VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT

on

COMPUTER NETWORKS

Submitted by

B VENKATESH(1BM22CS404)

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 JUN-2023 to SEP-2023

B. M. S. College of Engineering,
Bull Temple Road, Bangalore 560019
(Affiliated To Visvesvaraya Technological University, Belgaum)
Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "COMPUTER NETWORKS" carried out by **B VENKATESH (1BM22CS404),** who is bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2023. The Lab report has been approved as it satisfies the academic requirements in respect of a **Course Title - (Course code)** work prescribed for the said degree.

Name of the Lab-Incharge: Dr.Latha NR

Designation
Department of CSE
BMSCE, Bengaluru

Dr. Jyothi S Nayak

Professor and Head
Department of CSE
BMSCE, Bengaluru

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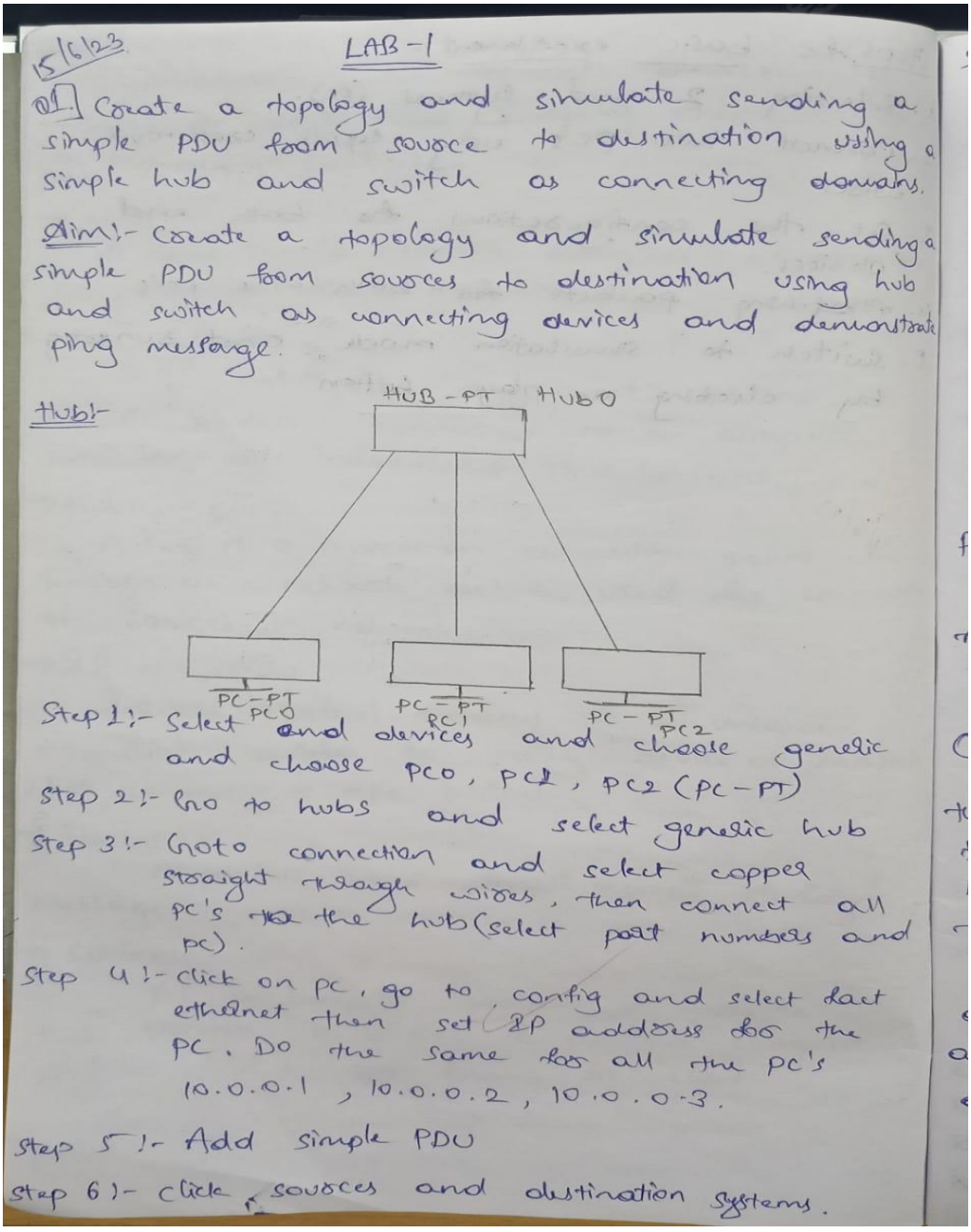
Index

LAB-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:



Step 7:- Then go to simulation mode, Auto capture/ play. Then the packets will starts to transfer.

Step 8:- click on PC go to desktop and select command prompt. Then type command ping 10.0.0.3

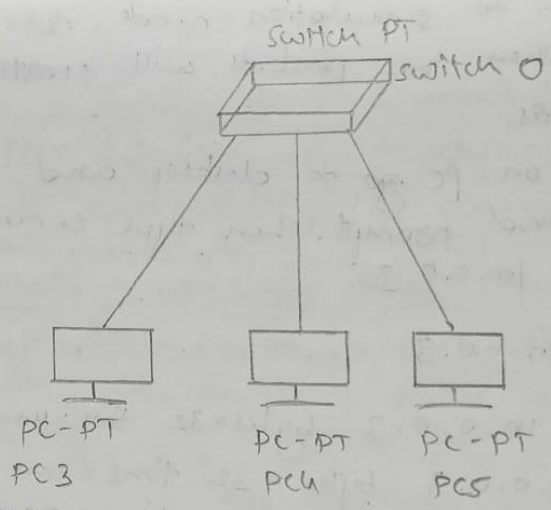
```
PC> ping 10.0.0.3

Reply from 10.0.0.3 bytes=32 time=4ms TTL=128
Reply from 10.0.0.3 bytes=32 time=3ms TTL=128
Reply from 10.0.0.3 bytes=32 time=0ms 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 multi-seconds
Minimum = 0ms, maximum = 4ms Average = 2ms.
```

Observation:-

When the source devices sent a packet to the hub it will broadcast or send the packet to all the devices which all connected to the hub. And the destination devices will receive the packet and others will reject the packet.

And destination devices will send the acknowledgement and that will be distributed among all devices and the sources will accept and other will discard

Switch



procedure:-

Step1 :- Select switch and 3PC's.

Step2 :- Set IP address for all the pc's

10.0.0.4, 10.0.0.8, 10.0.0.6

PC → catalog → fast ethernet → IP address.

Step 3 :- Connect PC's to the switch by selecting copper straight through.

Step 4 :- Add simple PDU.

Select source and destination.

Step 5 :- Go to simulation mode and click on Auto capture / play.

Step 6 :- Click on PC → Desktop → command prompt.

ping message

PC> ping 10.0.0.6

Pinging 10.0.0.6 with 32 bytes of data.

Reply from 10.0.0.6 bytes=32 time=4ms TTL=128

Reply from 10.0.0.6 bytes=32 time=4ms TTL=128

Reply from 10.0.0.6 bytes=32 time=4ms TTL=128

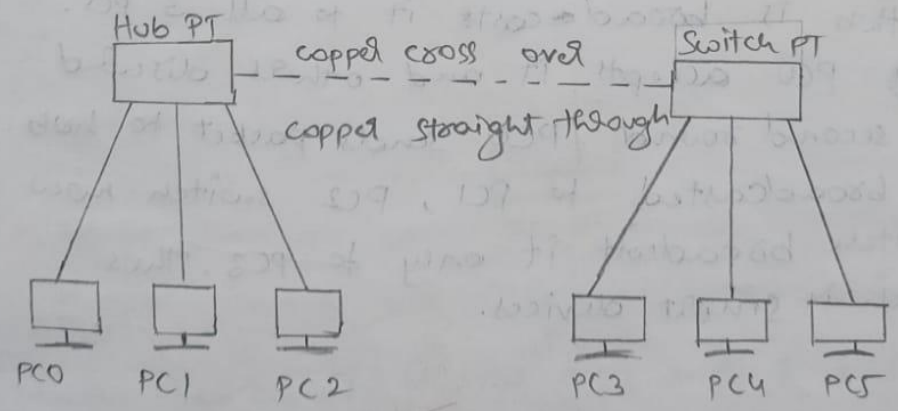
Reply from 10.0.0.6 bytes=32 time=4ms TTL=128

ping statistics for 10.0.0.6
packets sent = 4 Received = 4 Lost = 0 (0% loss)
Approximate round trip times in milli-seconds
minimum = 4ms Maximum = 4ms Average = 4ms

Observation:-

When the first time the packet is sent the switch will distribute the packet with all the devices. Once it learns about the IP address it will only send packet to the destination and send acknowledgement to the source.

Switch-Hub Connection:-



Step 1:- Previously drawn hub-topology and switches topology are connected through copper cross over. In hub port 3 is used in switch port ethernet 3/1 is used.

Step 2:-Add simple PDC from PC0 to PC3

Ping 10.0.0.4.

Pinging 10.0.0.4 with 32 bytes of data

Reply from 10.0.0.4 : bytes=32 time=1ms TTL=128

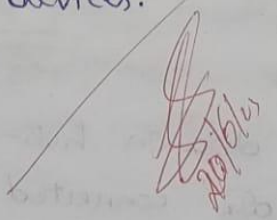
Reply from 10.0.0.4 : bytes=32 time=1ms TTL=128

Reply from 10.0.0.4 : bytes = 32 time = 1ms TTL = 128
Reply from 10.0.0.4 : bytes = 32 time = 1ms TTL = 128
Ping satisfies for 10.0.0.4.

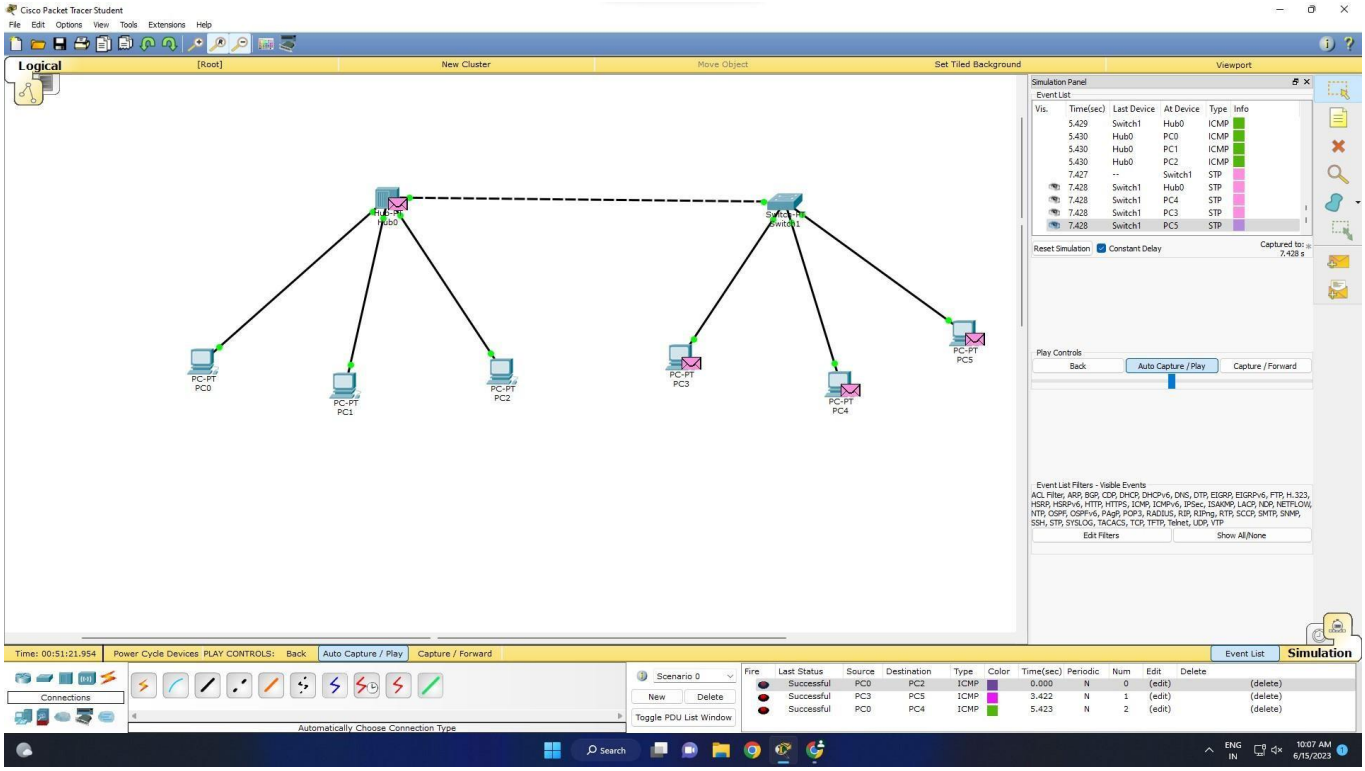
Packets : sent = 4 Received = 4 Lost = 0 (0% loss)
Approximate round trip times in milli seconds
Minimum = 4ms Maximum = 4ms Average = 4ms

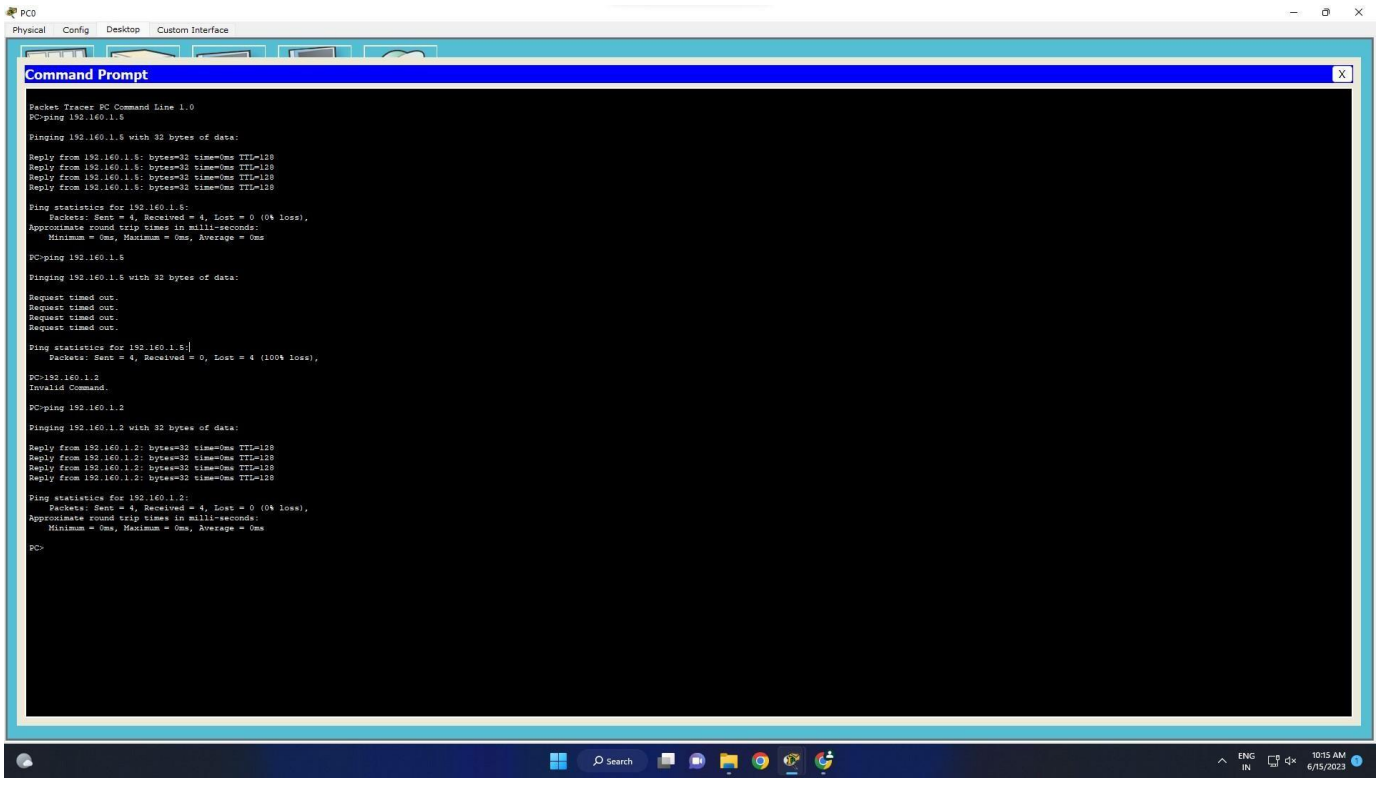
Observation:-

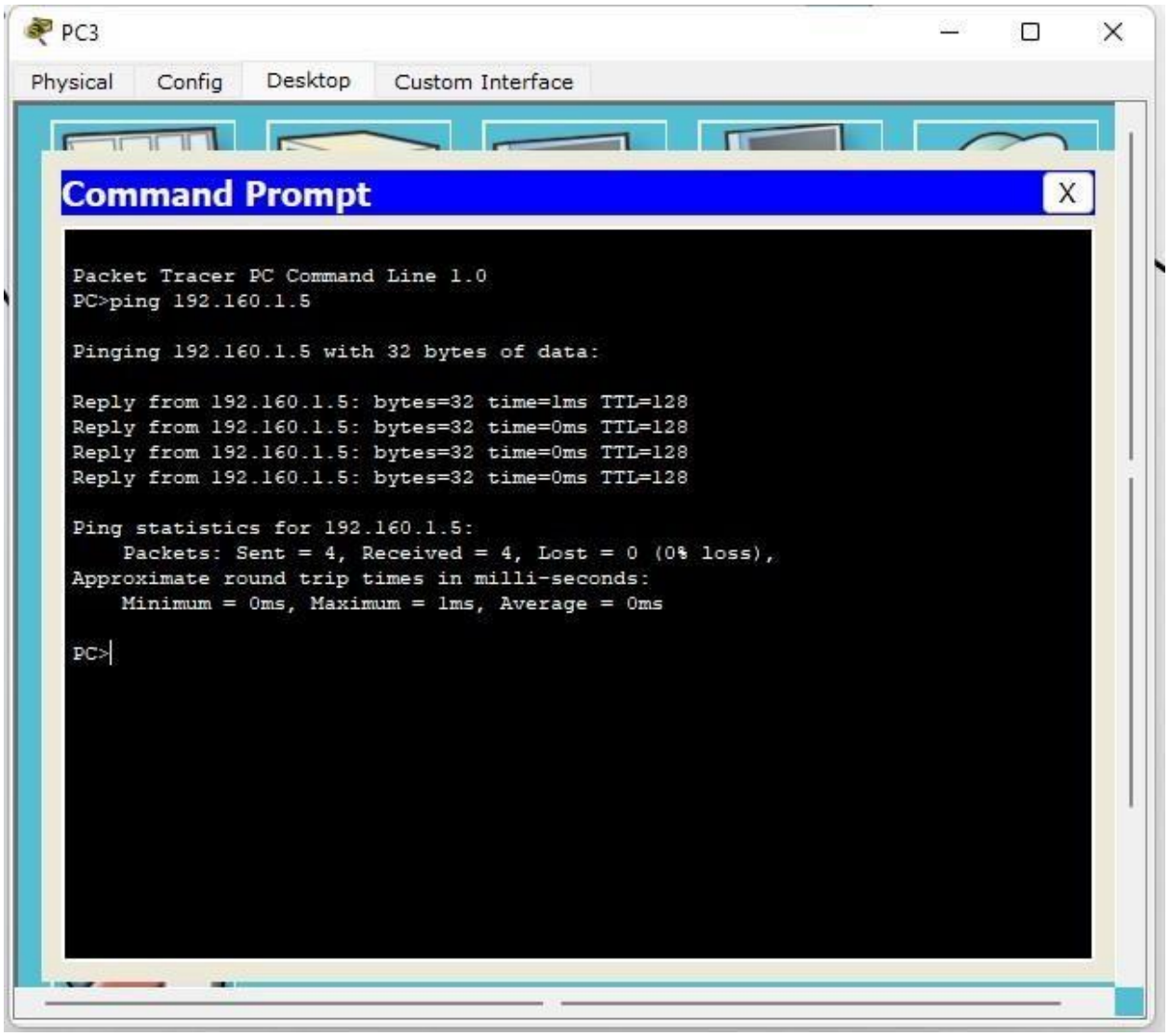
In simulation mode PC0 sends packet to hub sends it to PC1, PC2 & switch boards cast it to PC3, PC4 and PC5.
PC1, PC2, PC4 and PC5 discards them, PC3 accepts and sends acknowledgement to hub through switch.
Hub is broadcasts it to all 3 PCs.
Only PC0 accepts it and others discard
In second round PC0 sends packet to hub & broadcasted to PC1, PC2 switch now switch broadcast it only to PC3, Thus switch it smart devices.



OUTPUT:


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
5.429 Switch1 Hub0 ICMP
5.430 Hub0 PC0 ICMP
5.430 Hub0 PC1 ICMP
5.430 Hub0 PC2 ICMP
7.427 -- Switch1 STP
7.428 Switch1 Hub0 STP
7.428 Switch1 PC4 STP
7.428 Switch1 PC3 STP
7.428 Switch1 PC5 STP
Reset Simulation
Constant Delay
Captured to:
7.428 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
PC-PT PC4
PC-PT PC5
Time: 00:51:21.954
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC2 ICMP 0.000 N 0 (edit) (delete)
Successful PC3 PC5 ICMP 3.422 N 1 (edit) (delete)
Successful PC0 PC4 ICMP 5.423 N 2 (edit) (delete)
Search
ENG IN
10:07 AM 6/15/2023

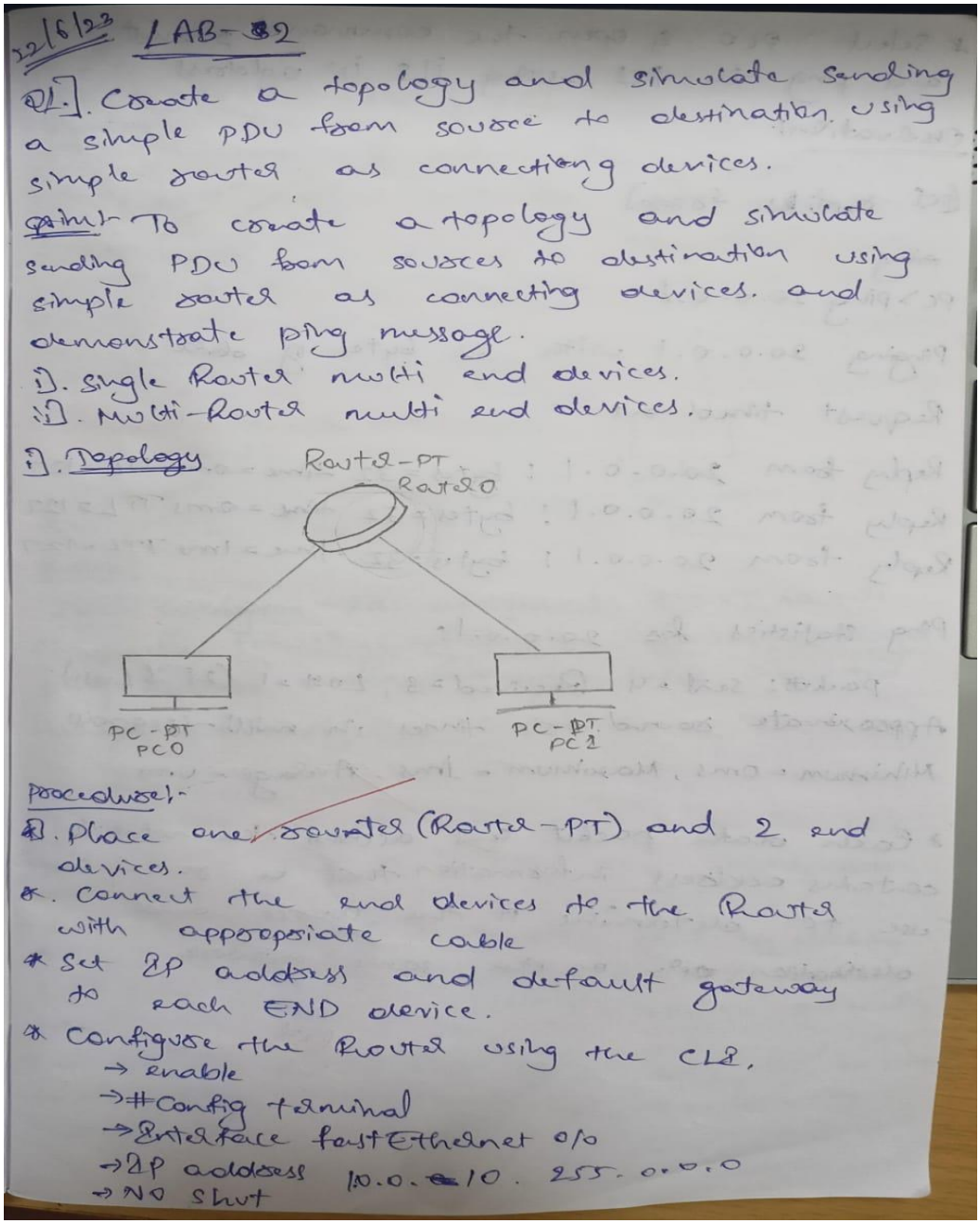

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 192.160.1.5
Pinging 192.160.1.5 with 32 bytes of data:
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Ping statistics for 192.160.1.5:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 192.160.1.5
Pinging 192.160.1.5 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.160.1.5:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>192.160.1.2
Invalid Command.
PC>ping 192.160.1.2
Pinging 192.160.1.2 with 32 bytes of data:
Reply from 192.160.1.2: bytes=32 time=0ms TTL=128
Reply from 192.160.1.2: bytes=32 time=0ms TTL=128
Reply from 192.160.1.2: bytes=32 time=0ms TTL=128
Reply from 192.160.1.2: bytes=32 time=0ms TTL=128
Ping statistics for 192.160.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>
Search
ENG IN
10:15 AM 6/15/2023


PC3
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 192.160.1.5
Pinging 192.160.1.5 with 32 bytes of data:
Reply from 192.160.1.5: bytes=32 time=1ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Ping statistics for 192.160.1.5:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>

LAB 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:



12/6/23 LAB-02

Q1]. Create a topology and simulate sending a simple PDU from source to destination using simple router as connecting devices.

Aim:- To create a topology and simulate sending PDU from sources to destination using simple router as connecting devices. and demonstrate ping message.

i]. Single Router multi end devices.

ii]. Multi-Router multi end devices.

i]. Topology

Procedure:-

1. Place one router (Router-PT) and 2 end devices.
2. Connect the end devices to the Router with appropriate cable
3. Set IP address and default gateway to each END device.
4. Configure the Router using the CLI.
   - → enable
   - → # Config terminal
   - → Interface fastEthernet 0/0
   - → IP address 10.0.0.10 255.0.0.0
   - → NO shut

* Select PC0 & open the command prompt and ping the PC1 using its ip address

Observation:-

(PC1 ~~ip~~ ~~from~~)

~~ping~~

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 = 1ms TTL = 127

Ping statistics for 20.0.0.1:

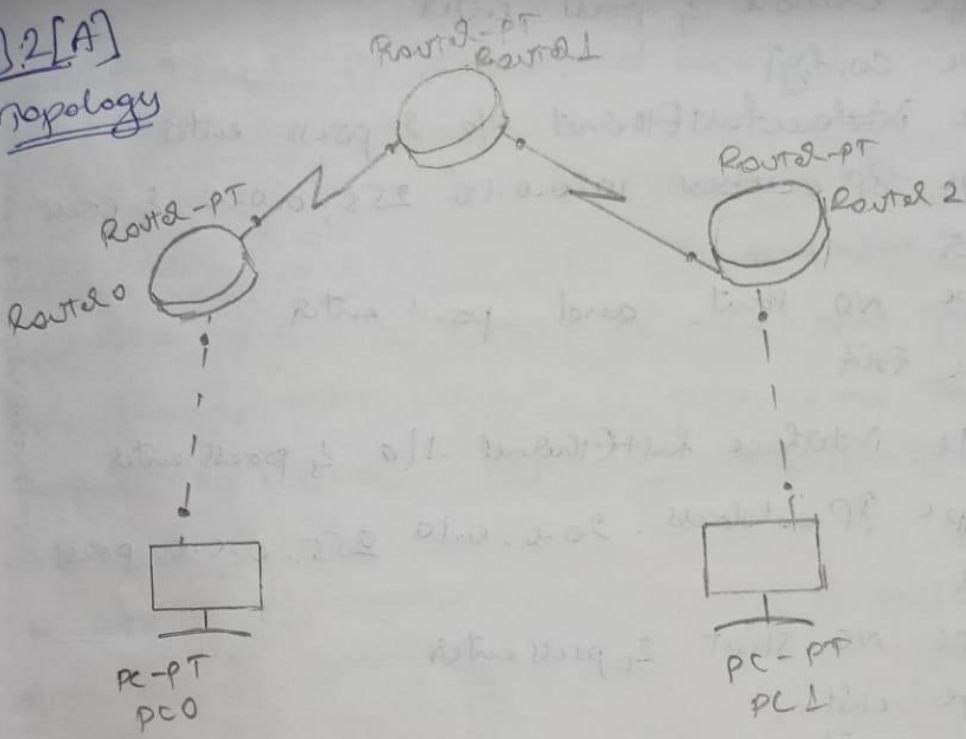
Packets: Sent = 4 Received = 3, Lost = 1 (25% Loss)
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms.

