What is Git?

Git is a distributed version control system for tracking changes in source code during software 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.

What does Git do?

- Manage projects with Repositories
- Clone a project to work on a local copy
- Control and track changes with Staging and Committing
- Branch and Merge to allow for work on different parts and versions of a project
- Pull the latest version of the project to a local copy
- 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 Git repository hosting service, which offers all of the distributed revision control and source code management (SCM) functionality of Git as well as adding its own features.

- 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.
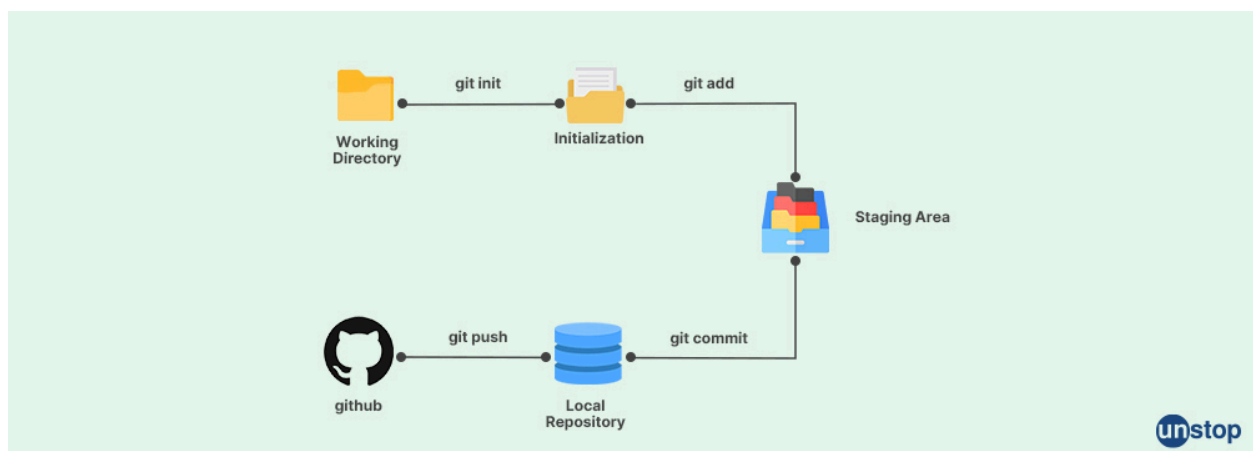- In this tutorial, we will focus on using Git with GitHub.

differences between Git and GitHub:

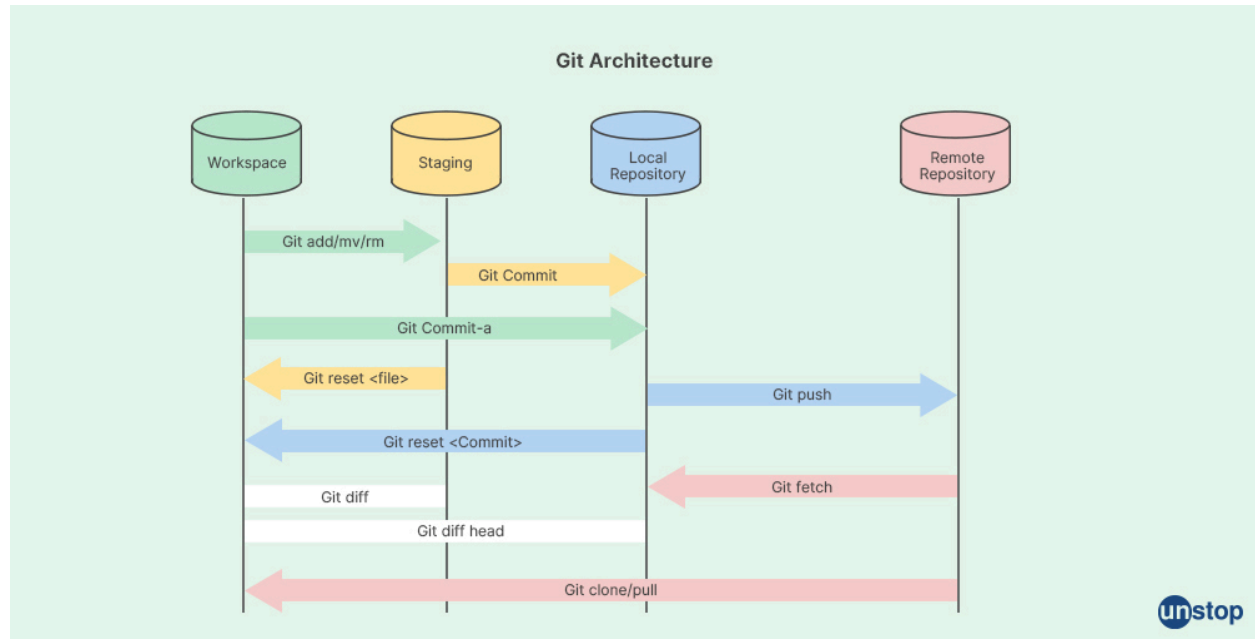| S.No.	Git	GitHub
1.	Git is a software.	GitHub is a service.
2.	Git is a command-line tool	GitHub is a graphical user interface
3.	Git is installed locally on the system	GitHub is hosted on the web
4.	Git is maintained by linux.	GitHub is maintained by Microsoft.

5.	Git is focused on version control and code sharing.	GitHub is focused on centralized source code hosting.
6.	Git is a version control system to manage source code history.	GitHub is a hosting service for Git repositories.
7.	Git was first released in 2005.	GitHub was launched in 2008.
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 has minimal external tool configuration.	GitHub has an active marketplace for tool integration.
11.	Git provides a Desktop interface named Git Gui.	GitHub provides a Desktop interface named GitHub Desktop.
12.	Git competes with CVS, Subversion, Mercurial, etc.	GitHub competes with GitLab, Bit Bucket, AWS Code Commit, Azure DevOps Server, etc.

The Git Lifecycle

Git Architecture

Steps git

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

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

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git add *
git
Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git status
On branch master

No commits yet

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


Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git commit -m "Added Hello.txt"
[master (root-commit) cdebdeb] Added Hello.txt
 1 file changed, 1 insertion(+)
 create mode 100644 Hello.txt

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (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'.


Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$
git push --set-upstream origin master
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Writing objects: 100% (3/3), 221 bytes | 110.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'master' on GitHub by visiting:
remote:      https://github.com/YogeshwariRajput/WADAssignment/pull/new/master
remote:
To https://github.com/YogeshwariRajput/WADAssignment.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ gti config --list
bash: gti: command not found
```

```
bash: gti: command not found

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (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=tppatil1326@gmail.com
core.repositoryformatversion=0
core.filemode=false
core.bare=false
core.logallrefupdates=true
core.symlinks=false
core.ignorecase=true
remote.origin.url=https://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@github.com/YogeshwariRajput/WADAssignment.git
remote.origin.fetch=+refs/heads/*:refs/remotes/origin/*
branch.master.remote=origin
branch.master.merge=refs/heads/master

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git config --global user.name "YogeshwaiRajput"

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git config --global user.name "rajputyogeshwari308"

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git config --global user.email "rajputyogeshwari308@gmail.com"

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (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=rajputyogeshwari308@gmail.com
```

```
Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (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=rajputyogeshwari308@gmail.com
user.name=rajputyogeshwari308
core.repositoryformatversion=0
core.filemode=false
core.bare=false
core.logallrefupdates=true
core.symlinks=false
core.ignorecase=true
remote.origin.url=https://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@github.com/YogeshwariRajput/WADAssignment.git
remote.origin.fetch=+refs/heads/*:refs/remotes/origin/*
branch.master.remote=origin
branch.master.merge=refs/heads/master

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git status
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 restore <file>..." to discard changes in working directory)
        modified:   Hello.txt

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

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git commit -m "Chnaged Hello.txt"
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 restore <file>..." to discard changes in working directory)
        modified:   Hello.txt

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

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git add *
```

```
$ git add *

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git commit -m "Chnaged Hello.txt"
[master cbc478e] Chnaged Hello.txt
 1 file changed, 1 insertion(+)

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git push
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Writing objects: 100% (3/3), 274 bytes | 274.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/YogeshwariRajput/WADAssignment.git
   cdebdeb..cbc478e  master -> master

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git pull
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (3/3), 872 bytes | 12.00 KiB/s, done.
From https://github.com/YogeshwariRajput/WADAssignment
 * [new branch]      main       -> origin/main
Already up to date.

