VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

COMPUTER NETWORKS

Submitted by

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(1BM21CS277)

in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
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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 **Goutham S Pujar (1BM21CS277),** who is a 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 **Computer Networks - (22CS4PCCON)** work prescribed for the said degree.

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BMSCE, Bengaluru

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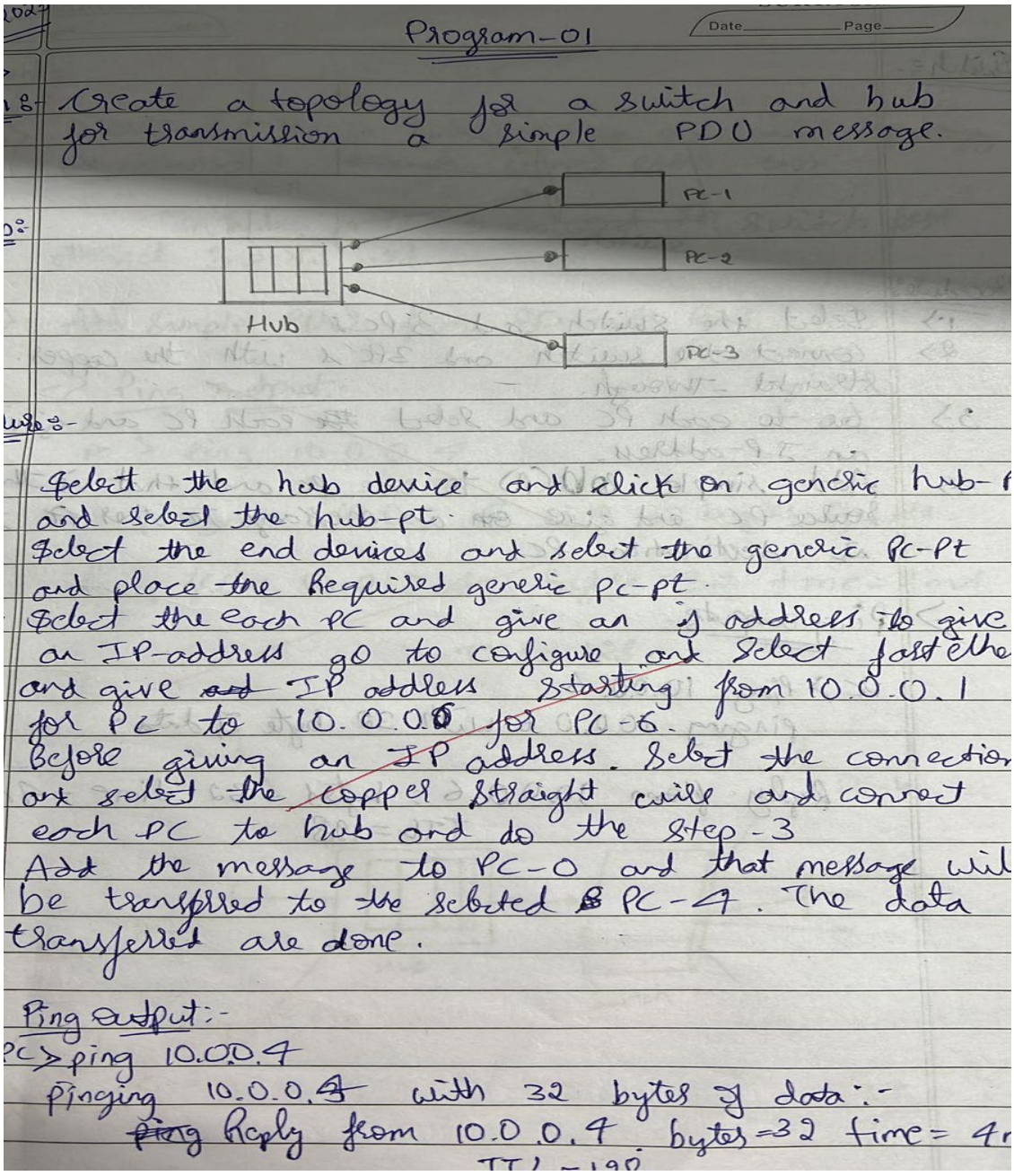
WEEK 1

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:



Program-01

Date Page

Aim:- Create a topology for a switch and hub for transmission a simple PDU message.

Procedure:-

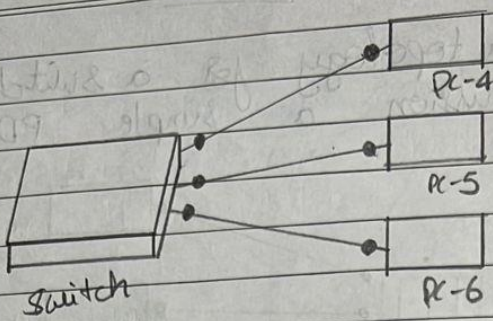
Select the hub device and click on generic hub-
and select the hub-pt.
Select the end devices and select the generic PC-Pt and place the Required generic pc-pt.
Select the each PC and give an ip address to give an IP-address go to configure and select fast eth and give IP address starting from 10.0.0.1 for PC to 10.0.0.6 for PC-6.
Before giving an IP address. Select the connection and select the copper straight cable and connect each PC to hub and do the step-3
Add the message to PC-0 and that message will be transferred to the selected PC-4. The data transferred are done.

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=4



Rules:-

1) Select the switch and 3-PC's
2) Connect the switch and 3PC's with the copper. Straight-Through.
3) Go to each PC and Select each PC and give an IP-address.
Add simple PDU (P) to one PC and that is the Source PC and give an message to other PC that is destination PC.

Ping outputs:-

PC > Ping 10.0.0.6

Pinging 10.0.0.6 with 32 byte of data:

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

Date Page

1) previously drawn hub-topology and switch topology are connected through copper cross ones.

In hub ports 3 is used in switch fast ethernet 3.1 is used.

2) Add simple PDU from PDC to PC3.

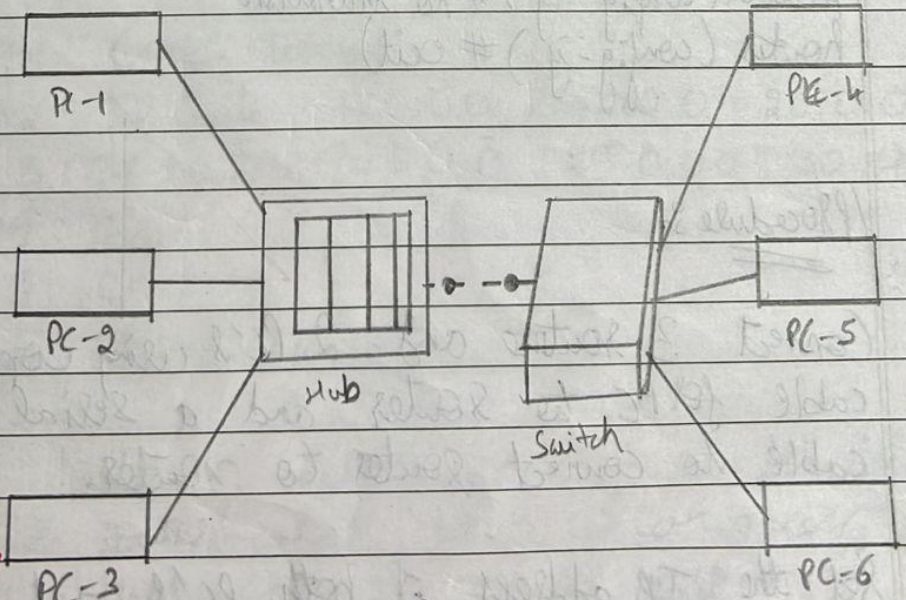
-> Ping output:

PC > ping 10.0.0.4

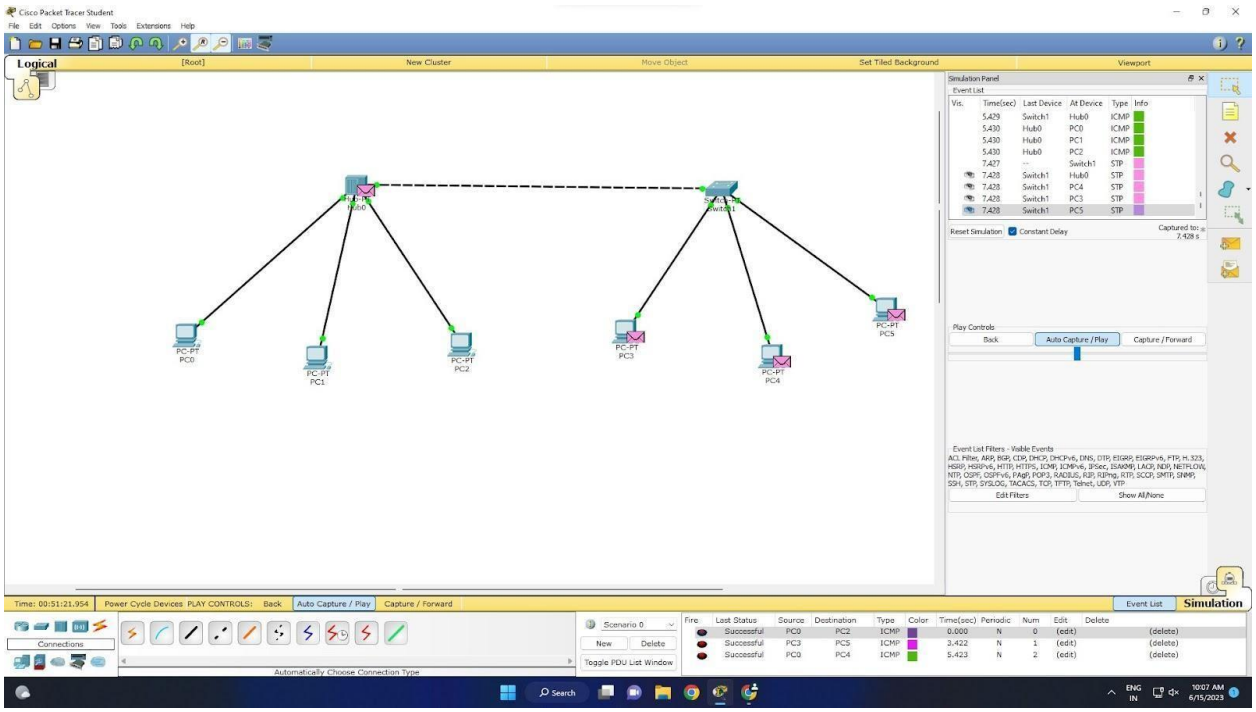
Pinging 10.0.0.4 with 32 bytes of data.

Reply from 10.0.0.4: bytes=32 time=1ms

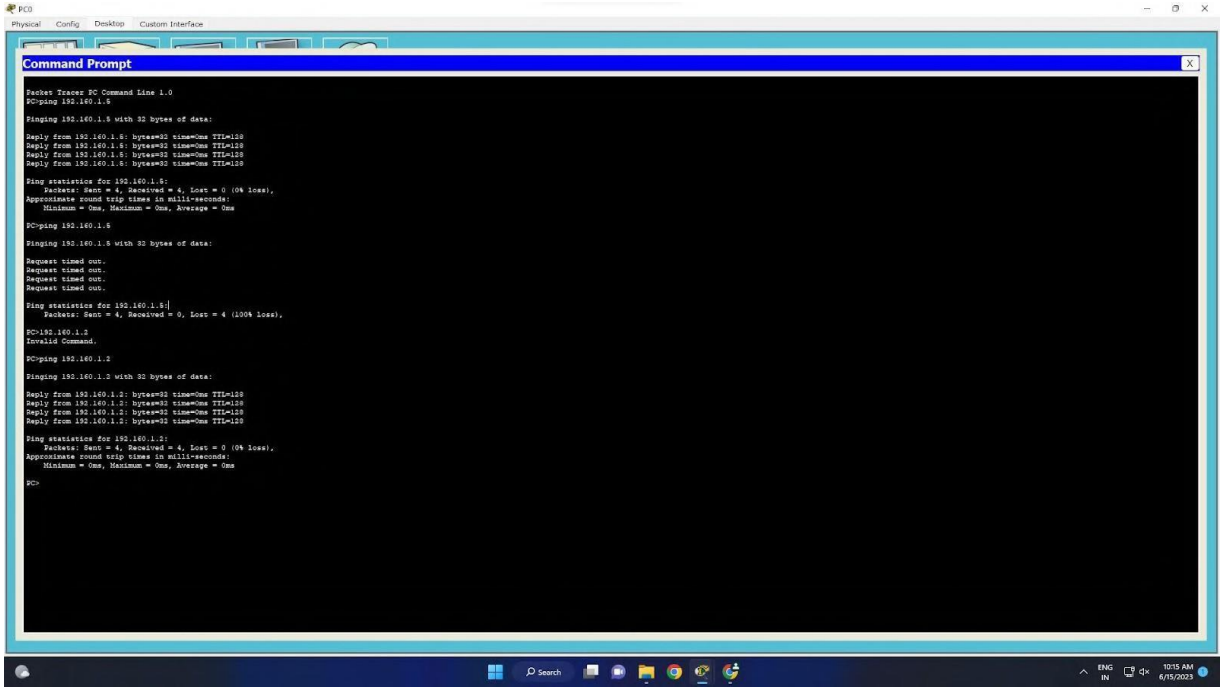
TTL=128.

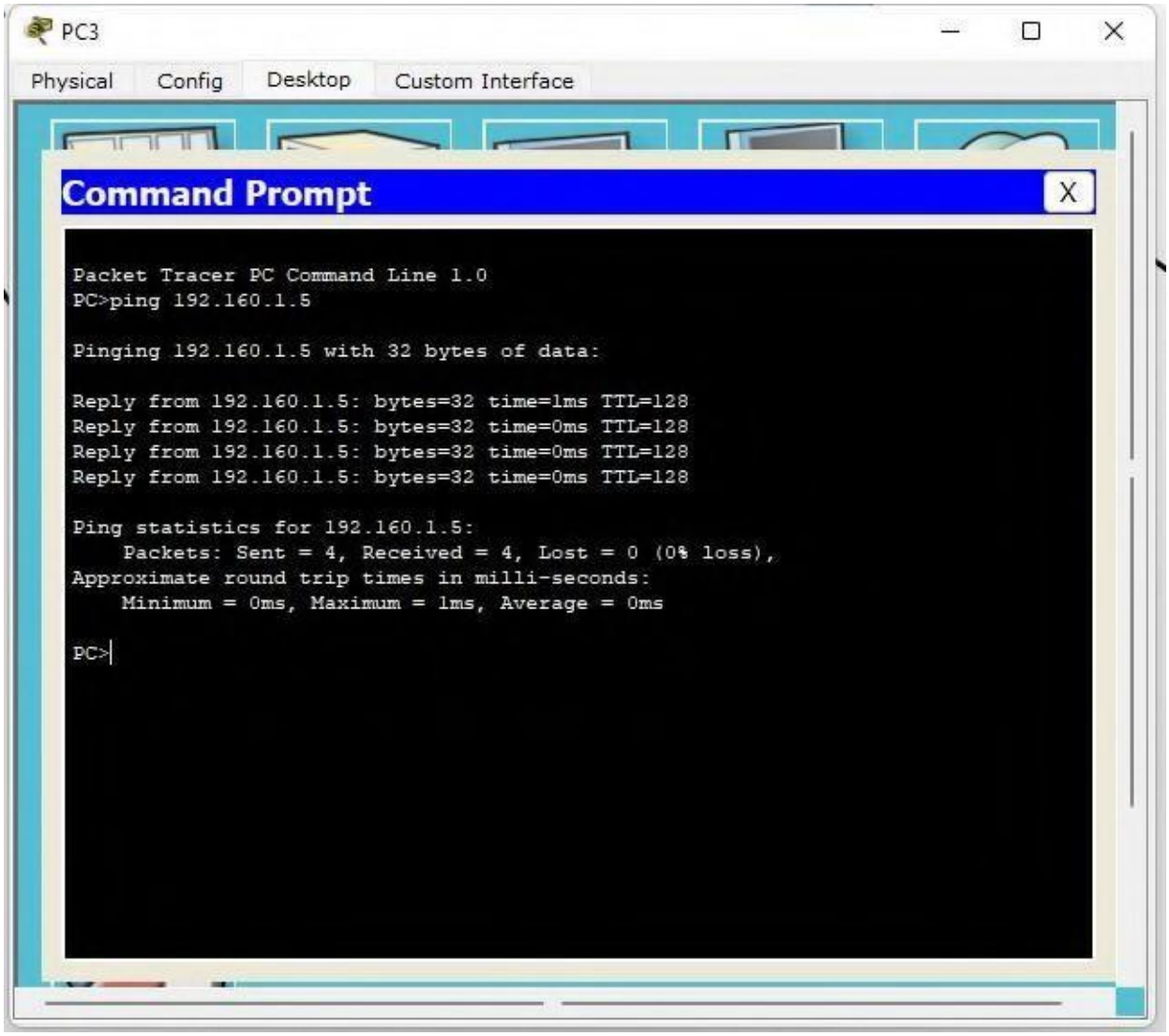


TOPOLOGY:



OUTPUT:

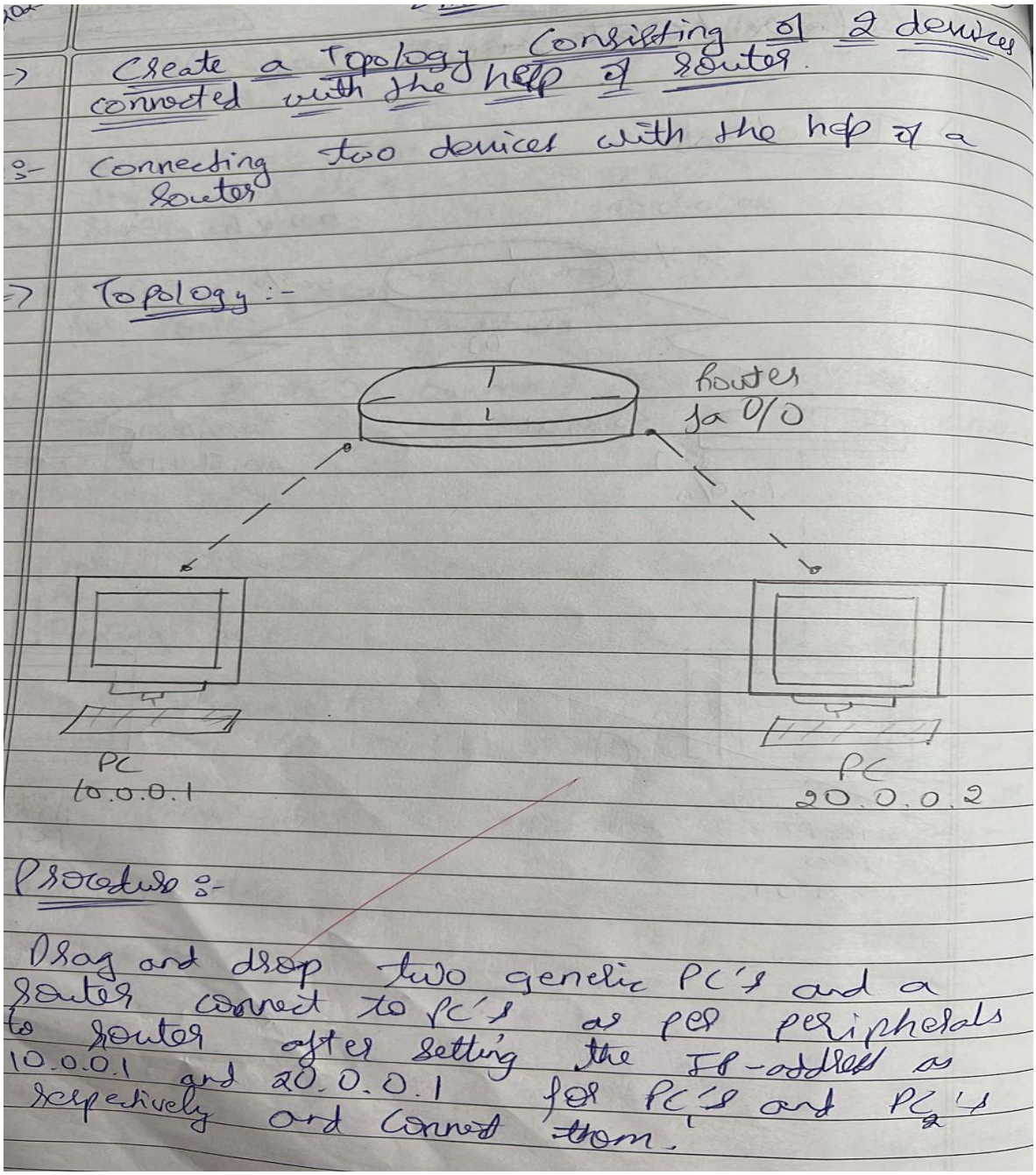



PC3
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 192.160.1.5
Pinging 192.160.1.5 with 32 bytes of data:
Reply from 192.160.1.5: bytes=32 time=1ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms 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>

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:



Date Page

Configure Router -> Enable
-> Configure terminal
-> interface fa 0/0
-> IP address (IPC, Subnet mask)
-> no Shut down
-> Exit

Repeat this for PC_2.

Ping the PC_1 to PC_2 and note the observati
give the gateway and ping again and
note down observations.

Ping Output :-

PC < ping 10.0.0.1

Ping 10.0.0.1 with 32 bytes of data.
Request timed out.

Reply from 10.0.0.1 : byte = 32 time = 3ms TTL =
Reply from 10.0.0.1 : bytes = 32 time = 3ms TTL =
eply from 10.0.0.1 : bytes = 32 time = 3ms TTL =

ping statics from 10.0.0.1

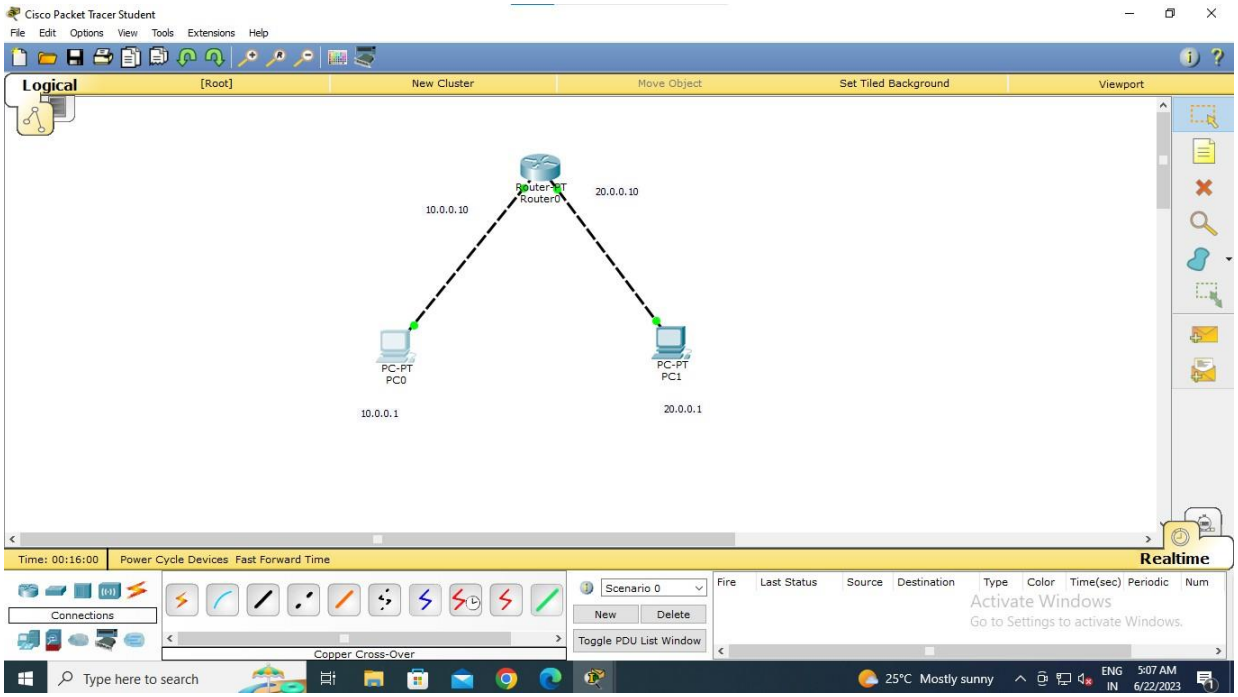
Packet ~~Sent~~ Sent = 4, packets received = 2

Lost = 2

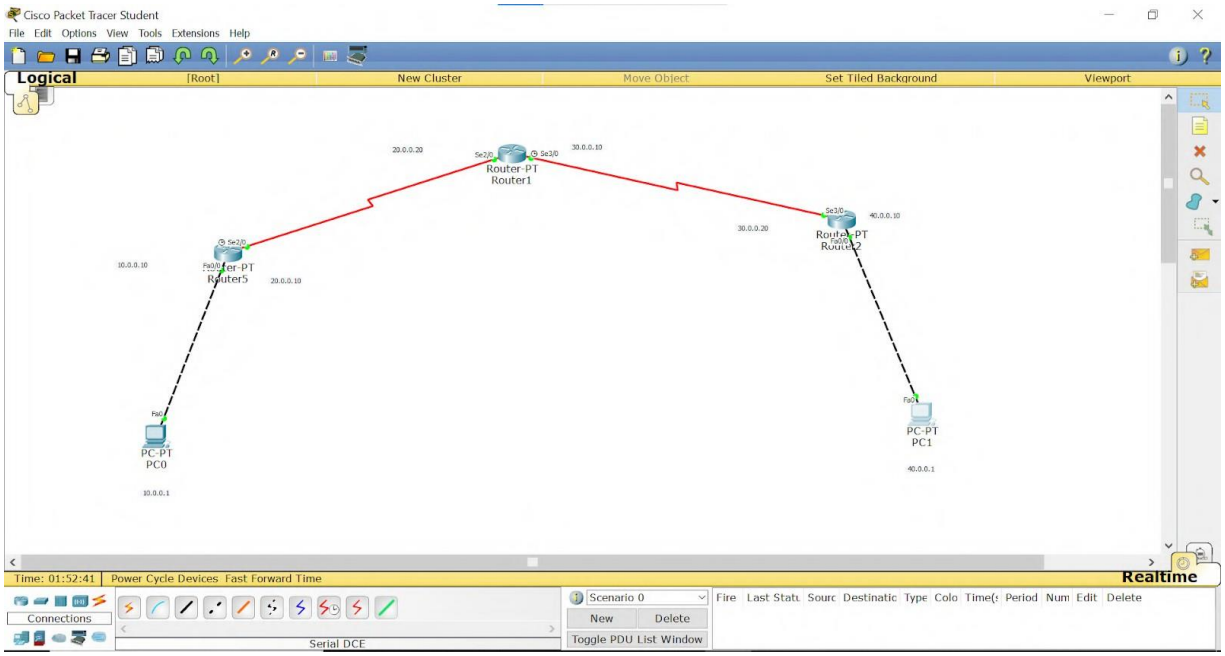
50% Loss

TOPOLOGY:

PROGRAM 2.1

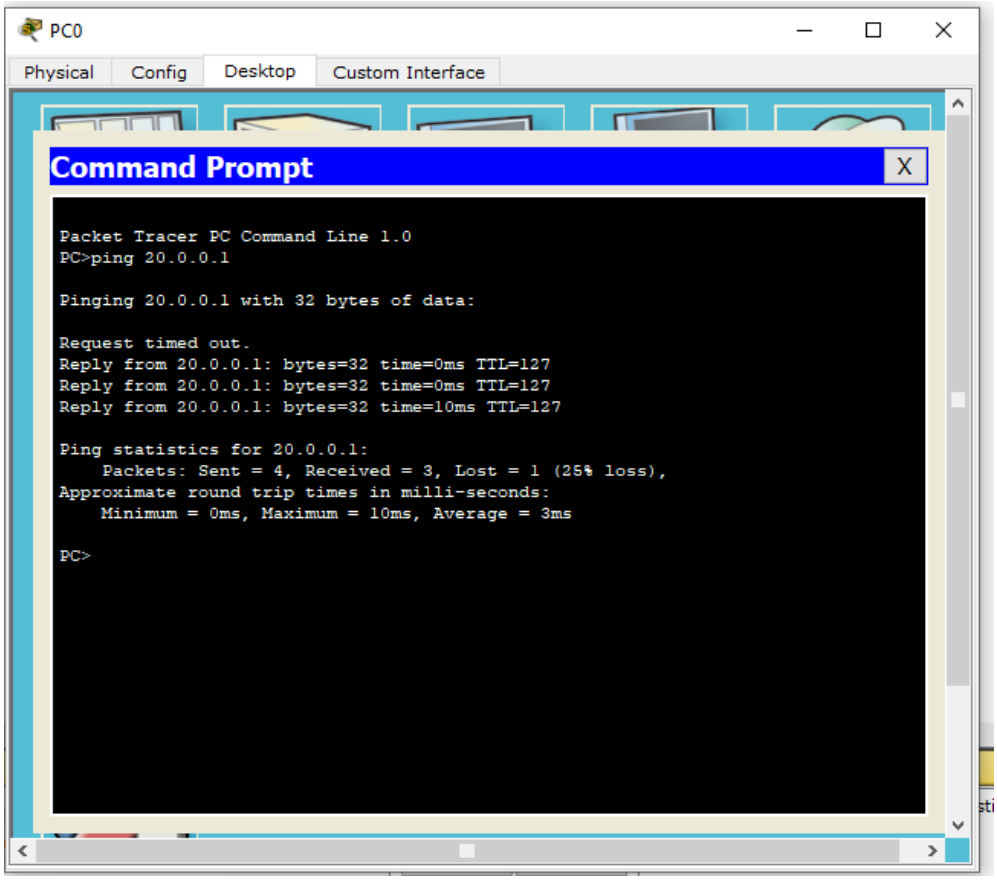


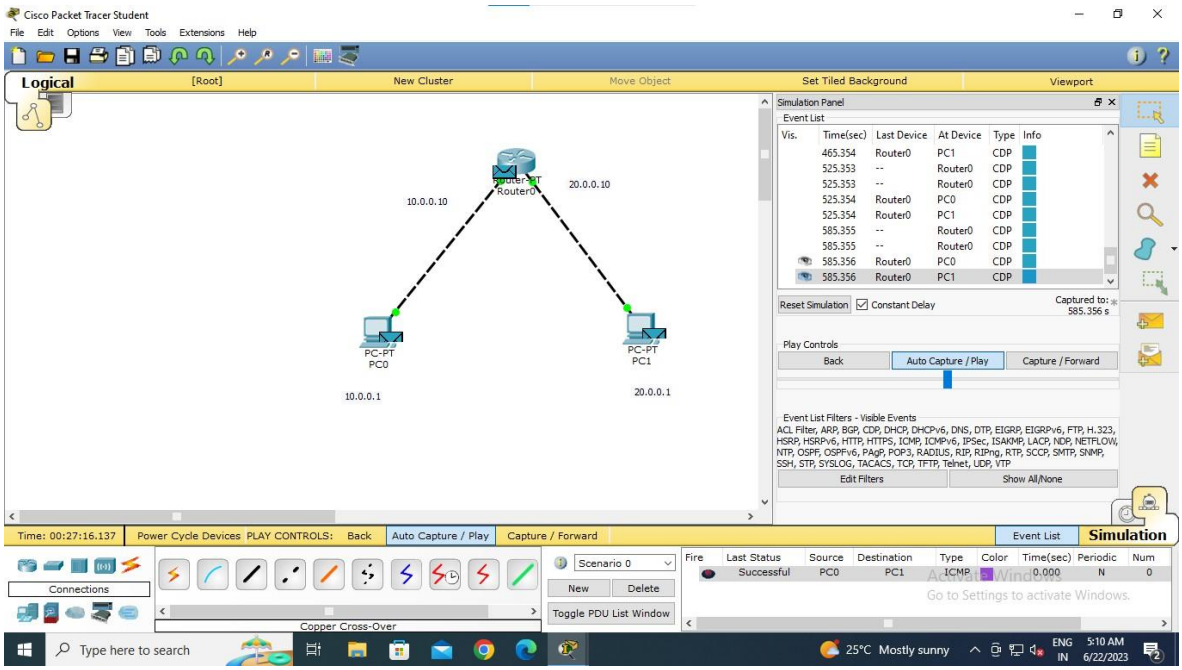
PROGRAM 2.2



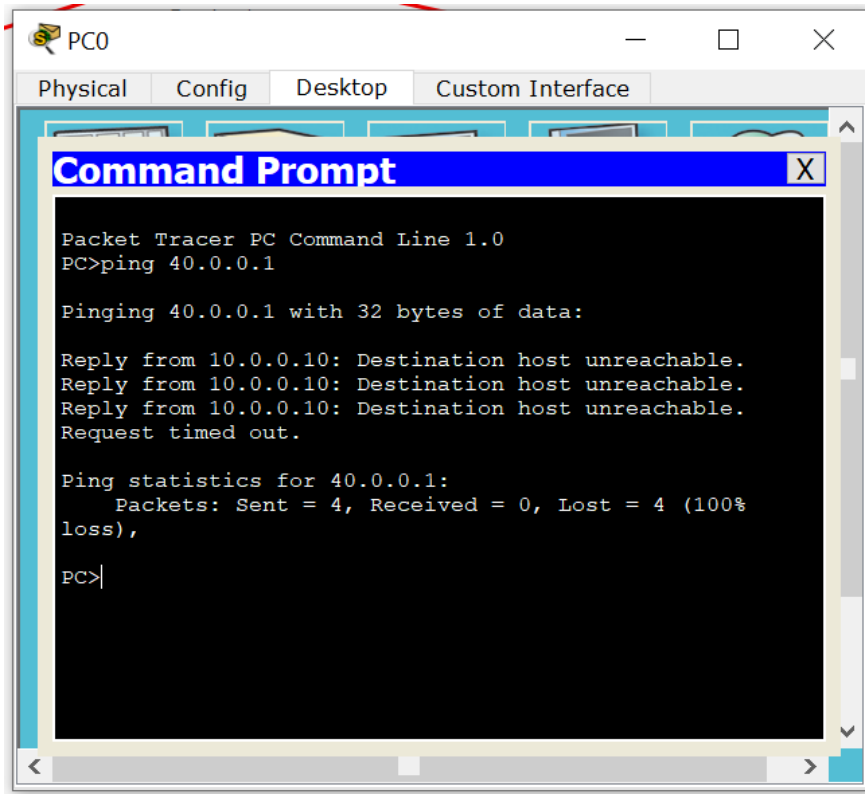
OUTPUT:

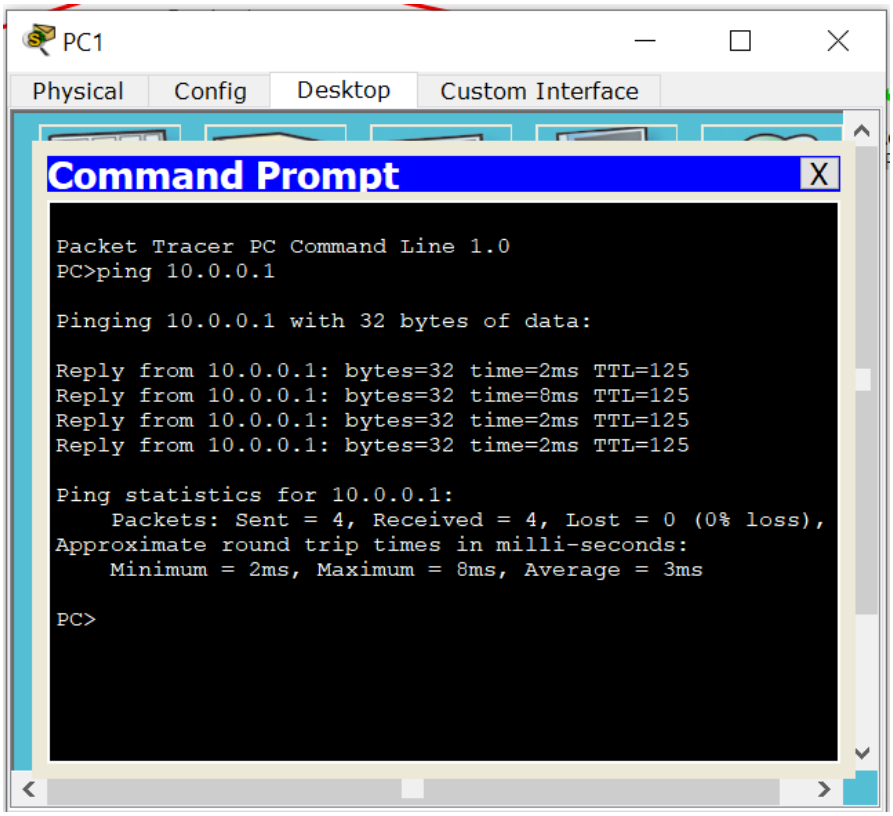
PROGRAM 2.1

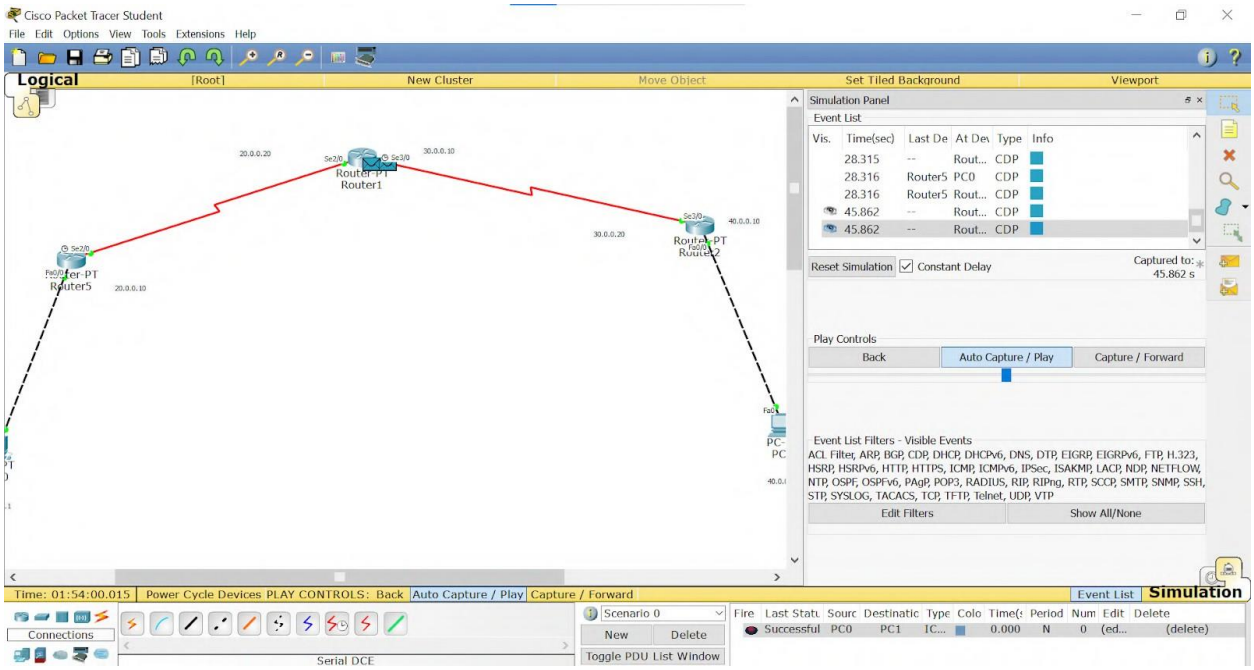




PROGRAM 2.2


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>

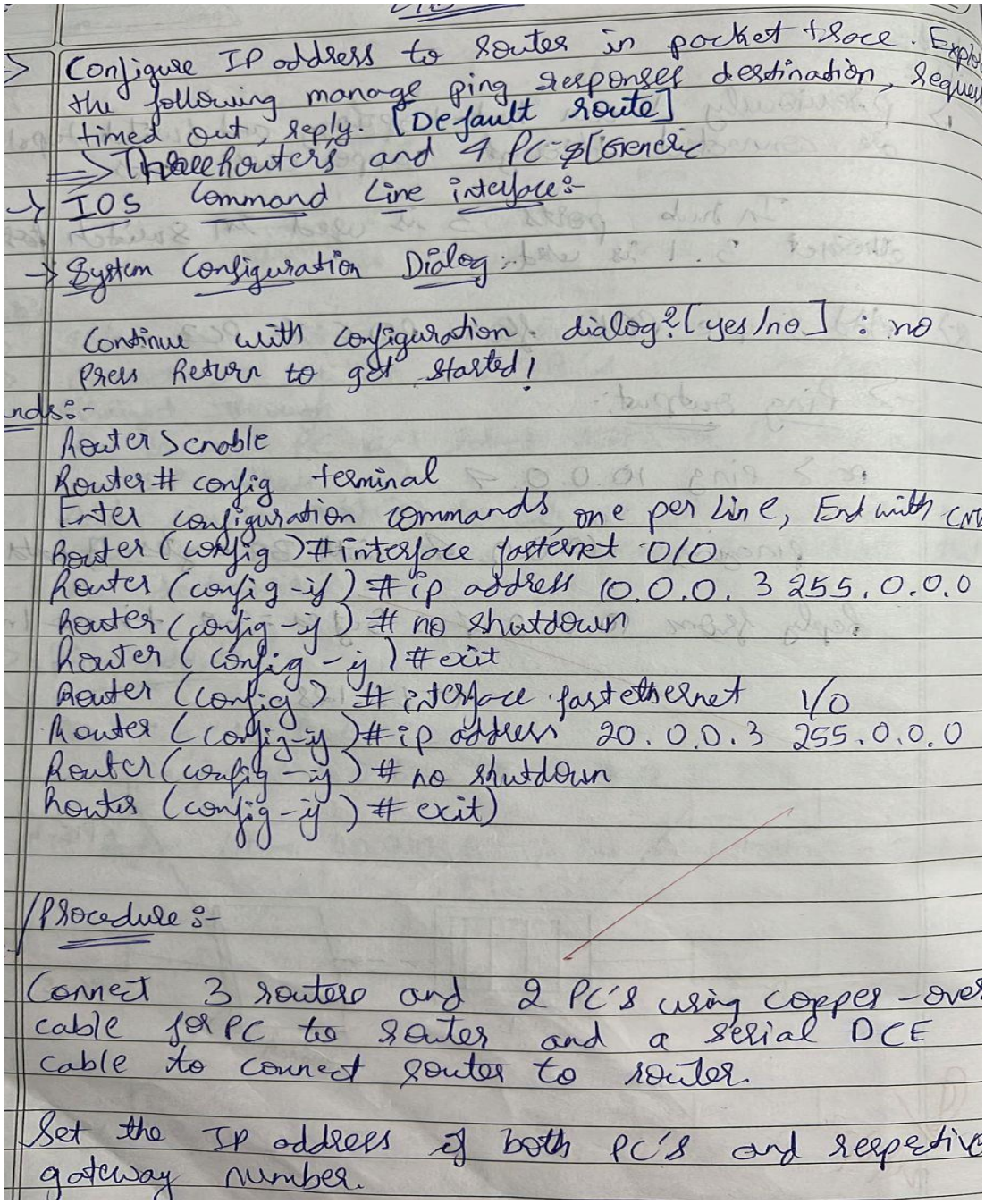

PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=8ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 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
Router1
Router5
Router2
PC-PC
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)

WEEK 3

Configure default route, static route to the Router.

OBSERVATION:


Configure IP address to Routes in packet tracer. Explo
the following manage ping responses destination, Requ
timed out, reply. [Default route]
=> [Three Routers and 4 PC-s[Generic
IOS Command Line interface:-
System Configuration Dialog:
Continue with configuration dialog? [yes/no] : no
Press Return to get started!
nds:-
Router>enable
Router# config terminal
Enter configuration commands one per line, End with CN
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 10.0.0.3 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface fastethernet 1/0
Router(config-if)#ip address 20.0.0.3 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#exit)
Procedure:-
Connect 3 routers and 2 PC's using copper-over
cable for PC to Router and a serial DCE
cable to connect Router to router.
Set the IP address of both PC's and respective
gateway number.

Date Page

For All 3 Routers set the respective 2 IP addr in CLI mode by using these commands

Step1: Enable
Step2: Config Terminal
Step 3: Interface fastethernet 0/0
Step 4: IP address 10.0.0.10 255.0.0.0
Step 5: No Shutdown
Step 6: Exit
Step 7: Interface & Se 2/0
Step 8: IP address 20.0.0.10 : 255.0.0.0
Step 9: No Shutdown
Step 10: Exit
Step 11: Exit

Repeat these commands for other two Rou with their respective IP address.

For Router 1 set the IP Router & other IP a statically by using following steps.

Step1: Config Terminal
Step 2: IP Route 10.0.0.0 255.0.0.0 20.0.0
Step 3: IP Route 40.0.0.0 255.0.0.0 30.0
Step 4: Exit
Step 5: Exit
Step 6: Show IP route

For Router 0 and Router 2 we set defa IP Router which means it can acces IP address with any subnet mask.

Set the default IP Route by following these commands.

Step1: Config Terminal
Step2: IP Route 10.0.0.0 0.0.0.0 20.0.0.20
Step3: IP Route 0.0.0.0 0.0.0.0 30.00.10

Step 2 is given for Router 0 and Step 3 comm for Router 1.

Go to PC's command prompt and type ping message to send packets across.

⇒ Ping Output:-

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
Reply from 40.0.0.1: bytes=32 time=10ms TTL=
Reply from 40.0.0.1: bytes=32 time=2ms TTL=

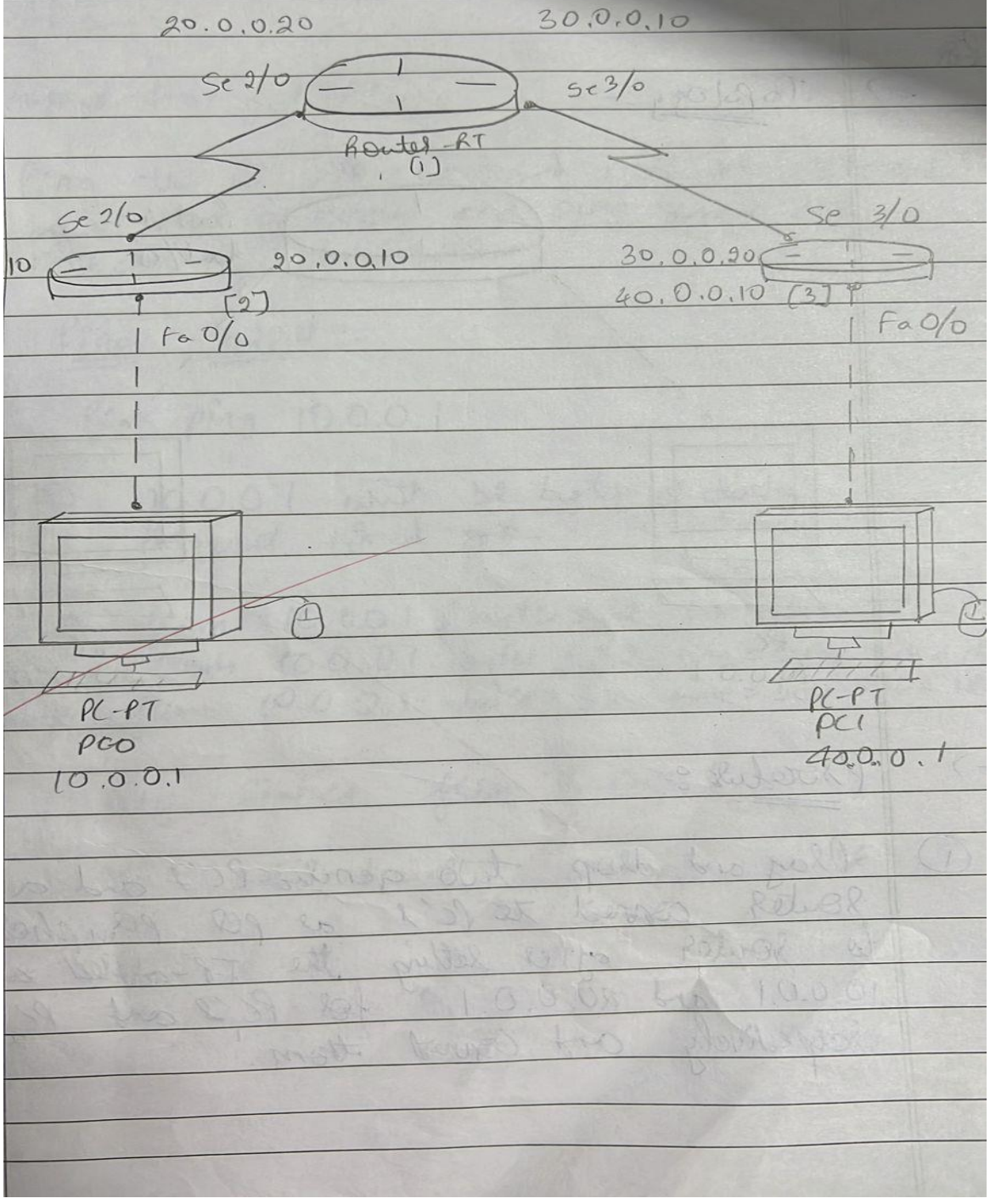
ping statistics for 40.0.0.1

Packets: sent = 4 Received = 3, Lost = 1
[25% loss],

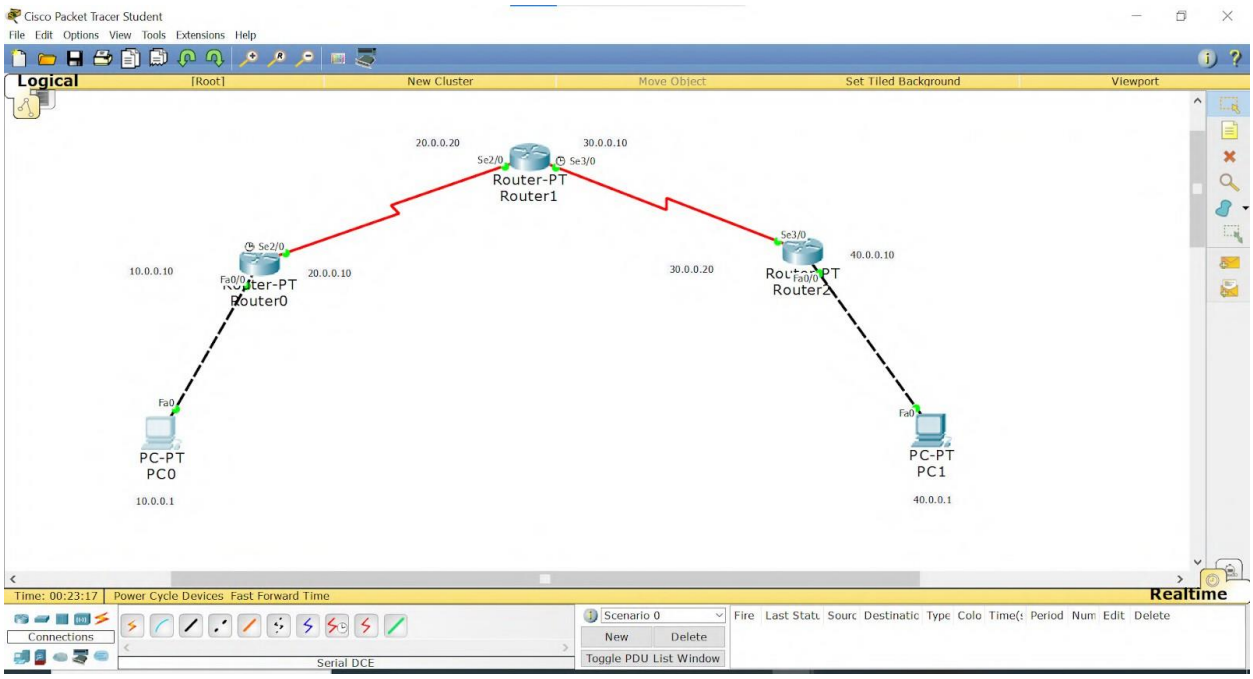
Approximate: Route trip times in milli-second
Minimum = 2ms, Maximum = 16ms, Average = 6