* Each data packet sent across the network contains address information that a router can use to determine if the source and destination are on the same network.

live

3.2[A]

Topology



~~3.2.2~~

Aim:- Configure IP address to three routers in packet tracer. Explore the following messages ping. response destination, unreachable, sequested timed out. reply.

Procedure:-

→ Select one generic router and 2 generic pc's. Connect the pc's to router using copper cross-over cable.

→ Set the IP address of both pc's by clicking on PC & config tab. Along with IP address set gate way in the settings opptions on config tab.

→ To set the IP address of a router, click on it and goto CLI tab and type the following commands

Step 1:- Type NO & press enter.
→ type enable & press enter
→ type configT
→ type interface fastEthernet 0/0 & press enter.
→ type IP address 10.0.0.10 255.0.0.0 & press enter.
→ type NO shut and press enter.
→ type Exit.
→ Type interface fastEthernet 1/0 & press enter
→ Type IP address 20.0.0.10 255.0.0.0 press enter
→ type NO shut & press enter
→ type exit
→ type exit
→ type show IP route [for showing connection status]
* close the tabs & click on PC to go to command prompt.
* Type ping 20.0.0.1 to sent packet across.
* At last send packets in simulation mode to get a successful transmission.

PING OUTPUT:-

output 1:-

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 (3)
Request timed out.
Ping statistics for 40.0.0.1

packets : sent = 4 Received = 0 Lost = 4 (100% loss)

output 2

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 ms

Min = 2ms Max = 8ms Average = 3ms.

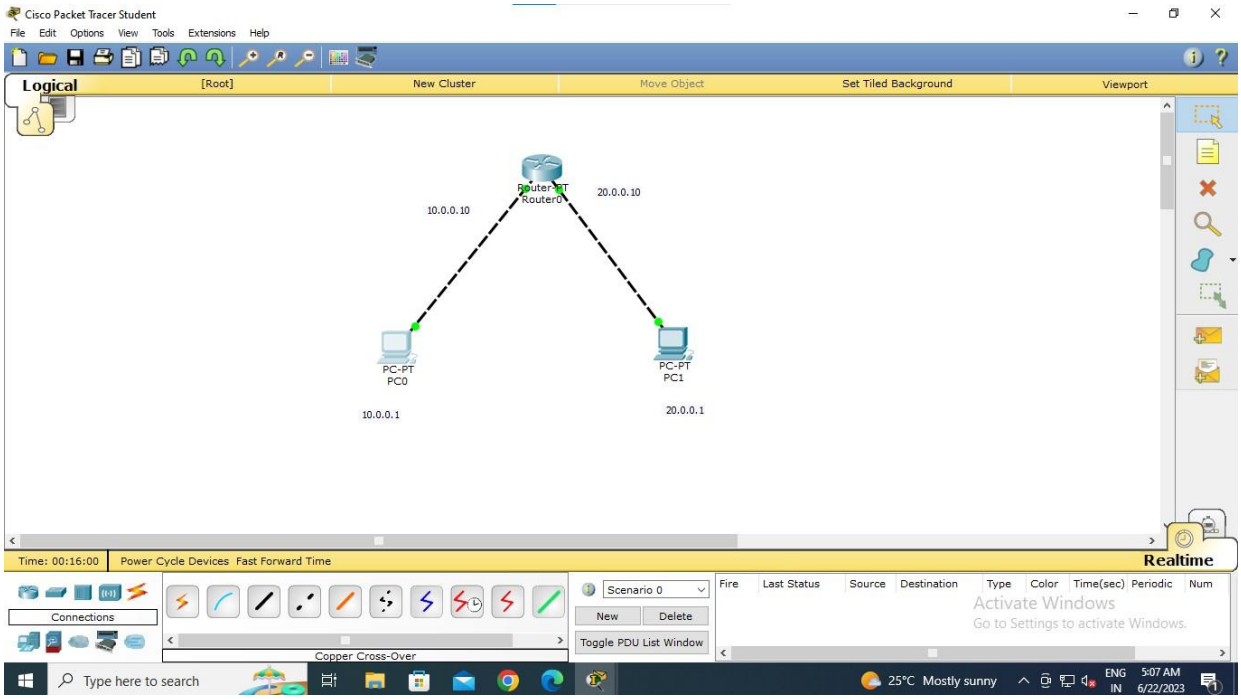
Observation:-

→ In program 2.1 when we ping the destination address we get allocated with 32 bytes. In this first 8 bytes are used to learn about the router and their address. Rest bytes are used for sending packets to destination address. Then again if we ping all bytes are used for message sending and there will be no timed-out message.

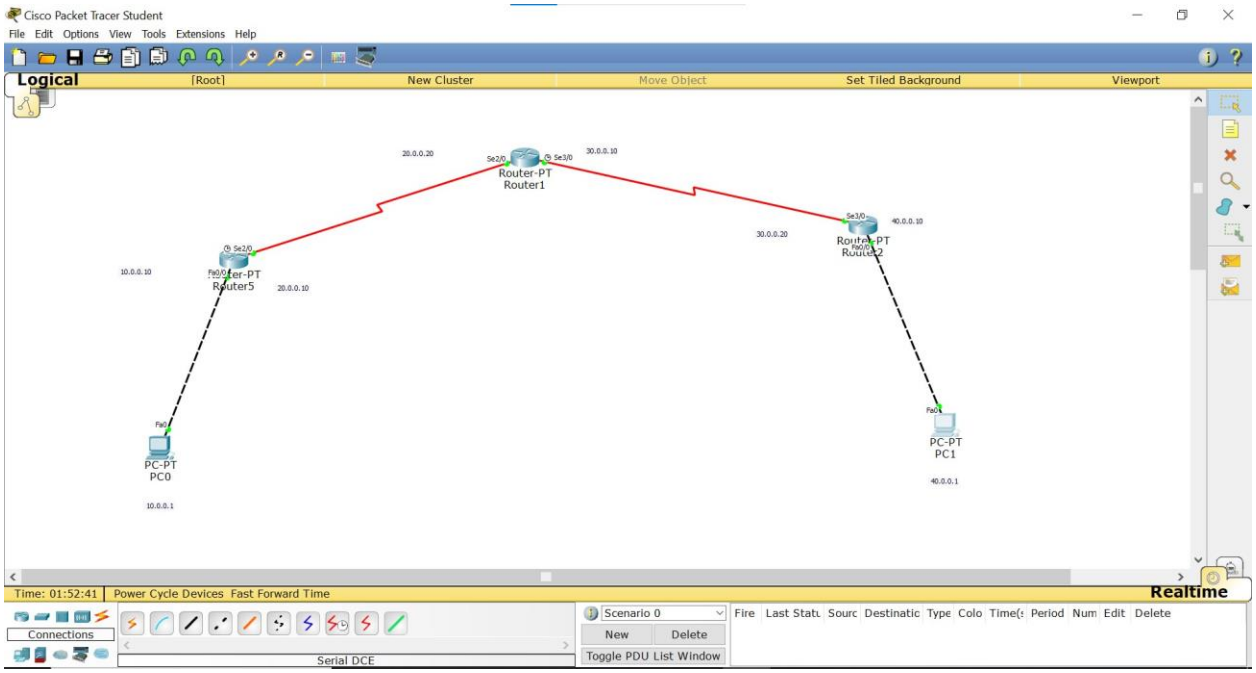
→ In program 2.2 when the routers doesn't know about the remaining address and we ping a message we get host unreachable message and the routers have here access/ knowledge about other addresses, message will be sent successfully.

TOPOLOGY:

PROGRAM 2.1

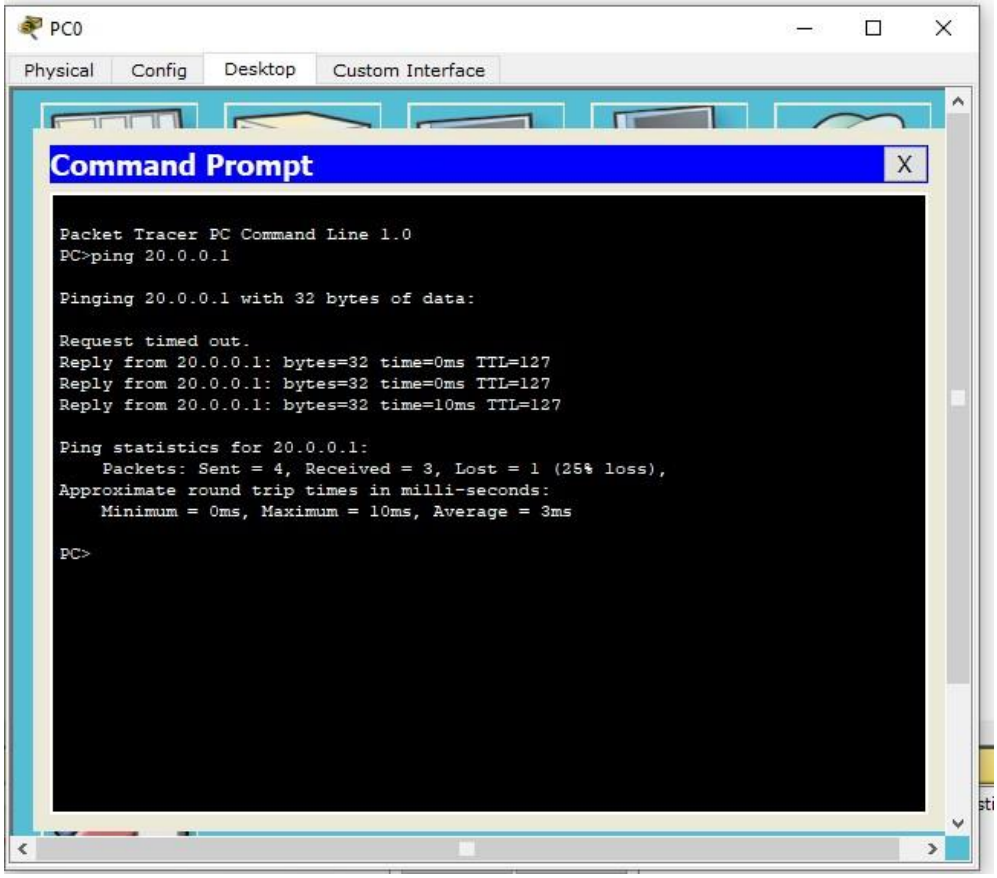


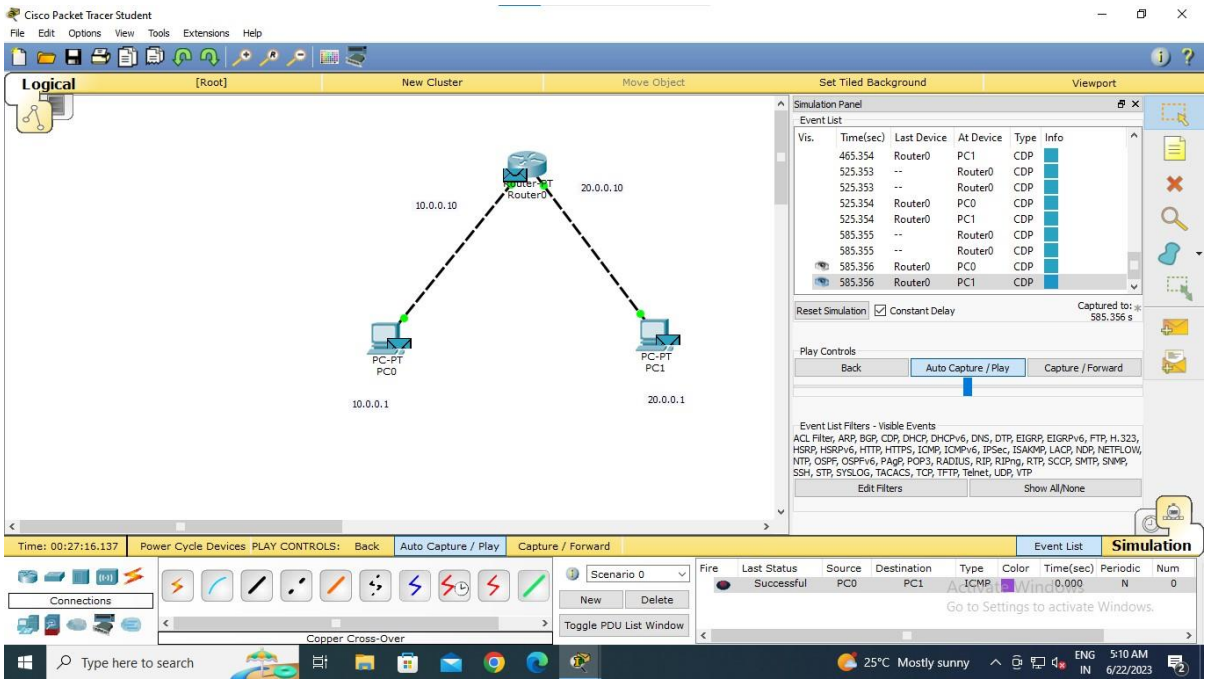
PROGRAM 2.2



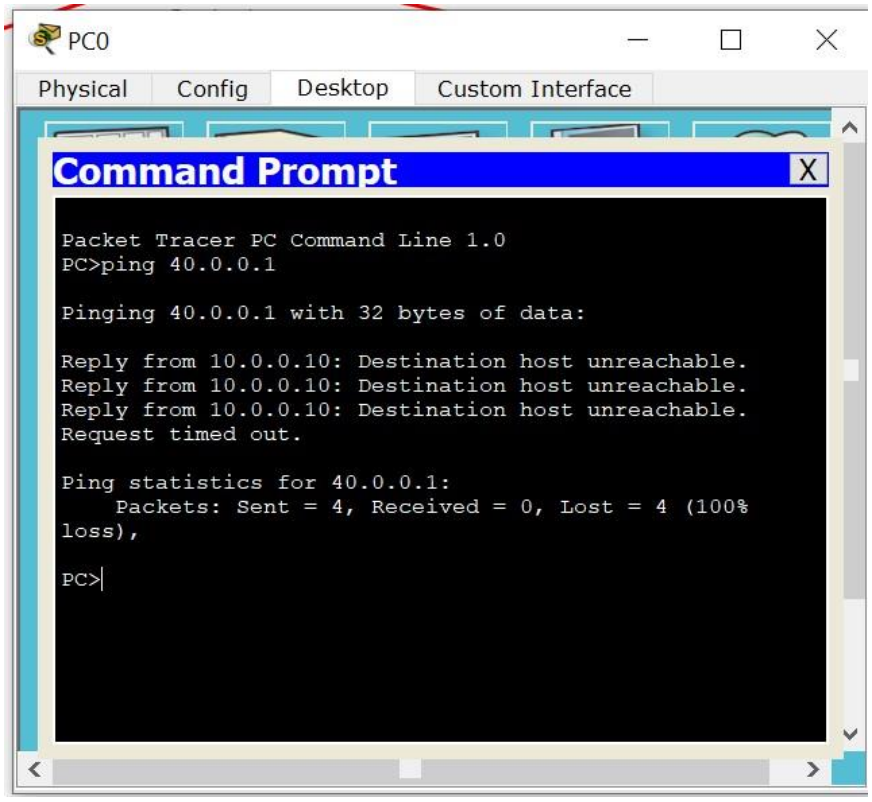
OUTPUT:

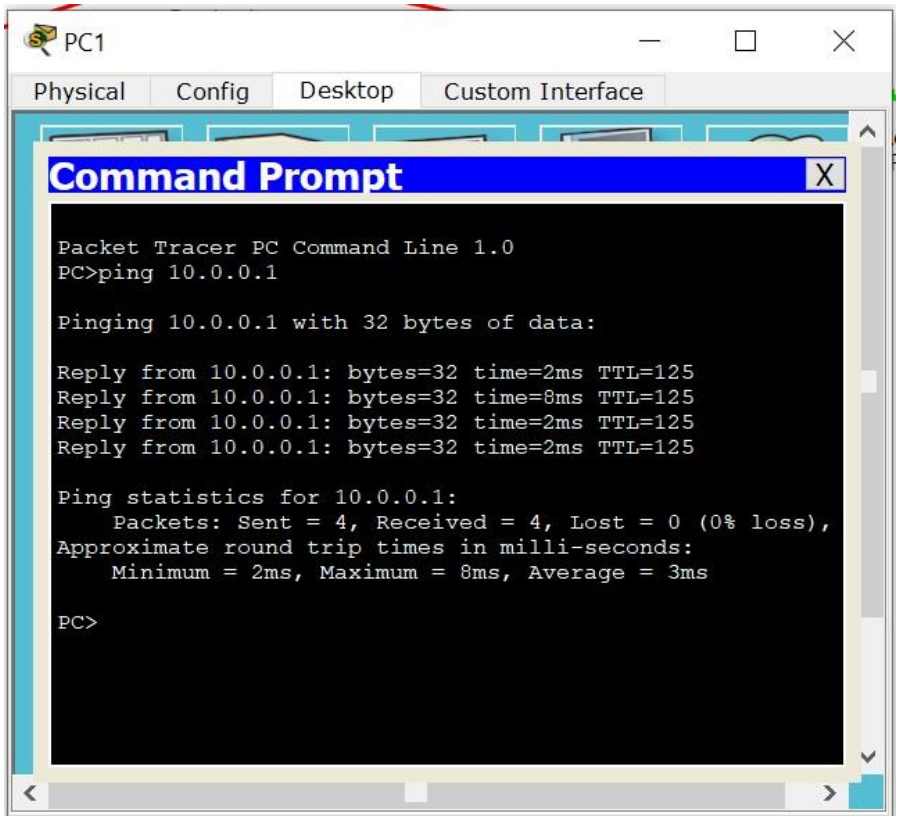
PROGRAM 2.1

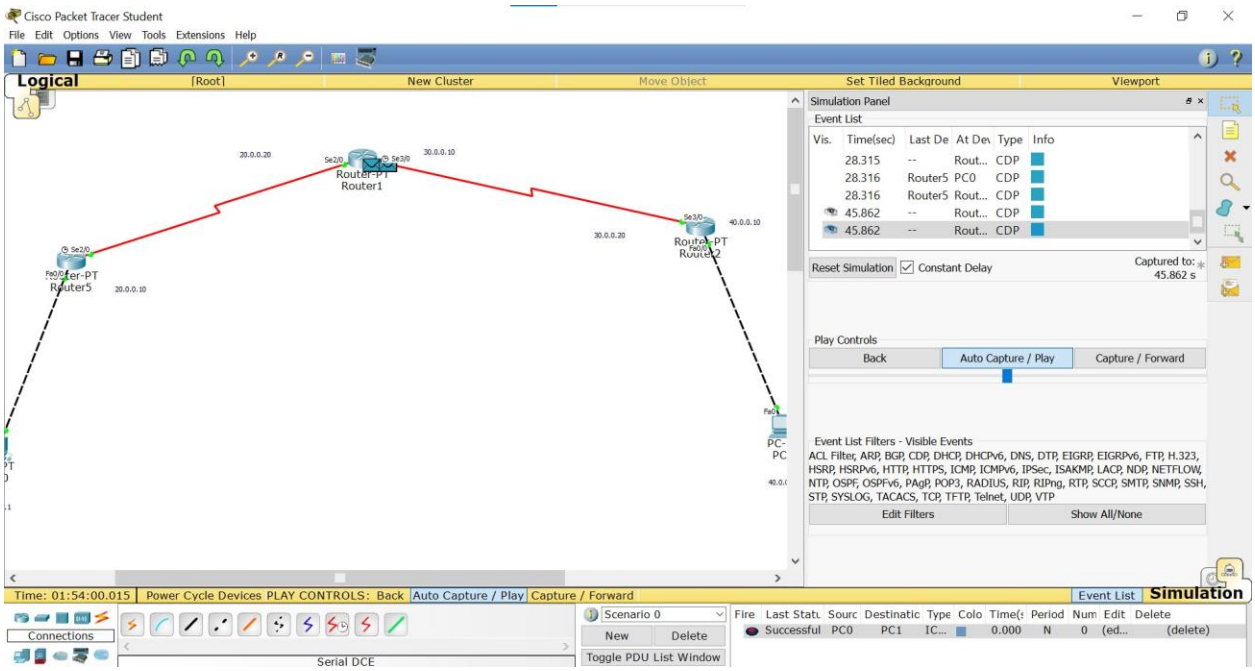

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.1
Pinging 20.0.0.1 with 32 bytes of data:
Request timed out.
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
Reply from 20.0.0.1: bytes=32 time=10ms 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>


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
10.0.0.10
20.0.0.10
Router0
PC-PT PC0
PC-PT PC1
10.0.0.1
20.0.0.1
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:27:16.137
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Copper Cross-Over
Scenario 0
New
Delete
Toggle PDU List Window
Successful
PC0
PC1
ICMP
Type here to search
25°C Mostly sunny
ENG IN
5:10 AM
6/22/2023

PROGRAM 2.2


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
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>

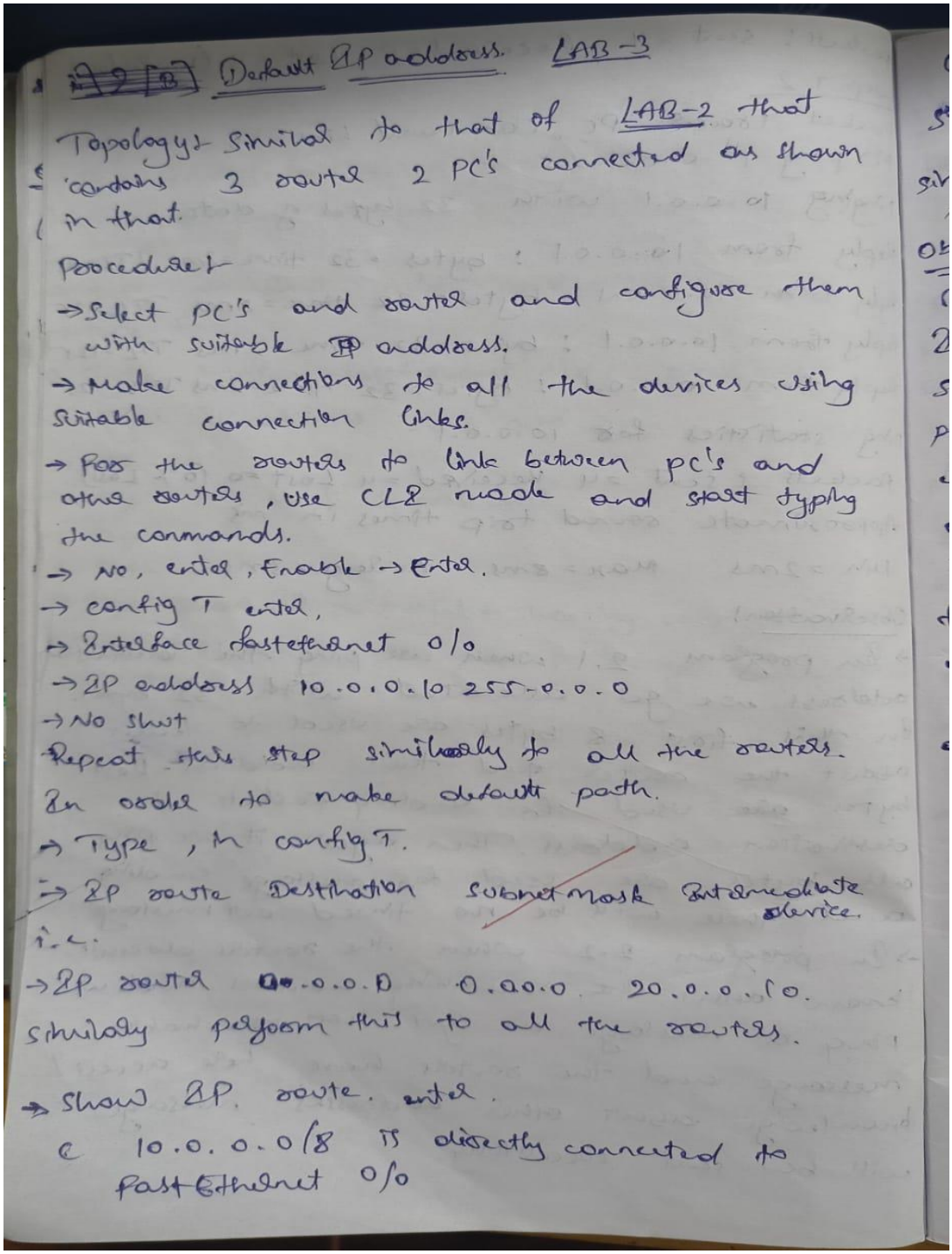

PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=8ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 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>


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
Router-PT
Router5
Router-PT
Router2
PC-PC
20.0.0.20
30.0.0.10
30.0.0.20
40.0.0.10
20.0.0.10
Simulation Panel
Event List
Vis. Time(sec) Last De At Dev Type Info
28.315 -- Rout... CDP
28.316 Router5 PC0 CDP
28.316 Router5 Rout... CDP
45.862 -- Rout... CDP
45.862 -- Rout... CDP
Reset Simulation
Constant Delay
Captured to: 45.862 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 01:54:00.015
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 PC1 IC... 0.000 N 0 (ed... (delete)

LAB 3

Configure default route to the Router.

OBSERVATION:



[2 [B] Default IP address. LAB-3

Topology:- Similar to that of LAB-2 that contains 3 router 2 PC's connected as shown in that.

Procedure:-

→ Select PC's and router and configure them with suitable IP address.

→ Make connections to all the devices using suitable connection links.

→ For the routers to link between pc's and other routers, use CLI mode and start typing the commands.

→ No, enter, Enable → Enter.

→ config T enter,

→ Interface fastethernet 0/0

→ IP address 10.0.0.10 255.0.0.0

→ No shut

Repeat this step similarly to all the routers.

In order to make default path.

→ Type, in config T.

→ IP route Destination subnet mask Intermediate device

i.e.

→ IP route 0.0.0.0 0.0.0.0 20.0.0.10.

similarly perform this to all the routers.

→ Show IP route. enter.

