

Linux Hands-on Session Day-2

1) Install the java and set the environment variable.

```
jsanghavi@ip-10-50-1-21: ~  
jsanghavi@ip-10-50-1-21:~$ java --version  
openjdk 11.0.13 2021-10-19  
OpenJDK Runtime Environment (build 11.0.13+8-Ubuntu-0ubuntu1.18.04)  
OpenJDK 64-Bit Server VM (build 11.0.13+8-Ubuntu-0ubuntu1.18.04, mixed mode  
sharing)  
jsanghavi@ip-10-50-1-21:~$ echo $JAVA_HOME  
/usr/lib/jvm/jdk1.7.0  
jsanghavi@ip-10-50-1-21:~$ hostname -f;date  
ip-10-50-1-21.cdsys.local  
Tue Jan 18 23:25:46 IST 2022  
jsanghavi@ip-10-50-1-21:~$
```

2) Find the files which have size greater than 2 kb using the find command.

find . size +2k

```
jsanghavi@ip-10-50-1-21: ~  
jsanghavi@ip-10-50-1-21:~$ clear  
jsanghavi@ip-10-50-1-21:~$ find . size +2k  
.  
./hello  
./f2.txt  
./bash_logout  
./local  
./local/share  
./local/share/nano  
./keyjaini  
./Demo1.pdf  
./ssh  
./ssh/known_hosts  
./ssh/id_rsa  
./ssh/authorized_keys  
./ssh/id_rsa.pub  
./Test0.txt  
./profile  
./hellojainilbhai  
./Demo2.pdf  
./emp2.txt  
./bash_history  
./jainil  
./bansilsfile  
./devansh  
./devansh/f2.txt  
./devansh/f4.txt  
./devansh/f3.txt  
./devansh/f1.txt  
./keyjaini.pub  
./student0.txt  
./dtadhani@10.50.1.21  
./gnupg  
./gnupg/private-keys-v1.d  
./empl.txt  
./f1.txt  
./sample.txt  
./viminfo  
./Demo0.pdf  
./emp3.txt  
./nos.txt  
./Demo1.txt  
./bashrc  
./example.txt
```

```
./example.txt
./Demo0.txt
./marks.txt
./Demo2.txt
find: 'size': No such file or directory
find: '+2k': No such file or directory
jsanghavi@ip-10-50-1-21:~$ hostname -f;date
ip-10-50-1-21.cdsys.local
Tue Jan 18 17:56:19 IST 2022
```

3) List all the packages of the current system, grab the full version from the output. Sort it and store it in a file.

```

jsanghavi@ip-10-50-1-21:~$
jsanghavi@ip-10-50-1-21:~$ ls
bansisfile Demo0.txt Demo1.txt Demo2.txt dtadhani@10.50.1.21 emp2.txt example.txt f2.txt hellojainilbhai keyjaini marks.txt sample.txt Test0.txt
Demo0.pdf Demo1.pdf Demo2.pdf devanash empl.txt emp3.txt fl.txt hello jainil keyjaini.pub nos.txt student0.txt
jsanghavi@ip-10-50-1-21:~$ ls -laS > Demo0.txt
jsanghavi@ip-10-50-1-21:~$ vi Demo0.txt
Total 148
-rw-rw-r-- 1 jsanghavi jsanghavi 55032 Jan 18 17:14 marks.txt
drwxr-xr-x 6 jsanghavi jsanghavi 4096 Jan 18 13:28 .
drwxr-xr-x 39 root root 4096 Jan 18 17:13 ..
drwxrwxr-x 2 jsanghavi jsanghavi 4096 Jan 13 13:12 devanash
drwx----- 3 jsanghavi jsanghavi 4096 Jan 13 11:12 .gnupg
drwxr-xr-x 2 jsanghavi jsanghavi 4096 Jan 18 13:07 .local
drwx----- 2 jsanghavi jsanghavi 4096 Jan 13 15:39 .ssh
-rw-r--r-- 1 jsanghavi jsanghavi 3771 Apr 5 2018 .bashrc
-rw----- 1 jsanghavi jsanghavi 2636 Jan 18 17:14 .bash_history
-rw----- 1 jsanghavi jsanghavi 1675 Jan 13 15:52 keyjaini
-rw----- 1 jsanghavi jsanghavi 1533 Jan 18 13:28 .viminfo
-rw-r--r-- 1 jsanghavi jsanghavi 807 Apr 5 2018 .profile
-rw-r--r-- 1 jsanghavi jsanghavi 405 Jan 13 15:52 keyjaini.pub
-rw-r--r-- 1 jsanghavi jsanghavi 220 Apr 5 2018 .bash_logout
-rw-rw-r-- 1 jsanghavi jsanghavi 99 Jan 18 13:28 example.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 66 Jan 13 13:07 dtadhani@10.50.1.21
-rw-rw-r-- 1 jsanghavi jsanghavi 66 Jan 13 12:11 student0.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 49 Jan 13 12:09 Test0.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 40 Jan 13 11:21 nos.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 24 Jan 13 11:19 Demo0.pdf
-rwx----- 1 jsanghavi jsanghavi 22 Jan 13 15:35 sample.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 18 Jan 13 11:25 emp2.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 17 Jan 13 11:24 empl.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 12 Jan 13 11:25 emp3.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 15:59 bansisfile
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 18 18:02 Demo0.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 11:19 Demo1.pdf
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 11:17 Demo1.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 11:19 Demo2.pdf
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 11:17 Demo2.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 13:16 fl.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 15:26 f2.txt
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 15:50 hello
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 15:51 hellojainilbhai
-rw-rw-r-- 1 jsanghavi jsanghavi 0 Jan 13 15:50 jainil

