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Practical applications of 'ls' command in Linux

Difficulty Level : Medium • Last Updated : 18 Feb, 2021

ls is a Linux shell command that lists directory contents of files and directories. Some practical examples of ls command are shown below.

1. Open Last Edited File Using ls -t



ls -t : It sorts the file by modification time, showing the last edited file first. **head -1** picks up this first file. To open the last edited file in the current directory use the combination of ls and head commands as shown below.

```
maverick@maverick-Inspiron-5548: ~  
maverick@maverick-Inspiron-5548:~$ vi first.txt  
maverick@maverick-Inspiron-5548:~$ vi second.txt  
maverick@maverick-Inspiron-5548:~$ ls -t | head -1
```

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[Note: This will open the last file you edited (i.e second.txt)]

2. Display One File Per Line Using ls -l

```
maverick@maverick-Inspiron-5548: ~  
maverick@maverick-Inspiron-5548:~$ ls -l  
1.c  
a.out  
ass8_1.c  
binary.txt  
cfile.c  
c++file.cpp  
cfile.o  
cfile.so  
client.c  
Desktop  
Downloads  
end.txt  
Exam  
examples.desktop  
FALCONN-1.2  
fifo1.c  
fifo2.c  
first.txt
```

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\$ ls -l: To show long listing information about the file/directory.

```
maverick@maverick-Inspiron-5548: ~
maverick@maverick-Inspiron-5548:~$ ls -l
total 44892
-rw-rw-r-- 1 maverick maverick 1176 Feb 16 00:19 1.c
-rwxrwxr-x 1 maverick maverick 9008 May 10 22:54 a.out
-rw-rw-r-- 1 maverick maverick 484 Mar 29 22:18 ass8_1.c
-rw-rw-r-- 1 maverick maverick 19920 Feb 16 00:20 binary.txt
-rw-rw-r-- 1 maverick maverick 67 May 31 13:16 cfile.c
-rw-rw-r-- 1 maverick maverick 187 May 31 13:21 c++file.cpp
-rw-rw-r-- 1 maverick maverick 1552 May 31 13:37 cfile.o
-rwxrwxr-x 1 maverick maverick 8120 May 31 13:37 cfile.so
-rw-rw-r-- 1 maverick maverick 1017 Feb 17 04:43 client.c
drwxr-xr-x 2 maverick maverick 4096 May 27 22:28 Desktop
drwxr-xr-x 2 maverick maverick 4096 Apr 2 04:11 Documents
drwxr-xr-x 2 maverick maverick 4096 May 31 13:12 Downloads
-rw-rw-r-- 1 maverick maverick 54 Mar 29 22:23 end.txt
drwxrwxr-x 11 maverick maverick 4096 Nov 18 2016 Exan
-rw-r--r-- 1 maverick maverick 8980 Nov 6 2016 examples.desktop
drwxr-xr-x 6 maverick maverick 4096 Nov 18 2016 FALCONN-1.2
-rw-rw-r-- 1 maverick maverick 513 May 10 22:47 fifo1.c
-rw-rw-r-- 1 maverick maverick 496 May 10 22:47 fifo2.c
-rw-rw-r-- 1 maverick maverick 152 Jun 3 16:43 first.txt
-rw-r--r-- 1 maverick maverick 10856 Nov 18 2016 glove.cc
-rw-rw-r-- 1 maverick maverick 45750028 Nov 1 2016 google-chrome-stable_curre
nt_and64.deb
```

-rw-rw-r-- 1 maverick maverick 1176 Feb 16 00:19 1.c

1st Character – File Type: First character specifies the type of the file.

In the example above the hyphen (-) in the 1st character indicates that this is a normal file. Following are the possible file type options in the 1st character of the ls -l output.

Field Explanation

- - normal file
- d : directory
- s : socket file
- l : link file
- **Field 1 – File Permissions:** Next 9 character specifies the files permission. The every 3 characters specifies read, write, execute permissions for user(root), group and others respectively in order. Taking above example, -rw-rw-r- indicates read-write permission for user(root) read permission for group and no permission for

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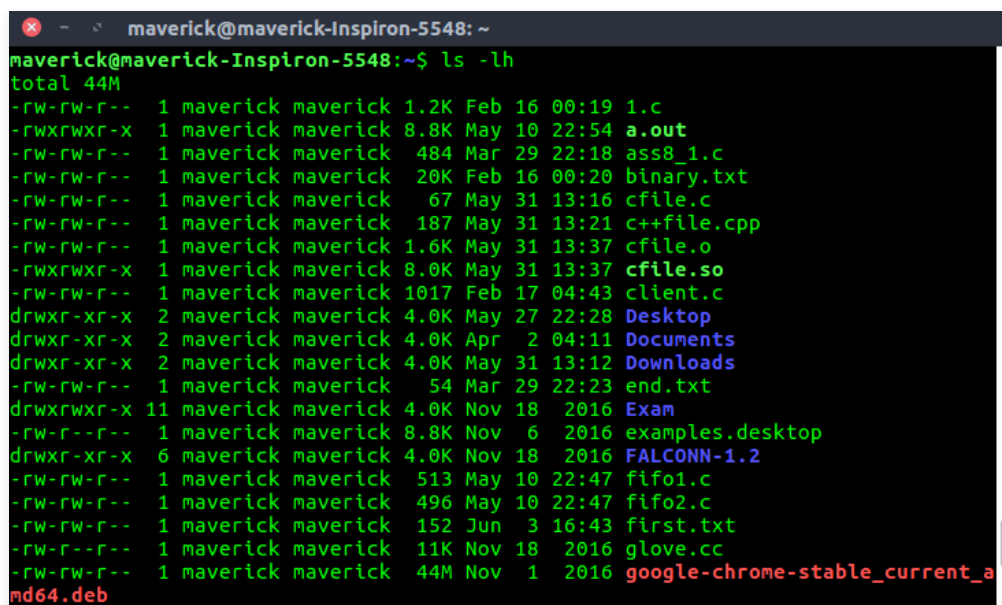
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- for that file. In this example, 1 indicates only one link to this file.
- **Field 3 – Owner:** Third field specifies owner of the file. In this example, this file is owned by username 'maverick'.
- **Field 4 – Group:** Fourth field specifies the group of the file. In this example, this file belongs to "maverick" group.
- **Field 5 – Size:** Fifth field specifies the size of file in bytes. In this example, '1176' indicates the file size in bytes.
- **Field 6 – Last modified date and time:** Sixth field specifies the date and time of the last modification of the file. In this example, 'Feb 16 00:19' specifies the last modification time of the file.
- **Field 7 – File name:** The last field is the name of the file. In this example, the file name is 1.c.

4. Display File Size in Human Readable Format Using ls -lh

ls -lh (h stands for human readable form) : To display file size in easy to read format. i.e i.e M for MB, K for KB, G for GB.



```
maverick@maverick-Inspiron-5548: ~  
maverick@maverick-Inspiron-5548:~$ ls -lh  
total 44M  
-rw-rw-r-- 1 maverick maverick 1.2K Feb 16 00:19 1.c  
-rwxrwxr-x 1 maverick maverick 8.8K May 10 22:54 a.out  
-rw-rw-r-- 1 maverick maverick 484 Mar 29 22:18 ass8_1.c  
-rw-rw-r-- 1 maverick maverick 20K Feb 16 00:20 binary.txt  
-rw-rw-r-- 1 maverick maverick 67 May 31 13:16 cfile.c  
-rw-rw-r-- 1 maverick maverick 187 May 31 13:21 c++file.cpp  
-rw-rw-r-- 1 maverick maverick 1.6K May 31 13:37 cfile.o  
-rwxrwxr-x 1 maverick maverick 8.0K May 31 13:37 cfile.so  
-rw-rw-r-- 1 maverick maverick 1017 Feb 17 04:43 client.c  
drwxr-xr-x 2 maverick maverick 4.0K May 27 22:28 Desktop  
drwxr-xr-x 2 maverick maverick 4.0K Apr 2 04:11 Documents  
drwxr-xr-x 2 maverick maverick 4.0K May 31 13:12 Downloads  
-rw-rw-r-- 1 maverick maverick 54 Mar 29 22:23 end.txt  
drwxrwxr-x 11 maverick maverick 4.0K Nov 18 2016 Exam  
-rw-r--r-- 1 maverick maverick 8.8K Nov 6 2016 examples.desktop  
drwxr-xr-x 6 maverick maverick 4.0K Nov 18 2016 FALCONN-1.2  
-rw-rw-r-- 1 maverick maverick 513 May 10 22:47 fifo1.c  
-rw-rw-r-- 1 maverick maverick 496 May 10 22:47 fifo2.c  
-rw-rw-r-- 1 maverick maverick 152 Jun 3 16:43 first.txt  
-rw-r--r-- 1 maverick maverick 11K Nov 18 2016 glove.cc  
-rw-rw-r-- 1 maverick maverick 44M Nov 1 2016 google-chrome-stable_current_arm64.deb
```

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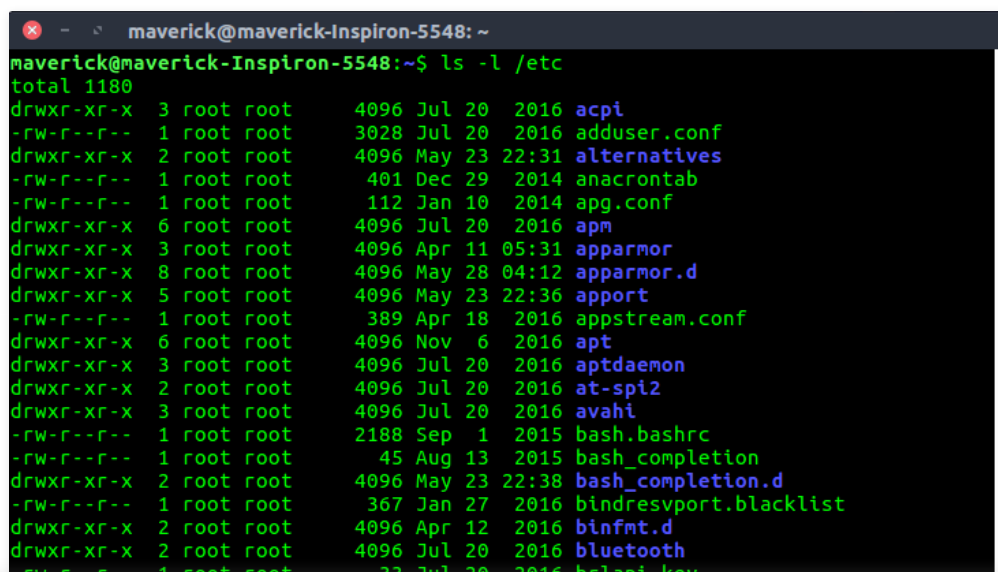
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5. Display Directory Information Using ls -ld

When you use "ls -l" you will get the details of directories content. But if you want the details of the directory then you can use -d option as., For example, if you use ls -l /etc will display all the files under the *etc* directory. But, if you want to display the information about the /etc/ directory, use -ld option as shown below.

\$ ls -ld /etc

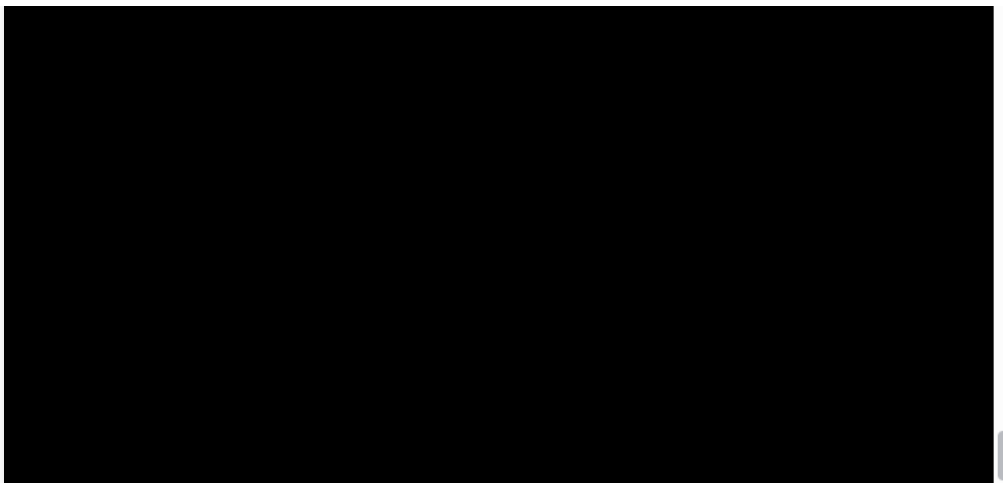


```
maverick@maverick-Inspiron-5548: ~  
maverick@maverick-Inspiron-5548:~$ ls -ld /etc  
total 1180  
drwxr-xr-x 3 root root 4096 Jul 20 2016 acpi  
-rw-r--r-- 1 root root 3028 Jul 20 2016 adduser.conf  
drwxr-xr-x 2 root root 4096 May 23 22:31 alternatives  
-rw-r--r-- 1 root root 401 Dec 29 2014 anacrontab  
-rw-r--r-- 1 root root 112 Jan 10 2014 apg.conf  
drwxr-xr-x 6 root root 4096 Jul 20 2016 apm  
drwxr-xr-x 3 root root 4096 Apr 11 05:31 apparmor  
drwxr-xr-x 8 root root 4096 May 28 04:12 apparmor.d  
drwxr-xr-x 5 root root 4096 May 23 22:36 apport  
-rw-r--r-- 1 root root 389 Apr 18 2016 appstream.conf  
drwxr-xr-x 6 root root 4096 Nov 6 2016 apt  
drwxr-xr-x 3 root root 4096 Jul 20 2016 aptdaemon  
drwxr-xr-x 2 root root 4096 Jul 20 2016 at-spi2  
drwxr-xr-x 3 root root 4096 Jul 20 2016 avahi  
-rw-r--r-- 1 root root 2188 Sep 1 2015 bash.bashrc  
-rw-r--r-- 1 root root 45 Aug 13 2015 bash_completion  
drwxr-xr-x 2 root root 4096 May 23 22:38 bash_completion.d  
-rw-r--r-- 1 root root 367 Jan 27 2016 bindresvport.blacklist  
drwxr-xr-x 2 root root 4096 Apr 12 2016 bintfmt.d  
drwxr-xr-x 2 root root 4096 Jul 20 2016 bluetooth  
-rw-r--r-- 1 root root 22 Jul 20 2016 bluetooth-key
```

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6. Order Files Based on Last Modified Time Using `ls -lt`

`ls -lt` : To sort the file names displayed in the order of last modification time. You will be finding it handy to use it in combination with `-l` option.

```
maverick@maverick-Inspiron-5548: ~  
maverick@maverick-Inspiron-5548:~$ ls -lt  
total 44892  
drwxr-xr-x  2 maverick maverick   4096 Jun  3 16:49 Pictures  
-rw-rw-r--  1 maverick maverick    75 Jun  3 16:44 second.txt  
-rw-rw-r--  1 maverick maverick   152 Jun  3 16:43 first.txt  
-rwxrwxr-x  1 maverick maverick  8120 May 31 13:37 cfile.so  
-rw-rw-r--  1 maverick maverick  1552 May 31 13:37 cfile.o  
-rw-rw-r--  1 maverick maverick   187 May 31 13:21 c++file.cpp  
-rwxrwxr-x  1 maverick maverick  8120 May 31 13:17 libcfile.so  
-rw-rw-r--  1 maverick maverick    67 May 31 13:16 cfile.c  
drwxr-xr-x  2 maverick maverick   4096 May 31 13:12 Downloads  
drwxr-xr-x  2 maverick maverick   4096 May 27 22:28 Desktop  
drwxr-xr-x  3 maverick maverick   4096 May 10 22:57 Videos  
-rwxrwxr-x  1 maverick maverick  9008 May 10 22:54 a.out  
-rw-rw-r--  1 maverick maverick   496 May 10 22:47 fifo2.c  
-rw-rw-r--  1 maverick maverick   513 May 10 22:47 fifo1.c  
drwxr-xr-x  2 maverick maverick   4096 Apr  2 04:11 Documents  
-rw-rw-r--  1 maverick maverick   247 Apr  2 03:53 zombie_1.c  
-rw-rw-r--  1 maverick maverick   322 Apr  2 03:49 zombie_4.c  
-rw-rw-r--  1 maverick maverick   284 Apr  2 03:48 zombie_3.c  
-rw-rw-r--  1 maverick maverick   271 Apr  2 03:47 zombie_2.c  
-rw-rw-r--  1 maverick maverick   382 Apr  2 03:33 zom5.c  
-rw-rw-r--  1 maverick maverick    54 Mar 29 22:23 end.txt  
-rw-rw-r--  1 maverick maverick   586 Mar 29 22:20 start.txt
```

7. Order Files Based on Last Modified Time (In Reverse Order) Using `ls -ltr`

`$ ls -ltr` : To sort the file names in the last modification time in reverse order. This will be showing the last edited file in the last line which will be handy when the listing goes beyond a page.

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```
drwxr-xr-x  2 maverick maverick    4096 Nov  6  2016 Music
drwxrwxr-x 11 maverick maverick    4096 Nov 18  2016 Exam
drwxr-xr-x  6 maverick maverick    4096 Nov 18  2016 FALCONN-1.2
-rw-r--r--  1 maverick maverick  10856 Nov 18  2016 glove.cc
-rw-rw-r--  1 maverick maverick   1176 Feb 16 00:19 1.c
-rw-rw-r--  1 maverick maverick  19920 Feb 16 00:20 binary.txt
drwxrwxr-x  2 maverick maverick    4096 Feb 17 03:36 kv
-rw-rw-r--  1 maverick maverick   1017 Feb 17 04:43 client.c
-rw-rw-r--  1 maverick maverick   1214 Feb 17 04:45 server.c
-rw-rw-r--  1 maverick maverick    259 Mar 29 21:02 time_sharing.c
-rw-rw-r--  1 maverick maverick    484 Mar 29 22:18 ass8_1.c
-rw-rw-r--  1 maverick maverick    586 Mar 29 22:20 start.txt
-rw-rw-r--  1 maverick maverick     54 Mar 29 22:23 end.txt
-rw-rw-r--  1 maverick maverick    382 Apr  2 03:33 zom5.c
-rw-rw-r--  1 maverick maverick    271 Apr  2 03:47 zombie_2.c
-rw-rw-r--  1 maverick maverick    284 Apr  2 03:48 zombie_3.c
```

8. Display Hidden Files Using ls -a (or) ls -A



\$ ls -a : To show all the hidden files in the directory, use '-a option'.

Hidden files in Unix starts with '.' in its file name. It will show all the files including the '.' (current directory) and '..' (parent directory).

