

Operating Systems Lab

Experiment No. 1

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Aim

Study of different Linux and shell commands for

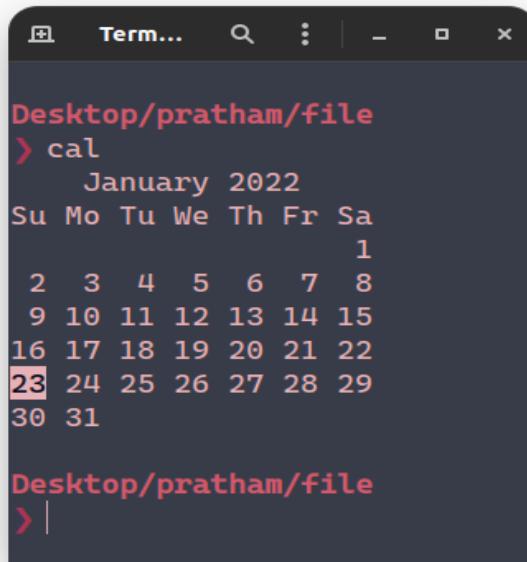
- General Commands
- File Management
- Memory Management
- User Access
- Disk Management
- Network Management

Students must prepare a document containing description, Syntax and execution of each command for around 200 commands.

General Commands

cal

Outputs calendar of current month (days are aligned horizontally)



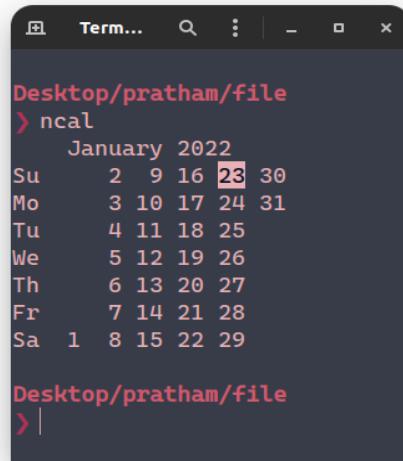
The screenshot shows a terminal window with a dark background and light-colored text. The title bar says "Term...". The command "cal" was run, and the output is a calendar for January 2022. The days of the week are labeled Su Mo Tu We Th Fr Sa. The dates are aligned horizontally under their respective day labels. The 23rd is highlighted with a red border. The terminal prompt "Desktop/pratham/file > |" is at the bottom.

```
Desktop/pratham/file
> 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

Desktop/pratham/file
> |
```

ncal

Outputs calendar of current month (days are aligned vertically)

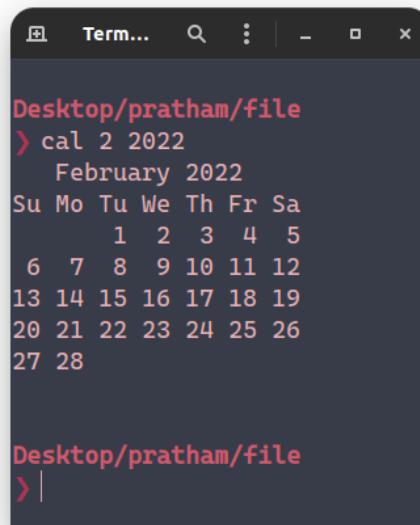


```
Desktop/pratham/file
> ncal
      January 2022
Su 2 9 16 23 30
Mo 3 10 17 24 31
Tu 4 11 18 25
We 5 12 19 26
Th 6 13 20 27
Fr 7 14 21 28
Sa 1 8 15 22 29

Desktop/pratham/file
> |
```

cal [month]

Outputs calendar of given month in the given year



```
Desktop/pratham/file
> cal 2 2022
      February 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

Desktop/pratham/file
> |
```

cal [year]

Outputs the complete calendar of the given year

```
Terminal
Desktop/pratham/file
> cal 2022
          2022
January           February          March
Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa
                         1       1   2   3   4   5       1   2   3   4   5
                         2   3   4   5   6   7   8       6   7   8   9   10  11  12
                         9   10  11  12  13  14  15      13  14  15  16  17  18  19
                        16  17  18  19  20  21  22      20  21  22  23  24  25  26
23 24 25 26 27 28 29      27  28
30 31

April            May              June
Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa
                         1   2       1   2   3   4   5   6   7       1   2   3   4
                         3   4   5   6   7   8   9       8   9   10  11  12  13  14
                        10  11  12  13  14  15  16      15  16  17  18  19  20  21
                        17  18  19  20  21  22  23      22  23  24  25  26  27  28
                        24  25  26  27  28  29  30      29  30  31
26 27 28 29 30

July             August           September
Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa
                         1   2       1   2   3   4   5   6       1   2   3
                         3   4   5   6   7   8   9       7   8   9   10  11  12  13
                        10  11  12  13  14  15  16      14  15  16  17  18  19  20
                        17  18  19  20  21  22  23      21  22  23  24  25  26  27
                        24  25  26  27  28  29  30      28  29  30  31
31

October          November         December
Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa
                         1       1   2   3   4   5       1   2   3
                         2   3   4   5   6   7   8       6   7   8   9   10
                         9   10  11  12  13  14  15      13  14  15  16  17
                        16  17  18  19  20  21  22      20  21  22  23  24
                        23  24  25  26  27  28  29      27  28  29  30
30 31

Desktop/pratham/file
> |
```

date

Outputs the day, date, and the current time of the system

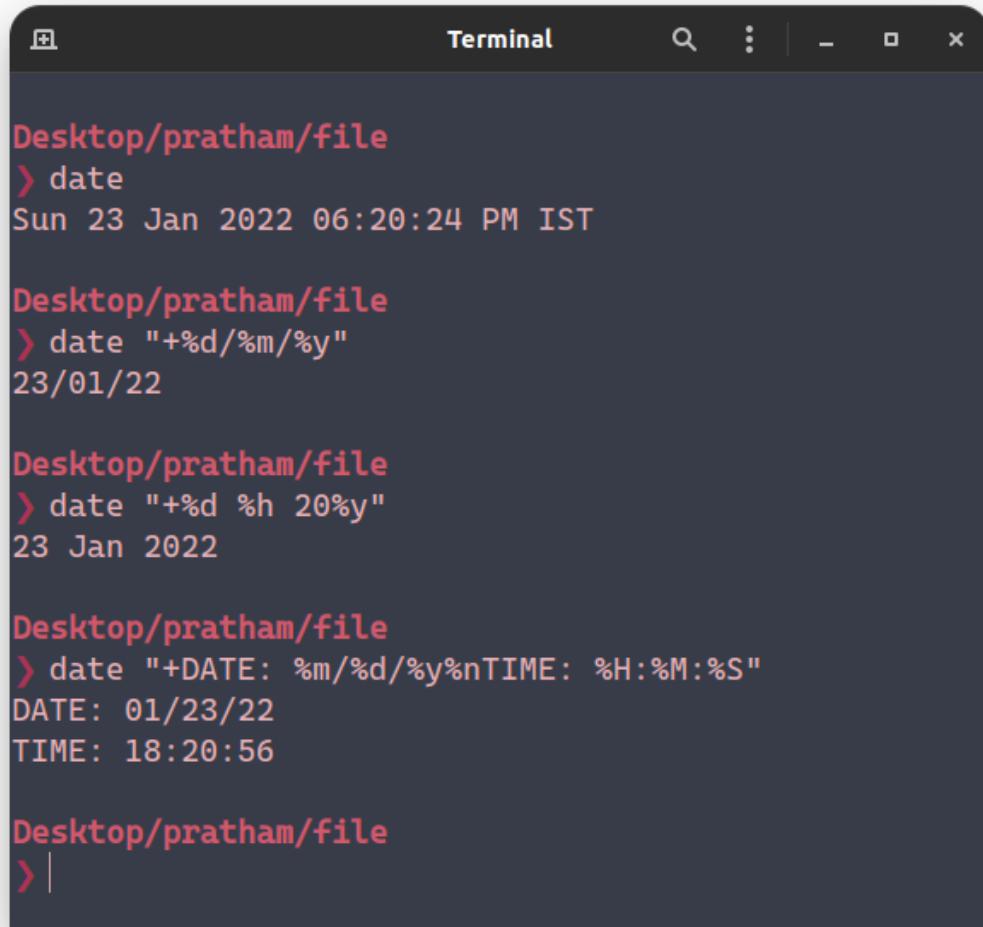
`date "+%d/%m/%y"`

Outputs the date in the given format

`date "+%d %h 20%y"`

Outputs the date in the given format

`date "+DATE: %m/%d/%y%nTIME: %H:%M:%S"`



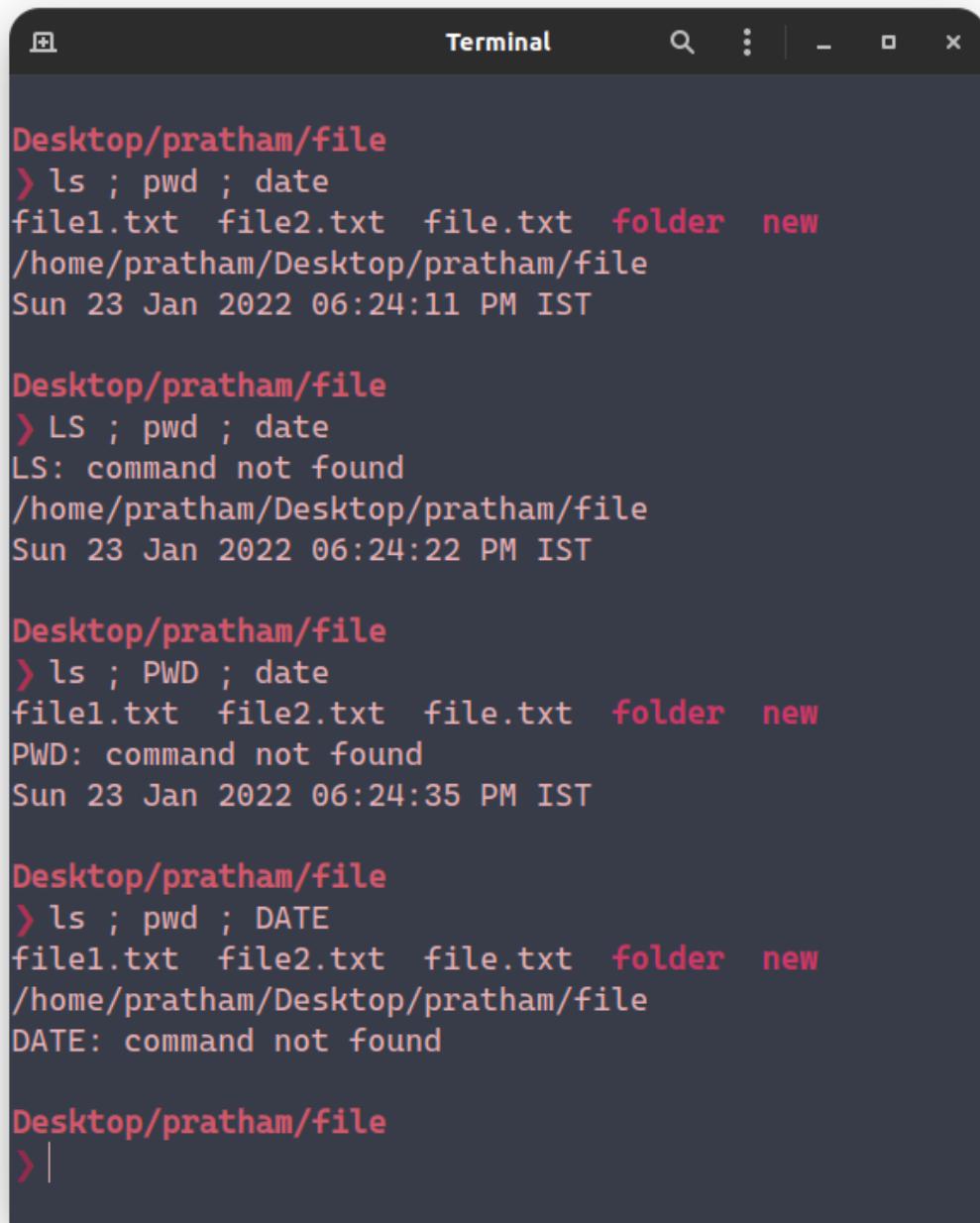
The screenshot shows a terminal window with a dark theme. It displays four examples of the date command:

- The first example shows the standard output of the date command: Sun 23 Jan 2022 06:20:24 PM IST.
- The second example uses the format string "+%d/%m/%y" to output the date as 23/01/22.
- The third example uses the format string "+%d %h 20%y" to output the date as 23 Jan 2022.
- The fourth example uses the format string "+DATE: %m/%d/%y%nTIME: %H:%M:%S" to output the date and time separately: DATE: 01/23/22 and TIME: 18:20:56.

Run Multiple commands in terminal at a time

;

Runs every command regardless of success and failure of commands



```
Desktop/pratham/file
> ls ; pwd ; date
file1.txt file2.txt file.txt folder new
/home/pratham/Desktop/pratham/file
Sun 23 Jan 2022 06:24:11 PM IST

Desktop/pratham/file
> LS ; pwd ; date
LS: command not found
/home/pratham/Desktop/pratham/file
Sun 23 Jan 2022 06:24:22 PM IST

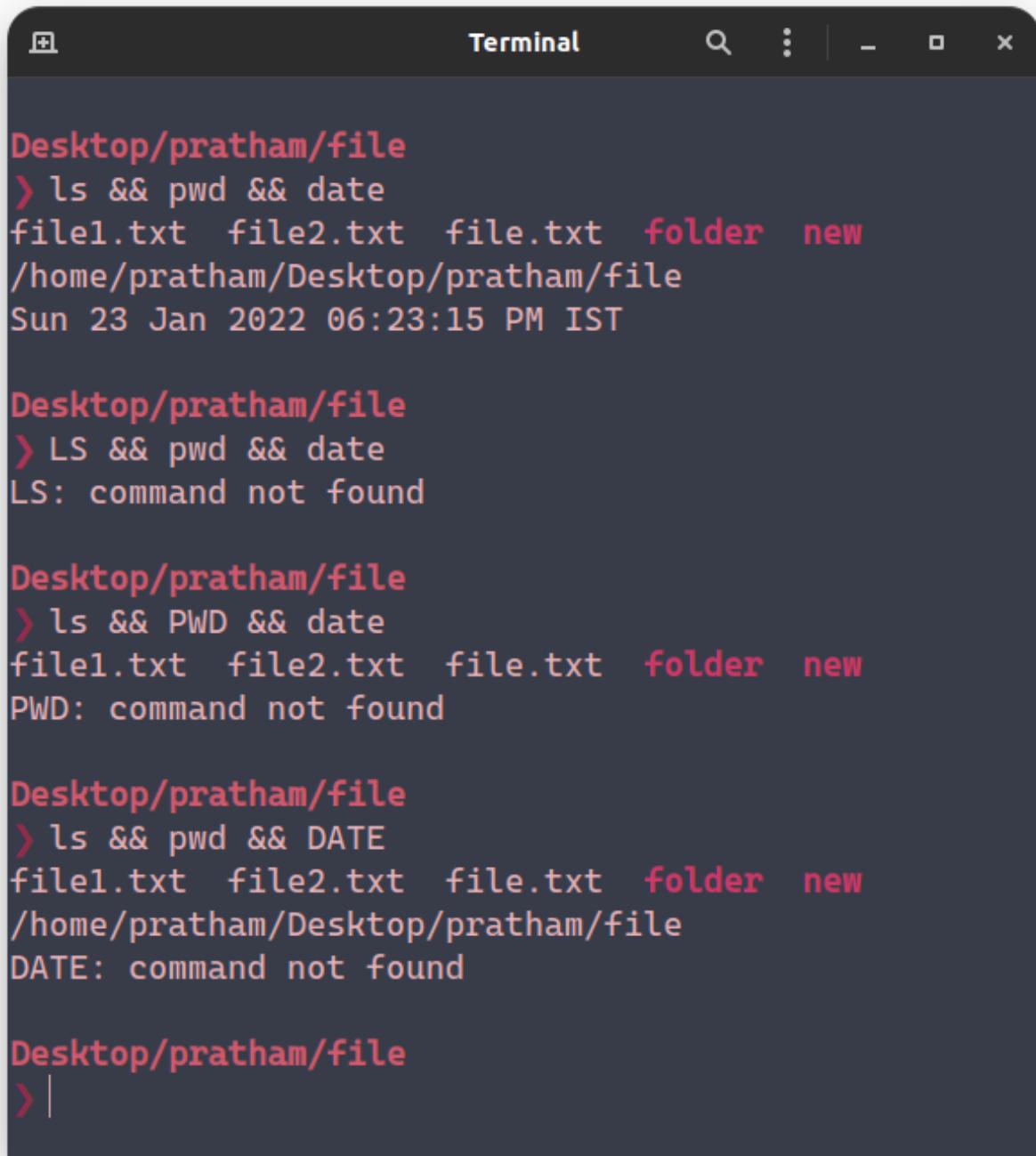
Desktop/pratham/file
> ls ; PWD ; date
file1.txt file2.txt file.txt folder new
PWD: command not found
Sun 23 Jan 2022 06:24:35 PM IST

Desktop/pratham/file
> ls ; pwd ; DATE
file1.txt file2.txt file.txt folder new
/home/pratham/Desktop/pratham/file
DATE: command not found

Desktop/pratham/file
> |
```

&&

executed in order from left to right



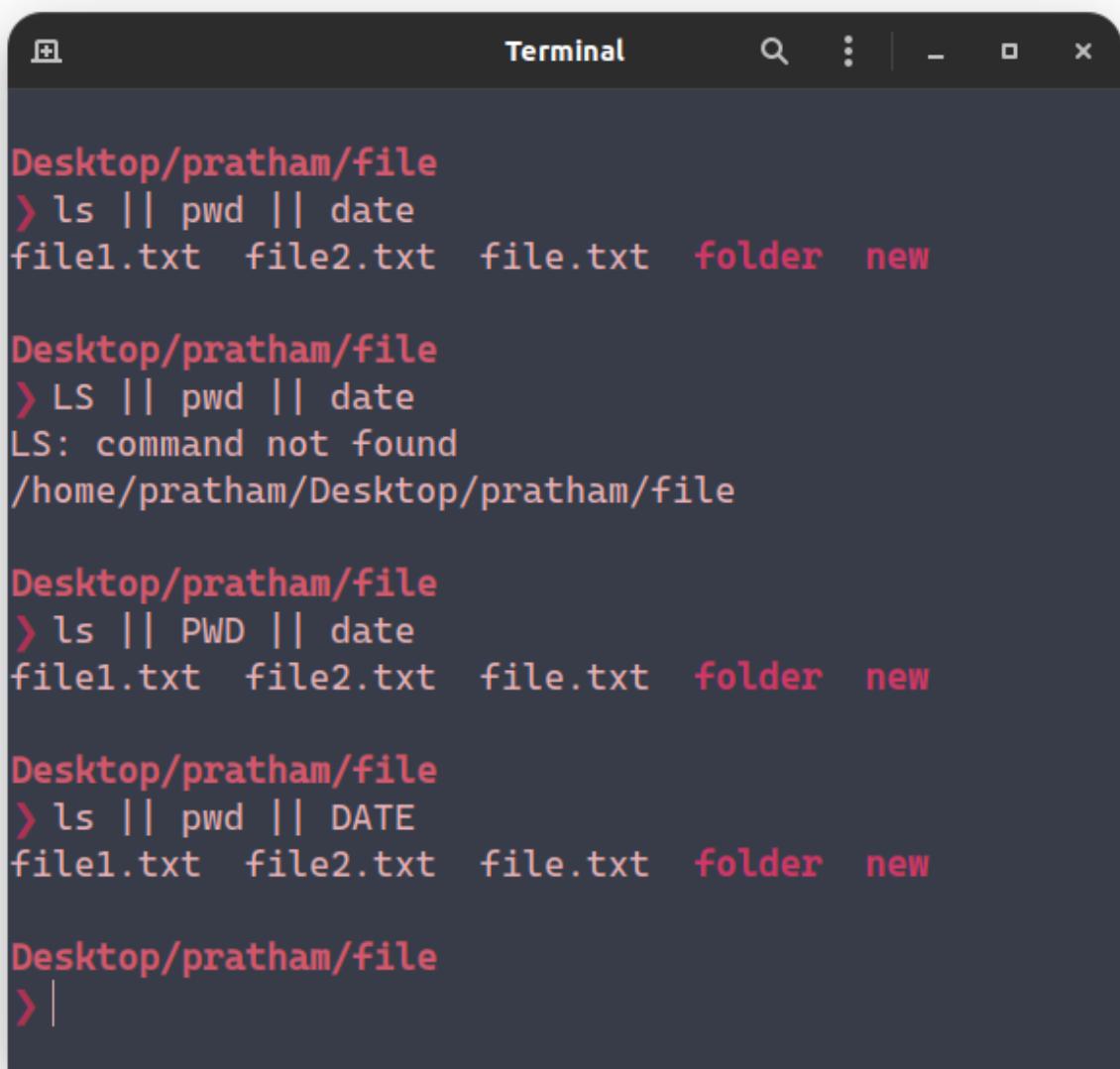
The screenshot shows a terminal window with a dark background and light-colored text. The window title is "Terminal". Below the title bar, there are standard window control icons: a plus sign for new tabs, a magnifying glass for search, three vertical dots for more options, a minus sign for缩小, a square for maximize/minimize, and an 'X' for close.

The terminal displays five examples of the && operator:

- Desktop/pratham/file**
❯ ls && pwd && date
file1.txt file2.txt file.txt folder new
/home/pratham/Desktop/pratham/file
Sun 23 Jan 2022 06:23:15 PM IST
- Desktop/pratham/file**
❯ LS && pwd && date
LS: command not found
- Desktop/pratham/file**
❯ ls && PWD && date
file1.txt file2.txt file.txt folder new
PWD: command not found
- Desktop/pratham/file**
❯ ls && pwd && DATE
file1.txt file2.txt file.txt folder new
/home/pratham/Desktop/pratham/file
DATE: command not found
- Desktop/pratham/file**
❯ |

||

Executes left and if no error is encountered it terminates
but if encountered an error it shifts to the right and this works in a loop until a command
gives no error



The screenshot shows a terminal window with a dark theme. The title bar says "Terminal". The terminal content is as follows:

```
Desktop/pratham/file
> ls || pwd || date
file1.txt  file2.txt  file.txt  folder  new

Desktop/pratham/file
> LS || pwd || date
LS: command not found
/home/pratham/Desktop/pratham/file

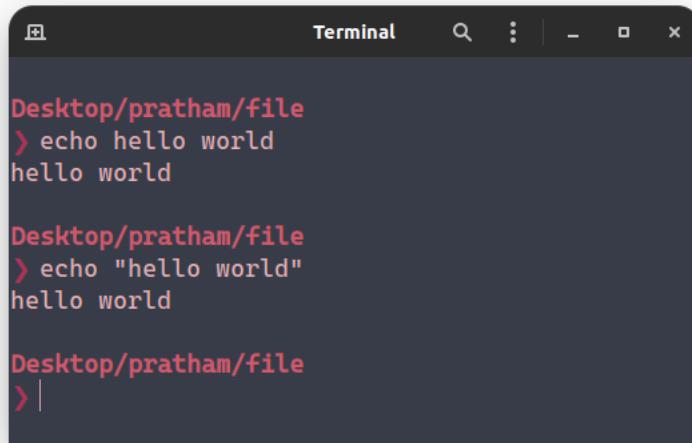
Desktop/pratham/file
> ls || PWD || date
file1.txt  file2.txt  file.txt  folder  new

Desktop/pratham/file
> ls || pwd || DATE
file1.txt  file2.txt  file.txt  folder  new

Desktop/pratham/file
> |
```

echo text / echo “text”(good practice)

Displays the text as an output in the terminal



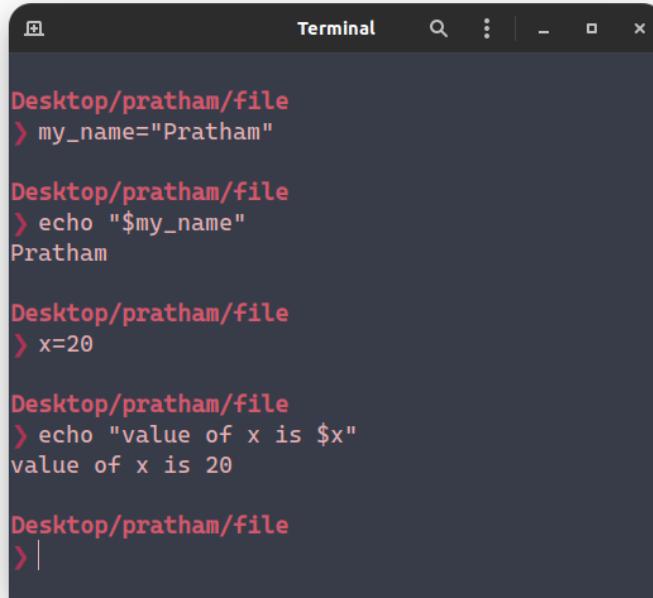
```
Desktop/pratham/file
> echo hello world
hello world

Desktop/pratham/file
> echo "hello world"
hello world

Desktop/pratham/file
> |
```

echo “this is a variable \$var”

Displays the text as an output in the terminal and replaces \$var to the value of the variable.



```
Desktop/pratham/file
> my_name="Pratham"

Desktop/pratham/file
> echo "$my_name"
Pratham

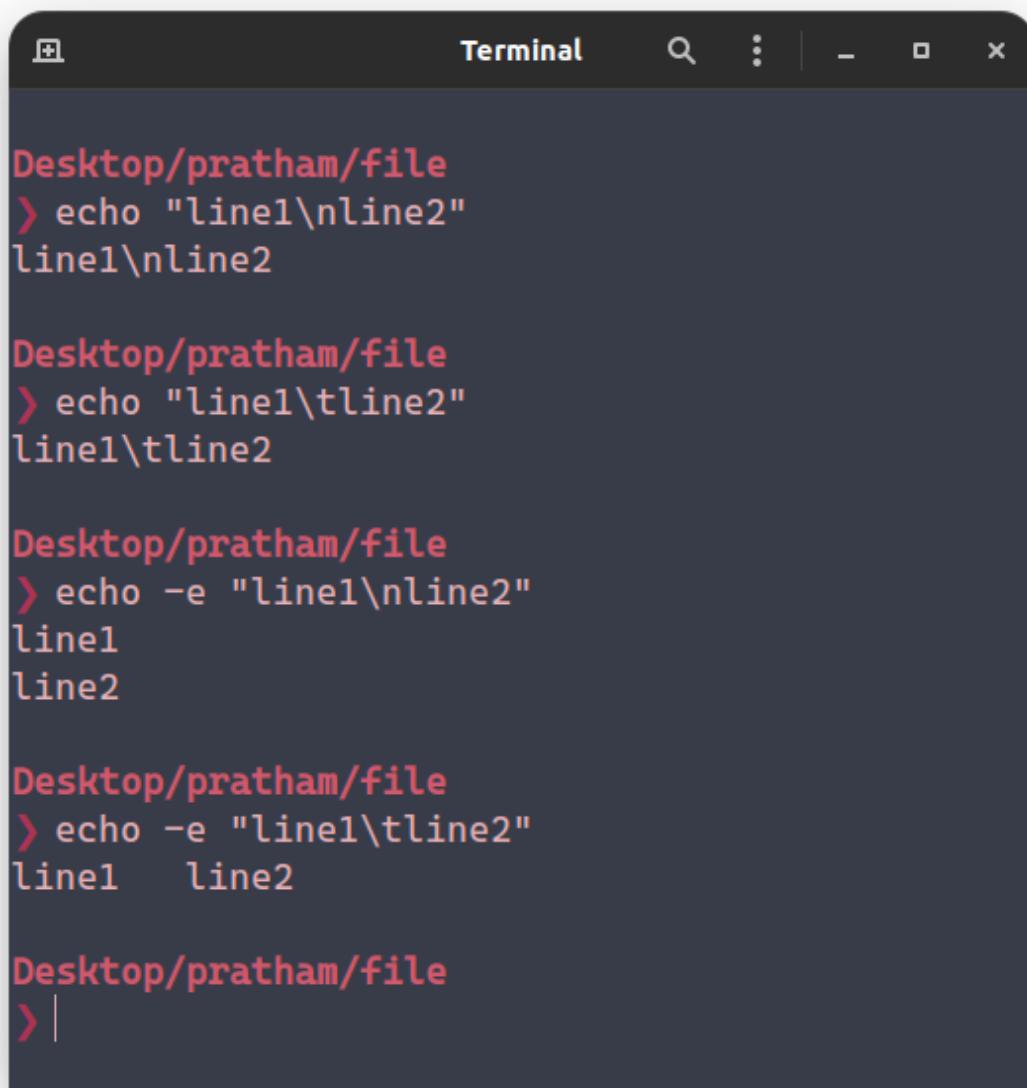
Desktop/pratham/file
> x=20

Desktop/pratham/file
> echo "value of x is $x"
value of x is 20

Desktop/pratham/file
> |
```

```
echo -e "\n" / echo -e "\t"
```

Takes input as in formatted form like in C. it supports escape characters like \n, \t

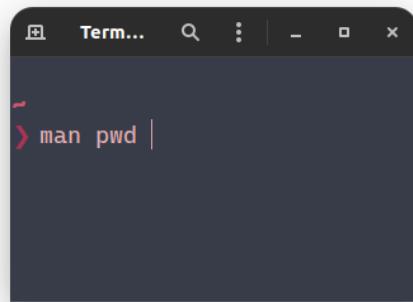


The screenshot shows a terminal window with a dark background and light-colored text. The window title is "Terminal". The content displays five examples of the "echo" command:

- Desktop/pratham/file**
› echo "line1\nline2"
line1\nline2
- Desktop/pratham/file**
› echo "line1\tline2"
line1\tline2
- Desktop/pratham/file**
› echo -e "line1\nline2"
line1
line2
- Desktop/pratham/file**
› echo -e "line1\tline2"
line1 line2
- Desktop/pratham/file**
› |

man [command]

Displays the system's reference manuals



```
File Terminal User Commands PWD(1)
PWD(1)          User Commands          PWD(1)

NAME
    pwd - print name of current/working directory

SYNOPSIS
    pwd [OPTION]...

DESCRIPTION
    Print the full filename of the current working directory.

    -L, --logical
        use PWD from environment, even if it contains symlinks

    -P, --physical
        avoid all symlinks

    --help display this help and exit

    --version
        output version information and exit

    If no option is specified, -P is assumed.

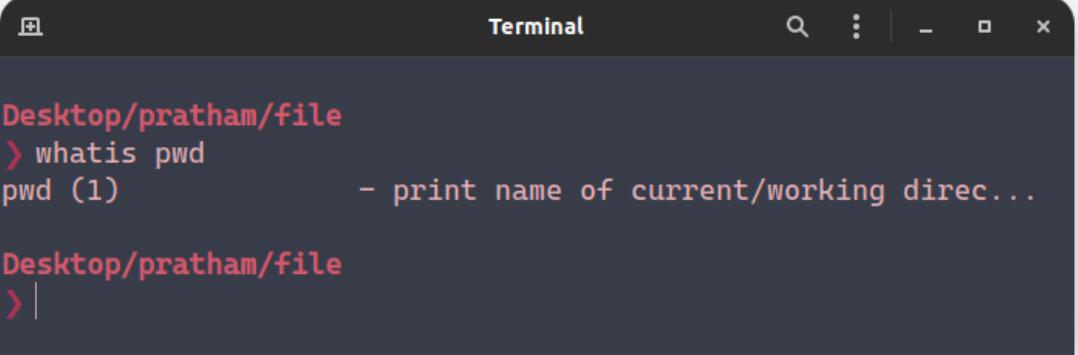
    NOTE: your shell may have its own version of pwd, which usually supersedes the version described here. Please refer to your shell's documentation for details about the options it supports.

AUTHOR
    Written by Jim Meyering.

REPORTING BUGS
    GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
    Manual page pwd(1) line 1/48 62% (press h for help or q to quit)
```

whatis [command]

Displays short descriptions of system commands



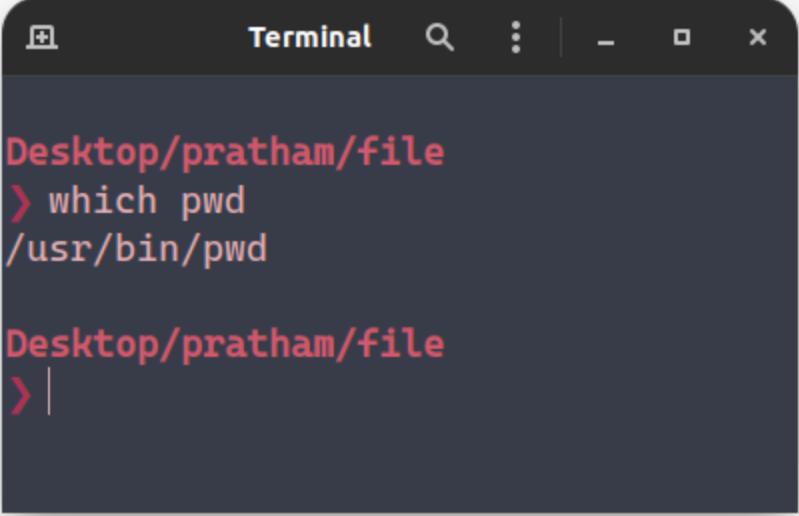
A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. It displays the following command and its description:

```
Desktop/pratham/file
> whatis pwd
pwd (1)           - print name of current/working direc...
```

The terminal prompt is shown as a red arrow followed by a vertical bar.

which [command]

Displays the full path of commands



A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. It displays the following command and its full path:

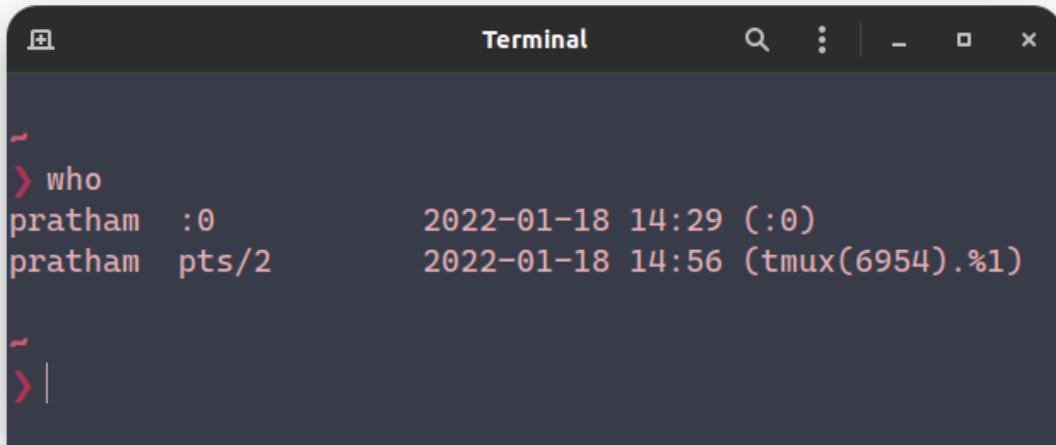
```
Desktop/pratham/file
> which pwd
/usr/bin/pwd

Desktop/pratham/file
> |
```

The terminal prompt is shown as a red arrow followed by a vertical bar.

who [command]

Displays user that is logged on



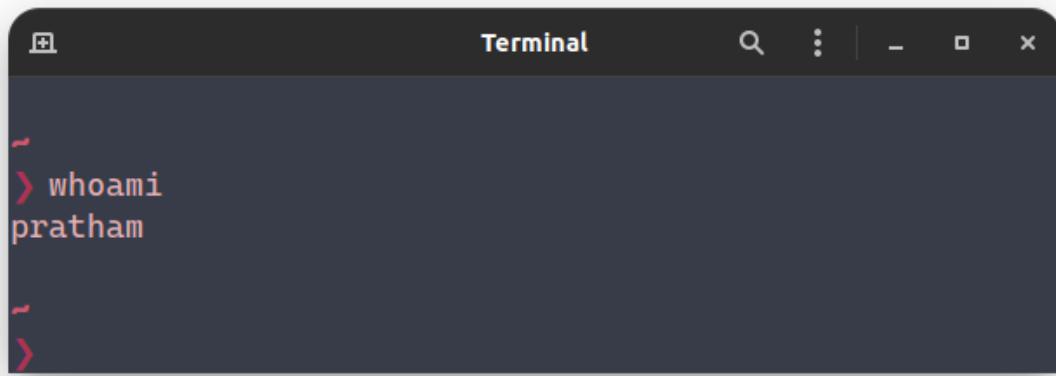
A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The command "who" is entered at the prompt, followed by two entries for the user "pratham". The first entry shows "pratham :0" at 2022-01-18 14:29 (:0). The second entry shows "pratham pts/2" at 2022-01-18 14:56 (tmux(6954).%1). The terminal window includes standard OS X-style controls at the top right.

```
~
> who
pratham :0          2022-01-18 14:29 (:0)
pratham pts/2       2022-01-18 14:56 (tmux(6954).%1)

~
> |
```

whoami [command]

Displays effective user id of current user



A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The command "whoami" is entered at the prompt, and the output is "pratham". The terminal window includes standard OS X-style controls at the top right.

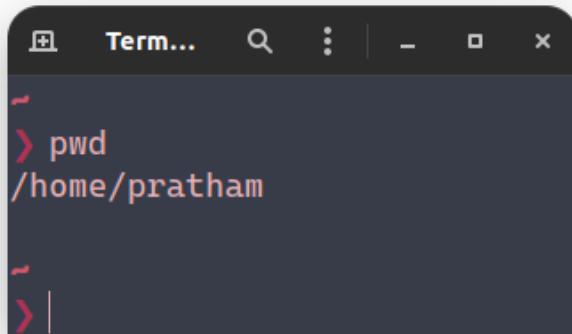
```
~
> whoami
pratham

~
>
```

File Management

`pwd`

Outputs present working directory

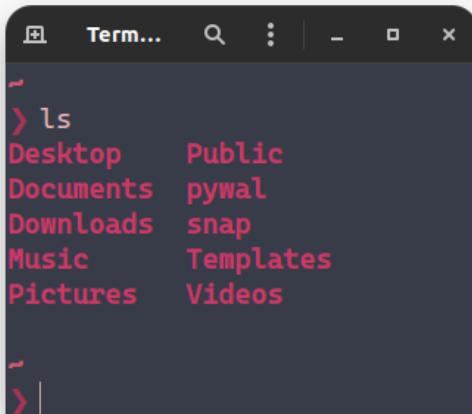


```
Term... ~
> pwd
/home/pratham
~ |
```

A screenshot of a terminal window titled "Term...". The window has a dark background with light-colored text. It shows the command "pwd" being run, followed by the output "/home/pratham". The cursor is at the bottom of the window.

