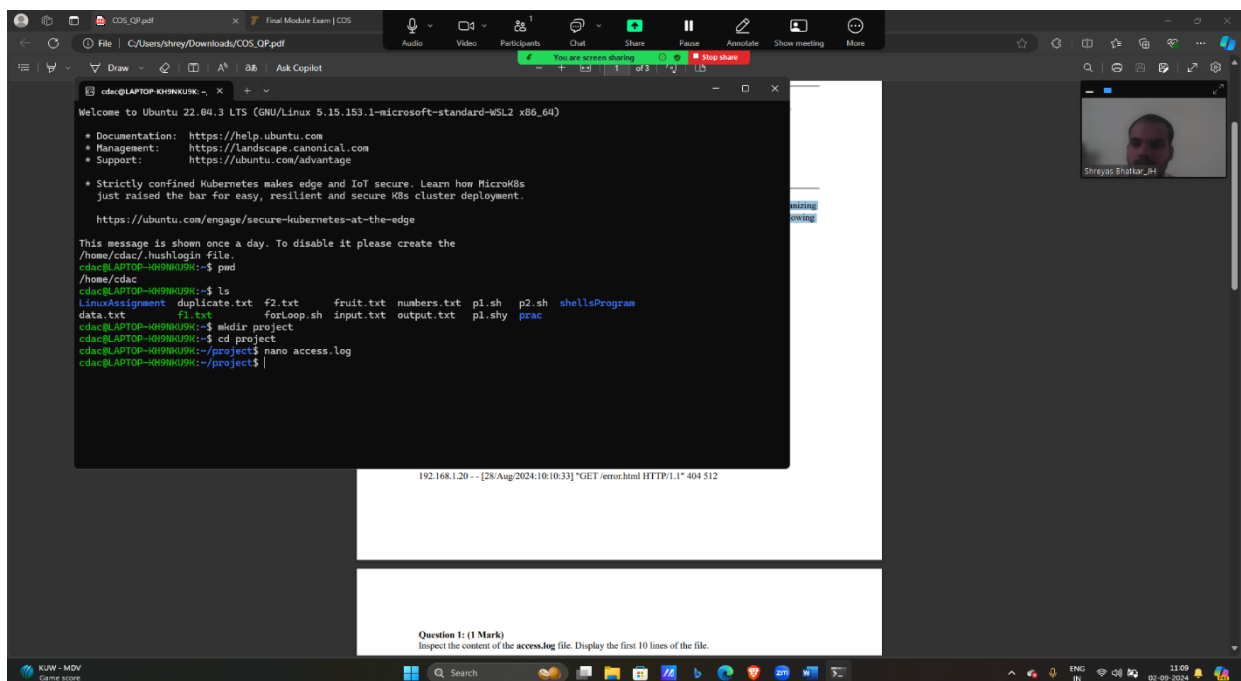


Name : Shreyas Bhatkar

Form no : 240601387

Center : Juhu

**Problem Statement:** You are working on a project that involves analysing a large log file and organizing the results. The log file is located at /home/[username]/project/access.log. The file contains the following data (Use this data



The screenshot shows a terminal window with the following content:

```
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.153.1-microsoft-standard-WSL2 x86_64)

 * Documentation: https://help.ubuntu.com
 * Management:   https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

 * Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.
   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

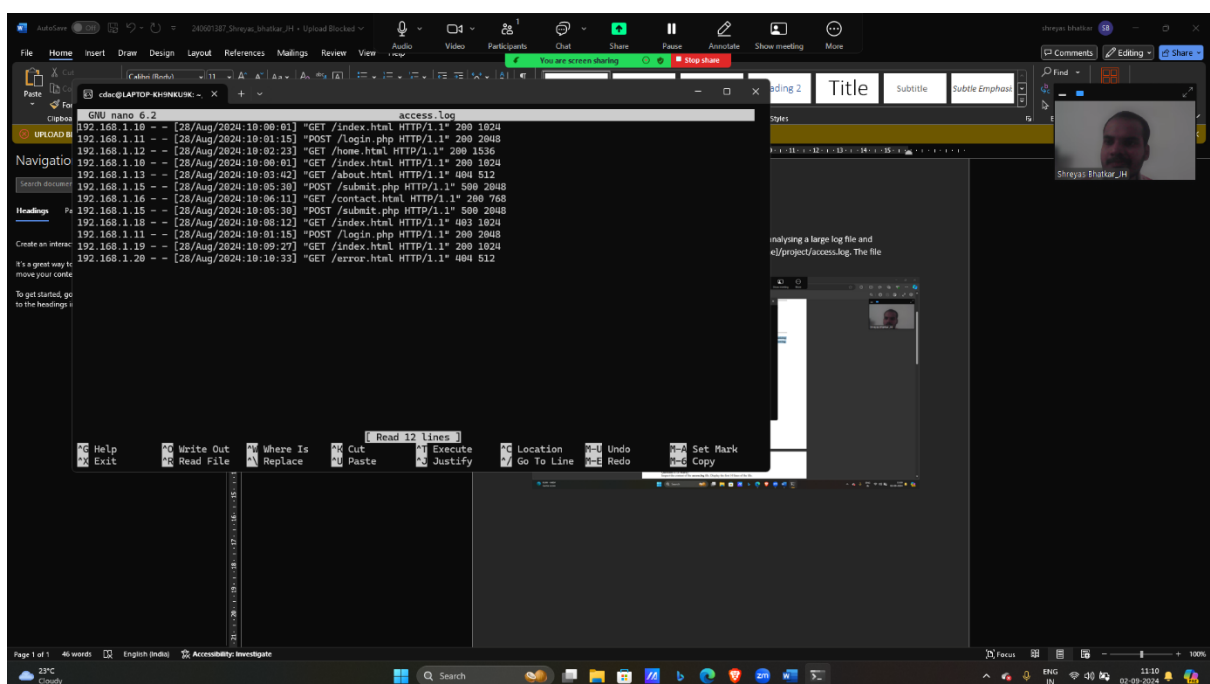
This message is shown once a day. To disable it please create the
/home/cdac/.hushlogin file.
cdac@LAPTOP-KH9NHU9H:~$ pwd
/home/cdac
cdac@LAPTOP-KH9NHU9H:~$ ls
LinuxAssignment  duplicate.txt  f2.txt      fruit.txt  numbers.txt  pi.sh  p2.sh  shellProgram
data.txt        f1.txt       forLoop.sh  input.txt  output.txt   pi.shy  pracc
cdac@LAPTOP-KH9NHU9H:~$ mkdir project
cdac@LAPTOP-KH9NHU9H:~$ cd project
cdac@LAPTOP-KH9NHU9H:~/project$ nano access.log
cdac@LAPTOP-KH9NHU9H:~/project$
```

