

Semester	Semester VIII
Subject	DevOps Lab
Subject Professor In-charge	Prof. Yash Shah
Laboratory	L11B
Student Name	Ashwini Jadhav
Roll Number	17101B0038
Grade and Subject Teacher's Signature	

Experiment Number	2
Experiment Title	To perform Version Control using GitHub
Resources / Apparatus Required	Hardware: Compatible Computer System Git, Github
Objectives	Learn and Implement Version Control using GitHub

Theory	<p>What is Version Control? Version control is a system that records changes to a file or set of files over time so that you can recall specific versions later. Version control software keeps track of every modification to the code in a special kind of database. If a mistake is made, developers can turn back the clock and compare earlier versions of the code to help fix the mistake while minimizing disruption to all team members.</p> <p>Why is Version Control needed? As development environments have accelerated, version control systems help software teams work faster and smarter. They are especially useful for DevOps teams since they help them to reduce development time and increase successful deployments. For most software teams, the source code is a repository of the invaluable knowledge and understanding about the problem domain that the developers have collected and refined through careful effort. Version control protects source code from both catastrophe and the casual degradation of human error and unintended consequences. Software developers working in teams are continually writing new source code and changing existing source code. The code for a project, app or software component is typically organized in a folder structure or "file tree". One</p>
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developer on the team may be working on a new feature while another developer fixes an unrelated bug by changing code, each developer may make their changes in several parts of the file tree.

Version control helps teams solve these kinds of problems, tracking every individual change by each contributor and helping prevent concurrent work from conflicting. Changes made in one part of the software can be incompatible with those made by another developer working at the same time. This problem should be discovered and solved in an orderly manner without blocking the work of the rest of the team. Further, in all software development, any change can introduce new bugs on its own and new software can't be trusted until it's tested. So testing and development proceed together until a new version is ready.

How to carry out Version Control?

Make sure that you have a Github account and that you have created a Github repository for your project. You can then push a local repo to this repository. Alternatively, you can clone an existing repository, which essentially creates a copy of the public repository onto your machine.

git clone filepath

When you clone, a remote connection (known as 'origin') to the original repository is automatically created. This allows you to push and pull changes (to and from the original repository) going forward.

The primary usefulness of Github is because it expedites collaborative work. Every contributor to a project can have their own local private repository for the project, make changes to their local repository, and push changes to the public repository later. They can do all this without having to keep up with changes made to the public repository.

A centralized workflow depends on a single public repository.

1. Contributors clone the central repository from Github, thereby creating copies of the repository onto their local machines.

git clone repository

2. They can then create their own branch on their local repository, where they can make, stage, and commit their changes locally.

git checkout -b branch

3. Then they can push those (committed) changes to the remote version of their branch on Github (still separate from the master remote branch).

#ensure local version of master is up-to-date

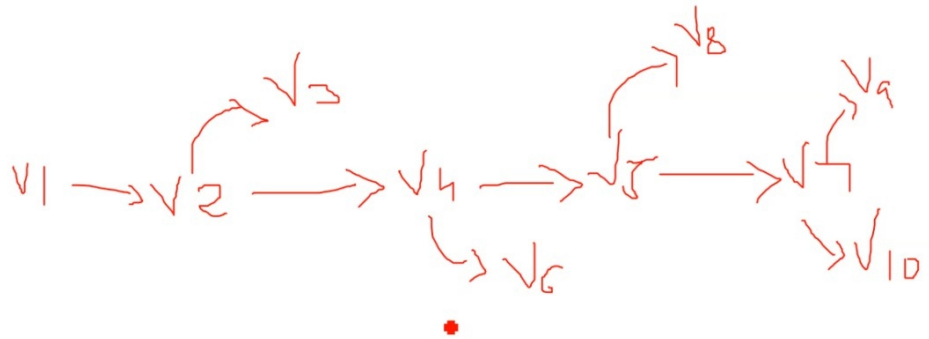
git pull --rebase origin master#push to remote branch

git push origin branch

4. Once a contributor is ready, they can submit a pull request for their remote branch. Other collaborators can review the changes and once the changes are approved, those changes can be merged to the master remote branch.

Output

Pushing the following structure to GitHub:



Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Owner * Repository name *

Great repository names are available. [DevOps-Exp2 is available.](#) Need inspiration? How about bug-free-bassoon?

Description (optional)

☒ Public
Anyone on the internet can see this repository. You choose who can commit.

☐ Private
You choose who can see and commit to this repository.

Initialize this repository with:
Skip this step if you're importing an existing repository.