`ls`

lists all files in cwd

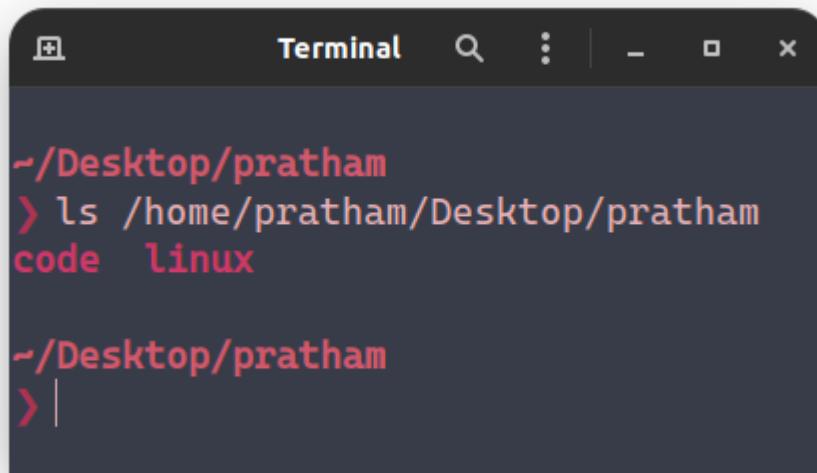


```
Term... ~
> ls
Desktop    Public
Documents  pywal
Downloads  snap
Music      Templates
Pictures   Videos
~ |
```

A screenshot of a terminal window titled "Term...". The window has a dark background with light-colored text. It shows the command "ls" being run, followed by a list of directories: Desktop, Documents, Downloads, Music, Pictures, Public, pywal, snap, Templates, and Videos. The cursor is at the bottom of the window.

ls [address]

lists all files in the dir of given address (both absolute and relative path are accepted)



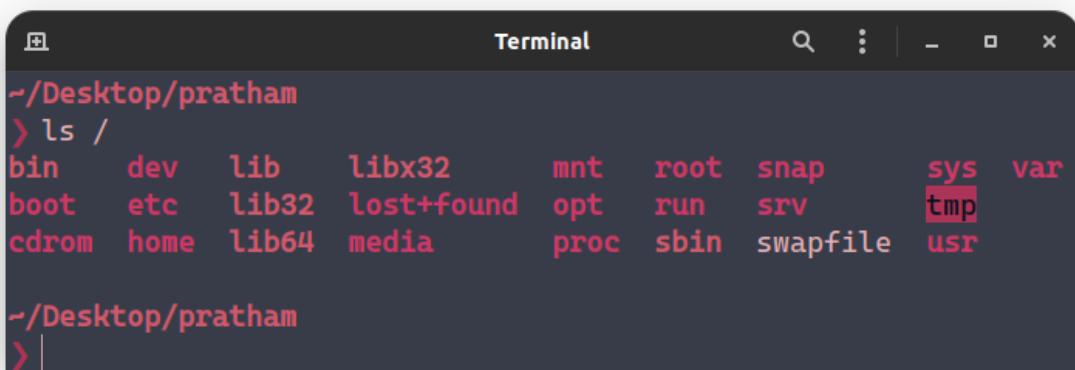
A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The text inside the terminal shows the following command and its output:

```
~/Desktop/pratham
> ls /home/pratham/Desktop/pratham
code linux

~/Desktop/pratham
> |
```

ls /

lists all files in root dir



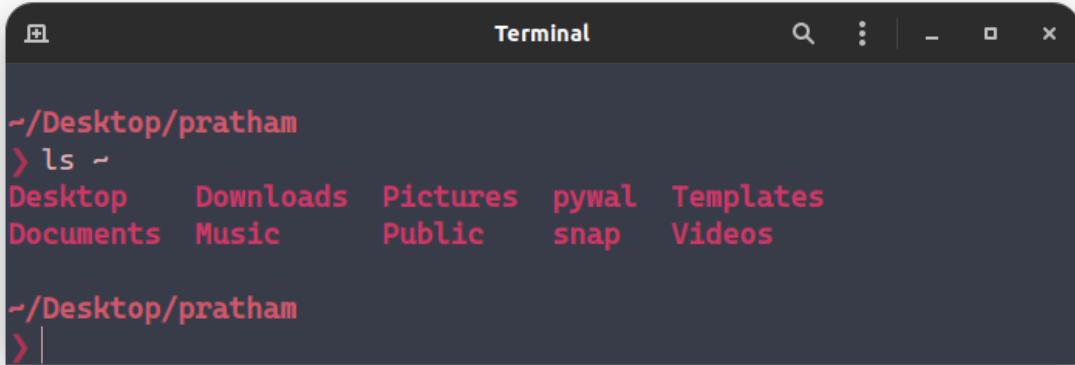
A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The text inside the terminal shows the following command and its output:

```
~/Desktop/pratham
> ls /
bin dev lib libx32 mnt root snap sys var
boot etc lib32 lost+found opt run srv tmp
cdrom home lib64 media proc sbin swapfile usr

~/Desktop/pratham
> |
```

```
ls ~
```

lists all files in home dir



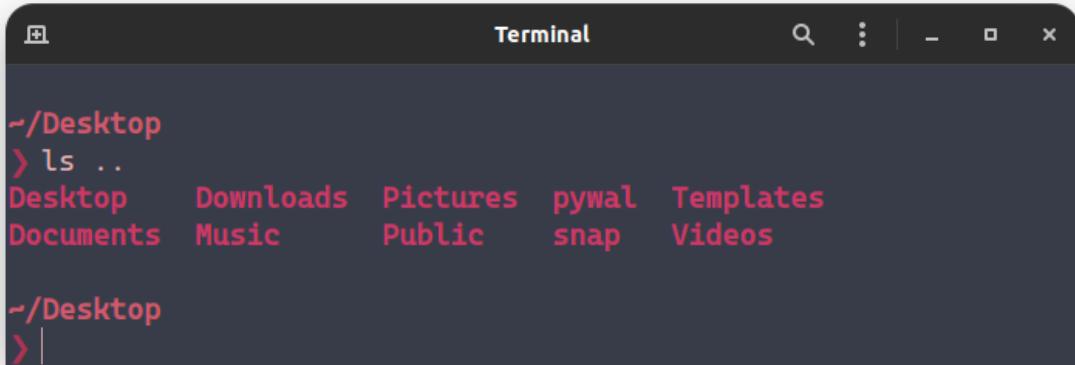
A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The command `ls ~` is entered, followed by a list of directory names: Desktop, Downloads, Pictures, pywal, Templates, Documents, Music, Public, snap, and Videos. The prompt `~/Desktop/pratham > |` is visible at the bottom.

```
~/Desktop/pratham
> ls ~
Desktop    Downloads  Pictures  pywal  Templates
Documents  Music      Public    snap    Videos

~/Desktop/pratham
> |
```

```
ls ..
```

lists all files in parent dir of pwd



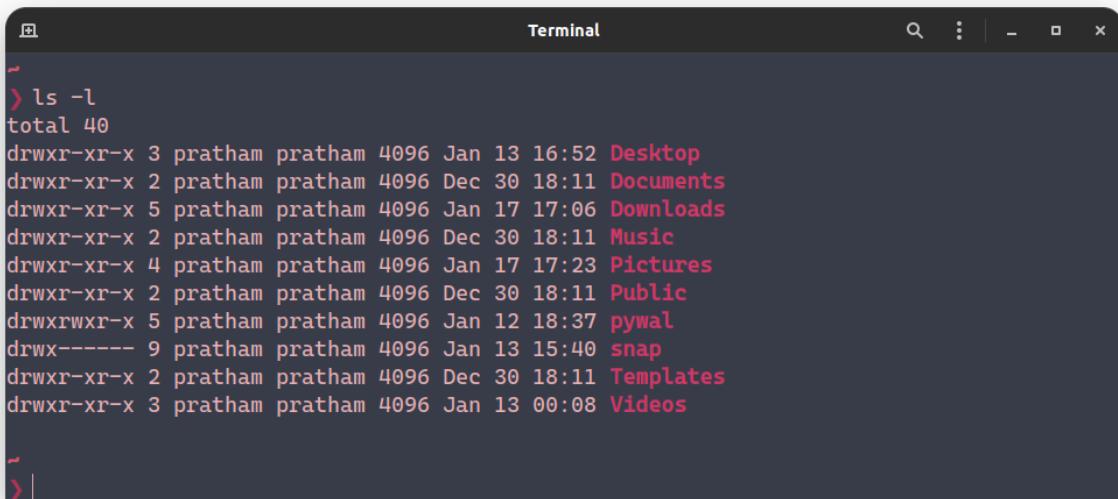
A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The command `ls ..` is entered, followed by a list of directory names: Desktop, Downloads, Pictures, pywal, Templates, Documents, Music, Public, snap, and Videos. The prompt `~/Desktop > |` is visible at the bottom.

```
~/Desktop
> ls ..
Desktop    Downloads  Pictures  pywal  Templates
Documents  Music      Public    snap    Videos

~/Desktop
> |
```

```
ls -l
```

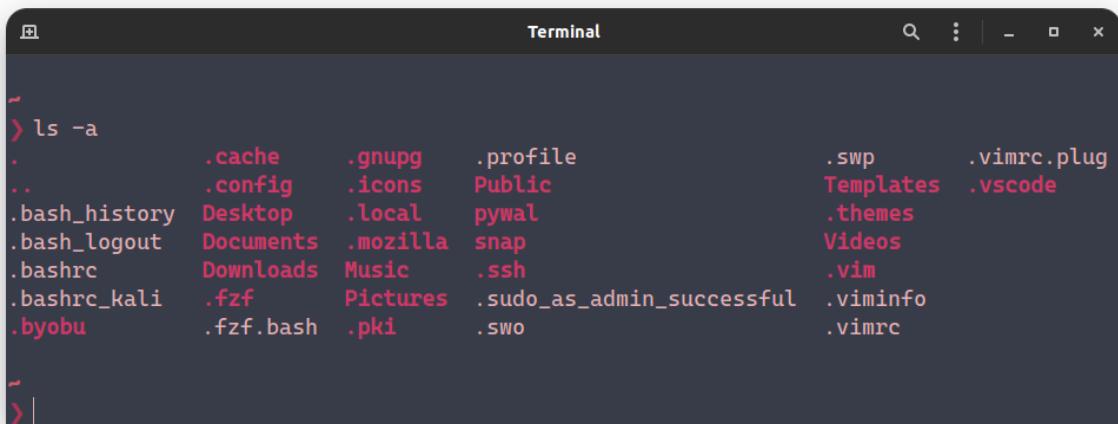
lists all files in the pwd in list(long format) form



```
Terminal
ls -l
total 40
drwxr-xr-x 3 pratham pratham 4096 Jan 13 16:52 Desktop
drwxr-xr-x 2 pratham pratham 4096 Dec 30 18:11 Documents
drwxr-xr-x 5 pratham pratham 4096 Jan 17 17:06 Downloads
drwxr-xr-x 2 pratham pratham 4096 Dec 30 18:11 Music
drwxr-xr-x 4 pratham pratham 4096 Jan 17 17:23 Pictures
drwxr-xr-x 2 pratham pratham 4096 Dec 30 18:11 Public
drwxrwxr-x 5 pratham pratham 4096 Jan 12 18:37 pywal
drwx----- 9 pratham pratham 4096 Jan 13 15:40 snap
drwxr-xr-x 2 pratham pratham 4096 Dec 30 18:11 Templates
drwxr-xr-x 3 pratham pratham 4096 Jan 13 00:08 Videos
```

```
ls -a
```

lists all files(including hidden(Ex .bashrc)) in pwd



```
Terminal
ls -a
.           .cache      .gnupg     .profile          .swp      .vimrc.plug
..          .config      .icons      Public           Templates .vscode
.bash_history Desktop    .local      pywal            .themes
.bash_logout Documents   .mozilla   snap             Videos
.bashrc      Downloads   Music      .ssh              .vim
.bashrc_kali .fzf        Pictures   .sudo_as_admin_successful .viminfo
.byobu       .fzf.bash   .pki       .swo              .vimrc
```

```
ls *.ext
```

lists all extension files in the pwd (here * is a wildcard)

```
ls **
```

lists all files (excluding dir) in pwd



```
pratham/code/file via ⚡ via 🍏 v17.0.1 via @ via 🐍 v3.8.10
> ls
eight.c first four.py one.c seven.c third two.cpp
fifth five.js fouth second six.dart three.java

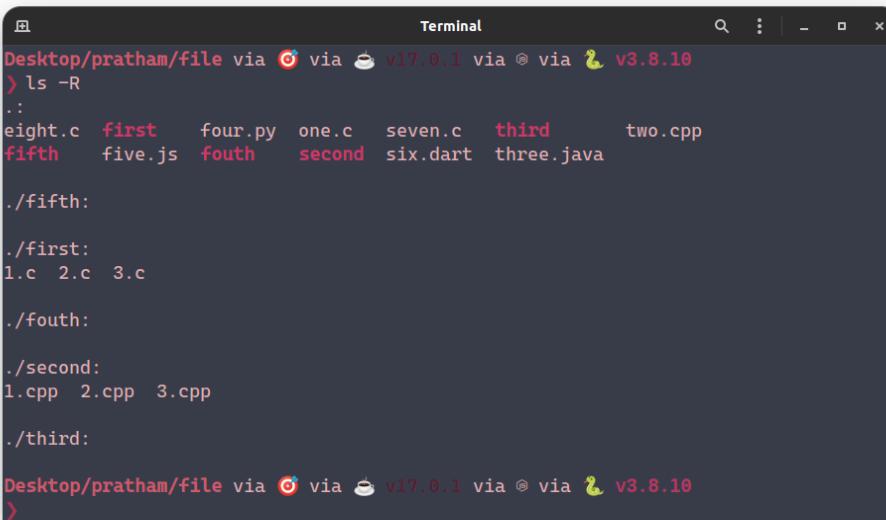
pratham/code/file via ⚡ via 🍏 v17.0.1 via @ via 🐍 v3.8.10
> ls *.c
eight.c one.c seven.c

pratham/code/file via ⚡ via 🍏 v17.0.1 via @ via 🐍 v3.8.10
> ls *.*
eight.c five.js four.py one.c seven.c six.dart three.java two.cpp

pratham/code/file via ⚡ via 🍏 v17.0.1 via @ via 🐍 v3.8.10
> |
```

```
ls -R
```

lists all files in a recursive fashion i.e files inside the directories in pwd



```
Desktop/pratham/file via ⚡ via 🍏 v17.0.1 via @ via 🐍 v3.8.10
> ls -R
.:
eight.c first four.py one.c seven.c third two.cpp
fifth five.js fouth second six.dart three.java

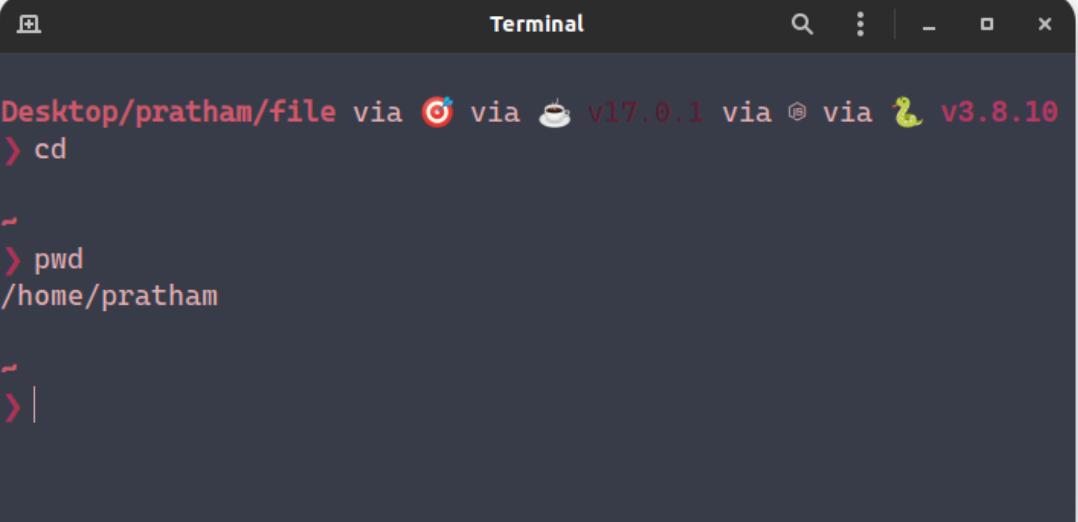
./fifth:
./first:
1.c 2.c 3.c

./fouth:
./second:
1.cpp 2.cpp 3.cpp

./third:
Desktop/pratham/file via ⚡ via 🍏 v17.0.1 via @ via 🐍 v3.8.10
>
```

```
cd OR cd ~
```

Changes pwd to current home dir



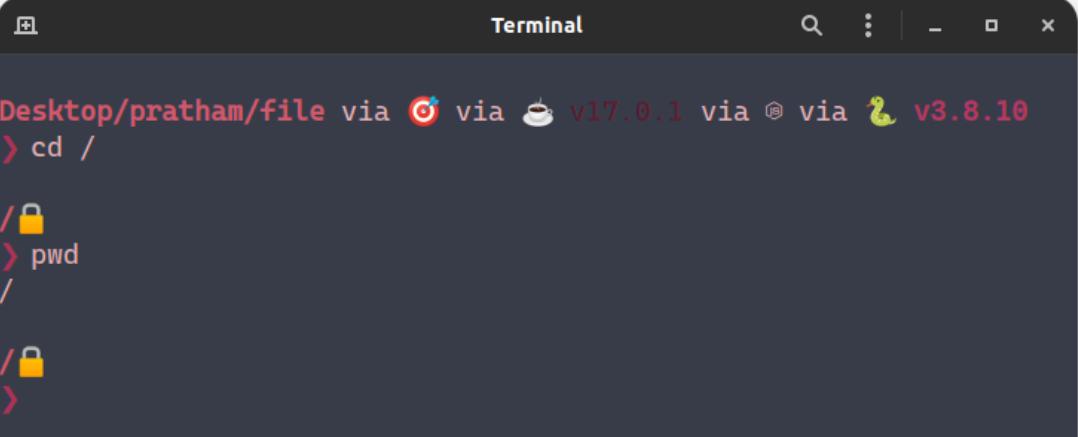
```
Desktop/pratham/file via ⚡ via ☕ v17.0.1 via 🌐 via 🐍 v3.8.10
> cd

~
> pwd
/home/pratham

~
> |
```

```
cd /
```

Changes pwd to root dir

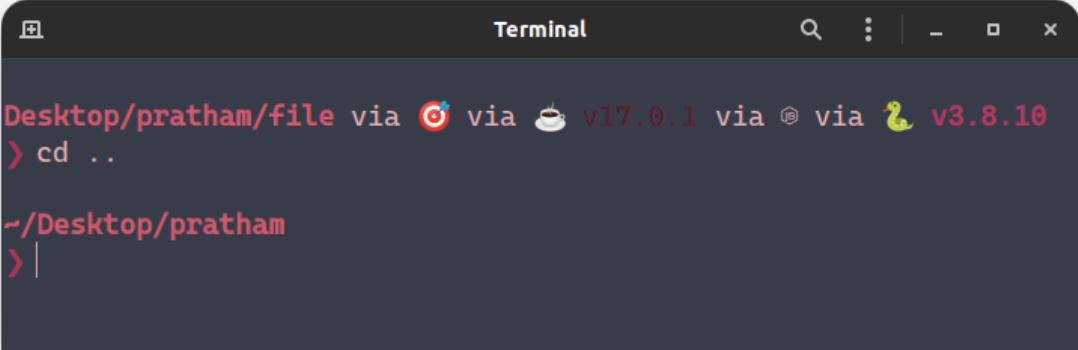


```
Desktop/pratham/file via ⚡ via ☕ v17.0.1 via 🌐 via 🐍 v3.8.10
> cd /

/
> pwd
/
> |
```

```
cd ..
```

Changes pwd to parent dir

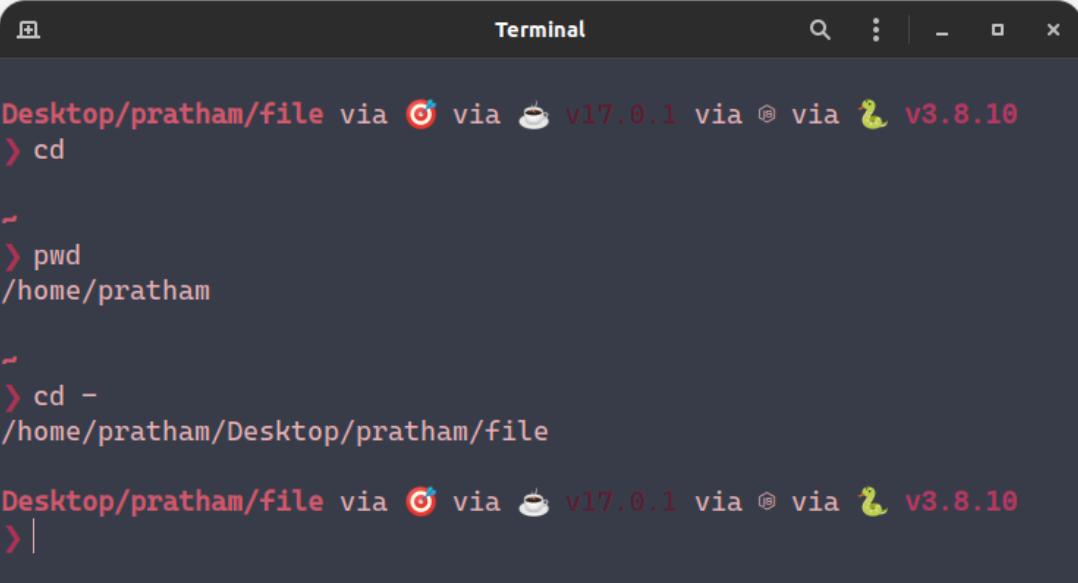


```
Desktop/pratham/file via ⚡ via ☕ v17.0.1 via 🌐 via 🐍 v3.8.10
> cd ..

~/Desktop/pratham
> |
```

```
cd -
```

Changes pwd to previous working dir and also outputs the address of previous working directory



```
Desktop/pratham/file via ⚡ via ☕ v17.0.1 via 🌐 via 🐍 v3.8.10
> cd

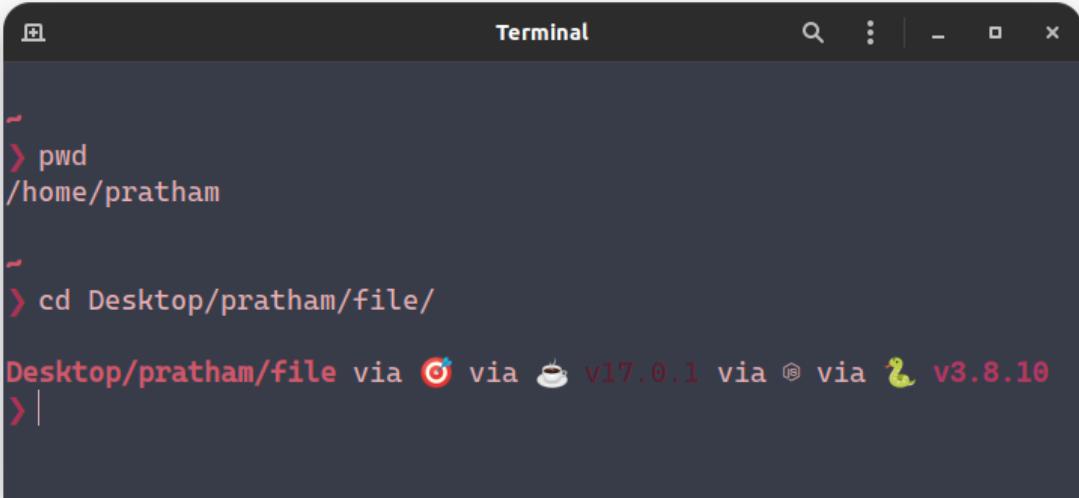
~
> pwd
/home/pratham

~
> cd -
/home/pratham/Desktop/pratham/file

Desktop/pratham/file via ⚡ via ☕ v17.0.1 via 🌐 via 🐍 v3.8.10
> |
```

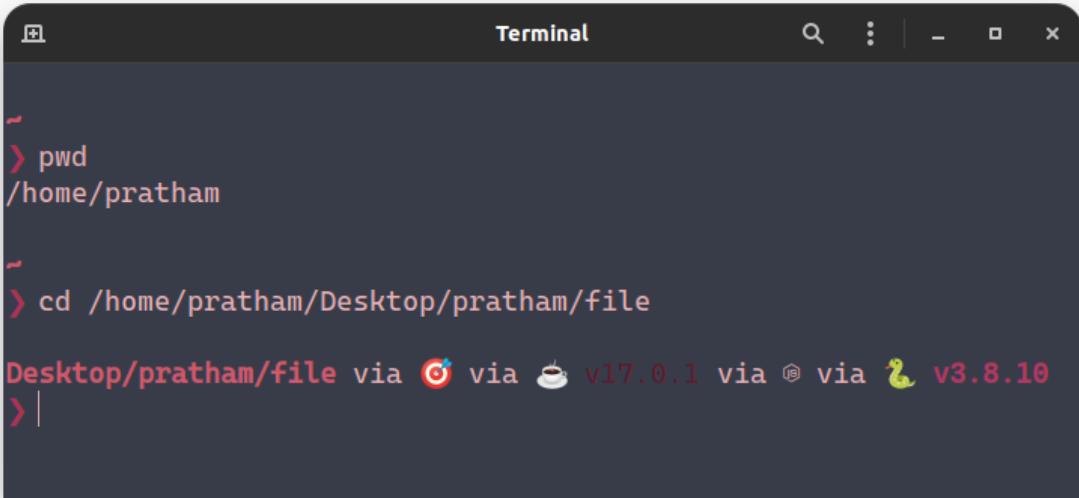
```
cd address
```

Outputs present working directory



```
Terminal
~
> pwd
/home/pratham

~
> cd Desktop/pratham/file/
Desktop/pratham/file via ⚡ via ☕ v17.0.1 via ⚙ via 🐍 v3.8.10
>
```



```
Terminal
~
> pwd
/home/pratham

~
> cd /home/pratham/Desktop/pratham/file
Desktop/pratham/file via ⚡ via ☕ v17.0.1 via ⚙ via 🐍 v3.8.10
>
```

```
cd my\ dir OR cd 'my dir' OR cd "my dir"
```

Handling string names of dir for changing pwd to these dir



A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The command history shows:

```
pratham/file/first
> ls
1.c  2.c  3.c  char  do  ek  'my dir'  paach  teen

pratham/file/first
> cd 'my dir'

file/first/my dir
> |
```



A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The command history shows:

```
pratham/file/first
> ls
1.c  2.c  3.c  char  do  ek  'my dir'  paach  teen

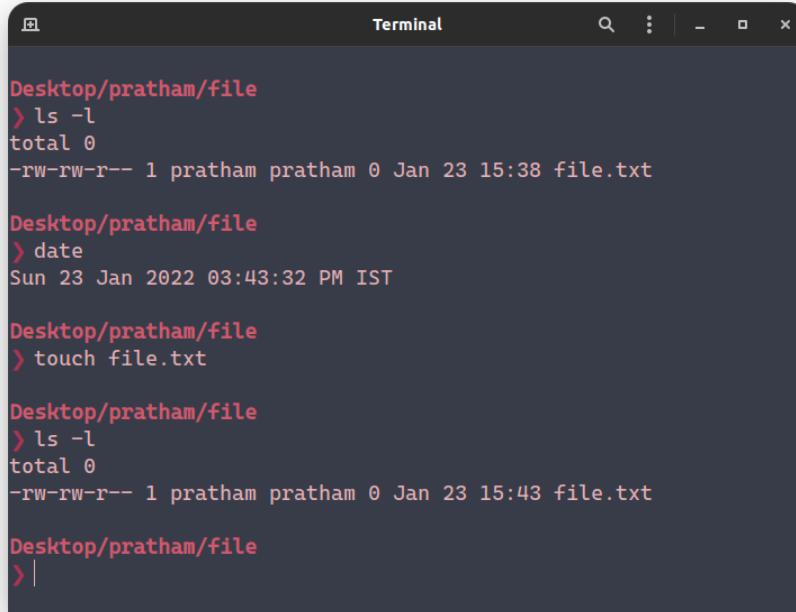
pratham/file/first
> cd my\ dir

file/first/my dir
> |
```

touch

Creates a new file in pwd

And if file already exist it will modify time-stamp of the file to current time



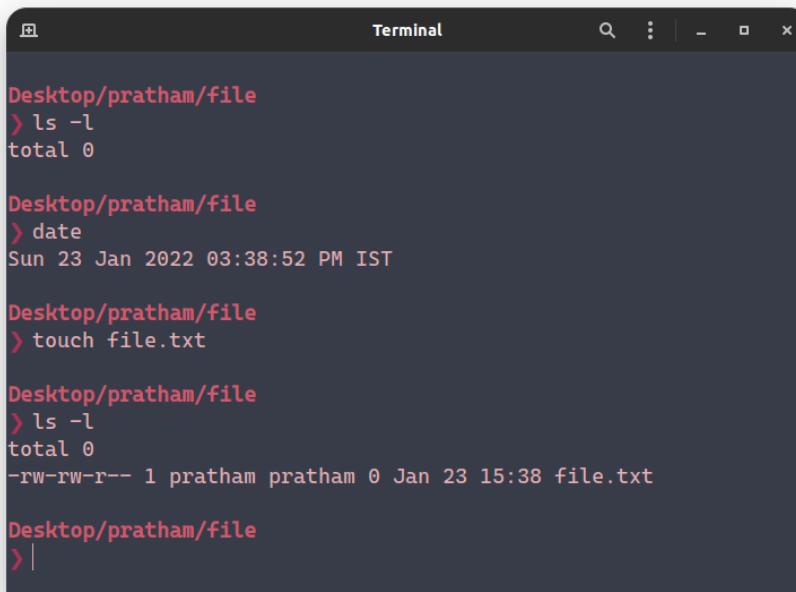
```
Desktop/pratham/file
> ls -l
total 0
-rw-rw-r-- 1 pratham pratham 0 Jan 23 15:38 file.txt

Desktop/pratham/file
> date
Sun 23 Jan 2022 03:43:32 PM IST

Desktop/pratham/file
> touch file.txt

Desktop/pratham/file
> ls -l
total 0
-rw-rw-r-- 1 pratham pratham 0 Jan 23 15:43 file.txt

Desktop/pratham/file
> |
```



```
Desktop/pratham/file
> ls -l
total 0

Desktop/pratham/file
> date
Sun 23 Jan 2022 03:38:52 PM IST

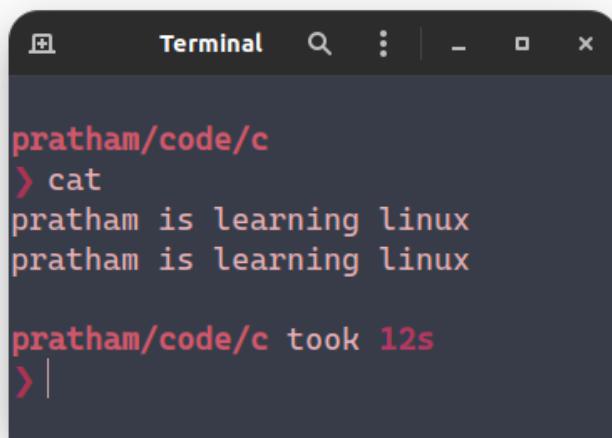
Desktop/pratham/file
> touch file.txt

Desktop/pratham/file
> ls -l
total 0
-rw-rw-r-- 1 pratham pratham 0 Jan 23 15:38 file.txt

Desktop/pratham/file
> |
```

cat

takes input and print it back and to exit ctrl+d

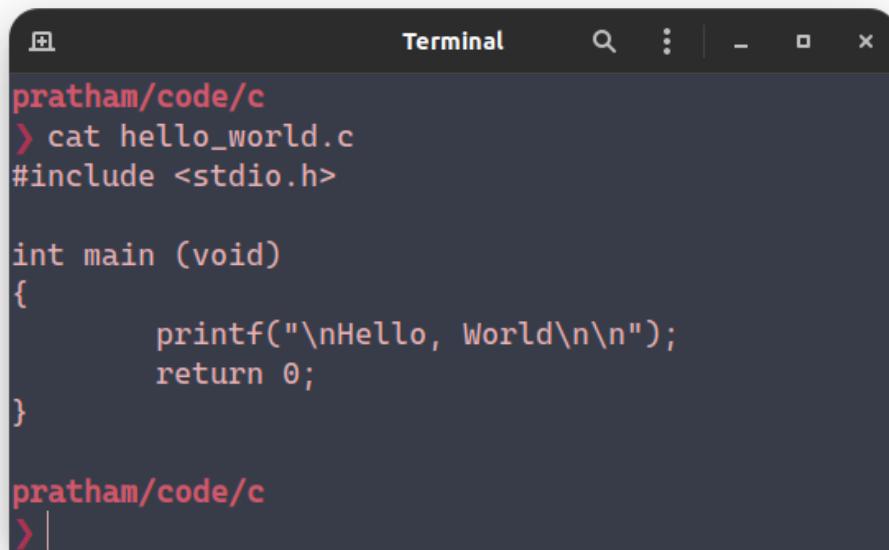


A screenshot of a terminal window titled "Terminal". The window shows the following text:
pratham/code/c
› cat
pratham is learning linux
pratham is learning linux

pratham/code/c took 12s
› |

cat [file]

print's data of file on the terminal



A screenshot of a terminal window titled "Terminal". The window shows the following text:
pratham/code/c
› cat hello_world.c
#include <stdio.h>

int main (void)
{
 printf("\nHello, World\n\n");
 return 0;
}

pratham/code/c
› |

```
cat file1 file2
```

print's data of file1 followed by file2 on terminal



```
pratham/code/c
> cat hello_world.c hello_world.cpp
#include <stdio.h>

int main (void)
{
    printf("\nHello, World\n\n");
    return 0;
}
#include <iostream>

using namespace std;

int main (void)
{
    cout << "\nHello, World\n\n";
    return 0;
}

pratham/code/c
> |
```

```
cat -b file
```

adds line number to non-blank line and print's data of file on the terminal



```
pratham/code/c
> cat -b hello_world.c
1 #include <stdio.h>

2 int main (void)
3 {
4     printf("\nHello, World\n\n");
5     return 0;
6 }

pratham/code/c
> |
```

cat -n file

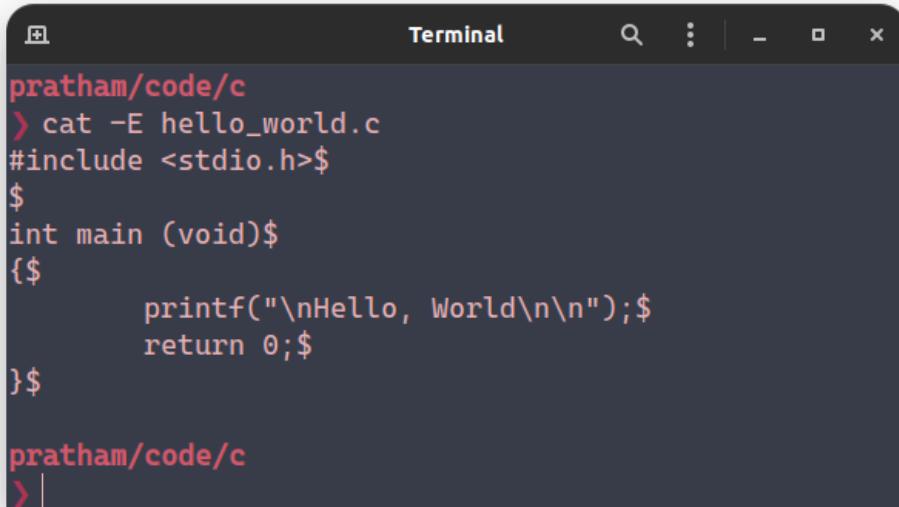
adds line number to every line and print's data of file on the terminal



```
pratham/code/c
> cat -n hello_world.c
 1 #include <stdio.h>
 2
 3 int main (void)
 4 {
 5     printf("\nHello, World\n\n");
 6     return 0;
 7 }
```

cat -E file

adds \$ symbol on end of each line and print's data of file on terminal



```
pratham/code/c
> cat -E hello_world.c
#include <stdio.h>$
$
int main (void)$
{$
    printf("\nHello, World\n\n");$
    return 0;$
}$

pratham/code/c
> |
```

I/O Redirection

`cat > file`

takes input from the terminal and re-writes the file

The screenshot shows a terminal window with a dark background and light-colored text. The terminal title is "Terminal". The session starts with the user navigating to their desktop directory:

```
Desktop/pratham/file
```

Then, they run the command `ls` to list files:

```
> ls
```

Next, they run `cat > file.txt` to start writing to a new file. They type "hello", "I am Learning Linux", and "thank you" into the terminal, followed by pressing `^C` to stop the process:

```
Desktop/pratham/file
> cat > file.txt
hello
I am Learning Linux
thank you
^C
```

After stopping the write process, they run `ls` again to see the newly created file:

```
Desktop/pratham/file took 20s
> ls
file.txt
```

Finally, they run `cat file.txt` to read the contents of the file back:

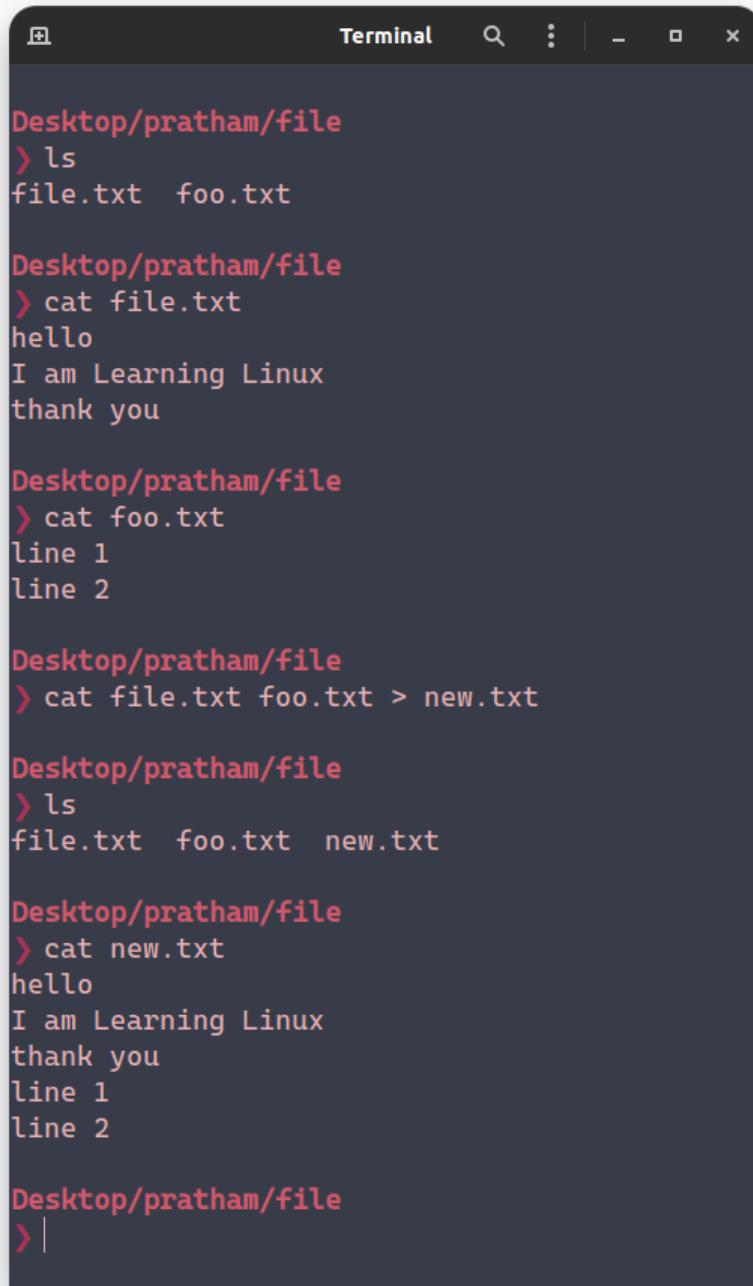
```
Desktop/pratham/file
> cat file.txt
hello
I am Learning Linux
thank you
```

The terminal ends with a blank line:

```
Desktop/pratham/file
> |
```

```
cat file1 file2 > file3
```

output of "cat file1 file2" is re-written into file3



```
Desktop/pratham/file
> ls
file.txt  foo.txt

Desktop/pratham/file
> cat file.txt
hello
I am Learning Linux
thank you

Desktop/pratham/file
> cat foo.txt
Line 1
line 2

Desktop/pratham/file
> cat file.txt foo.txt > new.txt

Desktop/pratham/file
> ls
file.txt  foo.txt  new.txt

Desktop/pratham/file
> cat new.txt
hello
I am Learning Linux
thank you
line 1
line 2

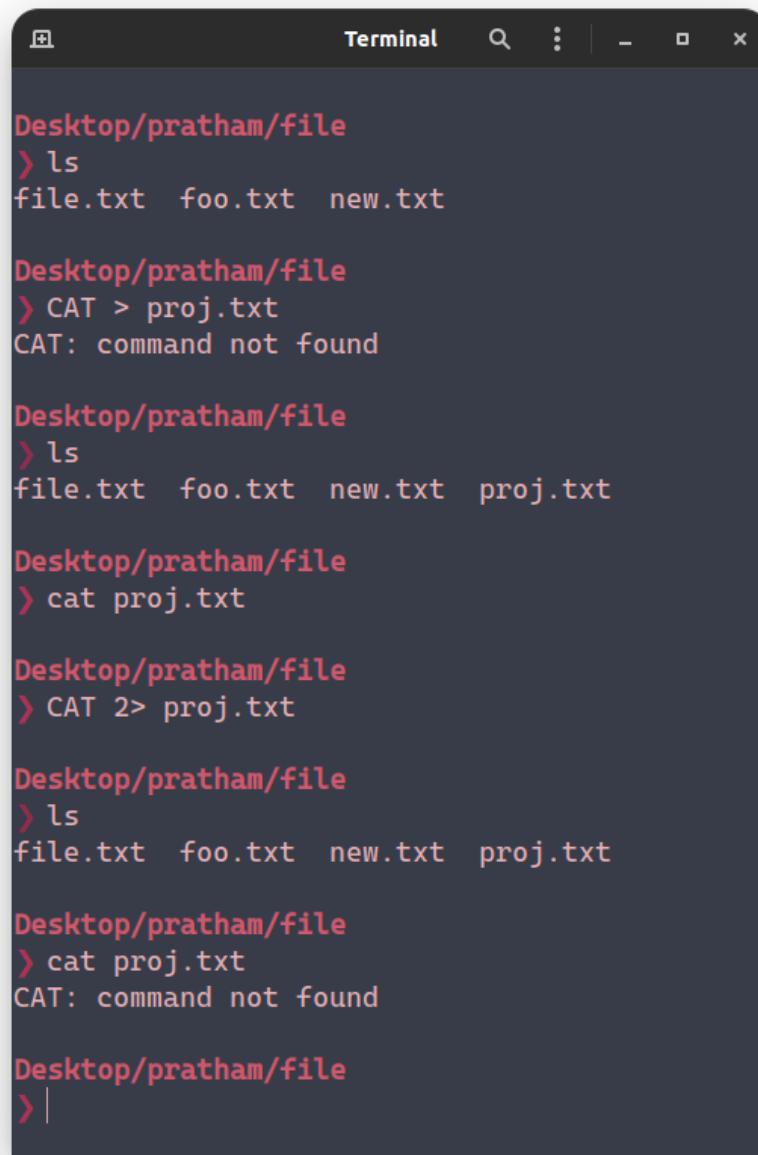
Desktop/pratham/file
> |
```

