

Lab 02 – Navigating the Terminal

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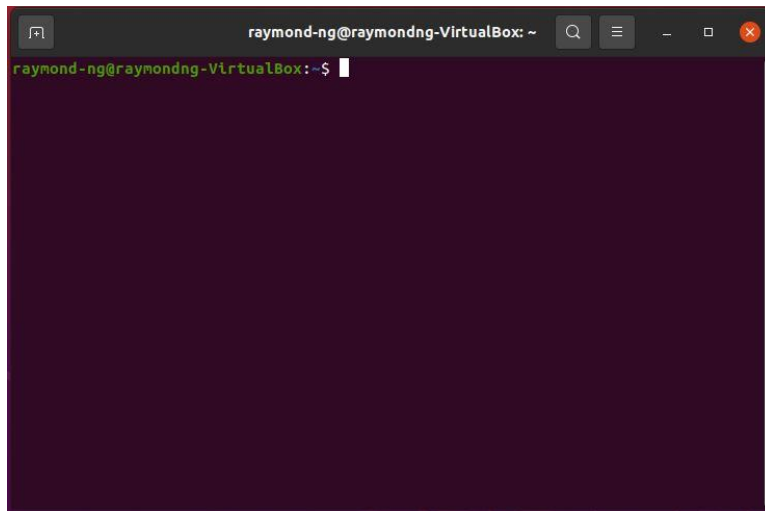
INTRODUCTION

The purpose of this lab is to provide students with the opportunity to experiment and become more familiarized with using the Command Line Interface (CLI). In this lab, students will be introduced to an array of rudimentary commands/arguments to navigate the CLI, specifically in Unix, as it applies to foundational knowledge of the cybersecurity field.

PROCESS

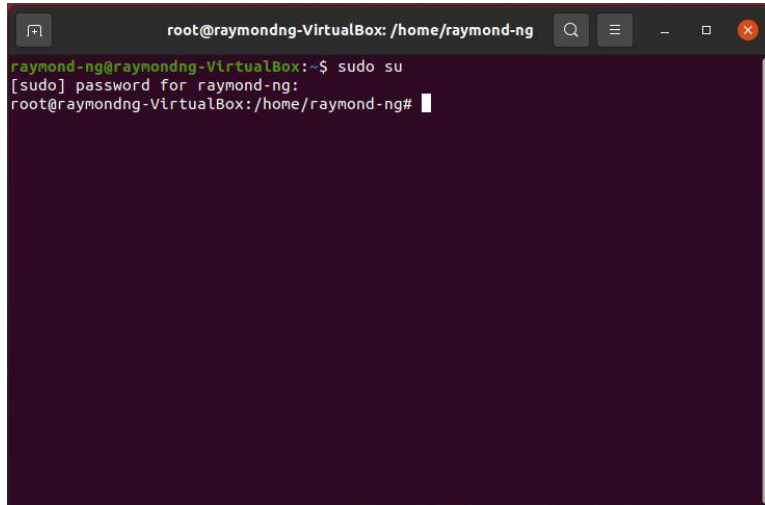
Setting Up

Before I began the lab I read through the reference material found on linuxcommand.org just to provide myself with some background knowledge before I executed each step of this lab. Especially to be more familiarized with terminology like “the Shell”. (Shotts, 2021)



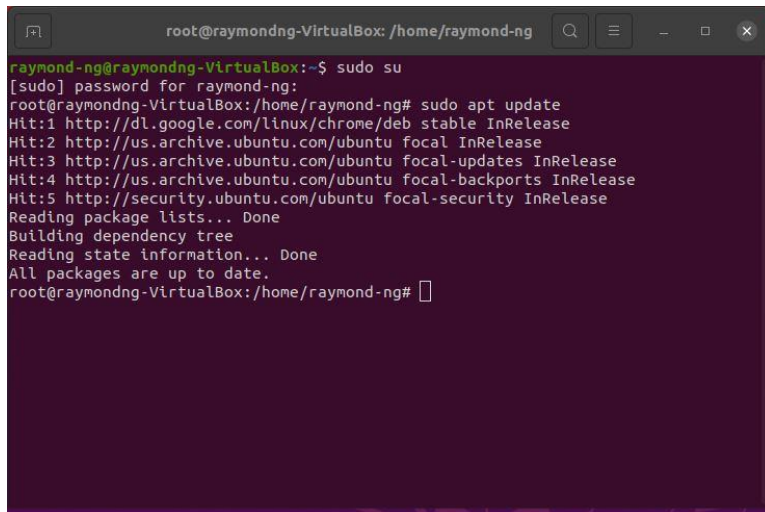
Revved up my Ubuntu browser via VM installed and setup from Lab01 and opened the terminal using the keys 'CTRL' + 'ALT' + 't'.

Part I: Administrative Privileges



```
root@raymondng-VirtualBox: /home/raymond-ng
raymond-ng@raymondng-VirtualBox:~$ sudo su
[sudo] password for raymond-ng:
root@raymondng-VirtualBox:~#
```

Per the instructions of Lab02, I entered the `sudo su` (switch user and do this command) command to gain root privilege. After the `sudo su` command was entered, I was prompted to enter the user password I created for my Ubuntu user profile. No observable issues to report on this step.



```
root@raymondng-VirtualBox: /home/raymond-ng
raymond-ng@raymondng-VirtualBox:~$ sudo su
[sudo] password for raymond-ng:
root@raymondng-VirtualBox:~# sudo apt update
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:2 http://us.archive.ubuntu.com/ubuntu focal InRelease
Hit:3 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:4 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease
Hit:5 http://security.ubuntu.com/ubuntu focal-security InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
root@raymondng-VirtualBox:~#
```

I updated the machine with the `sudo apt update` command. It appears Guest Additions are already set up so no further steps were required. No observable issue to report on this step.

