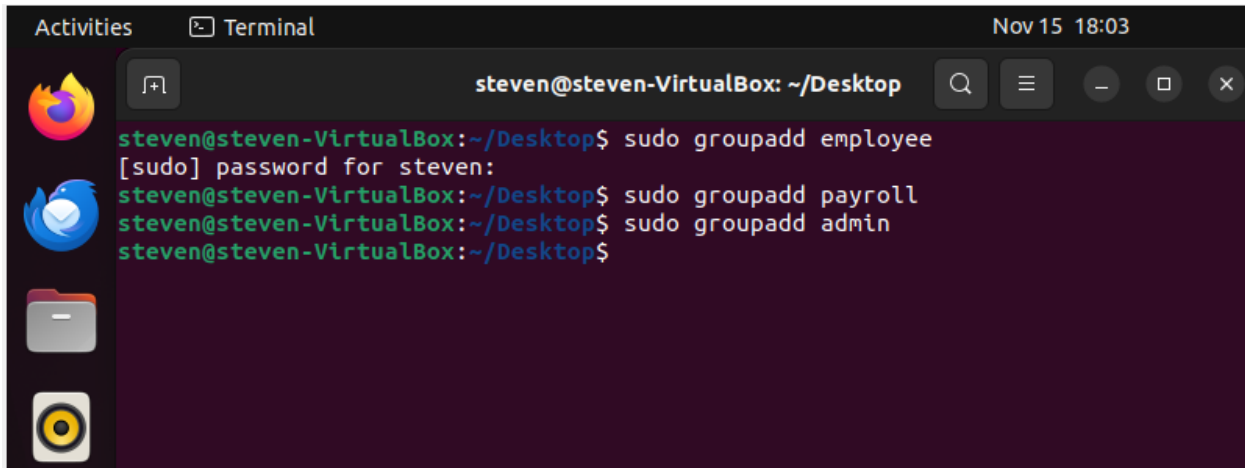
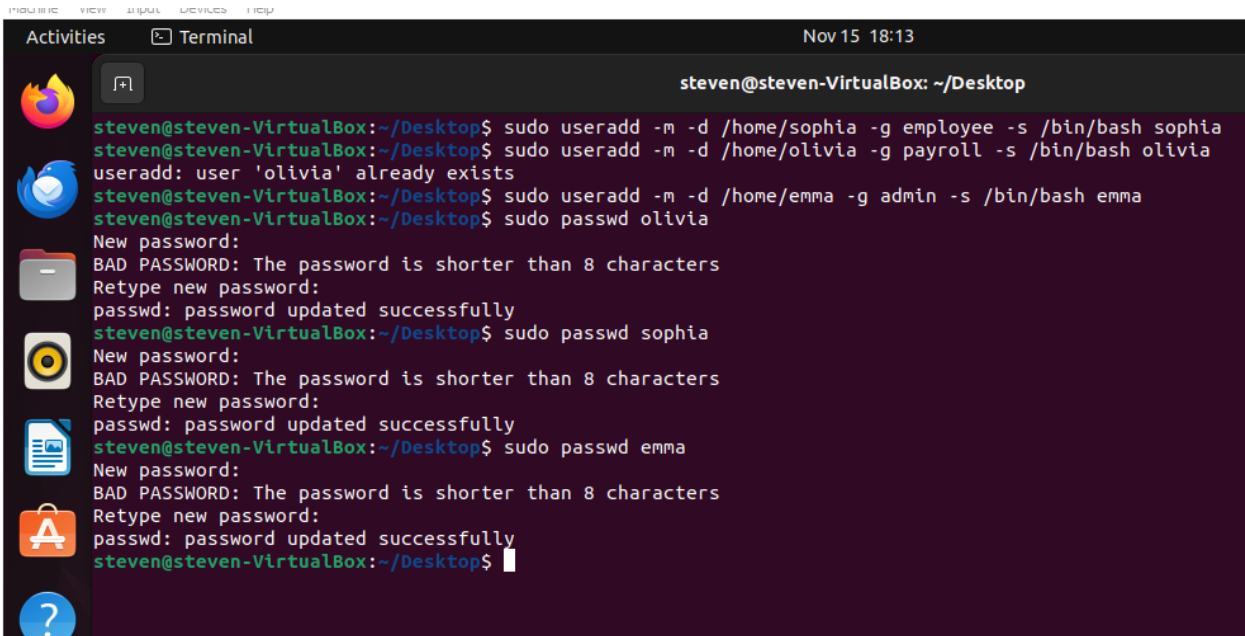


