Subject Name: **Source Code Management**

Subject Code: **CS181**

Cluster: **Beta**

Department: **DCSE**

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Submitted To:
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Experiment: 01

Aim: Setting up of GIT client

Description:

- GIT is basically 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 goal is to increase efficiency, speed and easily manage large projects through version controlling.

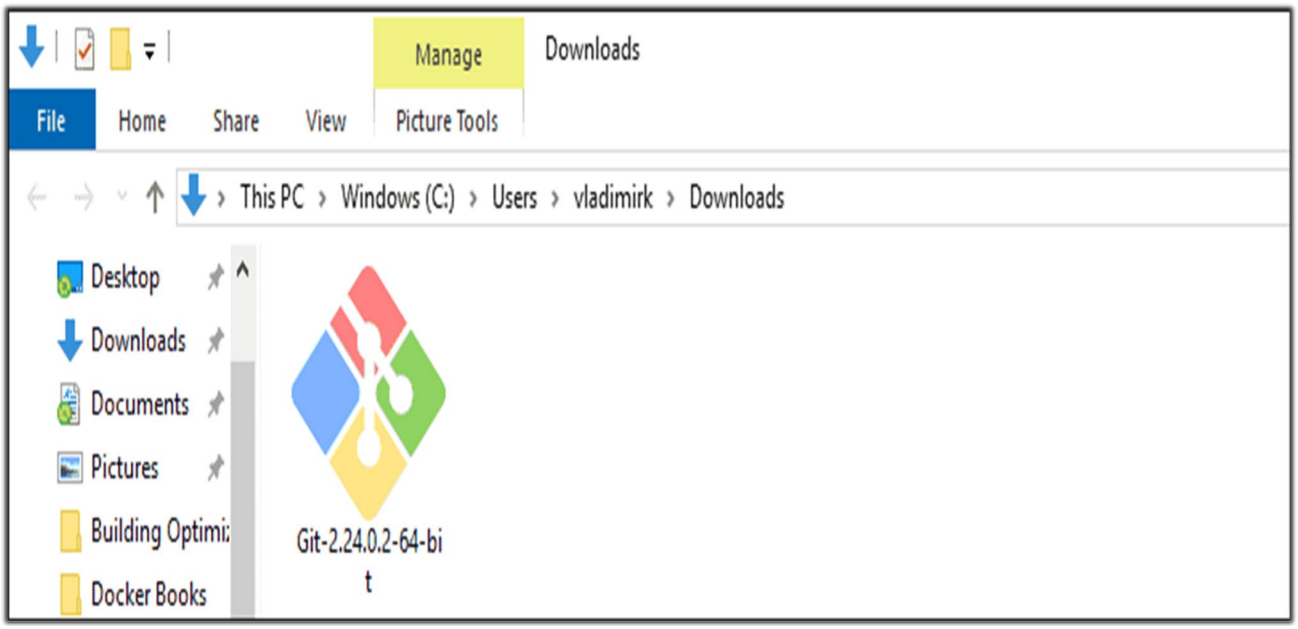
Objective: To Install GIT Bash

Follow the steps given below to install GIT Bash on Windows:

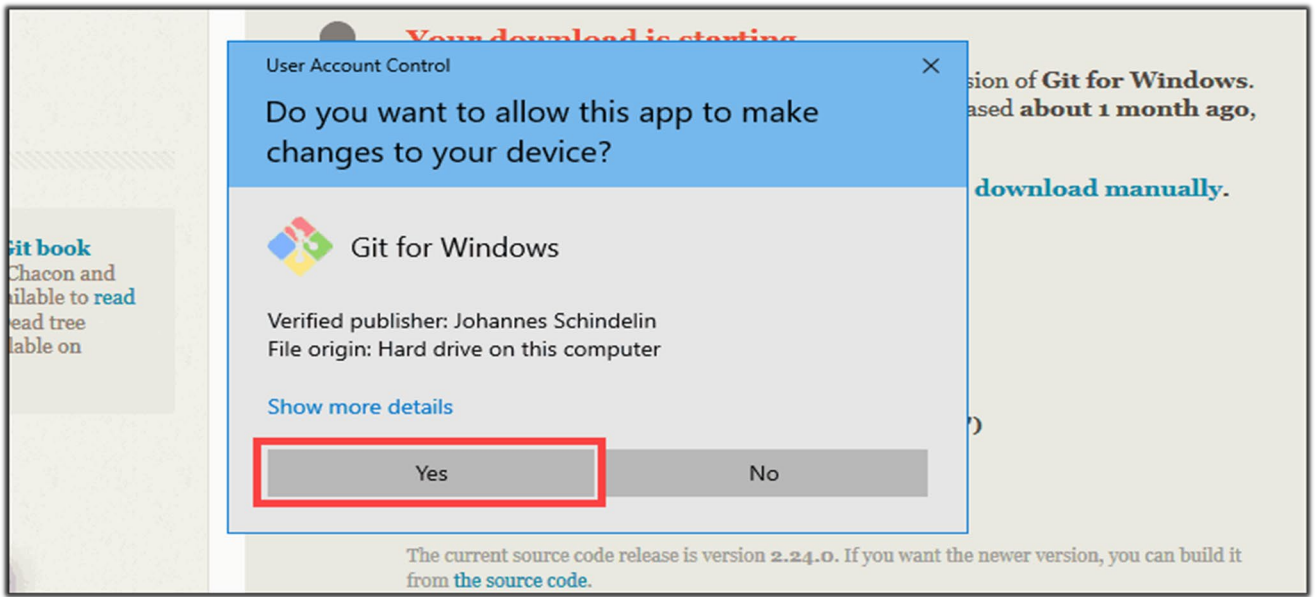
- Browse to the official GIT website: https://git-scm.com/downloads.
- Click the download link for Windows and allow the download to complete.

Extract and Launch GIT Installer

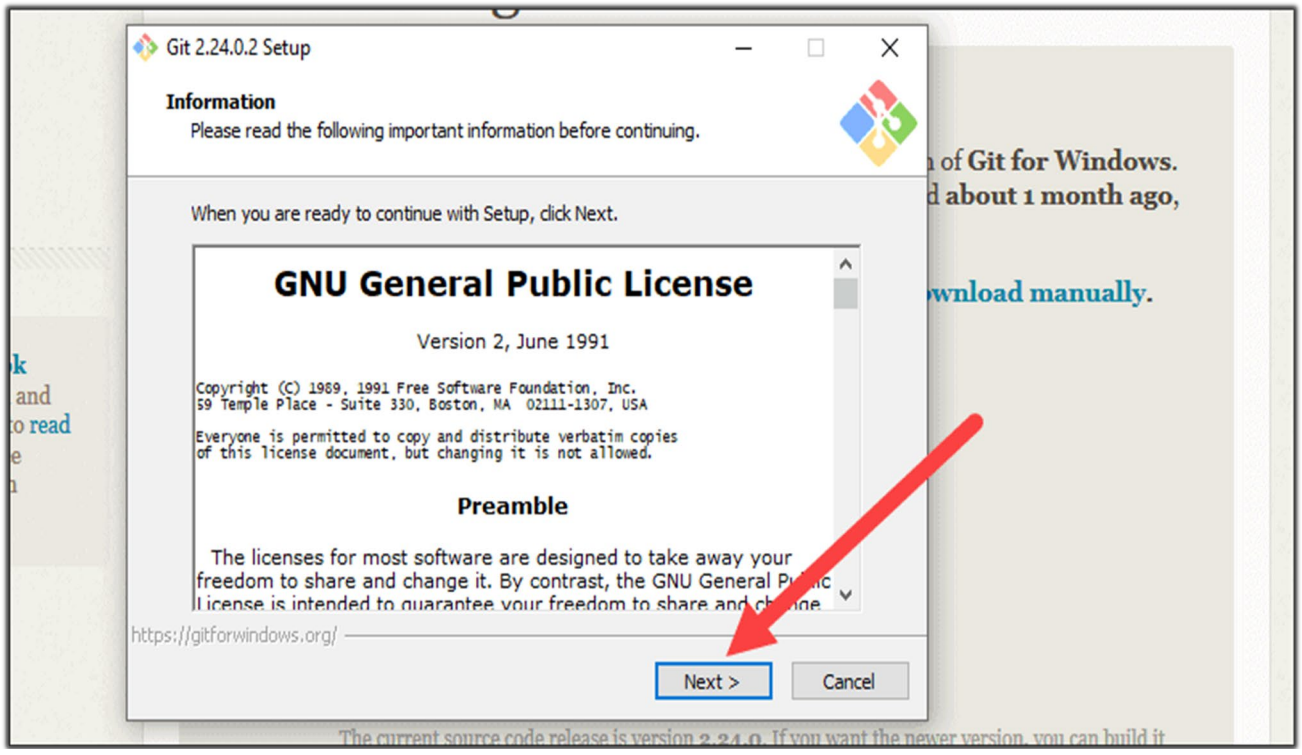
❖ Browse to the download location (or use the download shortcut in your browser). Double-click the file to extract and launch the installer.



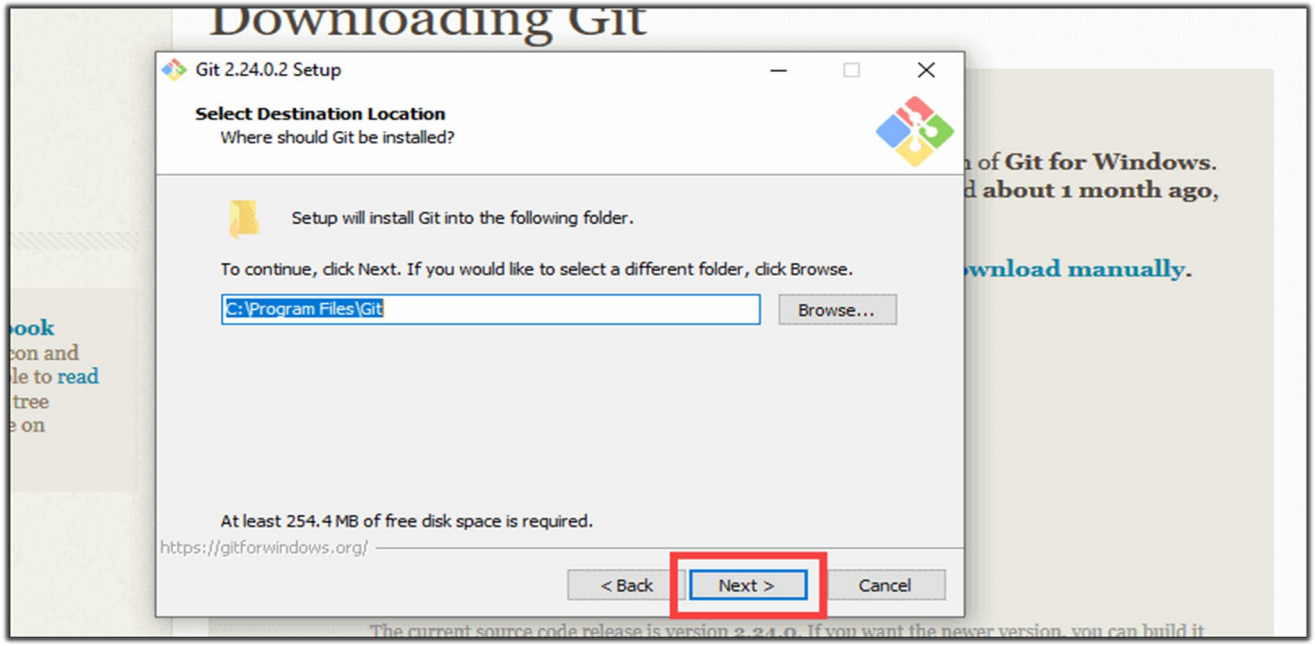
❖ Allow the app to make changes to your device by clicking **Yes** on the User Account Control dialog that opens.



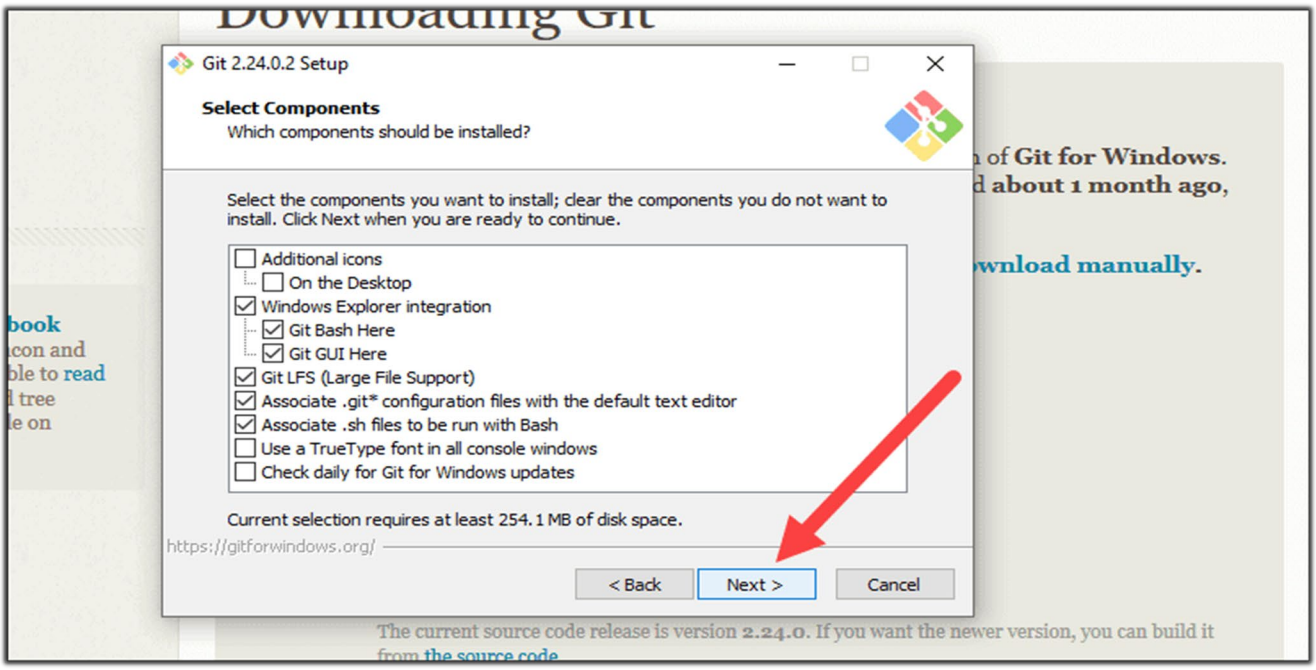
❖ Review the GNU General Public License, and when you're ready to install, click **Next**.



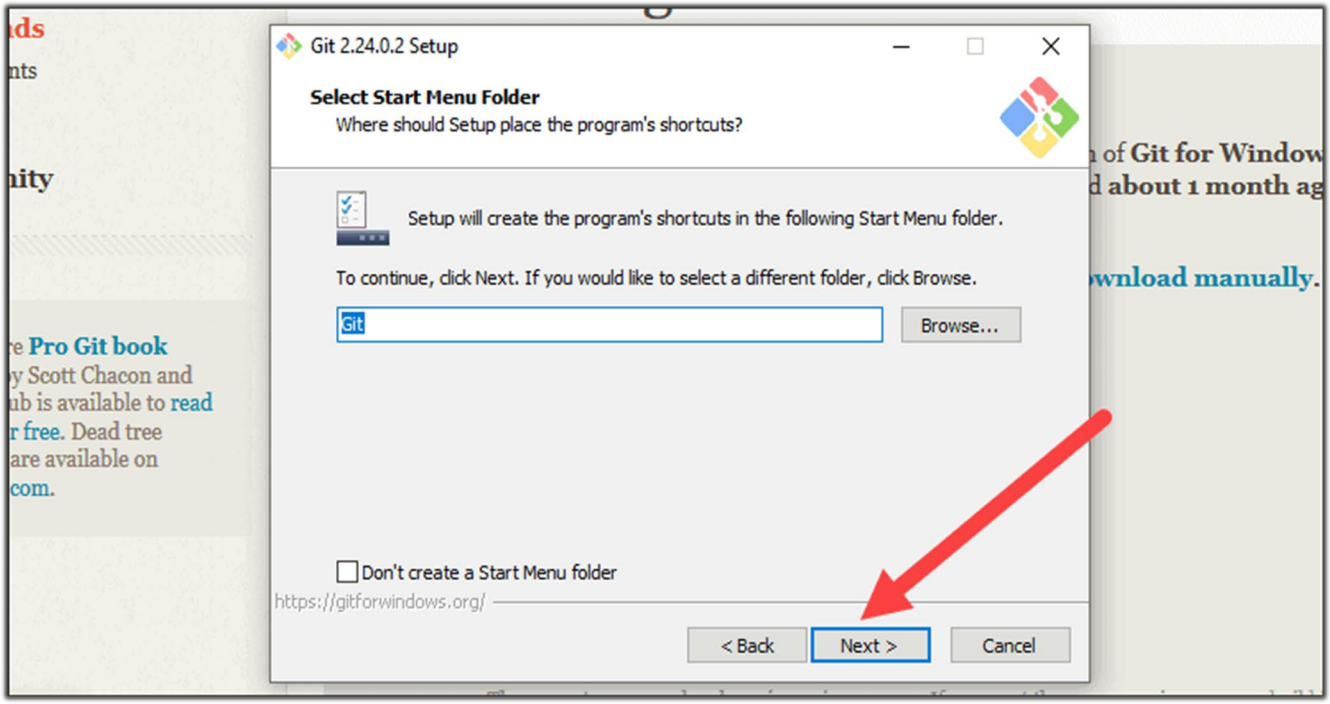
❖ The installer will ask you for an installation location. Leave the default, unless you have reason to change it, and click **Next**.



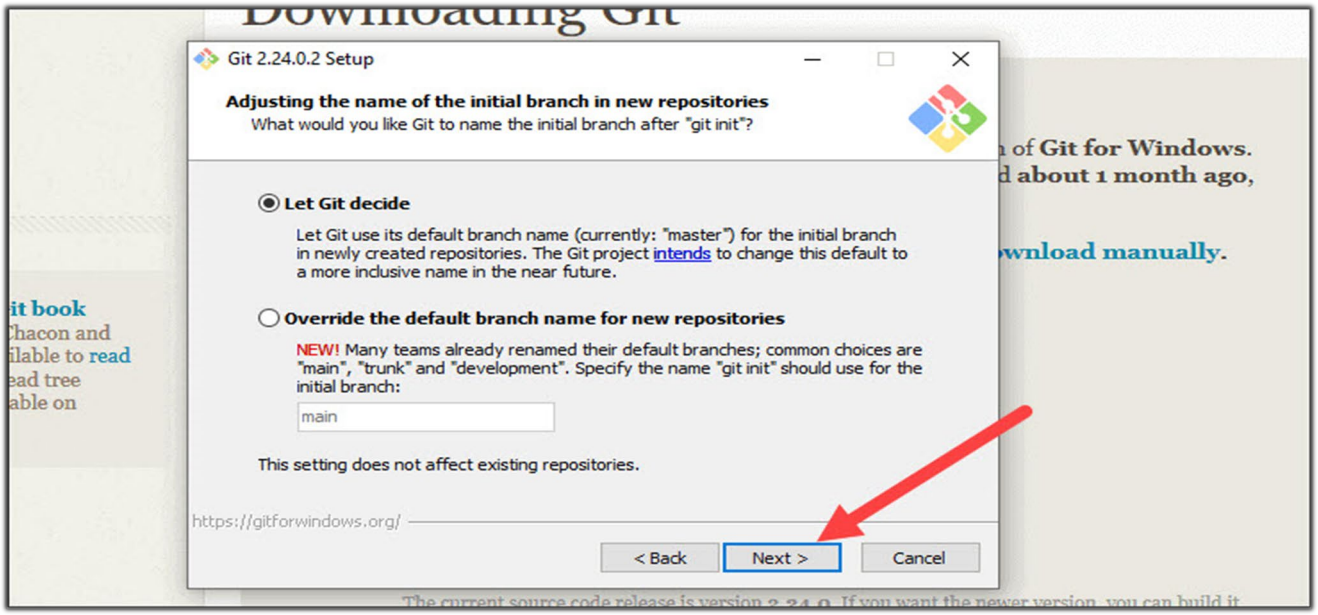
❖ A component selection screen will appear. Leave the defaults unless you have a specific need to change them and click **Next .**



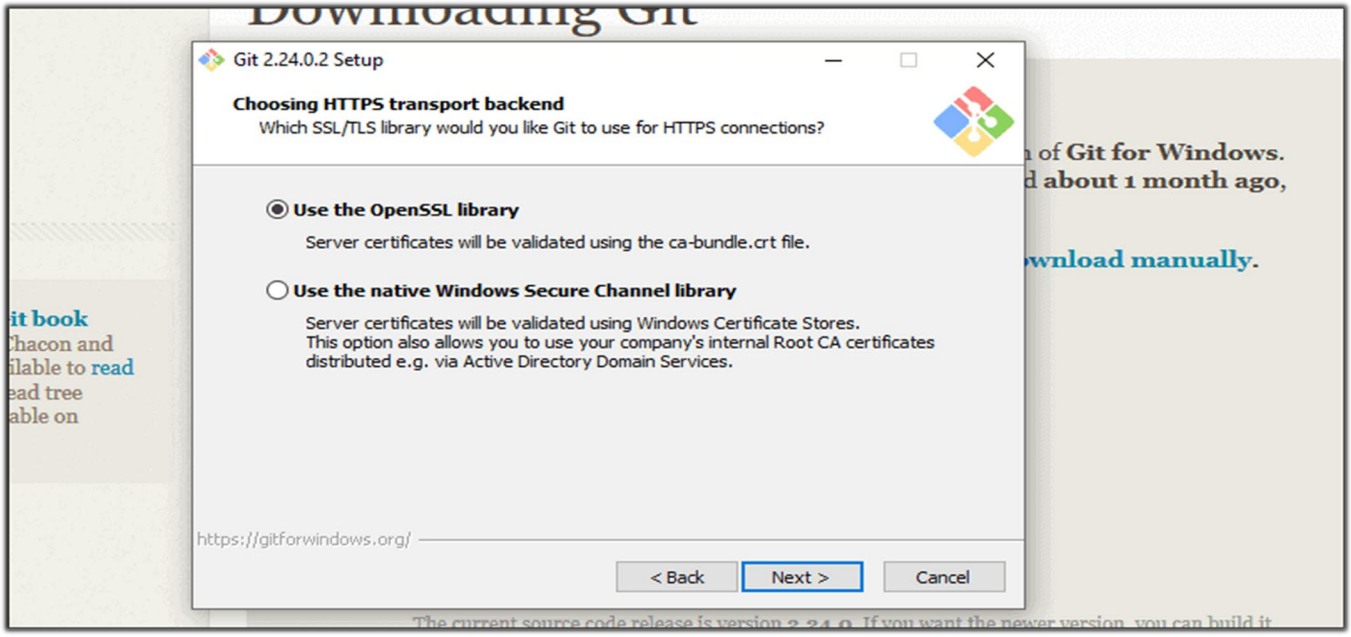
❖ The installer will offer to create a start menu folder. Simply click **Next**.



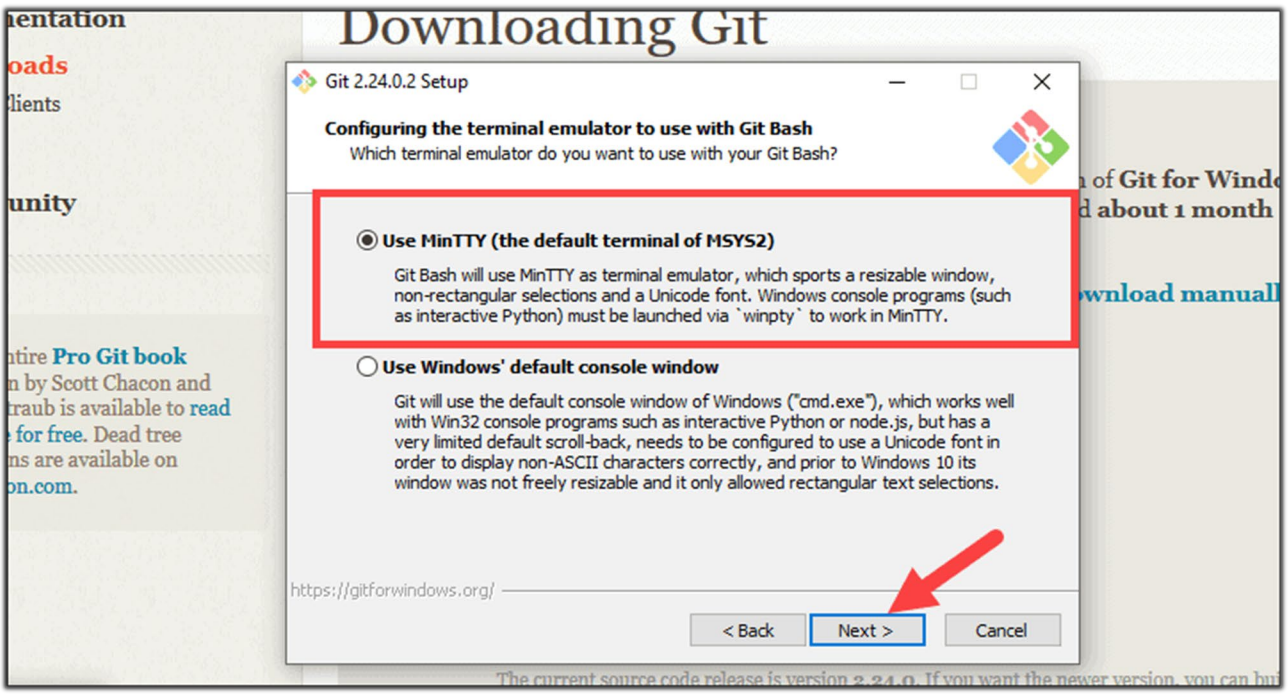
❖ The next step allows you to choose a different name for your initial branch. The default is 'master.' Unless you're working in a team that requires a different name, leave the default option and click **Next.**



❖ The next option relates to server certificates. Most users should use the default. Click **Next**.

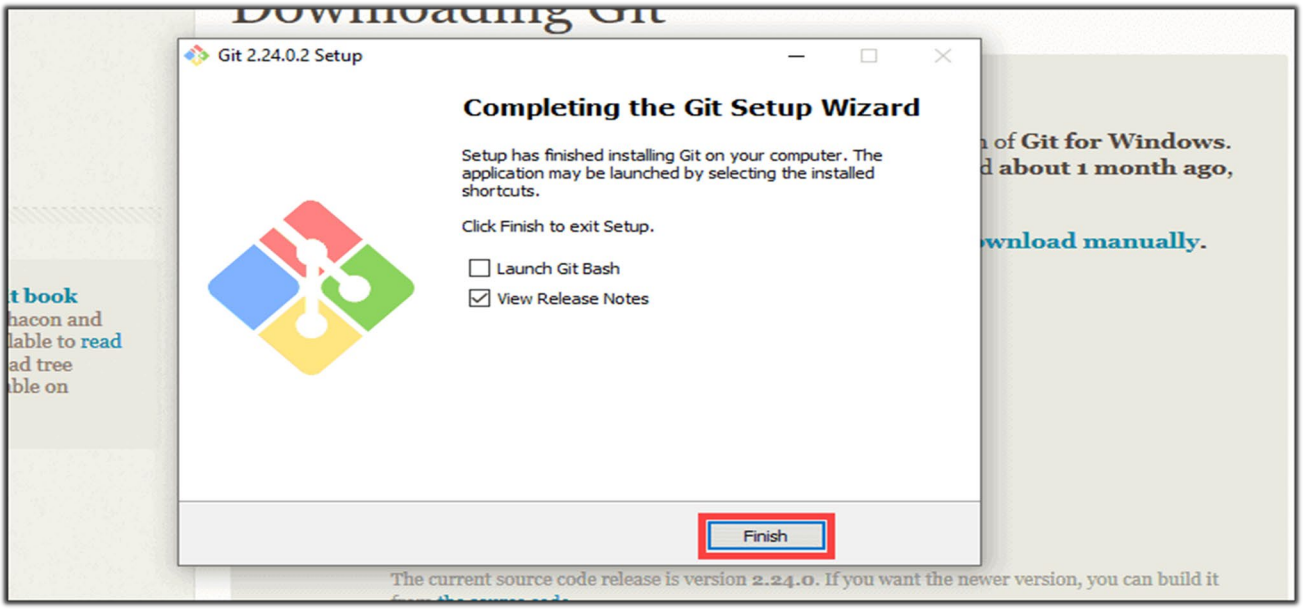


❖ Choose the terminal emulator you want to use. The default MinTTY is recommended, for its features. Click **Next**.



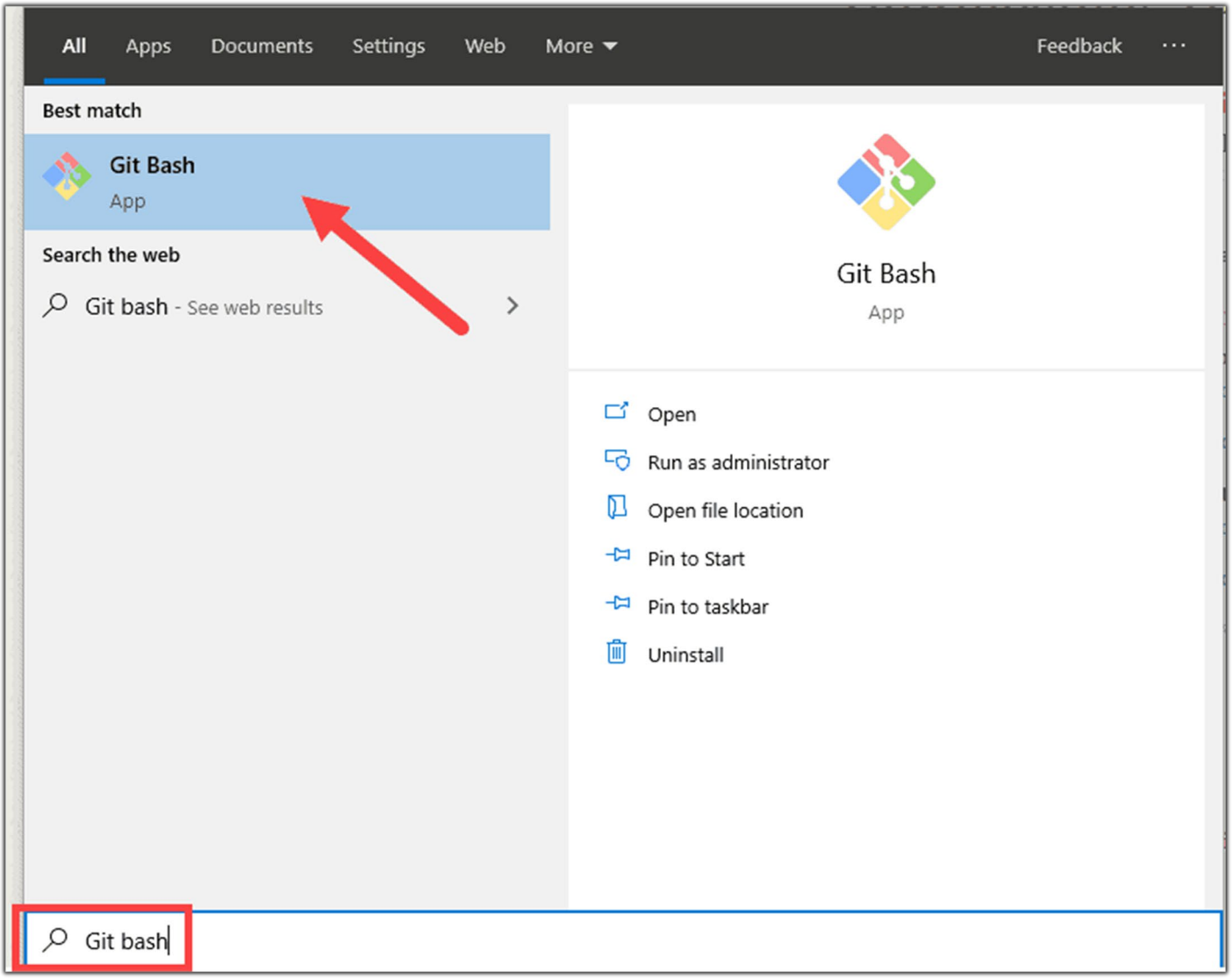
Complete GIT Installation Process

❖ Once the installation is complete, tick the boxes to view the Release Notes or Launch GIT Bash, then click **Finish**.



Launch GIT Bash Shell

❖ To launch **GIT Bash** open the **Windows Start** menu, type ***git bash*** and press **Enter** (or click the application icon).



Aim: Setting up of Github Account

Description:

- GitHub is an open-source repository hosting service, sort of like a cloud for code
- GitHub is a hosting site where developers and programmers can upload the code they create and work collaboratively to improve it.
- With GitHub, developers can build code, track changes, and innovate solutions to problems

Objectives:

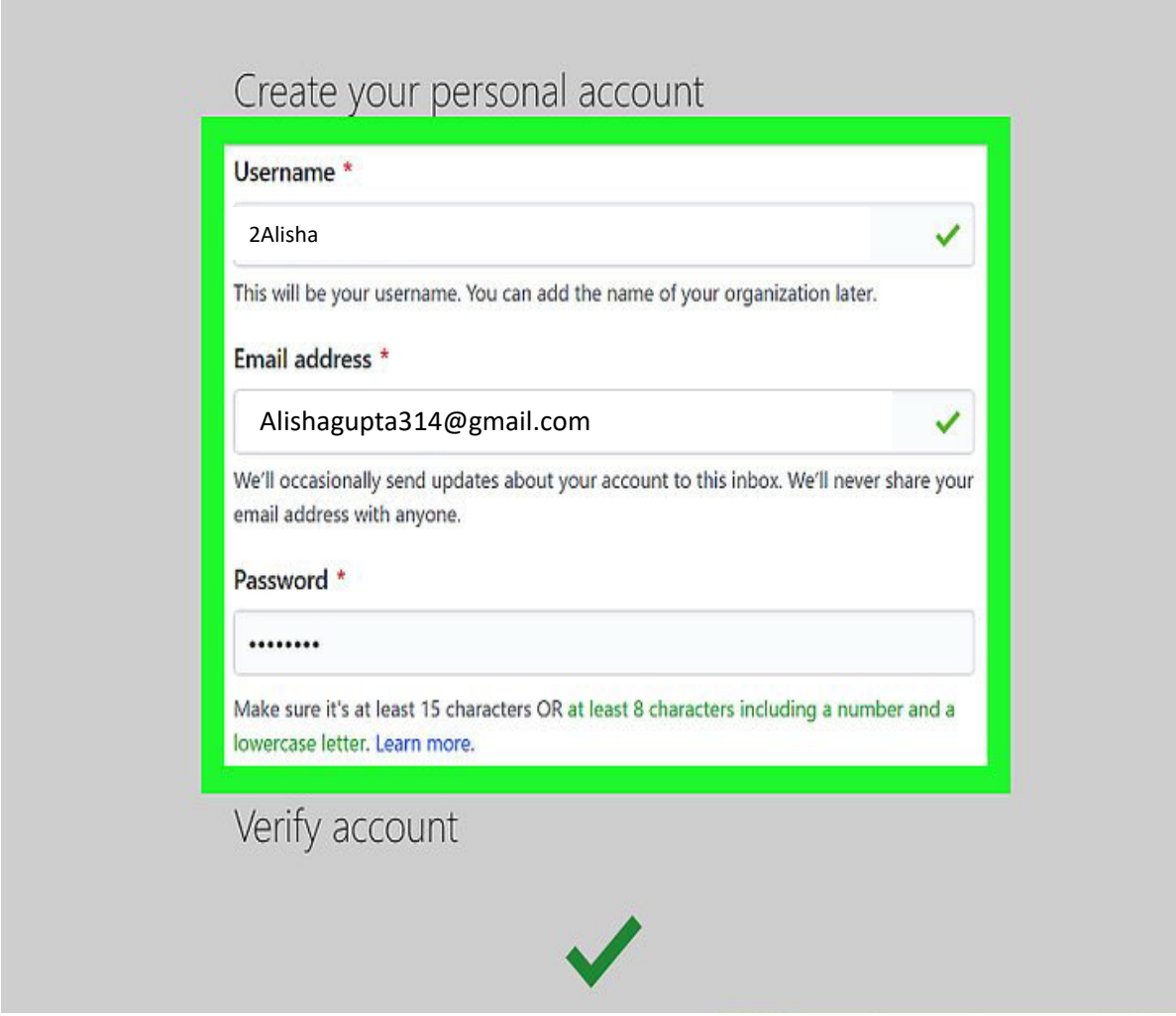
To *make your account on github follow the following steps:*

- **Go to https://github.com/join in a web browser.** You can use any web browser on your computer, phone, or tablet to join.

