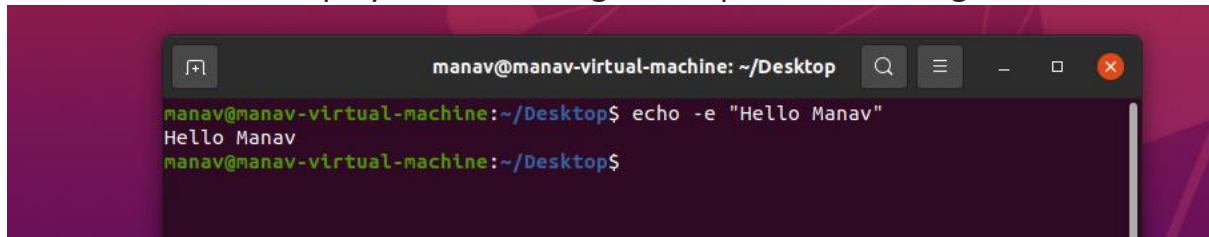


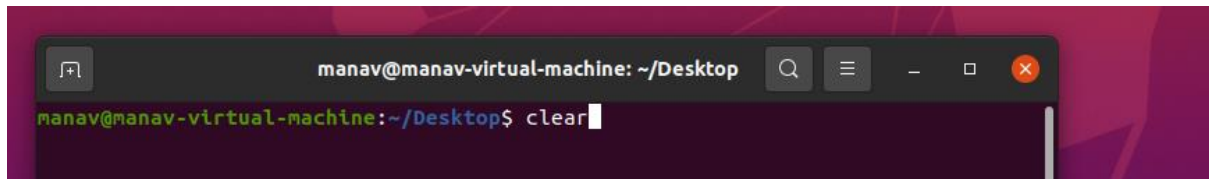
Aim: To execute general purpose utility commands of Unix.

Theory:

1. echo – Used to display a line of string that is passed as an argument.

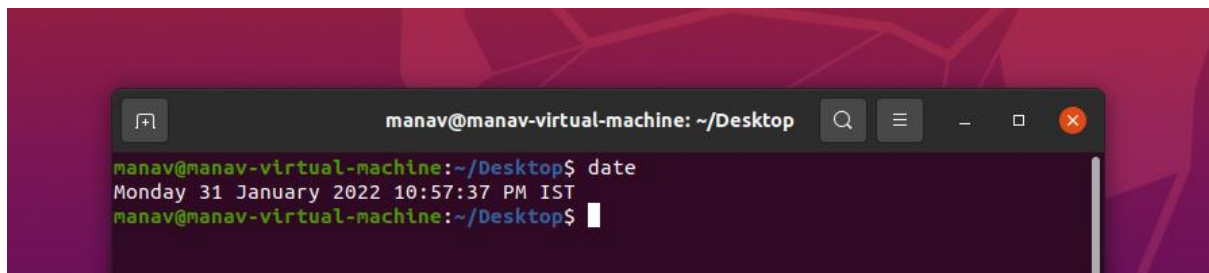
A terminal window titled 'manav@manav-virtual-machine: ~/Desktop'. The prompt is 'manav@manav-virtual-machine:~/Desktop\$'. The command 'echo -e "Hello Manav"' has been entered and executed, resulting in the output 'Hello Manav' on the next line. The prompt is now 'manav@manav-virtual-machine:~/Desktop\$'.

2. clear – Used to clear the terminal screen.

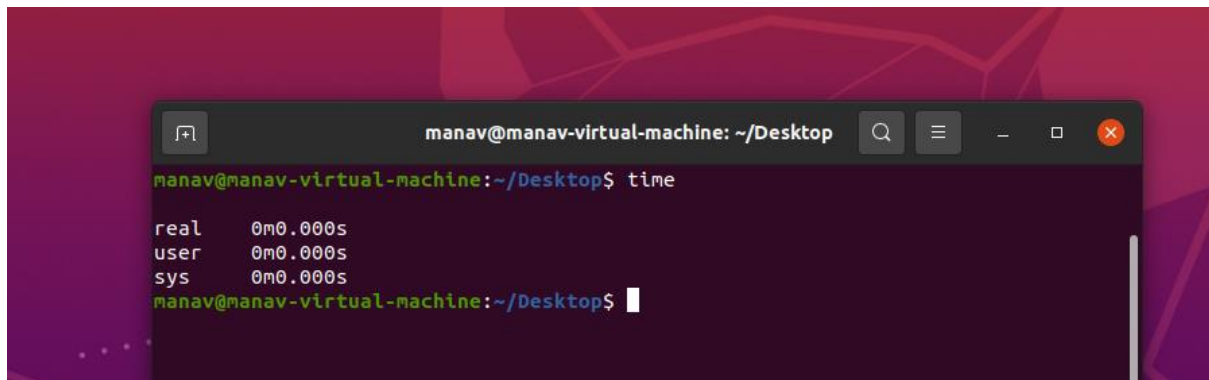
A terminal window titled 'manav@manav-virtual-machine: ~/Desktop'. The prompt is 'manav@manav-virtual-machine:~/Desktop\$'. The command 'clear' has been entered and is currently being executed, as indicated by the cursor at the end of the command line.

3. exit – Used to exit the currently running shell.

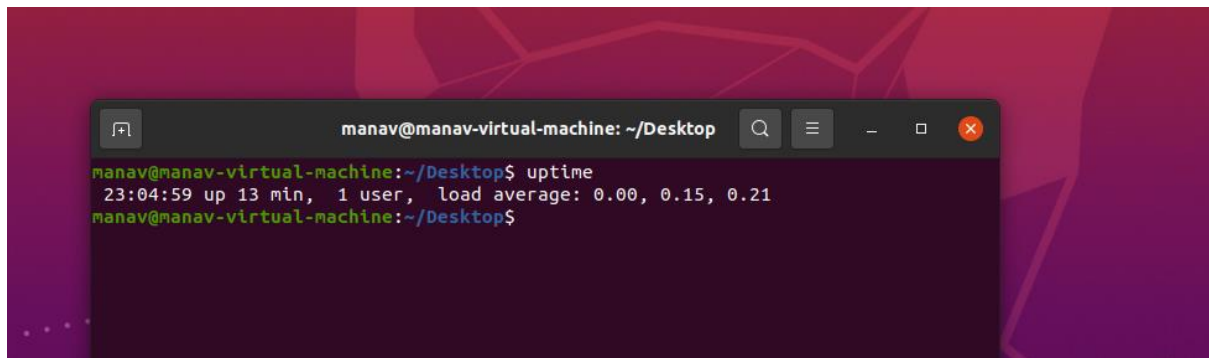
4. date – Used to display system date and time. Can also be used to set system date and time.

A terminal window titled 'manav@manav-virtual-machine: ~/Desktop'. The prompt is 'manav@manav-virtual-machine:~/Desktop\$'. The command 'date' has been entered and executed, resulting in the output 'Monday 31 January 2022 10:57:37 PM IST' on the next line. The prompt is now 'manav@manav-virtual-machine:~/Desktop\$'.

