Submitted to:-

Engr. Muhammad Shoaib

Engr. Waqas Saleem

Submitted by:-

Hafsa Khalid

Reg no:-

2023-BSE-021

Section:-

5 A

Cloud Computing

LAB O2

Task 1: Create Private GitHub Repository

Create a new repository

Repositories contain a project's files and version history. Have a project elsewhere? Import a repository.
Required fields are marked with an asterisk (*).

1 General

Owner *

Hafsa-Khalid021 ▼   /   Repository name *

Lab2

✔ Lab2 is available.

Great repository names are short and memorable. How about **urban-sniffle**?

Description

Lab 2 tasks

11 / 350 characters

2 Configuration

Choose visibility *
Choose who can see and commit to this repository

🔒 Private ▼

Add README
READMEs can be used as longer descriptions. About READMEs

Off ⚪

Task 2: Connect Repository via SSH

```
HP@DESKTOP-UGL3JHC MINGW64 ~
$ ssh-keygen -t ed25519 -C "23-21511-008env.fjwu.edu.pk"
Generating public/private ed25519 key pair.
Enter file in which to save the key (/c/Users/HP/.ssh/id_ed25519):
Enter passphrase for "/c/Users/HP/.ssh/id_ed25519" (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /c/Users/HP/.ssh/id_ed25519
Your public key has been saved in /c/Users/HP/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:M1lJDRXXSAPG1hSLgGvMkmAxHb/fHGBmIC9N6R7mLoY 23-21511-008env.fjwu.edu.pk
The key's randomart image is:
+--[ED25519 256]--+
|    ooo.oo+==**+  |
|    o..*oo ++ooo. |
|   . ..=+.B.. .   |
|      o.OB .      |
|       *S. .      |
|        o+ o .    |
|      . .  . o    |
|     E o .        |
|      . .         |
+----[SHA256]-----+
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~
$ cat /c/Users/HP/.ssh/id_ed25519.pub
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIB1qlaTsXgYlRfyY4oy21HFY7azO8AxJyMaSpsiStEfX 23-21511-008@env.fjwu.edu.pk
```

Add new SSH Key

Title

my laptop

Key type

Authentication Key ⇕

Key

ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIB1qlaTsXgYlRfyY4oy21HFY7azO8AxJyMaSpsiStEfX 23-21511-008@env.fjwu.edu.pk

Add SSH key

SSH keys

New SSH key

This is a list of SSH keys associated with your account. Remove any keys that you do not recognize.

Authentication keys

🗝️
SSH

my laptop
SHA256:YmtH5Vn5axOc1N1ic7Vt1BQDVnlWFqLKuwoKhu1X8mw
Added on Oct 8, 2025
Never used — Read/write

Delete

Task 3: Configure Git Username and Email

```
HP@DESKTOP-UGL3JHC MINGW64 ~
$ git config --global user.name "Hafsa-Khalid021"

HP@DESKTOP-UGL3JHC MINGW64 ~
$ git config --global user.email "23-21511-008@env.fjwu.edu.pk"
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~
$ git config --list
diff.astextplain.textconv=astextplain
filter.lfs.clean=git-lfs clean -- %f
filter.lfs.smudge=git-lfs smudge -- %f
filter.lfs.process=git-lfs filter-process
filter.lfs.required=true
http.sslbackend=schannel
core.autocrlf=true
core.fscache=true
core.symlinks=false
pull.rebase=false
credential.helper=manager
credential.https://dev.azure.com.usehttppath=true
init.defaultbranch=master
filter.lfs.clean=git-lfs clean -- %f
filter.lfs.smudge=git-lfs smudge -- %f
filter.lfs.process=git-lfs filter-process
filter.lfs.required=true
user.name=Hafsa-Khalid021
user.email=23-21511-008@env.fjwu.edu.pk
user.gmail=23-22411-027@se.fjwu.edu.pk
```

Task 4: Explore the .git Folder

Copy this ssh url.

```
HTTPS   SSH    git@github.com:Hafsa-Khalid021/Lab2.git
```

Open git bash on desktop.

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop
$ git clone git@github.com:Hafsa-Khalid021/Lab2.git
Cloning into 'Lab2'...
The authenticity of host 'github.com (20.207.73.82)' can't be established.
ED25519 key fingerprint is SHA256:+DiY3wvvV6TuJJhbpZisF/zLDAOzPMSvHdkr4UvCOqU.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'github.com' (ED25519) to the list of known hosts.
warning: You appear to have cloned an empty repository.
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop
$ cd Lab2

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (main)
$ ls -a
./   ../   .git/

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (main)
$ ls -a .git
./   ../   HEAD   config   description   hooks/   info/   objects/   refs/
```

Task 5: Local Repository Management

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (main)
$ rm -rf .git
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2
$ git init
Initialized empty Git repository in C:/Users/HP/Desktop/Lab2/.git/
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ echo "#Lab2 Git Practice" > README.md
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git add README.md
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git commit -m "Initial commit"
[master (root-commit) ad97289] Initial commit
 1 file changed, 1 insertion(+)
 create mode 100644 README.md
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git remote add origin git@github.com:Hafsa-Khalid021/Lab2.git
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git push -u origin master
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Writing objects: 100% (3/3), 245 bytes | 81.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Hafsa-Khalid021/Lab2.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.
```

Task 6: File Status & Staging

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ echo "This is my first note" > notes.txt
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git status
On branch master
Your branch is up to date with 'origin/master'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        notes.txt

nothing added to commit but untracked files present (use "git add" to track)
```
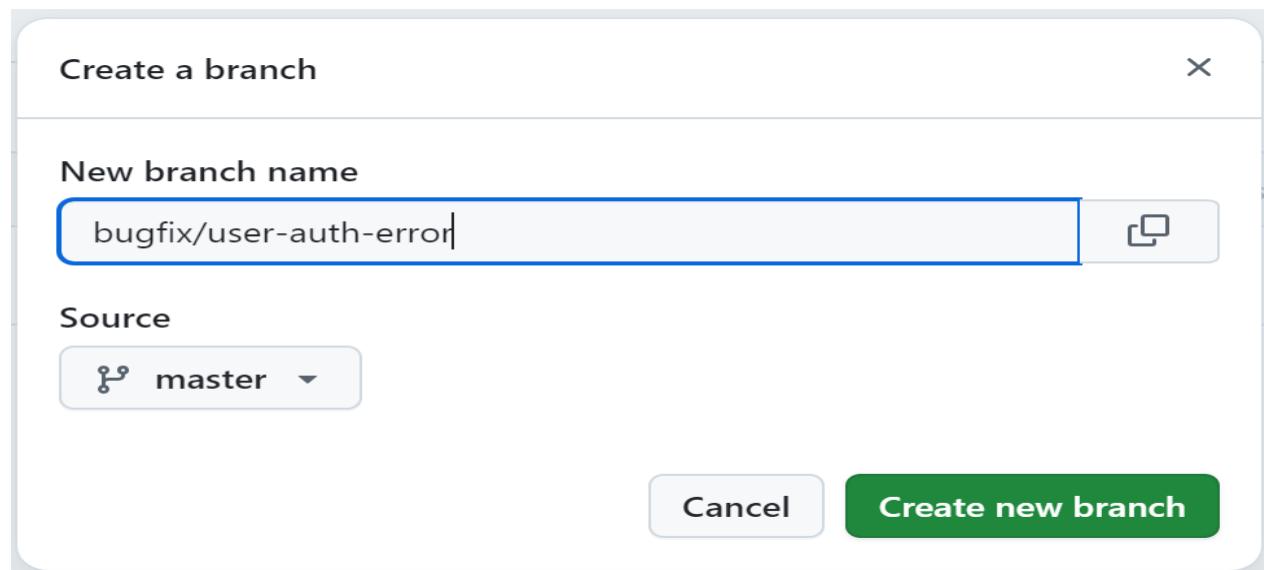
```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git add notes.txt
warning: in the working copy of 'notes.txt', LF will be replaced by CRLF the next time Git touches it
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git add notes.txt
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git commit -m "Add third line to notes.txt"
[master 3109e30] Add third line to notes.txt
 1 file changed, 1 insertion(+)
 create mode 100644 notes.txt
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git push
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 323 bytes | 161.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Hafsa-Khalid021/Lab2.git
   ad97289..3109e30  master -> master
```

Task 7: Branch Creation Using GitHub GUI

Create a branch   ✕

New branch name

[bugfix/user-auth-error   ] [⧉]

Source

[⎇ master ▾]

                              [Cancel] [Create new branch]

Branches


```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch -r
  origin/master
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git fetch --all
From github.com:Hafsa-Khalid021/Lab2
 * [new branch]      bugfix/user-auth-error -> origin/bugfix/user-auth-error
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout bugfix/user-auth-error
branch 'bugfix/user-auth-error' set up to track 'origin/bugfix/user-auth-error'.
Switched to a new branch 'bugfix/user-auth-error'
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (bugfix/user-auth-error)
$ git branch -r
  origin/HEAD -> origin/master
  origin/bugfix/user-auth-error
  origin/master
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (bugfix/user-auth-error)
$ git branch
* bugfix/user-auth-error
  master
```

Task 8: Branch Creation and Push Using Git Bash

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (bugfix/user-auth-error)
$ git checkout -b feature/db-connection
Switched to a new branch 'feature/db-connection'
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/db-connection)
$ git push origin feature/db-connection
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature/db-connection' on GitHub by visiting
remote:      https://github.com/Hafsa-Khalid021/Lab2/pull/new/feature/db-connect
ion
remote:
To github.com:Hafsa-Khalid021/Lab2.git
 * [new branch]      feature/db-connection -> feature/db-connection
```

Branches

New branch

Overview | Yours | Active | Stale | All

🔍 Search branches...

Default

Branch	Updated	Check status	Behind	Ahead	Pull request		
master 🗐	🐢 31 minutes ago		Default			🗑	...

Your branches

Branch	Updated	Check status	Behind	Ahead	Pull request		
feature/db-connection 🗐	🐢 1 minute ago		0	0		🗑	...
bugfix/user-auth-error 🗐	🐢 14 minutes ago		0	0		🗑	...

Active branches

Branch	Updated	Check status	Behind	Ahead	Pull request		
feature/db-connection 🗐	🐢 1 minute ago		0	0		🗑	...
bugfix/user-auth-error 🗐	🐢 14 minutes ago		0	0		🗑	...

