NAME: SANA TARIQ

CLASS: BSE-5B

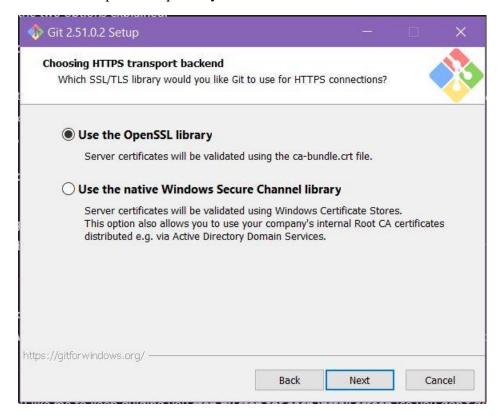
REG.NO: 058

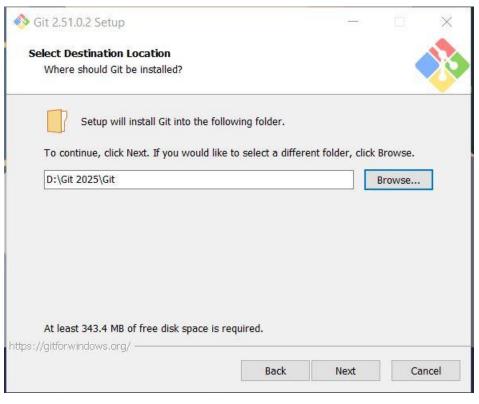
SUBJECT: CLOUD COMPUTING

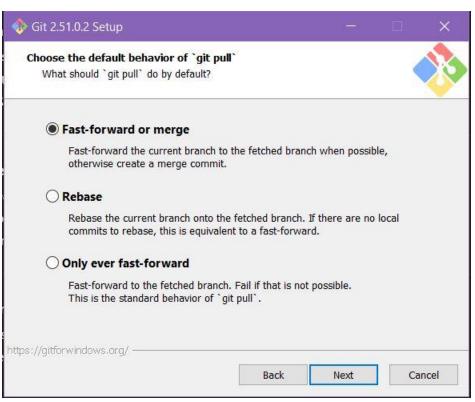
LAB#02:

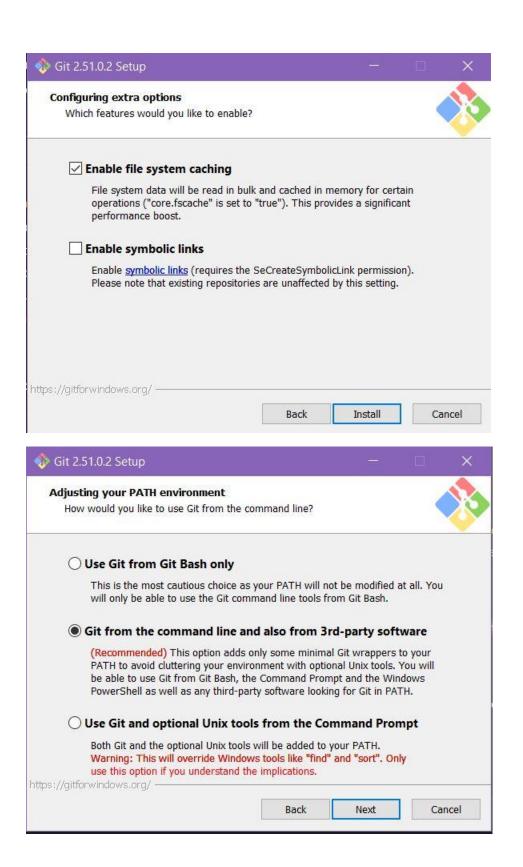
TASK#01:

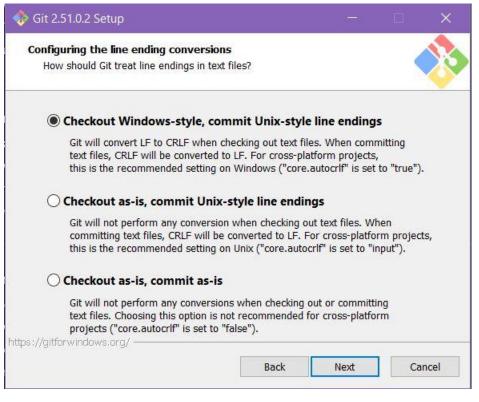
Create a new private repository named Lab2 on GitHub.

