

EXPERIMENT NO: 4

DATE:

FAMILIARISATION WITH LINUX COMMANDS

AIM: Basic linux commands.

1. pwd

Use the pwd command to find out the path of the current working directory (folder) you're in. The command will return an absolute (full) path, which is basically a path of all the directories that start with a forward slash (/). An example of an absolute path is /home/username.

A screenshot of a Linux terminal window. The window title is 'user@user-HP-Laptop-15-da0xxx: ~'. The terminal shows the command 'pwd' being entered at the prompt 'user@user-HP-Laptop-15-da0xxx:~\$'. The output of the command is '/home/user', displayed on the next line. The prompt 'user@user-HP-Laptop-15-da0xxx:~\$' is shown again on the following line, followed by a cursor.

2. cd

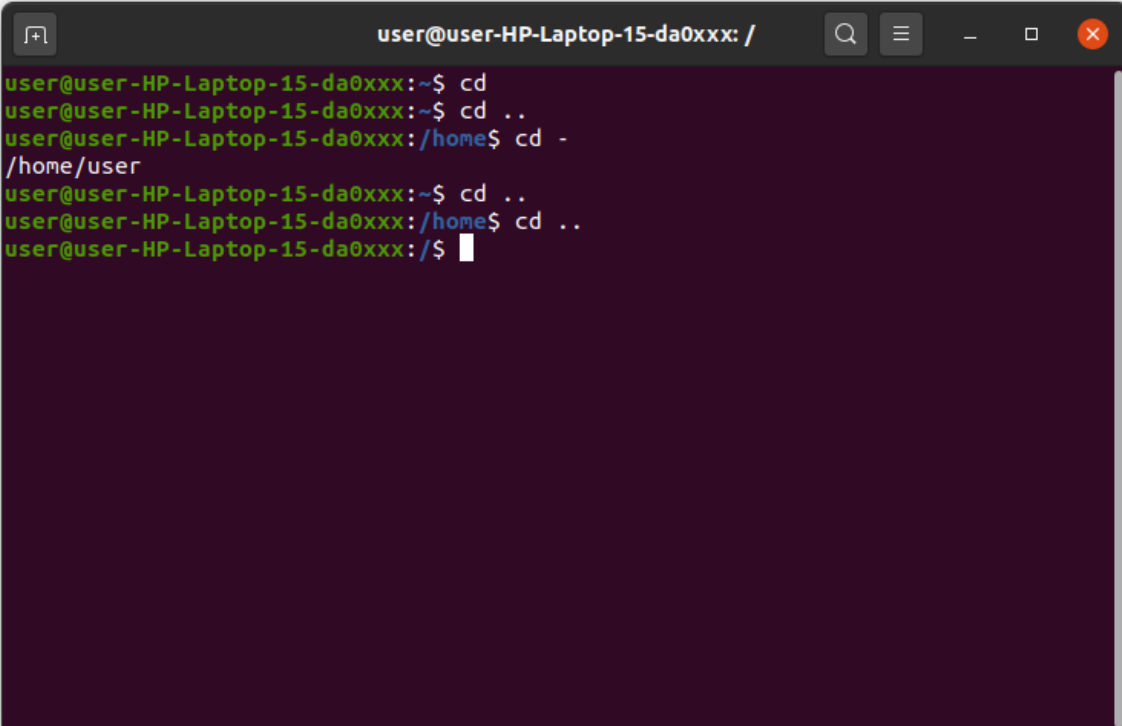
To navigate through the Linux files and directories, use the cd . It requires either the full path or the name of the directory, depending on the current working directory that you're in. Let's say you're in /home/username/Documents and you want to go to Photos, a subdirectory of Documents. To do so, simply type the following command: cd Photos. Another scenario is if you want to switch to a completely new directory, for

Another scenario is if you want to switch to a completely new directory, for example, /home/username/Movies. In this case, you have to type cd followed by the directory's absolute path: cd /home/username/Movies.

There are some shortcuts to help you navigate quickly:

- cd .. (with two dots) to move one directory up
- cd to go straight to the home folder
- cd- (with a hyphen) to move to your previous directory

On a side note, Linux's shell is case sensitive. So, you have to type the name's directory exactly as it is.

A terminal window titled 'user@user-HP-Laptop-15-da0xxx: /' with standard window controls. The terminal shows a sequence of 'cd' commands: starting from '~', moving to '..', then to '/home', then to '/home/user', then back to '..', then to '/home', and finally back to '..' to return to the root '~'.

```
user@user-HP-Laptop-15-da0xxx:~$ cd
user@user-HP-Laptop-15-da0xxx:~$ cd ..
user@user-HP-Laptop-15-da0xxx:/home$ cd -
/home/user
user@user-HP-Laptop-15-da0xxx:~$ cd ..
user@user-HP-Laptop-15-da0xxx:/home$ cd ..
user@user-HP-Laptop-15-da0xxx:/$
```

3. ls

The ls command is used to view the contents of a directory. By default, this command will display the contents of your current working directory.

If you want to see the content of other directories, type `ls` and then the directory's path. For example, enter `ls /home/username/Documents` to view the content of Documents.

There are variations you can use with the `ls` command:

- `ls -R` will list all the files in the sub-directories as well
- `ls -a` will show the hidden files
- `ls -al` will list the files and directories with detailed information like the permissions, size, owner, etc.
- `ls -t` lists files sorted in the order of “last modified”
- `-r` option will reverse the natural sorting order. Usually used in combination with other switches such as `ls -tr`. This will reverse the time-wise listing.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ ls  
bitstring.c  Desktop      GIT           Pictures      Templates  
cn           Documents   Music         prims.c       Videos  
cpgms        Downloads   '#newfile.txt#' Public  
user@user-HP-Laptop-15-da0xxx:~$
```

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ ls -al  
total 160  
drwxr-xr-x 20 user user 4096 Jun 11 02:08 .  
drwxr-xr-x  3 root root 4096 Dec  1 2020 ..  
-rw-r----- 1 user user 10016 Jun 11 02:20 .bash_history  
-rw-r--r--  1 user user  220 Dec  1 2020 .bash_logout  
-rw-r--r--  1 user user 3771 Dec  1 2020 .bashrc  
-rw-rw-r--  1 user user  458 Jan  3 00:59 bitstring.c  
drwxr-xr-x 16 user user 4096 Jun 10 03:39 .cache  
drwxrwxr-x  2 user user 4096 Jun 11 02:18 cn  
drwx----- 16 user user 4096 Jun 10 03:39 .config  
drwxrwxr-x  5 user user 4096 Mar 21 14:32 cpgms  
drwxr-xr-x  2 user user 4096 Dec  2 2020 Desktop  
drwxr-xr-x  2 user user 4096 Dec  2 2020 Documents  
drwxr-xr-x  2 user user 4096 Jun 11 17:27 Downloads  
drwx-----  3 user user 4096 Jun 10 03:47 .emacs.d  
drwxrwxr-x  3 user user 4096 Dec 28 01:32 GIT  
-rw-rw-r--  1 user user   58 Dec 25 21:00 .gitconfig  
drwx-----  3 user user 4096 Jun 11 02:19 .gnupg  
drwxr-xr-x  3 user user 4096 Dec  2 2020 .local  
drwx-----  5 user user 4096 Dec  5 2020 .mozilla  
drwxr-xr-x  2 user user 4096 Dec  2 2020 Music  
-rw-rw-r--  1 user user   29 Jun 10 03:58 '#newfile.txt#'  
drwxr-xr-x  4 user user 4096 Jun 11 17:28 Pictures  
-rw-rw-r--  1 user user 1625 Mar 21 14:18 prims.c  
-rw-r--r--  1 user user  807 Dec  1 2020 .profile  
drwxr-xr-x  2 user user 4096 Dec  2 2020 Public  
drwx-----  2 user user 4096 Dec 26 21:35 .ssh  
-rw-r--r--  1 user user   60 Dec  2 2020 .sudo_as_admin_successful  
-rw-r-----  1 user user 12288 Jun 11 02:08 .swm  
-rw-r-----  1 user user 12288 Jun 10 04:34 .swo  
-rw-r-----  1 user user 12288 Jun 10 04:13 .swp  
drwxr-xr-x  2 user user 4096 Dec  2 2020 Templates  
drwxr-xr-x  2 user user 4096 Dec  2 2020 Videos  
-rw-r-----  1 user user  782 Jun 11 02:08 .viminfo  
user@user-HP-Laptop-15-da0xxx:~$
```

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ ls  
bitstring.c Desktop GIT Pictures Templates  
cn Documents Music prims.c Videos  
cpgms Downloads '#newfile.txt#' Public  
user@user-HP-Laptop-15-da0xxx:~$
```

```
user@user-HP-Laptop-15-da0xxx:~$ ls -al  
total 160  
drwxr-xr-x 20 user user 4096 Jun 11 02:08 .  
drwxr-xr-x 3 root root 4096 Dec 1 2020 ..  
-rw-r----- 1 user user 10016 Jun 11 02:20 .bash_history  
-rw-r----- 1 user user 220 Dec 1 2020 .bash_logout  
-rw-r----- 1 user user 3771 Dec 1 2020 .bashrc  
-rw-rw-r-- 1 user user 458 Jan 3 00:59 bitstring.c  
drwxr-xr-x 16 user user 4096 Jun 10 03:39 .cache  
drwxrwxr-x 2 user user 4096 Jun 11 02:18 cn  
drwx----- 16 user user 4096 Jun 10 03:39 .config  
drwxrwxr-x 5 user user 4096 Mar 21 14:32 cpgms  
drwxr-xr-x 2 user user 4096 Dec 2 2020 Desktop  
drwxr-xr-x 2 user user 4096 Dec 2 2020 Documents  
drwxr-xr-x 2 user user 4096 Jun 11 17:27 Downloads  
drwx----- 3 user user 4096 Jun 10 03:47 .emacs.d  
drwxrwxr-x 3 user user 4096 Dec 28 01:32 GIT  
-rw-rw-r-- 1 user user 58 Dec 25 21:00 .gitconfig  
drwx----- 3 user user 4096 Jun 11 02:19 .gnupg  
drwxr-xr-x 3 user user 4096 Dec 2 2020 .local  
drwx----- 5 user user 4096 Dec 5 2020 .mozilla  
drwxr-xr-x 2 user user 4096 Dec 2 2020 Music  
-rw-rw-r-- 1 user user 29 Jun 10 03:58 '#newfile.txt#'  
drwxr-xr-x 4 user user 4096 Jun 11 17:28 Pictures  
-rw-rw-r-- 1 user user 1625 Mar 21 14:18 prims.c  
-rw-r----- 1 user user 807 Dec 1 2020 .profile  
drwxr-xr-x 2 user user 4096 Dec 2 2020 Public  
drwx----- 2 user user 4096 Dec 26 21:35 .ssh  
-rw-r----- 1 user user 0 Dec 2 2020 .sudo_as_admin_successful  
-rw----- 1 user user 12288 Jun 11 02:08 .swm  
-rw----- 1 user user 12288 Jun 10 04:34 .swp  
-rw----- 1 user user 12288 Jun 10 04:13 .swp  
drwxr-xr-x 2 user user 4096 Dec 2 2020 Templates  
drwxr-xr-x 2 user user 4096 Dec 2 2020 Videos  
-rw----- 1 user user 782 Jun 11 02:08 .viminfo  
user@user-HP-Laptop-15-da0xxx:~$
```

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ ls -R  
.:  
bitstring.c  Desktop  GIT  Pictures  Templates  
cn  Documents  Music  prims.c  Videos  
cpgms  Downloads  '#newfile.txt#'  Public  
  
./cn:  
a.1.png  'd$.2.png'  dw.1.png  I.2.png  l.1.png  O.3.png  
A.1.png  'd^1.1.png'  dw.2.png  I.3.png  l.2.png  x.1.png  
a.2.png  D.1.png  emacs.png  i.png  o.1.png  X.1.png  
A.2.png  'd^2.2.png'  'emacs version.png'  j.1.png  O.1.png  x.2.png  
a.3.png  D.2.png  h.1.png  j.2.png  o.2.png  X.2.png  
A.3.png  dd.1.png  h.2.png  k.1.png  O.2.png  
'd$.1.png'  dd.2.png  I.1.png  k.2.png  o.3.png  
  
./cpgms:  
a.c  dfs.c  kruskal.c  singledeletion.out  
a.out  dfs.out  kruskal.out  singlell.c  
bbits.c  dijkstra.c  linkedlists  sing.out  
bbits.out  disjoint.c  llfinal.c  sma.c  
bfs.c  disjoint.out  llfinal.out  smallarray.c  
bfs.out  display.c  mergesort.c  smallarray.out  
binomial.c  display.out  mergesort.out  smallesst.c  
binomial.out  doublyll.c  mul.c  smallesst.out  
bits.c  doublyll.out  mul.out  sma.out  
bitsfinal.c  ds.c  oebig.c  ssh.....  
bitsfinal.out  ds.out  oebig.out  stackarray.c  
bits.out  duply.c  prims.c  stackarray.out  
Bitstring  duply.out  prims.out  stackll.c  
bitstring.c  evenoddsun.c  queuearray.c  stackll.out  
bitstringorg.c  evenoddsun.out  queuearray.out  stack.out  
bitstringorg.out  evenoddsun.c  queueall.c  sum.c  
bitstring.out  evenoddsun.out  queueall.out  sum.out  
'bridge course'  great.c  rbtree.c  topological.c  
bst.c  great.out  rbtree.out  topological.out  
bst.out  infront.c  rectcircle.c  tree.c  
btree.c  infront.out  rectcircle.out  ttt.c  
btree.out  insfront.c  reversearr.c  ttt.out  
circular.c  insfront.out  reversearr.out  'Untitled Document 1.c'
```

4. cat cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output stdout . To run this command, type cat followed by the file's name and its extension. For instance: cat file.txt.

Here are other ways to use the cat command:

- cat > filename creates a new file
- cat filename1 filename2>filename3 joins two files (1 and 2) and stores the output of them in a new file (3)
- to convert a file to upper or lower case use, cat filename | tr a-z A-Z >output.txt

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ cat >hello.txt  
computer networking  
^Z  
[3]+  Stopped                  cat > hello.txt  
user@user-HP-Laptop-15-da0xxx:~$ cat >lab.txt  
linux commands  
^Z  
[4]+  Stopped                  cat > lab.txt  
user@user-HP-Laptop-15-da0xxx:~$ cat >hello.txt lab.txt >programming.txt  
user@user-HP-Laptop-15-da0xxx:~$
```

```
Open  hello.txt  Save  
file1  hello.txt  
1 computer networking  
Plain Text  Tab Width: 8  Ln 1, Col 1  INS
```



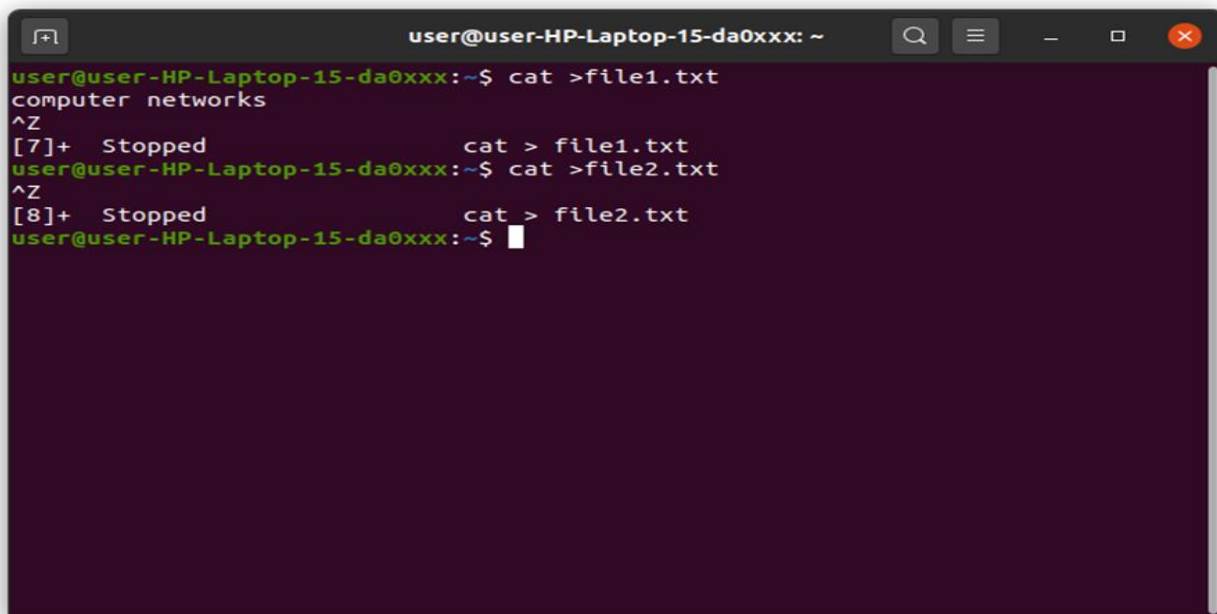
5. cp

Use the cp command to copy files from the current directory to a different directory.

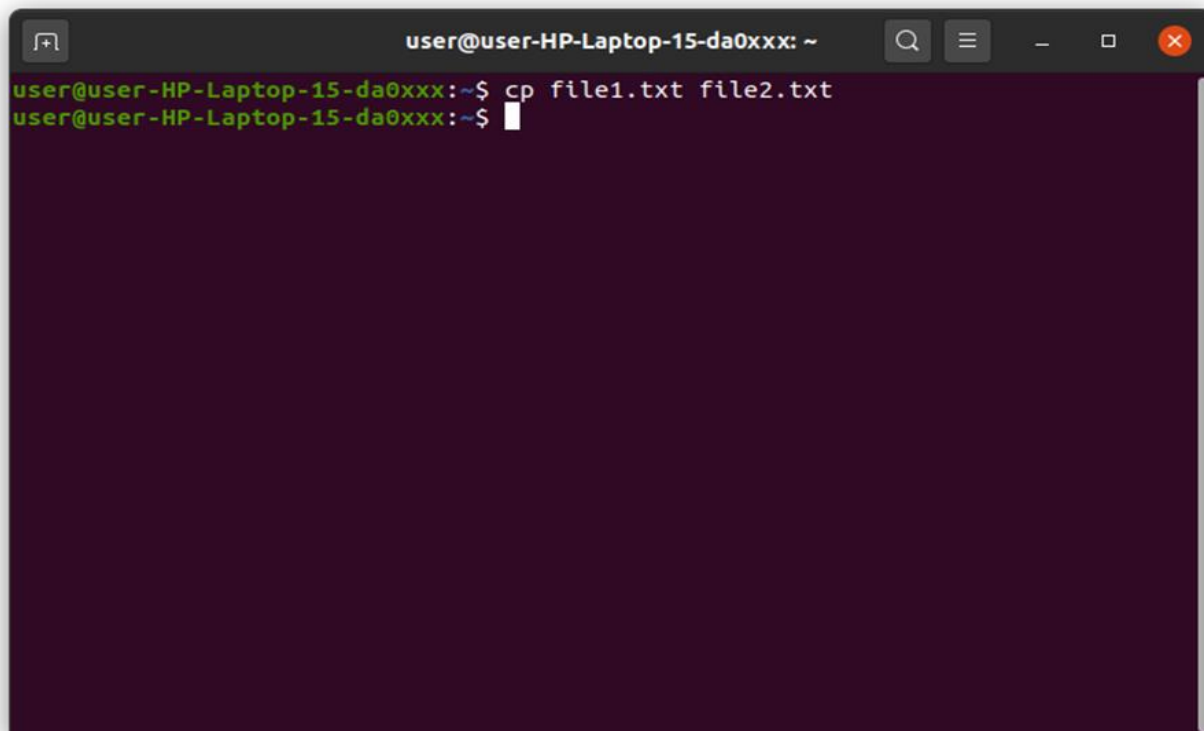
For instance, the command `cp scenery.jpg /home/username/Pictures` would create a copy of scenery.jpg (from your current directory) into the Pictures directory.

- `cp -i` will ask for user's consent in case of a potential file overwrite.
- `cp -p` will preserve source files' mode, ownership and timestamp.
- `cp -r` will copy directories recursively.

- `cp -u` copies files only if the destination file is not existing or the source file is newer than the destination file.



```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ cat >file1.txt  
computer networks  
^Z  
[7]+  Stopped                  cat > file1.txt  
user@user-HP-Laptop-15-da0xxx:~$ cat >file2.txt  
^Z  
[8]+  Stopped                  cat > file2.txt  
user@user-HP-Laptop-15-da0xxx:~$
```



```
user@user-HP-Laptop-15-da0xxx:~$ cp file1.txt file2.txt  
user@user-HP-Laptop-15-da0xxx:~$
```

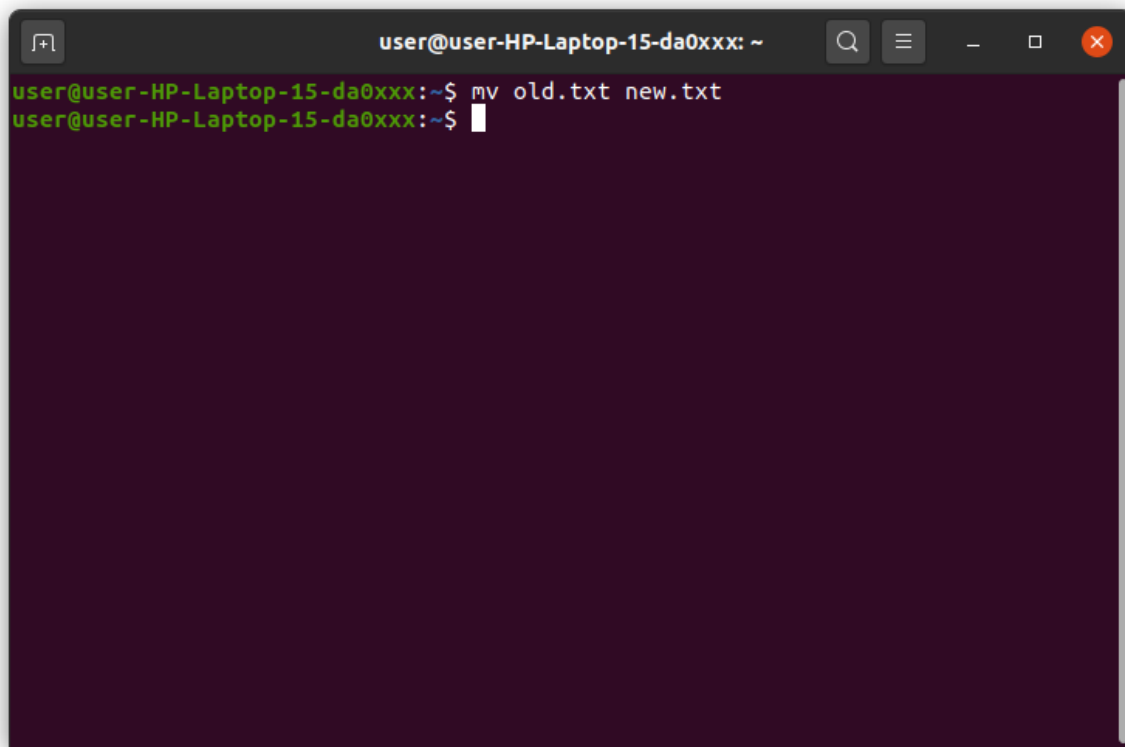


6. mv

The primary use of the `mv` command is to move files, although it can also be used to rename files.

The arguments in `mv` are similar to the `cp` command. You need to type `mv`, the file's name, and the destination's directory. For example: `mv file.txt /home/username/Documents`.

To rename files, the Linux is mv oldname.ext newname.ext

A terminal window with a dark purple background. The title bar shows 'user@user-HP-Laptop-15-da0xxx: ~'. The prompt is 'user@user-HP-Laptop-15-da0xxx:~\$'. The command 'mv old.txt new.txt' has been entered and executed. The prompt is now 'user@user-HP-Laptop-15-da0xxx:~\$' with a cursor.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ mv old.txt new.txt  
user@user-HP-Laptop-15-da0xxx:~$
```

A text editor window with a light gray background. The title bar shows 'new.txt'. The menu bar includes 'Open', 'Save', and window control buttons. The text '1 hello world' is on the first line. The status bar at the bottom shows 'Plain Text', 'Tab Width: 8', 'Ln 1, Col 1', and 'INS'.

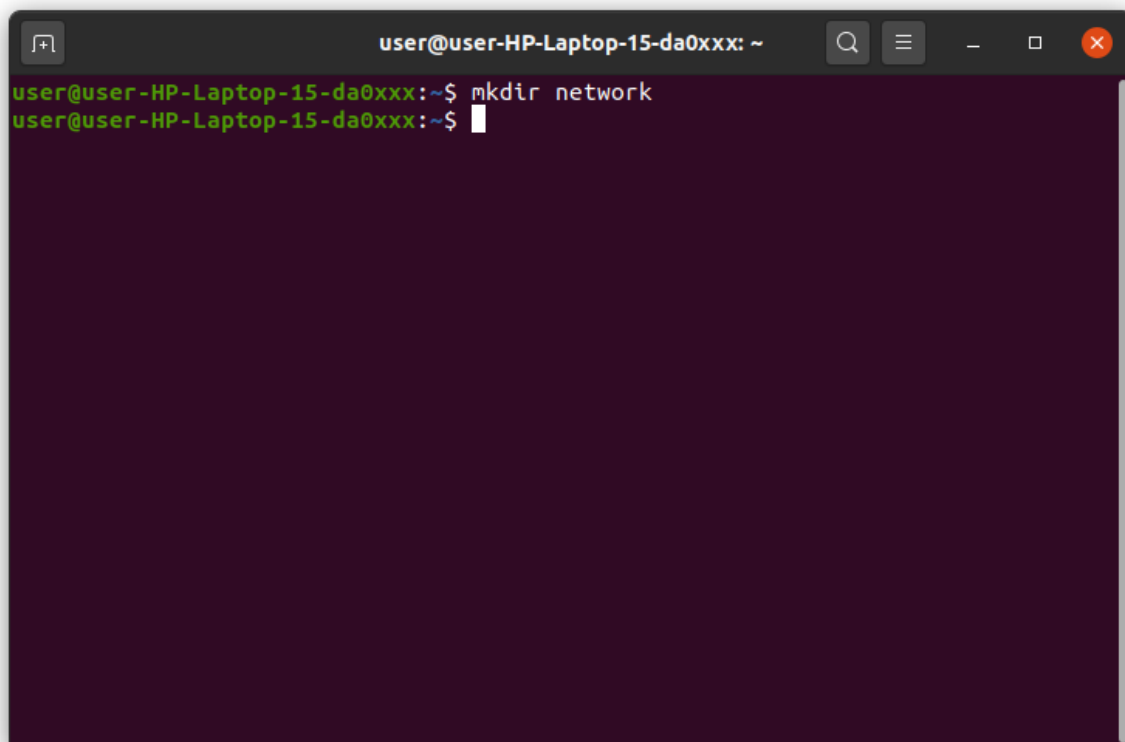
```
1 hello world
```

7. mkdir

Use mkdir command to make a new directory — if you type mkdir Music it will create a directory called Music.

There are extra mkdir commands as well:

- To generate a new directory inside another directory, use this Linux basic command mkdir Music/Newfile
- use the p (parents) option to create a directory in between two existing directories. For example, mkdir -p Music/2020/Newfile will create the new “2020” file.

