



BUBT | BANGLADESH UNIVERSITY OF
BUSINESS AND TECHNOLOGY

COMPUTER SCIENCE AND ENGINEERING

LAB REPORT

INTRODUCTION TO LINUX OPERATING SYSTEM

OPERATING SYSTEMS (CSE-210)

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Scenario

You are the system administrator of a Linux server used by a small development team. Recently, some team members reported some issues and you need to troubleshoot and perform user management tasks.

1 Troubleshooting

1.0.1 Identify the currently logged-in users on the system

Use the **who** command to identify the currently logged-in users on the system.

who

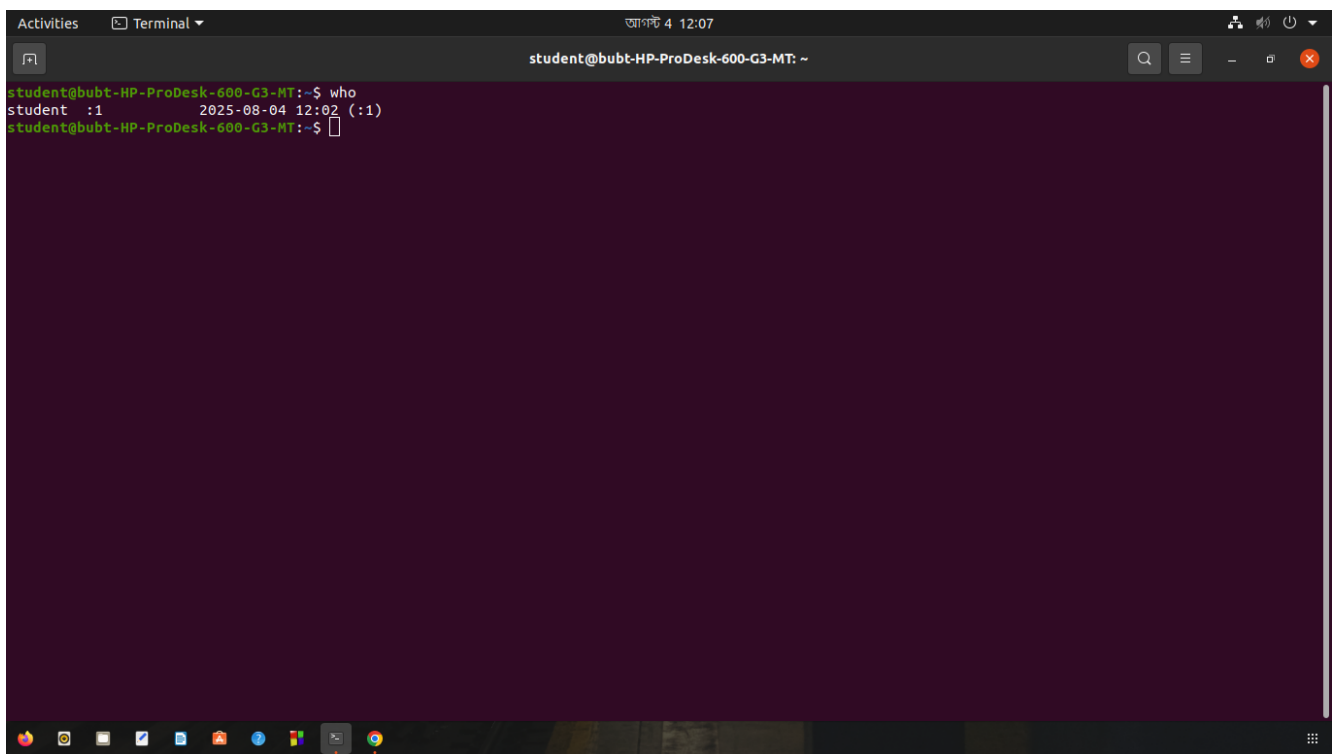
A screenshot of a Linux terminal window. The window title is "Terminal" and the user is "student@bubt-HP-ProDesk-600-G3-MT: ~". The terminal shows the command "who" being executed, which returns the output: "student :1 2025-08-04 12:02 (:1)". The terminal has a dark purple background and a light-colored text. The window is part of a desktop environment with a taskbar at the bottom showing various application icons.

Figure 1: Use of the who command

2 User Management

2.0.1 Create a new user named developer1

Create a new user named **developer1** using the **useradd** command.

sudo useradd -m developer2

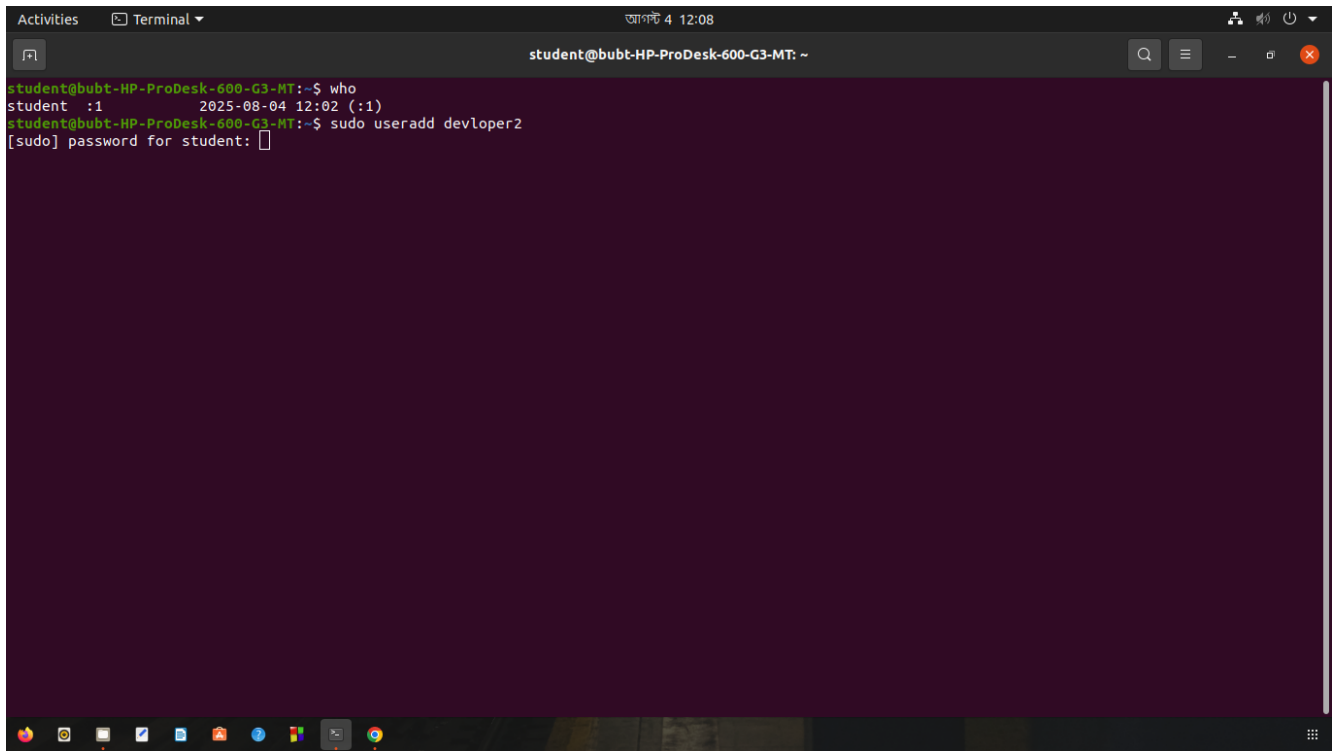


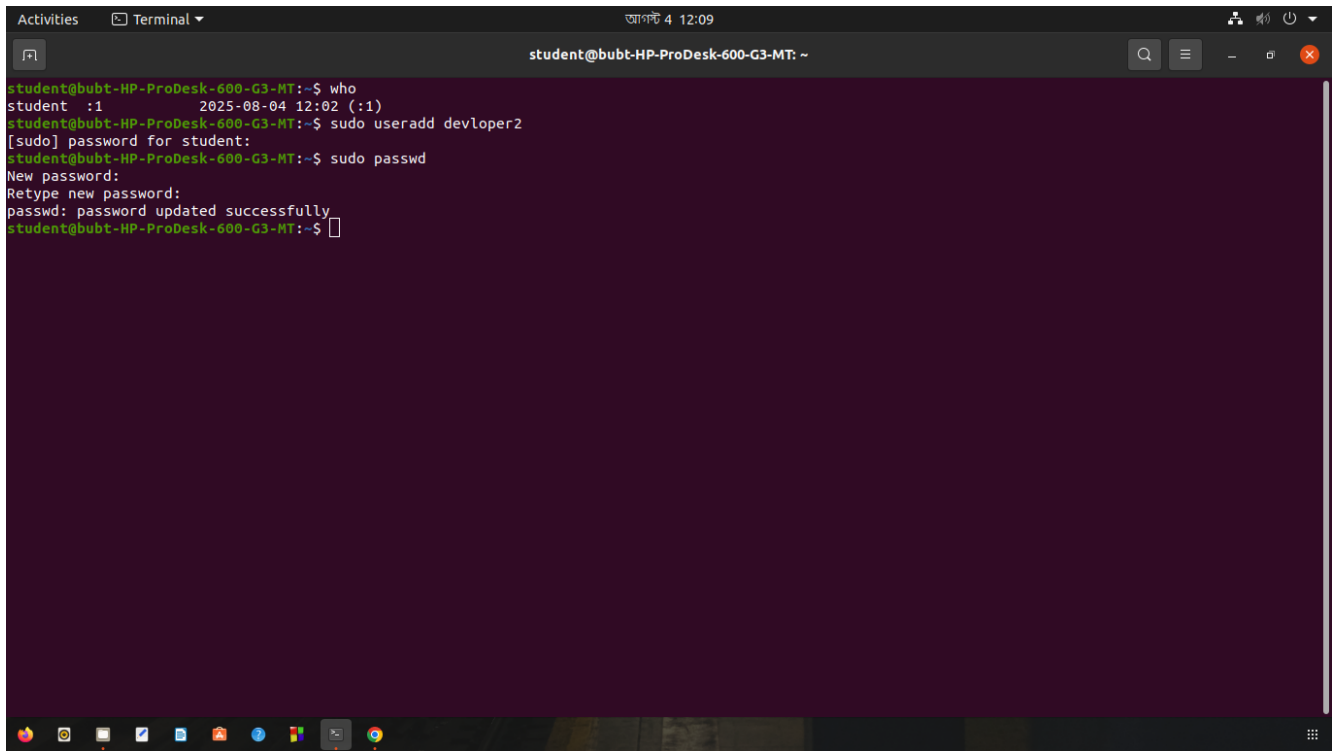
Figure 2: Create a new user

2.0.2 Set a password for the newly created user

Set a password for the newly created user using the **passwd** command.

sudo passwd

Example password: 1234

A terminal window titled 'Terminal' with a dark background and light green text. The window shows a user named 'student' at a machine named 'bubt-HP-ProDesk-600-G3-MT'. The user runs the command 'who', which shows they are logged in as 'student' on '2025-08-04 12:02 (:1)'. Then, they run 'sudo useradd developer2', which prompts for a password. Finally, they run 'sudo passwd', which prompts for a new password and then a retyped password, resulting in the message 'passwd: password updated successfully'. The terminal window has a standard Ubuntu-style top bar with 'Activities' and 'Terminal' menus, and a system status bar at the bottom with various icons.

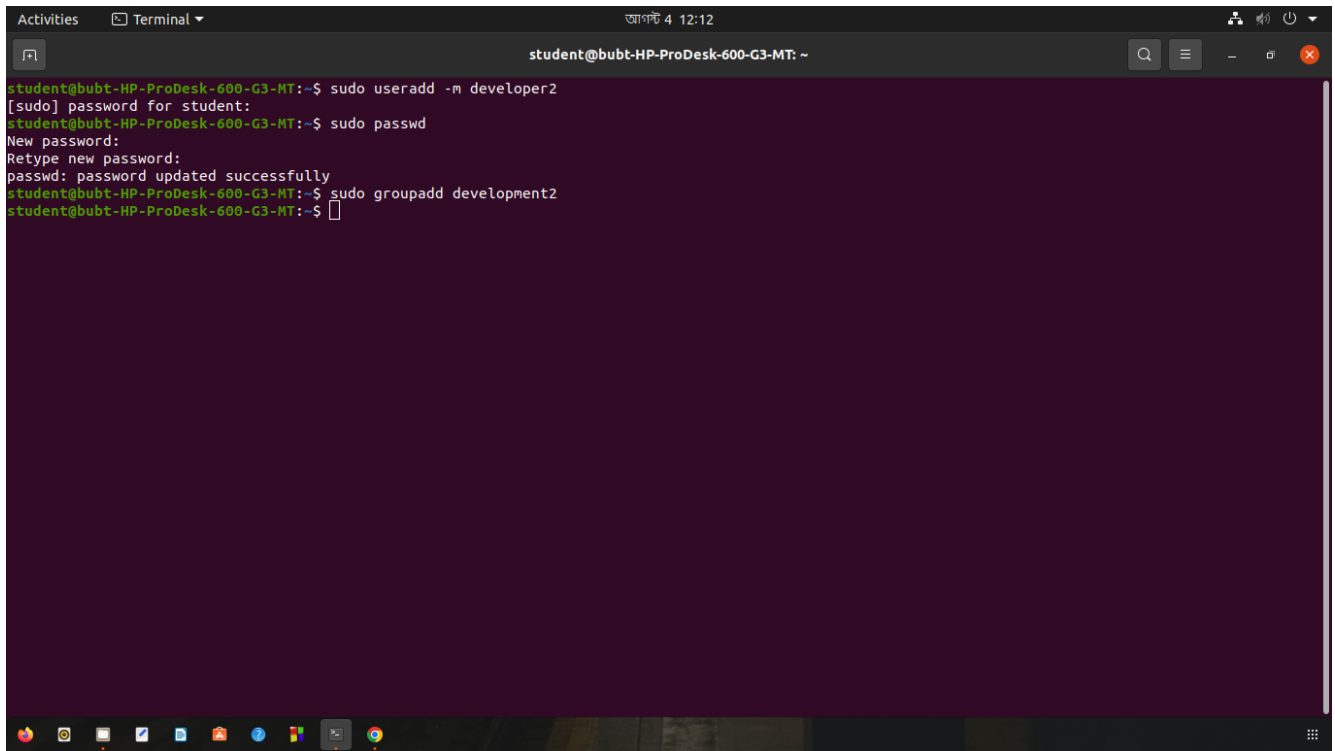
```
student@bubt-HP-ProDesk-600-G3-MT:~$ who
student  :1                2025-08-04 12:02 (:1)
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo useradd developer2
[sudo] password for student:
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
student@bubt-HP-ProDesk-600-G3-MT:~$
```

Figure 3: Set new password

2.0.3 Create a new group named development

Create a new group named development using the **groupadd** command.

sudo groupadd development2

A terminal window titled 'Terminal' with a dark background. The prompt is 'student@bubt-HP-ProDesk-600-G3-MT: ~'. The user enters 'sudo useradd -m developer2', followed by '[sudo] password for student:'. Then they enter 'sudo passwd', followed by 'New password:', 'Retype new password:', and 'passwd: password updated successfully'. Finally, they enter 'sudo groupadd development2' and the prompt returns to 'student@bubt-HP-ProDesk-600-G3-MT: ~'.

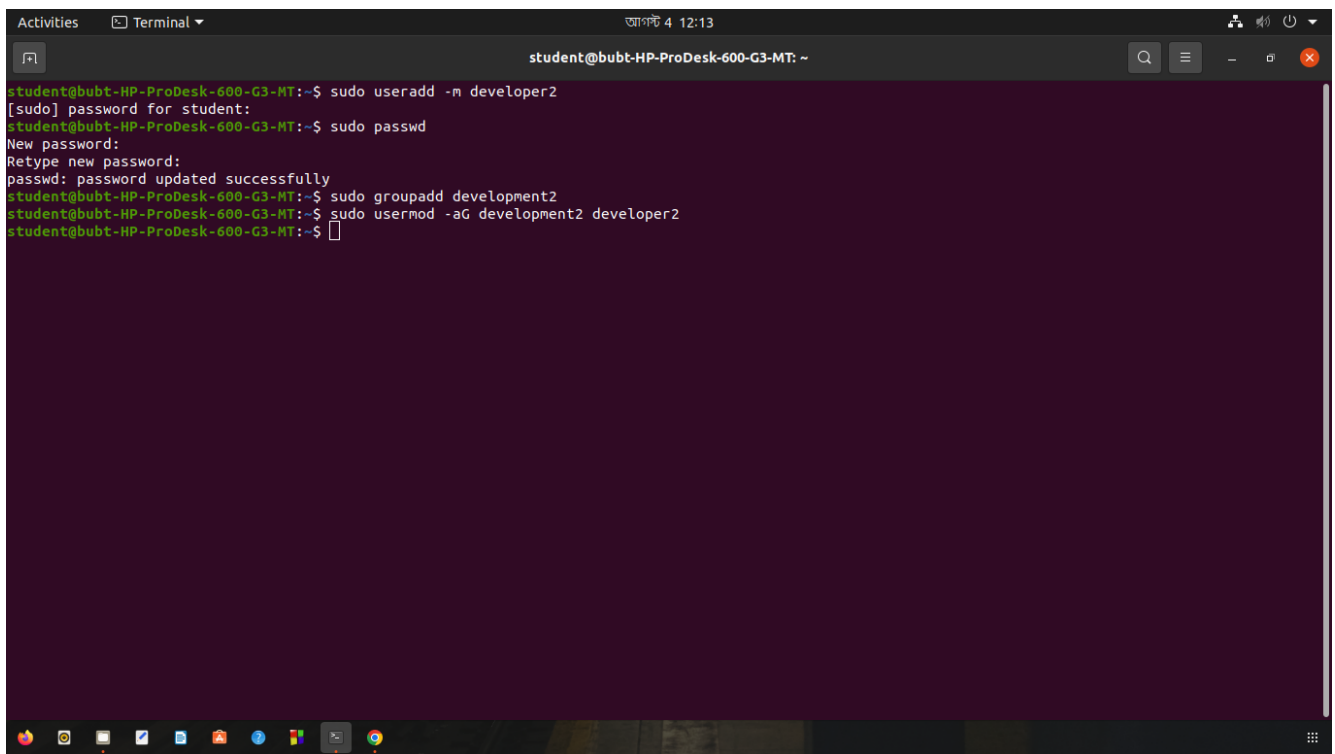
```
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo useradd -m developer2
[sudo] password for student:
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo groupadd development2
student@bubt-HP-ProDesk-600-G3-MT:~$
```

Figure 4: Creating a new group

2.0.4 Add the user developer2 to the development group

Add the user developer1 to the development group using the **usermod** command.

sudo usermod -aG development developer2

A terminal window titled 'Terminal' with a dark background. The prompt is 'student@bubt-HP-ProDesk-600-G3-MT: ~'. The user enters 'sudo useradd -m developer2', followed by '[sudo] password for student:'. Then they enter 'sudo passwd', followed by 'New password:', 'Retype new password:', and 'passwd: password updated successfully'. Next, they enter 'sudo groupadd development2'. Finally, they enter 'sudo usermod -aG development2 developer2'. The prompt returns to 'student@bubt-HP-ProDesk-600-G3-MT: ~'. The terminal window has a title bar with 'Activities', 'Terminal', and a clock showing 'আগস্ট 4 12:13'. The bottom of the window shows a taskbar with various application icons.

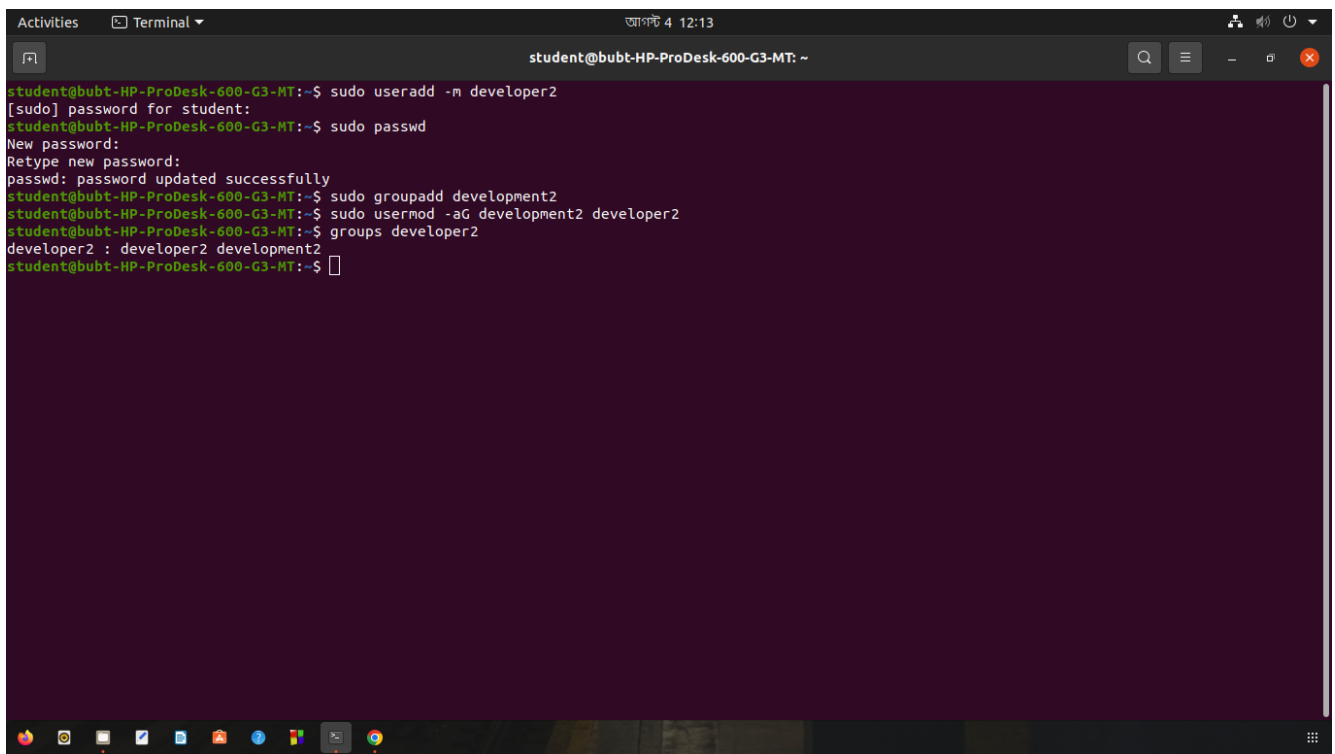
```
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo useradd -m developer2
[sudo] password for student:
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo groupadd development2
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo usermod -aG development2 developer2
student@bubt-HP-ProDesk-600-G3-MT:~$
```

Figure 5: Add the user developer2 to the development group

2.0.5 Check and display the group memberships of the user developer1

Check and display the group memberships of the user developer1 using the **groups** command.

groups developer2

A terminal window titled 'student@bubt-HP-ProDesk-600-G3-MT: ~' with a search bar and window controls. The terminal shows the following commands and output:

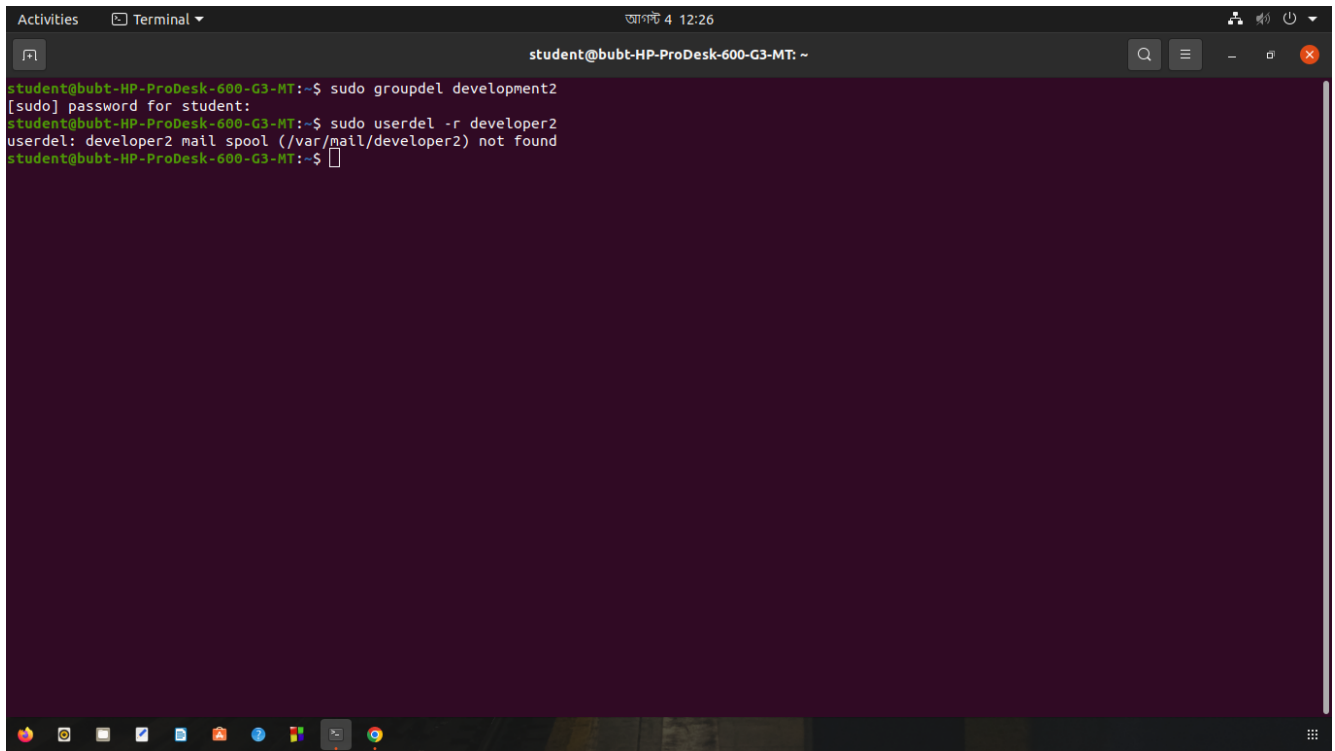
```
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo useradd -m developer2
[sudo] password for student:
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo groupadd development2
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo usermod -aG development2 developer2
student@bubt-HP-ProDesk-600-G3-MT:~$ groups developer2
developer2 : developer2 development2
student@bubt-HP-ProDesk-600-G3-MT:~$
```

Figure 6: display the group memberships

2.0.6 Deletion of created user

Delete the created user from the system

```
sudo groupdel development2
sudo userdel -r developer2
```


A terminal window titled 'Terminal' with a dark background. The prompt is 'student@bubt-HP-ProDesk-600-G3-MT: ~'. The user enters 'sudo groupdel development2'. The prompt changes to '[sudo] password for student:'. The user enters a password. The prompt returns to 'student@bubt-HP-ProDesk-600-G3-MT: ~'. The user enters 'sudo userdel -r developer2'. The prompt changes to 'userdel: developer2 mail spool (/var/mail/developer2) not found'. The user enters a blank line, and the prompt returns to 'student@bubt-HP-ProDesk-600-G3-MT: ~'.

```
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo groupdel development2
[sudo] password for student:
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo userdel -r developer2
userdel: developer2 mail spool (/var/mail/developer2) not found
student@bubt-HP-ProDesk-600-G3-MT:~$
```

Figure 7: Deletion of created user

3 File Permission Adjustment

3.0.1 Create a directory

Create a directory named `project_files` in the home directory of `developer1` using the `mkdir` command.

