Git: Remotes, Branches & Merges

Prashant K. Sharma
Diptesh Kanojia

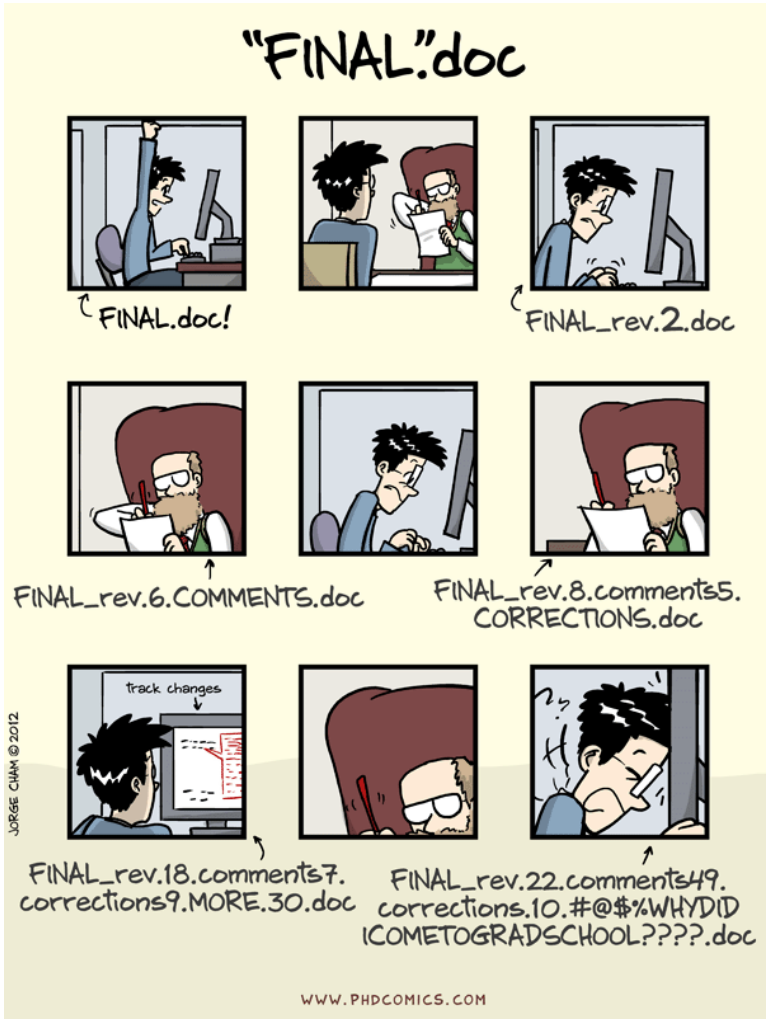
e-Yantra Team
ERTS Lab, IIT Bombay

IIT Bombay
April 17, 2021

Agenda for Discussion

1. Git: Recap
   - Why Version Control ?
   - Git Overview
2. Git: How ?
   - Remote in Git
   - Remote repository on GitHub
   - Adding changes to remote repository
   - Branches
   - Merging and Conflicts

Why Version Control ?



