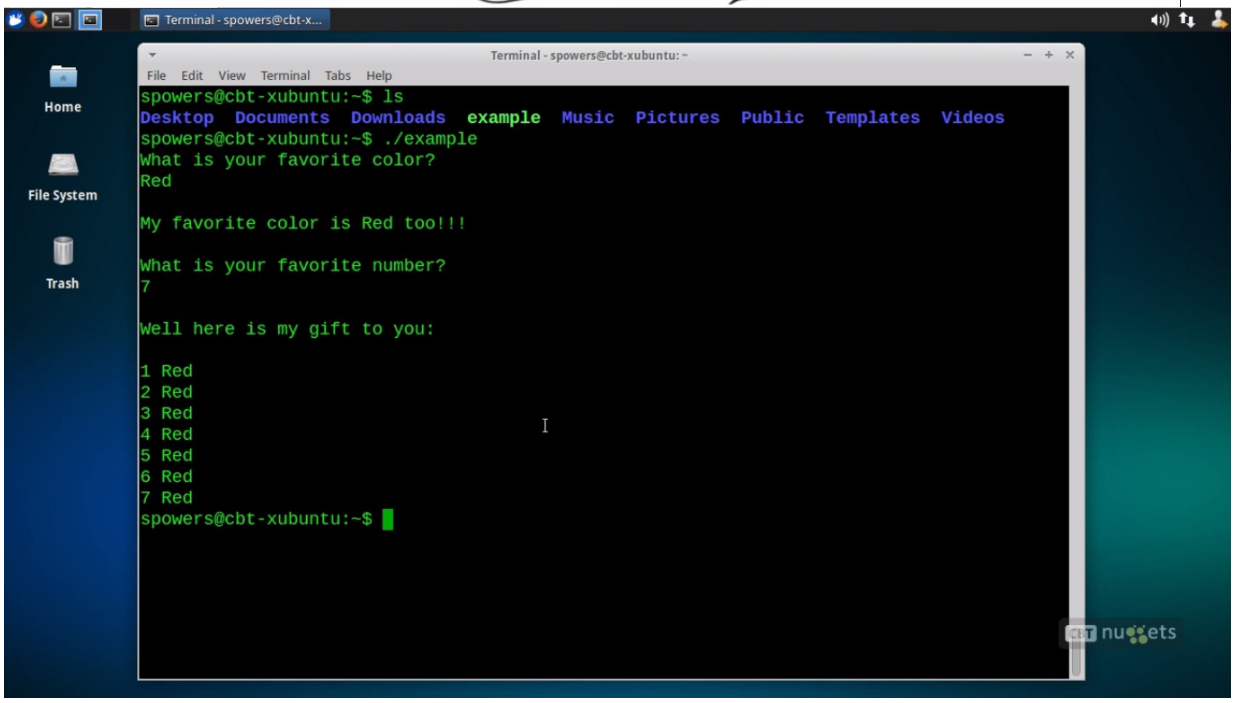
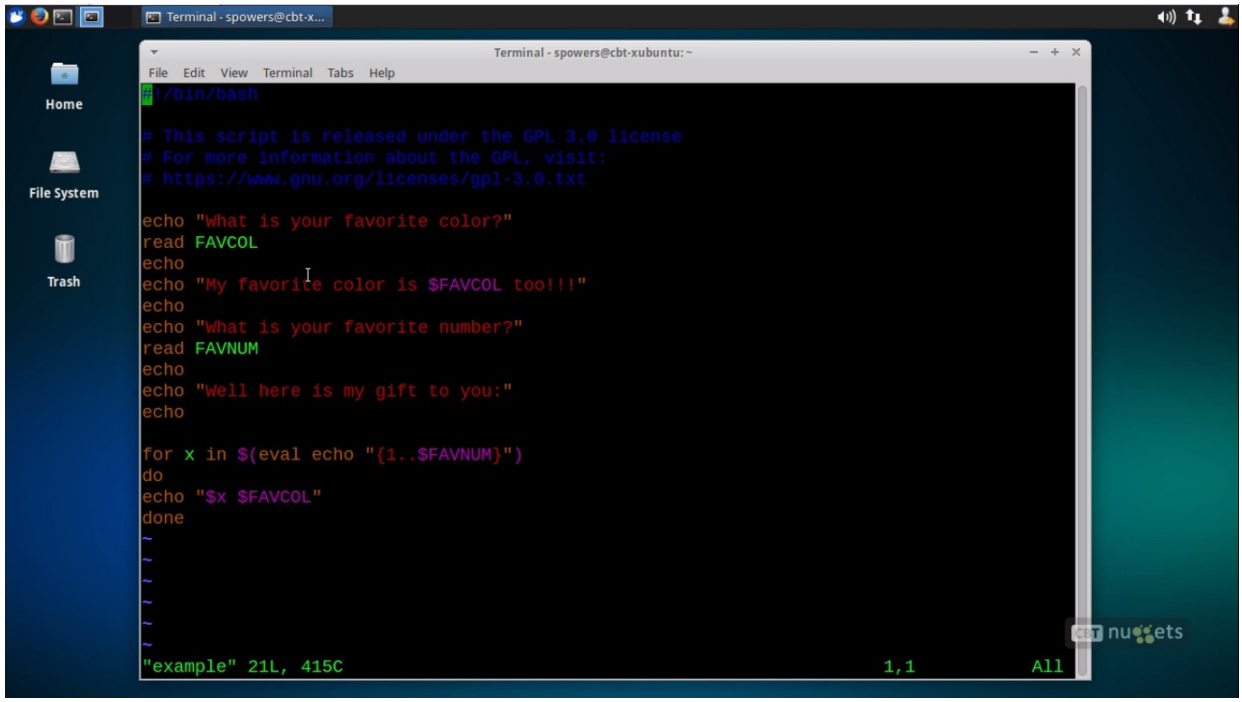
Open Source Philosophy

"Free as in beer, and Free as in speech"

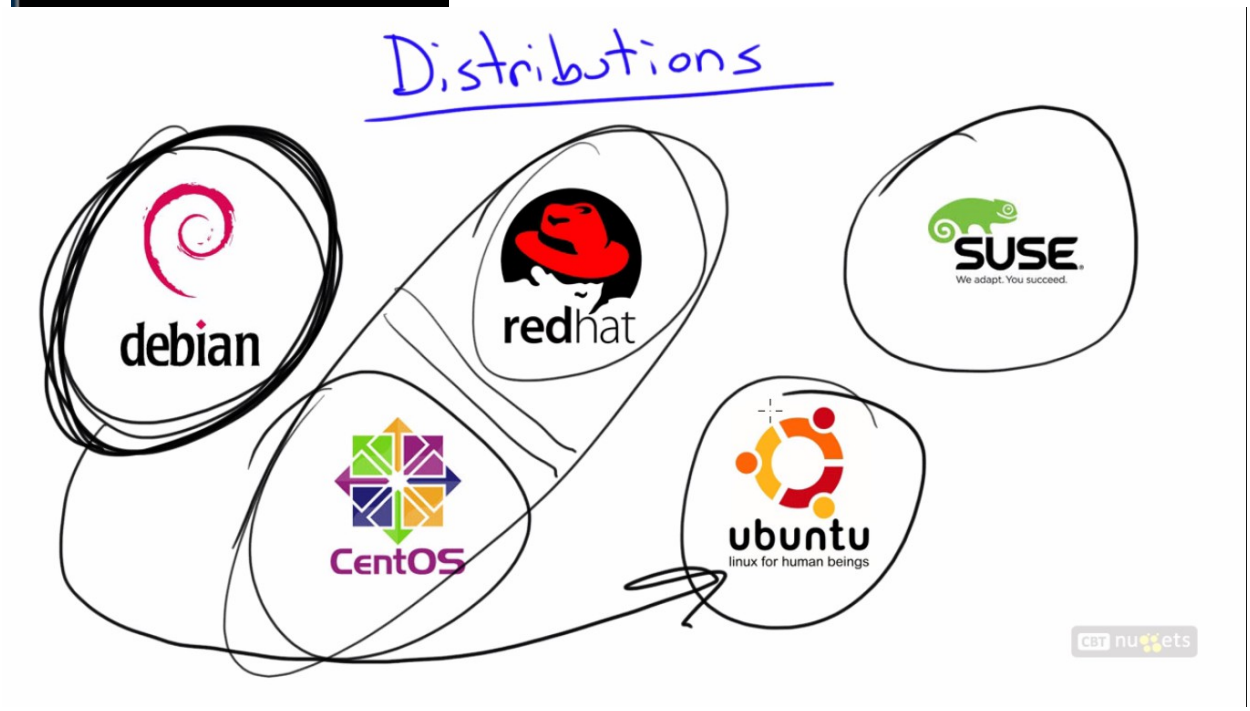
- Gratis vs Libre
- Free cookies, versus free cookie recipe
- With Open Source, it's not about the money; it's about your rights

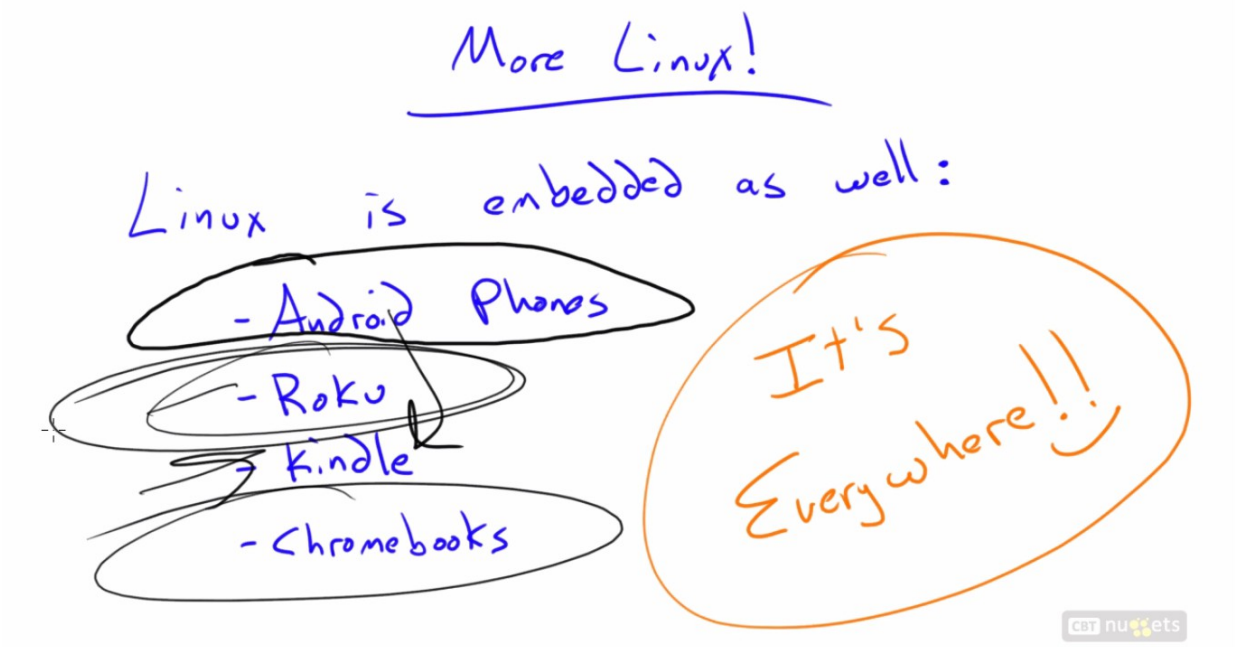
→ Redhat is CentOS

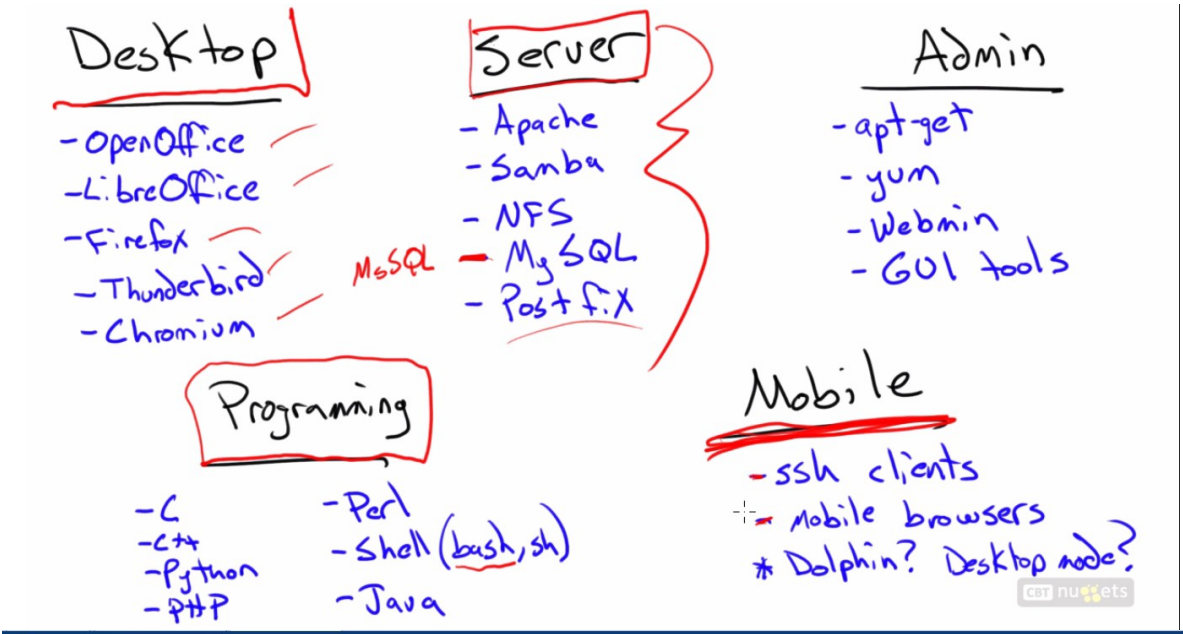


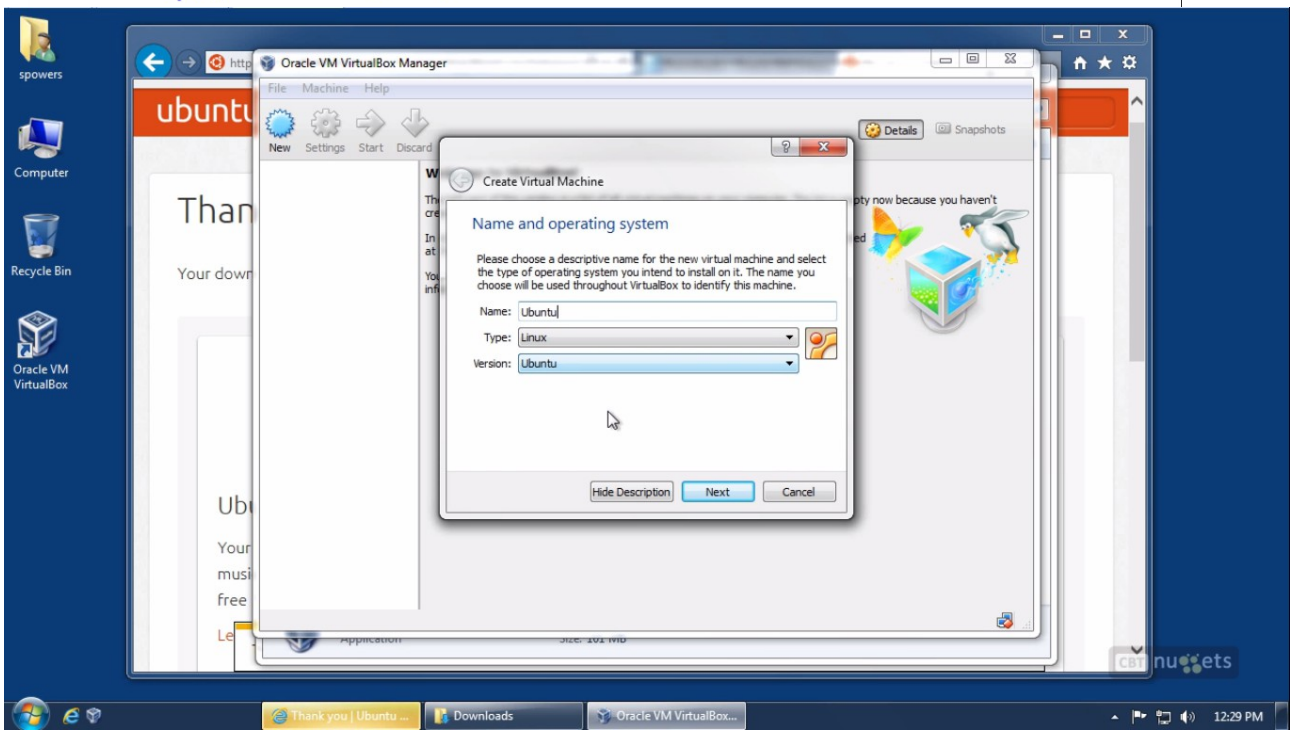


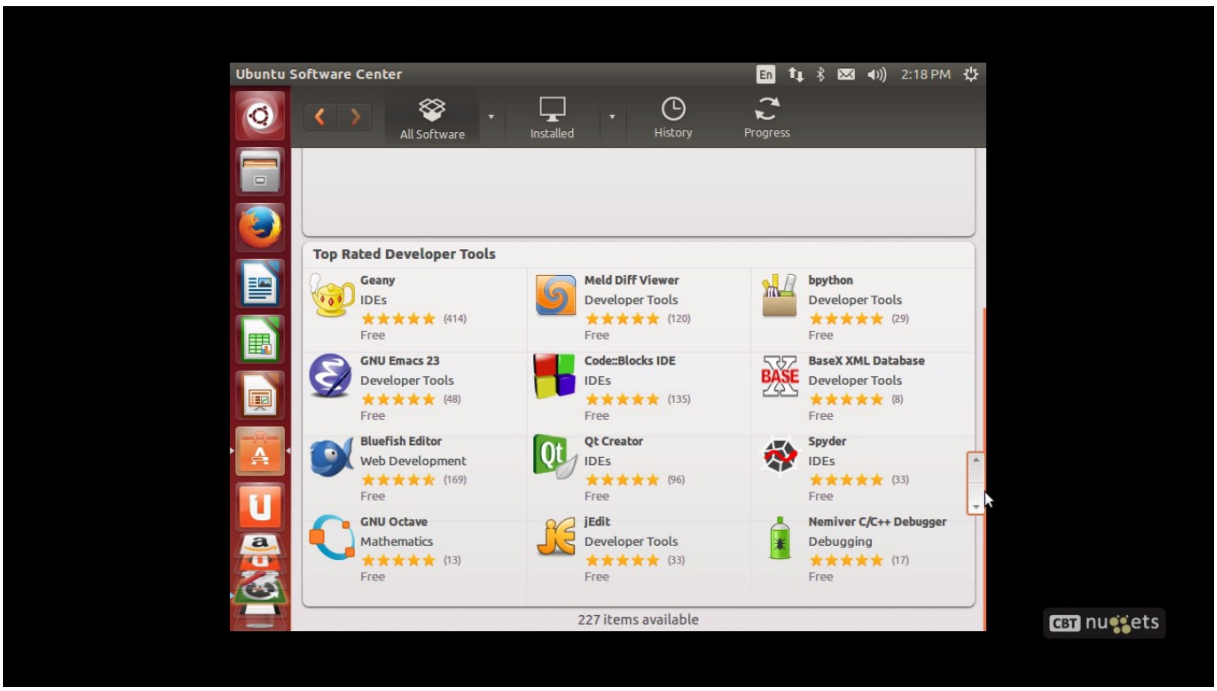
```
spowers@cbt-xubuntu:~$ ./example
What is your favorite color?
Turtle

My favorite color is Turtle too!!!

What is your favorite number?
five

Well here is my gift to you:

{1..five} Turtle
spowers@cbt-xubuntu:~$
```



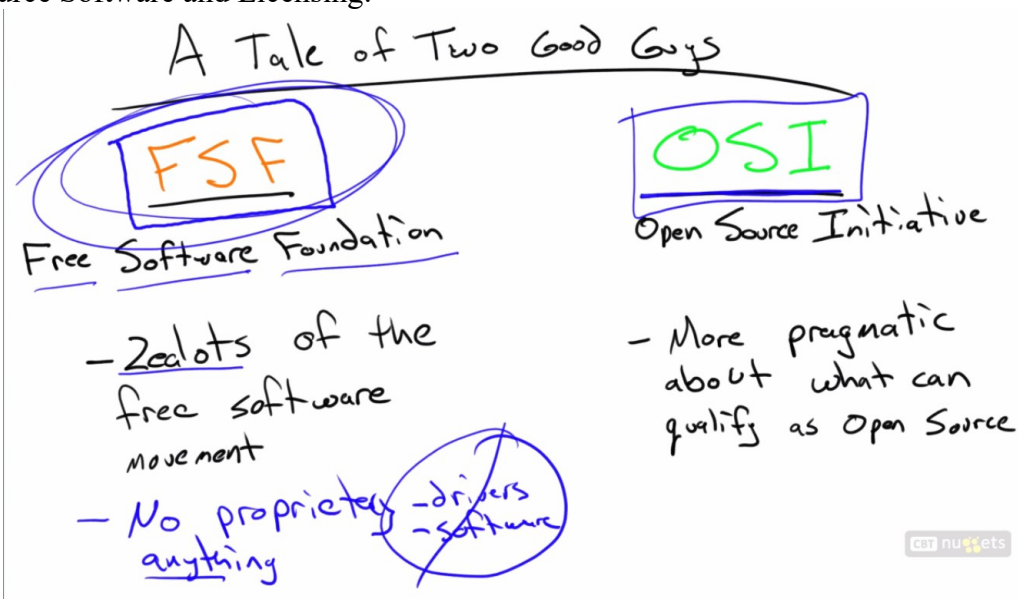


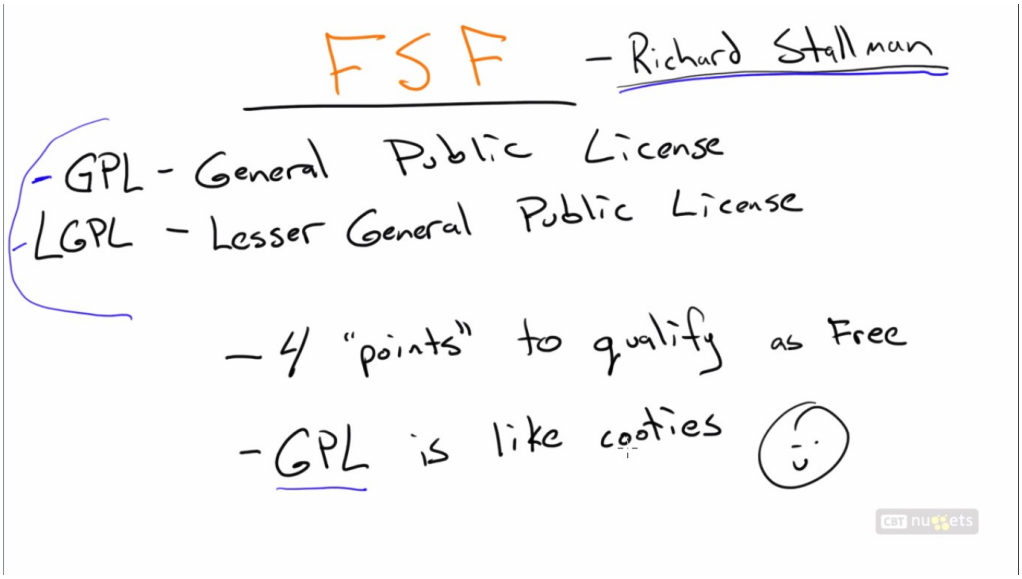

Desktop
- OpenOffice
- LibreOffice
- Firefox
- Thunderbird
- Chromium
Server
- Apache
- Samba
- NFS
- MySQL
- PostFix
MsSQL
Admin
- apt-get
- yum
- Webmin
- GUI tools
Programming
- C
- C++
- Python
- PHP
- Perl
- Shell (bash, sh)
- Java
Mobile
- ssh clients
- Mobile browsers
* Dolphin? Desktop mode?

