1) Create user with name Techie and provide sudo access to user.

Changed from admin user to root by using – sudo su –

Created a new user using command- adduser

created a password using – passwd

```
techie:x:1001:1001::/home/techie:/bin/sh
root@ubuntu:~# sudo s
sudo: s: command not found
root@ubuntu:~# pwd
/root
root@ubuntu:~# passwd techie
New password:
Retype new password:
passwd: password updated successfully
root@ubuntu:~#
```

Using command su – change the user

```
root@ubuntu:~#  su techie
$ id
uid=1001(techie) gid=1001(techie) groups=1001(techie)
$
```

Tried to install git, but I couldn't install,no sudoers,

Searched for the file (etc/sudoers) using command – find / -name sudoers

Check for the details using command – cat /etc/sudoers

```
# Host alias specification

# User alias specification

# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL

# Members of the admin group may gain root privileges
%admin ALL=(ALL) ALL

# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL
techie  ALL=(ALL:ALL) ALL
# See sudoers(5) for more information on "@include" directives:

@includedir /etc/sudoers.d
$
```

Edited by using command – vi /etc/sudoers

Check for sudo path

Add (techie ALL=(ALL:ALL) ALL)

Sudo permission added

Installed git using command – sudo apt install git

```
@includedir /etc/sudoers.d
$ sudo su
root@ubuntu:~# su techie
$ sudo apt install git
[sudo] password for techie:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
git is already the newest version (1:2.43.0-1ubuntu7.3).
0 upgraded, 0 newly installed, 0 to remove and 58 not upgraded.
$
```

2) Navigate to the home directory.

Using command – cd /home

```
vboxuser@ubuntu:/root$ cd /home
vboxuser@ubuntu:/home$
```

3) Create a new directory.

Creating new directory Using command – mkdir

```
[ec2-user@ip-172-31-17-3 ~]$ mkdir dirctory01
[ec2-user@ip-172-31-17-3 ~]$ ls
dirctory01  file1  file2  index.html
[ec2-user@ip-172-31-17-3 ~]$
```

4) list the contents of the directory

Contents of directory using command - ll

```
vboxuser@ubuntu:~/Desktop$ ls
directory01
vboxuser@ubuntu:~/Desktop$ ll
total 36
drwxr-xr-x  3 vboxuser vboxuser  4096 Sep 20 12:08 ./
drwxr-x--- 19 vboxuser vboxuser  4096 Sep 20 12:05 ../
-rw-r--r--  1 vboxuser vboxuser 12288 Sep 20 05:37 .02.swp
drwxrwxr-x  2 vboxuser vboxuser  4096 Sep 20 12:08 directory01/
-rw-------  1 vboxuser vboxuser 12288 Sep 20 05:08 .swp
```

5) change the directory

Using command – cd

6)create an new empty file

Command – touch (file name)

```
vboxuser@ubuntu:~/Desktop$ cd directory01
vboxuser@ubuntu:~/Desktop/directory01$ touch file01
vboxuser@ubuntu:~/Desktop/directory01$ vi file01
vboxuser@ubuntu:~/Desktop/directory01$
```

7)view contents of the file

View File contents using command – cat

Listing – ls

```
vboxuser@ubuntu:~/Desktop$ cd directory01
vboxuser@ubuntu:~/Desktop/directory01$ ls
file01  file02
vboxuser@ubuntu:~/Desktop/directory01$ cat file01
vboxuser@ubuntu:~/Desktop/directory01$ ls
file01  file02
vboxuser@ubuntu:~/Desktop/directory01$ vi file01
vboxuser@ubuntu:~/Desktop/directory01$
```

8) copy file to other location

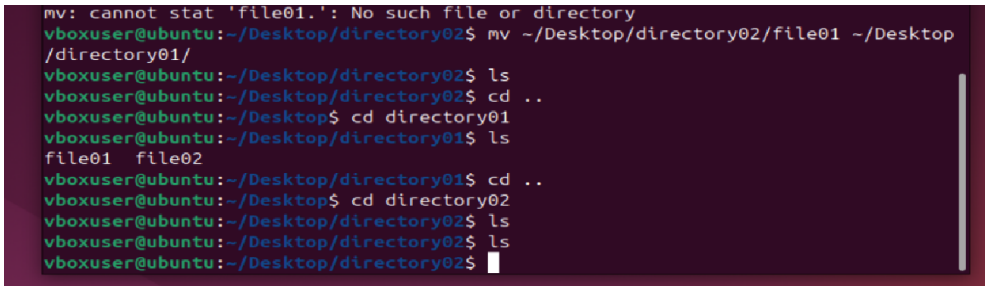
Command – cp (file name) ~/Desktop/(location name)

```
cat: directory01: Is a directory
vboxuser@ubuntu:~/Desktop$ ls
directory01  directory02
vboxuser@ubuntu:~/Desktop$ cd directory01
vboxuser@ubuntu:~/Desktop/directory01$ ls
file01
vboxuser@ubuntu:~/Desktop/directory01$ cp file01 /desktop/directory02
cp: cannot create regular file '/desktop/directory02': No such file or directory
vboxuser@ubuntu:~/Desktop/directory01$ cp file01 ~/Desktop/directory02
vboxuser@ubuntu:~/Desktop/directory01$ cd directory02
bash: cd: directory02: No such file or directory
vboxuser@ubuntu:~/Desktop/directory01$ cd ..
vboxuser@ubuntu:~/Desktop$ cd directory02
vboxuser@ubuntu:~/Desktop/directory02$ ls
file01
vboxuser@ubuntu:~/Desktop/directory02$
```

