Introducing Ubuntu Commands Lab 1

D158B Unix lab1 Ubuntu and Foxy
Logon (see username and password instructions on screen
Use ROS2 Foxy for Assignments

TO START

- Simultaneously hitting the buttons Ctrl-Alt-T will bring up a terminal window. If screen text is too small, use menu options (+) to make larger.
- The tilde (~) symbol stands for your home directory. If you are *user*, then the tilde (~) stands for /home/*user*

$ foxy Source: **source /opt/ros/foxy/setup.bash** for every Terminal

COMMAND HELP

man - use to view manual pages for executable program, utility or function **help**
- displays a list of shell commands
<command> **-h** or **--help** to display help for a built-in command

For any command, view the options. Pipe (|) "less" to display one screen at a time and you can scroll up and down on the screen.
$ man ls | less

If screen is too cluttered **$ clear or $ clear -x**
(The clear -x command clears the terminal, but previous output is still available. Scroll up or use the *PgUp* button. https://phoenixnap.com/kb/clear-terminal
[THERE IS NOTHING YOU CANNOT DO IN LINUX – ONLY LIMITED BY YOUR IMAGINATION!]

Assignment: Run the commands shown here in **Bold** and record the results.
Do exercises and save output. Put on stick and send to me or e-mail from workstation. If the output is long – just include the first few lines.

I. FILE AND DIRECTORY MANAGEMENT (20)

pwd - List current directory (Should be home/user)
(pwd–Displays the current working directory for the command line terminal. Good for when you've lost track of where you are in your system.)

ls – List all of the contents (names of files anheld directories) in a specified directory. If no directory is specified, it will use the current directory.

$ **ls –-help** (You do not need to include printout for this.)

```
$ ls -a,   or     --all
```

Show all entries including entries starting with . (hidden files such as .bashrc)

Show long listing format with:

- file type indicator
- read/write and execute permissions for Owner/Group/Others
- owner of the file and group the file belongs
- size and date of modification/creation

example:

```
-rwxrwxr-x  1 harman harman    501 Feb 14  2022  Turtlesim_GoStraight_ROS2.py python_goforward.py
```

cd –Changes the current working directory in the command line console.

mkdir / rmdir–Creates a directory (*mkdir*) or deletes a specified directory (*rmdir*). Directories can only be created and deleted within directories that you have permission to access.

```
$ mkdir ubuntuIntro<name>     (<name> is my initials)
$ cd ubuntuIntro<name>/                 ( / is optional  - Keep directory for later)
    (You have created a directory ubuntuIntro<name>.)
      ex:  harman@harman-VirtualBox:~/ubuntuIntroTLH
```

```
$ cd ..         Go up one level
$ cd ~          Go to user's home directory
$ cd /opt/ros    ( The / is important)
$ ls
$ cd ../..       Go up 2 levels
$ cd /           Go to root   (Notice the differences in ~ versus / prompt)
```

```
$ cd Desktop/
$ ~/Desktop$ ls         See what is on Desktop
```

At this point, return to your home directory and check you are there.

```
$ cd ~
$ pwd
```

II. CREATE A TEXT FILE   (10)

gedit, nano and emacs are text editors in Ubuntu.

cat - Concatenate and displays the content of files

```
$ gedit NewFile<name>_1.txt
```

(Type your text in the gedit (or editor) window)
If no line numbers, use Edit → Preferences then check "Display line numbers"
When finished, choose Save icon of gedit.)

Try Text: **This is my textfile<name>_1** and add a few lines.

```
$ cat NewFile<name>_1.txt     (Display the contents of your new file.)
        EX:  # Test of a new file
```

This is my textfileTLH_1.txt

IIa. COPY and REMOVE A FILE (10)

cp – Copy one or more files to another location.
rm – Removes one or more files.

```
$ cp NewFile<name>_1.txt   NewerFile<name>_2.txt
            (Copy file to a new location with a new name.)
            (Use the ls command to check that the command worked.)
$ ls    (Check file is there.)
$ rm NewFile<name>_2.txt                    (Delete the file.)
$ ls    (Check file is gone.)
```

(Always BEWARE of removing files – Linux is not very forgiving if you make a mistake!)

III. MAKE A FILE EXECUTABLE (20)

chmod – Changes the access permissions of one or more files. Only users with permission or ownership of a file can change that file’s permissions.

