# LAB 4

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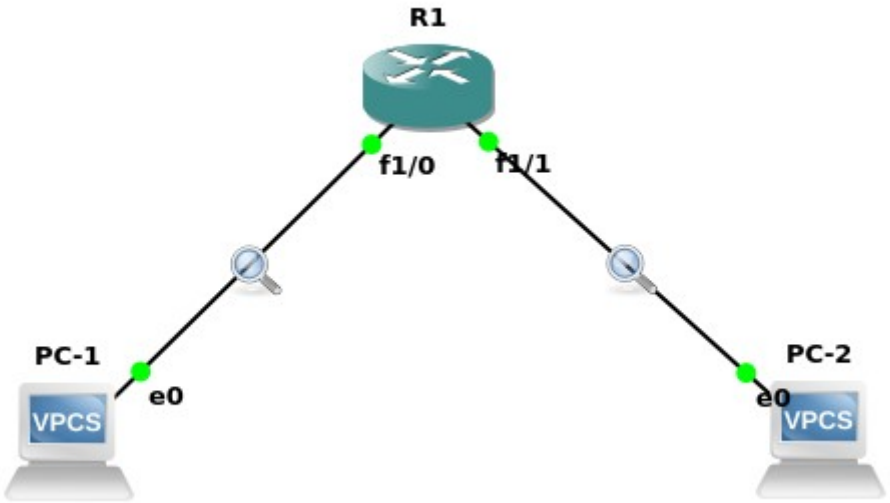
**Roll No: 55**
**Batch B3**

## 1) Connect 2 PCs with 1 router, ping PC2 from PC1 and see differences.

## Design:




In the router R1 console, configure R1 using the following:

R1# config t

//configure f1/0 and f1/1

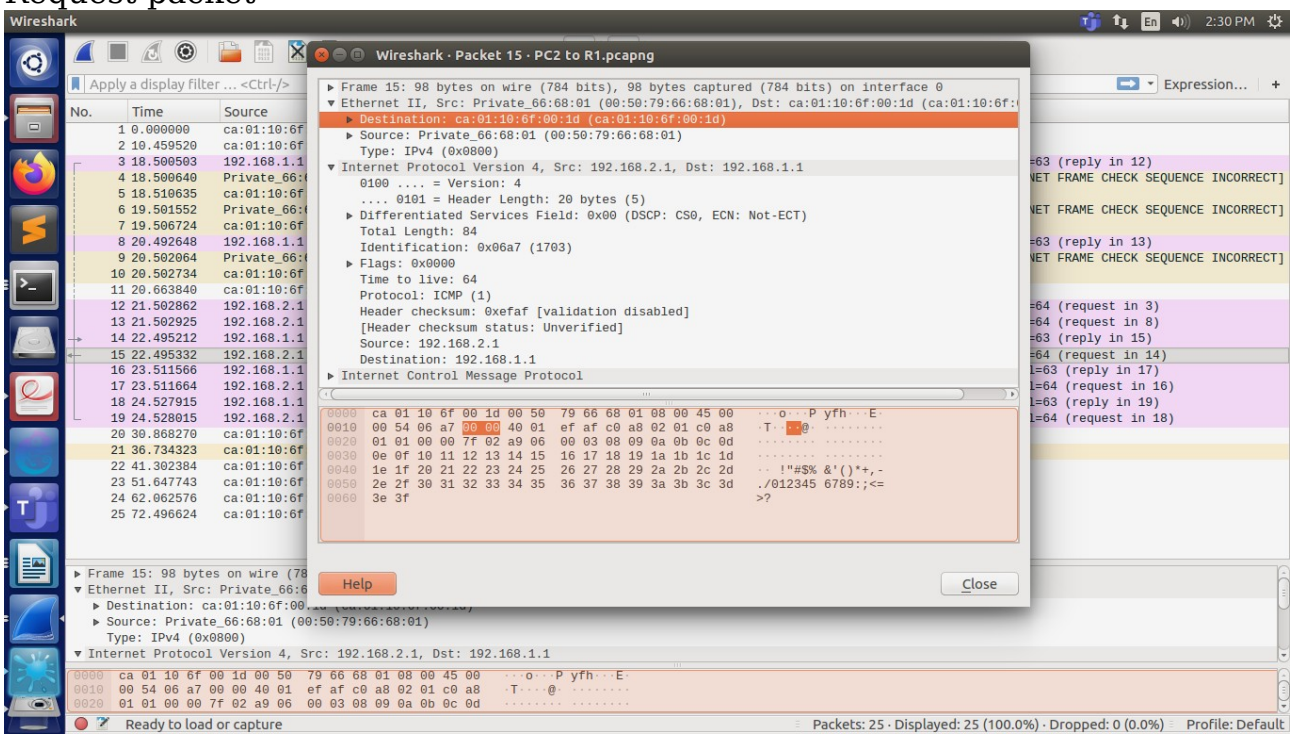
R1(Config)# interface f1/0
R1(Config if)# ip address 192.168.1.254 255.255.255.0
R1(Config if)# no shutdown
R1(Config if)# exit