9) Move a file to another location.

Moved a file01 from directory02 to directory01 using

command – mv ~/Desktop/directory02/file01 ~/Desktop/directory01/

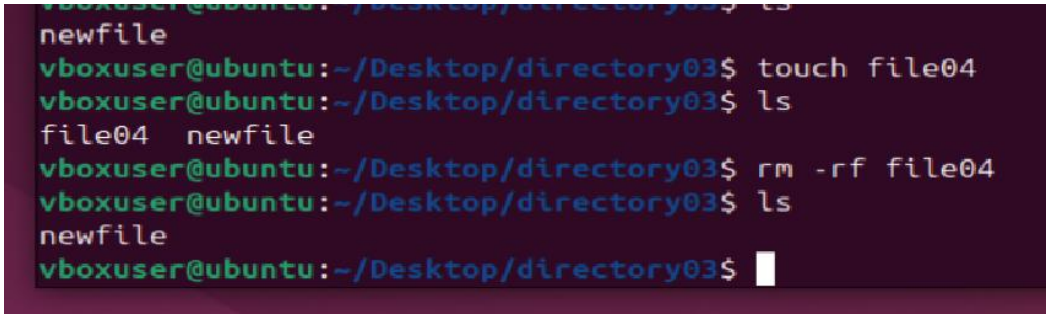


10) Rename a file.

Remane a existing file using command – mv (old filename) (enter new filename)

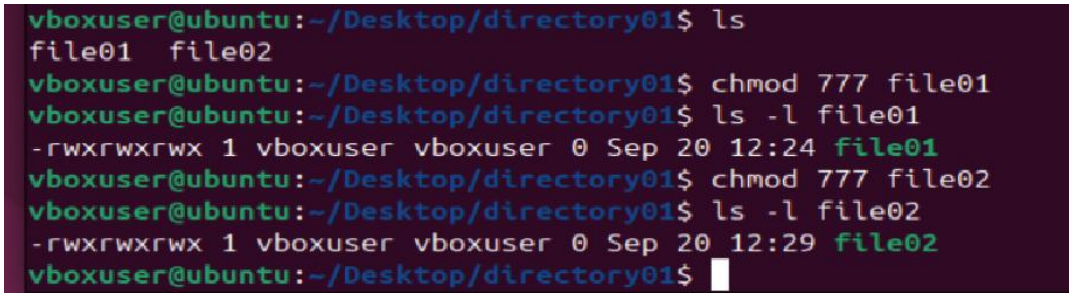
11) Delete a file.

Delete existing file using command – rm -rf (file name)



12) Grant or revoke permissions on a file or directory.

Granted permission to file using command – chmod 777 (file name)



Revoke permission to files using command – chmod 000(filename)

```
vboxuser@ubuntu:~/Desktop/directory01$ ls
file01  file02
vboxuser@ubuntu:~/Desktop/directory01$ chmod 000 file01
vboxuser@ubuntu:~/Desktop/directory01$ ls -l file01
---------- 1 vboxuser vboxuser 0 Sep 20 12:24 file01
vboxuser@ubuntu:~/Desktop/directory01$ chmod 000 file02
vboxuser@ubuntu:~/Desktop/directory01$ ls -l file02
---------- 1 vboxuser vboxuser 0 Sep 20 12:29 file02
vboxuser@ubuntu:~/Desktop/directory01$
```

13)current date and time by using command -date

```
vboxuser@ubuntu:~$ date
Sun Sep 21 12:30:57 PM UTC 2025
vboxuser@ubuntu:~$ uptime
 12:31:02 up 48 min,  1 user,  load average: 0.18, 0.15, 0.11
vboxuser@ubuntu:~$
```

14)show view running process by using command - uptime

```
vboxuser@ubuntu:~$ date
Sun Sep 21 12:30:57 PM UTC 2025
vboxuser@ubuntu:~$ uptime
 12:31:02 up 48 min,  1 user,  load average: 0.18, 0.15, 0.11
vboxuser@ubuntu:~$
```