```
maverick@maverick-Inspiron-5548: ~
maverick@maverick-Inspiron-5548:~$ ls -a
.          .gnupg
..         .gnuplot_history
1.c       .google-chrome-stable_current_amd64.deb
1.c.swo   .ICEauthority
1.c.swp   kv
a.out     libCfile.so
ass8_1.c  .local
.bash_history .mozilla
.bash_logout Music
```

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```
Desktop      .thunderbird
.dmrc        time_sharing.c
Documents    Videos
Downloads    .viminfo
```

\$ ls -A: To show the hidden files, but not the '.' (current directory) and '..' (parent directory).

```
maverick@maverick-Inspiron-5548: ~
maverick@maverick-Inspiron-5548:~$ ls -A
1.c                .gnuplot_history
.1.c.swo           google-chrome-stable_current_and64.deb
.1.c.swp           .ICEauthority
a.out              kv
ass8.1.c          libcfile.so
.bash_history      .local
.bash_logout       .mozilla
.bashrc            Music
binary.txt         Pictures
.cache             .pkg
cfile.c            .profile
c++file.cpp        Public
cfile.o            Release.key
cfile.so           second.txt
client.c           server.c
.compiz            start.txt
.config            .sudo_as_admin_successful
Desktop            Templates
.dmrc              .thunderbird
Documents          time_sharing.c
Downloads          Videos
end.txt            .viminfo
Exam               .wine
```

[Note: . and .. are not displayed here]

9. Display Files Recursively Using ls -R

\$ ls /etc/apt

```
maverick@maverick-Inspiron-5548: ~
maverick@maverick-Inspiron-5548:~$ ls /etc/apt
apt.conf      preferences.d  sources.list.d  trusted.gpg  trusted.gpg.d
apt.conf.d    sources.list  sources.list.save  trusted.gpg~
maverick@maverick-Inspiron-5548:~$
```

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```
maverick@maverick-Inspiron-5548: ~  
maverick@maverick-Inspiron-5548:~$ ls -R /etc/apt  
/etc/apt:  
apt.conf      preferences.d  sources.list.d  trusted.gpg     trusted.gpg.d  
apt.conf.d    sources.list  sources.list.save  trusted.gpg~  
  
/etc/apt/apt.conf.d:  
00aptitude           10periodic           50appstream  
00trustcdrom          15update-stamp       50unattended-upgrades  
01autoremove          20archive            70debconf  
01autoremove-kernels  20auto-upgrades      99synaptic  
01-vendor-ubuntu      20dbus               99update-notifier  
  
/etc/apt/preferences.d:  
  
/etc/apt/sources.list.d:  
arc-theme.list                noobslab-ubuntu-icons-xenial.list  
arc-theme.list.save           noobslab-ubuntu-icons-xenial.list.save  
google-chrome.list            numix-ubuntu-ppa-xenial.list  
nilarimogard-ubuntu-webupd8-xenial.list  numix-ubuntu-ppa-xenial.list.save  
  
/etc/apt/trusted.gpg.d:  
nilarimogard_ubuntu_webupd8.gpg  noobslab_ubuntu_icons.gpg~  
nilarimogard_ubuntu_webupd8.gpg~  numix_ubuntu_ppa.gpg  
noobslab_ubuntu_icons.gpg         numix_ubuntu_ppa.gpg~
```

10. Display File Inode Number Using ls -i

Sometimes you may want to know the inone number of a file for internal maintenance. Use -i option as shown below to display inone number. Using inode number you can remove files that has special characters in it's name.

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```

2103982 cfile.o          2097167 Public
2099728 cfile.so          2098568 Release.key
2101859 client.c           2100165 second.txt
2097164 Desktop          2101874 server.c
2097168 Documents        2101171 start.txt
2097165 Downloads        2097166 Templates
2102815 end.txt          2102715 time_sharing.c
2229834 Exam            2097171 Videos
2097156 examples.desktop 2100133 zom5.c
2104166 FALCONN-1.2         2100076 zombie_1.c
2107423 fifo1.c            2100930 zombie_2.c
2107416 fifo2.c            2100936 zombie_3.c
2101004 first.txt        2100953 zombie_4.c
maverick@maverick-Inspiron-5548:~$