R1(Config)# interface f1/1
R1(Config if)# ip address 192.168.2.254 255.255.255.0
R1(Config if)# no shutdown
R1(Config if)# exit

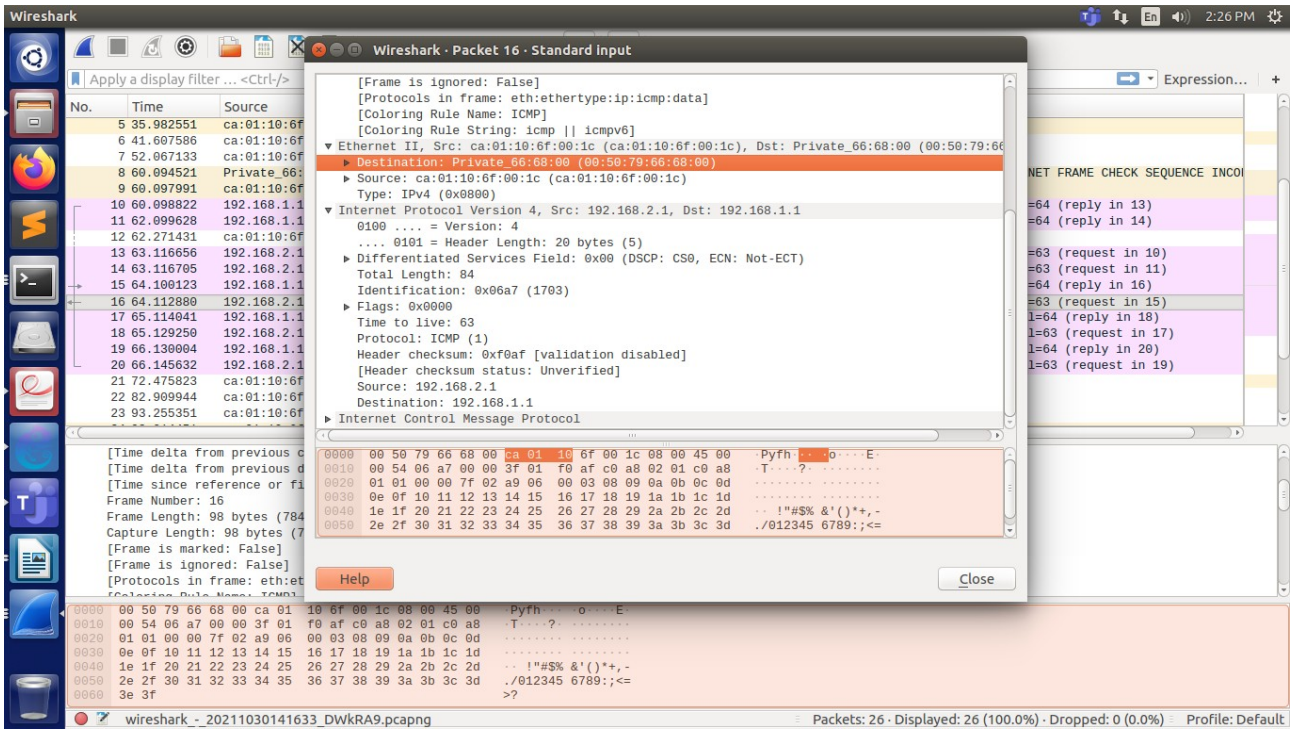
Then go to PC-1 console and then ping ip address of PC-2 (192.168.2.1)
Before configuring the router, when we try to ping PC-2 from PC-1, since the network ID is different for both, it says that the host is not reachable.

