page. At the top, there is a navigation bar with links for Platform, Solutions, Resources, Open Source, Enterprise, and Pricing. To the right of the navigation is a search bar with the placeholder "Search or jump to..." and a "Sign in" button. Below the search bar is a "Sign up" button. A blue call-to-action button features a yellow chick icon and the text "Explore the latest tools from Universe '25". The main headline reads "The future of building happens together" in large white text. Below the headline, a subtext states: "Tools and trends evolve, but collaboration endures. With GitHub, developers, agents, and code come together on one platform." At the bottom, there is a form with fields for "Enter your email" and "Sign up for GitHub", along with a "Try GitHub Copilot free" button. The background features abstract, colorful cloud-like shapes in shades of purple, pink, and blue.

Create a new repository

Create a new repository

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

Owner * **Repository name ***

 AmineFrj / my-repo 

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

Description (optional)

My first repo

 **Public**
Anyone on the internet can see this repository. You choose who can commit.

 **Private**
You choose who can see and commit to this repository.

Initialize this repository with:

Skip this step if you're importing an existing repository.

Add a README file
This is where you can write a long description for your project. [Learn more](#).

Add .gitignore

Choose which files not to track from a list of templates. [Learn more](#).

.gitignore template: Python

Choose a license

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

License: None

 You are creating a public repository in your personal account.

Create repository



Initial setup

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

[Set up in Desktop](#) or [HTTPS](#) [SSH](#) <https://github.com/AmineFrj/my-repo.git> [Copy](#)

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

...or create a new repository on the command line

```
echo "# my-repo" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/AmineFrj/my-repo.git
git push -u origin main
```

...or push an existing repository from the command line

```
git remote add origin https://github.com/AmineFrj/my-repo.git
git branch -M main
git push -u origin main
```

...or import code from another repository

You can initialize this repository with code from a Subversion, Mercurial, or TFS project.

[Import code](#)

💡 **ProTip!** Use the URL for this page when adding GitHub as a remote.



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[Contact GitHub](#)

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[API](#)

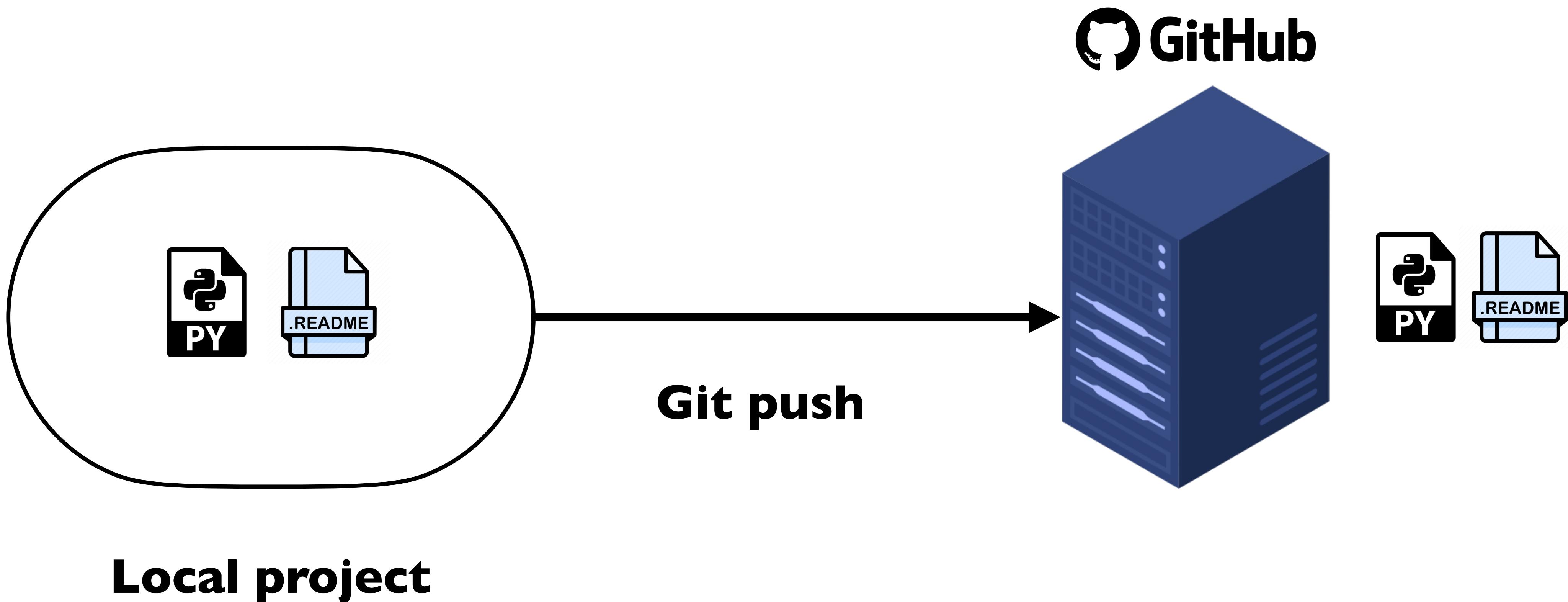
[Training](#)

[Blog](#)

[About](#)

What is a push

Git push sends projects into repository in the cloud



Setup ssh key

- ◆ Since august 2021 GitHub password authentication has been removed and replaced by ssh keys, so you don't have to enter your password multiple times.

```
[macbook-pro-de-amine:hello git amine$ git push -u origin main
Username for 'https://github.com': AmineFrj
Password for 'https://AmineFrj@github.com':
remote: Support for password authentication was removed on August 13, 2021.
remote: Please see https://docs.github.com/en/get-started/getting-started-with-git/about-remote-repositories#cloning-with-https-urls for information on currently recommended modes of authentication.
fatal: Authentication failed for 'https://github.com/AmineFrj/my-repo.git/'
```

Configure SSH keys

The screenshot shows a GitHub repository setup page for a public repository named "AmineFrj/my-repo". The user is signed in as "AmineFrj". A red arrow points from the bottom right towards the "Settings" link in the user menu on the right side of the page.

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

Set up in Desktop or HTTPS SSH <https://github.com/AmineFrj/my-repo.git>

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

...or create a new repository on the command line

```
echo "# my-repo" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/AmineFrj/my-repo.git
git push -u origin main
```

...or push an existing repository from the command line

```
git remote add origin https://github.com/AmineFrj/my-repo.git
git branch -M main
git push -u origin main
```

...or import code from another repository

You can initialize this repository with code from a Subversion, Mercurial, or TFS project.

[Import code](#)

💡 **ProTip!** Use the URL for this page when adding GitHub as a remote.

Configure SSH keys

The screenshot shows the GitHub account settings page for a user named Amine Ferdjaoui. The left sidebar contains navigation links for Public profile, Account, Appearance, Accessibility, Notifications, Access, Billing and plans, Emails, Password and authentication, Sessions, SSH and GPG keys (which is selected and highlighted with a red arrow), Organizations, and Moderation. The main content area displays sections for SSH keys, GPG keys, and Vigilant mode. The SSH keys section indicates no keys are associated, with a link to generate one. The GPG keys section also indicates no keys are associated, with a link to generate one. The Vigilant mode section includes a checkbox for flagging unsigned commits as unverified, with explanatory text and a link to learn more. A red arrow points from the 'SSH and GPG keys' link in the sidebar to the 'New SSH key' button in the main content area.

Search or jump to... / Pull requests Issues Codespaces Marketplace Explore

Amine Ferdjaoui
Your personal account

Public profile Account Appearance Accessibility Notifications

Billing and plans Emails Password and authentication Sessions

SSH and GPG keys (selected)

Organizations Moderation

Code, planning, and automation

Repositories Codespaces Packages Copilot Pages Saved replies

Security

Code security and analysis

Integrations

Applications Scheduled reminders

Archives

Security log Sponsorship log

SSH keys

New SSH key

There are no SSH keys associated with your account.

Check out our guide to [generating SSH keys](#) or troubleshoot [common SSH problems](#).

GPG keys

New GPG key

There are no GPG keys associated with your account.

Learn how to [generate a GPG key](#) and add it to your account.

Vigilant mode

Flag unsigned commits as unverified

This will include any commit attributed to your account but not signed with your GPG or S/MIME key.
Note that this will include your existing unsigned commits.

[Learn about vigilant mode.](#)

Go to your personal profile

Setup ssh key

- ◆ First check if you have no SSH keys on your computer

```
$ ls -al ~/.ssh
```

- ◆ SSH keys supported by GitHub are :
 - ◆ id_rsa.pub
 - ◆ id_ecdsa.pub
 - ◆ id_ed25519.pub
- ◆ If you already have one just copy it into your GitHub settings, otherwise follow the instructions : <https://docs.github.com/en/authentication/connecting-to-github-with-ssh/generating-a-new-ssh-key-and-adding-it-to-the-ssh-agent>

Setup multiple ssh keys

- ◆ If you have multiple accounts, make sure to add specific key for each one in `~/.ssh/config`
then add ssh private keys to your agent with : `ssh-add ~/.ssh/<key-name>`
- ◆ Cf. <https://gist.github.com/oanhnn/80a89405ab9023894df7>

Initial push

```
$ git remote add origin git@<repo_url>
$ git branch -M main
$ git push -u origin main
```

Nb. Use the **ssh url** in *git remote add origin*

```
$ echo "This repo is a python test on GitHub" > README.md
$ git add README.md
$ git commit -m 'Add a README.'
$ git push
```

Initial push

The screenshot shows a GitHub repository page for 'AmineFrj/my-repo'. The 'Code' tab is selected. A red arrow points to the '7 commits' link in the commit list.

AmineFrj / my-repo Public

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

main 1 branch 0 tags Go to file Add file Code

AmineFrj Add README. 912ffa1 4 minutes ago 7 commits

README.md Add README. 4 minutes ago

main2.py add new comment 2 4 hours ago

requirements.txt Add new print 9 hours ago

README.md

My readme

About

No description, website, or topics provided.

