Assignment 1 – File System Management

1) List out 5 files in your system which consuming most of the disk space

Cmd - sudo du -ah / | sort -rh | head -n 5

```
ubuntu@ip-172-31-2-192:~$ sudo du -ah / | sort -rh | head -n 5
du: cannot access '/proc/21815/task/21815/fd/4': No such file or directory
du: cannot access '/proc/21815/task/21815/fdinfo/4': No such file or directory
du: cannot access '/proc/21815/fd/3': No such file or directory
du: cannot access '/proc/21815/fdinfo/3': No such file or directory
3.4G    /
1.6G    /usr
935M    /snap
829M    /usr/lib
723M    /var
ubuntu@ip-172-31-2-192:~$ sudo du -ah / --exclude=proc | sort -rh | head -n 5

3.4G    /
1.6G    /usr
935M    /snap
829M    /usr/lib
723M    /var
ubuntu@ip-172-31-2-192:~$
```

/proc is a virtual filesystem that provides information about system and running processes. The files in /proc are generated dynamically by the kernel and can disappear at any moment if a process terminates, that is why output displays "No such file or directory" for /proc files. To avoid this we can use –exclude

sudo du -ah / --exclude-proc | sort -rh | head -n 5

du – display the amount of disk usage of files and directories
sort -r – sort and displays the output in reverse order
h – human readable format
head – displays the beginning lines of file/output
n – specified the number of lines of output, that should be displayed

2) Create one common folder in such a way that anyone can create files inside that independently and should not be able to delete other users files from that common folder.

Step 1 : create a folder /common cmd – sudo mkdir /common

```
ubuntu@ip-172-31-2-192:~$ sudo mkdir /common
ubuntu@ip-172-31-2-192:~$ ls -l /
total 84
lrwxrwxrwx   1 root root     7 Apr 22  2024 bin -> usr/bin
drwxr-xr-x   2 root root  4096 Feb 26  2024 bin.usr-is-merged
drwxr-xr-x   5 root root  4096 Nov  7 06:51 boot
drwxr-xr-x   2 root root  4096 Nov 10 06:54 common
drwxr-xr-x  16 root root  3220 Nov  6 05:10 dev
drwxr-xr-x 108 root root  4096 Nov  9 10:40 etc
drwxr-xr-x  18 root root  4096 Nov  9 10:40 home
lrwxrwxrwx   1 root root     7 Apr 22  2024 lib -> usr/lib
drwxr-xr-x   2 root root  4096 Apr  8  2024 lib.usr-is-merged
lrwxrwxrwx   1 root root     9 Apr 22  2024 lib64 -> usr/lib64
drwx------   2 root root 16384 Sep 27 08:38 lost+found
drwxr-xr-x   2 root root  4096 Sep 27 08:36 media
drwxr-xr-x   2 root root  4096 Sep 27 08:36 mnt
drwxr-xr-x   2 root root  4096 Sep 27 08:36 opt
dr-xr-xr-x 177 root root     0 Nov  6 05:09 proc
drwxrwxr-t   2 root group2 4096 Nov  9 11:00 project
drwx------   4 root root  4096 Nov  4 07:22 root
drwxr-xr-x  31 root root  1040 Nov 10 06:48 run
lrwxrwxrwx   1 root root     8 Apr 22  2024 sbin -> usr/sbin
drwxr-xr-x   2 root root  4096 Mar 31  2024 sbin.usr-is-merged
drwxr-xr-x   7 root root  4096 Nov  3 13:40 snap
drwxr-xr-x   2 root root  4096 Sep 27 08:36 srv
dr-xr-xr-x  13 root root     0 Nov  9 10:37 sys
drwxrwxrwt  13 root root  4096 Nov 10 06:53 tmp
drwxr-xr-x  12 root root  4096 Sep 27 08:36 usr
drwxr-xr-x  13 root root  4096 Oct 29 04:52 var
```