Below the terminal window, a snippet of the log file content is visible:

```
192.168.1.20 - - [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
```

At the bottom, a question is displayed:

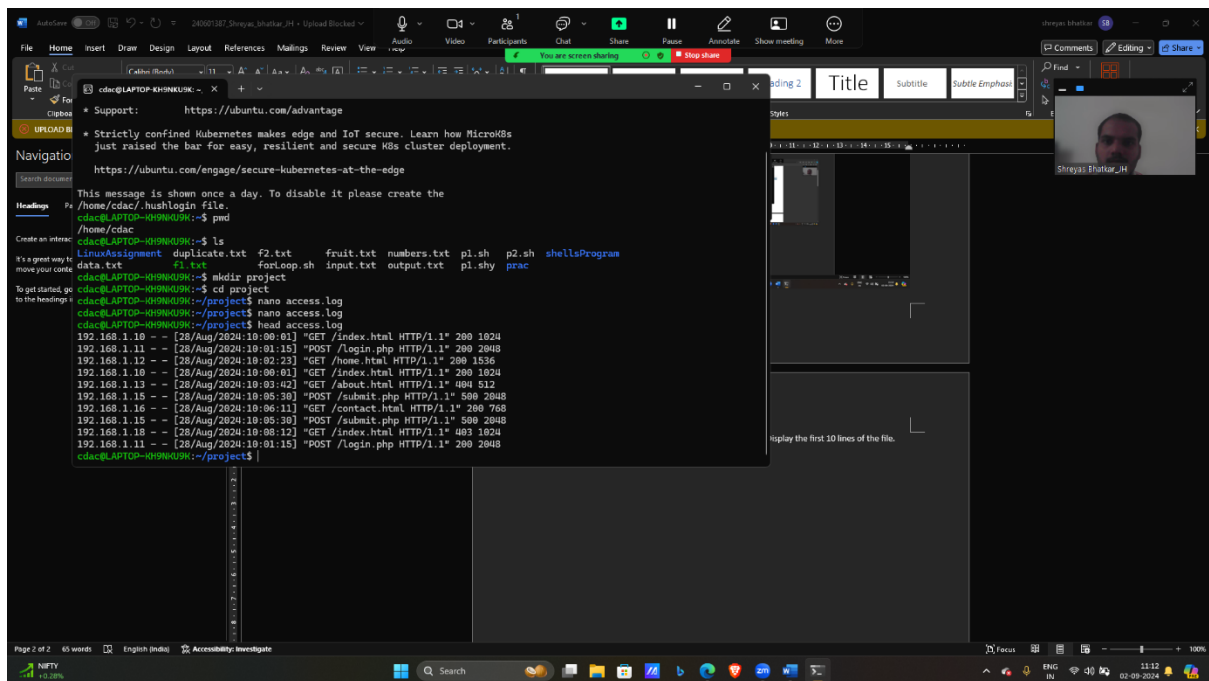
**Question 1: (1 Mark)**  
Inspect the content of the access.log file. Display the first 10 lines of the file.



The screenshot shows a nano editor window with the following content:

```
GNU nano 6.2 access.log
192.168.1.19 - - [28/Aug/2024:10:00:01] "GET /index.html HTTP/1.1" 200 1824
192.168.1.11 - - [28/Aug/2024:10:01:15] "POST /login.php HTTP/1.1" 200 2848
192.168.1.12 - - [28/Aug/2024:10:02:23] "GET /home.html HTTP/1.1" 200 1536
192.168.1.10 - - [28/Aug/2024:10:00:01] "GET /index.html HTTP/1.1" 200 1824
192.168.1.13 - - [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
192.168.1.15 - - [28/Aug/2024:10:05:30] "POST /submit.php HTTP/1.1" 500 2048
192.168.1.16 - - [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.15 - - [28/Aug/2024:10:05:30] "POST /submit.php HTTP/1.1" 500 2048
192.168.1.10 - - [28/Aug/2024:10:00:12] "GET /index.html HTTP/1.1" 404 512
192.168.1.11 - - [28/Aug/2024:10:01:15] "POST /login.php HTTP/1.1" 200 2848
192.168.1.19 - - [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1824
192.168.1.20 - - [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
```

