Experiment 3: To Perform various Git operations on local and remote repositories using Git cheat sheet.

THEORY:

Introduction to Git

Git is a distributed version control system used for tracking changes in source code. It allows multiple developers to work on a project simultaneously while keeping track of changes and enabling collaboration through remote repositories like GitHub, GitLab, and Bitbucket.

Configuring Git

Before using Git for the first time, it is necessary to configure the user's identity. The following commands set up the user's name and email, which will be associated with all commits:

bash

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it

```
git config --global user.name "Your Name"

git config --global user.email "your.email@example.com"
```

The --global flag ensures that the configuration applies to all repositories on the system.

Initializing a Git Repository

A Git repository must be initialized before tracking changes. This is done using the git

init command: bash

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init

Executing this command creates a hidden .git directory within the project folder, which stores all version control information.

This command provides an overview of changes that need to be staged, committed, or pushed.

Adding Files to the Staging Area

Before committing changes, files must be added to the staging area. This can be done using the following commands:

bash

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```
git add <file_name> # Adds a specific file
git add .     # Adds all modified and new files
```

The staging area acts as an intermediate step before committing changes.

Committing Changes

A commit captures the current state of the repository and saves it locally. Each commit requires a message that describes the changes made:

bash

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```
git commit -m "Descriptive commit message"
```

Commits are local and do not affect the remote repository until they are pushed.

Connecting to a Remote Repository

To link the local repository with a remote repository (e.g., GitHub),

the following command is used: bash

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git remote add origin

<repository_URL> For

example:

bash

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git remote add origin

https://github.com/username/repository.git To

verify that the remote repository has been

added, use:

bash

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git remote -v

Pushing Changes to a Remote Repository

To upload commits to a remote repository, the git push

command is used: bash

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git push origin main

- origin refers to the remote repository.
- main refers to the branch

being pushed. For the first push,

use:

bash

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git push -u origin main

The -u flag sets origin main as the default upstream branch, allowing future pushes to be done with git push alone.

Pulling Changes from a Remote Repository

To retrieve and merge updates from the remote repository, the

git pull command is used: bash

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git pull origin main

This command ensures the local repository is up-to-date with the remote repository.

Cloning an Existing Repository

To create a local copy of an existing remote repository, the git

clone command is used: bash

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git clone

<repository_URL>

For example:

bash

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git clone https://github.com/username/repository.git

This command downloads the repository and sets up a connection to the remote repository.

Branching and Merging

Git allows working with multiple branches to develop new features without affecting the main codebase.

Creating a new branch:

bash

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git branch new-branch

Switching to the new branch:

bash

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git checkout new-branch

Merging a branch into the main branch:

bash

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git merge new-branch

Deleting a branch:

bash

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git branch -d new-branch

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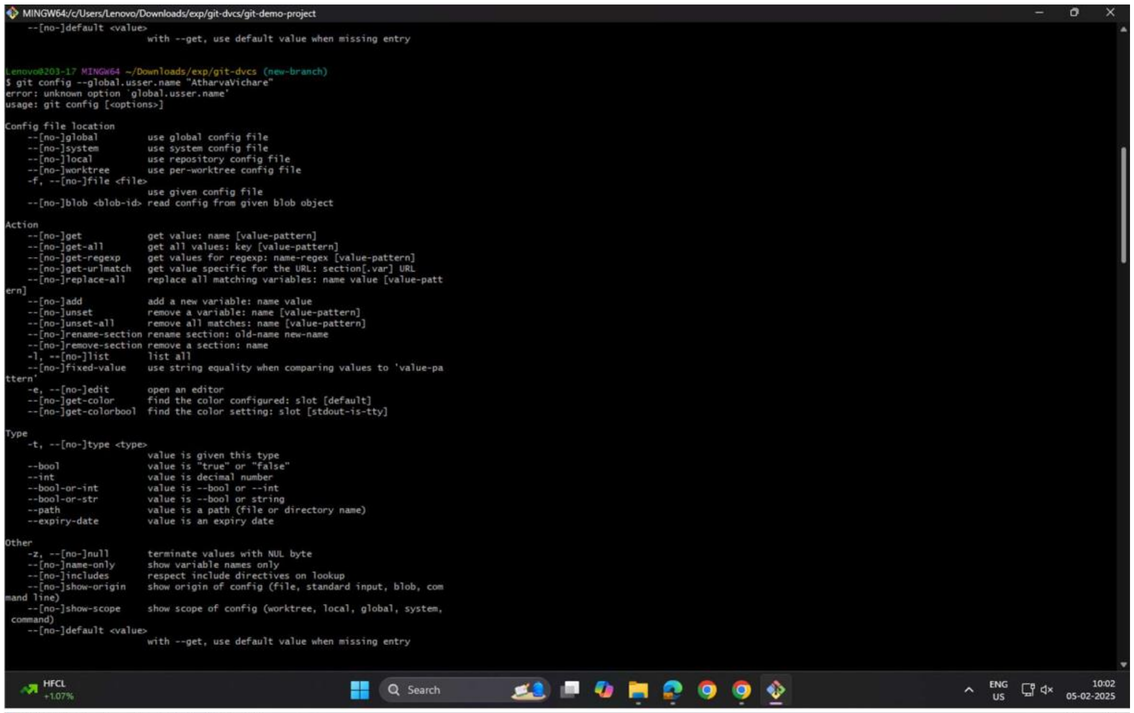
Output:



```
MINGW64:/c/Users/Lenovo/Downloads/exp/git-dvcs/git-demo-project
    --[no-]default <value>
                          with --get, use default value when missing entry

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git config --global.usser.name "AtharvaVichare"
error: unknown option `global.usser.name'
usage: git config [<options>]

Config file location
    --[no-]global         use global config file
    --[no-]system         use system config file
    --[no-]local          use repository config file
    --[no-]worktree       use per-worktree config file
    -f, --[no-]file <file>
                          use given config file
    --[no-]blob <blob-id> read config from given blob object

Action
    --[no-]get            get value: name [value-pattern]
    --[no-]get-all        get all values: key [value-pattern]
    --[no-]get-regexp     get values for regexp: name-regex [value-pattern]
    --[no-]get-urlmatch   get value specific for the URL: section[.var] URL
    --[no-]replace-all    replace all matching variables: name value [value-patt
ern]
    --[no-]add            add a new variable: name value
    --[no-]unset          remove a variable: name [value-pattern]
    --[no-]unset-all      remove all matches: name [value-pattern]
    --[no-]rename-section rename section: old-name new-name
    --[no-]remove-section remove a section: name
    -l, --[no-]list       list all
    --[no-]fixed-value    use string equality when comparing values to 'value-pa
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    -e, --[no-]edit       open an editor
    --[no-]get-color      find the color configured: slot [default]
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Type
    -t, --[no-]type <type>
                          value is given this type
    --bool                value is "true" or "false"
    --int                 value is decimal number
    --bool-or-int         value is --bool or --int
    --bool-or-str         value is --bool or string
    --path                value is a path (file or directory name)
    --expiry-date         value is an expiry date

Other
    -z, --[no-]null       terminate values with NUL byte
    --[no-]name-only      show variable names only
    --[no-]includes       respect include directives on lookup
    --[no-]show-origin    show origin of config (file, standard input, blob, com
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    --[no-]show-scope     show scope of config (worktree, local, global, system,
 command)
    --[no-]default <value>
                          with --get, use default value when missing entry
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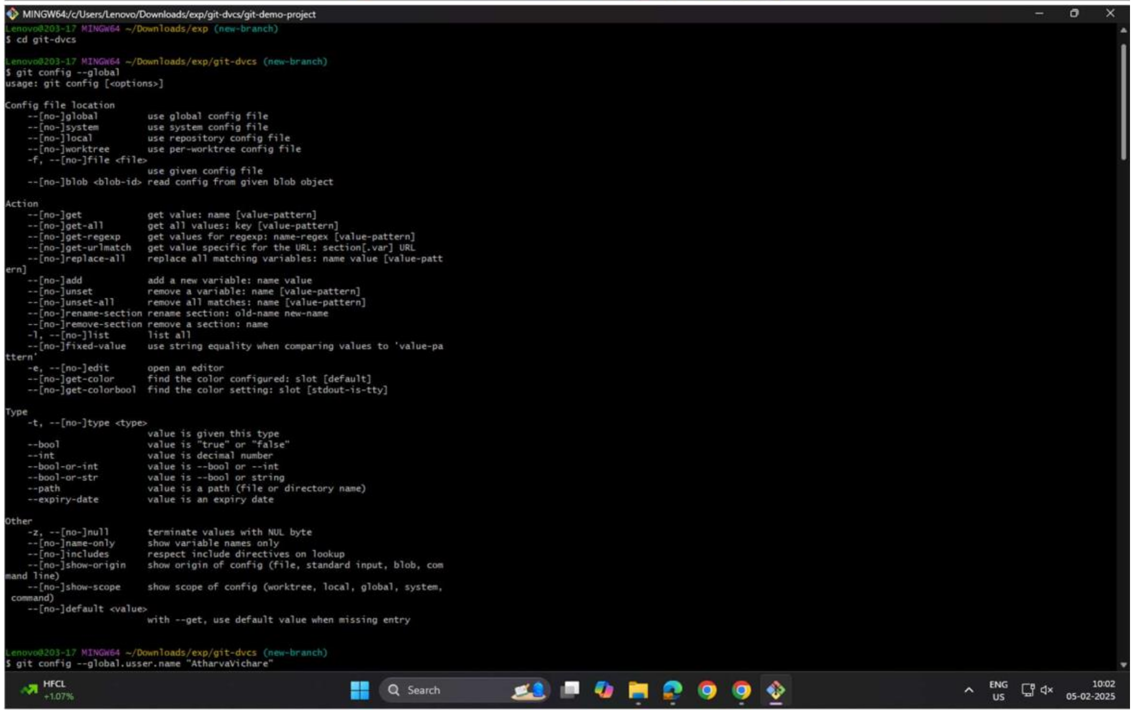