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git checkout main
Switched to a new branch 'main'
branch 'main' set up to track 'origin/main'.

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ touch Hello.txt

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git add *

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git commit -m "Added Hello.txt"
[main 9d3a0d9] Added Hello.txt
 1 file changed, 1 insertion(+)
 create mode 100644 Hello.txt

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git push
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
```

```
MINGW64:/c/Users/Dell/Documents/GitHub

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (master)
$ git checkout main
Switched to a new branch 'main'
branch 'main' set up to track 'origin/main'.

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ touch Hello.txt

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git add *

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git commit -m "Added Hello.txt"
[main 9d3a0d9] Added Hello.txt
 1 file changed, 1 insertion(+)
 create mode 100644 Hello.txt

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git push
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 286 bytes | 286.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/YogeshwariRajput/WADAssignment.git
   0bd6032..9d3a0d9  main -> main

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git pull
remote: Enumerating objects: 5, done.
remote: Counting objects: 100% (5/5), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (3/3), 940 bytes | 13.00 KiB/s, done.
From https://github.com/YogeshwariRajput/WADAssignment
   9d3a0d9..0b2588e  main         -> origin/main
Updating 9d3a0d9..0b2588e
Fast-forward
 Hello.txt | 3 ++-
 1 file changed, 2 insertions(+), 1 deletion(-)

Dell@DESKTOP-D7U22G8 MINGW64 ~/Documents/GitHub (main)
$ git log
commit 0b2588e688eaa4019b7c7130a246f13754c248a5 (HEAD -> main, origin/main)
Author: YogeshwariRajput <119652774+YogeshwariRajput@users.noreply.github.com>
Date:   Thu Jan 16 14:03:05 2025 +0530

    Updated Hello.txt
```

```
Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git push origin main
error: src refspec main does not match any
error: failed to push some refs to 'https://github.com/RatiAntapurkar/ne
it'

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git push https://ghp_jmFeYzFeRgKFYGPNRwvrk01Y6Hyq401WlUVs@github.com/Ra
urkar/new-repo.git
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Writing objects: 100% (3/3), 219 bytes | 219.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'master' on GitHub by visiting:
remote:        https://github.com/RatiAntapurkar/new-repo/pull/new/master
remote:
To https://github.com/RatiAntapurkar/new-repo.git
 * [new branch]      master -> master

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (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:   rati.txt

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

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git add .

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git commit -m "modified"
[master 3ae9155] modified
 1 file changed, 1 insertion(+)

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git log
commit 3ae9155a19d4e60908456758914bef67a385856b (HEAD -> master)
Author: rajputyogeshwari308 <rajputyogeshwari308@gmail.com>
Date:   Tue Jan 21 09:26:04 2025 +0530

    modified

commit 61dfcdc53b008ec98f8658d31305f7043f858307
Author: rajputyogeshwari308 <rajputyogeshwari308@gmail.com>
Date:   Tue Jan 21 09:12:33 2025 +0530

    add new text file

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ |
```

```
Dell@DESKTOP-D7U22G8 MINGW64 ~
$ cd Desktop/

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop
$ cd Rati

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati
$ git init
Initialized empty Git repository in C:/Users/Dell/Desktop/rati/.git/

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git add .

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git commit
Aborting commit due to empty commit message.

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git commit -m "add new text file"
[master (root-commit) 61dfcdc] add new text file
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 rati.txt

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git status
On branch master
nothing to commit, working tree clean

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git log
commit 61dfcdc53b008ec98f8658d31305f7043f858307 (HEAD -> master)
Author: rajputyogeshwari308 <rajputyogeshwari308@gmail.com>
Date:   Tue Jan 21 09:12:33 2025 +0530

    add new text file

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git add remote origin ^[[200~
fatal: pathspec 'remote' did not match any files

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git add remote origin https://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@github.
com/RatiAntapurkar/new-repo.git
fatal: pathspec 'remote' did not match any files

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git remote add origin https://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@github.
com/RatiAntapurkar/new-repo.git

Dell@DESKTOP-D7U22G8 MINGW64 ~/Desktop/Rati (master)
$ git push origin main
error: src refspec main does not match any
error: failed to push some refs to 'https://github.com/RatiAntapurkar/new-repo.g
it'
```