

1. sudo command

Superuser do

root is the superuser and normal user can't access it directly

sudo turns normal user to super user

normal user can't make changes to system but super user can;

when we do sudo for first time it will ask for password;

when we use sudo command again it will not ask for password (for 15 min)

to overcome this feature we use **sudo -k** (to revoke sudo right to user)

to permanent give user sudo right use **sudo -s**

this command will turn username to root and \$ to #.

To install : sudo apt install <dep name>

To do authentication of user

2. pwd command

path of your current working directory

To fetch current location

cmd: pwd || pwd -L or -logical (for env variable) || pwd -P or -physical (actual path)

3. cd command

Change directory

To move to new user || back || previous directory (<--)

cmd: cd ~[username] || cd .. || cd -

cmd: cd - // to go to your last directory

cmd: cd ~ // to go to home directory of current user

cmd: cd ~username // to go to home directory of other user “username”

cmd: cd // to go to home dir of curr user

cm : cd Exercise\ File or “Exercise File” // if dir name contains space or dir name is of more than 1 word

4. ls command

listing files

To show list of files and directory of current path || specific path

cmd: ls || ls [path] //it must be start from beginning eg. *home/beryl/Neeraj*

cmd: ls -R Neeraj // it will recursively call ls for all items inside Neeraj Folder

option: ls -l // to show more information about listed items

List of file in a directory with matching name

ls ch*.doc // it will return file with names like ch01-1.doc, ch090.doc etc

* === % in sql

? === _ in sql

eg. if we want to fetch list of .doc file we can use cmd : **ls *.doc**

to list invisible file:

cmd: ls -a

Note: **Single dot (.)** – This represents the current directory.

- **Double dot (..)** – This represents the parent directory.

5. cat command

concatenate

Create new file || merge two or more files in a current path

cmd: cat > filename.text || cat file1.text file2.text > file3.text

cmd : tac filename.text // to display text in vertically reverse order

6. cp command

copy

Copy file || files || directory from current to another path

cmd: cp file.txt [path] || cp file1.txt file2.txt [path] || cp -R [path]

note : if we don't provide path it will make the copy in current path

copy a file with new filename

cmd: cp filename copyfile //it will create a copy of filename in current path with name copyfile

7. mv command

move

To move || rename

cmd: mv file.txt [path] || mv oldname.txt newname.txt

cmd: mv [path]/file.txt . // . denote the current path (it will move the file from a given path to current path)

cmd: mv marketing/market/* . // to move everything in market folder to current folder

cmd: mv *.txt marketing/market // to move all file with .txt to another folder

8. mkdir command

make directory

To make new directories

cmd : mkdir FolderName // to create new folder in current directory

cmd: mkdir /tmp/test-dir //This command creates the directory test-dir in the /tmp directory.

cmd: mkdir Folder1/NewFolder // to create NewFolder in Folder1 where Folder1 already exist.

Cmd: mkdir -p Folder1/ New1F/ New2F // to create New2F inside New1F which will create inside Folder1 where only Folder1 already exist. //creating parent directory

9. rmdir command

remove directory

To remove a folder (folder must be empty)

cmd: rmdir FolderName // remove folder FolderName in current path

cmd: rmdir -p folder1/folder2 //remove folder2 with parent folder folder1 (only if folder 2 is empty)

10. rm command

***remove file* (not for folder)**

To remove one || multiple files in current path

cmd: rm filename.txt || rm file1.txt file2.txt file3.txt

//-i to ask permission before delete (safe)

// -f to delete without asking for permission (unsafe)

// -r to delete files and directories recursively.

11. touch command

To create an empty file

cmd: touch /home/beryl/Test/Web.html

12. locate command

To find a file in the database system

cmd : locate -i school*not // -i will make the search key word case insensitive and * will allow two search a file which contains both the keyword school and note

13. find command

To find a file in current || in a given path.

Cmd: find -name filename.txt || find [path] -name file.text (-name || -size || -date)

cmd: find ./ -type d -name directoryname **to look for directories.**

Cmd: find . -name “poe*” //it will find file or folder with name starting with poe inside current dir.

Cmd: find ~/Document -name “*d*” //it will find location of any file or folder containing “d” in its name inside Document

14. grep command

global regex || global regular expression

To search a word in a txt file and return the line which contains that word (case sensitive)

cmd: grep keyword file.txt

The grep command searches a file or files for lines that have a certain pattern. The syntax is –

\$grep pattern file(s)

cmd: grep -E “\w{6,}” file.txt //it will print lines which contains of word length more than 6 in file.txt

cmd: grep -E “[hijk]” file.txt // it will return lines which contains word having character h, r, e or f.

The name "**grep**" comes from the ed (a Unix line editor) command **g/re/p** which means “globally search for a regular expression and print all lines containing it”.

```
$ls -l | grep "Aug"
-rw-rw-rw- 1 john doc      11008 Aug  6 14:10 ch02
-rw-rw-rw- 1 john doc      8515 Aug  6 15:30 ch07
-rw-rw-r-- 1 john doc      2488 Aug 15 10:51 intro
-rw-rw-r-- 1 carol doc     1605 Aug 23 07:35 macros
$
```

Sr.No.	Option & Description
1	-v Prints all lines that do not match pattern.
2	-n Prints the matched line and its line number.
3	-l Prints only the names of files with matching lines (letter "l")
4	-c Prints only the count of matching lines.
5	-i Matches either upper or lowercase.

15. df command

diskSpace of Filesystem

To fetch system's disk space usage in KB

cmd: df

cmd : df -h //disk space usage in a human-readable format

cmd: df -m // displays information in MBs.

Cmd : df -k // in KBs.

Cmd : df -T //shows the file system type in a new column.

eg. df -h -m -T //display storage in human readable format in MB with type of system

16. du command

To check space information of a file or specific folder

cmd: du [path] // without path it will take current path

cmd: du -s //total size of a specified folder.

cmd: du -m //file information in MB

cmd: du -k // information in KB.

cmd: du -h //informs the last modification date of the displayed folders and files + human readable folder.

eg. du -s -h -m //display space information in human readable format in MB with last modified info

17. head command

To view first 10 line of text of one or multiple files

cmd: head file1.txt file2.txt

cmd: head -n 5 or -lines 5 file.txt //to show the first five lines of file.txt

cmd: head -c 10 or -bytes 10 file.txt //prints the first 10 bytes of each file.

cmd: head -file1.txt q or -quiet file2.txt //will not print headers of file2.txt

18. tail command

To view last 10 line of text of one or multiple files

cmd: tail file1.txt file2.txt

19. diff command

difference

It will display the parts that do not match in two files.

Cmd: diff file1.txt file2.txt

Cmd: diff -c file1.txt file2.txt //displays the difference in a context form with redundant info.

Cmd: diff -u file1.txt file2.txt // without redundant information.

Cmd: diff -i file1.txt file2.txt //makes the diff command case insensitive.

20. tar command

Tape Archive

archives multiple files into a TAR file

cmd: tar -cvf newTarFile.tar /home/beryl/Test //create a new TAR archive named newTarFile.tar in the /home/beryl/Test directory

options: :

- **-x** extracts a file. (require -f with -x) (eg. tar -x -f or -xf testTar.tar)
- **-t** lists the content of a file. (require -f with -x) (eg. tar -t -f or -tf testTar.tar)
- **-u** archives and adds to an existing archive file.

- **-c** : Creates Archive
- **-x** : Extract the archive
- **-f** : creates archive with given filename
- **-t** : displays or lists files in archived 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 creates 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
- **\$ tar cvf file.tar *.c**

Output :

```
os2.c
os3.c
os4.c
```

21. chmod command

change modification

To modifies a file or directory's read, write, and execute permissions.

-rwxrwxrwx == 777

cmd : chmod 777 file.txt

options :

- **-c** or **-changes** displays information when a change is made.
- **-f** or **-silent** suppresses the error messages.
- **-v** or **-verbose** displays a diagnostic for each processed file.

22. chown command

change ownership

To change the ownership of a file, directory,etc to other user

cmd: chown linuxuser2 filename.txt // make **linuxuser2** the owner of **filename.txt**

23. jobs command

To display all the running processes along with their statuses

cmd : **jobs [options] jobID**

options:

- **-l** lists process IDs along with their information.
- **-n** lists jobs whose statuses have changed since the last notification.
- **-p** lists process IDs only.

24. kill command

To terminate an unresponsive program manually

//know the PID === cmd: **ps ux**,

cmd: **kill [signal_option] pid**

signal options:

- **SIGTERM** requests a program to stop running and gives it some time to save all of its progress. The system will use this by default if you don't specify the signal when entering the kill command.
- **SIGKILL** forces programs to stop, and you will lose unsaved progress.

Eg: **kill SIGKILL 63773**

25. ping command

To check whether a network or a server is reachable

cmd: **ping fb.com**

26. wget command

To download files from the internet

cmd: **wget [url]**

27. uname command

To print detailed information about your Linux system and hardware.

Cmd: **uname [options]**

options:

- **-a** prints all the system information.
- **-s** prints the kernel name.
- **-n** prints the system's node hostname.

28. top command

To display all the running processes and a dynamic real-time view of the current system

cmd : **top**

29. history command

To list up to 500 previously executed commands, allowing you to reuse them without re-entering (with sudo permission require)

cmd: **history [options]**

options:

- **-c** clears the complete history list.
- **-d offset** deletes the history entry at the **OFFSET** position.
- **-a** appends history lines.

30. man command

To display the complete manual of a command

cmd: **man [command_name]**

eg. **man ls** //to access the manual for the **ls** command.

man 2 ls //to see section 2 of the **ls** command manual:

31. echo command

To displays a line of text or string

cmd: **echo “Hello world”**

options:

- **-n** displays the output without the trailing newline.
- **-e** enables the interpretation of the following backslash escapes:
 - **\a** plays sound alert.
 - **\b** removes spaces in between a text.
 - **\c** produces no further output.
 - **-E** displays the default option and disables the interpretation of backslash escapes.

32. zip, unzip commands

To compress your files into a **ZIP** file

cmd : **zip [options] zipfile file1 file2....**

Eg: **zip archive.zip note.txt**

To extracts the zipped files from an archive.

Cmd: **unzip [option] file_name.zip**

eg: **unzip archive.zip**

33. hostname command

To know the system's hostname.

Cmd: **hostname [option]**

option:

- **-a** or **-alias** displays the hostname's alias.
- **-A** or **-all-fqdns** displays the machine's Fully Qualified Domain Name (FQDN).
- **-i** or **-ip-address** displays the machine's IP address.

34. useradd, userdel commands

Cmd: **useradd [option] username**

To set the password: **passwd the_password_combination**

eg: **useradd John**

passwd 123456789

To delete a user account: **userdel username**

35. apt-get command

Advanced Package Tool (APT)

To update, remove, and install software and its dependencies.

Cmd: **apt-get [options] (command)**

options:

- **update** synchronizes the package files from their sources.
- **upgrade** installs the latest version of all installed packages.
- **check** updates the package cache and checks broken dependencies.

36. nano, vi, jed commands

To edit and manage files via a text editor, such as **nano**, **vi**, or **jed**. **nano** and **vi** come with the operating system, while **jed** has to be installed.

Cmd: **nano [filename]**

vi [filename]

jed has drop-down menu interface

37. alias, unalias commands

To allows you to create a shortcut with the same functionality as a command, file name, or text.

Cmd: **alias Name=String**

eg: **alias k='kill'**

unalias command deletes an existing alias.

Cmd: **unalias [alias_name]**

eg: **unalias k**

38. su command

Switch user: allows you to run a program as a different user.

Cmd: su [options] [username [argument]]

options:

- **-p or --preserve-environment** keeps the same shell environment, consisting HOME, SHELL, USER, and LOGNAME.
- **-s or --shell** lets you specify a different shell environment to run.
- **-l or --login** runs a login script to switch to a different username. Executing it requires you to enter the user's password.

39. htop command

To monitors system resources and server processes in real time.

Cmd: htop [options]

options:

- **-d or --delay** shows the delay between updates in tenths of seconds.
- **-C or --no-color** enables the monochrome mode.
- **-h or --help** displays the help message and exit.

40. ps command

To list all running processes

cmd: ps [options]

options:

- **-T** displays all processes associated with the current shell session.
- **-u username** lists processes associated with a specific user.
- **-A or -e** shows all the running processes.

40. help command

To get list and information related to all linux command

cmd : help

41. login: to login

cmd sudo login

42 passwd: to change password

cmd sudo passwd

43. whoami: to know who am i (username)

cmd : whoami

44. who: to know who is logged in

cmd: who

cmd: users

cmd: w

45. logout : to log out

cmd: logout

46. system shutdown commands

cmd:

1. halt //immediate shutdown

2. init 0 // clean up system before shutdown

3. init 6 // reboot

4. poweroff // poweroff

5. reboot // reboot

6. shutdown // shutdown

47. hidden files === files whose name start with ‘.’

eg. .profile === sh initialisation script

to list invisible file:

cmd: ls -a

48. creating files using vi

vi filename (filename does not exist before)

press the key **i** to come into the edit mode
Press the key **esc** to come out of the edit mode.
Press two keys **Shift + ZZ** together to come out of the file completely.

vi -R filename

Opens an existing file in the read-only mode.

49. Editing Files using vi

vi filename (filename already exist)

1. press the key **i** to come into the edit mode
2. If you want to move here and there inside a file, then first you need to come out of the edit mode.
3. Press the key **esc** to come out of the edit mode.
4. After this, you can use the following keys to move inside a file –
 - **l** key to move to the right side.
 - **h** key to move to the left side.
 - **k** key to move upside in the file.
 - **j** key to move downside in the file.
1. using the above keys, you can position your cursor wherever you want to edit.
2. use the **i** key to come in the edit mode.
3. press **Esc** and
4. Press two keys **Shift + ZZ** together to come out of the file completely.

50. To see content of a file cat

cmd: cat file name

cmd: cat -b filename //to display file with numbering of lines in vertical

51. Counting words in a file

cmd: wc filename

cmd: wc filename1 filename2 filename3 // for multiple files

Output will be in four columns –

- **First Column** – Represents the total number of lines in the file.
- **Second Column** – Represents the total number of words in the file.

- **Third Column** – Represents the total number of bytes in the file. This is the actual size of the file.
- **Fourth Column** – Represents the file name.

52. Absolute/Relative Pathnames

Absolute Pathnames: A pathname is absolute, if it is described in relation to root, thus absolute pathnames always begin with a /.

eg. /users/sjones/chem/notes

Relative Pathnames: Relative pathnames never begin with /. Relative to user amrood's home directory, some pathnames might look like this –

chem/notes

53. Every file in Unix has the following attributes –

- **Owner permissions** – The owner's permissions determine what actions the owner of the file can perform on the file.
- **Group permissions** – The group's permissions determine what actions a user, who is a member of the group that a file belongs to, can perform on the file.
- **Other (world) permissions** – The permissions for others indicate what action all other users can perform on the file.

The Permission Indicators

While using **ls -l** command, it displays various information related to file permission as follows –

```
$ls -l /home/amrood
-rwxr-xr-- 1 amrood    users 1024 Nov 2 00:10 myfile
drwxr-xr--- 1 amrood    users 1024 Nov 2 00:10 mydir
```

Here, the first column represents different access modes, i.e., the permission associated with a file or a directory.

The permissions are broken into groups of threes, and each position in the group denotes a specific permission, in this order: read (r), write (w), execute (x) –

- The first three characters (2-4) represent the permissions for the file's owner. For example, **-rwxr-xr--** represents that the owner has read (r), write (w) and execute (x) permission.
- The second group of three characters (5-7) consists of the permissions for the group to which the file belongs. For example, **-rwxr-xr--** represents that the group has read (r) and execute (x) permission, but no write permission.
- The last group of three characters (8-10) represents the permissions for everyone else. For example, **-rwxr-xr--** represents that there is **read (r)** only permission.

54. Changing Permissions

Using chmod in Symbolic Mode

Sr.No.	Chmod operator & Description
1	+ Adds the designated permission(s) to a file or directory.
2	- Removes the designated permission(s) from a file or directory.
3	= Sets the designated permission(s).

Here's an example using **testfile**. Running **ls -l** on the testfile shows that the file's permissions are as follows –

```
$ls -l testfile  
-rwxrwxr-- 1 amrood    users 1024 Nov 2 00:10 testfile
```

Then each example **chmod** command from the preceding table is run on the testfile, followed by **ls -l**, so you can see the permission changes –

```
$chmod o+wx testfile  
$ls -l testfile  
-rwxrwxrwx 1 amrood    users 1024 Nov 2 00:10 testfile  
  
$chmod u-x testfile  
$ls -l testfile  
-rw-rwxrwx 1 amrood    users 1024 Nov 2 00:10 testfile  
  
$chmod g = rx testfile  
$ls -l testfile  
-rw-r-xrwx 1 amrood    users 1024 Nov 2 00:10 testfile
```

Here's how you can combine these commands on a single line –

```
$chmod o+wx,u-x,g = rx testfile  
$ls -l testfile  
-rw-r-xrwx 1 amrood    users 1024 Nov 2 00:10 testfile
```

Using chmod with Absolute Permissions

Number	Octal Permission Representation	Ref
0	No permission	---
1	Execute permission	--x
2	Write permission	-w-
3	Execute and write permission: 1 (execute) + 2 (write) = 3	-wx
4	Read permission	r--
5	Read and execute permission: 4 (read) + 1 (execute) = 5	r-x
6	Read and write permission: 4 (read) + 2 (write) = 6	rw-
7	All permissions: 4 (read) + 2 (write) + 1 (execute) = 7	rwx

Here's an example using the testfile. Running **ls -l** on the testfile shows that the file's permissions are as follows –

```
$ls -l testfile
-rwxrwxr-- 1 amrood  users 1024 Nov 2 00:10 testfile
```

Then each example **chmod** command from the preceding table is run on the testfile, followed by **ls -l**, so you can see the permission changes –

```
$ chmod 755 testfile
$ls -l testfile
-rwxr-xr-x 1 amrood  users 1024 Nov 2 00:10 testfile

$chmod 743 testfile
$ls -l testfile
-rwxr---wx 1 amrood  users 1024 Nov 2 00:10 testfile

$chmod 043 testfile
$ls -l testfile
----r---wx 1 amrood  users 1024 Nov 2 00:10 testfile
```

55. Changing Owners and Groups

While creating an account on Unix, it assigns a **owner ID** and a **group ID** to each user. All the permissions mentioned above are also assigned based on the Owner and the Groups.

Two commands are available to change the owner and the group of files –

- **chown** – The **chown** command stands for "change owner" and is used to change the owner of a file.
- **chgrp** – The **chgrp** command stands for "change group" and is used to change the group of a file.

Changing Ownership

The **chown** command changes the ownership of a file. The basic syntax is as follows –

```
$ chown user filelist
```

The value of the user can be either the **name of a user** on the system or the **user id (uid)** of a user on the system.

The following example will help you understand the concept –

```
$ chown amrood testfile  
$
```

Changes the owner of the given file to the user **amrood**.

NOTE – The super user, root, has the unrestricted capability to change the ownership of any file but normal users can change the ownership of only those files that they own.

Changing Group Ownership

The **chgrp** command changes the group ownership of a file. The basic syntax is as follows –

```
$ chgrp group filelist
```

The value of group can be the **name of a group** on the system or the **group ID (GID)** of a group on the system.

Following example helps you understand the concept –

```
$ chgrp special testfile  
$
```

Changes the group of the given file to **special** group.

56. The simplest way to start a background process is to add an ampersand (**&**) at the end of the command.

```
$ ls ch*.doc &
```

57. _____

Bonus Tips and Tricks:

- Enter the **clear** command to clean the Terminal screen.
- Press the **Tab** button to autofill after entering a command with an argument.
- Use **Ctrl + C** to terminate a running command.
- Press **Ctrl + Z** to pause a working command.
- Use **Ctrl + S** to freeze your Terminal temporarily.
- Press **Ctrl + Q** to undo the Terminal freeze.
- Use **Ctrl + A** to move to the beginning of the line.
- Press **Ctrl + E** to bring you to the end of the line.

- When executing multiple commands in a single line, use `(;)` to separate them. Alternatively, use `&&` to only allow the next command to run if the previous one is successful.

Key Combination	Result
Ctrl-A (^A)	Move to beginning line
Ctrl-E (^E)	Move to end of line
Ctrl-Left arrow	Move left one word
Ctrl-Right arrow	Move right one word

Key Combination	Result
Ctrl-U	Remove (crop) from cursor to start
Ctrl-K	Remove (crop) from cursor to end
Ctrl-Y	Paste cropped text
Ctrl-Shift-C	Copy to clipboard
Ctrl-Shift-V	Paste from clipboard

Key Combination	Result
Up arrow	Recall previous commands
Down arrow	Scroll previous commands
Ctrl-R	Search command history
Ctrl-C	Cancel command

rwx == read write execute (execute== to run the program)

d= directory

drwerwerwe

directory user **group** others

Finding Out About Files

file

`file myfile.txt`

Determines file type

stat

`stat myfile.txt`

Display ownership, modification information, etc.

