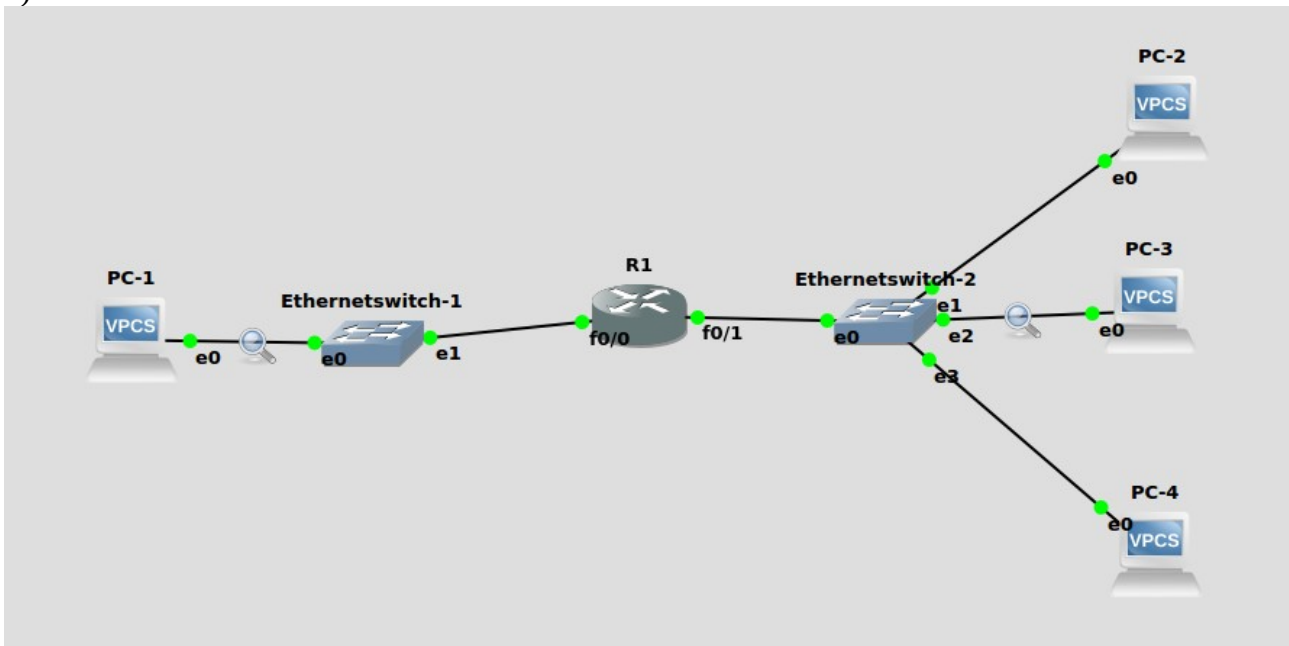


Q5.1

1)



PCs

2)

Terminal	Terminal
Trying 127.0.0.1... Connected to 127.0.0.1. Escape character is '^']'. PC-1> ip 10.0.1.10/24 10.0.1.1 Checking for duplicate address... PC1 : 10.0.1.10 255.255.255.0 gateway 10.0.1.1 PC-1> █	Trying 127.0.0.1... Connected to 127.0.0.1. Escape character is '^']'. PC-2> ip 10.0.2.10/24 10.0. Invalid options PC-2> ip 10.0.2.10/24 10.0.2.138 Checking for duplicate address... PC1 : 10.0.2.10 255.255.255.0 gateway 10.0.2.138 PC-2> █
PC-3> ip 10.0.2.137/24 10.0.2.138 Checking for duplicate address... PC1 : 10.0.2.137 255.255.255.0 gateway 10.0.2.138 PC-3> █	PC-4> ip 10.0.2.139/24 10.0.2.138 Checking for duplicate address... PC1 : 10.0.2.139 255.255.255.0 gateway 10.0.2.138 PC-4> █

Router R1

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int f0/0
R1(config-if)#ip addr 10.0.1.1/24
^
% Invalid input detected at '^' marker.

R1(config-if)#ip addr 10.0.1.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#
*Dec 16 14:36:31.571: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R1(config-if)#
*Dec 16 14:36:31.571: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
*Dec 16 14:36:32.571: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#exit
^
% Invalid input detected at '^' marker.

R1(config-if)#exit
R1(config)#exit
R1#
*Dec 16 14:36:57.403: %SYS-5-CONFIG_I: Configured from console by console
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int f0/1
R1(config-if)#ip addr 10.0.2.138 255.255.255.0
R1(config-if)#no shut
R1(config-if)#
*Dec 16 14:38:24.683: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
R1(config-if)#e
*Dec 16 14:38:24.683: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/1 Physical Port Administrative State Down
*Dec 16 14:38:25.683: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
R1(config-if)#exit
R1(config)#exit
R1#
*Dec 16 14:38:29.603: %SYS-5-CONFIG_I: Configured from console by console
R1#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 10.0.1.1 YES manual up
FastEthernet0/1 10.0.2.138 YES manual up
Serial1/0 unassigned YES unset administratively down down
Serial1/1 unassigned YES unset administratively down down
Serial1/2 unassigned YES unset administratively down down
```

3)

```
PC-1> clear arp

PC-1> ping 10.0.2.137 255.255.255.0 -c2
10.0.2.137 icmp_seq=1 timeout
84 bytes from 10.0.2.137 icmp_seq=2 ttl=63 time=19.454 ms
84 bytes from 10.0.2.137 icmp_seq=3 ttl=63 time=14.812 ms
84 bytes from 10.0.2.137 icmp_seq=4 ttl=63 time=14.654 ms
84 bytes from 10.0.2.137 icmp_seq=5 ttl=63 time=16.533 ms

PC-1> show arp

ca:01:15:2f:00:08 10.0.1.1 expires in 110 seconds

PC-1> █
```

4)

```
PC-3> show arp

ca:01:15:2f:00:06 10.0.2.138 expires in 106 seconds

█
```

Routing table

```
R1#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/24 is subnetted, 2 subnets
C      10.0.2.0 is directly connected, FastEthernet0/1
C      10.0.1.0 is directly connected, FastEthernet0/0
R1#
```

Wireshark ping pc1 to pc3

arp || icmp

pc1

The image shows a Wireshark packet capture of network traffic. The top pane displays a list of 12 packets. The first three packets are ARP requests and replies. The remaining nine packets are ICMP Echo (ping) requests and replies. The bottom pane shows the details of the selected packet (Frame 2), which is an Ethernet II frame with a source MAC of 08:00:06:04:00:01 and a destination MAC of 79:66:68:00:0a:00. The packet is an ARP request.

No.	Time	Source	Destination	Protocol	Info	Length
2	25.453882	Private_66:68:00	Broadcast	ARP	Who has 10.0.1.1? Tell 10.0.1.10 [ETHERNET FRAME CHECK SEQUENCE INCORR...	
3	25.461038	ca:01:15:2f:00:08	Private_66:68:00	ARP	10.0.1.1 is at ca:01:15:2f:00:08	
4	25.464293	10.0.1.10	10.0.2.137	ICMP	Echo (ping) request id=0xdfd6, seq=1/256, ttl=64 (no response found!)	
5	27.463125	10.0.1.10	10.0.2.137	ICMP	Echo (ping) request id=0xe1d6, seq=2/512, ttl=64 (reply in 6)	
6	27.482205	10.0.2.137	10.0.1.10	ICMP	Echo (ping) reply id=0xe1d6, seq=2/512, ttl=63 (request in 5)	
7	28.483174	10.0.1.10	10.0.2.137	ICMP	Echo (ping) request id=0xe2d6, seq=3/768, ttl=64 (reply in 8)	
8	28.497787	10.0.2.137	10.0.1.10	ICMP	Echo (ping) reply id=0xe2d6, seq=3/768, ttl=63 (request in 7)	
9	29.499067	10.0.1.10	10.0.2.137	ICMP	Echo (ping) request id=0xe3d6, seq=4/1024, ttl=64 (reply in 10)	
10	29.513460	10.0.2.137	10.0.1.10	ICMP	Echo (ping) reply id=0xe3d6, seq=4/1024, ttl=63 (request in 9)	
11	30.513880	10.0.1.10	10.0.2.137	ICMP	Echo (ping) request id=0xe4d6, seq=5/1280, ttl=64 (reply in 12)	
12	30.530215	10.0.2.137	10.0.1.10	ICMP	Echo (ping) reply id=0xe4d6, seq=5/1280, ttl=63 (request in 11)	

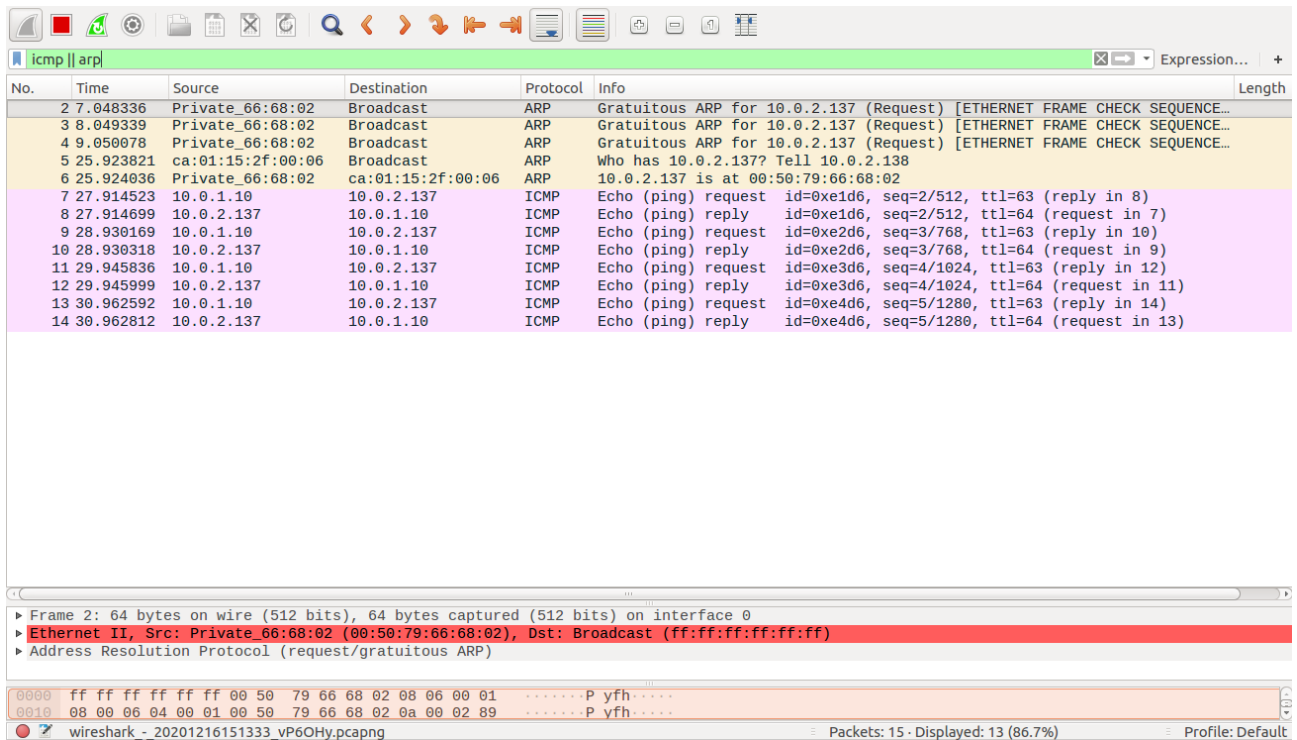
Frame 2: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface 0
▶ Ethernet II, Src: Private_66:68:00 (08:00:06:04:00:01), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
▶ Address Resolution Protocol (request)

0000 ff ff ff ff ff ff 00 50 79 66 68 00 0a 00 01P yfh.....
0010 08 00 06 04 00 01 00 50 79 66 68 00 0a 00 01 0aP yfh.....

wireshark - 20201216151334_nfDBVX.pcapng Packets: 19 · Displayed: 11 (57.9%) Profile: Default

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pc3



The image shows a Wireshark packet capture window. The top toolbar contains various icons for file operations, navigation, and analysis. Below the toolbar, a green filter bar displays 'icmp || arp'. The main packet list table shows 14 packets. The first six packets are ARP requests and responses. The remaining eight packets are ICMP echo (ping) requests and replies. The packet details pane on the right shows the selected packet (No. 2) as an Ethernet II frame with source MAC 66:68:02 and destination MAC ff:ff:ff:ff:ff:ff. The packet bytes pane at the bottom shows the raw data in hexadecimal and ASCII.

No.	Time	Source	Destination	Protocol	Info	Length
2	7.048336	Private_66:68:02	Broadcast	ARP	Gratuitous ARP for 10.0.2.137 (Request) [ETHERNET FRAME CHECK SEQUENCE...	
3	8.049339	Private_66:68:02	Broadcast	ARP	Gratuitous ARP for 10.0.2.137 (Request) [ETHERNET FRAME CHECK SEQUENCE...	
4	9.050078	Private_66:68:02	Broadcast	ARP	Gratuitous ARP for 10.0.2.137 (Request) [ETHERNET FRAME CHECK SEQUENCE...	
5	25.923821	ca:01:15:2f:00:06	Broadcast	ARP	Who has 10.0.2.137? Tell 10.0.2.138	
6	25.924036	Private_66:68:02	ca:01:15:2f:00:06	ARP	10.0.2.137 is at 00:50:79:66:68:02	
7	27.914523	10.0.1.10	10.0.2.137	ICMP	Echo (ping) request id=0xe1d6, seq=2/512, ttl=63 (reply in 8)	
8	27.914699	10.0.2.137	10.0.1.10	ICMP	Echo (ping) reply id=0xe1d6, seq=2/512, ttl=64 (request in 7)	
9	28.930169	10.0.1.10	10.0.2.137	ICMP	Echo (ping) request id=0xe2d6, seq=3/768, ttl=63 (reply in 10)	
10	28.930318	10.0.2.137	10.0.1.10	ICMP	Echo (ping) reply id=0xe2d6, seq=3/768, ttl=64 (request in 9)	
11	29.945836	10.0.1.10	10.0.2.137	ICMP	Echo (ping) request id=0xe3d6, seq=4/1024, ttl=63 (reply in 12)	
12	29.945999	10.0.2.137	10.0.1.10	ICMP	Echo (ping) reply id=0xe3d6, seq=4/1024, ttl=64 (request in 11)	
13	30.962592	10.0.1.10	10.0.2.137	ICMP	Echo (ping) request id=0xe4d6, seq=5/1280, ttl=63 (reply in 14)	
14	30.962812	10.0.2.137	10.0.1.10	ICMP	Echo (ping) reply id=0xe4d6, seq=5/1280, ttl=64 (request in 13)	

Frame 2: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface 0
▶ Ethernet II, Src: Private_66:68:02 (00:50:79:66:68:02), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
▶ Address Resolution Protocol (request/gratuitous ARP)

0000 ff ff ff ff ff ff 00 50 79 66 68 02 08 06 00 01P yfh.....
0010 08 00 06 04 00 01 00 50 79 66 68 02 0a 00 02 89P yfh.....

wireshark - 20201216151333_vP6OHY.pcapng Packets: 15 · Displayed: 13 (86.7%) Profile: Default

5)

pc 3 to pc4

```
PC-3> ping 10.0.2.139/24 -c3
84 bytes from 10.0.2.139 icmp_seq=1 ttl=64 time=0.307 ms
84 bytes from 10.0.2.139 icmp_seq=2 ttl=64 time=0.426 ms
84 bytes from 10.0.2.139 icmp_seq=3 ttl=64 time=0.363 ms
84 bytes from 10.0.2.139 icmp_seq=4 ttl=64 time=0.404 ms
84 bytes from 10.0.2.139 icmp_seq=5 ttl=64 time=0.388 ms
```

```
PC-3> show arp
```

```
00:50:79:66:68:03 10.0.2.139 expires in 111 seconds
```

Terminal

```
Trying 127.0.0.1...
Connected to 127.0.0.1.
Escape character is '^['.
```

```
PC-4> show arp
```

```
00:50:79:66:68:02 10.0.2.137 expires in 103 seconds
```

```
PC-4> █
```

arp || icmp

No.	Time	Source	Destination	Protocol	Info	Length
2	35.364878	Private_66:68:02	Broadcast	ARP	Who has 10.0.2.139? Tell 10.0.2.137 [ETHERNET FRAME CHECK SEQUENCE INC...	
3	35.365128	Private_66:68:03	Private_66:68:02	ARP	10.0.2.139 is at 00:50:79:66:68:03 [ETHERNET FRAME CHECK SEQUENCE INCO...	
4	35.365883	10.0.2.137	10.0.2.139	ICMP	Echo (ping) request id=0x14da, seq=1/256, ttl=64 (reply in 5)	
5	35.366041	10.0.2.139	10.0.2.137	ICMP	Echo (ping) reply id=0x14da, seq=1/256, ttl=64 (request in 4)	
6	36.367034	10.0.2.137	10.0.2.139	ICMP	Echo (ping) request id=0x15da, seq=2/512, ttl=64 (reply in 7)	
7	36.367260	10.0.2.139	10.0.2.137	ICMP	Echo (ping) reply id=0x15da, seq=2/512, ttl=64 (request in 6)	
8	37.368186	10.0.2.137	10.0.2.139	ICMP	Echo (ping) request id=0x16da, seq=3/768, ttl=64 (reply in 9)	
9	37.368369	10.0.2.139	10.0.2.137	ICMP	Echo (ping) reply id=0x16da, seq=3/768, ttl=64 (request in 8)	
10	38.369314	10.0.2.137	10.0.2.139	ICMP	Echo (ping) request id=0x17da, seq=4/1024, ttl=64 (reply in 11)	
11	38.369509	10.0.2.139	10.0.2.137	ICMP	Echo (ping) reply id=0x17da, seq=4/1024, ttl=64 (request in 10)	
12	39.370449	10.0.2.137	10.0.2.139	ICMP	Echo (ping) request id=0x18da, seq=5/1280, ttl=64 (reply in 13)	
13	39.370657	10.0.2.139	10.0.2.137	ICMP	Echo (ping) reply id=0x18da, seq=5/1280, ttl=64 (request in 12)	

Frame 2: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface 0

Ethernet II, Src: Private_66:68:02 (00:50:79:66:68:02), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

Address Resolution Protocol (request)

0000 ff ff ff ff ff ff 00 50 79 66 68 02 08 06 00 01P yfh.....

0010 08 00 06 04 00 01 00 50 79 66 68 02 0a 00 02 89P yfh.....

Internet Control Message Protocol: Protocol

Packets: 15 · Displayed: 12 (80.0%)

Profile: Default

pc3 to pc2

```
PC-3> clear arp

PC-3> ping 10.0.2.10/24 -c3
84 bytes from 10.0.2.10 icmp_seq=1 ttl=64 time=0.379 ms
84 bytes from 10.0.2.10 icmp_seq=2 ttl=64 time=0.351 ms
84 bytes from 10.0.2.10 icmp_seq=3 ttl=64 time=0.370 ms
84 bytes from 10.0.2.10 icmp_seq=4 ttl=64 time=0.391 ms
84 bytes from 10.0.2.10 icmp_seq=5 ttl=64 time=0.371 ms
```

```
PC-3> show arp

00:50:79:66:68:01 10.0.2.10 expires in 107 seconds
```

```
Terminal
Trying 127.0.0.1...
Connected to 127.0.0.1.
Escape character is '^]'.
```

```
PC-2> show arp

00:50:79:66:68:02 10.0.2.137 expires in 112 seconds
```

```
PC-2> █
```

The image shows a Wireshark packet capture of network traffic. The top pane displays a list of 13 packets. The middle pane shows the details of the selected packet (No. 13), which is an ICMP Echo (ping) reply. The bottom pane shows the raw packet data in hexadecimal and ASCII.

No.	Time	Source	Destination	Protocol	Info	Length
2	36.224707	Private_66:68:02	Broadcast	ARP	Who has 10.0.2.10? Tell 10.0.2.137 [ETHERNET FRAME CHECK SEQUENCE INCOR...	
3	36.224988	Private_66:68:01	Private_66:68:02	ARP	10.0.2.10 is at 00:50:79:66:68:01 [ETHERNET FRAME CHECK SEQUENCE INCOR...	
4	36.225784	10.0.2.137	10.0.2.10	ICMP	Echo (ping) request id=0x4ddb, seq=1/256, ttl=64 (reply in 5)	
5	36.225989	10.0.2.10	10.0.2.137	ICMP	Echo (ping) reply id=0x4ddb, seq=1/256, ttl=64 (request in 4)	
6	37.226973	10.0.2.137	10.0.2.10	ICMP	Echo (ping) request id=0x4edb, seq=2/512, ttl=64 (reply in 7)	
7	37.227151	10.0.2.10	10.0.2.137	ICMP	Echo (ping) reply id=0x4edb, seq=2/512, ttl=64 (request in 6)	
8	38.228151	10.0.2.137	10.0.2.10	ICMP	Echo (ping) request id=0x4fdb, seq=3/768, ttl=64 (reply in 9)	
9	38.228340	10.0.2.10	10.0.2.137	ICMP	Echo (ping) reply id=0x4fdb, seq=3/768, ttl=64 (request in 8)	
10	39.229290	10.0.2.137	10.0.2.10	ICMP	Echo (ping) request id=0x50db, seq=4/1024, ttl=64 (reply in 11)	
11	39.229478	10.0.2.10	10.0.2.137	ICMP	Echo (ping) reply id=0x50db, seq=4/1024, ttl=64 (request in 10)	
12	40.230397	10.0.2.137	10.0.2.10	ICMP	Echo (ping) request id=0x51db, seq=5/1280, ttl=64 (reply in 13)	
13	40.230576	10.0.2.10	10.0.2.137	ICMP	Echo (ping) reply id=0x51db, seq=5/1280, ttl=64 (request in 12)	

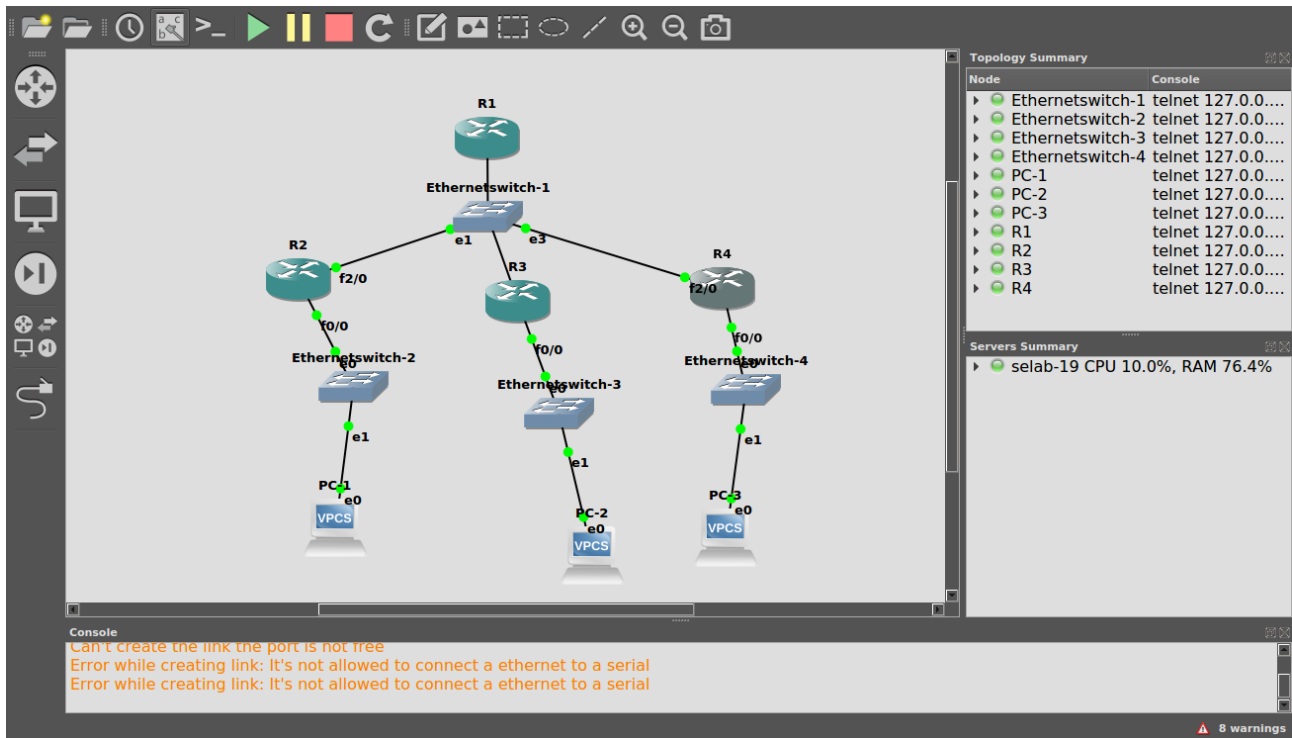
Frame 2: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface 0
Ethernet II, Src: Private_66:68:02 (00:50:79:66:68:02), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Address Resolution Protocol (request)

0000 ff ff ff ff ff ff 00 50 79 66 68 02 08 06 00 01P yfh.....
0010 08 00 06 04 00 01 00 50 79 66 68 02 0a 00 02 89P yfh.....

wireshark - 20201216153217_q9l4hX.pcapng Packets: 14 · Displayed: 12 (85.7%) Profile: Default

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Q5.2)



R1

```
R1
R1#enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int f0/0
R1(config-if)#ip add 10.0.1.13 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#
R1(config-if)#exit
R1(config)#ip route 14.24.74.128 255.255.255.192 10.0.1.11
R1(config)#ip route 14.24.74.0 255.255.255.128 10.0.1.12
R1(config)#do write
Building configuration...
[OK]
R1(config)#ip route 14.24.74.192 255.255.255.240 10.0.1.10
R1(config)#do write
Building configuration...
[OK]
R1(config)#
```

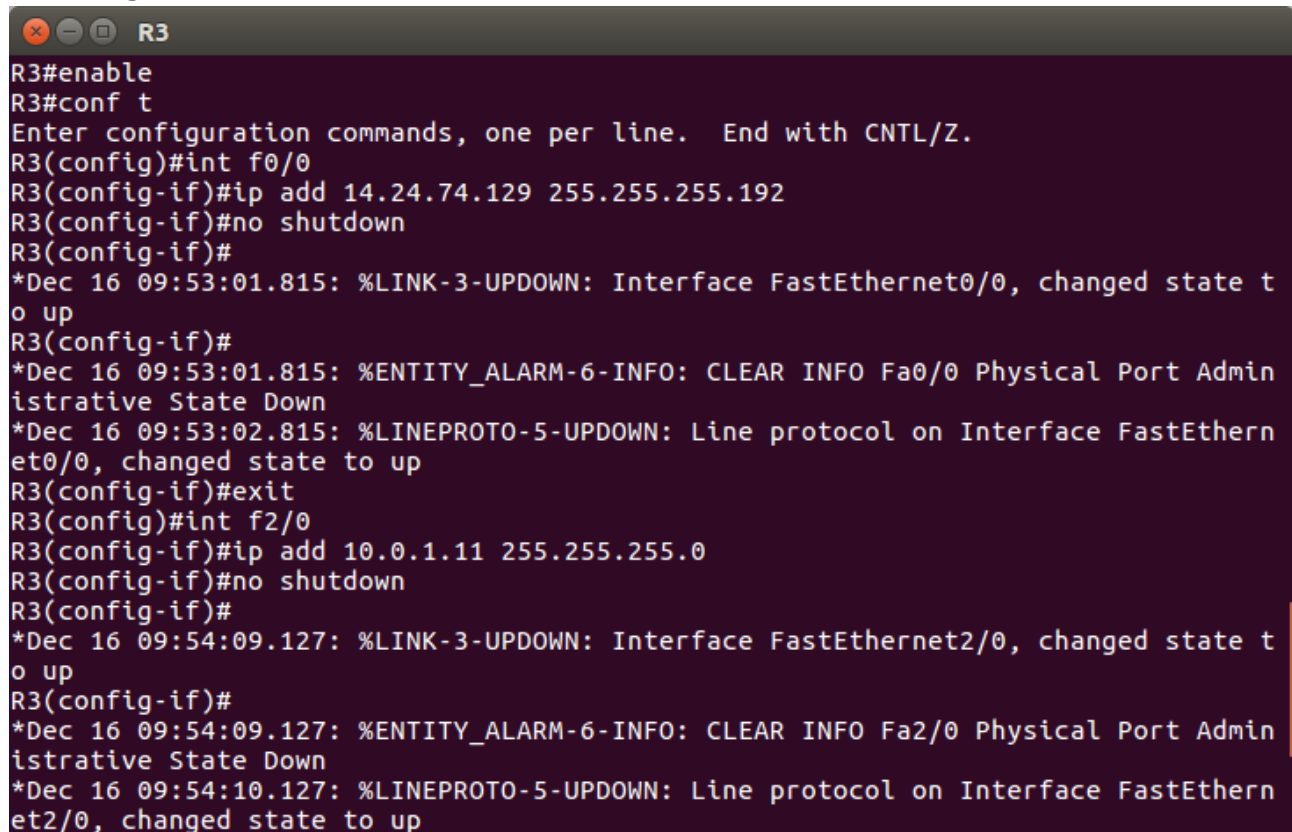

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R2

```
R2(config-if)#ip add 14.24.74.193 255.255.255.240
R2(config-if)#no shutdown
R2(config-if)#
*Dec 16 09:52:47.907: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R2(config-if)#
*Dec 16 09:52:47.907: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
*Dec 16 09:52:48.907: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R2(config-if)#exit
R2(config)#int f2/0
R2(config-if)#ip add 10.0.1.10 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#
*Dec 16 09:53:48.959: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
R2(config-if)#
R2(config-if)#exit
R2(config)#int f2/0
R2(config-if)#ip add 10.0.1.10 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#
```

```
R2(config)#do write
Building configuration...
[OK]
R2(config)#ip route 14.24.74.128 255.255.255.192 10.0.1.11
R2(config)#exit
R2#
*Dec 16 09:57:58.583: %SYS-5-CONFIG_I: Configured from console by console
R2#write
Building configuration...
[OK]
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip route 14.24.74.0 255.255.255.129 10.0.1.12
%Inconsistent address and mask
R2(config)#ip route 14.24.74.0 255.255.255.128 10.0.1.12
R2(config)#exit
```


R3



```
R3#enable
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#int f0/0
R3(config-if)#ip add 14.24.74.129 255.255.255.192
R3(config-if)#no shutdown
R3(config-if)#
*Dec 16 09:53:01.815: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R3(config-if)#
*Dec 16 09:53:01.815: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
*Dec 16 09:53:02.815: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R3(config-if)#exit
R3(config)#int f2/0
R3(config-if)#ip add 10.0.1.11 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#
*Dec 16 09:54:09.127: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
R3(config-if)#
*Dec 16 09:54:09.127: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa2/0 Physical Port Administrative State Down
*Dec 16 09:54:10.127: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
```

```
R3
et0/0, changed state to up
R3(config-if)#exit
R3(config)#int f2/0
R3(config-if)#ip add 10.0.1.11 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#
*Dec 16 09:54:09.127: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state t
o up
R3(config-if)#
*Dec 16 09:54:09.127: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa2/0 Physical Port Admin
istrative State Down
*Dec 16 09:54:10.127: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et2/0, changed state to up
R3(config-if)#exit
R3(config)#do write
Building configuration...
[OK]
R3(config)#ip route 14.24.74.192 255.255.255.240 10.0.1.10
R3(config)#ip route 14.24.74.0 255.255.255.128 10.0.1.12
R3(config)#exit
R3#
*Dec 16 10:01:03.807: %SYS-5-CONFIG_I: Configured from console by console
R3#write
Building configuration...
[OK]
R3#
```

R4

```
R4
nistrative State Down
R4#enable
R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#int f0/0
R4(config-if)#ip add 14.24.74.1 255.255.255.129
Bad mask 0xFFFFF81 for address 14.24.74.1
R4(config-if)#ip add 14.24.74.1 255.255.255.128
R4(config-if)#no shutdown
R4(config-if)#
*Dec 16 09:55:39.895: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
R4(config-if)#
*Dec 16 09:55:39.895: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Admin
istrative State Down
*Dec 16 09:55:40.895: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
R4(config-if)#exit
R4(config)#int f2/0
R4(config-if)#ip add 10.0.1.12 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#
*Dec 16 09:56:05.731: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state t
o up
```

```
R4
R4(config)#int f2/0
R4(config-if)#ip add 10.0.1.12 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#
*Dec 16 09:56:05.731: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
R4(config-if)#e
*Dec 16 09:56:05.731: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa2/0 Physical Port Administrative State Down
*Dec 16 09:56:06.731: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R4(config-if)#exit
R4(config)#do write
Building configuration...
[OK]
R4(config)#ip route 14.24.74.192 255.255.255.240 10.0.1.10
R4(config)#ip route 14.24.74.128 255.255.255.192 10.0.1.11
R4(config)#exit
R4#
*Dec 16 09:59:56.063: %SYS-5-CONFIG_I: Configured from console by console
R4#write
Building configuration...
[OK]
R4#
```

Pc

Pc1

```
Terminal
PC-1> ip 14.24.74.194/28 14.24.74.193
Checking for duplicate address...
PC1 : 14.24.74.194 255.255.255.240 gateway 14.24.74.193

PC-1> ping 14.24.74.130/26
14.24.74.130 icmp_seq=1 timeout
14.24.74.130 icmp_seq=2 timeout
84 bytes from 14.24.74.130 icmp_seq=3 ttl=62 time=23.505 ms
84 bytes from 14.24.74.130 icmp_seq=4 ttl=62 time=25.393 ms
84 bytes from 14.24.74.130 icmp_seq=5 ttl=62 time=25.043 ms

PC-1> 
```

Pc2

```
Terminal
PC-2> ip 14.24.74.130/26 14.24.74.129
Checking for duplicate address...
PC1 : 14.24.74.130 255.255.255.192 gateway 14.24.74.129

PC-2> save
Saving startup configuration to startup.vpc
. done

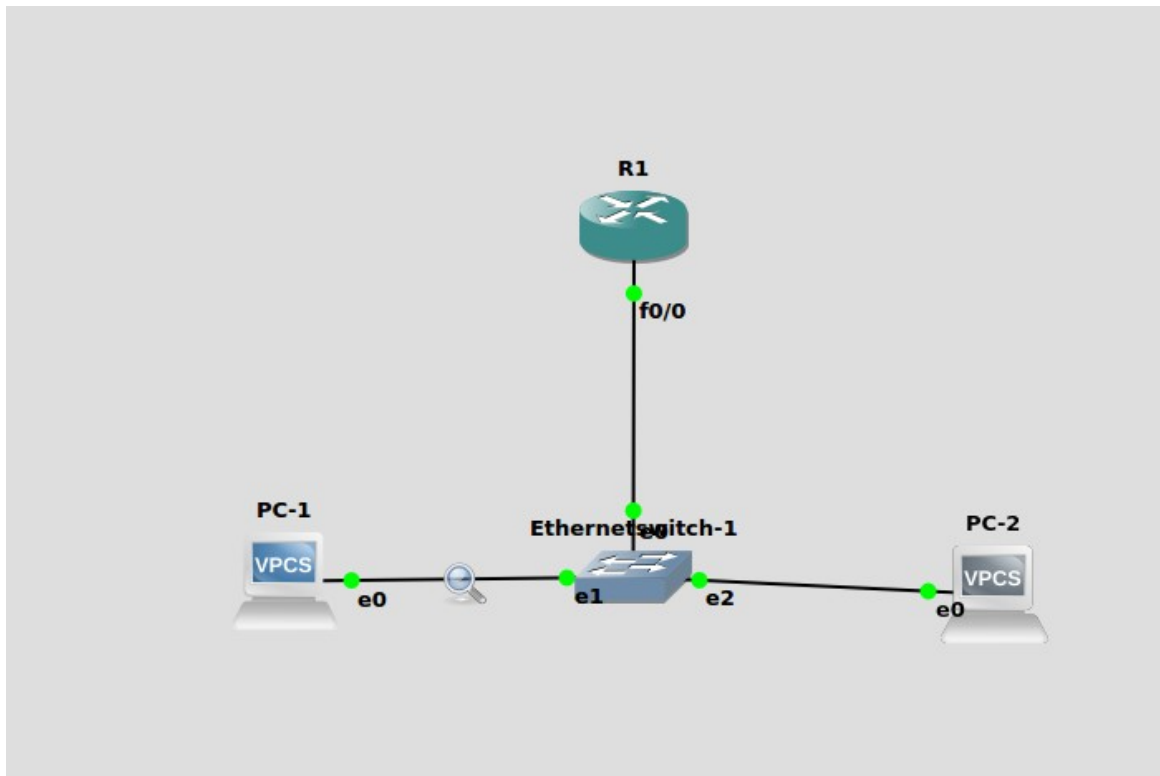
PC-2> 
```

Pc3

```
Terminal
PC-3> ip 14.24.74.2/25 14.24.74.1
Checking for duplicate address...
PC1 : 14.24.74.2 255.255.255.128 gateway 14.24.74.1

PC-3> 
```

Q7.1



R1

```
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool POOL1
R1(dhcp-config)#Network 192.168.3.0 255.255.255.0
R1(dhcp-config)#Default-router 192.168.3.1
R1(dhcp-config)#Interface fastEthernet 0/0
R1(config-if)#No shutdown
R1(config-if)#ip address 192.168.3.1 255.255.255.0
R1(config-if)#
```

Pc1

```
PC-1> dhcp
DDORA IP 192.168.3.2/24 GW 192.168.3.1
PC-1>
```

pc2

```
PC-2> dhcp
DDORA IP 192.168.3.3/24 GW 192.168.3.1
PC-2>
```

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Ping pc2 from pc1

pc1

```
PC-1> ping 192.168.3.3
84 bytes from 192.168.3.3 icmp_seq=1 ttl=64 time=0.347 ms
84 bytes from 192.168.3.3 icmp_seq=2 ttl=64 time=0.386 ms
84 bytes from 192.168.3.3 icmp_seq=3 ttl=64 time=0.362 ms
84 bytes from 192.168.3.3 icmp_seq=4 ttl=64 time=0.490 ms
84 bytes from 192.168.3.3 icmp_seq=5 ttl=64 time=0.413 ms

PC-1> show arp

ca:01:24:1a:00:00 192.168.3.1 expires in 104 seconds
00:50:79:66:68:00 192.168.3.3 expires in 107 seconds
```

pc2

```
PC-2> show arp

00:50:79:66:68:03 192.168.3.2 expires in 111 seconds

PC-2>
```

The image shows a Wireshark packet capture of a DHCP transaction. The packet list displays the following entries:

No.	Time	Source	Destination	Protocol	Info	Length
1	0.000000	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xef6c384c	
2	1.000088	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xef6c384c	
3	4.000160	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xef6c384c	
7	139.531975	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xa077d274	
8	140.532031	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xa077d274	
9	143.532122	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xa077d274	
14	319.083943	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xb3890e36	
16	320.084061	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xb3890e36	
17	320.840296	192.168.3.1	192.168.3.2	DHCP	DHCP Offer - Transaction ID 0xb3890e36	
18	320.850366	192.168.3.1	192.168.3.2	DHCP	DHCP Offer - Transaction ID 0xb3890e36	
19	323.084150	0.0.0.0	255.255.255.255	DHCP	DHCP Request - Transaction ID 0xb3890e36	
20	323.094250	192.168.3.1	192.168.3.2	DHCP	DHCP ACK - Transaction ID 0xb3890e36	
24	343.835996	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xed602c43	
26	344.836075	0.0.0.0	255.255.255.255	DHCP	DHCP Discover - Transaction ID 0xed602c43	

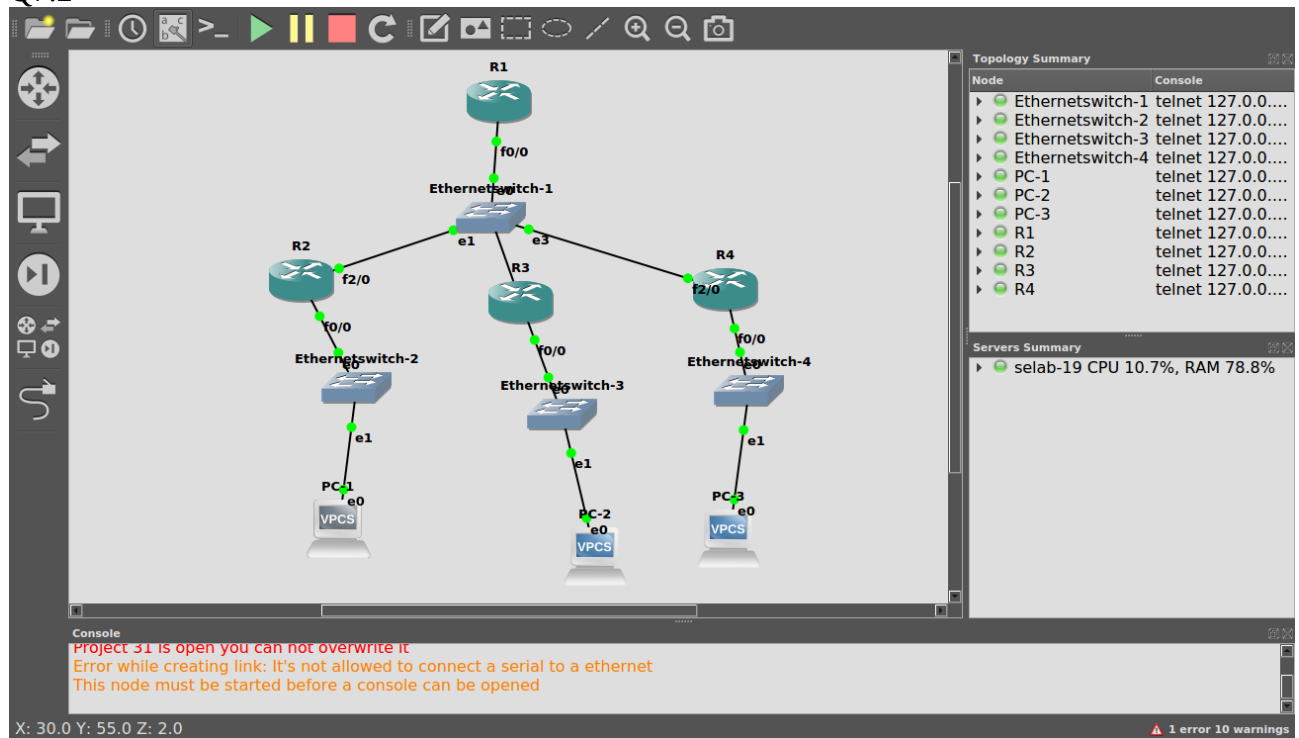
The packet details pane shows the structure of a DHCP Offer message (Frame 17):

- Frame 17: 342 bytes on wire (2736 bits), 342 bytes captured (2736 bits) on interface 0
- Ethernet II, Src: ca:01:24:1a:00:00 (ca:01:24:1a:00:00), Dst: Private_66:68:03 (00:50:79:66:68:03)
- Internet Protocol Version 4, Src: 192.168.3.1, Dst: 192.168.3.2
- User Datagram Protocol, Src Port: 67, Dst Port: 68

The packet bytes pane shows the raw data of the DHCP Offer message:

```
0000  00 50 79 66 68 03 ca 01 24 1a 00 00 08 00 45 00  .Pyfh...$....E.
0010  01 48 00 00 00 00 ff 11 33 51 c0 a8 03 01 c0 a8  .H.....3Q.....
```

Q7.2



R1

```
R1#enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#IP dhcp pool CS
R1(dhcp-config)#Network 12.98.64.0 255.255.255.0
R1(dhcp-config)#Default-router 12.98.64.1
R1(dhcp-config)#do write
R1(dhcp-config)#exit
R1(config)#do write
Building configuration...
[OK]
R1(config)#int f0/0
R1(config-if)#ip add 12.98.64.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#do write
Building configuration...
[OK]
R1(config)#
```

R2

```
R2#enable
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#int f0/0
R2(config-if)#ip helper-addr 12.98.64.1
R2(config-if)#exit
R2(config)#do write
Building configuration...
[OK]
R2(config)#
```

R3

```
R3#enable
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#int f0/0
R3(config-if)#ip helper-addr 12.98.64.1
R3(config-if)#exit
R3(config)#do write
Building configuration...
[OK]
R3(config)#
```

R4

```
R4#enable
R4#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#int f0/0
R4(config-if)#ip helper-addr 12.98.64.1
R4(config-if)#exit
R4(config)#do write
Building configuration...
[OK]
R4(config)#
```

```
Terminal
PC-1> dhcp
DDORA IP 12.98.64.2/24 GW 12.98.64.1

PC-1> dhcp
DORA IP 12.98.64.2/24 GW 12.98.64.1

PC-1> 
```