Step 1. Create three groups- employee, payroll, and admin. (You may refer to the slides for week-4 – Group Management)



```
Activities Terminal Nov 15 18:03
steven@steven-VirtualBox: ~/Desktop
steven@steven-VirtualBox:~/Desktop$ sudo groupadd employee
[sudo] password for steven:
steven@steven-VirtualBox:~/Desktop$ sudo groupadd payroll
steven@steven-VirtualBox:~/Desktop$ sudo groupadd admin
steven@steven-VirtualBox:~/Desktop$
```

Step 2. Create three user accounts with a specified home directory for Sophia, Olivia, and Emma. Set the primary group for Sophia, Olivia, and Emma to "employee", "payroll", and "admin", respectively. And change their login shell to /bin/bash. Don't forget to set their passwords.



```
Activities Terminal Nov 15 18:13
steven@steven-VirtualBox: ~/Desktop
steven@steven-VirtualBox:~/Desktop$ sudo useradd -m -d /home/sophia -g employee -s /bin/bash sophia
steven@steven-VirtualBox:~/Desktop$ sudo useradd -m -d /home/olivia -g payroll -s /bin/bash olivia
useradd: user 'olivia' already exists
steven@steven-VirtualBox:~/Desktop$ sudo useradd -m -d /home/emma -g admin -s /bin/bash emma
steven@steven-VirtualBox:~/Desktop$ sudo passwd olivia
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
steven@steven-VirtualBox:~/Desktop$ sudo passwd sophia
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
steven@steven-VirtualBox:~/Desktop$ sudo passwd emma
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
steven@steven-VirtualBox:~/Desktop$
```

Step 3. Create a shared group called "your_midass" (replace it with your MIDAS name) and set this shared group as the above accounts' secondary group. After this step, remember to check each user's group profile.

```
Activities Terminal Nov 15 18:15
steven@steven-VirtualBox: ~/Desktop
steven@steven-VirtualBox:~/Desktop$ sudo groupadd sday003
groupadd: group 'sday003' already exists
steven@steven-VirtualBox:~/Desktop$ sudo usermod -aG sday003 sophia
steven@steven-VirtualBox:~/Desktop$ sudo usermod -aG sday003 olivia
steven@steven-VirtualBox:~/Desktop$ sudo usermod -aG sday003 emma
steven@steven-VirtualBox:~/Desktop$ id sophia
uid=1010(sophia) gid=1008(employee) groups=1008(employee),1001(sday003)
steven@steven-VirtualBox:~/Desktop$ id olivia
uid=1009(olivia) gid=1009(payload) groups=1009(payload),1001(sday003)
steven@steven-VirtualBox:~/Desktop$ id emma
uid=1011(emma) gid=1010(admin) groups=1010(admin),1001(sday003)
steven@steven-VirtualBox:~/Desktop$
```

