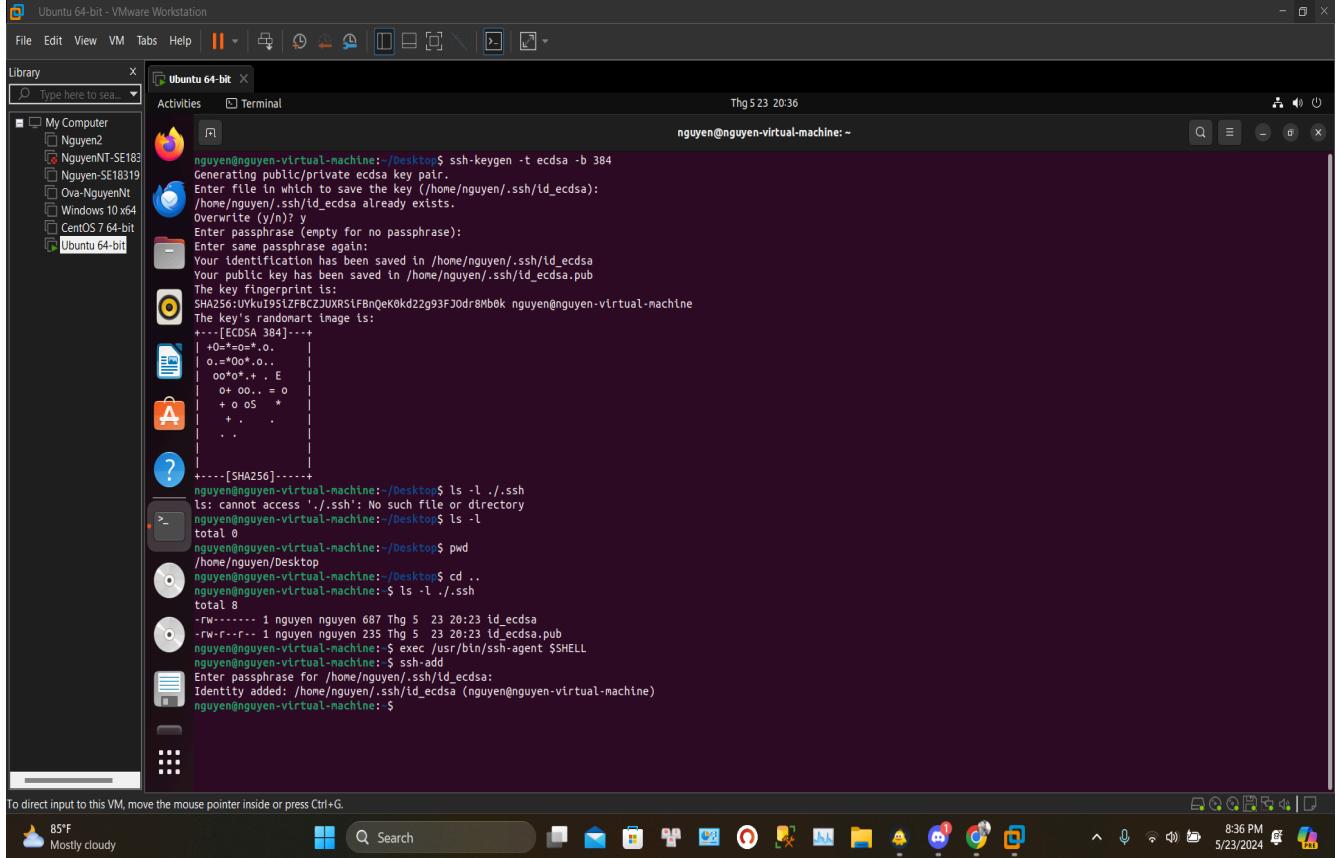
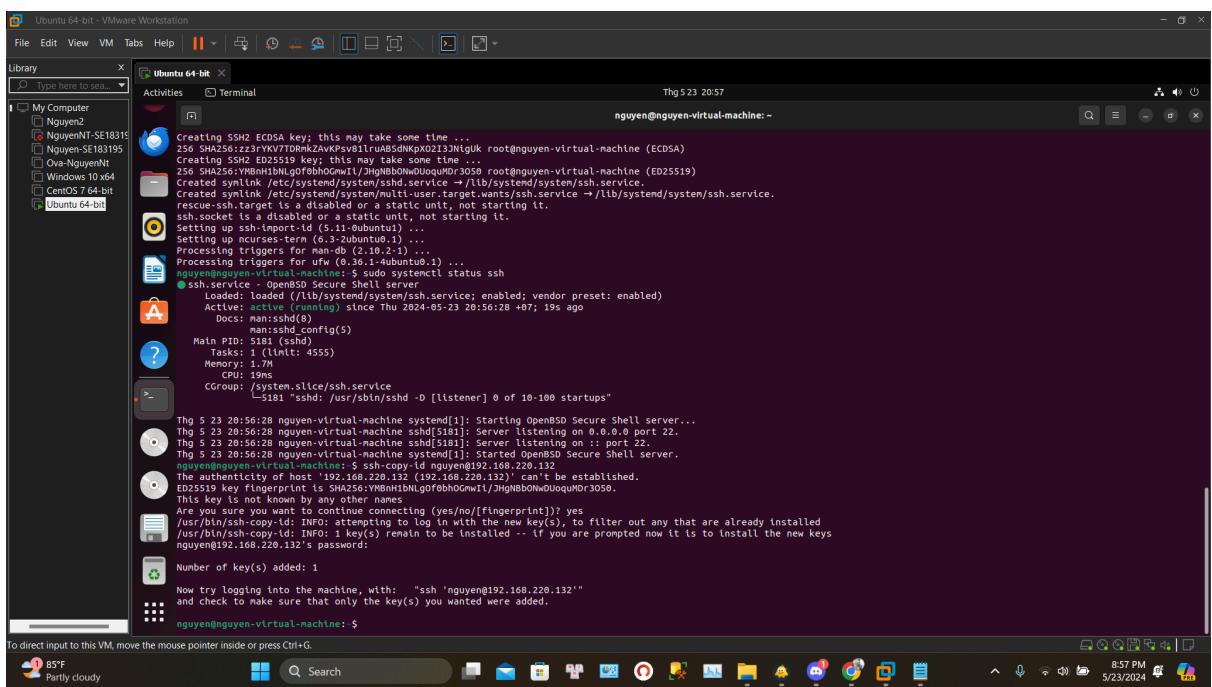


# LAB 4 – Applying Hardened Linux File System Security Controls

## 6.1 – Creating and Transferring SSH Keys:



```
nguyen@nguyen-virtual-machine:~/Desktop$ ssh-keygen -t ecdsa -b 384
Generating public/private ecdsa key pair.
Enter file in which to save the key (/home/nguyen/.ssh/id_ecdsa):
/home/nguyen/.ssh/id_ecdsa already exists.
Overwrite (y/n)? y
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/nguyen/.ssh/id_ecdsa
Your public key has been saved in /home/nguyen/.ssh/id_ecdsa.pub
The key fingerprint is:
SHA256:0vkUu951ZFBZJUXRSfBnQeK0kd22g93FJ0dr8Mb0k nguyen@nguyen-virtual-machine
The key's randomart image is:
+---[ECDSA 384]---+
|+o=+=o=o=.o.
|o.=Oo*.o...
|oo*o+.+ . E
|+ oo... = o
|+ o 05 *
|+ . .
|. .
