

Some of the useful and basic linux cli commands are given below :-

PWD

This command is used to print the current working directory.

- L => Prints the absolute physical path
- P => Prints the absolute path with resolved symlinks

```
vuyraj in ~ λ ln -s ~/Desktop ~/dsk
vuyraj in ~ λ ls
Desktop Documents Downloads dsk git go Music Pictures Public snap temp Templates Videos
vuyraj in ~ λ cd dsk
vuyraj in ~/dsk λ ls
Yuvraj_Sah_Resume.pdf
vuyraj in ~/dsk λ pwd
/home/vuyraj/dsk
vuyraj in ~/dsk λ pwd -L
/home/vuyraj/dsk
vuyraj in ~/dsk λ pwd -P
/home/vuyraj/Desktop
vuyraj in ~/dsk λ cd ~/Desktop
vuyraj in ~/Desktop λ ls
Yuvraj_Sah_Resume.pdf
vuyraj in ~/Desktop λ |
```

Cd

This command is used for changing the Directory.

- L => without resolving links
 - P => after resolving links
1. cd / => goto root directory
 2. cd => goto home directory
 3. cd .. => goto parent directory
 4. cd . => goto current directory
 5. cd - => goto previous directory

There is a new smarter cd command named zoxide for changing directories written in rust. It keeps track of the directories we use most frequently, and uses a ranking algorithm to navigate to the best match.

```
vuyraj in ~/temp λ ll
drwxr-xr-x@ - vuyraj vuyraj 7 Jan 15:03 docker-exercises
lrwxrwxrwx@ - vuyraj vuyraj 21 Jan 17:30 dsk -> /home/vuyraj/Desktop
drwxr-xr-x@ - vuyraj vuyraj 4 Jan 21:37 fullghostty
.rw xr-xr-x@ 10k vuyraj vuyraj 21 Jan 14:43 gameoflife.sh
.rw-r--r--@ 579 vuyraj vuyraj 21 Jan 14:45 gen0
drwxr-xr-x@ - vuyraj vuyraj 20 Jan 02:37 kubernetes

vuyraj in ~/temp λ cd dsk
vuyraj in ~/temp/dsk λ ls
Yuvraj_Sah_Resume.pdf
vuyraj in ~/temp/dsk λ cd -L ..
vuyraj in ~/temp λ cd dsk
vuyraj in ~/temp/dsk λ cd -P ..
vuyraj in ~ λ cd /home/vuyraj/temp/dsk
vuyraj in ~/temp/dsk λ cd -P .
vuyraj in ~/Desktop λ █
```

Ls

This command is used for listing directory contents. It lists alphabetically and vertically.

flags : - a => all contents including hidden one - I => in long format , horizontally - s => show by size - I => ignore pattern - r => sort in reverse - t => sort by time - h => human readable - d => only directories

I was using eza for listing which is a new tool for listing and it gives a nice color format as well as other features.

```
vuyraj in ~ λ ls
Desktop Documents Downloads dsk git go Music Pictures Public snap temp Templates Videos
vuyraj in ~ λ ls -a
.azure .cache .fehbg .local .nvm .shell.pre-oh-my-zsh .ubuntu24.10.draft.txt .zcompdump .zshrc git snap
.bash_history .cargo .gtkrc-2.0 .minikube .oh-my-zsh .shutter .var .zcompdump-192-5.9 Desktop go temp
.bash_logout .config .gtkrc-2.0-kde4 .mozilla .pki .ssh .vnc .zcompdump-192-5.9.zwc Documents Music Templates
.bash_profile .docker .histfile .npm .profile .telnet_history .vscode .zsh_history Downloads Pictures Videos
.bashrc .dotnet .kube .nv .rustup .themes .Xauthority .zshenv dsk Public
vuyraj in ~ λ ls -I "D*"
dsk git go Music Pictures Public snap temp Templates Videos
vuyraj in ~ λ ls -lhr
Permissions Size User Group Date Modified Name
drwxr-xr-x@ - vuyraj vuyraj 20 Jan 13:37 Videos
drwxr-xr-x@ - vuyraj vuyraj 18 Dec 2024 Templates
drwxr-xr-x@ - vuyraj vuyraj 21 Jan 18:57 temp
drwx-----@ - vuyraj vuyraj 17 Jan 00:01 snap
drwxr-xr-x@ - vuyraj vuyraj 18 Dec 2024 Public
drwxr-xr-x@ - vuyraj vuyraj 21 Jan 18:34 Pictures
drwxr-xr-x@ - vuyraj vuyraj 18 Dec 2024 Music
drwxr-xr-x@ - vuyraj vuyraj 25 Dec 2024 go
drwxr-xr-x@ - vuyraj vuyraj 8 Jan 19:38 git
ltxrwxrwxrwx@ - vuyraj vuyraj 21 Jan 17:30 dsk -> /home/vuyraj/Desktop
drwxr-xr-x@ - vuyraj vuyraj 17 Jan 23:35 Downloads
drwxr-xr-x@ - vuyraj vuyraj 31 Dec 2024 Documents
drwxr-xr-x@ - vuyraj vuyraj 21 Jan 17:28 Desktop
```

Cat

This command is used to print and concatenate file.

- Print the contents of a file to stdout:
`cat path/to/file`
- Concatenate several files into an output file:

```
        `cat path/to/file1 path/to/file2 ... >
path/to/output_file
    - Append several files to an output file:
          `cat path/to/file1 path/to/file2 ... >>
path/to/output_file
    - Write stdin to a file:
          cat - > path/to/file
    - [n]umber all output lines:
          `cat -n path/to/file
```

```
vuyraj in ~/temp λ cat > file
Hello world
we are concatenating file.
^C
vuyraj in ~/temp λ cat file
Hello world
we are concatenating file.
vuyraj in ~/temp λ cat >> file
now appending file text....
^C
vuyraj in ~/temp λ cat file
Hello world
we are concatenating file.
now appending file text....
```

Cp

This command is used to copy files and directories.

```
flags: - r => copy recursively - i => copy interactively - v => in verbose mode
- t => multiple file at once - --parents => create any missing intermediate
directories.
```

```
vuyraj in ~/temp λ ls
axx bxx docker-exercises file fullghostty gameoflife.sh gen0 kubernetes
vuyraj in ~/temp λ mkdir copied
vuyraj in ~/temp λ cp -riv fullghostty copied
'fullghostty' -> 'copied/fullghostty'
'fullghostty/Dockerfile' -> 'copied/fullghostty/Dockerfile'
vuyraj in ~/temp λ ls fullghostty
Dockerfile
vuyraj in ~/temp λ ls copied
fullghostty
vuyraj in ~/temp λ ls copied/fullghostty
Dockerfile
vuyraj in ~/temp λ |
```