☒ Add a README file
This is where you can write a long description for your project. [Learn more.](#)

☐ Add .gitignore
Choose which files not to track from a list of templates. [Learn more.](#)

☐ Choose a license
A license lets others know if they can and how they can use your work. [Learn more.](#)

saran820/DevOps-Exp2

github.com/saran820/DevOps-Exp2

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saran820 / DevOps-Exp2

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Quick setup — if you've done this kind of thing before

Set up in Desktop or HTTPS SSH `https://github.com/saran820/DevOps-Exp2.git`

Get started by creating a new file or uploading an existing file. We recommend every repository include a README, LICENSE, and .gitignore.

...or create a new repository on the command line

```
echo "# DevOps-Exp2" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/saran820/DevOps-Exp2.git
git push -u origin main
```

...or push an existing repository from the command line

```
git remote add origin https://github.com/saran820/DevOps-Exp2.git
git branch -M main
git push -u origin main
```

Type here to search

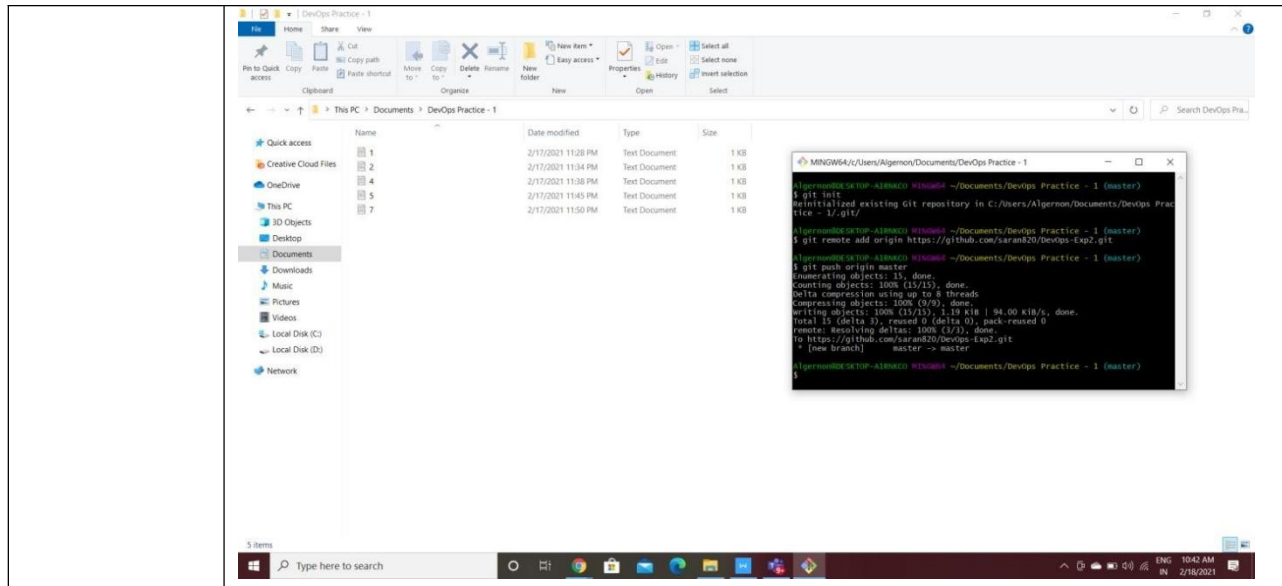
DevOps Practice - 1

Name	Date modified	Type	Size
1	2/17/2021 11:28 PM	Text Document	1 KB
2	2/17/2021 11:34 PM	Text Document	1 KB
4	2/17/2021 11:38 PM	Text Document	1 KB
5	2/17/2021 11:45 PM	Text Document	1 KB
7	2/17/2021 11:50 PM	Text Document	1 KB

5 items

MINGW64 C:/Users/Algermon/Documents/DevOps Practice - 1

```
$ git init
Initialized existing Git repository in C:/Users/Algermon/Documents/DevOps Practice - 1/.git/
$ git remote add origin https://github.com/saran820/DevOps-Exp2.git
$ git push -u origin main
Algermon@DESKTOP-41896C7 MINGW64 ~/Documents/DevOps Practice - 1 (master)
```



saran820 / DevOps-Exp2

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master 1 branch 0 tags

Go to file Add file Code

About

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This is commit for V7 in master branch f8ab781 11 hours ago 5 commits

