

DA LAB 1

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Linux Commands

ls: list files and directory in cwd

```
→ lab-1 git:(master) X ls -al
total 44
drwxr-xr-x. 2 sahil sahil 4096 Jan  5 16:19 .
drwxr-xr-x. 3 sahil sahil 4096 Jan  5 16:02 ..
-rw-r--r--. 1 sahil sahil 5733 Jan  5 16:19 info.txt
-rw-r--r--. 1 sahil sahil 27677 Jan  5 16:01 questions.pdf
→ lab-1 git:(master) X █
```

date: Displays current timestamp

```
→ lab-1 git:(master) X date
Tue 05 Jan 2021 04:11:37 PM IST
→ lab-1 git:(master) X █
```

help: display information about commands

```
$help help
help: help [-dms] [pattern...]
    Display information about builtin commands.

    Displays brief summaries of builtin commands. If PATTERN IS
    specified, gives detailed help on all commands matching PATTERN,
    otherwise the list of help topics is printed.

    Options:
      -d      output short description for each topic
      -m      display usage in pseudo-manpage format
      -s      output only a short usage synopsis for each topic matching
              PATTERN

    Arguments:
      PATTERN  Pattern specifying a help topic

    Exit Status:
      Returns success unless PATTERN is not found or an invalid option is given.
```

info: shows documentation for commands.

Next: dir invocation, Up: Directory listing

10.1 'ls': List directory contents

=====

The 'ls' program lists information about files (of any type, including directories). Options and file arguments can be intermixed arbitrarily, as usual.

For non-option command-line arguments that are directories, by default 'ls' lists the contents of directories, not recursively, and omitting files with names beginning with '.'. For other non-option arguments, by default 'ls' lists just the file name. If no non-option argument is specified, 'ls' operates on the current directory, acting as if it had been invoked with a single argument of '.'.

By default, the output is sorted alphabetically, according to the locale settings in effect.(1) If standard output is a terminal, the output is in columns (sorted vertically) and control characters are output as question marks; otherwise, the output is listed one per line and control characters are output as-is.

Because 'ls' is such a fundamental program, it has accumulated many options over the years. They are described in the subsections below; within each section, options are listed alphabetically (ignoring case). The division of options into the subsections is not absolute, since some options affect more than one aspect of 'ls''s operation.

Running info for ls

man: Shows manual for commands

```
GREP(1)                                User Commands                                GREP(1)

NAME
    grep, egrep, fgrep - print lines that match patterns

SYNOPSIS
    grep [OPTION...] PATTERNS [FILE...]
    grep [OPTION...] -e PATTERNS ... [FILE...]
    grep [OPTION...] -f PATTERN_FILE ... [FILE...]

DESCRIPTION
    grep searches for PATTERNS in each FILE. PATTERNS is one or patterns separated by newline characters, and grep prints each line that matches a pattern.

    A FILE of "-" stands for standard input. If no FILE is given, recursive searches examine the working directory, and nonrecursive searches read standard input.

    In addition, the variant programs egrep and fgrep are the same as grep -E and grep -F, respectively. These variants are deprecated, but are provided for backward compatibility.

OPTIONS
    Generic Program Information
    --help Output a usage message and exit.

    -V, --version
        Output the version number of grep and exit.

    Matcher Selection
    -E, --extended-regexp
        Interpret PATTERNS as extended regular expressions (EREs, see below).

    -F, --fixed-strings
        Interpret PATTERNS as fixed strings, not regular expressions.

    -G, --basic-regexp
        Interpret PATTERNS as basic regular expressions (BREs, see below). This is the default.

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

who: Print information about users who are currently logged in.

```
→ lab-1 git:(master) X who
sahil      :0                2021-01-05 08:45 (:0)
→ lab-1 git:(master) X
```

pwd: Print present working directory

```
→ lab-1 git:(master) X pwd
/home/sahil/code/github.com/godcrampy/college-notes/os/lab-1
→ lab-1 git:(master) X
```

cat: print file to stdout

```
→ lab-1 git:(master) ✗ cat info.txt
# grep

Matches patterns in input text.
Supports simple patterns and regular expressions.