`sudo su - developer2`

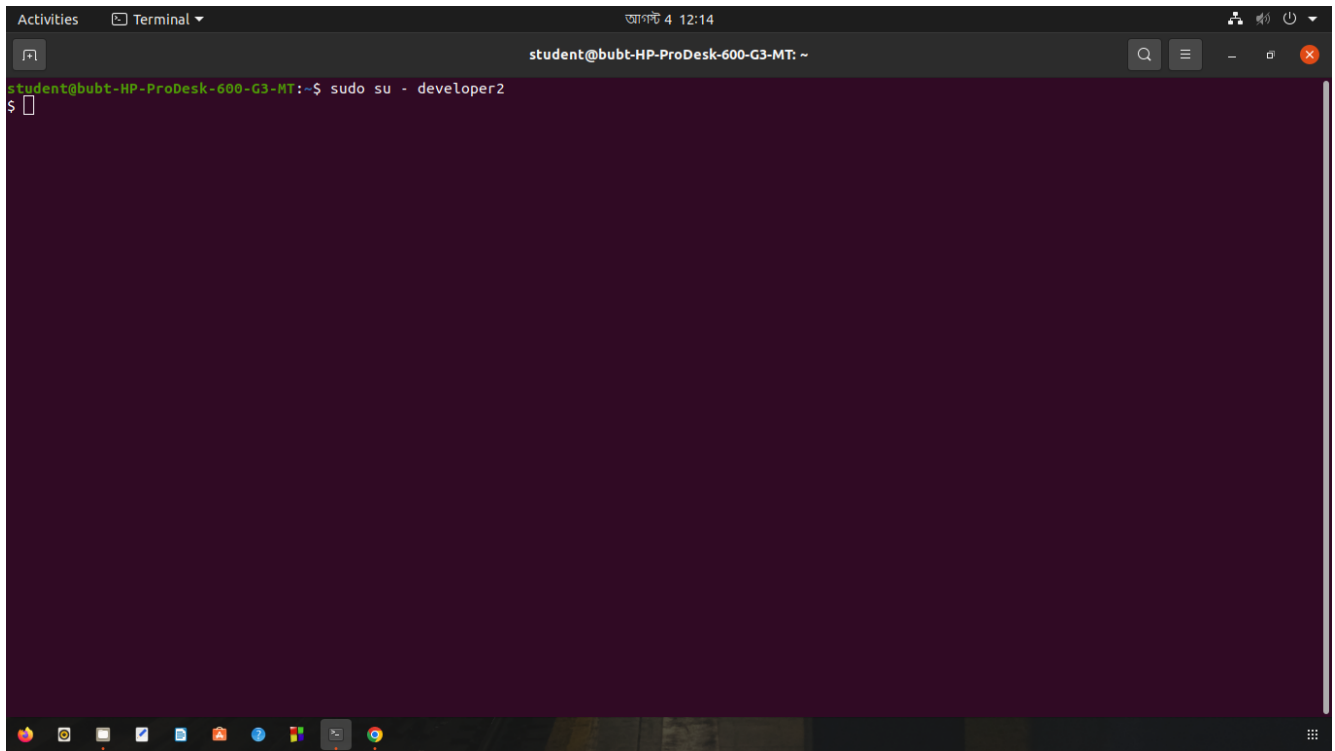


Figure 8: Logging into the developer2 account

who
whoami

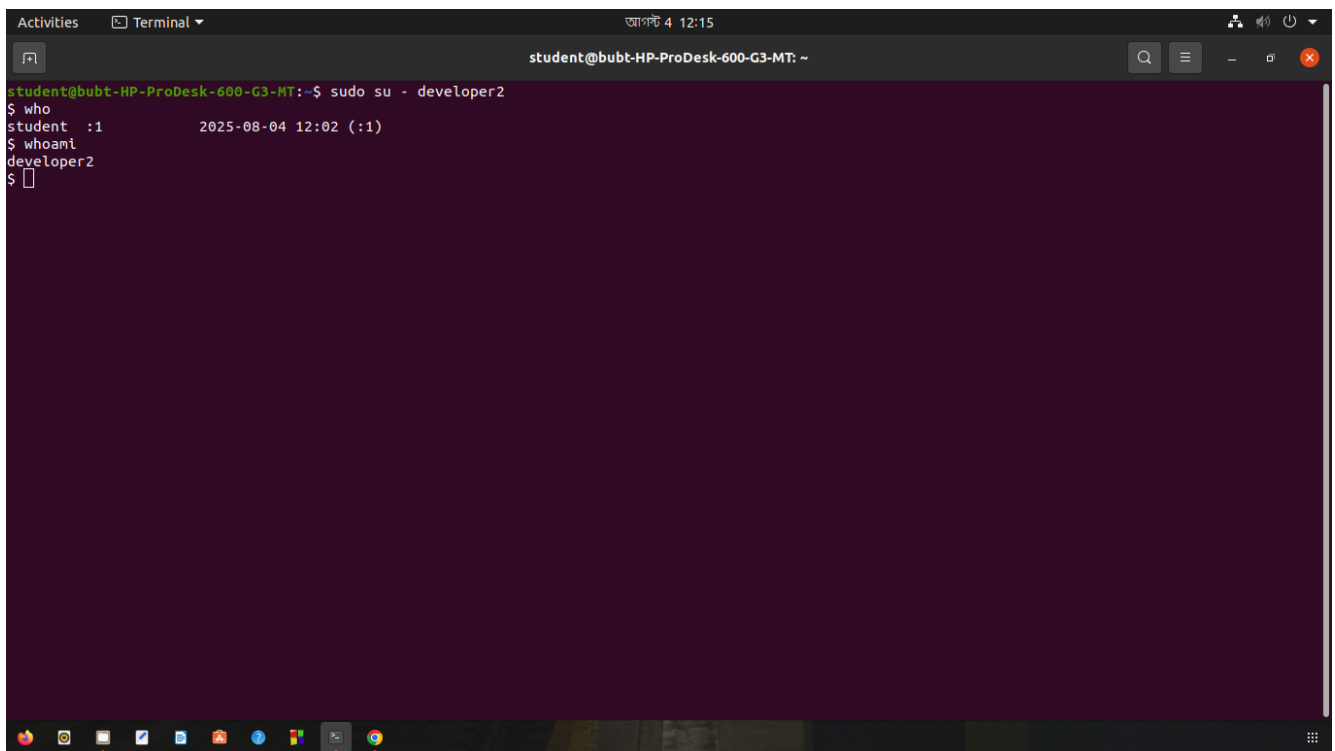
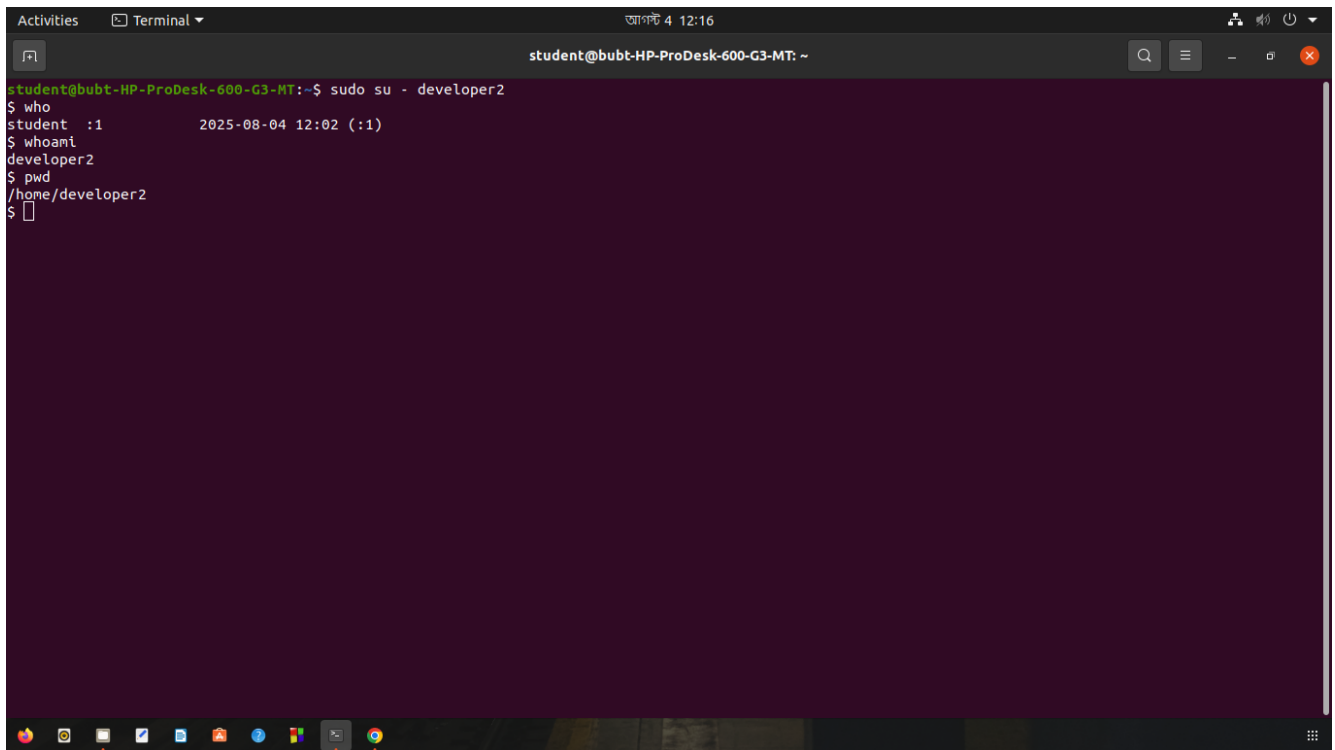