Task 9: Branching & Merging

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/db-connection)
$ git checkout -b feature-1
Switched to a new branch 'feature-1'
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature-1)
$ git branch
  bugfix/user-auth-error
* feature-1
  feature/db-connection
  master
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature-1)
$ echo "def new_function():" > main.py
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature-1)
$ git add main.py
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature-1)
$ git commit -m "Add new function to main.py"
[feature-1 be8ad9a] Add new function to main.py
 1 file changed, 1 insertion(+)
 create mode 100644 main.py
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature-1)
$ git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git merge feature-1
Updating 3109e30..be8ad9a
Fast-forward
 main.py | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 main.py
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git push origin master
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 353 bytes | 176.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Hafsa-Khalid021/Lab2.git
   3109e30..be8ad9a  master -> master
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git push origin feature-1
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature-1' on GitHub by visiting:
remote:      https://github.com/Hafsa-Khalid021/Lab2/pull/new/feature-1
remote:
To github.com:Hafsa-Khalid021/Lab2.git
 * [new branch]      feature-1 -> feature-1
```

Task 10: Pull Request and Branch Review (GitHub GUI)

Comparing changes

Choose two branches to see what's changed or to start a new pull request. If you need to, you can also compare across forks or learn more about diff comparisons.

⇅ base: master ▾ ← ⋯ compare: feature/db-connection ▾ ✓ **Able to merge.** These branches can be automatically merged.

Discuss and review the changes in this comparison with others. Learn about pull requests   **Create pull request**

| -○- **1 commit** | ⬆ **1 file changed** | 八 **1 contributor** |

-○- Commits on Oct 9, 2025

Added test line to enable pull request   📋 fc6bf39 ⟨⟩
🍥 **Hafsa-Khalid021** committed 2 days ago

⬆ Showing **1 changed file** with **1 addition** and **1 deletion**.   Split Unified

⌄ 2 ■■ ▨▨▨ README.md 📋   ⟨⟩ 🗋 ⋯

...	...	@@ -1 +1 @@
1		- #Lab2 Git Practice
	1	+ This is a test update for pull request

Added test line to enable pull request #1

⟨�⟩ **Open**   **Hafsa-Khalid021** wants to merge 1 commit into `master` from `feature/db-connection` 📋

💬 **Conversation** 0   -○- **Commits** 1   ▣ **Checks** 0   ⬆ **Files changed** 1

🍥   **Hafsa-Khalid021** commented now   ⋯
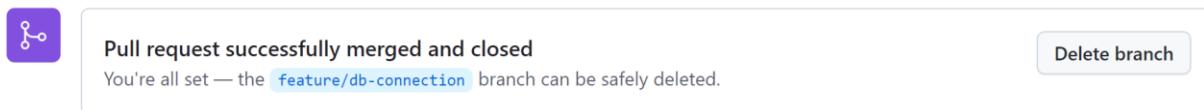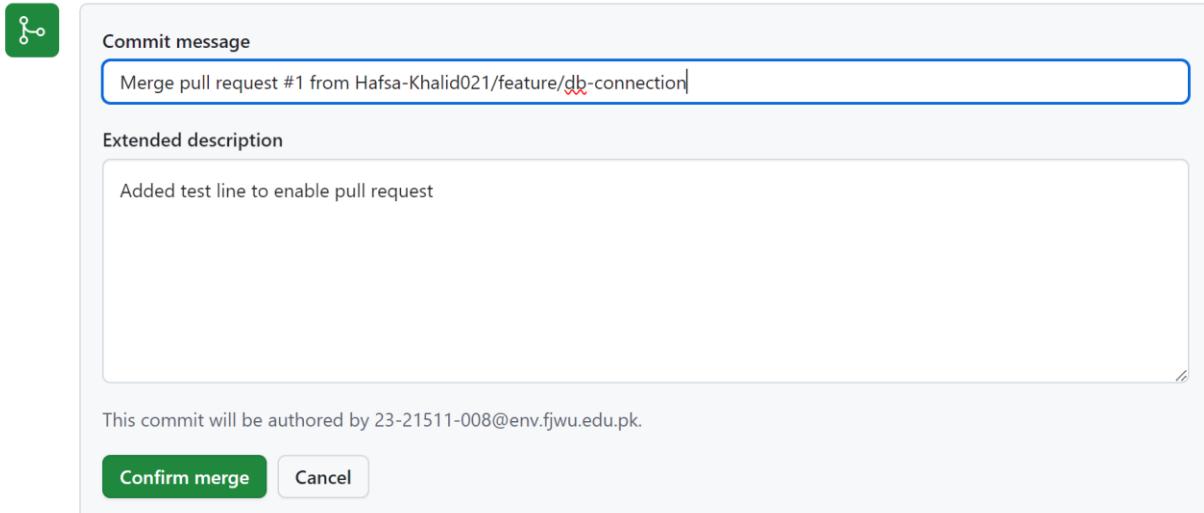
No description provided.

☺

-○- 🍥 Added test line to enable pull request   fc6bf39

⎇   ✓ **No conflicts with base branch**
Merging can be performed automatically.

Merge pull request ▾   You can also merge this with the command line. View command line instructions.

Commit message

Merge pull request #1 from Hafsa-Khalid021/feature/db-connection

Extended description

Added test line to enable pull request

This commit will be authored by 23-21511-008@env.fjwu.edu.pk.

Confirm merge   Cancel

Pull request successfully merged and closed
You're all set — the `feature/db-connection` branch can be safely deleted.

Delete branch

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout feature/db-connection
Switched to branch 'feature/db-connection'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/db-connection)
$ echo "This is a test update for pull request" > README.md

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/db-connection)
$ git add README.md
warning: in the working copy of 'README.md', LF will be replaced by CRLF the next time Git touches it

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/db-connection)
$ git add README.md

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/db-connection)
$ git commit -m "Added test line to enable pull request"
[feature/db-connection fc6bf39] Added test line to enable pull request
 1 file changed, 1 insertion(+), 1 deletion(-)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/db-connection)
$ git push origin feature/db-connection
```

Task 11: Detailed Branch Strategy (Develop/Staging)

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop|MERGING)
$ git checkout -b develop
fatal: a branch named 'develop' already exists