- Search for a pattern within a file:

  grep search_pattern path/to/file

- Search for an exact string:

  grep -F exact_string path/to/file
```

more: A file perusal filter for CRT viewing.

```
# grep

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Supports simple patterns and regular expressions.

- Search for a pattern within a file:

  grep search_pattern path/to/file

- Search for an exact string:

  grep -F exact_string path/to/file
```

mv: move files to given location

```
→ lab-1 git:(master) X ls
info.txt  questions.pdf  samples
→ lab-1 git:(master) X mv info.txt samples
→ lab-1 git:(master) X ls
questions.pdf  samples
→ lab-1 git:(master) X ls samples
info.txt
→ lab-1 git:(master) X █
```

rm: delete files

```
→ lab-1 git:(master) X ls
bad.txt  questions.pdf  samples
→ lab-1 git:(master) X rm bad.txt
→ lab-1 git:(master) X ls
questions.pdf  samples
→ lab-1 git:(master) X █
```

chmod: change permissions of files

```

→ lab-1 git:(master) X ls -al
total 40
drwxr-xr-x. 3 sahil sahil 4096 Jan  5 16:27 .
drwxr-xr-x. 3 sahil sahil 4096 Jan  5 16:02 ..
-rw-r--r--. 1 sahil sahil 27677 Jan  5 16:01 questions.pdf
drwxr-xr-x. 2 sahil sahil 4096 Jan  5 16:25 samples
-rw-r--r--. 1 sahil sahil  0 Jan  5 16:27 script.sh
→ lab-1 git:(master) X chmod +x script.sh
→ lab-1 git:(master) X ls -al
total 40
drwxr-xr-x. 3 sahil sahil 4096 Jan  5 16:27 .
drwxr-xr-x. 3 sahil sahil 4096 Jan  5 16:02 ..
-rw-r--r--. 1 sahil sahil 27677 Jan  5 16:01 questions.pdf
drwxr-xr-x. 2 sahil sahil 4096 Jan  5 16:25 samples
-rwxr-xr-x. 1 sahil sahil  0 Jan  5 16:27 script.sh
→ lab-1 git:(master) X █

```

whoami: print username of current user

```

→ lab-1 git:(master) X whoami
sahil

```

logout: logout off current user

wc: Display lines words and characters of stdin

```

→ lab-1 git:(master) X cat samples/info.txt | wc
    39    131   5733
→ lab-1 git:(master) X █

```

grep: search in files

```

→ lab-1 git:(master) X cat samples/info.txt | grep "the"
- Search for a pattern [R]ecursively in the current directory, showing
- Print file name with the corresponding line number for each match:
- Use the standard input instead of a file:
→ lab-1 git:(master) X █

```

sort: sort words

```
→ lab-1 git:(master) X cat words
india
england
australia
egypt
bangladesh
→ lab-1 git:(master) X cat words | sort
australia
bangladesh
egypt
england
india
→ lab-1 git:(master) X █
```

mkdir: make new directory

```
→ lab-1 git:(master) X ls
info.txt  questions.pdf
→ lab-1 git:(master) X mkdir samples
→ lab-1 git:(master) X ls
info.txt  questions.pdf  samples
→ lab-1 git:(master) X █
```

rmdir: remove empty directory

```
→ lab-1 git:(master) X ls
questions.pdf  samples  script.sh  temp  words
→ lab-1 git:(master) X rmdir temp
→ lab-1 git:(master) X ls
questions.pdf  samples  script.sh  words
→ lab-1 git:(master) X █
```

cd: change working directory

```
→ lab-1 git:(master) X pwd
/home/sahil/code/github.com/godcrampy/college-notes/os/lab-1
→ lab-1 git:(master) X cd samples
→ samples git:(master) X pwd
/home/sahil/code/github.com/godcrampy/college-notes/os/lab-1/samples
→ samples git:(master) X █
```

tail: print last 10 lines of file

```
→ samples git:(master) X tail --help | tail
With --follow (-f), tail defaults to following the file descriptor, which
means that even if a tail'ed file is renamed, tail will continue to track
its end. This default behavior is not desirable when you really want to
track the actual name of the file, not the file descriptor (e.g., log
rotation). Use --follow=name in that case. That causes tail to track the
named file in a way that accommodates renaming, removal and creation.

GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
Full documentation <https://www.gnu.org/software/coreutils/tail>
or available locally via: info '(coreutils) tail invocation'
→ samples git:(master) X █
```

cmp: compare files byte by byte

```
→ lab-1 git:(master) X cmp words sorted-words
words sorted-words differ: byte 1, line 1
→ lab-1 git:(master) X █
```

diff: compare files line by line


```
→ lab-1 git:(master) X diff words sorted-words
1,2d0
< india
< england
4d1
< egypt
5a3,5
> egypt
> england
> india
→ lab-1 git:(master) X
```

cp: copy files to location

```
→ lab-1 git:(master) X ls
questions.pdf  samples  script.sh  sorted-words  words
→ lab-1 git:(master) X cp words samples
→ lab-1 git:(master) X ls
questions.pdf  samples  script.sh  sorted-words  words
→ lab-1 git:(master) X ls samples
info.txt  words
→ lab-1 git:(master) X
```

clear: clear terminal

```
→ lab-1 git:(master) X ls
questions.pdf  samples  script.sh  sorted-words  words
→ lab-1 git:(master) X cp words samples
→ lab-1 git:(master) X ls
questions.pdf  samples  script.sh  sorted-words  words
→ lab-1 git:(master) X ls samples
info.txt  words
→ lab-1 git:(master) X clear
```

```
→ lab-1 git:(master) X
```

df: display filesystems and usage

```
→ lab-1 git:(master) X df
Filesystem                                1K-blocks    Used Available Use% Mounted on
devtmpfs                                8125804         0   8125804  0% /dev
tmpfs                                   8151844   710960   7440884  9% /dev/shm
tmpfs                                   8151844     2000   8149844  1% /run
/dev/mapper/fedora_localhost--live-root 71724152 20064816 47972936 30% /
tmpfs                                   8151844   22648   8129196  1% /tmp
/dev/loop1                             31872     31872         0 100% /var/lib/snapd/s
/dev/loop0                             56832     56832         0 100% /var/lib/snapd/s
/dev/sdb5                             999320   287924    642584 31% /boot
/dev/mapper/fedora_localhost--live-home 235974536 64544884 159373076 29% /home
/dev/sdb1                             98304     46359     51945 48% /boot/efi
tmpfs                                   1630368      128   1630240  1% /run/user/1000
→ lab-1 git:(master) X
```

du: Summarize disk usage of the set of FILES, recursively for directories.

```
→ quote-service du -d 1
8      ./public
19140  ./node_modules
8      ./routes
16     ./idea
8      ./models
8      ./services
8      ./config
19284  .
→ quote-service
```

uname: print system information

```

→ quote-service uname -a
Linux localhost.localdomain 5.9.16-100.fc32.x86_64 #1 SMP Mon Dec 21 14:
10:00 UTC 2020 x86_64 x86_64 x86_64 GNU/Linux
→ quote-service █

```

apt-get: Package manager for Ubuntu

```

→ quote-service sudo dnf list | head
Last metadata expiration check: 0:09:26 ago on Tue 05 Jan 2021 04:37:50
PM IST.
Installed Packages
GConf2.x86_64
    3.2.6-27.fc31 @ana
conda
LibRaw.x86_64
    0.19.5-4.fc32 @upd
ates
ModemManager.x86_64
    1.12.8-1.fc32 @ana
conda
ModemManager-glib.x86_64
    1.12.8-1.fc32 @ana
conda
NetworkManager.x86_64
    1:1.22.16-1.fc32 @upd
ates
NetworkManager-ads1.x86_64
    1:1.22.16-1.fc32 @upd
ates
NetworkManager-bluetooth.x86_64
    1:1.22.16-1.fc32 @upd
ates
NetworkManager-config-connectivity-fedora.noarch
    1:1.22.16-1.fc32 @upd
ates
→ quote-service █

```

find: Find files by patterns