+---[SHA256]---+
nguyen@nguyen-virtual-machine:~/Desktop$ ls -l ./ssh
ls: cannot access './ssh': No such file or directory
nguyen@nguyen-virtual-machine:~/Desktop$ ls -l
total 0
nguyen@nguyen-virtual-machine:~/Desktop$ pwd
/home/nguyen/Desktop
nguyen@nguyen-virtual-machine:~/Desktop$ cd ..
nguyen@nguyen-virtual-machine: $ ls -l ./ssh
total 8
-rw-r--r-- 1 nguyen nguyen 687 Thg 5 23 20:23 id_ecdsa
-rw-r--r-- 1 nguyen nguyen 235 Thg 5 23 20:23 id_ecdsa.pub
nguyen@nguyen-virtual-machine: $ exec /usr/bin/ssh-agent $SHELL
nguyen@nguyen-virtual-machine: $ ssh-add
Enter passphrase for /home/nguyen/.ssh/id_ecdsa:
Identity added: /home/nguyen/.ssh/id_ecdsa (nguyen@nguyen-virtual-machine)
nguyen@nguyen-virtual-machine: $
```

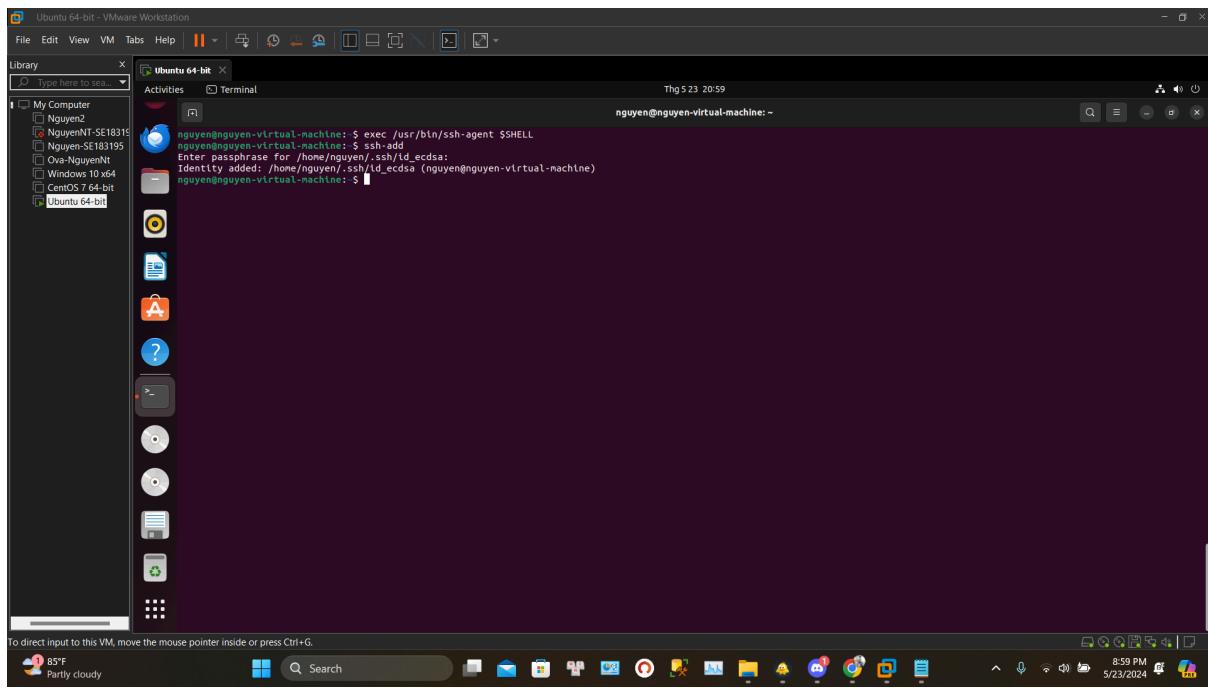
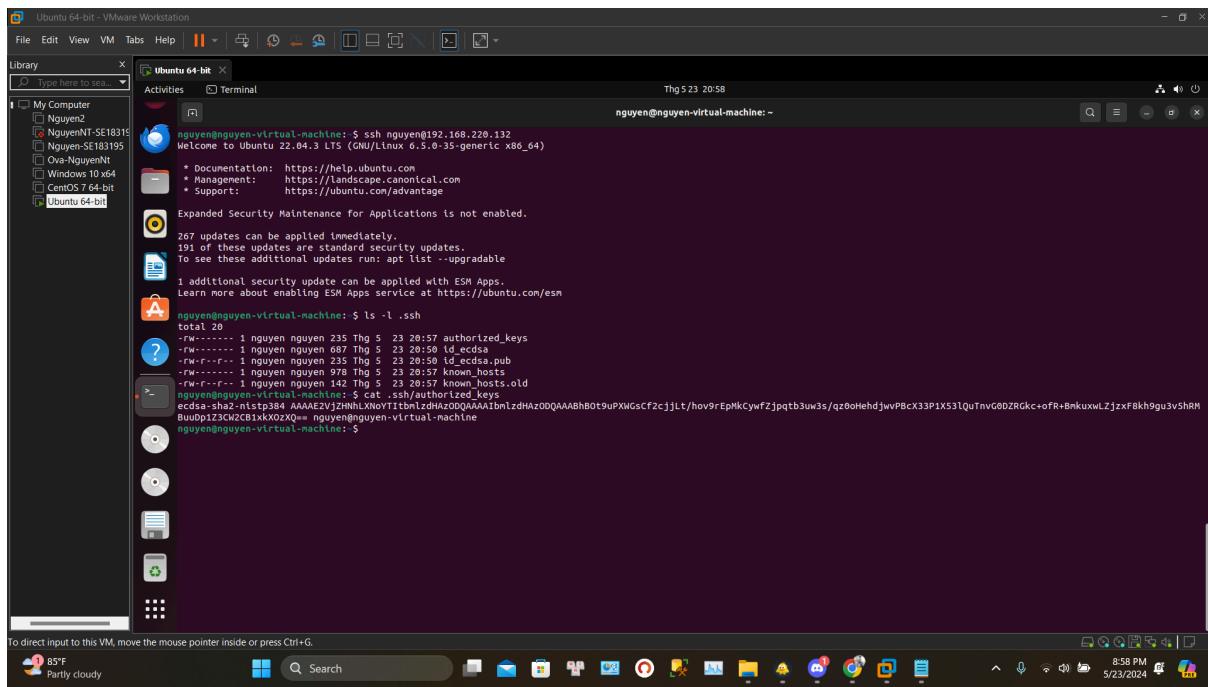


```
Creating SSH ECDSA key; this may take some time ...
256 SHA256:zz3ryXv7TDRmkZavKPsvb1ruABsdNkpx02I3JNqUk root@nguyen-virtual-machine (ECDSA)
Creating ED25519 key; this may take some time ...
256 SHA256:yMBHntibLgrfbh0bw11/HgnBBoW0UloquM0r3059 root@nguyen-virtual-machine (ED25519)
Created symlink /etc/systemd/system/shell.service → /lib/systemd/system/shell.service.
Created symlink /etc/systemd/system/getty.target.wants/shell.service → /lib/systemd/system/shell.service.
rescue-ssh.target is a disabled or a static unit, not starting it.
ssh.socket is a disabled or a static unit, not starting it.
Setting up ssh-import-id (5.11-0ubuntu1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for ufw (0.36.1-1ubuntu0.1) ...
