

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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Lab Experiment Record

Project Management with Git [BCSL58C]

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GSSS INSTITUTE OF ENGINEERING & TECHNOLOGY FOR WOMEN

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BASICS

1.git config

This command is used to customize the Git environment, typically defining the user's identity for associating commits. The --global flag ensures the setting applies to all local repositories.

2.git init

Initializes a new local Git repository.

This provides an overview of which files are modified, staged, or untracked, helping the user manage their changes effectively.

3.Tracking and Committing Changes

These commands manage the movement of files between the working directory, the staging area, and the local repository history.

*git add <file> :- Moves changes from the working directory to the staging area.

*git commit -m "msg" -Records staged changes as a permanent snapshot in the repository history

This creates a new, unique commit object with a descriptive message, effectively creating a specific version of the project at that point in time

4.git status →how the state of the working directory and staging area.

This provides an overview of which files are modified, staged, or untracked, helping the user manage their changes effectively.

5.git clone <URL> →Creates a complete local copy of an existing remote repository.

6. git push → Uploads local commits to a remote repository.

This shares local changes with collaborators and updates the remote branch with the latest local progress .

7. git pull → Fetches changes from a remote repository and immediately merges them into the current local branch.

Experiment 1 : Setting Up and Basic Commands

Initialize a new Git repository in a directory. Create a new file and add it to the staging area and commit the changes with an appropriate commit message.

Solution:

To initialize a new Git repository in a directory, create a new file, add it to the staging area, and commit the changes with an appropriate commit message, follow these steps:

1. Open your Git Bash and navigate to the directory where you want to create a git repository. (You can create a new folder and open that folder and right click and select a option open git Bash here).
2. You can set the global configuration with these git commands:

```
$ git config --global user.name "Your Name"
```

```
$ git config --global user.email "your.email@gmail.com"
```

```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git config --global user.name "BTanmayi30"
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git config --global user.email "btanmayi.1234@gmail.com"
```

3. Initialize a new Git repository in that directory:

```
$ git init
```

4. Next, create a new file in the directory. For example, let's create a file named "git_lab.docx" You can use any text editor or command-line tools to create the file.

5. Add the newly created file to the staging area ,with the following git command.

```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git add git_lab.docx
```

This command stages the file for the upcoming commit.

6. Commit the changes with an appropriate commit message.

```
$ git commit -m "Your commit message here"
```

```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git commit -m "practice for git_lab"
[master (root-commit) a8cf20b] practice for git_lab
1 file changed, 0 insertions(+), 0 deletions(-)
create mode 100644 git_lab.docx
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ |
```

Your commit message should briefly describe the purpose or nature of the changes you made. For example: `$ git commit -m "Add a new file called git_lab.docx"` After these steps, your changes will be committed to the Git repository with the provided commit message. You now have a version of the repository with the new file and its history stored in Git.

4. Make your changes in the "feature-branch" by adding, modifying, or deleting files as needed.

Stage and commit your changes in the "feature-branch": Replace "Your commit message for feature-branch" with a descriptive commit message for the changes you made in the "feature-branch."

5. Switch back to the "master" branch:

```
$ git checkout master
```

6. Merge the "feature-branch" into the "master" branch:

```
$ git merge feature-branch
```



```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (feature-branch)
$ git checkout master
Switched to branch 'master'

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git merge feature-branch
Updating a8cf20b..371af20
Fast-forward
 1 file changed, 0 insertions(+), 0 deletions(-)

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$
```

This command will incorporate the changes from the "feature-branch" into the "master" branch. Now, your changes from the "feature-branch" have been merged into the "master" branch. Your project's history will reflect the changes made in both branches

Experiment 3.

Creating and Managing Branches:

Write the commands to stash your changes, switch branches, and then apply the stashed changes.

Solution: To stash your changes, switch branches, and then apply the stashed changes in Git, you can use the following commands:

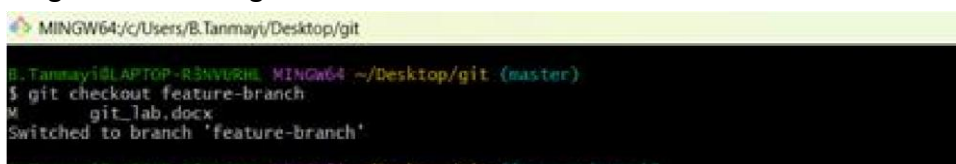
1. Stash your changes:

`$ git stash save "Your stash message"`

This command will save your changes in a stash, which acts like a temporary storage for changes that are not ready to be committed.

2. Switch to the desired branch:

`$ git checkout target-branch`



```
MINGW64/c:/Users/B.Tanmayi/Desktop/git
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git checkout feature-branch
M       git_lab.docx
Switched to branch 'feature-branch'
```

Replace "target-branch" with the name of the branch you want to switch to.

3. Apply the stashed changes: `$ git stash apply`



```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (feature-branch)
$ git stash apply
On branch feature-branch
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    modified:   git_lab.docx
    new file:   ~$git_lab.docx
```

This command will apply the most recent stash to your current working branch.

If you have multiple stashes, you can specify a stash by name or reference (e.g., `git stash apply stash@{2}`) if needed.

If you want to remove the stash after applying it, you can use `git stash pop` instead of `git stash apply`.

Remember to replace "Your stash message" and "target-branch" with the actual message you want for your stash and the name of the branch you want to switch to.

Experiment 4

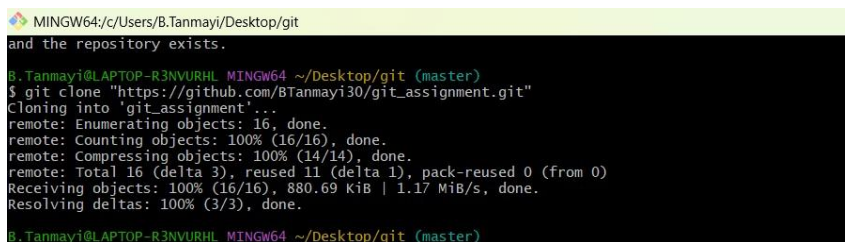
Collaboration and Remote Repositories:

Clone a remote Git repository to your local machine.

Solution:

To clone a remote Git repository to your local machine, follow these steps:

1. Open your terminal or command prompt.
2. Navigate to the directory where you want to clone the remote Git repository. You can use the `cd` command to change your working directory.
3. Use the `git clone` command to clone the remote repository. Replace with the URL of the remote Git repository you want to clone. For example, if you were cloning a repository from GitHub, the URL might look like this: `$ git clone`



```
MINGW64:/c:/Users/B.Tanmayi/Desktop/git
and the repository exists.

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git clone "https://github.com/BTanmayi30/git_assignment.git"
Cloning into 'git_assignment'...
remote: Enumerating objects: 16, done.
remote: Counting objects: 100% (16/16), done.
remote: Compressing objects: 100% (14/14), done.
remote: Total 16 (delta 3), reused 11 (delta 1), pack-reused 0 (from 0)
Receiving objects: 100% (16/16), 880.69 KiB | 1.17 MiB/s, done.
Resolving deltas: 100% (3/3), done.

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
```

Here's a full example: `$ git clone https://github.com/username/repo-name.git` Replace `https://github.com/username/repo-name.git` with the actual URL of the repository you want to clone.

4. Git will clone the repository to your local machine. Once the process is complete, you will have a local copy of the remote repository in your chosen directory. You can now work with the cloned repository on your local machine, make changes, and push those changes back to the remote repository as needed.

Experiment 5

Collaboration and Remote Repositories:

Fetch the latest changes from a remote repository and rebase your local branch onto the updated remote branch.

Solution:

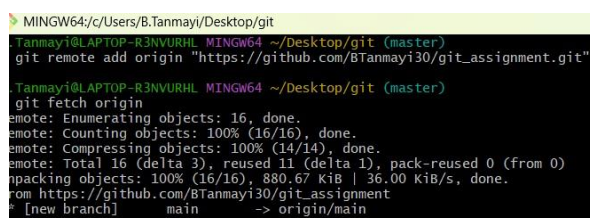
To fetch the latest changes from a remote repository and rebase your local branch onto the updated remote branch in Git, follow these steps:

1. Open your terminal or command prompt.
2. Make sure you are in the local branch that you want to rebase. You can switch to the branch using the following command, replacing with your actual branch name:

```
$ git checkout
```