[errorcommand] > file

cannot take input as error occurs but re-writes the file to an empty file

[errorcommand] 2> file

take error message as the re-writes the file



The screenshot shows a terminal window with a dark background and light-colored text. The title bar says "Terminal". The window contains several command-line examples demonstrating redirection and errors:

```
Desktop/pratham/file
> ls
file.txt  foo.txt  new.txt

Desktop/pratham/file
> CAT > proj.txt
CAT: command not found

Desktop/pratham/file
> ls
file.txt  foo.txt  new.txt  proj.txt

Desktop/pratham/file
> cat proj.txt

Desktop/pratham/file
> CAT 2> proj.txt

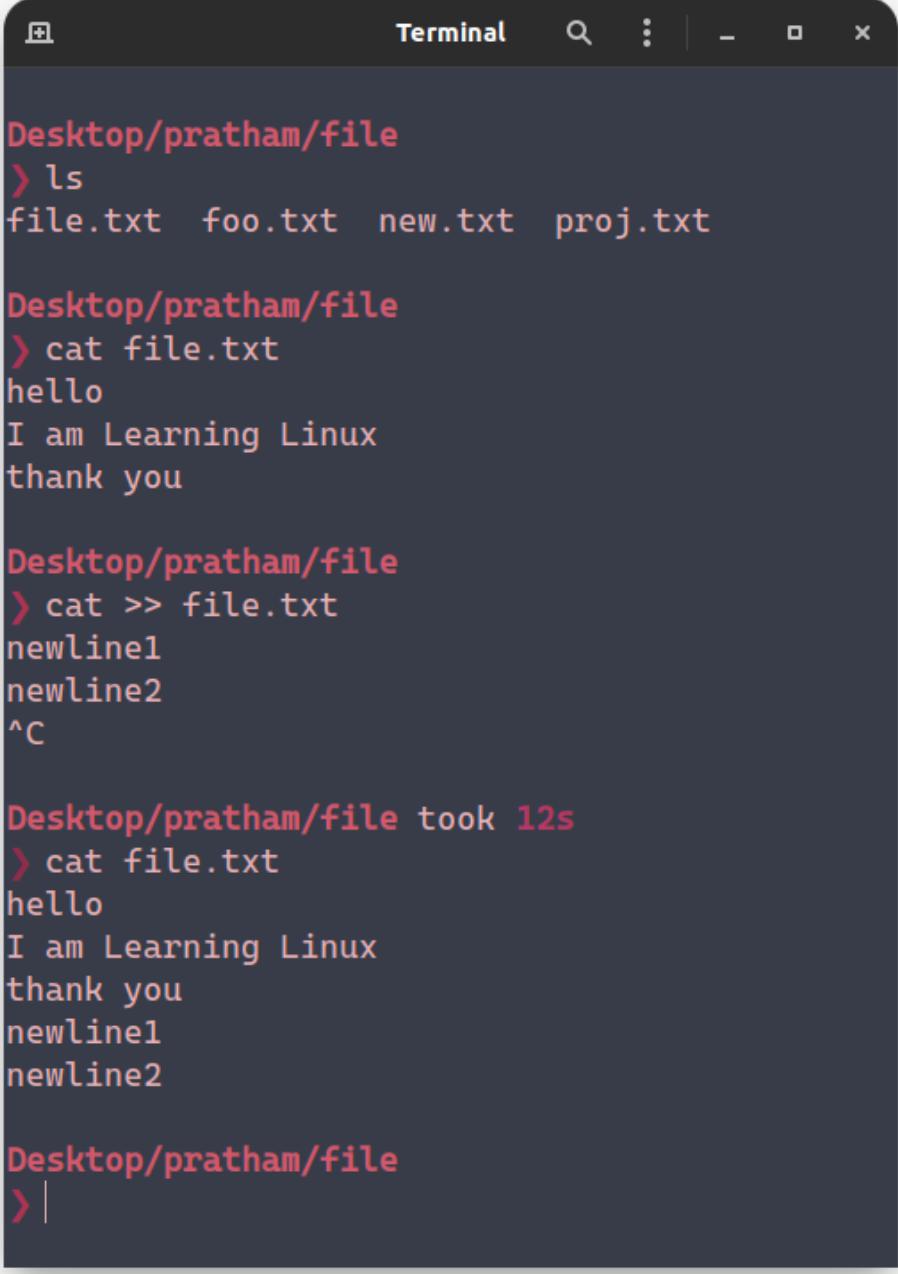
Desktop/pratham/file
> ls
file.txt  foo.txt  new.txt  proj.txt

Desktop/pratham/file
> cat proj.txt
CAT: command not found

Desktop/pratham/file
> |
```

```
cat >> file
```

takes input from the terminal and updates file



The screenshot shows a terminal window with a dark theme. The title bar says "Terminal". The terminal content is as follows:

```
Desktop/pratham/file
> ls
file.txt  foo.txt  new.txt  proj.txt

Desktop/pratham/file
> cat file.txt
hello
I am Learning Linux
thank you

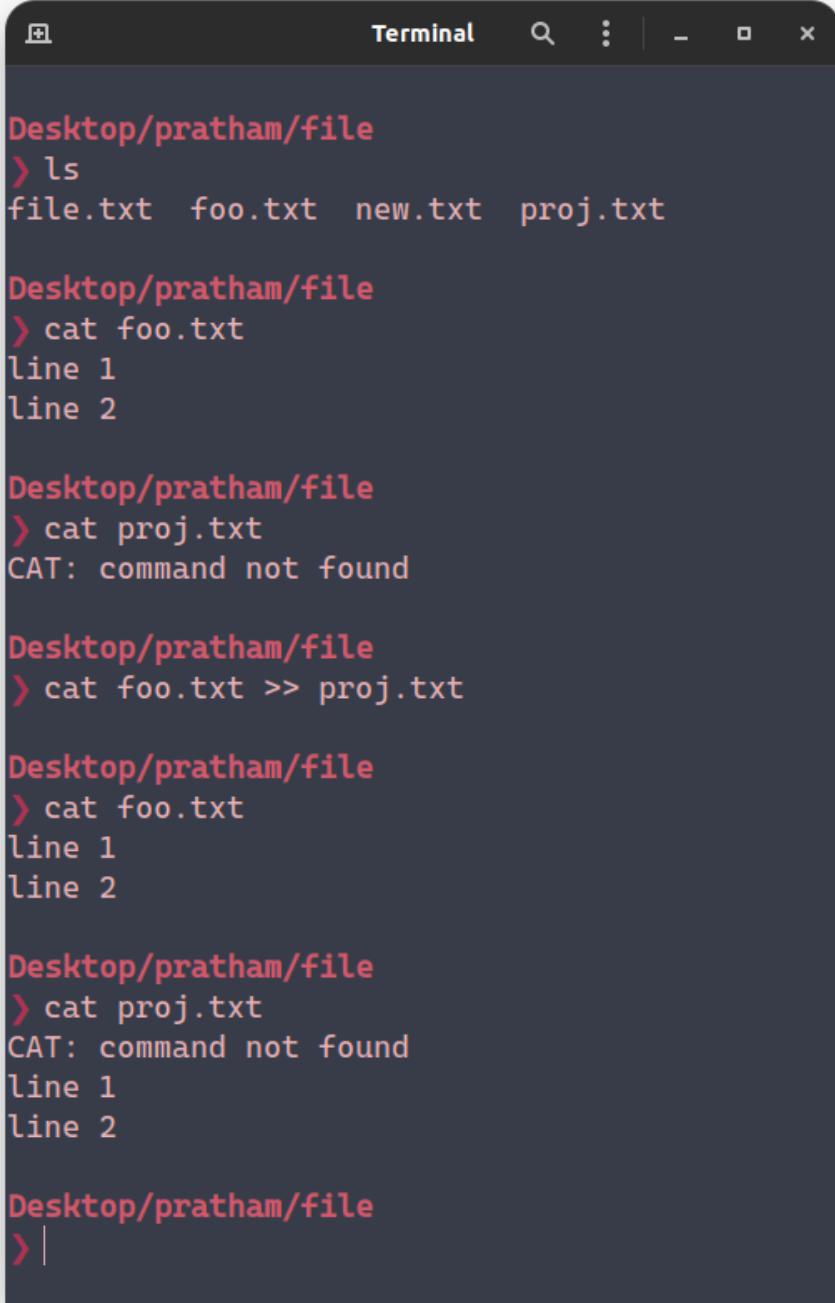
Desktop/pratham/file
> cat >> file.txt
newline1
newline2
^C

Desktop/pratham/file took 12s
> cat file.txt
hello
I am Learning Linux
thank you
newline1
newline2

Desktop/pratham/file
> |
```

```
cat file1 >> file2
```

file2 is updated by the output of "cat file1" i.e file1



```
Desktop/pratham/file
> ls
file.txt  foo.txt  new.txt  proj.txt

Desktop/pratham/file
> cat foo.txt
line 1
line 2

Desktop/pratham/file
> cat proj.txt
CAT: command not found

Desktop/pratham/file
> cat foo.txt >> proj.txt

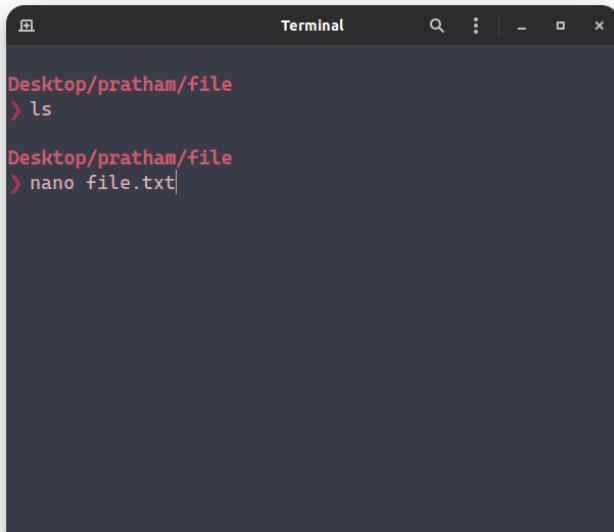
Desktop/pratham/file
> cat foo.txt
line 1
line 2

Desktop/pratham/file
> cat proj.txt
CAT: command not found
line 1
line 2

Desktop/pratham/file
> |
```

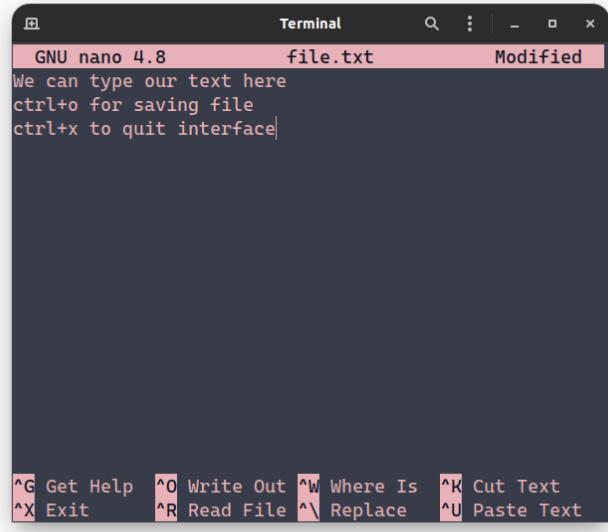
nano file

Creates file if it does not exists and then opens the file in an interactive text editor in the shell prompt itself



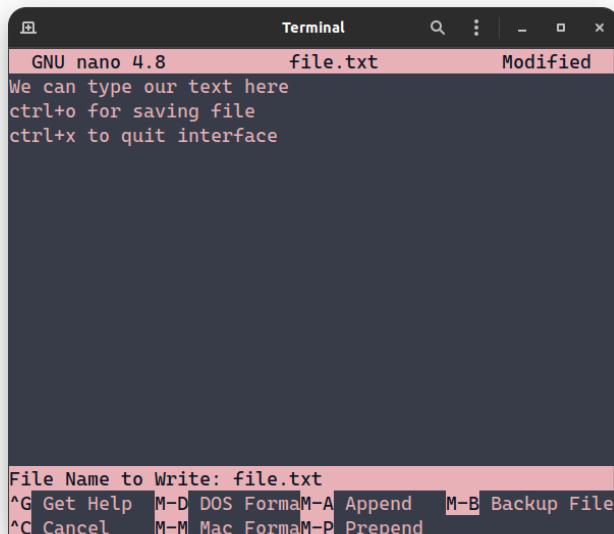
```
Desktop/pratham/file
> ls

Desktop/pratham/file
> nano file.txt
```



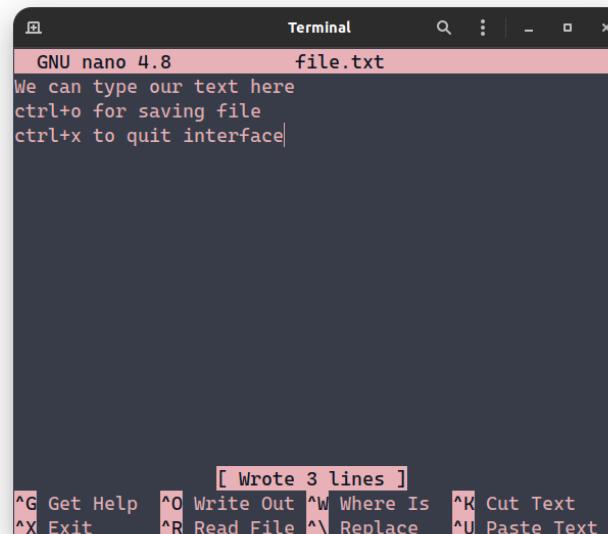
```
GNU nano 4.8          file.txt          Modified
We can type our text here
ctrl+o for saving file
ctrl+x to quit interface

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text
^X Exit      ^R Read File  ^\ Replace   ^U Paste Text
```



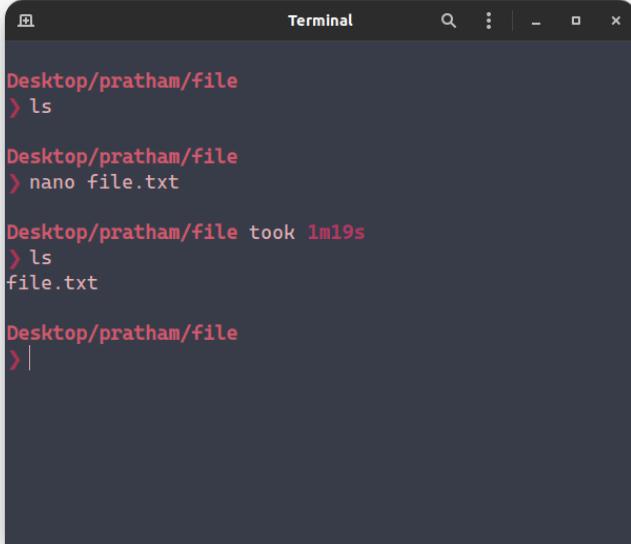
```
GNU nano 4.8          file.txt          Modified
We can type our text here
ctrl+o for saving file
ctrl+x to quit interface

File Name to Write: file.txt
^G Get Help  M-D DOS FormaM-A Append  M-B Backup File
^C Cancel    M-M Mac FormaM-P Prepend
```



```
GNU nano 4.8          file.txt
We can type our text here
ctrl+o for saving file
ctrl+x to quit interface

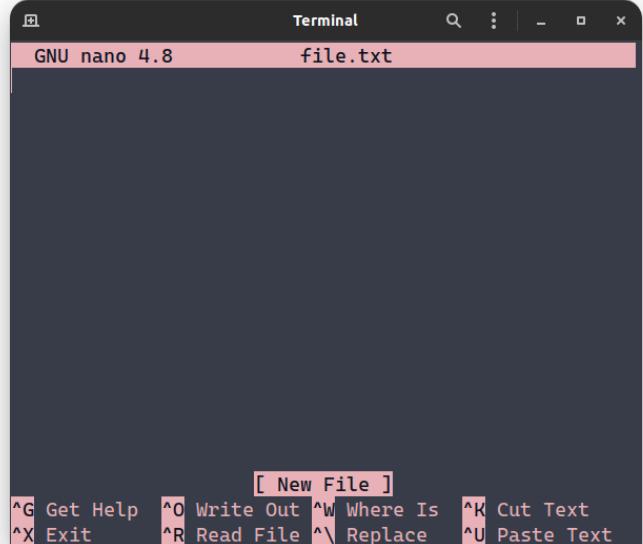
[ Wrote 3 lines ]
^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text
^X Exit      ^R Read File  ^\ Replace   ^U Paste Text
```



```
Desktop/pratham/file
> ls
Desktop/pratham/file
> nano file.txt

Desktop/pratham/file took 1m19s
> ls
file.txt

Desktop/pratham/file
> |
```

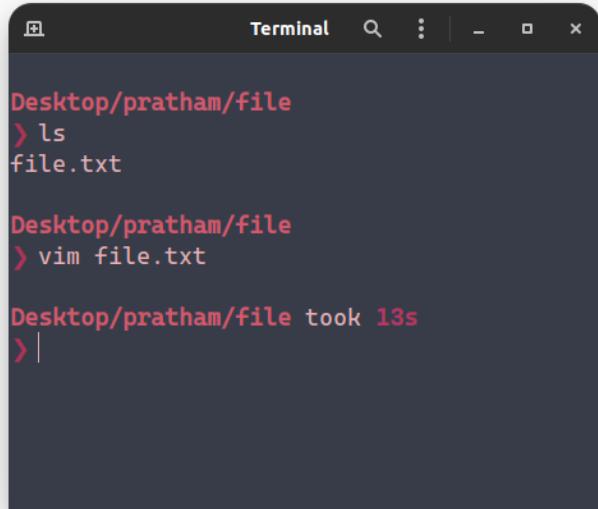


```
GNU nano 4.8           file.txt

[ New File ]
^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text
^X Exit      ^R Read File  ^\ Replace   ^U Paste Text
```

vim file

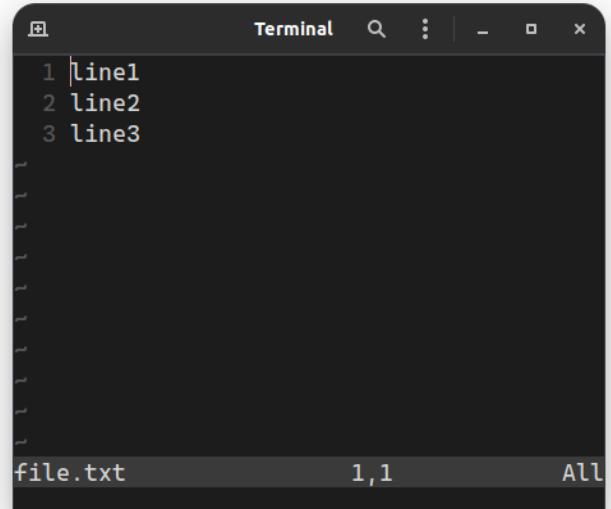
Vi IMproved, a programmers text editor



```
Desktop/pratham/file
> ls
file.txt

Desktop/pratham/file
> vim file.txt

Desktop/pratham/file took 13s
> |
```

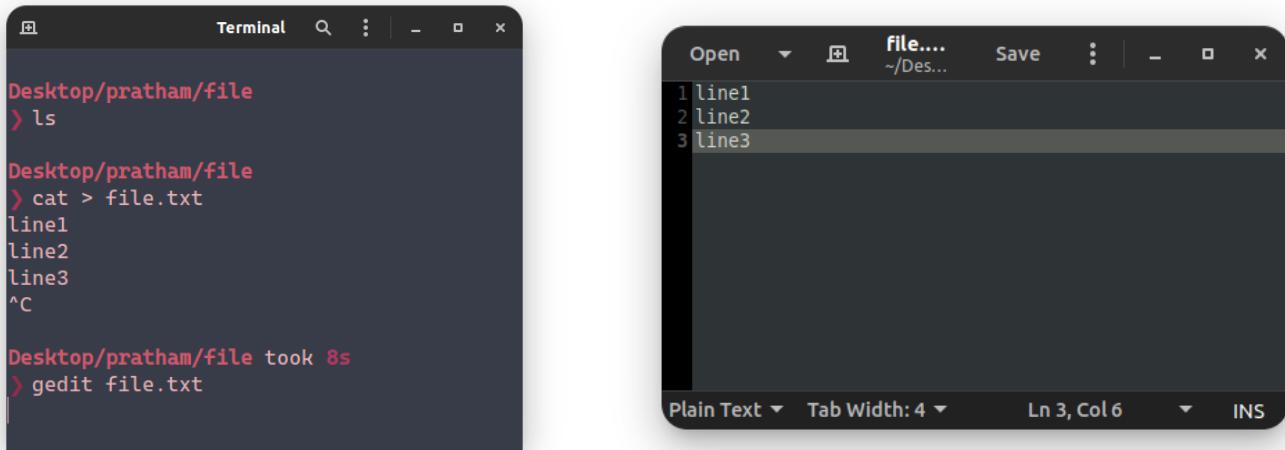


```
1 line1
2 line2
3 line3

file.txt          1,1          All
```

gedit file

opens the file in a GUI editor



less file

shows content of a file in an editor like view from start and could be easily handled using different keys like

arrow-keys for navigation,

space-bar for navigation to next page,

B for navigating to previous page,

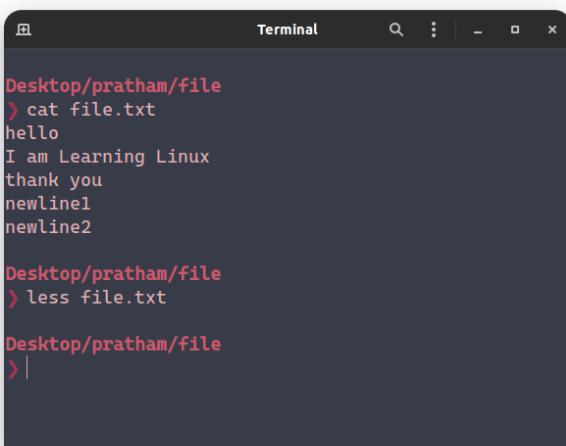
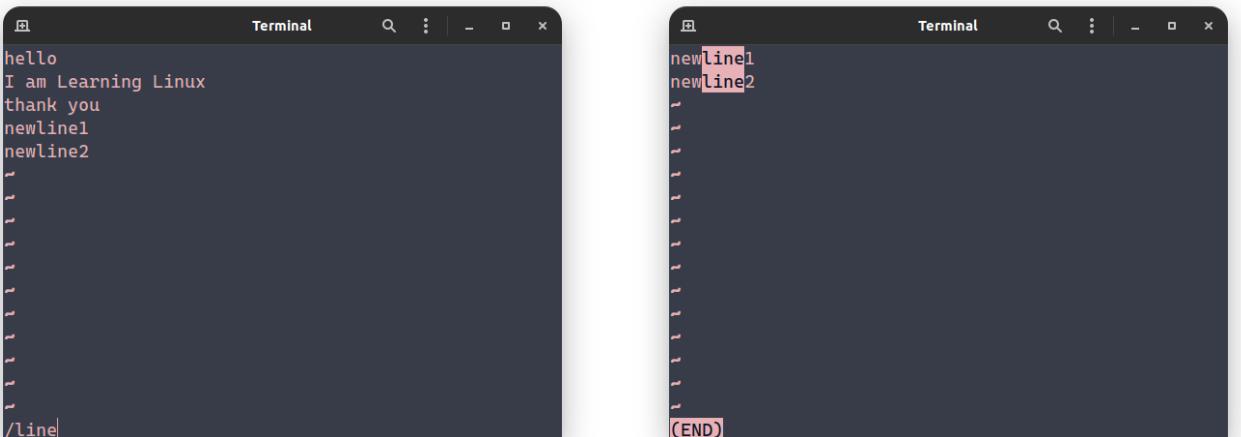
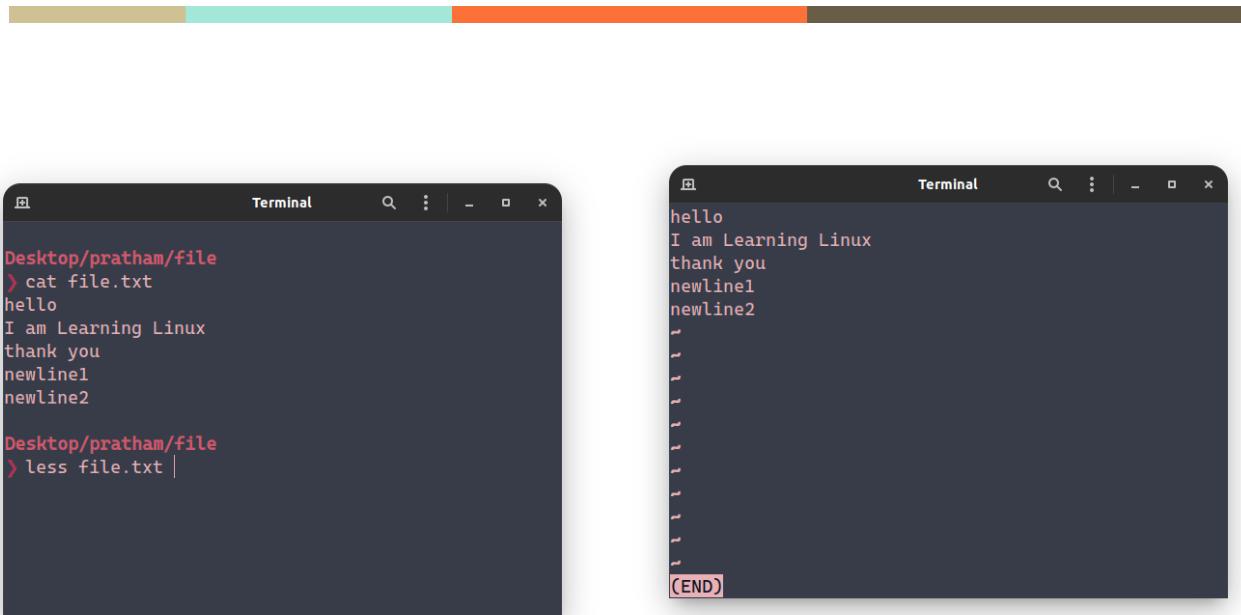
G for navigating to the end of the file,

g for navigating to the start of the file,

/word finds the word in the file from up to down

?word finds the word in the file from down to up

q to quit less command



Pipelining

A pipe is a form of redirection (transfer of standard output to some other destination) that is used in Linux and other Unix-like operating systems to send the output of one command/program/process to another command/program/process for further processing.

`ls -lR | less`

executes `ls -lR` command and redirects the output to the `less` command

```
Desktop/pratham/file
> ls -lR
.:
total 16
-rw-rw-r-- 1 pratham pratham 54 Jan 23 14:57 file.txt
-rw-rw-r-- 1 pratham pratham 14 Jan 23 14:53 foo.txt
-rw-rw-r-- 1 pratham pratham 50 Jan 23 14:54 new.txt
-rw-rw-r-- 1 pratham pratham 37 Jan 23 14:59 proj.txt

Desktop/pratham/file
> ls -lR | less|
```

```
:
total 16
-rw-rw-r-- 1 pratham pratham 54 Jan 23 14:57 file.txt
-rw-rw-r-- 1 pratham pratham 14 Jan 23 14:53 foo.txt
-rw-rw-r-- 1 pratham pratham 50 Jan 23 14:54 new.txt
-rw-rw-r-- 1 pratham pratham 37 Jan 23 14:59 proj.txt
.
.
.
.
.
.
.
.
(END)
```

```
Desktop/pratham/file
> ls -lR
.:
total 16
-rw-rw-r-- 1 pratham pratham 54 Jan 23 14:57 file.txt
-rw-rw-r-- 1 pratham pratham 14 Jan 23 14:53 foo.txt
-rw-rw-r-- 1 pratham pratham 50 Jan 23 14:54 new.txt
-rw-rw-r-- 1 pratham pratham 37 Jan 23 14:59 proj.txt

Desktop/pratham/file
> ls -lR | less

Desktop/pratham/file took 8s
>|
```

head file

Outputs top part of a file (by default -> first 10 lines of the file)

tail file

Outputs bottom part of a file (by default -> first 10 lines of the file)

```
Term... Desktop/pratham/file
> cat file1.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Desktop/pratham/file
> |
```

```
Term... Desktop/pratham/file
> cat file2.txt
11
12
13
14
15
16
17
18
19
110
111
112
113
114
115

Desktop/pratham/file
> |
```

```
Term... Desktop/pratham/file
> head file1.txt
1
2
3
4
5
6
7
8
9
10

Desktop/pratham/file
> |
```

```
Term... Desktop/pratham/file
> tail file1.txt
6
7
8
9
10
11
12
13
14
15

Desktop/pratham/file
> |
```

```
head file1 file2
```

Outputs first 10 lines of all the files

```
tail file1 file2
```

Outputs last 10 lines of all the files

```
Desktop/pratham/file
> head -n 5 file1.txt file2.txt
==> file1.txt <==
1
2
3
4
5

==> file2.txt <==
11
12
13
14
15

Desktop/pratham/file
> |
```

```
Desktop/pratham/file
> tail -n 5 file1.txt file2.txt
==> file1.txt <==
11
12
13
14
15

==> file2.txt <==
111
112
113
114
115

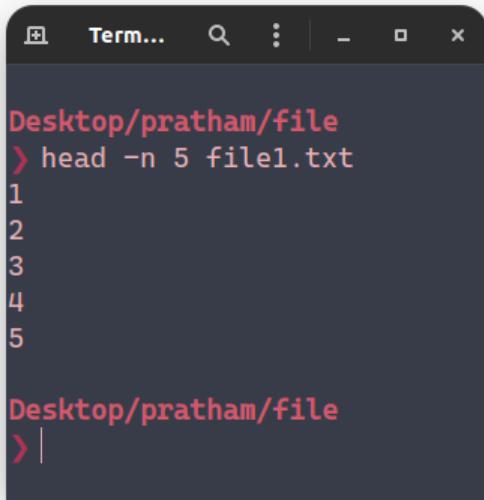
Desktop/pratham/file
> |
```

```
head -n num file
```

Shows the first num lines of the file

```
tail -n num file
```

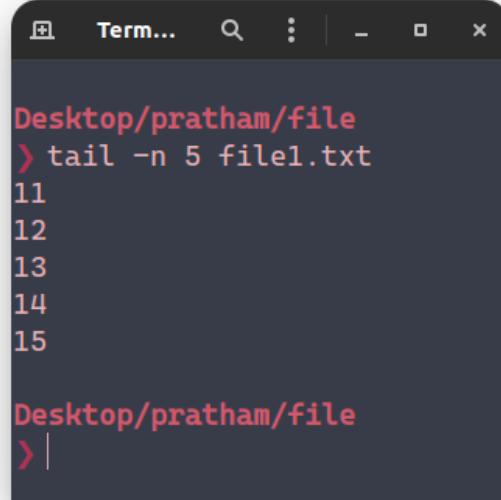
Shows the last num lines of the file



A screenshot of a terminal window titled "Term...". The window shows the command "head -n 5 file1.txt" followed by its output: the first five lines of the file "file1.txt". The terminal has a dark background with light-colored text.

```
Desktop/pratham/file
> head -n 5 file1.txt
1
2
3
4
5

Desktop/pratham/file
> |
```



A screenshot of a terminal window titled "Term...". The window shows the command "tail -n 5 file1.txt" followed by its output: the last five lines of the file "file1.txt". The terminal has a dark background with light-colored text.

```
Desktop/pratham/file
> tail -n 5 file1.txt
11
12
13
14
15

Desktop/pratham/file
> |
```

```
tail -f file
```

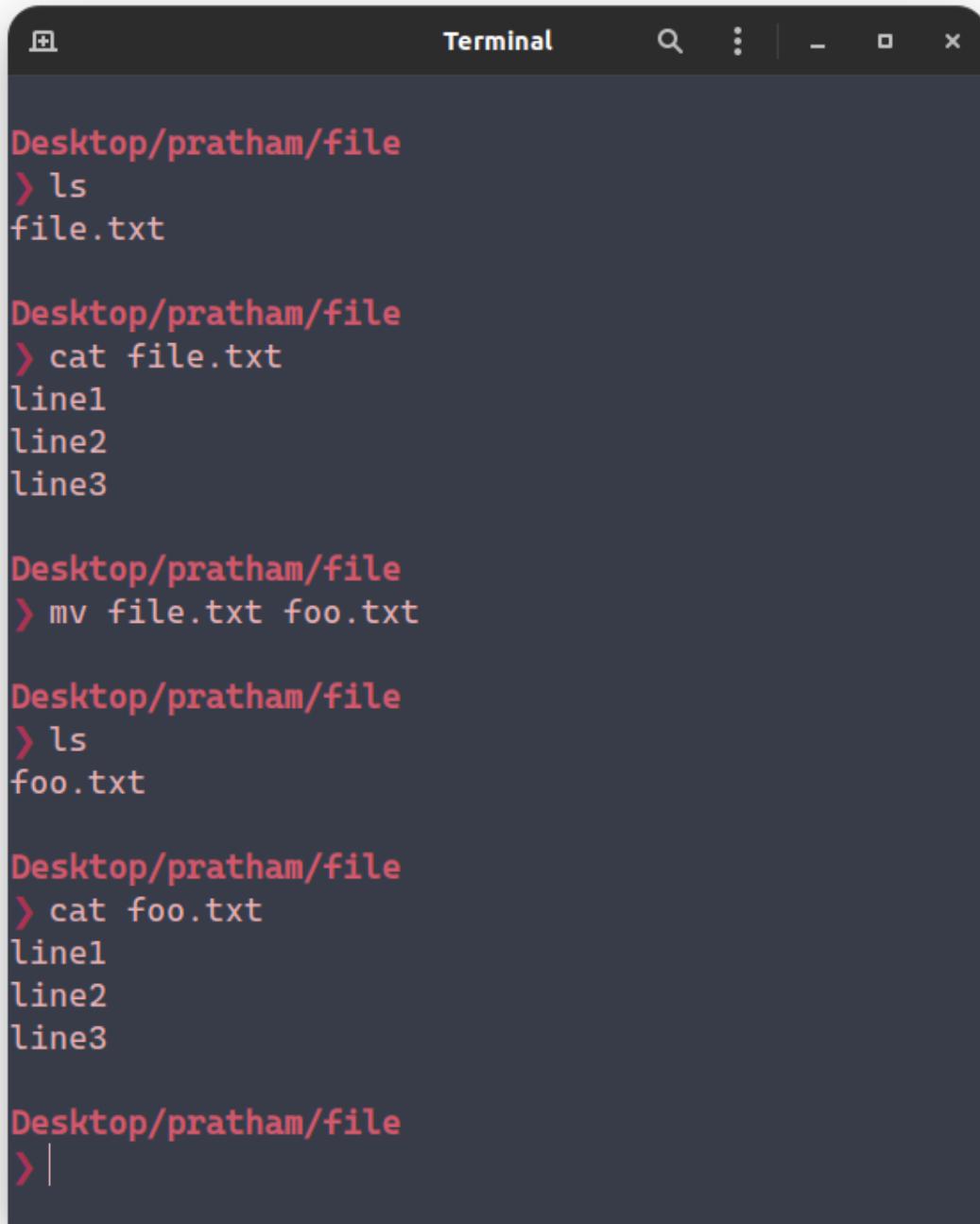
Outputs appended data as file grows [Could be used to check live output of the file]

The screenshot shows two separate terminal windows. The left window has the title 'Desktop/pratham/file' and contains the command 'tail -f file1.txt |'. The right window also has the title 'Desktop/pratham/file' and contains the command 'nano file1.txt |'. Both windows have standard terminal icons at the top.

The screenshot shows a single terminal window with two panes. The left pane displays the command 'tail -f file1.txt |'. The right pane shows the contents of 'file1.txt' with lines numbered 1 through 16. A cursor is positioned at the end of line 16. A message '[Wrote 17 lines]' is displayed above the bottom status bar. The status bar also shows command options: '^G Get Help', '^O Write', '^W Where Is', '^X Exit', '^R Read', and '^F Replace'.

```
mv [oldname_file] [newname_file]
```

renames the original filename to new filename



The screenshot shows a terminal window with a dark background and light-colored text. The title bar says "Terminal". The window contains the following session:

```
Desktop/pratham/file
> ls
file.txt

Desktop/pratham/file
> cat file.txt
line1
line2
line3

Desktop/pratham/file
> mv file.txt foo.txt

Desktop/pratham/file
> ls
foo.txt

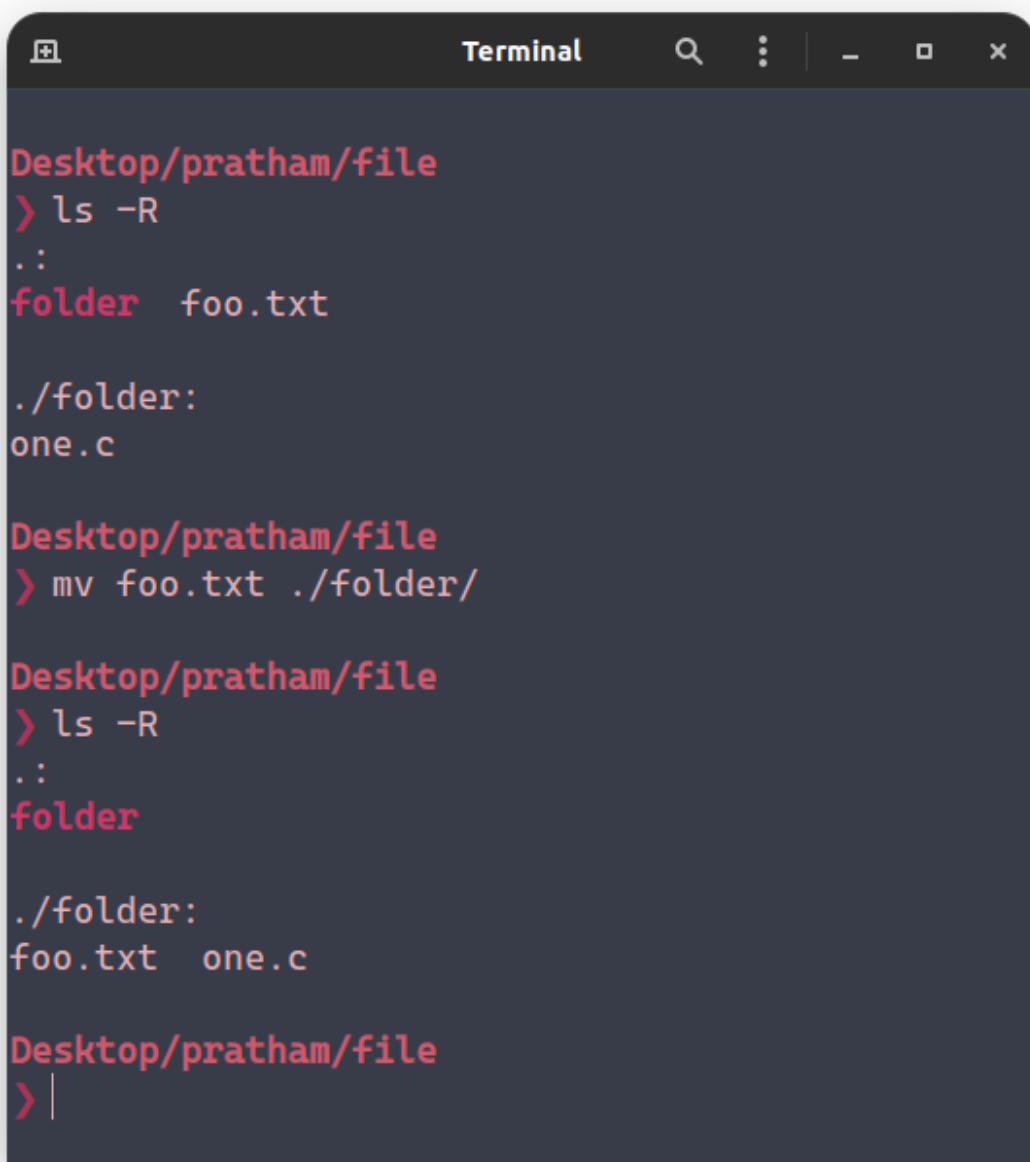
Desktop/pratham/file
> cat foo.txt
line1
line2
line3

Desktop/pratham/file
> |
```

mv [file] [address]

moves the file to the given address (both absolute and relative)

if a file already exists in the given address the previous file gets overwritten or replaced by the new file.



