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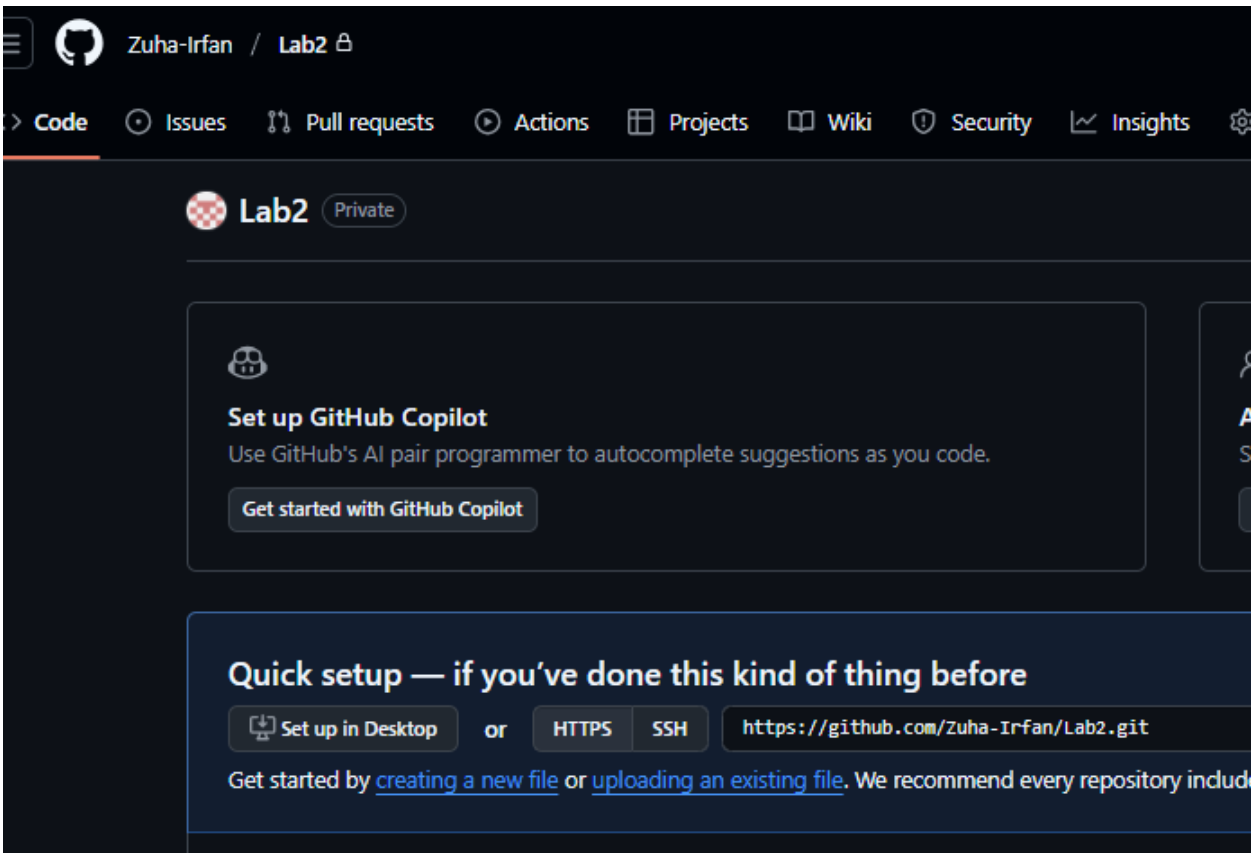
Reg_No:2023-BSE-073

Subject: Cloud Computing

Lab # 02

Task 1: Create Private GitHub Repository

repo_private.png



Task 2: Connect Repository via SSH

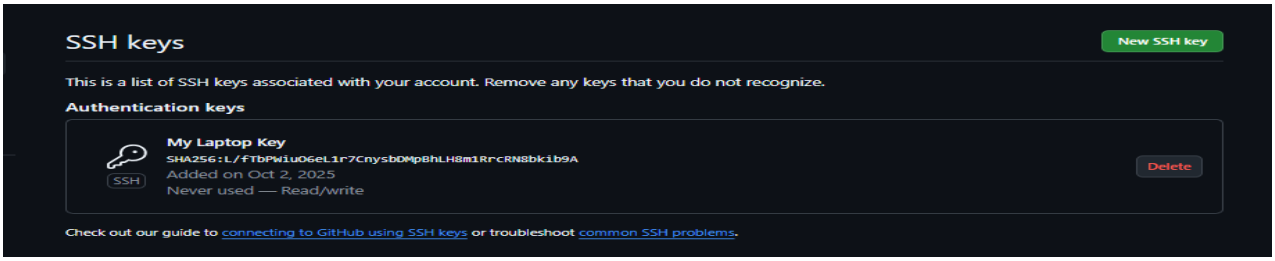
1. ssh_keygen.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~
$ ssh-keygen -t ed25519 -C 23-22144-073@se.fjwu.edu.pk
Generating public/private ed25519 key pair.
Enter file in which to save the key (/c/Users/lenovo/.ssh/id_ed25519):
Enter passphrase for "/c/Users/lenovo/.ssh/id_ed25519" (empty for no passphrase)
:
Enter same passphrase again:
Your identification has been saved in /c/Users/lenovo/.ssh/id_ed25519
Your public key has been saved in /c/Users/lenovo/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:L/fTbPWiuO6eL1r7CnysbDMpBhLH8m1RrcRN8bkib9A 23-22144-073@se.fjwu.edu.pk
The key's randomart image is:
+--[ED25519 256]--+
|        . +o.    |
|         + o. .  |
|    .   o .  o   |
|   o o . ..   .  |
|    = . .S E .   |
|   . o o. * .    |
|    . o  +.O  o ..|
|       o.=O.=. = .|
|      . o+BX*=+ . |
+----[SHA256]-----+
```

2. ssh_keygen.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~
$ cat ~/.ssh/id_ed25519.pub
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIAsyeQzdSw27qIq85+A5jgYKVPO9+8bXYyDIUudODQTM
 23-22144-073@se.fjwu.edu.pk
```

3. github_sshkey.png

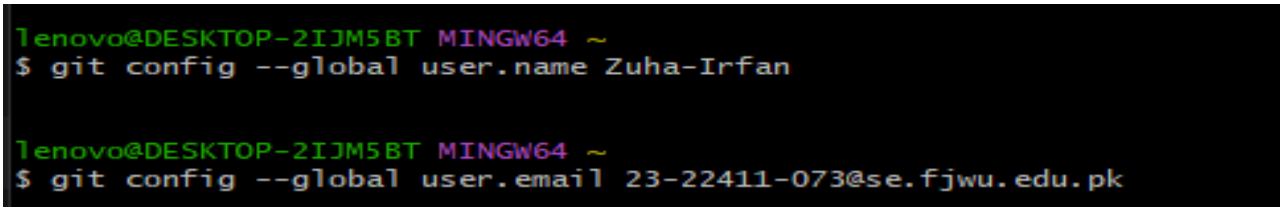


4. ssh_clone.png

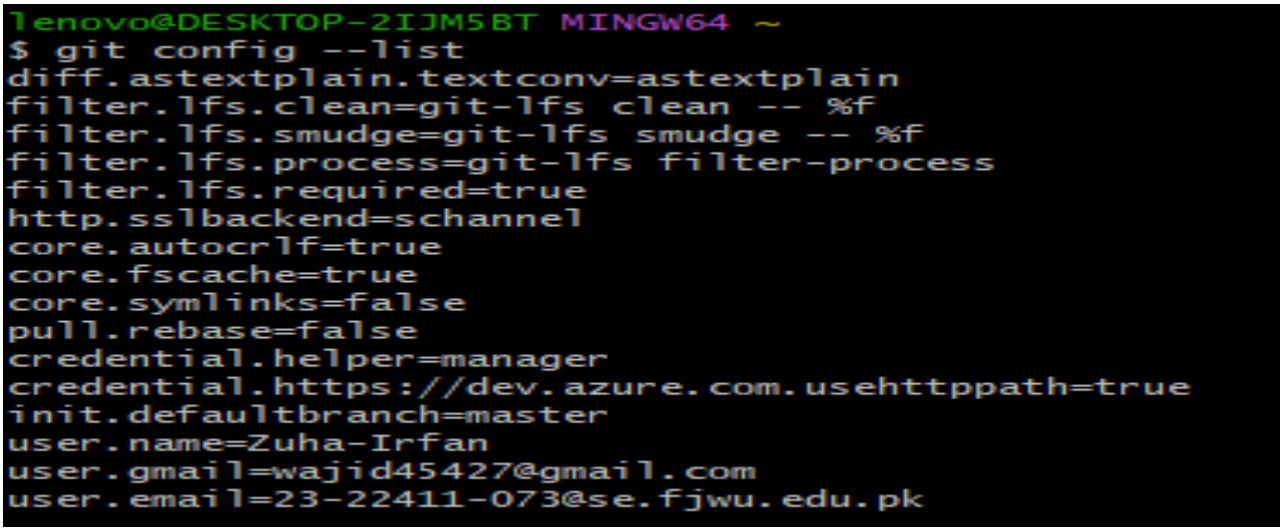
```
lenovo@DESKTOP-2IJM5BT MINGW64 ~
$ git clone git@github.com:Zuha-Irfan/Lab2.git
Cloning into 'Lab2'...
The authenticity of host 'github.com (20.207.73.82)' can't be established.
ED25519 key fingerprint is SHA256:+DiY3wvvV6TuJJhbpZisF/zLDA0zPMSvHdkr4UvCOqU.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes', 'no' or the fingerprint: yes
Warning: Permanently added 'github.com' (ED25519) to the list of known hosts.
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
warning: You appear to have cloned an empty repository.
```