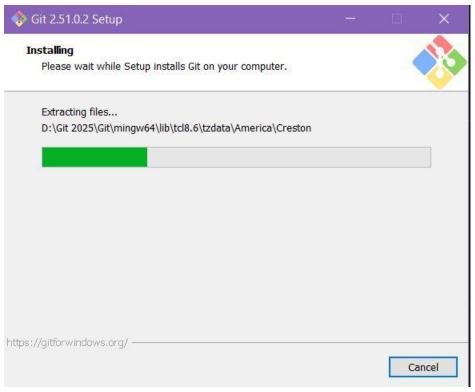


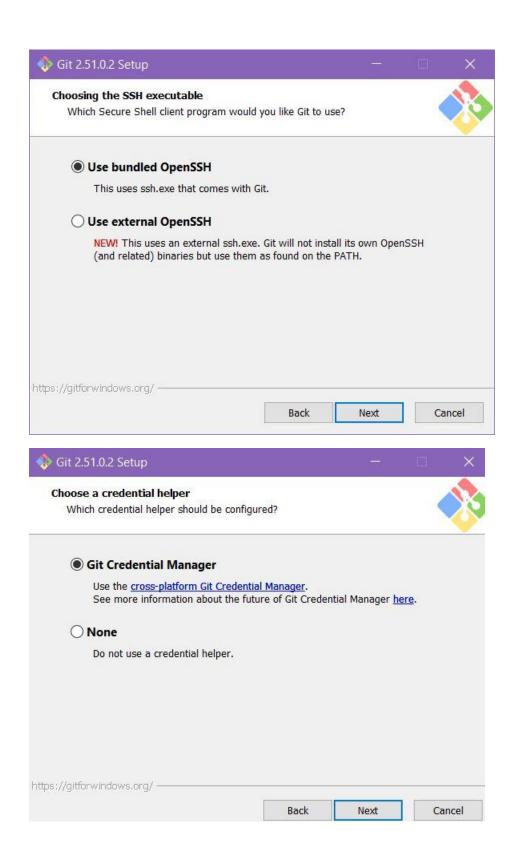


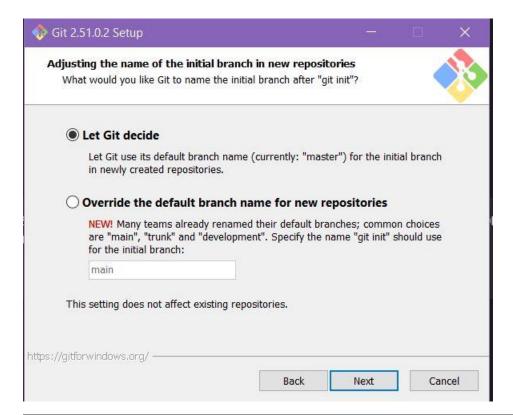


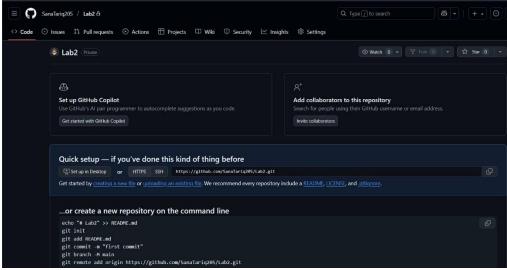








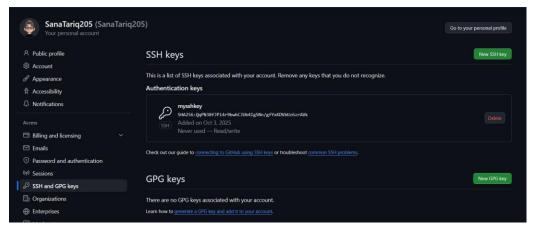




TASK#02:

- 1. Generate a new SSH key using PowerShell: ssh-keygen -t ed25519 -C "your email@example.com"
- 2. Add your SSH public key to GitHub (Settings > SSH and GPG keys).
- 3. Clone your Lab2 repo using SSH. git clone git@github.com:/Lab2.git

```
MINGW64:/c/Users/Sana
Sana@DESKTOP-OOECUUI MINGW64 ~
$ ssh-keygen -t ed25519 -C "23-22411-058@se.fjwu.edu.pk"
Generating public/private ed25519 key pair.
Enter file in which to save the key (/c/Users/Sana/.ssh/id_ed25519):
Enter passphrase for "/c/Users/Sana/.ssh/id_ed25519" (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /c/Users/Sana/.ssh/id ed25519
Your public key has been saved in /c/Users/Sana/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:QqPN38fJP14r9bwhCJUb4Ig5Nn/gfYxKDVbUz6zrAVk 23-22411-058@se.fjwu.edu.pk
The key's randomart image is:
 ---[ED25519 256]--+
     *o= . E+
.=*.= * o+
        .. .0*0.+
           .000...
    -[SHA256]----+
```



```
Sana@DESKTOP-OOECUUI MINGW64 ~

$ git clone git@github.com:SanaTariq205/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/zLDA0zPMSvHdkr4UvCOqU.
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.
```

TASK#03:

- 1. Set up your Git identity (this ensures all commits are linked to you): git config --global user.name "Your Name" git config --global user.email "your email@example.com"
- 2. Verify your configuration: git config --list

```
Sana@DESKTOP-OOECUUI MINGW64 ~

$ git config --global user.name "Sana Tariq"

Sana@DESKTOP-OOECUUI MINGW64 ~

$ git config --global user.email "23-22411-058@se.fjwu.edu.pk"
```

```
$ ana@DESKTOP-OOECUUI 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
core.editor="C:\\Program Files\\Notepad++\\notepad++.exe" -multiInst -notabbar -nosession -noPlugin
pull.rebase=false
init.defaultbranch=main
user.name=Sana Tariq
user.email=23-22411-058@se.fjwu.edu.pk
```

TASK#04:

Navigate into your cloned repository folder. Show hidden files and locate the .git directory. Explore what's inside using: ls -a .git

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ ls -a
./ ../ .git/

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ ls -a .git
./ ../ config description HEAD hooks/ info/ objects/ refs/

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$
```

TASK#05:

- 1. Delete the existing .git folder from your cloned repo using Git Bash: rm -rf .git
- 2. Re-initialize the local git repository: git init
- 3. Add a file named README.md and commit it: echo "# Lab2 Git Practice" > README.md git add README.md git commit -m "Initial commit"
- 4. Connect your local repo to GitHub and push: git remote add origin git@github.com:/Lab2.git git push -u origin main

```
Sana@DESKTOP-OOECUUI M<mark>INGW64 ~/Lab2 (main)</mark>
$ rm -rf .git
```

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

```
| Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main) | $ echo "# Lab2 Git Practice" > README.md | Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main) | 3$ git add README.md | warning: in the working copy of 'README.md', LF will be replaced by CRLF the next time Git touches it | Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main) | $ git commit -m "Initial commit" | [main (root-commit) 97f9bad] Initial commit | 1 file changed, 1 insertion(+) | create mode 100644 README.md
```

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git remote add origin git@github.com:SanaTariq205/Lab2.git

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git branch -M main

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git push -u origin main
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Writing objects: 100% (3/3), 242 bytes | 242.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:SanaTariq205/Lab2.git
* [new branch] main -> main
branch 'main' set up to track 'origin/main'.
```

TASK#06:

1. Create a new file notes.txt and write a note. Check status: git status

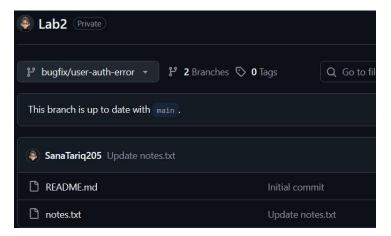
Stage and commit: git add notes.txt git commit -m "Add notes.txt"

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

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git commit -m "Add notes.txt"
[main b8d3275] Add notes.txt
1 file changed, 1 insertion(+)
create mode 100644 notes.txt
```

TASK#07:

On GitHub (web interface), create a branch named bugfix/user-auth-error. Pull the branch to your local repository to sync. git pull origin bugfix/user-auth-error



```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)

$ git pull origin bugfix/user-auth-error
From github.com:SanaTariq205/Lab2

* branch bugfix/user-auth-error -> FETCH_HEAD

* [new branch] bugfix/user-auth-error -> origin/bugfix/user-auth-error
Already up to date.

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)

$ Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)

$ git branch -a

* main
    remotes/origin/bugfix/user-auth-error
    remotes/origin/main
```

TASK#08:

1. Create a branch named feature/db-connection using Git Bash: git checkout -b feature/db-connection 2. Push the branch to the remote repository: git push origin feature/db-connection

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git checkout -b feature/db-connection
Switched to a new branch 'feature/db-connection'

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (feature/db-connection)
$
```

TASK#09:

1. Create and switch to a branch feature-1:

git checkout -b feature-1

2. Modify main.py (add a function) and commit. git add main.py git commit -m "Add new function to main.py"

Switch back to main and merge: git checkout main git merge feature-1

4. Push all branches: git push origin main git push origin feature-1

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (feature/db-connection)

$ git checkout -b feature-1
Switched to a new branch 'feature-1'
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (feature-1)
$
```

```
Sana@DESKTOP-ODECUUI MINGM64 ~/Lab2 (feature-1)
$ echo "def hello(): print('Hello from feature-1')" > main.py

Sana@DESKTOP-ODECUUI MINGM64 ~/Lab2 (feature-1)
$ git add main.py
warning: in the working copy of 'main.py', LF will be replaced by CRLF the next time Git touches it

Sana@DESKTOP-ODECUUI MINGM64 ~/Lab2 (feature-1)
$ git commit -m "Add new function to main.py"
[feature-1 45dc317] Add new function to main.py
1 file changed, 1 insertion(+)
create mode 100644 main.py
```

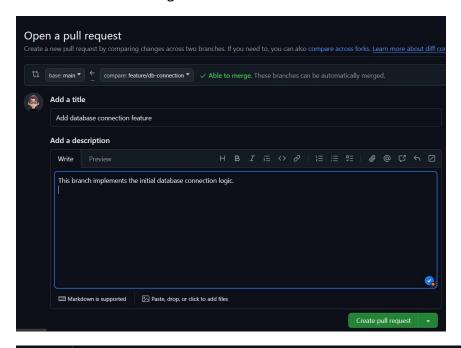
```
Sana@DESKTOP-ODECUUI MINGW64 ~/Lab2 (feature-1)
$ git checkout main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.