5. time – Used to execute a command and prints a summary of real-time user CPU time and system, CPU time spent by executing a command when it terminates.

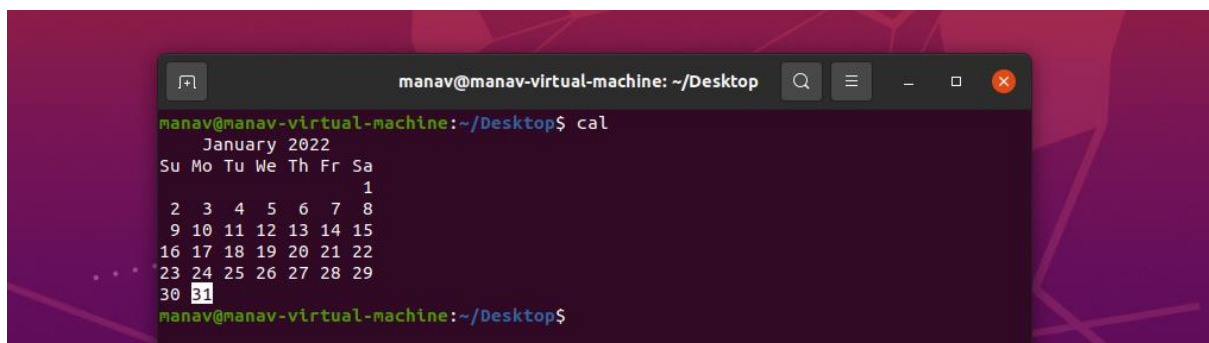
A terminal window titled 'manav@manav-virtual-machine: ~/Desktop'. The prompt is 'manav@manav-virtual-machine:~/Desktop\$'. The command 'time' has been entered and executed, resulting in the output:
real 0m0.000s
user 0m0.000s
sys 0m0.000s
The prompt is now 'manav@manav-virtual-machine:~/Desktop\$'.

6. uptime – Shows how long the system has been up and running.



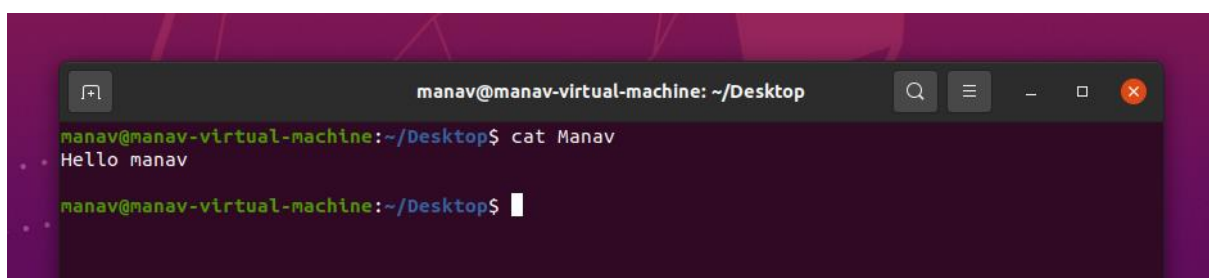
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ uptime
23:04:59 up 13 min, 1 user, load average: 0.00, 0.15, 0.21
manav@manav-virtual-machine:~/Desktop$
```

7. cal – Used to see the calendar of a specific month or a whole year. By default, it shows the current month's calendar as output (system).



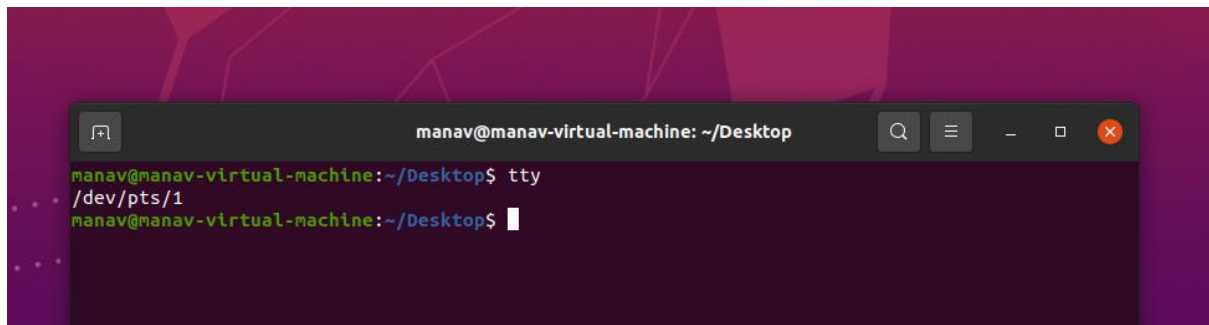
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ cal
      January 2022
Su Mo Tu We Th Fr Sa
                1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
manav@manav-virtual-machine:~/Desktop$
```

8. cat - Reads data from a file and gives the content inside as output. Can also be used for creating, viewing and concatenating files.



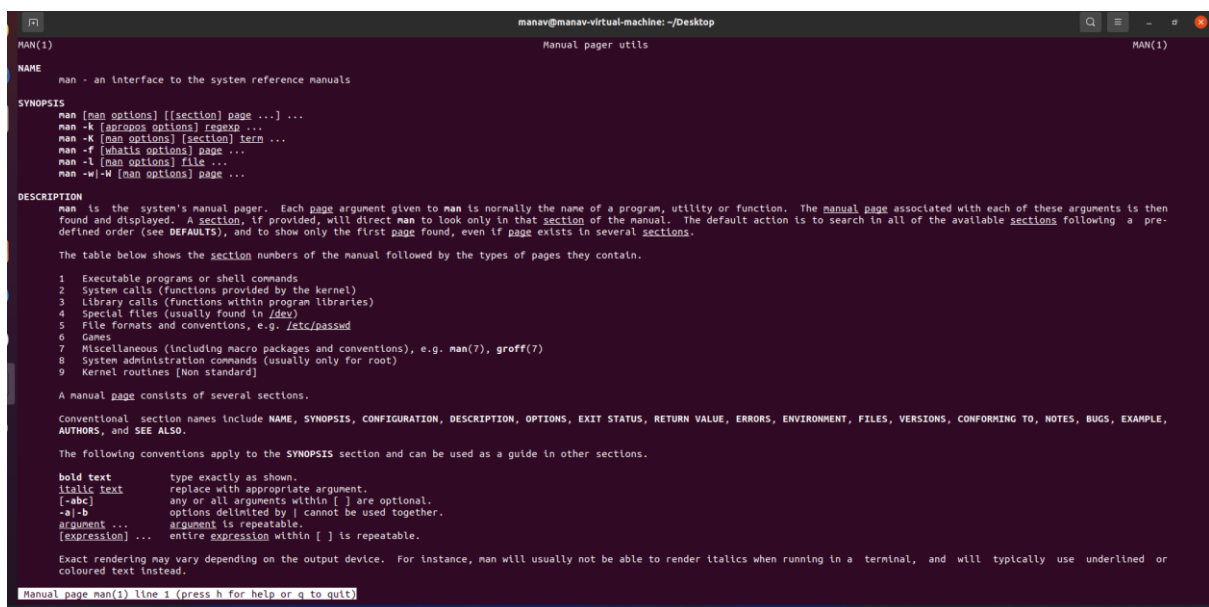
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ cat Manav
Hello manav
manav@manav-virtual-machine:~/Desktop$
```

9. `tty` - Displays the information related to the terminal. It basically prints the file name of the terminal connected to standard input.



