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CNIT 176
Lab 11

Installation of tree:

```
asurve@raspberrypi:/$ sudo apt-get install tree
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  tree
0 upgraded, 1 newly installed, 0 to remove and 48 not upgraded.
Need to get 0 B/43.5 kB of archives.
After this operation, 99.3 kB of additional disk space will be used.
Selecting previously unselected package tree.
(Reading database ... 40256 files and directories currently installed.)
Preparing to unpack .../tree_1.8.0-1_armhf.deb ...
Unpacking tree (1.8.0-1) ...
Setting up tree (1.8.0-1) ...
Processing triggers for man-db (2.8.5-2) ...
asurve@raspberrypi:/$
```

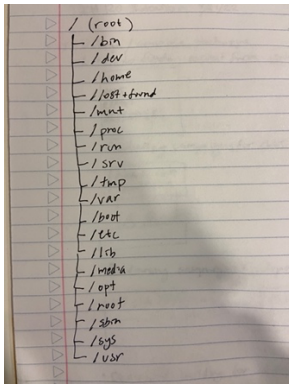
1.
   a.

MacOS	/
Windows	\
Linux	/

   b. Raspbian – "/home/asurve"
   Personal Computer (MacOS) – "/Users/arnavsurve/Documents"

   c. /usr/bin/xeyes/
   If I was in the /usr/ directory, the absolute path starting from the usr directory would be identical besides there being no leading '/'. The absolute path would be usr/bin/xeyes.

2.
   a. You would be located in the root directory, or '/'.
   b. cd /etc/X11/app-defaults or cd ../../app-defaults

3.
   a. 

b. The /etc directory looks to contain system configuration files, judging from the files' extensions and contents. I am converting my pi to a NAS for my project, and I will be using Samba to accomplish this. In /etc, I will be working within the /etc/samba directory to configure the smb.conf file.
c. With the command ls -alh, I can see that the files in /etc are owned by root. Using the 'hostname' file, I see that my user has the permissions "-rw-r--r--". This means I can read and write, but my group and other users only have read permissions. For subdirectories, my user can read, write, and execute.

4. 5 parts of the Linux system presented as a file are text documents, hardware (CPU, RAM), the kernel, applications, and the desktop environment. A part of the system that is not presented as a file are signals. According to user Sachar Shemesh on Stack Overflow, "[Signals] are handled asynchronously to the program's execution, and therefore cannot take on a file interface." Looking through the /dev directory, I see filetypes of "block special (b)" and "character special (c)" as well as links (l). Block special files provide buffered access to hardware devices and character special files provide access to input/output devices.
5.
a.

```
Nov 15 19:46:09 raspberrypi sshd[542]: Server listening on :: port 22.
Nov 15 19:46:13 raspberrypi systemd-logind[398]: Watching system buttons on /dev/input/e
vent2 (Logitech USB Keyboard System Control)
Nov 15 19:46:13 raspberrypi systemd-logind[398]: Watching system buttons on /dev/input/e
vent0 (Logitech USB Keyboard)
Nov 15 19:46:15 raspberrypi login[537]: pam_unix(login:session): session opened for user
 asurve(uid=1000) by LOGIN(uid=0)
Nov 15 19:46:15 raspberrypi lightdm: pam_unix(lightdm-autologin:session): session opened
 for user asurve(uid=1000) by (uid=0)
Nov 15 19:46:15 raspberrypi systemd-logind[398]: New session 2 of user asurve.
Nov 15 19:46:15 raspberrypi systemd-logind[398]: New session 1 of user asurve.
Nov 15 19:46:15 raspberrypi systemd: pam_unix(systemd-user:session): session opened for
user asurve(uid=1000) by (uid=0)
Nov 15 19:46:22 raspberrypi polkitd(authority=local): Registered Authentication Agent fo
r unix-session:2 (system bus name :1.32 [lxpolkit], object path /org/freedesktop/PolicyK
it1/AuthenticationAgent, locale en_US.UTF-8)
Nov 15 19:46:27 raspberrypi PackageKit: uid 1000 is trying to obtain org.freedesktop.pac
kagekit.system-sources-refresh auth (only_trusted:0)
Nov 15 19:46:27 raspberrypi PackageKit: uid 1000 obtained auth for org.freedesktop.packa
gekit.system-sources-refresh
Nov 17 17:47:24 raspberrypi sudo:   asurve : TTY=pts/0 ; PWD=/etc/ssh ; USER=root ; COMM
AND=/usr/bin/vi sshd_config
Nov 17 17:47:24 raspberrypi sudo: pam_unix(sudo:session): session opened for user root(u
id=0) by (uid=1000)
Nov 17 17:48:14 raspberrypi sudo: pam_unix(sudo:session): session closed for user root
Nov 17 17:48:22 raspberrypi sudo:   asurve : TTY=pts/0 ; PWD=/etc/ssh ; USER=root ; COMM
AND=/usr/sbin/service ssh restart
Nov 17 17:48:22 raspberrypi sudo: pam_unix(sudo:session): session opened for user root(u
id=0) by (uid=1000)
Nov 17 17:48:22 raspberrypi sshd[542]: Received signal 15; terminating.
Nov 17 17:48:22 raspberrypi sshd[1384]: Server listening on 0.0.0.0 port 22.
Nov 17 17:48:22 raspberrypi sshd[1384]: Server listening on :: port 22.
Nov 17 17:48:22 raspberrypi sudo: pam_unix(sudo:session): session closed for user root
Nov 17 17:48:28 raspberrypi sudo:   asurve : TTY=pts/0 ; PWD=/etc/ssh ; USER=root ; COMM
AND=/usr/sbin/service ssh status
Nov 17 17:48:28 raspberrypi sudo: pam_unix(sudo:session): session opened for user root(u
id=0) by (uid=1000)
Nov 17 17:48:53 raspberrypi sshd[1391]: Accepted password for asurve from fe80::1c09:d37
d:7477:178e%wlan0 port 58286 ssh2
Nov 17 17:48:53 raspberrypi sshd[1391]: pam_unix(sshd:session): session opened for user
asurve(uid=1000) by (uid=0)
Nov 17 17:48:54 raspberrypi systemd-logind[398]: New session 4 of user asurve.
asurve@raspberrypi:/ $
```

From the auth.log file, I can see the date and time of events that happened in my ssh session. It shows the hostname, command, and running event. For example, at 17:48:53 on November 17th, I started a new ssh session for the user 'asurve'.

b. For my project's troubleshooting, I could look at Samba log files. These are found at /var/log/samba by default. These could be useful as I can view the ip addresses of users who access the samba share and the directories that they used.

References

Gaurav Agarwal, Izzy. (1959, September 1). *What is the meaning of "block special"?* Ask Ubuntu. Retrieved November 17, 2022, from https://askubuntu.com/questions/166716/what-is-the-meaning-of-block-special

Jerry Chen, Shachar Shemesh , & Soroosh Sharif. (1963, November 1). *What is not file in linux*. Stack Overflow. Retrieved November 17, 2022, from https://stackoverflow.com/questions/39383041/what-is-not-file-in-linux