Step 2 : Give Stickybit premission to folder which means that anyone can create files inside that independently and should not be able to delete other users files from that commonfolder. Cmd – sudo chmod 1777 /common

```
ubuntu@ip-172-31-2-192:~$ sudo chmod 1777 /common
ubuntu@ip-172-31-2-192:~$ ls -l /
total 84
lrwxrwxrwx   1 root root        7 Apr 22  2024 bin -> usr/bin
drwxr-xr-x   2 root root     4096 Feb 26  2024 bin.usr-is-merged
drwxr-xr-x   5 root root     4096 Nov  7 06:51 boot
drwxrwxrwt   2 root root     4096 Nov 10 06:54 common
drwxr-xr-x  16 root root     3220 Nov  6 05:10 dev
drwxr-xr-x 108 root root     4096 Nov  9 10:40 etc
drwxr-xr-x  18 root root     4096 Nov  9 10:40 home
lrwxrwxrwx   1 root root        7 Apr 22  2024 lib -> usr/lib
drwxr-xr-x   2 root root     4096 Apr  8  2024 lib.usr-is-merged
lrwxrwxrwx   1 root root        9 Apr 22  2024 lib64 -> usr/lib64
drwx------   2 root root    16384 Sep 27 08:38 lost+found
drwxr-xr-x   2 root root     4096 Sep 27 08:36 media
drwxr-xr-x   2 root root     4096 Sep 27 08:36 mnt
drwxr-xr-x   2 root root     4096 Sep 27 08:36 opt
dr-xr-xr-x 174 root root        0 Nov  6 05:09 proc
drwxrwxr-t   2 root group2   4096 Nov  9 11:00 project
drwx------   4 root root     4096 Nov  4 07:22 root
drwxr-xr-x  31 root root     1040 Nov 10 06:48 run
lrwxrwxrwx   1 root root        8 Apr 22  2024 sbin -> usr/sbin
drwxr-xr-x   2 root root     4096 Mar 31  2024 sbin.usr-is-merged
drwxr-xr-x   7 root root     4096 Nov  3 13:40 snap
drwxr-xr-x   2 root root     4096 Sep 27 08:36 srv
dr-xr-xr-x  13 root root        0 Nov  9 10:37 sys
drwxrwxrwt  12 root root     4096 Nov 10 06:58 tmp
drwxr-xr-x  12 root root     4096 Sep 27 08:36 usr
drwxr-xr-x  13 root root     4096 Oct 29 04:52 var
```

Step 3 : Verify the working

```
ubuntu@ip-172-31-2-192:~$ sudo su usr1
$ touch /common/usr1file
$ exit
ubuntu@ip-172-31-2-192:~$ sudo su usr2
$ touch /common/usr2file
$ ls -l /common
total 0
-rw-rw-r-- 1 usr1 usr1 0 Nov 10 07:03 usr1file
-rw-rw-r-- 1 usr2 usr2 0 Nov 10 07:03 usr2file
$ rm /common/usr1file
rm: remove write-protected regular empty file '/common/usr1file'? y
rm: cannot remove '/common/usr1file': Operation not permitted
```

-usr1 creates usr1file inside /common and usr2 creates usr2file inside /common.
When usr2 tries to delete the file created by usr1, the ouput displays as “Operation not permitted”.

3)Create user name "shubham" and add that user in the group "adm"

a) Create folder /data , change owner and group as "root:adm

b) Change /data permission such a way that user can able to write data in this folder and ownership of files or folder which you creates in this folder should be same as parent folder i.e /data folder permission (root:adm)

Step 1 : Create user shubham

sudo useradd shubham

Step 2 : add shubham to group “adm”

sudo usermod -aG shubham

Step 3 : create folder in /

sudo mkdir /data

```
ubuntu@ip-172-31-2-192:~$ sudo useradd shubham
ubuntu@ip-172-31-2-192:~$ sudo usermod -aG adm shubham
ubuntu@ip-172-31-2-192:~$ groups shubham
shubham : shubham adm
ubuntu@ip-172-31-2-192:~$ sudo mkdir /data
ubuntu@ip-172-31-2-192:~$ sudo chown root:adm /data
ubuntu@ip-172-31-2-192:~$ ls -l /data
total 0
ubuntu@ip-172-31-2-192:~$ ls -ld /data
drwxr-xr-x 2 root adm 4096 Nov 10 07:33 /data
ubuntu@ip-172-31-2-192:~$ sudo chmod 2775 /data
ubuntu@ip-172-31-2-192:~$ ls -ld /data
drwxrwsr-x 2 root adm 4096 Nov 10 07:33 /data
```

Step 4 : change owner and group as "root:adm"

sudo chown root:adm /data

Step 5 : Change /data permission such a way that user can able to write data in this folder and ownership of files or folder which you creates in this folder should be same as parent folder i.e /data folder permission (root:adm)

sudo chmod 2775 /data

Step 6 : Verify

ls -ld /data

```
ubuntu@ip-172-31-2-192:~$ sudo -u shubham -s
shubham@ip-172-31-2-192:/home/ubuntu$ touch /data/ex2file
shubham@ip-172-31-2-192:/home/ubuntu$ ls -l /data/ex2file
-rw-rw-r-- 1 shubham adm 0 Nov 10 07:59 /data/ex2file
```