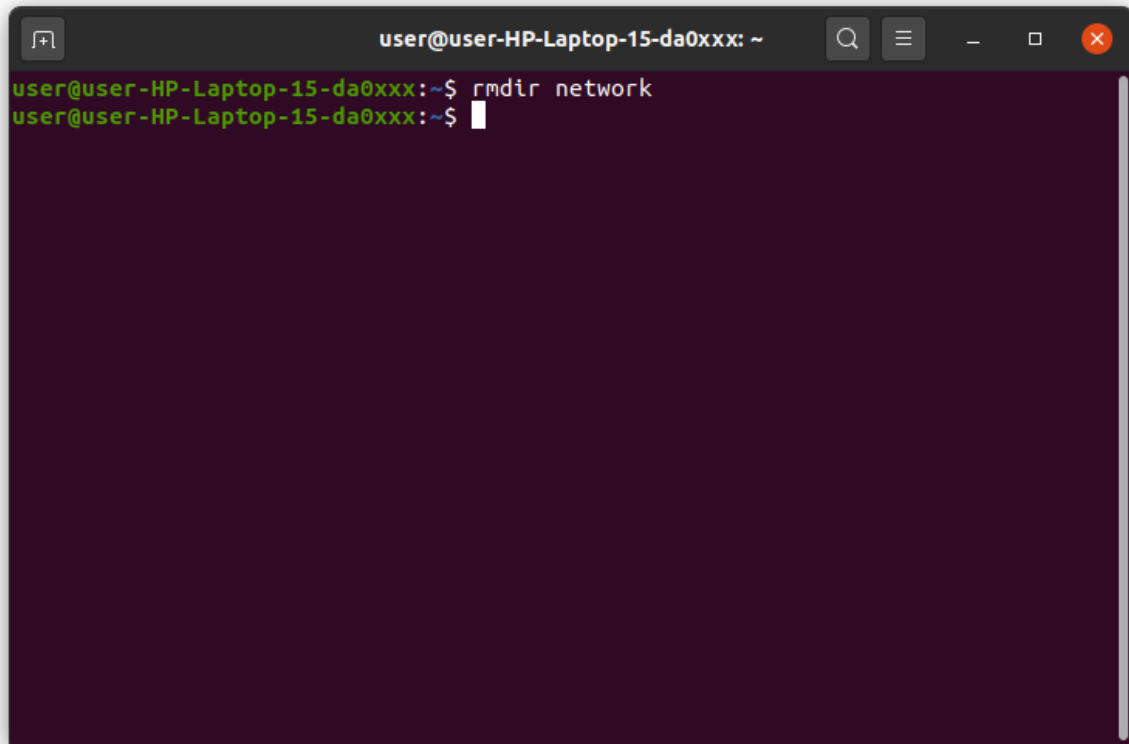


```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ mkdir network  
user@user-HP-Laptop-15-da0xxx:~$
```

Name	Size	Location
 network	0 items	

8. rmdir

If you need to delete a directory, use the `rmdir` command. However, `rmdir` only allows you to delete empty directories.

A terminal window titled "user@user-HP-Laptop-15-da0xxx: ~" with search, menu, and window control icons. It shows the command `rmdir network` being entered and executed. The prompt changes from `user@user-HP-Laptop-15-da0xxx:~$` to `user@user-HP-Laptop-15-da0xxx:~$` after the command is run.

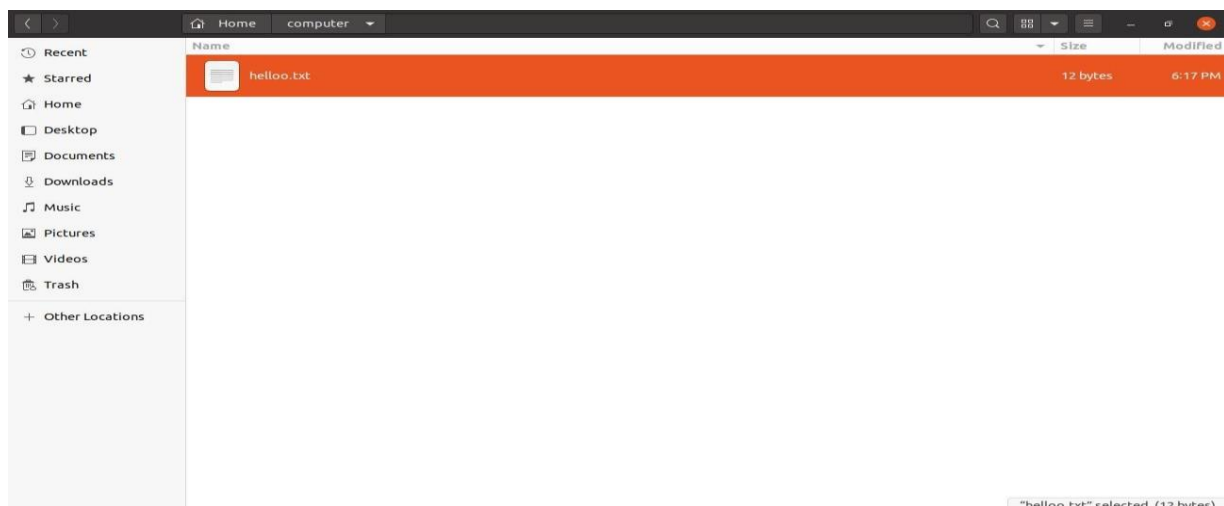
```
user@user-HP-Laptop-15-da0xxx:~$ rmdir network
user@user-HP-Laptop-15-da0xxx:~$
```

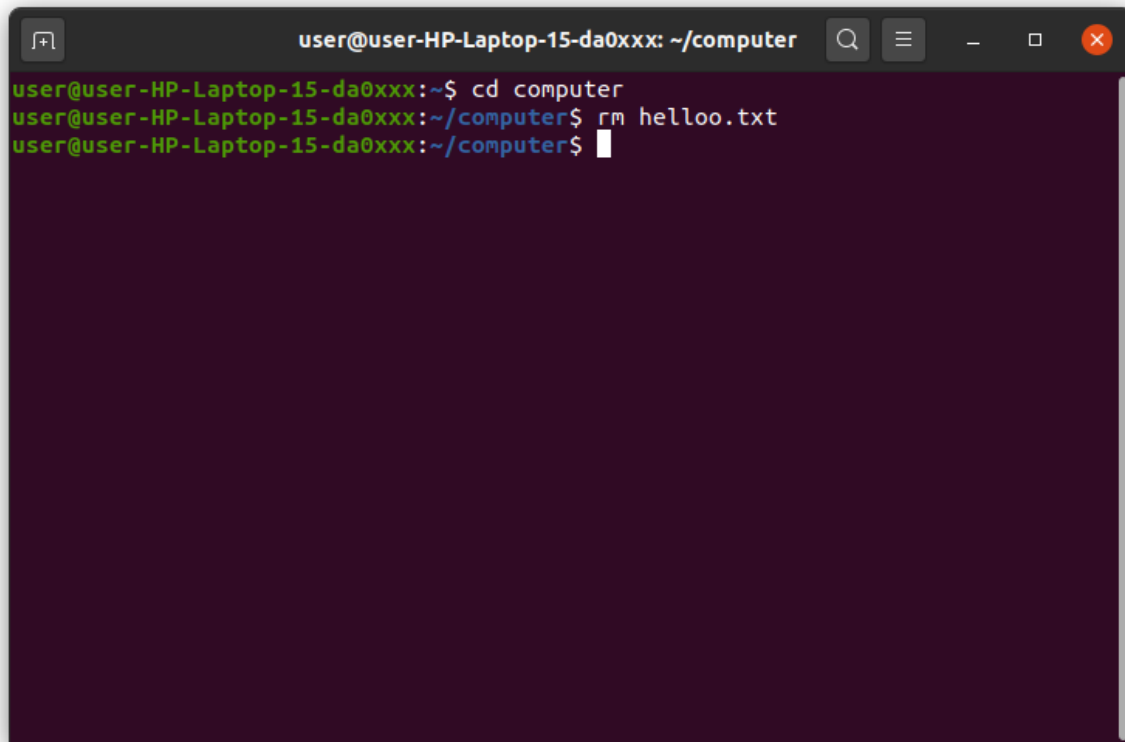
9. rm

The `rm` command is used to delete directories and the contents within them. If you only want to delete the directory — as an alternative to `rmdir` — use `rm -r`.

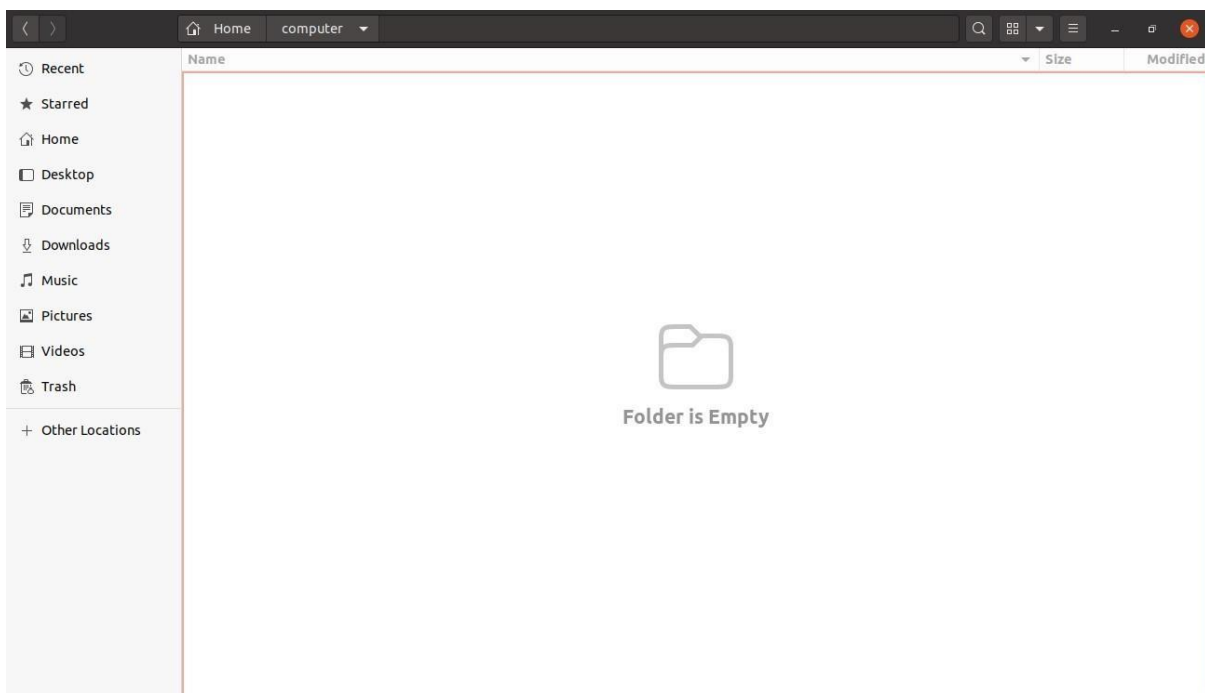
Note: Be very careful with this command and double-check which directory you are in.

This will delete everything and there is no undo.



A terminal window titled "user@user-HP-Laptop-15-da0xxx: ~/computer" with a dark purple background. It shows a sequence of three commands: "cd computer", "rm helloo.txt", and a blank prompt line. The window has standard Linux terminal window controls (search, menu, zoom, close) in the top right corner.

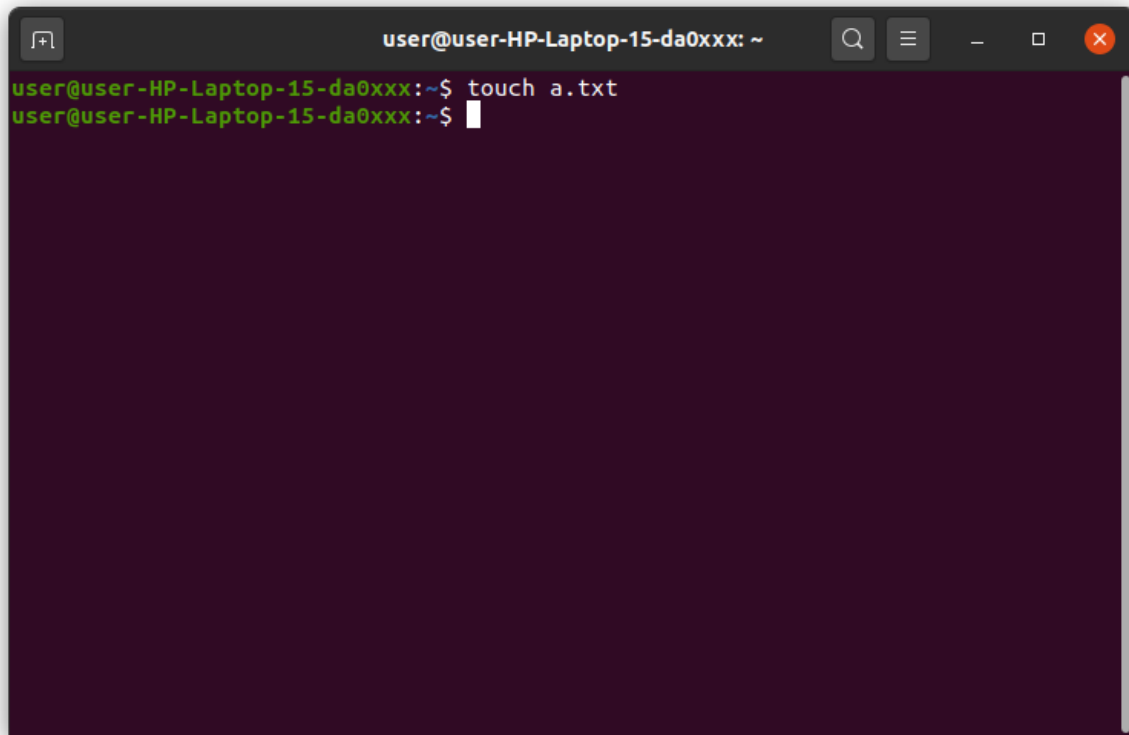
```
user@user-HP-Laptop-15-da0xxx:~$ cd computer
user@user-HP-Laptop-15-da0xxx:~/computer$ rm helloo.txt
user@user-HP-Laptop-15-da0xxx:~/computer$
```



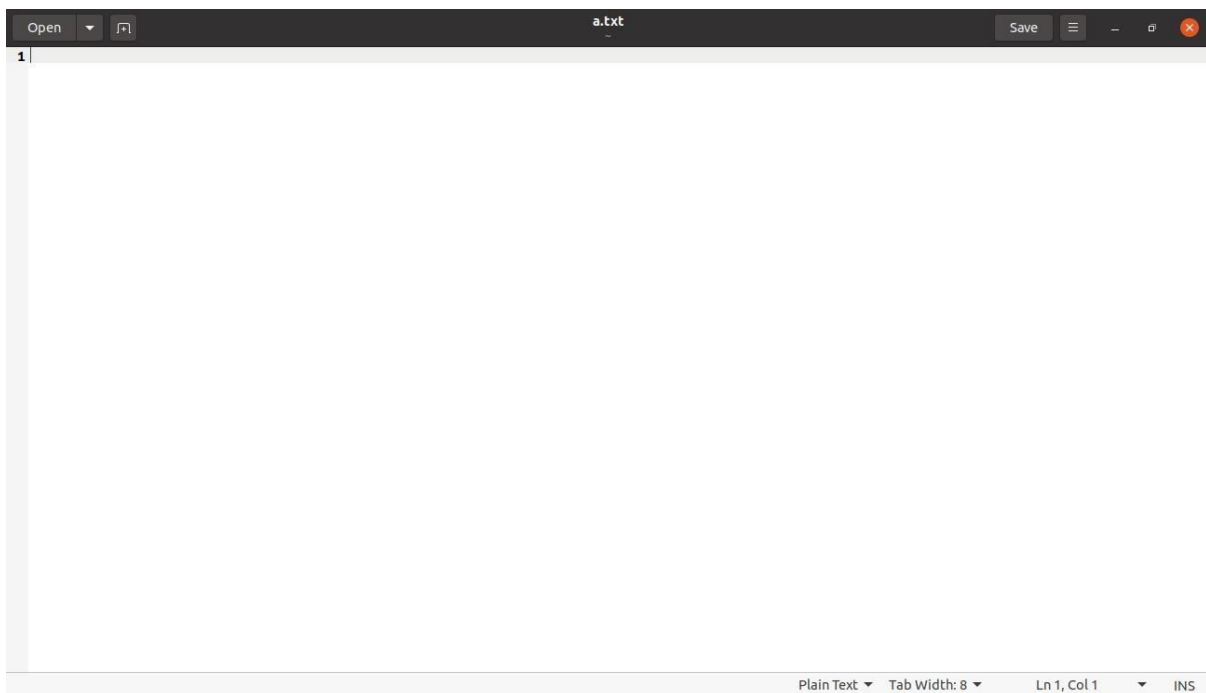
10. touch

The touch command allows you to create a blank new file through the Linux command line.