The screenshot shows a terminal window with a dark theme. The title bar says "Terminal". The terminal output is as follows:

```
Desktop/pratham/file
> ls -R
.:
folder  foo.txt

./folder:
one.c

Desktop/pratham/file
> mv foo.txt ./folder/

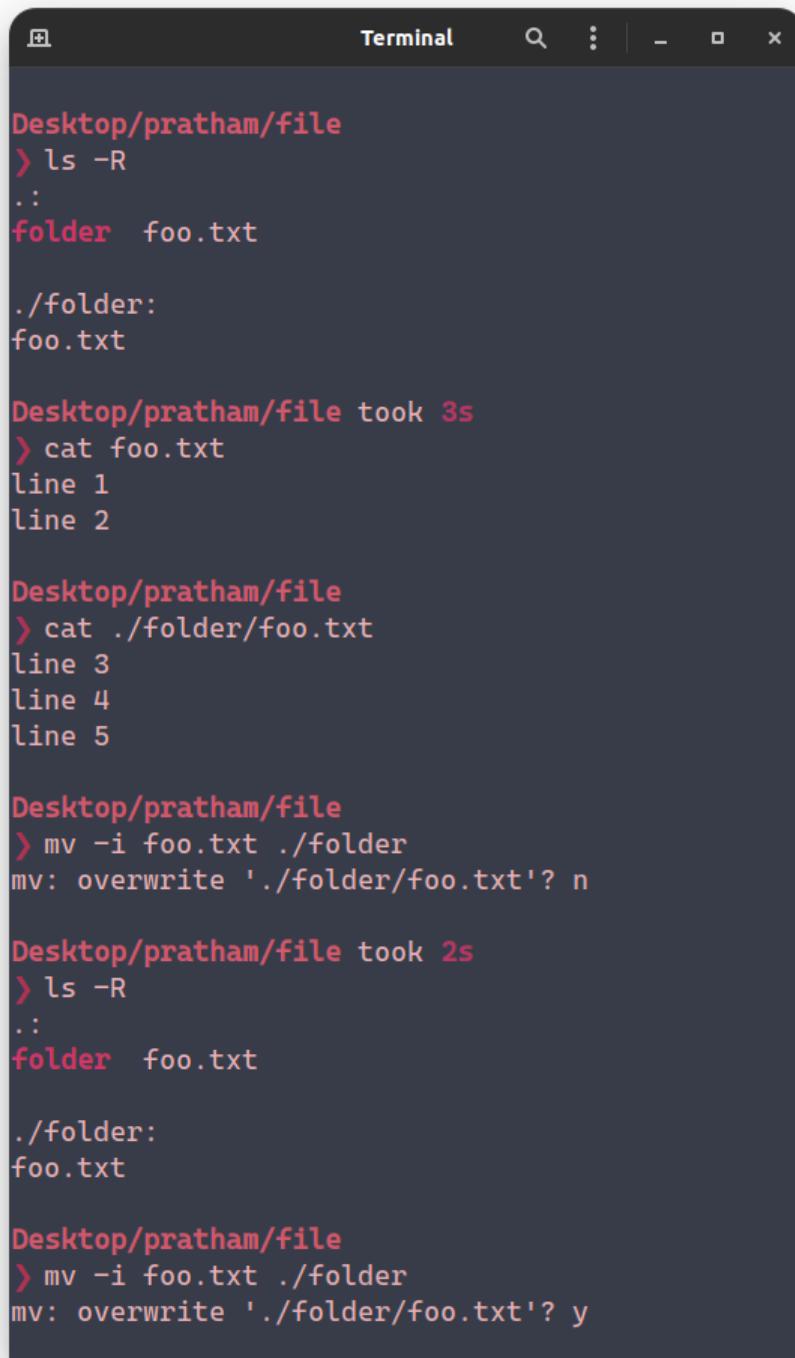
Desktop/pratham/file
> ls -R
.:
folder

./folder:
foo.txt  one.c

Desktop/pratham/file
> |
```

```
mv -i [file] [address]
```

prompts user whether to overwrite a file or not



The screenshot shows a terminal window with a dark background and light-colored text. The title bar says "Terminal". The terminal output is as follows:

```
Desktop/pratham/file
> ls -R
.:
folder foo.txt

./folder:
foo.txt

Desktop/pratham/file took 3s
> cat foo.txt
line 1
line 2

Desktop/pratham/file
> cat ./folder/foo.txt
line 3
line 4
line 5

Desktop/pratham/file
> mv -i foo.txt ./folder
mv: overwrite './folder/foo.txt'? n

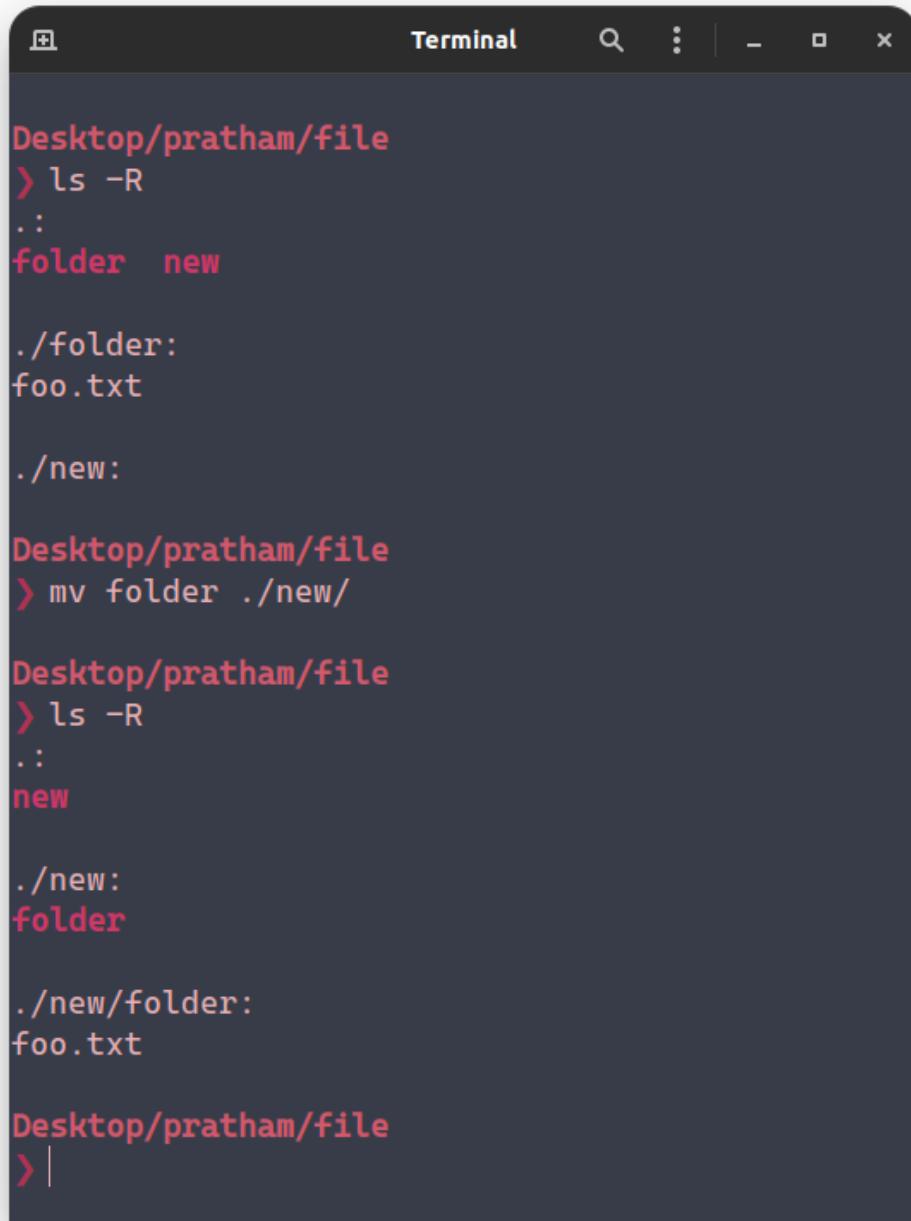
Desktop/pratham/file took 2s
> ls -R
.:
folder foo.txt

./folder:
foo.txt

Desktop/pratham/file
> mv -i foo.txt ./folder
mv: overwrite './folder/foo.txt'? y
```

```
mv [dir1] [address]
```

moves the dir to the given address



The screenshot shows a terminal window with a dark background and light-colored text. The title bar says "Terminal". The terminal output is as follows:

```
Desktop/pratham/file
> ls -R
.:
folder new

./folder:
foo.txt

./new:

Desktop/pratham/file
> mv folder ./new/

Desktop/pratham/file
> ls -R
.:
new

./new:
folder

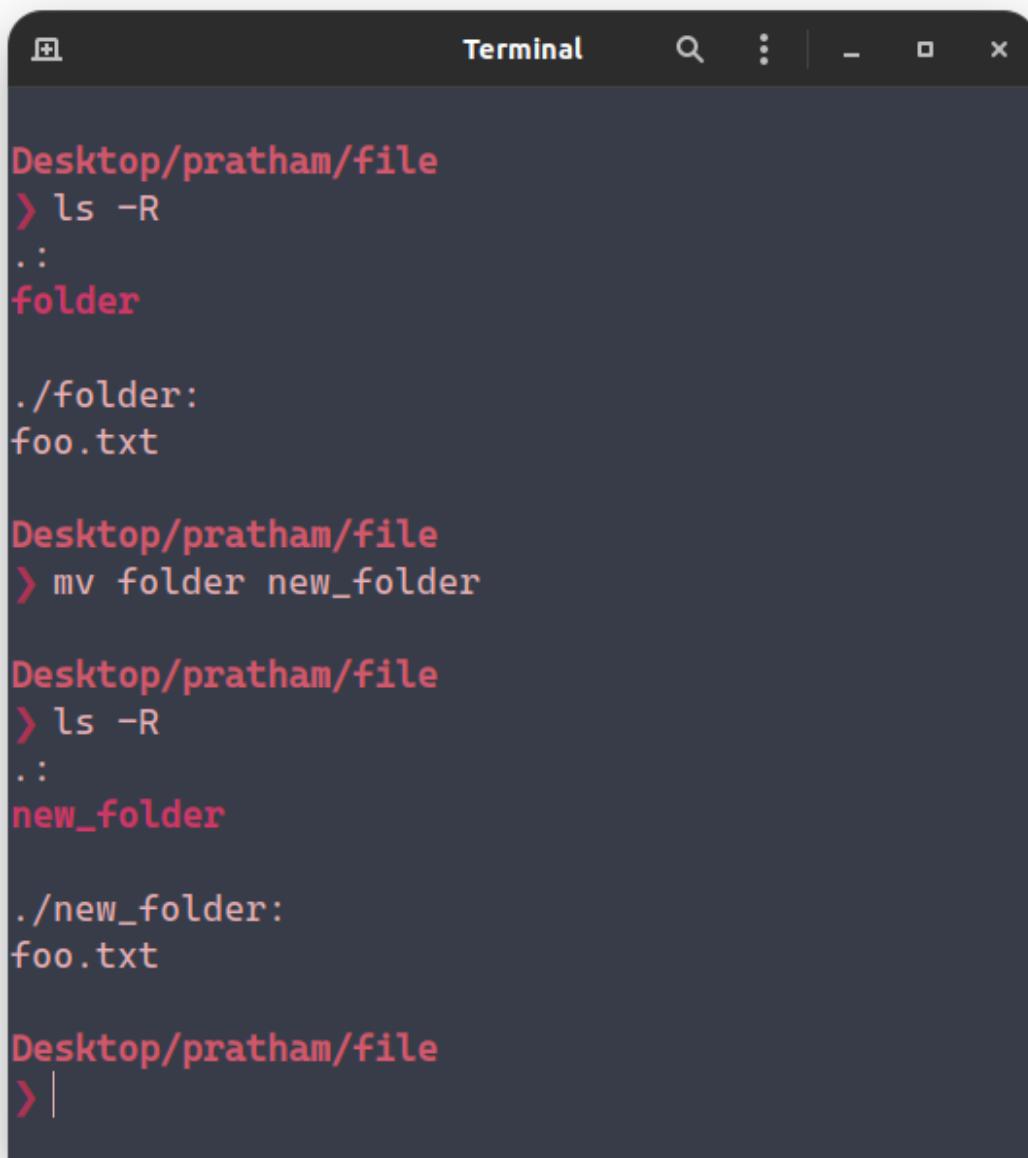
./new/folder:
foo.txt

Desktop/pratham/file
> |
```

```
mv [dir1] [dir2]
```

Outputs present working directory

if dir2 does not exist in pwd it will rename the dir1 to dir2



The screenshot shows a terminal window with a dark background and light-colored text. The title bar says "Terminal". The terminal content is as follows:

```
Desktop/pratham/file
> ls -R
.:
folder

./folder:
foo.txt

Desktop/pratham/file
> mv folder new_folder

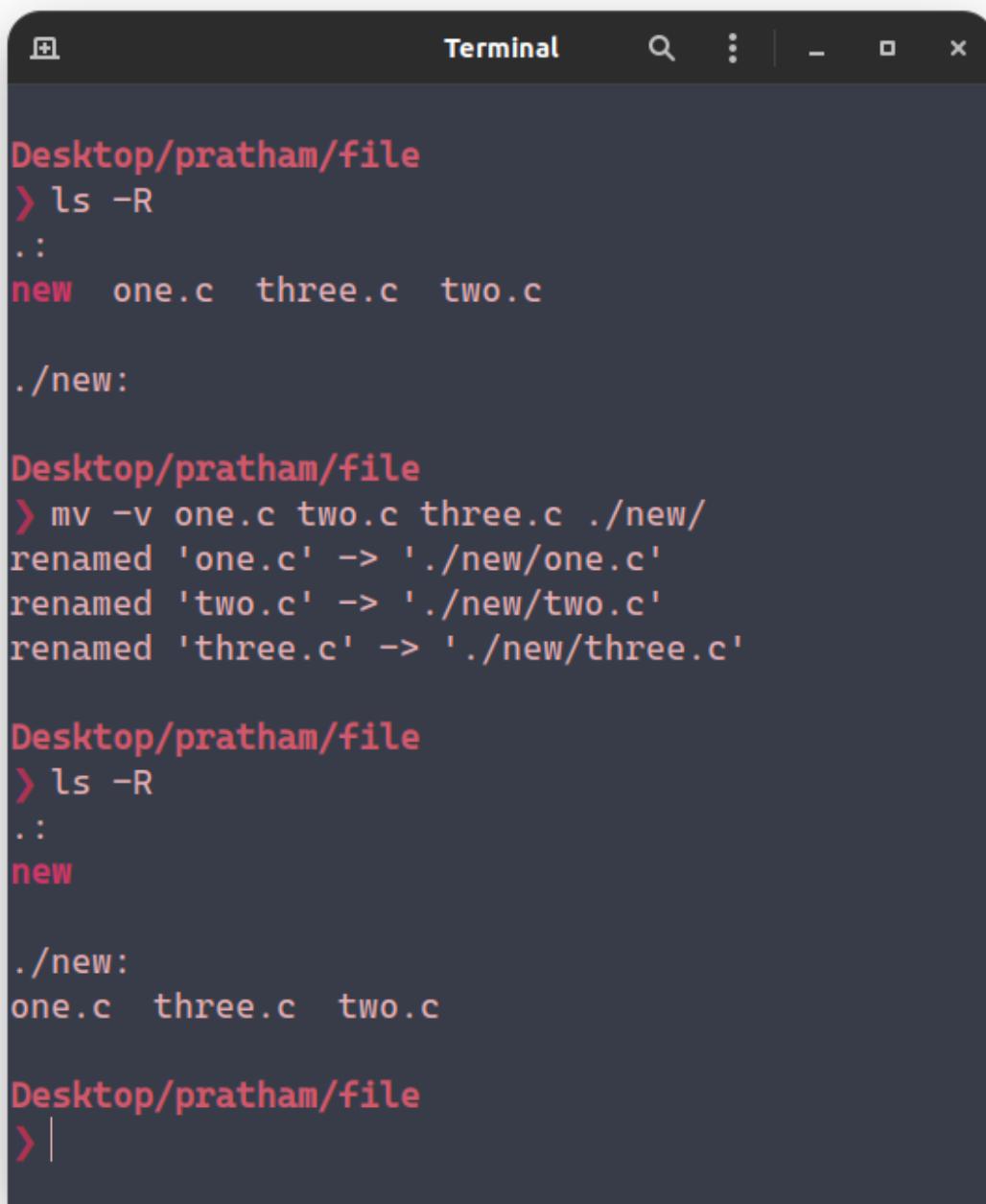
Desktop/pratham/file
> ls -R
.:
new_folder

./new_folder:
foo.txt

Desktop/pratham/file
> |
```

```
mv -v [dir1] [address]
```

used to determine the background processes executed due to the command



The screenshot shows a terminal window with a dark theme. The title bar says "Terminal". The terminal content is as follows:

```
Desktop/pratham/file
> ls -R
.:
new  one.c  three.c  two.c

./new:

Desktop/pratham/file
> mv -v one.c two.c three.c ./new/
renamed 'one.c' -> './new/one.c'
renamed 'two.c' -> './new/two.c'
renamed 'three.c' -> './new/three.c'

Desktop/pratham/file
> ls -R
.:
new

./new:
one.c  three.c  two.c

Desktop/pratham/file
> |
```

cp [OPTIONS] [SOURCE] [DESTINATION]

cp file1 file2

copies all content of file1 into file2

(if file2 is not present previously it would create file2)

(if file2 already have content it will be replaced with content of file1)

The image shows three sequential screenshots of a terminal window with a dark theme. The terminal title bar says "Terminal".

Screenshot 1: The user is in the directory "/file/third". They run "cat file.c" which prints the content of a C program that prints "Hello, World". Then they run "cat input.c" which prints the content of another C program that reads an integer from input and prints it back.

```
pratham@pratham-Vostro-3460:~/file/third$ cat file.c
#include <stdio.h>

int main (void)
{
    printf("Hello, World");
    return 0;
}

pratham@pratham-Vostro-3460:~/file/third$ cat input.c
#include <stdio.h>

int main (void)
{
    int a;
    printf("Input: ");
    scanf("%d",&a);
    printf("Output: %d",a);

    return 0;
}
```

Screenshot 2: The user runs "ls" to see files "hello.c" and "input.c". They then run "touch file.c" to create an empty file. Next, they run "cat hello.c" which prints its content. Finally, they run "cat file.c" which prints the content of the newly created empty file.

```
pratham@pratham-Vostro-3460:~/file/third$ ls
hello.c  input.c

pratham@pratham-Vostro-3460:~/file/third$ touch file.c

pratham@pratham-Vostro-3460:~/file/third$ cat hello.c
#include <stdio.h>

int main (void)
{
    printf("Hello, World");
    return 0;
}

pratham@pratham-Vostro-3460:~/file/third$ cat file.c

```

Screenshot 3: The user runs "cp hello.c new.c" to copy "hello.c" to "new.c". Then they run "cat new.c" which prints the content of "hello.c". Finally, they run "cat file.c" which prints the content of the empty file "file.c".

```
pratham@pratham-Vostro-3460:~/file/third$ file.c  hello.c  input.c

pratham@pratham-Vostro-3460:~/file/third$ cat hello.c
#include <stdio.h>

int main (void)
{
    printf("Hello, World");
    return 0;
}

pratham@pratham-Vostro-3460:~/file/third$ cp hello.c new.c

pratham@pratham-Vostro-3460:~/file/third$ cat new.c
#include <stdio.h>

int main (void)
{
    printf("Hello, World");
    return 0;
}

pratham@pratham-Vostro-3460:~/file/third$ cat file.c

```

cp file address

copies file to address with same filename
(both absolute and relative paths are valid)

```
pratham/file/third
> ls
dir  file.c  hello.c  input.c  new.c

pratham/file/third
> ls ./dir/

pratham/file/third
> cp hello.c ./dir

pratham/file/third
> ls ./dir/
hello.c

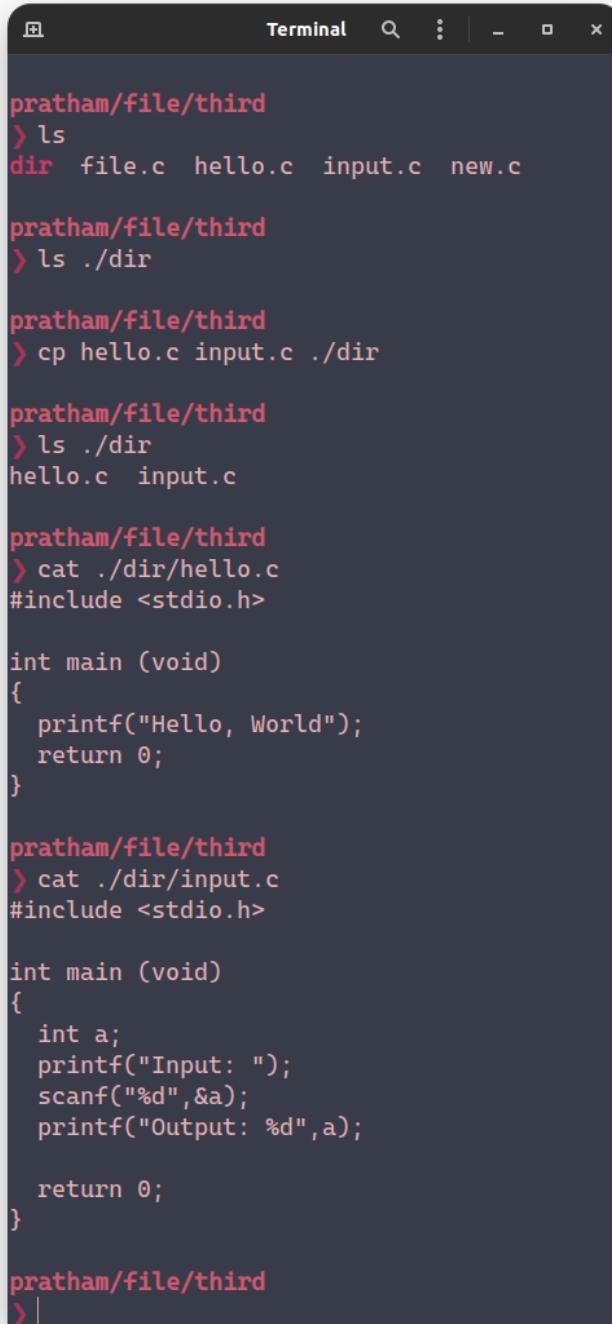
pratham/file/third
> cat ./dir/hello.c
#include <stdio.h>

int main (void)
{
    printf("Hello, World");
    return 0;
}

pratham/file/third
> |
```

```
cp file1 file2 ... address
```

copies file1, file2, ... to address with same filenames



The screenshot shows a terminal window with a dark background and light-colored text. The terminal title is "Terminal". The session starts with a directory listing:

```
pratham/file/third
> ls
dir  file.c  hello.c  input.c  new.c
```

Then, the user runs the command to copy files into a directory:

```
pratham/file/third
> cp hello.c input.c ./dir
```

After the copy, the directory listing changes:

```
pratham/file/third
> ls ./dir
hello.c  input.c
```

Next, the user checks the contents of the copied file "hello.c" using "cat":

```
pratham/file/third
> cat ./dir/hello.c
#include <stdio.h>

int main (void)
{
    printf("Hello, World");
    return 0;
}
```

Finally, the user checks the contents of the copied file "input.c":

```
pratham/file/third
> cat ./dir/input.c
#include <stdio.h>

int main (void)
{
    int a;
    printf("Input: ");
    scanf("%d", &a);
    printf("Output: %d", a);

    return 0;
}
```

```
cp -r dir1 dir2
```

copies all content of dir1 to dir2 (-r flag is for recursive copying)

(if dir2 is not present previously it would create dir2 which would contain content of dir1)

(if dir2 already have content it will contain a new dir1 copy along with previous content)

```
pratham/file/third
> ls
dir  dir1  file.c  hello.c  input.c  new.c

pratham/file/third
> ls dir
hello.c  input.c

pratham/file/third
> ls dir1
file.c

pratham/file/third
> cp -r dir dir1

pratham/file/third
> ls dir
hello.c  input.c

pratham/file/third
> ls dir1
dir  file.c

pratham/file/third
> ls dir1/dir
hello.c  input.c

pratham/file/third
>
```

```
pratham/file/third
> ls
dir  dir1  file.c  hello.c  input.c  new.c

pratham/file/third
> ls ./dir
hello.c  input.c

pratham/file/third
> cp -r dir dir2

pratham/file/third
> ls
dir  dir1  dir2  file.c  hello.c  input.c  new.c

pratham/file/third
> ls ./dir2
hello.c  input.c

pratham/file/third
>
```

mkdir [dir_name]

creates a new dir dir_name in pwd

mkdir [my\ dir] OR mkdir ["my dir"]

creates a new dir (my dir) in pwd

```
pratham/file/third
> mkdir mydir

pratham/file/third
> ls
mydir

pratham/file/third
> |
```

```
pratham/file/sixth
> mkdir mydir myfolder 'my dir' my\ folder

pratham/file/sixth
> ls
'my dir'  mydir  'my folder'  myfolder

pratham/file/sixth
> |
```

```
pratham/file/fifth
> mkdir 'my dir'

pratham/file/fifth
> ls
'my dir'

pratham/file/fifth
> |
```

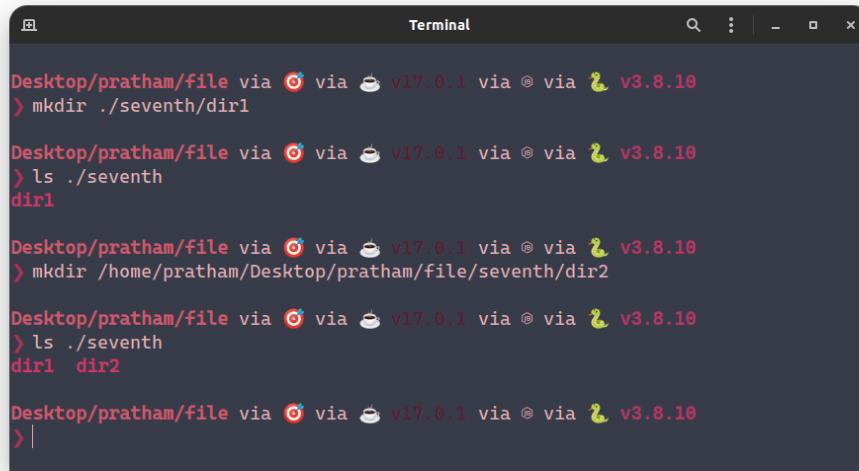
```
pratham/file/fouth
> mkdir my\ dir

pratham/file/fouth
> ls
'my dir'

pratham/file/fouth
> |
```

mkdir address/dir_name

creates a new dir dir_name at address (address should exist before operation)



```
Desktop/pratham/file via ⚡ via 🖥 v17.0.1 via ⚡ via 🐍 v3.8.10
> mkdir ./seventh/dir1

Desktop/pratham/file via ⚡ via 🖥 v17.0.1 via ⚡ via 🐍 v3.8.10
> ls ./seventh
dir1

Desktop/pratham/file via ⚡ via 🖥 v17.0.1 via ⚡ via 🐍 v3.8.10
> mkdir /home/pratham/Desktop/pratham/file/seventh/dir2

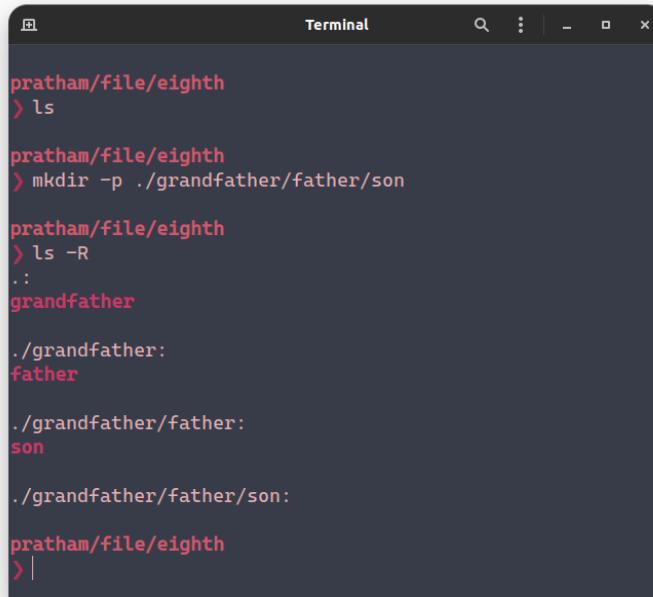
Desktop/pratham/file via ⚡ via 🖥 v17.0.1 via ⚡ via 🐍 v3.8.10
> ls ./seventh
dir1 dir2

Desktop/pratham/file via ⚡ via 🖥 v17.0.1 via ⚡ via 🐍 v3.8.10
>
```

mkdir -p address/dir_name OR mkdir --parents address/dir_name

creates a new dir dir_name at address

(-p OR --parents could create a complete tree structure if address does not exist previously)



```
pratham/file/eighth
> ls

pratham/file/eighth
> mkdir -p ./grandfather/father/son

pratham/file/eighth
> ls -R
.:
grandfather

./grandfather:
father

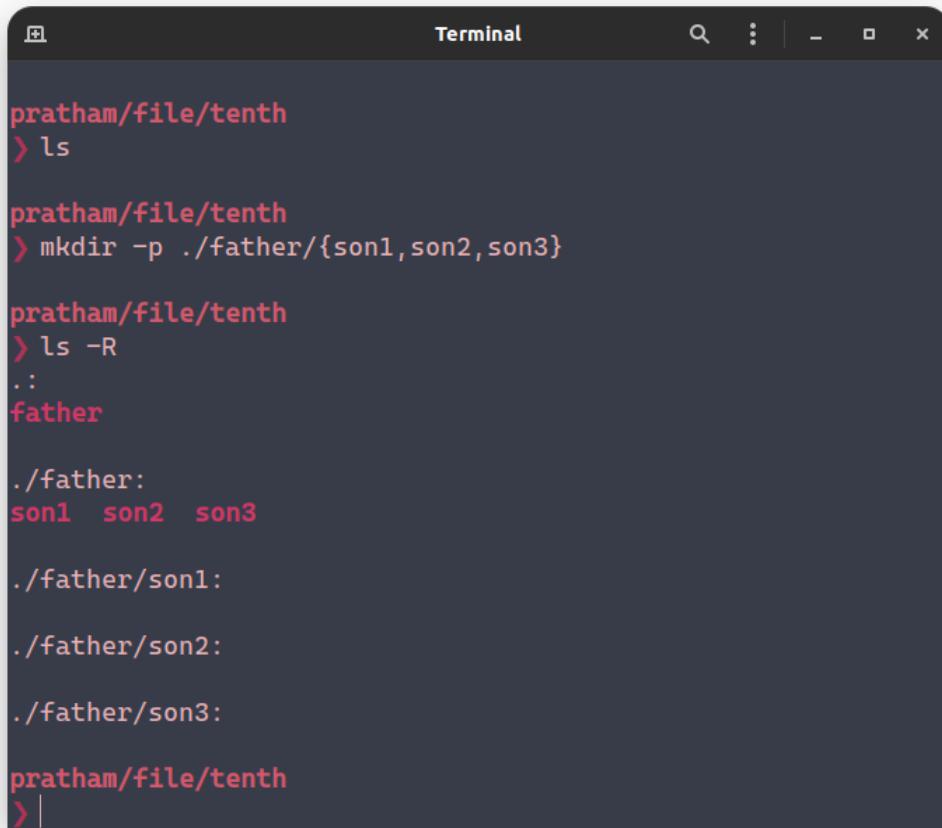
./grandfather/father:
son

./grandfather/father/son:
pratham/file/eighth
>
```

```
mkdir -p address/{dir1,dir2,...}
```

creates multiple new dir named dir1, dir2, ... at address

(don't add spaces after a comma in the list)



```
pratham/file/tenth
> ls

pratham/file/tenth
> mkdir -p ./father/{son1,son2,son3}

pratham/file/tenth
> ls -R
.:
father

./father:
son1  son2  son3

./father/son1:

./father/son2:

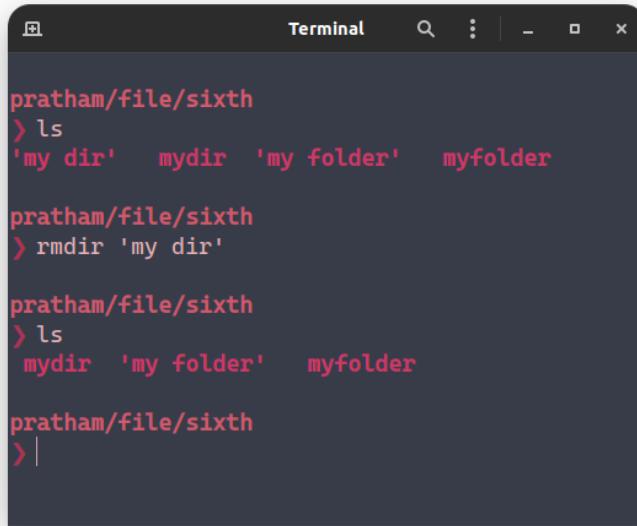
./father/son3:

pratham/file/tenth
> |
```

A screenshot of a Linux terminal window titled "Terminal". The terminal shows a command-line session. The user starts by navigating to the directory "pratham/file/tenth". They then run the command "ls" to see the contents of the directory. Next, they run "mkdir -p ./father/{son1,son2,son3}" to create three new directories named "son1", "son2", and "son3" inside the "father" directory. Finally, they run "ls -R" to list the contents of the directory again, showing the newly created subdirectories under "father". The terminal window has a dark background with light-colored text and standard window controls at the top.

rmdir dir_name

deletes the dir_name dir from pwd
(if present in pwd, else it will show error)



```
pratham/file/sixth
> ls
'my dir'  mydir 'my folder'  myfolder

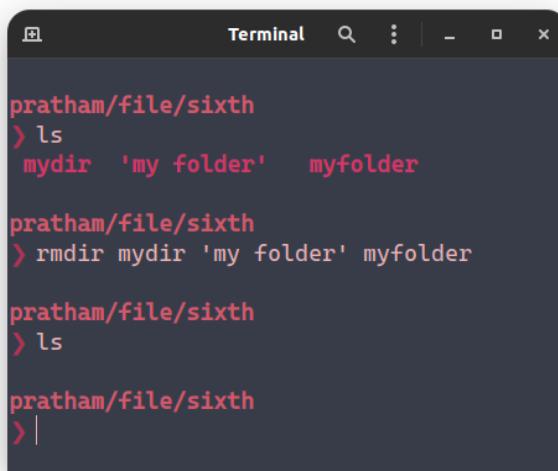
pratham/file/sixth
> rmdir 'my dir'

pratham/file/sixth
> ls
mydir 'my folder'  myfolder

pratham/file/sixth
> |
```

rmdir dir1 dir2 dir3

deletes dir dir1, dir2, dir3, ... in pwd (if they exists)



```
pratham/file/sixth
> ls
mydir 'my folder'  myfolder

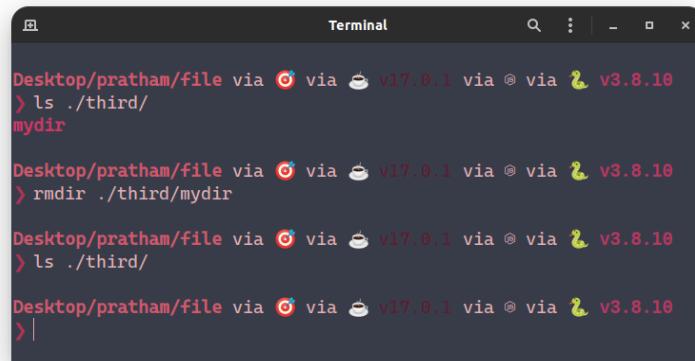
pratham/file/sixth
> rmdir mydir 'my folder' myfolder

pratham/file/sixth
> ls

pratham/file/sixth
> |
```

rmdir address/dir_name

deletes dir_name dir at address (address should exist before operation)



```
Desktop/pratham/file via ⚡ via 🖥 v17.0.1 via ⚡ via 🐍 v3.8.10
> ls ./third/
mydir

Desktop/pratham/file via ⚡ via 🖥 v17.0.1 via ⚡ via 🐍 v3.8.10
> rmdir ./third/mydir

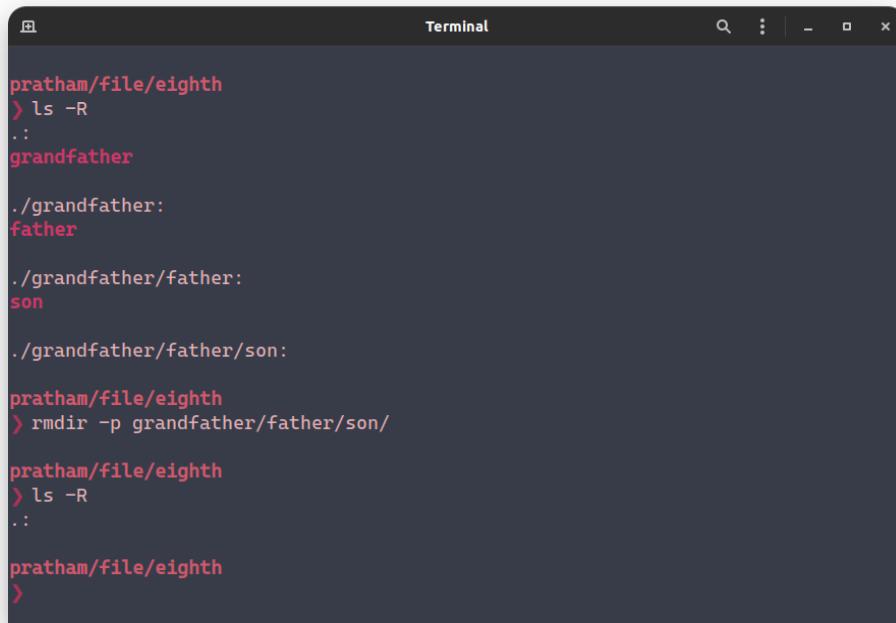
Desktop/pratham/file via ⚡ via 🖥 v17.0.1 via ⚡ via 🐍 v3.8.10
> ls ./third/

```

rmdir -p [address]

deletes the complete tree of the address i.e **rmdir -p a/b/c == rmdir a/b/c a/b a**

[parent tag] (should be used when subtrees have only one child and last one is empty)



```
pratham/file/eighth
> ls -R
.:
grandfather

./grandfather:
father

./grandfather/father:
son

./grandfather/father/son:

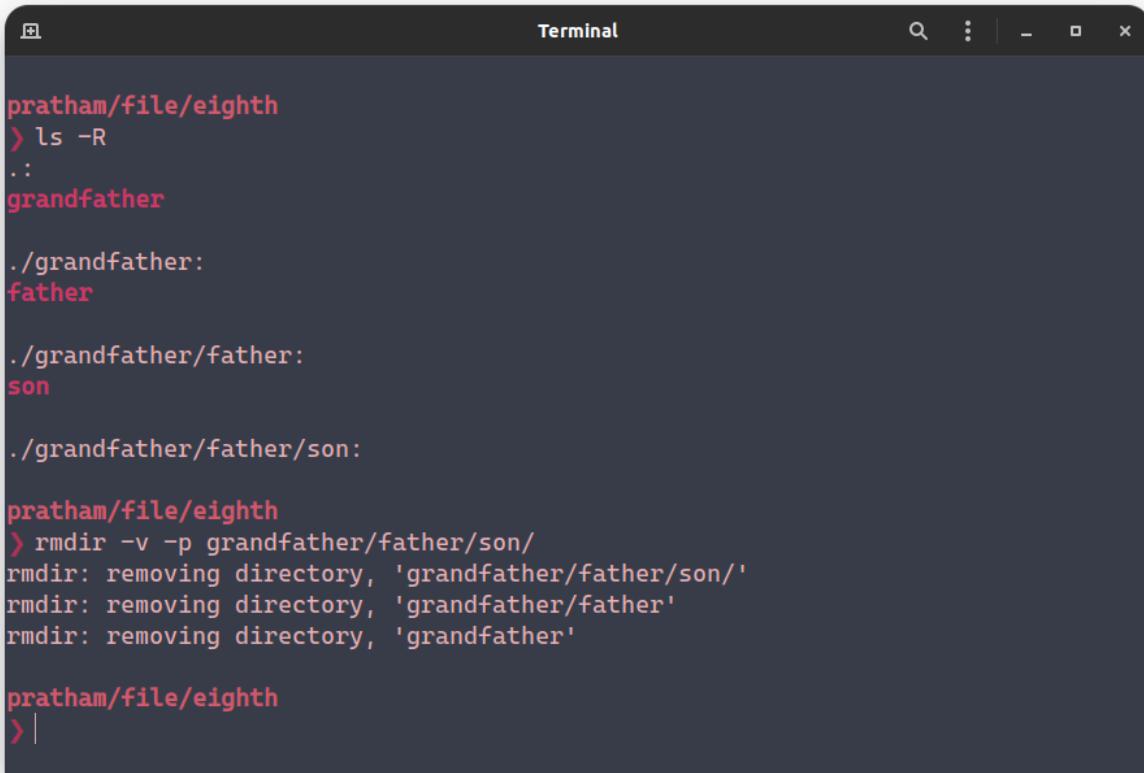
pratham/file/eighth
> rmdir -p grandfather/father/son/

pratham/file/eighth
> ls -R
.:

pratham/file/eighth
>
```

rmdir -v [address]

Outputs the processes that are executed in the background when running the rmdir command(i.e sequence of file deletions)



The screenshot shows a terminal window with the title "Terminal". The terminal displays the following command and its execution:

```
pratham/file/eighth
> ls -R
.:
grandfather

./grandfather:
father

./grandfather/father:
son

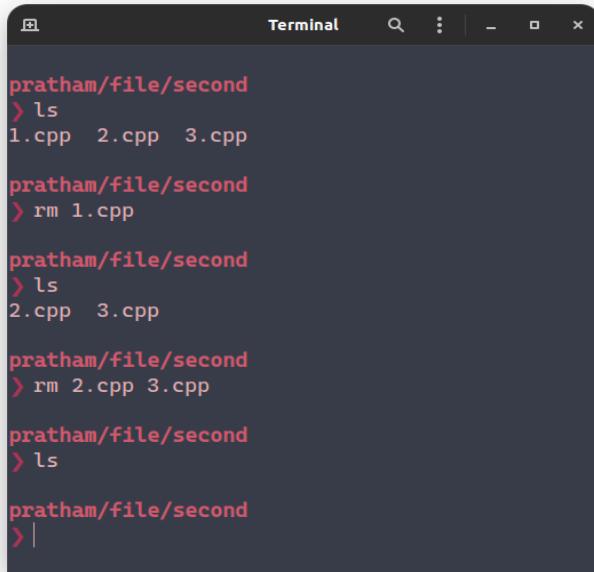
./grandfather/father/son:

pratham/file/eighth
> rmdir -v -p grandfather/father/son/
rmdir: removing directory, 'grandfather/father/son/'
rmdir: removing directory, 'grandfather/father'
rmdir: removing directory, 'grandfather'

pratham/file/eighth
> |
```

rm file

deletes the given file in the pwd



```
pratham/file/second
> ls
1.cpp  2.cpp  3.cpp

pratham/file/second
> rm 1.cpp

pratham/file/second
> ls
2.cpp  3.cpp

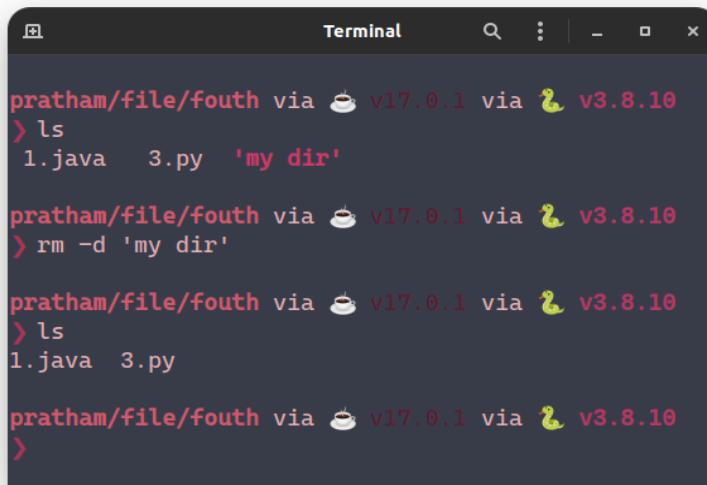
pratham/file/second
> rm 2.cpp 3.cpp

pratham/file/second
> ls

pratham/file/second
> |
```

rm -d [dir]

deletes empty directories i.e equivalent to rmdir dir



```
pratham/file/fouth via ☕ v17.0.1 via 🐍 v3.8.10
> ls
1.java  3.py  'my dir'

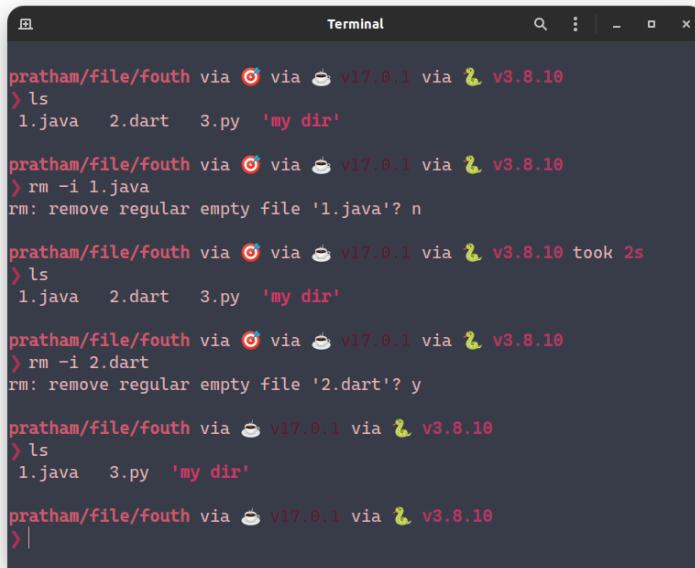
pratham/file/fouth via ☕ v17.0.1 via 🐍 v3.8.10
> rm -d 'my dir'

pratham/file/fouth via ☕ v17.0.1 via 🐍 v3.8.10
> ls
1.java  3.py

pratham/file/fouth via ☕ v17.0.1 via 🐍 v3.8.10
>
```

rm -i [dir]

prompt before deletion the file



A terminal window titled "Terminal" showing a session on a machine named "pratham". The user runs "ls" to list files: 1.java, 2.dart, 3.py, and a directory named "my dir". Then, they run "rm -i 1.java", which prompts "rm: remove regular empty file '1.java'? n". They respond with "n". Next, they run "rm -i 2.dart", which prompts "rm: remove regular empty file '2.dart'? y". They respond with "y". Finally, they run "rm -i my dir", which prompts "rm: remove directory 'my dir'?". The user has not yet responded.

```
pratham/file/fouth via ☕ via 🍏 v17.0.1 via 🐍 v3.8.10
> ls
1.java  2.dart  3.py  'my dir'

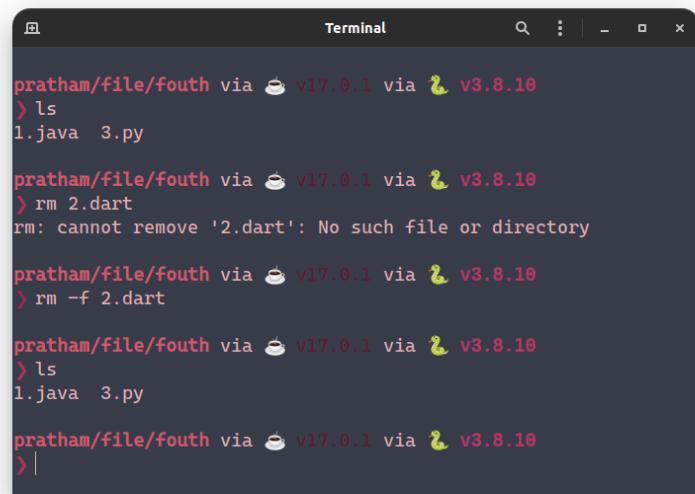
pratham/file/fouth via ☕ via 🍏 v17.0.1 via 🐍 v3.8.10
> rm -i 1.java
rm: remove regular empty file '1.java'? n

pratham/file/fouth via ☕ via 🍏 v17.0.1 via 🐍 v3.8.10
> rm -i 2.dart
rm: remove regular empty file '2.dart'? y

pratham/file/fouth via ☕ via 🍏 v17.0.1 via 🐍 v3.8.10
> rm -i my dir
rm: remove directory 'my dir'?
```

rm -f [dir]

deletes the file and ignores nonexistent files, never prompts user



A terminal window titled "Terminal" showing a session on a machine named "pratham". The user runs "ls" to list files: 1.java and 3.py. Then, they run "rm 2.dart", which outputs "rm: cannot remove '2.dart': No such file or directory". Next, they run "rm -f 2.dart", which deletes the non-existent file "2.dart". Finally, they run "ls" again to list the remaining files: 1.java and 3.py.

```
pratham/file/fouth via ☕ via 🍏 v3.8.10
> ls
1.java  3.py

pratham/file/fouth via ☕ via 🍏 v3.8.10
> rm 2.dart
rm: cannot remove '2.dart': No such file or directory

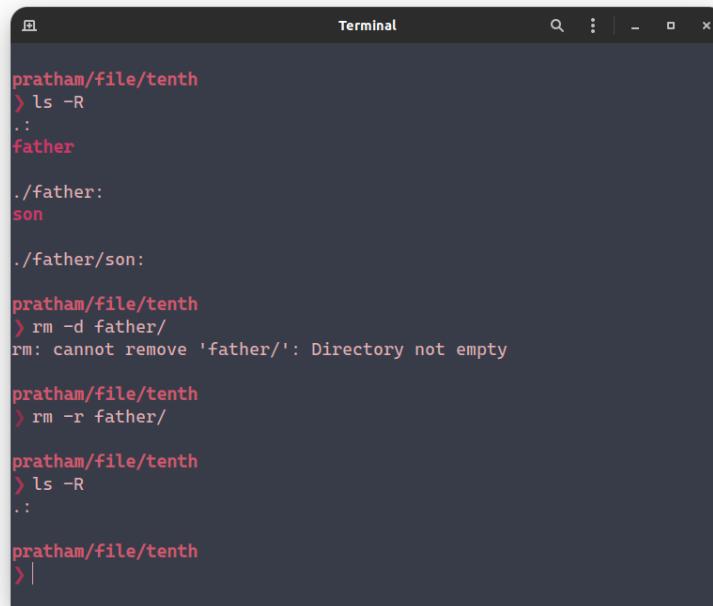
pratham/file/fouth via ☕ via 🍏 v3.8.10
> rm -f 2.dart

pratham/file/fouth via ☕ via 🍏 v3.8.10
> ls
1.java  3.py

pratham/file/fouth via ☕ via 🍏 v3.8.10
> |
```

rm -r [dir]

deletes directories and their contents recursively.



```
pratham/file/tenth
> ls -R
.:
father
./father:
son

./father/son:

pratham/file/tenth
> rm -d father/
rm: cannot remove 'father/': Directory not empty

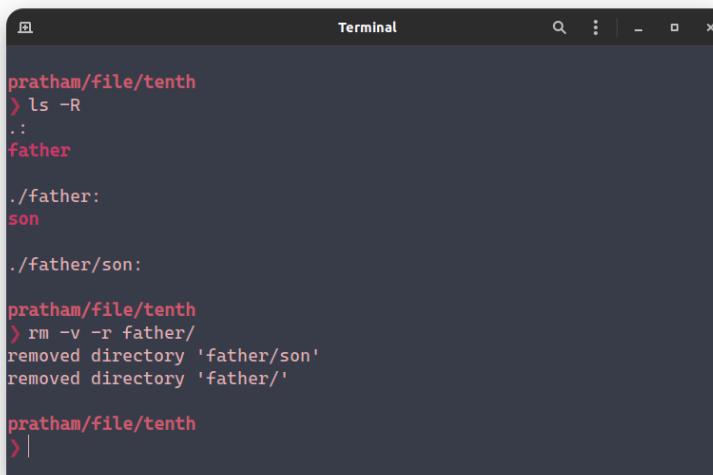
pratham/file/tenth
> rm -r father/

pratham/file/tenth
> ls -R
.:

pratham/file/tenth
> |
```

rm -v [dir]

Outputs the processes that are executed in the background when running the rm command (i.e sequence of file deletions)



```
pratham/file/tenth
> ls -R
.:
father
./father:
son

./father/son:

pratham/file/tenth
> rm -v -r father/
removed directory 'father/son'
removed directory 'father/'

pratham/file/tenth
> |
```

```
find -name file_name.ext
```

finds the file_name.ext in pwd in a recursive fashion

```
find address -name file_name.ext
```

finds the file_name.ext at the given address

```
Desktop/pratham/code
> ls -R
.:
c  c++  java  python

./c:
hello_world  hello_world.c  hello_world.cpp

./c++:
hello_world  hello_world.cpp

./java:
hello_world.class  hello_world.java

./python:
hello_world.py

Desktop/pratham/code
> find -name hello_world.py
./python/hello_world.py

Desktop/pratham/code
>
```

```
Desktop/pratham/code
> ls -R
.:
c  c++  java  python

./c:
hello_world  hello_world.c  hello_world.cpp

./c++:
hello_world  hello_world.cpp

./java:
hello_world.class  hello_world.java

./python:
hello_world.py

Desktop/pratham/code
> find ./python/ -name hello_world.py
./python/hello_world.py

Desktop/pratham/code
>
```

find address -name file_name.*

finds all the files in given dir which have file_name as name irrespective of their extensions

find address -name *.ext

finds all the files at the given address with extension as .ext irrespective of their file_names

```
Desktop/pratham/code
> ls -R
.:
c  c++  java  python

./c:
hello_world  hello_world.c  hello_world.cpp

./c++:
hello_world  hello_world.cpp

./java:
hello_world.class  hello_world.java

./python:
hello_world.py

Desktop/pratham/code
> find -name hello_world.*
./c/hello_world.c
./c/hello_world.cpp
./java/hello_world.java
./java/hello_world.class
./c++/hello_world.cpp
./python/hello_world.py

Desktop/pratham/code
>
```

```
Desktop/pratham/code
> ls -R
.:
c  c++  java  python

./c:
hello_world  hello_world.c  hello_world.cpp

./c++:
hello_world  hello_world.cpp

./java:
hello_world.class  hello_world.java

./python:
hello_world.py

Desktop/pratham/code
> find -name *.cpp
./c/hello_world.cpp
./c++/hello_world.cpp

Desktop/pratham/code
> |
```

```
tar -cvf tar_name.tar dir
```

tar command used to create, maintain, modify, and extract files which are archived in the tar(tapped archive) format.

-c to creating an archive[compression]

-v to verbose(i.e to show the step by step processes that are executed)

-f to name of the tar file that is being created

followed by the address of the dir that needs to be compressed

The screenshot shows a terminal window with a dark theme. The title bar says "Terminal". The terminal content is as follows:

```
Desktop/pratham/file
> ls
file1.txt  file2.txt  file.txt  folder  new

Desktop/pratham/file
> tar -cvf folder.tar ./folder
./folder/

Desktop/pratham/file
> ls
file1.txt  file2.txt  file.txt  folder  folder.tar  new

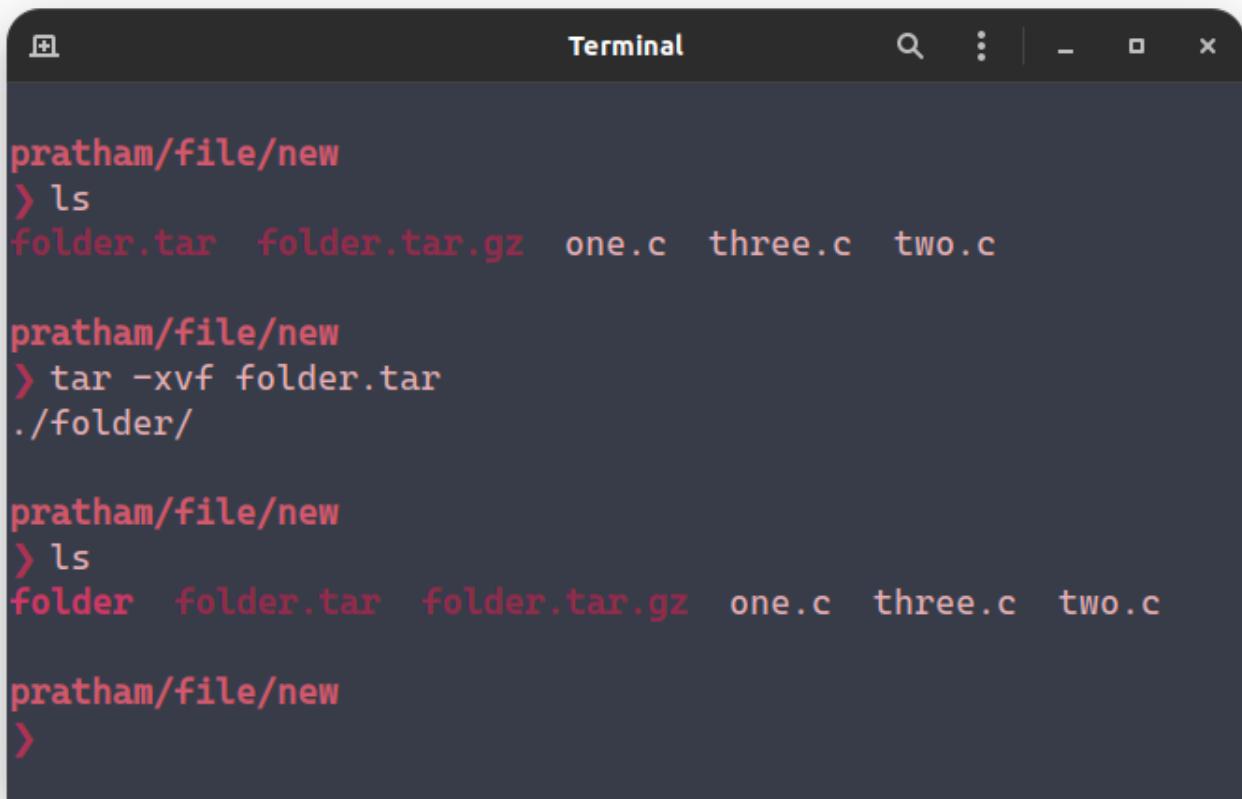
Desktop/pratham/file
> |
```

```
tar -xvf tar_name.tar
```

-x to extracting an archive[extraction]

-v to verbose(i.e to show the step by step processes that are executed)

-f to name of the tar file that is being extracted



The screenshot shows a macOS Terminal window with a dark theme. The title bar reads "Terminal". The window contains the following terminal session:

```
pratham/file/new
> ls
folder.tar  folder.tar.gz  one.c  three.c  two.c

pratham/file/new
> tar -xvf folder.tar
./folder/

pratham/file/new
> ls
folder  folder.tar  folder.tar.gz  one.c  three.c  two.c

pratham/file/new
>
```

```
tar -czvf tar_name.tar.gz dir
```

-z flag is used to compress the dir into .tar.gz extension archive

```
Desktop/pratham/file
> ls
file1.txt  file2.txt  file.txt  folder  folder.tar  new

Desktop/pratham/file
> tar -czvf folder.tar.gz ./folder/
./folder/

Desktop/pratham/file
> ls
file1.txt  file2.txt  file.txt  folder  folder.tar  folder.tar.gz  new

Desktop/pratham/file
> |
```

```
tar -xzvf tar_name.tar.gz
```

-z flag is used to extract the .tar.gz extension archive

```
pratham/file/new
> ls
folder.tar  folder.tar.gz  one.c  three.c  two.c

pratham/file/new
> tar -xzvf folder.tar.gz
./folder/

pratham/file/new
> ls
folder  folder.tar  folder.tar.gz  one.c  three.c  two.c

pratham/file/new
> |
```

wc command

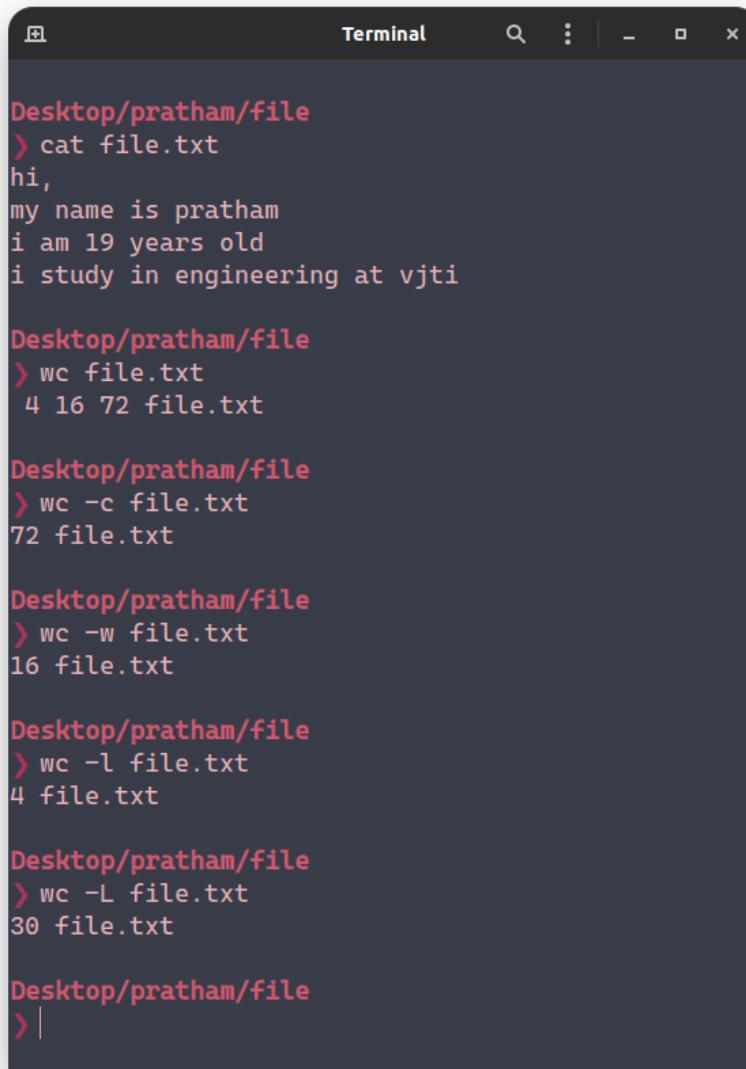
Outputs number of characters, words, lines, bytes for each input file along with file_name as the output

-c gives no. of characters in the file

-w gives no. of words in the file

-l gives no. of lines in the file

-L gives no. of characters in the longest line in the file



The screenshot shows a terminal window with a dark theme. The title bar says "Terminal". The window contains the following text:

```
Desktop/pratham/file
> cat file.txt
hi,
my name is pratham
i am 19 years old
i study in engineering at vjti

Desktop/pratham/file
> wc file.txt
4 16 72 file.txt

Desktop/pratham/file
> wc -c file.txt
72 file.txt

Desktop/pratham/file
> wc -w file.txt
16 file.txt

Desktop/pratham/file
> wc -l file.txt
4 file.txt

Desktop/pratham/file
> wc -L file.txt
30 file.txt

Desktop/pratham/file
> |
```

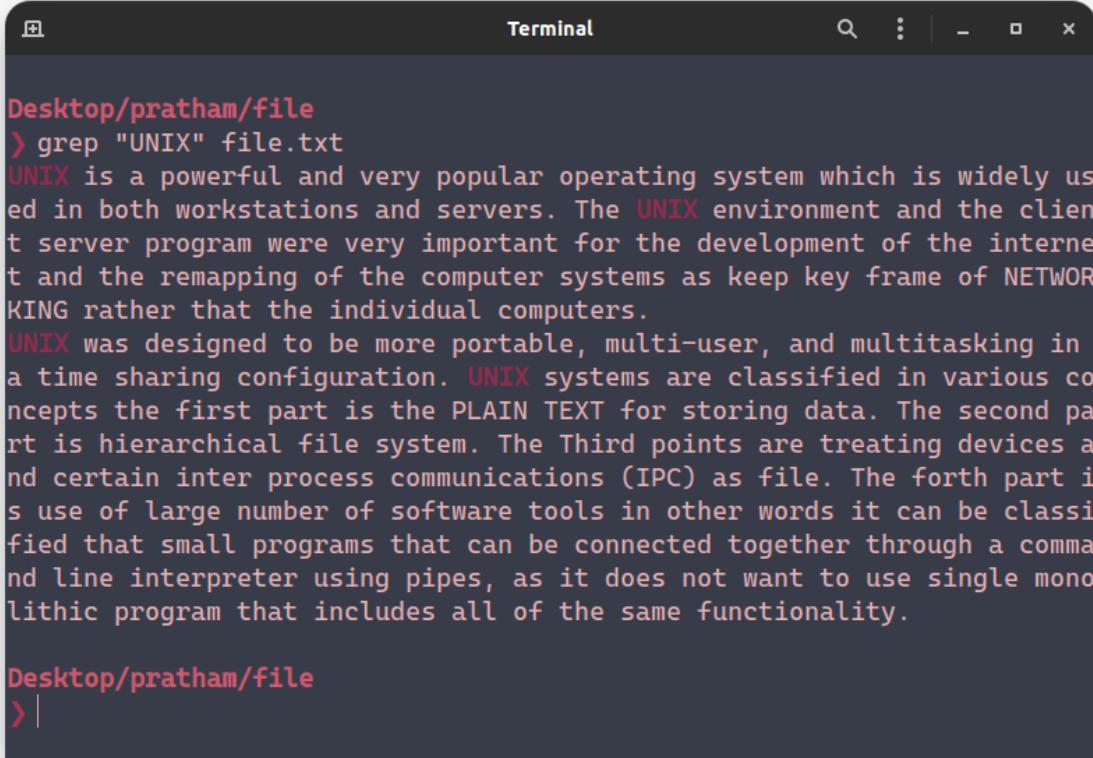
grep "word" [file]

grep command(global regular expression print)

grep command processes text line by line and print any line which matches a specified pattern

hence could be used to search some kind of pattern, word, or sentence in a file or a number of files with grep command along with some options with grep command.

outputs the line which contains following word from the file(case-sensitive)



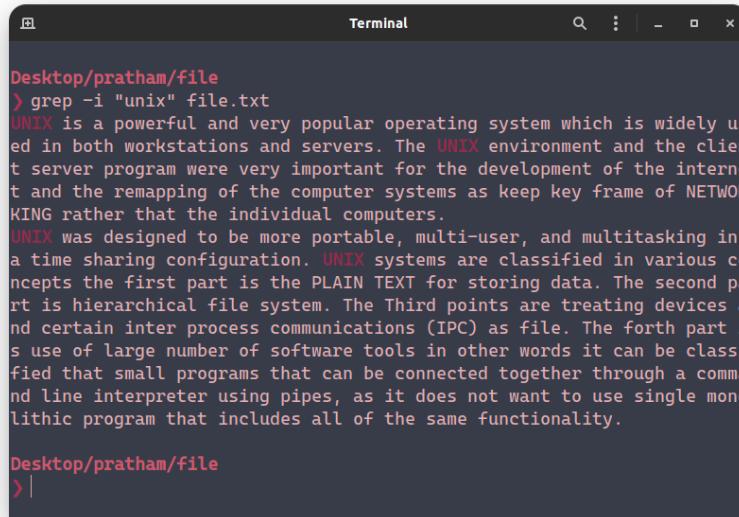
The screenshot shows a terminal window titled "Terminal". The window has a dark theme with a light gray background for the content area. At the top, there are several icons: a small square with a plus sign, the word "Terminal", a magnifying glass for search, three vertical dots for more options, a minus sign for window control, a square for maximize/minimize, and an 'X' for close. Below the title bar, the terminal prompt "Desktop/pratham/file" is visible, followed by a red right-pointing arrow. The user has run the command "grep \"UNIX\" file.txt". The output of the command is displayed in white text on the dark background. It contains two paragraphs about UNIX, with the word "UNIX" appearing in red. The first paragraph discusses UNIX's popularity and its role in network development. The second paragraph describes its design principles, including portability, multi-user support, multitasking, and various file system concepts. The terminal ends with another prompt "Desktop/pratham/file" and a red right-pointing arrow.

```
Desktop/pratham/file
> grep "UNIX" file.txt
UNIX is a powerful and very popular operating system which is widely us
ed in both workstations and servers. The UNIX environment and the clien
t server program were very important for the development of the interne
t and the remapping of the computer systems as keep key frame of NETWOR
KING rather than the individual computers.
UNIX was designed to be more portable, multi-user, and multitasking in
a time sharing configuration. UNIX systems are classified in various co
ncepts the first part is the PLAIN TEXT for storing data. The second pa
rt is hierarchical file system. The Third points are treating devices a
nd certain inter process communications (IPC) as file. The forth part i
s use of large number of software tools in other words it can be classi
fied that small programs that can be connected together through a comma
nd line interpreter using pipes, as it does not want to use single mono
lithic program that includes all of the same functionality.

Desktop/pratham/file
> |
```

`grep -i "word"[file]`

outputs the line which contains following word from the file(case-insensitive)

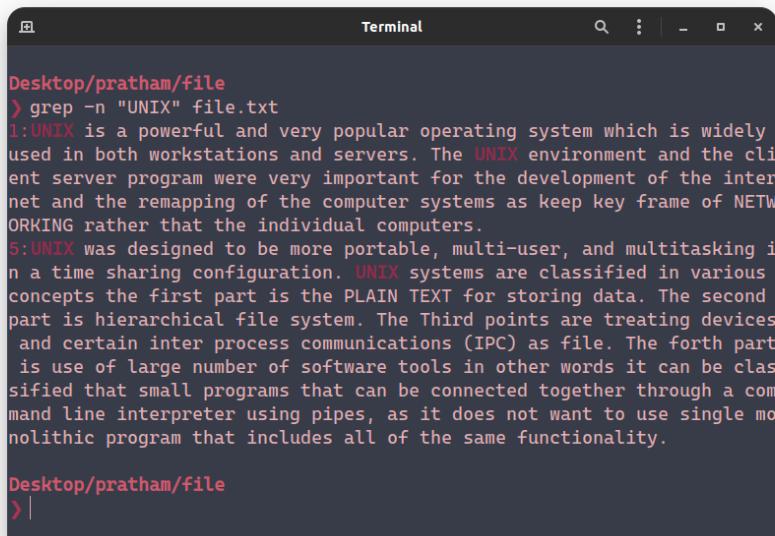


```
Desktop/pratham/file
> grep -i "unix" file.txt
UNIX is a powerful and very popular operating system which is widely used in both workstations and servers. The UNIX environment and the client server program were very important for the development of the internet and the remapping of the computer systems as keep key frame of NETWORKING rather than the individual computers.
UNIX was designed to be more portable, multi-user, and multitasking in a time sharing configuration. UNIX systems are classified in various concepts the first part is the PLAIN TEXT for storing data. The second part is hierarchical file system. The Third points are treating devices and certain inter process communications (IPC) as file. The forth part is use of large number of software tools in other words it can be classified that small programs that can be connected together through a command line interpreter using pipes, as it does not want to use single monolithic program that includes all of the same functionality.

Desktop/pratham/file
> |
```

`grep -n "word" [file]`

even shows the line no. of the occurrence of the word in the file

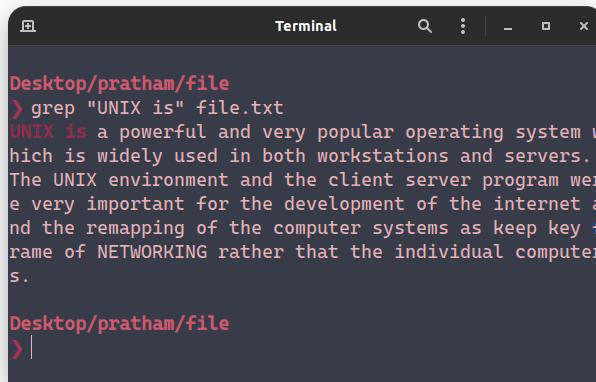


```
Desktop/pratham/file
> grep -n "UNIX" file.txt
1:UNIX is a powerful and very popular operating system which is widely used in both workstations and servers. The UNIX environment and the client server program were very important for the development of the internet and the remapping of the computer systems as keep key frame of NETWORKING rather than the individual computers.
5:UNIX was designed to be more portable, multi-user, and multitasking in a time sharing configuration. UNIX systems are classified in various concepts the first part is the PLAIN TEXT for storing data. The second part is hierarchical file system. The Third points are treating devices and certain inter process communications (IPC) as file. The forth part is use of large number of software tools in other words it can be classified that small programs that can be connected together through a command line interpreter using pipes, as it does not want to use single monolithic program that includes all of the same functionality.

Desktop/pratham/file
> |
```

grep "this is a sentence" [file]

outputs the line which contain following sentence in the file

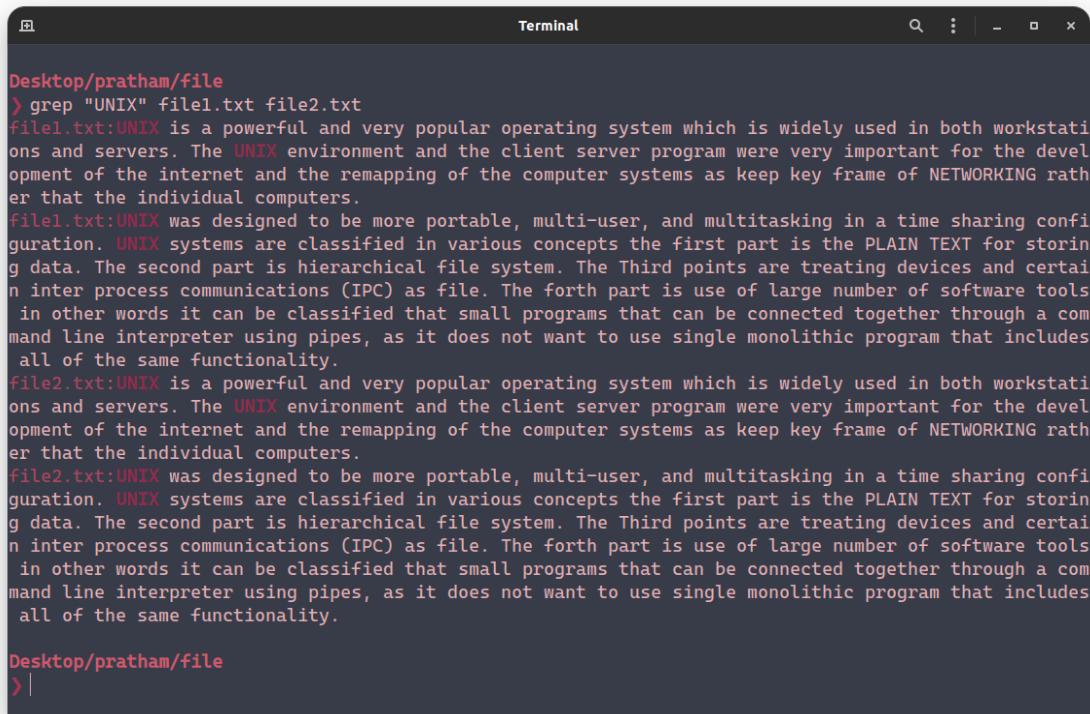


```
Desktop/pratham/file
> grep "UNIX is" file.txt
UNIX is a powerful and very popular operating system w
hich is widely used in both workstations and servers.
The UNIX environment and the client server program wer
e very important for the development of the internet a
nd the remapping of the computer systems as keep key f
rame of NETWORKING rather than the individual computer
s.

Desktop/pratham/file
>|
```

grep "word/sentence" [file1] [file2] ...

outputs the line which contains following word/sentence for all the files given as input

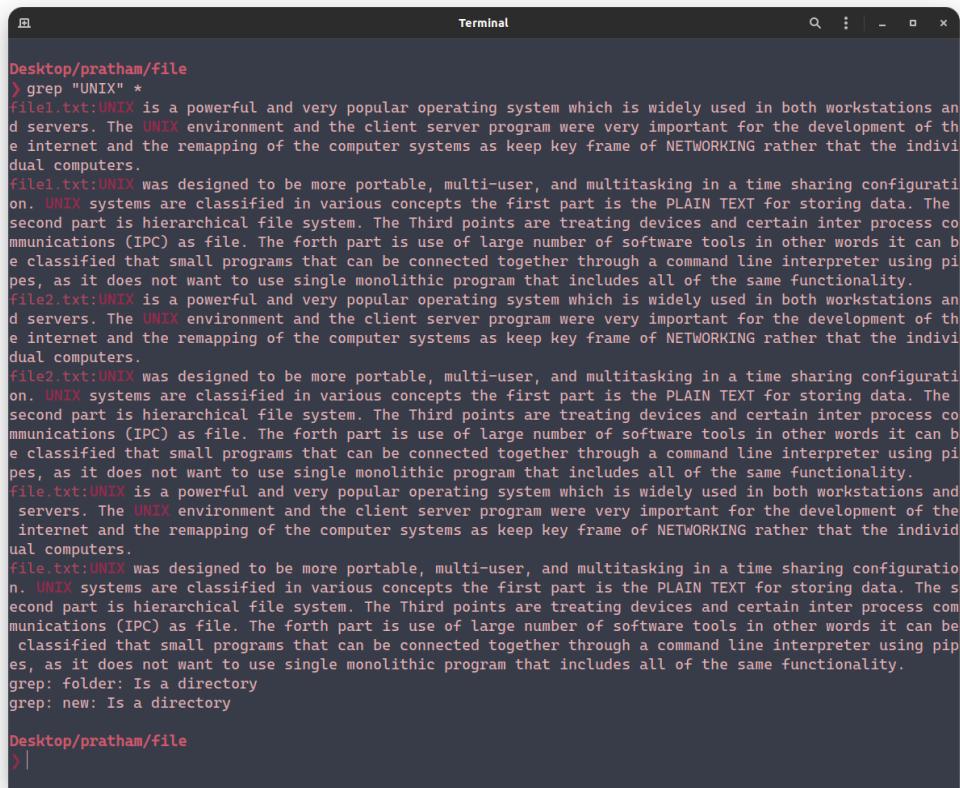


```
Desktop/pratham/file
> grep "UNIX" file1.txt file2.txt
file1.txt:UNIX is a powerful and very popular operating system which is widely used in both workstati
ons and servers. The UNIX environment and the client server program were very important for the devel
opment of the internet and the remapping of the computer systems as keep key frame of NETWORKING rath
er than the individual computers.
file1.txt:UNIX was designed to be more portable, multi-user, and multitasking in a time sharing config
uration. UNIX systems are classified in various concepts the first part is the PLAIN TEXT for storin
g data. The second part is hierarchical file system. The Third points are treating devices and certai
n inter process communications (IPC) as file. The forth part is use of large number of software tools
in other words it can be classified that small programs that can be connected together through a com
mand line interpreter using pipes, as it does not want to use single monolithic program that includes
all of the same functionality.
file2.txt:UNIX is a powerful and very popular operating system which is widely used in both workstati
ons and servers. The UNIX environment and the client server program were very important for the devel
opment of the internet and the remapping of the computer systems as keep key frame of NETWORKING rath
er than the individual computers.
file2.txt:UNIX was designed to be more portable, multi-user, and multitasking in a time sharing config
uration. UNIX systems are classified in various concepts the first part is the PLAIN TEXT for storin
g data. The second part is hierarchical file system. The Third points are treating devices and certai
n inter process communications (IPC) as file. The forth part is use of large number of software tools
in other words it can be classified that small programs that can be connected together through a com
mand line interpreter using pipes, as it does not want to use single monolithic program that includes
all of the same functionality.

Desktop/pratham/file
>|
```

```
grep "word/sentence" *
```

outputs the line which contains following word/sentence for all the files in the pwd