3. Fetch the latest changes from the remote repository. This will update your local repository with the changes from the remote without merging them into your local branch:

```
$ git fetch origin
```



```
MINGW64/c/Users/B.Tanmayi/Desktop/git
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git remote add origin "https://github.com/BTanmayi30/git_assignment.git"
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git fetch origin
remote: Enumerating objects: 16, done.
remote: Counting objects: 100% (16/16), done.
remote: Compressing objects: 100% (14/14), done.
remote: Total 16 (delta 3), reused 11 (delta 1), pack-reused 0 (from 0)
Unpacking objects: 100% (16/16), 880.67 KiB | 36.00 KiB/s, done.
From https://github.com/BTanmayi30/git_assignment
* [new branch]      main       -> origin/main
```

```
$ git rebase origin/
```



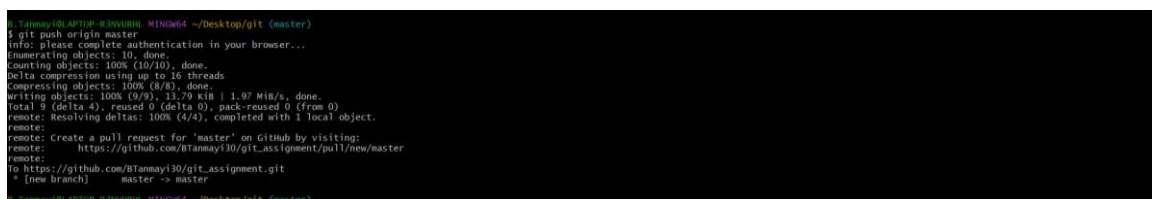
```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master|REBASE 1/3)
$ git rebase origin/master
```

Here, origin is the default name for the remote repository.

If you have multiple remotes, replace origin with the name of the specific remote you want to fetch from.

4. Once you have fetched the latest changes, rebase your local branch onto the updated remote branch: Replace with the name of the remote branch you want to rebase onto. This command will reapply your local commits on top of the latest changes from the remote branch, effectively incorporating the remote changes into your branch history.

5. Resolve any conflicts that may arise during the rebase process. Git will stop and notify you if there are conflicts that need to be resolved. Use a text editor to edit the conflicting files, save the changes, and then continue the rebase with: `$ git rebase --continue`
6. After resolving any conflicts and completing the rebase, you have successfully updated your local branch with the latest changes from the remote branch.
7. If you want to push your rebased changes to the remote repository, use the git push command. However, be cautious when pushing to a shared remote branch, as it can potentially overwrite other developers' changes: `$ git push origin`



```
BTanmay@Bartan-Rajivonn: ~/Desktop/git (master)
$ git push origin master
info: please complete authentication in your browser...
Enumerating objects: 10, done.
Counting objects: 100% (10/10), done.
Delta compression using up to 16 threads
Compressing objects: 100% (8/8), done.
Writing objects: 100% (9/9), 11.79 KiB | 1.97 MiB/s, done.
Total 9 (delta 4), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (4/4), completed with 1 local object.
remote:
remote: Create a pull request for 'master' on GitHub by visiting:
remote:   https://github.com/BTanmay130/git_assignment/pull/new/master
remote:
to https://github.com/BTanmay130/git_assignment.git
* [new branch]      master -> master
```

Replace with the name of your local branch.

By following these steps, you can keep your local branch up to date with the latest changes from the remote repository and maintain a clean and linear history through rebasing.

Experiment 6.

Collaboration and Remote Repositories:

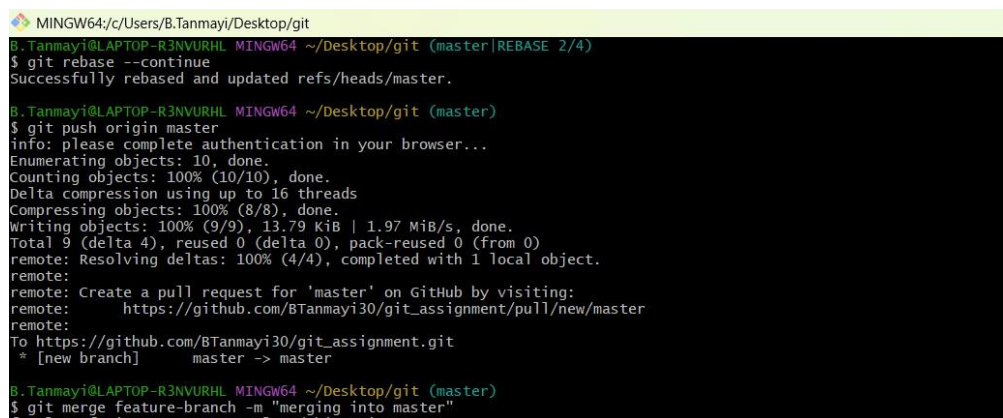
Write the command to merge "feature-branch" into "master" while providing a custom commit message for the merge.