Octal Value	Symbolic Value	Result
777	a+rwx	rwx rwx rwx
755	u+rwx, g=rx, o=rx	rwx r-xr-x
644	u=rw, g=r, o=r	rw-r--r--
700	u=rwx, g-rwx, o-rwx	rwx-----

Links

A file that acts as a reference to another file

Hard link

Points to data on the disk (inode)

Soft link (or symlink: symbolic link)

Points to a file on the disk (relative path)

soft link: if cmd: **ln -s filename linkname**

if link file move:

in case of relative path ==> linkfile will not work

in case of absolute path==> linkfile will work

if mainfile is lost then link will break;

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ ln -s poems.txt writing.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls -l
total 152
drwxr-xr-x 8 scott scott 4096 Jun 11 14:37 departments
-rw-r--r-- 1 scott scott 160 Jun 11 10:56 dupes.txt
-rw-r--r-- 1 scott scott 130340 Jun 11 10:56 log.tar.gz
-rw-r--r-- 1 scott scott 0 Jun 11 15:55 newfile
drwxr-xr-x 2 scott scott 4096 Jun 11 14:21 new_folder
-rw-r--r-- 1 scott scott 1474 Jun 11 10:56 poems.txt
-rw-r--r-- 1 scott scott 129 Jun 11 10:56 simple_data.txt
-rwxr-xr-x 1 scott scott 83 Jun 11 15:57 test.sh
lrwxrwxrwx 1 scott scott 9 Jun 11 16:07 writing.txt -> poems.txt
```

in hard link **cmd: ln filename linkname**

if link file move: ==> linkfile will work

if mainfile is lost then==> link will break;

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ ln poems.txt words.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls -l
total 156
drwxr-xr-x 8 scott scott 4096 Jun 11 14:37 departments
-rw-r--r-- 1 scott scott 160 Jun 11 10:56 dupes.txt
-rw-r--r-- 1 scott scott 130340 Jun 11 10:56 log.tar.gz
-rw-r--r-- 1 scott scott 0 Jun 11 15:55 newfile
drwxr-xr-x 2 scott scott 4096 Jun 11 14:21 new_folder
-rw-r--r-- 2 scott scott 1474 Jun 11 10:56 poems.txt
-rw-r--r-- 1 scott scott 129 Jun 11 10:56 simple_data.txt
-rwxr-xr-x 1 scott scott 83 Jun 11 15:57 test.sh
-rw-r--r-- 2 scott scott 1474 Jun 11 10:56 words.txt I
lrwxrwxrwx 1 scott scott 9 Jun 11 16:07 writing.txt -> poems.txt
```

Common Parts of a Linux Filesystem

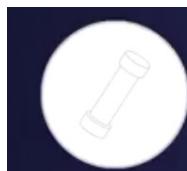
/	root (highest level of filesystem hierarchy)
home	stores user home folders
root	stores root's home folder
etc	configuration files for many tools
bin	stores binaries (programs)
sbin	stores binaries (programs)

lib	libraries and shared modules
dev	represents devices on the system
mnt	where local and remote filesystems are mounted
media	where removable storage is mounted
proc	virtual filesystem representing processes
sys	virtual filesystem representing kernel values

UNIX Philosophy

- Programs should do **one** thing
- They should use text interfaces (take in text, and output text)
- Many modular tools rather than one big one
- The standard GNU tools follow this pattern

Modularity and Flexibility



Pipes

Take the output of one command and send it to another

Pipes

cat users.txt



sort -u



...

cat users.txt | sort -u | ...

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ echo "hello"
hello
scott@scott-VirtualBox:~/Documents/Exercise Files$ echo "hello" | wc
      1      1      6
scott@scott-VirtualBox:~/Documents/Exercise Files$ echo "hello world from the command line" | wc
      1      6     34
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

```
File Edit View Search Terminal Help
41
42 What the hammer? what the chain,
43 In what furnace was thy brain?
44 What the anvil? what dread grasp,
45 Dare its deadly terrors clasp!
46
47 When the stars threw down their spears
48 And water'd heaven with their tears:
49 Did he smile his work to see?
50 Did he who made the Lamb make thee?
51
52 Tyger Tyger burning bright,
53 In the forests of the night:
54 What immortal hand or eye,
55 Dare frame thy fearful symmetry?
ott@scott-VirtualBox:~/Documents/Exercise Files$ cat poems.txt | cat -n | tail -n5
51
52 Tyger Tyger burning bright,
53 In the forests of the night:
54 What immortal hand or eye,
55 Dare frame thy fearful symmetry?
ott@scott-VirtualBox:~/Documents/Exercise Files$ cat poems.txt | tail -n5 | cat -n
1
2 Tyger Tyger burning bright,
3 In the forests of the night:
4 What immortal hand or eye,
5 Dare frame thy fearful symmetry?
ott@scott-VirtualBox:~/Documents/Exercise Files$
```

Tools for Text

less

Paginates text and provides navigation controls

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ less poems.txt
```

```
I met a traveller from an antique land  
Who said: Two vast and trunkless legs of stone  
Stand in the desert. Near them on the sand,  
Half sunk, a shatter'd visage lies, whose frown  
And wrinkled lip and sneer of cold command  
Tell that its sculptor well those passions read  
Which yet survive, stamp'd on these lifeless tools  
The hand that mock'd them and the heart that frown'd  
And on the pedestal these words appear:  
"My name is Ozymandias, king of kings:  
Look on my works, ye Mighty, and despair!"  
Nothing beside remains: round the decay  
Of that colossal wreck, boundless and bare,  
The lone and level sands stretch far away.
```

~ ~ ~

William Blake

The Tyger

move one line press ↑ or ↓ keys

In the forests of the night:
What immortal hand or eye,
Could frame thy fearful symmetry?

:

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat simple_data.txt
Name ID Team
Scott 314 Purple
Ananti 991 Orange
Jian 3127 Purple
Miguel 671 Green
Wes 1337 Orange
Anne 556 Green
scott@scott-VirtualBox:~/Documents/Exercise Files$ awk '{print $2}' simple_data.txt
ID
314
991
3127
671
1337
556
scott@scott-VirtualBox:~/Documents/Exercise Files$ awk '{print $2 "\t" $1}' simple_data.txt
ID      Name
314     Scott
991     Ananti
3127    Jian
671     Miguel
1337    Wes
556     Anne
```

```
Miguel 671 Green
Wes 1337 Orange
Anne 556 Green
scott@scott-VirtualBox:~/Documents/Exercise Files$ awk '{print $2}' simple_data.txt
ID
314
991
3127
671
1337
556
scott@scott-VirtualBox:~/Documents/Exercise Files$ awk '{print $2 "\t" $1}' simple_data.txt
ID      Name
314     Scott
991     Ananti
3127    Jian
671     Miguel
1337    Wes
556     Anne
scott@scott-VirtualBox:~/Documents/Exercise Files$ awk '{print $2 "\t" $1}' simple_data.txt | sort -n
ID      Name
314     Scott
556     Anne
671     Miguel
991     Ananti
1337    Wes
3127    Jian
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat simple_data.txt
Name ID Team
Scott 314 Purple
Ananti 991 Orange
Jian 3127 Purple
Miguel 671 Green
Wes 1337 Orange
Anne 556 Green
scott@scott-VirtualBox:~/Documents/Exercise Files$ sed "s/Orange/Red/" simple_data.txt
Name ID Team
Scott 314 Purple
Ananti 991 Red
Jian 3127 Purple
Miguel 671 Green
Wes 1337 Red
Anne 556 Green
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat simple_data.txt
Name    ID      Team
Scott   314    Purple
Ananti  991    Orange
Jian    3127   Purple
Miguel  671    Green
Wes     1337   Orange
Anne    556    Green
scott@scott-VirtualBox:~/Documents/Exercise Files$ sort simple_data.txt
Ananti  991    Orange
Anne    556    Green
Jian    3127   Purple
Miguel  671    Green
Name    ID      Team
Scott   314    Purple
Wes     1337   Orange
scott@scott-VirtualBox:~/Documents/Exercise Files$ sort -k2 simple_data.txt
Wes     1337   Orange
Jian    3127   Purple
Scott   314    Purple
Anne    556    Green
Miguel  671    Green
Ananti  991    Orange
Name    ID      Team
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

```
File Edit View Search Terminal Help
Miguel  671    Green
Wes     1337   Orange
Anne    556    Green
scott@scott-VirtualBox:~/Documents/Exercise Files$ sort simple_data.txt
Ananti  991    Orange
Anne    556    Green
Jian    3127   Purple
Miguel  671    Green
Name    ID      Team
Scott   314    Purple
Wes     1337   Orange
scott@scott-VirtualBox:~/Documents/Exercise Files$ sort -k2 simple_data.txt
Wes     1337   Orange
Jian    3127   Purple
Scott   314    Purple
Anne    556    Green
Miguel  671    Green
Ananti  991    Orange
Name    ID      Team
scott@scott-VirtualBox:~/Documents/Exercise Files$ sort -k2 -n simple_data.txt
Name    ID      Team
Scott   314    Purple
Anne    556    Green
Miguel  671    Green
Ananti  991    Orange
Wes     1337   Orange
Jian    3127   Purple
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat dupes.txt
Here's a line of text.
Here's a line of text.
Text can be easy to work with.
But some text can be tricky.
Here's a line of text.
Text can be easy to work with.
scott@scott-VirtualBox:~/Documents/Exercise Files$ sort -u dupes.txt
But some text can be tricky.
Here's a line of text.
Text can be easy to work with.
```

rev

Print text in reverse sequence.

tac

Concatenate and print files in reverse.

tr

Translate or modify individual characters according to parameters.

Tape Archives

- Put many files together into one file
- .tar files are a common way to package and distribute software and data
- Data compression (space saving) is optional
- Compressed formats: .tar.gz, .tgz, .tar.bz2

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents$ tar caf myfiles.tar.gz Exercise\ Files/
scott@scott-VirtualBox:~/Documents$ tar caf myfiles.tar.bz2 Exercise\ Files/
scott@scott-VirtualBox:~/Documents$ ls -lh
total 384K
drwxr-xr-x 4 scott scott 4.0K Jun 12 11:23 'Exercise Files'
-rw-r--r-- 1 scott scott 160K Jun 12 13:01 myfiles.tar
-rw-r--r-- 1 scott scott 111K Jun 12 13:03 myfiles.tar.bz2
-rw-r--r-- 1 scott scott 107K Jun 12 13:02 myfiles.tar.gz
scott@scott-VirtualBox:~/Documents$ mkdir unpack
scott@scott-VirtualBox:~/Documents$ mv myfiles.tar.bz2 unpack/
scott@scott-VirtualBox:~/Documents$ cd unpack/
scott@scott-VirtualBox:~/Documents/unpack$ tar xf myfiles.tar.bz2
scott@scott-VirtualBox:~/Documents/unpack$ ls -lh
total 116K
drwxr-xr-x 4 scott scott 4.0K Jun 12 11:23 'Exercise Files'
-rw-r--r-- 1 scott scott 111K Jun 12 13:03 myfiles.tar.bz2
scott@scott-VirtualBox:~/Documents/unpack$ █
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents$ mkdir unpack2
scott@scott-VirtualBox:~/Documents$ tar xf myfiles.tar.gz -C unpack2
scott@scott-VirtualBox:~/Documents$ ls -lah unpack2
total 12K
drwxr-xr-x 3 scott scott 4.0K Jun 12 13:06 .
drwxr-xr-x 5 scott scott 4.0K Jun 12 13:06 ..
drwxr-xr-x 4 scott scott 4.0K Jun 12 11:23 'Exercise Files'
scott@scott-VirtualBox:~/Documents$ █
```