Figure 9: Verifying that we are in the correct working directory

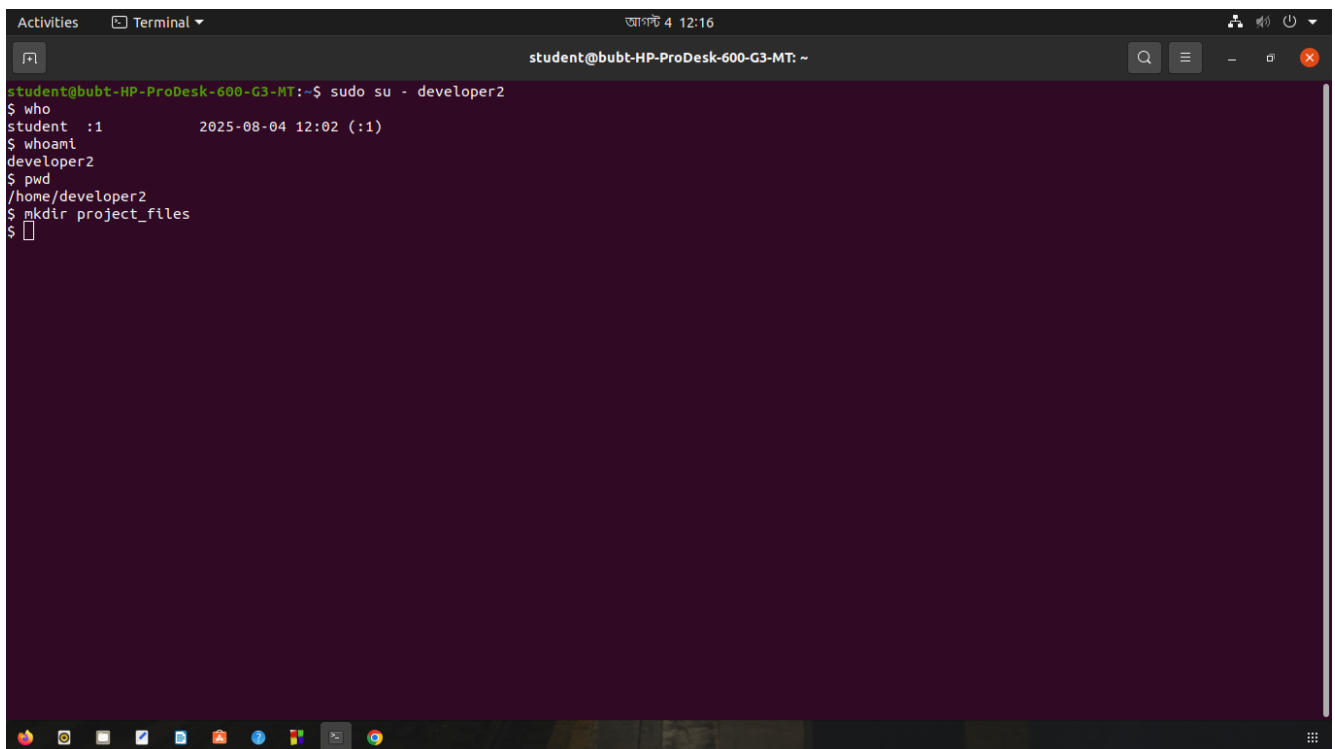
pwd

A terminal window titled 'Terminal' with a dark background. The prompt is 'student@bubt-HP-ProDesk-600-G3-MT: ~'. The user has entered 'sudo su - developer2'. The output shows the user is now 'developer2' with a shell of '/bin/bash'. The user then enters 'who', 'whoami', and 'pwd', which outputs 'student :1 2025-08-04 12:02 (:1)', 'developer2', and '/home/developer2' respectively. The prompt is now '\$' for the developer2 user.

```
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo su - developer2
$ who
student :1          2025-08-04 12:02 (:1)
$ whoami
developer2
$ pwd
/home/developer2
$
```

Figure 10: Verifying if we are logged in as developer2

`mkdir project_files`

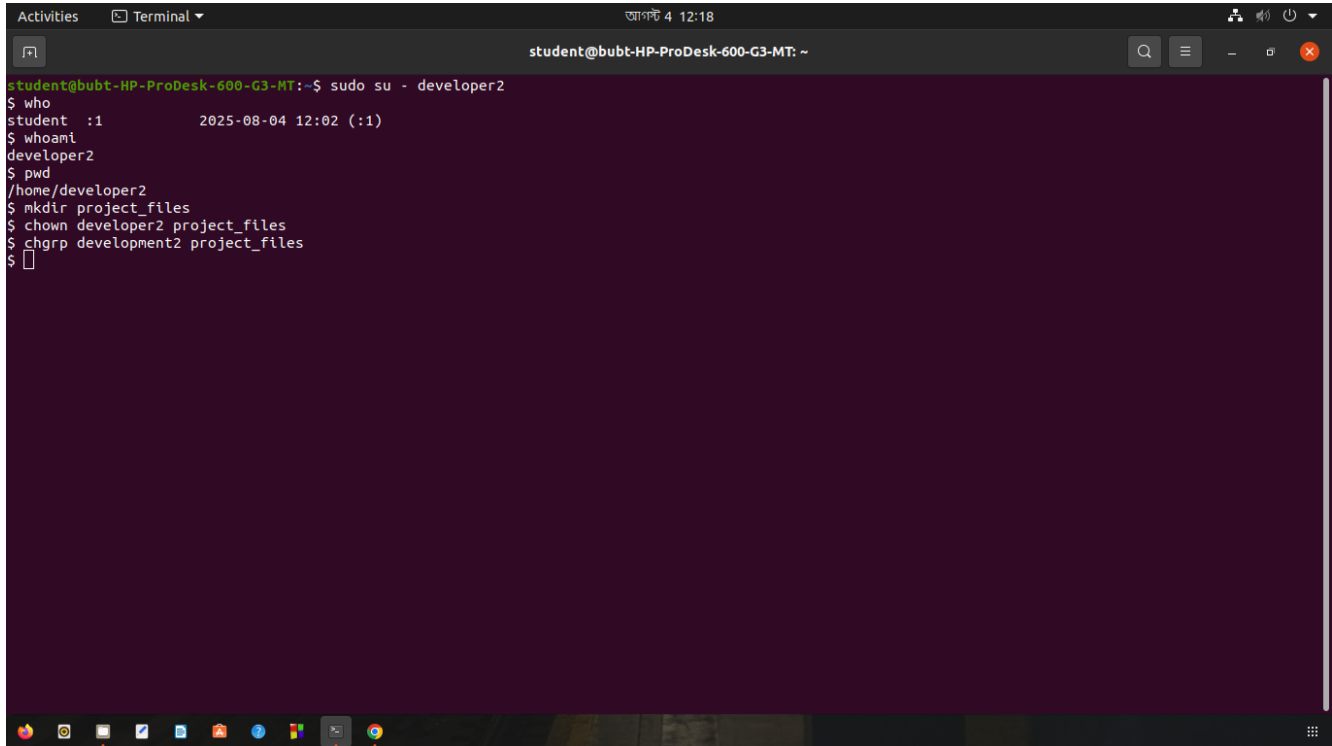
A terminal window titled 'Terminal' with a dark background. The prompt is 'student@bubt-HP-ProDesk-600-G3-MT: ~'. The user has entered 'sudo su - developer2'. The output shows the user is now 'developer2' with a shell of '/bin/bash'. The user then enters 'who', 'whoami', 'pwd', and 'mkdir project_files', which outputs 'student :1 2025-08-04 12:02 (:1)', 'developer2', '/home/developer2', and creates the directory 'project_files'. The prompt is now '\$' for the developer2 user.

```
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo su - developer2
$ who
student :1          2025-08-04 12:02 (:1)
$ whoami
developer2
$ pwd
/home/developer2
$ mkdir project_files
$
```

