



Source control  
with git and  
Github

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Principles

Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

# Source control with git and Github

Eric Marcon

11 October 2024



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Principles

Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

# Principles



# git

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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

git is a source manager:

- Track changes: much more than a backup!
- Ability to go back in time;
- Several competing versions: branches.



# GitHub

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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

GitHub is a collaboration platform based on Git.

- Multiple developers: the end of attached files!
- Presentation of results: GitHub pages;
- Continuous integration: GitHub Actions.



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Principles

**Installation**

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

# Installation



git

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Principles

Installation

Practical

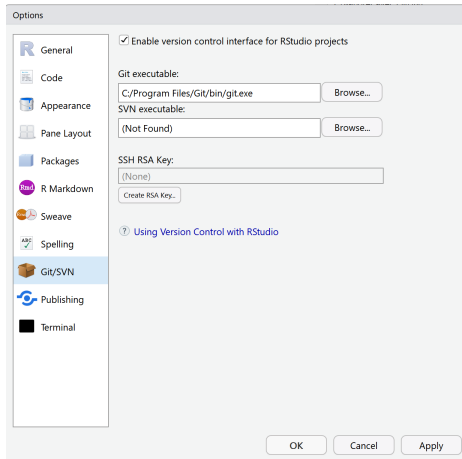
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Branches

Fork and Pull  
Request

Write  
Documents

## RStudio must detect Git



Otherwise, install it.



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Principles

Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

## Open an account on GitHub

The screenshot shows the GitHub profile of Eric Marcon. The browser address bar displays 'https://github.com/EricMarcon'. The profile header includes a profile picture of a man with grey hair and a beard, the name 'Eric Marcon', and the username 'EricMarcon'. Below the name is a link to 'Add a bio'. The 'About' section lists 'AgroParisTech' as the organization, 'Kourou, French Guiana' as the location, and an email address 'eric.marcon@ecofog.gf' with a link to a website 'http://www.ecofog.gf/isip.php?...'.

The 'Popular repositories' section displays four repositories:

- endropart**: Entropy Partitioning to Measure Diversity (1 star, 1 fork)
- dismes**: Distance Based Measures of Spatial Structures (1 star)
- SpatDiv**: Spatially Explicit Measures of Diversity (1 star)
- ericmarcon.github.io**: Home page

The 'Synchro' repository is also listed: 'Synchronize folders for Windows' (1 star, 1 fork).

The 'WMI' repository is listed: 'WMI wrapper for Visual Studio apps' (1 star, 1 fork).

The 'Contributions' section shows '429 contributions in the last year' with a heatmap visualization of contributions from March to February. The heatmap shows a high density of contributions in the latter half of the year, particularly in November and December. A legend at the bottom right indicates 'Less' and 'More' contributions.



# GitHub security

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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

Create a GitHub token:

- User account settings;
- Developer Settings > Personal Access Tokens;
- Generate a token, describe it as “git-RStudio” and give it “repo” authorization.

Save the token!





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with git and  
Github

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Principles

Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

# Practical



# Create a project

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Principles

Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

From scratch:

- In GitHub:
  - *New Repository*
  - Choose name (no special characters)
  - Add an appropriate *.gitignore*.
- Copy the URL from *Clone or Download*.
- In RStudio: new project from Git, paste URL.



# Create a project

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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

From an existing RStudio project:

- Put the project under version control:
  - *Tools /Version Control /Project Setup...*
  - Select *Git*.
- Create a repository on GitHub and retrieve its URL:  
<https://github.com/MyAccount/MyRepo.git>
- In RStudio Terminal, run :

```
git remote add origin https://github.com/MyAccount/MyRepo.git
git push -u origin master
```



# Basic operations: filter

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Practical

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Branches

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Request

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Modified files are displayed in the RStudio Git window.

Use `.gitignore` to hide non-tracked files.



# Basic operations: commit

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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

- Create an R file with one line of code and save it.

After each work session, *Commit* the result.

Select files to commit.

Enter a clear message: summary on the first line.



# Basic operations: synchronize

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Branches

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Request

Write  
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*Push* modifications to GitHub to make them public.

*Pull* to retrieve changes from GitHub.



# Basic operations: collaborate

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Installation

Practical

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Branches

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Request

Write  
Documents

Declare a collaborator.

Work with two or more people on the same file.

Content of a work session:

- Pull,
- Modify,
- Commit,
- Push.



# Conflicts

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Practical

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Branches

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Write  
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The elementary data is the line.

Conflicting changes imply a conflict.

Minimize conflicts: in a text, one sentence = one line.

In case of conflict, decide which code or text to keep.





# Project tracking

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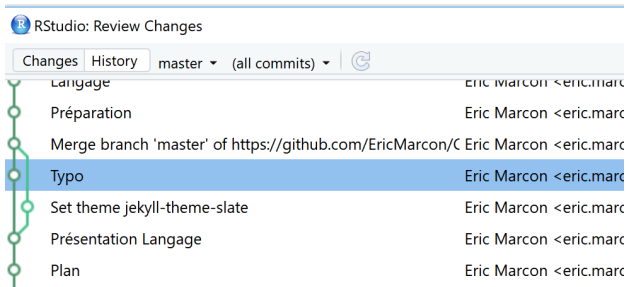
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Branches

Fork and Pull  
Request

Write  
Documents

## Clock icon in Git window





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Installation

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Branches

Fork and Pull  
Request

Write  
Documents

# Practical



# Generate a conflict

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Branches

Fork and Pull  
Request

Write  
Documents

Edit the same line of README.md :

- online on GitHub,
- locally.

Commit, Pull, observe the conflict, solve it.



# Collaborate with your neighbor

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Installation

Practical

**Practical**

Branches

Fork and Pull  
Request

Write  
Documents

The neighbor on the left invites the neighbor on the right to GitHub.

Both modify the project.

- Remember to pull before modifying.
- Push quickly to limit conflicts.



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Installation

Practical

Practical

**Branches**

Fork and Pull  
Request

Write  
Documents

# Branches



# Purpose

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Installation

Practical

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Fork and Pull  
Request

Write  
Documents

Modify the project without disturbing its stable state.

Application :

- develop new functionality ;
- test it, correct bugs ;
- make it visible when finished.



# Create a branch

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Practical

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**Branches**

Fork and Pull  
Request

Write  
Documents

Click on New Branch

Work in the new branch (pull, commit, push).



# Merge

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Branches

Fork and Pull  
Request

Write  
Documents

Move to master branch.

Run:

```
git merge branch_a_merge
```





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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

## Fork and Pull Request



# Fork

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Installation

Practical

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Branches

Fork and Pull  
Request

Write  
Documents

Goal: modify someone else's repository

**Fork**: create a copy of the repository

Start a new branch, modify it.



# Pull Request

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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

Branch integration request: *Pull Request*.

On GitHub.

Dialogue possible.

If accepted, merge branch and delete.



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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

## Write Documents



# Use memoirR

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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

Install the **memoiR** package.

Create a new document with memoirR: Stylish Document.

Knit it to check everything is OK.



# Source Control

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Principles

Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

Use git with your document.

Create an appropriate gitignore:

```
memoiR::build_gitignore()
```

Store the knitted files into /docs

```
memoiR::build_githubpages()
```

Make your first commit.



# Upload to GitHub

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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

Create your repo on GitHub.

Copy the commands to upload an existing git repo:

```
git remote add origin https://github.com/MyAccount/MyRepo.git  
git push -u origin master
```



# Declare repo in header

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Installation

Practical

Practical

Branches

Fork and Pull  
Request

Write  
Documents

In the header of your Rmd file, update the repository name and the URL.

Commit.

Add a README:

```
memoiR::build_readme()
```

Commit





# Activate CI

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Installation

Practical

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Branches

Fork and Pull  
Request

Write  
Documents

run

```
memoiR::build_ghworkflow()
```

Commit, Push and look at Actions.