Task 3: Configure Git Username and Email

1. git_identity.png

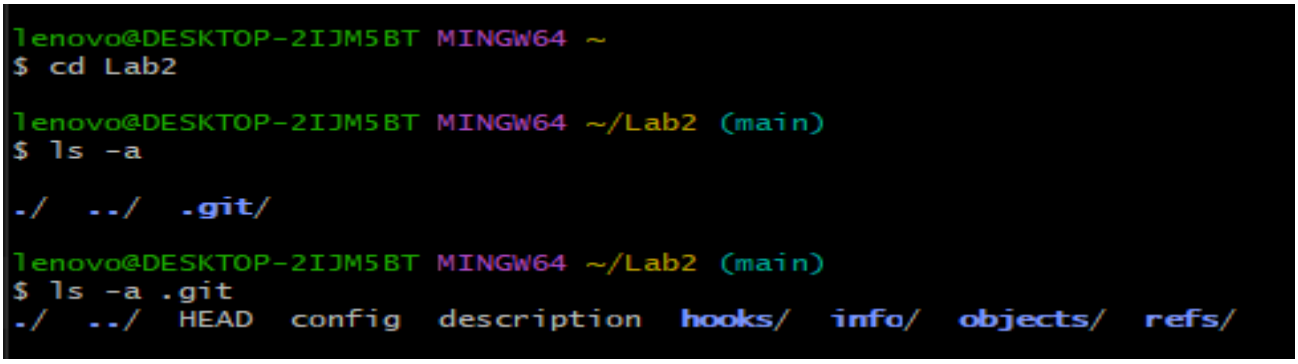


2. git_config_list.png



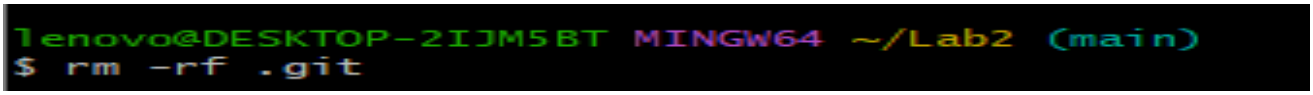
Task 4: Explore the .git Folder

1. git_folder.png



Task 5: Local Repository Management

1. delete_git.png



2. git_init.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (master)
$ git init
Reinitialized existing Git repository in C:/Users/lenovo/Lab2/.git/

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (master)
$ git branch -M main
```

3. first_commit.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ echo "# Lab2 Git Practice" > README.md


lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git add README.md

warning: in the working copy of 'README.md', LF will be replaced by CRLF the next time Git touches it

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git commit -m "Initial commit"
[main (root-commit) cb4f23d] Initial commit
 1 file changed, 1 insertion(+)
 create mode 100644 README.md
```

4. first_push.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ ggit remote add origin git@github.com:Zuha-Irfan/Lab2.git
bash: $'\302\223git': command not found
```

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git remote add origin git@github.com:Zuha-Irfan/Lab2.git
git push -u origin main
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
git@github.com: Permission denied (publickey).
fatal: Could not read from remote repository.

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

Task 6: File Status & Staging

1. status1.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ echo "This is my first note" > notes.txt

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git status
On branch main
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)
```