Figure 11: Creating the projectfiles directory

3.0.2 Change the Ownership

Change the ownership of the projectfiles directory to developer2 and the group to development2 using the chown and chgrp commands. `chown developer2 project_files`
`chgrp development2 project_files`

A terminal window titled 'student@bubt-HP-ProDesk-600-G3-MT: ~' with a dark purple background. The terminal shows the following commands and output:

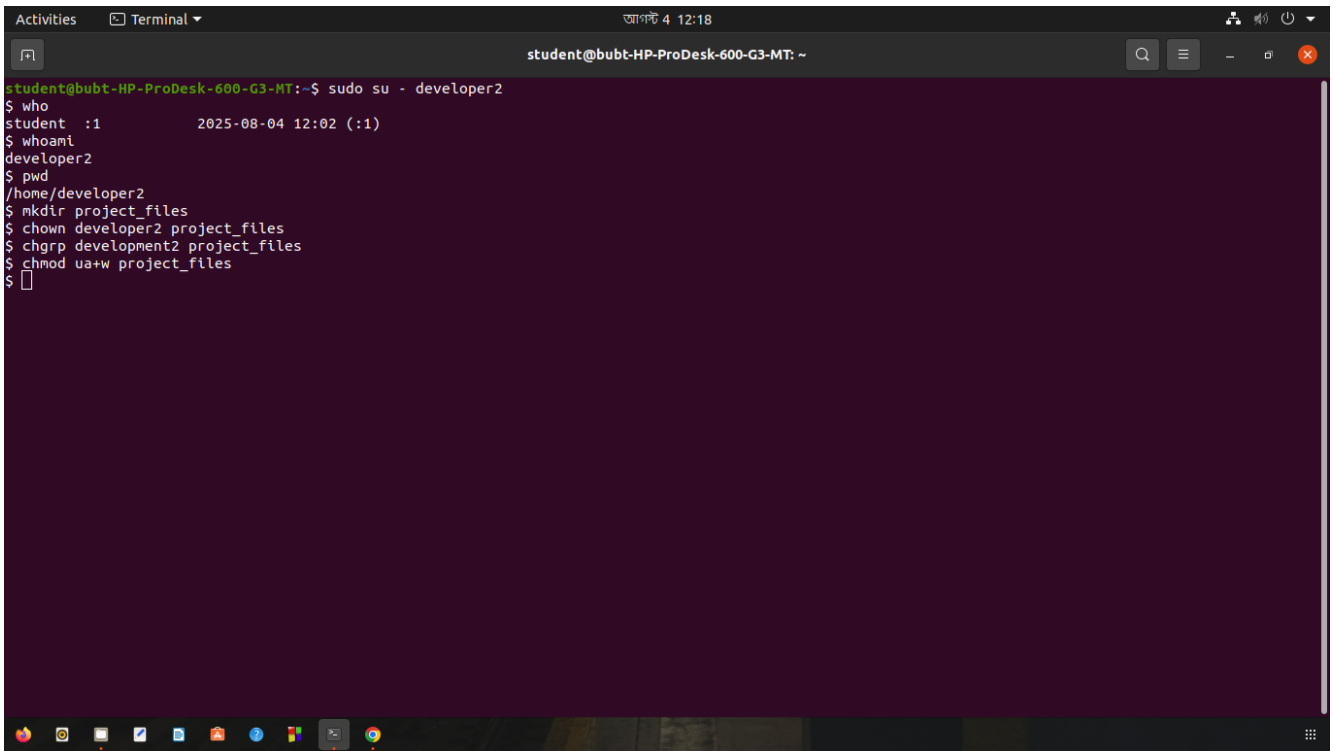
```
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo su - developer2
$ who
student  :1          2025-08-04 12:02 (:1)
$ whoami
developer2
$ pwd
/home/developer2
$ mkdir project_files
$ chown developer2 project_files
$ chgrp development2 project_files
$
```

Figure 12: Change the Ownership

3.0.3 Ensure Write Permissions Only to the Owner

Ensure that only the owner (developer2) has write permissions in the project_files directory.

`chmod u+w,go-w project_files`

A terminal window titled 'Terminal' with a dark background. The prompt is 'student@bubt-HP-ProDesk-600-G3-MT: ~'. The user has executed the following commands: 'sudo su - developer2', '\$ who', '\$ whoami', '\$ pwd', '\$ mkdir project_files', '\$ chown developer2 project_files', '\$ chgrp development2 project_files', and '\$ chmod ua+w project_files'. The output shows the user is now 'developer2' at the path '/home/developer2'.

```
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo su - developer2
$ who
student  :1          2025-08-04 12:02 (:1)
$ whoami
developer2
$ pwd
/home/developer2
$ mkdir project_files
$ chown developer2 project_files
$ chgrp development2 project_files
$ chmod ua+w project_files
$
```

Figure 13: Ensure write permissions for the owner only

4 Conclusion

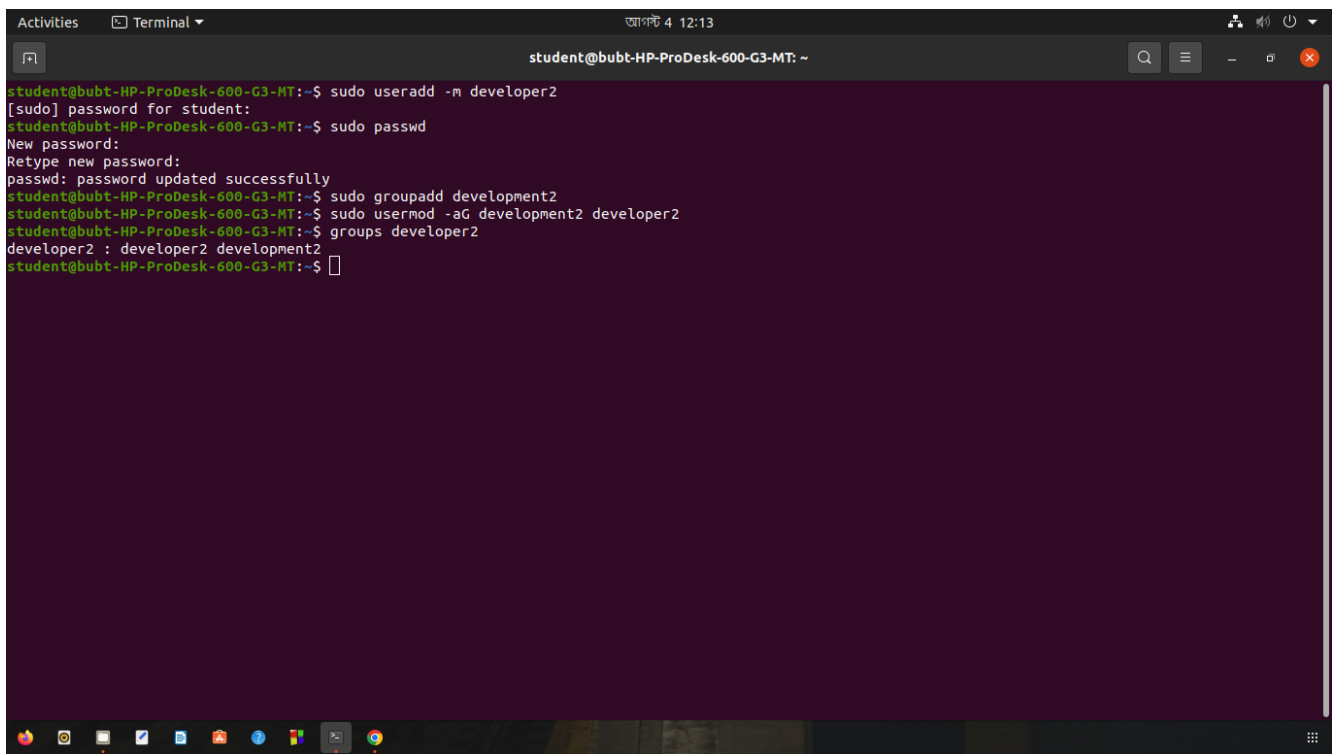
4.0.1 Summarize your troubleshooting findings and resolve

During the setup process, commands such as `useradd`, `groupadd`, and `usermod` required administrative access. To execute these commands, we used `sudo` along with the user's password to gain the necessary privileges.

```
sudo userdel developer2
sudo groupdel development2
```

4.0.2 Confirm that the new user `developer2` has been created

Confirm that the new user `developer2` has been successfully created, added to the `development2` group, and that file permissions are set correctly.