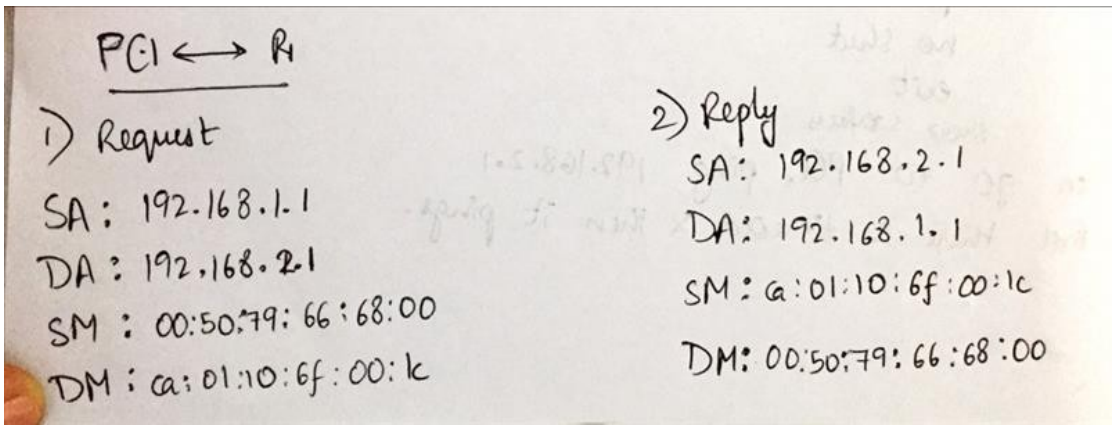
# PC1 <--> R1

## Request packet



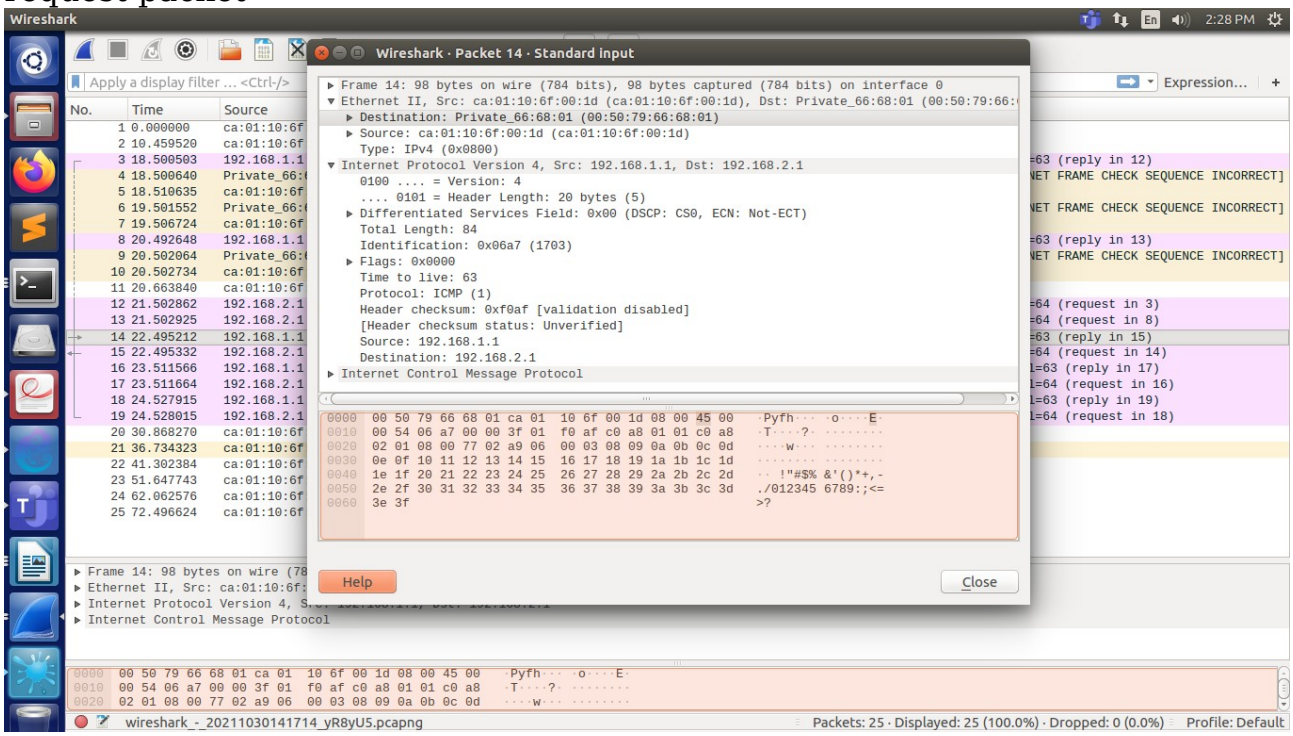

## Reply packet



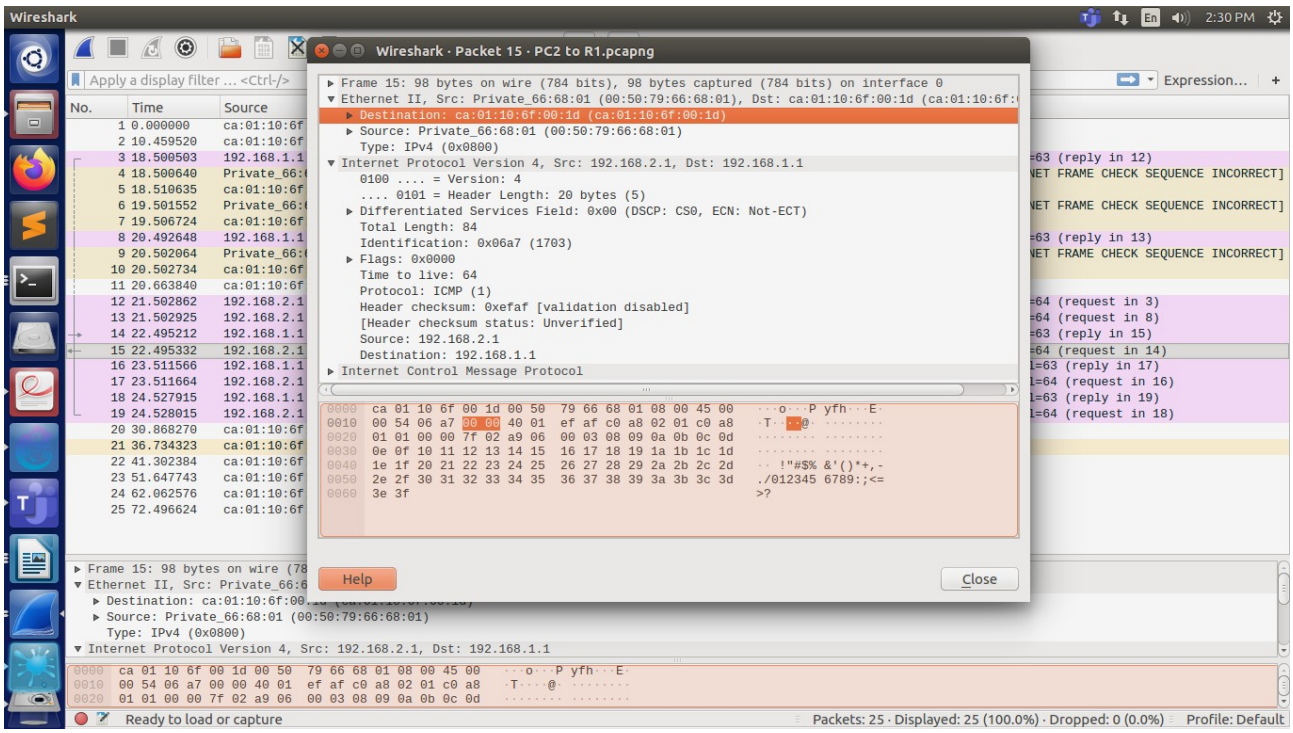


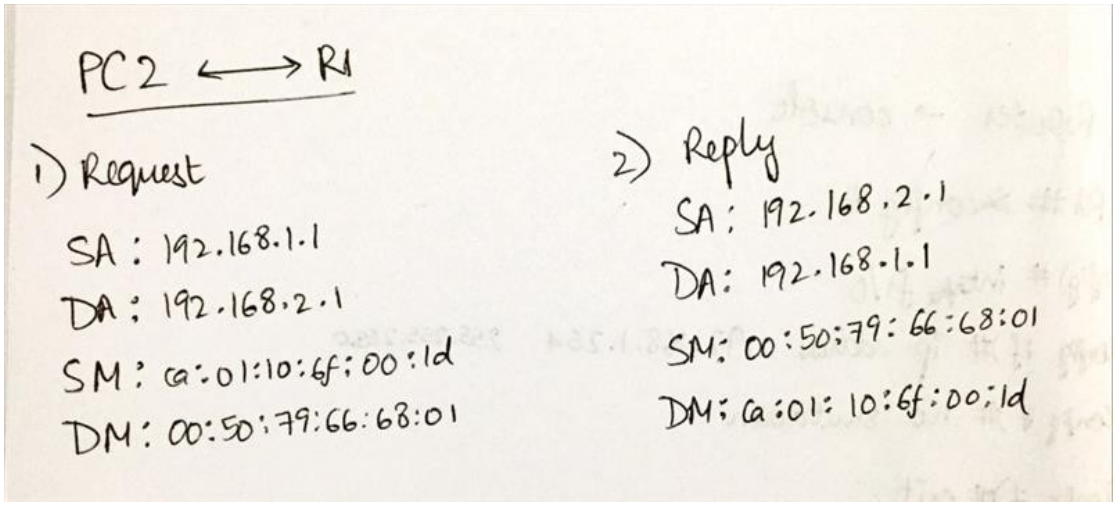

PC2 <--> R1

request packet



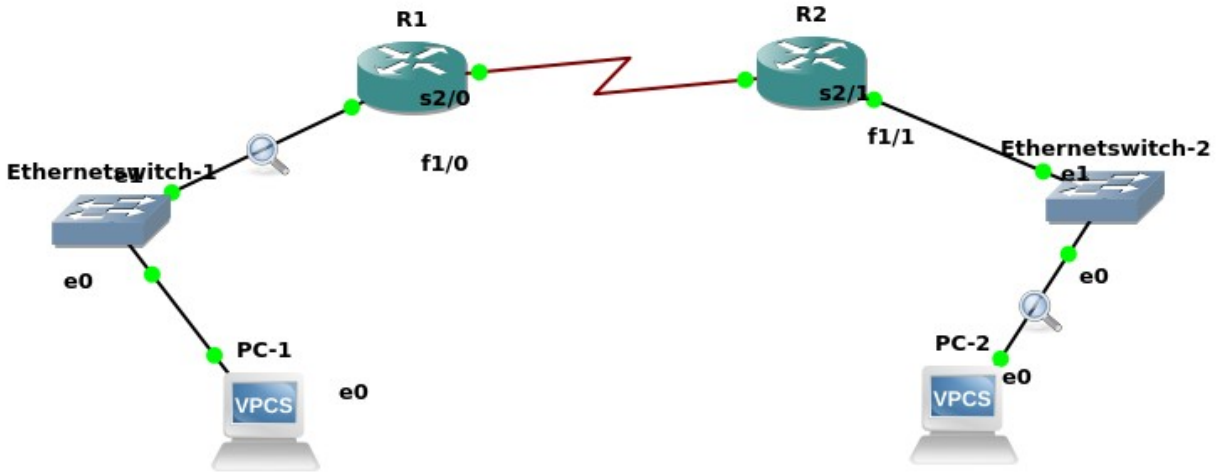

