LINUX COMMANDS

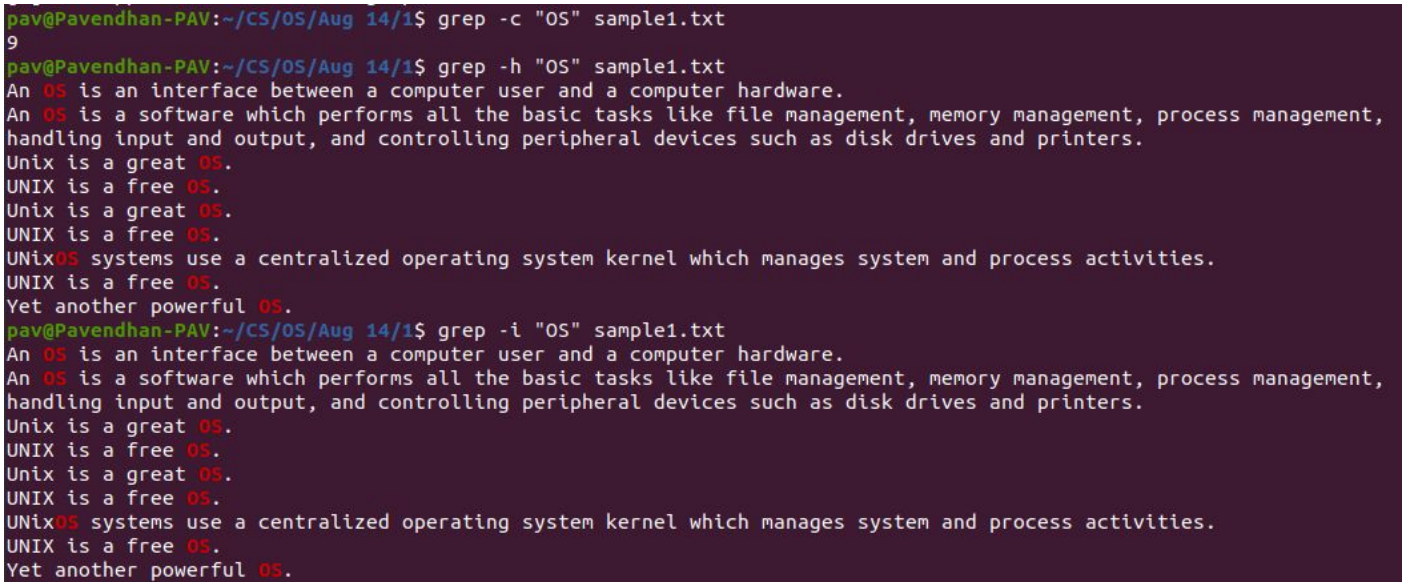
1. COMMONLY USED LINUX COMMANDS -

GREP - The grep filter searches a file for a particular pattern of characters, and displays all lines that contain that pattern. The pattern that is searched in the file is referred to as the regular expression (grep stands for globally search for regular expression and print out).

grep [options] pattern [files]

Options Description

-c : This prints only a count of the lines that match a pattern
-h : Display the matched lines, but do not display the filenames.
-i : Ignores, case for matching
-l : Displays list of filenames only.
-n : Display the matched lines and their line numbers.
-v : This prints out all the lines that do not matches the pattern
-e exp : Specifies expression with this option. Can use multiple times.
-f file : Takes patterns from file, one per line.
-E : Treats pattern as an extended regular expression (ERE)
-w : Match whole word
-o : Print only the matched parts of a matching line,
with each such part on a separate output line.



```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ grep -l "OS" sample1.txt
sample1.txt
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ grep -n "OS" sample1.txt
2:An OS is an interface between a computer user and a computer hardware.
3:An OS is a software which performs all the basic tasks like file management, memory management, process management,
handling input and output, and controlling peripheral devices such as disk drives and printers.
6:Unix is a great OS.
7:UNIX is a free OS.
9:Unix is a great OS.
10:UNIX is a free OS.
11:UNixOS systems use a centralized operating system kernel which manages system and process activities.
13:UNIX is a free OS.
15:Yet another powerful OS.
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ grep -v "OS" sample1.txt
This is a test document.
Operating system is one of the core subjects in computer science.
Operating system is one of the core subjects in computer science.
Unix systems use a centralized operating system kernel which manages system and process activities.
A user can also run multiple programs at the same time; hence Unix is a multitasking environment.
Multiuser operating system.
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ grep "^An" sample1.txt
An OS is an interface between a computer user and a computer hardware.
An OS is a software which performs all the basic tasks like file management, memory management, process management, ha
ndling input and output, and controlling peripheral devices such as disk drives and printers.
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ grep -v "^An" sample1.txt
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Multiuser operating system.
Yet another powerful OS.
```

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ grep -o "OS" sample1.txt
OS
OS
OS
OS
OS
OS
OS
OS
OS
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ grep -w "is" sample1.txt
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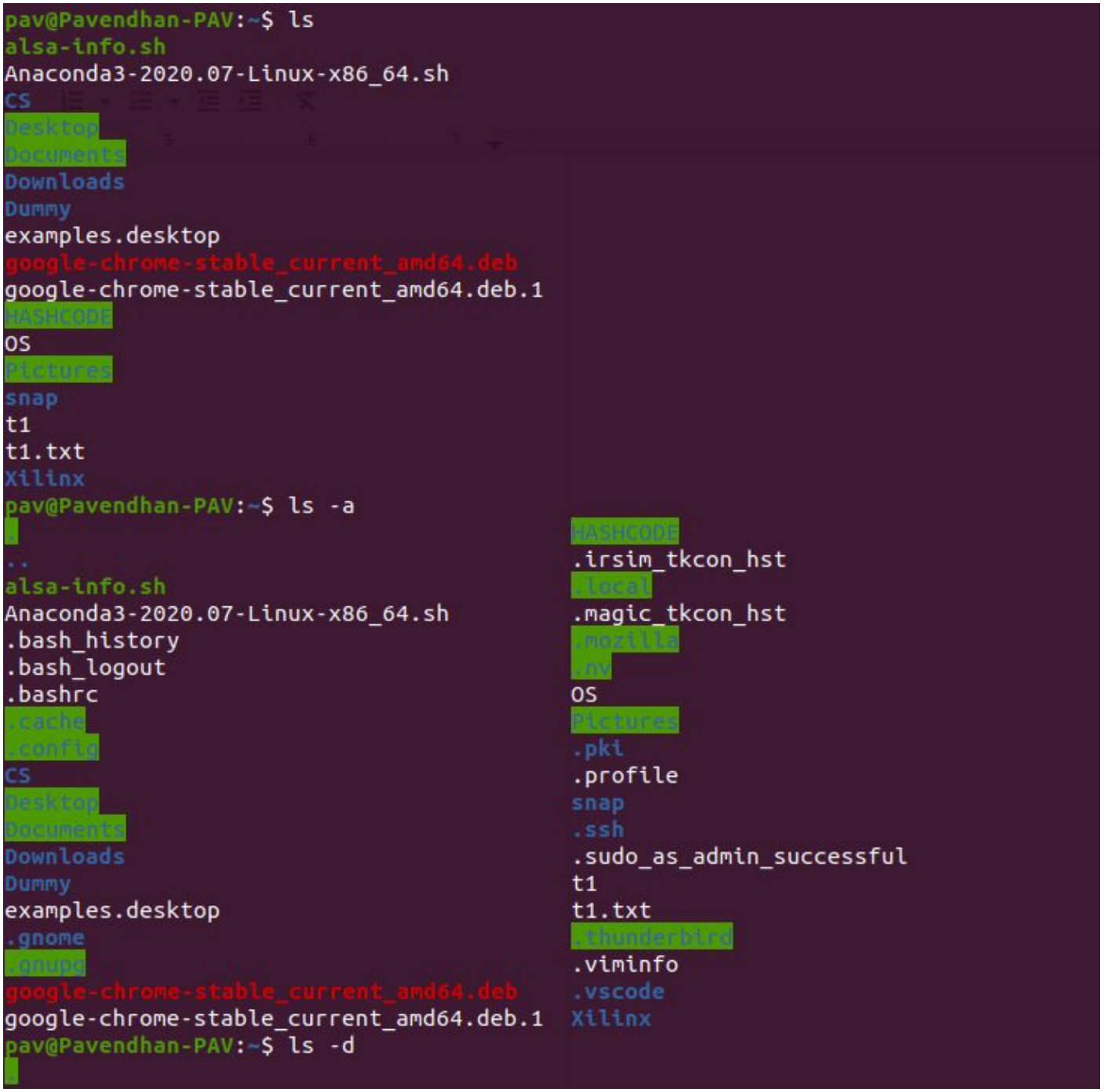
```

LS - It is a Linux shell command that lists directory contents of files and directories

Ls -[options] [dir]

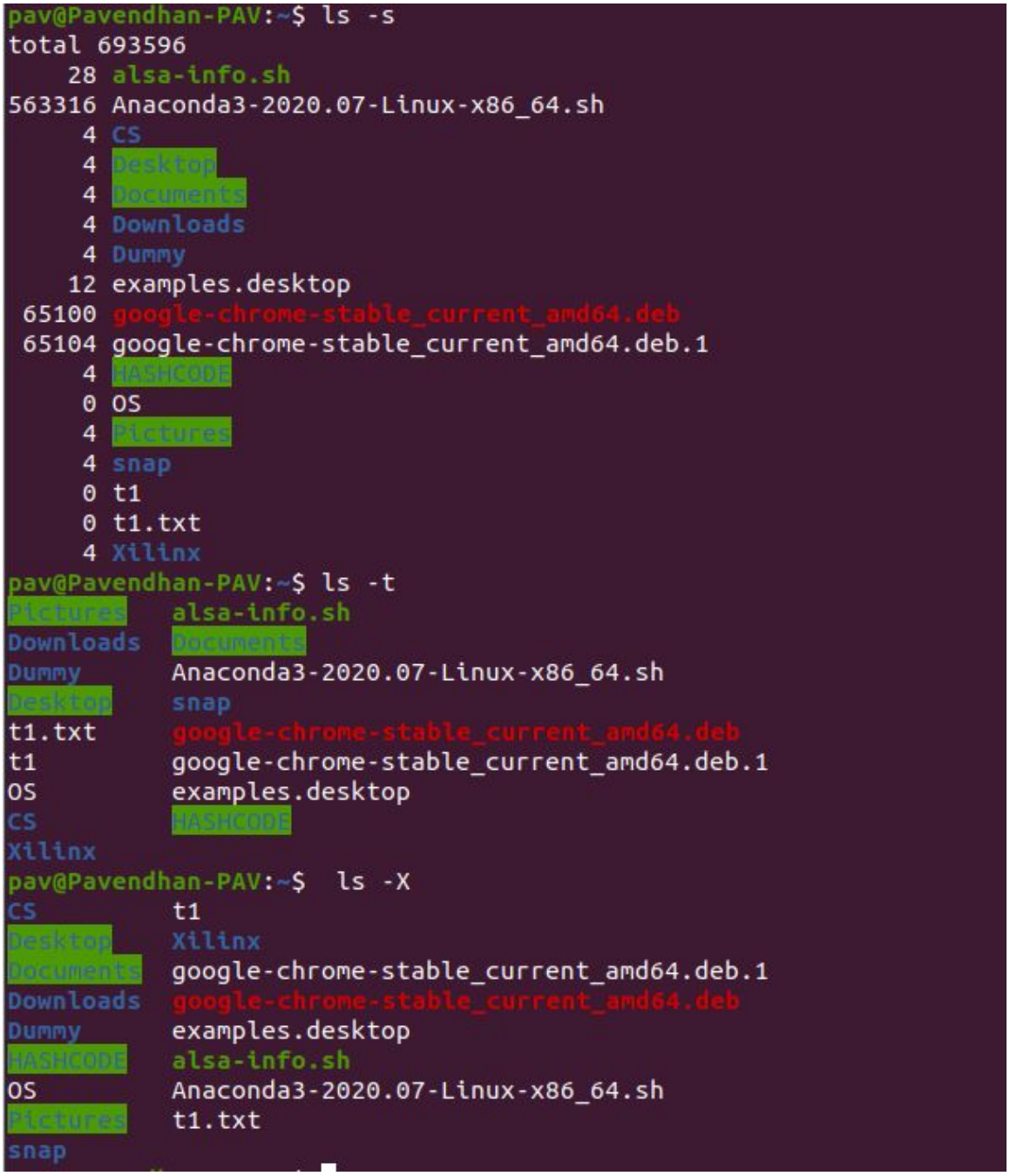
ls -a	list all files including hidden files starting with '.'
ls --color	colored list [=always/never/auto]
ls -d	list directories - with ' */'
ls -F	add one char of */=>@| to entries
ls -i	list file's inode index number
ls -l	list with long format - show permissions
ls -la	list long format including hidden files

ls -lh	list long format with readable file size
ls -ls	list with long format with file size
ls -r	list in reverse order
ls -R	list recursively directory tree
ls -s	list file size
ls -S	sort by file size
ls -t	sort by time & date
ls -X	sort by extension name



```
pav@Pavendhan-PAV:~$ ls -i
3412696 alsa-info.sh
3413420 Anaconda3-2020.07-Linux-x86_64.sh
3408897 CS
3407921 Desktop
3407925 Documents
3540662 Downloads
3412024 Dummy
3408884 examples.desktop
3409092 google-chrome-stable_current_amd64.deb
3409242 google-chrome-stable_current_amd64.deb.1
3408875 HASHCODE
3413265 OS
3407927 Pictures
3409175 snap
3412987 t1
3413266 t1.txt
3409928 Xilinx
pav@Pavendhan-PAV:~$ ls -l
total 693596
-rwxrwxr-x  1 pav pav     26730 Aug  5 21:47 alsa-info.sh
-rw-rw-r--  1 pav pav 576830621 Aug  2 17:11 Anaconda3-2020.07-Linux-x86_64.sh
drwxrwxr-x 10 pav pav      4096 Aug  7 15:31 CS
drwxrwxrwx  2 pav pav      4096 Aug 14 15:21 Desktop
drwxrwxrwx  2 pav pav      4096 Aug  5 15:42 Documents
drwxr-xr-x  2 pav pav      4096 Aug 19 14:58 Downloads
drwxrwxr-x  3 pav pav      4096 Aug 18 18:22 Dummy
-rw-rw-rw-  1 pav pav      8980 Mar 25 19:48 examples.desktop
-rw-rw-r--  1 pav pav  66659170 Apr 21 04:27 google-chrome-stable_current_amd64.deb
-rw-rw-r--  1 pav pav  66659170 Apr 21 04:27 google-chrome-stable_current_amd64.deb.
1
drwxrwxrwx  2 pav pav      4096 Feb 21  2020 HASHCODE
-rw-rw-r--  1 pav pav         0 Aug  7 17:34 OS
drwxrwxrwx  2 pav pav      4096 Aug 21 15:45 Pictures
drwxr-xr-x  4 pav pav      4096 Apr 25 00:40 snap
-rw-rw-r--  1 pav pav         0 Aug  7 17:34 t1
-rw-rw-r--  1 pav pav         0 Aug  7 17:38 t1.txt
drwxrwxr-x  4 pav pav      4096 Aug  5 21:58 Xilinx
```

```
pav@Pavendhan-PAV:~$ ls -lh
total 678M
-rwxrwxr-x  1 pav pav  27K Aug  5 21:47 alsa-info.sh
-rw-rw-r--  1 pav pav 551M Aug  2 17:11 Anaconda3-2020.07-Linux-x86_64.sh
drwxrwxr-x 10 pav pav 4.0K Aug  7 15:31 CS
drwxrwxrwx  2 pav pav 4.0K Aug 14 15:21 Desktop
drwxrwxrwx  2 pav pav 4.0K Aug  5 15:42 Documents
drwxr-xr-x  2 pav pav 4.0K Aug 19 14:58 Downloads
drwxrwxr-x  3 pav pav 4.0K Aug 18 18:22 Dummy
-rw-rw-rw-  1 pav pav 8.8K Mar 25 19:48 examples.desktop
-rw-rw-r--  1 pav pav  64M Apr 21 04:27 google-chrome-stable_current_amd64.deb
-rw-rw-r--  1 pav pav  64M Apr 21 04:27 google-chrome-stable_current_amd64.deb.1
drwxrwxrwx  2 pav pav 4.0K Feb 21  2020 HASHCODE
-rw-rw-r--  1 pav pav    0 Aug  7 17:34 OS
drwxrwxrwx  2 pav pav 4.0K Aug 21 15:45 Pictures
drwxr-xr-x  4 pav pav 4.0K Apr 25 00:40 snap
-rw-rw-r--  1 pav pav    0 Aug  7 17:34 t1
-rw-rw-r--  1 pav pav    0 Aug  7 17:38 t1.txt
drwxrwxr-x  4 pav pav 4.0K Aug  5 21:58 Xilinx
```



SED - SED command stands for stream editor and it can perform lot's of functions on files like, searching, find and replace, insertion or deletion. Though most common use of SED command in UNIX is for substitution or for find and replace. By using SED you can edit files even without opening it, which is a much quicker way to find and replace something in file, than first opening that file in VI Editor and then changing it.

SED is a powerful text stream editor. Can do insertion, deletion, search and replace(substitution). SED command in unix supports regular expression which allows it to perform complex pattern matching.

sed OPTIONS... [SCRIPT] [INPUTFILE...]

-n, --quiet, --silent	Suppress automatic printing of pattern space.
-e script, --expression=script	Add the script to the commands to be executed.
-f script-file, --file=script-file	Add the contents of script-file to the commands to be executed.
--follow-symlinks	Follow symlinks when processing in place.
-i[SUFFIX], --in-place[=SUFFIX]	Edit files in place (this makes a backup with file extension SUFFIX, if SUFFIX is supplied).
-l N, --line-length=N	Specify the desired line-wrap length, N, for the "l" command.
--POSIX	Disable all GNU extensions.
-r, --regexp-extended	Use extended regular expressions in the script.
-s, --separate	Consider files as separate rather than as a single continuous long stream.
-u, --unbuffered	Load minimal amounts of data from the input files and flush the output buffers more often.
--help	Display a help message, and exit.
--version	Output version information, and exit.

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sed 's/Unix/linux/p' sample2.txt
linux was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritch
ie, Douglas McIlroy, and Joe Ossanna at Bell Labs.
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There are various linux variants available in the market. Solaris Unix, AIX, HP Unix and BSD a
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A user can also run multiple programs at the same time; hence linux is a multitasking environm
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ent.
UNIX is a free OS.
Multiuser operating system.

pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sed -n 's/Unix/linux/p' sample2.txt
linux was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritch
ie, Douglas McIlroy, and Joe Ossanna at Bell Labs.
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tem.
A user can also run multiple programs at the same time; hence linux is a multitasking environm
ent.
```

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sed '1d' sample2.txt
There are various Unix variants available in the market. Solaris Unix, AIX, HP Unix and BSD ar
e a few examples. Linux is also a flavor of Unix which is freely available.
Several people can use a Unix computer at the same time; hence Unix is called a multiuser syst
em.
A user can also run multiple programs at the same time; hence Unix is a multitasking environme
nt.
UNIX is a free OS.
Multiuser operating system.

pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sed '/Unix/d' sample2.txt
UNIX is a free OS.
Multiuser operating system.
```

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sed 's/unix/linux/g' sample2.txt
Unix was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritchi
e, Douglas McIlroy, and Joe Ossanna at Bell Labs.
There are various Unix variants available in the market. Solaris Unix, AIX, HP Unix and BSD ar
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Several people can use a Unix computer at the same time; hence Unix is called a multiuser syst
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nt.
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pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sed 's/Unix/linux/g' sample2.txt
linux was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritch
ie, Douglas McIlroy, and Joe Ossanna at Bell Labs.
There are various linux variants available in the market. Solaris linux, AIX, HP linux and BSD
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stem.
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```

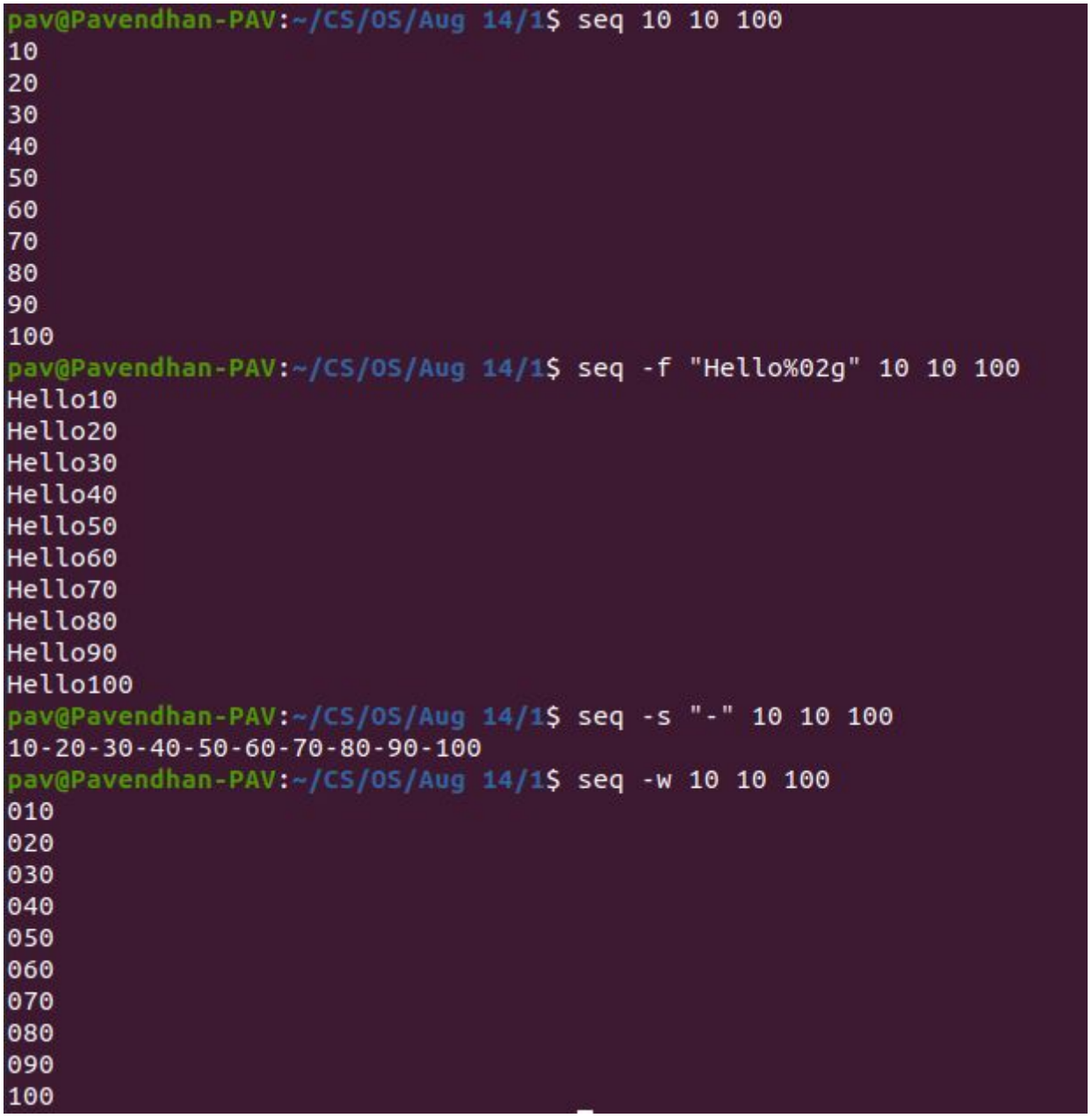
SEQ - It is used to generate numbers from *FIRST* to *LAST* in steps of *INCREMENT*. It is a very useful command where we had to generate a list of numbers in while, for, until loop.

```
seq [OPTION]... LAST
  or
seq [OPTION]... FIRST LAST
  or
seq [OPTION]... FIRST INCREMENT LAST

-f, --format=FORMAT      use printf style floating-point FORMAT

-s, --separator=STRING   use STRING to separate numbers (default: \n)

-w, --equal-width        equalize width by padding with leading zeroes
```



IFCONFIG- It is used to configure the kernel-resident network interfaces. It is used at the boot time to set up the interfaces as necessary. After that, it is usually used when needed during debugging or when you need system tuning. Also, this command is used to assign the IP address and netmask to an interface or to enable or disable a given interface.

ifconfig [...OPTIONS] [INTERFACE]

-a : This option is used to display all the interfaces available, even if they are down.

-s : Display a short list, instead of details.

-v : Run the command in verbose mode – log more details about execution.

up : This option is used to activate the driver for the given interface.

down : This option is used to deactivate the driver for the given interface.

add addr/prefixlen : This option is used to add an IPv6 address to an interface.

del addr/prefixlen : This option is used to remove an IPv6 address to an interface.

[-]arp : This option is used to enable/disable the use of ARP protocol on an interface.

[-]promisc : This option is used to enable/disable the promiscuous mode on an interface. If it is selected, all the packets on the network will be received by the interface.

[-]allmulti : This option is used to enable/disable all-multicast mode for an interface. If it is selected, all the multicast packets will be received by the interface.

mtu N : The user uses this parameter to set the Maximum Transfer Unit(MTU).

```
pav@Pavendhan-PAV:~$ ifconfig -a
eno1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.2  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fd9c:b2b2:d7dd:eb00:105f:3759:2911:40ea  prefixlen 64  scopeid 0x0<global>
        inet6 fd9c:b2b2:d7dd:eb00:3993:25aa:b00c:3cb  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::8c37:ffa6:617e:7ab6  prefixlen 64  scopeid 0x20<link>
        ether b4:b6:86:d1:91:ed  txqueuelen 1000  (Ethernet)
        RX packets 3874870  bytes 4170004324 (4.1 GB)
        RX errors 0  dropped 1  overruns 0  frame 0
        TX packets 1819639  bytes 175965453 (175.9 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 4969  bytes 429662 (429.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 4969  bytes 429662 (429.6 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.9  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fd9c:b2b2:d7dd:eb00:347e:c32:ade:d4da  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::ff84:3098:8a47:3550  prefixlen 64  scopeid 0x20<link>
        inet6 fd9c:b2b2:d7dd:eb00:2d7d:1d28:f387:5a33  prefixlen 64  scopeid 0x0<global>
        ether 5c:5f:67:07:7c:a9  txqueuelen 1000  (Ethernet)
        RX packets 4050  bytes 821570 (821.5 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 2292  bytes 364520 (364.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
pav@Pavendhan-PAV:~$ ifconfig -s
Iface      MTU    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
eno1      1500  3875482      0      1 0       1819898      0      0      0 BMRU
lo       65536     4969      0      0 0          4969      0      0      0 LRU
wlo1      1500     4051      0      0 0          2293      0      0      0 BMRU
```

```
pav@Pavendhan-PAV:~$ ifconfig -v
eno1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.2  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fd9c:b2b2:d7dd:eb00:105f:3759:2911:40ea  prefixlen 64  scopeid 0x0<global>
        inet6 fd9c:b2b2:d7dd:eb00:3993:25aa:b00c:3cb  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::8c37:ffa6:617e:7ab6  prefixlen 64  scopeid 0x20<link>
        ether b4:b6:86:d1:91:ed  txqueuelen 1000  (Ethernet)
        RX packets 3875741  bytes 4170291145 (4.1 GB)
        RX errors 0  dropped 1  overruns 0  frame 0
        TX packets 1820012  bytes 176002353 (176.0 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 4969  bytes 429662 (429.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 4969  bytes 429662 (429.6 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.9  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fd9c:b2b2:d7dd:eb00:347e:c32:ade:d4da  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::ff84:3098:8a47:3550  prefixlen 64  scopeid 0x20<link>
        inet6 fd9c:b2b2:d7dd:eb00:2d7d:1d28:f387:5a33  prefixlen 64  scopeid 0x0<global>
        ether 5c:5f:67:07:7c:a9  txqueuelen 1000  (Ethernet)
        RX packets 4051  bytes 821612 (821.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 2293  bytes 364590 (364.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

WGET - It is a free utility for non-interactive download of files from the web. It supports HTTP, HTTPS, and FTP protocols, as well as retrieval through HTTP proxies.

wget [OPTION]... [URL]...

-V, --version Display the version of wget, and exit.
-h, --help Print a help message describing all of wget's command-line options, and exit.
-b, --background Go to background immediately after startup. If no output file is specified via the -o, output is redirected to wget-log.

-e , --execute Execute command as if it were a part of the file .wgetrc. A command thus invoked will be executed after the commands in .wgetrc, thus taking precedence over them.

```
pav@Pavendhan-PAV:~$ wget -b  computerhope.com/unix/wget.htm
Continuing in background, pid 18824.
Output will be written to ‘wget-log.1’.
```

```
pav@Pavendhan-PAV:~$ wget computerhope.com/unix/wget.htm
--2020-08-24 15:11:16--  http://computerhope.com/unix/wget.htm
Resolving computerhope.com (computerhope.com)... 104.20.18.53, 172.67.0.39, 104.20.19.53, ...
Connecting to computerhope.com (computerhope.com)|104.20.18.53|:80... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://www.computerhope.com/unix/wget.htm [following]
--2020-08-24 15:11:17--  https://www.computerhope.com/unix/wget.htm
Resolving www.computerhope.com (www.computerhope.com)... 104.20.19.53, 172.67.0.39, 104.20.18.53, ..
.
Connecting to www.computerhope.com (www.computerhope.com)|104.20.19.53|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/html]
Saving to: 'wget.htm.1'

wget.htm.1                  [ <=>                                ]  85.87K  --.-KB/s    in 0.04s

2020-08-24 15:11:17 (1.96 MB/s) - 'wget.htm.1' saved [87929]
```

```
pav@Pavendhan-PAV:~$ wget -V
GNU Wget 1.20.3 built on linux-gnu.

-cares +digest -gpgme +https +ipv6 +iri +large-file -metalink +nls
+ntlm +opie +psl +ssl/openssl

Wgetrc:
    /etc/wgetrc (system)
Locale:
    /usr/share/locale
Compile:
    gcc -DHAVE_CONFIG_H -DSYSTEM_WGETRC="/etc/wgetrc"
    -DLOCALEDIR="/usr/share/locale" -I. -I../../src -I../lib
    -I../../lib -Wdate-time -D_FORTIFY_SOURCE=2 -DHAVE_LIBSSL -DNDEBUG
    -g -O2 -fdebug-prefix-map=/build/wget-OYIfr9/wget-1.20.3=.
    -fstack-protector-strong -Wformat -Werror=format-security
    -DNO_SSLv2 -D_FILE_OFFSET_BITS=64 -g -Wall
Link:
    gcc -DHAVE_LIBSSL -DNDEBUG -g -O2
    -fdebug-prefix-map=/build/wget-OYIfr9/wget-1.20.3=.
    -fstack-protector-strong -Wformat -Werror=format-security
    -DNO_SSLv2 -D_FILE_OFFSET_BITS=64 -g -Wall -Wl,-Bsymbolic-functions
    -Wl,-z,relro -Wl,-z,now -lpcre2-8 -luuid -lidn2 -lssl -lcrypto -lz
    -lpsl ftp-opie.o openssl.o http-ntlm.o ../lib/libgnu.a

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License GPLv3+: GNU GPL version 3 or later
<http://www.gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Originally written by Hrvoje Niksic <hniksic@xemacs.org>.
Please send bug reports and questions to <bug-wget@gnu.org>.
```

PMAP - The pmap command in Linux is used to display the memory map of a process. A memory map indicates how memory is spread out.

pmap [options] pid [...]

-x : This option is used to display the memory map in an extended format.

-p : This option is used to display the full path to the files.
-d : This option is used to display the device format.
-q : This option is used to ignore the column names while displaying the report of the memory map.
-A : This option is used to display results to the given range. Notice that the low and high arguments are single strings separated with a comma.
-XX : This option is used to display everything the kernel provides.
-n : This option is used to create a new configuration.
-c : This option is used to read the default configuration.
-h : This option is used to display help text.
-v : T his option is used to display the version information and exit.

```
pav@Pavendhan-PAV:~$ pmap -p 17723
17723:   bash
0000562f405c5000    180K r---- /usr/bin/bash
0000562f405f2000    708K r-x-- /usr/bin/bash
0000562f406a3000    220K r---- /usr/bin/bash
0000562f406da000     16K r---- /usr/bin/bash
0000562f406de000     36K rw--- /usr/bin/bash
0000562f406e7000     40K rw---   [ anon ]
0000562f41163000   1300K rw---   [ anon ]
00007fddcd995000     12K r---- /usr/lib/x86_64-linux-gnu/libnss_files-2.31.so
00007fddcd998000     28K r-x-- /usr/lib/x86_64-linux-gnu/libnss_files-2.31.so
00007fddcd99f000      8K r---- /usr/lib/x86_64-linux-gnu/libnss_files-2.31.so
00007fddcd9a1000      4K r---- /usr/lib/x86_64-linux-gnu/libnss_files-2.31.so
00007fddcd9a2000      4K rw--- /usr/lib/x86_64-linux-gnu/libnss_files-2.31.so
00007fddcd9a3000     24K rw---   [ anon ]
00007fddcd9c0000  14200K r---- /usr/lib/locale/locale-archive
00007fddce79e000     12K rw---   [ anon ]
00007fddce7a1000    148K r---- /usr/lib/x86_64-linux-gnu/libc-2.31.so
00007fddce7c6000   1504K r-x-- /usr/lib/x86_64-linux-gnu/libc-2.31.so
00007fddce93e000    296K r---- /usr/lib/x86_64-linux-gnu/libc-2.31.so
00007fddce988000      4K ----- /usr/lib/x86_64-linux-gnu/libc-2.31.so
00007fddce989000     12K r---- /usr/lib/x86_64-linux-gnu/libc-2.31.so
00007fddce98c000     12K rw--- /usr/lib/x86_64-linux-gnu/libc-2.31.so
00007fddce98f000     16K rw---   [ anon ]
00007fddce993000      4K r---- /usr/lib/x86_64-linux-gnu/libdl-2.31.so
00007fddce994000      8K r-x-- /usr/lib/x86_64-linux-gnu/libdl-2.31.so
00007fddce996000      4K r---- /usr/lib/x86_64-linux-gnu/libdl-2.31.so
00007fddce997000      4K r---- /usr/lib/x86_64-linux-gnu/libdl-2.31.so
00007fddce998000      4K rw--- /usr/lib/x86_64-linux-gnu/libdl-2.31.so
00007fddce999000     56K r---- /usr/lib/x86_64-linux-gnu/libtinfo.so.6.2
00007fddce9a7000     60K r-x-- /usr/lib/x86_64-linux-gnu/libtinfo.so.6.2
00007fddce9b6000     56K r---- /usr/lib/x86_64-linux-gnu/libtinfo.so.6.2
00007fddce9c4000     16K r---- /usr/lib/x86_64-linux-gnu/libtinfo.so.6.2
00007fddce9c8000      4K rw--- /usr/lib/x86_64-linux-gnu/libtinfo.so.6.2
00007fddce9c9000      8K rw---   [ anon ]
00007fddce9db000     28K r--s- /usr/lib/x86_64-linux-gnu/gconv/gconv-modules.cache
00007fddce9e2000      4K r---- /usr/lib/x86_64-linux-gnu/ld-2.31.so
00007fddce9e3000    140K r-x-- /usr/lib/x86_64-linux-gnu/ld-2.31.so
00007fddcea06000     32K r---- /usr/lib/x86_64-linux-gnu/ld-2.31.so
00007fddcea0f000      4K r---- /usr/lib/x86_64-linux-gnu/ld-2.31.so
00007fddcea10000      4K rw--- /usr/lib/x86_64-linux-gnu/ld-2.31.so
00007fddcea11000      4K rw---   [ anon ]
00007ffcc8cb0000    132K rw---   [ stack ]
00007ffcc8d9b000     12K r----   [ anon ]
00007ffcc8d9e000      4K r-x--   [ anon ]
ffffffffff600000      4K --x--   [ anon ]
 total            19376K
```

```
pav@Pavendhan-PAV:~$ pmap -d 17723
17723:   bash
Address           Kbytes Mode  Offset           Device    Mapping
0000562f405c5000     180 r---- 0000000000000000 008:00016 bash
0000562f405f2000     708 r-x-- 000000000002d000 008:00016 bash
0000562f406a3000     220 r---- 00000000000de000 008:00016 bash
0000562f406da000      16 r---- 0000000000114000 008:00016 bash
0000562f406de000      36 rw--- 0000000000118000 008:00016 bash
0000562f406e7000      40 rw--- 0000000000000000 000:00000   [ anon ]
0000562f41163000    1300 rw--- 0000000000000000 000:00000   [ anon ]
00007fddcd995000      12 r---- 0000000000000000 008:00016 libnss_files-2.31.so
00007fddcd998000      28 r-x-- 0000000000003000 008:00016 libnss_files-2.31.so
00007fddcd99f000       8 r---- 000000000000a000 008:00016 libnss_files-2.31.so
00007fddcd9a1000       4 r---- 000000000000b000 008:00016 libnss_files-2.31.so
00007fddcd9a2000       4 rw--- 000000000000c000 008:00016 libnss_files-2.31.so
00007fddcd9a3000      24 rw--- 0000000000000000 000:00000   [ anon ]
00007fddcd9c0000   14200 r---- 0000000000000000 008:00016 locale-archive
00007fddce79e000      12 rw--- 0000000000000000 000:00000   [ anon ]
00007fddce7a1000     148 r---- 0000000000000000 008:00016 libc-2.31.so
00007fddce7c6000    1504 r-x-- 0000000000025000 008:00016 libc-2.31.so
00007fddce93e000     296 r---- 000000000019d000 008:00016 libc-2.31.so
00007fddce988000       4 ----- 00000000001e7000 008:00016 libc-2.31.so
00007fddce989000      12 r---- 00000000001e7000 008:00016 libc-2.31.so
00007fddce98c000      12 rw--- 00000000001ea000 008:00016 libc-2.31.so
00007fddce98f000      16 rw--- 0000000000000000 000:00000   [ anon ]
00007fddce993000       4 r---- 0000000000000000 008:00016 libdl-2.31.so
00007fddce994000       8 r-x-- 0000000000001000 008:00016 libdl-2.31.so
00007fddce996000       4 r---- 0000000000003000 008:00016 libdl-2.31.so
00007fddce997000       4 r---- 0000000000003000 008:00016 libdl-2.31.so
00007fddce998000       4 rw--- 0000000000004000 008:00016 libdl-2.31.so
00007fddce999000      56 r---- 0000000000000000 008:00016 libtinfo.so.6.2
00007fddce9a7000      60 r-x-- 000000000000e000 008:00016 libtinfo.so.6.2
00007fddce9b6000      56 r---- 000000000001d000 008:00016 libtinfo.so.6.2
00007fddce9c4000      16 r---- 000000000002a000 008:00016 libtinfo.so.6.2
00007fddce9c8000       4 rw--- 000000000002e000 008:00016 libtinfo.so.6.2
00007fddce9c9000       8 rw--- 0000000000000000 000:00000   [ anon ]
00007fddce9db000      28 r--s- 0000000000000000 008:00016 gconv-modules.cache
00007fddce9e2000       4 r---- 0000000000000000 008:00016 ld-2.31.so
00007fddce9e3000     140 r-x-- 0000000000001000 008:00016 ld-2.31.so
00007fddcea06000      32 r---- 0000000000024000 008:00016 ld-2.31.so
00007fddcea0f000       4 r---- 000000000002c000 008:00016 ld-2.31.so
00007fddcea10000       4 rw--- 000000000002d000 008:00016 ld-2.31.so
00007fddcea11000       4 rw--- 0000000000000000 000:00000   [ anon ]
00007ffcc8cb0000     132 rw--- 0000000000000000 000:00000   [ stack ]
00007ffcc8d9b000      12 r---- 0000000000000000 000:00000   [ anon ]
00007ffcc8d9e000       4 r-x-- 0000000000000000 000:00000   [ anon ]
ffffffffff600000       4 --x-- 0000000000000000 000:00000   [ anon ]
mapped: 19376K    writeable/private: 1600K    shared: 28K
```

```
pav@Pavendhan-PAV:~$ pmap -x 17723
17723:   bash
Address           Kbytes     RSS   Dirty Mode  Mapping
0000562f405c5000     180     180       0 r---- bash
0000562f405f2000     708     708       0 r-x-- bash
0000562f406a3000     220     112       0 r---- bash
0000562f406da000      16      16      16 r---- bash
0000562f406de000      36      36      36 rw--- bash
0000562f406e7000      40      28      28 rw---   [ anon ]
0000562f41163000    1300    1208    1208 rw---   [ anon ]
00007fddcd995000      12      12       0 r---- libnss_files-2.31.so
00007fddcd998000      28      28       0 r-x-- libnss_files-2.31.so
00007fddcd99f000       8       8       0 r---- libnss_files-2.31.so
00007fddcd9a1000       4       4       4 r---- libnss_files-2.31.so
00007fddcd9a2000       4       4       4 rw--- libnss_files-2.31.so
00007fddcd9a3000      24       0       0 rw---   [ anon ]
00007fddcd9c0000   14200     472       0 r---- locale-archive
00007fddce79e000      12       8       8 rw---   [ anon ]
00007fddce7a1000     148     144       0 r---- libc-2.31.so
00007fddce7c6000    1504    1224       0 r-x-- libc-2.31.so
00007fddce93e000     296     184       0 r---- libc-2.31.so
00007fddce988000       4       0       0 ----- libc-2.31.so
00007fddce989000      12      12      12 r---- libc-2.31.so
00007fddce98c000      12      12      12 rw--- libc-2.31.so
00007fddce98f000      16      16      16 rw---   [ anon ]
00007fddce993000       4       4       0 r---- libdl-2.31.so
00007fddce994000       8       8       0 r-x-- libdl-2.31.so
00007fddce996000       4       0       0 r---- libdl-2.31.so
00007fddce997000       4       4       4 r---- libdl-2.31.so
00007fddce998000       4       4       4 rw--- libdl-2.31.so
00007fddce999000      56      56       0 r---- libtinfo.so.6.2
00007fddce9a7000      60      60       0 r-x-- libtinfo.so.6.2
00007fddce9b6000      56      56       0 r---- libtinfo.so.6.2
00007fddce9c4000      16      16      16 r---- libtinfo.so.6.2
00007fddce9c8000       4       4       4 rw--- libtinfo.so.6.2
00007fddce9c9000       8       8       8 rw---   [ anon ]
00007fddce9db000      28      28       0 r--s- gconv-modules.cache
00007fddce9e2000       4       4       0 r---- ld-2.31.so
00007fddce9e3000     140     140       0 r-x-- ld-2.31.so
00007fddcea06000      32      32       0 r---- ld-2.31.so
00007fddcea0f000       4       4       4 r---- ld-2.31.so
00007fddcea10000       4       4       4 rw--- ld-2.31.so
00007fddcea11000       4       4       4 rw---   [ anon ]
00007ffcc8cb0000     132     108     108 rw---   [ stack ]
00007ffcc8d9b000      12       0       0 r----   [ anon ]
00007ffcc8d9e000       4       4       0 r-x--   [ anon ]
ffffffffff600000       4       0       0 --x--   [ anon ]
---------------- ------- ------- -------
total kB          19376    4964    1500
```

```
pav@Pavendhan-PAV:~$ pmap 17723
17723:   bash
0000562f405c5000    180K r---- bash
0000562f405f2000    708K r-x-- bash
0000562f406a3000    220K r---- bash
0000562f406da000     16K r---- bash
0000562f406de000     36K rw--- bash
0000562f406e7000     40K rw---   [ anon ]
0000562f41163000   1300K rw---   [ anon ]
00007fddcd995000     12K r---- libnss_files-2.31.so
00007fddcd998000     28K r-x-- libnss_files-2.31.so
00007fddcd99f000      8K r---- libnss_files-2.31.so
00007fddcd9a1000      4K r---- libnss_files-2.31.so
00007fddcd9a2000      4K rw--- libnss_files-2.31.so
00007fddcd9a3000     24K rw---   [ anon ]
00007fddcd9c0000  14200K r---- locale-archive
00007fddce79e000     12K rw---   [ anon ]
00007fddce7a1000    148K r---- libc-2.31.so
00007fddce7c6000   1504K r-x-- libc-2.31.so
00007fddce93e000    296K r---- libc-2.31.so
00007fddce988000      4K ----- libc-2.31.so
00007fddce989000     12K r---- libc-2.31.so
00007fddce98c000     12K rw--- libc-2.31.so
00007fddce98f000     16K rw---   [ anon ]
00007fddce993000      4K r---- libdl-2.31.so
00007fddce994000      8K r-x-- libdl-2.31.so
00007fddce996000      4K r---- libdl-2.31.so
00007fddce997000      4K r---- libdl-2.31.so
00007fddce998000      4K rw--- libdl-2.31.so
00007fddce999000     56K r---- libtinfo.so.6.2
00007fddce9a7000     60K r-x-- libtinfo.so.6.2
00007fddce9b6000     56K r---- libtinfo.so.6.2
00007fddce9c4000     16K r---- libtinfo.so.6.2
00007fddce9c8000      4K rw--- libtinfo.so.6.2
00007fddce9c9000      8K rw---   [ anon ]
00007fddce9db000     28K r--s- gconv-modules.cache
00007fddce9e2000      4K r---- ld-2.31.so
00007fddce9e3000    140K r-x-- ld-2.31.so
00007fddcea06000     32K r---- ld-2.31.so
00007fddcea0f000      4K r---- ld-2.31.so
00007fddcea10000      4K rw--- ld-2.31.so
00007fddcea11000      4K rw---   [ anon ]
00007ffcc8cb0000    132K rw---   [ stack ]
00007ffcc8d9b000     12K r----   [ anon ]
00007ffcc8d9e000      4K r-x--   [ anon ]
ffffffffff600000      4K --x--   [ anon ]
 total            19376K
```