- chmod 777 *filename* (Or +x) gives owner, group and others read, write and execute privileges
- chmod 755 *filename* gives owner read, write, execute privileges; group and others get read and execute privileges

https://linuxhint.com/how-to-run-bash-script/

```
$ gedit bash_script.sh     (Create shell script and Save)
#!/bin/bash
echo "Hello, World"


$ ls -la | grep bash
            -rw-rw-r--  1 harman harman     42 Nov  6 13:01 bash_script.sh  (Not executable)

$ chmod +x bash_script.sh
$ ls -la | grep bash
        -rwxrwxr-x  1 harman harman     42 Nov  6 13:01 bash_script.sh  (Note the x)
$ source bash_script.sh
            Hello, World
$ ./bash_script.sh          (Alternative Note the ./)
            Hello, World
```

source –   (runs a specified command script in the current shell)

PYTHON SPECIAL CASE

```
$ gedit FirstProgram.py      (Create a simple program and then save.)
# My First Python Program
x = 1
if x == 1:
   # indented four spaces
   print("x is 1.")
```

```
$ python3 FirstProgram.py  (Expect x is1. As output;    x is 1. OK)
```

(Notice that it was not necessary to make FirstProgram.py executable.)

```
$ ls -la
          -rw-rw-r--  1 harman harman     91 Nov  6 12:20  FirstProgram.py
                    (Note that NewProgram.py  – no x – but it runs)
```

IV. MOVE AND RENAME FILE (10)

Create a new text file - eg: $ **gedit NewTextFile.txt** and add a few lines of text
mv – Moves file to another location or renames a file.

```
$ mv NewTextFile.txt ubuntuIntro/NewerTextFile.txt
$ cd ubuntuIntro/
~/ubuntuIntro$ ls
          NewerTextFile.txt
```

V. COMPARE FILES (10)

diff – Displays the differences between two files.

Make up two files that have some text the same and a few different lines of text. Use diff and show the results.

Ex:

```
~/ubuntuIntro$ cp ~/NewProgram.py .
~/ubuntuIntro$ diff NewerFile.txt NewProgram.py
          1,3c1,4
          < Hello Ubuntu file
          < This is a test of creating a text file NewFile.txt
          < Bye
          ---
          > # gedit of NewProgram.py
          > This is a different line
          > Another different line
```

VI. USEFUL COMMANDS (20)

GREP – One of the most powerful Commands

```
$ man grep     (671 Lines – No need to submit output! – Just read through)
```

https://www.gnu.org/software/grep/manual/

grep – Searches file(s) for lines that match a given text string

options are: - r or – R for recursive

- n for line number
- w to match whole word

Make a text file on the Desktop with the line “This is a test”

```
$ cd ~/Desk   <Tab>  <Tab>
$ gedit NewText1.txt   (Type a line and Save)
```

Find a file or a file with a specified line of text.

```
        harman@harman-VirtualBox:~$ cd Desktop
        harman@harman-VirtualBox:~/Desktop$ ls | grep New
                NewText1.txt
        harman@harman-VirtualBox:~/Desktop$ cat NewText1.txt
                This is NewText1.txt on Desktop
                This is a test
```

```
~/Desktop$ grep -R "This is a test"
        NewText1.txt:This is a test            (Very Useful)
```

```
harman@harman-VirtualBox:~$ grep -R "This is a test"    (From Home – Be Impressed)
        Desktop/NewText1.txt:This is a test
```

Find references to an environmental parameter

```
harman@harman-VirtualBox:~/ubuntuIntro
$ env | grep ROS
        ROS_VERSION=2
        ROS_PYTHON_VERSION=3
        ROS_DOMAIN_ID=231
        ROS_LOCALHOST_ONLY=0
        ROS_DISTRO=foxy
```

VII. OTHER USEFUL COMMANDS (10)

$ history –
displays commands with numbers
https://chrisjean.com/command-line-history-in-ubuntu-terminal/

Example: Find an ls command and its number
Ex: 2041 ls
$ **!2041** (Run the command from the history list)

$ **clear** –(clears the terminal screen) $ **clear -x** Clears but keeps data

```
harman@harman-VirtualBox:~$ locate history*
            /home/harman/history1.txt
            /home/harman/history2.txt
```

(Created by Redirecting history > <name.txt>)

Put the results in a file and submit for grading.