Configure / ~~Create~~ a

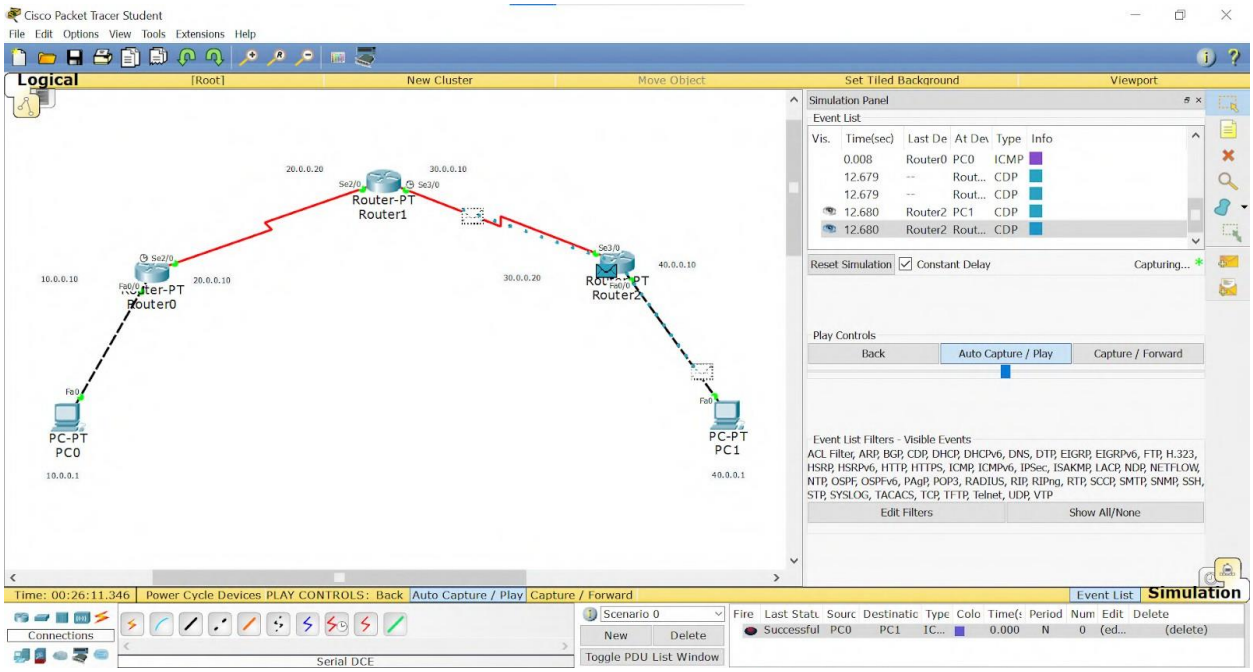
Topology :-

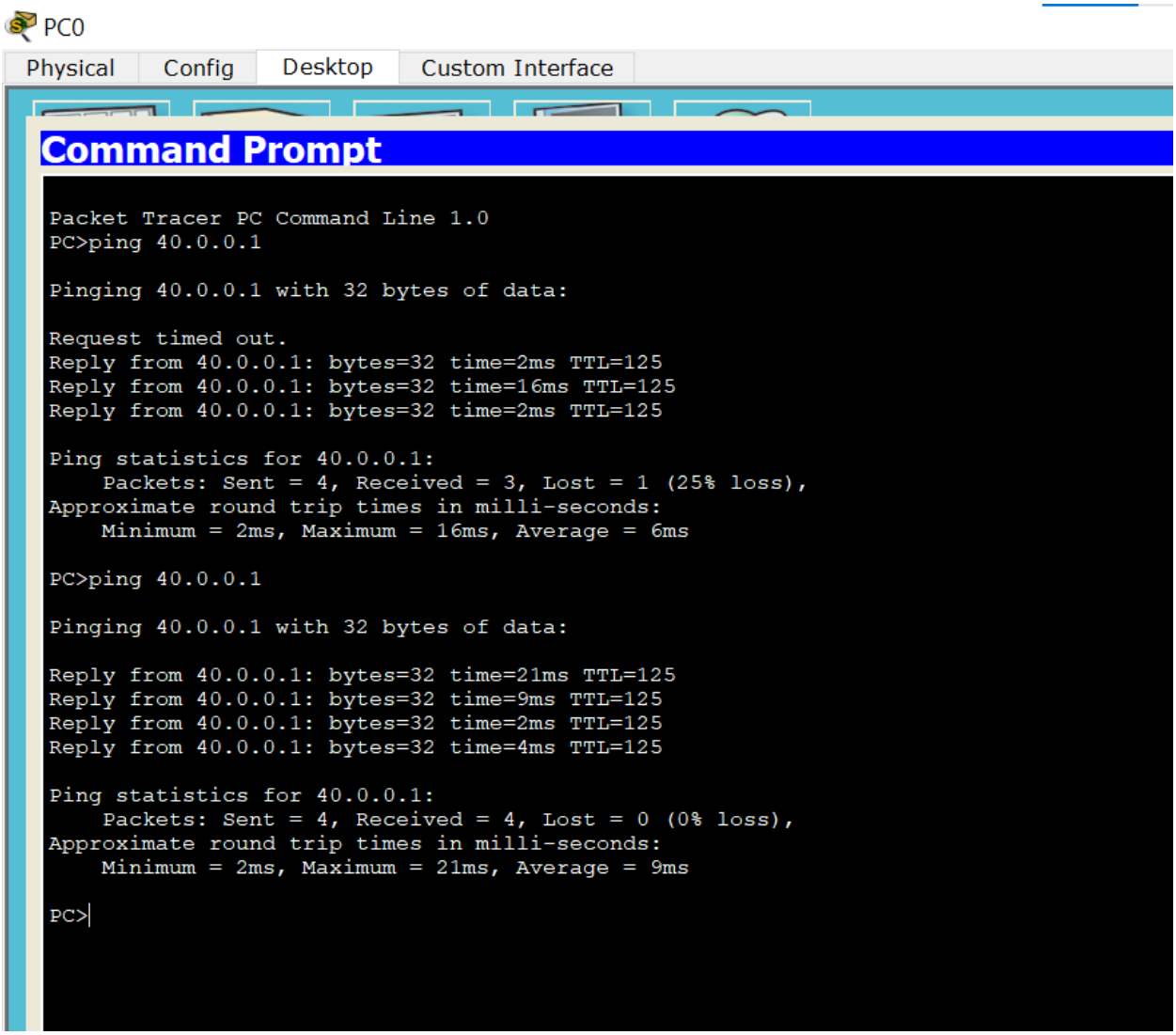


TOPOLOGY:



OUTPUT:

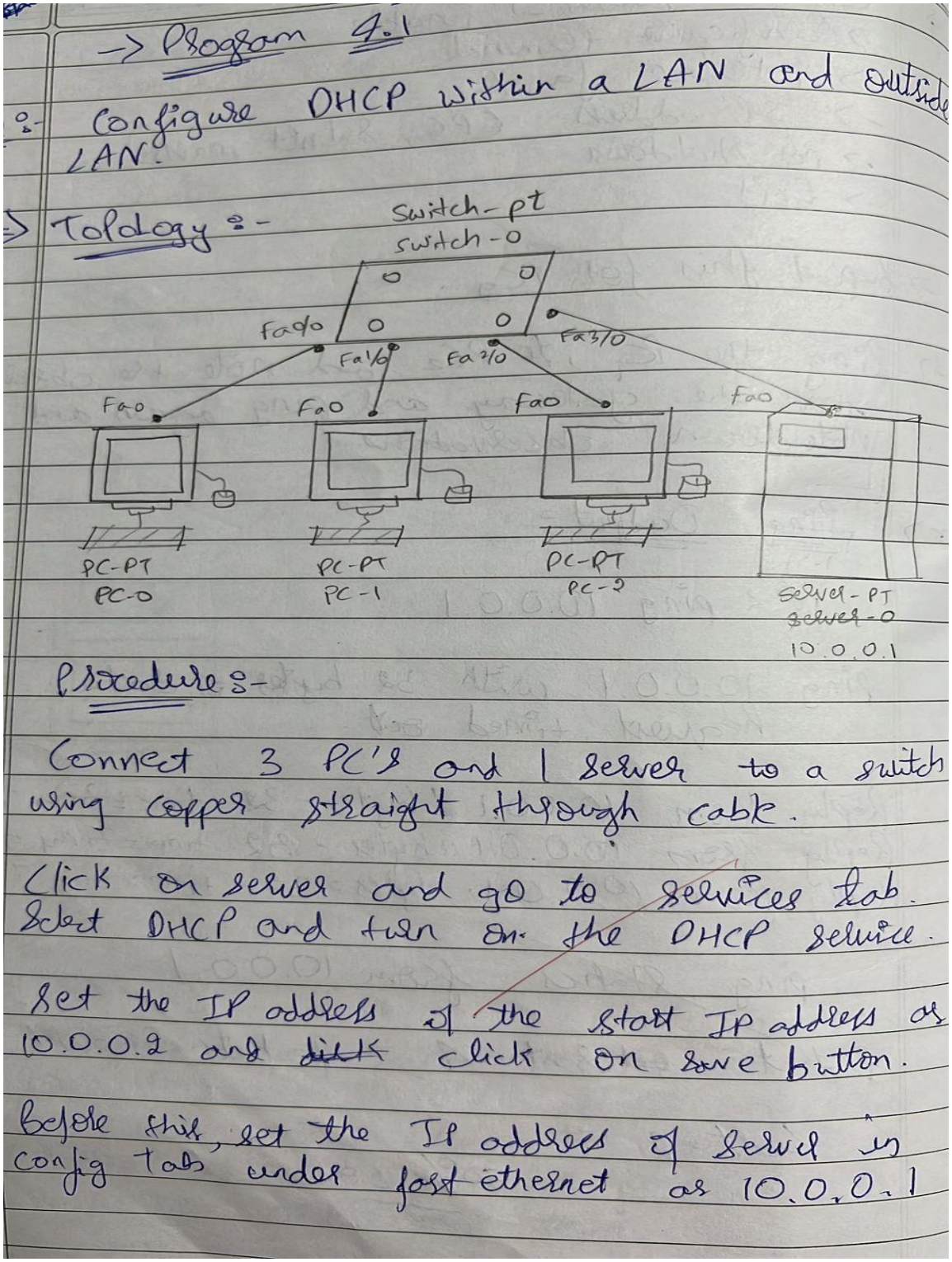



PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=16ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms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



SURYA Gold
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Next click on PC0 and go to desktop tab, next click on IP configuration. Select DHCP here. It will request for an IP address and successfully gets the DHCP request also sets the IP address.

Repeat this steps for other 2 PC's

To send a packet across PC's go to PC's command prompt and type ping destination IP address.

Ping output:-

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 statics for 10.0.0.3

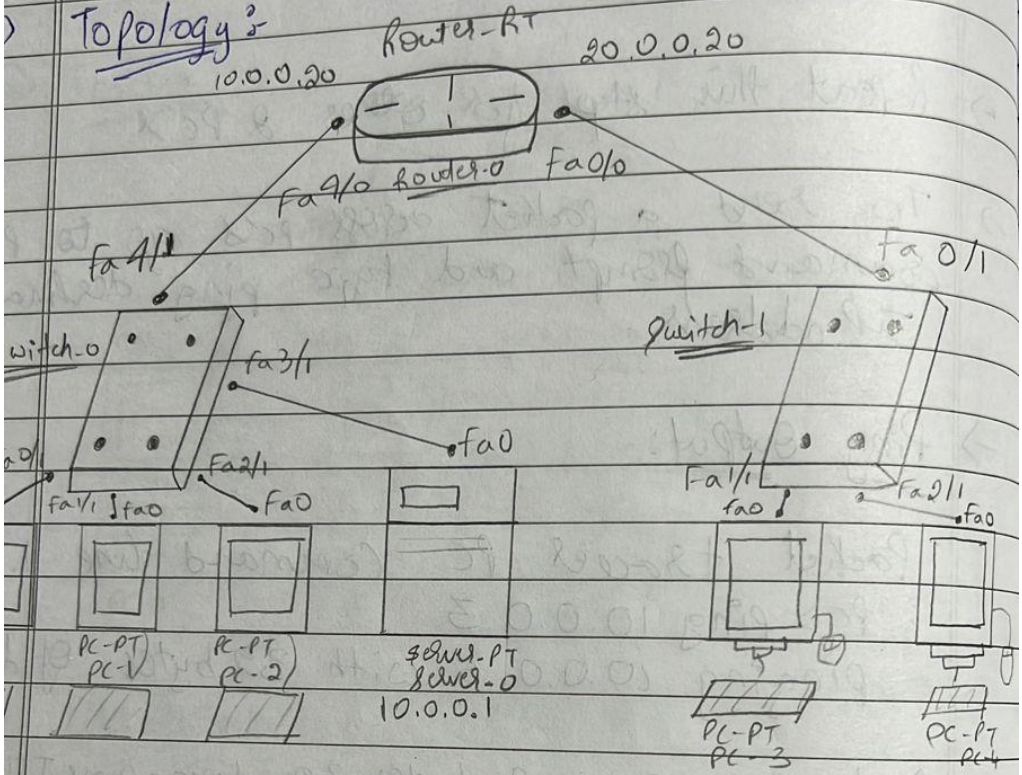
Packets: Sent 4, Received 4, Lost=0 [0% loss].

Approximate round trip times in milli seconds

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

Configure DHCP within a LAN and Outside LAN
Server, Switch, PC's

Topology :-



Procedure :-

Add a Router, a Switch and 2 PC's & to 4.1 Program network and connect the Router to both Switches.

Set the Server IP address of Server and with the help of Server set the first 3 PC's IP address through DHCP.

Now set the Router IP address with the following commands. Statically.

Step 1: No
Step 2: Enable
Step 3: Config Terminal
Step 4: Interface fastethernet 4/0
Step 5: Ip address 10.0.0.20 255.0.0.0
Step 6: No Shutdown
Step 7: Exit
Step 8: interface fastethernet 3/0
Step 9: Ip address 20.0.0.20 255.0.0.0
Step 10: No Shutdown
Step 11: Exit
Step 12: Exit
Step 13: Show ip route.

Go to Server and set the gateway as 10.0.0
Again go to Router CLI and follows
those commands.
Step 14: Config Terminal
Step 15: interface fastethernet 0/0
Step 16: Ip helper address — 10.0.0.1
Step 17: No Shutdown
Step 18: Exit

Now, go to server services and add one ne
Pool name as Server Pool, start Ip addre
as 20.0.0.2 and default gateway as 20.0
Then click add and save.

Now set the other two pc's Ip address
by going to their Desktop -> Ip configuratio
and selecting DHCP which will automatic
generate its Ip address.

Now the network is complete and can send packets from any PC to other by typing ping destination address in their respective command prompt.

PING Output:-

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

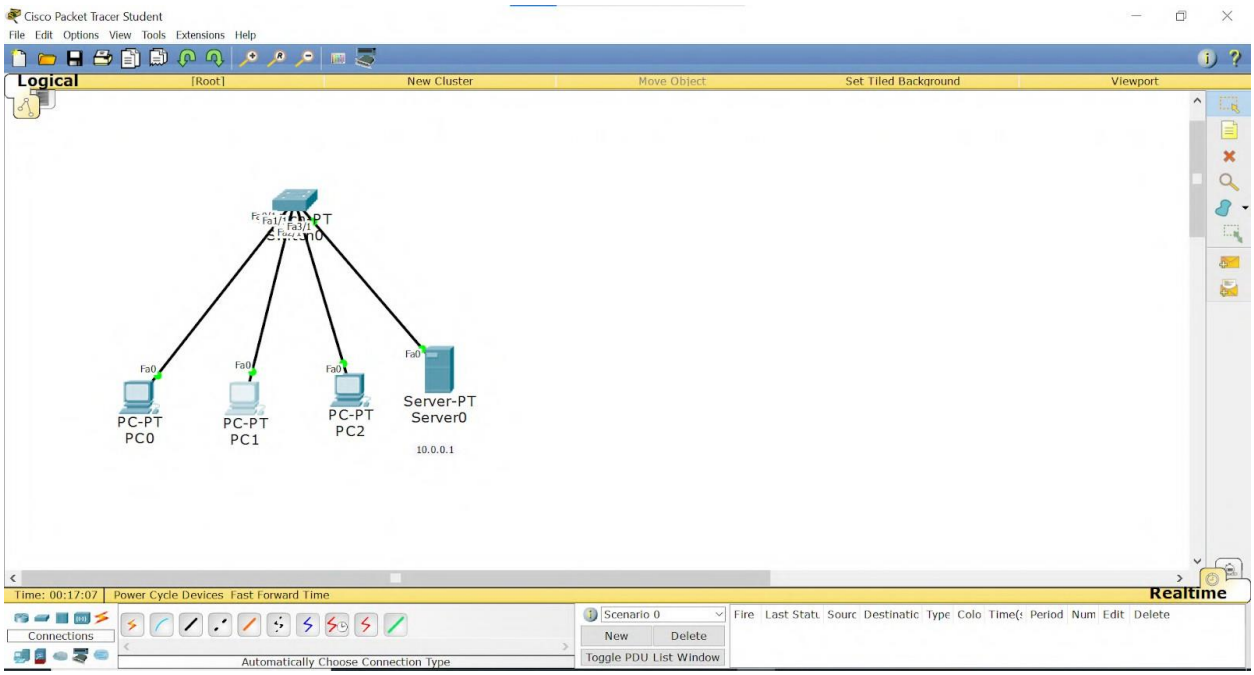
Reply from 20.0.0.2: bytes=32 time=0ms TTL=12
Reply from 20.0.0.2: bytes=32 time=0ms TTL=12
Reply from 20.0.0.2: bytes=32 time=0ms TTL=12

Ping statistics for 20.0.0.2
Packets ~~Set~~ Sent: 4
Received: 3
Lost = 1 [25% loss]

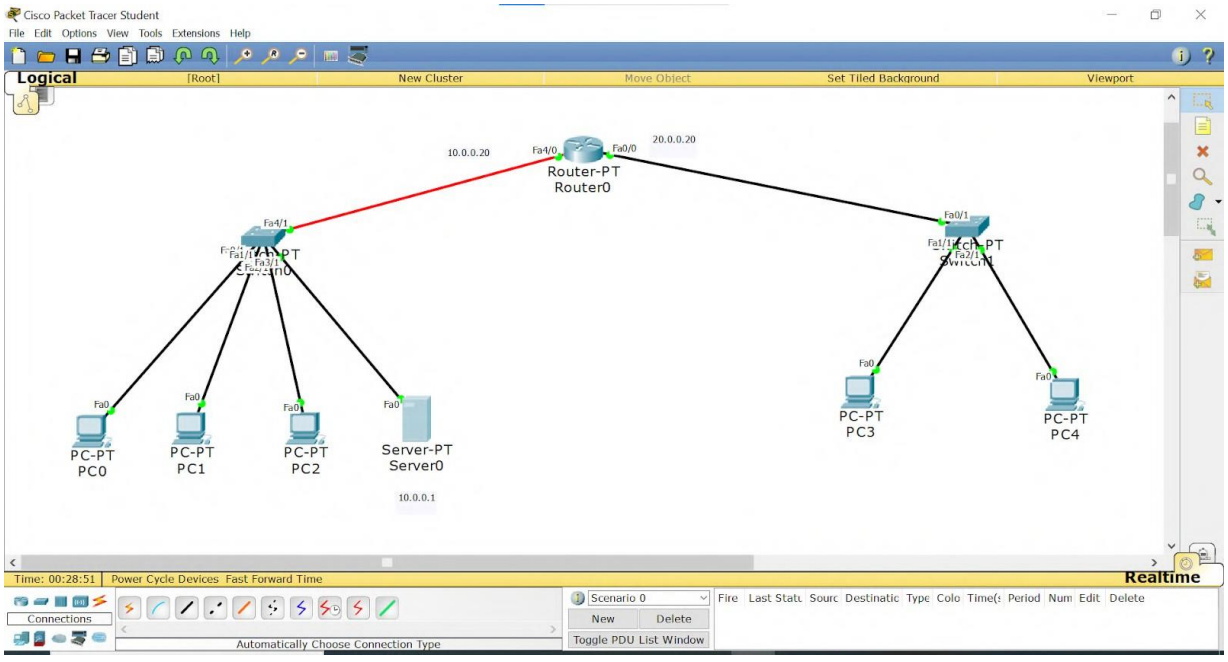
Approximate round trip times in milli seconds
minimum = 0ms, Maximum = 0ms, Average = 0ms

TOPOLOGY:

PROGRAM 4.1:

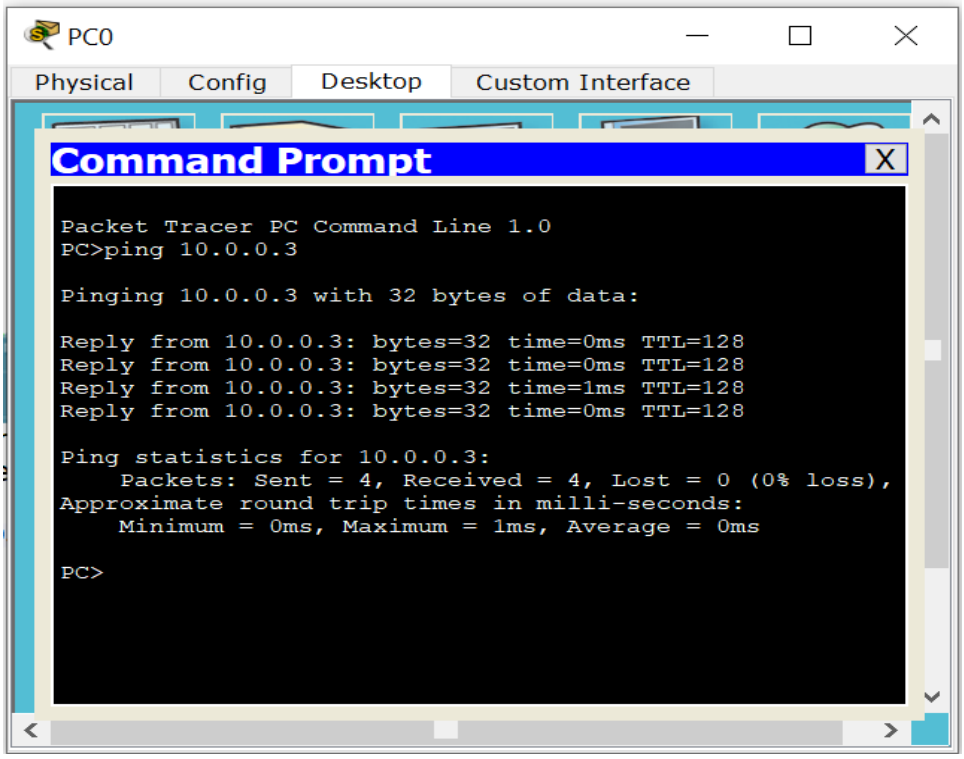


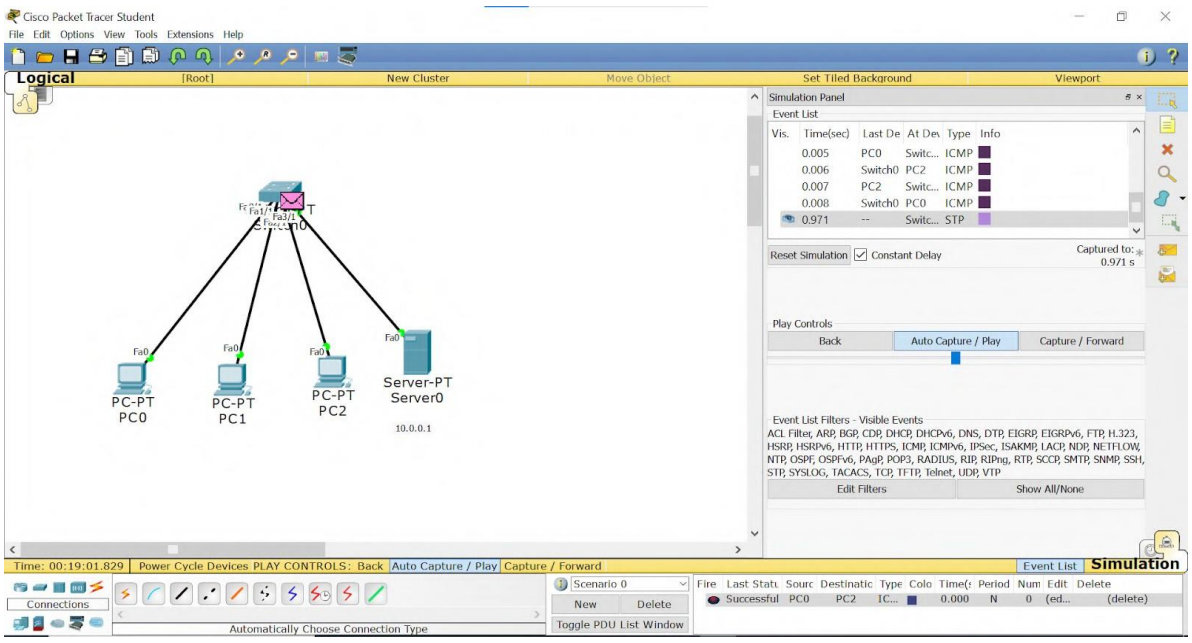
PROGRAM 4.2:



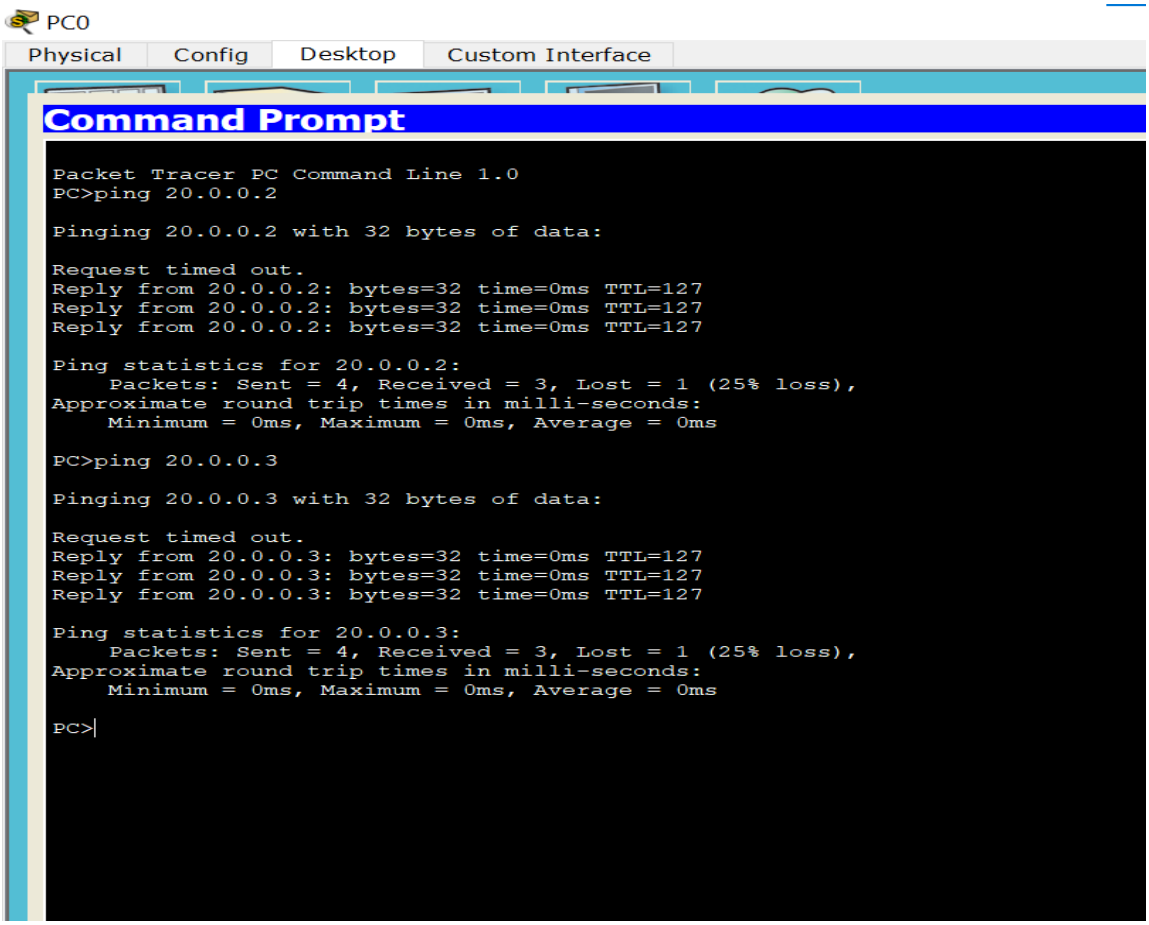
OUTPUT:

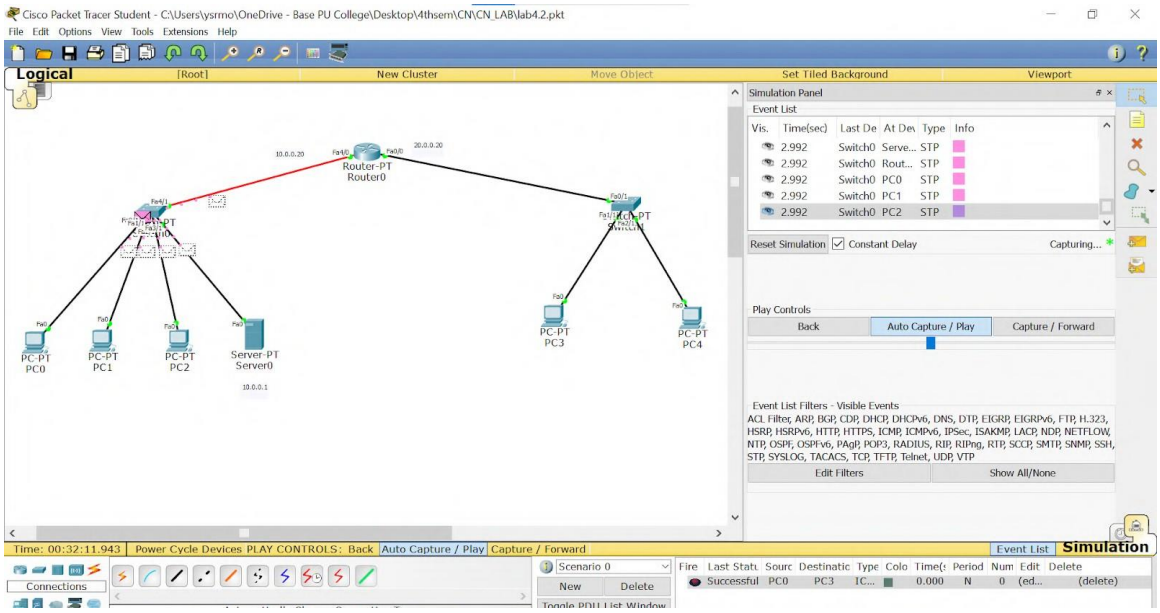
PROGRAM 4.1:





PROGRAM 4.2:

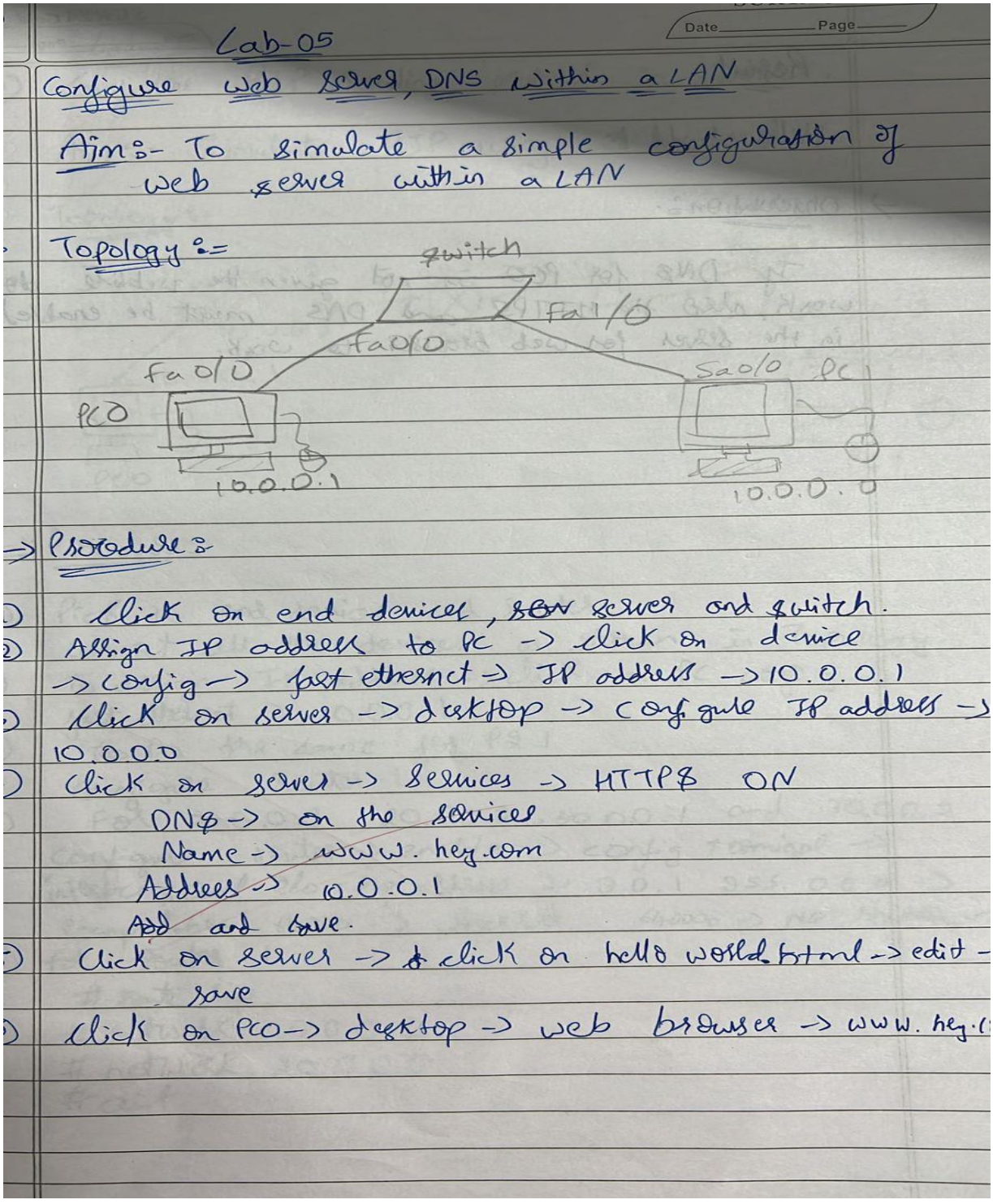

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Request timed out.
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms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


Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab4.2.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router0
10.0.0.20
20.0.0.20
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Server-PT
Server0
10.0.0.1
PC-PT
PC3
PC-PT
PC4
Simulation Panel
Event List
Vis. Time(sec) Last De At Dev Type Info
2.992 Switch0 Serve... STP
2.992 Switch0 Rout... STP
2.992 Switch0 PC0 STP
2.992 Switch0 PC1 STP
2.992 Switch0 PC2 STP
Reset Simulation
Constant Delay
Capturing...
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: 00:32:11.943
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 Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 PC3 IC... 0.000 N 0 (ed... (delete)

WEEK 5

Configure Web Server, DNS within a LAN.

OBSERVATION:



SURYA Gold

Date Page

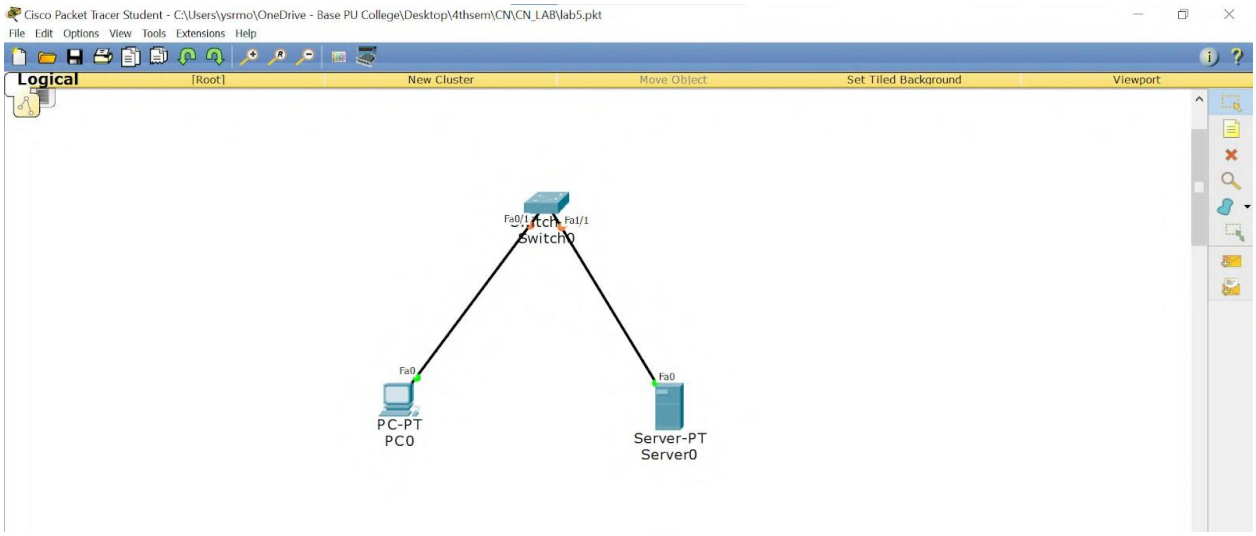
Result:-

Hello World !

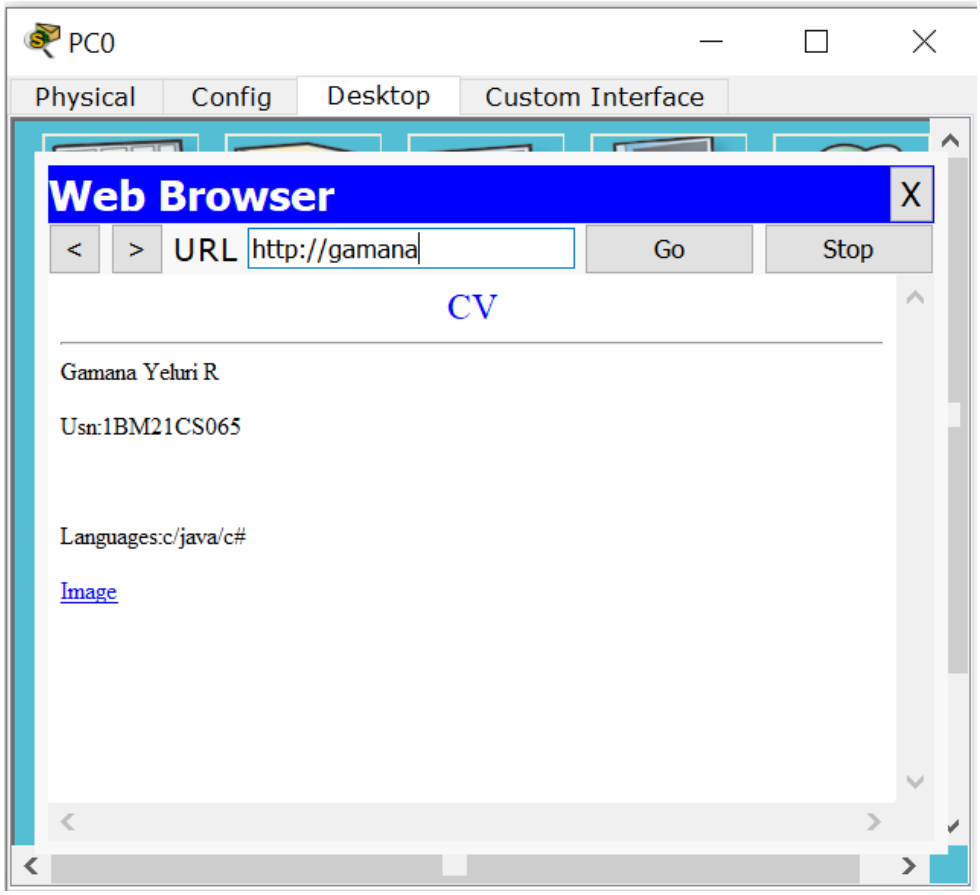
Observation:-

If DNS for PCO is not given the website does not work, also the HTTPS and DNS must be enabled in the server for web browsers to work.

TOPOLOGY:



OUTPUT:



WEEK 6

Configure RIP routing Protocol in Routers.

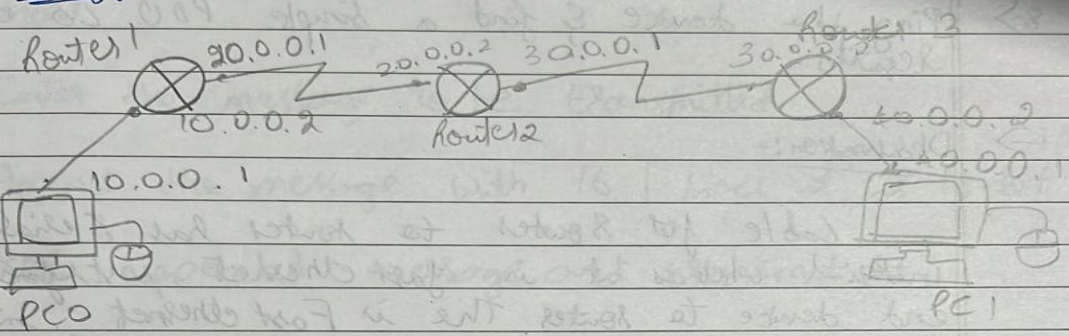
OBSERVATION:

Lab-6

Configure RIP routing protocol in routers.

Aim :- Simulate RIP using 3 routers.

Topology :-



Procedure :-

Pick the end devices and router.
Connect all the devices as shown in Topology
To assign IP address -> click on PC config -> fast ethernet -> 10.0.0.1
Do the same for PC1
Configure router 1
For 20.0.0.1, 20.0.0.2, 30.0.0.1 and 30.0.0.2
Configure router -> enable -> config terminal -> interface serial 2/0 -> ip address 20.0.0.1 255.0.0.0 -> encapsulation 64000 -> clock rate 64000 -> no shutdown
for router - 1
route rip
network 10.0.0.0
network 20.0.0.0
exit

Date Page

for Router 2
Router rip
network 20.0.0.0
network 30.0.0.0
exit

→ Ping the device & find a simple PDU to observe results

→ Observation:-

Cable for Router to router has Serial initially whereas it is fast ethernet interface for end device to router. The is Fast ethernet, Interface for end device to route to route was established using RIP ~~for~~ protocol, some in the configuration encapsulation and synchronization was done.

→ Result:-

ping 10.0.0.1

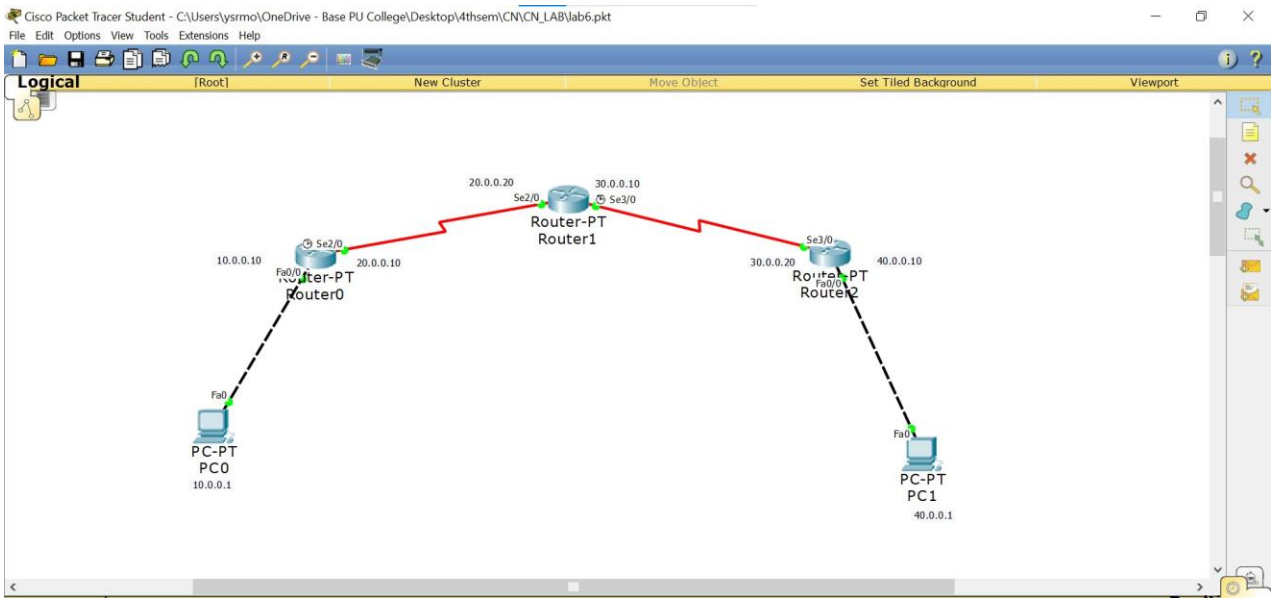
pinging 10.0.0.1 with 32 bytes of data

Reply from 10.0.0.1 : bytes 32 time = 9ms TTL = 12
bytes 32 time = 2ms TTL = 12
bytes 32 time = 5ms TTL = 1
bytes 32 time = 8ms TTL = 1

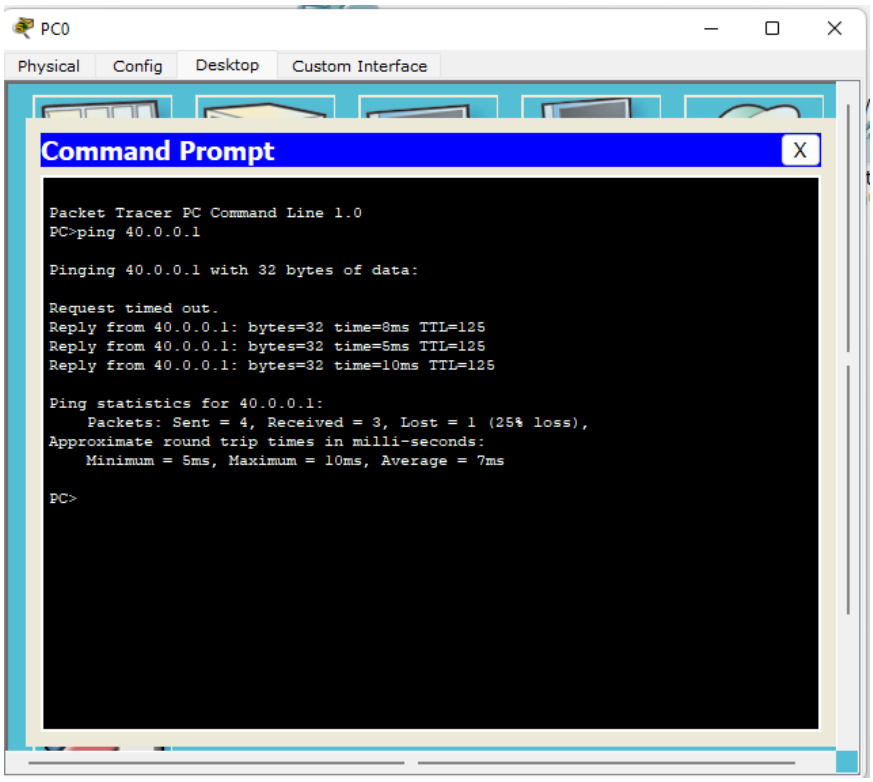
Packet: Sent = 4
Received = 4
lost = 0 [0% lost]

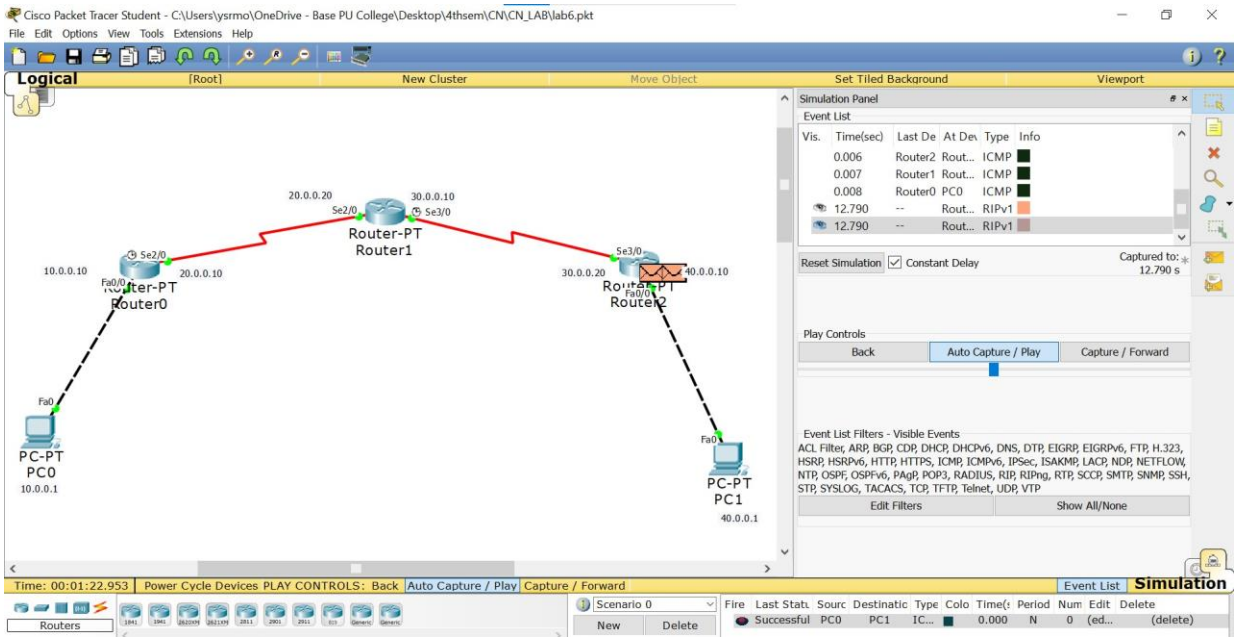
16/8

TOPOLOGY:



OUTPUT:

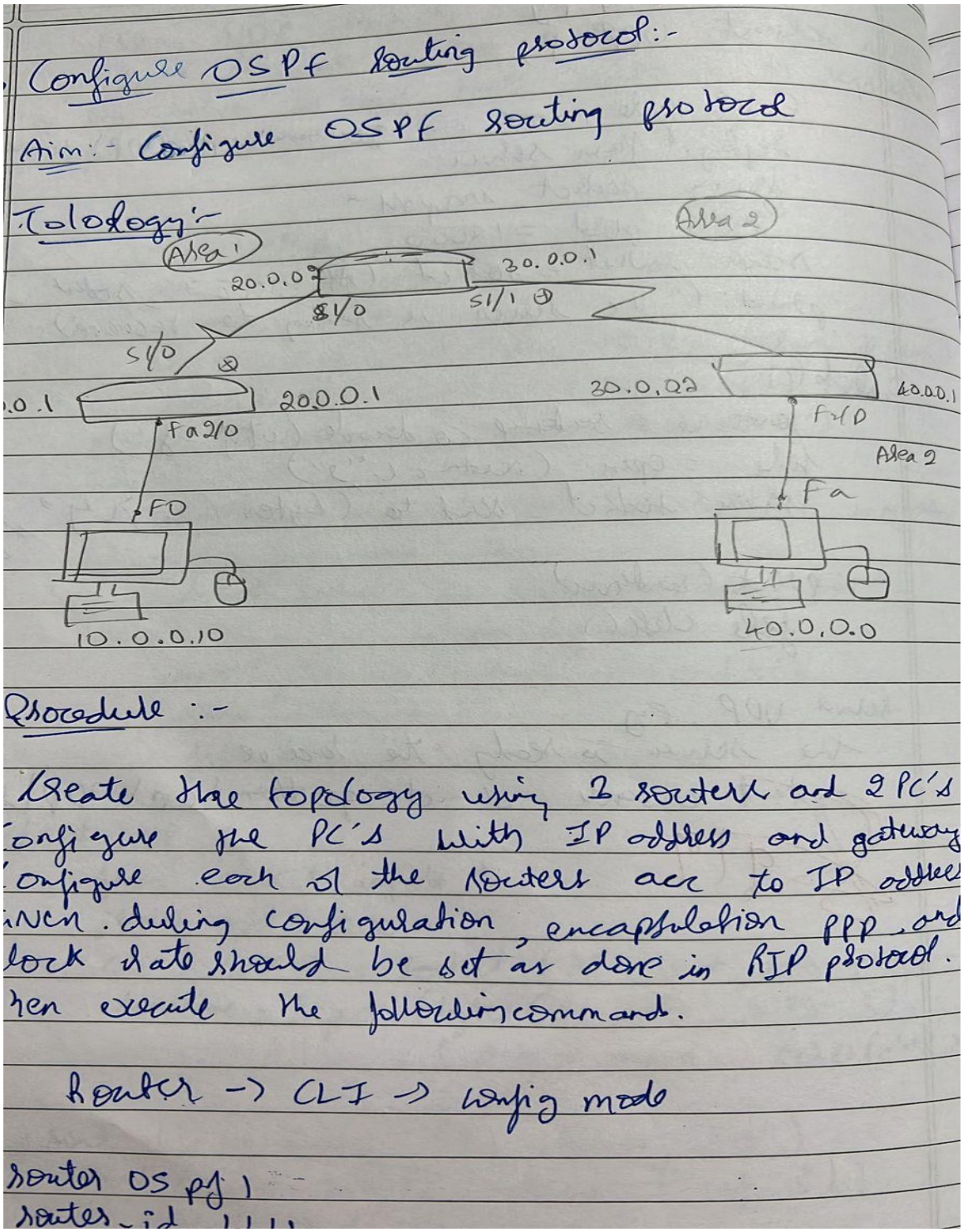



Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab6.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
Router-PT
Router0
Router-PT
Router2
PC-PT
PC0
10.0.0.1
PC-PT
PC1
40.0.0.1
20.0.0.20
30.0.0.10
10.0.0.10
20.0.0.10
30.0.0.20
40.0.0.10
Simulation Panel
Event List
Vis. Time(sec) Last De At Dev 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)

WEEK 7

Configure OSPF routing protocol.

OBSERVATION:



Repeat these commands for other routers.
Then type show output
Next to set loopbacks

Step 1: (in config if mode) interface ~~loopback~~ loopback 0

Step 2: ip address 17.2.10.1.252 255.255.0.0

Step 3: No shutdown.

Repeat these steps for other 2 routers

Create a virtual links between R1 R2, by this we create a virtual link to connect to area 0.

In config mode of R1

Step 1: router ospf 1

Step 2: area 1 virtual-link 2.2.2.2

Step 3: # enter/exit

$ In router 2 config mode

Step 1: # router ospf 1

Step 2: area 1 virtual link 1.1.1.1

Step 3: exit

Step 4: #

Check the routing table, show ip route

Lastly ping message from PC to PC

Output:-

Ping output:-

packet Tracer PC command - line 1.0

PC > ping 40.0.0.10

Ping 40.0.0.10 with 32 bytes of data

Request timed out

Reply from 40.0.0.10 : bytes = 32 time = 11ms TTL = 1

" from " " " " 11ms TTL = 1

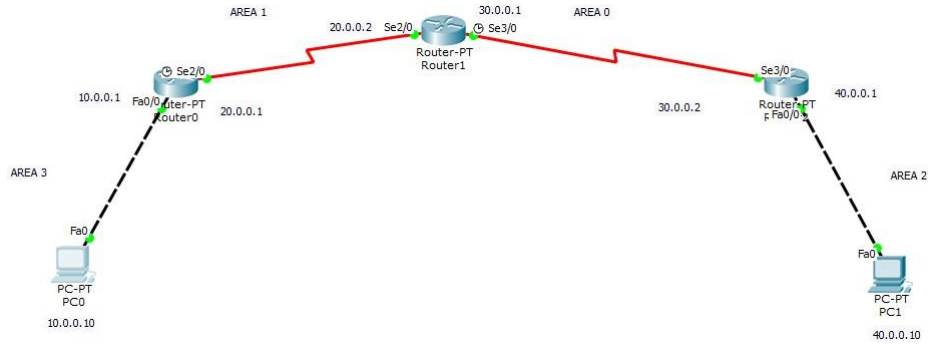
" " " " " 8ms TTL =

Ping statistics for 40.0.0.10

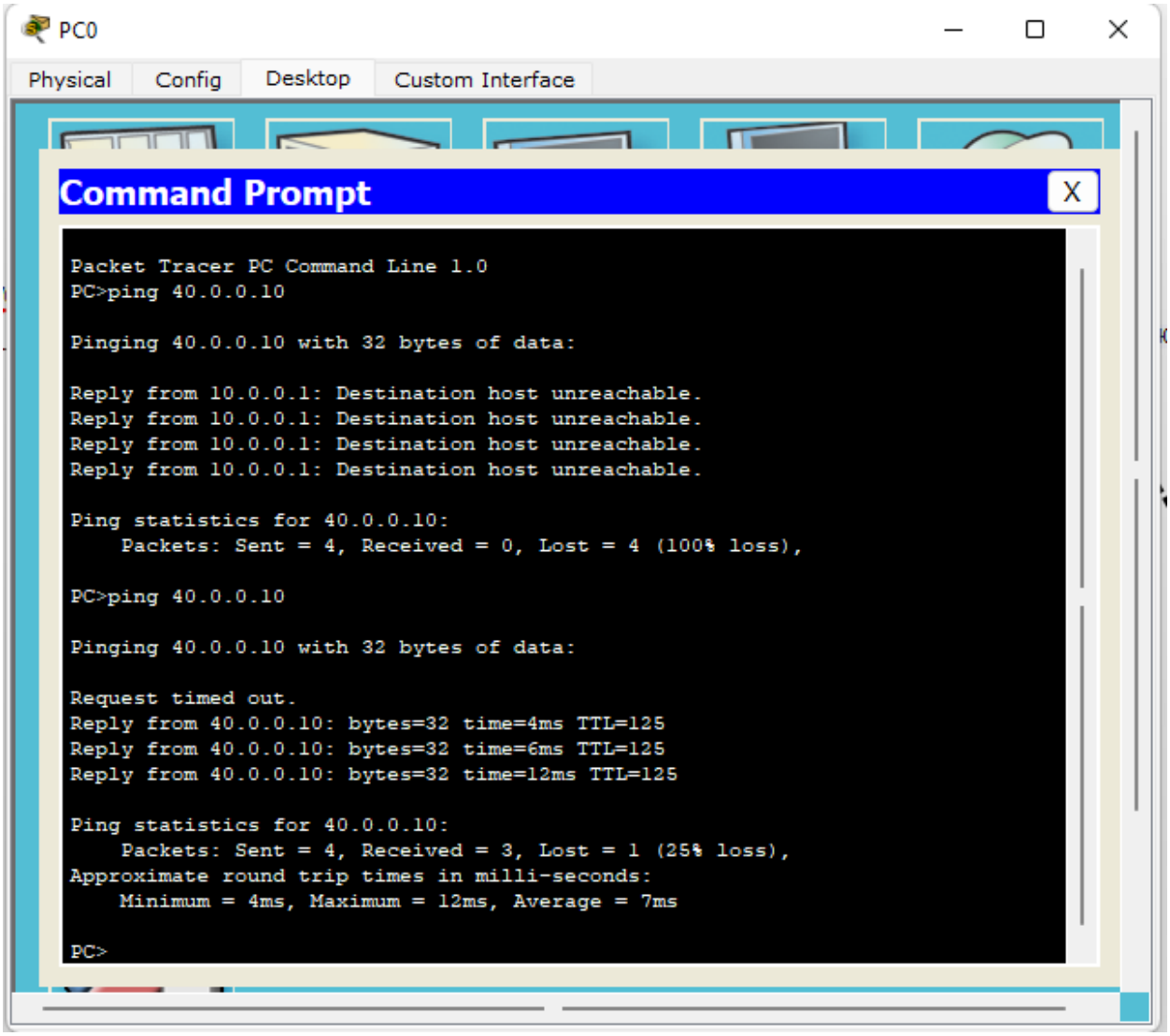
packets sent = 4 Received 3 , Lost = 1 [25% Lost]

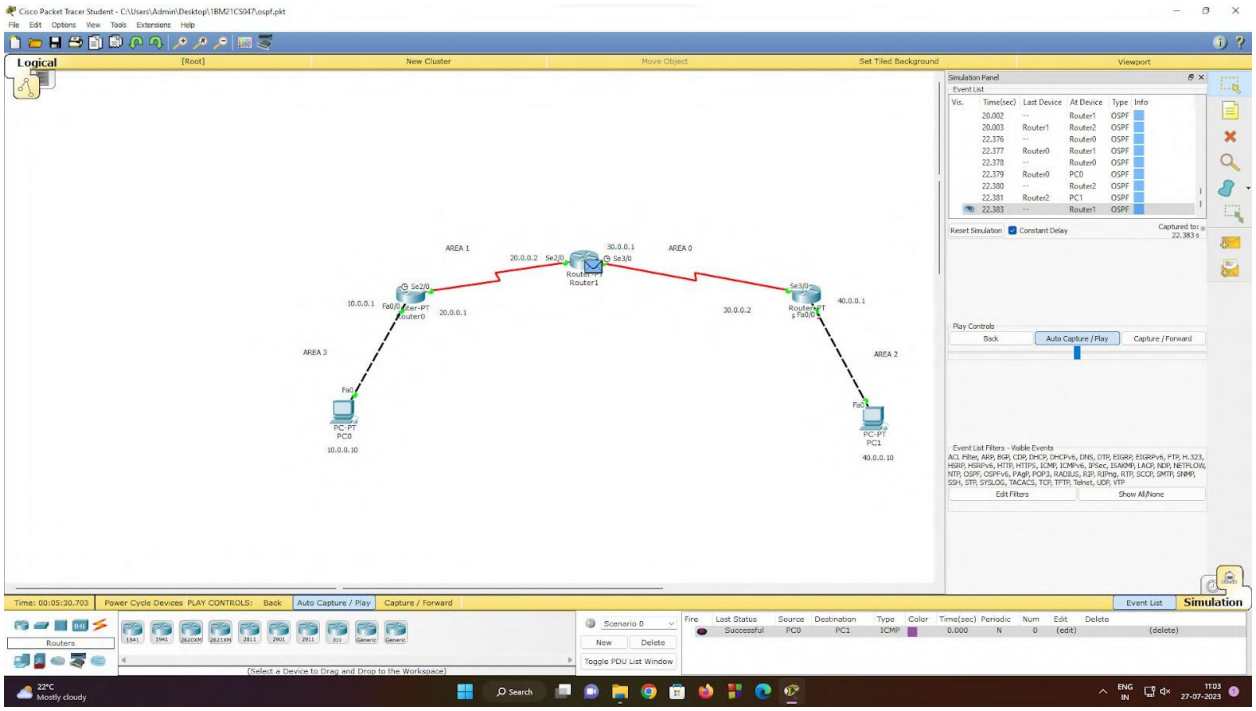
Minimum = 8ms , Maximum = 11ms , Average = 10ms.

TOPOLOGY:



OUTPUT:

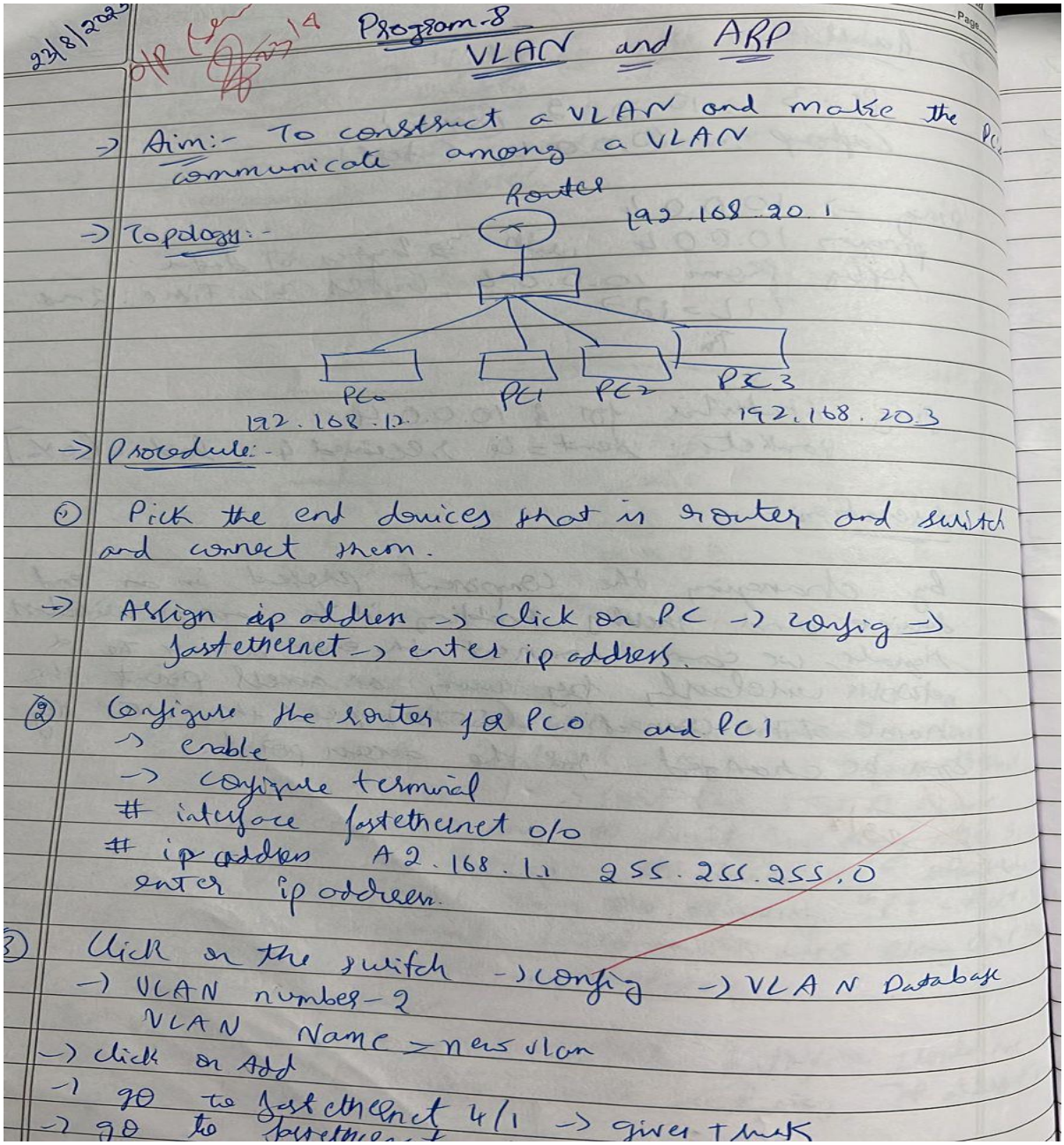



Cisco Packet Tracer Student - C:\Users\Admin\Desktop\1BM21CS047\ospf.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
AREA 1
AREA 0
AREA 3
AREA 2
20.0.0.2
Se2/0
30.0.0.1
Se3/0
Router1
Router0
10.0.0.1
20.0.0.1
30.0.0.2
40.0.0.1
PC-PT PC0
10.0.0.10
PC-PT PC1
40.0.0.10
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:05:30.703
Power Cycle Devices PLAY CONTROLS:
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

WEEK 8

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

OBSERVATION:



SURYA Gold

Date Page

-> go to fastethernet 2/1 -> select VLAN -> 2
-> go to fastethernet 3/1 -> select VLAN -> 2

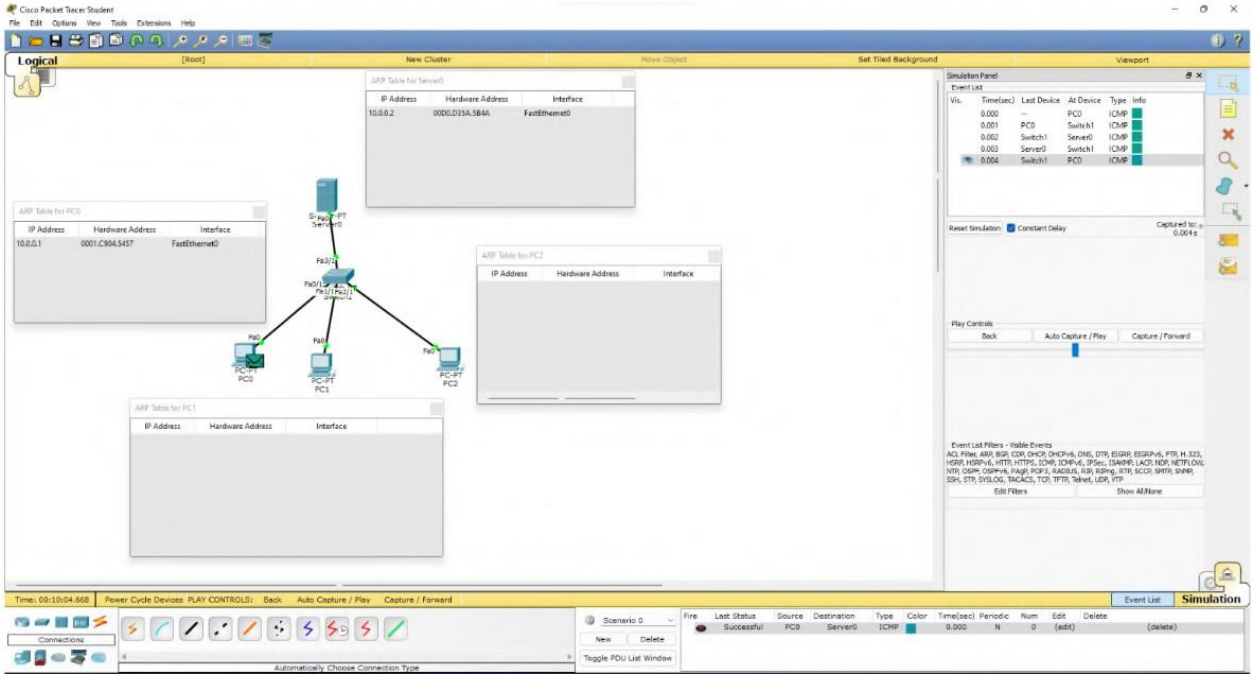
) Click routers -> config -> VLAN database
->VLAN number=2
VLAN name = newlan
-> click add
-> go to CLI
-> exit
Ping the PC and observe the results.

) Results:-
PC > ping 192.168.20.1
Reply from 192.168.20.1 bytes=32 time=3ms TTL=2
Reply from
}
;
Packets : sent=4 received=4 lost=0 (0% lo

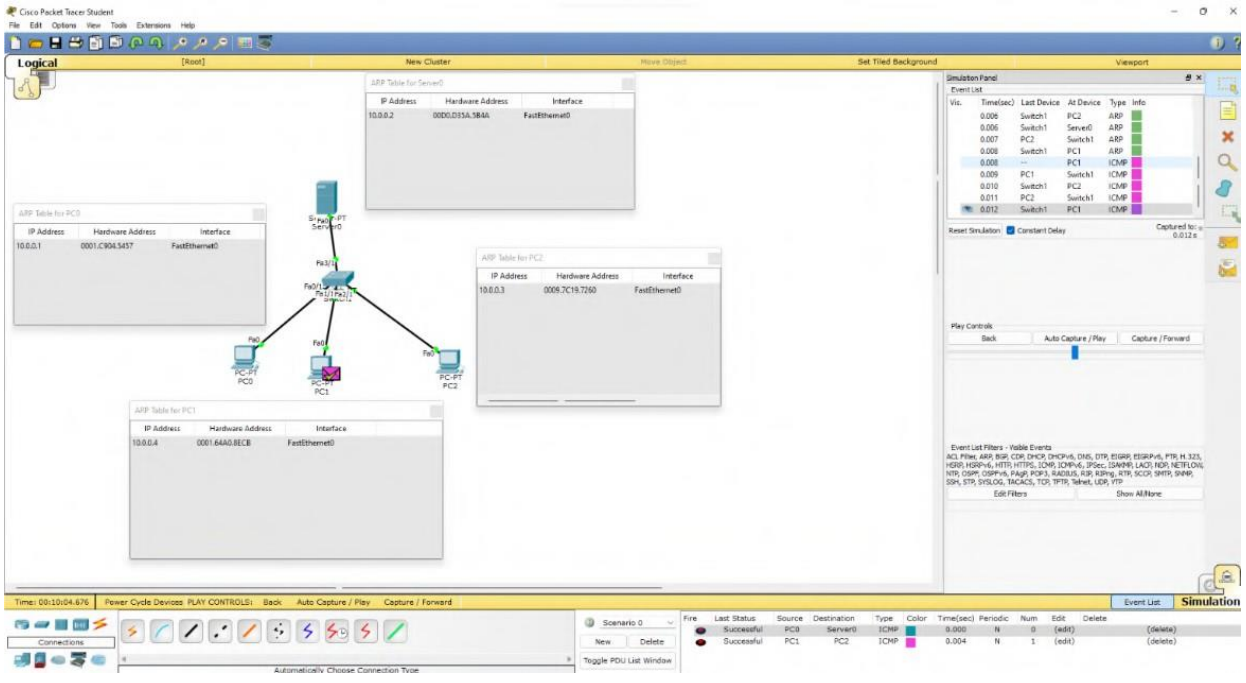
) Observation:-

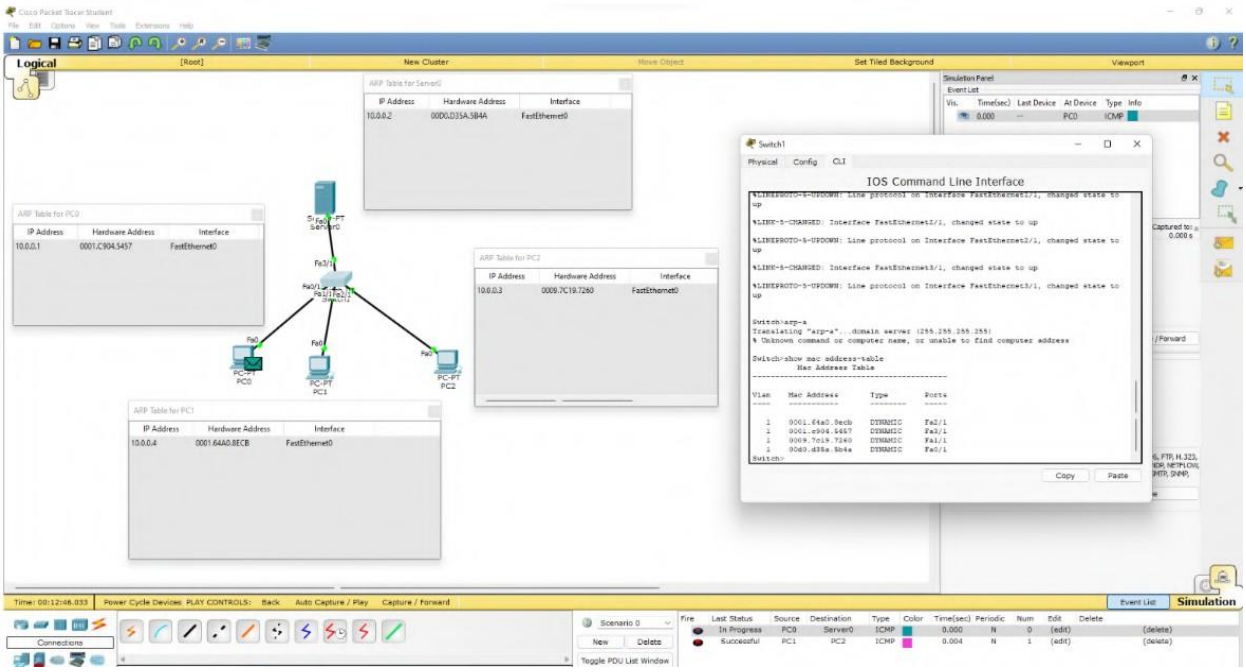
For the ping output, the reply is received only when both the routers & the switch recognize. And Ethernet 4/1 must be And change and vlan for the devices connected through vlan.

TOPOLOGY:



OUTPUT:

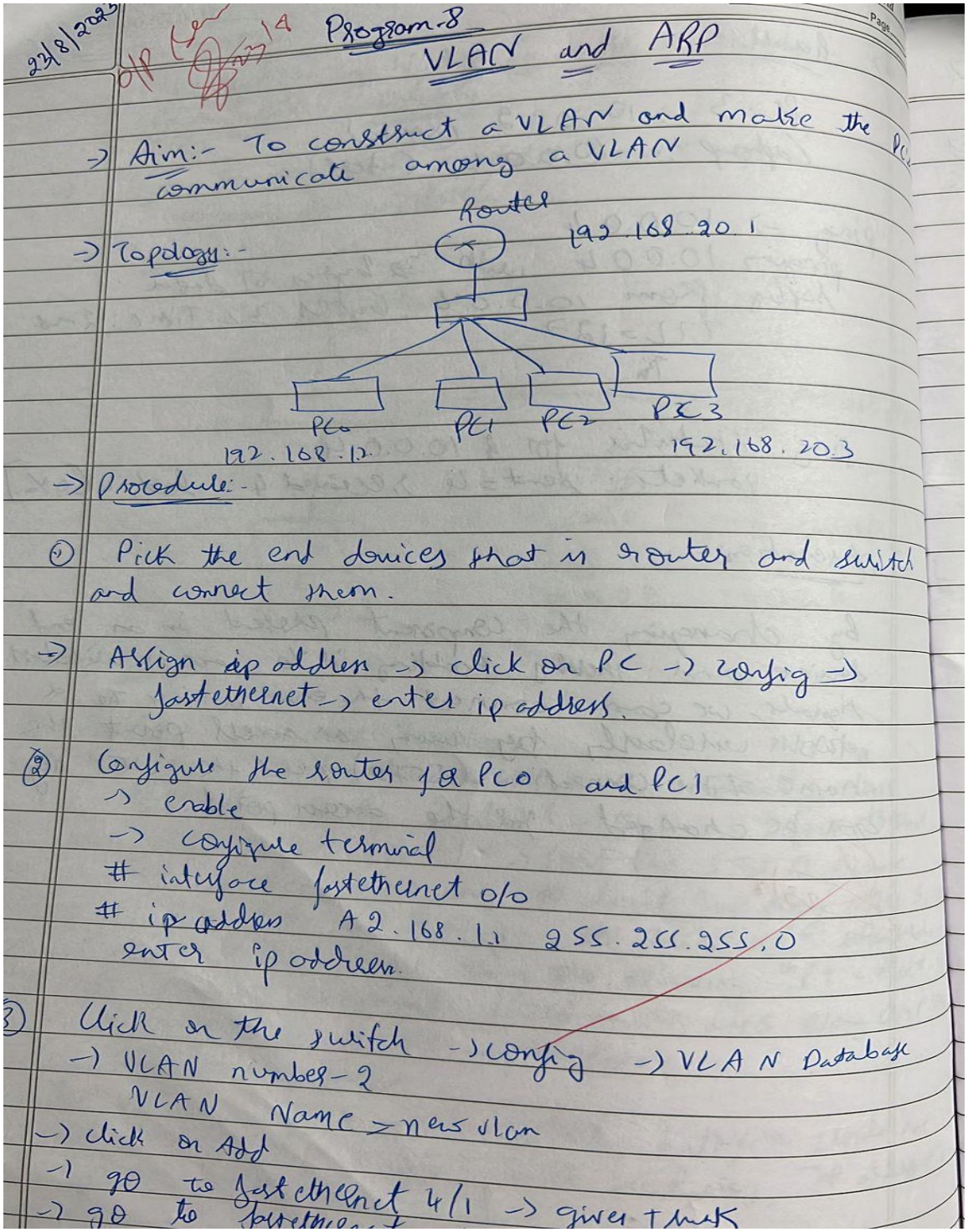



Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Switch1
Physical
Config
CLI
IOS Command Line Interface
Copy
Paste
Simulation
Event List

WEEK 9

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

OBSERVATION:



SURYA Gold

Date _____ Page _____

-> go to fastethernet 2/1 -> select VLAN -> 2
-> go to fastethernet 3/1 -> select VLAN -> 2

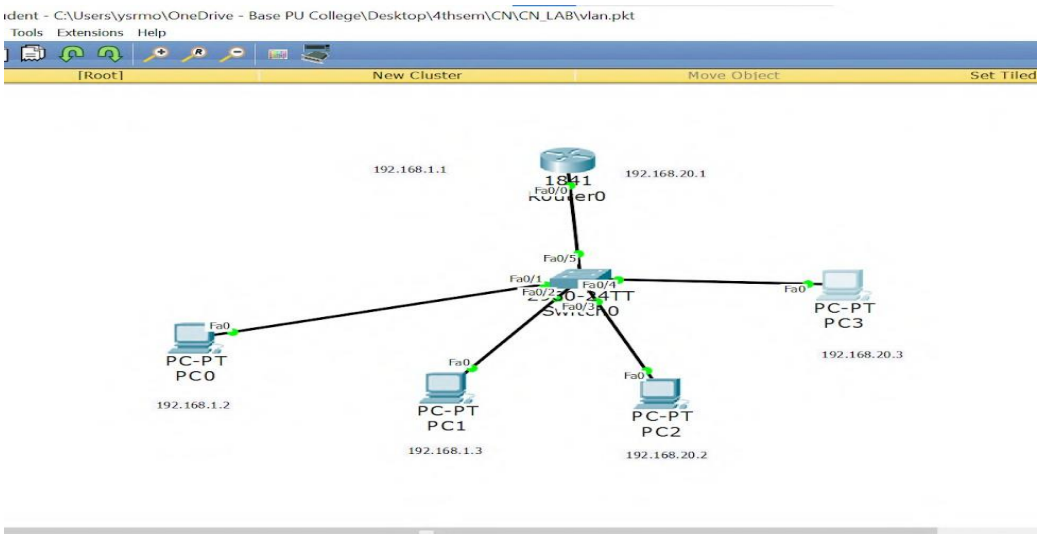
Click routers -> config -> VLAN database
->VLAN number=2
VLAN name = newlan
-> click add
-> go to CLI
-> exit
Ping the PC and observe the results.

Results:-
PC > ping 192.168.20.1
Reply from 192.168.20.1 bytes=32 time=3ms TTL=2
Reply from
}
;
Packets: sent=4 received=4 lost=0 (0% lo

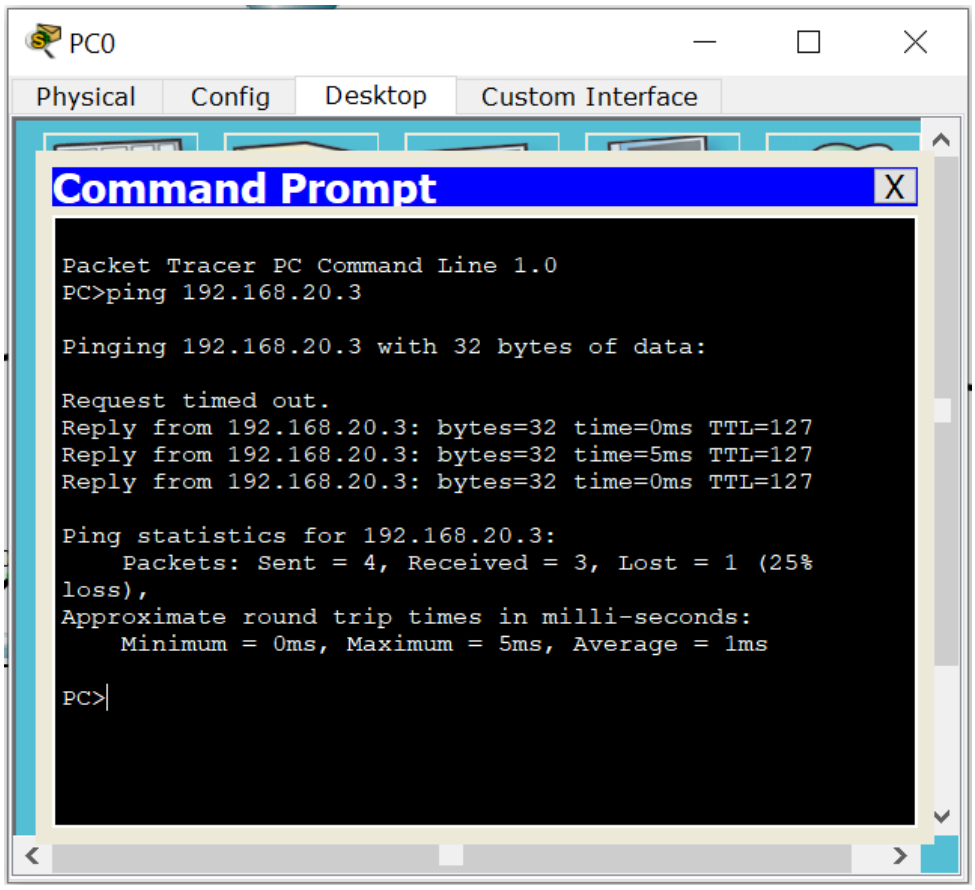
Observation:-

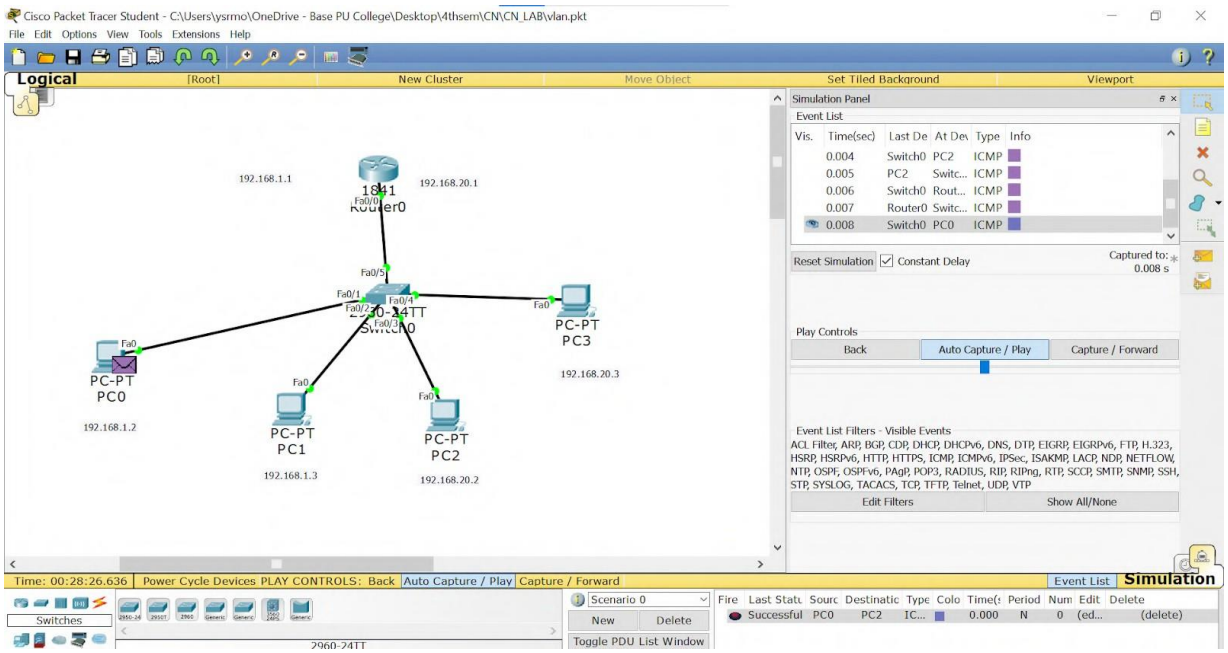
For the ping output, the reply is received only when both the routers & the switch recognize. And Ethernet 4/1 must be And change and vlan for the devices connected through vlan.

TOPOLOGY:


ident - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\vlan.pkt
Tools Extensions Help
[Root]
New Cluster
Move Object
Set Tiled
192.168.1.1
1841
Router0
192.168.20.1
Fa0/0
Fa0/5
Fa0/1
Fa0/2
Fa0/3
Fa0/4
2950-24TT
Switch0
Fa0
PC-PT
PC0
192.168.1.2
Fa0
PC-PT
PC1
192.168.1.3
Fa0
PC-PT
PC2
192.168.20.2
Fa0
PC-PT
PC3
192.168.20.3

OUTPUT:

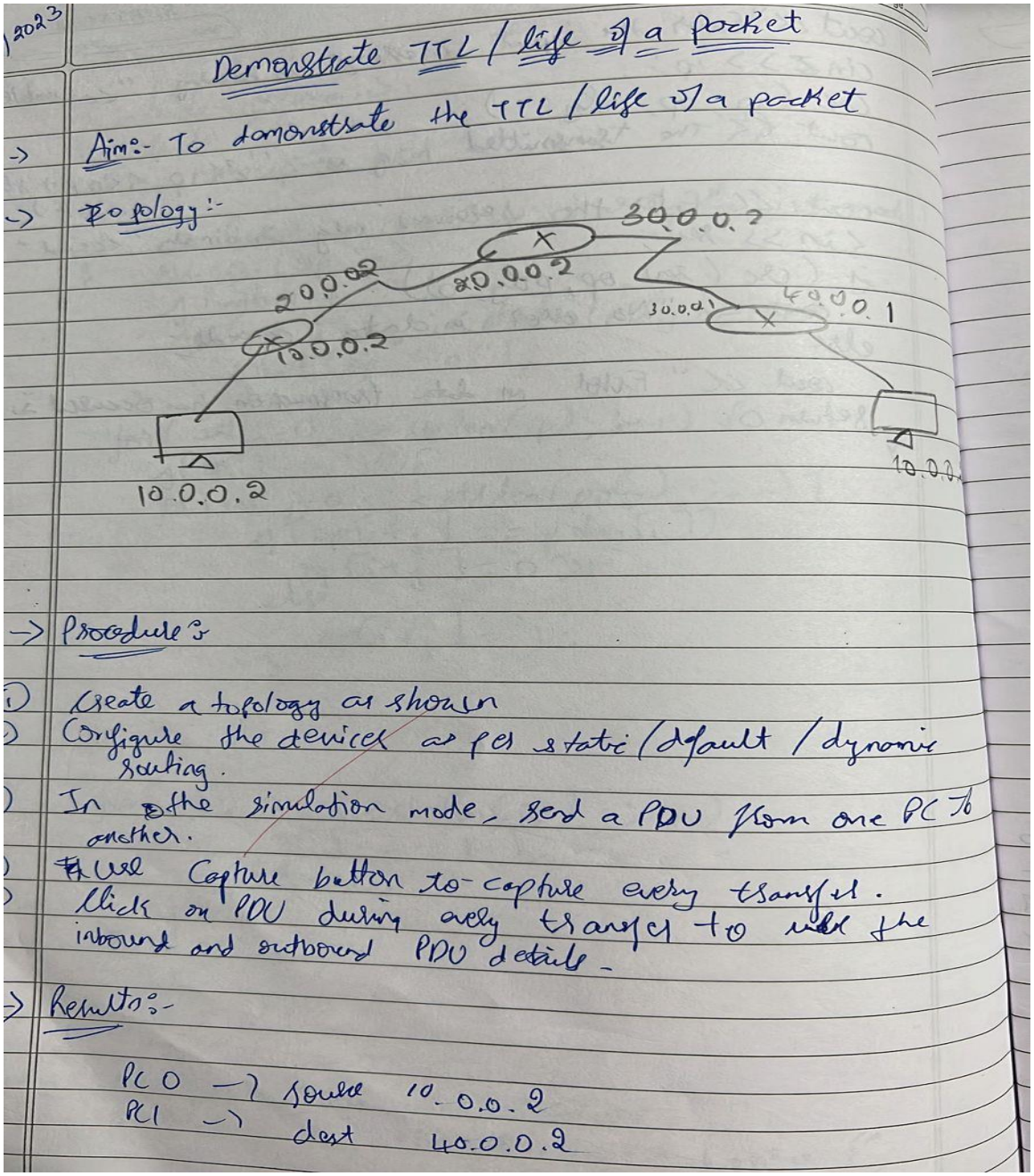

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.3: bytes=32 time=0ms TTL=127
Reply from 192.168.20.3: bytes=32 time=5ms TTL=127
Reply from 192.168.20.3: bytes=32 time=0ms TTL=127
Ping statistics for 192.168.20.3:
Packets: Sent = 4, Received = 3, Lost = 1 (25%
loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 5ms, Average = 1ms
PC>


Logical
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
192.168.1.1
192.168.20.1
192.168.1.2
192.168.1.3
192.168.20.2
192.168.20.3
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Simulation

WEEK 10

Demonstrate the TTL/ Life of a Packet.

OBSERVATION:



SURYA Gold
Date Page

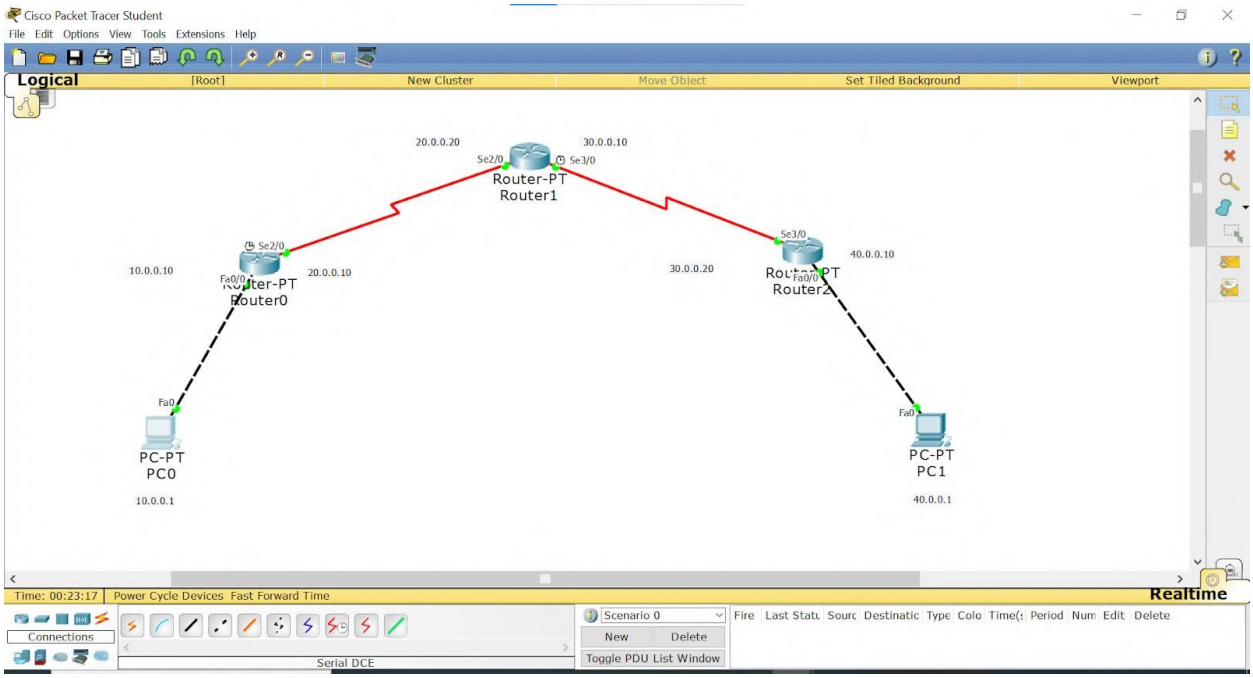
ping 40.0.0.2
pinging 40.0.0.2 with 32 bytes of data
Reply from 40.0.0.2 : bytes = 32 time = 2ms TTL = 127
Reply from 40.0.0.2 bytes of 32 time = 2ms TTL = 127

ping statistics for 40.0.0.2
packets : sent = 4, Received = 4, lost = 0 (0% loss

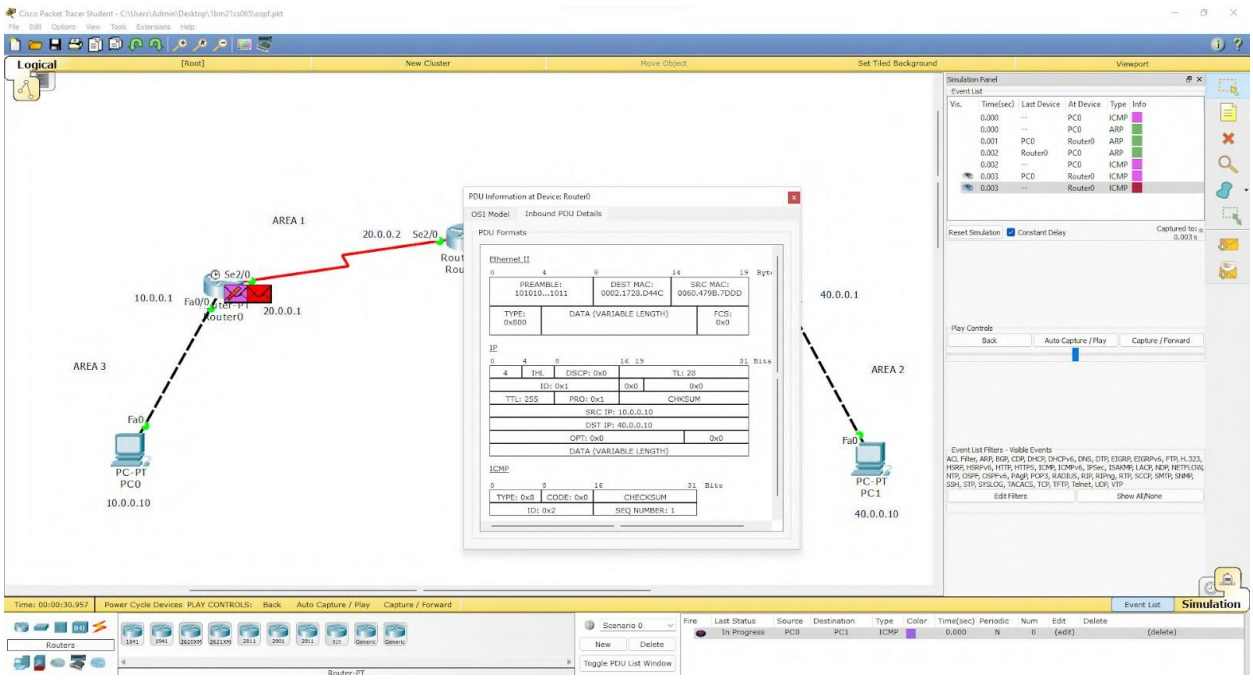
-> Observation:-

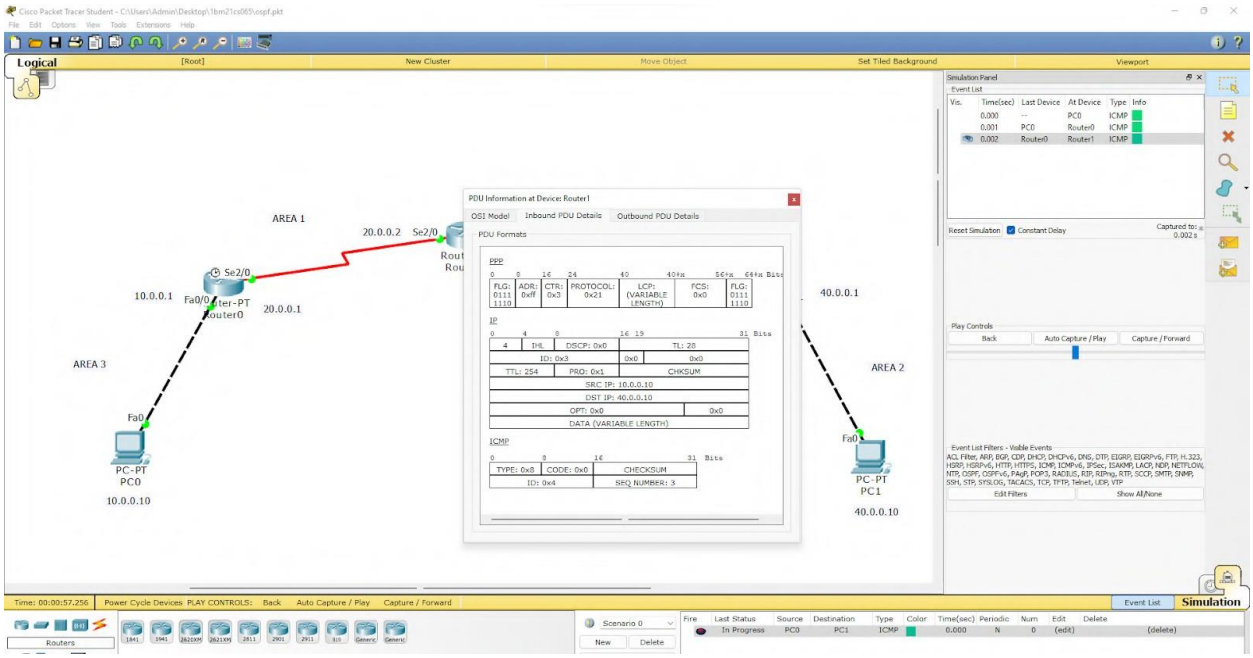
As the packet moves through each routes, its TTL field is decremented by 1. This can be seen by clicking on PDU each time. it is transferred from one routes to another. The representation of the PDU includes the IP packet form where the TTL field indicate the life of a packet

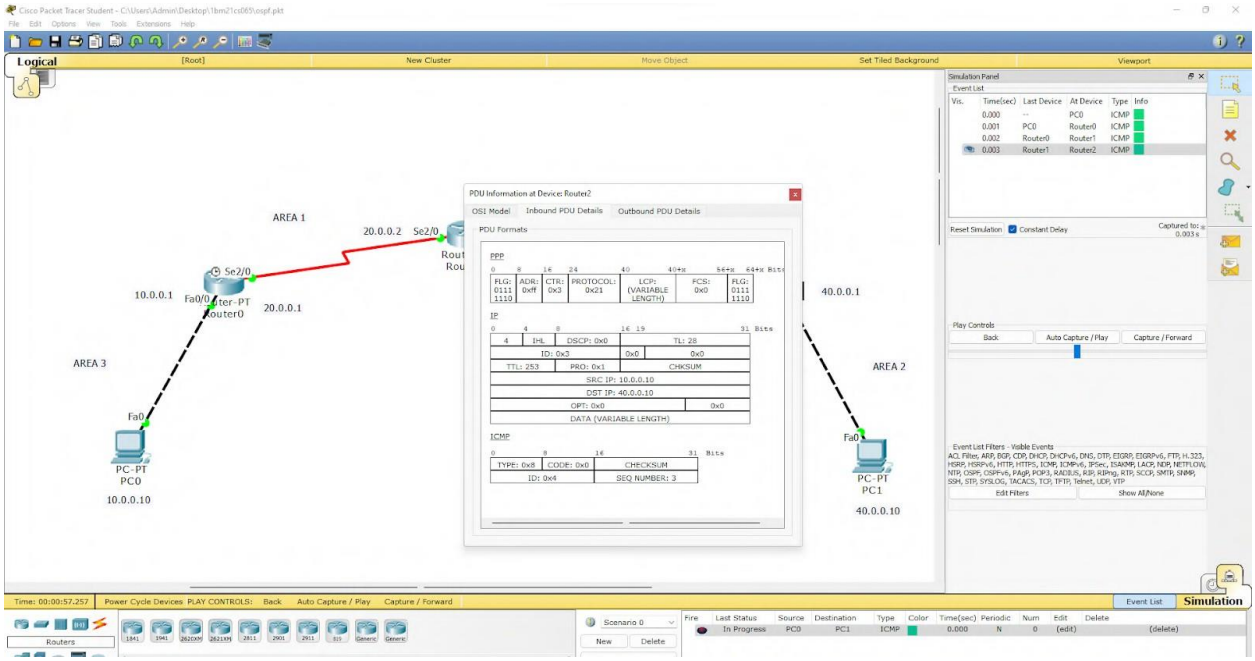
TOPOLOGY:

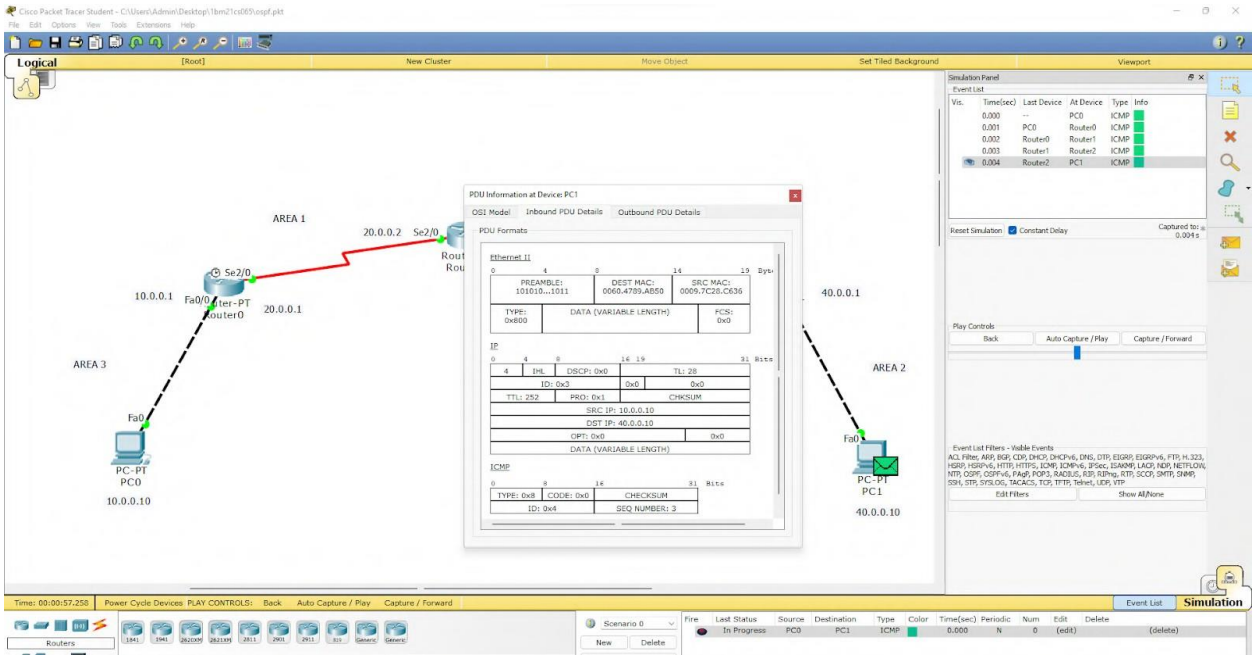


OUTPUT:




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
TYPE: 0x8
CODE: 0x0
CHECKSUM
SEQ NUMBER: 3
Simulation Panel
Event List
Time: 00:00:57.256
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation

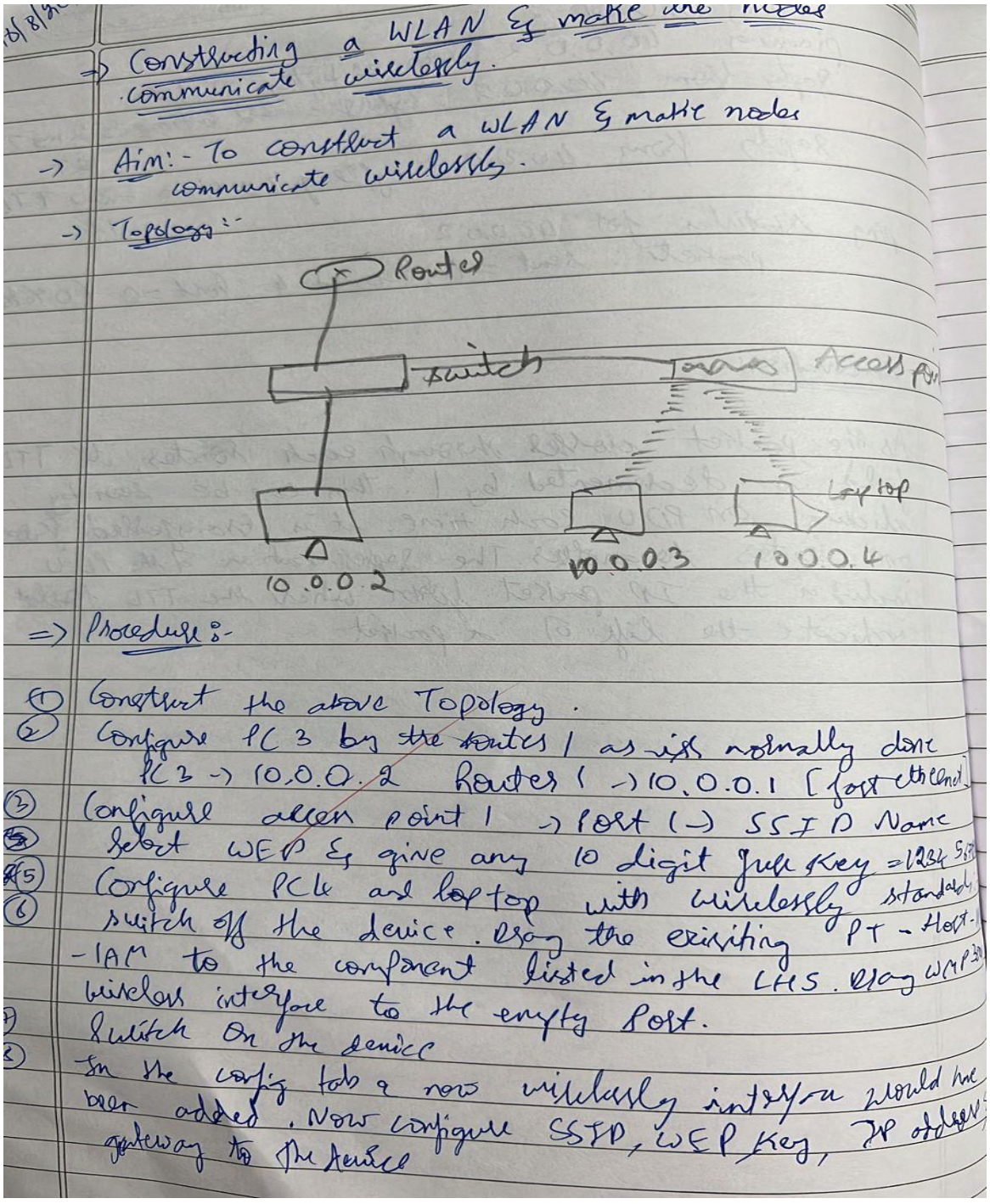

Logical
AREA 1
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
AREA 3
AREA 2
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
PC-PT
PC1
40.0.0.10
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
PPP
IP
ICMP
TTL: 253
TYPE: 0x8
CODE: 0x0
CHECKSUM
SEQ NUMBER: 3
Simulation Panel
Event List
Time: 00:00:57.257
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
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: PC1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 0060.4789.AB50
SRC MAC: 0009.7C28.C636
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
IHL
DSCP: 0x0
TL: 28
ID: 0x3
TTL: 252
PRO: 0x1
CHKSUM
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
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Time: 00:00:57.258
Power Cycle Devices
PLAY CONTROLS:
Routers
Scenario 0
New
Delete
Simulation

WEEK 11

To construct a WLAN and make the nodes communicate wirelessly

OBSERVATION:



SURYA Gold
Date Page

=> Result:-

PC-3 : 10.0.0.2 (Source)
Laptop :- 10.0.0.4 (dest)

ping -> 10.0.0.4
pinging 10.0.0.4 with 32 bytes of data.
Reply from 10.0.0.4 : bytes 32 Time: 2ms
TTL=128

Ping statistics for 10.0.0.4
Packets : Sent = 4 Received 4 Lost = 0 (0%)

=> Observation:-

By changing the component present in an end device and thereby enabling it to accept wireless signals, we can connect the end device to a network wirelessly by using an access point the name of the connection (SSID) / and the WEP key can be changed for the access point.

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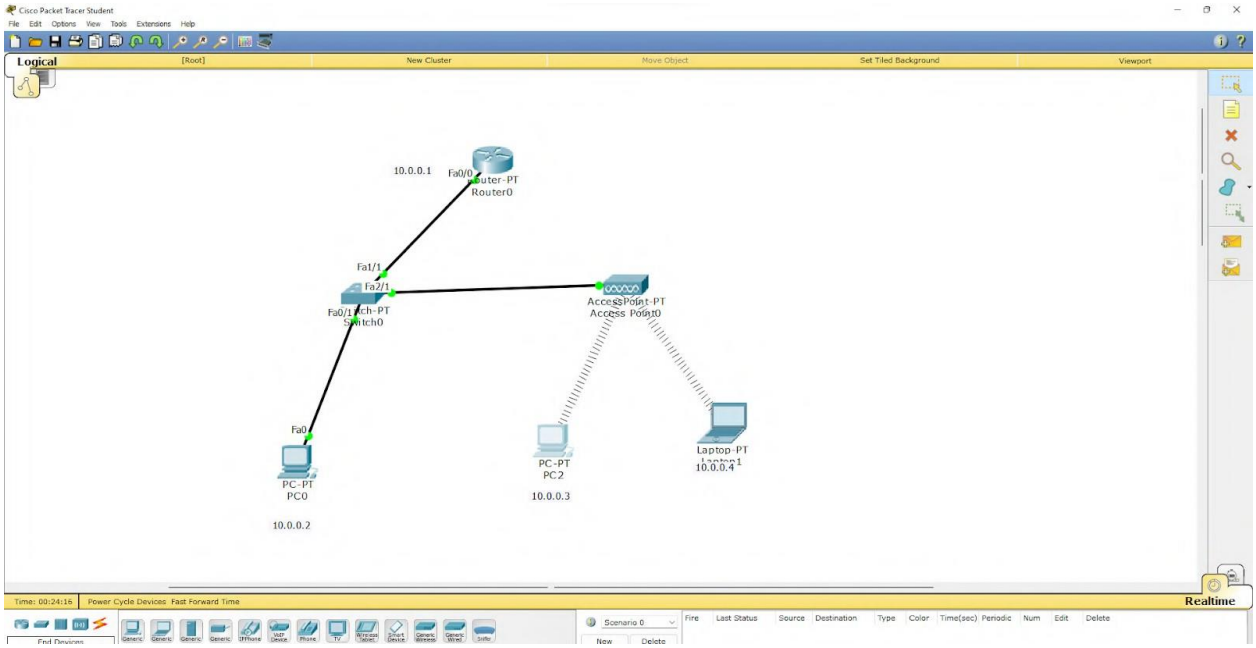
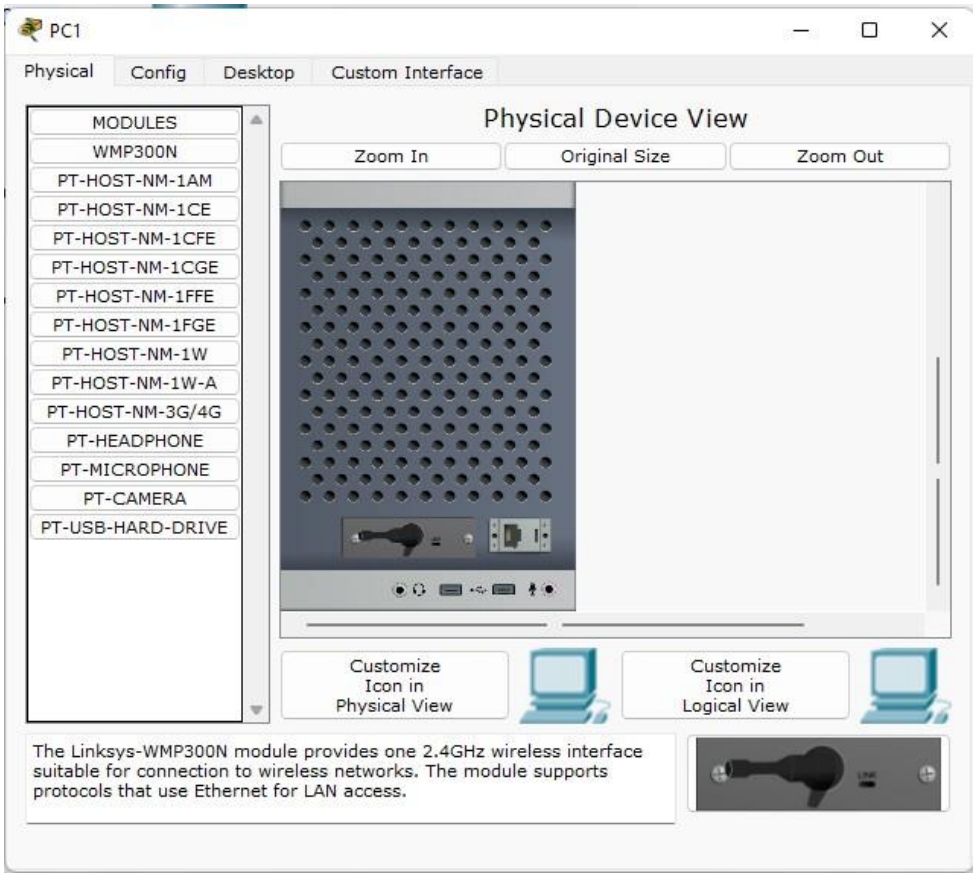
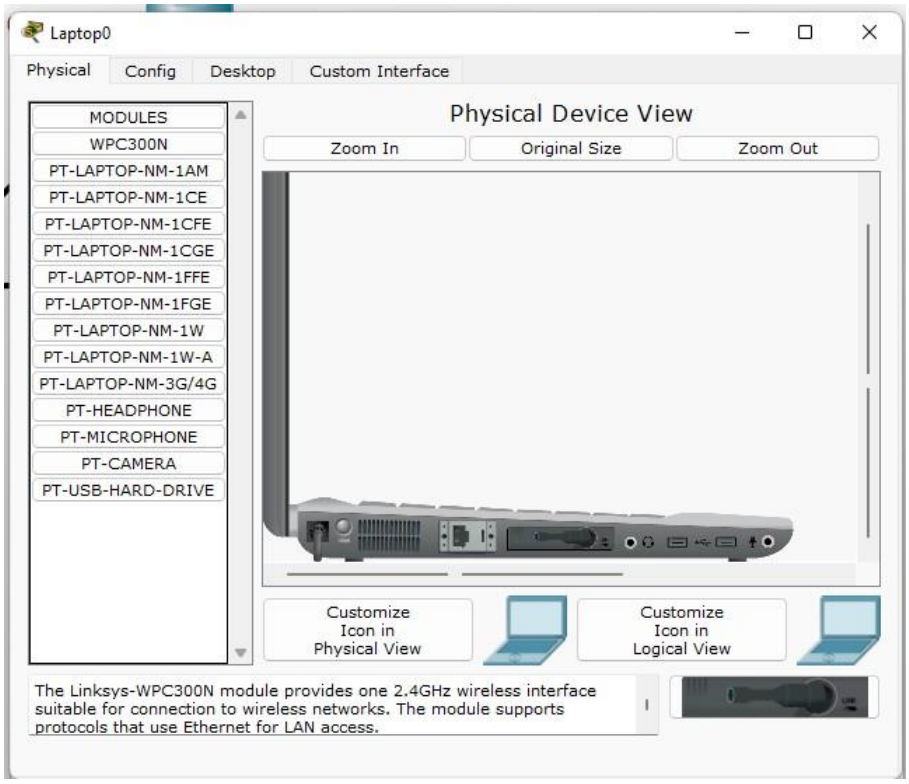
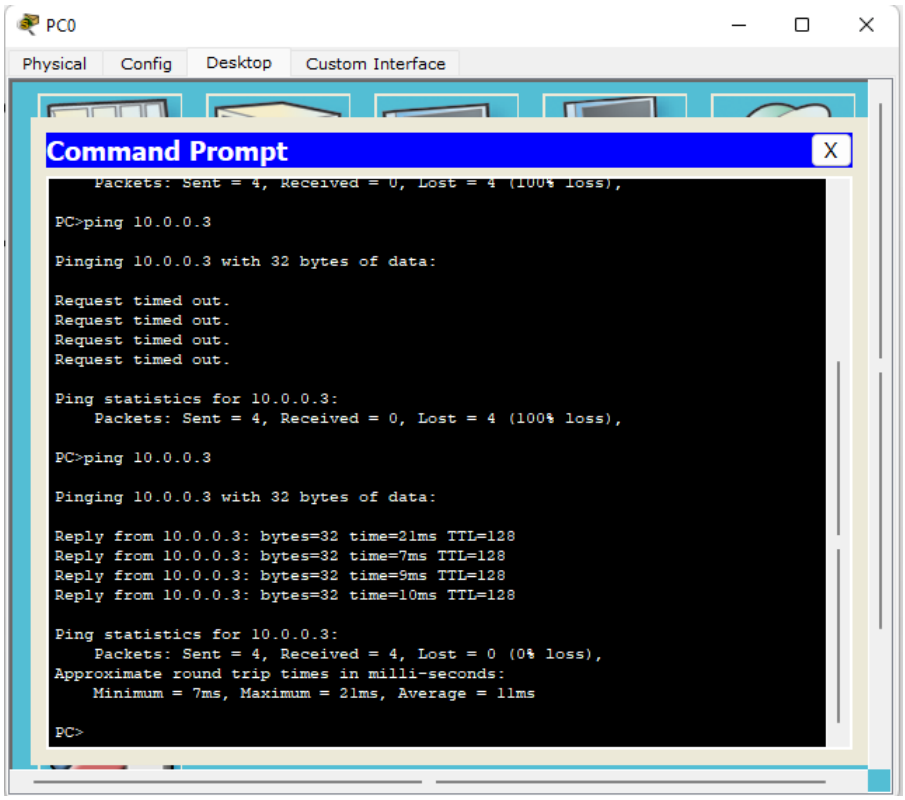
TOPOLOGY:


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>

WEEK 12

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

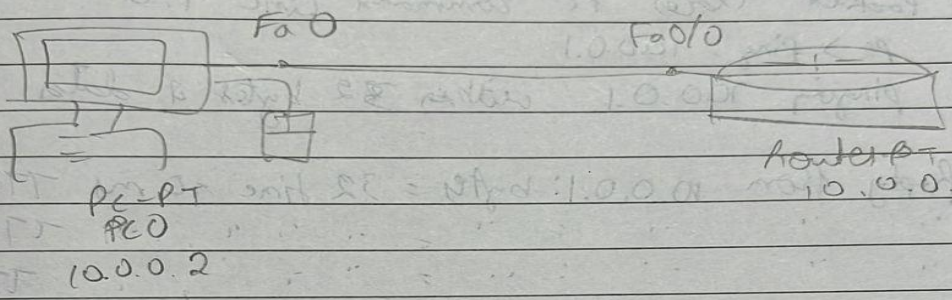
OBSERVATION:

TELNET

Date Page

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

Topology:-



Procedure:-

Create a topology as shown above

Configure the routes by executing the following co

-> enable
-> config T
-> hostname R1
-> enable secret p1
-> interface fastethernet 0/0
-> ip address 10.0.0.1 255.0.0.0
-> no shut
-> line vty 0 5
-> login

ping message to router
password for user exec verification PO
Accessing router CLI from PC
show ip route

→ Ping output:-

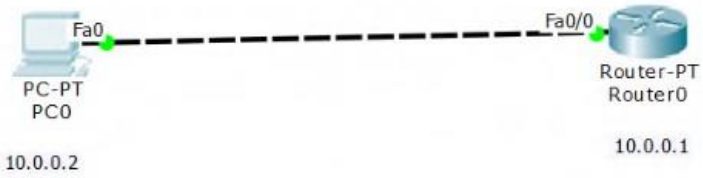
Packet Tracer PC command Line 1.0
PC > Ping 10.0.0.1
pinging 10.0.0.1 with 32 bytes of data

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

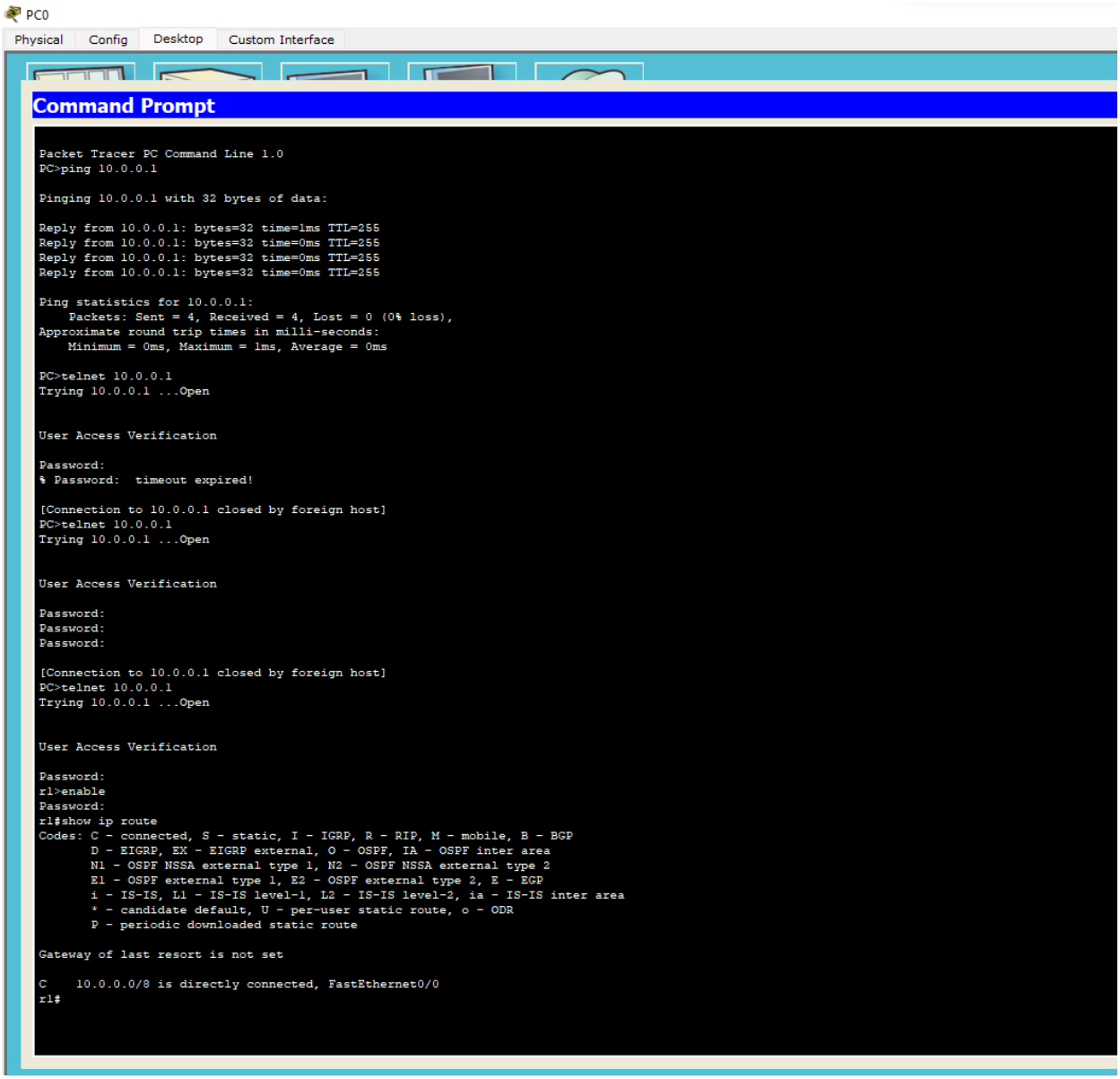
→ Ping statistics- for 10.0.0.1
Typing 10.0.0.1 : open
User Access verification
Password : PO
1> enable
Password : P1 :
Show ip route

C 10.0.0.0/8 is directly connected, fastethernet

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:
rl>enable
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#