AWK - Awk is a utility that enables a programmer to write tiny but effective programs in the form of statements that define text patterns that are to be searched for in each line of a document and the action that is to be taken when a match is found within a line. Awk is mostly used for pattern scanning and processing. It searches one or more files to see if they contain lines that match with the specified patterns and then performs the associated actions.

awk options 'selection _criteria {action }' input-file > output-file

-f program-file : Reads the AWK program source from the file program-file, instead of from the first command line argument.
-F fs : Use fs for the input field separator

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ awk '{print}' sample2.txt
Unix was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritchie, Douglas M
cIlroy, and Joe Ossanna at Bell Labs.
There are various Unix variants available in the market. Solaris Unix, AIX, HP Unix and BSD are a few exam
ples. Linux is also a flavor of Unix which is freely available.
Several people can use a Unix computer at the same time; hence Unix is called a multiuser system.
A user can also run multiple programs at the same time; hence Unix is a multitasking environment.
UNIX is a free OS.
Multiuser operating system.

pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ awk '/Unix/{print}' sample2.txt
Unix was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritchie, Douglas M
cIlroy, and Joe Ossanna at Bell Labs.
There are various Unix variants available in the market. Solaris Unix, AIX, HP Unix and BSD are a few exam
ples. Linux is also a flavor of Unix which is freely available.
Several people can use a Unix computer at the same time; hence Unix is called a multiuser system.
A user can also run multiple programs at the same time; hence Unix is a multitasking environment.
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ awk '{print NR,$0}' sample2.txt
1 Unix was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritchie, Douglas
 McIlroy, and Joe Ossanna at Bell Labs.
2 There are various Unix variants available in the market. Solaris Unix, AIX, HP Unix and BSD are a few ex
amples. Linux is also a flavor of Unix which is freely available.
3 Several people can use a Unix computer at the same time; hence Unix is called a multiuser system.
4 A user can also run multiple programs at the same time; hence Unix is a multitasking environment.
5 UNIX is a free OS.
6 Multiuser operating system.
7
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ awk '{print $2}' sample2.txt
was
are
people
user
is
operating

pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ awk 'END {print NR}' sample2.txt
7
```

MPSTAT - When executed mpstat command will display all the information about CPU utilization and performance stats on Linux Terminal window.

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ mpstat
Linux 5.4.0-42-generic (Pavendhan-PAV)  24/08/20        _x86_64_        (8 CPU)

04:01:24 PM IST  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
04:01:24 PM IST  all   16.02    0.01    4.05    0.23    0.00    1.72    0.00    0.00    0.00   77.97
```

DIFF - This command will compare the two directories and will display differences between them as shown in the following screenshot.

diff <file name1> <file name2>

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ diff sample1.txt sample2.txt
1,11c1,3
< This is a test document.
< An OS is an interface between a computer user and a computer hardware.
< An OS is a software which performs all the basic tasks like file management, memory management, process mana
gement, handling input and output, and controlling peripheral devices such as disk drives and printers.
< Operating system is one of the core subjects in computer science.
< Operating system is one of the core subjects in computer science.
< Unix is a great OS.
< UNIX is a free OS.
< Unix systems use a centralized operating system kernel which manages system and process activities.
< Unix is a great OS.
< UNIX is a free OS.
< UNixOS systems use a centralized operating system kernel which manages system and process activities.
---
> Unix was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritchie, Douglas McI
lroy, and Joe Ossanna at Bell Labs.
> There are various Unix variants available in the market. Solaris Unix, AIX, HP Unix and BSD are a few exampl
es. Linux is also a flavor of Unix which is freely available.
> Several people can use a Unix computer at the same time; hence Unix is called a multiuser system.
15c7
< Yet another powerful OS.
\ No newline at end of file
---
>
```

SORT - It is used to sort a file, arranging the records in a particular order. By default, the sort command sorts file assuming the contents are ASCII. Using options in sort command, it can also be used to sort numerically.

Sort [options] <filename>

-r Sorting In Reverse Order

-n To sort a file numerically

-k sort on a certain column

-c check if the file given is already sorted or not

-u sort and remove duplicates

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sort sample1.txt
An OS is an interface between a computer user and a computer hardware.
An OS is a software which performs all the basic tasks like file management, memory m
anagement, process management, handling input and output, and controlling peripheral
devices such as disk drives and printers.
A user can also run multiple programs at the same time; hence Unix is a multitasking
environment.
Multiuser operating system.
Operating system is one of the core subjects in computer science.
Operating system is one of the core subjects in computer science.
This is a test document.
UNIX is a free OS.
UNIX is a free OS.
UNIX is a free OS.
Unix is a great OS.
Unix is a great OS.
UNixOS systems use a centralized operating system kernel which manages system and pro
cess activities.
Unix systems use a centralized operating system kernel which manages system and proce
ss activities.
Yet another powerful OS.
```

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sort -r sample1.txt
Yet another powerful OS.
Unix systems use a centralized operating system kernel which manages system and process activitie
s.
UNixOS systems use a centralized operating system kernel which manages system and process activit
ies.
Unix is a great OS.
Unix is a great OS.
UNIX is a free OS.
UNIX is a free OS.
UNIX is a free OS.
This is a test document.
Operating system is one of the core subjects in computer science.
Operating system is one of the core subjects in computer science.
Multiuser operating system.
A user can also run multiple programs at the same time; hence Unix is a multitasking environment.
An OS is a software which performs all the basic tasks like file management, memory management, p
rocess management, handling input and output, and controlling peripheral devices such as disk dri
ves and printers.
An OS is an interface between a computer user and a computer hardware.
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sort -k 2 sample1.txt
Yet another powerful OS.
UNIX is a free OS.
UNIX is a free OS.
UNIX is a free OS.
Unix is a great OS.
Unix is a great OS.
This is a test document.
Multiuser operating system.
An OS is an interface between a computer user and a computer hardware.
An OS is a software which performs all the basic tasks like file management, memory management, p
rocess management, handling input and output, and controlling peripheral devices such as disk dri
ves and printers.
Operating system is one of the core subjects in computer science.
Operating system is one of the core subjects in computer science.
UNixOS systems use a centralized operating system kernel which manages system and process activit
ies.
Unix systems use a centralized operating system kernel which manages system and process activitie
s.
A user can also run multiple programs at the same time; hence Unix is a multitasking environment.
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sort -c sample1.txt
sort: sample1.txt:2: disorder: An OS is an interface between a computer user and a computer hardw
are.
```

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ sort -u sample1.txt
An OS is an interface between a computer user and a computer hardware.
An OS is a software which performs all the basic tasks like file management, memory management, p
rocess management, handling input and output, and controlling peripheral devices such as disk dri
ves and printers.
A user can also run multiple programs at the same time; hence Unix is a multitasking environment.
Multiuser operating system.
Operating system is one of the core subjects in computer science.
This is a test document.
UNIX is a free OS.
Unix is a great OS.
UNixOS systems use a centralized operating system kernel which manages system and process activit
ies.
Unix systems use a centralized operating system kernel which manages system and process activitie
s.
Yet another powerful OS.
```

LOCATE - It is used to find the files by name. There are two most widely used file searching utilities accessible to users are called find and *locate*. The *locate* utility works better and faster than *find* command counterpart because instead of searching the file system when a file search is initiated, it would look through a database.
locate [OPTION]... PATTERN...

-b, –basename : Match only the base name against the specified patterns, which is the opposite of –wholename.
-c, –count : Instead of writing file names on standard output, write the number of matching entries only.
-d, –database DBPATH : Replace the default database with DBPATH. DBPATH is a : (colon) separated list of database file names. If more than one –database option is specified, the resulting path is a concatenation of the separate paths. An empty database file name is replaced by the default database. A database file name – refers to the standard input. Note that a database can be read from the standard input only once.
-e, –existing : Print only entries that refer to files existing at the time locate is run.
-L, –follow : When checking whether files exist (if the –existing option is specified), follow trailing symbolic links. This causes bro ken symbolic links to be omitted from the output. This option is the default behavior. The opposite can be specified using –nofollow.
-h, –help : Write a summary of the available options to standard output and exit successfully.
-i, –ignore-case : Ignore case distinctions when matching patterns.
-l, –limit, -n LIMIT : Exit successfully after finding LIMIT entries. If the –count option is specified, the resulting count is also limited to LIMIT.
-m, –mmap : Ignored, but included for compatibility with BSD and GNU locate.
-P, –nofollow, -H : When checking whether files exist (if the –existing option is specified), do not follow trailing symbolic links. This causes broken symbolic links to be reported like other files. This option is the opposite of –follow.
-0, –null : Separate the entries on output using the ASCII NUL character instead of writing each entry on a separate line. This option is designed for interoperability with the –null option of GNU xargs.
-S, –statistics : Write statistics about each read database to standard output instead of searching for files and exit successfully.
-q, –quiet : Write no messages about errors encountered while reading and processing databases.
-r, –regexp REGEXP : Search for a basic regexp REGEXP. No PATTERNs are allowed if this option is used, but this option can be specified multiple times.
–regex : Interpret all PATTERNs as extended regexps.
-s, –stdio : Ignored, for compatibility with BSD and GNU locate.
-V, –version : Write information about the version and license of locate on standard output and exit successfully.
-w, –wholename : Match only the whole path name against the specified patterns. This option is the default behavior. The opposite can be specified using –basename.

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ locate *.txt
/home/pav/CS/OS/Aug 14/1/sample1.txt
/home/pav/CS/OS/Aug 14/1/sample2.txt
/home/pav/CS/OS/Aug 14/2-41/sample1.txt
/home/pav/CS/OS/Aug 14/2-41/sample2.txt
/home/pav/Dummy/Test/sample1.txt
/home/pav/Dummy/Test/sample2.txt
```

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ locate -c *.txt
6
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ locate -L *.txt
/home/pav/CS/OS/Aug 14/1/sample1.txt
/home/pav/CS/OS/Aug 14/1/sample2.txt
/home/pav/CS/OS/Aug 14/2-41/sample1.txt
/home/pav/CS/OS/Aug 14/2-41/sample2.txt
/home/pav/Dummy/Test/sample1.txt
/home/pav/Dummy/Test/sample2.txt
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ locate -i *.txt
/home/pav/CS/OS/Aug 14/1/sample1.txt
/home/pav/CS/OS/Aug 14/1/sample2.txt
/home/pav/CS/OS/Aug 14/2-41/sample1.txt
/home/pav/CS/OS/Aug 14/2-41/sample2.txt
/home/pav/Dummy/Test/sample1.txt
/home/pav/Dummy/Test/sample2.txt
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ locate *.txt -n 3
/home/pav/CS/OS/Aug 14/1/sample1.txt
/home/pav/CS/OS/Aug 14/1/sample2.txt
/home/pav/CS/OS/Aug 14/2-41/sample1.txt
```

WC - This command reads the file thrown with the command and displays word and line count of the file.

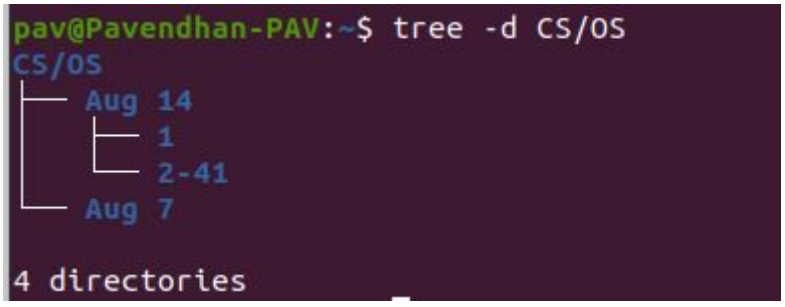
```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ wc sample1.txt
 14 149 906 sample1.txt
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ wc sample2.txt
  7  98 565 sample2.txt
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$
```

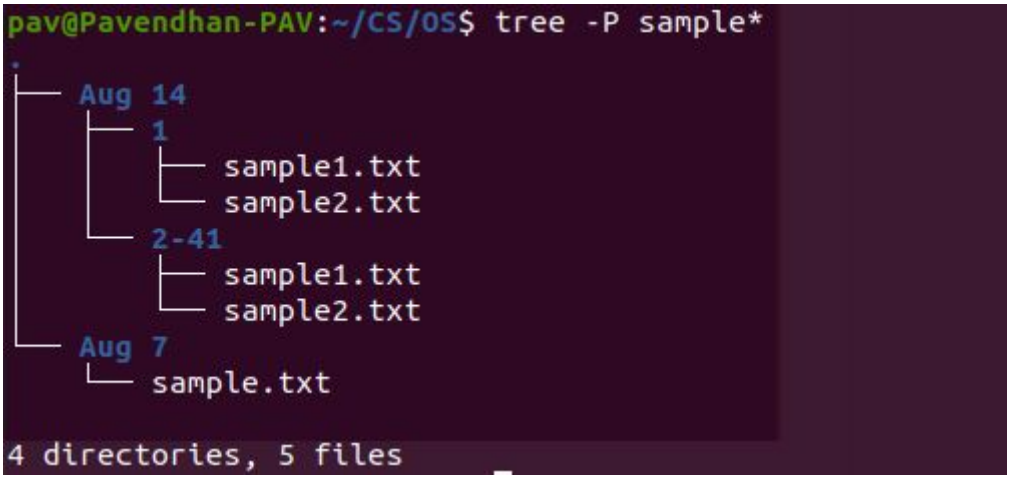
TREE -It is a recursive directory listing program that produces a depth-indented listing of files.