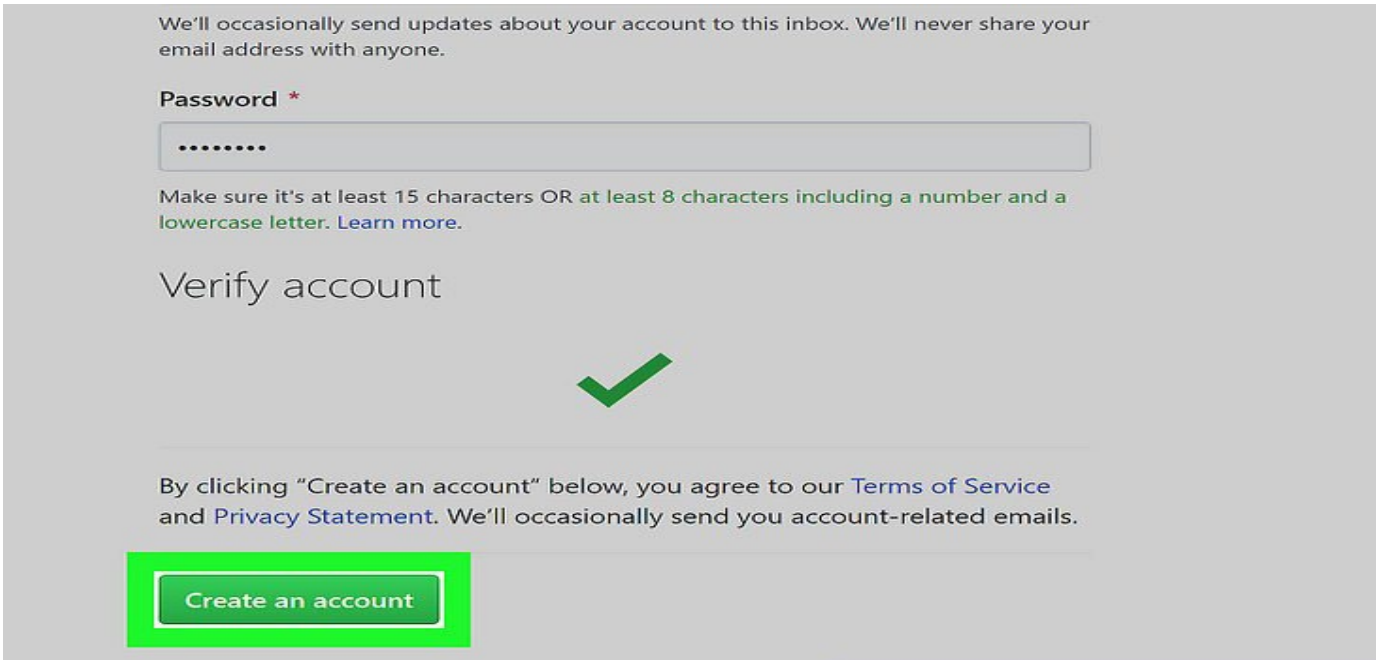
❖ Enter your personal details.

In addition to creating a username and entering an email address, you'll also have to create a password.

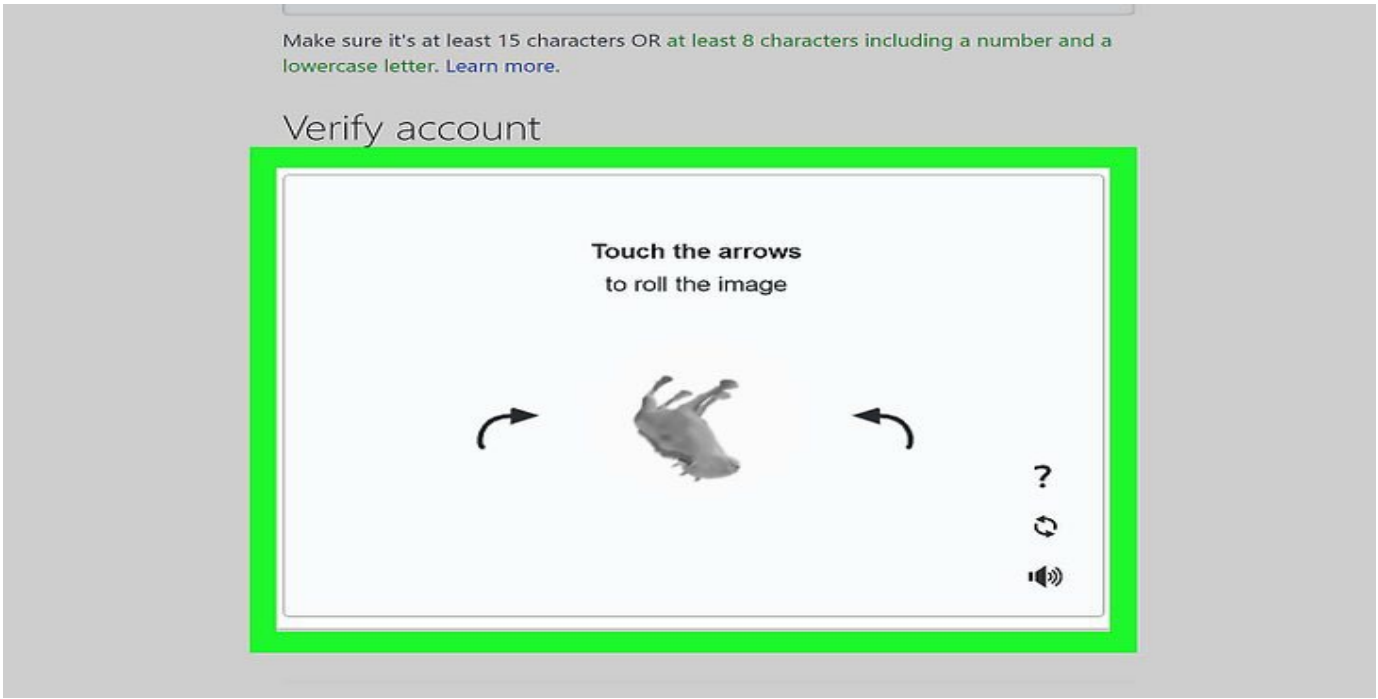
The login form will appear on the same page. Fill out the form with your details to create an account on GitHub.



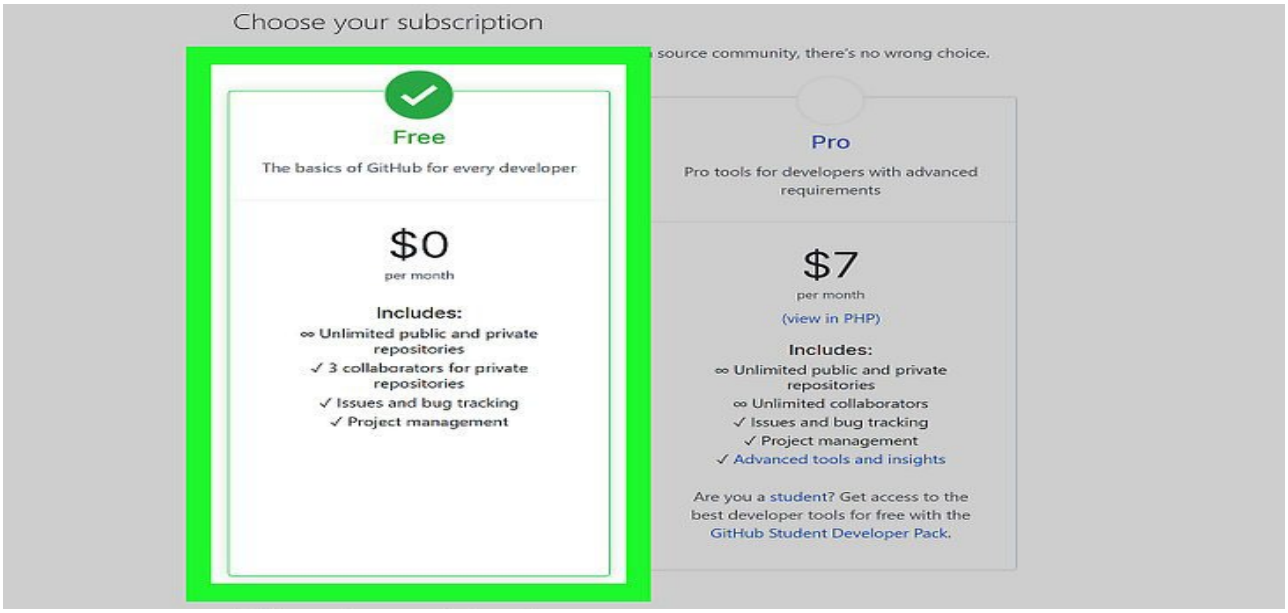
❖ **Click the Create an account button.** It's below the form.



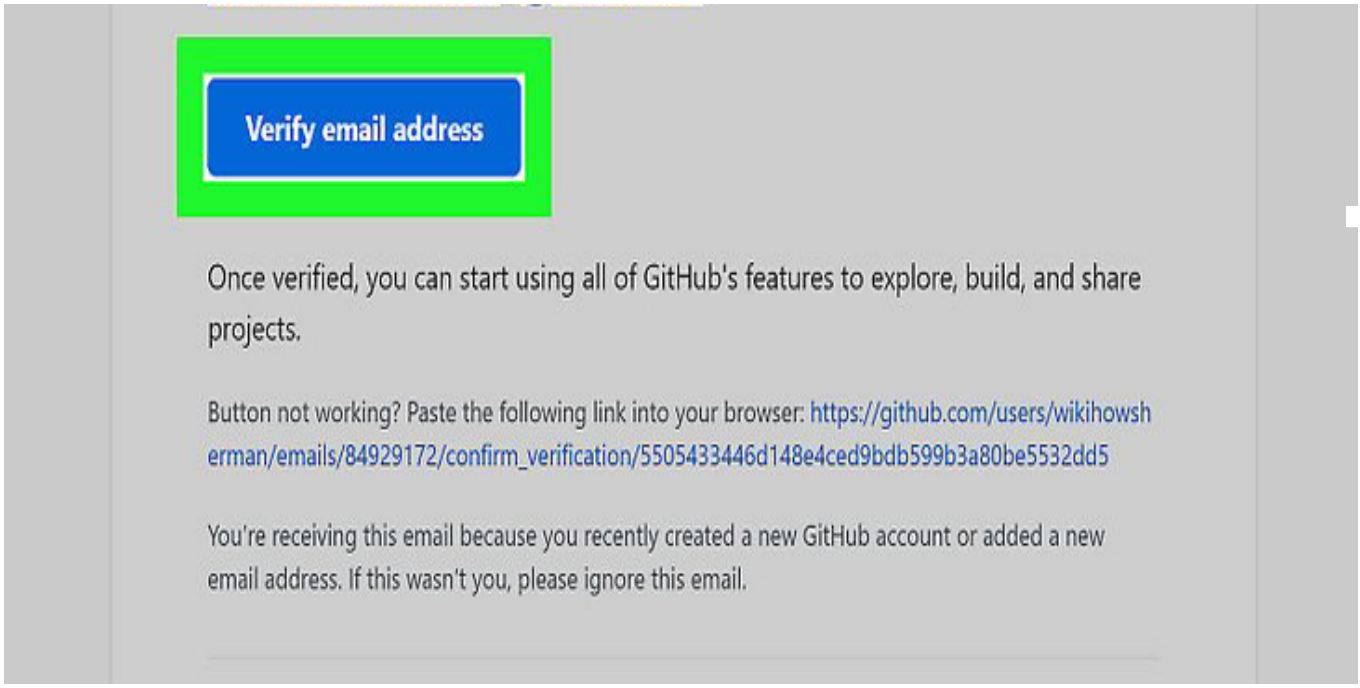
❖ **Complete the CAPTCHA puzzle.** The instructions vary by puzzle, so just follow the on-screen instructions to confirm that you are a human.



❖ **Click the Choose button for your desired plan.** Once you select a plan, GitHub will send an email confirmation message to the address you entered.

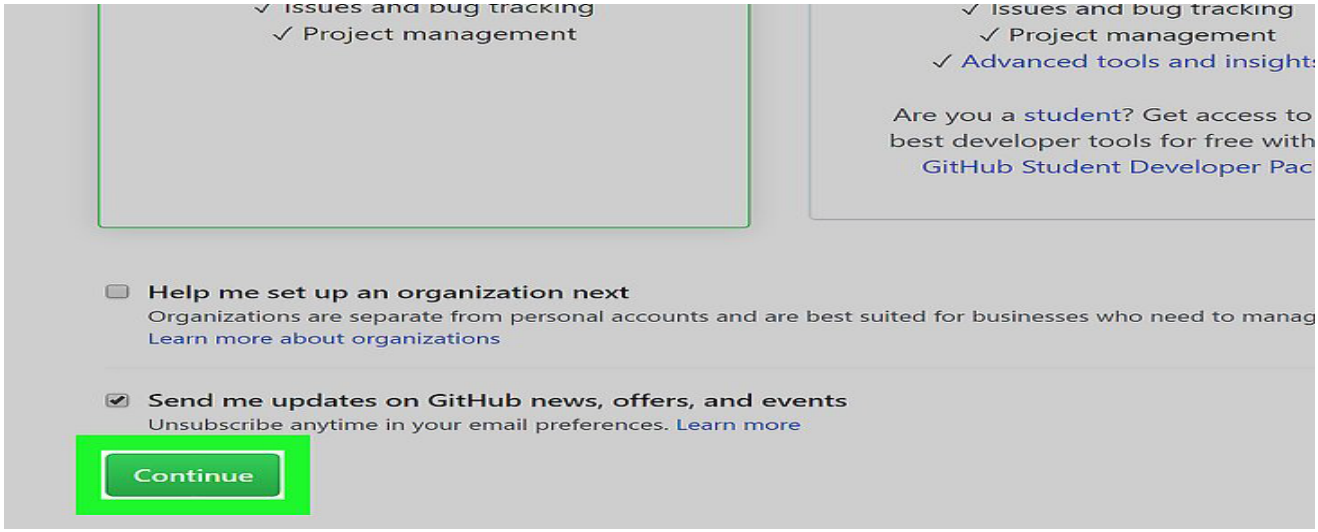


❖ **Click the Verify email address button in the message from GitHub.** This confirms your email address and returns you to the sign-up process.

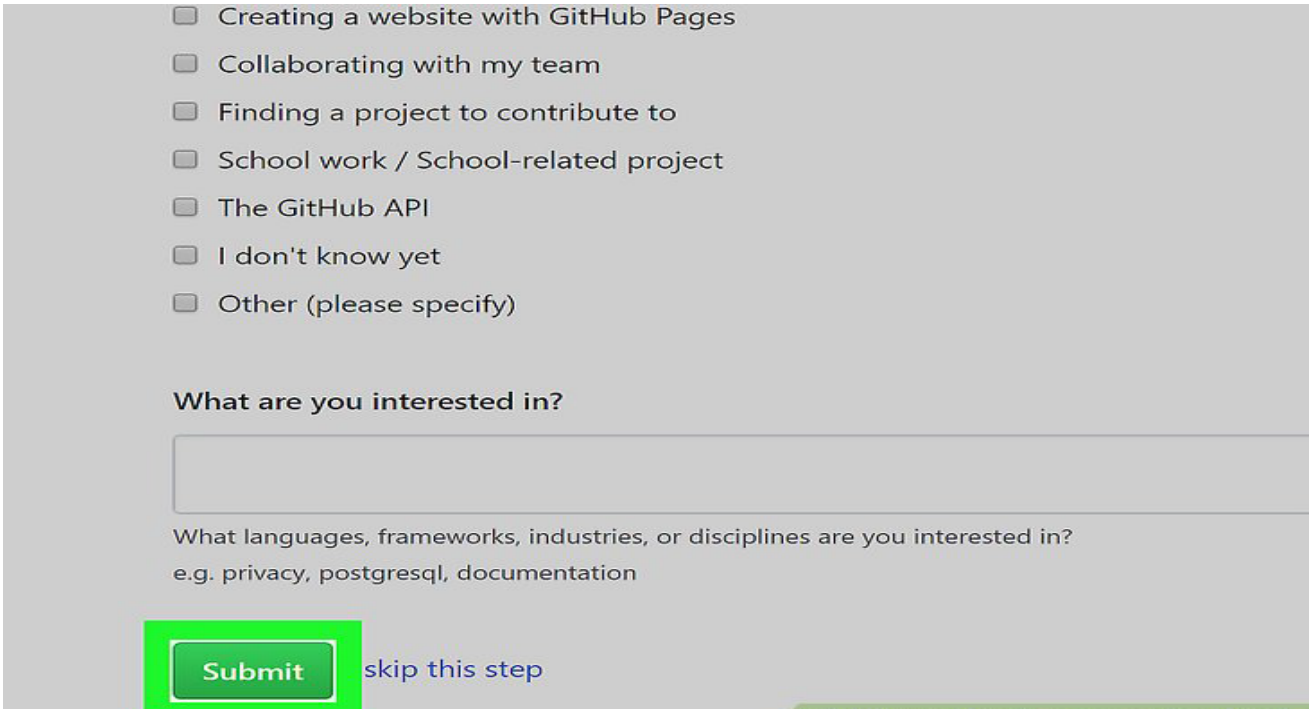


❖ **Review your plan selection and click Continue.** You can also choose whether you want to receive updates from GitHub via email by checking or unchecking the "Send me updates" box.

- If you chose a paid plan, you'll have to enter your payment information.

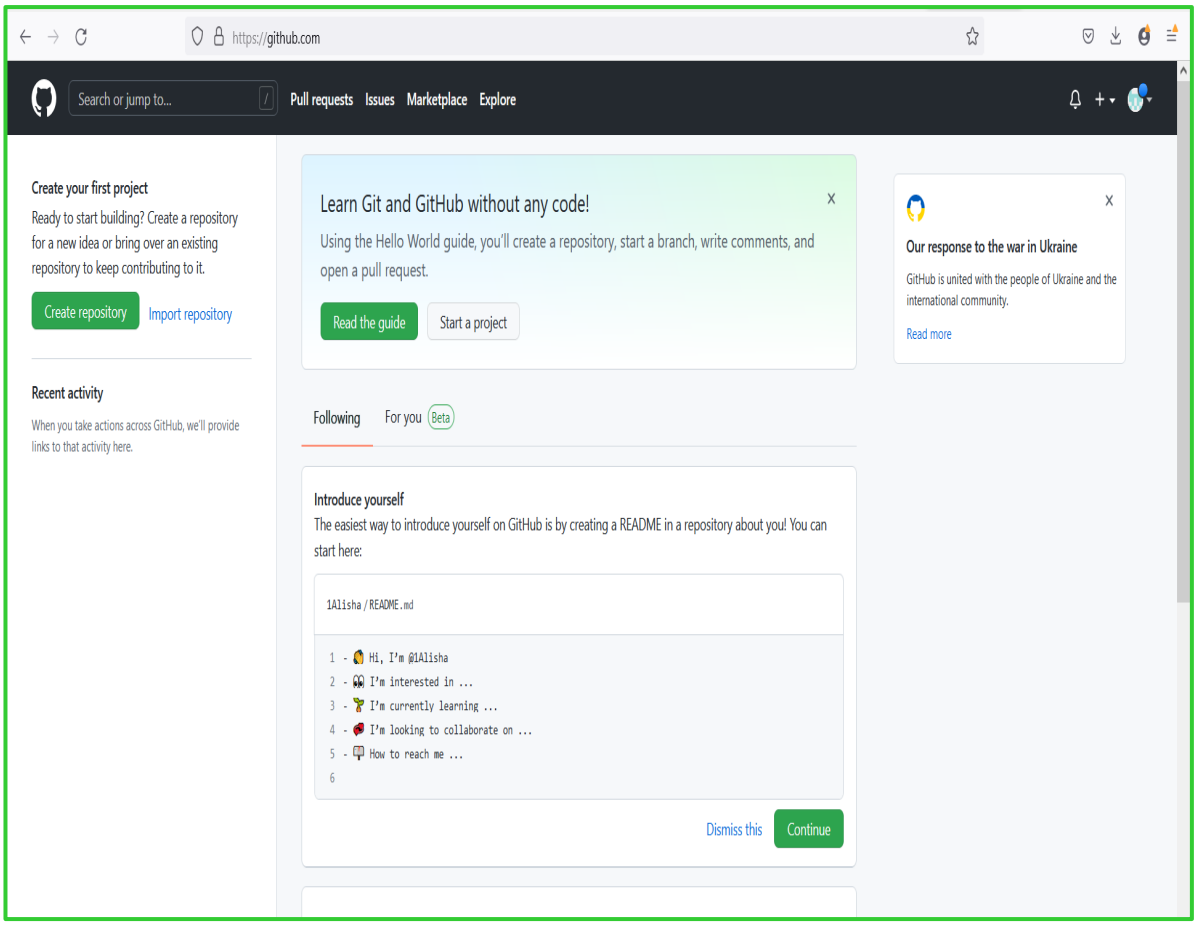


❖ **Select your preferences and click Submit**



❖ GitHub Account Dashboard

➢ Now that the GitHub account is all set up, you can log in through your credentials on the ***GitHub's website***.



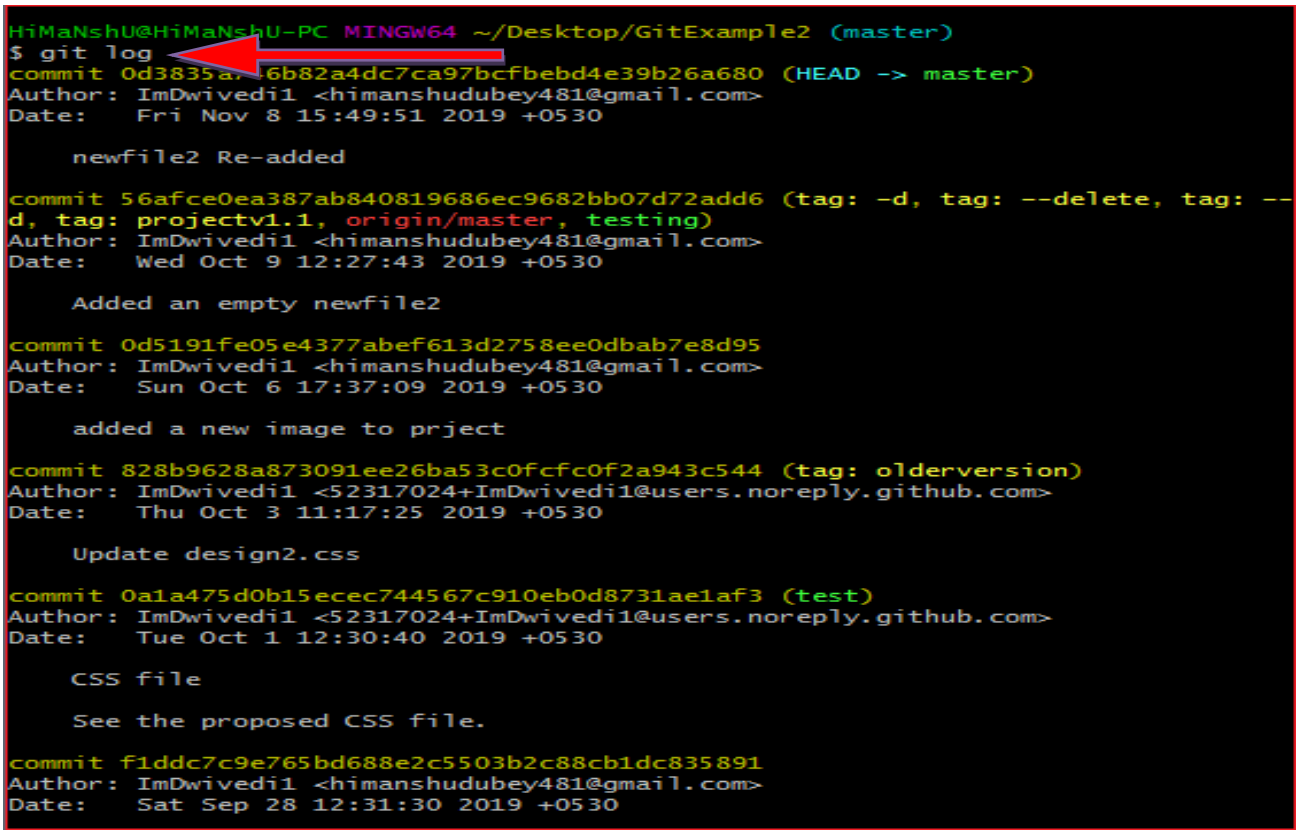
Aim: *Program* to generate logs

Description:

- Git log is a utility tool to review and read a history of everything that happens to a repository. Multiple options can be used with a git log to make history more specific.
- The basic git log command will display the most recent commits and the status of the head. It will use as:

```
$ git log
```

- The above command will display the last commits. Consider the below output:



The above command is listing all the recent commits. Each commit contains some unique sha-id, which is generated by the SHA algorithm. It also includes the date, time, author, and some additional details.

git init

Initializes a new git repository. If we want control to place a project under revision control, this the first command we need to learn.

git config

A convinent way to set configuration options for git installation.

Set your global username/email configuration

Open Git Bash and begin creating a username and email for working on Git Bash.

Set your username:

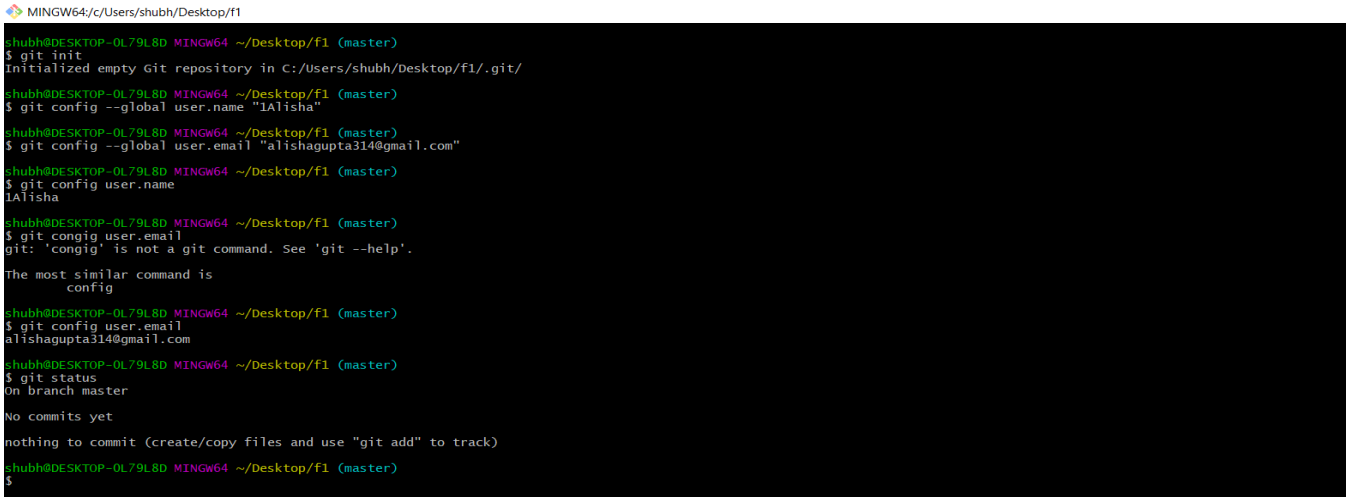
git config --global user.name "FIRST_NAME LAST_NAME"

Set your email address:

git config --global user.email "MY_NAME@example.com"

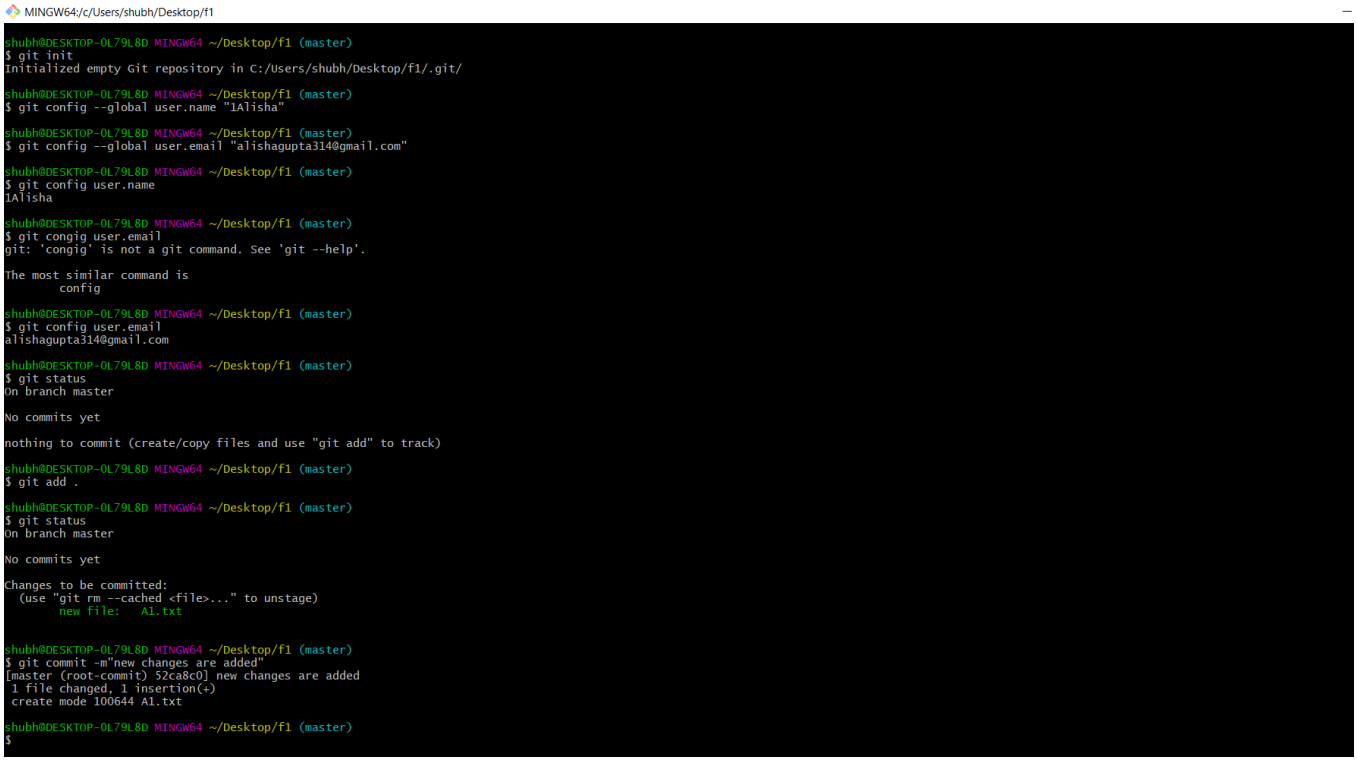
git status

Displays the state of the working directory and the staged snapshot .

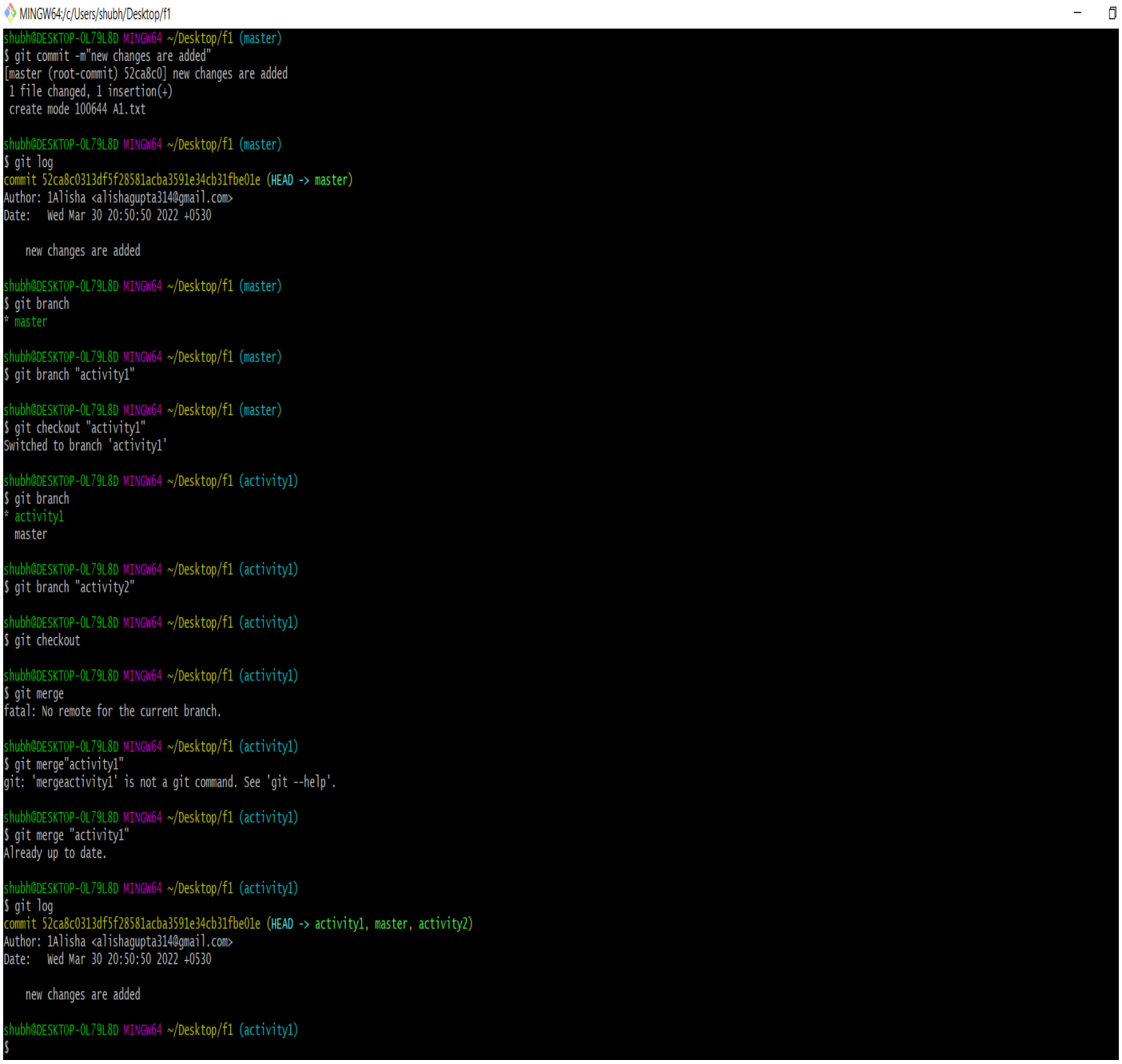


git add

Moves changes from the working directory to the staging area.



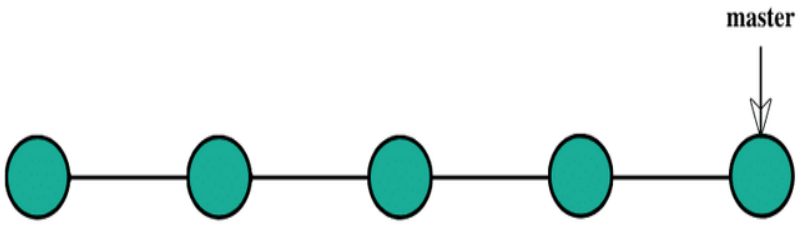
git log


MINGW64:/c/Users/shubh/Desktop/f1
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (master)
$ git commit -m"new changes are added"
[master (root-commit) 52ca8c0] new changes are added
1 file changed, 1 insertion(+)
create mode 100644 A1.txt
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (master)
$ git log
commit 52ca8c0313df5f28581acba3591e34cb31fbe01e (HEAD -> master)
Author: 1Alisha <alishagupta314@gmail.com>
Date: Wed Mar 30 20:50:50 2022 +0530
new changes are added
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (master)
$ git branch
* master
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (master)
$ git branch "activity1"
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (master)
$ git checkout "activity1"
Switched to branch 'activity1'
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (activity1)
$ git branch
* activity1
master
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (activity1)
$ git branch "activity2"
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (activity1)
$ git checkout
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (activity1)
$ git merge
fatal: No remote for the current branch.
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (activity1)
$ git merge"activity1"
git: 'mergeactivity1' is not a git command. See 'git --help'.
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (activity1)
$ git merge "activity1"
Already up to date.
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (activity1)
$ git log
commit 52ca8c0313df5f28581acba3591e34cb31fbe01e (HEAD -> activity1, master, activity2)
Author: 1Alisha <alishagupta314@gmail.com>
Date: Wed Mar 30 20:50:50 2022 +0530
new changes are added
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (activity1)
$

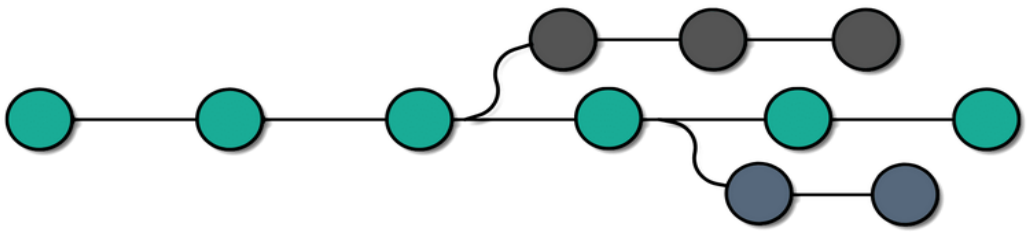
Aim: Create and Visualize branches

Description:

Suppose if a team is working on a project and a branch is created for every member working on the project.
Hence every member will work on their branches hence every time the best branch is merged to the master branch of the project.
The branching makes it version controlling system and makes it very easy to maintain a project source code.
The primary or default branch in Git is the master branch (similar to a trunk of the tree). As soon as the repository creates, so does the main branch (*or the default branch*).



Branches give you the freedom to independently work on different modules (*not necessarily though*) and merge the modules when you finish developing them



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Syntax:

- List all of the branches in your repository

```
git branch
```

- Create a new branch

```
git branch branch_name
```

Navigating between Branches

To navigate between the branches **git checkout** is used.

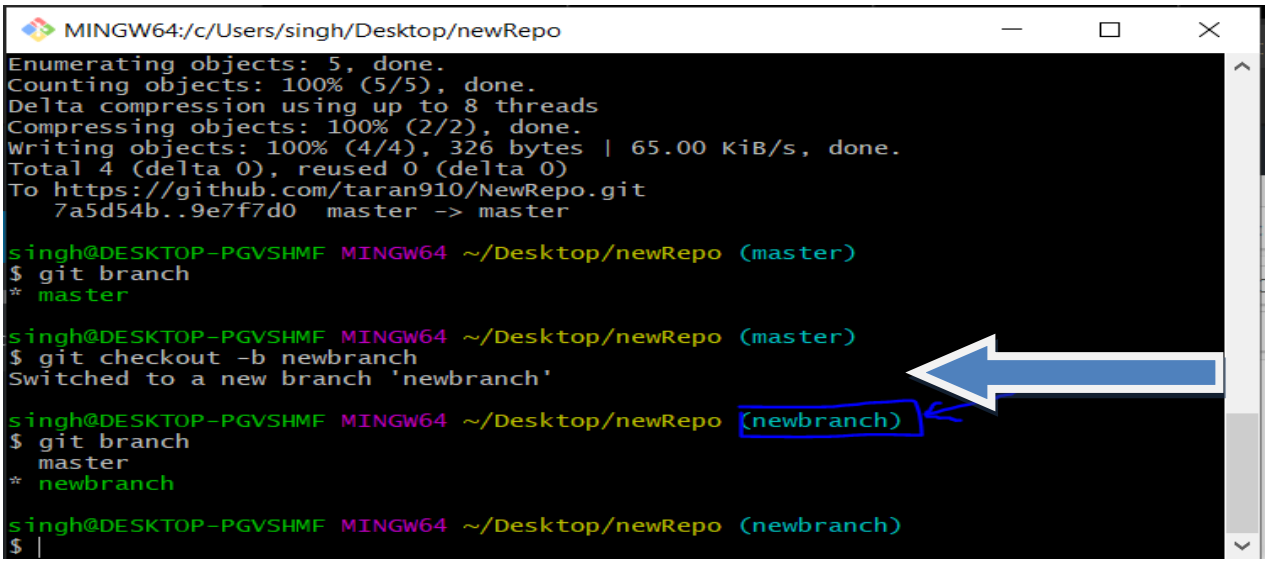
- To create a new branch and switch on it:

```
git checkout -b new_branch_name
```

- To simply switch to a branch

```
git checkout branch_name
```

After checkout to branch you can see a * on the current branch



Now the same **commit add** and **commit actions** can be performed on this branch also.

```
singh@DESKTOP-PGVSHMF MINGW64 ~/Desktop/newRepo (newbranch)
$ git add .

singh@DESKTOP-PGVSHMF MINGW64 ~/Desktop/newRepo (newbranch)
$ git commit -m "branch commit"
[newbranch 3eb93e9] branch commit
 1 file changed, 1 insertion(+)
 create mode 100644 branch file.txt
```

Merge any two branches

To merge a branch in any branch:

- First reach to the target branch

```
git checkout branch_name
```

- Merge the branch to target branch

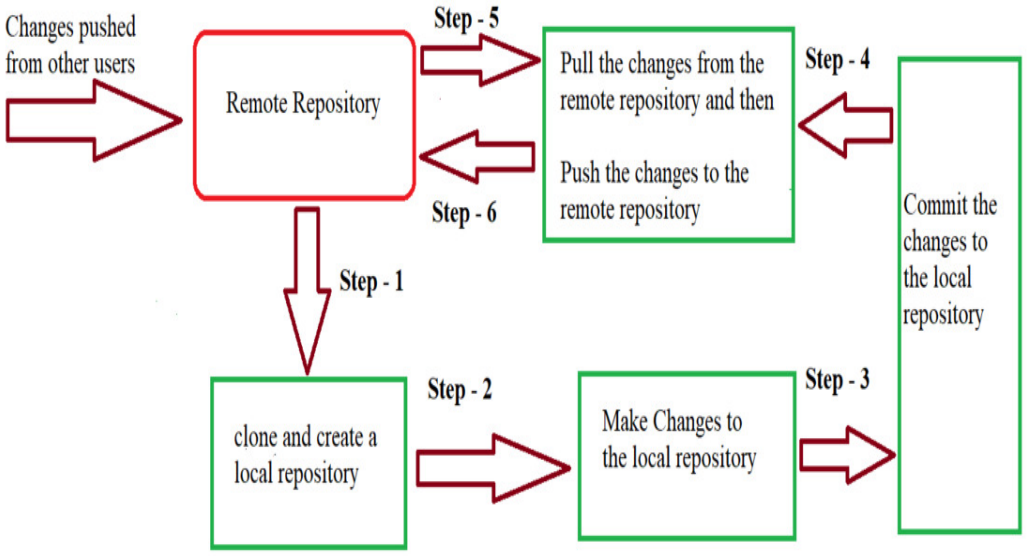
```
git merge new_branch
```

```
singh@DESKTOP-PGVSHMF MINGW64 ~/Desktop/newRepo (newbranch)
$ git checkout master
Switched to branch 'master'

singh@DESKTOP-PGVSHMF MINGW64 ~/Desktop/newRepo (master)
$ git merge newbranch
Updating 9e7f7d0..3eb93e9
Fast-forward
 branch file.txt | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 branch file.txt

singh@DESKTOP-PGVSHMF MINGW64 ~/Desktop/newRepo (master)
$
```

Aim: GIT lifecycle Description

Description :

- Git is used in our day-to-day work, we use git for keeping a track of our files,
- Let us look at the Life Cycle that git has and understand more about its life cycle.
- Let us see some of the basic steps that we follow while working with Git –



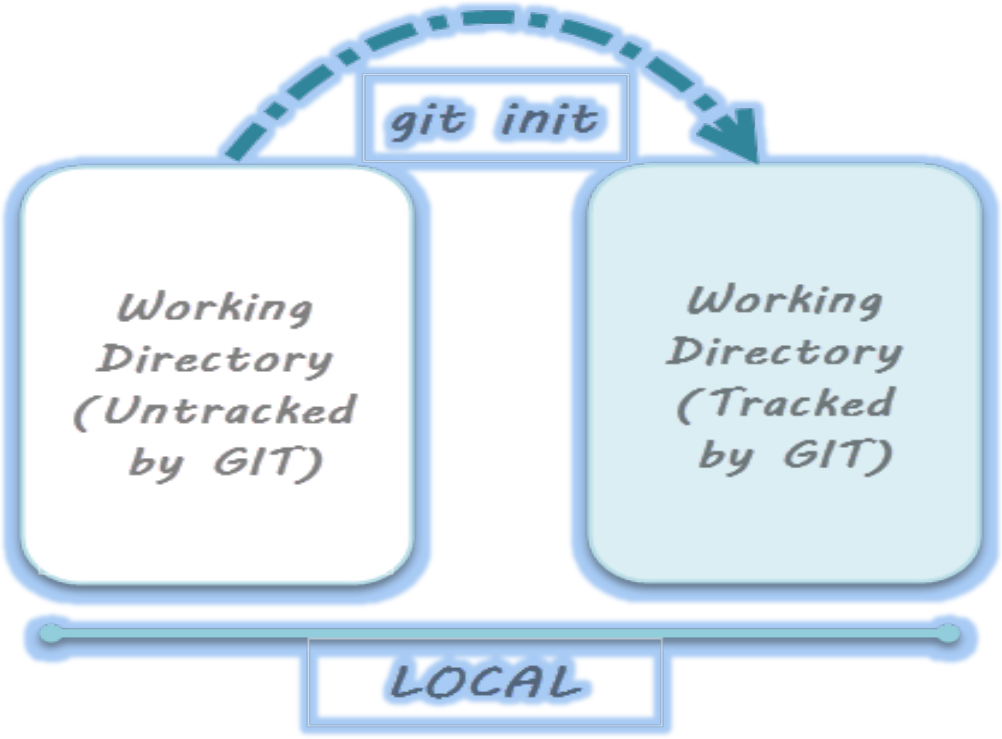
- ***In Step – 1****, We first clone any of the code residing in the remote repository t o make our won local repository.*
- ***In Step-2*** *we edit the files that we have cloned in our local repository and ma ke the necessary changes in it.*
- ***In Step-3*** *we commit our changes by first adding them to our staging area an d committing them with a commit message.*
- ***In Step – 4 and Step-5*** *we first check whether there are any of the changes d one in the remote repository by some other users and we first pull that chan ges.*
- *If there are no changes we directly proceed with* ***Step – 6*** *in which we push o ur changes to the remote repository and we are done with our work.*

When a directory is made a git repository, there are mainly 3 states which make the essence of Git Version Control System. The three states are –

- Working Directory
- Staging area
- GIT Directory

Working Directory

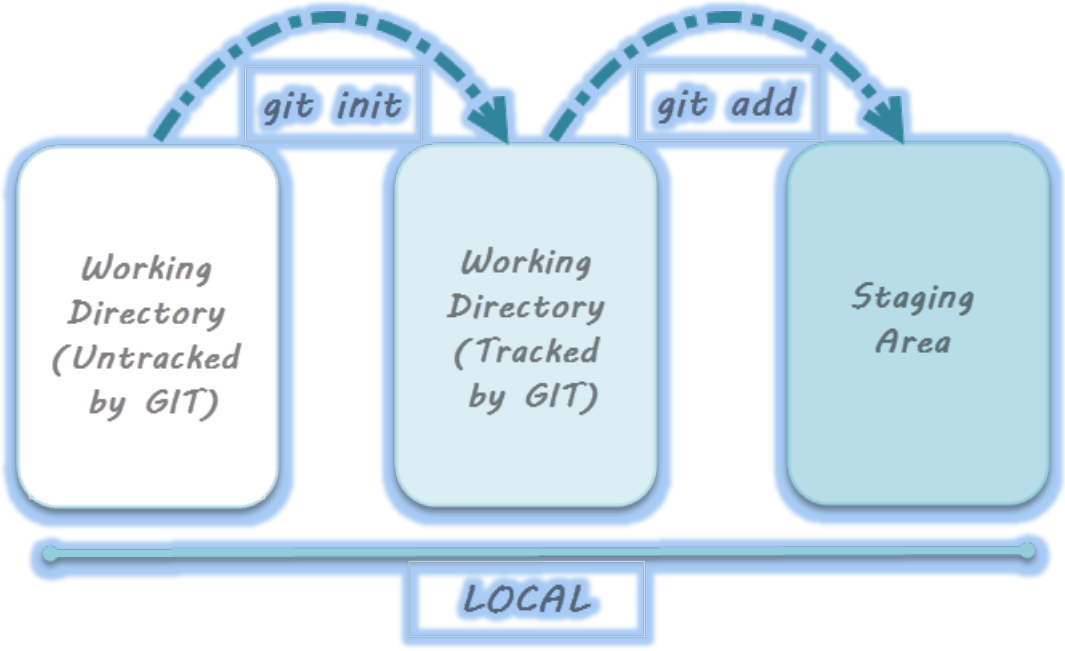
- Whenever we want to initialize our local project directory to make it a git repository, we use the ***git init*** command.
- After this command, git becomes aware of the files in the project although it doesn't track the files yet.
- The files are further tracked in the staging area.



Staging Area

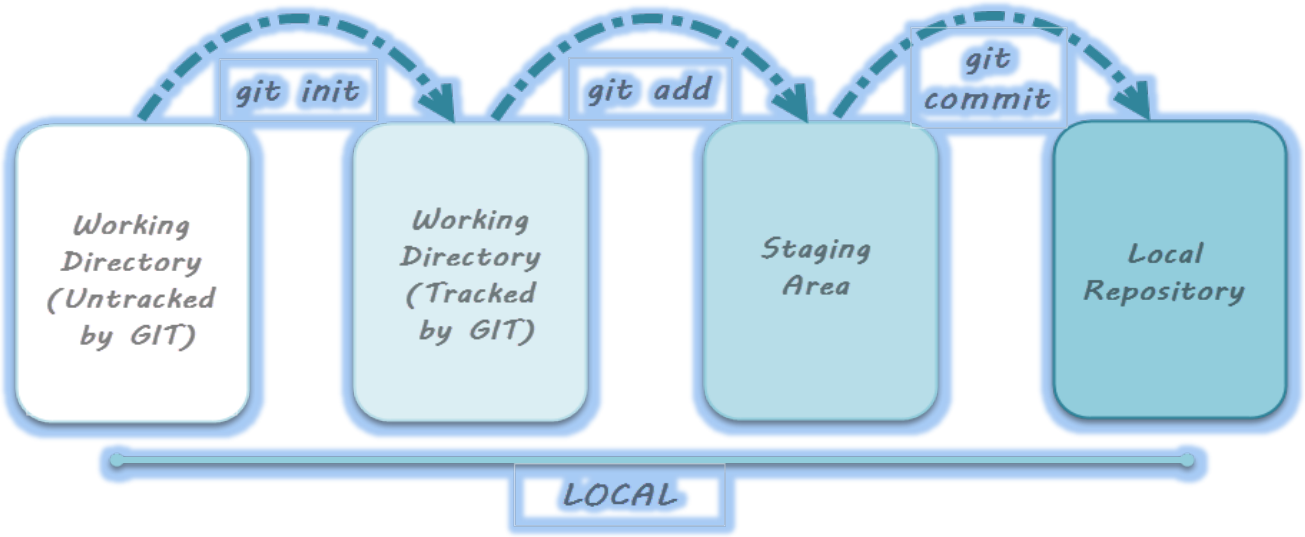
Now, to track the different versions of our files we use the command ***git add*** which copies the version of your file from your working directory to the staging area.

```
// to specify which file to add to the staging area

git add <filename>

// to add all files of the working directory to the stag
ing area

git add .
```

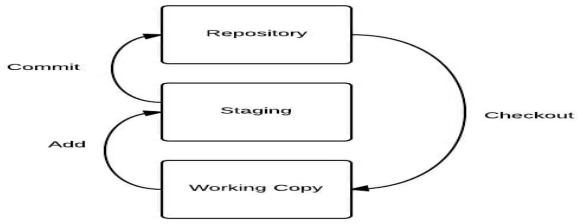


3. Git Directory

Now since we have all the files that are to be tracked and are ready in the staging area, we are ready to commit our files using the ***git commit*** command.



- So, we commit this group of files along with a commit message explaining what is the commit about.
- Now, a snapshot of the files in the commit is recorded by Git.
- The information related to this commit (*names of files committed, date and time of* commit, author of commit, commit message*) is stored in the Git directory.*
- Thus, Git directory is the database where metadata about project files' history will be tracked.



(Reference from the site: https://www.toolsqa.com/git/merge-branch-in-git/)

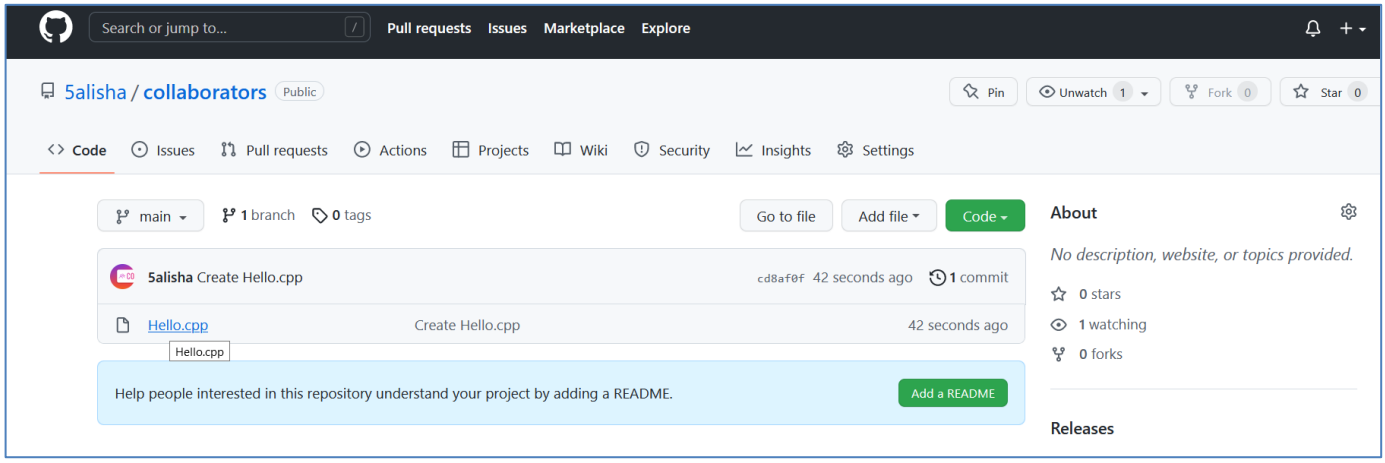
Aim: Add collaborators on Github Repository

Description:

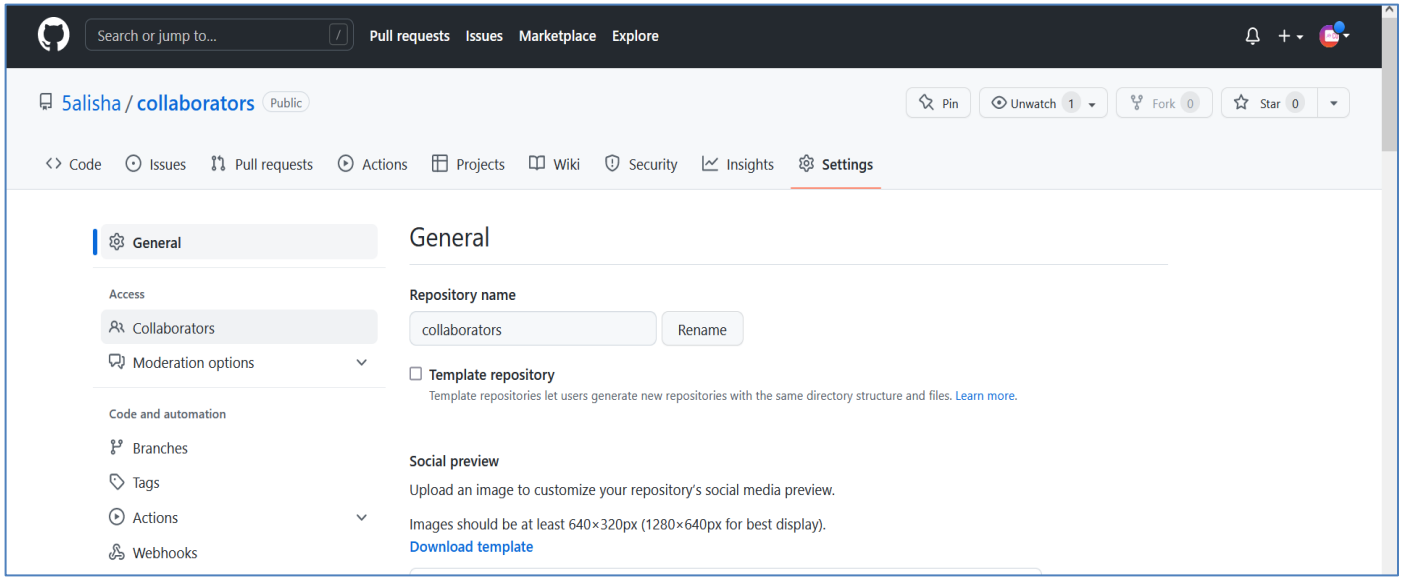
Collaboration is the way different people can work on the same project together. It is like creating a group in GitHub just like Groups in other social media. The people added to the collaborator's list can be able to push, merge, and do other kinds of similar things on the project.

Steps:

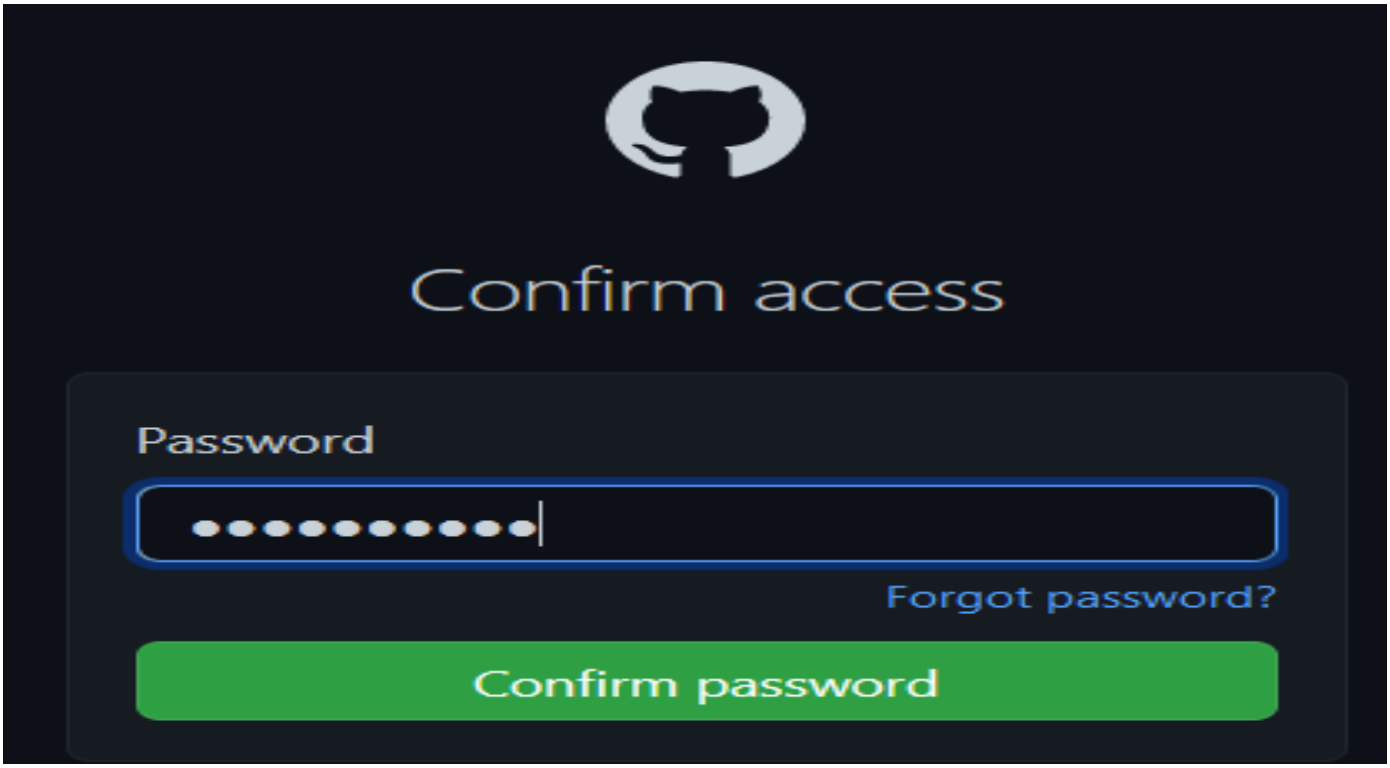
- Ask for the username of the person you're inviting as a collaborator. If they don't have a username yet, they can sign up for GitHub
- On GitHub.com, navigate to the main page of the repository.



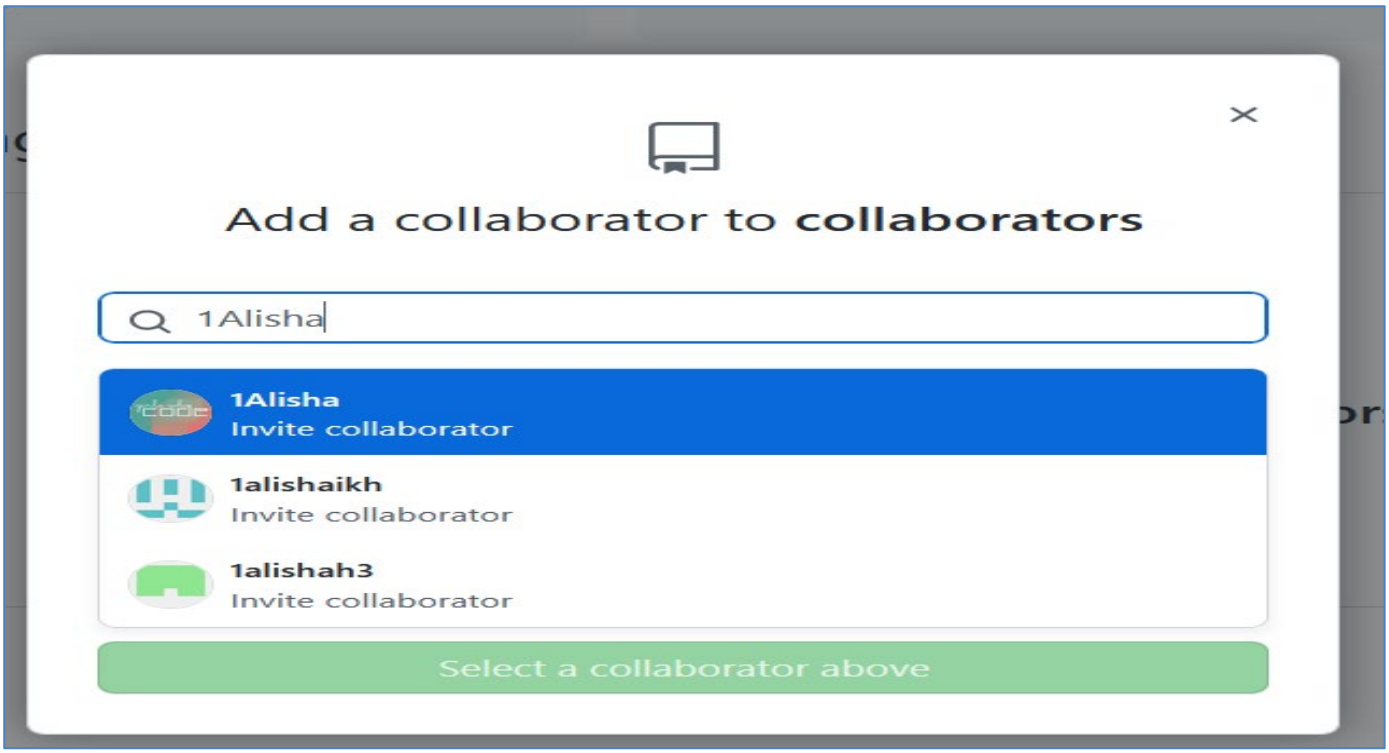
- Under your repository name, click **Settings**. In the "Access" section of the sidebar, click **Collaborators**



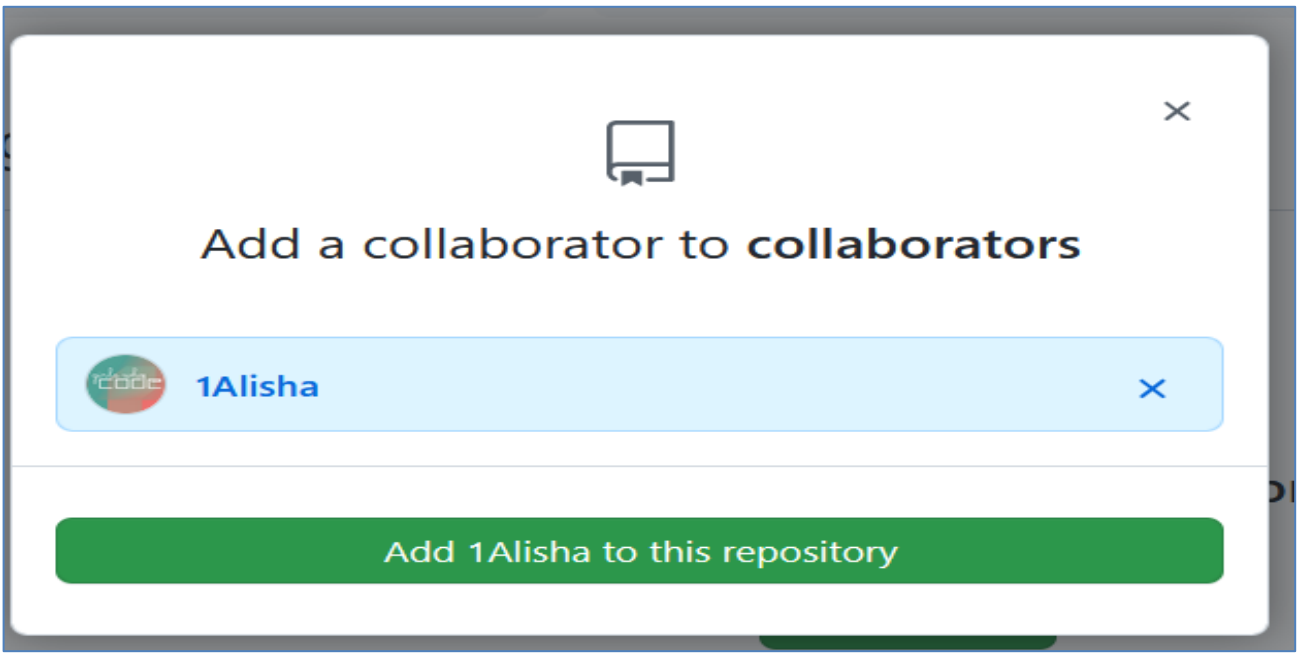
- Then a confirm password page may appear, enter your password for the confirmation.



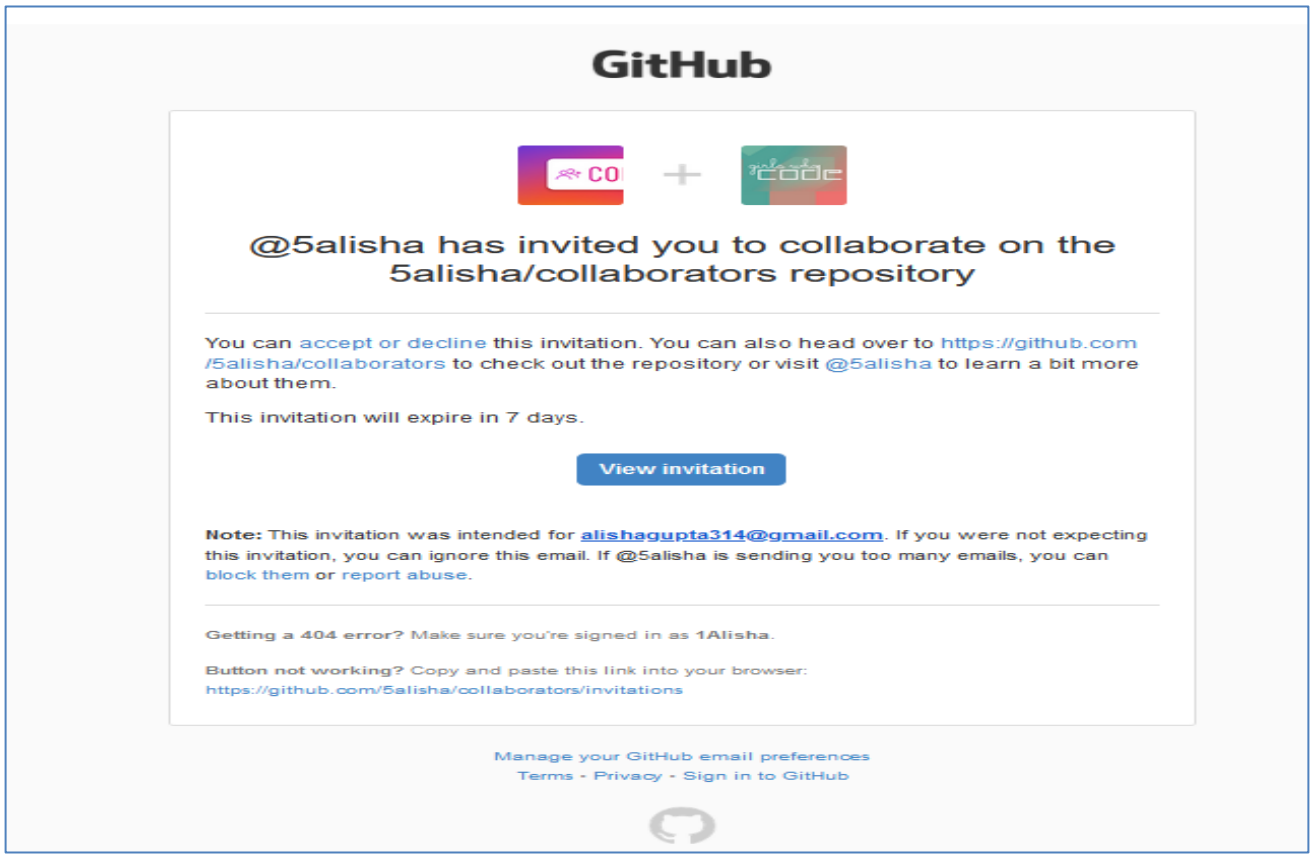
- Click **Invite a collaborator**. In the search field, start typing the name of person you want to invite, then click a name in the list of matches.



- Click **Add NAME to REPOSITORY**.



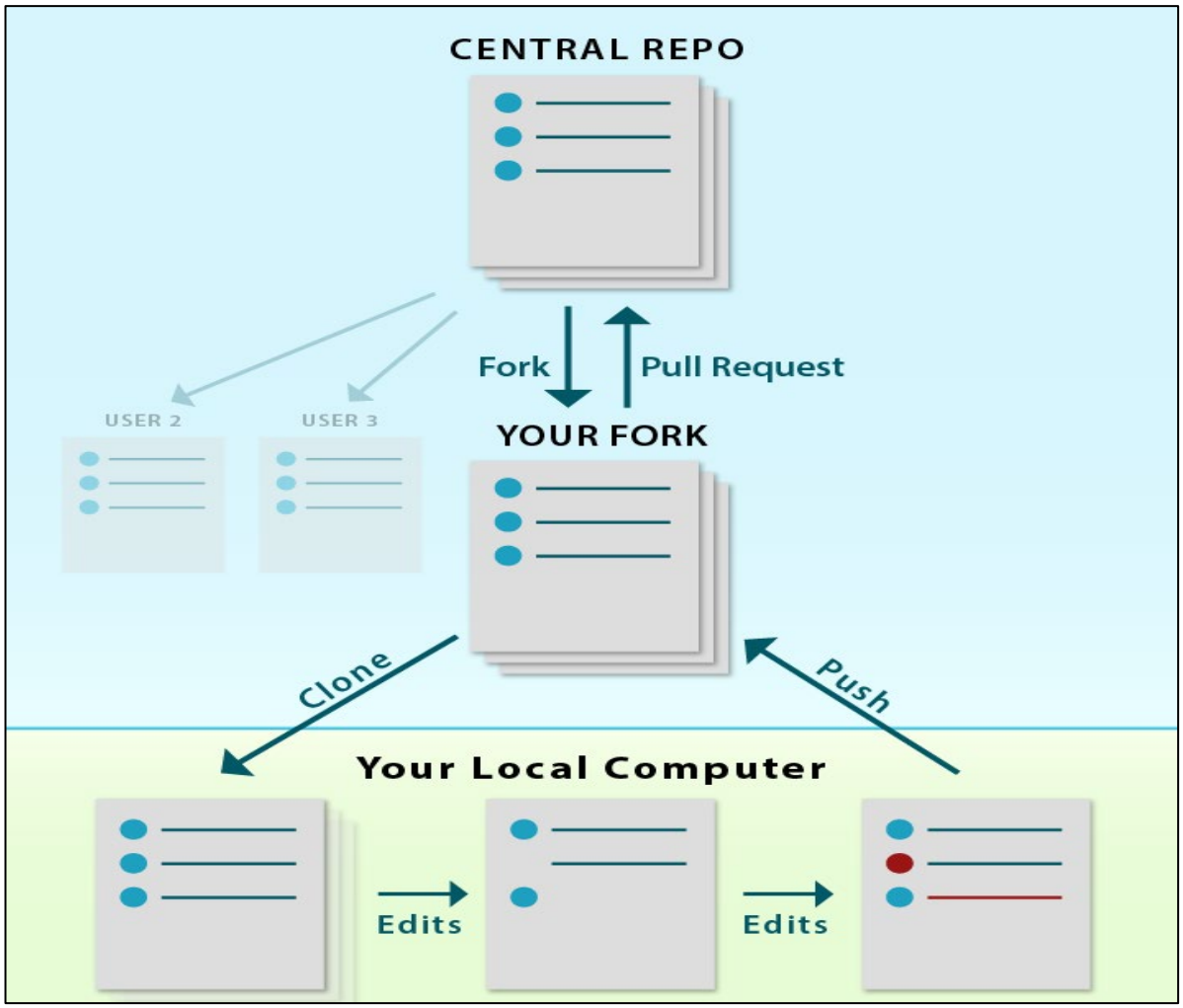
- The user will receive an email inviting them to the repository. Once invitation is accepted , the user will have collaborator access to the repository.



Aim: Fork and commit

Description:

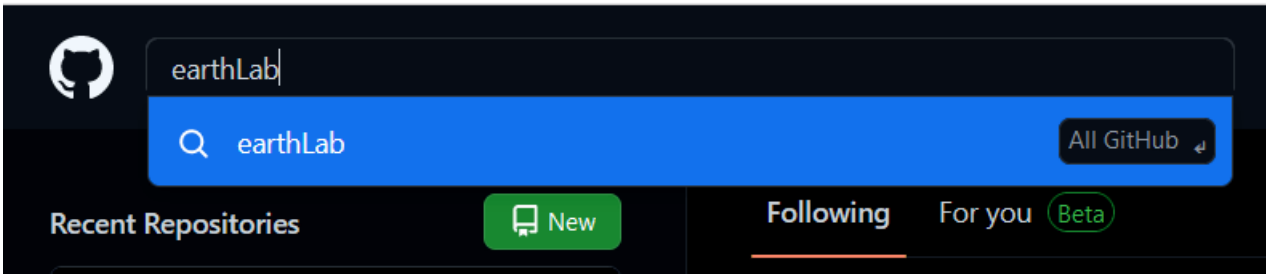
- When a repository is forked, an exact copy of the repository is made in user's account. Thus, user can freely modify it as he/she wishes. The forking workflow is simple to learn and let' get started.
- Forking is an excellent tool for copying source code from someone's repository to your repository and contributing to it. The forking workflow is simple to learn and let' get started.



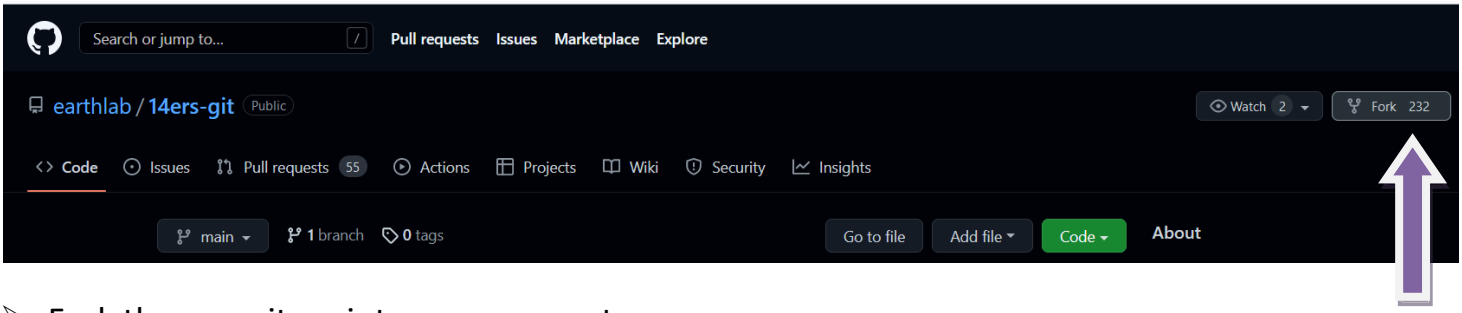
Steps to be followed:

- On the github.com website, login to your github account.

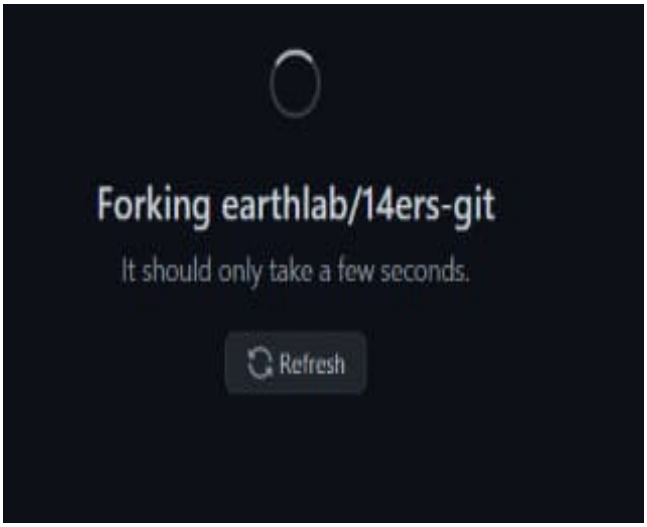
- Navigate to desired repository that you want to fork.

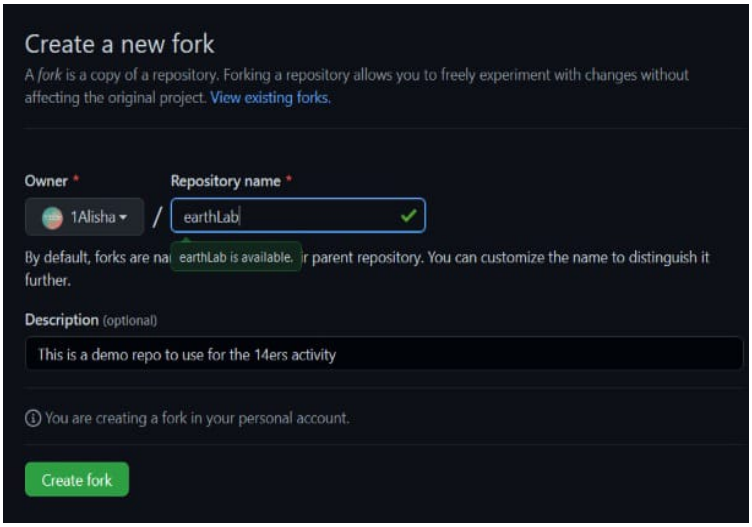


- Click fork button.

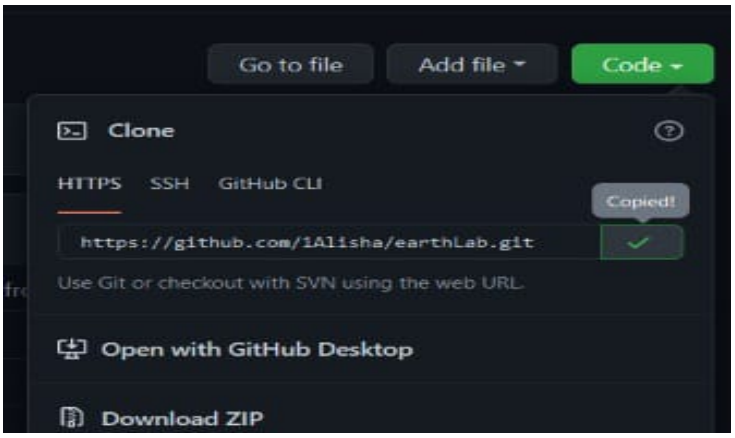


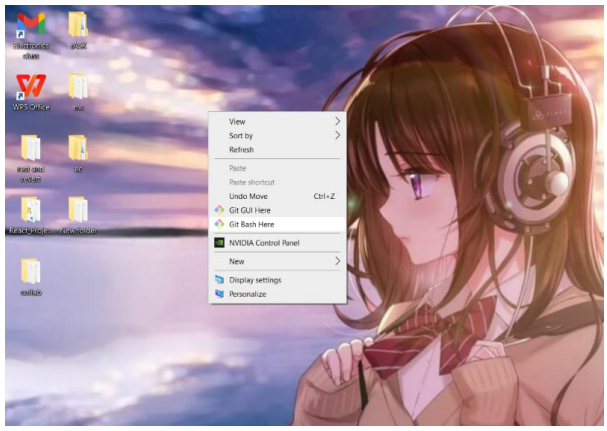
- Fork the repository into your account.





- Clone the fork of your repository, so that you can edit the contents locally.



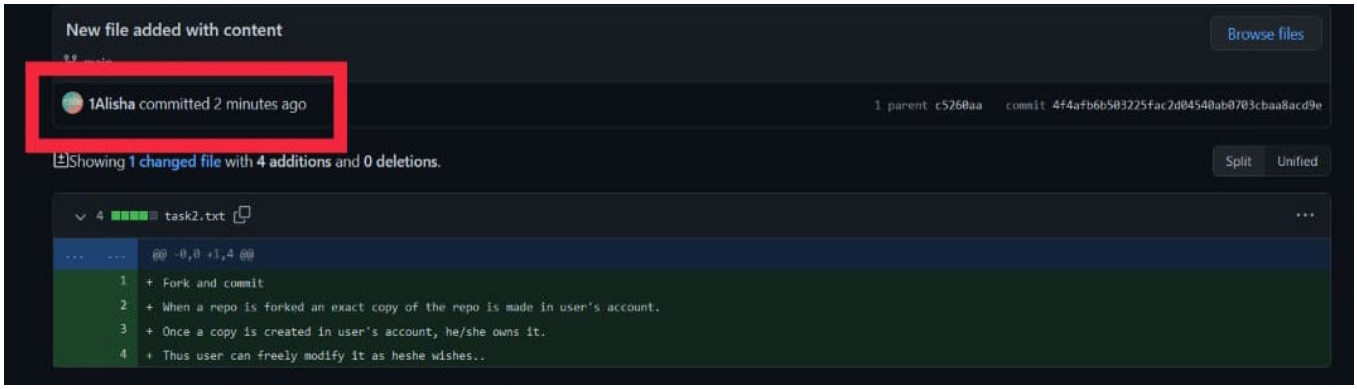


- Cloning the "earthLab" repository into Desktop folder.

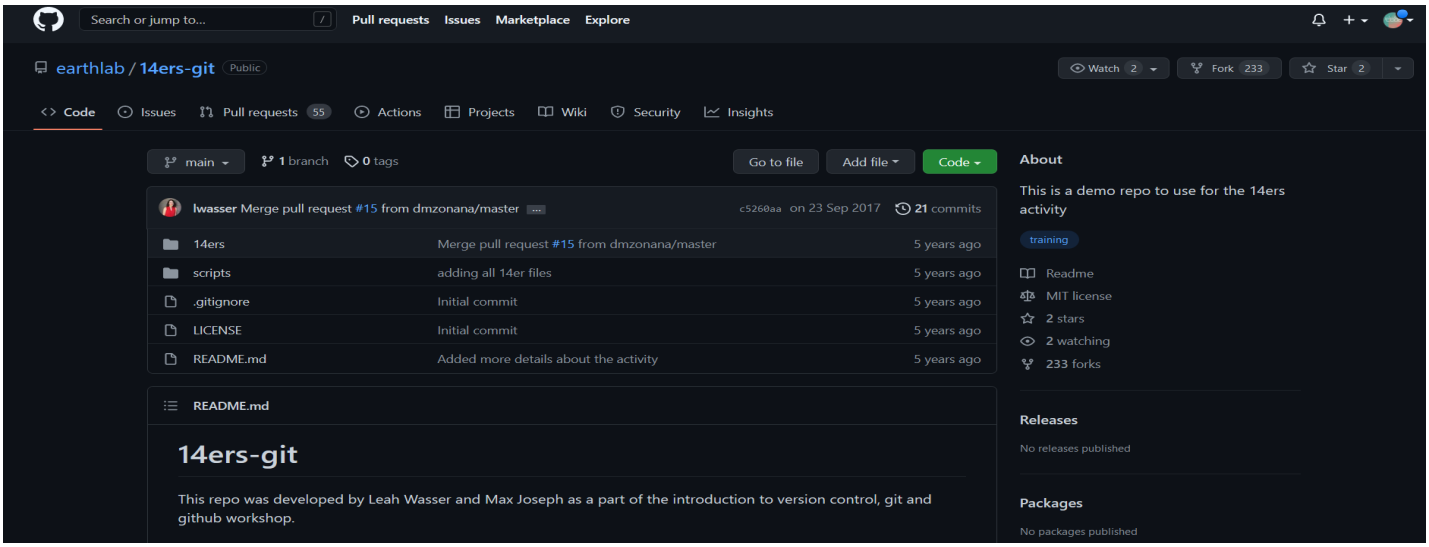
```
MINGW64:/c/Users/shubh/Desktop/earthLab

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop (master)
$ git clone https://github.com/1Alisha/earthLab.git
Cloning into 'earthLab'...
remote: Enumerating objects: 72, done.
remote: Counting objects: 100% (25/25), done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 72 (delta 19), reused 19 (delta 19), pack-reused 47
Receiving objects: 100% (72/72), 9.98 KiB | 123.00 KiB/s, done.
Resolving deltas: 100% (35/35), done.

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop (master)
$ cd earthLab

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/earthLab (main)
```

- Make edits to your local cloned copy of the repository on your computer.
- Add, Commit , Push those edits back to your fork on github, go on github ,we see that repository has a new commit

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/earthLab (main)
$ git status
On branch main
Your branch is ahead of 'origin/main' by 1 commit.
  (use "git push" to publish your local commits)

nothing to commit, working tree clean

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/earthLab (main)
$ git remote
origin

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/earthLab (main)
$ git push -u origin main
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 416 bytes | 416.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/1Alisha/earthLab.git
   c5260aa..4f4afb6  main -> main
branch 'main' set up to track 'origin/main'.
```



- Suggest the changes that you made, to be added to the earthLab Central repository using a pull request if it accepts the request then the changes will be reflected in the central repository otherwise it will not be .
- Here , we have not suggested the changes to the earthLab repo, so no changes will be reflected in it.



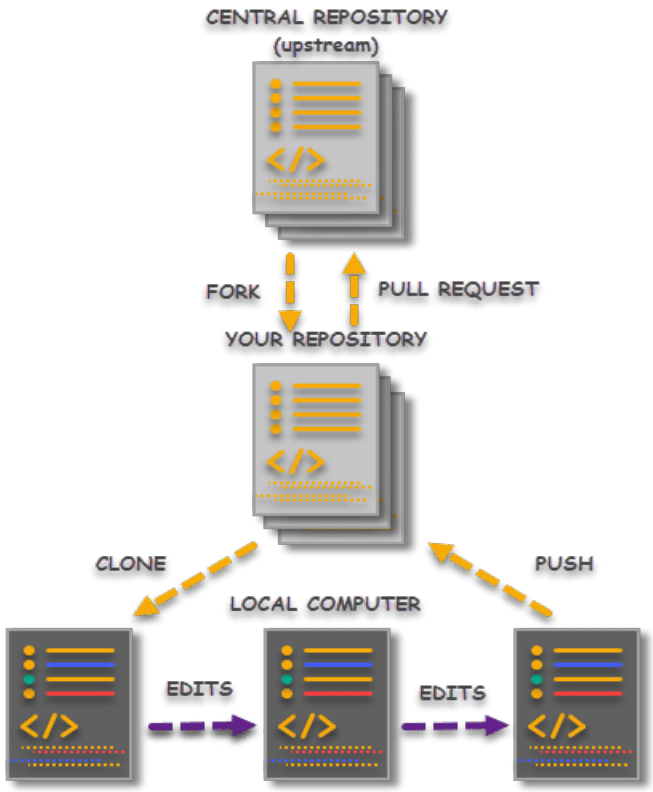
Tips:

- User can change the name of the forked repository and it will still be connected to the central repository from which it was forked.
- If the user modifies his/her forked repository, the changes will not be reflected in the central repository until user merge his/her fork with the central repository.

Updating your fork:

It may happen that while you are editing your fork ,other changes are made to the original repository. To fetch These changes into your fork, use these commands in your fork workspace

- Add the original repository as remote repository called “upstream”
- Fetch all the changes from the upstream repository
- Switch to the master branch of your fork
- Merge changes from the upstream repository into your fork



Note: Both git fork and clone creates copies of a repository, but they offer drastically different levels of access, isolation & control over the target repository.

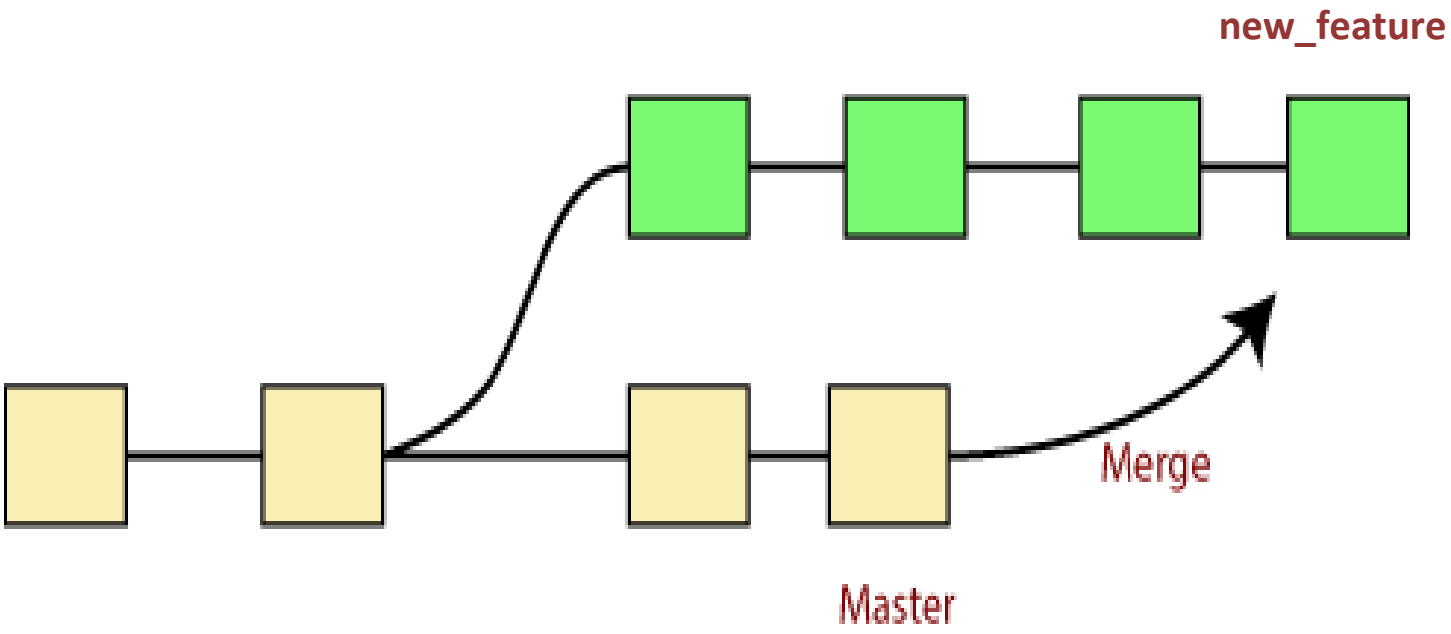
Aim: Merge conflict created due to own activity

Description:

A merge conflict is an event that takes place when Git is unable to automatically resolve differences in code between two commits. Git can merge the changes automatically only if the commits are on different lines or branches.The Git merge command combines separate branches and resolves any conflicting edits.

Let's understand with the help of following example:

- Here, we have two branches :
  - master
  - new_feature



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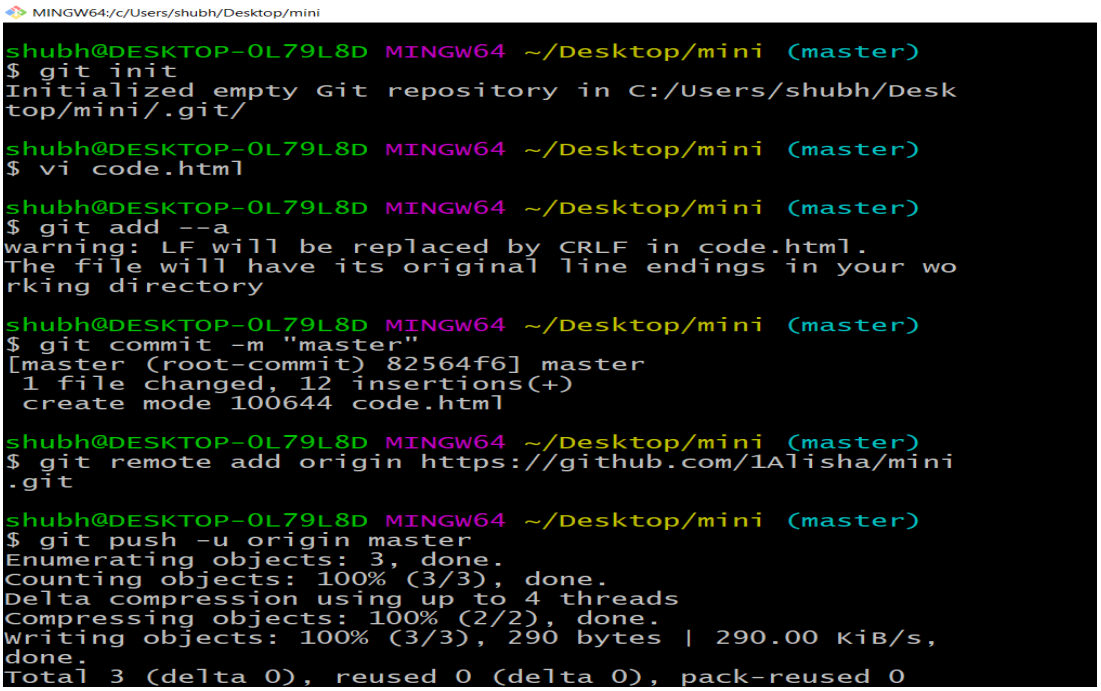
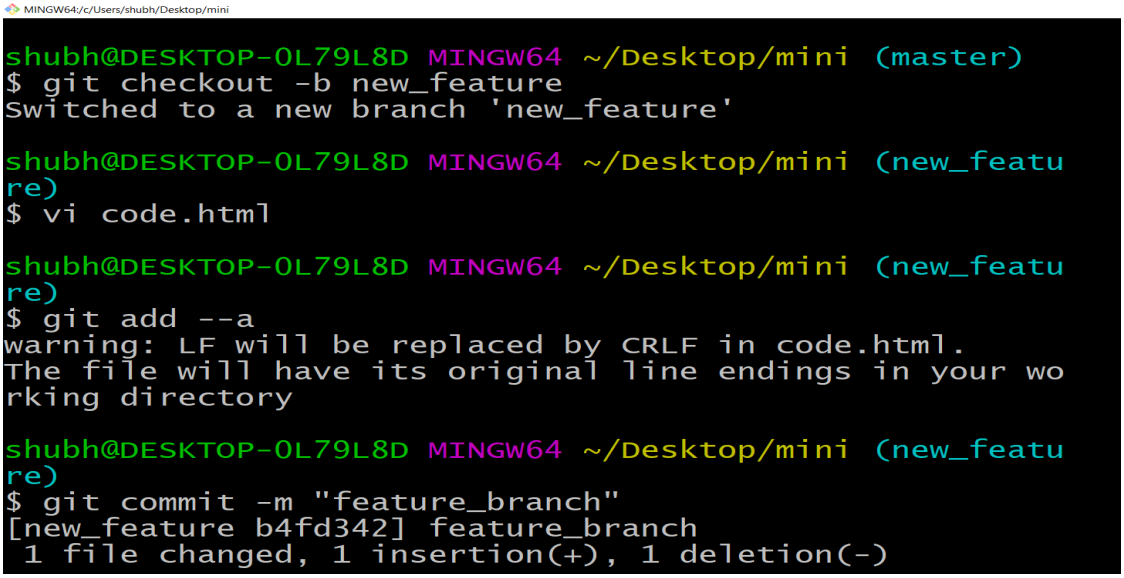
Steps to be followed to resolve merge conflicts created due to own activity:

- Initialized empty git repository
- Create a new file code.html and add content in it ; stage it and commit it.
- Push the changes on github.



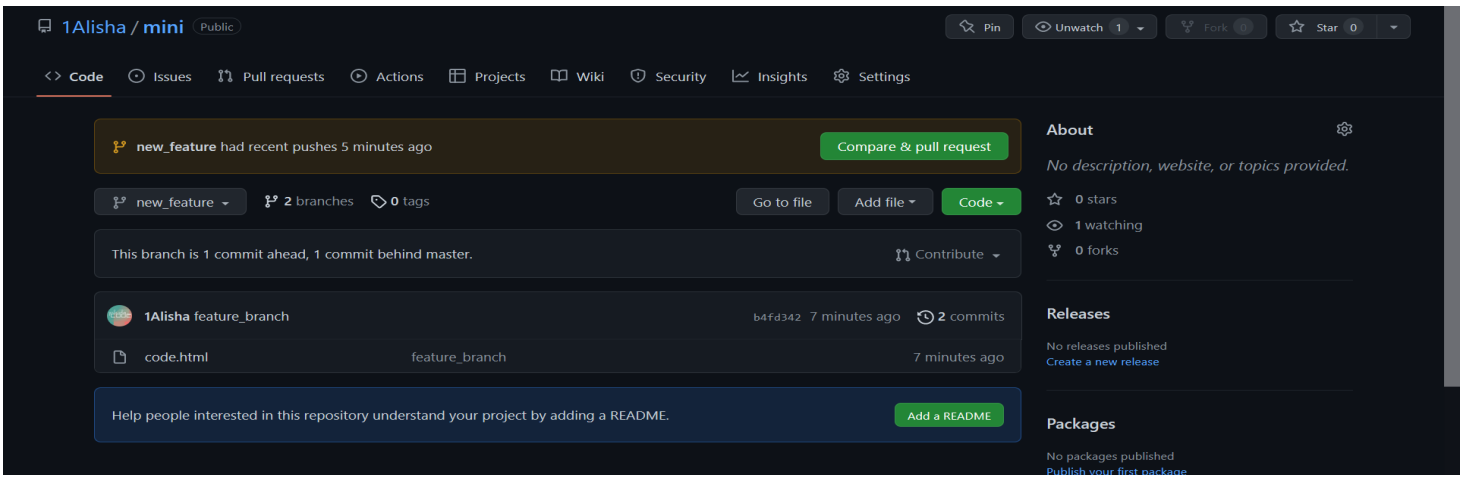
- Create a new branch(new_feature) and modify code.html & commit it.



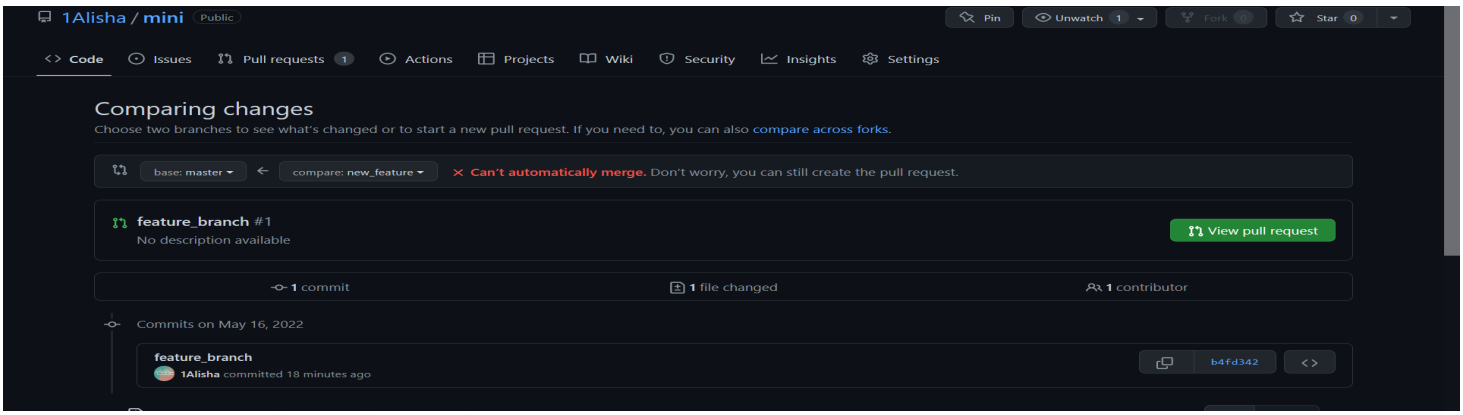
- Push the changes on github

```
MINGW64:/c/Users/shubh/Desktop/mini
shubh@DESKTOP-OL79L8D MINGW64 ~/Desktop/mini (new_featu
re)
$ git push -u origin new_feature
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 322 bytes | 322.00 KiB/s,
done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
remote:
remote: Create a pull request for 'new_feature' on GitH
ub by visiting:
remote:      https://github.com/1Alisha/mini/pull/new/n
ew_feature
remote:
To https://github.com/1Alisha/mini.git
 * [new branch]      new_feature -> new_feature
branch 'new_feature' set up to track 'origin/new_featur
e'.
```

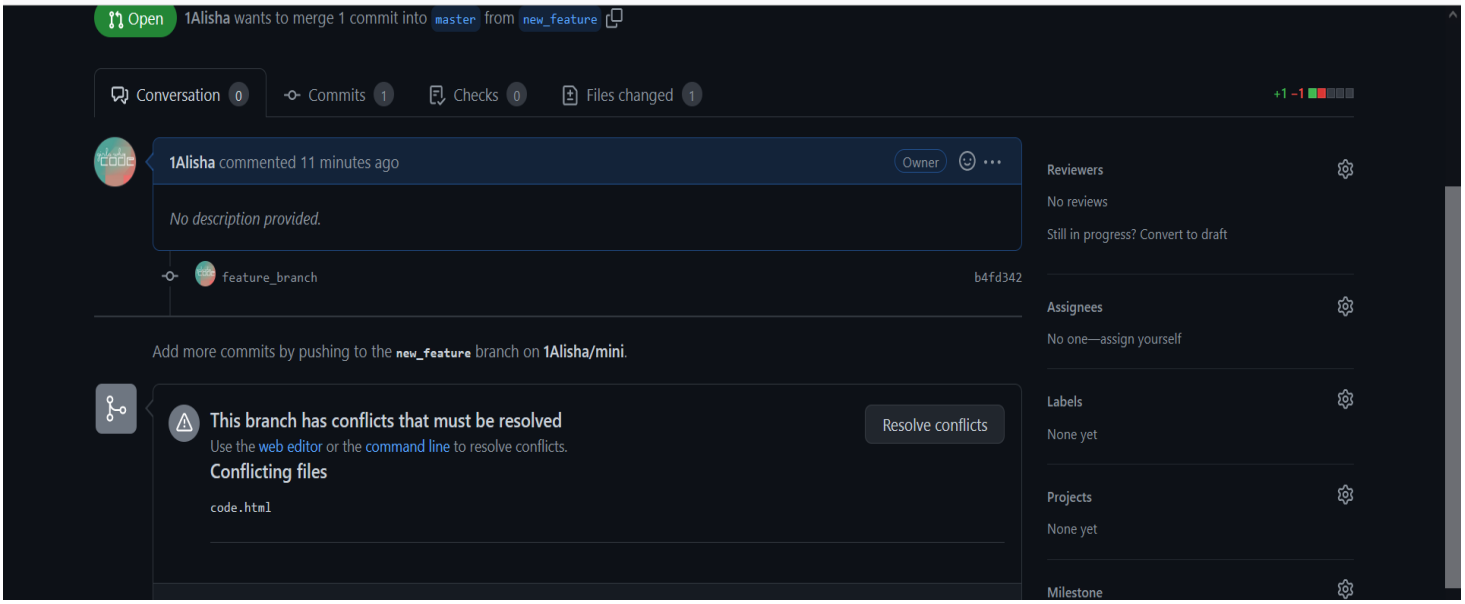
- On the github, we can see that new_feature branch had recent pushes 5 minutes ago.



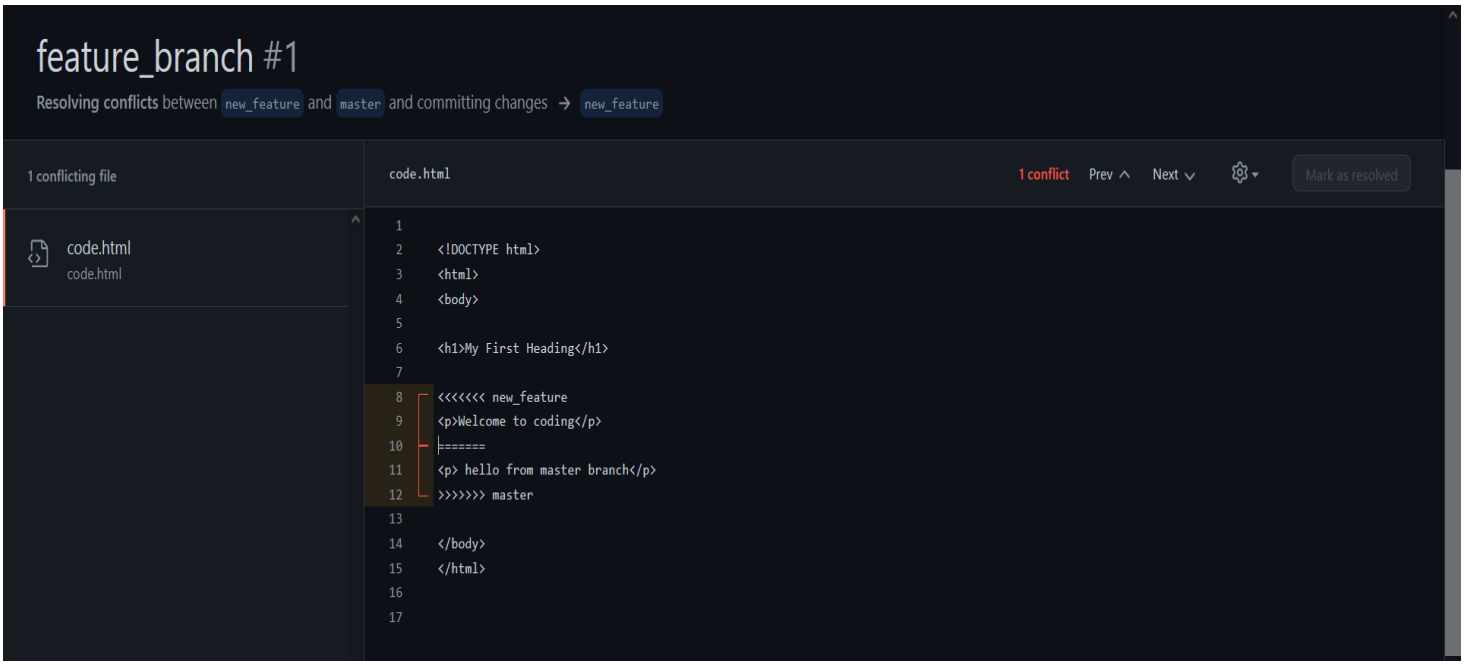
- Now, try to merge master branch and new_feature branch, it will show merge conflict



- This branch has conflicts that must be resolved for merging both branches.



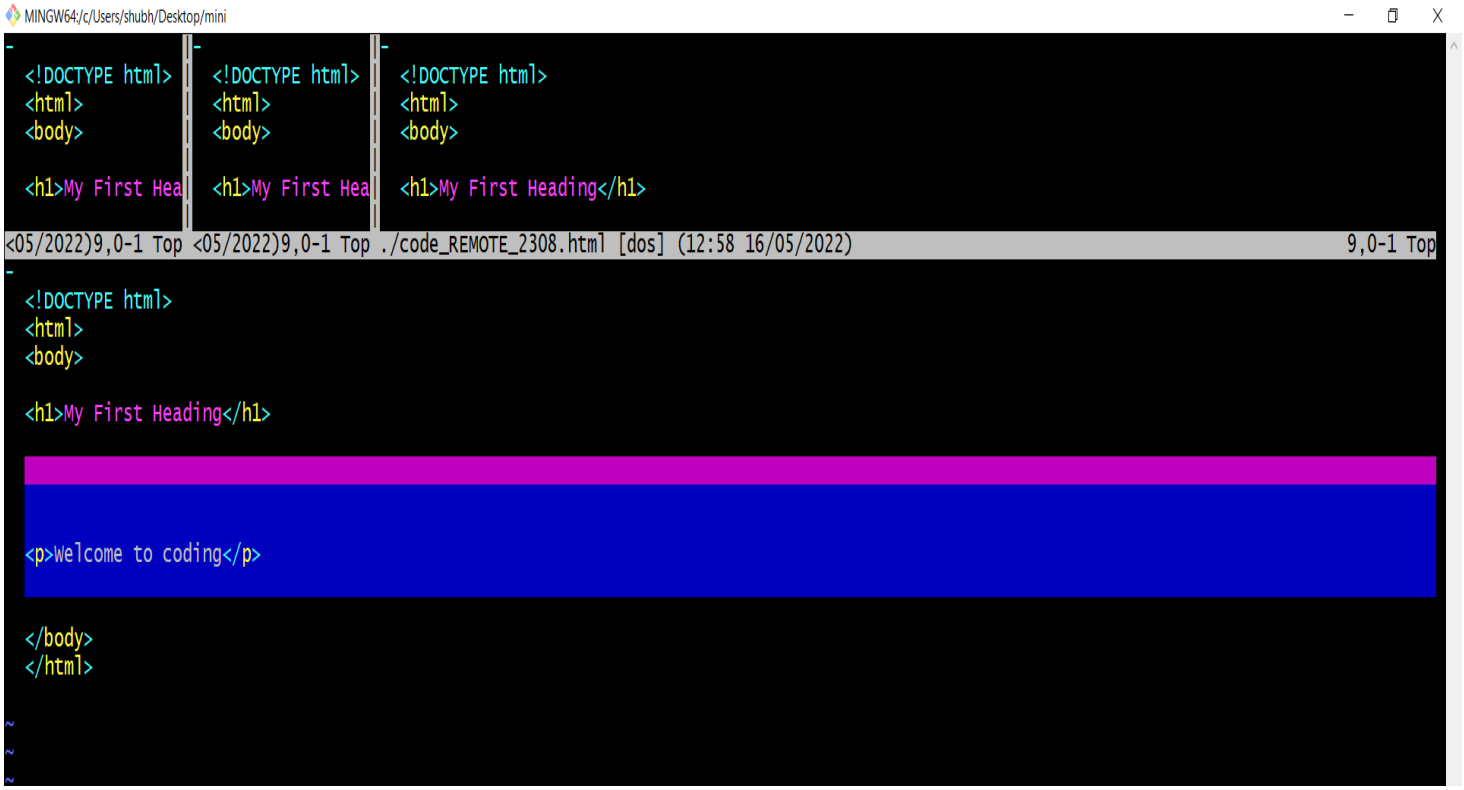
- Think of these new lines as "conflict dividers".
- The `=======` line is the "center" of the conflict.
- All the content between the center and the `<<<<<<< HEAD` line is content that exists in the current branch main which the `HEAD` ref is pointing to.
- Alternatively all content between the center and `>>>>>>> new_branch_to_merge_later` is content that is present in our merging branch.



- Let’s resolve the merge conflict on git bash using command “git mergetool”

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/mini (master)
$ git merge new_feature
Auto-merging code.html
CONFLICT (content): Merge conflict in code.html
Automatic merge failed; fix conflicts and then commit t
he result.

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/mini (master|ME
RGING)
$ git mergetool

This message is displayed because 'merge.tool' is not c
onfigured.
See 'git mergetool --tool-help' or 'git help config' fo
r more details.
'git mergetool' will now attempt to use one of the foll
owing tools:
opendiff kdiff3 tkdiff xxdiff meld tortoisemerge gvimdi
ff diffuse diffmerge ecmerge p4merge araxis bc codecomp
are smerge emerge vimdiff nvimdiff
Merging:
code.html

Normal merge conflict for 'code.html':
  {local}: modified file
  {remote}: modified file
Hit return to start merge resolution tool (vimdiff):
4 files to edit
```

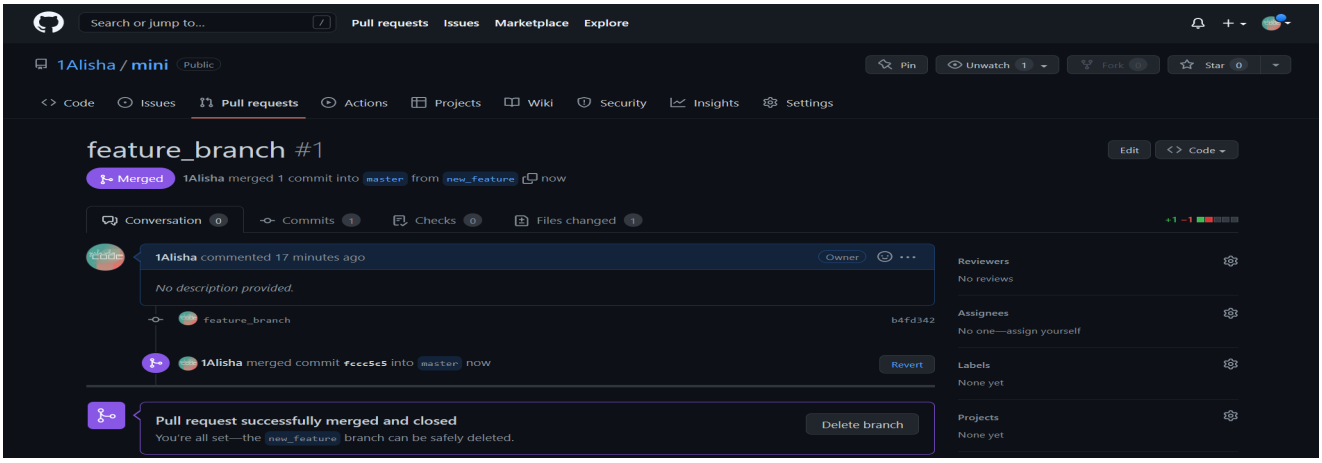
Using command “git mergetool” this window will open , here delete the content which you don’t want to keep using backspace key. Enter :wq to come out this window.



- After, editing the file using mergetool command, commit the changes and push them on github.

```
MINGW64:/c/Users/shubh/Desktop/mini
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/mini (master|MERGING)
$ git status
On branch master
Your branch is up to date with 'origin/master'.

All conflicts fixed but you are still merging.
  (use "git commit" to conclude merge)

Changes to be committed:
        modified:   code.html

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


shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/mini (master|MERGING)
$ git add --a

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/mini (master|MERGING)
$ git commit -m "merge conflict resolved"
[master fccc5c5] merge conflict resolved

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/mini (master)
$ git status
On branch master
Your branch is ahead of 'origin/master' by 2 commits.
  (use "git push" to publish your local commits)

nothing to commit, working tree clean
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/mini (master)
$ git push -u origin master
Enumerating objects: 8, done.
Counting objects: 100% (8/8), done.
Delta compression using up to 4 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 498 bytes | 498.00 KiB/s, done.
Total 4 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/1Alisha/mini.git
   b40d621..fccc5c5  master -> master
branch 'master' set up to track 'origin/master'.
```

- On the github, it is showing that 1Alisha merged 1 commit into master from new_feature branch.

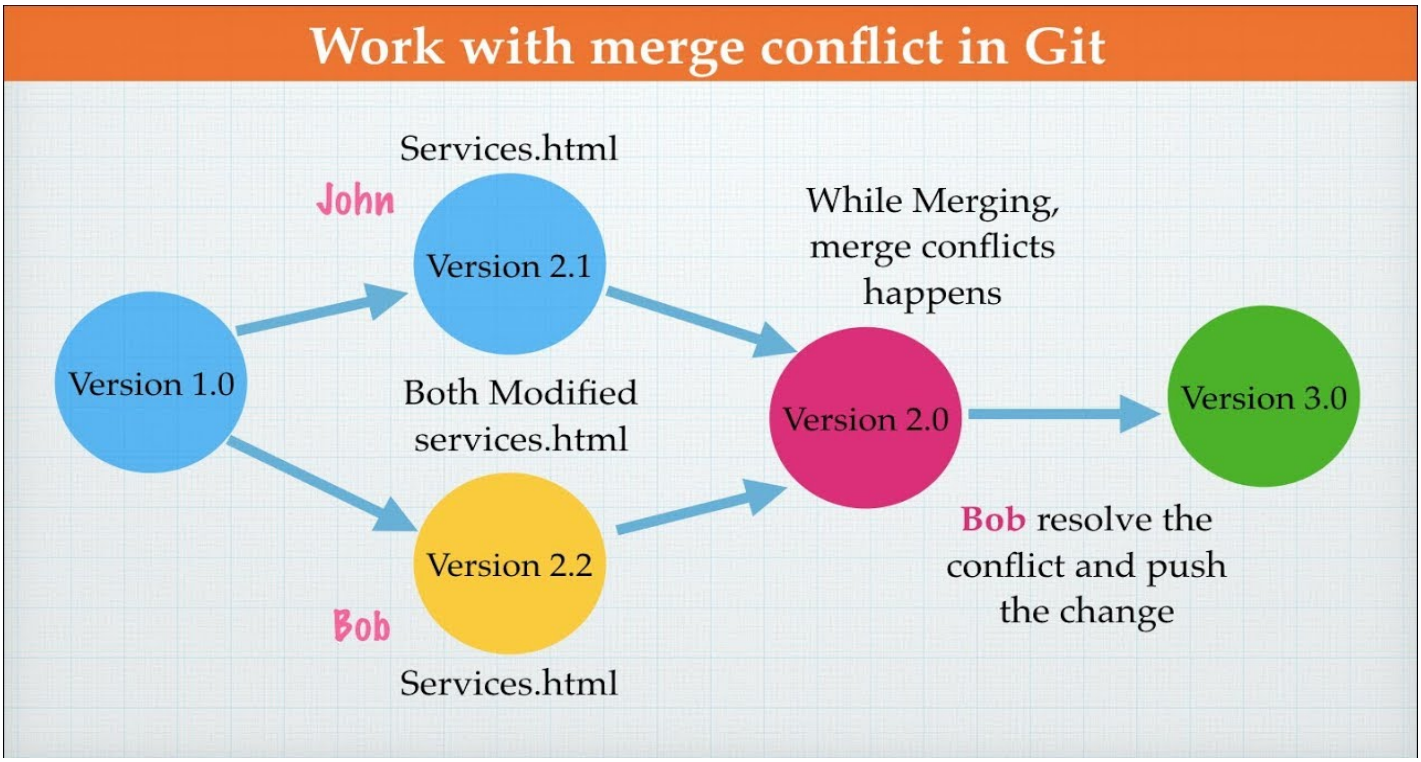


- Hence, the merge conflict due to own activity has been resolved.

Aim: Merge conflict created due to Collaborators

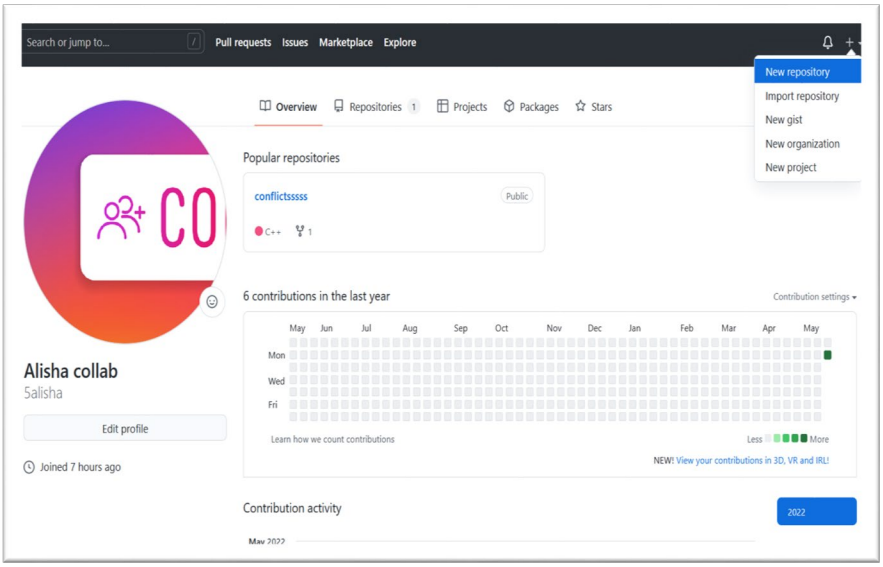
Description: When multiple contributors work on the same part of a code or work with numerous branches, merge conflicts are bound to happen. The primary goal of **`git merge`** is to resolve or *warn* about these conflicts automatically.

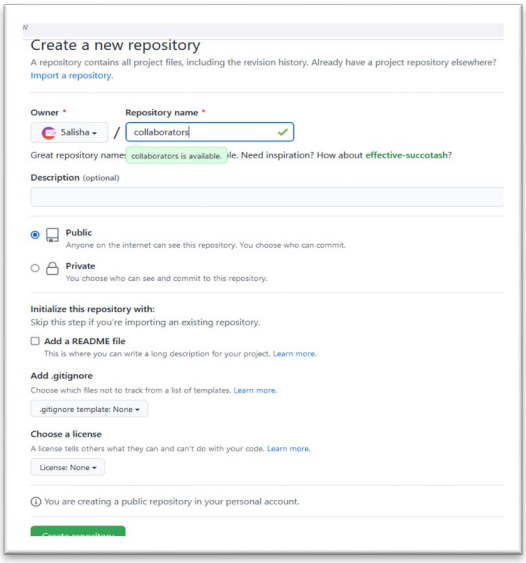
Let's understand with the help of following example:



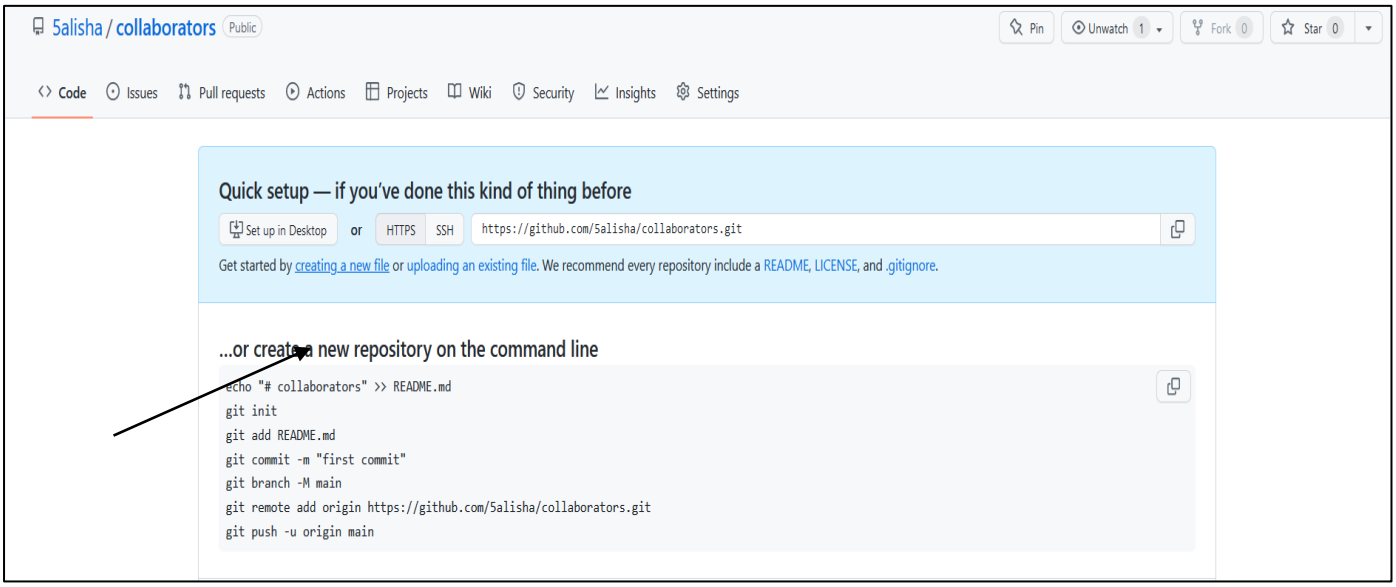
- Let's assume there are two developers: Bob and John.
- Both of them pull the same code file from the remote repository and try to make various amendments in that file.
- After making the changes, John pushes the file back to the remote repository from his local repository.
- Now, when Bob tries to push that file after making the changes from his end, he is unable to do so, as the file has already been changed in the remote repository.
- To prevent such conflicts, developers work in separate isolated branches. The Git merge command combines separate branches and resolves any conflicting edits.
- Hence, Bob resolve the conflict and push the change.

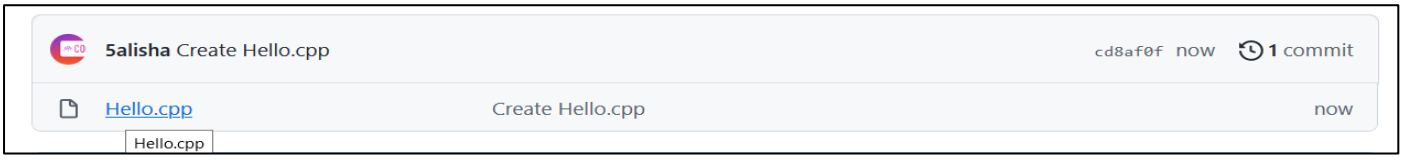
❖ On the github, a new repository named “Collaborators ” has been created as the remote Repository.



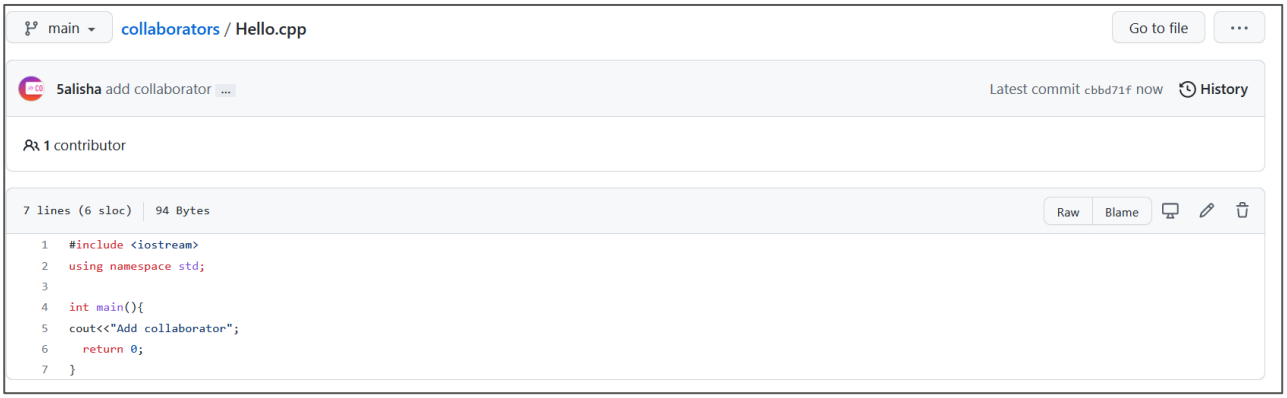


❖ After creating repo , this window will open where a file named hello .cpp has been created.

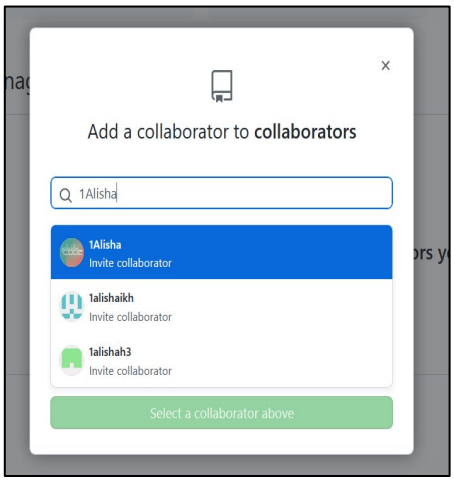


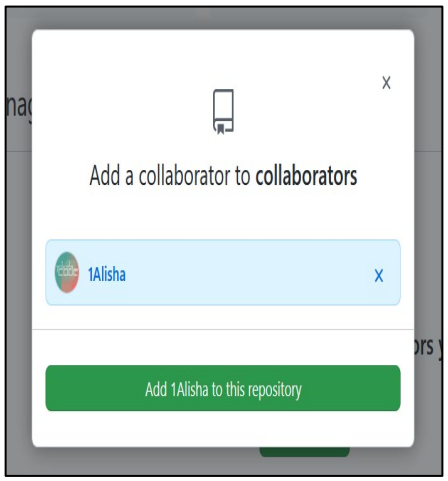


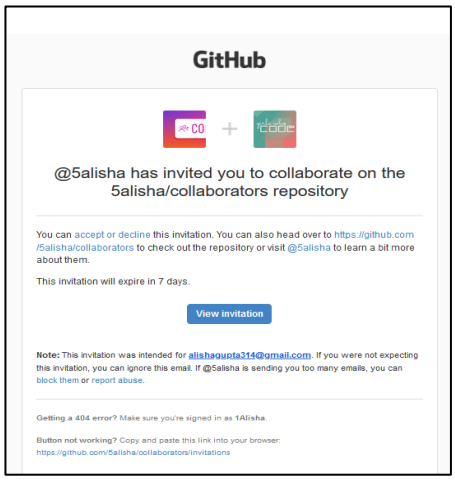
❖ A simple c++ code has been added in the file



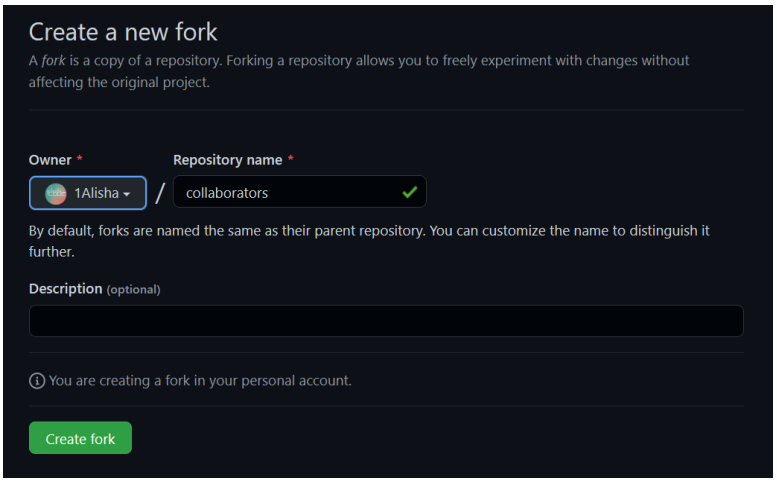
❖ Add collaborator, “1Alisha”. As you can the @5alisha has invited 1Alisha to collaborate.

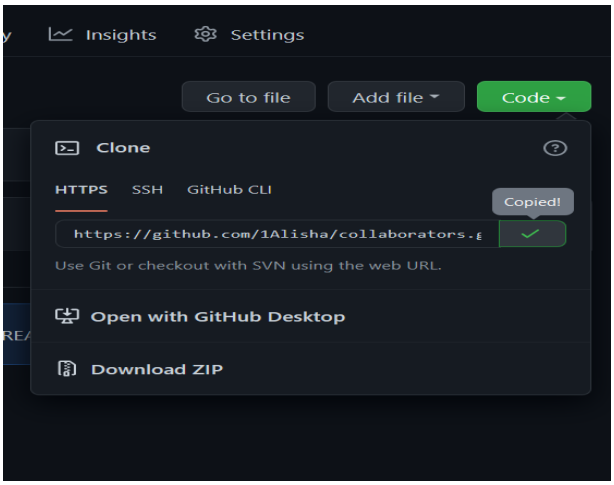




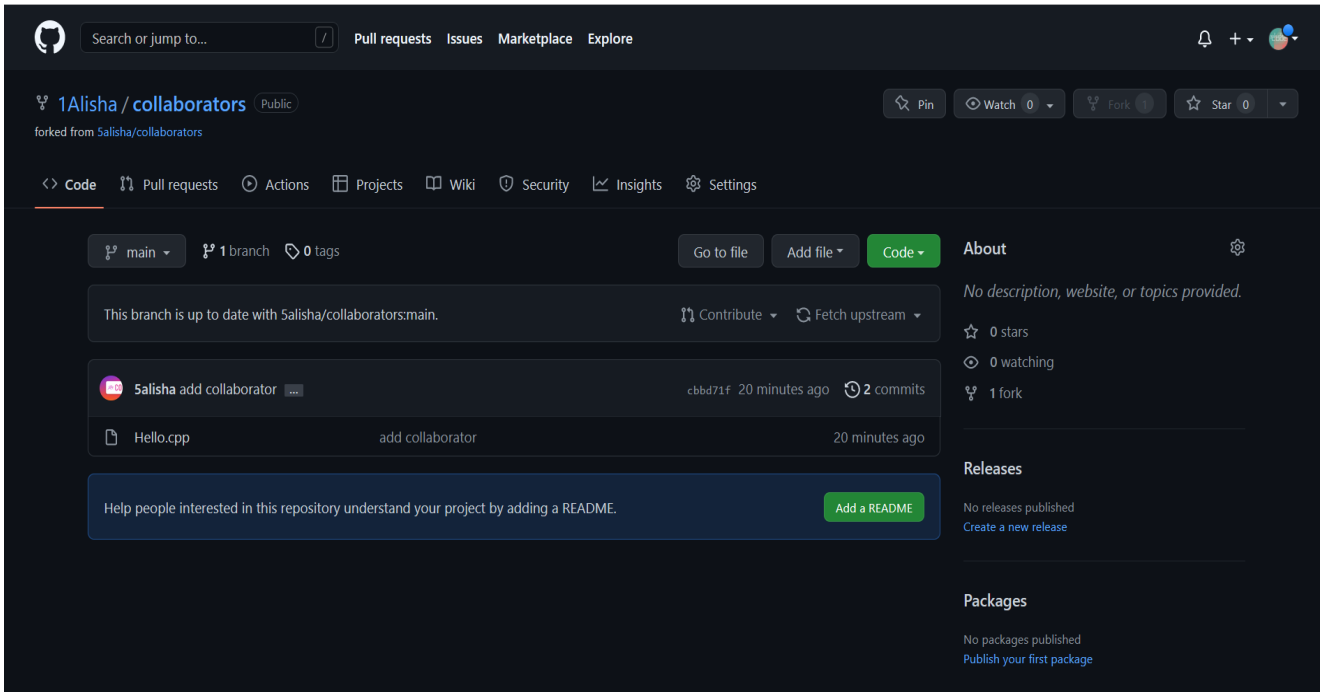


❖ 1Alisha has forked the repo and cloned the repo using the url.

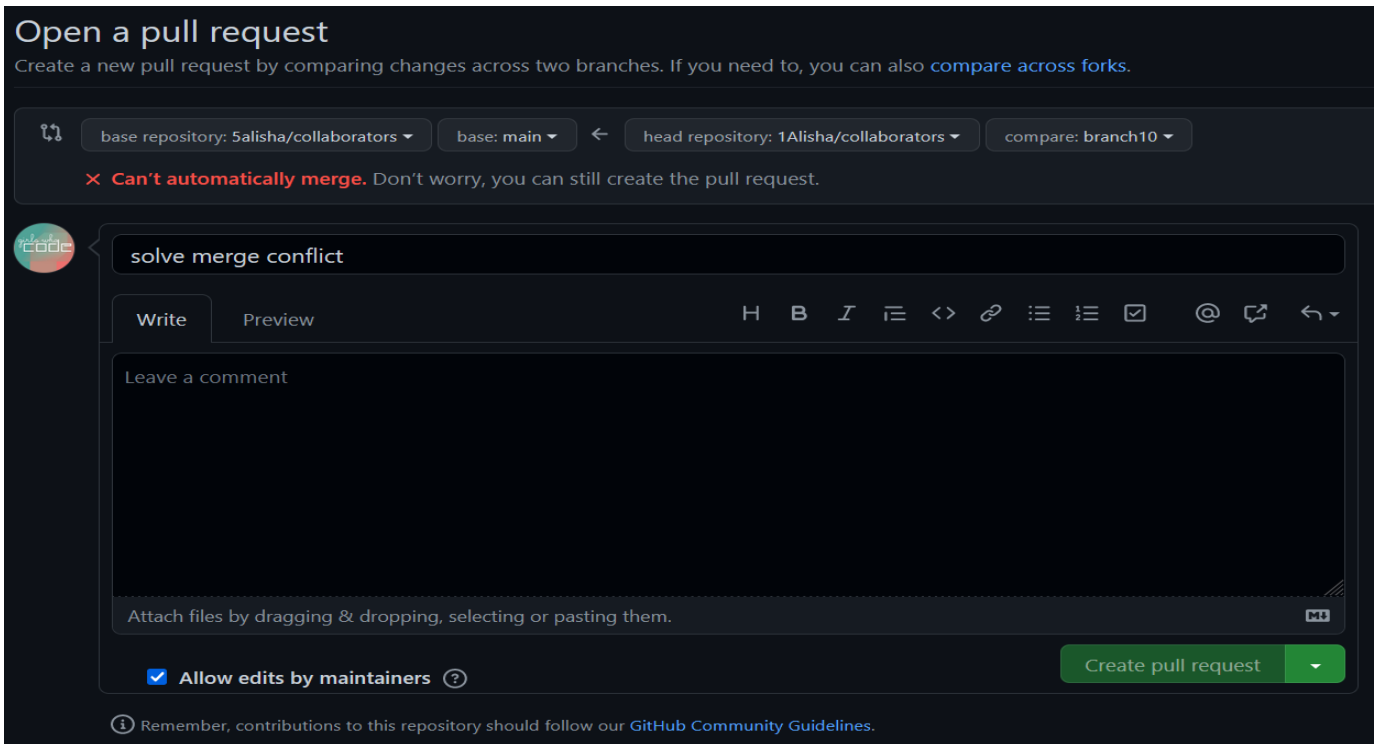




- Upto here main branch of 1Alisha is upto date with 5alisha/collaborators:main

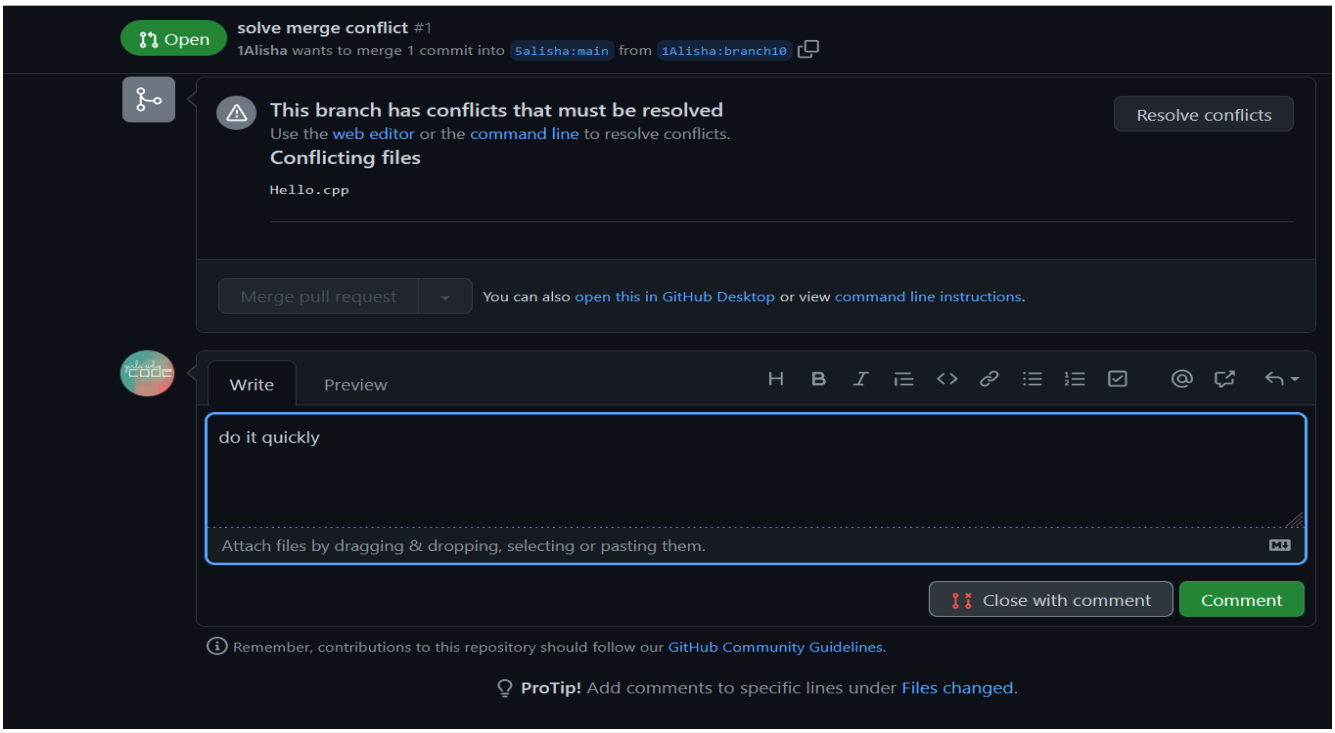


- After making a new branch “branch10” and adding different content in same hello.cpp file by 1Alisha, creates a merge conflict.