1.txt	This is first commit	11 hours ago
2.txt	This is Second commit	11 hours ago
4.txt	This is commit for V4 in master branch	11 hours ago
5.txt	This is commit for 5th file in master branch	11 hours ago
7.txt	This is commit for V7 in master branch	11 hours ago

Help people interested in this repository understand your project by adding a README. Add a README

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```
MINGW64/Users/Algermon/Documents/DevOps Practice - 1
$ git init
Initialized existing Git repository in C:/Users/Algermon/Documents/DevOps Practice - 1/.git/
$ git remote add origin https://github.com/saran820/DevOps-Exp2.git
$ git push origin master
Enumerating objects: 15, done.
Counting objects: 100% (15/15), done.
Delta compression using up to 8 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (15/15), 1.19 KiB | 94.00 KiB/s, done.
Total 15 (delta 3), reused 0 (delta 0), pack-reused 0
remote: resolving deltas: 100% (3/3), done.
To https://github.com/saran820/DevOps-Exp2.git
   [new branch]      master -> master

$ git push origin f1
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), 332 bytes | 83.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
remote: Create a pull request for 'f1' on GitHub by visiting:
remote:   https://github.com/saran820/DevOps-Exp2/pull/new/f1
remote:
To https://github.com/saran820/DevOps-Exp2.git
   [new branch]      f1 -> f1

$
```

saran820/DevOps-Exp2 at f1

github.com/saran820/DevOps-Exp2/tree/f1

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ft had recent pushes less than a minute ago [Compare & pull request](#)

ft 2 branches 0 tags [Go to file](#) [Add file](#) [Code](#)

This branch is 1 commit ahead, 3 commits behind master. [Pull request](#) [Compare](#)

saran820 This is commit in f1 branch c94fe18 11 hours ago 3 commits

1.txt	This is first commit	11 hours ago
2.txt	This is Second commit	11 hours ago
3.txt	This is commit in f1 branch	11 hours ago

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MINGW64 ~/Documents/DevOps Practice - 1

```
A:\gerson820\TOP-ALANCO> WING64 - ~/Documents/DevOps Practice - 1 (master)
$ git push origin f1
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), 316 bytes | 79.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
```

saran820/DevOps-Exp2 at f2 · GitHub

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Code Issues Pull requests Actions Projects Wiki Security Insights Settings

f1 had recent pushes 2 minutes ago [Compare & pull request](#)

f2 had recent pushes less than a minute ago [Compare & pull request](#)

f2 3 branches 0 tags [Go to file](#) [Add file](#) [Code](#)

This branch is 1 commit ahead, 2 commits behind master. [Pull request](#) [Compare](#)

saran820 This is commit in f2 branch 11 hours ago 4 commits

1.txt	This is first commit	11 hours ago
2.txt	This is Second commit	11 hours ago
4.txt	This is commit for V4 in master branch	11 hours ago
6.txt	This is commit in f2 branch	11 hours ago

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```
MINGW64/Users/Algenon/Documents/DevOps Practice - 1
A:german820@TOP-ALGENON: ~/Documents/DevOps Practice - 1 (master)
$ git push origin f2
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), 113 bytes | 158.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
remote: Create a pull request for 'f2' on GitHub by visiting:
remote:   https://github.com/saran820/devops-exp2/pull/new/f2
remote:
to https://github.com/saran820/devops-exp2.git
^ [new branch] f2 -> f2
A:german820@TOP-ALGENON: ~/Documents/DevOps Practice - 1 (master)
$
```


saran820/DevOps-Exp2 at f3

github.com/saran820/DevOps-Exp2/tree/f3

CodeIssues11 Pull requestsActionsProjectsWikiSecurityInsightsSettings

f1 had recent pushes 3 minutes ago

Compare & pull request

f2 had recent pushes 1 minute ago

Compare & pull request

f3 had recent pushes less than a minute ago

Compare & pull request

f3

4 branches

0 tags

Go to file

Add file

Code

This branch is 1 commit ahead, 1 commit behind master.

Pull request

Compare

saran820 This is commit for f3 branch V8

bf4e883 11 hours ago

5 commits

1.txt

This is first commit

11 hours ago

2.txt

This is Second commit

11 hours ago

4.txt

This is commit for V4 in master branch

11 hours ago

5.txt

This is commit for 5th file in master branch

11 hours ago

8.txt

This is commit for f3 branch V8

11 hours ago

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MINGW64/Users/Aligemon/Documents/DevOps Practice - 1

Aligemon@DESKTOP-A1N6NEC: W1064 ~\Documents\DevOps Practice - 1 (master)

\$ git push origin f4

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), 313 bytes | 104.00 KiB/s, done.