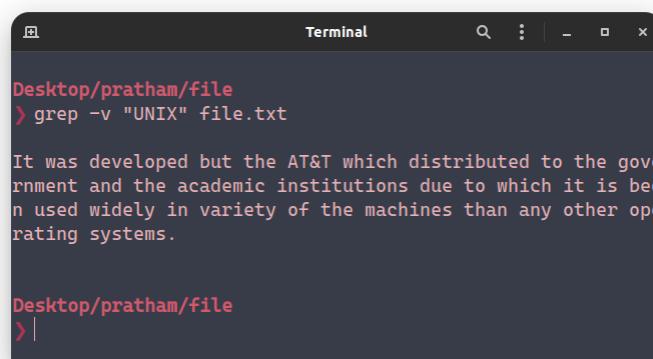


```
Desktop/pratham/file
> grep "UNIX" *
file1.txt:UNIX is a powerful and very popular operating system which is widely used in both workstations and servers. The UNIX environment and the client server program were very important for the development of the internet and the remapping of the computer systems as keep key frame of NETWORKING rather than the individual computers.
file1.txt:UNIX was designed to be more portable, multi-user, and multitasking in a time sharing configuration. UNIX systems are classified in various concepts the first part is the PLAIN TEXT for storing data. The second part is hierarchical file system. The Third points are treating devices and certain inter process communications (IPC) as file. The forth part is use of large number of software tools in other words it can be classified that small programs that can be connected together through a command line interpreter using pipes, as it does not want to use single monolithic program that includes all of the same functionality.
file2.txt:UNIX is a powerful and very popular operating system which is widely used in both workstations and servers. The UNIX environment and the client server program were very important for the development of the internet and the remapping of the computer systems as keep key frame of NETWORKING rather than the individual computers.
file2.txt:UNIX was designed to be more portable, multi-user, and multitasking in a time sharing configuration. UNIX systems are classified in various concepts the first part is the PLAIN TEXT for storing data. The second part is hierarchical file system. The Third points are treating devices and certain inter process communications (IPC) as file. The forth part is use of large number of software tools in other words it can be classified that small programs that can be connected together through a command line interpreter using pipes, as it does not want to use single monolithic program that includes all of the same functionality.
file3.txt:UNIX is a powerful and very popular operating system which is widely used in both workstations and servers. The UNIX environment and the client server program were very important for the development of the internet and the remapping of the computer systems as keep key frame of NETWORKING rather than the individual computers.
file3.txt:UNIX was designed to be more portable, multi-user, and multitasking in a time sharing configuration. UNIX systems are classified in various concepts the first part is the PLAIN TEXT for storing data. The second part is hierarchical file system. The Third points are treating devices and certain inter process communications (IPC) as file. The forth part is use of large number of software tools in other words it can be classified that small programs that can be connected together through a command line interpreter using pipes, as it does not want to use single monolithic program that includes all of the same functionality.
grep: folder: Is a directory
grep: new: Is a directory

Desktop/pratham/file
> |
```

```
grep -v "word/sentence" [file]
```

outputs the line which does not contains following word/sentence from the file



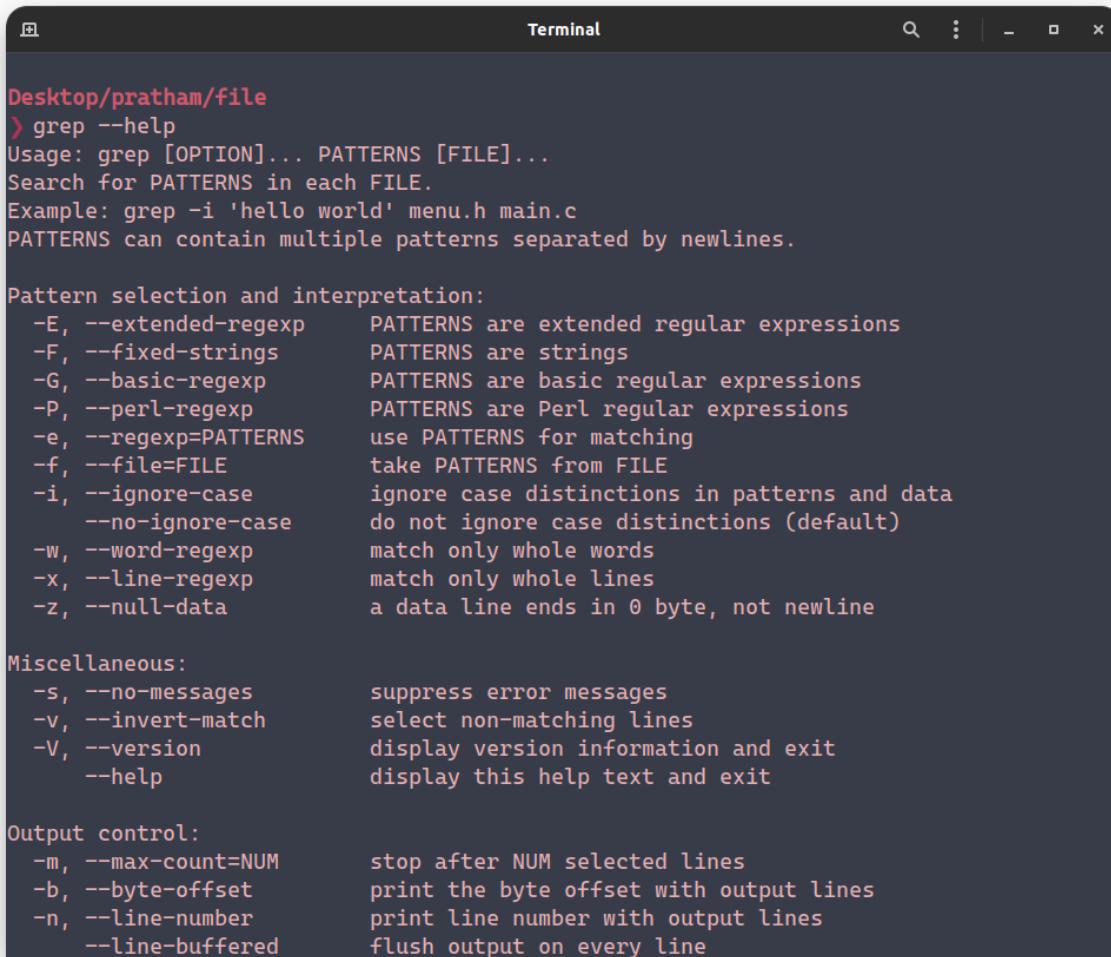
```
Desktop/pratham/file
> grep -v "UNIX" file.txt

It was developed by the AT&T which distributed to the government and the academic institutions due to which it is been used widely in variety of the machines than any other operating systems.

Desktop/pratham/file
> |
```

grep --help

gives the manual of different options of grep command



The screenshot shows a terminal window with the title "Terminal". The command "grep --help" is run from the directory "/Desktop/pratham/file". The output provides detailed information about grep's options:

```
Desktop/pratham/file
> grep --help
Usage: grep [OPTION]... PATTERN [FILE]...
Search for PATTERN in each FILE.
Example: grep -i 'hello world' menu.h main.c
PATTERNS can contain multiple patterns separated by newlines.

Pattern selection and interpretation:
-E, --extended-regexp      PATTERNS are extended regular expressions
-F, --fixed-strings        PATTERNS are strings
-G, --basic-regexp         PATTERNS are basic regular expressions
-P, --perl-regexp          PATTERNS are Perl regular expressions
-e, --regexp=PATTERNS     use PATTERNS for matching
-f, --file=FILE             take PATTERNS from FILE
-i, --ignore-case          ignore case distinctions in patterns and data
   --no-ignore-case        do not ignore case distinctions (default)
-w, --word-regexp          match only whole words
-x, --line-regexp           match only whole lines
-z, --null-data            a data line ends in 0 byte, not newline

Miscellaneous:
-s, --no-messages          suppress error messages
-v, --invert-match         select non-matching lines
-V, --version               display version information and exit
   --help                  display this help text and exit

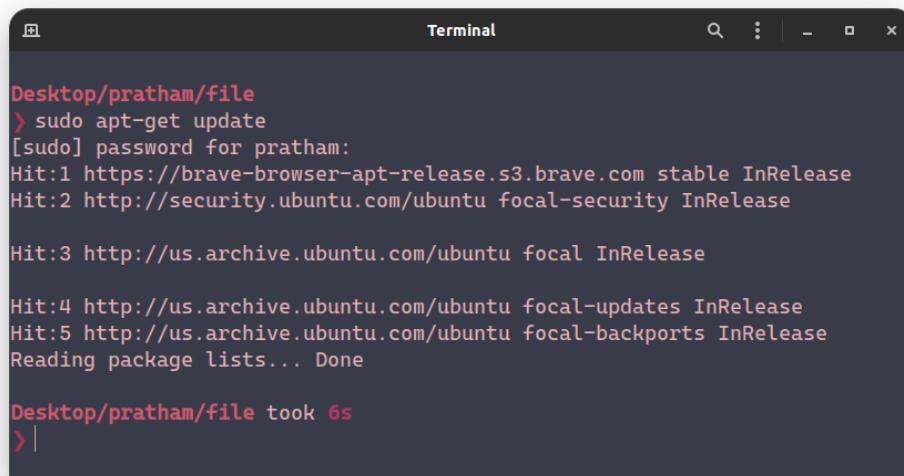
Output control:
-m, --max-count=NUM        stop after NUM selected lines
-b, --byte-offset           print the byte offset with output lines
-n, --line-number            print line number with output lines
   --line-buffered          flush output on every line
```

apt-get command

apt-get command [apt --> advanced packaging tool] for debian based operating system
[stored locally /usr/bin/apt-get]

sudo apt-get update

synchronize local index of package file compared to the remote server

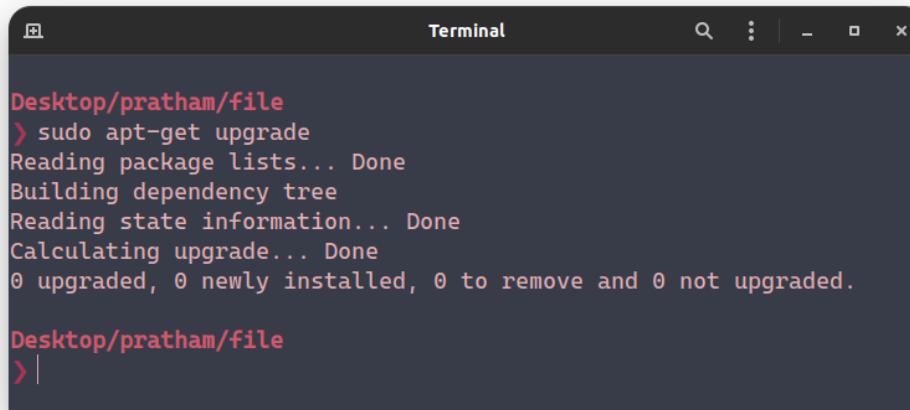


```
Desktop/pratham/file
> sudo apt-get update
[sudo] password for pratham:
Hit:1 https://brave-browser-apt-release.s3.brave.com stable InRelease
Hit:2 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:3 http://us.archive.ubuntu.com/ubuntu focal InRelease
Hit:4 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:5 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease
Reading package lists... Done

Desktop/pratham/file took 6s
>|
```

sudo apt-get upgrade

upgrades the package file that could be updated

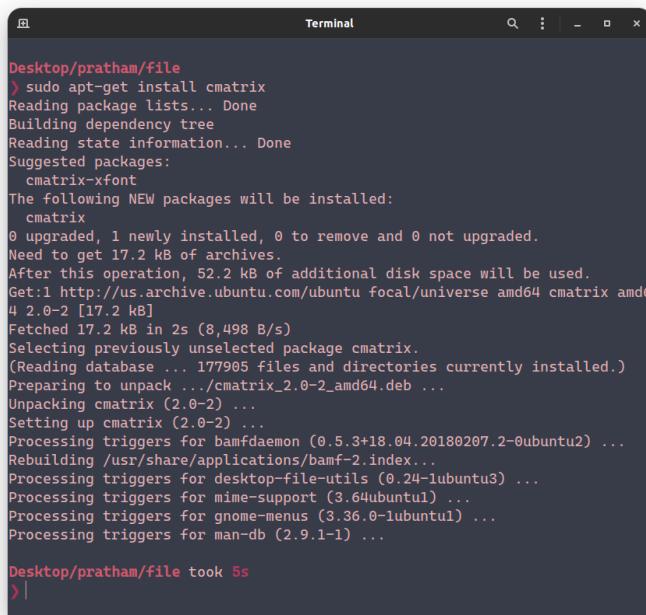


```
Desktop/pratham/file
> sudo apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.

Desktop/pratham/file
>|
```

sudo apt-get install package

used to install different softwares, packages, utilities, etc from the remote server using the apt package manager

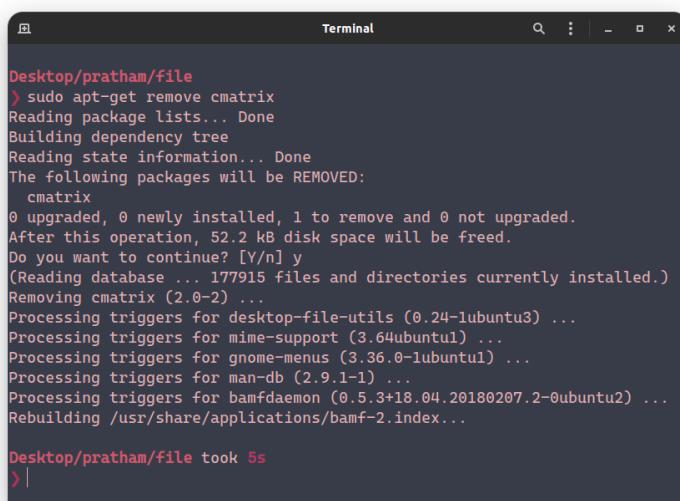


```
Desktop/pratham/file
> sudo apt-get install cmatrix
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  cmatrix-xfont
The following NEW packages will be installed:
  cmatrix
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 17.2 kB of archives.
After this operation, 52.2 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 cmatrix amd64 4.2.0-2 [17.2 kB]
Fetched 17.2 kB in 2s (8,498 B/s)
Selecting previously unselected package cmatrix.
(Reading database ... 177905 files and directories currently installed.)
Preparing to unpack .../cmatrix_4.2.0-2_amd64.deb ...
Unpacking cmatrix (4.2.0-2) ...
Setting up cmatrix (4.2.0-2) ...
Processing triggers for bamfdaemon (0.5.3+18.04.20180207.2-0ubuntu2) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for desktop-file-utils (0.24-1ubuntu3) ...
Processing triggers for mime-support (3.64ubuntu1) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...

Desktop/pratham/file took 5s
>|
```

sudo apt-get remove package

used to uninstall different softwares, packages, utilities, etc from the system

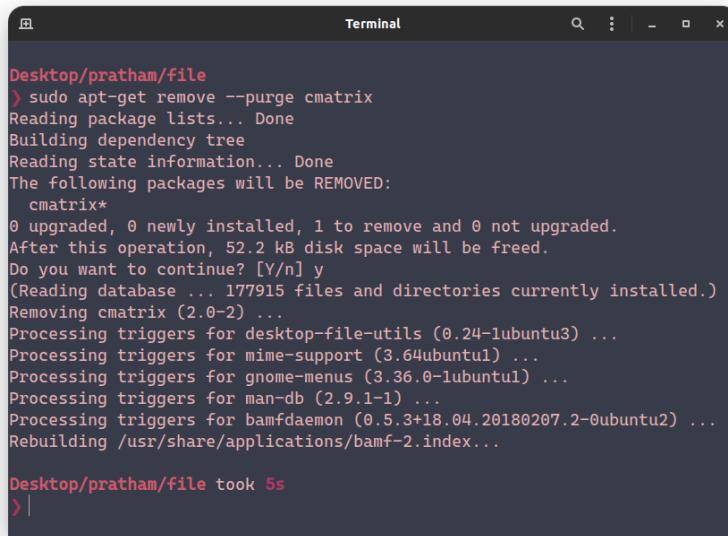


```
Desktop/pratham/file
> sudo apt-get remove cmatrix
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be REMOVED:
  cmatrix
0 upgraded, 0 newly installed, 1 to remove and 0 not upgraded.
After this operation, 52.2 kB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 177915 files and directories currently installed.)
Removing cmatrix (4.2.0-2) ...
Processing triggers for desktop-file-utils (0.24-1ubuntu3) ...
Processing triggers for mime-support (3.64ubuntu1) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for bamfdaemon (0.5.3+18.04.20180207.2-0ubuntu2) ...
Rebuilding /usr/share/applications/bamf-2.index...

Desktop/pratham/file took 5s
>|
```

`sudo apt-get remove --purge package`

used to uninstall as well as remove configuration files of different softwares, packages, utilities, etc from the system

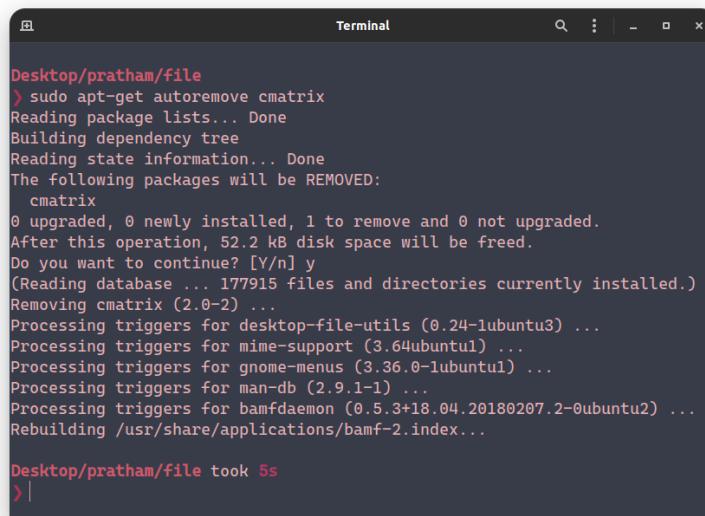


```
Desktop/pratham/file
> sudo apt-get remove --purge cmatrix
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be REMOVED:
  cmatrix*
0 upgraded, 0 newly installed, 1 to remove and 0 not upgraded.
After this operation, 52.2 kB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 177915 files and directories currently installed.)
Removing cmatrix (2.0-2) ...
Processing triggers for desktop-file-utils (0.24-1ubuntu3) ...
Processing triggers for mime-support (3.64ubuntu1) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for bamfdaemon (0.5.3+18.04.20180207.2-0ubuntu2) ...
Rebuilding /usr/share/applications/bamf-2.index...

Desktop/pratham/file took 5s
> |
```

`sudo apt-get autoremove package`

removes the packages/software/utilities which were automatically installed for satisfying dependency of another program but are no longer required



```
Desktop/pratham/file
> sudo apt-get autoremove cmatrix
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be REMOVED:
  cmatrix*
0 upgraded, 0 newly installed, 1 to remove and 0 not upgraded.
After this operation, 52.2 kB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 177915 files and directories currently installed.)
Removing cmatrix (2.0-2) ...
Processing triggers for desktop-file-utils (0.24-1ubuntu3) ...
Processing triggers for mime-support (3.64ubuntu1) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for bamfdaemon (0.5.3+18.04.20180207.2-0ubuntu2) ...
Rebuilding /usr/share/applications/bamf-2.index...

Desktop/pratham/file took 5s
> |
```

chmod command used to change the permission given to the file

```

ls -l
total 40
drwxr-xr-x 3 pratham pratham 4096 Jan 13 16:52 Desktop
drwxr-xr-x 2 pratham pratham 4096 Dec 30 18:11 Documents
drwxr-xr-x 5 pratham pratham 4096 Jan 17 17:06 Downloads
drwxr-xr-x 2 pratham pratham 4096 Dec 30 18:11 Music
drwxr-xr-x 4 pratham pratham 4096 Jan 17 17:23 Pictures
drwxr-xr-x 2 pratham pratham 4096 Dec 30 18:11 Public
drwxrwxr-x 5 pratham pratham 4096 Jan 12 18:37 pywal
drwx----- 9 pratham pratham 4096 Jan 13 15:40 snap
drwxr-xr-x 2 pratham pratham 4096 Dec 30 18:11 Templates
drwxr-xr-x 3 pratham pratham 4096 Jan 13 00:08 Videos

```

first column in this form is rights of root user followed by group rights and lastly other right

Ex -> **drwxr-xr-x**

user rights --> read write execute

group rights --> read execute

other rights --> read execute)

drwxrwxr-x --> first letter d --> **directory file**

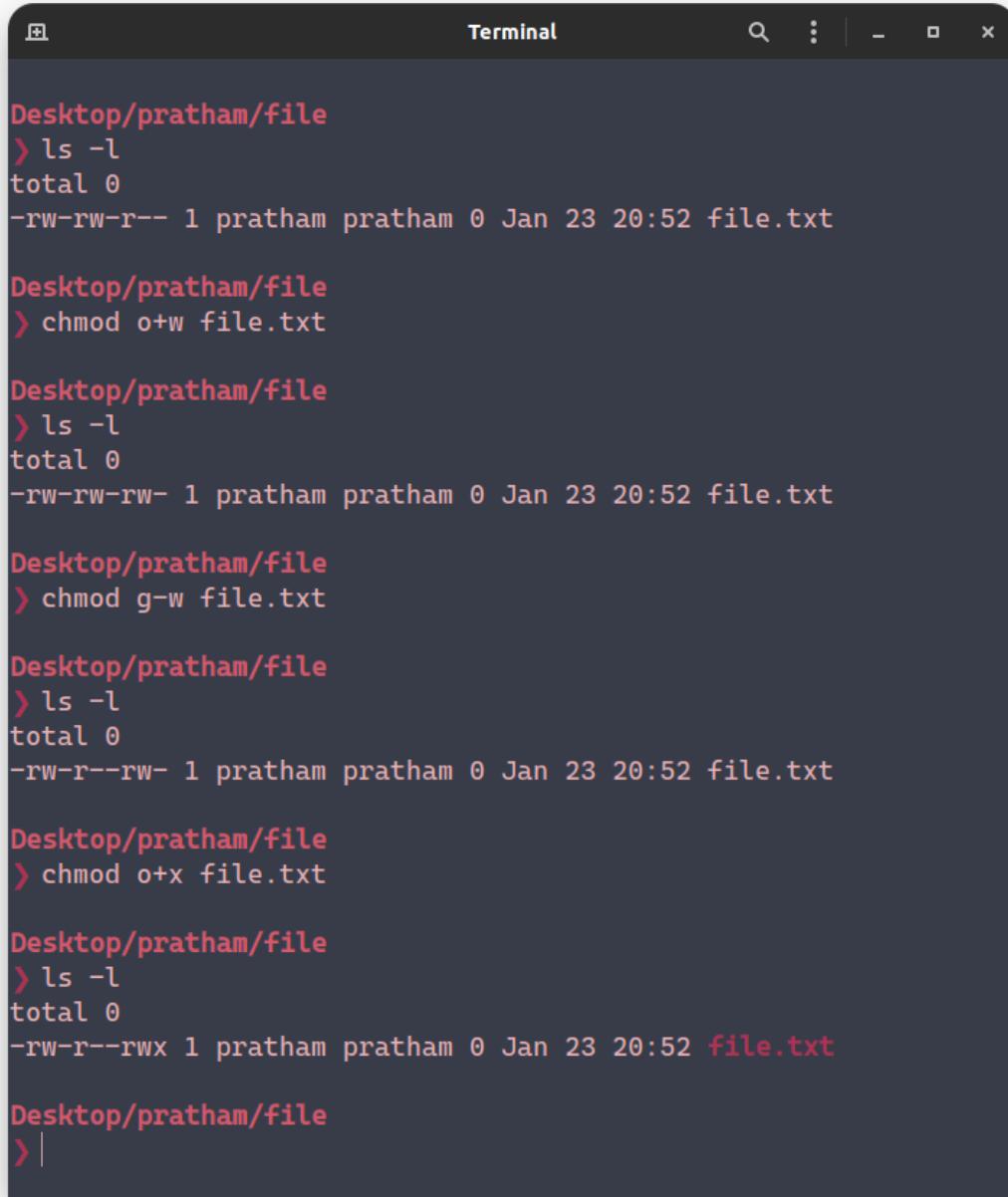
-rw-rw-r-- --> first letter - --> **normal file**

chmod command

chmod o[+r, +w, +x, -r, -w, -x] file --> to change permissions of other users

chmod g[+r, +w, +x, -r, -w, -x] file --> to change permissions of group owner

chmod u[+r, +w, +x, -r, -w, -x] file --> to change permissions of owner(root user)



The screenshot shows a terminal window with the title 'Terminal'. The terminal output is as follows:

```
Desktop/pratham/file
> ls -l
total 0
-rw-rw-r-- 1 pratham pratham 0 Jan 23 20:52 file.txt

Desktop/pratham/file
> chmod o+w file.txt

Desktop/pratham/file
> ls -l
total 0
-rw-rw-rw- 1 pratham pratham 0 Jan 23 20:52 file.txt

Desktop/pratham/file
> chmod g-w file.txt

Desktop/pratham/file
> ls -l
total 0
-rw-r--rw- 1 pratham pratham 0 Jan 23 20:52 file.txt

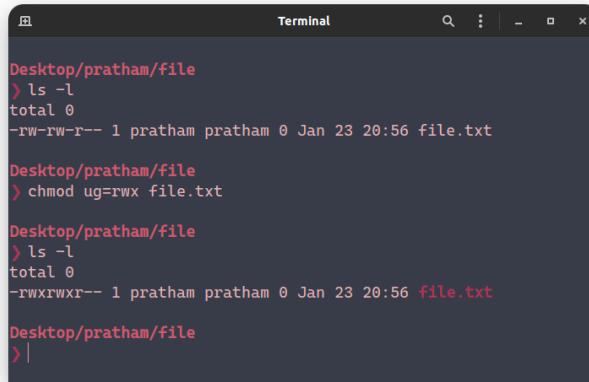
Desktop/pratham/file
> chmod o+x file.txt

Desktop/pratham/file
> ls -l
total 0
-rw-r--rwx 1 pratham pratham 0 Jan 23 20:52 file.txt

Desktop/pratham/file
> |
```

chmod command

chmod ug=rwx file --> gives all permissions to both owner and group-owner



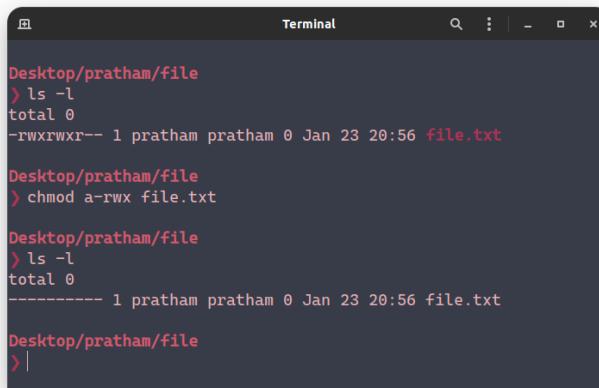
```
Desktop/pratham/file
> ls -l
total 0
-rw-rw-r-- 1 pratham pratham 0 Jan 23 20:56 file.txt

Desktop/pratham/file
> chmod ug=rwx file.txt

Desktop/pratham/file
> ls -l
total 0
-rwxrwxr-- 1 pratham pratham 0 Jan 23 20:56 file.txt

Desktop/pratham/file
> |
```

chmod a-rwx file OR chmod ugo-rwx file --> removes all permissions from the owner, group-owner and others



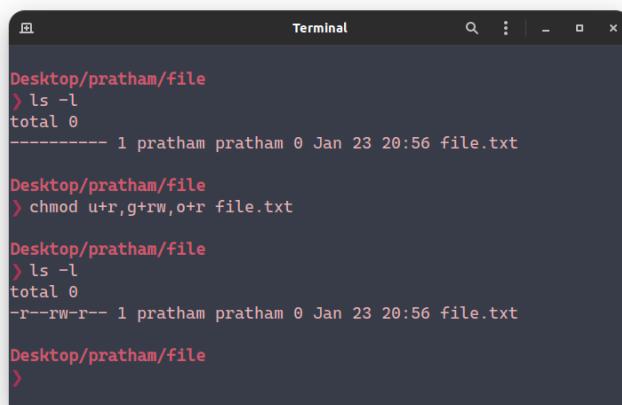
```
Desktop/pratham/file
> ls -l
total 0
-rwxrwxr-- 1 pratham pratham 0 Jan 23 20:56 file.txt

Desktop/pratham/file
> chmod a-rwx file.txt

Desktop/pratham/file
> ls -l
total 0
----- 1 pratham pratham 0 Jan 23 20:56 file.txt

Desktop/pratham/file
> |
```

chmod u+rwx, g+rw, o+r file --> giving multiple permissions at a time



```
Desktop/pratham/file
> ls -l
total 0
----- 1 pratham pratham 0 Jan 23 20:56 file.txt

Desktop/pratham/file
> chmod u+r,g+rw,o+r file.txt

Desktop/pratham/file
> ls -l
total 0
-r--rw-r-- 1 pratham pratham 0 Jan 23 20:56 file.txt

Desktop/pratham/file
> |
```

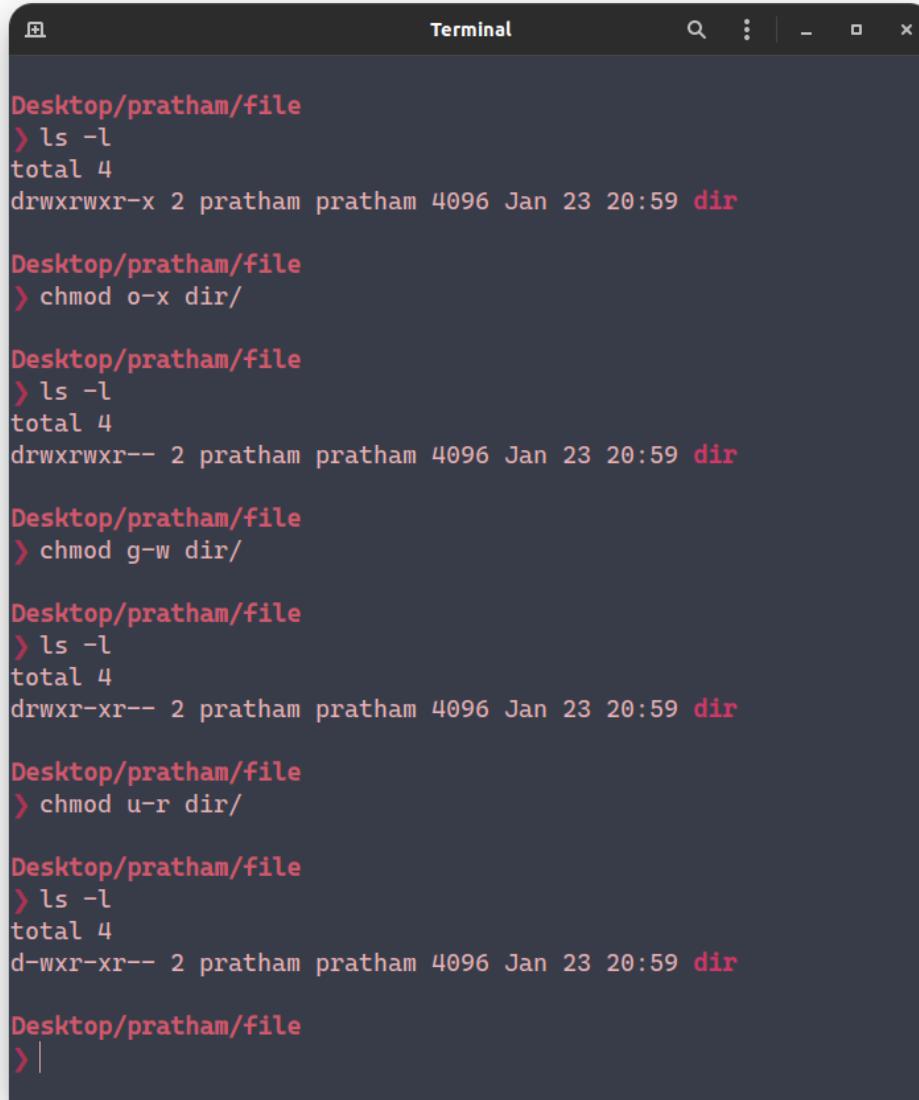
chmod command

Directory Permissions

chmod o[+r, +w, +x, -r, -w, -x] dir --> to change permissions of other users

chmod g[+r, +w, +x, -r, -w, -x] dir --> to change permissions of group owner

chmod u[+r, +w, +x, -r, -w, -x] dir --> to change permissions of owner(root user)



The screenshot shows a terminal window titled "Terminal" with a dark theme. It displays a series of commands and their outputs related to changing file permissions:

```
Desktop/pratham/file
> ls -l
total 4
drwxrwxr-x 2 pratham pratham 4096 Jan 23 20:59 dir

Desktop/pratham/file
> chmod o-x dir/

Desktop/pratham/file
> ls -l
total 4
drwxrwxr-- 2 pratham pratham 4096 Jan 23 20:59 dir

Desktop/pratham/file
> chmod g-w dir/

Desktop/pratham/file
> ls -l
total 4
drwxr-xr-- 2 pratham pratham 4096 Jan 23 20:59 dir

Desktop/pratham/file
> chmod u-r dir/

Desktop/pratham/file
> ls -l
total 4
d-wxr-xr-- 2 pratham pratham 4096 Jan 23 20:59 dir

Desktop/pratham/file
> |
```

chmod command

OCTAL/NUMERICAL Permissions in chmod command

Octal	Binary
---	000
--x	001
-w-	010
-wx	011
r--	100
r-x	101
rw-	110
rwx	111

users	group	others
r w x	r w x	r w x
1 0 1	1 0 0	0 1 1
4 2 1	4 2 1	4 2 1
4+0+1	4+0+0	0+2+1
5	4	3

chmod 543 file --> user=5(r-x), group=4(r--), others=3(-wx)

```
Desktop/pratham/file
> ls -l
total 0
-rw-rw-r-- 1 pratham pratham 0 Jan 23 21:01 file.txt

Desktop/pratham/file
> chmod 543 file.txt

Desktop/pratham/file
> ls -l
total 0
-r-xr---wx 1 pratham pratham 0 Jan 23 21:01 file.txt

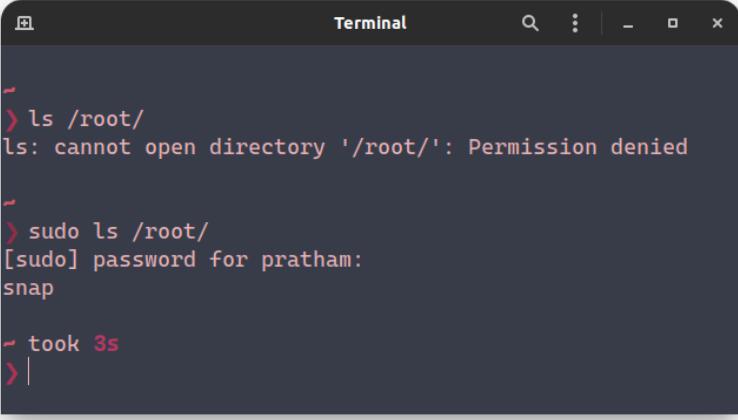
Desktop/pratham/file
> |
```

User Access Commands

sudo [command]

sudo superuser do (gives access to current user as the administrator/super-user)

Prompts for the password of the current user and the gives administrative privileges



A screenshot of a terminal window titled "Terminal". The window shows a command-line session. The user first tries to list the contents of the root directory without sudo, which fails with a permission denied error. Then, the user runs sudo followed by ls /root/, which succeeds because it's run as root. The terminal also shows the time taken for the command.