```

4) How to find words in vi editor?

We can find words by pressing / and write the word that you want to find.

[illegible]

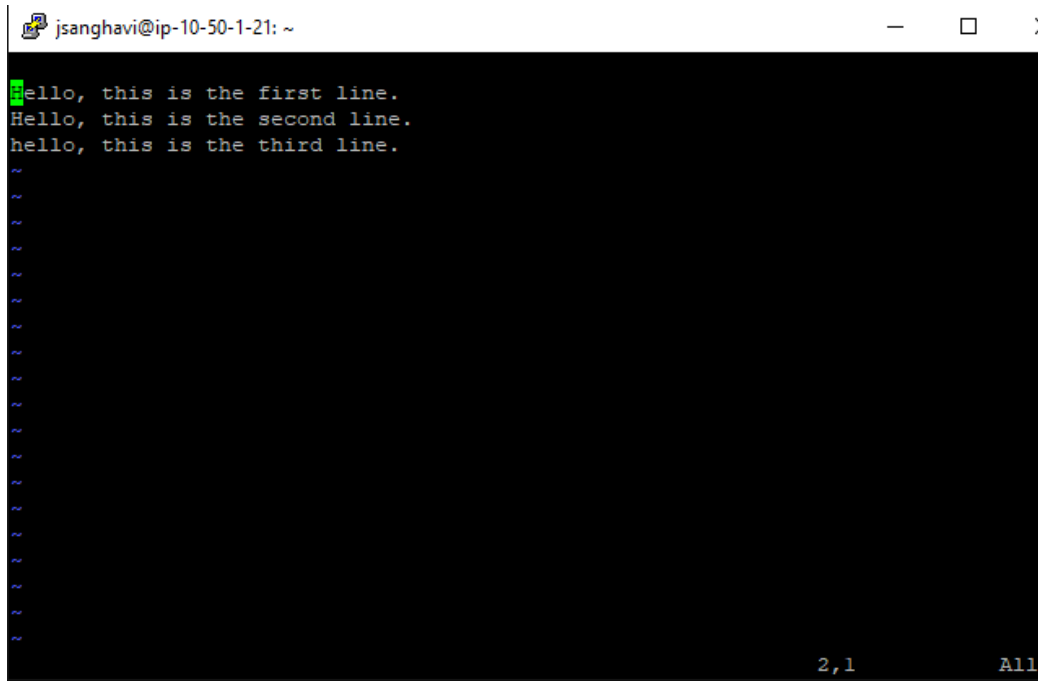
5) How to go to the next occurrence using a shortcut in vi editor?

In the command line, we just need to press "n" for the next occurrence of the word or "N" for the previous occurrence of the word.

