What is Git?

Git is a **distributed version control system (DVCS)** used for tracking changes in source code during software development. It helps developers collaborate efficiently, manage different versions of code, and track modifications over time.

What does Git do?

- Keeps a complete history of all modifications in files, allowing developers to revert to previous versions if needed.
- Enables developers to work with different versions of the same project without losing any progress.
- Allows developers to create separate branches for new features, bug fixes, or experiments, and later merge them into the main codebase.
- Developers can work on their local machines without an internet connection and sync changes with remote repositories (e.g., GitHub, GitLab, Bitbucket).
- Push local updates to the main project.

Why Git?

- Over 70% of developers use Git!
- Developers can work together from anywhere in the world.
- Developers can see the full history of the project.
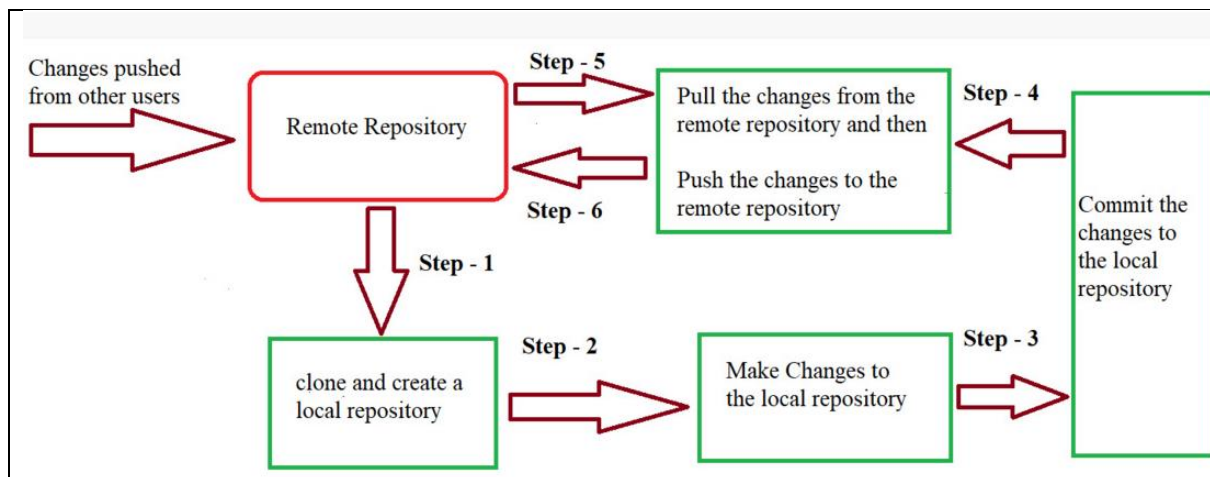- Developers can revert to earlier versions of a project.

What is GitHub?

GitHub is a **web-based platform** for hosting and managing Git repositories. It provides tools for **collaboration, version control, and project management**, making it easier for developers to work together on software projects.

- Git is not the same as GitHub.
- GitHub makes tools that use Git.
- GitHub is the largest host of source code in the world, and has been owned by Microsoft since 2018.
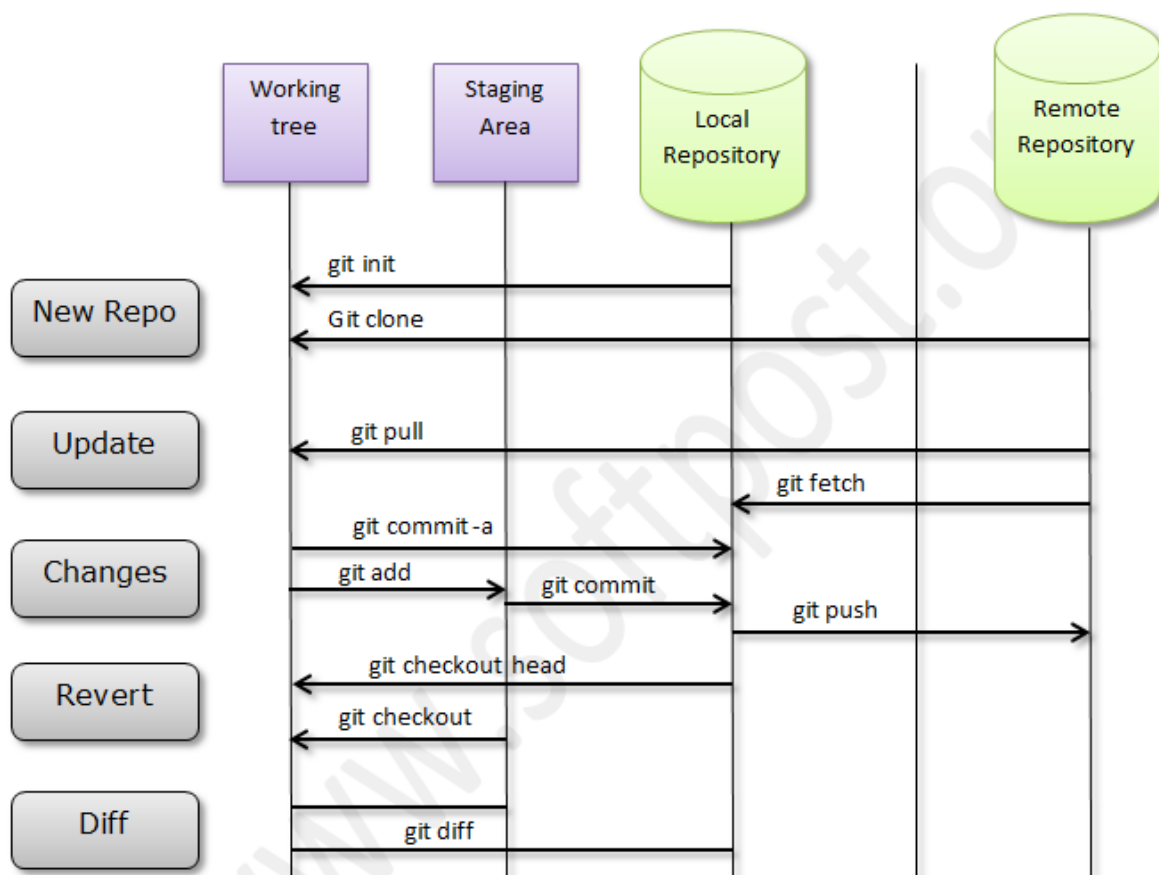- In this tutorial, we will focus on using Git with GitHub.

Difference between Git and GitHub:

Sr.No	Git	GitHub
1.	Git is a software.	GitHub is service
2.	Git is a command-line tool	It is graphical user interface
3.	It is installed locally on the system	GitHub is hosted on web
4.	Gi t is maintained by Linux	It is maintained by Microsoft
5.	Git was launched in 2005	GitHub was launched in 2008
6.	Git is focused on version control and code sharing.	GitHub is focused on centralized source code hosting.
7.	Git is a version control system to manage source code history.	GitHub is a hosting service for Git repositories.
8.	Git has no user management feature.	GitHub has a built-in user management feature.
9.	Git is open-source licensed.	GitHub includes a free-tier and pay-for-use tier.
10.	Git provides a Desktop interface named Git Gui.	GitHub provides a Desktop interface named GitHub Desktop.

Git Lifecycle:

Git Architecture:

Steps:


```
MINGW64:/c/Users/APURWA C PATIL/Desktop/git
gi
APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git init
Reinitialized existing Git repository in C:/Users/APURWA C PATIL/Desktop/git/.gi
t/

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        File1.txt

nothing added to commit but untracked files present (use "git add" to track)

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git add .

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   File1.txt

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git commit -m "Hello!!"
git commit -m "Hellogit status"
[master (root-commit) 941985f] Hellogit status
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 File1.txt

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git remote add orogin https://^[[200~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

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git remote add orogin https://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@https://github.com/apurwa-patil/practical
error: remote orogin already exists.

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git push  https://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@https://github.com/apurwa-patil/practical
fatal: unable to access 'https://https://github.com/apurwa-patil/practical/': Could not resolve host: https
```



```
MINGW64:/c/Users/APURWA C PATIL/Desktop/git
APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git push origin main

error: src refspec main does not match any
error: failed to push some refs to 'origin'

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git remote set-url origin https://apurwa-patil: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
@github.com/practical.git
error: No such remote 'origin'
bash: @github.com/practical.git: No such file or directory

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ ^C

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ ^[[200~git remote -v
bash: $'\E[200~git': command not found

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git remote -v
orogin  https://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 (fetch)
orogin  https://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 (push)

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git remote add origin https://github.com/apurwa-patil/practical.git

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git remote set-url origin https://apurwa-patil: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@github.com/apurwa-patil/practical.git

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git remote -v
origin  https://apurwa-patil: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@github.com/apurwa-patil/practical.git (fetch)
origin  https://apurwa-patil: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@github.com/apurwa-patil/practical.git (push)
orogin  https://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 (fetch)
orogin  https://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 (push)

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git push origin main
error: src refspec main does not match any
error: failed to push some refs to 'https://github.com/apurwa-patil/practical.git'

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ ^C

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git push origin master
To https://github.com/apurwa-patil/practical.git
 ! [rejected]        master -> master (fetch first)
```

```
APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ git push origin main
error: src refspec main does not match any
error: failed to push some refs to 'https://github.com/apurwa-patil/practical.git'

APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ ^C

APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ git fetch origin
git pull origin master --rebase

remote: Enumerating objects: 22, done.
remote: Counting objects: 100% (22/22), done.
remote: Compressing objects: 100% (19/19), done.
remote: Total 22 (delta 6), reused 3 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (22/22), 196.50 KiB | 3.64 MiB/s, done.
From https://github.com/apurwa-patil/practical
 * [new branch]      branch-1   -> origin/branch-1
 * [new branch]      master     -> origin/master
From https://github.com/apurwa-patil/practical
 * branch            master     -> FETCH_HEAD
Successfully rebased and updated refs/heads/master.

APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ git add .

APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ git rebase --continue
fatal: no rebase in progress

APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ git push origin master
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (2/2), 245 bytes | 245.00 KiB/s, done.
Total 2 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/apurwa-patil/practical.git
   6a00aff..c2268d8  master -> master

APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ git push
fatal: The current branch master has no upstream branch.
To push the current branch and set the remote as upstream, use

    git push --set-upstream origin master
```

```
To have this happen automatically for branches without a tracking
upstream, see 'push.autoSetupRemote' in 'git help config'.

APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ git push second
fatal: 'second' does not appear to be a git repository
fatal: Could not read from remote repository.

Please make sure you have the correct access rights
and the repository exists.

APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ git status
On branch master
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   File1.txt

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

APURWA C PATIL@LAPTOP-MVHM6OC7 MINGW64 ~/Desktop/git (master)
$ git config --list
diff.astextplain.textconv=astextplain
filter.lfs.clean=git-lfs clean -- %f
filter.lfs.smudge=git-lfs smudge -- %f
filter.lfs.process=git-lfs filter-process
filter.lfs.required=true
http.sslbackend=openssl
http.sslcainfo=C:/Program Files/Git/mingw64/etc/ssl/certs/ca-bundle.crt
core.autocrlf=true
core.fscache=true
core.symlinks=false
pull.rebase=false
credential.helper=manager
credential.https://dev.azure.com.usehttppath=true
init.defaultbranch=master
user.email=patilsc33@gmail.com
user.name=shrddha
filter.lfs.clean=git-lfs clean -- %f
filter.lfs.smudge=git-lfs smudge -- %f
filter.lfs.process=git-lfs filter-process
filter.lfs.required=true
core.repositoryformatversion=0
core.filemode=false
core.bare=false
core.logallrefupdates=true
core.symlinks=false
```

```
MINGW64:/c/Users/APURWA C PATIL/Desktop/git                                          —  □  ✕

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git status
On branch master
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   File1.txt

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

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git config --list
diff.astextplain.textconv=astextplain
filter.lfs.clean=git-lfs clean -- %f
filter.lfs.smudge=git-lfs smudge -- %f
filter.lfs.process=git-lfs filter-process
filter.lfs.required=true
http.sslbackend=openssl
http.sslcainfo=C:/Program Files/Git/mingw64/etc/ssl/certs/ca-bundle.crt
core.autocrlf=true
core.fscache=true
core.symlinks=false
pull.rebase=false
credential.helper=manager
credential.https://dev.azure.com.usehttppath=true
init.defaultbranch=master
user.email=patilsc33@gmail.com
user.name=shrddha
filter.lfs.clean=git-lfs clean -- %f
filter.lfs.smudge=git-lfs smudge -- %f
filter.lfs.process=git-lfs filter-process
filter.lfs.required=true
core.repositoryformatversion=0
core.filemode=false
core.bare=false
core.logallrefupdates=true
core.symlinks=false
core.ignorecase=true
remote.orogin.url=https://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
remote.orogin.fetch=+refs/heads/*:refs/remotes/orogin/*
remote.origin.url=https://apurwa-patil: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@github.com/apurwa-patil/practical.git
remote.origin.fetch=+refs/heads/*:refs/remotes/origin/*

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$ git push --set-upstream origin master
Everything up-to-date
branch 'master' set up to track 'origin/master'.

APURWA C PATIL@LAPTOP-MVHM60C7 MINGW64 ~/Desktop/git (master)
$
```