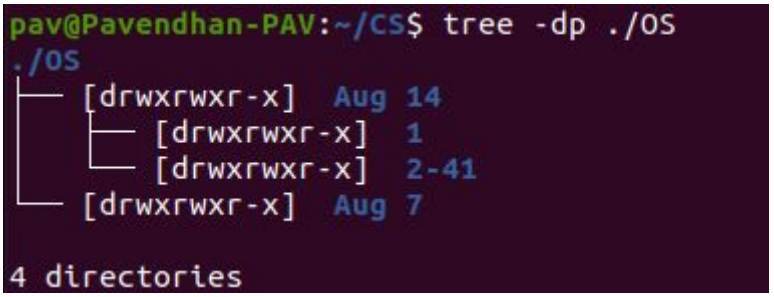
tree [-adfgilnopqrstuxACDFNS] [-L level [-R]] [-H baseHREF] [-T title] [-o filename] [–nolinks] [-P pattern] [-I pattern] [–inodes] [–device] [–noreport] [–dirsfirst] [–version] [–help] [directory …]

-a : All files are printed. By default, tree does not print hidden files (those beginning with a dot `.'). In no event does the tree print the file system constructs `.' (current directory) and `..' (previous directory).
-d : List directories only.
-f : Prints the full path prefix for each file.
-i : Tree will not print the indentation lines. Useful when used in conjunction with the -f option.
-l : Follows symbolic links to directories as if they were directories. Links that would result in a recursive loop are avoided.

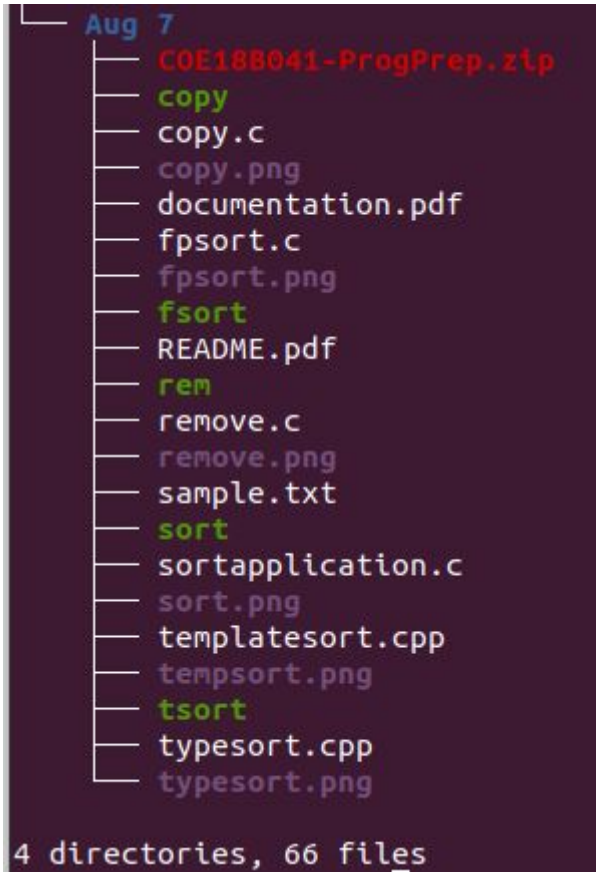
-x : Stay on the current file system only, as with find -xdev.
-P pattern : List only those files that match the wild-card pattern.
-p : Print the protections for each file (as per ls -l).
-s : Print the size of each file along with the name.
-u : Print the username, or UID # if no username is available, of the file.
-g : Print the group name, or GID # if no group name is available, of the file.
-D : Print the date of the last modification time for the file listed.
–inodes : Prints the inode number of the file or directory
–device : Prints the device number to which the file or directory belongs
-F : Append a `/' for directories, a `=' for socket files, a `*' for executable files and a `|' for FIFO's, as per ls -F
-q : Print non-printable characters in file names as question marks instead of the default carrot notation.
-N : Print non-printable characters as is instead of the default carrot notation.
-r : Sort the output in reverse alphabetic order.
-t : Sort the output by last modification time instead of alphabetically.

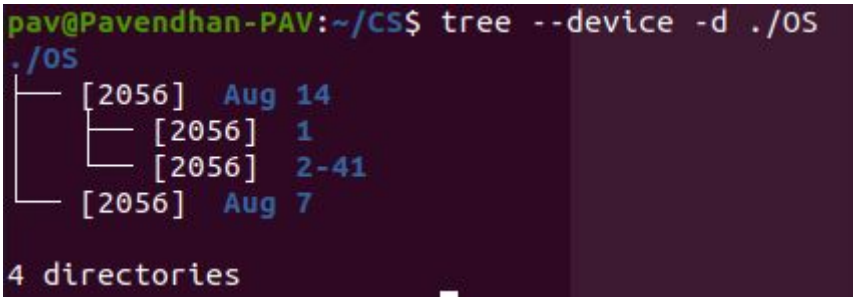


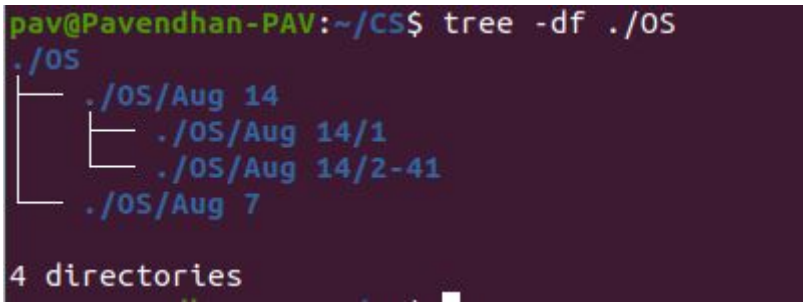





pav@Pavendhan-PAV:~$ tree -a CS/OS
CS/OS
Aug 14
1
sample1.txt
sample2.txt
2-41
10.png
11.png
12.png
13.png
14 15.png
16.png
17.png
18.png
19.png
20.png
21.png
22.png
23.png
24.png
25.png
26.png
27.png
28.png
29.png
2.png
30.png
31.png
32.png
33.png
34.png
35.png
36.png
37.png
38.png
3.png
40.png
41a.png
41b.png
41c.png
41d.png
4.png
5.png
6.png
7.png
8.png
9.png
sample1.txt
sample2.txt


Aug 7
COE188041-ProgPrep.zip
copy
copy.c
copy.png
documentation.pdf
fpsort.c
fpsort.png
fsort
README.pdf
rem
remove.c
remove.png
sample.txt
sort
sortapplication.c
sort.png
templatesort.cpp
tempsort.png
tsort
typesort.cpp
typesort.png
4 directories, 66 files

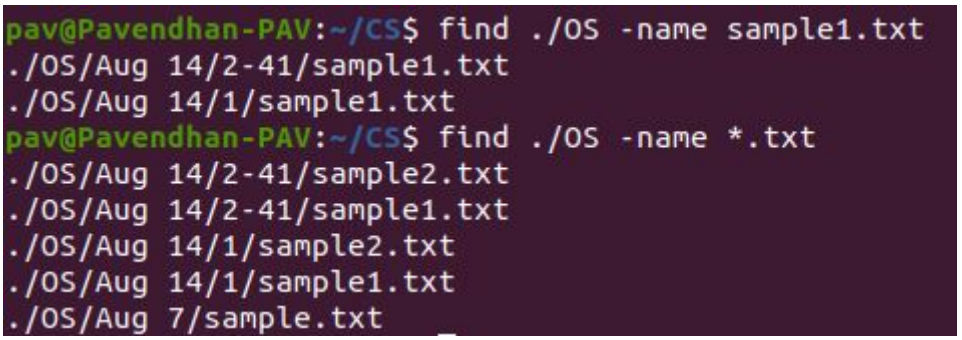




FIND - It can be used to find files and directories and perform subsequent operations on them. It supports searching by file, folder, name, creation date, modification date, owner and permissions.

find [where to start searching from] [expression determines what to find] [-options] [what to find]

-exec CMD: The file being searched which meets the above criteria and returns 0 for as its exit status for successful command execution.
-ok CMD : It works the same as -exec except the user is prompted first.
-inum N : Search for files with inode number 'N'.
-links N : Search for files with 'N' links.
-name demo : Search for files that are specified by 'demo'.
-newer file : Search for files that were modified/created after 'file'.
-perm octal : Search for the file if permission is 'octal'.
-print : Display the path name of the files found by using the rest of the criteria.
-empty : Search for empty files and directories.
-size +N/-N : Search for files of 'N' blocks; 'N' followed by 'c' can be used to measure size in characters; '+N' means size > 'N' blocks and '-N' means size < 'N' blocks.
-user name : Search for files owned by user name or ID 'name'.
\(expr \) : True if 'expr' is true; used for grouping criteria combined with OR or AND.
! expr : True if 'expr' is false.



```
pav@Pavendhan-PAV:~/CS$ find ./OS -perm 664
./OS/Aug 14/2-41/28.png
./OS/Aug 14/2-41/14 15.png
./OS/Aug 14/2-41/35.png
./OS/Aug 14/2-41/17.png
./OS/Aug 14/2-41/20.png
./OS/Aug 14/2-41/29.png
./OS/Aug 14/2-41/3.png
./OS/Aug 14/2-41/10.png
./OS/Aug 14/2-41/sample2.txt
./OS/Aug 14/2-41/8.png
./OS/Aug 14/2-41/sample1.txt
./OS/Aug 14/2-41/41d.png
./OS/Aug 14/2-41/41b.png
./OS/Aug 14/2-41/22.png
./OS/Aug 14/2-41/25.png
./OS/Aug 14/2-41/34.png
./OS/Aug 14/2-41/5.png
./OS/Aug 14/2-41/38.png
./OS/Aug 14/2-41/13.png
./OS/Aug 14/2-41/36.png
./OS/Aug 14/2-41/32.png
./OS/Aug 14/2-41/40.png
./OS/Aug 14/2-41/7.png
./OS/Aug 14/2-41/31.png
./OS/Aug 14/2-41/4.png
./OS/Aug 14/2-41/37.png
./OS/Aug 14/2-41/41c.png
./OS/Aug 14/2-41/21.png
./OS/Aug 14/2-41/30.png
./OS/Aug 14/2-41/11.png
./OS/Aug 14/2-41/23.png
./OS/Aug 14/2-41/2.png
./OS/Aug 14/2-41/27.png
./OS/Aug 14/2-41/24.png
./OS/Aug 14/2-41/41a.png
./OS/Aug 14/2-41/26.png
./OS/Aug 14/2-41/33.png
./OS/Aug 14/2-41/6.png
./OS/Aug 14/2-41/16.png
./OS/Aug 14/2-41/12.png
./OS/Aug 14/2-41/9.png
./OS/Aug 14/2-41/19.png
./OS/Aug 14/2-41/18.png
./OS/Aug 14/1/sample2.txt
./OS/Aug 14/1/sample1.txt
./OS/Aug 7/remove.c
./OS/Aug 7/fpsort.png
./OS/Aug 7/copy.c
./OS/Aug 7/README.pdf
./OS/Aug 7/sample.txt
```

```
pav@Pavendhan-PAV:~/CS$ find ./ -type f -name "*.txt" -exec grep 'Unix'  {} \;
        AF_UNIX         -- Unix internal protocols
The normal Unix close system call is also used to close a socket.
Unix was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritc
hie, Douglas McIlroy, and Joe Ossanna at Bell Labs.
There are various Unix variants available in the market. Solaris Unix, AIX, HP Unix and BSD
are a few examples. Linux is also a flavor of Unix which is freely available.
Several people can use a Unix computer at the same time; hence Unix is called a multiuser sy
stem.
A user can also run multiple programs at the same time; hence Unix is a multitasking environ
ment.
Unix is a great OS.
Unix systems use a centralized operating system kernel which manages system and process acti
vities.
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Unix is a great OS.
A user can also run multiple programs at the same time; hence Unix is a multitasking environ
ment.
```

PWD - Print the working directory.

pwd -L: Prints the symbolic path.
pwd -P: Prints the actual path.

```
pav@Pavendhan-PAV:~/CS/OS$ pwd
/home/pav/CS/OS
pav@Pavendhan-PAV:~/CS/OS$ pwd -L
/home/pav/CS/OS
pav@Pavendhan-PAV:~/CS/OS$ pwd -P
/home/pav/CS/OS
pav@Pavendhan-PAV:~/CS/OS$ echo $PWD
/home/pav/CS/OS
```

SHUTDOWN - The shutdown command in Linux is used to shutdown the system in a safe way. You can shutdown the machine immediately, or schedule a shutdown using 24 hour format.It brings the system down in a secure way. When the shutdown is initiated, all logged-in users and processes are notified that the system is going down, and no further logins are allowed.
Only the root user can execute the shutdown command.
shutdown [OPTIONS] [TIME] [MESSAGE]

options –	Shutdown options such as halt, power-off (the default option) or reboot the system.
time –	The time argument specifies when to perform the shutdown process.
message –	The message argument specifies a message which will be broadcast to all users.

Options

-r : Requests that the system be rebooted after it has been brought down.
-h : Requests that the system be either halted or powered off after it has been brought down, with the choice as to which left up to the system.
-H : Requests that the system be halted after it has been brought down.
-P : Requests that the system be powered off after it has been brought down.
-c : Cancels a running shutdown. TIME is not specified with this option, the first argument is MESSAGE.
-k : Only send out the warning messages and disable logins, do not actually bring the system down.

- The following example will schedule a system shutdown at 05 A.M:
  sudo shutdown 05:00

- The following example will schedule a system shutdown in 20 minutes from now:
  sudo shutdown +20

- How to shutdown the system immediately - To shutdown your system immediately you can use +0 or its alias now:
  sudo shutdown now

- How to broadcast a custom message - The following command will shut down the system in 10 minutes from now and notify the users with message “System upgrade”:
  sudo shutdown +10 "System upgrade"

- How to halt your system? This can be achieved using the -H option.
  shutdown -H

- How to make shutdown power-off machine
  shutdown -P

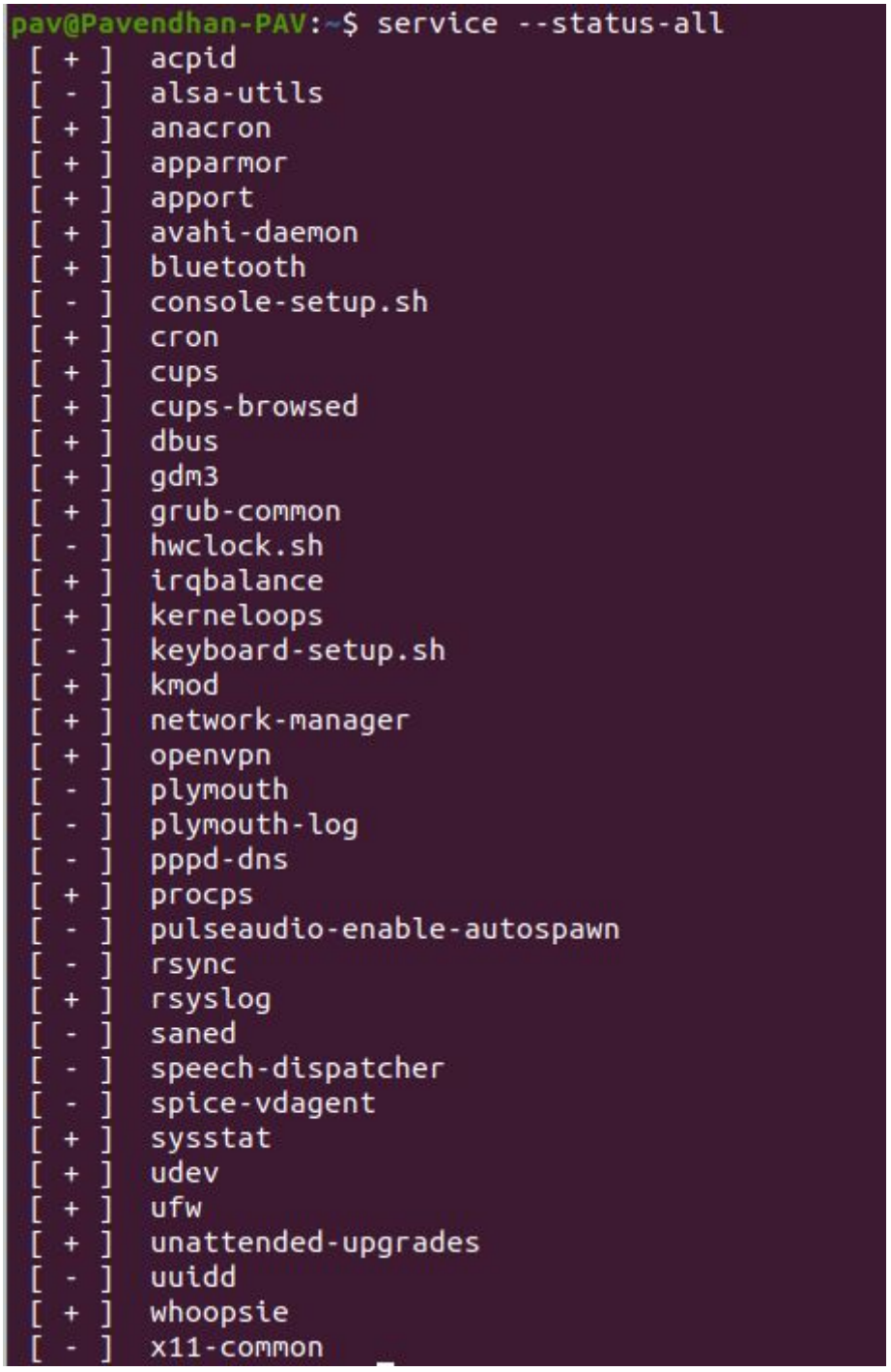
- How to reboot using shutdown
  shutdown -r

- You can also specify a time argument and a custom message:
  shutdown -r +5 "Updating Your System"

- How to cancel a scheduled shutdown? If you have scheduled a shutdown and you want to cancel it you can use the -c argument:
  sudo shutdown -c

- When canceling a scheduled shutdown, you cannot specify a time argument, but you can still broadcast a message that will be sent to all users.
  sudo shutdown -c "Canceling the reboot"

SERVICE - It is used to run the system V init scripts. i.e Instead of calling the scripts located in the /etc/init.d/ directory with their full path, you can use the service command.