Introduction to Git

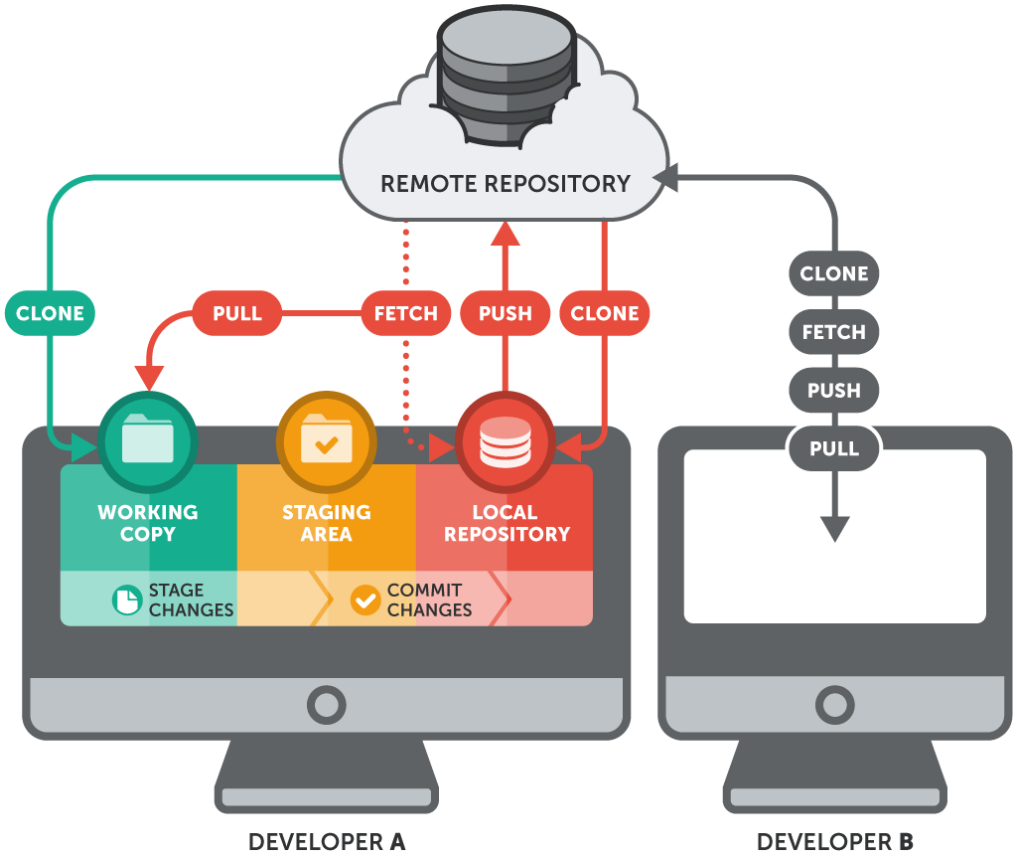


Figure 1: Git Overview

Remote in Git

To collaborate with other people, we need to be able to share changes we are doing in our local repository.

Remote in Git

To collaborate with other people, we need to be able to share changes we are doing in our local repository.

Using Git, we can move our local repository over the web. Most developers use, any of the following hosting services :

- GitHub (*Most widely used*)
- GitLab
- BitBucket

Creating a repository on GitHub

To be able to share changes we've made locally. Log in to GitHub, then click on the icon in the top right corner to create a new repository called **super**.

Creating a repository on GitHub

To be able to share changes we've made locally. Log in to GitHub, then click on the icon in the top right corner to create a new repository called **super**.

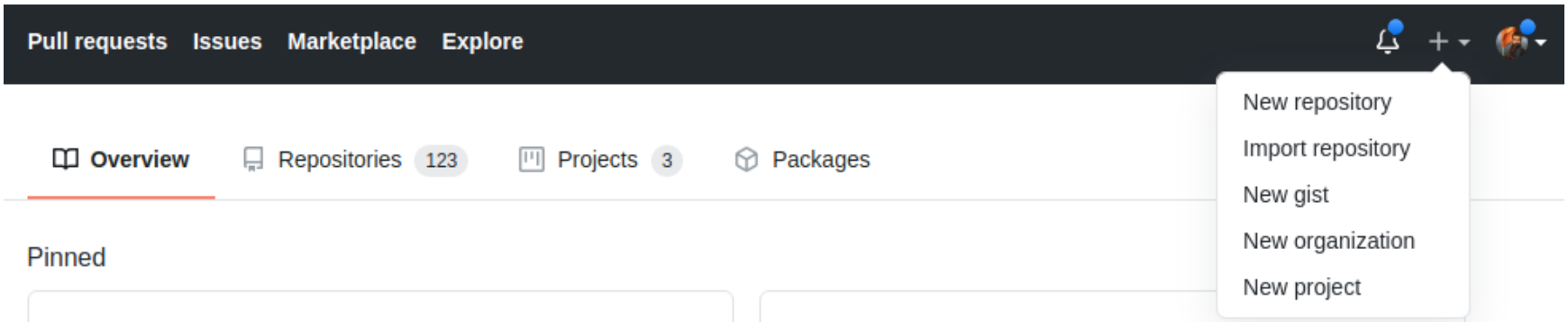


Figure 2: Creating new repository on GitHub

Creating a repository on Github

After naming your repository, adding description etc. click **Create Repository**

Creating a repository on Github

After naming your repository, adding description etc. click **Create Repository**