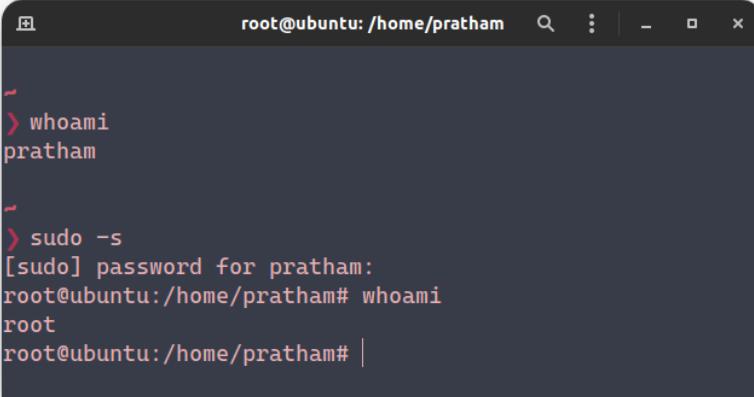
```
ls /root/
ls: cannot open directory '/root/': Permission denied

sudo ls /root/
[sudo] password for pratham:
snap

took 3s
|
```

sudo -s

changes current user to root user(i.e. super-user)



A screenshot of a terminal window showing the user becoming root using sudo -s. The user first checks their current user with whoami, which shows they are pratham. Then, they run sudo -s, enter their password, and become root. The terminal shows the root prompt and the user running whoami again, which now shows they are root.

```
whoami
pratham

sudo -s
[sudo] password for pratham:
root@ubuntu:/home/pratham# whoami
root
root@ubuntu:/home/pratham# |
```

User Management

useradd command

```
sudo useradd user_name -m -s /usr/bin/bash -g users -c "my-comment"
```

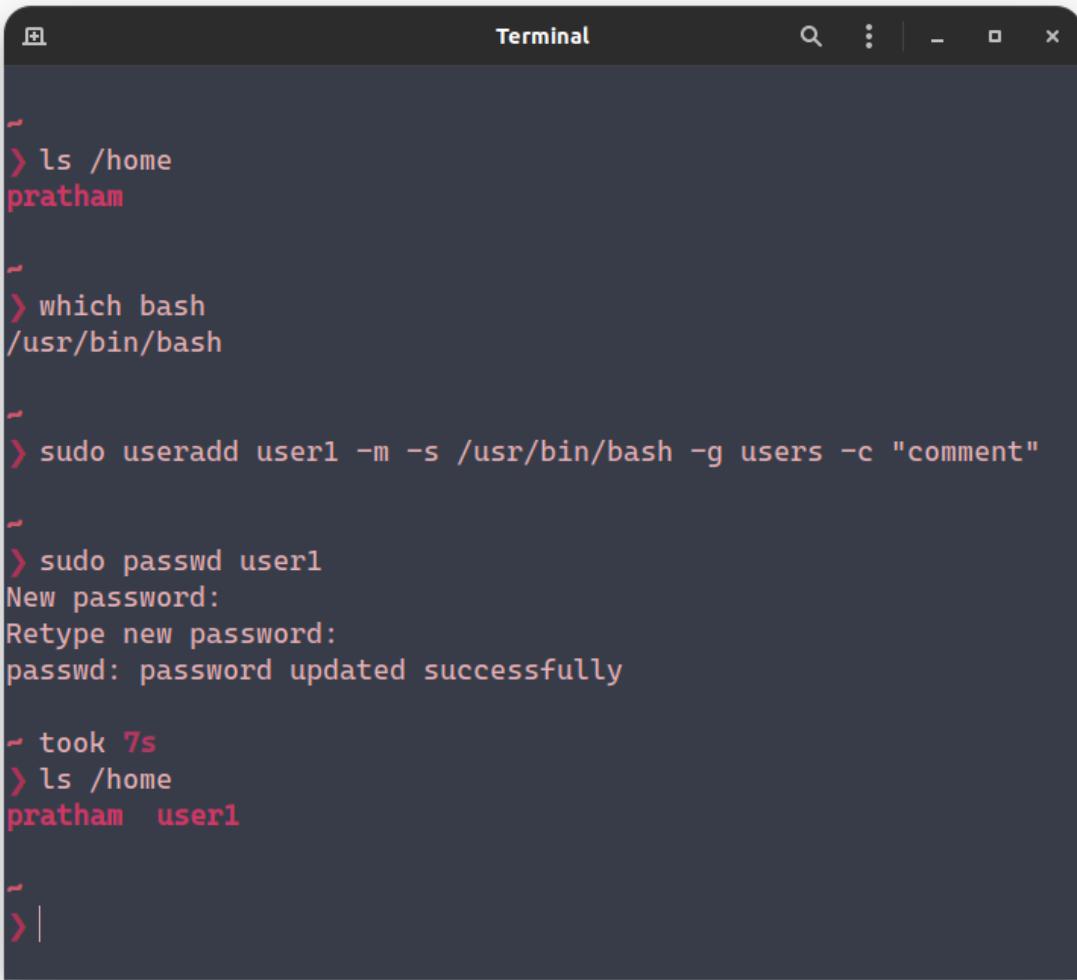
-**m** --> creates a default home directory named as the user_name

-**s** --> for shell and followed by default shell(bash) address

-**g** --> for group and followed by default group(users)

-**c** --> for comment

```
sudo passwd user_name
```



The screenshot shows a terminal window with the title 'Terminal'. The terminal history is as follows:

- ls /home
- which bash
- /usr/bin/bash
- sudo useradd user1 -m -s /usr/bin/bash -g users -c "comment"
- sudo passwd user1
- New password:
- Retype new password:
- passwd: password updated successfully
- took 7s
- ls /home
- pratham user1

userdel command

sudo userdel user_name --> deletes user-name & password of the user

(but does not delete home directory of user_name)

sudo rm -r /home/user_name --> delete the home dir of the user

sudo userdel -r user_name --> deletes the user_name, password and the home dir of user

```
Terminal
```

```
~ > ls /home/
pratham user1 user2

~ > sudo userdel user1

~ > ls /home/
pratham user1 user2

~ > sudo rm -r /home/user1

~ > ls /home/
pratham user2

~ > |
```

```
Terminal
```

```
~ > ls /home/
pratham user2

~ > sudo userdel -r user2
userdel: user2 mail spool (/var/mail/user2) not found

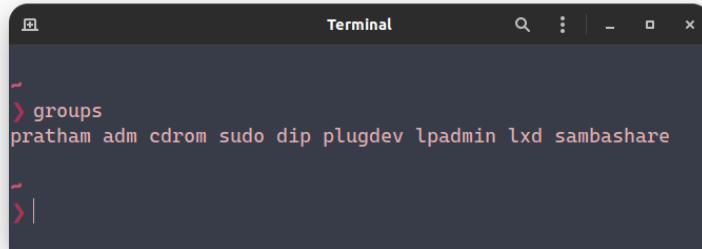
~ > ls /home/
pratham

~ > |
```

Group Management

groups

gives the list of all groups connected to current_user

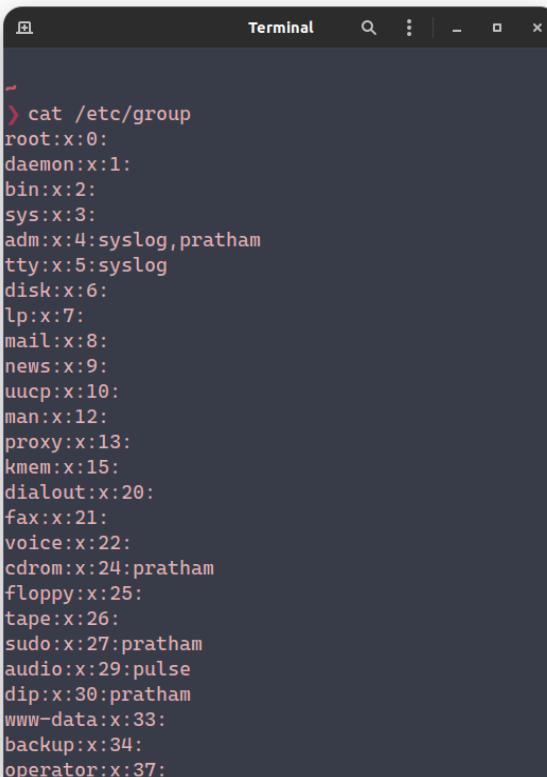


```
Terminal
```

```
pratham adm cdrom sudo dip plugdev lpadmin lxd sambashare
```

cat /etc/group

gives the list of all groups present in the operating system

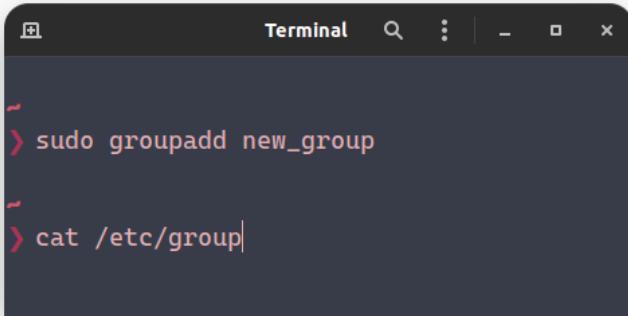


```
Terminal
```

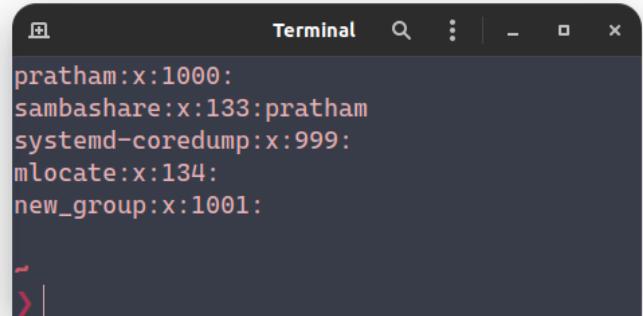
```
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,pratham
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:12:
proxy:x:13:
kmem:x:15:
dialout:x:20:
fax:x:21:
voice:x:22:
cdrom:x:24:pratham
floppy:x:25:
tape:x:26:
sudo:x:27:pratham
audio:x:29:pulse
dip:x:30:pratham
www-data:x:33:
backup:x:34:
operator:x:37:
```

sudo groupadd group_name

creates a new group named as group_name (can be verified from {cat /etc/group})



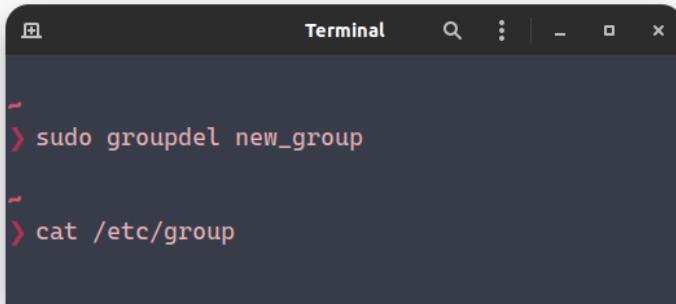
```
Terminal
~ > sudo groupadd new_group
~ > cat /etc/group
```



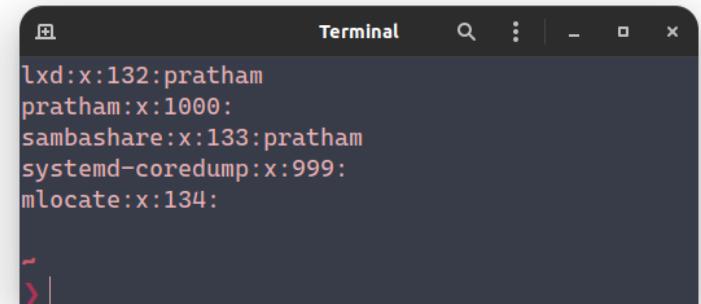
```
Terminal
pratham:x:1000:
sambashare:x:133:pratham
systemd-coredump:x:999:
mlocate:x:134:
new_group:x:1001:
~ >
```

sudo groupdel group_name

deletes the group from operating system (can be verified from {cat /etc/group})



```
Terminal
~ > sudo groupdel new_group
~ > cat /etc/group
```



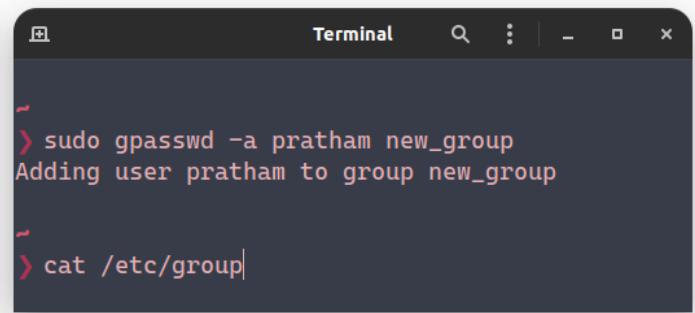
```
Terminal
lxd:x:132:pratham
pratham:x:1000:
sambashare:x:133:pratham
systemd-coredump:x:999:
mlocate:x:134:
~ >
```

```
sudo gpasswd -a user_name group_name
```

adds user to the group



```
pratham:x:1000:  
sambashare:x:133:pratham  
systemd-coredump:x:999:  
mlocate:x:134:  
new_group:x:1001:pratham
```



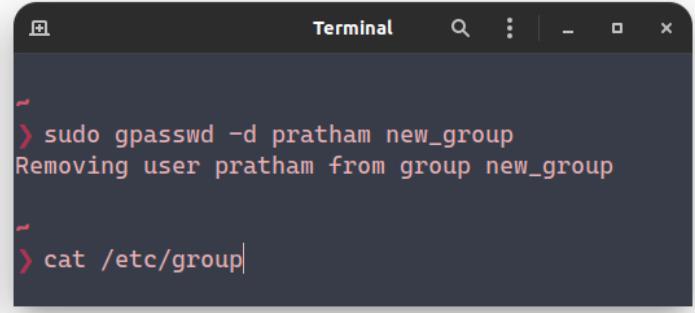
```
~> sudo gpasswd -a pratham new_group  
Adding user pratham to group new_group  
  
~> cat /etc/group|
```

```
sudo gpasswd -d user_name group_name
```

deletes user from the group



```
pratham:x:1000:  
sambashare:x:133:pratham  
systemd-coredump:x:999:  
mlocate:x:134:  
new_group:x:1001:
```



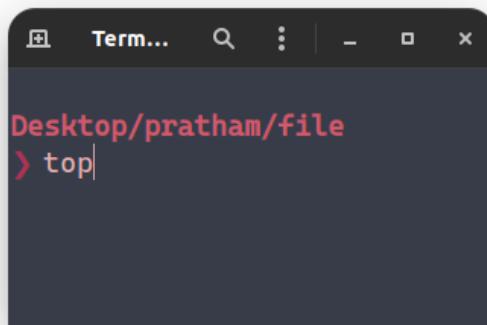
```
~> sudo gpasswd -d pratham new_group  
Removing user pratham from group new_group  
  
~> cat /etc/group|
```

Memory Management Commands

top

Gives the current running processes in a tabular form of

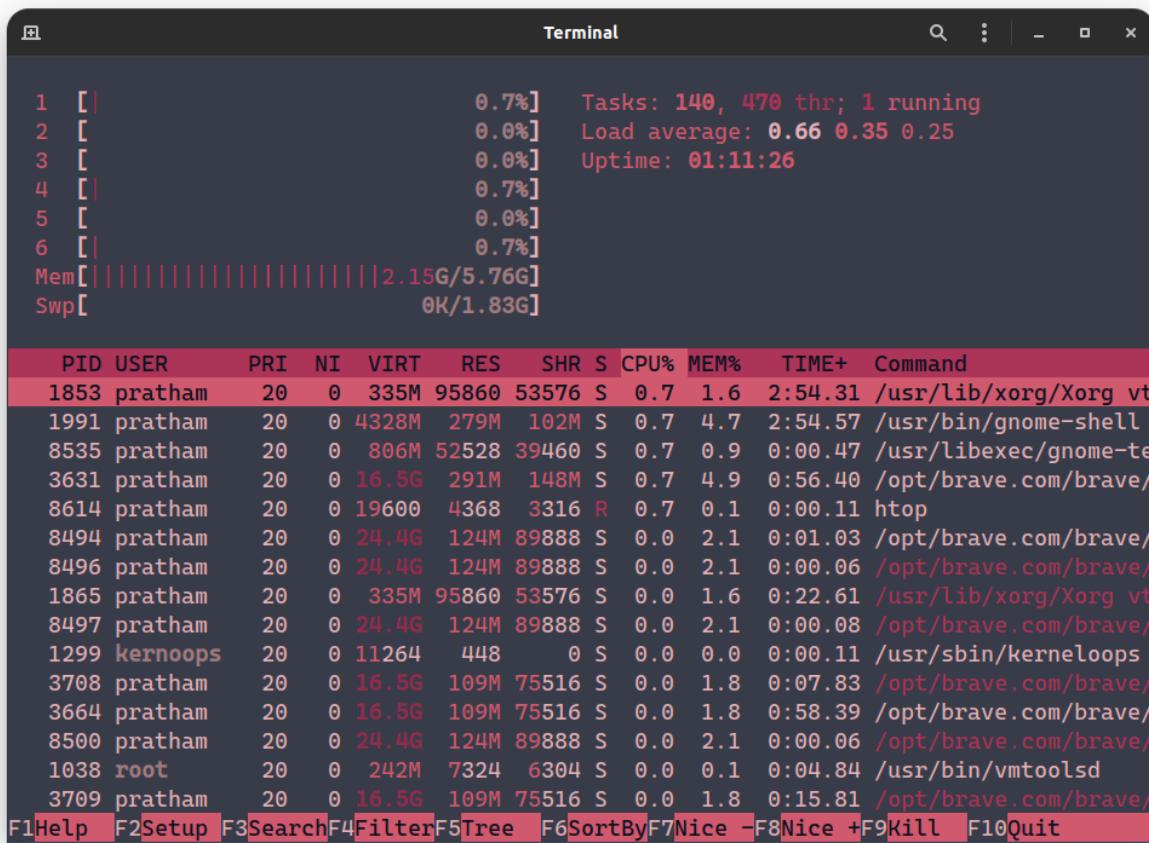
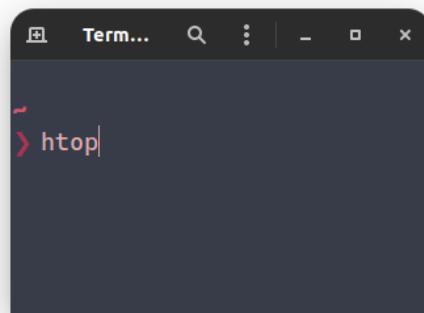
PID(process ID), **USER**, **%CPU**, **%MEM**, etc.



PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1189	root	0	-20	19252	18652	4320	S	8.0	0.3	0:09.72	atop
2028	pratham	20	0	412840	152348	70200	S	2.7	2.5	10:53.87	Xorg
2176	pratham	20	0	4358568	311028	105624	S	1.0	5.1	10:55.45	gnome-shell
26931	pratham	20	0	831044	56956	43568	S	1.0	0.9	0:20.07	gnome-terminal-
36121	pratham	20	0	20772	4244	3288	R	0.7	0.1	0:00.20	top
1067	root	20	0	321876	7948	6580	S	0.3	0.1	1:00.98	vmtoolsd
1124	root	20	0	347312	21760	18500	S	0.3	0.4	0:23.37	NetworkManager
18576	pratham	20	0	16.4g	87464	70668	S	0.3	1.4	0:31.89	brave
1	root	20	0	169036	12804	8152	S	0.0	0.2	0:04.57	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.08	kthreadd
3	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_gp
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_par_gp
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/0:0H-events_h+
9	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_percpu_wq
10	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_tasks_rude_

htop

The information the htop command provides is similar to the top command. However, the real advantage to the htop command is its user-friendly environment and improved controls.



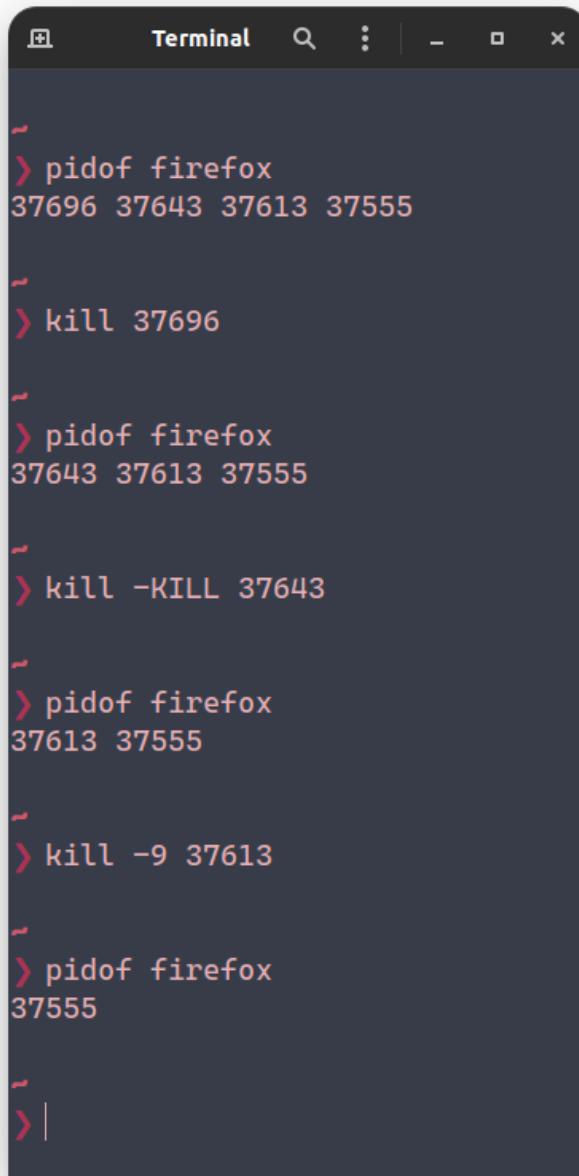
kill

pidof [process] --> gives PID of the process

kill PID --> kills the process with given PID

kill -KILL PID --> kills process forcefully with given PID

kill -9 PID --> more powerful than -KILL flag



The screenshot shows a terminal window with a dark background and light-colored text. The window title is "Terminal". The command history is as follows:

```
~ > pidof firefox
37696 37643 37613 37555

~ > kill 37696

~ > pidof firefox
37643 37613 37555

~ > kill -KILL 37643

~ > pidof firefox
37613 37555

~ > kill -9 37613

~ > pidof firefox
37555

~ |
```

ps

ps -aux --> lists out all the running processes(current user) with their PID in the shell itself

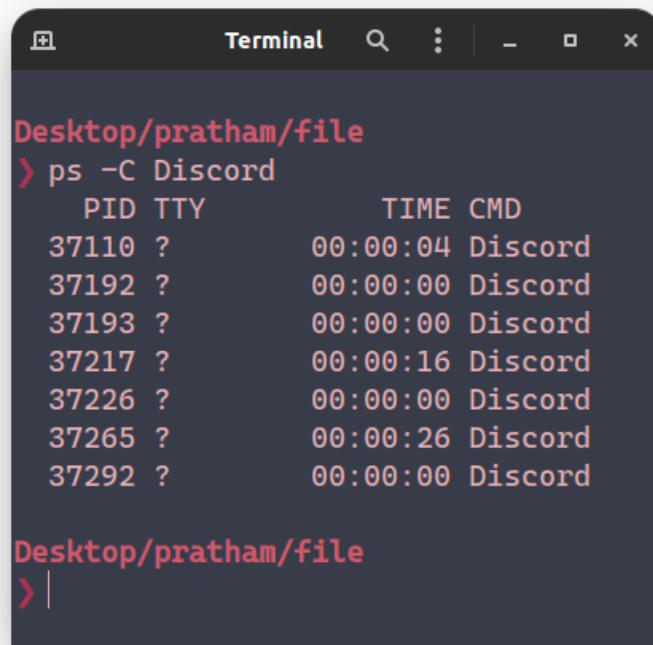
```
Desktop/pratham/file
> ps -aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root      1  0.0  0.2 169036 12804 ?
root      2  0.0  0.0     0   0 ?          S  12:32  0:04 /sbin/init auto noprompt
root      3  0.0  0.0     0   0 ?          I< 12:32  0:00 [kthreadd]
root      4  0.0  0.0     0   0 ?          I< 12:32  0:00 [rcu_gp]
root      6  0.0  0.0     0   0 ?          I< 12:32  0:00 [rcu_par_gp]
root      9  0.0  0.0     0   0 ?          I< 12:32  0:00 [kworker/0:0H-events_high]
root     10  0.0  0.0     0   0 ?          S  12:32  0:00 [rcu_tasks_rude_]
root     11  0.0  0.0     0   0 ?          S  12:32  0:00 [rcu_tasks_trace]
root     12  0.0  0.0     0   0 ?          S  12:32  0:00 [ksoftirqd/0]
root     13  0.1  0.0     0   0 ?          I  12:32  0:27 [rcu_sched]
root     14  0.0  0.0     0   0 ?          S  12:32  0:00 [migration/0]
root     15  0.0  0.0     0   0 ?          S  12:32  0:00 [idle_inject/0]
root     16  0.0  0.0     0   0 ?          S  12:32  0:00 [cpuhp/0]
root     17  0.0  0.0     0   0 ?          S  12:32  0:00 [cpuhp/1]
root     18  0.0  0.0     0   0 ?          S  12:32  0:00 [idle_inject/1]
root     19  0.0  0.0     0   0 ?          S  12:32  0:00 [migration/1]
root     20  0.0  0.0     0   0 ?          S  12:32  0:00 [ksoftirqd/1]
root     22  0.0  0.0     0   0 ?          I< 12:32  0:00 [kworker/1:0H-kblockd]
root     23  0.0  0.0     0   0 ?          S  12:32  0:00 [cpuhp/2]
root     24  0.0  0.0     0   0 ?          S  12:32  0:00 [idle_inject/2]
root     25  0.0  0.0     0   0 ?          S  12:32  0:00 [migration/2]
root     26  0.0  0.0     0   0 ?          S  12:32  0:00 [ksoftirqd/2]
```

ps -U username --> lists out all the running processes of given username

```
Desktop/pratham/file
> ps -U pratham
PID TTY      TIME CMD
1946 ?      00:00:02 systemd
1947 ?      00:00:00 (sd-pam)
1953 ?      00:06:15 pulseaudio
1955 ?      00:00:20 tracker-miner-f
1959 ?      00:00:11 dbus-daemon
1963 ?      00:00:00 gnome-keyring-d
1966 ?      00:00:00 gvfsd
1971 ?      00:00:00 gvfsd-fuse
1992 ?      00:00:00 gvfs-udisks2-vo
1998 ?      00:00:00 gvfs-goa-volume
2003 ?      00:00:00 goa-daemon
2010 ?      00:00:00 goa-identity-se
2015 ?      00:00:01 gvfs-afc-volume
2022 tty2    00:00:00 gdm-x-session
2023 ?      00:00:00 gvfs-mtp-volume
2028 tty2    00:11:21 Xorg
2029 ?      00:00:00 gvfs-gphoto2-vo
2052 tty2    00:00:00 gnome-session-b
2126 ?      00:00:00 ssh-agent
2145 ?      00:00:00 at-spi-bus-laun
2150 ?      00:00:01 dbus-daemon
2154 ?      00:00:00 gnome-session-c
2161 ?      00:00:01 gnome-session-b
```

ps

ps -C process_name --> gives the instance of the process_name from the ps list

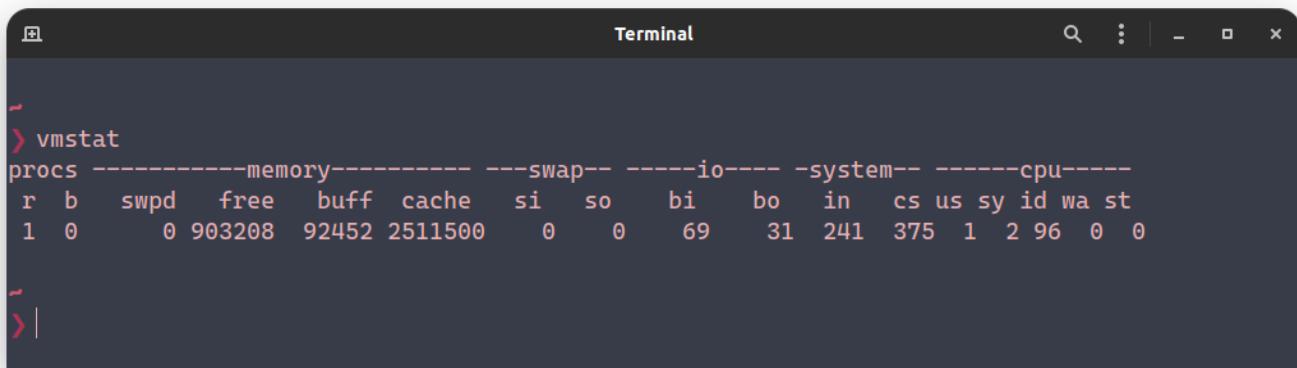


```
Desktop/pratham/file
> ps -C Discord
  PID TTY      TIME CMD
 37110 ?        00:00:04 Discord
 37192 ?        00:00:00 Discord
 37193 ?        00:00:00 Discord
 37217 ?        00:00:16 Discord
 37226 ?        00:00:00 Discord
 37265 ?        00:00:26 Discord
 37292 ?        00:00:00 Discord

Desktop/pratham/file
> |
```

vmstat

provides information about processes, memory, paging, block IO, traps, and CPU activity



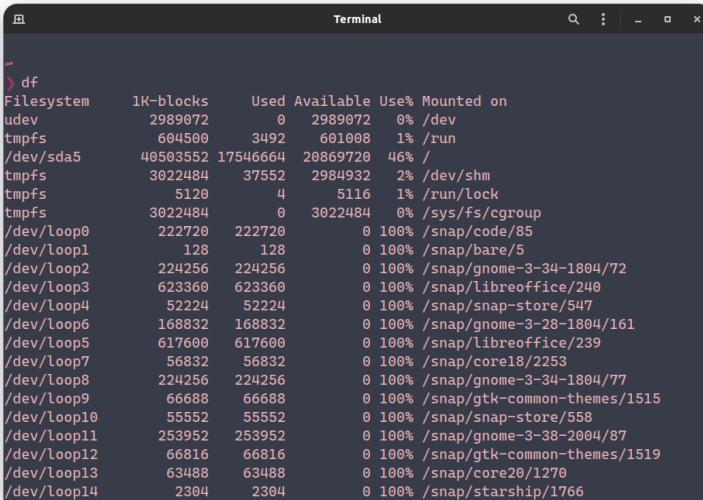
```
~
> vmstat
procs -----memory----- ---swap-- ----io---- -system-- -----cpu-----
 r b    swpd   free   buff  cache   si   so    bi    bo   in   cs us sy id wa st
 1 0      0 903208  92452 2511500    0    0    69    31  241  375  1  2 96  0  0

~
> |
```

Disk Management

df

outputs file system disk space usage [bytes]



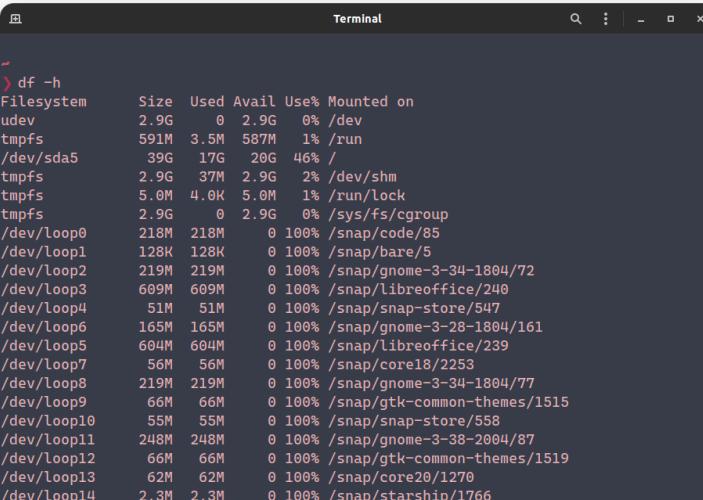
```

> df
Filesystem 1K-blocks Used Available Use% Mounted on
udev 2989072 0 2989072 0% /dev
tmpfs 604500 3492 601008 1% /run
/dev/sda5 40503552 17546664 20869720 46% /
tmpfs 3022484 37552 2984932 2% /dev/shm
tmpfs 5120 4 5116 1% /run/lock
tmpfs 3022484 0 3022484 0% /sys/fs/cgroup
/dev/loop0 222720 222720 0 100% /snap/code/85
/dev/loop1 128 128 0 100% /snap/bare/5
/dev/loop2 224256 224256 0 100% /snap/gnome-3-34-1804/72
/dev/loop3 623360 623360 0 100% /snap/libreoffice/240
/dev/loop4 52224 52224 0 100% /snap/snap-store/547
/dev/loop6 168832 168832 0 100% /snap/gnome-3-28-1804/161
/dev/loop5 617600 617600 0 100% /snap/libreoffice/239
/dev/loop7 56832 56832 0 100% /snap/core18/2253
/dev/loop8 224256 224256 0 100% /snap/gnome-3-34-1804/77
/dev/loop9 66688 66688 0 100% /snap/gtk-common-themes/1515
/dev/loop10 55552 55552 0 100% /snap/snap-store/558
/dev/loop11 253952 253952 0 100% /snap/gnome-3-38-2004/87
/dev/loop12 66816 66816 0 100% /snap/gtk-common-themes/1519
/dev/loop13 63488 63488 0 100% /snap/core20/1270
/dev/loop14 2304 2304 0 100% /snap/starship/1766

```

df -h

df command in human readable form [i. G, M, K]



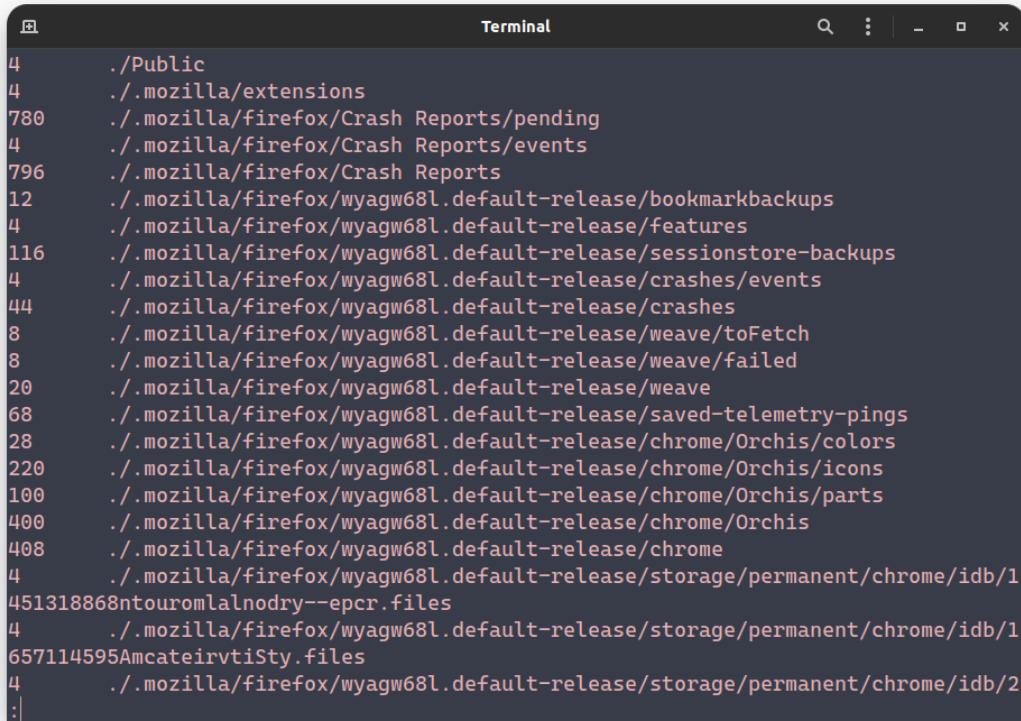
```

> df -h
Filesystem Size Used Avail Use% Mounted on
udev 2.9G 0 2.9G 0% /dev
tmpfs 591M 3.5M 587M 1% /run
/dev/sda5 39G 17G 20G 46% /
tmpfs 2.9G 37M 2.9G 2% /dev/shm
tmpfs 5.0M 4.0K 5.0M 1% /run/lock
tmpfs 2.9G 0 2.9G 0% /sys/fs/cgroup
/dev/loop0 218M 218M 0 100% /snap/code/85
/dev/loop1 128K 128K 0 100% /snap/bare/5
/dev/loop2 219M 219M 0 100% /snap/gnome-3-34-1804/72
/dev/loop3 609M 609M 0 100% /snap/libreoffice/240
/dev/loop4 51M 51M 0 100% /snap/snap-store/547
/dev/loop6 165M 165M 0 100% /snap/gnome-3-28-1804/161
/dev/loop5 604M 604M 0 100% /snap/libreoffice/239
/dev/loop7 56M 56M 0 100% /snap/core18/2253
/dev/loop8 219M 219M 0 100% /snap/gnome-3-34-1804/77
/dev/loop9 66M 66M 0 100% /snap/gtk-common-themes/1515
/dev/loop10 55M 55M 0 100% /snap/snap-store/558
/dev/loop11 248M 248M 0 100% /snap/gnome-3-38-2004/87
/dev/loop12 66M 66M 0 100% /snap/gtk-common-themes/1519
/dev/loop13 62M 62M 0 100% /snap/core20/1270
/dev/loop14 2.3M 2.3M 0 100% /snap/starship/1766

```

du

estimates the storage used for pwd [bytes]

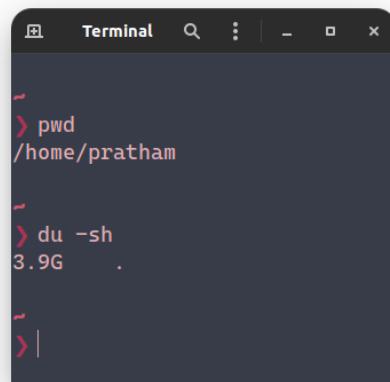


The screenshot shows a terminal window with the title "Terminal". The output of the "du" command is displayed, listing the storage usage for various sub-directories within the current working directory. The output is as follows:

```
4 ./Public
4 ./mozilla/extensions
780 ./mozilla/firefox/Crash Reports/pending
4 ./mozilla/firefox/Crash Reports/events
796 ./mozilla/firefox/Crash Reports
12 ./mozilla/firefox/wyagw68l.default-release/bookmarkbackups
4 ./mozilla/firefox/wyagw68l.default-release/features
116 ./mozilla/firefox/wyagw68l.default-release/sessionstore-backups
4 ./mozilla/firefox/wyagw68l.default-release/crashes/events
44 ./mozilla/firefox/wyagw68l.default-release/crashes
8 ./mozilla/firefox/wyagw68l.default-release/weave/toFetch
8 ./mozilla/firefox/wyagw68l.default-release/weave/failed
20 ./mozilla/firefox/wyagw68l.default-release/weave
68 ./mozilla/firefox/wyagw68l.default-release/saved-telemetry-pings
28 ./mozilla/firefox/wyagw68l.default-release/chrome/Orchis/colors
220 ./mozilla/firefox/wyagw68l.default-release/chrome/Orchis/icons
100 ./mozilla/firefox/wyagw68l.default-release/chrome/Orchis/part
400 ./mozilla/firefox/wyagw68l.default-release/chrome/Orchis
408 ./mozilla/firefox/wyagw68l.default-release/chrome
4 ./mozilla/firefox/wyagw68l.default-release/storage/permanent/chrome/idb/1
451318868ntouromlalnodry--epcr.files
4 ./mozilla/firefox/wyagw68l.default-release/storage/permanent/chrome/idb/1
657114595AmcateirvtiSty.files
4 ./mozilla/firefox/wyagw68l.default-release/storage/permanent/chrome/idb/2
:|
```

du -sh

directly results the storage used by pwd



The screenshot shows a terminal window with the title "Terminal". The user first types "pwd" and presses enter, which outputs the current working directory as "/home/pratham". Then, the user types "du -sh" and presses enter, which outputs the total storage usage for the current directory, "3.9G". The output is as follows:

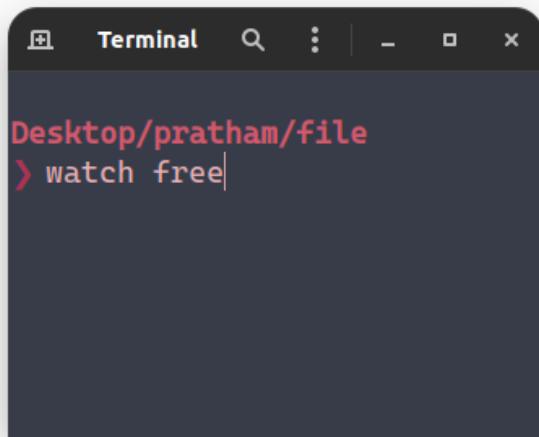
```
~> pwd
/home/pratham

~> du -sh
3.9G .
```

watch

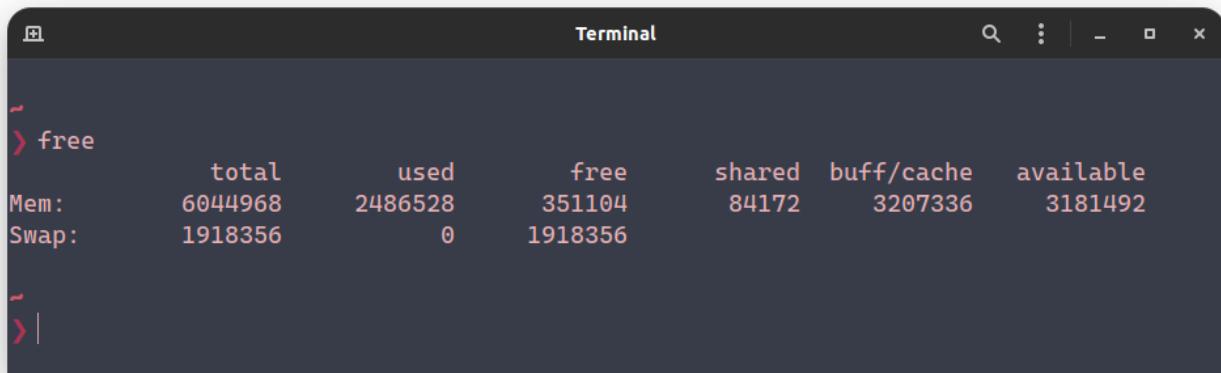
this can run a command at regular interval [by default 2 sec] or repeatedly(ctrl+c to quit)

watch -n freq command --> to change the the frequency of interval

A screenshot of a terminal window titled "Terminal". The window has a dark background and light-colored text. The output of the "watch free" command is displayed. It shows memory usage statistics every 2.0 seconds. The output includes columns for total, used, free, shared, buff/cache, and available memory. The timestamp at the bottom right indicates the output was generated on Sunday, January 23, 2022, at 17:27:53.

free

displays total memory free and used in both physical and swap memory as well as buffer used by the kernel [bytes]

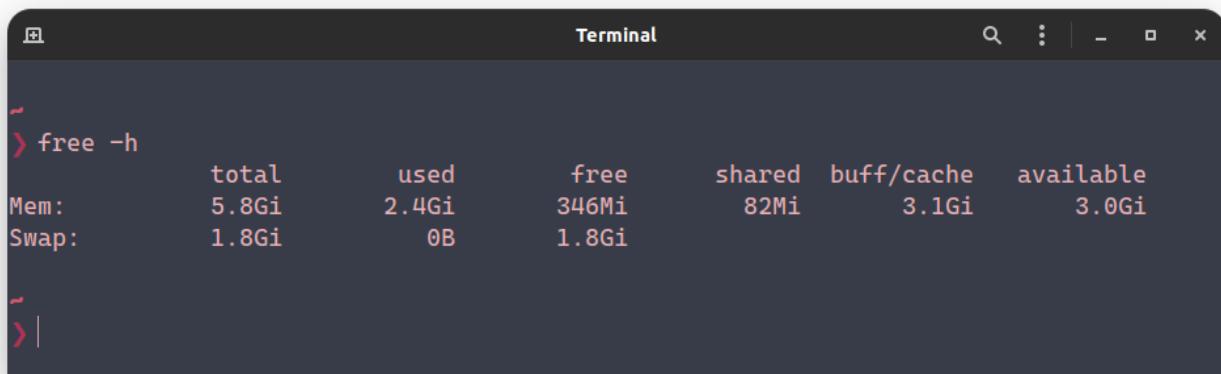


A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The command "free" is run, and the output shows memory usage for both physical (Mem) and swap memory. The output is as follows:

```
free
total        used         free        shared      buff/cache   available
Mem:       6044968     2486528     351104      84172      3207336     3181492
Swap:      1918356           0      1918356
```

free -h

free command in human readable form [i.e. G, M, K]