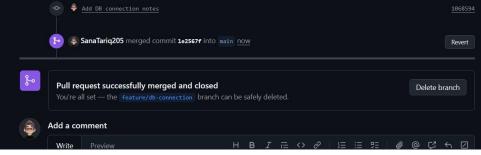
Sana@DESKTOP-ODECUUI MINGW64 ~/Lab2 (main)
$ git merge feature-1
Updating 84166f7..45dc317
Fast-forward
main.py | 1 +
1 file changed, 1 insertion(+)
create mode 100644 main.py
```

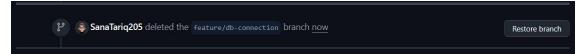
```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git push origin main
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 371 bytes | 123.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:SanaTariq205/Lab2.git
   84166f7..45dc317 main -> main
 Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ 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:
              https://github.com/SanaTariq205/Lab2/pull/new/feature-1
remote:
remote:
To github.com:SanaTariq205/Lab2.git
                        feature-1 -> feature-1
```

TASK#10:

On GitHub, create a Pull Request from the branch feature/db-connection to main. Review the Pull Request and merge it using the GitHub GUI. After merging, delete the feature/db-connection branch using the GitHub GUI.







TASK#11:

Create the following branches to simulate a professional branching strategy: develop staging feature/* bugfix/* Example workflow: Developers work on feature/* and bugfix/* branches. Merge into develop after completion. develop is merged into staging for testing. Finally, staging is merged into main (production).

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (staging)

$ git branch -a
    develop
    feature-1
    feature/db-connection
    feature/user-login
    main

* staging
    remotes/origin/HEAD -> origin/main
    remotes/origin/bugfix/user-auth-error
    remotes/origin/develop
    remotes/origin/feature-1
    remotes/origin/feature/db-connection
    remotes/origin/main
    remotes/origin/staging
```

```
Sana@DESKTOP-OOECUUI MINGM64 ~/Lab2 (staging)

$ git log --oneline --graph --all --decorate

* 33ab573 (origin/main, origin/HEAD, main) Merge pull request #4 from SanaTariq205/staging

| * 6e09887 (HEAD -> staging, origin/staging) Merge pull request #3 from SanaTariq205/develop

| * babae8a (origin/develop, develop) Merge pull request #2 from SanaTariq205/bugfix/fix-typo

| * f44d4c6 (origin/bugfix/fix-typo, bugfix/fix-typo) Fix typo in notes.txt

| * 1e2567f (feature/user-login) Merge pull request #1 from SanaTariq205/feature/db-connection

| * 1068594 (origin/feature/db-connection, feature/db-connection) Add DB connection notes

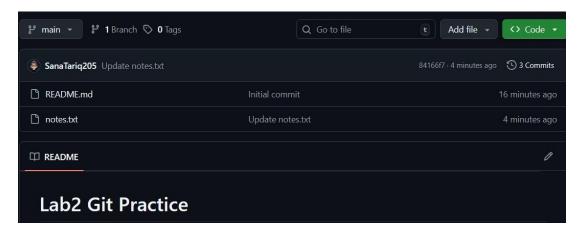
* | 45dc317 (origin/feature-1, feature-1) Add new function to main.py

| / * 84166f7 (origin/bugfix/user-auth-error) Update notes.txt

* 97f9bad Initial commit
```

TASK#12:

Create a Pull Request (PR) / Merge Request (MR): From a feature branch into main. Add a clear title and description summarizing the changes.



```
Lab2 / notes.txt  
SanaTariq205 Update notes.txt

Code Blame  2 lines (2 loc) · 44 Bytes

1  This is my first note.
2  Adding another line.
```

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)

$ git log --oneline

84166f7 (HEAD -> main, origin/main) Update notes.txt

b8d3275 Add notes.txt

97f9bad Initial commit
```

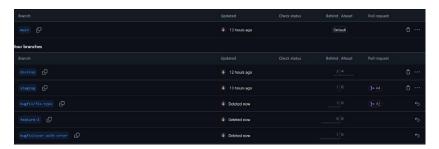
```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (feature/db-connection)

$ 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/SanaTariq205/Lab2/pull/new/feature/db-connection
remote:
To github.com:SanaTariq205/Lab2.git

* [new branch] feature/db-connection -> feature/db-connection
```

TASK#13:

1. Delete Remote Branch After Merge: Use GitHub UI



EXAM EVALUATION QUESTIONS:

Q 1: Advanced Branching & Merge Verification

Create a new branch in your repository.

Make a small change in a file and commit it.

Merge this branch back into the main branch.

Show the history of commits in a way that verifies the merge.

Q 2: Multi-Stage Workflow Simulation Set up a branching workflow with three branches: main, develop, and staging.

Create a feature branch from develop, make changes, and commit them.

Merge the feature branch into develop.

Merge develop into staging.

Merge staging into main.

Provide proof that each stage contains the updated changes before it reaches main.

Q 3: Collaboration & Conflict Resolution Work with a collaborator: both contributors should modify the same file but in separate branches.

Attempt to merge the branches and capture the conflict.

Resolve the conflict so that both contributions are preserved.

Provide evidence that the final version of the file contains both collaborators' changes.

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git checkout -b exam-branch
Switched to a new branch 'exam-branch'
```

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (exam-branch)

$ notepad notes.txt

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (exam-branch)

$ git status
On branch exam-branch
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

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

$ ana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (exam-branch)

$ git add notes.txt

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (exam-branch)

$ git commit -m "Exam Q1: small change"
[exam-branch ac5c83d] Exam Q1: small change
1 file changed, 1 insertion(+)
```

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (exam-branch)

$ git checkout main

Switched to branch 'main'

Your branch is up to date with 'origin/main'.

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)

$ git merge exam-branch

Updating 33ab573..ac5c83d

Fast-forward

notes.txt | 1 +

1 file changed, 1 insertion(+)
```

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (feature-x)
$ notepad notes.txt

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (feature-x)
$ git add notes.txt

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (feature-x)
$ git commit -m "Q2: feature-x changes"
[feature-x d484554] Q2: feature-x changes
1 file changed, 1 insertion(+)
```

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (feature-x)
$ git checkout develop
Switched to branch 'develop'

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (develop)
$ git merge feature-x
Updating bad8147..d484554
Fast-forward
notes.txt | 1 +
1 file changed, 1 insertion(+)
```

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (staging)

$ git checkout staging
Already on 'staging'

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (staging)

$ git merge develop
Already up to date.

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (feature-1)

$ git checkout main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)

$ git merge feature-1
Updating 84166f7..45dc317
```

Fast-forward main.py | 1 +

1 file changed, 1 insertion(+)
create mode 100644 main.py

```
Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (conflict_Sana)
$ git checkout main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git merge conflict_rabeea
merge: conflict_rabeea - not something we can merge

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git merge conflict_Sana
Updating 935a75d..27cf10e
Fast-forward
notes.txt | 3 ++-
1 file changed, 2 insertions(+), 1 deletion(-)
```

```
~/Lab2 (collab)
 Sana@DESKTOP-OOECUUI /
$ git commit -m "Added Sana's Fun Fact"
[collab 935a75d] Added Sana's Fun Fact
 1 file changed, 1 insertion(+)
  ana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (collab)
$ git push origin collab
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.
                                NGW64 ~/Lab2 (collab)
$ git push origin collab
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 8 threads
Compressing objects: 100% (3/3), done.

Writing objects: 100% (3/3), 323 bytes | 323.00 KiB/s, done.

Total 3 (delta 2), reused 0 (delta 0), pack-reused 0 (from 0) remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To github.com:SanaTariq205/Lab2.git
    7351ddd..935a75d collab -> collab
```

```
notepad notes.txt
 ana@DESKTOP-00ECUUI MINGW64 ~/Lab2 (conflict_Sana)
 git add notes.txt
    @DESKTOP-OOECUUI MINGW64 ~/Lab2 (conflict_Sana)
$ git commit -m "Sana changed line"
 conflict_Sana 27cf10e] Sana changed line
1 file changed, 2 insertions(+), 1 deletion(-)
$ git push origin conflict_Sana
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 8 threads
 Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 311 bytes | 311.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
 remote: Create a pull request for 'conflict_Sana' on GitHub by visiting:
              https://github.com/SanaTariq205/Lab2/pull/new/conflict_Sana
remote:
remote:
To github.com:SanaTariq205/Lab2.git
                      conflict_Sana -> conflict_Sana
 * [new branch]
```

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

Sana@DESKTOP-OOECUUI MINGW64 ~/Lab2 (main)
$ git commit -m "Add notes.txt"
[main b8d3275] Add notes.txt
1 file changed, 1 insertion(+)
create mode 100644 notes.txt
```

BONUS TASK:

