

# Introduction to DevOps

## Assignment -1



**MASTER OF TECHNOLOGY  
(SOFTWARE ENGINEERING)**

**Submitted By:**

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# **Problem Statement**

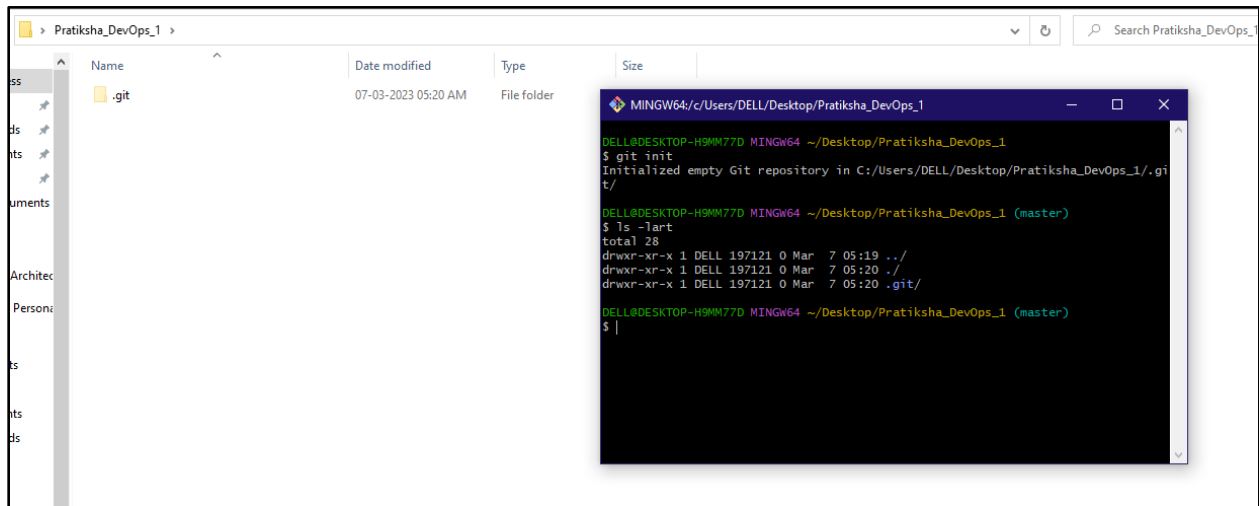
ABC Organization would like to opt for the distributed version control system to upgrade their environment, where Git has been selected as the solution. You been assigned as a consultant to educate the migration process to move their Source Code from Centralized to Distributed systems. As a phase one, you would like to go ahead with a workshop to demonstrate below operation to make the ABC team comfortable.

1. Create a Repository
2. Add Two Directories and some raw code files to the repository
3. Move Code from One directory to Another Directory
4. Update one source code file and display the difference
5. Create a Branch
6. Add some raw code to the branch
7. Merge the Branch with Main line
8. PUSH to GitHub
9. Summary of advantages of moving from Centralized Source Code to Distributed Version Control.

# 1. Create a Repository

Command :

**git init** : Used to create a repository in the current directory.



Git creates a hidden directory called **.git** . This hidden **.git** directory stores all of the objects and refs that Git uses and creates as a part of your project's history . This **.git** directory separates a regular directory from a Git repository.

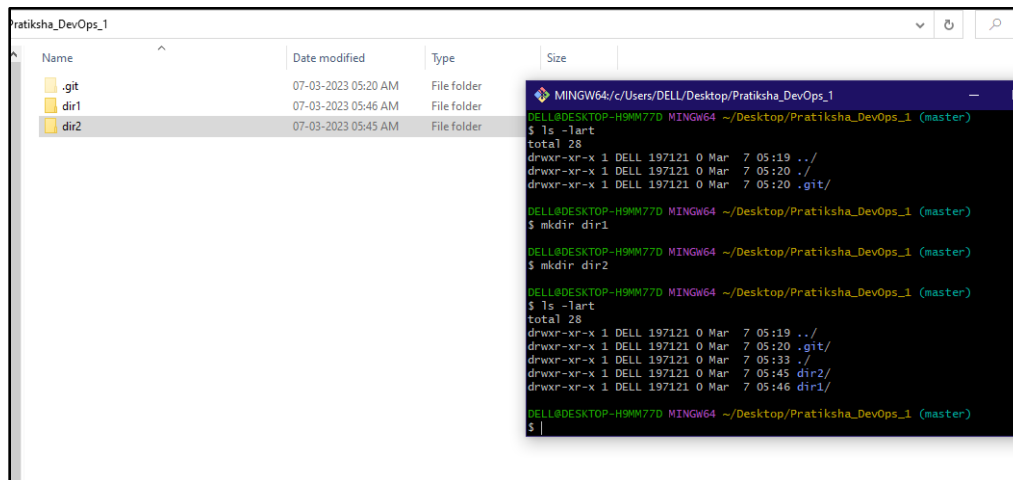
## 2. Add Two Directories and some raw code files to the repository