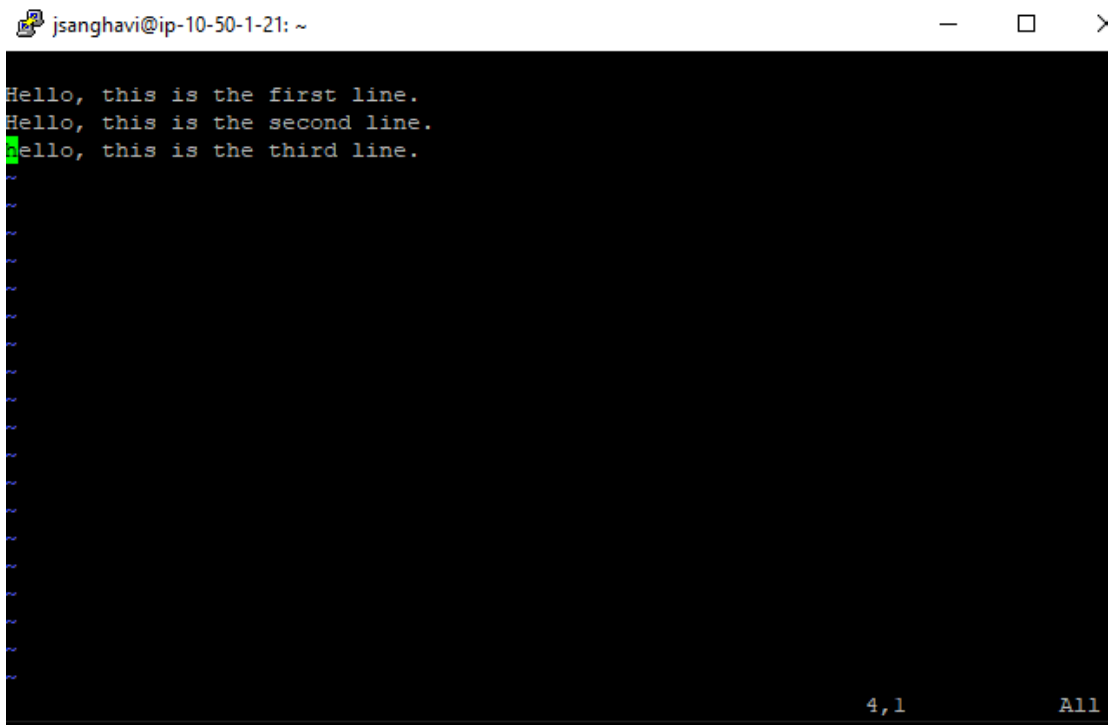
[illegible][illegible]

6) How to go to the end of a file in vi editor?

To end a file in vi editor, press the "Esc" key and then press "Shift + G" to move the cursor.



A screenshot of a terminal window showing the vi editor. The window title is "jsanghavi@ip-10-50-1-21: ~". The editor contains three lines of text: "Hello, this is the first line.", "Hello, this is the second line.", and "hello, this is the third line.". The cursor is positioned at the end of the first line. The status bar at the bottom right shows "2,1" and "All".



A screenshot of a terminal window showing the vi editor. The window title is "jsanghavi@ip-10-50-1-21: ~". The editor contains three lines of text: "Hello, this is the first line.", "Hello, this is the second line.", and "Hello, this is the third line.". The cursor is positioned at the end of the third line. The status bar at the bottom right shows "4,1" and "All".

7) What is the shortcut for copy/paste in vi editor?

- Position the cursor where you want to begin cutting.
- Press v to select characters or uppercase V to select the whole line.
- Move the cursor to the end of what you want to cut.
- Press d to cut or y to copy.
- Move to where you would like to paste.
- Press P to paste before the cursor, or p to paste after.

A screenshot of a terminal window titled "jsanghavi@ip-10-50-1-21: ~". The terminal has a black background with white text. It shows two identical blocks of three lines each: "Hello, this is the first line.", "Hello, this is the second line.", and "hello, this is the third line.". A green cursor is visible at the start of the first line of the second block. Below the second block, there are several tilde (~) symbols representing scrolling output. At the bottom right, the coordinates "10,0-1" and a partial word "All" are visible.

8) Find and replace words in vi editor.

```
jsanghavi@ip-10-50-1-21: ~  
Hi, this is the first line.  
Hi, this is the second line.  
hello, this is the third line.
```

9) How to search a string in reverse order in vi editor.

