

First steps in GitHub

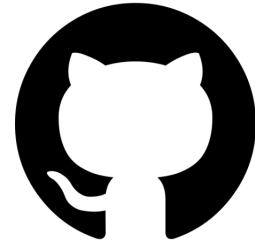
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All steps below are for passionate by terminal on **Linux** operational system.

1 Step 1 - What is GitHub?

GitHub is a code hosting platform for version control and collaboration using **git**. It lets you and others work alone or together on projects from anywhere.

Git is a distributed version-control system for tracking changes in source code during its development. It is designed for coordinating work among programmers, but it can be used to track changes in any set of files. Its goals include speed, data integrity and support for distributed non-linear workflows.



GitHub logo.

2 Step 2 - Creating a GitHub account

To start your experience on **GitHub** you need to make an account on: <https://github.com>. You will just need to inform your e-mail account, choose an username and create a password.

3 Step 3 - Installing git in your computer

You need to install **git** in your computer. If you are using **Ubuntu** you just need to run OS and package updates:

```
$ sudo apt-get update
```

And install **git** giving the following command:

```
$ sudo apt-get install git-core
```

You may be asked to confirm the download and installation. **Git** should be installed and ready to use. If you can confirm it you can just run the **git** version command:

```
$ git --version
```

Mine is:

```
$ git version 2.17.1.
```

4 Step 4 - Creating a repository

After creating an account you need to start a first (or new) **repository** on **GitHub**. A repository is usually used to organize a **project**. Repositories can contain anything your project needs: folders, files, images, videos, data sets, etc. If the project is not only your, or even if you can think to share it

with anyone, it is recommended to include a README, i.e, a file with information about your project. You can also include a `license` file to your project.

You can create your repository in the **GitHub** site, giving to it the following features:

- Name: `project_name`.
- Description: "This project has the objective to...".
- Privacy: `public` (anyone can see this repository, but you can choose who can commit) or `private` (you choose to see and commit to this repository).

Then, you need to start a first (or new) repository giving, inside the directory, in your computer, chosen by you, the command:

```
$ git init
```

Now you need to say who you are for your **git**. Write in the terminal:

```
$ git config --global user.email "you@example.com"
$ git config --global user.name "your_name"
```

You need to pay attention that `--global` means that you are the one using **git** on your computer. If you omit this option you are logging in only on the local folder.

If you want to see the user and the configuration of your **git**, write in the terminal:

```
$ nano ~/.gitconfig
```

and the informations will be displayed in nano environment like:

```
[user]

  email = you@example.com

  name = your_name
```

```
[user_name]

  email = you@example.com

  name = your_name
```

Press `Ctrl + X` to quit this environment.

5 Step 5 - Including files in your repository

You need to add the files you wish to keep your changes on **git** giving the command:

```
$ git add <filename> . . . <filename>
```

Remember that, in other times (beyond the first one), when you are adding the changes you need to write `stage`, instead `add`, in the command above, like:

```
$ git stage <filename> . . . <filename>
```

6 Step 6 - Committing

On **GitHub**, saved changes are called **commits**. Each commit has an associated **commit message**, which is a description explaining why a particular change was made. Commit messages capture the history of your changes, so you and other contributors can understand what you've done and why.

After adding/staging you need to commit it:

```
$ git commit -m "<message>"
```

You can do as many commits as you want, giving the command above and writing a message to warn you about your changes, in same documents, or about new documents added in your repository.

7 Step 7 - Uploading you files and changes into GitHub

It's time to upload your **git** on **GitHub**. Now you need to log in on **GitHub** site, access your project and upload your **git** giving the commands sequence:

```
$ git remote add origin https://github.com/user/project_name.git  
$ git push -u origin master
```

GitHub will ask for your username and password:

```
Username for 'https://github.com': username  
Password for 'https://username@github.com': password
```

And then, you can see which files and commits were upload by you:

```
Counting objects: N, done.  
Delta compression using up to M threads.  
Compressing objects: 100% (N/N), done.  
Writing objects: 100% (O/O), 1.46 KiB | 374.00 KiB/s, done.  
Total N (delta 0), reused 0 (delta 0)  
To https://github.com/username/project_name.git  
* [new branch] master -> master  
Branch 'master' set up to track remote branch 'master' from 'origin'.
```

The **git**'s magic works in this way: you create or add some files, modify them, commit your changes and upload the files on **GitHub**. But there is a lot more!

8 Step 8 - Creating a branch

Now you need to know that all that you have done above was made in the master branch. Ops, what I'm talking about?

Branching is the way to work on different versions of a repository at one time. By default your repository has one branch named **master** which is considered to be the *definitive branch*. We use

branches to experiment and make edits before committing them to master. In other words, in **git** you can have a tree history of your code. As a tree you have not only one, but a lot of branches. In the branches you can do changes in your files, save them and use it in your master branch as you want.

When you create a branch off the master branch, you're making a copy of master as it was at that point in time. If someone else made changes to the master branch while you were working on your branch, you could **pull** in those updates. But it is a story that I will tell to you in the next steps.

First, we are going to create a branch:

```
$ git branch name_of_branch
```

Second, you need to get to that branch:

```
$ git checkout name_of_branch
```

Then, you can stage, commit and push files to that branch, using the same commands used right above. You can give the same command sequence with just one command line as:

```
$ git checkout -b name_of_branch
```

going creating and going right to that created branch. Just notice that, when you do your push you just need to change master by your current brunch name_of_branch:

```
$ git push -u origin name_of_branch
```

You can add as many branches as you want, like direct and different branches from main or even branches starting in other branches. Just remember that, for each branch that you create, the files in that branch will be the same ones in the previous branch as you start your modifications and commits on it.

You can see all branches of your project writting in the terminal:

```
$ git branch
```

and the present branch that you are working in will be presented with a * at the left side as:

```
* master
```

```
branch 1
```

```
branch 2
```

```
branch 3
```

If you want to delete some branch you just need to write:

```
$ git branch -d name_of_branch
```

9 Step 9 - Merging

As I have described in the previous step, after all changes and commits in your branch, you can put the modifications in the main one. You just need to merge the main with the branch that you are using. Thus, in the main branch you can give the line command:

```
$ git merge name_of_branch
```

Finally, you have the main branch completely changed by your other branch changes!

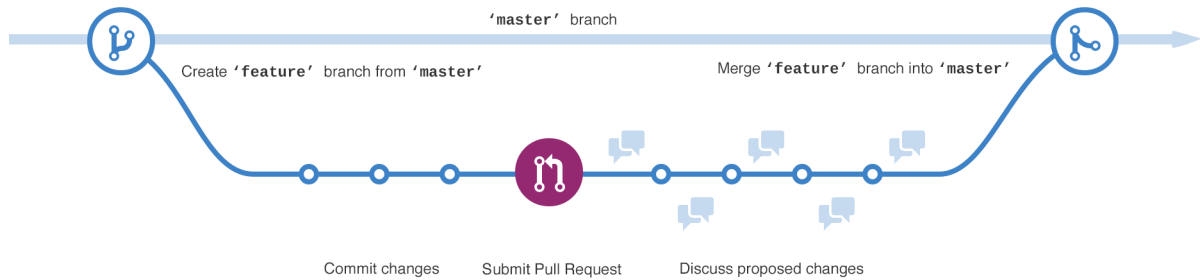


Figure 1: Master branch side by side another branch in which there are many commits, pull requests and discussion before merging into the main one. This image is from Hello Word project on GitHub's site.

Pay attention that, the command `merge`, merges the branch that you are in with the other branch you chose, i.e., you can add the changes of the chosen branch in the branch that you are in, and not just for the main branch and the other one desired branch.

If you need to verify in which branch you are, what files were be uploaded or not and how they are in your **GitHub**'s page, you can just write in the terminal:

```
$ git status
```

and you will see something like:

On branch master

Your branch is up to date with 'origin/master'.

Changes not staged for commit:

(use "git add <file>..." to update what will be committed)

(use "git checkout - <file>..." to discard changes in working directory)

modified: github.aux

modified: github.log

modified: github.pdf

modified: github.tex

Untracked files:

(use "git add <file>..." to include in what will be committed)

README.md

auto/]

no changes added to commit (use "git add" and/or "git commit -a").

10 Step 10 - Pull Requests

Pull Requests are the heart of collaboration on **GitHub**. When you open a pull request, you're proposing your changes and requesting that someone, really anyone, review and pull in your contribution and merge them into their branch. Pull requests show diffs, or differences, of the content from both branches. The changes, additions, and subtractions are shown in **green** and **red** in your **GitHub**'s page.

As soon as you make a commit, you can open a pull request and start a discussion, even before the code is finished.

By using **GitHub**'s @mention system in your pull request message, you can ask for feedback from specific people or teams.

You can even open pull requests in your own repository and merge them yourself. It's a great way to learn the **GitHub** flow before working on larger projects.

11 Step 11 - Forking/Cloning a repository

If you are surfing into **GitHub**'s site and find a great project that you like you can **fork/clone** it for you. Then, you will have this repo into your computer to run, to modify and to do whatever you want without affecting the original project. To fork/clone some repo you need to follow two steps:

11.1 Forking:

Navigate until the **GitHub** project that you liked and, in the top-right corner of the page, click **Fork!**

11.2 Cloning:

To be "connected" with that repo and receive the last atualizations of it, when the owner do some modifications, i.e., to keep your fork synced, you just need to write in the terminal:

```
$ git clone <link>
```

as a simple example, you can clone this tutorial writing:

```
$ git clone <https://github.com/natalidesanti/first_steps_on_github>.
```

Remember to clone some repo in some location that you want into your computer.

If you have interest to make a pull request in this repo you can give a:

```
$ git pull
```

to see the last alterations into this repo before proceed to make your pull request!
Again, there is a lot of other things to do on **git** and **GitHub**.

12 Basic git commands

I would like to finish this manuscript listing some basic **git commands**:

13 Acknowledgments and references

To write the **First steps in GitHub** I really appreciate the Nicolas Morazotti (@Morazotti) help, Patricia Novais (@pnovais) tutorial, the Hello World project and the Wikipedia pages for GitHub and git.

| Git task | Notes | Git commands |
|-------------------------------|---|---------------------------------|
| Adding files | “*” means all files | git add <filename> git add * |
| Branches | Create a new branch and switch to it or commit | git checkout -b name_of_branch |
| | Switch from one branch to another | git checkout name_of_branch |
| | List all the branches in your repo and tell you what branch you are in | git branch |
| | Delete the feature branch | git branch -d name_of_branch |
| Create a new local repository | | git init |
| Commit | | git commit -m “<message>” |
| Merge | To merge a different branch into your active branch | git merge name_of_branch |
| Push | Send changes to the master branch | git push origin master |
| | Push the branch to your repo | git push origin name_of_branch |
| Status | List the files you’ve changed and those you still need to add or commit | git status |

| | | |
|-------------------------|---|---|
| Tell git who you are | Configure the author name and email address to be used with your commits | <pre>git config --global user.email "you@example.com" git config --global user.name "your_name"</pre> |
| Undo | Undo the most recent commit | <pre>git reset HEAD~1</pre> |