Readme 0 stars 1 watching 0 forks

Releases

No releases published Create a new release

Packages

No packages published Publish your first package

Languages

Python 100.0%

Initial push

The screenshot shows a GitHub repository page for 'AmineFrj / my-repo'. The 'Code' tab is selected. The main area displays a list of commits:

- o Commits on Nov 28, 2022
 - Add README.
AmineFrj committed 4 minutes ago
 - add new comment 2
AmineFrj committed 4 hours ago
 - added comment
AmineFrj committed 4 hours ago
 - Rename main.py
AmineFrj committed 9 hours ago
 - add readme
AmineFrj committed 9 hours ago
 - Add new print
AmineFrj committed 9 hours ago
- o Commits on Nov 27, 2022
 - Initial commit.
AmineFrj committed yesterday

At the bottom, there are 'Newer' and 'Older' buttons.

Clone project

- Once you pushed the initial commit, you can clone it using this clone command

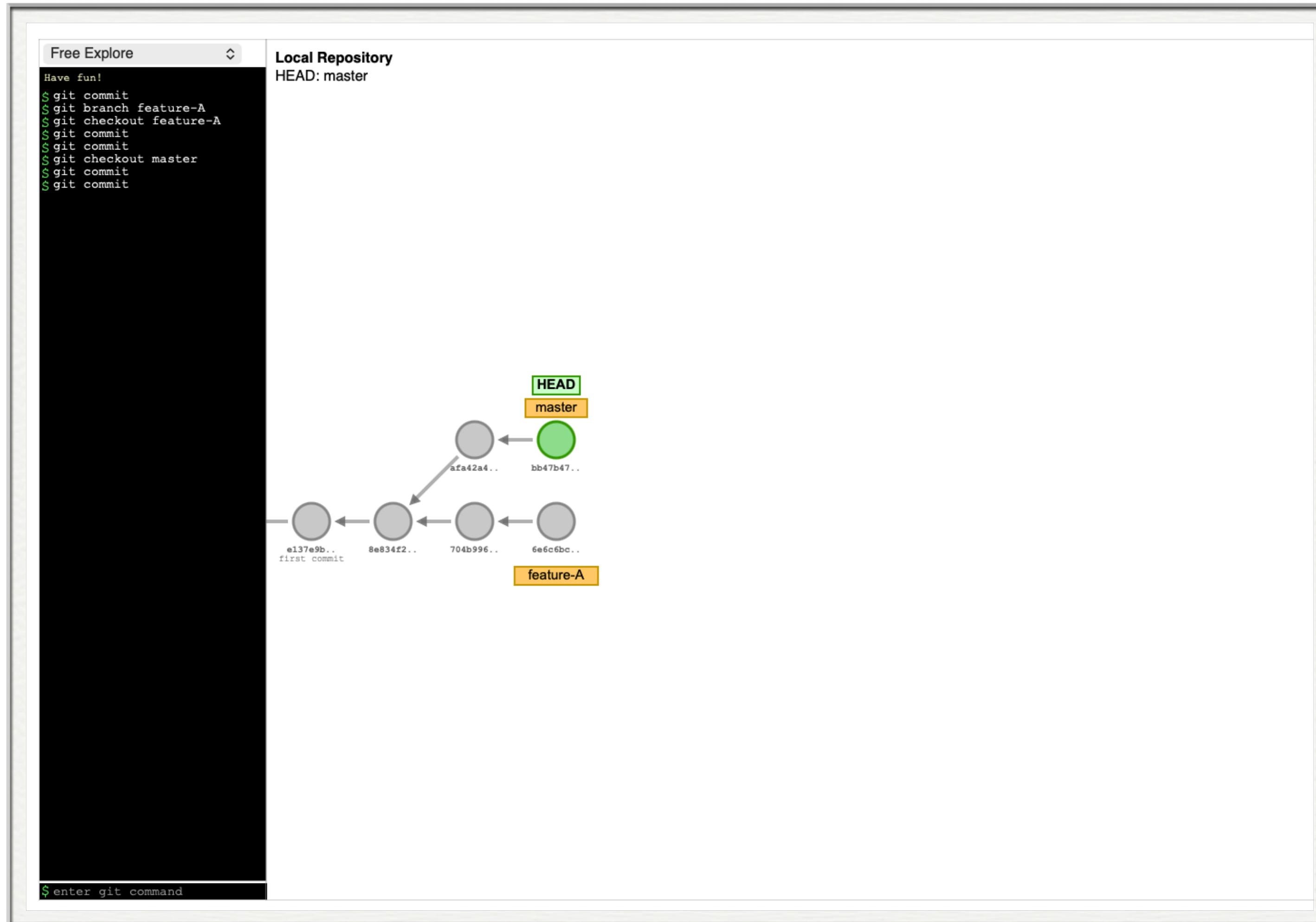
```
$ git clone <repo_url>
```

- You can see that git added the remote branches under origin

```
$ git branch -a
```

Git visualization

<https://git-school.github.io/visualizing-git/>

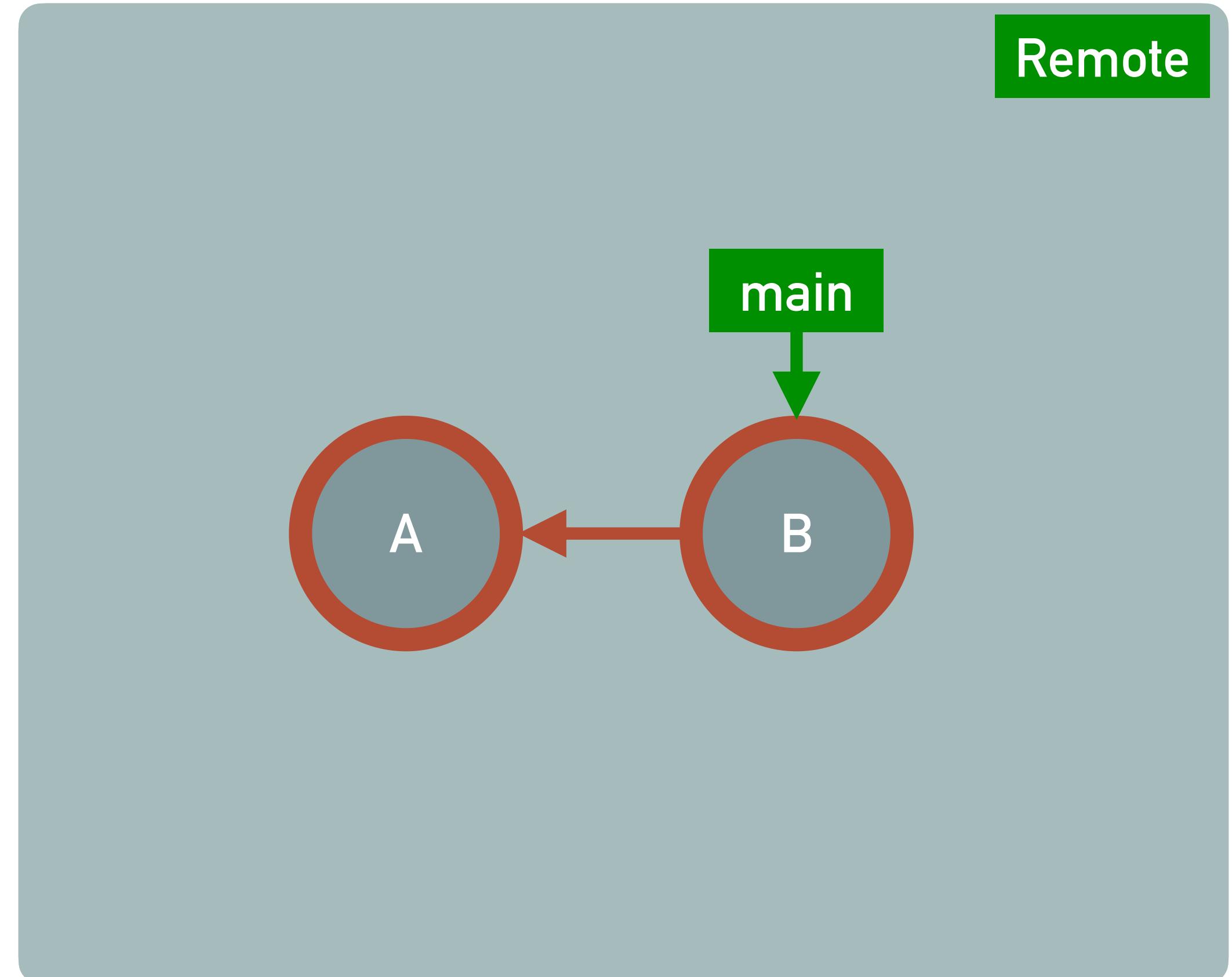
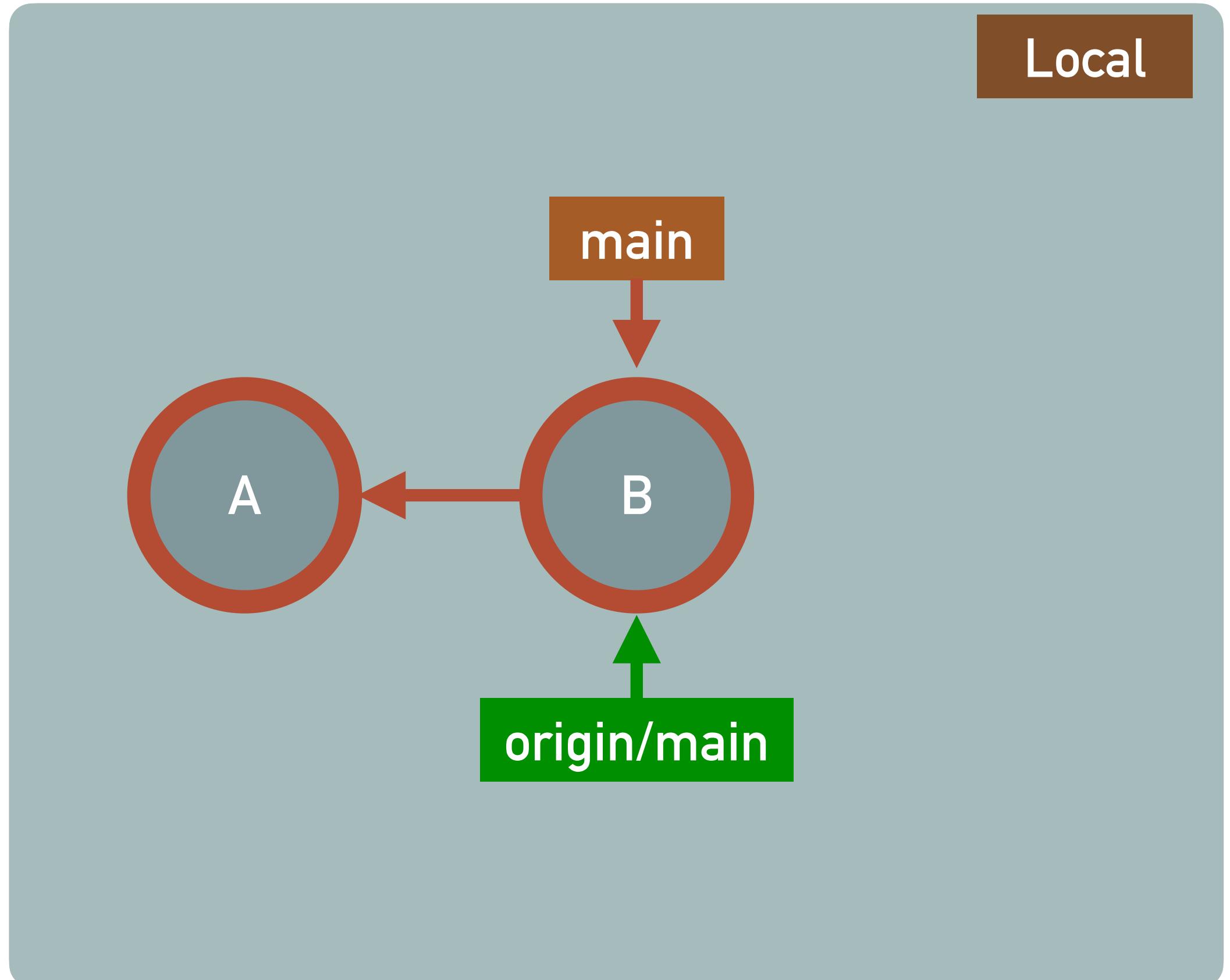


