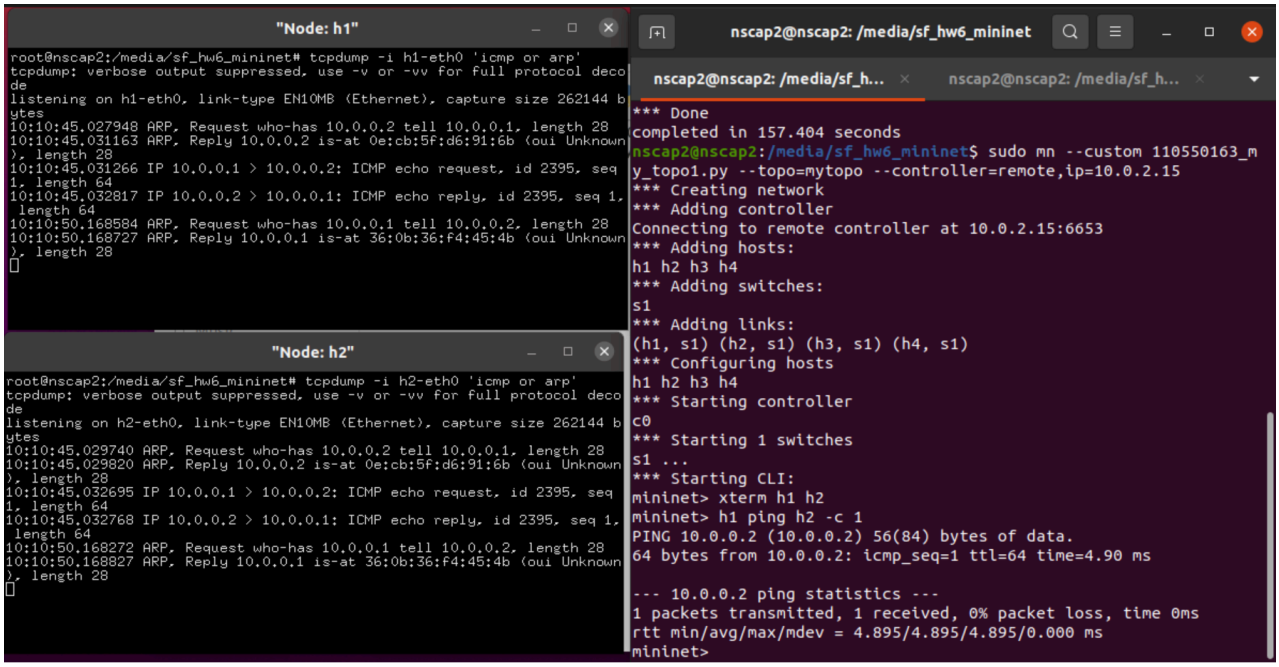
NSC hw6

1. When h1 ping h2, what will happen?

ARP:
h1 sent request
h2 received and replied
h1 received the reply

ICMP:
h1 sent request
h2 received and replied
h1 received the reply



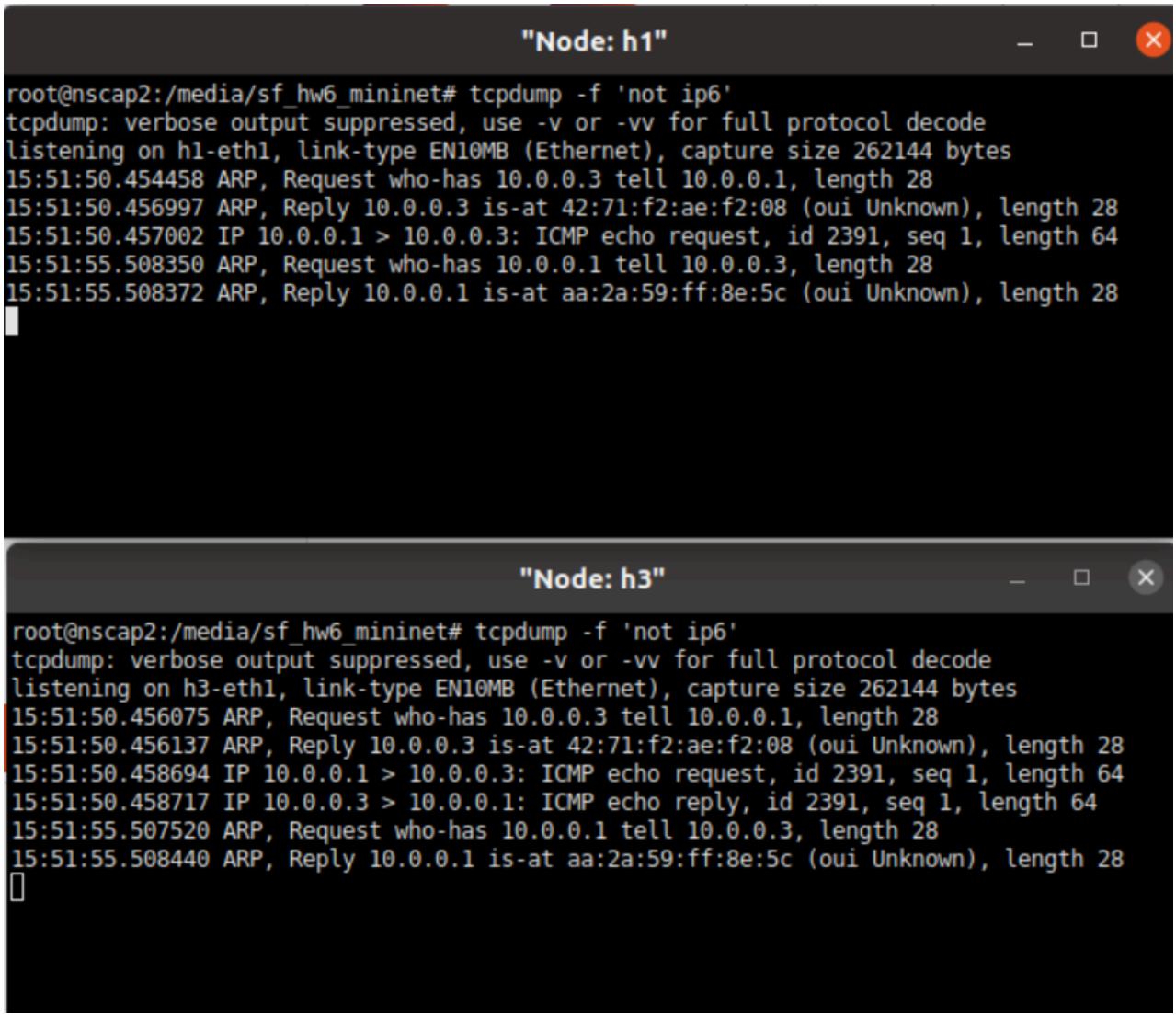
2. When h1 ping h3, what will happen?

ARP:
h1 sent request
h3 received and replied
h1 received the reply

ICMP:
h1 sent request
h3 received and replied
h1 didn't receive the reply since s1 dropped the reply from h3 according to controller's rule.

```
mininet> h1 ping h3 -c 1
PING 10.0.0.3 (10.0.0.3) 56(84) bytes of data.

--- 10.0.0.3 ping statistics ---
1 packets transmitted, 0 received, 100% packet loss, time 0ms
```



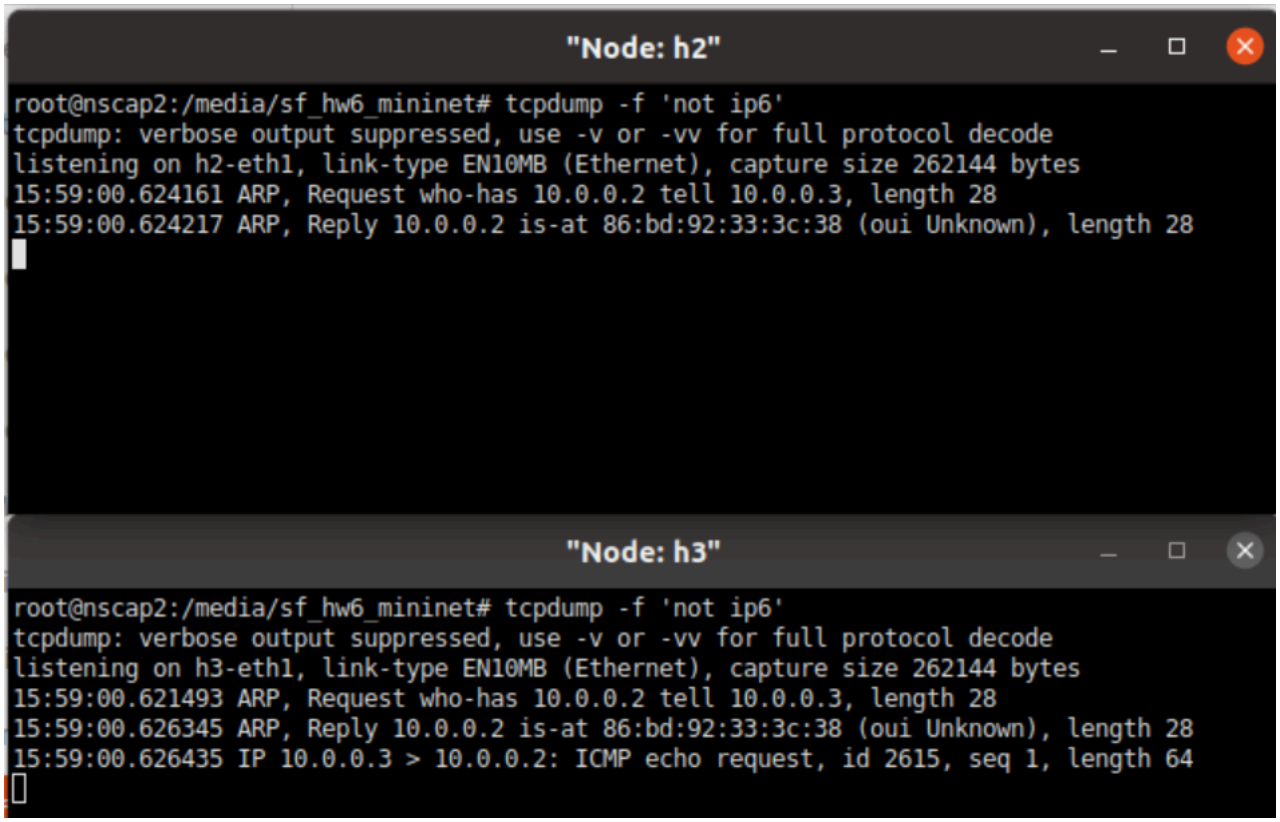
3. When h3 ping h2, what will happen?

ARP:
h3 sent request
h2 received and replied
h3 received the reply

ICMP:
h3 sent request
h2 didn't receive since s1 dropped the request from h3 according to controller's rule

```
mininet> h3 ping h2 -c 1
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.

--- 10.0.0.2 ping statistics ---
1 packets transmitted, 0 received, 100% packet loss, time 0ms
```



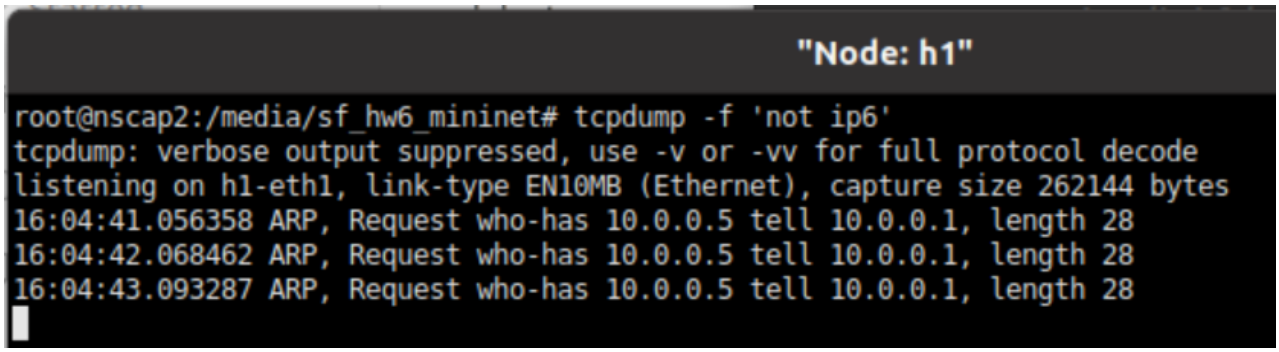
4. When h1 ping h5, what will happen?

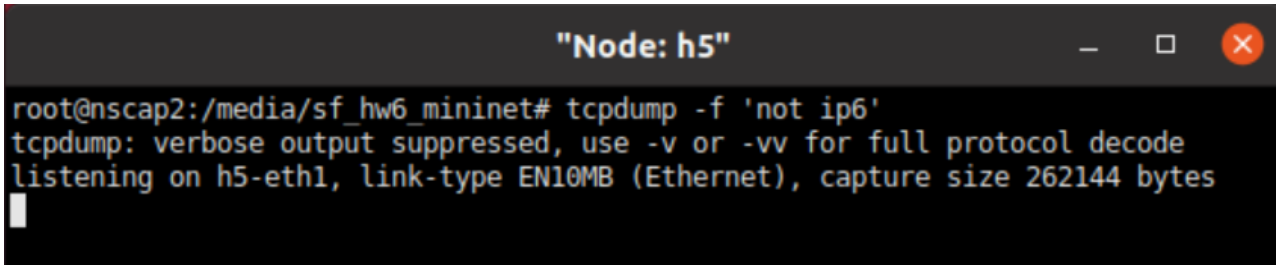
ARP:
h1 sent request
h1 sent request
h1 sent request
h5 didn't receive the request since s1 cannot find h5

ICMP:
No icmp packet

```
mininet> xterm h1
mininet> h1 ping h5 -c 1
ping: h5: Temporary failure in name resolution
mininet> h1 ping 10.0.0.5 -c 1
PING 10.0.0.5 (10.0.0.5) 56(84) bytes of data.
From 10.0.0.1 icmp_seq=1 Destination Host Unreachable

--- 10.0.0.5 ping statistics ---
1 packets transmitted, 0 received, +1 errors, 100% packet loss, time 0ms
```

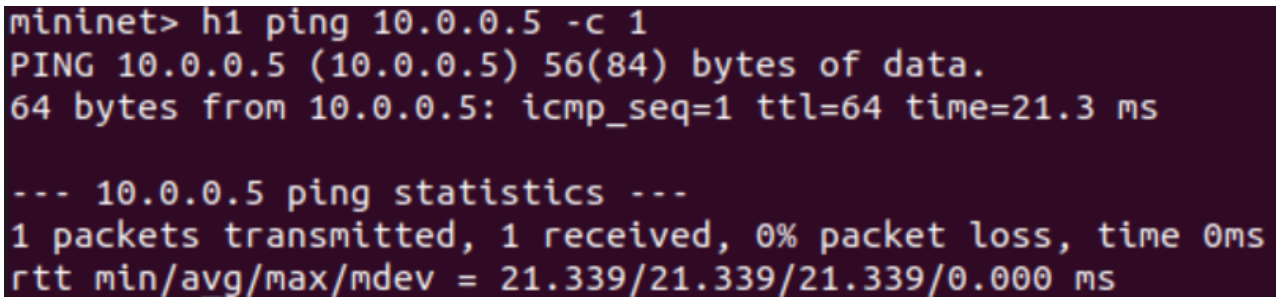


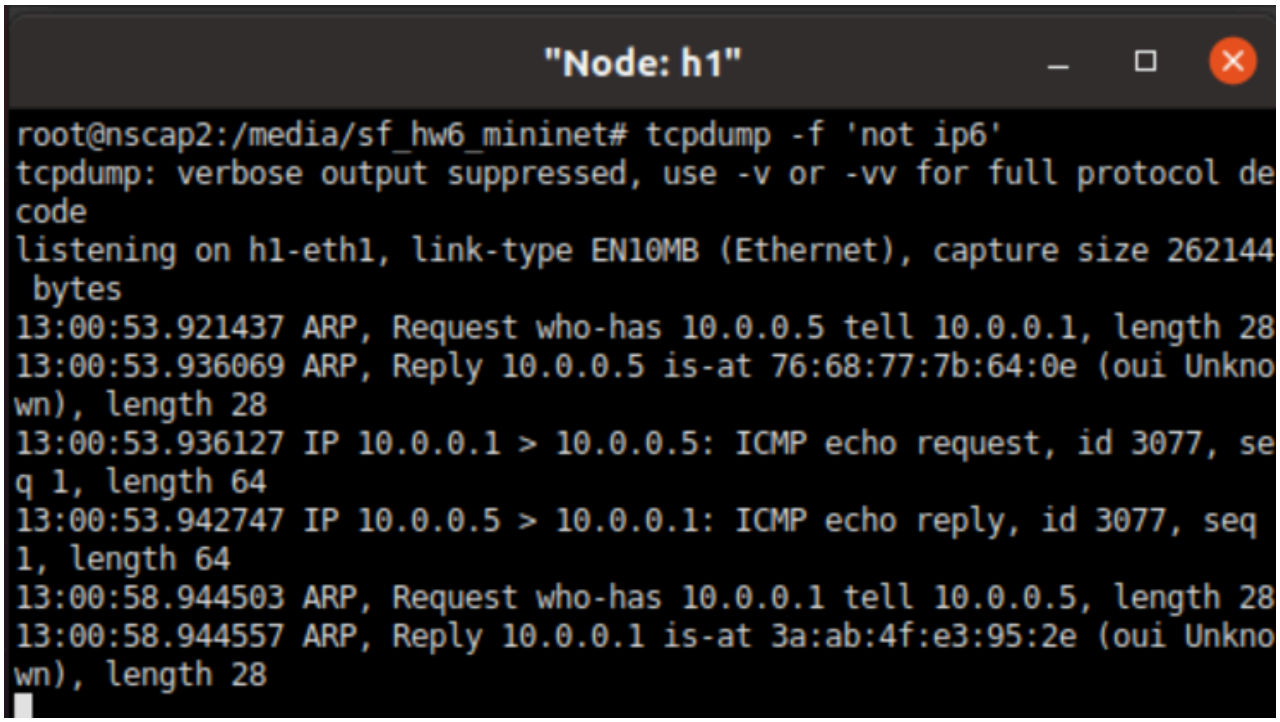


