

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.



LAB REPORT

on

OPERATING SYSTEMS

Submitted by

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in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING

in
COMPUTER SCIENCE AND ENGINEERING



B.M.S. COLLEGE OF ENGINEERING

(Autonomous Institution under VTU)

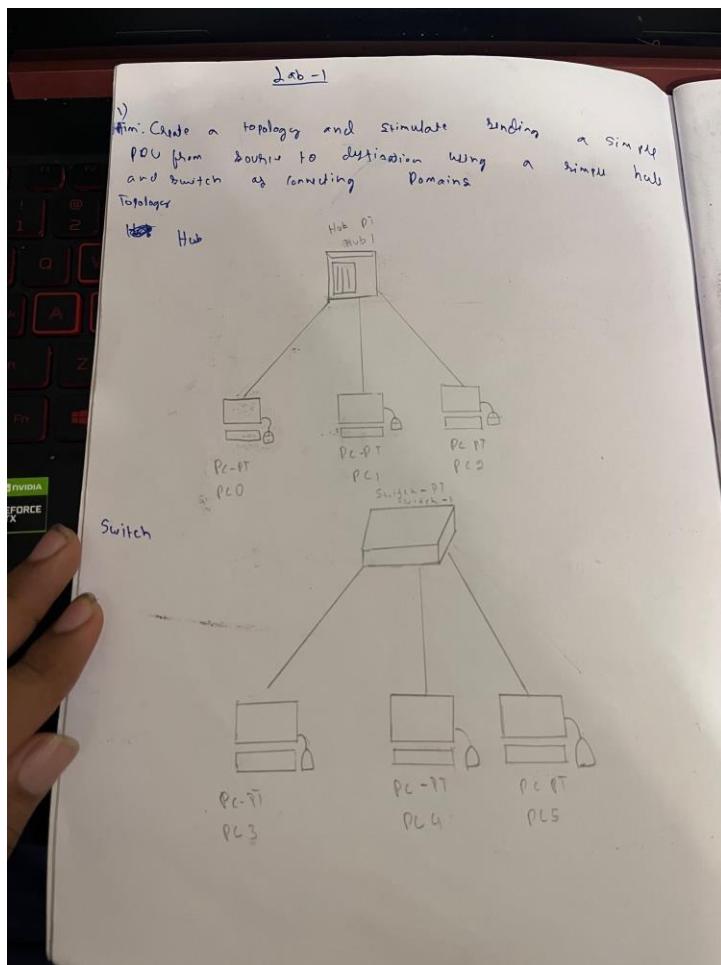
BENGALURU-560019

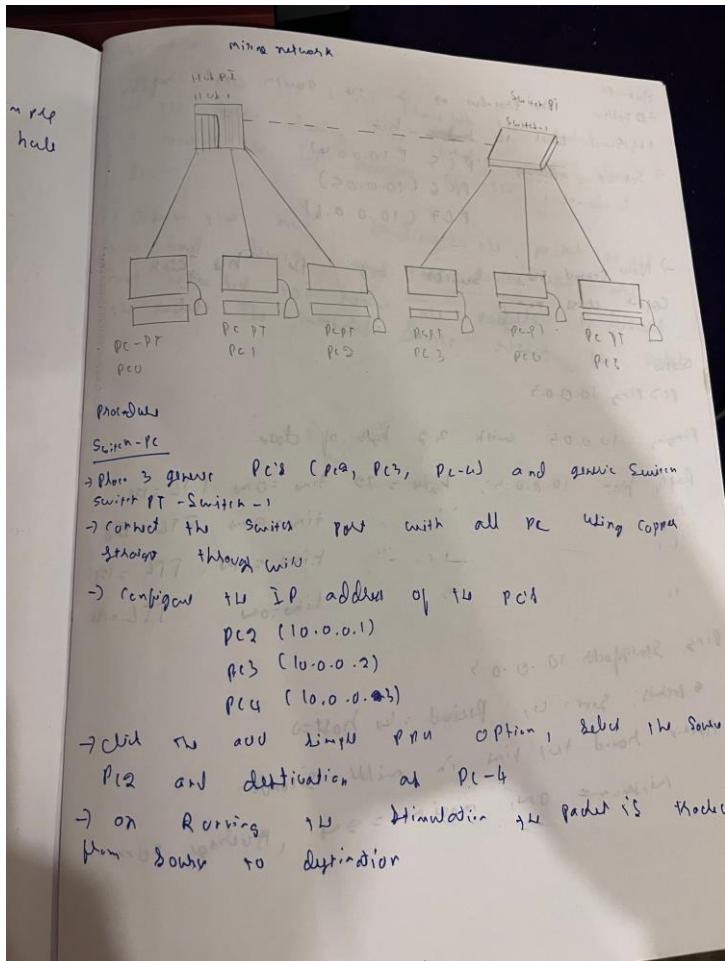
June-2023 to September-2023

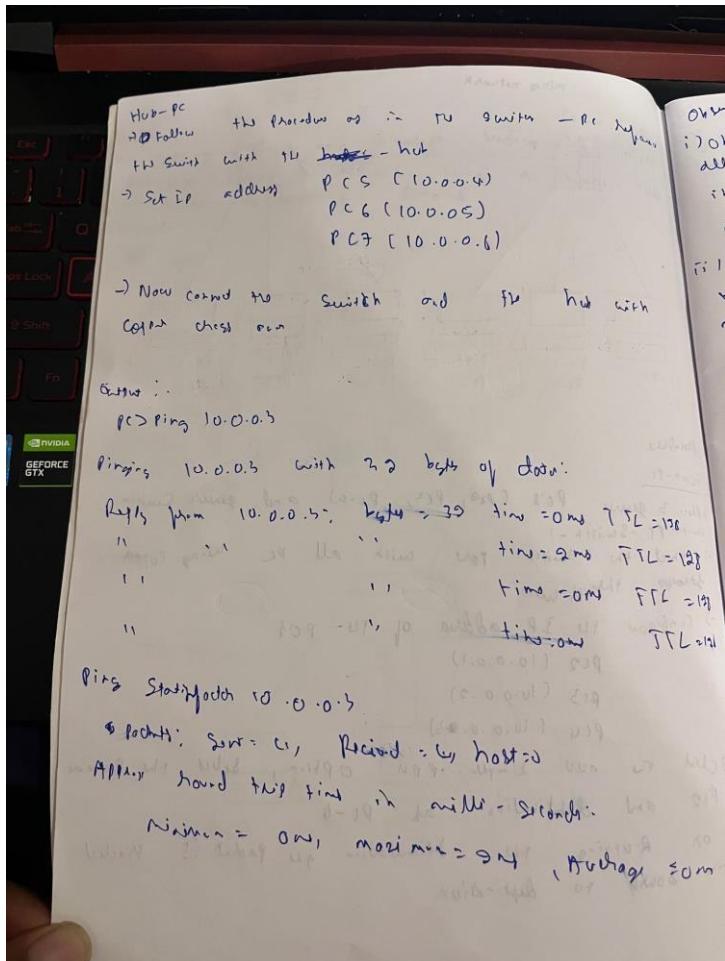
WEEK 1

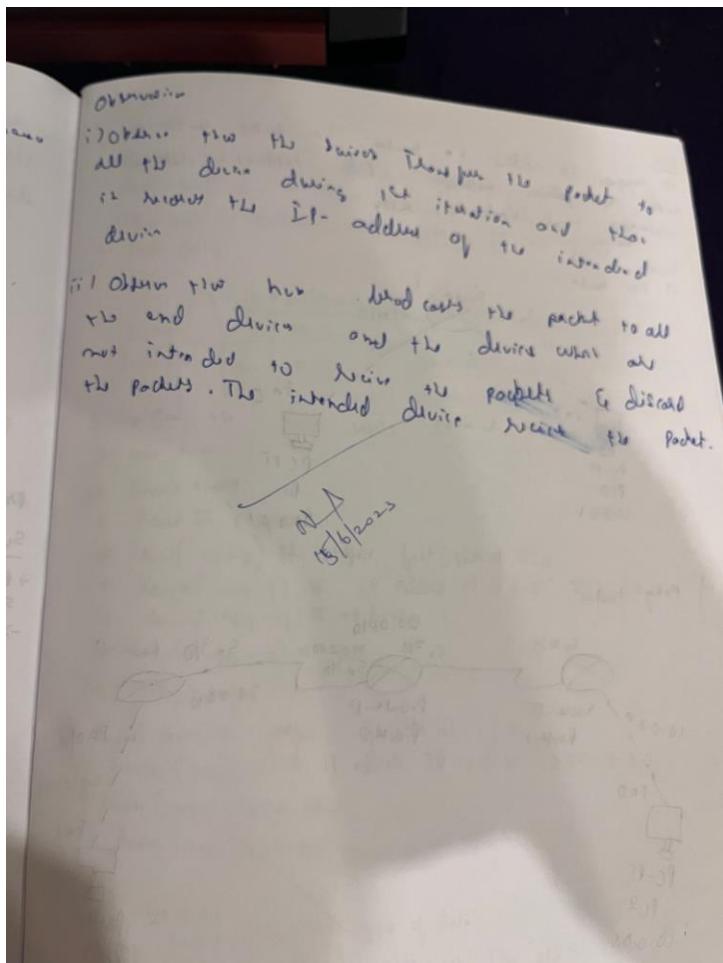
Create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate ping messages.

OBSERVATION :









OUTPUT:

Logical View:

Simulation Panel - Event List:

Vis.	Time(sec)	Last Device	At Device	Type	Info
7.543	--	PC2	PC2	STP	
9.539	--	Switch1	Switch1	STP	
9.540	--	Switch1	PC3	STP	
9.540	--	Switch1	PC2	STP	
9.540	--	Switch1	PC3	STP	
9.540	--	Hub0	PC0	STP	
9.541	Hub0	PC1	STP		
9.541	Hub0	PC2	STP		

Play Controls: Back, Auto Capture / Play, Capture / Forward

Event List Filters - Visible Events:

ACL, ARP, ARP_BGP, CDP, DHCPC, DNS, DPP, EIGRP, EIGRP-6, FPP, H.323, ICMP, IGMP, IP, IPX, L2TP, OSPF, OSPF-6, PING, RIPv1, RIPv2, RIPv6, RMON, RSRP, RSRQ, RTSP, SCP, SMTR, SNMP, SSH, STP, SYSLOG, TACACS, TDP, TFTP, Telnet, UDP, VTP

Simulation Panel - Event List (Realtime):

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete	Settings to active
Successful	PC0	PC2	ICMP	Blue	0.000	N	0	(edit)	(delete)	(edit)	(delete)
Successful	PC3	PC5	ICMP	Green	0.000	N	1	(edit)	(delete)	(edit)	(delete)
Successful	PC0	PC5	ICMP	Green	0.000	N	2	(edit)	(delete)	(edit)	(delete)

PC0 Command Prompt:

```

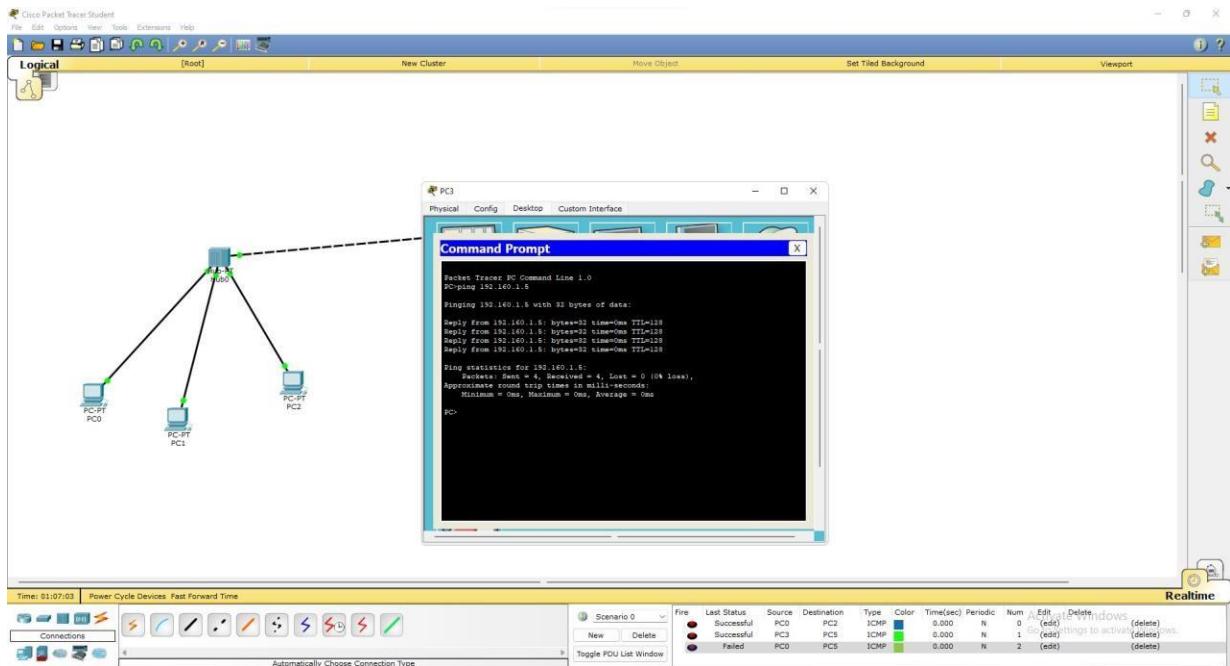
PCping 192.160.1.9
Pinging 192.160.1.9 with 32 bytes of data:
Reply from 192.160.1.9: bytes=32 time=0ms TTL=128
Reply from 192.160.1.9: bytes=32 time=1ms TTL=128
Reply from 192.160.1.9: bytes=32 time=1ms TTL=128
Reply from 192.160.1.9: bytes=32 time=0ms TTL=128

Ping statistics for 192.160.1.9:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
PCping 192.160.1.9

```

Realtime Simulation Panel - Event List:

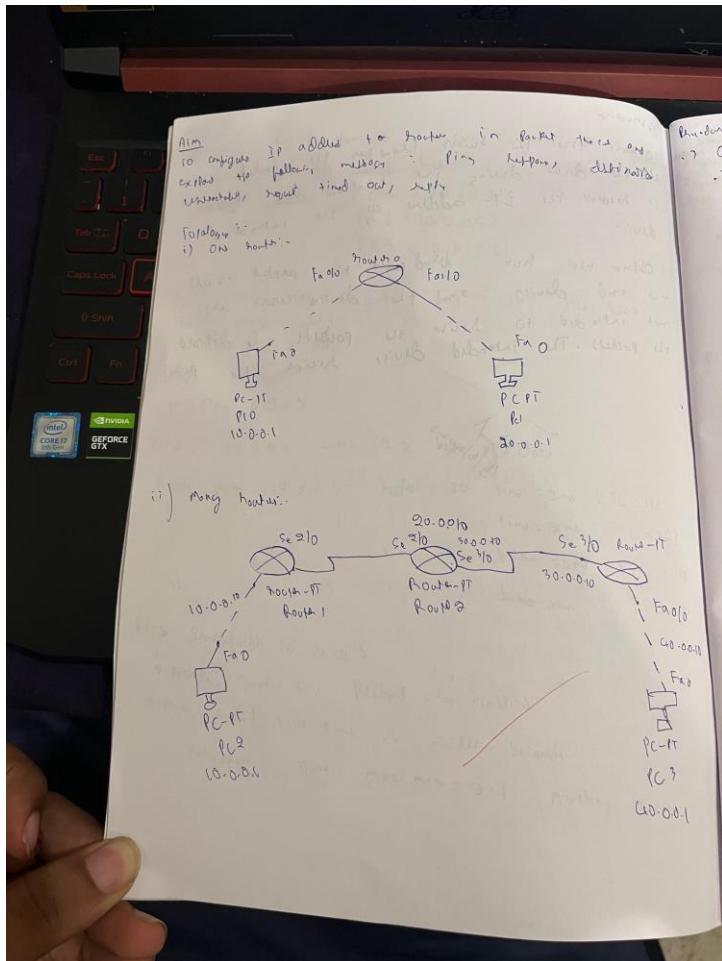
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete	Settings to active
Successful	PC0	PC2	ICMP	Blue	0.000	N	0	(edit)	(delete)	(edit)	(delete)
Failed	PC3	PC5	ICMP	Green	0.000	N	1	(edit)	(delete)	(edit)	(delete)
Failed	PC0	PC5	ICMP	Green	0.000	N	2	(edit)	(delete)	(edit)	(delete)



WEEK 2

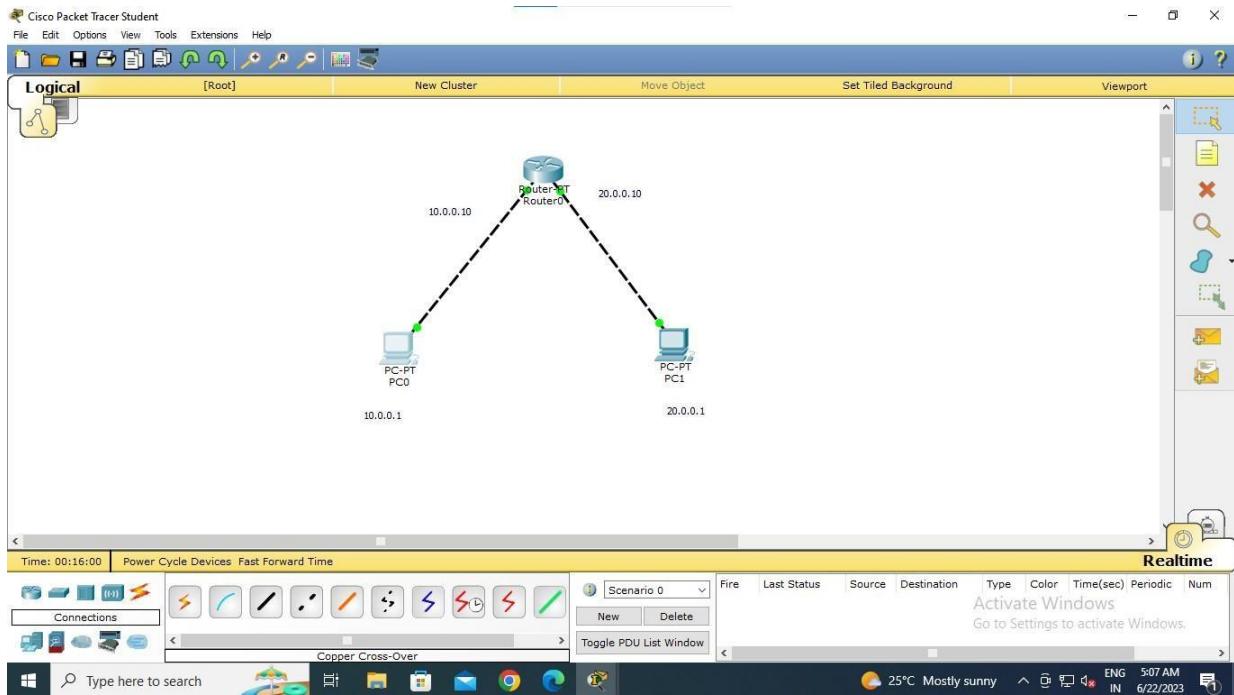
Configure IP address to routers (one and three) in packet tracer. Explore the following messages: ping responses, destination unreachable, request timed out, reply.

OBSERVATION:

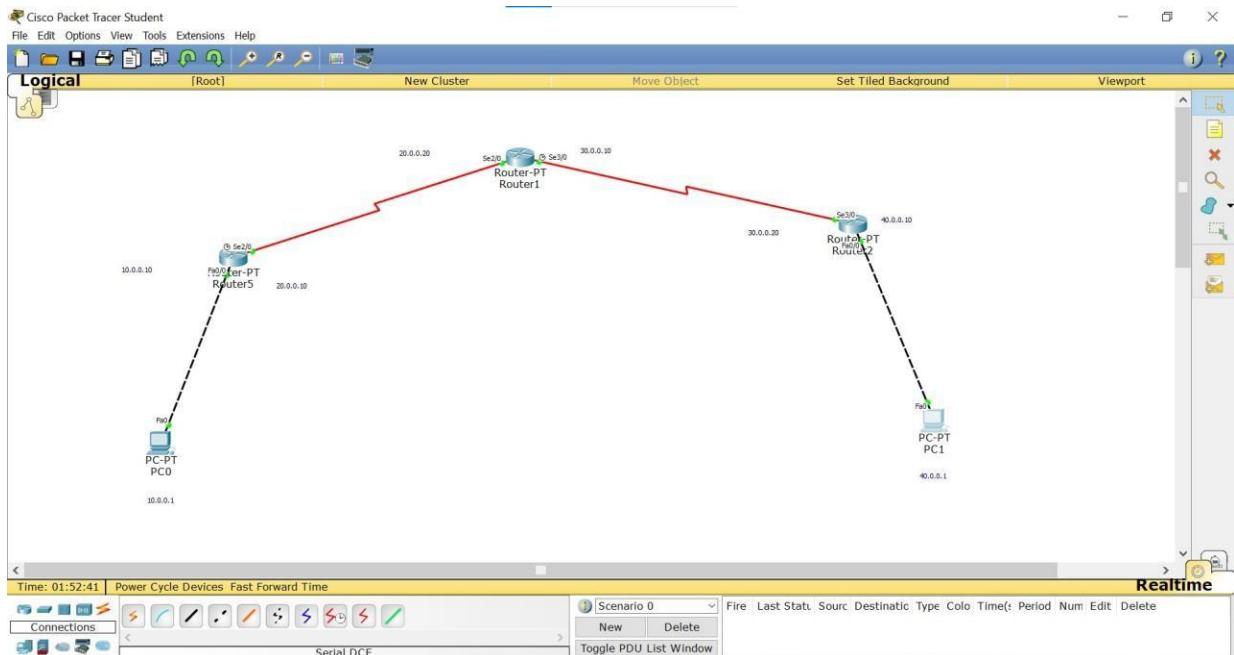


TOPOLOGY:

PROGRAM 2.1



PROGRAM 2.2



OUTPUT:

PROGRAM 2.1

The screenshot shows a Cisco Packet Tracer interface. A window titled "Command Prompt" is open, displaying the output of a ping command from PC0 to Router0. The output is as follows:

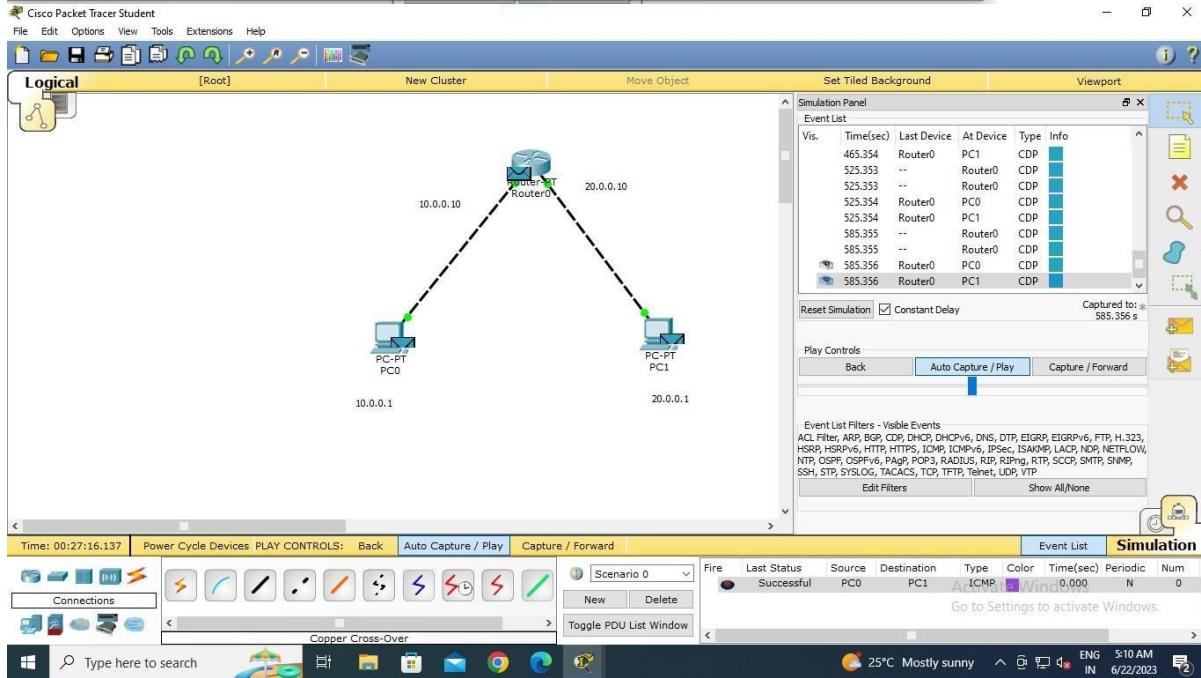
```
Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
Reply from 20.0.0.1: bytes=32 time=10ms TTL=127

Ping statistics for 20.0.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 3ms

PC>
```



PROGRAM 2.2

PC0

Physical Config Desktop Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

Reply from 10.0.0.10: Destination host unreachable.
Reply from 10.0.0.10: Destination host unreachable.
Reply from 10.0.0.10: Destination host unreachable.
Request timed out.

Ping statistics for 40.0.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
```

PC1

Physical Config Desktop Custom Interface

Command Prompt

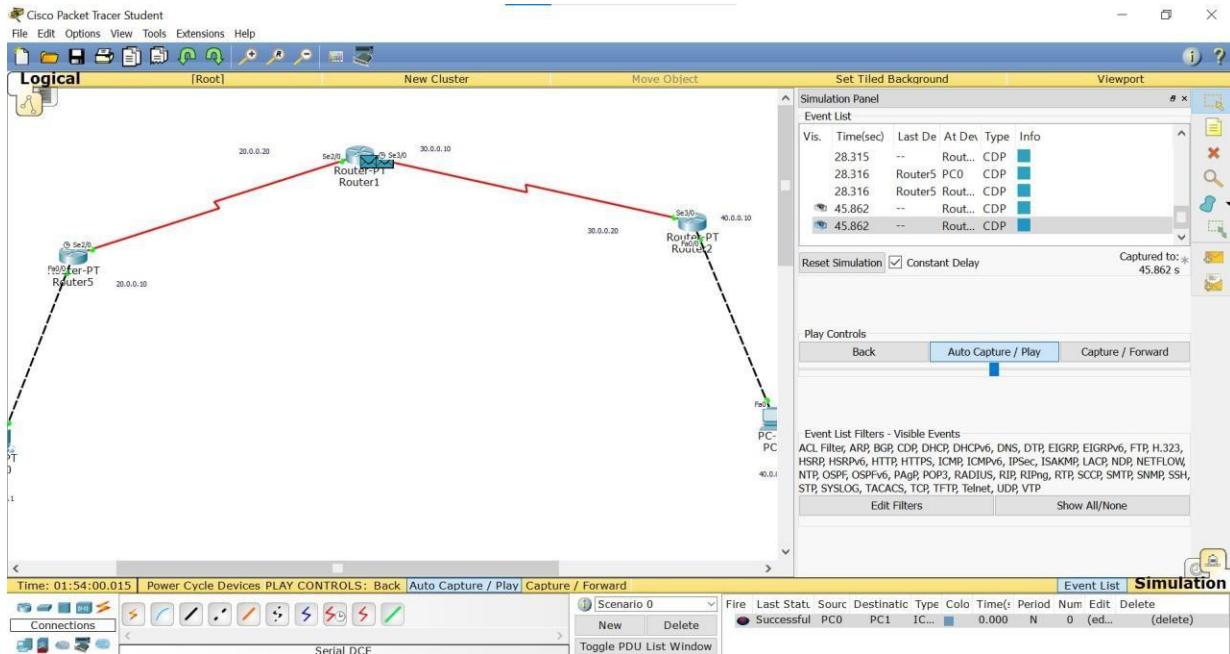
```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=8ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 8ms, Average = 3ms