15)view running process

Using command – ps -ef

```
vboxuser@ubuntu:~$ ps -ef
UID          PID    PPID  C STIME TTY          TIME CMD
root           1       0  0 11:42 ?        00:00:02 /sbin/init splash
root           2       0  0 11:42 ?        00:00:00 [kthreadd]
root           3       2  0 11:42 ?        00:00:00 [pool_workqueue_release]
root           4       2  0 11:42 ?        00:00:00 [kworker/R-rcu_gp]
root           5       2  0 11:42 ?        00:00:00 [kworker/R-sync_wq]
root           6       2  0 11:42 ?        00:00:00 [kworker/R-kvfree_rcu_reclaim]
root           7       2  0 11:42 ?        00:00:00 [kworker/R-slub_flushwq]
root           8       2  0 11:42 ?        00:00:00 [kworker/R-netns]
root          13       2  0 11:42 ?        00:00:00 [kworker/R-mm_percpu_wq]
root          14       2  0 11:42 ?        00:00:00 [rcu_tasks_kthread]
root          15       2  0 11:42 ?        00:00:00 [rcu_tasks_rude_kthread]
root          16       2  0 11:42 ?        00:00:00 [rcu_tasks_trace_kthread]
root          17       2  0 11:42 ?        00:00:01 [ksoftirqd/0]
root          18       2  0 11:42 ?        00:00:00 [rcu_preempt]
root          19       2  0 11:42 ?        00:00:00 [rcu_exp_par_gp_kthread_worker/0]
root          20       2  0 11:42 ?        00:00:00 [rcu_exp_gp_kthread_worker]
```

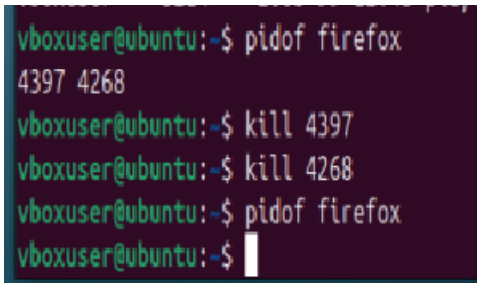
16) Kill a running process.

Searched for running process using command= ps -ef

Searched for firefox as it is running or not using pidof firefox

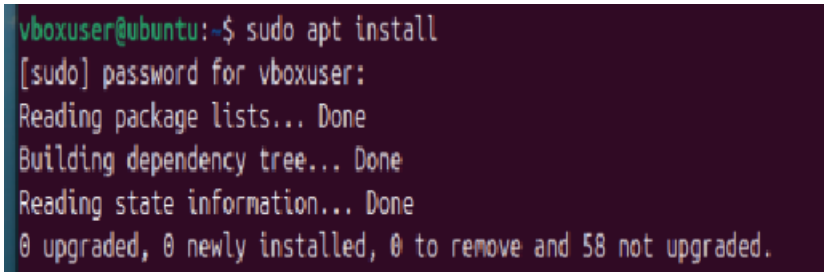
Received PID number, it means running

To kill process by using command = kill (pid no)



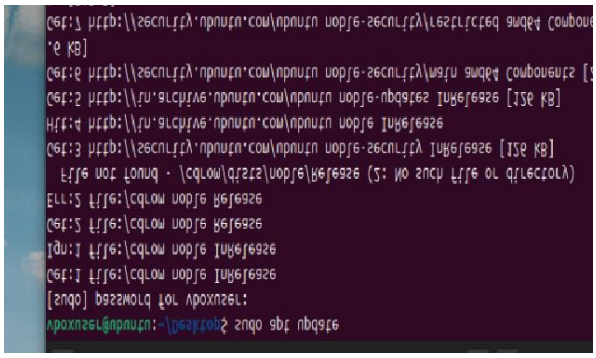
17)) Install a package using the package manager (e.g., apt or yum).

Command- sudo apt install



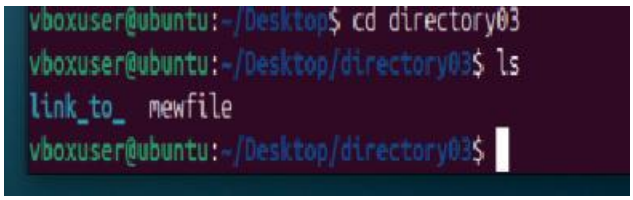
18) Update the system packages.

Command- sudo apt update



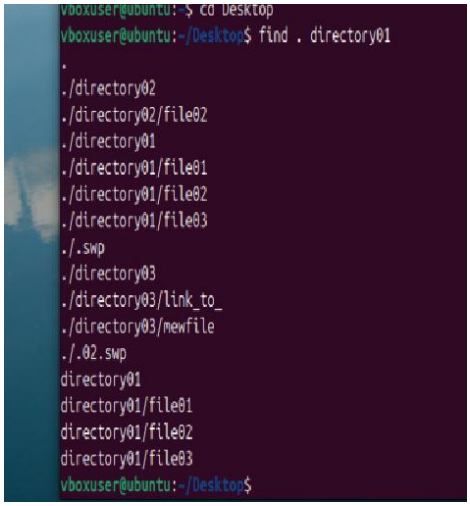
19)create symbolic link

Command – ln -s ~/Desktop/directory01 ~/Desktoop/directory03link_to_1



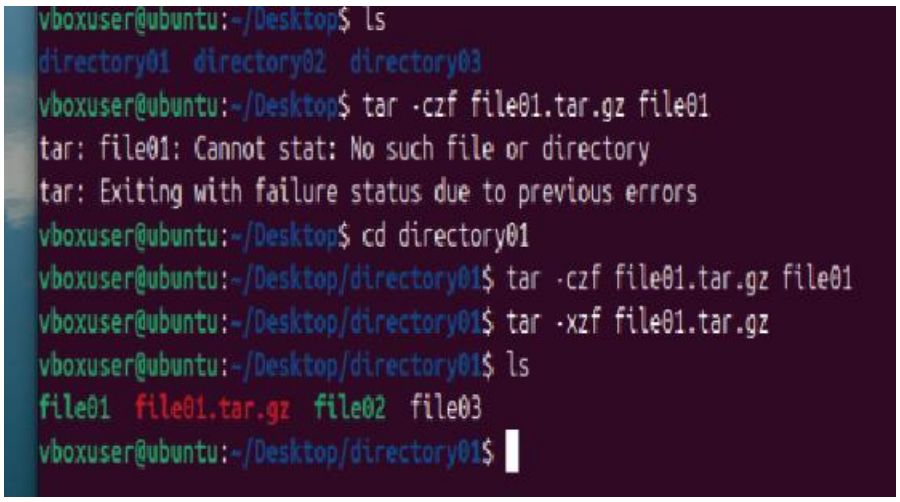
20) Search for files using the find command.

Command- find . (file name)



21)compress and extract file

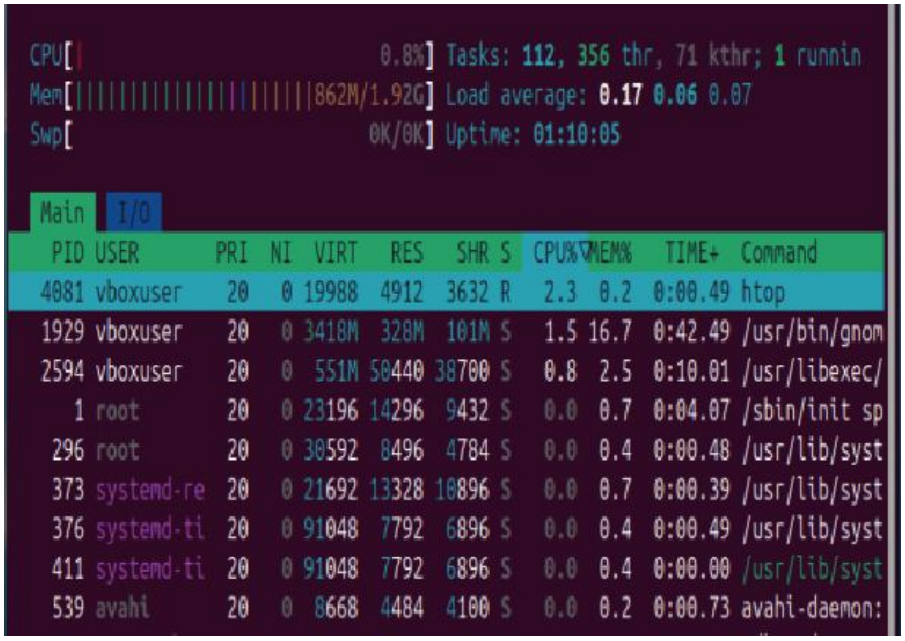
Command – tar -czf.file01.tar.gz file01



22) Monitor system resources with top or htop.

Installed htop resource with sudo apt install htop

Command – htop – running services list



23) Create and manage user groups.

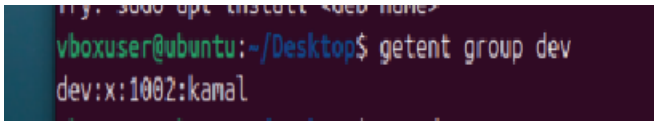
Command- sudo addgroup (name)

Sudo useradd -m s /bin/bash -G (name) (username0

Set passwd

Verify command – id (username)

TO see – getent group

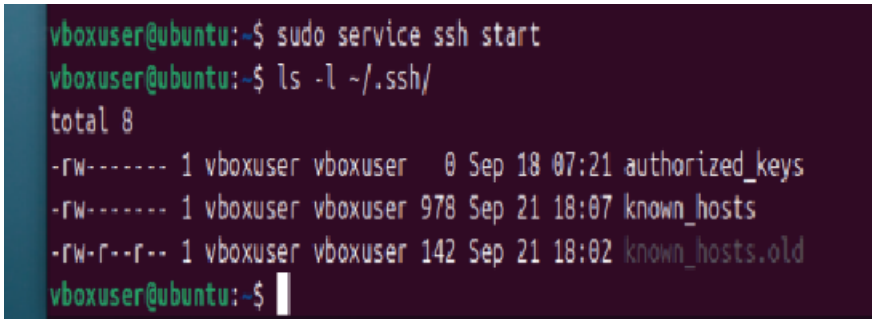


24) Set up SSH password less authentication.

Fetch for ip using command- ifconfig

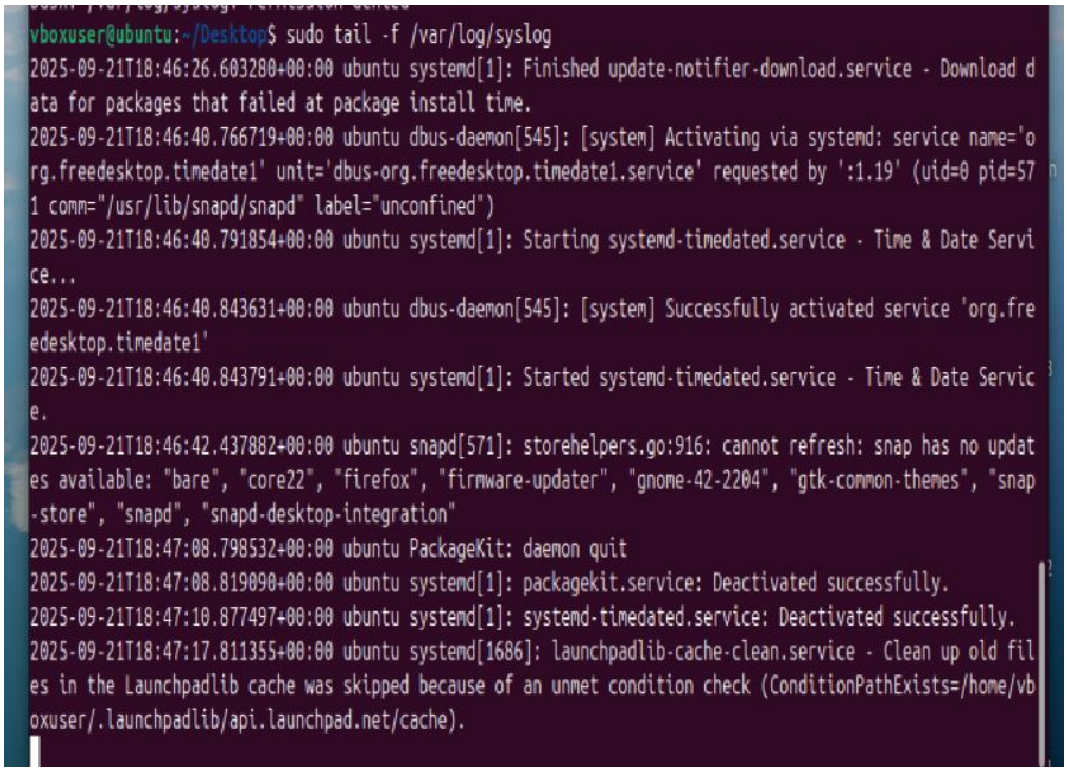
Changed the server using command- ssh (username_ip)

Commands - ssh-keygen -t rsa -b 4096 -f ~/.ssh/keygenration



25) Monitor log files using tail or grep.

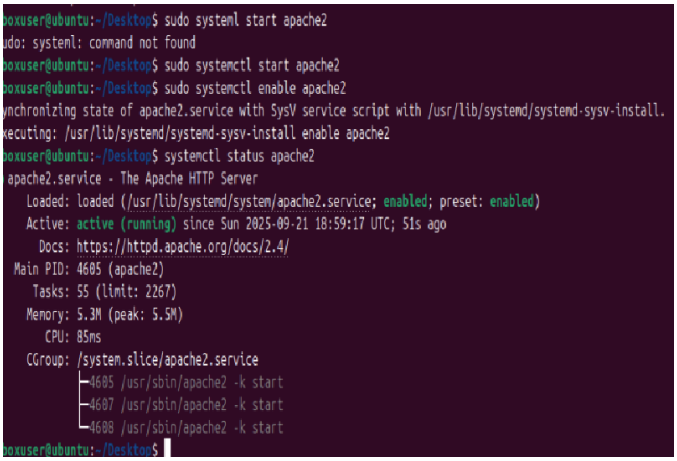
Using command – sudo tail -f /var/log/syslog



26) Set up a web server (e.g., Apache or Nginx).

Command – sudo apt install apache2

- sudo systemctl start apache2



- sudo systemctl enable apache

to check the status – systemctl status apache2

login into browser using http://server ip.

