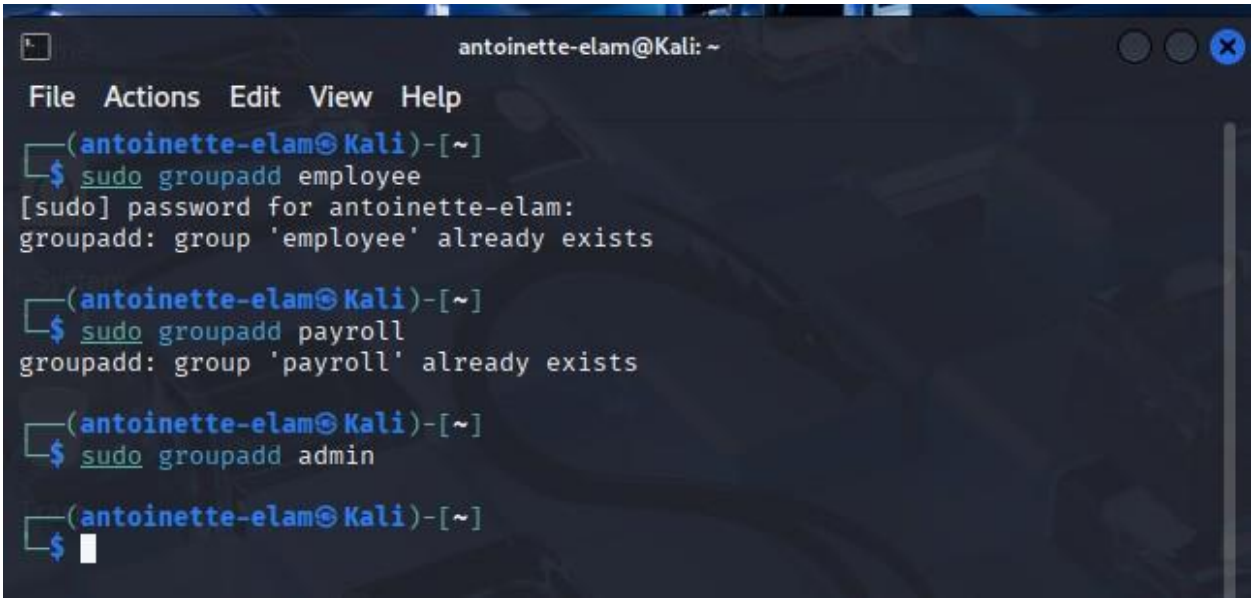
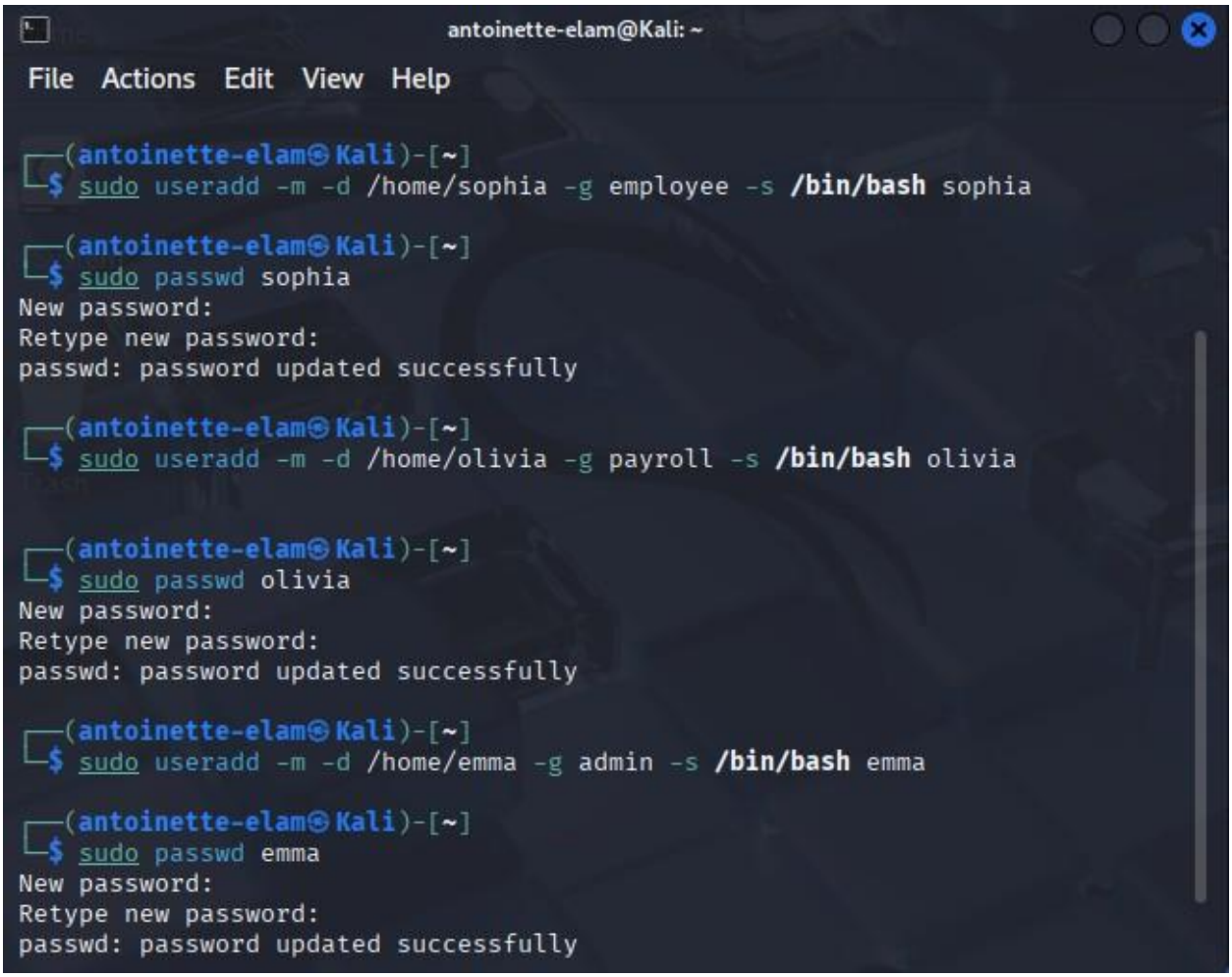
Task A: Get accounts and groups ready (70 points)

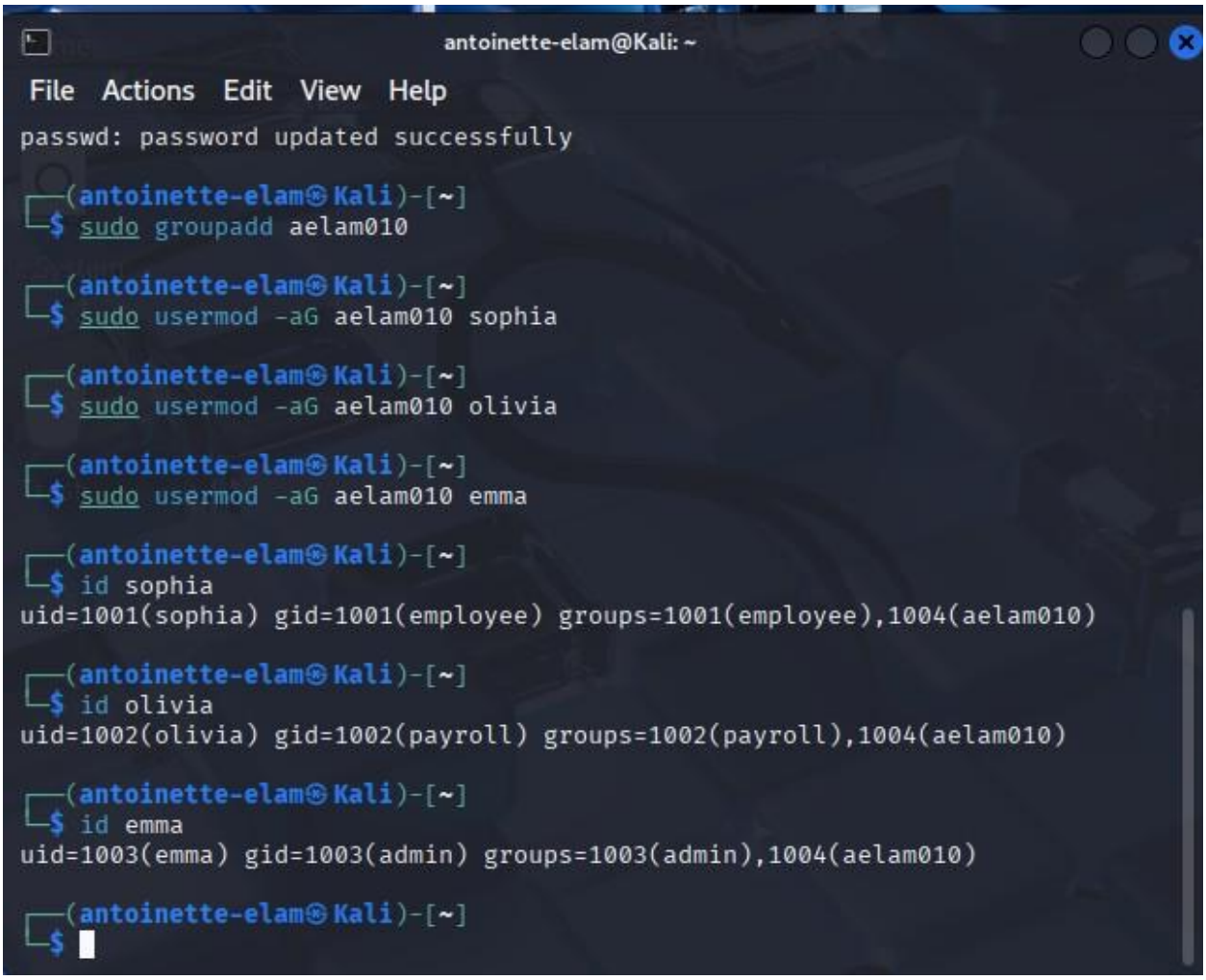
Step 1. Create three groups- employee, payroll, and admin. (You may refer to the slides under Module 2 – Group Management)



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.



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.

```
┌──(antoinette-elam㉿Kali)-[~]
└─$ sudo mkdir /home/cyse_project

┌──(antoinette-elam㉿Kali)-[~]
└─$ sudo chown :aelam010 /home/cyse_project

┌──(antoinette-elam㉿Kali)-[~]
└─$ sudo chmod 770 /home/cyse_project

┌──(antoinette-elam㉿Kali)-[~]
└─$ ls -ld /home/cyse_project
drwxrwx--- 2 root aelam010 4096 Oct 12 15:31 /home/cyse_project

┌──(antoinette-elam㉿Kali)-[~]
└─$
```

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.

```
┌──(antoinette-elam㉿Kali)-[~]
└─$ sudo chmod 770 /home/cyse_project

┌──(antoinette-elam㉿Kali)-[~]
└─$ ls -ld /home/cyse_project
drwxrwx--- 2 root aelam010 4096 Oct 12 15:31 /home/cyse_project
```

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.

```
└─$ su - sophia
Password:
┌──(sophia㉿Kali)-[~]
└─$ unmask 026
Command 'unmask' not found, did you mean:
  command 'unmass' from deb unmass
Try: apt install <deb name>

┌──(sophia㉿Kali)-[~]
└─$ umask026
umask026: command not found

┌──(sophia㉿Kali)-[~]
└─$ umask 026

┌──(sophia㉿Kali)-[~]
└─$ umask
0026

┌──(sophia㉿Kali)-[~]
└─$ touch testfile.txt

┌──(sophia㉿Kali)-[~]
└─$ ls -l testfile.txt
-rw-r----- 1 sophia employee 0 Oct 12 15:44 testfile.txt

┌──(sophia㉿Kali)-[~]
└─$
```

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㉿Kali)-[~]
└─$ cd ~

┌──(sophia㉿Kali)-[~]
└─$ echo "Antoinette Elam" > Sophia_homework

┌──(sophia㉿Kali)-[~]
└─$ cat Sophia_homework
Antoinette Elam

┌──(sophia㉿Kali)-[~]
└─$ ls -l Sophia_homework
-rw-r----- 1 sophia employee 16 Oct 12 15:45 Sophia_homework

┌──(sophia㉿Kali)-[~]
└─$
```

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㉿Kali)-[~]
└─$ cp ~/Sophia_homework /home/cyse_project/

┌──(sophia㉿Kali)-[~]
└─$ ls -l /home/cyse_project/Sophia_homework
-rw-r----- 1 sophia employee 16 Oct 12 15:48 /home/cyse_project/Sophia_homewo
rk

┌──(sophia㉿Kali)-[~]
└─$
```

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

```
┌──(sophia㉿Kali)-[~]
└─$ su - emma
Password:
┌──(emma㉿Kali)-[~]
└─$ cat /home/cyse_project/Sophia_homework
cat: /home/cyse_project/Sophia_homework: Permission denied
```

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

```
┌──(sophia㉿Kali)-[~]
└─$ exit
logout

┌──(emma㉿Kali)-[~]
└─$ exit
logout
```

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.

```
┌──(antoinette-elam㉿Kali)-[~]
└─$ sudo chmod g+s /home/cyse_project
[sudo] password for antoinette-elam:

┌──(antoinette-elam㉿Kali)-[~]
└─$ ls -ld /home/cyse_project
drwxrws--- 2 root aelam010 4096 Oct 12 15:48 /home/cyse_project
```

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

```
┌──(antoinette-elam㉿Kali)-[~]
└─$ su - sophia
Password:
┌──(sophia㉿Kali)-[~]
└─$ cp ~/Sophia_homework /home/cyse_project/Sophia_homework2

┌──(sophia㉿Kali)-[~]
└─$ ls -l /home/cyse_project/Sophia_homework2
-rw-r----- 1 sophia aelam010 16 Oct 12 16:01 /home/cyse_project/Sophia_homewo
rk2
```

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

```
┌──(sophia㉿Kali)-[~]
└─$ su - emma
Password:
┌──(emma㉿Kali)-[~]
└─$ cat /home/cyse_project/Sophia_homework2
Antoinette Elam
```

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.

```
┌──(sophia㉿Kali)-[~]
└─$ ls -ld /home/cyse_project
drwxrws--- 2 root aelam010 4096 Oct 12 16:01 /home/cyse_project
```

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

```
┌──(sophia㉿Kali)-[~]
└─$ cp ~/Sophia_homework /home/cyse_project/Sophia_homework3

┌──(sophia㉿Kali)-[~]
└─$ ls -l /home/cyse_project/Sophia_homework3
-rw-r----- 1 sophia aelam010 16 Oct 12 16:11 /home/cyse_project/Sophia_homewo
rk3
```

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

```
┌──(sophia㉿Kali)-[~]
└─$ su - olivia
Password:
┌──(olivia㉿Kali)-[~]
└─$ cat /home/cyse_project/Sophia_homework3
Antoinette Elam
```

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.

```
┌──(olivia㉿Kali)-[~]
└─$ rm /home/cyse_project/Sophia_homework
rm: remove write-protected regular file '/home/cyse_project/Sophia_homework'?
 y
```

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

```
┌──(sophia㉿Kali)-[~]
└─$ exit
logout

┌──(antoinette-elam㉿Kali)-[~]
└─$ sudo chmod +t /home/cyse_project
[sudo] password for antoinette-elam:
```

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

```
┌──(antoinette-elam㉿Kali)-[~]
└─$ su - olivia
Password:
┌──(olivia㉿Kali)-[~]
└─$ rm /home/cyse_project/Sophia_homework3
rm: remove write-protected regular file '/home/cyse_project/Sophia_homework3'
? y
rm: cannot remove '/home/cyse_project/Sophia_homework3': Operation not permit
ted
```

The sticky bit is set, only the owner/root can remove it.