Lab – Authentication, Authorization, and Accounting, Rymbayeva Anelya, 20B030299

Objectives

- Given a scenario, select the appropriate authentication, authorization, or access control
- Install and configure security controls when performing account management, based on best practices

Part 1: Adding Groups, Users, and Passwords on a Linux System

Part 2: Verify Users, Groups, and Passwords

Part 3: Using Symbolic Permissions

Part 4: Absolute Permissions

Background / Scenario

You will be conducting host security practices using the Linux command line by performing the following tasks:

- Adding Groups, Users, and Passwords
- Verifying Groups, Users, and Passwords
- Setting Symbolic Permissions
- Setting Absolute Permissions

Required Resources

- PC with Ubuntu 16.0.4 LTS installed in a VirtualBox or VMware virtual machine.

Part 1: Adding Groups, Users, and Passwords on a Linux System

In this part, you will add users, groups, and passwords to the local host machine.

Step 1: Open a terminal window in Ubuntu.

a. Log in to Ubuntu using the following credentials:

User: **cisco**

Password: **password**

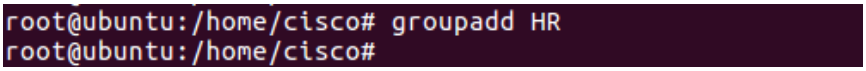
b. Click on the **terminal** icon to open a terminal.

Step 2: Escalate privileges to the root level by entering the sudo su command. Enter the password password when prompted.

```
cisco@ubuntu:~$ sudo su
```

Step 3: Add a new group named HR by entering the command groupadd HR.

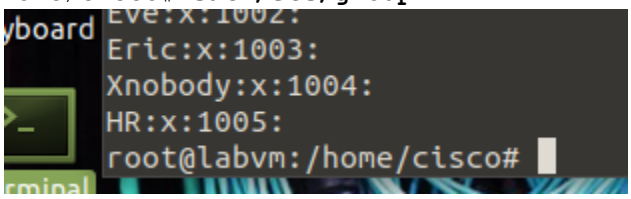
```
root@ubuntu:/home/cisco# groupadd HR
```



Part 2: Verify Users, Groups, and Passwords

Step 1: Verify the new group has been added to the group file list by entering cat /etc/group.

```
root@ubuntu:/home/cisco# cat /etc/group
```



The new group HR will be added to the bottom of the /etc/group file with a group ID of 1005.

Step 2: Add a new user named jenny.

```
root@ubuntu:/home/cisco# adduser jenny
```

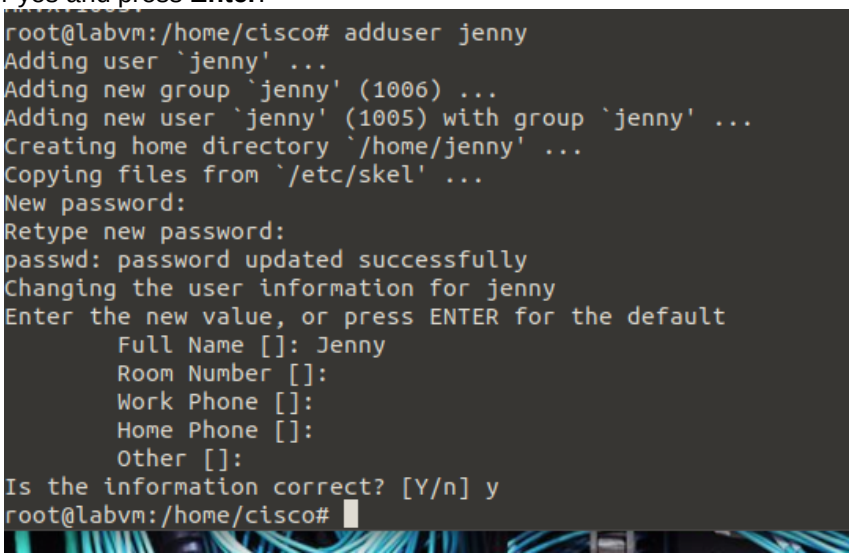
a. When prompted for a new password, type **lasocial**. Press **Enter**.

b. When prompted again, type **lasocial**. Press **Enter**.

c. When prompted for a full name, type **Jenny**. Press **Enter**.