C 10.0.0.0/8 is directly connected to FastEthernet 0/0

C 20.0.0.0/8 is directly connected, Serial 2/0

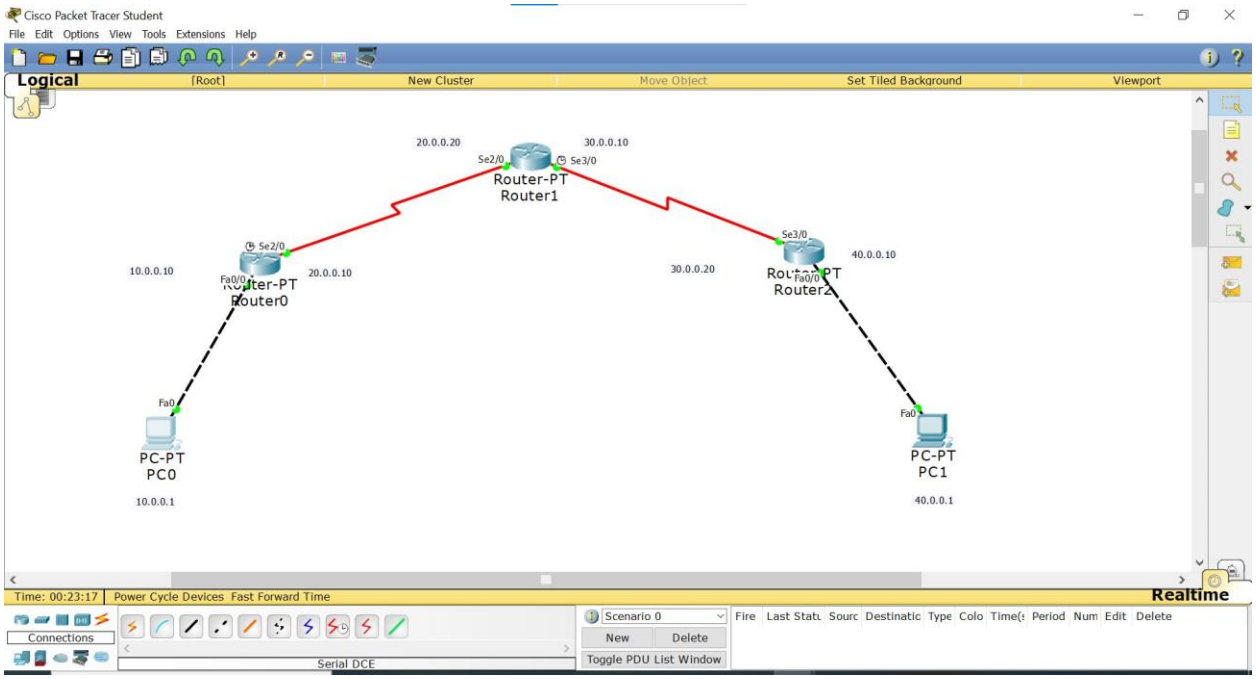
S* 0.0.0.0/0 [1/0] via 20.0.0.10

similarly all the routers are connected.

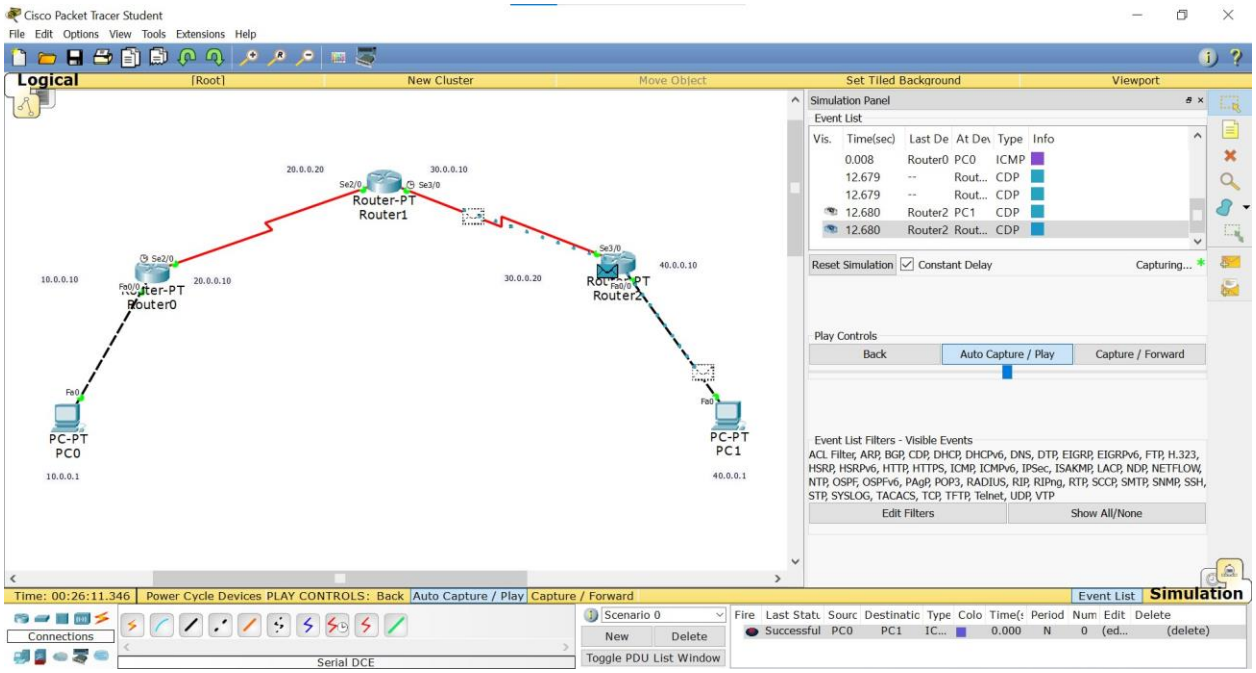
Observation:-

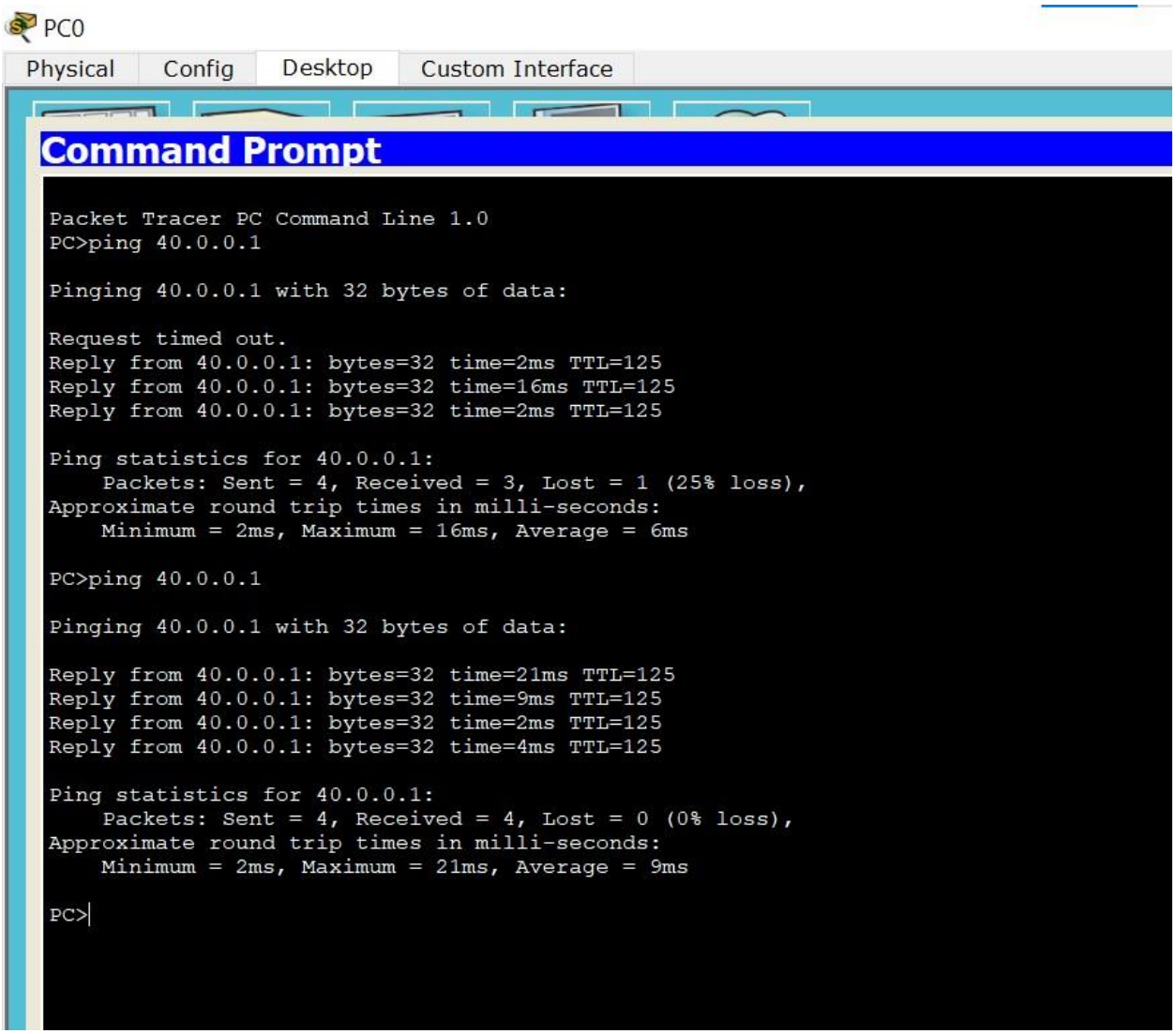
In the previous one, we have given the IP address to all the routers with destination subnet, and intermediate IP address of those particular devices, but here in this experiment we use a default IP address i.e. 0.0.0.0 and subnet mask 0.0.0.0 so that it can create a pass through channel to all the ~~devices~~ packets that are sent will be transferred by the intermediate device. This is generally used in Large no. device connections.

TOPOLOGY:



OUTPUT:

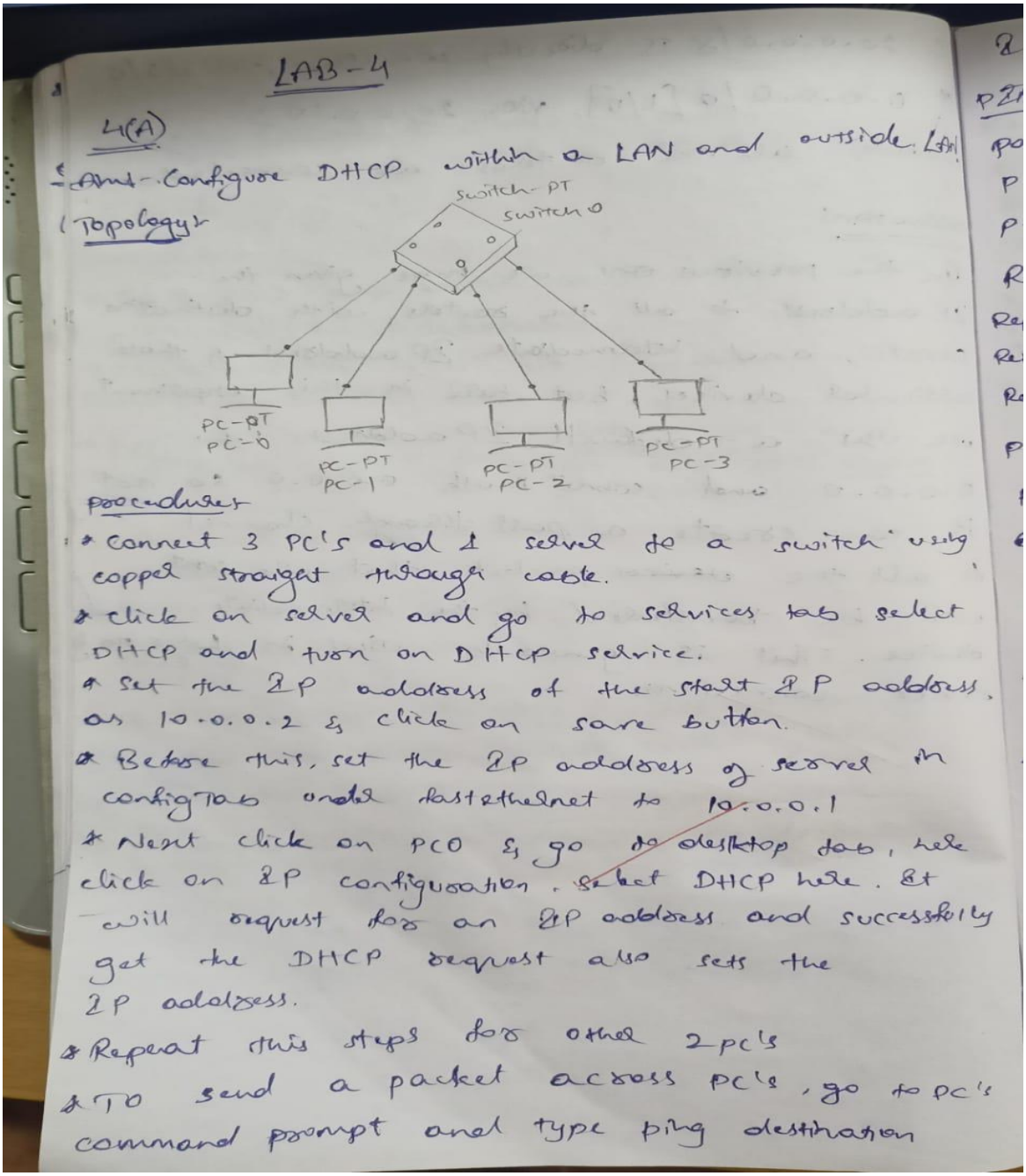



PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=16ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms 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>

LAB 4

Configure DHCP within a LAN and outside LAN.

OBSERVATION:



IP address.

PING Output:

Aim: packet tracer PC command Line 10:

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 ms.

Minimum=0ms, Maximum=1ms, Average=0ms

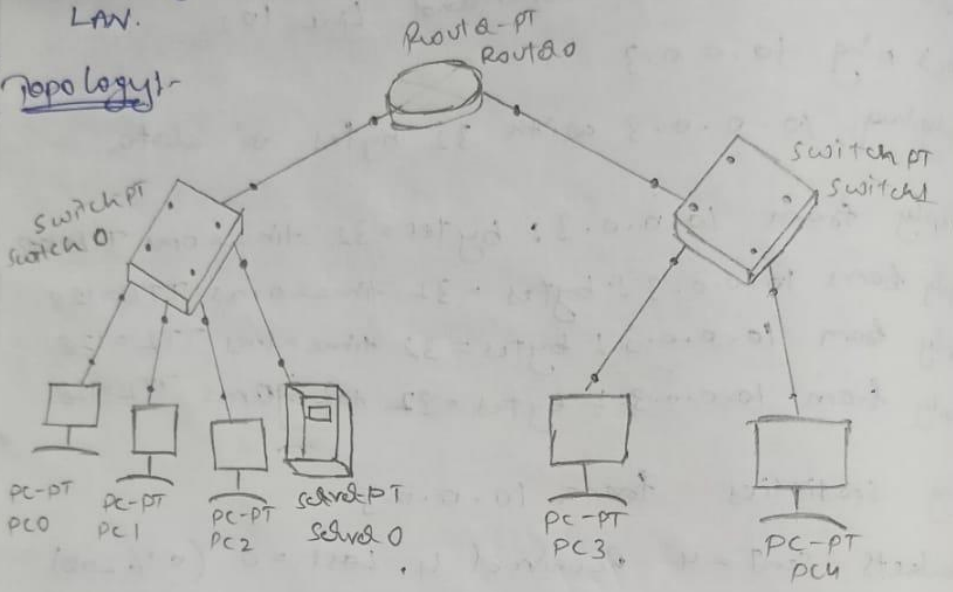
Observation:-

* DHCP is used to dynamically assigns an IP address to any device or node.
* It is a client-server protocol in which servers manage a pool of unique IP address & also about client configuration parameters.
* DHCP enabled clients sends a request to DHCP server when they want to connect to a network.
* The DHCP server responds to the client request by providing IP configuration information from address pools, previously specified by a network administrator.

4[B]

Aim:- Configure DHCP switch a LAN and outside LAN.

Topology:-



Procedure:-

- Add a router, a switch and 2 PC's to 4.1A) program. Network & connect the router to both switches.
- Set the server IP address of server & with the help of server set the first 3 PC's IP address through DHCP
- → Click on server
- → go to desktop → IP configuration
- → Add IP address, subnet mask and gateway.

IP address 10.0.0.1

Subnet Mask 255.0.0.0

Gateway 10.0.0.20

Step 3:- Configure the router

→ Click on router go to CLI

enable

Router# config t

Router(config)# fastethernet 0/0

Router(config)# ip address 20.0.0.20 255.0.0.0

Router(config-if)# no shut

Router(config-if)# exit.

Router(config)# interface fastethernet 1/0

Router(config-if)# ip address 20.0.0.20 255.0.0.0

Router(config-if)# no shut

Router(config-if)# exit

exit

Routing table

Router→ show ip route

C 10.0.0.0/1 is directly connected, fastethernet 0/

Step 4:- Go to server[DHCP server configuration]

→ select services then go to DHCP

→ Set service on

→ Set start IP address from (ex.-20.0.0.0) then save.

Step 5:- Then configure the PC's

→ Select a PC then desktop - go to IP configure select DHCP.

→ Repeat the same procedure for all other PC's.

Observation:-

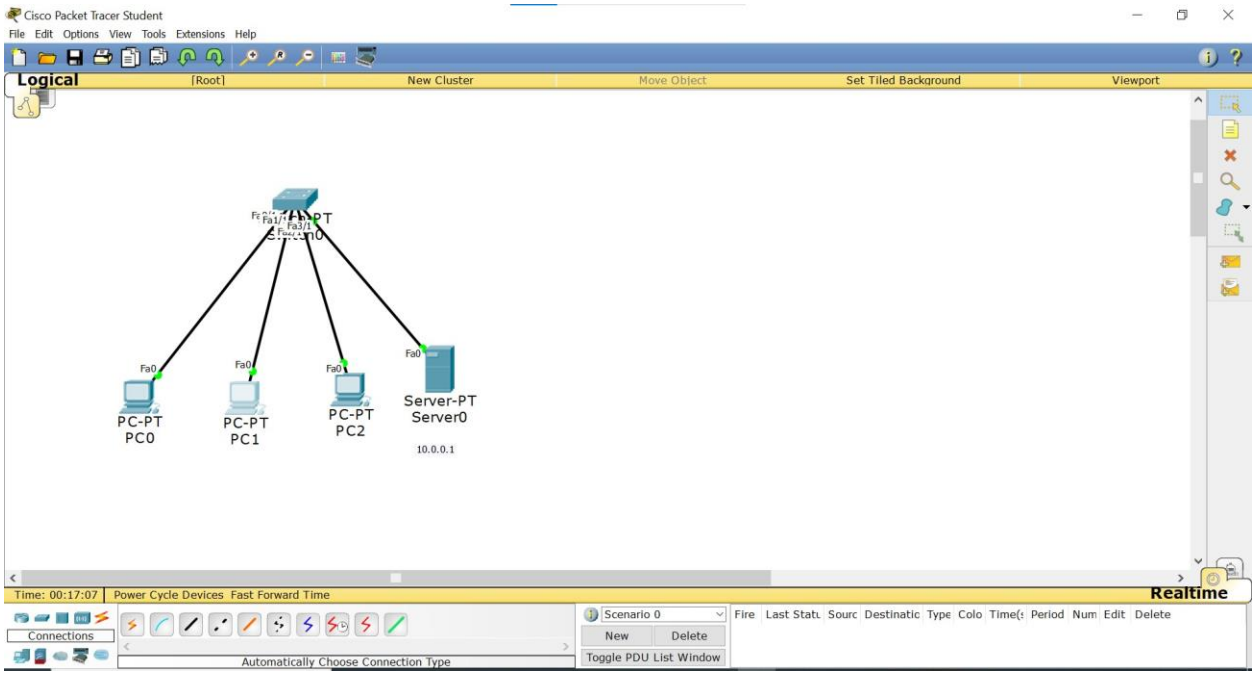
→ DHCP is used to design IP address Dynamically to different devices.

→ To assign continuous IP address we create a server pool where we assign the starting IP address and a default gateway number. For pc's under different switches we create a different server pool again & start.

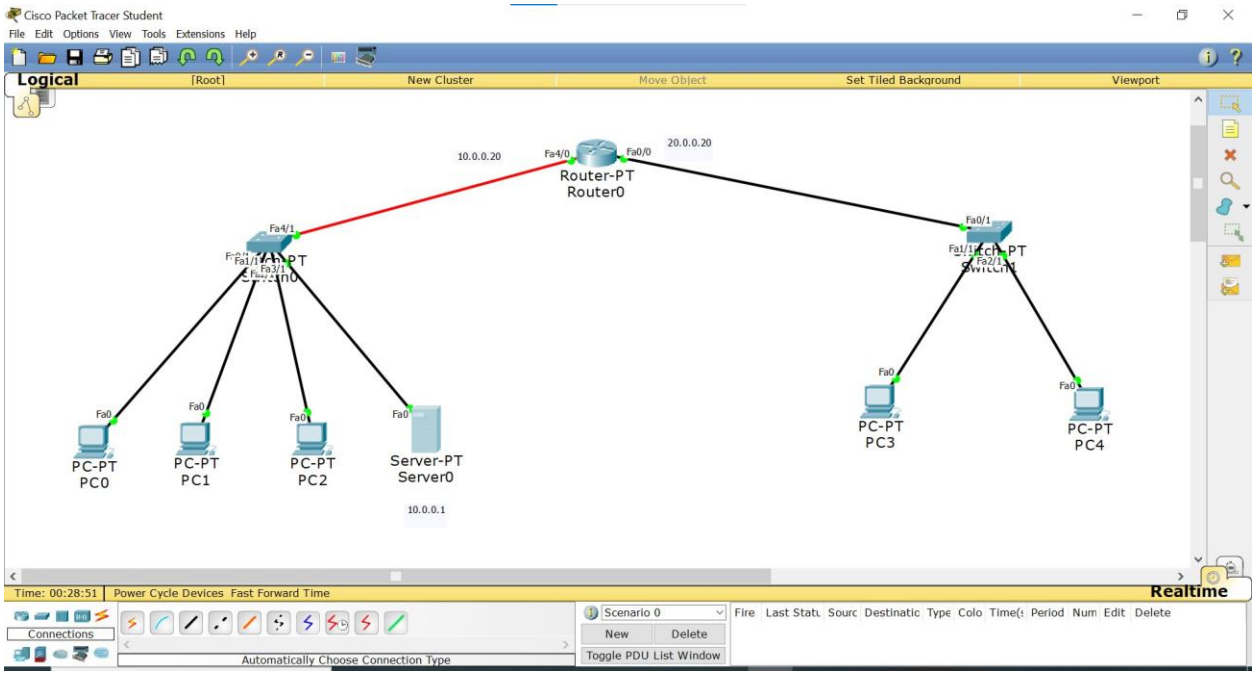
lee
19/7/23

TOPOLOGY:

PROGRAM 4.1:

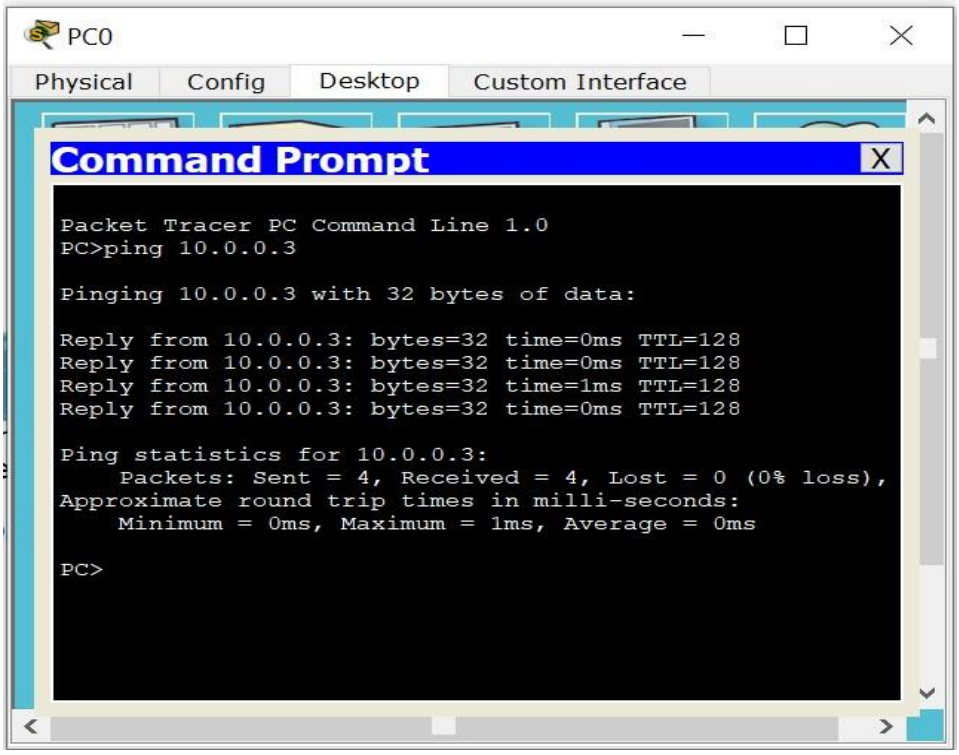


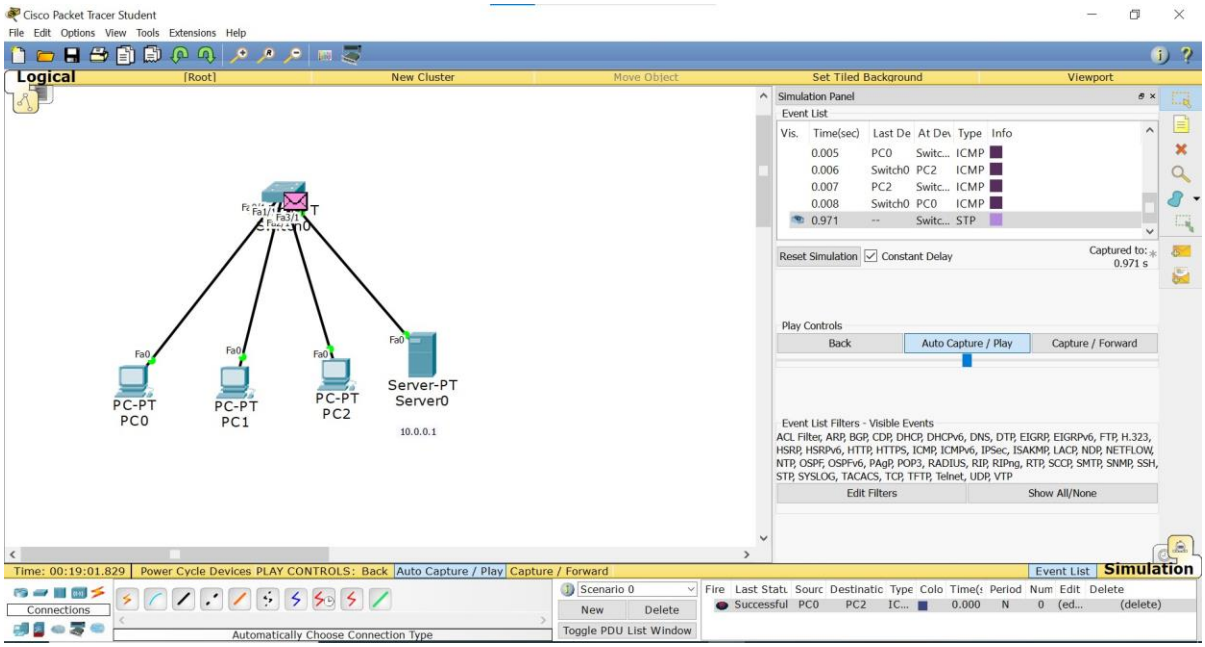
PROGRAM 4.2:



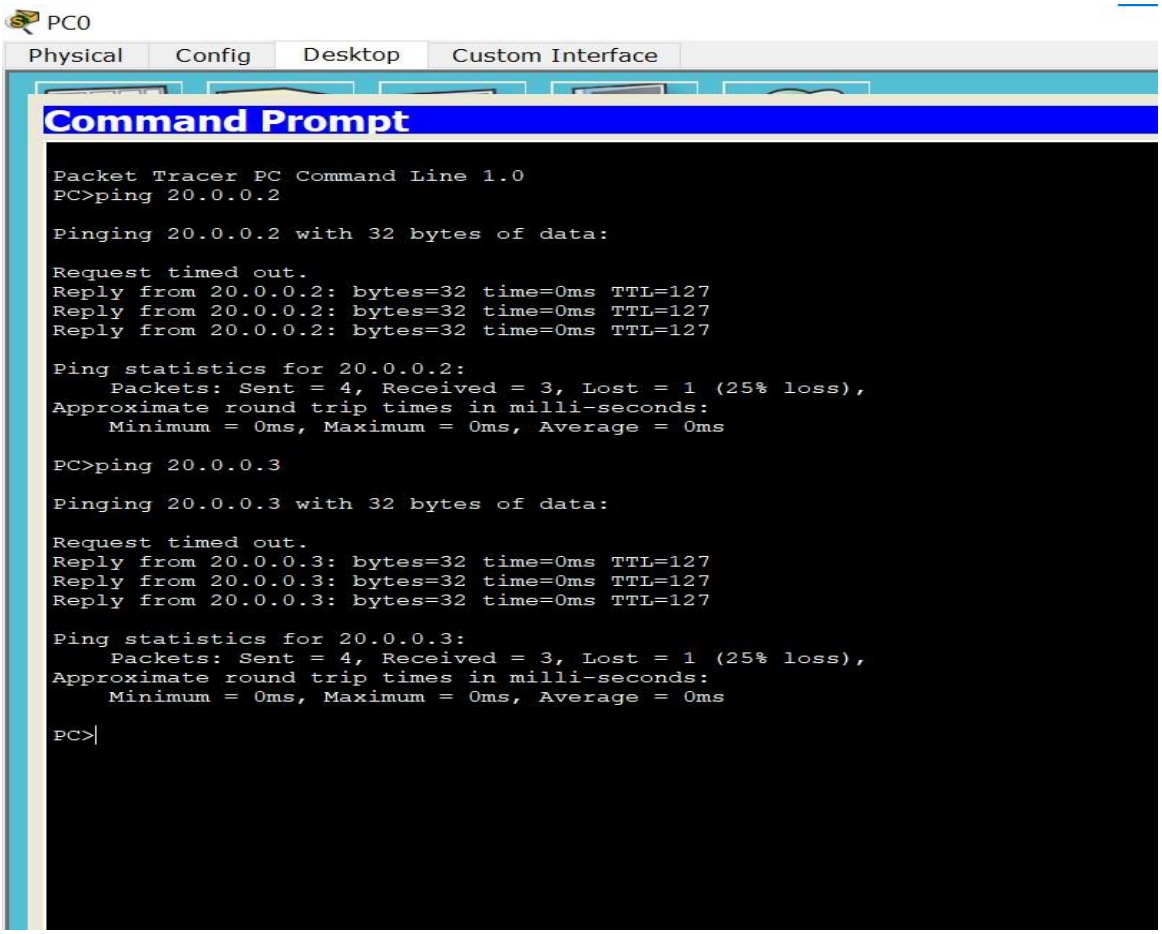
OUTPUT:

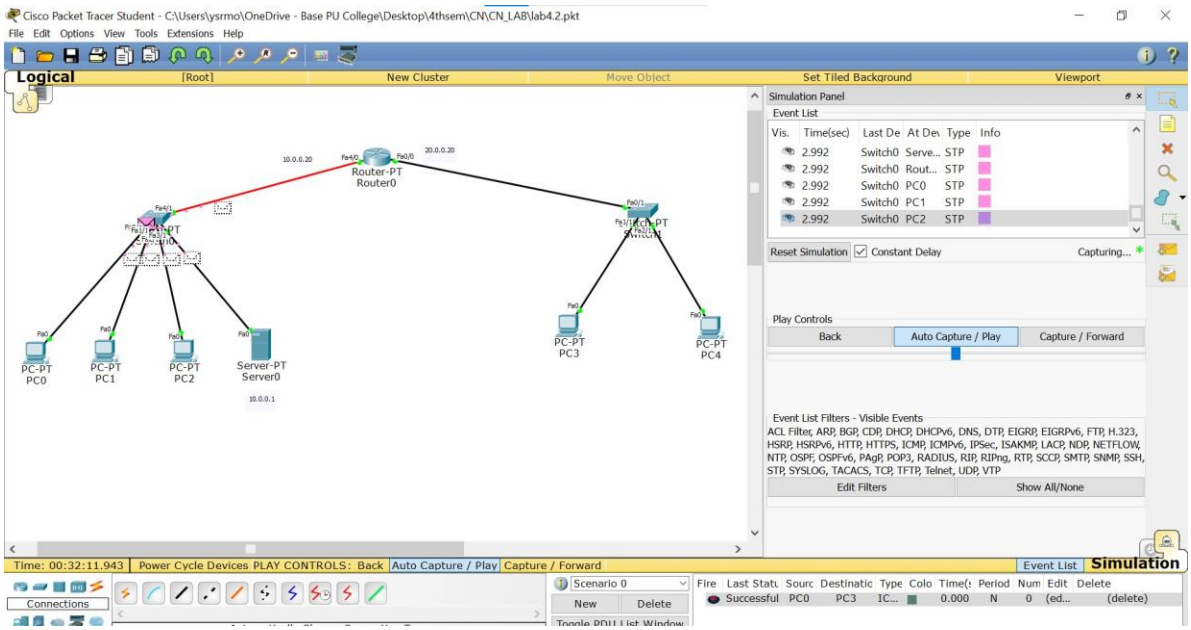
PROGRAM 4.1:





PROGRAM 4.2:

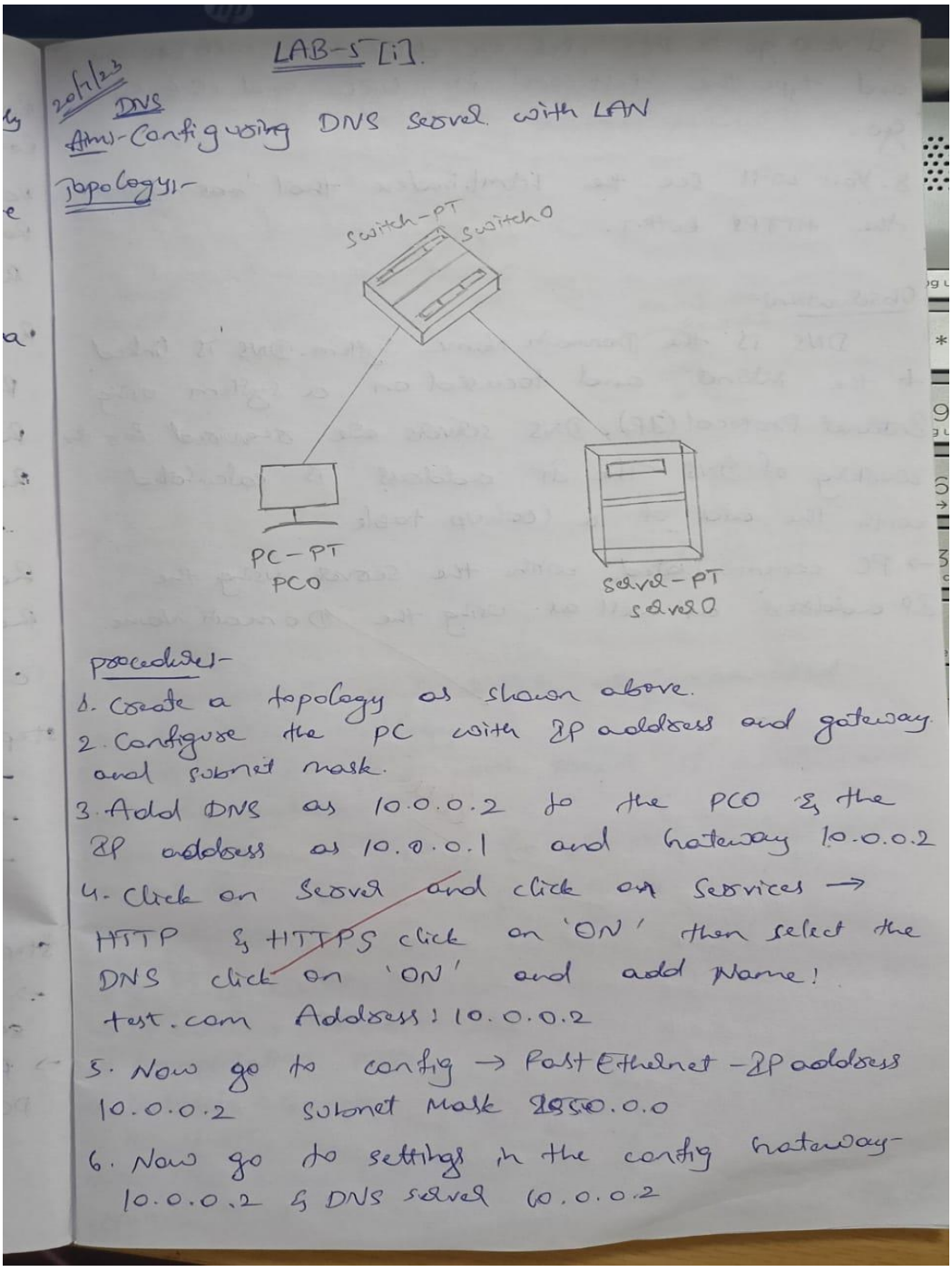

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Request timed out.
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms 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>


Logical
Router-PT
Router0
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Server-PT
Server0
PC-PT
PC3
PC-PT
PC4
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Simulation

LAB 5

Configure Web Server, DNS within a LAN.

OBSERVATION:



7. Now go to PC click on desktop → web browser and type the 'test.com' in URL and click on go.

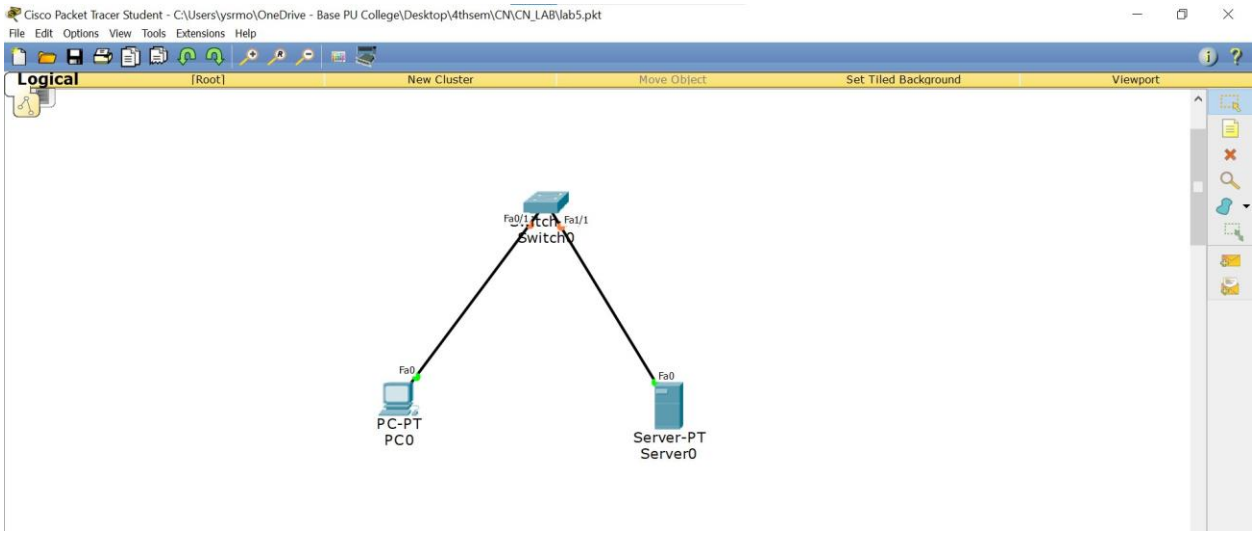
8. You will see the html.index that has written in the HTTPS button.

Observation-

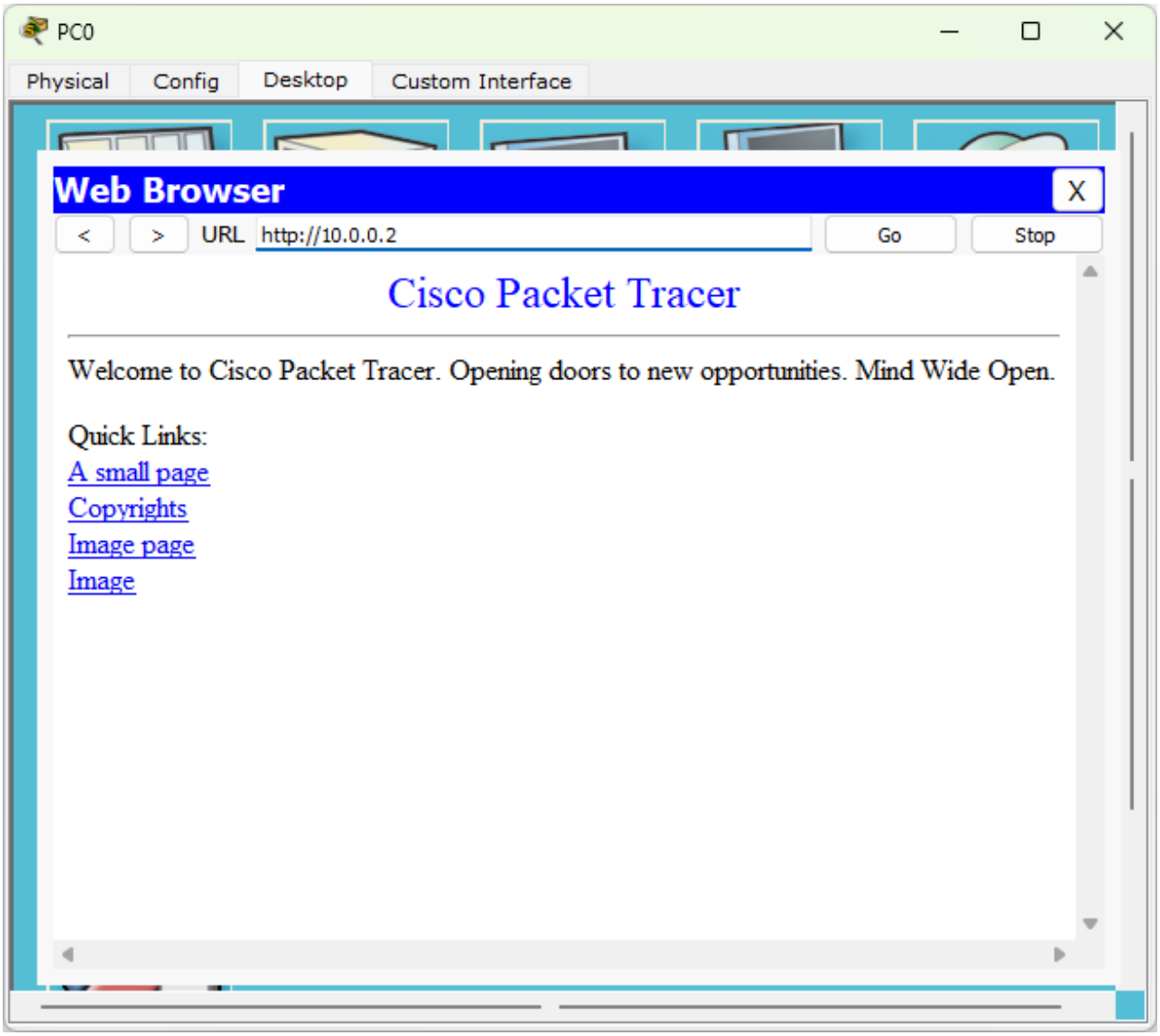
DNS is the Domain Name System. DNS is linked to the Internet and focussed on a system using Internet Protocol (IP). DNS servers are required for the working of DNS. The IP address is calculated with the aid of a lookup table.

→ PC communicated with the server using the IP address as well as using the Domain Name.

TOPOLOGY:


Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab5.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Fa0/1
Fa1/1
Switch0
Fa0
PC-PT
PC0
Fa0
Server-PT
Server0

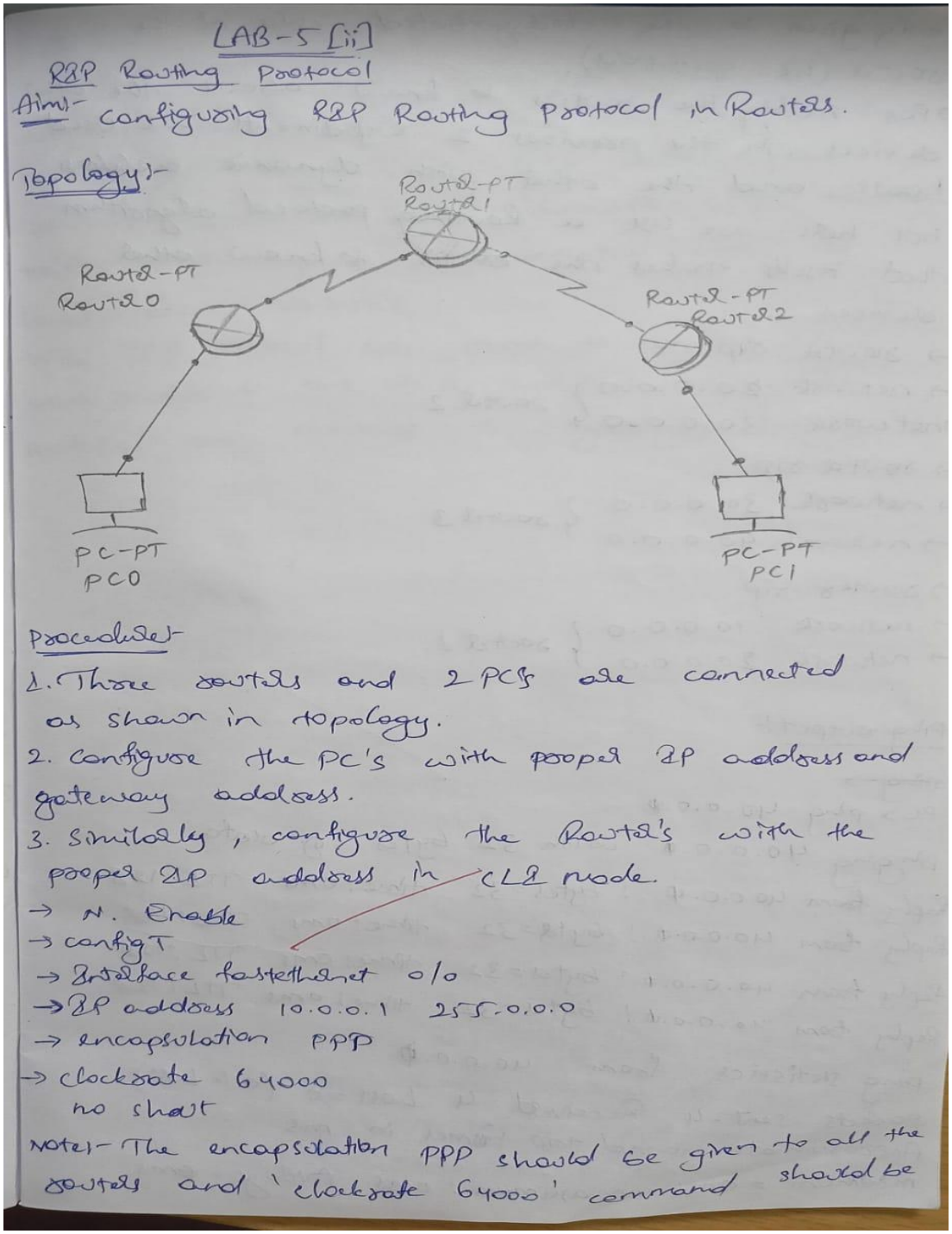
OUTPUT:


PC0
Physical
Config
Desktop
Custom Interface
Web Browser
X
<
>
URL
http://10.0.0.2
Go
Stop
Cisco Packet Tracer
Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
A small page
Copyrights
Image page
Image

LAB 6

Configure RIP routing Protocol in Routers.

OBSERVATION:



only given to the clockwise/left sides of the router (i.e. open sides).

→ For making the routers to know about the other devices, in the previous 2 experiments we used 1 static and the other with dynamic address but here we use a Routing protocol algorithm that itself makes the router to know other devices.

→ router rip
→ network 20.0.0.0
→ network 30.0.0.0
} router 2

→ router rip
→ network 30.0.0.0
→ network 40.0.0.0
} router 3

→ router rip
→ network 10.0.0.0
→ network 20.0.0.0
} router 1.

Ping output:-

~~ping~~ →

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=0ms TTL=128
Reply from 40.0.0.1 : bytes=32 time=0ms TTL=128
Reply from 40.0.0.1 : bytes=32 time=0ms TTL=128
Reply from 40.0.0.1 : bytes=32 time=0ms TTL=128

Ping statistics from 40.0.0.1

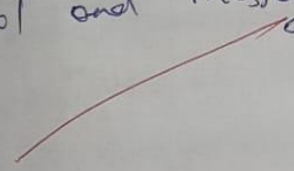
Packets sent=4 Received 4 Lost=0 (0% Loss)
Approximate round trip times in ms

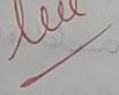
Minimum = 0ms, Maximum = 0ms Average = 0ms

Observation:-

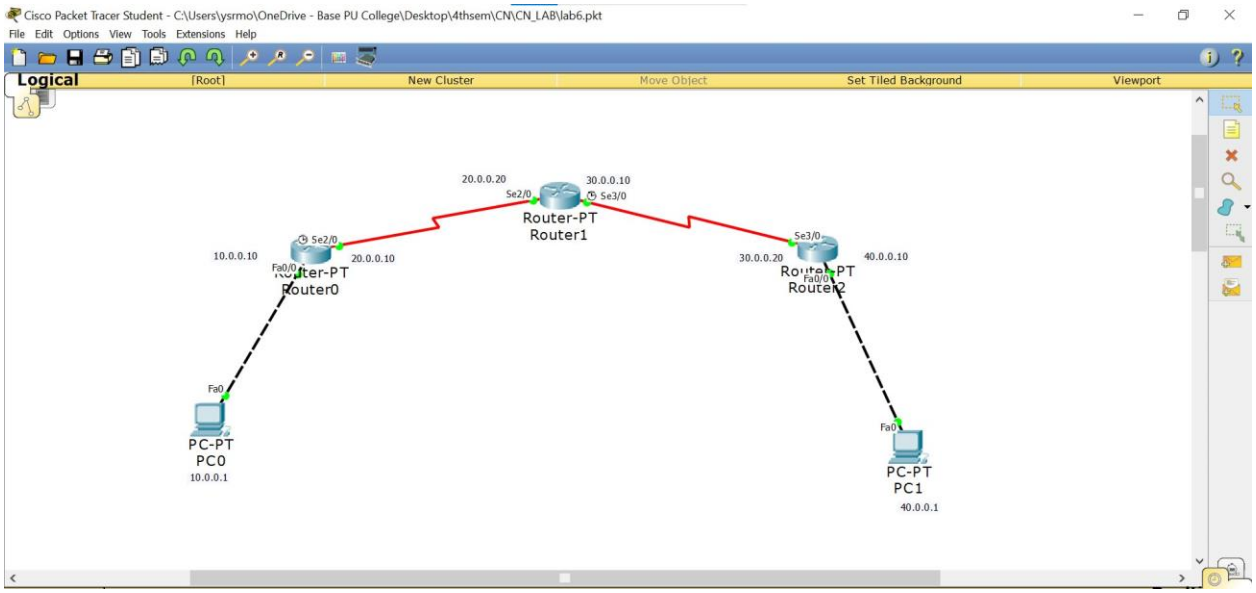
RIP is the Routing Information Protocol is a distance vector protocol that uses hop count as its primary metric. RIP defines how routers should be share information when moving traffic among an interconnected group of local area networks.

→ The RIP protocol here, used to connect the ~~other~~ routers to one other and PC's using RIP protocol and message is pinged successfully.

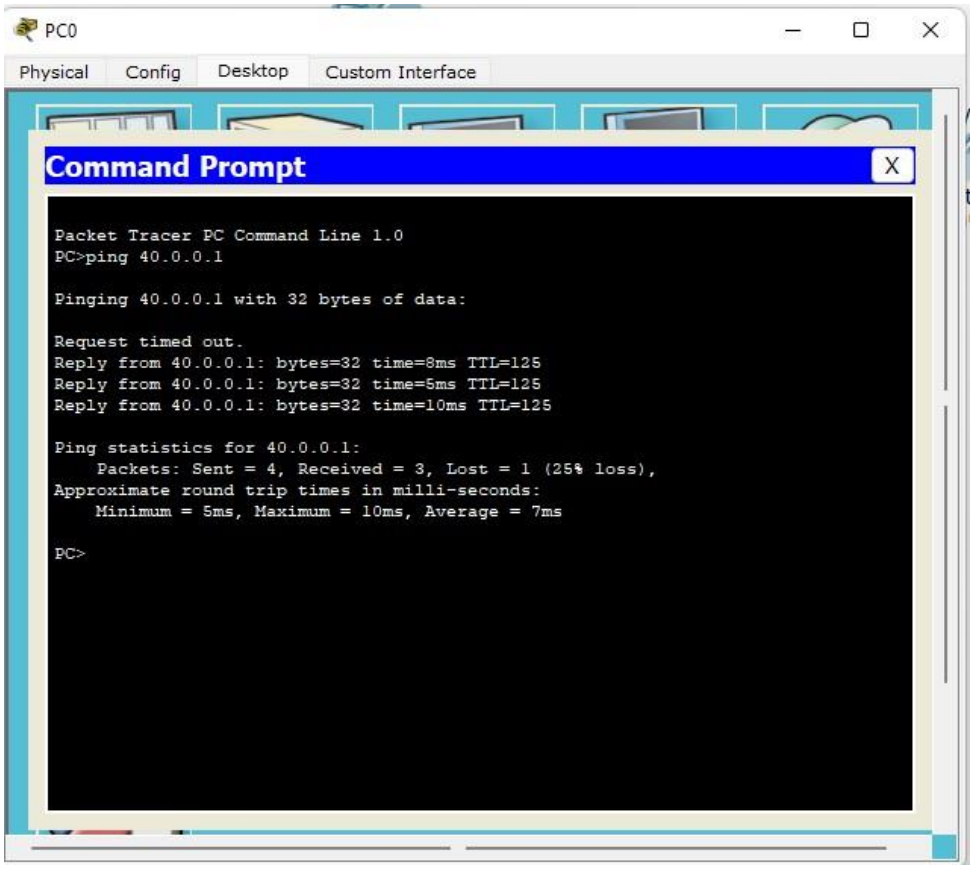


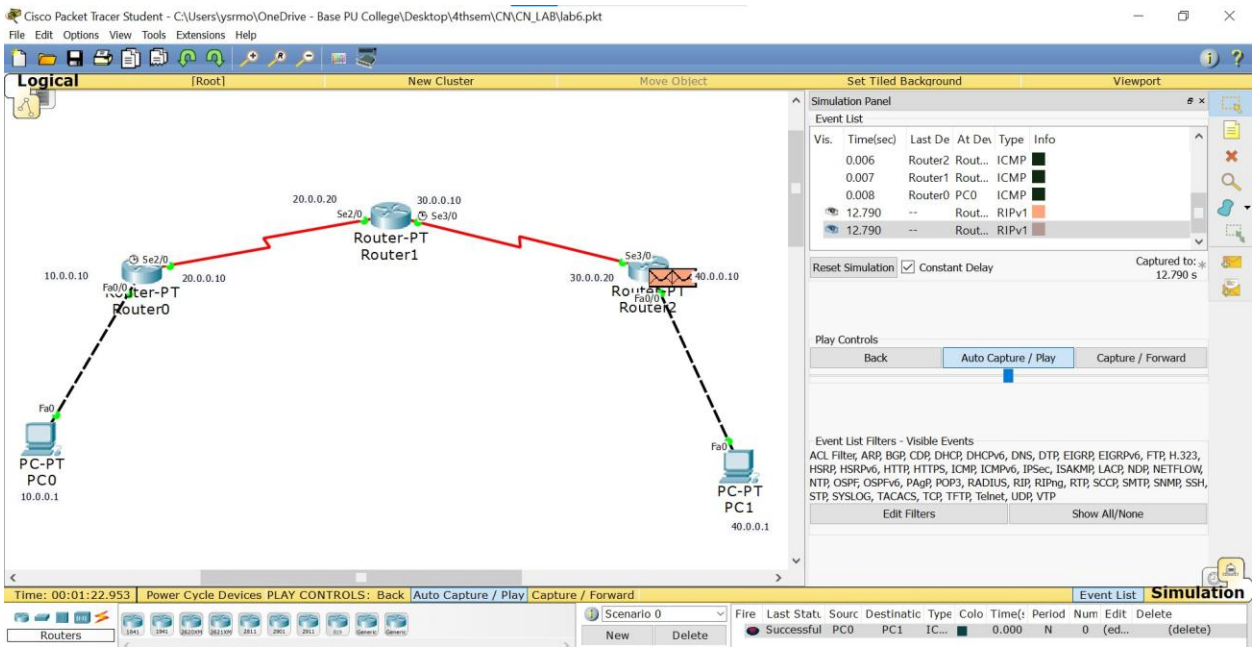


TOPOLOGY:



OUTPUT:

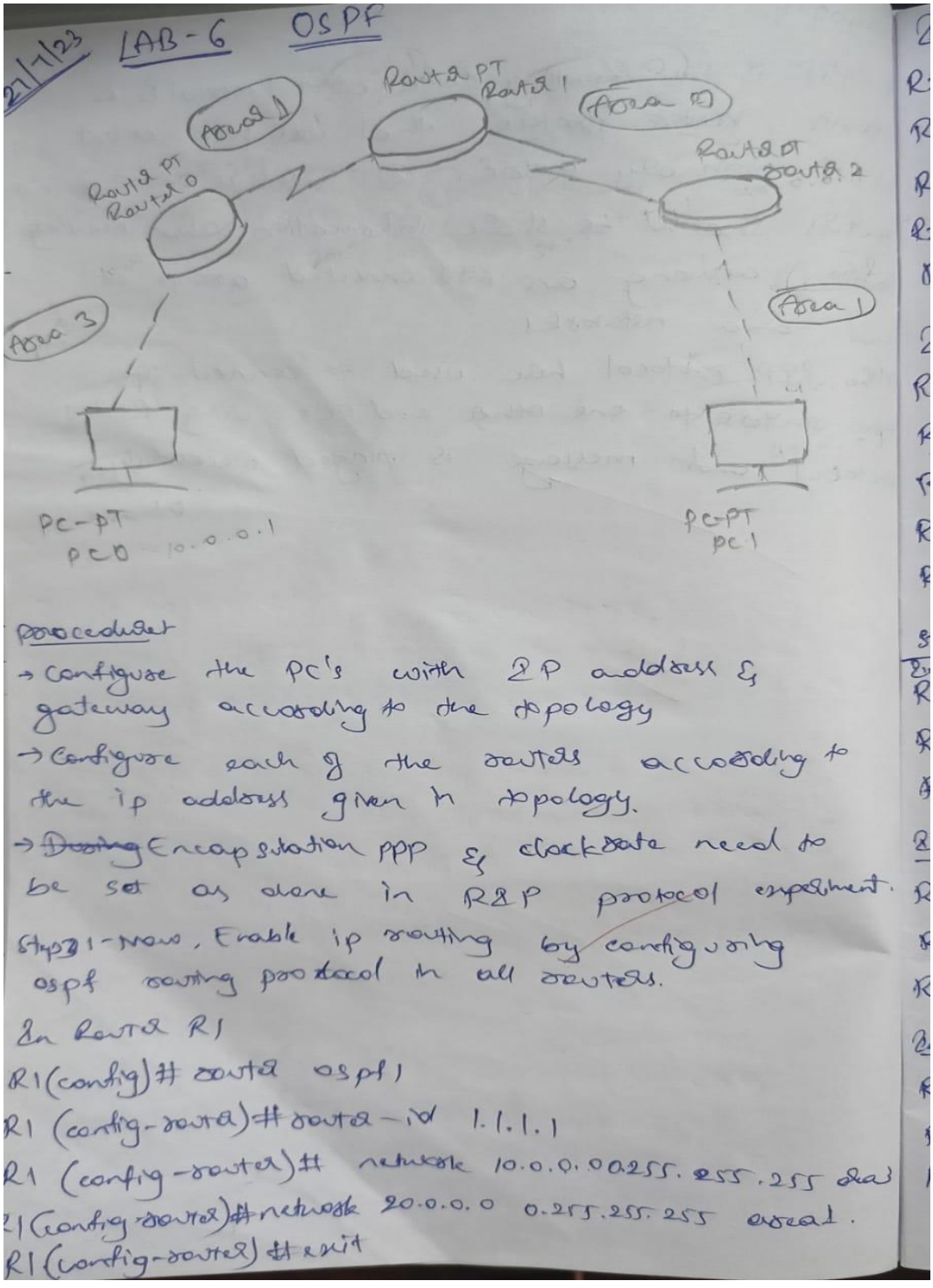



Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab6.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
Router-PT
Router0
Router-PT
Router2
PC-PT
PC0
PC-PT
PC1
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.006 Router2 Rout... ICMP
0.007 Router1 Rout... ICMP
0.008 Router0 PC0 ICMP
12.790 -- Rout... RIPv1
12.790 -- Rout... RIPv1
Reset Simulation
Constant Delay
Captured to: 12.790 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:01:22.953
Power Cycle Devices
PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Routers
Scenario 0
New
Delete
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 PC1 IC... 0.000 N 0 (ed... (delete)

LAB 7

Configure OSPF routing protocol.

OBSERVATION:



In Router R2,

R2(config)#router ospf 1.

R2(config-router)#router-id 2.2.2.2

R2(config-router)#network 20.0.0.0 0.255.255.255 area 1

R2(config-router)#network 30.0.0.0 0.255.255.255 area 0

R2(config-router)#exit

In Router R3,

R3(config)#router ospf 1

R3(config-router)#router-id 3.3.3.3

R3(config-router)#network 30.0.0.0 0.255.255.255 area 0

R3(config-router)#network 40.0.0.0 0.255.255.255 area 2

R3(config-router)#exit

Step 4:- Loopback in serial interface

In router R1

R1(config-if)#interface loopback 0

R1(config-if)# ip address 172.16.1.252 255.255.0.0

R1(config-if)# no shut.

In router 2 in serial interface

R2(config-if)#interface loopback 0

R2(config-if)#ip address 172.16.1.253 255.255.0.0

R2(config-if)#no shut

In router 3

R3(config-if)#interface loopback 0

R3(config-if)#ip address 172.16.1.254 255.255.0.0.

R3(config-if)# no shut.

Steps 1- virtual link

In router R1

R1(config)#router ospf 1
R1(config-router)#area 1 virtual-link 2.2.2.2
~~R1(config-router)# R1(config)# exit~~

In router R2

R2(config)#router ospf 1
R2(config-router)# area 1 virtual-link 1.1.1.1
R2(config-router)# exit

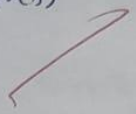
→ show ip route

O IA 10.0.0.0/8 [110/129] via 30.0.0.1 serial 3/0
O IA 20.0.0.0/8 [110/128] via 30.0.0.1 serial 3/0
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, serial 3/0
C 30.0.0.1/32 is directly connected, serial 3/0
C 40.0.0.0/8 is directly connected, ~~serial 3/0~~ fastethernet 0/0
C 172.16.0.0/16 is directly connected, Loopback 0

ping output

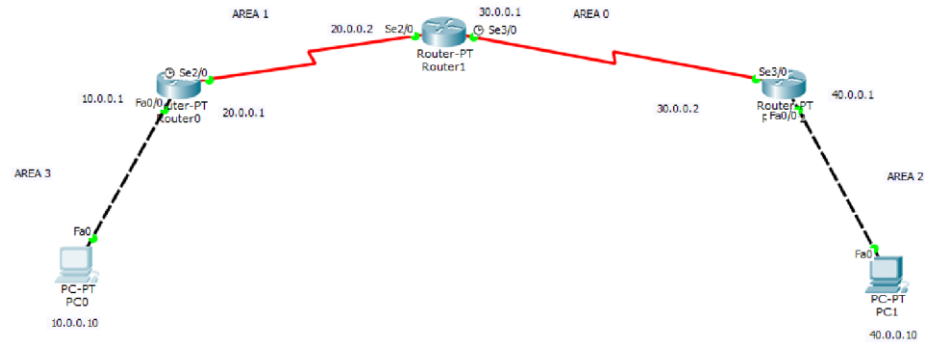
pinging 40.0.0.10 with 32 bytes of data
Request timed out
Reply from 40.0.0.10 bytes = 32 time = 2ms TTL = 125
Reply from 40.0.0.10 bytes = 32 time = 9ms TTL = 125
Reply from 40.0.0.10 bytes = 32 time = 10ms TTL = 125

Pinging statistics for 40.0.0.10:
Packets: sent = 4, Received = 3, Lost = 1 (25% loss),
Approx round trip in ms:
Min = 2ms, max = 10ms, Average = 7ms

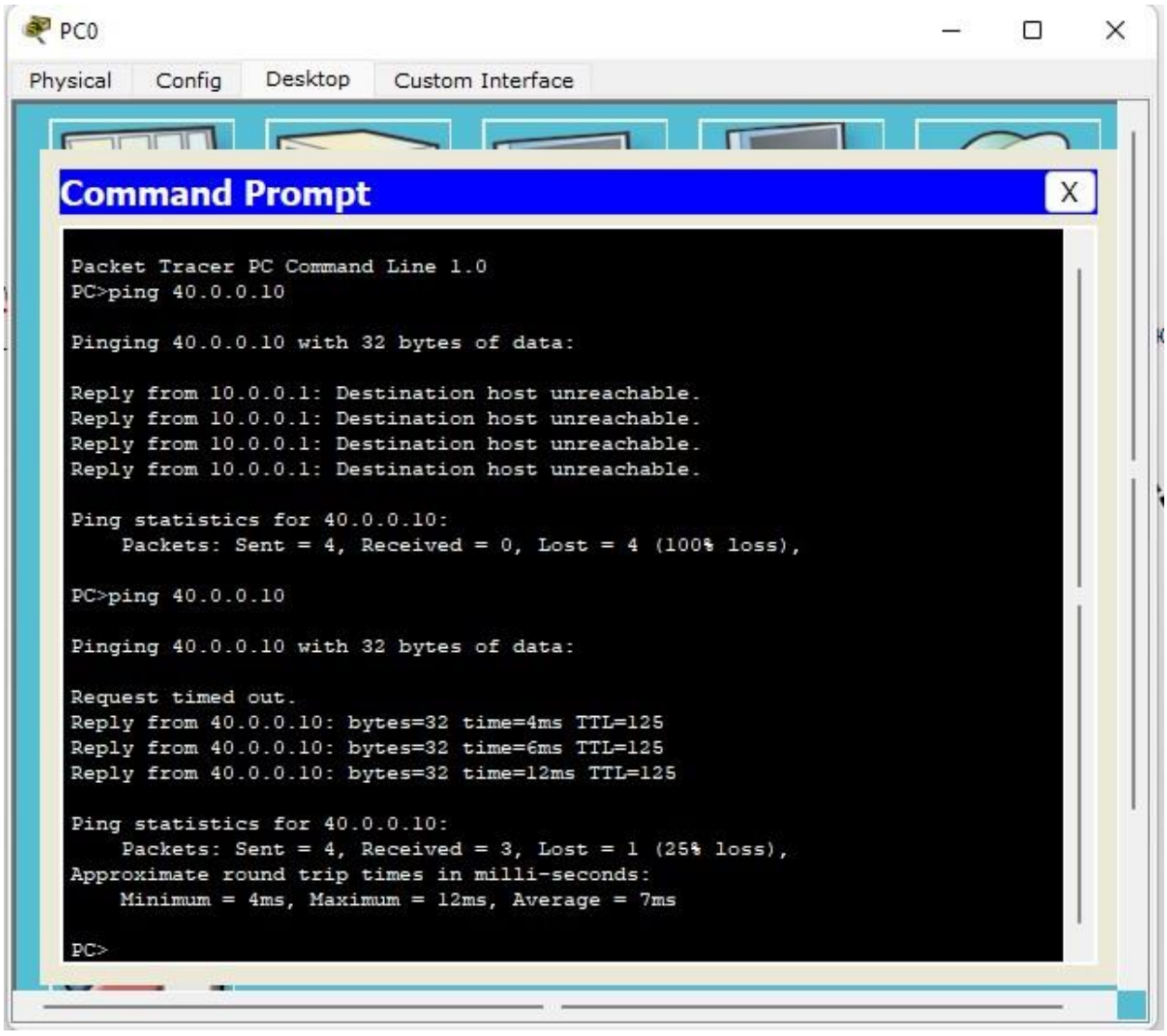


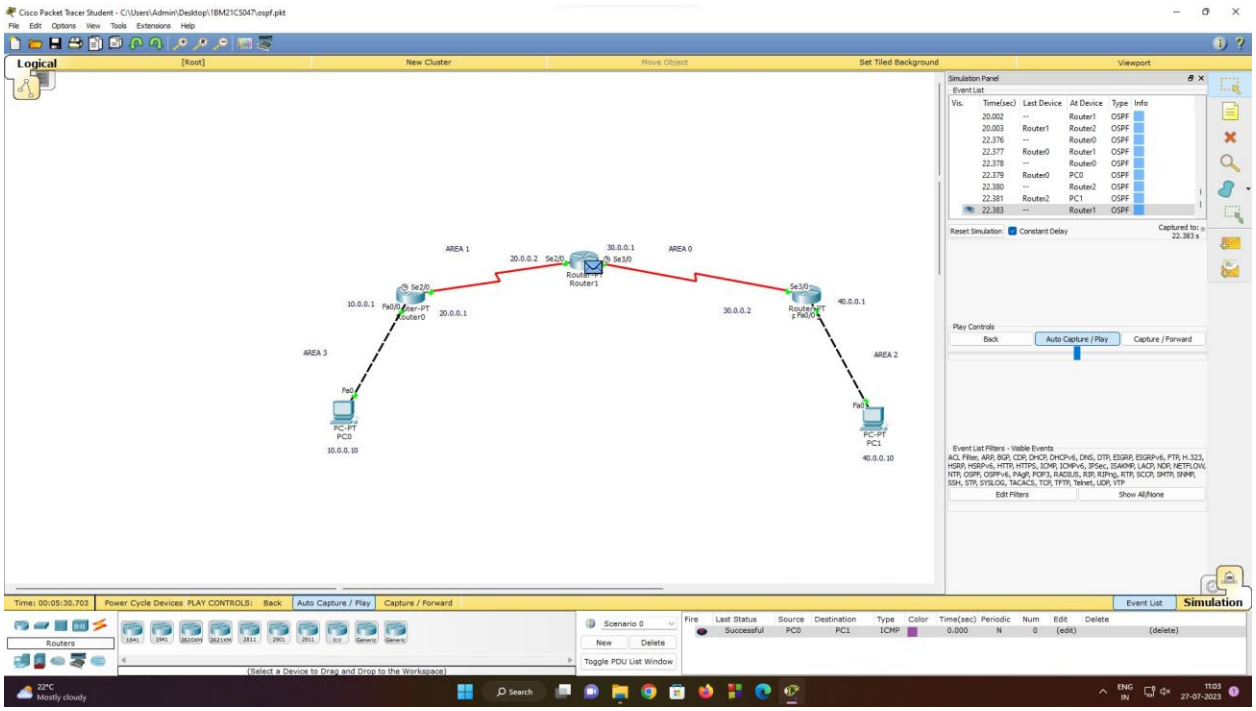
Lee
1/8/23

TOPOLOGY:



OUTPUT:

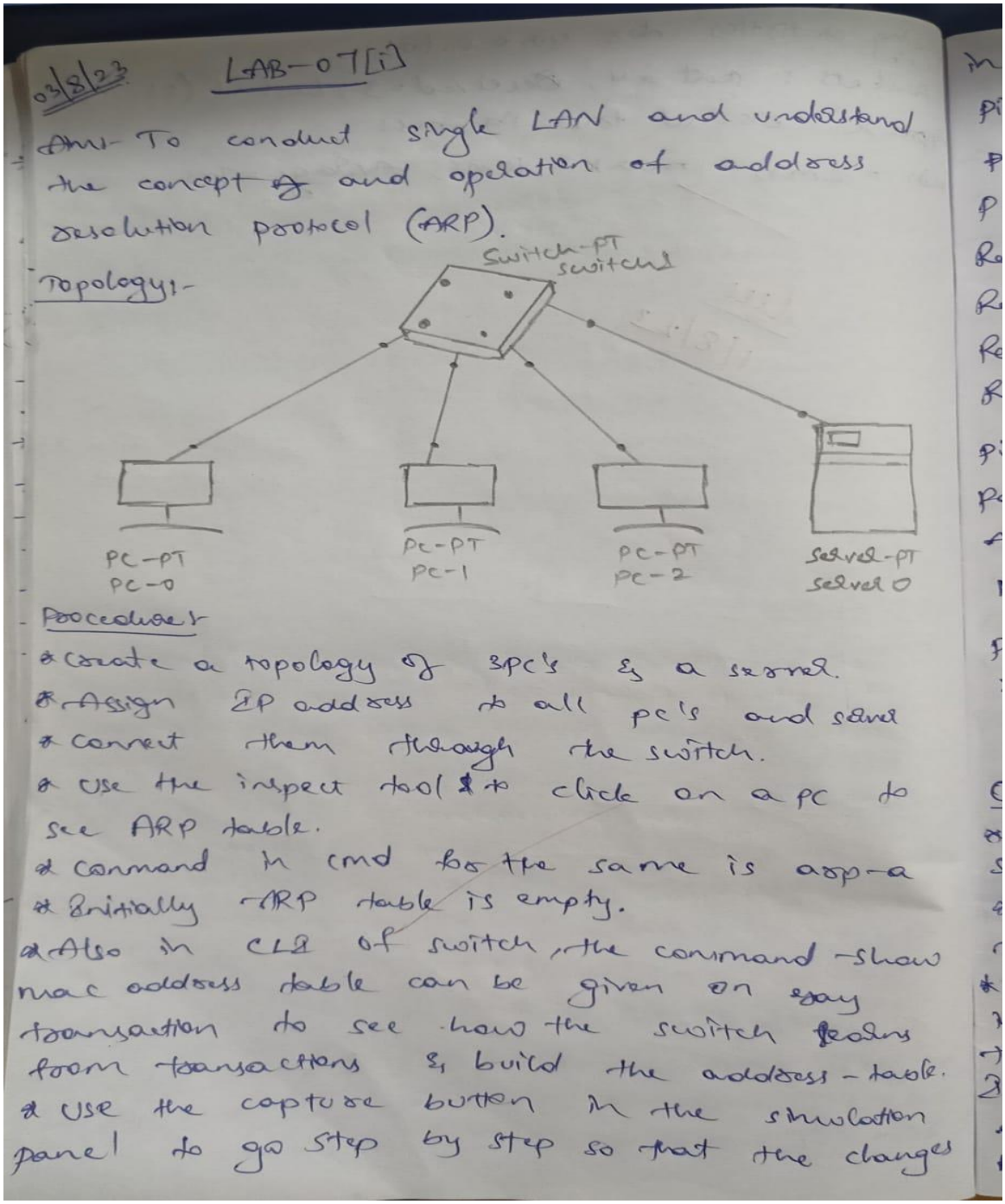



Cisco Packet Tracer Student - C:\Users\Admin\Desktop\1BM21CS047\ospf.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
AREA 1
AREA 0
AREA 3
AREA 2
20.0.0.2
Se2/0
30.0.0.1
Se3/0
Router-PT
Router1
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
30.0.0.2
Se3/0
Router-PT
Fa0/0
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
Fa0
PC-PT
PC1
40.0.0.10
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
20.002 -- Router1 OSPF
20.003 Router1 Router2 OSPF
22.376 -- Router0 OSPF
22.377 Router0 Router1 OSPF
22.378 -- Router0 OSPF
22.379 Router0 PC0 OSPF
22.380 -- Router2 OSPF
22.381 Router2 PC1 OSPF
22.383 -- Router1 OSPF
Reset Simulation
Constant Delay
Captured to: 22.383 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Time: 00:05:30.703
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Routers
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC1 ICMP 0.000 N 0 (edit) (delete)
22°C
Mostly cloudy
Search
ENG
IN
11:03
27-07-2023

LAB 8

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

OBSERVATION:



in ARP can be clearly noted.

ping output

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=0ms TTL=128

Reply from 10.0.0.4 bytes: 32 time=0ms TTL=128

Reply from 10.0.0.4 byte=32 time=0ms TTL=128

Reply from 10.0.0.4 byte=32 time=0ms TTL=128

ping statistics for 10.0.0.4:

Packets: sent = 4 Received = 4 Lost = 0 (0% Loss)

Approximate round trip times in ms

Min = 0ms, Max = 0ms Average = 0ms

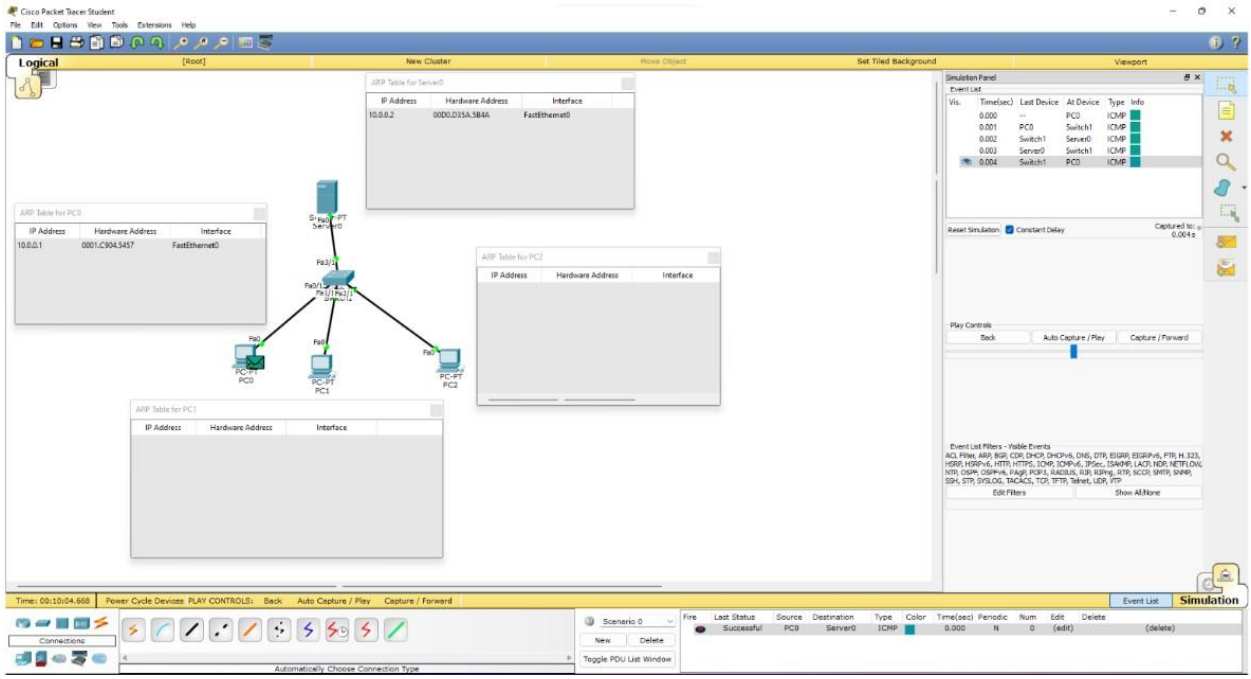
PC> arp -a

Internet address	physical address	Type
10.0.0.4	0060.2f00.324d	dynamic

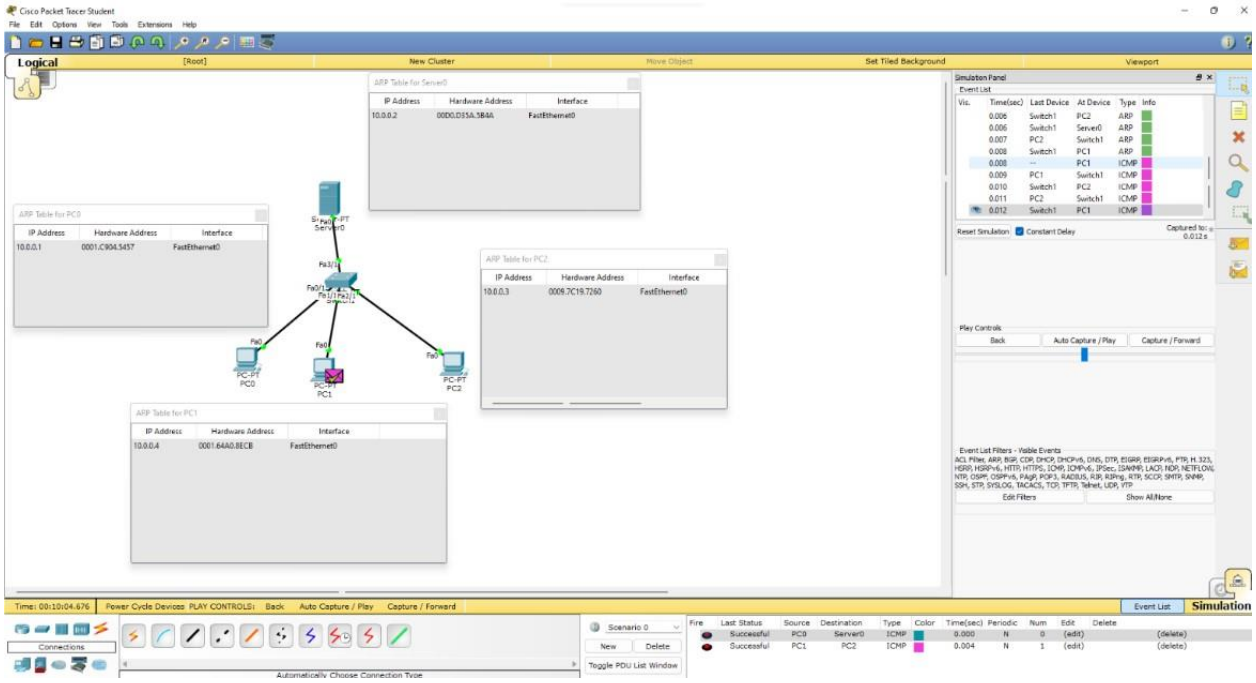
Observation:

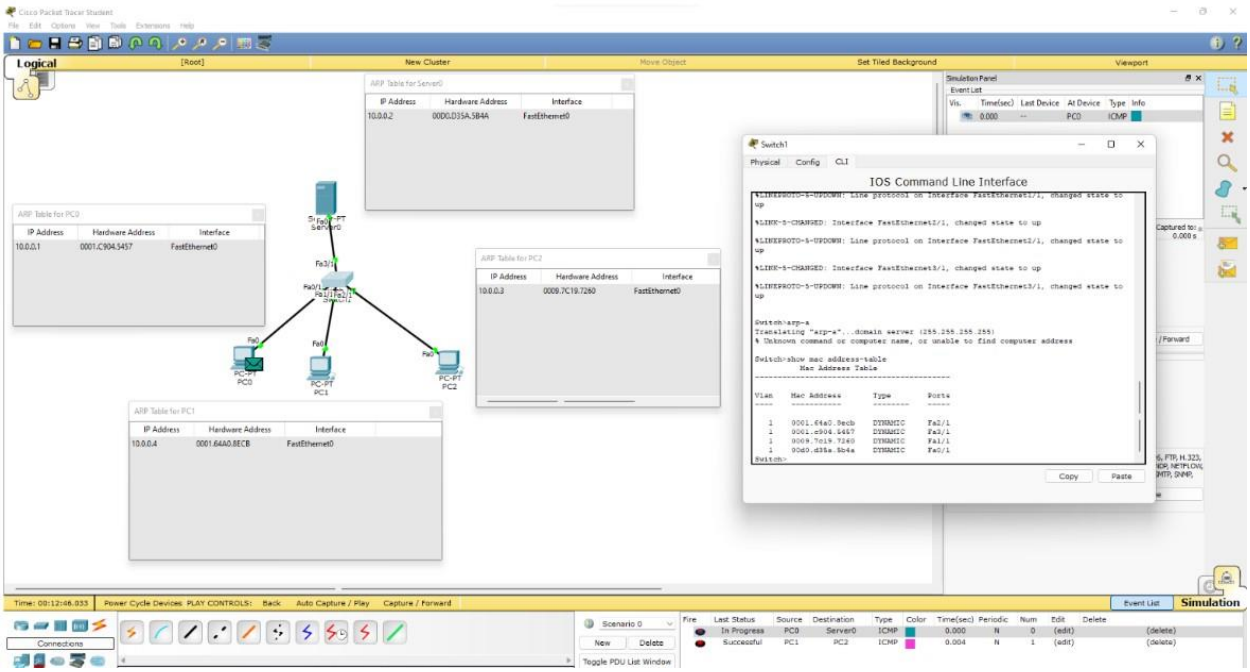
* When we ping a pc and server the address of server is known to pc & vice-versa
* When we ping between other pc's simultaneously the address of each other are known.
* Every time a host requested a MAC address in order to send a packet to another host in the LAN, it checks its ARP cache to see if the IP to mac address translation address already exists. If the translation doesn't exits it performs ARP.

TOPOLOGY:



OUTPUT:

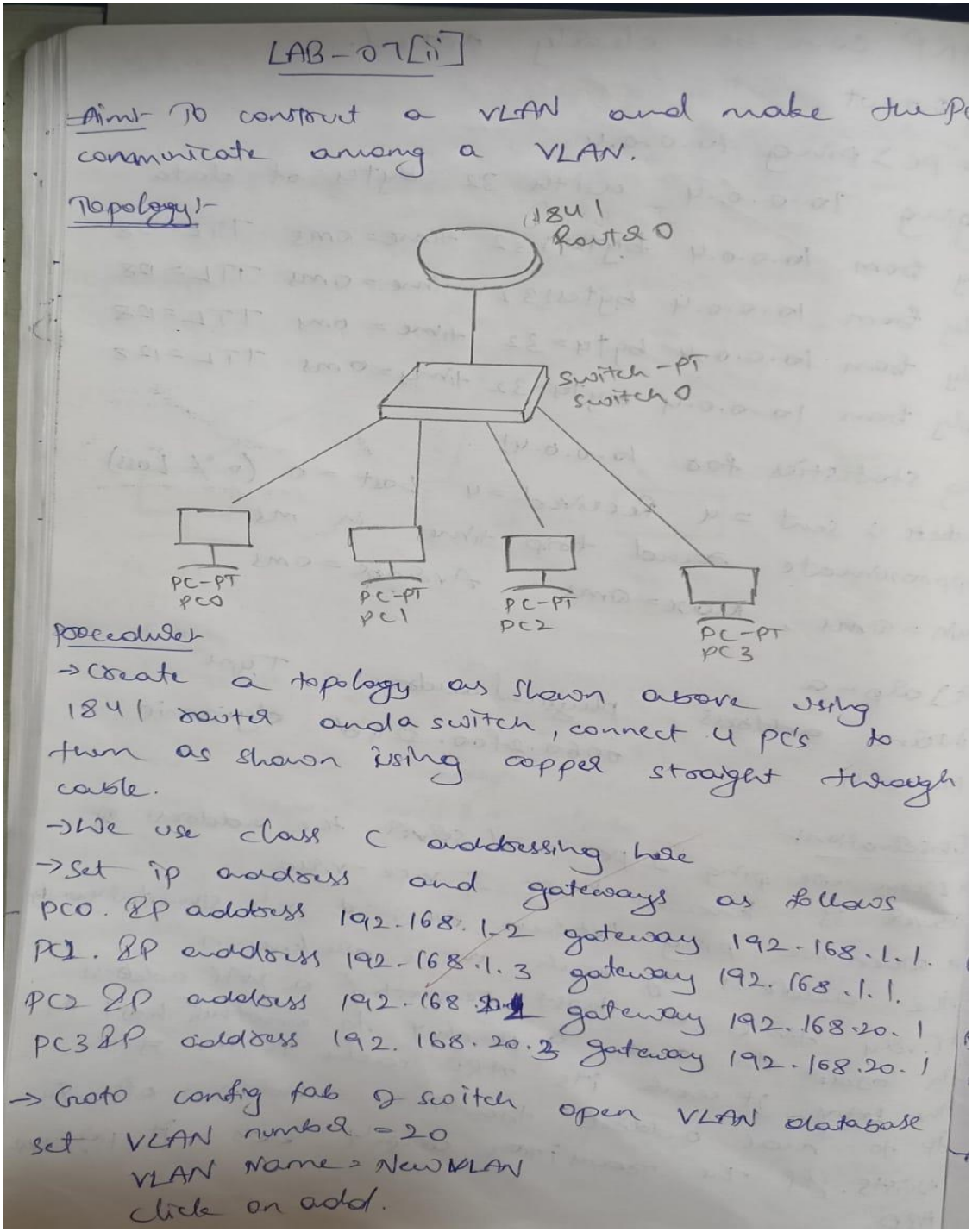



Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
ARP Table for Server0
IP Address
Hardware Address
Interface
10.0.0.2
00DG.D35A.5B4A
FastEthernet0
ARP Table for PC0
10.0.0.1
0001.C904.5457
ARP Table for PC2
10.0.0.3
0009.7C19.7260
ARP Table for PC1
10.0.0.4
0001.64A0.8ECB
Switch1
Physical
Config
CLI
IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet2/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet3/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/1, changed state to up
Switch>arp -a
Translating "arp-a"...domain server (255.255.255.255)
% Unknown command or computer name, or unable to find computer address
Switch>show mac address-table
Mac Address Table
Vlan Mac Address Type Ports
1 0001.64a0.8ecb DYNAMIC Fa2/1
1 0001.c904.5457 DYNAMIC Fa3/1
1 0009.7c19.7260 DYNAMIC Fa1/1
1 00d0.d35a.5b4a DYNAMIC Fa0/1
Switch>
Copy
Paste
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
Info
0.000
PC0
ICMP
Time: 00:12:06.033
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
In Progress
PC0
Server0
ICMP
0.000
N
0
(edit)
(delete)
Successful
PC1
PC2
ICMP
0.004
N
1
(edit)
(delete)

LAB 9

To construct a VLAN and make a pc communicate among VLAN.

OBSERVATION:



LAB-07[ii]

Aim:- To construct a VLAN and make the PC communicate among a VLAN.

Topology:-

Procedure:-

→ Create a topology as shown above using 1841 router and a switch, connect 4 PC's to them as shown using copper straight through cable.

→ We use class C addressing here

→ Set ip address and gateways as follows

PC0. IP address 192.168.1.2 gateway 192.168.1.1.
PC1. IP address 192.168.1.3 gateway 192.168.1.1.
PC2 IP address 192.168.20.2 gateway 192.168.20.1
PC3 IP address 192.168.20.3 gateway 192.168.20.1

→ Go to config tab of switch open VLAN database set VLAN number = 20
VLAN Name = NewVLAN
Click on add.

→ In switch go to fastethernet 5/0 and connect it to router and configure it.
select Trunk and choose 20, NewVLAN.
→ For f0/3 and f0/4 select 10 : NewLAN and keep access as it is.
→ open config table in router, go to VLAN database Add VLAN no. 10
→ In router, go to CLI mode.
fa 0/0
Router (config)# ip address 192.168.1.1 255.255.255.0
Router (config)# no shut.

Router (config)# interface fastethernet 0/0.1
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)# exit

Ping output:-

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=2ms TTL=127
Reply from 192.168.20.2 bytes=32 time=1ms TTL=127

Ping statistics for 192.168.20.2
packets sent=4 Recieved=3 Lost=1 (25% loss)
Approximate round trip in ms:
min=0ms Max=2ms Average=0ms.

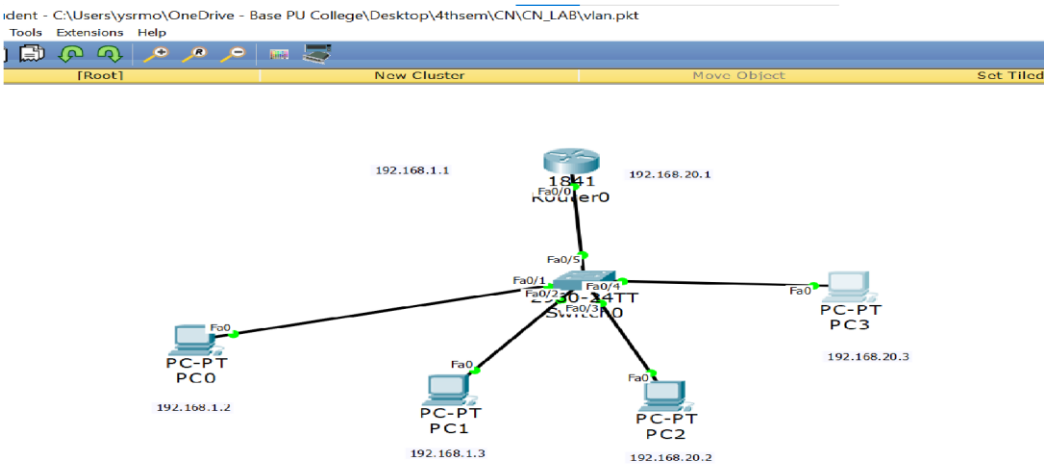
Observation:

→ We can observe that after VLAN is configured we can successfully ping PC2 (192.168.20.2) from PC0 (192.168.1.2).

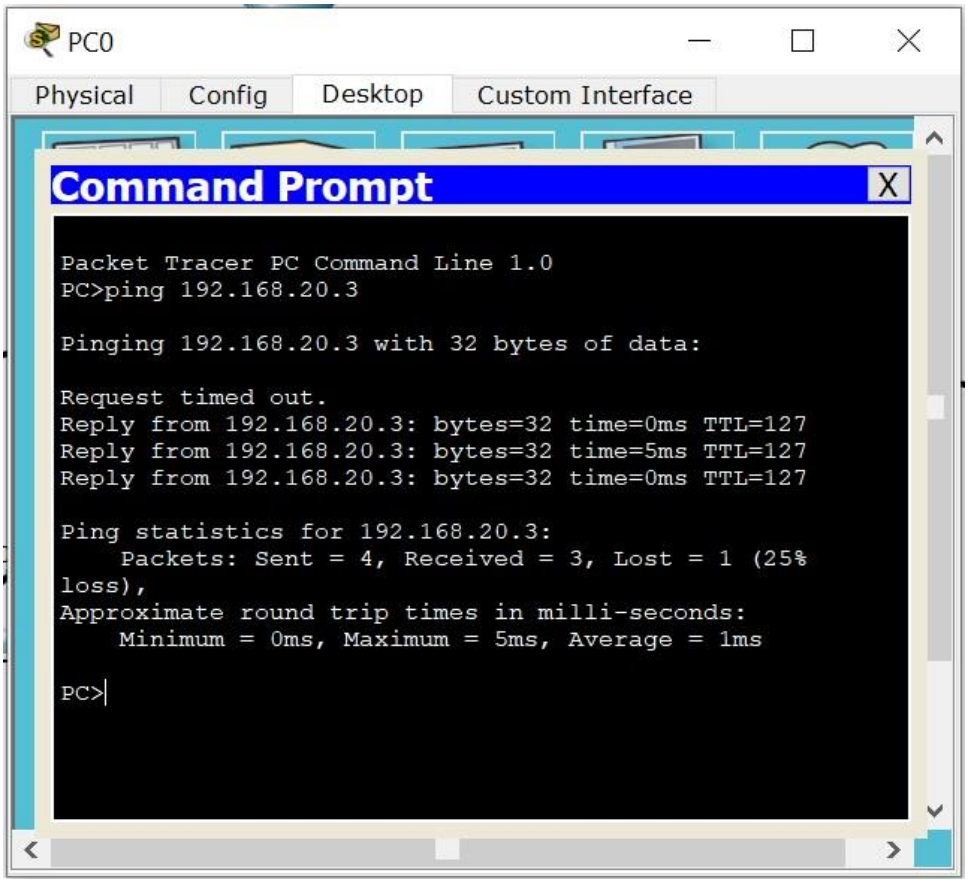
→ PC2 and PC3 are grouped together and communication among them is done via VLAN.

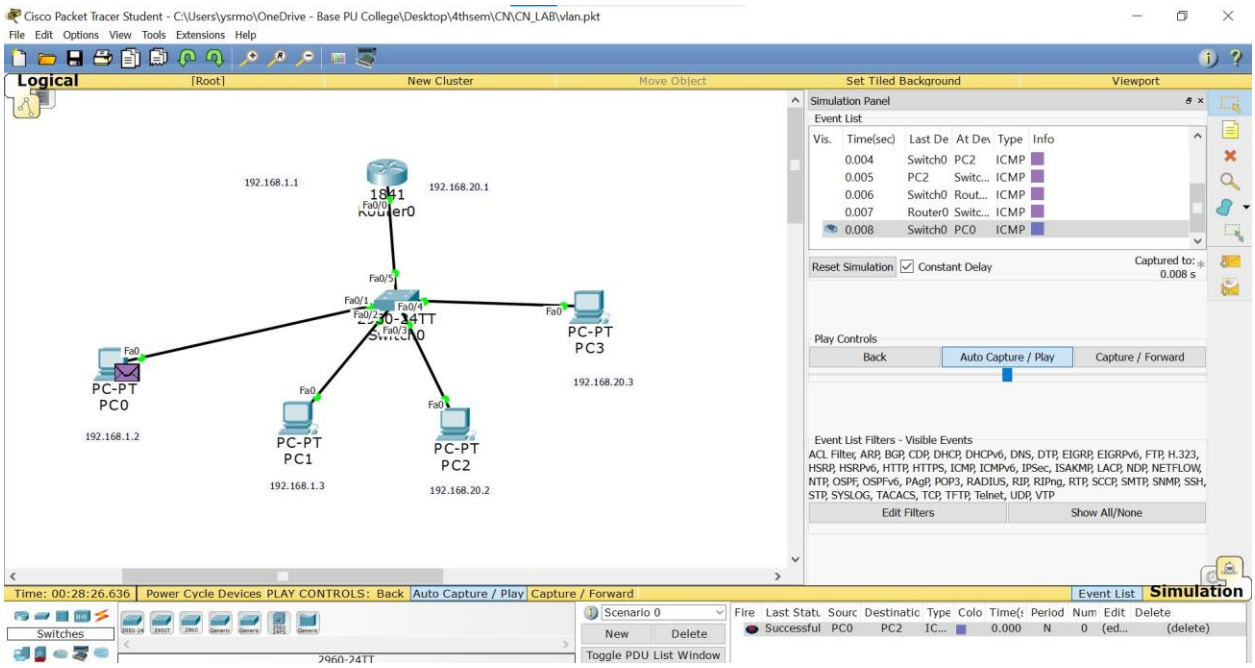
192.168.20.1 is a sub interface 0/0.1 created

TOPOLOGY:



OUTPUT:

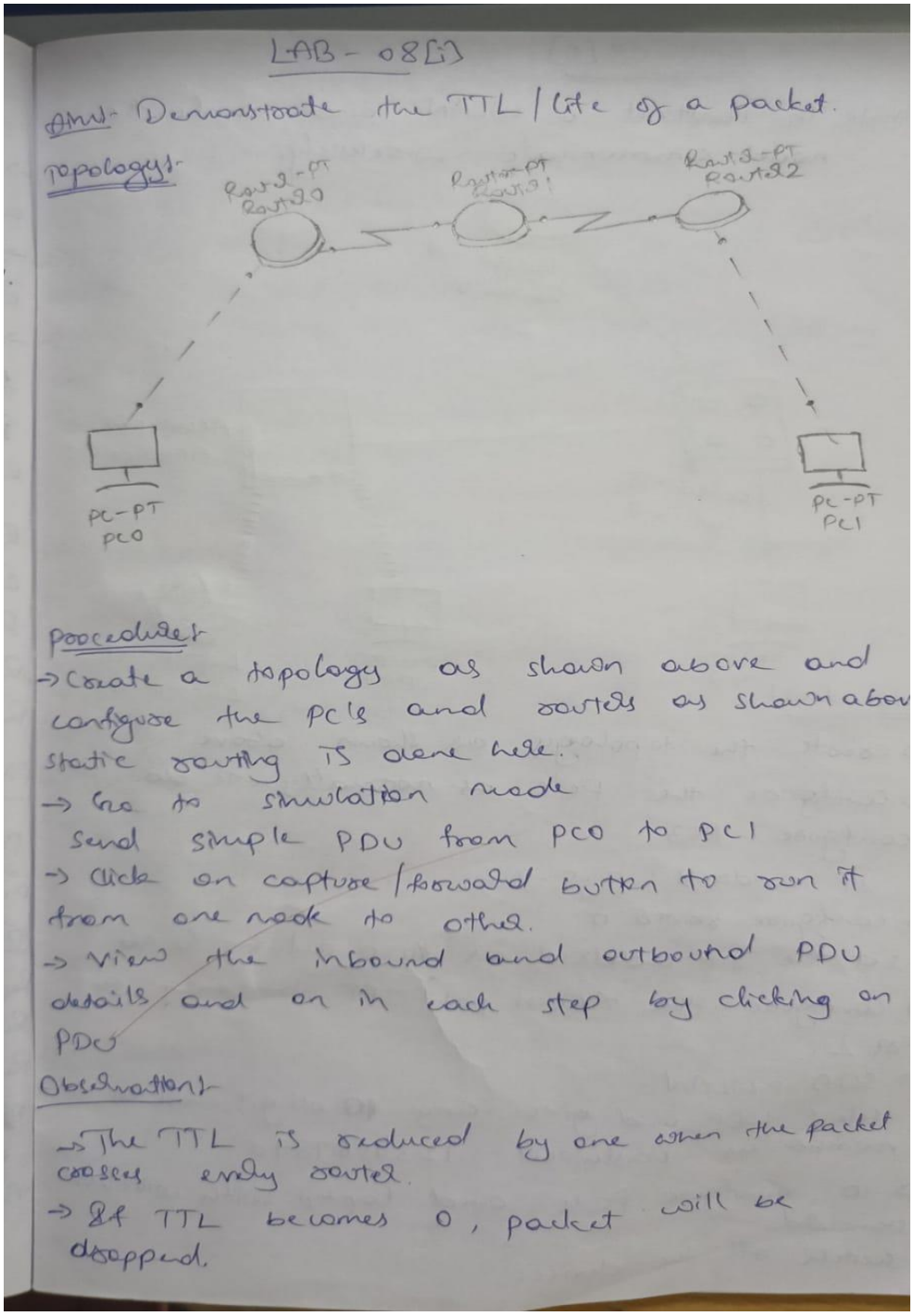



Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\vlan.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
192.168.1.1
1841
Router0
192.168.20.1
Fa0/5
Fa0/1
Fa0/2
Fa0/3
Fa0/4
2960-24TT
Switch0
Fa0
PC-PT
PC0
192.168.1.2
PC-PT
PC1
192.168.1.3
PC-PT
PC2
192.168.20.2
PC-PT
PC3
192.168.20.3
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.004 Switch0 PC2 ICMP
0.005 PC2 Switc... ICMP
0.006 Switch0 Rout... ICMP
0.007 Router0 Switc... ICMP
0.008 Switch0 PC0 ICMP
Reset Simulation
Constant Delay
Captured to: 0.008 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:28:26.636
Power Cycle Devices
PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Switches
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 PC2 IC... 0.000 N 0 (ed... (delete)

LAB 10

Demonstrate the TTL/ Life of a Packet.

OBSERVATION:



LAB - 08[i]

Aim:- Demonstrate the TTL / life of a packet.

Topology:-

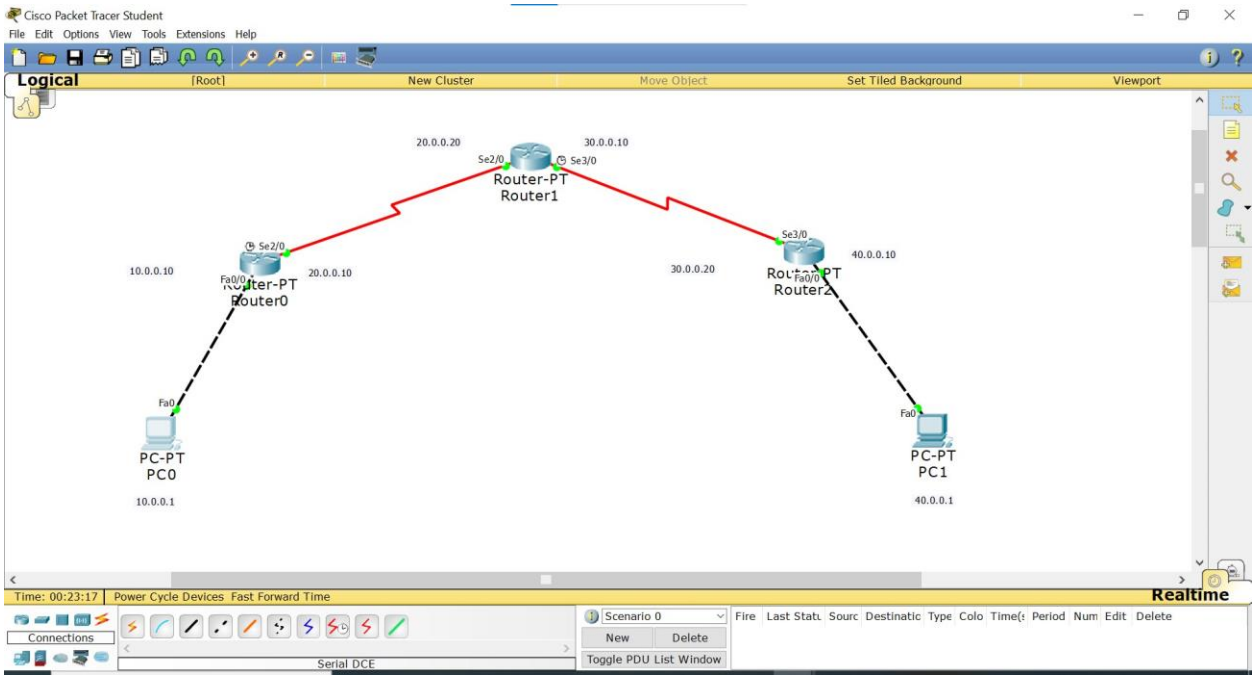
Procedure:-

→ Create a topology as shown above and configure the PC's and routers as shown abov
static routing is done here.
→ Go to simulation mode
Send simple PDU from PC0 to PC1
→ Click on capture / forward button to run it from one node to other.
→ View the inbound and outbound PDU details and on in each step by clicking on PDU

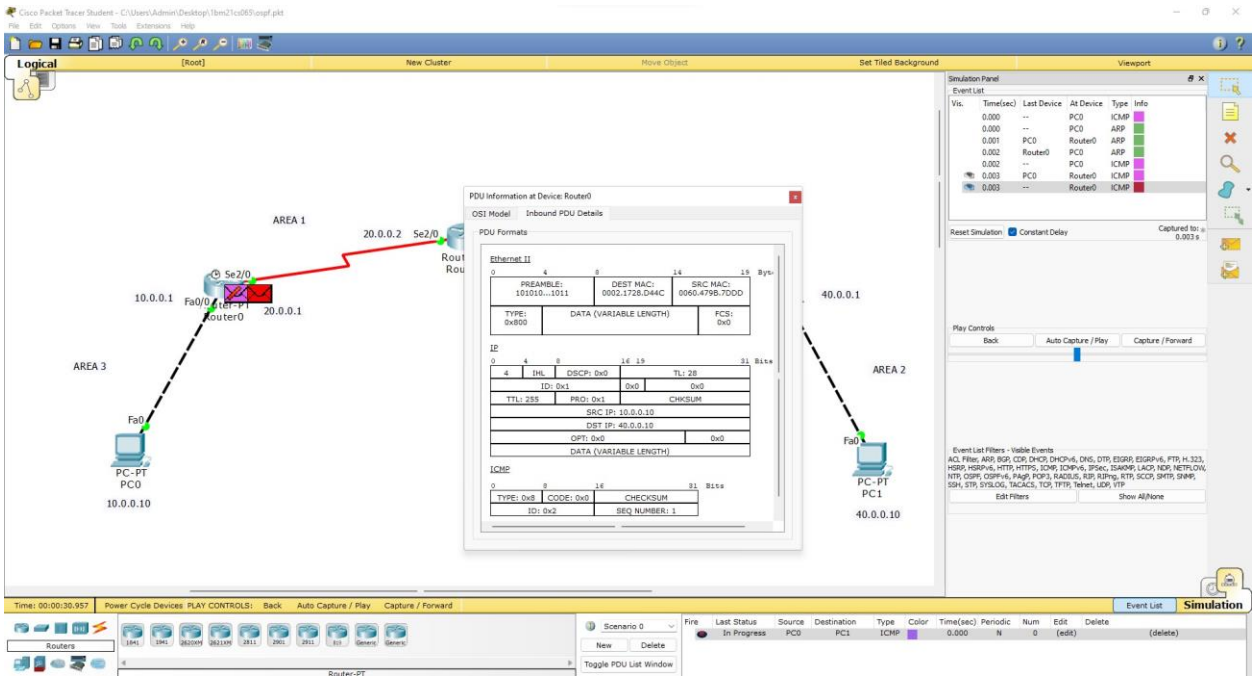
Observation:-

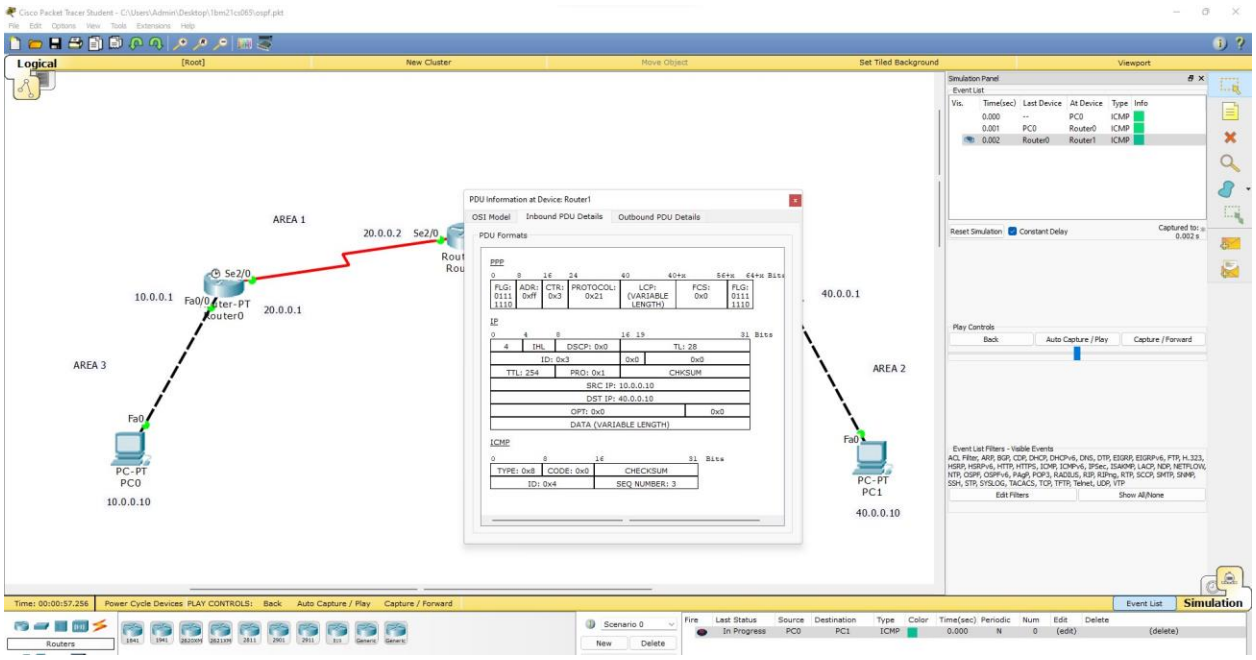
→ The TTL is reduced by one when the packet crosses every router.
→ If TTL becomes 0, packet will be dropped.

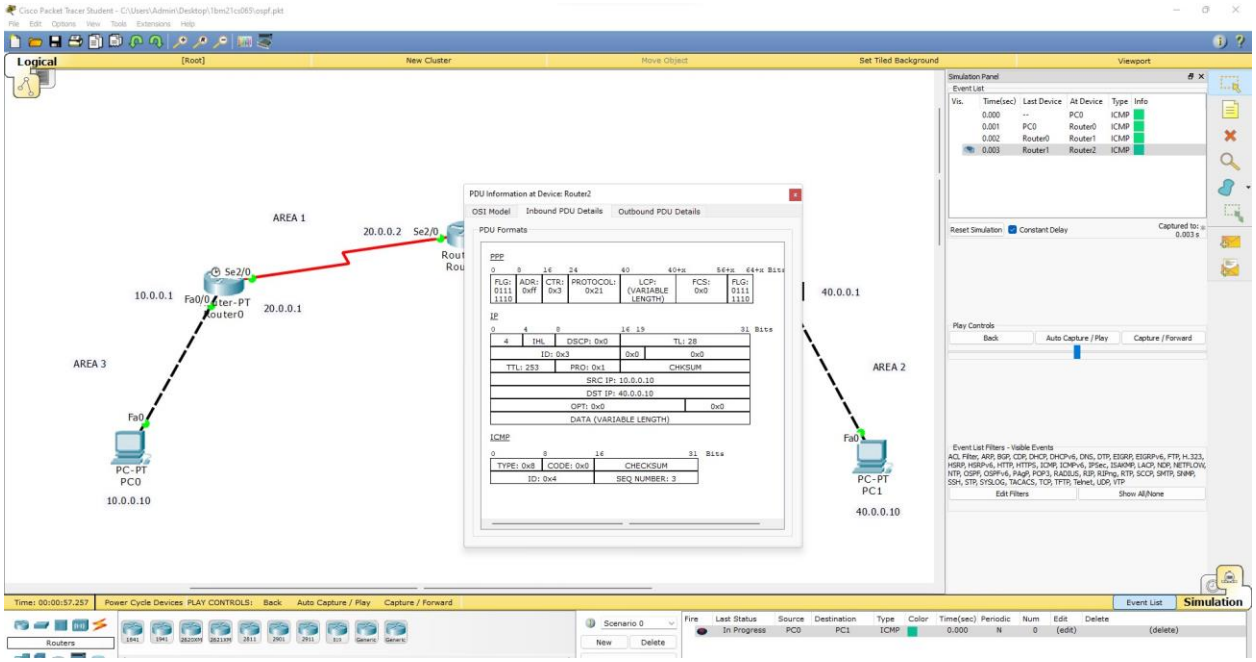
TOPOLOGY:

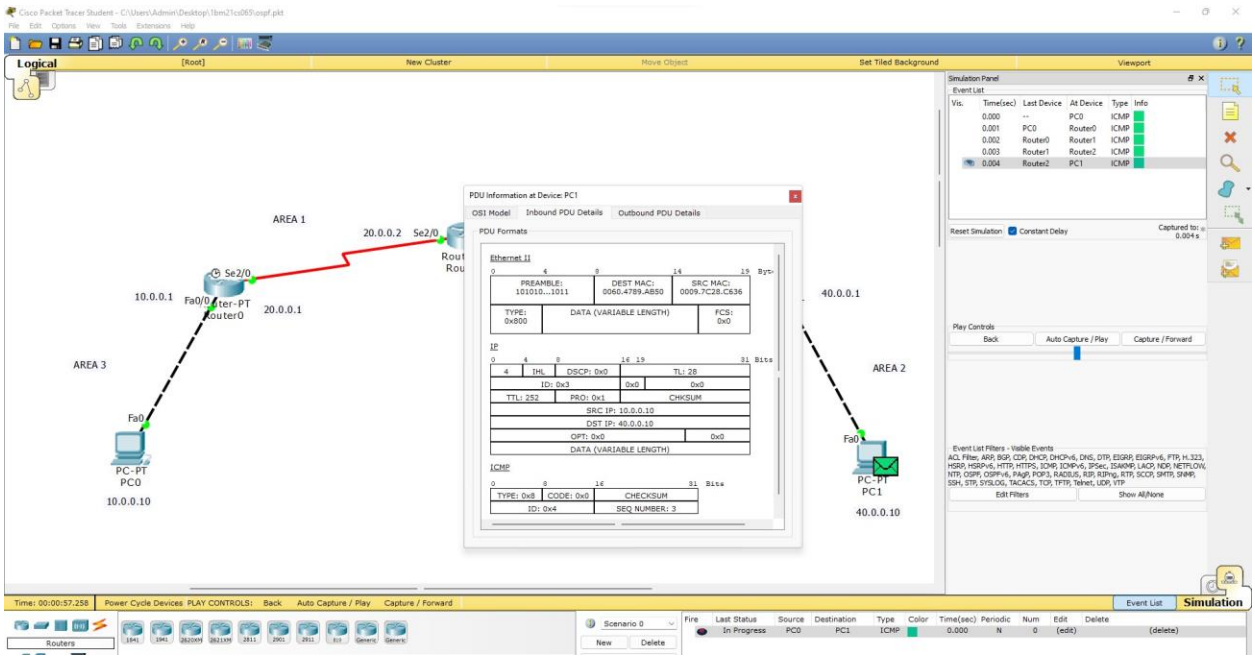


OUTPUT:




Logical
AREA 1
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
AREA 3
AREA 2
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
PC-PT
PC1
40.0.0.10
PDU Information at Device: Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
PPP
IP
ICMP
TTL: 254
SRC IP: 10.0.0.10
DST IP: 40.0.0.10
OPT: 0x0
DATA (VARIABLE LENGTH)
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Time: 00:00:57.256
Power Cycle Devices
PLAY CONTROLS:
Event List
Simulation

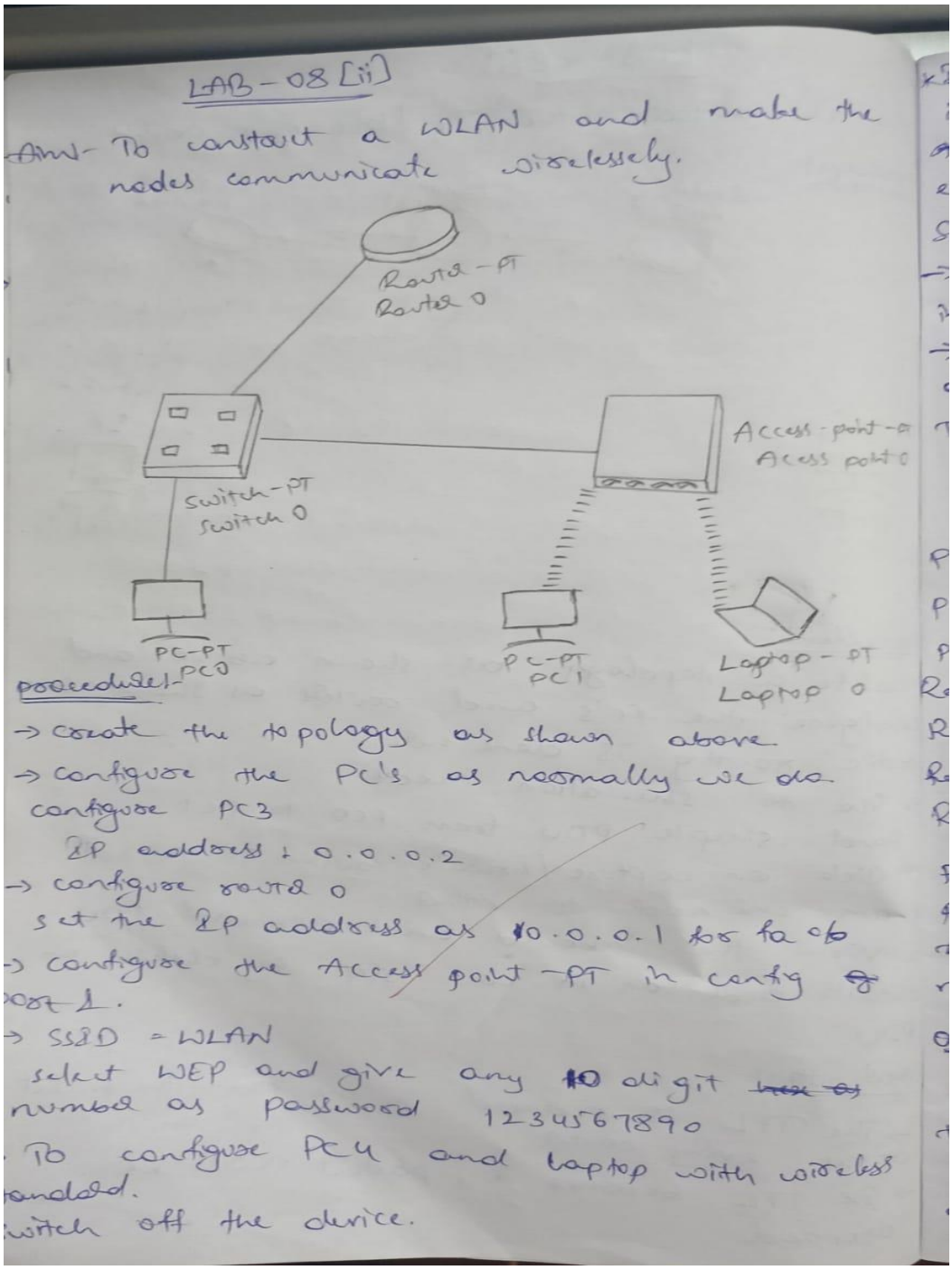

Logical
AREA 1
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
AREA 3
AREA 2
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
PC-PT
PC1
40.0.0.10
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
PPP
IP
ICMP
TTL: 253
SRC IP: 10.0.0.10
DST IP: 40.0.0.10
OPT: 0x0
DATA (VARIABLE LENGTH)
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Time: 00:00:57.257
Power Cycle Devices
PLAY CONTROLS:
Event List
Simulation


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
AREA 1
AREA 2
AREA 3
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
20.0.0.1
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
PC-PT
PC1
40.0.0.10
PDU Information at Device: PC1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 10101010...1011
DEST MAC: 0060.4789.AB50
SRC MAC: 0009.7C28.C636
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
SRC IP: 10.0.0.10
DST IP: 40.0.0.10
OPT: 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:00:57.258
Power Cycle Devices
PLAY CONTROLS:
Routers
Scenario 0
New
Delete
In Progress
ICMP
Simulation

LAB 11

To construct a WLAN and make the nodes communicate wirelessly

OBSERVATION:



*Drag the existing PT-HOST-NM-1AM to LHS to place it on its mentioned name.
*Drag the WMP300N wireless interface to empty port.
Switch on the device.
→ In config tabs off the device a new wireless interface will now become visible.
→ Now configure the SSID, WEP key, gateway and IP address of PC and laptop.
The SSID is set to WLAN
WEP key = 1234567890
Gateway = 10.0.0.1

ping output In PC0 go to command prompt

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 = 127
Reply from 10.0.0.4 bytes = 32 time = 15ms TTL = 127
Reply from 10.0.0.4 bytes = 32 time = 5ms TTL = 127
Reply from 10.0.0.4 bytes = 32 time = 12ms TTL = 127

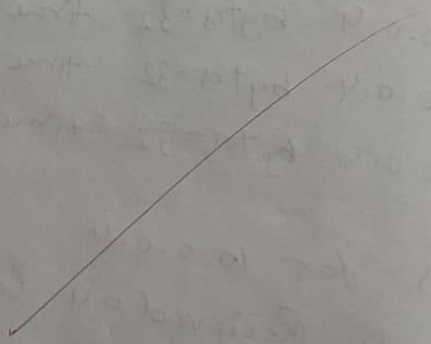
ping statistics for 10.0.0.4
Packets Sent = 4, Recieved = 4 Lost = 0 (0% loss)
Approximate round trip time in ms.
min = 5ms max = 24ms Average = 14

Observation:-

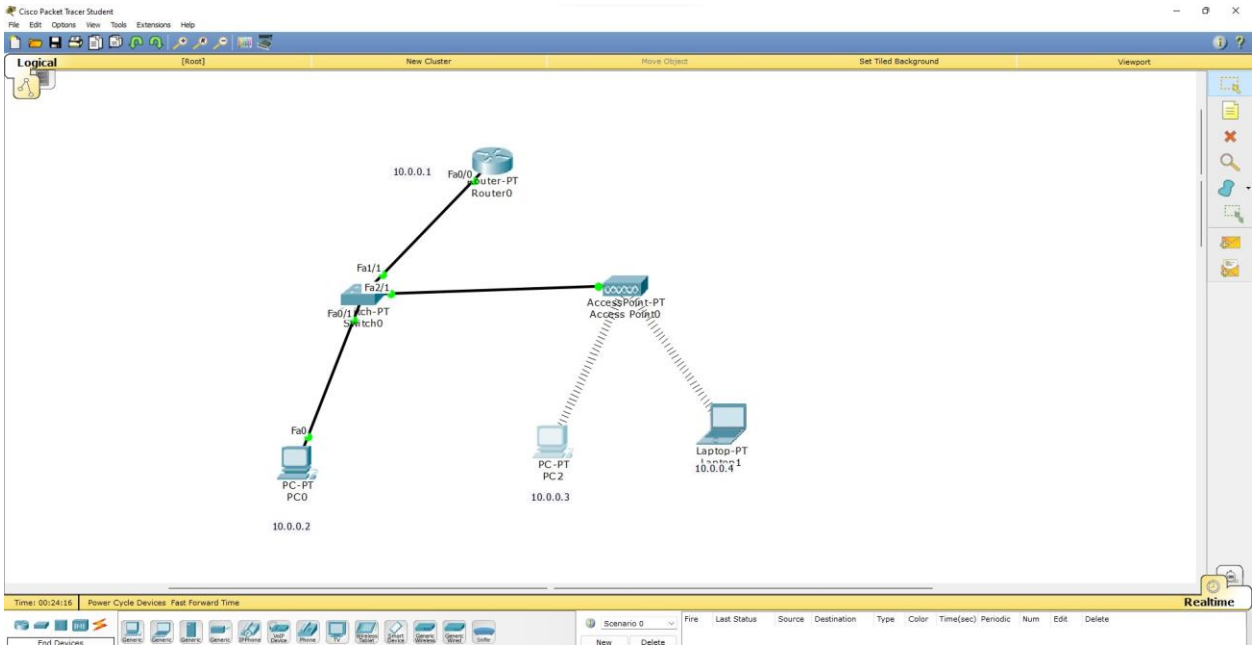
We can ping each and every device to the other device.

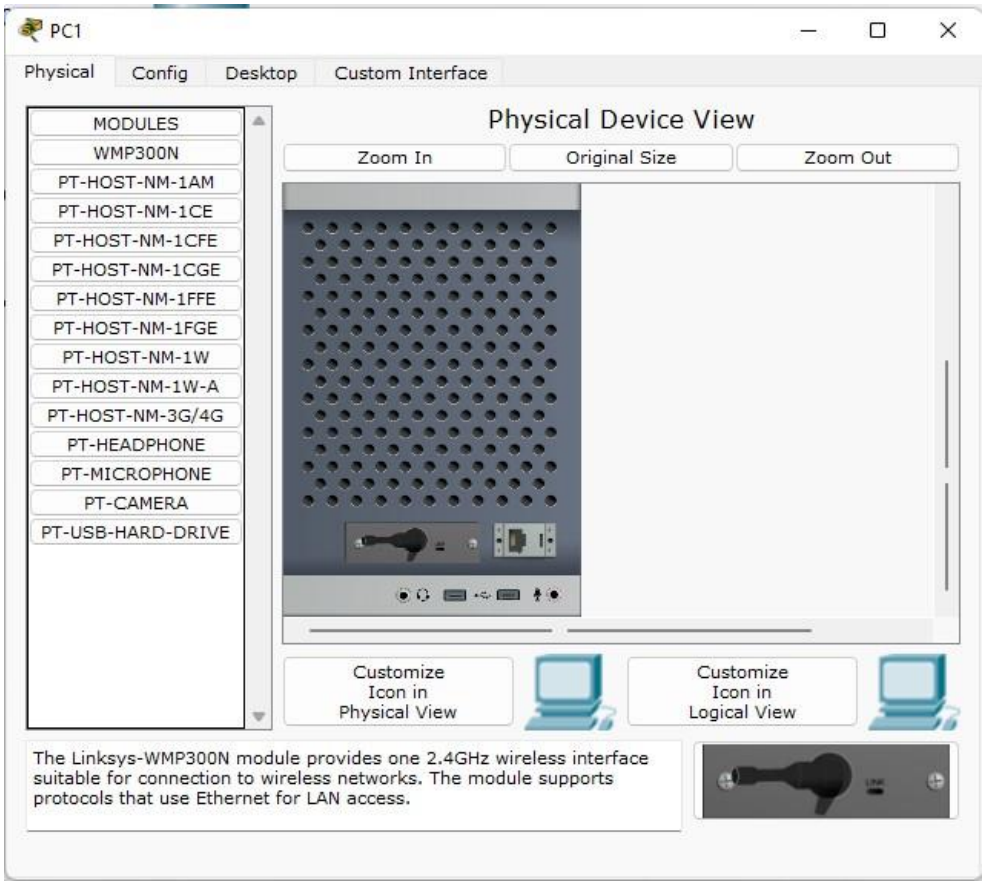
So we can observe that wireless connection is done successfully.

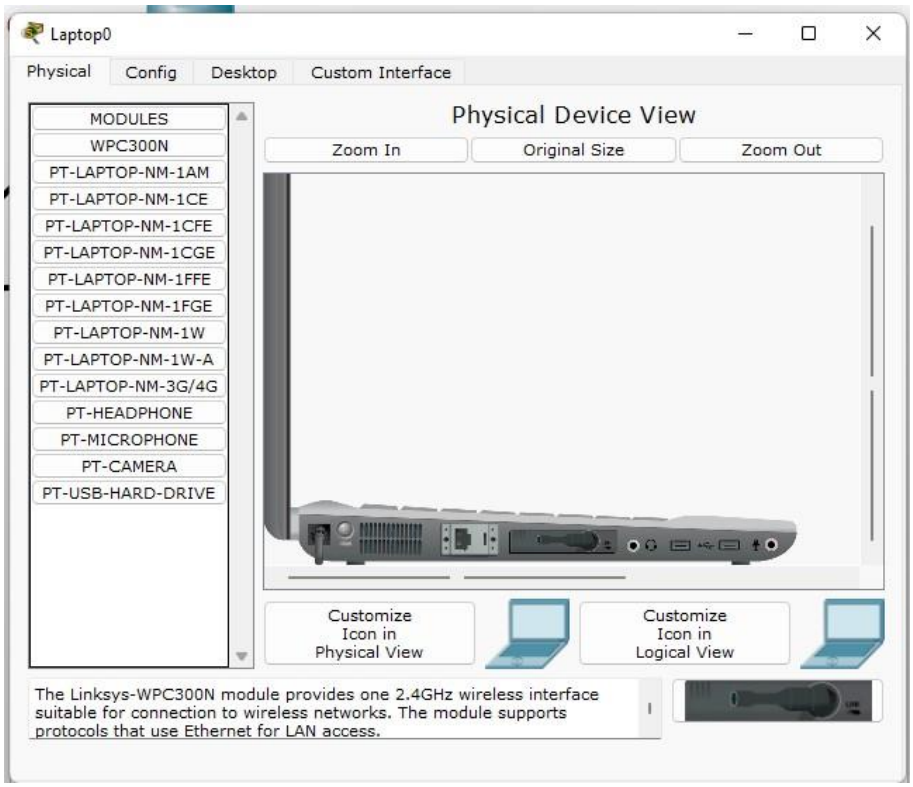
→ When connection is established these we can observe stripped lines connecting access points and end devices.



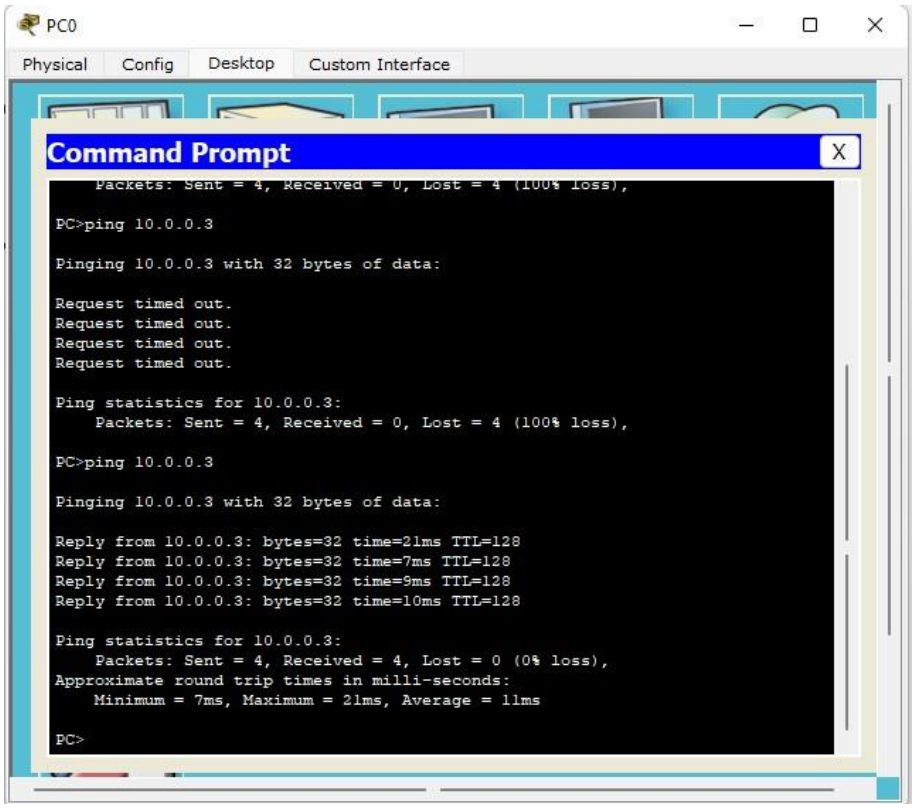
TOPOLOGY:


Logical
10.0.0.1
Fa0/0
Router-PT
Router0
Fa1/1
Fa2/1
Fa0/1
Switch0
Access Point-PT
Access Point0
Fa0
PC-PT
PC0
10.0.0.2
PC-PT
PC2
10.0.0.3
Laptop-PT
10.0.0.4
Realtime


PC1
Physical
Config
Desktop
Custom Interface
MODULES
WMP300N
PT-HOST-NM-1AM
PT-HOST-NM-1CE
PT-HOST-NM-1CFE
PT-HOST-NM-1CGE
PT-HOST-NM-1FFE
PT-HOST-NM-1FGE
PT-HOST-NM-1W
PT-HOST-NM-1W-A
PT-HOST-NM-3G/4G
PT-HEADPHONE
PT-MICROPHONE
PT-CAMERA
PT-USB-HARD-DRIVE
Physical Device View
Zoom In
Original Size
Zoom Out
Customize Icon in Physical View
Customize Icon in Logical View
The Linksys-WMP300N module provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.


Laptop0
Physical
Config
Desktop
Custom Interface
MODULES
WPC300N
PT-LAPTOP-NM-1AM
PT-LAPTOP-NM-1CE
PT-LAPTOP-NM-1CFE
PT-LAPTOP-NM-1CGE
PT-LAPTOP-NM-1FFE
PT-LAPTOP-NM-1FGE
PT-LAPTOP-NM-1W
PT-LAPTOP-NM-1W-A
PT-LAPTOP-NM-3G/4G
PT-HEADPHONE
PT-MICROPHONE
PT-CAMERA
PT-USB-HARD-DRIVE
Physical Device View
Zoom In
Original Size
Zoom Out
Customize Icon in Physical View
Customize Icon in Logical View
The Linksys-WPC300N module provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.

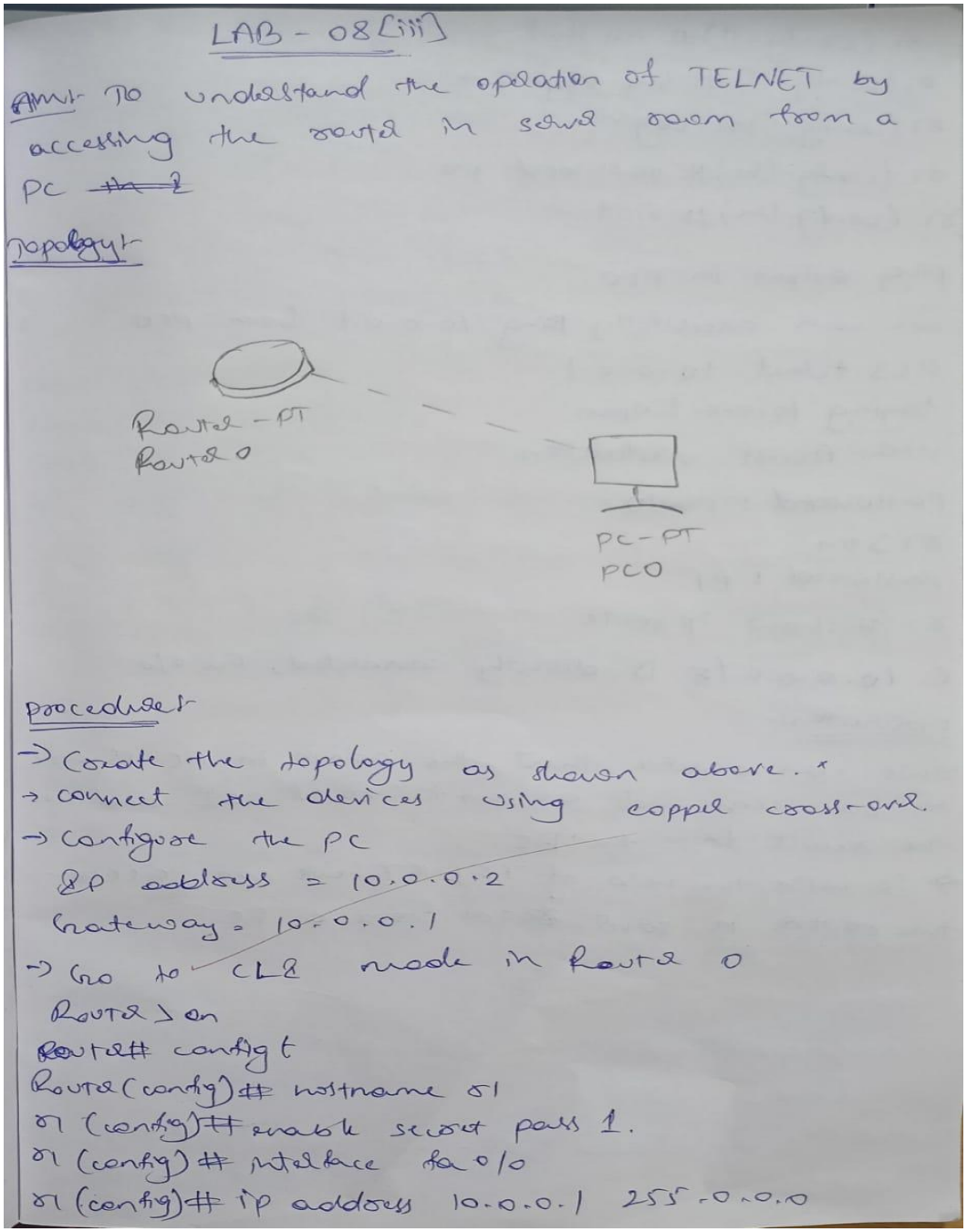
OUTPUT:


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
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=21ms TTL=128
Reply from 10.0.0.3: bytes=32 time=7ms TTL=128
Reply from 10.0.0.3: bytes=32 time=9ms TTL=128
Reply from 10.0.0.3: bytes=32 time=10ms 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 = 7ms, Maximum = 21ms, Average = 11ms
PC>

WEEK12

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

OBSERVATION:



R1 (config-if)# no shut
R1 (config-if)# line vty 0 4
R1 (config-if)# login
R1 (config-line)# password p0
R1 (config-line)# exit

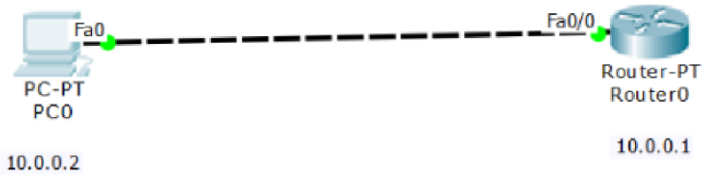
ping output in PC0
we can successfully ping 10.0.0.1 from PC0
PC> telnet 10.0.0.1
trying 10.0.0.1 ...open
User Access Verification
password : p0
R1>en
password : p1
R1# show ip route
C 10.0.0.0/8 is directly connected, Fa0/0

Observation:-

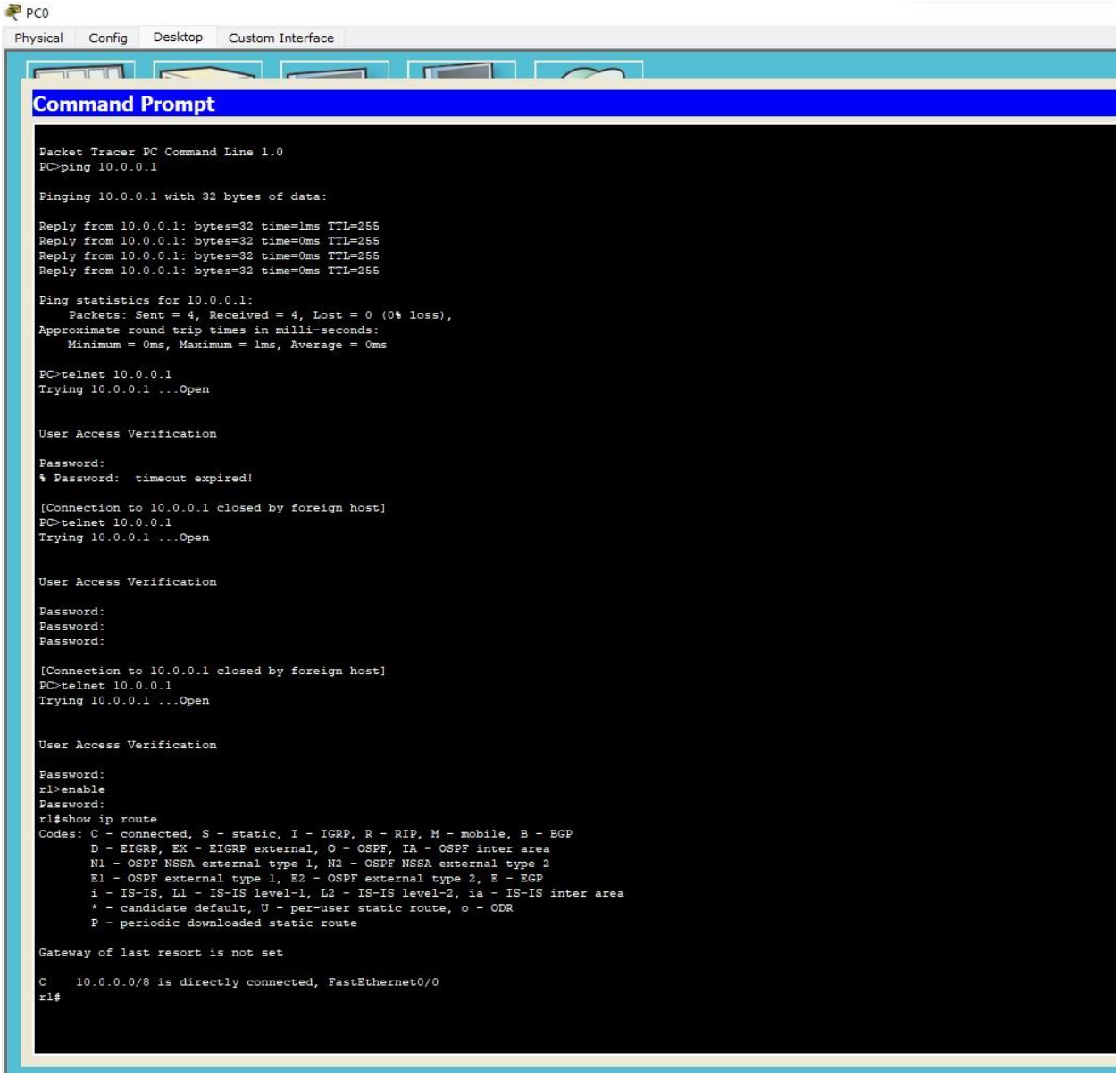
→ We can observe that the admin in PC is able to run commands as run in router CLI and see the result from the PC.

⇒ So with the help of TELNET, we can access the router in server room from a PC

TOPOLOGY:



OUTPUT:


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=0ms 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 = 1ms, Average = 0ms
PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open
User Access Verification
Password:
% Password: timeout expired!
[Connection to 10.0.0.1 closed by foreign host]
PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open
User Access Verification
Password:
Password:
Password:
[Connection to 10.0.0.1 closed by foreign host]
PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open
User Access Verification
Password:
r1>enable
Password:
r1#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
r1#

LAB 13 Program 1

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

CODE:

```
#include<stdio.h>#include<string.h>

#define N strlen(gen_poly) char data[28]; char check_value[28]; char
gen_poly[10]; int data_length,i,j;

void XOR(){

for(j = 1;j < N; j++) check_value[j] = (( check_value[j] == gen_poly[j])?'0':'1');}

void receiver(){
   printf("Enter the received data: "); scanf("%s",
   data); printf("Data received: %s", data); crc();
   for(i=0;(i<N-1) && (check_value[i]!='1');i++);
      if(i<N-1)
         printf("\nError detected\n\n");
      else
         printf("\nNo error detected\n\n");
}

void crc(){
   for(i=0;i<N;i++)
      check_value[i]=data[i];
   do{
      if(check_value[0]=='1')
         XOR();
      for(j=0;j<N-1;j++)
         check_value[j]=check_value[j+1];
      check_value[j]=data[i++];
```

```
    }while(i<=data_length+N-1);
}

int main()
{ printf("\nEnter data to be transmitted: ");
    scanf("%s",data); printf("\n Enter the
    Generating polynomial: ");
    scanf("%s",gen_poly);
    data_length=strlen(data);
    for(i=data_length;i<data_length+N-1;i++)
        data[i]='0';
    printf("\n Data padded with n-1 zeros : %s",data);
    crc();
    printf("\nCRC or Check value is : %s",check_value);
    for(i=data_length;i<data_length+N-1;i++)
    data[i]=check_value[i-data_length];
    printf("\n Final data to be sent : %s",data);
    receiver();
        return 0;
}
```

OUTPUT:

```
Enter data to be transmitted: 10001000000100001

 Enter the Generating polynomial: 1011

 Data padded with n-1 zeros : 10001000000100001000
CRC or Check value is : 100
 Final data to be sent : 10001000000100001100
Enter the received data: 10001000000100001100
Data received: 10001000000100001100
No error detected
```

```
Enter data to be transmitted: 10001000000100001

 Enter the Generating polynomial: 1011

 Data padded with n-1 zeros : 10001000000100001000
CRC or Check value is : 100
 Final data to be sent : 10001000000100001100
Enter the received data: 10010000000100001100
Data received: 10010000000100001100
Error detected
```

Program 2

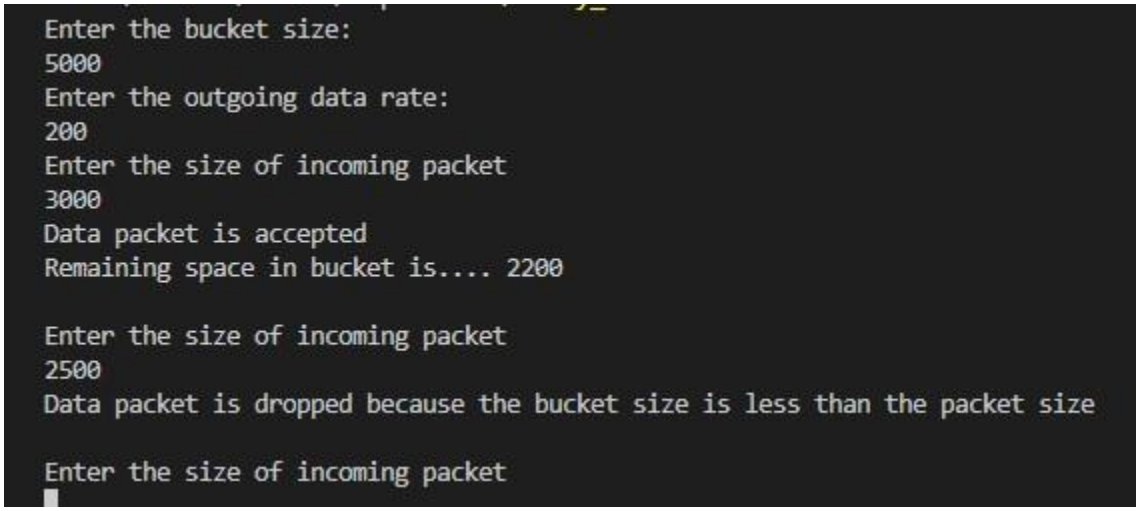
Write a program for congestion control using Leaky bucket algorithm.

CODE:

```
#include<stdio.h>
void main()
{ int b_size,d_rate,in_d_rate,rem_b_size;
   printf("Enter the bucket size:\n");
   scanf("%d",&b_size);
   rem_b_size=b_size; printf("Enter the
   outgoing data rate:\n");
   scanf("%d",&d_rate); while(1) {
   printf("Enter the size of incoming packet\n");
   scanf("%d",&in_d_rate);
   if(in_d_rate<=b_size)
   { if(in_d_rate<=rem_b_size)
      { rem_b_size=rem_b_size-in_d_rate;
      rem_b_size=rem_b_size+d_rate; printf("Data packet is
      accepted\n"); printf("Remaining space in bucket is....
      %d\n",rem_b_size); printf("\n");
      } else{ printf("Data packet is dropped because the bucket size is less than
      the packet
size\n");
      printf("\n");
   }
   }
   }
```

}

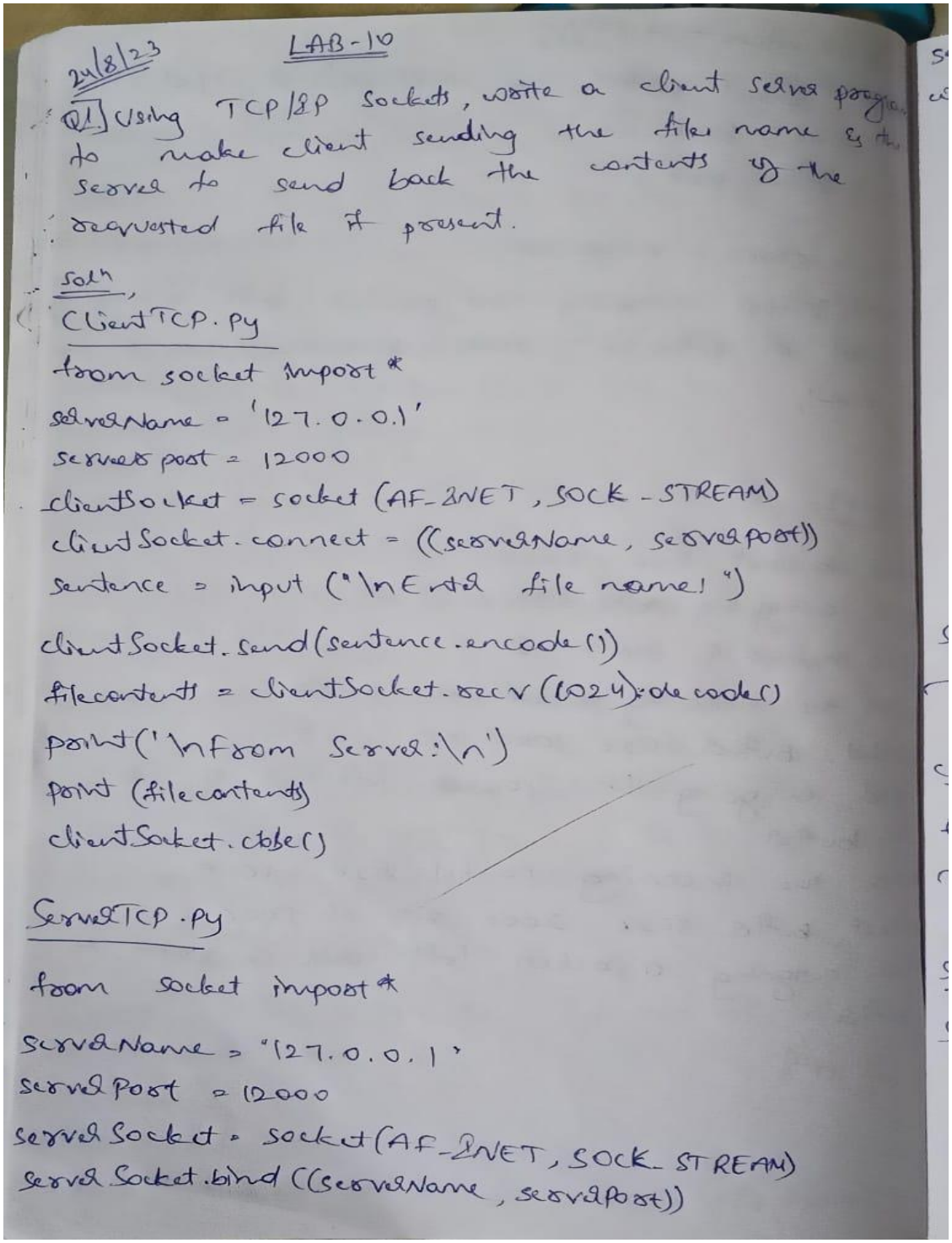
OUTPUT:


Enter the bucket size:
5000
Enter the outgoing data rate:
200
Enter the size of incoming packet
3000
Data packet is accepted
Remaining space in bucket is.... 2200
Enter the size of incoming packet
2500
Data packet is dropped because the bucket size is less than the packet size
Enter the size of incoming packet

LAB 14 Program 1

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.

Observation:



24/8/23 LAB-10

Q1] Using TCP/IP sockets, write a client server program to make client sending the file name & the server to send back the contents of the requested file if present.

Soln,

ClientTCP.py

```
from socket import *
serverName = '127.0.0.1'
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName, serverPort))
sentence = input("\nEnter file name:")
clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print('\nfrom Server:\n')
print(filecontents)
clientSocket.close()
```

ServerTCP.py

```
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('\n Sent contents of ' + sentence)
    file.close()
    connectionSocket.close()
```

Output

Server side:

The server is ready to receive

client side:

Enter file name: serverTCP.py

The contents of file serverTCP is displayed here.

server side:-

Sent contents of serverTCP.py.

SOLUTION:

ClientTCP.py from socket import * serverName =
'127.0.0.1' serverPort = 12000 clientSocket =
socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName,serverPort))
sentence = input("\nEnter file name: ")

clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print ('\nFrom Server:\n') print(filecontents)
clientSocket.close()

ServerTCP.py

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)

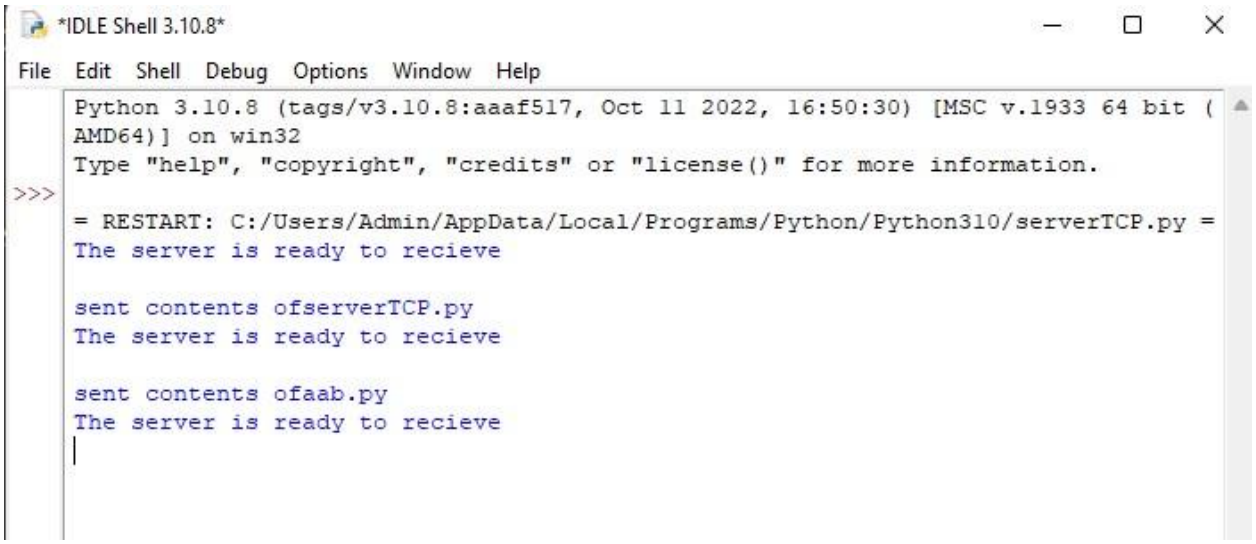
    connectionSocket.send(l.encode())
    print ('\nSent contents of ' + sentence)
    file.close() connectionSocket.close()

OUTPUT:

Client:

```
>>>
= RESTART: C:/Users/Admin/AppData/Local/Programs/Python/Python310/clientTCP.py =

Enter file name:aab.py

From Server:

Python 3.10.8 (tags/v3.10.8:aaaf517, Oct 11 2022, 16:50:30) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
class Node:
    def _init_(self,data):
        self.data=data
        self.left=None
        self.right=None
        self.height=1

class AVL Tree:
    def getHeight(self,root):
        if not root:
            return 0
        return root.height

    def getBalance(self,root):
        if not root:
            return 0
        return self.getHeight(root.left)-self.getHeight(root.right)

    def rightRotate(self,z):
        y=z.left
        T3=y.right

        y.right=z
        z.left=T3

        z.height=1+max(self.getHeight(z.left),self.getHeight(z.right))
        y.height=1+max(self.getHeight(y.left),self.getHeight(y.right))

        return y

    def insert(self,root,data):
        if not root:
            return Node(data)
        if data < root.data
            root.left=self.insert(root.left,data)
        else:
            root.right=se
>>>
```

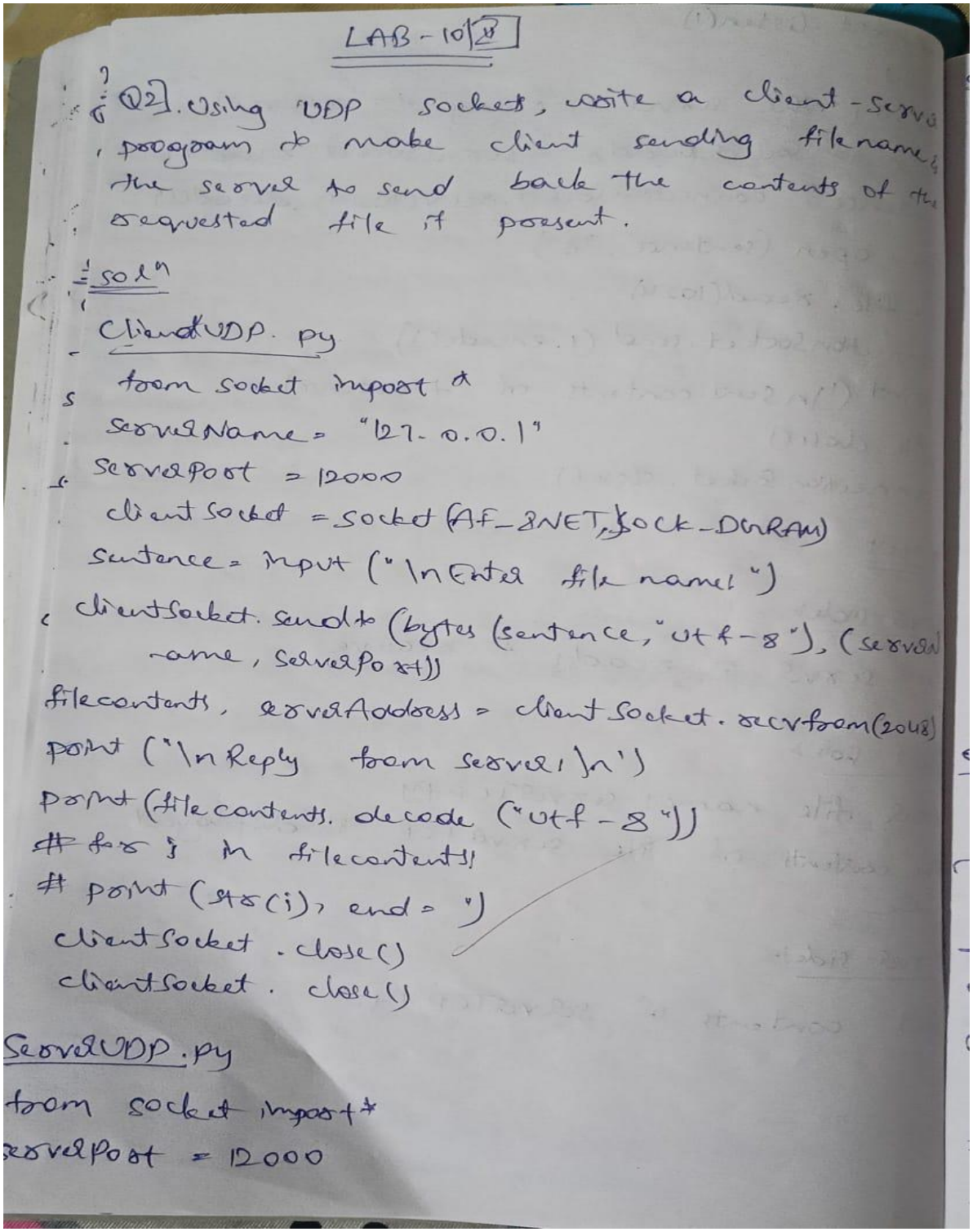
Server:



Program 2

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.

Observation:



LAB - 10

Q2]. Using UDP sockets, write a client-server program to make client sending filename & the server to send back the contents of the requested file if present.

Soln

ClientUDP.py

```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_DGRAM)
sentence = input("\nEnter file name: ")
clientSocket.sendto(bytes(sentence,"utf-8"), (serverName, serverPort))
fileContents, serverAddress = clientSocket.recvfrom(2048)
print("\nReply from server:\n")
print(fileContents.decode("utf-8"))
# for i in fileContents:
# print(str(i), end = '')
clientSocket.close()
clientSocket.close()
```

ServerUDP.py

```
from socket import *
serverPort = 12000
```

```
serverSocket = socket(AF_INET,SOCK_DGRAM)
serverSocket.bind(("127.0.0.1",serverPort))
print("The server is ready to receive")
while 1:
sentence, clientAddress = serverSocket.recvfrom(2048)
sentence = sentence.decode("utf-8")
file = open(sentence,"r")
con = file.read(2048)
serverSocket.sendto(bytes(con,"utf-8"),clientAddress)
print("\n Sent contents of ", end = ' ')
print(sentence)
# for i in sentence:
# print(str(i), end = ")
file.close()
```

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output

server side

The server is ready to recieve.

client side

Data file name : serverUDP.py.

The contents of the file serverUDP are displayed here.

server side

Sent contents of serverUDP.py.

SOLUTION:

ClientUDP.py from socket import * serverName = "127.0.0.1"

serverPort = 12000 clientSocket = socket(AF_INET,

SOCK_DGRAM) sentence = input("\nEnter file name: ")

clientSocket.sendto(bytes(sentence,"utf-8"),(serverName, serverPort))

filecontents,serverAddress = clientSocket.recvfrom(2048)
print ('\nReply from Server:\n') print
(filecontents.decode("utf-8")) # for i in filecontents:
   # print(str(i), end = '')
clientSocket.close()
clientSocket.close()

ServerUDP.py

from socket import * serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort))
print ("The server is ready to receive")
while 1:
    sentence, clientAddress =
    serverSocket.recvfrom(2048) sentence =
    sentence.decode("utf-8") file=open(sentence,"r")
    con=file.read(2048)
    serverSocket.sendto(bytes(con,"utf-8"),clientAddress)
    print ('\nSent contents of ', end = ' ') print (sentence)
   # for i in sentence:

```
    # print (str(i), end = '')
  file.close()
```

OUTPUT:

Client:

```
= RESTART: C:/Users/Admin/AppData/Local/Programs/Python/Python310/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))
print ("The server is ready to receive")
while 1:
     sentence, clientAddress = serverSocket.recvfrom(2048)
     sentence = sentence.decode("utf-8")
     file=open(sentence,"r")
     con=file.read(2048)

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

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

>>>
```

Server:

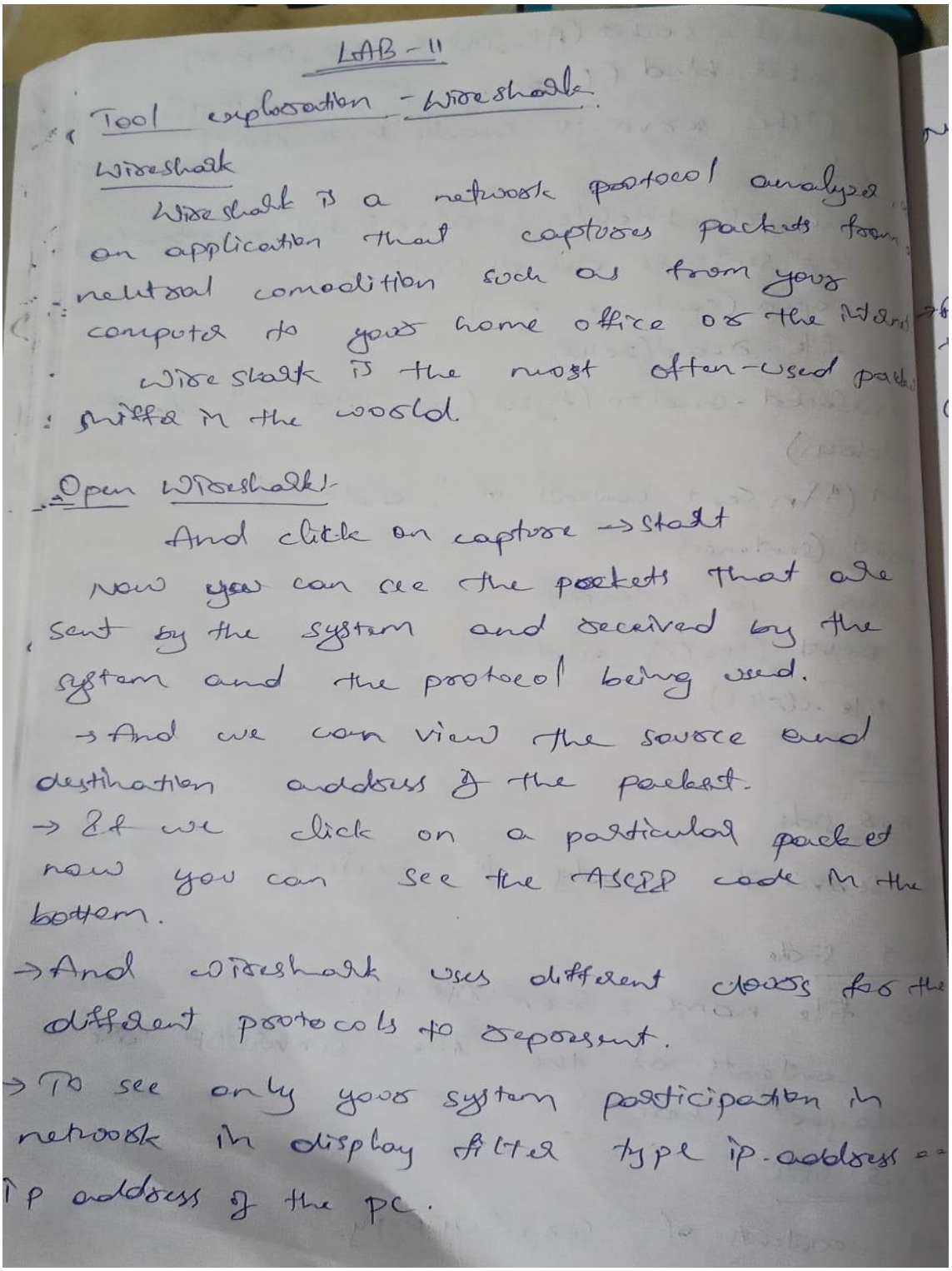
```
>>>
= RESTART: C:/Users/Admin/AppData/Local/Programs/Python/Python310/serverUDP.py =
The server is ready to receive

Sent contents of  serverUDP.py
```

LAB 15

Tool Exploration -Wireshark

Observation:



LAB - 11

Tool exploration - Wireshark

Wireshark

Wireshark is a network protocol analyzer, an application that captures packets from a network condition such as from your computer to your home office or the Internet. Wireshark is the most often-used packet sniffer in the world.

Open Wireshark.

And click on capture → start

Now you can see the packets that are sent by the system and received by the system and the protocol being used.

→ And we can view the source and destination address of the packet.

→ If we click on a particular packet now you can see the ASCII code in the bottom.

→ And Wireshark uses different colors for the different protocols to represent.

→ To see only your system participation in network in display filter type ip.address == IP address of the PC.

Ex:- Ipaddress = 10.124.7.1

Note:- To know ip address of the system open cmd & type ipconfig
you can now see the ip address of your system.

And we can even filter packets by the type of the protocol.

Goto to analyze & display filters to see the filters to stop capturing go to capture & click on stop.

To colors packet best go to view and click on colorize packet list.