reply packet




## 2) Connect 2 PCs with 2 routers, ping PC2 from PC1 and see differences.

## Design:




In the router R1 console, configure R1

config t

//configure f1/0 and s2/0
interface f1/0
ip address 192.168.1.254 255.255.255.0
no shutdown
exit

interface s2/0
ip address 10.0.0.1 255.0.0.0
no shutdown
exit

ip route 192.168.2.0 255.255.255.0 10.0.0.2

In the router R2 console, configure R2

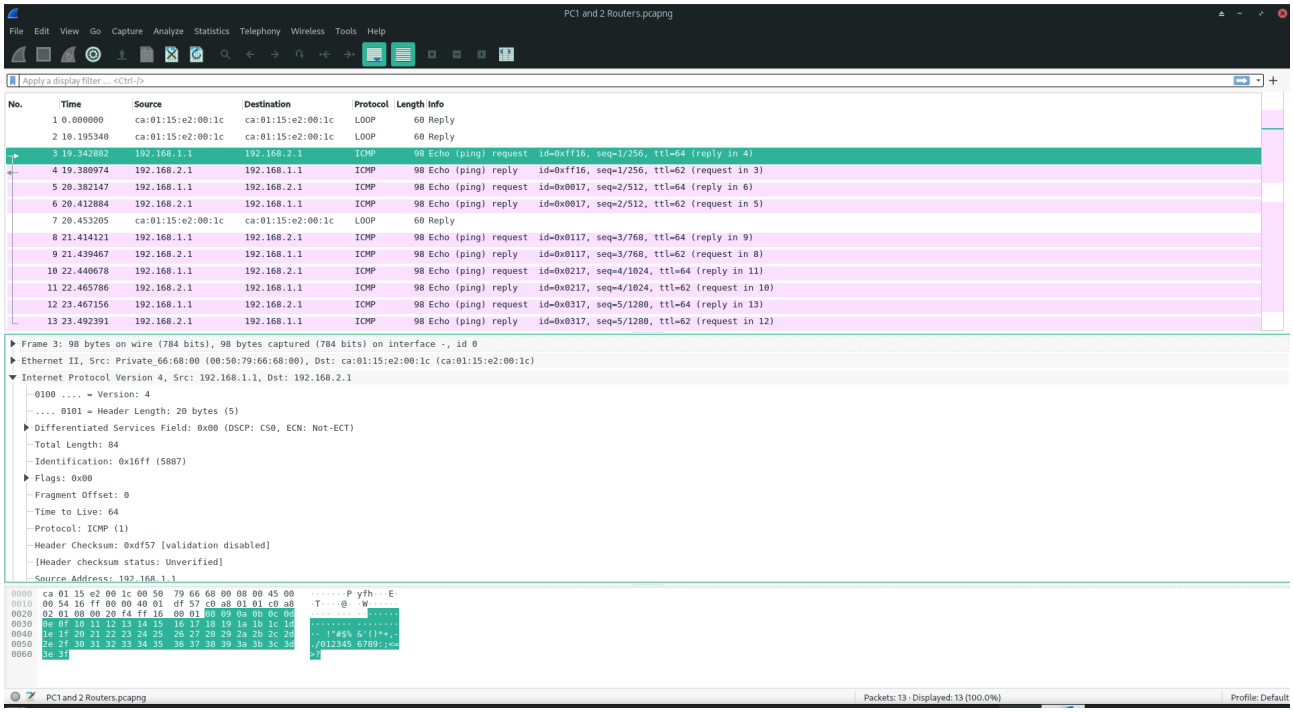
config t

//configure f1/1 and s2/1
interface f1/1
ip address 192.168.2.254 255.255.255.0
no shutdown
exit