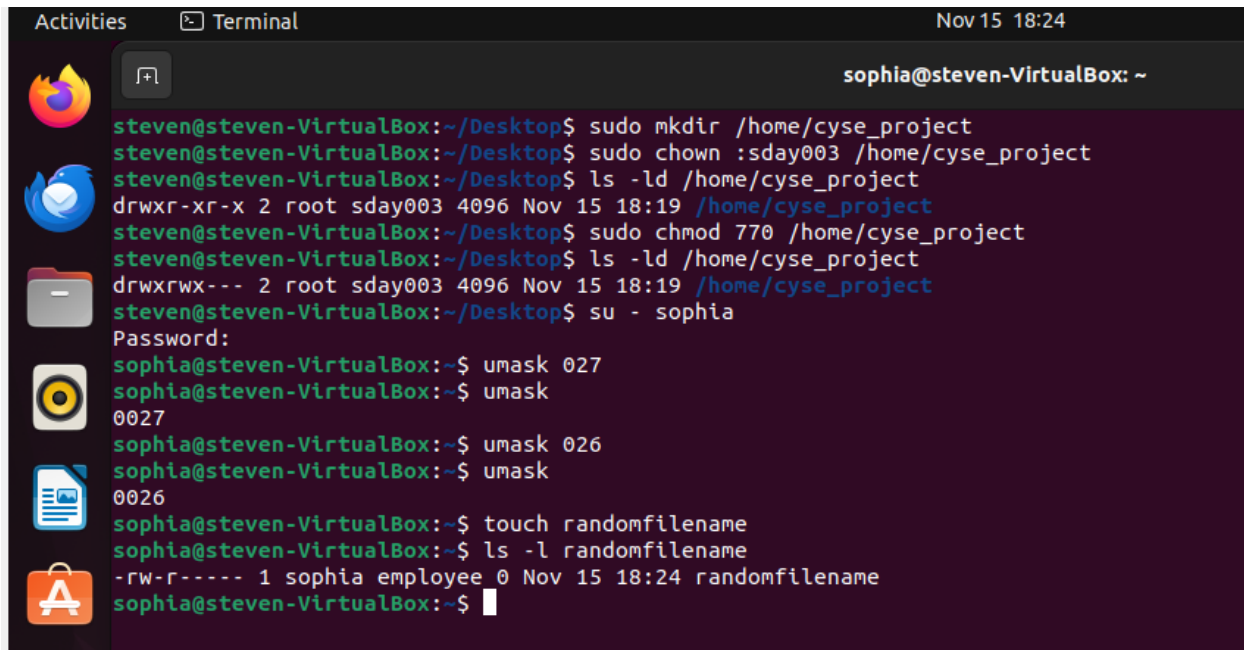
Step 4. Create a directory named /home/cyse_project, which is to be owned by the “your_midas” group which is a shared group). After this step, remember to check the permission of this shared directory.

```
Activities Terminal Nov 15 18:20
steven@steven-VirtualBox: ~/Desktop
steven@steven-VirtualBox:~/Desktop$ sudo mkdir /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ sudo chown :sday003 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ ls -ld /home/cyse_project
drwxr-xr-x 2 root sday003 4096 Nov 15 18:19 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$
```

Step 5. Change the permissions of the /home/cyse_project directory to "rwxrwx---" using the octal method so that only the project group members have access to this directory. After this step, remember to check the permission of this shared directory.

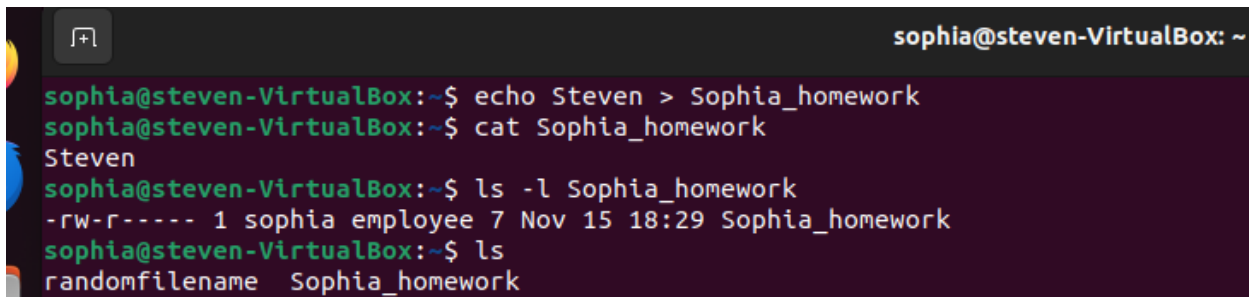
```
Activities Terminal Nov 15 18:22
steven@steven-VirtualBox: ~/Desktop
steven@steven-VirtualBox:~/Desktop$ sudo mkdir /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ sudo chown :sday003 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ ls -ld /home/cyse_project
drwxr-xr-x 2 root sday003 4096 Nov 15 18:19 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ sudo chmod 770 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ ls -ld /home/cyse_project
drwxrwx--- 2 root sday003 4096 Nov 15 18:19 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$
```