```
MINGW64:/c/Users/Lenovo/Downloads/exp/git-dvcs/git-demo-project
Lenovo@203-17 MINGW64 ~/Downloads/exp (new-branch)
$ cd git-dvcs

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git config --global
usage: git config [<options>]

Config file location
    --[no-]global         use global config file
    --[no-]system         use system config file
    --[no-]local          use repository config file
    --[no-]worktree       use per-worktree config file
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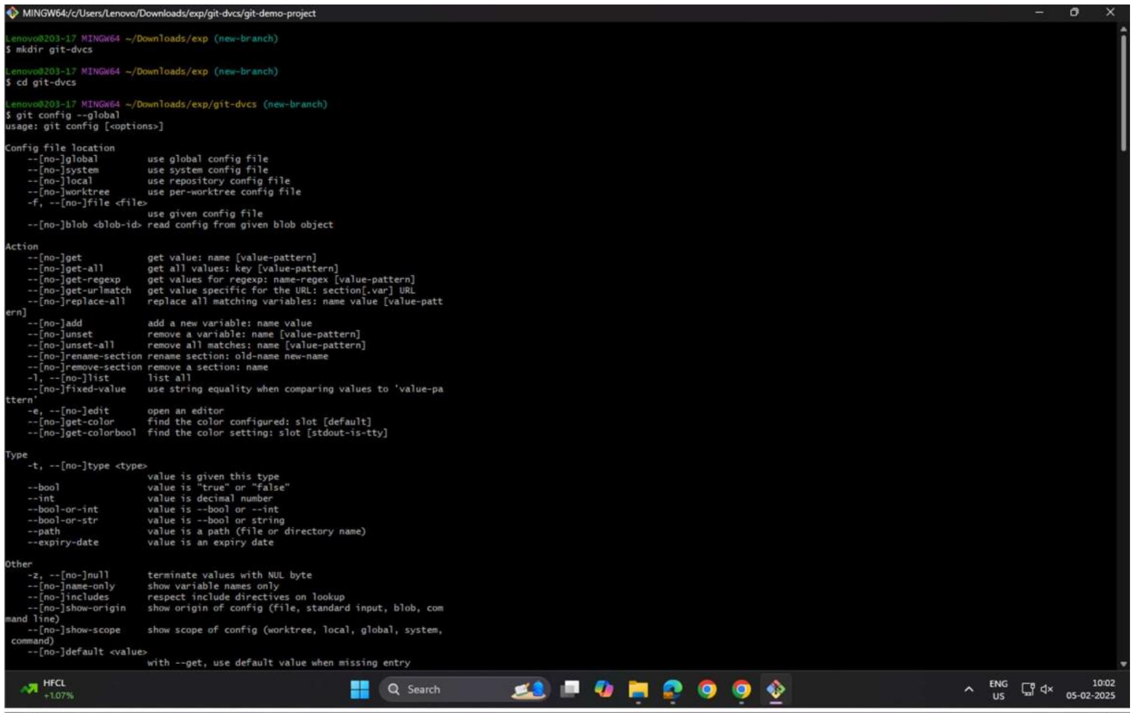
Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git config --global.usser.name "AtharvaVichare"
```