Redirection

Stream	Number	Usage
Standard input (stdin)	0	Text input
Standard output (stdout)	1	Normal text output
Standard error (stderr)	2	Error text

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Downloads$ cd ../Documents/Exercise Files/
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls
departments log.tar.gz newfile new.txt simple_data.txt words.txt
dupes.txt new2.txt new_folder poems.txt test.sh writing.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls 1>filelist.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat filelist.txt
departments
dupes.txt
filelist.txt
log.tar.gz
new2.txt
newfile
new_folder
new.txt
poems.txt
simple_data.txt
test.sh
words.txt
writing.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ █
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Downloads$ cd ..../Documents/Exercise\ Files/
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls
departments log.tar.gz newfile new.txt simple_data.txt words.txt
duplicates.txt new2.txt new_folder poems.txt test.sh writing.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls 1>filelist.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat filelist.txt
departments
duplicates.txt
filelist.txt
log.tar.gz
new2.txt
newfile
new_folder
new.txt
poems.txt
simple_data.txt
test.sh
words.txt
writing.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls > filelist2.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls notreal
ls: cannot access 'notreal': No such file or directory
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls notreal > filelist3.txt
ls: cannot access 'notreal': No such file or directory
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls notreal 2>filelist4.txt
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat filelist4.txt
ls: cannot access 'notreal': No such file or directory
scott@scott-VirtualBox:~/Documents/Exercise Files$ >filelist4.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat filelist4.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls > filelist5.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ echo "some appended text" >>filelist5.txt
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat filelist5.txt
departments
duplicates.txt
filelist2.txt
filelist3.txt
filelist4.txt
filelist5.txt
filelist.txt
log.tar.gz
new2.txt
newfile
new_folder
new.txt
poems.txt
simple_data.txt
test.sh
words.txt
writing.txt
some appended text
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

File Edit View Search Terminal Help

scott@scott-VirtualBox:~/Documents/Exercise Files\$ env

```
File Edit View Search Terminal Help
GJS_DEBUG_OUTPUT=stderr
GTK_MODULES=gail:atk-bridge
WINDOWPATH=2
TERM=xterm-256color
SHELL=/bin/bash
VTE_VERSION=5201
QT_IM_MODULE=xim
XMODIFIERS=@im=ibus
IM_CONFIG_PHASE=2
XDG_CURRENT_DESKTOP=ubuntu:GNOME
GPG_AGENT_INFO=/run/user/1000/gnupg/S.gpg-agent:0:1
GNOME_TERMINAL_SERVICE=:1.77
XDG_SEAT=seat0
SHLVL=1
GDMSESSION=ubuntu
GNOME_DESKTOP_SESSION_ID=this-is-deprecated
LOGNAME=scott
DBUS_SESSION_BUS_ADDRESS=unix:path=/run/user/1000/bus
XDG_RUNTIME_DIR=/run/user/1000
XAUTHORITY=/run/user/1000/gdm/Xauthority
XDG_CONFIG_DIRS=/etc/xdg/xdg-ubuntu:/etc/xdg
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin
GJS_DEBUG_TOPICS=JS ERROR;JS LOG
SESSION_MANAGER=local/scott-VirtualBox:@tmp/.ICE-unix/970,unix/scott-VirtualBox:/tmp/.ICE-unix/970
LESSOPEN=| /usr/bin/lesspipe %
GTK_IM_MODULE=ibus
_= /usr/bin/env
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

LinkedIn user

```
_=/usr/bin/env
scott@scott-VirtualBox:~/Documents/Exercise Files$ which ls
/bin/ls
scott@scott-VirtualBox:~/Documents/Exercise Files$ which less
/usr/bin/less
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

File Edit View Search Terminal Help

```
scott@scott-VirtualBox:~/Documents/Exercise Files$ cd
scott@scott-VirtualBox:~$ ls -lah
total 100K
drwxr-xr-x 16 scott scott 4.0K Jun 12 11:18 .
drwxr-xr-x 3 root root 4.0K Jun 11 10:46 ..
-rw----- 1 scott scott 154 Jun 11 14:51 .bash_history
-rw-r--r-- 1 scott scott 220 Jun 11 10:46 .bash_logout
-rw-r--r-- 1 scott scott 3.7K Jun 11 10:46 .bashrc
drwx----- 11 scott scott 4.0K Jun 11 11:18 .cache
drwxr-xr-x 3 scott scott 4.0K Jun 11 10:56 commandlinebasics
drwx----- 11 scott scott 4.0K Jun 11 10:52 .config
drwxr-xr-x 2 scott scott 4.0K Jun 11 10:51 Desktop
drwxr-xr-x 5 scott scott 4.0K Jun 12 13:18 Documents
drwxr-xr-x 3 scott scott 4.0K Jun 12 13:19 Downloads
-rw-r--r-- 1 scott scott 8.8K Jun 11 10:46 examples.desktop
drwx----- 3 scott scott 4.0K Jun 11 10:52 .gnupg
-rw----- 1 scott scott 354 Jun 11 10:51 .ICEauthority
drwx----- 3 scott scott 4.0K Jun 11 10:51 .local
drwxr-xr-x 2 scott scott 4.0K Jun 11 10:51 Music
drwxr-xr-x 2 scott scott 4.0K Jun 11 10:51 Pictures
-rw-r--r-- 1 scott scott 807 Jun 11 10:46 .profile
drwxr-xr-x 2 scott scott 4.0K Jun 11 10:51 Public
drwx----- 2 scott scott 4.0K Jun 11 10:52 .ssh
-rw-r--r-- 1 scott scott 0 Jun 11 10:53 .sudo_as_admin_successful
drwxr-xr-x 2 scott scott 4.0K Jun 11 10:51 Templates
drwxr-xr-x 2 scott scott 4.0K Jun 11 10:51 Videos
-rw----- 1 scott scott 2.8K Jun 12 11:18 .viminfo
scott@scott-VirtualBox:~$ nano .profile
```

```
[scott@localhost ~]$ ls /etc/*release
/etc/centos-release  /etc/os-release  /etc/redhat-release  /etc/system-release
[scott@localhost ~]$ cat /etc/*release
CentOS Linux release 7.4.1788 (Core)
NAME="CentOS Linux"
VERSION="7 (Core)"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="7"
PRETTY_NAME="CentOS Linux 7 (Core)"
ANSI_COLOR="8;31"
CPE_NAME="cpe:/o:centos:centos:7"
HOME_URL="https://www.centos.org/"
BUG_REPORT_URL="https://bugs.centos.org/"

CENTOS_MANTISBT_PROJECT="CentOS-7"
CENTOS_MANTISBT_PROJECT_VERSION="7"
REDHAT_SUPPORT_PRODUCT="centos"
REDHAT_SUPPORT_PRODUCT_VERSION="7"

CentOS Linux release 7.4.1788 (Core)
CentOS Linux release 7.4.1788 (Core)
[scott@localhost ~]$
```

File Edit View Search Terminal Help

```
scott@scott-VirtualBox:~/Documents/Exercise Files$ ls -lah /etc/*release
-rw-r--r-- 1 root root 103 Apr 24 01:33 /etc/lsb-release
lrwxrwxrwx 1 root root 21 Jun 11 10:43 /etc/os-release -> ../usr/lib/os-release
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat /etc/*release
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=18.04
DISTRIB_CODENAME=bionic
DISTRIB_DESCRIPTION="Ubuntu 18.04 LTS"
NAME="Ubuntu"
VERSION="18.04 LTS (Bionic Beaver)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 18.04 LTS"
VERSION_ID="18.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
VERSION_CODENAME=bionic
UBUNTU_CODENAME=bionic
scott@scott-VirtualBox:~/Documents/Exercise Files$ █
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ uname -a
Linux scott-VirtualBox 4.15.0-20-generic #21-Ubuntu SMP Tue Apr 24 06:16:15 UTC 2018 x86_64 x86_64 x86_64 GNU/Li
nux
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

Hardware

- How much RAM does the system have?
- How large is the hard drive?
- What kind of CPU?
- What other hardware is available?



LinkedIn

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ free -h
              total        used        free      shared  buff/cache   available
Mem:           1.9G       1.1G      218M        13M       684M       713M
Swap:          2.0G        15M       2.0G
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat /proc/cpuinfo
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ cat /proc/cpuinfo
processor       : 0
vendor_id      : GenuineIntel
cpu family     : 6
model          : 79
model name     : Intel(R) Xeon(R) CPU E5-2643 v4 @ 3.40GHz
stepping        : 1
cpu MHz        : 3392.146
cache size     : 20480 KB
physical id    : 0
siblings        : 1
core id         : 0
cpu cores      : 1
apicid          : 0
initial apicid : 0
fpu             : yes
fpu_exception  : yes
cpuid level    : 20
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse s
se2 syscall nx rdtscp lm constant_tsc rep_good nopl xtopology nonstop_tsc cpuid dni pclmulqdq monitor ssse3 cx16
pcid sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx rdrand hypervisorlahf_lm abm 3dnowprefetch invpcid_single
pti fsgsbase avx2 invpcid rdseed
bugs            : cpu_meltdown spectre_v1 spectre_v2
bogomips       : 6784.29
clflush size   : 64
cache_alignment : 64
address sizes  : 46 bits physical, 48 bits virtual
```