```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ tty
/dev/pts/1
manav@manav-virtual-machine:~/Desktop$
```

10. `man` - Used to display the user manual of any command which is run on the terminal.



```
MAN(1)                                Manual pager utils                                MAN(1)
NAME
  man - an interface to the system reference manuals

SYNOPSIS
  man [man options] [[section] page ...] ...
  man -k [apropos options] response ...
  man -k [man options] [section] term ...
  man -f [whatIs options] page ...
  man -l [man options] file ...
  man -w|-W [man options] page ...

DESCRIPTION
  man is the system's manual pager. Each page argument given to man is normally the name of a program, utility or function. The manual page associated with each of these arguments is then found and displayed. A section, if provided, will direct man to look only in that section of the manual. The default action is to search in all of the available sections following a pre-defined order (see DEFAULTS), and to show only the first page found, even if page exists in several sections.

  The table below shows the section numbers of the manual followed by the types of pages they contain.

  1 Executable programs or shell commands
  2 System calls (functions provided by the kernel)
  3 Library calls (functions within program libraries)
  4 Special files (usually found in /dev)
  5 File formats and conventions, e.g. /etc/passwd
  6 Games
  7 Miscellaneous (including macro packages and conventions), e.g. man(7), groff(7)
  8 System administration commands (usually only for root)
  9 Kernel routines [Non standard]

  A manual page consists of several sections.

  Conventional section names include NAME, SYNOPSIS, CONFIGURATION, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUE, ERRORS, ENVIRONMENT, FILES, VERSIONS, CONFORMING TO, NOTES, BUGS, EXAMPLE, AUTHORS, and SEE ALSO.

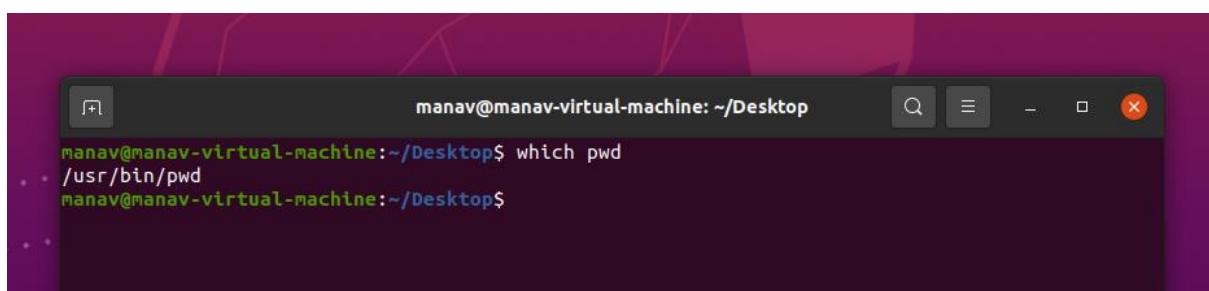
  The following conventions apply to the SYNOPSIS section and can be used as a guide in other sections.

  bold text      type exactly as shown.
  italic text    replace with appropriate argument.
  [-abc]         any or all arguments within [ ] are optional.
  -a|-b          options delimited by | cannot be used together.
  argument ...   argument is repeatable.
  [expression] ... entire expression within [ ] is repeatable.

  Exact rendering may vary depending on the output device. For instance, man will usually not be able to render italics when running in a terminal, and will typically use underlined or coloured text instead.

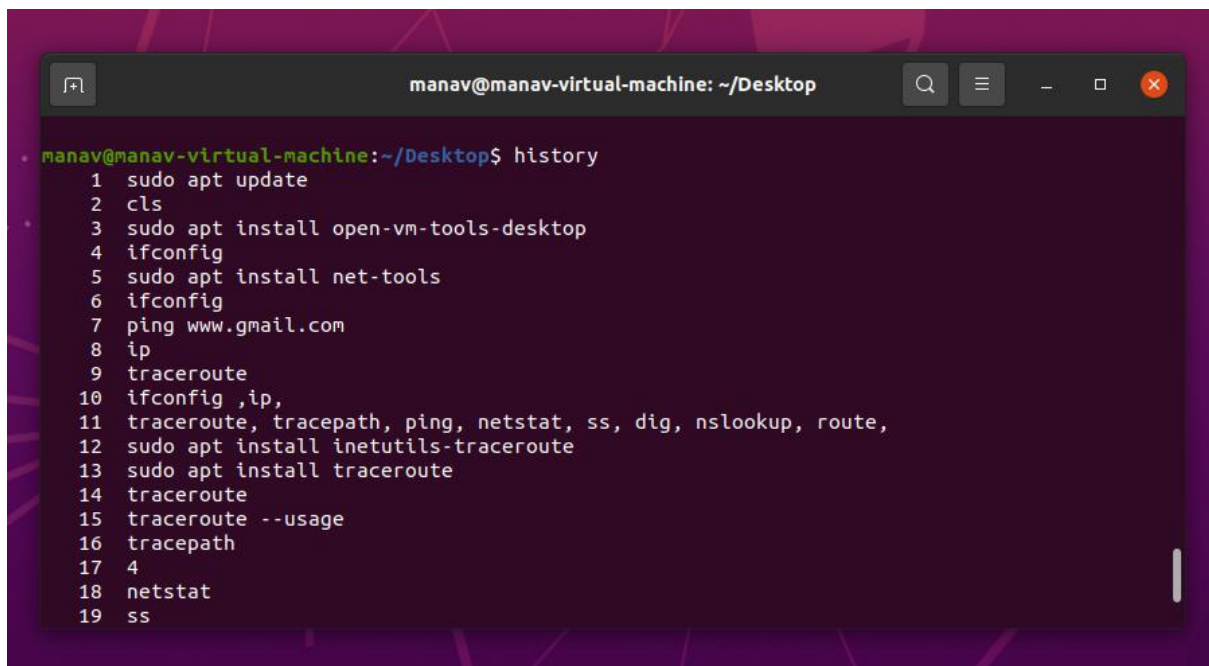
Manual page man(1) line 1 (press h for help or q to quit)
```

11. `which` - Used to locate the executable file associated with the given command by searching it in the path environment variable.



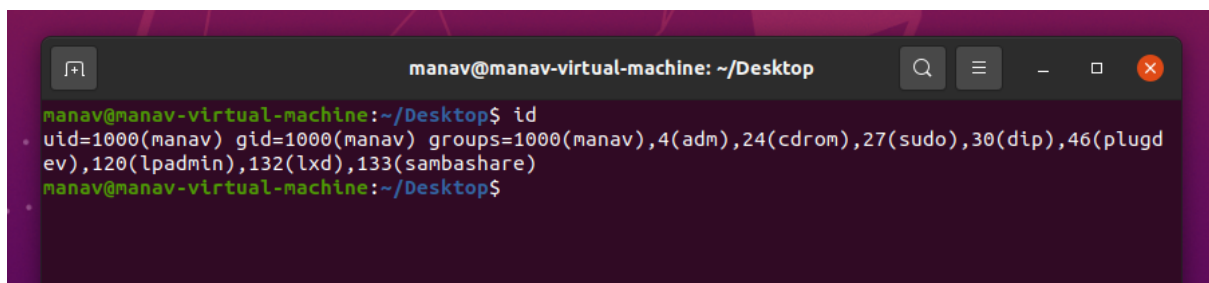
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ which pwd
/usr/bin/pwd
manav@manav-virtual-machine:~/Desktop$
```

