



Academic Year: 2024-25

Semester: V

Class / Branch: TEIT

Subject: DevOps Lab

Name of Instructor: Ms. Sujata Oak

Experiment No. 2

Aim: To perform installation of Git and work on local and remote Git repositories.

GIT is a Version Control System (VCS) (aka Revision Control System (RCS), Source Code Manager (SCM)). A VCS serves as a Repository (or repo) of program codes, including all the historical revisions. It records changes to files at so-called commits in a log so that you can recall any file at any commit point.

To issue a command, start a "Terminal" (for Ubuntu/Mac) or "Git Bash" (for Windows):

```
$ git <command> <arguments>
```

The commonly-used commands are:

1. **init, clone, config**: for starting a Git-managed project.
2. **add, mv, rm**: for staging file changes.
3. **commit, rebase, reset, tag**:
4. **status, log, diff, grep, show**: show status
5. **checkout, branch, merge, push, fetch, pull**

Getting Started with Local Repo

There are 2 ways to start a Git-managed project:

1. Starting your own project;
2. Cloning an existing project from a GIT host.

Git uses two stages to commit file changes:

1. "git add <file>" to stage file changes into the staging area, and
2. "git commit" to commit ALL the file changes in the staging area to the local repo.



You need to setup Git on your local machine, as follows:

```
devasc@labvm:~$ cd Desktop/  
devasc@labvm:~/Desktop$ cd git-sujata/  
devasc@labvm:~/Desktop/git-sujata$ ls  
devasc@labvm:~/Desktop/git-sujata$ pwd  
/home/devasc/Desktop/git-sujata
```

To update all local package index for ubuntu:

\$sudo su

#apt update

```
devasc@labvm:~/Desktop/git-sujata$ sudo su  
root@labvm:/home/devasc/Desktop/git-sujata# apt update  
Get:1 https://download.docker.com/linux/ubuntu focal InRelease [57.7 kB]  
Ign:2 https://pkg.jenkins.io/debian-stable binary/ InRelease  
Hit:3 https://pkg.jenkins.io/debian-stable binary/ Release  
Hit:5 http://archive.ubuntu.com/ubuntu focal InRelease  
Hit:6 http://archive.ubuntu.com/ubuntu focal-updates InRelease  
Hit:7 http://archive.ubuntu.com/ubuntu focal-backports InRelease  
Hit:8 http://security.ubuntu.com/ubuntu focal-security InRelease  
Fetched 57.7 kB in 1s (67.1 kB/s)  
Reading package lists... Done
```

Step1: Download & Install:

#apt-get install git

```
root@labvm:/home/devasc/Desktop/git-sujata# apt-get install git  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  bridge-utils ubuntu-fan  
Use 'sudo apt autoremove' to remove them.  
Suggested packages:
```

To check version of git:

#git --version



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```
root@labvm:/home/devasc/Desktop/git-sujata# git --version
git version 2.25.1
```

Step 2: Customize and configure your Git Account:

```
#git config --list
```

```
#git config --global --unset user.name
```

```
#git config --global --unset user.email
```

```
#git config --global user.name "sujataoak799"
```

```
root@labvm:/home/devasc/Desktop/git-sujata# git config --global user.name "sujataoak799"
```

```
#git config --global user.email sujataoak2021@gmail.com
```

```
root@labvm:/home/devasc/Desktop/git-sujata# git config --global user.email sujataoak2021@gmail.com
```

To List Global configuration for Git:

```
#git config --list
```

```
root@labvm:/home/devasc/Desktop/git-sujata# git config --list
user.name="sujataoak799"
user.email=sujataoak2021@gmail.com
```

Step . 3

To Integrate Git account with Github:

Goto www.github.com

Sign-in to your account

Create a Repository



Create a new repository Try the new experience

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Required fields are marked with an asterisk (*).

Repository template

No template ▾

Start your repository with a template repository's contents.

Owner * sujataoak799 ▾ / **Repository name ***

gldemo11072025 is available.

Great repository names are short and memorable. Need inspiration? How about [vigilant-octo-guide](#) ?

Description (optional)

☒ **Public** Anyone on the internet can see this repository. You choose who can commit.

☐ **Private** You choose who can see and commit to this repository.

Initialize this repository with:

☒ **Add a README file** This is where you can write a long description for your project. [Learn more about READMEs.](#)

Add .gitignore

▾

Choose which files not to track from a list of templates. [Learn more about ignoring files.](#)

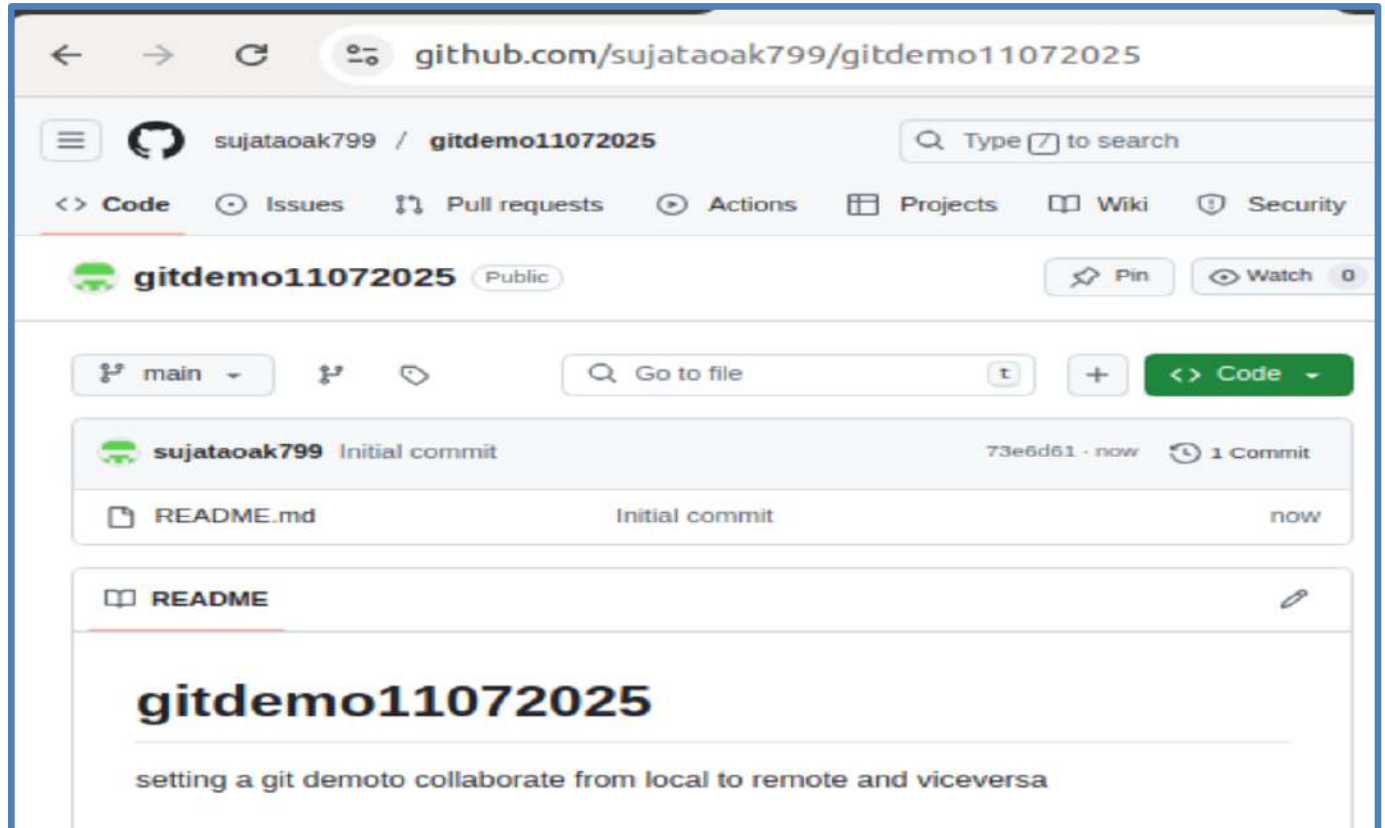
Choose a license

▾

A license tells others what they can and can't do with your code. [Learn more about licenses.](#)

This will set **main** as the default branch. Change the default name in your [settings](#).

Click on Create Repository



Step . 3:

- In local repository initiate the directory to make it a git repository (.git file must be added inside that folder after initiation)

#git init

```
root@labvm:/home/devasc/Desktop/git-sujata# git init
Initialized empty Git repository in /home/devasc/Desktop/git-sujata/.git/
```

```
root@labvm:/home/devasc/Desktop/git-sujata# ls -altr
total 12
drwxr-xr-x 7 devasc devasc 4096 Jul 10 16:40 ..
drwxrwxr-x 3 devasc devasc 4096 Jul 10 17:00 .
drwxr-xr-x 7 root   root   4096 Jul 10 17:00 .git
```

Now Clone the Remote Repository into your Local Repository ie; Ubuntu Operating System:

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git clone <https://github.com/sujataoak799/gitdemo11072025.git>

```
root@labvm:/home/devasc/Desktop/git-sujata# git clone https://github.com/sujataoak799/gitdemo11072025.git
Cloning into 'gitdemo11072025'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (3/3), 925 bytes | 925.00 KiB/s, done.
```

```
root@labvm:/home/devasc/Desktop/git-sujata# ls -ltr
total 4
drwxr-xr-x 3 root root 4096 Jul 10 17:05 gitdemo11072025
```

```
root@labvm:/home/devasc/Desktop/git-sujata# cd gitdemo11072025/
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# ls
README.md
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# cat README.md
# gitdemo11072025
setting a git demoto collaborate from local to remote and viceversa
```

Now Create a python file factorial.py in Local Repository:

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# gedit factorial.py
```

```
num = int(input("Enter a number: "))
factorial = 1

if num < 0:
    print("Factorial does not exist for negative numbers")
elif num == 0:
    print("The factorial of 0 is 1")
else:
    for i in range(1, num + 1):
        factorial = factorial * i
    print("The factorial of", num, "is", factorial)
```



```
# factorial of given number
def factorial(n):
    if n < 0:
        return 0
    elif n == 0 or n == 1:
        return 1
    else:
        fact = 1
        while(n > 1):
            fact *= n
            n -= 1
        return fact

# Driver Code
num = 5
print("Factorial of",num,"is",
factorial(num))
```

Step 4: Now we will apply some git commands to add, commit and push factorial.py file to remote repository: Firstly To View Uncommitted File:

#git status

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git status
On branch main
Your branch is up to date with 'origin/main'.

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

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

The file factorial.py shown in red color is untracked (it means not tracked by git till now). So to add to the git versioning : git add <filename>

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git add factorial.py
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025#
```



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```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:   factorial.py

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

Once file is added to git, the color changes to green color. But it says changes to be committed

Step 5: To start first commit

```
sujaat@Sujata-Oak MINGW64 /d/mygithublearning/devopslearn123 (main)
$ git commit -m "my commit file.txt"
Author identity unknown

*** Please tell me who you are.

Run

  git config --global user.email "you@example.com"
  git config --global user.name "Your Name"

to set your account's default identity.
Omit --global to set the identity only in this repository.

fatal: unable to auto-detect email address (got 'sujaat@Sujata-Oak.(none)')
```

git commit -m "First Python File"

```
error: pathspec 'file' did not match any file(s) known to git
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git commit -m "first file added"
[main cc225cc] first file added
1 file changed, 11 insertions(+)
create mode 100644 factorial.py
```




```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git status
On branch main
Your branch is ahead of 'origin/main' by 1 commit.
(use "git push" to publish your local commits)

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

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

Step 6: To Push your changes from local repository to Github/remote Repository:

git push origin master or git push origin main

#git push origin main

Enter username and password

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git push origin main
Username for 'https://github.com': sujataoak799
Password for 'https://sujataoak799@github.com':
remote: Support for password authentication was removed on August 13, 2021.
remote: Please see https://docs.github.com/get-started/getting-started-with-git/about-remote-repositories#cloning-with-https-urls for information on currently recommended modes of authentication.
fatal: Authentication failed for 'https://github.com/sujataoak799/gitdemo11072025.git/'
```

It says support for password authentication was removed on August 13, 2021.

So we need a new kind of method:

Goto your Github Account → User Profile → Settings → Developer Settings → Personal Access Token → Token(classic) → Generate New token → Generate New Token(Classic)



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Click on Generate Token

Copy the token and paste it some location:

#git remote set-url origin https://tokenhere@github.com/user_name/repo_name

#git remote set-url origin

https://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@github.com/sujataoak799/gitdemo11072025

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git remote set-url origin https://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@github.com/sujataoak799/gitdemo11072025
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025#
```

Again try to Push your changes to Github Repository:

#git push origin main

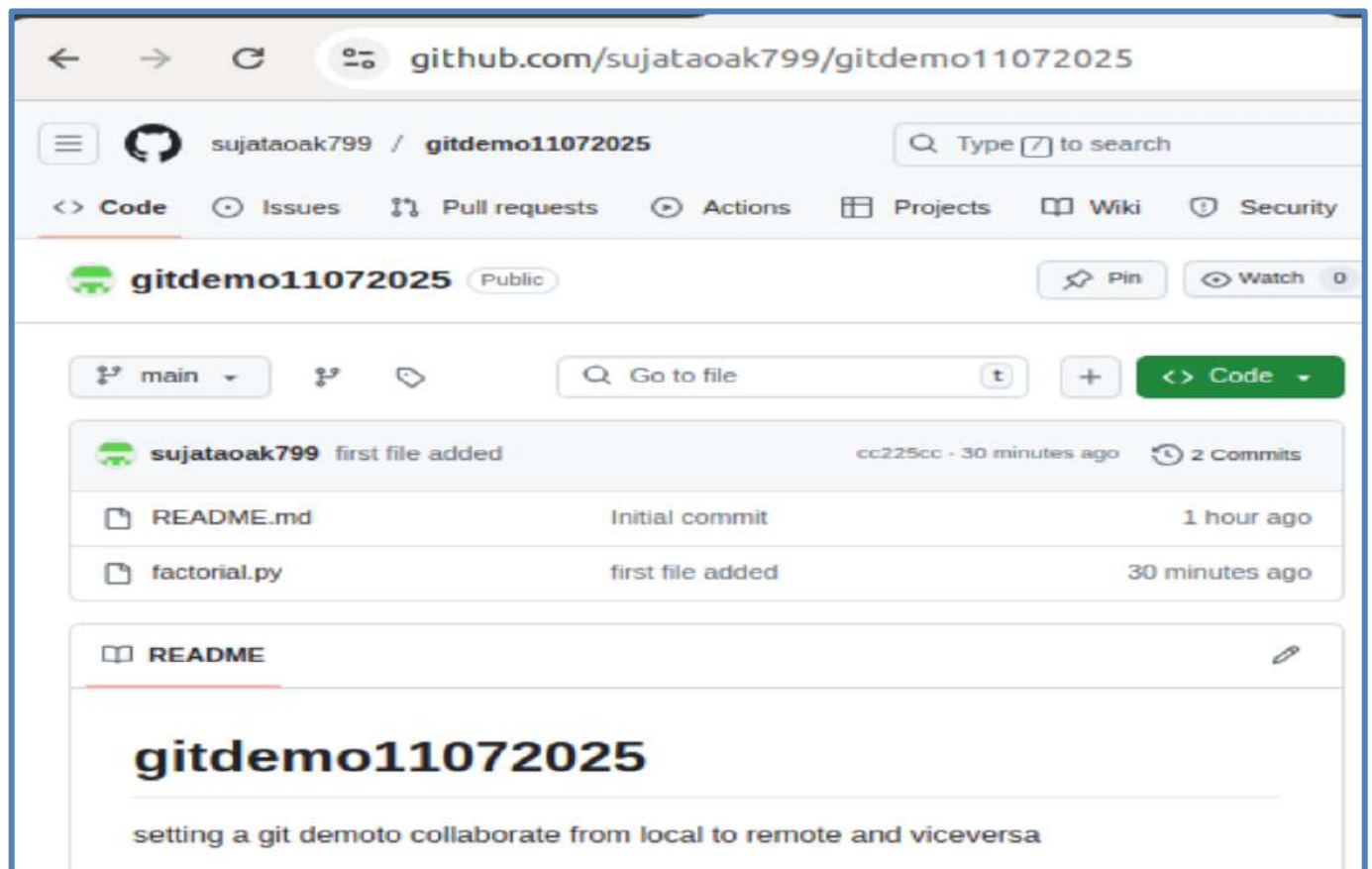


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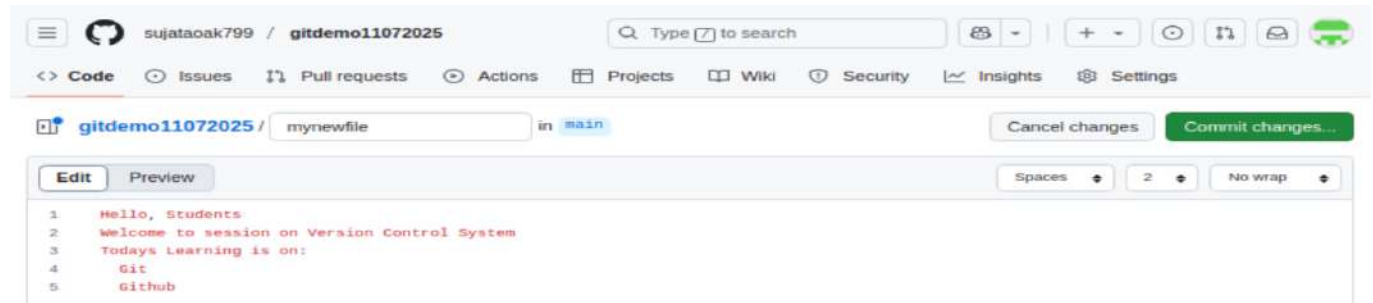
```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git push origin main
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 2 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 453 bytes | 453.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To https://github.com/sujataoak799/gitdemo11072025
73e6d61..cc225cc main -> main
```

This time it is successfully implemented.
Goto Remote Repository and see the file factorial.py





Now I create a new file on my github page: Add file->create new file→Commit changes



Click on Commit Changes

Commit changes ×

Commit message

Extended description

I am committing my mynewfile in remote repository

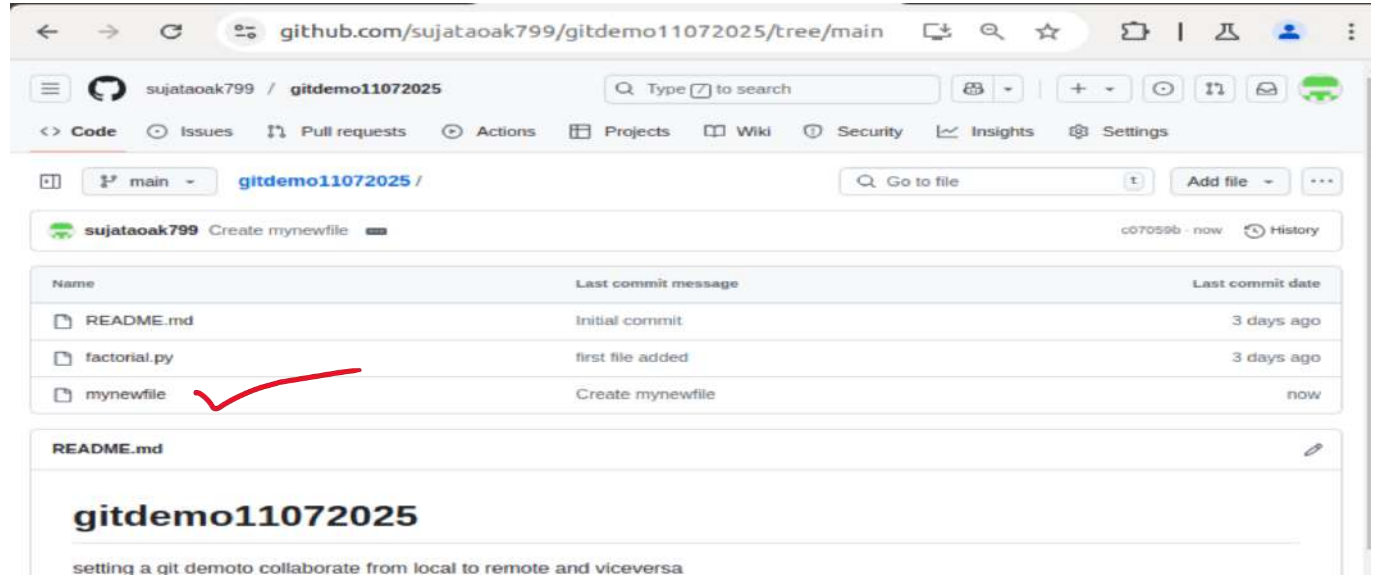
☒ Commit directly to the main branch
☐ Create a **new branch** for this commit and start a pull request [Learn more about pull requests](#)