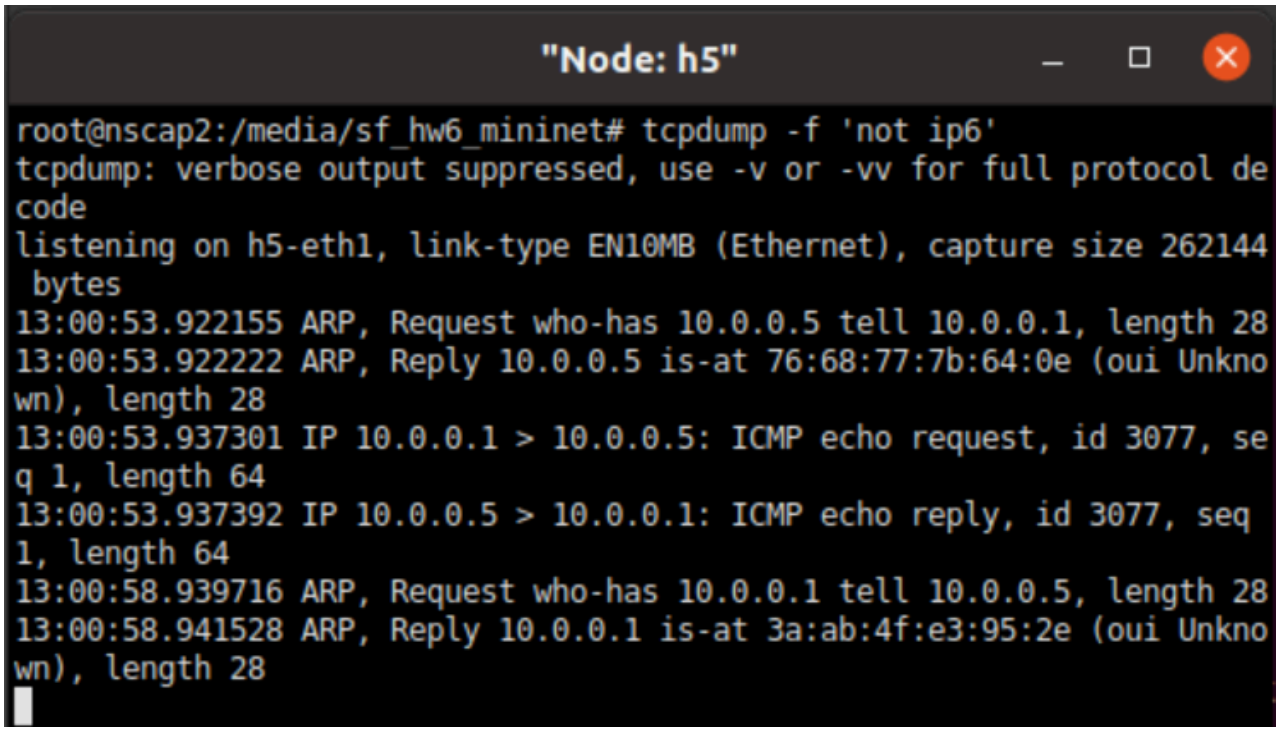
5. When h1 ping h5, what will happen?

ARP:
h1 sent request
h5 received and replied
h1 received the reply

ICMP:
h1 sent request
h5 received and replied
h1 received the reply







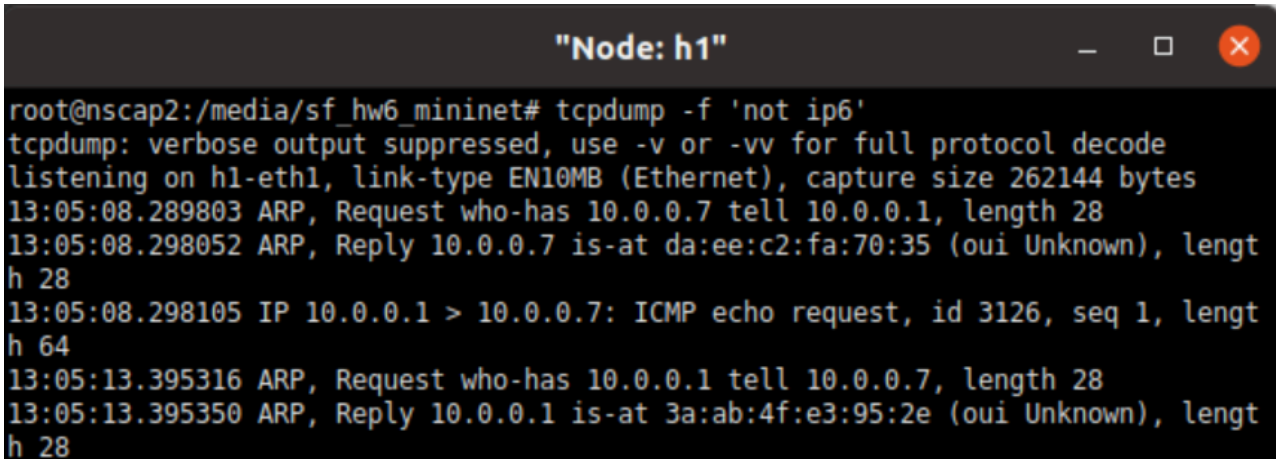
6. When h1 ping h7, what will happen?

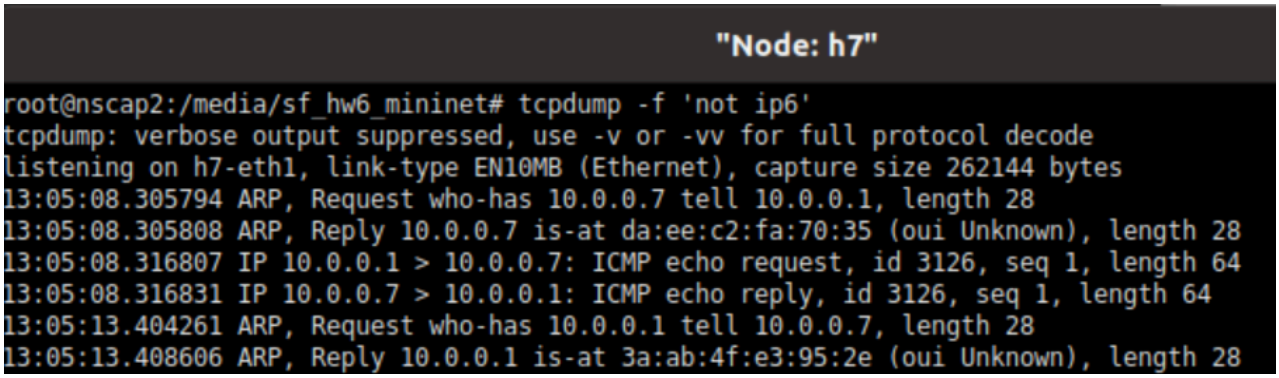
ARP:
h1 sent ARP request
h7 received and replied
h1 received the reply