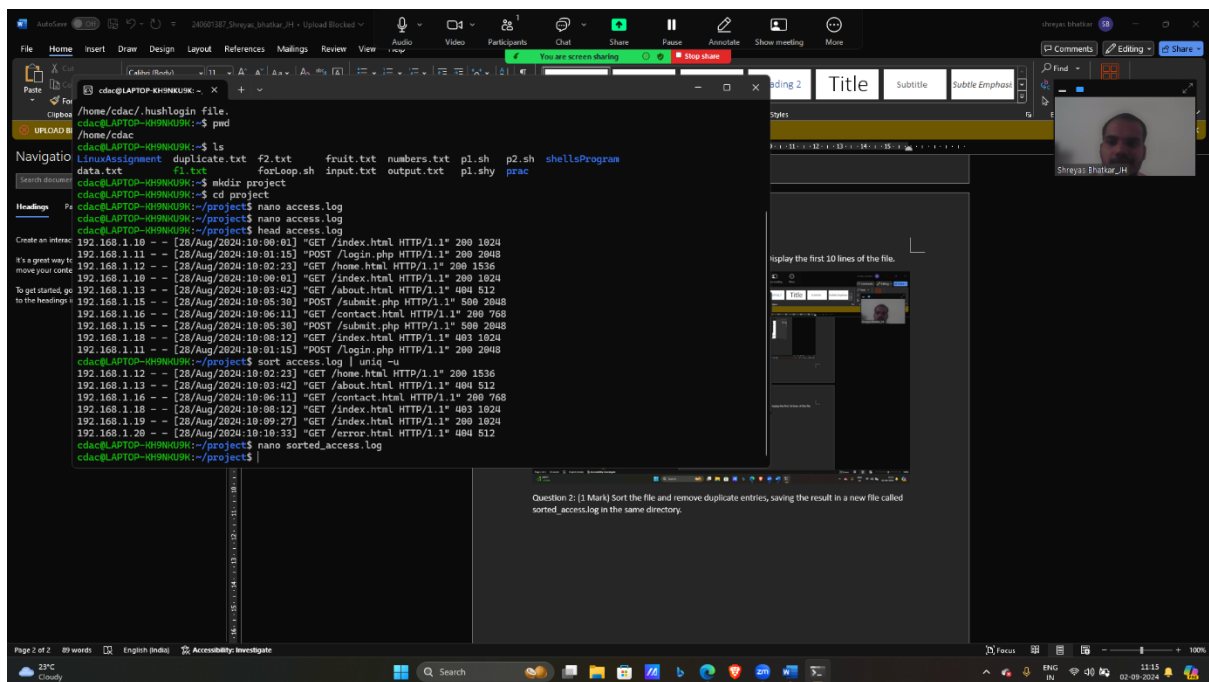
Question 1: (1 Mark) Inspect the content of the access.log file. Display the first 10 lines of the file.



The screenshot shows a terminal window with the following commands and output:

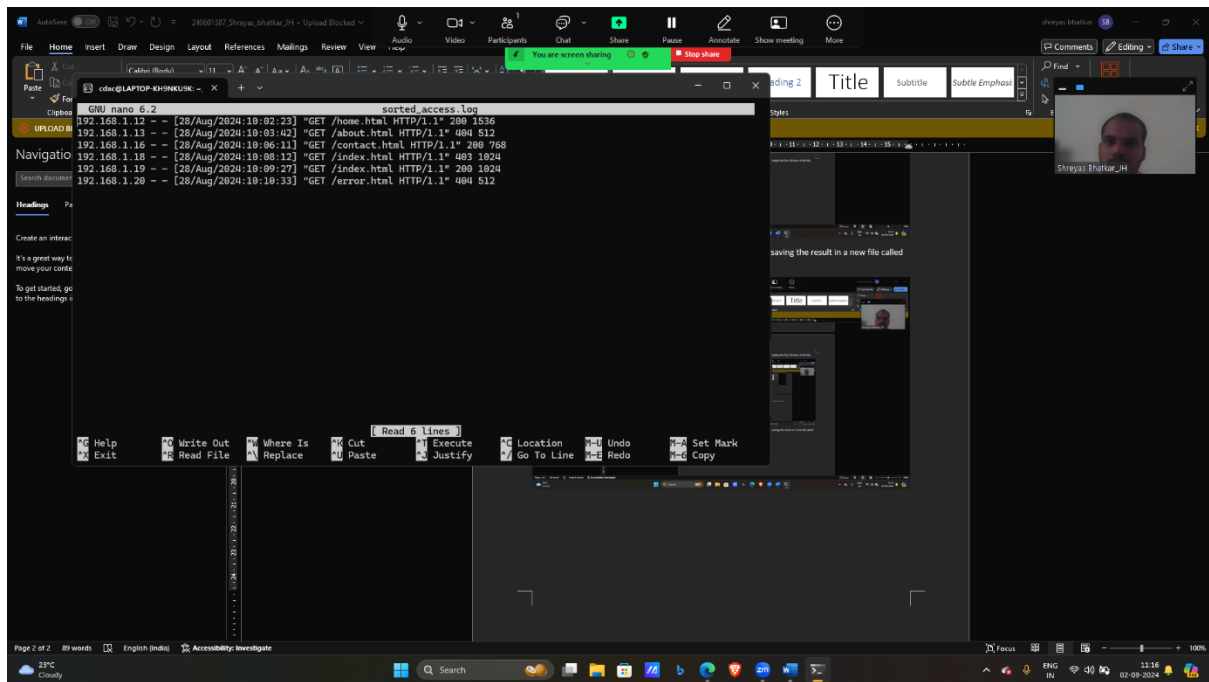
```
cdac@LAPTOP-KH9NKUJK:~$ pmd
/home/cdac
cdac@LAPTOP-KH9NKUJK:~$ ls
LinuxAssignment duplicate.txt f2.txt fruit.txt numbers.txt p1.sh p2.sh shellsProgram
data.txt f1.txt forLoop.sh input.txt output.txt p1.shy prac
cdac@LAPTOP-KH9NKUJK:~$ mkdir project
cdac@LAPTOP-KH9NKUJK:~$ cd project
cdac@LAPTOP-KH9NKUJK:~/project$ nano access.log
cdac@LAPTOP-KH9NKUJK:~/project$ head access.log
192.168.1.10 - - [28/Aug/2024:10:00:01] "GET /index.html HTTP/1.1" 200 1824
192.168.1.11 - - [28/Aug/2024:10:01:15] "POST /login.php HTTP/1.1" 200 2848
192.168.1.12 - - [28/Aug/2024:10:02:23] "GET /home.html HTTP/1.1" 200 1536
192.168.1.10 - - [28/Aug/2024:10:00:01] "GET /index.html HTTP/1.1" 200 1824
192.168.1.13 - - [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
192.168.1.15 - - [28/Aug/2024:10:05:30] "POST /submit.php HTTP/1.1" 500 2048
192.168.1.16 - - [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.15 - - [28/Aug/2024:10:05:30] "POST /submit.php HTTP/1.1" 500 2048
192.168.1.18 - - [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1824
192.168.1.11 - - [28/Aug/2024:10:01:15] "POST /login.php HTTP/1.1" 200 2848
cdac@LAPTOP-KH9NKUJK:~/project$
```

Question 2: (1 Mark) Sort the file and remove duplicate entries, saving the result in a new file called sorted\_access.log in the same directory.