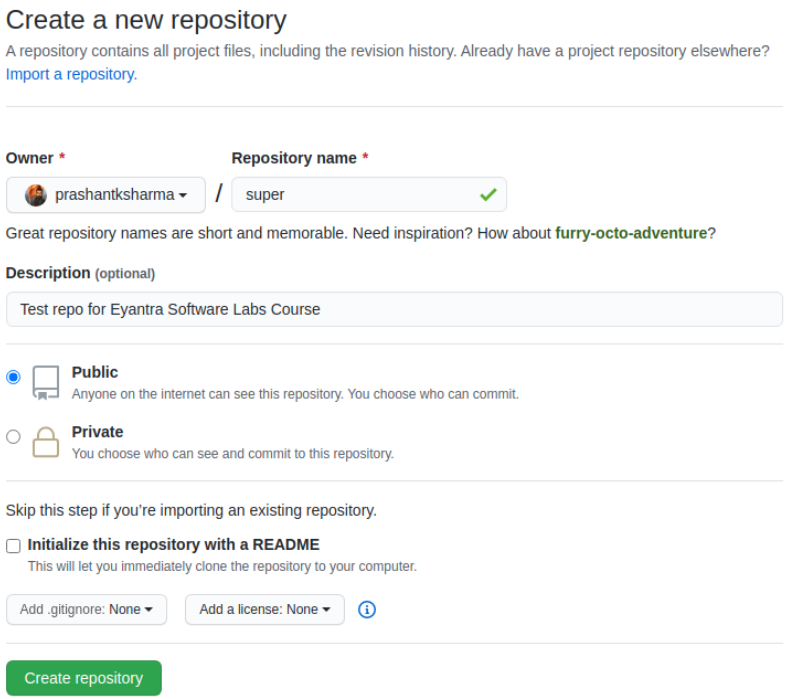


Figure 3: Adding details for New repository

Creating a repository on Github

After your repository on GitHub, you should be able to see information on how to configure your local repository.

Creating a repository on Github

After your repository on GitHub, you should be able to see information on how to configure your local repository.

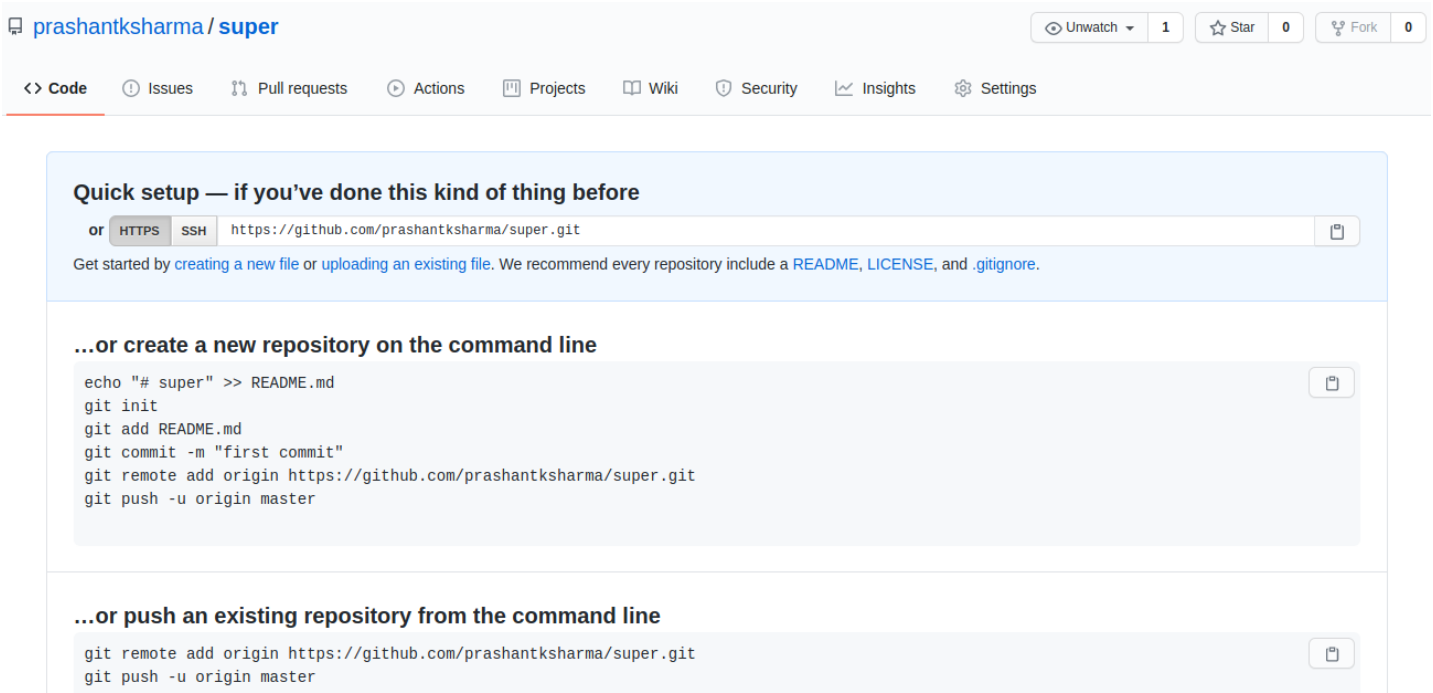


Figure 4: GitHub Quick Setup information

Adding changes to remote repository

How do we add remote repository on GitHub ?