2. commit_notes.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git add notes.txt

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git commit -m "Add notes.txt"
[main d0cf56b] Add notes.txt
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 notes.txt
```

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ echo "Second line of notes" >> notes.txt


lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ 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:   README.md
        modified:   notes.txt

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

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git add notes.txt

warning: in the working copy of 'notes.txt', LF will be replaced by CRLF the nex
t time Git touches it

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git commit -m "Update notes.txt"
[main 2353c8a] Update notes.txt
 1 file changed, 1 insertion(+)
```

Task 7: Branch Creation (GitHub GUI)

1. bugfix_branch_gui.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~
$ cd Lab2

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git checkout -b feature/login-page
Switched to a new branch 'feature/login-page'

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/login-page)
$ git push -u origin feature/login-page
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
Enumerating objects: 9, done.
Counting objects: 100% (9/9), done.
Delta compression using up to 4 threads
Compressing objects: 100% (5/5), done.
Writing objects: 100% (9/9), 775 bytes | 155.00 KiB/s, done.
Total 9 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Zuha-Irfan/Lab2.git
 * [new branch]      feature/login-page -> feature/login-page
branch 'feature/login-page' set up to track 'origin/feature/login-page'.
```

2. bugfix_branch_local.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/login-page)
$ git fetch origin

Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
From github.com:Zuha-Irfan/Lab2
 * [new branch]      bugfix/user-auth-error -> origin/bugfix/user-auth-error

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/login-page)
$ git checkout -b bugfix/user-auth-error origin/bugfix/user-auth-error

M       README.md
branch 'bugfix/user-auth-error' set up to track 'origin/bugfix/user-auth-error'.
Switched to a new branch 'bugfix/user-auth-error'

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (bugfix/user-auth-error)
$ git branch -a
* bugfix/user-auth-error
  feature/login-page
  main
  remotes/origin/HEAD -> origin/feature/login-page
  remotes/origin/bugfix/user-auth-error
  remotes/origin/feature/login-page
```

Task 8: Branch Creation & Push (Git Bash)

1. feature_db_branch.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (bugfix/user-auth-error)
$ git checkout -b feature/db-connection
Switched to a new branch 'feature/db-connection'

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/db-connection)
$ git push origin feature/db-connection
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
Received disconnect from 20.207.73.82 port 22:11: Bye Bye
Disconnected from 20.207.73.82 port 22
Fatal: Could not read from remote repository.

Please make sure you have the correct access rights
```

Task 9: Branching & Merging

1. branch_create.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/db-connection)
$ git checkout -b feature-1
Switched to a new branch 'feature-1'
```