WEEK 13

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

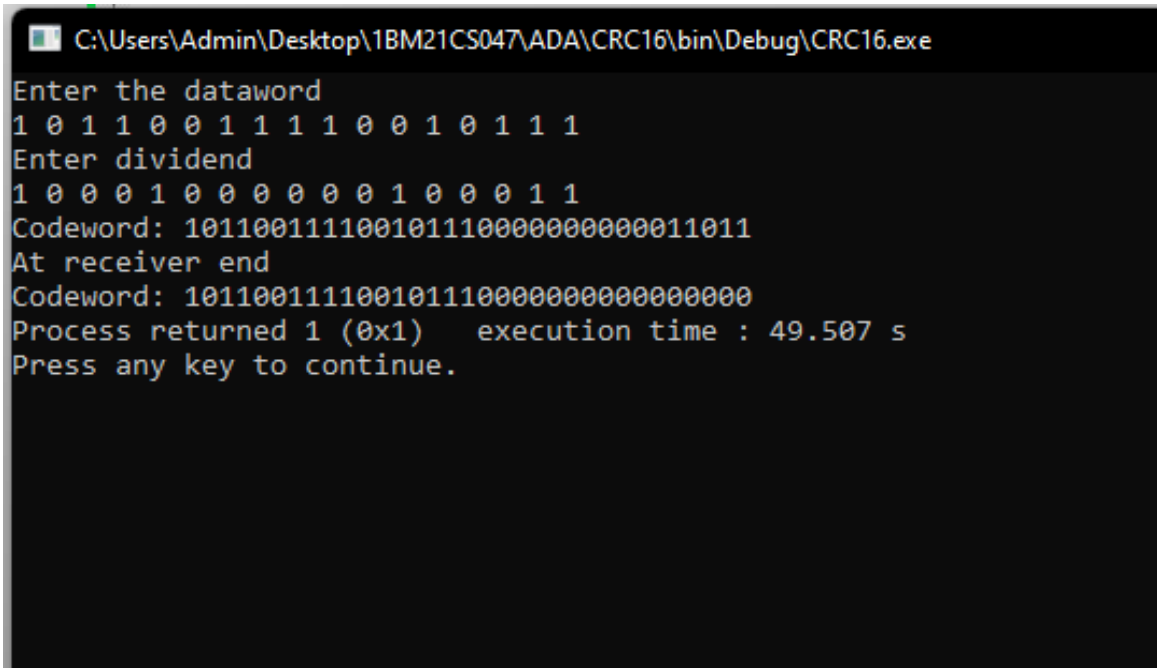
CODE:

```
#include<stdio.h>
int arr[17];

void xor(int x[], int y[])
{
   int k=0;
   for(int i=1;i<16;i++)
   {
      if(x[i]==y[i])
         arr[k++]=0;
      else
         arr[i]=1;
   }
}

void main()
{
   int dd[17],div[33],ze[17],i,k;

   printf("Enter the dataword \n");
   for(i=0;i<17;i++)
      scanf("%d",&div[i]);

   for(i=i;i<33;i++)
      div[i]=0;

   for(i=0;i<17;i++)
      ze[i]=0;
   printf("Enter dividend \n");
```

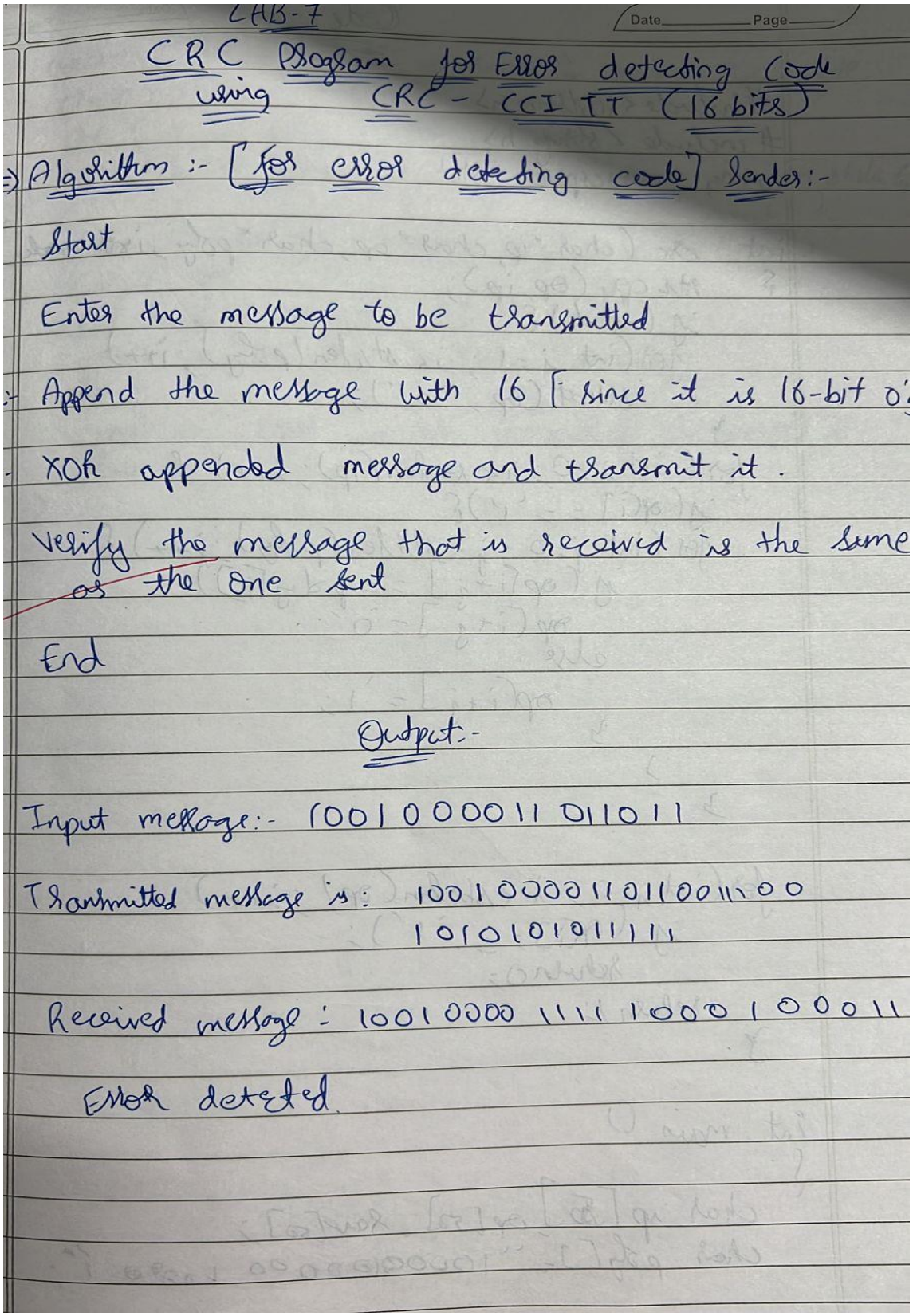
```
for(i=0;i<17;i++)
   scanf("%d",&dd[i]);

i=0;
k=0;
   for(i=i;i<17;i++)
      arr[k++]=div[i];
while(i<33)
{
   if(arr[0]==0)
      xor(arr,ze);
   else
      xor(arr,dd);

   arr[16]=div[i++];

}
k=0;
for(i=17;i<33;i++)
   div[i]=arr[k++];
printf("Codeword: ");
   for(i=0;i<33;i++)
      printf("%d",div[i]);

for(i=0;i<17;i++)
   arr[i]=0;

printf("\nAt receiver end \n");

 k=0;
   for(i=i;i<17;i++)
      arr[k++]=div[i];
while(i<33)
{
```

```
        if(arr[0]==0)
            xor(arr,ze);
        else
            xor(arr,dd);

        arr[16]=div[i++];

    }
    k=0;
    for(i=17;i<33;i++)
        div[i]=arr[k++];

    printf("Codeword: ");
        for(i=0;i<33;i++)
            printf("%d",div[i]);
}
```

OUTPUT:



OBSERVATION:



LAB-7

Date Page

CRC Program for Error detecting code using CRC - CCITT (16 bits)

Algorithm :- [for error detecting code] Sender:-

Start

Enter the message to be transmitted

Append the message with 16 [since it is 16-bit C

XOR appended message and transmit it.

Verify the message that is received is the same as the one sent

End

Output:-

Input message:- 1001000011011011

Transmitted message is: 1001000011011001110001010101111111

Received message : 10010000 1111 1000 1000 11

Error detected

Code:-

```
#include <iostream.h>
#include <string.h>
using namespace std

int crc (char *ip, char *op, char *poly, int mode)
{ strcpy (op, ip);
  if (mode) {
   for(int i=1; i< strlen(poly); i++)
     strcat (op, "0");
  }
 for( int i=0; i< strlen(ip); i++) {
  if(op[i] == '1'){
  for (int j=0; j< strlen(poly); j++) {
      if (op[i+j] == poly[j])
        op[i+j] = '0';
      else
        op[i+j] = '1';
      }
    }
  }

for(int i=0; i < strlen(op); i++)
    if (op[i] == '1');
      return 0;
  return 1;
}

int main ()
{
  char ip[50], op[52], rev[50];
  char poly[];
```

```
cout<<"Enter the input message in binary: "<<endl;
cin>>ip;
crc(ip, op, poly, 1);
cout<<"The transmitted msg is: "<<ip<<op+string(1,
                                  <<endl);
cout<<"Enter the received msg in binary"<<endl;
cin>>rev;
if (crc(rev, op, poly, 0))
  cout<<"No error in data"<<endl;
else
  cout<<"Error in data transmission has occured";
return 0;
}
```

WEEK 15

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.

CODE:

ClientTCP.py

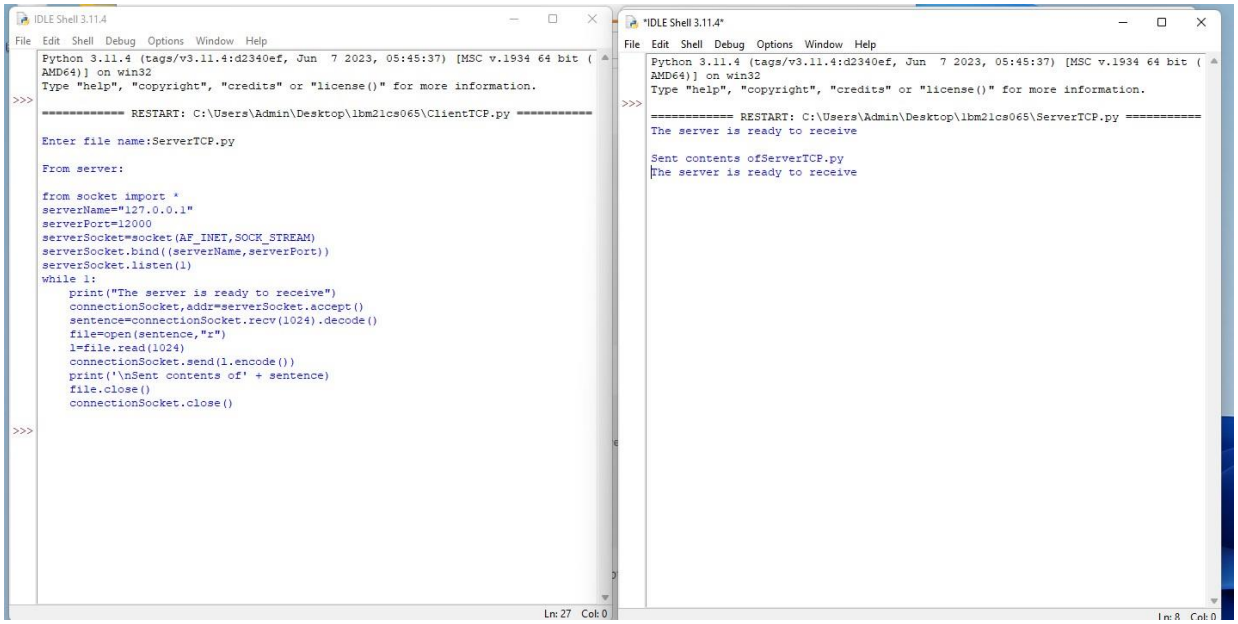
```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName,serverPort))
sentence = input("\nEnter file name: ")
clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print ("\nFrom Server:\n")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

ServerTCP.py

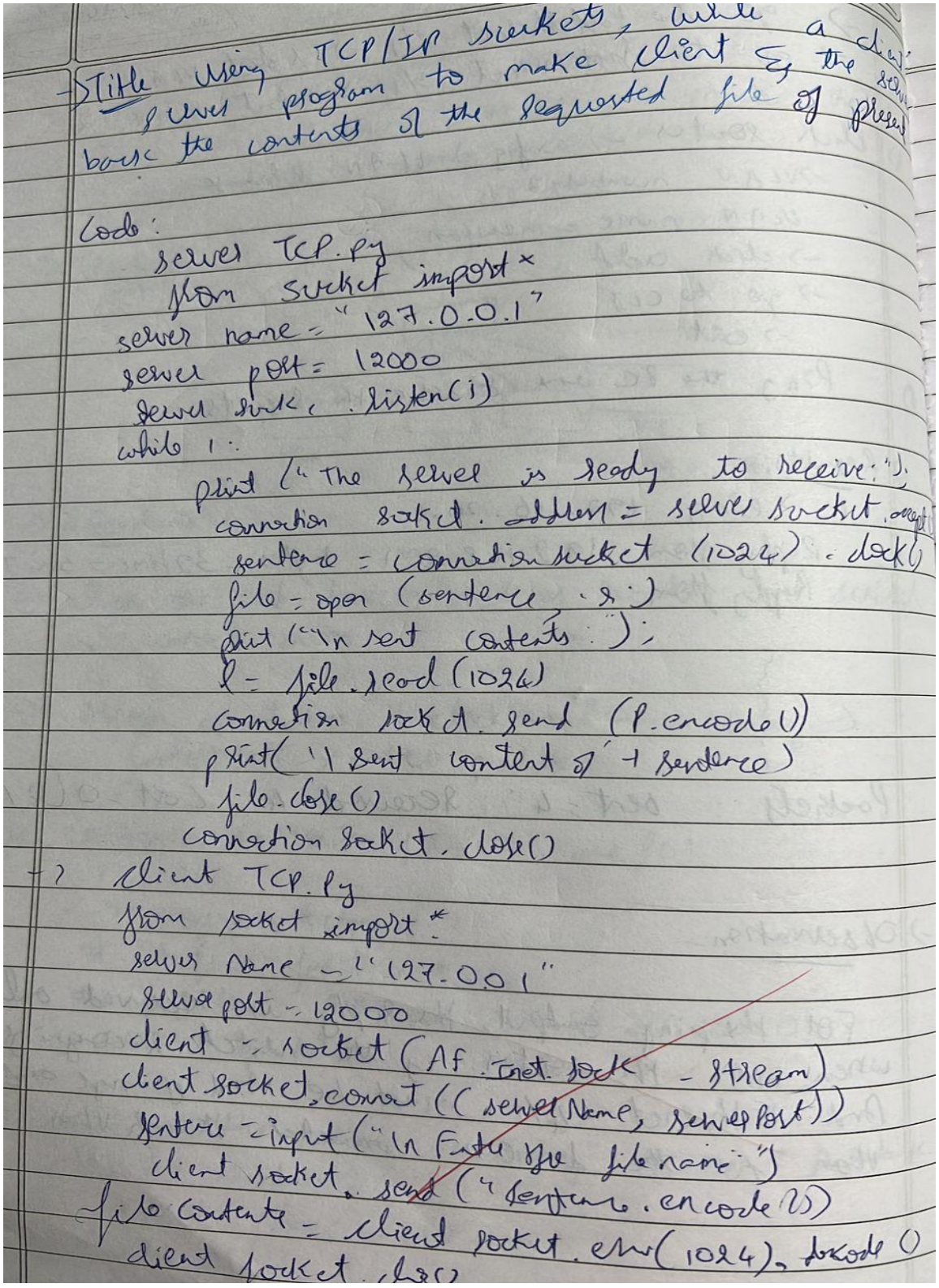
```
from socket import *
serverName="127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_INET,SOCK_STREAM)
serverSocket.bind((serverName,serverPort))
serverSocket.listen(1)
while 1:
print ("The server is ready to receive")
connectionSocket, addr = serverSocket.accept()
sentence = connectionSocket.recv(1024).decode()
file=open(sentence,"r")
l=file.read(1024)
connectionSocket.send(l.encode())
```

print (“\nSent contents of “ + sentence)
file.close()
connectionSocket.close()

OUTPUT:



OBSERVATION:



Title: Using TCP/IP sockets, write a client server program to make client & the server bank the contents of the requested file & present

Code:

server TCP.py

```
from socket import *
server name = "127.0.0.1"
server port = 12000
Server sock, .listen(1)
while 1:
    print ("The server is ready to receive:");
    connection socket. addrem = server socket.accept()
    sentence = connection socket (1024) . decode()
    file = open (sentence, 'r')
    print ("\n sent contents:");
    l = file.read (1024)
    connection socket. send (l.encode())
    print("\n Sent content of" + sentence)
    file.close()
  connection socket. close()
```

→ client TCP.py

```
from socket import *
server Name = "127.0.0.1"
server port = 12000
client = socket (Af. Inet. Sock - Stream)
client socket. connect ((server Name, server Port))
sentence = input ("\n Enter the file name:")
client socket. send (sentence. encode())
file contents = client socket. recv(1024). decode()
client socket. close()
```

Output:-

Server TCP.py
The server is ready to recieve
client TCP.py
Enter file name : d:\jgiri\CN\TCP\server TCP.py

from server:
from socket import *
server name = "127.0.0.1"
Server PORT = 12000
Server Socket = Socket (AF_INET, SOCK_STREAM)
serv socket.bind ((server name, Server Port))
Servsocket.listen()

while (1)
print ("The server is ready to recieve");
connection Socket.addr = server socket accept()
sentence = connection Socket.recv(1024).decode()
file = open (sentence, "r")
l = file.read(1024)
connection socket.sent(l.encode)
print ("\n sent contents of " + sentence)
fil.close()
connection socket.close()

server TCP.py
The server is ready to recieve
sent contents of d:\jgiri\CN\TCP\client TCP
The server is ready to receive.

WEEK 16

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

CODE:

ClientUDP.py

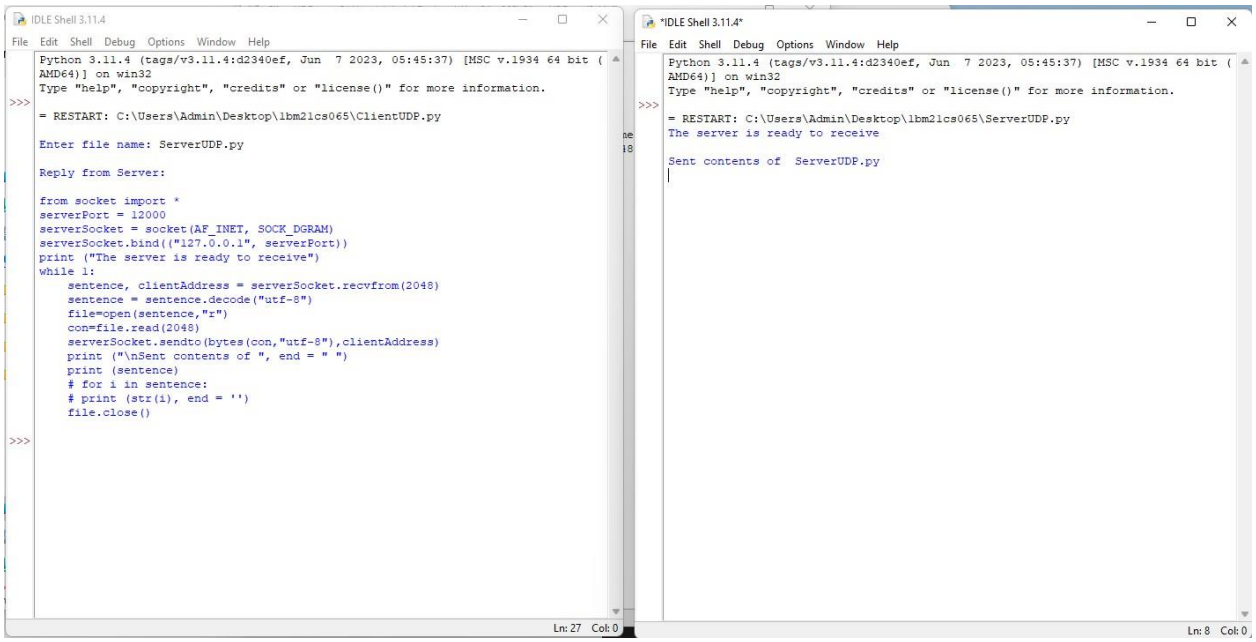
```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_DGRAM)
sentence = input("\nEnter file name: ")
clientSocket.sendto(bytes(sentence,"utf-8"),(serverName, serverPort))
filecontents,serverAddress = clientSocket.recvfrom(2048)
print ("\nReply from Server:\n")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

ServerUDP.py

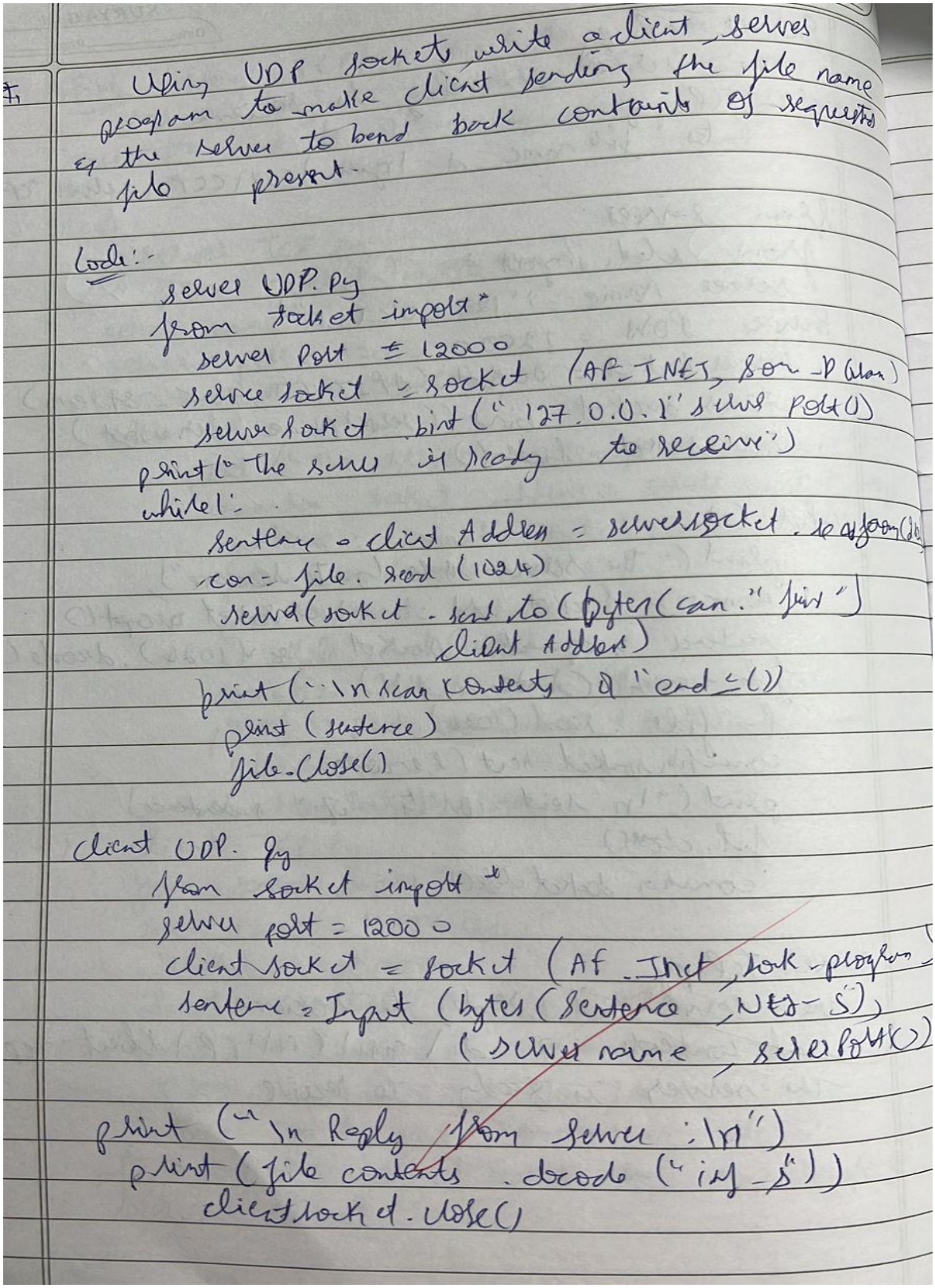
```
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort))
print ("The server is ready to receive")
while 1:
sentence, clientAddress = serverSocket.recvfrom(2048)
sentence = sentence.decode("utf-8")
file=open(sentence,"r")
```

```
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:



OBSERVATION:



Using UDP socket write a client server program to make client sending the file name & the server to send back contents of requested file present.

Code:-

server UDP.py

```
from socket import *
server port = 12000
server socket = socket (AF_INET, SOCK_DGRAM)
server socket.bind ("127.0.0.1", server port())
print ("The server is ready to receive")
while 1:
    sentence, client Address = server socket.recvfrom(
    con = file.read (1024)
    send(socket.sendto(bytes(con."utf")
                       client Address)
    print ("\n sent contents of "end=())
    print (sentence)
    file.close()
```

client UDP.py

```
from socket import *
server port = 12000
client socket = socket (AF_INET, SOCK_DGRAM)
sentence = input (bytes (sentence, "UTF-8"),
                  (server name, server port())

print ("\n Reply from server :\n")
print (file contents.decode ("utf-8"))
client socket.close()
```

Date Page

Server UDP.py
client UDP.py

Enter file name : d:\gautham\CN(UDP)\server(UDP).p
Reply from server
from socket import *
serverport = 12000
serverSocket = socket(AF_INET, SOCKDGRAM
print("The server is ready to recieve")

while(1):
sentence = sentence.decode(utf-8)
file = open(sentence,"r")
serverSocket.sendto(bytes(con,"utf-8"), clientaddress)

print(sentence)
file.close()

Server UDP.py
the server is ready to receive
sent contents of d:\gautham\CN\UDP\server.UDP

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