



Git and GitHub





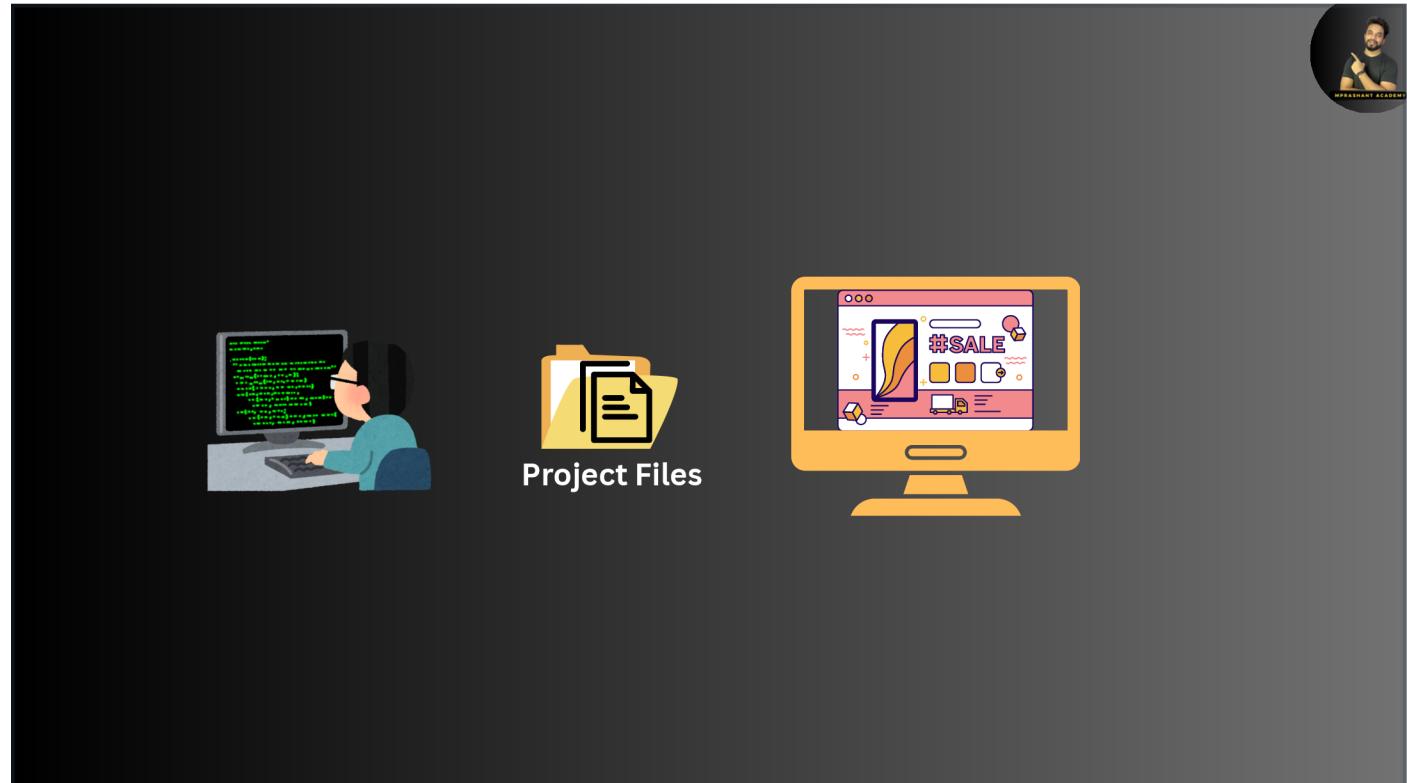
What is Git?

Git is a distributed version control system (VCS).

Git is a tool that helps multiple people work on the same code project or documents by tracking and managing changes to the files.



Project Files





Bug Fix

New Updates

Security Updates



Project Files

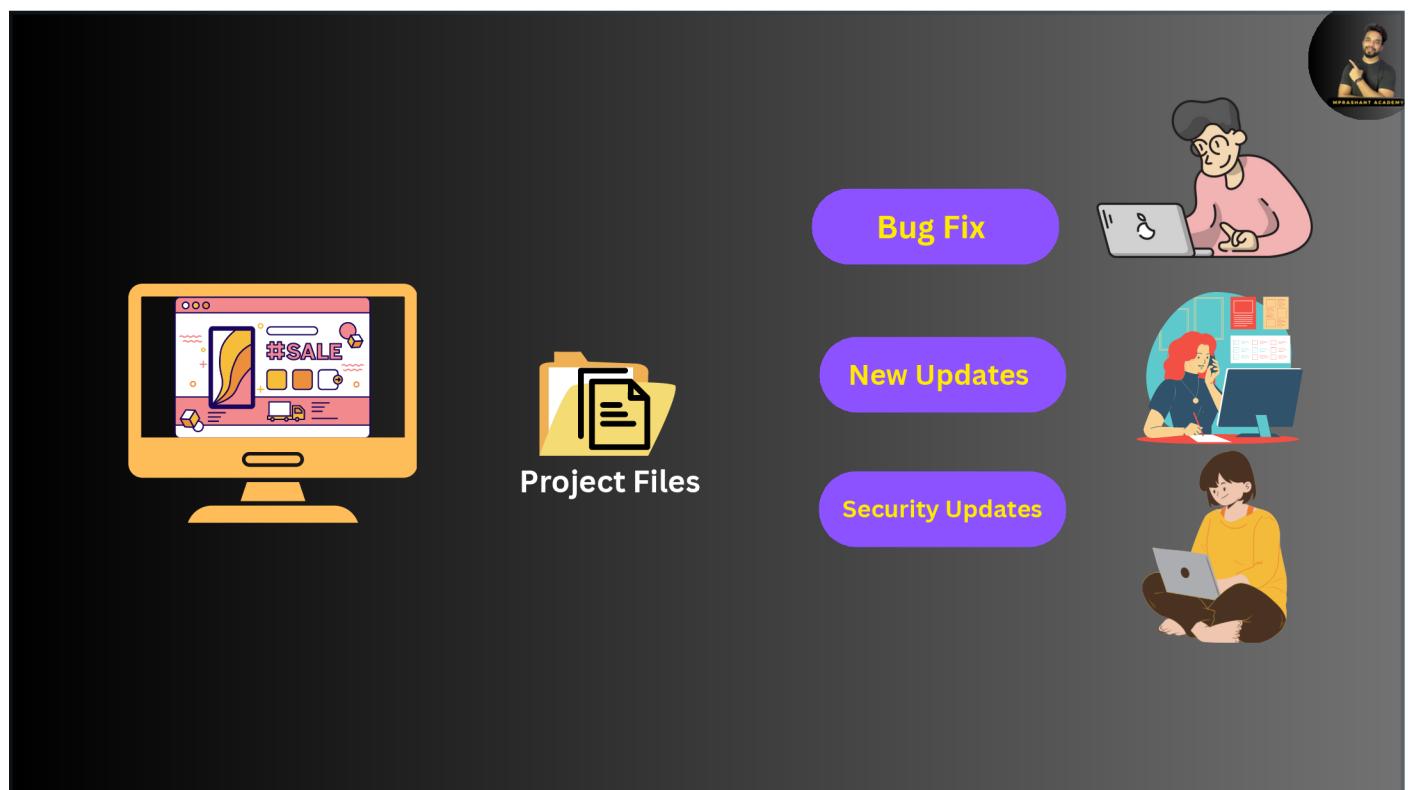
Bug Fix



New Updates



Security Updates





What is VCS?



Every time you make a change, whether it's adding a sentence to a document or altering a line of code, the VCS records and saves the outcome.



project



project-1



project-2



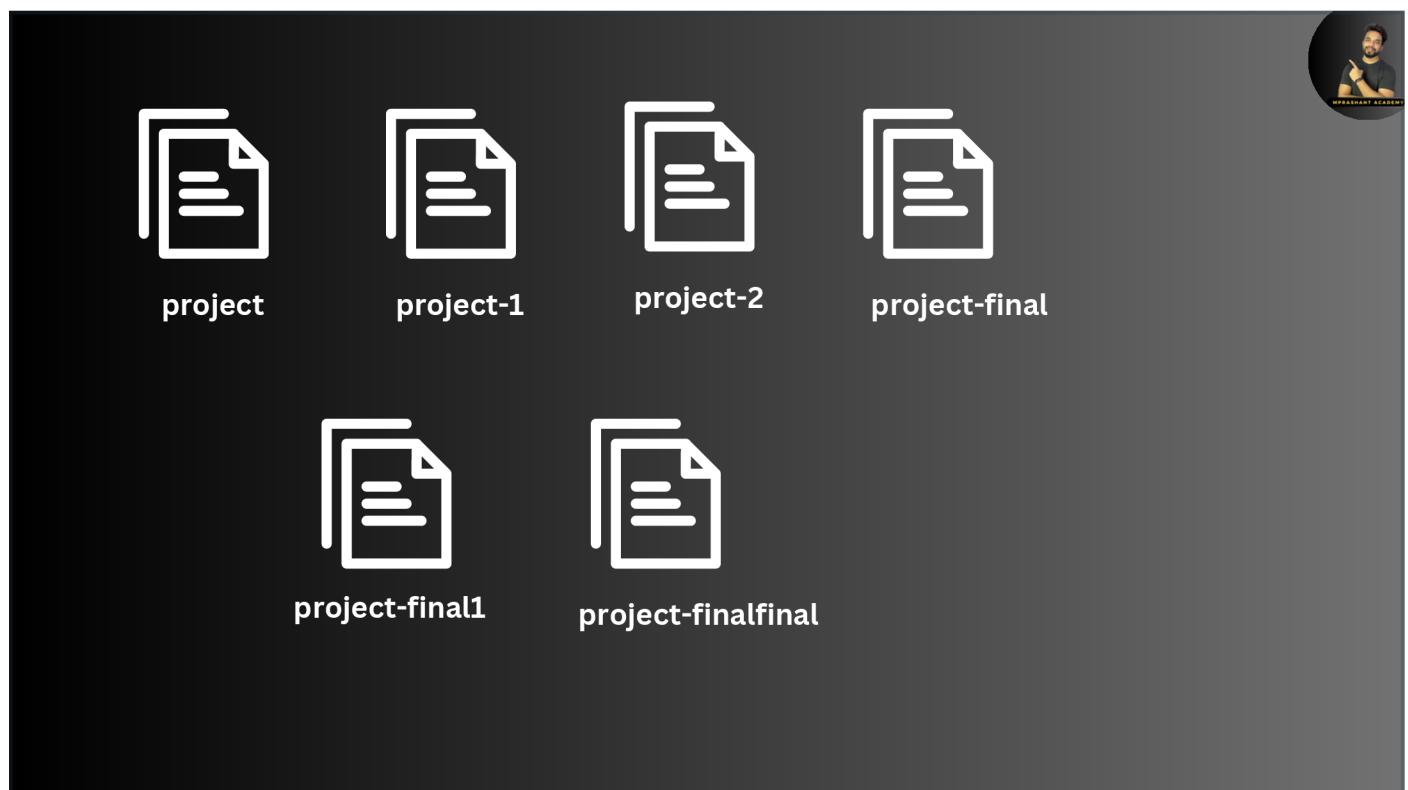
project-final



project-final1



project-finalfinal





Project Files

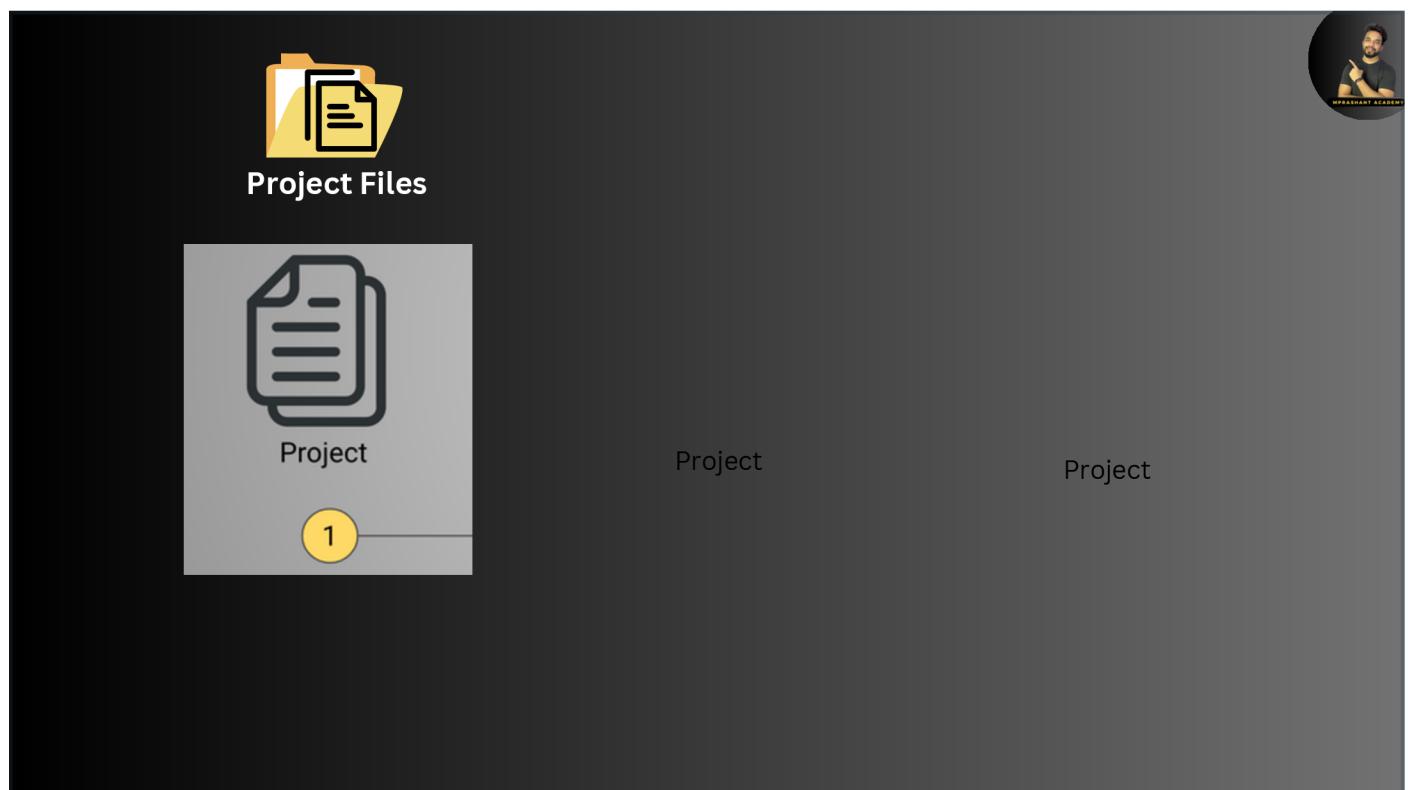


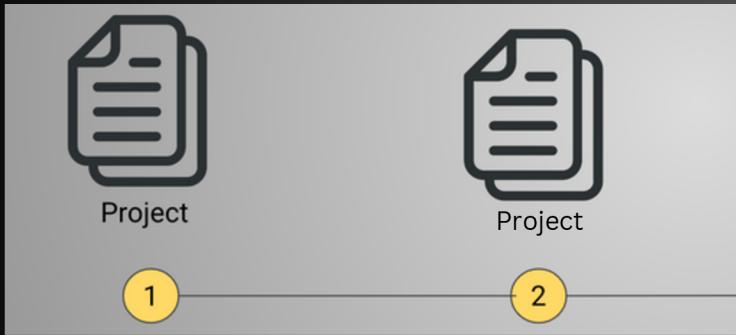
Project

1

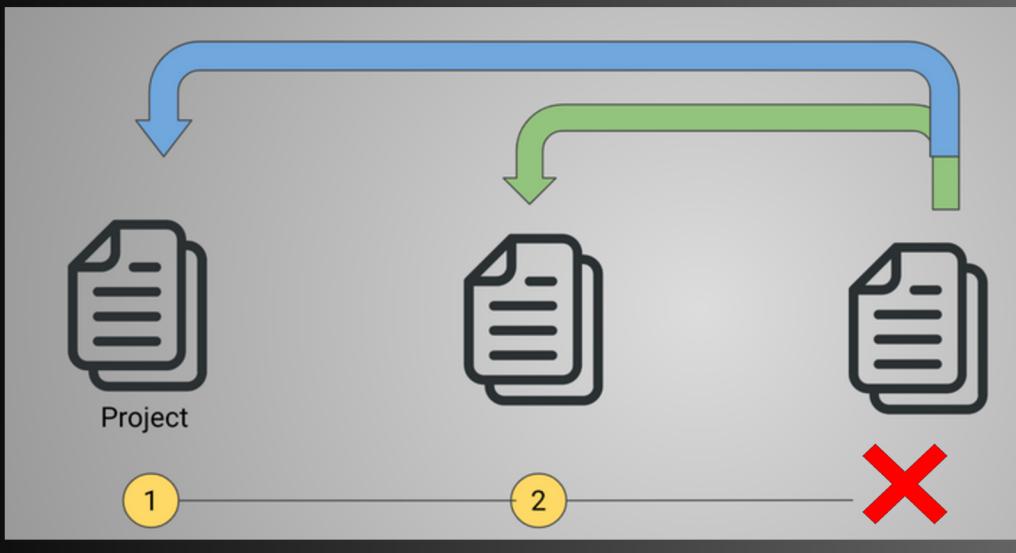
Project

Project











Why VCS?

- **Backup and Restore:** Files are safe against accidental losses or mistakes.
- **Collaboration:** Multiple people can work on the same project simultaneously.
- **Branching and Merging:** Users can diverge from the main base of code, experiment, and then bring changes back in line without losing work.
- **Tracking Changes:** You can see specific changes made and by whom.



Installing Git



- Step-by-step installation of Git.
- Configuring Git with your username and email.



Configure Git with Username and Email

```
$ git config --global user.name "Paul Philips"
```

```
$ git config --global user.email paulphilips@email.com
```

```
$ git config --list
```



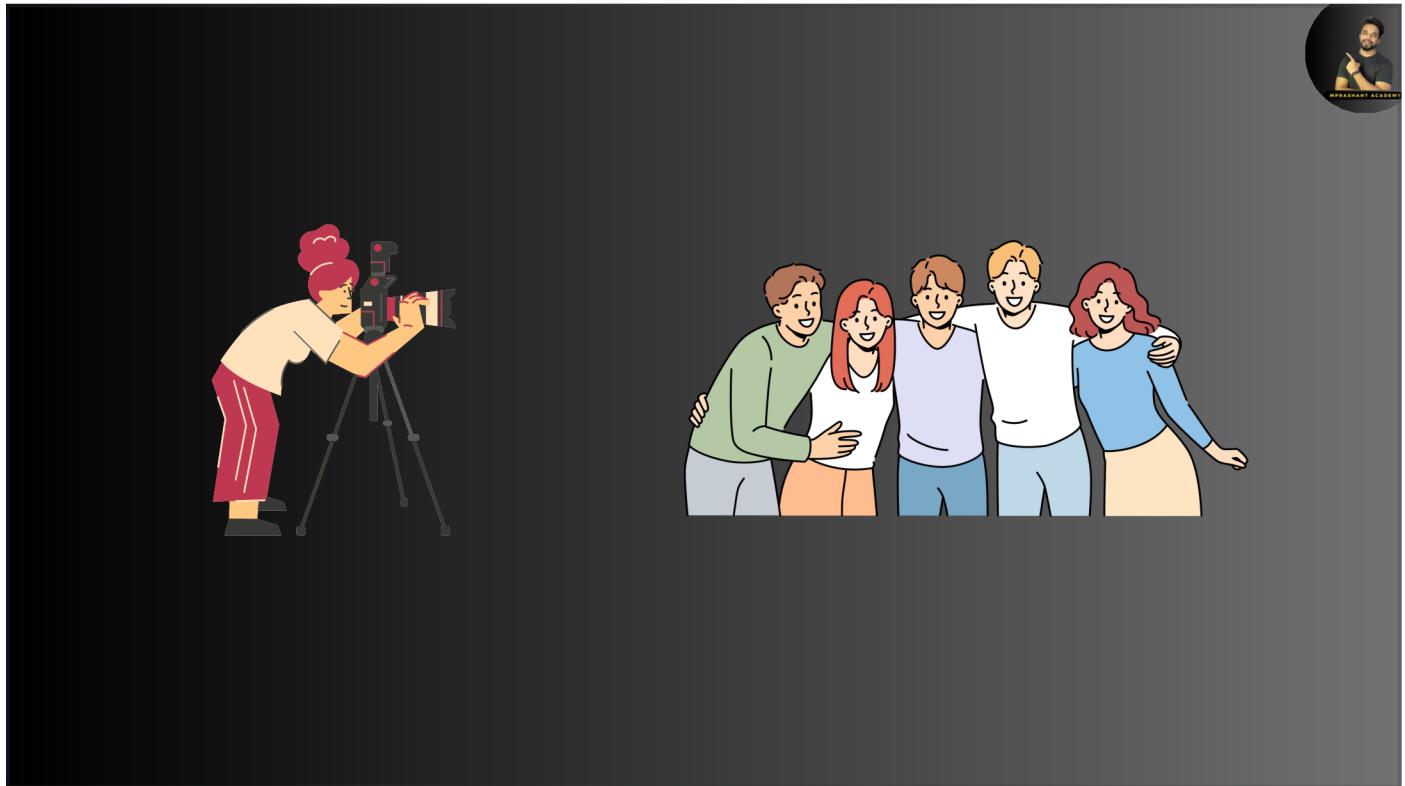
Creating Local Git Repo

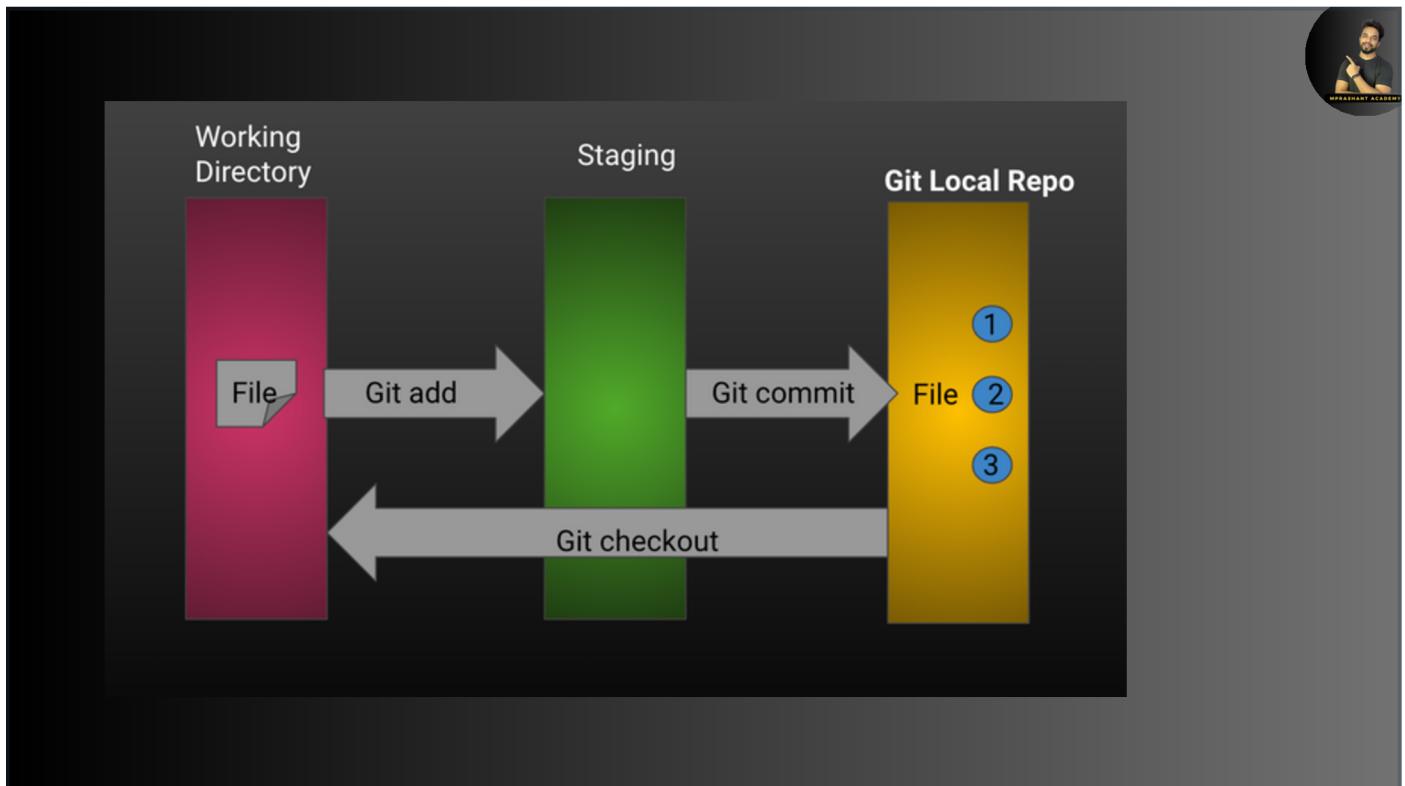
`$ git init`



What is Git Commit?

A git commit is a command in Git that captures a snapshot of the project's currently staged changes, creating a permanent record in the repository's history.







Negative Cases

If we made any change by mistake and save it

Case1: To undo changes, get the last successful change

git restore . or filename (. mean all files)

Case2: If we added the changes using git add then..

git restore --staged <file_path> # To unstage

git restore <file_path> # To discard changes in the working directory



Negative Cases

Case3: Added changes to staging area (didn't commit) after this added more changes to file

//To get the staged changes

`git restore --worktree index.html`

Case4: How about if we did commit also wrong files

`git reset --soft HEAD^` (uncommit and keep the changes)

`git reset --hard HEAD^` (uncommit and discard the changes)



Logging in Git



Useful Log Options

- **git log -p -2** (*last two commit with diff*)
- **git log --stat** (*summary of changes*)
- **git log --pretty=oneline**
- **git log --pretty=format:"%h - %an, %ar : %s"**
- **git log -S function_name**



Useful Log Options

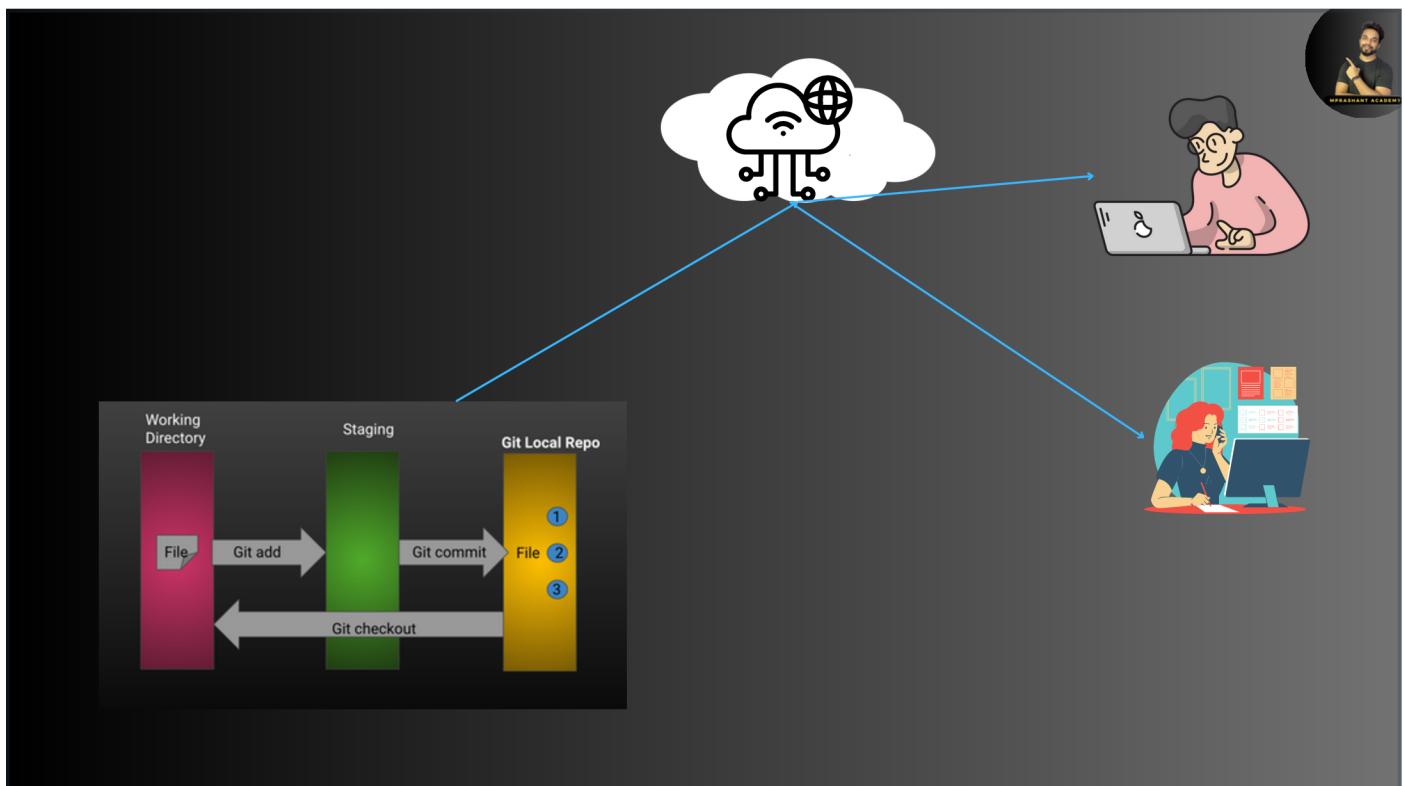
- `git log --grep="fix bug"` (*search commit msg*)
- `git log --since="2024-01-01"`
- `git log --until="2024-01-01"`
- `git log --author="Paul"`
- `git log --no-merges`



Remote Repo



A remote repository refers to a version of your project that resides on a network server or a hosted repository on the internet.