Part II: Looking at Your Directories

```
root@raymondng-VirtualBox: /home/raymond-ng
raymond-ng@raymondng-VirtualBox:~$ sudo su
[sudo] password for raymond-ng:
root@raymondng-VirtualBox:~#
```

Typed the `pwd` (present working directory) command to locate my home directory which was located at `/home/raymond-ng`.

```
root@raymondng-VirtualBox: /home/raymond-ng
raymond-ng@raymondng-VirtualBox:~$ sudo su
[sudo] password for raymond-ng:
root@raymondng-VirtualBox:~# sudo apt update
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:2 http://us.archive.ubuntu.com/ubuntu focal InRelease
Hit:3 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:4 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease
Hit:5 http://security.ubuntu.com/ubuntu focal-security InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
root@raymondng-VirtualBox:~# pwd
/home/raymond-ng
root@raymondng-VirtualBox:~# ls
Desktop  google-chrome-stable_current_amd64.deb  Pictures  Templates
Documents google-chrome-stable_current_amd64.deb.1  Public    Videos
Downloads Music                                     snap
```

In order to list the contents of my home directory I used the `ls` (list) command. I noticed “google-chrome-stable_current_amd64.deb” was listed in the directory. I had previously downloaded Google Chrome browser from the previous lab, Lab01, using the command line.

```
root@raymondng-VirtualBox: /home/raymond-ng
All packages are up to date.
root@raymondng-VirtualBox: /home/raymond-ng# pwd
/home/raymond-ng
root@raymondng-VirtualBox: /home/raymond-ng# ls
Desktop      google-chrome-stable_current_amd64.deb  Pictures  Templates
Documents    google-chrome-stable_current_amd64.deb.1  Public    Videos
Downloads    Music                                     snap
root@raymondng-VirtualBox: /home/raymond-ng# ls -a
.
..
.bash_history
.bash_logout
.bashrc
.cache
.config
Desktop
Documents
Downloads
.gnupg
google-chrome-stable_current_amd64.deb
google-chrome-stable_current_amd64.deb.1
.local
.mozilla
Pictures
.pkf
.profile
Public
snap
.ssh
.sudo_as_admin_successful
Templates
.vboxclient-clipboard.pid
.vboxclient-display-svga-x11.pid
.vboxclient-draganddrop.pid
.vboxclient-seamless.pid
Videos
root@raymondng-VirtualBox: /home/raymond-ng#
```

In this step I was instructed to use the `ls -al` (list all) command to list all objects in the directory. All of the objects, including hidden files and directories were depicted.

```
root@raymondng-VirtualBox: /home/raymond-ng
.gnupg                                .vboxclient-display-svga-x11.pid
google-chrome-stable_current_amd64.deb .vboxclient-draganddrop.pid
google-chrome-stable_current_amd64.deb.1 .vboxclient-seamless.pid
.local                                Videos
.mozilla
total 142288
drwxr-xr-x 18 raymond-ng raymond-ng 4096 Feb 25 18:47 .
drwxr-xr-x  3 root      root      4096 Feb  4 11:22 ..
-rw-r--r--  1 raymond-ng raymond-ng  776 Feb 27 10:21 .bash_history
-rw-r--r--  1 raymond-ng raymond-ng  220 Feb  4 11:22 .bash_logout
-rw-r--r--  1 raymond-ng raymond-ng 3771 Feb  4 11:22 .bashrc
drwxr-xr-x 14 raymond-ng raymond-ng 4096 Feb  5 10:26 .cache
drwxr-xr-x 13 raymond-ng raymond-ng 4096 Feb  5 10:26 .config
drwxr-xr-x  2 raymond-ng raymond-ng 4096 Feb  4 11:30 Desktop
drwxr-xr-x  2 raymond-ng raymond-ng 4096 Feb  4 11:30 Documents
drwxr-xr-x  2 raymond-ng raymond-ng 4096 Feb  4 11:30 Downloads
drwxr-xr-x  3 raymond-ng raymond-ng 4096 Feb  5 09:53 .gnupg
-rw-rw-r--  1 raymond-ng raymond-ng 72796932 Feb  3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r--  1 raymond-ng raymond-ng 72796932 Feb  3 20:50 google-chrome-stable_current_amd64.deb.1
drwxr-xr-x  3 raymond-ng raymond-ng 4096 Feb  4 11:30 .local
drwxr-xr-x  5 raymond-ng raymond-ng 4096 Feb  5 09:05 .mozilla
drwxr-xr-x  2 raymond-ng raymond-ng 4096 Feb  4 11:30 Music
drwxr-xr-x  2 raymond-ng raymond-ng 4096 Feb  4 11:30 Pictures
drwxr-xr-x  3 raymond-ng raymond-ng 4096 Feb  5 10:26 .pkf
-rw-r--r--  1 raymond-ng raymond-ng  807 Feb  4 11:22 .profile
drwxr-xr-x  2 raymond-ng raymond-ng 4096 Feb  4 11:30 Public
drwxr-xr-x  3 raymond-ng raymond-ng 4096 Feb  5 09:24 snap
drwxr-xr-x  2 raymond-ng raymond-ng 4096 Feb  5 09:53 .ssh
-rw-r--r--  1 raymond-ng raymond-ng   0 Feb  5 10:02 .sudo_as_admin_successful
drwxr-xr-x  2 raymond-ng raymond-ng 4096 Feb  4 11:30 Templates
-rw-r--r--  1 raymond-ng raymond-ng   5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-r--r--  1 raymond-ng raymond-ng   5 Feb 25 18:33 .vboxclient-display-svga-x11.pid
-rw-r--r--  1 raymond-ng raymond-ng   5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-r--r--  1 raymond-ng raymond-ng   5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x  2 raymond-ng raymond-ng 4096 Feb  4 11:30 Videos
root@raymondng-VirtualBox: /home/raymond-ng#
```