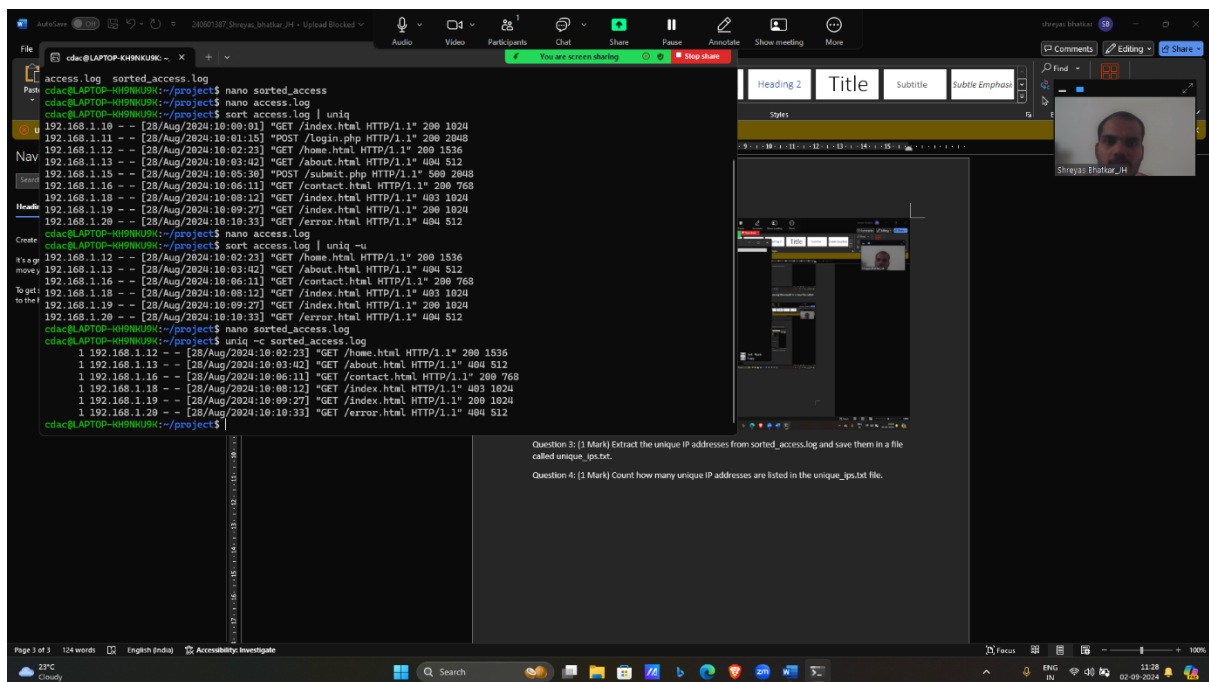
The screenshot shows a terminal window with the following commands and output:

```
cdac@LAPTOP-KH9NKUJK:~$ pmd
/home/cdac
cdac@LAPTOP-KH9NKUJK:~$ ls
LinuxAssignment duplicate.txt f2.txt fruit.txt numbers.txt p1.sh p2.sh shellsProgram
data.txt f1.txt forLoop.sh input.txt output.txt p1.shy prac
cdac@LAPTOP-KH9NKUJK:~$ mkdir project
cdac@LAPTOP-KH9NKUJK:~$ cd project
cdac@LAPTOP-KH9NKUJK:~/project$ nano access.log
cdac@LAPTOP-KH9NKUJK:~/project$ head access.log
192.168.1.10 - - [28/Aug/2024:10:00:01] "GET /index.html HTTP/1.1" 200 1824
192.168.1.11 - - [28/Aug/2024:10:01:15] "POST /login.php HTTP/1.1" 200 2848
192.168.1.12 - - [28/Aug/2024:10:02:23] "GET /home.html HTTP/1.1" 200 1536
192.168.1.10 - - [28/Aug/2024:10:00:01] "GET /index.html HTTP/1.1" 200 1824
192.168.1.13 - - [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
192.168.1.15 - - [28/Aug/2024:10:05:30] "POST /submit.php HTTP/1.1" 500 2048
192.168.1.16 - - [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.15 - - [28/Aug/2024:10:05:30] "POST /submit.php HTTP/1.1" 500 2048
192.168.1.18 - - [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1824
192.168.1.11 - - [28/Aug/2024:10:01:15] "POST /login.php HTTP/1.1" 200 2848
cdac@LAPTOP-KH9NKUJK:~/project$ sort access.log | uniq -u
192.168.1.12 - - [28/Aug/2024:10:02:23] "GET /home.html HTTP/1.1" 200 1536
192.168.1.16 - - [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.18 - - [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1824
192.168.1.19 - - [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1824
192.168.1.20 - - [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKUJK:~/project$ nano sorted_access.log
cdac@LAPTOP-KH9NKUJK:~/project$
```



Question 3: (1 Mark) Extract the unique IP addresses from sorted\_access.log and save them in a file called unique\_ips.txt.

Question 4: (1 Mark) Count how many unique IP addresses are listed in the unique\_ips.txt file.



Explanation :

I was unable to solve Q3 therefore I choose to go with sorted\_access.log to count unique ips

Question 5: (1 Mark) Extract the last 5 lines from sorted\_access.log and save them to a file called recent\_access.log.

```
cdac@LAPTOP-KH9NKU9K:~/project$ nano access.log
cdac@LAPTOP-KH9NKU9K:~/project$ sort access.log | uniq -u
192.168.1.12 -- [28/Aug/2024:10:02:23] "GET /home.html HTTP/1.1" 200 1536
192.168.1.13 -- [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
192.168.1.15 -- [28/Aug/2024:10:05:30] "POST /submit.php HTTP/1.1" 500 2048
192.168.1.16 -- [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.18 -- [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1024
192.168.1.19 -- [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1024
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9K:~/project$ nano sorted_access.log
cdac@LAPTOP-KH9NKU9K:~/project$ uniq -c sorted_access.log
  1 192.168.1.12 -- [28/Aug/2024:10:02:23] "GET /home.html HTTP/1.1" 200 1536
  1 192.168.1.13 -- [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
  1 192.168.1.16 -- [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
  1 192.168.1.18 -- [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1024
  1 192.168.1.19 -- [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1024
  1 192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9K:~/project$ nano sorted_access.log
cdac@LAPTOP-KH9NKU9K:~/project$ tail -5 sorted_access.log
192.168.1.13 -- [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
192.168.1.16 -- [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.18 -- [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1024
192.168.1.19 -- [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1024
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9K:~/project$
```

Question 7: (1 Mark)  
Display the first 5 lines of the errors.log file.