As an example, enter `touch /home/username/Documents/Web.html` to create an HTML file entitled Web under the Documents directory.



```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ touch a.txt  
user@user-HP-Laptop-15-da0xxx:~$
```



11. locate

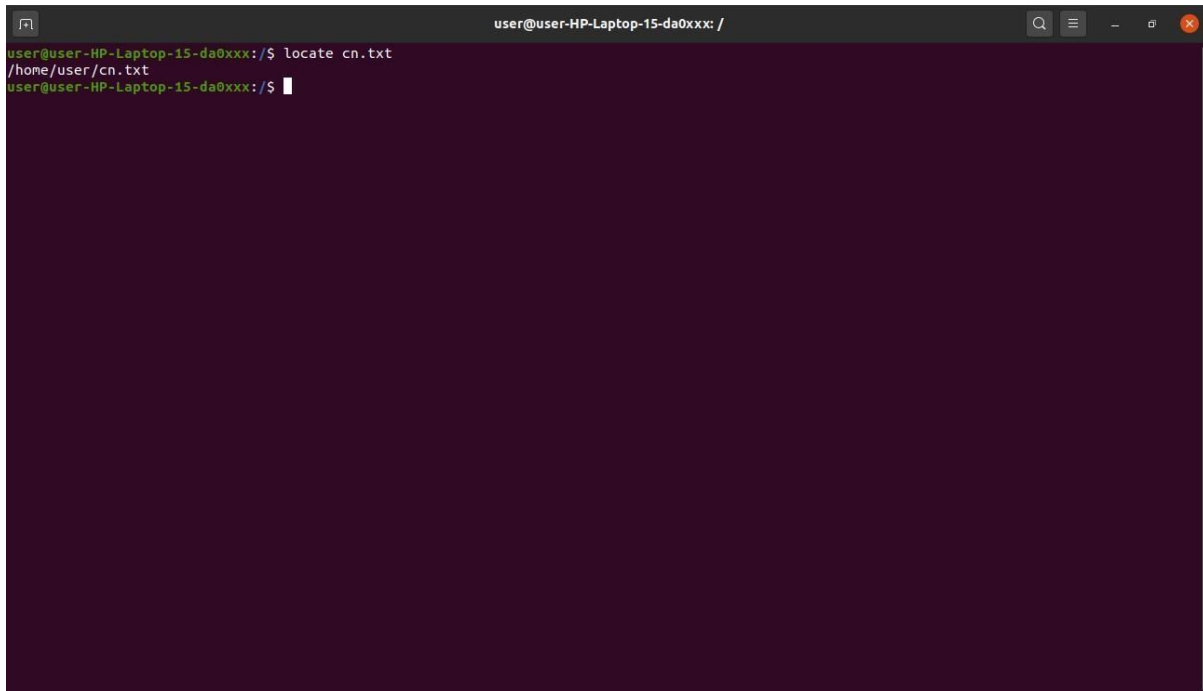
You can use this command to locate a file, just like the search command in Windows.

What's more, using the `-i` argument along with this command will make it caseinsensitive, so you can search for a file even if you don't remember its exact name.

To search for a file that contains two or more words, use an asterisk (*). For example,

locate -i school*note command will search for any file that contains the word “school” and

“note”, whether it is uppercase or lowercase.

A terminal window with a dark purple background. The title bar at the top reads "user@user-HP-Laptop-15-da0xxx: /". The terminal shows the command "locate cn.txt" being entered, followed by the output "/home/user/cn.txt". The prompt "user@user-HP-Laptop-15-da0xxx: \$" is visible at the bottom.

```
user@user-HP-Laptop-15-da0xxx: /
user@user-HP-Laptop-15-da0xxx:/$ locate cn.txt
/home/user/cn.txt
user@user-HP-Laptop-15-da0xxx:/$
```

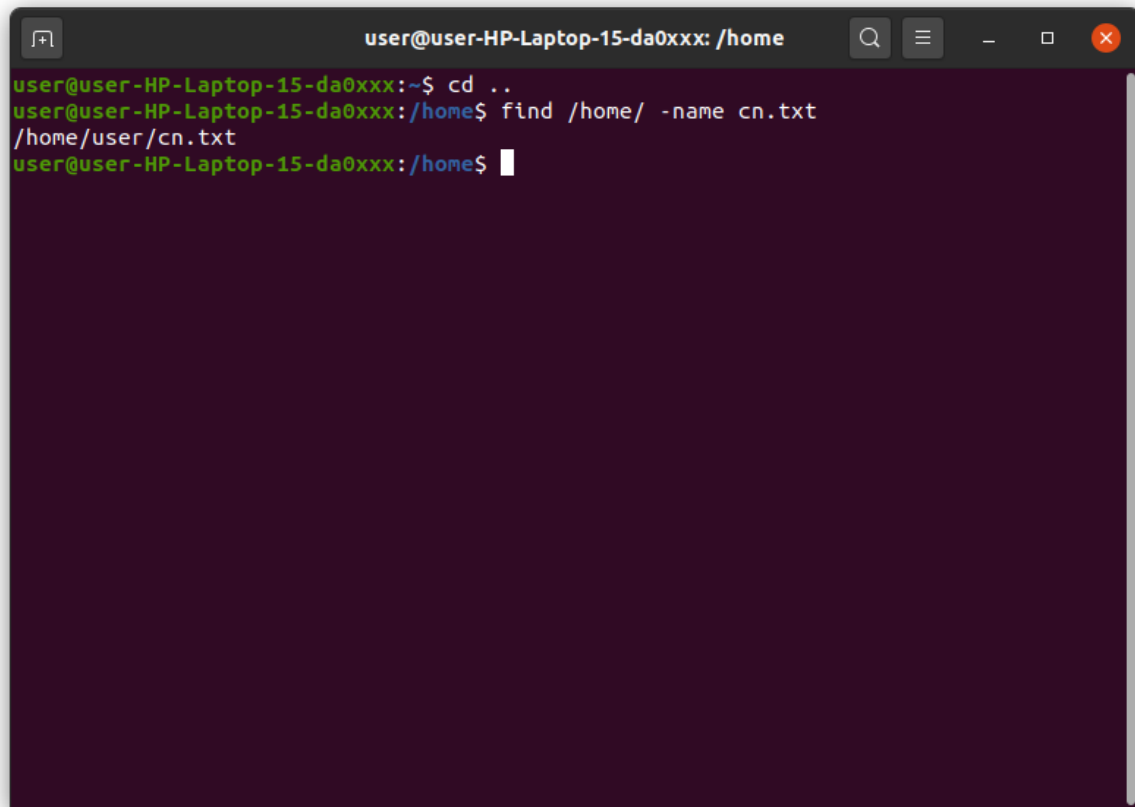
12. find

Similar to the locate command, using find also searches for files and directories. The difference is, you use the find command to locate files within a given directory.

As an example, find /home/ -name notes.txt command will search for a file called notes.txt within the home directory and its subdirectories.

Other variations when using the find are:

- To find files in the current directory use, find . -name notes.txt
- To look for directories use, / -type d -name notes. txt

A terminal window with a dark purple background and light green text. The window title is "user@user-HP-Laptop-15-da0xxx: /home". The terminal shows the following commands and output:

```
user@user-HP-Laptop-15-da0xxx:~$ cd ..  
user@user-HP-Laptop-15-da0xxx:/home$ find /home/ -name cn.txt  
/home/user/cn.txt  
user@user-HP-Laptop-15-da0xxx:/home$
```

13. grep

Another basic Linux command that is undoubtedly helpful for everyday use is grep. It lets you search through all the text in a given file.

To illustrate, `grep blue notepad.txt` will search for the word blue in the notepad file.

Lines that contain the searched word will be displayed fully. You should refer to some [grep tutorial](#)

Useful for command line use as well. Usually output of a previous command is piped into the grep command. For example `ls -l | grep "kernel"`

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ cat file1.txt  
computer networks  
user@user-HP-Laptop-15-da0xxx:~$ grep networks file1.txt  
computer networks  
user@user-HP-Laptop-15-da0xxx:~$
```

14. sudo

Short for “SuperUser Do”, this command enables you to perform tasks that require administrative or root permissions. You must have sufficient permissions to use this command.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ sudo -h  
sudo - execute a command as another user  
  
usage: sudo -h | -K | -k | -V  
usage: sudo -v [-AknS] [-g group] [-h host] [-p prompt] [-u user]  
usage: sudo -l [-AknS] [-g group] [-h host] [-p prompt] [-U user] [-u user]  
[command]  
usage: sudo [-AbEHknPS] [-r role] [-t type] [-C num] [-g group] [-h host] [-p  
prompt] [-T timeout] [-u user] [VAR=value] [-i|-s] [<command>]  
usage: sudo -e [-AknS] [-r role] [-t type] [-C num] [-g group] [-h host] [-p  
prompt] [-T timeout] [-u user] file ...  
  
Options:  
-A, --askpass          use a helper program for password prompting  
-b, --background      run command in the background  
-B, --bell             ring bell when prompting  
-C, --close-from=num  close all file descriptors >= num  
-E, --preserve-env     preserve user environment when running command  
--preserve-env=list   preserve specific environment variables  
-e, --edit            edit files instead of running a command  
-g, --group=group      run command as the specified group name or ID  
-H, --set-home         set HOME variable to target user's home dir  
-h, --help            display help message and exit  
-i, --host=host       run command on host (if supported by plugin)  
-l, --login            run login shell as the target user; a command  
may also be specified  
-K, --remove-timestamp remove timestamp file completely  
-k, --reset-timestamp invalidate timestamp file  
-l, --list            list user's privileges or check a specific  
command; use twice for longer format  
-n, --non-interactive non-interactive mode, no prompts are used  
-P, --preserve-groups preserve group vector instead of setting to  
target's  
-p, --prompt=prompt   use the specified password prompt  
-r, --role=role       create SELinux security context with specified  
role  
-S, --stdin           read password from standard input  
-s, --shell           run shell as the target user; a command may  
also be specified
```

```
Options:
-A, --askpass          use a helper program for password prompting
-b, --background      run command in the background
-B, --bell             ring bell when prompting
-C, --close-from=num   close all file descriptors >= num
-E, --preserve-env     preserve user environment when running command
--preserve-env=list    preserve specific environment variables
-e, --edit             edit files instead of running a command
-g, --group=group      run command as the specified group name or ID
-H, --set-home         set HOME variable to target user's home dir
-h, --help             display help message and exit
-h, --host=host        run command on host (if supported by plugin)
-i, --login            run login shell as the target user; a command
                        may also be specified
-K, --remove-timestamp remove timestamp file completely
-k, --reset-timestamp  invalidate timestamp file
-l, --list             list user's privileges or check a specific
                        command; use twice for longer format
-n, --non-interactive  non-interactive mode, no prompts are used
-P, --preserve-groups  preserve group vector instead of setting to
                        target's
-p, --prompt=prompt    use the specified password prompt
-r, --role=role        create SELinux security context with specified
                        role
-S, --stdin            read password from standard input
-s, --shell            run shell as the target user; a command may
                        also be specified
-t, --type=type        create SELinux security context with specified
                        type
-T, --command-timeout=timeout terminate command after the specified time limit
-U, --other-user=user  in list mode, display privileges for user
-u, --user=user        run command (or edit file) as specified user
                        name or ID
-V, --version          display version information and exit
-v, --validate         update user's timestamp without running a
                        command
--                    stop processing command line arguments
user@user-HP-Laptop-15-da0xxx:~$
```

15. df

Use df command to get a report on the system's disk space usage, shown in percentage and KBs. If you want to see the report in megabytes, type df -m.

```
user@user-HP-Laptop-15-da0xxx:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
udev            1943564         0   1943564   0% /dev
tmpfs           394348      1756    392592   1% /run
/dev/sda7       60214148 9336564 47789152  17% /
tmpfs           1971724         0    1971724   0% /dev/shm
tmpfs           5120         4        5116   1% /run/lock
tmpfs           1971724         0    1971724   0% /sys/fs/cgroup
/dev/loop0       56832     56832         0 100% /snap/core18/2066
/dev/loop1       56832     56832         0 100% /snap/core18/1988
/dev/loop2       224256    224256         0 100% /snap/gnome-3-34-1804/66
/dev/loop5       66688     66688         0 100% /snap/gtk-common-themes/1515
/dev/loop4       66432     66432         0 100% /snap/gtk-common-themes/1514
/dev/loop6       52352     52352         0 100% /snap/snap-store/518
/dev/loop8       52224     52224         0 100% /snap/snap-store/542
/dev/loop7       32896     32896         0 100% /snap/snapd/12057
/dev/loop9       33152     33152         0 100% /snap/snapd/11107
/dev/loop3       224256    224256         0 100% /snap/gnome-3-34-1804/72
/dev/sda1        98304     43210     55094   44% /boot/efi
tmpfs           394344         24    394320   1% /run/user/1000
user@user-HP-Laptop-15-da0xxx:~$
```

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ df -m  
Filesystem      1M-blocks  Used Available Use% Mounted on  
udev            1899      0      1899   0% /dev  
tmpfs           386      2       384   1% /run  
/dev/sda7       58803   9118    46669  17% /  
tmpfs           1926     0     1926   0% /dev/shm  
tmpfs           5        1        5   1% /run/lock  
tmpfs           1926     0     1926   0% /sys/fs/cgroup  
/dev/loop0      56      56      0 100% /snap/core18/2066  
/dev/loop1      56      56      0 100% /snap/core18/1988  
/dev/loop2     219     219      0 100% /snap/gnome-3-34-1804/66  
/dev/loop5      66      66      0 100% /snap/gtk-common-themes/1515  
/dev/loop4      65      65      0 100% /snap/gtk-common-themes/1514  
/dev/loop6      52      52      0 100% /snap/snap-store/518  
/dev/loop8      51      51      0 100% /snap/snap-store/542  
/dev/loop7      33      33      0 100% /snap/snapd/12057  
/dev/loop9      33      33      0 100% /snap/snapd/11107  
/dev/loop3     219     219      0 100% /snap/gnome-3-34-1804/72  
/dev/sda1       96      43      54  44% /boot/efi  
tmpfs           386      1     386   1% /run/user/1000  
user@user-HP-Laptop-15-da0xxx:~$
```

16. du

If you want to check how much space a file or a directory takes, the `du` (Disk Usage) command is the answer. However, the disk usage summary will show disk block numbers instead of the usual size format. If you want to see it in bytes, kilobytes, and megabytes, add the `-h` argument to the command line.