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop|MERGING)
$ git push origin develop
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'develop' on GitHub by visiting:
remote:        https://github.com/Hafsa-Khalid021/Lab2/pull/new/develop
remote:
To github.com:Hafsa-Khalid021/Lab2.git
 * [new branch]      develop -> develop

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop|MERGING)
$
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ git checkout -b feature/login-page
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ git checkout feature/login-page
error: The following untracked working tree files would be overwritten by checkout:
        login.py
Please move or remove them before you switch branches.
Aborting

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ mv login.py login_backup.py

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ git checkout feature/login-page
Switched to branch 'feature/login-page'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/login-page)
$ echo "print('Login feature added')" > login.py

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/login-page)
$ git add login.py
warning: in the working copy of 'login.py', LF will be replaced by CRLF the next time Git touches it

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/login-page)
$ git commit -m "Add login feature"
On branch feature/login-page
Merge branch 'feature/login-page' into develop
```

```
Merge made by the 'ort' strategy.
 login.py | 1 +
 main.py  | 1 +
 2 files changed, 2 insertions(+)
 create mode 100644 login.py
 create mode 100644 main.py
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (2/2), 392 bytes | 392.00 KiB/s, done.
Total 2 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Hafsa-Khalid021/Lab2.git
   fc6bf39..9469ea3  develop -> develop
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ git checkout staging
Switched to branch 'staging'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (staging)
$ git merge develop
Updating be8ad9a..9469ea3
Fast-forward
 README.md | 2 +-
 login.py  | 1 +
 2 files changed, 2 insertions(+), 1 deletion(-)
 create mode 100644 login.py

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (staging)
$ git push origin staging
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'staging' on GitHub by visiting:
remote:        https://github.com/Hafsa-Khalid021/Lab2/pull/new/staging
remote:
To github.com:Hafsa-Khalid021/Lab2.git
 * [new branch]      staging -> staging
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (staging)
$ git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git merge staging
Updating be8ad9a..9469ea3
Fast-forward
 README.md | 2 +-
 login.py  | 1 +
 2 files changed, 2 insertions(+), 1 deletion(-)
 create mode 100644 login.py
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git push origin master
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 391 bytes | 78.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Hafsa-Khalid021/Lab2.git
   80db360..14ad477  master -> master
```

Bonus Task: Simulated Team Collaboration

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout -b collab
Switched to a new branch 'collab'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git push origin collab
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'collab' on GitHub by visiting:
remote:      https://github.com/Hafsa-Khalid021/Lab2/pull/new/collab
remote:
To github.com:Hafsa-Khalid021/Lab2.git
 * [new branch]      collab -> collab

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git pull origin collab
From github.com:Hafsa-Khalid021/Lab2
 * branch            collab     -> FETCH_HEAD
Already up to date.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ nano notes.txt

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git commit -m "Add names and fun facts to notes.txt"
On branch collab
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:   notes.txt

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        login_backup.py

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

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git add notes.txt login_backup.py
warning: in the working copy of 'notes.txt', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'login_backup.py', LF will be replaced by CRLF the next time Git touches it

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git add.
git: 'add.' is not a git command. See 'git --help'.

The most similar command is
        add

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git add .

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git commit -m "Add names and fun facts to notes.txt"
[collab 49af863] Add names and fun facts to notes.txt
 2 files changed, 2 insertions(+)
 create mode 100644 login_backup.py

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git push origin collab
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 321 bytes | 107.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To github.com:Hafsa-Khalid021/Lab2.git
   14ad477..49af863  collab -> collab
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git pull origin master
From github.com:Hafsa-Khalid021/Lab2
 * branch            master     -> FETCH_HEAD
Already up to date.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git merge collab
Updating 14ad477..49af863
Fast-forward
 login_backup.py | 1 +
 notes.txt       | 1 +
 2 files changed, 2 insertions(+)
 create mode 100644 login_backup.py

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git push origin master
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Hafsa-Khalid021/Lab2.git
   14ad477..49af863  master -> master

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout collab
Switched to branch 'collab'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git pull origin collab
From github.com:Hafsa-Khalid021/Lab2
 * branch            collab     -> FETCH_HEAD
Already up to date.
```

Task 12: Code Review Workflow

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab)
$ git checkout -b feature/my-task
Switched to a new branch 'feature/my-task'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/my-task)
$ git add .