nguyen@nguyen: ~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: enabled)
     Active: active (running) since Thu 2024-05-23 20:56:28 +07, 19s ago
       Docs: man:sshd(8)
         Main PID: 5181 (sshd)
            Tasks: 1 (limit: 4555)
           Memory: 1.9MiB
              CPU: 19ms
             CGroup: /system.slice/ssh.service
                     └─ 5181 "/usr/sbin/sshd -D [listener] 0 of 10-100 startups"

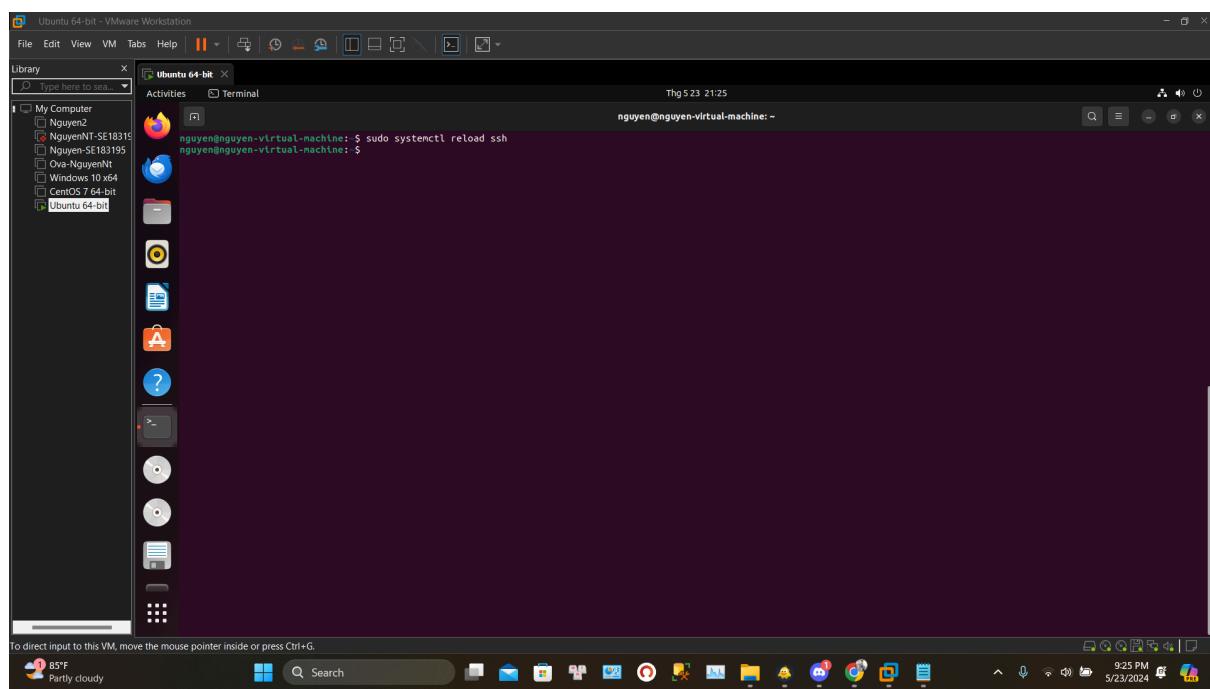
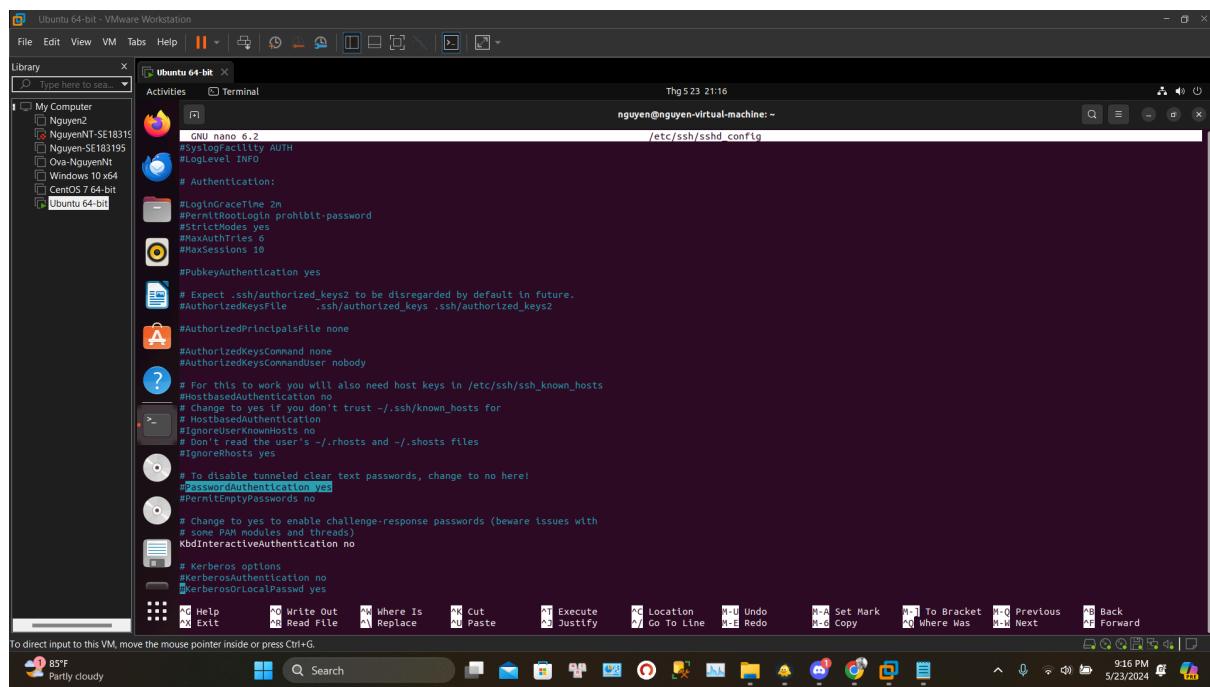
Thg 5 23 20:56:28 nguyen-virtual-machine systemd[1]: Starting OpenBSD Secure Shell server...
Thg 5 23 20:56:28 nguyen-virtual-machine sshd[5181]: Server listening on 0.0.0.0 port 22.
Thg 5 23 20:56:28 nguyen-virtual-machine sshd[5181]: Server listening on :: port 22.
Thg 5 23 20:56:28 nguyen-virtual-machine systemd[1]: Started OpenBSD Secure Shell server.
nguyen@nguyen-virtual-machine: ~$ ssh-copy-id nguyen@192.168.220.132
The authenticity of host '192.168.220.132 (192.168.220.132)' can't be established.
ED25519 key fingerprint is SHA256:yMBHntibLgrfbh0bw11/HgnBBoW0UloquM0r3059.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: i key(s) remain to be installed -- if you are prompted now it is to install the new keys
nguyen@192.168.220.132's password:
Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'nguyen@192.168.220.132'"
and check to make sure that only the key(s) you wanted were added.