Created 2 directories **dir1** and **dir2**.

Added two java files **add.java** and **diff.java** in respective directories.

Commands :

- **git add** : used to add files to the staging area
- **git commit**: create a snapshot of the changes and save it to the git directory.
- **git status**: displays the list of changed files together with the files that are yet to be staged or committed.



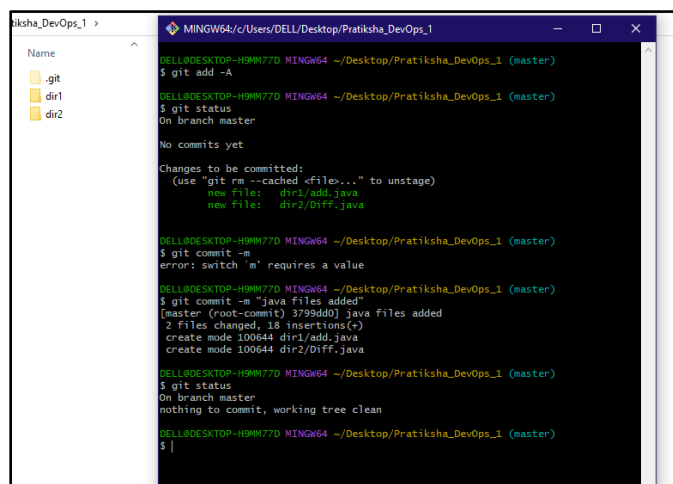
```
MINGW64/c/Users/DELL/Desktop/Pratiksha_DevOps_1
$ ls -lart
total 28
drwxr-xr-x 1 DELL 197121 0 Mar 7 05:19 ../
drwxr-xr-x 1 DELL 197121 0 Mar 7 05:20 ./
drwxr-xr-x 1 DELL 197121 0 Mar 7 05:20 .git/

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ mkdir dir1

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ mkdir dir2

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ ls -lart
total 28
drwxr-xr-x 1 DELL 197121 0 Mar 7 05:19 ../
drwxr-xr-x 1 DELL 197121 0 Mar 7 05:20 .git/
drwxr-xr-x 1 DELL 197121 0 Mar 7 05:33 ./
drwxr-xr-x 1 DELL 197121 0 Mar 7 05:45 dir2/
drwxr-xr-x 1 DELL 197121 0 Mar 7 05:46 dir1/

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ |
```



```
MINGW64/c/Users/DELL/Desktop/Pratiksha_DevOps_1
$ git add -A
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   dir1/add.java
        new file:   dir2/Diff.java

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git commit -m
error: switch '-m' requires a value

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git commit -m "java files added"
[master (root-commit) 3799d90] java files added
 2 files changed, 18 insertions(+)
 create mode 100644 dir1/add.java
 create mode 100644 dir2/Diff.java

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git status
On branch master
nothing to commit, working tree clean

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ |
```