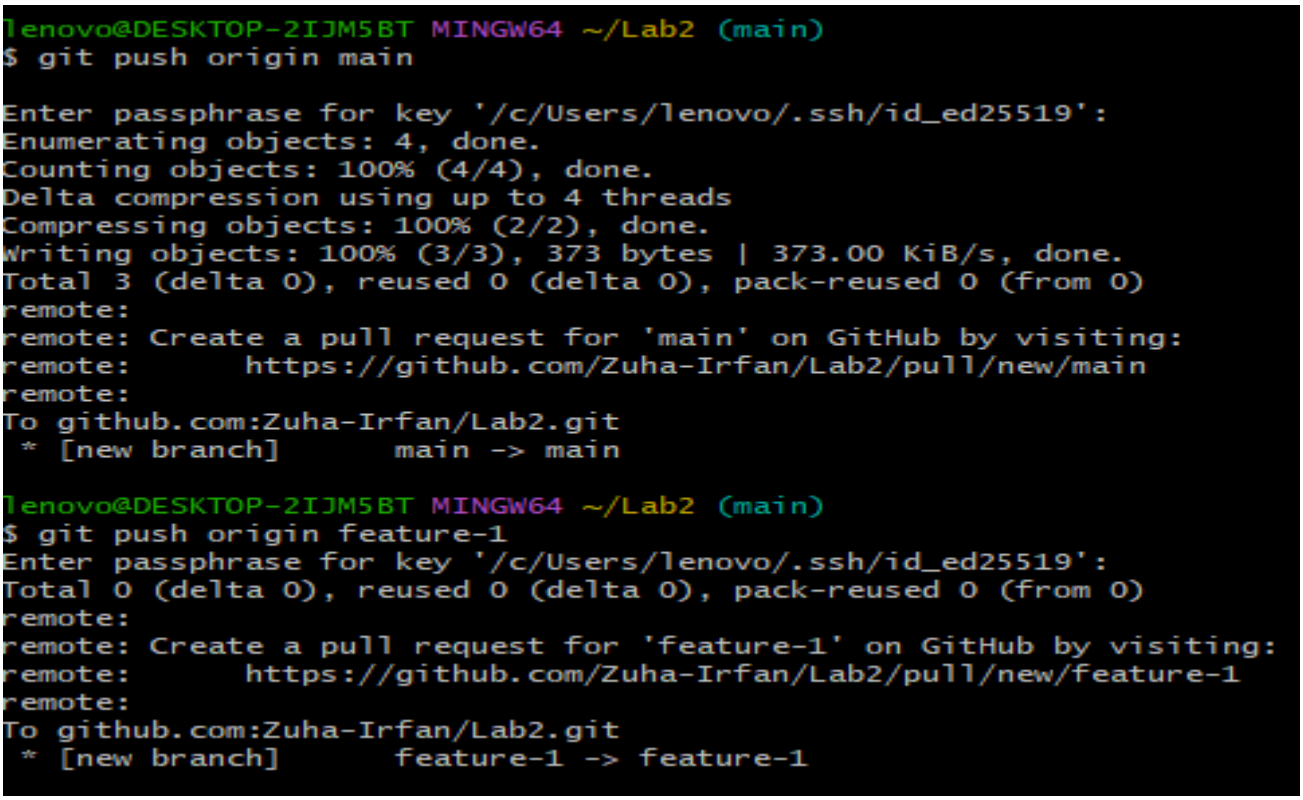
2. feature_commit.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/db-connection)
$ git checkout -b feature-1
Switched to a new branch 'feature-1'

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature-1)
$ echo "def greet():\n    return 'Hello from feature-1'" > main.py

lenovo@DESKTOP-2IJM5BT MINGW64 ~/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