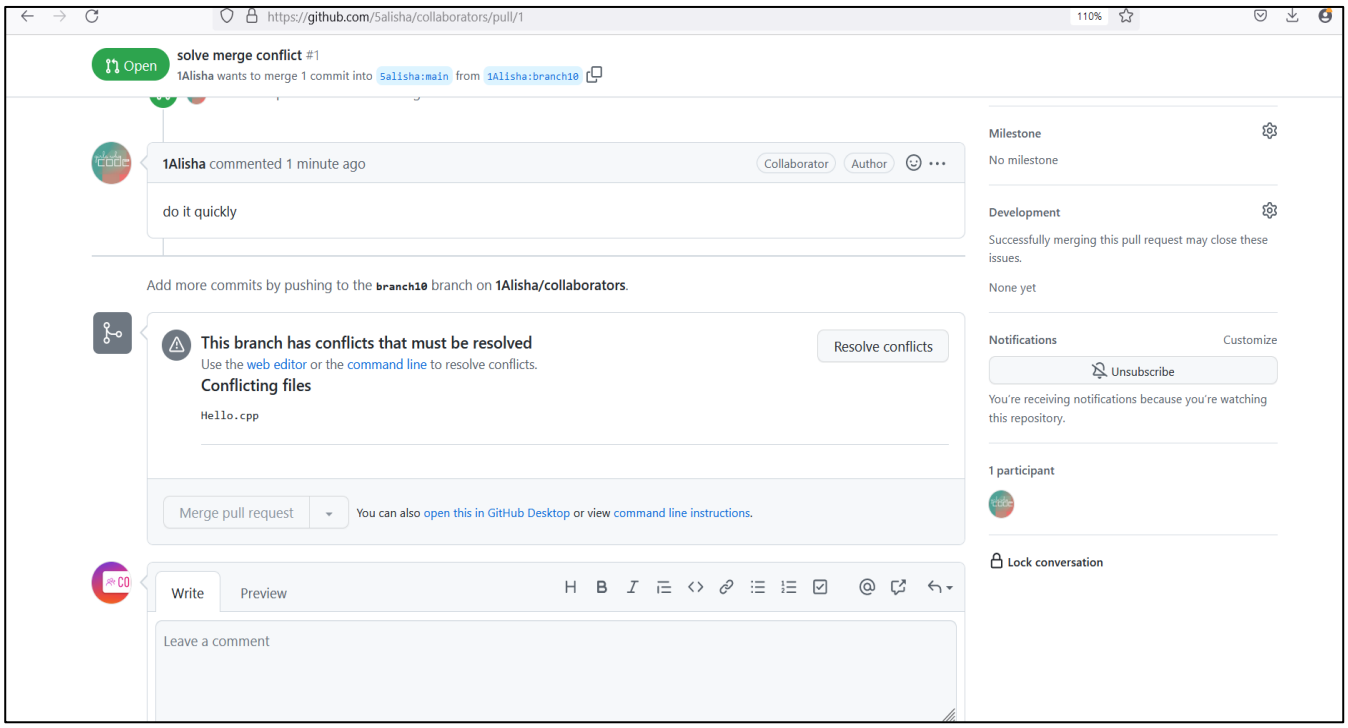


- So, we will create a pull request to @5alisha to merge 1commit into @5alisha:main from 1Alisha:branch10

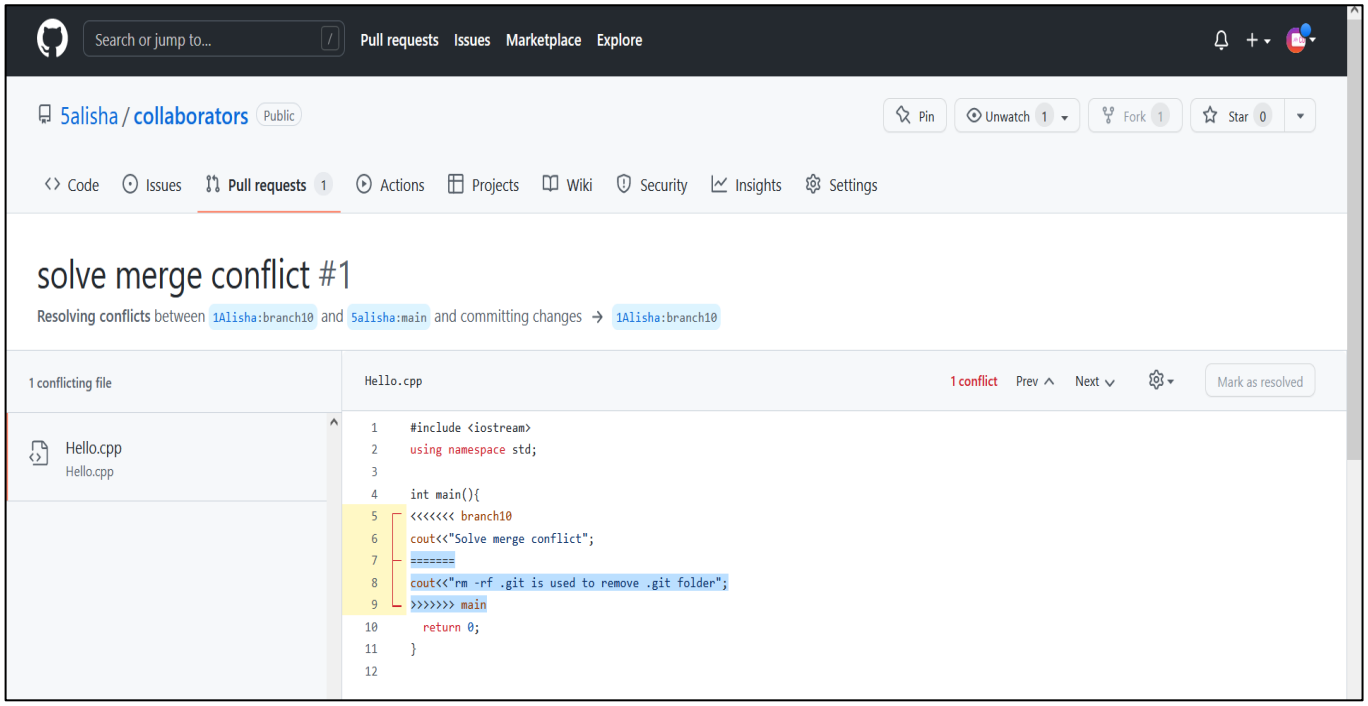
- Along with the merge pull request , we can also comment or attach files by dragging & dropping or passing them.



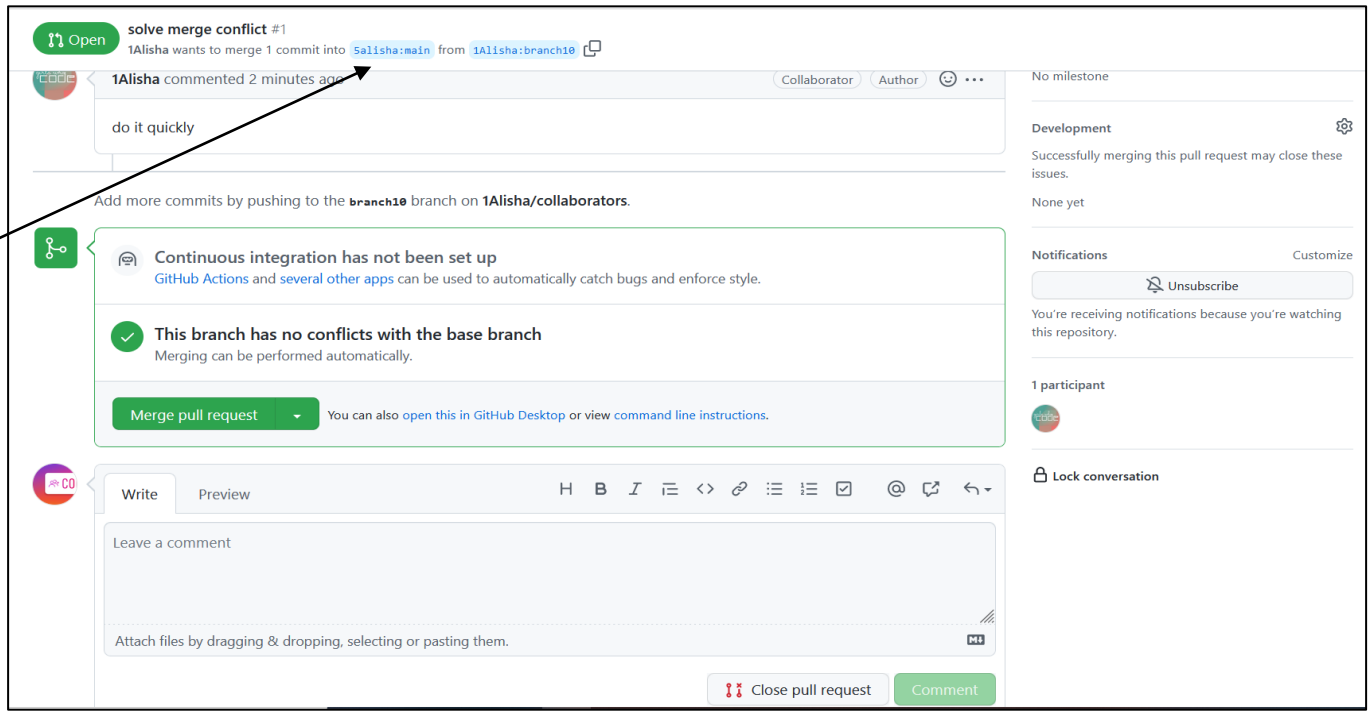
❖ @5alisha had opened the merge pull request

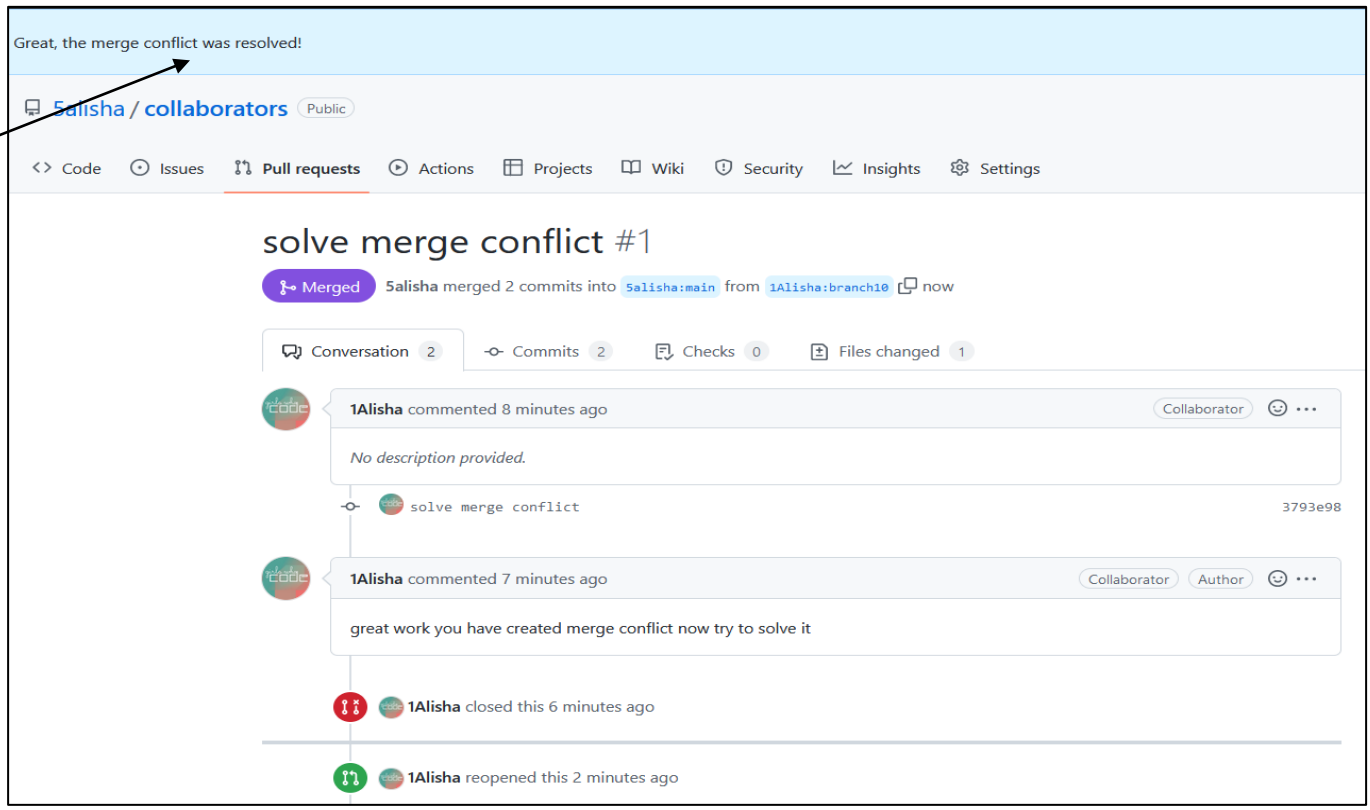


❖ Now, 5@alisha can keep the changes she want and delete other changes to resolve the merge conflict created due to collaboration.

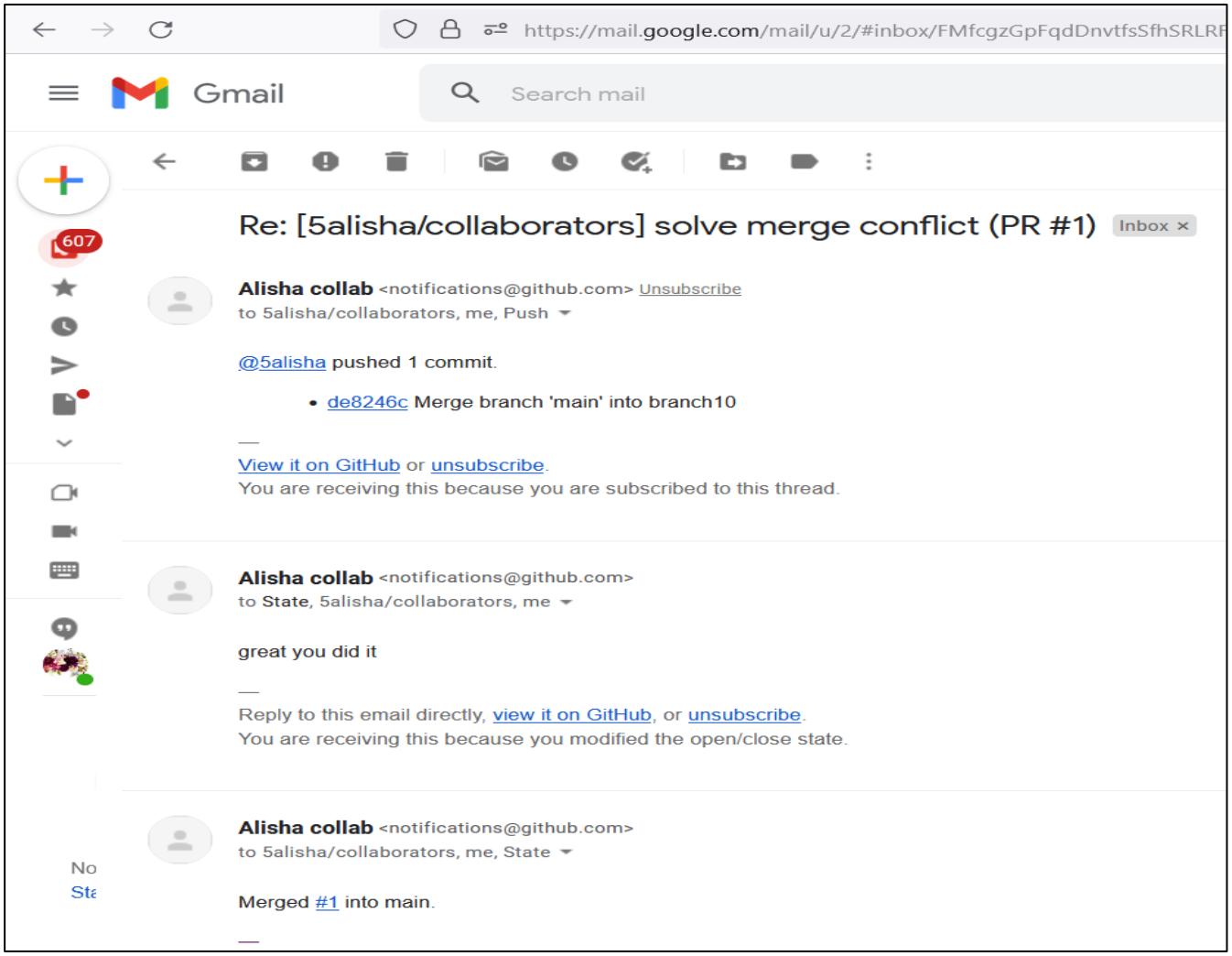


❖ After performing the above step, merging can be done easily and pull request can be closed after merging.





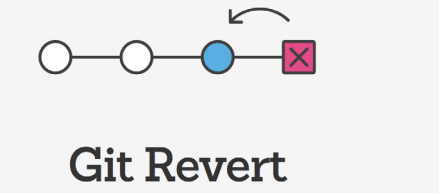
❖ Notifications received on email during collaboration have been shown here



Aim: Revert and Reset

Description for Revert:

- When you revert a git command, the changes from targeted commits are removed from local workspace. A new commit is also created to reflect the new state of your repository
- When you git revert a commit, only the changes associated with that commit are undone.



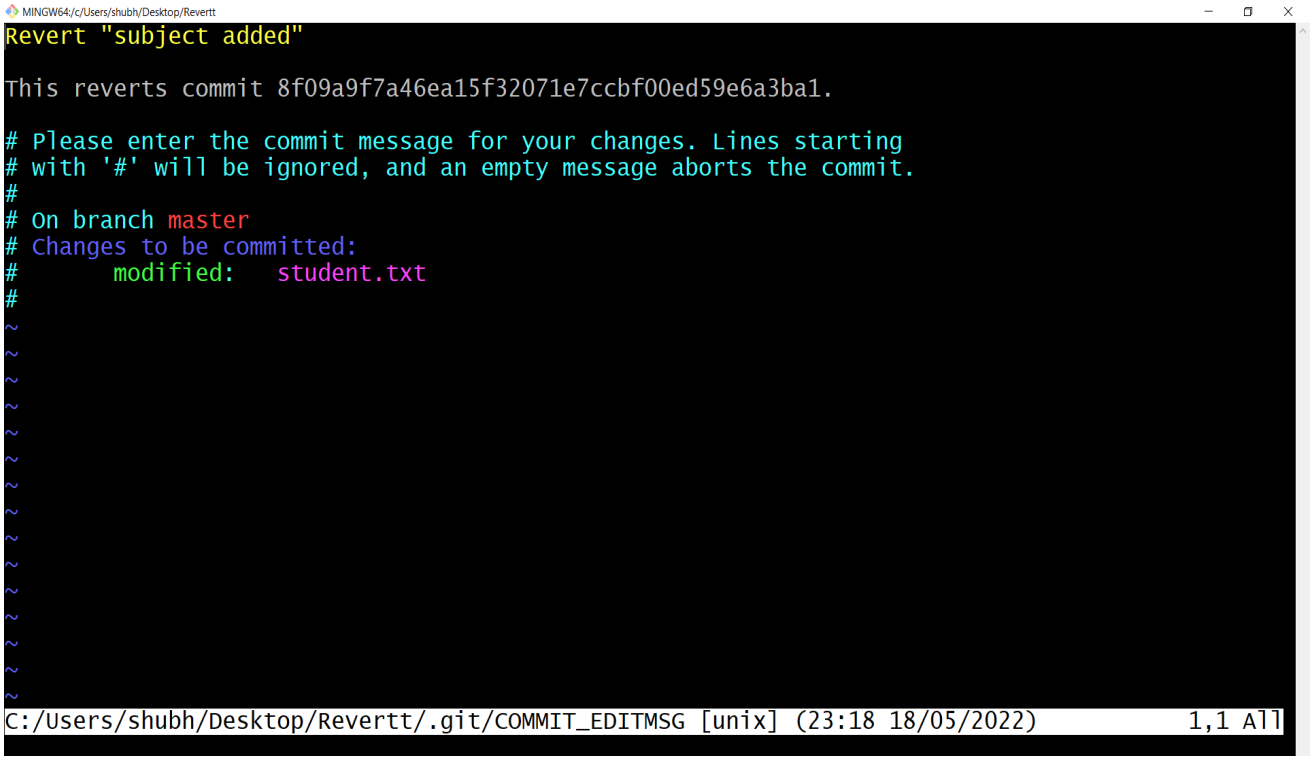
- For example, if a past commit added a file named index.html to the repo, a git revert on that commit will remove the index.html file from the repo. If a past commit added a new line of code to a Java file, a git revert on that commit will remove the added line.

Steps to be followed to revert a git command:

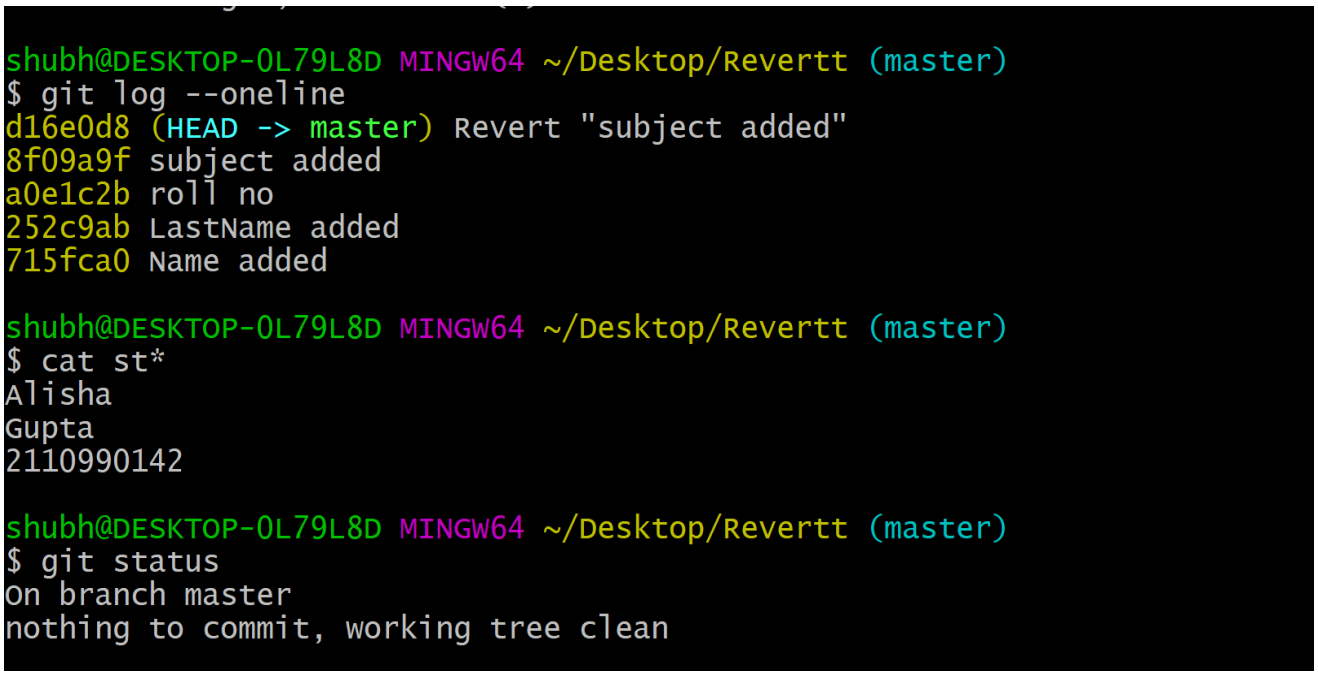
- Initialize the empty git repository, create a file student.txt and add the content .
- Here, in student.txt file changes like name , LastName, roll no and subject have been staged and committed.

```
MINGW64:/c/Users/shubh/Desktop/Revertt

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git init
Initialized empty Git repository in C:/Users/shubh/Desktop/Revertt/.git/

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ touch student.txt

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ vi st*

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ cat st*
Alisha

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git add --a
warning: LF will be replaced by CRLF in student.txt.
The file will have its original line endings in your working
 directory

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git commit -m"Name added"
[master (root-commit) 715fca0] Name added
 1 file changed, 1 insertion(+)
```

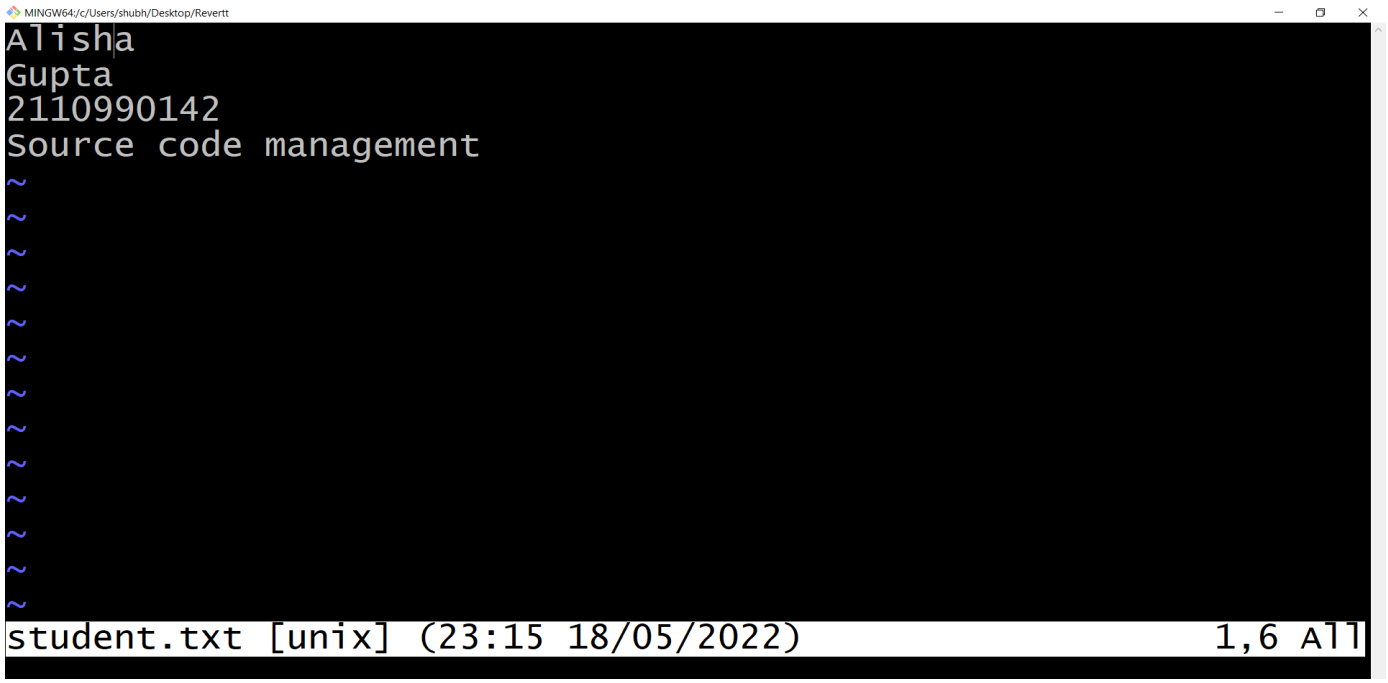
- Copy the checksum of last commit and run the command
- git revert d16e0d8



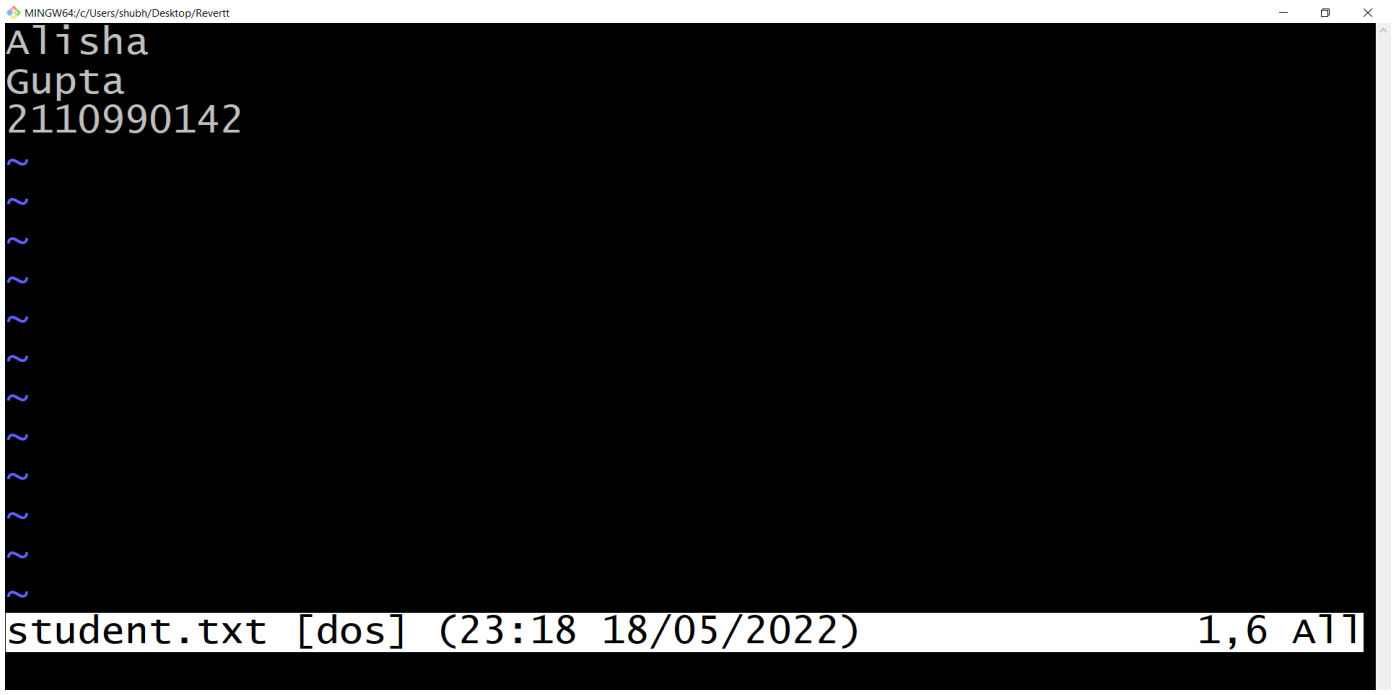
- After executing git revert command when we use git log –online command a new commit is also created to reflect the new state of repository .



❖ Before executing revert command student.txt file has 4 commits.



❖ After executing the git revert command, last commit “subject added” has been removed.



Description for reset:

Practically, you can think of it as a "rollback"—it points your local environment back to a previous commit. By "local environment," we mean your local repository, staging area, and working directory. Git reset will delete/undo changes which are committed in local repository. It will undo changes in three ways:

--soft

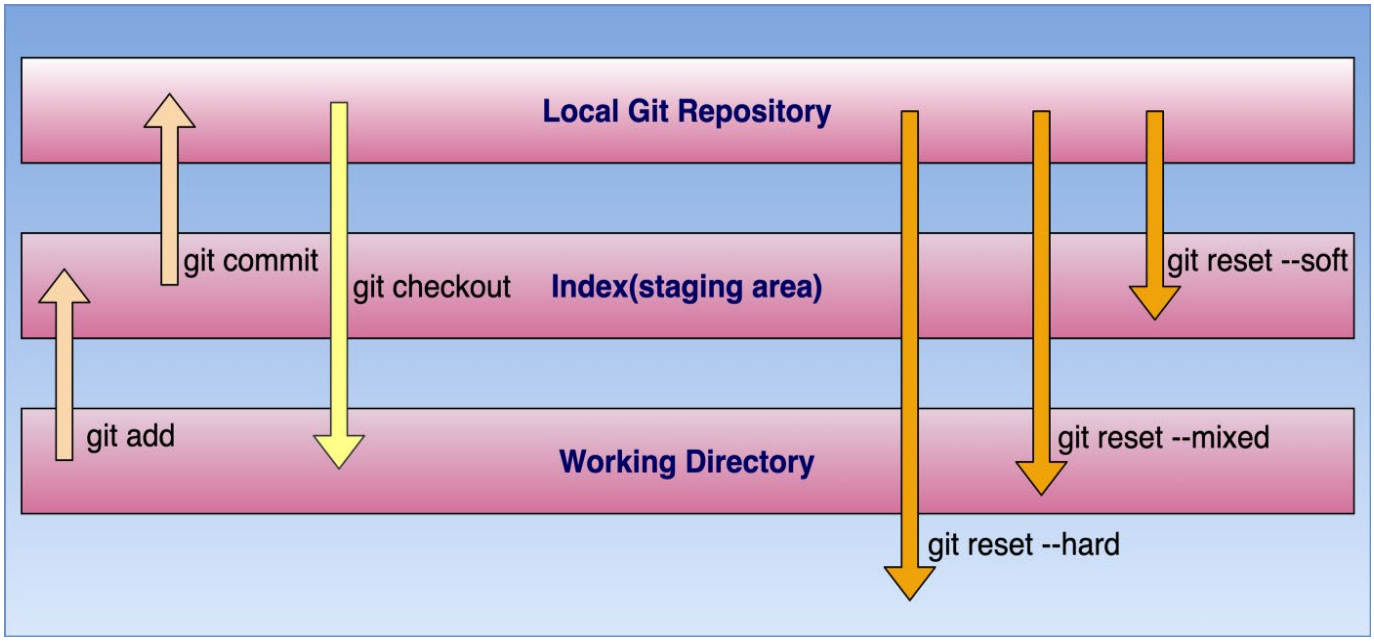
Does not touch the index file or the working tree at all (but resets the head to <commit>, just like all modes do). This leaves all your changed files "Changes to be committed", as git status would put it.

--mixed

Resets the index but not the working tree (i.e., the changed files are preserved but not marked for commit) and reports what has not been updated. This is the default action.

--hard

Resets the index and working tree. Any changes to tracked files in the working tree since <commit> are discarded. Any untracked files or directories in the way of writing any tracked files are simply deleted.



git reset --soft Head~1

- **git reset** changes where the current branch is pointing to (**HEAD**).
- *HEAD is a pointer or a reference to the last commit in the current branch.*
- *HEAD~3 would mean behind 3 commits from HEAD.*

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git status
On branch master
nothing to commit, working tree clean

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ cat st*
Alisha
Gupta
2110990142
alishagupta0142.be21@chitkara.edu.in
Monika sthi
SCM

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git log --oneline
b781be9 (HEAD -> master) 1st subject added
6ff4d67 mentor added
b854bb6  mail id added
d16e0d8 Revert "subject added"
8f09a9f subject added
a0e1c2b roll no
252c9ab LastName added
715fca0 Name added
```

MINGW64:/c/Users/shubh/Desktop/Revertt

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git reset --soft Head~2

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git log --oneline
b854bb6 (HEAD -> master)  mail id added
d16e0d8 Revert "subject added"
8f09a9f subject added
a0e1c2b roll no
252c9ab LastName added
715fca0 Name added

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ cat st*
Alisha
Gupta
2110990142
alishagupta0142.be21@chitkara.edu.in
Monika sthi
SCM

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git status
On branch master
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   student.txt
```

git reset --mixed Head~1

Suppose we have three commits in the order -C1 - C2 – C3. Assume **HEAD** is pointing to **C3** commit and the index matches **C3** commit. When we execute **git reset --mixed HEAD~1** then HEAD points to C2 commit,

- If we run **git commit** at this point, nothing will happen since the index matches HEAD. But the changes are still there in the working directory, but since they're not in the index, **git status** show them as unstaged.
- To commit them, we would use **git add** , and then we'll use **git commit -m "<message>"** to commit changes as we do.

Note that --mixed is the default option.

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git log --oneline
e9b7259 (HEAD -> master) using reset soft
b854bb6  mail id added
d16e0d8 Revert "subject added"
8f09a9f subject added
a0e1c2b roll no
252c9ab LastName added
715fca0 Name added

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ cat st*
Alisha
Gupta
2110990142
alishagupta0142.be21@chitkara.edu.in
Monika sthi
SCM

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git reset --mixed Head~2
Unstaged changes after reset:
M       student.txt
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ cat st*
Alisha
Gupta
2110990142
alishagupta0142.be21@chitkara.edu.in
Monika sthi
SCM

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git log --oneline
d16e0d8 (HEAD -> master) Revert "subject added"
8f09a9f subject added
a0e1c2b roll no
252c9ab LastName added
715fca0 Name added

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (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:   student.txt

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

git reset --hard Head~1

- Assuming **HEAD** is pointing to **C3** and the index matches **C3**
- **--hard** flag modifies HEAD, index, and working directory.
- If we're at C3 and when we run **git reset --hard HEAD~1** , then the changes committed to C3 , uncommitted changes that we have in the staging area, all the changes in the working directory will be removed and the working directory will match match C2 commit.