Total 3 (delta 1), reused 0 (delta 0), pack-reused 0

remote: Resolving deltas: 100% (1/1), completed with 1 local object.

remote: Create a pull request for 'f4' on GitHub by visiting:

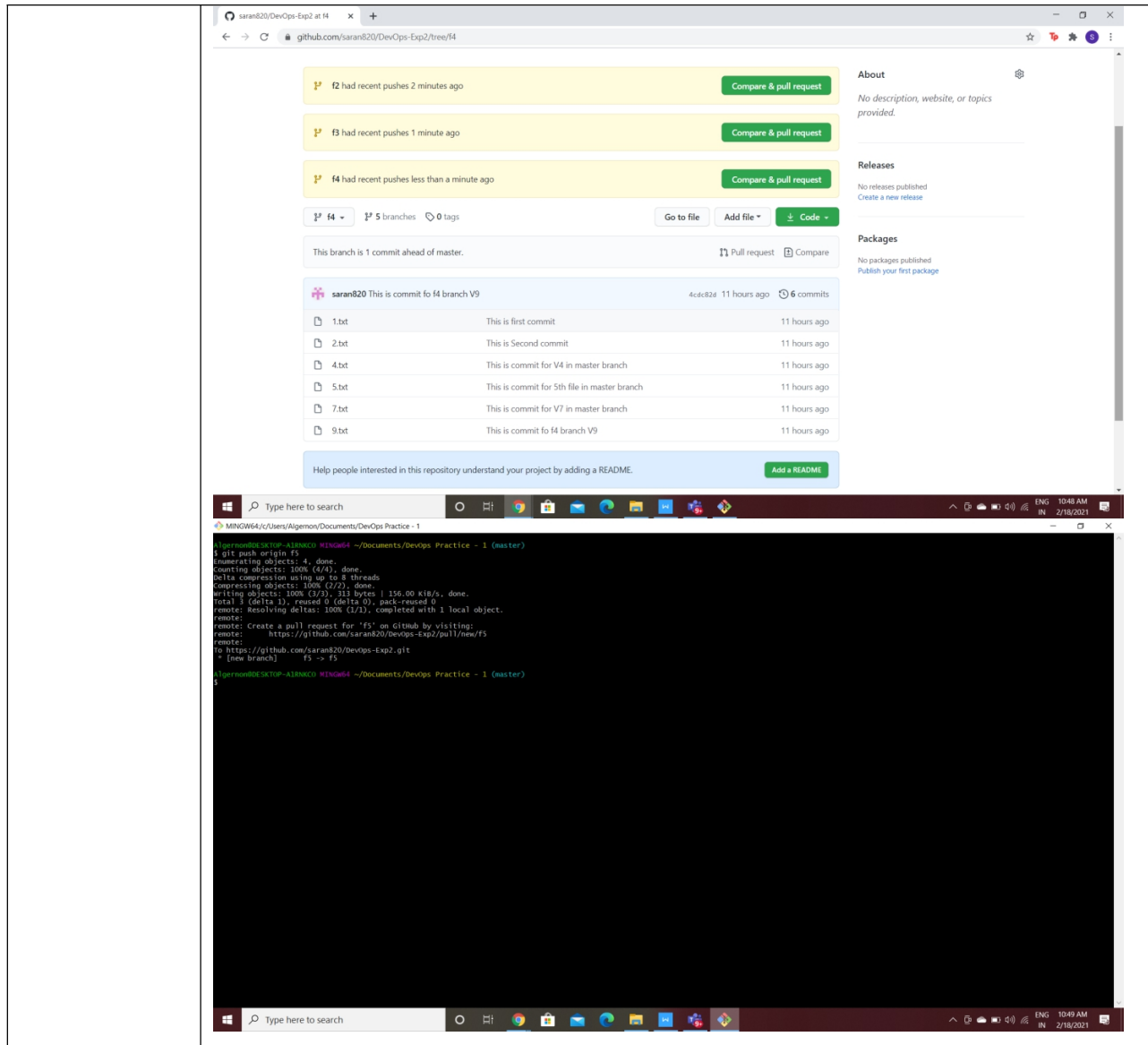
remote: https://github.com/saran820/devops-exp2/pull/new/f4

remote: https://github.com/saran820/devops-exp2.git

> [new branch] f4 -> f4

Aligemon@DESKTOP-A1N6NEC: W1064 ~\Documents\DevOps Practice - 1 (master)