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature-1)
$ git commit -m "Add new function to main.py"
[feature-1 e993b41] Add new function to main.py
 1 file changed, 1 insertion(+)
 create mode 100644 main.py
```

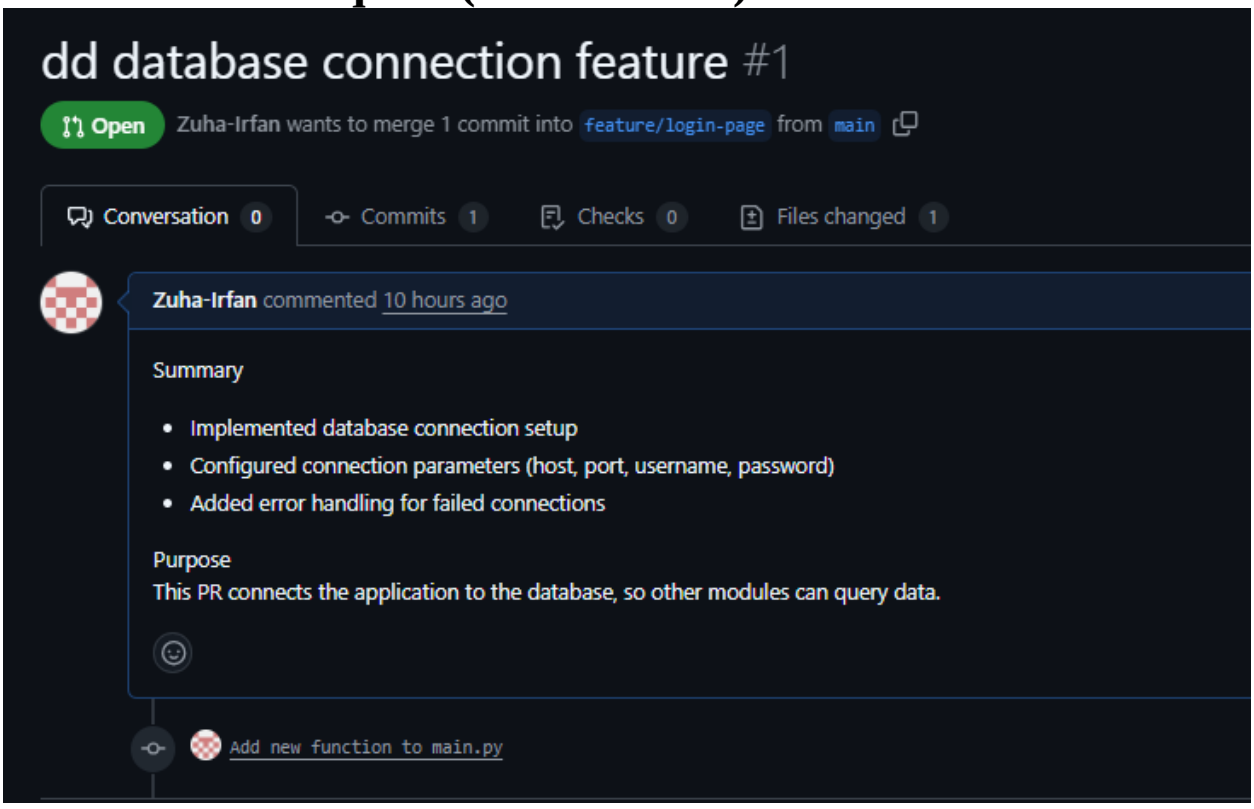
3. merge.png

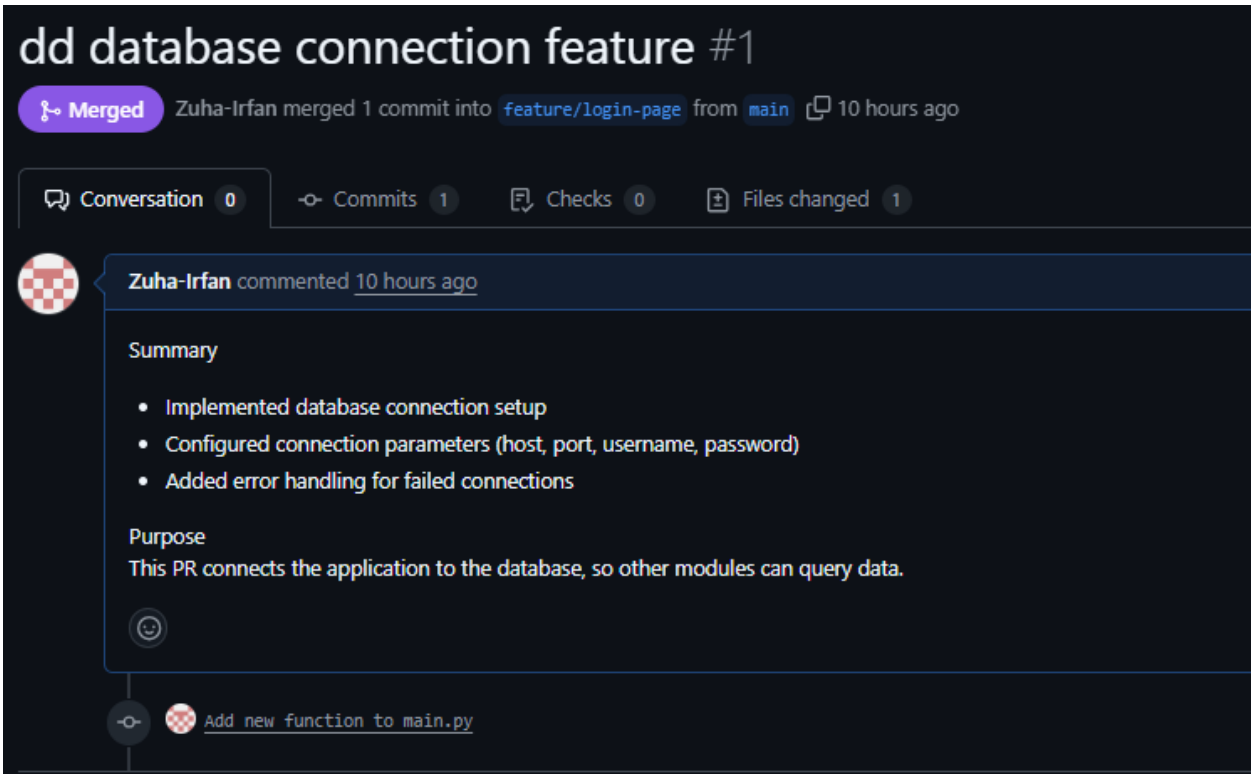
```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature-1)
$ git checkout main
M       README.md
Switched to branch 'main'