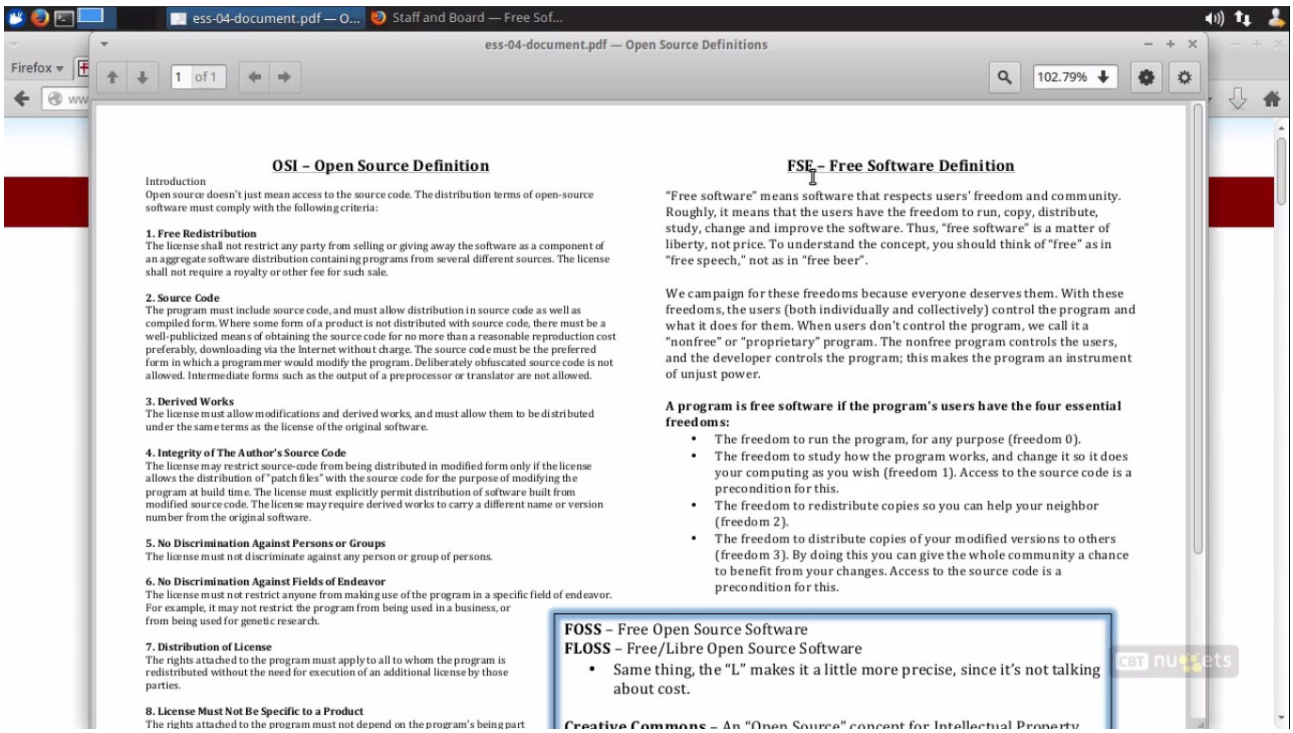

spowers
Computer
Recycle Bin
Oracle VM VirtualBox
Oracle VM VirtualBox Manager
File Machine Help
New Settings Start Discard
Details Snapshots
Create Virtual Machine
Name and operating system
Please choose a descriptive name for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.
Name: Ubuntu
Type: Linux
Version: Ubuntu
Hide Description
Next
Cancel
Thank you | Ubuntu ...
Downloads
Oracle VM VirtualBox...
12:29 PM



Open Source Software and Licensing:



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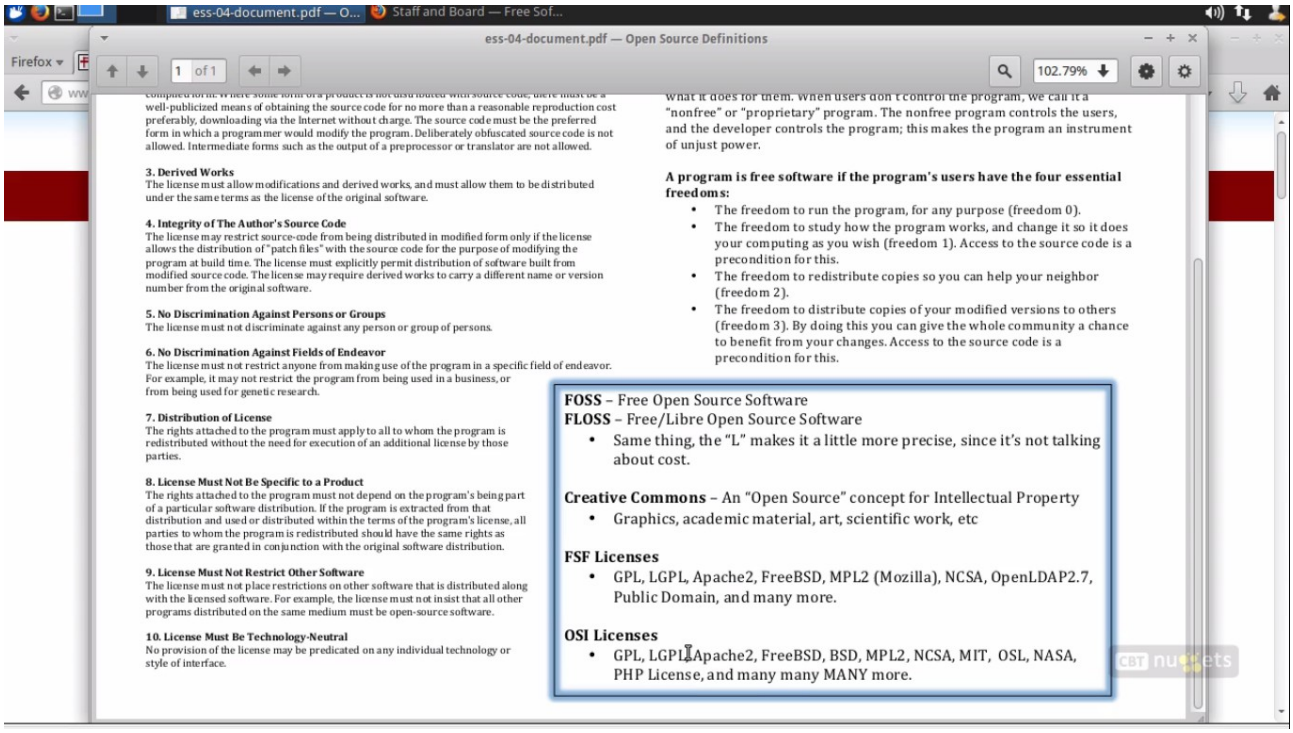
OSI – Open Source Definition
Introduction
Open source doesn't just mean access to the source code. The distribution terms of open-source software must comply with the following criteria:
1. Free Redistribution
The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.
2. Source Code
The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably, downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.
3. Derived Works
The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.
4. Integrity of The Author's Source Code
The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.
5. No Discrimination Against Persons or Groups
The license must not discriminate against any person or group of persons.
6. No Discrimination Against Fields of Endeavor
The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.
7. Distribution of License
The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.
8. License Must Not Be Specific to a Product
The rights attached to the program must not depend on the program's being part
FSF – Free Software Definition
"Free software" means software that respects users' freedom and community. Roughly, it means that the users have the freedom to run, copy, distribute, study, change and improve the software. Thus, "free software" is a matter of liberty, not price. To understand the concept, you should think of "free" as in "free speech," not as in "free beer".
We campaign for these freedoms because everyone deserves them. With these freedoms, the users (both individually and collectively) control the program and what it does for them. When users don't control the program, we call it a "nonfree" or "proprietary" program. The nonfree program controls the users, and the developer controls the program; this makes the program an instrument of unjust power.
A program is free software if the program's users have the four essential freedoms:
• The freedom to run the program, for any purpose (freedom 0).
• The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.
• The freedom to redistribute copies so you can help your neighbor (freedom 2).
• The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.
FOSS – Free Open Source Software
FLOSS – Free/Libre Open Source Software
• Same thing, the "L" makes it a little more precise, since it's not talking about cost.
Creative Commons – An "Open Source" concept for Intellectual Property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Staff and Board — Free Sof...
ess-04-document.pdf — Open Source Definitions
Firefox
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well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably, downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.
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5. No Discrimination Against Persons or Groups
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6. No Discrimination Against Fields of Endeavor
The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.
7. Distribution of License
The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.
8. License Must Not Be Specific to a Product
The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.
9. License Must Not Restrict Other Software
The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.
10. License Must Be Technology-Neutral
No provision of the license may be predicated on any individual technology or style of interface.
what it does for them. When users don't control the program, we call it a "nonfree" or "proprietary" program. The nonfree program controls the users, and the developer controls the program; this makes the program an instrument of unjust power.
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FLOSS – Free/Libre Open Source Software
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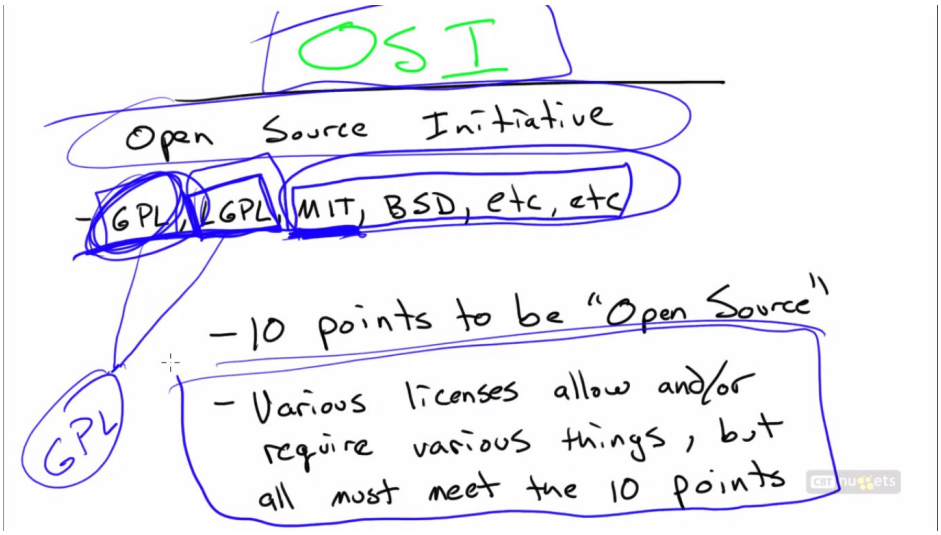
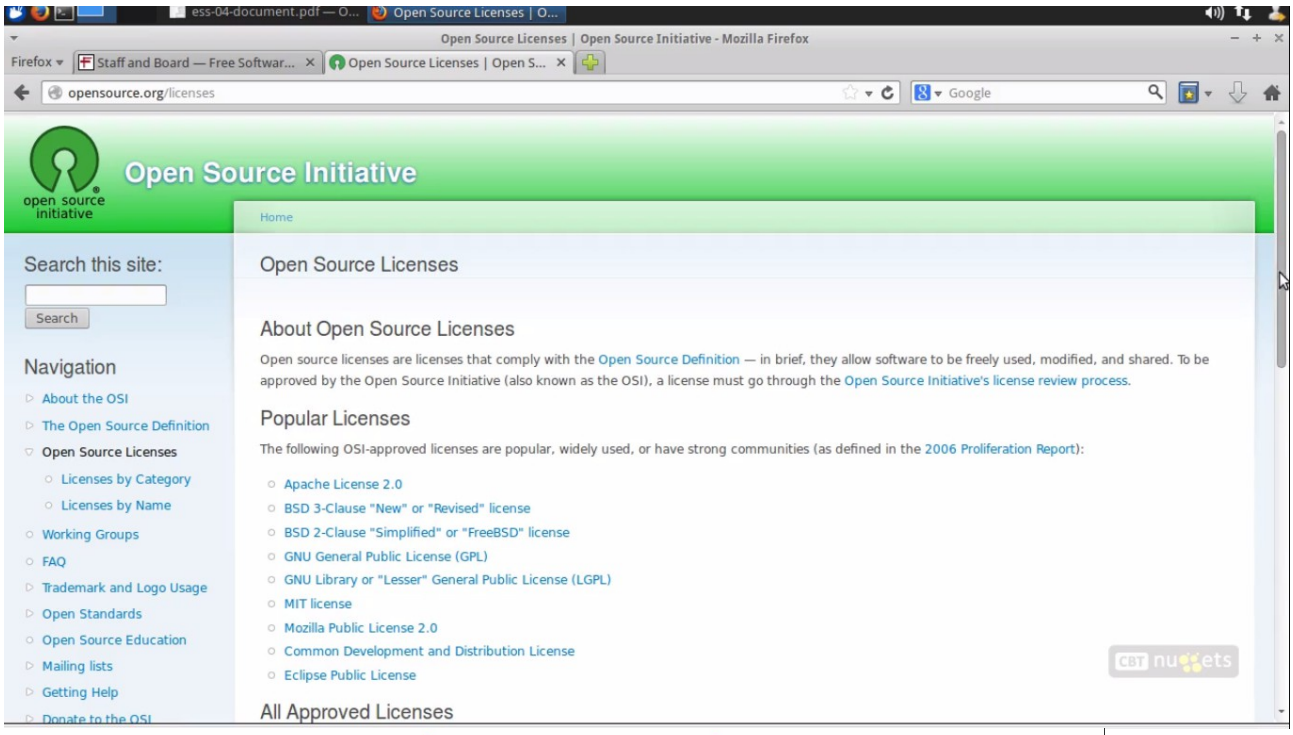
Creative Commons – An "Open Source" concept for Intellectual Property
• Graphics, academic material, art, scientific work, etc
FSF Licenses
• GPL, LGPL, Apache2, FreeBSD, MPL2 (Mozilla), NCSA, OpenLDAP2.7, Public Domain, and many more.
OSI Licenses
• GPL, LGPL, Apache2, FreeBSD, BSD, MPL2, NCSA, MIT, OSL, NASA, PHP License, and many many MANY more.


OSI
Open Source Initiative
- GPL, LGPL, MIT, BSD, etc, etc
- 10 points to be "Open Source"
- Various licenses allow and/or require various things, but all must meet the 10 points
GPL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Getting Help
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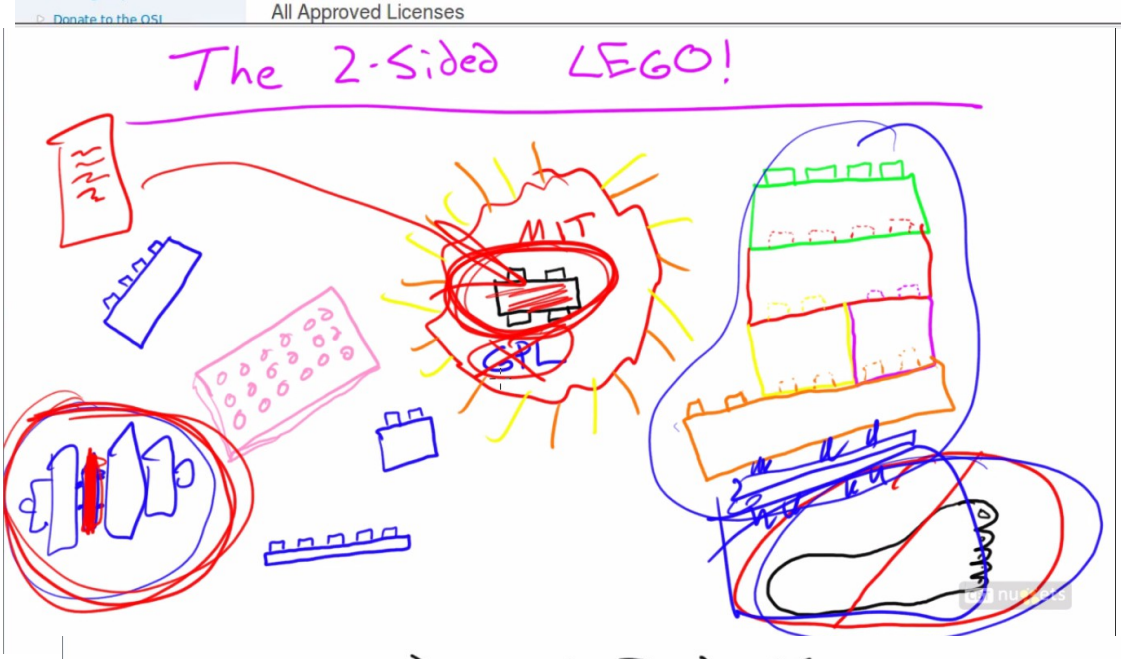
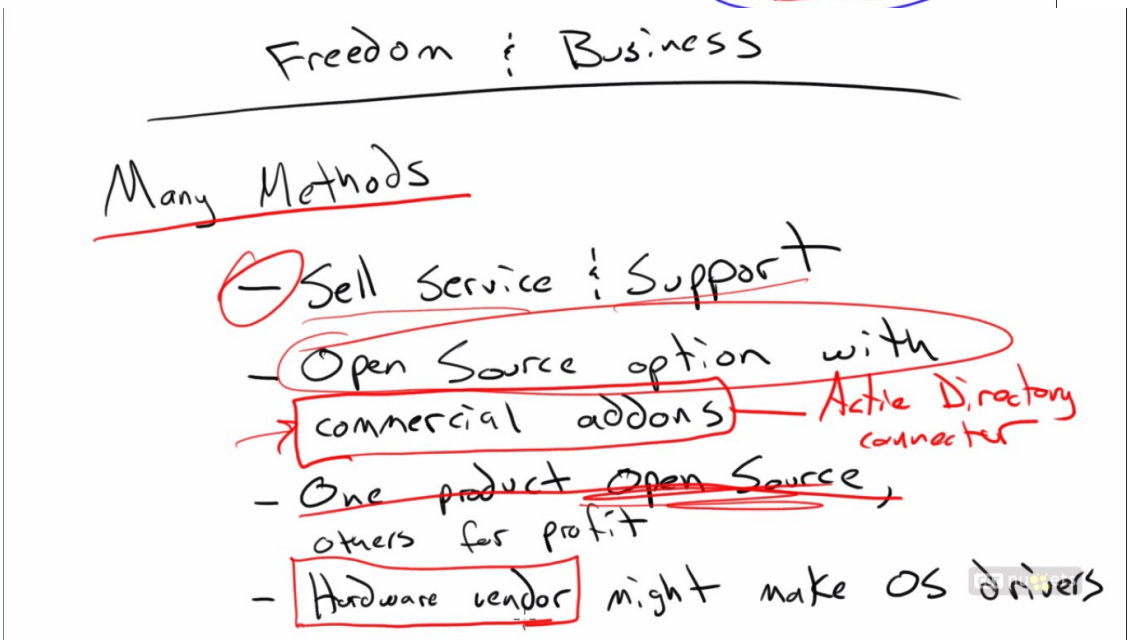
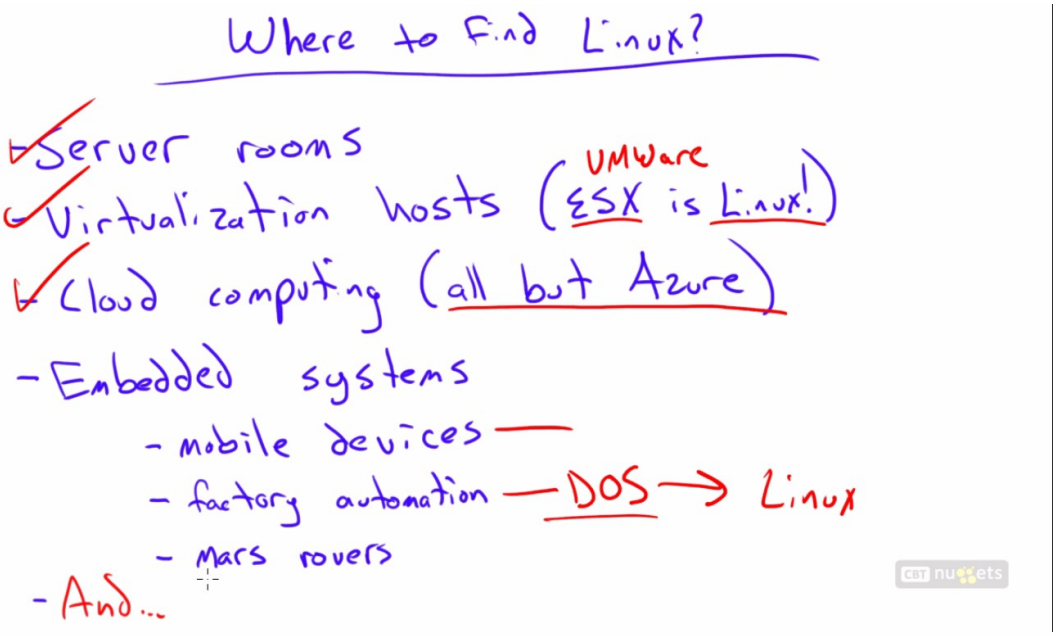
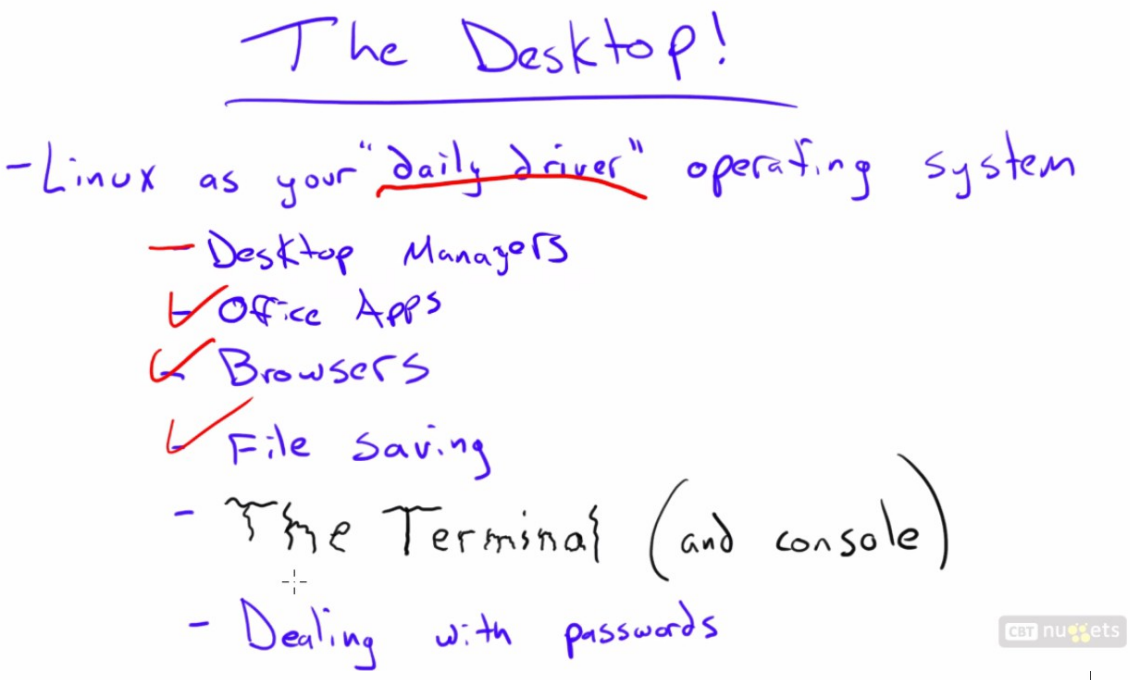
About Open Source Licenses
Open source licenses are licenses that comply with the Open Source Definition — in brief, they allow software to be freely used, modified, and shared. To be approved by the Open Source Initiative (also known as the OSI), a license must go through the Open Source Initiative's license review process.
Popular Licenses
The following OSI-approved licenses are popular, widely used, or have strong communities (as defined in the 2006 Proliferation Report):
Apache License 2.0
BSD 3-Clause "New" or "Revised" license
BSD 2-Clause "Simplified" or "FreeBSD" license
GNU General Public License (GPL)
GNU Library or "Lesser" General Public License (LGPL)
MIT license
Mozilla Public License 2.0
Common Development and Distribution License
Eclipse Public License
All Approved Licenses

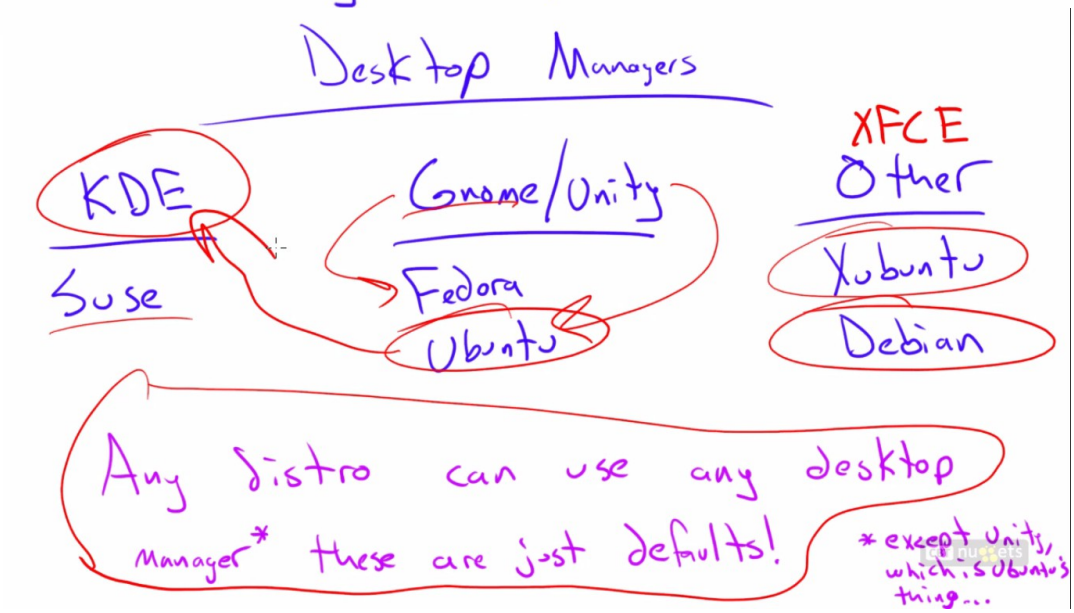

The 2-Sided LEGO!
MIT
GPL


Freedom & Business
Many Methods
- Sell service & support
- Open Source option with
commercial addons
Active Directory connector
- One product Open Source, others for profit
- Hardware vendor might make OS drivers

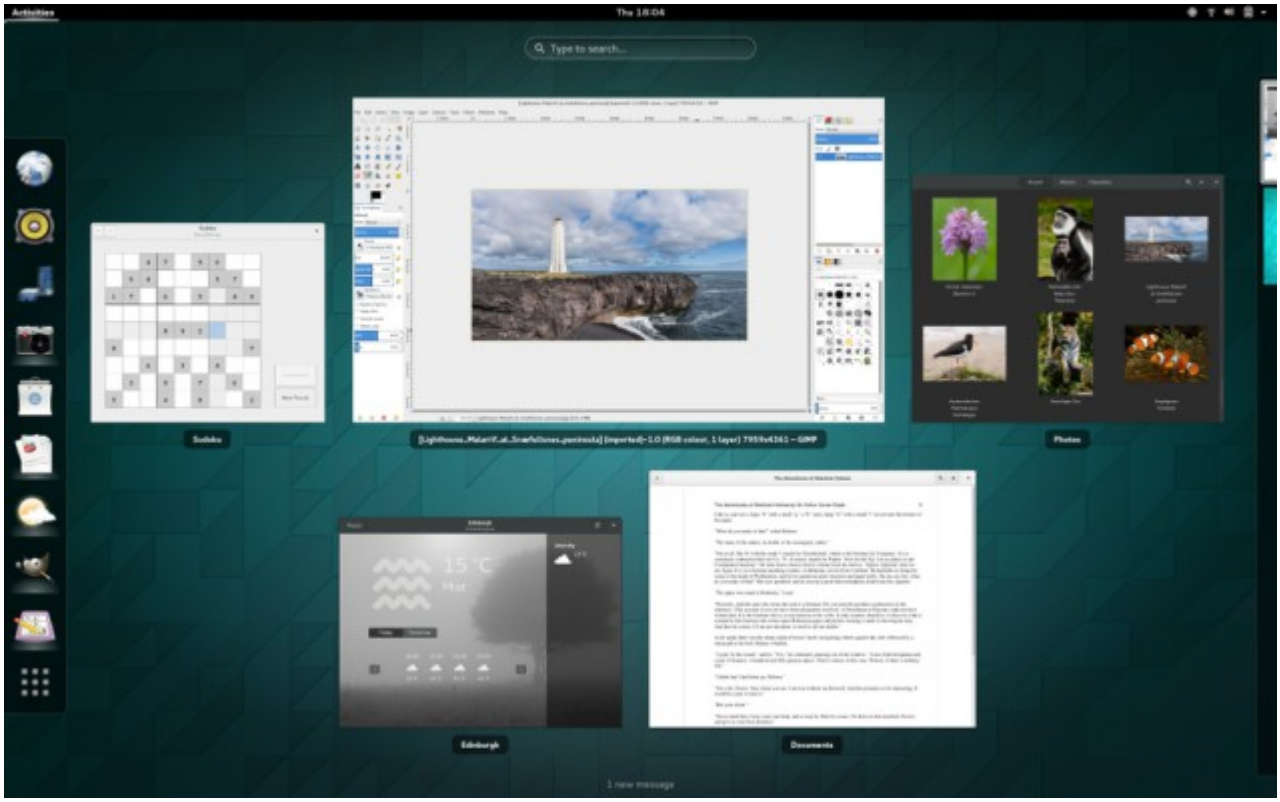
ICT (Information and Communications Technology):





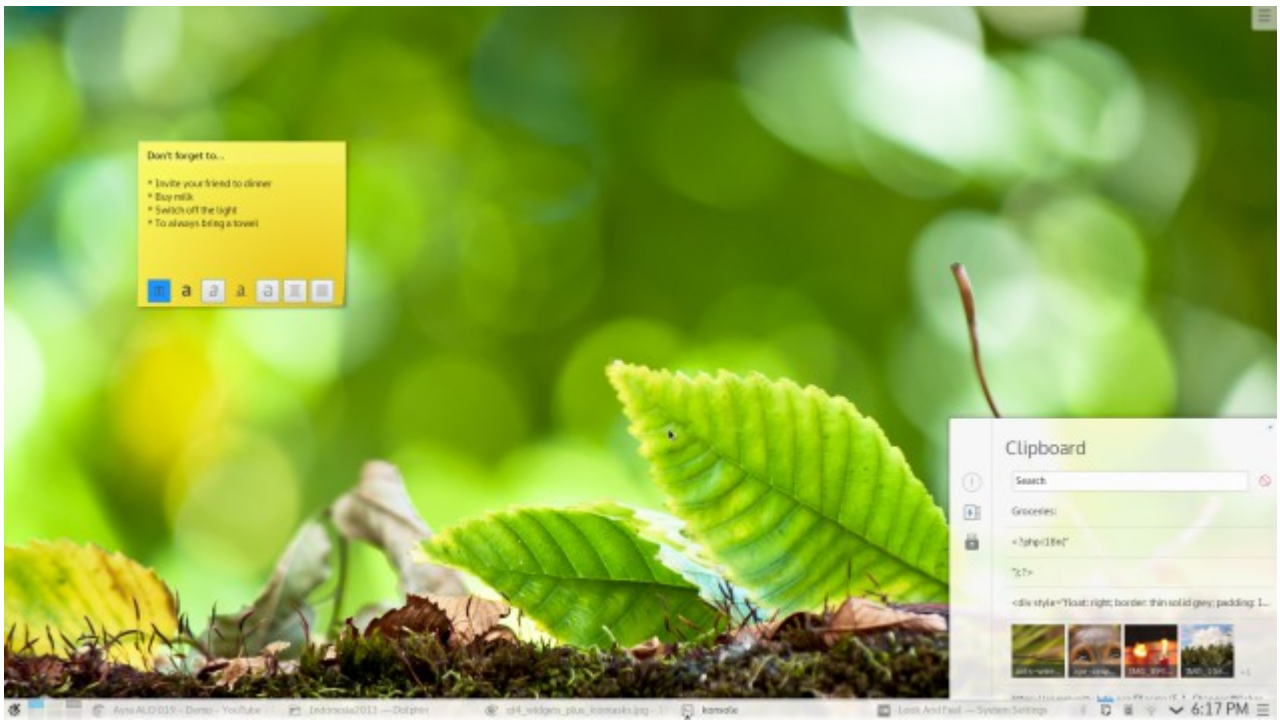


GNOME Shell (GNU Object Model Environment)

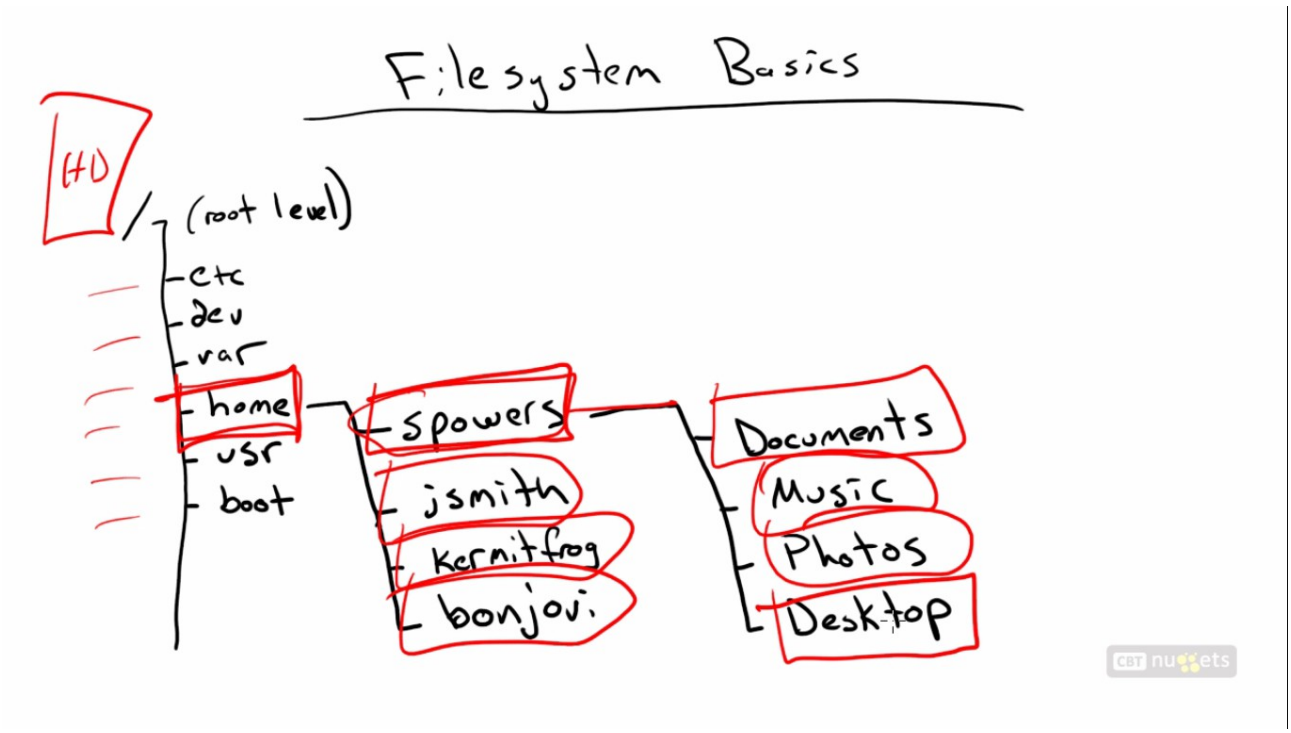


Xfce

KDE (K Desktop Environment)



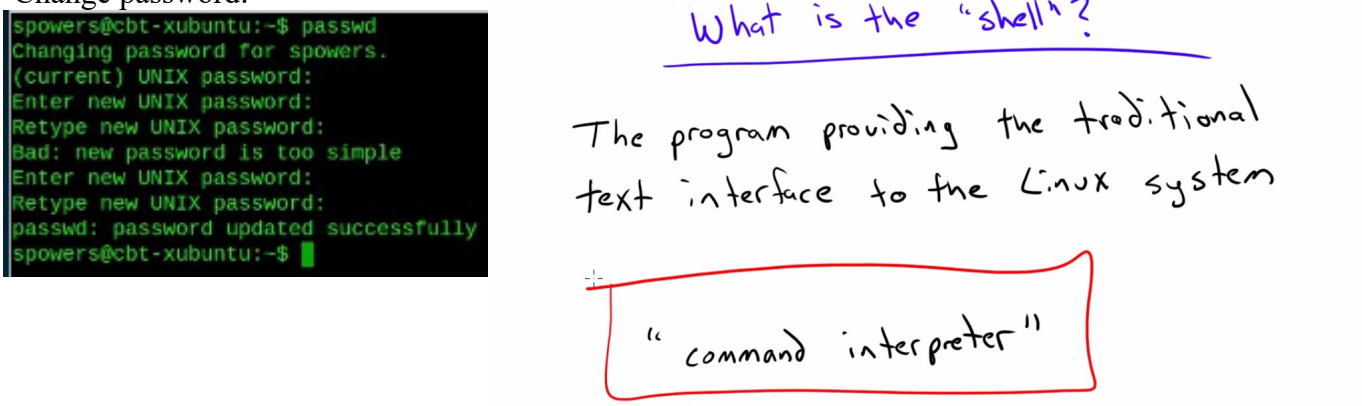
Unity

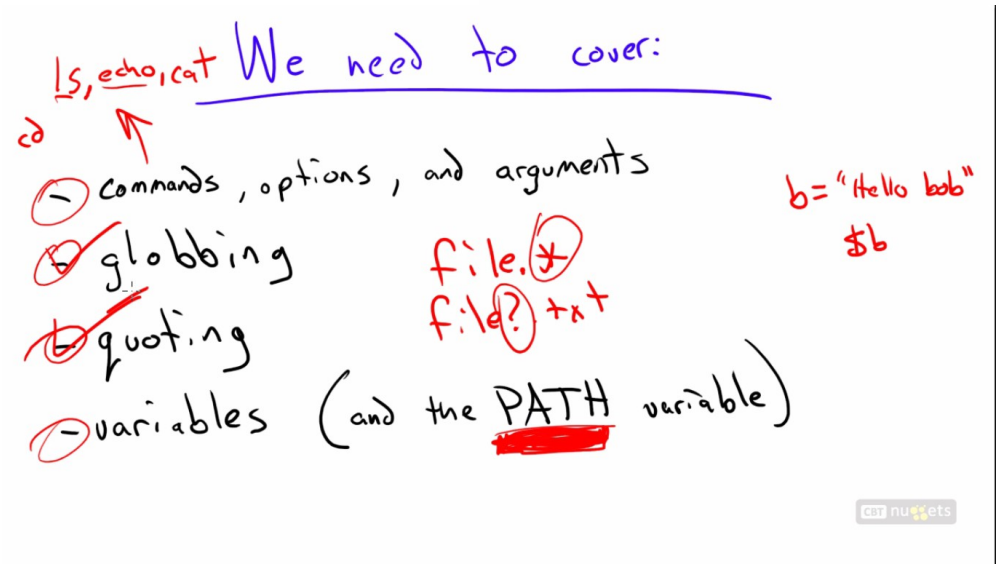


Press Ctrl+F1 to get to the console screen of Linux as opposed to a terminal window.

