Unit 02: GIT

CONTENTS

Objectives

After studying this unit, you will be able to:

- Understand GIT
- Execute basic commands of git
- Analyze linking git with cloud repository
- Understand full stack developer

Introduction

Git is a free and open-source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

Git is easy to learn and has a tiny footprint with lightning-fast performance. It outclasses SCM tools like Subversion, CVS, Perforce, and ClearCase with features like cheap local branching, convenient staging areas, and multiple workflows.

2.1 GIT

Git is a contemporary distributed version control system that is used extensively worldwide. It was created to manage tasks quickly and effectively. We can keep track of and collaborate with our team members in the same workspace thanks to the version control system.

Git is a free and open-source version control system, originally created by Linus Torvalds in 2005. Unlike older centralized version control systems such as SVN and CVS, Git is distributed: every developer has the full history of their code repository locally. This makes the initial clone of the repository slower, but subsequent operations such as commit, blame, diff, merge, and log dramatically faster.Git is a distributed version management system that is open-source. It is made to manage small to large jobs quickly and effectively. It was created to organize the development team's work. We can keep track of each other's work and collaborate in the same workspace thanks to version control.

Did you Know?

Git is created by Linus Torvalds in 2005.

How Git works.

1. Create a "repository" (project) with a git hosting tool (like Bitbucket)
2. Copy (or clone) the repository to your local machine
3. Add a file to your local repo and "commit" (save) the changes
4. "Push" your changes to your main branch
5. Make a change to your file with a git hosting tool and commit
6. "Pull" the changes to your local machine
7. Create a "branch" (version), make a change, commit the change
8. Open a "pull request" (propose changes to the main branch)
9. "Merge" your branch to the main branch

2.2 GIT basic commands

Git commands are a distributed version control system for tracking changes in any set of files. They were originally designed for coordinating work among programmers who were operating source codes during software development.

Git is a fast, scalable, and distributed revision control system with an unusually rich command set that provides both high-level operations and full access to internals.

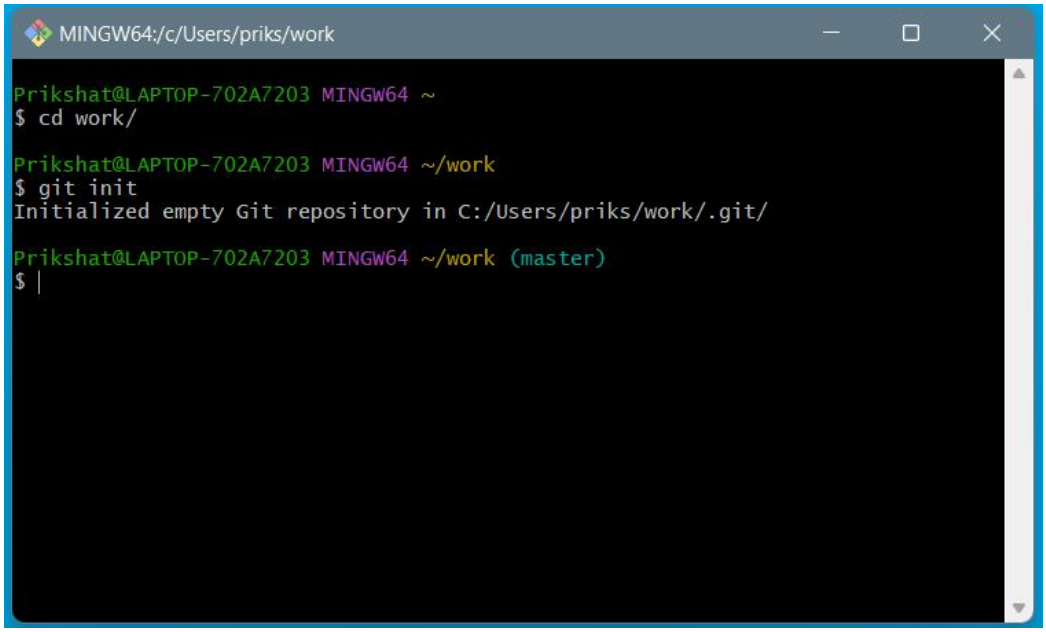
Let's see the following are Git commands discussed with their proper syntax and execution.

