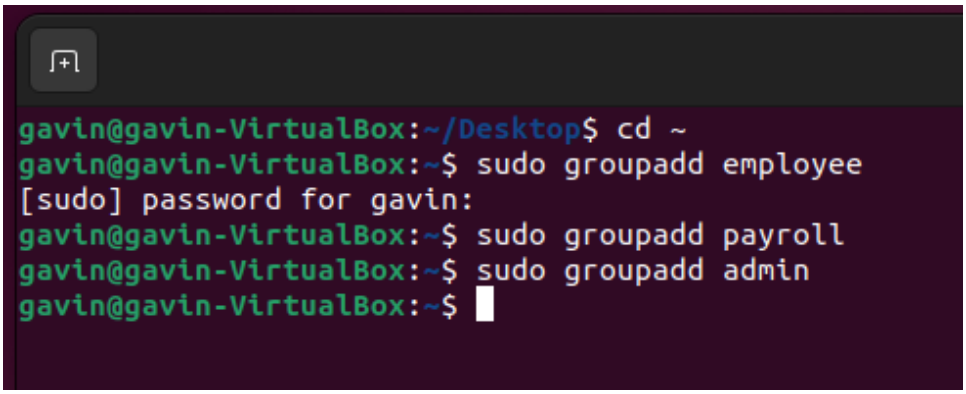
# CYSE 270: Linux System for Cybersecurity

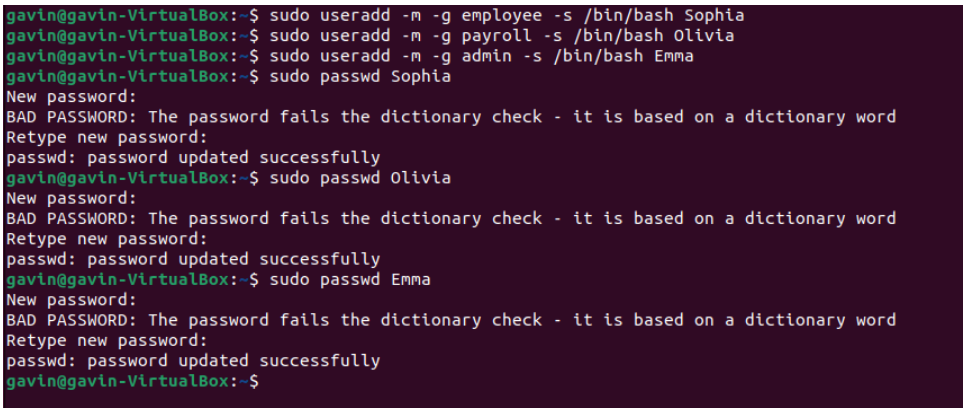
## Lab 6 – File Permission

## Task A: Get accounts and groups ready (70 points)

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




**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.




**Step 3.** Create a shared group called "your_midas" (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.

```
gavin@gavin-VirtualBox:~$ sudo usermod -aG gwill018 Sophia
gavin@gavin-VirtualBox:~$ sudo usermod -aG gwill018 Olivia
gavin@gavin-VirtualBox:~$ sudo usermod -aG gwill018 Emma
gavin@gavin-VirtualBox:~$ groups Sophia
Sophia : employee gwill018
gavin@gavin-VirtualBox:~$ groups Olivia
Olivia : payroll gwill018
gavin@gavin-VirtualBox:~$ groups Emma
Emma : admin gwill018
gavin@gavin-VirtualBox:~$
```

**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.**

```
gavin@gavin-VirtualBox:~$ sudo mkdir /home/cyse_project
gavin@gavin-VirtualBox:~$ sudo chgrp gwill018 /home/cyse_project
gavin@gavin-VirtualBox:~$ ls -ld /home/cyse_project
drwxr-xr-x 2 root gwill018 4096 Oct  9 10:11 /home/cyse_project
gavin@gavin-VirtualBox:~$
```

**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.**

```
gavin@gavin-VirtualBox:~$ sudo chmod 770 /home/cyse_project
gavin@gavin-VirtualBox:~$ ls -ld /home/cyse_project
drwxrwx--- 2 root gwill018 4096 Oct  9 10:11 /home/cyse_project
gavin@gavin-VirtualBox:~$
```

**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.**

```
gavin@gavin-VirtualBox:~$ su Sophia
Password:
Sophia@gavin-VirtualBox:/home/gavin$ cd ~
Sophia@gavin-VirtualBox:~$ pwd
/home/Sophia
Sophia@gavin-VirtualBox:~$ umask 027
Sophia@gavin-VirtualBox:~$ touch testfile.txt
Sophia@gavin-VirtualBox:~$ ls -l testfile.txt
-rw-r----- 1 Sophia employee 0 Oct  9 11:08 testfile.txt
Sophia@gavin-VirtualBox:~$ umask
0027
Sophia@gavin-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@gavin-VirtualBox:~$ echo Gavin > Sophia_homework
Sophia@gavin-VirtualBox:~$ cat Sophia_homework
Gavin
Sophia@gavin-VirtualBox:~$ ls -l Sophia_homework
-rw-r----- 1 Sophia employee 6 Oct  9 11:14 Sophia_homework
Sophia@gavin-VirtualBox:~$
```

