



LAB REPORT

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SUBMITTED TO

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PROGRAM : B.Sc. Engg. in CSE

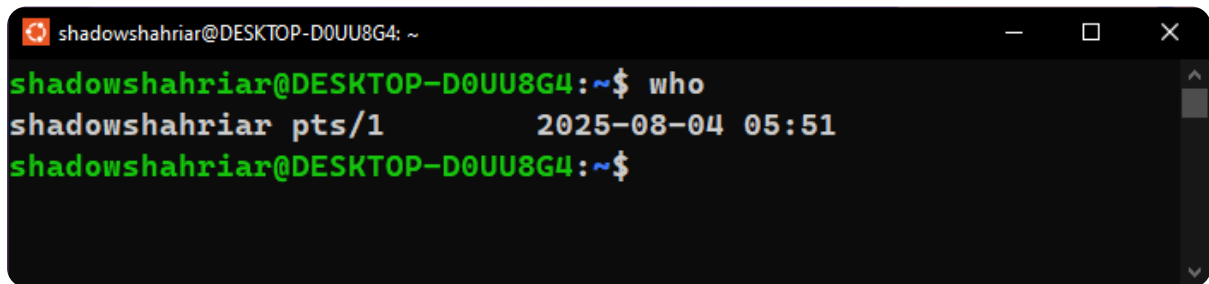
Operating Systems Lab

1. Troubleshooting

Task 1.1: Use the `who` command to identify the currently logged-in users on the system.

Solution:

```
who
```

A terminal window with a black background and green text. The title bar shows 'shadowshahriar@DESKTOP-D0UU8G4: ~'. The prompt is 'shadowshahriar@DESKTOP-D0UU8G4:~\$'. The command 'who' has been entered. The output is 'shadowshahriar pts/1 2025-08-04 05:51'. The prompt is now 'shadowshahriar@DESKTOP-D0UU8G4:~\$'.

```
shadowshahriar@DESKTOP-D0UU8G4: ~  
shadowshahriar@DESKTOP-D0UU8G4:~$ who  
shadowshahriar pts/1          2025-08-04 05:51  
shadowshahriar@DESKTOP-D0UU8G4:~$
```

Figure - 1.1. Task 1.1

2. User Management

Task 2.1: Create a new user named **developer1** using the `useradd` command.

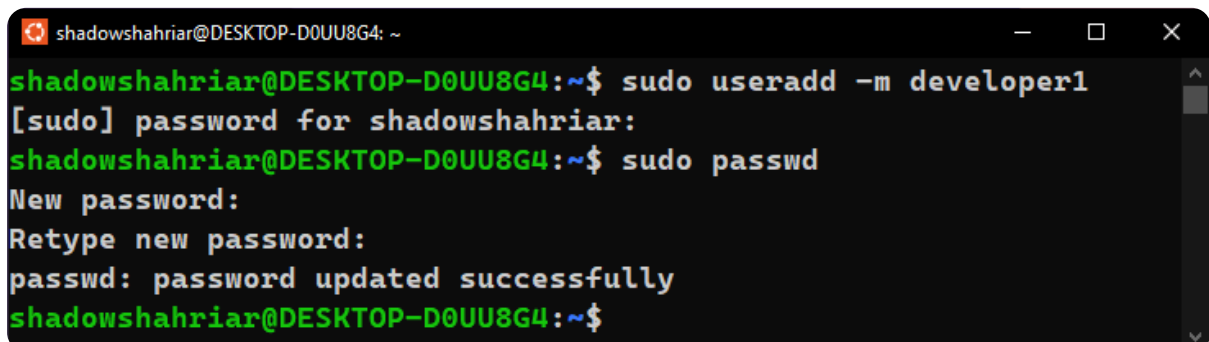
[Solution:](#)

```
sudo useradd -m developer1
```

Task 2.2: Set a password for the newly created user using the `passwd` command.