```
user@user-HP-Laptop-15-da0xxx:~$ du  
4      ./Videos  
1768   ./Pictures/commands  
3736   ./Pictures/outputs  
232    ./Pictures/Downloads  
13360  ./Pictures  
16     ./ssh  
4      ./emacs.d/auto-save-list  
8      ./emacs.d  
4      ./Documents  
968    ./cn  
4      ./Public  
408    ./local/share/tracker/data  
412    ./local/share/tracker  
72     ./local/share/xorg  
4      ./local/share/webkitgtk/deviceidhashsalts/1  
8      ./local/share/webkitgtk/deviceidhashsalts  
4      ./local/share/webkitgtk/localstorage  
4      ./local/share/webkitgtk/databases/indexeddb/v1  
8      ./local/share/webkitgtk/databases/indexeddb  
12     ./local/share/webkitgtk/databases  
40     ./local/share/webkitgtk  
4      ./local/share/ibus-table  
4      ./local/share/sounds  
12     ./local/share/gnome-shell  
4      ./local/share/evolution/mail/trash  
8      ./local/share/evolution/mail  
4      ./local/share/evolution/addressbook/system/photos  
92     ./local/share/evolution/addressbook/system  
4      ./local/share/evolution/addressbook/trash  
100    ./local/share/evolution/addressbook  
8      ./local/share/evolution/calendar/system  
4      ./local/share/evolution/calendar/trash  
16     ./local/share/evolution/calendar  
4      ./local/share/evolution/memos/trash  
8      ./local/share/evolution/memos  
8      ./local/share/evolution/tasks/system  
4      ./local/share/evolution/tasks/trash  
16     ./local/share/evolution/tasks
```

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ du -h  
4.0K  ./Videos  
2.9M  ./Pictures/commands  
3.7M  ./Pictures/outputs  
232K  ./Pictures/Downloads  
15M   ./Pictures  
16K   ./ssh  
4.0K  ./emacs.d/auto-save-list  
8.0K  ./emacs.d  
4.0K  ./Documents  
968K  ./cn  
4.0K  ./Public  
412K  ./local/share/tracker/data  
416K  ./local/share/tracker  
72K   ./local/share/xorg  
4.0K  ./local/share/webkitgtk/deviceidhashsalts/1  
8.0K  ./local/share/webkitgtk/deviceidhashsalts  
4.0K  ./local/share/webkitgtk/localstorage  
4.0K  ./local/share/webkitgtk/databases/indexeddb/v1  
8.0K  ./local/share/webkitgtk/databases/indexeddb  
12K   ./local/share/webkitgtk/databases  
40K   ./local/share/webkitgtk  
4.0K  ./local/share/ibus-table  
4.0K  ./local/share/sounds  
12K   ./local/share/gnome-shell  
4.0K  ./local/share/evolution/mail/trash  
8.0K  ./local/share/evolution/mail  
4.0K  ./local/share/evolution/addressbook/system/photos  
92K   ./local/share/evolution/addressbook/system  
4.0K  ./local/share/evolution/addressbook/trash  
100K  ./local/share/evolution/addressbook  
8.0K  ./local/share/evolution/calendar/system  
4.0K  ./local/share/evolution/calendar/trash  
16K   ./local/share/evolution/calendar  
4.0K  ./local/share/evolution/memos/trash  
8.0K  ./local/share/evolution/memos  
8.0K  ./local/share/evolution/tasks/system  
4.0K  ./local/share/evolution/tasks/trash  
16K   ./local/share/evolution/tasks
```

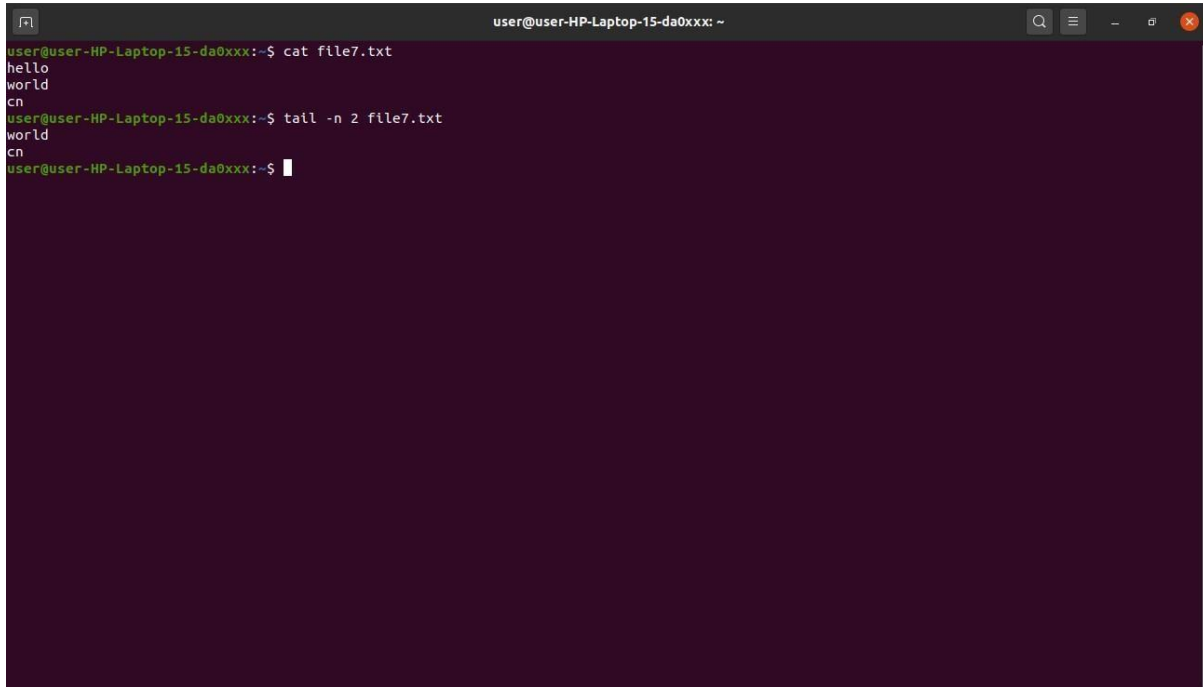
17. head

The head command is used to view the first lines of any text file. By default, it will show the first ten lines, but you can change this number to your liking. For example, if you only want to show the first five lines, type `head -n 5 filename.ext`. (Read the manual)

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ cat file1.txt  
computer networks  
user@user-HP-Laptop-15-da0xxx:~$ head -n 1 file1.txt  
computer networks  
user@user-HP-Laptop-15-da0xxx:~$
```

18. tail

This one has a similar function to the head command, but instead of showing the first lines, the tail command will display the last ten lines of a text file. For example, tail -n filename.ext.

A terminal window with a dark purple background. The title bar reads 'user@user-HP-Laptop-15-da0xxx: ~'. The user enters 'cat file7.txt' and the output is 'hello', 'world', 'cn'. Then, the user enters 'tail -n 2 file7.txt' and the output is 'world', 'cn'.

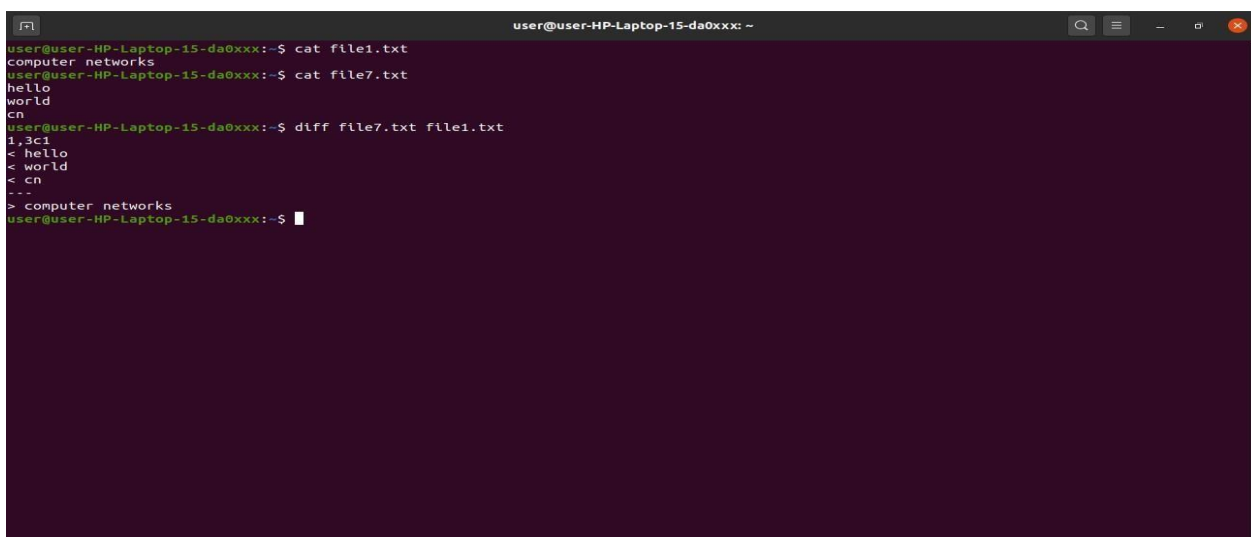
```
user@user-HP-Laptop-15-da0xxx:~$ cat file7.txt
hello
world
cn
user@user-HP-Laptop-15-da0xxx:~$ tail -n 2 file7.txt
world
cn
user@user-HP-Laptop-15-da0xxx:~$
```

19. diff

Short for difference, the diff command compares the contents of two files line by line.

After analyzing the files, it will output the lines that do not match. Programmers often use this command when they need to make program alterations instead of rewriting the entire source code.

The simplest form of this command is diff file1.ext file2.ext

A terminal window with a dark purple background. The title bar reads 'user@user-HP-Laptop-15-da0xxx: ~'. The user enters 'cat file1.txt' and the output is 'computer networks'. Then, the user enters 'cat file7.txt' and the output is 'hello', 'world', 'cn'. Finally, the user enters 'diff file7.txt file1.txt' and the output shows the differences between the two files.