[illegible]

10) Explain all the attributes of the TOP command.

```

jsanghavi@ip-10-50-1-21: ~
top - 00:28:54 up 2 days, 2:55, 1 user, load average: 0.00, 0.00, 0.00
Tasks: 192 total, 1 running, 101 sleeping, 1 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.0 sy, 0.0 ni, 100.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem : 4015804 total, 1116624 free, 265788 used, 2633392 buff/cache
KiB Swap: 1003516 total, 1003504 free, 12 used. 3460084 avail Mem


```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
52997	root	20	0	0	0	0	I	0.3	0.0	0:00.06	kworker/u256:2
53031	jsangha+	20	0	44228	4064	3392	R	0.3	0.1	0:00.09	top
1	root	20	0	225584	9240	6584	S	0.0	0.2	0:07.67	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.03	kthreadd
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/0:0H
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_percpu_wq
7	root	20	0	0	0	0	S	0.0	0.0	0:00.19	ksoftirqd/0
8	root	20	0	0	0	0	I	0.0	0.0	0:15.67	rcu_sched
9	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_bh
10	root	rt	0	0	0	0	S	0.0	0.0	0:00.01	migration/0
11	root	rt	0	0	0	0	S	0.0	0.0	0:00.37	watchdog/0
12	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/0
13	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/1
14	root	rt	0	0	0	0	S	0.0	0.0	0:00.32	watchdog/1
15	root	rt	0	0	0	0	S	0.0	0.0	0:00.04	migration/1
16	root	20	0	0	0	0	S	0.0	0.0	0:00.14	ksoftirqd/1
18	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/1:0H
19	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/2
20	root	rt	0	0	0	0	S	0.0	0.0	0:00.39	watchdog/2
21	root	rt	0	0	0	0	S	0.0	0.0	0:00.04	migration/2
22	root	20	0	0	0	0	S	0.0	0.0	0:00.16	ksoftirqd/2
24	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/2:0H
25	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/3
26	root	rt	0	0	0	0	S	0.0	0.0	0:00.37	watchdog/3

Top command is used to show the Linux processes. It provides a dynamic real-time view of the running system.

- PID: Shows task's unique process id.
- PR: Stands for priority of the task.
- SHR: Represents the amount of shared memory used by a task.
- VIRT: Total virtual memory used by the task.
- USER: User name of owner of task.
- %CPU: Represents the CPU usage.
- TIME+: CPU Time, the same as `TIME`, but reflecting more granularity through hundredths of a second.
- SHR: Represents the Shared Memory size (kb) used by a task.
- NI: Represents a Nice Value of task. A Negative nice value implies higher priority, and positive Nice value means lower priority.
- %MEM: Shows the Memory usage of tasks.

11) How to find the parent process ID of a process.

```
jsanghavi@ip-10-50-1-21: ~
jsanghavi@ip-10-50-1-21:~$ echo $PPID
51940
jsanghavi@ip-10-50-1-21:~$ ps -e | grep 51940
51940 pts/1    00:00:00 sh
jsanghavi@ip-10-50-1-21:~$ ps -o ppid= -p 51940
51939
jsanghavi@ip-10-50-1-21:~$ hostname -f;date
ip-10-50-1-21.cdsys.local
Tue Jan 18 18:39:33 IST 2022
jsanghavi@ip-10-50-1-21:~$
```

```
jsanghavi@ip-10-50-1-21: ~
jsanghavi@ip-10-50-1-21:~$ ps -o ppid=2
2
51939
51940
51943
jsanghavi@ip-10-50-1-21:~$ hostname -f;date
ip-10-50-1-21.cdsys.local
Tue Jan 18 18:40:07 IST 2022
jsanghavi@ip-10-50-1-21:~$
```

12) Explain how you can create a folder using Terminal?

```
jsanghavi@ip-10-50-1-21: ~  
jsanghavi@ip-10-50-1-21:~$ ls  
bansilsfile  Demo2.txt      example.txt      keyjaini        student0.txt  
Demo0.pdf    devansh        fl.txt           keyjaini.pub    Test0.txt  
Demo0.txt    dtadhani@10.50.1.21  f2.txt          marks.txt  
Demo1.pdf    emp1.txt       hello           nos.txt  
Demo1.txt    emp2.txt       hellojainilbhai sample.txt  
Demo2.pdf    emp3.txt       jainil          Sample.txt  
jsanghavi@ip-10-50-1-21:~$ mkdir Jainil  
jsanghavi@ip-10-50-1-21:~$ ls  
bansilsfile  Demo2.txt      example.txt      Jainil          Sample.txt  
Demo0.pdf    devansh        fl.txt           keyjaini        student0.txt  
Demo0.txt    dtadhani@10.50.1.21  f2.txt          keyjaini.pub    Test0.txt  
Demo1.pdf    emp1.txt       hello           marks.txt  
Demo1.txt    emp2.txt       hellojainilbhai nos.txt  
Demo2.pdf    emp3.txt       jainil          sample.txt  
jsanghavi@ip-10-50-1-21:~$ hostname -f;date  
ip-10-50-1-21.cdsys.local  
Tue Jan 18 18:40:56 IST 2022  
jsanghavi@ip-10-50-1-21:~$
```

13) Create a user and group of your name and add the user into a group. Set expiry of user to 3 days.

