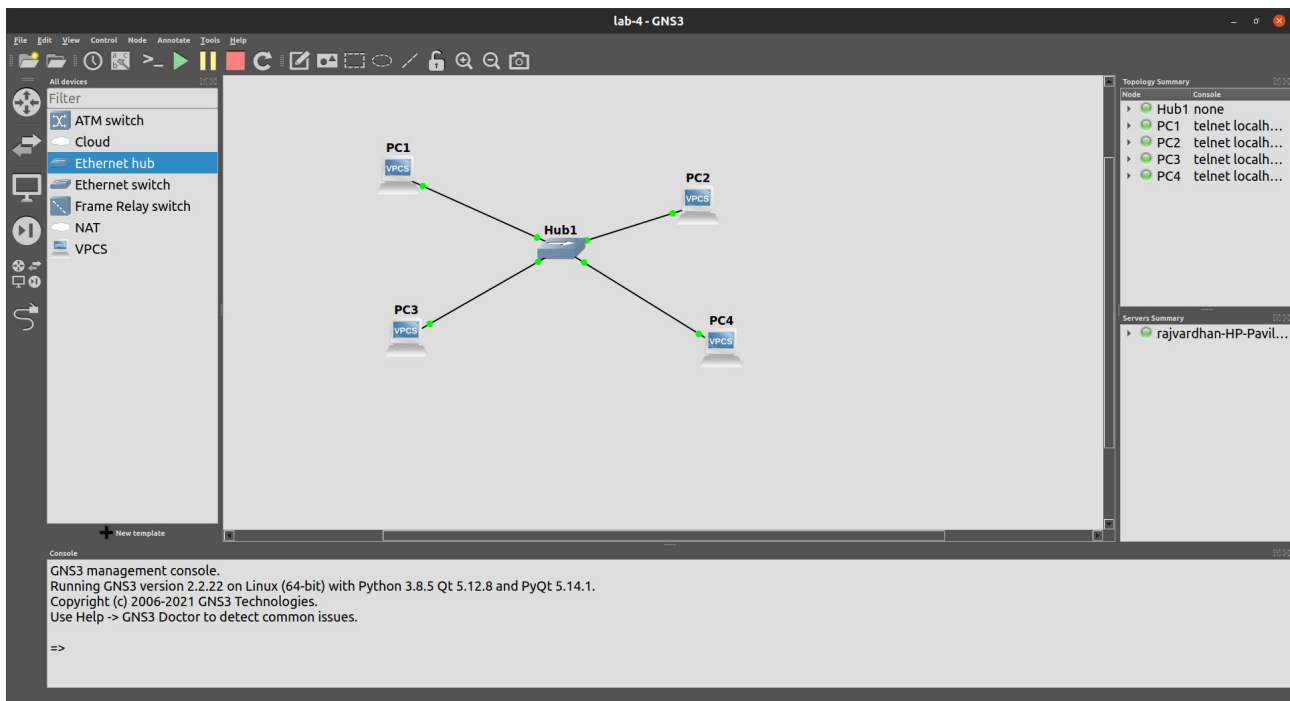


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CN LAB - 4 : STUDY OF NETWORK DEVICES IN GNS3

P4.1)

Design network configuration shown in Figure 4.1 for all parts. Connect all four VMs to a single Ethernet segment via a single hub as shown in Figure 4.1. Configure the IP addresses for the PCs as shown in Table 4.1.



IP address configuration FOR THE 4 pcs and show arp:

The screenshot displays four terminal windows for PCs 1, 2, 3, and 4. Each window shows the process of configuring an IP address, checking for duplicates, and displaying the ARP table. PC1 and PC2 show an 'Invalid address' error when attempting to use 10.0.1.11 and 10.0.1.12 respectively, indicating these addresses are already in use. PC3 and PC4 successfully configure their IP addresses and show empty ARP tables.

```
PC4> Checking for duplicate address...
PC4 : 10.0.1.14 255.255.255.0 gateway 10.0.1.254

PC4> ip 10.0.1.14/24
Checking for duplicate address...
PC4 : 10.0.1.14 255.255.255.0

PC4> show ip
NAME      : PC4[1]
IP/MASK    : 10.0.1.14/24
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:03
LPORT     : 10014
RHOST:PORT : 127.0.0.1:10015
MTU        : 1500

PC4> show arp
arp table is empty

PC4>

PC3> ip 10.0.1.13 255.255.255.0 10.0.1.254
Checking for duplicate address...
PC3 : 10.0.1.13 255.255.255.0 gateway 10.0.1.254

PC3> show arp
arp table is empty

PC3> ip 10.0.1.13/24
Checking for duplicate address...
PC3 : 10.0.1.13 255.255.255.0

PC3> show ip
NAME      : PC3[1]
IP/MASK    : 10.0.1.13/24
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:02
LPORT     : 10012
RHOST:PORT : 127.0.0.1:10013
MTU        : 1500

PC3>

PC1> ip 10.0.1.11 255.255.255.0 10.0.1.254
Checking for duplicate address...
PC1 : 10.0.1.11 255.255.255.0 gateway 10.0.1.254

PC1> ip 10.0.1.11/24
Checking for duplicate address...
PC1 : 10.0.1.11 255.255.255.0

PC1> ip show
Invalid address

PC1> show ip
NAME      : PC1[1]
IP/MASK    : 10.0.1.11/24
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:00
LPORT     : 10008
RHOST:PORT : 127.0.0.1:10009
MTU        : 1500

PC1> show arp
arp table is empty

PC1>

PC2> Trying 127.0.0.1...
Connected to localhost.
Escape character is '^['.
ip 10.0.1.12 255.255.255.0 10.0.1.254
Checking for duplicate address...
PC2 : 10.0.1.12 255.255.255.0 gateway 10.0.1.254

PC2> show arp
arp table is empty

PC2> ip 10.0.1.12/24
Checking for duplicate address...
PC2 : 10.0.1.12 255.255.255.0

PC2> show ip
NAME      : PC2[1]
IP/MASK    : 10.0.1.12/24
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:01
LPORT     : 10010
RHOST:PORT : 127.0.0.1:10011
MTU        : 1500

PC2>
```

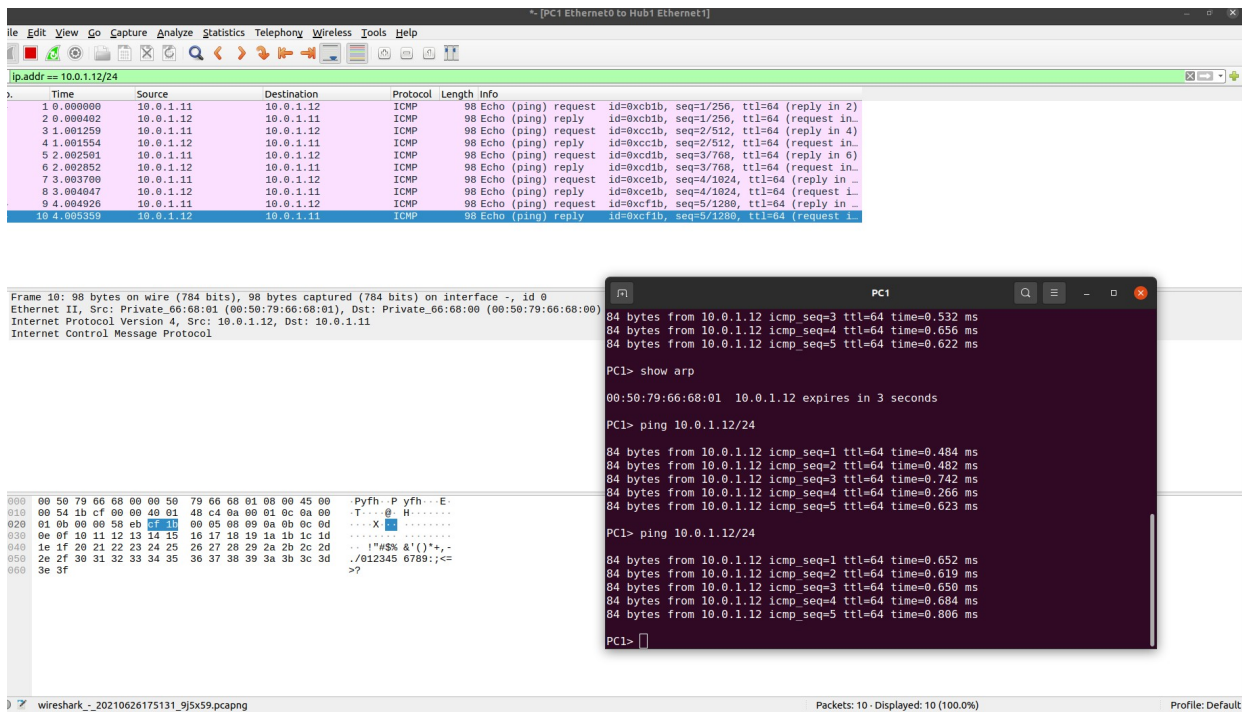
a. On PC1, view the ARP cache with showarp

This screenshot shows the output of the 'show ip' command on PC1, displaying its configuration details.

```
PC1[1]
10.0.1.11/24
0.0.0.0

00:50:79:66:68:00
10008
127.0.0.1:10009
1500
```

b) Start Wireshark on PC1-Hub1 link with a capture filter set to the IP address:



C) Issue a ping command from PC1 to PC2:

```

0.1.12 icmp_seq=5 ttl=64 time=0.623 ms

12/24

0.1.12 icmp_seq=1 ttl=64 time=0.652 ms
0.1.12 icmp_seq=2 ttl=64 time=0.619 ms
0.1.12 icmp_seq=3 ttl=64 time=0.650 ms
0.1.12 icmp_seq=4 ttl=64 time=0.684 ms
0.1.12 icmp_seq=5 ttl=64 time=0.806 ms

12/24

0.1.12 icmp_seq=1 ttl=64 time=0.619 ms
0.1.12 icmp_seq=2 ttl=64 time=0.751 ms
0.1.12 icmp_seq=3 ttl=64 time=0.521 ms
0.1.12 icmp_seq=4 ttl=64 time=0.725 ms
0.1.12 icmp_seq=5 ttl=64 time=0.715 ms

10.0.1.12 expires in 110 seconds

```

d. View the ARP cache again with the command arp -a. Note that ARP cache

```

2/24

.1.12 icmp_seq=1 ttl=64 time=0.625 ms
.1.12 icmp_seq=2 ttl=64 time=0.589 ms
.1.12 icmp_seq=3 ttl=64 time=0.765 ms
.1.12 icmp_seq=4 ttl=64 time=0.748 ms
.1.12 icmp_seq=5 ttl=64 time=0.734 ms

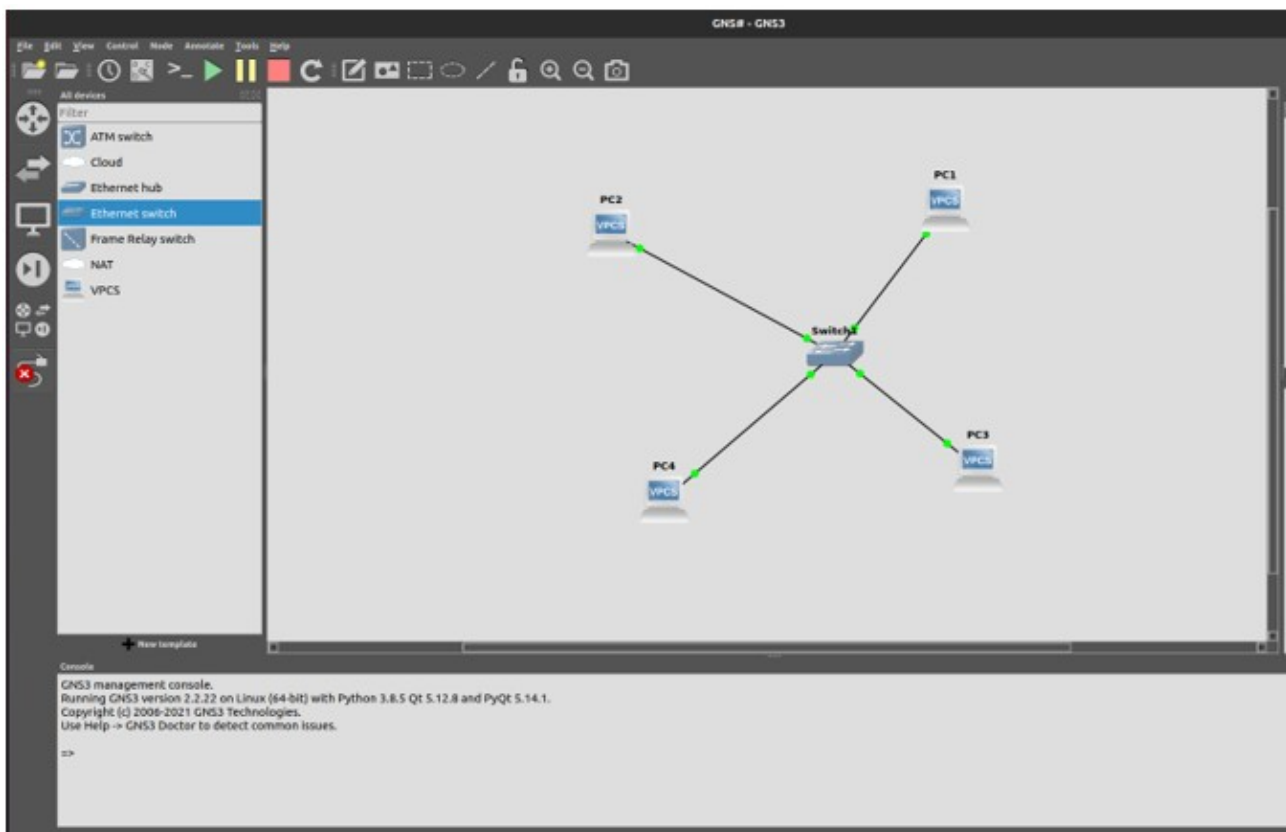
10.0.1.12 expires in 108 seconds

```

**e) Saved the results of Wireshark and
uploaded the file on teams**

Q 4.2

To test the effects of changing the netmask of a network configuration. Design the configuration as Q4.1 and replace the hub with a switch, two hosts (PC2 and PC4) have been assigned different network prefixes.



Run Wireshark on PC1-Switch1 link and capture the packets for the following scenarios

i. From PC1 ping PC3.

Ping was successful

```
PC-1> ip 10.0.1.100/24 255.255.255.0
Checking for duplicate address...
PC1 : 10.0.1.100 255.255.255.0

PC-1> ping 10.0.1.120 -c3
84 bytes from 10.0.1.120 icmp_seq=1 ttl=64 time=0.389 ms
84 bytes from 10.0.1.120 icmp_seq=2 ttl=64 time=0.425 ms
84 bytes from 10.0.1.120 icmp_seq=3 ttl=64 time=0.795 ms
84 bytes from 10.0.1.120 icmp_seq=4 ttl=64 time=0.417 ms
84 bytes from 10.0.1.120 icmp_seq=5 ttl=64 time=0.669 ms

PC-1>
```

```
PC-1> ping 10.0.1.120/24
1=84 bytes from 10.0.1.120 icmp_seq=1 ttl=64
1=84 bytes from 10.0.1.120 icmp_seq=2 ttl=64
1=84 bytes from 10.0.1.120 icmp_seq=3 ttl=64
1=84 bytes from 10.0.1.120 icmp_seq=4 ttl=64
1=84 bytes from 10.0.1.120 icmp_seq=5 ttl=64

PC-1>
```

```
Frame 1: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface 0
Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: Private_66:68:02 (00:50:79:66:68:02)
Internet Protocol Version 4, Src: 10.0.1.100, Dst: 10.0.1.120
Internet Control Message Protocol
```

```
0000 00 50 79 66 68 02 00 50 79 66 68 00 00 00 45 00  Pyth-P yth-E-
0010 00 54 fb 81 00 00 40 01 68 4c 6a 00 01 64 6a 00  T...@ hL...d..
```

q41.txt

Packets: 10 - Displayed: 10 (100.0%) Profile: Default

120%

ii. From PC1 pingPC2.

Ping was successful

```
PC-1> ping 10.0.1.101 -c2
84 bytes from 10.0.1.101 icmp_seq=1 ttl=64 time=0.277 ms
84 bytes from 10.0.1.101 icmp_seq=2 ttl=64 time=0.391 ms
84 bytes from 10.0.1.101 icmp_seq=3 ttl=64 time=0.412 ms
84 bytes from 10.0.1.101 icmp_seq=4 ttl=64 time=0.318 ms
84 bytes from 10.0.1.101 icmp_seq=5 ttl=64 time=0.322 ms

PC-1> 
```

iii.

The image shows a Wireshark packet capture of a ping command from PC1 (10.0.1.100) to PC2 (10.0.1.101). The packet list table is as follows:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.0.1.100	10.0.1.101	ICMP	98	Echo (ping) request id=0xc7fa, seq=1/256, ttl=64 (r...
2	0.000214	10.0.1.101	10.0.1.100	ICMP	98	Echo (ping) reply id=0xc7fa, seq=1/256, ttl=64 (r...
3	1.001120	10.0.1.100	10.0.1.101	ICMP	98	Echo (ping) request id=0xc8fa, seq=2/512, ttl=64 (r...
4	1.001290	10.0.1.101	10.0.1.100	ICMP	98	Echo (ping) reply id=0xc8fa, seq=2/512, ttl=64 (r...
5	2.002271	10.0.1.100	10.0.1.101	ICMP	98	Echo (ping) request id=0xc9fa, seq=3/768, ttl=64 (r...
6	2.002429	10.0.1.101	10.0.1.100	ICMP	98	Echo (ping) reply id=0xc9fa, seq=3/768, ttl=64 (r...
7	3.003440	10.0.1.100	10.0.1.101	ICMP	98	Echo (ping) request id=0xcafa, seq=4/1024, ttl=64 (r...
8	3.003574	10.0.1.101	10.0.1.100	ICMP	98	Echo (ping) reply id=0xcafa, seq=4/1024, ttl=64 (r...
9	4.004636	10.0.1.100	10.0.1.101	ICMP	98	Echo (ping) request id=0xcbfa, seq=5/1280, ttl=64 (r...
10	4.004814	10.0.1.101	10.0.1.100	ICMP	98	Echo (ping) reply id=0xcbfa, seq=5/1280, ttl=64 (r...

The packet details pane shows the selected packet (No. 1) with the following structure:

- Frame 1: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface 0
- Ethernet II, Src: Private_66:68:00 (08:50:79:66:68:00), Dst: Private_66:68:01 (08:50:79:66:68:01)
- Internet Protocol Version 4, Src: 10.0.1.100, Dst: 10.0.1.101
- Internet Control Message Protocol

The packet bytes pane shows the raw data of the ICMP Echo request.

Overlaid on the Wireshark window is a terminal screenshot showing the command `PC-1> ping 10.0.1.101/28` and its output, which matches the ping results shown in the terminal screenshot above the Wireshark window.

From
PC1

pingPC4.

The pings was not successful

```
PC-1> ping 10.0.1.121 -c4
10.0.1.121 icmp_seq=1 timeout
10.0.1.121 icmp_seq=2 timeout
10.0.1.121 icmp_seq=3 timeout
10.0.1.121 icmp_seq=4 timeout

PC-1> 
```


iv.

The image shows a Wireshark packet capture and a terminal window. The Wireshark interface displays a list of 27 packets. The first 26 packets are ARP requests from 10.0.1.100 to 10.0.1.121. The 27th packet is an ICMP Echo (ping) request from 10.0.1.100 to 10.0.1.121. The packet details pane shows the Ethernet II, Internet Protocol Version 4, and ICMP Echo (ping) request fields. The packet bytes pane shows the raw data. The terminal window shows the command 'PC-1> ping 10.0.1.121' and the output '10.0.1.121 icmp_seq=1 timeout', '10.0.1.121 icmp_seq=2 timeout', '10.0.1.121 icmp_seq=3 timeout', '10.0.1.121 icmp_seq=4 timeout', '10.0.1.121 icmp_seq=5 timeout'.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	Private_66:68:03	Broadcast	ARP	64	Who has 10.0.1.121? Tell 10.0.1.100 [ETHERNET FRAME ...]
2	0.000326	Private_66:68:03	Private_66:68:03	ARP	64	10.0.1.121 is at 00:50:79:66:68:03 [ETHERNET FRAME ...]
3	0.001046	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=0xc7f9, seq=1/256, ttl=64 (f...
4	0.001221	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
5	1.002293	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
6	2.001554	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=0xc9f9, seq=2/512, ttl=64 (f...
7	2.002792	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
8	3.003991	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=0xc7f9, seq=1/256, ttl=64 (f...
9	3.003962	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
10	4.001833	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=0xc9f9, seq=3/768, ttl=64 (f...
11	4.003919	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
12	5.004987	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
13	6.002827	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=0xc9f9, seq=4/1024, ttl=64 (f...
14	6.005393	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=0xc9f9, seq=2/512, ttl=64 (f...
15	6.005360	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
16	7.005825	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
17	8.003148	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=0xc9f9, seq=5/1280, ttl=64 (f...
18	8.005934	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
19	9.006764	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=0xc9f9, seq=3/768, ttl=64 (f...
20	9.006818	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
21	10.007837	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
22	11.007855	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
23	12.008685	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=0xc9f9, seq=4/1024, ttl=64 (f...
24	12.008749	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
25	13.009215	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
26	14.009309	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERN...
27	15.009722	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=0xc9f9, seq=5/1280, ttl=64 (f...

From PC4 pingPC1.

Shows error message.

host
not

```
PC-4> ip 10.0.1.121/28 255.255.255.240
Checking for duplicate address...
PC1 : 10.0.1.121 255.255.255.240

PC-4> ping 10.0.1.100 -c1
host (255.255.255.240) not reachable

PC-4> 
```

(255.255.255.240)
reachable

The image shows a Wireshark packet capture and a terminal window. The Wireshark interface displays a list of 3 packets. The first 2 packets are ARP requests from 10.0.1.100 to 10.0.1.121. The 3rd packet is an ARP request from 10.0.1.100 to 10.0.1.121. The packet details pane shows the Ethernet II, Internet Protocol Version 4, and ARP request fields. The packet bytes pane shows the raw data. The terminal window shows the command 'PC-4> ping 10.0.1.100/24' and the output 'host (255.255.255.240) not reachable'.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET FRAME ...]
2	1.000846	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET FRAME ...]
3	2.001285	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET FRAME ...]

v. From PC2 ping PC4.

From PC2 ping PC4.

host (255.255.255.240) not reachable

```
PC-2> ip 10.0.1.101/28 255.255.255.240
Checking for duplicate address...
PC1 : 10.0.1.101 255.255.255.240

PC-2> ping 10.0.1.121
host (255.255.255.240) not reachable
```

vi.

The image shows a Wireshark packet capture and a terminal window. The Wireshark interface displays three ARP request packets from Private_66:68:01 to the broadcast address ff:ff:ff:ff:ff:ff. The terminal window shows the command 'PC-2> ping 10.0.1.121/28' resulting in 'host (255.255.255.240) not reachable'.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	Private_66:68:01	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.101
2	1.000561	Private_66:68:01	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.101
3	2.001696	Private_66:68:01	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.101

From PC2 ping PC3.

host (255.255.255.240) not reachable

The image shows a Wireshark packet capture and a terminal window. The Wireshark interface displays three ARP request packets from Private_66:68:01 to the broadcast address ff:ff:ff:ff:ff:ff. The terminal window shows the command 'PC-2> ping 10.0.1.120 -c3' resulting in 'host (255.255.255.240) not reachable'.

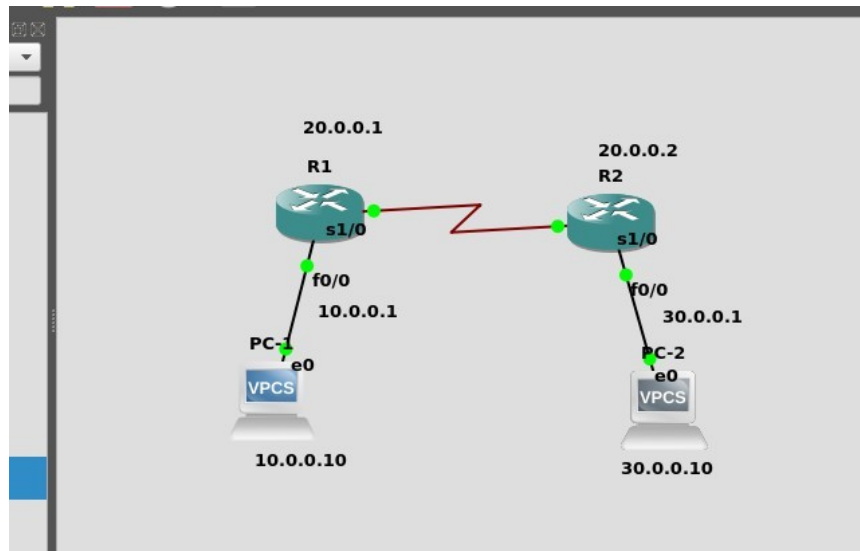
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	Private_66:68:01	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.101
2	1.000409	Private_66:68:01	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.101
3	2.001128	Private_66:68:01	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.101

Wireshark output: Overall

Capturing from Standard input [PC-3 Ethernet0 to switch Ethernet1]						
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help						
Apply a display filter ... <Ctrl-/> Expression... +						
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	Private_66:68:00	Broadcast	ARP	64	Who has 10.0.1.120? Tell 10.0.1.100 [ETHERNET FRAM...
2	0.000271	Private_66:68:02	Private_66:68:00	ARP	64	10.0.1.120 is at 00:50:79:66:68:02 [ETHERNET FRAM...
3	0.000990	10.0.1.100	10.0.1.120	ICMP	98	Echo (ping) request id=0x320e, seq=1/256, ttl=64 ...
4	0.001238	10.0.1.120	10.0.1.100	ICMP	98	Echo (ping) reply id=0x320e, seq=1/256, ttl=64 ...
5	1.002177	10.0.1.100	10.0.1.120	ICMP	98	Echo (ping) request id=0x330e, seq=2/512, ttl=64 ...
6	1.002400	10.0.1.120	10.0.1.100	ICMP	98	Echo (ping) reply id=0x330e, seq=2/512, ttl=64 ...
7	2.003357	10.0.1.100	10.0.1.120	ICMP	98	Echo (ping) request id=0x340e, seq=3/768, ttl=64 ...
8	2.003926	10.0.1.120	10.0.1.100	ICMP	98	Echo (ping) reply id=0x340e, seq=3/768, ttl=64 ...
9	3.004540	10.0.1.100	10.0.1.120	ICMP	98	Echo (ping) request id=0x350e, seq=4/1024, ttl=64...
10	3.004715	10.0.1.120	10.0.1.100	ICMP	98	Echo (ping) reply id=0x350e, seq=4/1024, ttl=64...
11	4.005668	10.0.1.100	10.0.1.120	ICMP	98	Echo (ping) request id=0x360e, seq=5/1280, ttl=64...
12	4.005865	10.0.1.120	10.0.1.100	ICMP	98	Echo (ping) reply id=0x360e, seq=5/1280, ttl=64...
13	34.495945	Private_66:68:00	Broadcast	ARP	64	Who has 10.0.1.101? Tell 10.0.1.100 [ETHERNET FRAM...
14	75.471959	Private_66:68:00	Broadcast	ARP	64	Who has 10.0.1.121? Tell 10.0.1.100 [ETHERNET FRAM...
15	75.473097	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
16	76.473849	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
17	77.474051	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
18	78.475029	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
19	79.476031	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
20	80.476631	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
21	81.477040	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
22	82.477449	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
23	83.477614	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
24	84.477802	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
25	85.478482	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
26	86.478904	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
27	87.479036	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
28	88.479496	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
29	89.479459	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
30	119.015968	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
31	120.016912	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
32	121.017700	Private_66:68:03	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.121 [ETHERNET...
33	196.439988	Private_66:68:01	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.101 [ETHERNET...
34	197.440766	Private_66:68:01	Broadcast	ARP	64	Who has 255.255.255.240? Tell 10.0.1.101 [ETHERNET...
0000	ff ff ff ff ff 00 50	79 66 68 00 08 06 00 01P yfh....			
0010	08 00 06 04 00 01 00 50	79 66 68 00 0a 00 01 64P yfh....d			
0020	ff ff ff ff ff 0a 00	01 78 00 00 00 00 00 00x.....			
0030	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00			

P4.6)