LinkedIn

```
scott@scott-VirtualBox:~/Documents/Exercise Files$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            969M    0  969M   0% /dev
tmpfs           208M  1.6M 198M   1% /run
/dev/sda1        79G  6.9G  68G  10% /
tmpfs           997M    0  997M   0% /dev/shm
tmpfs           5.0M  4.0K  5.0M   1% /run/lock
tmpfs           997M    0  997M   0% /sys/fs/cgroup
/dev/loop0       3.4M  3.4M    0 100% /snap/gnome-system-monitor/36
/dev/loop1       1.7M  1.7M    0 100% /snap/gnome-calculator/154
/dev/loop2       13M   13M    0 100% /snap/gnome-characters/69
/dev/loop3       141M  141M    0 100% /snap/gnome-3-26-1604/59
/dev/loop4       87M   87M    0 100% /snap/core/4486
/dev/loop5       21M   21M    0 100% /snap/gnome-logs/25
tmpfs           208M  28K  200M   1% /run/user/120
tmpfs           208M  64K  200M   1% /run/user/1000
/dev/loop6       87M   87M    0 100% /snap/core/4650
/dev/loop7       2.4M  2.4M    0 100% /snap/gnome-calculator/170
/dev/loop8       3.8M  3.8M    0 100% /snap/gnome-system-monitor/41
/dev/loop9       13M   13M    0 100% /snap/gnome-characters/96
/dev/loop10      15M   15M    0 100% /snap/gnome-logs/34
/dev/loop11      140M  140M    0 100% /snap/gnome-3-26-1604/64
/dev/loop12      3.8M  3.8M    0 100% /snap/gnome-system-monitor/45
/dev/loop13      13M   13M    0 100% /snap/gnome-characters/101
/dev/loop14      15M   15M    0 100% /snap/gnome-logs/37
/dev/loop15      2.4M  2.4M    0 100% /snap/gnome-calculator/178
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

```
scott@scott-VirtualBox:~/Documents/Exercise Files$ sudo du / -hd1
scott@scott-VirtualBox:~/Documents/Exercise Files$ sudo du / -hd1
[sudo] password for scott:
4.0K    /cdrom
11M    /sbin
16K    /root
du: cannot access '/run/user/1000/gvfs': Permission denied
1.6M    /run
4.0K    /lib64
138M   /boot
4.0K    /opt
8.3M   /home
777M   /lib
13M    /etc
1.2G   /var
4.0K   /mnt
4.0K   /srv
0     /sys
16K   /lost+found
2.0G   /snap
0     /dev
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ sudo lshw | less

File Edit View Search Terminal Help
      version: 1.00
      capabilities: usb-1.10
      configuration: driver=usbhid maxpower=100mA speed=12Mbit/s
*-bridge
      description: Bridge
      product: 82371AB/EB/MB PIIX4 ACPI
      vendor: Intel Corporation
      physical id: 7
      bus info: pci@0000:00:07.0
      version: 08
      width: 32 bits
      clock: 33MHz
      capabilities: bridge
      configuration: driver=piix4_smbus latency=0
      resources: irq:9
*-usb:1
      description: USB controller
      product: 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI Controller
      vendor: Intel Corporation
      physical id: b
      bus info: pci@0000:00:0b.0
      version: 00
      width: 32 bits
      clock: 33MHz
      capabilities: ehci bus_master cap_list
      configuration: driver=ehci-pci latency=64
      resources: irq:19 memory:f0805000-f0805fff
:
```

LinkedIn 

```
scott@scott-VirtualBox:~/Documents/Exercise Files$ sudo lshw | less
scott@scott-VirtualBox:~/Documents/Exercise Files$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:ca:bf:1a brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 68205sec preferred_lft 68205sec
    inet6 fe80::ab7d:9184:3aed:975b/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
scott@scott-VirtualBox:~/Documents/Exercise Files$
```

```
File Edit View Search Terminal Help
scott@scott-VirtualBox:~/Documents/Exercise Files$ apt search tree
```

```
File Edit View Search Terminal Help
xfstrogs/bionic 4.9.0+nmui1ubuntu2 amd64
    Utilities for managing the XFS filesystem

xmlbeans/bionic,bionic 2.6.0+dfsg-3 all
    Java library for accessing XML by binding it to Java types - tools

xmldiff/bionic 0.6.10-3 amd64
    tree to tree correction between xml documents

xmlstarlet/bionic 1.6.1-2 amd64
    command line XML toolkit

xnav/bionic,bionic 0.05-0ubuntu1 all
    Automatically construct web site navigation links

xutils-dev/bionic 1:7.7+5ubuntu1 amd64
    X Window System utility programs for development

yersinia/bionic 0.8.2-2 amd64
    Network vulnerabilities check software

youtube-dl/bionic,bionic 2018.03.14-1 all
    downloader of videos from YouTube and other sites

ytree/bionic 1.94-2 amd64
    File manager for terminals

scott@scott-VirtualBox:~/Documents/Exercise Files$ apt show tree
Package: tree
Version: 1.7.0-5
Priority: optional
Section: universe/utils
Origin: Ubuntu
Maintainer: Ubuntu Developers <ubuntu-devel-discuss@lists.ubuntu.com>
Original-Maintainer: Florian Ernst <florian@debian.org>
Bugs: https://bugs.launchpad.net/ubuntu/+filebug
Installed-Size: 105 kB
Depends: libc6 (>= 2.14)
Homepage: http://mama.indstate.edu/users/ice/tree/
Task: lubuntu-qt-desktop
Supported: 9m
Download-Size: 40.7 kB
APT-Sources: http://us.archive.ubuntu.com/ubuntu bionic/universe amd64 Packages
Description: displays an indented directory tree, in color
Tree is a recursive directory listing command that produces a depth indented
listing of files, which is colorized ala dircolors if the LS_COLORS environment
variable is set and output is to tty.
```

```
scott@scott-VirtualBox:~/Documents/Exercise Files$ tree
Command 'tree' not found, but can be installed with:
  sudo snap install tree
  sudo apt install tree

See 'snap info tree' for additional versions.
```

See [snap info tree](#) for additional versions.

```
scott@scott-VirtualBox:~/Documents/Exercise Files$ sudo apt update
```

```
File Edit View Search Terminal Help
Get:5 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [92.4 kB]
Get:6 http://us.archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [131 kB]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/main i386 Packages [79.6 kB]
Get:8 http://security.ubuntu.com/ubuntu bionic-security/main Translation-en [34.5 kB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/main amd64 DEP-11 Metadata [204 B]
Get:10 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [32.7 kB]
Get:11 http://us.archive.ubuntu.com/ubuntu bionic-updates/main i386 Packages [118 kB]
Get:12 http://security.ubuntu.com/ubuntu bionic-security/universe i386 Packages [32.6 kB]
Get:13 http://security.ubuntu.com/ubuntu bionic-security/universe Translation-en [16.9 kB]
Get:14 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 DEP-11 Metadata [2,452 B]
Get:15 http://us.archive.ubuntu.com/ubuntu bionic-updates/main Translation-en [51.5 kB]
Get:16 http://us.archive.ubuntu.com/ubuntu bionic-updates/main amd64 DEP-11 Metadata [74.7 kB]
Get:17 http://us.archive.ubuntu.com/ubuntu bionic-updates/main DEP-11 48x48 Icons [15.8 kB]
Get:18 http://us.archive.ubuntu.com/ubuntu bionic-updates/main DEP-11 64x64 Icons [30.5 kB]
Get:19 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe i386 Packages [82.7 kB]
Get:20 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [82.8 kB]
Get:21 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe Translation-en [38.2 kB]
Get:22 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 DEP-11 Metadata [117 kB]
Get:23 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe DEP-11 48x48 Icons [120 kB]
Get:24 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe DEP-11 64x64 Icons [190 kB]
Get:25 http://us.archive.ubuntu.com/ubuntu bionic-backports/universe amd64 DEP-11 Metadata [5,104 B]
Fetched 1,589 kB in 2s (729 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
66 packages can be upgraded. Run 'apt list --upgradable' to see them.
scott@scott-VirtualBox:~/Documents/Exercise Files$ sudo apt install tree
Reading package lists... 0%
```

Linked

21 directories, 18 files

```
scott@scott-VirtualBox:~/Documents/Exercise Files$ man tree
scott@scott-VirtualBox:~/Documents/Exercise Files$ sudo apt update
Hit:1 http://us.archive.ubuntu.com/ubuntu bionic InRelease
Hit:2 http://us.archive.ubuntu.com/ubuntu bionic-updates InRelease
Hit:3 http://security.ubuntu.com/ubuntu bionic-security InRelease
Hit:4 http://us.archive.ubuntu.com/ubuntu bionic-backports InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
66 packages can be upgraded. Run 'apt list --upgradable' to see them.
scott@scott-VirtualBox:~/Documents/Exercise Files$ sudo apt upgrade
```

```
scott@scott-VirtualBox:~/Documents/Exercise Files$ sudo apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following packages will be upgraded:
  apport apport-gtk bsdutils fdisk gdm3 gir1.2-gdm-1.0 gnome-initial-setup gnome-keyring gnome-keyring-pkcs11
  gnome-session-bin gnome-session-common gnome-startup-applications gnome-terminal gnome-terminal-data
  ifupdown im-config imagemagick imagemagick-6-common imagemagick-6.q16 language-selector-common
  language-selector-gnome libasound2 libasound2-data libblkid1 libfdisk1 libgdm1 libmagickcore-6.q16-3
  libmagickcore-6.q16-3-extra libmagickwand-6.q16-3 libmount1 libncurses5 libncursesw5 libpam-gnome-keyring
  libpulse-mainloop-glib0 libpulse0 libpulsedsp libsmartcols1 libtinfo5 libuuid1 linux-firmware mount
  nautilus-extension-gnome-terminal ncurses-base ncurses-bin netcat-openbsd netplan.io nplan pulseaudio
  pulseaudio-module-bluetooth pulseaudio-utils python3-apport python3-distupgrade python3-problem-report
  python3-software-properties rfkill snapd software-properties-common software-properties-gtk
  ubuntu-release-upgrader-core ubuntu-release-upgrader-gtk ubuntu-session update-notifier
  update-notifier-common util-linux uuid-runtime x11-xkb-utils
66 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 2,797 kB/87.0 MB of archives.
After this operation, 10.8 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

LinkedIn Learning

rev will print in horizontal reverse (mirror image) (Neeraj == jareeN)

tac will print in vertical reverse (first line will become last line)

How to get confirmation prompt before every removal of a dir

You need to pass the -i option to the rm command:

`rm -ir foo`

How to get visual confirmation about deleting directory

Pass the -v to the rm command:

`rm -vrf dir1`

`rm -vrf dir1 dir2`

We use the rm command to delete a directory that is not empty. The syntax is:

`rm -rf dir-name`

`rm -rf /path/to/dir/name`

Be careful when you use the rm command with -r and -f options. The -r option removes directories and their contents recursively including all files. The -f option to rm command ignores nonexistent files and arguments, never prompting for anything. There is no undo option. So you have to be very careful with rm -rf command. Let us see some examples.

