

Basic Linux Commands

man(manual)

A program that shows the manuals of every basic command.

Screenshot of `man man`

The screenshot shows a terminal window with two tabs. The left tab is titled 'danny@localhost:/Data/Danny/Project/OOP/HW1' and contains the text of the man(1) manual page. The right tab is titled 'danny@localhost:/Data/Danny/GitHub'. The terminal window has a dark background and white text. The man(1) page is well-formatted with sections like NAME, SYNOPSIS, DESCRIPTION, and a table of contents. The bottom of the window shows a status bar with the message 'Manual page man(1) line 1 (press h for help or q to quit)'.

```
Applications Terminal Fri Mar 3, 10:46:37 danny@localhost:/Data/Danny/Project/OOP/HW1 danny@localhost:/Data/Danny/GitHub
File Edit View Search Terminal Tabs Help
danny@localhost:/Data/Danny/Project/OOP/HW1 Manual pager utils danny@localhost:/Data/Danny/GitHub
MAN(1) MAN(1)
NAME man - an interface to the on-line reference manuals
SYNOPSIS man [-C file] [-d] [--warnings[=warnings]] [-R encoding] [-L locale] [-m system[...]] [-M path] [-S list] [-E extension] [-i|-I] [--regex|--wildcard] [-H[browser]] [-X[dpi]] [-Z] [section] page ...
man [-W] [-W] [-S list] [-i|-I] [--regex] [section] term ...
man -f [what is options] page
man -l [-C file] [-d] [-D] [--warnings[=warnings]] [-R encoding] [-L locale] [-P pager] [-r prompt] [-7] [-E encoding] [-p string] [-t] [-T[device]] [-H[browser]] [-X[dpi]] [-Z] file ...
man -w [-W] [-C file] [-d] [-D] page ...
man -c [-C file] [-d] [-D] page ...
man [-?V]
DESCRIPTION man is the system's manual pager. Each page argument given to man is normally the name of a program, utility or function. The manual page associated with each of these arguments is then found and displayed. A section, if provided, will direct man to look only in that section of the manual. The default action is to search in all of the available sections following a pre-defined order ("1 1p 8 2 3 3p 4 5 6 / 9 0p h l p o ix 2x 3x 4x 5x 6x 7x 8x" by default, unless overridden by the SECTION directive in /etc/man_db.conf), and to show only the first page found, even if page exists in several sections.
The table below shows the section numbers of the manual followed by the types of pages they contain.
1 Executable programs or shell commands
2 System calls (functions provided by the kernel)
3 Library calls (functions within program libraries)
4 Special files (usually found in /dev)
5 File formats and conventions eg /etc/passwd
6 Games
7 Miscellaneous (including macro packages and conventions), e.g. man(7), groff(7)
8 System administration commands (usually only for root)
9 Kernel routines [Non standard]
A manual page consists of several sections.
Conventional section names include NAME, SYNOPSIS, CONFIGURATION, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUE, ERRORS, ENVIRONMENT, FILES, VERSIONS, CONFORMING TO, NOTES, BUGS, EXAMPLE, AUTHORS, and SEE ALSO.
The following conventions apply to the SYNOPSIS section and can be used as a guide in other sections.
Manual page man(1) line 1 (press h for help or q to quit)
```

info(information)

Detailed version of `man`.