Solution:

To merge the "feature-branch" into "master" in Git while providing a custom commit message for the merge, you can use the following command:

```
$ git checkout master
```

```
$ git merge feature-branch -m "Your custom commit message here"
```



```
MINGW64; c:/Users/B.Tanmayi/Desktop/git
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master|REBASE 2/4)
$ git rebase --continue
Successfully rebased and updated refs/heads/master.

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git push origin master
info: please complete authentication in your browser...
Enumerating objects: 10, done.
Counting objects: 100% (10/10), done.
Delta compression using up to 16 threads
Compressing objects: 100% (8/8), done.
Writing objects: 100% (9/9), 13.79 KiB | 1.97 MiB/s, done.
Total 9 (delta 4), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (4/4), completed with 1 local object.
remote:
remote: Create a pull request for 'master' on GitHub by visiting:
remote:   https://github.com/BTanmayi30/git_assignment/pull/new/master
remote:
To https://github.com/BTanmayi30/git_assignment.git
 * [new branch]      master -> master

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git merge feature-branch -m "merging into master"
```

Replace "Your custom commit message here" with a meaningful and descriptive commit message for the merge. This message will be associated with the merge commit that is created when you merge "feature-branch" into "master."

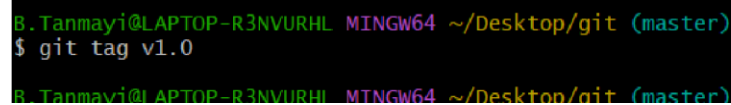
Experiment 7.**Git Tags and Releases:**

Write the command to create a lightweight Git tag named "v1.0" for a commit in your local repository.

Solution:

To create a lightweight Git tag named "v1.0" for a commit in your local repository, you can use the following command:

```
$ git tag v1.0
```



```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git tag v1.0
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
```

This command will create a lightweight tag called "v1.0" for the most recent commit in your current branch. If you want to tag a specific commit other than the most recent one, you can specify the commit's SHA-1 hash after the tag name. For example:

```
$ git tag v1.0 <commit-id>
```

Experiment 8.

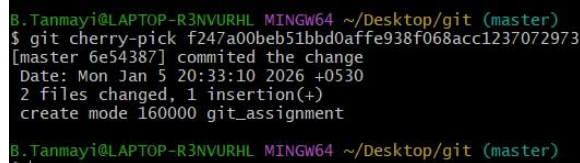
Advanced Git Operations:

Write the command to cherry-pick a range of commits from "source-branch" to the current branch.

Solution:

To cherry-pick a range of commits from "source-branch" to the current branch, you can use the following command:

```
$ git cherry-pick <start-commit>^..<end-commit>
```



```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git cherry-pick f247a00beb51bbd0affe938f068acc1237072973
[master 6e54387] committed the change
Date: Mon Jan 5 20:33:10 2026 +0530
2 files changed, 1 insertion(+)
create mode 160000 git_assignment
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
```

Replace with the commit at the beginning of the range, and with the commit at the end of the range. The ^ symbol is used to exclude the itself and include all commits after it up to and including . This will apply the changes from the specified range of commits to your current branch. For example, if you want to cherry-pick a range of commits from "source-branch" starting from commit ABC123 and ending at commit DEF456, you would use:

```
$ git cherry-pick ABC123^..DEF456
```

Make sure you are on the branch where you want to apply these changes before

Experiment 9.

Analysing and Changing Git History:

Given a commit ID, how would you use Git to view the details of that specific commit, including the author, date, and commit message? Solution:

To view the details of a specific commit, including the author, date, and commit message, you can use the `git show` or `git log` command with the commit ID. Here are both options:

1. Using `git show`:

bash

`git show <commit-id>`

```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git rev-parse HEAD
f247a00beb51bbd0affe938f068acc1237072973

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git show f247a00beb51bbd0affe938f068acc1237072973
commit f247a00beb51bbd0affe938f068acc1237072973 (HEAD -> master, tag: v1.0, origin/master)
Author: BTanmayi30 <btanmayi.1234@gmail.com>
Date: Mon Jan 5 20:33:10 2026 +0530

    committed the change

diff --git a/git_assignment b/git_assignment
new file mode 160000
index 0000000..9b934d3
--- /dev/null
+++ b/git_assignment
@@ -0,0 +1 @@
+Subproject commit 9b934d30b29ad97026212fee741229f4ec0afbd5
diff --git a/git_lab.docx b/git_lab.docx
index e78a03b..c2820b9 100644
--- a/git_lab.docx
+++ b/git_lab.docx
@@ -1,1 @@
- Git_
+ Git_lab

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$
```