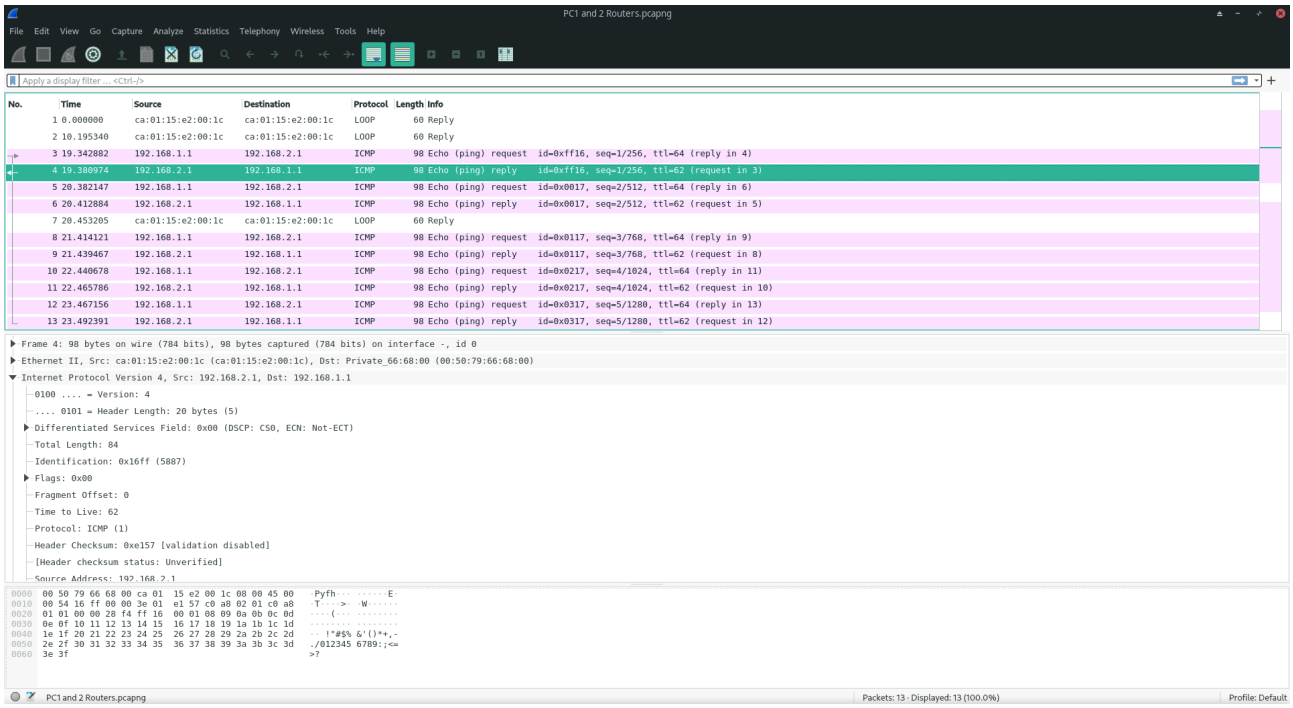
interface s2/1
ip address 10.0.0.2 255.0.0.0
no shutdown
exit