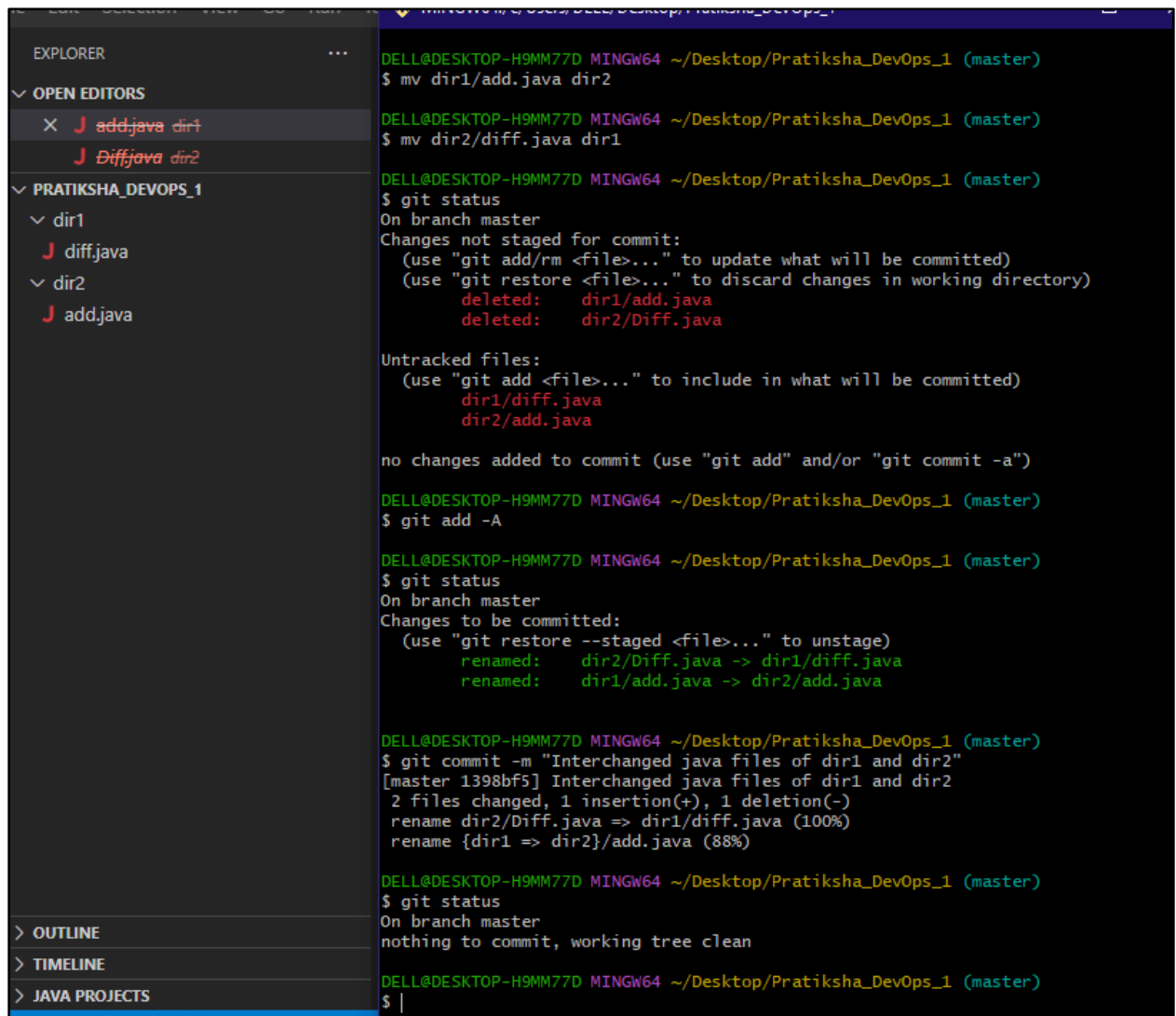
### 3. Move Code from One directory to Another Directory

Moved dir1 → add.java → dir2

And dir2 → diff.java → dir1

After Moving the files from one directory to another.

Run the commands **git add** to stage the files , **git commit -m "commit\_message"** to commit



```
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ mv dir1/add.java dir2

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ mv dir2/diff.java dir1

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git status
On branch master
Changes not staged for commit:
  (use "git add/rm <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
    deleted:    dir1/add.java
    deleted:    dir2/Diff.java

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    dir1/diff.java
    dir2/add.java

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

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git add -A

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git status
On branch master
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    renamed:    dir2/Diff.java -> dir1/diff.java
    renamed:    dir1/add.java -> dir2/add.java

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git commit -m "Interchanged java files of dir1 and dir2"
[master 1398bf5] Interchanged java files of dir1 and dir2
 2 files changed, 1 insertion(+), 1 deletion(-)
 rename dir2/Diff.java => dir1/diff.java (100%)
 rename {dir1 => dir2}/add.java (88%)

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git status
On branch master
nothing to commit, working tree clean

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ |
```

## 4. Update one source code file and display the difference

Command :

**git diff** : shows the changes between commits, commit and working tree, etc .

Updated both add.java and diff.java files.