Click on Commit changes

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But this new file is not reflected in my local repository

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# ls -ltr
total 8
-rw-r--r-- 1 root root 299 Jul 10 17:22 name.html
-rw-r--r-- 1 root root 299 Jul 10 17:28 factorial.py
```

#git pull

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git pull
remote: Enumerating objects: 4, done.
remote: Counting objects: 100% (4/4), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (3/3), 1.06 KiB | 1.06 MiB/s, done.
From https://github.com/sujataoak799/gitdemo11072025
 cc225cc..c07059b  main -> origin/main
Merge made by the 'recursive' strategy.
 mynewfile | 5 +++++
 1 file changed, 5 insertions(+)
 create mode 100644 mynewfile
```

#ls -ltr

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# ls -ltr
total 12
-rw-r--r-- 1 root root 299 Jul 10 17:22 name.html
-rw-r--r-- 1 root root 299 Jul 10 17:28 factorial.py
-rw-r--r-- 1 root root 99 Jul 13 09:59 mynewfile
```



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#cat mynewfile

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# cat mynewfile
Hello, Students
Welcome to session on Version Control System
Today's Learning is on:
  Git
  Github
```

Step7 : To see the logs in online like username, email -id, date, time of creation.

#git log

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git log
commit 650568337cdc24cb0792f83479739de39113efa0 (HEAD -> main)
Merge: c62d707 c07059b
Author: "sujataoak799" <sujataoak2021@gmail.com>
Date: Sun Jul 13 09:59:59 2025 +0000

    Merge branch 'main' of https://github.com/sujataoak799/gitdemo11072025 into
    main

commit c07059b6d27720f3f9af46e03a8b63df5bb16218 (origin/main, origin/HEAD)
Author: sujataoak799 <79905110+sujataoak799@users.noreply.github.com>
Date: Sun Jul 13 09:56:31 2025 +0000

    Create mynewfile

    I am committing my mynewfile in remote repository

commit c62d7072911f3f6a0bd0c8b1d4f3217ce086de58
Author: "sujataoak799" <sujataoak2021@gmail.com>
Date: Thu Jul 10 18:25:44 2025 +0000
```

To Print list of all commits:

#git log --oneline

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git log --oneline
6505683 (HEAD -> main) Merge branch 'main' of https://github.com/sujataoak799/gi
tdemo11072025 into main
c07059b (origin/main, origin/HEAD) Create mynewfile
c62d707 Revert "Initial commit"
cc225cc first file added
73e6d61 Initial commit
```

NOTE: Head: The last commit happen on your system

Step 8: To show repository id and other detail or want to know about a particular commit