```

\$ ls -i /etc/apt

```

maverick@maverick-Inspiron-5548: ~
maverick@maverick-Inspiron-5548:~$ ls -i /etc/apt
2360671 apt.conf          2360669 sources.list      2360670 trusted.gpg
2360001 apt.conf.d          2360003 sources.list.d      2360761 trusted.gpg~
2360002 preferences.d        2360682 sources.list.save   2360004 trusted.gpg.d
maverick@maverick-Inspiron-5548:~$

```

11. Hide Control Characters Using ls -q

ls -q : To print question mark instead of the non graphics control characters.

```

maverick@maverick-Inspiron-5548: ~
maverick@maverick-Inspiron-5548:~$ ls -q
1.c          Exam          Release.key
a.out        examples.desktop second.txt
ass8_1.c     FALCONN-1.2  server.c
binary.txt   fifo1.c       start.txt
cfile.c      fifo2.c       Templates
c++file.cpp  first.txt     time_sharing.c
cfile.o      glove.cc      Videos
cfile.so     google-chrome-stable_current_amd64.deb zom5.c
client.c     kv            zombie_1.c
Desktop     libcfile.so  zombie_2.c
Documents   Music        zombie_3.c
Downloads   Pictures     zombie_4.c
end.txt     Public

```

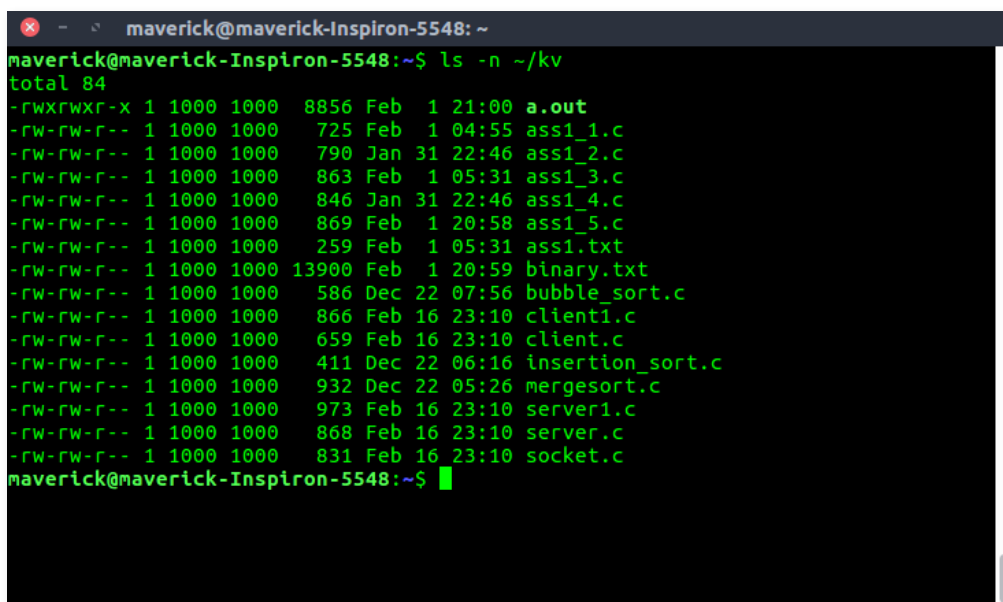
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12. Display File UID and GID Using ls -n

\$ ls -n ~/kv : Lists the output like -l, but shows the uid and gid in numeric format instead of names.