Change password:

```
spowers@cbt-xubuntu:~$ passwd
Changing password for spowers.
(current) UNIX password:
Enter new UNIX password:
Retype new UNIX password:
Bad: new password is too simple
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
spowers@cbt-xubuntu:~$
```





```
spowers@cbt-xubuntu:~/Documents$ ls
file1.txt  file2.txt
spowers@cbt-xubuntu:~/Documents$ ls -l
total 8
-rw-r--r-- 1 spowers spowers 38 Mar 25 13:55 file1.txt
-rw-r--r-- 1 spowers spowers 64 Mar 25 13:55 file2.txt
spowers@cbt-xubuntu:~/Documents$ ls -l /home/spowers/Documents
total 8
-rw-r--r-- 1 spowers spowers 38 Mar 25 13:55 file1.txt
-rw-r--r-- 1 spowers spowers 64 Mar 25 13:55 file2.txt
```

```
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 4
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file1.txt
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Apr  7 09:30 thing2
spowers@cbt-xubuntu:~/Folder1$ ls -R
.:
file1.txt  file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2

./thing2:
thingy1.txt  thingy2.txt
spowers@cbt-xubuntu:~/Folder1$ cd thing2
spowers@cbt-xubuntu:~/Folder1/thing2$ ls
thingy1.txt  thingy2.txt
spowers@cbt-xubuntu:~/Folder1/thing2$ ls -l
total 0
-rw-r--r-- 1 spowers spowers 0 Apr  7 09:59 thingy1.txt
-rw-r--r-- 1 spowers spowers 0 Apr  7 09:59 thingy2.txt
spowers@cbt-xubuntu:~/Folder1/thing2$ pwd
/home/spowers/Folder1/thing2
spowers@cbt-xubuntu:~/Folder1/thing2$ cd ..
spowers@cbt-xubuntu:~/Folder1$ ls -a
.  ..  file1.txt  file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$
```

```
spowers@cbt-xubuntu:~/Folder1$ ls -a
.  ..  file1.txt  file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$ mv file1.txt .file1.txt
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$ ls -a
.  ..  .file1.txt  file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$ cd
spowers@cbt-xubuntu:~$ ls -a
.              Desktop     .gstreamer-0.10  .profile      .xscreensaver
..             .dmrc       .ICEauthority    Public        .xsession-errors
.bash_history  Documents   .local           Templates     .xsession-errors.old
.bash_logout   Downloads   .mozilla         Videos
.bashrc        Folder1     Music            .viminfo
.cache         .gconf      Pictures         .Xauthority
.config        .gnome2     .pki             .Xdefaults
spowers@cbt-xubuntu:~$ ls -la
```

```
spowers@cbt-xubuntu:~/Documents$ cat file1.txt
This is file 1.
It is two lines long.
spowers@cbt-xubuntu:~/Documents$ cat file2.txt
This is file 2.
It is three lines long.
This is the third line!
spowers@cbt-xubuntu:~/Documents$ cat file1.txt file2.txt
This is file 1.
It is two lines long.
This is file 2.
It is three lines long.
This is the third line!
```

```
spowers@cbt-xubuntu:~/Documents$ echo Hello
Hello
spowers@cbt-xubuntu:~/Documents$ echo Hello There
Hello There
spowers@cbt-xubuntu:~/Documents$ echo Hello         There
Hello There
spowers@cbt-xubuntu:~/Documents$ echo "Hello             There"
Hello             There
spowers@cbt-xubuntu:~/Documents$ a=Hello
spowers@cbt-xubuntu:~/Documents$ echo $a
Hello
spowers@cbt-xubuntu:~/Documents$ a=Hello There
There: command not found
spowers@cbt-xubuntu:~/Documents$ a="Hello There"
spowers@cbt-xubuntu:~/Documents$ echo $a
Hello There
spowers@cbt-xubuntu:~/Documents$ b="Good Buddy"
spowers@cbt-xubuntu:~/Documents$ echo $a $b
Hello There Good Buddy
spowers@cbt-xubuntu:~/Documents$ echo "$a$b"
Hello ThereGood Buddy
spowers@cbt-xubuntu:~/Documents$ echo $b
Good Buddy
spowers@cbt-xubuntu:~/Documents$
```

```
spowers@cbt-xubuntu:~$ cd Documents/
spowers@cbt-xubuntu:~/Documents$ ls
file1.txt  file2.txt
spowers@cbt-xubuntu:~/Documents$ ls *.txt
file1.txt  file2.txt
spowers@cbt-xubuntu:~/Documents$ ls file1.*
file1.txt
spowers@cbt-xubuntu:~/Documents$ ls file?.txt
file1.txt  file2.txt
spowers@cbt-xubuntu:~/Documents$ ls *
file1.txt  file2.txt
```

```
spowers@cbt-xubuntu:~/Documents$ echo $PATH
/usr/lib/lightdm/lightdm:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/u
sr/games:/usr/local/games
spowers@cbt-xubuntu:~/Documents$ which ls
/bin/ls
spowers@cbt-xubuntu:~/Documents$ which echo
/bin/echo
spowers@cbt-xubuntu:~/Documents$ file1.txt
file1.txt: command not found
spowers@cbt-xubuntu:~/Documents$ ls; ls
file1.txt  file2.txt
file1.txt  file2.txt
```

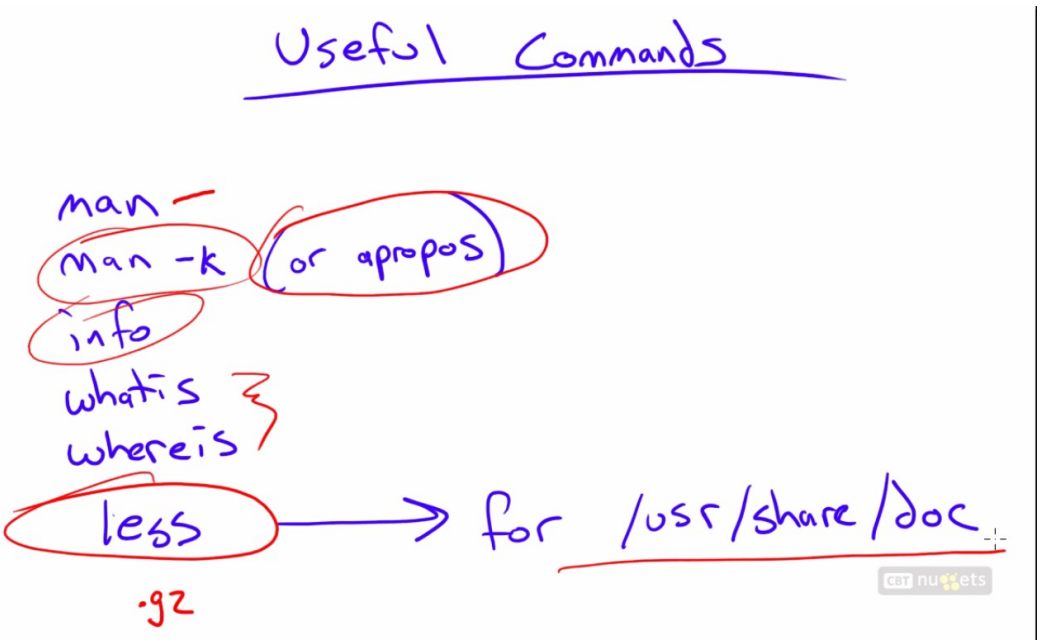
```
spowers@cbt-xubuntu:~/Documents$ a="Hello there"
spowers@cbt-xubuntu:~/Documents$ b="good buddy"
spowers@cbt-xubuntu:~/Documents$ echo $a $b
Hello there good buddy
spowers@cbt-xubuntu:~/Documents$ echo $a
Hello there
spowers@cbt-xubuntu:~/Documents$ echo $b
good buddy
spowers@cbt-xubuntu:~/Documents$ echo $a; echo $b
Hello there
good buddy
spowers@cbt-xubuntu:~/Documents$ a=Hello
spowers@cbt-xubuntu:~/Documents$ echo $a $b
Hello good buddy
spowers@cbt-xubuntu:~/Documents$ echo $a$b
Hellogood buddy
spowers@cbt-xubuntu:~/Documents$
```

history command shows all the previously typed commands

How to get help on Linux command Line:

```
spowers@cbt-xubuntu:~$ ls --help
Usage: ls [OPTION]... [FILE]...
List information about the FILEs (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

Mandatory arguments to long options are mandatory for short options too.
  -a, --all                  do not ignore entries starting with .
  -A, --almost-all           do not list implied . and ..
      --author               with -l, print the author of each file
  -b, --escape               print C-style escapes for nongraphic characters
      --block-size=SIZE      scale sizes by SIZE before printing them.  E.g.,
                               '--block-size=M' prints sizes in units of
                               1,048,576 bytes.  See SIZE format below.
  -B, --ignore-backups       do not list implied entries ending with ~
  -c                         with -lt: sort by, and show, ctime (time of last
                               modification of file status information)
                               with -l: show ctime and sort by name
                               otherwise: sort by ctime, newest first
  -C                         list entries by columns
      --color[=WHEN]         colorize the output.  WHEN defaults to 'always'
```

```
spowers@cbt-xubuntu:~$ cat --help
Usage: cat [OPTION]... [FILE]...
Concatenate FILE(s), or standard input, to standard output.

  -A, --show-all           equivalent to -vET
  -b, --number-nonblank    number nonempty output lines, overrides -n
  -e                       equivalent to -vE
  -E, --show-ends          display $ at end of each line
  -n, --number             number all output lines
  -s, --squeeze-blank      suppress repeated empty output lines
  -t                       equivalent to -vT
  -T, --show-tabs          display TAB characters as ^I
  -u                       (ignored)
  -v, --show-nonprinting   use ^ and M- notation, except for LFD and TAB
      --help     display this help and exit
      --version  output version information and exit

With no FILE, or when FILE is -, read standard input.

Examples:
  cat f - g  Output f's contents, then standard input, then g's contents.
  cat        Copy standard input to standard output.

Report cat bugs to bug-coreutils@gnu.org
GNU coreutils home page: <http://www.gnu.org/software/coreutils/>
General help using GNU software: <http://www.gnu.org/gethelp/>
For complete documentation, run: info coreutils 'cat invocation'
spowers@cbt-xubuntu:~$
```



clear command clears the screen.

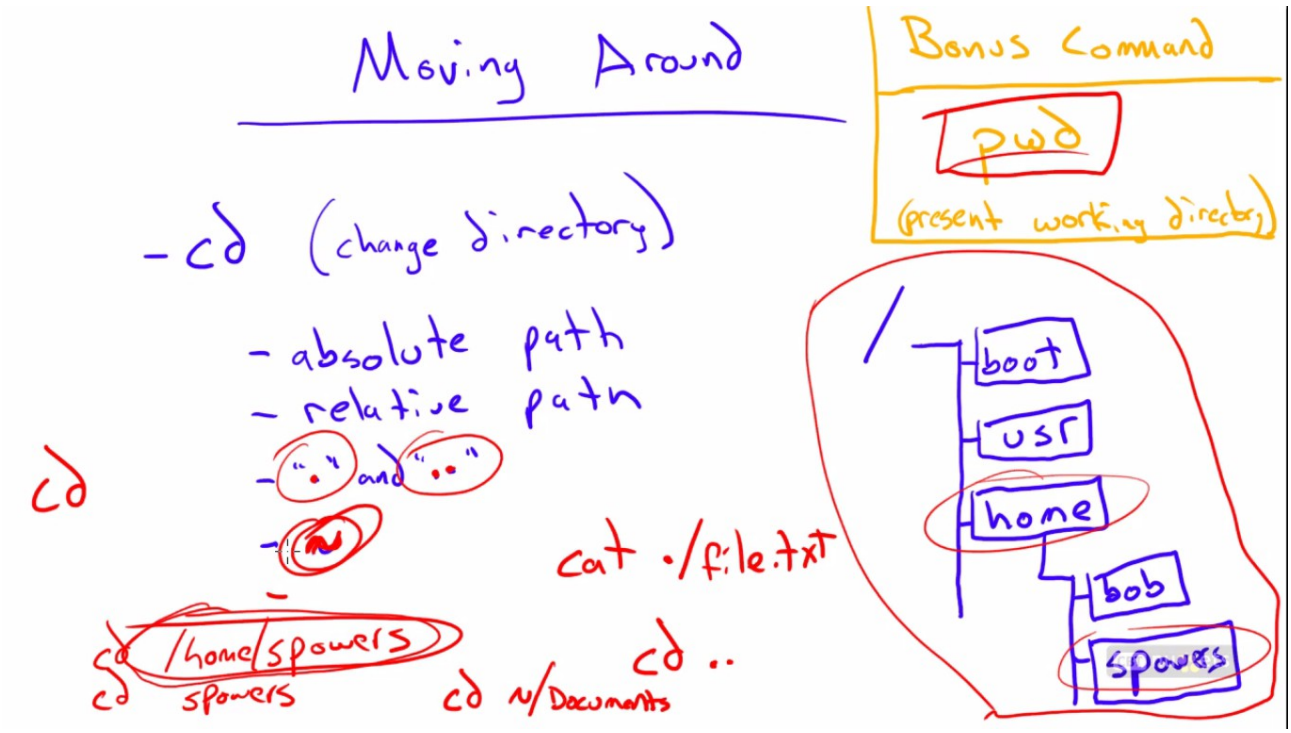
```
spowers@cbt-xubuntu:~$ man ls
spowers@cbt-xubuntu:~$ man echo
```

```
spowers@cbt-xubuntu:~$ man ls
spowers@cbt-xubuntu:~$ man echo
spowers@cbt-xubuntu:~$ man man
spowers@cbt-xubuntu:~$ man -k echo
echo (1)             - display a line of text
l2ping (8)           - Send L2CAP echo request and receive answer
lessecho (1)         - expand metacharacters
pam_echo (8)         - PAM module for printing text messages
ping (8)             - send ICMP ECHO_REQUEST to network hosts
ping6 (8)            - send ICMP ECHO_REQUEST to network hosts
xmessage (1)         - display a message or query in a window (X-based /bin/echo)
spowers@cbt-xubuntu:~$ man ping
spowers@cbt-xubuntu:~$ whatis ping
ping (8)             - send ICMP ECHO_REQUEST to network hosts
spowers@cbt-xubuntu:~$ whatis cat
cat (1)              - concatenate files and print on the standard output
spowers@cbt-xubuntu:~$ whatis ls
ls (1)               - list directory contents
spowers@cbt-xubuntu:~$ whatis man
man (7)              - macros to format man pages
man (1)              - an interface to the on-line reference manuals
spowers@cbt-xubuntu:~$ man 7 man
spowers@cbt-xubuntu:~$ whereis man
man: /usr/bin/man /usr/bin/X11/man /usr/local/man /usr/share/man /usr/share/man/man7/man
.7.gz /usr/share/man/man1/man.1.gz
spowers@cbt-xubuntu:~$
```

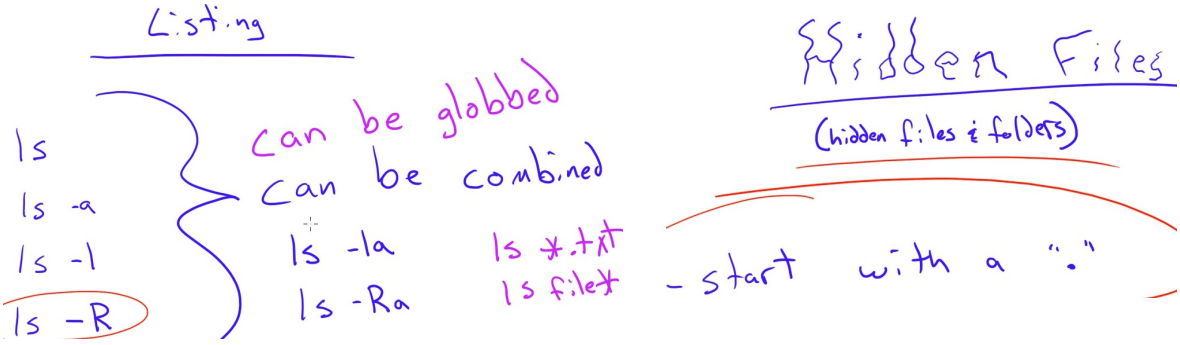
```
spowers@cbt-xubuntu:~$ info ls
spowers@cbt-xubuntu:~$ info man
spowers@cbt-xubuntu:~$ info ping
spowers@cbt-xubuntu:~$ cd /usr/share/doc
spowers@cbt-xubuntu:/usr/share/doc$
```

```
spowers@cbt-xubuntu:/usr/share/doc$ cd python
spowers@cbt-xubuntu:/usr/share/doc/python$ ls
changelog.Debian.gz  faq       python-policy.html     python-policy.txt.gz
copyright            FAQ.html  python-policy.sgml.gz  README.Debian
spowers@cbt-xubuntu:/usr/share/doc/python$ less python-policy.txt.gz
spowers@cbt-xubuntu:/usr/share/doc/python$ cd ..
spowers@cbt-xubuntu:/usr/share/doc$ cd pidgin
spowers@cbt-xubuntu:/usr/share/doc/pidgin$ ls
changelog.Debian.gz  copyright
spowers@cbt-xubuntu:/usr/share/doc/pidgin$ less changelog.Debian.gz
spowers@cbt-xubuntu:/usr/share/doc/pidgin$
```

less command unzips the file in real time as opposed to cat.




```
spowers@cbt-xubuntu:~/Folder1$ pwd
/home/spowers/Folder1
spowers@cbt-xubuntu:~/Folder1$ cd /home/spowers
spowers@cbt-xubuntu:~$ pwd
/home/spowers
spowers@cbt-xubuntu:~$ cd Folder1
spowers@cbt-xubuntu:~/Folder1$ pwd
/home/spowers/Folder1
spowers@cbt-xubuntu:~/Folder1$ cd ..
spowers@cbt-xubuntu:~$ pwd
/home/spowers
spowers@cbt-xubuntu:~$ cd ~/Folder1
spowers@cbt-xubuntu:~/Folder1$ pwd
/home/spowers/Folder1
spowers@cbt-xubuntu:~/Folder1$ cd .
spowers@cbt-xubuntu:~/Folder1$ pwd
/home/spowers/Folder1
spowers@cbt-xubuntu:~/Folder1$ cd
spowers@cbt-xubuntu:~$ pwd
/home/spowers
spowers@cbt-xubuntu:~$ cd /etc
spowers@cbt-xubuntu:/etc$ pwd
/etc
spowers@cbt-xubuntu:/etc$ cd ../home/spowers/Folder1/../
spowers@cbt-xubuntu:~$ pwd
/home/spowers
spowers@cbt-xubuntu:~$
```