PS - Utility for viewing information related with the processes on a system which stands as an abbreviation for **“Process Status”.** ps command is used to list the currently running processes and their PIDs along with some other information depends on different options. It reads the process information from the virtual files in **/proc** file-system. /proc contains virtual files, this is the reason it’s referred as a virtual file system.

ps [options]

To see every process on the system using standard syntax:

ps -e

ps -ef

ps -eF

ps -ely

To see every process on the system using BSD syntax:

ps ax

ps axu

To print a process tree:

ps -ejH

ps axjf

To get info about threads:

ps -eLf

ps axms

To get security info:

ps -eo euser,ruser,suser,fuser,f,comm,label

ps axZ

ps -eM

To see every process running as root (real & effective ID) in user format:

ps -U root -u root u

To see every process with a user-defined format:

ps -eo pid,tid,class,rtprio,ni,pri,psr,pcpu,stat,wchan:14,comm

ps axo stat,euid,ruid,tty,tpgid,sess,pgrp,ppid,pid,pcpu,comm

ps -eopid,tt,user,fname,tmout,f,wchan

Print only the process IDs of syslogd:

ps -C syslogd -o pid=

Print only the name of PID 42:

ps -p 42 -o comm=

```
pav@Pavendhan-PAV:~$ ps
    PID TTY          TIME CMD
   5600 pts/0    00:00:00 bash
  12223 pts/0    00:00:00 ps
pav@Pavendhan-PAV:~$ ps -a
    PID TTY          TIME CMD
   1287 tty2     00:05:36 Xorg
   1505 tty2     00:00:00 gnome-session-b
  12225 pts/0    00:00:00 ps
pav@Pavendhan-PAV:~$ ps -T
    PID    SPID TTY          TIME CMD
   5600    5600 pts/0    00:00:00 bash
  12227   12227 pts/0    00:00:00 ps
pav@Pavendhan-PAV:~$ ps -r
    PID TTY      STAT   TIME COMMAND
  12229 pts/0    R+     0:00 ps -r
pav@Pavendhan-PAV:~$ ps -x
    PID TTY      STAT   TIME COMMAND
   1229 ?        Ss     0:00 /lib/systemd/systemd --user
   1230 ?        S      0:00 (sd-pam)
   1254 ?        S<sl  16:21 /usr/bin/pulseaudio --daemonize=no --log-target=journal
   1260 ?        SNsl   0:00 /usr/libexec/tracker-miner-fs
   1270 ?        SLl    0:00 /usr/bin/gnome-keyring-daemon --daemonize --login
   1284 tty2     Ssl+   0:00 /usr/lib/gdm3/gdm-x-session --run-script env GNOME_SHELL_SESSIO
   1297 ?        Ss     0:02 /usr/bin/dbus-daemon --session --address=systemd: --nofork --no
   1312 ?        Ssl    0:00 /usr/libexec/gvfsd
   1317 ?        Sl     0:00 /usr/libexec/gvfsd-fuse /run/user/1000/gvfs -f -o big_writes
   1324 ?        Ssl    0:00 /usr/libexec/gvfs-udisks2-volume-monitor
   1329 ?        Ssl    0:00 /usr/libexec/gvfs-afc-volume-monitor
   1334 ?        Ssl    0:00 /usr/libexec/gvfs-gphoto2-volume-monitor
   1338 ?        Ssl    0:00 /usr/libexec/gvfs-goa-volume-monitor
   1343 ?        Sl     0:00 /usr/libexec/goa-daemon
   1358 ?        Sl     0:00 /usr/libexec/goa-identity-service
   1363 ?        Ssl    0:00 /usr/libexec/gvfs-mtp-volume-monitor
   1505 tty2     Sl+    0:00 /usr/libexec/gnome-session-binary --systemd --systemd --session
   1577 ?        Ss     0:00 /usr/bin/ssh-agent /usr/bin/im-launch env GNOME_SHELL_SESSION_M
   1594 ?        Ssl    0:49 /usr/bin/ibus-daemon --daemonize --xim
   1599 ?        Sl     0:00 /usr/libexec/ibus-dconf
   1600 ?        Sl     0:00 /usr/libexec/ibus-ui-gtk3
   1601 ?        Sl     0:15 /usr/libexec/ibus-extension-gtk3
   1603 ?        Sl     0:00 /usr/libexec/ibus-x11 --kill-daemon
   1607 ?        Sl     0:00 /usr/libexec/ibus-portal
   1613 ?        Ssl    0:00 /usr/libexec/at-spi-bus-launcher
   1618 ?        S      0:00 /usr/bin/dbus-daemon --config-file=/usr/share/defaults/at-spi2/
   1628 ?        Sl     0:03 /usr/libexec/at-spi2-registryd --use-gnome-session
   1630 ?        Ssl    0:00 /usr/libexec/xdg-desktop-portal
   1636 ?        Ssl    0:00 /usr/libexec/xdg-document-portal
   1639 ?        Ssl    0:00 /usr/libexec/xdg-permission-store
   1648 ?        Ssl    0:00 /usr/libexec/xdg-desktop-portal-gtk
   1658 ?        Sl     0:00 /usr/libexec/dconf-service
   1664 ?        Sl     0:00 /usr/bin/gnome-keyring-daemon --start --foreground --components
   1668 ?        Ssl    0:00 /usr/libexec/gnome-session-ctl --monitor
```

```
  1839 ?        Ssl    0:01 /usr/libexec/gsd-media-keys
  1841 ?        Ssl    0:00 /usr/libexec/gsd-power
  1842 ?        Ssl    0:00 /usr/libexec/gsd-print-notifications
  1844 ?        Ssl    0:00 /usr/libexec/gsd-rfkill
  1845 ?        Ssl    0:00 /usr/libexec/gsd-screensaver-proxy
  1846 ?        Ssl    0:00 /usr/libexec/gsd-sharing
  1847 ?        Ssl    0:00 /usr/libexec/gsd-smartcard
  1848 ?        Ssl    0:00 /usr/libexec/gsd-sound
  1849 ?        Ssl    0:00 /usr/libexec/gsd-usb-protection
  1850 ?        Ssl    0:00 /usr/libexec/gsd-wacom
  1851 ?        Ssl    0:00 /usr/libexec/gsd-wwan
  1852 ?        Ssl    0:00 /usr/libexec/gsd-xsettings
  1874 ?        Sl     0:00 /usr/libexec/gsd-disk-utility-notify
  1909 ?        Sl     0:00 /usr/libexec/evolution-data-server/evolution-alarm-notify
  1968 ?        Sl     0:00 /usr/libexec/gsd-printer
  1985 ?        Sl     0:08 /snap/snap-store/467/usr/bin/snap-store --gapplication-service
  2085 ?        Sl     0:00 /usr/libexec/gvfsd-burn --spawner :1.4 /org/gtk/gvfs/exec_spaw/
  2105 ?        SLl    9:38 /opt/google/chrome/chrome
  2111 ?        S      0:00 cat
  2112 ?        S      0:00 cat
  2120 ?        S      0:00 /opt/google/chrome/chrome --type=zygote --no-zygote-sandbox --e
  2121 ?        S      0:00 /opt/google/chrome/chrome --type=zygote --enable-crash-reporter
  2130 ?        S      0:00 /opt/google/chrome/nacl_helper
  2131 ?        S      0:00 /opt/google/chrome/nacl_helper
  2134 ?        S      0:00 /opt/google/chrome/chrome --type=zygote --enable-crash-reporter
  2153 ?        Sl    13:34 /opt/google/chrome/chrome --type=gpu-process --field-trial-hand
  2157 ?        SLl    6:03 /opt/google/chrome/chrome --type=utility --utility-sub-type=net
  2172 ?        S      0:00 /opt/google/chrome/chrome --type=broker
  2212 ?        Sl     0:17 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
  2218 ?        Sl     0:27 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
  2222 ?        Sl     0:13 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
  2230 ?        Sl     0:02 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
  2405 ?        Sl     0:05 /opt/google/chrome/chrome --type=utility --utility-sub-type=pro
  2930 ?        Sl     7:23 /opt/google/chrome/chrome --type=utility --utility-sub-type=aud
  3415 ?        Ssl    0:00 /usr/libexec/gvfsd-metadata
  3719 ?        Sl     0:00 update-notifier
  3721 ?        Sl     0:04 /usr/bin/gnome-software --gapplication-service
  4393 ?        Sl     9:50 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
  4430 ?        Sl     2:24 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
  5201 ?        Sl     0:03 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
  5215 ?        Sl     0:23 /usr/bin/nautilus --gapplication-service
  5301 ?        Sl     0:28 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
  5323 ?        Sl     0:02 /opt/google/chrome/chrome --type=ppapi --field-trial-handle=729
  5574 ?        Sl     0:00 /usr/libexec/gvfsd-recent --spawner :1.4 /org/gtk/gvfs/exec_spa
  5591 ?        Ssl    0:16 /usr/libexec/gnome-terminal-server
  5600 pts/0    Ss     0:00 bash
  5688 ?        Sl     0:00 /usr/libexec/gvfsd-network --spawner :1.4 /org/gtk/gvfs/exec_sp
  5716 ?        Sl     0:00 /usr/libexec/gvfsd-dnssd --spawner :1.4 /org/gtk/gvfs/exec_spaw
 10237 ?        Sl     0:14 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
 10909 ?        Sl     0:03 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
 10923 ?        Sl     0:01 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
 10949 ?        Sl     0:00 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
 12081 ?        Sl     0:00 /opt/google/chrome/chrome --type=renderer --field-trial-handle=
 12230 pts/0    R+     0:00 ps -x
```

FREE - This command is used to display the free, used, swap memory available in the system.

```
pav@Pavendhan-PAV:~$ free
               total        used        free      shared  buff/cache   available
Mem:         8035728     2536008     2759496      204648     2740224     4986264
Swap:       15999996           0    15999996
```

TOP - This command displays the top processes in the system (by default sorted by cpu usage).

```
top - 18:56:26 up  3:06,  1 user,  load average: 0.33, 0.45, 0.36
Tasks: 293 total,   1 running, 292 sleeping,   0 stopped,   0 zombie
%Cpu(s):  4.3 us,  2.9 sy,  0.0 ni, 92.6 id,  0.0 wa,  0.0 hi,  0.1 si,  0.0 st
MiB Mem :   7847.4 total,   2714.9 free,   2462.3 used,   2670.2 buff/cache
MiB Swap:  15625.0 total,  15625.0 free,      0.0 used.   4890.9 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   1695 pav       20   0 4475528 389412 115132 S  20.6   4.8   8:35.77 gnome-shell
   1287 root      20   0  354312 115444  71876 S   8.0   1.4   5:57.95 Xorg
   1346 root     -51   0       0      0      0 S   2.0   0.0   1:24.14 irq/135-nvidia
      1 root      20   0  169848  11768   8392 S   0.7   0.1   0:09.43 systemd
   2157 pav       20   0  377368 100456  66976 S   0.7   1.3   6:06.91 chrome
  12508 pav       20   0   20728   4056   3136 R   0.7   0.1   0:00.08 top
    496 root     -51   0       0      0      0 S   0.3   0.0   0:01.31 irq/133-iwlwifi
   1348 root      20   0       0      0      0 S   0.3   0.0   0:19.48 nv_queue
   1846 pav       20   0  473460  10568   9000 S   0.3   0.1   0:00.67 gsd-sharing
   2105 pav       20   0 1409884 370508 166340 S   0.3   4.6   9:55.59 chrome
      2 root      20   0       0      0      0 S   0.0   0.0   0:00.00 kthreadd
      3 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_gp
      4 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_par_gp
      6 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/0:0H-kblockd
      9 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 mm_percpu_wq
     10 root      20   0       0      0      0 S   0.0   0.0   0:00.36 ksoftirqd/0
     11 root      20   0       0      0      0 I   0.0   0.0   0:14.45 rcu_sched
     12 root      rt   0       0      0      0 S   0.0   0.0   0:00.05 migration/0
     13 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/0
     14 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/0
     15 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/1
     16 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/1
     17 root      rt   0       0      0      0 S   0.0   0.0   0:00.17 migration/1
     18 root      20   0       0      0      0 S   0.0   0.0   0:00.05 ksoftirqd/1
     20 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/1:0H-kblockd
     21 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/2
     22 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/2
     23 root      rt   0       0      0      0 S   0.0   0.0   0:00.17 migration/2
     24 root      20   0       0      0      0 S   0.0   0.0   0:00.25 ksoftirqd/2
     26 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/2:0H-kblockd
     27 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/3
     28 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/3
     29 root      rt   0       0      0      0 S   0.0   0.0   0:00.17 migration/3
     30 root      20   0       0      0      0 S   0.0   0.0   0:00.36 ksoftirqd/3
     32 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/3:0H
     33 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/4
     34 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/4
     35 root      rt   0       0      0      0 S   0.0   0.0   0:00.17 migration/4
     36 root      20   0       0      0      0 S   0.0   0.0   0:00.12 ksoftirqd/4
     38 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/4:0H-kblockd
     39 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/5
     40 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/5
     41 root      rt   0       0      0      0 S   0.0   0.0   0:00.17 migration/5
     42 root      20   0       0      0      0 S   0.0   0.0   0:00.08 ksoftirqd/5
     44 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/5:0H-kblockd
     45 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/6
     46 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/6
     47 root      rt   0       0      0      0 S   0.0   0.0   0:00.17 migration/6
     48 root      20   0       0      0      0 S   0.0   0.0   0:00.07 ksoftirqd/6
```

DF - Displays the file system disk space usage. By default df -k displays output in bytes.

```
pav@Pavendhan-PAV:~$ df -k
Filesystem     1K-blocks      Used Available Use% Mounted on
udev             3989708         0   3989708   0% /dev
tmpfs             803576      2032    801544   1% /run
/dev/sdb6       26961228   9695740  15872852  38% /
tmpfs            4017864    191132   3826732   5% /dev/shm
tmpfs               5120         4      5116   1% /run/lock
tmpfs            4017864         0   4017864   0% /sys/fs/cgroup
/dev/loop0         56704     56704         0 100% /snap/core18/1885
/dev/loop1         56320     56320         0 100% /snap/core18/1880
/dev/loop2        261760    261760         0 100% /snap/gnome-3-34-1804/36
/dev/loop3         63616     63616         0 100% /snap/gtk-common-themes/1506
/dev/loop4         51072     51072         0 100% /snap/snap-store/467
/dev/loop6        261760    261760         0 100% /snap/gnome-3-34-1804/33
/dev/loop5         51072     51072         0 100% /snap/snap-store/454
/dev/loop7         30720     30720         0 100% /snap/snapd/8542
/dev/loop8         30720     30720         0 100% /snap/snapd/8790
/dev/loop9        167680    167680         0 100% /snap/spotify/41
/dev/sda1         262144     98944    163200  38% /boot/efi
/dev/sda8       78079668  31283568  42786784  43% /home
tmpfs             803572        48    803524   1% /run/user/1000
```

KILL - This command is used to terminate a process.

kill [pid]
Example: kill 2209, kill -9 2209

RM - This command is used to remove objects such as files, directories, symbolic links and so on from the file system.

rm [OPTION]... FILE…

-i Interactive remove

-r Recursive remove

-f Forced remove

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ tree
.
├── dummy
│   └── new.txt
├── new.txt
├── sample1.txt
└── sample2.txt

1 directory, 4 files
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ rm -i new.txt
rm: remove regular empty file 'new.txt'? yes
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ rm -r dummy
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ tree
.
├── sample1.txt
└── sample2.txt

0 directories, 2 files
```

CP - This command is used to copy files or groups of files or directory. It creates an exact image of a file on a disk with a different file name. *cp* command requires at least two filenames in its arguments.

cp [OPTION] Source Destination

cp [OPTION] Source Directory

cp [OPTION] Source-1 Source-2 Source-3 Source-n Directory

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ cp sample1.txt dummy/newsample.txt
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ tree
.
├── dummy
│   └── newsample.txt
├── sample1.txt
└── sample2.txt

1 directory, 3 files
```

MV - This command is used to move one or more files or directories from one place to another in a file system. It has two distinct functions:
(i) It rename a file or folder.
(ii) It moves a group of files to different directories.
No additional space is consumed on a disk during renaming. This command normally works silently means no prompt for confirmation**.**

mv [Option] source destination

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ mv sample2.txt dummy/sample2.txt
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ tree
.
├── dummy
│   ├── newsample.txt
│   └── sample2.txt
└── sample1.txt

1 directory, 3 files
```

MKDIR - This command in Linux allows the user to create directories (also referred to as folders in some operating systems). This command can create multiple directories at once as well as set the permissions for the directories. It is important to note that the user executing this command must have enough permissions to create a directory in the parent directory, or he/she may receive a '*permission denied*' error.

mkdir [options...] [directories ...]

-v Verbose

-m create along with setting dir permissions

-p create parent directories if necessary

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ mkdir -v dummy1 dummy2
mkdir: created directory 'dummy1'
mkdir: created directory 'dummy2'
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ tree
.
├── dummy
│   ├── newsample.txt
│   └── sample2.txt
├── dummy1
├── dummy2
├── sample1.txt
└── sample2.txt

3 directories, 4 files
```

TAR - The Linux 'tar' stands for tape archive, is used to create Archive and extract the Archive files. tar command in Linux is one of the important commands which provides archiving functionality in Linux. We can use Linux tar command to create compressed or uncompressed Archive files and also maintain and modify them.

tar [options] [archive-file] [file or directory to be archived]

-c : Creates Archive

-x : Extract the archive

-f : creates archive with given filename

-t : displays or lists files in archive file

-u : archives and adds to an existing archive file

-v : Displays Verbose Information

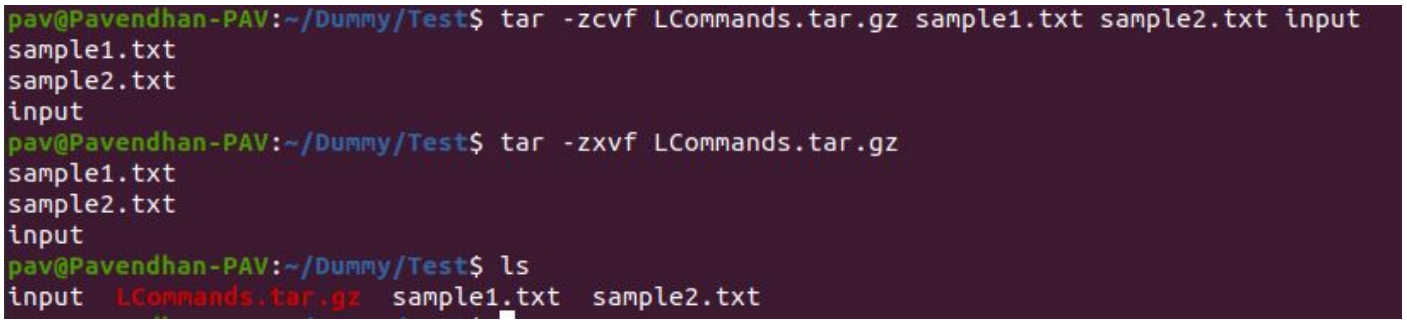
-A : Concatenates the archive files

-z : zip, tells tar command that create tar file using gzip

-j : filter archive tar file using tbzip

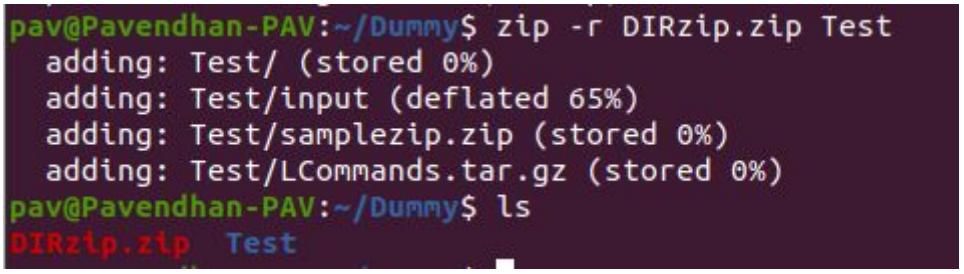
-W : Verify a archive file

-r : update or add file or directory in already existed .tar file



ZIP - ZIP is a compression and file packaging utility for Unix. Each file is stored in single .zip {.zip-filename} file with the extension .zip.

zip [options] zipfile files_list



```
pav@Pavendhan-PAV:~/Dummy/Test$ zip -d samplezip.zip input
deleting: input
pav@Pavendhan-PAV:~/Dummy/Test$ unzip -l samplezip.zip
Archive:  samplezip.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
      906  2020-08-18 12:19   sample1.txt
      565  2020-08-18 17:46   sample2.txt
---------                     -------
     1471                     2 files
```

```
pav@Pavendhan-PAV:~/Dummy/Test$ unzip -l samplezip.zip
Archive:  samplezip.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
      906  2020-08-18 12:19   sample1.txt
      565  2020-08-18 17:46   sample2.txt
---------                     -------
     1471                     2 files
```

CHOWN - This command is used to change the file Owner or group. Whenever you want to change ownership you can use the chown command.

chown [OPTION]… [OWNER][:[GROUP]] FILE…
chown [OPTION]… –reference=RFILE FILE…

-c Reports file change

-v Verbose

```
pav@Pavendhan-PAV:~/dummy/test$ ls -l
total 0
-rw-rw-r-- 1 pav pav 0 Aug 17 16:33 test.txt
pav@Pavendhan-PAV:~/dummy/test$ chown pav test.txt
pav@Pavendhan-PAV:~/dummy/test$ ls -l
total 0
-rw-rw-r-- 1 pav pav 0 Aug 17 16:33 test.txt
```

CHMOD - This command is used to change the access mode of a file. The name is an abbreviation of **change mode**.
chmod [reference][operator][mode] file…

Reference	Class	Description
u	owner	file's owner
g	group	users who are members of the file's group
o	others	users who are neither the file's owner nor members of the file's group
a	all	All three of the above, same as ugo

Operator	Description
+	Adds the specified modes to the specified classes
-	Removes the specified modes from the specified classes
=	The modes specified are to be made the exact modes for the specified classes

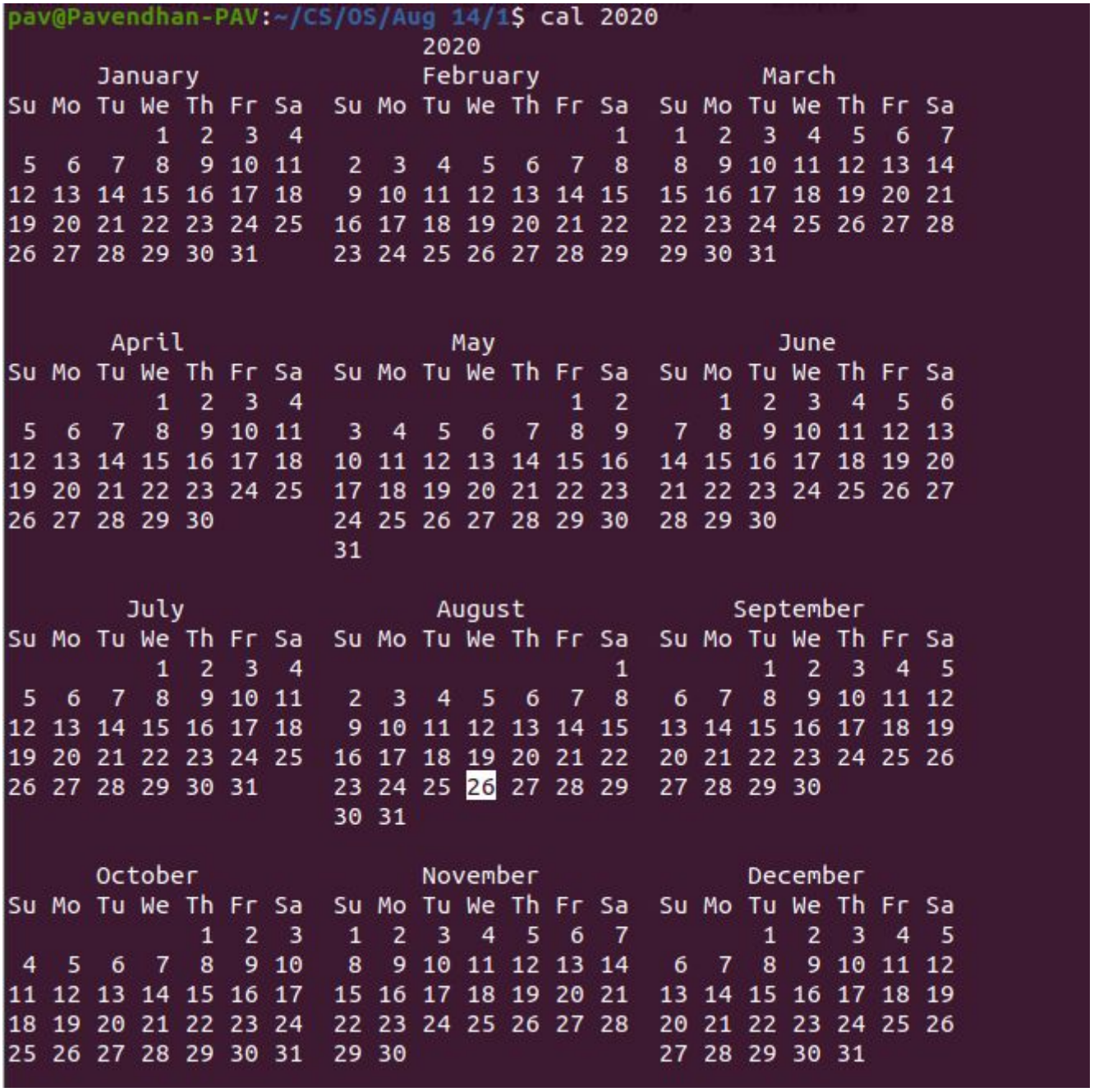
```
pav@Pavendhan-PAV:~/dummy/test$ chmod u-rwx sample.txt
pav@Pavendhan-PAV:~/dummy/test$ ls -l
total 16
-rw-rw-r-- 1 pav pav    0 Aug 17 17:07 input
-rw-rw-r-- 1 pav pav   13 Aug 17 17:14 sample1.txt
-rw-rw-r-- 1 pav pav    0 Aug 17 17:06 sample1.txt~
-rw-rw-r-- 1 pav pav    6 Aug 17 17:09 sample2.txt
-rw-rw-r-- 1 pav pav    0 Aug 17 17:07 sample2.txt~
----rw-r-- 1 pav pav    6 Aug 17 17:09 sample.txt
drwxrwxr-x 2 pav pav 4096 Aug 17 16:56 subtest
-rw-rw-r-- 1 pav pav    0 Aug 17 16:33 test.txt
```

CAL - This is used to see the calendar of a specific month or a whole year.

cal [[month] year]

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ cal
    August 2020
Su Mo Tu We Th Fr Sa
                   1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ cal 08 2021
    August 2021
Su Mo Tu We Th Fr Sa
 1  2  3  4  5  6  7
 8  9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31
```

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ cal -3
                                2020
        July                  August                September
Su Mo Tu We Th Fr Sa  Su Mo Tu We Th Fr Sa  Su Mo Tu We Th Fr Sa
            1  2  3  4                  1            1  2  3  4  5
 5  6  7  8  9 10 11   2  3  4  5  6  7  8   6  7  8  9 10 11 12
12 13 14 15 16 17 18   9 10 11 12 13 14 15  13 14 15 16 17 18 19
19 20 21 22 23 24 25  16 17 18 19 20 21 22  20 21 22 23 24 25 26
26 27 28 29 30 31     23 24 25 26 27 28 29  27 28 29 30
                      30 31
```



BC - This command is used for command line calculator. It is similar to a basic calculator by using which we can do basic mathematical calculations.
Arithmetic operations are the most basic in any kind of programming language. Linux or Unix operating system provides the **bc command** and **expr command** for doing arithmetic calculations. You can use these commands in bash or shell script also for evaluating arithmetic expressions.

bc [-hlwsqv] [long-options] [file ...]

Options:

-h, {- -help } : Print the usage and exit

-i, {- -interactive } : Force interactive mode

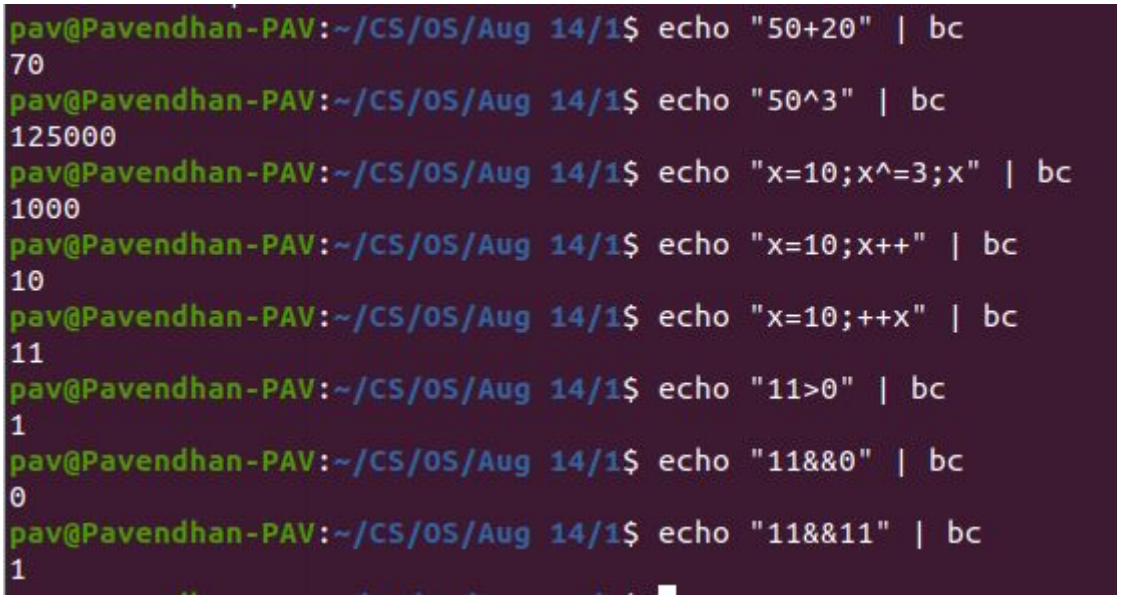
-l, {- -mathlib } : Define the standard math library

-w, {- -warn } : Give warnings for extensions to POSIX bc

-s, {- -standard } : Process exactly the POSIX bc language

-q, {- -quiet } : Do not print the normal GNU bc welcome

-v, {- -version } : Print the version number and copyright and quit



UNAME - This command displays important information about the system such as — Kernel name, Host name, Kernel release number.

uname [OPTION]

-a option: It prints all the system information in the following order: Kernel name, network node hostname, kernel release date, kernel version, machine hardware name, hardware platform, operating system

-s option: It prints the kernel name.

-n option: It prints the hostname of the network node(current computer).

-r option: It prints the kernel release date.

-v option: It prints the version of the current kernel.

-m option: It prints the machine hardware name.

-p option: It prints the type of the processor.

-i option: It prints the platform of the hardware.

-o option: It prints the name of the operating system.

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ uname -a
Linux Pavendhan-PAV 5.4.0-42-generic #46-Ubuntu SMP Fri Jul 10 00:24:02 UTC 2020
 x86_64 x86_64 x86_64 GNU/Linux
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ uname -s
Linux
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ uname -n
Pavendhan-PAV
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ uname -r
5.4.0-42-generic
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ uname -v
#46-Ubuntu SMP Fri Jul 10 00:24:02 UTC 2020
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ uname -m
x86_64
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ uname -p
x86_64
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ uname -i
x86_64
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ uname -o
GNU/Linux
```

WHEREIS - This command is used to find the location of source/binary file of a command and manuals sections for a specified file in Linux system.

whereis [options] filename…

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whereis sort
sort: /usr/bin/sort /usr/share/man/man1/sort.1.gz
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whereis grep
grep: /usr/bin/grep /usr/share/man/man1/grep.1.gz /usr/share/info/grep.info.gz
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whereis pwd
pwd: /usr/bin/pwd /usr/include/pwd.h /usr/share/man/man1/pwd.1.gz
```

WHATIS - This command in Linux is used to get a one-line manual page description. In Linux, each manual page has some sort of description within it. So this command searches for the manual page names and shows the manual page description of the specified filename or argument.

whatis [-dlv?V] [-r|-w] [-s list] [-m system[, …]] [-M path] [-L locale] [-C file] name …

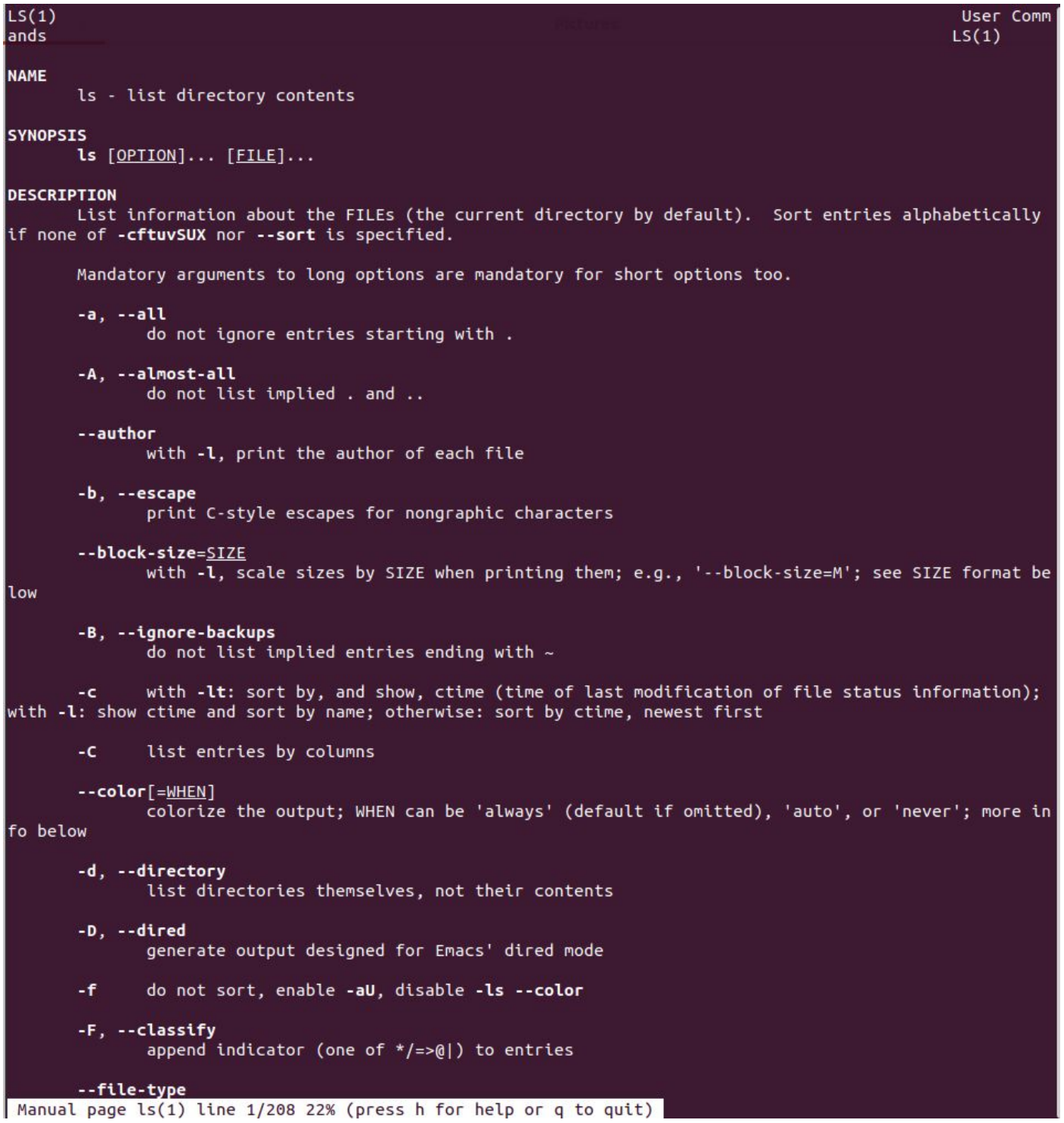
-d, --debug emit debugging messages
-v, --verbose print verbose warning messages
-r, --regex interpret each keyword as a regex
-w, --wildcard the keyword(s) contain wildcards
-l, --long do not trim output to terminal width
-C, --config-file=FILE use this user configuration file
-L, --locale=LOCALE define the locale for this search
-m, --systems=SYSTEM use manual pages from other systems
-M, --manpath=PATH set search path for manual pages to PATH
-s, --sections=LIST, --section=LIST search only these sections (colon-separated)
-?, --help give this help list
--usage give a short usage message
-V, --version print program version

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whatis sort
sort (1)             - sort lines of text files
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whatis grep
grep (1)             - print lines that match patterns
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whatis ls
ls (1)               - list directory contents
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whatis pwd
pwd (1)              - print name of current/working directory
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whatis ifconfig
ifconfig (8)         - configure a network interface
```

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whatis -d  ifconfig
From the config file /etc/manpath.config:
  Mandatory mandir `/usr/man'.
  Mandatory mandir `/usr/share/man'.
  Mandatory mandir `/usr/local/share/man'.
  Path `/bin' mapped to mandir `/usr/share/man'.
  Path `/usr/bin' mapped to mandir `/usr/share/man'.
  Path `/sbin' mapped to mandir `/usr/share/man'.
  Path `/usr/sbin' mapped to mandir `/usr/share/man'.
  Path `/usr/local/bin' mapped to mandir `/usr/local/man'.
  Path `/usr/local/bin' mapped to mandir `/usr/local/share/man'.
  Path `/usr/local/sbin' mapped to mandir `/usr/local/man'.
  Path `/usr/local/sbin' mapped to mandir `/usr/local/share/man'.
  Path `/usr/X11R6/bin' mapped to mandir `/usr/X11R6/man'.
  Path `/usr/bin/X11' mapped to mandir `/usr/X11R6/man'.
  Path `/usr/games' mapped to mandir `/usr/share/man'.
  Path `/opt/bin' mapped to mandir `/opt/man'.
  Path `/opt/sbin' mapped to mandir `/opt/man'.
  Global mandir `/usr/man', catdir `/var/cache/man/fsstnd'.
  Global mandir `/usr/share/man', catdir `/var/cache/man'.
  Global mandir `/usr/local/man', catdir `/var/cache/man/oldlocal'.
  Global mandir `/usr/local/share/man', catdir `/var/cache/man/local'.
  Global mandir `/usr/X11R6/man', catdir `/var/cache/man/X11R6'.
  Global mandir `/opt/man', catdir `/var/cache/man/opt'.
  Global mandir `/snap/man', catdir `/var/cache/man/snap'.
  Added sections: `1', `n', `l', `8', `3', `2', `3posix', `3pm', `3perl', `3am', `5', `4', `9', `6', `7'.
path directory /usr/local/sbin is in the config file
  adding /usr/local/man to manpath
  adding /usr/local/share/man to manpath
path directory /usr/local/bin is in the config file
path directory /usr/sbin is in the config file
  adding /usr/share/man to manpath
path directory /usr/bin is in the config file
path directory /sbin is in the config file
path directory /bin is in the config file
path directory /usr/games is in the config file
path directory /usr/local/games is not in the config file
path directory /snap/bin is not in the config file
adding mandatory man directories
warning: /usr/man: No such file or directory
add_nls_manpaths(): processing /usr/local/man:/usr/local/share/man:/usr/share/man
checking for locale en_IN
checking for locale en
checking for locale en_IN
adding /usr/local/man to manpathlist
adding /usr/share/man to manpathlist
final search path = /usr/local/man:/usr/share/man
path=/usr/local/man
warning: can't read the fallback whatis text database /usr/local/man/whatis
path=/usr/share/man
name:      ifconfig
sec. ext:  8
section:   8
comp. ext: gz
id:        A
mtime:     1549044473.000000000
```

MAN - This command in Linux is used to display the user manual of any command that we can run on the terminal. It provides a detailed view of the command which includes NAME, SYNOPSIS, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUES, ERRORS, FILES, VERSIONS, EXAMPLES, AUTHORS and SEE ALSO.

man [OPTION]... [COMMAND NAME]...



DATE - This command is used to display the system date and time. date command is also used to set the date and time of the system. By default the date command displays the date in the time zone on which the unix/linux operating system is configured.You must be the super-user (root) to change the date and time.

date [OPTION]... [+FORMAT]
date [-u|--utc|--universal] [MMDDhhmm[[CC]YY][.ss]]

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ date
Wednesday 26 August 2020 12:10:38 PM IST
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ date -u
Wednesday 26 August 2020 06:40:40 AM UTC
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ date --date="1 year ago"
Monday 26 August 2019 12:10:43 PM IST
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ date --date="next year"
Thursday 26 August 2021 12:10:45 PM IST
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ date -r sample1.txt
Tuesday 18 August 2020 12:19:52 PM IST
```

HEAD - This command, as the name implies, prints the top N number of data of the given input. By default, it prints the first 10 lines of the specified files. If more than one file name is provided then data from each file is preceded by its file name.

head [OPTION]... [FILE]...

-c, --bytes=[-]NUM print the first NUM bytes of each file; with the leading '-', print all but the last NUM bytes of each file

-n, --lines=[-]NUM print the first NUM lines instead of the first 10; with the leading '-', print all but the last NUM lines of each file

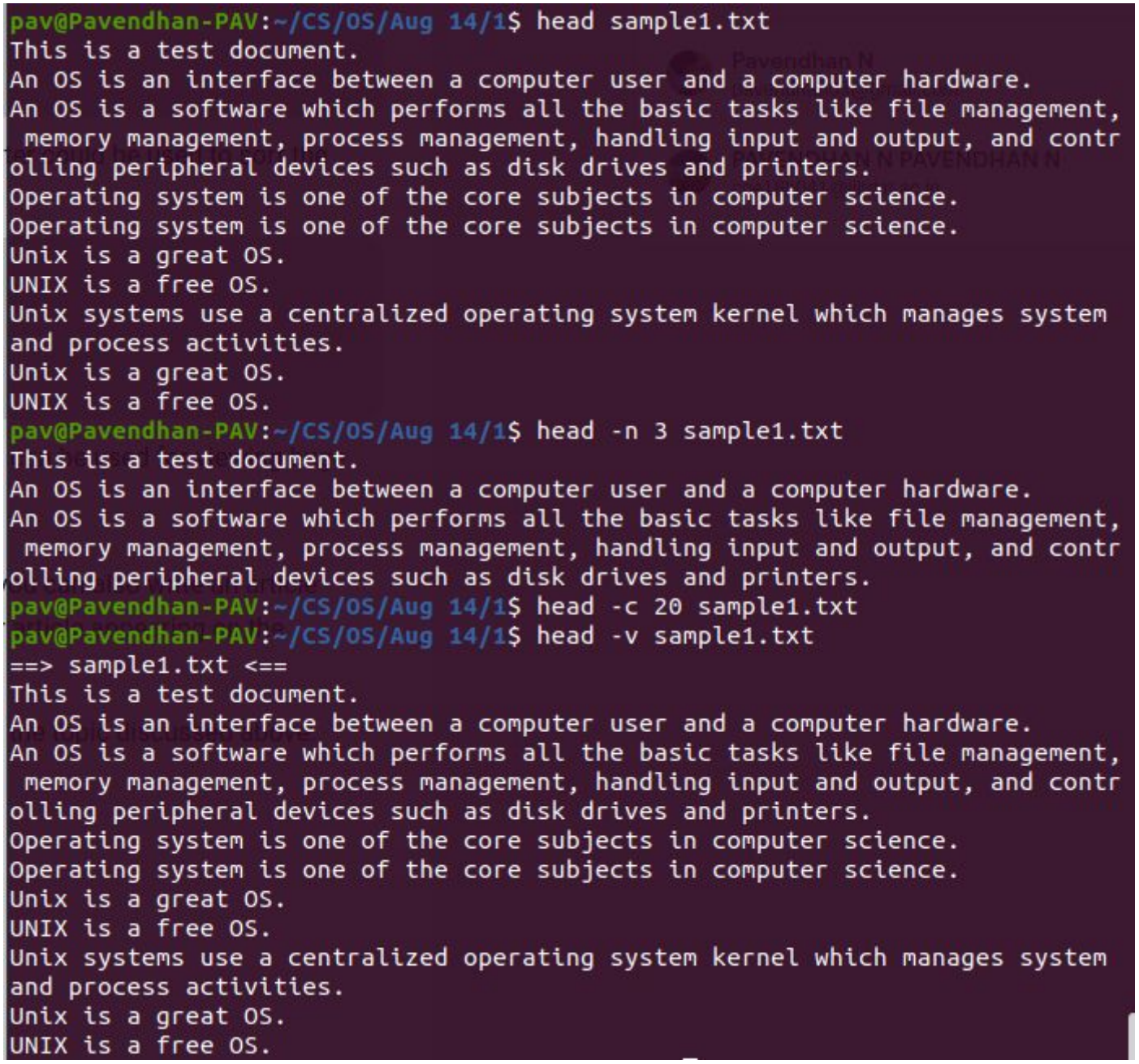
-q, --quiet, --silent never print headers giving file names

-v, --verbose always print headers giving file names

-z, --zero-terminated line delimiter is NUL, not newline

--help display this help and exit

--version output version information and exit



TAIL - This command, as the name implies, prints the last N number of data of the given input. By default it prints the last 10 lines of the specified files. If more than one file name is provided then data from each file is preceded by its file name.

tail [OPTION]... [FILE]...

-c, --bytes=[+]NUM output the last NUM bytes; or use -c +NUM to output starting with byte NUM of each file

-f, --follow[={name|descriptor}] output appended data as the file grows; an absent option argument means 'descriptor'

-n, --lines=[+]NUM output the last NUM lines, instead of the last 10; or use -n +NUM to output starting with line NUM

-q, --quiet, --silent	never output headers giving file names
-v, --verbose	always output headers giving file names
-z, --zero-terminated	line delimiter is NUL, not newline

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ tail -n 3 sample2.txt
UNIX is a free OS.
Multiuser operating system.

pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ tail -c 30 sample2.txt
ultiuser operating system.

pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ tail -v sample2.txt
==> sample2.txt <==
Unix was originally developed in 1969 by a group of AT&T employees Ken Thomp
son, Dennis Ritchie, Douglas McIlroy, and Joe Ossanna at Bell Labs.
There are various Unix variants available in the market. Solaris Unix, AIX,
HP Unix and BSD are a few examples. Linux is also a flavor of Unix which is
freely available.
Several people can use a Unix computer at the same time; hence Unix is calle
d a multiuser system.
A user can also run multiple programs at the same time; hence Unix is a mult
itasking environment.
UNIX is a free OS.
Multiuser operating system.
```

PING - *PING (Packet Internet Groper)* command is used to check the network connectivity between host and server/host. This command takes as input the IP address or the URL and sends a data packet to the specified address with the message “PING” and gets a response from the server/host this time is recorded which is called latency.

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ ping www.google.com
PING www.google.com (172.217.31.4) 56(84) bytes of data.
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=1 ttl=118 ti
me=39.1 ms
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=2 ttl=118 ti
me=39.2 ms
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=3 ttl=118 ti
me=39.4 ms
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=4 ttl=118 ti
me=39.6 ms
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=5 ttl=118 ti
me=39.2 ms
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=6 ttl=118 ti
me=39.4 ms
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=7 ttl=118 ti
me=39.2 ms
^C
--- www.google.com ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6010ms
rtt min/avg/max/mdev = 39.073/39.292/39.553/0.148 ms
```

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ ping -c 3 www.google.com
PING www.google.com (172.217.31.4) 56(84) bytes of data.
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=1 ttl=118 ti
me=39.5 ms
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=2 ttl=118 ti
me=39.4 ms
64 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=3 ttl=118 ti
me=39.4 ms

--- www.google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 39.421/39.439/39.455/0.014 ms
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ ping -s 30 -c 3 www.google.com
PING www.google.com (172.217.31.4) 30(58) bytes of data.
38 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=1 ttl=118 ti
me=39.2 ms
38 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=2 ttl=118 ti
me=39.2 ms
38 bytes from del03s01-in-f4.1e100.net (172.217.31.4): icmp_seq=3 ttl=118 ti
me=38.9 ms

--- www.google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 38.894/39.076/39.184/0.129 ms
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ ping -c 3 -q www.google.com
PING www.google.com (172.217.31.4) 56(84) bytes of data.

--- www.google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 39.319/39.361/39.413/0.039 ms
```

WHOAMI - This command will help you to find out which user is logged into the system or who you are logged in as.

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ whoami
pav
```

HISTORY - When fired into Terminal shell, history command will list all the commands used by you in serial numbered form

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ history
  114  cd ~/Xilinx/Xilinx/14.7/ISE_DS/ISE/bin/lin64
  115  ./ise
  116  iverilog HalfAdder.v
  117  iverilog HalfAdder_tb.v
  118  ./a.out
  119  gtkwave HalfAdder.vcd
  120  sudo apt install gtkwave
  121  gtkwave HalfAdder.vcd
  122  cat /proc/asound/{version,cards,devices,hwdep,pcm,seq/clients}; ls -l /usr/share/pulseaudio/alsa-m
ixer/paths/; sudo rm /etc/asound.conf; sudo rm -r ~/.pulse ~/.asound* ;sudo rm ~/.pulse-cookie; sudo apt-
get update; sudo apt-get install aptitude; sudo aptitude install paman gnome-alsamixer libasound2-plugins
 padevchooser libsdl1.2debian-pulseaudio; sudo lshw -short;ls -lart /dev/snd; find /lib/modules/`uname -r
` | grep snd ;cat /dev/sndstat; lspci -nn; lsusb; sudo which alsactl; sudo fuser -v /dev/dsp /dev/snd/* ;
 dpkg -S bin/slmodemd; dmesg | egrep 'EMU|probe|emu|ALSA|alsa|ac97|udi|snd|ound|irmware'; sudo /etc/init.
d/sl-modem-daemon status; sudo grep model /etc/modprobe.d/* ; sudo dmidecode|egrep 'anufact|roduct|erial|
elease'; lsmod | egrep 'snd|usb|midi|udio'; pacmd list-sinks; aplay -l; sudo alsa force-reload; ubuntu-su
pport-status || ubuntu-security-status ; sudo lshw -C sound
  123  sudo apt remove --purge alsa-base pulseaudio
  124  sudo apt install alsa-base pulseaudio
  125  sudo apt install gnome
  126  sudo apt-get update
  127  speaker-test
  128  pulse-audio
  129  killall pulseaudio; rm -r ~/.config/pulse/* ; rm -r ~/.pulse*
  130  pulseaudio -k
  131  killall pulseaudio; rm -r ~/.config/pulse/* ; rm -r ~/.pulse*
  132  rm -r ~/.pulse ~/.pulse-cookie ~/.config/pulse
  133  sudo pulseaudio -k
  134  sudo pulseaudio --start
  135  rm -r ~/.pulse ~/.pulse-cookie ~/.config/pulse
  136  sudo alsa force-reload
  137  magic &
  138  ls
  139  gedit iverter.ext
  140  gedit inverter.ext
  141  magic &
  142  ls
  143  gedit inverter.sim
  144  gvim inverter.sim
  145  sudo apt install vim
  146  gvim inverter.sim
  147  sudo apt install vim-gtk3
  148  gvim inverter.sim
  149  irsim scmos100.prm inverter.sim
  150  ./udp_s
  151  make udp_c udp_s
  152  ./udp_s
  153  make udp_c udp_s
  154  clear
  155  ./udp_s
  156  make udp_c udp_s
  157  ./udp_s
  158  make udp_c udp_s
```

LSCPU - This command will display all the CPU architecture information such as threads, sockets, cores and CPU count.

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/1$ lscpu
Architecture:                    x86_64
CPU op-mode(s):                  32-bit, 64-bit
Byte Order:                      Little Endian
Address sizes:                   39 bits physical, 48 bits virtual
CPU(s):                          8
On-line CPU(s) list:             0-7
Thread(s) per core:              2
Core(s) per socket:              4
Socket(s):                       1
NUMA node(s):                    1
Vendor ID:                       GenuineIntel
CPU family:                      6
Model:                           142
Model name:                      Intel(R) Core(TM) i7-8550U CPU @ 1.80GHz
Stepping:                        10
CPU MHz:                         800.019
CPU max MHz:                     4000.0000
CPU min MHz:                     400.0000
BogoMIPS:                        3999.93
Virtualization:                  VT-x
L1d cache:                       128 KiB
L1i cache:                       128 KiB
L2 cache:                        1 MiB
L3 cache:                        8 MiB
NUMA node0 CPU(s):               0-7
Vulnerability Itlb multihit:     KVM: Mitigation: Split huge pages
Vulnerability L1tf:              Mitigation; PTE Inversion; VMX conditional cache flushes, SMT vulnerable
Vulnerability Mds:               Mitigation; Clear CPU buffers; SMT vulnerable
Vulnerability Meltdown:          Mitigation; PTI
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2:        Mitigation; Full generic retpoline, IBPB conditional, IBRS_FW, STIBP con
                                 ditional, RSB filling
Vulnerability Srbds:             Mitigation; Microcode
Vulnerability Tsx async abort:   Not affected
Flags:                           fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                                 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsc
                                 p lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nons
                                 top_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2
                                  ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt ts
                                 c_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpu
                                 id_fault epb invpcid_single pti ssbd ibrs ibpb stibp tpr_shadow vnmi fle
                                 xpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms i
                                 nvpcid mpx rdseed adx smap clflushopt intel_pt xsaveopt xsavec xgetbv1 x
                                 saves dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp md_c
                                 lear flush_l1d
```

PRACTICE QUESTIONS

2. Create a directory and create a file inside that directory.

mkdir test && touch $_/test.txt

```
pav@Pavendhan-PAV:~$ mkdir test && touch $_/test.txt
pav@Pavendhan-PAV:~$ cd test
pav@Pavendhan-PAV:~/test$ ls
test.txt
```

3. List the files and directories that are empty in a working directory.

find . -maxdepth 1 -type f -empty

```
pav@Pavendhan-PAV:~/test$ find . -maxdepth 1 -type f -empty
./test.txt
```

4. Show commands to delete empty and non-empty directory.

find . -type d -empty -delete // delete empty dir

rm -r test //delete non-empty dir

```
pav@Pavendhan-PAV:~/dummy$ ls
test  test2
pav@Pavendhan-PAV:~/dummy$ find . -type d -empty -delete
pav@Pavendhan-PAV:~/dummy$ ls
test
pav@Pavendhan-PAV:~/dummy$ rm -r test
pav@Pavendhan-PAV:~/dummy$ ls
```

5. Find the location of the input files using locate and find command.

locate test.txt

find -iname test.txt

```
pav@Pavendhan-PAV:~/dummy/test$ locate test.txt
/home/pav/dummy/test/test.txt
pav@Pavendhan-PAV:~/dummy/test$ find -iname test.txt
./test.txt
```

6. View the user permissions and ownership of the files in the current directory and change the ownership of some selected files to another user.

ls -l //show the owner and permissions

Chown pav test.txt //change owner

```
pav@Pavendhan-PAV:~/dummy/test$ ls -l
total 0
-rw-rw-r-- 1 pav pav 0 Aug 17 16:33 test.txt
pav@Pavendhan-PAV:~/dummy/test$ chown pav test.txt
pav@Pavendhan-PAV:~/dummy/test$ ls -l
total 0
-rw-rw-r-- 1 pav pav 0 Aug 17 16:33 test.txt
```

7. List all the files in the current directory and subdirectories.

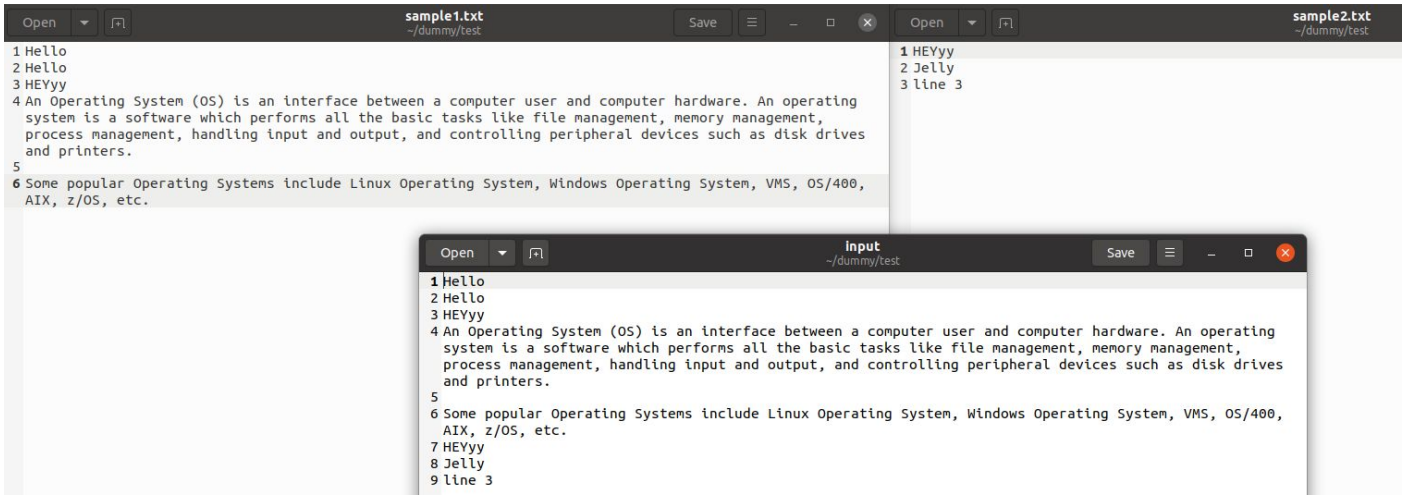
ls -R