27) Configure and secure a MySQL Database

* sudo apt install mysql-server -y

To start the server

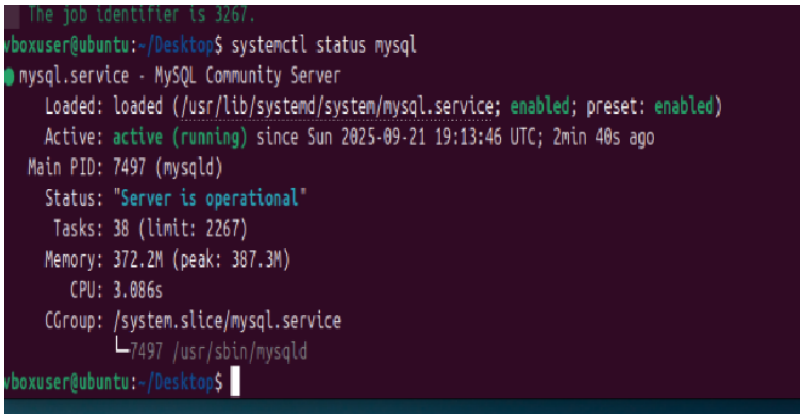
* sudo systemctl start mysql

To enable the server

* sudo systemctl enable mysql

To secure mysql server

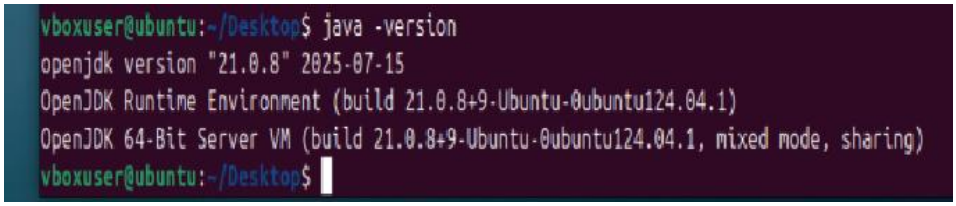
* sudo mysql_secure_installation



28) Set up a Application Server (e.g.,Apache Tomcat)

I installed java by using command

* sudo apt install openjdk-11-jdk -y



29) create a service file for Apache Tomcat.(Should execute by using systemtctl command)

*changed to root user

*for installing tomcat I used command – sudo yum install -y javs-11-open-jdl-devel

*verified as java -version

*create a tomcat user by using – sudo useradd -r -m -u -d /opt/tomcat -s /bin/false tomcat

*java home - sudo nano /etc/systemd/system/tomcat.service

* created the file in one shot using tee and ran this command in terminal –

cat <<EOF | sudo tee /etc/systemd/system/tomcat.service > /dev/null

[Unit]

Description=Apache Tomcat Web Application Container

After=network.target

[Service]

Type=forking

User=tomcat

Group=tomcat

Environment=JAVA_HOME=/usr/lib/jvm/java-11-openjdk

Environment=CATALINA_HOME=/opt/tomcat

Environment=CATALINA_BASE=/opt/tomcat

Environment=CATALINA_PID=/opt/tomcat/temp/tomcat.pid

Environment=CATALINA_OPTS=-Xms512M -Xmx1024M -server -XX:+UseParallelGC

ExecStart=/opt/tomcat/bin/startup.sh

ExecStop=/opt/tomcat/bin/shutdown.sh

Restart=on-failure

RestartSec=10

LimitNOFILE=65536

[Install]

WantedBy=multi-user.target

EOF

*reload tomcat by using command – sudo systemctl daemon-reload

* start tomcat - sudo systemctl enable –now tomcat

```
[Install]
WantedBy=multi-user.target
EOF
[root@ip-172-31-47-238 ~]# sudo systemctl daemon-reload
sudo systemctl enable --now tomcat
sudo systemctl status tomcat
Created symlink /etc/systemd/system/multi-user.target.wants/tomcat.service → /etc/systemd/sy
stem/tomcat.service.
Job for tomcat.service failed because the control process exited with error code.
See "systemctl status tomcat.service" and "journalctl -xeu tomcat.service" for details.
● tomcat.service - Apache Tomcat Web Application Container
     Loaded: loaded (/etc/systemd/system/tomcat.service; enabled; preset: disabled)
     Active: activating (auto-restart) (Result: exit-code) since Tue 2025-09-23 16:08:48 UT
    Process: 2592 ExecStart=/opt/tomcat/bin/startup.sh (code=exited, status=203/EXEC)
        CPU: 1ms
```

*To read - readlink -f $(which java)

```
[root@ip-172-31-47-238 ~]# readlink -f $(which java)
/usr/lib/jvm/java-11-amazon-corretto.x86_64/bin/java
[root@ip-172-31-47-238 ~]#
```

30) Print specific columns from a delimited file.