```
user@user-HP-Laptop-15-da0xxx:~$ cat file1.txt
computer networks
user@user-HP-Laptop-15-da0xxx:~$ cat file7.txt
hello
world
cn
user@user-HP-Laptop-15-da0xxx:~$ diff file7.txt file1.txt
1,3c1
< hello
< world
< cn
---
> computer networks
user@user-HP-Laptop-15-da0xxx:~$
```


20. tar

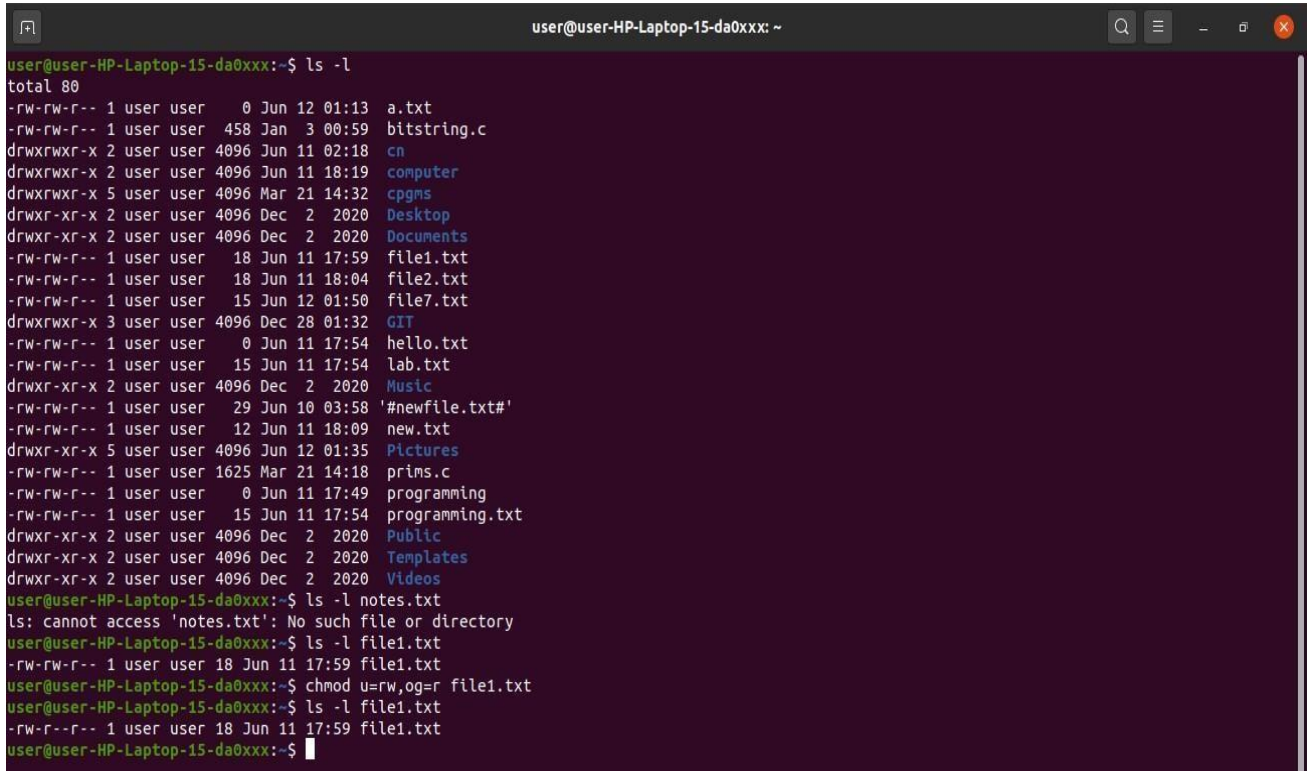
The tar command is the most used command to archive multiple files into a tarball — a common Linux file format that is similar to zip format, with compression being optional. This command is quite complex with a long list of functions such as adding new files into an existing archive, listing the content of an archive, extracting the content from an archive, and many more. Read some tutorial on net.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:/$ cd ..  
user@user-HP-Laptop-15-da0xxx:/$ cd  
user@user-HP-Laptop-15-da0xxx:~$ cat >acn.txt  
computer networks  
^Z  
[1]+  Stopped                  cat > acn.txt  
user@user-HP-Laptop-15-da0xxx:~$ cat >hworld.txt  
hello world  
^Z  
[2]+  Stopped                  cat > hworld.txt  
user@user-HP-Laptop-15-da0xxx:~$ cat >pgm.txt  
programming  
^Z  
[3]+  Stopped                  cat > pgm.txt  
user@user-HP-Laptop-15-da0xxx:~$ tar cvf file.tar *.txt  
acn.txt  
a.txt  
cn.txt  
file1.txt  
file2.txt  
file7.txt  
hello.txt  
hworld.txt  
lab.txt  
new.txt  
pgm.txt  
programming.txt  
user@user-HP-Laptop-15-da0xxx:~$
```

```
user@user-HP-Laptop-15-da0xxx: ~  
computer networks  
^Z  
[1]+  Stopped                  cat > acn.txt  
user@user-HP-Laptop-15-da0xxx:~$ cat >hworld.txt  
hello world  
^Z  
[2]+  Stopped                  cat > hworld.txt  
user@user-HP-Laptop-15-da0xxx:~$ cat >pgm.txt  
programming  
^Z  
[3]+  Stopped                  cat > pgm.txt  
user@user-HP-Laptop-15-da0xxx:~$ tar cvf file.tar *.txt  
acn.txt  
a.txt  
cn.txt  
file1.txt  
file2.txt  
file7.txt  
hello.txt  
hworld.txt  
lab.txt  
new.txt  
pgm.txt  
programming.txt  
user@user-HP-Laptop-15-da0xxx:~$ tar xvf file.tar  
acn.txt  
a.txt  
cn.txt  
file1.txt  
file2.txt  
file7.txt  
hello.txt  
hworld.txt  
lab.txt  
new.txt  
pgm.txt  
programming.txt  
user@user-HP-Laptop-15-da0xxx:~$
```

21. chmod

chmod is another Linux command, used to change the read, write, and execute permissions of files and directories. Read about permissions and how to manipulate them .

A terminal window titled 'user@user-HP-Laptop-15-da0xxx: ~' with a dark purple background. It shows the execution of 'ls -l' displaying a list of files and directories with their permissions, owner, group, size, and date. The files include 'a.txt', 'bitstring.c', 'cn', 'computer', 'cpgns', 'Desktop', 'Documents', 'file1.txt', 'file2.txt', 'file7.txt', 'GIT', 'hello.txt', 'lab.txt', 'Music', 'newfile.txt#', 'new.txt', 'Pictures', 'prins.c', 'programming', 'programming.txt', 'Public', 'Templates', and 'Videos'. Subsequent commands show an attempt to access 'notes.txt' (which fails), listing 'file1.txt', and then using 'chmod u=rw,og=r file1.txt' to change permissions. The final 'ls -l file1.txt' shows the updated permissions as '-rw-r--r--'.

```
user@user-HP-Laptop-15-da0xxx:~$ ls -l
total 80
-rw-rw-r-- 1 user user  0 Jun 12 01:13 a.txt
-rw-rw-r-- 1 user user 458 Jan  3 00:59 bitstring.c
drwxrwxr-x 2 user user 4096 Jun 11 02:18 cn
drwxrwxr-x 2 user user 4096 Jun 11 18:19 computer
drwxrwxr-x 5 user user 4096 Mar 21 14:32 cpgns
drwxr-xr-x 2 user user 4096 Dec  2 2020 Desktop
drwxr-xr-x 2 user user 4096 Dec  2 2020 Documents
-rw-rw-r-- 1 user user  18 Jun 11 17:59 file1.txt
-rw-rw-r-- 1 user user  18 Jun 11 18:04 file2.txt
-rw-rw-r-- 1 user user  15 Jun 12 01:50 file7.txt
drwxrwxr-x 3 user user 4096 Dec 28 01:32 GIT
-rw-rw-r-- 1 user user  10 Jun 11 17:54 hello.txt
-rw-rw-r-- 1 user user  15 Jun 11 17:54 lab.txt
drwxr-xr-x 2 user user 4096 Dec  2 2020 Music
-rw-rw-r-- 1 user user  29 Jun 10 03:58 '#newfile.txt#'
-rw-rw-r-- 1 user user  12 Jun 11 18:09 new.txt
drwxr-xr-x 5 user user 4096 Jun 12 01:35 Pictures
-rw-rw-r-- 1 user user 1625 Mar 21 14:18 prins.c
-rw-rw-r-- 1 user user  10 Jun 11 17:49 programming
-rw-rw-r-- 1 user user  15 Jun 11 17:54 programming.txt
drwxr-xr-x 2 user user 4096 Dec  2 2020 Public
drwxr-xr-x 2 user user 4096 Dec  2 2020 Templates
drwxr-xr-x 2 user user 4096 Dec  2 2020 Videos
user@user-HP-Laptop-15-da0xxx:~$ ls -l notes.txt
ls: cannot access 'notes.txt': No such file or directory
user@user-HP-Laptop-15-da0xxx:~$ ls -l file1.txt
-rw-rw-r-- 1 user user 18 Jun 11 17:59 file1.txt
user@user-HP-Laptop-15-da0xxx:~$ chmod u=rw,og=r file1.txt
user@user-HP-Laptop-15-da0xxx:~$ ls -l file1.txt
-rw-r--r-- 1 user user 18 Jun 11 17:59 file1.txt
user@user-HP-Laptop-15-da0xxx:~$
```

22. chown

In Linux, all files are owned by a specific user. The chown command enables you to change or transfer the ownership of a file to the specified username. For instance, chown linuxuser2 file.ext will make linuxuser2 as the owner of the file.ext.


```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ cat >cn.txt  
computer  
networks  
programming  
lab  
hello  
world  
^Z  
[1]+  Stopped                  cat > cn.txt  
user@user-HP-Laptop-15-da0xxx:~$ cat cn.txt  
computer  
networks  
programming  
lab  
hello  
world  
user@user-HP-Laptop-15-da0xxx:~$ ls  
a.txt      cn.txt      Desktop    file2.txt  hello.txt  '#newfile.txt#'  prims.c      Public  
bitstring.c  computer  Documents  file7.txt  lab.txt    new.txt          programming  Templates  
cn          cpgms     file1.txt  GIT        Music      Pictures         programming.txt  Videos  
user@user-HP-Laptop-15-da0xxx:~$ ls -l cn.txt  
-rw-rw-r-- 1 user user 46 Jun 13 17:45 cn.txt  
user@user-HP-Laptop-15-da0xxx:~$ chown gowri cn.txt  
chown: changing ownership of 'cn.txt': Operation not permitted  
user@user-HP-Laptop-15-da0xxx:~$
```

23. ps

Ps command will display all current processes along with their process ids (PID) . Read manuals for various options.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ ps  
  PID TTY          TIME CMD  
 2742 pts/0    00:00:00 bash  
 2996 pts/0    00:00:00 ps  
user@user-HP-Laptop-15-da0xxx:~$
```

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ ps -ux  
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND  
user      1449  0.1  0.2  19272 10628 ?        Ss   17:27   0:00 /lib/systemd/  
user      1451  0.0  0.0  168984 3556 ?        S    17:27   0:00 (sd-pam)  
user      1464  0.0  0.4  2277664 19652 ?       S<sl 17:27   0:00 /usr/bin/puls  
user      1466  0.0  0.6  520092 24460 ?       SnsL 17:27   0:00 /usr/libexec/  
user      1468  0.1  0.1   8740  5816 ?        Ss   17:27   0:00 /usr/bin/dbus  
user      1472  0.0  0.2  248804 7968 ?        Sl   17:27   0:00 /usr/bin/gnom  
user      1477  0.0  0.1  248316 7796 ?        Ssl 17:27   0:00 /usr/libexec/  
user      1482  0.0  0.2  382056 8552 ?        Sl   17:27   0:00 /usr/libexec/  
user      1502  0.0  0.2  326040 11804 ?       Ssl 17:27   0:00 /usr/libexec/  
user      1507  0.0  0.1  244500 6192 ?        Ssl 17:27   0:00 /usr/libexec/  
user      1511  0.0  0.9  550416 36356 ?       Sl   17:27   0:00 /usr/libexec/  
user      1518  0.0  0.2  327272 11556 ?       Sl   17:27   0:00 /usr/libexec/  
user      1525  0.0  0.1  325352 7572 ?        Ssl 17:27   0:00 /usr/libexec/  
user      1531  0.0  0.1  246596 6684 ?        Ssl 17:27   0:00 /usr/libexec/  
user      1532  0.0  0.1  172628 6596 tty2    Ssl+ 17:27   0:00 /usr/lib/gdm3  
user      1536  0.0  0.1  244320 6180 ?        Ssl 17:27   0:00 /usr/libexec/  
user      1543  4.4  2.2  865960 88972 tty2    Sl+  17:27   0:18 /usr/lib/xorg  
user      1570  0.0  0.3  199404 15604 tty2    Sl+  17:27   0:00 /usr/libexec/  
user      1644  0.0  0.0   6032   456 ?        Ss   17:27   0:00 /usr/bin/ssh-  
user      1661  0.2  0.2  323528 9596 ?        Ssl 17:27   0:00 /usr/bin/ibus  
user      1668  0.0  0.2  248868 9056 ?        Sl   17:27   0:00 /usr/libexec/  
user      1669  0.1  1.8  728184 73536 ?       Sl   17:27   0:00 /usr/libexec/  
user      1672  0.4  1.5  686388 61652 ?       Sl   17:27   0:01 /usr/libexec/  
user      1678  0.0  0.7  208996 29996 ?       Sl   17:27   0:00 /usr/libexec/  
user      1681  0.0  0.2  248848 9016 ?        Sl   17:27   0:00 /usr/libexec/  
user      1686  0.0  0.2  309820 9488 ?        Ssl 17:27   0:00 /usr/libexec/  
user      1695  0.0  0.1   7216  4288 ?        S    17:27   0:00 /usr/bin/dbus  
user      1707  0.0  0.1  162812 7640 ?        Sl   17:27   0:00 /usr/libexec/  
user      1716  0.0  0.2  1012088 10572 ?       Ssl 17:27   0:00 /usr/libexec/  
user      1725  0.0  0.1  98672  4328 ?        Ssl 17:27   0:00 /usr/libexec/  
user      1727  0.0  0.1  466048 6480 ?        Ssl 17:27   0:00 /usr/libexec/  
user      1733  0.0  0.4  568944 17520 ?       Ssl 17:27   0:00 /usr/libexec/  
user      1738  0.0  0.1  244220 4932 ?        Ssl 17:27   0:00 /usr/libexec/  
user      1748  0.0  0.2  175172 9124 ?        Sl   17:27   0:00 /usr/libexec/  
user      1752  0.1  0.8  506680 32264 ?       Ssl 17:27   0:00 /usr/libexec/  
user      1762  0.0  0.1  156208 5732 ?        Sl   17:27   0:00 /usr/libexec/  
user      1789  5.5  6.3  4552988 248976 ?       Ssl 17:27   0:23 /usr/bin/gnom
```

24. Kill

If you have an unresponsive program, you can terminate it manually by using the kill command. It will send a certain signal to the misbehaving app and instructs the app to terminate itself.

There is a total of sixty-four signals that you can use, but people usually only use two signals:

- SIGTERM (15) — requests a program to stop running and gives it some time to save all of its progress. If you don't specify the signal when entering the kill command, this signal will be used.
- SIGKILL (9) — forces programs to stop immediately. Unsaved progress will be lost. Besides knowing the signals, you also need to know the process identification number (PID) of the program you want to kill. If you don't know the PID, simply run the command `ps ux`.

