



LINUX

MANIPULATING FILES
AND DIRECTORIES

Basic command for manipulation are :

- touch
- cp
- mv
- mkdir
- rm

Touch :- It is used to create, change and modify timestamp of a file .

To create a file we write touch filename.extension



```
inventor@Cosmologic: ~/Desktop
Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)
09:34:21 AM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
09:34:21 AM IST  all    14.22    0.05    3.79    1.08    0.00    1.98    0.00    0.00    0.00    78.88
inventor@Cosmologic:~$ cd Desktop/
inventor@Cosmologic:~/Desktop$ touch test.txt
inventor@Cosmologic:~/Desktop$ ls
test.txt
inventor@Cosmologic:~/Desktop$
```

we can also create file by using > like
> filename.extension

```
inventor@Cosmotic: ~/Desktop

Linux 5.4.0-33-generic (Cosmotic)      08/06/20      _x86_64_      (4 CPU)

09:36:19 AM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
09:36:19 AM IST  all    14.44    0.05    3.78    1.04    0.00    2.04    0.00    0.00    0.00    78.66

inventor@Cosmotic:~$ cd Desktop/
inventor@Cosmotic:~/Desktop$ > test1.txt
inventor@Cosmotic:~/Desktop$ ls
test1.txt  test.txt
inventor@Cosmotic:~/Desktop$
```

we can get the same result by using gedit or subl
gedit filename.extension (gedit is preinstalled editor in
ubuntu)
subl filename.extension (if you have installed sublime)

```
inventor@Cosmotic: ~/Desktop

Linux 5.4.0-33-generic (Cosmotic)      08/06/20      _x86_64_      (4 CPU)

09:39:07 AM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
09:39:07 AM IST  all    14.65    0.05    3.75    0.98    0.00    2.13    0.00    0.00    0.00    78.45

inventor@Cosmotic:~$ cd Desktop/
inventor@Cosmotic:~/Desktop$ gedit test2.txt
inventor@Cosmotic:~/Desktop$ subl test3.txt
inventor@Cosmotic:~/Desktop$ ls
test1.txt  test2.txt  test3.txt  test.txt
inventor@Cosmotic:~/Desktop$
```

Gedit and subl will create file and we will be relocated to gedit or sublime we can view those file after we have saved them .

Different options of touch are :

```

inventor@Cosmologic: ~
Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)

10:22:24 AM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
10:22:24 AM IST  all    33.27    0.07    8.65    0.39    0.00    3.81    0.00    0.00    0.00    53.81

inventor@Cosmologic:~$ touch --help
Usage: touch [OPTION]... FILE...
Update the access and modification times of each FILE to the current time.

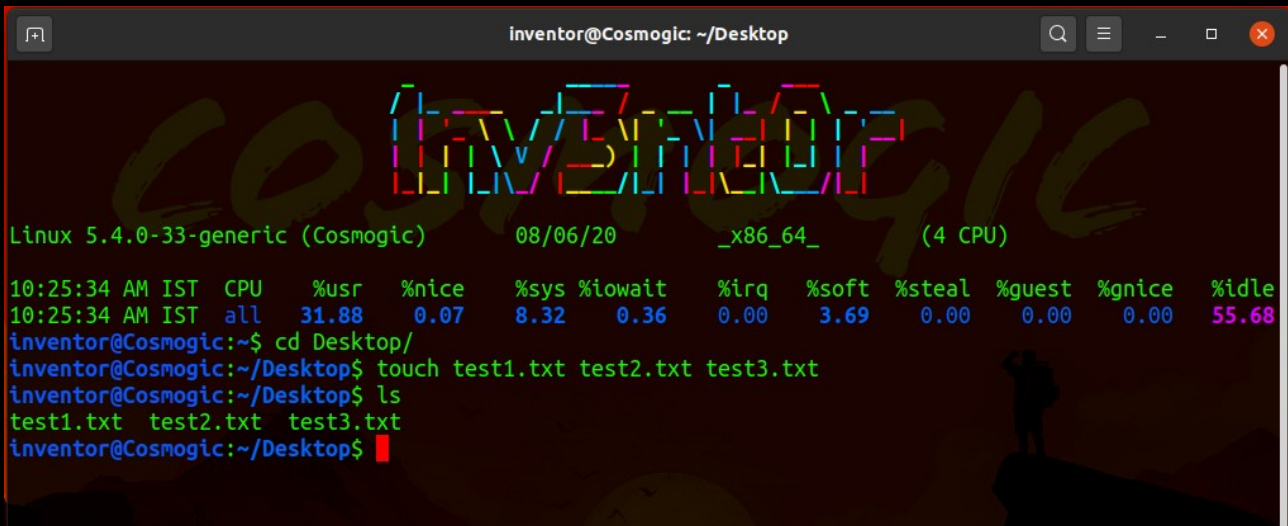
A FILE argument that does not exist is created empty, unless -c or -h
is supplied.

A FILE argument string of - is handled specially and causes touch to
change the times of the file associated with standard output.

Mandatory arguments to long options are mandatory for short options too.
-a                change only the access time
-c, --no-create    do not create any files
-d, --date=STRING  parse STRING and use it instead of current time
-f                (ignored)
-h, --no-dereference affect each symbolic link instead of any referenced
                  file (useful only on systems that can change the
                  timestamps of a symlink)
-m                change only the modification time
-r, --reference=FILE use this file's times instead of current time
-t STAMP           use [[CC]YY]MMDDhhmm[.ss] instead of current time
                  --time=WORD      change the specified time:
                                WORD is access, atime, or use: equivalent to -a
                                WORD is modify or mtime: equivalent to -m
                  --help          display this help and exit
                  --version       output version information and exit

Note that the -d and -t options accept different time-date formats.
  
```

we can create multiple file by
touch file1 file2 file3

A terminal window titled 'inventor@Cosmotic: ~/Desktop' showing system information and file creation commands. The background has a 'Cosmotic' logo and a silhouette of a person on a cliff.

```
Linux 5.4.0-33-generic (Cosmotic)      08/06/20      _x86_64_      (4 CPU)

10:25:34 AM IST  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
10:25:34 AM IST  all    31.88    0.07    8.32    0.36    0.00    3.69    0.00    0.00    0.00   55.68

inventor@Cosmotic:~$ cd Desktop/
inventor@Cosmotic:~/Desktop$ touch test1.txt test2.txt test3.txt
inventor@Cosmotic:~/Desktop$ ls
test1.txt test2.txt test3.txt
inventor@Cosmotic:~/Desktop$
```

we can write touch -a filename to update the last
access and modified time of file

we might end creating file with same name so to avoid
that we use touch -c filename

to change timestamp of one file with one another we
write

touch -r file1 file2

this will change timestamp of file2 with file1

to create a file with specific timestamp we write

touch -t time (in YYYYMMDDHH.ss format) filename

CP :- it stands for copy and it's used to a copy file or a group of files to another location .

```
inventor@Cosmologic: ~/Desktop

Linux 5.4.0-33-generic (Cosmologic)      08/06/20      _x86_64_      (4 CPU)

01:37:58 PM IST  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
01:37:58 PM IST  all    32.08    0.05    7.91   0.27    0.00   4.57   0.00   0.00    0.00   55.12

inventor@Cosmologic:~$ cd Desktop/
inventor@Cosmologic:~/Desktop$ ls
a.txt
inventor@Cosmologic:~/Desktop$ cat a.txt
cosmologic
inventor@Cosmologic:~/Desktop$ cp a.txt b.txt
inventor@Cosmologic:~/Desktop$ cat b.txt
cosmologic
inventor@Cosmologic:~/Desktop$
```

To copy files to a folder
cp file1 file2 file3 destination(folder)

```
inventor@Cosmologic: ~/Desktop/fol

Linux 5.4.0-33-generic (Cosmologic)      08/06/20      _x86_64_      (4 CPU)

01:42:11 PM IST  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
01:42:11 PM IST  all    30.88    0.05    7.62   0.26    0.00   4.46   0.00   0.00    0.00   56.73

inventor@Cosmologic:~$ cd Desktop/
inventor@Cosmologic:~/Desktop$ mkdir fol
inventor@Cosmologic:~/Desktop$ ls
a.txt b.txt fol
inventor@Cosmologic:~/Desktop$ cd fol/
inventor@Cosmologic:~/Desktop/fol$ ls
inventor@Cosmologic:~/Desktop/fol$ cd ..
inventor@Cosmologic:~/Desktop$ cp a.txt b.txt fol/
inventor@Cosmologic:~/Desktop$ cd fol
inventor@Cosmologic:~/Desktop/fol$ ls
a.txt b.txt
inventor@Cosmologic:~/Desktop/fol$
```

option available with cp command are

Mandatory arguments to long options are mandatory for short options too.