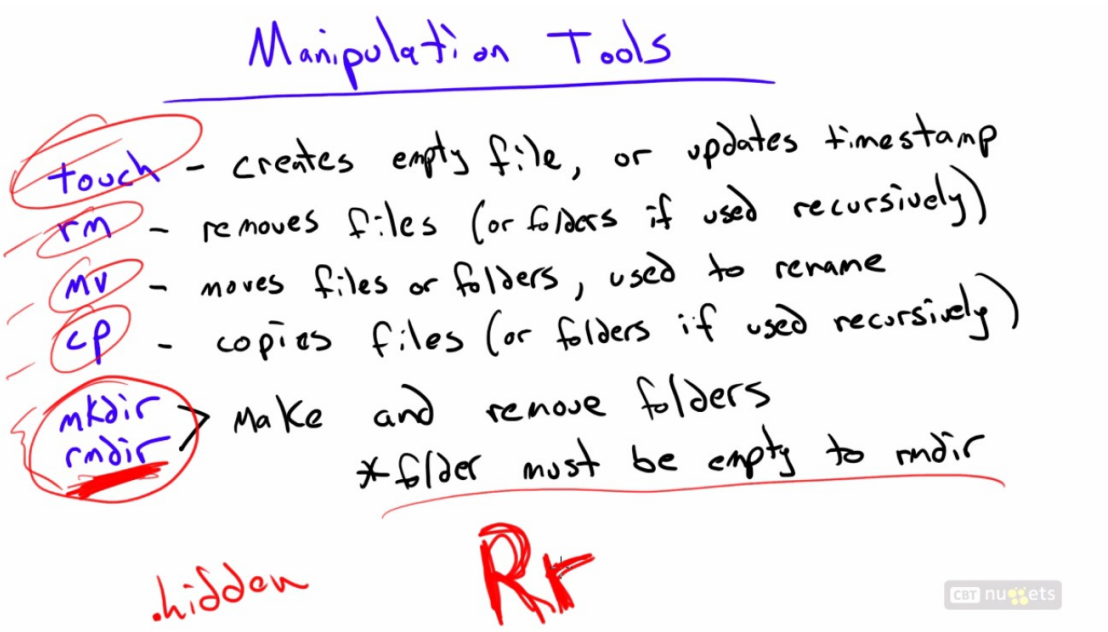

```
spowers@cbt-xubuntu:~$ ls
Desktop  Documents  Downloads  Folder1  Music  Pictures  Public  Templates  Videos
spowers@cbt-xubuntu:~$ pwd
/home/spowers
spowers@cbt-xubuntu:~$ cd Folder1
spowers@cbt-xubuntu:~/Folder1$ pwd
/home/spowers/Folder1
spowers@cbt-xubuntu:~/Folder1$ ls
file1.txt  file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 4
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file1.txt
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Apr  7 09:30 thing2
spowers@cbt-xubuntu:~/Folder1$ ls -R
.:
file1.txt  file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2

./thing2:
thingy1.txt  thingy2.txt
spowers@cbt-xubuntu:~/Folder1$
```

```
spowers@cbt-xubuntu:~/Folder1$ cd thing2
spowers@cbt-xubuntu:~/Folder1/thing2$ ls
thingy1.txt  thingy2.txt
spowers@cbt-xubuntu:~/Folder1/thing2$ ls -l
total 0
-rw-r--r-- 1 spowers spowers 0 Apr  7 09:59 thingy1.txt
-rw-r--r-- 1 spowers spowers 0 Apr  7 09:59 thingy2.txt
spowers@cbt-xubuntu:~/Folder1/thing2$ pwd
/home/spowers/Folder1/thing2
spowers@cbt-xubuntu:~/Folder1/thing2$ cd ..
spowers@cbt-xubuntu:~/Folder1$ ls -a
.  ..  file1.txt  file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$ mv file1.txt .file1.txt
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$ ls -a
.  ..  .file1.txt  file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$ cd
spowers@cbt-xubuntu:~$ ls -a
.              Desktop     .gstreamer-0.10  .profile      .xscreensaver
..             .dmrc       .ICEauthority    Public        .xsession-errors
.bash_history  Documents   .local           Templates     .xsession-errors.old
.bash_logout   Downloads   .mozilla         Videos
.bashrc        Folder1     Music            .viminfo
.cache         .gconf      Pictures         .Xauthority
.config        .gnome2     .pki             .Xdefaults
spowers@cbt-xubuntu:~$ ls -la
```

```
spowers@cbt-xubuntu:~$ ls -la
total 124
drwxr-xr-x 19 spowers spowers 4096 Apr  7 07:48 .
drwxr-xr-x  3 root    root    4096 Feb  4 21:55 ..
-rw-------  1 spowers spowers 2090 Apr  7 09:59 .bash_history
-rw-r--r--  1 spowers spowers  220 Feb  4 21:55 .bash_logout
-rw-r--r--  1 spowers spowers 3637 Feb  4 21:55 .bashrc
drwx------ 13 spowers spowers 4096 Apr  3 18:13 .cache
drwx------ 14 spowers spowers 4096 Mar 25 14:42 .config
```

```
spowers@cbt-xubuntu:~$ ls -l
total 36
drwxr-xr-x 2 spowers spowers 4096 Mar 25 13:58 Desktop
drwxr-xr-x 2 spowers spowers 4096 Mar 25 13:55 Documents
drwxr-xr-x 2 spowers spowers 4096 Mar 17 16:11 Downloads
drwxr-xr-x 3 spowers spowers 4096 Apr  7 10:01 Folder1
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Music
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Pictures
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Public
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Templates
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Videos
spowers@cbt-xubuntu:~$ ls -a
.              Desktop     .gstreamer-0.10  .profile      .xscreensaver
..             .dmrc       .ICEauthority    Public        .xsession-errors
.bash_history  Documents   .local           Templates     .xsession-errors.old
.bash_logout   Downloads   .mozilla         Videos
.bashrc        Folder1     Music            .viminfo
.cache         .gconf      Pictures         .Xauthority
.config        .gnome2     .pki             .Xdefaults
```

```
spowers@cbt-xubuntu:~$ cd Folder1
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$ ls -a
.  ..  .file1.txt  file2.jpg  file3.jpg  file4.jpeg  thing1.txt  thing2
spowers@cbt-xubuntu:~/Folder1$ ls file*
file2.jpg  file3.jpg  file4.jpeg
spowers@cbt-xubuntu:~/Folder1$ ls -Rla
.:
total 12
drwxr-xr-x  3 spowers spowers 4096 Apr  7 10:01 .
drwxr-xr-x 19 spowers spowers 4096 Apr  7 07:48 ..
-rw-r--r--  1 spowers spowers    0 Apr  7 07:48 .file1.txt
-rw-r--r--  1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r--  1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r--  1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r--  1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x  2 spowers spowers 4096 Apr  7 09:59 thing2

./thing2:
total 8
drwxr-xr-x 2 spowers spowers 4096 Apr  7 09:59 .
drwxr-xr-x 3 spowers spowers 4096 Apr  7 10:01 ..
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:59 thingy1.txt
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:59 thingy2.txt
spowers@cbt-xubuntu:~/Folder1$
```




```
spowers@cbt-xubuntu:~$ touch myfoot
spowers@cbt-xubuntu:~$ ls -l
total 36
drwxr-xr-x 3 spowers spowers 4096 Apr 17 11:43 Desktop
drwxr-xr-x 2 spowers spowers 4096 Mar 25 13:55 Documents
drwxr-xr-x 2 spowers spowers 4096 Mar 17 16:11 Downloads
drwxr-xr-x 3 spowers spowers 4096 May  6 15:17 Folder1
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Music
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 myfoot
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Pictures
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Public
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Templates
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Videos
spowers@cbt-xubuntu:~$ touch MyFoot
spowers@cbt-xubuntu:~$ ls -l
total 36
drwxr-xr-x 3 spowers spowers 4096 Apr 17 11:43 Desktop
drwxr-xr-x 2 spowers spowers 4096 Mar 25 13:55 Documents
drwxr-xr-x 2 spowers spowers 4096 Mar 17 16:11 Downloads
drwxr-xr-x 3 spowers spowers 4096 May  6 15:17 Folder1
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Music
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 myfoot
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Pictures
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Public
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Templates
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Videos
spowers@cbt-xubuntu:~$
```

```
spowers@cbt-xubuntu:~$ touch "My Hand"
spowers@cbt-xubuntu:~$ ls -l
total 36
drwxr-xr-x 3 spowers spowers 4096 Apr 17 11:43 Desktop
drwxr-xr-x 2 spowers spowers 4096 Mar 25 13:55 Documents
drwxr-xr-x 2 spowers spowers 4096 Mar 17 16:11 Downloads
drwxr-xr-x 3 spowers spowers 4096 May  6 15:17 Folder1
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Music
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 myfoot
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Pictures
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Public
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Templates
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Videos
-rw-r--r-- 1 spowers spowers    0 May  6 15:19 YourFoot
spowers@cbt-xubuntu:~$
```

```
spowers@cbt-xubuntu:~$ cp My\ Hand "Your Hand"
spowers@cbt-xubuntu:~$ ls -l
total 36
drwxr-xr-x 3 spowers spowers 4096 Apr 17 11:43 Desktop
drwxr-xr-x 2 spowers spowers 4096 Mar 25 13:55 Documents
drwxr-xr-x 2 spowers spowers 4096 Mar 17 16:11 Downloads
drwxr-xr-x 4 spowers spowers 4096 May  6 15:32 Folder1
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Music
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Pictures
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Public
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Templates
-rw-r--r-- 1 spowers spowers    0 May  6 15:23 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Videos
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 yourfoot
-rw-r--r-- 1 spowers spowers    0 May  6 15:19 YourFoot
-rw-r--r-- 1 spowers spowers    0 May  6 15:35 Your Hand
spowers@cbt-xubuntu:~$
```

```
spowers@cbt-xubuntu:~$ mv MyFoot Folder1/
spowers@cbt-xubuntu:~$ ls -l
total 36
drwxr-xr-x 3 spowers spowers 4096 Apr 17 11:43 Desktop
drwxr-xr-x 2 spowers spowers 4096 Mar 25 13:55 Documents
drwxr-xr-x 2 spowers spowers 4096 Mar 17 16:11 Downloads
drwxr-xr-x 3 spowers spowers 4096 May  6 15:21 Folder1
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Music
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 myfoot
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Pictures
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Public
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Templates
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Videos
-rw-r--r-- 1 spowers spowers    0 May  6 15:19 YourFoot
spowers@cbt-xubuntu:~$ ls -l Folder1/
total 4
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Apr  7 09:59 thing2
```

```
spowers@cbt-xubuntu:~$ mv myfoot yourfoot
spowers@cbt-xubuntu:~$ ls -l
total 36
drwxr-xr-x 3 spowers spowers 4096 Apr 17 11:43 Desktop
drwxr-xr-x 2 spowers spowers 4096 Mar 25 13:55 Documents
drwxr-xr-x 2 spowers spowers 4096 Mar 17 16:11 Downloads
drwxr-xr-x 3 spowers spowers 4096 May  6 15:21 Folder1
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Music
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Pictures
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Public
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Templates
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Videos
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 yourfoot
-rw-r--r-- 1 spowers spowers    0 May  6 15:19 YourFoot
spowers@cbt-xubuntu:~$ cd Folder1/
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpeg  MyFoot  thing1.txt  thing2
```

```
spowers@cbt-xubuntu:~/Folder1$ cp thing1.txt ..
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 4
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Apr  7 09:59 thing2
spowers@cbt-xubuntu:~/Folder1$ cd ..
spowers@cbt-xubuntu:~$ ls -l
total 36
drwxr-xr-x 3 spowers spowers 4096 Apr 17 11:43 Desktop
drwxr-xr-x 2 spowers spowers 4096 Mar 25 13:55 Documents
drwxr-xr-x 2 spowers spowers 4096 Mar 17 16:11 Downloads
drwxr-xr-x 3 spowers spowers 4096 May  6 15:21 Folder1
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Music
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My
-rw-r--r-- 1 spowers spowers    0 May  6 15:20 My Hand
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Pictures
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Public
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Templates
-rw-r--r-- 1 spowers spowers    0 May  6 15:23 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Feb  4 21:59 Videos
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 yourfoot
-rw-r--r-- 1 spowers spowers    0 May  6 15:19 YourFoot
```

```
spowers@cbt-xubuntu:~/Folder1$ ls thing2
thingy1.txt  thingy2.txt
spowers@cbt-xubuntu:~/Folder1$ cp thing2 thing3
cp: omitting directory ‘thing2’
spowers@cbt-xubuntu:~/Folder1$ cp -R thing2 thing3
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 8
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Apr  7 09:59 thing2
drwxr-xr-x 2 spowers spowers 4096 May  6 15:24 thing3
spowers@cbt-xubuntu:~/Folder1$ ls thing3
thingy1.txt  thingy2.txt
spowers@cbt-xubuntu:~/Folder1$ mv thing3 otherthing
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 8
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
drwxr-xr-x 2 spowers spowers 4096 May  6 15:24 otherthing
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Apr  7 09:59 thing2
```

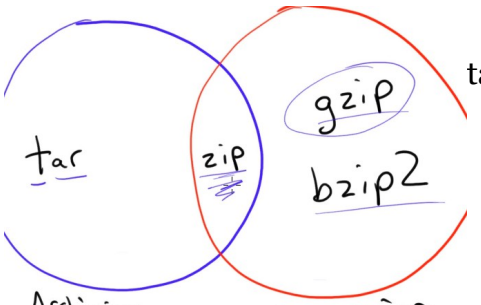
```
spowers@cbt-xubuntu:~/Folder1$ mkdir thingthing
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 12
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
drwxr-xr-x 2 spowers spowers 4096 May  6 15:24 otherthing
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Apr  7 09:59 thing2
drwxr-xr-x 2 spowers spowers 4096 May  6 15:25 thingthing
spowers@cbt-xubuntu:~/Folder1$ rmdir thingthing
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 8
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
drwxr-xr-x 2 spowers spowers 4096 May  6 15:24 otherthing
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 Apr  7 09:59 thing2
spowers@cbt-xubuntu:~/Folder1$ rmdir thing2
rmdir: failed to remove ‘thing2’: Directory not empty
spowers@cbt-xubuntu:~/Folder1$ cd thing2
spowers@cbt-xubuntu:~/Folder1/thing2$ ls
thingy1.txt  thingy2.txt
spowers@cbt-xubuntu:~/Folder1/thing2$
```

```
spowers@cbt-xubuntu:~/Folder1/thing2$ rm thingy1.txt
spowers@cbt-xubuntu:~/Folder1/thing2$ ls -l
total 0
-rw-r--r-- 1 spowers spowers 0 Apr  7 09:59 thingy2.txt
spowers@cbt-xubuntu:~/Folder1/thing2$ touch thingy1.txt
spowers@cbt-xubuntu:~/Folder1/thing2$ ls -l
total 0
-rw-r--r-- 1 spowers spowers 0 May  6 15:26 thingy1.txt
-rw-r--r-- 1 spowers spowers 0 Apr  7 09:59 thingy2.txt
spowers@cbt-xubuntu:~/Folder1/thing2$ rm *
spowers@cbt-xubuntu:~/Folder1/thing2$ ls -l
total 0
spowers@cbt-xubuntu:~/Folder1/thing2$ cd ..
spowers@cbt-xubuntu:~/Folder1$ rmdir thing2
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 4
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
drwxr-xr-x 2 spowers spowers 4096 May  6 15:24 otherthing
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
spowers@cbt-xubuntu:~/Folder1$
```

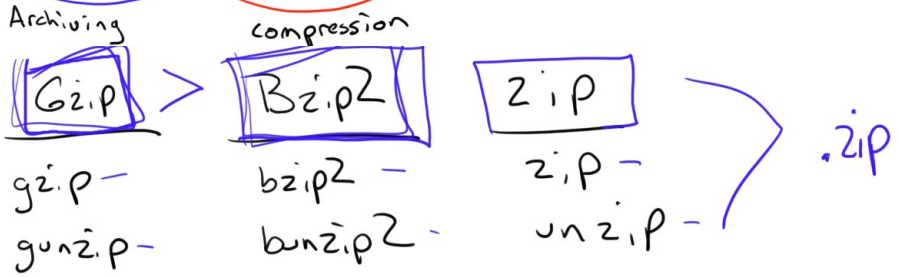
```
spowers@cbt-xubuntu:~/Folder1$ cd otherthing/
spowers@cbt-xubuntu:~/Folder1/otherthing$ ls
thingy1.txt  thingy2.txt
spowers@cbt-xubuntu:~/Folder1/otherthing$ rm thingy*
spowers@cbt-xubuntu:~/Folder1/otherthing$ ls
spowers@cbt-xubuntu:~/Folder1/otherthing$ ls -l
total 0
spowers@cbt-xubuntu:~/Folder1/otherthing$ cd ..
spowers@cbt-xubuntu:~/Folder1$ rmdir otherthing/
rmdir: failed to remove ‘otherthing/’: Directory not empty
spowers@cbt-xubuntu:~/Folder1$ cd otherthing/
spowers@cbt-xubuntu:~/Folder1/otherthing$ ls -a
.  ..  .sneakyshawn
spowers@cbt-xubuntu:~/Folder1/otherthing$ cd ..
spowers@cbt-xubuntu:~/Folder1$ rmdir otherthing/
rmdir: failed to remove ‘otherthing/’: Directory not empty
spowers@cbt-xubuntu:~/Folder1$ rm -rf otherthing/
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 0
-rw-r--r-- 1 spowers spowers 0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers 0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers 0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers 0 May  6 15:18 MyFoot
-rw-r--r-- 1 spowers spowers 0 Apr  7 09:29 thing1.txt
spowers@cbt-xubuntu:~/Folder1$
```

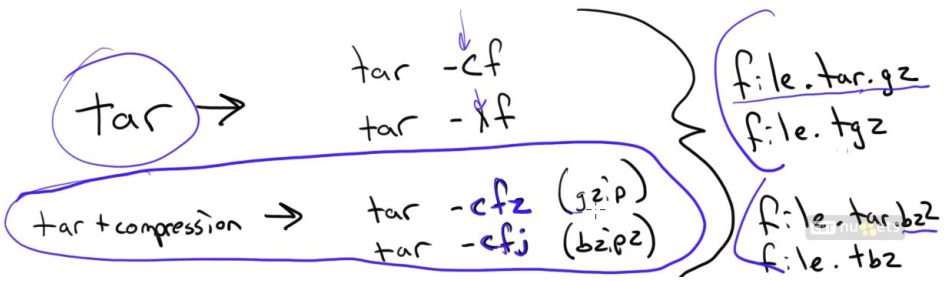
```
spowers@cbt-xubuntu:~/Folder1$ mkdir thing1
spowers@cbt-xubuntu:~/Folder1$ mkdir thing2
spowers@cbt-xubuntu:~/Folder1$ mkdir otherthing
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 12
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
drwxr-xr-x 2 spowers spowers 4096 May  6 15:31 otherthing
drwxr-xr-x 2 spowers spowers 4096 May  6 15:31 thing1
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
drwxr-xr-x 2 spowers spowers 4096 May  6 15:31 thing2
spowers@cbt-xubuntu:~/Folder1$ mv thing2 otherthing/
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 8
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file2.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file3.jpg
-rw-r--r-- 1 spowers spowers    0 Apr  7 07:48 file4.jpeg
-rw-r--r-- 1 spowers spowers    0 May  6 15:18 MyFoot
drwxr-xr-x 3 spowers spowers 4096 May  6 15:31 otherthing
drwxr-xr-x 2 spowers spowers 4096 May  6 15:31 thing1
-rw-r--r-- 1 spowers spowers    0 Apr  7 09:29 thing1.txt
spowers@cbt-xubuntu:~/Folder1$ ls -l otherthing/
total 4
drwxr-xr-x 2 spowers spowers 4096 May  6 15:31 thing2
spowers@cbt-xubuntu:~/Folder1$
```

```
spowers@cbt-xubuntu:~/Folder1$ mv MyFoot thing1/newfoot
spowers@cbt-xubuntu:~/Folder1$ ls -l thing1
total 0
-rw-r--r-- 1 spowers spowers 0 May  6 15:18 newfoot
spowers@cbt-xubuntu:~/Folder1$
```



tar: tape archive





zip does archiving and compression at the same time.

```
spowers@cbt-xubuntu:~/Folder1$ zip file.zip thing1
  adding: thing1/ (stored 0%)
spowers@cbt-xubuntu:~/Folder1$ rm file.zip
spowers@cbt-xubuntu:~/Folder1$ zip -r file.zip thing1
  adding: thing1/ (stored 0%)
  adding: thing1/thatthing.txt (deflated 100%)
  adding: thing1/thisthing.txt (deflated 100%)
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpg  file.zip  thing1  thing1.txt
spowers@cbt-xubuntu:~/Folder1$ rm -rf thing1
spowers@cbt-xubuntu:~/Folder1$ ls -
ls: cannot access -: No such file or directory
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 3696
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
spowers@cbt-xubuntu:~/Folder1$ unzip file.zip
Archive:  file.zip
   creating: thing1/
  inflating: thing1/thatthing.txt
  inflating: thing1/thisthing.txt
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpg  file.zip  thing1  thing1.txt
```

```
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpg  file.zip  thing1  thing1.txt
spowers@cbt-xubuntu:~/Folder1$ tar -cf files.tar file2.jpg file3.jpg file4.jpg
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpg  files.tar  file.zip  thing1  thing1.txt
spowers@cbt-xubuntu:~/Folder1$ rm files.tar
spowers@cbt-xubuntu:~/Folder1$ tar -c -f files.tar file2.jpg file3.jpg
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpg  files.tar  file.zip  thing1  thing1.txt
spowers@cbt-xubuntu:~/Folder1$ tar -fc files.tar file2.jpg file3.jpg
tar: You must specify one of the `-Acdtrux' or `--test-label'  options
Try `tar --help' or `tar --usage' for more information.
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 6780
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers 3153920 May 28 14:24 files.tar
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
spowers@cbt-xubuntu:~/Folder1$ rm file2.jpg
spowers@cbt-xubuntu:~/Folder1$ rm file3.jpg
spowers@cbt-xubuntu:~/Folder1$ ls
file4.jpg  files.tar  file.zip  thing1  thing1.txt
```

```
spowers@cbt-xubuntu:~/Folder1$ tar -xf files.tar
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpg  files.tar  file.zip  thing1  thing1.txt
spowers@cbt-xubuntu:~/Folder1$ rm file2.jpg file3.jpg
spowers@cbt-xubuntu:~/Folder1$ ls
file4.jpg  files.tar  file.zip  thing1  thing1.txt
spowers@cbt-xubuntu:~/Folder1$ tar -xvf files.tar
file2.jpg
file3.jpg
spowers@cbt-xubuntu:~/Folder1$ ls
file2.jpg  file3.jpg  file4.jpg  files.tar  file.zip  thing1  thing1.txt
spowers@cbt-xubuntu:~/Folder1$ rm file2.jpg file3.jpg
spowers@cbt-xubuntu:~/Folder1$ tar -vxf files.tar
file2.jpg
file3.jpg
spowers@cbt-xubuntu:~/Folder1$ gzip files.tar
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 3704
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers    3237 May 28 14:24 files.tar.gz
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
```

```
spowers@cbt-xubuntu:~/Folder1$ gunzip files.tar.gz
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 6780
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers 3153920 May 28 14:24 files.tar
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
spowers@cbt-xubuntu:~/Folder1$ bzip2 files.tar
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 3704
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers     169 May 28 14:24 files.tar.bz2
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
```

```
spowers@cbt-xubuntu:~/Folder1$ bunzip2 files.tar.bz2
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 6780
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers 3153920 May 28 14:24 files.tar
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
spowers@cbt-xubuntu:~/Folder1$ rm files.tar
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 3700
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
```

```
spowers@cbt-xubuntu:~/Folder1$ tar -cvzf file.tgz file2.jpg file3.jpg
file2.jpg
file3.jpg
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 3704
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers    3227 May 28 14:31 file.tgz
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
spowers@cbt-xubuntu:~/Folder1$ rm file2.jpg file3.jpg
spowers@cbt-xubuntu:~/Folder1$ ls
file4.jpg  file.tgz  file.zip  thing1  thing1.txt
spowers@cbt-xubuntu:~/Folder1$ tar -zxvf file.tgz
file2.jpg
file3.jpg
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 3704
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers    3227 May 28 14:31 file.tgz
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
```

```
spowers@cbt-xubuntu:~/Folder1$ tar -jcvf bzipfile.bz2 thing1
thing1/
thing1/thatthing.txt
thing1/thisthing.txt
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 3708
-rw-r--r-- 1 spowers spowers     208 May 28 14:34 bzipfile.bz2
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers    3227 May 28 14:31 file.tgz
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
spowers@cbt-xubuntu:~/Folder1$ mv bzipfile.bz2 bzipfile.tar.bz2
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 3708
-rw-r--r-- 1 spowers spowers     208 May 28 14:34 bzipfile.tar.bz2
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers    3227 May 28 14:31 file.tgz
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
```

```
spowers@cbt-xubuntu:~/Folder1$ mv bzipfile.tar.bz2 bzipfile.tbz
spowers@cbt-xubuntu:~/Folder1$ ls -l
total 3708
-rw-r--r-- 1 spowers spowers     208 May 28 14:34 bzipfile.tbz
-rw-r--r-- 1 spowers spowers 2097152 May  8 14:48 file2.jpg
-rw-r--r-- 1 spowers spowers 1048576 May  8 14:48 file3.jpg
-rw-r--r-- 1 spowers spowers  612352 May  8 14:49 file4.jpg
-rw-r--r-- 1 spowers spowers    3227 May 28 14:31 file.tgz
-rw-r--r-- 1 spowers spowers   19864 May 28 14:19 file.zip
drwxr-xr-x 2 spowers spowers    4096 May  8 14:43 thing1
-rw-r--r-- 1 spowers spowers      47 May  8 14:49 thing1.txt
spowers@cbt-xubuntu:~/Folder1$ mv bzipfile.tbz bzipfile.tb2
```

Commands

less → read a file

head/tail → view begining or end of file

find → locate files on a system

grep → search for strings in a file

sort → organize text in a file

cut → manipulate data by column

wc → word count

Regex

Regular Expressions

^ → begining of line

$ → end of line

grow the carrots first, then sell them for money.