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git status
On branch master
nothing to commit, working tree clean

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git log --oneline
edfbc88 (HEAD -> master) using reset mixe
d16e0d8 Revert "subject added"
8f09a9f subject added
a0e1c2b roll no
252c9ab LastName added
715fca0 Name added

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ cat st*
Alisha
Gupta
2110990142
alishagupta0142.be21@chitkara.edu.in
Monika sthi
SCM

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git reset --hard Head~2
HEAD is now at 8f09a9f subject added
```

MINGW64:/c/Users/shubh/Desktop/Revertt

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ cat st*
Alisha
Gupta
2110990142
Source code management

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git status
On branch master
nothing to commit, working tree clean

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git reset edfbc88 --hard
HEAD is now at edfbc88 using reset mixe

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git log --oneline
edfbc88 (HEAD -> master) using reset mixe
d16e0d8 Revert "subject added"
8f09a9f subject added
a0e1c2b roll no
252c9ab LastName added
715fca0 Name added
```

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ cat st*
Alisha
Gupta
2110990142
alishagupta0142.be21@chitkara.edu.in
Monika sthi
SCM
```

- Using **git reset edfbc88 --hard** , deleted commits can be restored.

Checksum of last commit

A Project report

On

“Hosting a website”

with

Source Code Management

(CS181)

Submitted by

Team Member 1 Name Roll No. 2110990142

Team Member 2 Name Roll No. 2110990143

Team Member 3 Name Roll No. 2110990144

Team Member 3 Name Roll No. 2110990145

Department of Computer Science & Engineering

Chitkara University Institute of Engineering and Technology, Punjab

Jan- June
(2021-22)

Institute/School Name	**Chitkara University Institute of Engineering and Technology**		
Department Name	**Department of Computer Science & Engineering**		
Programme Name	**Bachelor of Engineering (B.E.), Computer Science & Engineering**		
Course Name	**Source Code Management**	Session	**2021-22**
Course Code	**CS181**	Semester/Batch	**2nd/2021**
Vertical Name	**Beta**	Group No	G-2
Course Coordinator	**Dr. Neeraj Singla**		
Faculty Name	**Dr. Deepak Thakur**		

Submission

Name: Alisha Gupta

Signature:

Date: May23, 2022

Table of content

1. Version control with Git

We all have maintained several versions, whether it's ***adding documentation to the code, rearranging the methods, adding or removing some classes or resources***, Most of the time these versions would have been maintained by giving a suitable name to the file as shown below

1. abc_1.java
2. abc_14Mar.java

Naturally, we all must've wished for an organized way of storing these versions to see progressive changes made to the code. Some of the problems that one can face in code management are mentioned below

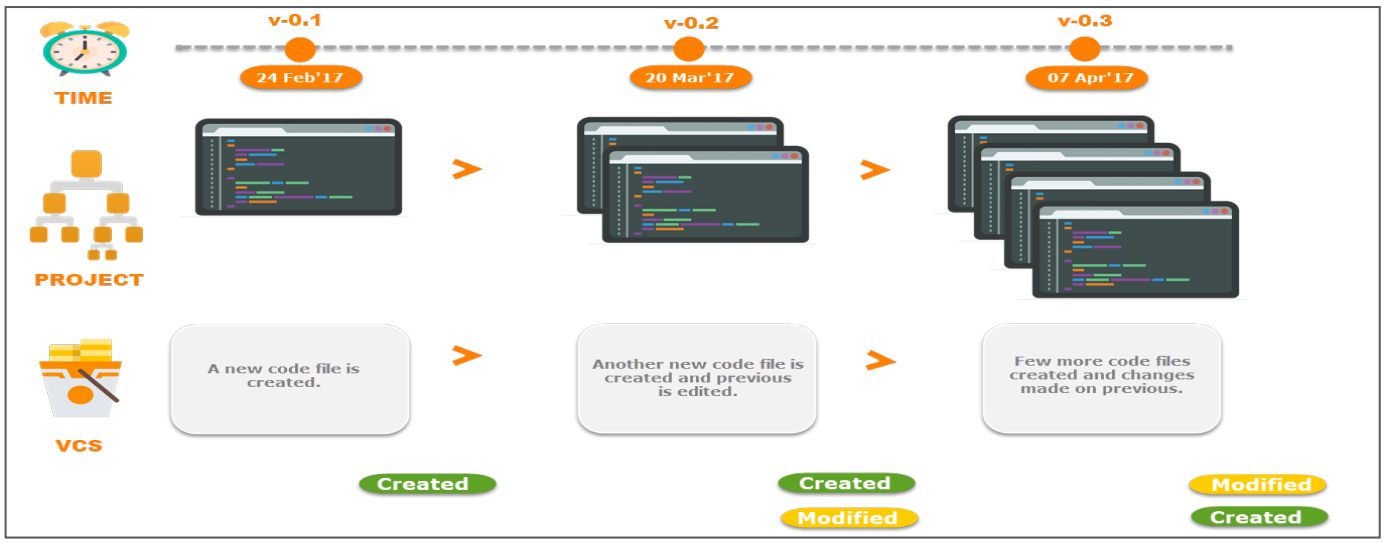
Challenges in Code Management

3. Maintaining multiple copies of the same code files based on changes done on different dates
4. Trace the file's history to find the version of the code which introduced the bug
5. Maintain back-up of your files

What is Version Control System?

We can think of a ***Version Control System*** as a kind of ***database***. Version Control Systems (VCS) are tools that help teams manage and track changes in code over time. It lets us save a snapshot of the complete project at any point in time. Every change made to the project files is tracked, along with

- Who made the change
- Why the change was made (references to problems fixed or features added in the change)



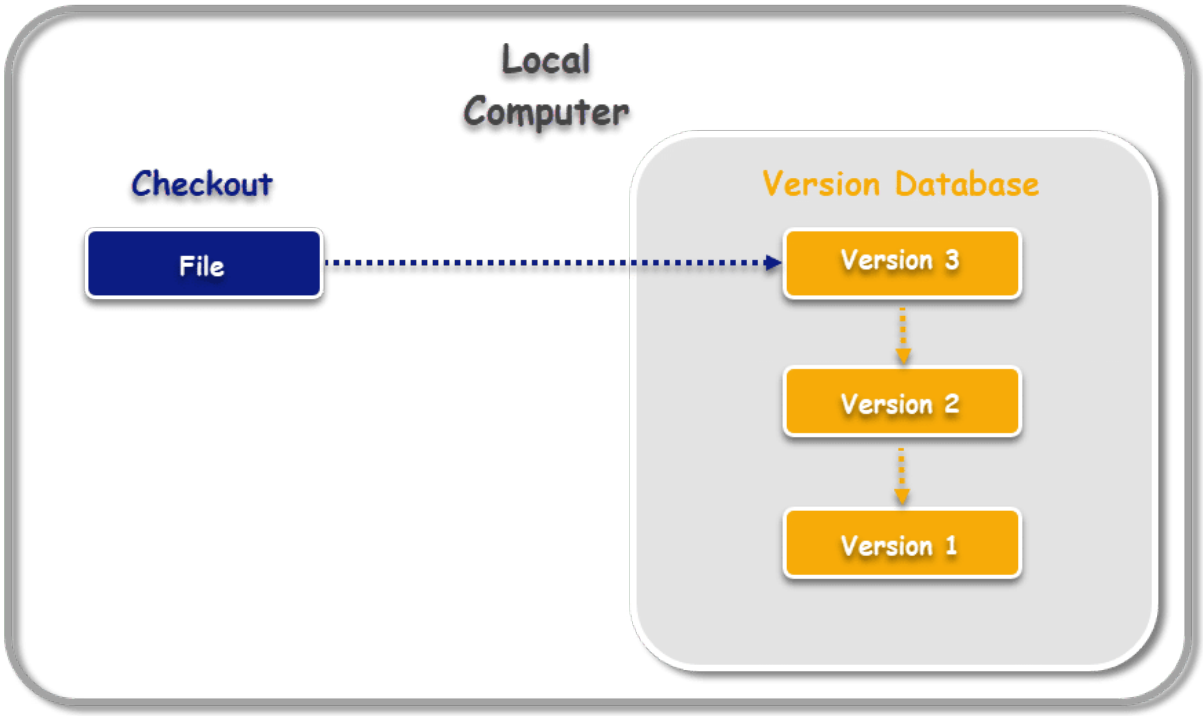
Note: Snapshot is the entire state of the project at a given point of time.

In general, there are three types of ***Version Control Systems***

- **Local Version Control System**
- **Central Version Control System**
- **Distributed Version Control Systems**

Local VCS

- Usually, ***Local VCS*** would store the changes to a file in a ***Local Database***.
- ***VCS***, in general, have got advance these days.
- Instead of storing the new versions of the complete file, VCS now store only the difference between two versions. This saves memory cost.



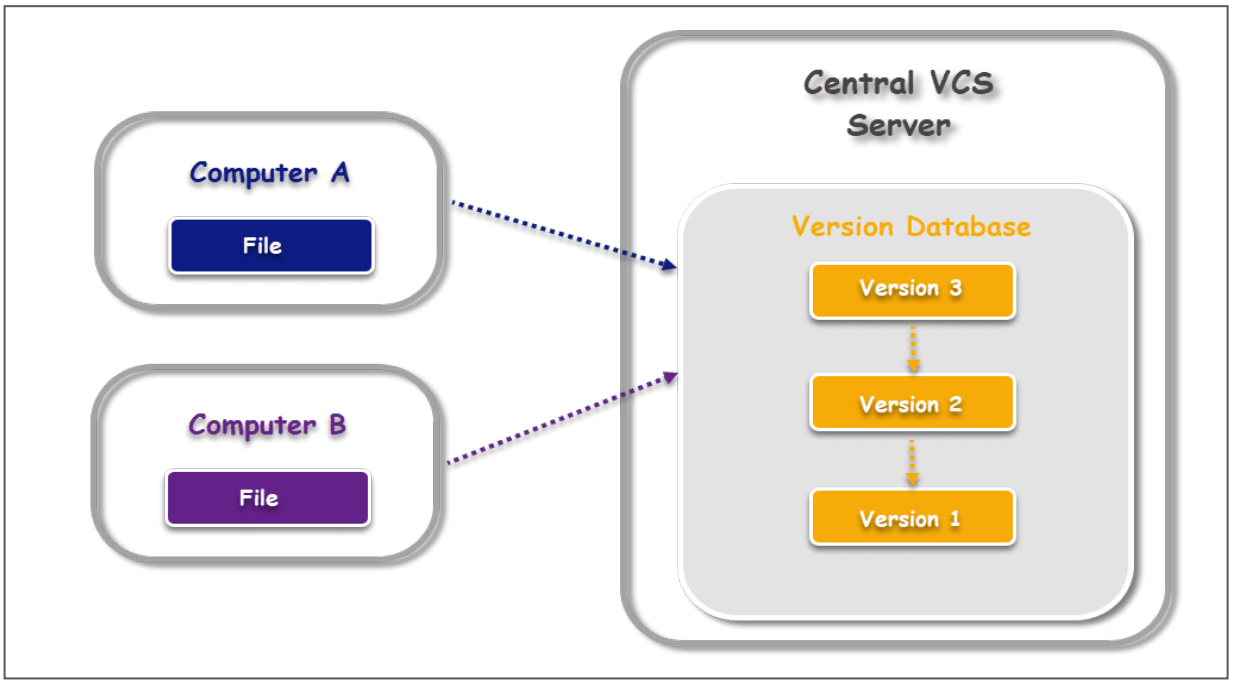
As shown in the image above, the local database stores ***Version 1, Version 2***, and so on. These versions are groups of related files that have undergone changes since their last edit.

Note: Local VCS had a major drawback of being useful to only a single developer at a time. Thus, several developers working on different systems in a project could not collaborate effectively by using local VCS.

Central VCS

The developers needed to collaborate with other developers on other systems. The localized version control system failed in this case. To deal with this problem, Centralized Version Control Systems were developed.

- Everyone on the system has information about the work what others are doing on the project.
- Administrators have control over other developers.
- It is easier to deal with a centralized version control system than a localized version control system.
- A local version control system facilitates with a server software component which stores and manages the different versions of the files.



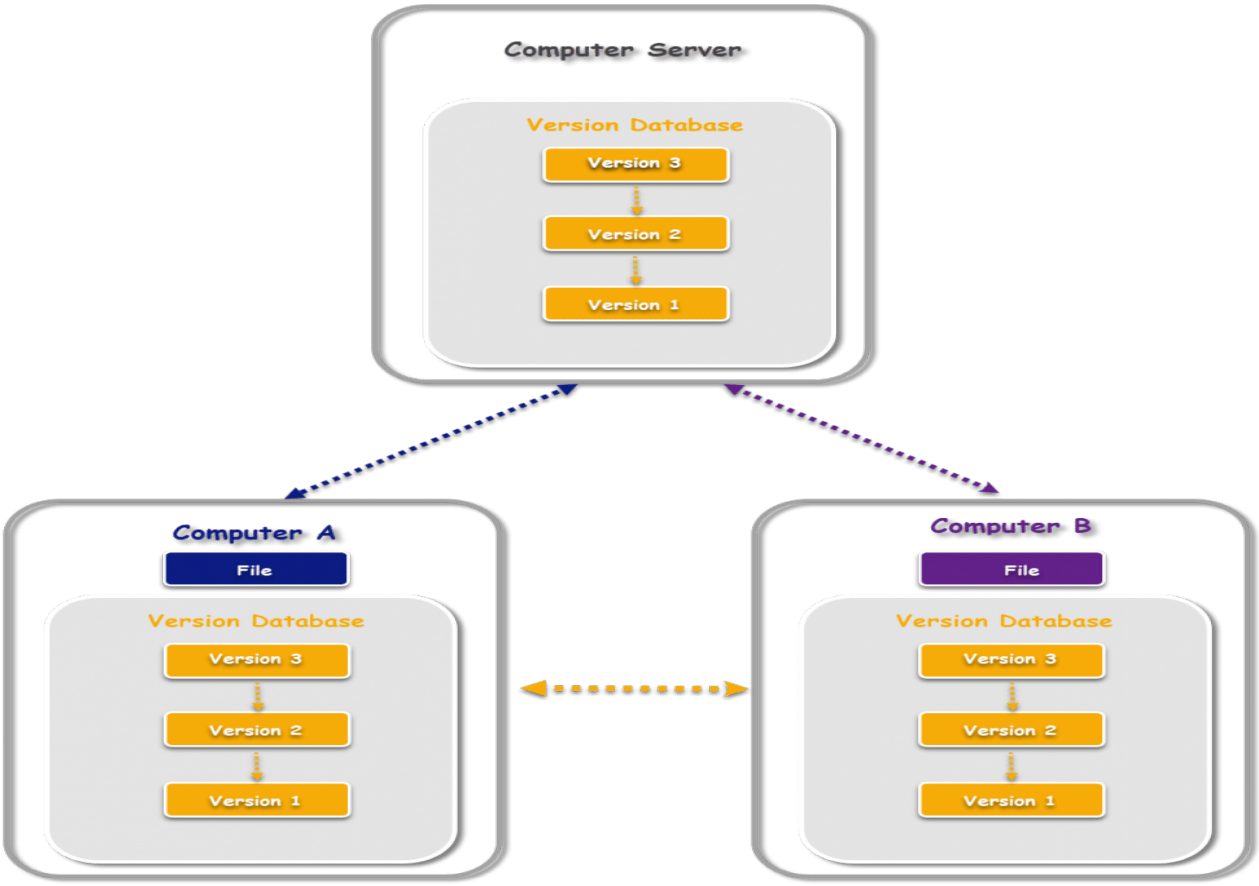
These systems have a single server that contains the versioned files, and some clients to check out files from a central place.

Few drawbacks of Central VCS

- Though central VCS helped developers and teams collaborate, there's a risk of an outage of the central server.
- Teams would neither be able to collaborate nor record changes of whatever they're working on due to such outages.
- Such servers are also prone to hacking. In such a case, it'd be pain-staking for teams to recover their work. Therefore it's not advisable to store all changes to code in a single place.

Distributed Version Control Systems (D-VCS)

- Distributed VCS introduced significant improvement over the risks posed by Central VCS.
- In Distributed VCS, every local machine would have a copy of the entire code-base along with its history. Thus Distributed VCS moves from the client-server approach of Central VCS to peer-to-peer approach for version control a



- Centralized Version Control System uses a central server to store all the database and team collaboration, but due the failure of the central server, developers do not prefer it
- In a Distributed Version Control System, the user has a local copy of a repository. So, the clients don't just check out the latest snapshot of the files even they can fully mirror the repository.
- Developers can record changes in their local machine while working offline and upload the new history of versions to the central server for others to view and use after connecting to the network.

NOTE: Git is a Distributed Version Control system.

2. Problem statement

We have to edit and send our project to other team members which is very lengthy process:
So we want an alternate solution for this to make changes conveniently and accurately. Also we want that if we make the changes it should reflect to all the other participants and they should be able to revert and edit.

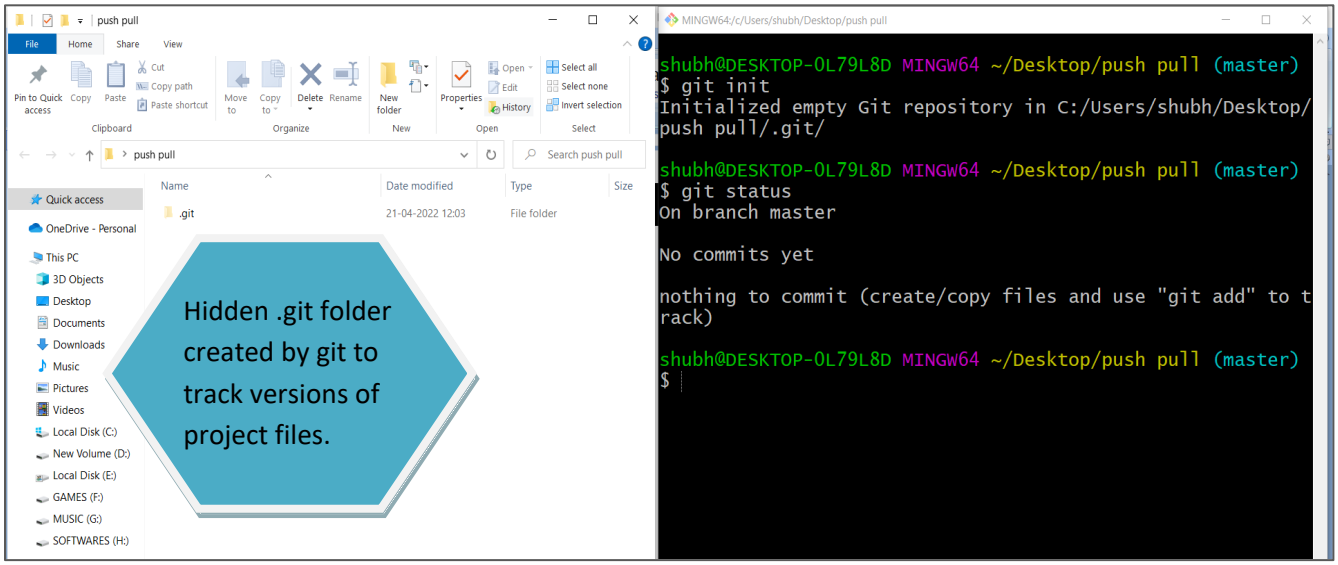
3. Objectives

❖ Following points are the Objectives of Git:

- To track changes in the code using Git and do collaborations.
- Git keeps track of changes to files and allows multiple users to coordinate updates to those files.
- To make our code more public for everyone to use.
- To do distributed development as Git enables the developers to manage the changes offline and allows you to branch and merge whenever required, giving them full control over the local code base.

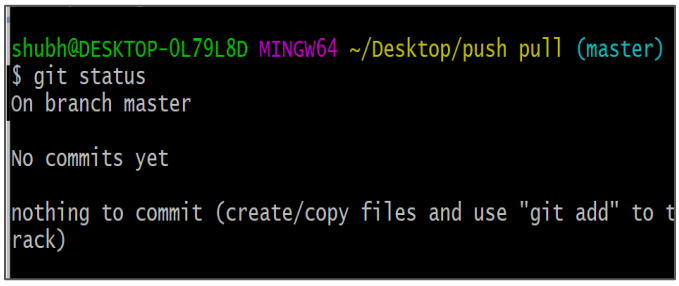
❖ git init

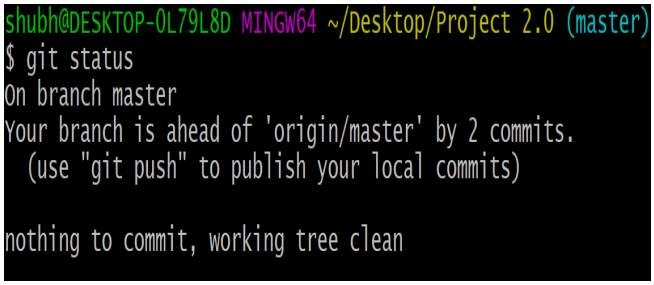
➢ Initializes empty git repository



❖ git status

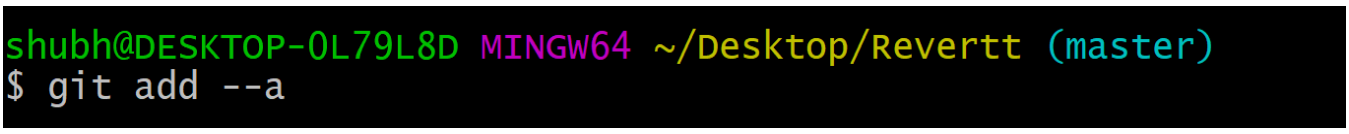
➢ Displays the state of the working directory and the staging area.





❖ git add --a

➢ This command updates the current content of the working tree to the staging area.



❖ **git config --global user.name "FIRST_NAME LAST_NAME"**

➢ Set username

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (master)
$ git config --global user.name "1Alisha"

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (master)
$ git config --global user.email "alishagupta314@gmail.com"

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (master)
$ git config user.name
1Alisha
```

❖ **git config --global user.email "MY_NAME@example.com"**

➢ Set your email address

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/f1 (master)
$ git config user.email
alishagupta314@gmail.com
```

❖ **pwd**

➢ Shows the present working directory

MINGW64:/c/Users/shubh/Desktop/Revertt

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ pwd
/c/Users/shubh/Desktop/Revertt
```

❖ **ls**

➢ lists the current directory contents

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ ls
student.txt
```

❖ **git commit –m “message for the commit”**

➢ commit the staged snapshot

MINGW64:/c/Users/shubh/Desktop/Project 2.0

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git commit -m"logo image added"
[master e497cd7] logo image added
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 SSS.jpeg
```

git log

➢ commit the staged snapshot

```
shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (super)
$ git log
commit 3066ad7722b9517a88c70f600e80c8599a5b8cc8 (HEAD -> super)
Author: 1Alisha <alishagupta314@gmail.com>
Date:   Wed Apr 13 06:19:04 2022 +0530
```

❖ **git log --oneline**

➢ commit the staged snapshot

```
shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (super)
$ git log --oneline
3066ad7 (HEAD -> super) men section on super branch
b4629b3 toy section nd women section modified
f0cbabe (master) women and toy section adeded
6341bcd men section added
54ae60d home page on master branch
50578d8 new content added on master branch
ea085ea file name changeg to home.txt
3c65142 file name changed to contactus
6d873a3 new text files added
```

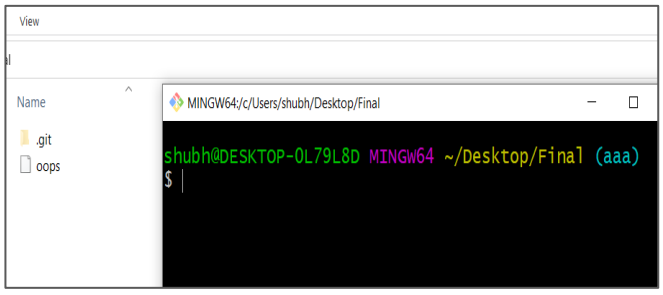
❖ **git log --oneline graph**

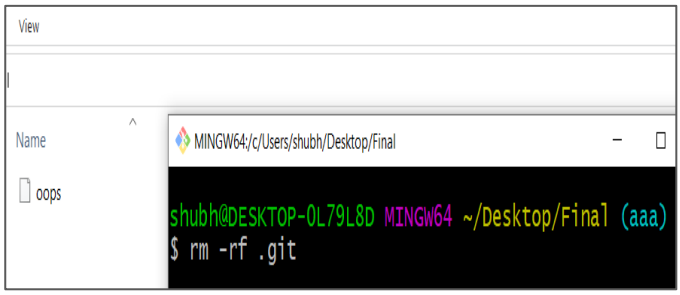
➢ commit the staged snapshot

```
shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (master)
$ git log --oneline --graph
*   8a5718e (HEAD -> master) Merge branch 'super'
|\
| * 29f2150 (super) women section on super branch ....
* | fa215fd home and contactus on master branch
|/
* 3066ad7 men section on super branch
* b4629b3 toy section nd women section modified
* f0cbabe women and toy section adeded
* 6341bcd men section added
* 54ae60d home page on master branch
* 50578d8 new content added on master branch
* ea085ea file name changeg to home.txt
* 3c65142 file name changed to contactus
* 6d873a3 new text files added
```

❖ **rm –rf .git**

➢ Deletes the .git folder.





❖ **git branch "branch_name"**

➢ Creates a new branch

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git branch branch1
```

❖ **Git checkout branch_name**

➢ Swapping between different branches

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git checkout branch1
Switched to branch 'branch1'
```

❖ **git branch**

➢ Shows all branches present in that directory

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (branch1)
$ git branch
* branch1
  branch3
  master
```

❖ **git merge branch_name**

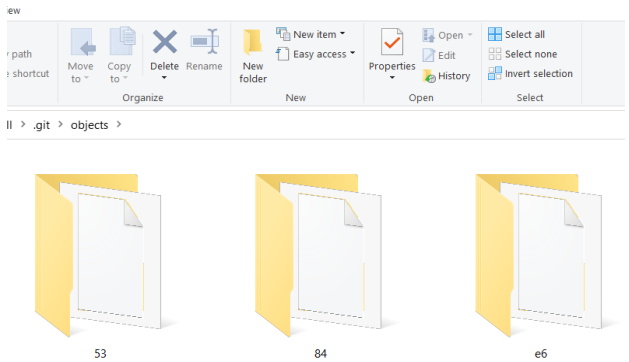
➢ Merge two branches

```
shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (master)
$ git merge tree
Auto-merging home.txt
CONFLICT (content): Merge conflict in home.txt
Automatic merge failed; fix conflicts and then commit the result.
```

❖ **git cat-file** checksum -p

➢ Show the pointer to TREE object *git cat-file* commit

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/push pull (master
)
$ git cat-file 53539c12e4db7d001113efdff3fd74e4ec30b905 -p
tree 84feb77cc36c1f8da2b093b0665aa3b9cdf87c54
author 1Alisha <alishagupta314@gmail.com> 1650526404 +0530
committer 1Alisha <alishagupta314@gmail.com> 1650526404 +0530

aboutus and home created

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/push pull (master)
$ git cat-file 84feb77cc36c1f8da2b093b0665aa3b9cdf87c54 -p
100644 blob e69de29bb2d1d6434b8b29ae775ad8c2e48c5391    Aboutus.txt
100644 blob e69de29bb2d1d6434b8b29ae775ad8c2e48c5391    home.txt
```



❖ **mv file1.txt file2.txt**

➢ Renames the file using this command we have to stage the file again

```
shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (master)
$ mv aboutus.txt.txt contactus.txt

shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (master)
$ git status
On branch master
Changes not staged for commit:
  (use "git add/rm <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        deleted:    aboutus.txt.txt

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

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

❖ **git mv file1.txt file2.txt**

➢ Renames the file and shows the status as modified

```
shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (master)
$ git mv home.txt.txt home.txt

shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (master)
$ git status
On branch master
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        renamed:    home.txt.txt -> home.txt


shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (master)
$ git commit -m 'file name changeg to home.txt'
[master ea085ea] file name changeg to home.txt
 1 file changed, 0 insertions(+), 0 deletions(-)
 rename home.txt.txt => home.txt (100%)
```

❖ **git restore --staged file1.txt**

➢ Unstage the file

```
shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (master)
$ git restore --staged home.txt

shubh@DESKTOP-0L79L8D MINGW64 /e/Evening_class_scm (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:   home.txt
```

❖ **git branch –d branch_name**

➢ Deletes the branch after merging

❖ **git branch –D branch_name**

➢ deletes the branch without merging

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git branch -d branch1
error: The branch 'branch1' is not fully merged.
If you are sure you want to delete it, run 'git branch -D branch1

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git merge branch1
Updating fa6e7bf..a06925a
Fast-forward
 oops.cpp | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git branch -d branch1
Deleted branch branch1 (was a06925a).

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git status
On branch master
nothing to commit, working tree clean

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git branch -D branch2
Deleted branch branch2 (was fa6e7bf).
```

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (branch1)
$ git branch -d branch1
error: Cannot delete branch 'branch1' checked out at 'C
:/Users/shubh/Desktop/Final'

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (branch1)
$ git checkout master
Switched to branch 'master'

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git branch -d branch1
error: The branch 'branch1' is not fully merged.
If you are sure you want to delete it, run 'git branch -D branch1'.

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git merge branch1
Updating fa6e7bf..a06925a
Fast-forward
 oops.cpp | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)
```

❖ **git remote add origin “url”**

➢ Create a new, empty Git repository on your remote server

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git remote add origin https://github.com/1Alisha/Project2.0.git
```

❖ **git push –u origin master**

➢ Uploads content from a local repository to a remote repository.

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git push -u origin master
Enumerating objects: 13, done.
Counting objects: 100% (13/13), done.
Delta compression using up to 4 threads
Compressing objects: 100% (13/13), done.
Writing objects: 100% (13/13), 68.03 KiB | 7.56 MiB/s, done.
Total 13 (delta 4), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (4/4), done.
To https://github.com/1Alisha/Project2.0.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.
```

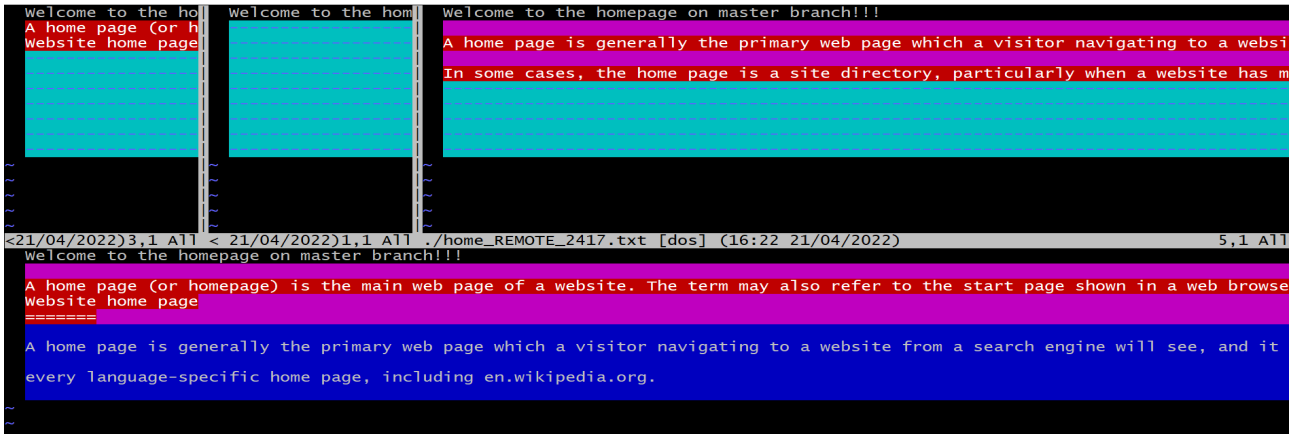
❖ git branch pull “url”

➢ To *pull* the data from the edited *branch*.

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git pull https://github.com/1Alisha/Project2.0.git
remote: Enumerating objects: 7, done.
remote: Counting objects: 100% (7/7), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 5 (delta 2), reused 4 (delta 2), pack-reused 0
Unpacking objects: 100% (5/5), 205.54 KiB | 880.00 KiB/s, done.
From https://github.com/1Alisha/Project2.0
 * branch            HEAD       -> FETCH_HEAD
Updating 9b8352f..7492b19
Fast-forward
 #Kurtis.html          |   2 +-
 Screenshot (17).png | Bin 0 -> 209423 bytes
 2 files changed, 1 insertion(+), 1 deletion(-)
 create mode 100644 Screenshot (17).png
```

❖ git mergetool

➢ To remove conflicts between two branches



❖ git clone “url”

➢ deletes the branch without merging

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop (master)
$ git clone https://github.com/1Alisha/earthLab.git
Cloning into 'earthLab'...
remote: Enumerating objects: 72, done.
remote: Counting objects: 100% (25/25), done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 72 (delta 19), reused 19 (delta 19), pack-reused 47
Receiving objects: 100% (72/72), 9.98 KiB | 123.00 KiB/s, done.
Resolving deltas: 100% (35/35), done.
```

❖ **cd**

➢ To change this current working directory

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop (master)
$ cd earthLab

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/earthLab (main)
```

❖ **touch file.txt**

➢ To create a file

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/earthLab (main)
$ touch task2.txt
```

❖ **vi file.txt**

➢ to either create a new file, or to edit an existing one

```
MINGW64:/c/Users/shubh/Desktop/Revertt
Alisha
Gupta
2110990142
Source code management
~
~
```

❖ **cat file.txt**

```
#include <iostream.h>
using namespace std;

int main(){
cout<<"hello from b2 branch"

return 0,
```

➢ To view the content of file

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ cat student.txt
Alisha
Gupta
2110990142
alishagupta0142.be21@chitkara.edu.in
```

❖ **git remote add upstream “url”**

➢ Add the original repository as remote repository called “upstream”

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/earthLab (main)
$ git remote add upstream "https://github.com/1Alisha/earthLab.git"
```

❖ **git fetch upstream**

➢ Fetch all the changes from the upstream repository

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/earthLab (main)
$ git fetch upstream
From https://github.com/1Alisha/earthLab
 * [new branch]      main       -> upstream/main
```

❖ **git checkout master**

➢ Switch to the master branch of your fork

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/earthLab (main)
$ git checkout main
Already on 'main'
Your branch is up to date with 'origin/main'.
```

❖ **git revert checksum**

➢ The changes from targeted commits are removed from your local workspace.

```
Revert "subject added"

This reverts commit 8f09a9f7a46ea15f32071e7ccbf00ed59e6a3ba1.

# Please enter the commit message for your changes. Lines starting
# with '#' will be ignored, and an empty message aborts the commit.
#
# On branch master
# Changes to be committed:
#       modified:   student.txt
#
```

❖ **.git reset --soft Head~1**

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git reset --soft Head~2
```

❖ .git reset --mixed Head~1

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git reset --mixed Head~2
Unstaged changes after reset:
M       student.txt
```

❖ git reset --hard Head~1

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git reset --hard Head~2
HEAD is now at 8f09a9f subject added
```

❖ git reset checksum --hard

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Revertt (master)
$ git reset edfbc88 --hard
HEAD is now at edfbc88 using reset mixe
```

❖ **mkdir**

➢ To make a new directory

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ mkdir scm

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ ls
oops.cpp  scm/
```

❖ **git add .**

➢ **This adds the untracked file in staging area**

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Final (master)
$ git add .
```

❖ **:wq + enter**

➢ To exit any command

```
~
oops.cpp [dos] (17:32 20/05/2022)                          7,14-21 All
:wq
```

❖ **git remote –v**

➢ This shows which remote is associated with which URL

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git remote -v
origin  https://github.com/1Alisha/Project2.0.git (fetch)
origin  https://github.com/1Alisha/Project2.0.git (push)
```

❖ **git branch -r**

➢ This shows which remote is linked with which branch

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git branch -r
  origin/master
```

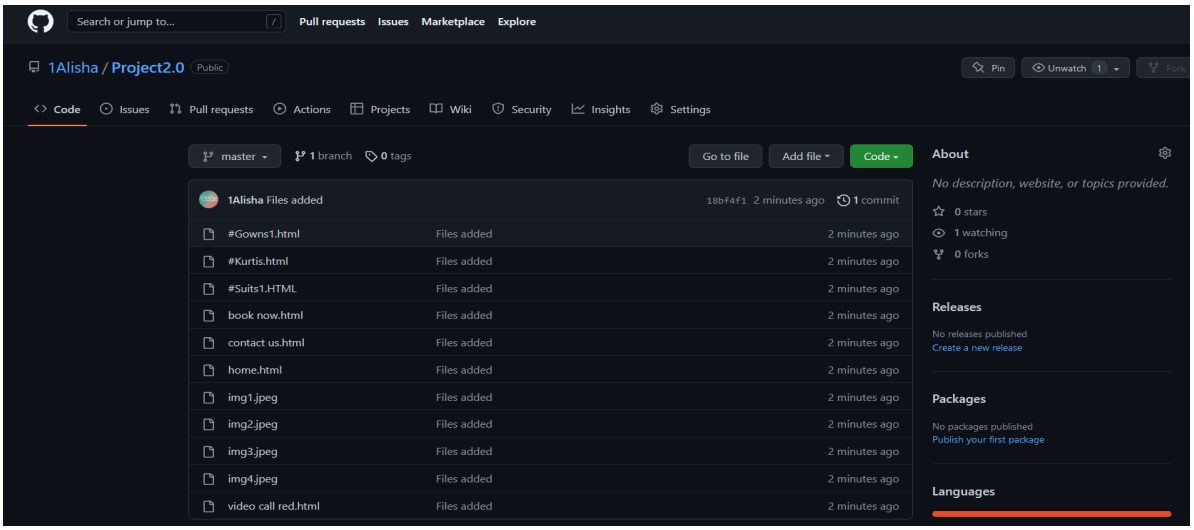
❖ **git branch -a**

➢ Shows the master branch of local repository

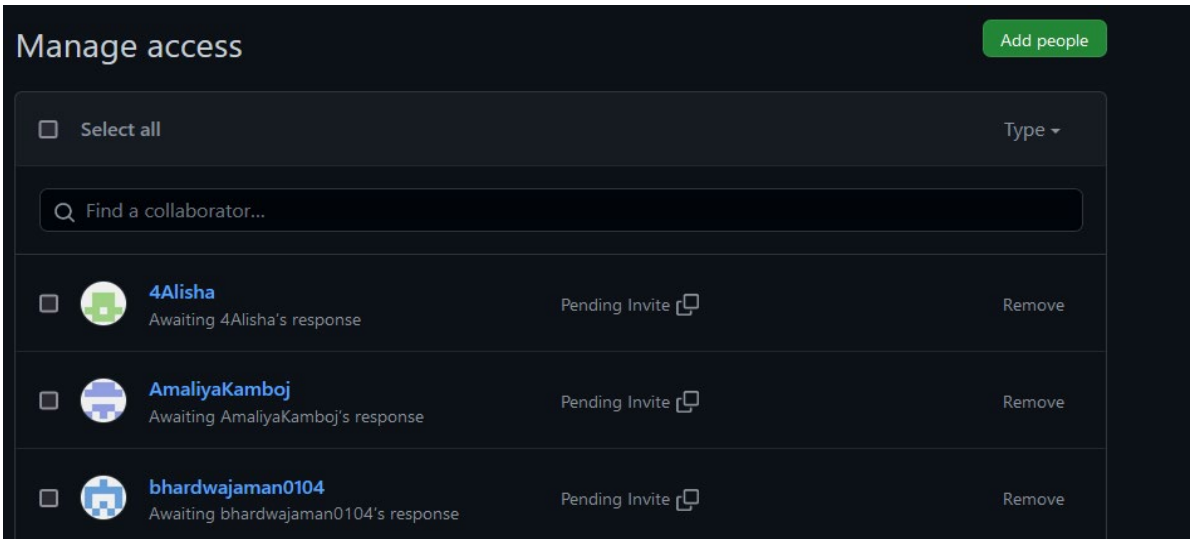
```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git branch -a
* master
  remotes/origin/master
```

❖ Firstly make a repository and add members in project team:

- Login to your Github account and you will land on the homepage as shown below. Click on Repositories to create a new repository



- Add your team members as collaborators



- After accepting the invitation, all members are ready to contribute to the project

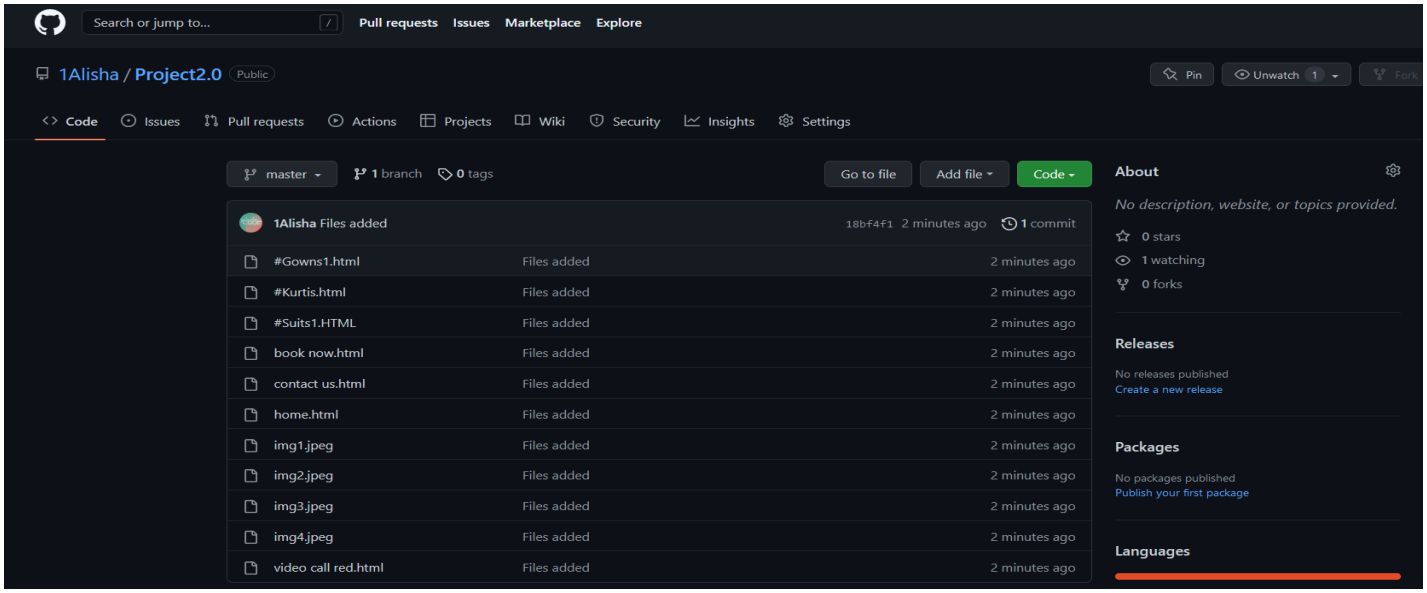
My snapshot's of collaboration ->

MINGW64:/c/Users/shubh/Desktop/Project 2.0

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git init
Initialized empty Git repository in C:/Users/shubh/Desktop/Project 2.0/.git/

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git add --a
g
```

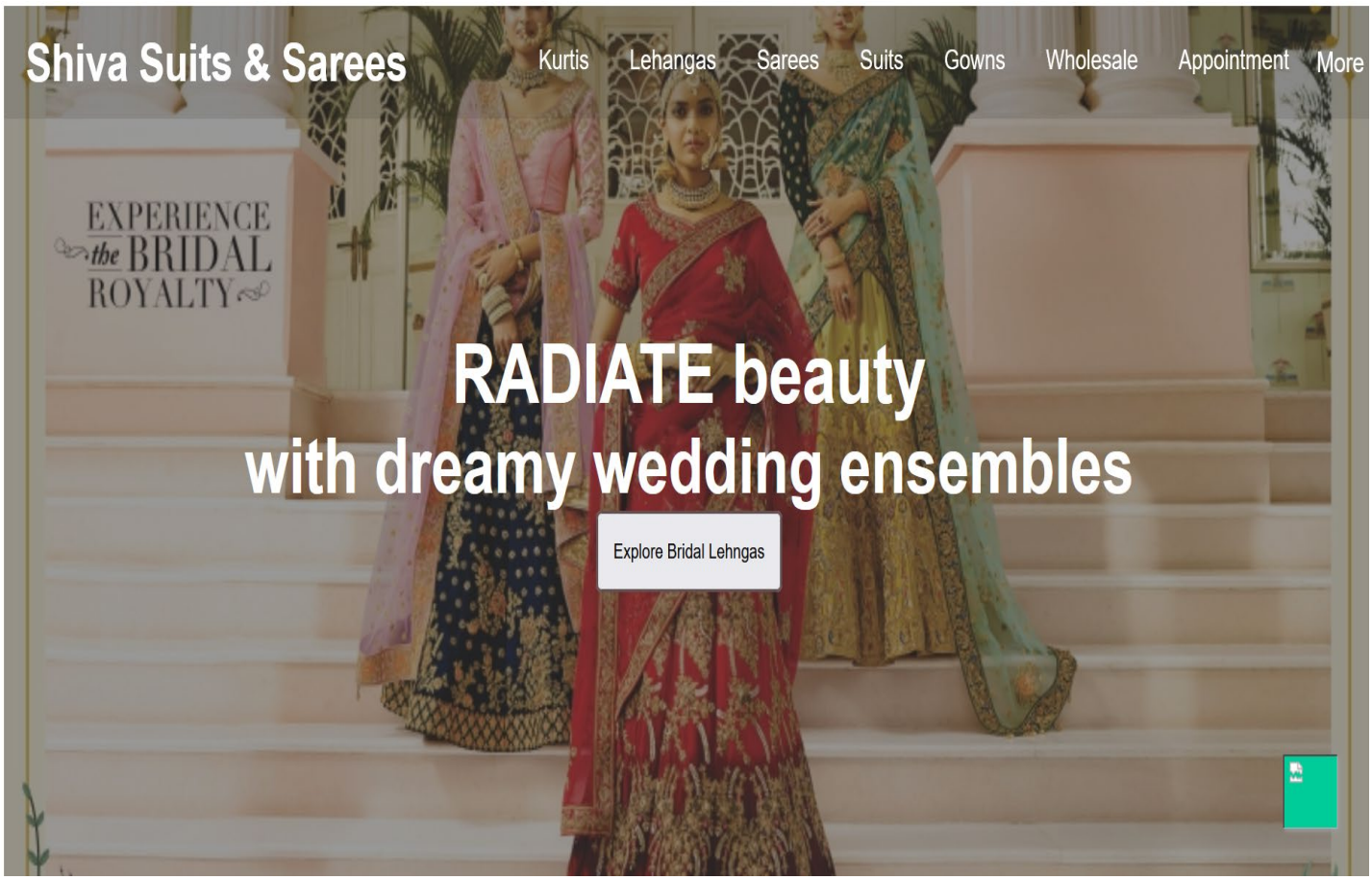
```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git commit -m"Files added"
[master (root-commit) 18bf4f1] Files added
 11 files changed, 2349 insertions(+)
 create mode 100644 #Gowns1.html
 create mode 100644 #Kurtis.html
 create mode 100644 #Suits1.HTML
 create mode 100644 book now.html
 create mode 100644 contact us.html
 create mode 100644 home.html
 create mode 100644 img1.jpeg
 create mode 100644 img2.jpeg
 create mode 100644 img3.jpeg
 create mode 100644 img4.jpeg
 create mode 100644 video call red.html

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git remote add origin https://github.com/1Alisha/Project2.0.git
```

```
shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git push -u origin master
Enumerating objects: 13, done.
Counting objects: 100% (13/13), done.
Delta compression using up to 4 threads
Compressing objects: 100% (13/13), done.
Writing objects: 100% (13/13), 68.03 KiB | 7.56 MiB/s, done.
Total 13 (delta 4), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (4/4), done.
To https://github.com/1Alisha/Project2.0.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git add --a

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git commit -m"css added"
[master 9b8352f] css added
 2 files changed, 241 insertions(+)
 create mode 100644 site.css
 create mode 100644 styles.css

shubh@DESKTOP-0L79L8D MINGW64 ~/Desktop/Project 2.0 (master)
$ git push -u origin master
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 1.74 KiB | 1.74 MiB/s, done.
Total 4 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/1Alisha/Project2.0.git
   18bf4f1..9b8352f  master -> master
branch 'master' set up to track 'origin/master'.
```



This is how my uploaded Web pages looks like:

Home page of the website

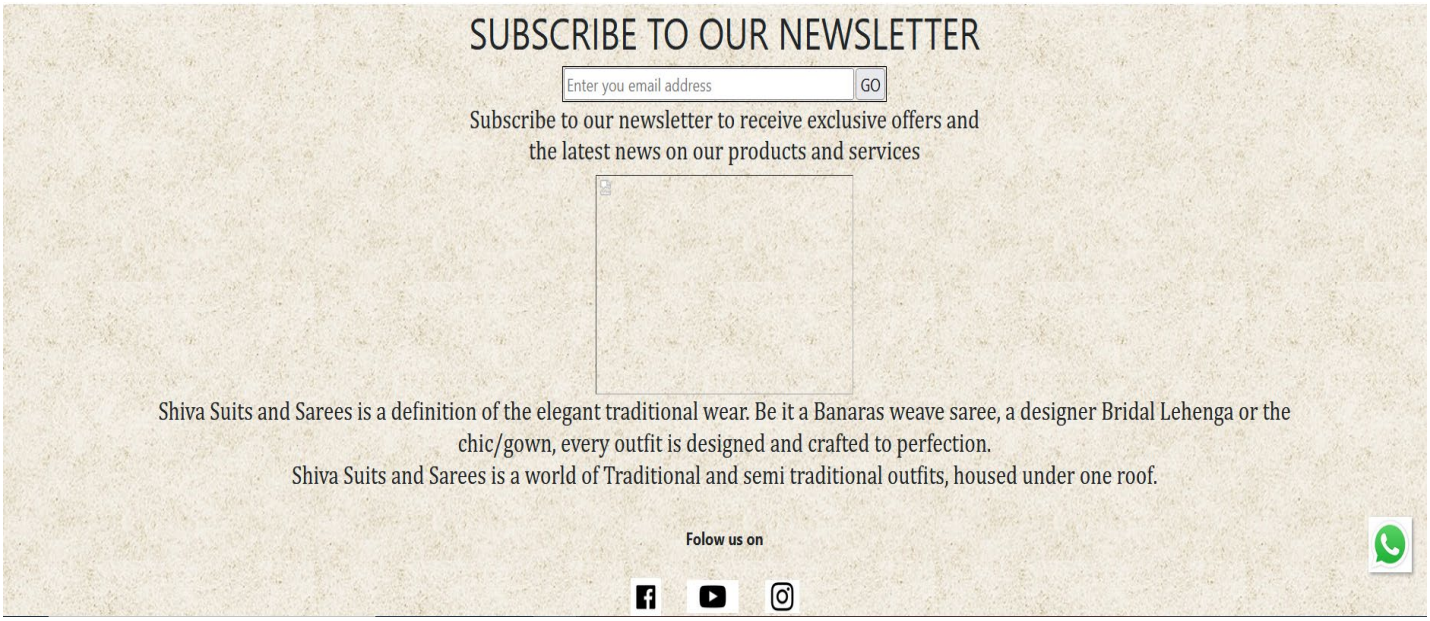


Gown's page


Stunning Festive
₹ 45,000
Trendy Attire
₹ 42,000
Radiate Joy
₹ 50,000
Stunning
₹ 35,000
Beautiful
₹ 40,000
Festivities
₹ 42,000
Enquire now
Enchanting Style
Exuberant Choice
₹ 47,599
Blooming Bright

Payment gateway for the website

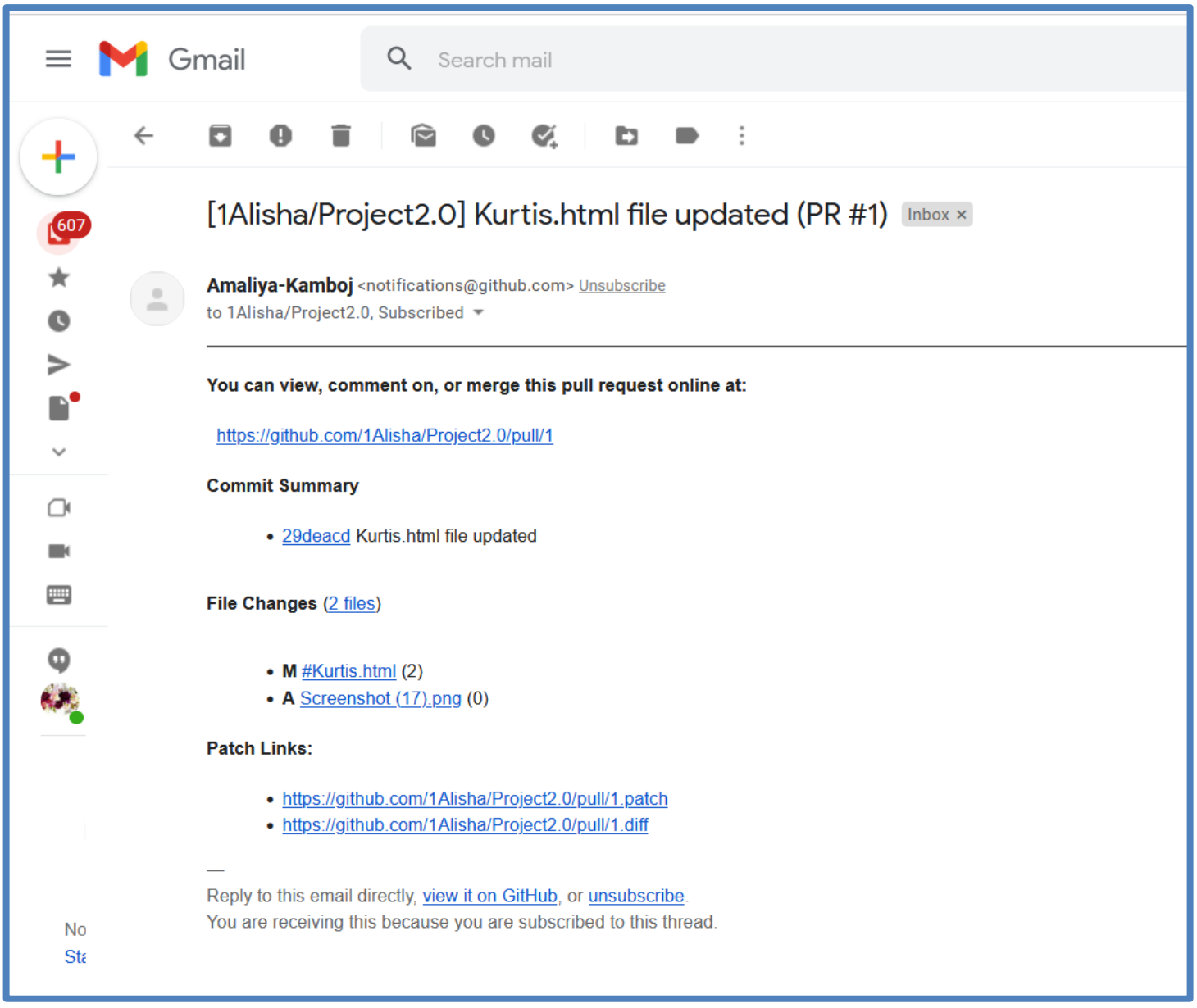
Footer



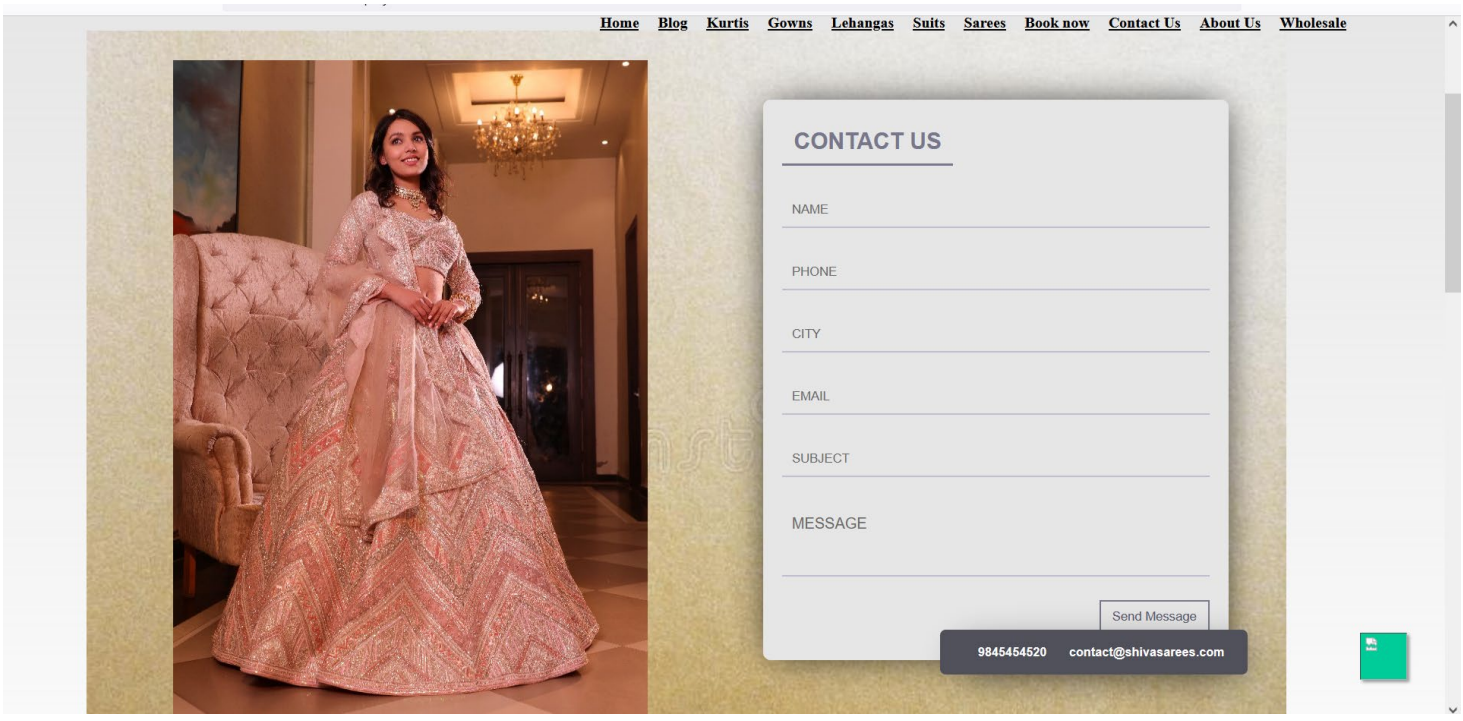
Only home page, Gown's page, payment gateway, Navbar is inserted in it.

Now collaborators have to do fork, clone "Project2.0" repository in localdrive, add other web pages, commit it, pull it in their fork repository and sendme 'pull request' so that I can add those web pages in my website.

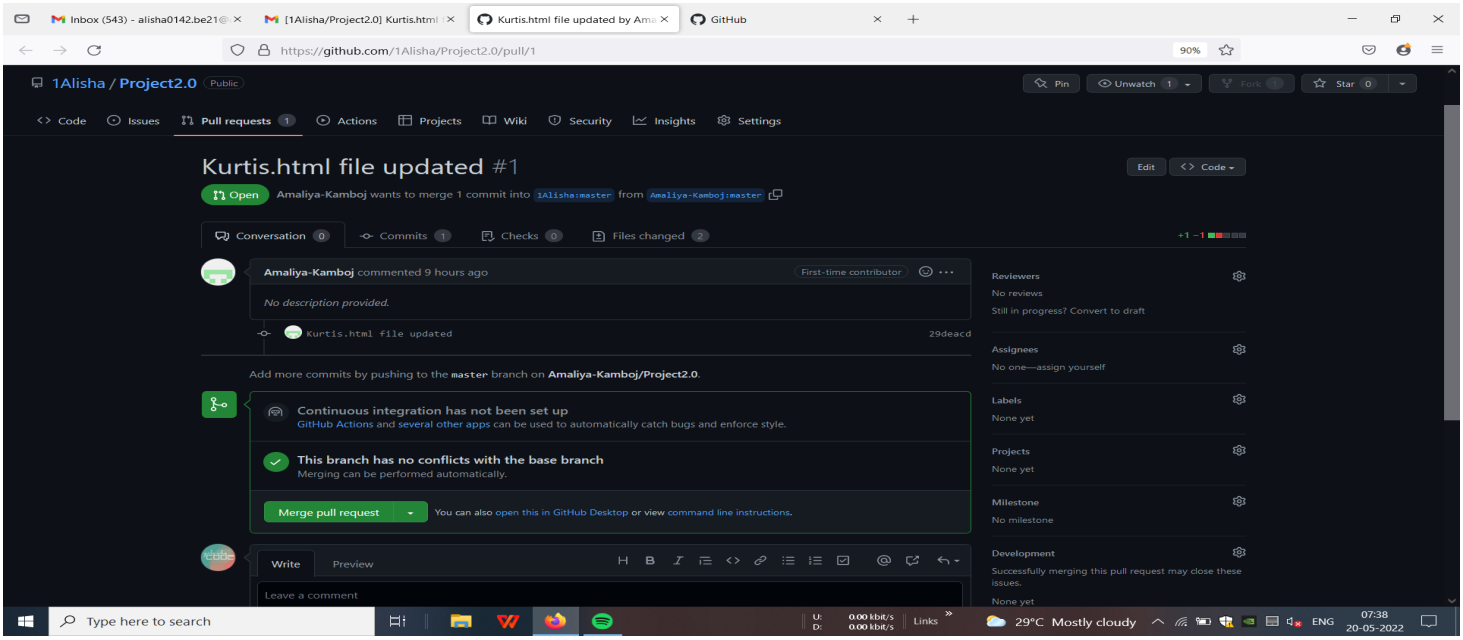
Amaliya's snapshot's of collaboration ->



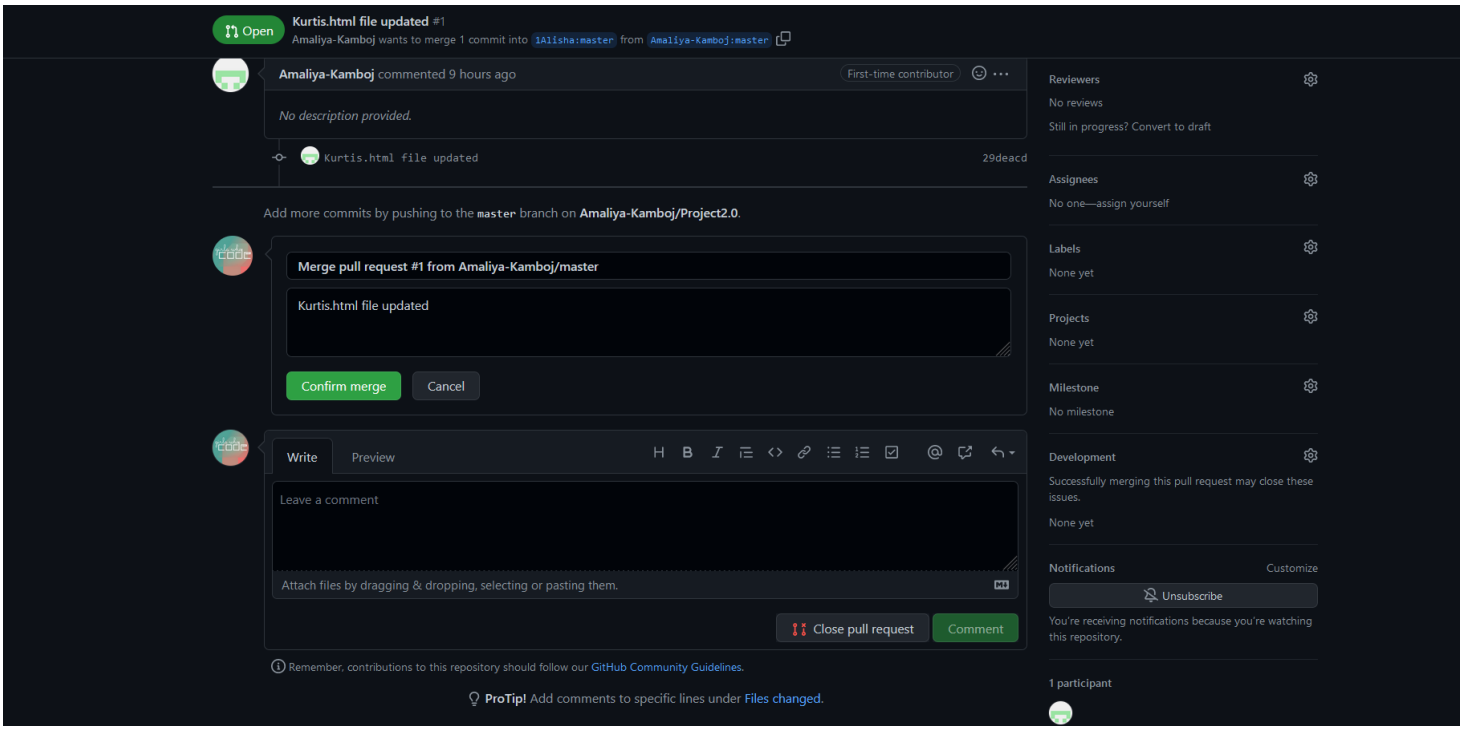
Kurti's page and contact us page added by Amaliya



Opened the pull request sent by Amaliya.



Added Kurtis.html file in the website and confirmed merging of 1Alisha:master from AmaliyaKamboj:master.



Now to Publish and print network graphs.

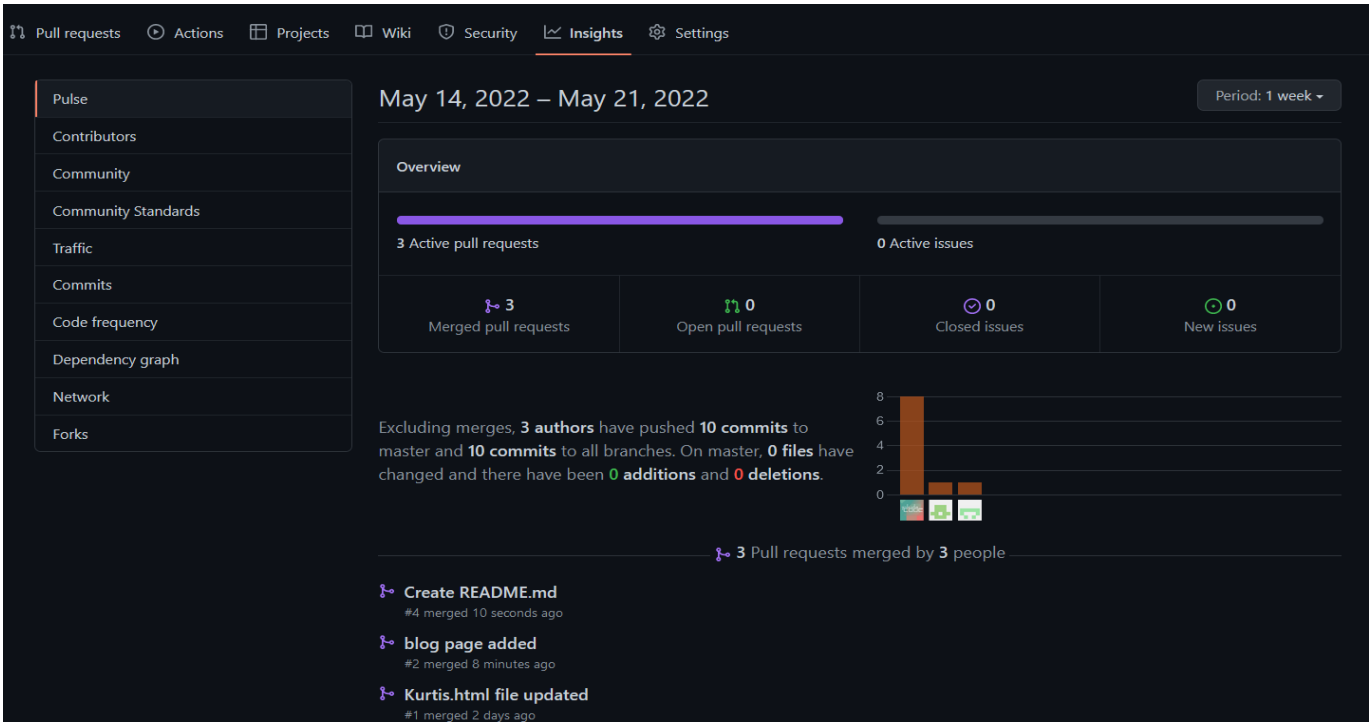
The network graph is one of the useful features for developers on GitHub. It is used to display the branch history of the entire repository network, including branches of the root repository and branches of forks that contain commits unique to the network. A repository's graphs give you information on traffic, projects that depend on the repository, contributors and commits to the repository, and a repository's forks and network. If you maintain a repository, you can use this data to get a better understanding of who's using your repository and why they're using it.

Some repository graphs are available only in public repositories with GitHub Free

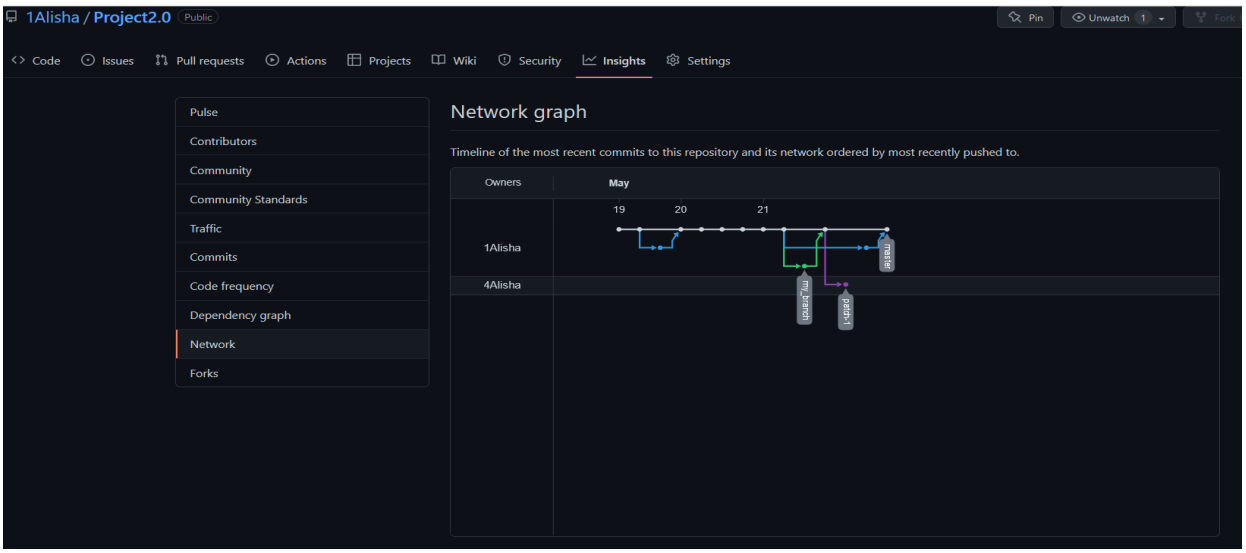
- Pulse
- Contributors
- Commits
- Code frequency
- Network

Steps to access network graphs of respective repository:

1. On GitHub.com, navigate to the main page of the repository.
2. Under your repository name, click Insights.



At the left sidebar, click on Network.

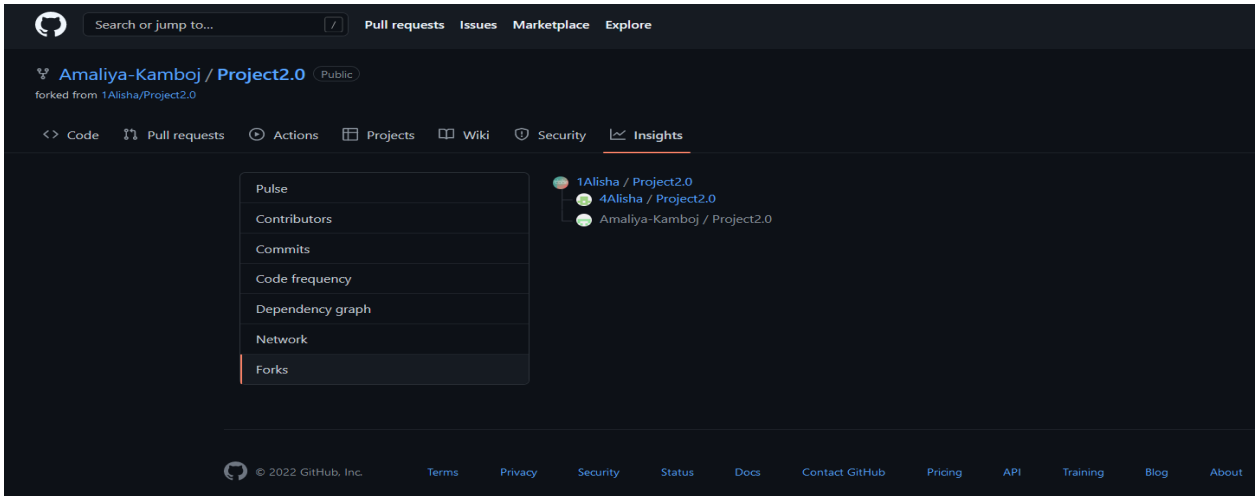


You will get the network graph of your repository which displays the branch history of the entire repository network, including branches of the root repository and branches of forks that contain commits unique to the network.

Listing the forks of a repository:

Forks are listed alphabetically by the username of the person who forked the repository clicking the number of forks shows you the full network. From there you can click "members" to see who forked the repo

1. On GitHub.com, navigate to the main page of the repository.
2. Under your repository name, click **Insights.**
3. In the left sidebar, click **Forks.**



6. References

S.no.	Links
1.	https://stackoverflow.com/questions/3528245/whats-the-difference-between-git-reset-mixed-soft-and-hard
2.	https://initialcommit.com/blog/Technical-Guide-VCS-Internals
3.	https://www.geeksforgeeks.org/version-control-systems/
4.	https://git-scm.com/book/en/v2/Getting-Started-About-Version-Control
5.	https://dzone.com/articles/top-20-git-commands-with-examples
6.	https://www.toolsqa.com/git/what-is-git/
7.	https://www.javatpoint.com/git-reset