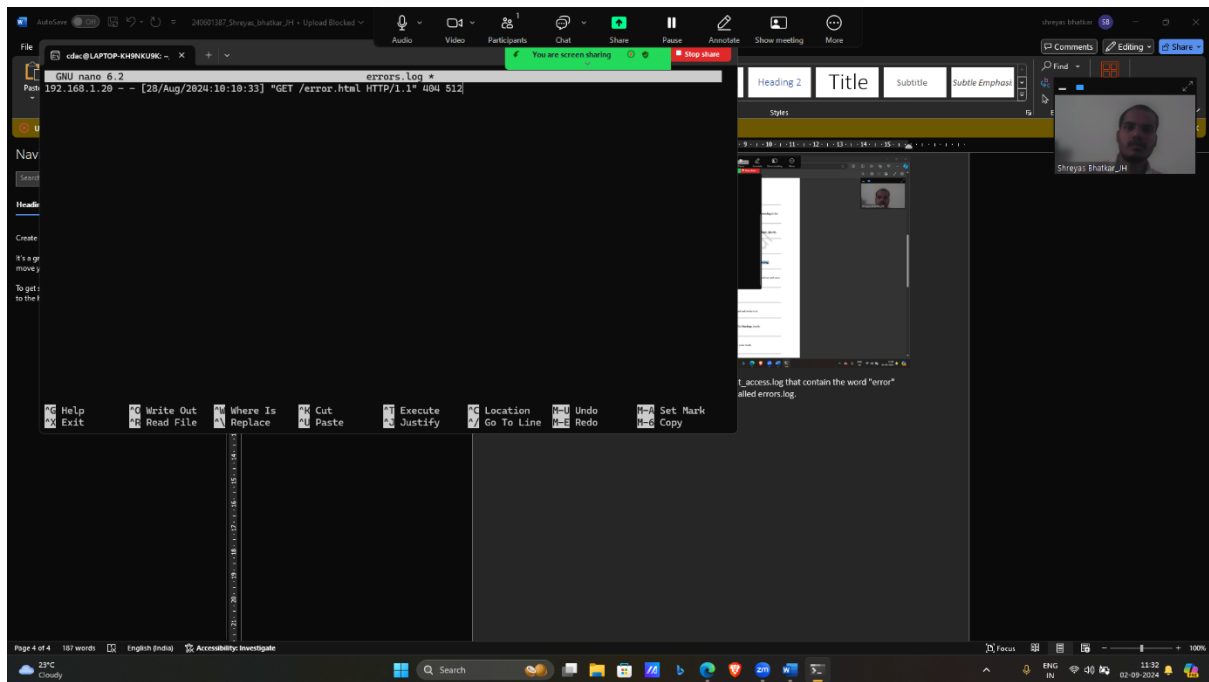
Question 8: (1 Mark)  
Change the permissions of the errors.log file so that everyone can read and write to it.

Question 9: (1 Mark)  
Copy the errors.log and unique\_ips.txt files into a new directory called backup, inside /home/[username]/project. Create the directory if it doesn't exist.

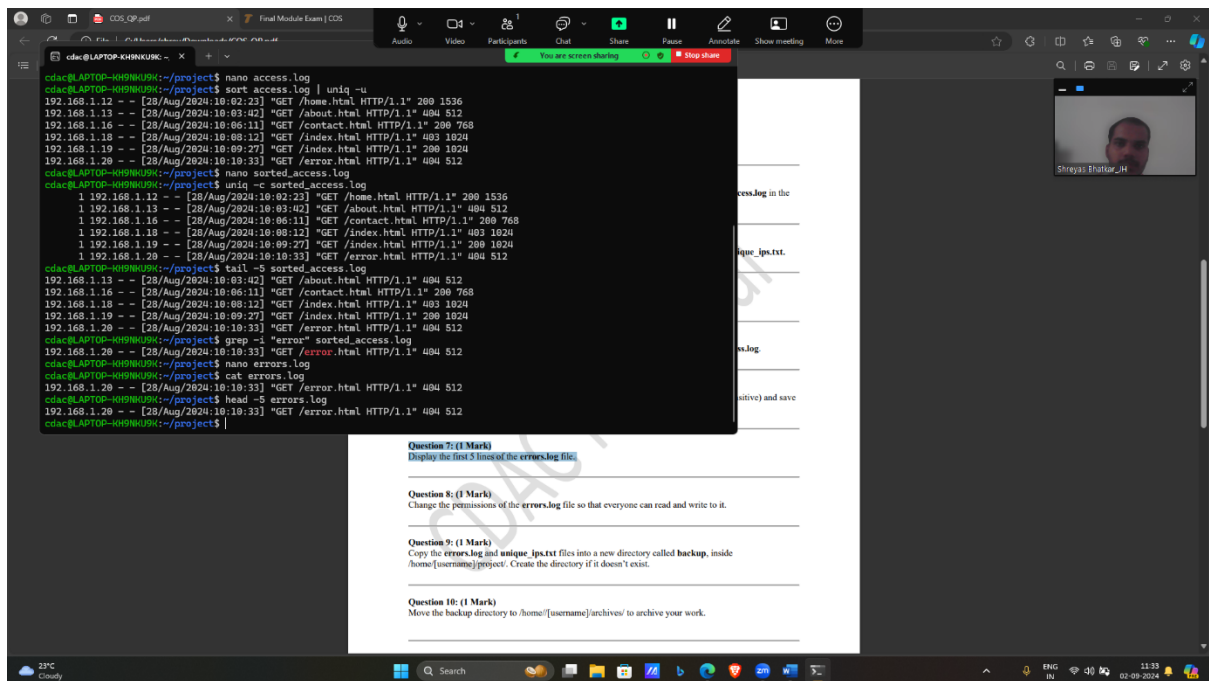
Question 10: (1 Mark)  
Move the backup directory to /home/[username]/archives to archive your work.