Cmd: `rm -d foldername` /// to remove empty directory

We can use the "cd ~ or cd \$HOME" commands as well, to do the same. Consider the below commands:

1. `cd ~`
2. `cd $Home`

Procedure

1. To create a new group, use the `groupadd` command.

Type the following command:

```
groupadd -g group-ID group-name
```

- where *group-ID* is the numeric identifier of the group, and *group-name* is the name of the group.
- To add a member to a supplementary group, use the `usermod` command to list the supplementary groups that the user is currently a member of, and the supplementary groups that the user is to become a member of.

For example, if the user is already a member of the group `groupa`, and is to become a member of `groupb`, use the following command:

```
usermod -G groupa,groupb user-name
```

- where *user-name* is the user name.
- To display who is a member of a group, use the `getent` command.

Type the following command:

```
getent group group-name
```

- where *group-name* is the name of the group.
- To remove a member from a supplementary group, use the `usermod` command to list the supplementary groups that you want the user to remain a member of.

For example, if the user's primary group is `users` and the user is also a member of the groups `mqm`, `groupa` and `groupb`, to remove the user from the `mqm` group, use the following command:

```
usermod -G groupa,groupb user-name
```

where *user-name* is the user name.

Linux ls command options

ls option	Description
<u>ls -a</u>	In Linux, hidden files start with . (dot) symbol and they are not visible in the regular directory. The (ls -a) command will enlist the whole list of the current directory including the hidden files.
<u>ls -l</u>	It will show the list in a long list format.
ls -lh	This command will show you the file sizes in human readable format. Size of the file is very difficult to read when displayed in terms of byte. The (ls -lh) command will give you the data in terms of Mb, Gb, Tb, etc.
ls -lhS	If you want to display your files in descending order (highest at the top) according to their size, then you can use (ls -lhS) command.
<u>ls -l - -block-size=[SIZE]</u>	It is used to display the files in a specific size format. Here, in [SIZE] you can assign size according to your requirement.
<u>ls -d */</u>	It is used to display only subdirectories.
<u>ls -g or ls -lG</u>	With this you can exclude column of group information and owner.
ls -n	It is used to print group ID and owner ID instead of their names.
<u>ls --color=[VALUE]</u>	This command is used to print list as colored or discolored.
ls -li	This command prints the index number if file is in the first column.
ls -p	It is used to identify the directory easily by marking the directories with a slash (/) line sign.
ls -r	It is used to print the list in reverse order.
ls -R	It will display the content of the sub-directories also.
ls -lX	It will group the files with same extensions together in the list.
ls -lt	It will sort the list by displaying recently modified file at top.
<u>ls ~</u>	It gives the contents of home directory.
<u>ls ..</u>	It gives the contents of parent directory.
ls --version	It checks the version of ls command.

version of ls in current system: 8.30

Linux Directory Commands

1. pwd Command

The [pwd](#) command is used to display the location of the current working directory.

Syntax:

1. `pwd`

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ pwd  
/home/javatpoint
```

2. mkdir Command

The [mkdir](#) command is used to create a new directory under any directory.

Syntax:

1. `mkdir <directory name>`

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ mkdir new_directory  
javatpoint@javatpoint-Inspiron-3542:~$ █
```

3. rmdir Command

The [rmdir](#) command is used to delete a directory.

Syntax:

1. `rmdir <directory name>`

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ rmdir new_directory  
javatpoint@javatpoint-Inspiron-3542:~$ █
```

4. ls Command

The [ls](#) command is used to display a list of content of a directory.

Syntax:

1. `ls`

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ ls  
a Desktop examples.desktop Music sample  
Akash Directory hello.c pico snap  
a.out Documents hello.i Pictures Templates  
composer.phar Downloads hello.o project Test.txt  
Demo.sh eclipse hello.s Public Videos  
Demo.txt eclipse-installer index.html Python  
Demo.txt~ eclipse-workspace mail Python-3.8.0
```

5. cd Command

The [cd](#) command is used to change the current directory.

Syntax:

1. cd <directory name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ cd Desktop  
javatpoint@javatpoint-Inspiron-3542:~/Desktop$ █
```

Linux File commands

6. touch Command

The [touch](#) command is used to create empty files. We can create multiple empty files by executing it once.

Syntax:

1. touch <file name>
2. touch <file1> <file2>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~/Newfolder$ touch Demo.txt  
javatpoint@javatpoint-Inspiron-3542:~/Newfolder$ touch Demo1.txt Demo2.txt  
javatpoint@javatpoint-Inspiron-3542:~/Newfolder$ ls  
Demo1.txt  Demo2.txt  Demo.txt
```

7. cat Command

The [cat](#) command is a multi-purpose utility in the Linux system. It can be used to create a file, display content of the file, copy the content of one file to another file, and more.

Syntax:

1. cat [OPTION]... [FILE]..

To create a file, execute it as follows:

1. cat > <file name>
2. // Enter file content

Press "CTRL+ D" keys to save the file. To display the content of the file, execute it as follows:

1. cat <file name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~/Newfolder$ cat > Demo.txt  
This is a text file.  
javatpoint@javatpoint-Inspiron-3542:~/Newfolder$ cat Demo.txt  
This is a text file.
```

8. rm Command

The [rm](#) command is used to remove a file.

Syntax:

```
rm <file name>
```

Output:

```
javatpoint@javatpoint-Inspiron-3542:~/Newfolder$ rm Demo.txt  
javatpoint@javatpoint-Inspiron-3542:~/Newfolder$ rm Demo1.txt Demo2.txt
```

9. cp Command

The [cp](#) command is used to copy a file or directory.

Syntax:

To copy in the same directory:

1. cp <existing file name> <new file name>

To copy in a different directory:

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ cp demo.txt demo1.txt  
javatpoint@javatpoint-Inspiron-3542:~$ cp demo.txt Documents
```

10. mv Command

The [mv](#) command is used to move a file or a directory from one location to another location.

Syntax:

1. mv <file name> <directory path>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ mv demo.txt Directory
```

11. rename Command

The [rename](#) command is used to rename files. It is useful for renaming a large group of files.

Syntax:

1. rename 's/old-name/new-name/' files

For example, to convert all the text files into pdf files, execute the below command:

1. rename 's/>.txt\$/>.pdf/' *.txt

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ rename 's/\.txt$/\.pdf/' *.txt
javatpoint@javatpoint-Inspiron-3542:~$ ls
a              Desktop           examples.desktop  Music      Python-3.8.0
Akash         Directory        hello.c            Newfolder  sample
a.out          Documents       hello.i            pico       snap
composer.phar  Downloads       hello.o            Pictures   Templates
demo1.pdf     eclipse         hello.s            project   Test.pdf
Demo.sh        eclipse-installer index.html       Public    Videos
Demo.txt~     eclipse-workspace mail
```

Linux File Content Commands

12. head Command

The [head](#) command is used to display the content of a file. It displays the first 10 lines of a file.

Syntax:

1. head <file name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ head Demo.txt
1
2
3
4
5
6
7
8
9
10
```

13. tail Command

The [tail](#) command is similar to the head command. The difference between both commands is that it displays the last ten lines of the file content. It is useful for reading the error message.

Syntax:

1. tail <file name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ tail Demo.txt
2
3
4
5
6
7
8
9
10
11
```

14. tac Command

The [tac](#) command is the reverse of cat command, as its name specified. It displays the file content in reverse order (from the last line).

Syntax:

1. tac <file name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ tac Demo.txt
11
10
9
8
7
6
5
4
3
2
1
```

15. more command

The [more](#) command is quite similar to the cat command, as it is used to display the file content in the same way that the cat command does. The only difference between both commands is that, in case of larger files, the more command displays screenful output at a time.

In more command, the following keys are used to scroll the page:

ENTER key: To scroll down page by line.

Space bar: To move to the next page.

b key: To move to the previous page.

/ key: To search the string.

Syntax:

1. more <file name>

Output:

```
;;; gyp.el - font-lock-mode support for gyp files.

;; Copyright (c) 2012 Google Inc. All rights reserved.
;; Use of this source code is governed by a BSD-style license that can be
;; found in the LICENSE file.

;; Put this somewhere in your load-path and
;; (require 'gyp)

(require 'python)
(require 'cl)

(when (string-match "python-mode.el" (symbol-file 'python-mode 'defun))
  (error (concat "python-mode must be loaded from python.el (bundled with "
                 "recent emacsen), not from the older and less maintained "
                 "'python-mode.el')))

(defadvice python-indent-calculate-levels (after gyp-outdent-closing-parens
                                                activate)
  "De-indent closing parens, braces, and brackets in gyp-mode."
  (when (and (eq major-mode 'gyp-mode)
             (string-match "^ *[{}][,)]* *$"
                           (buffer-substring-no-properties
--More-- (7%)
```

16. less Command

The [less](#) command is similar to the more command. It also includes some extra features such as 'adjustment in width and height of the terminal.' Comparatively, the more command cuts the output in the width of the terminal.

Syntax:

1. less <file name>

Output:

```
;;; gyp.el - font-lock-mode support for gyp files.  
;; Copyright (c) 2012 Google Inc. All rights reserved.  
;; Use of this source code is governed by a BSD-style license that can be  
;; found in the LICENSE file.  
;; Put this somewhere in your load-path and  
;; (require 'gyp)  
  
(require 'python)  
(require 'cl)  
  
(when (string-match "python-mode.el" (symbol-file 'python-mode 'defun))  
  (error (concat "python-mode must be loaded from python.el (bundled with "  
                "recent emacsen), not from the older and less maintained "  
                "python-mode.el")))  
  
(defadvice python-indent-calculate-levels (after gyp-outdent-closing-parens  
                                              activate)
```

Linux User Commands

17. su Command

The [su](#) command provides administrative access to another user. In other words, it allows access of the Linux shell to another user.

Syntax:

1. su <user name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ su javatpoint  
Password:  
javatpoint@javatpoint-Inspiron-3542:~$ █
```

18. id Command

The [id](#) command is used to display the user ID (UID) and group ID (GID).

Syntax:

1. id

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ id  
uid=1000(javatpoint) gid=1000(javatpoint) groups=1000(javatpoint),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),116(lpadmin),126(sambashare)  
javatpoint@javatpoint-Inspiron-3542:~$ █
```

19. useradd Command

The [useradd](#) command is used to add or remove a user on a Linux server.

Syntax:

1. useradd username

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ sudo useradd JTP  
[sudo] password for javatpoint:  
javatpoint@javatpoint-Inspiron-3542:~$ █
```

20. passwd Command

The [passwd](#) command is used to create and change the password for a user.

Syntax:

1. passwd <username>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ sudo passwd JTP  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully
```

21. groupadd Command

The [groupadd](#) command is used to create a user group.

Syntax:

1. groupadd <group name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ sudo groupadd Developer  
javatpoint@javatpoint-Inspiron-3542:~$ █
```

Linux Filter Commands**22. cat Command**

The [cat](#) command is also used as a filter. To filter a file, it is used inside pipes.

Syntax:

1. cat <fileName> | cat or tac | cat or tac | . . .

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ cat Demo.txt | tac | cat | cat | tac
1
2
3
4
5
6
7
8
9
10
11
```

23. cut Command

The [cut](#) command is used to select a specific column of a file. The '-d' option is used as a delimiter, and it can be a space (' '), a slash (/), a hyphen (-), or anything else. And, the '-f' option is used to specify a column number.

Syntax:

1. `cut -d(delimiter) -f(columnNumber) <fileName>`

Output:

```
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:~$
```

24. grep Command

The [grep](#) is the most powerful and used filter in a Linux system. The 'grep' stands for "**g**lobal **r**egular **e**xpression **p**rint." It is useful for searching the content from a file. Generally, it is used with the pipe.

Syntax:

1. `command | grep <searchWord>`

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ cat marks.txt | grep 9
celena-90
```

25. comm Command

The '[comm](#)' command is used to compare two files or streams. By default, it displays three columns, first displays non-matching items of the first file, second indicates the non-matching item of the second file, and the third column displays the matching items of both files.

Syntax:

1. comm <file1> <file2>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ comm Demo.txt Demo1.txt
1
2
3
comm: file 2 is not in sorted order
11
4
5
22
33
6
7
8
9
comm: file 1 is not in sorted order
10
11
```

26. sed command

The [sed](#) command is also known as **stream editor**. It is used to edit files using a regular expression. It does not permanently edit files; instead, the edited content remains only on display. It does not affect the actual file.

Syntax:

1. command | sed 's/<oldWord>/<newWord>/'

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ echo class7 | sed 's/class/jtp/'
jtp7
javatpoint@javatpoint-Inspiron-3542:~$ echo class7 | sed 's/7/10/'
class10
```

27. tee command

The [tee](#) command is quite similar to the cat command. The only difference between both filters is that it puts standard input on standard output and also write them into a file.

Syntax:

1. cat <fileName> | tee <newFile> | cat or tac |.....

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ cat marks.txt | tee new.txt | cat
alex-50
alen-70
jon-75
carry-85
celena-90
justin-80
javatpoint@javatpoint-Inspiron-3542:~$ cat new.txt
alex-50
alen-70
jon-75
carry-85
celena-90
justin-80
```

28. tr Command

The [tr](#) command is used to translate the file content like from lower case to upper case.

Syntax:

1. command | tr <'old'> <'new'>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ cat marks.txt | tr 'prcu' 'PRCU'
alex-50
alen-70
jon-75
CaRRy-85
CeLEna-90
jUStIn-80
```

29. uniq Command

The [uniq](#) command is used to form a sorted list in which every word will occur only once.

Syntax:

1. command <fileName> | uniq

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ sort marks.txt | uniq
alen-70
alex-50
carry-85
celena-90
jon-75
justin-80
```

30. wc Command

The [wc](#) command is used to count the lines, words, and characters in a file.

Syntax:

1. wc <file name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ wc marks.txt
 6 6 52 marks.txt
```

31. od Command

The [od](#) command is used to display the content of a file in different formats, such as hexadecimal, octal, and ASCII characters.

Syntax:

1. od -b <fileName> // Octal format
2. od -t x1 <fileName> // Hexa decimal format
3. od -c <fileName> // ASCII character format

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ od -b marks.txt
00000000 141 154 145 170 055 065 060 012 141 154 145 156 055 067 060 012
00000020 152 157 156 055 067 065 012 143 141 162 162 171 055 070 065 012
00000040 143 145 154 145 156 141 055 071 060 012 152 165 163 164 151 156
00000060 055 070 060 012
00000064
javatpoint@javatpoint-Inspiron-3542:~$ od -t x1 marks.txt
00000000 61 6c 65 78 2d 35 30 0a 61 6c 65 6e 2d 37 30 0a
00000020 6a 6f 6e 2d 37 35 0a 63 61 72 72 79 2d 38 35 0a
00000040 63 65 6c 65 6e 61 2d 39 30 0a 6a 75 73 74 69 6e
00000060 2d 38 30 0a
00000064
javatpoint@javatpoint-Inspiron-3542:~$ od -c marks.txt
00000000 a l e x - 5 0 \n a l e n - 7 0 \n
00000020 j o n - 7 5 \n c a r r y - 8 5 \n
00000040 c e l e n a - 9 0 \n j u s t i n
```

32. sort Command

The [sort](#) command is used to sort files in alphabetical order.

Syntax:

1. sort <file name>

Output:

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

33. gzip Command

The [gzip](#) command is used to truncate the file size. It is a compressing tool. It replaces the original file by the compressed file having '.gz' extension.

Syntax:

1. gzip <file1> <file2> <file3>...

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ gzip Demo.txt Demo1.txt
javatpoint@javatpoint-Inspiron-3542:~$ ls
a           Demo.txt.gz      examples.desktop  Music      Python-3.8.0
Akash       Desktop          hello.c          Newfolder  sample
a.out       Directory        hello.i          new.txt    snap
composer.phar Documents      hello.o          pico      Templates
demo1.pdf   Downloads        hello.s          Pictures   Test.pdf
Demo1.txt.gz eclipse         index.html     project    Videos
Demo.sh     eclipse-installer mail
Demo.txt~   eclipse-workspace marks.txt      Public
javatpoint@javatpoint-Inspiron-3542:~$
```

34. gunzip Command

The [gunzip](#) command is used to decompress a file. It is a reverse operation of gzip command.

Syntax:

1. gunzip <file1> <file2> <file3>..

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ gunzip Demo.txt Demo1.txt
javatpoint@javatpoint-Inspiron-3542:~$ ls
a           Demo.txt~      examples.desktop  Music      Python-3.8.0
Akash       Desktop          hello.c          Newfolder  sample
a.out       Directory        hello.i          new.txt    snap
composer.phar Documents      hello.o          pico      Templates
demo1.pdf   Downloads        hello.s          Pictures   Test.pdf
Demo1.txt   eclipse         index.html     project    Videos
Demo.sh     eclipse-installer mail
Demo.txt    eclipse-workspace marks.txt      Public
javatpoint@javatpoint-Inspiron-3542:~$
```

Linux Utility Commands

35. find Command

The [find](#) command is used to find a particular file within a directory. It also supports various options to find a file such as byname, by type, by date, and more.

The following symbols are used after the find command:

(.) : For current directory name

(/) : For root

Syntax:

1. find . -name "*.pdf"

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ find . -name "*.pdf"
./Test.pdf
./Python-3.8.0/Doc/library/turtle-star.pdf
./Akash/Joomla/Origional Copy/Brochure-Joomla-2019.pdf
./Akash/Joomla/Origional Copy/Joomla-Guide-Final.pdf
./.local/share/Trash/files/2400966-250544e72f817db3bcef-1587140240830.pdf
./.local/share/Trash/files/2400966-3ad982eaa58c5d43fb53-1585763620407.pdf
find: './anydesk/incoming': Permission denied
./Downloads/ConfirmationPage_20030070774.pdf
./demo1.pdf
find: './dbus': Permission denied
find: './cache/dconf': Permission denied
./Directory/demo.pdf
./Directory/demo2.pdf
./Directory/demo1.pdf
```

36. locate Command

The [locate](#) command is used to search a file by file name. It is quite similar to find command; the difference is that it is a background process. It searches the file in the database, whereas the find command searches in the file system. It is faster than the find command. To find the file with the locates command, keep your database updated.

Syntax:

1. locate <file name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ locate sysctl.conf
/etc/sysctl.conf
/etc/sysctl.d/99-sysctl.conf
/etc/ufw/sysctl.conf
/snap/core/8935/etc/sysctl.conf
/snap/core/8935/etc/sysctl.d/99-sysctl.conf
/snap/core/9066/etc/sysctl.conf
/snap/core/9066/etc/sysctl.d/99-sysctl.conf
/snap/core18/1705/etc/sysctl.d/99-sysctl.conf
/snap/core18/1754/etc/sysctl.d/99-sysctl.conf
/usr/share/doc/procps/examples/sysctl.conf
/usr/share/man/man5/sysctl.conf.5.gz
```

37. date Command

The [date](#) command is used to display date, time, time zone, and more.

Syntax:

1. date

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ date
Fri May 22 21:51:05 IST 2020
```

38. cal Command

The [cal](#) command is used to display the current month's calendar with the current date highlighted.

Syntax:

1. cal<

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ cal
      May 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
```

39. sleep Command

The [sleep](#) command is used to hold the terminal by the specified amount of time. By default, it takes time in seconds.

Syntax:

1. sleep <time>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ sleep 4
```

40. time Command

The [time](#) command is used to display the time to execute a command.

Syntax:

1. time

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ time  
real    0m0.000s  
user    0m0.000s  
sys     0m0.000s
```

41. zcat Command

The zcat command is used to display the compressed files.

Syntax:

1. zcat <file name>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ ls  
a           Demo.txt.gz      examples.desktop  Music      Python-3.8.0  
Akash       Desktop          hello.c          Newfolder  sample  
a.out       Directory        hello.i          new.txt   snap  
composer.phar Documents      hello.o          pico      Templates  
demo1.pdf   Downloads       hello.s          Pictures  Test.pdf  
Demo1.txt   eclipse         index.html      project   Videos  
Demo.sh     eclipse-installer mail          Public  
Demo.txt~   eclipse-workspace marks.txt      Python  
javatpoint@javatpoint-Inspiron-3542:~$ zcat Demo.txt  
1  
2  
3  
4  
5  
6
```

42. df Command

The [df](#) command is used to display the disk space used in the file system. It displays the output as in the number of used blocks, available blocks, and the mounted directory.

Syntax:

1. df

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
udev            1931652       0   1931652   0% /dev
tmpfs           393260     1756   391504   1% /run
/dev/sda1      479668904 26471148 428762148   6% /
tmpfs           1966284   243536   1722748  13% /dev/shm
tmpfs            5120        4     5116   1% /run/lock
tmpfs           1966284       0   1966284   0% /sys/fs/cgroup
/dev/loop1      231936   231936       0 100% /snap/wine-platform-runtime/136
/dev/loop2      144128   144128       0 100% /snap/gnome-3-26-1604/98
/dev/loop4      384        384       0 100% /snap/gnome-characters/539
/dev/loop6      220160   220160       0 100% /snap/wine-platform-5-stable/4
/dev/loop5      164096   164096       0 100% /snap/gnome-3-28-1804/116
```

43. mount Command

The [mount](#) command is used to connect an external device file system to the system's file system.

Syntax:

1. mount -t type <device> <directory>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=1931652k,nr_inodes=482913,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=393260k,mode=755)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
```

44. exit Command

Linux [exit](#) command is used to exit from the current shell. It takes a parameter as a number and exits the shell with a return of status number.

Syntax:

1. exit

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ exit
```

After pressing the ENTER key, it will exit the terminal.

45. clear Command

Linux [clear](#) command is used to clear the terminal screen.

Syntax:

1. clear

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ ls
a           Demo.txt.gz      examples.desktop  Music       Python-3.8.0
Akash       Desktop          hello.c          Newfolder   sample
a.out       Directory        hello.i          new.txt     snap
composer.phar Documents      hello.o          pico        Templates
demo1.pdf   Downloads        hello.s          Pictures    Test.pdf
Demo1.txt   eclipse          index.html     project     Videos
Demo.sh     eclipse-installer mail
Demo.txt~   eclipse-workspace marks.txt
javatpoint@javatpoint-Inspiron-3542:~$ clear
```

After pressing the ENTER key, it will clear the terminal screen.

Linux Networking Commands

46. ip Command

Linux [ip](#) command is an updated version of the ipconfig command. It is used to assign an IP address, initialize an interface, disable an interface.

Syntax:

1. ip a or ip addr

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    qlen 1000
        link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 scope host lo
            valid_lft forever preferred_lft forever
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: enp7s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state DOWN
    group default qlen 1000
        link/ether 74:e6:e2:02:93:b8 brd ff:ff:ff:ff:ff:ff
3: wlp6s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP
    group default qlen 1000
        link/ether 00:71:cc:00:e2:89 brd ff:ff:ff:ff:ff:ff
        inet 192.168.43.240/24 brd 192.168.43.255 scope global dynamic noprefixroute
            wlp6s0
                valid_lft 2296sec preferred_lft 2296sec
                inet6 fe80::8c59:e84e:1670:27cc/64 scope link noprefixroute
                    valid_lft forever preferred_lft forever
```

47. ssh Command

Linux [ssh](#) command is used to create a remote connection through the ssh protocol.

Syntax:

1. ssh user_name@host(IP/Domain_name)</p>

48. mail Command

The [mail](#) command is used to send emails from the command line.

Syntax:

1. mail -s "Subject" <recipient address>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ mail -s "Hello World" Himanshudubey481@gmail.com
Cc:
Hello There
Hope you are doing well.
```

49. ping Command

The [ping](#) command is used to check the connectivity between two nodes, that is whether the server is connected. It is a short form of "Packet Internet Groper."

Syntax:

1. ping <destination>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ ping javatpoint.com
PING javatpoint.com (194.169.80.121) 56(84) bytes of data.
64 bytes from www.javatpoint.com (194.169.80.121): icmp_seq=1 ttl=48 time=3889 ms
64 bytes from www.javatpoint.com (194.169.80.121): icmp_seq=2 ttl=48 time=3043 ms
64 bytes from www.javatpoint.com (194.169.80.121): icmp_seq=3 ttl=48 time=2136 ms
64 bytes from www.javatpoint.com (194.169.80.121): icmp_seq=4 ttl=48 time=1122 ms
```

50. host Command

The [host](#) command is used to display the IP address for a given domain name and vice versa. It performs the DNS lookups for the DNS Query.

Syntax:

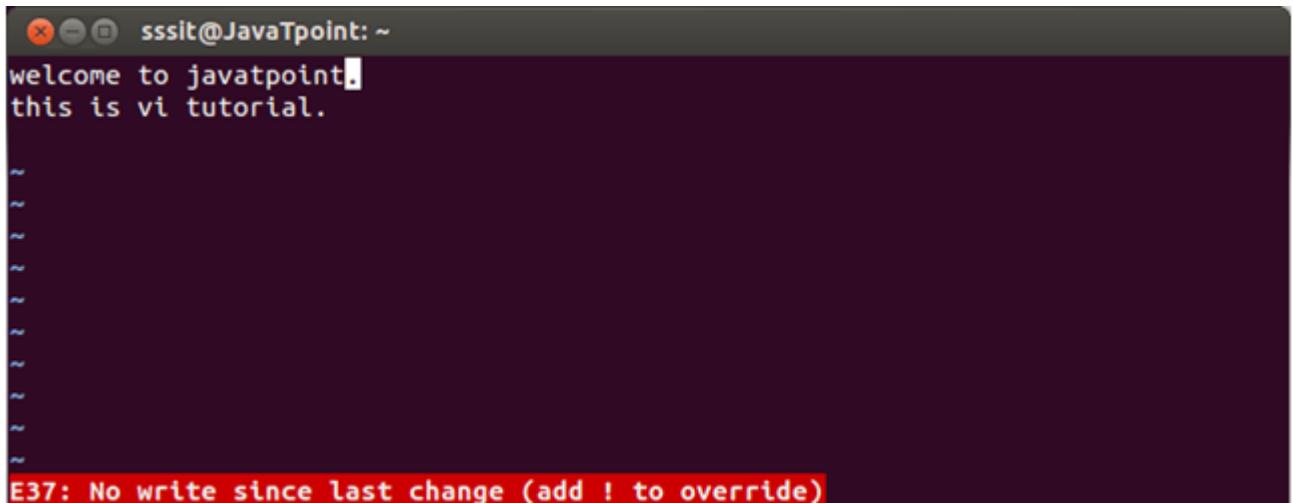
1. host <domain name> or <ip address>

Output:

```
javatpoint@javatpoint-Inspiron-3542:~$ host javatpoint.com
javatpoint.com has address 194.169.80.121
```

vi:

If you want to quit without saving the file, use **:q**. This command will only work when you have not made any changes in the file.



```
sssit@JavaPoint: ~
welcome to javatpoint.
this is vi tutorial.

~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
E37: No write since last change (add ! to override)
```

Look at the above snapshot, this file is modified and hence on typing **:q** it displays this message at bottom left corner.

The above file can be saved with the command **:!q**. It discards the changes made in the file and save it.



```
sssit@JavaPoint: ~
welcome to javatpoint.
this is vi tutorial.

~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
:
!: !q
```

Look at the above snapshot, we have typed **:!q**, it will save our file by discarding the changes made.

To switch from command to insert mode:

Command	Action
i	Start typing before the current character
I	Start typing at the start of current line
a	Start typing after the current character

- A Start typing at the end of current line
- o Start typing on a new line after the current line
- O Start typing on a new line before the current line

To delete:

Commands	Action
x	Delete the current character
X	Delete the character before the cursor
r	Replace the current character
xp	Switch two characters
dd	Delete the current line
D	Delete the current line from current character to the end of the line
dG	delete from the current line to the end of the file

To repeat and undo:

Commands	Action
u	Undo the last command
.	Repeat the last command

Command to cut, copy and paste:

Commands	Action
dd	Delete a line
yy	(yank yank) copy a line
p	Paste after the current line
P	Paste before the current line

Command to cut, copy and paste in blocks:

Commands	Action
<n>dd	Delete the specified n number of lines
<n>yy	Copy the specified n number of lines

Start and end of line:

Commands	Action
θ	Bring at the start of the current line
^	Bring at the start of the current line
\$	Bring at the end of the current line
dθ	Delete till start of a line
d\$	Delete till end of a line

Search a string:

Commands	Action
-----------------	---------------

/string	Forward search for given string
?string	Backward search for given string
/^string	Forward search string at beginning of a line
/string\$	Forward search string at end of a line
n	Go to next occurrence of searched string
\<he\>	Search for the word he (and not for there, here, etc.)
/pl[abc]ce	Search for place, plbce, and plcce

Replace all

Syntax:

1. :<startLine,endLine> s/<oldString>/<newString>/g

Example:

Commands	Action
:1,\$ s/readable/changed/	Replace forward with backward from first line to the last line
:3,6 s/letters/neww/g	Replace forward with backward from third line to the ninth line

system commands Following are some of the important system commands in Linux.

uname

This will display the system information.

In the following example we are getting the name of the system.

```
$ uname  
Linux
```

uname -o

This will display the OS information.

In the following example we are getting the OS information.

```
$ uname -o  
GNU/Linux
```

uname -m

This will display the machine hardware information.

In the following example we are getting the machine hardware information.

```
$ uname -m  
x86_64
```

uname -v

This will display the kernel release information.

In the following example we are getting the OS kernel information.

```
$ uname -v  
#21-Ubuntu SMP Tue Apr 24 06:16:15 UTC 2018
```

uname -n

This will display the network node hostname.

In the following example we are getting the network node hostname.

```
$ uname -n  
yusufshakeel-ubuntu
```

uname -a

This will display all the system related information.

In the following example we are getting all the system information.

```
$ uname -a
Linux yusufshakeel-ubuntu 4.15.0-20-generic #21-Ubuntu SMP Tue Apr 24 06:16:15
UTC 2018 x86_64 x86_64 x86_64 GNU/Linux
```

cat /etc/os-release

This will print the version of OS installed.

I have installed Ubuntu 18.04 LTS so I am getting the related information.

```
$ cat /etc/os-release
NAME="Ubuntu"
VERSION="18.04 LTS (Bionic Beaver)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 18.04 LTS"
VERSION_ID="18.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-
policy"
VERSION_CODENAME=bionic
UBUNTU_CODENAME=bionic
```

uptime

This command tells us how long the system has been running.

In the following example we can see that the system has been running for the past 55 minutes.

```
$ uptime
08:37:55 up 55 min,  1 user,  load average: 0.00, 0.02, 0.06
```

reboot

This will reboot the system.

```
$ reboot
```

shutdown

This will shutdown the system.

```
$ shutdown
```

whoami

This command will print the current user.

In the following example we are getting the current user.

```
$ whoami
yusufshakeel
```

hostname

This command will print the current hostname.

In the following example we are getting the current hostname.

```
$ hostname  
yusufshakeel-ubuntu
```

hostname -i

This command will print the current hostname IP address.

In the following example we are getting the current hostname IP address.

```
$ hostname -i  
127.0.1.1
```