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/my-task)
$ git commit -m "Added feature for task 12"
On branch feature/my-task
nothing to commit, working tree clean

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/my-task)
$ git push origin feature/my-task
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature/my-task' on GitHub by visiting:
remote:      https://github.com/Hafsa-Khalid021/Lab2/pull/new/feature/my-task
remote:
To github.com:Hafsa-Khalid021/Lab2.git
 * [new branch]      feature/my-task -> feature/my-task
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/my-task)
$ echo "Added by Hafsa for Task 12 PR demo" >> notes.txt

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/my-task)
$ git add notes.txt
warning: in the working copy of 'notes.txt', LF will be replaced by CRLF the next time Git touches it

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/my-task)
$ git commit -m "Added feature for task 12"
[feature/my-task 0787f47] Added feature for task 12
 1 file changed, 1 insertion(+)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/my-task)
$ git push origin feature/my-task
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 332 bytes | 83.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To github.com:Hafsa-Khalid021/Lab2.git
   49af863..0787f47  feature/my-task -> feature/my-task
```

Comparing changes

Choose two branches to see what's changed or to start a new pull request. If you need to, you can also compare across forks or learn more about diff comparisons.

| ⇅ | base: master ▾ | ← | compare: feature/my-task ▾ | ✓ **Able to merge.** These branches can be automatically merged. |

Discuss and review the changes in this comparison with others. Learn about pull requests   **Create pull request**

| -○- **1 commit** | ⊞ **1 file changed** | ⋔ **1 contributor** |

-○- Commits on Oct 11, 2025

Added feature for task 12
Hafsa-Khalid021 committed 2 minutes ago   📋 0787f47 <>

⊞ Showing **1 changed file** with **1 addition** and **0 deletions.**   Split Unified

| ∨ 1 ■ notes.txt 📋 | ⋯ |

```
...    ...    @@ -1,2 +1,3 @@
 1      1      This is my first note
 2      2
        3    + Added by Hafsa for Task 12 PR demo
```

Added feature for task 12 #2

⑂ Open **Hafsa-Khalid021** wants to merge 1 commit into `master` from `feature/my-task` ⧉

💬 Conversation 0	-○- Commits 1	▣ Checks 0	± Files changed 1

Hafsa-Khalid021 commented now   ···

task 12

☺

-○-   🏁 Added feature for task 12   0787f47

⑂ ✓ **No conflicts with base branch**
     Merging can be performed automatically.

Merge pull request ▾   You can also merge this with the command line. View command line instructions.

⑂ **Merged** **Hafsa-Khalid021** merged 1 commit into `master` from `feature/my-task` ⧉ now

💬 Conversation 0	-○- Commits 1	▣ Checks 0	± Files changed 1

Hafsa-Khalid021 commented now   ···

task 12

☺

-○-   🏁 Added feature for task 12   0787f47
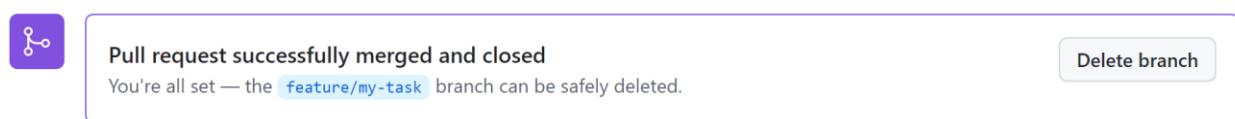
⑂ 🏁 **Hafsa-Khalid021** merged commit **9e97b43** into `master` now   [Revert]

⑂ **Pull request successfully merged and closed**   [Delete branch]
   You're all set — the `feature/my-task` branch can be safely deleted.
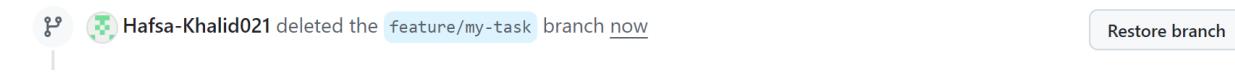
Task 13: Branch Cleanup Best Practices

Delete the branch from here.

> **Pull request successfully merged and closed**   **Delete branch**
> You're all set — the `feature/my-task` branch can be safely deleted.

Branch deleted.

> 🔀 **Hafsa-Khalid021** deleted the `feature/my-task` branch now   **Restore branch**

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/my-task)
$ git push origin --delete feature/my-task
error: unable to delete 'feature/my-task': remote ref does not exist
error: failed to push some refs to 'github.com:Hafsa-Khalid021/Lab2.git'
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/my-task)
$ git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git pull origin master
remote: Enumerating objects: 1, done.
remote: Counting objects: 100% (1/1), done.
remote: Total 1 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (1/1), 913 bytes | 114.00 KiB/s, done.
From github.com:Hafsa-Khalid021/Lab2
 * branch            master     -> FETCH_HEAD
   49af863..9e97b43  master     -> origin/master
Updating 49af863..9e97b43
Fast-forward
 notes.txt | 1 +
 1 file changed, 1 insertion(+)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch -d feature/my-task
Deleted branch feature/my-task (was 0787f47).
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch
  bugfix/user-auth-error
  collab
  develop
  feature-1
  feature/db-connection
  feature/login-page
* master
  staging
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git pull origin master
From github.com:Hafsa-Khalid021/Lab2
 * branch              master        -> FETCH_HEAD
Already up to date.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch -d bugfix/user-auth-error
Deleted branch bugfix/user-auth-error (was 3109e30).

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch -d collab
Deleted branch collab (was 49af863).
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch -d develop
Deleted branch develop (was 9469ea3).

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch
  feature/login-page
* master
  staging

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git merge staging
Already up to date.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch -d staging
Deleted branch staging (was 9469ea3).

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch -d feature/login-page
Deleted branch feature/login-page (was 96049e1).

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch
* master
```