Question 6: (1 Mark) Search for any log entries in recent\_access.log that contain the word "error" (case-insensitive) and save the matching lines to a file called errors.log.

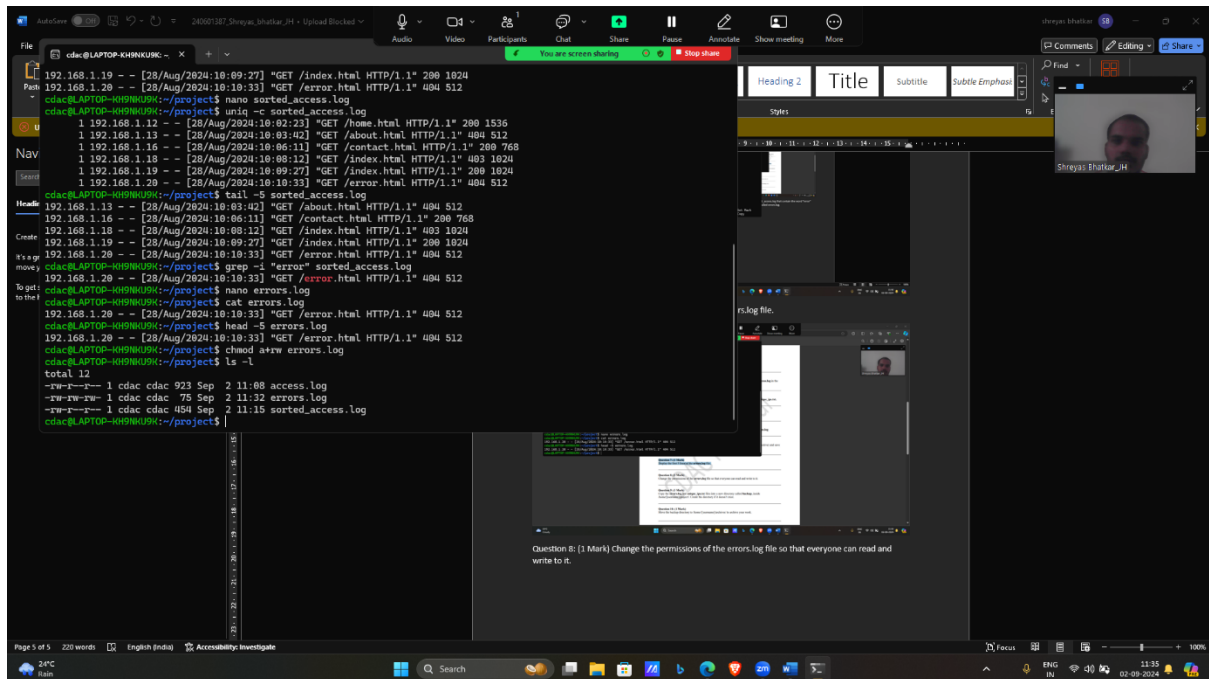
```
cdac@LAPTOP-KH9NKU9K:~/project$ nano access.log
cdac@LAPTOP-KH9NKU9K:~/project$ sort access.log | uniq -u
192.168.1.12 -- [28/Aug/2024:10:02:23] "GET /home.html HTTP/1.1" 200 1536
192.168.1.13 -- [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
192.168.1.15 -- [28/Aug/2024:10:05:30] "POST /submit.php HTTP/1.1" 500 2048
192.168.1.16 -- [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.18 -- [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1024
192.168.1.19 -- [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1024
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9K:~/project$ nano sorted_access.log
cdac@LAPTOP-KH9NKU9K:~/project$ uniq -c sorted_access.log
  1 192.168.1.12 -- [28/Aug/2024:10:02:23] "GET /home.html HTTP/1.1" 200 1536
  1 192.168.1.13 -- [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
  1 192.168.1.16 -- [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
  1 192.168.1.18 -- [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1024
  1 192.168.1.19 -- [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1024
  1 192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9K:~/project$ nano sorted_access.log
cdac@LAPTOP-KH9NKU9K:~/project$ tail -5 sorted_access.log
192.168.1.13 -- [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
192.168.1.16 -- [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.18 -- [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1024
192.168.1.19 -- [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1024
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9K:~/project$ grep -i "error" sorted_access.log
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9K:~/project$ nano errors.log
cdac@LAPTOP-KH9NKU9K:~/project$ cat errors.log
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9K:~/project$
```



Question 7: (1 Mark) Display the first 5 lines of the errors.log file.