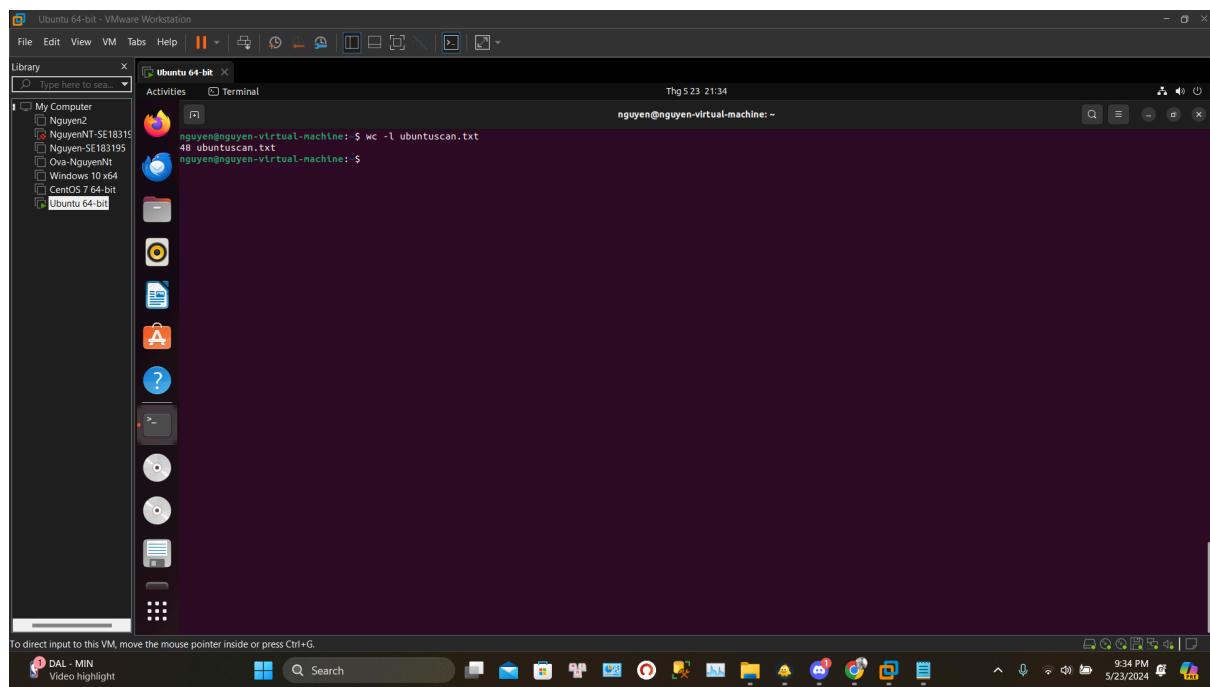
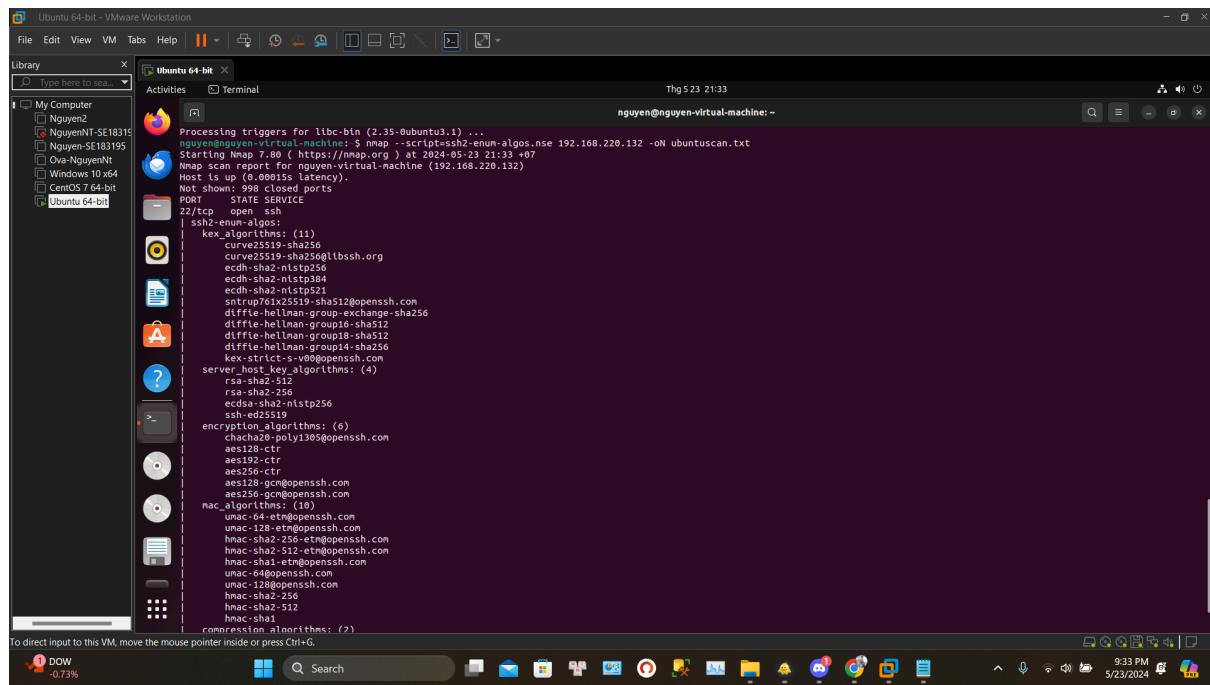
nguyen@nguyen-virtual-machine: ~$
```

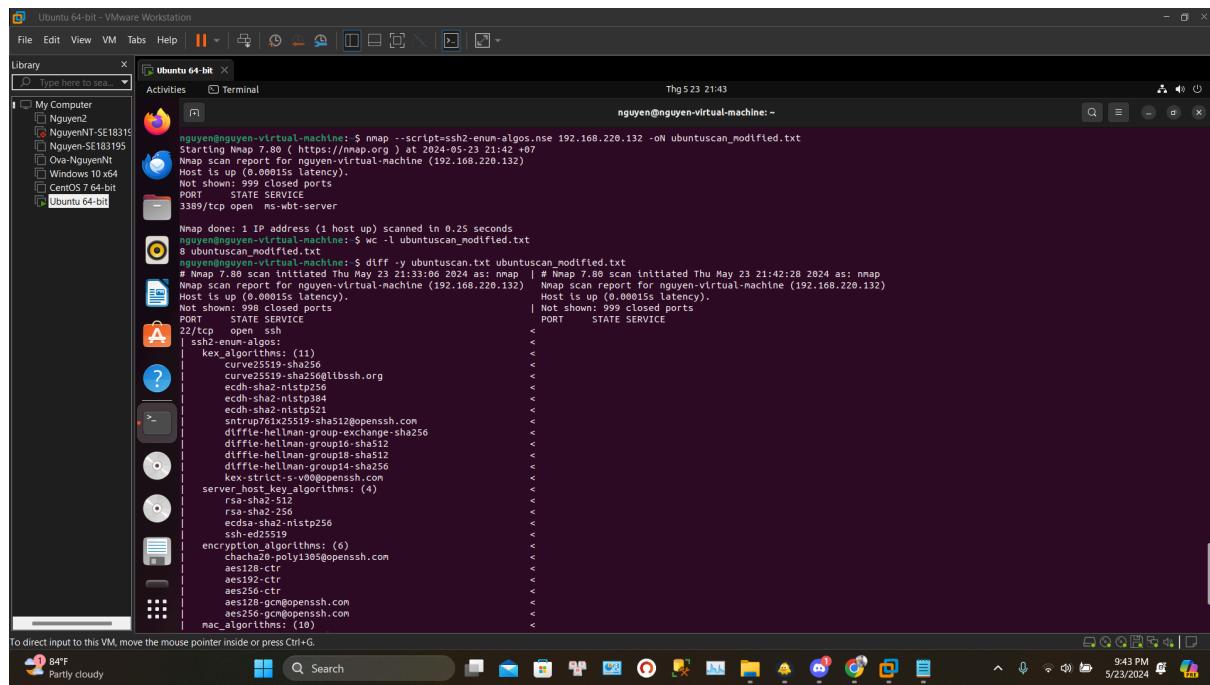
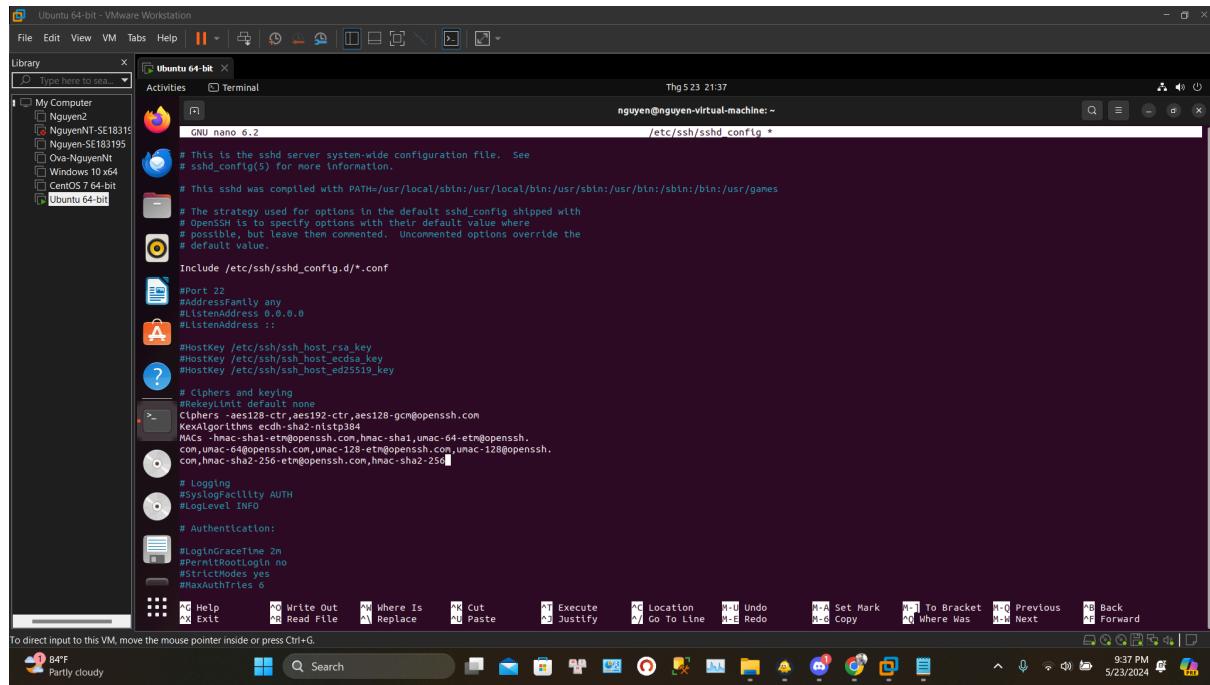


## 6.2 – Disabling root login and password authentication

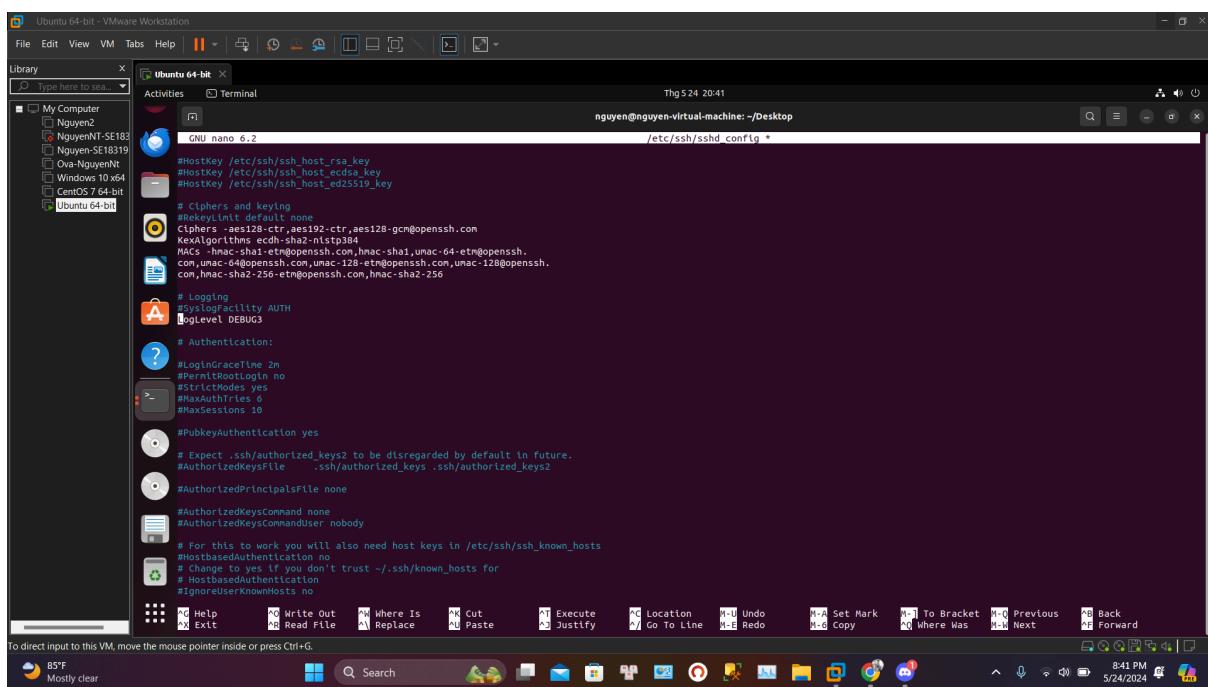
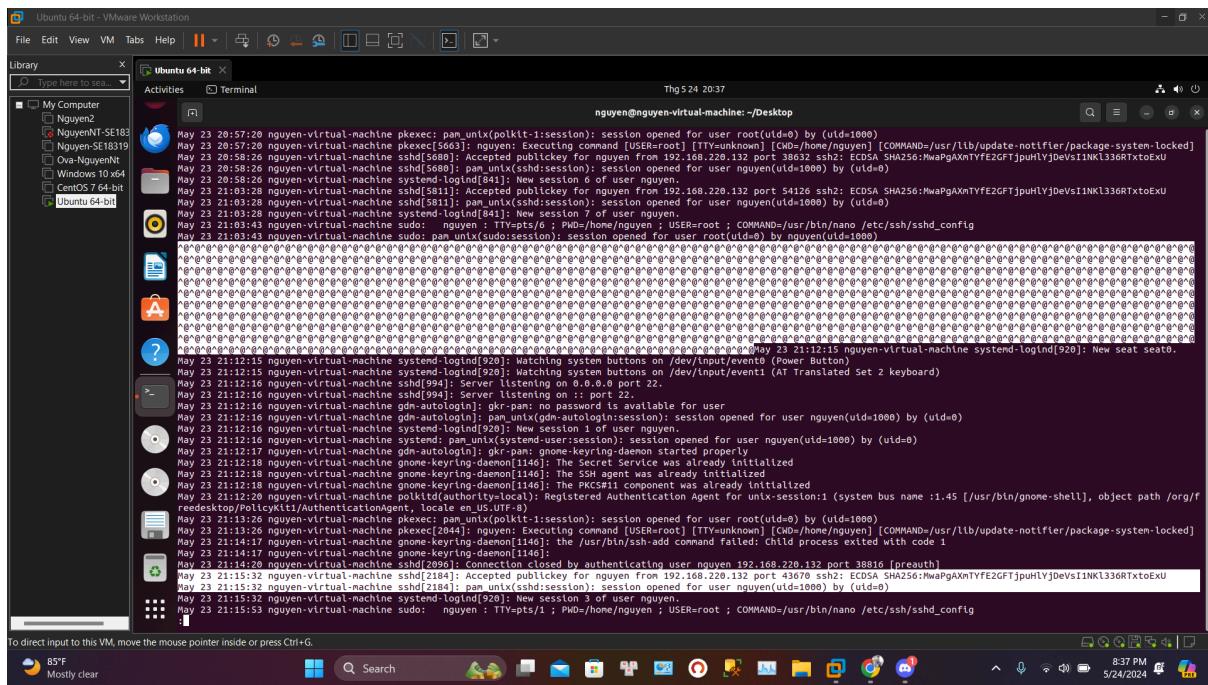