-a, --archive	same as -dR --preserve=all
--attributes-only	don't copy the file data, just the attributes
--backup[=CONTROL]	make a backup of each existing destination file
-b	like --backup but does not accept an argument
--copy-contents	copy contents of special files when recursive
-d	same as --no-dereference --preserve=links
-f, --force	if an existing destination file cannot be opened, remove it and try again (this option is ignored when the -n option is also used)
-i, --interactive	prompt before overwrite (overrides a previous -n option)
-H	follow command-line symbolic links in SOURCE
-l, --link	hard link files instead of copying
-L, --dereference	always follow symbolic links in SOURCE
-n, --no-clobber	do not overwrite an existing file (overrides a previous -i option)
-P, --no-dereference	never follow symbolic links in SOURCE
-p	same as --preserve=mode,ownership,timestamps
--preserve[=ATTR_LIST]	preserve the specified attributes (default: mode,ownership,timestamps), if possible additional attributes: context, links, xattr, all
--no-preserve=ATTR_LIST	don't preserve the specified attributes
--parents	use full source file name under DIRECTORY
-R, -r, --recursive	copy directories recursively
--reflink[=WHEN]	control clone/CoW copies. See below
--remove-destination	remove each existing destination file before attempting to open it (contrast with --force)
--sparse=WHEN	control creation of sparse files. See below
--strip-trailing-slashes	remove any trailing slashes from each SOURCE argument
-s, --symbolic-link	make symbolic links instead of copying
-S, --suffix=SUFFIX	override the usual backup suffix
-t, --target-directory=DIRECTORY	copy all SOURCE arguments into DIRECTORY
-T, --no-target-directory	treat DEST as a normal file
-u, --update	copy only when the SOURCE file is newer than the destination file or when the destination file is missing
-v, --verbose	explain what is being done
-x, --one-file-system	stay on this file system
-Z	set SELinux security context of destination file to default type
--context[=CTX]	like -Z, or if CTX is specified then set the SELinux or SMACK security context to CTX

to copy all the files of one directory to another
`cp -R Source Destination` (this will copy all file and sub directories recursively)

```
inventor@Cosmologic: ~/Desktop/fol2

Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)

01:46:51 PM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
01:46:51 PM IST  all    29.70    0.05    7.31    0.24    0.00    4.31    0.00    0.00    0.00    58.38

inventor@Cosmologic:~$ cd Desktop/
inventor@Cosmologic:~/Desktop$ cd fol
inventor@Cosmologic:~/Desktop/fol$ ls
a.txt b.txt
inventor@Cosmologic:~/Desktop/fol$ cd ..
inventor@Cosmologic:~/Desktop$ cp -R fol/ fol2
inventor@Cosmologic:~/Desktop$ cd fol2
inventor@Cosmologic:~/Desktop/fol2$ ls
a.txt b.txt
inventor@Cosmologic:~/Desktop/fol2$
```

`cp -i a.txt b.txt` this is an interactive method of copying file . It will ask for permission to overwrite file

```
inventor@Cosmologic: ~/Desktop

Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)

06:00:41 PM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
06:00:41 PM IST  all    33.54    0.06    8.21    0.27    0.00    4.81    0.00    0.00    0.00    53.13

inventor@Cosmologic:~$ cd Desktop/
inventor@Cosmologic:~/Desktop$ cp -i a.txt b.txt
cp: overwrite 'b.txt'? y
```

if we write `y` it will overwrite the file and we can write `n` to cancel the action

if we want to copy all file with same extension we can use `cp *.txt location(folder)`


```
inventor@Cosmologic: ~/Desktop/test

Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)

06:09:21 PM IST  CPU    %usr    %nice    %sys    %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
06:09:21 PM IST  all    30.94    0.05    7.52    0.24    0.00    4.42    0.00    0.00    0.00    56.83

inventor@Cosmologic:~/Desktop$ mkdir test
inventor@Cosmologic:~/Desktop$ cd test/
inventor@Cosmologic:~/Desktop/test$ ls
inventor@Cosmologic:~/Desktop/test$ cd ..
inventor@Cosmologic:~/Desktop$ cp *.txt test/
inventor@Cosmologic:~/Desktop$ cd test/
inventor@Cosmologic:~/Desktop/test$ ls
a.txt  b.txt
inventor@Cosmologic:~/Desktop/test$
```

