

## 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:

@include /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 directory01
[ec2-user@ip-172-31-17-3 ~]$ ls
directory01 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/

```
mv: cannot stat 'file01.': No such file or directory
vboxuser@ubuntu:~/Desktop/directory02$ mv ~/Desktop/directory02/file01 ~/Desktop
/directory01/
vboxuser@ubuntu:~/Desktop/directory02$ ls
vboxuser@ubuntu:~/Desktop/directory02$ cd ..
vboxuser@ubuntu:~/Desktop$ cd directory01
vboxuser@ubuntu:~/Desktop/directory01$ ls
file01 file02
vboxuser@ubuntu:~/Desktop/directory01$ cd ..
vboxuser@ubuntu:~/Desktop$ cd directory02
vboxuser@ubuntu:~/Desktop/directory02$ ls
vboxuser@ubuntu:~/Desktop/directory02$ ls
vboxuser@ubuntu:~/Desktop/directory02$
```

### 10) Rename a file.

Renamed an existing file using command – mv (old filename) (enter new filename)

```
vboxuser@ubuntu:~/Desktop/directory03$ ls
file02
vboxuser@ubuntu:~/Desktop/directory03$ mv file02 newfile
vboxuser@ubuntu:~/Desktop/directory03$ ls
newfile
vboxuser@ubuntu:~/Desktop/directory03$
```

### 11) Delete a file.

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

```
vboxuser@ubuntu:~/Desktop/directory03$ ls
newfile
vboxuser@ubuntu:~/Desktop/directory03$ touch file04
vboxuser@ubuntu:~/Desktop/directory03$ ls
file04 newfile
vboxuser@ubuntu:~/Desktop/directory03$ rm -rf file04
vboxuser@ubuntu:~/Desktop/directory03$ ls
newfile
vboxuser@ubuntu:~/Desktop/directory03$
```

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

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

```
vboxuser@ubuntu:~/Desktop/directory01$ ls
file01 file02
vboxuser@ubuntu:~/Desktop/directory01$ chmod 777 file01
vboxuser@ubuntu:~/Desktop/directory01$ ls -l file01
-rwxrwxrwx 1 vboxuser vboxuser 0 Sep 20 12:24 file01
vboxuser@ubuntu:~/Desktop/directory01$ chmod 777 file02
vboxuser@ubuntu:~/Desktop/directory01$ ls -l file02
-rwxrwxrwx 1 vboxuser vboxuser 0 Sep 20 12:29 file02
vboxuser@ubuntu:~/Desktop/directory01$
```



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 40 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 40 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)

```
vboxuser@ubuntu:~$ pidof firefox
4397 4268
vboxuser@ubuntu:~$ kill 4397
vboxuser@ubuntu:~$ kill 4268
vboxuser@ubuntu:~$ pidof firefox
vboxuser@ubuntu:~$
```

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

Command- sudo apt install

```
vboxuser@ubuntu:~$ sudo apt install
[sudo] password for vboxuser:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
0 upgraded, 0 newly installed, 0 to remove and 58 not upgraded.
```

## 18) Update the system packages.

Command- sudo apt update

```
vboxuser@ubuntu:~$ sudo apt update
Get:1 http://archive.ubuntu.com/ubuntu focal InRelease [156 kB]
Get:2 http://archive.ubuntu.com/ubuntu focal-updates InRelease [156 kB]
Get:3 http://archive.ubuntu.com/ubuntu focal-backports InRelease [156 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security InRelease [156 kB]
Fetched 612 kB in 1s (58.5 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
5 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

## 19)create symbolic link

Command – ln -s ~/Desktop/directory01 ~/Desktop/directory03link\_to\_1

```
vboxuser@ubuntu:~/Desktop$ cd directory03
vboxuser@ubuntu:~/Desktop/directory03$ ls
link_to_1  newfile
vboxuser@ubuntu:~/Desktop/directory03$
```

## 20) Search for files using the find command.

Command- find . (file name)

```
vboxuser@ubuntu:~$ cd Desktop
vboxuser@ubuntu:~/Desktop$ find . directory01
.
./directory02
./directory02/file02
./directory01
./directory01/file01
./directory01/file02
./directory01/file03
./..swp
./directory03
./directory03/link_to
./directory03/newfile
./..02.swp
directory01
directory01/file01
directory01/file02
directory01/file03
vboxuser@ubuntu:~/Desktop$
```

## 21)compress and extract file

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

```
vboxuser@ubuntu:~/Desktop$ ls
directory01 directory02 directory03
vboxuser@ubuntu:~/Desktop$ tar -czf file01.tar.gz file01
tar: file01: Cannot stat: No such file or directory
tar: Exiting with failure status due to previous errors
vboxuser@ubuntu:~/Desktop$ cd directory01
vboxuser@ubuntu:~/Desktop/directory01$ tar -czf file01.tar.gz file01
vboxuser@ubuntu:~/Desktop/directory01$ tar -xzf file01.tar.gz
vboxuser@ubuntu:~/Desktop/directory01$ ls
file01 file01.tar.gz file02 file03
vboxuser@ubuntu:~/Desktop/directory01$
```

## 22) Monitor system resources with top or htop.

Installed htop resource with sudo apt install htop

Command – htop – running services list

```

CPU[ 0.8%] Tasks: 112, 356 thr, 71 kthr; 1 runnin
Mem[|||||||862M/1.92G] Load average: 0.17 0.06 0.07
Swp[ 0K/0K] Uptime: 01:10:05

Main I/O

```

PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
4881	vboxuser	20	0	19988	4912	3632	R	2.3	0.2	0:00.49	htop
1929	vboxuser	20	0	3418M	328M	101M	S	1.5	16.7	0:42.49	/usr/bin/gnom
2594	vboxuser	20	0	551M	50440	38700	S	0.8	2.5	0:10.01	/usr/libexec/
1	root	20	0	23196	14296	9432	S	0.0	0.7	0:04.07	/sbin/init sp
296	root	20	0	30592	8496	4784	S	0.0	0.4	0:00.48	/usr/lib/syst
373	systemd-re	20	0	21692	13328	10896	S	0.0	0.7	0:00.39	/usr/lib/syst
376	systemd-ti	20	0	91048	7792	6896	S	0.0	0.4	0:00.49	/usr/lib/syst
411	systemd-ti	20	0	91048	7792	6896	S	0.0	0.4	0:00.00	/usr/lib/syst
539	avahi	20	0	8668	4484	4100	S	0.0	0.2	0:00.73	avahi-daemon:

### 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`

```

vboxuser@ubuntu:~/Desktop$ getent group dev
dev:x:1002:kamal

```

### 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`

```

vboxuser@ubuntu:~$ sudo service ssh start
vboxuser@ubuntu:~$ ls -l ~/.ssh/
total 8
-rw----- 1 vboxuser vboxuser  0 Sep 18 07:21 authorized_keys
-rw----- 1 vboxuser vboxuser 978 Sep 21 18:07 known_hosts
-rw-r--r-- 1 vboxuser vboxuser 142 Sep 21 18:02 known_hosts.old
vboxuser@ubuntu:~$

```

### 25) Monitor log files using tail or grep.



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

```
vboxuser@ubuntu:~/Desktop$ sudo tail -f /var/log/syslog
2025-09-21T18:46:26.603280+00:00 ubuntu systemd[1]: Finished update-notifier-download.service - Download data for packages that failed at package install time.
2025-09-21T18:46:40.766719+00:00 ubuntu dbus-daemon[545]: [system] Activating via systemd: service name='org.freedesktop.timedate1' unit='dbus-org.freedesktop.timedate1.service' requested by ':1.19' (uid=0 pid=571 comm="/usr/lib/snapd/snapd" label="unconfined")
2025-09-21T18:46:40.791854+00:00 ubuntu systemd[1]: Starting systemd-timedated.service - Time & Date Service...
2025-09-21T18:46:40.843631+00:00 ubuntu dbus-daemon[545]: [system] Successfully activated service 'org.freedesktop.timedate1'
2025-09-21T18:46:40.843791+00:00 ubuntu systemd[1]: Started systemd-timedated.service - Time & Date Service.
2025-09-21T18:46:42.437882+00:00 ubuntu snapd[571]: storehelpers.go:916: cannot refresh: snap has no updates available: "bare", "core22", "firefox", "firmware-updater", "gnome-42-2204", "gtk-common-themes", "snap-store", "snapd", "snapd-desktop-integration"
2025-09-21T18:47:08.798532+00:00 ubuntu PackageKit: daemon quit
2025-09-21T18:47:08.819090+00:00 ubuntu systemd[1]: packagekit.service: Deactivated successfully.
2025-09-21T18:47:10.877497+00:00 ubuntu systemd[1]: systemd-timedated.service: Deactivated successfully.
2025-09-21T18:47:17.811355+00:00 ubuntu systemd[1686]: launchpadlib-cache-clean.service - Clean up old files in the Launchpadlib cache was skipped because of an unmet condition check (ConditionPathExists=/home/vboxuser/.launchpadlib/api.launchpad.net/cache).
```

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

Command – `sudo apt install apache2`

- `sudo systemctl start apache2`

```
vboxuser@ubuntu:~/Desktop$ sudo systemctl start apache2
sudo: systemctl: command not found
vboxuser@ubuntu:~/Desktop$ sudo systemctl start apache2
vboxuser@ubuntu:~/Desktop$ sudo systemctl enable apache2
Synchronizing state of apache2.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable apache2
vboxuser@ubuntu:~/Desktop$ systemctl status apache2
apache2.service - The Apache HTTP Server
Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
Active: active (running) since Sun 2025-09-21 18:59:17 UTC; 51s ago
Docs: https://httpd.apache.org/docs/2.4/
Main PID: 4605 (apache2)
Tasks: 55 (limit: 2267)
Memory: 5.3M (peak: 5.5M)
CPU: 85ms
CGroup: /system.slice/apache2.service
├─4605 /usr/sbin/apache2 -k start
├─4607 /usr/sbin/apache2 -k start
└─4608 /usr/sbin/apache2 -k start
```

- `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`

```

The job identifier is 3267.
vboxuser@ubuntu:~/Desktop$ systemctl status mysql
● mysql.service - MySQL Community Server
   Loaded: loaded (/usr/lib/systemd/system/mysql.service; enabled; preset: enabled)
   Active: active (running) since Sun 2025-09-21 19:13:46 UTC; 2min 40s ago
     Main PID: 7497 (mysqld)
        Status: "Server is operational"
       Tasks: 38 (limit: 2267)
      Memory: 372.2M (peak: 387.3M)
         CPU: 3.886s
       CGroup: /system.slice/mysql.service
              └─7497 /usr/sbin/mysqld
vboxuser@ubuntu:~/Desktop$

```

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

I installed java by using command

\* `sudo apt install openjdk-11-jdk -y`

```
vboxuser@ubuntu:~/Desktop$ java -version
openjdk version "21.0.8" 2025-07-15
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
vboxuser@ubuntu:~/Desktop$
```

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

\*changed to root user

\*for installing tomcat I used command – `sudo yum install -y java-11-openjdk-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/system/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 UTC
   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

```
bash: name,rollno: Command not found
[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

\*csvcut -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.csv file using – cat > data.csv <<EOL

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

```
[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.cal
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

```
> EOL
[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\Downloads; cd C:\Users\kamal\Downloads; scp -i
.\linux_ ...
+ ~~~
+ CategoryInfo          : InvalidArgument: (:) [Set-Location
], ParameterBindingException
+ FullyQualifiedErrorId : AmbiguousParameter,Microsoft.Power
Shell.Commands.SetLocationCommand

PS C:\Users\guntun> 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\guntun> 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\guntun> scp -i C:\Users\kamal\Downloads\linux_key.pem C
:\Users\kamal\Desktop\data.merge ec2-user@ec2-13-233-87-45.ap-sou
th-1.compute.amazonaws.com:/home/ec2-user/
C:\WINDOWS\System32\OpenSSH\scp.exe: stat local "C:/Users/kamal/D
esktop/data.merge": No such file or directory
PS C:\Users\guntun> scp -i C:\Users\kamal\Downloads\linux_key.pem C
:\Users\kamal\Desktop\data.merge ec2-user@ec2-13-233-87-45.ap-sou
th-1.compute.amazonaws.com:/home/ec2-user/
C:\WINDOWS\System32\OpenSSH\scp.exe: stat local "C:/Users/kamal/D
esktop/data.merge": No such file or directory
PS C:\Users\guntun>
```

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

Case 1 – printing specific column

```
[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 number in file

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

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