Replace with the actual commit ID you want to view. This command will display detailed information about the specified commit, including the commit message, author, date, and the changes introduced by that commit. For example:

`$ git show abc123 2.`

Using `git log`:

`$ git log -n 1`

```
git_log
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git log -n 1 f247a00beb51bbd0affe938f068acc1237072973
commit f247a00beb51bbd0affe938f068acc1237072973 (HEAD -> master, tag: v1.0, origin/master)
Author: BTanmayi30 <btanmayi.1234@gmail.com>
Date: Mon Jan 5 20:33:10 2026 +0530

    committed the change

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$
```

For example: The `-n 1` option tells Git to show only one commit. Replace with the actual commit ID.

This command will display a condensed view of the specified commit, including its commit message, author, date, and commit ID. `$ git log -n 1 abc123` Both of these commands will provide you with the necessary information about the specific commit you're interested in.

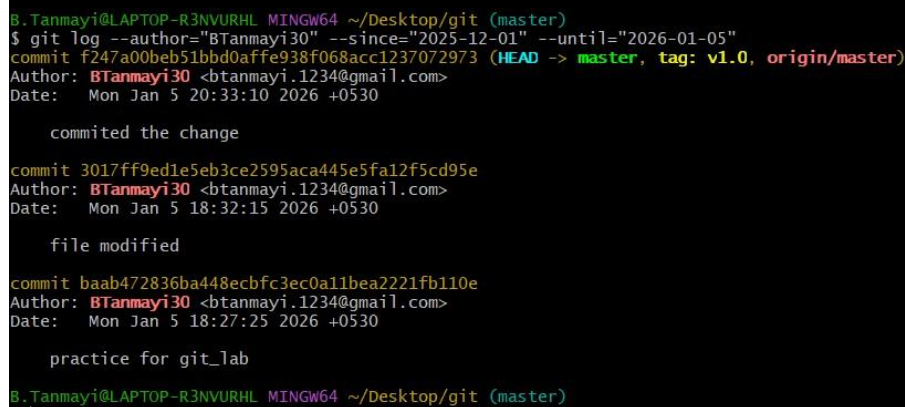
Experiment 10.

Analysing and Changing Git History

Write the command to list all commits made by the author "JohnDoe" between "2023-01-01" and "2023-12-31."

Solution: To list all commits made by the author "JohnDoe" between "2023-01-01" and "2023-12-31" in Git, you can use the git log command with the --author and --since and --until options. Here's the command:

```
$ git log --author="JohnDoe" --since="2023-01-01" --until="2023-12-31"
```



```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git log --author="BTanmayi30" --since="2025-12-01" --until="2026-01-05"
commit f247a00beb51bbd0affe938f068acc1237072973 (HEAD -> master, tag: v1.0, origin/master)
Author: BTanmayi30 <btanmayi.1234@gmail.com>
Date: Mon Jan 5 20:33:10 2026 +0530

    committed the change

commit 3017ff9ed1e5eb3ce2595aca445e5fa12f5cd95e
Author: BTanmayi30 <btanmayi.1234@gmail.com>
Date: Mon Jan 5 18:32:15 2026 +0530

    file modified

commit baab472836ba448ecbfc3ec0a11bea2221fb110e
Author: BTanmayi30 <btanmayi.1234@gmail.com>
Date: Mon Jan 5 18:27:25 2026 +0530

    practice for git_lab

B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
```

This command will display a list of commits made by the author "JohnDoe" that fall within the specified date range, from January 1, 2023, to December 31, 2023. Make sure to adjust the author name and date range as needed for your specific use case.

Experiment 11.