ip route 192.168.1.0 255.255.255.0 10.0.0.1

**Request packet at PC-1:**

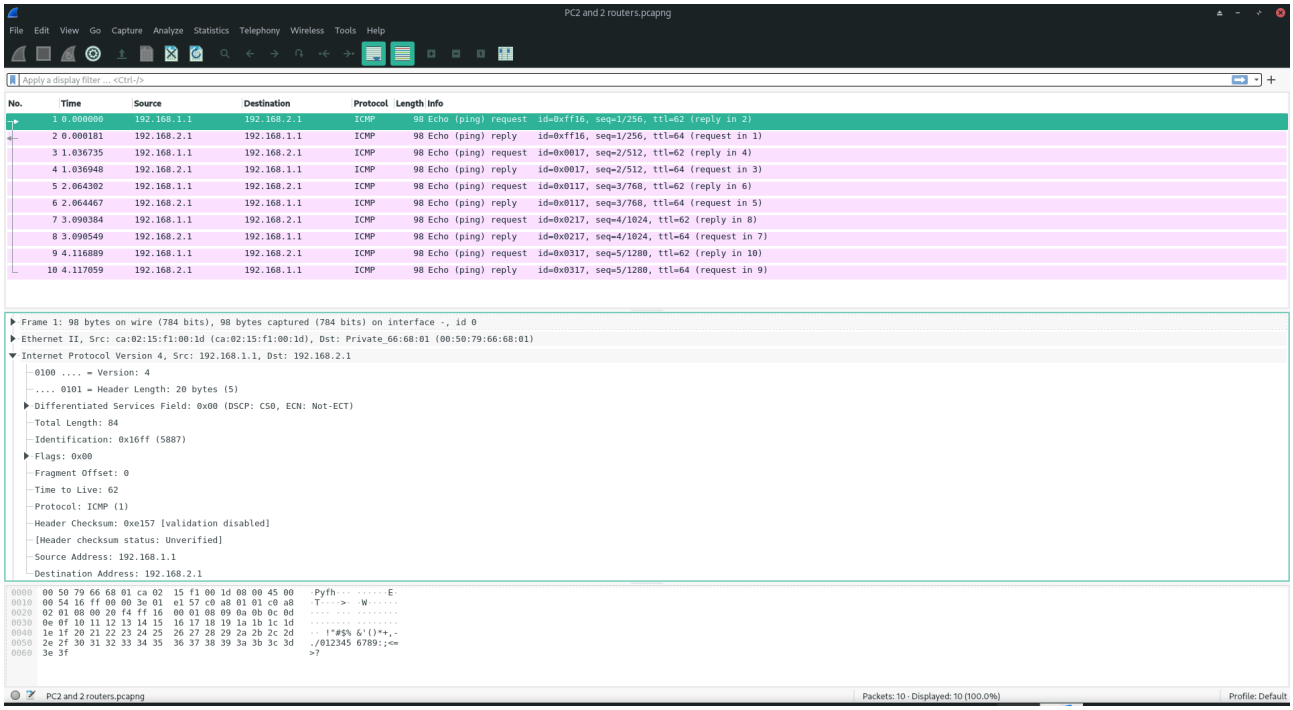



## Reply packet at PC-1:

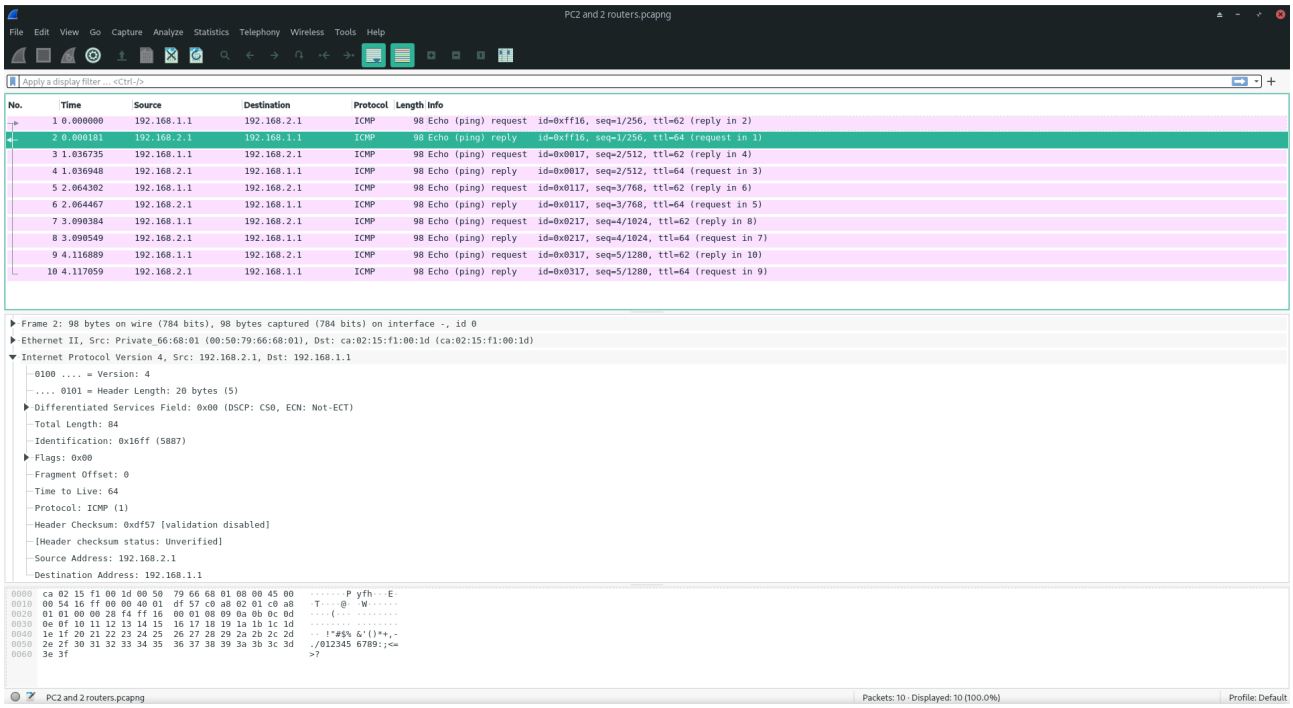



When I configured both the routers, and went to ping PC-2 from PC-1, the next hop address will be that of R2 and vice versa. One thing to note is that the routers will have the same net id which is why they can communicate with each other. Since, we dont have all the permissions, we notice that we cannot see the MAC addresses of both the routers.

