

LAB 3



Họ tên và MSSV: Quách Minh Hón - B2110078

Nhóm học phần: 11

- Các sinh viên bị phát hiện sao chép bài của nhau sẽ nhận 0đ cho tất cả bài thực hành của môn này.
- Bài nộp phải ở dạng PDF. Tên file PDF đặt theo cấu trúc “CT112_MSSV_Lab3_HoTen”. Ví dụ, SV có MSSV là B1234 và Họ tên là “Nguyễn Văn A”; tên file sẽ đặt như sau “CT112_B1234_Lab3_NguyenVanA”.
- File nộp cần cung cấp đầy đủ các bước giải quyết bài toán.

Bài 8:

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Feb
b2110078@UbuntuB2110078: ~/CT112/BaiTap8
b2110078@UbuntuB2110078:~/CT112/BaiTap8$ mkdir pc1 pc2 pc3 pc4 switch
b2110078@UbuntuB2110078:~/CT112/BaiTap8$
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Mar 2 21:54
b2110078@UbuntuB2110078: ~/CT112/BaiTap8
GNU nano 6.2 lab.conf
pc1[0]=A
pc2[0]=B
pc3[0]=C
pc4[0]=D
switch[0]=A
switch[1]=B
switch[2]=C
switch[3]=D
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Feb 29 23:52
b2110078@UbuntuB2110078: ~/CT112/BaiTap8
GNU nano 6.2 pc1.startup
ifconfig eth0 10.0.0.10/24 up
ifconfig eth0 hw ether 00:00:00:00:00:10
[Wrote 2 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line
```

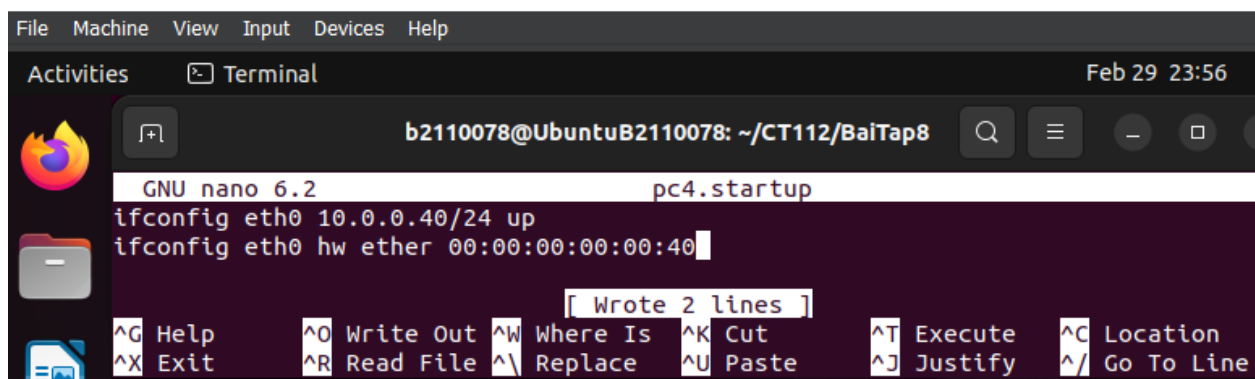
UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Feb 29 23:54
b2110078@UbuntuB2110078: ~/CT112/BaiTap8
GNU nano 6.2 pc2.startup
ifconfig eth0 10.0.0.20/24 up
ifconfig eth0 hw ether 00:00:00:00:00:20
[Wrote 2 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Feb 29 23:55
b2110078@UbuntuB2110078: ~/CT112/BaiTap8
GNU nano 6.2 pc3.startup
ifconfig eth0 10.0.0.30/24 up
ifconfig eth0 hw ether 00:00:00:00:00:30
[Wrote 2 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

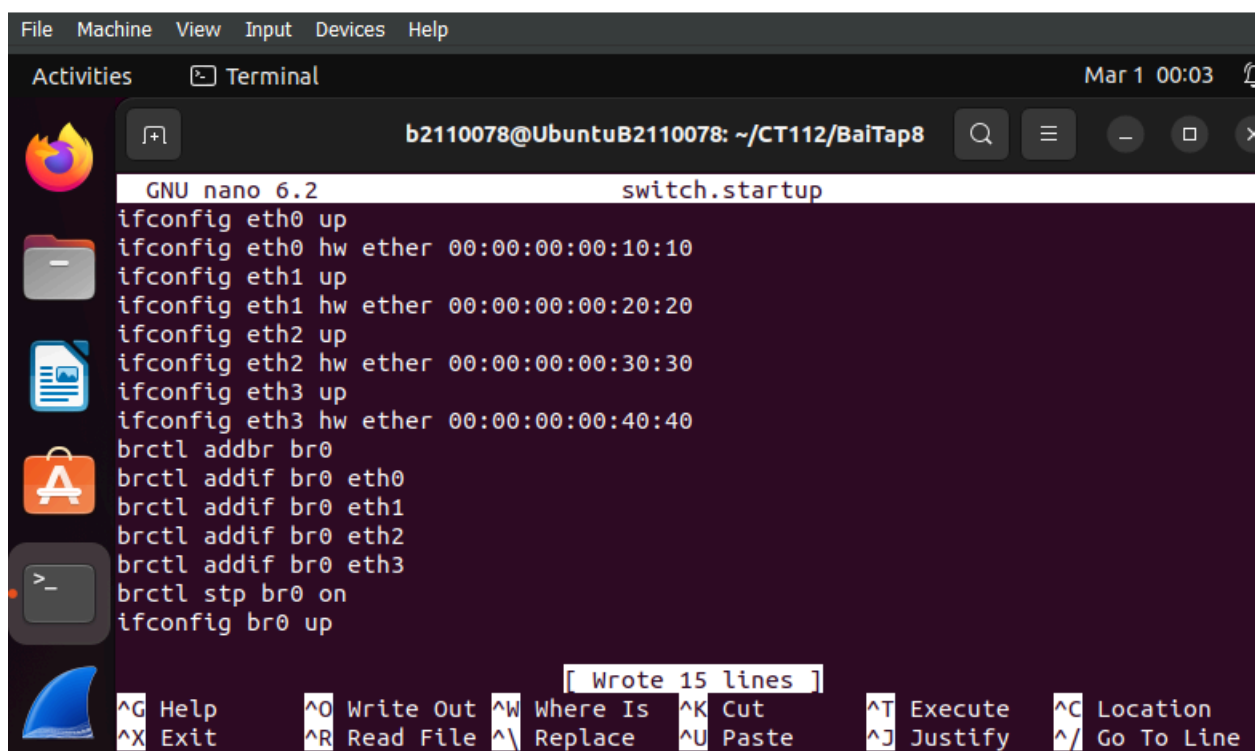


The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap8". The terminal is running the GNU nano 6.2 editor, editing a file named "pc4.startup". The content of the file is as follows:

```
ifconfig eth0 10.0.0.40/24 up
ifconfig eth0 hw ether 00:00:00:00:00:40
```

The status bar at the bottom of the nano editor indicates "Wrote 2 lines". The terminal window has a menu bar with "File", "Machine", "View", "Input", "Devices", and "Help". The top bar shows "Activities" and "Terminal" with a search icon and window controls. The date and time "Feb 29 23:56" are displayed in the top right corner.

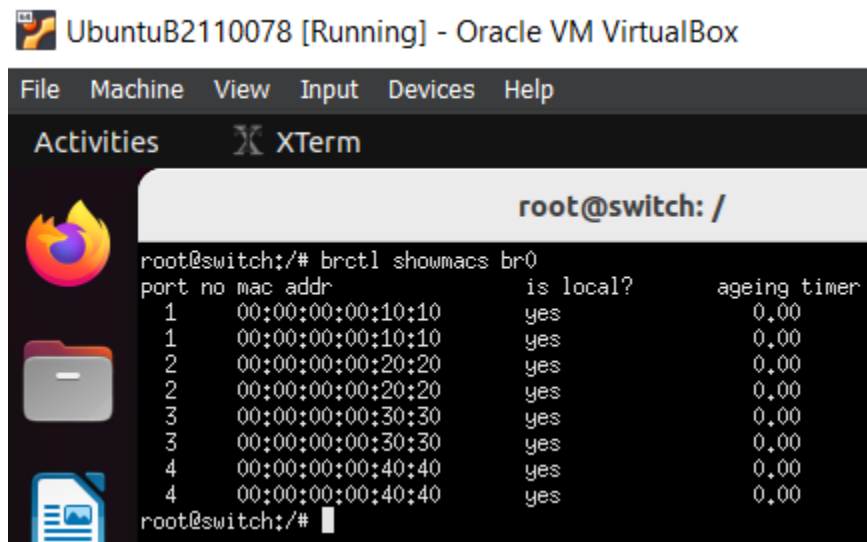
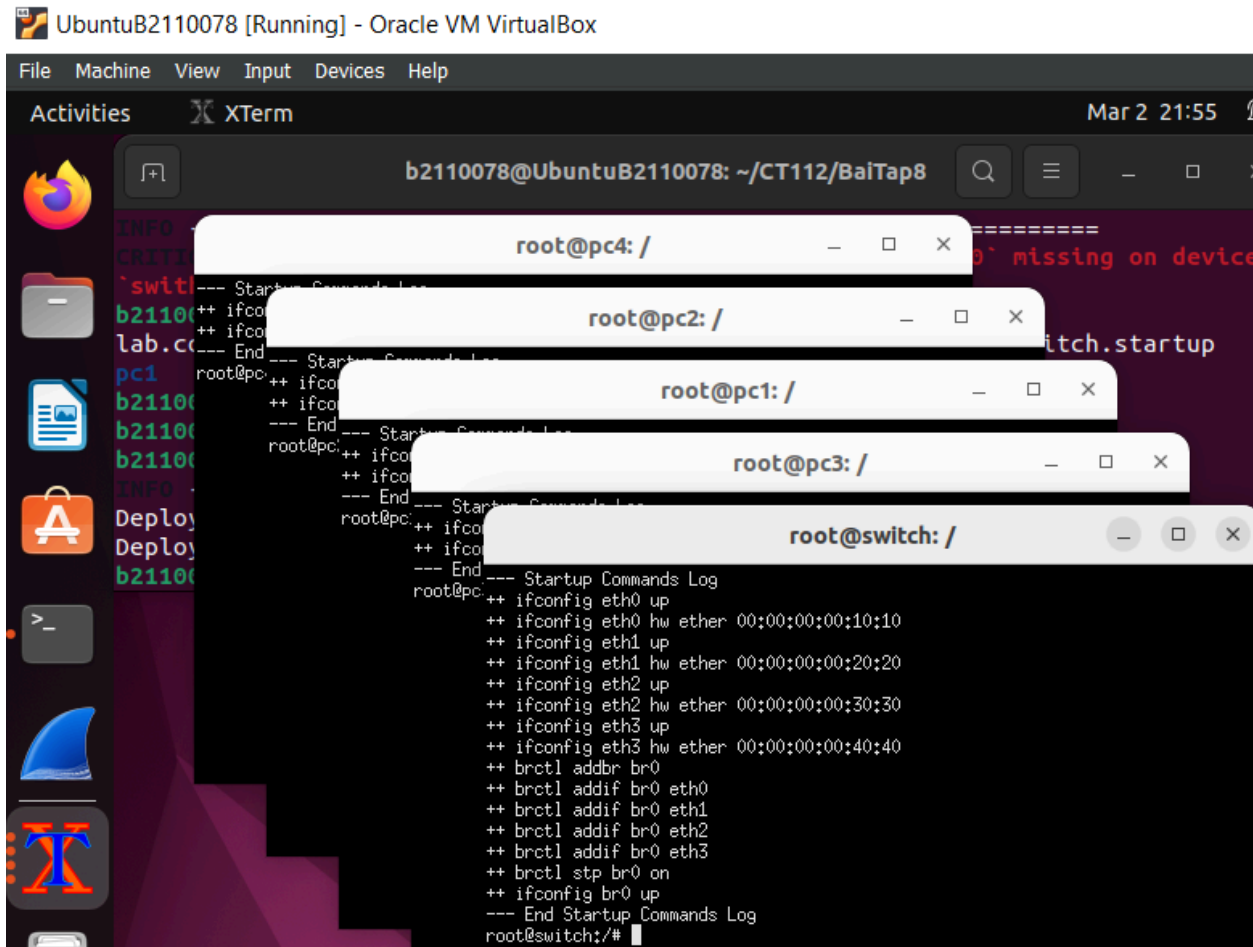
UbuntuB2110078 [Running] - Oracle VM VirtualBox



The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap8". The terminal is running the GNU nano 6.2 editor, editing a file named "switch.startup". The content of the file is as follows:

```
ifconfig eth0 up
ifconfig eth0 hw ether 00:00:00:00:10:10
ifconfig eth1 up
ifconfig eth1 hw ether 00:00:00:00:20:20
ifconfig eth2 up
ifconfig eth2 hw ether 00:00:00:00:30:30
ifconfig eth3 up
ifconfig eth3 hw ether 00:00:00:00:40:40
brctl addbr br0
brctl addif br0 eth0
brctl addif br0 eth1
brctl addif br0 eth2
brctl addif br0 eth3
brctl stp br0 on
ifconfig br0 up
```

The status bar at the bottom of the nano editor indicates "Wrote 15 lines". The terminal window has a menu bar with "File", "Machine", "View", "Input", "Devices", and "Help". The top bar shows "Activities" and "Terminal" with a search icon and window controls. The date and time "Mar 1 00:03" are displayed in the top right corner.



- Có 4 địa chỉ vật lý.
- Lần lượt là các giao diện của eth0, eth1, eth2, eth3.

UbuntuB2110078 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities XTerm

```
root@switch: /
root@switch:/# tcpdump -e -q -w /shared/BT8_switch.pcap
tcpdump: listening on br0, link-type EN10MB (Ethernet), snapshot length 262144 bytes
^

root@pc1: /
root@pc1:/# tcpdump -e -q -w /shared/BT8_pc1.pcap
tcpdump: listening on eth0, link-type EN10MB (Ethernet), snapshot length 262144 bytes
^

root@pc3: /
root@pc3:/# tcpdump -e -q -w /shared/BT8_pc3.pcap
tcpdump: listening on eth0, link-type EN10MB (Ethernet), snapshot length 262144 bytes
^
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities XTerm

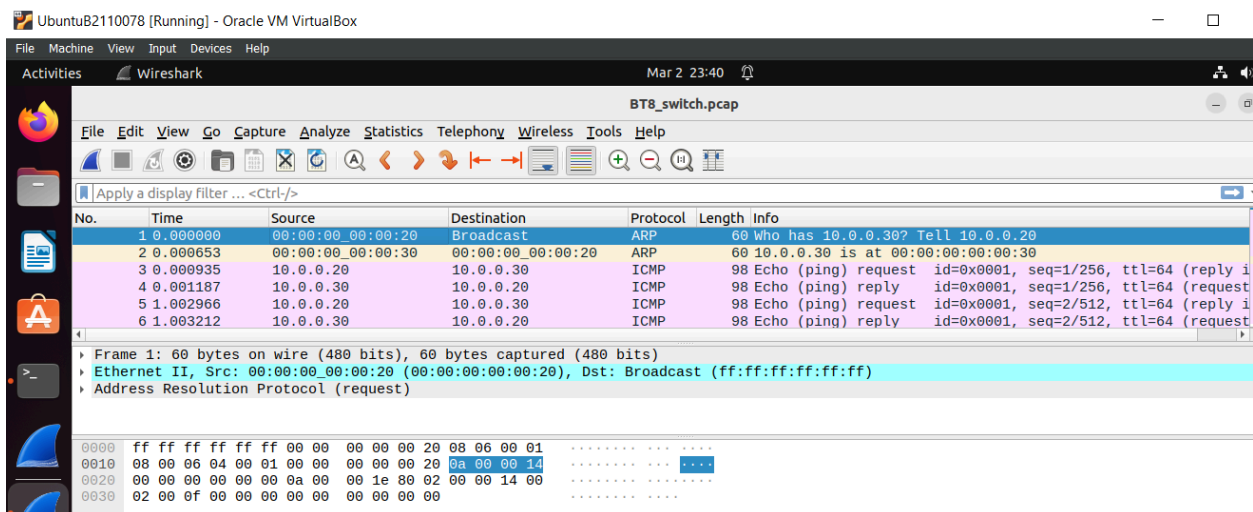
```
root@pc2: /
root@pc2:/# ping 10.0.0.30
PING 10.0.0.30 (10.0.0.30) 56(84) bytes of data:
64 bytes from 10.0.0.30: icmp_seq=1 ttl=64 time=1.60 ms
64 bytes from 10.0.0.30: icmp_seq=2 ttl=64 time=0.521 ms
64 bytes from 10.0.0.30: icmp_seq=3 ttl=64 time=0.651 ms
64 bytes from 10.0.0.30: icmp_seq=4 ttl=64 time=0.627 ms
64 bytes from 10.0.0.30: icmp_seq=5 ttl=64 time=0.596 ms
64 bytes from 10.0.0.30: icmp_seq=6 ttl=64 time=0.698 ms
64 bytes from 10.0.0.30: icmp_seq=7 ttl=64 time=0.620 ms
64 bytes from 10.0.0.30: icmp_seq=8 ttl=64 time=1.09 ms
64 bytes from 10.0.0.30: icmp_seq=9 ttl=64 time=0.611 ms
64 bytes from 10.0.0.30: icmp_seq=10 ttl=64 time=0.350 ms
64 bytes from 10.0.0.30: icmp_seq=11 ttl=64 time=0.532 ms
64 bytes from 10.0.0.30: icmp_seq=12 ttl=64 time=0.411 ms
64 bytes from 10.0.0.30: icmp_seq=13 ttl=64 time=0.298 ms
64 bytes from 10.0.0.30: icmp_seq=14 ttl=64 time=0.418 ms
^C
--- 10.0.0.30 ping statistics ---
14 packets transmitted, 14 received, 0% packet loss, time 13268ms
rtt min/avg/max/mdev = 0.298/0.644/1.598/0.322 ms
root@pc2:/#
```

```

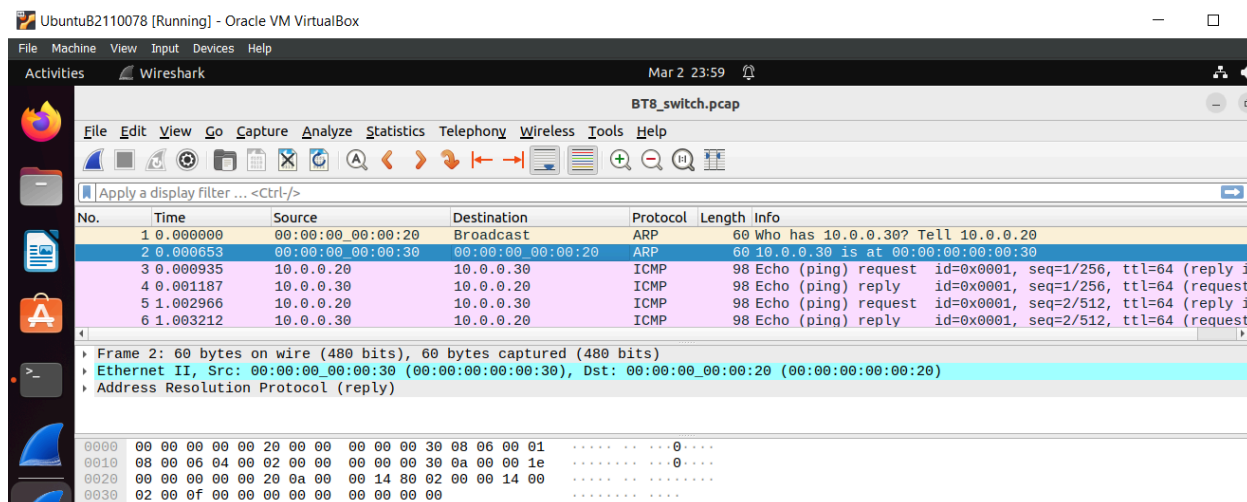
root@switch: /
root@switch:~# brctl showmacs br0
port no mac addr is local? ageing timer
2 00:00:00:00:00:20 no 79.50
3 00:00:00:00:00:30 no 79.50
1 00:00:00:00:10:10 yes 0.00
1 00:00:00:00:10:10 yes 0.00
2 00:00:00:00:20:20 yes 0.00
2 00:00:00:00:20:20 yes 0.00
3 00:00:00:00:30:30 yes 0.00
3 00:00:00:00:30:30 yes 0.00
4 00:00:00:00:40:40 yes 0.00
4 00:00:00:00:40:40 yes 0.00
root@switch:~#

```

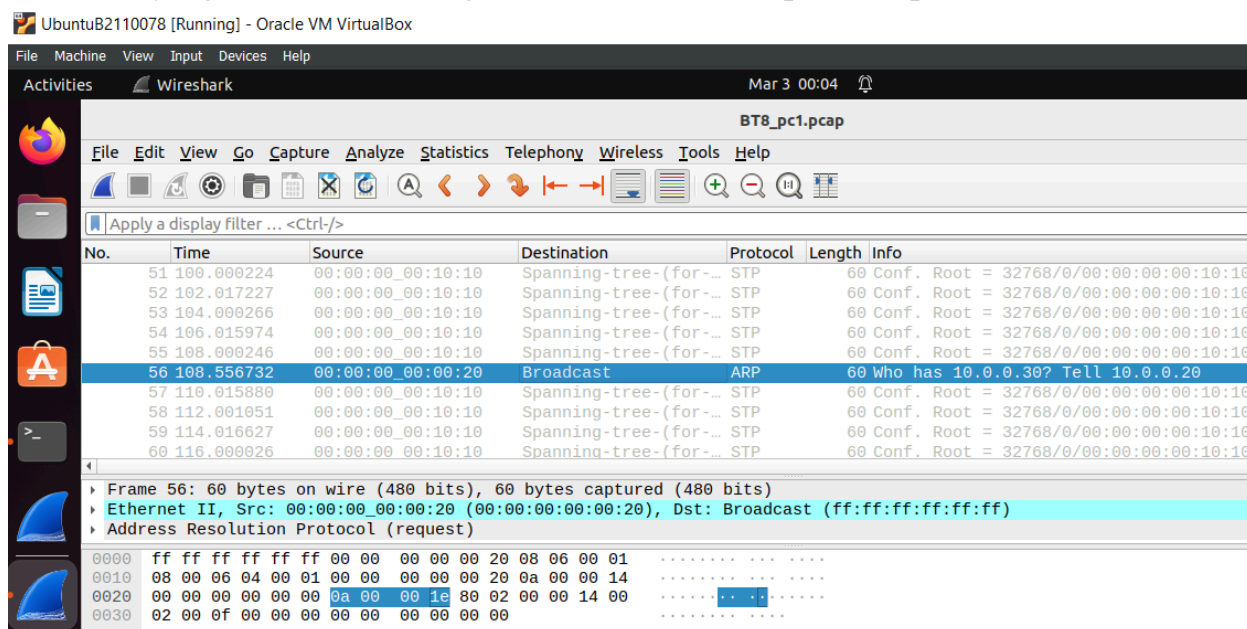
- Switch biết thêm địa chỉ MAC của pc2 ở port 2 và pc3 ở port 3.



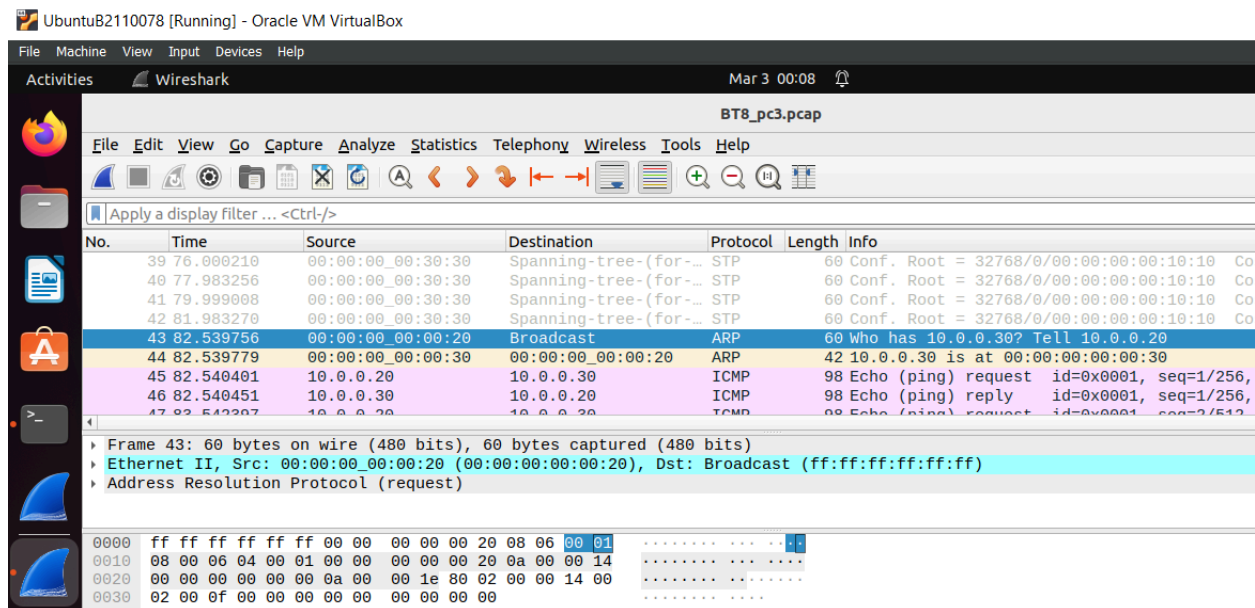
- Trên hình, khung 1 có địa chỉ MAC 00:00:00:00:00:20.
- Switch nhận được khung này vì pc2 đã ping đến pc3. Pc2 truyền thông điệp tới switch để tìm địa chỉ MAC của pc3.
- Khung dữ liệu này có nghĩa là switch đã nhận được yêu cầu tìm địa chỉ MAC của pc3 do pc2 gửi tới.



- Trên hình, khung 2 có địa chỉ MAC 00:00:00:00:00:30.
- Switch nhận được khung này vì đã tìm thấy địa chỉ MAC của pc3.
- Có ý nghĩa là switch đã gửi địa chỉ MAC của pc3 đến pc2.

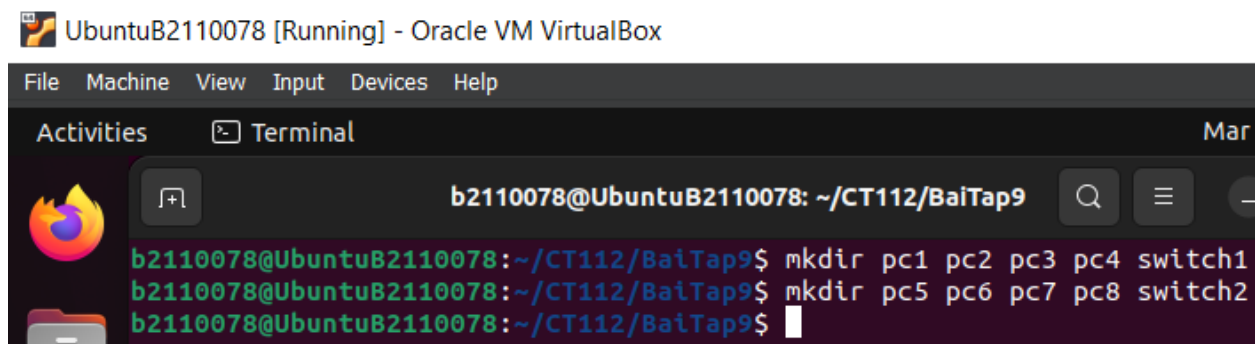


- Trên hình, khung 56 có địa chỉ MAC 00:00:00:00:00:20.
- pc1 nhận được dữ liệu này vì switch truyền quảng bá khung dữ liệu ra tất cả các cổng để tìm được địa chỉ vật lý của pc3.
- Khung dữ liệu này có ý nghĩa pc1 sẽ không hồi đáp vì 10.0.0.30 không phải là IP của pc1.

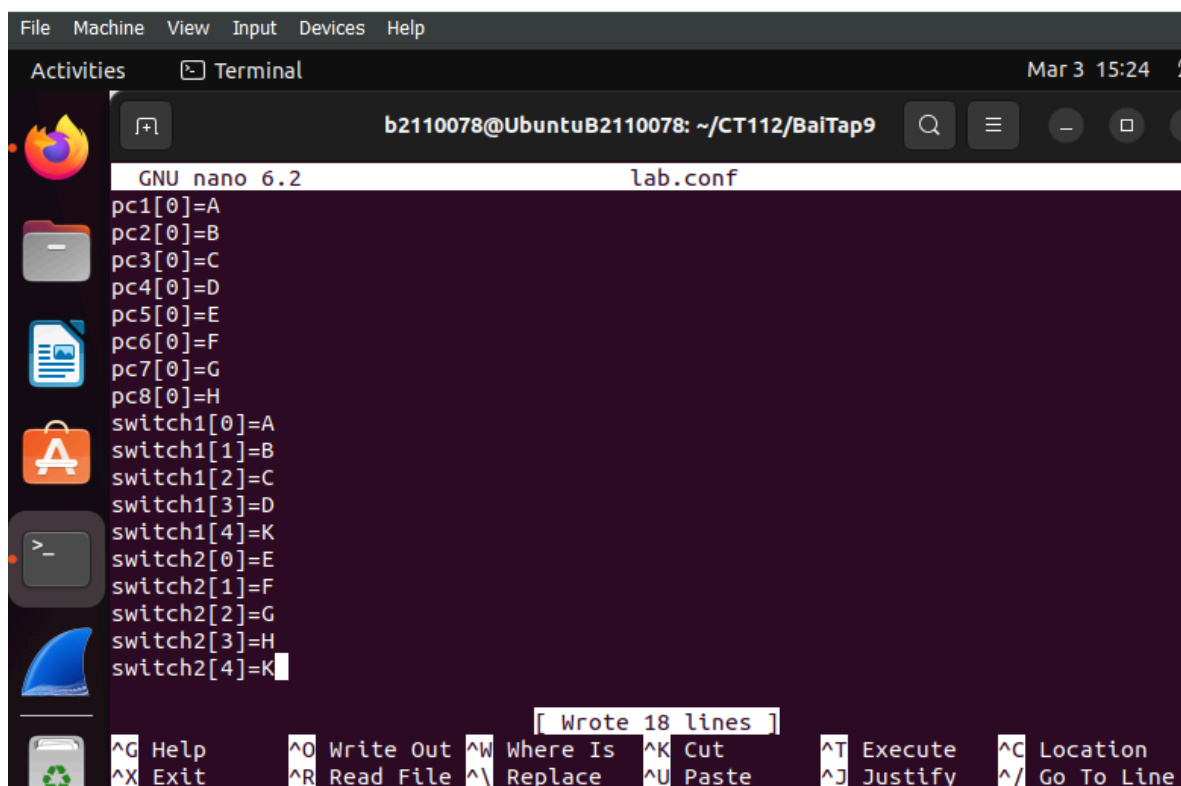


- pc3 nhận được khung này vì switch truyền bá khung dữ liệu ra tất cả các cổng để tìm địa chỉ vật lý của pc3.
 - pc3 sẽ phản hồi khung này, vì địa chỉ của pc3 là 10.0.0.30 khớp với địa chỉ switch đang tìm kiếm.
- ★ Kết luận: Sau khi ping giữa 2 máy có cùng switch thì switch sẽ truyền dữ liệu tìm kiếm đến tất cả các thiết bị được kết nối trong cùng LAN, switch sẽ học được địa chỉ MAC của các máy ảo đó và cập nhật vào MAC lookup table.

Bài 9:

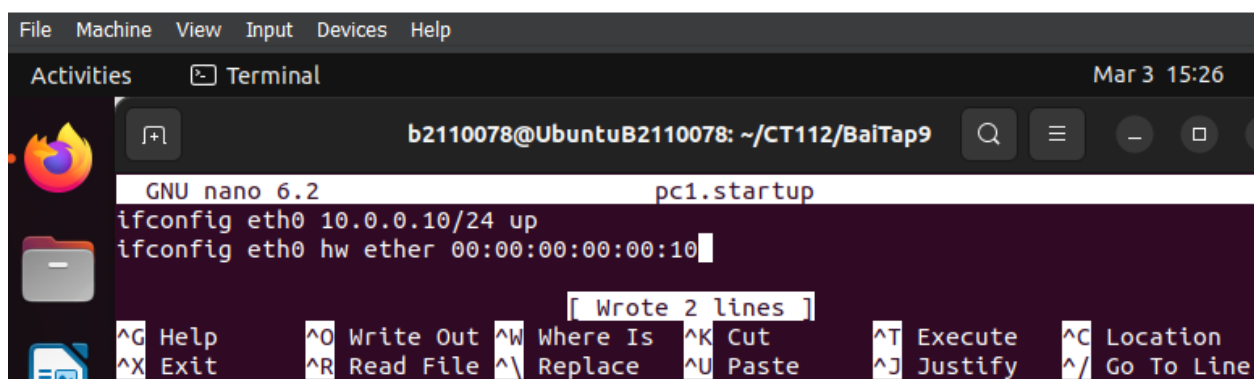


UbuntuB2110078 [Running] - Oracle VM VirtualBox



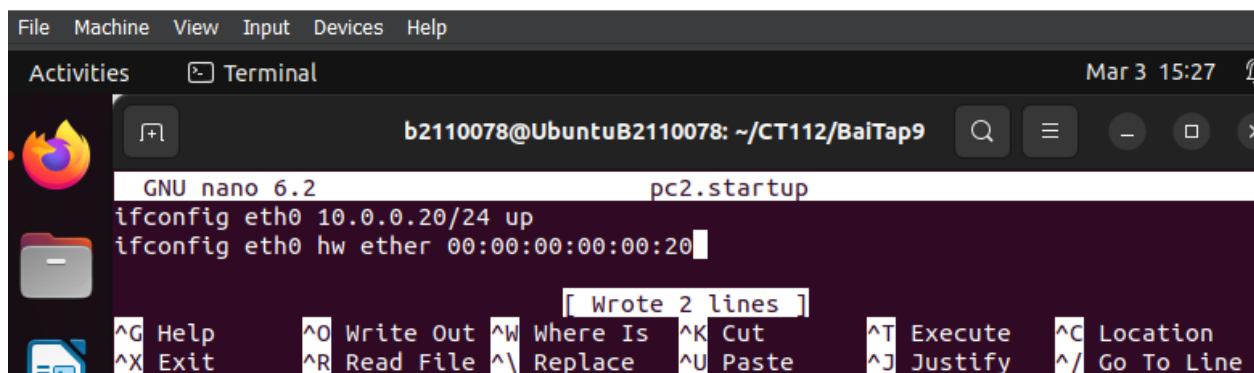
```
b2110078@UbuntuB2110078: ~/CT112/BaiTap9
GNU nano 6.2 lab.conf
pc1[0]=A
pc2[0]=B
pc3[0]=C
pc4[0]=D
pc5[0]=E
pc6[0]=F
pc7[0]=G
pc8[0]=H
switch1[0]=A
switch1[1]=B
switch1[2]=C
switch1[3]=D
switch1[4]=K
switch2[0]=E
switch2[1]=F
switch2[2]=G
switch2[3]=H
switch2[4]=K
[ Wrote 18 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox



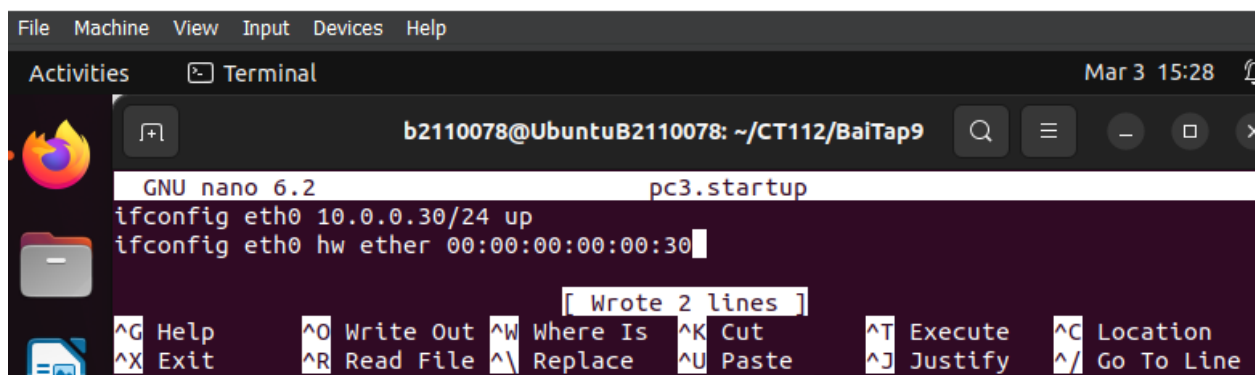
```
b2110078@UbuntuB2110078: ~/CT112/BaiTap9
GNU nano 6.2 pc1.startup
ifconfig eth0 10.0.0.10/24 up
ifconfig eth0 hw ether 00:00:00:00:00:10
[ Wrote 2 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox



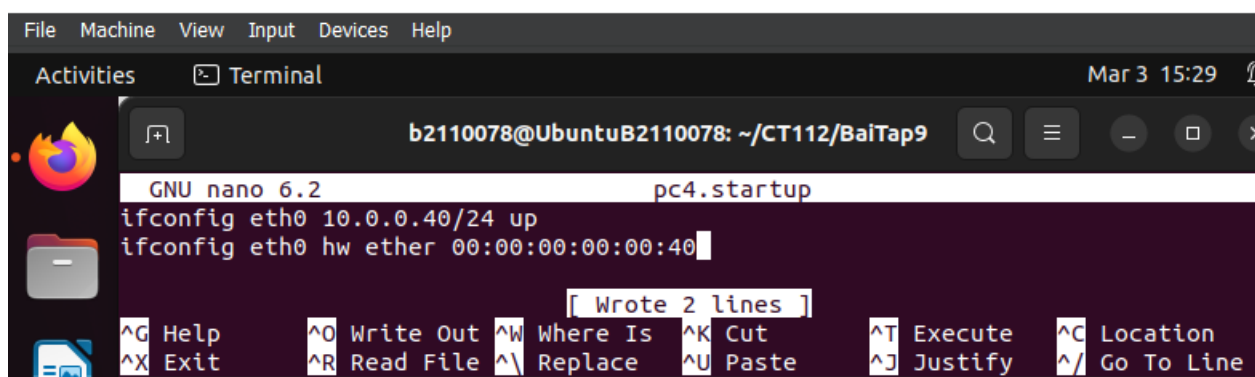
```
b2110078@UbuntuB2110078: ~/CT112/BaiTap9
GNU nano 6.2 pc2.startup
ifconfig eth0 10.0.0.20/24 up
ifconfig eth0 hw ether 00:00:00:00:00:20
[ Wrote 2 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox



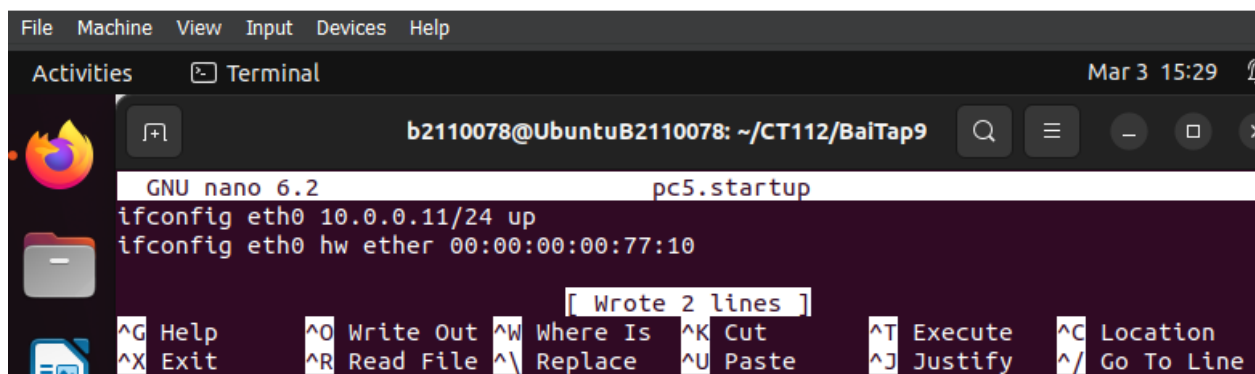
```
File Machine View Input Devices Help
Activities Terminal Mar 3 15:28
b2110078@UbuntuB2110078: ~/CT112/BaiTap9
GNU nano 6.2 pc3.startup
ifconfig eth0 10.0.0.30/24 up
ifconfig eth0 hw ether 00:00:00:00:00:30
[Wrote 2 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox



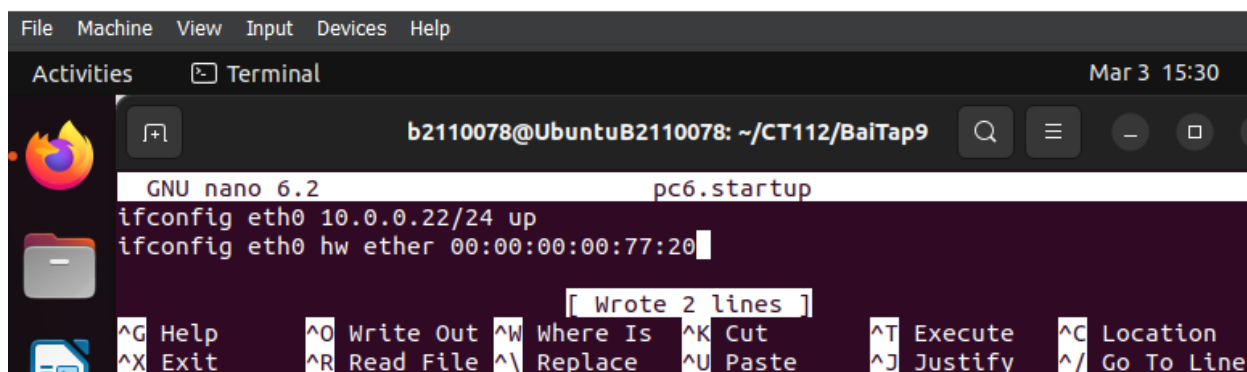
```
File Machine View Input Devices Help
Activities Terminal Mar 3 15:29
b2110078@UbuntuB2110078: ~/CT112/BaiTap9
GNU nano 6.2 pc4.startup
ifconfig eth0 10.0.0.40/24 up
ifconfig eth0 hw ether 00:00:00:00:00:40
[Wrote 2 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox



```
File Machine View Input Devices Help
Activities Terminal Mar 3 15:29
b2110078@UbuntuB2110078: ~/CT112/BaiTap9
GNU nano 6.2 pc5.startup
ifconfig eth0 10.0.0.11/24 up
ifconfig eth0 hw ether 00:00:00:00:77:10
[Wrote 2 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

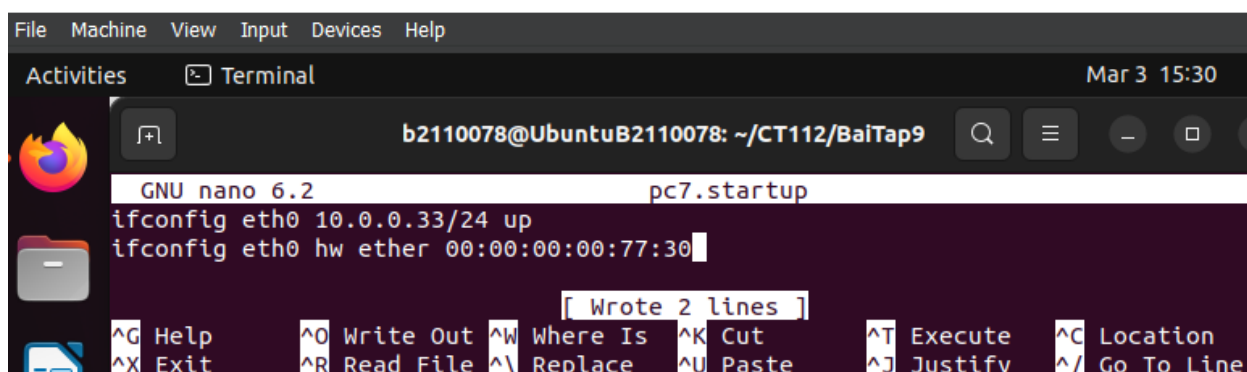


The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap9". The terminal is running the GNU nano 6.2 editor, editing a file named "pc6.startup". The content of the file is as follows:

```
ifconfig eth0 10.0.0.22/24 up
ifconfig eth0 hw ether 00:00:00:00:77:20
```

The cursor is at the end of the second line. The bottom of the screen shows the nano editor's help menu with various shortcuts.

UbuntuB2110078 [Running] - Oracle VM VirtualBox

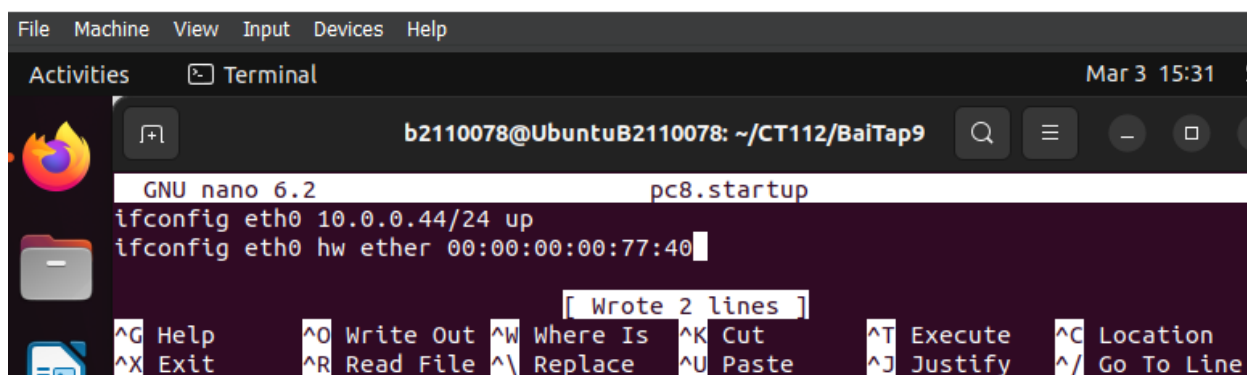


The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap9". The terminal is running the GNU nano 6.2 editor, editing a file named "pc7.startup". The content of the file is as follows:

```
ifconfig eth0 10.0.0.33/24 up
ifconfig eth0 hw ether 00:00:00:00:77:30
```

The cursor is at the end of the second line. The bottom of the screen shows the nano editor's help menu with various shortcuts.

UbuntuB2110078 [Running] - Oracle VM VirtualBox

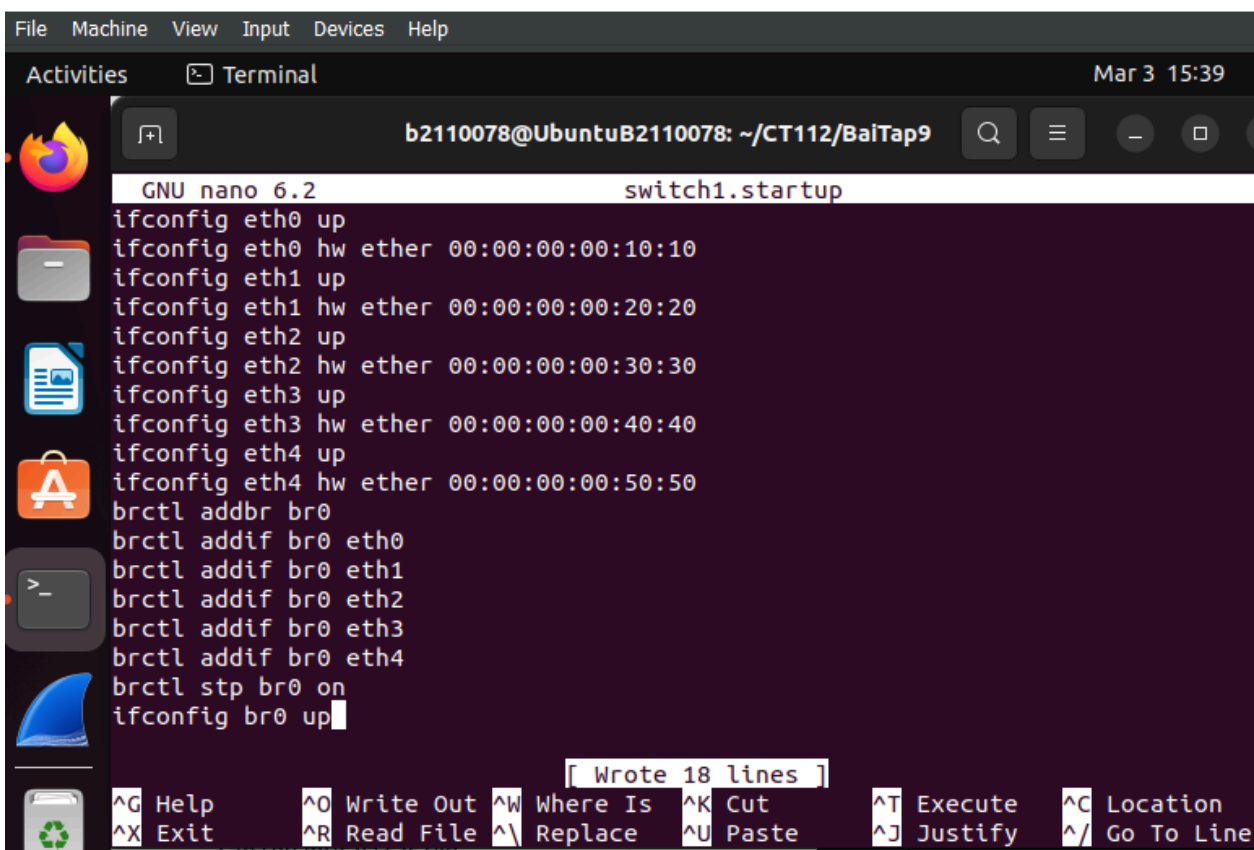


The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap9". The terminal is running the GNU nano 6.2 editor, editing a file named "pc8.startup". The content of the file is as follows:

```
ifconfig eth0 10.0.0.44/24 up
ifconfig eth0 hw ether 00:00:00:00:77:40
```

The cursor is at the end of the second line. The bottom of the screen shows the nano editor's help menu with various shortcuts.

UbuntuB2110078 [Running] - Oracle VM VirtualBox



The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap9" with a search bar and window controls. The terminal is running GNU nano 6.2 editing a file named "switch1.startup". The content of the file is as follows:

```
ifconfig eth0 up
ifconfig eth0 hw ether 00:00:00:00:10:10
ifconfig eth1 up
ifconfig eth1 hw ether 00:00:00:00:20:20
ifconfig eth2 up
ifconfig eth2 hw ether 00:00:00:00:30:30
ifconfig eth3 up
ifconfig eth3 hw ether 00:00:00:00:40:40
ifconfig eth4 up
ifconfig eth4 hw ether 00:00:00:00:50:50
brctl addbr br0
brctl addif br0 eth0
brctl addif br0 eth1
brctl addif br0 eth2
brctl addif br0 eth3
brctl addif br0 eth4
brctl stp br0 on
ifconfig br0 up
```

At the bottom of the terminal, a status bar indicates "Wrote 18 lines". Below the terminal window, a row of keyboard shortcuts is visible:

^G Help	^O Write Out	^W Where Is	^K Cut	^T Execute	^C Location
^X Exit	^R Read File	^_ Replace	^U Paste	^J Justify	^_ Go To Line

UbuntuB2110078 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

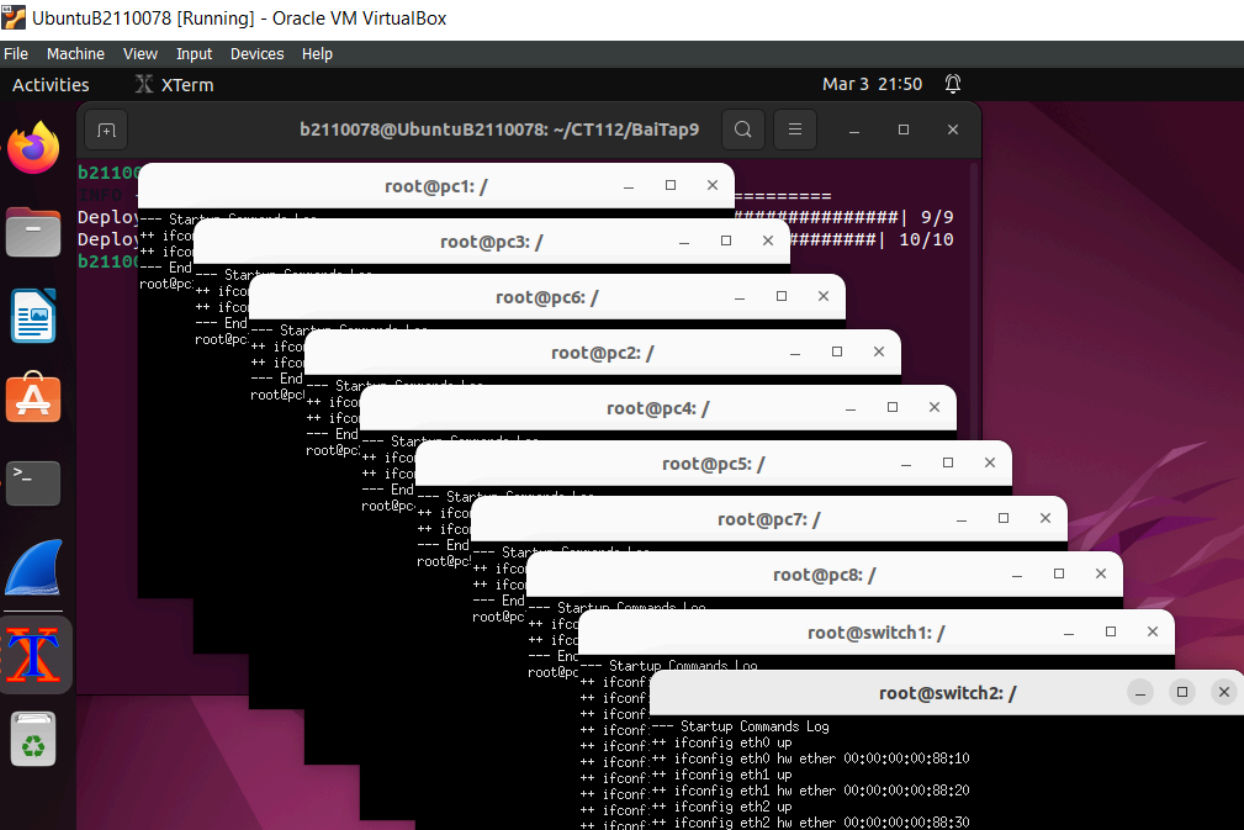
Activities Terminal Mar 3 15:40

b2110078@UbuntuB2110078: ~/CT112/BaiTap9

```
GNU nano 6.2 switch2.startup
ifconfig eth0 up
ifconfig eth0 hw ether 00:00:00:00:88:10
ifconfig eth1 up
ifconfig eth1 hw ether 00:00:00:00:88:20
ifconfig eth2 up
ifconfig eth2 hw ether 00:00:00:00:88:30
ifconfig eth3 up
ifconfig eth3 hw ether 00:00:00:00:88:40
ifconfig eth4 up
ifconfig eth4 hw ether 00:00:00:00:88:50
brctl addbr br0
brctl addif br0 eth0
brctl addif br0 eth1
brctl addif br0 eth2
brctl addif br0 eth3
brctl addif br0 eth4
brctl stp br0 on
ifconfig br0 up
```

[Wrote 18 lines]








^G Help	^O Write Out	^W Where Is	^K Cut	^T Execute	^C Location
^X Exit	^R Read File	^_ Replace	^U Paste	^J Justify	^_ Go To Line



UbuntuB2110078 [Running] - Oracle VM VirtualBox

FileMachineViewInputDevicesHelp

ActivitiesXTerm



root@switch1: /

```
root@switch1:~# brctl showmacs br0
port no mac addr is local? ageing timer
1 00:00:00:00:10:10 yes 0.00
1 00:00:00:00:10:10 yes 0.00
2 00:00:00:00:20:20 yes 0.00
2 00:00:00:00:20:20 yes 0.00
3 00:00:00:00:30:30 yes 0.00
3 00:00:00:00:30:30 yes 0.00
4 00:00:00:00:40:40 yes 0.00
4 00:00:00:00:40:40 yes 0.00
5 00:00:00:00:50:50 yes 0.00
5 00:00:00:00:50:50 yes 0.00
5 00:00:00:00:88:50 no 131.60
root@switch1:~#
```




root@switch2: /

```
root@switch2:~# brctl showmacs br0
port no mac addr is local? ageing timer
5 00:00:00:00:50:50 no 0.70
1 00:00:00:00:88:10 yes 0.00
1 00:00:00:00:88:10 yes 0.00
2 00:00:00:00:88:20 yes 0.00
2 00:00:00:00:88:20 yes 0.00
3 00:00:00:00:88:30 yes 0.00
3 00:00:00:00:88:30 yes 0.00
4 00:00:00:00:88:40 yes 0.00
4 00:00:00:00:88:40 yes 0.00
5 00:00:00:00:88:50 yes 0.00
5 00:00:00:00:88:50 yes 0.00
root@switch2:~#
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

FileMachineViewInputDevicesHelp

ActivitiesXTerm



root@switch1: /

```
root@switch1:~# tcpdump -e -q -w /shared/BT9_switch1_A.pcap
tcpdump: listening on br0, link-type EN10MB (Ethernet), snapshot length 262144 b
ytes

```

root@switch2: /

```
root@switch2:~# tcpdump -e -q -w /shared/BT9_switch2_A.pcap
tcpdump: listening on br0, link-type EN10MB (Ethernet), snapshot length 262144 b
ytes

```

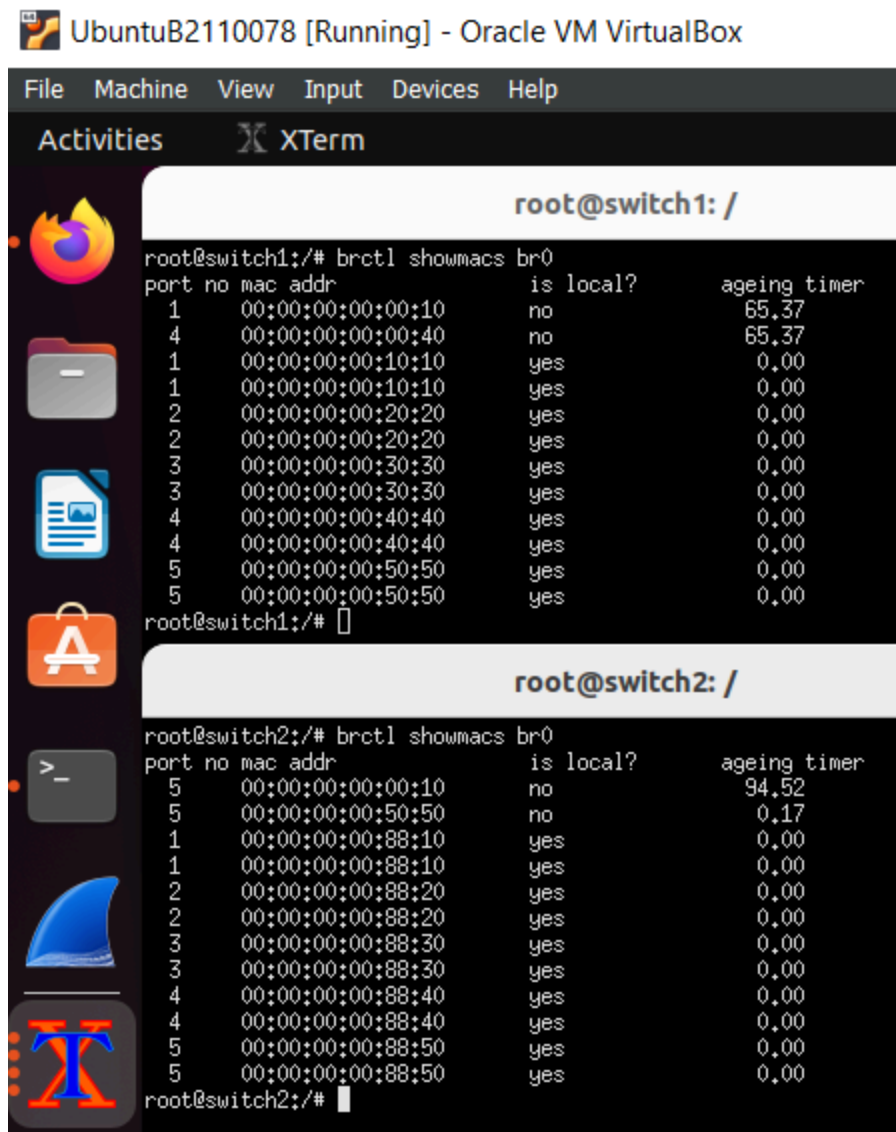

UbuntuB2110078 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities XTerm

root@pc1: /

```
root@pc1:/# ping 10.0.0.40
PING 10.0.0.40 (10.0.0.40) 56(84) bytes of data.
64 bytes from 10.0.0.40: icmp_seq=1 ttl=64 time=1.06 ms
64 bytes from 10.0.0.40: icmp_seq=2 ttl=64 time=0.675 ms
64 bytes from 10.0.0.40: icmp_seq=3 ttl=64 time=0.897 ms
64 bytes from 10.0.0.40: icmp_seq=4 ttl=64 time=0.672 ms
64 bytes from 10.0.0.40: icmp_seq=5 ttl=64 time=0.408 ms
64 bytes from 10.0.0.40: icmp_seq=6 ttl=64 time=0.443 ms
64 bytes from 10.0.0.40: icmp_seq=7 ttl=64 time=0.432 ms
64 bytes from 10.0.0.40: icmp_seq=8 ttl=64 time=0.516 ms
64 bytes from 10.0.0.40: icmp_seq=9 ttl=64 time=0.402 ms
64 bytes from 10.0.0.40: icmp_seq=10 ttl=64 time=0.486 ms
64 bytes from 10.0.0.40: icmp_seq=11 ttl=64 time=0.470 ms
64 bytes from 10.0.0.40: icmp_seq=12 ttl=64 time=0.474 ms
64 bytes from 10.0.0.40: icmp_seq=13 ttl=64 time=0.394 ms
64 bytes from 10.0.0.40: icmp_seq=14 ttl=64 time=0.396 ms
64 bytes from 10.0.0.40: icmp_seq=15 ttl=64 time=1.05 ms
64 bytes from 10.0.0.40: icmp_seq=16 ttl=64 time=0.505 ms
^C
--- 10.0.0.40 ping statistics ---
16 packets transmitted, 16 received, 0% packet loss, time 15265ms
rtt min/avg/max/mdev = 0.394/0.579/1.060/0.220 ms
root@pc1:/#
```



UbuntuB2110078 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities XTerm

root@switch1: /

```
root@switch1:/# brctl showmacs br0
```

port	no	mac	addr	is local?	ageing timer
1		00:00:00:00:00:10		no	65.37
4		00:00:00:00:00:40		no	65.37
1		00:00:00:00:10:10		yes	0.00
1		00:00:00:00:10:10		yes	0.00
2		00:00:00:00:20:20		yes	0.00
2		00:00:00:00:20:20		yes	0.00
3		00:00:00:00:30:30		yes	0.00
3		00:00:00:00:30:30		yes	0.00
4		00:00:00:00:40:40		yes	0.00
4		00:00:00:00:40:40		yes	0.00
5		00:00:00:00:50:50		yes	0.00
5		00:00:00:00:50:50		yes	0.00

root@switch1:/#

root@switch2: /

```
root@switch2:/# brctl showmacs br0
```

port	no	mac	addr	is local?	ageing timer
5		00:00:00:00:00:10		no	94.52
5		00:00:00:00:50:50		no	0.17
1		00:00:00:00:88:10		yes	0.00
1		00:00:00:00:88:10		yes	0.00
2		00:00:00:00:88:20		yes	0.00
2		00:00:00:00:88:20		yes	0.00
3		00:00:00:00:88:30		yes	0.00
3		00:00:00:00:88:30		yes	0.00
4		00:00:00:00:88:40		yes	0.00
4		00:00:00:00:88:40		yes	0.00
5		00:00:00:00:88:50		yes	0.00
5		00:00:00:00:88:50		yes	0.00

root@switch2:/#

- Switch1 học được địa chỉ của 2 máy pc1 và pc4.
- Switch2 chỉ học được địa chỉ của pc1, (vì pc1 ping tới pc4), đường đi này không qua nối kết đến LAN trong switch2.
- Các máy tính pc5, pc6, pc7, pc8 nhận được gói tin ICMP từ pc1.

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities XTerm

root@switch1: /

root@switch1:/# tcpdump -e -q -w /shared/BT9_switch1_B.pcap
tcpdump: listening on br0, link-type EN10MB (Ethernet), snapshot length 262144 b
ytes
^C

root@switch2: /

root@switch2:/# tcpdump -e -q -w /shared/BT9_switch2_B.pcap
tcpdump: listening on br0, link-type EN10MB (Ethernet), snapshot length 262144 b
ytes
^C
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities XTerm

root@pc2: /

root@pc2:/# ping 10.0.0.33
PING 10.0.0.33 (10.0.0.33) 56(84) bytes of data.
64 bytes from 10.0.0.33: icmp_seq=1 ttl=64 time=1.44 ms
64 bytes from 10.0.0.33: icmp_seq=2 ttl=64 time=0.958 ms
64 bytes from 10.0.0.33: icmp_seq=3 ttl=64 time=1.20 ms
64 bytes from 10.0.0.33: icmp_seq=4 ttl=64 time=0.770 ms
64 bytes from 10.0.0.33: icmp_seq=5 ttl=64 time=0.926 ms
64 bytes from 10.0.0.33: icmp_seq=6 ttl=64 time=0.932 ms
64 bytes from 10.0.0.33: icmp_seq=7 ttl=64 time=0.893 ms
64 bytes from 10.0.0.33: icmp_seq=8 ttl=64 time=0.763 ms
64 bytes from 10.0.0.33: icmp_seq=9 ttl=64 time=0.787 ms
64 bytes from 10.0.0.33: icmp_seq=10 ttl=64 time=1.23 ms
64 bytes from 10.0.0.33: icmp_seq=11 ttl=64 time=1.00 ms
64 bytes from 10.0.0.33: icmp_seq=12 ttl=64 time=1.51 ms
64 bytes from 10.0.0.33: icmp_seq=13 ttl=64 time=1.08 ms
64 bytes from 10.0.0.33: icmp_seq=14 ttl=64 time=1.06 ms
^C
--- 10.0.0.33 ping statistics ---
14 packets transmitted, 14 received, 0% packet loss, time 13077ms
rtt min/avg/max/mdev = 0.763/1.038/1.508/0.224 ms
root@pc2:/#
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities XTerm

root@switch1: /

```
root@switch1:/# brctl showmacs br0
```

port	no	mac addr	is local?	ageing timer
2		00:00:00:00:00:20	no	41.35
1		00:00:00:00:10:10	yes	0.00
1		00:00:00:00:10:10	yes	0.00
2		00:00:00:00:20:20	yes	0.00
2		00:00:00:00:20:20	yes	0.00
3		00:00:00:00:30:30	yes	0.00
3		00:00:00:00:30:30	yes	0.00
4		00:00:00:00:40:40	yes	0.00
4		00:00:00:00:40:40	yes	0.00
5		00:00:00:00:50:50	yes	0.00
5		00:00:00:00:50:50	yes	0.00
5		00:00:00:00:77:30	no	41.35

root@switch1:/#

root@switch2: /

```
root@switch2:/# brctl showmacs br0
```


port	no	mac addr	is local?	ageing timer
5		00:00:00:00:00:20	no	46.37
5		00:00:00:00:50:50	no	0.20
3		00:00:00:00:77:30	no	46.37
1		00:00:00:00:88:10	yes	0.00
1		00:00:00:00:88:10	yes	0.00
2		00:00:00:00:88:20	yes	0.00
2		00:00:00:00:88:20	yes	0.00
3		00:00:00:00:88:30	yes	0.00
3		00:00:00:00:88:30	yes	0.00
4		00:00:00:00:88:40	yes	0.00
4		00:00:00:00:88:40	yes	0.00
5		00:00:00:00:88:50	yes	0.00
5		00:00:00:00:88:50	yes	0.00

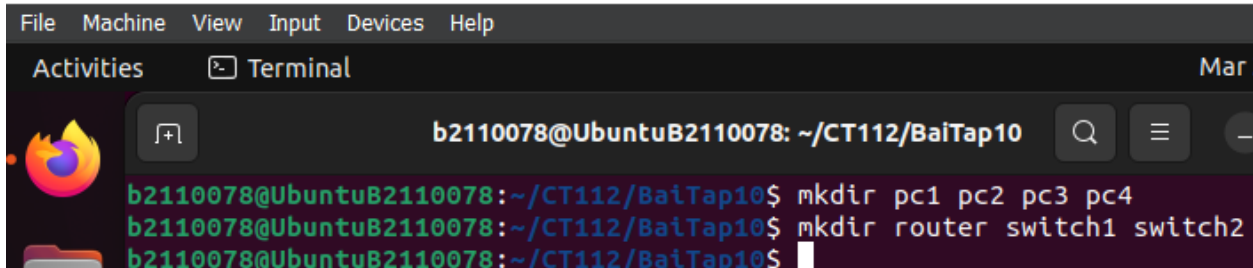
root@switch2:/#

- Switch1 học được địa chỉ của máy pc2, pc7.
- Switch2 học được địa chỉ của máy pc2, pc7.
- Pc5, pc6, pc7, pc8 có nhận được gói tin từ pc2.
- ★ Kết luận: Nếu ping giữa 2 máy khác nhánh mạng LAN thì switch sẽ nhận được địa chỉ của hai máy đó (cùng nhánh và khác nhánh).


Bài 10:

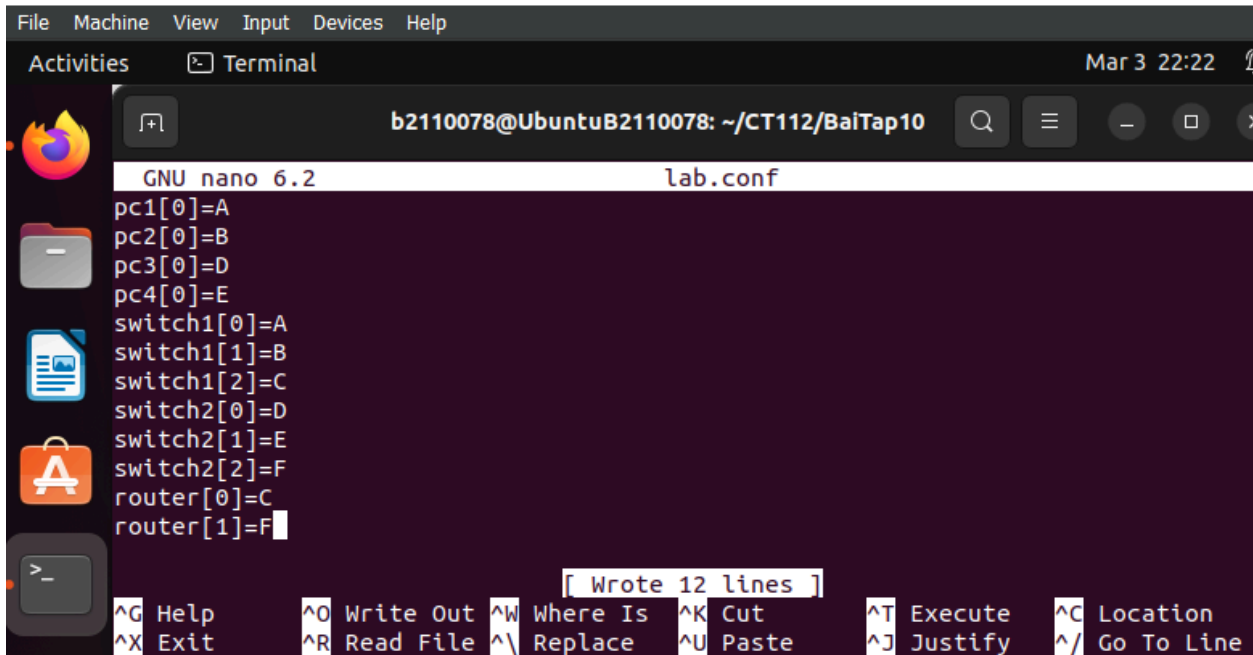
- Điền IP cho các máy:
 - Pc1: 192.168.10.14
 - Pc2: 192.168.10.15
 - Pc3: 192.168.11.16
 - Pc4: 192.168.11.17

 UbuntuB2110078 [Running] - Oracle VM VirtualBox



```
File Machine View Input Devices Help
Activities Terminal
b2110078@UbuntuB2110078: ~/CT112/BaiTap10
b2110078@UbuntuB2110078:~/CT112/BaiTap10$ mkdir pc1 pc2 pc3 pc4
b2110078@UbuntuB2110078:~/CT112/BaiTap10$ mkdir router switch1 switch2
b2110078@UbuntuB2110078:~/CT112/BaiTap10$
```

 UbuntuB2110078 [Running] - Oracle VM VirtualBox



```
File Machine View Input Devices Help
Activities Terminal
b2110078@UbuntuB2110078: ~/CT112/BaiTap10
GNU nano 6.2 lab.conf
pc1[0]=A
pc2[0]=B
pc3[0]=D
pc4[0]=E
switch1[0]=A
switch1[1]=B
switch1[2]=C
switch2[0]=D
switch2[1]=E
switch2[2]=F
router[0]=C
router[1]=F
[ Wrote 12 lines ]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Mar 3 22:23
b2110078@UbuntuB2110078: ~/CT112/BaiTap10
GNU nano 6.2 pc1.startup
ifconfig eth0 192.168.10.14/24 up
route add default gw 192.168.10.1
[Wrote 2 lines]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^_ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```

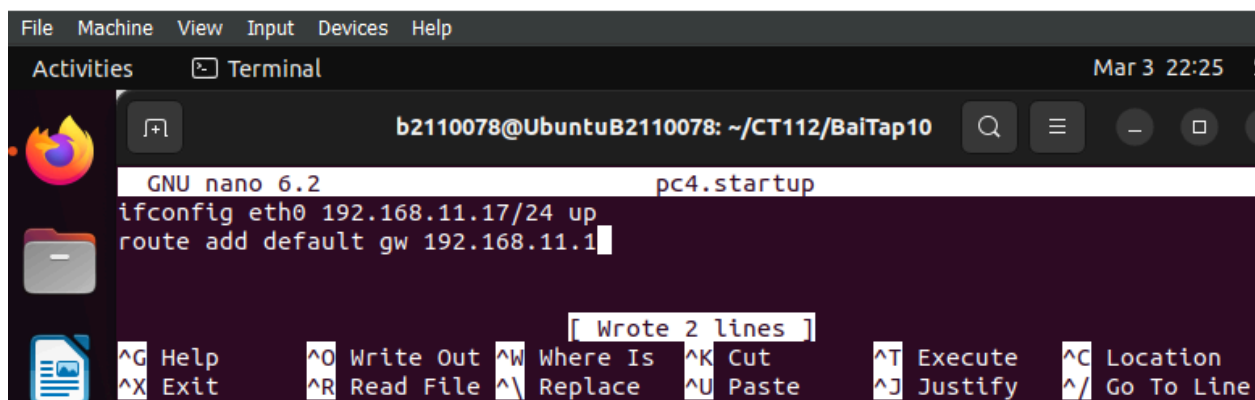
UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Mar 3 22:24
b2110078@UbuntuB2110078: ~/CT112/BaiTap10
GNU nano 6.2 pc2.startup
ifconfig eth0 192.168.10.15/24 up
route add default gw 192.168.10.1
[Wrote 2 lines]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^_ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Mar 3 22:24
b2110078@UbuntuB2110078: ~/CT112/BaiTap10
GNU nano 6.2 pc3.startup
ifconfig eth0 192.168.11.16/24 up
route add default gw 192.168.11.1
[Wrote 2 lines]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^_ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```

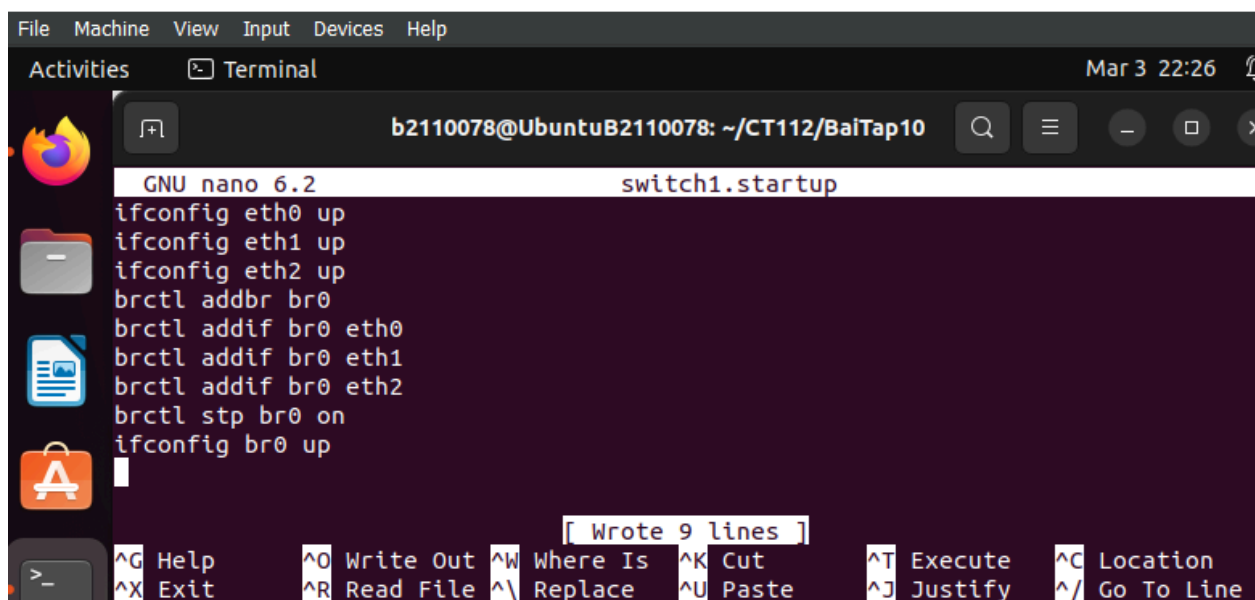
UbuntuB2110078 [Running] - Oracle VM VirtualBox



The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap10". The terminal is running GNU nano 6.2, editing a file named "pc4.startup". The file contains two lines of text: "ifconfig eth0 192.168.11.17/24 up" and "route add default gw 192.168.11.1". A status bar at the bottom indicates "Wrote 2 lines". The terminal window is part of a larger interface with a menu bar (File, Machine, View, Input, Devices, Help) and a sidebar with icons for Activities, Terminal, and other applications.

```
GNU nano 6.2 pc4.startup
ifconfig eth0 192.168.11.17/24 up
route add default gw 192.168.11.1
[ Wrote 2 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```

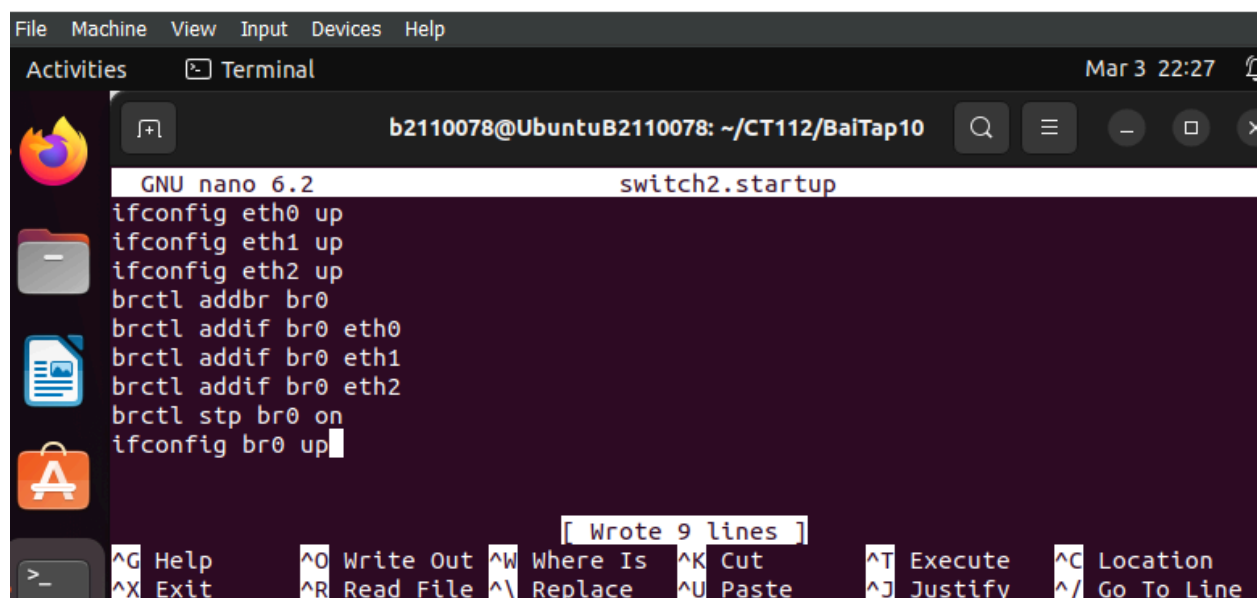
UbuntuB2110078 [Running] - Oracle VM VirtualBox



The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap10". The terminal is running GNU nano 6.2, editing a file named "switch1.startup". The file contains nine lines of text: "ifconfig eth0 up", "ifconfig eth1 up", "ifconfig eth2 up", "brctl addbr br0", "brctl addif br0 eth0", "brctl addif br0 eth1", "brctl addif br0 eth2", "brctl stp br0 on", and "ifconfig br0 up". A status bar at the bottom indicates "Wrote 9 lines". The terminal window is part of a larger interface with a menu bar (File, Machine, View, Input, Devices, Help) and a sidebar with icons for Activities, Terminal, and other applications.

```
GNU nano 6.2 switch1.startup
ifconfig eth0 up
ifconfig eth1 up
ifconfig eth2 up
brctl addbr br0
brctl addif br0 eth0
brctl addif br0 eth1
brctl addif br0 eth2
brctl stp br0 on
ifconfig br0 up
[ Wrote 9 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```


UbuntuB2110078 [Running] - Oracle VM VirtualBox

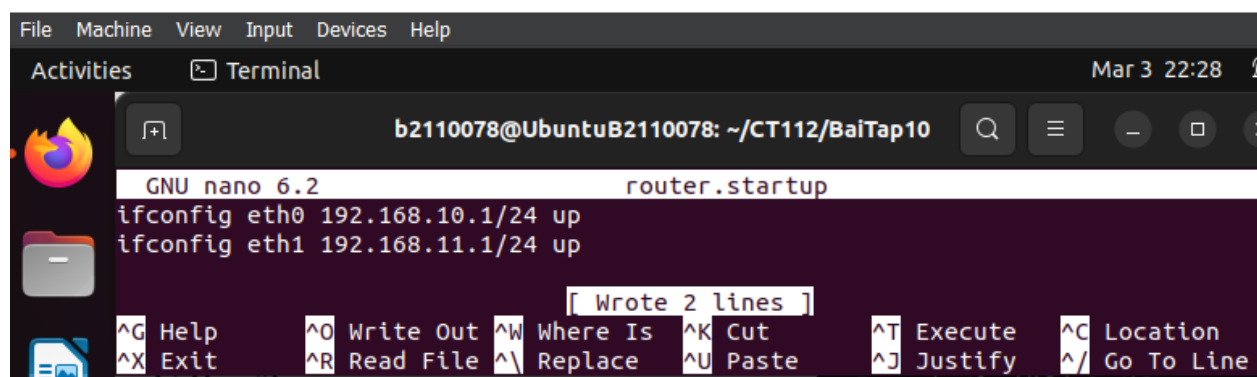


The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap10". The terminal is running the GNU nano 6.2 editor, editing a file named "switch2.startup". The content of the file is as follows:

```
ifconfig eth0 up
ifconfig eth1 up
ifconfig eth2 up
brctl addbr br0
brctl addif br0 eth0
brctl addif br0 eth1
brctl addif br0 eth2
brctl stp br0 on
ifconfig br0 up
```

A status bar at the bottom of the terminal indicates "Wrote 9 lines". The terminal also shows a menu with various shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.