Step 6. Switch to Sophia's account. Change the default permissions using octal method with umask command, to "rw-r-----" for Sophia when she creates a file or directory. Check the value of umask, and permission of a new file after this step.



```
Activities Terminal Nov 15 18:24
sophia@steven-VirtualBox: ~
steven@steven-VirtualBox:~/Desktop$ sudo mkdir /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ sudo chown :sday003 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ ls -ld /home/cyse_project
drwxr-xr-x 2 root sday003 4096 Nov 15 18:19 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ sudo chmod 770 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ ls -ld /home/cyse_project
drwxrwx--- 2 root sday003 4096 Nov 15 18:19 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ su - sophia
Password:
sophia@steven-VirtualBox:~$ umask 027
sophia@steven-VirtualBox:~$ umask
0027
sophia@steven-VirtualBox:~$ umask 026
sophia@steven-VirtualBox:~$ umask
0026
sophia@steven-VirtualBox:~$ touch randomfilename
sophia@steven-VirtualBox:~$ ls -l randomfilename
-rw-r----- 1 sophia employee 0 Nov 15 18:24 randomfilename
sophia@steven-VirtualBox:~$
```

Step 7. Create a new file called "Sophia_homework" in the home directory of Sophia and put your name in the file as content. After this step, remember to check the content and the permission of the new file. (ls -l Sophia_homework)



```
sophia@steven-VirtualBox: ~
sophia@steven-VirtualBox:~$ echo Steven > Sophia_homework
sophia@steven-VirtualBox:~$ cat Sophia_homework
Steven
sophia@steven-VirtualBox:~$ ls -l Sophia_homework
-rw-r----- 1 sophia employee 7 Nov 15 18:29 Sophia_homework
sophia@steven-VirtualBox:~$ ls
randomfilename Sophia_homework
```

Step 8. Copy "Sophia_homework" to the /home/cyse_project directory. After this step, remember to check the permission of the file in the shared directory.

```
machine view input devices help
Nov 15 18:34
sophia@steven-VirtualBox: ~
sophia@steven-VirtualBox:~$ cp Sophia_homework /home/cyse_project/
sophia@steven-VirtualBox:~$ ls -l /home/cyse_project/Sophia_homework
-rw-r----- 1 sophia employee 7 Nov 15 18:34 /home/cyse_project/Sophia_homework
sophia@steven-VirtualBox:~$
```

Step 9. Switch to Emma's account. Try to read "Sophia_homework" in the /home/cyse_project Directory.

```
Nov 15 18:37
emma@steven-VirtualBox: ~
sophia@steven-VirtualBox:~$ su - emma
Password:
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

emma@steven-VirtualBox:~$ cat /home/cyse_project/Sophia_homework
cat: /home/cyse_project/Sophia_homework: Permission denied
emma@steven-VirtualBox:~$
```

Step 10. Exit out of Emma's account and Sophia's account.

```
Activities Terminal Nov 15 18:37
steven@steven-VirtualBox: ~/D

sophia@steven-VirtualBox:~$ su - emma
Password:
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

emma@steven-VirtualBox:~$ cat /home/cyse_project/Sophia_homework
cat: /home/cyse_project/Sophia_homework: Permission denied
emma@steven-VirtualBox:~$ exit
logout
sophia@steven-VirtualBox:~$ exit
logout
steven@steven-VirtualBox:~/Desktop$
```

Task B: Set SGID permission (15 points)

Step 1. Switch to root or the regular user's account. To allow group members to access the files shared in the shared directory, you need to fix the sharing issue by setting the correct SGID group values to /home/cyse_project directory.

```
Activities Terminal Nov 15 18:46
steven@steven-VirtualBox:

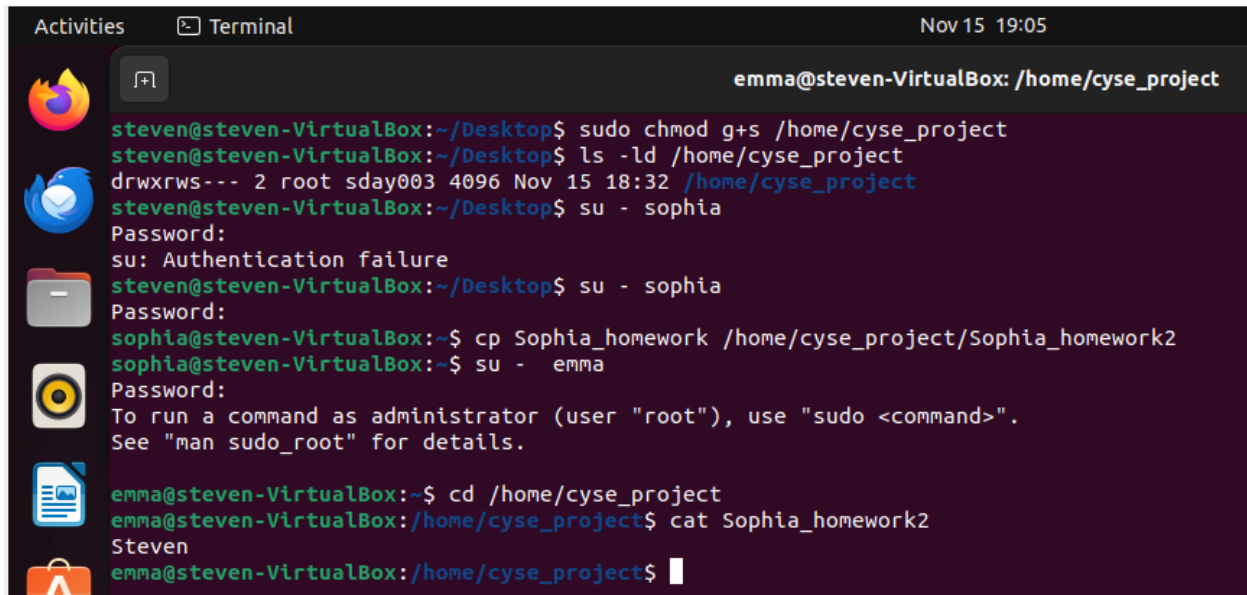
steven@steven-VirtualBox:~/Desktop$ sudo chmod g+s /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ ls -ld /home/cyse_project
drwxrws--- 2 root sday003 4096 Nov 15 18:32 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$
```

Step 2. Switch to Sophia's account. Copy "Sophia_homework" to the /home/cyse_project directory as "Sophia_homework2".

```
Activities Terminal Nov 15 19:04
emma@steven-VirtualBox: /home/cyse_project

steven@steven-VirtualBox:~/Desktop$ sudo chmod g+s /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ ls -ld /home/cyse_project
drwxrws--- 2 root sday003 4096 Nov 15 18:32 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ su - sophia
Password:
su: Authentication failure
steven@steven-VirtualBox:~/Desktop$ su - sophia
Password:
sophia@steven-VirtualBox:~$ cp Sophia_homework /home/cyse_project/Sophia_homework2
```

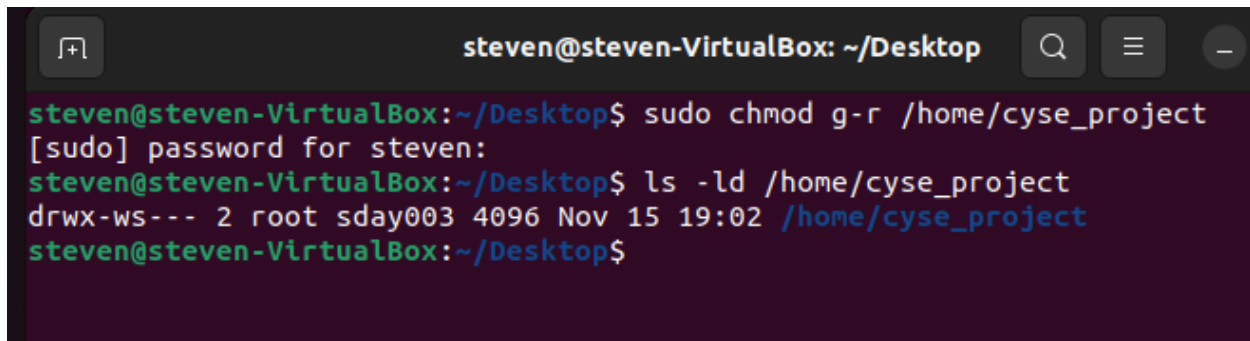
Step 3. Switch to Emma's account. Try to read "Sophia_homework2" in the /home/cyse_project directory.



```
emma@steven-VirtualBox: /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ sudo chmod g+s /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ ls -ld /home/cyse_project
drwxrws--- 2 root sday003 4096 Nov 15 18:32 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ su - sophia
Password:
su: Authentication failure
steven@steven-VirtualBox:~/Desktop$ su - sophia
Password:
sophia@steven-VirtualBox:~$ cp Sophia_homework /home/cyse_project/Sophia_homework2
sophia@steven-VirtualBox:~$ su - emma
Password:
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
emma@steven-VirtualBox:~$ cd /home/cyse_project
emma@steven-VirtualBox:/home/cyse_project$ cat Sophia_homework2
Steven
emma@steven-VirtualBox:/home/cyse_project$
```