To view a bigger picture of the contents of the current directory I used the `ls -al` (list long) command as instructed. All the contents in this directory were not only listed, but owner and size of each object was depicted as well.

```
root@raymondng-VirtualBox: /home/raymond-ng
-rw-r----- 1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-r----- 1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-display-svga-x11.pid
-rw-r----- 1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-r----- 1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Videos
root@raymondng-VirtualBox: /home/raymond-ng# ll
total 142288
drwxr-xr-x 18 raymond-ng raymond-ng    4096 Feb 25 18:47 ./
drwxr-xr-x  3 root      root          4096 Feb  4 11:22 ../
-rw-r----- 1 raymond-ng raymond-ng    776 Feb 27 10:21 .bash_history
-rw-r----- 1 raymond-ng raymond-ng    220 Feb  4 11:22 .bash_logout
-rw-r----- 1 raymond-ng raymond-ng   3771 Feb  4 11:22 .bashrc
drwxr-xr-x 14 raymond-ng raymond-ng    4096 Feb  5 10:26 .cache/
drwxr----- 13 raymond-ng raymond-ng    4096 Feb  5 10:26 .config/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Desktop/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Documents/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Downloads/
drwxr-----  3 raymond-ng raymond-ng    4096 Feb  5 09:53 .gnupg/
-rw-rw-r--  1 raymond-ng raymond-ng 72796932 Feb  3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r--  1 raymond-ng raymond-ng 72796932 Feb  3 20:50 google-chrome-stable_current_amd64.deb.1
drwxr-xr-x  3 raymond-ng raymond-ng    4096 Feb  4 11:30 .local/
drwxr-----  5 raymond-ng raymond-ng    4096 Feb  5 09:05 .mozilla/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Music/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Pictures/
drwxr-----  3 raymond-ng raymond-ng    4096 Feb  5 10:26 .pki/
-rw-r-----  1 raymond-ng raymond-ng    807 Feb  4 11:22 .profile
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Public/
drwxr-xr-x  3 raymond-ng raymond-ng    4096 Feb  5 09:24 snap/
drwxr-----  2 raymond-ng raymond-ng    4096 Feb  5 09:53 .ssh/
-rw-r-----  1 raymond-ng raymond-ng      0 Feb  5 10:02 .sudo_as_admin_successful
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Templates/
-rw-r-----  1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-r-----  1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-display-svga-x11.pid
-rw-r-----  1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-r-----  1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Videos/
root@raymondng-VirtualBox: /home/raymond-ng#
```

Per the block of instructions, I typed the shortcut **ll** command (shortcut command to **ls -l** command) and it depicted the same results.

```
root@raymondng-VirtualBox: /home/raymond-ng
-rw-r----- 1 raymond-ng raymond-ng    3771 Feb  4 11:22 .bashrc
drwxr-xr-x 14 raymond-ng raymond-ng    4096 Feb  5 10:26 .cache/
drwxr----- 13 raymond-ng raymond-ng    4096 Feb  5 10:26 .config/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Desktop/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Documents/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Downloads/
drwxr-----  3 raymond-ng raymond-ng    4096 Feb  5 09:53 .gnupg/
-rw-rw-r--  1 raymond-ng raymond-ng 72796932 Feb  3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r--  1 raymond-ng raymond-ng 72796932 Feb  3 20:50 google-chrome-stable_current_amd64.deb.1
drwxr-xr-x  3 raymond-ng raymond-ng    4096 Feb  4 11:30 .local/
drwxr-----  5 raymond-ng raymond-ng    4096 Feb  5 09:05 .mozilla/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Music/
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Pictures/
drwxr-----  3 raymond-ng raymond-ng    4096 Feb  5 10:26 .pki/
-rw-r-----  1 raymond-ng raymond-ng    807 Feb  4 11:22 .profile
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Public/
drwxr-xr-x  3 raymond-ng raymond-ng    4096 Feb  5 09:24 snap/
drwxr-----  2 raymond-ng raymond-ng    4096 Feb  5 09:53 .ssh/
-rw-r-----  1 raymond-ng raymond-ng      0 Feb  5 10:02 .sudo_as_admin_successful
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Templates/
-rw-r-----  1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-r-----  1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-display-svga-x11.pid
-rw-r-----  1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-r-----  1 raymond-ng raymond-ng      5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Videos/
root@raymondng-VirtualBox: /home/raymond-ng# ls -lt | head
total 142288
drwxr-xr-x  3 raymond-ng raymond-ng    4096 Feb  5 09:24 snap
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Music
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Pictures
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Videos
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Desktop
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Documents
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Downloads
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Public
drwxr-xr-x  2 raymond-ng raymond-ng    4096 Feb  4 11:30 Templates
root@raymondng-VirtualBox: /home/raymond-ng#
```

Here I was instructed to use the **ls -lt | head** (head command) to display the 10 newest files on the current directory.


```
root@raymondng-VirtualBox: /home/raymond-ng/temp
-rw-r--r-- 1 raymond-ng raymond-ng 3771 Feb 4 11:22 .bashrc
drwxr-xr-x 14 raymond-ng raymond-ng 4096 Feb 5 10:26 .cache/
drwx----- 13 raymond-ng raymond-ng 4096 Feb 5 10:26 .config/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Desktop/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Documents/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Downloads/
drwx----- 3 raymond-ng raymond-ng 4096 Feb 5 09:53 .gnupg/
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb.
1
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 4 11:30 .local/
drwx----- 5 raymond-ng raymond-ng 4096 Feb 5 09:05 .mozilla/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Music/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Pictures/
drwx----- 3 raymond-ng raymond-ng 4096 Feb 5 10:26 .pkt/
-rw-r--r-- 1 raymond-ng raymond-ng 887 Feb 4 11:22 .profile
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Public/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:24 snap/
drwx----- 2 raymond-ng raymond-ng 4096 Feb 5 09:53 .ssh/
-rw-r--r-- 1 raymond-ng raymond-ng 0 Feb 5 10:02 .sudo_as_admin_successful
drwxr-xr-x 2 root root 4096 Feb 27 11:45 temp/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Templates/
-rw-r----- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-r----- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-display-svga-x11.pid
-rw-r----- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-r----- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Videos/
root@raymondng-VirtualBox:/home/raymond-ng# cd temp
root@raymondng-VirtualBox:/home/raymond-ng/temp# pwd
/home/raymond-ng/temp
root@raymondng-VirtualBox:/home/raymond-ng/temp# ll -a
total 8
drwxr-xr-x 2 root root 4096 Feb 27 11:45 ./
drwxr-xr-x 19 raymond-ng raymond-ng 4096 Feb 27 11:45 ../
root@raymondng-VirtualBox:/home/raymond-ng/temp#
```