**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.

```
Sophia@gavin-VirtualBox:~$ cp Sophia_homework /home/cyse_project
Sophia@gavin-VirtualBox:~$ ls -l /home/cyse_project/Sophia_homework
-rw-r----- 1 Sophia employee 6 Oct  9 11:15 /home/cyse_project/Sophia_homework
Sophia@gavin-VirtualBox:~$
```

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

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

Emma@gavin-VirtualBox:/home/gavin$ cd ~
Emma@gavin-VirtualBox:~$ cat /home/cyse_project/Sophia_homework
cat: /home/cyse_project/Sophia_homework: Permission denied
Emma@gavin-VirtualBox:~$
```

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

```
Emma@gavin-VirtualBox:~$ exit
exit
gavin@gavin-VirtualBox:~$
```

## 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.

```
gavin@gavin-VirtualBox:~$ sudo chmod g+s /home/cyse_project
[sudo] password for gavin:
gavin@gavin-VirtualBox:~$ ls -ld /home/cyse_project
drwxrws--- 2 root gwill018 4096 Oct  9 11:15 /home/cyse_project
gavin@gavin-VirtualBox:~$
```

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

```
gavin@gavin-VirtualBox:~$ su Sophia
Password:
Sophia@gavin-VirtualBox:/home/gavin$ cd ~
Sophia@gavin-VirtualBox:~$ cp Sophia_homework /home/cyse_project/Sophia_homework2
Sophia@gavin-VirtualBox:~$
```

**Step 3.** Switch to Emma's account. Try to read "Sophia_ homework2" in the /home/cyse_project directory.

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

Emma@gavin-VirtualBox:/home/Sophia$ cat /home/cyse_project/Sophia_homework2
Gavin
Emma@gavin-VirtualBox:/home/Sophia$
```

## 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.

```
gavin@gavin-VirtualBox:~$ sudo chmod g-s /home/cyse_project
gavin@gavin-VirtualBox:~$ ls -ld /home/cyse_project
drwxrwx--- 2 root gwill018 4096 Oct  9 11:22 /home/cyse_project
gavin@gavin-VirtualBox:~$
```

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

```
gavin@gavin-VirtualBox:~$ su Sophia
Password:
Sophia@gavin-VirtualBox:/home/gavin$ cd ~
Sophia@gavin-VirtualBox:~$ cp Sophia_homework /home/cyse_project/Sophia_homework3
Sophia@gavin-VirtualBox:~$
```

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

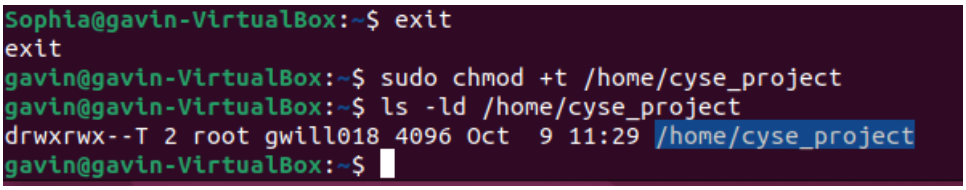
```
Sophia@gavin-VirtualBox:~$ su Olivia
Password:
Olivia@gavin-VirtualBox:/home/Sophia$ cd ~
Olivia@gavin-VirtualBox:~$ cat /home/cyse_project/Sophia_homework3
cat: /home/cyse_project/Sophia_homework3: Permission denied
Olivia@gavin-VirtualBox:~$
```

## Extra credit: Sticky Bit (10 points)

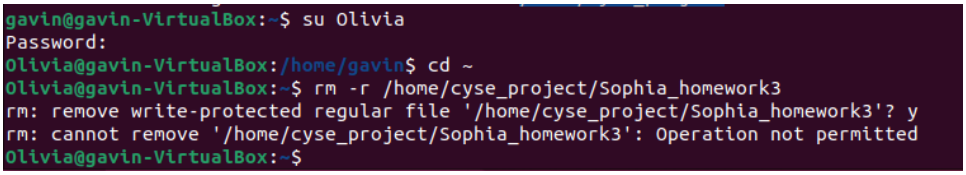
**Step 1.** Switch to Olivia' account. Delete "Sophia_ homework" in the /home/cyse_project directory.

```
Olivia@gavin-VirtualBox:~$ rm -r /home/cyse_project/Sophia_homework
rm: remove write-protected regular file '/home/cyse_project/Sophia_homework'? y
Olivia@gavin-VirtualBox:~$
```

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




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




No, I cannot delete it because Olivia isn't the owner of the file, Sophia is.