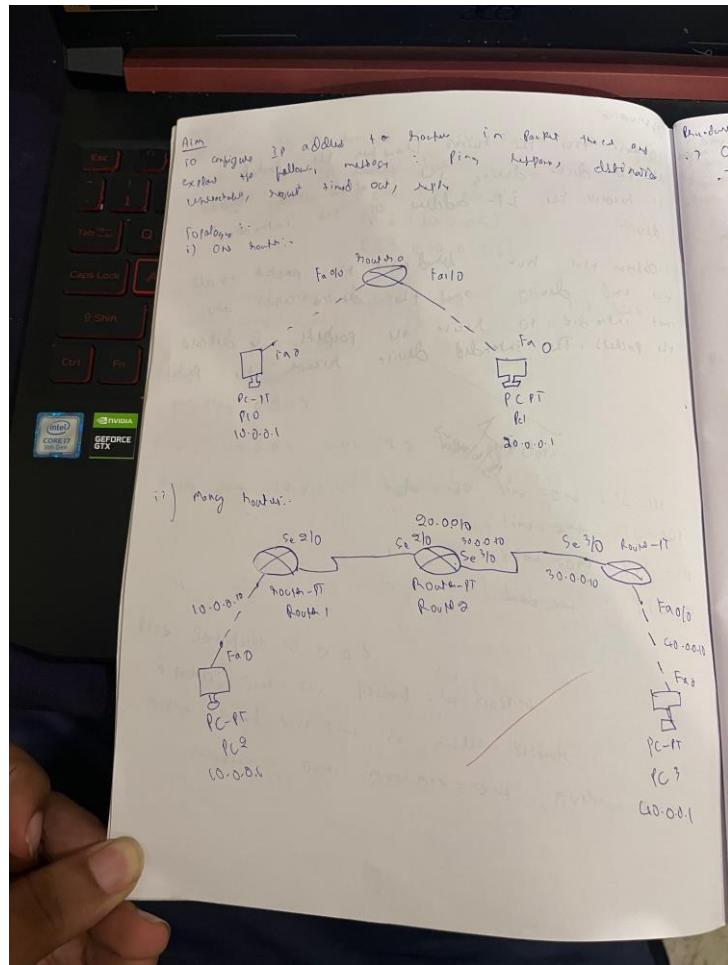
PC>
```

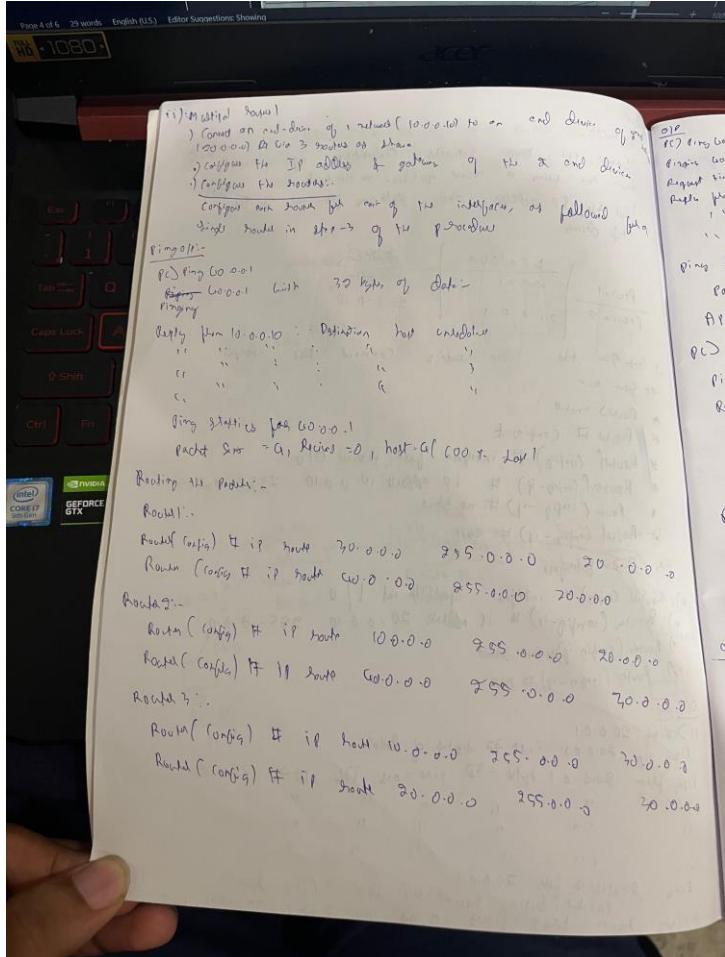


WEEK 3

Configure default route, static route to the Router.

OBSERVATION:





drives of two
and drives
all over full on

IC ping 60.0.1
trans 60.0.1 instead bytes of data.
biggest round trip 60.0.0.1 bytes = 20 time = 10ms TTL = 125
bytes 10ms time = 11ms TTL = 125
bytes 10ms time = 6ms TTL = 125

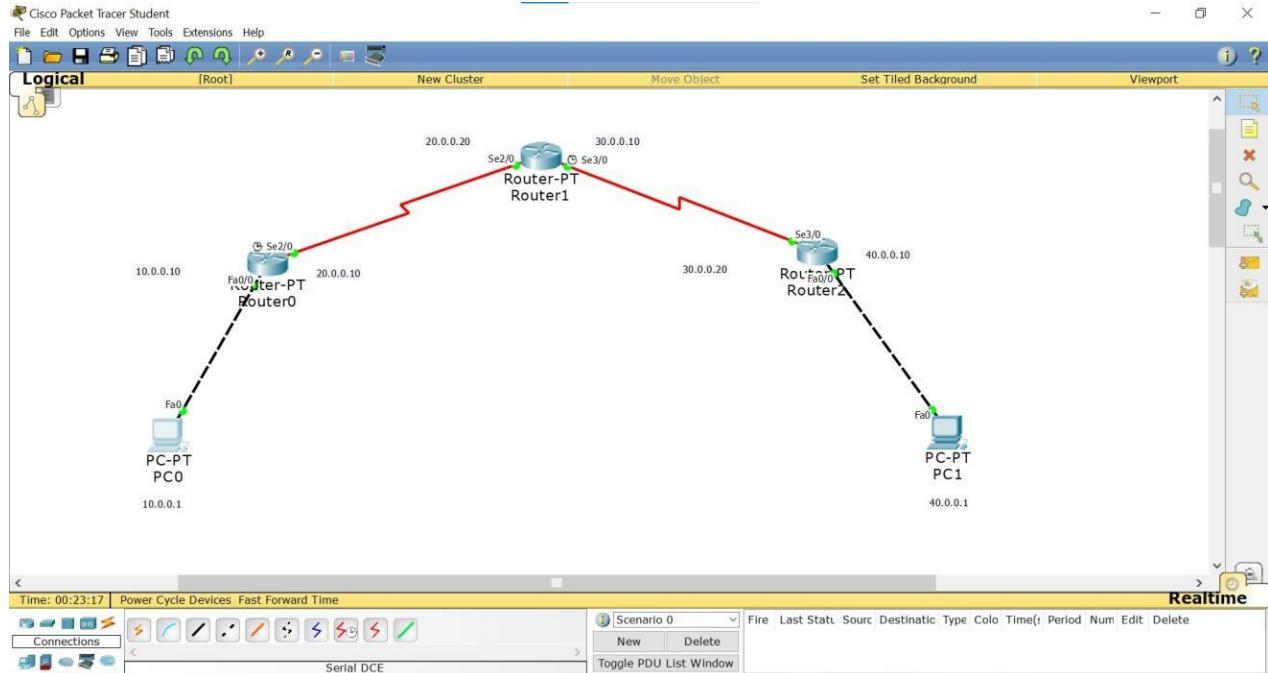
ping statistics for 60.0.0.1
packets: Sent = 0, Received = 0, Lost = 1 (25.0% loss),
approx round trip time in ms: min = 6ms max = 11ms, avg = 9ms
ping 60.0.0.1

pings 60.0.0.1 with 30 bytes of data.
bytes from 60.0.0.1 bytes = 20 time = 10ms TTL = 125
time = 2ms TTL = 125
time = 2ms TTL = 125
time = 8ms TTL = 125

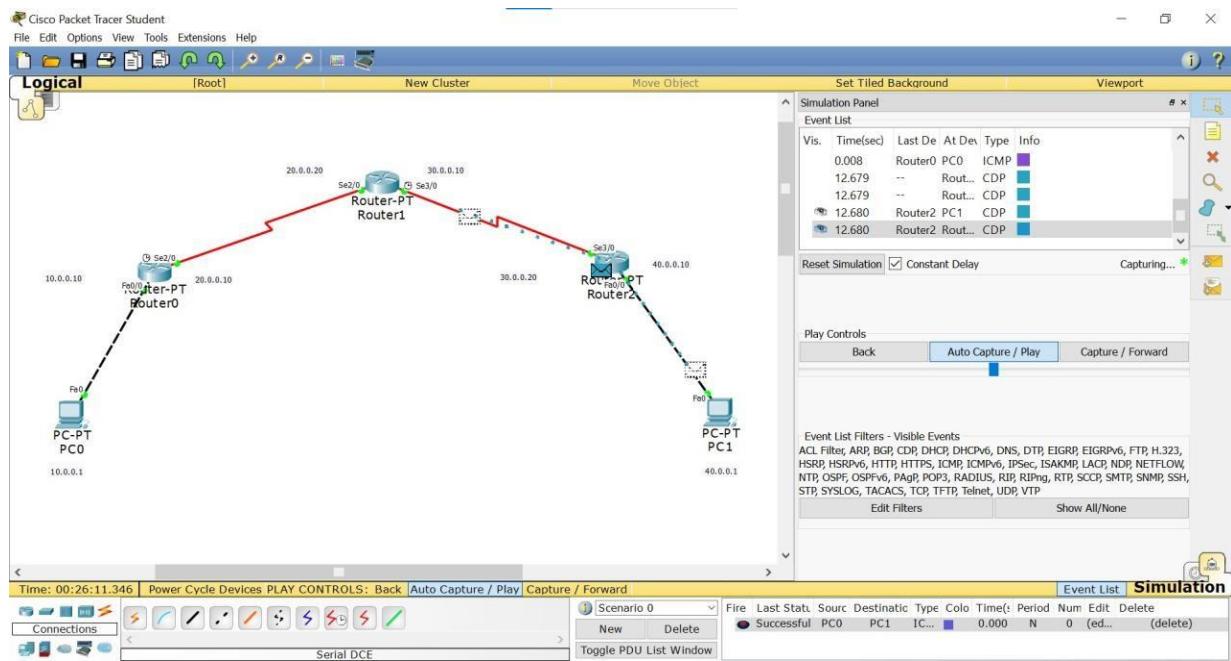
ping statistics for 60.0.0.1:
packets: Sent = 0, Received = 0, Lost = 0 (0.0% loss),
approx round trip time in ms: min = 10ms, max = 18ms, avg = 13ms

obstacles
obtained different case for big test net
but at destination chidambaram (when routing and gateway IP of
not done), report find out and bytes min = 10ms
max = 19ms with TTL = 125

TOPOLOGY:



OUTPUT:



 PC0

Physical Config Desktop Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=16ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125

Ping statistics for 40.0.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 16ms, Average = 6ms

PC>ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

Reply from 40.0.0.1: bytes=32 time=21ms TTL=125
Reply from 40.0.0.1: bytes=32 time=9ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=4ms TTL=125

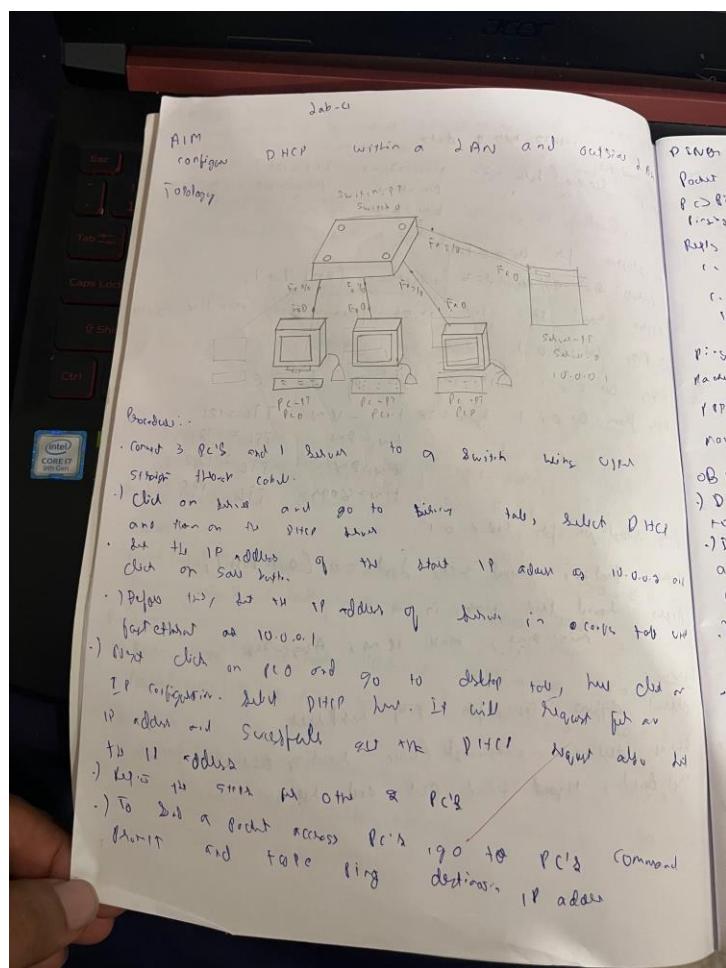
Ping statistics for 40.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 21ms, Average = 9ms

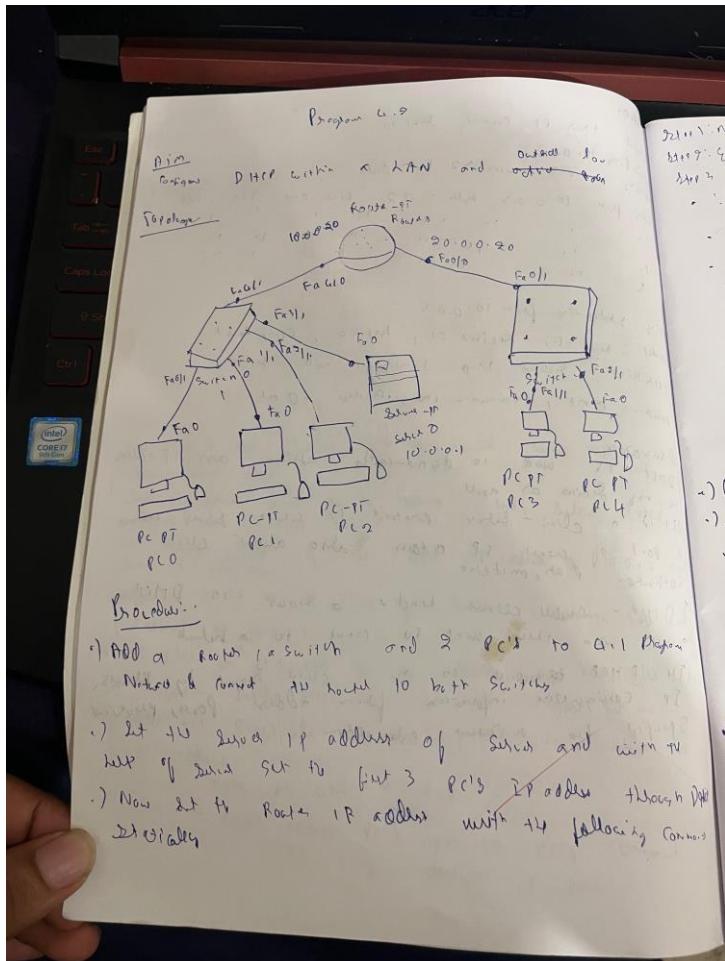
PC>
```

WEEK 4

Configure DHCP within a LAN and outside LAN.

OBSERVATION:





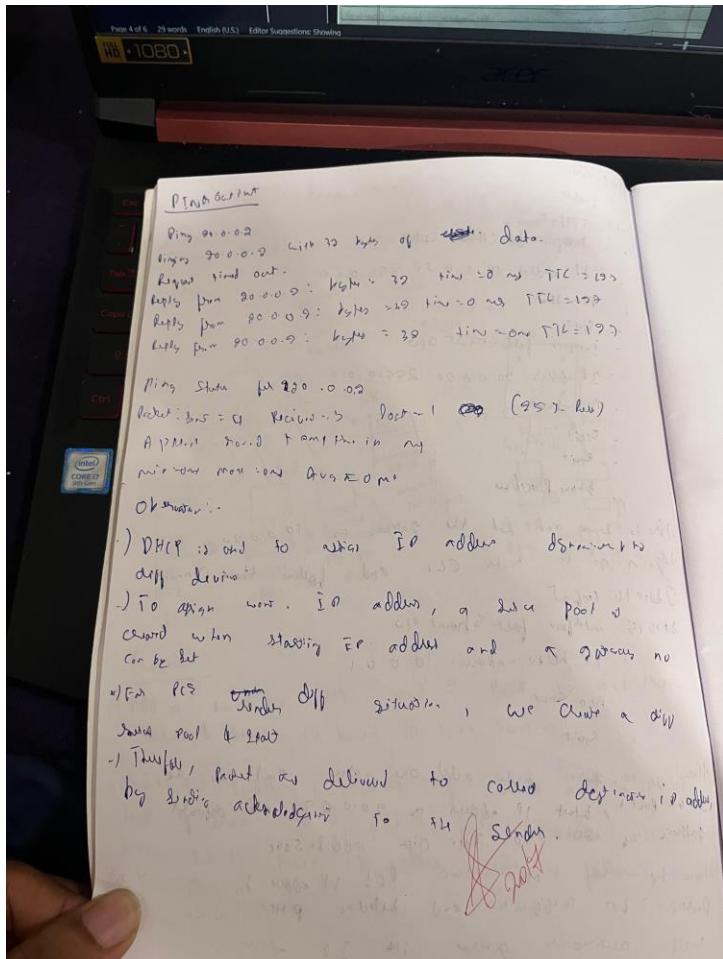
22/11/17: rns
start: enable
step 3: config

- Interface fast Ethernet G1/0
- IP address 10.0.0.20 255.0.0.0
- No shut
- Exit
- Interface fast Ethernet G1/0
- IP address 10.0.0.20 255.0.0.0
- No shut
- Exit
- Exit
- Show IP interface brief

→ Go to rns and set the gateway as 10.0.0.90

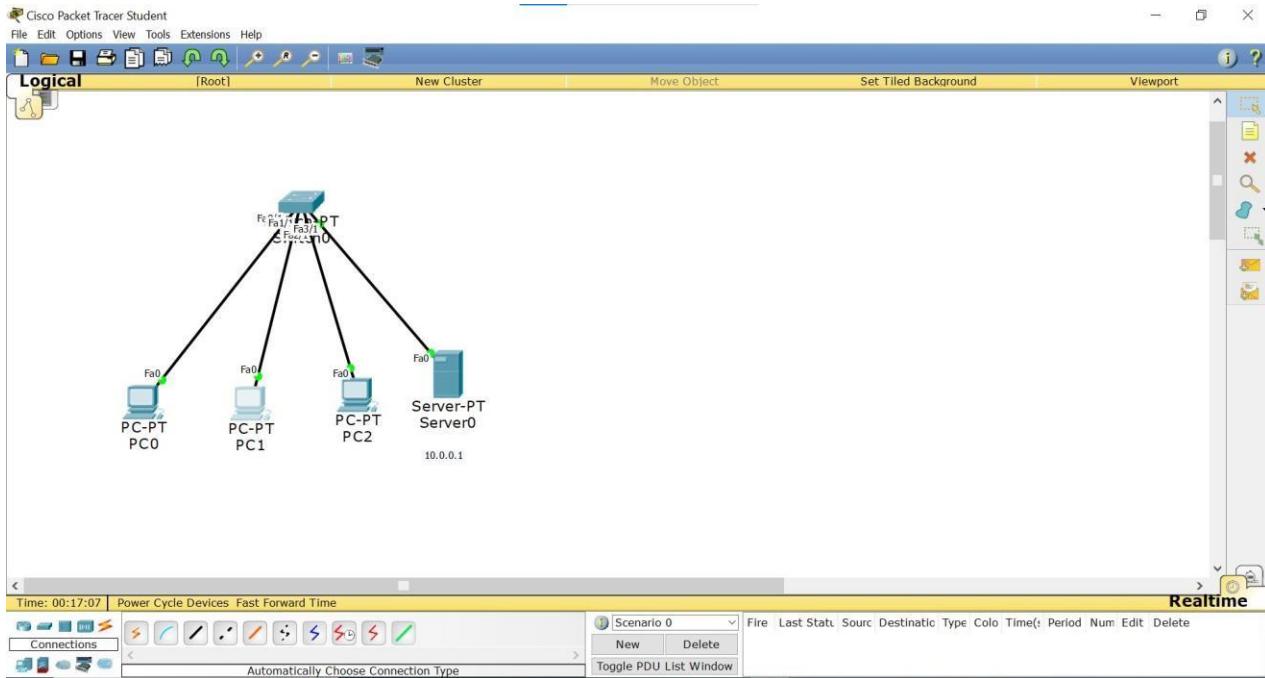
→ Again go to route C1 and follow these steps:
① Step 16: config
② Step 15: interface fast Ethernet 0/0
on Step 15: interface fast Ethernet 0/0
IP address 10.0.0.1
No shut
Exit
③ Now go to rns and add one more IP address as
Subnet掩码, start IP address as 10.0.0.91 and default
Gateway as 10.0.0.90. Then click add & save

④ Now for the other two PCs IP address by giving 10 till
12 and 13 to 15 configuration and selecting PC10 when
will automatically give it the IP address

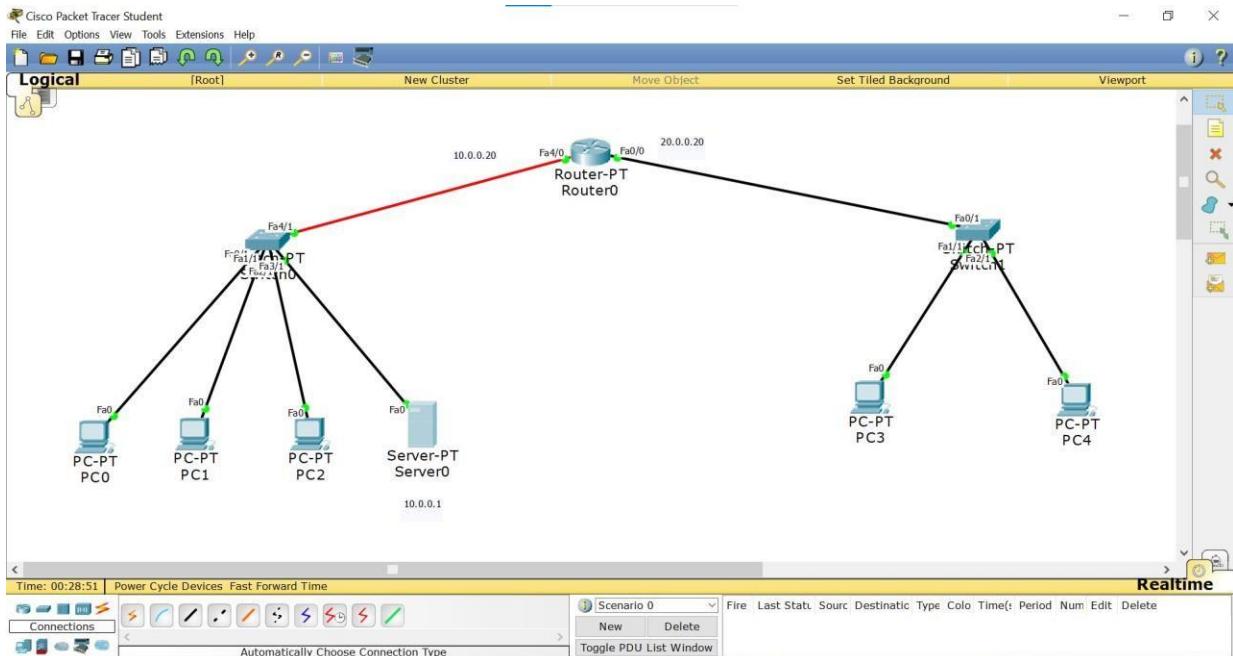


TOPOLOGY:

PROGRAM 4.1:

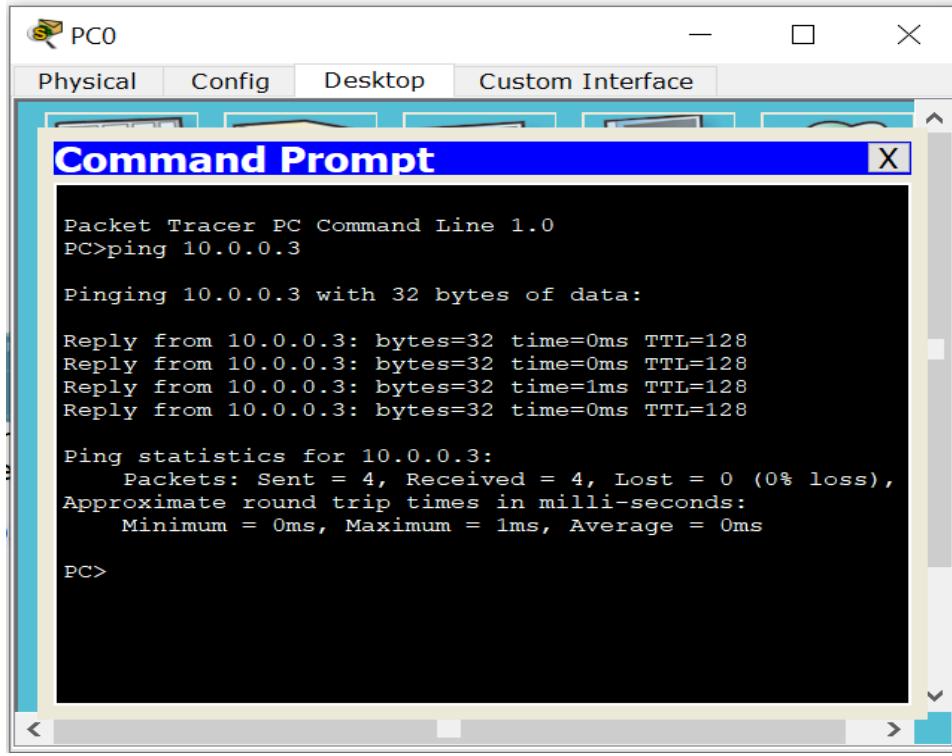


PROGRAM 4.2:



OUTPUT:

PROGRAM 4.1:



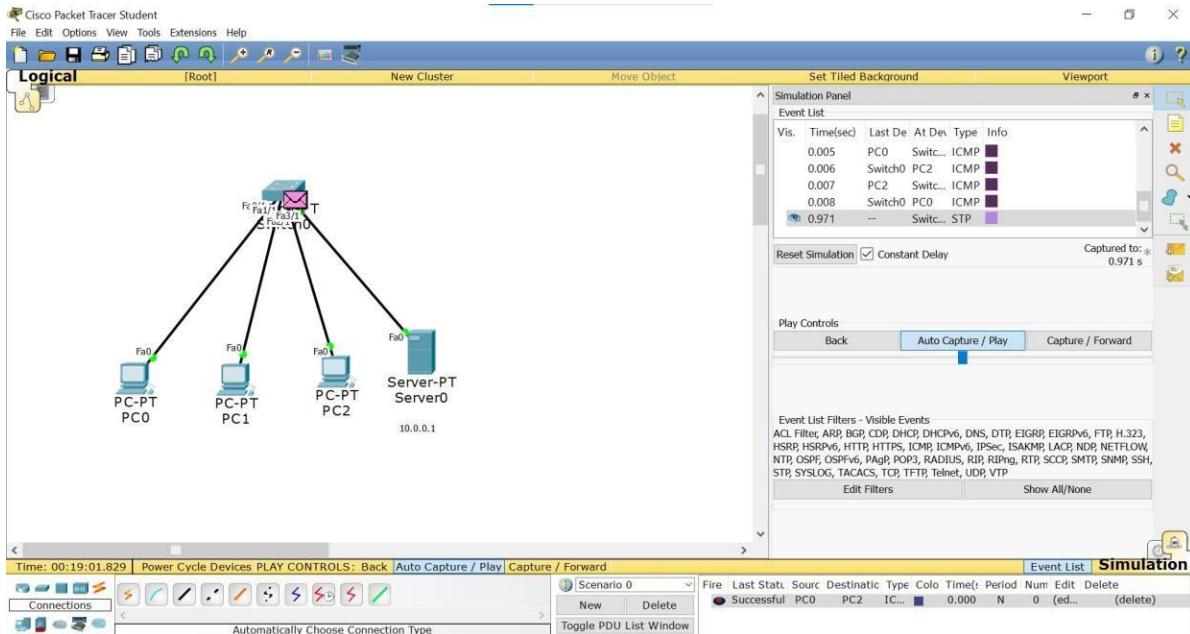
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128

Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>



PROGRAM 4.2:

PC0

Physical Config Desktop Custom Interface

Command Prompt

```

Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.2

Pinging 20.0.0.2 with 32 bytes of data:

Request timed out.
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127

Ping statistics for 20.0.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>ping 20.0.0.3

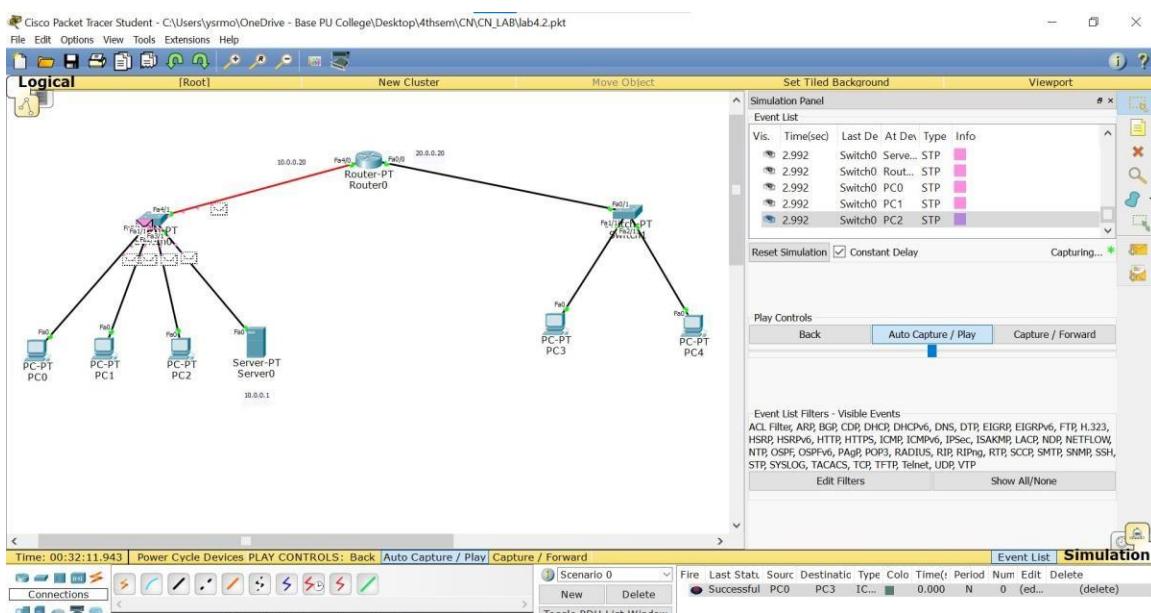
Pinging 20.0.0.3 with 32 bytes of data:

Request timed out.
Reply from 20.0.0.3: bytes=32 time=0ms TTL=127
Reply from 20.0.0.3: bytes=32 time=0ms TTL=127
Reply from 20.0.0.3: bytes=32 time=0ms TTL=127

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>

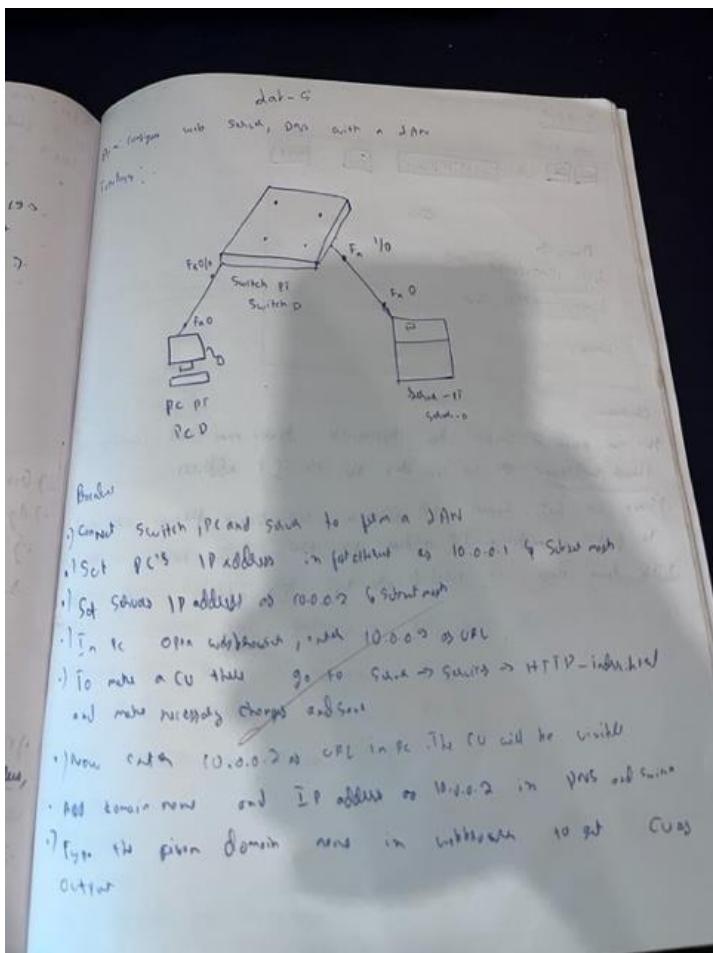
```



WEEK 5

Configure Web Server, DNS within a LAN.