Here I changed the directory using the `cd` command and listed all the contents of the new directory with the `ll -a` command. At least two directories were depicted in this step.

```
root@raymondng-VirtualBox: /home/raymond-ng/temp
/home/raymond-ng/temp
root@raymondng-VirtualBox:/home/raymond-ng/temp# ll -a
total 8
drwxr-xr-x 2 root root 4096 Feb 27 11:45 ./
drwxr-xr-x 19 raymond-ng raymond-ng 4096 Feb 27 11:45 ../
root@raymondng-VirtualBox:/home/raymond-ng/temp# ll ..
total 142292
drwxr-xr-x 19 raymond-ng raymond-ng 4096 Feb 27 11:45 ./
drwxr-xr-x 3 root root 4096 Feb 4 11:22 ../
-rw----- 1 raymond-ng raymond-ng 776 Feb 27 10:21 .bash_history
-rw-r--r-- 1 raymond-ng raymond-ng 220 Feb 4 11:22 .bash_logout
-rw-r--r-- 1 raymond-ng raymond-ng 3771 Feb 4 11:22 .bashrc
drwxr-xr-x 14 raymond-ng raymond-ng 4096 Feb 5 10:26 .cache/
drwx----- 13 raymond-ng raymond-ng 4096 Feb 5 10:26 .config/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Desktop/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Documents/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Downloads/
drwx----- 3 raymond-ng raymond-ng 4096 Feb 5 09:53 .gnupg/
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb.
1
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 4 11:30 .local/
drwx----- 5 raymond-ng raymond-ng 4096 Feb 5 09:05 .mozilla/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Music/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Pictures/
drwx----- 3 raymond-ng raymond-ng 4096 Feb 5 10:26 .pkt/
-rw-r--r-- 1 raymond-ng raymond-ng 887 Feb 4 11:22 .profile
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Public/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:24 snap/
drwx----- 2 raymond-ng raymond-ng 4096 Feb 5 09:53 .ssh/
-rw-r--r-- 1 raymond-ng raymond-ng 0 Feb 5 10:02 .sudo_as_admin_successful
drwxr-xr-x 2 root root 4096 Feb 27 11:45 temp/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Templates/
-rw-r----- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-r----- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-display-svga-x11.pid
```

In this step the `dotdot` directory argument was executed. Here I used the `ll ..` command to list the contents of the parent directory.

```
root@raymondng-VirtualBox: /home/raymond-ng
drwxr-xr-x 19 raymond-ng raymond-ng 4096 Feb 27 11:45 ./
drwxr-xr-x 3 root root 4096 Feb 4 11:22 ../
-rw-r--r-- 1 raymond-ng raymond-ng 776 Feb 27 10:21 .bash_history
-rw-r--r-- 1 raymond-ng raymond-ng 220 Feb 4 11:22 .bash_logout
-rw-r--r-- 1 raymond-ng raymond-ng 3771 Feb 4 11:22 .bashrc
drwxr-xr-x 14 raymond-ng raymond-ng 4096 Feb 5 10:26 .cache/
drwxr-xr-x 13 raymond-ng raymond-ng 4096 Feb 5 10:26 .config/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Desktop/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Documents/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Downloads/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:53 .gnupg/
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb.
1
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 4 11:30 .local/
drwxr-xr-x 5 raymond-ng raymond-ng 4096 Feb 5 09:05 .mozilla/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Music/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Pictures/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 10:26 .pkt/
-rw-r--r-- 1 raymond-ng raymond-ng 807 Feb 4 11:22 .profile
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Public/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:24 snap/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 5 09:53 .ssh/
-rw-r--r-- 1 raymond-ng raymond-ng 0 Feb 5 10:02 .sudo_as_admin_successful
drwxr-xr-x 2 root root 4096 Feb 27 11:45 temp/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Templates/
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-display-svga-x11.pid
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Videos/
root@raymondng-VirtualBox: /home/raymond-ng/temp# cd ..
root@raymondng-VirtualBox: /home/raymond-ng# pwd
/home/raymond-ng
root@raymondng-VirtualBox: /home/raymond-ng#
```

Continuing with the use of the dotdot directory argument, here I used the `cd ..` command to change my working directory to a parent directory and verified it with the `pwd` command.

```
root@raymondng-VirtualBox: /home/raymond-ng
root@raymondng-VirtualBox: /home/raymond-ng# mv temp temp2
root@raymondng-VirtualBox: /home/raymond-ng# ll
total 142292
drwxr-xr-x 19 raymond-ng raymond-ng 4096 Feb 27 12:34 ./
drwxr-xr-x 3 root root 4096 Feb 4 11:22 ../
-rw-r--r-- 1 raymond-ng raymond-ng 776 Feb 27 10:21 .bash_history
-rw-r--r-- 1 raymond-ng raymond-ng 220 Feb 4 11:22 .bash_logout
-rw-r--r-- 1 raymond-ng raymond-ng 3771 Feb 4 11:22 .bashrc
drwxr-xr-x 14 raymond-ng raymond-ng 4096 Feb 5 10:26 .cache/
drwxr-xr-x 13 raymond-ng raymond-ng 4096 Feb 5 10:26 .config/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Desktop/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Documents/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Downloads/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:53 .gnupg/
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb.
1
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 4 11:30 .local/
drwxr-xr-x 5 raymond-ng raymond-ng 4096 Feb 5 09:05 .mozilla/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Music/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Pictures/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 10:26 .pkt/
-rw-r--r-- 1 raymond-ng raymond-ng 807 Feb 4 11:22 .profile
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Public/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:24 snap/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 5 09:53 .ssh/
-rw-r--r-- 1 raymond-ng raymond-ng 0 Feb 5 10:02 .sudo_as_admin_successful
drwxr-xr-x 2 root root 4096 Feb 27 11:45 temp2/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Templates/
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-display-svga-x11.pid
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Videos/
root@raymondng-VirtualBox: /home/raymond-ng#
```

In this step I renamed the temp directory to `temp2` by using the `mv temp temp2` command and listing it with `ll` command. I chose the same nomenclature for my temp directory as the one indicated in the lab instructions because I thought for instructional purposes it would be easier.


```
root@raymondng-VirtualBox: /home/raymond-ng
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:53 .gnupg/
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb.
1
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 4 11:30 .local/
drwxr-xr-x 5 raymond-ng raymond-ng 4096 Feb 5 09:05 .mozilla/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Music/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Pictures/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 10:26 .pki/
-rw-rw-r-- 1 raymond-ng raymond-ng 807 Feb 4 11:22 .profile
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Public/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:24 snap/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 5 09:53 .ssh/
-rw-rw-r-- 1 raymond-ng raymond-ng 0 Feb 5 10:02 .sudo_as_admin_successful
drwxr-xr-x 2 root root 4096 Feb 27 11:45 temp2/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Templates/
-rw-rw-r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-rw-r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-display-svg-x11.ptd
-rw-rw-r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-rw-r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Videos/
root@raymondng-VirtualBox:/home/raymond-ng# cp .bashrc temp2
root@raymondng-VirtualBox:/home/raymond-ng# ll -a temp2
total 12
drwxr-xr-x 2 root root 4096 Feb 27 12:43 ./
drwxr-xr-x 19 raymond-ng raymond-ng 4096 Feb 27 12:34 ../
-rw-rw-r-- 1 root root 3771 Feb 27 12:43 .bashrc
root@raymondng-VirtualBox:/home/raymond-ng# cp .bashrc temp2/.bash
root@raymondng-VirtualBox:/home/raymond-ng# ll -a temp2
total 16
drwxr-xr-x 2 root root 4096 Feb 27 12:45 ./
drwxr-xr-x 19 raymond-ng raymond-ng 4096 Feb 27 12:34 ../
-rw-rw-r-- 1 root root 3771 Feb 27 12:45 .bash
-rw-rw-r-- 1 root root 3771 Feb 27 12:43 .bashrc
root@raymondng-VirtualBox:/home/raymond-ng#
```

In this step I used the `cp` command to copy one of the files in my temp2 directory, specifically `cp .bashrc temp2`. I verified the listing using `ll -a temp2` command. The hidden file was later copied again and renamed using `cp .bashrc temp2/.bash`. The name of the temp file was renamed to `.bash` and it was verified again using `ll -a temp2`.

```
root@raymondng-VirtualBox: /home/raymond-ng
root@raymondng-VirtualBox:/home/raymond-ng# rmdir temp2
rmdir: failed to remove 'temp2': Directory not empty
root@raymondng-VirtualBox:/home/raymond-ng# rm temp2/.bas*
root@raymondng-VirtualBox:/home/raymond-ng# ll -a temp2
total 8
drwxr-xr-x 2 root root 4096 Feb 27 12:59 ./
drwxr-xr-x 19 raymond-ng raymond-ng 4096 Feb 27 12:34 ../
root@raymondng-VirtualBox:/home/raymond-ng# ll
total 142292
drwxr-xr-x 19 raymond-ng raymond-ng 4096 Feb 27 12:34 ./
drwxr-xr-x 3 root root 4096 Feb 4 11:22 ../
-rw-rw-r-- 1 raymond-ng raymond-ng 776 Feb 27 10:21 .bash_history
-rw-rw-r-- 1 raymond-ng raymond-ng 220 Feb 4 11:22 .bash_logout
-rw-rw-r-- 1 raymond-ng raymond-ng 3771 Feb 4 11:22 .bashrc
drwxr-xr-x 14 raymond-ng raymond-ng 4096 Feb 5 10:26 .cache/
drwxr-xr-x 13 raymond-ng raymond-ng 4096 Feb 5 10:26 .config/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Desktop/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Documents/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Downloads/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:53 .gnupg/
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb.
1
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 4 11:30 .local/
drwxr-xr-x 5 raymond-ng raymond-ng 4096 Feb 5 09:05 .mozilla/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Music/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Pictures/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 10:26 .pki/
-rw-rw-r-- 1 raymond-ng raymond-ng 807 Feb 4 11:22 .profile
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Public/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:24 snap/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 5 09:53 .ssh/
-rw-rw-r-- 1 raymond-ng raymond-ng 0 Feb 5 10:02 .sudo_as_admin_successful
drwxr-xr-x 2 root root 4096 Feb 27 12:59 temp2/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Templates/
-rw-rw-r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-rw-r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-display-svg-x11.ptd
-rw-rw-r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-rw-r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Videos/
root@raymondng-VirtualBox:/home/raymond-ng#
```

Lastly, in Part III, I followed the instructions to use the `rmdir` command to delete the renamed directory. The first attempt failed because the files still existed in the `temp2` directory. In order to remove the files in the `temp2` directory I used the `rm temp2/.bas*` command. Verified my work using `ll -a temp2` command.

```
root@raymondng-VirtualBox: /home/raymond-ng
root@raymondng-VirtualBox: /home/raymond-ng# rmdir temp2
root@raymondng-VirtualBox: /home/raymond-ng# ll
total 142288
drwxr-xr-x 18 raymond-ng raymond-ng 4096 Feb 27 13:05 ./
drwxr-xr-x 3 root root 4096 Feb 4 11:22 ../
-rw-r--r-- 1 raymond-ng raymond-ng 776 Feb 27 10:21 .bash_history
-rw-r--r-- 1 raymond-ng raymond-ng 228 Feb 4 11:22 .bash_logout
-rw-r--r-- 1 raymond-ng raymond-ng 3771 Feb 4 11:22 .bashrc
drwxr-xr-x 14 raymond-ng raymond-ng 4096 Feb 5 10:26 .cache/
drwxr-xr-x 13 raymond-ng raymond-ng 4096 Feb 5 10:26 .config/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Desktop/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Documents/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Downloads/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:53 .gnupg/
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb
-rw-rw-r-- 1 raymond-ng raymond-ng 72796932 Feb 3 20:50 google-chrome-stable_current_amd64.deb.1
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 4 11:30 .local/
drwxr-xr-x 5 raymond-ng raymond-ng 4096 Feb 5 09:05 .mozilla/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Music/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Pictures/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 10:26 .pkt/
-rw-r--r-- 1 raymond-ng raymond-ng 807 Feb 4 11:22 .profile
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Public/
drwxr-xr-x 3 raymond-ng raymond-ng 4096 Feb 5 09:24 snap/
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 5 09:53 .ssh/
-rw-r--r-- 1 raymond-ng raymond-ng 0 Feb 5 10:02 .sudo_as_admin_successful
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Templates/
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-clipboard.pid
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-display-svga-x11.pid
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-draganddrop.pid
-rw-r--r-- 1 raymond-ng raymond-ng 5 Feb 25 18:33 .vboxclient-seamless.pid
drwxr-xr-x 2 raymond-ng raymond-ng 4096 Feb 4 11:30 Videos/
root@raymondng-VirtualBox: /home/raymond-ng#
```

After deleting the files from the `temp2` directory I could finally remove the directory using the `rmdir temp2` command and I used `ll` command to verify my work.