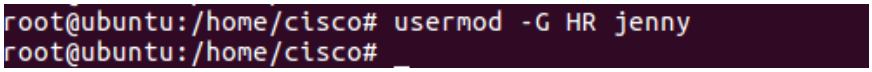
d. For the rest of the configurations, press **Enter** until when asked is the information correct.

e. Type **Y** for yes and press **Enter**.



Step 3: Place the user jenny in the HR group.

```
root@ubuntu:/home/cisco# usermod –G HR jenny
```



Step 4: Add another new user named joe.

```
root@ubuntu:/home/cisco# adduser joe
```

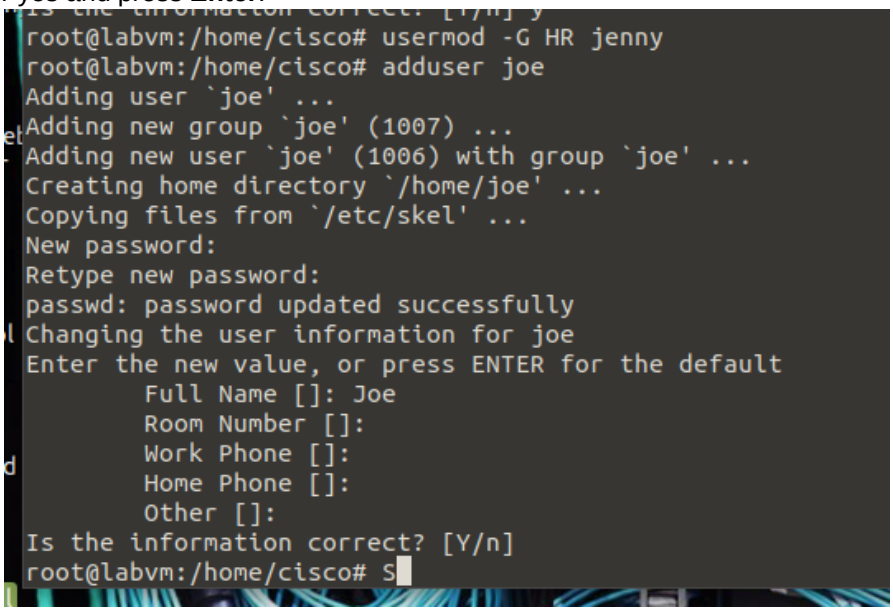
a. When prompted for a new password, type **tooth**. Press **Enter**.

b. When prompted again, type **tooth**. Press **Enter**.

c. When prompted for a full name, type **Joe**. Press **Enter**.

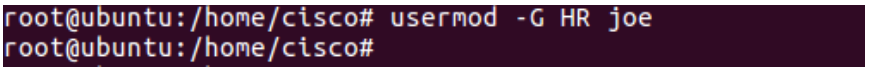
d. For the rest of the configurations, press **Enter** until when asked is the information correct.

e. Type **Y** for yes and press **Enter**.



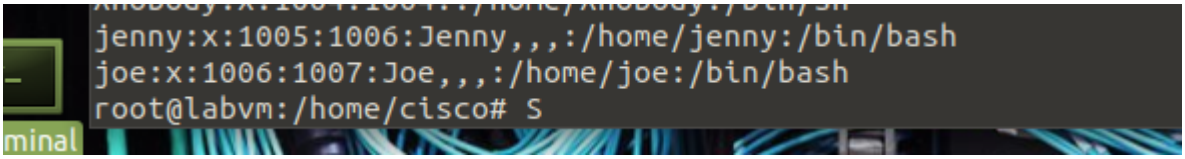
f. Place the user joe in the HR group.

```
root@ubuntu:/home/cisco# usermod –G HR joe
```



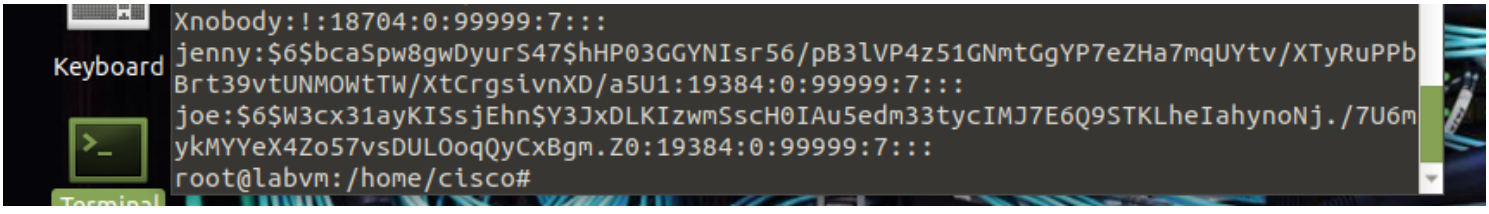
Step 5: Verify the newly created users in the passwd file.

```
root@ubuntu:/home/cisco# cat /etc/passwd
```



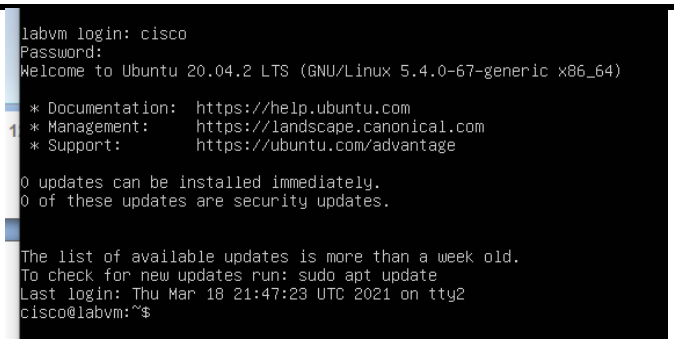
Step 6: View the created users in the shadow file.

```
root@ubuntu:/home/cisco# cat /etc/shadow
```



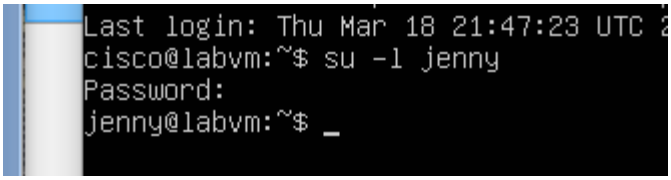
Part 3: Using Symbolic Permissions

Step 1: While on the Ubuntu system, press and hold the keys CTRL+ALT+F1 until the screen changes to the tty1 Terminal.



Note: If you are unable to use tty1 terminal, return to graphical user interface (GUI) of the host by using **CTRL+ALT+F7** and open a terminal window in the GUI Ubuntu OS. At the prompt, enter **su –l jenny** at the prompt and enter the password **lasocial**. Proceed to Step 4.

```
cisco@ubuntu:~$ su –l jenny
```

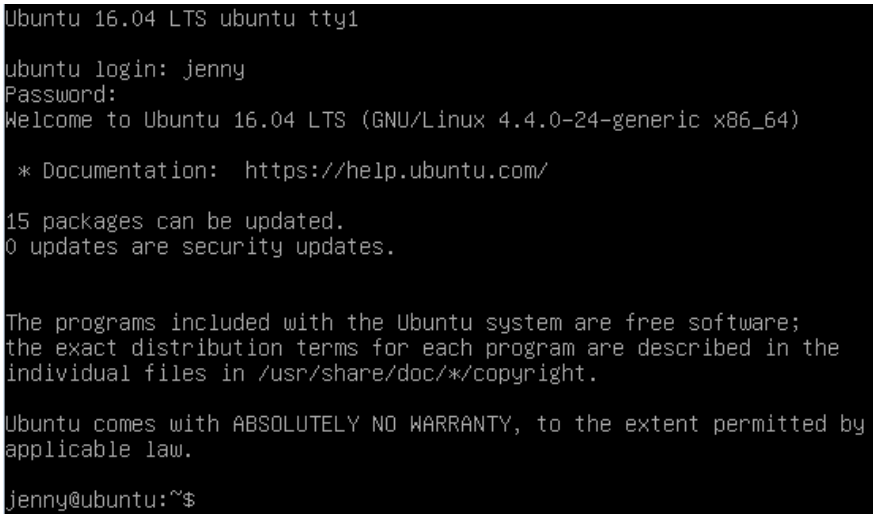


Note: If CTRL+ALT+F7 did not work, try CTRL+ALT+F8.

Step 2: Once on the Terminal login screen, type jenny and press Enter.

Step 3: When prompted for the password, type lasocial and press Enter.

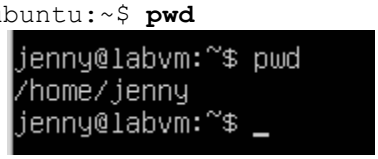
Step 4: After a successful login, you will see the *jenny@ubuntu:~$* prompt.



Since we are not logged in as the *root* (superuser), we are presented with the dollar sign instead of the # if we were to be logged in as the user root.

Step 5: View your present directory.

```
jenny@ubuntu:~$ pwd
```



Step 6: Go back one directory level to the /home directory.

```
jenny@ubuntu:~$ cd ..
```

```
jenny@labvm:~$ cd ..
jenny@labvm:/home$
```

Step 7: List all directories and their permissions.

```
jenny@ubuntu:/home$ ls -l
```

```
jenny@labvm:/home$ ls -l
total 28
drwxr-xr-x  2 Alice Alice 4096 Mar 18  2021 Alice
drwxr-xr-x  2 Bob   Bob   4096 Mar 18  2021 Bob
drwxr-xr-x 11 cisco cisco 4096 Jan 27 11:48 cisco
drwxr-xr-x  2 Eric  Eric  4096 Mar 18  2021 Eric
drwxr-xr-x  2 Eve   Eve   4096 Mar 18  2021 Eve
drwxr-xr-x  2 jenny jenny 4096 Jan 27 11:40 jenny
drwxr-xr-x  2 joe   joe   4096 Jan 27 11:42 joe
jenny@labvm:/home$
```

The Linux operating system has a total of 10 letters or dashes in the permissions fields:

- The first field is a dash for a file an a d for a directory
- The 2nd through 4th fields are for the user
- The 5th through 7th fields are for the group
- The 8th through 10th fields are for others (accounts other than those in the group)

Step 8: Enter Joe's folder as Jenny by typing the command cd joe.

```
jenny@ubuntu:/home$ cd joe
```

```
jenny@labvm:/home$ cd joe
jenny@labvm:/home/joe$
```

Notice that we are able to go into *Joe's home folder*.

```
jenny@ubuntu:/home/joe$ cd ..
```

```
jenny@ubuntu:/home/joe$ cd ..
jenny@ubuntu:/home$
```

Step 9: Press and hold CTRL+ALT+F2 to switch to another Terminal session (tty2).

```
Ubuntu 16.04 LTS ubuntu tty2

ubuntu login: _
```

Step 10: Login as the user root with the password secretpassword.

```
Ubuntu 16.04 LTS ubuntu tty2

ubuntu login: root
Password:
Welcome to Ubuntu 16.04 LTS (GNU/Linux 4.4.0-24-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

15 packages can be updated.
0 updates are security updates.
```

Note: If you are unable to use tty2 terminal, return to graphical user interface (GUI) of the host by using **CTRL+ALT+F7** and open a terminal window in the GUI Ubuntu OS. At the prompt, enter **sudo -i** at the prompt and enter the password **password**.

```
exit
cisco@labvm:~$ sudo -i
[sudo] password for cisco:
root@labvm:~# cd /home
```

Step 11: Change to the /home directory.

```
root@ubuntu:~# cd /home
root@labvm:~# cd /home
root@labvm:/home#
```

Step 12: Change the "other" permission on joe's folder by making it non-executable.

```
root@ubuntu:/home# chmod o-x joe
root@labvm:/home# chmod o-x joe
root@labvm:/home#
```

Step 13: List the directories once more with their respective permissions.

```
root@ubuntu:/home# ls -l
root@labvm:/home# ls -l
total 28
drwxr-xr-x  2 Alice Alice 4096 Mar 18  2021 Alice
drwxr-xr-x  2 Bob   Bob   4096 Mar 18  2021 Bob
drwxr-xr-x 11 cisco cisco 4096 Jan 27 11:48 cisco
drwxr-xr-x  2 Eric  Eric  4096 Mar 18  2021 Eric
drwxr-xr-x  2 Eve   Eve   4096 Mar 18  2021 Eve
drwxr-xr-x  2 jenny jenny 4096 Jan 27 11:40 jenny
drwxr-xr--  2 joe   joe   4096 Jan 27 11:42 joe
root@labvm:/home# S
```

Notice now that there are two dashes in the "others" field for joe's folder.

Step 14: Press and hold CTRL+ALT+F1 to switch back to the other Terminal session (tty1). Make sure you are viewing the following command prompt: jenny@ubuntu:/home$.

Step 15: Attempt to go into Joe's folder once more.

```
jenny@ubuntu:/home$ cd joe
```

Notice that we do not have the permissions to do so.

The chart below shows examples of other ways the **chmod** command can be used:

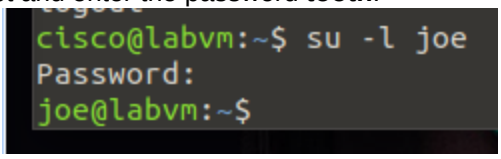
chmod command	Results
chmod u+rwx	Adds read, write, and execute permissions for the user
chmod u+rw	Adds read and write permission for the user
chmod o+r	Adds read permission for others
chmod g-rwx	Removes read, write, and execute permissions for the group

Step 16: Type exit followed by pressing Enter to logout of the Terminal session.

Part 4: Absolute Permissions

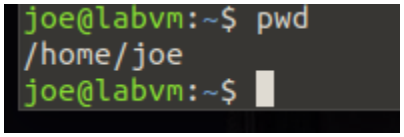
Step 1: Login as the user joe with the password tooth while on tty1.

Note: If you are unable to use tty1 terminal, return to graphical user interface (GUI) of the host by using **CTRL+ALT+F7** and open a terminal window in the GUI Ubuntu OS. At the prompt, enter **sudo –l joe** at the prompt and enter the password **tooth**.



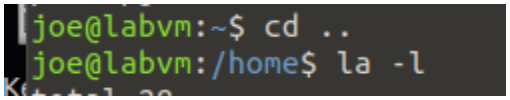
Step 2: Print your current working directory.

```
joe@ubuntu:~$ pwd
```



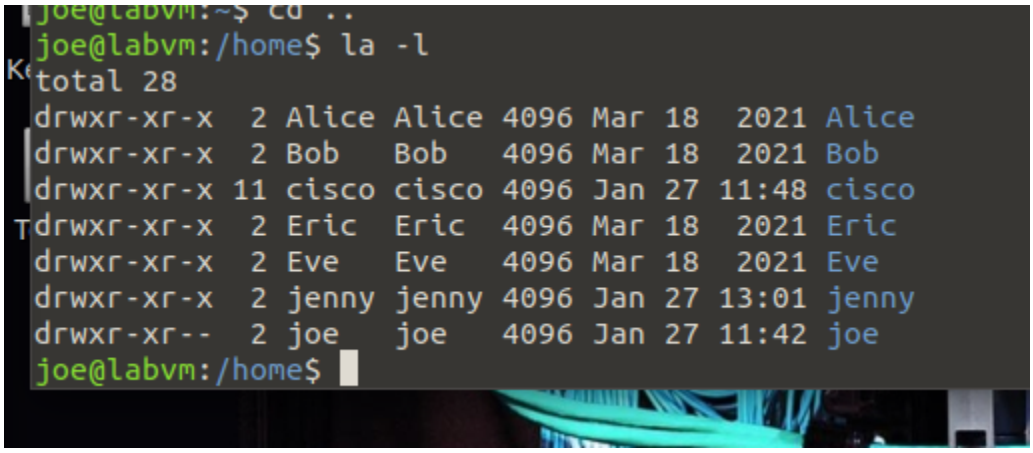
Step 3: Go back one directory level to the /home directory.

```
joe@ubuntu:~$ cd ..
```



Step 4: List all directories and their permissions in the current working directory.

```
joe@ubuntu:/home~$ ls -l
```



Notice that Joe's folder is set so that "others" are not able to access the folder.

The other way of assigning permissions besides using symbolic permissions is the use of absolute permissions. Absolute permissions use a three digit octal number to represent the permissions for owner, group and other.

The table below outlines each absolute value and its corresponding permissions:

Number	Permissions
7	Read, Write, and Execute
6	Read and Write
5	Read and Execute
4	Read
3	Write and Execute
2	Write
1	Execute
0	None

By typing the command **chmod 764 *examplefile***, the examplefile will be assigned the follow permissions:

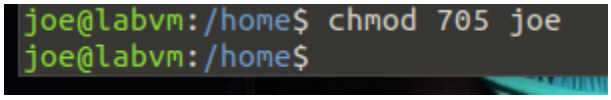
- The user will get read, write and execute permissions
- The group will get read and write permissions
- Others will get read access

Breakdown of how 764 represents these permissions:

Digit	Binary Equivalent	Permission
7 (user)	111	1-Read 1-Write 1-Execute
6 (group)	110	1-Read 1-Write 0-No Execute
4 (others)	100	1-Read 0-No Write 0-No Execute

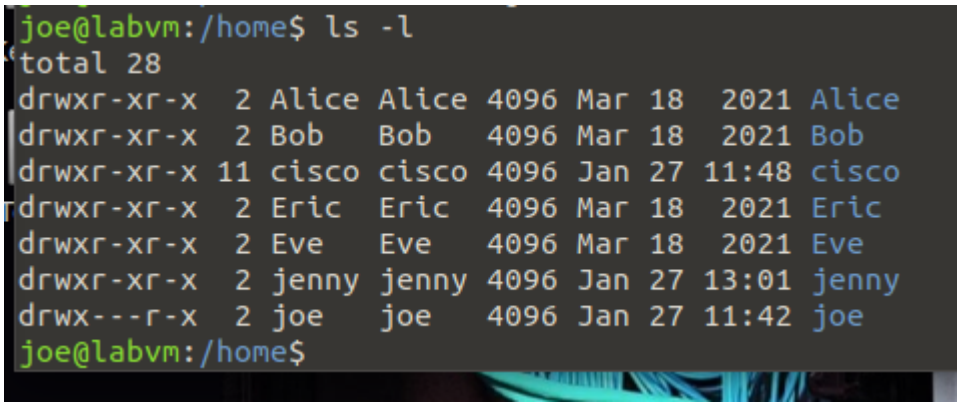
Step 5: Modify the "others" field for Joe's folder so that others will be able read and execute but not write while still maintaining the "user" field to read, write, and execute.

```
joe@ubuntu:/home$ chmod 705 joe
```



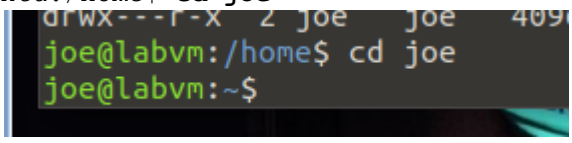
Step 6: List the file permissions of the current directory to see that the absolute changes were made.

```
joe@ubuntu:/home$ ls -l
```



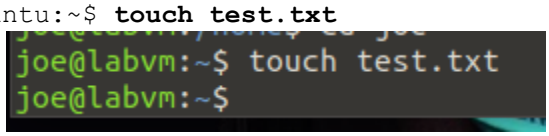
Step 7: Change to the *~/home/joe* directory.

```
joe@ubuntu:/home$ cd joe
```



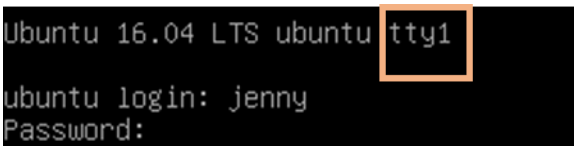
Step 8: Create a simple text file named test.txt using *touch*.

```
joe@ubuntu:~$ touch test.txt
```



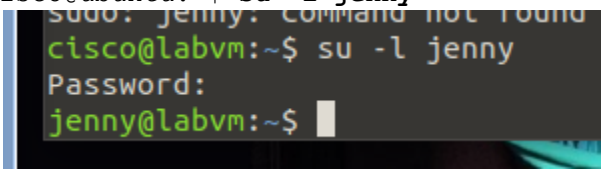
a. Type **exit** followed by pressing **Enter** to log out of Joe's session.

b. While on the tty1 Terminal, log back in as **jenny** and enter the password **lasocial**. Press **Enter**.



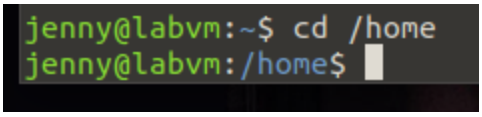
Note: If you are unable to use tty1 terminal, return to graphical user interface (GUI) of the host by using **CTRL+ALT+F7** and open a terminal window in the GUI Ubuntu OS. At the prompt, enter **su –l jenny** at the prompt and enter the password **lasocial**.

```
cisco@ubuntu:~$ su –l jenny
```



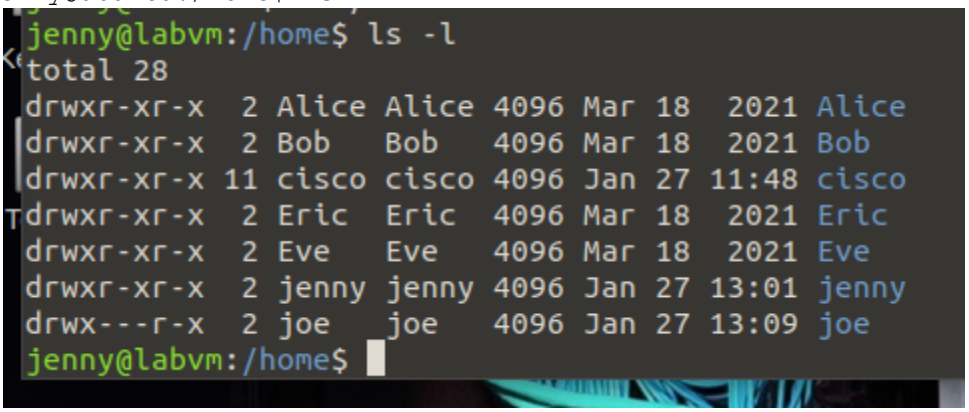
Step 9: Change to the /home directory.

```
jenny@ubuntu:~$ cd /home
```



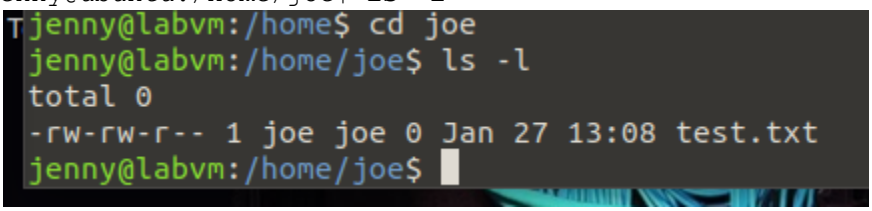
Step 10: List all directories with their respective permissions.

```
jenny@ubuntu:/home$ ls -l
```



Step 11: Change to the /home/joe directory and list the content of the directory.

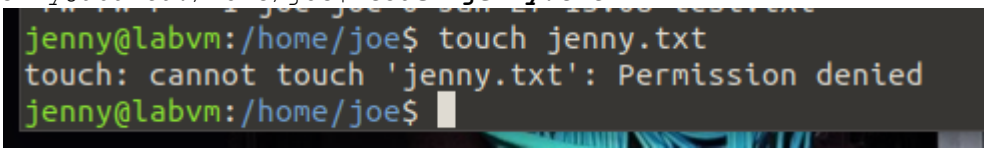
```
jenny@ubuntu:/home$ cd joe
jenny@ubuntu:/home/joe$ ls -l
```



Notice that we are able to enter Joe's folder and read the files within the directory. We are able to see the *test.txt* file.

Step 12: Attempt to create a file.

```
jenny@ubuntu:/home/joe$ touch jenny.txt
```



Notice we do not have permission to create the file.

Step 13: Close all remaining windows.