```

→ lab-1 git:(master) X find . -name "*.txt"
./samples/info.txt
→ lab-1 git:(master) X █

```

wget: Retrieve files over network

```

→ lab-1 git:(master) X wget https://raw.githubusercontent.com/godcrampy/site/master/package.json
--2021-01-05 16:53:10-- https://raw.githubusercontent.com/godcrampy/site/master/package.json
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 199.232.56.133
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|199.232.56.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1031 (1.0K) [text/plain]
Saving to: 'package.json'

package.json          100%[=====] 1.01K

2021-01-05 16:53:11 (68.7 MB/s) - 'package.json' saved [1031/1031]

→ lab-1 git:(master) X ls
package.json  questions.pdf  samples  script.sh  sorted-words  words
→ lab-1 git:(master) X

```

top: Display real time dynamic information of running processes

```

top - 16:54:03 up 8:08, 1 user, load average: 1.84, 1.97, 1.97
Tasks: 373 total, 2 running, 371 sleeping, 0 stopped, 0 zombie
%Cpu(s): 13.3 us, 3.7 sy, 0.0 ni, 81.6 id, 0.0 wa, 1.0 hi, 0.3 si, 0.0 st
MiB Mem : 15921.6 total, 1534.7 free, 6326.8 used, 8060.0 buff/cache
MiB Swap: 8028.0 total, 8004.5 free, 23.5 used. 7895.4 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
140935 sahil    20   0   18.9g   269224 117792 S   83.4   1.7   39:05.42 chrome
 4007 sahil     9  -11  2280820 13788   10160 S   19.5   0.1   54:08.02 pulseaudio
 3836 sahil    20   0 1220684  97772  46820 R    9.3   0.6   44:03.22 Xorg
 6120 sahil    20   0 1314104  63312  50556 S    8.9   0.4   25:50.95 chrome
 4026 sahil    20   0 5616824 279640 112248 S    6.3   1.7   23:35.28 gnome-shell
 5706 sahil    20   0 1286820 229368 129944 S    3.3   1.4   58:18.45 chrome
 5246 sahil    20   0 2003500 723476 425856 S    3.0   4.4   38:05.34 chrome
16235 sahil    20   0 665096  59200  42596 S    3.0   0.4   11:56.49 gnome-system-mo
 5711 sahil    20   0 633264 123984  66972 S    1.3   0.8   15:58.10 chrome
148760 sahil    20   0 9185520 234760 100576 S    1.3   1.4    0:30.31 chrome
 2387 mongod    20   0 1492688  81916  26540 S    0.7   0.5    2:49.41 mongod
17355 sahil    20   0 740656  94056  45060 S    0.7   0.6    1:31.25 terminator
140988 sahil    20   0 4841868  95032  67856 S    0.7   0.6    0:19.86 chrome
157292 sahil    20   0 228840   5056   4108 R    0.7   0.0    0:00.09 top
  11 root      20   0      0      0      0 I    0.3   0.0    0:44.72 rcu_sched
 3807 sahil    20   0 2401220   1.0g 237516 S    0.3   6.6    2:58.58 kited
 4091 sahil    20   0 528504   9588   6568 S    0.3   0.1    2:20.84 ibus-daemon
 4096 sahil    20   0 479908  32016 18856 S    0.3   0.2    0:41.56 ibus-extension-
 4111 sahil    20   0 160832   7716   6952 S    0.3   0.0    0:07.93 at-spi2-registr
 5907 sahil    20   0 4836036  93036  66828 S    0.3   0.6    0:35.25 chrome
27780 sahil    20   0 4836036  89192  70760 S    0.3   0.5    0:07.02 chrome
55520 sahil    20   0  14.8g 277204 106144 S    0.3   1.7    3:36.67 code
100046 root      20   0      0      0      0 I    0.3   0.0    0:01.96 kworker/6:0-mm_percpu_wq
140602 sahil    20   0  14.8g 239864 106000 S    0.3   1.5    0:50.87 code

```

mpstat: Display CPU information