```
MINGW64:/c/Users/Lenovo/Downloads/exp/git-dvcs/git-demo-project

Lenovo@203-17 MINGW64 ~/Downloads/exp (new-branch)
$ mkdir git-dvcs

Lenovo@203-17 MINGW64 ~/Downloads/exp (new-branch)
$ cd git-dvcs

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git config --global
usage: git config [<options>]

Config file location
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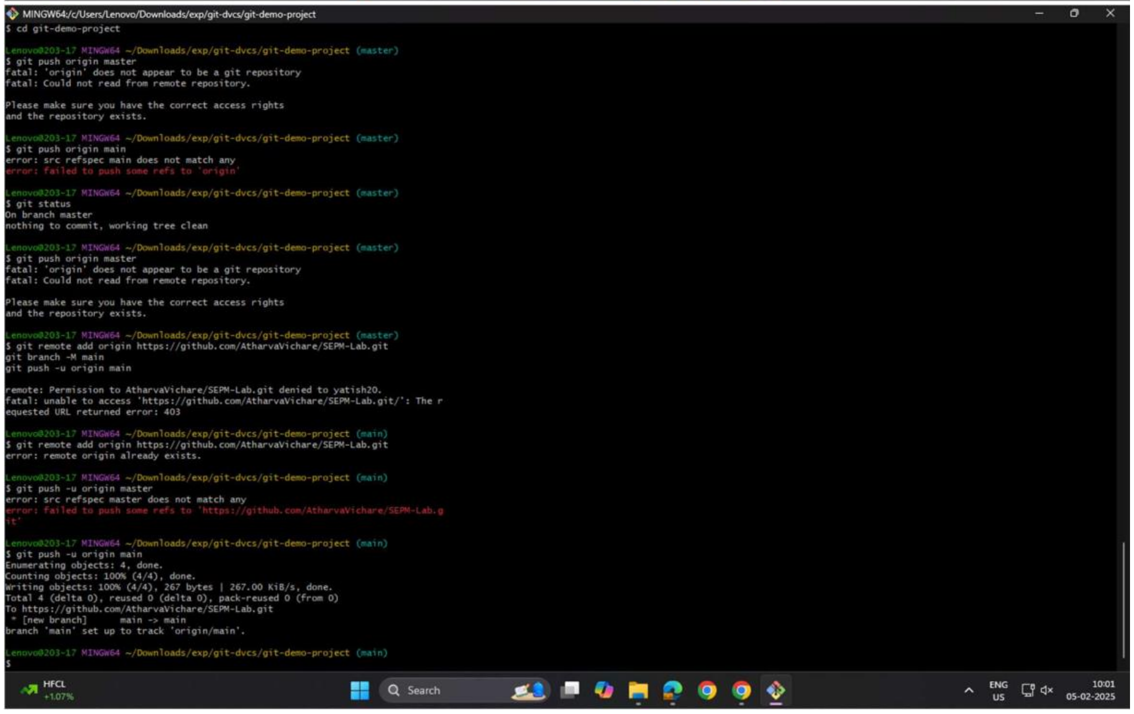
```



```
MINGW64:/c/Users/Lenovo/Downloads/exp/git-dvcs/git-demo-project
$ cd git-demo-project

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (master)
$ git push origin master
fatal: 'origin' does not appear to be a git repository
fatal: Could not read from remote repository.

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

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (master)
$ git push origin main
error: src refspec main does not match any
error: failed to push some refs to 'origin'

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (master)
$ git status
On branch master
nothing to commit, working tree clean

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (master)
$ git push origin master
fatal: 'origin' does not appear to be a git repository
fatal: Could not read from remote repository.

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

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (master)
$ git remote add origin https://github.com/AtharvaVichare/SEPM-Lab.git
git branch -M main
git push -u origin main

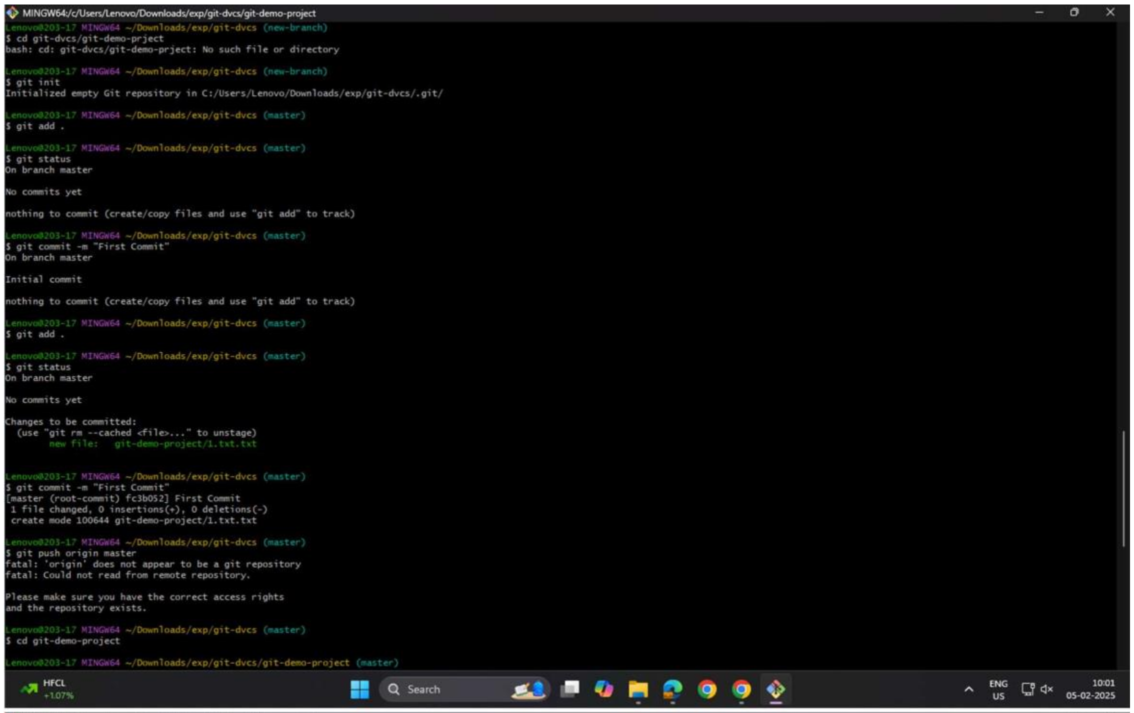
remote: Permission to AtharvaVichare/SEPM-Lab.git denied to yatish20.
fatal: unable to access 'https://github.com/AtharvaVichare/SEPM-Lab.git/': The r
equested URL returned error: 403

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (main)
$ git remote add origin https://github.com/AtharvaVichare/SEPM-Lab.git
error: remote origin already exists.

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (main)
$ git push -u origin master
error: src refspec master does not match any
error: failed to push some refs to 'https://github.com/AtharvaVichare/SEPM-Lab.g
it'

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (main)
$ git push -u origin main
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Writing objects: 100% (4/4), 267 bytes | 267.00 KiB/s, done.
Total 4 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/AtharvaVichare/SEPM-Lab.git
 * [new branch]      main -> main
branch 'main' set up to track 'origin/main'.

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (main)
$
```



```
Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ cd git-dvcs/git-demo-prject
bash: cd: git-dvcs/git-demo-prject: No such file or directory

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git init
Initialized empty Git repository in C:/Users/Lenovo/Downloads/exp/git-dvcs/.git/

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (master)
$ git add .

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (master)
$ git status
On branch master

No commits yet

nothing to commit (create/copy files and use "git add" to track)

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (master)
$ git commit -m "First Commit"
On branch master

Initial commit

nothing to commit (create/copy files and use "git add" to track)

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (master)
$ git add .