GIT PUSH

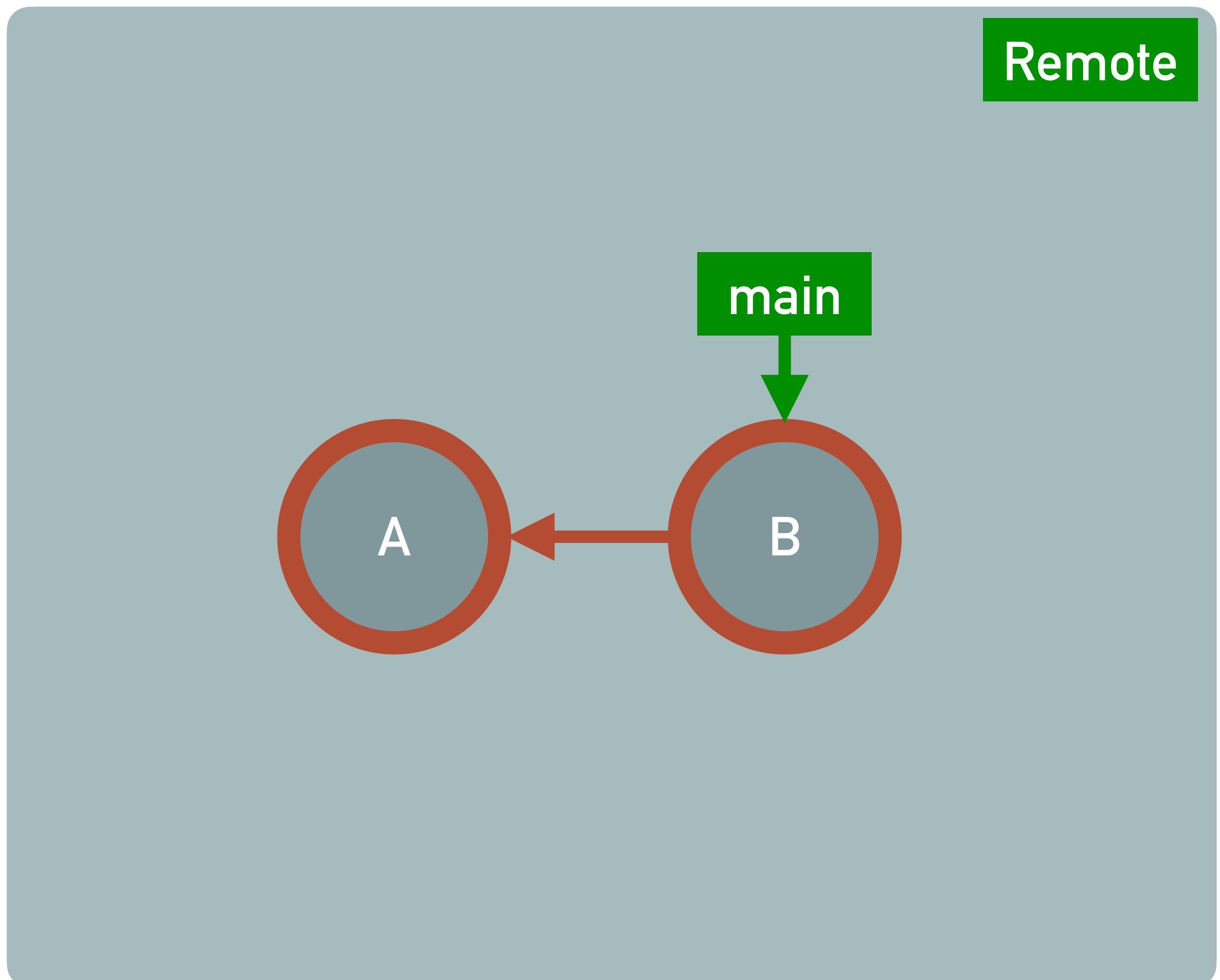
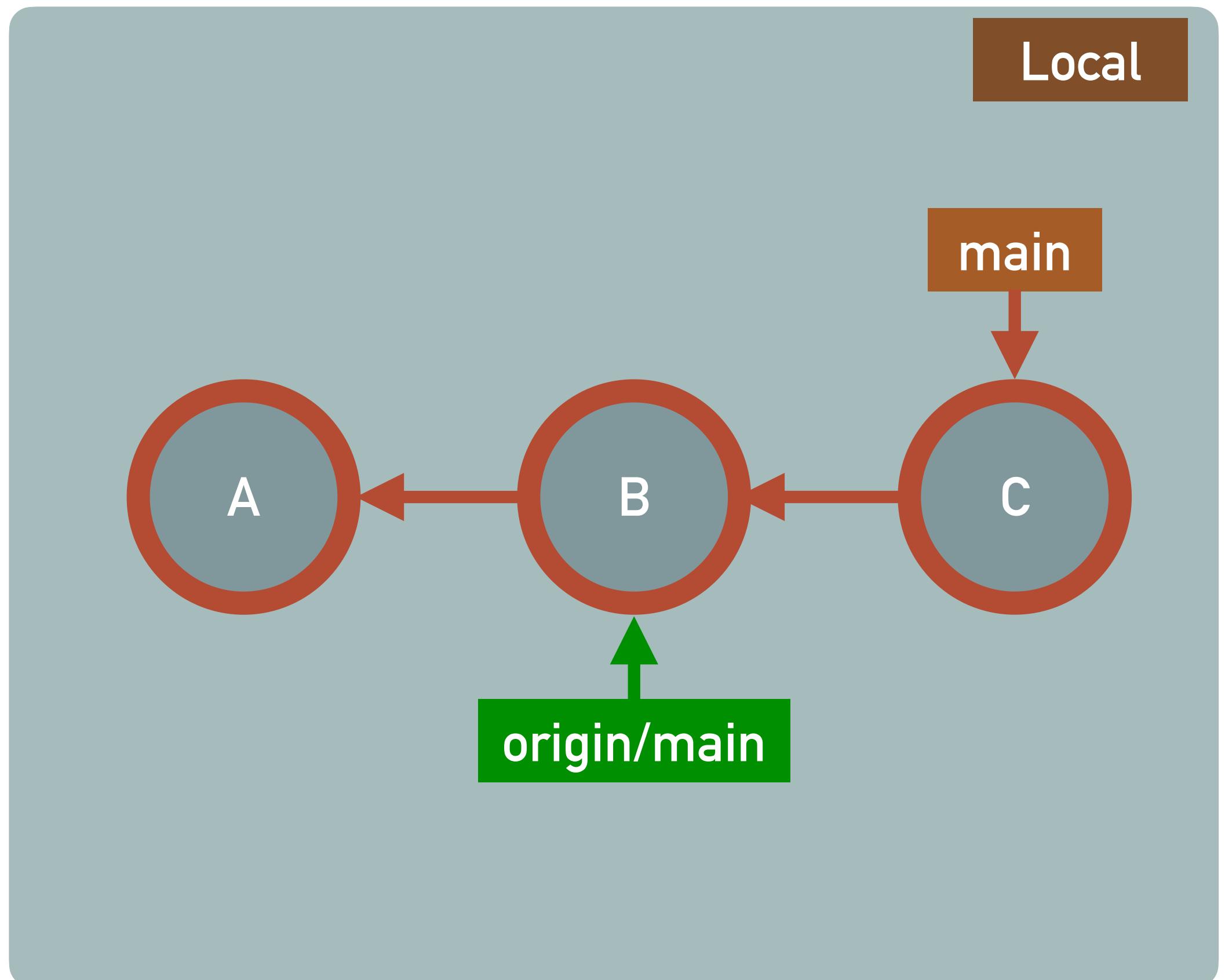