. → any single character

```
-rw-r--r-- 1 spowers spowers 30 May 29 12:49 abcfile.txt
-rw-r--r-- 1 spowers spowers 38 Mar 25 13:55 file1.txt
-rw-r--r-- 1 spowers spowers 64 Mar 25 13:55 file2.txt
-rw-r--r-- 1 spowers spowers 84 May 29 12:53 file3.txt
spowers@cbt-xubuntu:~/Documents$ cat abcfile.txt
a
aa
aabb
aabbc
abc
aaabbbccc
spowers@cbt-xubuntu:~/Documents$ less abcfile.txt
spowers@cbt-xubuntu:~/Documents$ head -n 2 abcfile.txt
a
aa
spowers@cbt-xubuntu:~/Documents$ tail -n 3 abcfile.txt
aabbc
abc
aaabbbccc
spowers@cbt-xubuntu:~/Documents$ tail abcfile.txt
a
aa
aabb
aabbc
abc
aaabbbccc
spowers@cbt-xubuntu:~/Documents$
```

abcfile.txt - Mousepad

File Edit View Text Document

```
a
aa
aabb
aabbc
abc
aaabbbccc
```

Filetype: None Line: 1 C

file1.txt - Mousepad

File Edit View Text Document

```
This is file 1.
It is two lines long.
```

Filetype: None Line: 1 C

file2.txt - Mousepad

File Edit View Text Document

```
This is file 2.
It is three lines long.
This is the third line!
```

Filetype: None Line: 3 Co

file3.txt - Mousepad

File Edit View Text Document

```
Today we learn
The future is to learn things
Now is the future
The fuse has a thing
```

1. **Find Files Using Name**
This is a basic usage of the find command. This example finds all files with name — MyCProgram.c in the current directory and all its sub-directories.
find -name "MyCProgram.c"
./backup/MyCProgram.c
./MyCProgram.c

2. **Find Files Using Name and Ignoring Case**
This is a basic usage of the find command. This example finds all files with name — MyCProgram.c (ignoring the case) in the current directory and all its sub-directories.
find -iname "MyCProgram.c"
./mycprogram.c
./backup/mycprogram.c
./backup/MyCProgram.c
./MyCProgram.c

3. **Limit Search To Specific Directory Level Using mindepth and maxdepth**
Find the passwd file under all sub-directories starting from root directory.
find / -name passwd
./usr/share/doc/nss_ldap-253/pam.d/passwd
./usr/bin/passwd
./etc/pam.d/passwd
./etc/passwd

Find the passwd file under root and one level down. (i.e root — level 1, and one sub-directory — level 2)
find -maxdepth 2 -name passwd
./etc/passwd

Find the passwd file under root and two levels down. (i.e root — level 1, and two sub-directories — level 2 and 3)
find / -maxdepth 3 -name passwd
./usr/bin/passwd
./etc/pam.d/passwd
./etc/passwd

4. **Inverting the match.**
Shows the files or directories whose name are not MyCProgram.c .Since the maxdepth is 1, this will look only under current directory.
find -maxdepth 1 -not -iname "MyCProgram.c"
.
./MybashProgram.sh
./create_sample_files.sh
./backup
./Program.c

5. **Finding the Top 5 Big Files**
The following command will display the top 5 largest file in the current directory and its subdirectory. This may take a while to execute depending on the total number of files the command has to process.
find . -type f -exec ls -s {} \; | sort -n -r | head -5

6. **Finding the Top 5 Small Files**
Technique is same as finding the bigger files, but the only difference the sort is ascending order.
find . -type f -exec ls -s {} \; | sort -n | head -5

In the above command, most probably you will get to see only the ZERO byte files (empty files).
So, you can use the following command to list the smaller files other than the ZERO byte files.
find . -not -empty -type f -exec ls -s {} \; | sort -n | head -5

7. **Find Files by Size**
Using the -size option you can find files by size.
Find files bigger than the given size
find ~ -size +100M

Find files smaller than the given size
find ~ -size -100M

Find files that matches the exact given size
find ~ -size 100M

#tail -f /var/log/squid/access.log | grep 10.25.49.39

#tail -f /var/log/dansguardian3/access.log | grep 192.168.238.98 | grep '"blocked":true'

1. **Search for the given string in a single file**
The basic usage of grep command is to search for a specific string in the specified file as shown below.
Syntax:
grep "literal_string" filename
$ grep "this" demo_file
this line is the 1st lower case line in this file.
Two lines above this line is empty.
And this is the last line.

2. **Checking for the given string in multiple files.**
$ cp demo_file demo_file1

$ grep "this" demo_*
demo_file:this line is the 1st lower case line in this file.
demo_file:Two lines above this line is empty.
demo_file:And this is the last line.
demo_file1:this line is the 1st lower case line in this file.
demo_file1:Two lines above this line is empty.
demo_file1:And this is the last line.

3. **Case insensitive search using grep -i**
$ grep -i "the" demo_file
THIS LINE IS THE 1ST UPPER CASE LINE IN THIS FILE.
this line is the 1st lower case line in this file.
This Line Has All Its First Character Of The Word With Upper Case.
And this is the last line.

4. **Match regular expression in files**
$ grep "lines.*empty" demo_file
Two lines above this line is empty.

5. **Searching in all files recursively using grep -r**
$ grep -r "ramesh" *

6. **Counting the number of matches using grep -c**
When you want to count that how many lines matches the given pattern/string, then use the option -c.
Syntax:
grep -c "pattern" filename
$ grep -c "go" demo_text
6

When you want do find out how many lines matches the pattern
$ grep -c this demo_file
3

When you want do find out how many lines that does not match the pattern
$ grep -v -c this demo_file
4

7. **Display only the file names which matches the given pattern using grep -l**
$ grep -l this demo_*
demo_file
demo_file1

grep NEGATE:
grep -v 'pattern'

grep AND:
grep 'pattern1' | grep 'pattern2'

grep OR:
grep 'pattern1 \| pattern2'

$ sort test
aaa
AAA
BBB
ddd
qqq
sss
zzz

$ sort -r test
5
4
4
2
2

g3loghelper.pl --file /var/log/logs.txt --field clientip | sort | uniq -c | sort

$ cat test.txt
cat command for file oriented operations.
cp command for copy files or directories.
ls command to list out files and directories with its attributes.

1. **Select Column of Characters**
$ cut -c2 test.txt
a
p
s

2. **Select Column of Characters using Range**
$ cut -c1-3 test.txt
cat
cp
ls

$ cut -c3- test.txt
t command for file oriented operations.
 command for copy files or directories.
 command to list out files and directories with its attributes.

$ cut -c-8 test.txt
cat comm
cp comma
ls comma

3. **Select a Specific Field from a File**
$ cut -d':' -f1 /etc/passwd
root
daemon
bin
sys
sync
games
bala

4. **Select Multiple Fields from a File**
You can also extract more than one fields from a file or stdout. Below example displays username and home directory of users who has the login shell as “/bin/bash”.
$ grep "/bin/bash" /etc/passwd | cut -d':' -f1,6
root:/root
bala:/home/bala
To display the range of fields specify start field and end field as shown below. In this example, we are selecting field 1 through 4, 6 and 7

$ grep "/bin/bash" /etc/passwd | cut -d':' -f1-4,6,7
root:x:0:0:/root:/bin/bash
bala:x:1000:1000:/home/bala:/bin/bash

5. **Select Fields Only When a Line Contains the Delimiter**
In our /etc/passwd example, if you pass a different delimiter other than : (colon), cut will just display the whole line.
In the following example, we've specified the delimiter as | (pipe), and cut command simply displays the whole line, even when it doesn't find any line that has | (pipe) as delimiter.

```
$ grep "/bin/bash" /etc/passwd | cut -d'|'  -f1
root:x:0:0:root:/root:/bin/bash
bala:x:1000:1000:bala,,,:/home/bala:/bin/bash
```

But, it is possible to filter and display only the lines that contains the specified delimiter using -s option.
The following example doesn't display any output, as the cut command didn't find any lines that has | (pipe) as delimiter in the /etc/passwd file.

```
$ grep "/bin/bash" /etc/passwd | cut -d'|' -s -f1
```

6. **Select All Fields Except the Specified Fields**
In order to complement the selection field list use option –complement.
The following example displays all the fields from /etc/passwd file except field 7

```
$ grep "/bin/bash" /etc/passwd | cut -d':' --complement -s -f7
root:x:0:0:root:/root
bala:x:1000:1000:bala,,,:/home/bala
```

1. **A basic example**
Here is a basic example of Linux wc command :

```
$ cat sort.txt
UK
Australia
Newzealand
Brazil
America

$ wc sort.txt
 5  5 41 sort.txt
```

The three numbers produced in output correspond to number of lines, number of words and number of bytes. These three numbers are followed by name of the file.

2. **Display word count through -w option**
The word count of a file can be displayed explicitly through -w option.
Here is an example :

```
$ wc -w sort.txt
5 sort.txt
```

So we see that number of words were printed followed by the file name.

3. **Display length of longest line through -L option**
The wc command provides an option -L that can be used to display the length of longest line in the file.
Here is an example :

```
$ wc -L sort.txt
10 sort.txt
```

So we see that length of the longest line ('Newzealand' in our case) was displayed in the output.

4. **Display number of newlines through -l option**

The wc command provides an option -l through which number of newlines can be displayed in the output.
Here is an example :
$ wc -l sort.txt
5 sort.txt
So we see that there were 5 newlines in the file sort.txt

5. **Display number of bytes through -c option**
Total number of bytes in a file can be displayed by using -c option of the wc command.
Here is an example :
$ wc -c sort.txt
41 sort.txt

ps aux | grep httpd | wc -l

BASIC REGULAR EXPRESSIONS

Basic regular expressions: This set includes very basic set of regular expressions which do not require any options to execute. This set of regular expressions are developed long time back.

^ –Caret/Power symbol to match a starting at the beginning of line.
$ –To match end of the line

*** –0 or more occurrence of previous character.**
. –To match any character
[] –Range of character
[^char] –negate of occurrence of a character set
<word> –Actual word finding
–Escape character
Lets start with our Regexp with examples, so that we can understand it better.

^ REGULAR EXPRESSION

Example 1: Find all the files in a given directory
ls -l | grep ^-
As you are aware that the first character in ls -l output, – is for regular files and d for directories in a given folder. Let us see what ^- indicates. The ^ symbol is for matching line starting, ^- indicates what ever lines starts with -, just display them. Which indicates a regular file in Linux/Unix.
If we want to find all the directories in a folder use grep ^d option along ls -l as shown below

ls -l | grep ^d
How about character files and block files?

ls -l | grep ^c
ls -l | grep ^b
We can even find the lines which are commented using ^ operator with below example

grep '^#' filename
How about finding lines in a file which starts with 'abc'

grep '^abc' filename
We can have number of examples with this ^ option.

$ REGULAR EXPRESSION
Example 2: Match all the files which ends with sh
ls -l | grep sh$
As $ indicates end of the line, the above command will list all the files whose names end with sh.

how about finding lines in a file which ends with dead

grep 'dead$' filename
How about finding empty lines in a file?

grep '^$' filename
*** REGULAR EXPRESSION**
Example 3: Match all files which have a word twt, twet, tweet etc in the file name.
ls -l | grep 'twe*t'
How about searching for apple word which was spelled wrong in a given file where apple is misspelled as ale, aple, appple, apppple, appppppple etc. To find all patterns

grep 'ap*le' filename
Readers should observe that the above pattern will match even ale word as * indicates 0 or more of previous character occurrence.

. REGULAR EXPRESSION
Example 4: Filter a file which contains any single character between t and t in a file name.
ls -l | grep 't.t'
Here . will match any single character. It can match tat, t3t, t.t, t&t etc any single character between t and t letters.

How about finding all the file names which starts with a and end with x using regular expressions?

ls -l | grep 'a.*x'
The above .* indicates any number of characters

Note: .* in this combination . indicates any character and it repeated(*) 0 or more number of times.
Suppose you have files as..
awx
awex
aweex
awasdfx
a35dfetrx
etc.. it will find all the files/folders which start with a and ends with x in our example.
[] SQUARE BRACES/BRACKETS REGULAR EXPRESSION
Example 5: Find all the files which contains a number in the file name between a and x
ls -l | grep 'a[0-9]x'
This will find all the files which is
a0xsdf
asda1xsdfas

..
..
asdfdsara9xsdf
etc.
So where ever it finds a number it will try to match that number.

Some of the range operator examples for you.

[a-z] –Match's any single char between a to z.

[A-Z] –Match's any single char between A to Z.

[0-9] –Match's any single char between 0 to 9.

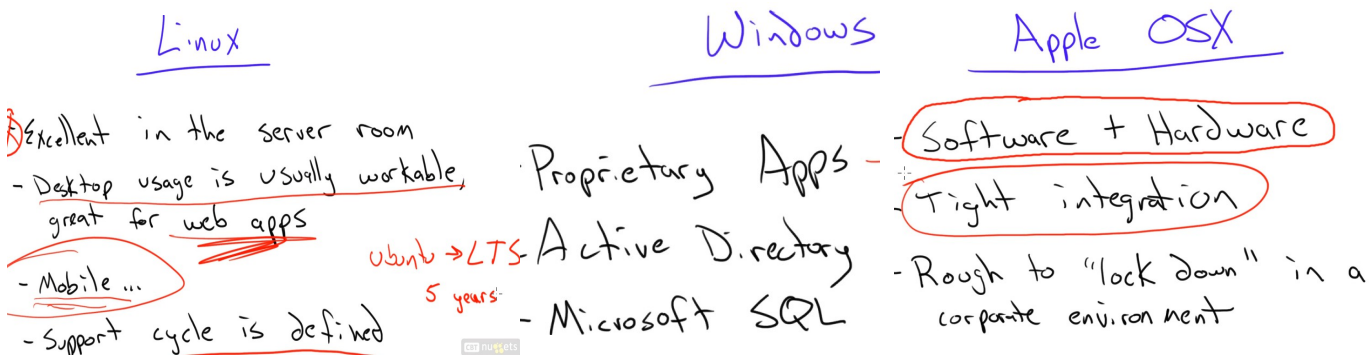
[a-zA-Z0-9] – Match's any single character either a to z or A to Z or 0 to 9

[!@#$%^] — Match's any ! or @ or # or $ or % or ^ character.

You just have to think what you want match and keep those character in the braces/Brackets.

[^CHAR] REGULAR EXPRESSION
Example6: Match all the file names except a or b or c in its filenames
ls | grep '[^abc]'
This will give output all the file names except files which contain a or b or c.

<WORD> REGULAR EXPRESSION
Example7: Search for a word abc, for example I should not get abcxyz or readabc in my output.
grep '<abc>' filename
ESCAPE REGULAR EXPRESSION
Example 8: Find files which contain [in its name, as [is a special charter we have to escape it
grep "[" filename
or
grep '[[]' filename
Note: If you observe [] is used to negate the meaning of [regular expressions, so if you want to find any specail char keep them in [] so that it will not be treated as special char.



GUI or CLI

Graphical User Interface — Command Line Interface

- Linux, both, and CLI can be independant
- Mac, has Unix underpinning, still has GUI
- windows, Powershell stuff, but still GUI

Beta? Stable?

- Beta is testing, not ready for production.
- Stable means it's been tested, and is ready for production.

Drivers

- Often built into Linux
- Easier to find compatible hardware than olden days
- Printers are still often incompatible
  check → www.linuxprinting.org

Peripherals?

- Things you plug in
  - ✓ printer
  - ✓ scanner
  - ✓ mouse
  - ✓ trackpad
  - ✓ USB drive
  - ✓ webcam

  → also need driver support

Network Tools

/etc/resolv.conf → where current DNS server info is stored (not always edited though!)

ifconfig, route → look at current network settings for local system

dig → look up IP addresses for DNS names

ping → contact remote server test

```
spowers@cbt-xubuntu:~$ cat /etc/resolv.conf
# Dynamic resolv.conf(5) file for glibc resolver(3) generated by resolvconf(8)
#     DO NOT EDIT THIS FILE BY HAND -- YOUR CHANGES WILL BE OVERWRITTEN
nameserver 127.0.1.1
search localdomain
spowers@cbt-xubuntu:~$
```

```
spowers@cbt-xubuntu:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0c:29:9d:a2:89
          inet addr:192.168.202.128  Bcast:192.168.202.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe9d:a289/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:294231 errors:0 dropped:0 overruns:0 frame:0
          TX packets:103555 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:231379562 (231.3 MB)  TX bytes:9069015 (9.0 MB)
          Interrupt:19 Base address:0x2000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:17221 errors:0 dropped:0 overruns:0 frame:0
          TX packets:17221 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:1457808 (1.4 MB)  TX bytes:1457808 (1.4 MB)
```

```
spowers@cbt-xubuntu:~$ dig cbtnuggets.com

; <<>> DiG 9.9.3-rpz2+rl.13214.22-P2-Ubuntu-1:9.9.3.dfsg.P2-4ubuntu1.1 <<>> cbtnugg
ets.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 18970
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; MBZ: 0005 , udp: 1280
;; QUESTION SECTION:
;cbtnuggets.com.                        IN      A

;; ANSWER SECTION:
cbtnuggets.com.         5       IN      A       54.225.173.254

;; Query time: 1709 msec
;; SERVER: 127.0.1.1#53(127.0.1.1)
;; WHEN: Fri Jun 20 02:52:33 EDT 2014
;; MSG SIZE  rcvd: 59
```

```
spowers@cbt-xubuntu:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         192.168.202.2   0.0.0.0         UG    0      0        0 eth0
192.168.202.0   *               255.255.255.0   U     1      0        0 eth0
```