- git init
- git add
- git commit
- git status
- git remote
- git push
- git clone

git init

Usage: git init [repository name]

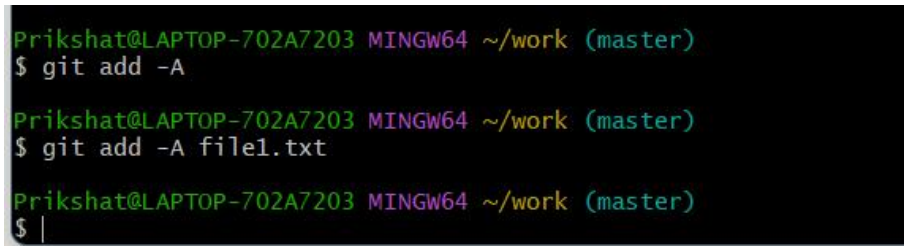
To start a Git repository for our local project folder, we must navigate to the project directory and use the command git init. In order to keep its files structured in other subdirectories, Git will create a hidden.git directory and use it.



git add

Usage (i): git add [file(s) name]

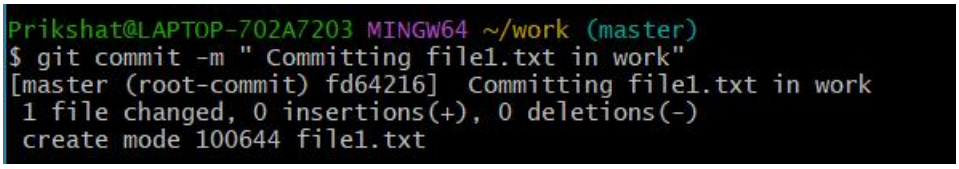
This will add the specified file(s) into the Git repository, the staging area, where they are already being tracked by Git and now ready to be committed.



git commit

Usage: git commit -m "message"

This command records or snapshots files permanently in the version history. All the files, which are there in the directory right now, are being saved in the Git file system.



Before executing the git commit command, it is required that you logged in with your email id on GitHub (https://github.com/). For login using Git Bash following commands used

1. git config user.name "<username>"
2. git config user.email "<user email>"

Git status

Usage: git status

This command will show the modified status of an existing file and the file addition status of a new file, if any, that has to be committed.

```
Prikshat@LAPTOP-702A7203 MINGW64 ~/work (master)
$ git status
On branch master
nothing to commit, working tree clean
```