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git merge feature-1
Updating 2353c8a..e993b41
Fast-forward
 main.py | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 main.py
```

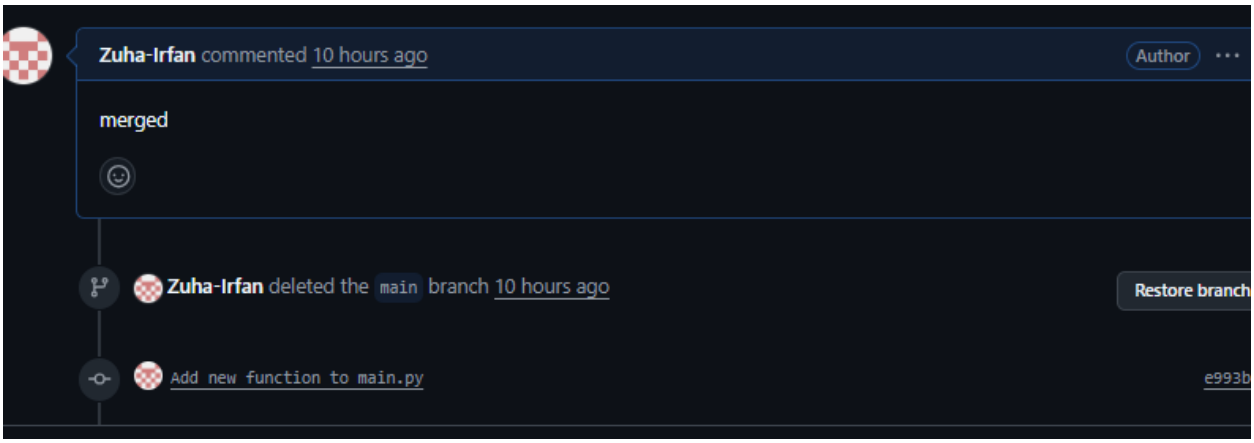
4. push_branches.png



Task 10: Pull Request (GitHub GUI)







Task 11: Branch Strategy

1. branch_strategy.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git checkout main
Already on 'main'
Your branch is up to date with 'origin/main'.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git checkout -b feature/sample-feature
Switched to a new branch 'feature/sample-feature'

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/sample-feature)
$ git push -u origin feature/sample-feature
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature/sample-feature' on GitHub by visiting
:
remote:      https://github.com/Zuha-Irfan/Lab2/pull/new/feature/sample-feature
remote:
To github.com:Zuha-Irfan/Lab2.git
 * [new branch]      feature/sample-feature -> feature/sample-feature
branch 'feature/sample-feature' set up to track 'origin/feature/sample-feature'.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/sample-feature)
$ git checkout main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git checkout -b bugfix/sample-bug
Switched to a new branch 'bugfix/sample-bug'

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (bugfix/sample-bug)
$ git push -u origin bugfix/sample-bug
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'bugfix/sample-bug' on GitHub by visiting:
remote:      https://github.com/Zuha-Irfan/Lab2/pull/new/bugfix/sample-bug
remote:
To github.com:Zuha-Irfan/Lab2.git
 * [new branch]      bugfix/sample-bug -> bugfix/sample-bug
branch 'bugfix/sample-bug' set up to track 'origin/bugfix/sample-bug'.
```

2. branch_merges.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (bugfix/sample-bug)
$ git branch -a
  bugfix/sample
* bugfix/sample-bug
  bugfix/user-auth-error
  develop
  feature-1
  feature/db-connection
  feature/login-page
  feature/sample
  feature/sample-feature
  main
  staging
  remotes/origin/HEAD -> origin/feature/login-page
  remotes/origin/bugfix/sample
  remotes/origin/bugfix/sample-bug
  remotes/origin/bugfix/user-auth-error
  remotes/origin/develop
  remotes/origin/feature-1
  remotes/origin/feature/login-page
  remotes/origin/feature/sample
  remotes/origin/feature/sample-feature
  remotes/origin/main
  remotes/origin/staging

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (bugfix/sample-bug)
$ git checkout feature/sample-feature
Switched to branch 'feature/sample-feature'
Your branch is up to date with 'origin/feature/sample-feature'.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/sample-feature)
$ echo "feature change $(date)" >> feature-file.txt