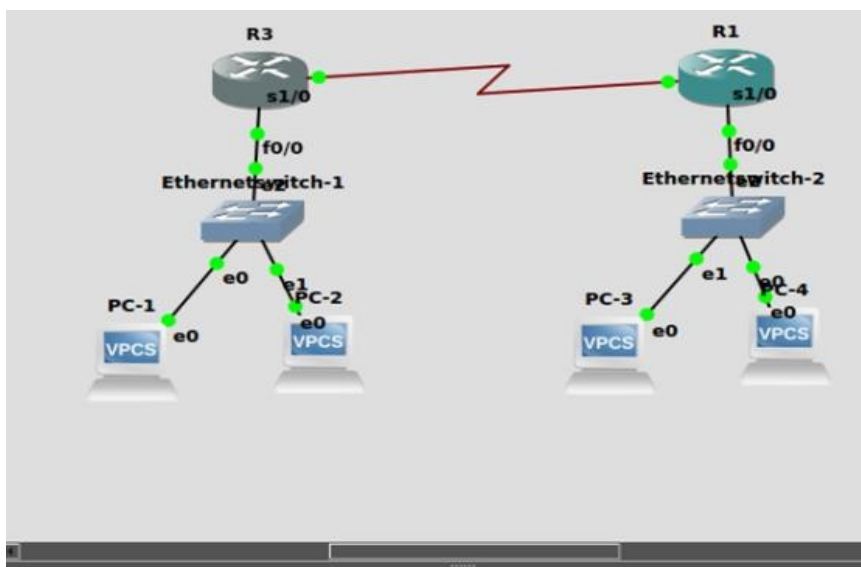
i. check the connectivity by pinging from PC1 to PC2.



No gateway found for pings. And ARP table was empty.

```
PC-1> ping 30.0.0.10
*10.0.0.1 icmp_seq=1 ttl=255 time=9.683 ms (ICMP type:3, code:1, Destination host unreachable)
*10.0.0.1 icmp_seq=2 ttl=255 time=4.752 ms (ICMP type:3, code:1, Destination host unreachable)
*10.0.0.1 icmp_seq=3 ttl=255 time=5.737 ms (ICMP type:3, code:1, Destination host unreachable)
*10.0.0.1 icmp_seq=4 ttl=255 time=5.662 ms (ICMP type:3, code:1, Destination host unreachable)
*10.0.0.1 icmp_seq=5 ttl=255 time=5.123 ms (ICMP type:3, code:1, Destination host unreachable)
```

ii. Analyse ARP exchanges between various network components.



ping from pc2 on router 3 to pc 3 on router 1.

ping success full.

```

ping 127.0.0.1...
connected to 127.0.0.1.
escape character is '^]'.

Welcome to Virtual PC Simulator, version 0.6.1
dedicated to Daling.
Build time: Apr 3 2018 13:45:00
Copyright (c) 2007-2014, Paul Meng (mirnshi@gmail.com)
All rights reserved.

VPCS is free software, distributed under the terms of the "BSD" licence.
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

C-2> ip 10.0.0.11 255.255.255.0 10.0.0.254
Checking for duplicate address...
C1 : 10.0.0.11 255.255.255.0 gateway 10.0.0.254

C-2> ip 10.0.0.11 255.255.255.0 10.0.0.1
Checking for duplicate address...
C1 : 10.0.0.11 255.255.255.0 gateway 10.0.0.1

C-2> ip 10.0.0.11 255.255.255.0 10.0.0.254[1;2D[1;2D[1;2D[1;2D[1;2D[
Invalid options

C-2> ping 30.0.0.11
4 bytes from 30.0.0.11 icmp_seq=1 ttl=62 time=27.322 ms
4 bytes from 30.0.0.11 icmp_seq=2 ttl=62 time=25.412 ms
4 bytes from 30.0.0.11 icmp_seq=3 ttl=62 time=25.580 ms
4 bytes from 30.0.0.11 icmp_seq=4 ttl=62 time=25.229 ms
4 bytes from 30.0.0.11 icmp_seq=5 ttl=62 time=25.498 ms

C-2> |

```

Ping from pc4 on router1 to pc1 on router 3

ping successfull

```
to 127.0.0.1.  
racter is '^j'.  
d: "j". Use ? for help.  
  
10.0.0.11  
icmp_seq=1 timeout
```

b)show arp for both cases:

```
to 127.0.0.1.  
character is '^]'.  
nd: "j". Use ? for help.  
g 10.0.0.11  
icmp_seq=1 timeout  
icmp_seq=2 timeout  
from 10.0.0.11 icmp_seq=3 ttl=62 time=21.132 ms  
from 10.0.0.11 icmp_seq=4 ttl=62 time=34.841 ms  
from 10.0.0.11 icmp_seq=5 ttl=62 time=24.492 ms  
w arp  
7a:00:00 30.0.0.1 expires in 69 seconds
```

All the ping requests were succesful.

This is because, the IP address provided by P1 for the ping request was found by ARP by the process of Broadcasting. Hence, every subsequent request has been forwarded to the correct destination and hence we also got the right responses as well.