Creating a new user with expiry date:

```
sudo useradd jsanghavi  
sudo usermod -e 2022-01-21 jsanghavi
```

Shows expiry date of user:

```
Sudo chage -l jsanghavi
```

Create a new group named jainil:

```
sudo groupadd jainil
```

Adding user in jainil group:

```
Sudo useradd jsanghavi jainil
```



```
10.50.1.54 - PuTTY
devuser@ip-10-50-1-54:~$ sudo useradd jsanghavi
devuser@ip-10-50-1-54:~$ sudo usermod -e 2022-01-21 jsanghavi
devuser@ip-10-50-1-54:~$
devuser@ip-10-50-1-54:~$ sudo chage -l jsanghavi
Last password change           : Jan 19, 2022
Password expires                : Apr 28, 2022
Password inactive               : never
Account expires                 : Jan 21, 2022
Minimum number of days between password change : 0
Maximum number of days between password change : 99
Number of days of warning before password expires : 15
devuser@ip-10-50-1-54:~$
devuser@ip-10-50-1-54:~$ sudo groupadd jainil
devuser@ip-10-50-1-54:~$
devuser@ip-10-50-1-54:~$ sudo adduser jsanghavi jainil
Adding user `jsanghavi' to group `jainil' ...
Adding user jsanghavi to group jainil
Done.
devuser@ip-10-50-1-54:~$ hostname -f;date
ip-10-50-1-54.cdsys.local
Wed Jan 19 08:36:59 IST 2022
devuser@ip-10-50-1-54:~$
```

14) Analyze which process is using how much memory.

```
jsanghavi@ip-10-50-1-21: ~
jsanghavi@ip-10-50-1-21:~$ ps -eo pid,ppid,user,cmd,%mem,%cpu,command ax | head
  PID   PPID USER   CMD                                %MEM %CPU COMMAND
    1      0 root    /sbin/init                        0.2  0.0 /sbin/init
    2      0 root    [kthreadd]                       0.0  0.0 [kthreadd]
    4      2 root    [kworker/0:0H]                   0.0  0.0 [kworker/0:0H]
    6      2 root    [mm_percpu_wq]                   0.0  0.0 [mm_percpu_wq]
    7      2 root    [ksoftirqd/0]                    0.0  0.0 [ksoftirqd/0]
    8      2 root    [rcu_sched]                      0.0  0.0 [rcu_sched]
    9      2 root    [rcu_bh]                         0.0  0.0 [rcu_bh]
   10      2 root    [migration/0]                    0.0  0.0 [migration/0]
   11      2 root    [watchdog/0]                     0.0  0.0 [watchdog/0]
jsanghavi@ip-10-50-1-21:~$ hostname -f;date
ip-10-50-1-21.cdsys.local
Tue Jan 18 18:45:26 IST 2022
jsanghavi@ip-10-50-1-21:~$
```

15) Create a file with the name of your friends from the terminal only without using any text editors.

```
jsanghavi@ip-10-50-1-21: ~  
jsanghavi@ip-10-50-1-21:~$ cat > friends.txt  
Jainil  
Jay  
Darshit  
Mohak  
raj  
Venus  
Krutarth  
^C  
jsanghavi@ip-10-50-1-21:~$ hostname -f;date  
ip-10-50-1-21.cdsys.local  
Tue Jan 18 18:50:05 IST 2022  
jsanghavi@ip-10-50-1-21:~$
```

16) Rename the file to friends_list.txt

```
jsanghavi@ip-10-50-1-21: ~  
jsanghavi@ip-10-50-1-21:~$ ls  
bansilsfile Demo2.txt example.txt jainil sample.txt  
Demo0.pdf devansh f1.txt Jainil Sample.txt  
Demo0.txt dtadhani@10.50.1.21 f2.txt keyjaini student0.txt  
Demo1.pdf empl.txt friends.txt keyjaini.pub Test0.txt  
Demo1.txt emp2.txt hello marks.txt  
Demo2.pdf emp3.txt hellojainilbhai nos.txt  
jsanghavi@ip-10-50-1-21:~$ mv friends.txt friends_list.txt  
jsanghavi@ip-10-50-1-21:~$ ls  
bansilsfile Demo2.txt example.txt jainil sample.txt  
Demo0.pdf devansh f1.txt Jainil Sample.txt  
Demo0.txt dtadhani@10.50.1.21 f2.txt keyjaini student0.txt  
Demo1.pdf empl.txt friends_list.txt keyjaini.pub Test0.txt  
Demo1.txt emp2.txt hello marks.txt  
Demo2.pdf emp3.txt hellojainilbhai nos.txt  
jsanghavi@ip-10-50-1-21:~$ hostname -f;date  
ip-10-50-1-21.cdsys.local  
Tue Jan 18 18:50:57 IST 2022  
jsanghavi@ip-10-50-1-21:~$
```

17) Find the storage occupied by friends_list.txt in bytes.

```
jsanghavi@ip-10-50-1-21: ~  
jsanghavi@ip-10-50-1-21:~$ du friends_list.txt  
4      friends_list.txt  
jsanghavi@ip-10-50-1-21:~$ du -h friends_list.txt  
4.0K   friends_list.txt  
jsanghavi@ip-10-50-1-21:~$ hostname -f;date  
ip-10-50-1-21.cdsys.local  
Tue Jan 18 18:51:39 IST 2022  
jsanghavi@ip-10-50-1-21:~$
```

18) List down other ways to identify the storage occupied by friends_list.txt in human readable format.

```
jsanghavi@ip-10-50-1-21: ~  
jsanghavi@ip-10-50-1-21:~$ du -h friends_list.txt  
4.0K   friends_list.txt  
jsanghavi@ip-10-50-1-21:~$ du -sh friends_list.txt  
4.0K   friends_list.txt  
jsanghavi@ip-10-50-1-21:~$ stat friends_list.txt  
File: friends_list.txt  
Size: 44      Blocks: 8      IO Block: 4096   regular file  
Device: fd00h/64768d Inode: 803088 Links: 1  
Access: (0664/-rw-rw-r--)  Uid: ( 1019/jsanghavi)  Gid: ( 1019/jsanghavi)  
Access: 2022-01-18 18:49:16.249900508 +0530  
Modify: 2022-01-18 18:49:48.709814324 +0530  
Change: 2022-01-18 18:50:50.131451118 +0530  
Birth: -  
jsanghavi@ip-10-50-1-21:~$ hostname -f;date  
ip-10-50-1-21.cdsys.local  
Tue Jan 18 18:53:24 IST 2022  
jsanghavi@ip-10-50-1-21:~$
```

19) Create another file with names of your family members in it.

```
jsanghavi@ip-10-50-1-21: ~  
jsanghavi@ip-10-50-1-21:~$ cat > family.txt  
Jainil  
Kamal  
Soniya  
Sanghavi  
^C  
jsanghavi@ip-10-50-1-21:~$ hostname -f;date  
ip-10-50-1-21.cdsys.local  
Tue Jan 18 18:54:12 IST 2022  
jsanghavi@ip-10-50-1-21:~$
```

20) Concatenate friends_list.txt and family.txt directly from the terminal and sort the combined file in alphabetical order. Keep filename to be combined.txt

```
jsanghavi@ip-10-50-1-21: ~  
jsanghavi@ip-10-50-1-21:~$ cat friends_list.txt family.txt > combined.txt | sort combined.txt  
Darshit  
Jainil  
Jainil  
Jay  
Kamal  
Krutarth  
Mohak  
raj  
Sanghavi  
Soniya  
Venus  
jsanghavi@ip-10-50-1-21:~$ hostname -f;date  
ip-10-50-1-21.cdsys.local  
Tue Jan 18 18:56:13 IST 2022  
jsanghavi@ip-10-50-1-21:~$
```

21) Display the contents of combined.txt on the terminal screen and keep it interactive so that not all the list will be displayed and you need to scroll up and down to view the content.

less combined.txt

```
jsanghavi@ip-10-50-1-21: ~  
Jainil  
Jay  
Darshit  
Mohak  
raj  
Venus  
Krutarth  
Jainil  
Kamal  
Soniya  
Sanghavi  
combined.txt (END)
```

22) Which directory contains the Linux kernel.

The kernel file, in Ubuntu, is stored in your /boot folder.

23) How to exit from vi editors.

vi editor is exit using the following commands:

- :q for quit
- :q! for quieting without saving
- :wq for save and exit