MV :- mv stands for move and as its name suggest it is used to move file or directories from one location to another location . We can also use it to rename files .

```
inventor@Cosmologic: ~/Desktop

Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)

08:05:00 PM IST  CPU    %usr    %nice    %sys    %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
08:05:00 PM IST  all    26.82    0.05    6.49    0.22    0.00    3.63    0.00    0.00    0.00    62.79

inventor@Cosmologic:~$ cd Desktop/
inventor@Cosmologic:~/Desktop$ cat a.txt
cosmologic
inventor@Cosmologic:~/Desktop$ mv a.txt x.txt
inventor@Cosmologic:~/Desktop$ ls
b.txt  c.txt  test  x.txt
inventor@Cosmologic:~/Desktop$
```

Options available with mv command are

```

Inventor@Cosmotic: ~
Linux 5.4.0-33-generic (Cosmotic)      08/06/20      _x86_64_      (4 CPU)

08:14:13 PM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
08:14:13 PM IST  all    25.76    0.05    6.19    0.21    0.00    3.49    0.00    0.00    0.00    64.31

inventor@Cosmotic:~$ mv --help
Usage: mv [OPTION]... [-T] SOURCE DEST
or: mv [OPTION]... SOURCE... DIRECTORY
or: mv [OPTION]... -t DIRECTORY SOURCE...
Rename SOURCE to DEST, or move SOURCE(s) to DIRECTORY.

Mandatory arguments to long options are mandatory for short options too.
  --backup[=CONTROL]  make a backup of each existing destination file
  -b                  like --backup but does not accept an argument
  -f, --force          do not prompt before overwriting
  -i, --interactive    prompt before overwrite
  -n, --no-clobber     do not overwrite an existing file
If you specify more than one of -i, -f, -n, only the final one takes effect.
  --strip-trailing-slashes  remove any trailing slashes from each SOURCE argument
  -S, --suffix=SUFFIX  override the usual backup suffix
  -t, --target-directory=DIRECTORY  move all SOURCE arguments into DIRECTORY
  -T, --no-target-directory  treat DEST as a normal file
  -u, --update          move only when the SOURCE file is newer
                        than the destination file or when the
                        destination file is missing
  -v, --verbose         explain what is being done
  -Z, --context          set SELinux security context of destination
                        file to default type
  --help               display this help and exit
  --version             output version information and exit

```

we can use `mv -i a.txt b.txt` this will ask for confirmation before taking action

```

Inventor@Cosmotic: ~/Desktop
Linux 5.4.0-33-generic (Cosmotic)      08/06/20      _x86_64_      (4 CPU)

08:51:53 PM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
08:51:53 PM IST  all    22.59    0.04    5.42    0.18    0.00    2.97    0.00    0.00    0.00    68.79

inventor@Cosmotic:~/Desktop$ mv -i b.txt c.txt
mv: overwrite 'c.txt'? y
inventor@Cosmotic:~/Desktop$ ls
c.txt  test  test.txt
inventor@Cosmotic:~/Desktop$

```

MKDIR :- This command is used to create directories (folders) .

`mkdir directory name`

```
inventor@Cosmologic: ~/Desktop/test
```



The terminal window displays system information and the execution of the `mkdir` command. The background features a stylized 'COSMAGIC' logo and a silhouette of a person on a cliff.

```
Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)
```