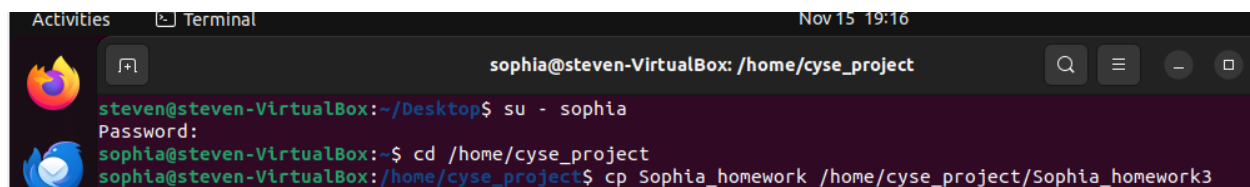
Task C: Unset SGID permissions (15 points)

Step 1. Switch to root the regular user's account. To disallow group members to access the files in the shared folder, you need to fix the sharing issue by setting the correct SGID group values to /home/cyse_project directory to remove the group user read permission.



```
steven@steven-VirtualBox: ~/Desktop
steven@steven-VirtualBox:~/Desktop$ sudo chmod g-r /home/cyse_project
[sudo] password for steven:
steven@steven-VirtualBox:~/Desktop$ ls -ld /home/cyse_project
drwx-ws--- 2 root sday003 4096 Nov 15 19:02 /home/cyse_project
steven@steven-VirtualBox:~/Desktop$
```

Step 2. Switch to Sophia's account. Copy "Sophia_homework" to the /home/cyse_project directory as "Sophia_homework3".



```
sophia@steven-VirtualBox: /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ su - sophia
Password:
sophia@steven-VirtualBox:~$ cd /home/cyse_project
sophia@steven-VirtualBox:/home/cyse_project$ cp Sophia_homework /home/cyse_project/Sophia_homework3
```

Step 3. Switch to Olivia's account. Try to read "Sophia_home3" in the /home/cyse_project directory.

```
sophia@steven-VirtualBox: /home/cyse_project
steven@steven-VirtualBox:~/Desktop$ su - sophia
Password:
sophia@steven-VirtualBox:~$ cd /home/cyse_project
sophia@steven-VirtualBox:/home/cyse_project$ cp Sophia_homework /home/cyse_project/Sophia_homework3
sophia@steven-VirtualBox:/home/cyse_project$ su - olivia
Password:
su: warning: cannot change directory to /home/olivia: No such file or directory
olivia@steven-VirtualBox:/home/cyse_project$ cd/home_project
-bash: cd/home_project: No such file or directory
olivia@steven-VirtualBox:/home/cyse_project$ cat Sophia_homework3
Steven
olivia@steven-VirtualBox:/home/cyse_project$
```

Extra credit: Sticky Bit (10 points)

