LINUX TASK EXECUTION

1. **Create a user with the name Techie and provide sudo access to the user.**

```
root@Ubuntu:/# useradd techie
root@Ubuntu:/# passwd techie
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
root@Ubuntu:/# su techie
$ whoami
techie
$
```

```
# 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
$ whoami
techie
$
```

Created a user with the name Techie, and made the user “sudoer”.

2. **Navigate to the home directory.**

```
omer@Ubuntu:~$ cd /home
omer@Ubuntu:/home$ ls
farooq  omer
omer@Ubuntu:/home$
```

3) Create a new directory.

```
omer@Ubuntu:~$ cd /home
omer@Ubuntu:/home$ mkdir test
mkdir: cannot create directory ‘test’: Permission denied
omer@Ubuntu:/home$ sudo mkdir test
[sudo] password for omer:
omer@Ubuntu:/home$ ls
omer  test
omer@Ubuntu:/home$
```

4) List the contents of a directory.

```
[sudo] password for omer:
omer@Ubuntu:/home$ ls
omer  test
omer@Ubuntu:/home$ ls
omer  test
omer@Ubuntu:/home$ ls -a
.  ..  omer  test
omer@Ubuntu:/home$ ls -ll
total 8
drwxrwxrwx 15 omer omer 4096 Aug  1 18:42 omer
drwxr-xr-x  2 root root 4096 Aug  2 09:54 test
omer@Ubuntu:/home$ ls -l
total 8
drwxrwxrwx 15 omer omer 4096 Aug  1 18:42 omer
drwxr-xr-x  2 root root 4096 Aug  2 09:54 test
omer@Ubuntu:/home$ ls -la
total 16
drwxr-xr-x  4 root root 4096 Aug  2 09:54 .
drwxr-xr-x 25 root root 4096 Aug  2 09:34 ..
drwxrwxrwx 15 omer omer 4096 Aug  1 18:42 omer
drwxr-xr-x  2 root root 4096 Aug  2 09:54 test
omer@Ubuntu:/home$
```

5) Change the current directory.

```
omer@Ubuntu:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
omer@Ubuntu:~$ pwd
/home/omer
omer@Ubuntu:~$ cd ..
omer@Ubuntu:/home$ cd ../..
omer@Ubuntu:/$ pwd
/
omer@Ubuntu:/$ ls
a                boot   etc   lib              lost+found  opt   run              snap  tmp
bin              cdrom  home  lib64            media       proc  sbin             srv   usr
bin.usr-is-merged  dev    jab   lib.usr-is-merged  mnt         root  sbin.usr-is-merged  sys   var
omer@Ubuntu:/$
```

6) Create a new empty file

```
omer@Ubuntu:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
omer@Ubuntu:~$ touch a b
omer@Ubuntu:~$ ls
a  b  Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
omer@Ubuntu:~$
```

7) View the contents of a file.

```
omer@Ubuntu:~$ ls
a  b  Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
omer@Ubuntu:~$ vi a
omer@Ubuntu:~$ vi b
omer@Ubuntu:~$ cat a b
This is a test file
This is a test file too
omer@Ubuntu:~$
```

8) Copy a file to another location

```
omer@Ubuntu:~$ sudo cp /home/omer/a /home
omer@Ubuntu:~$ ls
a  b  Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
omer@Ubuntu:~$ cd ..
omer@Ubuntu:/home$ ls
a  omer  test
omer@Ubuntu:/home$
```

9) Move a file to another location

```
omer@Ubuntu:~$ ls
a  b  Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
omer@Ubuntu:~$ pwd
/home/omer
omer@Ubuntu:~$ sudo mv /home/omer/b /home
omer@Ubuntu:~$ ls
a  Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
omer@Ubuntu:~$ cd ..
omer@Ubuntu:/home$ ls
a  b  omer  test
omer@Ubuntu:/home$
```

10) Rename a file

```
omer@Ubuntu:/home$ sudo mv /home/c d
omer@Ubuntu:/home$ ls
a  b  d  omer  test
omer@Ubuntu:/home$
```

A file with the name “c” is changed to “d”

11) Delete a file

```
omer@Ubuntu:/home$ ls
a  b  d  omer  test
omer@Ubuntu:/home$ sudo rm -f d
omer@Ubuntu:/home$ ls
a  b  omer  test
omer@Ubuntu:/home$
```

A file with the name “d” is deleted. Next line shows no file with that name.

12) Grant or revoke permissions on a file or directory

```
omer@Ubuntu:/home$ ll
total 24
drwxr-xr-x  4 root root 4096 Aug  2 10:45 ./
drwxr-xr-x 24 root root 4096 Aug  2 10:11 ../
-rw-r--r--  1 root root   20 Aug  2 10:14 a
-rw-rw-r--  1 omer omer   24 Aug  2 10:13 b
drwxrwxrwx 15 omer omer 4096 Aug  2 10:16 omer/
drwxr-xr-x  2 root root 4096 Aug  2 09:54 test/
omer@Ubuntu:/home$ sudo chmod 777 a
omer@Ubuntu:/home$ sudo chmod 777 b
omer@Ubuntu:/home$ ll
total 24
drwxr-xr-x  4 root root 4096 Aug  2 10:45 ./
drwxr-xr-x 24 root root 4096 Aug  2 10:11 ../
-rwxrwxrwx  1 root root   20 Aug  2 10:14 a*
-rwxrwxrwx  1 omer omer   24 Aug  2 10:13 b*
drwxrwxrwx 15 omer omer 4096 Aug  2 10:16 omer/
drwxr-xr-x  2 root root 4096 Aug  2 09:54 test/
omer@Ubuntu:/home$
```

13) View the current date and time.

```
omer@Ubuntu:/home$ date
Sat Aug  2 10:49:55 AM UTC 2025
```

14) Check the system uptime.

```
omer@Ubuntu:/home$ uptime
 11:03:39 up  3:14,  1 user,  load average: 0.04, 0.12, 0.14
omer@Ubuntu:/home$
```

15) View the running processes.

```
omer@Ubuntu:/home$ ps aux
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.3  23216 14024 ?        Ss   07:49   0:03 /sbin/init splash
root           2  0.0  0.0      0     0 ?        S    07:49   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        S    07:49   0:00 [pool_workqueue_release]
root           4  0.0  0.0      0     0 ?        I<   07:49   0:00 [kworker/R-rcu_gp]
root           5  0.0  0.0      0     0 ?        I<   07:49   0:00 [kworker/R-sync_wq]
root           6  0.0  0.0      0     0 ?        I<   07:49   0:00 [kworker/R-kvfree_rcu_reclaim
root           7  0.0  0.0      0     0 ?        I<   07:49   0:00 [kworker/R-slub_flushwq]
root           8  0.0  0.0      0     0 ?        I<   07:49   0:00 [kworker/R-netns]
root          11  0.0  0.0      0     0 ?        I<   07:49   0:00 [kworker/0:0H-kblockd]
root          13  0.0  0.0      0     0 ?        I<   07:49   0:00 [kworker/R-mm_percpu_wq]
root          14  0.0  0.0      0     0 ?        I    07:49   0:00 [rcu_tasks_kthread]
root          15  0.0  0.0      0     0 ?        I    07:49   0:00 [rcu_tasks_rude_kthread]
root          16  0.0  0.0      0     0 ?        I    07:49   0:00 [rcu_tasks_trace_kthread]
root          17  0.0  0.0      0     0 ?        S    07:49   0:00 [ksoftirqd/0]
```

16) Kill a running process.

```
omer@Ubuntu:/home$ kill 3591
bash: kill: (3591) - Operation not permitted
omer@Ubuntu:/home$ sudo kill -9 3591
omer@Ubuntu:/home$
```

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

```
omer@Ubuntu:/$ htop
Command 'htop' not found, but can be installed with:
sudo snap install htop  # version 3.4.1, or
sudo apt  install htop  # version 3.2.2-2
See 'snap info htop' for additional versions.
omer@Ubuntu:/$ sudo snap install htop
[sudo] password for omer:
htop 3.4.1 from Maximiliano Bertacchini (maxiberta✪) installed
omer@Ubuntu:/$
```

18) Update the system packages.

```
omer@Ubuntu:/home$ sudo apt update -y
Hit:1 http://in.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
23 packages can be upgraded. Run 'apt list --upgradable' to see them.
omer@Ubuntu:/home$
```

19) Create a symbolic link

```
$ sudo ln -s /home/test/a/f1 /sim_links
$ sudo ln -s /home/test/b /sim_links
$ sudo ln -s /home/test/3 /sim_links
$ cd sim_links
$ ls
3  b  f1
$ cd /home/test
$ ls
1  2  3  a  b  c
$ cd a
$ ls
f1
```

20) Search for files using the find command

```
$ cd /home/test
$ ls
1.txt  2.c  3.txt  4.c  5.txt  a  b  c
$ sudo find -name "*.txt"
./3.txt
./1.txt
./5.txt
$ sudo find . -name "4.c"
./4.c
$ sudo find . -type d
.
./a
./c
./b
$
```

21) Compress and decompress files using tar

```
[root@ip-172-31-28-79 home]# tar -cf archive.tar file1.txt file2.txt
[root@ip-172-31-28-79 home]# ls
archive.tar  ec2-user  file1.txt  file2.txt
[root@ip-172-31-28-79 home]#
```

22) Monitor system resources with top or htop

```
  Main   I/O
    PID USER      PRI  NI  VIRT   RES   SHR S  CPU%▽MEM%   TIME+  Command
   1896 omer       20   0 4862M  407M     0 S   6.6 10.4  6:42.91 /usr/bin/gnome-shell
   1899 omer       20   0 4862M  407M     0 S   6.6 10.4  6:36.42 /usr/bin/gnome-shell
   1900 omer       20   0 4862M  407M     0 S   5.9 10.4  6:27.00 /usr/bin/gnome-shell
   1898 omer       20   0 4862M  407M     0 S   5.6 10.4  6:39.24 /usr/bin/gnome-shell
   1866 omer       20   0 4862M  407M   145M S   2.8 10.4  2:16.51 /usr/bin/gnome-shell
   7318 omer       20   0  5976  4316  3164 R   2.8  0.1  0:01.64 /snap/htop/5092/usr/local/bin/htop
   2674 omer       20   0  550M 61380 47904 S   1.7  1.5  0:36.37 /usr/libexec/gnome-terminal-server
   1891 omer       20   0 4862M  407M     0 S   0.7 10.4  0:13.55 /usr/bin/gnome-shell
   1918 omer       20   0 4862M  407M     0 S   0.7 10.4  0:09.09 /usr/bin/gnome-shell
```

23) Create and manage user groups

```
omer@Ubuntu:/$ sudo groupadd devops
omer@Ubuntu:/$ sudo gpasswd -a techie devops
Adding user techie to group devops
omer@Ubuntu:/$ sudo usermod -aG devops omer
omer@Ubuntu:/$ getent group devops
devops:x:1004:techie,omer
omer@Ubuntu:/$
```

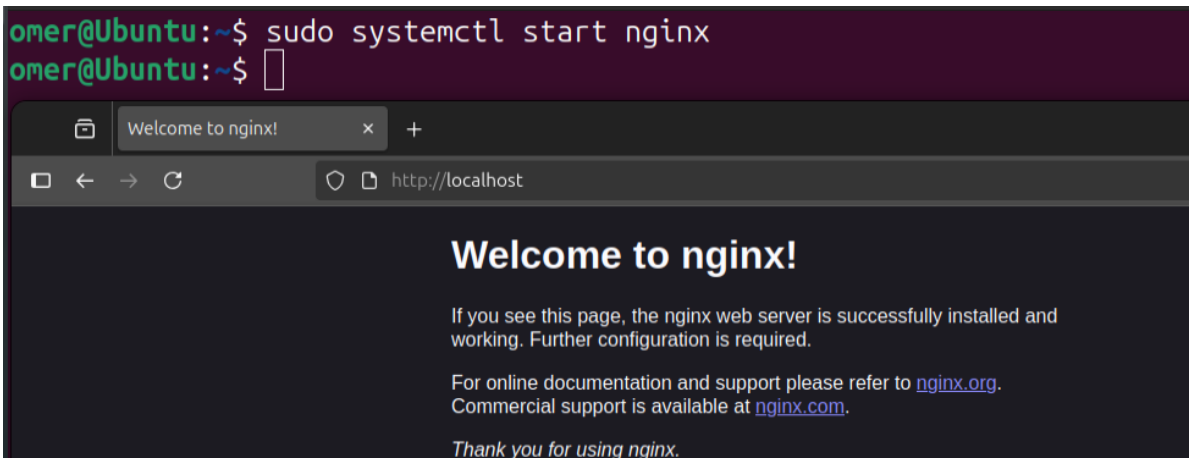
24) Set up SSH passwordless authentication

```
omer@Ubuntu:/$ sudo ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa
Your public key has been saved in /root/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:eeUlESjaThNJdYV1ietgRecLWqX3s2DVPwQsZch86kc root@Ubuntu
The key's randomart image is:
+---[RSA 3072]----+
|       ..o+.OX+oo|
|        + .*o**o.|
|       o o  B+o=.|
|      . +. *oE= +|
|       oS.+.=o +o|
|        .. ..o. +|
|             .  .|
|                 |
|                 |
+----[SHA256]-----+
```

25) Monitor log files using tail or grep

```
omer@Ubuntu:~$ sudo tail -f /var/log/syslog | sudo grep "error" /var/log/syslog
2025-07-28T08:29:53.081104+00:00 localhost systemd[1]: apport-autoreport.path - Process error reports when automatic reporting is e
nabled (file watch) was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-07-28T08:29:53.081133+00:00 localhost systemd[1]: apport-autoreport.timer - Process error reports when automatic reporting is
enabled (timer based) was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-07-28T08:29:53.083993+00:00 localhost alsactl[852]: alsa-lib main.c:1554:(snd_use_case_mgr_open) error: failed to import hw:0
use case configuration -2
2025-07-28T08:30:15.923157+00:00 localhost org.gnome.Shell.desktop[1952]: MESA: error: ZINK: failed to choose pdev
2025-07-28T08:30:32.429521+00:00 localhost gnome-initial-s[3199]: Failed to set text 'You can always enable Ubuntu Pro later via th
e Software & Updates application' from markup due to error parsing markup: Error on line 1: Entity did not end with a semicolon; mo
st likely you used an ampersand character without intending to start an entity – escape ampersand as &amp;amp;
2025-07-28T08:30:47.187667+00:00 localhost tracker-miner-fs-3[3519]: (tracker-extract-3:3519): GLib-GIO-WARNING **: 08:30:47.186: E
rror creating IO channel for /proc/self/mountinfo: Invalid argument (g-io-error-quark, 13)
2025-07-28T08:42:38.289410+00:00 Ubuntu gnome-shell[2532]: libinput error: event5  - ImExPS/2 Generic Explorer Mouse: client bug: e
vent processing lagging behind by 26ms, your system is too slow
2025-07-28T08:42:43.885089+00:00 Ubuntu gnome-shell[2532]: libinput error: event6  - VirtualBox mouse integration: client bug: even
t processing lagging behind by 21ms, your system is too slow
```

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



27) Configure and secure a MySQL Database

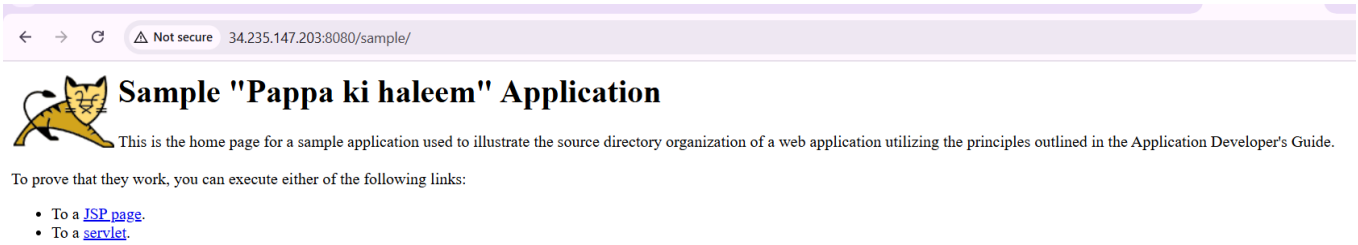
```
omer@Ubuntu:~$ sudo mysql_secure_installation

Securing the MySQL server deployment.

Connecting to MySQL using a blank password.

VALIDATE PASSWORD COMPONENT can be used to test passwords
and improve security. It checks the strength of password
and allows the users to set only those passwords which are
secure enough. Would you like to setup VALIDATE PASSWORD component?

Press y|Y for Yes, any other key for No: y
```

```
 - Removing privileges on test database...
Success.

Reloading the privilege tables will ensure that all changes
made so far will take effect immediately.

Reload privilege tables now? (Press y|Y for Yes, any other key for No) : y
Success.

All done!
omer@Ubuntu:~$
```

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

```
[root@ip-172-31-18-59 bin]# ./startup.sh
Using CATALINA_BASE:   /opt/tomcat
Using CATALINA_HOME:   /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME:        /usr
Using CLASSPATH:       /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
[root@ip-172-31-18-59 bin]#
```

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



30) Print specific columns from a delimited file

```
[root@ip-172-31-21-152 bin]# cat << 'EOF' > employees.csv
Name,Age,Department,Salary
John,30,IT,50000
Jane,25,HR,45000
Bob,35,Finance,60000
Alice,28,IT,52000
EOF
[root@ip-172-31-21-152 bin]# cut -d',' -f1,3 employees.csv
Name,Department
John,IT
Jane,HR
Bob,Finance
Alice,IT
[root@ip-172-31-21-152 bin]# cut -d',' -f1,4 employees.csv
Name,Salary
John,50000
Jane,45000
Bob,60000
Alice,52000
[root@ip-172-31-21-152 bin]# cut -d',' -f2-4 employees.csv
Age,Department,Salary
30,IT,50000
25,HR,45000
35,Finance,60000
28,IT,52000
[root@ip-172-31-21-152 bin]#
```

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

```
[root@ip-172-31-21-152 bin]# grep "IT" employees.csv
John,30,IT,50000
Alice,28,IT,52000
[root@ip-172-31-21-152 bin]# grep -i "alice" employees.csv
Alice,28,IT,52000
[root@ip-172-31-21-152 bin]# grep -i "alice" employees.csv
Alice,28,IT,52000
[root@ip-172-31-21-152 bin]# grep -v "HR" employees.csv
Name,Age,Department,Salary
John,30,IT,50000
Bob,35,Finance,60000
Alice,28,IT,52000
[root@ip-172-31-21-152 bin]#
```

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

```
[root@ip-172-31-21-152 bin]# awk -F',' 'NR>1 {sum+=$4} END {print "Total Salary:", sum}' employees.csv
Total Salary: 207000
[root@ip-172-31-21-152 bin]# awk -F',' 'NR>1 {if($4>max) max=$4; if(min=="" || $4<min) min=$4} END {print "Max:", max, "Min:", min}' employees.csv
Max: 60000 Min: 45000
[root@ip-172-31-21-152 bin]#
```

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

```
[root@ip-172-31-21-152 bin]# awk -F',' '{print toupper($1)}' employees.csv
NAME
JOHN
JANE
BOB
ALICE
[root@ip-172-31-21-152 bin]# echo "John.Doe@company.com" | awk -F'[@.]' '{print $1, $2, $3}'
John Doe company
[root@ip-172-31-21-152 bin]#
```

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

```
[root@ip-172-31-21-152 bin]# grep -c "IT" employees.csv
2
[root@ip-172-31-21-152 bin]# awk '/IT/ {count++} END {print "IT appears", count, "times"}' employees.csv
IT appears 2 times
[root@ip-172-31-21-152 bin]#
```

35) Sort lines based on a specific field or column

```
[root@ip-172-31-21-152 bin]# sort employees.csv
Alice,28,IT,52000
Bob,35,Finance,60000
Jane,25,HR,45000
John,30,IT,50000
Name,Age,Department,Salary
[root@ip-172-31-21-152 bin]#
```

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

```
[root@ip-172-31-21-152 bin]# cat << 'EOF' > employees.csv
ID,Name,Department
1,John,IT
2,Jane,HR
3,Bob,Finance
EOF

cat << 'EOF' > salaries.csv
ID,Salary,Bonus
1,50000,5000
2,45000,4000
3,60000,6000
EOF
[root@ip-172-31-21-152 bin]# join -t',' employees.csv salaries.csv
ID,Name,Department,Salary,Bonus
1,John,IT,50000,5000
2,Jane,HR,45000,4000
3,Bob,Finance,60000,6000
[root@ip-172-31-21-152 bin]#
```

37) Substitute text in a file using search and replace

```
[root@ip-172-31-21-152 bin]# sed 's/IT/Information Technology/' employees.csv
ID,Name,Department
1,John,Information Technology
2,Jane,HR
3,Bob,Finance
[root@ip-172-31-21-152 bin]#
```

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

```
[root@ip-172-31-21-152 bin]# sed '/HR/d' employees.csv
ID,Name,Department
1,John,IT
3,Bob,Finance
[root@ip-172-31-21-152 bin]#
```

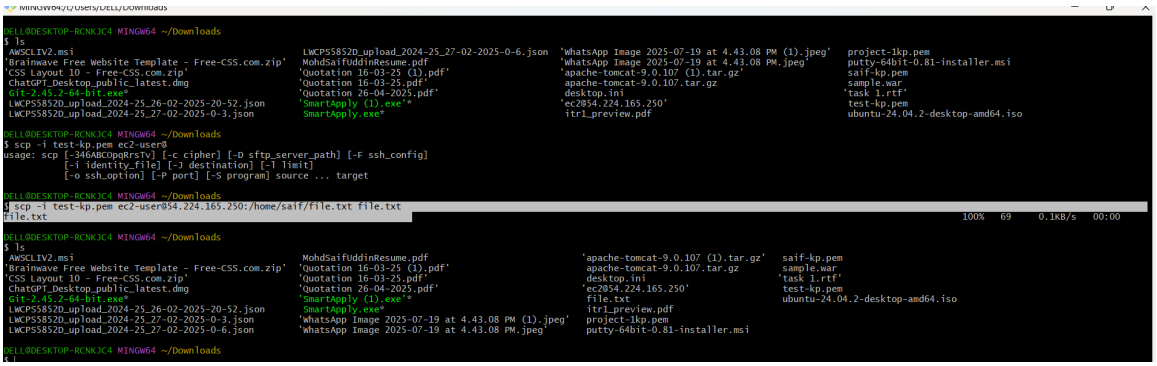
39) Append or insert text before or after a specific pattern or line

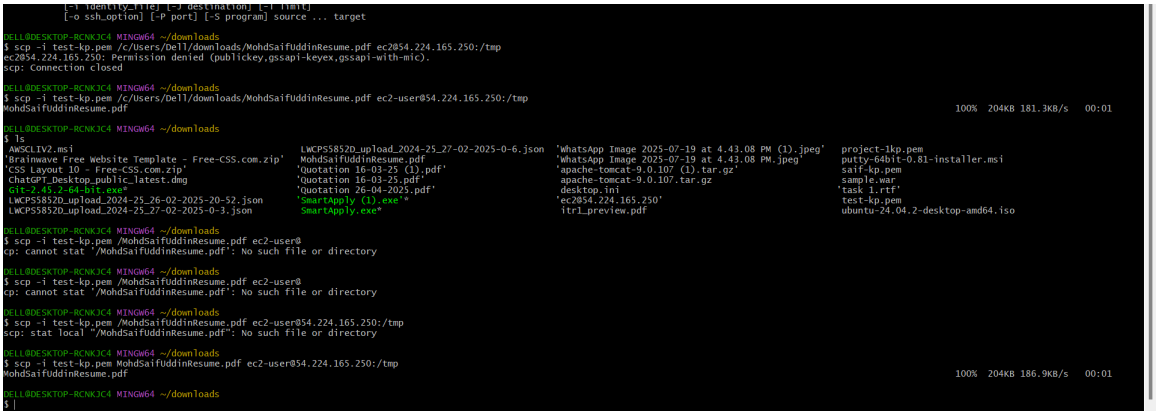
```
[root@ip-172-31-21-152 bin]# sed '/IT/a\New line after IT department' employees.csv
ID,Name,Department
1,John,IT
New line after IT department
2,Jane,HR
3,Bob,Finance
[root@ip-172-31-21-152 bin]#
```

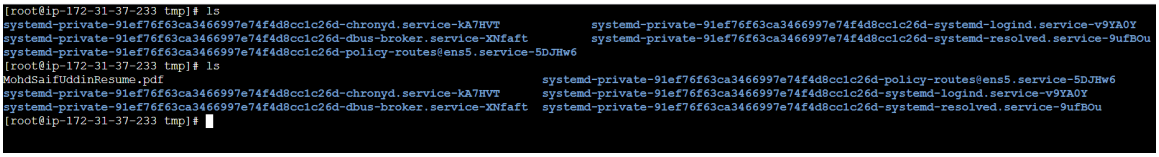
40) Print only specific lines from a file

```
[root@ip-172-31-21-152 bin]# sed -n '2p' employees.csv
1,John,IT
[root@ip-172-31-21-152 bin]# sed -n '2,4p' employees.csv
1,John,IT
2,Jane,HR
3,Bob,Finance
[root@ip-172-31-21-152 bin]#
```

41) Copy a file from Linux to a Windows machine







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

AWK Use Cases:

1. *# Analyze Apache access logs*
   awk '{print $1, $7, $9}' /var/log/apache2/access.log | sort | uniq -c
2. *# Calculate bandwidth usage by IP*
   awk '{bytes[$1]+=$10} END {for(ip in bytes) print ip, bytes[ip]/1024/1024 "MB"}' access.log
3. *# Disk usage analysis*
   df -h | awk '$5+0 > 80 {print $1, $5, "WARNING: High disk usage"}'
4. *# Format financial data*
   awk '{printf "%-15s $%8.2f\n", $1, $2}' financial_data.txt
5. *# Convert between different date formats*
   echo "2024-03-15" | awk -F'-' '{print $2"/"$3"/"$1}'

SED Use Cases:

1. *# Add configuration if it doesn't exist*
   sed -i '/^#Port/a Port 2222' /etc/ssh/sshd_config
2. *# Extract error messages only*
   sed -n '/ERROR/p' application.log > error_log.txt
3. *# Remove comments from code files*
   sed -i '/^[[:space:]]*#/d; s/#.*$//' script.py
4. *# Normalize text case and spacing*
   sed 's/[[:space:]]\+/ /g; s/^ //; s/ $//' text_file.txt
5. *# Update version numbers in multiple files*
   sed -i 's/version = "1\.0\.0"/version = "1.1.0"/g' *.py *.js *.json

Shaik Omer Farooq

Batch 14