[Sample Solution]

Lab **01**
Git URL

Contribution {To be completed by Students}:

Student ID	Student Name	Contribution

Self-Evaluation {To be highlighted by Student only}:

Need Help	Work in Progress	Pass	Credit	Distinction	High Distinction

Tutor Evaluation {To be highlighted by Tutor only}:

Incomplete	Needs Improvement	Pass	Credit	Distinction	High Distinction

Note: Self-Evaluation and Tutor Evaluation to be carried out during an assessed lab week.

1. Finding Help:

1.a.   man <command_name>, info <command_name>, <command_name> --help

1.b.   man ssh

1.c.   man <section_number> <command_name>

1.d.   linuxquestions.org, stackoverflow.com, google.com, reddit.com, unix.stackexchange.com, quora.com (Any three)

2. File and Directory Manipulation:

2.a.
- Create directory: mkdir <directory_name>
- Delete (empty) directory: rmdir <directory_name>
- Delete (non-empty) directory: rmdir -r <directory_name>

2.b.   touch <file_name> or use text editor, e.g., vim, gedit to create empty file

3. Users and Access Control:

3.a.
- Create User: useradd <user_name>
- Create Group: groupadd <group_name>
- Assign the User to the Group: usermod -a -G <group_name> <user_name>

3.b.   chmod 700 $HOME

3.c.   The first digit, i.e., 4 from 4775 selects the set user ID (SUID) permission so that the users can execute the file as the file owner. The remaining three digits, i.e., 775 from the 4775 refer to the **r**ead, **w**rite and **e**xecution permissions for the owner, group, and other. In particular, the owner and group are granted for the read, write and execution permission, while the other is granted for the read and execute permissions.

3.d.   chmod +x <file_name>

3.e.   ls -l <file_name>

3.f.   ls -ld

4. Linux Shell

4.a.   Issue the command **echo $SHELL** in the terminal to show the SHELL environment variable that is set to the machine.
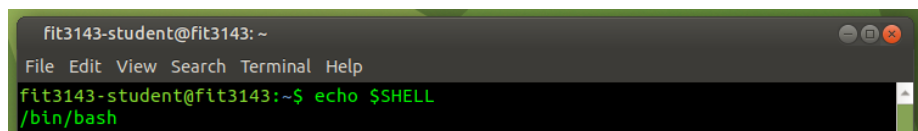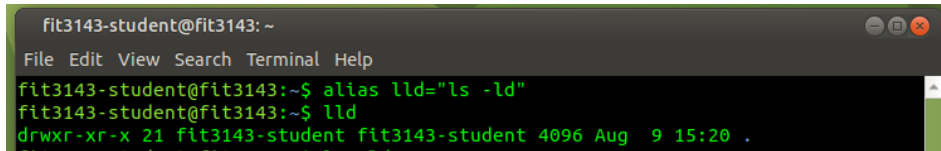

Fig. 1. Screenshot of terminal showing the shell variable

As shown in the figure above, the shell is bash.

4.b.   Press **up** key on the keyboard or use the shortcut **CTRL + p**

4.c.   Press **tab** key on the keyboard or use the shortcut **CTRL + i**

4.d.
- /etc/environment contains the PATH variable.
- It specifies a set of directories where the executable programs are located
- Issue the command **cat /etc/environment** in the terminal to inspect the value of the PATH variable

4.e.
- The shell function alias creates an abbreviation for a command
- Create alias: alias <alias_name>="<commands>"

Fig. 2. Screenshot of creating alias for ls -ld command

4.f. The **which** command locates the executable file associated with the given command by searching it in the path environment variable. Issue **which <command_name>** in the terminal to show the result.
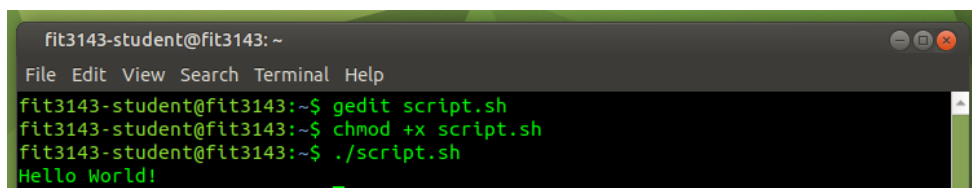
4.g. ./<program_name>

4.h. The prefix ./ is required when the executable file is not in the $PATH environment variable.

4.i. cat <file_name>

4.j. find / -name *.html

4.k.
- A sample shell script is created to display "Hello World!" in the terminal
- Firstly, issue **gedit script.sh** (or any text editor) to create the shell script
- Write "echo Hello World!" into the script.sh
- Issue **chmod +x script.sh** in the terminal to make the shell script executable
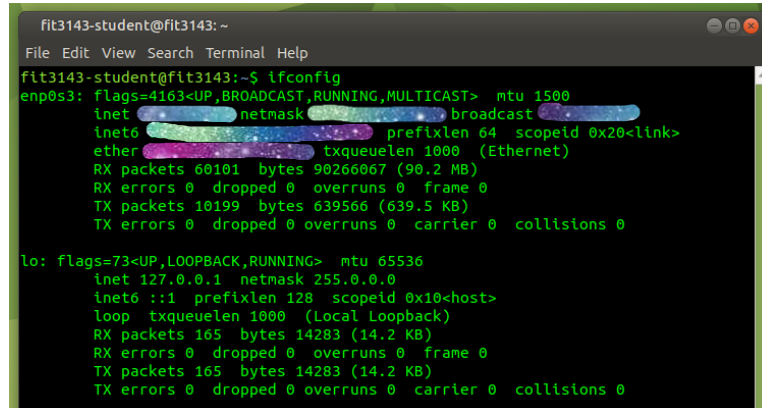- Use ./script.sh to run the script

Fig. 3. Screenshot of creating and executing the script.sh

5. Networking

5.a.
- Issue **ifconfig** or **ip addr** to list the network interface that is used to connect to the internet in the machine
- Look for any interface other than the **lo** (this is the loopback interface), it can be enp0s3, eth0.

```
fit3143-student@fit3143: ~                                    ⊖⊕⊗
File  Edit  View  Search  Terminal  Help
fit3143-student@fit3143:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet            netmask            broadcast
        inet6                        prefixlen 64  scopeid 0x20<link>
        ether                 txqueuelen 1000  (Ethernet)
        RX packets 60101  bytes 90266067 (90.2 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 10199  bytes 639566 (639.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 165  bytes 14283 (14.2 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 165  bytes 14283 (14.2 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Fig. 4. Output of ifconfig command

From the figure above,
- ip address (IPv4): *refer to the inet*
- hardware address: *refer to the ether*
- netmask: *refer to the netmask*

5.b. /etc/hosts file is used to map the hostnames to the IP address in the system, e.g., localhost is mapped to 127.0.0.1

5.c. /etc/resolv.conf is used to specify the name servers for resolver lookups, where it will use the DNS protocol to resolve the hostnames

5.d. netstat -r -n 8.8.8.8

6. Programming Tools (any command that can list the installed packages is applicable, e.g., dpkg, apt)

6.a. apt list –installed | grep gcc

6.b. apt list –installed | grep openmpi

Declaration

I declare that this eFolio tasks and the linked code are my individual work. I have not copied from any other student's work or from any other source except where due acknowledgment is made explicitly in the text and code, nor has any part of this submission been written for me by another person.

Signature of student 1:_____

Signature of student 2:_____

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