A terminal window titled 'student@bubt-HP-ProDesk-600-G3-MT: ~' with a search bar and window controls. The terminal shows the following commands and output:

```
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo useradd -m developer2
[sudo] password for student:
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo groupadd development2
student@bubt-HP-ProDesk-600-G3-MT:~$ sudo usermod -aG development2 developer2
student@bubt-HP-ProDesk-600-G3-MT:~$ groups developer2
developer2 : developer2 development2
student@bubt-HP-ProDesk-600-G3-MT:~$
```

Figure 14: Verification of the new user `developer2` and group membership

5 Additional Task

5.0.1 Concatenate `file1.txt` and `file2.txt` to make a `file3.txt`

Concatenate `file1.txt` and `file2.txt` to make a `file3.txt` with all the contents of `file1.txt` and `file2.txt`

```
touch file1.txt touch file2.txt
touch file2.txt
```

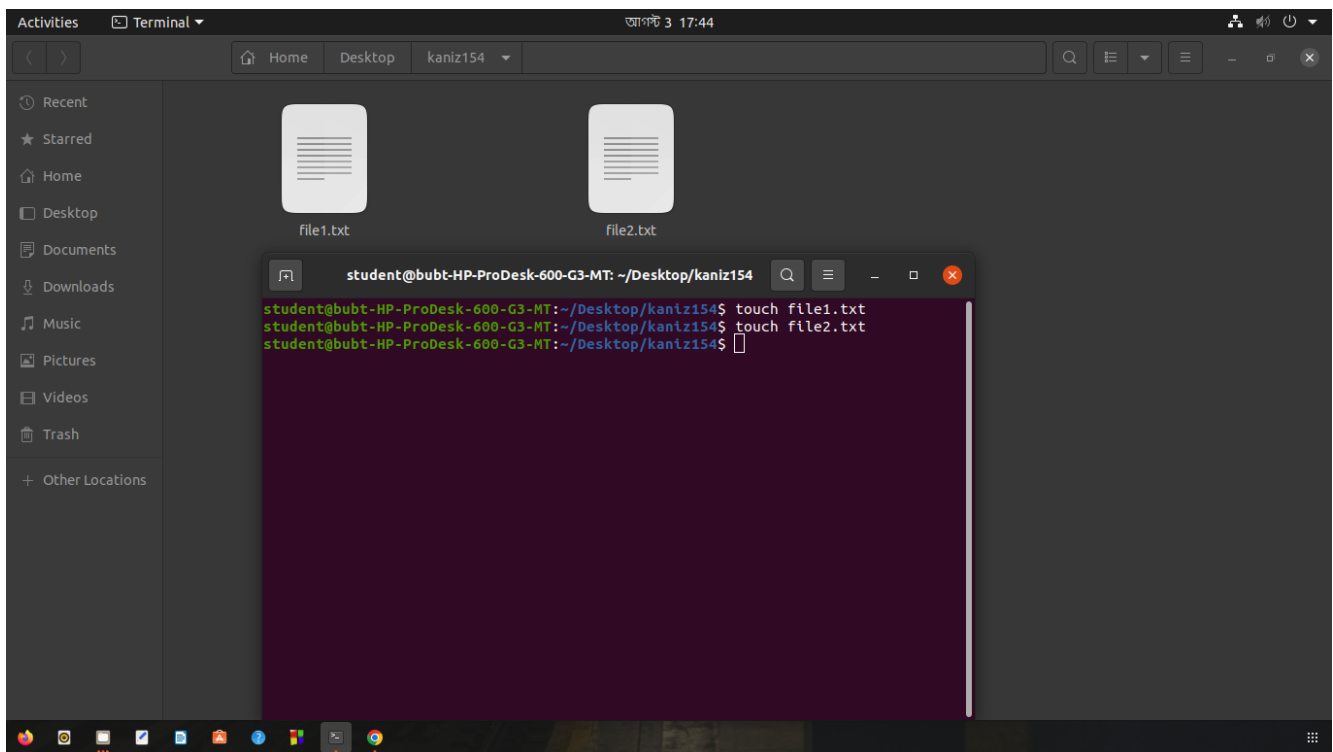


Figure 15: Create file1.txt and file2.txt

nano file1.tx
cat file1.txt

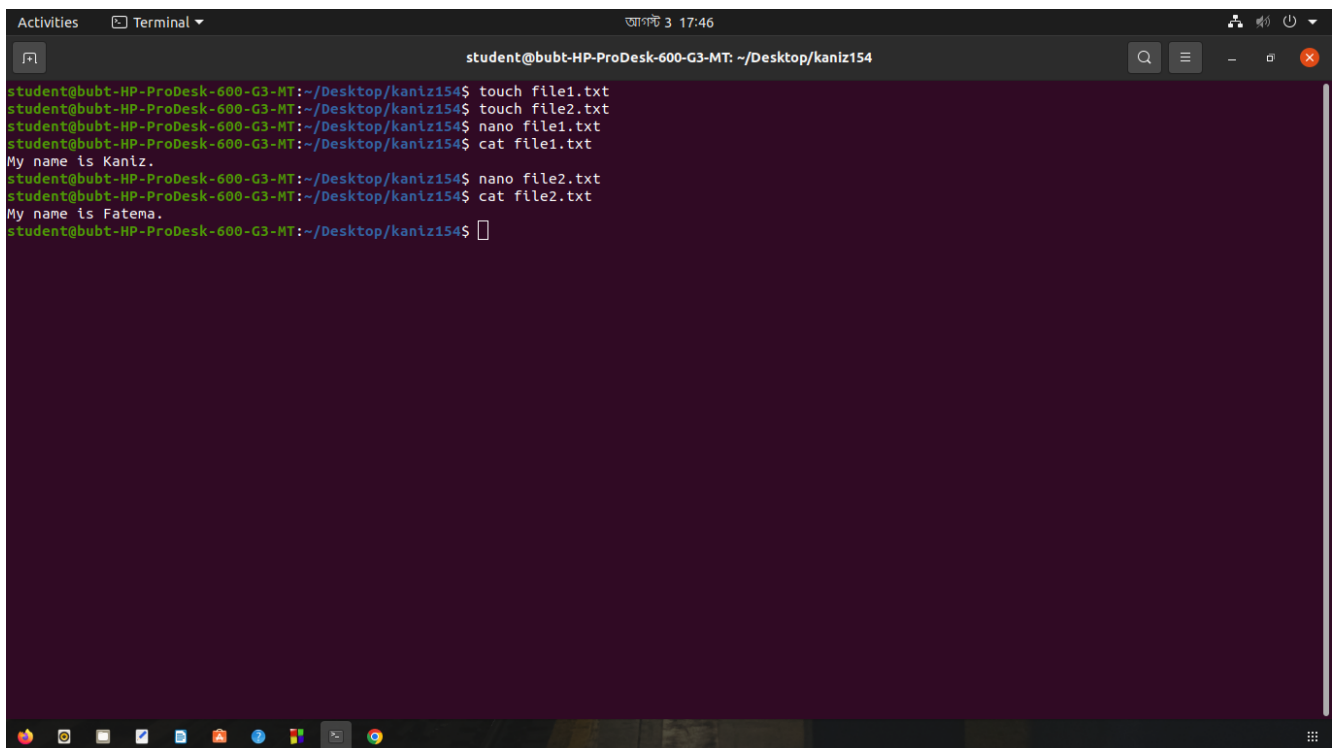
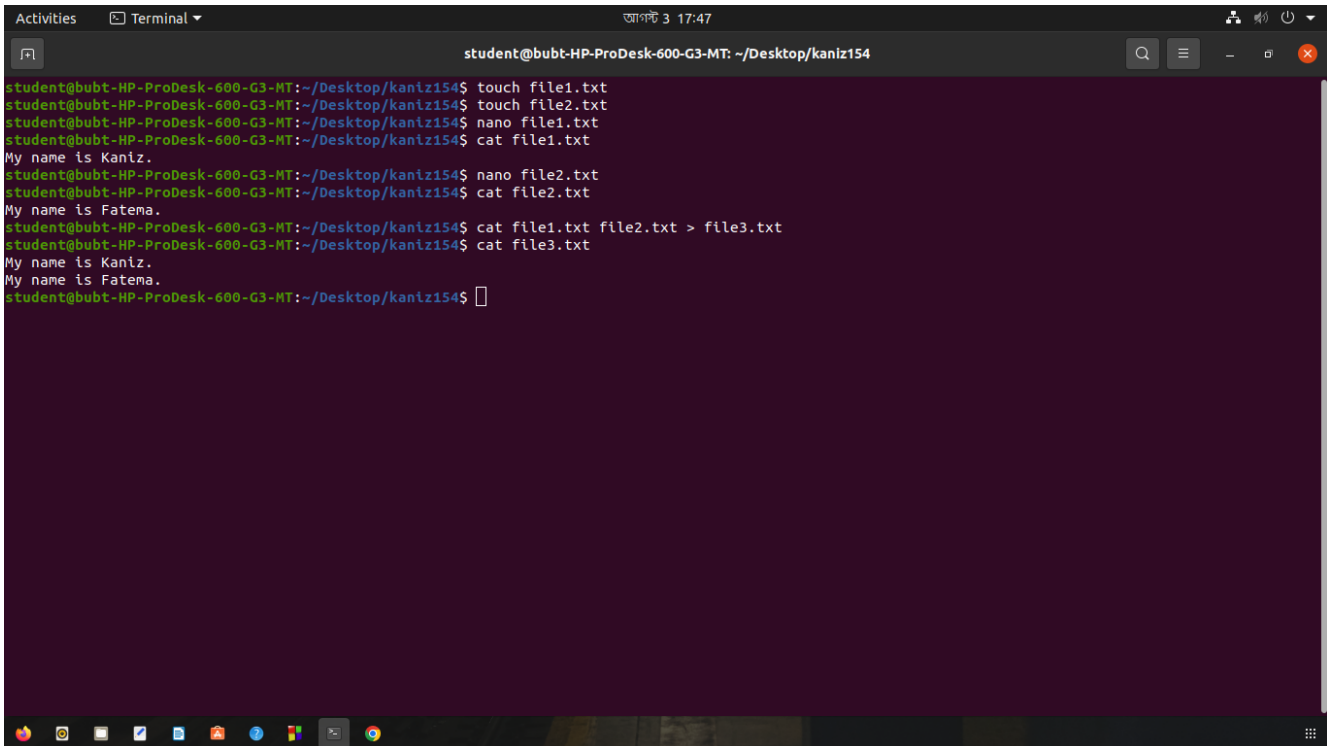