*installed python pip using command - sudo yum install -y python3-pip

pip3 install csvkit

*Created a file using command –

cat > data.csv <<EOL

a,1

b,2

c,3

d,4

e,5

to exit and save file enter – EOL

```
[ec2-user@ip-172-31-47-238 ~]$ cat > data.csv <<EOL
> name,rollno
> a,1
> b,2
> c,3
> d,4
> e,5
> EOL
[ec2-user@ip-172-31-47-238 ~]$
```

31)Filter and print lines based on a specific pattern or condition.

*printed files using – csvcut -c name data.csv

*cvscut -c name,rollno data.csv

```
[ec2-user@ip-172-31-47-238 ~]$ csvcut -c name data.csv
name
a
b
c
d
e
[ec2-user@ip-172-31-47-238 ~]$ csvcut -c rollno data.csv
rollno
1
2
3
4
5
[ec2-user@ip-172-31-47-238 ~]$ csvcut -c name,rollno data.csv
name,rollno
a,1
b,2
c,3
d,4
e,5
[ec2-user@ip-172-31-47-238 ~]$
```

32) Calculate and print the average, sum, or other statistics of a column.

*created a data.casl file using – cat > data.cal <<EOL

TO calculate command - awk '{sum += $2} END {print "Sum =", sum}' data.txt

```
[ec2-user@ip-172-31-47-238 ~]$  cat > data.csv <<EOL
> name price
> A 10
> B 20
> C 10
> D 30
> EOL
[ec2-user@ip-172-31-47-238 ~]$ vi data.csv
[ec2-user@ip-172-31-47-238 ~]$ mv data.csv data.cal
[ec2-user@ip-172-31-47-238 ~]$ ls
data.cal  file01
[ec2-user@ip-172-31-47-238 ~]$ awk '{sum += $2} END {print "Sum =", sum}' data.c
al
Sum = 70
```

33) Perform string manipulation, such as extracting substrings or changing case.

str="HelloWorld"

echo ${str:0:5} # Extract 5 chars starting at position 0

echo ${str:5:5} # Extract next 5 chars

```
[ec2-user@ip-172-31-47-238 ~]$ str="HelloWorld"
echo ${str:0:5}   # Extract 5 chars starting at position 0
echo ${str:5:5}   # Extract next 5 chars
Hello
World
[ec2-user@ip-172-31-47-238 ~]$
```

34) Count the occurrences of a specific pattern in a file

To find paericular word or letter – grep -c “C” data.cal

```
[ec2-user@ip-172-31-47-238 ~]$ grep -c "error" data.cal
0
[ec2-user@ip-172-31-47-238 ~]$ grep -c "C" data.cal
1
[ec2-user@ip-172-31-47-238 ~]$
```

35) Sort lines based on a specific field or column.

sort -t, -k1,1 data.cal

-t, → delimiter is a comma.

```
[ec2-user@ip-172-31-47-238 ~]$ sort -t, -k1,1 data.cal
A 10
B 20
C 10
D 30
name price
[ec2-user@ip-172-31-47-238 ~]$
```

36) Merge multiple files based on a common field or column.

Created 2 file using – cat > data.merge << EOL

Merged those 2 files using command - join -t, -1 1 -2 1 students.cal marks.cal

```
[ec2-user@ip-172-31-47-238 ~]$ cat > data.cal << EOL
> 1,10,
> 2,10
> 3,10
> 4,10
> 5,10
> 6,10
> EOL
[ec2-user@ip-172-31-47-238 ~]$ join -t -1 1 -2 1 data.merge data.cal
join: extra operand 'data.cal'
Try 'join --help' for more information.
[ec2-user@ip-172-31-47-238 ~]$ join -t, -1 1 -2 1 data.merge data.cal
1,A,10,
2,B,10
3,C,10
4,D,10
5,E,10
6,F,10
[ec2-user@ip-172-31-47-238 ~]$
```

37) Substitute text in a file using search and replace

*my files data.merge - sed -i 's/A/Z/' data.merge

Swapped A with Z –

```
[ec2-user@ip-172-31-47-238 ~]$ sed -i 's/A/Z/' data.merge
[ec2-user@ip-172-31-47-238 ~]$ sed -i 's/A/Z/' data.merge
[ec2-user@ip-172-31-47-238 ~]$ ls
data.cal  data.merge  file01
[ec2-user@ip-172-31-47-238 ~]$ cat data.cal
1,10,
2,10
3,10
4,10
5,10
6,10
[ec2-user@ip-172-31-47-238 ~]$ cat data.merge
1,Z
2,B
3,C
4,D
5,E
6,F
[ec2-user@ip-172-31-47-238 ~]$
```

38) Delete specific lines based on a pattern or line number.