Run **git status** to know which all files were modified and then **git diff** to check the difference.

```
MINGW64/c/Users/DELL/Desktop/Pratiksha_DevOps_1
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git status
On branch master
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:   dir1/diff.java
        modified:   dir2/add.java

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

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git diff
diff --git a/dir1/diff.java b/dir1/diff.java
index 47d4391..d4eba3b 100644
--- a/dir1/diff.java
+++ b/dir1/diff.java
@@ -2,8 +2,10 @@ public class diff
 {
     public static void main (String args[])
     {
-        int a = 10 , b=15,diff ;
+        int a = 10 , b=15,diff,mult ;
+        diff= a - b;
-        system.out.println("diff : " + diff);
+        System.out.println("diff : " + diff);
+        mult = a*b;
+        System.out.println("mult"+mult);
     }
 }
\ No newline at end of file
diff --git a/dir2/add.java b/dir2/add.java
index f1ee0b3..9f30b6a 100644
--- a/dir2/add.java
+++ b/dir2/add.java
@@ -4,6 +4,6 @@ public class add
 {
     int a = 10 , b=15,add ;
-    add= a + b;
-    system.out.println("add : " + add);
+    System.out.println("add : " + add);
 }
}
\ No newline at end of file
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ |
```

Run **git add** , **git commit**

```
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git add -A

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git status
On branch master
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   dir1/diff.java
        modified:   dir2/add.java

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git commit -m "modified files"
[master 5a6c094] modified files
2 files changed, 5 insertions(+), 3 deletions(-)

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git status
On branch master
nothing to commit, working tree clean

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ |
```

## 5. Create a Branch

In Git, a **Branch** is a new/separate version of the main repository.

Commands :

**git branch** : used to create a new branch

**git checkout** : used to switch to an existing branch.

By executing **git branch feature1** created feature1 branch

By default it's in master branch So to switch to feature1 branch and do changes run **git checkout feature1** . Once the changes are done do **git add** and **git commit**.

```
diff.java M x
dir1 > J diff.java
You, 1 second ago | 1 author (You)
1 //Feature1 file
2 public class diff
3 {
4     public static void main (String args[])
5     {
6         int a = 10 , b=15,diff,mult,div;
7         diff= a - b;
8         System.out.println("diff : " + diff);
9         mult = a*b;
10        System.out.println("mult"+mult);
11        div = a/b;
12        System.out.println("div"+div);
13    }
14 }

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git branch feature1
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git branch
feature1
* master
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git checkout feature1
Switched to branch 'feature1'
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ git status
On branch feature1
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:   dir1/diff.java

no changes added to commit (use "git add" and/or "git commit -a")
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ git add -A
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ git commit -m "added division part in diff.java file"
[feature1 b1e03cb] added division part in diff.java file
1 file changed, 3 insertions(+), 1 deletion(-)
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ git status
On branch feature1
nothing to commit, working tree clean
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ |
```

To switch back to master file run **git checkout master**

```
diff.java M x
dir1 > J diff.java
You, 26 minutes ago | 1 author (You)
1 public class diff
2 {
3     public static void main (String args[])
4     {
5         int a = 10 , b=15,diff,mult ;
6         diff= a - b;
7         System.out.println("diff : " + diff);
8         mult = a*b;
9         System.out.println("mult"+mult);
10    }
11 }

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ git checkout master
Switched to branch 'master'
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git status
On branch master
nothing to commit, working tree clean
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ |
```

## 6. Add some raw code to the branch

Add Code in Feature1.java file (added division logic).  
Then do the **git add** and **git commit** before changing the branch to master

```
J diff.java M X
dir1 > J diff.java
You, 1 second ago | 1 author (You)
1 | //Feature1 file You, 1 second ago • Unco
2 | public class diff
3 | {
4 |     public static void main (String args[])
5 |     {
6 |         int a = 10 , b=15,diff,mult,div;
7 |         diff= a - b;
8 |         System.out.println("diff : " + diff);
9 |         mult = a*b;
10 |        System.out.println("mult"+mult);
11 |        div = a/b;
12 |        System.out.println("div"+div);
13 |    }
14 | }

DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git branch feature1
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git branch feature1
* master
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (master)
$ git checkout feature1
Switched to branch 'feature1'
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ git status
On branch feature1
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:   dir1/diff.java

no changes added to commit (use "git add" and/or "git commit -a")
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ git add -A
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ git commit -m "added division part in diff.java file"
[feature1 b1e03cb] added division part in diff.java file
1 file changed, 3 insertions(+), 1 deletion(-)
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ git status
On branch feature1
nothing to commit, working tree clean
DELL@DESKTOP-H9MM77D MINGW64 ~/Desktop/Pratiksha_DevOps_1 (feature1)
$ |
```



