VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT

On

Computer Networks

(22CS4PCCON)

Submitted by:

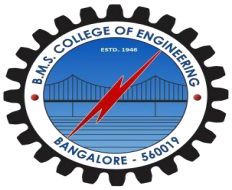
Chanchal Bhati (1BM21CS042)

in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING



B.M.S. COLLEGE OF ENGINEERING

(Autonomous Institution under VTU)

BENGALURU-560019

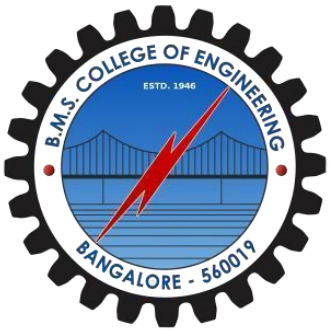
June 2023 - August 2023

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 **Chanchal Bhati(1BM21CS042),** 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 2022-23. The Lab report has been approved as it satisfies the academic requirements in respect of **COMPUTER NETWORKS- (22CS4PCCON)** work prescribed for the said degree.

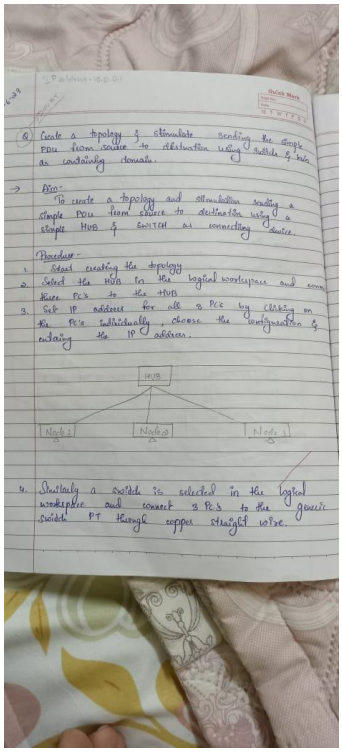
Prof.M Lakshmi Neelima	**Dr. Jyothi S Nayak**
Assistant Professor	Professor and Head
Department of CSE	Department of CSE
BMSCE, Bengaluru	BMSCE, Bengaluru

INDEX

CYCLE-1
WEEK1

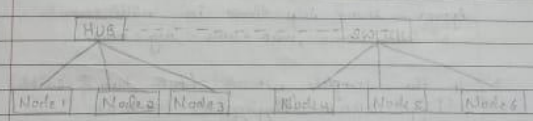
Create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate ping messages.

OBSERVATION :



5. Set the IP address for all 6 PC's by clicking on Pc, navigating to the config & entering the IP address.

6. Now connect the HUB & the SWITCH with the help of a copper-cross over wire. This completes the designing of the required topology.



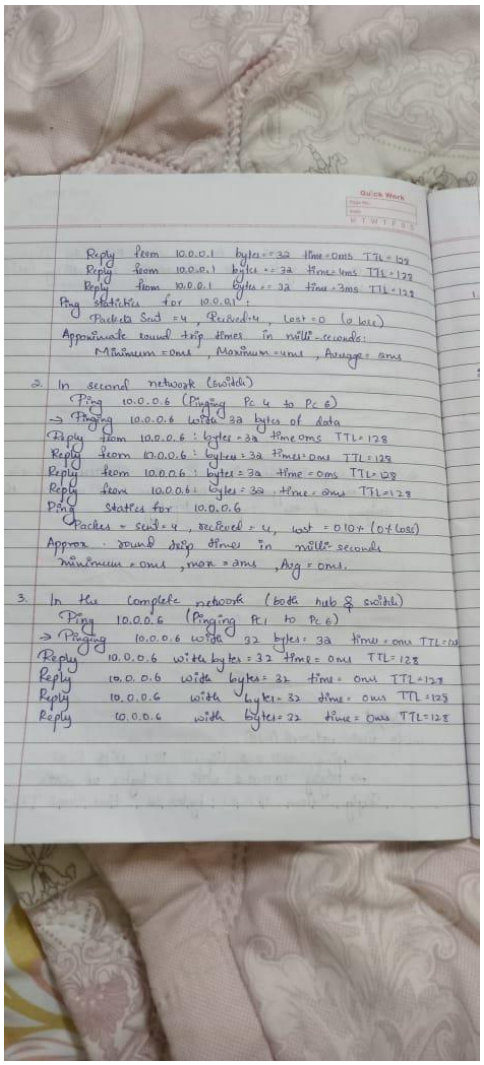
Output:

1. In first network (HUB),

Ping 10.0.0.2 (Pinged Pc1 with Pc3)

→ Pinging 10.0.0.2 with 32 bytes of data

Reply from 10.0.0.1 : bytes=32 time=4ms TTL=128



Reply from 10.0.0.1 bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.1 bytes = 32 time = 1ms TTL = 128
Reply from 10.0.0.1 bytes = 32 time = 3ms TTL = 128
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 = 4ms, Average = 0ms

2. In second network (switch)
Ping 10.0.0.6 (Pinging Pc 4 to Pc 6)
→ Pinging 10.0.0.6 with 32 bytes of data
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Ping statics for 10.0.0.6
Packets = sent = 4, received = 4, lost = 0 (0% loss)
Approx : round trip times in milli seconds
Minimum = 0ms, max = 0ms, Avg = 0ms.

3. In the complete network (both hub & switch)
Ping 10.0.0.6 (Pinging PC1 to Pc 6)
→ Pinging 10.0.0.6 with 32 bytes: 32 time = 0ms TTL = 128
Reply 10.0.0.6 with bytes = 32 time = 0ms TTL = 128
Reply 10.0.0.6 with bytes = 32 time = 0ms TTL = 128
Reply 10.0.0.6 with bytes = 32 time = 0ms TTL = 128
Reply 10.0.0.6 with bytes = 32 time = 0ms TTL = 128

Quick Work

Page No.
Date
M T W T F S S

Observation -

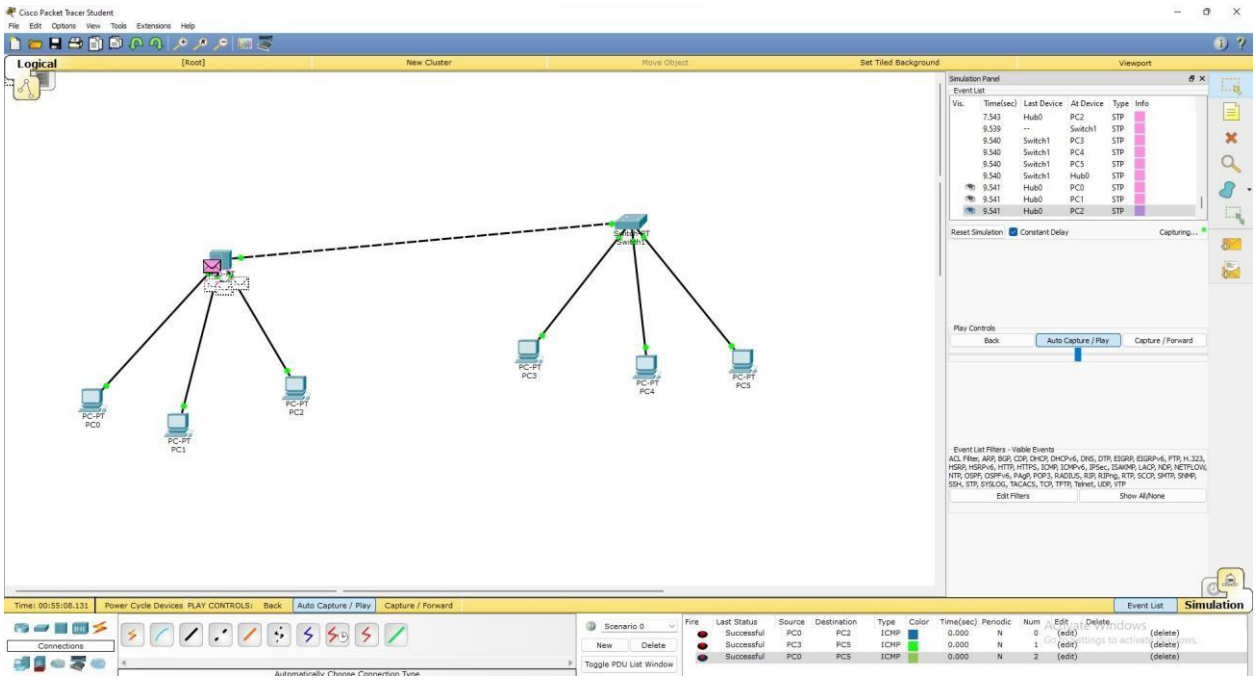
1. When a packet is sent from Pc 1 to Pc 3 that are connected to the HUB it is broadcasted to all the Pc, but acknowledgment is recived from only the addressed Pc.

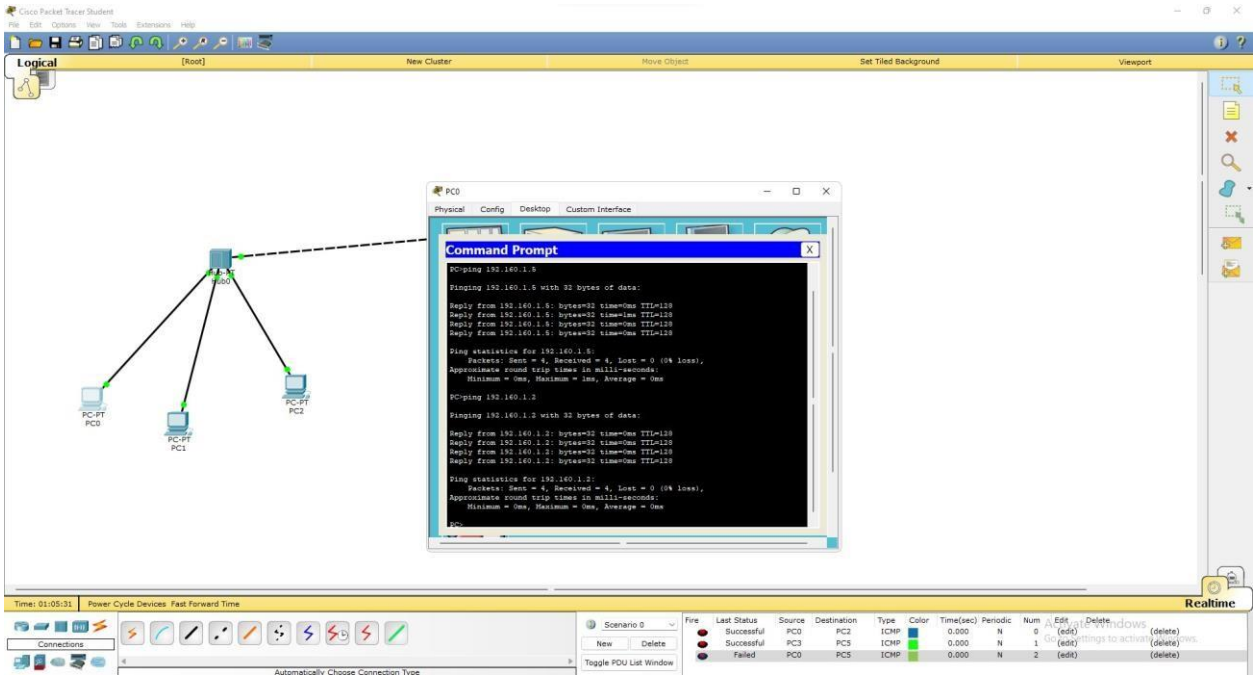
2. When Packet is sent from Pc4 to Pc 6 connected to a switch at first it is broadcasted to all addressed Pc but from next time it is only unicasted that is sent to the add. Pc.

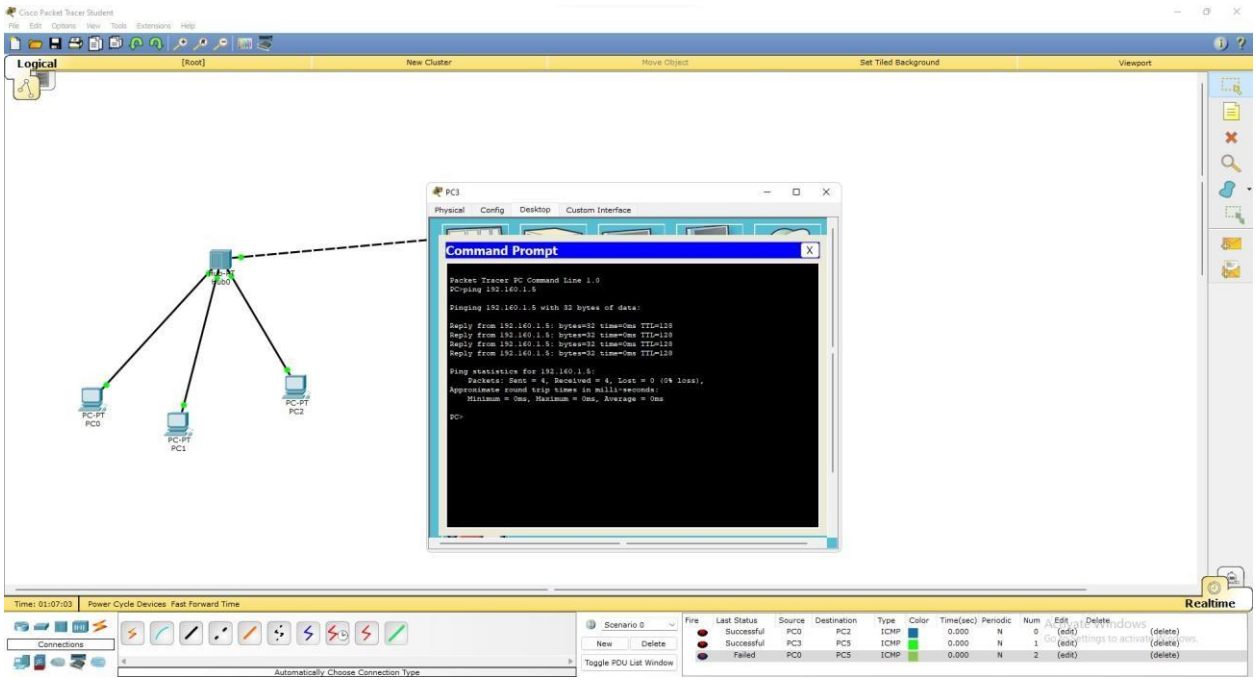
3. When Packet is sent from Pc 1 to Pc 6 that are connected to HUB & switch, which are also connected to HUB but no ackn is recived & it is only sent to the addressed Pc though switch & ackt is also received only for it.

15/6/2023

OUTPUT:


Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Reset Simulation
Constant Delay
Capturing...
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
PC-PT PC4
PC-PT PC5
Time: 00:55:08.131
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
Successful PC0 PC2 ICMP 0.000 N 0 (edit) (delete)
Successful PC3 PC5 ICMP 0.000 N 1 (edit) (delete)
Successful PC0 PC5 ICMP 0.000 N 2 (edit) (delete)


Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
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=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
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>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-PT PC0
PC-PT PC1
PC-PT PC2
Time: 01:05:31
Power Cycle Devices Fast Forward Time
Realtime
Connections
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 0.000 N 1 (edit) (delete)
Failed PC0 PC5 ICMP 0.000 N 2 (edit) (delete)



WEEK2

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

OBSERVATION:

22/06/23

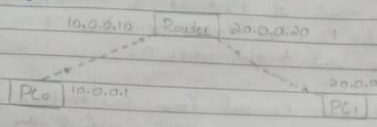
Quick Work

M T W T F S S

8. Configure IP address to routers in packet tracer. Capture the following messages: ping responses, destination unreachable, request timeout, reply.

→ Aim: To configure IP address to router in packet tracer and get ping responses - Request timed out, reply

Topology:



Procedure:

- 2 PC's are connected to a router using copper crossover
- IP addresses are set for PC's and router
- IP addresses for routers is set by giving following commands:

```
router > enable
router # config t
router(config-if) # ip address 10.0.0.10 255.0.0.0
router (config-if) # no shut
router (config-if) # exit
router (config) # interface fastethernet 1/0
router (config-if) # ip address 20.0.0.10 255.0.0.0
router (config-if) # no shut
router (config-if) # exit
```

After all IP are set, Ping message is sent

Quick Work

M T W T F S S

- Result - PC > ping 20.0.0.10

Pinging 20.0.0.10 with 32 bytes of data

Request time 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 = 0ms TTL = 127

Ping statistics for 20.0.0.1

Packets sent = 4, recieved = 3, lost = 1 (25% loss),

approximate round trip times in milli-seconds

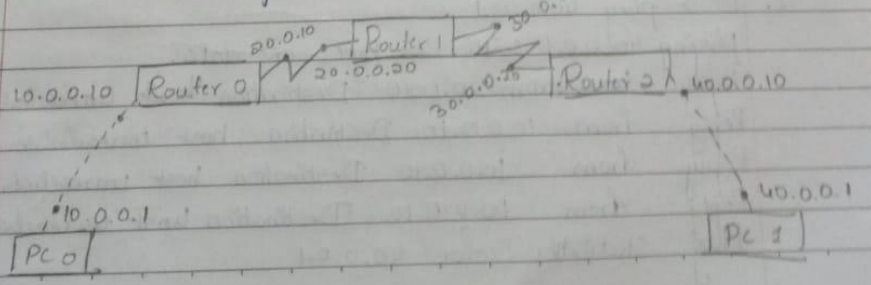
Minimum = 0ms, Maximum = 0ms, Average = 0ms.

- Observation

PC 0 is in network 10.0.0.0 and PC 1 is in 20.0.0.0. Hence we use router to connect them when a ping message is send from PC 10.0.0.1 to 20.0.0.1 the message reaches the destination through router. when a message is send, the router captures it and sends to the destination PC which is in another network.

→ Solution: ab

Aim: To configue IP address to routers in packet tracer and get ping responses, destination host unreachable replies.



- Procedure
- Connect two corresponding routers using copper cross-over.
- Connect routers using serial - DCE.
- Set IP address for PC's.
- Configure IP address to routers by giving commands in CLI
- After all IP's are set, ping PC to get destination host unreachable message
- Route the IPs to the adjcent IP's using following command -
  - for router 0 - routing (config)# ip route 30.0.0.0 255.0.0.0 20.0.0.20
    router (config)# ip route 40.0.0.0 255.0.0.0 20.0.0.20
  - for router 1 - router (config)# ip route 10.0.0.0 255.0.0.0 20.0.0.10
    - router (config)# ip route 40.0.0.0 255.0.0.0 30.0.0.20
  - for router 2 - router (config)# ip route 0.0.0.0 255.0.0.0 30.0.0.10
    - router (config)# ip route 20.0.0.0 255.0.0.0 30.0.0.10
- After this done, ping pc to get reply messages.

- Result

1. 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
   Reply from 10.0.0.10 Destination host unreachable
   Ping statistics for 40.0.0.1

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

2. PC> Ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data
Reply from 10.0.0.10 bytes=32 time=16ms TTL=128
Reply from 10.0.0.10 bytes=32 time=1ms TTL=128
Reply from 10.0.0.10 bytes=32 time=2ms TTL=128
Reply from 10.0.0.10 bytes=32 time=4ms TTL=128
Ping statics for 10.0.0.10
Packets sent = 4, recieved = 4, loss = 0 (0% loss)
Approximate round trip times in milliseconds.
Minimum = 1ms, maximum = 10ms, average = 6ms.

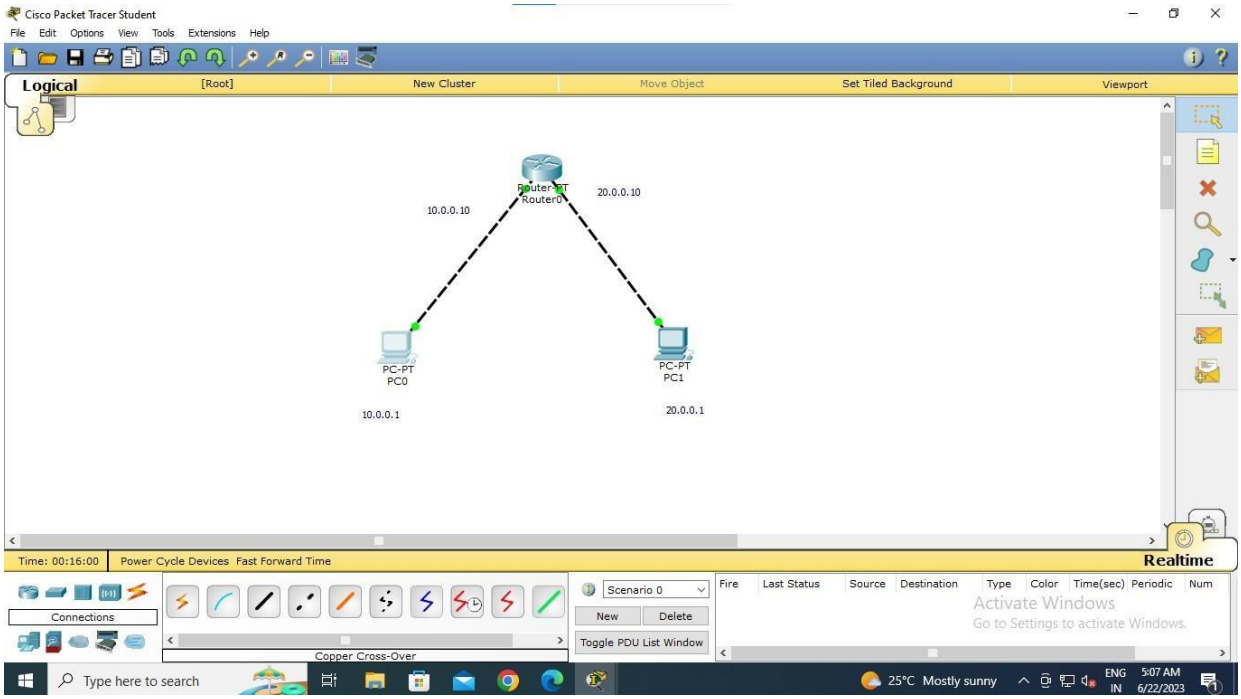
- Observations

PC 0 is in network 10.0.0.0 and PC 1 is in the network 40.0.0.0 There the 3 routers in between which initially directly connect 10.0.0.0, 20.0.0.0 30.0.0.0 and 40.0.0.0. Hence when a ping message is sent from 10.0.0.1 to 40.0.0.1, it doesn't reach the destination. Instead it only reaches the first router and gives destination host unreachable msg

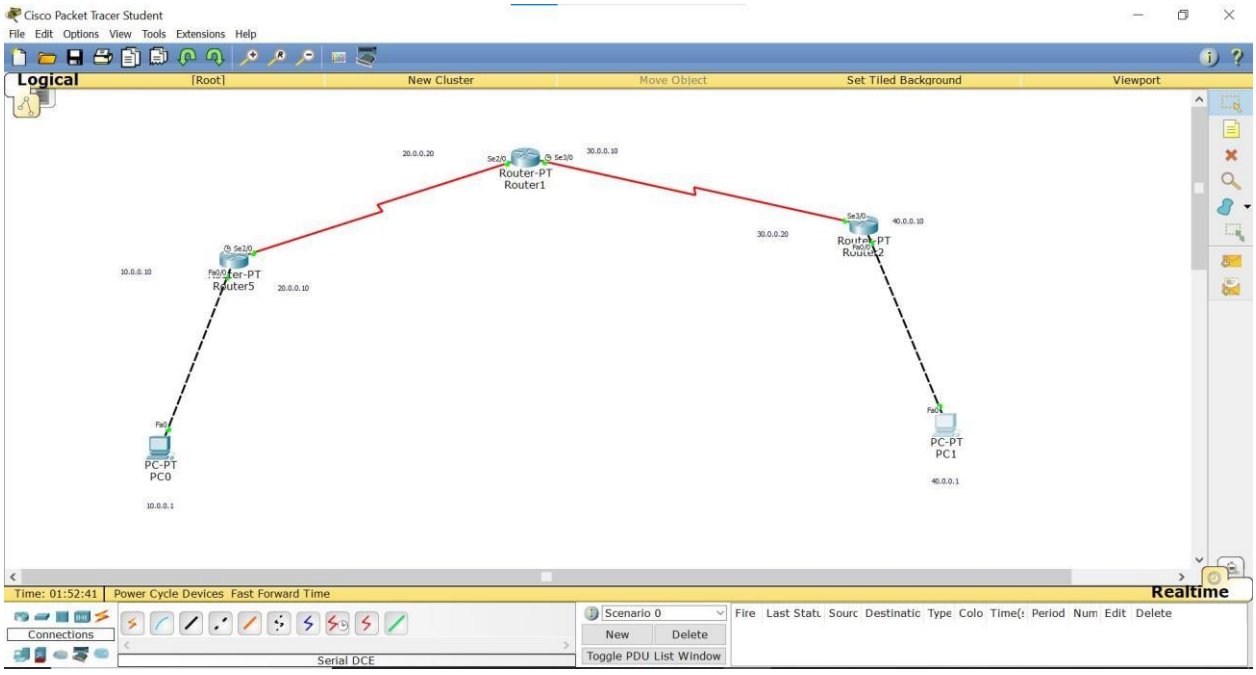
After letting the routers know about other adjacent networks (next hop) we send a ping message from 40.0.0.1 to 10.0.0.1 to get desired result. The message reaches the destination.

TOPOLOGY:

PROGRAM 2.1

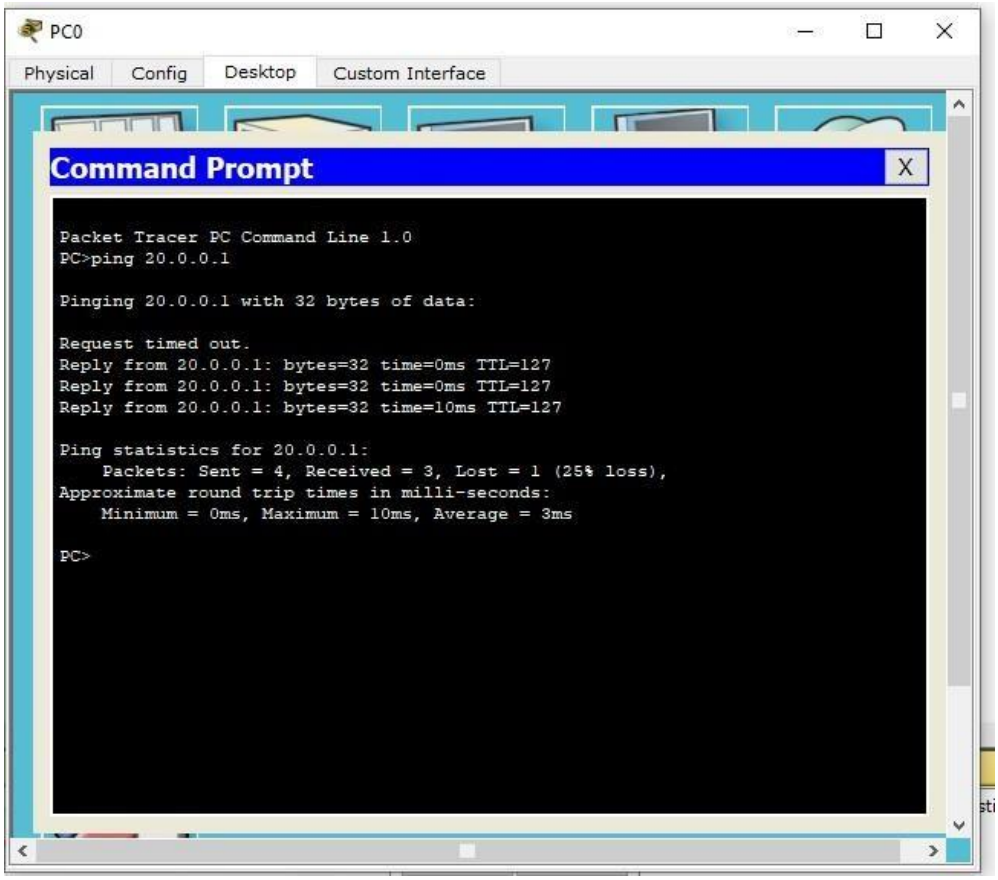


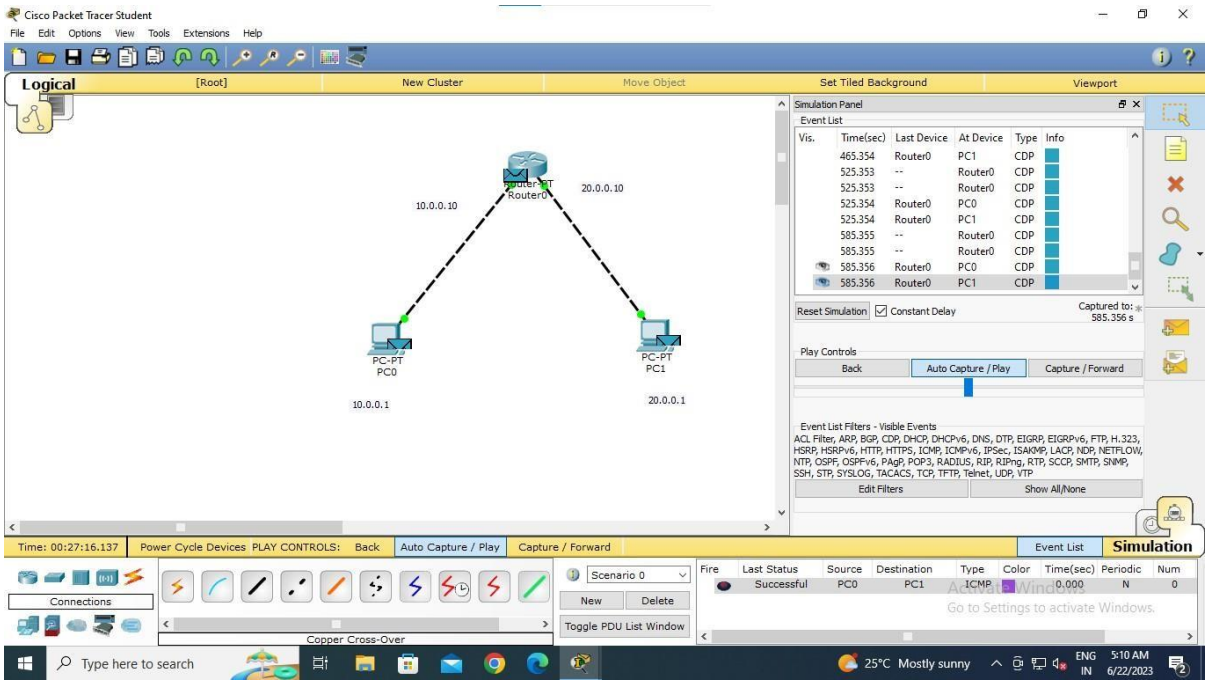
PROGRAM 2.2



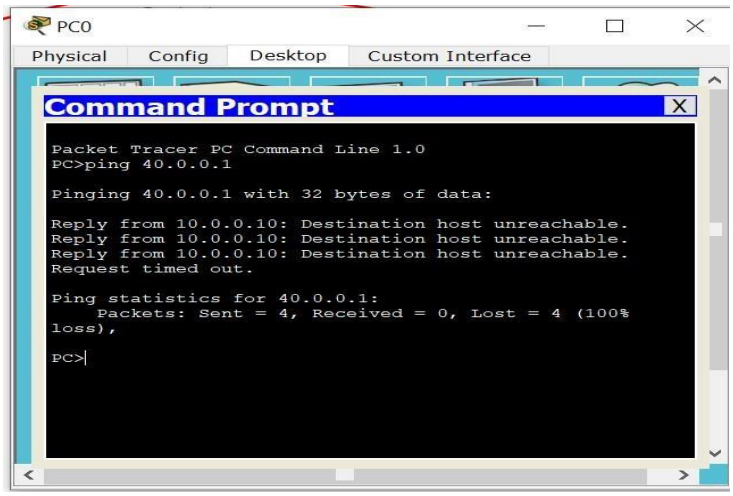
OUTPUT:

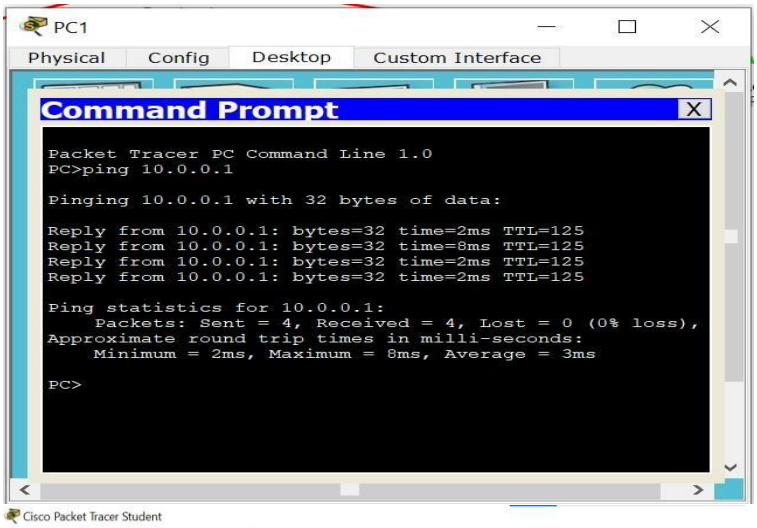
PROGRAM 2.1

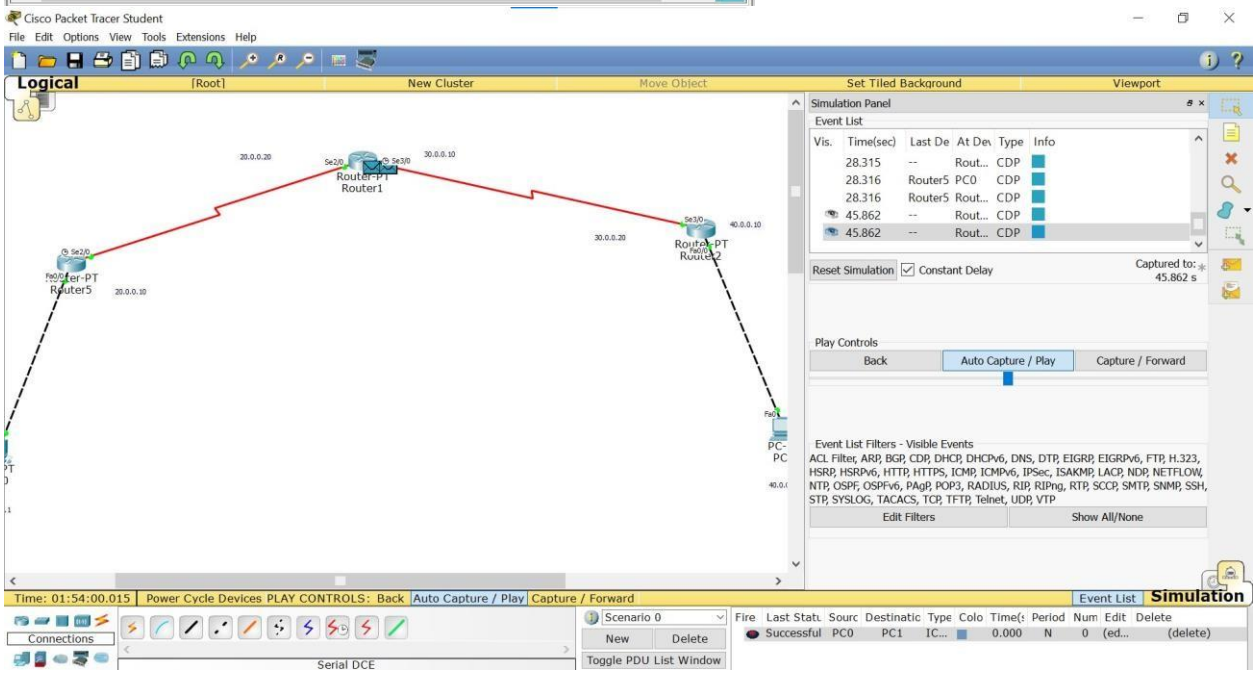




PROGRAM 2.2


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Reply from 10.0.0.10: Destination host unreachable.
Reply from 10.0.0.10: Destination host unreachable.
Reply from 10.0.0.10: Destination host unreachable.
Request timed out.
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100%
loss),
PC>


PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=8ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 8ms, Average = 3ms
PC>


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
Router2
Router-PT
Router5
PC-PT
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)

WEEK3

Configure default route, static route to the Router.

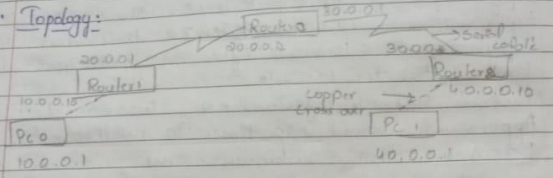
OBSERVATION:

14/9/23

Q. Configure default and static route for a connection of routers

→ Aim: Configure default and static route for a connection of routers.

- Topology:



- Procedure

1. Select 3 generic routers and 2 PCs as end devices connect the PC's to different routers with copper cross-over and connect both the routers to the main router with serial cable.
2. Set IP address for PC and gateways
3. Set the gateway address in all the routers taking as fastethernet for the PC's and serial for routers
4. Connect the PC's to the interface
5. Config-steps

```
> enable (router1)
# config t
# interface fastethernet0/0
# ip address 10.0.0.10 255.0.0.0
# no shut
# exit
# interface serial 2/0
```

IP address 30.0.0.1 255.0.0.0
no shut
exit

Similarly for router-0

> enable
config t
Interface serial 0/0
ip address 20.0.0.2 255.0.0.0
no shut
exit
interface serial 3/0
ip address 30.0.0.1 255.0.0.0
no shut
exit

- For router-2

> enable
config t
interface fastethernet 0/0
IP address 40.0.0.10 255.0.0.0
no shut
exit
interface serial 0/0
IP address 30.0.0.2 255.0.0.0
no shut
exit

6. We need to set IP routers for all routes via routers For router-1 & router-2, we do deafault routing and for router-0, static routing is done.

For router1

config t
ip route 0.0.0.0 0.0.0.0 20.0.0.2

no shut
exit
show ip route
C 10.0.0.0/8 is directly connected, FastEthernet 0/0
C 20.0.0.0/8 is directly connected, Serial 0/0
S 0.0.0.0/0 [1/0] via 20.0.0.2

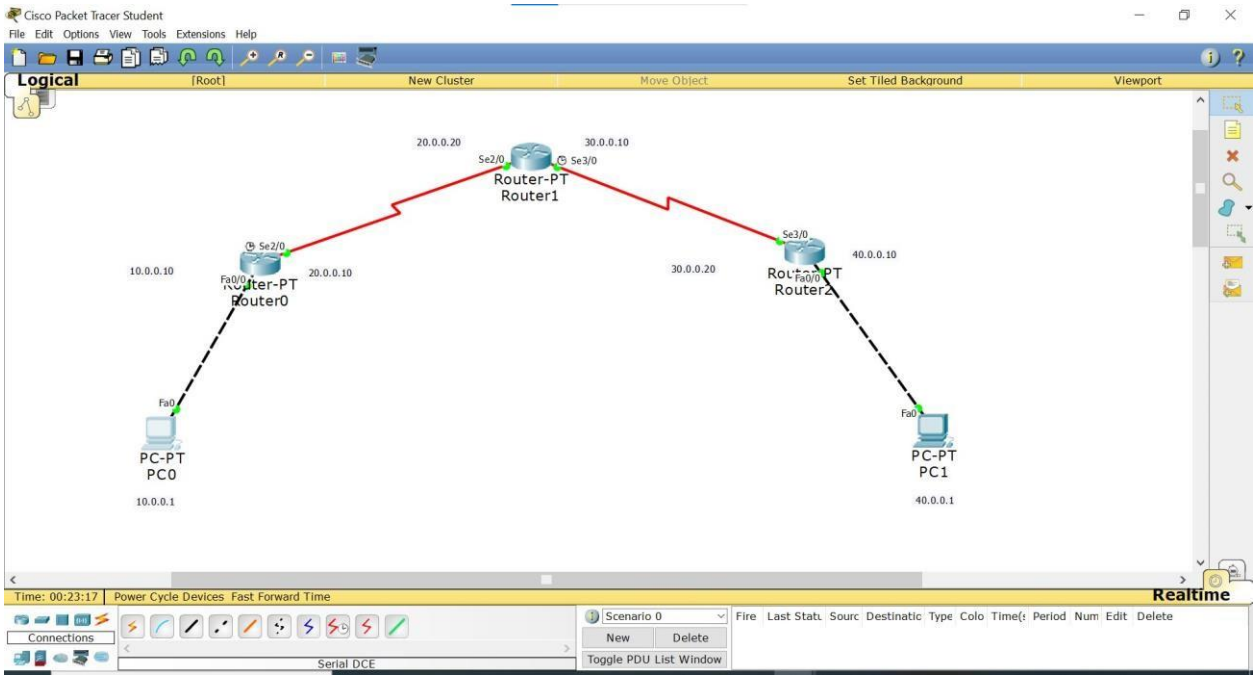
Similarly for router2
config t
ip route 0.0.0.0 0.0.0.0 30.0.0.1
exit

for router-0 (static routing)
config t
ip route 10.0.0.0 255.0.0.0 20.0.0.0
ip route 40.0.0.0 255.0.0.0 30.0.0.0
exit
show ip route
S 10.0.0.0/8 [1/0] via 20.0.0.0
C 20.0.0.0/8 is directly connected, Serial 0/0
C 30.0.0.0/8 is directly connected, Serial 3/0
S 40.0.0.0/8 [1/0] via 30.0.0.0

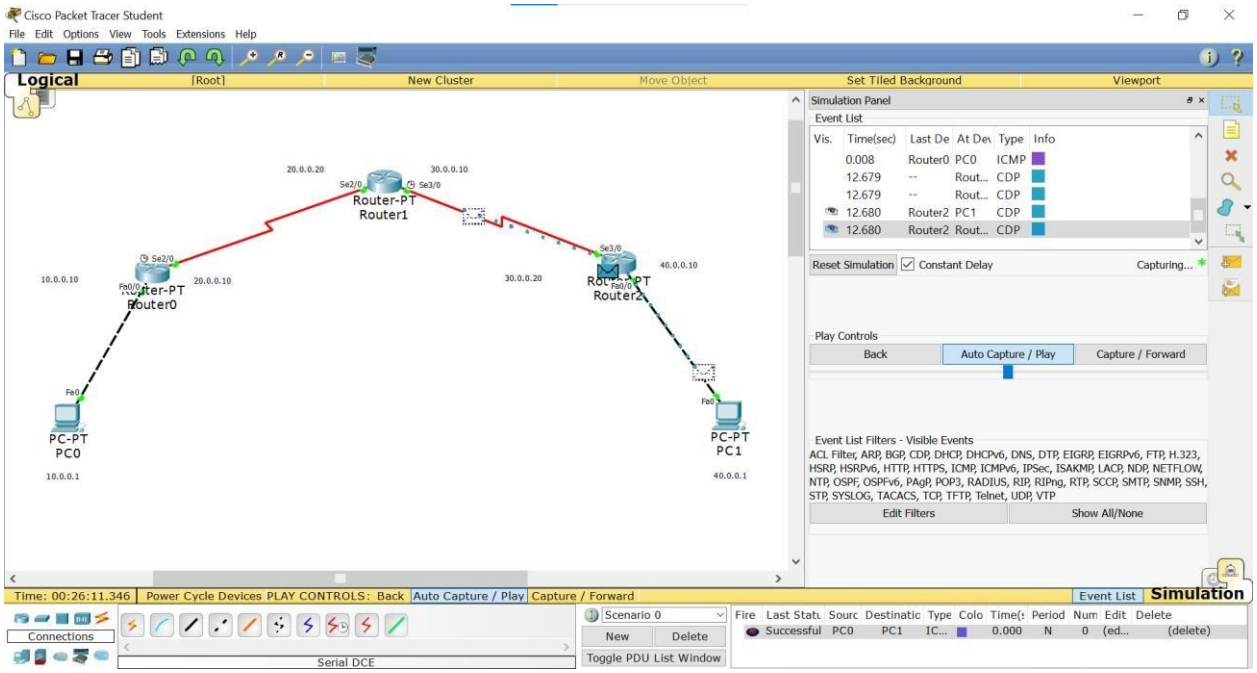
→ Now we ping 10.0.0.1 from the command prompt of 40.0.0.1
Request timed out
Reply from 40.0.0.1 bytes=32 time=0ms TTL=125
Reply from 40.0.0.1 bytes=32 time=0ms TTL=125
Reply from 40.0.0.1 bytes=32 time=0ms TTL=125
Ping status for 40.0.0.1
Packets Send = 4, Received = 3, Lost = 1 (25% loss)

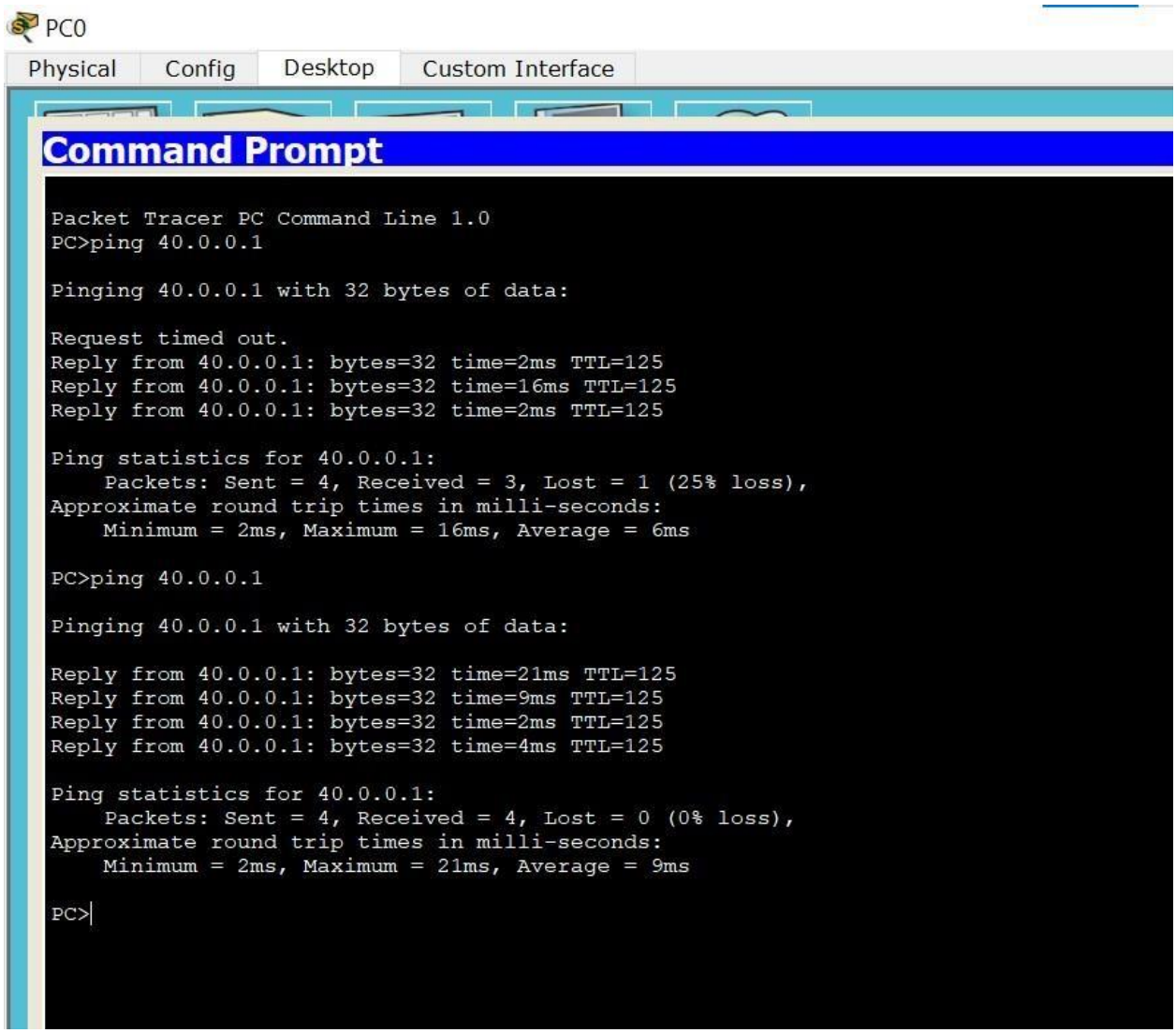
- Observation
  Through default routing we configure the network here.

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>

WEEK4

Configure DHCP within a LAN and outside LAN.

OBSERVATION:

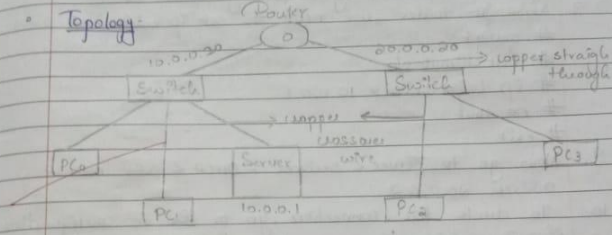
Quick Work

Page No.:
Date:
M T W T F S S

Q. Configure DHCP within a LAN and outside the LAN

- Aim:-
  Connection of server LAN within and outside the network using switches and routers.

- Topology:



- Procedure:

1. Select two or more PC and a server connecting to switch and another network with only end devices and switch
2. Connect both switches to router.
3. Set IP address of server as 10.0.0.1
4. Now go to services < select DHCP < save the current IP address 20.0.0.2
5. Now check the IP addresses of other devices in the network in the IP configuration in desktop.
6. Now in the CLI of router enable follow steps:

```
> enable
# config t
# interface fastethernet 0/0
# ipaddress 10.0.0.10 255.0.0.0
# no shut
# exit
```

interface fastethernet 0/0
ip address 20.0.0.20 255.0.0.0
no shut
exit

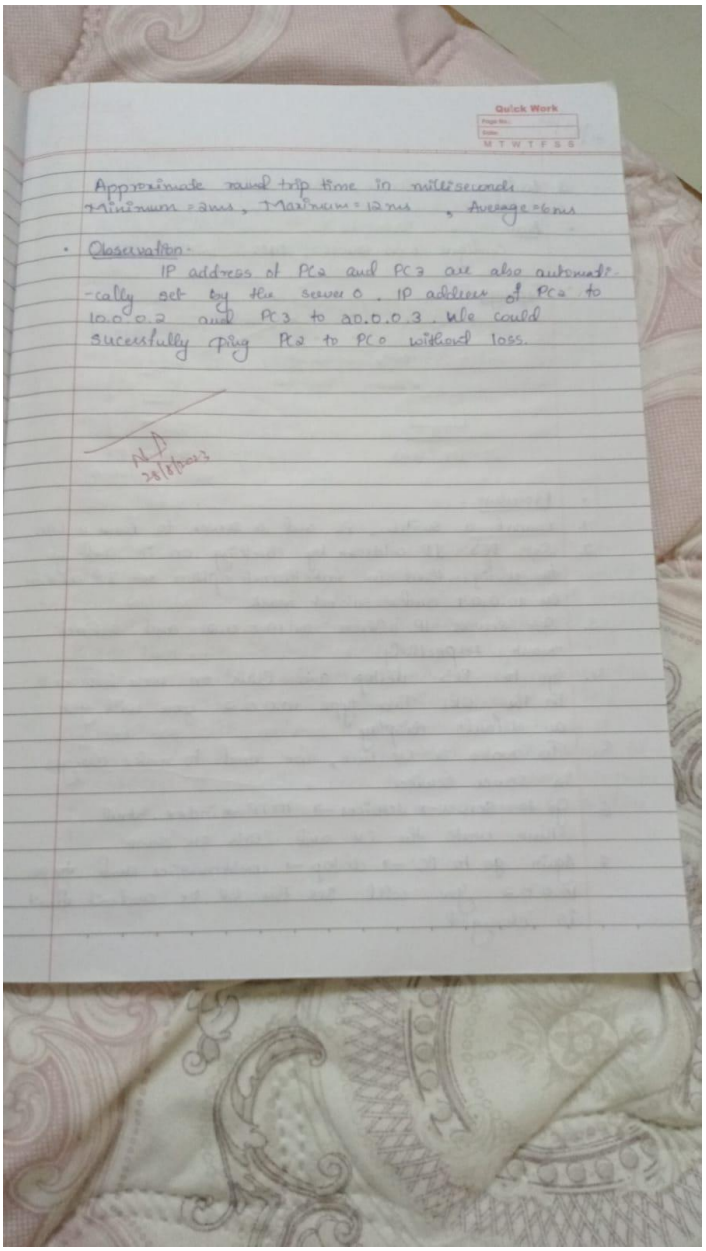
7. Go to server < config < gateway 10.0.0.20
8. Now in router, we need to set ip address of server
config t
fastethernet 0/0
ip helper address 10.0.0.1
no shut
exit
9. Now go to server < services < DHCP < add new IP address 20.0.0.2
10. To check the connection, go to the IP configuration of Pc outside the network and click on DHCP and IP gateway will be visible.

- Result:

From server - from Pc2 to Pc0 whose ip address is 10.0.0.2

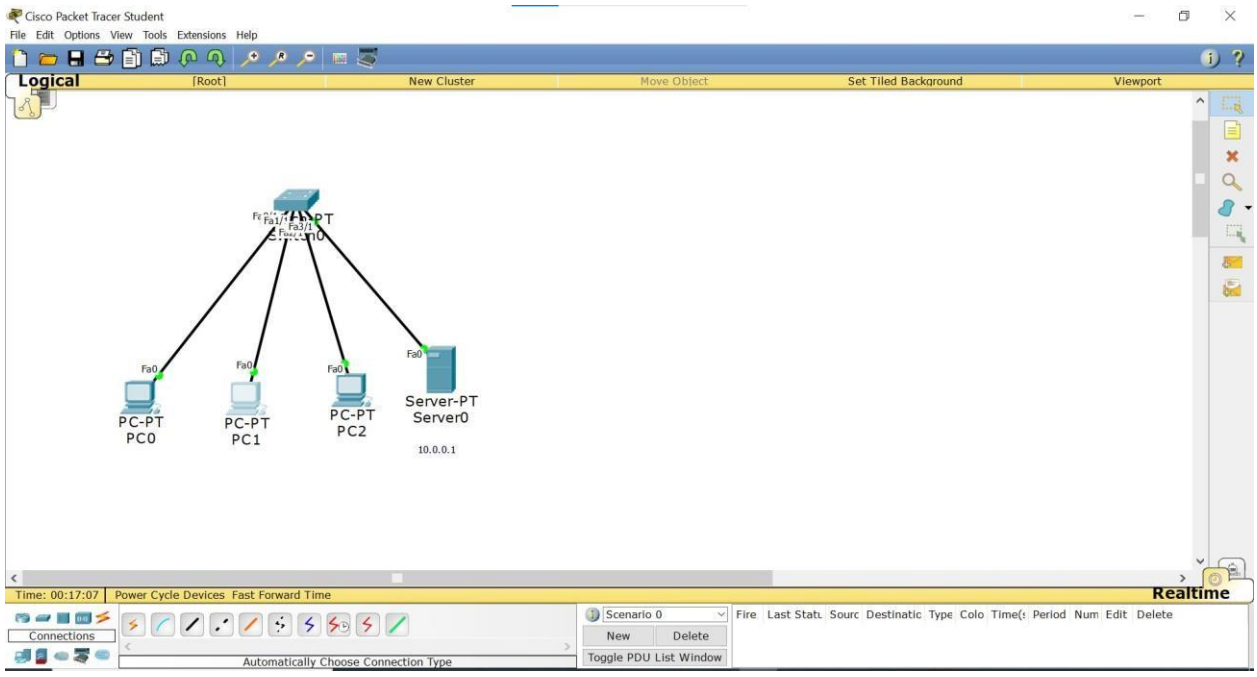
Pc > ping 10.0.0.2
pinging 10.0.0.2 with 32bytes of data:
Request timed out

Reply from 10.0.0.2 bytes = 32 time = 6ms TTL = 125
Reply from 10.0.0.2 bytes = 32 time = 2ms TTL = 125
Reply from 10.0.0.2 bytes = 32 time = 12ms TTL = 125
Ping statistics ~~fror~~ for 10.0.0.2:
Packets sent = 4, Recieved = 3, Lost = 1

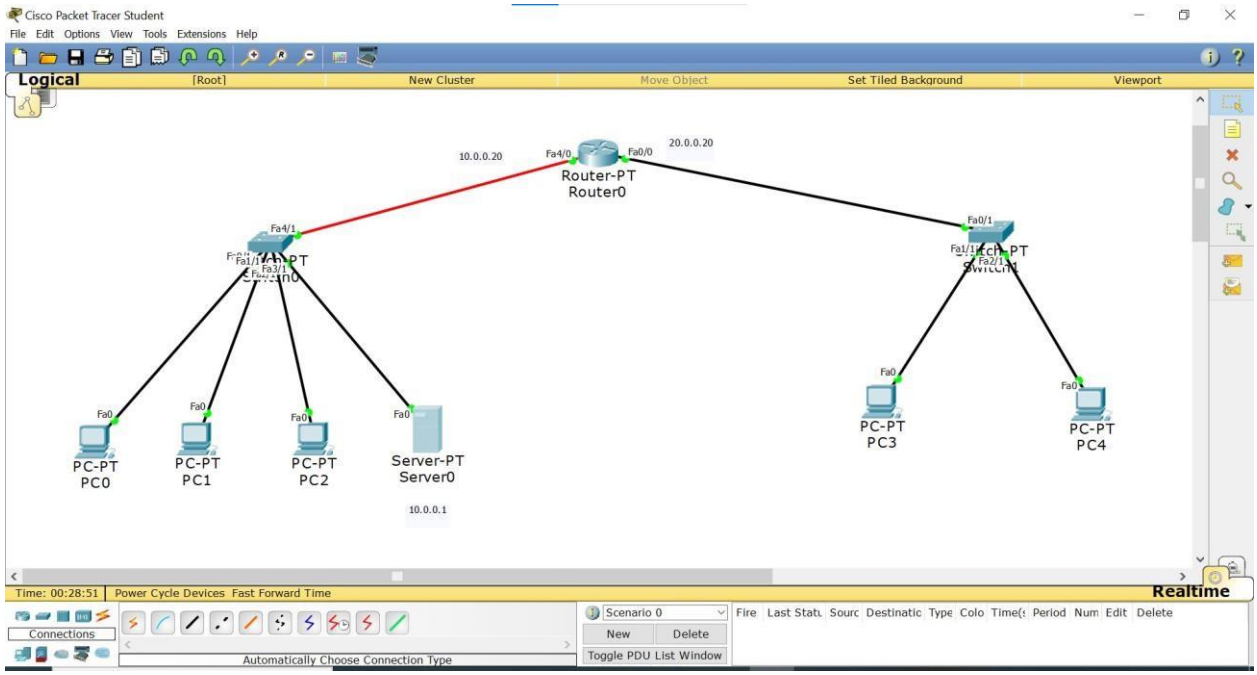


TOPOLOGY:

PROGRAM 4.1:

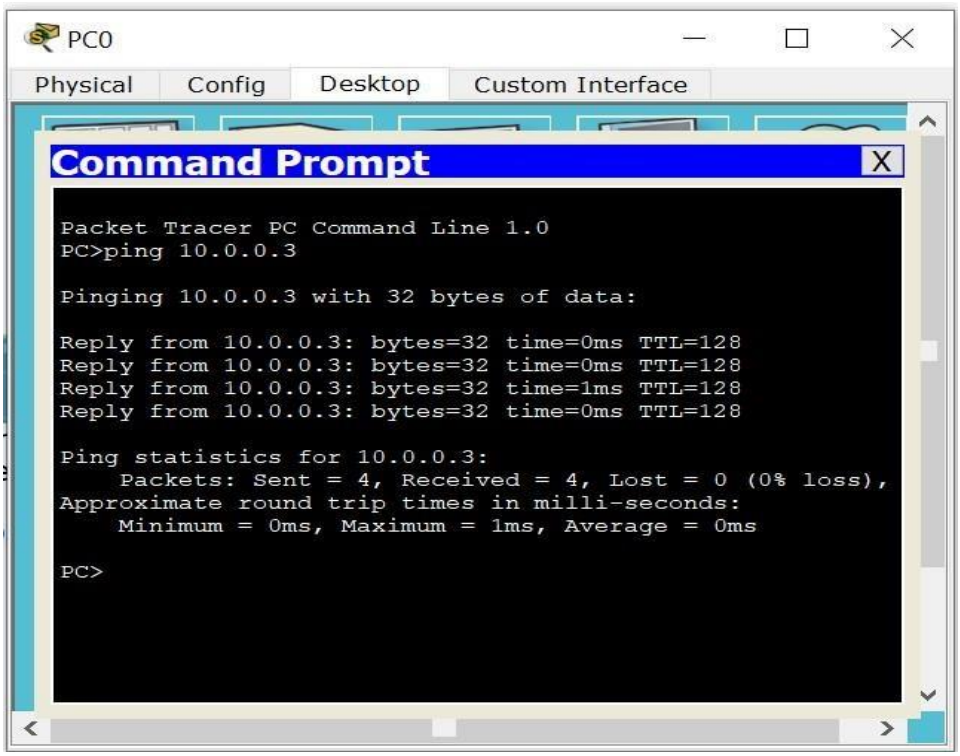


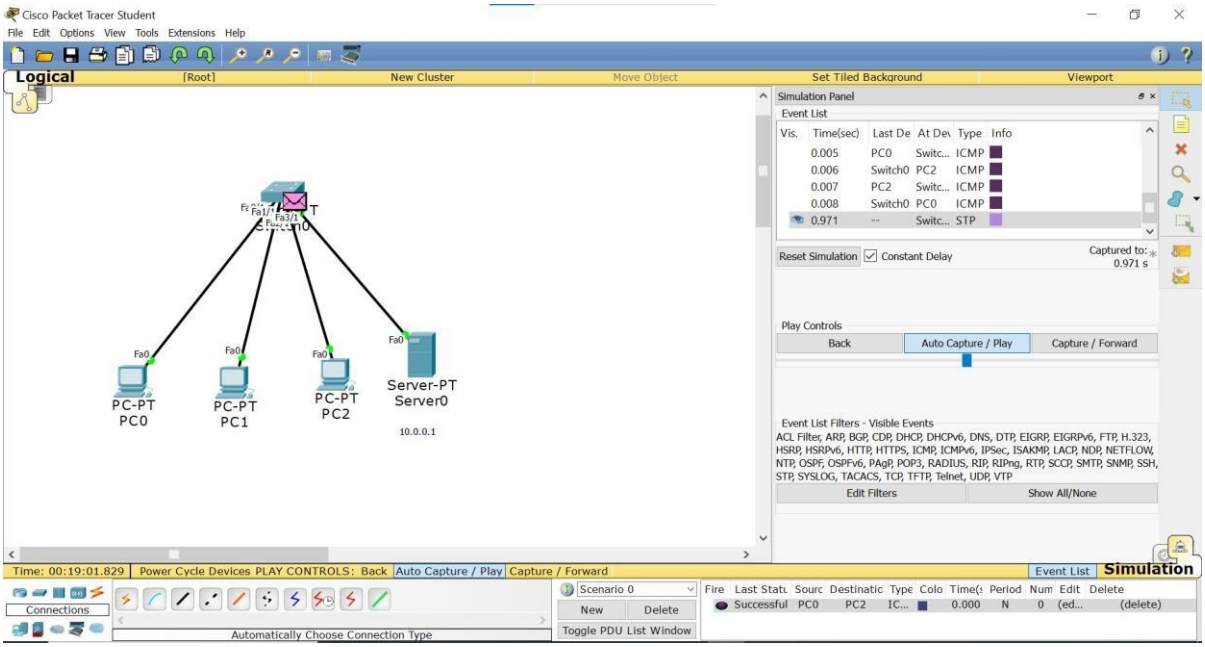
PROGRAM 4.2:



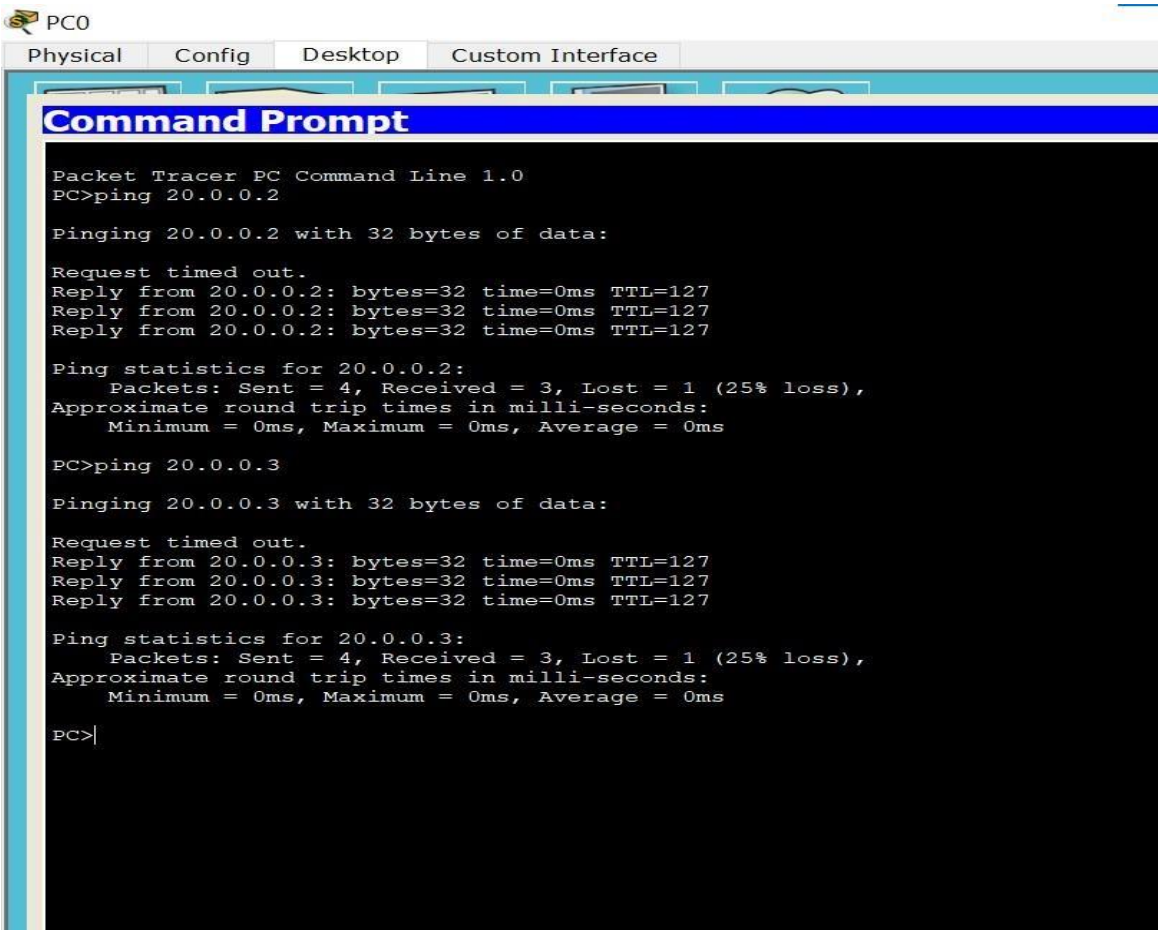
OUTPUT:

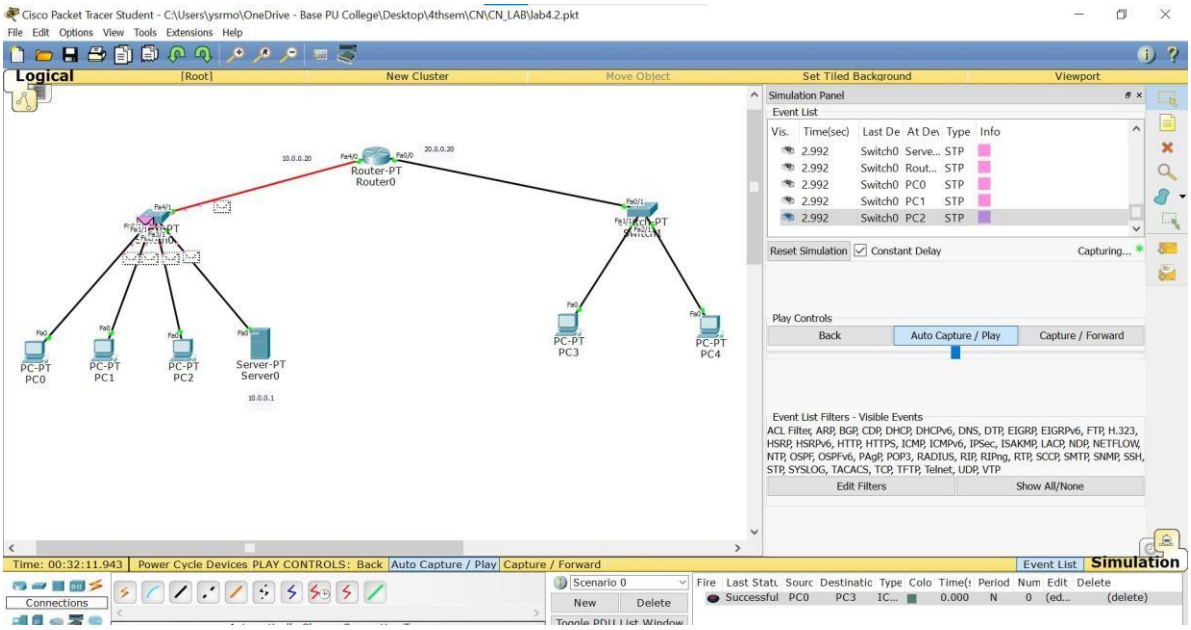
PROGRAM 4.1:


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>

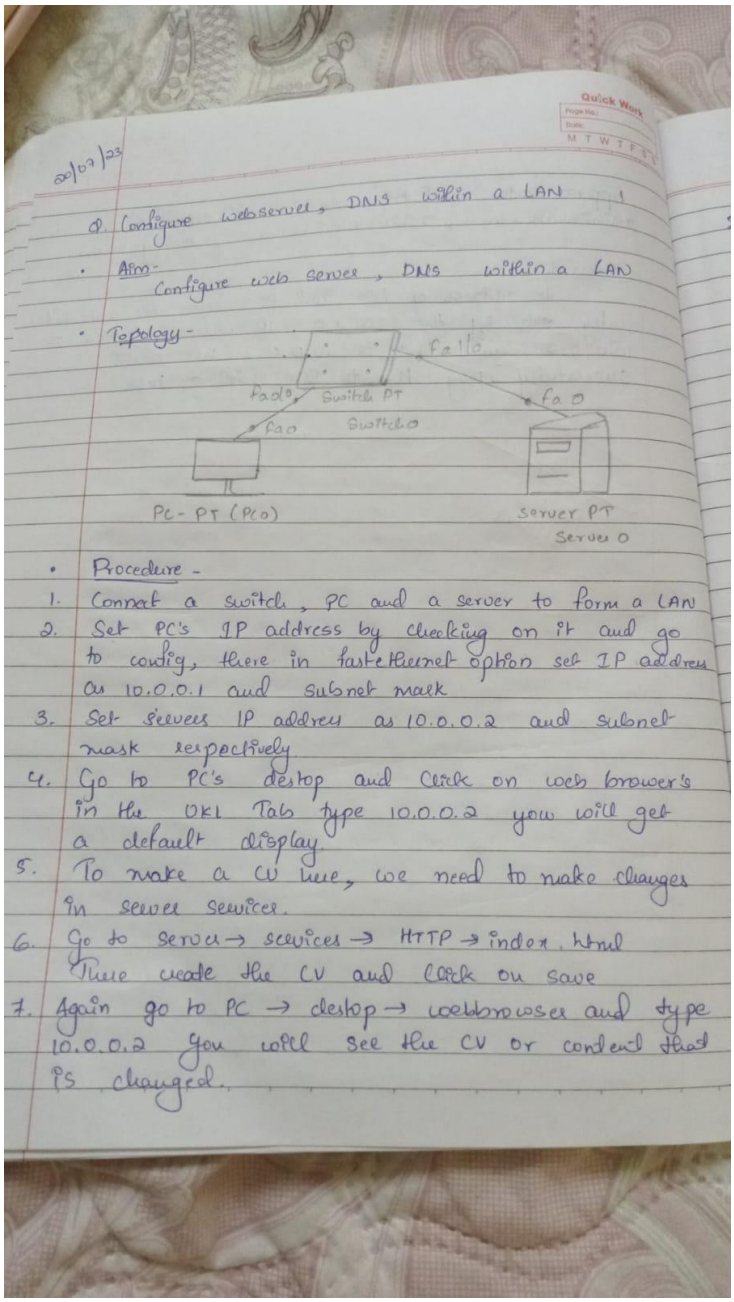

Cisco Packet Tracer Student
Logical
PC-PT PC0
PC-PT PC1
PC-PT PC2
Server-PT Server0
10.0.0.1
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Simulation

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
PC-PT PC0
PC-PT PC1
PC-PT PC2
Server-PT Server0
PC-PT PC3
PC-PT PC4
Simulation Panel
Event List
Vis. Time(sec) Last De At De 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
Fire Last Stat. Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 PC3 IC... 0.000 N 0 (ed... (delete)

Aim: Configure Web Server, DNS within a LAN. Observation:



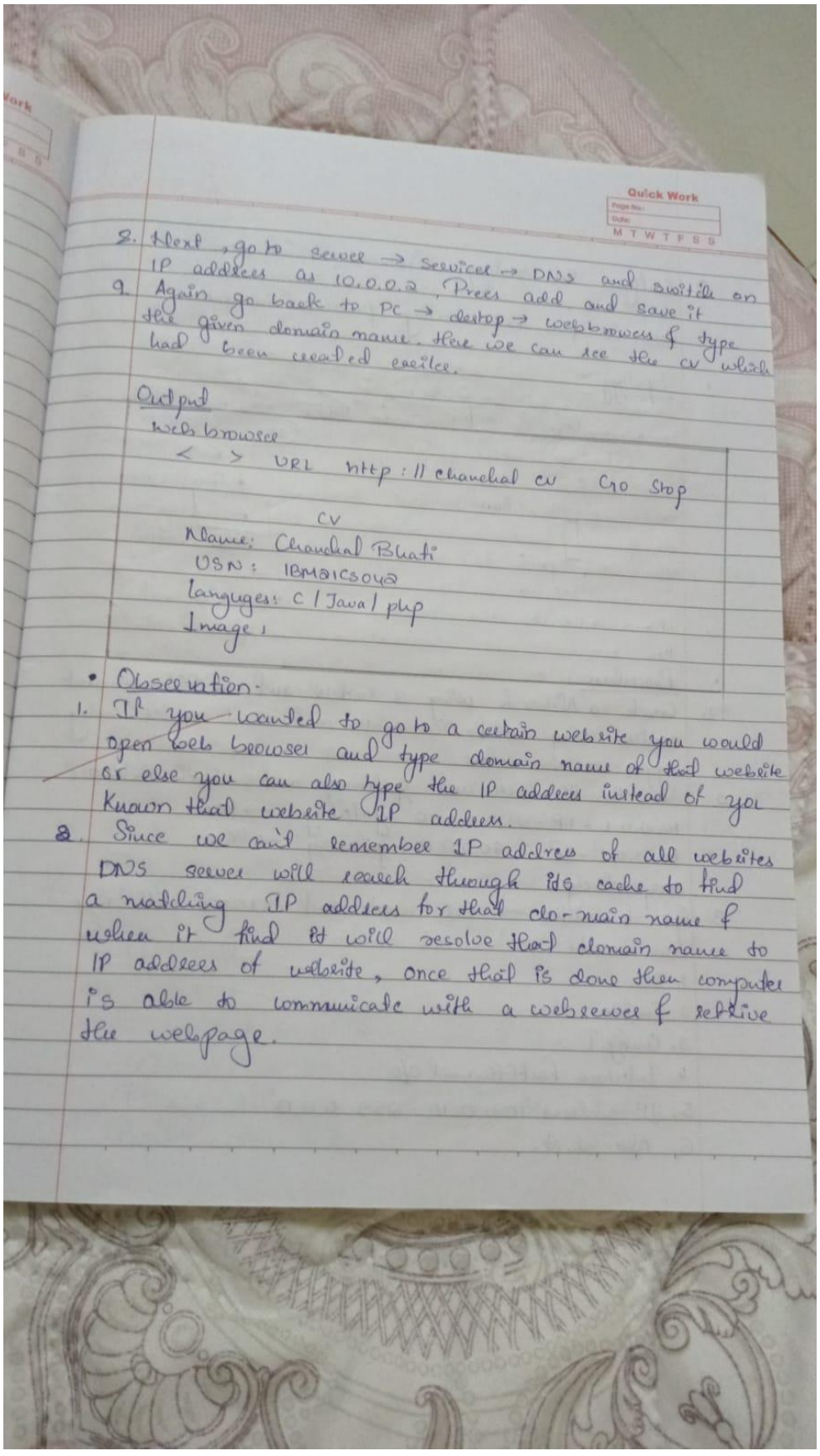
20/09/23

Q. Configure webserver, DNS within a LAN

- Aim-
  Configure web server, DNS within a LAN
- Topology -

- Procedure -

1. Connect a switch, PC and a server to form a LAN
2. Set PC's IP address by checking on it and go to config, there in fastethernet option set IP address as 10.0.0.1 and subnet mask
3. Set servers IP address as 10.0.0.2 and subnet mask respectively
4. Go to PC's desktop and click on web browser's in the URL Tab type 10.0.0.2 you will get a default display.
5. To make a CV live, we need to make changes in server services.
6. Go to server → services → HTTP → index.html There create the CV and click on save
7. Again go to PC → desktop → webbrowser and type 10.0.0.2 you will see the CV or content that is changed.



2. Next, go to server → Services → DNS and switch on IP address as 10.0.0.2. Press add and save it
3. Again go back to PC → desktop → web browser & type the given domain name. Here we can see the CV which had been created earlier.

Output

Web browser

< > URL http://chanchal cv Go Stop

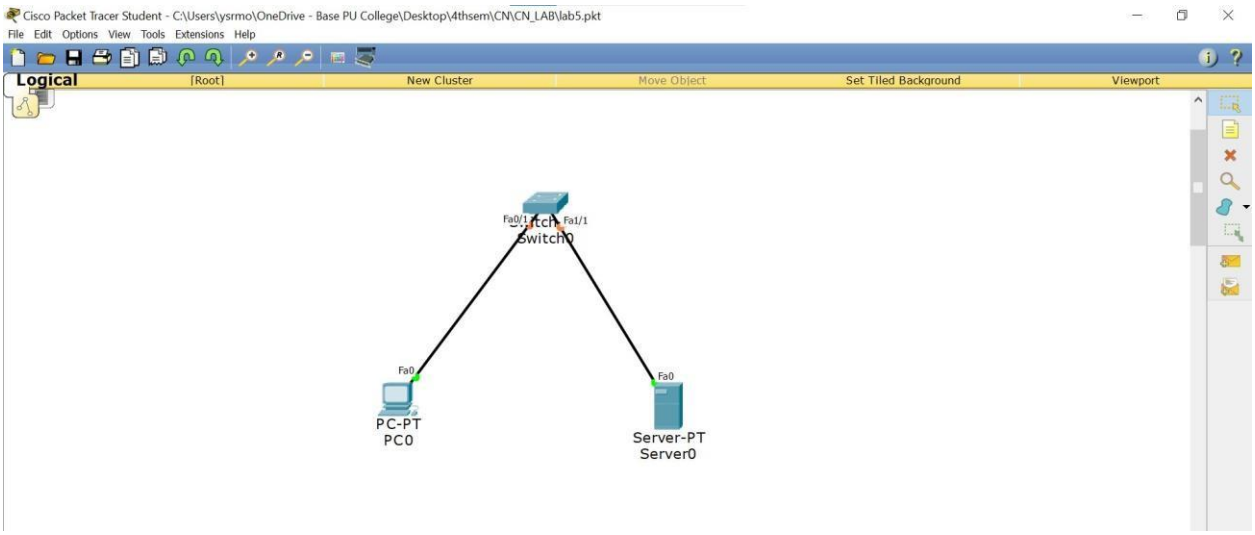
CV

Name: Chanchal Bhati
USN: 1BM21CS042
Languages: C / Java / php
Image:

- Observation:

1. If you wanted to go to a certain website you would open web browser and type domain name of that website or else you can also type the IP address instead of you known that website IP address.
2. Since we can't remember IP address of all websites DNS server will search through its cache to find a matching IP address for that domain name & when it find it will resolve that domain name to IP address of website, once that is done then computer is able to communicate with a web server & retrive the webpage.

Topology:



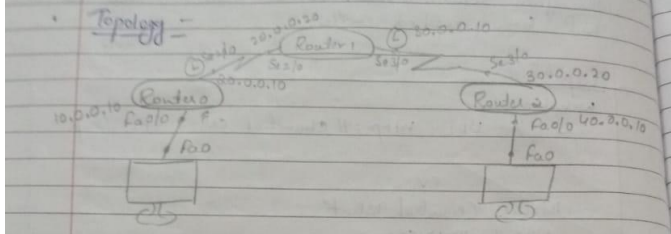
Output:

Aim: Configure RIP routing Protocol in Routers Observation:

8. Configure RIP routing Protocols in Routers.

Aim: Configure RIP routing protocols in routers.

Topology –



Procedure

1. Create a Network using 3 routers and 2 PCs connect routers using Serial DCE cable and PC to routes using coppes-crossover cable.
2. Set the IP address and gateway no for both PC's are
   10.0.0.1 - IP 10.0.0.10 - gateway → PC 0
   40.0.0.1 - IP 40.0.0.10 - gateway → PC 1
   respectively.
3. Go to router → CLI mode and execute following commands
   1. No
   2. Enable
   3. Config T
   4. Interface FastEthernet 0/0
   5. IP address 10.0.0.10 255.0.0.0
   6. No shut.

2. Exit
8. Interface Se 2/0
9. IP address 20.0.0.10 255.0.0.0
10. Encapsulation PPP
11. clock rate 64000
12. No shut

4. Here for router with but ethernet execute only the step 9 and type no shut.
5. Only for router to router connection execute all steps, also execute the step 11 only for the router connection which has a clock symbol at start. Repeat the steps for all routers.
6. Again go to router 0 → CLI mode and type these step 10
   1. Config T
   2. router rip
   3. Network 10.0.0.0
   4. Network 20.0.0.0
   5. Exit
7. Repeat these steps for all the routers.
8. At last now go to each router and type show IP route. Here the IP addresses associated with the router will be labelled as C and other IP addresses will be labelled as R.
9. Lastly go to PC0 and ping a message to PC1 using ping destination IP address command.

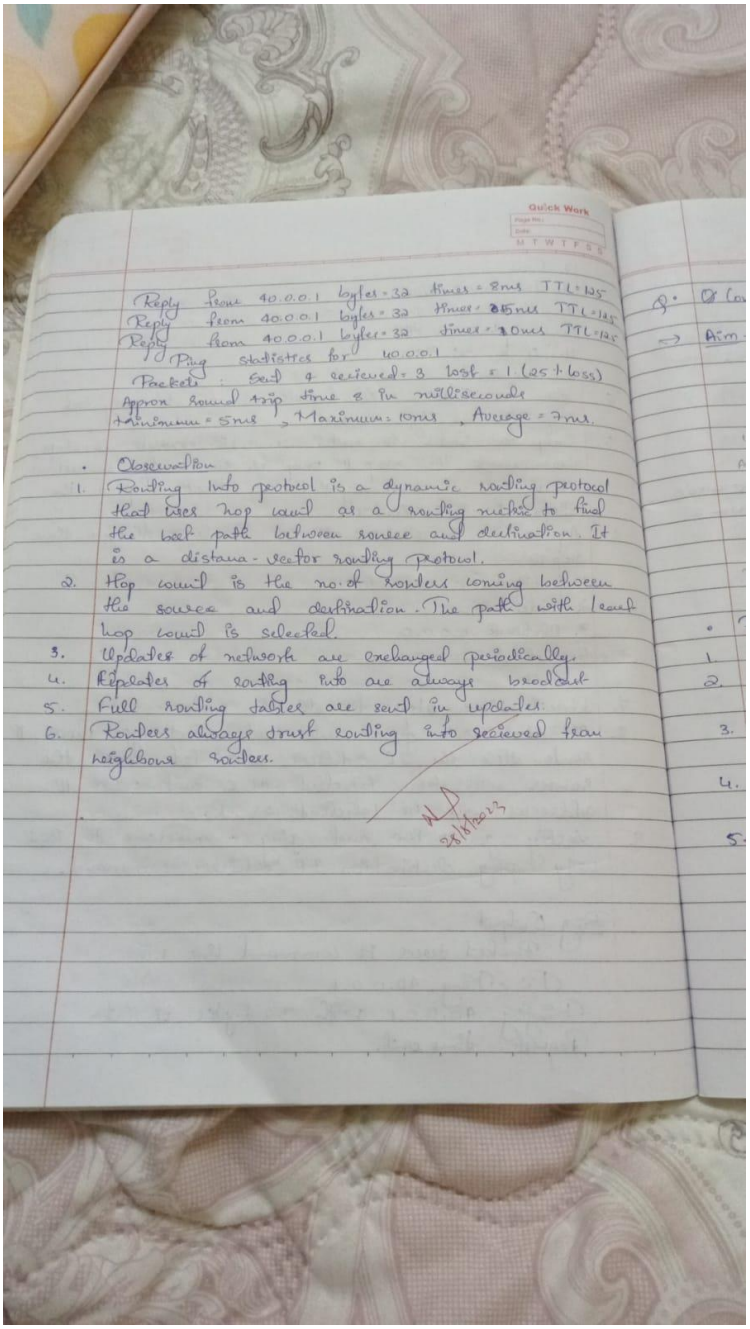
Ping Output

Packet tracer PC command line 1.0

PC > Ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data

Request time out.



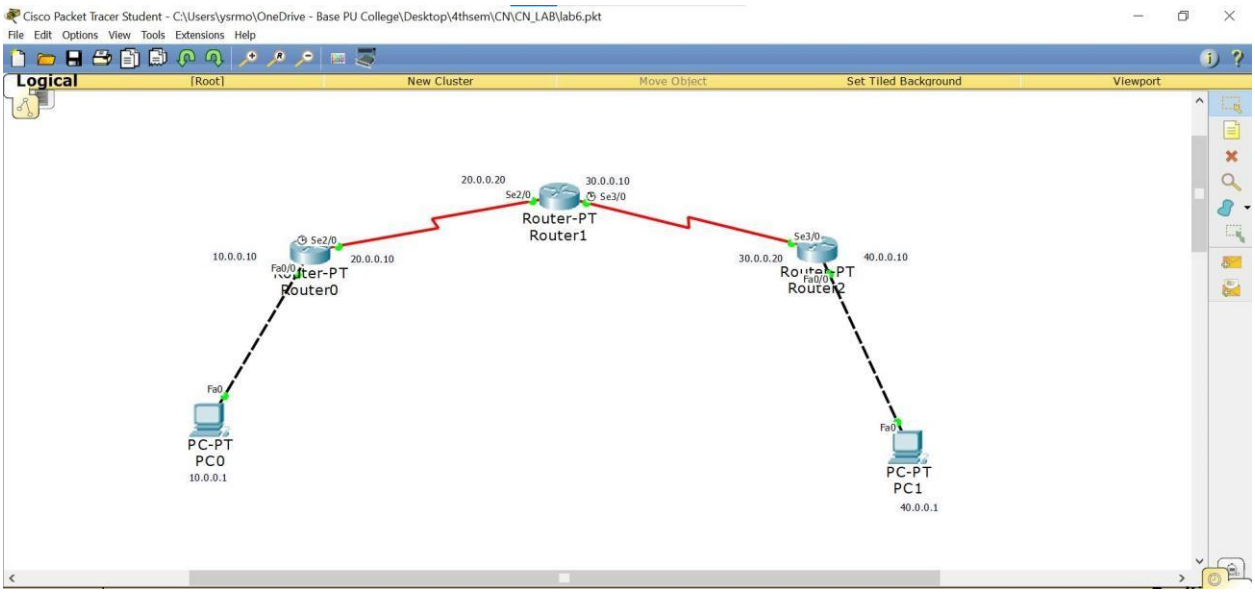
Reply from 40.0.0.1 bytes=32 times=8ms TTL=125
Reply from 40.0.0.1 bytes=32 times=5ms TTL=125
Reply from 40.0.0.1 bytes=32 times=10ms TTL=125
Ping statistics for 40.0.0.1
Packets: Sent 4 recieved=3 lost=1 (25% loss)
Approx round trip time in milliseconds
Minimum=5ms, Maximum=10ms, Average=7ms

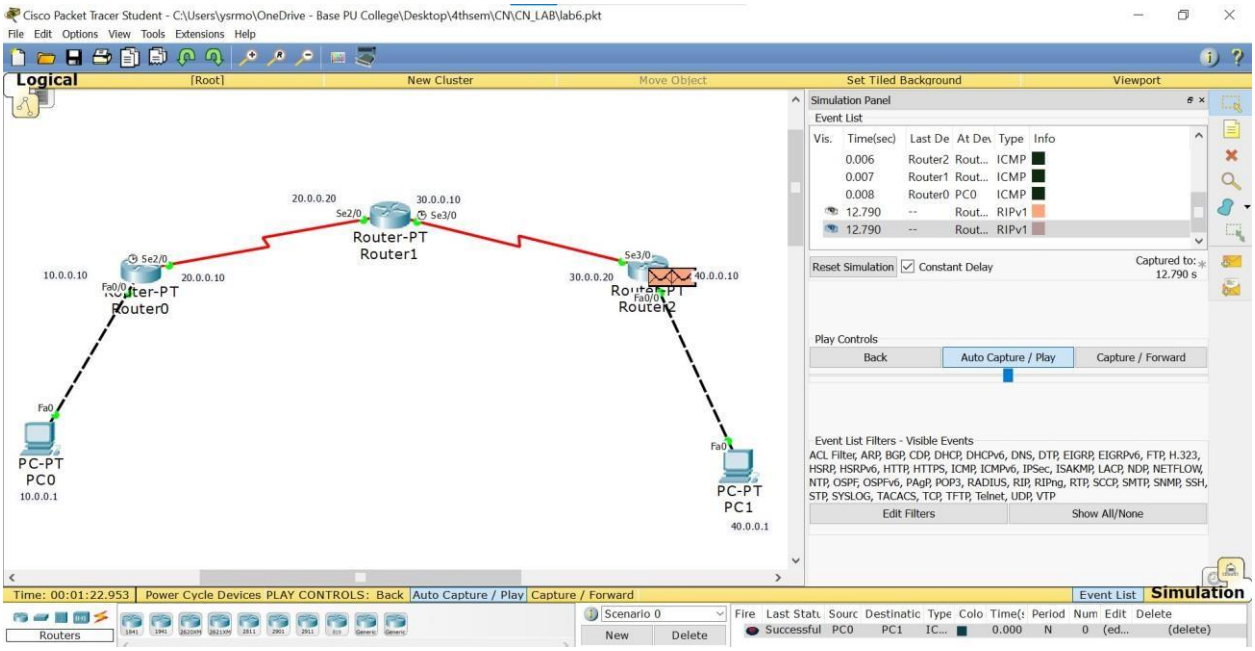
Observation

1. Routing info protocol is a dynamic routing protocol that uses hop count as a routing metric to find the best path between source and destination. It is a distance-vector routing protocol.
2. Hop count is the no. of routers coming between the source and destination. The path with least hop count is selected.
3. Updates of network are exchanged periodically.
4. Updates of routing info are always broadcast.
5. Full routing tables are sent in updates.
6. Routers always trust routing info recieved from neighbour routers.

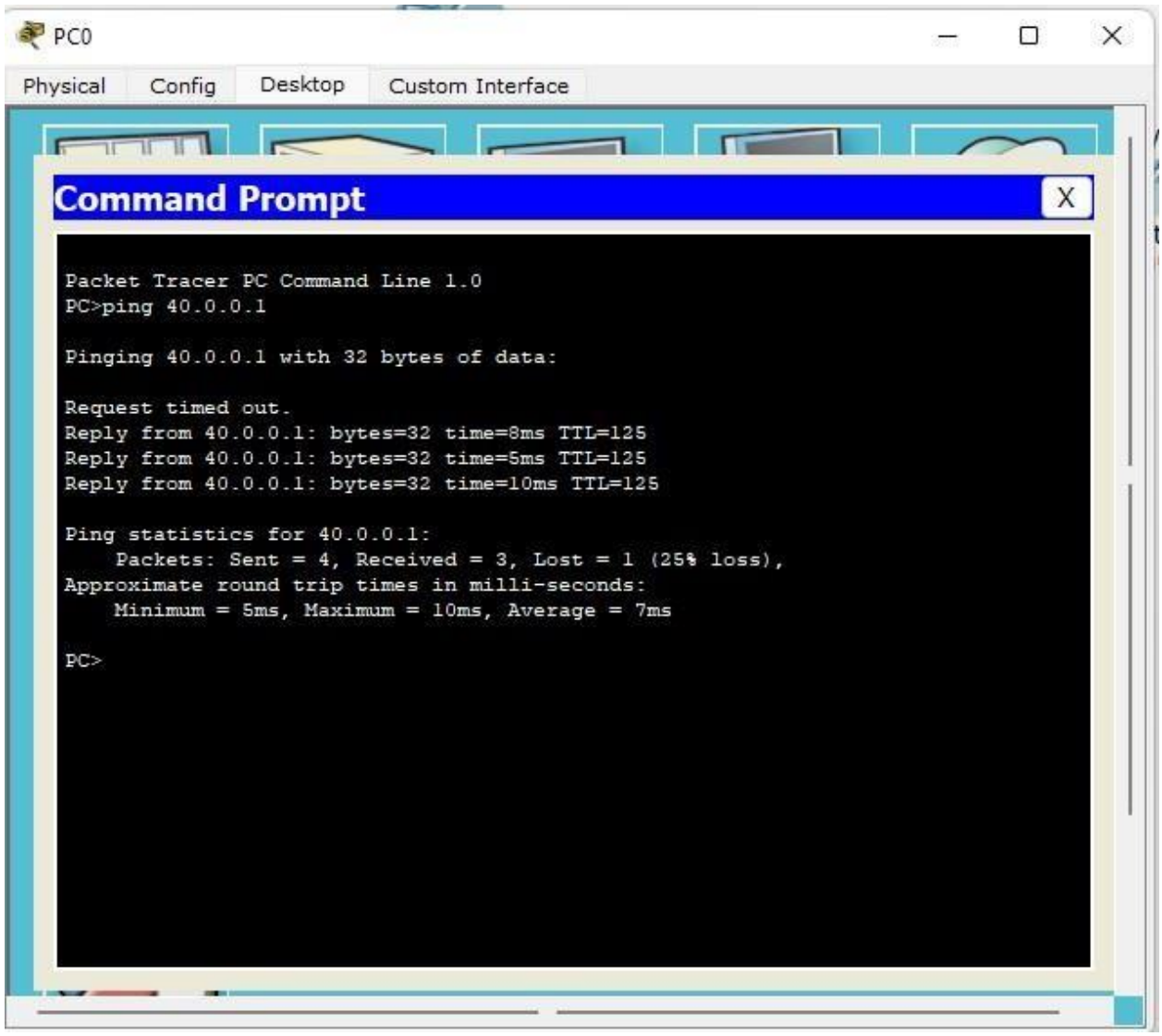
28/8/2023

Topology:


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
20.0.0.20
Se2/0
30.0.0.10
Se3/0
Router-PT
Router1
10.0.0.10
Se2/0
Fa0/0
Router-PT
Router0
20.0.0.10
30.0.0.20
Se3/0
40.0.0.10
Fa0/0
Router-PT
Router2
Fa0
PC-PT
PC0
10.0.0.1
Fa0
PC-PT
PC1
40.0.0.1


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
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)

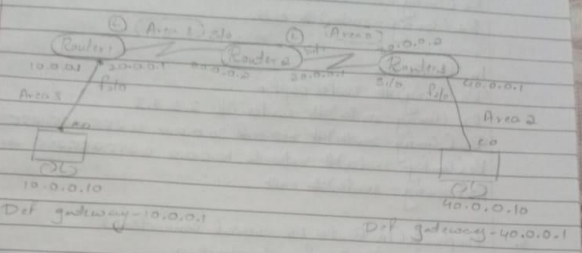
Output:



Aim: Configure OSPF routing Protocol Observation:

Q. Configure OSPF routing protocol

→ Aim:- To configure OSPF routing protocol.



- Procedure

1. Create a network using 3 routers and 2 pc's as shown
2. Configure the PC's with the ip address and gateway as per the topology above
3. Configure each of the routers with the ip address as shown in the topology
4. Encapsulation ppp and clock rate needs to be set as done in rip protocol experiment.
5. In Router R1 (Enable routing by enabling OSPF protocol)

R1 (config)# router ospf 1
R1 (config)# router-id 1.1.1.1
R1 (config-router)# network 10.0.0.0 0.255.255.255 area 3
R1 (config-router)# network 20.0.0.0 0.255.255.255 area 1
R1 (config-router)# exit

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 0
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 0
R3 (config-router)# exit

6. Loopback (In Router 1's serial connection)
R1 (Config-if)# interface loopback 0
R1 (Config-if)# ip address 172.16.1.255.255.255.0.0
R1 (Config-if)# no shutdown
In Router 2's any of serial connection
R2 (Config-if)# interface loopback 0
R2 (Config-if)# ip address 172.16.1.253 255.255.0.0
R2 (Config-if)# no shutdown
In Router 3's Serial connection
R3 (Config-if)# interface loopback 0
R3 (Config-if)# ip address 172.16.1.254 255.255.0.0
R3 (Config-if)# no shutdown

7. Creating virtual link between R1, R2
In Router R1
R1 (Config)# router ospf 1
R1 (Config-router)# area 1 virtual-link 2.2.2.2

In Router 2
R2 (config)# router ospf 1
R2 (config-router)# area 1 virtual-link 1.1.1.1
R2 (config-router)# exit

(8. For every router, we do show ip-route command.)»

Now, check the connect

Output

Ping PC> Ping 40.0.0.10

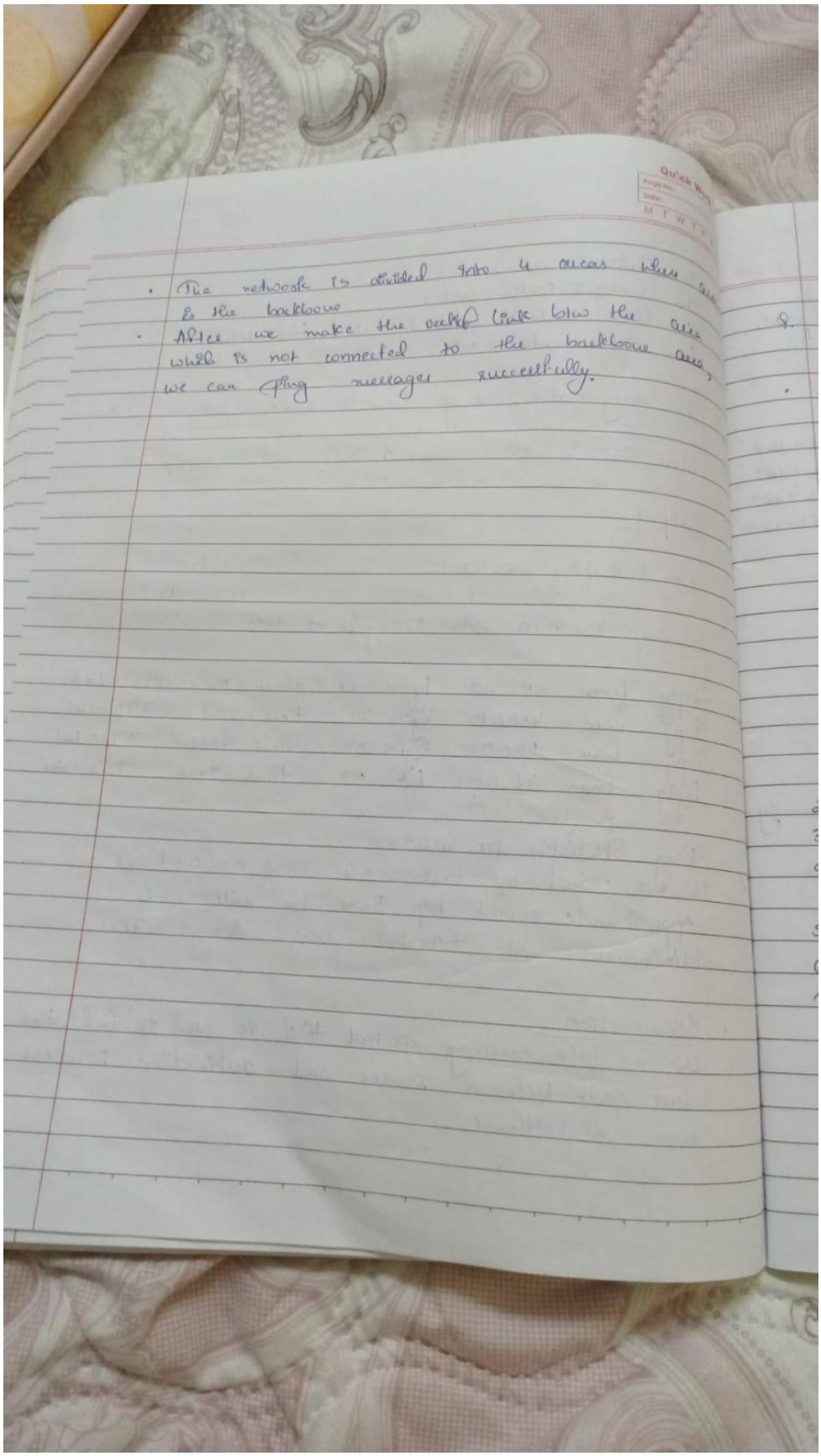
Pinging 40.0.0.10 with 32 bytes of data

Reply from 40.0.0.10 bytes = 32 time = 11ms TTL = 125
Reply from 40.0.0.10 bytes = 32 time = 8ms TTL = 125
Reply from 40.0.0.10 bytes = 32 time = 9ms TTL = 125
Reply from 40.0.0.10 bytes = 32 time = 8ms TTL = 125

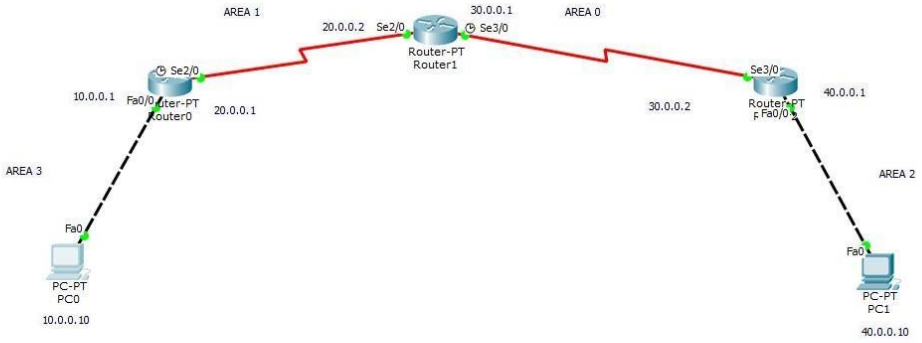
26/11/2023

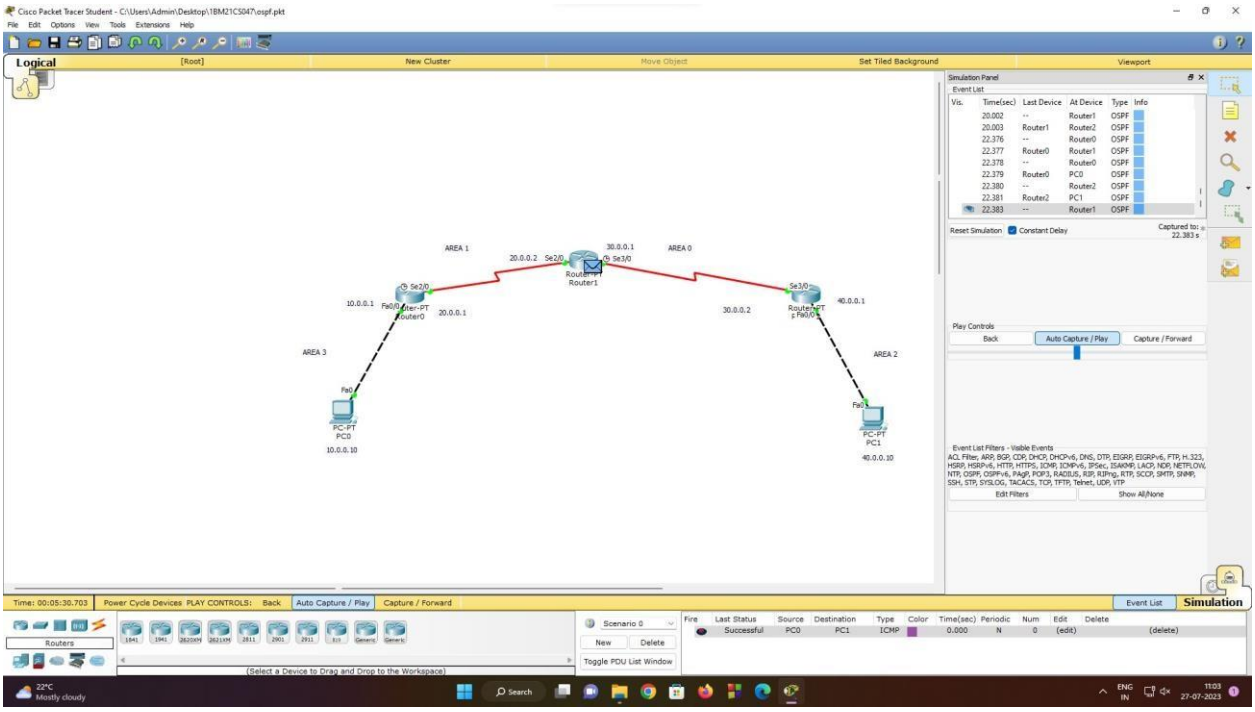
Ping Statistics for 40.0.0.10
Packets: Sent = 4 Received = 4 Lost = 0 (0% loss)
Approximate round trip time in milliseconds
Minimum = 2ms Maximum = 11ms Average = 7ms.

- Observation
- OS a state routing protocol that is used to find the best path between source and destination routers over algorithms.

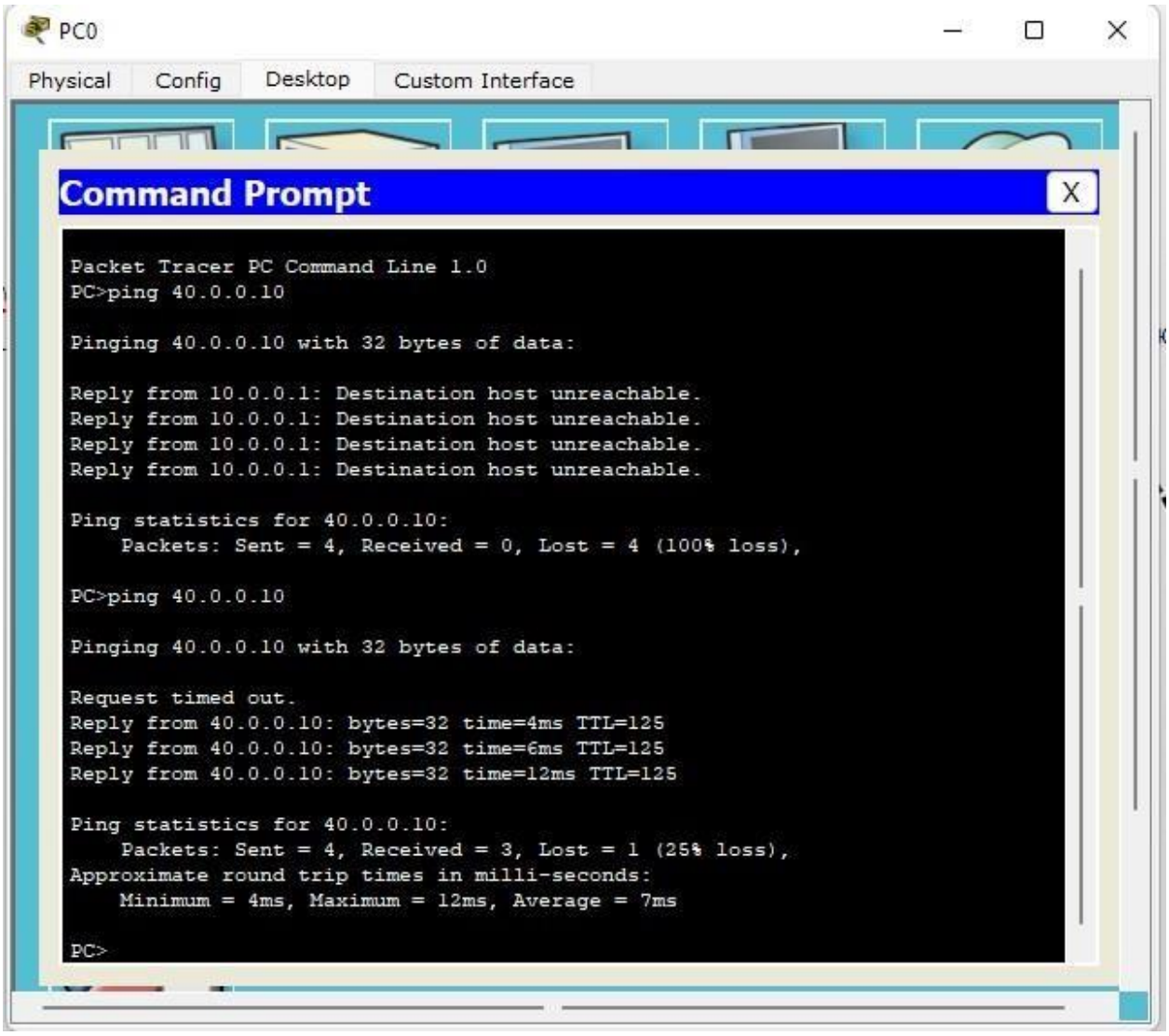

• The network is divided into 4 areas where area 0 is the backbone
• After we make the router link blw the area which is not connected to the backbone area, we can ping messages successfully.

Topology:

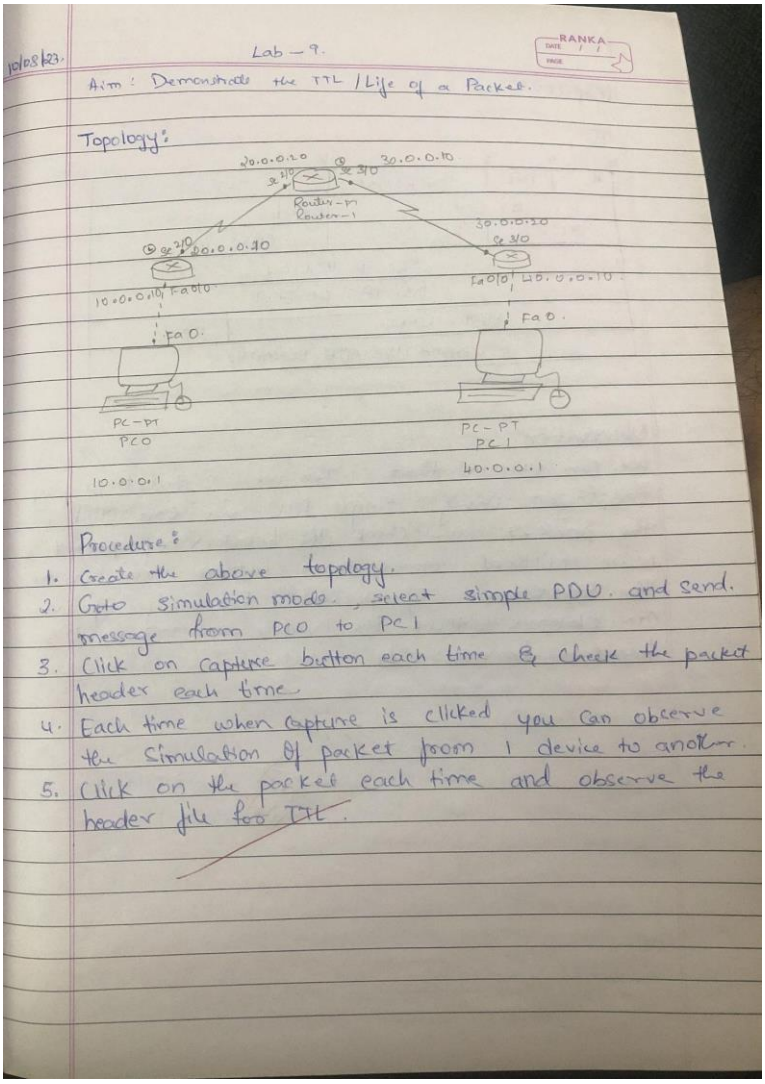

AREA 1
20.0.0.2
Se2/0
30.0.0.1
Se3/0
AREA 0
Router-PT
Router1
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
Se3/0
30.0.0.2
Router-PT
Fa0/0
40.0.0.1
AREA 3
AREA 2
Fa0
PC-PT
PC0
10.0.0.10
Fa0
PC-PT
PC1
40.0.0.10


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
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:
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)

Output:


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data:
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.10: bytes=32 time=4ms TTL=125
Reply from 40.0.0.10: bytes=32 time=6ms TTL=125
Reply from 40.0.0.10: bytes=32 time=12ms TTL=125
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 12ms, Average = 7ms
PC>

Aim: Demonstrate the TTL/ Life of a Packet Observation:



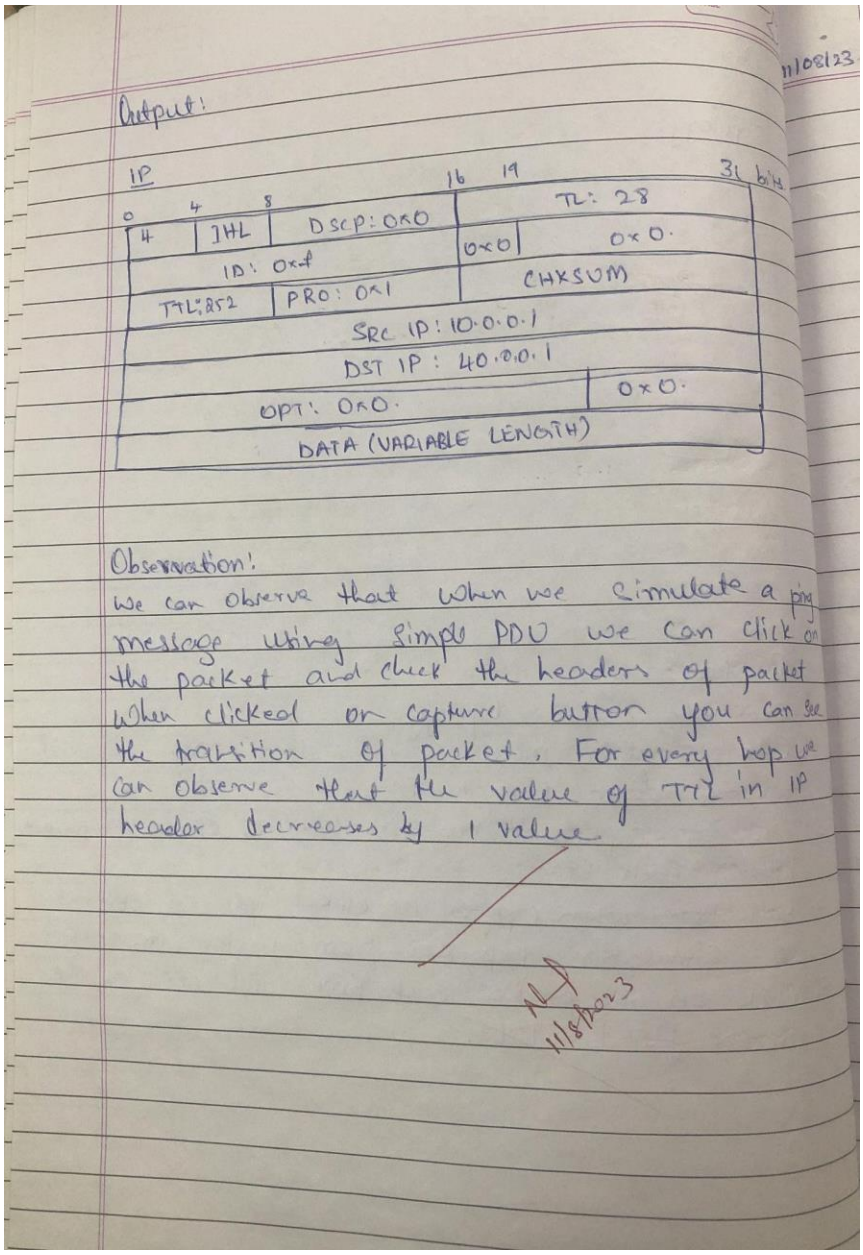
Lab – 9.

Aim: Demonstrate the TTL / Life of a Packet.

Topology:

Procedure:

1. Create the above topology.
2. Goto simulation mode, select simple PDU and send message from PC0 to PC1
3. Click on capture button each time & Check the packet header each time.
4. Each time when capture is clicked you can observe the simulation of packet from 1 device to another.
5. Click on the packet each time and observe the header file for TTL.



Output:

IP

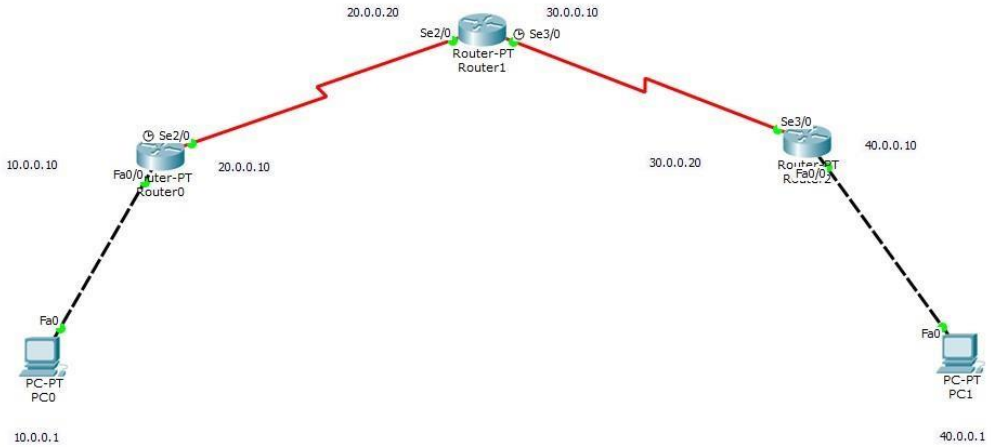
0	4	8	16	19	31 bits
4	IHL	DSCP: 0x0	TL: 28		
ID: 0x1			0x0	0x0	
TTL: 252	PRO: 0x1		CHKSUM		
SRC IP: 10.0.0.1					
DST IP: 40.0.0.1					
OPT: 0x0				0x0	
DATA (VARIABLE LENGTH)					

Observation:

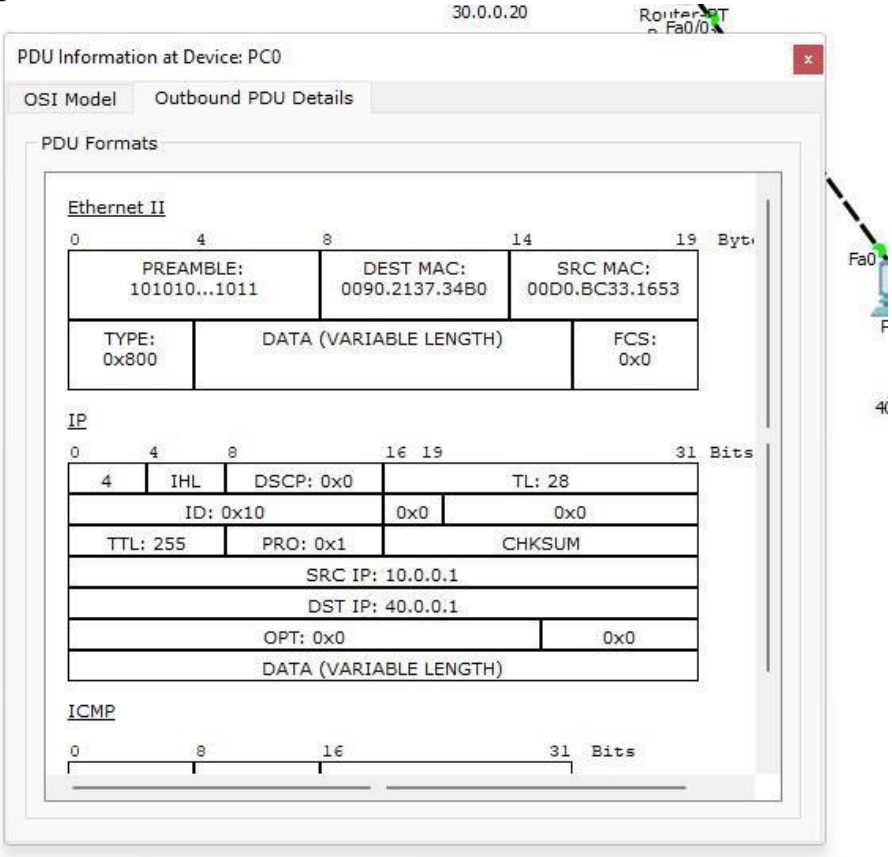
We can observe that when we simulate a ping message using simple PDU we can click on the packet and check the headers of packet when clicked on capture button you can see the transition of packet. For every hop we can observe that the value of TTL in IP header decreases by 1 value.

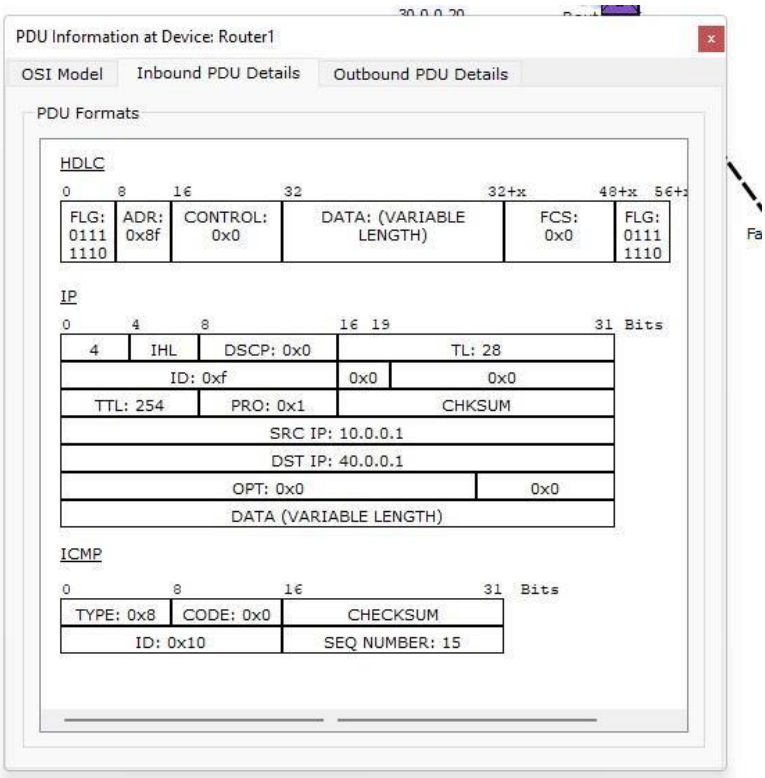
NL 11/8/2023

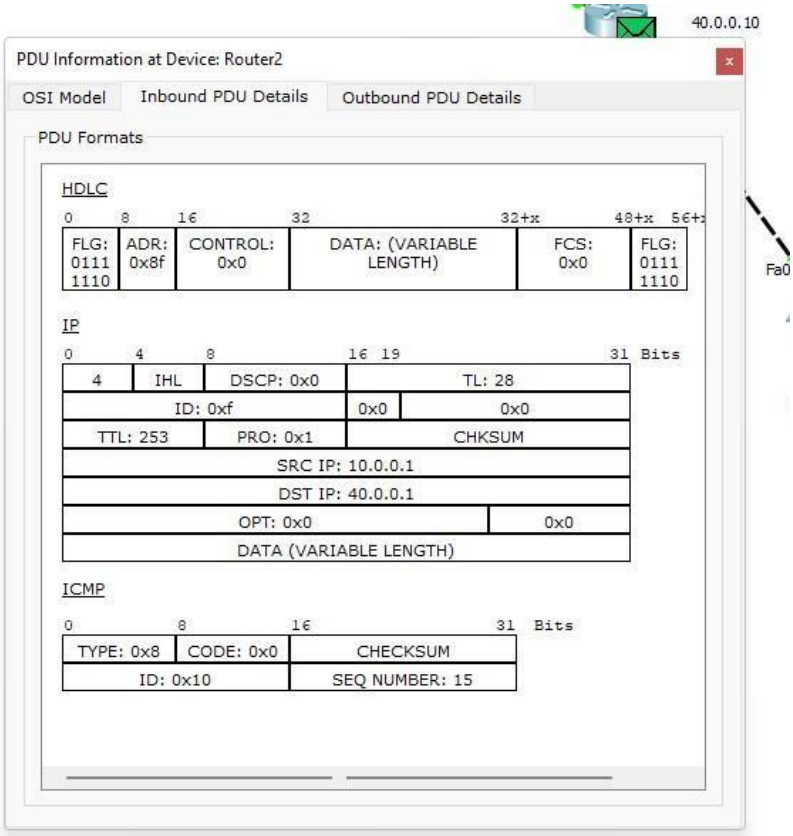
Topology:

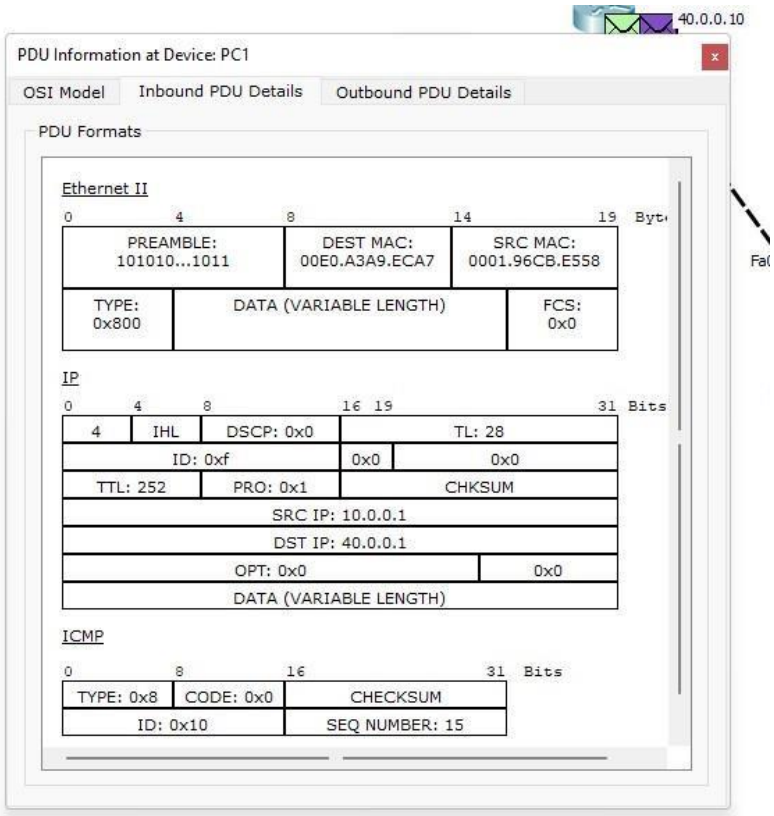

20.0.0.20
30.0.0.10
Se2/0
Se3/0
Router-PT
Router1
Se2/0
10.0.0.10
Fa0/0
Router0
20.0.0.10
30.0.0.20
Se3/0
40.0.0.10
Fa0/0
Fa0
PC-PT
PC0
10.0.0.1
Fa0
PC-PT
PC1
40.0.0.1

Output:


30.0.0.20
PDU Information at Device: PC0
OSI Model
Outbound PDU Details
PDU Formats
Ethernet II
0 4 8 14 19 Byt
PREAMBLE: 101010...1011
DEST MAC: 0090.2137.34B0
SRC MAC: 00D0.BC33.1653
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
0 4 8 16 19 31 Bits
4
IHL
DSCP: 0x0
TL: 28
ID: 0x10
0x0
0x0
TTL: 255
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
0 8 16 31 Bits
Fa0


PDU Information at Device: Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
0 8 16 32 32+x 48+x 56+x
FLG: 0111 1110
ADR: 0x8f
CONTROL: 0x0
DATA: (VARIABLE LENGTH)
FCS: 0x0
FLG: 0111 1110
IP
0 4 8 16 19 31 Bits
4
IHL
DSCP: 0x0
TL: 28
ID: 0xf
0x0
0x0
TTL: 254
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
0 8 16 31 Bits
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x10
SEQ NUMBER: 15


40.0.0.10
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
0 8 16 32 32+x 48+x 56+x
FLG: 0111 1110
ADR: 0x8f
CONTROL: 0x0
DATA: (VARIABLE LENGTH)
FCS: 0x0
FLG: 0111 1110
IP
0 4 8 16 19 31 Bits
4
IHL
DSCP: 0x0
TL: 28
ID: 0xf
0x0
0x0
TTL: 253
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
0 8 16 31 Bits
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x10
SEQ NUMBER: 15



Aim: To construct simple LAN and understand the concept and operation of

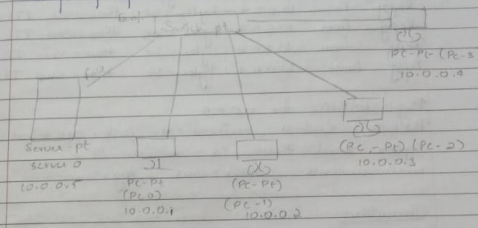
Address Resolution Protocol (ARP) Observation:

Quick Work

Page No.:
Date:
M T W T F S S

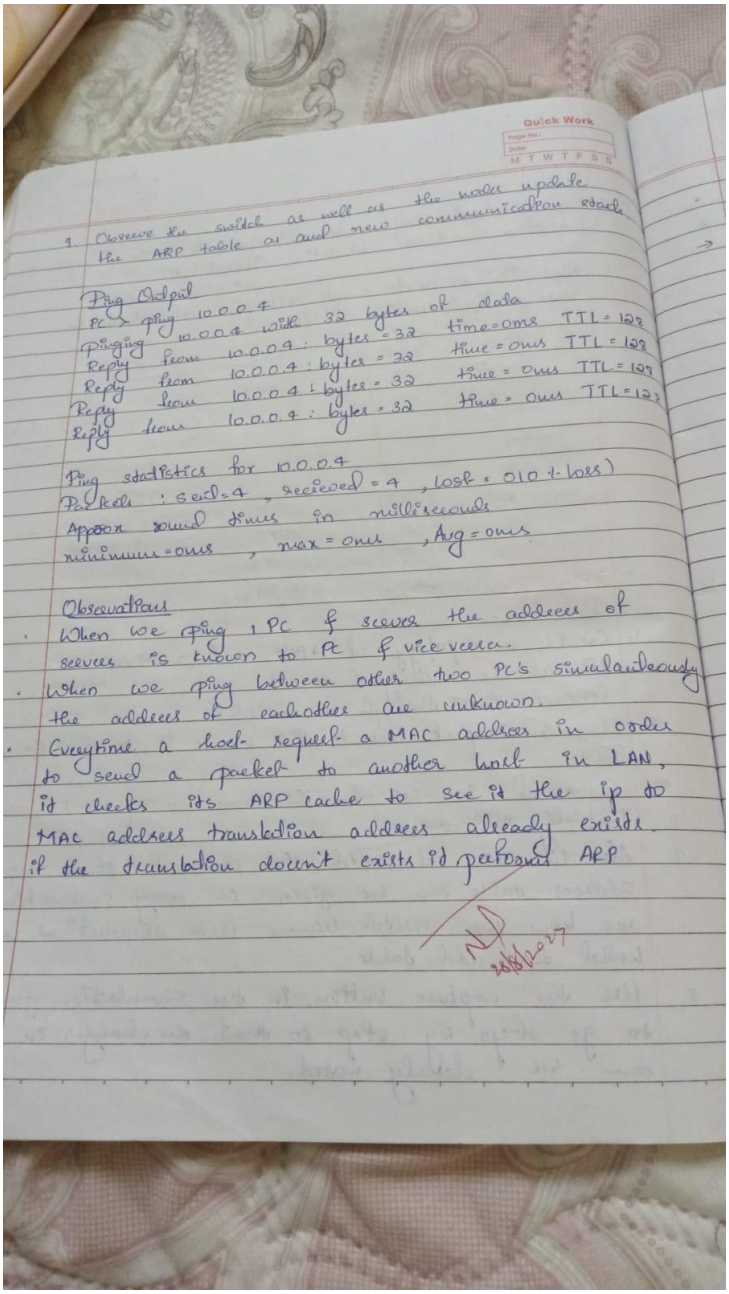
8. To construct simple LAN and understand the concept & operation of Address Resolution Protocol (ARP)

• Aim - To construct simple LAN and understand the concept & operation of ARP

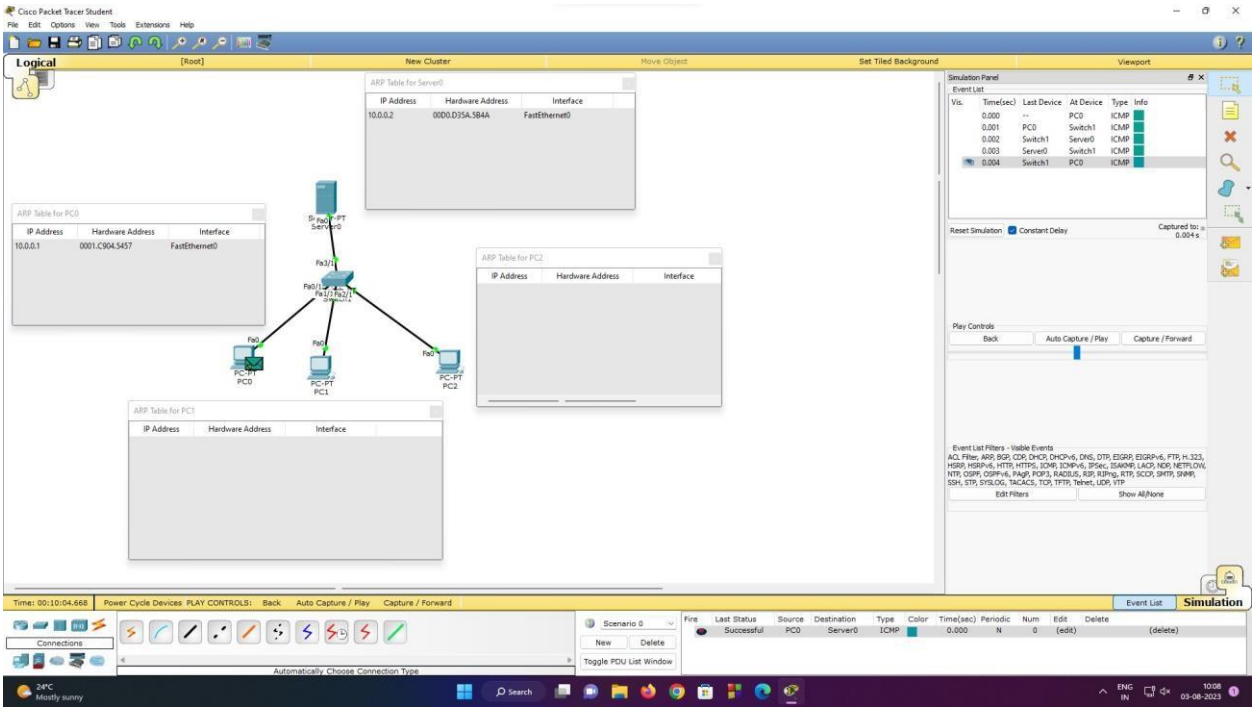


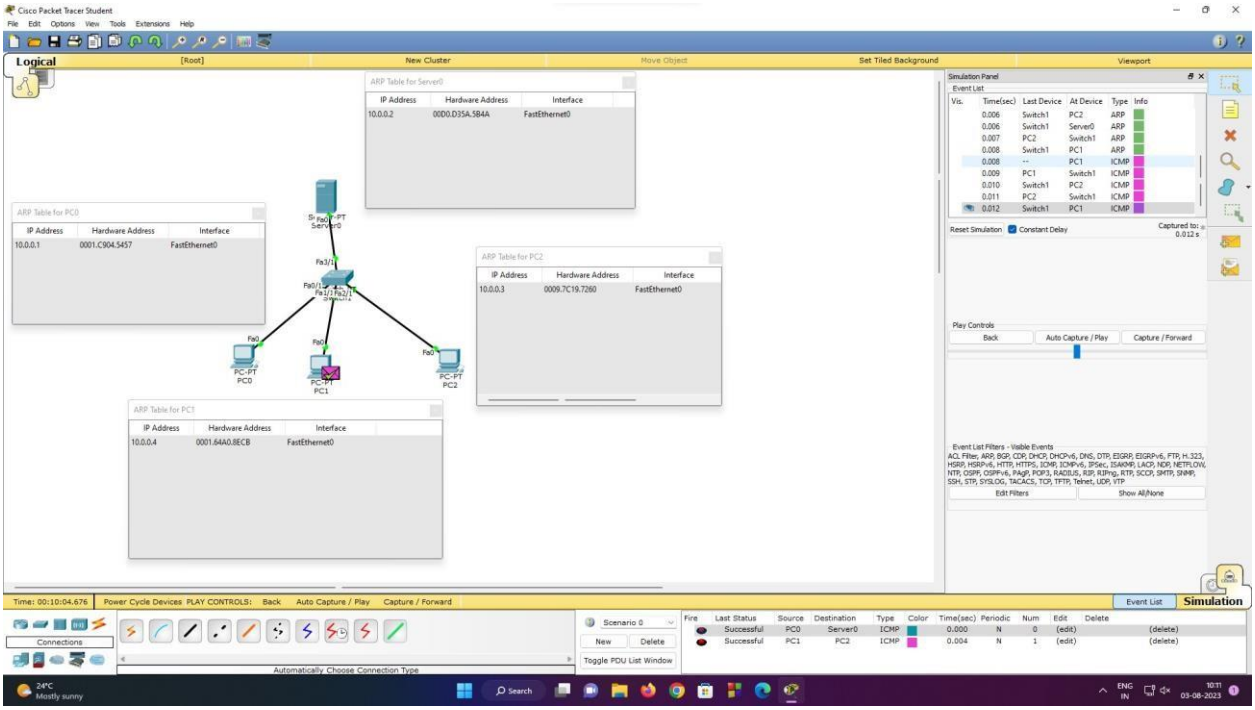
Procedure -

1. Create a topology of 4 PC's and a server
2. IP address assigned to all.
3. Connect them through a switch.
4. Use a inspect tool to click on a PC to see the ARP Table
5. Command in CLI for the same is arp -a (PC - CLI)
6. Initially ARP table
7. Also in CLI of switch, the command show mac address - table can be given on every transaction to see how the switch learns from transactions and loaded the add. table
8. Use the capture button in the simulation panel to go steps by step so that the changes in ARP can be clearly noted.

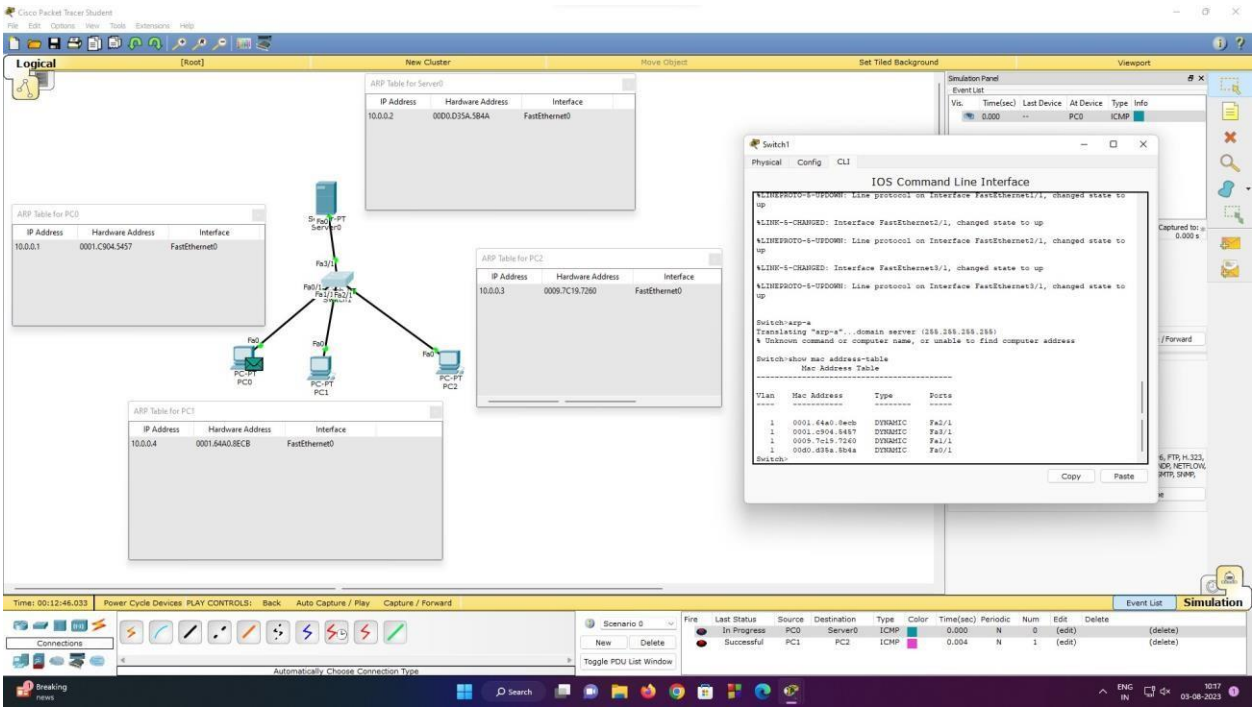

Quick Work
M T W T F S S
4 Observe the switch as well as the nodes update the ARP table as and new communication starts
Ping Output
PC> ping 10.0.0.4
Pinging 10.0.0.4 with 32 bytes of data
Reply from 10.0.0.4: bytes=32 time=0ms TTL=128
Reply from 10.0.0.4: bytes=32 time=0ms TTL=128
Reply from 10.0.0.4: bytes=32 time=0ms TTL=128
Reply from 10.0.0.4: bytes=32 time=0ms TTL=128
Ping statistics for 10.0.0.4
Packets: Sent=4, Received=4, Lost=0(0% loss)
Approximate round times in milliseconds
minimum=0ms, max=0ms, Avg=0ms
Observations
When we ping, PC & server the address of server is known to PC & vice versa.
When we ping between other two PC's simultaneously the address of eachother are unknown.
Everytime a host request a MAC address in order to send a packet to another host in LAN, it checks its ARP cache to see if the ip to MAC address translation address already exists. if the translation doesn't exists 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
00D0.D35A.5B4A
FastEthernet0
ARP Table for PC0
10.0.0.1
0001.C904.5457
FastEthernet0
ARP Table for PC2
10.0.0.3
0009.7C19.7260
FastEthernet0
ARP Table for PC1
10.0.0.4
0001.64A0.8ECB
FastEthernet0
Switch1
Physical
Config
CLI
IOS Command Line Interface
%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: 00:12:46.033
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
In Progress
PC0
Server0
ICMP
0.000
N
0
(edit)
(delete)
Successful
PC1
PC2
ICMP
0.004
N
1
(edit)
(delete)

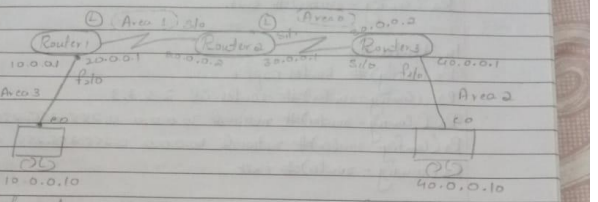
LAB 09

Quick Work

Page No.:
Date:
M T W T F S S

Q. