

# Setting up a Version Control System with Git

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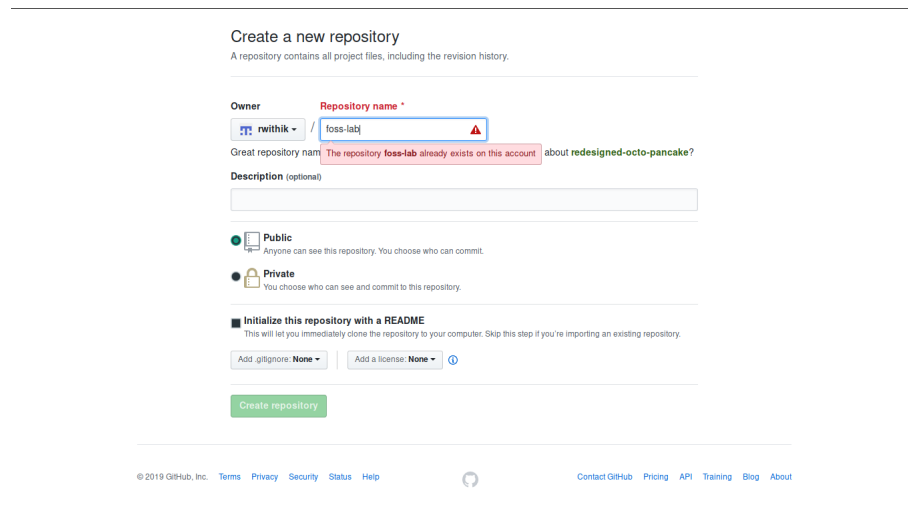
## The Local Repository

The first step in using a version control system is making the actual repository. Here, I've made a directory named 'foss-lab' and converted it into a git repo by using `git init` inside the directory. This creates a `.git` directory inside the repo, which store the details about git. This directory is our local repository. I've also made a `README.md` file.

```
rwthik@Zeus ~  
» mkdir foss-lab  
rwthik@Zeus ~  
» cd foss-lab  
rwthik@Zeus ~/foss-lab  
» git init  
Initialized empty Git repository in /home/rwthik/foss-lab/.git/  
rwthik@Zeus ~/foss-lab (master)  
» echo "FOSS Lab Repo" > README.md  
rwthik@Zeus ~/foss-lab (master %)  
»
```

## The Remote Repository

The local repository exists only on my system. We need to connect it to a remote repository, for any sort of collaboration to be possible. So, I made an online repo at github.com.



Now we need to connect the local repo to the online repo. This is done using the `git remote` command.  
Syntax: `git remote add origin [URL]`

```
rwithik@Zeus ~  
» mkdir foss-lab  
rwithik@Zeus ~  
» cd foss-lab  
rwithik@Zeus ~/foss-lab  
» git init  
Initialized empty Git repository in /home/rwithik/foss-lab/.git/  
rwithik@Zeus ~/foss-lab (master)  
» echo "FOSS Lab Repo" > README.md  
rwithik@Zeus ~/foss-lab (master %)  
» git remote add origin https://github.com/rwithik/foss-lab  
rwithik@Zeus ~/foss-lab (master %)  
»
```

## Making Changes

Any new files or any changes in existing files should be added to the local and remote repositories. This is done with the **git add** command. This adds the modified and new files to the staging area. Then the files are committed with a commit message using **git commit**. This records the changes in the local repo.

```
rwithik@Zeus Projects/foss-lab (master !*)  
» ls  
Images README.md Reports Scripts  
rwithik@Zeus Projects/foss-lab (master !*)  
» git add .  
rwithik@Zeus Projects/foss-lab (master ~+)  
»
```

```
rwithik@Zeus Projects/foss-lab (master ~+)  
» git commit -m "Git Expt"  
[master 60cd50c] Git Expt  
75 files changed, 320 insertions(+), 33 deletions(-)  
rename Images/{Expt1-3 => Cycle1}/cat.png (100%)  
rename Images/{Expt1-3 => Cycle1}/cd.png (100%)  
rename Images/{Expt1-3 => Cycle1}/chmod.png (100%)  
rename Images/{Expt1-3 => Cycle1}/cp.png (100%)  
rename Images/{Expt1-3 => Cycle1}/curl.png (100%)  
rename Images/{Expt1-3 => Cycle1}/echo.png (100%)  
rename Images/{Expt1-3 => Cycle1}/ftp.png (100%)  
rename Images/{Expt1-3 => Cycle1}/grep.png (100%)  
rename Images/{Expt1-3 => Cycle1}/head.png (100%)  
rename Images/{Expt1-3 => Cycle1}/jobdisplay.png (100%)  
rename Images/{Expt1-3 => Cycle1}/kill.png (100%)  
rename Images/{Expt1-3 => Cycle1}/less.png (100%)  
rename Images/{Expt1-3 => Cycle1}/ls.png (100%)  
rename Images/{Expt1-3 => Cycle1}/man1.png (100%)  
rename Images/{Expt1-3 => Cycle1}/man2.png (100%)  
rename Images/{Expt1-3 => Cycle1}/mkdir.png (100%)  
rename Images/{Expt1-3 => Cycle1}/mv.png (100%)  
rename Images/{Expt1-3 => Cycle1}/pipimg.png (100%)  
rename Images/{Expt1-3 => Cycle1}/ps.png (100%)  
rename Images/{Expt1-3 => Cycle1}/pwd.png (100%)  
rename Images/{Expt1-3 => Cycle1}/redirection.png (100%)  
rename Images/{Expt1-3 => Cycle1}/rm.png (100%)  
rename Images/{Expt1-3 => Cycle1}/sort.png (100%)  
rename Images/{Expt1-3 => Cycle1}/ssh.png (100%)  
rename Images/{Expt1-3 => Cycle1}/tail.png (100%)  
rename Images/{Expt1-3 => Cycle1}/touch.png (100%)  
rename Images/{Expt1-3 => Cycle1}/tree.png (100%)  
rename Images/{Expt1-3 => Cycle1}/uniq.png (100%)  
rename Images/{Expt1-3 => Cycle1}/uniq.png (100%)  
rename Images/{Expt1-3 => Cycle1}/wget.png (100%)
```

## Pushing Changes to the Remote Repository

The changes we committed are currently recorded in the local repository. To push these changes to the remote repo, use **git push**. In the example given below, origin is the name of the remote, and master is the name of the branch.

```
create mode 100644 Images/Cycle2/8.png
create mode 100644 Images/Cycle2/9.png
create mode 100644 Images/Network/1.png
create mode 100644 Images/Network/2.png
create mode 100644 Images/Network/3.png
create mode 100644 Images/Network/4.png
create mode 100644 Images/Network/5.png
create mode 100644 Images/Network/6.png
create mode 100644 Images/Network/7.png
create mode 100644 Images/Network/8.png
create mode 100644 Images/Network/9.png
rename Reports/{Expt1-3.pdf => Cycle1.pdf} (99%)
rename Reports/{Expt1-3.tex => Cycle1.tex} (76%)
create mode 100644 Reports/Network.pdf
create mode 100644 Reports/Network.tex
create mode 100644 Reports/Practical.pdf
create mode 100644 Reports/Practical.tex
create mode 100755 Scripts/Expt8.sh
create mode 100644 Scripts/ulist
rwthik@Zeus Projects/foss-lab (master)
» git push origin master
Username for 'https://github.com': rwthik
Password for 'https://rwthik@github.com':
Enumerating objects: 63, done.
Counting objects: 100% (63/63), done.
Delta compression using up to 4 threads
Compressing objects: 100% (58/58), done.
Writing objects: 100% (60/60), 3.92 MiB | 237.00 KiB/s, done.
Total 60 (delta 2), reused 0 (delta 0)
remote: Resolving deltas: 100% (2/2), completed with 1 local object.
To https://github.com/rwthik/foss-lab
   d6fd740..60cd50c master -> master
rwthik@Zeus Projects/foss-lab (master)
»
```

## Comparing Previous Versions

Use the `git log` command to see all the previous changes with their commit messages.

```
commit 60cd50c91d9a49c80827e001ed1802a03a81af0c (HEAD -> master, origin/master)
Author: rwithik <rwithik@gmail.com>
Date:   Fri Feb 22 18:39:18 2019 +0530

    Git Expt

commit 5ff5156981be12598050aa2caf011446ef73750e
Author: rwithik <rwithik@gmail.com>
Date:   Sun Feb 17 22:27:47 2019 +0530

    Experiments 4-6

commit d6fd740f9616839eec63bfa87c154738b0ba1189
Author: rwithik <rwithik@gmail.com>
Date:   Sun Feb 17 20:14:32 2019 +0530

    Cleaning up

commit c88f4dee7ffa21f0cfa0044d42a725cbcf39bc8e
Author: rwithik <rwithik@gmail.com>
Date:   Fri Feb 15 07:44:56 2019 +0530

    Cleaning up

commit 039c60e6d3adf7721629556204d274f856e30a02
Author: rwithik <rwithik@gmail.com>
Date:   Thu Feb 14 21:08:07 2019 +0530

    report 1

commit 89e823403c546e394b98c44de0d0c748fe91345d
Author: rwithik <rwithik@gmail.com>
Date:   Tue Feb 12 19:49:35 2019 +0530

    .
```