12. history - Used to view the previously executed commands.



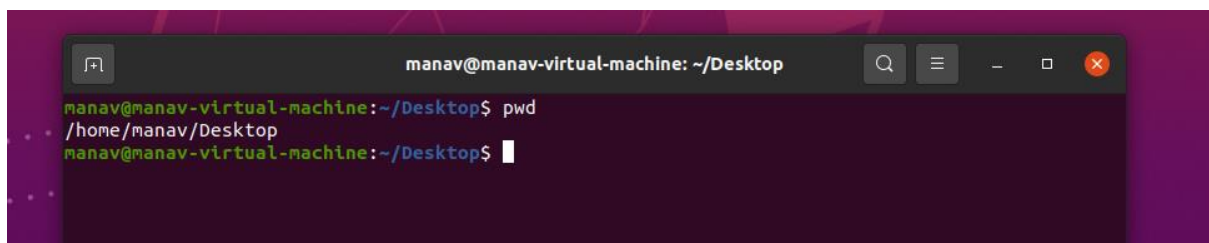
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ history
1  sudo apt update
2  cls
3  sudo apt install open-vm-tools-desktop
4  ifconfig
5  sudo apt install net-tools
6  ifconfig
7  ping www.gmail.com
8  ip
9  traceroute
10 ifconfig ,ip,
11 traceroute, tracepath, ping, netstat, ss, dig, nslookup, route,
12 sudo apt install inetutils-traceroute
13 sudo apt install traceroute
14 traceroute
15 traceroute --usage
16 tracepath
17 4
18 netstat
19 ss
```

13. id - Used to find out user and group names and numeric IDs (UID or group ID) of the current user or any other user in the server.



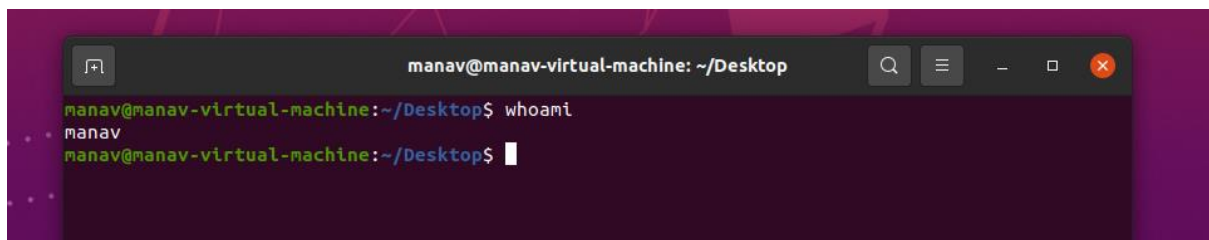
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ id
uid=1000(manav) gid=1000(manav) groups=1000(manav),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),120(lpadmin),132(lxd),133(sambashare)
manav@manav-virtual-machine:~/Desktop$
```

14. pwd - Prints the path of the current working directory starting from the root.



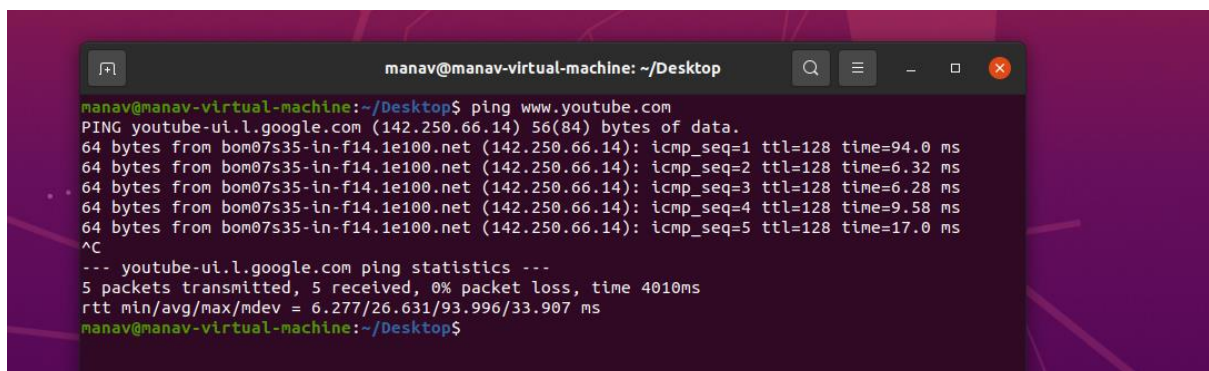
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ pwd
/home/manav/Desktop
manav@manav-virtual-machine:~/Desktop$
```

15. whoami - Prints the username of the current system user.

A terminal window titled 'manav@manav-virtual-machine: ~/Desktop'. The prompt is 'manav@manav-virtual-machine:~/Desktop\$'. The user has entered the command 'whoami'. The output is 'manav'.

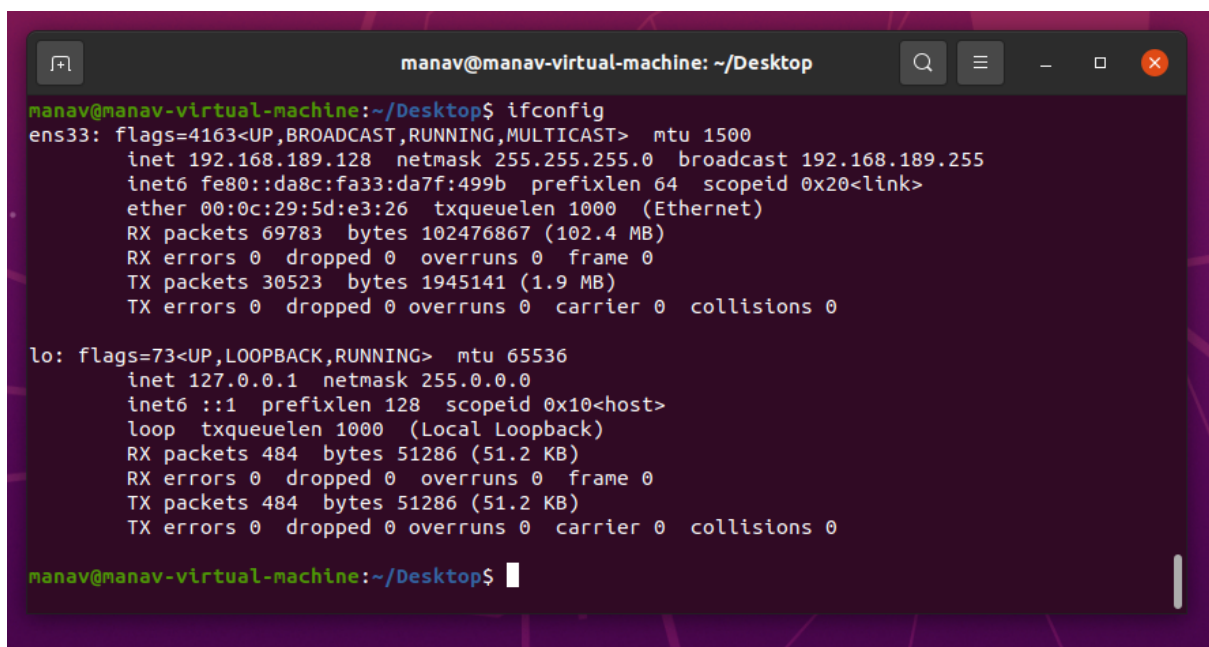
```
manav@manav-virtual-machine:~/Desktop$ whoami
manav
manav@manav-virtual-machine:~/Desktop$
```

16. ping - Used to check connectivity between the host and a server/host.

A terminal window titled 'manav@manav-virtual-machine: ~/Desktop'. The prompt is 'manav@manav-virtual-machine:~/Desktop\$'. The user has entered the command 'ping www.youtube.com'. The output shows the results of the ping command, including the IP address of the destination, the size of the data, the sequence number, the TTL, and the time taken for each packet. It also shows the statistics for the ping command.

