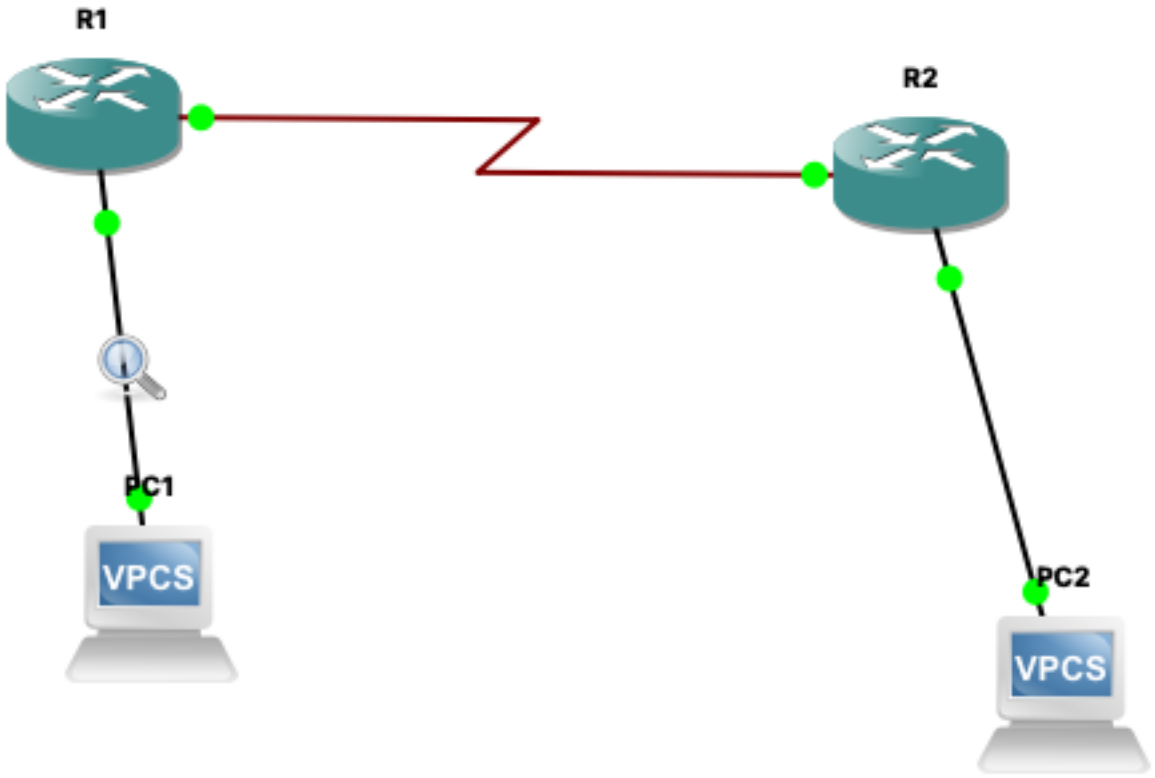
# Computer Networks Lab 6

1)




iv) **To see commands available in this mode**

R1#?

Exec commands:

access-enable Create a temporary Access-List entry

access-profile Apply user-profile to interface

access-template Create a temporary Access-List entry

archive manage archive files

audio-prompt load ivr prompt

auto Exec level Automation

bfe For manual emergency modes setting

call Voice call

```
 ccm-manager      Call Manager Application exec commands
 cd               Change current directory
 clear            Reset functions
 clock            Manage the system clock
 cns              CNS agents
 configure        Enter configuration mode
 connect          Open a terminal connection
 copy             Copy from one file to another
 crypto           Encryption related commands.
 debug            Debugging functions (see also 'undebug')
 delete           Delete a file
 dir              List files on a filesystem
 disable          Turn off privileged commands
--More--
```

v) **To enter the Privileged EXEC mode**

```
R1>enable
R1#
```

vi) **To disable the Privileged EXEC mode**

```
R1#disable
R1>
```

vii) **To enter global configuration mode**

```
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#
```

viii) **To enter interface configuration mode**

R1(config)#interface FastEthernet0/0

R1(config-if)#

ix)

R1(config)#interface FastEthernet0/0

R1(config-if)#exit **//to go from interface configuration to global configuration mode**

R1(config)#exit **//to go from global configuration to privileged EXEC mode**

R1#

*Mar 1 00:08:42.871: %SYS-5-CONFIG_I: Configured from console by console

R1#

To go directly from interface configuration to privileged EXEC Mode

R1(config-if)#end

R1#

*Mar 1 00:10:19.027: %SYS-5-CONFIG_I: Configured from console by console

R1#

x) **To terminate the console session from the User EXEC mode**

R1>logout

R1 con0 is now available

Press RETURN to get started.

2) **Configuration**

*Configuring gateway of router 1*

R1(config)#inter f0/0
R1(config-if)#ip address 10.0.0.1 255.0.0.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#
*Mar 1 00:04:12.999: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:04:13.999: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config)#

*Configuring router 1 interface to router 2*

```
R1(config)#inter s1/0
R1(config-if)#ip address 20.0.0.1 255.0.0.0
R1(config-if)#clock rate 64000
R1(config-if)#encapsulation ppp
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#
*Mar  1 00:06:44.447: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R1(config)#
```

*Configuring gateway for router 2*

```
R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#inter f0/0
R2(config-if)#ip address 30.0.0.1 255.0.0.0
R2(config-if)#no shutdown
R2(config-if)#exit
*Mar  1 00:01:09.371: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar  1 00:01:10.371: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up
R2(config-if)#exit
R2(config)#
```

*Configuring interface for router 2 to router 1*

```
R2(config)#inter s1/0
R2(config-if)#ip address 20.0.0.2 255.0.0.0
R2(config-if)#encapsulation ppp
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#
*Mar  1 00:02:41.731: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R2(config)#
*Mar  1 00:02:42.875: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to
up
R2(config)#
```

*Configuring pc1*

PC1> ip 10.0.0.10/8 10.0.0.1
Checking for duplicate address...
PC1 : 10.0.0.10 255.0.0.0 gateway 10.0.0.1

*Configuring pc2*
PC2> ip 30.0.0.10/8 30.0.0.1
Checking for duplicate address...
PC2 : 30.0.0.10 255.0.0.0 gateway 30.0.0.1

**R1#show interfaces**

FastEthernet0/0 is up, line protocol is up

Hardware is Gt96k FE, address is c401.1fa1.0000 (bia c401.1fa1.0000)

Internet address is 10.0.0.1/8

MTU 1500 bytes, BW 10000 Kbit/sec, DLY 1000 usec,

reliability 255/255, txload 1/255, rxload 1/255

Encapsulation ARPA, loopback not set

Keepalive set (10 sec)

Half-duplex, 10Mb/s, 100BaseTX/FX

ARP type: ARPA, ARP Timeout 04:00:00

Last input never, output 00:00:08, output hang never

Last clearing of "show interface" counters never

Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0

Queueing strategy: fifo

Output queue: 0/40 (size/max)

5 minute input rate 0 bits/sec, 0 packets/sec

5 minute output rate 0 bits/sec, 0 packets/sec

0 packets input, 0 bytes

Received 0 broadcasts, 0 runts, 0 giants, 0 throttles

0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored

0 watchdog

0 input packets with dribble condition detected

65 packets output, 7125 bytes, 0 underruns

0 output errors, 0 collisions, 1 interface resets

**R1#show running-config**

Building configuration...

Current configuration : 1211 bytes

!

version 12.4

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname R1

!

boot-start-marker

boot-end-marker

!

!

no aaa new-model

memory-size iomem 5

no ip icmp rate-limit unreachable

ip cef

!

!

!

!

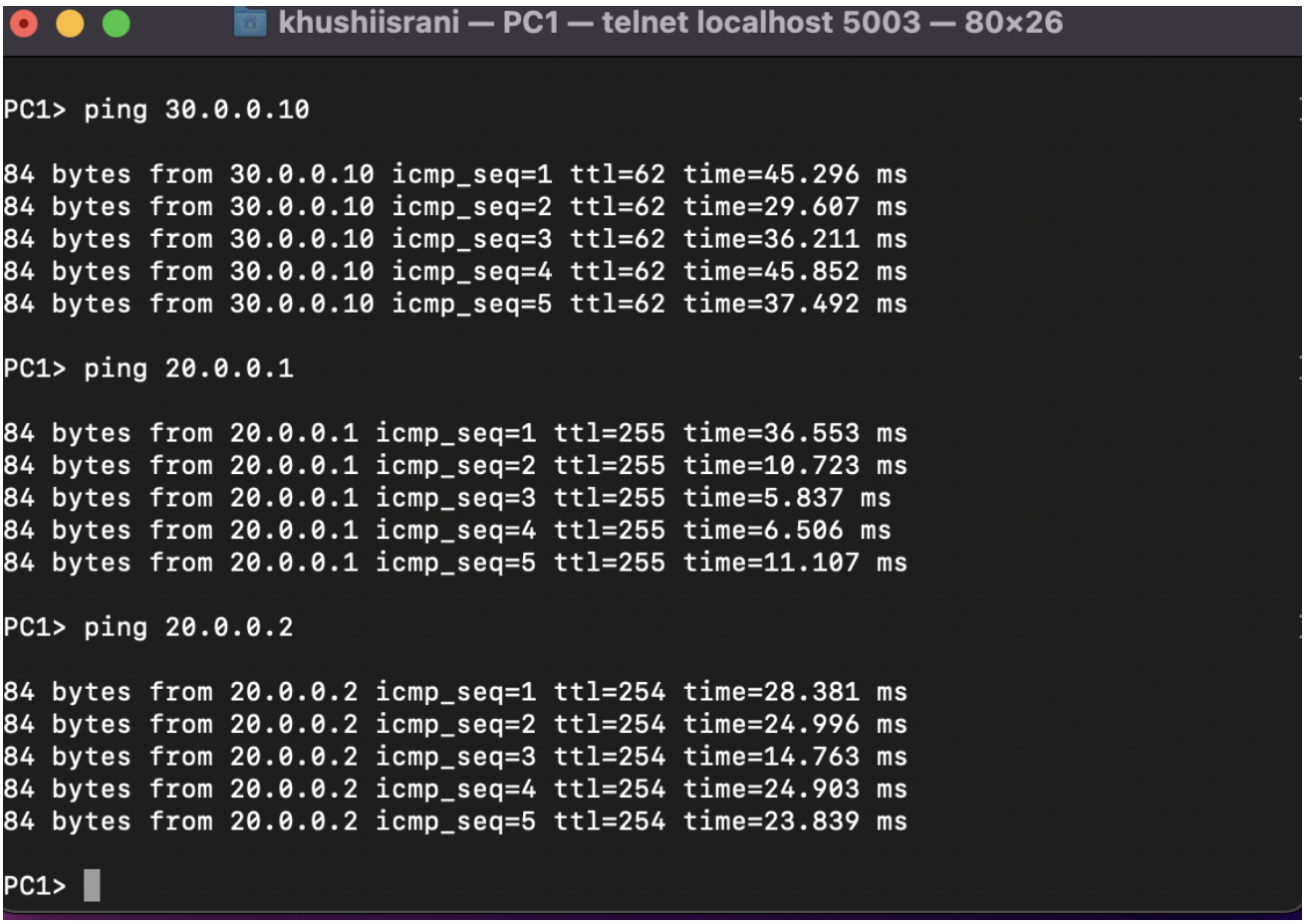
no ip domain lookup

3) **Adding static route to both routers**

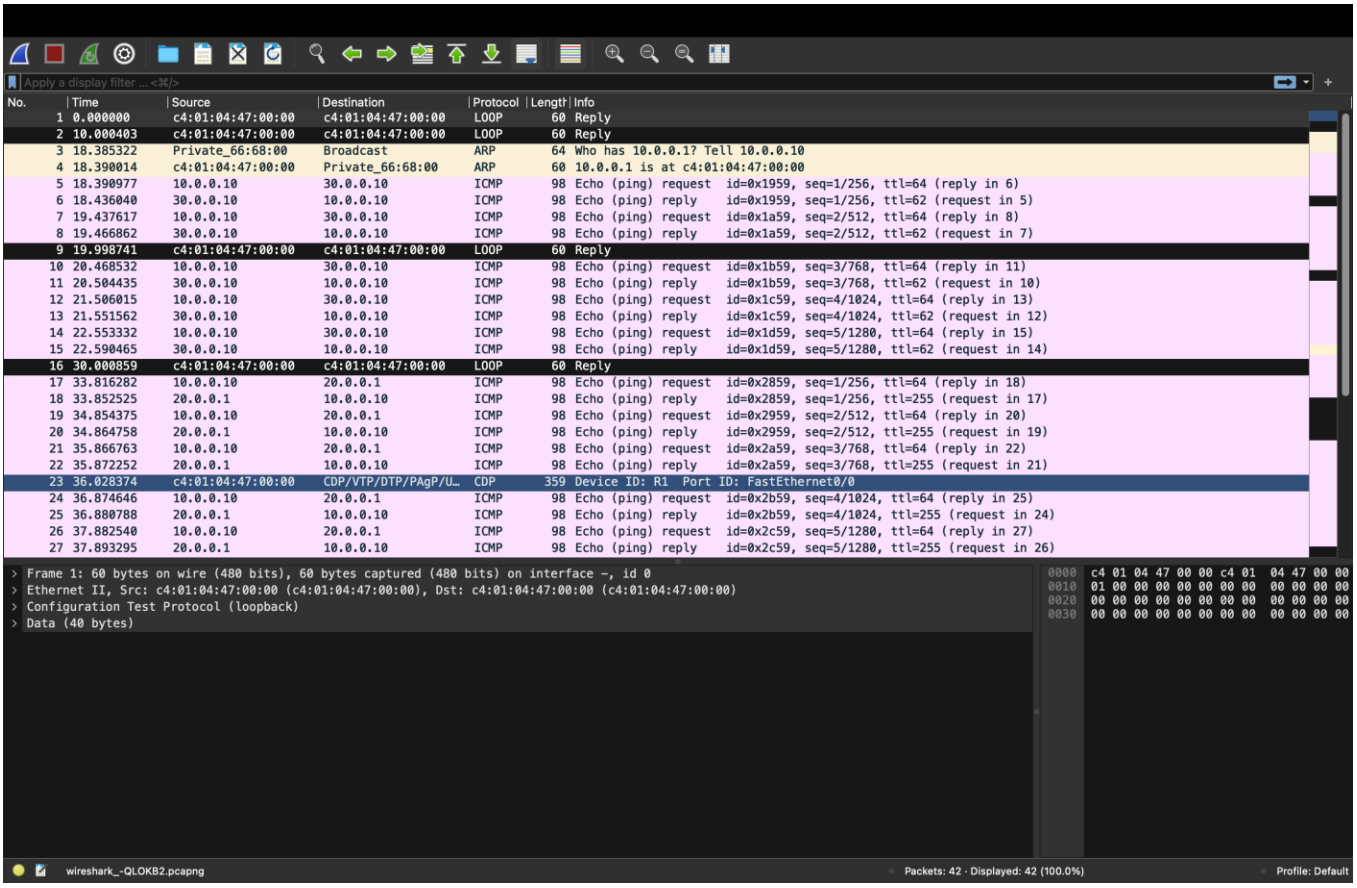
R1(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2

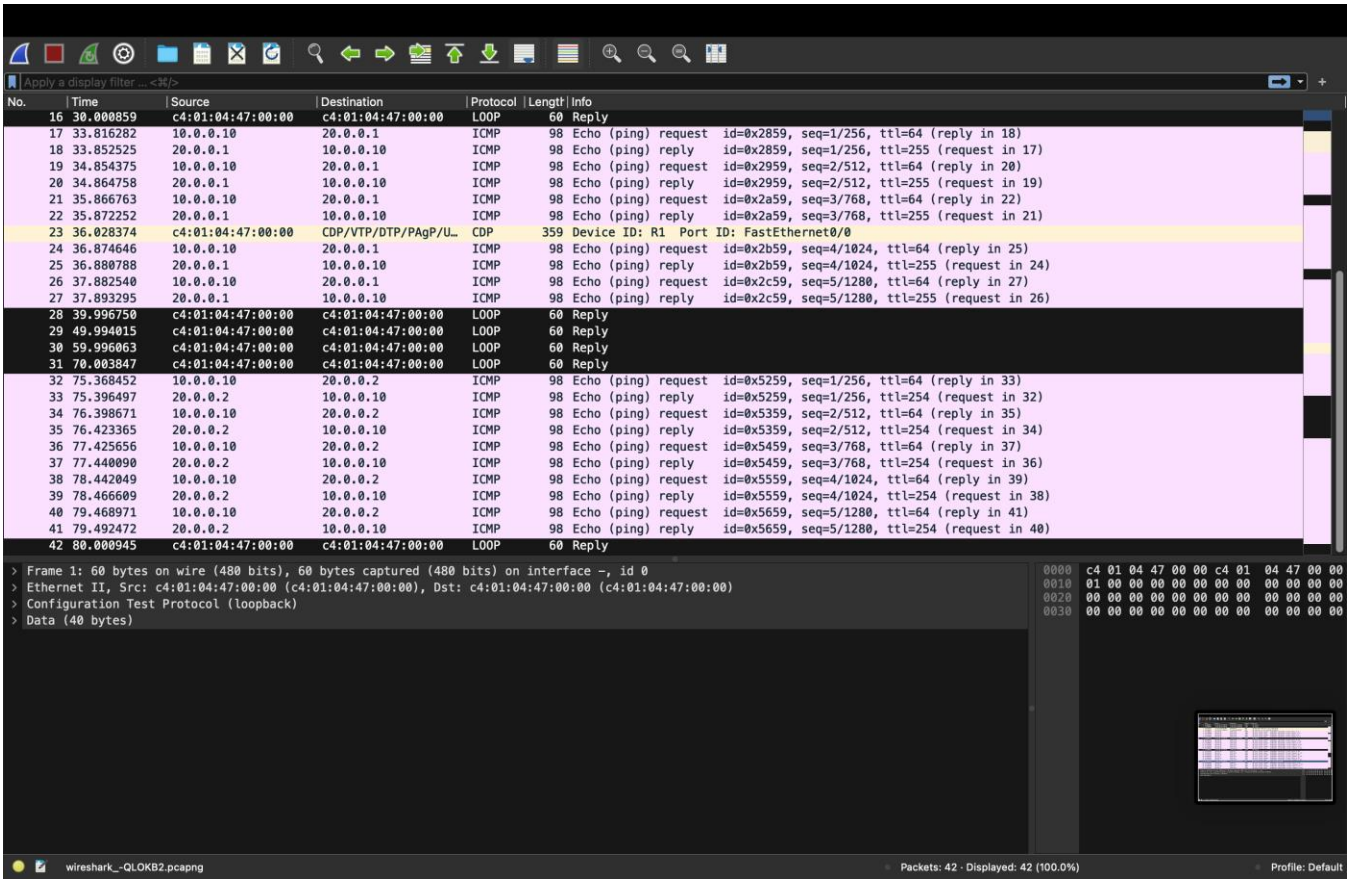
R2(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.1

i) Issuing ping command from PC1 to PC2, Router 1 and Router 2.




ii) Saving the captured wireshark output


Apply a display filter ... <⌘/>
No. Time Source Destination Protocol Lengtr Info
1 0.000000 c4:01:04:47:00:00 c4:01:04:47:00:00 LOOP 60 Reply
2 10.000403 c4:01:04:47:00:00 c4:01:04:47:00:00 LOOP 60 Reply
3 18.385322 Private_66:68:00 Broadcast ARP 64 Who has 10.0.0.1? Tell 10.0.0.10
4 18.390014 c4:01:04:47:00:00 Private_66:68:00 ARP 60 10.0.0.1 is at c4:01:04:47:00:00
5 18.390977 10.0.0.10 30.0.0.10 ICMP 98 Echo (ping) request id=0x1959, seq=1/256, ttl=64 (reply in 6)
6 18.436040 30.0.0.10 10.0.0.10 ICMP 98 Echo (ping) reply id=0x1959, seq=1/256, ttl=62 (request in 5)
7 19.437617 10.0.0.10 30.0.0.10 ICMP 98 Echo (ping) request id=0x1a59, seq=2/512, ttl=64 (reply in 8)
8 19.466862 30.0.0.10 10.0.0.10 ICMP 98 Echo (ping) reply id=0x1a59, seq=2/512, ttl=62 (request in 7)
9 19.998741 c4:01:04:47:00:00 c4:01:04:47:00:00 LOOP 60 Reply
10 20.468532 10.0.0.10 30.0.0.10 ICMP 98 Echo (ping) request id=0x1b59, seq=3/768, ttl=64 (reply in 11)
11 20.504435 30.0.0.10 10.0.0.10 ICMP 98 Echo (ping) reply id=0x1b59, seq=3/768, ttl=62 (request in 10)
12 21.506015 10.0.0.10 30.0.0.10 ICMP 98 Echo (ping) request id=0x1c59, seq=4/1024, ttl=64 (reply in 13)
13 21.551562 30.0.0.10 10.0.0.10 ICMP 98 Echo (ping) reply id=0x1c59, seq=4/1024, ttl=62 (request in 12)
14 22.553332 10.0.0.10 30.0.0.10 ICMP 98 Echo (ping) request id=0x1d59, seq=5/1280, ttl=64 (reply in 15)
15 22.590465 30.0.0.10 10.0.0.10 ICMP 98 Echo (ping) reply id=0x1d59, seq=5/1280, ttl=62 (request in 14)
16 30.000859 c4:01:04:47:00:00 c4:01:04:47:00:00 LOOP 60 Reply
17 33.816282 10.0.0.10 20.0.0.1 ICMP 98 Echo (ping) request id=0x2859, seq=1/256, ttl=64 (reply in 18)
18 33.852525 20.0.0.1 10.0.0.10 ICMP 98 Echo (ping) reply id=0x2859, seq=1/256, ttl=255 (request in 17)
19 34.854375 10.0.0.10 20.0.0.1 ICMP 98 Echo (ping) request id=0x2959, seq=2/512, ttl=64 (reply in 20)
20 34.864758 20.0.0.1 10.0.0.10 ICMP 98 Echo (ping) reply id=0x2959, seq=2/512, ttl=255 (request in 19)
21 35.866763 10.0.0.10 20.0.0.1 ICMP 98 Echo (ping) request id=0x2a59, seq=3/768, ttl=64 (reply in 22)
22 35.872252 20.0.0.1 10.0.0.10 ICMP 98 Echo (ping) reply id=0x2a59, seq=3/768, ttl=255 (request in 21)
23 36.028374 c4:01:04:47:00:00 CDP/VTP/DTP/PAgP/U… CDP 359 Device ID: R1 Port ID: FastEthernet0/0
24 36.874646 10.0.0.10 20.0.0.1 ICMP 98 Echo (ping) request id=0x2b59, seq=4/1024, ttl=64 (reply in 25)
25 36.880788 20.0.0.1 10.0.0.10 ICMP 98 Echo (ping) reply id=0x2b59, seq=4/1024, ttl=255 (request in 24)
26 37.882540 10.0.0.10 20.0.0.1 ICMP 98 Echo (ping) request id=0x2c59, seq=5/1280, ttl=64 (reply in 27)
27 37.893295 20.0.0.1 10.0.0.10 ICMP 98 Echo (ping) reply id=0x2c59, seq=5/1280, ttl=255 (request in 26)
Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface -, id 0
Ethernet II, Src: c4:01:04:47:00:00 (c4:01:04:47:00:00), Dst: c4:01:04:47:00:00 (c4:01:04:47:00:00)
Configuration Test Protocol (loopback)
Data (40 bytes)
0000 c4 01 04 47 00 00 c4 01 04 47 00 00
0010 01 00 00 00 00 00 00 00 00 00 00 00
0020 00 00 00 00 00 00 00 00 00 00 00 00
0030 00 00 00 00 00 00 00 00 00 00 00 00
wireshark_-QLOKB2.pcapng
Packets: 42 · Displayed: 42 (100.0%)
Profile: Default




*Q) Which packets, if any, are captured by Wireshark?*

During the network activity where I was pinging from PC1 to PC2, Router1, and Router2 in a GNS3 simulation, Wireshark captured several types of packets:

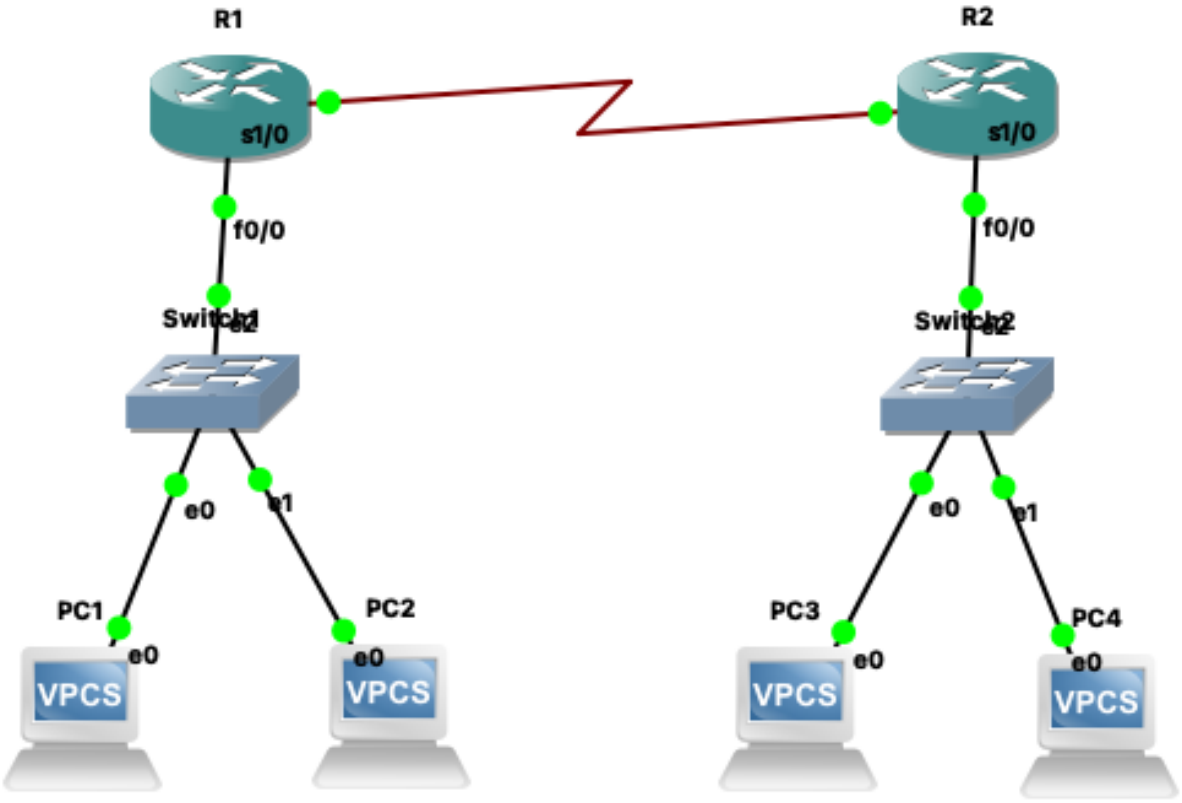
- ICMP (Internet Control Message Protocol) Packets: These packets are generated by the ping command and are used for network troubleshooting and diagnostics. They are the direct result of the ping activity between PC1 and the other devices.
- ARP (Address Resolution Protocol) Packets: ARP packets are used to map IP addresses to MAC addresses on a local network. They are essential for devices to communicate with each other within the same subnet.
- LOOP Packets: LOOP is likely a virtual or loopback interface used in the GNS3 environment. Packets related to this interface might be captured if they are part of the network activity.
- CDP (Cisco Discovery Protocol) Packets: CDP is a proprietary Cisco protocol used for discovering and gathering information about neighboring Cisco devices on a network. If Router1 and Router2 are Cisco devices or are configured to use CDP, Wireshark might capture CDP packets as well.

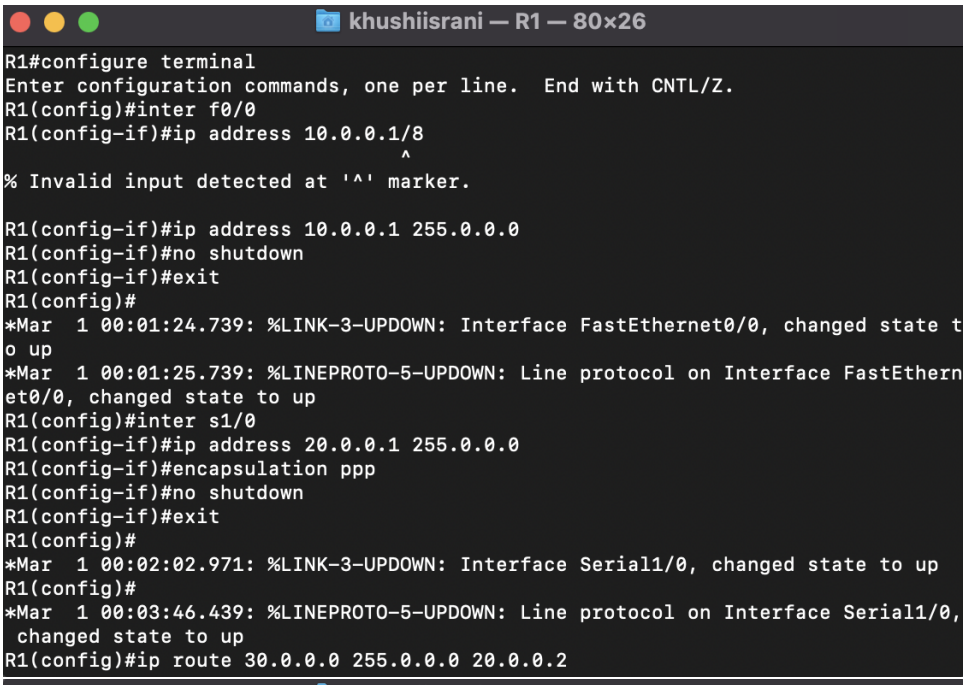
These are the types of packets that Wireshark captured during the ping activity, each serving a specific purpose in network communication.

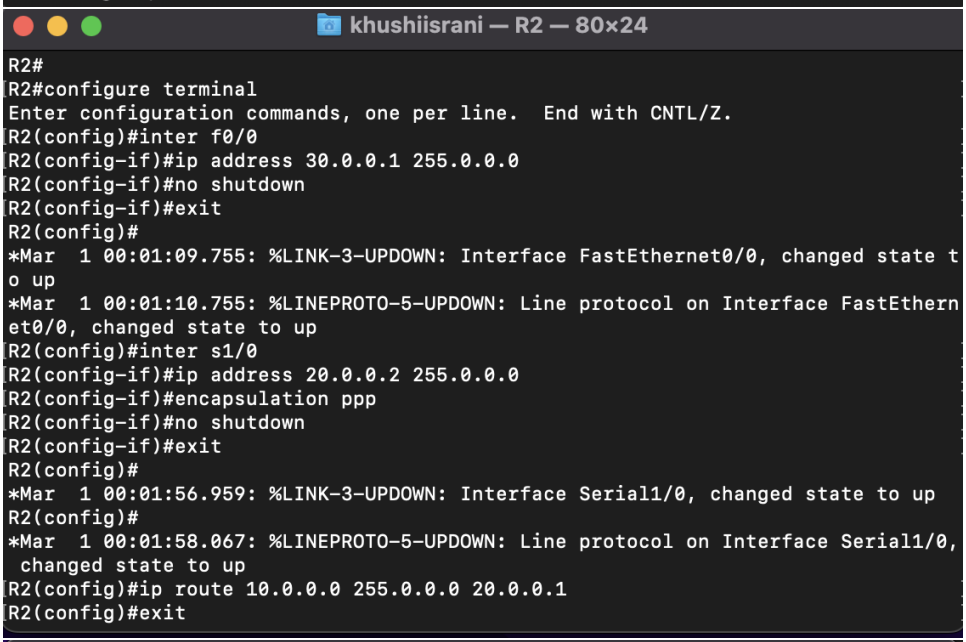
*Q) Do you observe any ARP packets? If so, what do they indicate?*

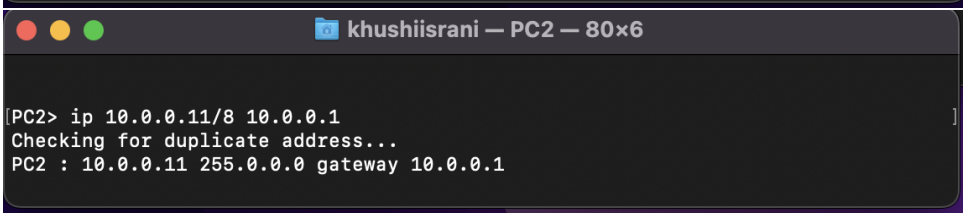
Yes, I observed ARP Packets. They are used to map IP addresses to MAC addresses on a local network. They are essential for devices to communicate with each other within the same subnet.

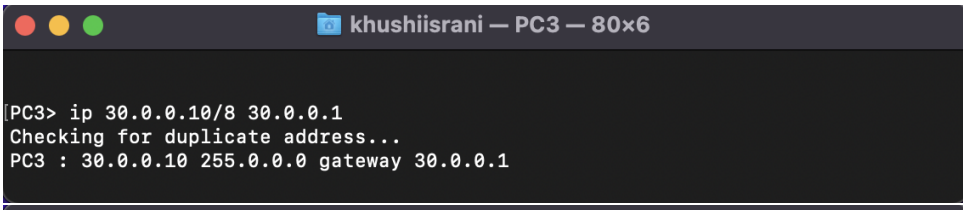
**II.** In the CSE department, two students sitting in two different labs want to establish a connection and send the data. So, configure the below network topology as shown in Figure. 6.8 and check the connectivity by pinging from PC0 to PC2.