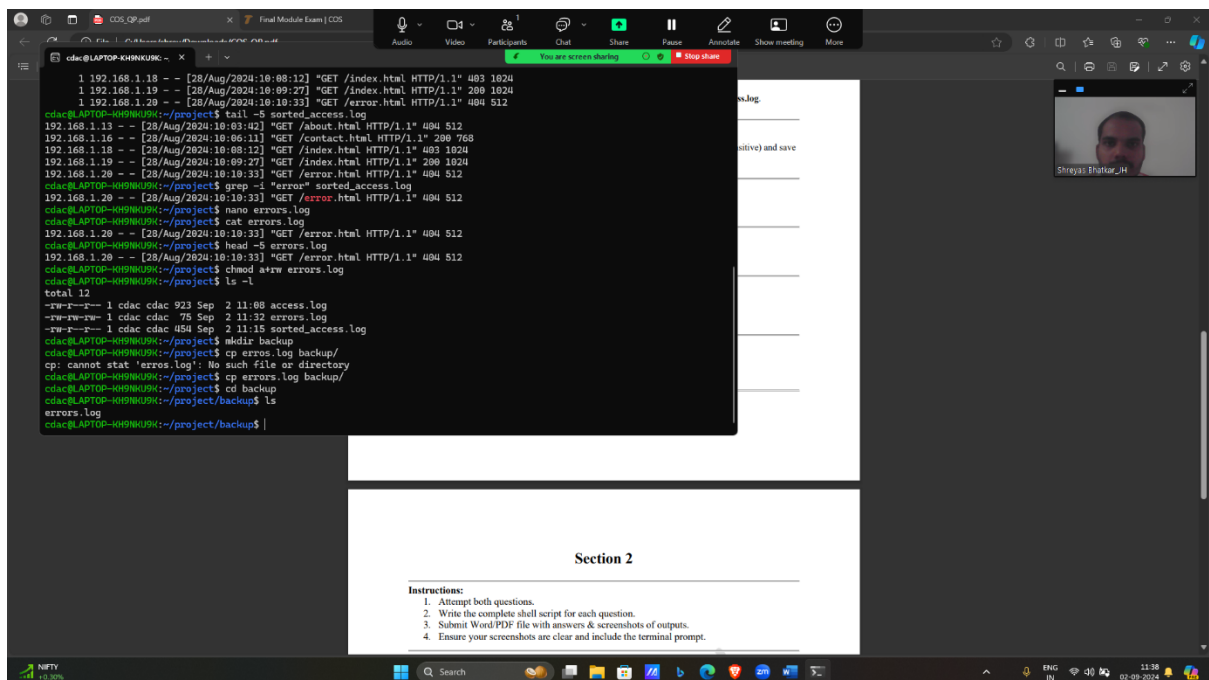


Question 8: (1 Mark) Change the permissions of the errors.log file so that everyone can read and write to it.



```
cdac@LAPTOP-KH9NKU9C: ~/project$ nano sorted_access.log
cdac@LAPTOP-KH9NKU9C:~/project$ uniq -c sorted_access.log
1 192.168.1.12 -- [28/Aug/2024:10:02:23] "GET /home.html HTTP/1.1" 200 1536
1 192.168.1.13 -- [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
1 192.168.1.16 -- [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
1 192.168.1.18 -- [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1024
1 192.168.1.19 -- [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1024
1 192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ tail -5 sorted_access.log
192.168.1.13 -- [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
192.168.1.16 -- [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.19 -- [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1024
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ grep -i "error" sorted_access.log
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ nano errors.log
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ cat errors.log
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ head -5 errors.log
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ chmod a+rw errors.log
cdac@LAPTOP-KH9NKU9C:~/project$ ls -l
total 12
-rw-r--r-- 1 cdac cdac 923 Sep  2 11:08 access.log
-rw-rw-rw- 1 cdac cdac 75 Sep  2 11:32 errors.log
-rw-r--r-- 1 cdac cdac 454 Sep  2 11:15 sorted_access.log
cdac@LAPTOP-KH9NKU9C:~/project$
```

Question 9: (1 Mark) Copy the errors.log and unique\_ips.txt files into a new directory called backup, inside /home/[username]/project/. Create the directory if it doesn't exist.

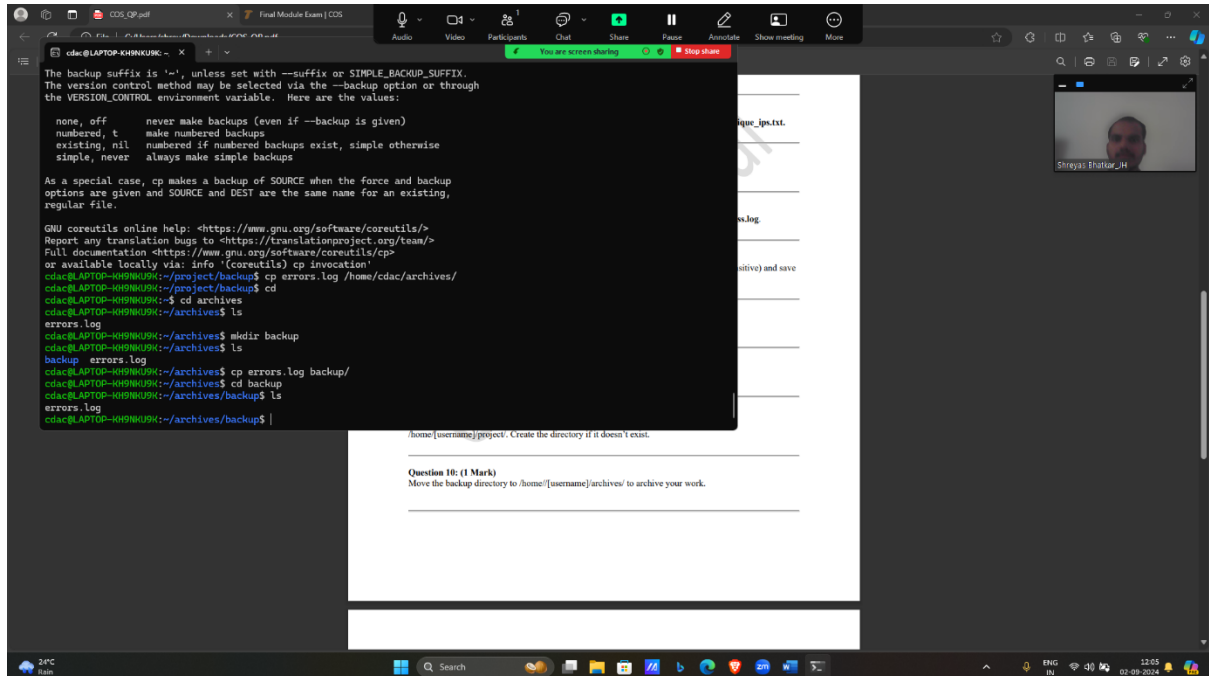


```
cdac@LAPTOP-KH9NKU9C:~/project$ tail -5 sorted_access.log
192.168.1.13 -- [28/Aug/2024:10:03:42] "GET /about.html HTTP/1.1" 404 512
192.168.1.16 -- [28/Aug/2024:10:06:11] "GET /contact.html HTTP/1.1" 200 768
192.168.1.18 -- [28/Aug/2024:10:08:12] "GET /index.html HTTP/1.1" 403 1024
192.168.1.19 -- [28/Aug/2024:10:09:27] "GET /index.html HTTP/1.1" 200 1024
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ grep -i "error" sorted_access.log
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ nano errors.log
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ head -5 errors.log
192.168.1.20 -- [28/Aug/2024:10:10:33] "GET /error.html HTTP/1.1" 404 512
cdac@LAPTOP-KH9NKU9C:~/project$ chmod a+rw errors.log
cdac@LAPTOP-KH9NKU9C:~/project$ ls -l
total 12
-rw-r--r-- 1 cdac cdac 923 Sep  2 11:08 access.log
-rw-rw-rw- 1 cdac cdac 75 Sep  2 11:32 errors.log
-rw-r--r-- 1 cdac cdac 454 Sep  2 11:15 sorted_access.log
cdac@LAPTOP-KH9NKU9C:~/project$ mkdir backup
cdac@LAPTOP-KH9NKU9C:~/project$ cp errors.log backup/
cp: cannot stat 'errors.log': No such file or directory
cdac@LAPTOP-KH9NKU9C:~/project$ cp errors.log backup/
cdac@LAPTOP-KH9NKU9C:~/project$ cd backup$ ls
errors.log
cdac@LAPTOP-KH9NKU9C:~/project/backup$
```