Editors

vi → hard to use, but everywhere

pico, nano } same interface, on most systems

echo —

for → loop

if →

Interpreter

/bin/sh

/bin/bash

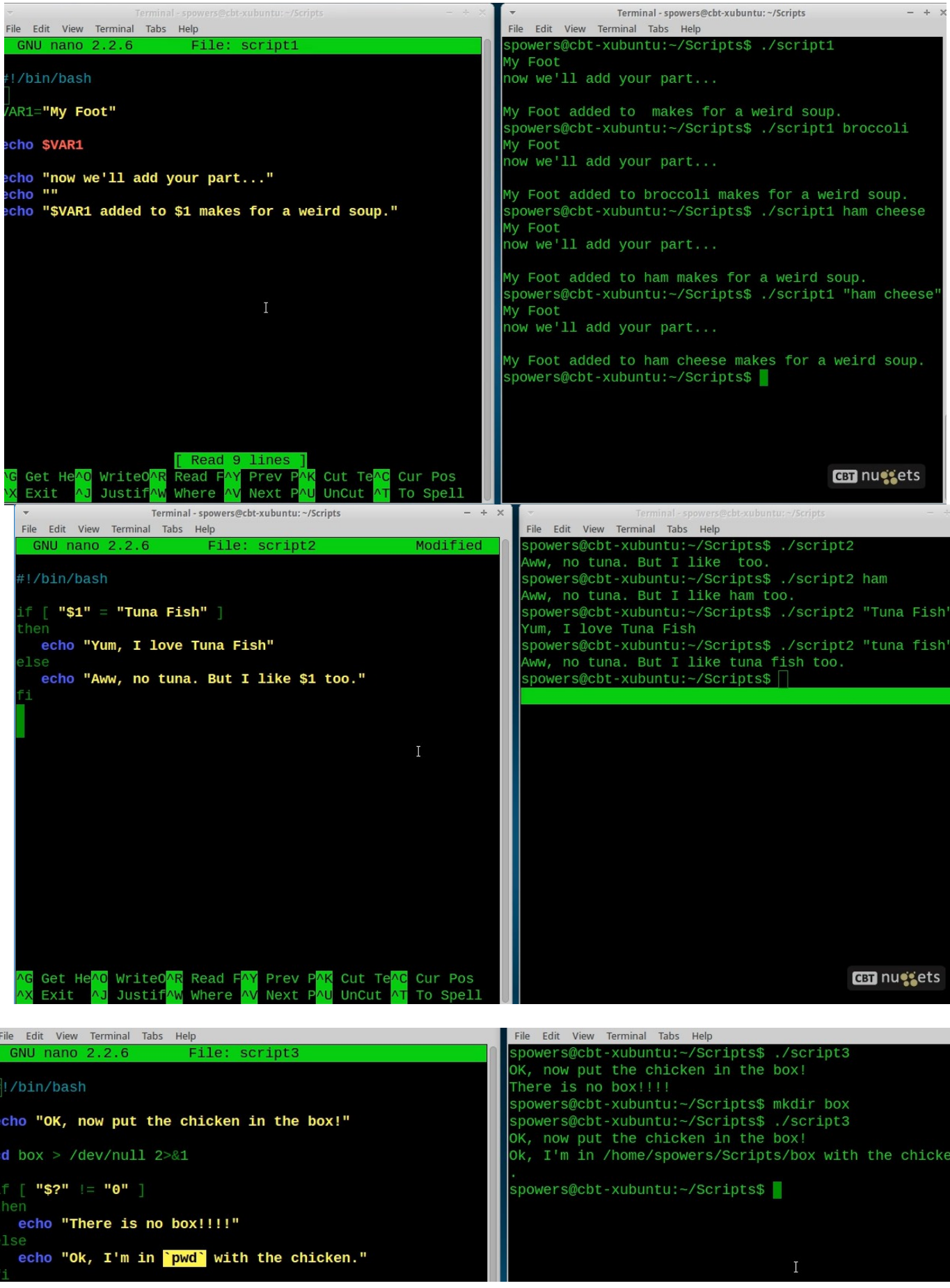
Variables

$ANYNAME

$1 → first argument

$2 → second argumen

$? → exit code


Terminal - spowers@cbt-xubuntu: ~/Scripts
File Edit View Terminal Tabs Help
GNU nano 2.2.6 File: script1
#!/bin/bash
VAR1="My Foot"
echo $VAR1
echo "now we'll add your part..."
echo ""
echo "$VAR1 added to $1 makes for a weird soup."
[Read 9 lines]
^G Get He ^O WriteO ^R Read F ^Y Prev P ^K Cut Te ^C Cur Pos
^X Exit ^J Justif ^W Where ^V Next P ^U UnCut ^T To Spell
Terminal - spowers@cbt-xubuntu: ~/Scripts
File Edit View Terminal Tabs Help
spowers@cbt-xubuntu:~/Scripts$ ./script1
My Foot
now we'll add your part...
My Foot added to makes for a weird soup.
spowers@cbt-xubuntu:~/Scripts$ ./script1 broccoli
My Foot
now we'll add your part...
My Foot added to broccoli makes for a weird soup.
spowers@cbt-xubuntu:~/Scripts$ ./script1 ham cheese
My Foot
now we'll add your part...
My Foot added to ham makes for a weird soup.
spowers@cbt-xubuntu:~/Scripts$ ./script1 "ham cheese"
My Foot
now we'll add your part...
My Foot added to ham cheese makes for a weird soup.
spowers@cbt-xubuntu:~/Scripts$
CBT nuggets
Terminal - spowers@cbt-xubuntu: ~/Scripts
File Edit View Terminal Tabs Help
GNU nano 2.2.6 File: script2 Modified
#!/bin/bash
if ["$1" = "Tuna Fish"]
then
echo "Yum, I love Tuna Fish"
else
echo "Aww, no tuna. But I like $1 too."
fi
^G Get He ^O WriteO ^R Read F ^Y Prev P ^K Cut Te ^C Cur Pos
^X Exit ^J Justif ^W Where ^V Next P ^U UnCut ^T To Spell
Terminal - spowers@cbt-xubuntu: ~/Scripts
File Edit View Terminal Tabs Help
spowers@cbt-xubuntu:~/Scripts$ ./script2
Aww, no tuna. But I like too.
spowers@cbt-xubuntu:~/Scripts$ ./script2 ham
Aww, no tuna. But I like ham too.
spowers@cbt-xubuntu:~/Scripts$ ./script2 "Tuna Fish"
Yum, I love Tuna Fish
spowers@cbt-xubuntu:~/Scripts$ ./script2 "tuna fish"
Aww, no tuna. But I like tuna fish too.
spowers@cbt-xubuntu:~/Scripts$
CBT nuggets
File Edit View Terminal Tabs Help
GNU nano 2.2.6 File: script3
#!/bin/bash
echo "OK, now put the chicken in the box!"
cd box > /dev/null 2>&1
if ["$?" != "0"]
then
echo "There is no box!!!!"
else
echo "Ok, I'm in `pwd` with the chicken."
fi
File Edit View Terminal Tabs Help
spowers@cbt-xubuntu:~/Scripts$ ./script3
OK, now put the chicken in the box!
There is no box!!!!
spowers@cbt-xubuntu:~/Scripts$ mkdir box
spowers@cbt-xubuntu:~/Scripts$ ./script3
OK, now put the chicken in the box!
Ok, I'm in /home/spowers/Scripts/box with the chicken
.
spowers@cbt-xubuntu:~/Scripts$

```
 GNU nano 2.2.6        File: script4

#!/bin/bash

for x in {1..9}
do
   echo "This is loop number $x"
done
echo ""
echo "All the loops are gone!"
```

```
spowers@cbt-xubuntu:~/Scripts$ ./script4
This is loop number 1
This is loop number 2
This is loop number 3
This is loop number 4
This is loop number 5
This is loop number 6
This is loop number 7
This is loop number 8
This is loop number 9

All the loops are gone!
spowers@cbt-xubuntu:~/Scripts$
```

```
 GNU nano 2.2.6        File: script5

#!/bin/bash

for LOOP in `ls`
do
   echo "Here is $LOOP:"
   echo `cat $LOOP`
   echo ""
done

                [ Read 8 lines ]
^G Get He^O WriteO^R Read F^Y Prev P^K Cut Te^C Cur Pos
^X Exit  ^J Justif^W Where ^V Next P^U UnCut ^T To Spell
```

```
spowers@cbt-xubuntu:~/Scripts$ ls
box  script1  script2  script3  script4  script5
spowers@cbt-xubuntu:~/Scripts$ ./script5
Here is box:
cat: box: Is a directory


Here is script1:
#!/bin/bash VAR1="My Foot" echo $VAR1 echo "now we'll
 add your part..." echo "" echo "$VAR1 added to $1 ma
kes for a weird soup."

Here is script2:
#!/bin/bash if [ "$1" = "Tuna Fish" ] then echo "Yum,
 I love Tuna Fish" else echo "Aww, no tuna. But I lik
e $1 too." fi

Here is script3:
#!/bin/bash echo "OK, now put the chicken in the box!
" cd box > /dev/null 2>&1 if [ "$?" != "0" ] then ech
o "There is no box!!!!" else echo "Ok, I'm in `pwd` w
ith the chicken." fi

Here is script4:
#!/bin/bash for x in {1..9} do echo "This is loop num
ber $x" done echo "" echo "All the loops are gone!"
```

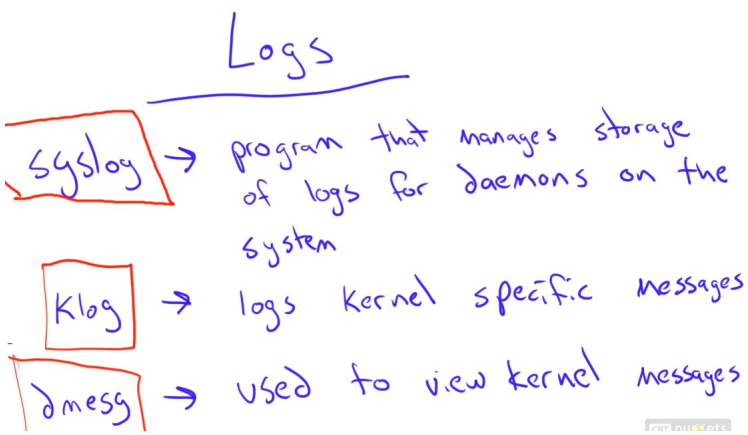

Dealing with processes

- **ps** → shows list of running programs
- **top** → interactive live display of processes
- **free** → shows free memory

Data Locations

- **/etc** → config files
- **/lib**, **/usr/lib** → linked library files used by binaries in /bin and /usr/bin
- **/var/log** → log files

```
root@erlerobot:/etc# ls
ConsoleKit              fonts              lsb-base              rc4.d
X11                     foomatic           lsb-base-logging.sh   rc5.d
adduser.conf            fstab              lsb-release           rc6.d
adjtime                 fstab.d            magic                 rcS.d
alternatives            gai.conf           magic.mime            resolv.conf
apache2                 gdb                mailcap               resolvconf
apparmor                ghostscript        mailcap.order         rmt
apparmor.d              group              mercurial             ros
apport                  group-             mime.types            rpc
apt                     gshadow            mke2fs.conf           rsyslog.conf
avahi                   gshadow-           modprobe.d            rsyslog.d
avrdude.conf            gtk-2.0            modules               samba
bash.bashrc             host.conf          modules-load.d        sane.d
bash_completion.d       hostapd            motd                  securetty
bindresvport.blacklist  hostname           mtab                  security
blkid.conf              hosts              mysql                 sensors.d
blkid.tab               hosts.allow        nanorc                sensors3.conf
bluetooth               hosts.deny         network               services
ca-certificates         ifplugd            networks              sgml
ca-certificates.conf    init               newt                  shadow
calendar                init.d             nginx                 shadow-
colord.conf             initramfs-tools    nsswitch.conf         shells
console-setup           inputrc            opt                   skel
cron.d                  insserv            os-release            snmp
cron.daily              insserv.conf       pam.conf              ssh
cron.hourly             insserv.conf.d     pam.d                 ssl
cron.monthly            iproute2           papersize             subversion
cron.weekly             issue              passwd                sudoers
crontab                 issue.dpkg-dist    passwd-               sudoers.d
cups                    issue.net          perl                  sysctl.conf
dbus-1                  kbd                php5                  sysctl.d
debconf.conf            kernel             pnm2ppa.conf          systemd
debian_version          ld.so.cache        polkit-1              terminfo
default                 ld.so.conf         ppp                   timezone
deluser.conf            ld.so.conf.d       profile               ucf.conf
depmod.d                ldap               profile.d             udev
dhcp                    legal              protocols             ufw
dhcp3                   libnl-3            pulse                 update-motd.d
dkms                    libpaper.d         python                vim
dnsmasq.conf            locale.alias       python2.7             vtrgb
dnsmasq.conf.orig       localtime          rc.local              wgetrc
dnsmasq.d               logcheck           rc0.d                 wpa_supplicant
dpkg                    login.defs         rc1.d                 xml
emacs                   logrotate.conf     rc2.d
environment             logrotate.d        rc3.d
root@erlerobot:/etc#
```



```
spowers@cbt-xubuntu:~$ cd /var/log
spowers@cbt-xubuntu:/var/log$ ls
alternatives.log       cups            installer              syslog
alternatives.log.1     dist-upgrade    kern.log               syslog.1
alternatives.log.2.gz  dmesg           kern.log.1             syslog.2.gz
alternatives.log.3.gz  dmesg.0         kern.log.2.gz          syslog.3.gz
alternatives.log.4.gz  dmesg.1.gz      kern.log.3.gz          syslog.4.gz
apport.log             dmesg.2.gz      kern.log.4.gz          syslog.5.gz
apport.log.1           dmesg.3.gz      lastlog                syslog.6.gz
apt                    dmesg.4.gz      lightdm                syslog.7.gz
auth.log               dpkg.log        mail.err               udev
auth.log.1             dpkg.log.1      mail.log               ufw.log
auth.log.2.gz          dpkg.log.2.gz   news                   unattended-upgrades
auth.log.3.gz          dpkg.log.3.gz   pm-powersave.log       upstart
auth.log.4.gz          dpkg.log.4.gz   pm-powersave.log.1     wtmp
boot.log               faillog         pm-powersave.log.2.gz  wtmp.1
bootstrap.log          fontconfig.log  pm-powersave.log.3.gz  Xorg.0.log
btmp                   fsck            samba                  Xorg.0.log.old
btmp.1                 hp              speech-dispatcher
spowers@cbt-xubuntu:/var/log$
```

```
spowers@cbt-xubuntu:/var/log$ tail syslog
Jun 20 01:15:02 cbt-xubuntu NetworkManager[663]: <info>   address 192.168.202.128
Jun 20 01:15:02 cbt-xubuntu NetworkManager[663]: <info>   prefix 24 (255.255.255.0)
Jun 20 01:15:02 cbt-xubuntu NetworkManager[663]: <info>   gateway 192.168.202.2
Jun 20 01:15:02 cbt-xubuntu NetworkManager[663]: <info>   nameserver '192.168.202.2
'
Jun 20 01:15:02 cbt-xubuntu NetworkManager[663]: <info>   domain name 'localdomain'
Jun 20 01:15:02 cbt-xubuntu NetworkManager[663]: <info>   wins '192.168.202.2'
Jun 20 01:15:02 cbt-xubuntu dbus[378]: [system] Activating service name='org.freede
sktop.nm_dispatcher' (using servicehelper)
Jun 20 01:15:02 cbt-xubuntu dhclient: bound to 192.168.202.128 -- renewal in 755 se
conds.
Jun 20 01:15:02 cbt-xubuntu dbus[378]: [system] Successfully activated service 'org
.freedesktop.nm_dispatcher'
Jun 20 01:17:01 cbt-xubuntu CRON[28460]: (root) CMD (   cd / && run-parts --report
/etc/cron.hourly)
spowers@cbt-xubuntu:/var/log$
```

dmesg (display message or driver message) is a command on most Unix-like operating systems that prints the message buffer of the kernel. The output of this command typically contains the messages produced by the device drivers.

[root@tecmint.com ~]# dmesg
[root@tecmint.com ~]# dmesg | less
[root@tecmint.com log]# dmesg | grep -i usb
[root@tecmint.com log]# dmesg | grep -i dma
[root@tecmint.com log]# dmesg | grep -i eth
[root@tecmint.com log]# dmesg | grep -i memory
[root@tecmint.com log]# dmesg -c !(clear dmesg buffer logs)
[root@tecmint.com log]# watch "dmesg | tail -20" !(monitor dmesg in real-time)

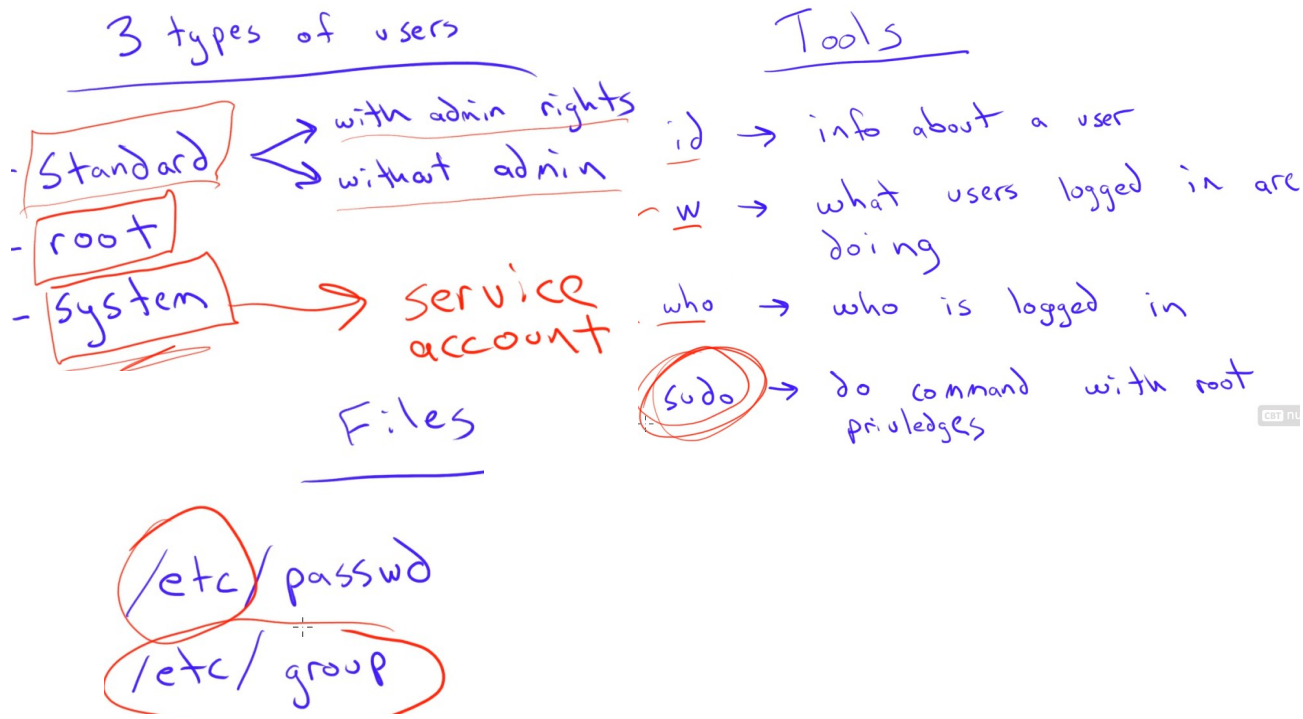
```
[3076355.070735] pcnet32 0000:02:01.0 eth0: link down
[3076367.079901] pcnet32 0000:02:01.0 eth0: link up
[3726435.073898] pcnet32 0000:02:01.0 eth0: link down
[3726445.082517] pcnet32 0000:02:01.0 eth0: link up
[3726451.086881] pcnet32 0000:02:01.0 eth0: link down
[3726462.096825] pcnet32 0000:02:01.0 eth0: link up
[3763982.073614] pcnet32 0000:02:01.0 eth0: link down
[3763984.073045] pcnet32 0000:02:01.0 eth0: link up
[3764570.130800] usb 2-2.1: new full-speed USB device number 4 using uhci_hcd
[3764570.248943] usb 2-2.1: New USB device found, idVendor=8087, idProduct=07da
[3764570.248975] usb 2-2.1: New USB device strings: Mfr=0, Product=0, SerialNumber=
0
[3764570.621847] usbcore: registered new interface driver btusb
[3764611.226728] usb 2-2.1: USB disconnect, device number 4
spowers@cbt-xubuntu:/var/log$
```

```
top - 01:25:03 up 43 days, 12:53,  2 users,  load average: 0.39, 0.26, 0.14
Tasks: 137 total,   1 running, 136 sleeping,   0 stopped,   0 zombie
%Cpu(s):  8.8 us,  7.5 sy,  0.0 ni, 83.7 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
KiB Mem:   1025780 total,   799916 used,   225864 free,   161432 buffers
KiB Swap:  1046524 total,    32156 used,  1014368 free,   274508 cached

  PID USER      PR  NI  VIRT  RES  SHR S  %CPU %MEM    TIME+  COMMAND
 1061 root      20   0  109m  26m 7244 S  12.0  2.6  82:53.28 Xorg
 1344 spowers   20   0  198m  13m 9940 S   4.0  1.3   1:49.98 xfce4-terminal
 7891 spowers   20   0  233m  32m  14m S   0.7  3.2 228:16.92 vmtoolsd
 7907 root      20   0 27324 3084 2340 S   0.3  0.3 119:01.85 vmtoolsd
    1 root      20   0  4184 2140 1240 S   0.0  0.2   0:05.40 init
    2 root      20   0     0    0    0 S   0.0  0.0   0:00.04 kthreadd
    3 root      20   0     0    0    0 S   0.0  0.0   1:20.78 ksoftirqd/0
    5 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 kworker/0:0H
    7 root      rt   0     0    0    0 S   0.0  0.0   0:00.05 migration/0
    8 root      20   0     0    0    0 S   0.0  0.0   0:00.00 rcu_bh
    9 root      20   0     0    0    0 S   0.0  0.0   1:49.08 rcu_sched
   10 root      rt   0     0    0    0 S   0.0  0.0   1:03.01 watchdog/0
   11 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 khelper
   12 root      20   0     0    0    0 S   0.0  0.0   0:00.00 kdevtmpfs
   13 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 netns
   14 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 writeback
   15 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 kintegrityd
   16 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 bioset
```

```
root@CentOS:/var/log/httpd
[root@CentOS httpd]# ps aux | grep httpd
root      1784  0.0  0.8 252260  9052 ?        Ss   15:13   0:00 /usr/sbin/httpd
apache    1786  0.0  0.5 252260  5800 ?        S    15:13   0:00 /usr/sbin/httpd
apache    1787  0.0  0.5 252260  5800 ?        S    15:13   0:00 /usr/sbin/httpd
apache    1788  0.0  0.5 252260  5800 ?        S    15:13   0:00 /usr/sbin/httpd
apache    1789  0.0  0.5 252260  5788 ?        S    15:13   0:00 /usr/sbin/httpd
apache    1790  0.0  0.5 252260  5800 ?        S    15:13   0:00 /usr/sbin/httpd
apache    1791  0.0  0.5 252260  5800 ?        S    15:13   0:00 /usr/sbin/httpd
apache    1792  0.0  0.5 252260  5800 ?        S    15:13   0:00 /usr/sbin/httpd
apache    1793  0.0  0.5 252260  5800 ?        S    15:13   0:00 /usr/sbin/httpd
root      1941  0.0  0.0 103236   872 pts/1    S+   16:43   0:00 grep httpd
[root@CentOS httpd]#
```

```
spowers@cbt-xubuntu:~$ free
             total       used       free     shared    buffers     cached
Mem:       1025780     799528     226252          0     161540     274524
-/+ buffers/cache:     363464     662316
Swap:      1046524      32156    1014368
spowers@cbt-xubuntu:~$ free -tom
             total       used       free     shared    buffers     cached
Mem:          1001        780        220          0        157        268
Swap:         1021         31        990
Total:        2023        812       1211
spowers@cbt-xubuntu:~$
```