Exam Evaluation Questions

1. Advanced Branching & Merge Verification

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout master
Already on 'master'
Your branch is ahead of 'origin/master' by 3 commits.
  (use "git push" to publish your local commits)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git pull origin master
ssh: Could not resolve hostname github.com: Name or service not known
fatal: Could not read from remote repository.

Please make sure you have the correct access rights
and the repository exists.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout -b feature/q1-branch
Switched to a new branch 'feature/q1-branch'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q1-branch)
$ git add notes.txt

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q1-branch)
$ echo "This is a change for Q1" > notes.txt

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q1-branch)
$ git add .
warning: in the working copy of 'notes.txt', LF will be replaced by CRLF the next time Git touches it

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q1-branch)
$ git commit -m "Added change for Q1"
[feature/q1-branch 1d578d1] Added change for Q1
 1 file changed, 1 insertion(+), 3 deletions(-)
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q1-branch)
$ git checkout master
Switched to branch 'master'
Your branch is ahead of 'origin/master' by 3 commits.
  (use "git push" to publish your local commits)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git merge feature/q1-branch
Updating 3a280a4..1d578d1
Fast-forward
 notes.txt | 4 +---
 1 file changed, 1 insertion(+), 3 deletions(-)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git push origin master
Enumerating objects: 8, done.
Counting objects: 100% (8/8), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (4/4), 496 bytes | 70.00 KiB/s, done.
Total 4 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To github.com:Hafsa-Khalid021/Lab2.git
   9e97b43..1d578d1  master -> master