Screenshot of `info info`

The screenshot shows a terminal window with two tabs. The left tab is titled 'danny@localhost:/Data/Danny/Project/OOP/HW1' and contains the text of the info(1) manual page. The right tab is titled 'danny@localhost:/Data/Danny/GitHub'. The terminal window has a dark background and white text. The info(1) page is a detailed manual for the Info reader, listing various commands and their descriptions. The bottom of the window shows a status bar with the message '....Info: (info-stnd.info.gz)Top, 31 lines, -All--.... Welcome to Info version 6.1. Type H for help, h for tutorial.'

```
Applications Terminal Fri Mar 3, 10:46:15 danny@localhost:/Data/Danny/Project/OOP/HW1 danny@localhost:/Data/Danny/GitHub
File Edit View Search Terminal Tabs Help
danny@localhost:/Data/Danny/Project/OOP/HW1 Stand-alone GNU Info danny@localhost:/Data/Danny/GitHub
Next: Stand-alone Info, Up: (dir)
Stand-alone GNU Info ****
This documentation describes the stand-alone Info reader which you can use to read Info documentation.

If you are new to the Info reader, then you can get started by typing 'H' for a list of basic key bindings. You can read through the rest of this manual by typing <SPC> and <DEL> (or <Space> and <Backspace>) to move forwards and backwards in it.

* Menu:
* Stand-alone Info::      What is Info?
* Invoking Info::         Options you can pass on the command line.
* Cursor Commands::      Commands which move the cursor within a node.
* Scrolling Commands::   Commands for reading the text within a node.
* Node Commands::        Commands for selecting a new node.
* Searching Commands::  Commands for searching an Info file.
* Index Commands::       Commands for looking up in indices.
* Xref Commands::        Commands for selecting cross-references.
* Window Commands::     Commands for working with multiple windows.
* Printing Nodes::       How to print out the contents of a node.
* Miscellaneous Commands:: A few commands that defy categorization.
* Variables::            How to change the default behavior of Info.
* Colors and Styles::   Customize the colors used by Info.
* Custom Key Bindings:: How to define your own key-to-command bindings.
* Index::                Global index.

....Info: (info-stnd.info.gz)Top, 31 lines, -All--.... Welcome to Info version 6.1. Type H for help, h for tutorial.
```

If you want to see mere syntax, use `man` instead.

dnf

Fedora's package manager. It is namely `apt-get` for Ubuntu.

Installing new packages or modifying installed ones requires administrative privileges. But, searching for packages in enabled repositories doesn't. Hence, `dnf upgrade` and `dnf install <package-name>` are invalid. And `dnf search <package-name>` is good to go.

The `update` option is currently an alias of the `upgrade` option. It may be taken out someday.

Screenshot of `sudo dnf upgrade`

```
[danny@localhost HW1]$ sudo dnf update
[sudo] password for danny:
Last metadata expiration check: 0:03:14 ago on Fri Mar  3 00:32:36 2017.
Dependencies resolved.

Upgrading:
NetworkManager-openvpn      x86_64  1:1.2.8-2.fc25    updates   237 k
NetworkManager-openvpn-gnome x86_64  1:1.2.8-2.fc25    updates   91 k
container-selinux            noarch  2:2.9-1.fc25     updates   29 k
gnome-terminal               x86_64  3.22.1-5.fc25   updates   1.2 M
libblockdev                  x86_64  1.9-9.fc25     updates   85 k
libblockdev-btrfs             x86_64  1.9-9.fc25     updates   41 k
libblockdev-crypto            x86_64  1.9-9.fc25     updates   43 k
libblockdev-dm                x86_64  1.9-9.fc25     updates   41 k
libblockdev-fs                x86_64  1.9-9.fc25     updates   42 k
libblockdev-kbd               x86_64  1.9-9.fc25     updates   45 k
libblockdev-lvm               x86_64  1.9-9.fc25     updates   39 k
libblockdev-mdraid            x86_64  1.9-9.fc25     updates   48 k
libblockdev-mpath              x86_64  1.9-9.fc25     updates   40 k
libblockdev-part              x86_64  1.9-9.fc25     updates   45 k
libblockdev-plugins-all       x86_64  1.9-9.fc25     updates   34 k
libblockdev-swap              x86_64  1.9-9.fc25     updates   39 k
libblockdev-utils              x86_64  1.9-9.fc25     updates   41 k
pcre                         x86_64  8.40-5.fc25    updates   200 k
pcre-utf16                    x86_64  8.40-5.fc25    updates   190 k
pcre2                        x86_64  10.23-2.fc25   updates   210 k
python3-blockdev              x86_64  1.9-9.fc25     updates   44 k
vim-common                   x86_64  2.8.0-386.1.fc25  updates   6.6 M
vim-enhanced                  x86_64  2.8.0-386.1.fc25  updates   1.2 M
vim-filesystem                x86_64  2.8.0-386.1.fc25  updates   32 k
vim-minimal                   x86_64  2.8.0-386.1.fc25  updates   517 k
xdg-desktop-portal-gtk        x86_64  0.5-3.fc25     updates   104 k

Transaction Summary

Upgrade 27 Packages

Total download size: 11 M
Is this ok [Y/N]: y
Downloading Packages:
(1/27): NetworkManager-openvpn-gnome-1.2.8-1.fc50 kB/s | 40 kB     00:00
[dnny@localhost ~]$
```

ls(list)

Lists directories and files under a chosen path. It will list the items under the current path if no path specified.

Screenshot of `ls -la /`

```
[danny@localhost ~]$ ls -la /
total 76
dr-xr-xr-x. 19 root root 4096 Feb 27 16:22 .
dr-xr-xr-x. 19 root root 4096 Feb 27 16:22 ..
-rw-r--r--. 1 root root 0 Nov 16 05:32 1
lrwxrwxrwx. 1 root root 7 Feb 4 2016 bin -> usr/bin
dr-xr-xr-x. 6 root root 4096 Mar 3 17:19 boot
drwxrwxrwx. 1 root root 4096 Feb 27 23:13 Data
drwxr-xr-x. 21 root root 4140 Mar 6 13:32 dev
drwxr-xr-x. 141 root root 12288 Mar 6 14:16 etc
drwxr-xr-x. 4 root root 4096 Feb 3 09:25 home
lrwxrwxrwx. 1 root root 7 Feb 4 2016 lib -> usr/lib
lrwxrwxrwx. 1 root root 9 Feb 4 2016 lib64 -> usr/lib64
drwx----- 2 root root 16384 Nov 16 05:16 lost+found
drwxr-xr-x. 2 root root 4096 Feb 4 2016 media
drwxr-xr-x. 2 root root 4096 Feb 4 2016 mnt
drwxr-xr-x. 3 root root 4096 Feb 2 21:20 opt
dr-xr-xr-x. 313 root root 0 Mar 6 2017 proc
dr-xr-x---. 5 root root 4096 Feb 25 11:14 root
drwxr-xr-x. 46 root root 1280 Mar 6 14:16 run
lrwxrwxrwx. 1 root root 8 Feb 4 2016 sbin -> usr/sbin
drwxr-xr-x. 2 root root 4096 Feb 4 2016 srv
dr-xr-xr-x. 13 root root 0 Mar 6 12:23 sys
drwxrwxrwt. 14 root root 380 Mar 6 14:59 tmp
drwxr-xr-x. 13 root root 4096 Dec 13 08:54 usr
drwxr-xr-x. 22 root root 4096 Nov 16 05:49 var
[danny@localhost ~]$
```

mv(move)

Moves items from one place to another. It is also used to rename items.