\$



saran820/DevOps-Exp2 at f5 · GitHub

github.com/saran820/DevOps-Exp2/tree/f5

f3 had recent pushes 2 minutes ago [Compare & pull request](#)

f4 had recent pushes 1 minute ago [Compare & pull request](#)

f5 had recent pushes less than a minute ago [Compare & pull request](#)

f5 6 branches 0 tags [Go to file](#) [Add file](#) [Code](#)

This branch is 1 commit ahead of master. [Pull request](#) [Compare](#)

saran820 This is commit for f5 branch V10 46162a6 11 hours ago 6 commits

1.txt	This is first commit	11 hours ago
10.txt	This is commit for f5 branch V10	11 hours ago
2.txt	This is Second commit	11 hours ago
4.txt	This is commit for V4 in master branch	11 hours ago
5.txt	This is commit for 5th file in master branch	11 hours ago
7.txt	This is commit for V7 in master branch	11 hours ago

Help people interested in this repository understand your project by adding a README. [Add a README](#)

About
No description, website, or topics provided.

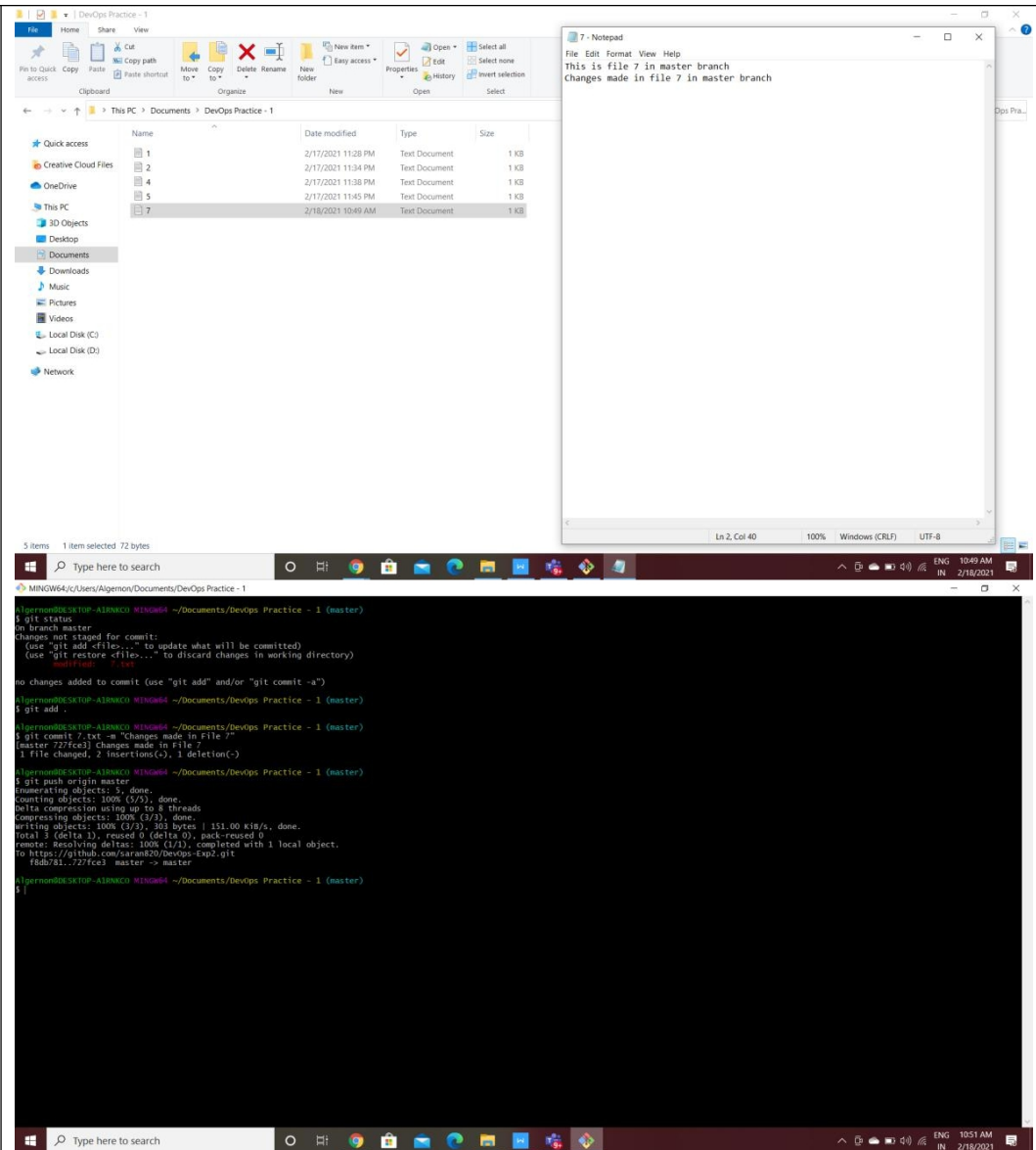
Releases
No releases published
[Create a new release](#)