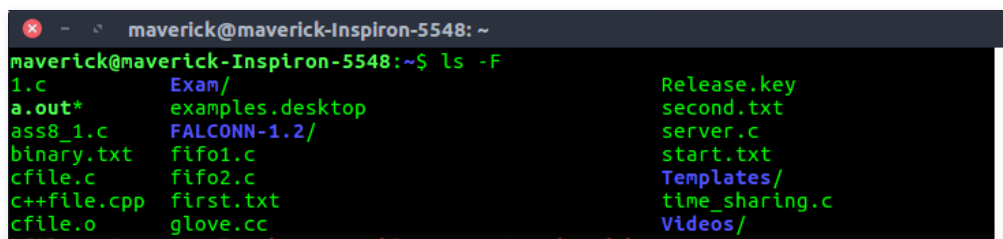


```
maverick@maverick-Inspiron-5548: ~
maverick@maverick-Inspiron-5548:~$ ls -n ~/kv
total 84
-rwxrwxr-x 1 1000 1000 8856 Feb  1 21:00 a.out
-rw-rw-r-- 1 1000 1000  725 Feb  1 04:55 ass1_1.c
-rw-rw-r-- 1 1000 1000  790 Jan 31 22:46 ass1_2.c
-rw-rw-r-- 1 1000 1000  863 Feb  1 05:31 ass1_3.c
-rw-rw-r-- 1 1000 1000  846 Jan 31 22:46 ass1_4.c
-rw-rw-r-- 1 1000 1000  869 Feb  1 20:58 ass1_5.c
-rw-rw-r-- 1 1000 1000  259 Feb  1 05:31 ass1.txt
-rw-rw-r-- 1 1000 1000 13900 Feb  1 20:59 binary.txt
-rw-rw-r-- 1 1000 1000  586 Dec 22 07:56 bubble_sort.c
-rw-rw-r-- 1 1000 1000  866 Feb 16 23:10 client1.c
-rw-rw-r-- 1 1000 1000  659 Feb 16 23:10 client.c
-rw-rw-r-- 1 1000 1000  411 Dec 22 06:16 insertion_sort.c
-rw-rw-r-- 1 1000 1000  932 Dec 22 05:26 mergesort.c
-rw-rw-r-- 1 1000 1000  973 Feb 16 23:10 server1.c
-rw-rw-r-- 1 1000 1000  868 Feb 16 23:10 server.c
-rw-rw-r-- 1 1000 1000  831 Feb 16 23:10 socket.c
maverick@maverick-Inspiron-5548:~$
```

13. Visual Classification of Files With Special Characters Using ls -F

\$ ls -F : Instead of doing the 'ls -l' and then the checking for the first character to determine the type of file. You can use -F which classifies the file with different special character for different kind of files.

- / – directory.
- nothing – normal file.
- @ – link file.
- * – Executable file



```
maverick@maverick-Inspiron-5548: ~
maverick@maverick-Inspiron-5548:~$ ls -F
1.c          Exam/       Release.key
a.out*       examples.desktop  second.txt
ass8_1.c     FALCONN-1.2/    server.c
binary.txt   fifo1.c         start.txt
cfile.c      fifo2.c         Templates/
c++file.cpp  first.txt       time_sharing.c
cfile.o      glove.cc        Videos/
file.out     apple-chrome-stable-current-amd64.deb
```

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14. Visual Classification of Files With Colors Using ls -F

\$ ls -color=auto : Recognizing the file type by the color in which it gets displayed is another kind of classification of file. In the below output, directories get displayed in blue, soft links get displayed in green, and ordinary files get displayed in default color.

```
maverick@maverick-Inspiron-5548: ~  
maverick@maverick-Inspiron-5548:~$ ls --color=auto  
1.c          Exam          Release.key  
a.out        examples.desktop second.txt  
ass8_1.c     FALCONN-1.2  server.c  
binary.txt   fifo1.c       start.txt  
cfile.c      fifo2.c       Templates  
c++file.cpp  first.txt     time_sharing.c  
cfile.o      glove.cc      Videos  
cfile.so     google-chrome-stable_current_amd64.deb zom5.c  
client.c     kv            zombie_1.c  
Desktop      libCfile.so   zombie_2.c  
Documents    Music         zombie_3.c  
Downloads    Pictures      zombie_4.c  
end.txt      Public  
maverick@maverick-Inspiron-5548:~$
```

Reference:

[Linux manual page for ls command](#)

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