Figure 16: Write and show text file1.txt and file2.txt

```
cat file1.txt file2.txt > file3.txt
cat file3.txt
```

A screenshot of a Linux terminal window. The window title is "student@bubt-HP-ProDesk-600-G3-MT: ~/Desktop/kaniz154". The terminal shows a series of commands and their outputs. The user creates two files, file1.txt and file2.txt, using the 'touch' command. Then, they use 'nano' to edit file1.txt, adding the text "My name is Kaniz.". Next, they edit file2.txt, adding the text "My name is Fatema.". Finally, they use the 'cat' command to concatenate the contents of file1.txt and file2.txt into file3.txt, and then display the contents of file3.txt. The output shows the concatenated text: "My name is Kaniz. My name is Fatema.".

```
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$ touch file1.txt
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$ touch file2.txt
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$ nano file1.txt
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$ cat file1.txt
My name is Kaniz.
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$ nano file2.txt
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$ cat file2.txt
My name is Fatema.
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$ cat file1.txt file2.txt > file3.txt
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$ cat file3.txt
My name is Kaniz.
My name is Fatema.
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$
```

Figure 17: Concatenate file1.txt and file2.txt

5.0.2 Show all your running process list

To view all running processes on the system, use the command *ps aux*


```
Activities Terminal 3 17:52
student@bubt-HP-ProDesk-600-G3-MT: ~/Desktop/kaniz154

student 14065 0.0 0.0 11228 5356 pts/0 Ss 17:43 0:00 bash
root 14112 0.0 0.0 0 0 ? I 17:44 0:00 [kworker/1:1-events]
root 14113 0.0 0.0 0 0 ? I 17:44 0:00 [kworker/2:1-events]
root 14225 0.0 0.0 0 0 ? I 17:46 0:00 [kworker/3:0-events]
root 14226 0.0 0.0 0 0 ? I 17:46 0:00 [kworker/6:2-events]
root 14291 0.2 0.0 0 0 ? I 17:48 0:00 [kworker/5:2-events]
student 14302 0.0 0.0 11836 3400 pts/0 R+ 17:51 0:00 ps aux

student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$ ping google.com
PING google.com (142.250.194.14) 56(84) bytes of data.
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=1 ttl=114 time=34.7 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=2 ttl=114 time=34.6 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=3 ttl=114 time=34.7 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=4 ttl=114 time=34.6 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=5 ttl=114 time=34.6 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=6 ttl=114 time=34.5 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=7 ttl=114 time=34.8 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=8 ttl=114 time=34.6 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=9 ttl=114 time=34.6 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=10 ttl=114 time=34.5 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=11 ttl=114 time=34.5 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=12 ttl=114 time=34.5 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=13 ttl=114 time=34.6 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=14 ttl=114 time=34.7 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=15 ttl=114 time=34.7 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=16 ttl=114 time=34.9 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=17 ttl=114 time=34.6 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=18 ttl=114 time=34.5 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=19 ttl=114 time=34.6 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=20 ttl=114 time=34.5 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=21 ttl=114 time=34.7 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=22 ttl=114 time=34.4 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=23 ttl=114 time=34.6 ms
64 bytes from del12s01-in-f14.1e100.net (142.250.194.14): icmp_seq=24 ttl=114 time=34.6 ms
^Z
[1]+  Stopped                  ping google.com
student@bubt-HP-ProDesk-600-G3-MT:~/Desktop/kaniz154$
```

Figure 19: Show all running process list

5.0.4 File Zip and Unzip

To create a compressed archive (tarball) using gzip compression, use the following command

```
tar -czvf archive.tar.gz *
```

- **-c**: create a new archive
- **-z**: filter the archive through gzip
- **-v**: verbose mode, shows progress in the terminal
- **-f**: specifies the filename of the archive

To extract the contents of the compressed archive, use:

```
tar -xzvf archive.tar.gz
```

- **-x**: extract files from the archive
- Other flags (**-zvf**) are the same as above

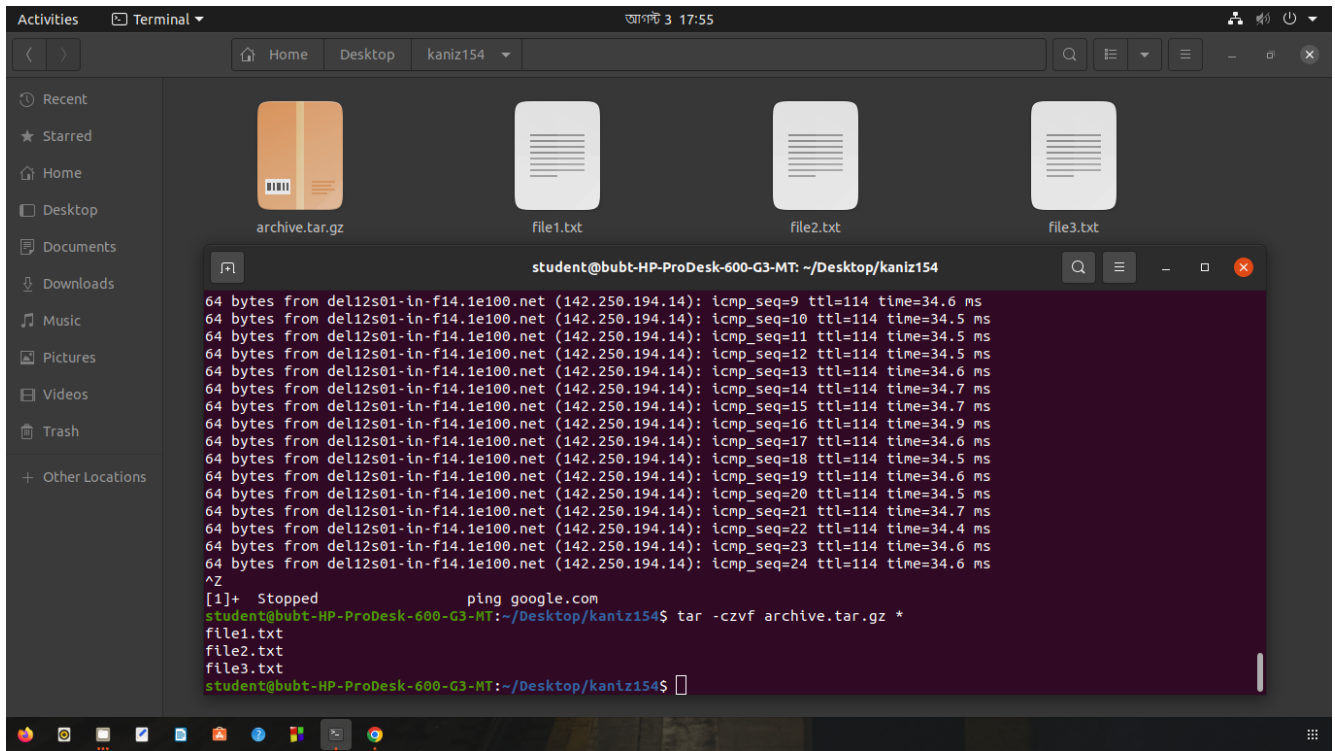


Figure 20: File Zip and Unzip

1 2

¹Kaniz Fatema

²ID: 20245103154