Packages
No packages published
[Publish your first package](#)

Type here to search

10:49 AM 2/16/2021

Changes made to file 7 in master branch:



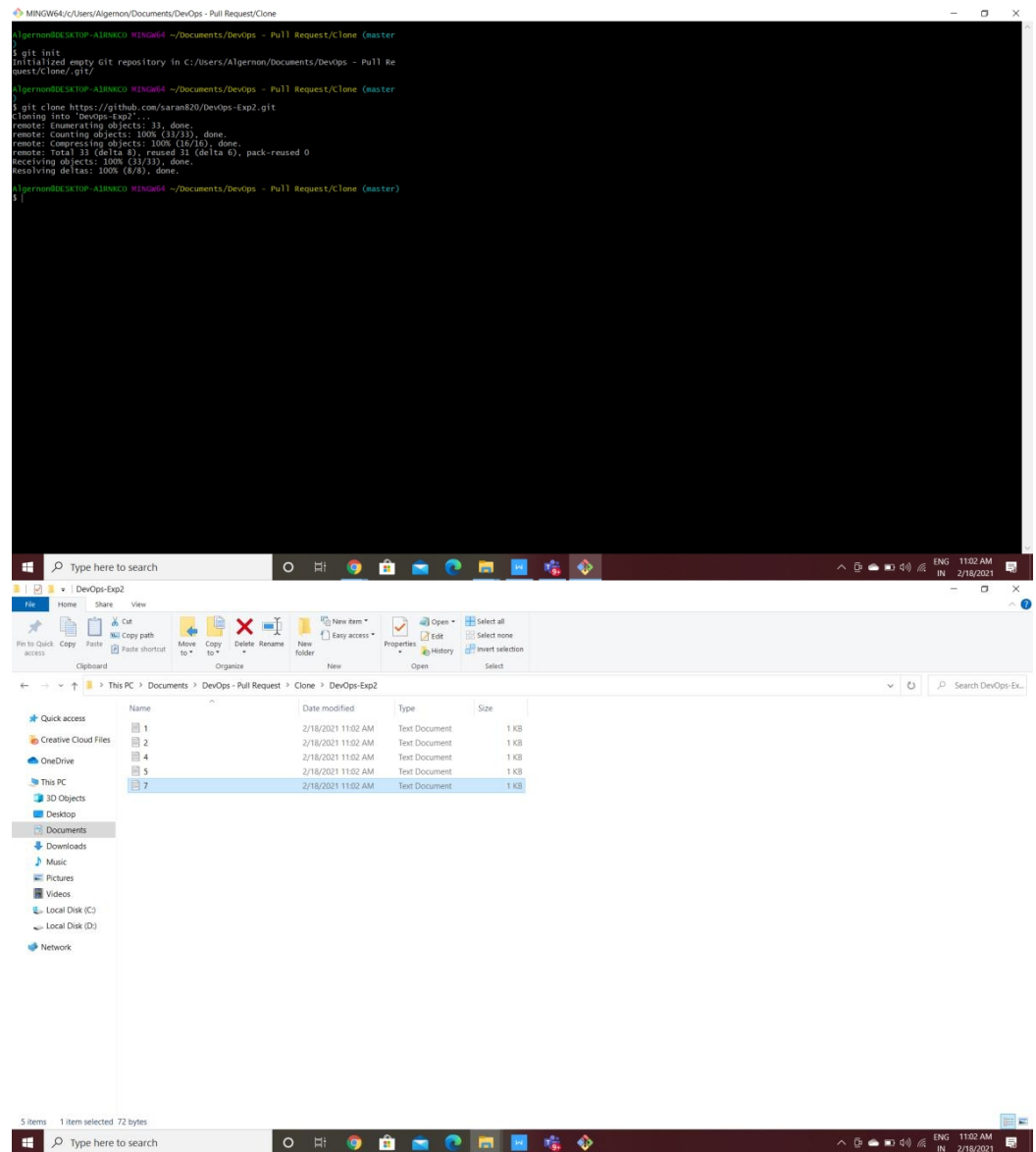
After pushing, reflected on remote repository i.e GitHub