[Solution:](#)

```
sudo passwd
```

A terminal window screenshot showing the execution of two commands. The first command is 'sudo useradd -m developer1', which prompts for a password for the user 'shadowshahriar'. The second command is 'sudo passwd', which prompts for a new password and its retype, followed by a confirmation message 'passwd: password updated successfully'. The terminal title bar shows 'shadowshahriar@DESKTOP-D0UU8G4: ~' and standard window controls.

```
shadowshahriar@DESKTOP-D0UU8G4: ~  
shadowshahriar@DESKTOP-D0UU8G4:~$ sudo useradd -m developer1  
[sudo] password for shadowshahriar:  
shadowshahriar@DESKTOP-D0UU8G4:~$ sudo passwd  
New password:  
Retype new password:  
passwd: password updated successfully  
shadowshahriar@DESKTOP-D0UU8G4:~$
```

Figure - 1.2. Task 2.1 and 2.2

Task 2.3: Create a new group named **development** using the `groupadd` command.

[Solution:](#)

```
sudo groupadd development
```

Task 2.4: Add the user **developer1** to the **development** group using the `usermod` command.

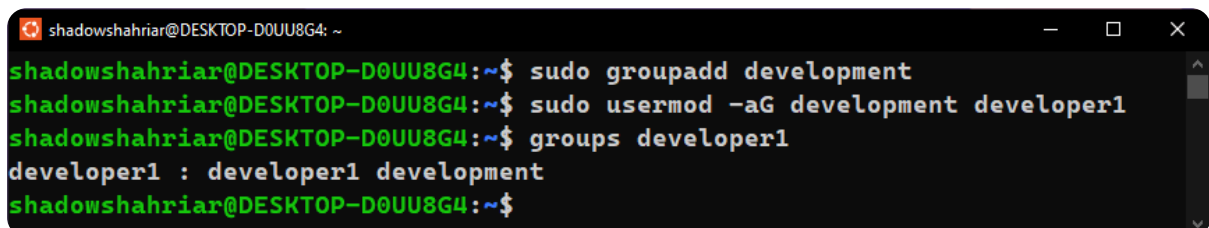
Solution:

```
sudo usermod -aG development developer1
```

Task 2.5: Check and display the group memberships of the user **developer1** using the `groups` command.

Solution:

```
groups developer1
```



```
shadowshahriar@DESKTOP-D0UU8G4: ~  
shadowshahriar@DESKTOP-D0UU8G4:~$ sudo groupadd development  
shadowshahriar@DESKTOP-D0UU8G4:~$ sudo usermod -aG development developer1  
shadowshahriar@DESKTOP-D0UU8G4:~$ groups developer1  
developer1 : developer1 development  
shadowshahriar@DESKTOP-D0UU8G4:~$
```