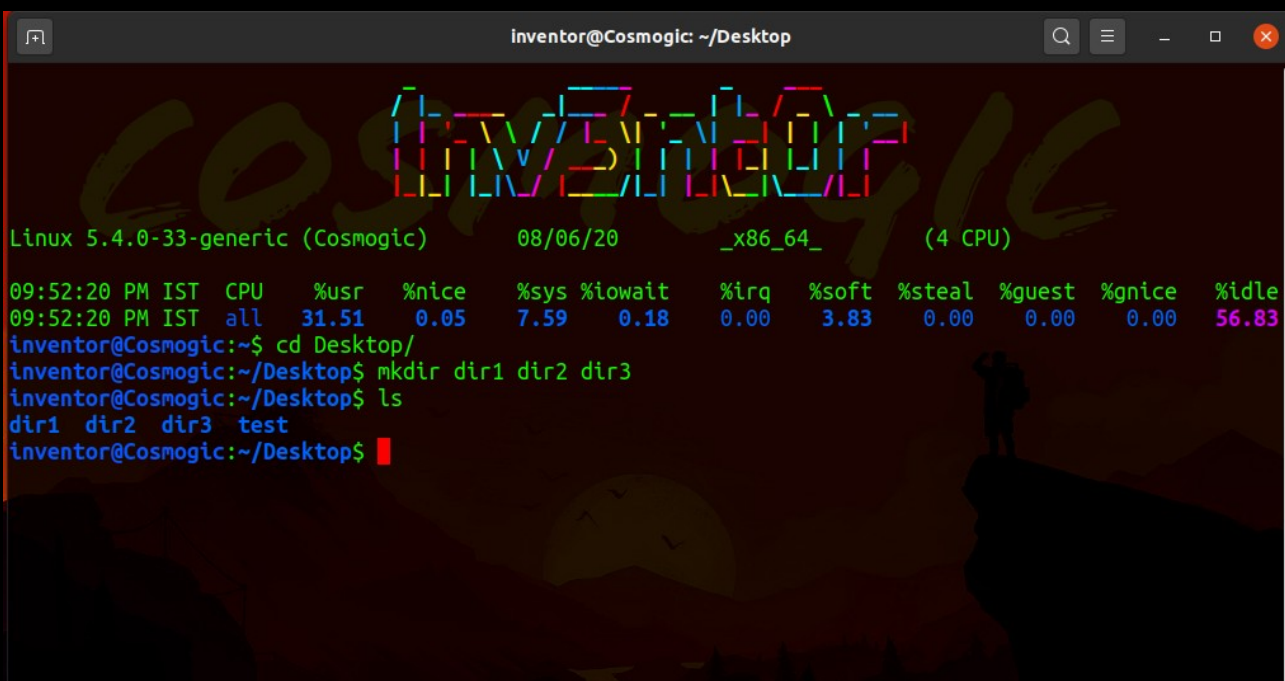
		CPU	%usr	%nice	%sys	%iowait	%irq	%soft	%steal	%guest	%gnice	%idle
09:49:13 PM IST	all		31.75	0.05	7.64	0.18	0.00	3.88	0.00	0.00	0.00	56.50

```
inventor@Cosmologic:~$ cd Desktop/  
inventor@Cosmologic:~/Desktop$ mkdir test  
inventor@Cosmologic:~/Desktop$ ls  
test  
inventor@Cosmologic:~/Desktop$ cd test/  
inventor@Cosmologic:~/Desktop/test$
```

we can also create multiple directories

`mkdir dir1 dir2 dir3`

```
inventor@Cosmologic: ~/Desktop
```



The terminal window shows the creation of three directories at once. The background features a stylized 'COSMAGIC' logo and a silhouette of a person on a cliff.

```
Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)
```

		CPU	%usr	%nice	%sys	%iowait	%irq	%soft	%steal	%guest	%gnice	%idle
09:52:20 PM IST	all		31.51	0.05	7.59	0.18	0.00	3.83	0.00	0.00	0.00	56.83

```
inventor@Cosmologic:~$ cd Desktop/  
inventor@Cosmologic:~/Desktop$ mkdir dir1 dir2 dir3  
inventor@Cosmologic:~/Desktop$ ls  
dir1 dir2 dir3 test  
inventor@Cosmologic:~/Desktop$
```


options of mkdir command are

```
inventor@Cosmotic: ~/Desktop

Linux 5.4.0-33-generic (Cosmotic)      08/06/20      _x86_64_      (4 CPU)

09:54:37 PM IST  CPU    %usr   %nice   %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
09:54:37 PM IST  all    31.39   0.05    7.56   0.18     0.00   3.80    0.00    0.00    0.00    57.01

inventor@Cosmotic:~/Desktop$ mkdir --help
Usage: mkdir [OPTION]... DIRECTORY...
Create the DIRECTORY(ies), if they do not already exist.

Mandatory arguments to long options are mandatory for short options too.
-m, --mode=MODE    set file mode (as in chmod), not a=rwx - umask
-p, --parents       no error if existing, make parent directories as needed
-v, --verbose       print a message for each created directory
-Z                set SELinux security context of each created directory
                  to the default type
--context[=CTX]    like -Z, or if CTX is specified then set the SELinux
                  or SMACK security context to CTX
--help            display this help and exit
--version         output version information and exit
```

`mkdir -v dir1 dir2`

this will show a message after directory is been created

```
inventor@Cosmotic: ~/Desktop

Linux 5.4.0-33-generic (Cosmotic)      08/06/20      _x86_64_      (4 CPU)

10:34:09 PM IST  CPU    %usr   %nice   %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
10:34:09 PM IST  all    36.18   0.06    8.72   0.17     0.00   4.36    0.00    0.00    0.00    50.51

inventor@Cosmotic:~/Desktop$ mkdir -v dir1 dir2
mkdir: created directory 'dir1'
mkdir: created directory 'dir2'
inventor@Cosmotic:~/Desktop$
```