The screenshot shows the GitHub repository page for 'saran820/DevOps-Exp2'. The repository is on the 'master' branch, which has 6 branches and 0 tags. The commit history shows 6 commits, with the most recent commit being '727fce3' from 1 minute ago. The commit message is 'Changes made in File 7'. The commit details show a list of files: 1.txt, 2.txt, 4.txt, 5.txt, and 7.txt. The commit message for each file is: 'This is first commit', 'This is Second commit', 'This is commit for V4 in master branch', 'This is commit for 5th file in master branch', and 'Changes made in File 7' respectively. The commit is 11 hours old. The repository has a README file, which is currently empty. The repository also has a 'Compare & pull request' button. The repository is currently on the 'master' branch, which has 6 branches and 0 tags. The repository is currently on the 'master' branch, which has 6 branches and 0 tags. The repository is currently on the 'master' branch, which has 6 branches and 0 tags.

A list of changes made:

The screenshot shows the GitHub commit page for 'Changes made in File 7'. The commit is from the 'master' branch, committed 1 minute ago by 'saran820'. The commit message is 'Changes made in File 7'. The commit details show a list of changes: '1.txt' (1 addition, 1 deletion), '2.txt' (1 addition, 1 deletion), '4.txt' (1 addition, 1 deletion), '5.txt' (1 addition, 1 deletion), and '7.txt' (1 addition, 1 deletion). The commit is 11 hours old. The repository has a README file, which is currently empty. The repository also has a 'Compare & pull request' button. The repository is currently on the 'master' branch, which has 6 branches and 0 tags. The repository is currently on the 'master' branch, which has 6 branches and 0 tags. The repository is currently on the 'master' branch, which has 6 branches and 0 tags.

Clone Request:



The screenshot shows a Windows 10 desktop environment. In the background, a terminal window titled "MINGW64 [C:\Users\Algermon\Documents\DevOps - Pull Request\Clone]" is open. It displays the following commands and output:

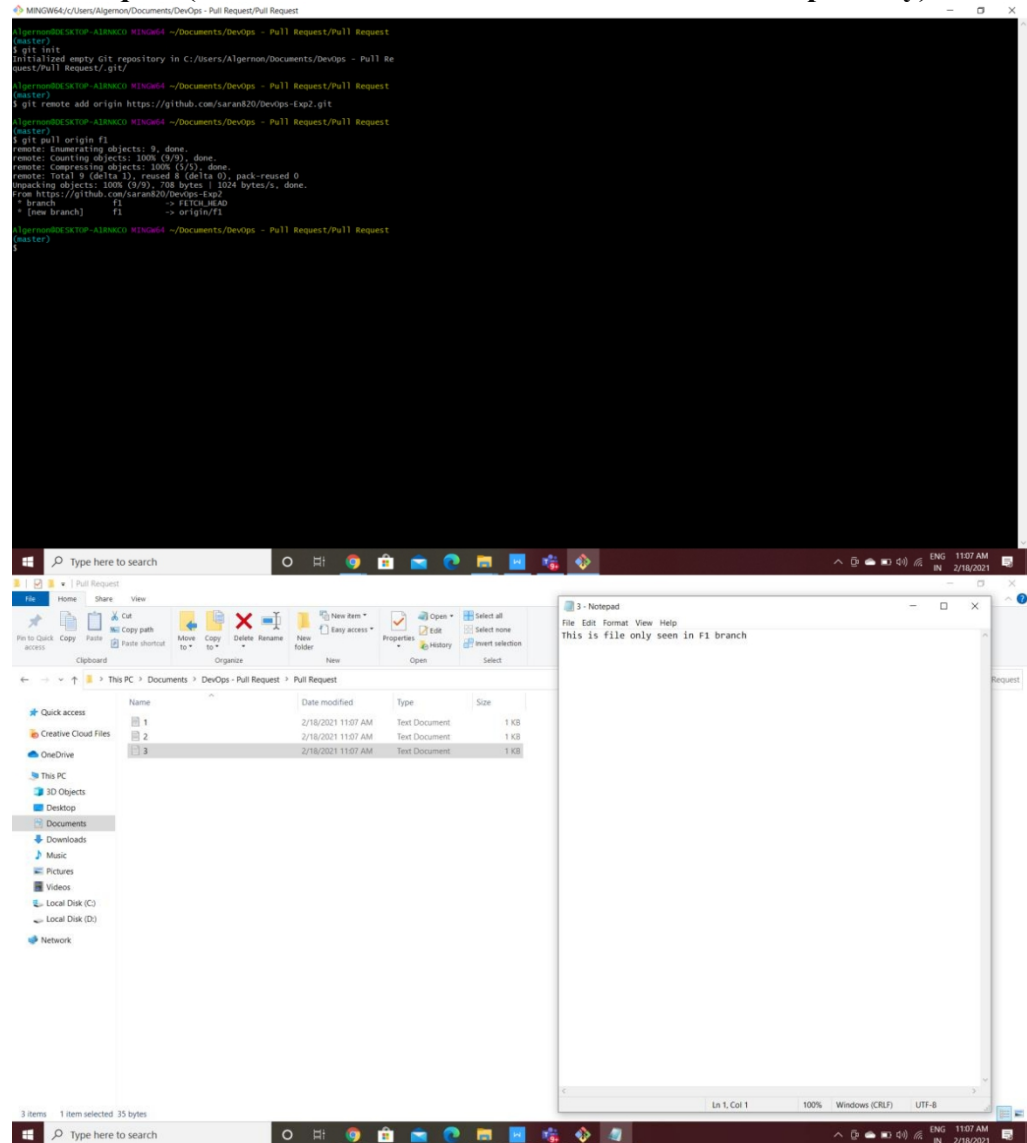
```
algermon@DESKTOP-AJNNKCO MINGW64 ~\Documents\DevOps - Pull Request\Clone (master)
$ git init
Initialized empty Git repository in C:/Users/Algermon/Documents/DevOps - Pull Request/Clone/.git/
algermon@DESKTOP-AJNNKCO MINGW64 ~\Documents\DevOps - Pull Request\Clone (master)
$ git clone https://github.com/saran820/DevOps-Exp2.git
Cloning into 'DevOps-Exp2'...
remote: Enumerating objects: 100% (13/13), done.
remote: Counting objects: 100% (13/13), done.
remote: Compressing objects: 100% (13/13), done.
remote: Total 13 (delta 0), reused 13 (delta 0), pack-reused 0
Receiving objects: 100% (13/13), done.
Resolving deltas: 100% (6/6), done.
algermon@DESKTOP-AJNNKCO MINGW64 ~\Documents\DevOps - Pull Request\Clone (master)
$
```

