Lab Exercise 2- Working with Git Reset

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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:

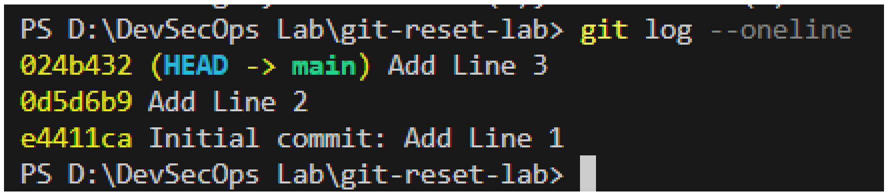
```
echo "Line 3" >> file.txt

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

4. Check the commit history:

```
git log --oneline
```

Example output:



```
PS D:\DevSecOps Lab\git-reset-lab> git log --oneline
024b432 (HEAD -> main) Add Line 3
0d5d6b9 Add Line 2
e4411ca Initial commit: Add Line 1
PS D:\DevSecOps Lab\git-reset-lab>
```

---

2. Use git reset --soft

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

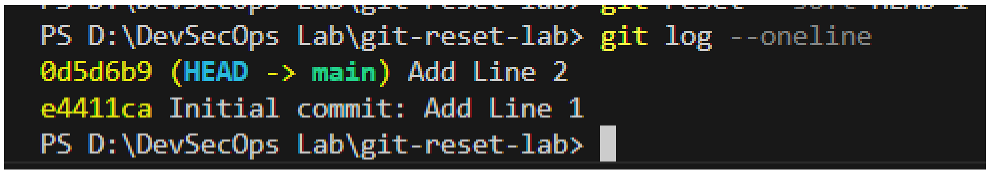
1. Reset to the second commit:

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

2. Check the commit history:

```
git log --oneline
```

Output:

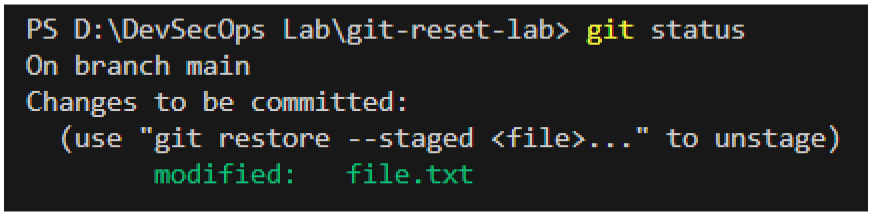


```
PS D:\DevSecOps Lab\git-reset-lab> git log --oneline
0d5d6b9 (HEAD -> main) Add Line 2
e4411ca Initial commit: Add Line 1
PS D:\DevSecOps Lab\git-reset-lab>
```

3. Verify the staged changes:

```
git status
```

Output:



```
PS D:\DevSecOps Lab\git-reset-lab> 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"
```

---

3. Use git reset --mixed

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

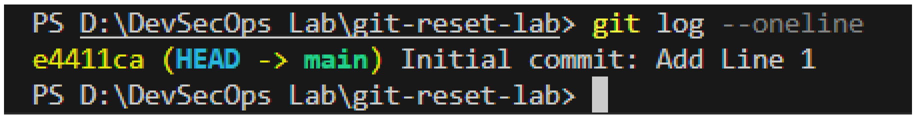
1. Reset to the first commit:

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

2. Check the commit history:

```
git log --oneline
```

Output:

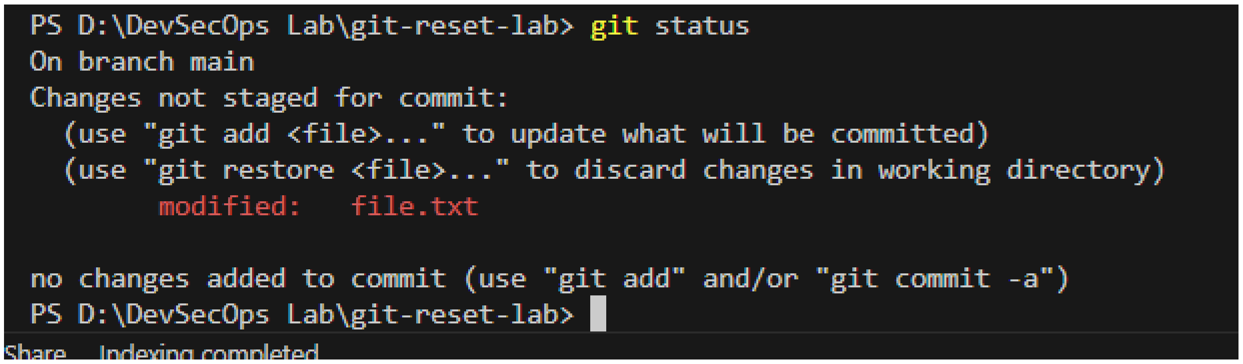


```
PS D:\DevSecOps Lab\git-reset-lab> git log --oneline
e4411ca (HEAD -> main) Initial commit: Add Line 1
PS D:\DevSecOps Lab\git-reset-lab>
```

3. Verify the changes in the working directory:

```
git status
```

Output:



```
PS D:\DevSecOps Lab\git-reset-lab> git status
On branch main
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:   file.txt

no changes added to commit (use "git add" and/or "git commit -a")
PS D:\DevSecOps Lab\git-reset-lab>
```

4. If needed, stage and re-commit:

```
git add file.txt

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

---

4. Use git reset --hard

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

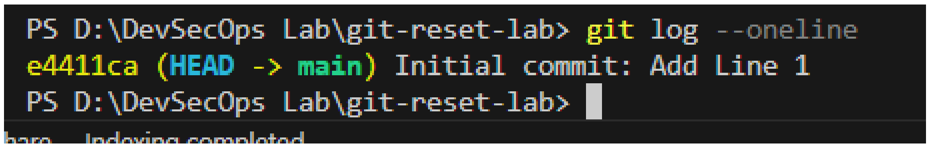
1. Reset to the initial commit:

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

2. Check the commit history:

```
git log --oneline
```

Output:

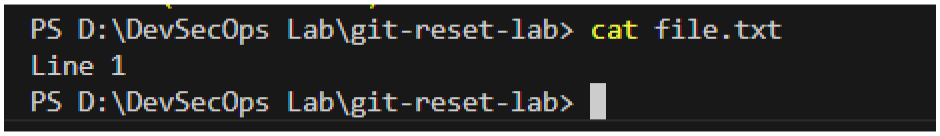


```
PS D:\DevSecOps Lab\git-reset-lab> git log --oneline
e4411ca (HEAD -> main) Initial commit: Add Line 1
PS D:\DevSecOps Lab\git-reset-lab>
```

3. Verify the working directory:

```
cat file.txt
```

Output:



```
PS D:\DevSecOps Lab\git-reset-lab> cat file.txt
Line 1
PS D:\DevSecOps Lab\git-reset-lab>
```

---

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
```

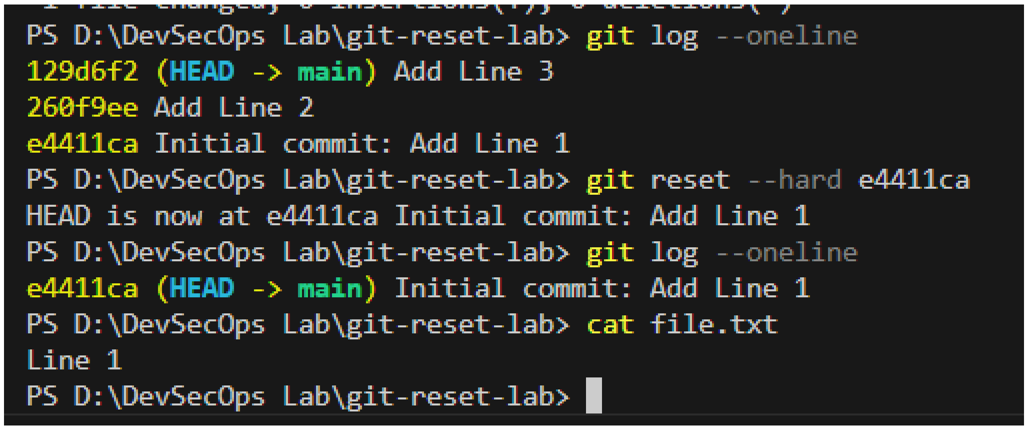
3. Reset to the initial commit using the hash:

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

4. Verify the working directory and commit history:

```
git log --oneline

cat file.txt
```



```
PS D:\DevSecOps Lab\git-reset-lab> git log --oneline
129d6f2 (HEAD -> main) Add Line 3
260f9ee Add Line 2
e4411ca Initial commit: Add Line 1
PS D:\DevSecOps Lab\git-reset-lab> git reset --hard e4411ca
HEAD is now at e4411ca Initial commit: Add Line 1
PS D:\DevSecOps Lab\git-reset-lab> git log --oneline
e4411ca (HEAD -> main) Initial commit: Add Line 1
PS D:\DevSecOps Lab\git-reset-lab> cat file.txt
Line 1
PS D:\DevSecOps Lab\git-reset-lab>
```

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

Mode	**Effect**	**Command Example**
--hard	Moves HEAD, discards all changes in staging and working dir.	git reset --hard HEAD~1