Explanation :

I was unable to solve Q3 therefore I have only moved errors.log file in backup directory

Question 10: (1 Mark) Move the backup directory to /home/[username]/archives/ to archive your work.



Explanation :

I had manually made archives and backup files using mkdir

Then I had copied errors.log only I was unable to solve Q3 using cp command

To /home/cdac/archives/backup/

### Question 1: Integer Addition and Even/Odd Determination (5 Marks)

Write a shell script that performs the following tasks:

1. Prompt the user to enter two integers.
2. Compute the sum of these two integers.
3. Check if the computed sum is even or odd.
4. Output the result of the addition and indicate whether the sum is "Even" or "Odd."

Input (Command Line):

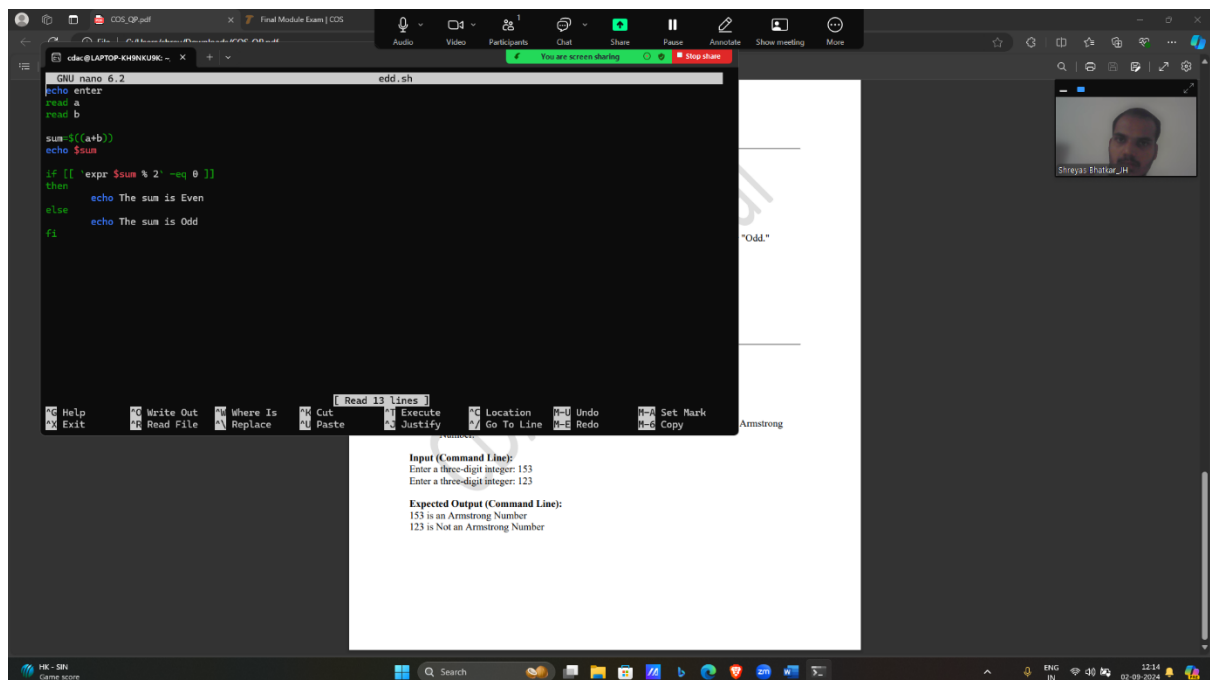
Enter first integer: 7

Enter second integer: 3

Expected Output (Command Line):

Sum: 10

The sum is Even



```
GNU nano 6.2 edd.sh
echo enter
read a
read b

sum=$((a+b))
echo $sum

if [[ $(expr $sum % 2) = 0 ]]
then
    echo The sum is Even
else
    echo The sum is Odd
fi
```

Input (Command Line):  
Enter a three-digit integer: 153  
Enter a three-digit integer: 123

Expected Output (Command Line):  
153 is an Armstrong Number  
123 is Not an Armstrong Number



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cdac@LAPTOP-KH9NKURK: ~/archives/backup\$ bash edd.sh  
enter  
2  
3  
5  
cdac@LAPTOP-KH9NKURK:~/archives/backup\$ nano edd.sh  
cdac@LAPTOP-KH9NKURK:~/archives/backup\$ bash edd.sh  
enter  
7  
3  
10  
cdac@LAPTOP-KH9NKURK:~/archives/backup\$ nano edd.sh  
cdac@LAPTOP-KH9NKURK:~/archives/backup\$ bash edd.sh  
enter  
7  
3  
10  
edd.sh: line 8: conditional binary operator expected  
edd.sh: line 8: expected `|'  
edd.sh: line 8: expected `|'  
edd.sh: line 8: syntax error near `|'  
edd.sh: line 8: `if [[ ((\$sum % 2)) -eq 0 ]]'  
cdac@LAPTOP-KH9NKURK:~/archives/backup\$ nano edd.sh  
cdac@LAPTOP-KH9NKURK:~/archives/backup\$ bash edd.sh  
enter  
7  
3  
10  
The sum is Even  
cdac@LAPTOP-KH9NKURK:~/archives/backup\$ |

Input (Command Line):  
Enter a three-digit integer: 153  
Enter a three-digit integer: 123

Expected Output (Command Line):  
153 is an Armstrong Number  
123 is Not an Armstrong Number

Shreyas Bhattacharjee\_H

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