Mv

This command is used to move or rename files or directories

```
-- force => forcefully move the file
-- interactive => ask for confirmation before overwriting
the files.
```

```
vuyraj in ~/temp λ ls
axx bxx copied docker-exercises file fullghostty gameoflife.sh gen0 kubernetes
vuyraj in ~/temp λ mv file renamed_file
vuyraj in ~/temp λ ls
axx copied fullghostty gen0 renamed_file
bxx docker-exercises gameoflife.sh kubernetes
vuyraj in ~/temp λ |
```

Mkdir

This command is used to make a directory. It can be used to set permissions while creating the directory.

```
flags: -p => Create parents directory if needed -m => Create directories with
specific permissions
```

```
vuyraj in ~/temp λ ls
axx bxx copied docker-exercises file fullghostty gameoflife.sh gen0 kubernetes
vuyraj in ~/temp λ mv file renamed_file
vuyraj in ~/temp λ ls
axx copied fullghostty gen0 renamed_file
bxx docker-exercises gameoflife.sh kubernetes
vuyraj in ~/temp λ ls
axx copied fullghostty gen0 renamed_file
bxx docker-exercises gameoflife.sh kubernetes
vuyraj in ~/temp λ mkdir -p hello/world
vuyraj in ~/temp λ ls -r hello
world
vuyraj in ~/temp λ ls
axx copied fullghostty gen0 kubernetes
bxx docker-exercises gameoflife.sh hello renamed_file
vuyraj in ~/temp λ |
```

Rm

This command is used to remove files or directories (rmdir).

flags: - r => delete recursively - f => delete forcefully - i => delete interactively - v => Verbose

```
vuyraj in ~/temp λ rm -rfi hello
rm: descend into directory 'hello'? y
rm: descend into directory 'hello/world'? y
rm: remove regular file 'hello/world/renamed_file'? y
rm: remove directory 'hello/world'? y
rm: remove directory 'hello'? y
vuyraj in ~/temp λ |
```

Touch

This command is used to create files and can also set access/modification times.

```
vuyraj in ~/temp/tmp λ ls  
file1 file2  
vuyraj in ~/temp/tmp λ ll  
.rw-r--r--@ 0 vuyraj vuyraj 22 Jan 12:04 file1  
.rw-r--r--@ 0 vuyraj vuyraj 22 Jan 12:04 file2  
vuyraj in ~/temp/tmp λ touch -c -m file1  
vuyraj in ~/temp/tmp λ ll  
.rw-r--r--@ 0 vuyraj vuyraj 22 Jan 12:05 file1  
.rw-r--r--@ 0 vuyraj vuyraj 22 Jan 12:04 file2  
vuyraj in ~/temp/tmp λ |
```

Locate

This command is used to find the filenames. It looks for the pattern in database

- i => ignore case-sensitivity
- l => sets limit
- c => print the total number of match found

```
/var/lib/snapd/snap/core/17200/usr/share/bash-completion/completions/file  
/var/lib/snapd/snap/core18/2846/usr/share/bash-completion/completions/file  
/var/lib/snapd/snap/core20/2434/usr/bin/file  
/var/lib/snapd/snap/core20/2434/usr/lib/file  
/var/lib/snapd/snap/core20/2434/usr/share/file  
/var/lib/snapd/snap/core20/2434/usr/share/bash-completion/completions/file  
/var/lib/snapd/snap/core20/2434/usr/share/bug/file  
/var/lib/snapd/snap/core20/2434/usr/share/doc/file  
/var/lib/snapd/snap/core22/1722/usr/share/bash-completion/completions/file  
vuyraj in ~/temp/tmp λ locate -c '/file'  
70  
vuyraj in ~/temp/tmp λ locate -c -l 49 '/file'  
49  
vuyraj in ~/temp/tmp λ locate -c -i '/file'  
90  
vuyraj in ~/temp/tmp λ locate -c -i 'file'  
299262  
vuyraj in ~/temp/tmp λ locate -c 'file'  
298709  
vuyraj in ~/temp/tmp λ |
```

Find

This command is used to find files or directories under a directory tree, recursively.

```
vuyraj in ~/temp/tmp λ touch find.found
vuyraj in ~/temp/tmp λ ls
file1 file2 find.found
vuyraj in ~/temp/tmp λ find ~ -name '*.found'
/home/vuyraj/temp/tmp/find.found
vuyraj in ~/temp/tmp λ find ~ -type d -iname 'kube*'
/home/vuyraj/.cache/libdnf5/kubernetes-fc47d0f70a6f1be1
/home/vuyraj/temp/kubernetes
/home/vuyraj/.oh-my-zsh/plugins/kube-ps1
/home/vuyraj/.oh-my-zsh/plugins/kubectl
/home/vuyraj/.oh-my-zsh/plugins/kubectx
vuyraj in ~/temp/tmp λ |
```

Grep

This command is used to find patterns in files or texts using regular expressions.

flags: - F => disable regular expression search - r => search recursively - o => print for only matching - v => print inverted match (lines that do not match a pattern)

```
vuyraj in ~/temp/tmp λ ls
file1 file2 find.found
vuyraj in ~/temp/tmp λ echo "heloooo world" > file1
vuyraj in ~/temp/tmp λ cat file1 | grep oo
heloooo world
vuyraj in ~/temp/tmp λ cat file1 | grep -v oo
vuyraj in ~/temp/tmp λ cat file1 | grep -H -n 'or'
(standard input):1:heloooo world
vuyraj in ~/temp/tmp λ |
```

Sudo

This command is used to run a single command as the superuser.

```
vuyraj in ~/temp/tmp λ sudo less /var/log/hawkey.log
[sudo] password for vuyraj:
vuyraj in ~/temp/tmp λ sudo --shell
[root@192]~/home/vuyraj/temp/tmp# exit
vuyraj in ~/temp/tmp λ sudo --list
Matching Defaults entries for vuyraj on 192:
    !visiblepw, always_set_home, match_group_by_gid, always_query_group_plugin,
    env_reset, env_keep="COLORS DISPLAY HOSTNAME HISTSIZE KDEDIR LS_COLORS",
    env_keep+="MAIL QTDIR USERNAME LANG LC_ADDRESS LC_CTYPE", env_keep+="LC_COLLATE
    LC_IDENTIFICATION LC_MEASUREMENT LC_MESSAGES", env_keep+="LC_MONETARY LC_NAME
    LC_NUMERIC LC_PAPER LC_TELEPHONE", env_keep+="LC_TIME LC_ALL LANGUAGE LINGUAS
    _XKB_CHARSET XAUTHORITY",
    secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin\:/va
r/lib/snapd/snap/bin

User vuyraj may run the following commands on 192:
    (ALL) ALL
vuyraj in ~/temp/tmp λ |
```