OBSERVATION:



Output:

Web browser

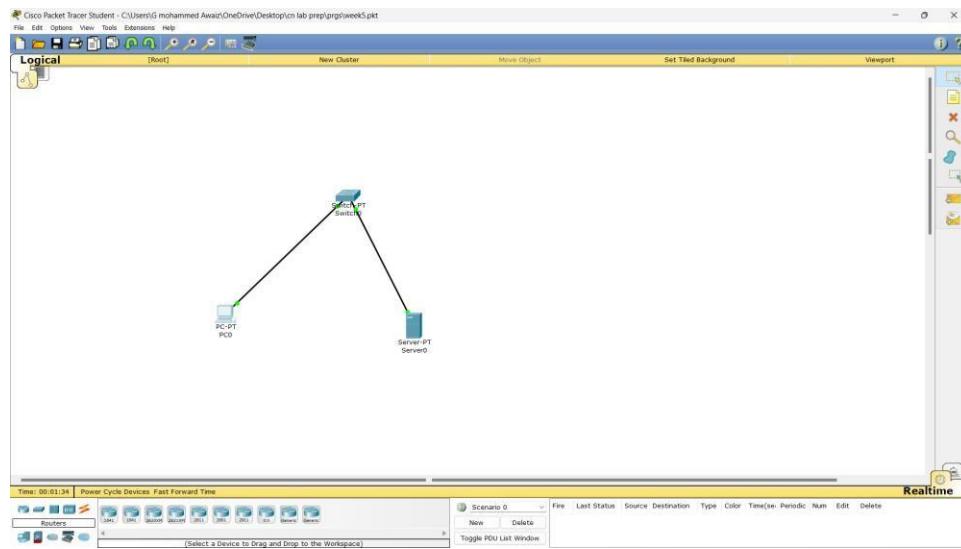
URL: http://www.google.com	Go	Stop
----------------------------	----	------

Result: 6s
User: 180.91.156.60
Language: C/C#/Java
Image:

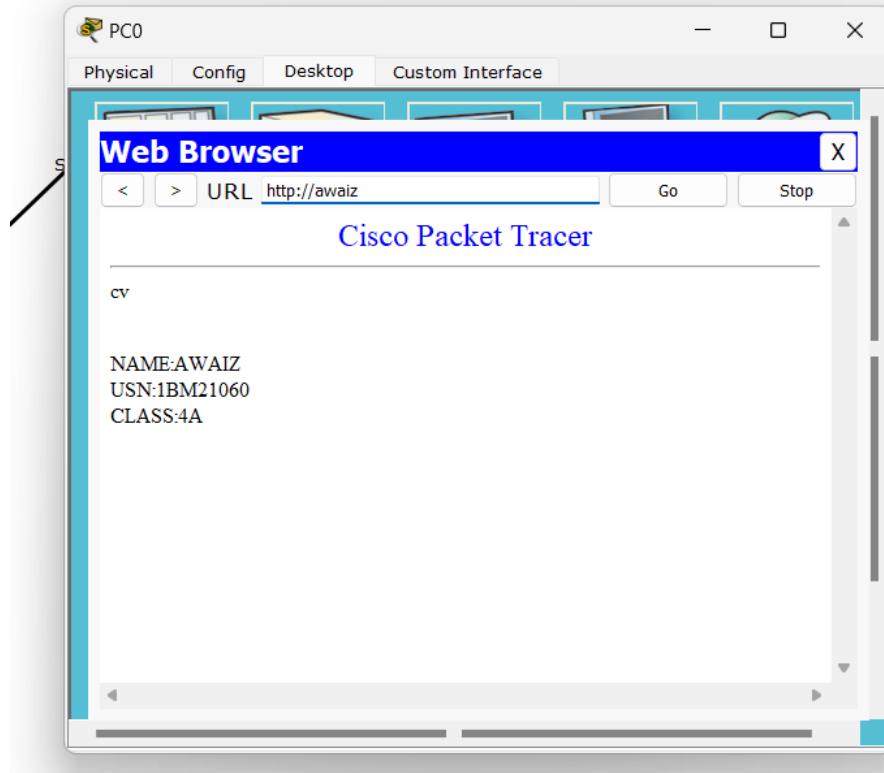
Observation:

- .) We can access a website by typing the domain name and sending it through workstation or we can also type the IP address
- .) Since we enter domain IP address we check through its to find a matching IP address for the domain name
- .) The domain name is mapped to the IP address of

TOPOLOGY:



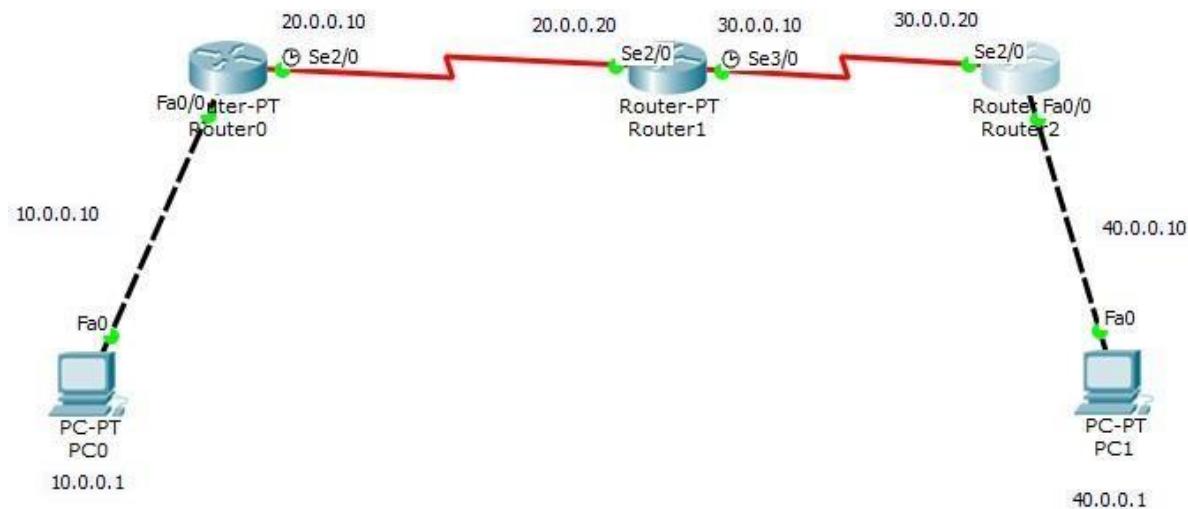
OUTPUT:



LAB6:

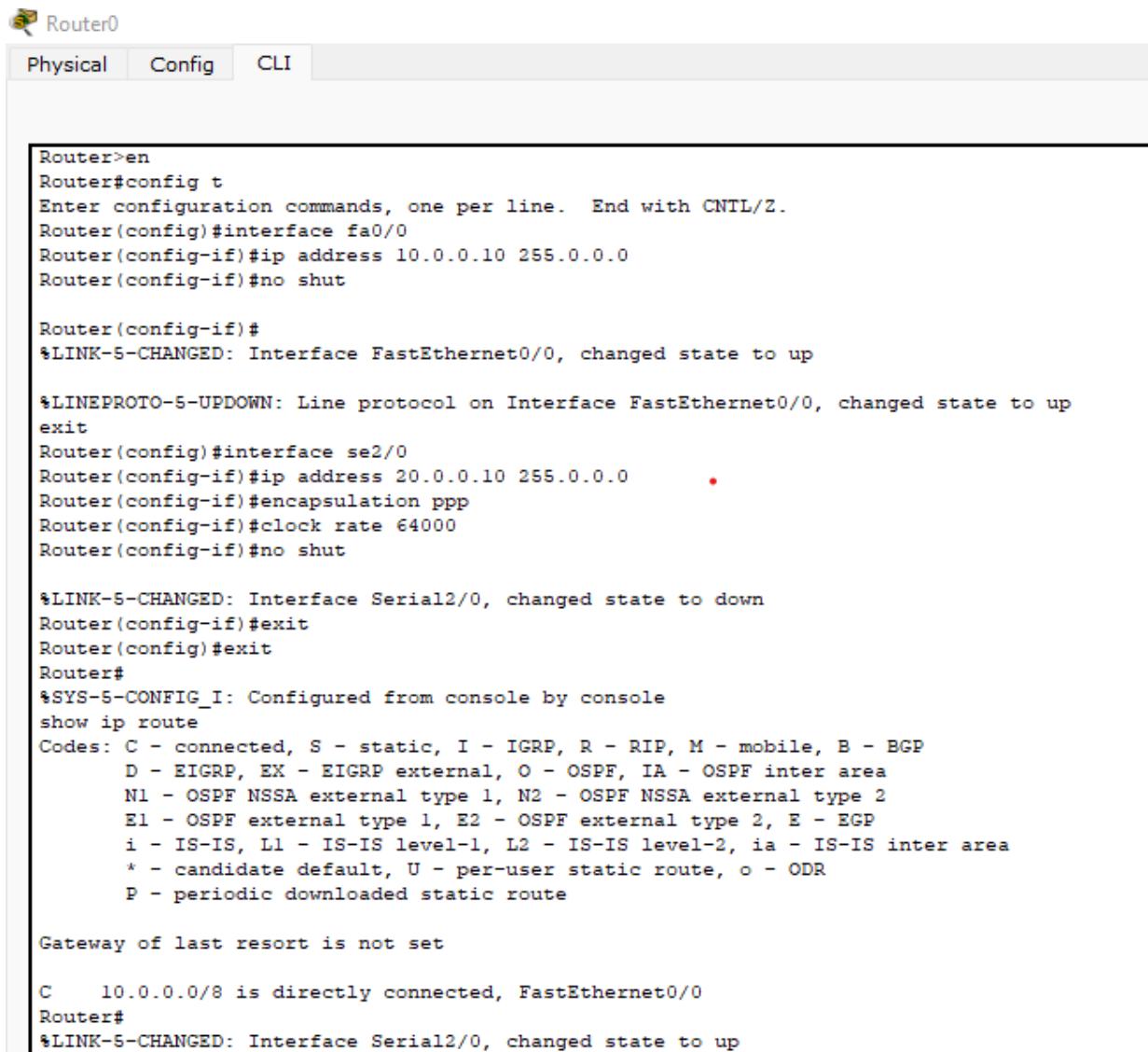
Aim: Configure RIP routing Protocol in Routers.

Topology:



Configuration:

Router 0 :



The screenshot shows a software interface for configuring a router. At the top, there's a toolbar with icons for search, refresh, and save, followed by tabs labeled "Physical", "Config", and "CLI". The "Config" tab is currently selected. Below the tabs is a large text area containing the router's configuration commands.

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#ip address 10.0.0.10 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
*LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
Router(config)#interface se2/0
Router(config-if)#ip address 20.0.0.10 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#clock rate 64000
Router(config-if)#no shut

*LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit
Router(config)#exit
Router#
*SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
      i - IS-IS, 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, FastEthernet0/0
Router#
*LINK-5-CHANGED: Interface Serial2/0, changed state to up
```

Router 1 :



Router1

Physical Config CLI

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface se2/0
Router(config-if)#ip address 20.0.0.20 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#no shut

Router(config-if)#
*LINK-5-CHANGED: Interface Serial2/0, changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
exit
Router(config)#interface se3/0
Router(config-if)#ip address 30.0.0.10 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#clock rate 64000
Router(config-if)#no shut

*LINK-5-CHANGED: Interface Serial3/0, changed state to down
Router(config-if)#exit
Router(config)#show ip route
^
* Invalid input detected at '^' marker.

Router(config)#exit
Router#
*SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
      i - IS-IS, 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

      20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        20.0.0.0/8 is directly connected, Serial2/0
C        20.0.0.10/32 is directly connected, Serial2/0
Router#
*LINK-5-CHANGED: Interface Serial3/0, changed state to up
```

Router 2 :

Router2

Physical Config CLI

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface se2/0
Router(config-if)#ip address 30.0.0.20 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#no shut

Router(config-if)#
*LINK-5-CHANGED: Interface Serial2/0, changed state to up
exit
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config)#interface fa0/0
Router(config-if)#ip address 40.0.0.10 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
*LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
exit
*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
Router(config)#exit
Router#
*SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
      i - IS-IS, 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

      30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        30.0.0.0/8 is directly connected, Serial2/0
C        30.0.0.10/32 is directly connected, Serial2/0
C        40.0.0.0/8 is directly connected, FastEthernet0/0
```

RIP routing:

Router 0:

```
Router#
*LINK-5-CHANGED: Interface Serial2/0, changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#exit
Router(config)#exit
Router#
*SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
      i - IS-IS, 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, FastEthernet0/0
      20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C          20.0.0.0/8 is directly connected, Serial2/0
C          20.0.0.20/32 is directly connected, Serial2/0
R    30.0.0.0/8 [120/1] via 20.0.0.20, 00:00:18, Serial2/0
R    40.0.0.0/8 [120/2] via 20.0.0.20, 00:00:18, Serial2/0
Router#
```

Router 1:

```
Router#  
*LINK-5-CHANGED: Interface Serial3/0, changed state to up  
  
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up  
config t  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#router rip  
Router(config-router)#network 20.0.0.0  
Router(config-router)#network 30.0.0.0  
Router(config-router)#exit  
Router(config)#exit  
Router#  
*SYS-5-CONFIG_I: Configured from console by console  
show ip route  
Codes: C - connected, S - static, I - IGRP, 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, E - EGP  
       i - IS-IS, 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  
  
R    10.0.0.0/8 [120/1] via 20.0.0.10, 00:00:20, Serial2/0  
      20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks  
C      20.0.0.0/8 is directly connected, Serial2/0  
C      20.0.0.10/32 is directly connected, Serial2/0  
      30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks  
C      30.0.0.0/8 is directly connected, Serial3/0  
C      30.0.0.20/32 is directly connected, Serial3/0  
R    40.0.0.0/8 [120/1] via 30.0.0.20, 00:00:19, Serial3/0  
Router#
```

Router 2:

```
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#network 30.0.0.0
^
* Invalid input detected at '^' marker.

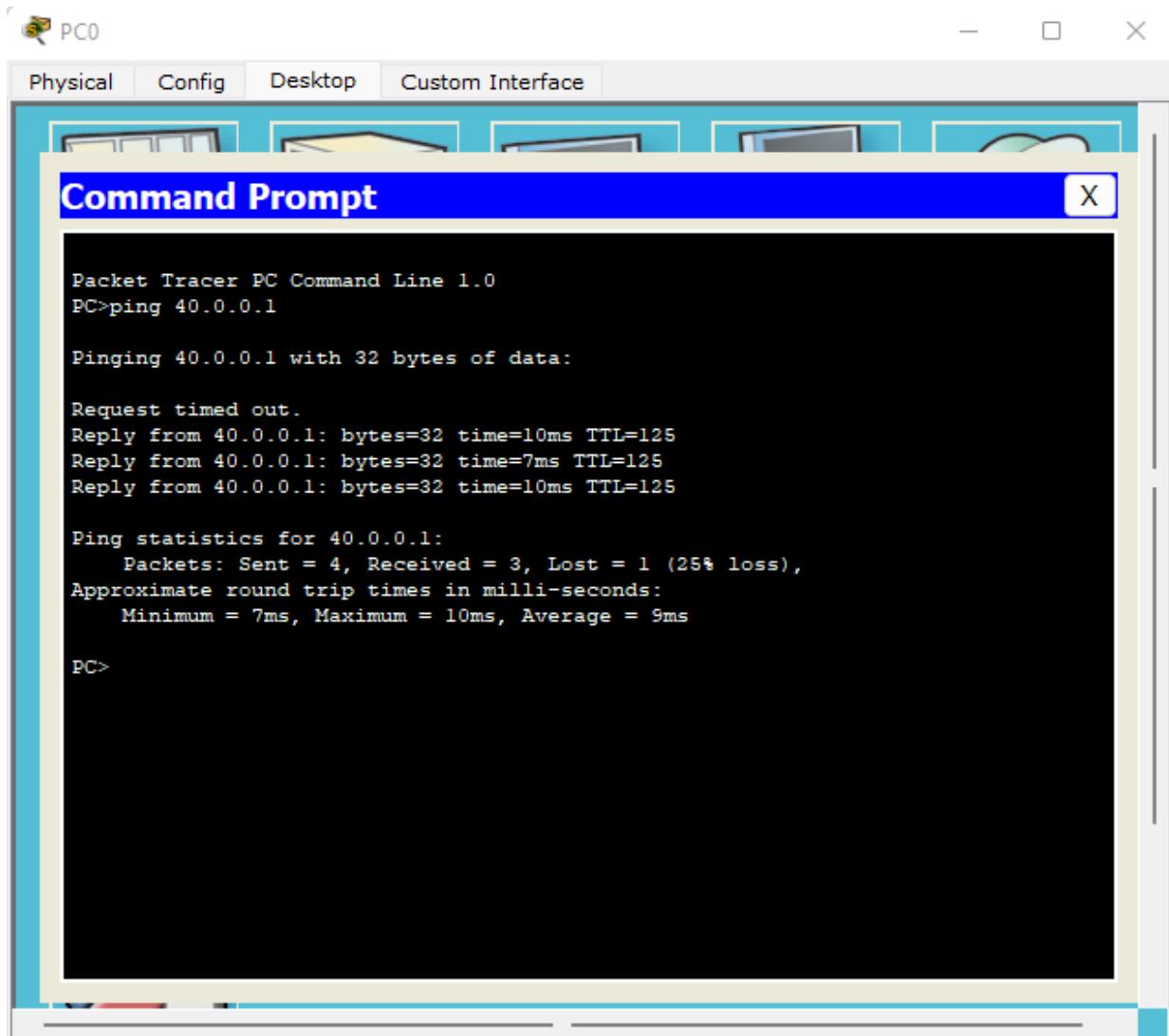
Router(config)#router rip
Router(config-router)#network 30.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#exit
Router(config)#exit
Router#
*SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
      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, E - EGP
      i - IS-IS, 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

R    10.0.0.0/8 [120/2] via 30.0.0.10, 00:00:14, Serial2/0
R    20.0.0.0/8 [120/1] via 30.0.0.10, 00:00:14, Serial2/0
      30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      30.0.0.0/8 is directly connected, Serial2/0
C      30.0.0.10/32 is directly connected, Serial2/0
C      40.0.0.0/8 is directly connected, FastEthernet0/0
Router#
```

Command Prompt:

P0:



The screenshot shows a Cisco Packet Tracer Command Line interface window titled "Command Prompt". The window contains the following text output from a ping command:

```
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1

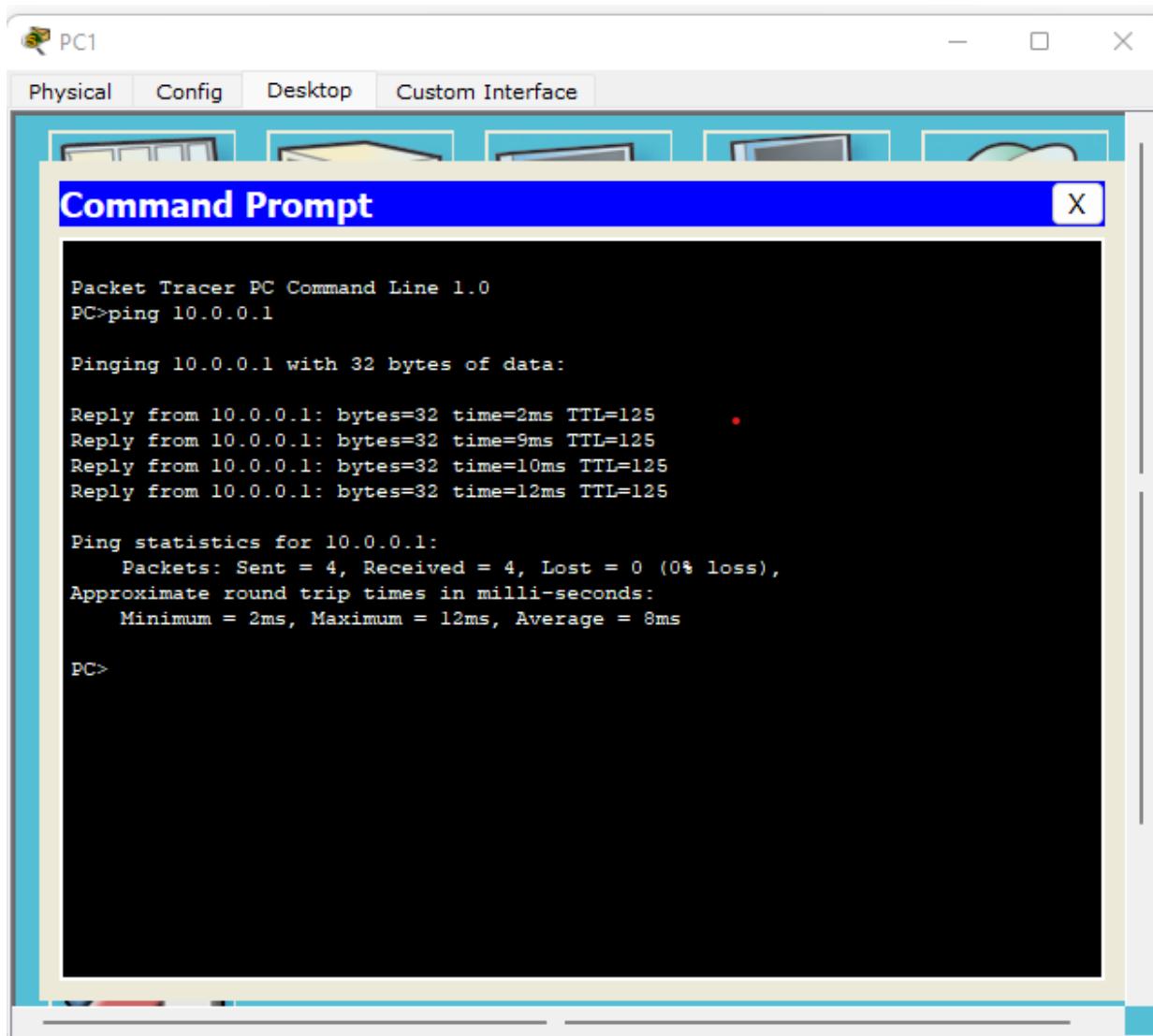
Pinging 40.0.0.1 with 32 bytes of data:

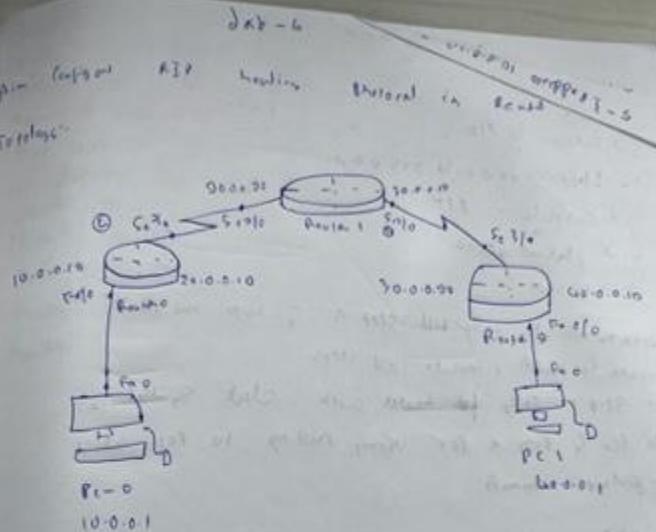
Request timed out.
Reply from 40.0.0.1: bytes=32 time=10ms TTL=125
Reply from 40.0.0.1: bytes=32 time=7ms TTL=125
Reply from 40.0.0.1: bytes=32 time=10ms TTL=125

Ping statistics for 40.0.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 7ms, Maximum = 10ms, Average = 9ms

PC>
```

P1:





24 Cache

八

- 1) Create a Network using 3 routers and 2 PCs. Connect routers using Serial Port and PC to Router using Gigabit Ethernet Cable
 - 2) Set IP address and gateway no for both PCs

~~10-0-0-1 - 10-0-0-10~~ - 10-0-0-10 - 10-0-0-10

40-0-0-1-T P 40-0-0-30 gosew - ec 1

15th command in Route - CHI

Spill: No

33 Chapter

3 - Config 1

4) Interface funktion w/o

5 - 1. Redundant (0.0.0.10) 255.0.0.0

C -> N1 = Serial

→ 3 Com+

8 → Interface Sc. 2/0

9 ~ 1. Redundant 20.0.0.10 255.0.0.0

10 + Encapsulation PPP

11 → Clockout 60000

15 → Ethernet

→ For switch to calculate only till Step 9 & bypass no short

→ For router to router, calculate all steps

→ Calculate Step 11 only for Routed with Clock signal.

→ Go to PC & ping a PC via V. interface to PC1 wires

Ping destination comments.

Ping output:

PC> Ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data

Request send out:

Reply from 10.0.0.1: bytes=32 time=8ms TTL=195

11 11 11 time=4ms TTL=195

11 11 11 time=10ms TTL=195

Ping statistics for 10.0.0.1:

bytes: Sent=3, Received=3, Lost=0 (0% loss)

Average round trip time in milli seconds:

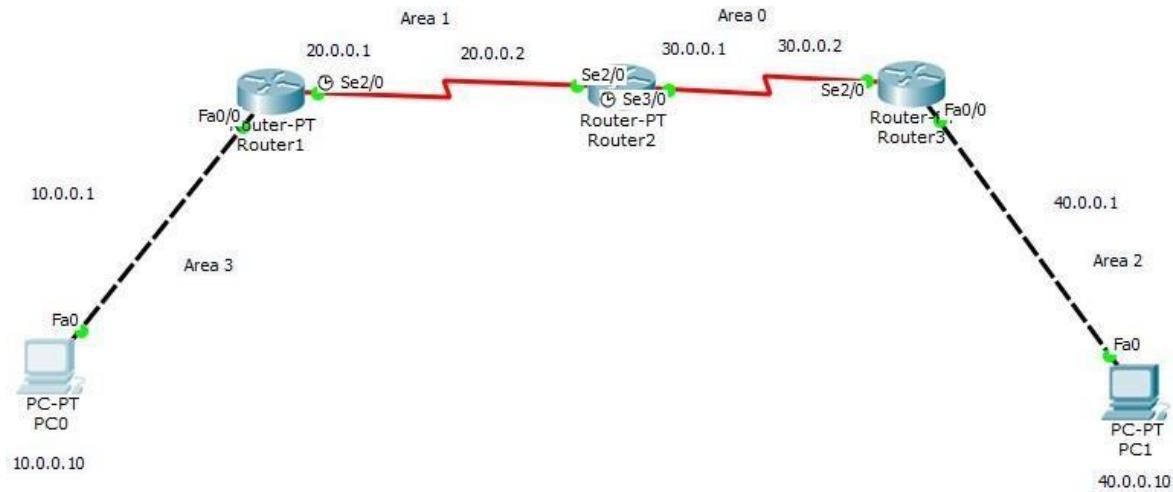
Observation

- ✓ RPL is a generic routing protocol that can keep route as a working metric to find the best path between source & destination. It is a distance vector protocol.
- ✓ Hot route is the one of routes coming in the table with best hot route is selected.
- ✓ Update of the network on Gated routers is periodically.
- ✓ Path routing tables are static or update.
- ✓ Protocols always check routing info received from neighbor routers.

LAB7:

Aim : Configure OSPF routing protocol.

Topology:



Router 1 :



Router1

Physical	Config	CLI
----------	--------	-----

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#ip add 10.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
Router(config)#interface se2/0
Router(config-if)#ip add 20.0.0.1 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface se2/0
Router(config-if)#encapsulation ppp
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down
clock rate 64000
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#
%LINK-5-CHANGED: Line protocol on Interface Serial2/0, changed state to up

%LINK-5-CHANGED: Interface Serial2/0, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down

%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config)#router ospf 1
Router(config-router)#router-id 1.1.1.1
Router(config-router)#network 10.0.0.0 0.255.255.255 area 3
Router(config-router)#network 20.0.0.0 0.255.255.255 area 1
Router(config-router)#exit
Router(config)#
00:18:07: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial2/0 from LOADING to FULL, Loading 1

Router(config)#interface se2/0
Router(config-if)#interface loopback 0

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

Router(config-if)#ip address 172.16.1.252 255.255.0.0
Router(config-if)#no shut
```

```
Router(config)#interface se2/0
Router(config-if)#interface loopback 0

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

Router(config-if)#ip address 172.16.1.252 255.255.0.0
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#router ospf 1
Router(config-router)#area 1 virtual-link 2.2.2.2
Router(config-router)#exit
Router(config)#
00:24:20: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on OSPF_VL0 from LOADING to FULL, Loading Done
exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
      i - IS-IS, 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, FastEthernet0/0
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      20.0.0.0/8 is directly connected, Serial2/0
C      20.0.0.2/32 is directly connected, Serial2/0
O     30.0.0.0/8 [110/128] via 20.0.0.2, 00:00:54, Serial2/0
O IA 40.0.0.0/8 [110/129] via 20.0.0.2, 00:00:54, Serial2/0
C    172.16.0.0/16 is directly connected, Loopback0
Router#
```

Router 2 :

Router2

Physical Config CLI

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface se2/0
Router(config-if)#ip add 20.0.0.2
% Incomplete command.
Router(config-if)#ip add 20.0.0.2 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up
exit
Router(config)#ip add 20.0.0.2
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, chang
Router(config)#interface se3/0
Router(config-if)#ip add 30.0.0.1 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial3/0, changed state to down
Router(config-if)#no shut
Router(config)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down
interface se2/0
Router(config-if)#encapsulation ppp
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
no shut
Router(config-if)#exit
Router(config)#interface se3/0
Router(config-if)#encapsulation ppp
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to down
clock rate 640000
Unknown clock rate
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up

%LINK-5-CHANGED: Interface Serial2/0, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down

%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config)#router ospf
% Incomplete command.
Router(config)#router ospf 1
Router(config-router)#router-id 2.2.2.2
Router(config-router)#network 20.0.0.0 0.255.255.255 area 1
Router(config-router)#network 20.0.0.0 0.255.255.255 area 1
00:18:05: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial2/
Router(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router(config-router)#exit
Router(config)#
00:19:20: %OSPF-5-ADJCHG: Process 1, Nbr 40.0.0.1 on Serial3/0 from LOADING to FULL, Loading Done
```

Router2

Physical Config CLI

IOS Command Line Interface

```

Router(config)#interface se3/0
Router(config-if)#interface loopback 0

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
is add 172.16.1.253 255.255.0.0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to down

00:23:22: *OSPF-5-ADJCHG: Process 1, Nbr 40.0.0.1 on Serial3/0 from FULL to DOWN, Neighbor Down: Interface down or detached
%LINK-5-CHANGED: Interface Serial3/0, changed state to up

Router(config-if)#exit
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
t
00:23:33: *OSPF-4-ERRRCV: Received invalid packet: mismatch area ID, from backbone area must be virtual-link but not found from 20.0.0.2, Serial2/0

Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

00:23:41: *OSPF-5-ADJCHG: Process 1, Nbr 40.0.0.1 on Serial3/0 from LOADING to FULL, Loading Done

Router#
00:23:43: *OSPF-4-ERRRCV: Received invalid packet: mismatch area ID, from backbone area must be virtual-link but not found from 20.0.0.2, Serial2/0
config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#
00:23:53: *OSPF-4-ERRRCV: Received invalid packet: mismatch area ID, from backbone area must be virtual-link but not found from 20.0.0.2, Serial2/0

Router(config-router)#area 1 virtual-link
00:24:03: *OSPF-4-ERRRCV: Received invalid packet: mismatch area ID, from backbone area must be virtual-link but not found from 20.0.0.2, Serial2/0
1.1.1.1
Router(config-router)#
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router(c
00:24:18: *OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on OSPF_VL0 from LOADING to FULL, Loading Done

* Ambiguous command: "c"
Router>show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
      i - IS-IS, 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

  20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        20.0.0.0/8 is directly connected, Serial2/0
C        20.0.0.1/32 is directly connected, Serial2/0
  30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

```

```
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#area 1 virtual-link 1.1.1.1
Router(config-router)#exit
Router(config)#exit
Router#
*SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
      i - IS-IS, 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

O IA 10.0.0.0/8 [110/65] via 20.0.0.1, 00:00:34, Serial2/0
  20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    20.0.0.0/8 is directly connected, Serial2/0
C    20.0.0.1/32 is directly connected, Serial2/0
      30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    30.0.0.0/8 is directly connected, Serial3/0
C    30.0.0.2/32 is directly connected, Serial3/0
O IA 40.0.0.0/8 [110/65] via 30.0.0.2, 00:01:24, Serial3/0
C    172.16.0.0/16 is directly connected, Loopback0
Router#
```

Router 3 :



The screenshot shows a Cisco Router configuration interface. The top navigation bar includes tabs for Physical, Config (which is selected), and CLI. To the right of the interface, the text "IOS Commar" is visible. The main area displays the router's configuration commands:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#ip add 40.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
*LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
Router(config)#interface se2/0
Router(config-if)#ip add 30.0.0.2 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
*LINK-5-CHANGED: Interface Serial2/0, changed state to up
exit
Router(config)#
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down

Router(config)#interface se2/0
Router(config-if)#encapsulation ppp
Router(config-if)#
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
no shut
Router(config-if)#exit
Router(config)#router ospf 1
Router(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router(config-router)#
00:18:56: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial2/0 from LOADING to FULL, Loading Done

Router(config-router)#network 40.0.0.0 0.255.255.255 area 2
Router(config-router)#exit
Router(config)#interface se2/0
Router(config-if)#interface loopback 0

Router(config-if)#
*LINK-5-CHANGED: Interface Loopback0, changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
ip add 172.16.1.254 255.255.0.0
Router(config-if)#no shut
Router(config-if)#
*LINK-5-CHANGED: Interface Serial2/0, changed state to down

*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down

00:22:58: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial2/0 from FULL to DOWN, Neighbor Down: Interface down or detached

*LINK-5-CHANGED: Interface Serial2/0, changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

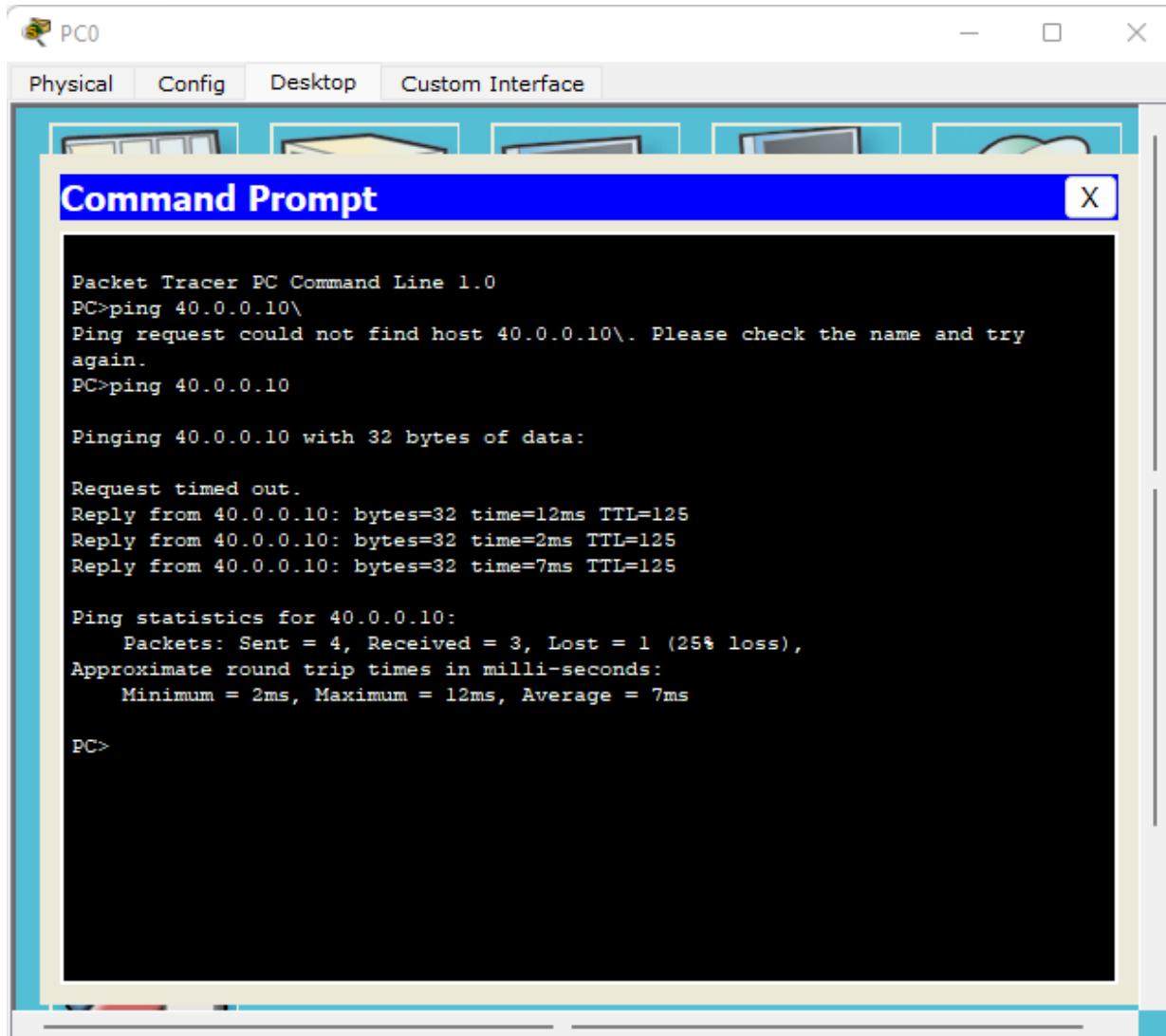
00:23:18: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial2/0 from LOADING to FULL, Loading Done

Router(config-if)#exit
Router(config)#exit
Router#
*SYS-5-CONFIG_I: Configured from console by console
```

```
Router#  
%SYS-5-CONFIG_I: Configured from console by console  
show ip route  
Codes: C - connected, S - static, I - IGRP, 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, E - EGP  
       i - IS-IS, 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  
  
O IA 10.0.0.0/8 [110/129] via 30.0.0.1, 00:05:53, Serial2/0  
O IA 20.0.0.0/8 [110/128] via 30.0.0.1, 00:06:30, Serial2/0  
      30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks  
C       30.0.0.0/8 is directly connected, Serial2/0  
C       30.0.0.1/32 is directly connected, Serial2/0  
C       40.0.0.0/8 is directly connected, FastEthernet0/0  
C       172.16.0.0/16 is directly connected, Loopback0  
Router#
```

Command Prompt:

P0:



The screenshot shows a Cisco Packet Tracer interface. At the top, there's a toolbar with icons for Physical, Config, Desktop, and Custom Interface. Below the toolbar is a row of icons representing different network components like switches and routers. A main window titled "Command Prompt" is open, displaying the following text output from the PC Command Line 1.0:

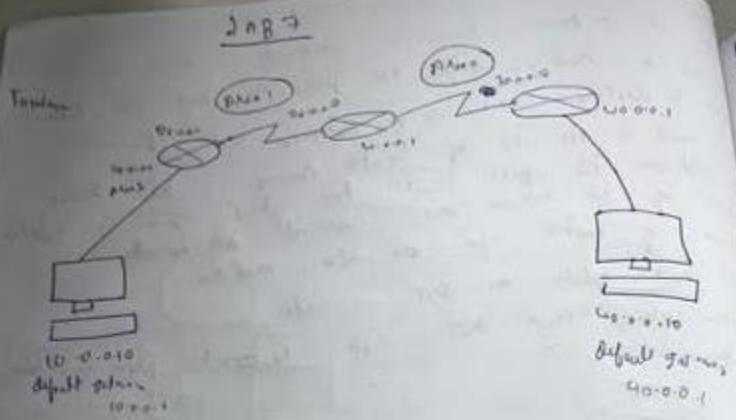
```
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.10\
Ping request could not find host 40.0.0.10\. Please check the name and try
again.
PC>ping 40.0.0.10

Pinging 40.0.0.10 with 32 bytes of data:

Request timed out.
Reply from 40.0.0.10: bytes=32 time=12ms TTL=125
Reply from 40.0.0.10: bytes=32 time=2ms TTL=125
Reply from 40.0.0.10: bytes=32 time=7ms TTL=125

Ping statistics for 40.0.0.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 12ms, Average = 7ms

PC>
```



พิชัย

- Configure the switch IP address & gateway as per the topology above
 - Configure each of the routers using the IP addresses given.
 - Configuration PPP and click next and so on until you get physical port

Ex post facto

1) $(\sin x)$ ने लाउटोफ़िल्म

R1 / (org - route) II route - i) L (1 , 1

R1 (long-horned) # return 10-0-0 0.255-255.255 and 3
C 11 11 90-2-0 11 11 and

R1#
R1(config) # interface serial 1

R1(config-if) # bandwidth 100000

R1(config-if) # duplex full

R1(config-if) # speed 1000000000

R1(config-if) # no shutdown

R1#

R2#(config) # interface serial 1

R2(config-if) # bandwidth 100000

R2(config-if) # duplex full

R2(config-if) # speed 1000000000

R2(config-if) # no shutdown

R1#(config) # interface serial 0

R1(config-if) # duplex full

R1(config-if) # ip address 172.16.1.90 255.255.0.0

R1(config-if) # no shutdown

R2#(config-if) # interface serial 0

R2(config-if) # ip address 172.16.1.95 255.255.0.0

R2(config-if) # no shutdown

R1#(config-if) # interface loopback 0

R1(config-if) # ip address 172.16.1.94 255.255.0.0

R1(config-if) # no shutdown

To Router 1:

Rif (sys) # node OSPF1

Rif (sys - route) # area 1 initial link 2.2.2.0

Rif (sys - route) # (---)

Rif (sys) # node OSPF1

Rif (sys - route) # area 1 initial - link

Rif (sys - route) # exit

Rif (sys) #

Check if - route

Observation:

• OSPF is a link state routing protocol which is said to find the best path between source and destination hosts using its own SPF algorithm.

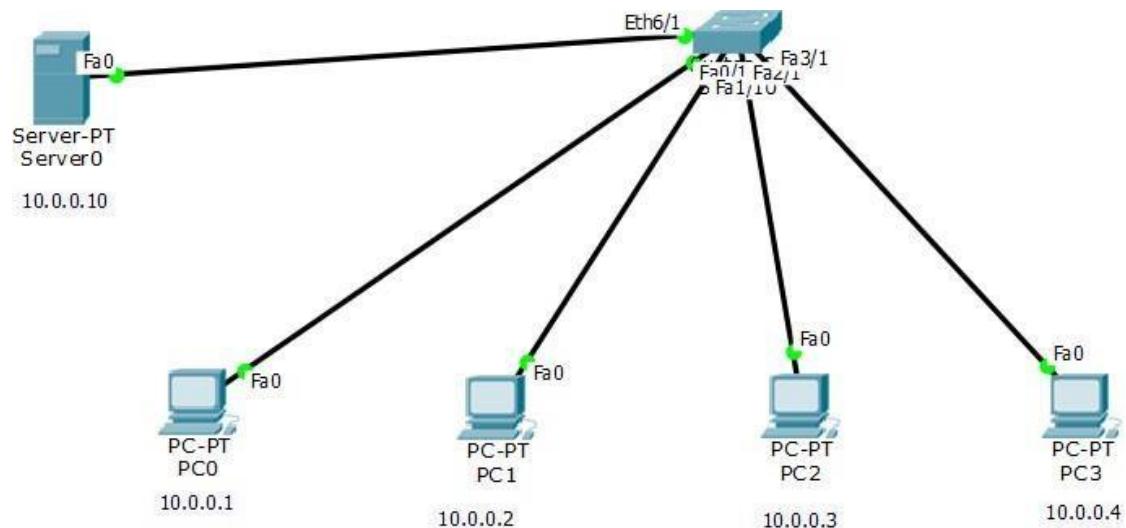
• This network is divided into 4 area which are interconnected.

• After we make initial link between two routers which is not connected to backbone, we can ping messages successfully.

LAB 8:

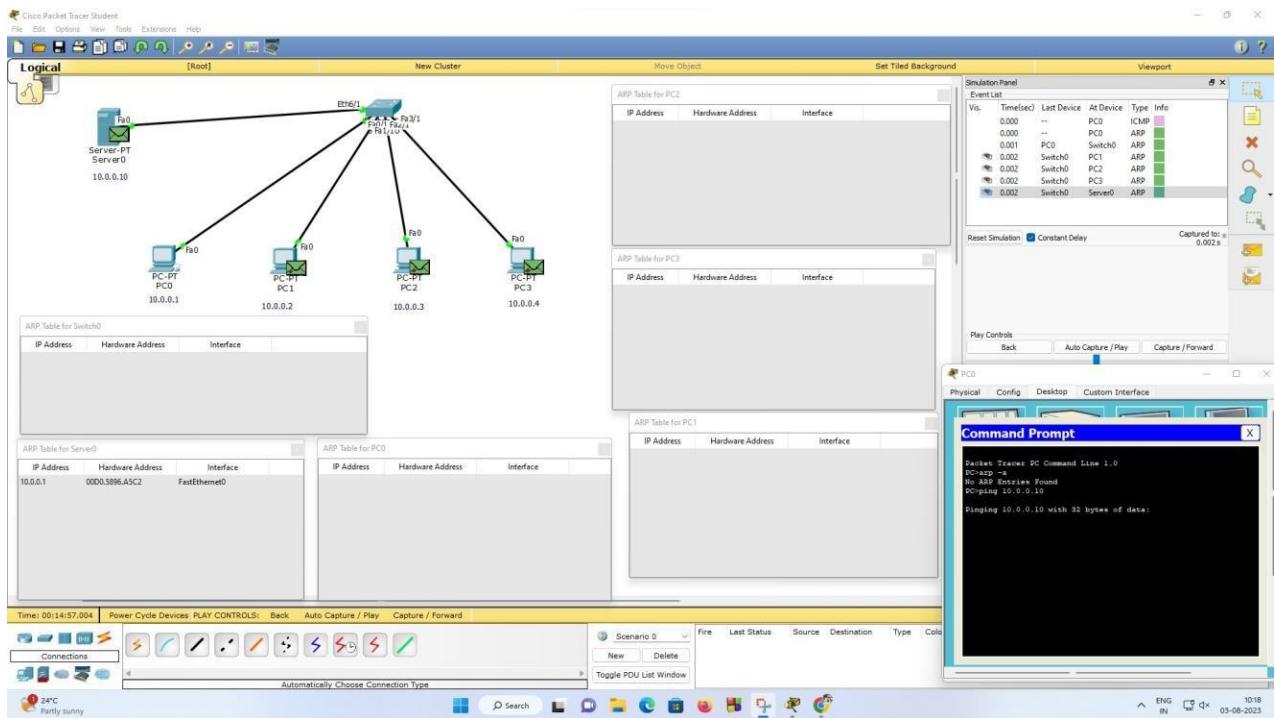
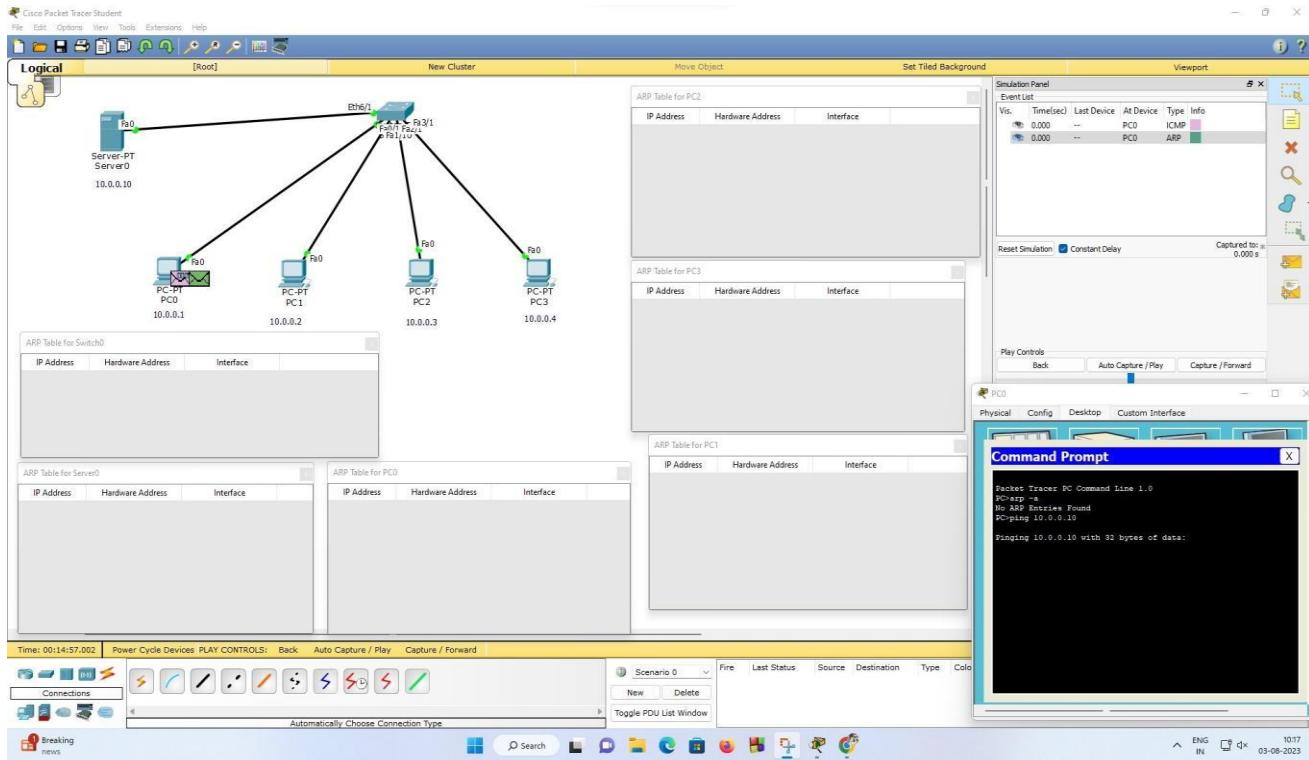
Aim : To construct simple LAN and understand the concept and operation of Address Resolution Protocol (ARP)

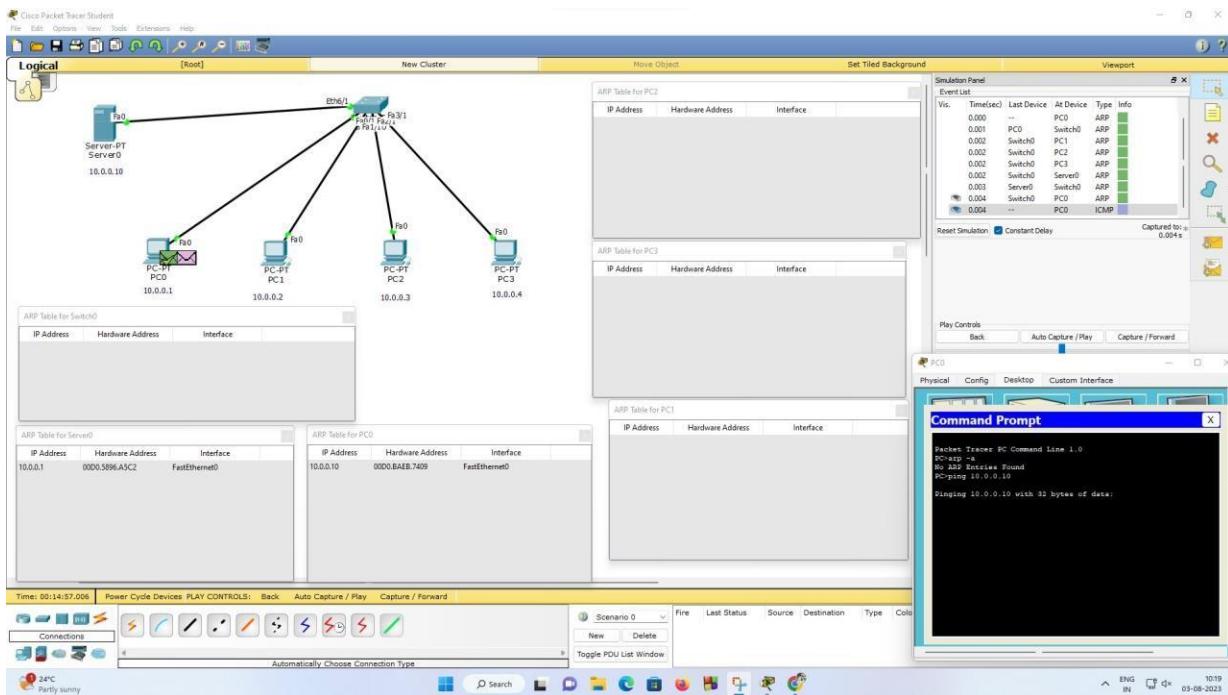
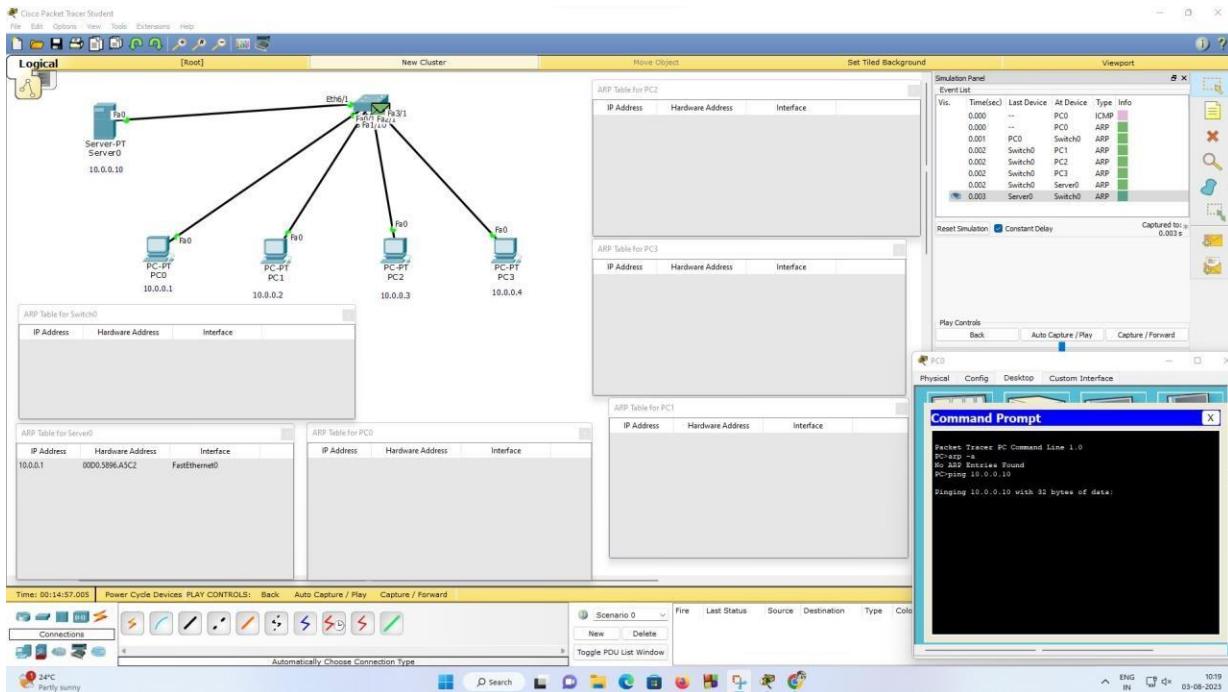
Topology:

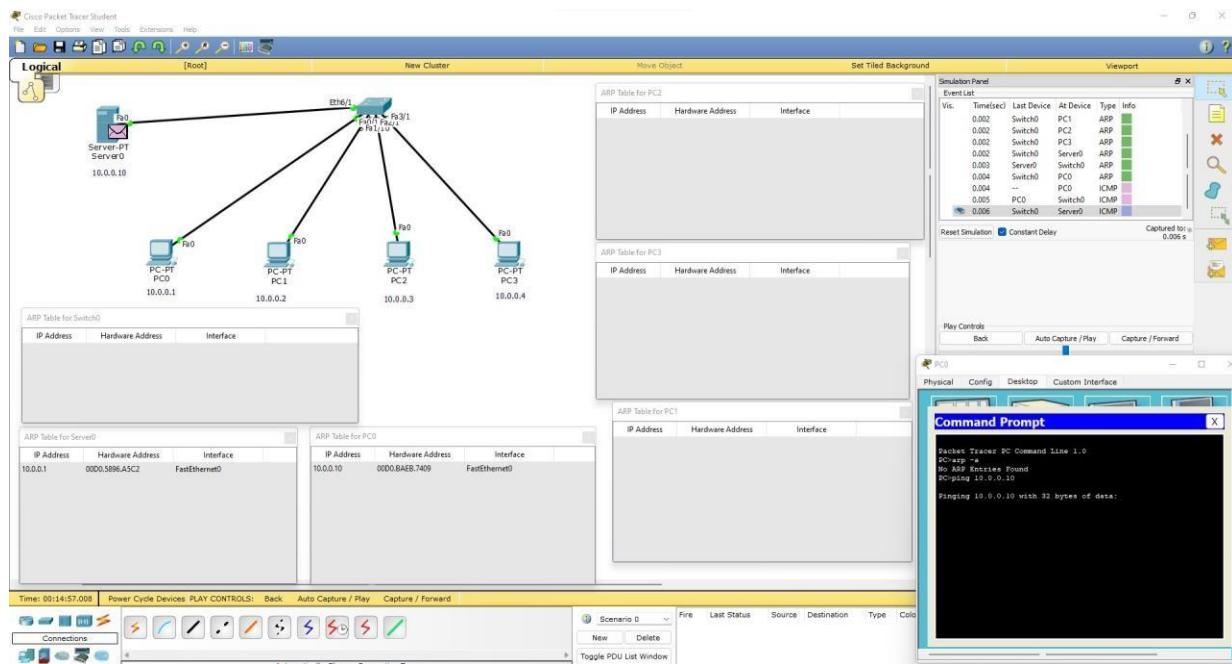
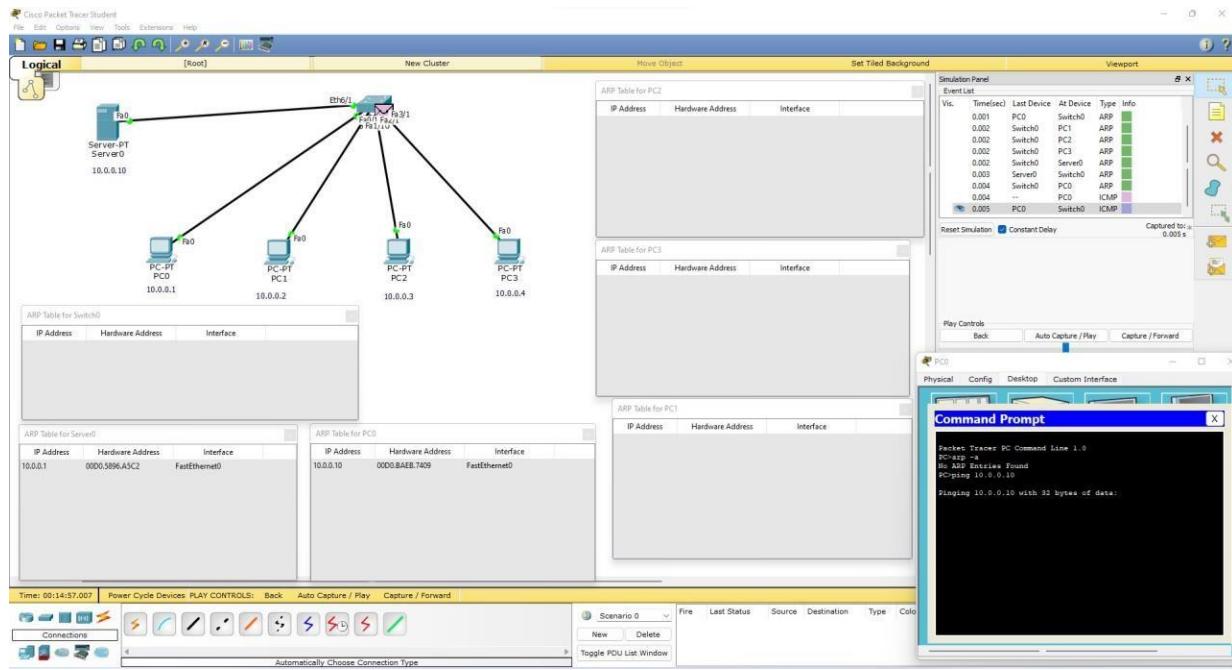


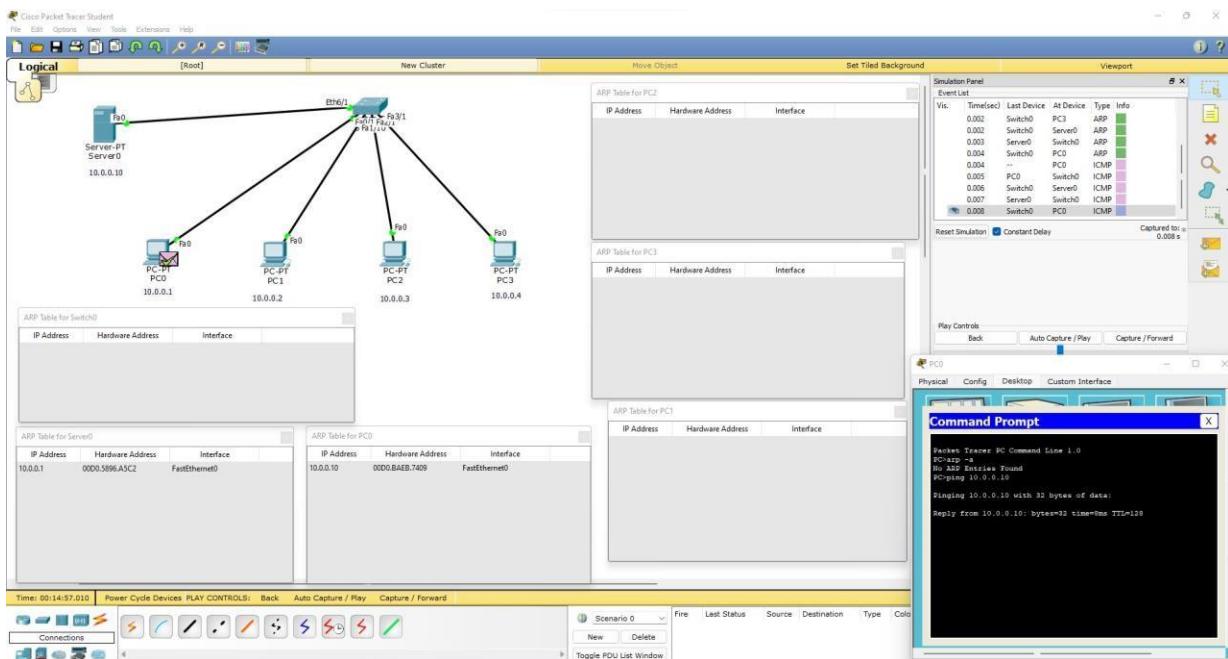
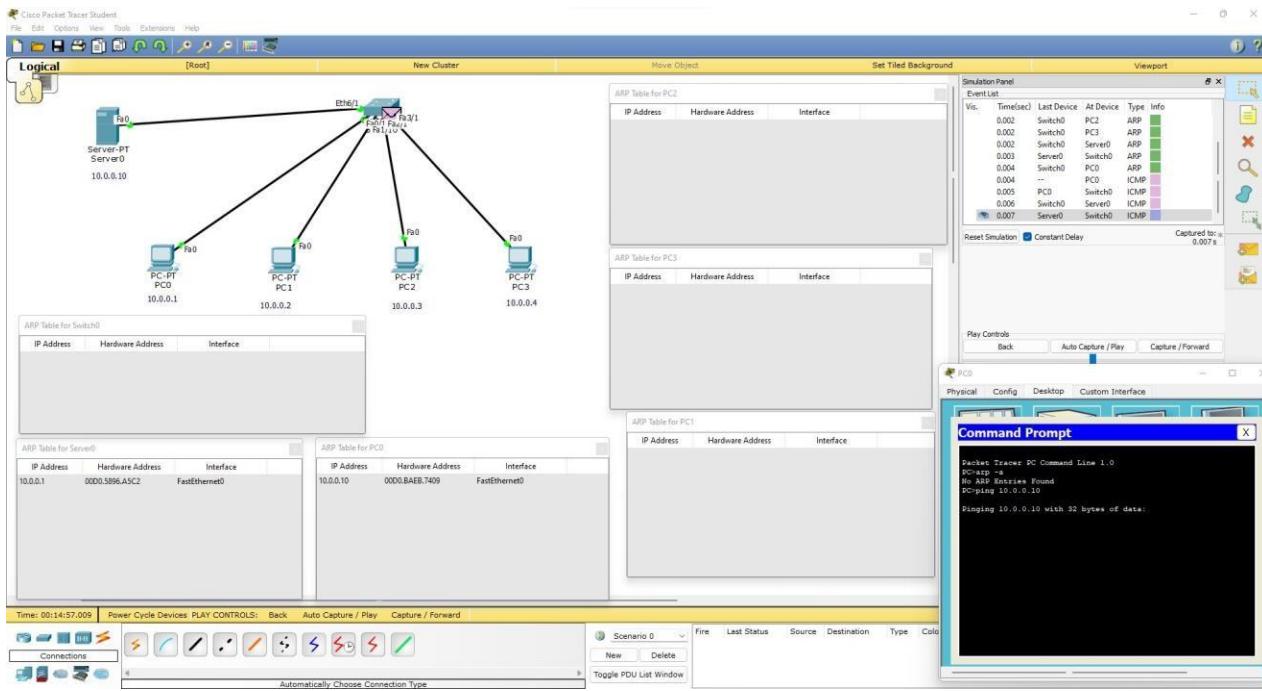
ARP Tables while pinging:

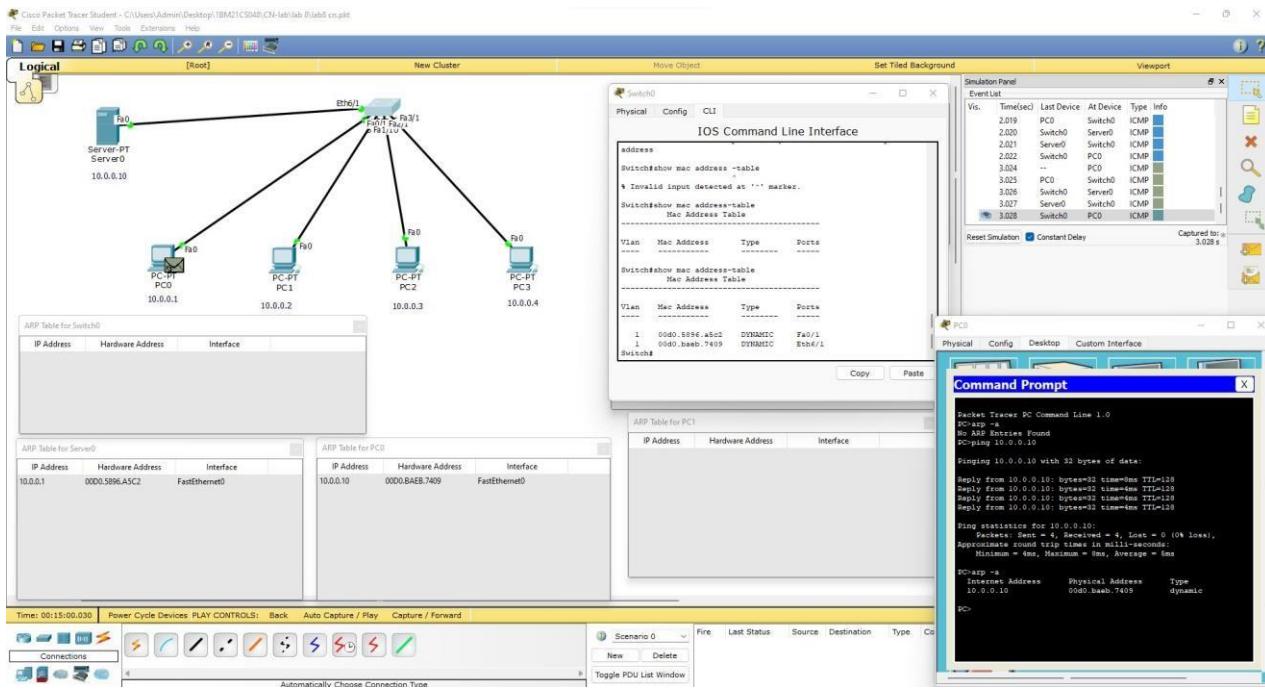
Ping from PC0 to Server0:



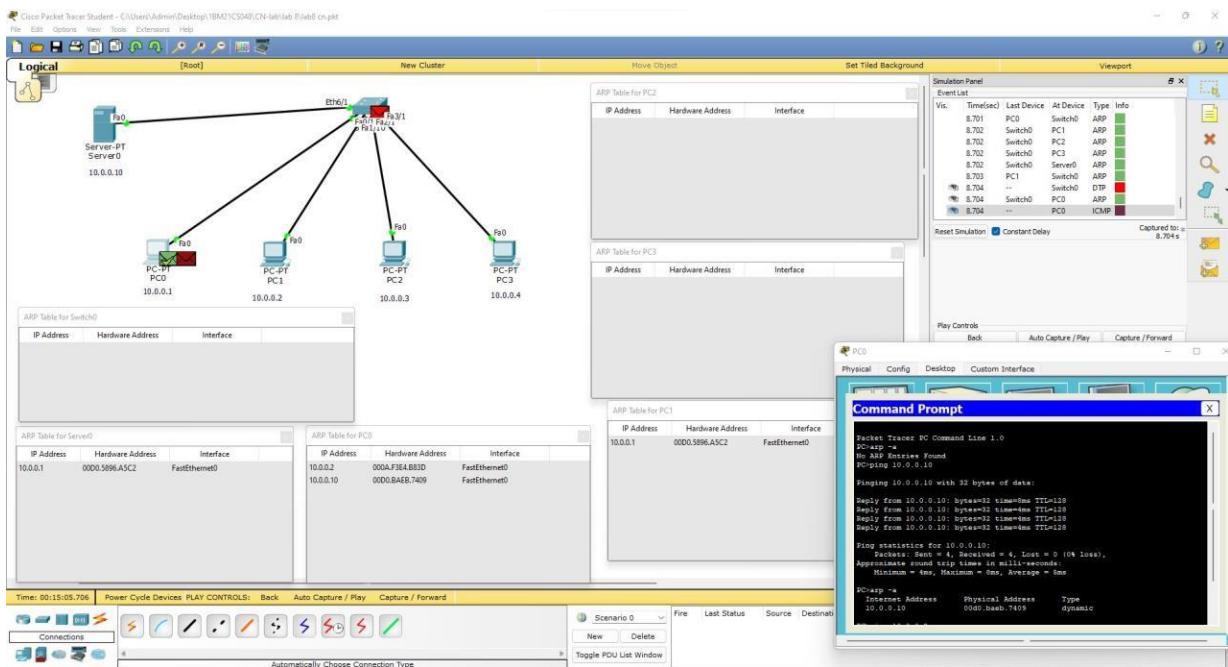


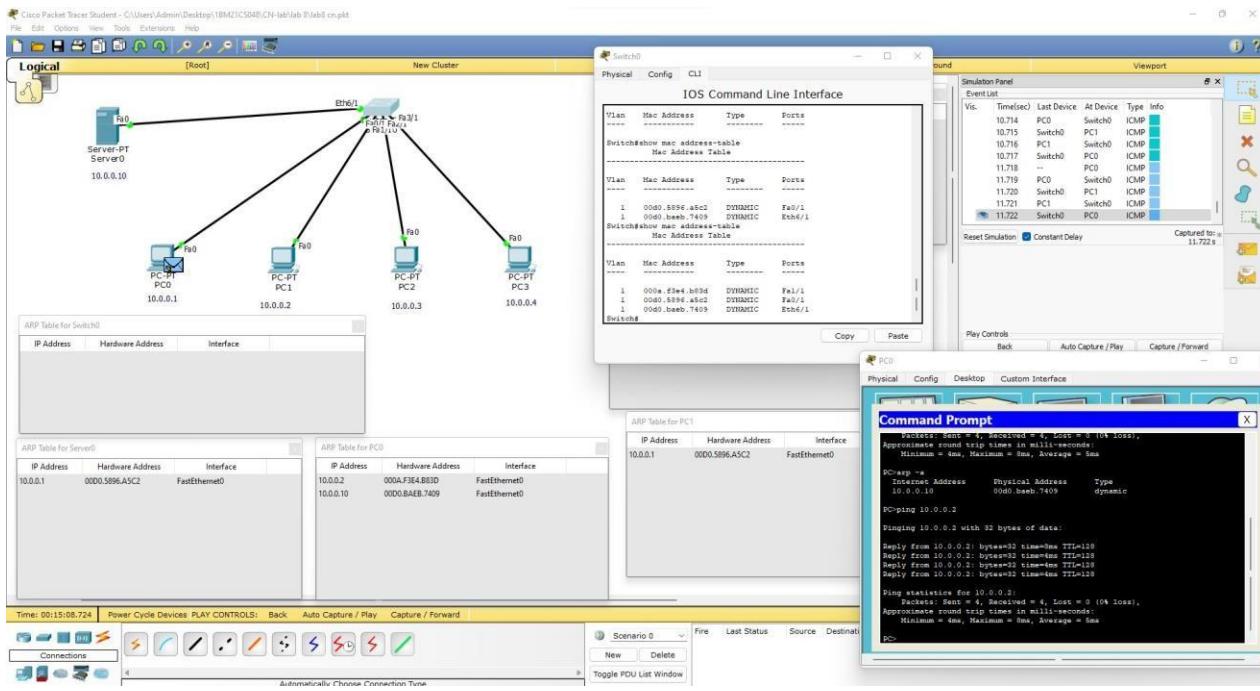




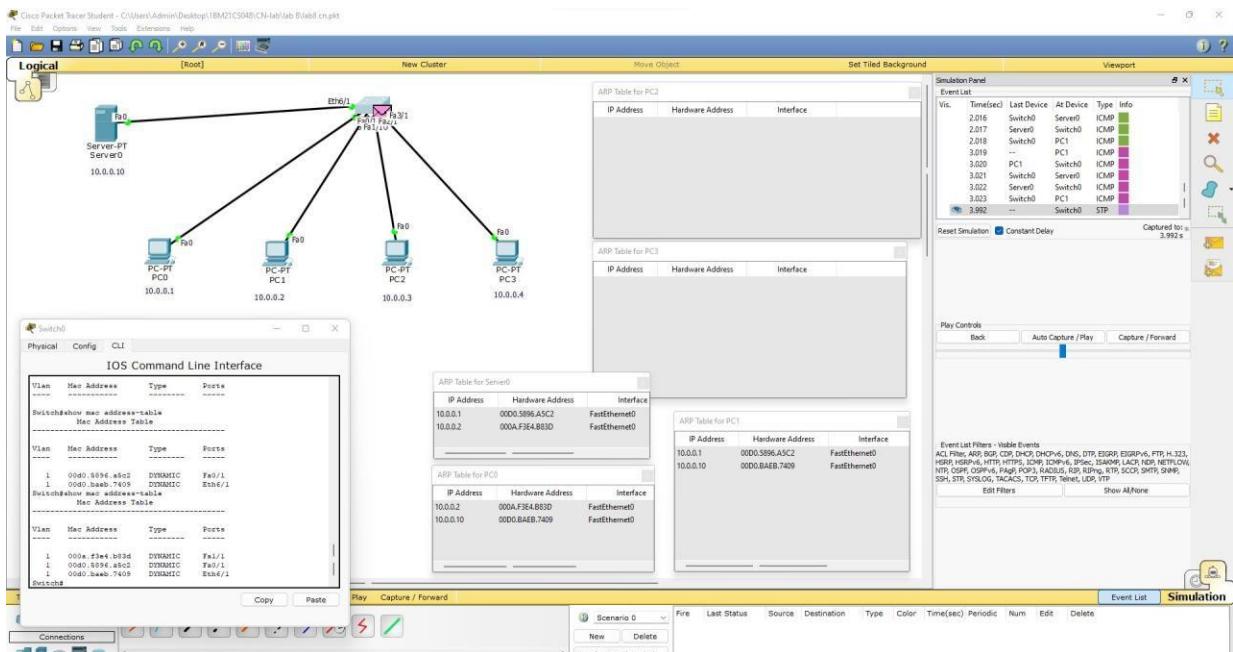


Ping from PC0 to PC1:



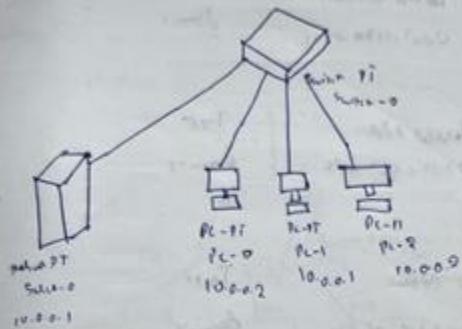


Final ARP Tables after pinging:



2.0.7.9
Bind to routes 31.1.0.0 & 192.168.1.0 in router to option
of adding broadcast routes

Topology



1.0

2.0.7.10

Router topology as shown above

→ Select the interface click on edit Source + click IP

→ Edit ARP table options setting IP address for collision

→ Set PC0A in the Router CLI mode, PC>ping 10.0.0.1 (src=)

→ In the simulation mode you can see the ping request

retransmission for PC to Source Stop by clicking

cancel buffer during time.

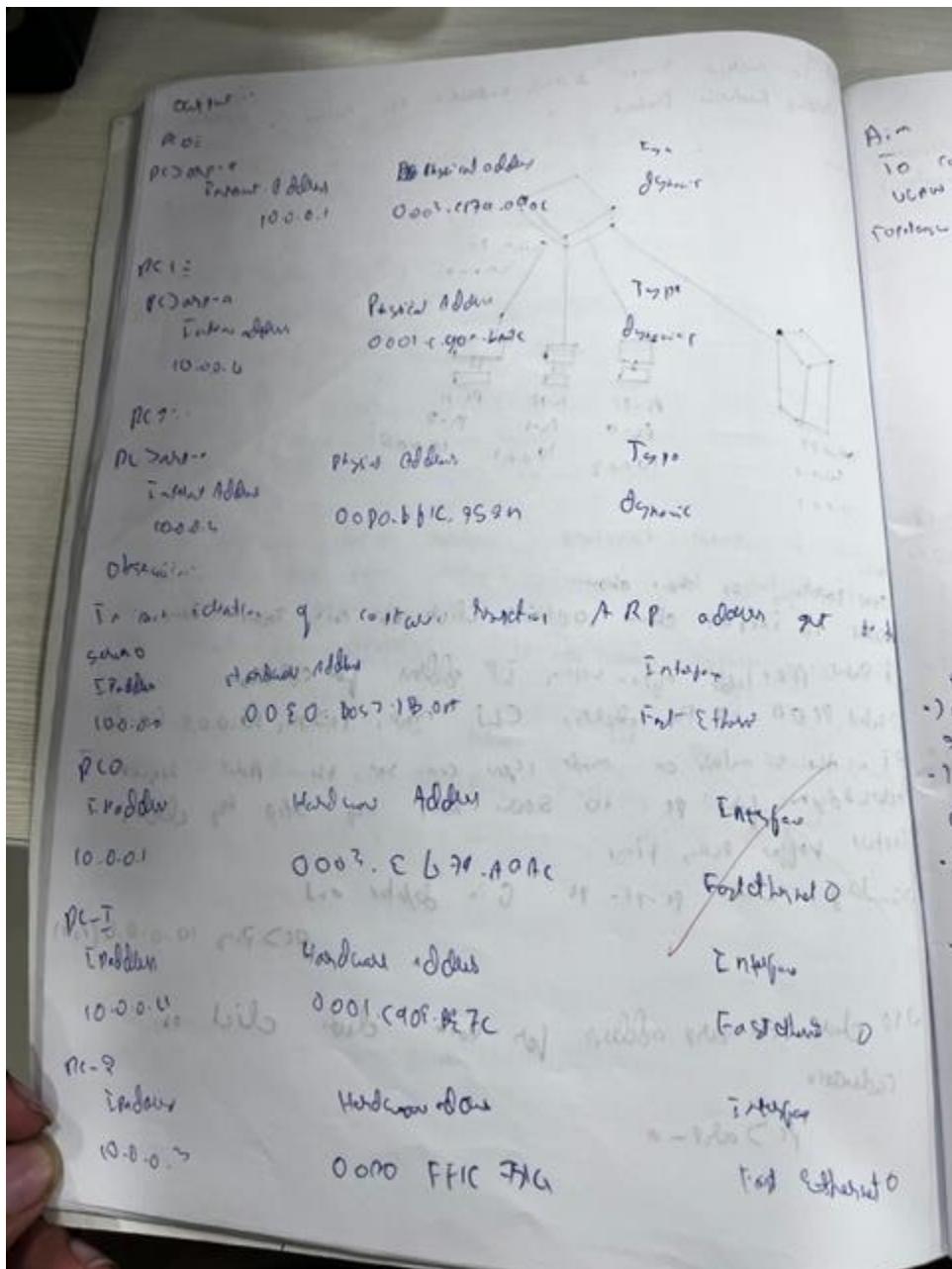
→ Similarly click pc>pc>1 C in Router mode

PC>ping 10.0.0.6 (src)

→ So click on any address for both click on

cancel

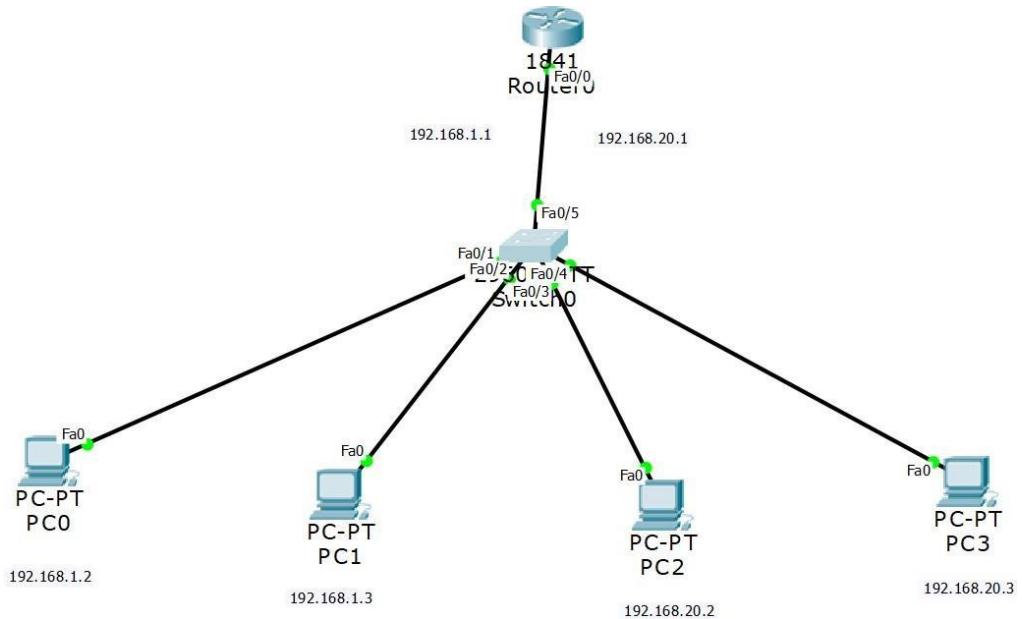
PC>arp -a



LAB 9:

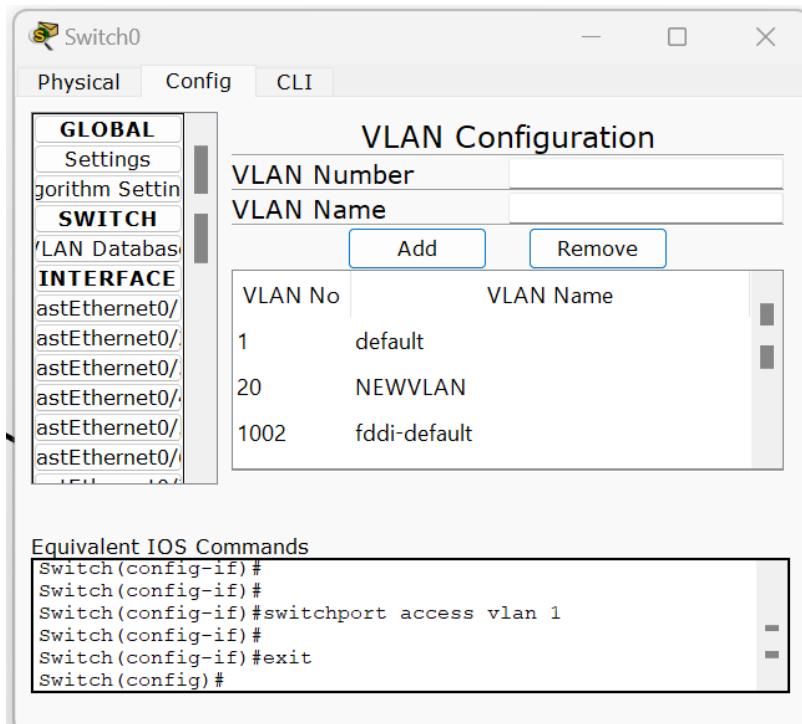
Aim : To construct a VLAN and make the PC's communicate among a VLAN

Topology:

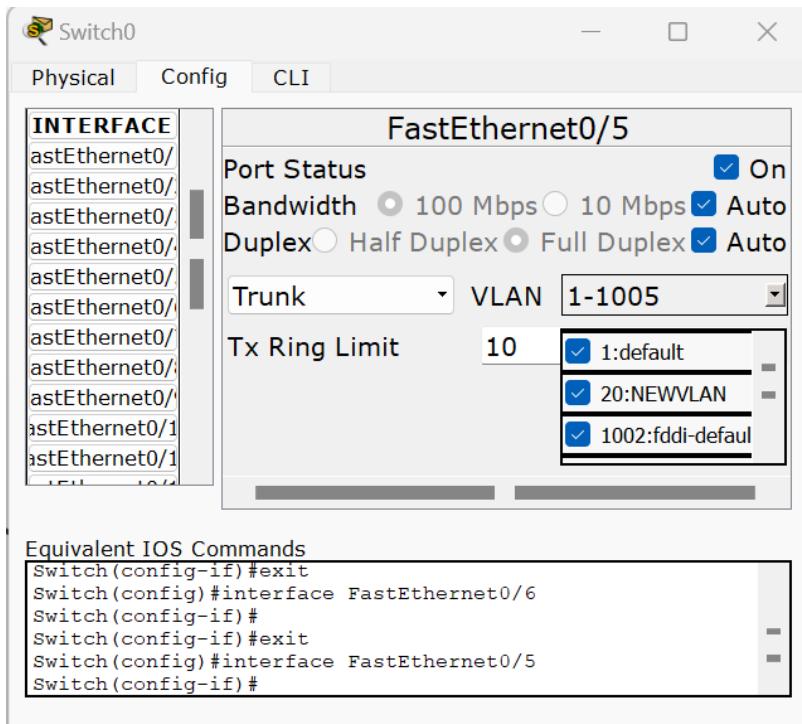


Configurations:

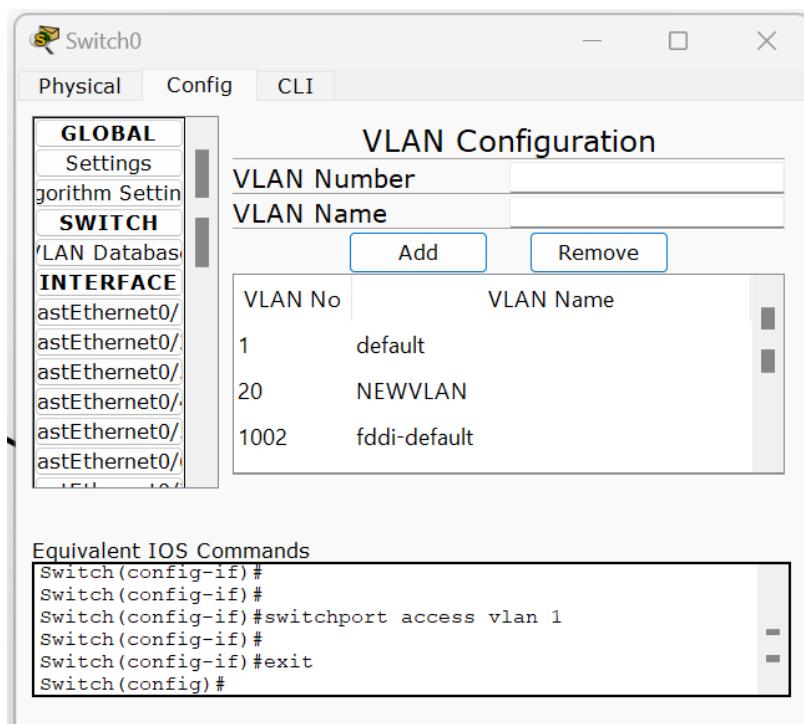
Switch VLAN Database:



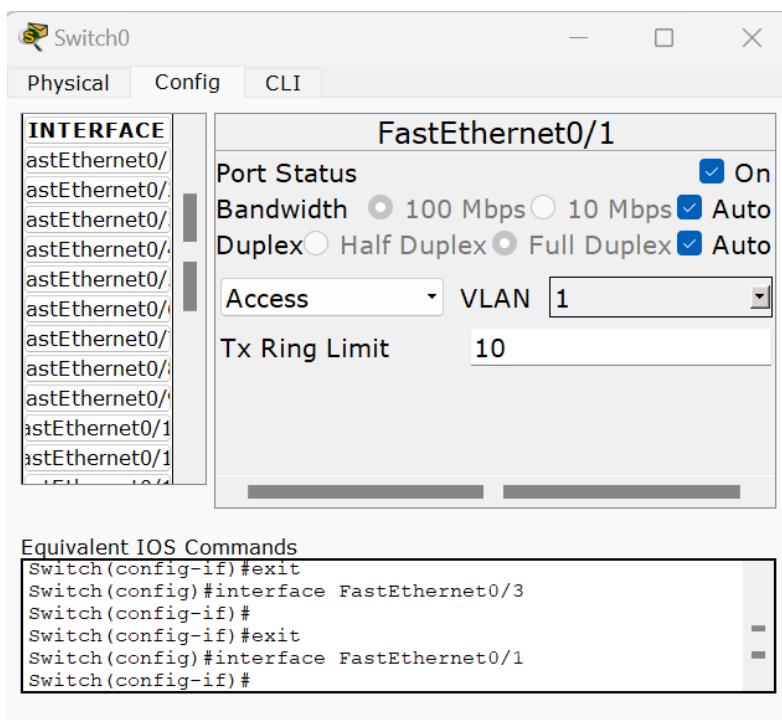
Switch FastEthernet0/5



Switch FastEthernet0/3 and FastEthernet0/4



Switch FastEthernet0/1 and FastEthernet0/2



Router 0 : VLAN DataBase:

Router0

Physical Config CLI

GLOBAL
Settings
Algorithm Setting
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1

VLAN Configuration

VLAN Number	VLAN Name	VLAN Name
Add	Remove	
VLAN No		
1	default	
20	NEWVLAN	
1002	fddi-default	
1003	token-ring-default	
1004	fddinet-default	
1005	trnet-default	

Equivalent IOS Commands

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
Router(config)#int fa 0/0.1
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up

Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
Router(config-subif)#no shut
Router(config-subif)#exit
Router(config)#
Router(config)#exit
Router#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Router(vlan)#
%SYS-5-CONFIG_I: Configured from console by console
```

Router 0 :

CLI:

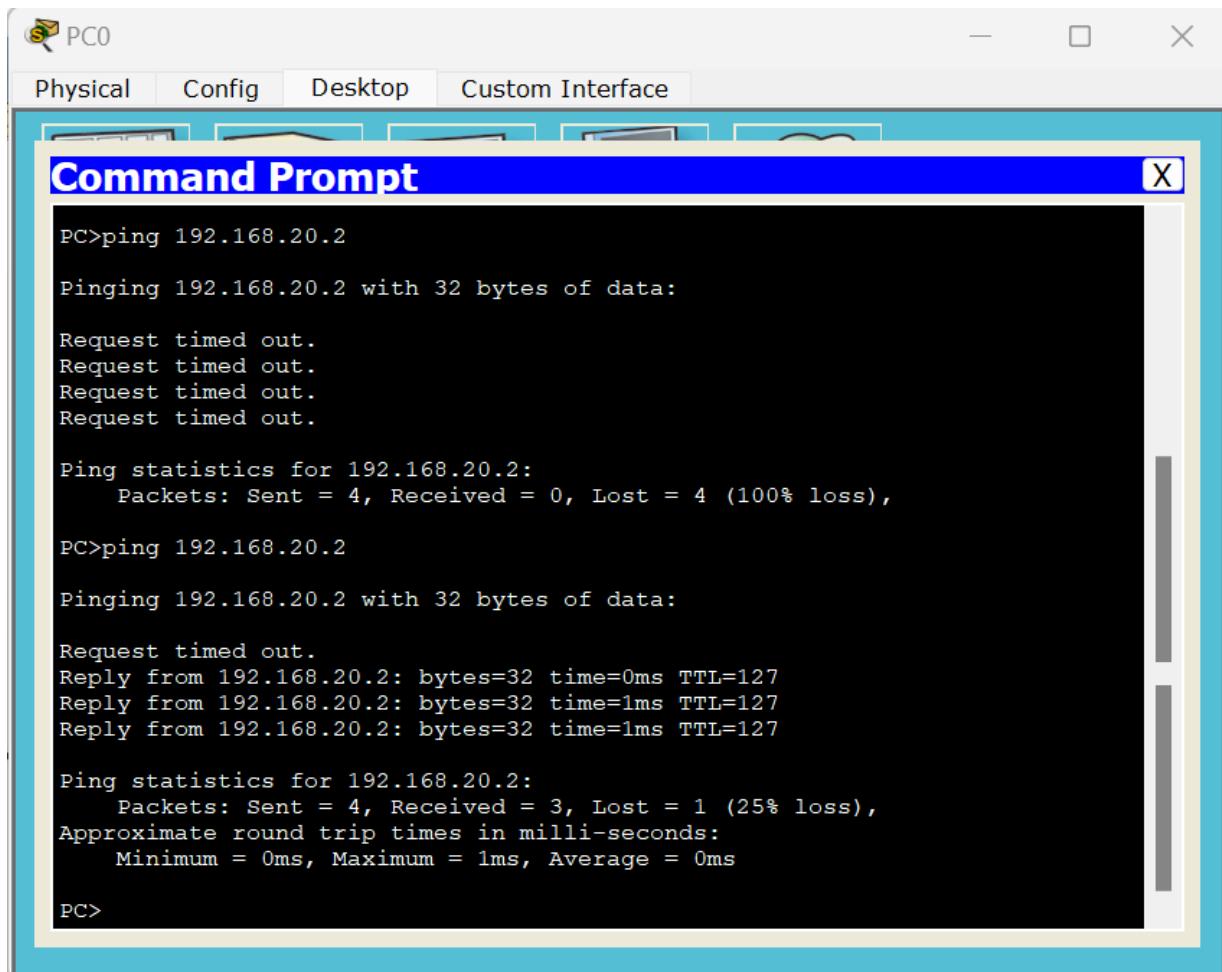
The screenshot shows a software interface for managing network devices. At the top, there are three tabs: "Physical", "Config", and "CLI". The "CLI" tab is currently active, indicated by a thicker border. To the right of the tabs, the text "IOS Commar" is partially visible. The main area displays the following text:

```
--- System Configuration Dialog ---  
Continue with configuration dialog? [yes/no]: n  
  
Press RETURN to get started!  
  
Router>enable  
Router#vlan database  
% Warning: It is recommended to configure VLAN from config mode,  
as VLAN database mode is being deprecated. Please consult user  
documentation for configuring VTP/VLAN in config mode.  
  
Router(vlan)#vlan 20 name NEWVLAN  
VLAN 20 modified:  
    Name: NEWVLAN  
Router(vlan)#exit  
APPLY completed.  
Exiting....  
Router#config t  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#int fa0/5  
%Invalid interface type and number  
Router(config)#int fa0/0  
Router(config-if)#ip address 192.168.1.1 255.255.255.0  
Router(config-if)#no shut  
  
Router(config-if)#  
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up  
exit  
Router(config)#int fa 0/0.1  
Router(config-subif)#  
%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up  
  
Router(config-subif)#encapsulation dot1q 20  
Router(config-subif)#ip address 192.168.20.1 255.255.255.0  
Router(config-subif)#no shut  
Router(config-subif)#exit  
Router(config)#[/pre>
```

Command Prompt:

P0:

Before and after VLAN configuration was successful.



The screenshot shows a Cisco Packet Tracer interface with a window titled "Command Prompt". The window displays terminal output for ping commands. The first ping attempt to 192.168.20.2 fails with a 100% loss due to Request timed out. The second ping attempt succeeds with a 25% loss, receiving three replies from 192.168.20.2 with TTL=127. The terminal prompt is "PC>".

```
PC>ping 192.168.20.2
Pinging 192.168.20.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.20.2:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 192.168.20.2
Pinging 192.168.20.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.2: bytes=32 time=0ms TTL=127
Reply from 192.168.20.2: bytes=32 time=1ms TTL=127
Reply from 192.168.20.2: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.20.2:
  Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
  Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>
```

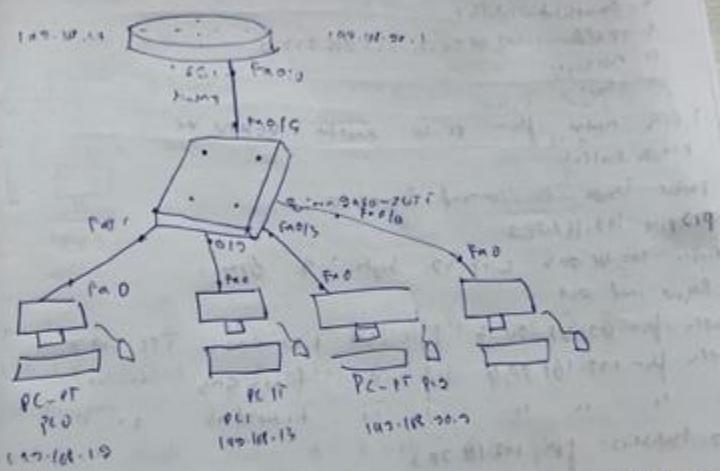
Chap. 29

9

To confirm a UMAN PRO model or PC connection please enter the following:

148

Page 4



- Create a 50 entries of Show address, Chk 1861 module and 2960-24T switch table
 - Set the IP address of the switch and a PC's IP's respectively we can class C type address also set gate way
 - In switch 190 to config tab and select VLAN Database Unisys any VLAN no like 3 and name as VLAN
 - Select the interface portEthernet 0/1 and make it trunk
• Assign count 16 switches with 1000 and 10000 bytes limit No. interface of 3 8 10/0
• VLAN Port of 91m and set VLAN name 9
 - Go to Switch > Config tab and select VLAN Octet 0 and enter the new VLAN & no? Created

1. first name: John 2. last name: Smith 3. address: 123 Main Street 4. city: New York 5. state: NY 6. zip code: 100-00

Final output

Partial Periodic vs. random time 1-0

$$p_i > p_{i+1} \quad \forall i \geq 16 \wedge 20 - 3$$

Figure 140-146 20-16 W-1877 bright of 0000

卷之三

Aug 19 1968 1 m 32 1-18-68 - 711-2197

1970s 1980s 1990s 2000s 2010s 2020s 2030s 2040s 2050s

Reps. $\mu = 139.16 \pm 90.5$ $t = 1.17$ $N = 545$

Ping Statistics 10:192.168.20.3

10.000-10.000-10.000 (1000000)

Field Site 5, Round 8, lot 9 (25-1.1053),

Almond had 12 pines as neighbors.

Minimum 5000, Maximum 5000, Average = 100

GB67. *Thomomys talpoides* *macrourus* *macrourus*

∴ We can have one device on one VLAN & switch on other VLAN
Conversely to the two switch. They will only speak with broadcast traffic
from either this VLAN

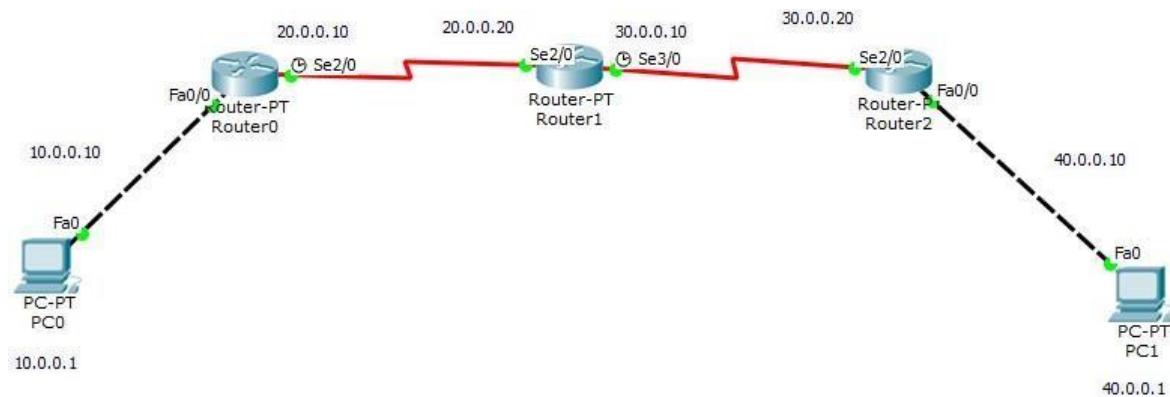
→ TWO CLANS ARE IN TROUBLE

•) Inter-VLAN routing via a bridged ~~host~~ ^{host} to ^{host} (no logical connection to the network)

LAB 10:

Aim : Demonstrate the TTL/ Life of a Packet

Topology:



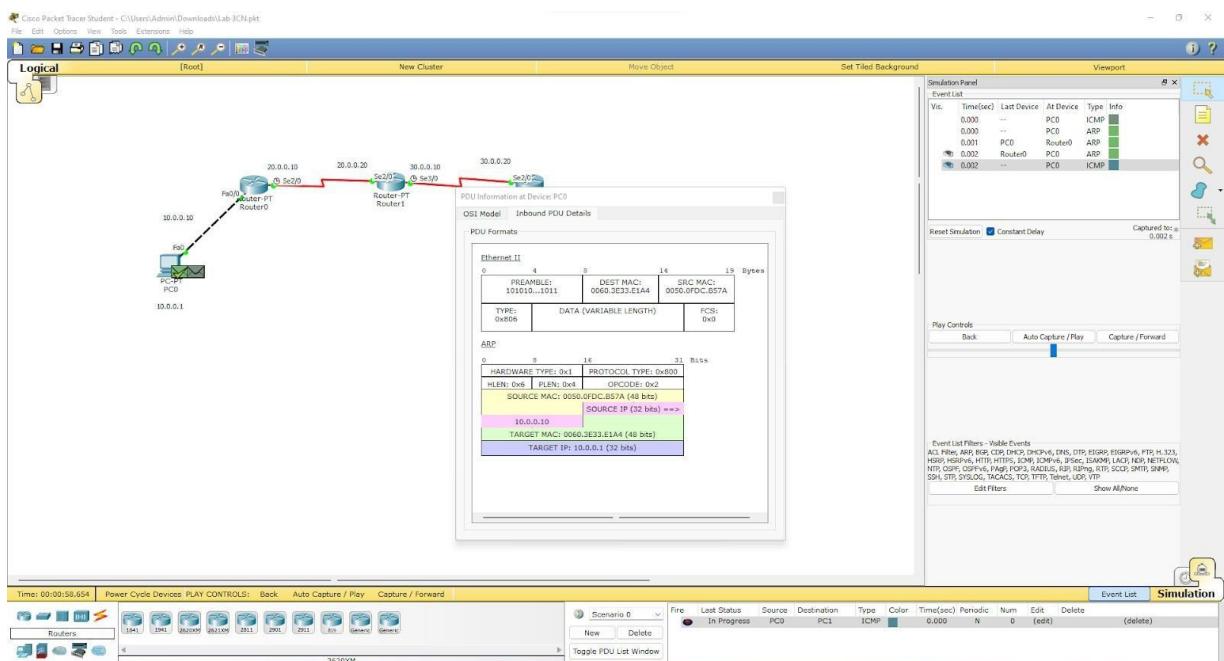
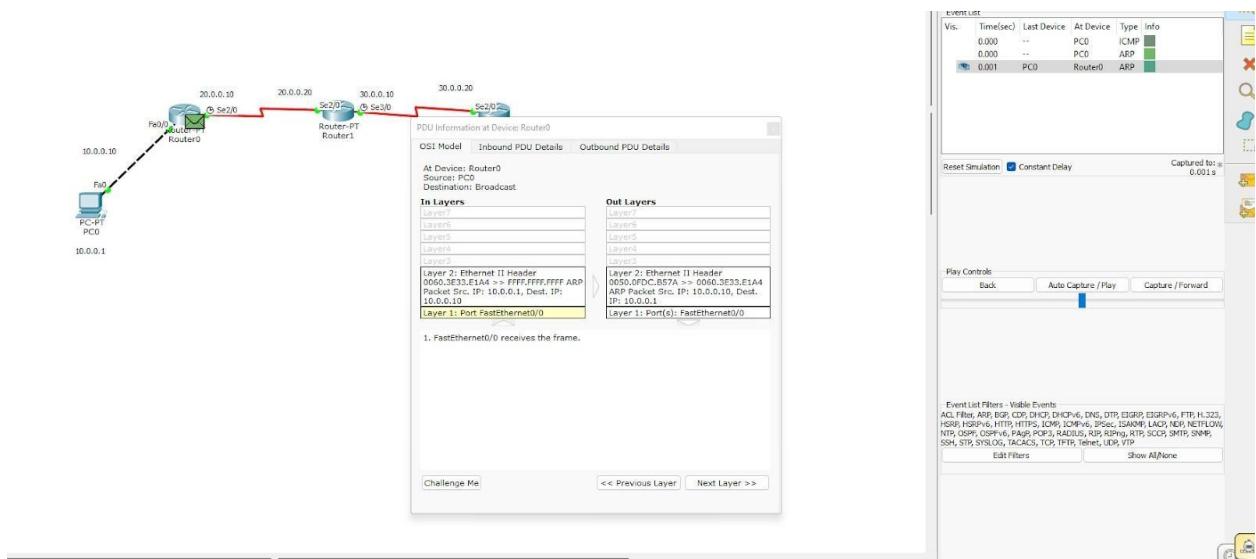
Configurations:

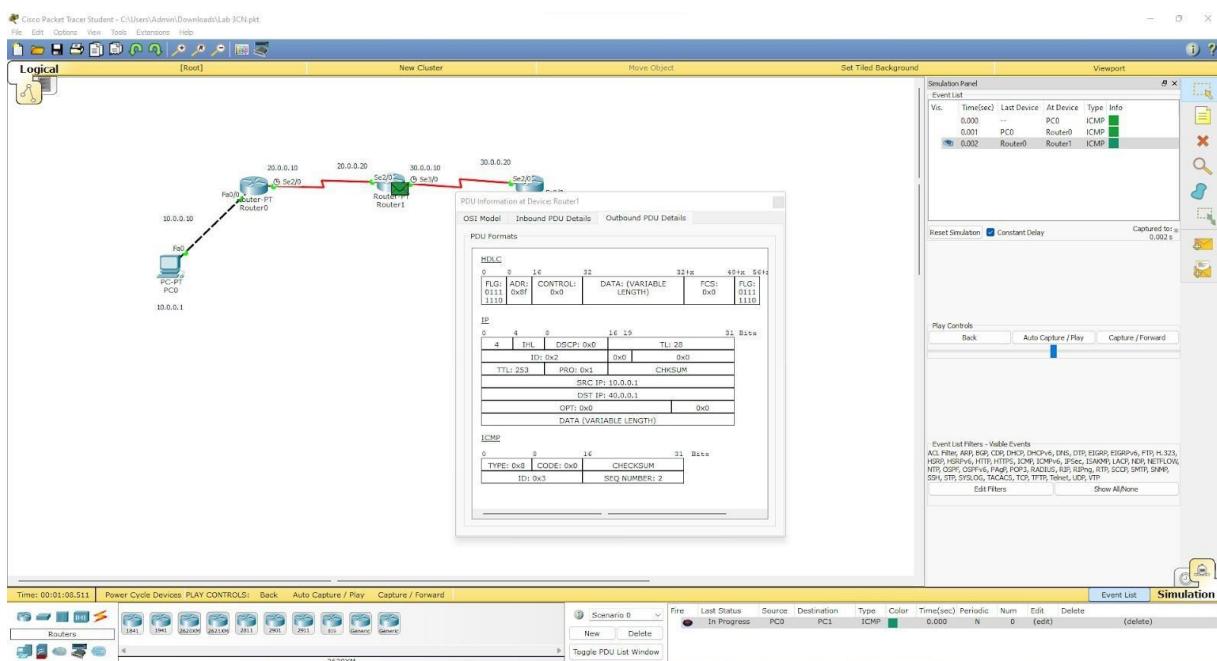
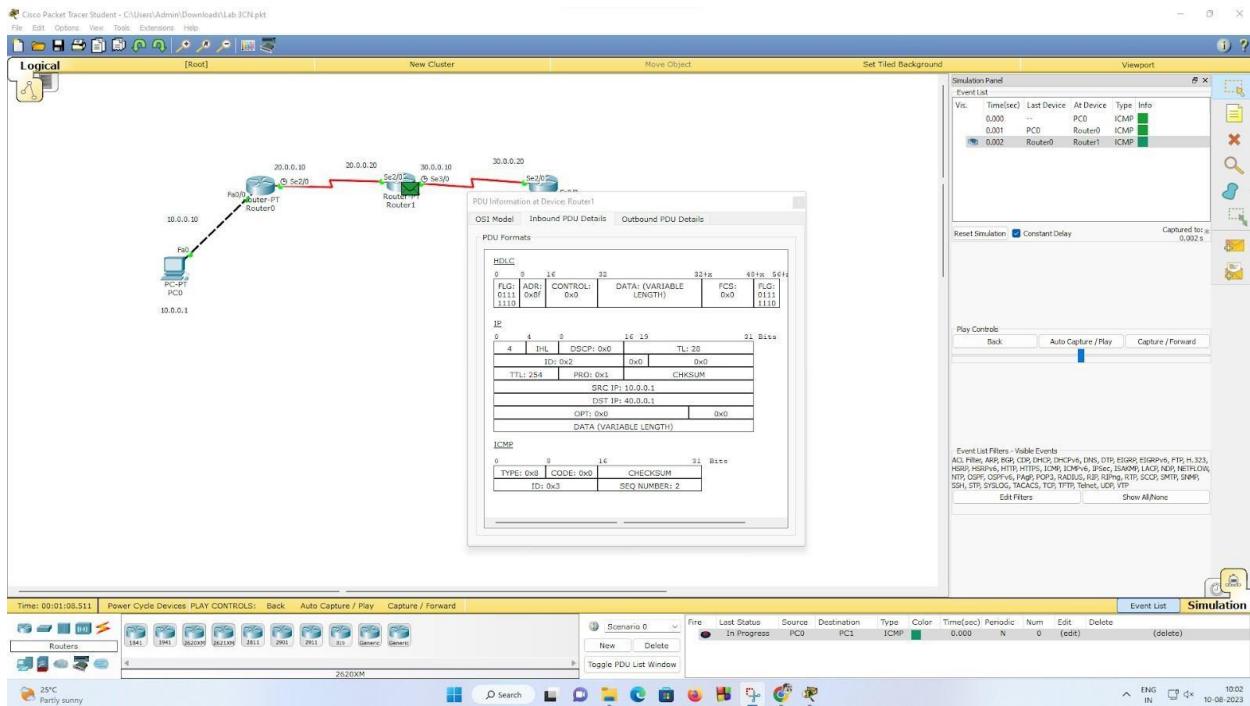
Configure the devices as per static / default / dynamic routing.

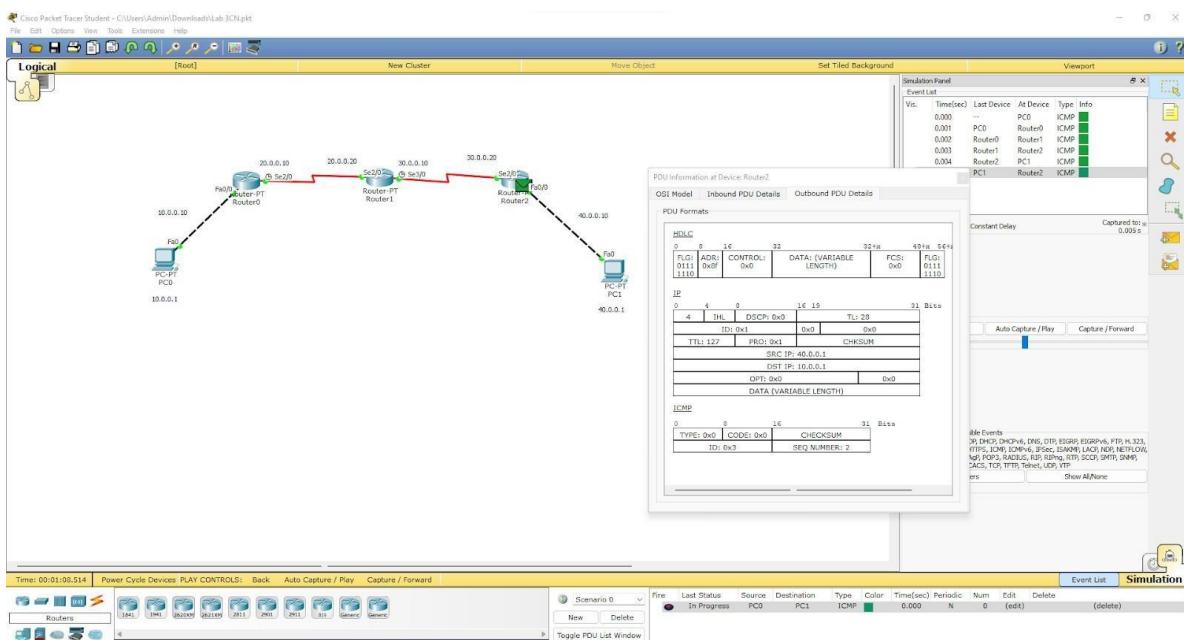
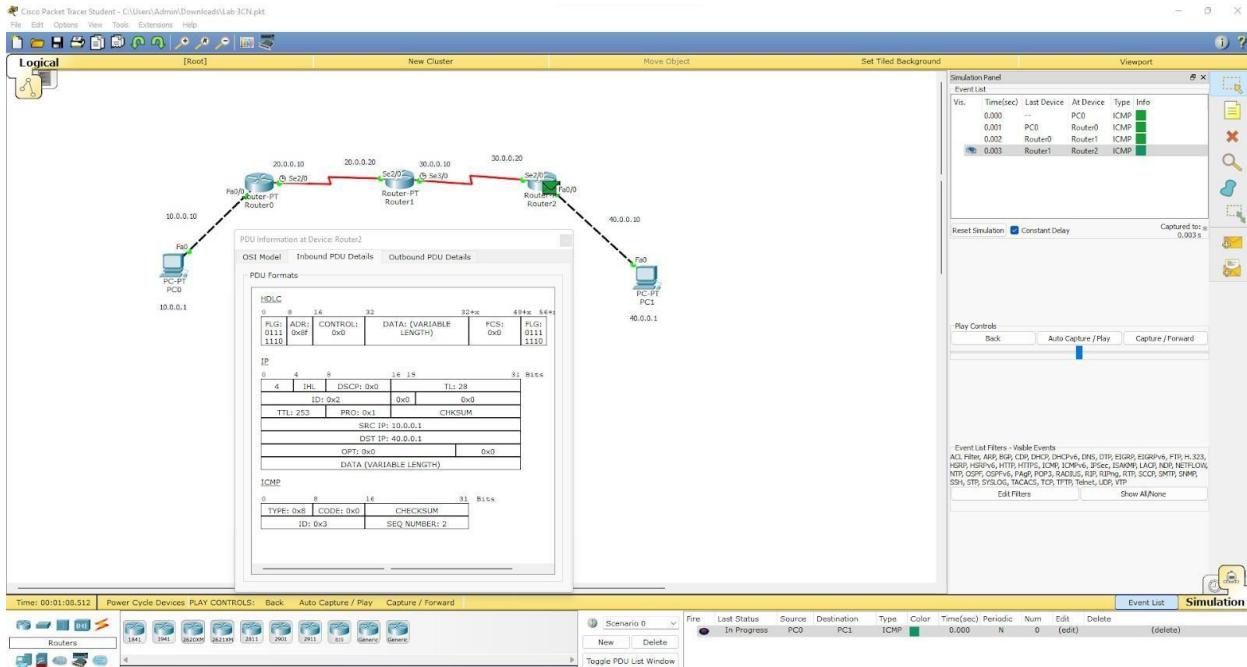
Above is done using static routing.

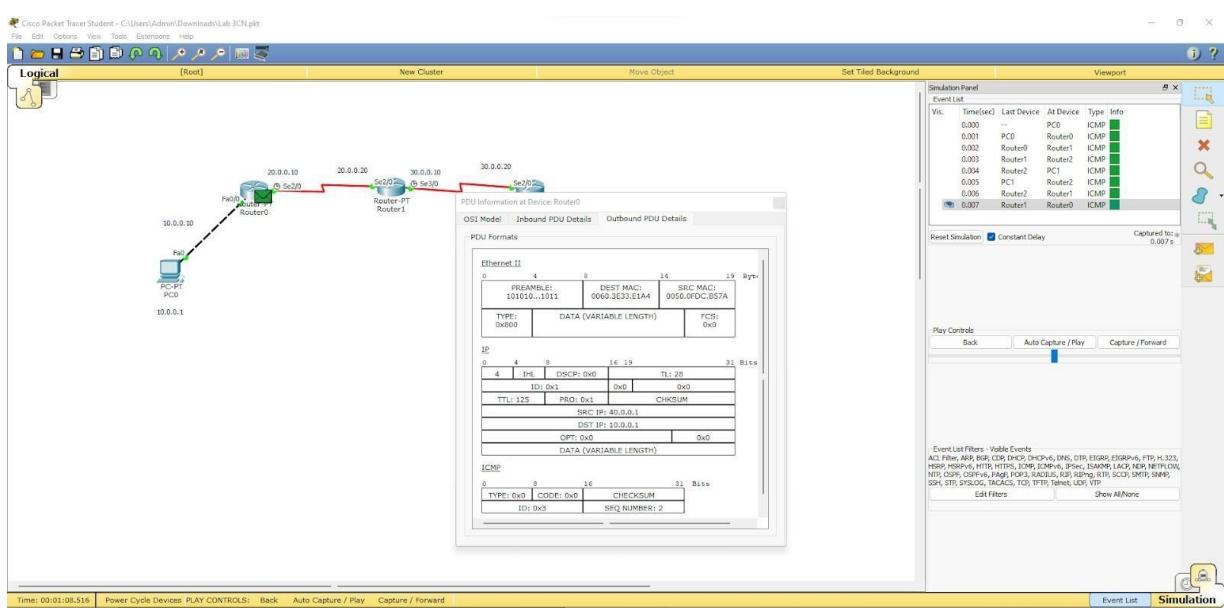
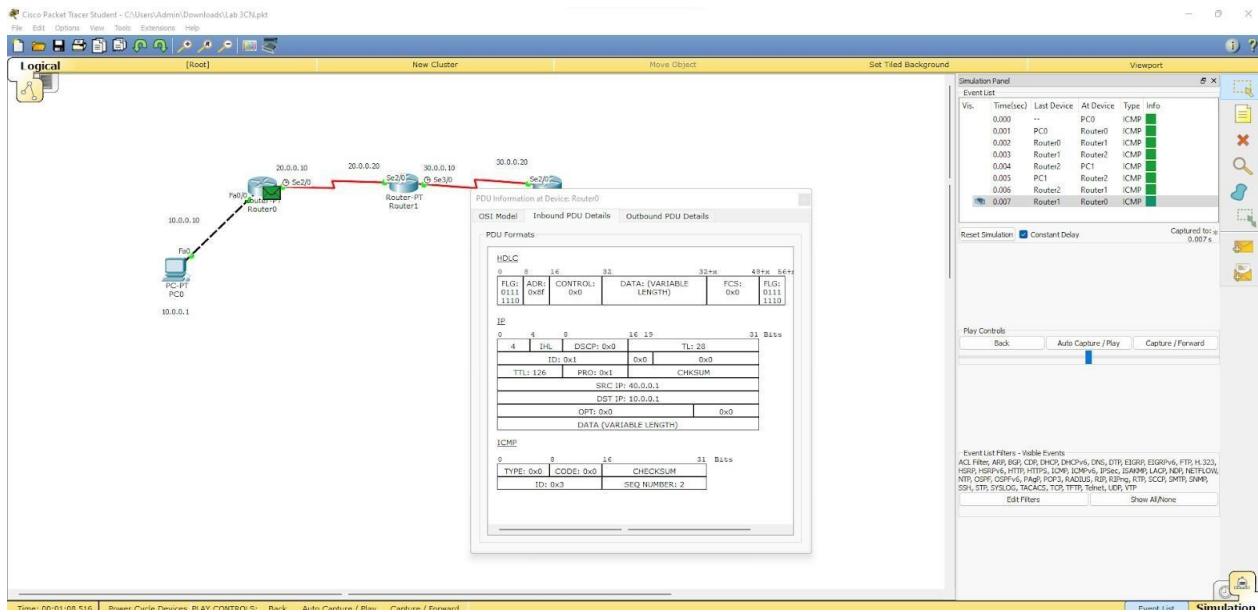
PDU Details:

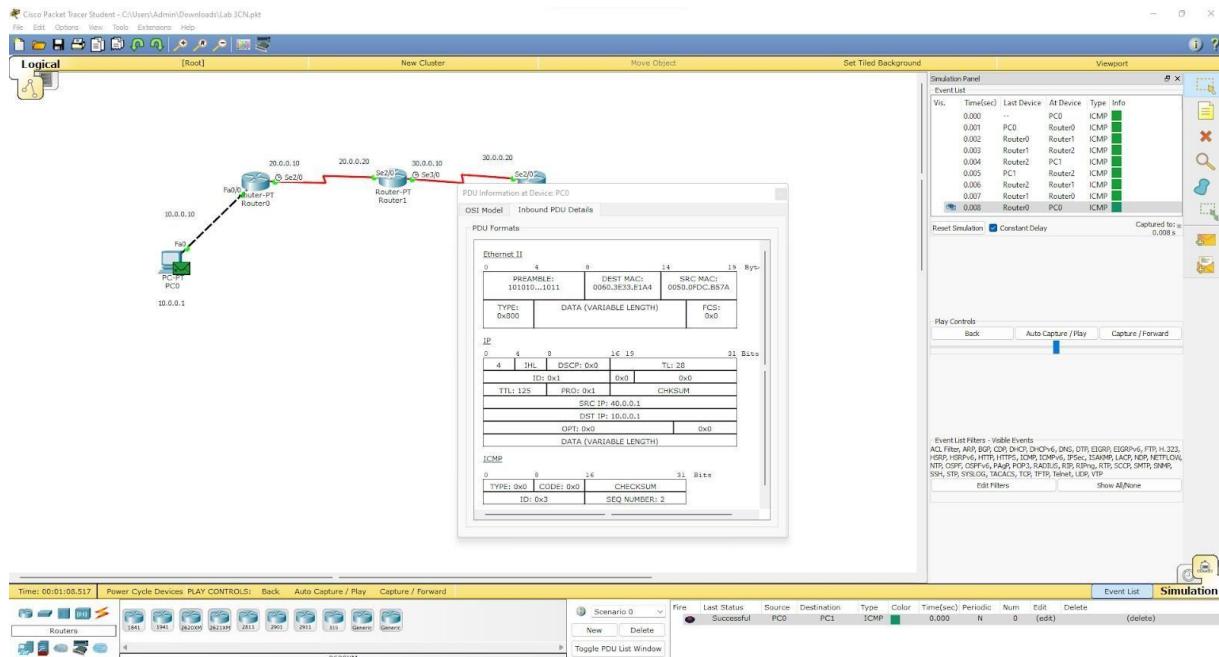
Simple PDU sent from PC0 to PC1 in simulation mode.



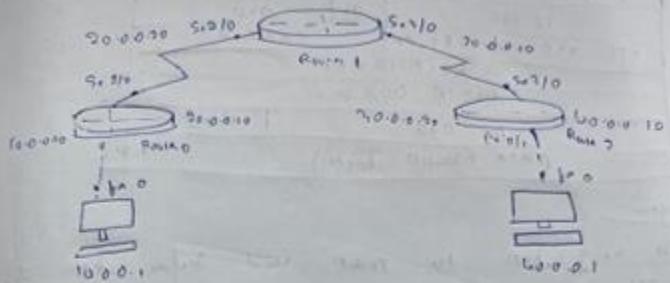








A...
Demonstrate the TTL / life of a packet
Topology:-



Procedure

- 1) Create a topology as shown above two PCs and 3 Routing
- 2) Set TU IP address and gate way for PCs
- 3) Configure Routers
- 4) In simulation mode send a simple PDU from one PC to another
- 5) Use capture button to capture every frame
- 6) Click on the PDU ~~data~~ details button then map to see the inbound & outbound PDU detail

Output

0	4	8	12	16	19
	IHL	PSCP		TTL: 28	
	10 hrs		0x1	0x0	
TTL	255	PRO. OH		CRRGSM	
		SRC IP: 10.0.0.1			
		DST IP: 0.0.0.0			
	OPT	0x0		0x0	
		DATA (Forward bytes)			

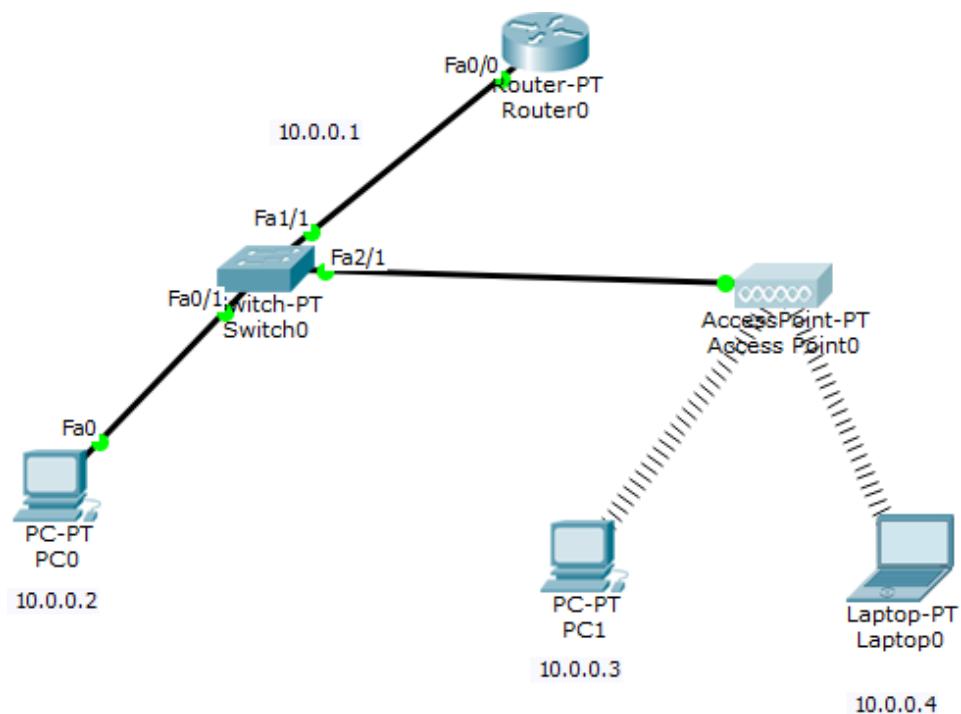
Observation

- If TTL = 0, then the packet should be discarded.
- Before TTL goes to zero, the sender and receiver try to take actions before the packet reaches its destination.
- When ICMP receives TTL value is 0, it should discard and send an ICMP message.

LAB 11:

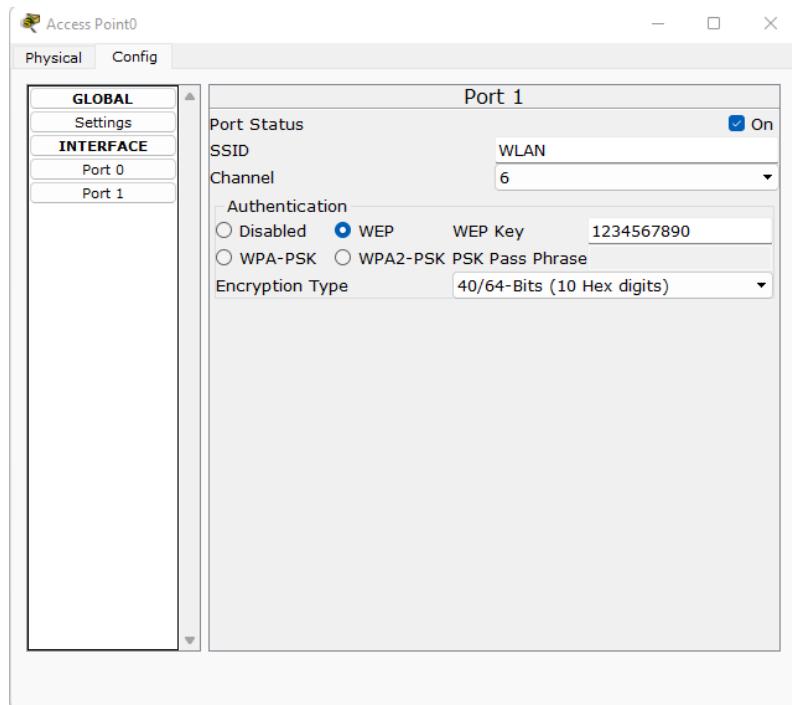
Aim : To construct a WLAN and make the nodes communicate wirelessly

Topology:

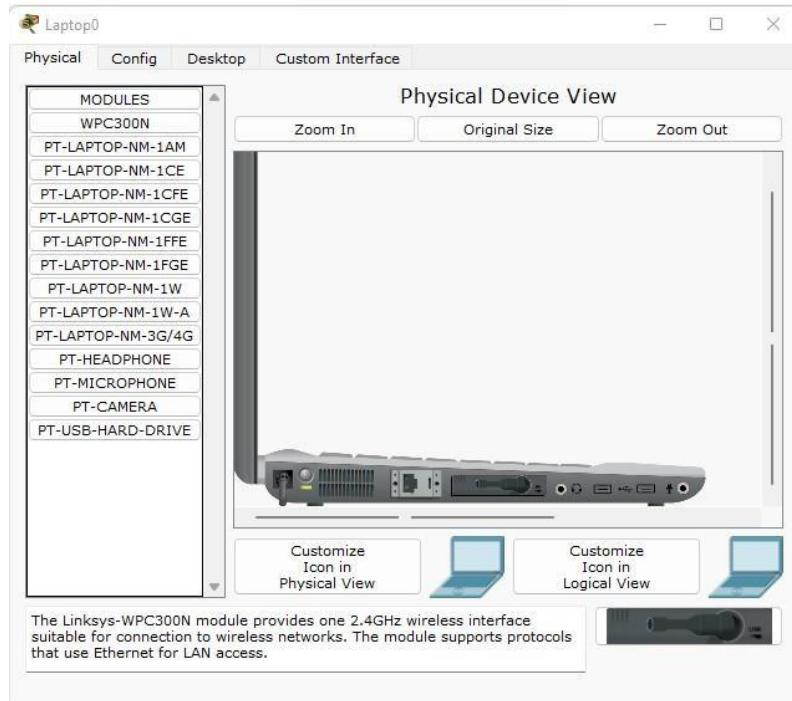


Configurations:

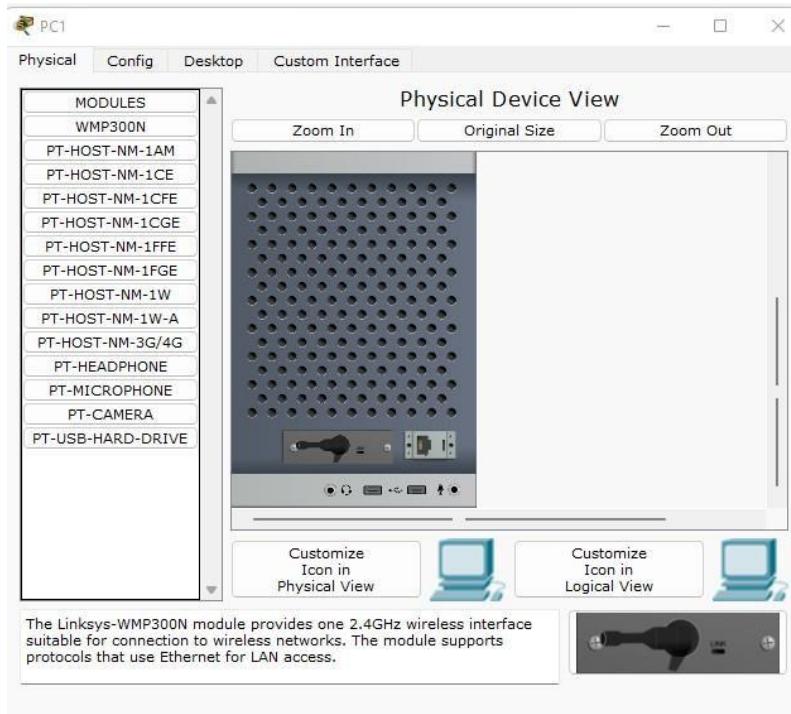
Access Point0:



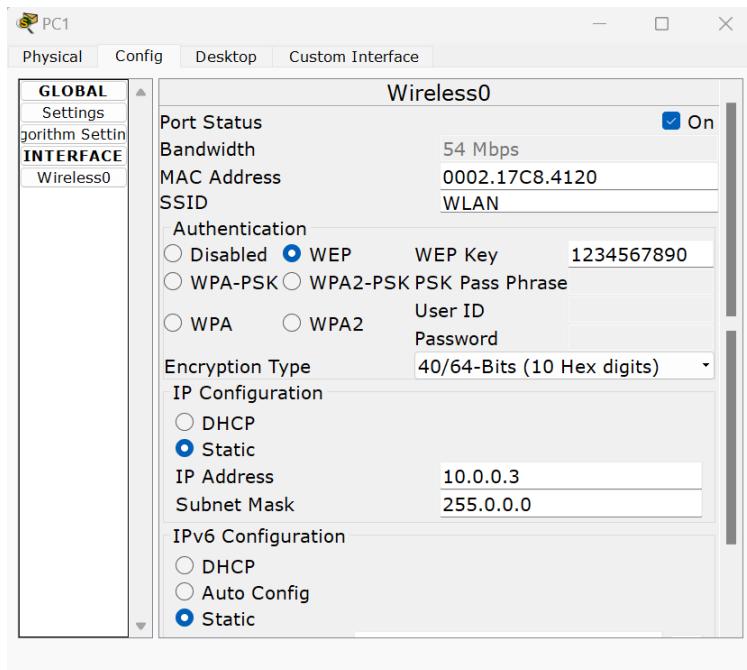
Laptop0 Physical port change:



PC0 Physical port change:



PC0 and Laptop0 Wireless configuration:



Router 0 CLI:



Router0

Physical Config CLI

IOS Command Line Interface

```
Bridging software.  
X.25 software, Version 3.0.0.  
4 FastEthernet/IEEE 802.3 interface(s)  
2 Low-speed serial(sync/async) network interface(s)  
32K bytes of non-volatile configuration memory.  
63488K bytes of ATA CompactFlash (Read/Write)

--- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: no

Press RETURN to get started!

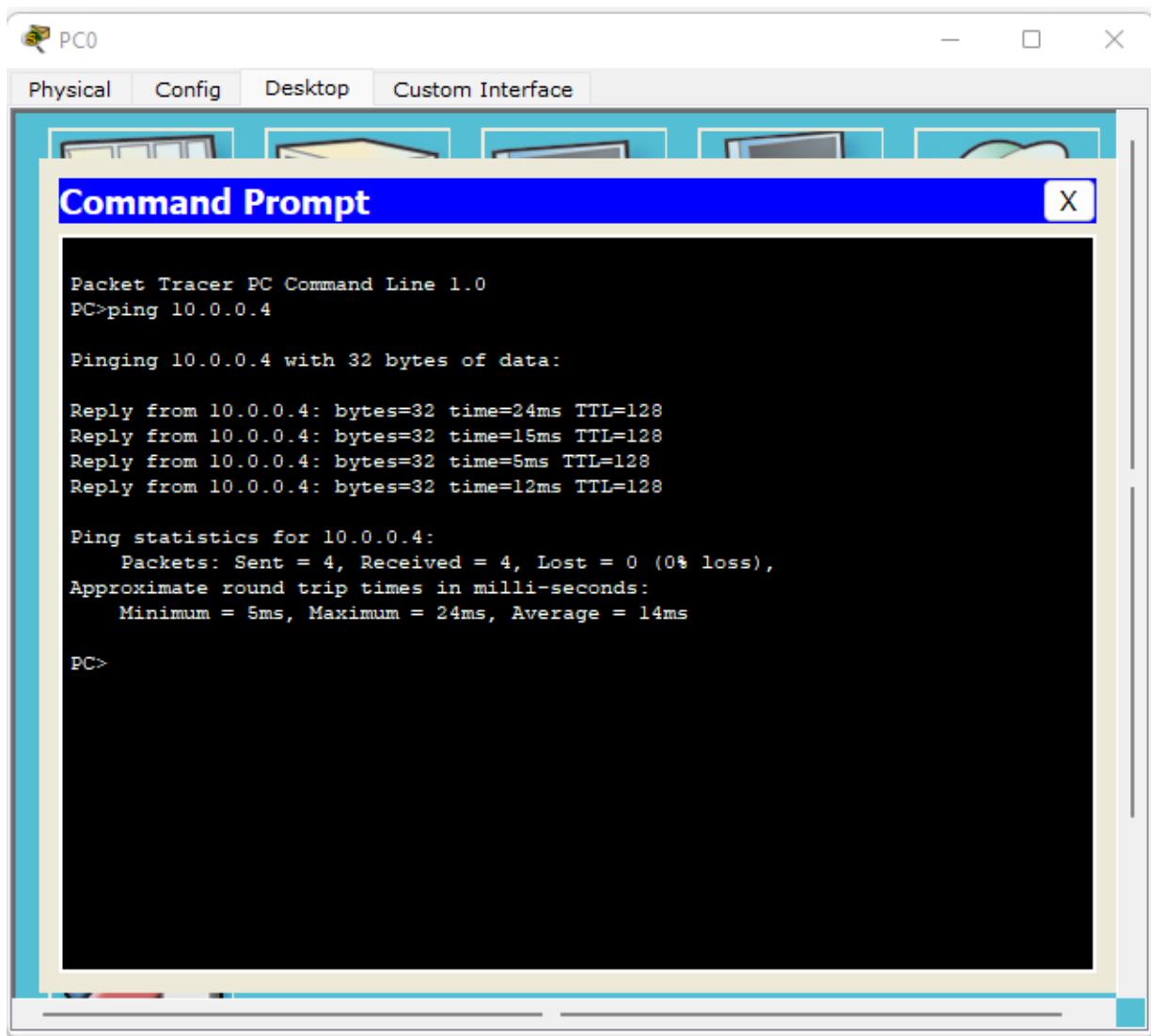
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
up
```

Copy Paste

Command Prompt:

PC0 to Laptop0 :



```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.4

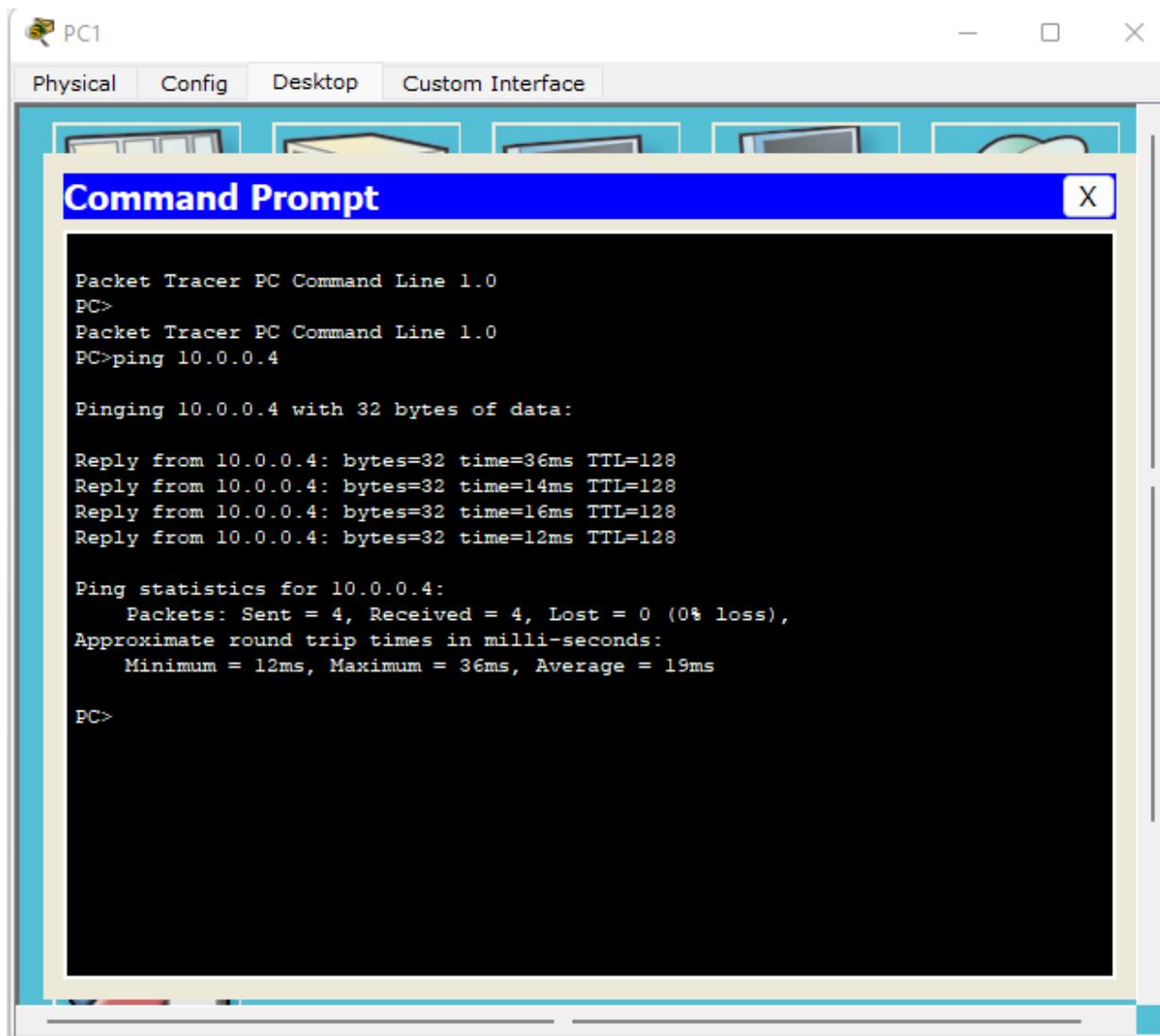
Pinging 10.0.0.4 with 32 bytes of data:

Reply from 10.0.0.4: bytes=32 time=24ms TTL=128
Reply from 10.0.0.4: bytes=32 time=15ms TTL=128
Reply from 10.0.0.4: bytes=32 time=5ms TTL=128
Reply from 10.0.0.4: bytes=32 time=12ms TTL=128

Ping statistics for 10.0.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 5ms, Maximum = 24ms, Average = 14ms

PC>
```

PC1 to Laptop0 :



The screenshot shows a Cisco Packet Tracer interface with a "Command Prompt" window open. The window title is "Command Prompt". The command entered was "ping 10.0.0.4". The output shows the ping results for four replies from the target IP address, followed by statistics and a final prompt.

```
Packet Tracer PC Command Line 1.0
PC>
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.4

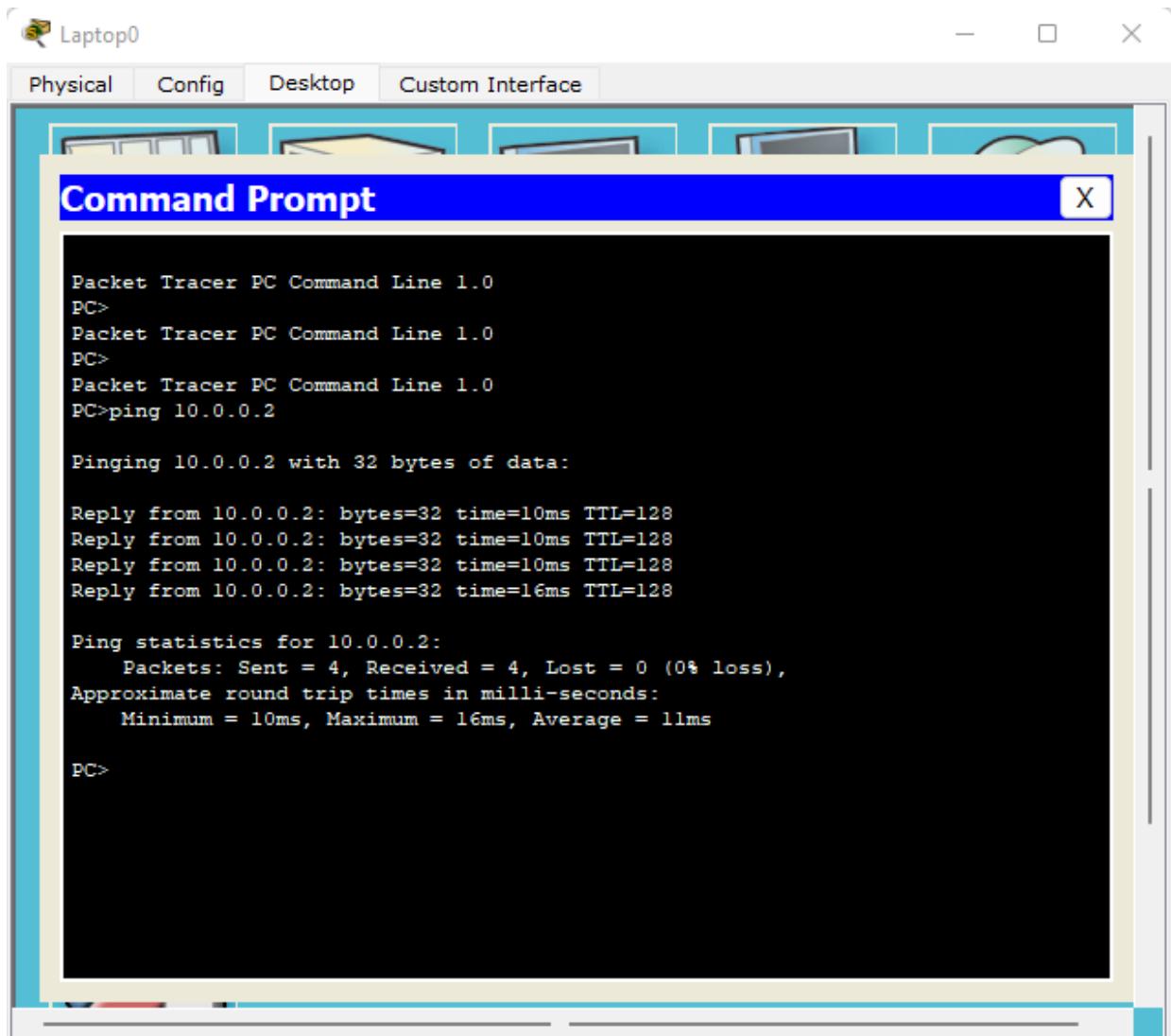
Pinging 10.0.0.4 with 32 bytes of data:

Reply from 10.0.0.4: bytes=32 time=36ms TTL=128
Reply from 10.0.0.4: bytes=32 time=14ms TTL=128
Reply from 10.0.0.4: bytes=32 time=16ms TTL=128
Reply from 10.0.0.4: bytes=32 time=12ms TTL=128

Ping statistics for 10.0.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 36ms, Average = 19ms

PC>
```

Laptop0 to PC0:



Laptop0

Physical Config Desktop Custom Interface

Command Prompt X

```
Packet Tracer PC Command Line 1.0
PC>
Packet Tracer PC Command Line 1.0
PC>
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

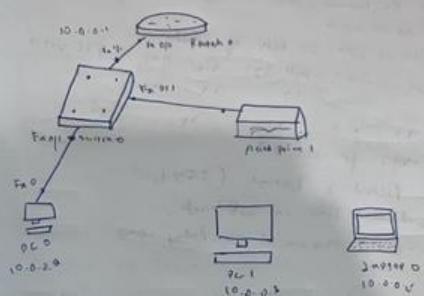
Reply from 10.0.0.2: bytes=32 time=10ms TTL=128
Reply from 10.0.0.2: bytes=32 time=10ms TTL=128
Reply from 10.0.0.2: bytes=32 time=10ms TTL=128
Reply from 10.0.0.2: bytes=32 time=16ms TTL=128

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 16ms, Average = 11ms

PC>
```

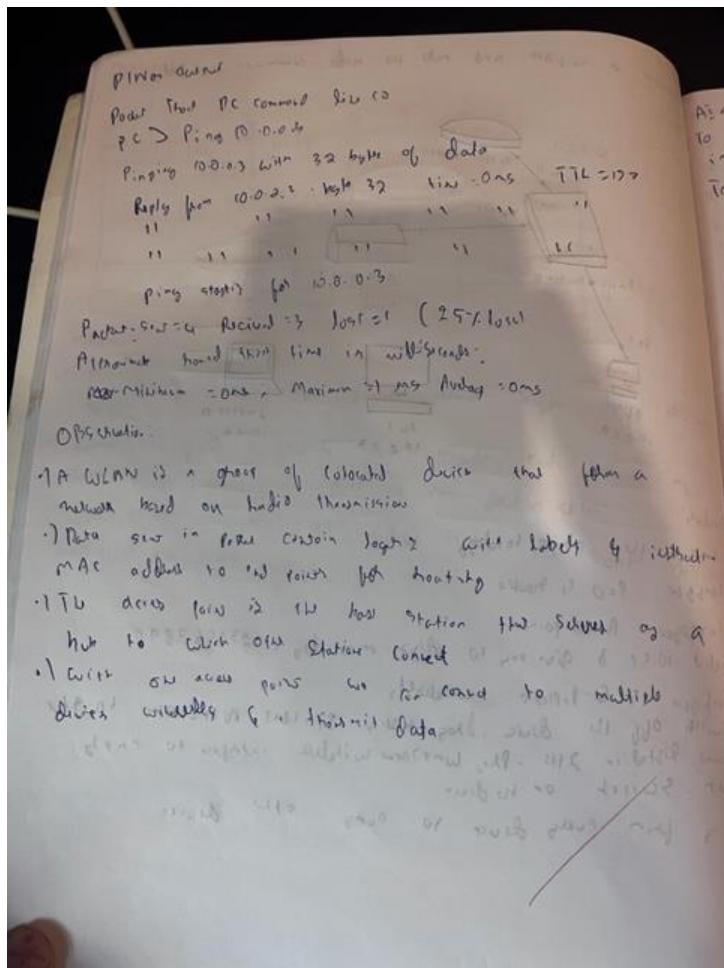
Aim:
To connect in WLAN and make all node connected with Jupyter

Topology:



Procedure:

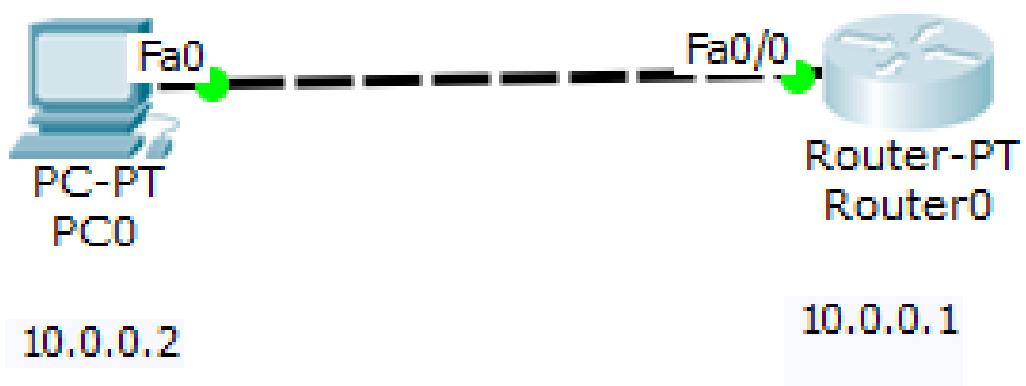
- 1) Construct the above topology
- 2) Configure PCO to Router
- 3) Configure Access point
- 4) Select 10.0.0.8 giving 10 digit mac tag: 1234567890
- 5) Configure 10.0.0.9 with AP
- 6) Switch off the device, then assign 99-Host-NM-1AM to the component listed in 2145 - Then turn on with all interface to enable port. Switch on the device
- 7) Ping from every device to every other device



LAB 12:

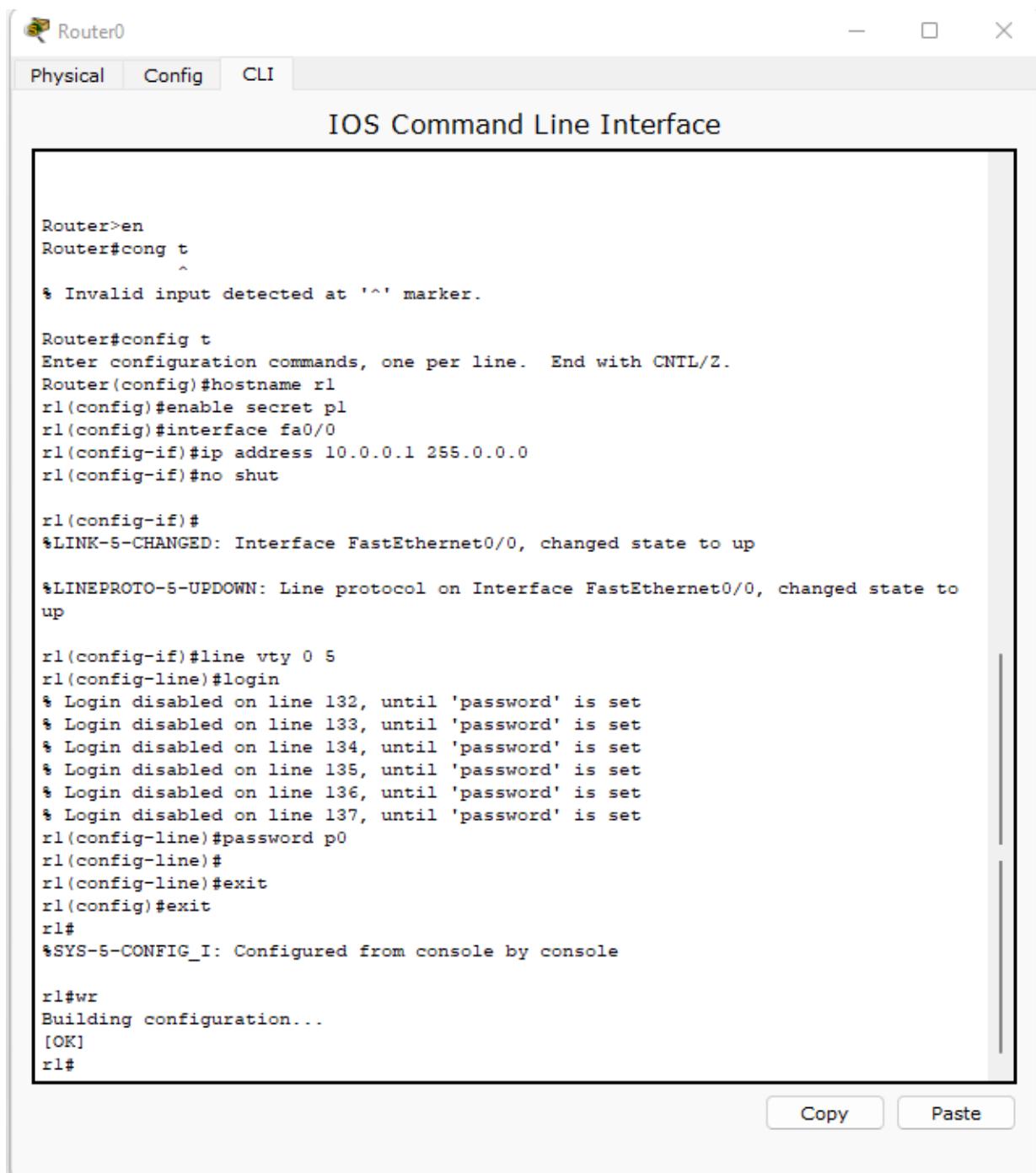
Aim : To understand the operation of TELNET by accessing the router in server room from a PC in IT office.

Topology:



Configuration:

Router 0 CLI:



The image shows a software interface titled "Router0" with three tabs: "Physical", "Config", and "CLI". The "CLI" tab is selected, displaying the "IOS Command Line Interface". The terminal window contains the following configuration session:

```
Router>en
Router#cong t
^
% Invalid input detected at '^' marker.

Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname r1
r1(config)#enable secret p1
r1(config)#interface fa0/0
r1(config-if)#ip address 10.0.0.1 255.0.0.0
r1(config-if)#no shut

r1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

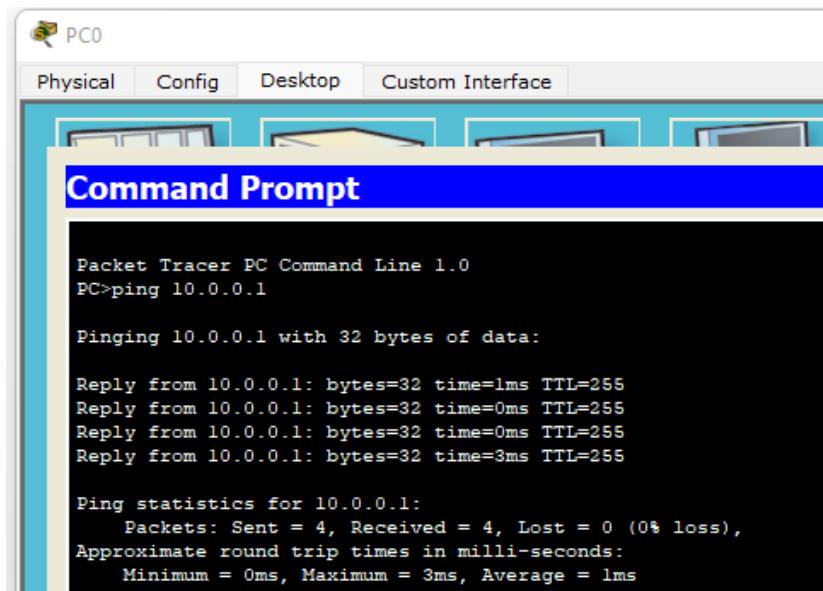
r1(config-if)#line vty 0 5
r1(config-line)#login
% Login disabled on line 132, until 'password' is set
% Login disabled on line 133, until 'password' is set
% Login disabled on line 134, until 'password' is set
% Login disabled on line 135, until 'password' is set
% Login disabled on line 136, until 'password' is set
% Login disabled on line 137, until 'password' is set
r1(config-line)#password p0
r1(config-line)#
r1(config-line)#exit
r1(config)#exit
r1#
%SYS-5-CONFIG_I: Configured from console by console

r1#wr
Building configuration...
[OK]
r1#
```

At the bottom right of the terminal window are two buttons: "Copy" and "Paste".

Command Prompt:

PC0 to Router:



PC0

Physical Config Desktop Custom Interface

Command Prompt

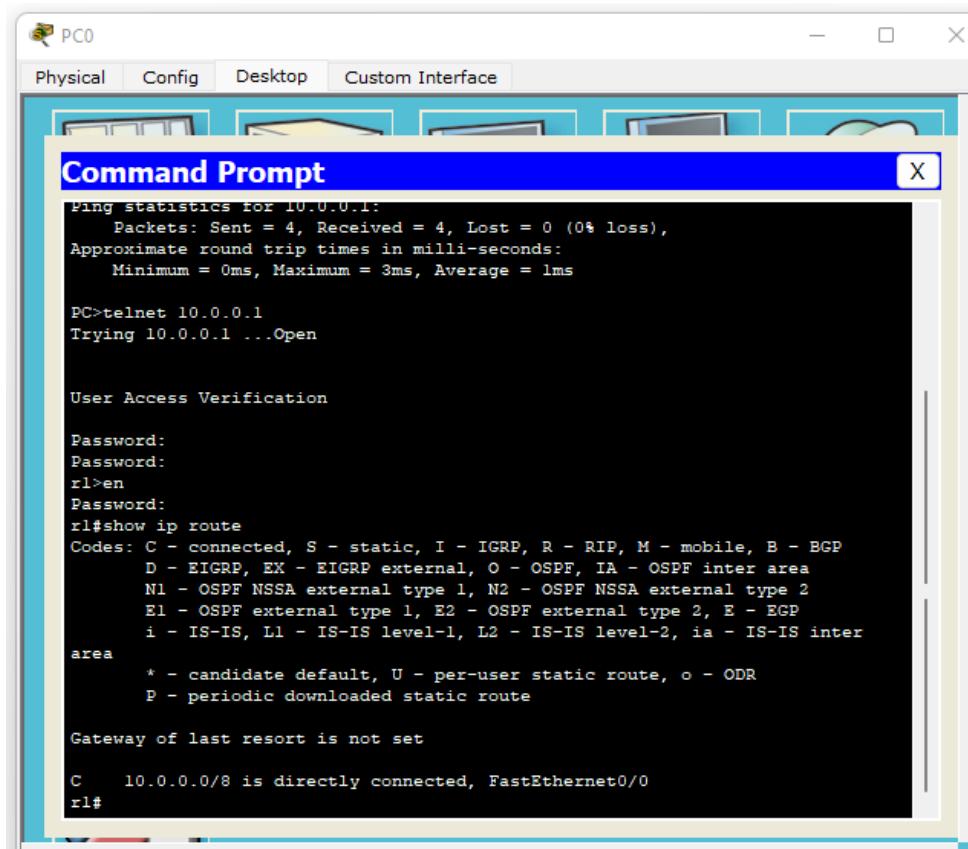
```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=1ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=3ms TTL=255

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 1ms
```

Accessing the router in server room from a PC in IT office.



PC0

Physical Config Desktop Custom Interface

Command Prompt

```
Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 1ms

PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open

User Access Verification

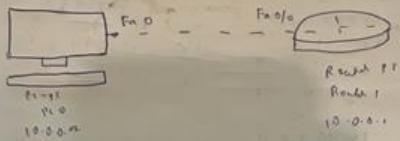
Password:
Password:
rl>en
Password:
rl#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      i - IS-IS, 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, FastEthernet0/0
rl#
```

As per
to understand the operation of Telnet by reading Routh in Siswa
in Siswa Name from the pc in its office

Topology



Procedure

1. Start a terminal on Host

1. Configure the IP address & gateway for PC0

1. Configure

1. Start. Cable0

2. Config T

3. Host now T1

4. Config Router T1

5. Interface fastethernet 0/0

6. IP address 10.0.0.1 255.0.0.0

7. No shot

8. Line 61905

9. Log..

10. PAUSE IP 0.0.0.0 not off at 0.0.0.0

11. Exit, End

12. 108

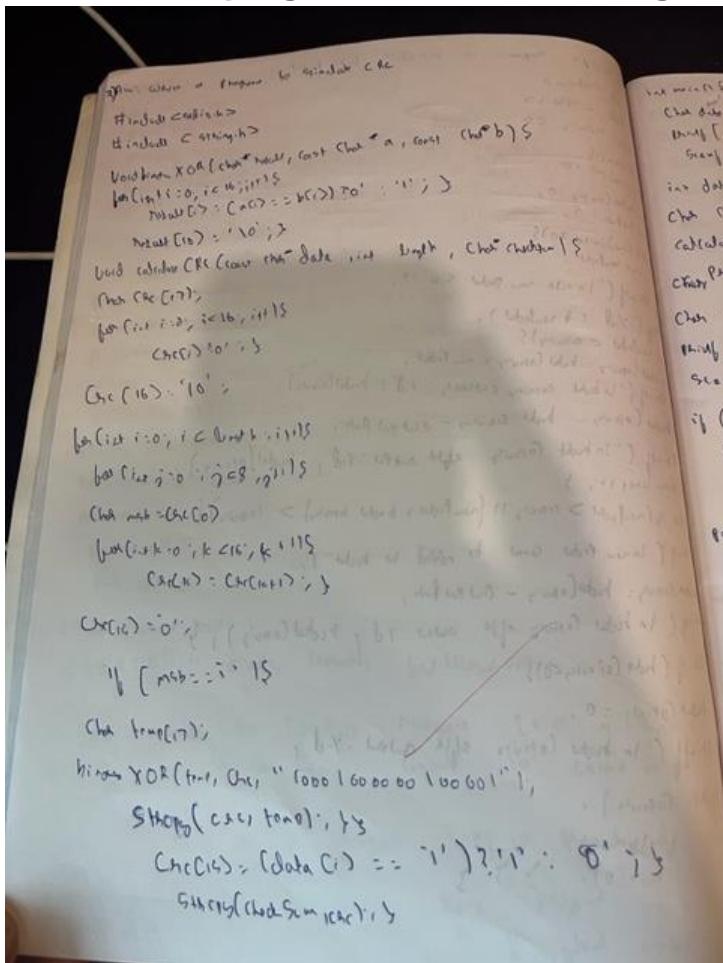
1. Very nothing to Router

Reboot for USB Adapter Unification is do

Cycle II

LAB 13:

Aim : Write a program for error detecting code using CRC CCITT (16-bits).



```
int main() {
    char date[100];
    printf("Enter date in YYYY-MM-DD\n");
    scanf("%s", date);
    int dataLength = strlen(date);
    char checkSum[17];
    calculateCheckSum(date, dataLength, checkSum);
    char printIf("Calculation of CAC : %s\n");
    char wordCheckSum[17];
    printf("Enter second CAC : \n");
    scanf("%s", wordCheckSum);
    if (strcmp(wordCheckSum, checkSum) == 0) {
        printf("Date is valid\n");
    } else {
        printf("Date is not valid\n");
    }
}
```

~~date not valid~~

Output :

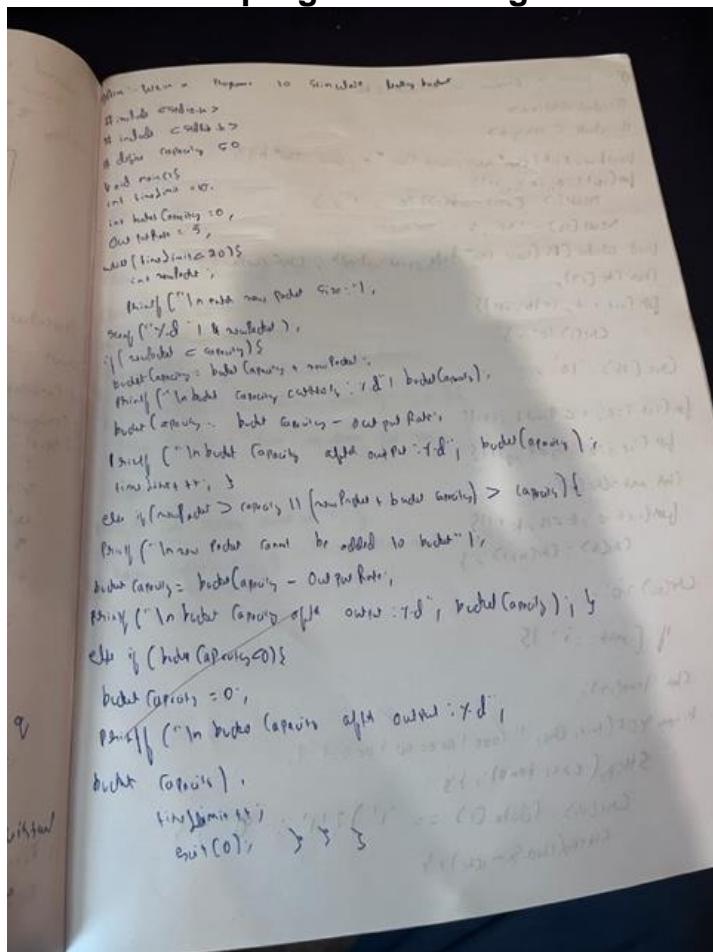
```
c:\ "C:\Users\HP\Desktop\BMSCI" + ▾
Enter data in binary: 11001010111001001
Calculated CRC: 1110100101110001
Enter received CRC: 1110100101110001
Data is error-free.

Process returned 0 (0x0)    execution time : 38.006 s
Press any key to continue.
```

Cycle II

LAB 14:

Aim : Write a program for congestion control using Leaky bucket algorithm.



10000 - (2nd batch)

Can has size and date code

6000 710

Can front size

Code

front shape

Can front shape?

10000

front can 10000 size

Can front shape?

Can front size

3000

front size 3000 size

Can front shape?

Can front size

750

front size 750 shape

Can front shape?

0

Can front shape?

10000 - (2nd batch) front shape

Output :

```
  "C:\Users\HP\Downloads\Bur" + ▾
Enter the Bucket size = 5000
Enter the outgoing rate = 200

Enter the packet size = 3000
The Packet of size 3000 is added and in the bucket

Enter 1 to Continue or 0 to Stop: 1

Enter the packet size = 2000
The Packet of size 2000 is added and in the bucket

Enter 1 to Continue or 0 to Stop: 1

Enter the packet size = 1500
The Packet of size 6422296 is dropped due to lack of space in the bucket

Enter 1 to Continue or 0 to Stop: 1

Enter the packet size = 100
The Packet of size 100 is added and in the bucket

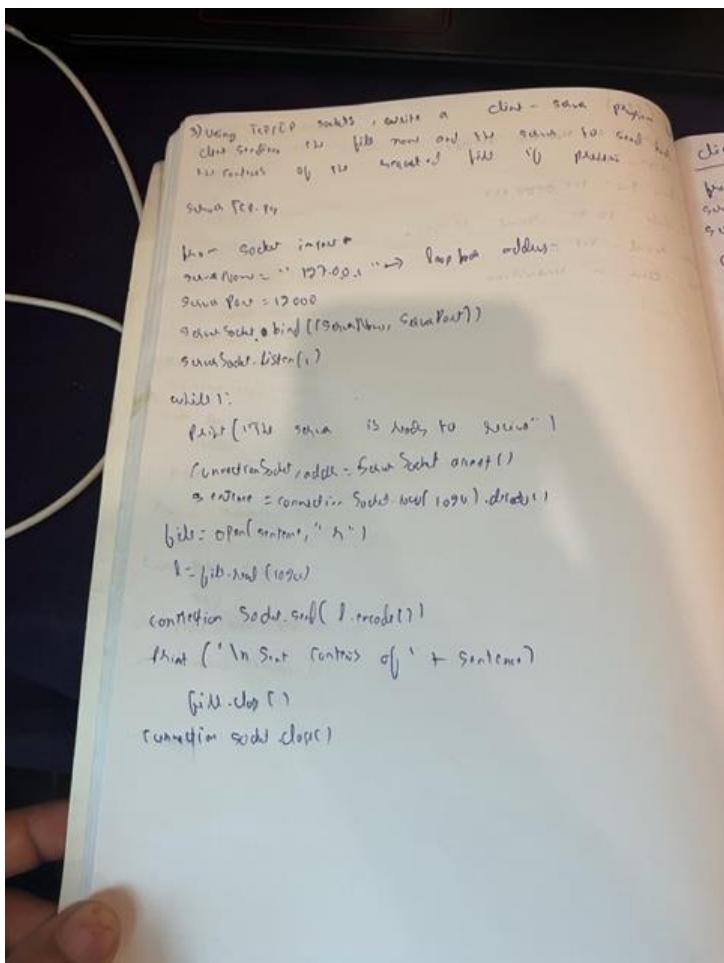
Enter 1 to Continue or 0 to Stop: 0

Process returned 0 (0x0)  execution time : 33.269 s
Press any key to continue.
```

Cycle II

LAB 15:

Aim : Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.



Program to run
Client Side

Client TCP-12

```
from socket import *
serverName = '192.0.0.1'
serverPort = 12000
clientSocket = Socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName, serverPort))
sentence = input("In what file name?")
clientSocket.send(sentence.encode())
fileContent = clientSocket.recv(1024).decode()
print(fileContent)
clientSocket.close()
```

Procedure:

- 1) Create 2 files: server and client dir and some files
- 2) Run server first and then run client

Output:

Server Instance:

The server is ready to listen.

Client Instance:

(On GUI Now: SERVER IP)

From Client:

The content of serverTCP.py is displayed here

Server Instance :-

The server is ready to receive.

Sent contents of Server TCP ID

The server is ready to receive (1301 - 7A) when

((not null, max(1000))) but

((the current file size < 1000))

((the current number of

file blocks, (not 0)) will take over

((not null))

but if the current file has to receive ((1000))

then it will take over the current file size

((not null)) and will start receiving

((not null)) and will receive the current file size

((not null)) and will receive the current file size

((not null)) and will receive the current file size

((not null)) and will receive the current file size

((not null)) and will receive the current file size

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((not null)) and will receive the current file size

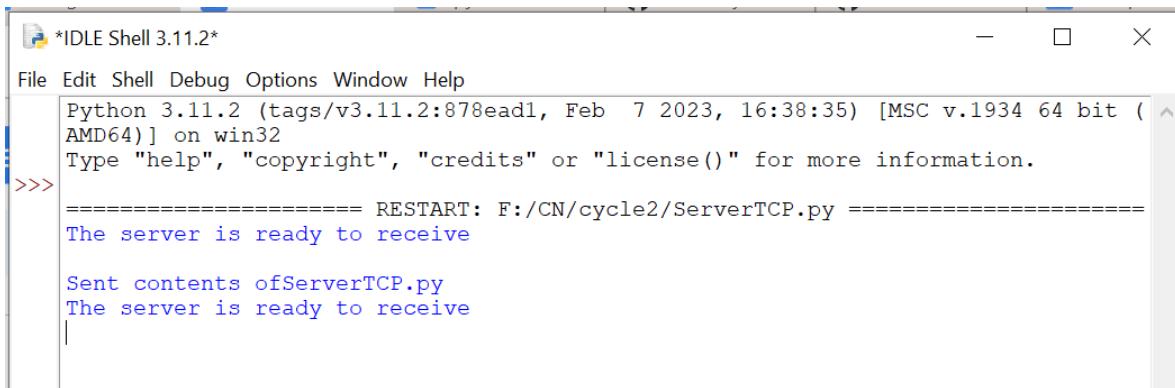
((not null)) and will receive the current file size

((not null)) and will receive the current file size

((not null)) and will receive the current file size

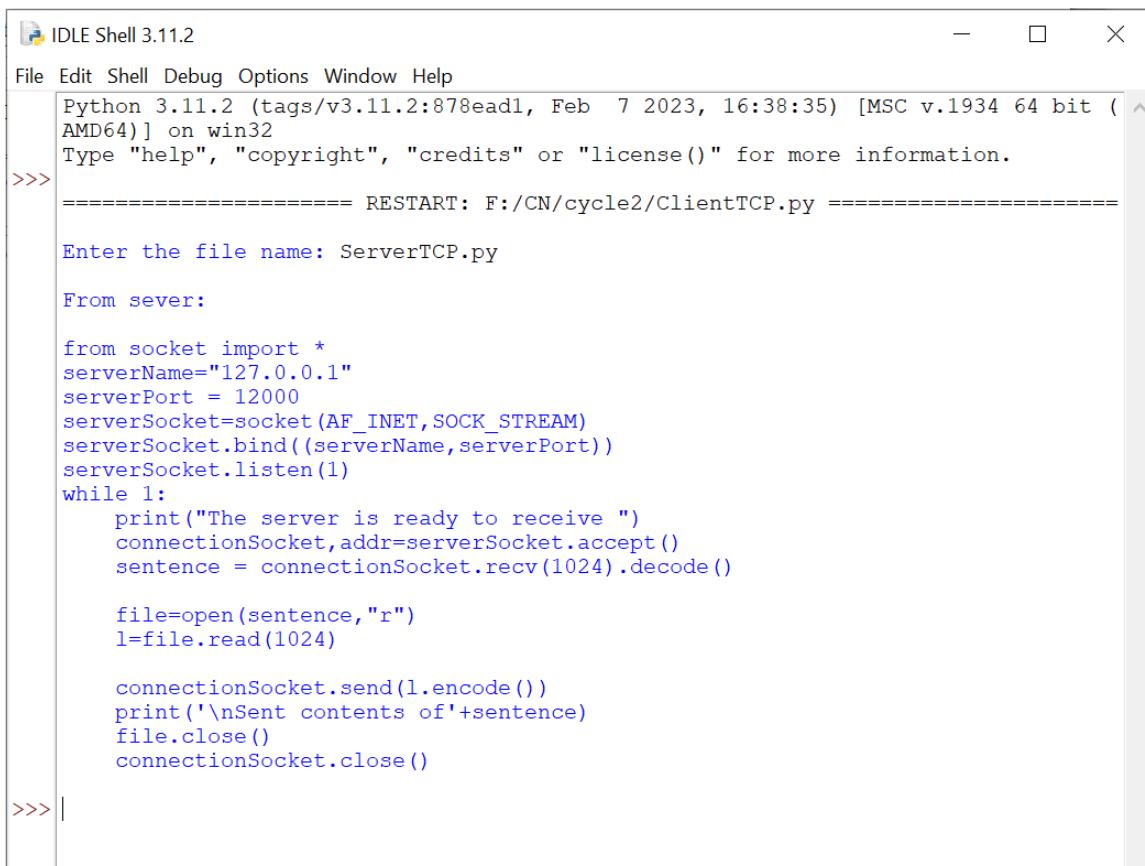
Output :

Server instance:



```
*IDLE Shell 3.11.2*
File Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb  7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> ===== RESTART: F:/CN/cycle2/ServerTCP.py =====
The server is ready to receive
Sent contents ofServerTCP.py
The server is ready to receive
```

Client instance:



```
IDLE Shell 3.11.2
File Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb  7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> ===== RESTART: F:/CN/cycle2/ClientTCP.py =====
Enter the file name: ServerTCP.py
From sever:
from socket import *
serverName="127.0.0.1"
serverPort = 12000
serverSocket=socket(AF_INET,SOCK_STREAM)
serverSocket.bind((serverName,serverPort))
serverSocket.listen(1)
while 1:
    print("The server is ready to receive ")
    connectionSocket,addr=serverSocket.accept()
    sentence = connectionSocket.recv(1024).decode()

    file=open(sentence,"r")
    l=file.read(1024)

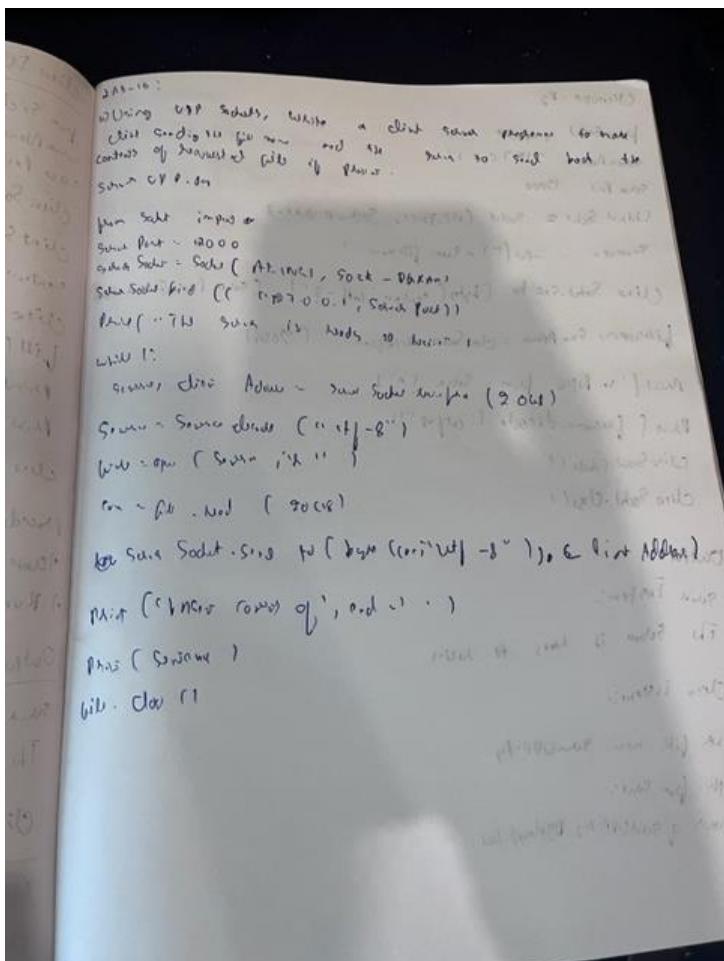
    connectionSocket.send(l.encode())
    print('\nSent contents of'+sentence)
    file.close()
    connectionSocket.close()

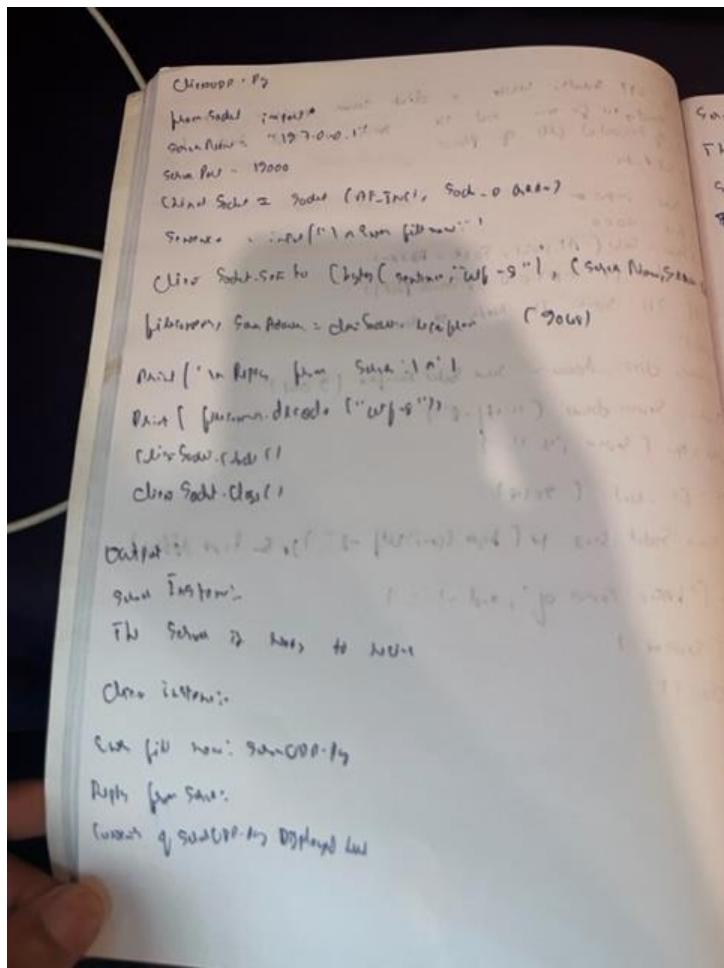
>>>
```

Cycle II

Lab 16:

Aim : Using UDP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.





Some Testimony

The Sun is ready to burn

Some content of some writings

The Sun is ready to burn

Output :

Server instance :

```
Python 3.6.7 Shell*
File Edit Shell Debug Options Window Help
Python 3.6.7 (v3.6.7:6ec5cf24b7, Oct 20 2018, 13:35:33) [MSC v.1900 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information
>>>
===== RESTART: D:\AUG_DEC_2021\CN\LAB\cycle_3\ServerUDP.py ====
The server is ready to receive

Sent contents of ServerUDP.py
The server is ready to receive
```

Client instance :

```
Python 3.6.7 Shell
File Edit Shell Debug Options Window Help
Python 3.6.7 (v3.6.7:6ec5cf24b7, Oct 20 2018, 13:35:33) [MSC v.1900 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: D:\AUG_DEC_2021\CN\LAB\cycle_3\ClientUDP.py =====

Enter file name: ServerUDP.py

Reply from Server:

from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort))

while 1:
    print ("The server is ready to receive")
    sentence, clientAddress = serverSocket.recvfrom(2048)
    sentence = sentence.decode("utf-8")
    file=open(sentence,"r")
    l=file.read(2048)

    serverSocket.sendto(bytes(l,"utf-8"),clientAddress)

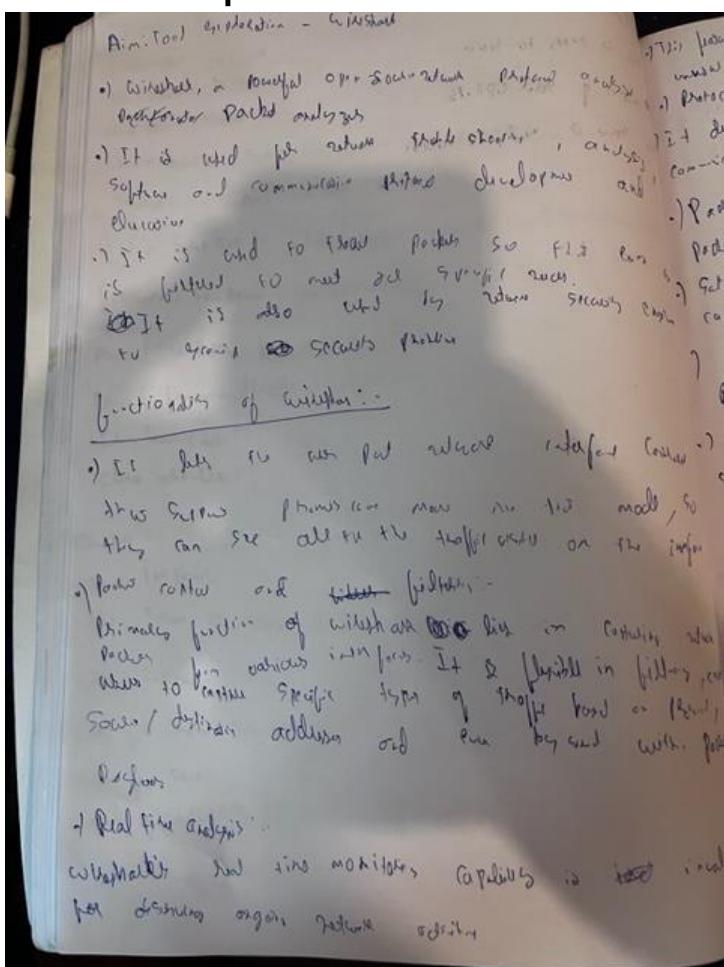
    print ('\nSent contents of ', end = ' ')
    print (sentence)
    # for i in sentence:
    #     print (str(i), end = '')
    file.close()

>>>
```


Cycle II

LAB 17:

Aim : Tool Exploration - Wireshark.



- 7) From 2017 it includes radar traffic flow, vehicle behaviour and crash-based outcome data.
- 8) **Protocol Analysis:**
 - 9) **Design Analysis:** Plots traffic in 2017 into specific comparison method
 - 10) **Pilot Reconstruction:** Allows reconstruction of previous years' photo
 - 11) **Geographical Information:** Allows statistical analysis of regional data
 - 12) **Local - road classification:** Allows color-coded filters to indicate various aspects such as slow
 - 13) **Customizable Display:** This tool offers a customizable interface where users can choose which fields to display & how to arrange them

Procedure :-

- 1) In the 1st window, select "Photo".
 - 2) Filter TCD about required photos.
 - 3) Click on "1", new window opens.
- 4) **Reconstruction:** Then choose "Control Panel".

Shr. Rnd: 68161, Shr. Lnd: 6671 Sm: 77

Ah 65, Thn: 6

5) This is available in the Person window in the
left side of Share.

6) Click on Properties of " ", Clicks on "..."
then Lightbox in command if size sets to 9

7) Second, 75m → IP ports

Recent ports: 192.168.1.11 - 192.168.1.11
Windows 7P Configuration - 192.168.1.11 - 192.168.1.11
ethan admin Client and services of Win
canon - Skipper DNS Buffer 192.168.1.11
eth - New IP address: 192.168.1.11
Subnet mask: 255.255.0.0
Default gateway: 10.177.0.11
IP address: 10.177.9.83
Subnet mask: 255.255.0.0
Default gateway: 10.177.0.11