Git HUB





Adding Remote Repo

```
git remote add origin <remote URL>
```

```
git push -u origin master
```



Working with Remote

To see the remote git link

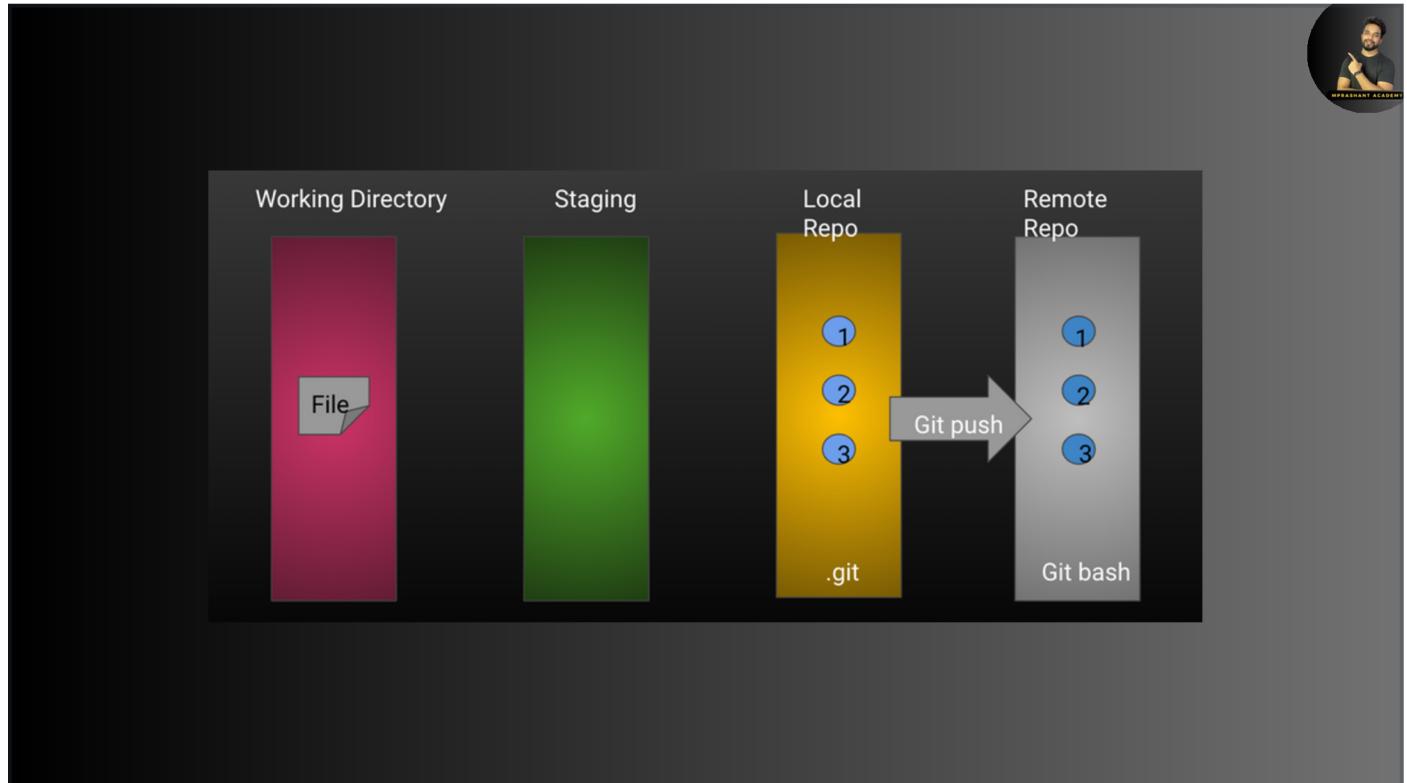
git remote

git remote -v

git remote show origin (to get more info about remote)

git clone

git pull



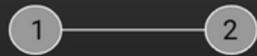


Git status	To check for any change in the repo
Git diff	To see the difference of current version with last committed version
Git pull	To fetch the latest files from remote repo
Git add	To add the modified files in staging area
Git commit	To add the changes in git repo
Git push	To push the committed changes in Remote repo
Git log	To see the old commits history



Branching and Merging

master branch





Branching and Merging

master branch

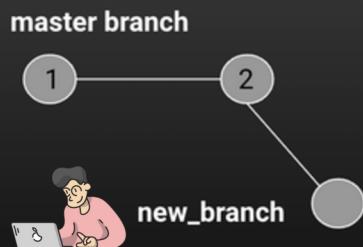


I can add
design





Branching and Merging

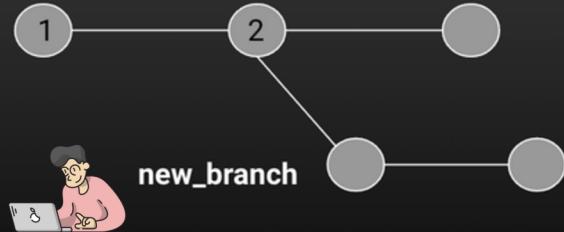


```
$ git branch new_branch
```



Branching and Merging

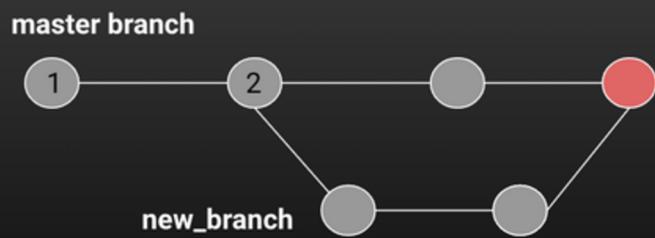
master branch



```
$ git branch new_branch
```