After knowing what signal you want to use and the PID of the program, enter the following syntax: `kill [signal option] PID`. You can issue `kill -9 PID`

25. ping

Use the ping command to check your connectivity status to a server. For example, by simply entering `ping google.com`, the command will check whether you're able to connect to Google and also measure the response time.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ ping google.com  
PING google.com(bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e)) 56 data bytes  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=1 ttl=117 time=305 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=2 ttl=117 time=122 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=3 ttl=117 time=145 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=4 ttl=117 time=167 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=5 ttl=117 time=194 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=6 ttl=117 time=167 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=7 ttl=117 time=233 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=8 ttl=117 time=256 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=9 ttl=117 time=278 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=10 ttl=117 time=301 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=11 ttl=117 time=324 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=12 ttl=117 time=143 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=13 ttl=117 time=163 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=14 ttl=117 time=185 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=15 ttl=117 time=207 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=16 ttl=117 time=231 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=17 ttl=117 time=251 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=18 ttl=117 time=274 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=19 ttl=117 time=296 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=20 ttl=117 time=114 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=21 ttl=117 time=137 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=22 ttl=117 time=159 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=23 ttl=117 time=182 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=24 ttl=117 time=204 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=25 ttl=117 time=226 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=26 ttl=117 time=248 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=27 ttl=117 time=270 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=28 ttl=117 time=294 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=29 ttl=117 time=110 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=30 ttl=117 time=133 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=31 ttl=117 time=156 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=32 ttl=117 time=178 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=33 ttl=117 time=200 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=34 ttl=117 time=223 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=35 ttl=117 time=246 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=36 ttl=117 time=269 ms  
64 bytes from bon12s05-in-x0e.1e100.net (2404:6800:4009:80ff::200e): icmp_seq=37 ttl=117 time=291 ms
```

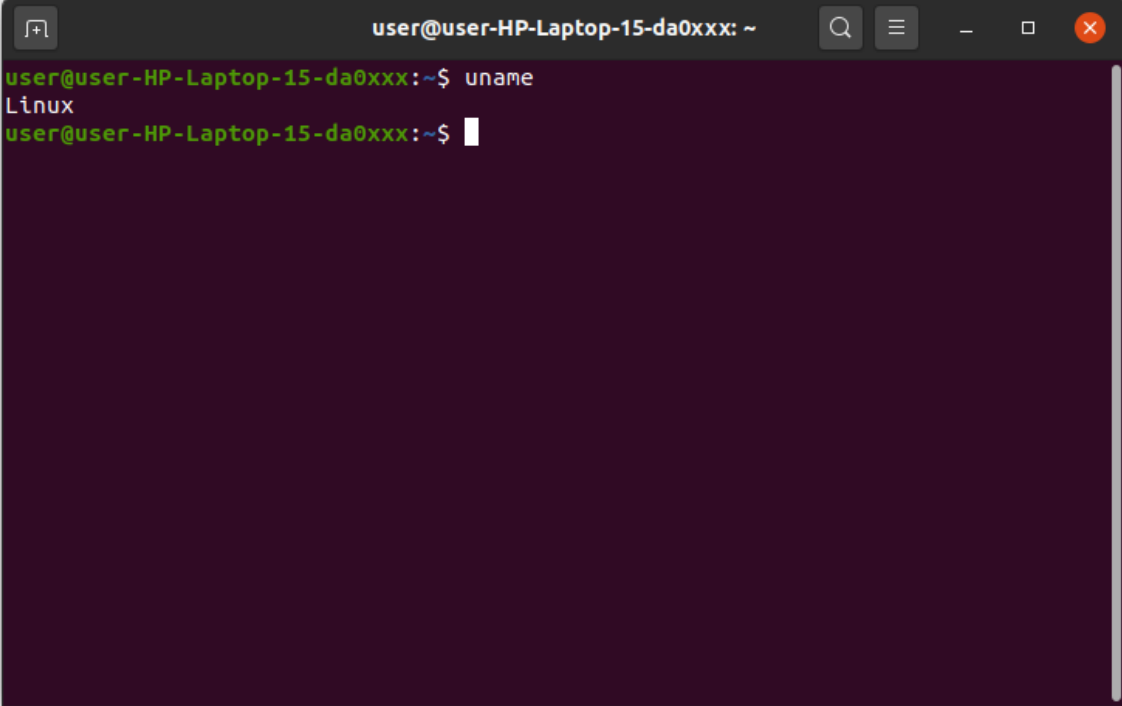
26. wget

The Linux command line is super useful — you can even download files from the internet with the help of the `wget` command. To do so, simply type `wget` followed by the download link.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ wget https://www.oracle.com/in/index.html  
--2021-06-13 17:53:10-- https://www.oracle.com/in/index.html  
Resolving www.oracle.com (www.oracle.com)... 2405:200:1630:4b8::a15, 2405:200:1630:482::a15, 23.9.76.25  
Connecting to www.oracle.com (www.oracle.com)|2405:200:1630:4b8::a15|:443... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: unspecified [text/html]  
Saving to: 'index.html'  
  
index.html          [ <=>          ] 38.10K  186KB/s  in 0.2s  
  
2021-06-13 17:53:12 (186 KB/s) - 'index.html' saved [39011]  
  
user@user-HP-Laptop-15-da0xxx:~$
```

27. uname

The `uname` command, short for Unix Name, will print detailed information about your Linux system like the machine name, operating system, kernel, and so on.

A terminal window with a dark purple background. The title bar at the top reads "user@user-HP-Laptop-15-da0xxx: ~" and includes standard window controls (search, menu, zoom, close). The terminal shows the command "uname" being executed, with the output "Linux" displayed on the next line. The prompt "user@user-HP-Laptop-15-da0xxx:~\$" is visible at the bottom of the terminal area.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ uname  
Linux  
user@user-HP-Laptop-15-da0xxx:~$
```

28. top

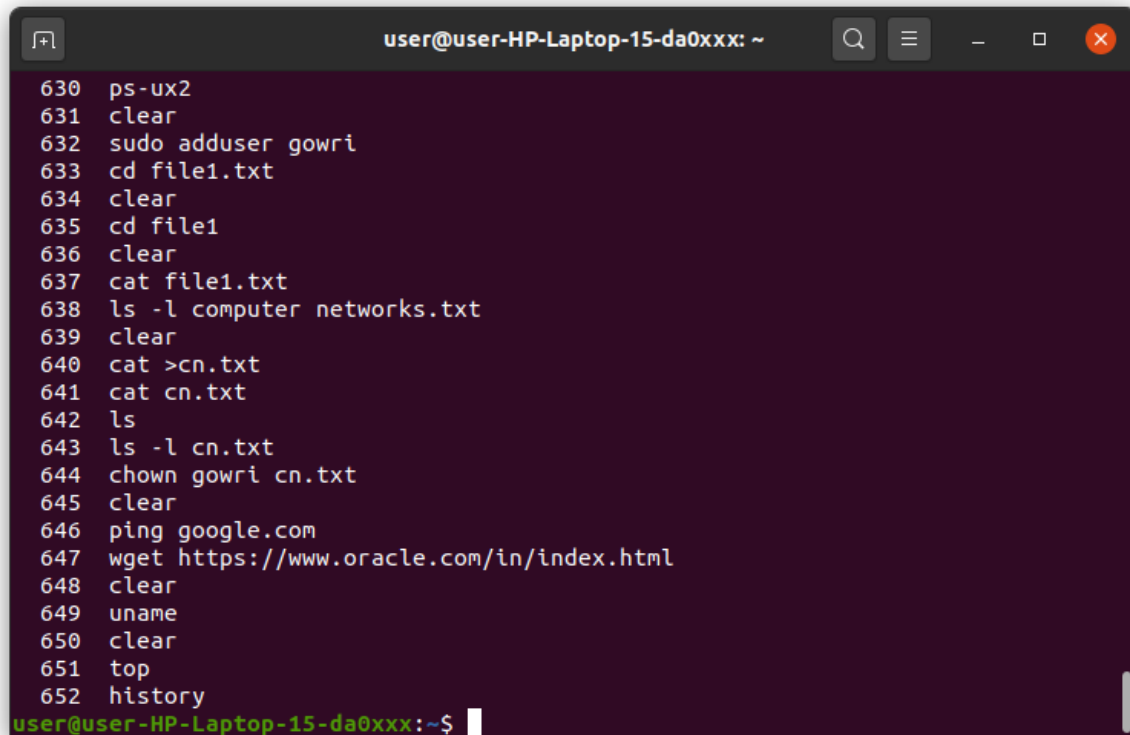
As a terminal equivalent to Task Manager in Windows, the `top` command will display a list of running processes and how much CPU each process uses. It's very useful to monitor system resource usage, especially knowing which process needs to be terminated because it consumes too many resources.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ top  
  
top - 17:55:37 up 29 min, 1 user, load average: 0.53, 0.28, 0.32  
Tasks: 213 total, 2 running, 211 sleeping, 0 stopped, 0 zombie  
%Cpu(s): 5.9 us, 4.1 sy, 0.0 ni, 89.0 id, 0.0 wa, 0.0 hi, 0.9 si, 0.0 st  
MiB Mem : 3851.0 total, 1822.5 free, 1032.1 used, 996.4 buff/cache  
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used, 2420.1 avail Mem  
  
  PID USER      PR  NI  VIRT  RES  SHR  S  %CPU  %MEM    TIME+  COMMAND  
 1543 user      20   0 879916 90132 57736 R   11.1   2.3   0:56.43 Xorg  
 1789 user      20   0 4560456 255944 103488 S   11.1   6.5   1:05.16 gnome-shell  
 3825 user      20   0 971000 52368 39688 S    9.3   1.3   0:03.59 gnome-terminal-  
  963 rtkit     21   1 152916 3032 2792 S    3.7   0.1   0:00.06 rtkit-daemon  
    8 root       20   0      0      0      0 I    1.9   0.0   0:01.38 kworker/u8:0-i915  
   44 root       20   0      0      0      0 D    1.9   0.0   0:02.04 kworker/u8:1+events_unbound  
 4131 user      20   0 20640 3932 3176 R    1.9   0.1   0:00.04 top  
    1 root       20   0 167588 11792 8616 S    0.0   0.3   0:02.80 systemd  
    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
```

29. history

When you've been using Linux for a certain period of time, you'll quickly notice that you can run hundreds of commands every day. As such, running history command is particularly useful if you want to review the s you've entered before.

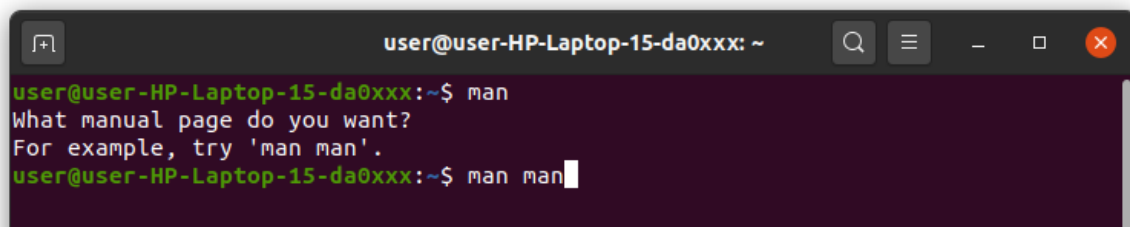
```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ history  
 1 cd cpqms  
 2 gcc display.c -o display.out  
 3 sudo apt install gcc  
 4 gcc display.c -o display.out  
 5 sudo apt install gcc  
 6 sudo apt-get update  
 7 sudo apt install dovecot  
 8 sudo apt install gcc  
 9 cd cpqms  
10 gcc display.c -o display.out  
11 ./display.out  
12 git --v  
13 sudo apt-get install git  
14 git --version  
15 cd linkedlist  
16 cd cpqms  
17 gcc singlell.c -o singlell.out  
18 gcc sing.c -o sing.out  
19 cd cpqms  
20 gcc insingle.c -o insingle.out  
21 gcc singlell.c -o singlell.out  
22 ./singlell.out  
23 gcc singlell.c -o singlell.out
```



```
user@user-HP-Laptop-15-da0xxx: ~
630 ps-ux2
631 clear
632 sudo adduser gowri
633 cd file1.txt
634 clear
635 cd file1
636 clear
637 cat file1.txt
638 ls -l computer networks.txt
639 clear
640 cat >cn.txt
641 cat cn.txt
642 ls
643 ls -l cn.txt
644 chown gowri cn.txt
645 clear
646 ping google.com
647 wget https://www.oracle.com/in/index.html
648 clear
649 uname
650 clear
651 top
652 history
user@user-HP-Laptop-15-da0xxx:~$
```

30. man

Confused about the function of certain Linux commands? Don't worry, you can easily learn how to use them right from Linux's shell by using the man command. For instance, entering man tail will show the manual instruction of the tail command. Use the command: man man to start learning about man utility.



```
user@user-HP-Laptop-15-da0xxx:~$ man
What manual page do you want?
For example, try 'man man'.
user@user-HP-Laptop-15-da0xxx:~$ man man
```



```
user@user-HP-Laptop-15-da0xxx: ~  
MAN(1) Manual pager utils MAN(1)  
NAME  
man - an interface to the system reference manuals  
SYNOPSIS  
man [man options] [[section] page ...] ...  
man -k [apropos options] regexp ...  
man -K [man options] [section] term ...  
man -f [whatis options] page ...  
man -l [man options] file ...  
man -w|-W [man options] page ...  
DESCRIPTION  
man is the system's manual pager. Each page argument given to man is normally the name of a program, utility or function. The manual page associated with each of these arguments is then found and displayed. A section, if provided, will direct man to look only in that section of the manual. The default action is to search in all of the available sections following a pre-defined order (see DEFAULTS), and to show only the first page found, even if page exists in several sections.  
  
The table below shows the section numbers of the manual followed by the types of pages they contain.  
  
1 Executable programs or shell commands  
2 System calls (functions provided by the kernel)  
3 Library calls (functions within program libraries)  
4 Special files (usually found in /dev)  
5 File formats and conventions, e.g. /etc/passwd  
6 Games  
7 Miscellaneous (including macro packages and conventions), e.g. man(7), groff(7)  
8 System administration commands (usually only for root)  
9 Kernel routines [Non standard]  
  
A manual page consists of several sections.  
Manual page man(1) line 1 (press h for help or q to quit)
```