SSH

This command known as Secure Shell is a protocol used to securely log onto remote systems. It can be used for logging or executing commands on a remote server. It uses the remote servers ip address or domain and the username to log into the server as the provided username. Use `-p` for connecting to a specific port of server.

```
vuyraj in ~/temp λ ssh yuv@20.83.179.175
The authenticity of host '20.83.179.175 (20.83.179.175)' can't be established.

Warning: Permanently added '20.83.179.175' (ED25519) to the list of known hosts.
yuv@20.83.179.175's password:
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1078-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Wed Jan 22 08:25:54 UTC 2025

 System load:  0.86           Processes:      134
 Usage of /:   5.3% of 28.89GB  Users logged in:  0
 Memory usage: 3%            IPv4 address for eth0: 10.0.0.4
 Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.
```

Df

This command is used to display an overview of the filesystem disk space usage.

flags: - h => human readable

```
vuyraj in ~/temp/tmp λ df -h | head
Filesystem      Size  Used Avail Use% Mounted on
/dev/nvme0n1p6  92G   25G   65G  28% /
devtmpfs        4.0M   0    4.0M  0% /dev
tmpfs          7.7G   3.5M   7.7G  1% /dev/shm
efivarfs       374K  243K  127K  66% /sys/firmware/efi/efivars
tmpfs          3.1G  2.1M  3.1G  1% /run
tmpfs          1.0M   0    1.0M  0% /run/credentials/systemd-journald.service
tmpfs          1.0M   0    1.0M  0% /run/credentials/systemd-network-generator.service
tmpfs          1.0M   0    1.0M  0% /run/credentials/systemd-udev-load-credentials.service
tmpfs          1.0M   0    1.0M  0% /run/credentials/systemd-sysctl.service
vuyraj in ~/temp/tmp λ df -h -i -T | head
Filesystem      Type     INodes IUsed  IFree IUse% Mounted on
/dev/nvme0n1p6 btrfs      0     0     0     -  /
devtmpfs        devtmpfs  2.0M   843   2.0M  1% /dev
tmpfs          tmpfs     2.0M   23    2.0M  1% /dev/shm
efivarfs       efivarfs  0     0     0     - /sys/firmware/efi/efivars
tmpfs          tmpfs     800K  1.6K  799K  1% /run
tmpfs          tmpfs     1.0K   2    1022  1% /run/credentials/systemd-journald.service
tmpfs          tmpfs     1.0K   2    1022  1% /run/credentials/systemd-network-generator.service
tmpfs          tmpfs     1.0K   2    1022  1% /run/credentials/systemd-udev-load-credentials.service
tmpfs          tmpfs     1.0K   2    1022  1% /run/credentials/systemd-sysctl.service
vuyraj in ~/temp/tmp λ df | head
Filesystem  1K-blocks  Used Available Use% Mounted on
/dev/nvme0n1p6 96098304 25845084 68126260 28% /
devtmpfs        4096     0    4096  0% /dev
tmpfs          8043360   3568  8039792 1% /dev/shm
efivarfs       374     243    127  66% /sys/firmware/efi/efivars
tmpfs          3217348   2148  3215200 1% /run
tmpfs          1024     0    1024  0% /run/credentials/systemd-journald.service
tmpfs          1024     0    1024  0% /run/credentials/systemd-network-generator.service
tmpfs          1024     0    1024  0% /run/credentials/systemd-udev-load-credentials.service
tmpfs          1024     0    1024  0% /run/credentials/systemd-sysctl.service
vuyraj in ~/temp/tmp λ
```