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (master)
$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   git-demo-project/1.txt.txt


Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (master)
$ git commit -m "First Commit"
[master (root-commit) fc3b052] First Commit
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 git-demo-project/1.txt.txt

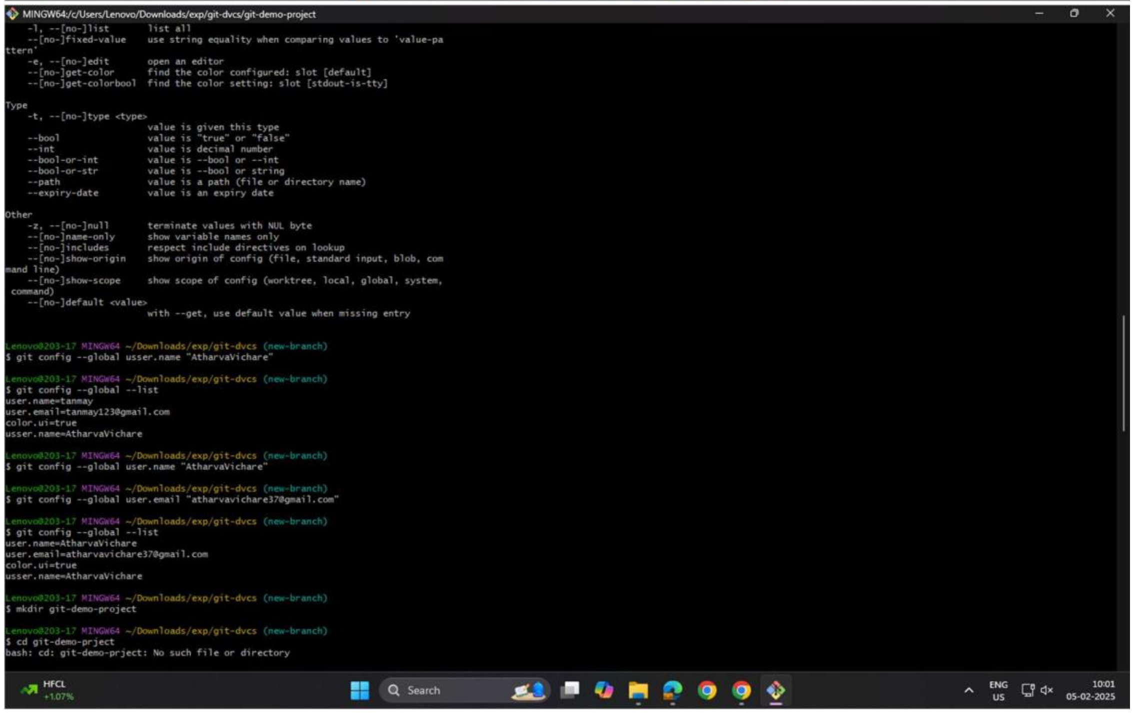
Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (master)
$ git push origin master
fatal: 'origin' does not appear to be a git repository
fatal: Could not read from remote repository.

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

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (master)
$ cd git-demo-project

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs/git-demo-project (master)
```

MINGW64:/c/Users/Lenovo/Downloads/exp/git-dvcs/git-demo-project
HFCL
+1.07%
Search
ENG
US
10:01
05-02-2025



```
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 command)
    --[no-]default <value>
                          with --get, use default value when missing entry


Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git config --global usser.name "AtharvaVichare"

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git config --global --list
user.name=tanmay
user.email=tanmay123@gmail.com
color.ui=true
usser.name=AtharvaVichare

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git config --global user.name "AtharvaVichare"

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git config --global user.email "atharvavichare37@gmail.com"

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ git config --global --list
user.name=AtharvaVichare
user.email=atharvavichare37@gmail.com
color.ui=true
usser.name=AtharvaVichare

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ mkdir git-demo-project

Lenovo@203-17 MINGW64 ~/Downloads/exp/git-dvcs (new-branch)
$ cd git-demo-prject
bash: cd: git-demo-prject: No such file or directory
```

MINGW64:/c/Users/Lenovo/Downloads/exp/git-dvcs/git-demo-project
HFCL
+1.07%
Search
ENG
US
10:01
05-02-2025

Conclusion: Successfully implemented various Git operations on local and remote repositories using Git cheat sheet.