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Experiment 3

AIM: To Perform various GIT operations on local and Remote repositories.

THEORY:

1. Git Local Repository Operations

A local Git repository exists on your computer and allows you to manage changes to a project independently of any remote server.

a. Initialize a Local Repository

```
bash
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git init
```

This creates a new Git repository in the current directory.

b. Checking Repository Status

```
bash
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git status
```

Shows the current state of the working directory and staging area.

c. Adding Files to Staging Area

```
bash
```

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```
git add <filename>      # Adds a specific file
```

```
git add .               # Adds all files in the directory
```

Prepares files for commit by moving them to the staging area.

d. Committing Changes

bash

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```
git commit -m "Commit message"
```

Saves a snapshot of the staged changes to the local repository.

e. Viewing Commit History

bash

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```
git log
```

Displays a list of all the commits made in the repository.

f. Creating and Switching Branches

bash

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```
git branch <branch-name> # Create a new branch
```

```
git checkout <branch-name> # Switch to the branch
```

```
git switch <branch-name>  # Alternative to checkout for switching
```

g. Merging Branches

bash

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```
git checkout main
```

```
git merge <branch-name>
```

Combines changes from another branch into the current branch.

2. Git Remote Repository Operations

A remote Git repository is hosted on a server like GitHub, GitLab, or Bitbucket. It allows collaboration and backup of your code.

a. Connecting to a Remote Repository

```
bash
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git remote add origin https://github.com/user/repo.git
```

Links the local repository to a remote one.

b. Pushing Changes to Remote

```
bash
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git push origin main    # Push changes from local main to remote
main
git push -u origin main  # Sets upstream to track remote branch
```

c. Pulling Changes from Remote

```
bash
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git pull origin main
```

Fetches and merges changes from the remote repository into your local branch.

d. Cloning a Remote Repository

```
bash
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git clone https://github.com/user/repo.git
```

Creates a local copy of the remote repository.

e. Fetching Updates Without Merging

```
bash  
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git fetch origin
```

Downloads commits, files, and refs from a remote repository without merging them automatically.

SCREENSHOTS:

CONCLUSION: Hence, we have performed various GIT operations on local and Remote repositories.