Lab Exercise 2- Working with Git Reset

Lab Exercise: Git Reset

This lab exercise will guide you through the usage of the git reset command in various scenarios. The git reset command is used to undo changes in the Git history, working directory, or staging area. There are three main modes: **soft**, **mixed**, and **hard**.

Objective

- Learn how to use git reset to modify the commit history, unstage files, or discard changes.
- Understand the differences between --soft, --mixed, and --hard reset modes.

Prerequisites

1. Install Git on your system.
2. Set up a Git repository:

```
git init git-reset-lab

cd git-reset-lab
```

Steps

1. Set Up the Repository

1. Create and commit an initial file:

```
echo "Line 1" > file.txt

git add file.txt

git commit -m "Initial commit: Add Line 1"
```

2. Add a second change:

```
echo "Line 2" >> file.txt

git commit -am "Add Line 2"
```

3. Add a third change:

```
echo "Line 3" >> file.txt

git commit -am "Add Line 3"
```

4. Check the commit history:

```
git log --oneline
```

Example output:

```
shagu@Shagun MINGW64 ~/git-reset-lab (main)
$ git log --oneline
88a0bdc (HEAD -> main) add line 3
8c124ab add line 2
8b24543 initial commit
```

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2. Use git reset --soft

This mode moves the HEAD pointer to an earlier commit but keeps the changes in the staging area.

1. Reset to the second commit:

```
git reset --soft HEAD~1
```

2. Check the commit history:

```
git log --oneline
```

Output:

```
shagu@Shagun MINGW64 ~/git-reset-lab (main)
$ git log --oneline
8c124ab (HEAD -> main) add line 2
8b24543 initial commit
```

3. Verify the staged changes:

```
git status
```

Output:

```
shagu@Shagun MINGW64 ~/git-reset-lab (main)
$ git status
On branch main
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   file.txt
```

4. If needed, re-commit the changes:

```
git commit -m "Recommit Line 3"
```

```
shagu@Shagun MINGW64 ~/git-reset-lab (main)
$ git commit -m "recommit line 3"
[main 18fbd67] recommit line 3
 1 file changed, 1 insertion(+)
```

---

3. Use git reset --mixed

This mode moves the HEAD pointer and unstages the changes but keeps them in the working directory.

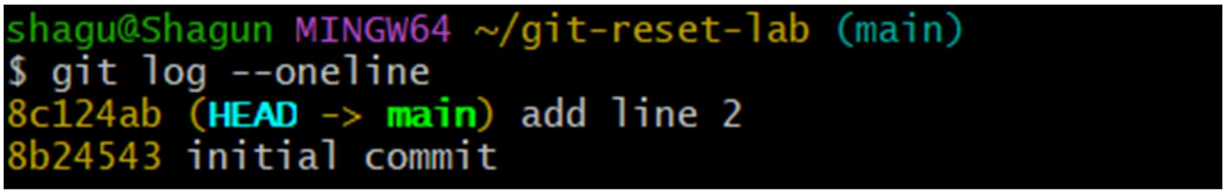
1. Reset to the first commit:

```
git reset --mixed HEAD~1
```

2. Check the commit history:

```
git log --oneline
```

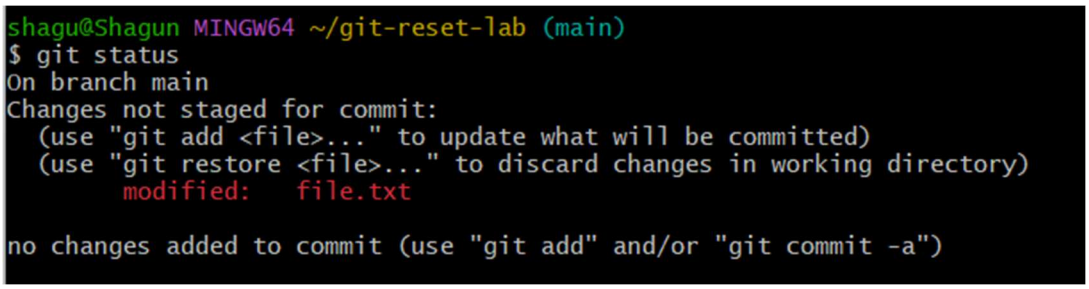
Output:



3. Verify the changes in the working directory:

```
git status
```

Output:

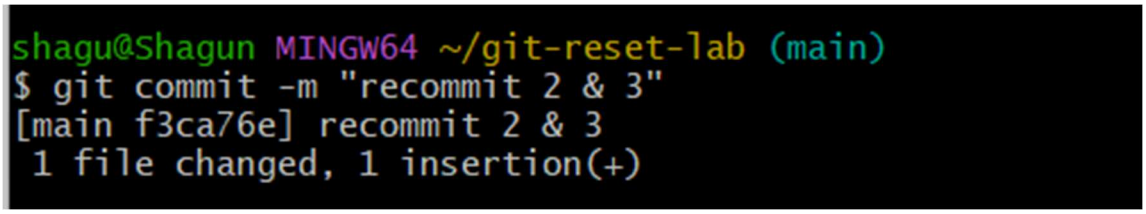


4. If needed, stage and re-commit:

```
git add file.txt

git commit -m "Recommit Line 2 and Line 3"
```

Output:



---

4. Use git reset --hard

This mode moves the HEAD pointer and discards all changes in the staging area and working directory.

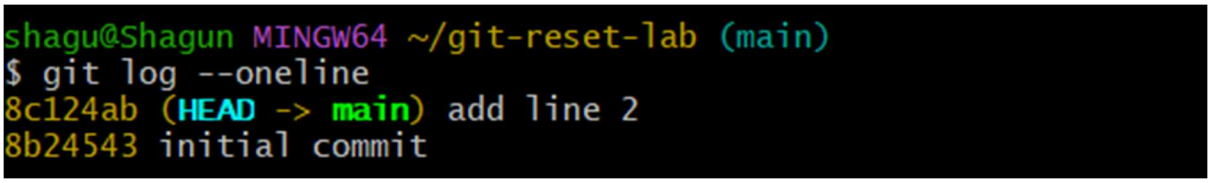
1. Reset to the initial commit:

```
git reset --hard HEAD~1
```

2. Check the commit history:

```
git log --oneline
```

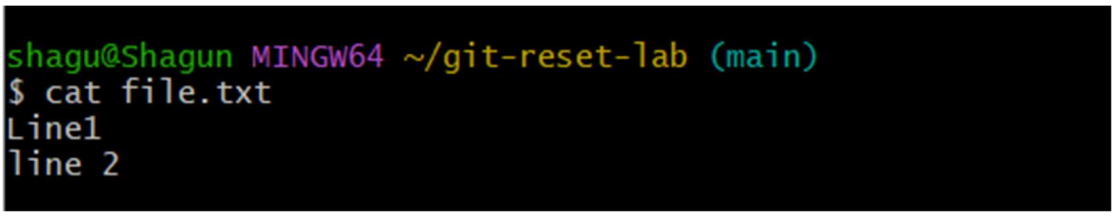
Output:



3. Verify the working directory:

```
cat file.txt
```

Output:



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5. Use git reset with a Commit Hash

1. Add some changes for demonstration:

```
echo "Line 2" >> file.txt

git commit -am "Add Line 2"

echo "Line 3" >> file.txt

git commit -am "Add Line 3"
```

2. Get the commit hash for the initial commit:

```
git log --oneline
```

3. Reset to the initial commit using the hash:

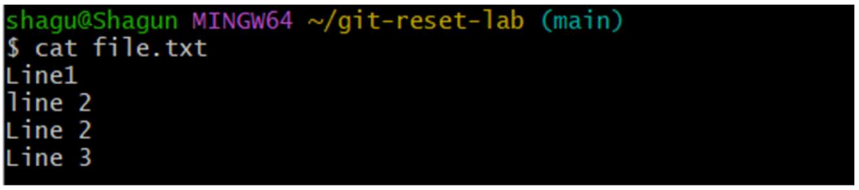
```
git reset --hard <commit-hash>
```

4. Verify the working directory and commit history:

```
git log --oneline

cat file.txt
```

Output:



Summary of Commands

Mode	Effect	Command Example
--soft	Moves HEAD, keeps changes staged.	git reset --soft HEAD~1
--mixed	Moves HEAD, unstages changes, keeps them in working dir.	git reset --mixed HEAD~1
--hard	Moves HEAD, discards all changes in staging and working dir.	git reset --hard HEAD~1