```
pav@Pavendhan-PAV:~/dummy/test$ ls -R
.:
subtest  test.txt

./subtest:
```

8. Concatenate the two input files: “sample1.txt” and “sample2.txt” and save it to a new file named “Input”.

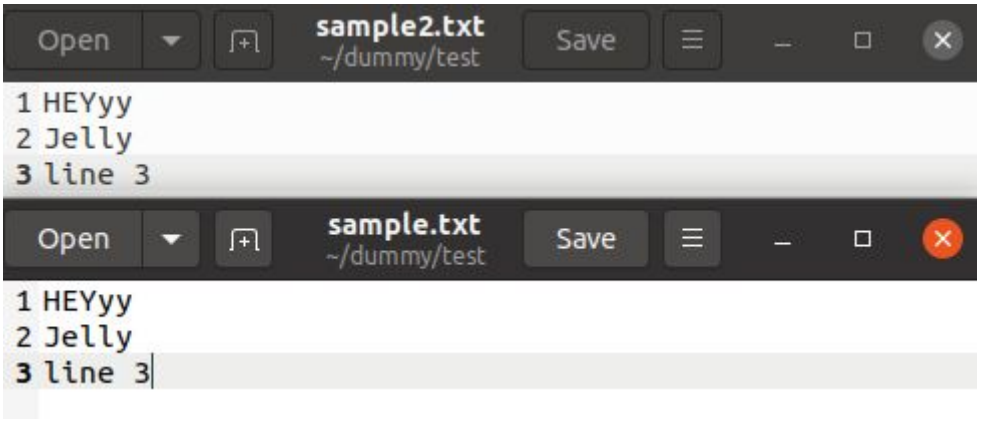
cat sample1.txt sample2.txt > input



9. Copy the contents of file ‘sample2.txt’ to ‘sample.txt’

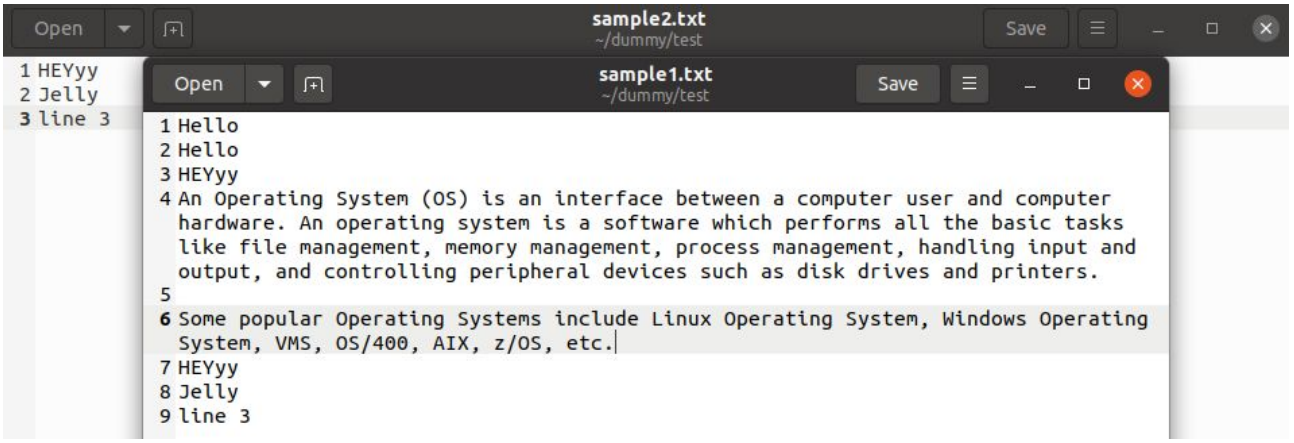
cp sample2.txt sample.txt

ls -l



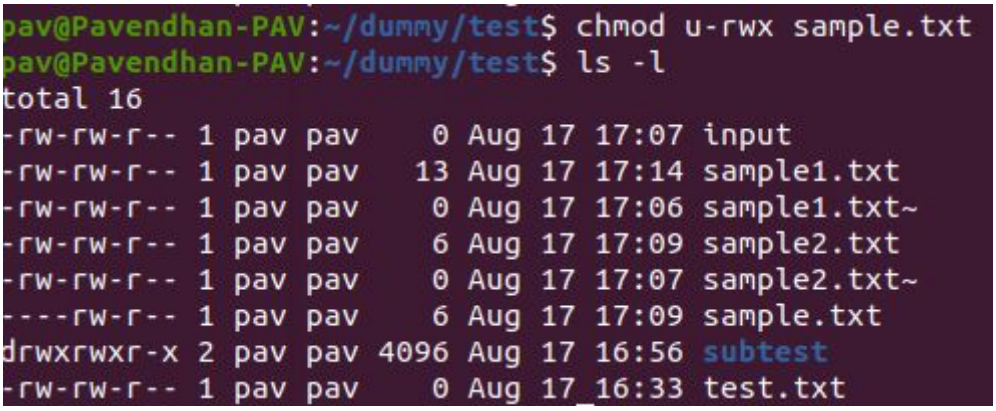
10. Append the file contents of input file ‘sample2.txt’ to the end of the first input file ‘Sample1.txt’.

cat sample2.txt >> sample1.txt



11. Remove the permission for the users to read, write and execute the file ‘sample.txt’.

chmod u-rwx sample.txt

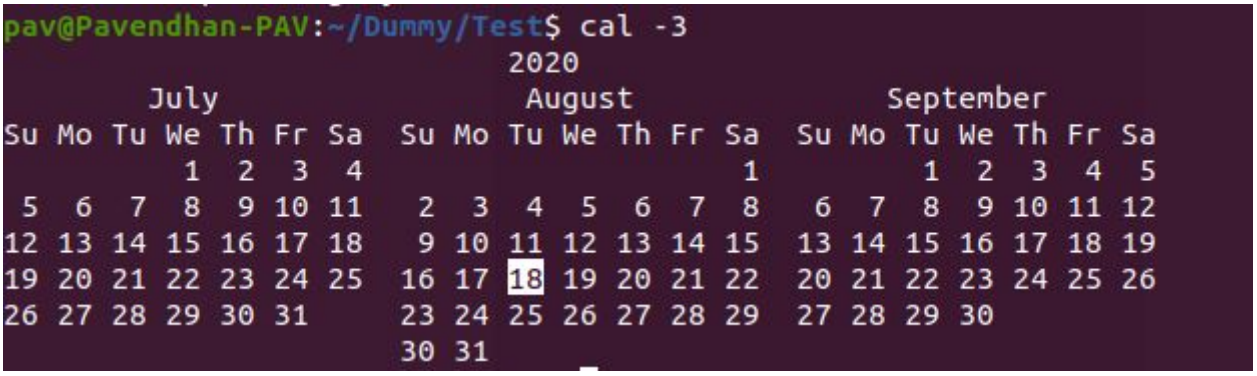


12. Display the current date with the day of week, month, time and the year.

Date

13. Show the calendar of previous, current and next month.

cal -3



14. Sort the contents of the file ‘sample1.txt’ in alphabetical order.

Sort sample1.txt

```
pav@Pavendhan-PAV:~/dummy/test$ sort sample1.txt
Hello
Hello
HEYyy
pav@Pavendhan-PAV:~/dummy/test$ sort sample1.txt | uniq
Hello
HEYyy
```

15. Erase duplicate records in the file ‘sample1.txt’ and display only the unique records

Sort sample1.txt | uniq

```
pav@Pavendhan-PAV:~/dummy/test$ sort sample1.txt
Hello
Hello
HEYyy
pav@Pavendhan-PAV:~/dummy/test$ sort sample1.txt | uniq
Hello
HEYyy
```

16. Add line numbers to the file ‘sample2.txt’

nl -b a sample2.txt

```
pav@Pavendhan-PAV:~/dummy/test$ nl -b a sample2.txt
     1  HEYyy
     2  Jelly
     3  line 3
     4
```

17. Find out whether the two pairs of input files are identical or not.

Compare sample1.txt and sample2.txt

Compare sample2.txt and sample.txt

cmp sample1.txt sample2.txt

cmp sample2.txt sample.txt

```
pav@Pavendhan-PAV:~/dummy/test$ cmp sample1.txt sample2.txt
sample1.txt sample2.txt differ: byte 2, line 1
pav@Pavendhan-PAV:~/dummy/test$ cmp sample.txt sample2.txt
```

18. Show how the input file “sample1.txt” differs line by line from “sample2.txt” in context and unified mode.

diff -c sample1.txt sample2.txt

diff -u sample1.txt sample2.txt

```
pav@Pavendhan-PAV:~/dummy/test$ diff -c sample1.txt sample2.txt
*** sample1.txt 2020-08-17 17:20:44.832818798 +0530
--- sample2.txt 2020-08-17 17:30:23.232366802 +0530
***************
*** 1,3 ****
- Hello
- Hello
  HEYyy
--- 1,3 ----
  HEYyy
+ Jelly
+ line 3
pav@Pavendhan-PAV:~/dummy/test$ diff -u sample1.txt sample2.txt
--- sample1.txt 2020-08-17 17:20:44.832818798 +0530
+++ sample2.txt 2020-08-17 17:30:23.232366802 +0530
@@ -1,3 +1,3 @@
-Hello
-Hello
 HEYyy
+Jelly
+line 3
```

19. Solve the arithmetic expression: ((8+12)*(5-3))/2 using linux commands,

echo "((8+12)*(5-3))/2" | bc //no need to install any extra features like calc

```
pav@Pavendhan-PAV:~/dummy/test$ echo "((8+12)*(5-3))/2" | bc
20
```

20. Cut and display the first 10 characters of every line of the file “Input.txt”.

cut -c1-10 input

```
pav@Pavendhan-PAV:~/dummy/test$ cut -c1-10 input
Hello
Hello
HEYyy
An Operati

Some popul
HEYyy
Jelly
line 3
```

21. Print the name of the current working directory.

pwd

```
pav@Pavendhan-PAV:~/dummy/test$ pwd
/home/pav/dummy/test
```

22. Process Status

a. List all the running processes with their corresponding PIDs.

ps a

b. List the processes that are not associated with the terminal.

ps - a

c. List the processes that are associated with the terminal.

ps t

```
pav@Pavendhan-PAV:~/dummy/test$ ps a
    PID TTY      STAT   TIME COMMAND
   1285 tty2     Ssl+   0:00 /usr/lib/gdm3/gdm-x-session --run-script env GNOME_
   1287 tty2     Sl+    5:50 /usr/lib/xorg/Xorg vt2 -displayfd 3 -auth /run/user
   1499 tty2     Sl+    0:00 /usr/libexec/gnome-session-binary --systemd --syste
   5274 pts/0    Ss     0:00 bash
   6900 pts/0    T      0:01 find . -type d -empty -delete
  13732 pts/0    R+     0:00 ps a
pav@Pavendhan-PAV:~/dummy/test$ ps -a
    PID TTY          TIME CMD
   1287 tty2     00:05:50 Xorg
   1499 tty2     00:00:00 gnome-session-b
   6900 pts/0    00:00:01 find
  13733 pts/0    00:00:00 ps
pav@Pavendhan-PAV:~/dummy/test$ ps t
    PID TTY      STAT   TIME COMMAND
   5274 pts/0    Ss     0:00 bash
   6900 pts/0    T      0:01 find . -type d -empty -delete
  13734 pts/0    R+     0:00 ps t
```

x23. Print the number of characters, number of lines and number of words for all the given input files.

wc -l -w -m sample1.txt sample2.txt sample.txt input

```
pav@Pavendhan-PAV:~/dummy/test$ wc -l -w -m sample1.txt sample2.txt sample.txt input
  6  66 453 sample1.txt
  3   4  19 sample2.txt
  3   4  19 sample.txt
  9  70 472 input
 21 144 963 total
```

24. Print the length of the longest line from all the input files.

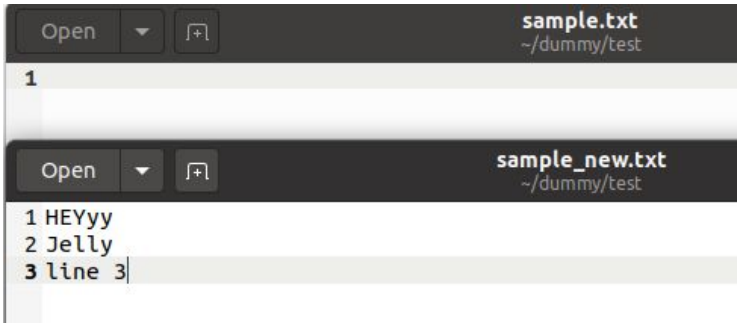
cat sample1.txt sample2.txt sample.txt input | awk '{ print length }' | sort -n | tail -1

```
pav@Pavendhan-PAV:~/dummy/test$ cat sample1.txt sample2.txt sample.txt input | awk '
{ print length }' | sort -n | tail -1
313
```

25. Move the contents of the input file sample.txt to a new file.

cp sample.txt sample_new.txt

echo "" > sample.txt



26. Copy the contents of one directory to another directory.

cp -r test another_test

```
pav@Pavendhan-PAV:~/dummy$ ls -R
.:
test

./test:
input        sample1.txt~  sample2.txt~    sample.txt   subtest
sample1.txt  sample2.txt   sample_new.txt  sample.txt~  test.txt

./test/subtest:
pav@Pavendhan-PAV:~/dummy$ cp -r test another_test
pav@Pavendhan-PAV:~/dummy$ ls -R
.:
another_test  test

./another_test:
input        sample1.txt~  sample2.txt~    sample.txt   subtest
sample1.txt  sample2.txt   sample_new.txt  sample.txt~  test.txt

./another_test/subtest:

./test:
input        sample1.txt~  sample2.txt~    sample.txt   subtest
sample1.txt  sample2.txt   sample_new.txt  sample.txt~  test.txt

./test/subtest:
```

27. Reverse the lines of the two input files and concatenate the file contents using a single Command.

cat Sample1.txt Sample2.txt | tac

```
pav@Pavendhan-PAV:~/Dummy/Test$ cat Sample1.txt Sample2.txt | tac

Yet another powerful OS.
Multiuser operating system.
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An OS is a software which performs all the basic tasks like file management, memory management, process management, handling in
put and output, and controlling peripheral devices such as disk drives and printers.
An OS is an interface between a computer user and a computer hardware.
This is a test document.
```

28. Delete all the files with *.txt extension from the working directory using yes command.

yes | rm -i *.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ ls
input.txt  Sample1.txt  Sample2.txt  sample.txt
pav@Pavendhan-PAV:~/Dummy/Test$ yes | rm -i *.txt
rm: remove regular empty file 'input.txt'? rm: remove regular file 'Sample1.txt'? rm: remove regular file 'Sample2.txt'? rm: re
move regular empty file 'sample.txt'? pav@Pavendhan-PAV:~/Dummy/Test$ ls
```

29. Given the input file “sample1.txt”, print the number of the lines that match the pattern “System”.

grep -n "system" sample1.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ grep -n "system" sample1.txt
4:Operating system is one of the core subjects in computer science.
5:Operating system is one of the core subjects in computer science.
8:Unix systems use a centralized operating system kernel which manages system and process activities.
11:UNixOS systems use a centralized operating system kernel which manages system and process activities.
14:Multiuser operating system.
pav@Pavendhan-PAV:~/Dummy/Test$ grep -c "system" sample1.txt
5
```

30. Having sample1 file as input, print the matched lines that contain the pattern “Unix” as whole words.

grep -w "Unix" sample1.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ grep -w "Unix" sample1.txt
Unix is a great OS.
Unix systems use a centralized operating system kernel which manages system and process activities.
Unix is a great OS.
A user can also run multiple programs at the same time; hence Unix is a multitasking environment.
```

31. Print the lines from “sample1.txt” that do not match the pattern “OS”.

grep -v "OS" sample1.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ grep -v "OS" sample1.txt
This is a test document.
Operating system is one of the core subjects in computer science.
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Multiuser operating system.
```

32. Fetch the files that contain the word “OS”, “Operating System”, “Operating Systems” with its respective line number. (Ignore the case).

grep -iRl "OS\|Operating system\|Operating systems" ./

```
pav@Pavendhan-PAV:~/Dummy$ grep -iRl "OS\|Operating system\|Operating systems" ./
./Test/sample2.txt
./Test/input
./Test/sample1.txt
```

33. Having “sample1.txt” and “core” as the input and pattern respectively, along with the matched line print three lines before and after the pattern match.

grep "core" -A3 -B3 sample1.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ grep "core" -A3 -B3 sample1.txt
This is a test document.
An OS is an interface between a computer user and a computer hardware.
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ess management, handling input and output, and controlling peripheral devices such as disk drives an
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Unix systems use a centralized operating system kernel which manages system and process activities.
```

34. Find and replace the string “OS” with “Operating System”.

sed -i 's/OS/Operating System/g' input

```
pav@Pavendhan-PAV:~/Dummy/Test$ sed -i 's/OS/Operating System/g' input
pav@Pavendhan-PAV:~/Dummy/Test$ cat input
This is a test document.
An Operating System is an interface between a computer user and a computer hardware.
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```

35. List only the text files in the current working directory with its corresponding disk space occupied.

ls -sh *.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ ls -sh *.txt
4.0K sample1.txt  4.0K sample2.txt
```

36. Show the last modification time of all the input text files.

stat -c '%y' *.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ stat -c '%y' *.txt
2020-08-18 12:19:52.094780717 +0530
2020-08-18 12:20:00.242824506 +0530
```

37. Delete the line that has the word “Powerful” from the text file “sample2.txt”.

sed -i '/Powerful/Id' sample2.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ cat sample2.txt
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pav@Pavendhan-PAV:~/Dummy/Test$ sed -i '/Powerful/Id' sample2.txt
pav@Pavendhan-PAV:~/Dummy/Test$ cat sample2.txt
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```

38. Print the roll numbers that end with even numbers in the format (COE18B002) up to COE18B050.

seq -f "COE18B0%02g" 2 2 50

```
pav@Pavendhan-PAV:~/Dummy/Test$ seq -f "COE18B0%02g" 2 2 50
COE18B002
COE18B004
COE18B006
COE18B008
COE18B010
COE18B012
COE18B014
COE18B016
COE18B018
COE18B020
COE18B022
COE18B024
COE18B026
COE18B028
COE18B030
COE18B032
COE18B034
COE18B036
COE18B038
COE18B040
COE18B042
COE18B044
COE18B046
COE18B048
COE18B050
```

39. Use filter commands like head, tail, more to view the file contents page by page.

```
pav@Pavendhan-PAV:~/CS/OS/Aug 14/2-41$ head -200 sample.txt | more -8
This is a test document.
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--More--
```

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--More--
```

```
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```

Similarly with tail - **tail -200 sample.txt | more -8.**

40. Compress the current working directory contents to a tar file and extract those files from the compressed tar file.

tar -zcvf LCommands.tar.gz sample1.txt sample2.txt input

```
pav@Pavendhan-PAV:~/Dummy/Test$ tar -zcvf LCommands.tar.gz sample1.txt sample2.txt input
sample1.txt
sample2.txt
input
pav@Pavendhan-PAV:~/Dummy/Test$ tar -zxvf LCommands.tar.gz
sample1.txt
sample2.txt
input
pav@Pavendhan-PAV:~/Dummy/Test$ ls
input  LCommands.tar.gz  sample1.txt  sample2.txt
```

41. Compress the files using zip command.

a. Zip the input file “sample1.txt” as samplezip.zip and remove the file from the current directory after zipping.

zip -m samplezip.zip sample1.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ zip -m samplezip.zip sample1.txt
  adding: sample1.txt (deflated 58%)
pav@Pavendhan-PAV:~/Dummy/Test$ ls
input  LCommands.tar.gz  sample2.txt  samplezip.zip
```

b. Add “sample2.txt” and update the zip archive.

zip -m samplezip.zip sample2.txt

```
pav@Pavendhan-PAV:~/Dummy/Test$ zip -m samplezip.zip sample2.txt
  adding: sample2.txt (deflated 39%)
pav@Pavendhan-PAV:~/Dummy/Test$ unzip -l samplezip.zip
Archive:  samplezip.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
      906  2020-08-18 12:19   sample1.txt
      565  2020-08-18 17:46   sample2.txt
---------                     -------
     1471                     2 files
```

c. Zip a directory with all its contents.

zip -r DIRzip.zip Test

```
pav@Pavendhan-PAV:~/Dummy$ zip -r DIRzip.zip Test
  adding: Test/ (stored 0%)
  adding: Test/input (deflated 65%)
  adding: Test/samplezip.zip (stored 0%)
  adding: Test/LCommands.tar.gz (stored 0%)
pav@Pavendhan-PAV:~/Dummy$ ls
DIRzip.zip  Test
```

d. Remove a file from the zip archive

zip -d samplezip.zip input

```
pav@Pavendhan-PAV:~/Dummy/Test$ zip -d samplezip.zip input
deleting: input
pav@Pavendhan-PAV:~/Dummy/Test$ unzip -l samplezip.zip
Archive:  samplezip.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
      906  2020-08-18 12:19   sample1.txt
      565  2020-08-18 17:46   sample2.txt
---------                     -------
     1471                     2 files
```

e. Unzip the contents from samplezip.zip

unzip -l samplezip.zip

```
pav@Pavendhan-PAV:~/Dummy/Test$ unzip -l samplezip.zip
Archive:  samplezip.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
      906  2020-08-18 12:19   sample1.txt
      565  2020-08-18 17:46   sample2.txt
---------                     -------
     1471                     2 files
```