A screenshot of a terminal window titled "Terminal". The window has a dark theme with light-colored text. The command "free -h" is run, and the output shows memory usage for both physical (Mem) and swap memory in human-readable units (Gi). The output is as follows:

```
free -h
total        used         free        shared      buff/cache   available
Mem:      5.8Gi       2.4Gi      346Mi       82Mi       3.1Gi       3.0Gi
Swap:      1.8Gi          0B      1.8Gi
```

```
free [-k, -m, -g, -tebi, -kilo, -mega, -giga, -peta]
```

free command in

(kibibytes, mebibytes, gibibytes, tebibytes, kilobytes, megabytes, gigabytes, terabytes)

```
Terminal
```

```
free --kilo
      total        used         free      shared  buff/cache   available
Mem:    6190047      2532499     369434      82513    3288113     3275231
Swap:  1964396          0     1964396

free --mega
      total        used         free      shared  buff/cache   available
Mem:    6190          2528         372        82      3288     3279
Swap:  1964          0       1964

free --giga
      total        used         free      shared  buff/cache   available
Mem:      6           2           0          0        3       3
Swap:      1           0           1

|
```

```
Terminal
```

```
free -k
      total        used         free      shared  buff/cache   available
Mem:    6044968      2452812     383436      80092    3208720     3219288
Swap:  1918356          0     1918356

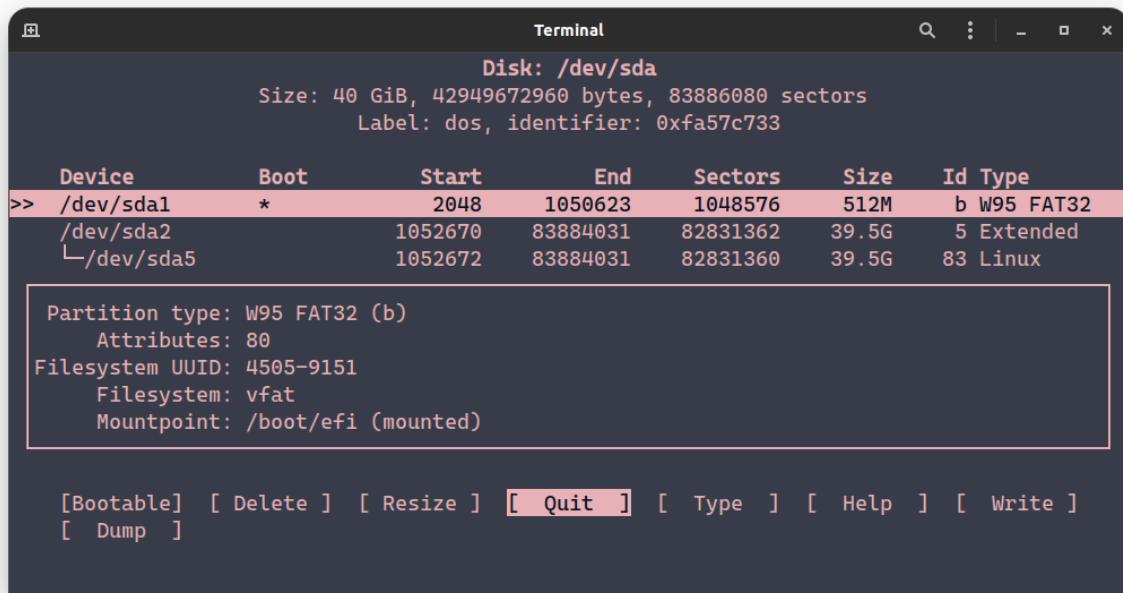
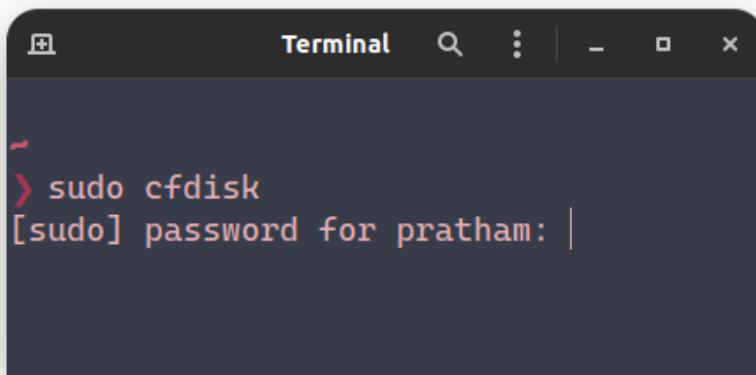
free -m
      total        used         free      shared  buff/cache   available
Mem:    5903          2396         372        78      3134     3142
Swap:  1873          0       1873

free -g
      total        used         free      shared  buff/cache   available
Mem:      5           2           0          0        3       3
Swap:      1           0           1

|
```

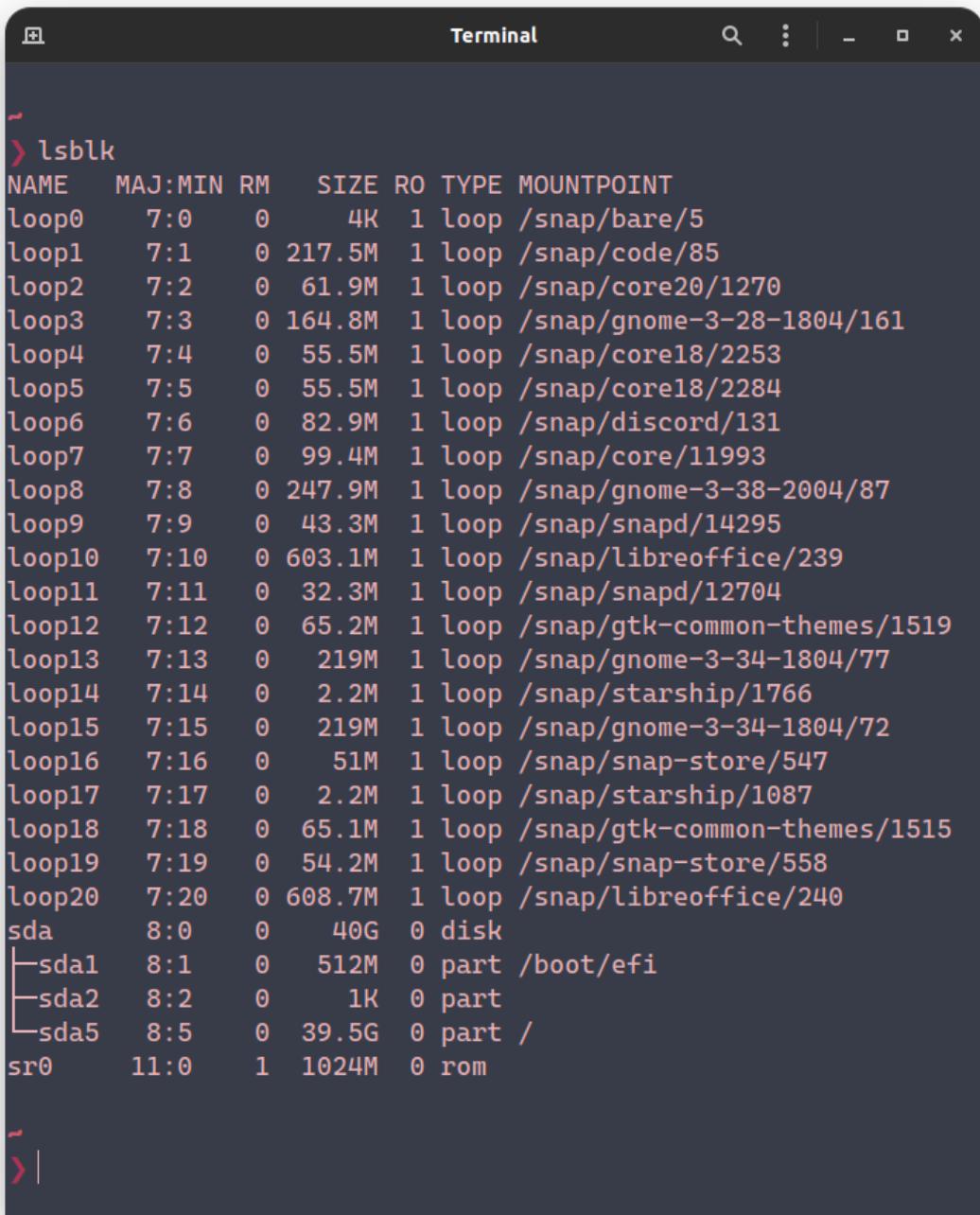
cfdisk

cfdisk is a linux partition editor with an interactive user interface based on ncurses. It can be used to list out the existing partitions as well as create or modify them



lsblk

Lists out all the storage blocks, which includes disk partitions and optical drives. Details include the total size of the partition/block and the mount point if any.



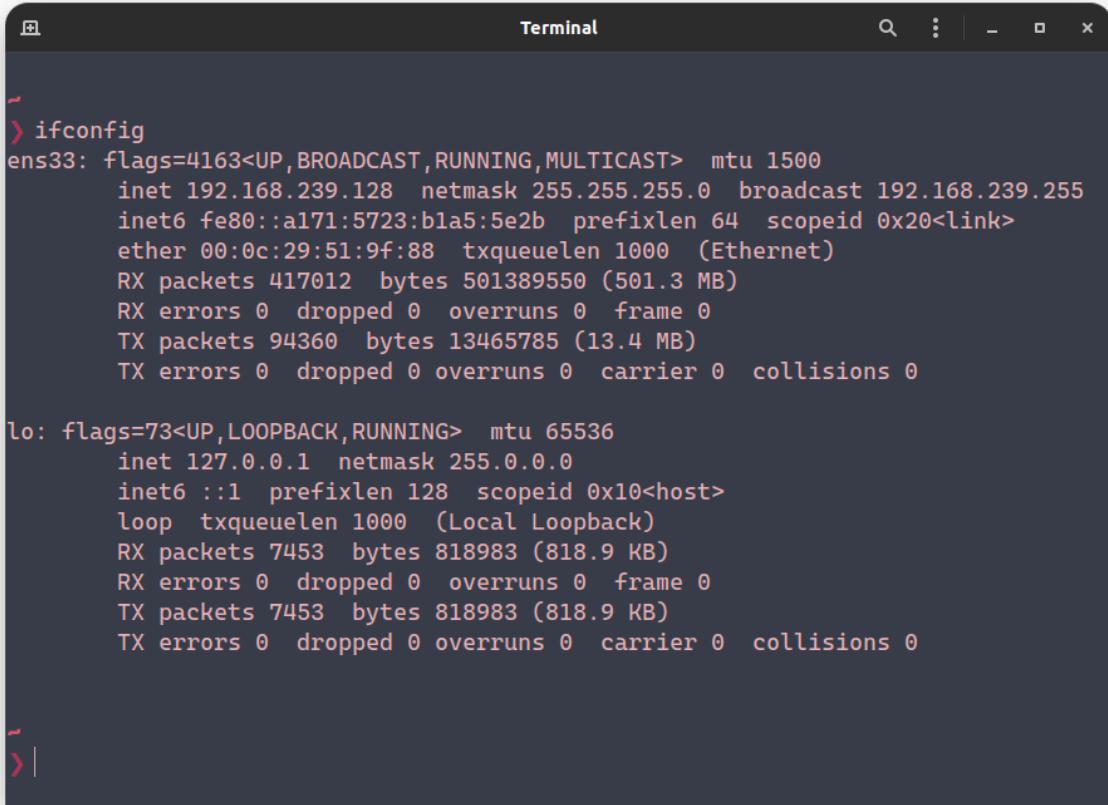
The screenshot shows a terminal window with a dark theme. The title bar says "Terminal". The command "lsblk" is run, and the output lists various storage blocks. The output is as follows:

```
lsblk
NAME   MAJ:MIN RM    SIZE RO TYPE MOUNTPOINT
loop0    7:0     0      4K  1  loop /snap/bare/5
loop1    7:1     0  217.5M 1  loop /snap/code/85
loop2    7:2     0   61.9M 1  loop /snap/core20/1270
loop3    7:3     0  164.8M 1  loop /snap/gnome-3-28-1804/161
loop4    7:4     0   55.5M 1  loop /snap/core18/2253
loop5    7:5     0   55.5M 1  loop /snap/core18/2284
loop6    7:6     0   82.9M 1  loop /snap/discord/131
loop7    7:7     0   99.4M 1  loop /snap/core/11993
loop8    7:8     0  247.9M 1  loop /snap/gnome-3-38-2004/87
loop9    7:9     0   43.3M 1  loop /snap/snapd/14295
loop10   7:10   0  603.1M 1  loop /snap/libreoffice/239
loop11   7:11   0   32.3M 1  loop /snap/snapd/12704
loop12   7:12   0   65.2M 1  loop /snap/gtk-common-themes/1519
loop13   7:13   0   219M 1  loop /snap/gnome-3-34-1804/77
loop14   7:14   0   2.2M 1  loop /snap/starship/1766
loop15   7:15   0   219M 1  loop /snap/gnome-3-34-1804/72
loop16   7:16   0   51M 1  loop /snap/snap-store/547
loop17   7:17   0   2.2M 1  loop /snap/starship/1087
loop18   7:18   0   65.1M 1  loop /snap/gtk-common-themes/1515
loop19   7:19   0   54.2M 1  loop /snap/snap-store/558
loop20   7:20   0  608.7M 1  loop /snap/libreoffice/240
sda      8:0     0    40G  0  disk
└─sda1   8:1     0   512M 0  part /boot/efi
└─sda2   8:2     0     1K 0  part
└─sda5   8:5     0  39.5G 0  part /
sr0     11:0   1  1024M 0  rom
```

Network Management

ifconfig

ifconfig command can be used to assign an address to a network interface and to configure or display the current network interface configuration information.



The screenshot shows a terminal window with the title "Terminal". The window contains the output of the "ifconfig" command. The output is as follows:

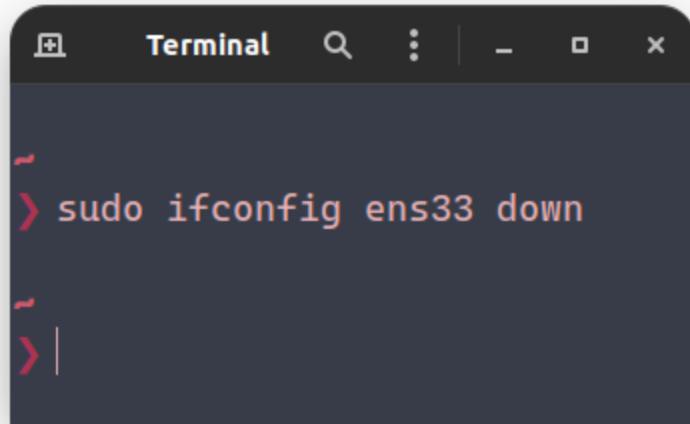
```
~> ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.239.128 netmask 255.255.255.0 broadcast 192.168.239.255
        inet6 fe80::a171:5723:b1a5:5e2b prefixlen 64 scopeid 0x20<link>
            ether 00:0c:29:51:9f:88 txqueuelen 1000 (Ethernet)
                RX packets 417012 bytes 501389550 (501.3 MB)
                RX errors 0 dropped 0 overruns 0 frame 0
                TX packets 94360 bytes 13465785 (13.4 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 7453 bytes 818983 (818.9 KB)
                RX errors 0 dropped 0 overruns 0 frame 0
                TX packets 7453 bytes 818983 (818.9 KB)
                TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

~|
```

```
sudo ifconfig ens33 down
```

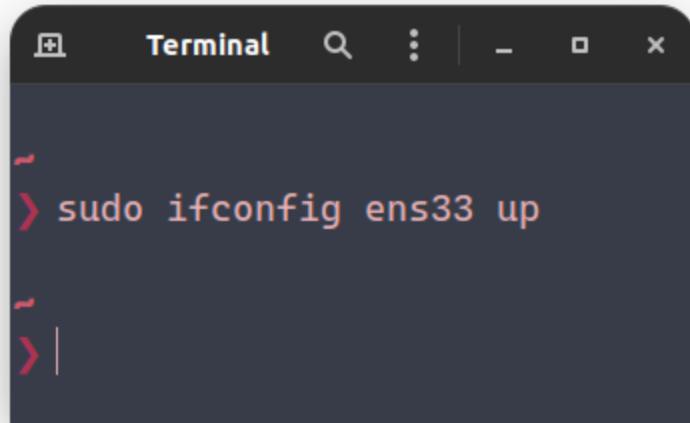
shuts down wifi-internet for the system



```
sudo ifconfig ens33 down
```

```
sudo ifconfig ens33 up
```

starts the wifi-internet for the system after internet shut down by sudo ifconfig en33 down



```
sudo ifconfig ens33 up
```

netstat -a

netstat command to display network connections, routing tables, interface statistics and even can be used to view network protocol statistics

displays all the connections(tcp, udp, unix-connections) that are available on the system

```

> netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0  localhost:6463           0.0.0.0:*
                                         LISTEN
tcp      0      0  localhost:domain        0.0.0.0:*
                                         LISTEN
tcp      0      0  localhost:ipp           0.0.0.0:*
                                         LISTEN
tcp      0      0  ubuntu:45254            162.159.136.234:https ESTABLISH
ED
tcp      0      0  ubuntu:40598            84.170.224.35.bc.g:http TIME_WAIT
ED
tcp      0      0  ubuntu:42338            47.224.186.35.bc..https ESTABLISH
ED
tcp6     0      0  ip6-localhost:ipp       [::]:*
                                         LISTEN
udp      0      0  localhost:domain        0.0.0.0:*
                                         LISTEN
udp      0      0  ubuntu:bootpc          192.168.239.254:bootps ESTABLISH
ED
udp      0      0  ubuntu:32947            bom12s08-in-f14.lel:443 ESTABLISH
ED
udp      0      0  0.0.0.0:631           0.0.0.0:*
                                         LISTEN

```

netstat -a

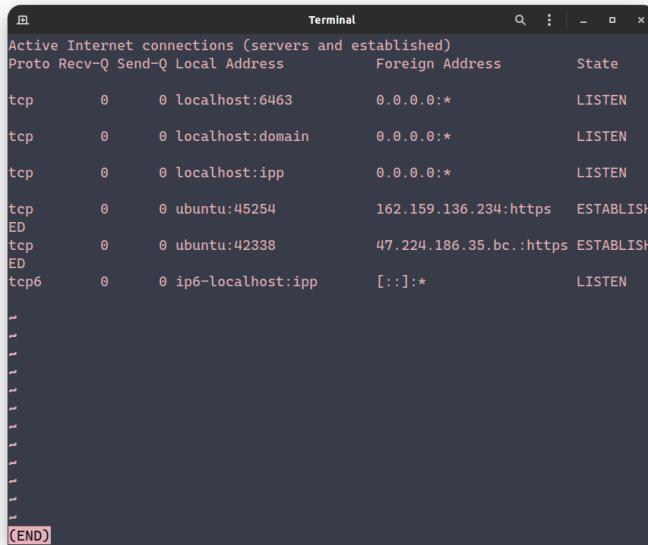
to view in a new window and supports navigation through arrow keys

```

Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0  localhost:6463           0.0.0.0:*
                                         LISTEN
tcp      0      0  localhost:domain        0.0.0.0:*
                                         LISTEN
tcp      0      0  localhost:ipp           0.0.0.0:*
                                         LISTEN
tcp      0      0  ubuntu:45254            162.159.136.234:https ESTABLISH
ED
tcp      0      0  ubuntu:42338            47.224.186.35.bc..https ESTABLISH
ED
tcp6     0      0  ip6-localhost:ipp       [::]:*
                                         LISTEN
udp      0      0  localhost:domain        0.0.0.0:*
                                         LISTEN
udp      0      0  ubuntu:bootpc          192.168.239.254:bootps ESTABLISH
ED
udp      0      0  0.0.0.0:631           0.0.0.0:*
                                         LISTEN
udp      0      0  0.0.0.0:mdns          0.0.0.0:*
                                         LISTEN
udp      0      0  0.0.0.0:51167         0.0.0.0:*
                                         LISTEN
udp      0      0  ubuntu:51439           bom12s06-in-f14.lel:443 ESTABLISH
ED
:
```

netstat -at | less

displays only tcp connections

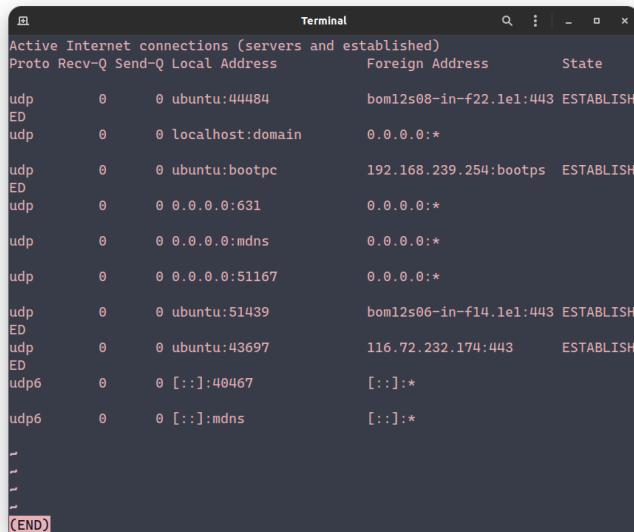


```
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 localhost:6463           0.0.0.0:*
tcp      0      0 localhost:domain        0.0.0.0:*
tcp      0      0 localhost:ipp           0.0.0.0:*
tcp      0      0 ubuntu:45254            162.159.136.234:https ESTABLISH
tcp      0      0 ubuntu:42338            47.224.186.35.bc.:https ESTABLISH
tcp6     0      0 ip6-localhost:ipp       [::]:*
```

(END)

netstat -au | less

displays only udp connections



```
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
udp      0      0 ubuntu:44484             bom12s08-in-f22.le1:443 ESTABLISH
udp      0      0 localhost:domain        0.0.0.0:*
udp      0      0 ubuntu:bootpc          192.168.239.254:bootps ESTABLISH
udp      0      0 0.0.0.0:631            0.0.0.0:*
udp      0      0 0.0.0.0:mdns          0.0.0.0:*
udp      0      0 0.0.0.0:51167         0.0.0.0:*
udp      0      0 ubuntu:51439            bom12s06-in-f14.le1:443 ESTABLISH
udp      0      0 ubuntu:43697            116.72.232.174:443      ESTABLISH
udp6     0      0 [::]:40467            [::]:*
udp6     0      0 [::]:mdns            [::]:*
```

(END)

netstat -l | less

displays the ports that are in LISTENING state

```
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp     0      0  localhost:6463           0.0.0.0:*
tcp     0      0  localhost:domain        0.0.0.0:*
tcp     0      0  localhost:ipp           0.0.0.0:*
tcp6    0      0  ip6-localhost:ipp       :::*
udp     0      0  localhost:domain        0.0.0.0:*
udp     0      0  0.0.0.0:631            0.0.0.0:*
udp     0      0  0.0.0.0:mdns           0.0.0.0:*
udp     0      0  0.0.0.0:51167          0.0.0.0:*
udp6    0      0  :::40467              :::*
udp6    0      0  :::mdns               :::*
raw    0      0  0.0.0.0:255            0.0.0.0:*
raw6   0      0  :::ipv6-icmp          :::*
:
```

netstat -s | less

displays summary statistics for each type of network connections

```
Ip:
Forwarding: 2
423999 total packets received
2 with invalid addresses
0 forwarded
0 incoming packets discarded
423995 incoming packets delivered
105043 requests sent out
20 outgoing packets dropped
22 dropped because of missing route

Icmp:
40 ICMP messages received
0 input ICMP message failed
ICMP input histogram:
    destination unreachable: 40
66 ICMP messages sent
0 ICMP messages failed
ICMP output histogram:
    destination unreachable: 66

IcmpMsg:
InType3: 40
OutType3: 66

Tcp:
1169 active connection openings
0 passive connection openings
5 failed connection attempts
73 connection resets received
:]
```

netstat -p | less

displays the PID of the and name of the program to which each connection belongs

displays the numeric addresses(INODE) of each connection

```

Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State      PID/Program name
tcp     0      0  ubuntu:45254           162.159.136.234:https ESTABLISHED 37226/Discord --typ
tcp     0      0  ubuntu:42338           47.224.186.35.bc.:https ESTABLISHED 37226/Discord --typ
udp    10      0  ubuntu:bootpc         192.168.239.254:bootps ESTABLISHED -
udp     0      0  ubuntu:47414           bom07s36-in-f14.1e1:443 ESTABLISHED 38920/brave --type=-
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State      I-Node PID/Program name      Path
unix  3      [ ]     DGRAM          30176   -          /run/systemd/notify
unix  2      [ ]     DGRAM          70478   1946/systemd          /run/user/1000/systemd/not
ify
unix  2      [ ]     DGRAM          30190   -          /run/systemd/journal/syslo
g
unix 17      [ ]     DGRAM          30200   -          /run/systemd/journal/dev-l
og
unix  8      [ ]     DGRAM          30204   -          /run/systemd/journal/socke
t
unix  3      [ ]     SEQPACKET    CONNECTED  379959  38881/brave --enabl @0002b
unix  3      [ ]     SEQPACKET    CONNECTED  379961  38881/brave --enabl @0002c
unix  3      [ ]     SEQPACKET    CONNECTED  379954  38883/chrome_crashp @0002a
unix  3      [ ]     SEQPACKET    CONNECTED  354005  37110/Discord --no- @00026
unix  3      [ ]     SEQPACKET    CONNECTED  379953  38881/brave --enabl @00027
unix  3      [ ]     SEQPACKET    CONNECTED  354003  37110/Discord --no- @00025
unix  3      [ ]     SEQPACKET    CONNECTED  378041  38883/chrome_crashp @00028
unix  3      [ ]     SEQPACKET    CONNECTED  378042  38885/chrome_crashp @00029
unix  3      [ ]     STREAM       CONNECTED  72319   2308/gsd-media-keys
unix  3      [ ]     STREAM       CONNECTED  366712  37292/Discord --typ
[:]

```

netstat -c

displays it continuously (i.e refreshes/updates after an interval)

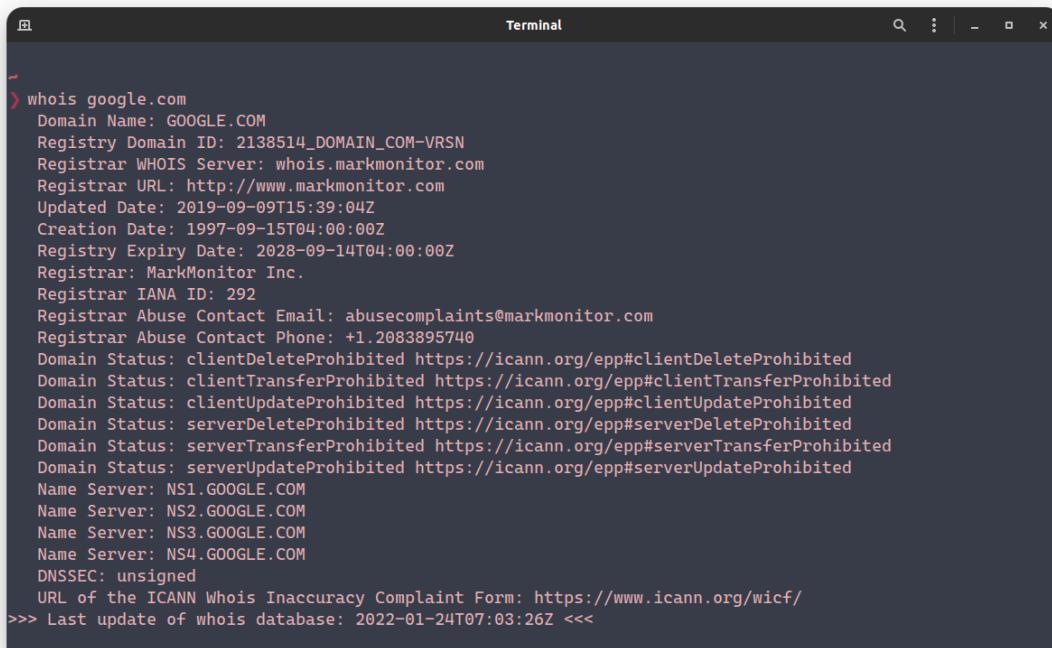
```

netstat -c
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp     0      0  ubuntu:52520           server-52-84-45-9:https ESTABLISHED
tcp     0      0  ubuntu:45254           162.159.136.234:https ESTABLISHED
tcp     0      0  ubuntu:42338           47.224.186.35.bc.:https ESTABLISHED
udp    10      0  ubuntu:bootpc         192.168.239.254:bootps ESTABLISHED
udp     0      0  ubuntu:39406           bom12s06-in-f14.1e1:443 ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State      I-Node Path
unix  3      [ ]     DGRAM          30176   /run/systemd/notify
unix  2      [ ]     DGRAM          70478   /run/user/1000/systemd/notify
unix  2      [ ]     DGRAM          30190   /run/systemd/journal/syslog
unix 17      [ ]     DGRAM          30200   /run/systemd/journal/dev-log
unix  8      [ ]     DGRAM          30204   /run/systemd/journal/socket
unix  3      [ ]     SEQPACKET    CONNECTED  379959  @0002b
unix  3      [ ]     SEQPACKET    CONNECTED  379961  @0002c
unix  3      [ ]     SEQPACKET    CONNECTED  379954  @0002a
unix  3      [ ]     SEQPACKET    CONNECTED  354005  @00026
unix  3      [ ]     SEQPACKET    CONNECTED  379953  @00027
unix  3      [ ]     SEQPACKET    CONNECTED  354003  @00025
unix  3      [ ]     SEQPACKET    CONNECTED  378041  @00028
unix  3      [ ]     SEQPACKET    CONNECTED  378042  @00029
unix  3      [ ]     STREAM       CONNECTED  72319   @2308/gsd-media-keys
unix  3      [ ]     STREAM       CONNECTED  366712  @37292/Discord --typ
unix  3      [ ]     STREAM       CONNECTED  74534   @/tmp/.X11-unix/X0

```

whois [website]

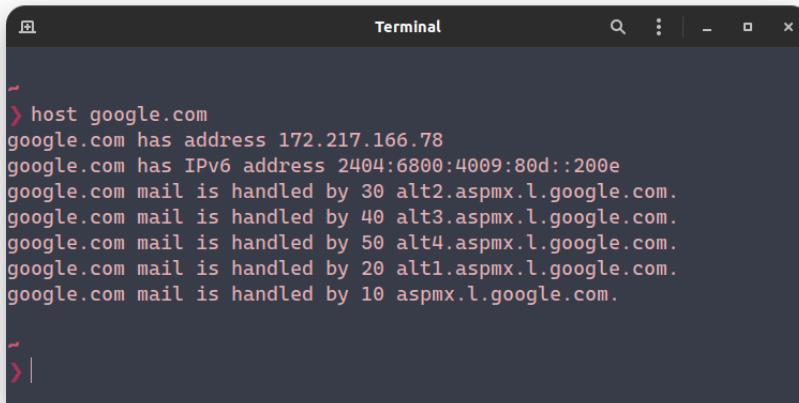
displays information about a website's record. You may get all the information about a website regarding its registration and owner's information.



```
whois google.com
Domain Name: GOOGLE.COM
Registry Domain ID: 2138514_DOMAIN_COM-VRSN
Registrar WHOIS Server: whois.markmonitor.com
Registrar URL: http://www.markmonitor.com
Updated Date: 2019-09-09T15:39:04Z
Creation Date: 1997-09-15T04:00:00Z
Registry Expiry Date: 2028-09-14T04:00:00Z
Registrar: MarkMonitor Inc.
Registrar IANA ID: 292
Registrar Abuse Contact Email: abusecomplaints@markmonitor.com
Registrar Abuse Contact Phone: +1.2083895740
Domain Status: clientDeleteProhibited https://icann.org/epp#clientDeleteProhibited
Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferProhibited
Domain Status: clientUpdateProhibited https://icann.org/epp#clientUpdateProhibited
Domain Status: serverDeleteProhibited https://icann.org/epp#serverDeleteProhibited
Domain Status: serverTransferProhibited https://icann.org/epp#serverTransferProhibited
Domain Status: serverUpdateProhibited https://icann.org/epp#serverUpdateProhibited
Name Server: NS1.GOOGLE.COM
Name Server: NS2.GOOGLE.COM
Name Server: NS3.GOOGLE.COM
Name Server: NS4.GOOGLE.COM
DNSSEC: unsigned
URL of the ICANN Whois Inaccuracy Complaint Form: https://www.icann.org/wicf/
>>> Last update of whois database: 2022-01-24T07:03:26Z <<<
```

host [website]

displays domain name for given IP address or vice-versa



```
host google.com
google.com has address 172.217.166.78
google.com has IPv6 address 2404:6800:4009:80d::200e
google.com mail is handled by 30 alt2.aspmx.l.google.com.
google.com mail is handled by 40 alt3.aspmx.l.google.com.
google.com mail is handled by 50 alt4.aspmx.l.google.com.
google.com mail is handled by 20 alt1.aspmx.l.google.com.
google.com mail is handled by 10 aspmx.l.google.com.
```

Some Cool Commands

cmatrix

```

Terminal
p d s F / @ 9 _ J A V & = D ^ 8 Z R
6 f E D T ^ 7 R V s ! p R F y q W % m l ^
w / Y e L X Y d L b ^ + s D . B p b 9 8 _ o
q q O Z X . j w F a ) [ / h , u l b o t > A B b
5 8 ' f d B B = + A 3 _ ' ( > * g O G _ $ x -
? - & Z m 0 M b w C ] ' + J 0 \ 7 W 0 h . = $ R
! 1 z b b : J Y ) m q w t : ' 4 % 9 + ? Z q
e = ; , @ p r p g e R V 6 \ & A , = < s v B P
% w A * " k A Y ? [ 7 ; f > ; : ] l = 1 )
g o ; , L K ? 7 M M t k U 8 " * 0 0 " ? y G e
. C a a I + s P ' k - K / - % h z * . ^ = d
: ! u U & 2 0 B / R o + . A u < a x U :
A q A W M % , x C x ' t ! , m < P % 8 p y W ? @
= N f ' 8 R = \ T ! 6 ) ( , T J Q E s K l n R h
I n J p ? r U < H b 2 0 U p " y > ' F E p u l M
= I j / P V h F F c H \ + a f S - D ? N ; b 3
O H ; [ u " o q # E e = 1 K F j z L w i 1 ,
I : 9 X ! n + J ) : j - & ' < \ D F P m x
f k G - t " s : X T " 2 @ u ) T ^ 2 D 0 * *
F \ 0 & s y @ B * h > R j . ? a 3 A \ n ! T T 6
! : P I " E s ; ' j w 0 B X S f g ) w g
% B _ J e b J W 9 l 5 u ] T F m l = 0 K g ?
- A K ) ( ! l - s q ( ? _ - ^ G g E d R < b K
l @ 7 i E * x ^ G R X 7 K e * # , y l .

```

toilet

```

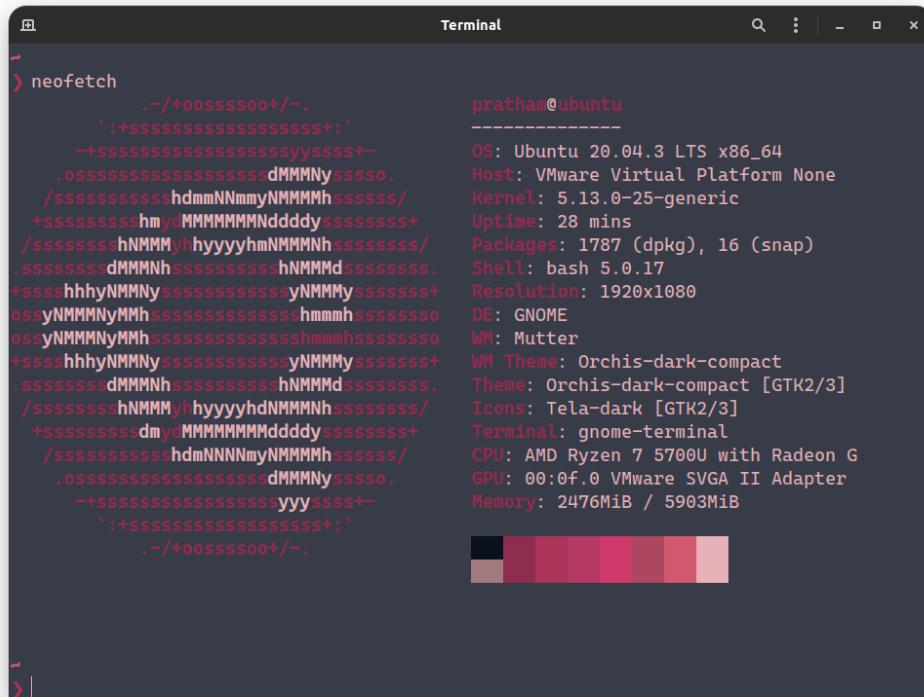
Term...
> toilet 101

mmmm      mmmm      mmm
#       m"    "m    #
#       #     m #    #
#       #     #     #
mm#mm    #mm#    mm#mm

>

```

neofetch



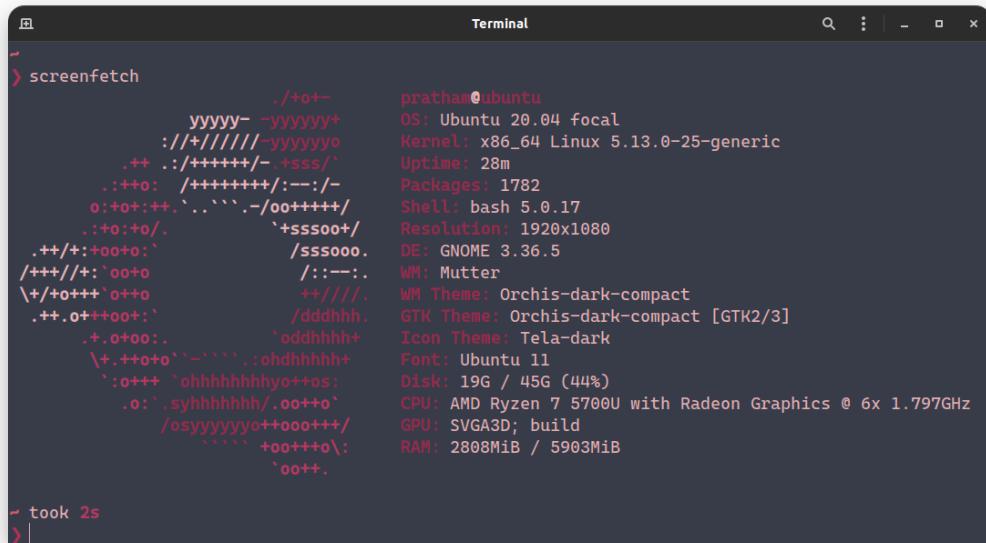
```

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      +ssshhyNMMNyssssssssssyNMMMyssssss+-+
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pratham@ubuntu
-----
OS: Ubuntu 20.04.3 LTS x86_64
Host: VMware Virtual Platform None
Kernel: 5.13.0-25-generic
Uptime: 28 mins
Packages: 1787 (dpkg), 16 (snap)
Shell: bash 5.0.17
Resolution: 1920x1080
DE: GNOME
WM: Mutter
WM Theme: Orchis-dark-compact
Theme: Orchis-dark-compact [GTK2/3]
Icons: Tela-dark [GTK2/3]
Terminal: gnome-terminal
CPU: AMD Ryzen 7 5700U with Radeon G
GPU: 00:0f.0 VMware SVGA II Adapter
Memory: 2476MiB / 5903MiB

```

screenfetch



```

❯ screenfetch
      ./o+-.
      yyyyy- -yyyyy+
      //||||/-yyyyyo
      .++ .:/+++++/-+sss/`+
      .:+o: /++++++/:-:-
      o:+o:+:.`..``.-/oo++++/
      .:+o:+/. `+sssoo+/
      .++/+:+o+:` /sssooo.
      /++/+:/`oo+o /:--:.
      \+/+o+++`oo+o +///.
      .++o+++oo+:` /ddhhh.
      .+o+oo: `oddhhh+
      \+.++o+o`--`.:ohdhhhhh+
      `:o+++ `ohhhhhhyo+os:
      .o: `.syhhhhhh/..oo++o`
      /osyyyyyyo++ooo+++
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 `oo++.

pratham@ubuntu

OS: Ubuntu 20.04 focal
Kernel: x86_64 Linux 5.13.0-25-generic
Uptime: 28m
Packages: 1782
Shell: bash 5.0.17
Resolution: 1920x1080
DE: GNOME 3.36.5
WM: Mutter
WM Theme: Orchis-dark-compact
GTK Theme: Orchis-dark-compact [GTK2/3]
Icon Theme: Tela-dark
Font: Ubuntu 11
Disk: 19G / 45G (44%)
CPU: AMD Ryzen 7 5700U with Radeon Graphics @ 6x 1.797GHz
GPU: SVGASD; build
RAM: 2808MiB / 5903MiB

```

- took 2s

# hollywood

# Thank You