Figure - 1.3. Task 2.3-2.5

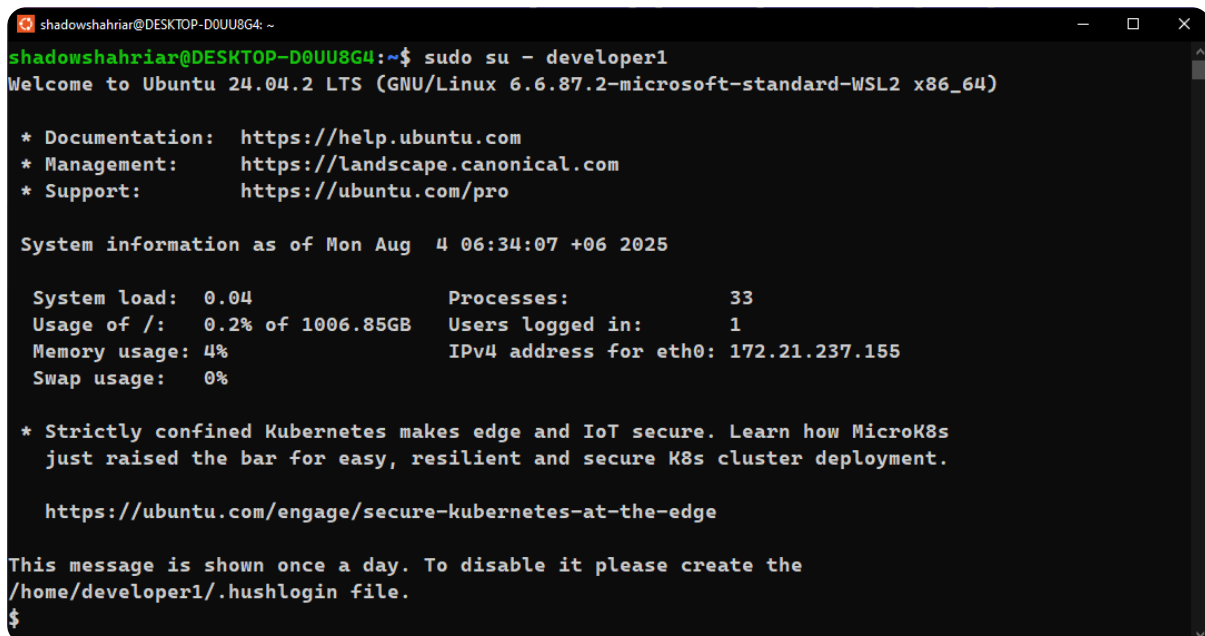
3. File Permission Adjustment

Task 3.1: Create a directory named **project_files** in the home directory of **developer1** using the `mkdir` command.

Solution:

Logging into the **developer1** account:

```
sudo su - developer1
```



```
shadowshahriar@DESKTOP-D0UU8G4: ~$ sudo su - developer1
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.6.87.2-microsoft-standard-WSL2 x86_64)

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

System information as of Mon Aug  4 06:34:07 +06 2025

System load:  0.04               Processes:            33
Usage of /:   0.2% of 1006.85GB   Users logged in:     1
Memory usage: 4%                IPv4 address for eth0: 172.21.237.155
Swap usage:   0%

 * 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/developer1/.hushlogin file.
$
```

Figure - 1.4. Logging into the newly created account

Verifying that we are logged in as **developer1**:

```
who
whoami
```

```
shadowshahriar@DESKTOP-D0UU8G4: ~  
$ who  
shadowshahriar pts/1          2025-08-04 06:32  
shadowshahriar pts/2          2025-08-04 06:34  
$ whoami  
developer1  
$
```

Figure - 1.5. Verifying that we are logged in

Verifying that we are in the correct working directory:

```
pwd
```

```
shadowshahriar@DESKTOP-D0UU8G4: ~  
$ pwd  
/home/developer1  
$
```

Figure - 1.6. Verifying the present working directory

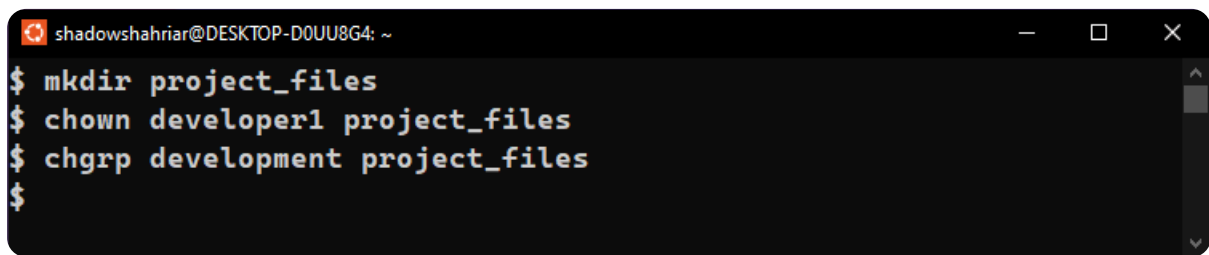
Creating the **project_files** directory:

```
mkdir project_files
```

Task 3.2: Change the ownership of the **project_files** directory to **developer1** and the group to **development** using the `chown` and `chgrp` commands.

Solution:

```
chown developer1 project_files  
chgrp development project_files
```



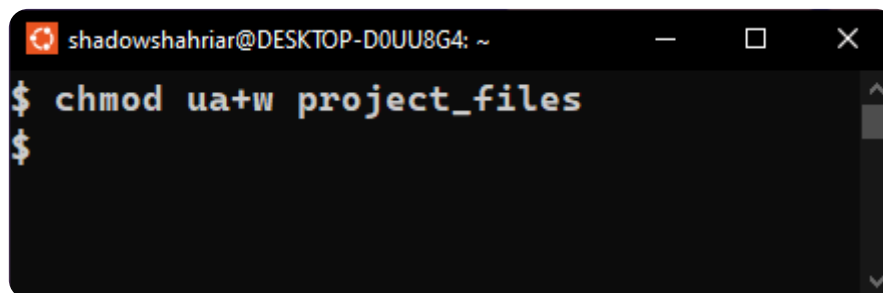
```
shadowshahriar@DESKTOP-D0UU8G4: ~  
$ mkdir project_files  
$ chown developer1 project_files  
$ chgrp development project_files  
$
```

Figure - 1.7. Task 3.1 and 3.2

Task 3.3: Ensure that only the owner (**developer1**) has write permissions in the **project_files** directory.

Solution:

```
chmod ua+w project_files
```



```
shadowshahriar@DESKTOP-D0UU8G4: ~  
$ chmod ua+w project_files  
$
```

Figure - 1.8. Task 3.3

4. Additional Tasks

Task 4.1: Concatenate **file1.txt** and **file2.txt** to make a **file3.txt** with all the contents of **file1.txt** and **file2.txt**.

Solution:

Creating a subdirectory named **shahriar408** in the **home directory** and navigating into it:

```
mkdir shahriar408  
cd shahriar408
```

Creating two new files:

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

Adding contents to the newly created files using **nano** :

```
nano file1.txt  
nano file2.txt
```

Verifying the contents of **file1.txt** and **file2.txt**:

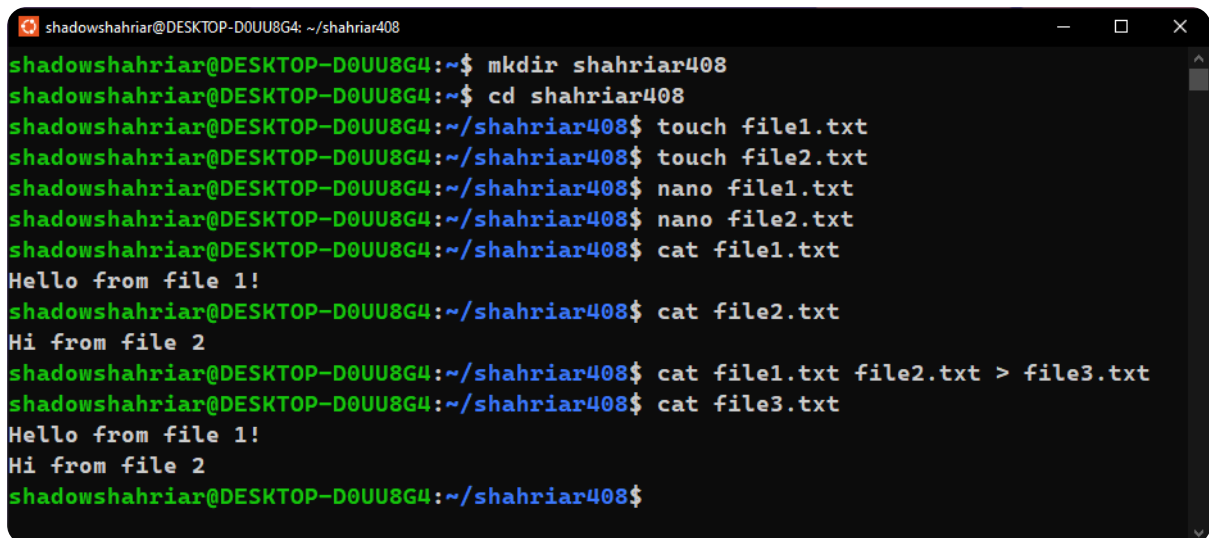
```
cat file1.txt  
cat file2.txt
```

Concatenate the contents of these two files into **file3.txt**:


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

Verifying the contents of **file3.txt**:

```
cat file3.txt
```

A terminal window with a dark background and light green text. The window title is 'shadowshahriar@DESKTOP-D0UU8G4: ~/shahriar408'. The terminal shows a series of commands and their outputs: 'mkdir shahriar408' is executed; 'cd shahriar408' changes the directory; 'touch file1.txt' and 'touch file2.txt' create two files; 'nano file1.txt' and 'nano file2.txt' are used to edit the files, with 'Hello from file 1!' and 'Hi from file 2' being entered; 'cat file1.txt' outputs 'Hello from file 1!'; 'cat file2.txt' outputs 'Hi from file 2'; 'cat file1.txt file2.txt > file3.txt' concatenates the contents of file1.txt and file2.txt into file3.txt; and finally 'cat file3.txt' outputs both 'Hello from file 1!' and 'Hi from file 2' on separate lines.

```
shadowshahriar@DESKTOP-D0UU8G4:~$ mkdir shahriar408
shadowshahriar@DESKTOP-D0UU8G4:~$ cd shahriar408
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ touch file1.txt
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ touch file2.txt
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ nano file1.txt
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ nano file2.txt
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ cat file1.txt
Hello from file 1!
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ cat file2.txt
Hi from file 2
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ cat file1.txt file2.txt > file3.txt
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ cat file3.txt
Hello from file 1!
Hi from file 2
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$
```

Figure - 1.9. Task 4.1

Task 4.2: Show the list of all running processes.

Solution:

```
ps aux
```

```
shadowshahriar@DESKTOP-D0UU8G4: ~/shahriar408
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ ps aux
USER          PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.1  21664 12256 ?        Ss   07:17   0:00 /sbin/init
root           2  0.0  0.0   3060  1920 ?        Sl   07:17   0:00 /init
root           7  0.0  0.0   3100  1884 ?        Sl   07:17   0:00 plan9 --control-socket 7 --log-level 4
root          53  0.0  0.2  83212 16848 ?        S<s  07:17   0:00 /usr/lib/systemd/systemd-journald
root          99  0.0  0.0   24996  6016 ?        Ss   07:17   0:00 /usr/lib/systemd/systemd-udev
systemd+     115  0.0  0.1  21452 12544 ?        Ss   07:17   0:00 /usr/lib/systemd/systemd-resolved
systemd+     116  0.0  0.0   91020  7552 ?        Ssl  07:17   0:00 /usr/lib/systemd/systemd-timesyncd
root        174  0.0  0.0   4236  2432 ?        Ss   07:17   0:00 /usr/sbin/cron -f -p
message+    175  0.0  0.0   9624  4864 ?        Ss   07:17   0:00 @dbus-daemon --system --address=systemd
root        182  0.0  0.1  17956  8448 ?        Ss   07:17   0:00 /usr/lib/systemd/systemd-logind
root        184  0.0  0.1 1756096 12032 ?        Ssl  07:17   0:00 /usr/libexec/wsl-pro-service -vv
root        190  0.0  0.0   3160  1920 hvc0     Ss+  07:17   0:00 /sbin/agetty -o -p -- \u --noclear --ke
syslog      204  0.0  0.0  222508  5376 ?        Ssl  07:17   0:00 /usr/sbin/rsyslogd -n -iNONE
root        207  0.0  0.0   3116  1792 tty1     Ss+  07:17   0:00 /sbin/agetty -o -p -- \u --noclear - li
root        213  0.0  0.2 106996 22400 ?        Ssl  07:17   0:00 /usr/bin/python3 /usr/share/unattended-
root        300  0.0  0.0   3064   896 ?        Ss   07:17   0:00 /init
root        301  0.0  0.0   3080  1152 ?        S    07:17   0:00 /init
shadowshahriar+ 302  0.0  0.0   6072  4992 pts/0    Ss   07:17   0:00 -bash
root        303  0.0  0.0   6660  4480 pts/1    Ss   07:17   0:00 /bin/login -f
shadowshahriar+ 354  0.0  0.1  20296 11264 ?        Ss   07:17   0:00 /usr/lib/systemd/systemd --user
shadowshahriar+ 355  0.0  0.0  21152  3520 ?        S    07:17   0:00 (sd-pam)
shadowshahriar+ 363  0.0  0.0   6072  4992 pts/1    S+   07:17   0:00 -bash
shadowshahriar+ 416  0.0  0.0   8280  4096 pts/0    R+   07:27   0:00 ps aux
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$
```