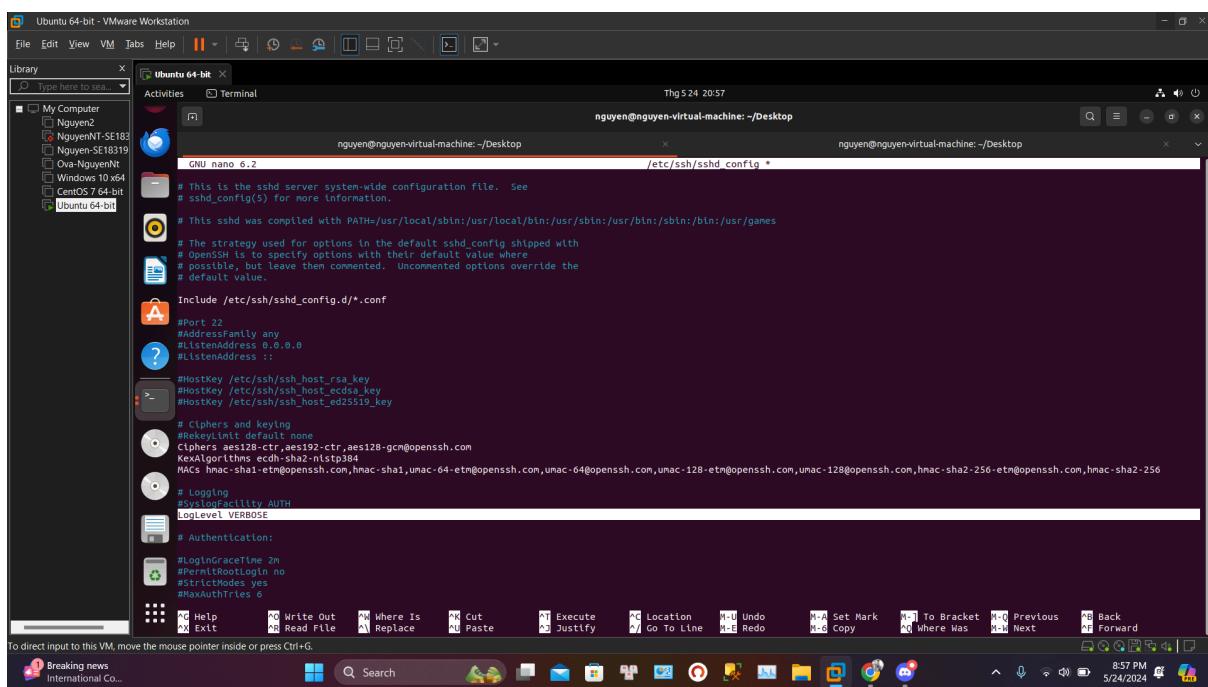
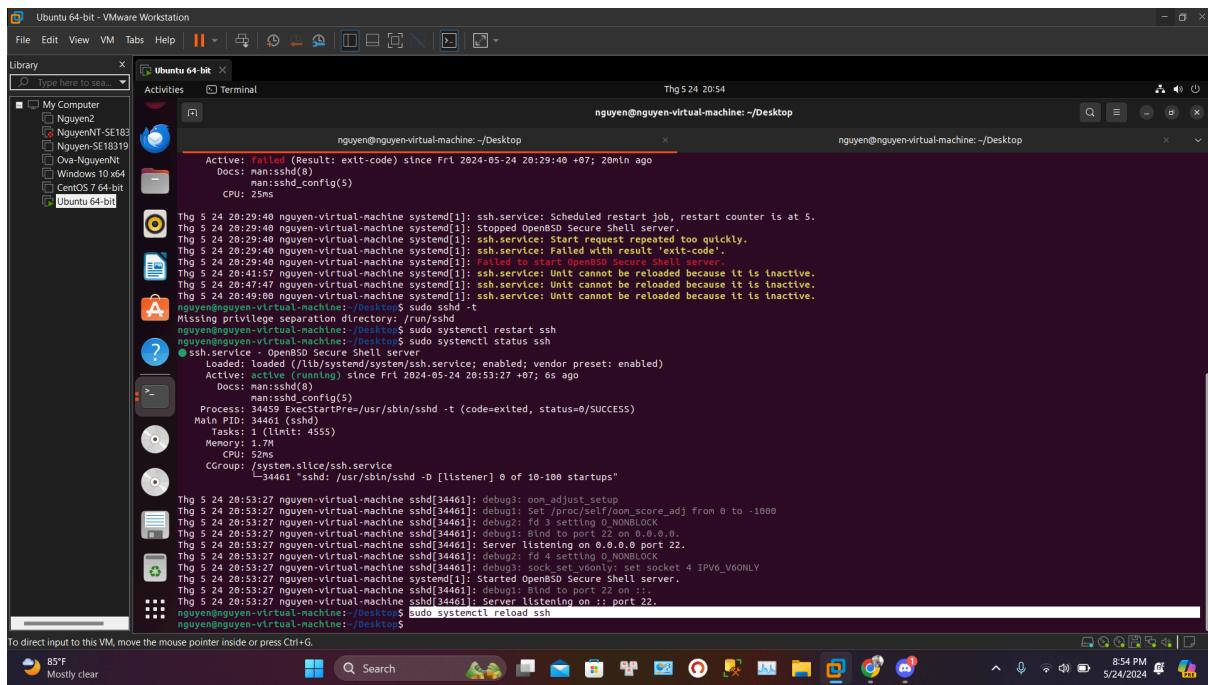
## 6.6 – Disabling weak SSH encryption algorithms – Ubuntu 22.04



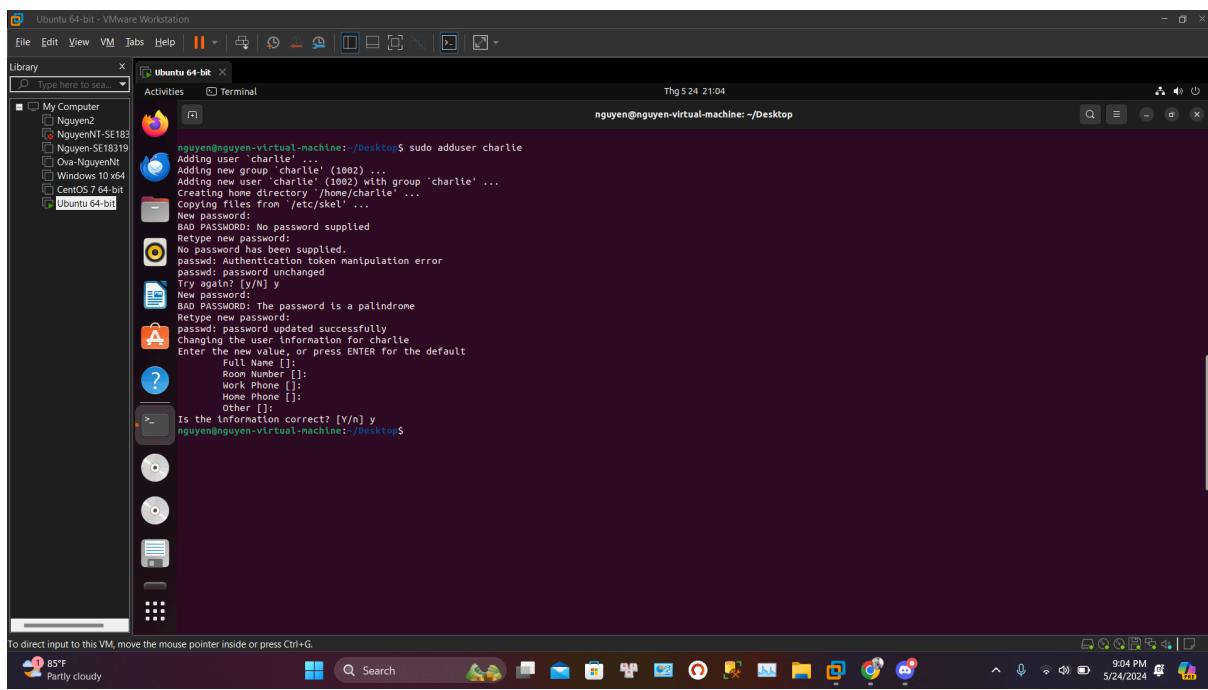
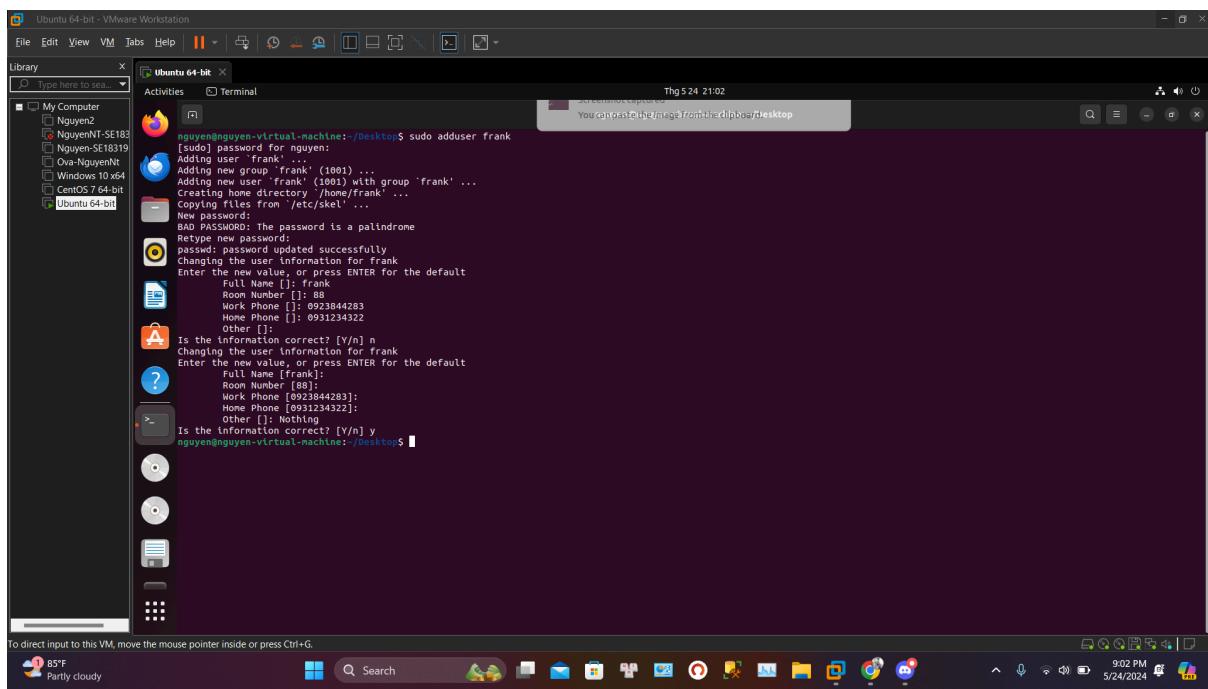


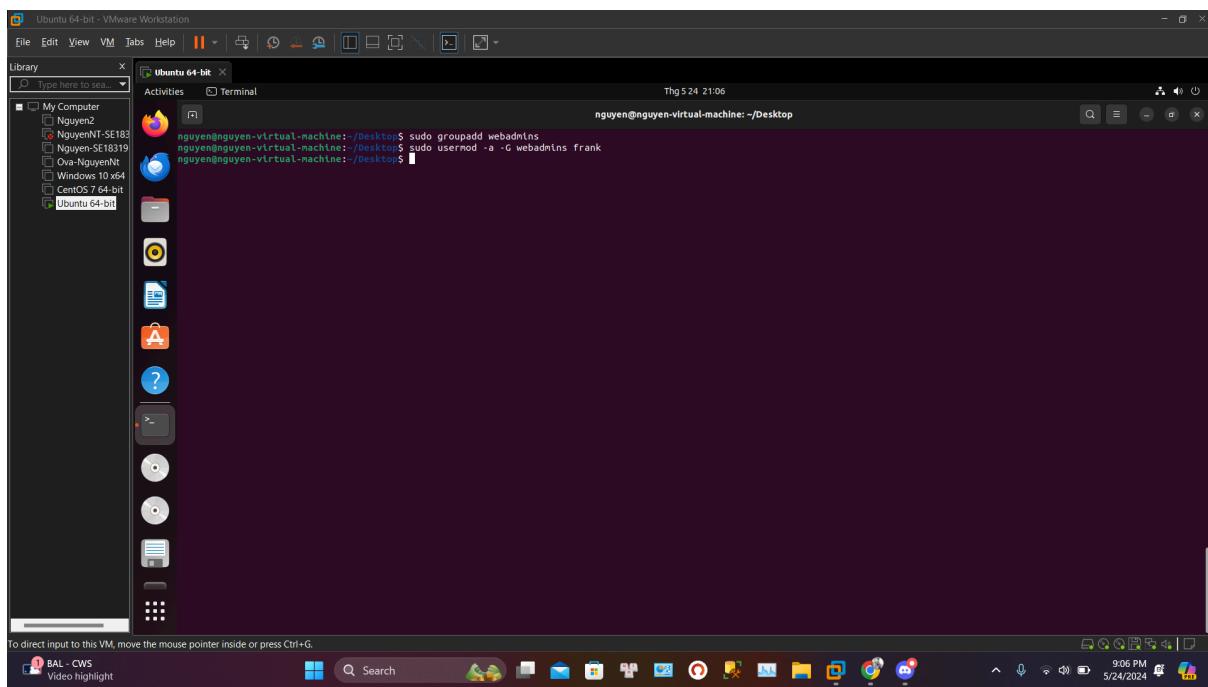
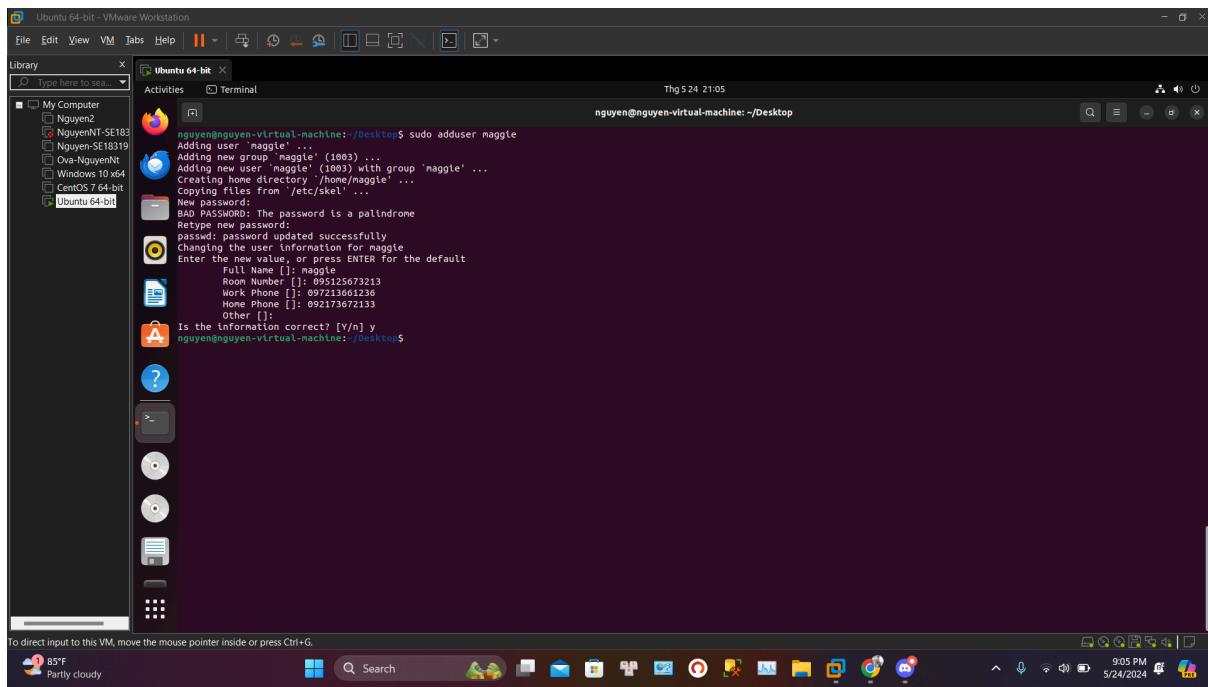