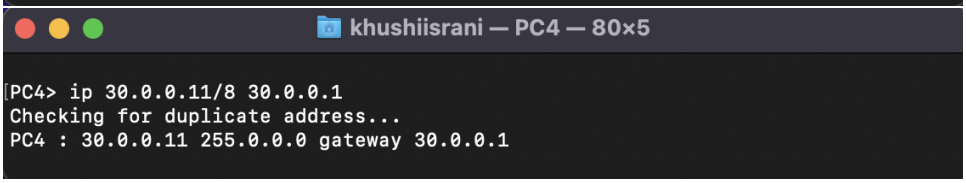


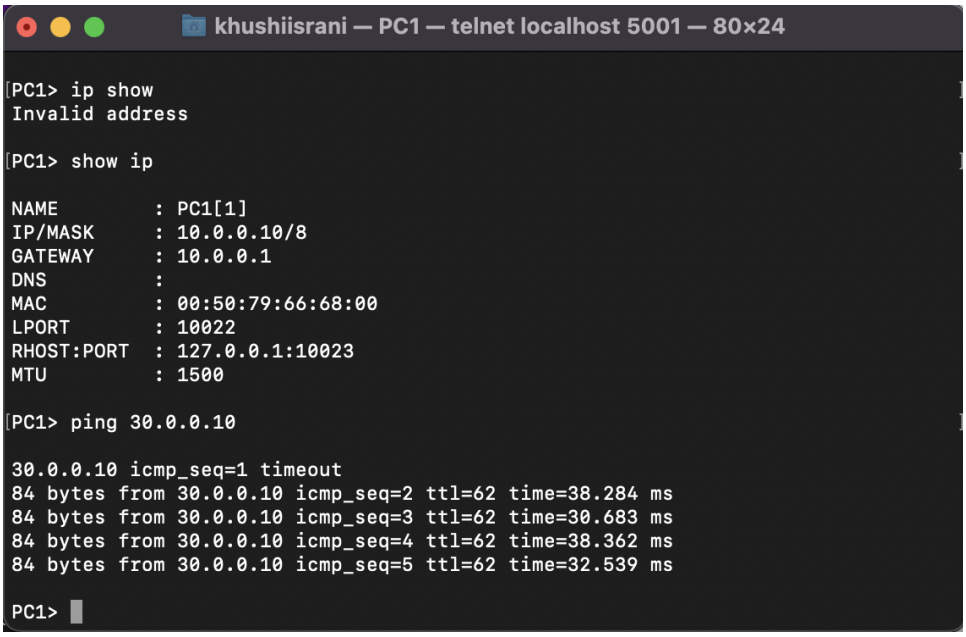

khushiisrani — R1 — 80×26
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#inter f0/0
R1(config-if)#ip address 10.0.0.1/8
                              ^
% Invalid input detected at '^' marker.
R1(config-if)#ip address 10.0.0.1 255.0.0.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#
*Mar  1 00:01:24.739: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:01:25.739: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
R1(config)#inter s1/0
R1(config-if)#ip address 20.0.0.1 255.0.0.0
R1(config-if)#encapsulation ppp
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#
*Mar  1 00:02:02.971: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R1(config)#
*Mar  1 00:03:46.439: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0,
 changed state to up
R1(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2


khushiisrani — R2 — 80×24
R2#
R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#inter f0/0
R2(config-if)#ip address 30.0.0.1 255.0.0.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#
*Mar  1 00:01:09.755: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:01:10.755: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
R2(config)#inter s1/0
R2(config-if)#ip address 20.0.0.2 255.0.0.0
R2(config-if)#encapsulation ppp
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#
*Mar  1 00:01:56.959: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R2(config)#
*Mar  1 00:01:58.067: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0,
 changed state to up
R2(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.1
R2(config)#exit


khushiisrani — PC2 — 80×6
PC2> ip 10.0.0.11/8 10.0.0.1
Checking for duplicate address...
PC2 : 10.0.0.11 255.0.0.0 gateway 10.0.0.1


khushiisrani — PC3 — 80×6
PC3> ip 30.0.0.10/8 30.0.0.1
Checking for duplicate address...
PC3 : 30.0.0.10 255.0.0.0 gateway 30.0.0.1


khushiisrani — PC4 — 80×5
PC4> ip 30.0.0.11/8 30.0.0.1
Checking for duplicate address...
PC4 : 30.0.0.11 255.0.0.0 gateway 30.0.0.1


khushiisrani — PC1 — telnet localhost 5001 — 80×24
PC1> ip show
Invalid address
PC1> show ip
NAME : PC1[1]
IP/MASK : 10.0.0.10/8
GATEWAY : 10.0.0.1
DNS :
MAC : 00:50:79:66:68:00
LPORT : 10022
RHOST:PORT : 127.0.0.1:10023
MTU : 1500
PC1> ping 30.0.0.10
30.0.0.10 icmp_seq=1 timeout
84 bytes from 30.0.0.10 icmp_seq=2 ttl=62 time=38.284 ms
84 bytes from 30.0.0.10 icmp_seq=3 ttl=62 time=30.683 ms
84 bytes from 30.0.0.10 icmp_seq=4 ttl=62 time=38.362 ms
84 bytes from 30.0.0.10 icmp_seq=5 ttl=62 time=32.539 ms
PC1>