Push

- Origin/main is considered as a separate branch
- Since it shows the remote state, it can only be modified with a push

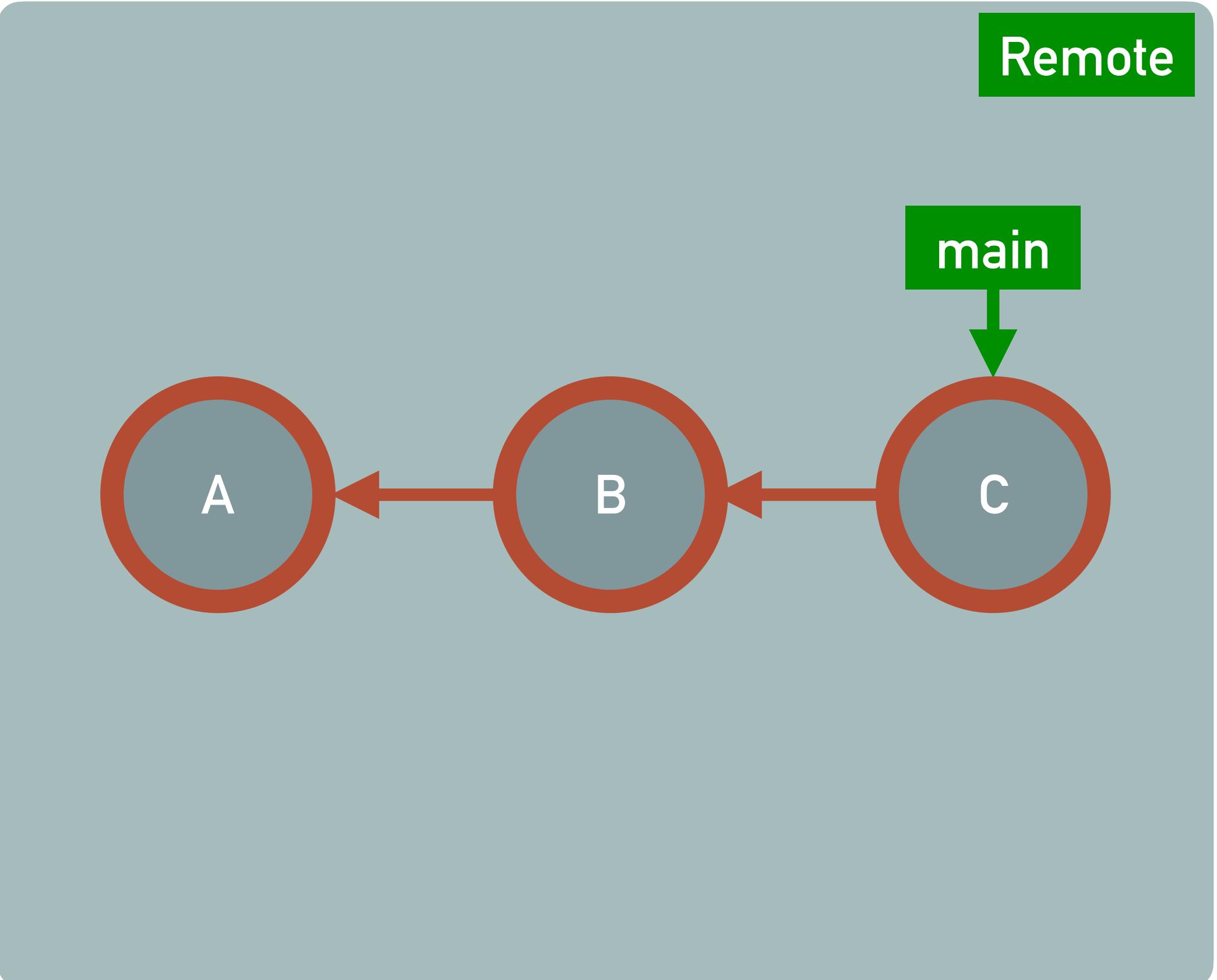
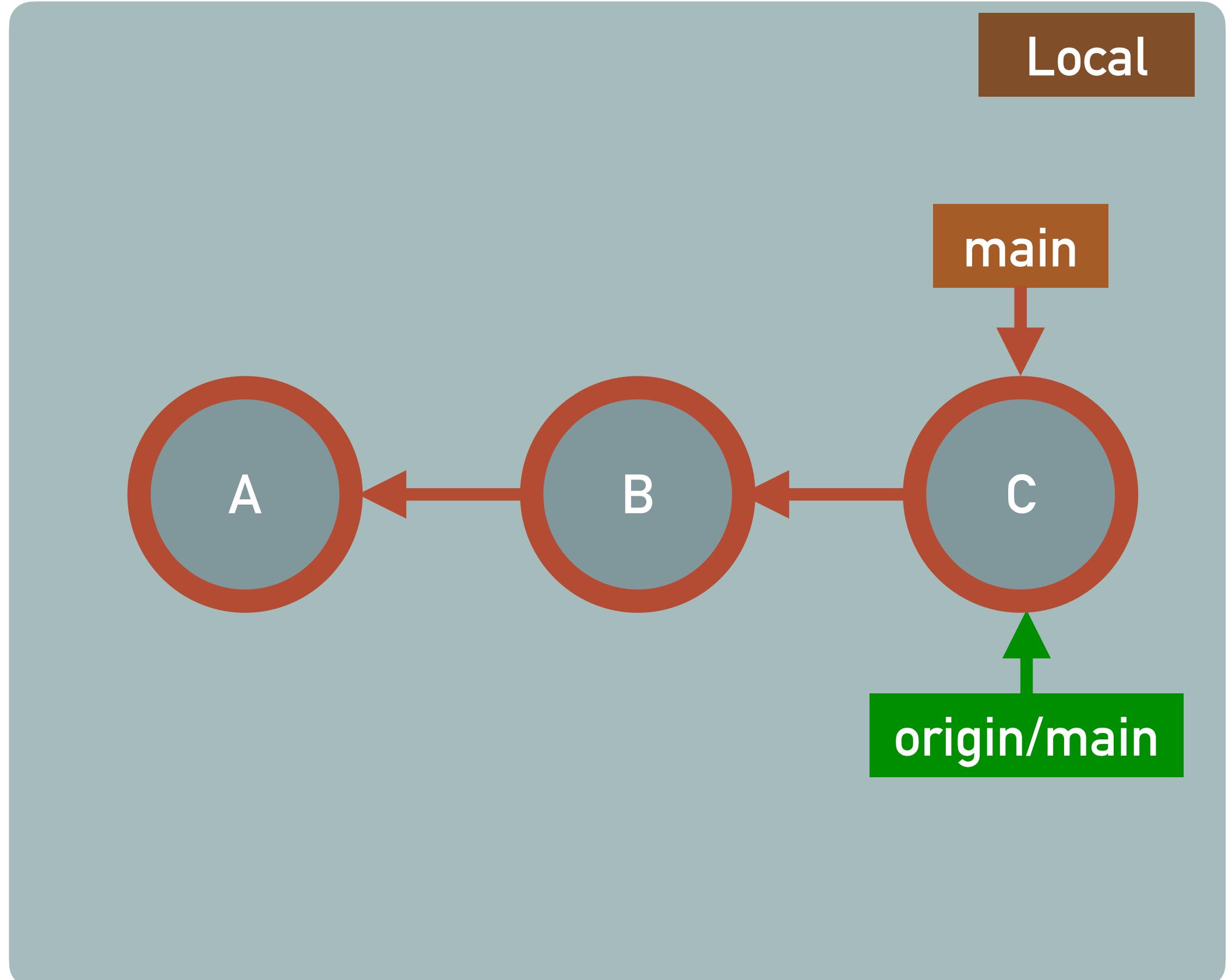


Push



Push

```
$ git push origin <branch> #By default push into origin and your current branch
```