Screenshot of `mv <from> <to>` (an example of renaming items)

```
[danny@localhost HW1]$ ls -la
total 5504
drwxrwxrwx. 1 root root    4096 Mar  6 15:05 .
drwxrwxrwx. 1 root root      0 Mar  3 10:42 ..
-rwxrwxrwx. 1 root root   1453 Mar  7 09:20 BasicCommands.md
-rwxrwxrwx. 1 root root 3248456 Mar  6 15:09 BasicCommands.pdf
-rwxrwxrwx. 1 root root  383876 Mar  3 10:46 infoinfo.png
-rwxrwxrwx. 1 root root 533352 Mar  6 14:55 ls-la.png
-rwxrwxrwx. 1 root root 297999 Mar  6 15:01 ls-la_root.png
-rwxrwxrwx. 1 root root 526557 Mar  3 10:46 manman.png
-rwxrwxrwx. 1 root root 623178 Mar  3 10:45 sudodnfupgrade.png
[danny@localhost HW1]$ mv ./BasicCommands.pdf ./BC.pdf
[danny@localhost HW1]$ ls -la
total 5504
drwxrwxrwx. 1 root root    4096 Mar  7 09:32 .
drwxrwxrwx. 1 root root      0 Mar  3 10:42 ..
-rwxrwxrwx. 1 root root   1453 Mar  7 09:20 BasicCommands.md
-rwxrwxrwx. 1 root root 3248456 Mar  6 15:09 BC.pdf
-rwxrwxrwx. 1 root root  383876 Mar  3 10:46 infoinfo.png
-rwxrwxrwx. 1 root root 533352 Mar  6 14:55 ls-la.png
-rwxrwxrwx. 1 root root 297999 Mar  6 15:01 ls-la_root.png
-rwxrwxrwx. 1 root root 526557 Mar  3 10:46 manman.png
-rwxrwxrwx. 1 root root 623178 Mar  3 10:45 sudodnfupgrade.png
```

chmod(change mode)

Changes users' privileges about items.

Screenshot of `chmod <mode> files...` (an example of renaming items)

```
[danny@localhost HW1]$ sudo chmod 766 -v infoinfo.png ls-la.png ls-la_root.png manman.png sudodnfupgrade.png
[sudo] password for danny:
mode of 'infoinfo.png' changed from 0777 (rwxrwxrwx) to 0766 (rwxrw-rw-)
mode of 'ls-la.png' changed from 0777 (rwxrwxrwx) to 0766 (rwxrw-rw-)
mode of 'ls-la_root.png' changed from 0777 (rwxrwxrwx) to 0766 (rwxrw-rw-)
mode of 'manman.png' changed from 0777 (rwxrwxrwx) to 0766 (rwxrw-rw-)
mode of 'sudodnfupgrade.png' changed from 0777 (rwxrwxrwx) to 0766 (rwxrw-rw-)
[danny@localhost HW1]$ ls -la
total 9636
drwxrwxrwx. 1 root root    4096 Mar  7 09:51 .
drwxrwxrwx. 1 root root      0 Mar  3 10:42 ..
-rwxrwxrwx. 1 root root   1757 Mar  7 09:52 BasicCommands.md
-rwxrwxrwx. 1 root root 3859808 Mar  7 09:52 BasicCommands.pdf
-rwxrwxrwx. 1 root root 3248456 Mar  6 15:09 BC.pdf
-rwxrwxrwx. 1 root root  90551 Mar  7 09:48 chmod.png
-rwxrwxrwx. 1 root root  383876 Mar  3 10:46 infoinfo.png
-rwxrwxrwx. 1 root root 533352 Mar  6 14:55 ls-la.png
-rwxrwxrwx. 1 root root 297999 Mar  6 15:01 ls-la_root.png
-rwxrwxrwx. 1 root root 526557 Mar  3 10:46 manman.png
-rwxrwxrwx. 1 root root 270462 Mar  7 09:33 mv.png
-rwxrwxrwx. 1 root root 623178 Mar  3 10:45 sudodnfupgrade.png
```

Did you find anything strange?

The privileges aren't changed at all!

Well, that's because the files are on an **NTFS** drive.

Linux operating systems can't handle NTFS very well.

chown

Changes the ownership of items.