```
manav@manav-virtual-machine:~/Desktop$ ping www.youtube.com
PING youtube-ui.l.google.com (142.250.66.14) 56(84) bytes of data.
64 bytes from bom07s35-in-f14.1e100.net (142.250.66.14): icmp_seq=1 ttl=128 time=94.0 ms
64 bytes from bom07s35-in-f14.1e100.net (142.250.66.14): icmp_seq=2 ttl=128 time=6.32 ms
64 bytes from bom07s35-in-f14.1e100.net (142.250.66.14): icmp_seq=3 ttl=128 time=6.28 ms
64 bytes from bom07s35-in-f14.1e100.net (142.250.66.14): icmp_seq=4 ttl=128 time=9.58 ms
64 bytes from bom07s35-in-f14.1e100.net (142.250.66.14): icmp_seq=5 ttl=128 time=17.0 ms
^C
--- youtube-ui.l.google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4010ms
rtt min/avg/max/mdev = 6.277/26.631/93.996/33.907 ms
manav@manav-virtual-machine:~/Desktop$
```

17. ifconfig - Used to configure the kernel-resident network interfaces.

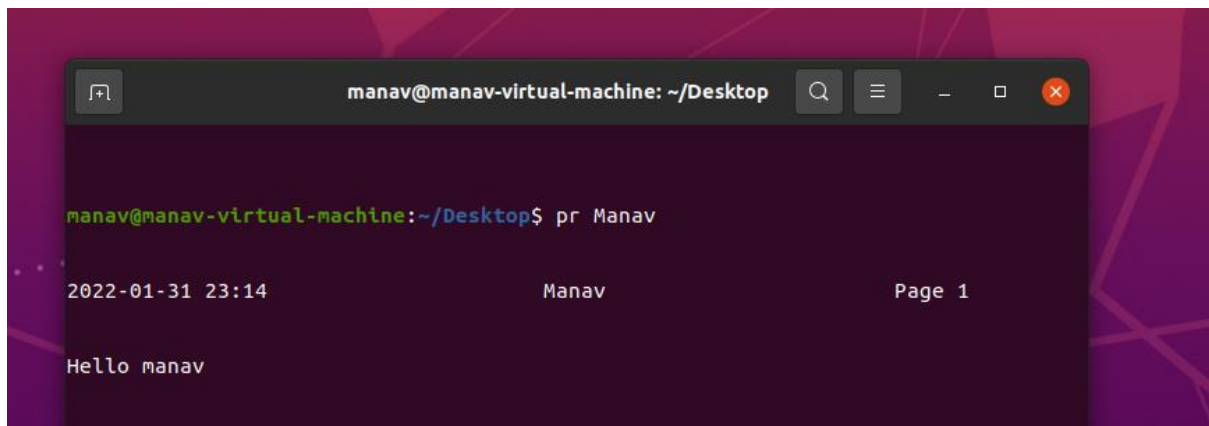
A terminal window titled 'manav@manav-virtual-machine: ~/Desktop'. The prompt is 'manav@manav-virtual-machine:~/Desktop\$'. The user has entered the command 'ifconfig'. The output shows the configuration for the network interfaces 'ens33' and 'lo'. It includes details such as flags, MTU, IP address, netmask, broadcast address, prefix length, scope ID, and statistics for RX and TX packets, errors, dropped, overruns, carrier, and collisions.

```
manav@manav-virtual-machine:~/Desktop$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.189.128 netmask 255.255.255.0 broadcast 192.168.189.255
    inet6 fe80::da8c:fa33:da7f:499b prefixlen 64 scopeid 0x20<link>
    ether 00:0c:29:5d:e3:26 txqueuelen 1000 (Ethernet)
    RX packets 69783 bytes 102476867 (102.4 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 30523 bytes 1945141 (1.9 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 484 bytes 51286 (51.2 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 484 bytes 51286 (51.2 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

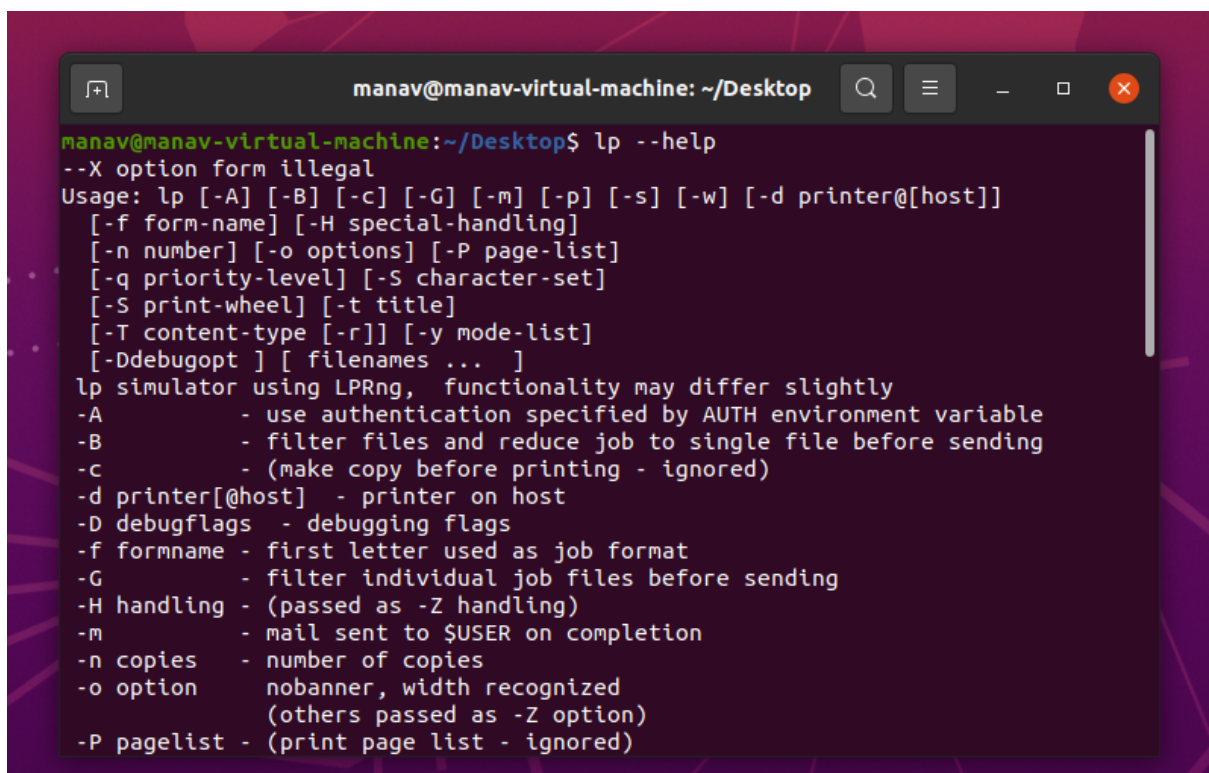
manav@manav-virtual-machine:~/Desktop$
```


18. pr - To prepare a file for printing by adding suitable footers, headers and formatted text. The header part shows the date and time of the last modification of the file with the file name and page number.



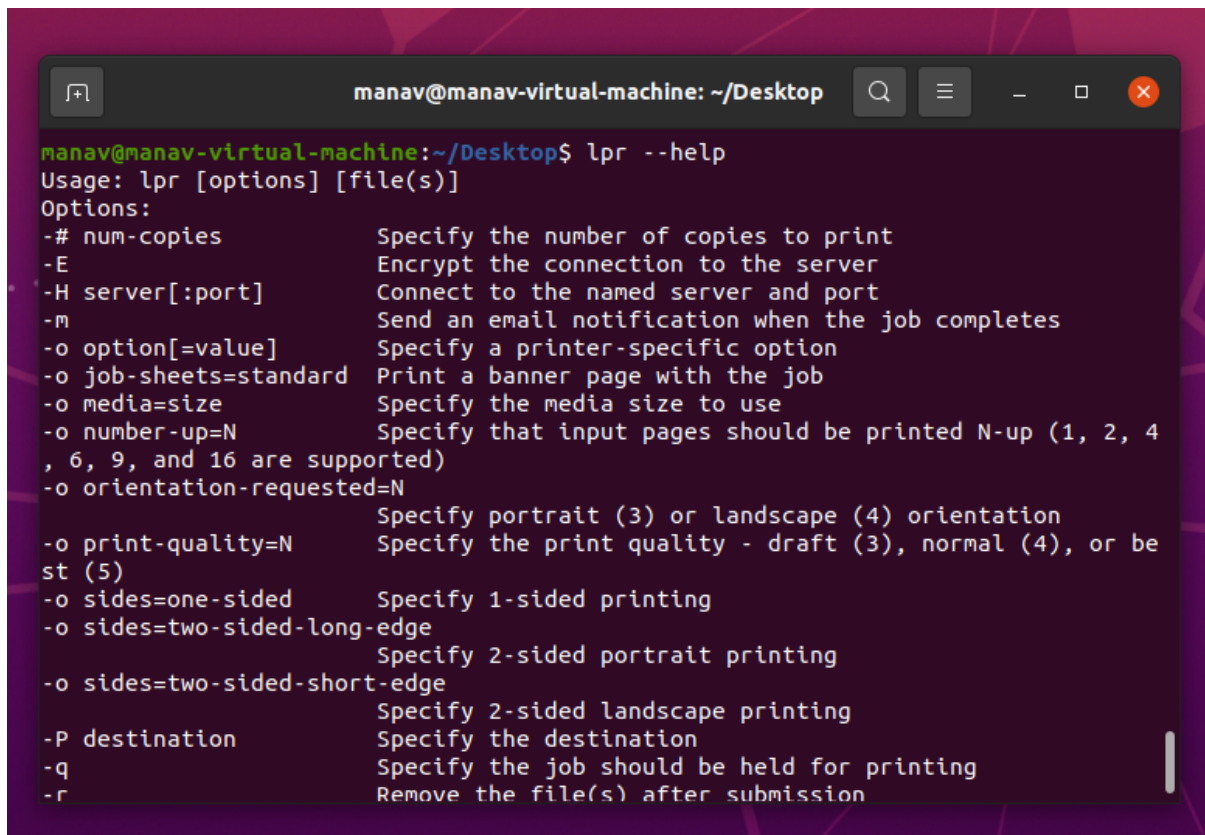
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ pr Manav
2022-01-31 23:14                               Manav                               Page 1
Hello manav
```

19. lp - The lp command in Linux stands for 'Line printer' which lets you print the files through the terminal. There is no need to change or manage the settings through the GUI. You can simply manage the printers using lp command.



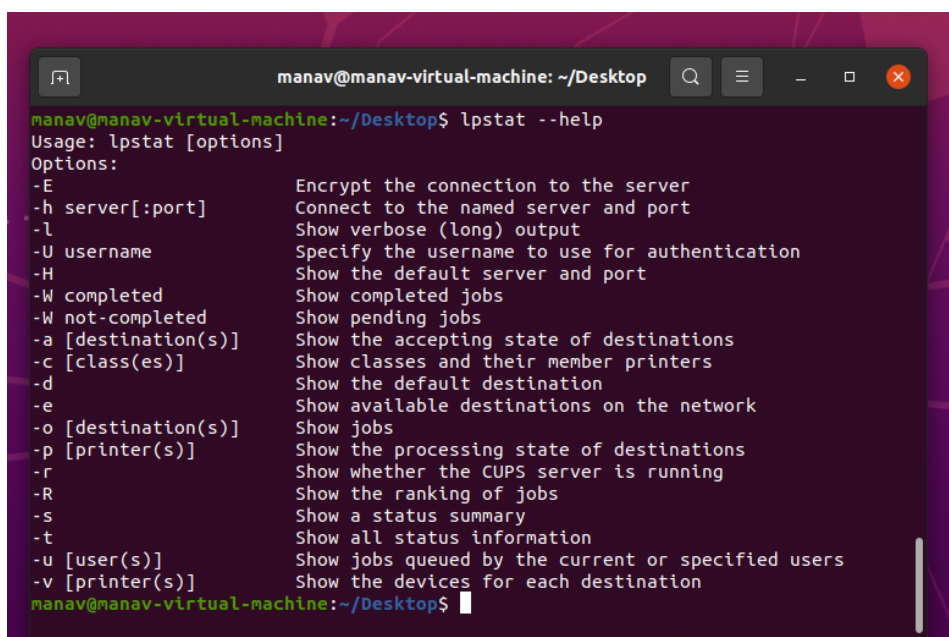
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ lp --help
--X option form illegal
Usage: lp [-A] [-B] [-c] [-G] [-m] [-p] [-s] [-w] [-d printer@[host]]
       [-f form-name] [-H special-handling]
       [-n number] [-o options] [-P page-list]
       [-q priority-level] [-S character-set]
       [-S print-wheel] [-t title]
       [-T content-type [-r]] [-y mode-list]
       [-Ddebugopt ] [ filenames ... ]
lp simulator using LPRng, functionality may differ slightly
-A          - use authentication specified by AUTH environment variable
-B          - filter files and reduce job to single file before sending
-c          - (make copy before printing - ignored)
-d printer@[host] - printer on host
-D debugflags - debugging flags
-f formname  - first letter used as job format
-G          - filter individual job files before sending
-H handling  - (passed as -Z handling)
-m          - mail sent to $USER on completion
-n copies   - number of copies
-o option    nobanner, width recognized
              (others passed as -Z option)
-P pagelist  - (print page list - ignored)
```

20. lpr - lpr submits files for printing. Files named on the command line are sent to the named printer. If no files are listed, lpr reads the print file from standard input.



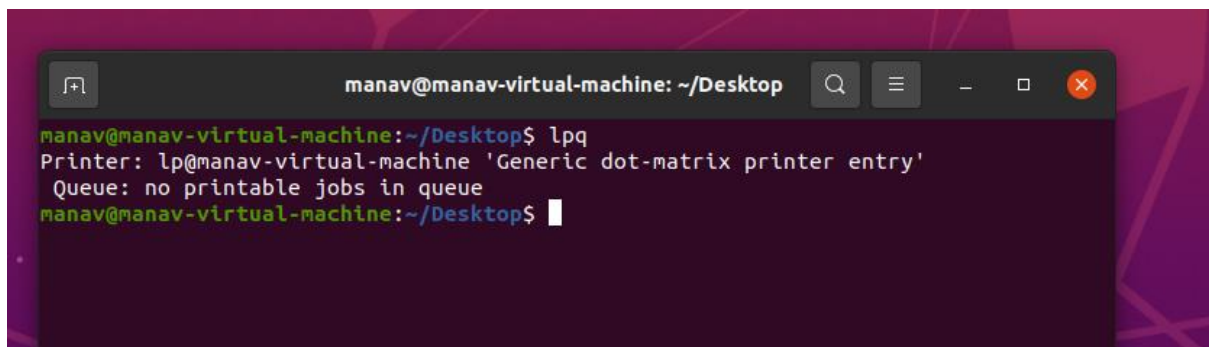
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ lpr --help
Usage: lpr [options] [file(s)]
Options:
  -# num-copies          Specify the number of copies to print
  -E                     Encrypt the connection to the server
  -H server[:port]       Connect to the named server and port
  -M                     Send an email notification when the job completes
  -o option[=value]      Specify a printer-specific option
  -o job-sheets=standard Print a banner page with the job
  -o media=size          Specify the media size to use
  -o number-up=N         Specify that input pages should be printed N-up (1, 2, 4, 6, 9, and 16 are supported)
  -o orientation-requested=N
                        Specify portrait (3) or landscape (4) orientation
  -o print-quality=N     Specify the print quality - draft (3), normal (4), or best (5)
  -o sides=one-sided     Specify 1-sided printing
  -o sides=two-sided-long-edge
                        Specify 2-sided portrait printing
  -o sides=two-sided-short-edge
                        Specify 2-sided landscape printing
  -P destination         Specify the destination
  -q                     Specify the job should be held for printing
  -r                     Remove the file(s) after submission
```

21. lpstat - lpstat displays the status information of the current classes, jobs and printers.