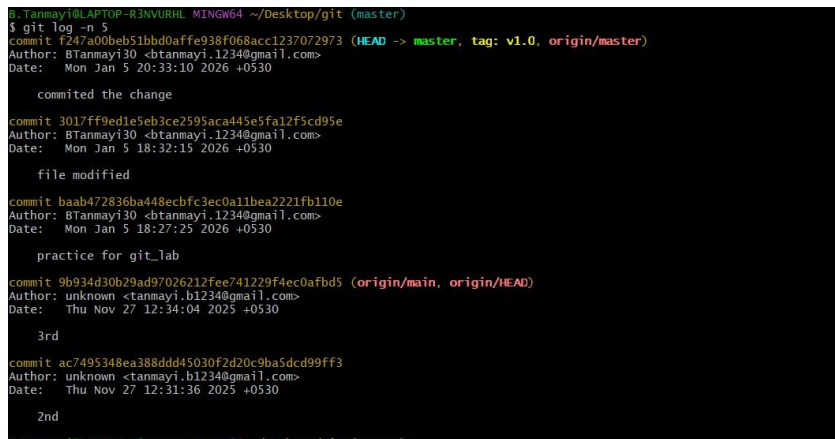
Analysing and Changing Git History

Write the command to display the last five commits in the repository's history.

Solution:

To display the last five commits in a Git repository's history, you can use the `git log` command with the `-n` option, which limits the number of displayed commits. Here's the command:

```
$ git log -n 5
```



```
B.Tanmayi@LAPTOP-R3NVURHL MINGW64 ~/Desktop/git (master)
$ git log -n 5
commit f247a00beb51bbd0affe938f068acc1237072973 (HEAD -> master, tag: v1.0, origin/master)
Author: BTanmayi30 <btanmayi.1234@gmail.com>
Date: Mon Jan 5 20:33:10 2026 +0530

    committed the change

commit 3017ff9ed1e5eb3ce2595aca445e5fa12f5cd95e
Author: BTanmayi30 <btanmayi.1234@gmail.com>
Date: Mon Jan 5 18:32:15 2026 +0530

    file modified

commit baab472836ba448ecbfc3ec0a11bea2221fb110e
Author: BTanmayi30 <btanmayi.1234@gmail.com>
Date: Mon Jan 5 18:27:25 2026 +0530

    practice for git_lab

commit 9b934d30b29ad97026212fee741229f4ec0afbd5 (origin/main, origin/HEAD)
Author: unknown <tanmayi.b1234@gmail.com>
Date: Thu Nov 27 12:34:04 2025 +0530

    3rd

commit ac7495348ea388ddd45030f2d20c9ba5dcd99ff3
Author: unknown <tanmayi.b1234@gmail.com>
Date: Thu Nov 27 12:31:36 2025 +0530

    2nd
```

This command will show the last five commits in the repository's history. You can adjust the number after `-n` to display a different number of commits if needed

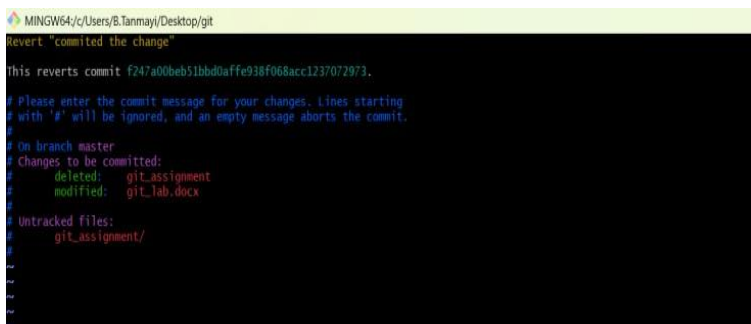
Experiment 12.

Analysing and Changing Git History

Write the command to undo the changes introduced by the commit with the ID "abc123".

Solution: To undo the changes introduced by a specific commit with the ID "abc123" in Git, you can use the `git revert` command. The `git revert` command creates a new commit that undoes the changes made by the specified commit, effectively "reverting" the commit. Here's the command:

```
$ git revert abc123
```



```
MINGW64/c/Users/B.Tanmay/Desktop/git
Revert "committed the change"

This reverts commit f247a00beb51bbd0affe938f068acc1237072973.

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:
#   deleted:   git_assignment
#   modified:  git_lab.docx
#
# Untracked files:
#   git_assignment/
#
#
```

Replace "abc123" with the actual commit ID that you want to revert. After running this command, Git will create a new commit that negates the changes introduced by the specified commit. This is a safe way to undo changes in Git because it preserves the commit history and creates a new commit to record the reversal of the changes.

REPO LINK: “<https://github.com/BTanmayi30/4GW24CI005.git>”