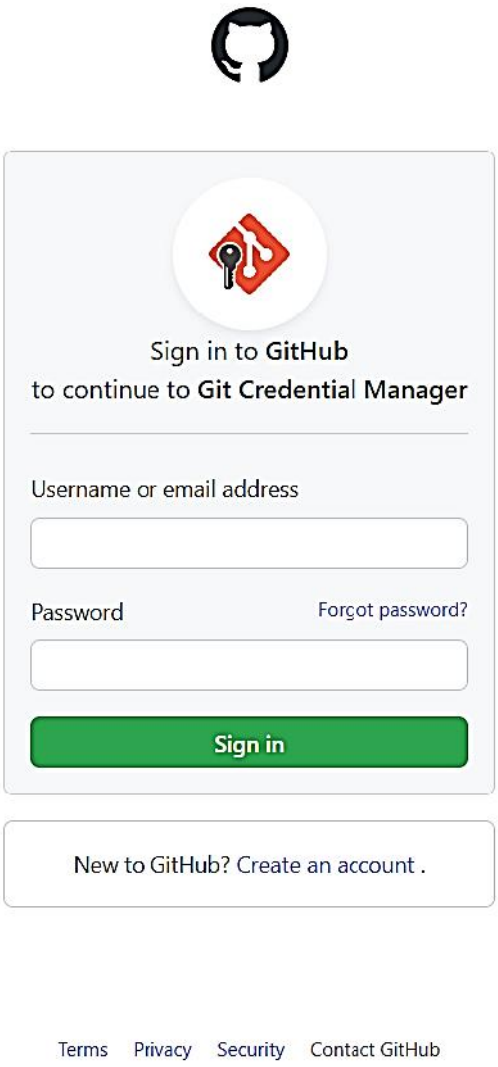
git push

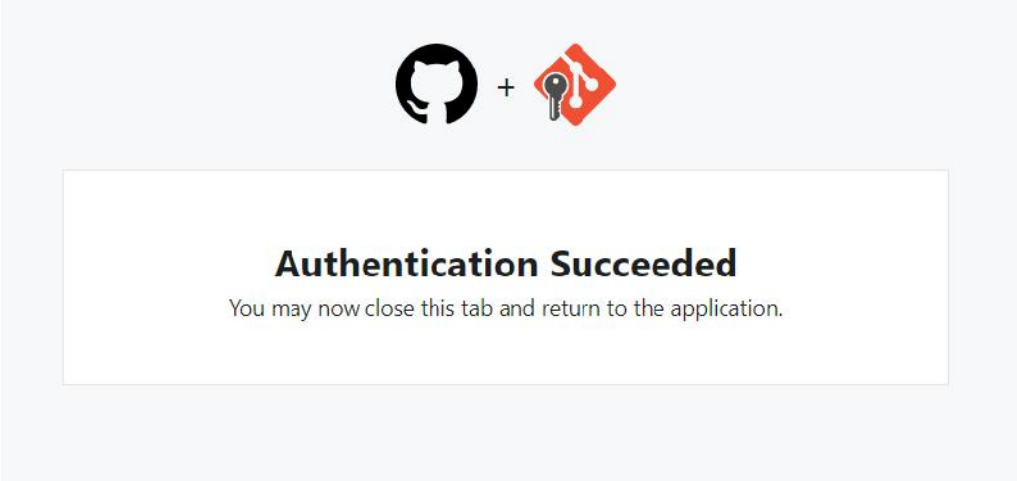
Usage: git push origin [branch name]

Suppose,we have made some changes in the file and want to push the changes to our remote repository on a particular branch. By using the command 'git push,' the local repository's files can be synced with the remote repository on Github.

Before executing the git push command, it is required to add the origin of the remote repository.

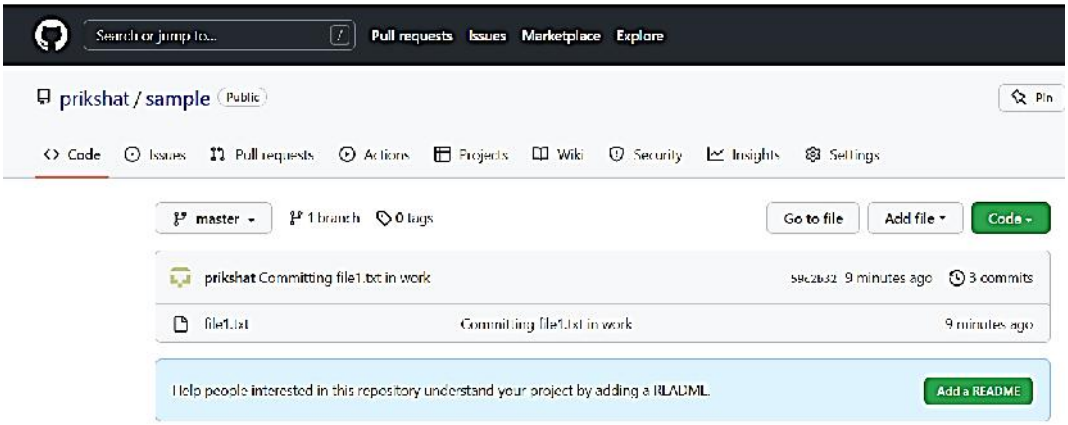
git remote add origin https://github.com/prikshat/sample.git






```
Prikshat@LAPTOP-702A7203 MINGW64 ~/work (master)
$ git push -u origin master
Enumerating objects: 9, done.
Counting objects: 100% (9/9), done.
Delta compression using up to 8 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (9/9), 665 bytes | 221.00 KiB/s, done.
Total 9 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/prikshat/sample.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.
```

After push



git clone

Usage: git clone [URL]

This command is used to clone (download) remote repository data on a local computer.