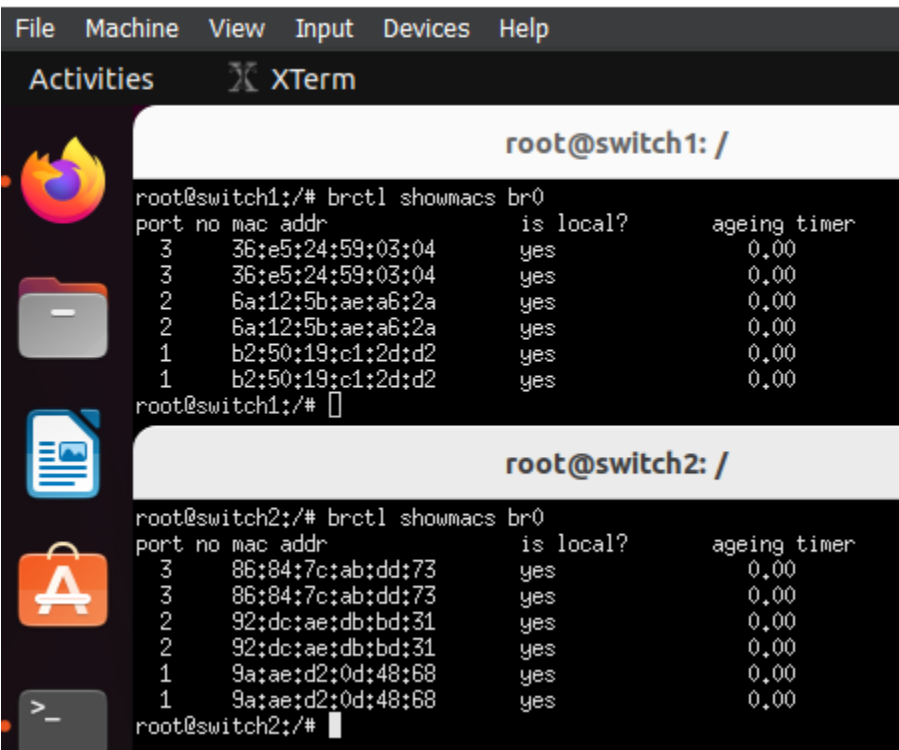
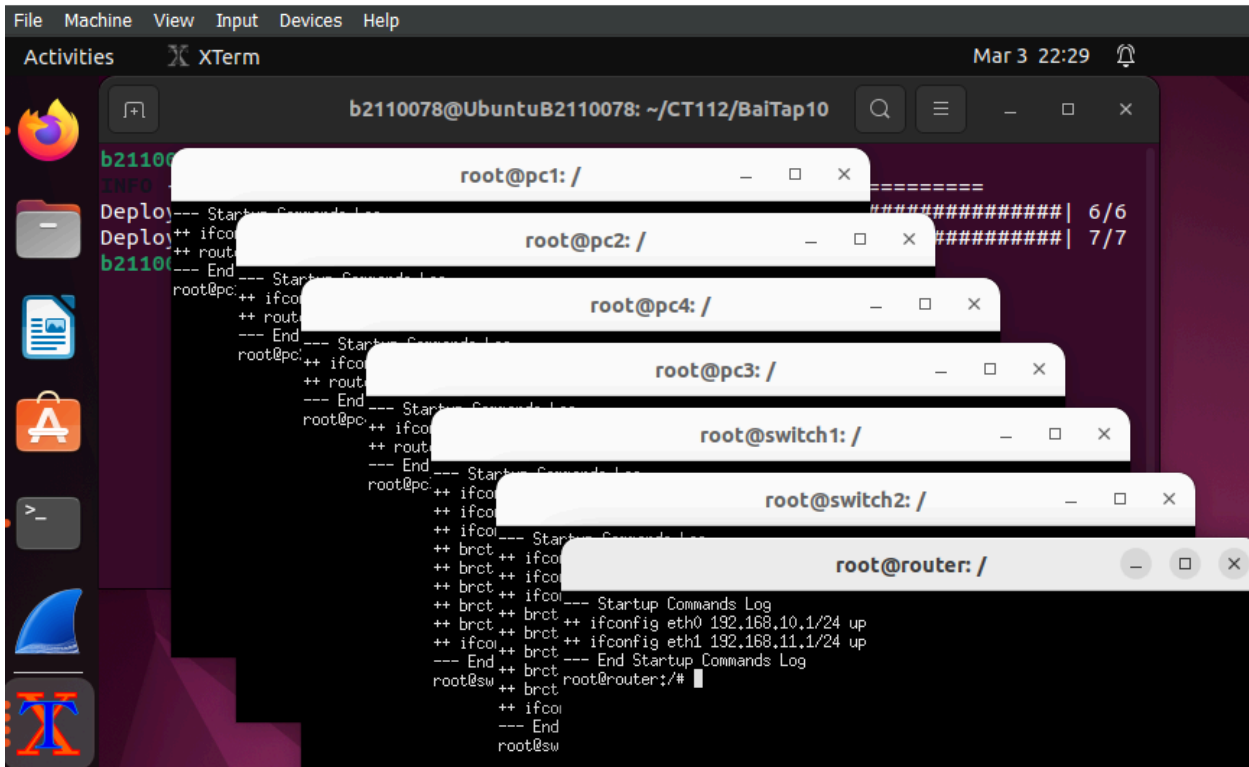
UbuntuB2110078 [Running] - Oracle VM VirtualBox



The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap10". The terminal is running the GNU nano 6.2 editor, editing a file named "router.startup". The content of the file is as follows:

```
ifconfig eth0 192.168.10.1/24 up
ifconfig eth1 192.168.11.1/24 up
```

A status bar at the bottom of the terminal indicates "Wrote 2 lines". The terminal also shows a menu with various shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.



- Từ pc1 ping đến pc2, pc3, pc4:

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities XTerm

root@pc1: /

root@pc1:/# ping 192.168.10.15 -c 3
PING 192.168.10.15 (192.168.10.15) 56(84) bytes of data.
64 bytes from 192.168.10.15: icmp_seq=1 ttl=64 time=0.819 ms
64 bytes from 192.168.10.15: icmp_seq=2 ttl=64 time=0.377 ms
64 bytes from 192.168.10.15: icmp_seq=3 ttl=64 time=0.525 ms

--- 192.168.10.15 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2047ms
rtt min/avg/max/mdev = 0.377/0.573/0.819/0.183 ms
root@pc1:/# ping 192.168.11.16 -c 3
PING 192.168.11.16 (192.168.11.16) 56(84) bytes of data.
64 bytes from 192.168.11.16: icmp_seq=1 ttl=63 time=3.48 ms
64 bytes from 192.168.11.16: icmp_seq=2 ttl=63 time=0.936 ms
64 bytes from 192.168.11.16: icmp_seq=3 ttl=63 time=0.860 ms

--- 192.168.11.16 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 0.860/1.759/3.483/1.218 ms
root@pc1:/# ping 192.168.11.17 -c 3
PING 192.168.11.17 (192.168.11.17) 56(84) bytes of data.
64 bytes from 192.168.11.17: icmp_seq=1 ttl=63 time=7.74 ms
64 bytes from 192.168.11.17: icmp_seq=2 ttl=63 time=1.68 ms
64 bytes from 192.168.11.17: icmp_seq=3 ttl=63 time=0.871 ms

--- 192.168.11.17 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 0.871/3.429/7.735/3.062 ms
root@pc1:/#
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities XTerm

root@switch1: /

root@switch1:/# brctl showmacs br0
port no mac addr is local? ageing timer
3 36:e5:24:59:03:04 yes 0.00
3 36:e5:24:59:03:04 yes 0.00
2 46:ad:27:dd:53:1e no 122.96
2 6a:12:5b:ae:a6:2a yes 0.00
2 6a:12:5b:ae:a6:2a yes 0.00
1 72:d6:3f:31:c7:22 no 100.30
1 b2:50:19:c1:2d:d2 yes 0.00
1 b2:50:19:c1:2d:d2 yes 0.00
3 da:87:e3:d3:33:d8 no 100.30
root@switch1:/#

root@switch2: /

root@switch2:/# brctl showmacs br0
port no mac addr is local? ageing timer
3 56:01:33:41:0d:da no 105.88
3 86:84:7c:ab:dd:73 yes 0.00
3 86:84:7c:ab:dd:73 yes 0.00
2 92:dc:ae:db:bd:31 yes 0.00
2 92:dc:ae:db:bd:31 yes 0.00
1 9a:ae:d2:0d:48:68 yes 0.00
1 9a:ae:d2:0d:48:68 yes 0.00
1 aa:9b:95:b4:bb:36 no 114.84
2 ee:db:62:fa:ab:b8 no 105.88
root@switch2:/#
```

Bài 11:

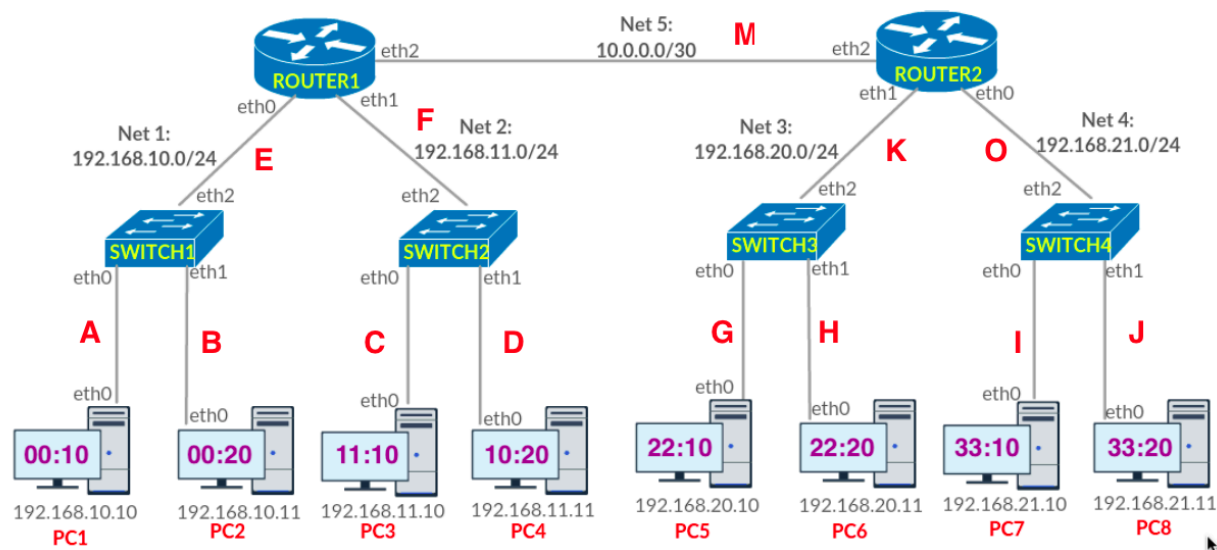
UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Mar 4 22:42

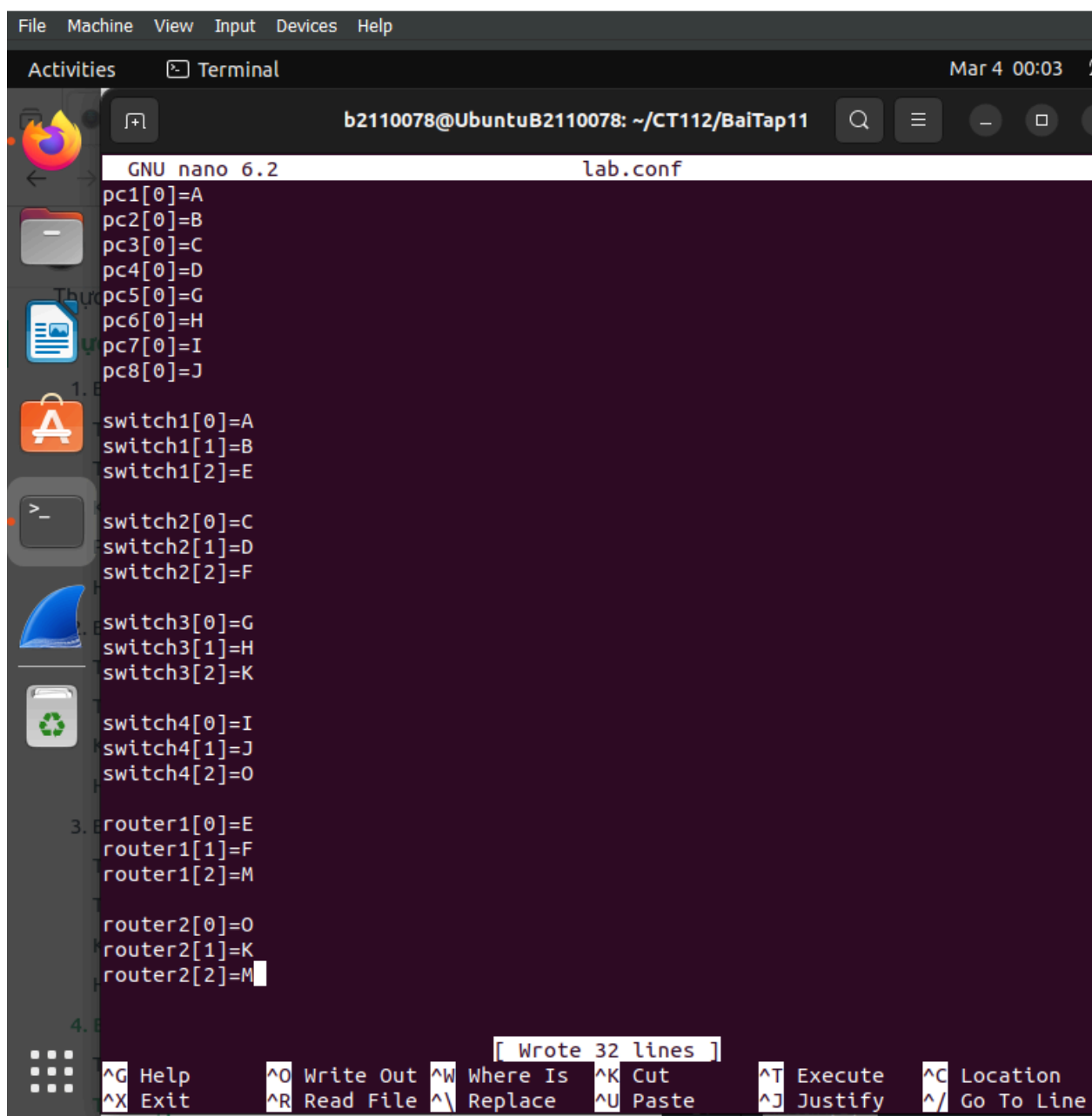
b2110078@UbuntuB2110078: ~/CT112/BaiTap11

b2110078@UbuntuB2110078:~/CT112/BaiTap11$ mkdir pc1 pc2 pc3 pc4 switch1 switch2 router1
b2110078@UbuntuB2110078:~/CT112/BaiTap11$ mkdir pc5 pc6 pc7 pc8 switch3 switch4 router2
b2110078@UbuntuB2110078:~/CT112/BaiTap11$
```

- Đặt tên cho các nhánh mạng như sau:

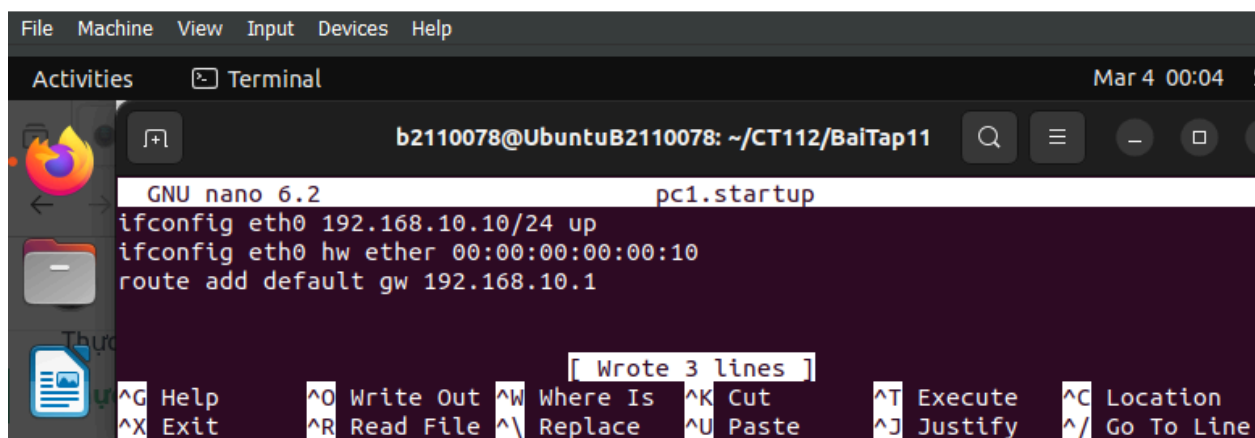


UbuntuB2110078 [Running] - Oracle VM VirtualBox



```
File Machine View Input Devices Help
Activities Terminal Mar 4 00:03
b2110078@UbuntuB2110078: ~/CT112/BaiTap11
GNU nano 6.2 lab.conf
pc1[0]=A
pc2[0]=B
pc3[0]=C
pc4[0]=D
pc5[0]=G
pc6[0]=H
pc7[0]=I
pc8[0]=J
1. E
switch1[0]=A
switch1[1]=B
switch1[2]=E
switch2[0]=C
switch2[1]=D
switch2[2]=F
switch3[0]=G
switch3[1]=H
switch3[2]=K
switch4[0]=I
switch4[1]=J
switch4[2]=O
3. E
router1[0]=E
router1[1]=F
router1[2]=M
router2[0]=O
router2[1]=K
router2[2]=M
4. E
[Wrote 32 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

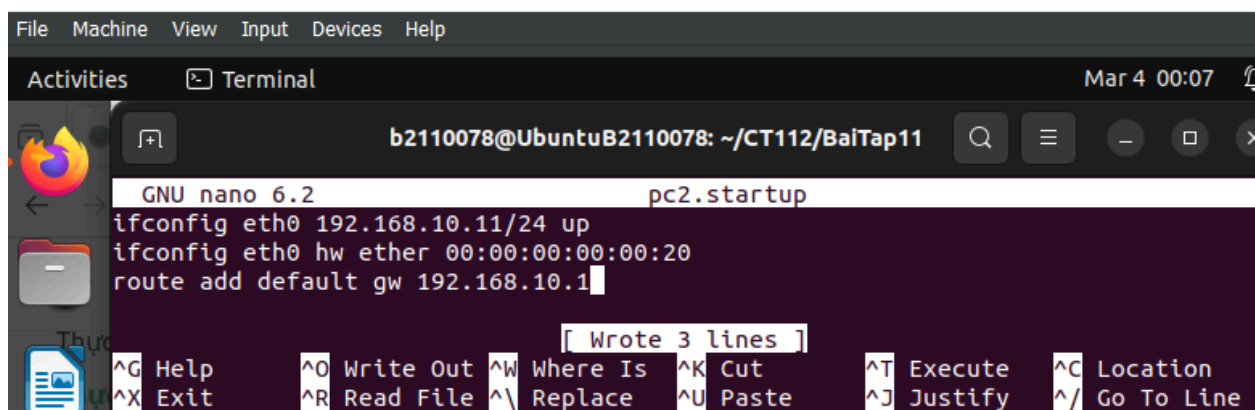


The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running GNU nano 6.2, editing a file named "pc1.startup". The content of the file is as follows:

```
ifconfig eth0 192.168.10.10/24 up
ifconfig eth0 hw ether 00:00:00:00:00:10
route add default gw 192.168.10.1
```

At the bottom of the terminal, there is a status bar with the following text: "[Wrote 3 lines]". Below this, there is a list of keyboard shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.

UbuntuB2110078 [Running] - Oracle VM VirtualBox

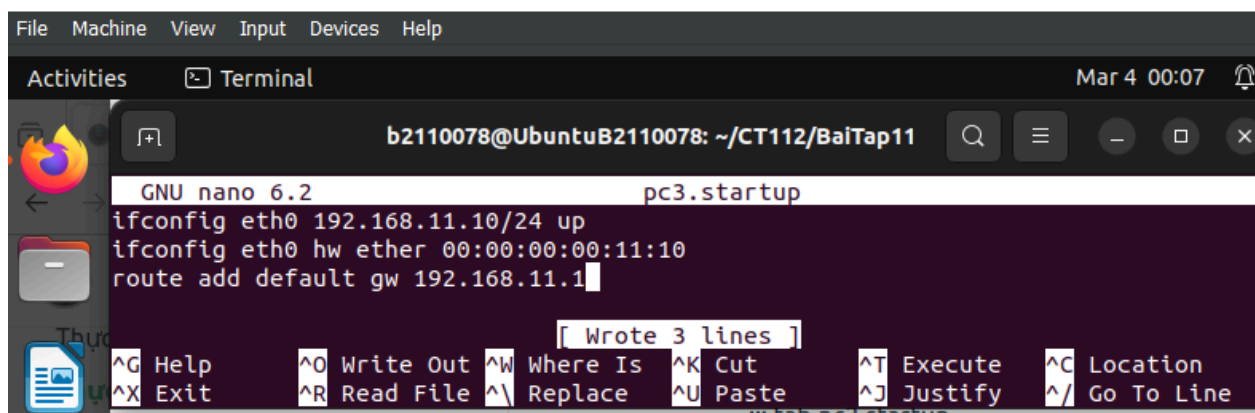


The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running GNU nano 6.2, editing a file named "pc2.startup". The content of the file is as follows:

```
ifconfig eth0 192.168.10.11/24 up
ifconfig eth0 hw ether 00:00:00:00:00:20
route add default gw 192.168.10.1
```

At the bottom of the terminal, there is a status bar with the following text: "[Wrote 3 lines]". Below this, there is a list of keyboard shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.

UbuntuB2110078 [Running] - Oracle VM VirtualBox



The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running GNU nano 6.2, editing a file named "pc3.startup". The content of the file is as follows:

```
ifconfig eth0 192.168.11.10/24 up
ifconfig eth0 hw ether 00:00:00:00:11:10
route add default gw 192.168.11.1
```

At the bottom of the terminal, there is a status bar with the following text: "[Wrote 3 lines]". Below this, there is a list of keyboard shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Mar 4 00:08
b2110078@UbuntuB2110078: ~/CT112/BaiTap11
GNU nano 6.2 pc4.startup
ifconfig eth0 192.168.11.11/24 up
ifconfig eth0 hw ether 00:00:00:00:10:20
route add default gw 192.168.11.1
[ Wrote 3 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste       ^J Justify    ^_ Go To Line
```

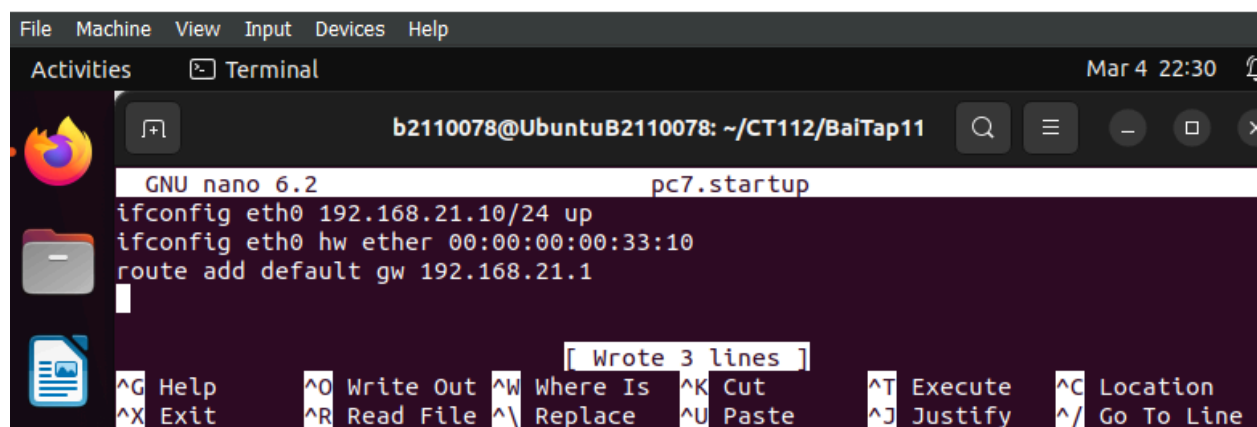
UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Mar 4 22:28
b2110078@UbuntuB2110078: ~/CT112/BaiTap11
GNU nano 6.2 pc5.startup
ifconfig eth0 192.168.20.10/24 up
ifconfig eth0 hw ether 00:00:00:00:22:10
route add default gw 192.168.20.1
[ Wrote 3 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste       ^J Justify    ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox

```
File Machine View Input Devices Help
Activities Terminal Mar 4 22:28
b2110078@UbuntuB2110078: ~/CT112/BaiTap11
GNU nano 6.2 pc6.startup
ifconfig eth0 192.168.20.11/24 up
ifconfig eth0 hw ether 00:00:00:00:22:20
route add default gw 192.168.20.1
[ Wrote 3 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste       ^J Justify    ^_ Go To Line
```

UbuntuB2110078 [Running] - Oracle VM VirtualBox



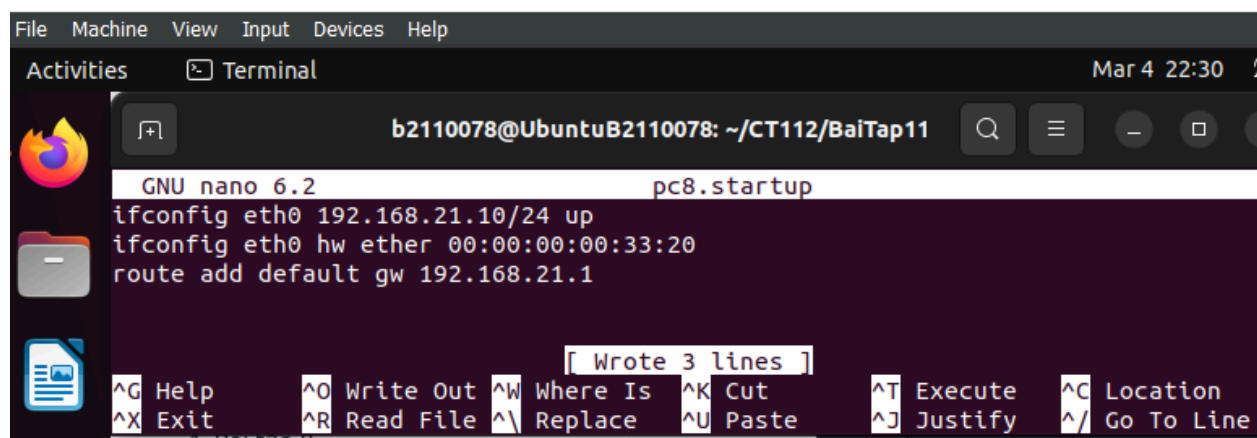
The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running the GNU nano 6.2 editor, editing a file named "pc7.startup". The content of the file is as follows:

```
ifconfig eth0 192.168.21.10/24 up
ifconfig eth0 hw ether 00:00:00:00:33:10
route add default gw 192.168.21.1
```

The bottom of the screen displays the nano editor's help menu with the following options:

^G Help	^O Write Out	^W Where Is	^K Cut	^T Execute	^C Location
^X Exit	^R Read File	^_ Replace	^U Paste	^J Justify	^_ Go To Line

UbuntuB2110078 [Running] - Oracle VM VirtualBox



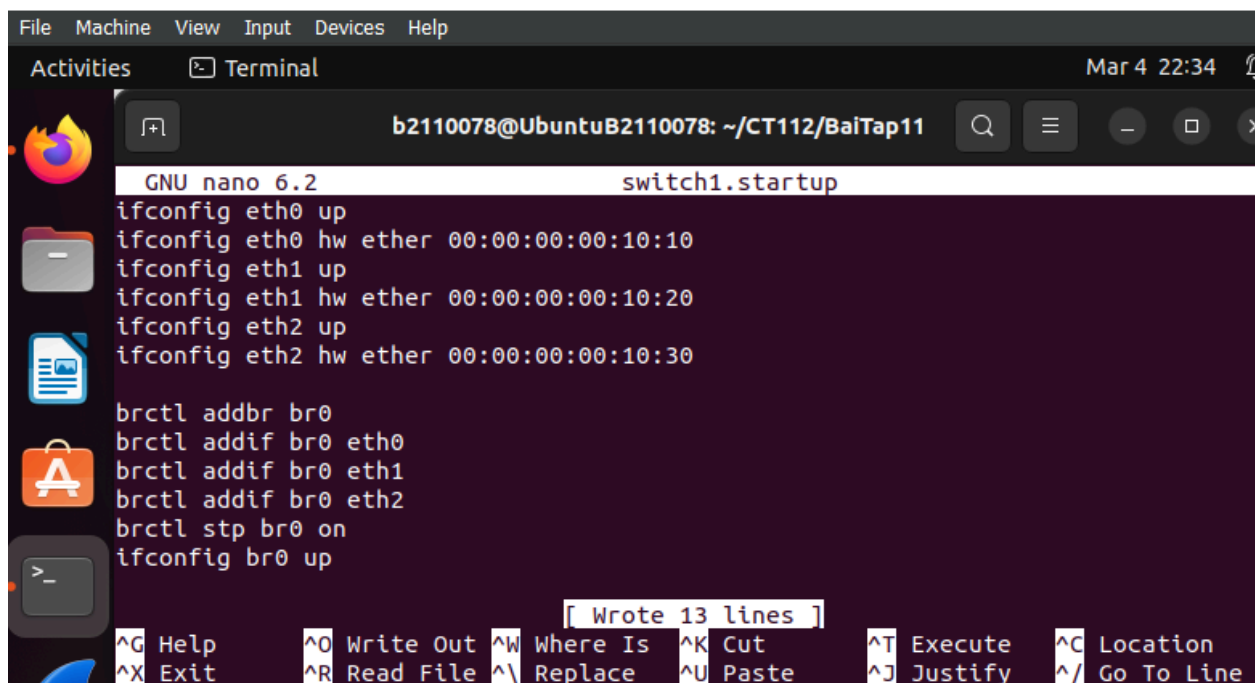
The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running the GNU nano 6.2 editor, editing a file named "pc8.startup". The content of the file is as follows:

```
ifconfig eth0 192.168.21.10/24 up
ifconfig eth0 hw ether 00:00:00:00:33:20
route add default gw 192.168.21.1
```

The bottom of the screen displays the nano editor's help menu with the following options:

^G Help	^O Write Out	^W Where Is	^K Cut	^T Execute	^C Location
^X Exit	^R Read File	^_ Replace	^U Paste	^J Justify	^_ Go To Line

UbuntuB2110078 [Running] - Oracle VM VirtualBox



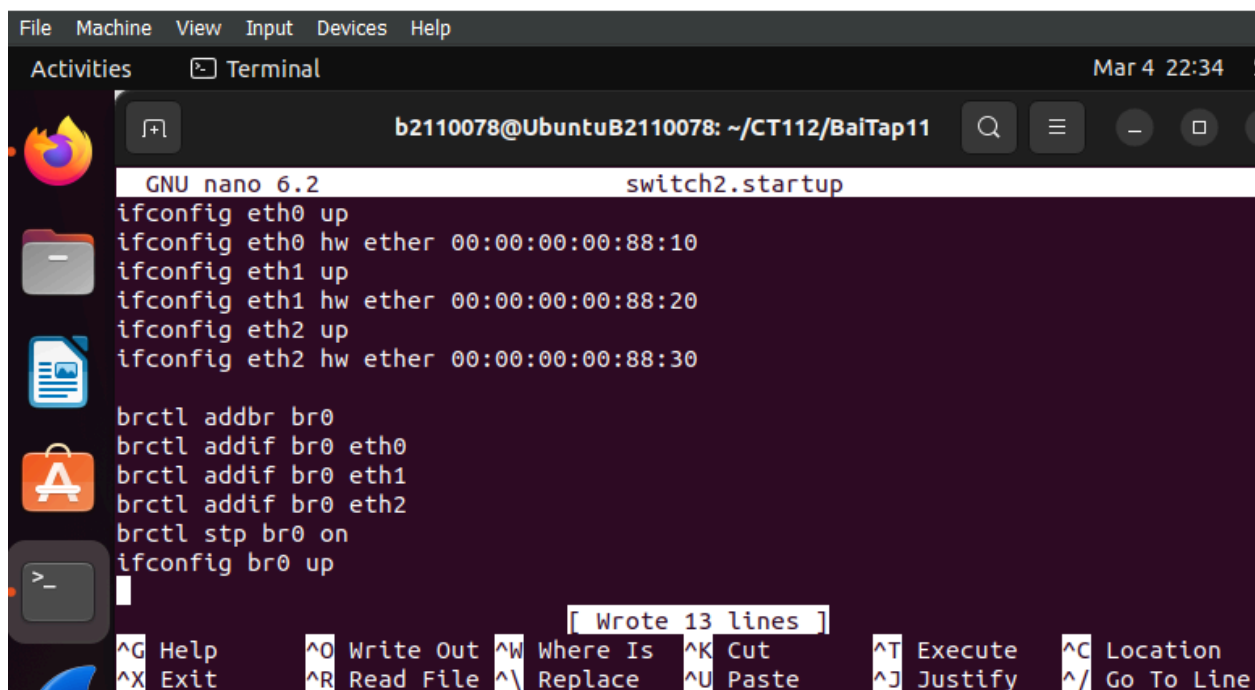
The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running the GNU nano 6.2 editor, editing the file "switch1.startup". The content of the file is as follows:

```
ifconfig eth0 up
ifconfig eth0 hw ether 00:00:00:00:10:10
ifconfig eth1 up
ifconfig eth1 hw ether 00:00:00:00:10:20
ifconfig eth2 up
ifconfig eth2 hw ether 00:00:00:00:10:30

brctl addbr br0
brctl addif br0 eth0
brctl addif br0 eth1
brctl addif br0 eth2
brctl stp br0 on
ifconfig br0 up
```

At the bottom of the terminal, a status bar indicates "Wrote 13 lines". Below the status bar, there is a row of keyboard shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.

UbuntuB2110078 [Running] - Oracle VM VirtualBox



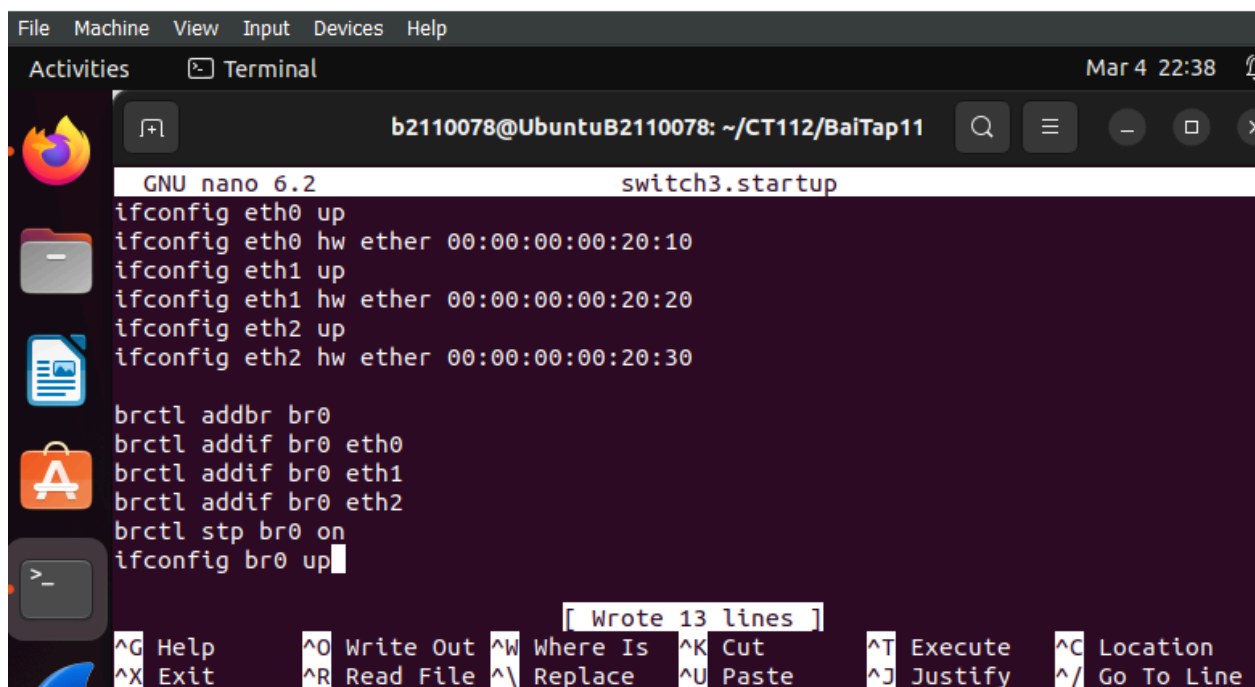
The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running the GNU nano 6.2 editor, editing the file "switch2.startup". The content of the file is as follows:

```
ifconfig eth0 up
ifconfig eth0 hw ether 00:00:00:00:88:10
ifconfig eth1 up
ifconfig eth1 hw ether 00:00:00:00:88:20
ifconfig eth2 up
ifconfig eth2 hw ether 00:00:00:00:88:30

brctl addbr br0
brctl addif br0 eth0
brctl addif br0 eth1
brctl addif br0 eth2
brctl stp br0 on
ifconfig br0 up
```

At the bottom of the terminal, a status bar indicates "Wrote 13 lines". Below the status bar, there is a row of keyboard shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.

UbuntuB2110078 [Running] - Oracle VM VirtualBox



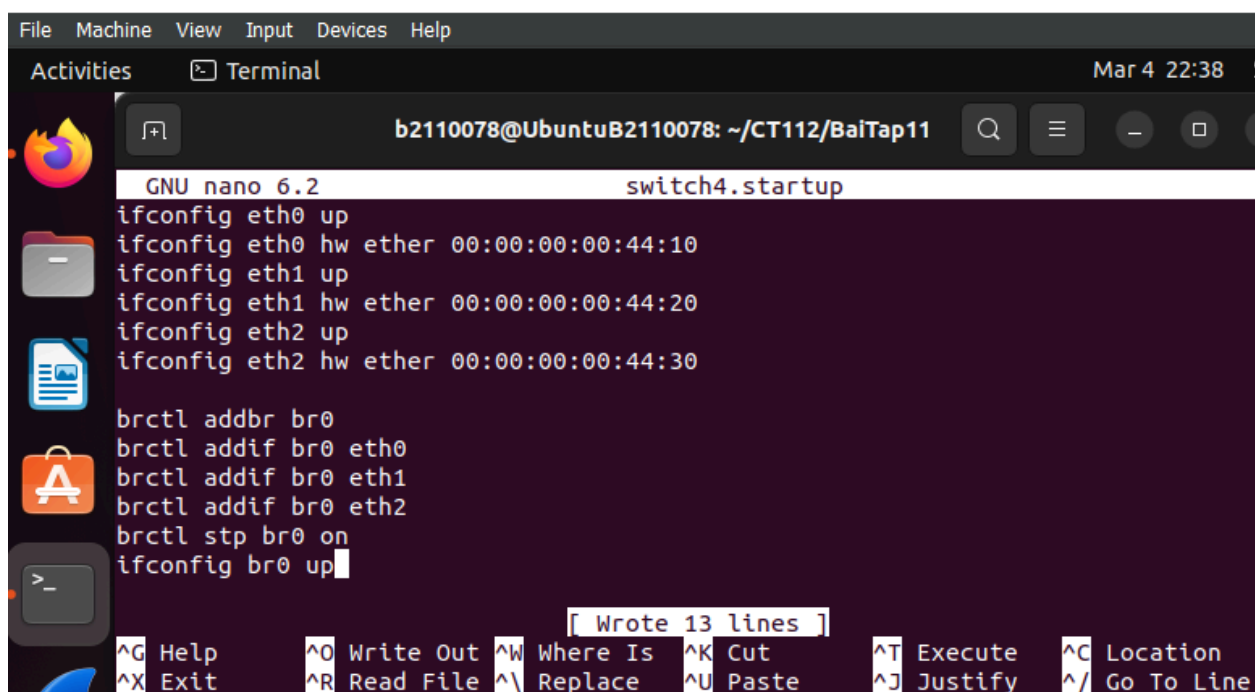
The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running the GNU nano 6.2 editor, editing a file named "switch3.startup". The content of the file is as follows:

```
ifconfig eth0 up
ifconfig eth0 hw ether 00:00:00:00:20:10
ifconfig eth1 up
ifconfig eth1 hw ether 00:00:00:00:20:20
ifconfig eth2 up
ifconfig eth2 hw ether 00:00:00:00:20:30

brctl addbr br0
brctl addif br0 eth0
brctl addif br0 eth1
brctl addif br0 eth2
brctl stp br0 on
ifconfig br0 up
```

At the bottom of the terminal, a status bar indicates "Wrote 13 lines". Below the status bar, there are keyboard shortcuts for various nano editor functions: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.

UbuntuB2110078 [Running] - Oracle VM VirtualBox



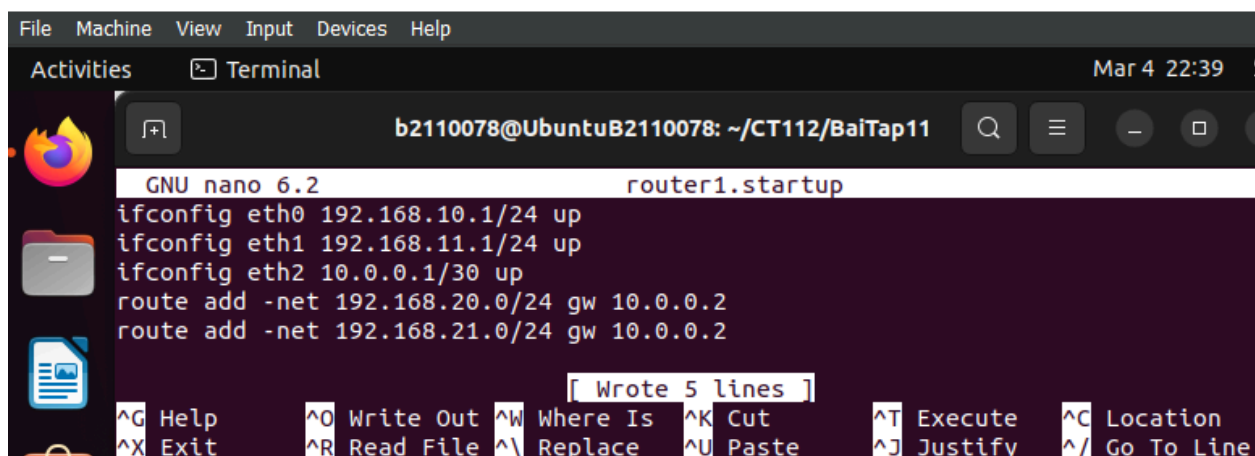
The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running the GNU nano 6.2 editor, editing a file named "switch4.startup". The content of the file is as follows:

```
ifconfig eth0 up
ifconfig eth0 hw ether 00:00:00:00:44:10
ifconfig eth1 up
ifconfig eth1 hw ether 00:00:00:00:44:20
ifconfig eth2 up
ifconfig eth2 hw ether 00:00:00:00:44:30

brctl addbr br0
brctl addif br0 eth0
brctl addif br0 eth1
brctl addif br0 eth2
brctl stp br0 on
ifconfig br0 up
```

At the bottom of the terminal, a status bar indicates "Wrote 13 lines". Below the status bar, there are keyboard shortcuts for various nano editor functions: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.

UbuntuB2110078 [Running] - Oracle VM VirtualBox

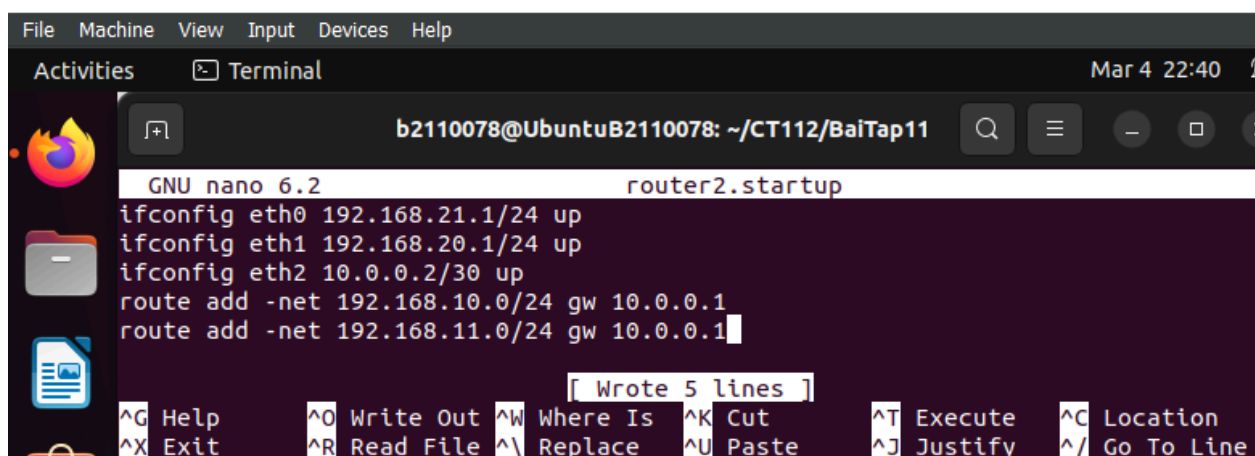


The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running GNU nano 6.2 and editing a file named "router1.startup". The content of the file is as follows:

```
ifconfig eth0 192.168.10.1/24 up
ifconfig eth1 192.168.11.1/24 up
ifconfig eth2 10.0.0.1/30 up
route add -net 192.168.20.0/24 gw 10.0.0.2
route add -net 192.168.21.0/24 gw 10.0.0.2
```

The bottom of the terminal shows the nano editor's help menu with various shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^_ Replace, ^U Paste, ^J Justify, and ^_/ Go To Line. A status bar at the bottom indicates "Wrote 5 lines".

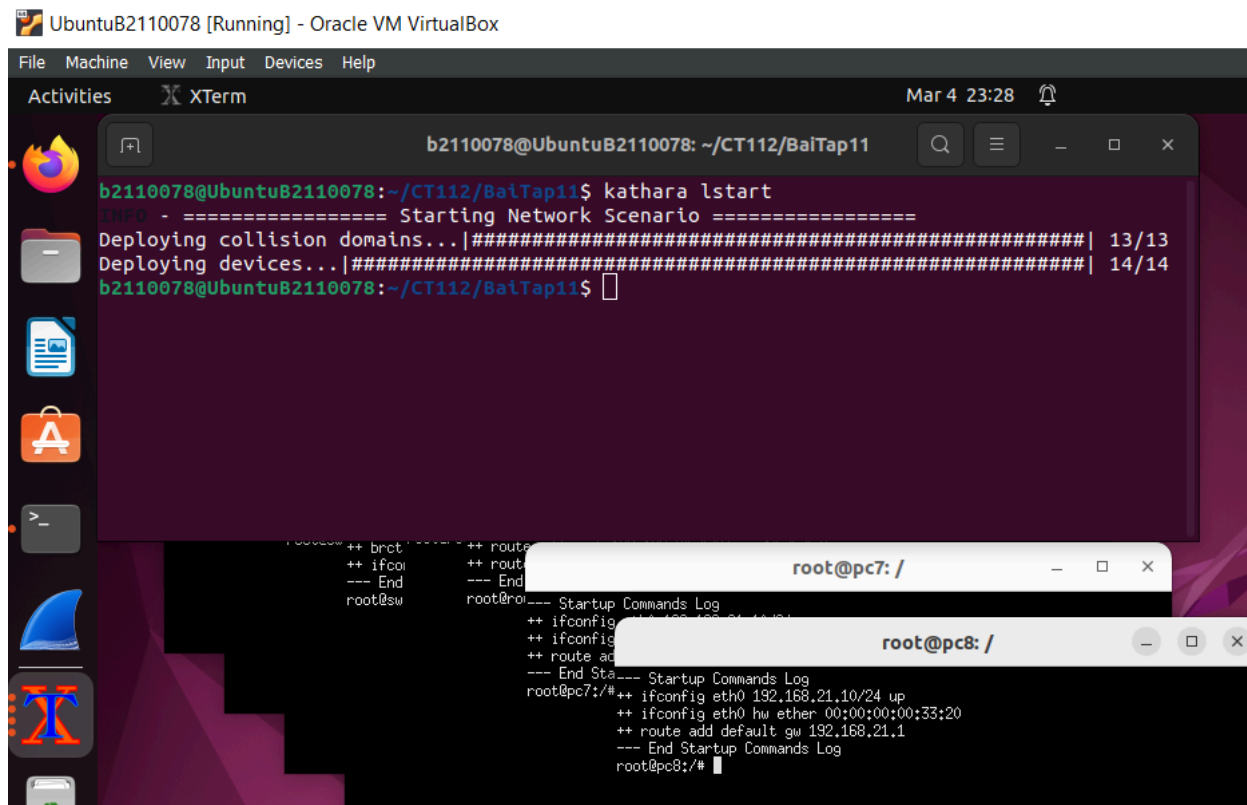
UbuntuB2110078 [Running] - Oracle VM VirtualBox



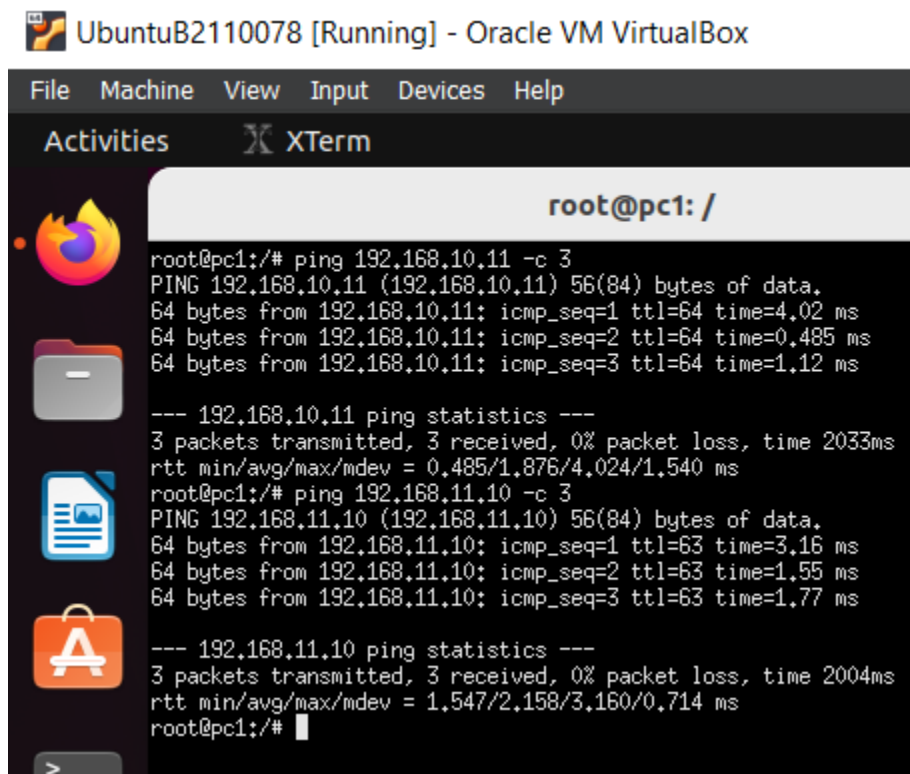
The screenshot shows a terminal window titled "b2110078@UbuntuB2110078: ~/CT112/BaiTap11". The terminal is running GNU nano 6.2 and editing a file named "router2.startup". The content of the file is as follows:

```
ifconfig eth0 192.168.21.1/24 up
ifconfig eth1 192.168.20.1/24 up
ifconfig eth2 10.0.0.2/30 up
route add -net 192.168.10.0/24 gw 10.0.0.1
route add -net 192.168.11.0/24 gw 10.0.0.1
```

The bottom of the terminal shows the nano editor's help menu with various shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^_ Replace, ^U Paste, ^J Justify, and ^_/ Go To Line. A status bar at the bottom indicates "Wrote 5 lines".



- Từ pc1 ping đến pc2, pc3, pc5, pc7:



UbuntuB2110078 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities XTerm

```
root@pc1: /  
root@pc1:/# ping 192.168.20.10 -c 3  
PING 192.168.20.10 (192.168.20.10) 56(84) bytes of data.  
64 bytes from 192.168.20.10: icmp_seq=1 ttl=62 time=3.31 ms  
64 bytes from 192.168.20.10: icmp_seq=2 ttl=62 time=2.35 ms  
64 bytes from 192.168.20.10: icmp_seq=3 ttl=62 time=3.39 ms  
  
--- 192.168.20.10 ping statistics ---  
3 packets transmitted, 3 received, 0% packet loss, time 2003ms  
rtt min/avg/max/mdev = 2.350/3.019/3.393/0.474 ms  
root@pc1:/# ping 192.168.21.10 -c 3  
PING 192.168.21.10 (192.168.21.10) 56(84) bytes of data.  
64 bytes from 192.168.21.10: icmp_seq=1 ttl=62 time=2.37 ms  
64 bytes from 192.168.21.10: icmp_seq=2 ttl=62 time=2.01 ms  
64 bytes from 192.168.21.10: icmp_seq=3 ttl=62 time=2.38 ms  
  
--- 192.168.21.10 ping statistics ---  
3 packets transmitted, 3 received, 0% packet loss, time 2002ms  
rtt min/avg/max/mdev = 2.008/2.250/2.375/0.171 ms  
root@pc1:/#
```