Part IV: Looking at Text

```
root@raymondng-VirtualBox: /home/raymond-ng
root@raymondng-VirtualBox: /home/raymond-ng# cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
llist:x:38:38:Listing List Manager:/var/llist:/usr/sbin/nologin
lrc:x:39:39:lrcd:/var/run/lrcd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106:/:/nonexistent:/usr/sbin/nologin
syslog:x:104:110:/:/home/syslog:/usr/sbin/nologin
_apt:x:105:65534:/:/nonexistent:/usr/sbin/nologin
tas:x:106:111:TPM software stack,,:/var/lib/tpm:/bin/false
uidd:x:107:114:/:/run/uidd:/usr/sbin/nologin
tcpdump:x:108:115:/:/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:110:46:usbmux daemon,,:/var/lib/usbmux:/usr/sbin/nologin
rtkit:x:111:117:RealtimeKit,,:/proc:/usr/sbin/nologin
dnsmasq:x:112:65534:dnsmasq,,:/var/lib/misc:/usr/sbin/nologin
cups-pk-helper:x:113:120:user for cups-pk-helper service,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:114:29:Speech Dispatcher,,:/run/speech-dispatcher:/bin/false
avahi:x:115:121:Avahi mDNS daemon,,:/var/run/avahi-daemon:/usr/sbin/nologin
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,:/usr/sbin/nologin
saned:x:117:123:/:/var/lib/saned:/usr/sbin/nologin
nm-openvpn:x:118:124:NetworkManager OpenVPN,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,:/run/hplip:/bin/false
whoopsie:x:120:125:/:/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127:/:/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534:/:/run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
raymond-ng:x:1000:1000:Raymond,,:/home/raymond-ng:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
vboxadd:x:998:1:/:/var/run/vboxadd:/bin/false
root@raymondng-VirtualBox: /home/raymond-ng#
```

In this step I explored the use of the `cat` (concatenate) command to display the contents of text file to the screen. Here we are displayed the contents of the password file in the `etc` directory by using `cat /etc/passwd` command.


```
root@raymondng-VirtualBox: /home/raymond-ng
root@raymondng-VirtualBox:/home/raymond-ng# help -m cd
NAME
  cd - Change the shell working directory.

SYNOPSIS
  cd [-L][-P [-e]] [-@]] [dir]

DESCRIPTION
  Change the shell working directory.

  Change the current directory to DIR. The default DIR is the value of the
  HOME shell variable.

  The variable CDPATH defines the search path for the directory containing
  DIR. Alternative directory names in CDPATH are separated by a colon (:).
  A null directory name is the same as the current directory. If DIR begins
  with a slash (/), then CDPATH is not used.

  If the directory is not found, and the shell option 'cdable_vars' is set,
  the word is assumed to be a variable name. If that variable has a value,
  its value is used for DIR.

Options:
  -L      force symbolic links to be followed: resolve symbolic
          links in DIR after processing instances of '..'
  -P      use the physical directory structure without following
          symbolic links: resolve symbolic links in DIR before
          processing instances of '..'
  -e      if the -P option is supplied, and the current working
          directory cannot be determined successfully, exit with
          a non-zero status
  -@      on systems that support it, present a file with extended
          attributes as a directory containing the file attributes

The default is to follow symbolic links, as if '-L' were specified.
'..' is processed by removing the immediately previous pathname component
back to a slash or the beginning of DIR.

Exit Status:
Returns 0 if the directory is changed, and if $PWD is set successfully when
-P is used; non-zero otherwise.

SEE ALSO
  bash(1)

IMPLEMENTATION
  GNU bash, version 5.0.17(1)-release (x86_64-pc-linux-gnu)
  Copyright (c) 2019 Free Software Foundation, Inc.
  License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>

root@raymondng-VirtualBox:/home/raymond-ng#
```

On this screen I experimented with the `help` command. I typed in `help -m cd`, per the instructions.

```
root@raymondng-VirtualBox: /home/raymond-ng
MKDIR(1) User Commands MKDIR(1)
NAME
  mkdir - make directories
SYNOPSIS
  mkdir [OPTION]... DIRECTORY...
DESCRIPTION
  Create the DIRECTORY(ies), if they do not already exist.

  Mandatory arguments to long options are mandatory for short options too.

  -m, --mode=MODE
      set file mode (as in chmod), not a=rwx - umask
  -p, --parents
      no error if existing, make parent directories as needed
  -v, --verbose
      print a message for each created directory
  -Z
      set SELinux security context of each created directory to the default type
  --context[=CTX]
      like -Z, or if CTX is specified then set the SELinux or SMACK security context to CTX
  --help
      display this help and exit
  --version
      output version information and exit
AUTHOR
  Written by David MacKenzie.
REPORTING BUGS
  GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
  Report mkdir translation bugs to <https://translationproject.org/team/>
COPYRIGHT
  Copyright © 2018 Free Software Foundation, Inc. License GPLv3+: GNU GPL version 3
  or later <https://gnu.org/licenses/gpl.html>.
  This is free software: you are free to change and redistribute it. There is NO WARRANTY,
  to the extent permitted by law.
SEE ALSO
  mkdir(2)

  Full documentation at: <https://www.gnu.org/software/coreutils/mkdir>
  or available locally via: info '(coreutils) mkdir invocation'
GNU coreutils 8.30 September 2019 MKDIR(1)
Manual page mkdir(1) line 1/53 (END) (press h for help or q to quit)

root@raymondng-VirtualBox:/home/raymond-ng# man mkdir
root@raymondng-VirtualBox:/home/raymond-ng# man
What manual page do you want?
For example, try 'man man'.
root@raymondng-VirtualBox:/home/raymond-ng# man man
```

Following along with the prescribed instructions, I typed `man mkdir` command into the terminal to get more information regarding the `mkdir` command.