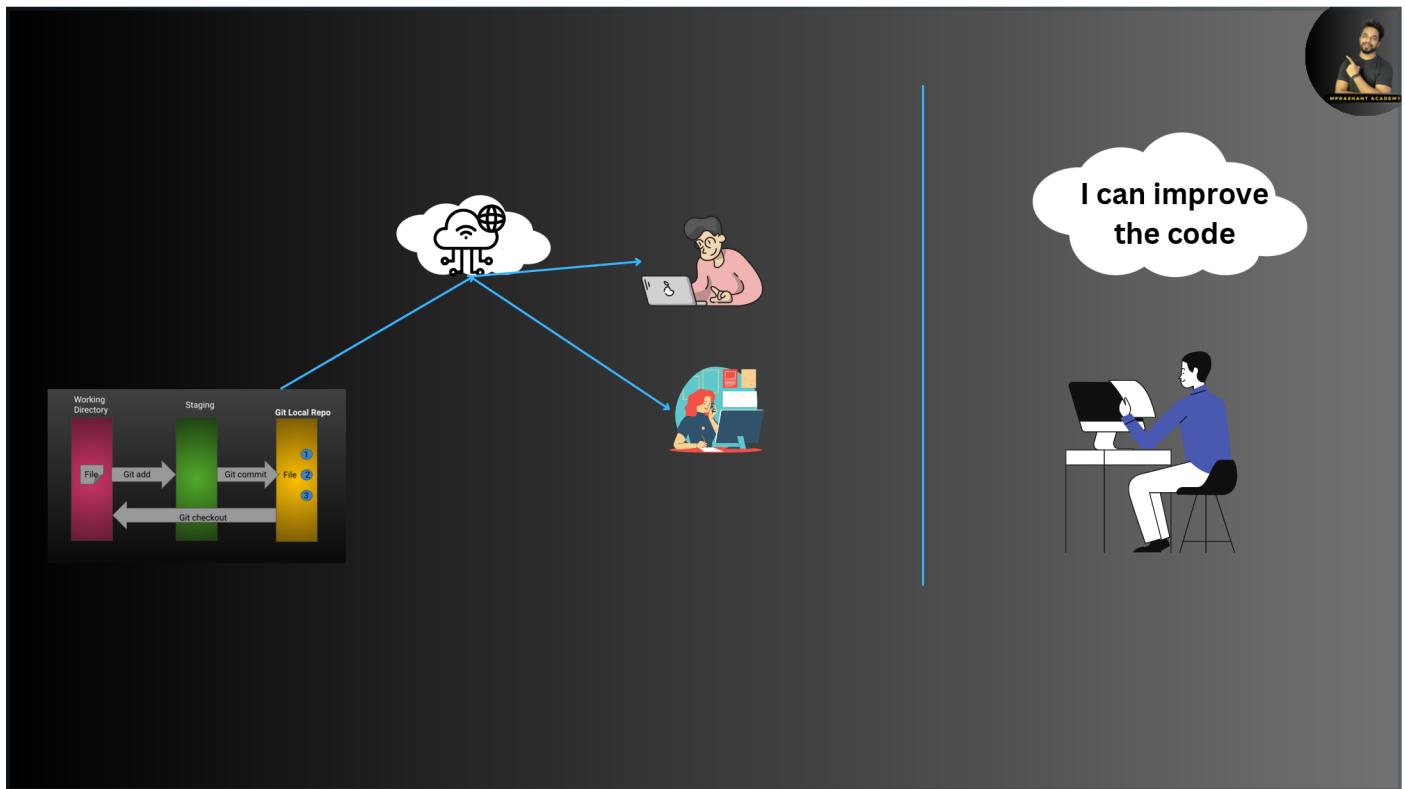
Branching and Merging



```
$ git checkout master  
$ git merge new_branch
```



Git Forking and Pull Request





Gitignore



Git Ignore

In case you don't want to commit some files from your working directories then add those files name in `.gitignore` file.

Will be useful when your file contain confidential info.



Cloning

To get the remote repo into your local system.

git clone <remote_repo_link>



Git Clean



Git Tags





Git Tagging

To create annotated tags

```
git tag -a v1.0 -m "My version 1.0"
```

To show tags data

```
git show v1.0
```

To tag old commit in case you forgot

```
git tag -a v1.2 <commit_no>
```



Git Tagging

To delete a tag

```
git tag -d <tag_no>
```

Tags created remain local, to move it to remote:

```
git push origin v1.5
```

```
git push origin --tags (For all tags together)
```

In case in future, if you wanna give patch for v1.2 release let's say

```
git checkout -b version2 v2.0.0 (it will create new branch also)
```



Managing access and permissions.



Using GitHub for Project Management



- Overview of GitHub features like Issues, GitHub Actions, and Projects.
- Tracking project progress using Kanban boards.
- Automating workflows with GitHub Actions.



- **Securing your Git and GitHub accounts.**
- **Managing access and permissions.**
- **Monitoring repositories for vulnerabilities.**