## 7. Merge the Branch with Main line

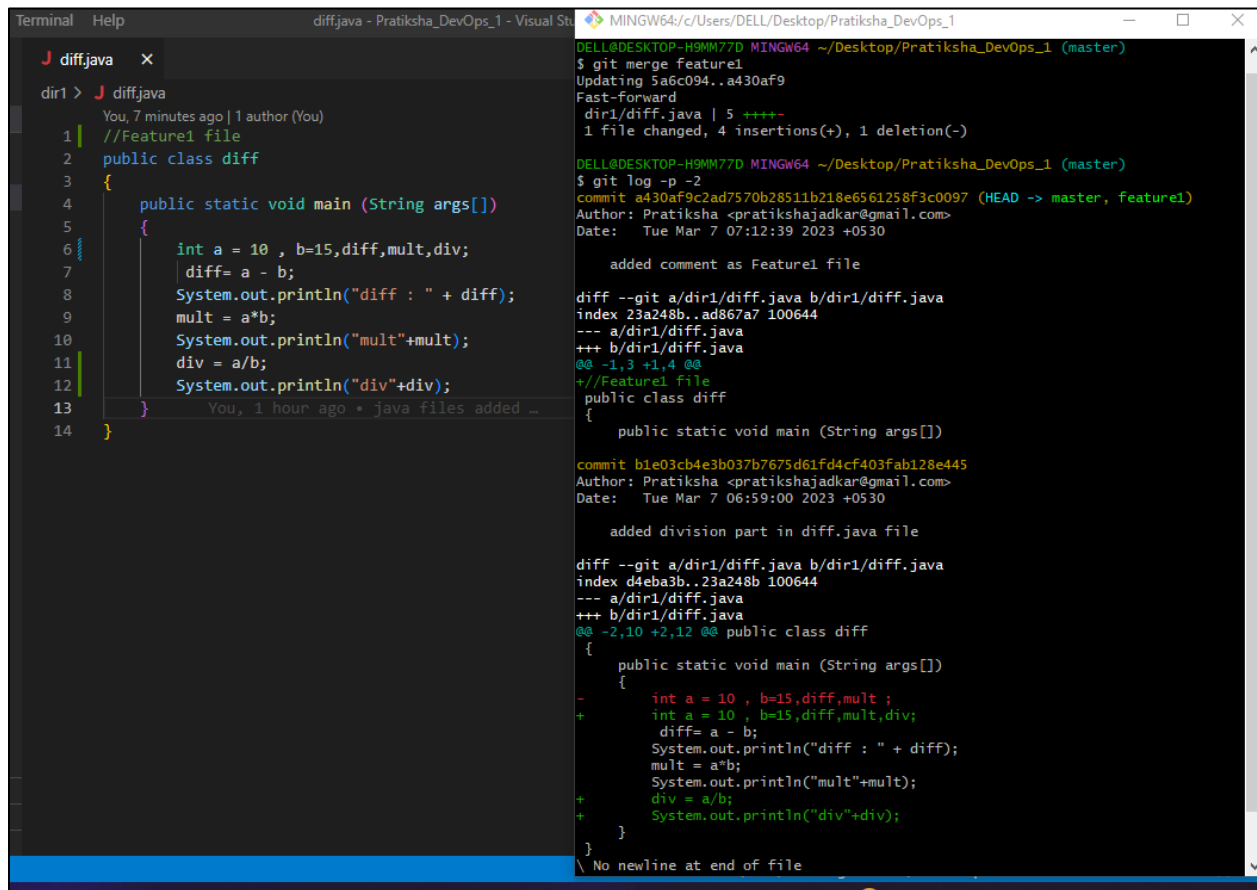
### Commands :

**git merge** : used to merge feature file changes in master file.

**git log -p -2** : Lists the commits made in that repository in reverse chronological order; that is, the most recent commits show up first. **-p** which shows the difference introduced in each commit. **-2** to show only the last two entries.

