

EXPERIMENT -1

Git Version Control

Introduction to Git

Git is a distributed version control system that helps you track changes in your codebase. It allows multiple people to collaborate on a project without overwriting each other's work. Git keeps a complete history of changes and enables you to revert to previous versions, compare code, and merge different versions of files.

Basic Git Commands

Initializing a Git Repository

To start using Git, navigate to your project directory and initialize a Git repository.

```
cd /path/to/your/project
```

```
git init
```

Checking the Status

To see the current state of your working directory, including changes not yet staged for commit:

```
git status
```

Adding Files to Staging

Before committing changes, add files to the staging area:

```
git add <file-name> # Add a specific file
```

```
git add .      # Add all files
```

Committing Changes

After staging your changes, commit them with a descriptive message:

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

Viewing Commit History

To view the commit history of your project:

```
git log
```

Creating a Branch

Branches allow you to work on different features or bug fixes without affecting the main codebase. To create a new branch:

```
git checkout -b <branch-name>
```

Switching Branches

To switch to an existing branch:

```
git checkout <branch-name>
```

Merging Branches

Once you've made changes on a branch, you may want to merge it into the main branch (or another branch). First, switch to the branch you want to merge into (e.g., main):

```
git checkout main
```

Then merge the changes:

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

Deleting a Branch

After a branch has been merged, you can delete it:

```
git branch -d <branch-name>
```

Collaboration with Git

Pulling Changes from a Remote Repository

To fetch and merge changes from a remote repository:

```
git pull origin main
```

Resolving Merge Conflicts

If there are conflicting changes between branches, Git will notify you, and you'll need to manually resolve the conflicts by editing the affected files. After resolving, mark them as resolved:

```
git add <resolved-file>
```

```
git commit -m "Resolved merge conflict"
```

OUTPUT:

The screenshot shows a Git commit history in a terminal window. The commit message is "Resolved merge conflict". The commit details show the addition of a Java file and a notes file, followed by a push operation. The terminal then shows the user switching to a new branch named 'feature-update'.

```
program and notes"
[master (root-commit) 4045b44] Added HelloWorld program and notes
  2 files changed, 10 insertions(+)
  create mode 100644 HelloWorld.java
  create mode 100644 notes.txt

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git branch -M main

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git push -u origin main
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (4/4), 456 bytes | 152.00 KiB/s, done.
Total 4 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/Vikram13062006/SkillLabPrograms_90202_section-6.git
 * [new branch]      main -> main
branch 'main' set up to track 'origin/main'.

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>
+ History restored

Microsoft Windows [Version 10.0.26200.7462]
(c) Microsoft Corporation. All rights reserved.

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git checkout -b feature-update
Switched to a new branch 'feature-update'
```

The screenshot shows a Git commit history in a terminal window. The commits include adding a notes file, committing the update, switching to a new branch 'bug-fix', adding a Main.java file, committing the fix, and finally switching back to the 'main' branch. The terminal also shows the user checking out the 'main' branch.

```
Switched to a new branch 'feature-update'

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git add notes.txt

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git commit -m "Added feature update notes"
[feature-update d5d4aea] Added feature update notes
  1 file changed, 3 insertions(+), 1 deletion(-)

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git checkout
C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git checkout -b bug-fix
Switched to a new branch 'bug-fix'

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git add Main.java
fatal: pathspec 'Main.java' did not match any files

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git add HelloWorld.java

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git commit -m "Fixed bug in main.java"
[bug-fix 3396eba] Fixed bug in main.java
  1 file changed, 1 insertion(+)

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git checkout main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.
```

The screenshot shows the VS Code interface with the Terminal tab selected. The terminal window displays a series of git commands and their outputs:

```
[bug-fix 3396eba] Fixed bug in main.java
1 file changed, 1 insertion(+)

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git checkout main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git merge feature-update
Updating 4045b44..d5d4aea
Fast-forward
 notes.txt | 4 +++
 1 file changed, 3 insertions(+), 1 deletion(-)

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git merge bug-fix
Updating d5d4aea..3396eba
Fast-forward
 HelloWorld.java | 1 +
 1 file changed, 1 insertion(+)

C:\Users\JAINI VIKRAM\OneDrive\Pictures\Documents - Copy\2nd Year\2nd year Second Sem\FSAD\expe-1>git push origin
Enumerating objects: 9, done.
Counting objects: 100% (9/9), done.
Delta compression using up to 12 threads
Compressing objects: 100% (6/6), done.
Writing objects: 100% (6/6), 725 bytes | 725.00 KiB/s, done.
Total 6 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/Vikram13062006/SkillLabPrograms_90202_section-6.git
 * [new branch] main > main
```

The screenshot shows a GitHub repository page for "SkillLabPrograms_90202_section-6". The repository is public and has 8 commits. The commits listed are:

- Vikram13062006 EXPERIMENT-2.pdf (yesterday)
- HelloWorld.java (yesterday) - *Fixed bug in main.java*
- Section-2_90202_EXPERIMENT-2.pdf (17 hours ago)
- notes.txt (yesterday) - *Added feature update notes*

The commits for "HelloWorld.java" and "notes.txt" are circled in red.