```

→ lab-1 git:(master) X mpstat 2
Linux 5.9.16-100.fc32.x86_64 (localhost.localdomain) 01/05/2021 _x86_64_ (8 CPU)

04:55:28 PM CPU      %usr   %nice    %sys %iowait    %irq   %soft  %steal   %guest   %gnice   %idle
04:55:30 PM all       9.50    0.00    3.65    2.96    0.75    0.31    0.00    0.00    0.00    82.83
04:55:32 PM all       9.01    0.00    3.27    0.06    0.94    0.31    0.00    0.00    0.00    86.40
04:55:34 PM all       8.19    0.00    3.91    0.00    0.88    0.38    0.00    0.00    0.00    86.64
^CAverage:   all       8.90    0.00    3.61    1.01    0.86    0.34    0.00    0.00    0.00    85.29
→ lab-1 git:(master) X

```

netstat: Display port information

```

→ lab-1 git:(master) X netstat -l | head
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:27017         0.0.0.0:*               LISTEN
tcp        0      0 localhost.locald:domain 0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 localhost:46624         0.0.0.0:*               LISTEN
tcp6       0      0 localhost:ipp           [::]:*                  LISTEN
udp        0      0 0.0.0.0:40511          0.0.0.0:*               *
udp        0      0 localhost.locald:domain 0.0.0.0:*               *
udp        0      0 0.0.0.0:bootps          0.0.0.0:*               *
→ lab-1 git:(master) X

```

sar: Monitor performance of various Linux subsystems.

```

→ lab-1 git:(master) X sar -b 1 | head
Linux 5.9.16-100.fc32.x86_64 (localhost.localdomain)    01/05/2021    _x86_64_

04:58:07 PM      tps      rtps      wtps      dtps    bread/s    bwrtn/s    bdsd/s
04:58:08 PM      0.00      0.00      0.00      0.00      0.00      0.00      0.00
04:58:09 PM      3.00      0.00      3.00      0.00      0.00     56.00      0.00
04:58:10 PM     62.00      0.00     62.00      0.00      0.00    1048.00      0.00
04:58:11 PM      0.00      0.00      0.00      0.00      0.00      0.00      0.00
04:58:12 PM     17.00      0.00     17.00      0.00      0.00     592.00      0.00
04:58:13 PM      1.00      0.00      1.00      0.00      0.00      8.00      0.00
04:58:14 PM      2.00      0.00      2.00      0.00      0.00     16.00      0.00
→ lab-1 git:(master) X

```

ps: Display Running processes

```

→ lab-1 git:(master) X ps aux | head
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root         1  0.0  0.1 176560 19520 ?        Ss   08:45   0:10 /usr/lib/systemd/systemd
root         2  0.0  0.0      0     0 ?        S    08:45   0:00 [kthreadd]
root         3  0.0  0.0      0     0 ?        I<   08:45   0:00 [rcu_gp]
root         4  0.0  0.0      0     0 ?        I<   08:45   0:00 [rcu_par_gp]
root         6  0.0  0.0      0     0 ?        I<   08:45   0:00 [kworker/0:0H-kblockd]
root         9  0.0  0.0      0     0 ?        I<   08:45   0:00 [mm_percpu_wq]
root        10  0.0  0.0      0     0 ?        S    08:45   0:00 [ksoftirqd/0]
root        11  0.1  0.0      0     0 ?        I    08:45   0:45 [rcu_sched]
root        12  0.0  0.0      0     0 ?        S    08:45   0:00 [migration/0]
→ lab-1 git:(master) X

```

kill: Stop Process

```

→ ~ kill 160257
→ ~

```

```
[1] + 160257 terminated ping www.google.com  
→ lab-1 git:(master) X
```

bg: resume suspended jobs

```
→ lab-1 git:(master) X bg  
[1] + 161124 continued ping www.google.com
```