*Deleting the second line from data.merge using command - sed -i '2d' data.merge

*verified by using “cat” command.

```
[ec2-user@ip-172-31-47-238 ~]$ sed -i '2d' data.merge
[ec2-user@ip-172-31-47-238 ~]$ ls
data.cal  data.merge  file01
[ec2-user@ip-172-31-47-238 ~]$ cat data.merge
1,Z
3,C
4,D
5,E
6,F
[ec2-user@ip-172-31-47-238 ~]$
```

39) Append or insert text before or after a specific pattern or line.

*Add a new line after line containing 3,C

Command - sed -i '/3,C/a 3.5,X' data.merge

Check command - cat

```
[ec2-user@ip-172-31-47-238 ~]$ sed -i '/3,C/a 3.5,X' data.merge
[ec2-user@ip-172-31-47-238 ~]$ cat data.merge
1,Z
3,C
3.5,X
4,D
5,E
6,F
[ec2-user@ip-172-31-47-238 ~]$
```

40) Print only specific lines from a file.

To print specific line Command - sed -n '3p' data.merge

```
[ec2-user@ip-172-31-47-238 ~]$ sed -n '3p' data.merge
3.5,X
[ec2-user@ip-172-31-47-238 ~]$
```

41) Copy file from linux to windows machine

Exit from ec2 and using public ip from ec2 instance by adding scp to address

scp -i .\linux_key.pem ec2-user@ec2-13-233-87-45.ap-south-1.compute.amazonaws.com:/home/ec2-user/data.merge C:\Users\kamal\Desktop\

using powershell

```
Set-Location : Parameter cannot be processed because the
parameter name 'i' is ambiguous. Possible matches include:
-InformationAction -InformationVariable.
At line:1 char:59
+ cd C:\Users\kamal\Downloadscd C:\Users\kamal\Downloadsscp -i
.\linux_ ...
+                                                           ~~
    + CategoryInfo          : InvalidArgument: (:) [Set-Location
   ], ParameterBindingException
    + FullyQualifiedErrorId : AmbiguousParameter,Microsoft.Power
   Shell.Commands.SetLocationCommand

PS C:\Users\guntu> icacls .\linux_key.pem /inheritance:r
.\linux_key.pem: The system cannot find the file specified.
Successfully processed 0 files; Failed processing 1 files
PS C:\Users\guntu> icacls .\linux_key.pem /grant:r "%USERNAME%:R"
%USERNAME%: No mapping between account names and security IDs was
done.
Successfully processed 0 files; Failed processing 1 files
PS C:\Users\guntu> scp -i C:\Users\kamal\Downloads\linux_key.pem
:\Users\kamal\Desktop\data.merge ec2-user@ec2-13-233-87-45.ap-sou
h-1.compute.amazonaws.com:/home/ec2-user/
C:\WINDOWS\System32\OpenSSH\scp.exe: stat local "C:/Users/kamal/De
sktop/data.merge": No such file or directory
PS C:\Users\guntu> scp -i C:\Users\kamal\Downloads\linux_key.pem
:\Users\kamal\Desktop\data.merge ec2-user@ec2-13-233-87-45.ap-sou
h-1.compute.amazonaws.com:/home/ec2-user/
C:\WINDOWS\System32\OpenSSH\scp.exe: stat local "C:/Users/kamal/De
sktop/data.merge": No such file or directory
```

42) 5 use cases for AWK and 5 use cases for sed

Case 1 – printing specific coloumn

```
[ec2-user@ip-172-31-17-3 ~]$ awk '{print $1}' file1
1
2
3
4
[ec2-user@ip-172-31-17-3 ~]$
```

Case 2 – Adding number

Command - awk '{sum+=$1} END {print "Total:", sum}' file1

```
[ec2-user@ip-172-31-17-3 ~]$ awk '{print $1}' file1
1
2
3
4
[ec2-user@ip-172-31-17-3 ~]$ awk '{sum+=$1} END {print "Total:", sum}' file1
Total: 10
[ec2-user@ip-172-31-17-3 ~]$
```

Case 3 - average of nu,ber in file

Command - awk '{sum+=$1} END {print "Average:", sum/NR}' file2

```
Total: 10
[ec2-user@ip-172-31-17-3 ~]$ awk '{sum+=$1} END {print "Average:", sum/NR}' file2
Average: 6.5
[ec2-user@ip-172-31-17-3 ~]$
```

4. Case 4 - Filter rows (only numbers greater than 2)

command - awk '$1 > 2' file1

```
[ec2-user@ip-172-31-17-3 ~]$ awk '$1 > 2' file1
3
4
[ec2-user@ip-172-31-17-3 ~]$
```

Case 5 – combine file1 and file2

Command - paste file1 file2 | awk '{print $1, "+", $2, "=", $1+$2}'

```
[ec2-user@ip-172-31-17-3 ~]$ paste file1 file2 | awk '{print $1, "+", $2, "=", $1+$2}'
1 + 5 = 6
2 + 6 = 8
3 + 7 = 10
4 + 8 = 12
[ec2-user@ip-172-31-17-3 ~]$
```