

### Part - B

#### Case Studies

Case Study 6 : Conceptual understanding

- a. Explain git. What is its role in modern software development?
- b. List any 10 essential git commands along with the syntax and example use cases.
- c. What is version control? Explain how git implements version control in software.

Title of the Experiment :

Understanding Git and Role in Version Control for Modern Software Development.

Aim:

To understand the concept of git, its purpose in modern software development, explore essential git commands and learn how git implements version control effectively.

- a. Explain git. What is its role in modern software development?

Git is a distributed version control system that helps developers to manage changes in source code over time. It allows multiple developers to collaborate on the same project without interfacing with each other's work. Git tracks changes, manages branches and stores complete version histories of files in a project.

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### Role in Modern Software Development:

- Facilitates collaborative coding in teams or open source projects.
- Enables branching, allowing safe experimentation with new features.
- Provides full history of changes for auditing or reverting.
- Powers DevOps workflows by integrating with CI/CD tools.
- Supports platforms like GitHub, GitLab and Bitbucket for remote collaboration and repository hosting.

b. List any essential git commands along with syntax and example use cases.

Command	Syntax	Use Case
1. git init	git init	Initialize a new git repository in a folder
2. git clone	git clone <repository>	Clones a remote repository locally
3. git status	git status	Show the state of working directory and staging area
4. git add	git add <filename>	Stages a file for commit
5. git commit	git commit -m "message"	Commits staged changes from a remote message
6. git push	git push origin <branch>	uploads local changes to a remote repository

7. git pull	git pull origin <branch>	Fetches and merges changes from a remote repository.
8. git branch	git branch <branch_name>	List or creates branches
9. git checkout	git checkout <branch>	Switches between branches
10. git merge	git merge <branch>	Merges the changes from one branch into the current branch

c. What is Version Control? Explain how Git implements Version Control.

Version control is a system that tracks and manages changes to files over time. It allows multiple people to work on the same codebase, keeps a history of all changes, and helps reverting or comparing different versions of code.

#### How Git Implements Version Control:

- Git stores snapshots of code changes with timestamp and author info.
- It uses Branches to allow developers to work independently on features or bug fixes.
- Git provides merge and rebase tools to combine code from multiple contributors.
- Changes are tracked locally and remotely, allowing offline work and global collaboration.
- Tools like GitHub integrate with Git for cloud-based version management.

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**Theory:-**

git is a lightweight, fast and distributed version control system. Developers use it to initiate, track and manage changes in source code over the lifecycle of a project.

**Key Concepts:-**

- Repository : The project folder being tracked.
- Commit : A saved snapshot of changes.
- Branching : A parallel version of the project to work on independently.
- Merging : Combining different branches into one.
- Remote : A hosted version of the repo on a server like GitHub.

**Use Cases:-**

- Collaborative development in teams.
- Open source contribution
- CI/CD deployment pipelines.
- Bug tracking and rollback to earlier versions.

**Benefits**

- Track every change with who | when | why.
- Backup entire project history.
- Simultaneous development via branches.
- Seamless collaboration through push | pull.

**Conclusion :-** I relayed the importance of commands like git commit, and git push and how git ensures changes are traceable & reversible. making

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development much more reliable.