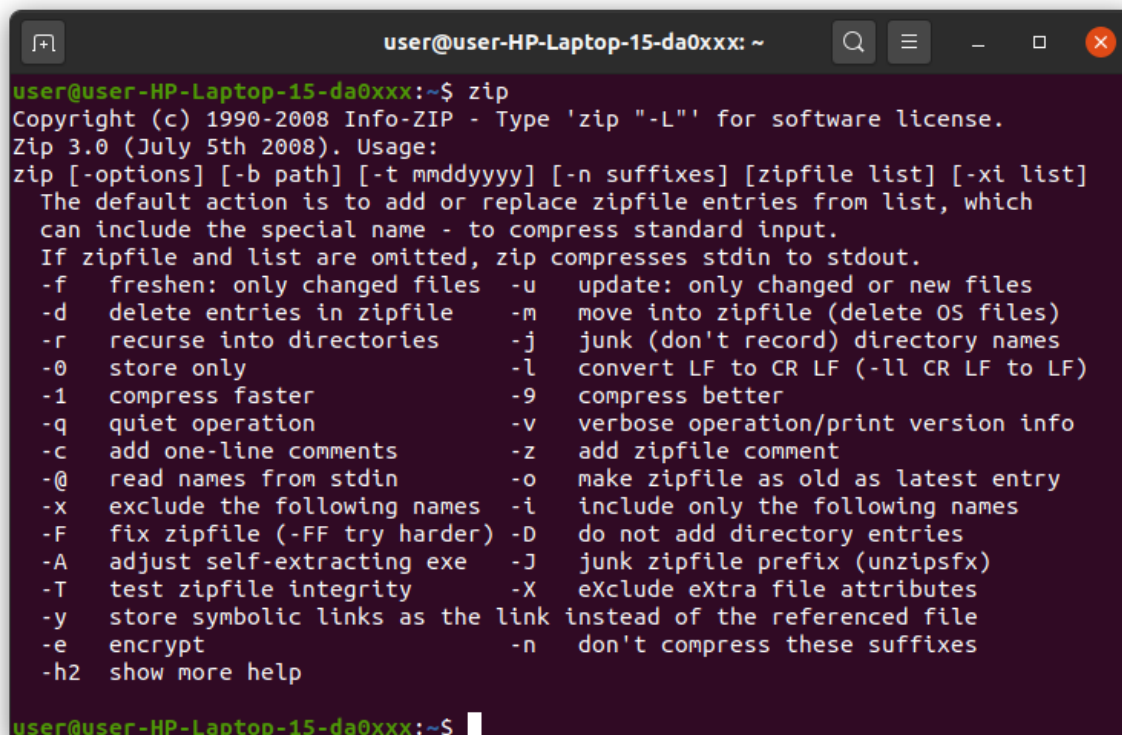
31. echo

This command is used to move some data into a file. For example, if you want to add the text, “Hello, my name is John” into a file called name.txt, you would type echo Hello, my name is John >> name.txt

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ echo My name is GangaKrishnanG  
My name is GangaKrishnanG  
user@user-HP-Laptop-15-da0xxx:~$
```


32. zip, unzip

Use the zip command to compress your files into a zip archive, and use the unzip command to extract the zipped files from a zip archive. (This program should be installed , some distributions may not have them. You can also look at gzip and bzip commands)



```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ zip  
Copyright (c) 1990-2008 Info-ZIP - Type 'zip "-L"' for software license.  
Zip 3.0 (July 5th 2008). Usage:  
zip [-options] [-b path] [-t mmddyyyy] [-n suffixes] [zipfile list] [-xi list]  
The default action is to add or replace zipfile entries from list, which  
can include the special name - to compress standard input.  
If zipfile and list are omitted, zip compresses stdin to stdout.  
-f  freshen: only changed files  -u  update: only changed or new files  
-d  delete entries in zipfile    -m  move into zipfile (delete OS files)  
-r  recurse into directories     -j  junk (don't record) directory names  
-0  store only                  -l  convert LF to CR LF (-ll CR LF to LF)  
-1  compress faster             -9  compress better  
-q  quiet operation             -v  verbose operation/print version info  
-c  add one-line comments       -z  add zipfile comment  
-@  read names from stdin       -o  make zipfile as old as latest entry  
-x  exclude the following names -i  include only the following names  
-F  fix zipfile (-FF try harder) -D  do not add directory entries  
-A  adjust self-extracting exe  -J  junk zipfile prefix (unzipsfx)  
-T  test zipfile integrity      -X  eXclude eXtra file attributes  
-y  store symbolic links as the link instead of the referenced file  
-e  encrypt                     -n  don't compress these suffixes  
-h2 show more help  
user@user-HP-Laptop-15-da0xxx:~$
```

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ unzip  
UnZip 6.00 of 20 April 2009, by Debian. Original by Info-ZIP.  
  
Usage: unzip [-Z] [-opts[modifiers]] file[.zip] [list] [-x xlist] [-d exdir]  
Default action is to extract files in list, except those in xlist, to exdir;  
file[.zip] may be a wildcard. -Z => ZipInfo mode ("unzip -Z" for usage).  
  
-p extract files to pipe, no messages      -l list files (short format)  
-f freshen existing files, create none     -t test compressed archive data  
-u update files, create if necessary        -z display archive comment only  
-v list verbosely/show version info        -T timestamp archive to latest  
-x exclude files that follow (in xlist)    -d extract files into exdir  
  
modifiers:  
-n never overwrite existing files          -q quiet mode (-qq => quieter)  
-o overwrite files WITHOUT prompting       -a auto-convert any text files  
-j junk paths (do not make directories)    -aa treat ALL files as text  
-U use escapes for all non-ASCII Unicode   -UU ignore any Unicode fields  
-C match filenames case-insensitively     -L make (some) names lowercase  
-X restore UID/GID info                   -V retain VMS version numbers  
-K keep setuid/setgid/tacky permissions   -M pipe through "more" pager  
-O CHARSET specify a character encoding for DOS, Windows and OS/2 archives  
-I CHARSET specify a character encoding for UNIX and other archives  
  
See "unzip -hh" or unzip.txt for more help. Examples:  
unzip data1 -x joe    => extract all files except joe from zipfile data1.zip  
unzip -p foo | more   => send contents of foo.zip via pipe into program more  
unzip -fo foo ReadMe => quietly replace existing ReadMe if archive file newer  
user@user-HP-Laptop-15-da0xxx:~$
```

33. hostname

If you want to know the name of your host/network simply type hostname. Adding a -I to the end will display the IP address of your network.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ hostname  
user-HP-Laptop-15-da0xxx  
user@user-HP-Laptop-15-da0xxx:~$ hostname -I  
192.168.43.12 2409:4073:4e09:e1fe:1975:e1c4:ef1b:9c7f 2409:4073:4e09:e1fe:62e7:  
9033:2cc3:514a  
user@user-HP-Laptop-15-da0xxx:~$
```

34. useradd, userdel

This is available only to system admins. Since Linux is a multi-user system, this means more than one person can interact with the same system at the same time. useradd is used to create a new user, while passwd is adding a password to that user's account.

To add a new person named John type, `useradd John` and then to add his password type, `passwd 123456789`.

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ useradd  
Usage: useradd [options] LOGIN  
        useradd -D  
        useradd -D [options]  
  
Options:  
  -b, --base-dir BASE_DIR      base directory for the home directory of the  
                                new account  
  --btrfs-subvolume-home       use BTRFS subvolume for home directory  
  -c, --comment COMMENT        GECOS field of the new account  
  -d, --home-dir HOME_DIR      home directory of the new account  
  -D, --defaults               print or change default useradd configuration  
  -e, --expiredate EXPIRE_DATE expiration date of the new account  
  -f, --inactive INACTIVE      password inactivity period of the new account  
  -g, --gid GROUP              name or ID of the primary group of the new  
                                account  
  -G, --groups GROUPS          list of supplementary groups of the new  
                                account  
  -h, --help                   display this help message and exit  
  -k, --skel SKEL_DIR          use this alternative skeleton directory  
  -K, --key KEY-VALUE          override /etc/login.defs defaults  
  -l, --no-log-init            do not add the user to the lastlog and  
                                faillog databases  
  -m, --create-home            create the user's home directory  
  -M, --no-create-home         do not create the user's home directory  
  -N, --no-user-group          do not create a group with the same name as  
                                the user  
  -o, --non-unique             allow to create users with duplicate  
                                (non-unique) UID  
  -p, --password PASSWORD      encrypted password of the new account  
  -r, --system                 create a system account  
  -R, --root CHROOT_DIR        directory to chroot into  
  -P, --prefix PREFIX_DIR      prefix directory where are located the /etc/* files  
  -s, --shell SHELL            login shell of the new account  
  -u, --uid UID                user ID of the new account  
  -U, --user-group             create a group with the same name as the user  
  -Z, --selinux-user SEUSER    use a specific SEUSER for the SELinux user mapping  
  --extrausers                 Use the extra users database
```

```
user@user-HP-Laptop-15-da0xxx: ~  
user@user-HP-Laptop-15-da0xxx:~$ userdel  
Usage: userdel [options] LOGIN  
  
Options:  
  -f, --force                 force removal of files,  
                                even if not owned by user  
  -h, --help                   display this help message and exit  
  -r, --remove                 remove home directory and mail spool  
  -R, --root CHROOT_DIR        directory to chroot into  
  -P, --prefix PREFIX_DIR      prefix directory where are located the /etc/* files  
  --extrausers                 Use the extra users database  
  -Z, --selinux-user           remove any SELinux user mapping for the user  
  
user@user-HP-Laptop-15-da0xxx:~$
```

35. passwd

passwd command in Linux is used to change the user account passwords. The root user reserves the privilege to change the password for any user on the system, while a normal user can only change the account password for his or her own account.

```
himanshu@ansh:~$ passwd
Changing password for himanshu.
(current) UNIX password:
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
himanshu@ansh:~$
```

36. expr

The *expr* command in Unix evaluates a given expression and displays its corresponding output. It is used for:

- Basic operations like addition, subtraction, multiplication, division, and modulus on integers.
- Evaluating regular expressions, string operations like substring, length of strings etc.

```
anshul@anshul-VirtualBox:~/Desktop$ expr --version
expr (GNU coreutils) 8.28
Copyright (C) 2017 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://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.

Written by Mike Parker, James Youngman, and Paul Eggert.
anshul@anshul-VirtualBox:~/Desktop$
```

37. cut

The *cut* command in UNIX is a command for cutting out the sections from each line of files and writing the result to standard output. It can be used to cut parts of a line by byte position, character and field. Basically the *cut* command slices a line and extracts the text. It is necessary to specify option with command otherwise it gives error. If more than one file name is provided then data from each file is not precedes by its file name.

```
javatpoint@javatpoint-Inspiron-3542:~$ cat marks.txt
alex-50
alen-70
jon-75
carry-85
celena-90
justin-80
javatpoint@javatpoint-Inspiron-3542:~$ cut -d- -f2 marks.txt
50
70
75
85
90
80
javatpoint@javatpoint-Inspiron-3542:~$ cut -d- -f1 marks.txt
alex
alen
jon
carry
celena
justin
```

38.paste

Paste command is one of the useful commands in Unix or Linux operating system. It is used to join files horizontally (parallel merging) by outputting lines consisting of lines from each file specified, separated by tab as delimiter, to the standard output. When no file is specified, or put dash (“-“) instead of file name, paste reads from standard input and gives output as it is until a interrupt command

```
anjana@anjana-VirtualBox:~$ touch states
anjana@anjana-VirtualBox:~$ cat states
anjana@anjana-VirtualBox:~$ touch capital
anjana@anjana-VirtualBox:~$ cat capital
anjana@anjana-VirtualBox:~$ paste number states capital
paste: number: No such file
or directory
anjana@anjana-VirtualBox:~$ paste states capital
Assam    Dispur
Bihar    patna
anjana@anjana-VirtualBox:~$
```

39. ssh,scp

ssh stands for “**Secure Shell**”. It is a protocol used to securely connect to a remote server/system. *ssh* is secure in the sense that it transfers the data in encrypted form between the host and the client. It transfers inputs from the client to the host and relays back the output. *ssh* runs at TCP/IP port 22.

scp (secure copy) command in Linux system is used to copy file(s) between servers in a secure way. The SCP command or secure copy allows secure transferring of files in between the local host and the remote host or between two remote hosts. It uses the same authentication and security as it is used in the Secure Shell (SSH) protocol. SCP is known for its simplicity, security and pre-installed availability.

```
parvathy@parvathy-VirtualBox: ~/Desktop$ ssh
usage: ssh [-46AaCfGgKkMmNnQsTtVvXxYy] [-B bind_interface]
          [-b bind_address] [-c cipher_spec] [-D [bind_address:]port]
          [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
          [-i identity_file] [-J [user@]host[:port]] [-L address]
          [-l login_name] [-m mac_spec] [-O ctl_cmd] [-o option] [-p port]
          [-Q query_option] [-R address] [-S ctl_path] [-W host:port]
          [-w local_tun[:remote_tun]] destination [command [argument ...]]
parvathy@parvathy-VirtualBox: ~/Desktop$ scp
usage: scp [-346ABCOpqRrsTv] [-c cipher] [-D sftp_server_path] [-F ssh_config]
          [-i identity_file] [-J destination] [-l limit]
          [-o ssh_option] [-P port] [-S program] source ... target
parvathy@parvathy-VirtualBox: ~/Desktop$
```

40.ssh-keygen, ssh-copy-id

ssh-keygen is the utility used to generate, manage, and convert authentication keys for SSH. *sshkeygen* comes installed with SSH in most of the operating systems. *ssh-keygen* is able to generate a key using one of three different digital signature algorithms.

- RSA
- DSA
- ECDSA

The ssh-copy-id command is a simple tool that allows you to install an SSH key on a remote server's authorized keys. This command facilitates SSH key login, which removes the need for a password for each login, thus ensuring a password-less, automatic login process. The ssh-copy-id command is part of OpenSSH, a tool for performing remote system administrations using encrypted SSH connections.

```
parvathy@parvathy-VirtualBox:~/Desktop$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/parvathy/.ssh/id_rsa): parvathy
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in parvathy
Your public key has been saved in parvathy.pub
The key fingerprint is:
SHA256:i6dHgSoe1ZPXw2owsnLgRwtFade9JJRUQZQwTyK67ro parvathy@parvathy-VirtualBox
The key's randomart image is:
+---[RSA 3072]-----+
|  ....+*B*o          |
|  +...+*=+          |
|  o.o o o =..       |
|  o +.B o =         |
|  . =. =So .        |
|  =.*  .+.          |
|  . * .oo           |
|  .. o.             |
|  Eo. ..            |
+---[SHA256]-----+
parvathy@parvathy-VirtualBox:~/Desktop$ ssh-copy-id
Usage: /usr/bin/ssh-copy-id [-h|-?|-f|-n|-s] [-i [identity_file]] [-p port] [-F alternative_ssh_config_file] [[-o <ssh -o options>]
...] [user@]hostname
    -f: force mode -- copy keys without trying to check if they are already installed
    -n: dry run -- no keys are actually copied
    -s: use sftp -- use sftp instead of executing remote-commands. Can be useful if the remote only allows sftp
    -h|-?: print this help
parvathy@parvathy-VirtualBox:~/Desktop$
```

RESULT : Familiarised with basic linux commands.

