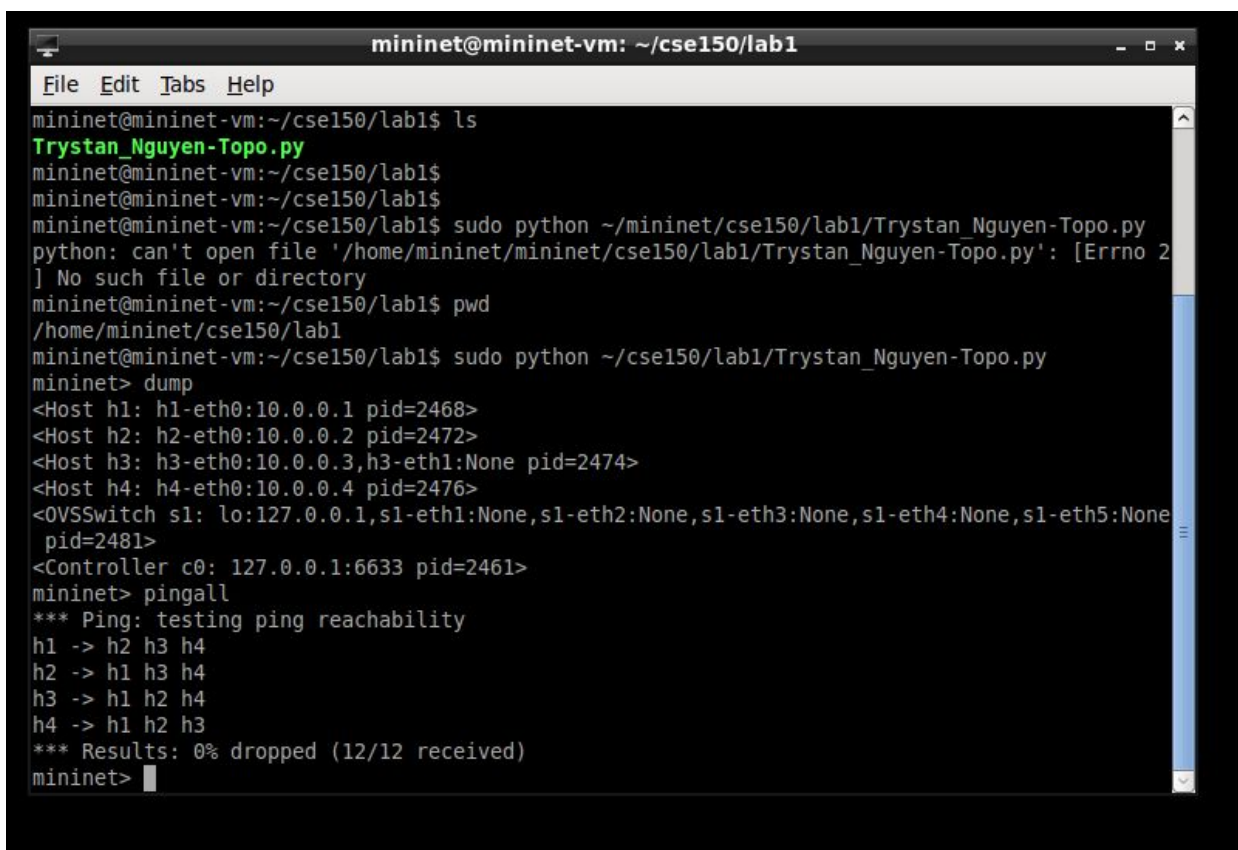


Prelab 1:

1. groups
2. 0, the exit code of the previous command stored in the shell
3. CTRL+Z bg
4. Uname -r
5. . is the current working directory,
.. is the parent of the current directory,
~ is the default home directory.
/ is the very root directory
6. Pid is the process identification number generated when a process is created on a unix based operating system. The command is to find the pid is ps
7. cd ~ | pwd
8. sudo allows the user to login as root without a password while su root requires a password to become root
9. Adding "[at time" at the end of a declaring process will run said process at the time, given in 00:00 format. For an interval, a for loop can be used to run a process at an interval. for i in {1..30}; do process; sleep 1800; done;

Lab 1:

1. See Trystan_Nguyen-Topo.py
2. Dump will display the information about all available nodes within the running mininet, including port connection and process ID. Pingall will individually ping each pair of nodes and determine if any data is lost



```
mininet@mininet-vm: ~/cse150/lab1
File Edit Tabs Help
mininet@mininet-vm:~/cse150/lab1$ ls
Trystan_Nguyen-Topo.py
mininet@mininet-vm:~/cse150/lab1$
mininet@mininet-vm:~/cse150/lab1$
mininet@mininet-vm:~/cse150/lab1$ sudo python ~/mininet/cse150/lab1/Trystan_Nguyen-Topo.py
python: can't open file '/home/mininet/mininet/cse150/lab1/Trystan_Nguyen-Topo.py': [Errno 2]
] No such file or directory
mininet@mininet-vm:~/cse150/lab1$ pwd
/home/mininet/cse150/lab1
mininet@mininet-vm:~/cse150/lab1$ sudo python ~/cse150/lab1/Trystan_Nguyen-Topo.py
mininet> dump
<Host h1: h1-eth0:10.0.0.1 pid=2468>
<Host h2: h2-eth0:10.0.0.2 pid=2472>
<Host h3: h3-eth0:10.0.0.3,h3-eth1:None pid=2474>
<Host h4: h4-eth0:10.0.0.4 pid=2476>
<OVSSwitch s1: lo:127.0.0.1,s1-eth1:None,s1-eth2:None,s1-eth3:None,s1-eth4:None,s1-eth5:None
pid=2481>
<Controller c0: 127.0.0.1:6633 pid=2461>
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3 h4
h2 -> h1 h3 h4
h3 -> h1 h2 h4
h4 -> h1 h2 h3
*** Results: 0% dropped (12/12 received)
mininet>
```

3. The connection is 11.8Gbits/sec

```
mininet@mininet-vm: ~/cse150/lab1
File Edit Tabs Help
python: can't open file '/home/mininet/mininet/cse150/lab1/Trystan_Nguyen-Topo.py': [Errno 2] No such file or directory
mininet@mininet-vm:~/cse150/lab1$ pwd
/home/mininet/cse150/lab1
mininet@mininet-vm:~/cse150/lab1$ sudo python ~/cse150/lab1/Trystan_Nguyen-Topo.py
mininet> dump
<Host h1: h1-eth0:10.0.0.1 pid=2468>
<Host h2: h2-eth0:10.0.0.2 pid=2472>
<Host h3: h3-eth0:10.0.0.3,h3-eth1:None pid=2474>
<Host h4: h4-eth0:10.0.0.4 pid=2476>
<OVSSwitch s1: lo:127.0.0.1,s1-eth1:None,s1-eth2:None,s1-eth3:None,s1-eth4:None,s1-eth5:None pid=2481>
<Controller c0: 127.0.0.1:6633 pid=2461>
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3 h4
h2 -> h1 h3 h4
h3 -> h1 h2 h4
h4 -> h1 h2 h3
*** Results: 0% dropped (12/12 received)
mininet> exit
mininet@mininet-vm:~/cse150/lab1$ sudo python ~/cse150/lab1/Trystan_Nguyen-Topo.py
mininet> iperf
*** Iperf: testing TCP bandwidth between h1 and h4
*** Results: ['11.8 Gbits/sec', '11.8 Gbits/sec']
mininet> |
```

4.

a. 6

The image shows a Wireshark 1.10.6 packet capture window. The filter is set to 'of'. The packet list shows 110 packets, with 36 displayed (32.7% of total). The packet details pane shows the selected packet (No. 110) as an OpenFlow message (OF 1.0) with a length of 148 bytes. The packet bytes pane shows the raw data of the packet. The status bar at the bottom indicates 'Packets: 110 - Displayed: 36 (32.7%) - Dropped: 0 (0.0%)'.

No.	Time	Source	Destination	Protocol	Length	Info
16	3.003747000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of features request
18	3.003866000	127.0.0.1	127.0.0.1	OF 1.0	388	388 of features reply
19	3.004026000	127.0.0.1	127.0.0.1	OF 1.0	88	88 of set config
21	3.029771000	127.0.0.1	127.0.0.1	OF 1.0	132	132 of port status
23	8.000089000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo request
25	8.001630000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo reply
27	13.002165000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo request
28	13.003183000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo reply
40	18.017267000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo request
41	18.020701000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo reply
45	23.001394000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo request
46	23.001932000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo reply
48	28.017259000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo request
49	28.018817000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo reply
51	33.000656000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo request
52	33.001021000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo reply
54	38.001559000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo request
55	38.002948000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo reply
57	43.001355000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo request
58	43.002717000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo reply
61	46.195580000	32:9e:b1:17:23:6f	Broadcast	OF 1.0	128	128 of packet in
62	46.196398000	127.0.0.1	127.0.0.1	OF 1.0	92	92 of packet out
70	46.196820000	16:ea:76:ab:0b:80	32:9e:b1:17:23:6f	OF 1.0	128	128 of packet in
71	46.197332000	127.0.0.1	127.0.0.1	OF 1.0	148	148 of flow add
74	46.197720000	10.0.0.1	10.0.0.2	OF 1.0	184	184 of packet in
75	46.198159000	127.0.0.1	127.0.0.1	OF 1.0	148	148 of flow add
78	46.198537000	10.0.0.2	10.0.0.1	OF 1.0	184	184 of packet in
79	46.198914000	127.0.0.1	127.0.0.1	OF 1.0	148	148 of flow add
98	51.001089000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo request
99	51.001460000	127.0.0.1	127.0.0.1	OF 1.0	76	76 of echo reply
102	51.204789000	16:ea:76:ab:0b:80	32:9e:b1:17:23:6f	OF 1.0	128	128 of packet in
103	51.207660000	127.0.0.1	127.0.0.1	OF 1.0	148	148 of flow add
107	51.210330000	32:9e:b1:17:23:6f	16:ea:76:ab:0b:80	OF 1.0	128	128 of packet in
108	51.211855000	127.0.0.1	127.0.0.1	OF 1.0	148	148 of flow add

- ```

01 40.195080000 32:9e:b1:17:23:6f Broadcast OF 1.0 128 of packet in
62 46.196398000 127.0.0.1 127.0.0.1 OF 1.0 92 of packet out
78 46.196820000 16:ea:76:ab:0b:80 32:9e:b1:17:23:6f OF 1.0 128 of packet in
71 46.197332000 127.0.0.1 127.0.0.1 OF 1.0 148 of flow add
74 46.197720000 10.0.0.1 10.0.0.2 OF 1.0 184 of packet in
75 46.198159000 127.0.0.1 127.0.0.1 OF 1.0 148 of flow add
78 46.198537000 10.0.0.2 10.0.0.1 OF 1.0 184 of packet in
79 46.198914000 127.0.0.1 127.0.0.1 OF 1.0 148 of flow add
98 51.001009000 127.0.0.1 127.0.0.1 OF 1.0 76 of echo_request
99 51.001460000 127.0.0.1 127.0.0.1 OF 1.0 76 of echo_reply
102 51.204789000 16:ea:76:ab:0b:80 32:9e:b1:17:23:6f OF 1.0 128 of packet in
103 51.207660000 127.0.0.1 127.0.0.1 OF 1.0 148 of flow add
107 51.210353000 32:9e:b1:17:23:6f 16:ea:76:ab:0b:80 OF 1.0 128 of packet in
108 51.211855000 127.0.0.1 127.0.0.1 OF 1.0 148 of flow add

```

```

> Transmission Control Protocol, Src Port: 6633 (6633), Dst Port: 56234 (56234), Seq: 93, Ack: 517, Len: 24
 OpenFlow
 version: 1
 type: OFPT_PACKET_OUT (13)
 length: 24
 xid: 0
 buffer_id: 256
 in_port: 1
 actions len: 8
 of_action_list
 of_action_output
 type: OFPAT_OUTPUT (0)
 len: 8
0000 00 00 03 04 00 06 00 00 00 00 00 00 3c 19 08 00<.....
0010 45 00 00 4c 19 26 48 00 40 06 23 84 7f 08 00 01 E..L..@. @.#....
0020 7f 00 00 01 19 e9 db aa 86 a3 26 05 e4 03 17 40 ...&...@
0030 80 18 08 58 fe 48 08 00 01 01 08 0a ff ff 66 c0 ...X.@.....f.
0040 ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

```

- [illegible]