ICMP:
h1 sent request
h7 received and replied
h1 didn't received since s2 dropped the reply from h7 according to controller's rule

```
mininet> h1 ping 10.0.0.7 -c 1
PING 10.0.0.7 (10.0.0.7) 56(84) bytes of data.

--- 10.0.0.7 ping statistics ---
1 packets transmitted, 0 received, 100% packet loss, time 0ms
```





7. When h7 ping h1, what will happen?

ARP:
h7 sent request
h1 received and replied
h7 received the reply

ICMP:
h7 sent request
h1 didn't receive since s2 dropped the request from h7 according to controller's rule

```
mininet> h7 ping 10.0.0.1 -c 1
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.

--- 10.0.0.1 ping statistics ---
1 packets transmitted, 0 received, 100% packet loss, time 0ms
```

```
"Node: h1"
root@nscap2:/media/sf_hw6_mininet# tcpdump -f 'not ip6'
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on h1-eth1, link-type EN10MB (Ethernet), capture size 262144 bytes
13:10:59.770028 ARP, Request who-has 10.0.0.1 tell 10.0.0.7, length 28
13:10:59.770157 ARP, Reply 10.0.0.1 is-at 3a:ab:4f:e3:95:2e (oui Unknown), length 28
```

```
"Node: h7"
root@nscap2:/media/sf_hw6_mininet# tcpdump -f 'not ip6'
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on h7-eth1, link-type EN10MB (Ethernet), capture size 262144 bytes
13:10:54.748177 IP 10.0.0.7 > 10.0.0.1: ICMP echo request, id 2565, seq 1, length 64
13:10:59.771514 ARP, Request who-has 10.0.0.1 tell 10.0.0.7, length 28
13:10:59.774987 ARP, Reply 10.0.0.1 is-at 3a:ab:4f:e3:95:2e (oui Unknown), length 28
```

8. If the packet in Question 6 or 7 is dropped in some part of the network, are the outcome and explanation the same as that of Question 4? (use screenshots to prove your answers)

原因不同，因為在Q4 時還沒有建立 GRE tunnel，所以連 ARP 封包都收不到，因此判斷為 unreachable。而 Q6、Q7 中 h1 和 h7是有連通的，因此收得到 ARP封包，但因為從 h7 傳出的 ICMP 會被 drop，因此判斷為 packet loss。

```
mininet> xterm h1
mininet> h1 ping h5 -c 1
ping: h5: Temporary failure in name resolution
mininet> h1 ping 10.0.0.5 -c 1
PING 10.0.0.5 (10.0.0.5) 56(84) bytes of data.
From 10.0.0.1 icmp_seq=1 Destination Host Unreachable

--- 10.0.0.5 ping statistics ---
1 packets transmitted, 0 received, +1 errors, 100% packet loss, time 0ms
```

```
mininet> h1 ping 10.0.0.7 -c 1
PING 10.0.0.7 (10.0.0.7) 56(84) bytes of data.

--- 10.0.0.7 ping statistics ---
1 packets transmitted, 0 received, 100% packet loss, time 0ms
```

```
mininet> h7 ping 10.0.0.1 -c 1
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.

--- 10.0.0.1 ping statistics ---
1 packets transmitted, 0 received, 100% packet loss, time 0ms
```

9. Change filter_table2 rule

From the original rule: packets coming from port_3 or port_4 will be dropped, while other packets will be allowed to pass.
To the new rule: packets coming from port_1 or port_2 will be allowed to pass, while other packets will be dropped.
Will the outcome of Questions 5, 6, and 7 differ? (no need to print screenshots)
Explain your answers.

Q5、Q6、Q7 都會 packet loss。
因為 GRE tunnel 對 switch 來說是 port 5，因此這個情境下的 ICMP 會被 drop 掉。