Adding changes to remote repository

How do we add remote repository on GitHub ?

Use of **git remote** command

```
$ git remote add origin https://github.com/john/super.git
```

NOTE: replace "john" by your own GitHub username.

Adding changes to remote repository

How do we add remote repository on GitHub ?

Use of **git remote** command

```
$ git remote add origin https://github.com/john/super.git
```

NOTE: replace "john" by your own GitHub username.

How do we verify that remote repository has been added ?

Adding changes to remote repository

How do we add remote repository on GitHub ?

Use of **git remote** command

```
$ git remote add origin https://github.com/john/super.git
```

NOTE: replace "john" by your own GitHub username.

How do we verify that remote repository has been added ?

Use of **git remote** command

```
$ git remote -v
```

Adding changes to remote repository

How do we push all the changes from our local repository to remote repository on GitHub ?

Adding changes to remote repository

How do we push all the changes from our local repository to remote repository on GitHub ?

Use of **git push** command

```
$ git push origin master
```

What is branch ?

The concept of branches in Git, allow us to diverge from our current development and try something new which won't alter the history of our main work. E.g. When working on code bases, we might want to create a new code feature at the same time leave our main code intact.

What is branch ?

The concept of branches in Git, allow us to diverge from our current development and try something new which won't alter the history of our main work. E.g. When working on code bases, we might want to create a new code feature at the same time leave our main code intact.

How do we create a new branch called "experiment" for our repository i.e "super"?

What is branch ?

The concept of branches in Git, allow us to diverge from our current development and try something new which won't alter the history of our main work. E.g. When working on code bases, we might want to create a new code feature at the same time leave our main code intact.

How do we create a new branch called "experiment" for our repository i.e "super"?

Use of **git branch** command

```
$ git branch experiment
```

Switching branch

How do we switch to the new branch called "experiment"?

Switching branch

How do we switch to the new branch called "experiment"?

Use of **git checkout** command

```
$ git checkout experiment
```

Switching branch

How do we switch to the new branch called "experiment"?

Use of **git checkout** command

```
$ git checkout experiment
```

How do we create and switch to the branch using a single command ?

Switching branch

How do we switch to the new branch called "experiment"?

Use of git checkout command

```
$ git checkout experiment
```

How do we create and switch to the branch using a single command ?

Use of git checkout command

```
$ git checkout -b experiment
```

Merging

As of now, we have two branches namely: **master** and **experiment**. Let us assume that we are working on **experiment** branch. Making changes and committing changes.

Merging

As of now, we have two branches namely: **master** and **experiment**. Let us assume that we are working on **experiment** branch. Making changes and committing changes.

How do we merge the changes done on **experiment** branch to **master** branch ?

Merging

As of now, we have two branches namely: **master** and **experiment**. Let us assume that we are working on **experiment** branch. Making changes and committing changes.

How do we merge the changes done on **experiment** branch to **master** branch ?

Use of **git merge** command

```
$ git checkout master

$ git merge experiment
```

Merging

How do we delete the **experiment** branch after merging the changes ?

Merging

How do we delete the **experiment** branch after merging the changes ?

Use of **git branch** command

```
$ git branch -d experiment
```

Merging

How do we delete the **experiment** branch after merging the changes ?

Merging

How do we delete the **experiment** branch after merging the changes ?

Use of **git branch** command

```
$ git branch -d experiment
```

Conflicts

Most of the time, doing **git merge** will work smoothly. Unless, two branches are in conflict: e.g. due to changes made to the same file etc.

Conflicts

Most of the time, doing **git merge** will work smoothly. Unless, two branches are in conflict: e.g. due to changes made to the same file etc.

As of now, we have two branches namely: **master** and **experiment**. Let us assume that we encounter a conflict due to changes made to a file `test.txt` which is present on both **experiment** branch and **master** branch.

Conflicts

How to resolve merge conflict ?

Key steps to be taken

- `git merge experiment`
- `Open test.txt in an editor and keep relevant changes.`
- `git commit -a`

References

- Git Cheat Sheet
- Visualizing Git

Thank You!

Author: Prashant K. Sharma
Contributor: Diptesh Kanojia

Post your queries at: resources@e-yantra.org