#git show <commit-id>



```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git show cc225cc
commit cc225ccfcd548eea4d1052a7d79537f4a850092e
Author: "sujataoak799" <sujataoak2021@gmail.com>
Date: Thu Jul 10 17:36:17 2025 +0000

    first file added

diff --git a/factorial.py b/factorial.py
new file mode 100644
index 00000000..87338e7
--- /dev/null
+++ b/factorial.py
@@ -0,0 +1,11 @@
+num = int(input("Enter a number: "))
+factorial = 1
+
+if num < 0:
+    print("Factorial does not exist for negative numbers")
+elif num == 0:
+    print("The factorial of 0 is 1")
+else:
+    for i in range(1, num + 1):
+        factorial = factorial * i
```

Step 09: To see the difference in the content of file between first and second commit.

```
#git diff <latest commit-id> <commit-id>
```

I will check what is the difference in the file created : mynewfile

```
#cat mynewfile
```

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# cat mynewfile
Hello, Students
Welcome to session on Version Control System
Todays Learning is on:
  Git
  Github
```

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# gedit mynewfile
```




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```
Open  mynewfile
/home/devasc/Desktop/git-sujata/gitdemo11072025

1 Hello, Students
2 Welcome to session on Version Control System
3 Todays Learning is on:
4   Git
5   Github
6
7 We Will  also learn about branching in git
8 Various Commands in branching are:
9 How to create a branch?
10 How to checkout a branch?
11 How to Delete a branch?
```

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git status
On branch main
Your branch is ahead of 'origin/main' by 2 commits.
  (use "git push" to publish your local commits)

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:   mynewfile

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

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

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git add .
```

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git status
On branch main
Your branch is ahead of 'origin/main' by 2 commits.
  (use "git push" to publish your local commits)

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   mynewfile
        new file:   name.html
```

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git commit -m "Added
Info on Branching"
[main a4f7201] Added Info on Branching
 2 files changed, 17 insertions(+)
 create mode 100644 name.html
```




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```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git log --oneline
a4f7201 (HEAD -> main) Added Info on Branching
6505683 Merge branch 'main' of https://github.com/sujataoak799/gitdemo11072025 i
nto main
c07059b (origin/main, origin/HEAD) Create mynewfile
c62d707 Revert "Initial commit"
cc225cc first file added
73e6d61 Initial commit
```

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git diff a4f7201 c07
059b
diff --git a/README.md b/README.md
new file mode 100644
index 0000000..c0bee4d
--- /dev/null
+++ b/README.md
@@ -0,0 +1,2 @@
+# gitdemo11072025
+setting a git demoto collaborate from local to remote and viceversa
diff --git a/mynewfile b/mynewfile
index 45facd4..d4610b0 100644
--- a/mynewfile
+++ b/mynewfile
@@ -3,9 +3,3 @@ Welcome to session on Version Control System
  Todays Learning is on:
    Git
    Github
-
- We Will also learn about branching in git
- Various Commands in branching are:
- How to create a branch?
- How to checkout a branch?
```

Step 10: Creating a latter commit and reverting back to see the initial/original content

```
git revert<secondcommitID>
```

```
# git revert 73e6d
```



```
File Edit View Search Terminal Help
/home/devasc/Desktop/git-sujata/gitdemo11072025/.git/COMMIT_EDITMSG
Revert "Initial commit"

This reverts commit 73e6d6181e3557c88c4f12b9cfc1fd76f36cf345.

# Please enter the commit message for your changes. Lines starting
# with '#' will be ignored, and an empty message aborts the commit.
#
# On branch main
# Your branch is up to date with 'origin/main'.
#
# Changes to be committed:
#   deleted:    README.md
#
# Untracked files:
#   name.html
#
```

Save it

```
root@labvm:/home/devasc/Desktop/git-sujata/gitdemo11072025# git revert 73e6d
Removing README.md
[main c62d707] Revert "Initial commit"
1 file changed, 2 deletions(-)
delete mode 100644 README.md
```

TASK: push the changes done in local repository of mynewfile into remote repository

Conclusion:

In this experiment, we understood the use case of Version Control System, its benefits in real time scenario which provides a application of reverting the changes when people are in working in a collaborating environment. Different commands were used for the same such as revert (by using its id), diff for displaying the changes between the initial and latter texts.