To merge feature1 file changes to master file run **git merge feature1**

Then run **git log -p -2** which will display all the feature file commits merged in master file.



```
Terminal Help diff.java - Pratiksha_DevOps_1 - Visual S... MINGW64/c/Users/DELL/Desktop/Pratiksha_DevOps_1
diff.java x
dir1 > J diff.java
You, 7 minutes ago | 1 author (You)
1 //Feature1 file
2 public class diff
3 {
4     public static void main (String args[])
5     {
6         int a = 10 , b=15,diff,mult,div;
7         diff= a - b;
8         System.out.println("diff : " + diff);
9         mult = a*b;
10        System.out.println("mult"+mult);
11        div = a/b;
12        System.out.println("div"+div);
13    }
14 }
You, 1 hour ago * java files added ...

MINGW64/c/Users/DELL/Desktop/Pratiksha_DevOps_1 (master)
$ git merge feature1
Updating 5a6c094..a430af9
Fast-forward
 dir1/diff.java | 5 +++++
 1 file changed, 4 insertions(+), 1 deletion(-)

MINGW64/c/Users/DELL/Desktop/Pratiksha_DevOps_1 (master)
$ git log -p -2
commit a430af9c2ad7570b28511b218e6561258f3c0097 (HEAD -> master, feature1)
Author: Pratiksha <pratikshajadkar@gmail.com>
Date: Tue Mar 7 07:12:39 2023 +0530

    added comment as Feature1 file

diff --git a/dir1/diff.java b/dir1/diff.java
index 23a248b..ad867a7 100644
--- a/dir1/diff.java
+++ b/dir1/diff.java
@@ -1,3 +1,4 @@
+//Feature1 file
 public class diff
 {
     public static void main (String args[])
 {
     {
         int a = 10 , b=15,diff,mult ;
+        int a = 10 , b=15,diff,mult,div;
         diff= a - b;
         System.out.println("diff : " + diff);
         mult = a*b;
         System.out.println("mult"+mult);
+        div = a/b;
+        System.out.println("div"+div);
     }
 }
\ No newline at end of file

commit b1e03cb4e3b037b7675d61fd4cf403fab128e445
Author: Pratiksha <pratikshajadkar@gmail.com>
Date: Tue Mar 7 06:59:00 2023 +0530

    added division part in diff.java file

diff --git a/dir1/diff.java b/dir1/diff.java
index d4eba3b..23a248b 100644
--- a/dir1/diff.java
+++ b/dir1/diff.java
@@ -2,10 +2,12 @@ public class diff
 {
     public static void main (String args[])
 {
     {
         int a = 10 , b=15,diff,mult ;
+        int a = 10 , b=15,diff,mult,div;
         diff= a - b;
         System.out.println("diff : " + diff);
         mult = a*b;
         System.out.println("mult"+mult);
+        div = a/b;
+        System.out.println("div"+div);
     }
 }
```

## 8. PUSH to GitHub

Commands:

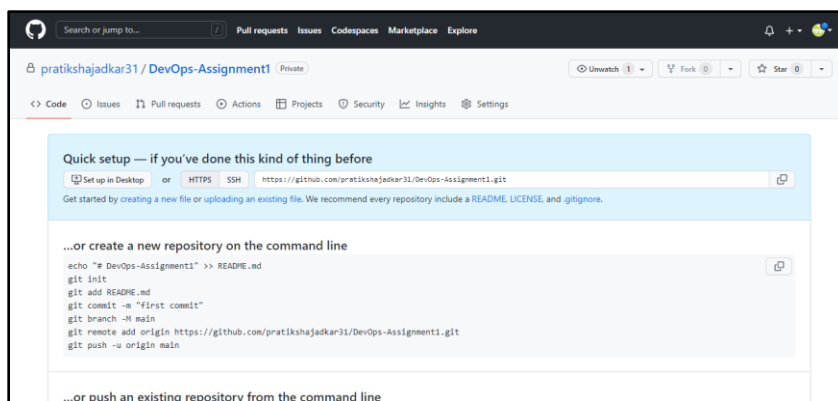
**git push**: used to push local commits to a remote repository

**git remote add** : used to add a new remote.

It takes two arguments:

- A remote name, for example, origin
- A remote URL

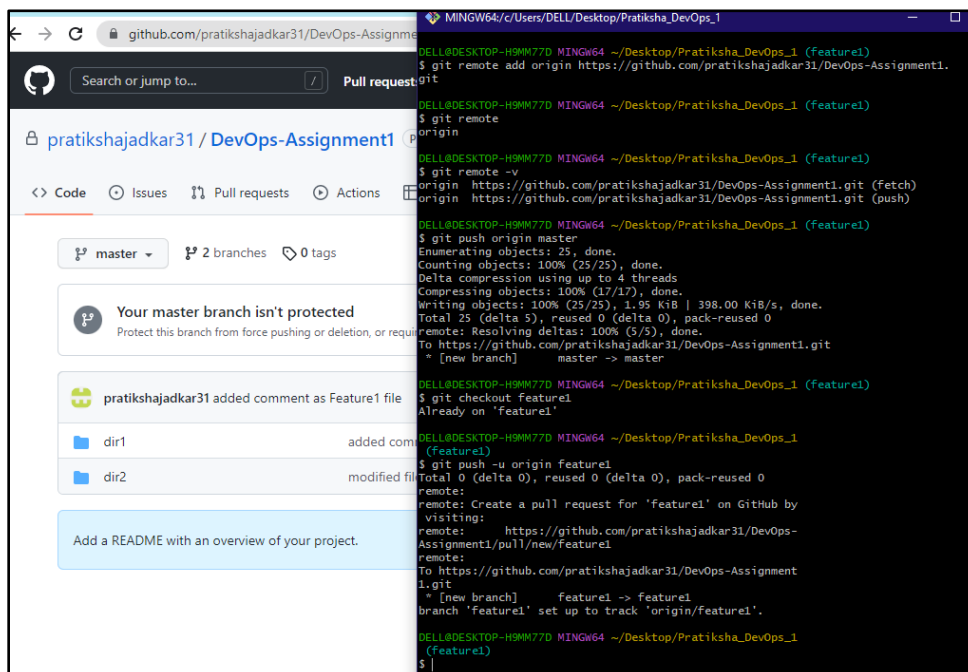
Create GitHub Account and then create New Repository



Now to push Local repository into Remote repository.

Copy the remote path and run that command

1<sup>st</sup> pushed master branch :



## Push feature1 branch :

The screenshot displays a GitHub repository interface for `pratikshajadkar31 / DevOps-Assignment1`. The repository is private and has two branches: `master` and `feature1`, both updated 50 minutes ago by `pratikshajadkar31`. The `feature1` branch is currently selected.

Overlaid on the right side of the repository view is a terminal window titled `MINGW64: c:/Users/DELL/Desktop/Pratiksha_...`. The terminal shows the following sequence of Git commands and their output:

```
$ git remote -v
origin https://github.com/pratikshajadkar31/DevOps-Assig
origin https://github.com/pratikshajadkar31/DevOps-Assig

$ git push origin master
Enumerating objects: 25, done.
Counting objects: 100% (25/25), done.
Delta compression using up to 4 threads
Compressing objects: 100% (17/17), done.
Writing objects: 100% (25/25), 1.95 KiB | 398.00 KiB/s, done.
Total 25 (delta 5), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (5/5), done.
To https://github.com/pratikshajadkar31/DevOps-Assignment1
 * [new branch]      master -> master

$ git checkout feature1
Already on 'feature1'

$ git push -u origin feature1
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0
remote: Create a pull request for 'feature1' on GitHub by
visiting:
remote:   https://github.com/pratikshajadkar31/DevOps-
Assignment1/pull/new/feature1
remote:
To https://github.com/pratikshajadkar31/DevOps-Assignment1.git
 * [new branch]      feature1 -> feature1
branch 'feature1' set up to track 'origin/feature1'.

$
```

The terminal output indicates that the `feature1` branch has been successfully pushed to the remote repository and is now tracking the origin.

## 9. **Advantages of moving from Centralized Source Code to Distributed Version Control.**

- The full history is always available because of local commits
- No need to access a remote server (faster access)
- Each developer has a copy of the code on their system, even if the main server loses its copy, it can easily be recovered
- New feature has its own branch, which is tested and modified in isolation and later merged into the main branch once ready.
- Good for projects with off-shore developers