Figure - 1.10. Task 4.2

Task 4.3: Ping google.com.

Solution:

```
ping google.com
```

```
shadowshahriar@DESKTOP-D0UU8G4: ~/shahriar408
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ ping google.com
PING google.com (142.251.221.174) 56(84) bytes of data:
64 bytes from pnmaaa-au-in-f14.1e100.net (142.251.221.174): icmp_seq=1 ttl=114 time=25.8 ms
64 bytes from pnmaaa-au-in-f14.1e100.net (142.251.221.174): icmp_seq=2 ttl=114 time=25.0 ms
64 bytes from pnmaaa-au-in-f14.1e100.net (142.251.221.174): icmp_seq=3 ttl=114 time=25.1 ms
64 bytes from pnmaaa-au-in-f14.1e100.net (142.251.221.174): icmp_seq=4 ttl=114 time=25.2 ms
64 bytes from pnmaaa-au-in-f14.1e100.net (142.251.221.174): icmp_seq=5 ttl=114 time=25.0 ms
64 bytes from pnmaaa-au-in-f14.1e100.net (142.251.221.174): icmp_seq=6 ttl=114 time=25.9 ms
64 bytes from pnmaaa-au-in-f14.1e100.net (142.251.221.174): icmp_seq=7 ttl=114 time=26.0 ms
^Z
[1]+  Stopped                  ping google.com
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$
```

Figure - 1.11. Task 4.3

Task 4.4: Create an archive of the created folder.

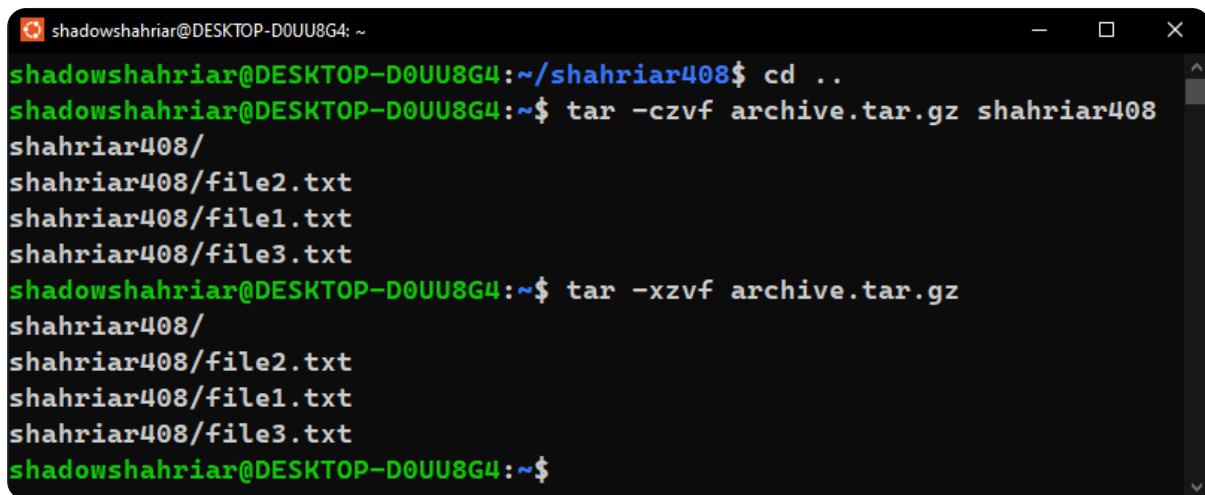
Solution:

```
tar -czvf archive.tar.gz shahriar408
```

Task 4.5: Decompress the archived folder.

Solution:

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



```
shadowshahriar@DESKTOP-D0UU8G4: ~  
shadowshahriar@DESKTOP-D0UU8G4:~/shahriar408$ cd ..  
shadowshahriar@DESKTOP-D0UU8G4:~$ tar -czvf archive.tar.gz shahriar408  
shahriar408/  
shahriar408/file2.txt  
shahriar408/file1.txt  
shahriar408/file3.txt  
shadowshahriar@DESKTOP-D0UU8G4:~$ tar -xzvf archive.tar.gz  
shahriar408/  
shahriar408/file2.txt  
shahriar408/file1.txt  
shahriar408/file3.txt  
shadowshahriar@DESKTOP-D0UU8G4:~$
```

Figure - 1.12. Task 4.4 and 4.5

5. Conclusion

Task 5.1: Summarize your troubleshooting findings and the actions taken to resolve any issues.

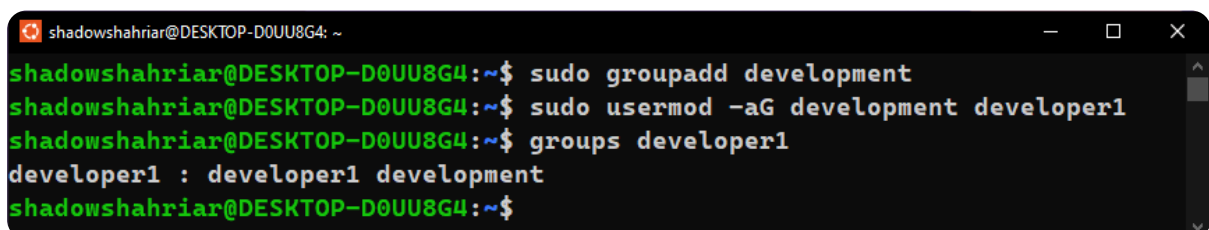
Solution:

Some of the low-level commands like `useradd`, `groupadd`, `usermod` required administrative permissions. Therefore, we had to use the `sudo` command and enter the password of the user account. We can delete the newly created user and group using the following commands:

```
sudo groupdel development
sudo userdel -r developer1
```

Task 5.2: Confirm that the new user `developer1` has been successfully created, added to the `development` group, and that file permissions are set correctly.

Solution:

A terminal window with a black background and green text. The window title is 'shadowshahriar@DESKTOP-D0UU8G4: ~'. The terminal shows the following commands and output:

```
shadowshahriar@DESKTOP-D0UU8G4:~$ sudo groupadd development
shadowshahriar@DESKTOP-D0UU8G4:~$ sudo usermod -aG development developer1
shadowshahriar@DESKTOP-D0UU8G4:~$ groups developer1
developer1 : developer1 development
shadowshahriar@DESKTOP-D0UU8G4:~$
```

Figure - 1.13. Task 5.2