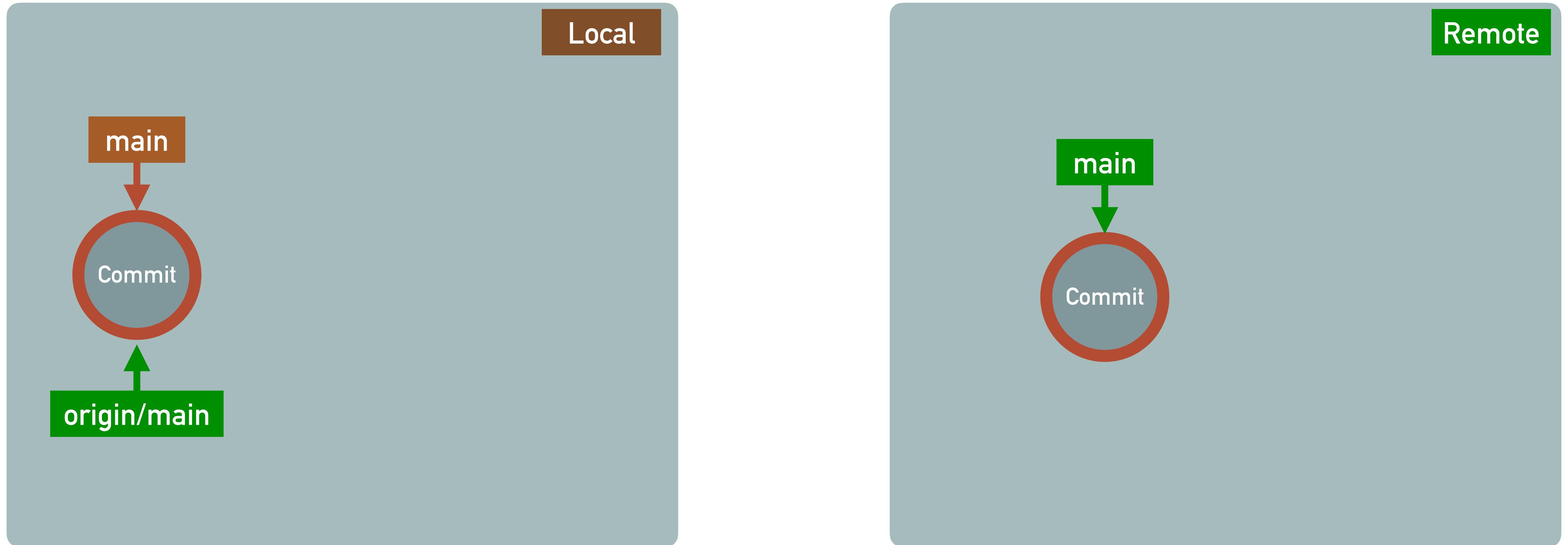


GIT FETCH & GIT PULL

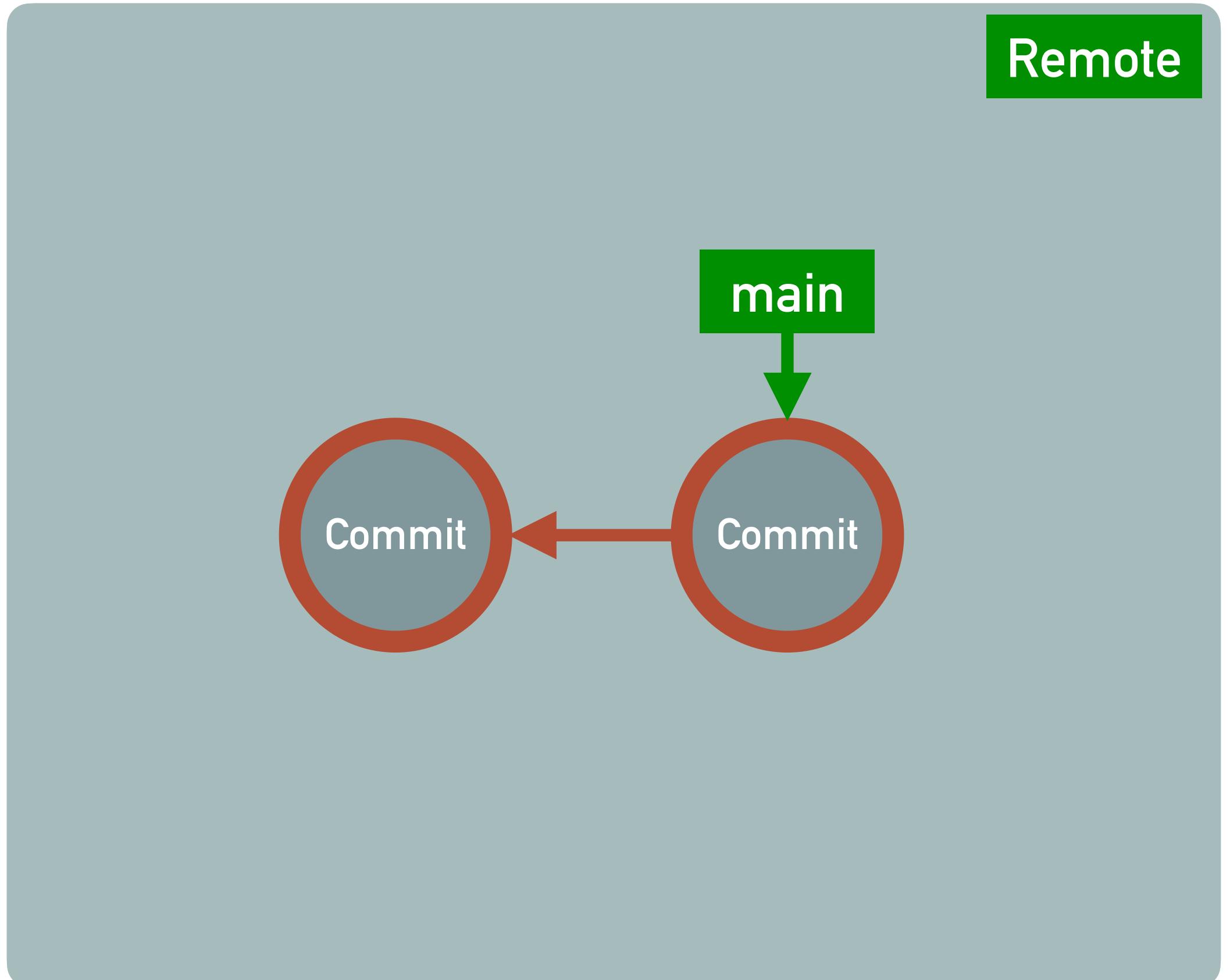
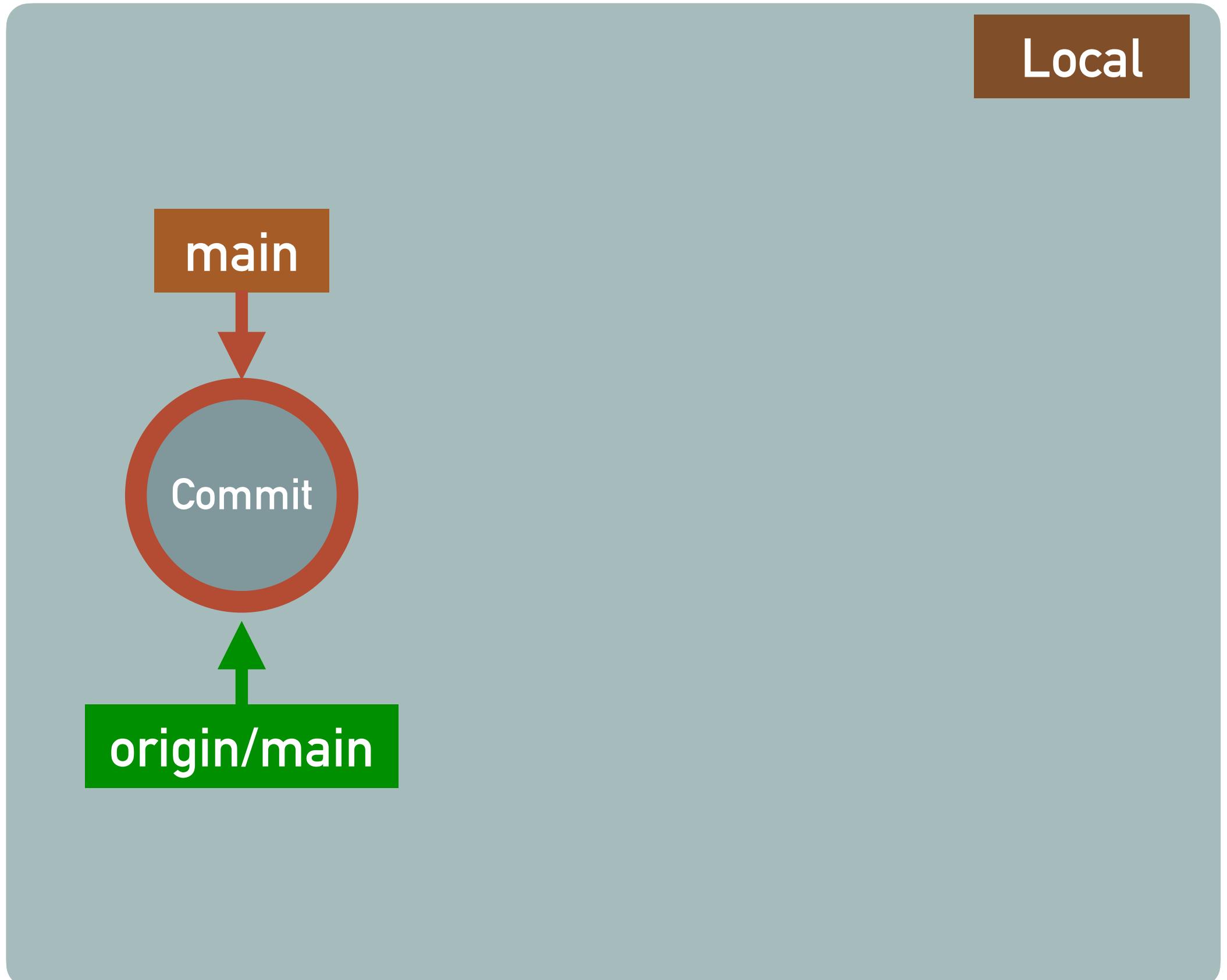


Fetching

Your local repository is not automatically synchronised with the remote, you have to update the remote changes locally to have the latest version

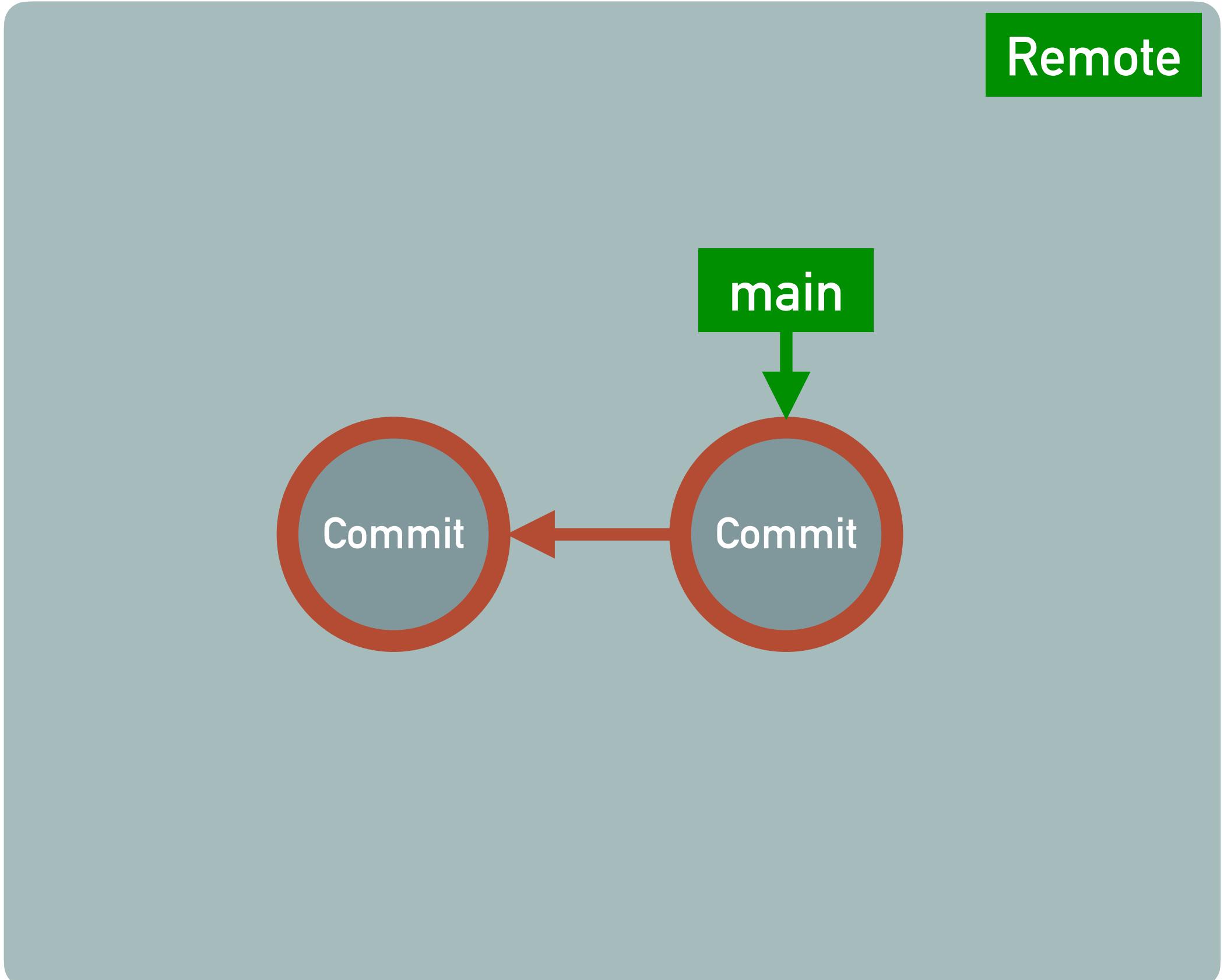
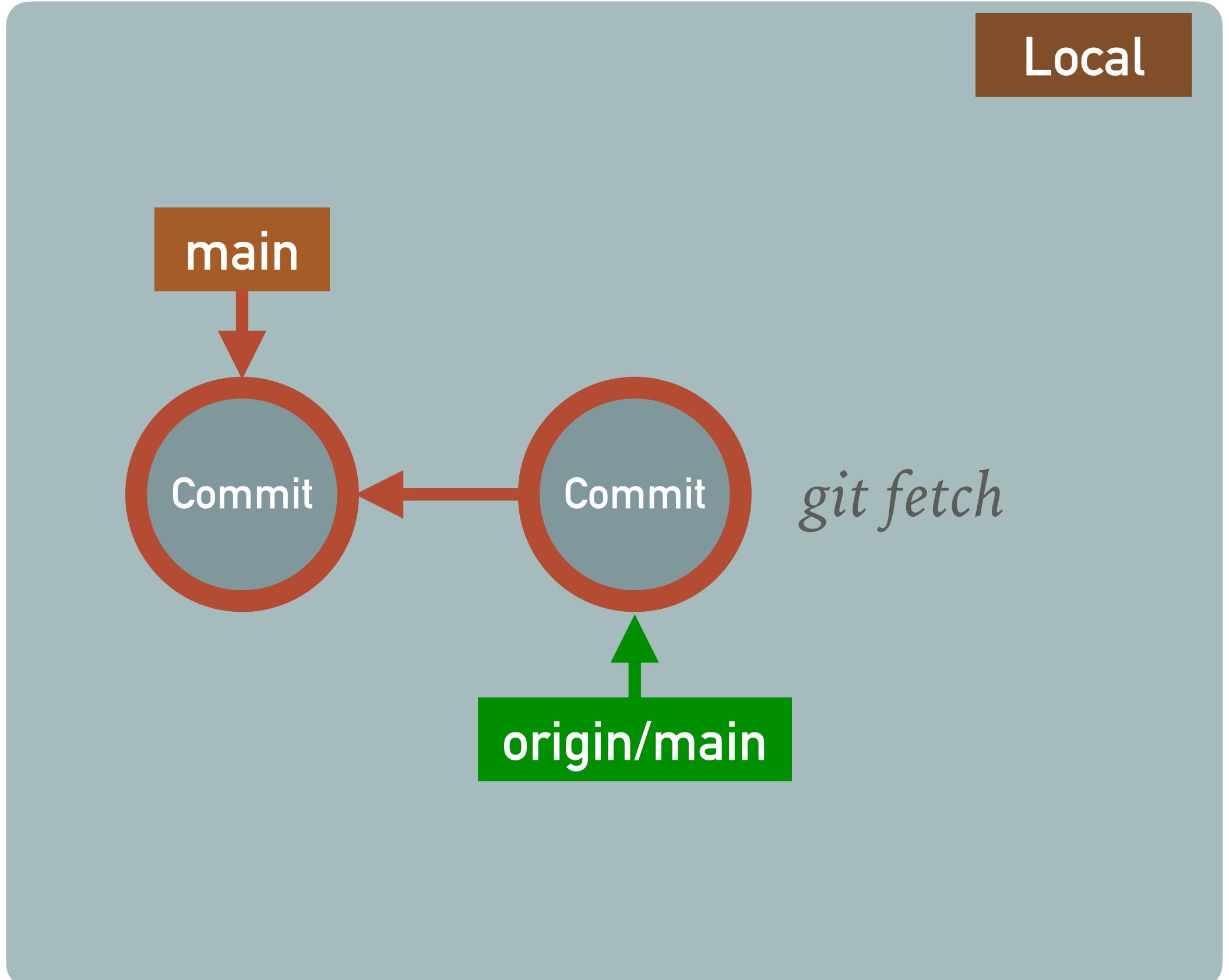


Fetching



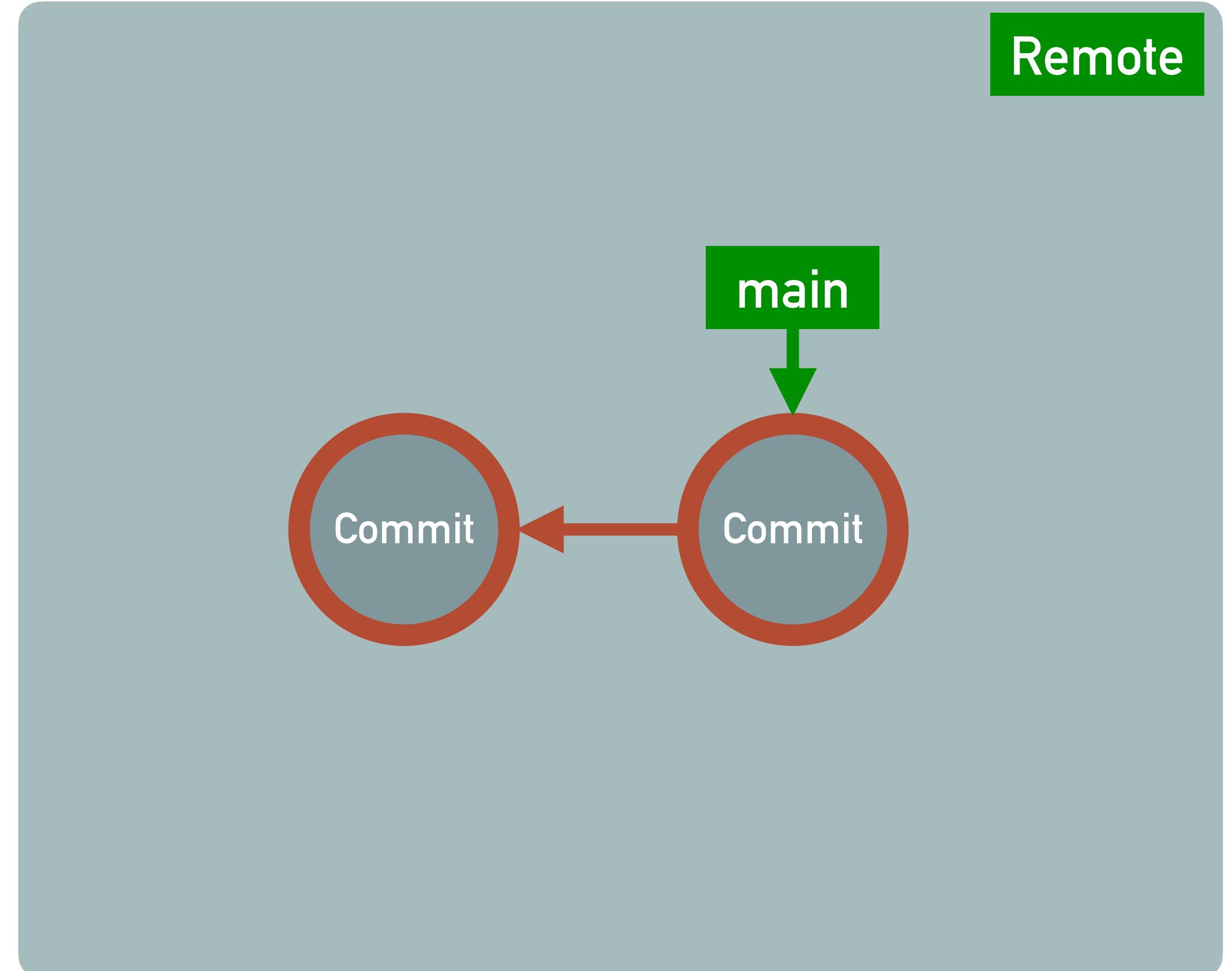
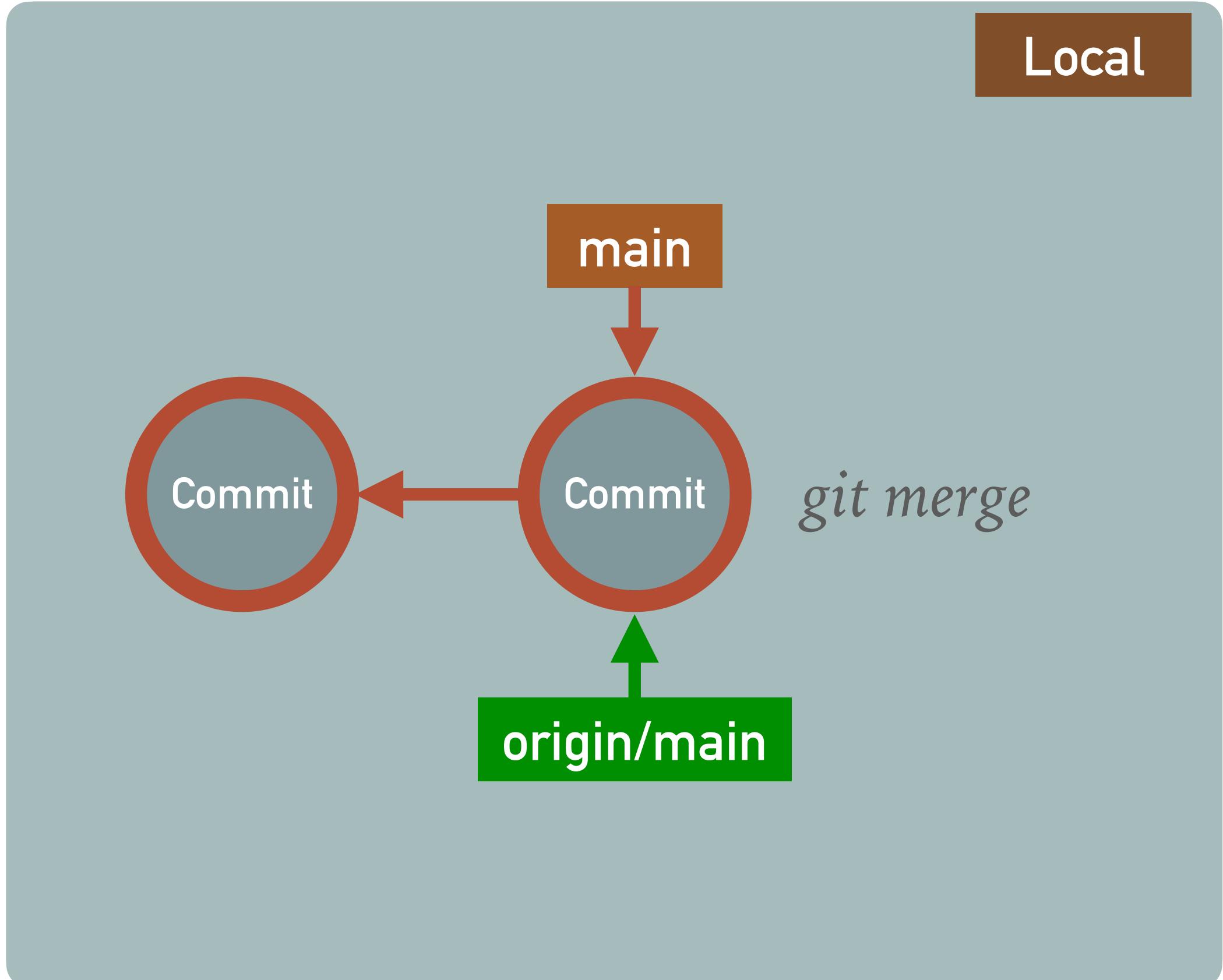
Fetching

```
$ git fetch <branch-name> #get the remote changes locally
```



Fetching

```
$ git merge origin/main
```



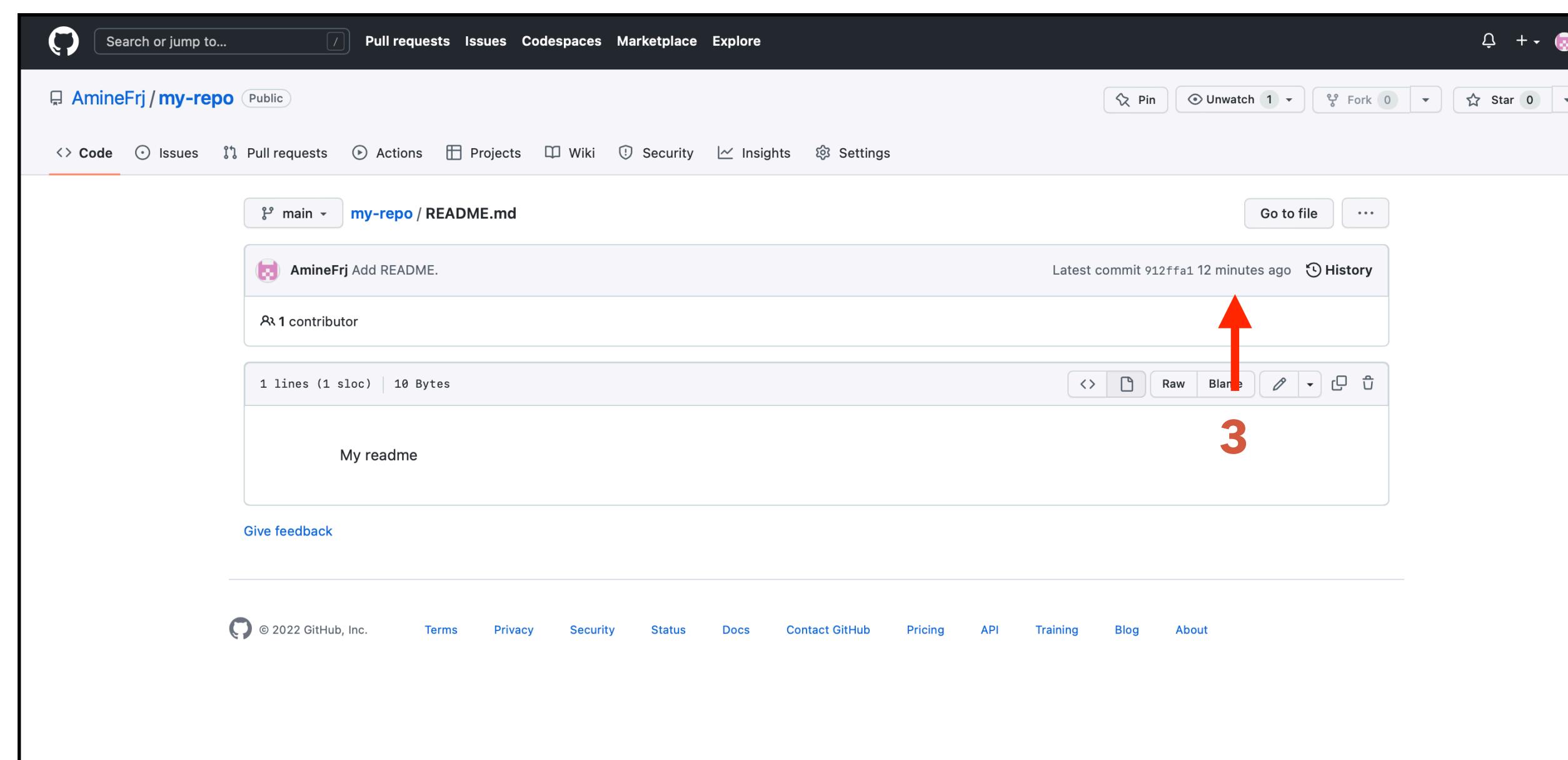
Git pull

We can do both in a single command :
git pull = git fetch + get merge + create a new commit

```
$ git pull
```

Git pull

- Simuler un push dans github en modifiant sur l'interface github comme suit :
- Faire un pull ensuite en local



A screenshot of the GitHub interface showing a commit changes dialog for the file README.md. The dialog contains:

- A text area with the placeholder "Update README!"
- An optional extended description area with the placeholder "Add an optional extended description..."
- Two radio button options:
 - Commit directly to the `main` branch.
 - Create a **new branch** for this commit and start a pull request. [Learn more about pull requests.](#)
- Two buttons at the bottom: "Commit changes" (green) and "Cancel" (gray).

The radio button option "Commit directly to the main branch." is highlighted with a red arrow labeled "2".

PUSH BRANCH TO REMOTE



Push a branch to remote

When creating a branch locally you have to push it to remote

```
$ git switch -C <branch-name>
$ git push -u origin <branch-name> #push the branch to remote
$ git branch -vv #check if local branches are synchronised with remote
```

Delete a branch (locally and remotely)

```
$ git push -d origin <branch-name> #delete the remote branch
$ git switch main
$ git branch -d <branch-name>
```

FETCH A REMOTE BRANCH LOCALLY



Setup a track remote branch

- ◆ In order to work on a new remote branch you have to fetch it and then create a new one locally and make it track the remote one

```
$ git fetch  
$ git switch -C <branch_name> origin/<branch_name>
```

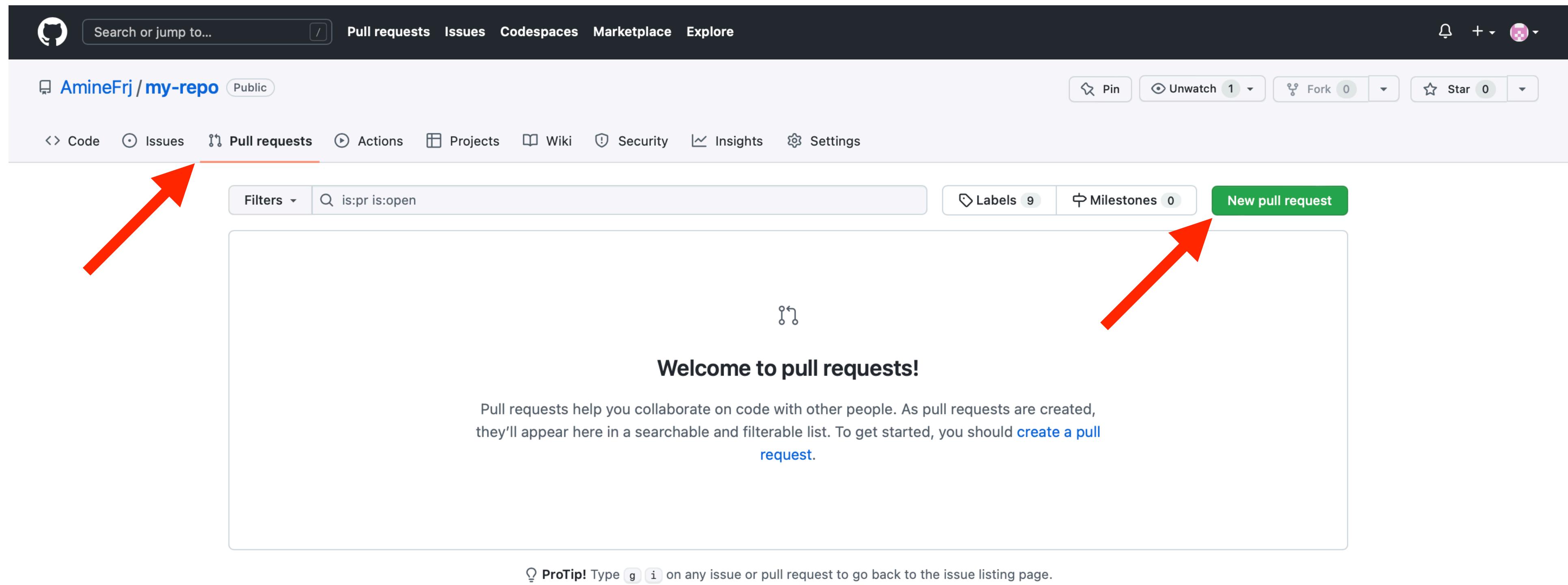
MERGE PULL REQUESTS



Why do we need merge pull requests

- ◆ In real world projects developers don't merge their branches directly to the main branch, otherwise everybody overwrites each other work !
- ◆ We do what we call a ***pull request***. It simply means that you ask a ***reviewer*** to review your changes and make sure that your changes passed the ***tests*** and doesn't cause problems to the main project and then ***approves*** your merge.

Git merge pull request



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Git merge pull request

The screenshot shows the GitHub interface for comparing branches. At the top, the repository 'AmineFrj / my-repo' is selected. The 'Code' tab is active. In the center, a comparison between 'base: main' and 'compare: pre-processing' is shown. A green checkmark indicates 'Able to merge'. Red arrows point to the 'base: main' dropdown and the 'compare: pre-processing' dropdown. Below this, a message encourages discussion and review. A green 'Create pull request' button is highlighted with a red arrow. Summary statistics show 1 commit, 1 file changed, and 1 contributor. A commit log entry for 'Add preprocessing' by 'AmineFrj' is listed. At the bottom, a diff view shows a single addition of the 'numpy' import statement in the 'pre_processing.py' file. Red arrows also point to the 'Split' and 'Unified' buttons at the bottom right of the diff view.

Comparing changes

Choose two branches to see what's changed or to start a new pull request. If you need to, you can also [compare across forks](#).

base: main ▾ ← compare: pre-processing ▾ ✓ Able to merge. These branches can be automatically merged.

Discuss and review the changes in this comparison with others. [Learn about pull requests](#)

Create pull request

-o 1 commit

1 file changed

1 contributor

Commits on Nov 29, 2022

Add preprocessing

AmineFrj committed 11 hours ago

b1f9c26

Showing 1 changed file with 1 addition and 0 deletions.

1 pre_processing.py

... @@ -0,0 +1 @@ 1 + import numpy

Split Unified

Git merge pull request

The screenshot shows a GitHub pull request page for a repository named "AmineFrj / my-repo". The pull request is titled "Add preprocessing #1" and is currently open, merging 1 commit from the "pre-processing" branch into the "main" branch. The commit message is "Add preprocessing". The pull request has 0 reviews, 0 assignees, and 0 labels. It also has 0 projects and 0 milestones.

A red arrow points to the "Merge pull request" button at the bottom of the main content area. Another red arrow points to the "Reviewers" section on the right side of the page, where there is a gear icon followed by the text "Choose a reviewer to check your changes".

Add preprocessing #1

Open AmineFrj wants to merge 1 commit into `main` from `pre-processing`

Conversation 0 Commits 1 Checks 0 Files changed 1 +1 -0

AmineFrj commented 1 minute ago
No description provided.

b1f9c26 Add preprocessing

Add more commits by pushing to the `pre-processing` branch on [AmineFrj/my-repo](#).

Continuous integration has not been set up
GitHub Actions and several other apps can be used to automatically catch bugs and enforce style.

This branch has no conflicts with the base branch
Merging can be performed automatically.

Merge pull request You can also [open this in GitHub Desktop](#) or view [command line instructions](#).

Reviewers
No reviews
Still in progress? Convert to draft

Assignees
No one—assign yourself

Labels
None yet

Projects
None yet

Milestone
No milestone

Development
Successfully merging this pull request may close these issues.
None yet

Notifications
Customize
Unsubscribe

Git merge pull request

The screenshot shows a GitHub pull request page for a repository named "Add preprocessing #1". The pull request has been merged by "AmineFrj" into the "main" branch 1 minute ago. The commit message is "Add preprocessing". A red arrow points from the "Delete branch" button in the merged commit's commit message area to the "Delete branch" section in the right sidebar.

Merged AmineFrj merged 1 commit into `main` from `pre-processing` 1 minute ago

Conversation 0 Commits 1 Checks 0 Files changed 1

AmineFrj commented 8 minutes ago
No description provided.

-o Add preprocessing

b1f9c26

AmineFrj merged commit 5648093 into `main` 1 minute ago

Revert

Pull request successfully merged and closed
You're all set—the `pre-processing` branch can be safely deleted.

Delete branch

Write Preview

Leave a comment

Attach files by dragging & dropping, selecting or pasting them.

Comment

Remember, contributions to this repository should follow our [GitHub Community Guidelines](#).

ProTip! Add comments to specific lines under [Files changed](#).

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

Reviewers
No reviews

Assignees
No one—assign yourself

Labels
None yet

Projects
None yet

Milestone
No milestone

Development
Successfully merging this pull request may close these issues.
None yet

Notifications
Customize
Unsubscribe
You're receiving notifications because you're watching this repository.

1 participant

The branch will be removed
from the server only

To update the remote branches
on local use

\$ git remote prune origin

TAGS



Tags

Add a tag to the last commit

```
$ git tag <tag name>
$ git push origin <tag name>
$ git tag --delete <tag name>
```

The screenshot shows a GitHub repository page for 'AmineFrj / my-repo'. The 'Code' tab is selected. In the top navigation bar, there are links for Pull requests, Issues, Codespaces, Marketplace, Explore, and a user icon. Below the navigation bar, there are buttons for Pin, Unwatch (1), Fork (0), and Star (0). The main content area shows a 'Releases' tab followed by a 'Tags' tab, which is highlighted with a blue background. A single tag named 'v0' is listed, with details: '1 hour ago', a commit hash 'a1dd4f3', and file formats 'zip' and 'tar.gz'. A red arrow points to the 'v0' tag. At the bottom of the page, there is a footer with links for GitHub, Inc., Terms, Privacy, Security, Status, Docs, Contact GitHub, Pricing, API, Training, Blog, and About.

Best practices

- ◆ Use pull request instead of merge
- ◆ Pull latest changes from remote main and create a branch

1. Créer un repo sur GitHub appelé object-detection et mettre deux fichiers : main.py et README.md.
2. Deux développeurs clonent le repo.
3. Le dev A fait un commit et le pousse sur le remote.
4. Le dev B fait un fetch, regarde si son main et le origin/main sont synchronisées (non) et fait un merge.
5. Le dev B crée une branche "classification" et fait un commit dessus et la pousse dans le remote.
6. Les deux dev s'assurent que les deux branches sont à jour sur GitHub.
7. Le dev A fait un fetch et regarde la liste de toutes les branches.
8. Le dev A crée une branche classification et la synchronise avec origin/classification.
9. Le dev B fait un commit sur la branche main et la pousse dans le remote.
10. Le dev A pull les changements.
11. Regarder comment les deux branches divergent.
12. Le dev B fait un merge et pousse vers le remote.
13. Le dev A fait un fetch et merge avec ses branches en local.