## 6.9 – Configuring more verbose SSH logging

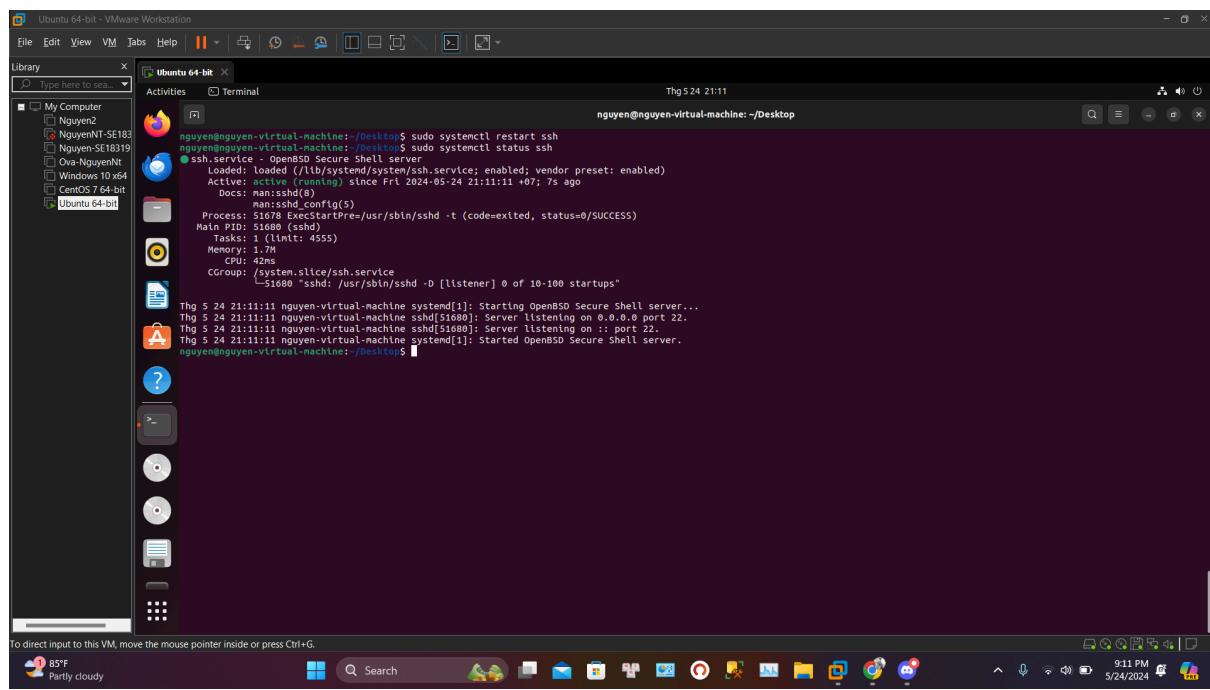
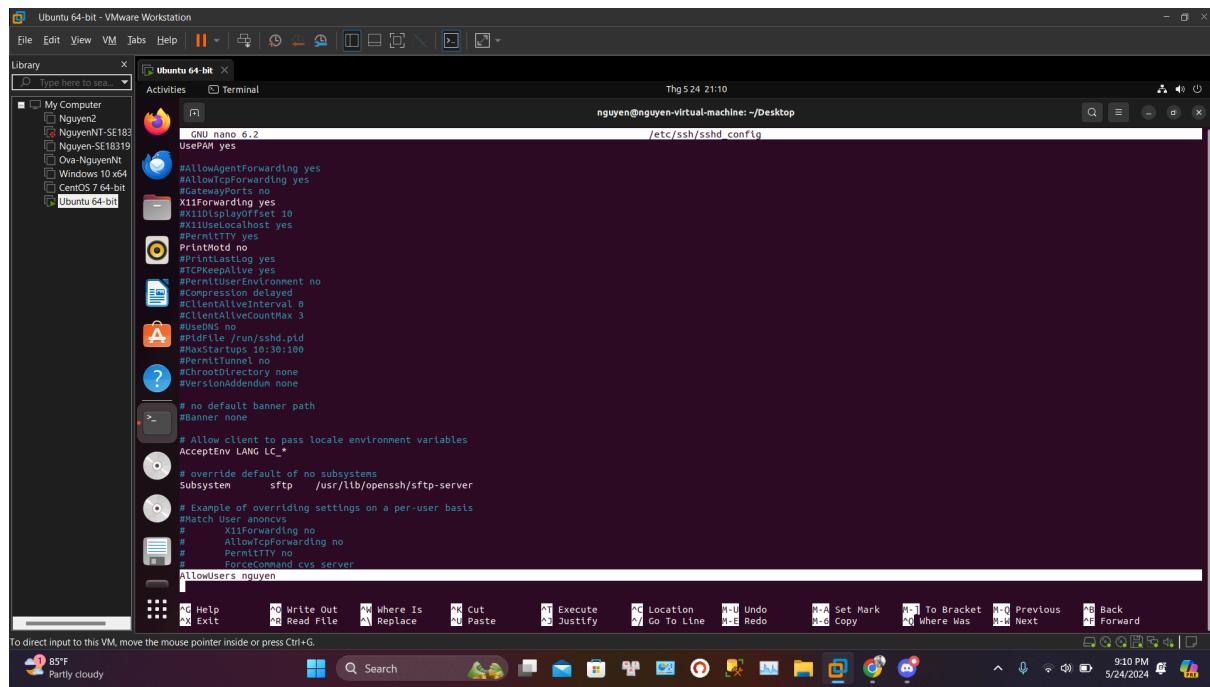


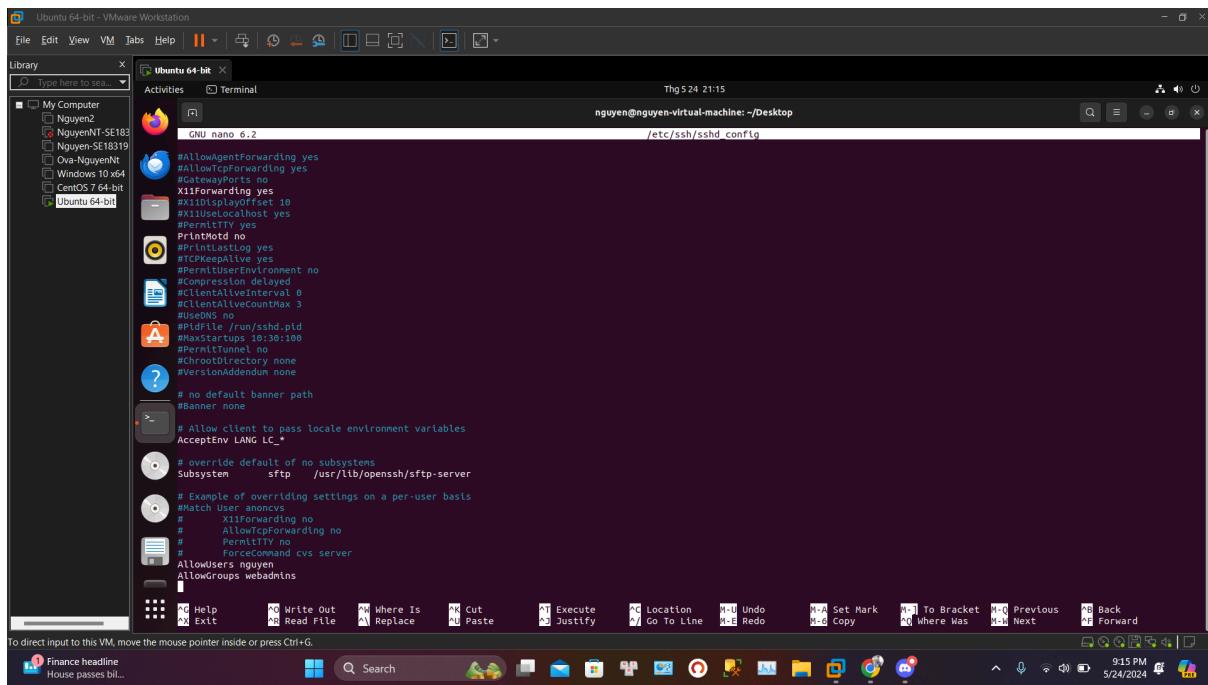


## 6.10 – Configuring whitelists within sshd\_config









## 7.1 – Searching for SUID and SGID files

```
nguyen@nguyen-virtual-machine: ~/Desktop$ sudo find / - type f -perm /6000 -ls > suid_sgids_files.txt
nguyen@nguyen-virtual-machine: ~/Desktop$ su - frank
frank@nguyen-virtual-machine: ~$ touch some_shell_script.sh
frank@nguyen-virtual-machine: ~$ chmod 4755 some_shell_script.sh
frank@nguyen-virtual-machine: ~$ ls -l some_shell_script.sh
-rwsr-xr-x 1 frank frank 0 Thg 5 24 21:37 some_shell_script.sh
frank@nguyen-virtual-machine: ~$ exit
logout
nguyen@nguyen-virtual-machine: ~/Desktop$ sudo find / - type f -perm /6000 -ls > suid_sgids_files_2.txt
nguyen@nguyen-virtual-machine: ~/Desktop$ diff suid_sgids_files.txt suid_sgids_files_2.txt
1048824      0 -rwsr-xr-x  1 frank   frank          0 Thg 5 24 21:37 /home/frank/some_shell_script.sh
```

## 7.2 – Setting security-related extended file attributes