In the foreground, a File Explorer window titled "DevOps-Exp2" is open, showing the contents of the cloned repository. The address bar indicates the path: "This PC > Documents > DevOps - Pull Request > Clone > DevOps-Exp2". The left sidebar shows the "Documents" folder selected. The main pane displays a list of files:

Name	Date modified	Type	Size
1	2/18/2021 11:02 AM	Text Document	1 KB
2	2/18/2021 11:02 AM	Text Document	1 KB
4	2/18/2021 11:02 AM	Text Document	1 KB
5	2/18/2021 11:02 AM	Text Document	1 KB
7	2/18/2021 11:02 AM	Text Document	1 KB

The status bar at the bottom of the File Explorer window shows "5 items" and "1 item selected 72 bytes".

Pull Request(f1 branch saved as master branch on local repository):



The screenshot displays a Windows desktop environment. In the foreground, a terminal window titled "MINGW64/C:/Users/Algermon/Documents/DevOps - Pull Request/Pull Request" shows the following Git commands and output:

```
(master)
$ git init
Initialized empty Git repository in C:/Users/Algermon/Documents/DevOps - Pull Request/Pull Request/.git/

$ git remote add origin https://github.com/saran20/DevOps-Exp2.git
$ git pull origin f1
remote: Enumerating objects: 9, done.
remote: Counting objects: 100% (9/9), done.
remote: Compressing objects: 100% (5/5), done.
remote: Total 9 (delta 3), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (9/9), 708 bytes | 1024 bytes/s, done.
From https://github.com/saran20/DevOps-Exp2
* branch      f1                -> FETCH_HEAD
* [new branch] f1                -> origin/f1

$
```

Below the terminal window, a File Explorer window is open to the "Pull Request" directory. It shows three files:

Name	Date modified	Type	Size
1	2/18/2021 11:07 AM	Text Document	1 KB
2	2/18/2021 11:07 AM	Text Document	1 KB
3	2/18/2021 11:07 AM	Text Document	1 KB

A Notepad window is also open, displaying the text: "This is file only seen in f1 branch".

Conclusion

Thus we have implemented Version Control using GitHub