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git log --oneline --graph --decorate --all
* 1d578d1 (HEAD -> master, origin/master, origin/HEAD, feature/q1-branch) Added change for Q1
*   3a280a4 Merge branch 'develop'
|\
| *   9469ea3 (origin/staging, origin/develop) Merge branch 'feature/login-page' into develop
| |\
| | * 96049e1 (origin/feature/login-page) Add login feature
* | |   9e97b43 Merge pull request #2 from Hafsa-Khalid021/feature/my-task
|\ \ \
| * | | 0787f47 (origin/feature/my-task) Added feature for task 12
|/ / /
* | | 49af863 (origin/collab) Add names and fun facts to notes.txt
* | | 14ad477 Add login feature
* | | 80db360 Merge pull request #1 from Hafsa-Khalid021/feature/db-connection
|\| |
| |/
|/|
| * fc6bf39 (origin/feature/db-connection) Added test line to enable pull request
* | be8ad9a (origin/feature-1) Add new function to main.py
|/
* 3109e30 (origin/bugfix/user-auth-error) Add third line to notes.txt
* ad97289 Initial commit
```

2. Multi-Stage Workflow Simulation

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout master
Already on 'master'
Your branch is up to date with 'origin/master'.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git pull origin master
From github.com:Hafsa-Khalid021/Lab2
 * branch            master       -> FETCH_HEAD
Already up to date.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch develop

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch staging

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git branch
  develop
  feature/q1-branch
* master
  staging

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout develop
Switched to branch 'develop'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ git checkout -b feature/q2-feature
Switched to a new branch 'feature/q2-feature'
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ git checkout feature/q2-feature
M       notes.txt
Switched to branch 'feature/q2-feature'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q2-feature)
$ git add notes.txt

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q2-feature)
$ echo "This change was made for Q2" > notes.txt

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q2-feature)
$ git add .
warning: in the working copy of 'notes.txt', LF will be replaced by CRLF the next time Git touches it

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q2-feature)
$ git commit -m "Added Q2 feature update"
[feature/q2-feature 2d941b1] Added Q2 feature update
 1 file changed, 1 insertion(+), 1 deletion(-)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (feature/q2-feature)
$ git checkout develop
Switched to branch 'develop'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ git merge feature/q2-feature
Updating 1d578d1..2d941b1
Fast-forward
 notes.txt | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ git checkout staging
Switched to branch 'staging'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (staging)
$ git merge develop
Updating 1d578d1..2d941b1
Fast-forward
 notes.txt | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (staging)
$ git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git merge staging
Updating 1d578d1..2d941b1
Fast-forward
 notes.txt | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout develop
Switched to branch 'develop'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ cat notes.txt
This change was made for Q2

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (develop)
$ git checkout staging
Switched to branch 'staging'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (staging)
$ cat notes.txt
This change was made for Q2

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (staging)
$ git checkout master
Switched to branch 'master'
Your branch is ahead of 'origin/master' by 1 commit.
  (use "git push" to publish your local commits)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ cat notes.txt
This change was made for Q2
```

3. Collaboration & Conflict Resolution

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout master
Already on 'master'
Your branch is ahead of 'origin/master' by 1 commit.
  (use "git push" to publish your local commits)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git pull origin master
From github.com:Hafsa-Khalid021/Lab2
 * branch            master      -> FETCH_HEAD
Already up to date.

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout -b collab1
Switched to a new branch 'collab1'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1)
$ git checkout master
Switched to branch 'master'
Your branch is ahead of 'origin/master' by 1 commit.
  (use "git push" to publish your local commits)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (master)
$ git checkout -b collab2
Switched to a new branch 'collab2'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab2)
$ git checkout collab1
Switched to branch 'collab1'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1)
$ echo "Hafsa: I added my update here for collaboration." >> notes.txt

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1)
$ git add notes.txt
warning: in the working copy of 'notes.txt', LF will be replaced by CRLF the next time Git touches it

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1)
$ git commit -m "Collab1: added Hafsa's update"
[collab1 f26d053] Collab1: added Hafsa's update
 1 file changed, 1 insertion(+)
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1)
$ git checkout collab2
Switched to branch 'collab2'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab2)
$ echo "Teammate: Ialso edited this file in my branch." >> notes.txt

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab2)
$ git add notes.txt
warning: in the working copy of 'notes.txt', LF will be replaced by CRLF the next time Git touches it

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab2)
$ git commit -m "Collab2: added teammate's update"
[collab2 8ef55a2] Collab2: added teammate's update
 1 file changed, 1 insertion(+)

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab2)
$ git checkout collab1
Switched to branch 'collab1'

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1)
$ git merge collab2
Auto-merging notes.txt
CONFLICT (content): Merge conflict in notes.txt
Automatic merge failed; fix conflicts and then commit the result.
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1|MERGING)
$ notepad notes.txt
```

```
HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1|MERGING)
$ git add notes.txt

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1|MERGING)
$ git commit -m "Resolved merge conflict and kept both updates"
[collab1 f537f30] Resolved merge conflict and kept both updates

HP@DESKTOP-UGL3JHC MINGW64 ~/Desktop/Lab2 (collab1)
$ cat notes.txt

Hafsa: I added my update here for collaboration.
Teammate: Ialso edited this file in my branch.
```