CYSE 270: Linux System for Cybersecurity

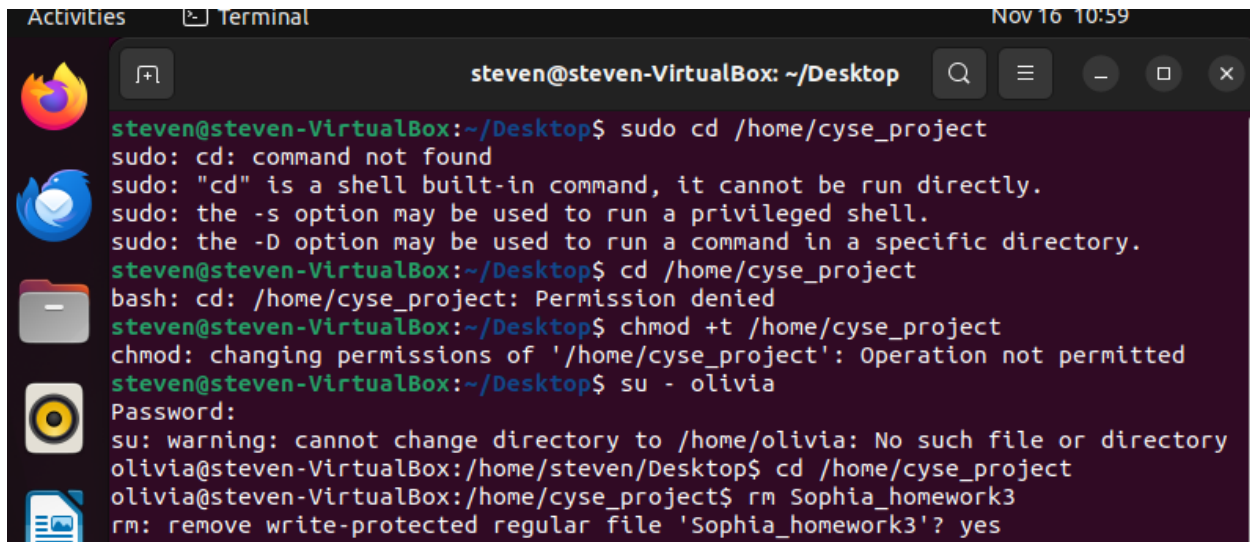
Step 1. Switch to Olivia' account. Delete "Sophia_ homework" in the /home/cyse_project directory.

```
Activities Terminal Nov 16 10:58
steven@steven-VirtualBox: ~/Desktop
steven@steven-VirtualBox:~/Desktop$ sudo cd /home/cyse_project
```

Step 2. Switch to root account. Set the sticky bit permission, to make files can only be removed by the owner of the file.

```
Activities Terminal Nov 16 10:58
steven@steven-VirtualBox: ~/Desktop
steven@steven-VirtualBox:~/Desktop$ sudo cd /home/cyse_project
sudo: cd: command not found
sudo: "cd" is a shell built-in command, it cannot be run directly.
sudo: the -s option may be used to run a privileged shell.
sudo: the -D option may be used to run a command in a specific directory.
steven@steven-VirtualBox:~/Desktop$ cd /home/cyse_project
bash: cd: /home/cyse_project: Permission denied
steven@steven-VirtualBox:~/Desktop$ chmod +t /home/cyse_project
```

Step 3. Switch to Olivia' account. Try to delete "Sophia_ homework3" in the /home/cyse_project directory. Can you delete it this time? Why?



```
Activities Terminal Nov 16 10:59
steven@steven-VirtualBox: ~/Desktop
steven@steven-VirtualBox:~/Desktop$ sudo cd /home/cyse_project
sudo: cd: command not found
sudo: "cd" is a shell built-in command, it cannot be run directly.
sudo: the -s option may be used to run a privileged shell.
sudo: the -D option may be used to run a command in a specific directory.
steven@steven-VirtualBox:~/Desktop$ cd /home/cyse_project
bash: cd: /home/cyse_project: Permission denied
steven@steven-VirtualBox:~/Desktop$ chmod +t /home/cyse_project
chmod: changing permissions of '/home/cyse_project': Operation not permitted
steven@steven-VirtualBox:~/Desktop$ su - olivia
Password:
su: warning: cannot change directory to /home/olivia: No such file or directory
olivia@steven-VirtualBox:/home/steven/Desktop$ cd /home/cyse_project
olivia@steven-VirtualBox:/home/cyse_project$ rm Sophia_homework3
rm: remove write-protected regular file 'Sophia_homework3'? yes
```

I had accidentally hit clear before taking screenshots but it seems that I was able to delete. This is because you deleted the original and I assume that the permissions to the 3rd set of homework has changed and switched permissions so that in case of deletion the permissions switch to allow others to use them.