Find the repository link on the website.

Goto Git bash and then fire following commands

```
mkdir [directory- name]
cd [directory- name]
git clone [URL]
```

Linking GIT with cloud repository

1. Go the Configure Git settings in your Looker Instance
2. For Repository URL put in the URL of the repository you want to use starting with ssh://... You can generate this by clicking **Clone** and selecting **SSH Authentication** in your Cloud Source Repositories. Make sure to cut off the 'git clone ' bit from the link. It should have a format like the below
   ssh://<USERNAME>@source.developers.google.com:2022/p/<PROJECT NAME>/r/<REPOSITORY NAME>
3. For Git Hosting Service select 'Custom Git Configuration' and click continue
4. Copy the SSH key that Looker generates in the next screen for you.
5. In Cloud Source Repositories open the Manage SSH Keys page, click **Register SSH key**. Here you give the key a unique name and paste the key value from Looker and click **Register.**
6. Once the key is registered you go back to your Looker instance and click **Test and Finalize Setup.**

2.3 What is Full Stack developer

Full Stack Developer is an engineer who works on both client-side and server-side of the software application. This type of developer works on the Full Stack of a software application meaning Front end development, Back end development, Database, Server, API, and version controlling systems. Hence, the name "Full Stack" Developer.

A Full-Stack Developer doesn't necessarily master all technologies. However, the professional is expected to work on the client as well as server sides and understand what is going on when developing an application. He or she should have a genuine interest in all software technologies.

2.4 Starting a GIT Basics Project

Following steps are involved to start a basic project using Git.

Step 1: Install Git and Create a GitHub Account

Online link for download git

Git - Downloads (git-scm.com)

After installing Git on your machine, the next step is to create a free GitHub account.

Follow these steps:

1. Visit the official account creation page: Join GitHub

2. Pick a **username**, enter your **email address**, and choose a **password**.

3. Opt for or opt out of receiving updates and announcements by checking/unchecking the **Email preferences** checkbox.

4. Verify you're not a robot by solving the **Captcha** puzzle.

5. Click **Create account**.

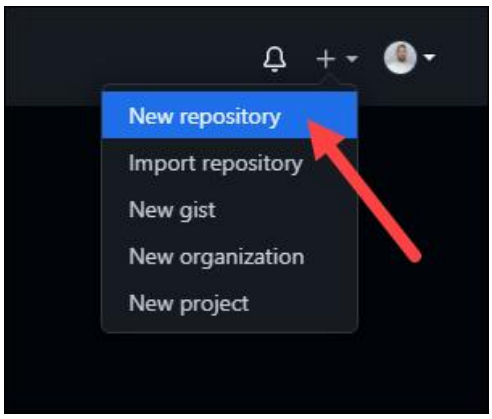
Step 2: Create a Local Git Repository.

Step 3: Create a New Repository on GitHub

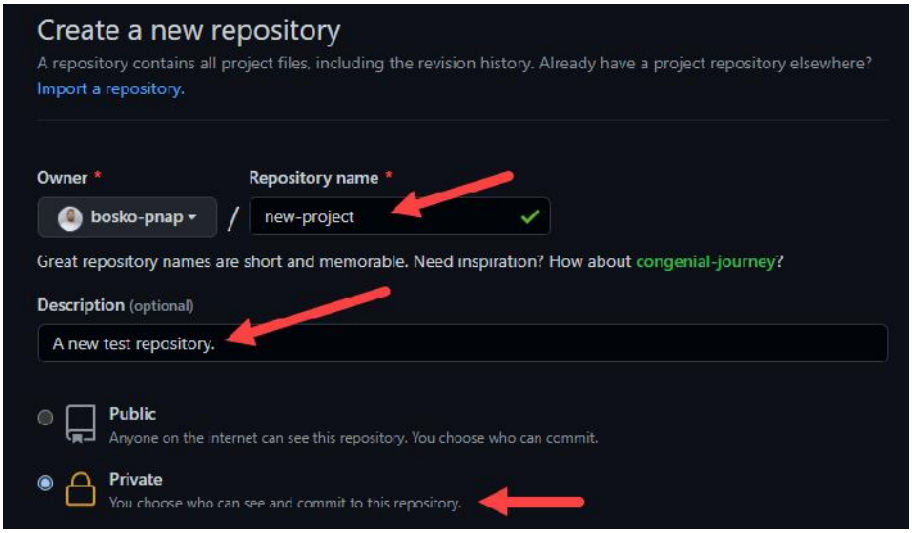
Follow these steps to create a new repository on GitHub:

1. Log in and browse to the GitHub home page.

2. Find the **New repository** option under the + sign next to your profile picture, in the top right corner.



3. Enter a name for your repository, provide a brief description, and choose a privacy setting.



Step 4: Add a File to the Repository

Step 5: Unstage Files on Git

Step 6: Create a Commit

Summary

- git initwill create a new local GIT repository.
- git clone is used to copy a repository. If the repository lies on a remote server.
- git add is used to add files to the staging area.
- git commit will create a snapshot of the changes and save it to the git directory.
- Full Stack Developer is an engineer who works on both client-side and server-side of the software application.

Keywords

Git: Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency also called global information tracker.

GitHub: A GitHub repository can be used to store a development project. It can contain folders and any type of files (HTML, CSS, JavaScript, Documents, Data, Images).

Repository:A repository is like a data structure used by VCS to store metadata for a set of files and directories.

Full Stack developer: Full Stack Developer is an engineer who works on both client-side and server-side of the software application.

SelfAssessment

1. Choose a true statement from the followings about GIT?

A. Git is open-source

B. Git is an example of distributed version control system

C. Used for handling the development of small and large projects

D. All of the above

2. A repository is a file structure where git stores all the project-based files.

A. TRUE

B. FALSE

C. Can be true or false

D. Cannot say

3. How to initialize the local repository with git?

A. $ git start

B. $ git pull

C. $ git clean

D. $ git init

4. How to check the status of your local repository since your last commit?

A. $ git check

B. $ git commit

C. $ git diff

D. $ git status

5. Which command do you use to check the history of your repository?

A. $ git checkout

B. $ git fetch

C. $ git log

D. $ git diff

6. Git can be used for which project?

A. Java enterprise project

B. .Net project

C. File version management

D. All of the above

7. Which of the following git command downloads your repository from GitHub to your computer?

A. git fork

B. git commit

C. git clone

D. git push

8. What is the full form of GIT?

A. Gastro Intestional Track.

B. Gastro International Track.

C. Global Information Tracker

D. None of these

9. Which of the following advantage of using GIT?

A. Collaboration friendly

B. Data redundancy and replication

C. Data redundancy and replication

D. All of the above

10. What is the function of 'GIT PUSH' in GIT?

A. 'GIT PUSH' updates remote refs.

B. 'GIT PUSH' updates remote refs along with associated objects.

C. 'GIT PUSH' remote refs along with associated objects.

D. None of these

11. What is full form of VCS?

A. Version Configuration Solutions

B. Version Configuration System

C. Version Control System

D. Version Consolidated Solutions

12. Git works on
A. Windows
B. Mac
C. Linux
D. All of above

13. Which of the following is git tool?
A. GitK
B. Git Bash
C. Git GUI
D. All of the above

14. Who created Git?
A. Dennis Ritchie
B. Linus Babbage
C. Linus Torvalds
D. James Gosling

15. GIT comes from
A. 2005
B. 2007
C. 2004
D. 2008

Answers for SelfAssessment

1.	D	2.	A	3.	D	4.	D	5.	C
6.	D	7.	C	8.	C	9.	D	10.	B
11.	C	12.	D	13.	D	14.	C	15.	A

Review Questions

1. What is Git? How Git is different from GitHub.
2. Why do we need Git? Explain with a suitable example.
3. What are the uses of git clone and git push commands? Explain with a suitable example.
4. Explain the steps that are used to log in on GitHub.
5. What is full stack development?

Further Readings

- Scott Chacon and Ben Straud,Pro Git Second edition,Apress

Web Links

- https://git-scm.com/
- https://en.wikipedia.org/wiki/Git
- https://www.w3schools.com/git/default.asp