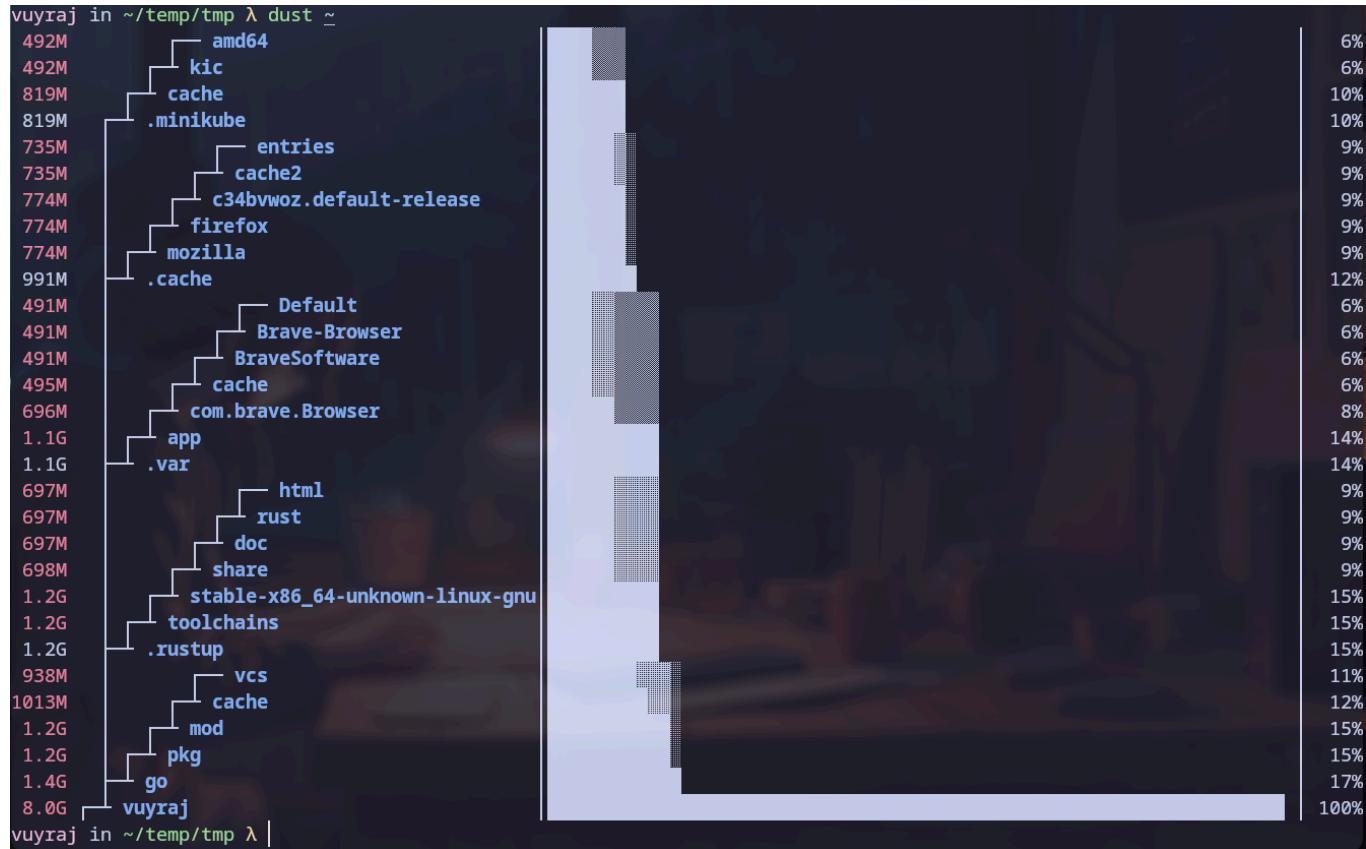
Du

This command is used to see the file and directories space usage.

```
flags: - h => in human readable form - b|k|m => show size in unit of (B/KiB/MiB)
- a => all files or directories - c => show cumulative total at the end
```

```
vuyraj in ~/temp/tmp λ du ~/temp/tmp
4      /home/vuyraj/temp/tmp
vuyraj in ~/temp/tmp λ du -h ~/temp/tmp
4.0K   /home/vuyraj/temp/tmp
vuyraj in ~/temp/tmp λ du -m ~/temp/tmp
1      /home/vuyraj/temp/tmp
vuyraj in ~/temp/tmp λ du -b ~/temp/tmp
14     /home/vuyraj/temp/tmp
vuyraj in ~/temp/tmp λ du -ah ~/temp/tmp
4.0K   /home/vuyraj/temp/tmp/file1
0      /home/vuyraj/temp/tmp/file2
0      /home/vuyraj/temp/tmp/find.found
4.0K   /home/vuyraj/temp/tmp
vuyraj in ~/temp/tmp λ du -ch ./*.found
0      ./find.found
0      total
vuyraj in ~/temp/tmp λ |
```

Instead Use Dust another tool which gives a graphical view in command line.



Free

This command is used to display amount of free and used memory in the system.

flags: - h => human readable - b|k|m|g => in the provided unit - s => at every provided second refresh the output.

```
vuyraj in ~/temp/tmp λ free
      total        used         free        shared  buff/cache   available
Mem:    16086724     3610068    7549716      589560      5864188    12476656
Swap:   8388604          0    8388604
vuyraj in ~/temp/tmp λ free -h
      total        used         free        shared  buff/cache   available
Mem:    15Gi       3.4Gi     7.3Gi      535Mi      5.6Gi     11Gi
Swap:   8.0Gi      0B       8.0Gi
vuyraj in ~/temp/tmp λ free -h -s 2
      total        used         free        shared  buff/cache   available
Mem:    15Gi       3.4Gi     7.2Gi      535Mi      5.6Gi     11Gi
Swap:   8.0Gi      0B       8.0Gi
      total        used         free        shared  buff/cache   available
Mem:    15Gi       3.4Gi     7.2Gi      535Mi      5.6Gi     11Gi
Swap:   8.0Gi      0B       8.0Gi
      total        used         free        shared  buff/cache   available
Mem:    15Gi       3.4Gi     7.2Gi      536Mi      5.6Gi     11Gi
Swap:   8.0Gi      0B       8.0Gi
```

Head

This command outputs the first part of the files.

flags: - n | --lines => Output the first few lines of file. with `--` sign at the number we can view everything but last lines - --bytes => Output the first few bytes of a file.

```
vuyraj in ~/temp λ head --lines 15 gameoflife.sh
#!/bin/bash
# life.sh: "Life in the Slow Lane"
# Version 2: Patched by Daniel Albers
#+      to allow non-square grids as input.

# ######
# This is the Bash script version of John Conway's "Game of Life". #
# "Life" is a simple implementation of cellular automata. #
# -----
# On a rectangular grid, let each "cell" be either "living" or "dead". #
# Designate a living cell with a dot, and a dead one with a blank space.#
# Begin with an arbitrarily drawn dot-and-blank grid, #
#+ and let this be the starting generation, "generation 0". #
# Determine each successive generation by the following rules: #
# 1) Each cell has 8 neighbors, the adjoining cells
vuyraj in ~/temp λ head --bytes 105 gameoflife.sh
#!/bin/bash
# life.sh: "Life in the Slow Lane"
# Version 2: Patched by Daniel Albers
#+      to allo%
vuyraj in ~/temp λ |
```

Tail

This command outputs the last part of the files.

flags: - n | --lines => Output the last few lines of file. with `+` sign at the number we can view everything from that line number.

```
vuyraj in ~/temp λ cat gen0
# gen0
#
# This is an example "generation 0" start-up file for "life.sh".
# -----
# The "gen0" file is a 10 x 10 grid using a period (.) for live cells,
#+ and an underscore (_) for dead ones. We cannot simply use spaces
#+ for dead cells in this file because of a peculiarity in Bash arrays.
# [Exercise for the reader: explain this.]
#
# Lines beginning with a '#' are comments, and the script ignores them.
_____._____
_____._____
_____._____
_____._____
_____._____
_____._____
_____._____
_____._____
_____._____
_____._____
vuyraj in ~/temp λ tail --lines 5 gen0
_____._____
_____._____
_____._____
_____._____
_____._____
vuyraj in ~/temp λ tail --bytes 5 gen0
_____
vuyraj in ~/temp λ tail --lines +15 gen0
_____._____
_____._____
_____._____
_____._____
_____._____
vuyraj in ~/temp λ |
```

Diff

This command is used to compare the files and directories.

flags : - w => ignore all the space - y => compare side by side - r => compare directories recursively and only show which files are different.

```
vuyraj in ~/temp/tmp λ echo "heloooo world" >> file1
vuyraj in ~/temp/tmp λ echo "heloooo world" >> file2
vuyraj in ~/temp/tmp λ echo "hell world" >> file2
vuyraj in ~/temp/tmp λ diff file1 file2
2c2
< heloooo world
---
> hell world
vuyraj in ~/temp/tmp λ diff -y file1 file2
heloooo world                                     heloooo world
heloooo world                                     | hell world
vuyraj in ~/temp/tmp λ |
```

Tar

This is an archiving utility. It combines multiples file in a single file . Which is often combined with compression method such as gzip / bzip2 .

flags: - c => Create / Compress - z => gzipped - f => file - x => Extract - t => list - v => Verbose - a => automatically determine compression program

```
vuyraj in ~/temp/tmp λ ls
file1 file2 find(found)
vuyraj in ~/temp/tmp λ tar czf ./arch.tar file1 file2 find(found)
vuyraj in ~/temp/tmp λ ls
arch.tar file1 file2 find(found)
vuyraj in ~/temp/tmp λ tar xvf ./arch.tar
file1
file2
find(found)
vuyraj in ~/temp/tmp λ ls
arch.tar file1 file2 find(found)
vuyraj in ~/temp/tmp λ rm fi
rm: cannot remove 'fi': No such file or directory
vuyraj in ~/temp/tmp λ rm fi*
vuyraj in ~/temp/tmp λ ls
arch.tar
vuyraj in ~/temp/tmp λ tar xvf ./arch.tar
file1
file2
find(found)
vuyraj in ~/temp/tmp λ ls
arch.tar file1 file2 find(found)
vuyraj in ~/temp/tmp λ |
```

Zip

This command packages and compresses (archive) files into a Zip archive.

```
vuyraj in ~/temp/tmp λ zip -r ../arch.zip ../tmp
adding: ../tmp/ (stored 0%)
adding: ../tmp/arch.tar (stored 0%)
adding: ../tmp/file1 (deflated 39%)
adding: ../tmp/file2 (deflated 20%)
adding: ../tmp/find(found) (stored 0%)
vuyraj in ~/temp/tmp λ ls ..
arch.zip axx bxx copied docker-exercises fullghostty gameoflife.sh gen0 kubernetes renamed_file tmp
vuyraj in ~/temp/tmp λ zip -sf ../arch.zip
Archive contains:
  ../tmp/
  ../tmp/arch.tar
  ../tmp/file1
  ../tmp/file2
  ../tmp/find(found)
Total 5 entries (235 bytes)
vuyraj in ~/temp/tmp λ |
```

Chmod

This command changes the access permissions of a file or directory.

args: - u => user to which permission change is applicable - o => others - g =>

groups to which permission change is applicable - + => gives rights/ permissions
- - => remove rights/ permissions] - r => read file permission - w => write file permission - x => execute file permission

vuyraj in ~/temp/tmp λ ll

```
.rw-r--r--@ 182 vuyraj vuyraj 22 Jan 12:52 arch.tar
.rw-r--r--@ 28 vuyraj vuyraj 22 Jan 12:49 file1
.rw-r--r--@ 25 vuyraj vuyraj 22 Jan 12:50 file2
.rw-r--r--@ 0 vuyraj vuyraj 22 Jan 12:22 find.found
```

vuyraj in ~/temp/tmp λ chmod u+x file1

vuyraj in ~/temp/tmp λ ll

```
.rw-r--r--@ 182 vuyraj vuyraj 22 Jan 12:52 arch.tar
.rwxr--r--@ 28 vuyraj vuyraj 22 Jan 12:49 file1
.rw-r--r--@ 25 vuyraj vuyraj 22 Jan 12:50 file2
.rw-r--r--@ 0 vuyraj vuyraj 22 Jan 12:22 find.found
```

vuyraj in ~/temp/tmp λ chmod a+rx file2

vuyraj in ~/temp/tmp λ ll

```
.rw-r--r--@ 182 vuyraj vuyraj 22 Jan 12:52 arch.tar
.rwxr--r--@ 28 vuyraj vuyraj 22 Jan 12:49 file1
.rwxr-xr-x@ 25 vuyraj vuyraj 22 Jan 12:50 file2
.rw-r--r--@ 0 vuyraj vuyraj 22 Jan 12:22 find.found
```

vuyraj in ~/temp/tmp λ chmod 0= find.found

chmod: invalid mode: '0='

Try 'chmod --help' for more information.

vuyraj in ~/temp/tmp λ chmod o= find.found

vuyraj in ~/temp/tmp λ ll

```
.rw-r--r--@ 182 vuyraj vuyraj 22 Jan 12:52 arch.tar
.rwxr--r--@ 28 vuyraj vuyraj 22 Jan 12:49 file1
.rwxr-xr-x@ 25 vuyraj vuyraj 22 Jan 12:50 file2
.rw-r-----@ 0 vuyraj vuyraj 22 Jan 12:22 find.found
```

vuyraj in ~/temp/tmp λ chmod a= arch.tar

vuyraj in ~/temp/tmp λ ll

```
-----@ 182 vuyraj vuyraj 22 Jan 12:52 arch.tar
.rwxr--r--@ 28 vuyraj vuyraj 22 Jan 12:49 file1
.rwxr-xr-x@ 25 vuyraj vuyraj 22 Jan 12:50 file2
.rw-r-----@ 0 vuyraj vuyraj 22 Jan 12:22 find.found
```

vuyraj in ~/temp/tmp λ |

Chown/chgrp

They are used to manage ownership for a file and directory for users and groups. -R is used to change the ownership of the whole directory and its content.

```
vuyraj in ~/temp/tmp λ chown root file1
chown: changing ownership of 'file1': Operation not permitted
vuyraj in ~/temp/tmp λ sudo chown root file1
[sudo] password for vuyraj:
vuyraj in ~/temp/tmp λ ll
.-----@ 182 vuyraj vuyraj 22 Jan 12:52 arch.tar
.rwXr--r--@ 28 root    vuyraj 22 Jan 12:49 file1
.rwXr-xr-x@ 25 vuyraj vuyraj 22 Jan 12:50 file2
.rw-r----@  0 vuyraj vuyraj 22 Jan 12:22 find(found
vuyraj in ~/temp/tmp λ sudo chgrp root file1
vuyraj in ~/temp/tmp λ ll
.-----@ 182 vuyraj vuyraj 22 Jan 12:52 arch.tar
.rwXr--r--@ 28 root    root    22 Jan 12:49 file1
.rwXr-xr-x@ 25 vuyraj vuyraj 22 Jan 12:50 file2
.rw-r----@  0 vuyraj vuyraj 22 Jan 12:22 find(found
vuyraj in ~/temp/tmp λ |
```

Ping

This command is used to check connectivity to a network by sending the a packets to the network hosts.

```
flags: - c => specific no. of times send packets - i => defines interval for
sending packets - w => define timeout for each reply
```

```
vuyraj in ~/temp/tmp λ ping -c 5 -W 5 -i 2 www.google.com
PING www.google.com (2404:6800:4007:82d::2004) 56 data bytes
64 bytes from maa05s28-in-x04.1e100.net (2404:6800:4007:82d::2004): icmp_seq=1 ttl=114 time=54.2 ms
64 bytes from maa05s28-in-x04.1e100.net (2404:6800:4007:82d::2004): icmp_seq=2 ttl=114 time=54.5 ms
64 bytes from maa05s28-in-x04.1e100.net (2404:6800:4007:82d::2004): icmp_seq=3 ttl=114 time=55.1 ms
64 bytes from maa05s28-in-x04.1e100.net (2404:6800:4007:82d::2004): icmp_seq=4 ttl=114 time=54.0 ms
64 bytes from maa05s28-in-x04.1e100.net (2404:6800:4007:82d::2004): icmp_seq=5 ttl=114 time=61.2 ms

--- www.google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 8008ms
rtt min/avg/max/mdev = 54.040/55.818/61.219/2.727 ms
vuyraj in ~/temp/tmp λ ping www.google.com
PING www.google.com (2404:6800:4007:82b::2004) 56 data bytes
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=1 ttl=55 time=78.9 ms
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=2 ttl=55 time=139 ms
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=3 ttl=55 time=54.7 ms
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=4 ttl=55 time=53.7 ms
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=5 ttl=55 time=58.0 ms
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=6 ttl=55 time=54.9 ms
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=7 ttl=55 time=60.1 ms
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=8 ttl=55 time=59.4 ms
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=10 ttl=55 time=54.6 ms
64 bytes from maa03s46-in-x04.1e100.net (2404:6800:4007:82b::2004): icmp_seq=11 ttl=55 time=53.8 ms
^C
--- www.google.com ping statistics ---
11 packets transmitted, 10 received, 9.09091% packet loss, time 10068ms
rtt min/avg/max/mdev = 53.740/66.713/139.108/25.156 ms
vuyraj in ~/temp/tmp λ |
```

Uname

Uname prints information about the machine and operating system it is run on.

```
flags: - all - kernel-name - kernel-version - kernel-release - machine -
processor - operating-system
```

```
vuyraj in ~/temp/tmp λ uname --all
Linux 192.168.101.12 6.12.9-200.fc41.x86_64 #1 SMP PREEMPT_DYNAMIC Thu Jan  9 16:05:40 UTC 2025 x86_64
GNU/Linux
vuyraj in ~/temp/tmp λ |
```

History

This command line tool is used to view recently used commands. It display the commands history list with line numbers.

```
flags: -c => clear the history for running shell session -w => Overwrite history
file with current bash shell examples: - `!!` => substitute with the previous
command - `![0-9]*` => substitute with a command based on its line number found
with history. - `![a-Z ]*` Substitute with the most recent command that starts
with a string.
```

```
vuyraj in ~/temp/tmp λ history | head
 1  cls
 2  clear
 3  ls
 4  cd .oh-my-zsh
 5  ls
 6  cd themes
 7  ls
 8  source .zshrc
 9  cd ..
10  source .zshrc
vuyraj in ~/temp/tmp λ history | tail
1626  cls
1627  ping -c 5 -W 5 -i 2 www.google.com
1628  ping www.google.com
1629  cls
1630  uname --all
1631  uname --processor
1632  cls
1633  history
1634  cls
1635  history | head
vuyraj in ~/temp/tmp λ |
```

Man

This is used to format and display manual pages of a specific command.

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)**, **man-pages(7)**
- 8 System administration commands (usually only for root)

Manual page man(1) line 1 (press h for help or q to quit)]

Top

This command displays dynamic real-time information about running processes.

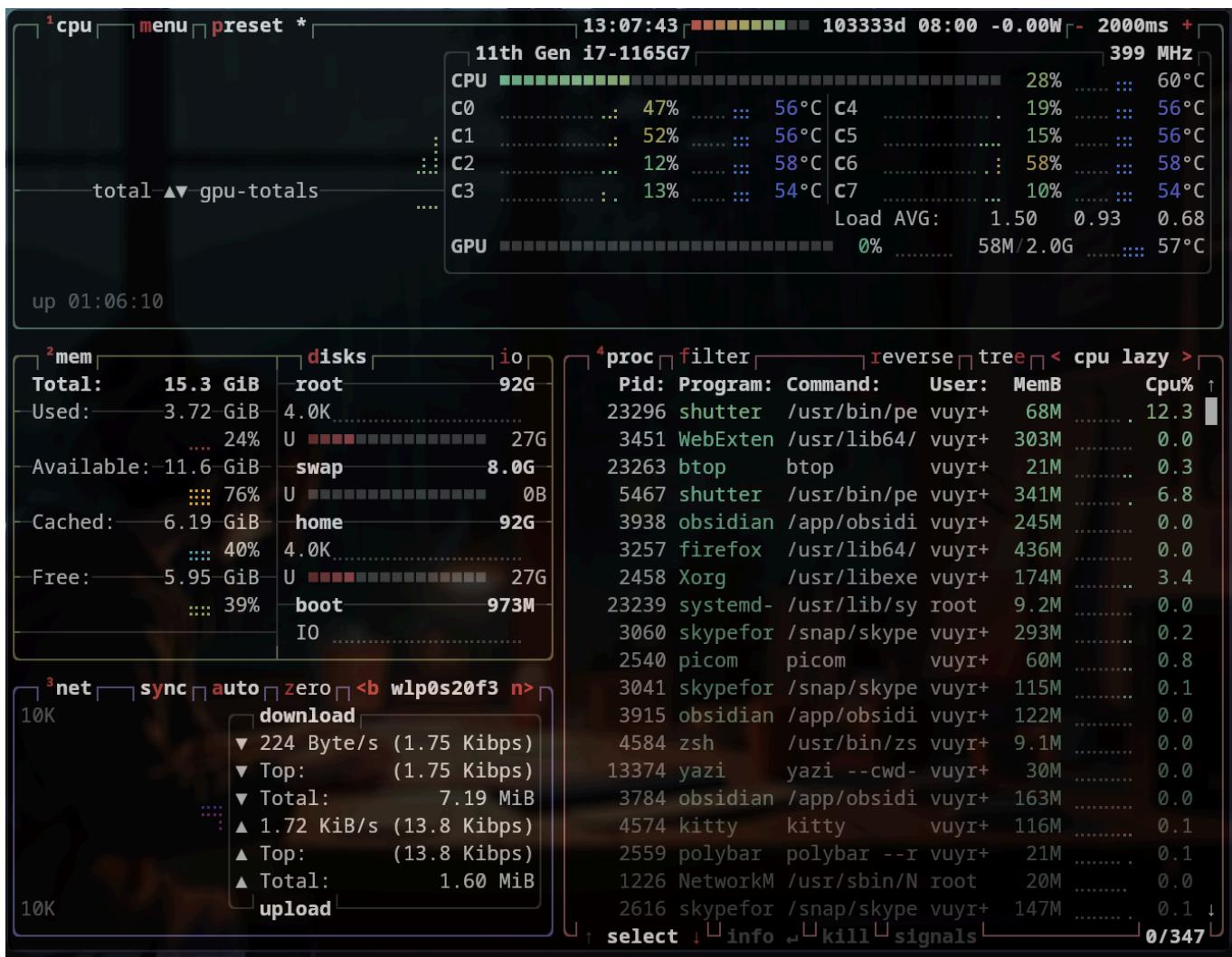
we can use its alternatives like htop, btop, etc.

```

top - 13:07:18 up 1:05, 2 users, load average: 1.09, 0.81, 0.64
Tasks: 347 total, 3 running, 342 sleeping, 0 stopped, 2 zombie
%Cpu(s): 17.9 us, 1.2 sy, 0.0 ni, 79.9 id, 0.3 wa, 0.5 hi, 0.2 si, 0.0 st
MiB Mem : 15709.7 total, 6015.9 free, 3905.3 used, 6814.0 buff/cache
MiB Swap: 8192.0 total, 8192.0 free, 0.0 used. 11804.3 avail Mem

```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
3451	vuyraj	20	0	19.2g	459700	96160	R	107.9	2.9	4:58.59	WebExtensions
23154	vuyraj	20	0	461652	69920	23584	R	37.4	0.4	0:01.13	shutter
2458	vuyraj	20	0	24.9g	177960	130332	S	1.3	1.1	1:15.97	Xorg
679	root	20	0	155896	36196	34916	S	1.0	0.2	0:01.17	systemd-journal
2540	vuyraj	20	0	743864	61904	42692	S	0.7	0.4	0:35.55	picom
2559	vuyraj	20	0	698824	21736	18920	S	0.7	0.1	0:12.86	polybar
3060	vuyraj	20	0	40.9g	300772	142664	S	0.7	1.9	1:04.29	skypeforlinux
3915	vuyraj	20	0	32.8g	125464	89772	S	0.7	0.8	0:22.79	obsidian
18	root	20	0	0	0	0	I	0.3	0.0	0:02.26	rcu_preempt
79	root	-51	0	0	0	0	S	0.3	0.0	0:07.62	irq/9-acpi
509	root	-51	0	0	0	0	S	0.3	0.0	0:07.23	irq/132-DELL0A24:00
826	root	-51	0	0	0	0	S	0.3	0.0	0:00.87	irq/145-iwlwifi:default_queue
981	systemd+	20	0	16092	7276	6508	S	0.3	0.0	0:03.10	systemd-oomd
2474	vuyraj	20	0	328400	17616	14636	S	0.3	0.1	0:01.58	i3
2583	vuyraj	20	0	735532	40300	33104	S	0.3	0.3	0:00.17	volumeicon
2616	vuyraj	20	0	36.8g	150952	111676	S	0.3	0.9	0:11.74	skypeforlinux
2823	vuyraj	20	0	617732	10780	9372	S	0.3	0.1	0:00.31	goa-identity-se
3041	vuyraj	20	0	32.6g	118380	85616	S	0.3	0.7	0:24.94	skypeforlinux
3257	vuyraj	20	0	3549988	445364	217028	S	0.3	2.8	1:20.02	firefox
4059	vuyraj	20	0	615152	11104	9696	S	0.3	0.1	0:00.85	dunst
4574	vuyraj	20	0	1035736	118904	60140	S	0.3	0.7	0:14.57	kitty
21292	root	20	0	0	0	0	I	0.3	0.0	0:00.27	kworker/u32:4-flush-btrfs-1
23127	vuyraj	20	0	233368	5380	3332	R	0.3	0.0	0:00.13	top
1	root	20	0	76888	30100	11064	S	0.0	0.2	0:02.80	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.01	kthreadd
3	root	20	0	0	0	0	S	0.0	0.0	0:00.00	pool_workqueue_release
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-rcu_gp



Jobs

This is a Shell built-in command for viewing information about processes spawned by the current shell.

flags: - l => List jobs and their process IDs - p => Display only process IDs

```
vuyraj in ~/temp/tmp λ ping google.com
PING google.com (2404:6800:4007:819::200e) 56 data bytes
64 bytes from maa05s18-in-x0e.1e100.net (2404:6800:4007:819::200e): icmp_seq=1 ttl=55 time=56.3 ms
64 bytes from maa05s18-in-x0e.1e100.net (2404:6800:4007:819::200e): icmp_seq=2 ttl=55 time=55.7 ms
^Z
[1] + 32175 suspended ping google.com
vuyraj in ~/temp/tmp λ sleep 600 &
[2] 32258
vuyraj in ~/temp/tmp λ jobs
[1] + suspended ping google.com
[2] - running sleep 600
vuyraj in ~/temp/tmp λ jobs -l
[1] + 32175 suspended ping google.com
[2] - 32258 running sleep 600
vuyraj in ~/temp/tmp λ jobs -p
[1] + 32175 suspended ping google.com
[2] - 32258 running sleep 600
vuyraj in ~/temp/tmp λ jobs -r
[2] - running sleep 600
vuyraj in ~/temp/tmp λ |
```

Kill

This command is used to send a signal to a process to kill that particular process which might be unresponsive and unwanted.

Process id of the procee is usually given to the comand.

```
vuyraj in ~ λ ps aux | grep ghostty
vuyraj      27772  2.9  1.0 3013340 164480 ?      Sl   13:22  0:00 ghostty
vuyraj      27931  0.0  0.0 230344  2264 pts/1    S+   13:22  0:00 grep --color=auto --exclude-dir=.bzr
--exclude-dir=CVS --exclude-dir=.git --exclude-dir=.hg --exclude-dir=.svn --exclude-dir=.idea --exclud
e-dir=.tox --exclude-dir=.venv --exclude-dir=venv ghostty
vuyraj in ~ λ kill 27772
vuyraj in ~ λ ps aux | grep ghostty
vuyraj      28005  0.0  0.0 230344  2364 pts/1    S+   13:22  0:00 grep --color=auto --exclude-dir=.bzr
--exclude-dir=CVS --exclude-dir=.git --exclude-dir=.hg --exclude-dir=.svn --exclude-dir=.idea --exclud
e-dir=.tox --exclude-dir=.venv --exclude-dir=venv ghostty
```

Echo

It is used to Print given arguments. It can also be used to append a message to the file using `>>` or overwrite using `>`. It can be used to interpret the varibales as well by prefixing `$` to the variable.

```
flags : - e => Enable interpretation of backslash escapes (special characters)
-n => Print a message without the trailing newline. `echo $? => Print the exit
status of the last executed command`
```

```
vuyraj in ~ λ echo "Hello World"
Hello World
vuyraj in ~ λ echo "My path is $PATH"
My path is /home/vuyraj/.cargo/bin:/home/vuyraj/.local/bin:/home/vuyraj/bin:/usr/local/bin:/usr/local/sbin:/usr/bin:/usr/sbin:/home/vuyraj/.config/rofi/scripts:/var/lib/snapd/snap/bin:/home/vuyraj/go/bin/
vuyraj in ~ λ echo -n "Hello World"
Hello World%
vuyraj in ~ λ echo -e "Column 1\tColumn 2"
Column 1      Column 2
vuyraj in ~ λ |
```