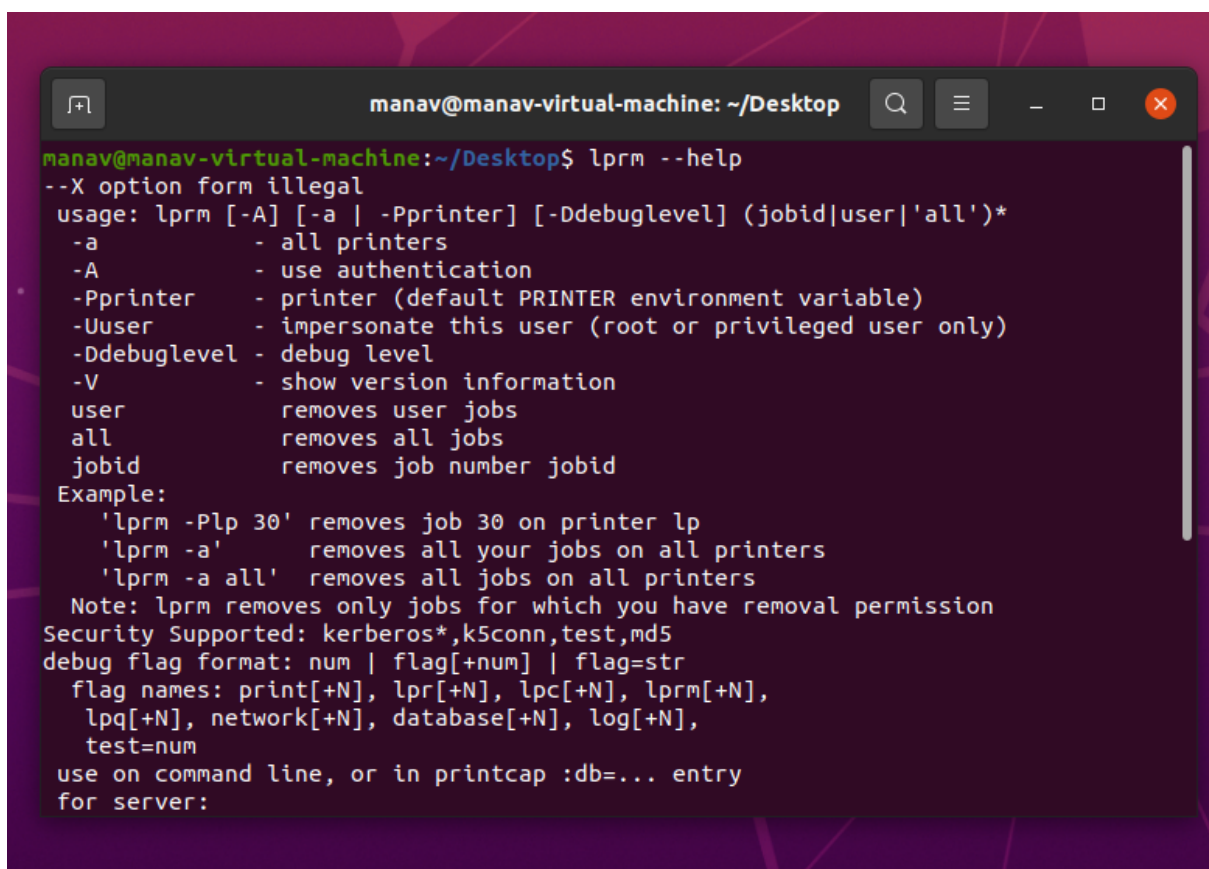
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ lpstat --help
Usage: lpstat [options]
Options:
  -E                     Encrypt the connection to the server
  -h server[:port]       Connect to the named server and port
  -l                     Show verbose (long) output
  -U username            Specify the username to use for authentication
  -H                     Show the default server and port
  -W completed           Show completed jobs
  -W not-completed       Show pending jobs
  -a [destination(s)]    Show the accepting state of destinations
  -c [class(es)]         Show classes and their member printers
  -d                     Show the default destination
  -e                     Show available destinations on the network
  -o [destination(s)]    Show jobs
  -p [printer(s)]        Show the processing state of destinations
  -r                     Show whether the CUPS server is running
  -R                     Show the ranking of jobs
  -s                     Show a status summary
  -t                     Show all status information
  -u [user(s)]           Show jobs queued by the current or specified users
  -v [printer(s)]        Show the devices for each destination
manav@manav-virtual-machine:~/Desktop$
```

22. lpq – The lpq command displays the contents of a printer queue.



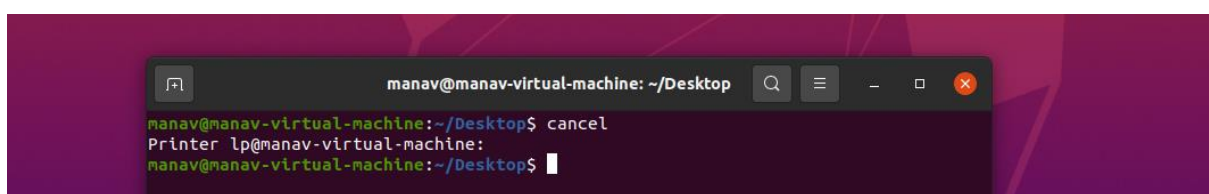
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ lpq
Printer: lp@manav-virtual-machine 'Generic dot-matrix printer entry'
Queue: no printable jobs in queue
manav@manav-virtual-machine:~/Desktop$
```

23. lprm - lprm cancels print jobs that have been queued for printing. If no arguments are supplied, the current job on the default destination is cancelled.



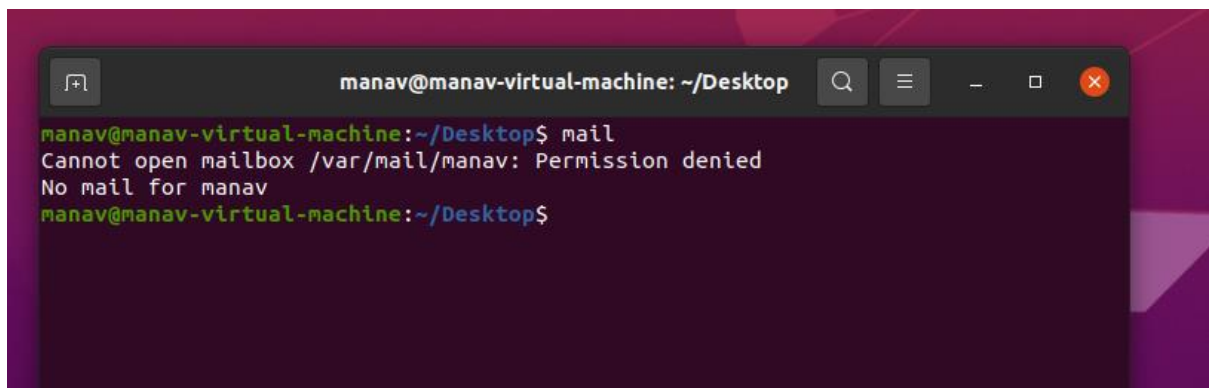
```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ lprm --help
--X option form illegal
usage: lprm [-A] [-a | -Pprinter] [-Ddebuglevel] (jobid|user|'all')*
  -a          - all printers
  -A          - use authentication
  -Pprinter   - printer (default PRINTER environment variable)
  -User       - impersonate this user (root or privileged user only)
  -Ddebuglevel - debug level
  -V          - show version information
  user       - removes user jobs
  all        - removes all jobs
  jobid      - removes job number jobid
Example:
  'lprm -Plp 30' removes job 30 on printer lp
  'lprm -a'      removes all your jobs on all printers
  'lprm -a all'  removes all jobs on all printers
Note: lprm removes only jobs for which you have removal permission
Security Supported: kerberos*,k5conn,test,md5
debug flag format: num | flag[+num] | flag=str
flag names: print[+N], lpr[+N], lpc[+N], lprm[+N],
            lpq[+N], network[+N], database[+N], log[+N],
            test=num
use on command line, or in printcap :db=... entry
for server:
```

24. cancel – 'cancel' command cancels the existing print jobs. The -a option removes all jobs from the specified destination.



```
manav@manav-virtual-machine: ~/Desktop
manav@manav-virtual-machine:~/Desktop$ cancel
Printer lp@manav-virtual-machine:
manav@manav-virtual-machine:~/Desktop$
```


25. mail - Linux mail command is used to send mails from the command line.

A terminal window titled 'manav@manav-virtual-machine: ~/Desktop' with standard window controls. The terminal shows the command 'mail' being executed, followed by two lines of error output: 'Cannot open mailbox /var/mail/manav: Permission denied' and 'No mail for manav'. The prompt returns to 'manav@manav-virtual-machine:~/Desktop\$'.

```
manav@manav-virtual-machine:~/Desktop$ mail
Cannot open mailbox /var/mail/manav: Permission denied
No mail for manav
manav@manav-virtual-machine:~/Desktop$
```

Conclusion – We have successfully executed Unix General Purpose Utility Commands.