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/sample-feature)
$ git add feature-file.txt
warning: in the working copy of 'feature-file.txt', LF will be replaced by CRLF
the next time Git touches it

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/sample-feature)
$ git commit -m "Add sample change for feature/sample-feature"
[feature/sample-feature 876c85d] Add sample change for feature/sample-feature
 1 file changed, 1 insertion(+)
 create mode 100644 feature-file.txt
```

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/sample-feature)
$ git push origin feature/sample-feature
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
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), 418 bytes | 209.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Zuha-Irfan/Lab2.git
   e993b41..876c85d  feature/sample-feature -> feature/sample-feature

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (feature/sample-feature)
$ git checkout develop
Switched to branch 'develop'
Your branch is up to date with 'origin/develop'.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (develop)
$ git pull origin develop
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
From github.com:Zuha-Irfan/Lab2
 * branch            develop    -> FETCH_HEAD
Already up to date.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (develop)
$ git merge feature/sample-feature
Updating e993b41..876c85d
Fast-forward
 feature-file.txt | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 feature-file.txt

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (develop)
$ git push origin develop
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Zuha-Irfan/Lab2.git
   e993b41..876c85d  develop -> develop

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (develop)
$ git checkout staging
Switched to branch 'staging'
Your branch is up to date with 'origin/staging'.
```

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (staging)
$ git pull origin staging
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
From github.com:Zuha-Irfan/Lab2
 * branch            staging    -> FETCH_HEAD
Already up to date.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (staging)
$ git merge develop
Updating e993b41..876c85d
Fast-forward
 feature-file.txt | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 feature-file.txt

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (staging)
$ git push origin staging
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Zuha-Irfan/Lab2.git
   e993b41..876c85d  staging -> staging

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (staging)
$ git checkout main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git pull origin main
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
From github.com:Zuha-Irfan/Lab2
 * branch            main       -> FETCH_HEAD
Already up to date.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git merge staging
Updating e993b41..876c85d
Fast-forward
 feature-file.txt | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 feature-file.txt

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git push origin main
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To github.com:Zuha-Irfan/Lab2.git
   e993b41..876c85d  main -> main
```

3. final_merge.png

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git add <file-with-conflict>
bash: syntax error near unexpected token `newline'

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git commit -m "Resolve merge conflict"
On branch main
Your branch is up to date with 'origin/main'.

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

nothing added to commit but untracked files present (use "git add" to track)

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git push origin <branch>
bash: syntax error near unexpected token `newline'

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git log --oneline --graph --all --decorate
* 876c85d (HEAD -> main, origin/staging, origin/main, origin/feature/sample-feat
ure, origin/develop, staging, feature/sample-feature, develop) Add sample change
 for feature/sample-feature
| * 6fdd86f (bugfix/sample) Initial commit
|/
* e993b41 (origin/feature/sample, origin/feature-1, origin/bugfix/sample-bug, or
igin/bugfix/sample, feature/sample, feature-1, bugfix/sample-bug) Add new functi
on to main.py
* 2353c8a (origin/feature/login-page, origin/bugfix/user-auth-error, origin/HEAD
, feature/login-page, feature/db-connection, bugfix/user-auth-error) Update note
s.txt
* d0cf56b Add notes.txt
* cb4f23d Initial commit
```

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git branch -r
  origin/HEAD -> origin/feature/login-page
  origin/bugfix/sample
  origin/bugfix/sample-bug
  origin/bugfix/user-auth-error
  origin/develop
  origin/feature-1
  origin/feature/login-page
  origin/feature/sample
  origin/feature/sample-feature
  origin/main
  origin/staging
```

TASK 13: Branch Cleanup

```
lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git checkout main
Already on 'main'
Your branch is up to date with 'origin/main'.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git pull origin main
Enter passphrase for key '/c/Users/lenovo/.ssh/id_ed25519':
From github.com:Zuha-Irfan/Lab2
 * branch            main       -> FETCH_HEAD
Already up to date.

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git branch -d feature/sample
Deleted branch feature/sample (was e993b41).

lenovo@DESKTOP-2IJM5BT MINGW64 ~/Lab2 (main)
$ git branch
  bugfix/sample
  bugfix/sample-bug
  bugfix/user-auth-error
  develop
  feature-1
  feature/db-connection
  feature/login-page
  feature/sample-feature
* main
  staging
```