I wanted to get information about the `man` command itself so I typed into the terminal and the results yielded a

question `What manual page do you want?` so I typed the example provided `man man`.

```
root@raymondng-VirtualBox: /home/raymond-ng
MAN(1) Manual pager utils MAN(1)
NAME
man - an interface to the system reference manuals

SYNOPSIS
man [man options] [[section] page ...] ...
man -k [apropos options] regexp ...
man -K [man options] [section] term ...
man -f [whatIs options] page ...
man -l [man options] file ...
man -w|-W [man options] page ...

DESCRIPTION
man is the system's manual pager. Each page argument given to man is normally the
name of a program, utility or function. The manual page associated with each of
these arguments is then found and displayed. A section, if provided, will direct
man to look only in that section of the manual. The default action is to search in
all of the available sections following a pre-defined order (see DEFAULTS), and to
show only the first page found, even if page exists in several sections.

The table below shows the section numbers of the manual followed by the types of
pages they contain.

1 Executable programs or shell commands
2 System calls (functions provided by the kernel)
3 Library calls (functions within program libraries)
4 Special files (usually found in /dev)
5 File formats and conventions, e.g. /etc/passwd
6 Games
7 Miscellaneous (including macro packages and conventions), e.g. man(7), groff(7)
8 System administration commands (usually only for root)
9 Kernel routines [Non standard]

A manual page consists of several sections.

Conventional section names include NAME, SYNOPSIS, CONFIGURATION, DESCRIPTION, OP-
TIONS, EXIT STATUS, RETURN VALUE, ERRORS, ENVIRONMENT, FILES, VERSIONS, CONFORM-
ING TO, NOTES, BUGS, EXAMPLE, AUTHORS, and SEE ALSO.

The following conventions apply to the SYNOPSIS section and can be used as a guide
in other sections.

bold text      type exactly as shown.
italic text    replace with appropriate argument.
[-abc]        any or all arguments within [ ] are optional.
-a|-b         options delimited by | cannot be used together.
argument ...  argument is repeatable.
[expression] ... entire expression within [ ] is repeatable.

Exact rendering may vary depending on the output device. For instance, man will
usually not be able to render italics when running in a terminal, and will typically
use underlined or coloured text instead.
Manual page man(1) line 1 (press h for help or q to quit)
```

This screen appeared after the `man` command was entered. It provided instructional guidance to the use of the `man` command.

Part IX: Finding Files

```
root@raymondng-VirtualBox: /home/raymond-ng
root@raymondng-VirtualBox: /home/raymond-ng# find /etc -name hosts -print
/etc/hosts
/etc/avahi/hosts
root@raymondng-VirtualBox: /home/raymond-ng#
```

Here I used `find /etc -name hosts -print` command to locate a file with a known name.

```
root@raymondng-VirtualBox: /home/raymond-ng
root@raymondng-VirtualBox: /home/raymond-ng# sudo find /etc -name hosts -print
/etc/hosts
/etc/avahi/hosts
root@raymondng-VirtualBox: /home/raymond-ng#
```

command.

Executed the last `find` command with root privileges by using `sudo find /etc -name hosts -print`

```
root@raymondng-VirtualBox: /home/raymond-ng
root@raymondng-VirtualBox: /home/raymond-ng# find . -type f -print | wc -l
6389
root@raymondng-VirtualBox: /home/raymond-ng#
```

The command `find . -type f -print | wc -l` was executed to display the total number of files in the

current working directory and all of its subdirectories.


```
root@raymondng-VirtualBox: /home/raymond-ng# find /usr/include -name "*.h" -print
/usr/include/gcalc-2/gcalc/gcalc.h
/usr/include/openspn/openspn-msg.h
/usr/include/openspn/openspn-plugin.h
/usr/include/xorg/wacom-properties.h
/usr/include/xorg/wacom-util.h
/usr/include/xorg/isdv4.h
/usr/include/xorg/Xwacom.h
/usr/include/reglib/nl80211.h
/usr/include/reglib/reglib.h
/usr/include/reglib/regdb.h
/usr/include/python3.8/Imaging.h
/usr/include/python3.8/ImagingUtils.h
/usr/include/python3.8/ImDib.h
/usr/include/python3.8/ImPlatform.h
/usr/include/iproute2/bpf_elf.h
/usr/include/gcl-2/gcl/gcl.h
/usr/include/sudo_plugin.h
root@raymondng-VirtualBox: /home/raymond-ng#
```

The command `find /usr/include -name "*.h" -print` was executed to find all the files ending with `".h"`.

```
root@raymondng-VirtualBox: /home/raymond-ng# find /usr/local -print
/usr/local
/usr/local/etc
/usr/local/sbin
/usr/local/src
/usr/local/lib
/usr/local/lib/python3.8
/usr/local/lib/python3.8/dist-packages
/usr/local/include
/usr/local/bin
/usr/local/man
/usr/local/games
/usr/local/share
/usr/local/share/fonts
/usr/local/share/fonts/.uuid
/usr/local/share/ca-certificates
/usr/local/share/man
/usr/local/share/xml
/usr/local/share/xml/entities
/usr/local/share/xml/schema
/usr/local/share/xml/declaration
/usr/local/share/xml/misc
/usr/local/share/sgml
/usr/local/share/sgml/entities
/usr/local/share/sgml/stylesheet
/usr/local/share/sgml/declaration
/usr/local/share/sgml/dtd
/usr/local/share/sgml/misc
root@raymondng-VirtualBox: /home/raymond-ng#
```

The command `find /usr/local -print` was executed to display all the files and directory names in the hierarchy starting with `"/usr/local"`.

```
raymond-ng@raymondng-VirtualBox: ~#
root@raymondng-VirtualBox: /home/raymond-ng# exit
exit
raymond-ng@raymondng-VirtualBox: ~$
```

The `exit` command was used to return the privilege of regular user.