Screenshot of `chown <owner> files...`

```
[danny@localhost Downloads]$ sudo chown root ./atom.x86_64.rpm
[sudo] password for danny:
[danny@localhost Downloads]$ ls -la
total 1611100
drwxr-xr-x.  2 danny danny      4096 Mar  7 09:29 .
drwx----- 28 danny danny      4096 Mar  7 09:54 ..
-rw-rw-r--.  1 root  danny    86619803 Feb  2 22:12 atom.x86_64.rpm
-rw-rw-r--.  1 danny danny 1440743424 Mar  6 21:03 Fedora-Workstation-Live-x86_64-25-1.3.iso
-rw-rw-r--.  1 danny danny    771795 Feb  6 17:13 'Froggy Dance.mp4'
-rw-rw-r--.  1 danny danny   45730053 Feb  2 21:18 google-chrome-stable_current_x86_64.rpm
-rw-rw-r--.  1 danny danny  75869960 Feb  5 09:45 NVIDIA-Linux-x86_64-375.26.run
```

chgrp

Changes the group the item belongs to.

Screenshot of `chgrp <group> files...`

```
[danny@localhost Downloads]$ sudo chgrp root ./atom.x86_64.rpm
[danny@localhost Downloads]$ ls -la
total 1611100
drwxr-xr-x.  2 danny danny      4096 Mar  7 09:29 .
drwx----- 28 danny danny      4096 Mar  7 09:54 ..
-rw-rw-r--.  1 root  root    86619803 Feb  2 22:12 atom.x86_64.rpm
-rw-rw-r--.  1 danny danny 1440743424 Mar  6 21:03 Fedora-Workstation-Live-x86_64-25-1.3.iso
-rw-rw-r--.  1 danny danny    771795 Feb  6 17:13 'Froggy Dance.mp4'
-rw-rw-r--.  1 danny danny   45730053 Feb  2 21:18 google-chrome-stable_current_x86_64.rpm
-rw-rw-r--.  1 danny danny  75869960 Feb  5 09:45 NVIDIA-Linux-x86_64-375.26.run
```

ln

Creates links for files.

Screenshot of `ln <options> original_file link_name`

```
[danny@localhost Downloads]$ ln ./atom.x86_64.rpm at
[danny@localhost Downloads]$ ln -s ./atom.x86_64.rpm ats
[danny@localhost Downloads]$ ls -la
total 1695696
drwxr-xr-x.  2 danny danny      4096 Mar  7 13:31 .
drwx----- 28 danny danny      4096 Mar  7 09:54 ..
-rw-rw-r--.  2 danny danny    86619803 Feb  2 22:12 at
-rw-rw-r--.  2 danny danny    86619803 Feb  2 22:12 atom.x86_64.rpm
lrwxrwxrwx.  1 danny danny       17 Mar  7 13:31 ats -> ./atom.x86_64.rpm
-rw-rw-r--.  1 danny danny 1440743424 Mar  6 21:03 Fedora-Workstation-Live-x86_64-25-1.3.iso
-rw-rw-r--.  1 danny danny    771795 Feb  6 17:13 'Froggy Dance.mp4'
-rw-rw-r--.  1 danny danny   45730053 Feb  2 21:18 google-chrome-stable_current_x86_64.rpm
-rw-rw-r--.  1 danny danny  75869960 Feb  5 09:45 NVIDIA-Linux-x86_64-375.26.run
```

Hard links vs soft(symbolic) links

Hard links link directly to the contents of the entry.

Soft links link to the entry.

tar

The compress and decompress program for Linux systems.