Systemctl

This a powerful command line utility which is used to control the systemd system and service manager.

```
args: - status - start|stop|restart|reload|status - enable|disable - daemon-
reload - is-active|is-enabled|is-failed unit
```

```
vuyraj in ~ λ systemctl status
● 192.168.101.12
  State: running
  Units: 673 loaded (incl. loaded aliases)
    Jobs: 0 queued
  Failed: 0 units
  Since: Wed 2025-01-22 17:46:35 +0545; 4h 21min left
  systemd: 256.11-1.fc41
  Tainted: local-hwclock
  CGroup: /
    |-init.scope
    |  └─1 /usr/lib/systemd/systemd --switched-root --system --deserialize=51 rghb
    └─system.slice
      ├─ModemManager.service
      |  └─1187 /usr/sbin/ModemManager
      ├─NetworkManager.service
      |  └─1226 /usr/sbin/NetworkManager --no-daemon
      ├─abrt-journal-core.service
      |  └─1198 /usr/bin/abrt-dump-journal-core -D -T -f -e
      ├─abrt-oops.service
      |  └─1199 /usr/bin/abrt-dump-journal-oops -fxtD
      ├─abrt-xorg.service
      |  └─1200 /usr/bin/abrt-dump-journal-xorg -fxtD
      ├─abrtd.service
      |  └─1134 /usr/sbin/abrtd -d -s
      ├─accounts-daemon.service
      |  └─1057 /usr/libexec/accounts-daemon
      ├─alsa-state.service
      |  └─1123 /usr/sbin/alsactl -s -n 19 -c -E ALSA_CONFIG_PATH=/etc/alsa/alsactl.conf --initf
      ├─auditd.service
      |  └─989 /usr/sbin/auditd
      ├─avahi-daemon.service
      |  └─1028 "avahi-daemon: running [fedora.local]"
      |     └─1083 "avahi-daemon: chroot helper"
      └─bluetooth.service
```

useradd/userdel

These are used to create or delete users in linux system. Usually they are superuser command.

```
vuyraj in ~/temp/tmp λ sudo useradd tusr
[sudo] password for vuyraj:
vuyraj in ~/temp/tmp λ sudo userdel tusr
vuyraj in ~/temp/tmp λ |
```

Hostname

This command is used to show or set the system's host name.

flags : - i => show the network address of the host - fqdn => shows the Fully Qualified Domain Name

```
vuyraj in ~ λ hostname -I
192.168.101.12 192.168.49.1 172.17.0.1 2404:7c00:49:84c1:1f27:26d1:d0ff:682f
vuyraj in ~ λ hostname -i
192.168.101.12
vuyraj in ~ λ |
```

Wget

This command is used to download files from the Web with the help of its URL. It supports HTTP, HTTPS, and FTP.

```
vuyraj in ~/temp/tmp λ wget google.com
HTTP response 301 Moved Permanently [http://google.com]
Adding URL: http://www.google.com/
Saving 'index.html.1'
HTTP response 200 OK [http://www.google.com/]
index.html.1          100% [=====]     8.41K   --.KB/s
[Files: 1 Bytes: 8.62K [8.24KB/s] Redirects: 1 Todo:]
vuyraj in ~/temp/tmp λ ls
arch.tar  file1  file2  find(found index.html  index.html.1)
vuyraj in ~/temp/tmp λ
```

IP

This command is used to show/manipulate routing, devices, policy routing and tunnels.

args: - address => List interfaces - link => List interfaces with brief link layer info: - route => Display the routing table - neighbour => Show neighbors (ARP table)

```
vuyraj in ~/temp/tmp λ ip
Usage: ip [ OPTIONS ] OBJECT { COMMAND | help }
      ip [ -force ] -batch filename
where OBJECT := { address | addrlabel | fou | help | ila | ioam | l2tp | link |
                  macsec | maddress | monitor | mptcp | mroute | mrule |
                  neighbor | neighbour | netconf | netns | nexthop | ntable |
                  ntbl | route | rule | sr | stats | tap | tcpmetrics |
                  token | tunnel | tuntap | vrf | xfrm }
OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[esolve] |
              -h[uman-readable] | -iec | -j[son] | -p[retty] |
              -f[amily] { inet | inet6 | mpls | bridge | link } |
              -4 | -6 | -M | -B | -0 |
              -l[oops] { maximum-addr-flush-attempts } | -echo | -br[ief] |
              -o[neline] | -t[imestamp] | -ts[hort] | -b[atch] [filename] |
              -rc[vbuf] [size] | -n[etns] name | -N[umeric] | -a[ll] |
              -c[olor]}}
vuyraj in ~/temp/tmp λ ip addr show
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 noprefixroute
        valid_lft forever preferred_lft forever
2: enp3s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state DOWN group default qlen 1000
```

scp/rsync

It is used to copy/ transfer files between hosts over SSH.

SCP is Secure Copy. It copies files between hosts using Secure Copy Protocol over SSH. scp is more secure than rsync.

Rsync transfer files either to or from a remote host by default using SSH. It is better than scp in performance and interrupt handling.

Rsync is a fast file copying tool.

```
vuyraj in ~ λ cd temp
vuyraj in ~/temp λ ls
arch.zip bxx docker-exercises gameoflife.sh kubernetes tmp
axx copied fullghosty gen0 renamed_file
vuyraj in ~/temp λ scp ./arch.zip yuv@20.83.179.175:~
yuv@20.83.179.175's password:
arch.zip                                              100% 1007      3.7KB/s  00:00
vuyraj in ~/temp λ rsync _ yuv@20.83.179.175:~
yuv@20.83.179.175's password:
skipping directory .
vuyraj in ~/temp λ rsync -r _ yuv@20.83.179.175:~
yuv@20.83.179.175's password:
skipping non-regular file "docker-exercises/Finished/01/Answer/node_modules/.bin/handlebars"
skipping non-regular file "docker-exercises/Finished/01/Answer/node_modules/.bin/mime"
skipping non-regular file "docker-exercises/Finished/01/Answer/node_modules/.bin/mkdirp"
skipping non-regular file "docker-exercises/Finished/01/Answer/node_modules/.bin/newman"
yuv@yuvraj:~$ 
yuv@yuvraj:~$ ls
arch.zip
yuv@yuvraj:~$ ls
arch.zip
yuv@yuvraj:~$ ls
arch.zip axx bxx copied docker-exercises gameoflife.sh gen0 renamed_file
yuv@yuvraj:~$ 
```