Part X: Escape Sequences

```
raymond-ng@raymondng-VirtualBox: ~#
raymond-ng@raymondng-VirtualBox:~$ echo -e "We are inserting several blank lines\n\n\n"
We are inserting several blank lines

raymond-ng@raymondng-VirtualBox:~$ echo -e "Words\tseparated\tby\tthorizental\ttabs."
Words separated by horizontal tabs.
raymond-ng@raymondng-VirtualBox:~$ echo -e "\aMy computer went \"beep\"."
My computer went "beep".
raymond-ng@raymondng-VirtualBox:~$
```

In Part XI I experimented with escape sequences, specifically the backlash escape characters: `\n` `\t` `\a`.

The following escape sequences were used in conjunctions with the `echo` command:

```
Echo -e "We are inserting several
blank lines\n\n\n"
Echo -e
"Words\tseparated\tby\tthorizental\ttab
s."
Echo -e "\aMy computer went \"beep\"."
```

Bonus: Command Line Art

```

raymond-ng@raymondng-VirtualBox: ~
raymond-ng@raymondng-VirtualBox:~$ figlet Welcome

Command 'figlet' not found, but can be installed with:

sudo snap install figlet # version 2.2.5+git24.202a0a8, or
sudo apt install figlet # version 2.2.5-3
sudo apt install toilet # version 0.3-1.2

See 'snap info figlet' for additional versions.

raymond-ng@raymondng-VirtualBox:~$ sudo apt install figlet
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libfprint-2-todi libllvm10
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  figlet
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 133 kB of archives.
After this operation, 752 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 figlet amd64 2.2.5-3 [133 kB]
Fetched 133 kB in 0s (416 kB/s)
Selecting previously unselected package figlet.
(Reading database ... 183486 files and directories currently installed.)
Preparing to unpack .../figlet_2.2.5-3_amd64.deb ...
Unpacking figlet (2.2.5-3) ...
Setting up figlet (2.2.5-3) ...
update-alternatives: using /usr/bin/figlet-figlet to provide /usr/bin/figlet (figlet) in auto mode
Processing triggers for man-db (2.9.1-1) ...
raymond-ng@raymondng-VirtualBox:~$ figlet Welcome

Welcome

raymond-ng@raymondng-VirtualBox:~$ █

```

For one of the extra credit options I attempted the figlet – draw banners option. First I had to install the `figlet` command first so I entered `sudo apt install figlet` command. Then entered `figlet` `Welcome` and it depicted a “Welcome” banner. (Moon, 2020)

```
raymond-ng@raymondng-VirtualBox: ~  
raymond-ng@raymondng-VirtualBox:~$ sudo apt-get install cowsay  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  libfprint-2-tod1 libllvm10  
Use 'sudo apt autoremove' to remove them.  
Suggested packages:  
  filters cowsay-off  
The following NEW packages will be installed:  
  cowsay  
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.  
Need to get 18.5 kB of archives.  
After this operation, 93.2 kB of additional disk space will be used.  
Get:1 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 cowsay all 3.03+dfsg2-7 [18.5 kB]  
Fetched 18.5 kB in 0s (59.7 kB/s)  
Selecting previously unselected package cowsay.  
(Reading database ... 183561 files and directories currently installed.)  
Preparing to unpack .../cowsay_3.03+dfsg2-7_all.deb ...  
Unpacking cowsay (3.03+dfsg2-7) ...  
Setting up cowsay (3.03+dfsg2-7) ...  
Processing triggers for man-db (2.9.1-1) ...  
raymond-ng@raymondng-VirtualBox:~$ cowsay -f ghostbusters Who you Gonna Call  
  
< Who you Gonna Call >  
-----  
      \      /  
     /XXX\  /  
    /XXXXX( 0 0 )XXXXXXXXXXXXX\.  
   /XXX(      U      )XXXXXXXXXXXXX\.  
  /XXXXX(      0      )XXXXXXXXXXXXX\.  
 /XXXXX/ (      0      )XXXXXXX  \XXXXX\  
XXXXXX/  /      /      /XXXXXXX  \XXXXXX  
XXXXXX/  /      /      /XXXXXXX  \XXXXXX  
XXX  /  /      /      /XXXXXXX  \XXXXXX  
--- /  /      /      /XXXXXXX  \XXXXXX  
- /  /XXX\ XXXXXX  /      /XXXXXX  \XXXXXX  
 \XXXXXXXXX \      /XXXXXX  \XXXXXX/  
 \XXXXXX  >      /XXXXXX  \XXXXXX/  
 \XXXXX- /      /      /XXXXX  \XXXXX/  
-XXXXXXXXX----- XXXXXX-  
 \XXXXXXXXXXXXXXXXXXXXXXXXX/  
  "VXXXXXXXXXXXXXXXXXXXXV"  
raymond-ng@raymondng-VirtualBox:~$
```

I ghostbuster graphic looked appealing so I installed the cowsay command by entering `sudo apt-get install cowsay`. Next, I entered `cowsay -f ghostbusters Who you Gonna Call` into the terminal. (Moon, 2020)

CONCLUSION

In conclusion the lab was executed successfully with no issues. At no point did I encounter any error messages. I experimented and attempted to familiarize myself with every command-line argument, argument or option that was prescribed in the block of instructions. Additionally, the lab illuminated the importance of learning to operate the CLI as it allows a greater deal of flexibility of use than the Graphic User Interface (GUI). One might argue the GUI does not have the same level of functionality and granular control as the CLI. A CLI can be used to easily do things that might be difficult or even impossible to do with a GUI, like interpreting problem sets in the cyber security domain. Further the simplicity of this lab allowed a novice user like myself to navigate the CLI a lot more confidently. At this

point I'm not really sure what I would like to explore more of specifically in this lab, but I'm sure that will change as we go through each module and perform future lab.

REFERENCES

Internet Resources

Moon, S. (2020, July 23). *20 Amusing Linux Commands to Have Fun with the Terminal*. Retrieved from BinaryTides.com: <https://www.binarytides.com/linux-fun-commands/>

Shotts, W. (2021). *Learning the Shell*. Retrieved from LinuxCommand.org: http://linuxcommand.org/lc3_learning_the_shell.php

Collaboration

No collaboration was involved in this lab. I did frequently tune into the chat on *Slack* to see if other students encountered issues that I should be on the lookout for; however, I completed this lab with none of the issues presented by the other students via *Slack*.