#ps aux | grep httpd | wc -l >> /var/log/logs.txt
#free -hm (in MB)
#top -b -n 1 | head -17 >> /var/log/logs.txt
#top -b -n 1 -o %MEM | head -17 >> /var/log/logs.txt




```
spowers@cbt-xubuntu:~$ who
spowers  tty7         2014-04-18 12:54 (:0)
spowers  pts/0        2014-05-28 13:58 (:0.0)
spowers  pts/3        2014-06-20 03:49 (:0.0)
spongebob pts/4        2014-06-20 03:52 (localhost)
spowers@cbt-xubuntu:~$ w
 04:10:06 up 43 days, 15:38,  4 users,  load average: 0.00, 0.01, 0.05
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
spowers  tty7     :0               18Apr14 62days  1:24m  0.76s init --user
spowers  pts/0    :0.0             28May14 16:38   2.22s  2:06  /usr/bin/xfce4-terminal
spowers  pts/3    :0.0             03:49    6.00s  0.07s  2:06  /usr/bin/xfce4-terminal
spongebo pts/4    localhost        03:52   16:38   0.20s  0.10s /bin/bash ./flipping_bu
spowers@cbt-xubuntu:~$ w
 04:10:25 up 43 days, 15:38,  4 users,  load average: 0.08, 0.03, 0.05
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
spowers  tty7     :0               18Apr14 62days  1:24m  0.76s init --user
spowers  pts/0    :0.0             28May14 16:57   2.22s  2:06  /usr/bin/xfce4-terminal
spowers  pts/3    :0.0             03:49    1.00s  0.07s  2:06  /usr/bin/xfce4-terminal
spongebo pts/4    localhost        03:52   16:57   0.20s  0.10s /bin/bash ./flipping_burgers
spowers@cbt-xubuntu:~$ id spongebob
uid=1001(spongebob) gid=1001(spongebob) groups=1001(spongebob)
spowers@cbt-xubuntu:~$ id spowers
uid=1000(spowers) gid=1000(spowers) groups=1000(spowers),4(adm),24(cdrom),27(sudo),30(dip),46(plugd
ev),112(lpadmin),124(sambashare)
spowers@cbt-xubuntu:~$
```

```
[root@arch01 ~]# cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/usr/bin/nologin
daemon:x:2:2:daemon:/:/usr/bin/nologin
mail:x:8:12:mail:/var/spool/mail:/usr/bin/nologin
ftp:x:14:11:ftp:/srv/ftp:/usr/bin/nologin
http:x:33:33:http:/srv/http:/usr/bin/nologin
uuidd:x:68:68:uuidd:/:/usr/bin/nologin
dbus:x:81:81:dbus:/:/usr/bin/nologin
nobody:x:99:99:nobody:/:/usr/bin/nologin
systemd-journal-gateway:x:191:191:systemd-journal-gateway:/:/usr/bin/nologin
systemd-timesync:x:192:192:systemd-timesync:/:/usr/bin/nologin
systemd-network:x:193:193:systemd-network:/:/usr/bin/nologin
systemd-bus-proxy:x:194:194:systemd-bus-proxy:/:/usr/bin/nologin
systemd-resolve:x:195:195:systemd-resolve:/:/usr/bin/nologin
systemd-journal-upload:x:998:998:systemd Journal Upload:/:/sbin/nologin
systemd-journal-remote:x:999:999:systemd Journal Remote:/:/sbin/nologin
avahi:x:84:84:avahi:/:/bin/nologin
polkitd:x:102:102:Policy Kit Daemon:/:/usr/bin/nologin
mbo:x:1000:1000::/home/mbo:/bin/bash
git:x:997:997:git daemon user:/:/bin/bash
michael:x:1001:1001::/home/michael:/bin/bash
```

```
testuser:x:1481:1482:This is a test user:/home/testuser:/bin/bash
     |    |   |    |           |               |              |
[Username]  |   |    |           |               |              |
     [Password] |    |           |               |              |
          [Userid]  |           |               |              |
                 [Groupid]      |               |              |
                                |               |              |
                        [User Information]      |              |
                                          [User home path]  |
                                                        [User shell]
```

```
bob@bobs-computer:~$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,bob
tty:x:5:
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:bob
floppy:x:25:
tape:x:26:
sudo:x:27:bob
```

/etc/group

- Information about system groups

```
faculty: x: 23: bowman, ribbens, mcquain
```

List of group members

Group ID

[encrypted group password]

Group name

Commands

useradd → adds user

groupadd → adds group

id → gives info about user

last → shows recent logins

passwd → change passwords

Files

/etc/passwd → user info

/etc/shadow → user passwords

/etc/group → group info

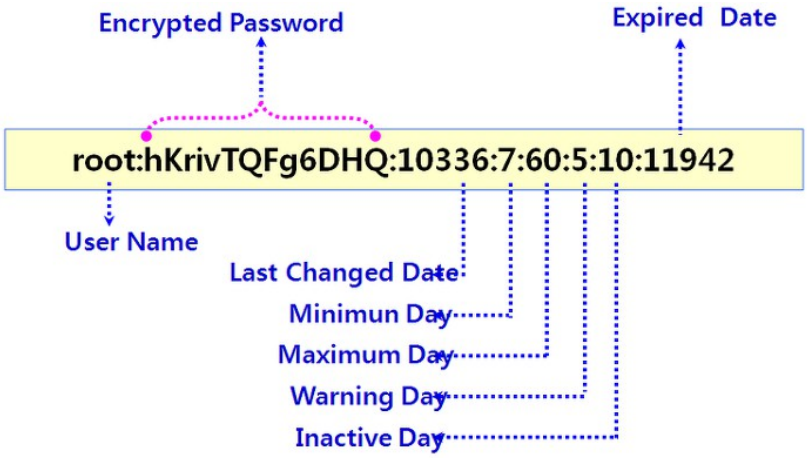
usermod → change aspects of existing user

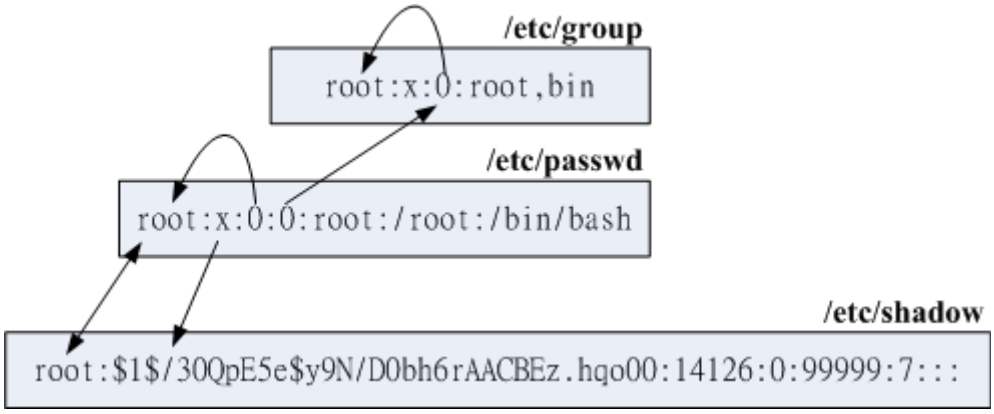
userdel → delete user

groupdel → delete group

```
spowers@cbt-xubuntu:~$ sudo adduser patrick
Adding user `patrick' ...
Adding new group `patrick' (1002) ...
Adding new user `patrick' (1002) with group `patrick' ...
Creating home directory `/home/patrick' ...
Copying files from `/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for patrick
Enter the new value, or press ENTER for the default
        Full Name []: Patrick Star
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n]
spowers@cbt-xubuntu:~$ ls /home/
patrick  spongebob  spowers
spowers@cbt-xubuntu:~$ id patrick
uid=1002(patrick) gid=1002(patrick) groups=1002(patrick)
spowers@cbt-xubuntu:~$ sudo groupadd pineapple
spowers@cbt-xubuntu:~$
```

```
root@kali:~# useradd joe
root@kali:~# cat /etc/passwd /etc/group /etc/shadow | grep joe
joe:x:1000:1001::/home/joe:/bin/sh
joe:x:1001:
joe:!:16806:0:99999:7:::
root@kali:~#
```



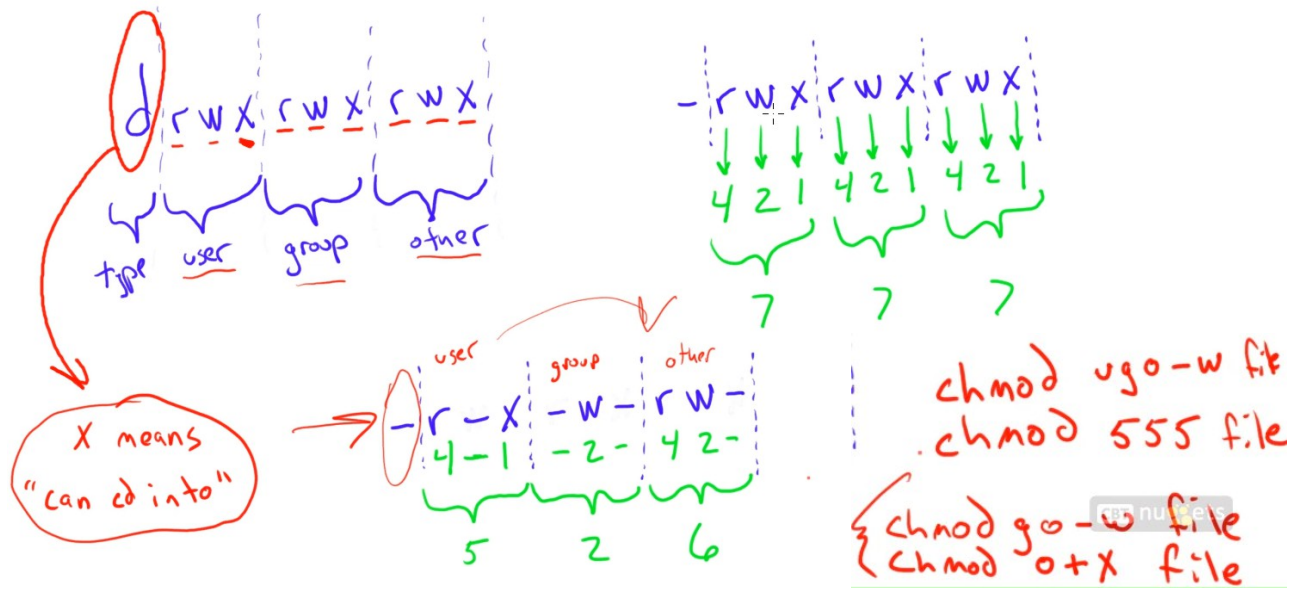


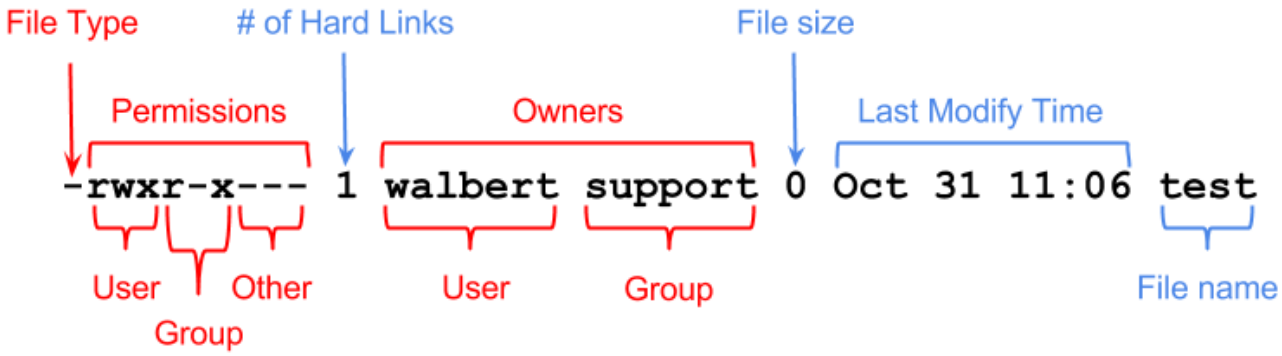
```
spowers@cbt-xubuntu:~$ last
spongebo pts/4        localhost        Fri Jun 20 03:52 - 07:04  (03:11)
spongebo pts/4        localhost        Fri Jun 20 03:52 - 03:52  (00:00)
spowers  pts/3        :0.0             Fri Jun 20 03:49   still logged in
spowers  pts/3        :0.0             Fri Jun  6 18:43 - 01:11 (13+06:28)
spowers  pts/3        :0.0             Fri Jun  6 13:26 - 13:30  (00:04)
spowers  pts/3        :0.0             Fri Jun  6 13:20 - 13:22  (00:01)

wtmp begins Fri Jun  6 13:20:26 2014
spowers@cbt-xubuntu:~$
```

```
spowers@cbt-xubuntu:~$ userdel --help
Usage: userdel [options] LOGIN

Options:
  -f, --force                   force removal of files,
                                even if not owned by user
  -h, --help                    display this help message and exit
  -r, --remove                  remove home directory and mail spool
  -R, --root CHROOT_DIR         directory to chroot into
  -Z, --selinux-user            remove any SELinux user mapping for the user

spowers@cbt-xubuntu:~$ sudo userdel -r spongebob
userdel: spongebob mail spool (/var/mail/spongebob) not found
spowers@cbt-xubuntu:~$ ls /home
patrick  spowers
```

```
spowers@cbt-xubuntu:~$ sudo usermod -a -G pineapple patrick
spowers@cbt-xubuntu:~$ id patrick
uid=1002(patrick) gid=1002(patrick) groups=1002(patrick),1003(pineapple)
spowers@cbt-xubuntu:~$ sudo usermod -a -G sudo patrick
spowers@cbt-xubuntu:~$ id patrick
uid=1002(patrick) gid=1002(patrick) groups=1002(patrick),27(sudo),1003(pineapple)
spowers@cbt-xubuntu:~$ sudo userdel -r patrick
userdel: user patrick is currently used by process 2147
spowers@cbt-xubuntu:~$ sudo userdel -r patrick
userdel: patrick mail spool (/var/mail/patrick) not found
spowers@cbt-xubuntu:~$ ls /home
spowers
spowers@cbt-xubuntu:~$
```

```
spowers@cbt-xubuntu:~$ sudo groupdel pineapple
```





whoami commands shows the logged in user name

1. **Add single permission to a file/directory**
Changing permission to a single set. + symbol means adding permission. For example, do the following to give execute permission for the user irrespective of anything else:
$ chmod u+x filename

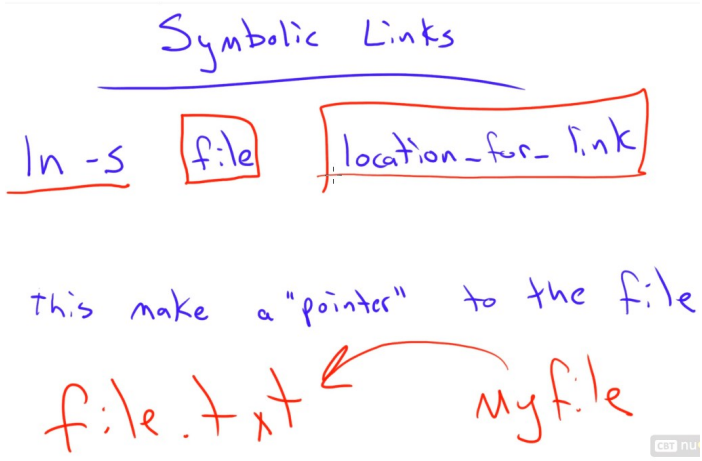
2. **Add multiple permission to a file/directory**
Use comma to separate the multiple permission sets as shown below.
$ chmod u+r,g+x filename

3. **Remove permission from a file/directory**
Following example removes read and write permission for the user.
$ chmod u-rx filename

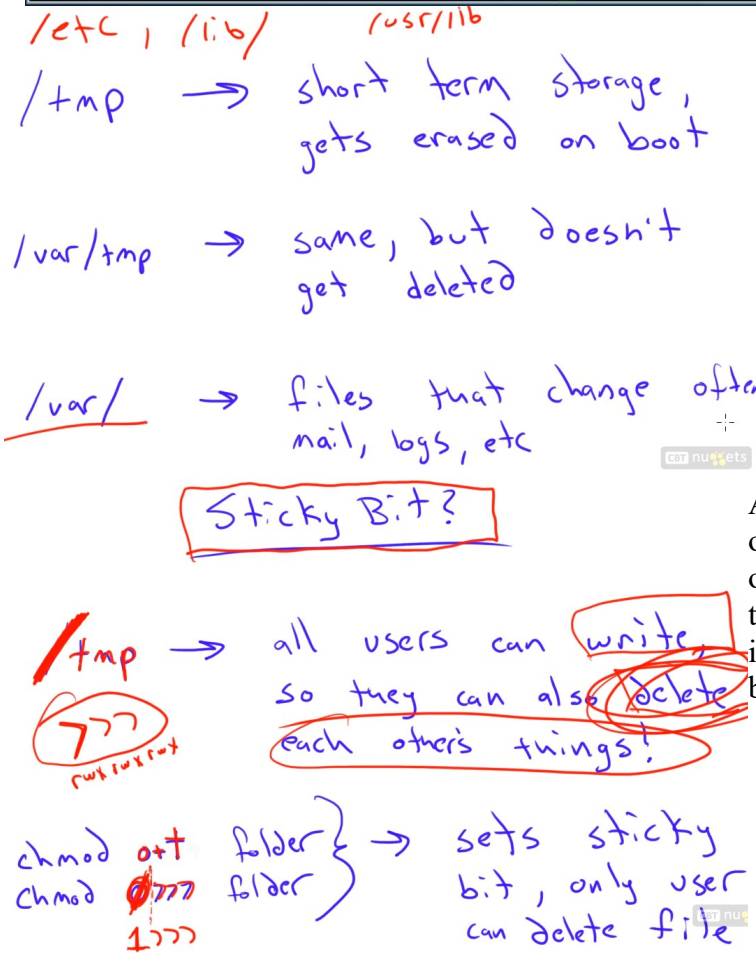
1. **Change the owner of a file**
ls -lart tmpfile
-rw-r--r-- 1 himanshu family 0 2012-05-22 20:03 tmpfile
chown root tmpfile
ls -l tmpfile
-rw-r--r-- 1 root family 0 2012-05-22 20:03 tmpfile
So we see that the owner of the file was changed from ‘himanshu’ to ‘root’.

2. **Change the group of a file**
Through the chown command, the group (that a file belongs to) can also be changed.
ls -l tmpfile
-rw-r--r-- 1 himanshu family 0 2012-05-22 20:03 tmpfile
chown :friends tmpfile
ls -l tmpfile
-rw-r--r-- 1 himanshu friends 0 2012-05-22 20:03 tmpfile
If you observe closely, the group of the file changed from ‘family’ to ‘friends’. So we see that by just adding a ‘:’ followed by the new group name, the group of the file can be changed.

3. **Change both owner and the group**
ls -l tmpfile
-rw-r--r-- 1 root family 0 2012-05-22 20:03 tmpfile
chown himanshu:friends tmpfile
ls -l tmpfile
-rw-r--r-- 1 himanshu friends 0 2012-05-22 20:03 tmpfile
So we see that using the syntax ‘<newOwner>:<newGroup>’, the owner as well as group can be changed in one go.




```
spowers@cbt-xubuntu:~/Documents$ ln -s /etc/apache2/ports.conf localports
spowers@cbt-xubuntu:~/Documents$ ls -l
total 16
lrwxrwxrwx 1 spowers    spowers   10 Jun 23 00:09 diamonds.txt -> rubies.txt
lrwxrwxrwx 1 spowers    spowers   23 Jun 23 00:10 localports -> /etc/apache2/por
ts.conf
drwxrwx--- 2 blackbeard pirate  4096 Jun 22 21:33 old_bucket
-rw-r--r-- 1 spowers    pirate    41 Jun 22 23:54 rubies.txt
drwxrwx--- 2 spowers    captain 4096 Jun 22 22:29 spowers_footlocker
drwxrwx-wx 2 blackbeard captain 4096 Jun 22 22:29 treasure_chest
spowers@cbt-xubuntu:~/Documents$ vi localports
spowers@cbt-xubuntu:~/Documents$ cat rubies.txt
The rubies are really squid tentacles...
spowers@cbt-xubuntu:~/Documents$ cat diamonds.txt
The rubies are really squid tentacles...
spowers@cbt-xubuntu:~/Documents$
```



A Sticky bit is a permission bit that is set on a file or a directory that lets only the owner of the file/directory or the root user to delete or rename the file. No other user is given privileges to delete the file created by some other user.

sticky bit – ensures the deletion of files by only file owner in a public writable directory

- chmod +t f1
- Chmod 1744 f1

```
drwxrwxrwt  11 root root  4096 Jun 23 00:25 tmp
```