Screenshot of `tar` compression and decompression with lzop.

```
[danny@localhost Downloads]$ tar --lzop -cv -f atom.x86_64.rpm.lzo atom.x86_64.rpm  
atom.x86_64.rpm  
[danny@localhost Downloads]$ ls -la  
total 1695216  
drwxr-xr-x. 2 danny danny 4096 Mar 7 15:14 .  
drwx----- 28 danny danny 4096 Mar 7 09:54 ..  
-rw-rw-r--. 1 danny danny 86619803 Feb 2 22:12 atom.x86_64.rpm  
-rw-rw-r--. 1 danny danny 86136080 Mar 7 15:14 atom.x86_64.rpm.lzo  
-rw-rw-r--. 1 danny danny 1440743424 Mar 6 21:03 Fedora-Workstation-Live-x86_64-25-1.3.iso  
-rw-rw-r--. 1 danny danny 771795 Feb 6 17:13 'Froggy Dance.mp4'  
-rw-rw-r--. 1 danny danny 45730053 Feb 2 21:18 google-chrome-stable_current_x86_64.rpm  
-rw-rw-r--. 1 danny danny 75869960 Feb 5 09:45 NVIDIA-Linux-x86_64-375.26.run  
[danny@localhost Downloads]$ mkdir test  
[danny@localhost Downloads]$ tar --lzop -xv -f atom.x86_64.rpm.lzo -C ./test/  
atom.x86_64.rpm  
[danny@localhost Downloads]$ ls -la ./test/  
total 84600  
drwxrwxr-x. 2 danny danny 4096 Mar 7 15:14 .  
drwxr-xr-x. 3 danny danny 4096 Mar 7 15:14 ..  
-rw-rw-r--. 1 danny danny 86619803 Feb 2 22:12 atom.x86_64.rpm
```

vim

Improved version of vi.

file creation/modification: `vim <filename>`

Interactive mode:

- insert: `Esc -> i`
- quit without change: `Esc -> :!q`
- write and quit: `Esc -> :wq`

Screenshot of vim usage.

```
[danny@localhost test]$ vim yee
```

```
~  
-- INSERT --  
  
~  
:q!
```

gcc

GNU Compiler Collection. What is GNU? It stands for "GNU's Not Unix". So what does GNU actually means?
"G(G(G(G(G(G(G(G(G(G(G...)--Recursive--

Screenshot of compiling C code with some parameters.

```
[danny@localhost HW1]$ gcc -Wall -Wextra -std=c11 -o sample
BasicCommands.md    chgrp.png      ConvexHull.c    ls-la.png      mv.png        vimcreate.png
BasicCommands.pdf   chmod.png      infoinfo.png  ls-la_root.png mv.png        vimforcequit.png
BC.pdf              chown.png     ln.png       manman.png    tarlzop.png  viminsert.png
[danny@localhost HW1]$ gcc -Wall -Wextra -std=c11 -o sample ConvexHull.c
ConvexHull.c: In function 'main':
ConvexHull.c:79:5: warning: suggest parentheses around assignment used as truth value [-Wparentheses]
  while(cur=pre_point(data, cur))
  ^
[danny@localhost HW1]$ ls
BasicCommands.md    BC.pdf      chmod.png  ConvexHull.c  ln.png      ls-la_root.png  mv.png      sudodnfupgrade.png  vimcreate.png  viminsert.png
BasicCommands.pdf   chgrp.png  chown.png  infoinfo.png ls-la.png  manman.png    sample    tarlzop.png  vimforcequit.png
```

mount

Mounts drives.

Screenshot of `mount -l` and `sudo umount <path>`.

```
└─ 8.2 GB Volume      ▲ K,mode=700,uid=42,gid=42)
   └─ tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,seclabel,size=16250
      72k,mode=700,uid=1000,gid=1000)
   └─ gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime
      ,user_id=1000,group_id=1000)
      └─ /dev/sda1 on /run/media/danny/6094-0DE4 type vfat (rw,nosuid,nodev,relatime,uid=
      1000,gid=1000,fmask=0022,dmask=0022,codepage=437,iocharset=ascii,shortname=mixed
      ,showexec,utf8,flush,errors=remount-ro,uhelper=udisks2)
[danny@localhost ~]$ sudo umount /dev/sda1
[sudo] password for danny:
[danny@localhost ~]$ █
```

Screenshot of `mount <path> <destination>`.

```
[danny@localhost ~]$ sudo mount /dev/sda1 /mnt
[sudo] password for danny:
[danny@localhost ~]$ █
```