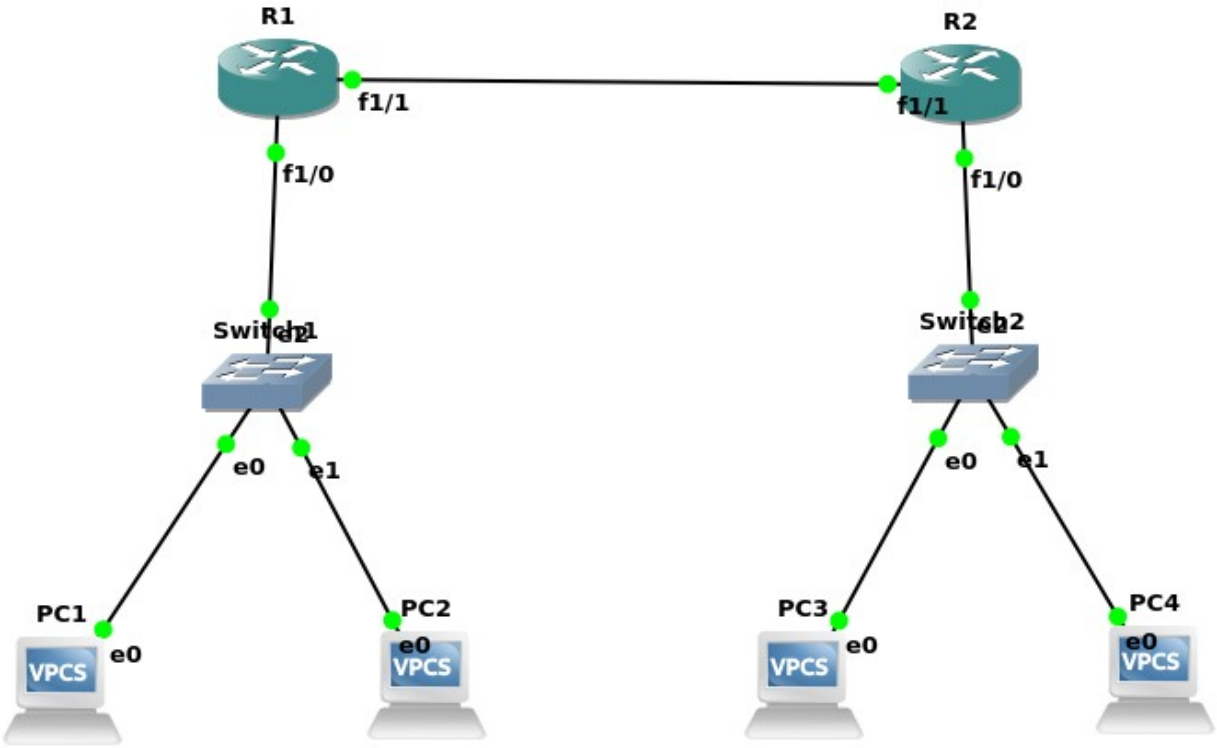
## Request packet at PC-2:




## Reply packet at PC-2:




# Additional Question:
# Connect 4 PCs using 2 routers




Configuration of the PCs and routers:

PC1

```
Dedicated to Daling.
Build time: Nov  1 2021 21:18:46
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
All rights reserved.

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Press '?' to get help.

Executing the startup file


PC1> ip 192.168.1.1 255.255.255.0
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.0
```

PC2

```
Trying ::1...
Connected to localhost.
Escape character is '^]'.

Welcome to Virtual PC Simulator, version 0.8.2
Dedicated to Daling.
Build time: Nov  1 2021 21:18:46
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
All rights reserved.

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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


PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC2 : 192.168.1.2 255.255.255.0

PC2>
```

PC3

```
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file


PC3> ip 192.168.2.1/24
Checking for duplicate address...
PC3 : 192.168.2.1 255.255.255.0
```

```
PC4> ip 192.168.2.2/24
Checking for duplicate address...
PC4 : 192.168.2.2 255.255.255.0

PC4>
```

R1

```
*Nov 14 15:55:27.135: %LINK-5-CHANGED: Interface FastEthernet1/1, changed state
to administratively down
R1#
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#int f1/0
R1(config-if)#ip address 192.168.1.254 255.255.255.0
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#
*Nov 14 16:34:46.319: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state t
o up
*Nov 14 16:34:47.319: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/0, changed state to up
R1(config)#int f1/1
R1(config-if)#ip address 10.0.0.1 255.0.0.0
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#e
*Nov 14 16:35:43.831: %LINK-3-UPDOWN: Interface FastEthernet1/1, changed state t
o up
*Nov 14 16:35:44.831: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/1, changed state to up
R1(config)#exit
```

R2

```
R2#
R2#
R2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#int f1/1
R2(config-if)#ip address 10.0.0.2 255.0.0.0
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#
*Nov 14 16:37:23.323: %LINK-3-UPDOWN: Interface FastEthernet1/1, changed state t
o up
*Nov 14 16:37:24.323: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/1, changed state to up
R2(config)#int f1/0
R2(config-if)#ip address 192.168.2.254 255.255.255.0
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#
*Nov 14 16:37:54.039: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state t
o up
*Nov 14 16:37:55.039: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/0, changed state to up
R2(config)#exit
```

```
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ip route 192.168.2.0 255.255.255.0 10.0.0.2
R1(config)#exit
R1#
*Nov 14 16:47:42.211: %SYS-5-CONFIG_I: Configured from console by console
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

C    10.0.0.0/8 is directly connected, FastEthernet1/1
C    192.168.1.0/24 is directly connected, FastEthernet1/0
S    192.168.2.0/24 [1/0] via 10.0.0.2
```


```
R2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip route 192.168.1.0 255.255.255.0 10.0.0.1
R2(config)#exit
R2#
*Nov 14 16:47:37.447: %SYS-5-CONFIG_I: Configured from console by console
R2#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

C    10.0.0.0/8 is directly connected, FastEthernet1/1
S    192.168.1.0/24 [1/0] via 10.0.0.1
C    192.168.2.0/24 is directly connected, FastEthernet1/0
```