RM :- rm stands for remove and as the name suggest it remove files and directories . By default it does not remove directories (we use rm -rf)

```
inventor@Cosmologic: ~/Desktop
Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)
10:40:58 PM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
10:40:58 PM IST  all   35.24    0.06    8.48    0.17    0.00    4.25    0.00    0.00    0.00    51.81
inventor@Cosmologic:~/Desktop$ ls
dir2  test.txt
inventor@Cosmologic:~/Desktop$ rm test.txt
inventor@Cosmologic:~/Desktop$ ls
dir2
inventor@Cosmologic:~/Desktop$
```

options of rm command

```
inventor@Cosmologic: ~
Linux 5.4.0-33-generic (Cosmologic)    08/06/20    _x86_64_    (4 CPU)
10:41:50 PM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
10:41:50 PM IST  all   35.10    0.06    8.44    0.17    0.00    4.23    0.00    0.00    0.00    52.01
inventor@Cosmologic:~$ rm --help
Usage: rm [OPTION]... [FILE]...
Remove (unlink) the FILE(s).

  -f, --force            ignore nonexistent files and arguments, never prompt
  -i                     prompt before every removal
  -I                     prompt once before removing more than three files, or
                        when removing recursively; less intrusive than -i,
                        while still giving protection against most mistakes
  --interactive[=WHEN]  prompt according to WHEN: never, once (-I), or
                        always (-i); without WHEN, prompt always
  --one-file-system      when removing a hierarchy recursively, skip any
                        directory that is on a file system different from
                        that of the corresponding command line argument
  --no-preserve-root     do not treat '/' specially
  --preserve-root[=all] do not remove '/' (default);
                        with 'all', reject any command line argument
                        on a separate device from its parent
  -r, -R, --recursive   remove directories and their contents recursively
  -d, --dir              remove empty directories
  -v, --verbose          explain what is being done
  --help                display this help and exit
  --version              output version information and exit
```

we can also remove more than one file

```
inventor@Cosmotic: ~/Desktop

Linux 5.4.0-33-generic (Cosmotic)    08/06/20    _x86_64_    (4 CPU)

10:47:02 PM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
10:47:02 PM IST  all    34.45    0.06    8.28    0.16    0.00    4.15    0.00    0.00    0.00    52.90

inventor@Cosmotic:~/Desktop$ ls
a.txt b.txt dir2
inventor@Cosmotic:~/Desktop$ rm a.txt b.txt
inventor@Cosmotic:~/Desktop$ ls
dir2
inventor@Cosmotic:~/Desktop$
```

`rm -f`: forcefully remove file even file is write protected

`rm -r`: recursive deletion, this perform a tree walk and remove every thing in a directory

they both are used in combination to remove directory

```
inventor@Cosmotic: ~/Desktop

Linux 5.4.0-33-generic (Cosmotic)    08/06/20    _x86_64_    (4 CPU)

10:54:48 PM IST  CPU    %usr    %nice    %sys %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
10:54:48 PM IST  all    33.56    0.05    8.05    0.16    0.00    4.07    0.00    0.00    0.00    54.10

inventor@Cosmotic:~/Desktop$ cd dir2/
inventor@Cosmotic:~/Desktop/dir2$ ls
a a.txt
inventor@Cosmotic:~/Desktop/dir2$ cd ..
inventor@Cosmotic:~/Desktop$ rm dir2/
rm: cannot remove 'dir2/': Is a directory
inventor@Cosmotic:~/Desktop$ rm -rf dir2/
inventor@Cosmotic:~/Desktop$ ls
inventor@Cosmotic:~/Desktop$
```


ln command is used to create links .

ln -s source destination

this is used to create soft links .

Source code of commands

Touch

<https://github.com/coreutils/coreutils/blob/master/src/touch.c>

CP

<https://github.com/coreutils/coreutils/blob/master/src/cp.c>

MV

<https://github.com/coreutils/coreutils/blob/master/src/mv.c>

MKDIR

<https://github.com/coreutils/coreutils/blob/master/src/mkdir.c>

RM

<https://github.com/coreutils/coreutils/blob/master/src/rm.c>

LN

<https://github.com/coreutils/coreutils/blob/master/src/ln.c>

Thank you

— inv3ntor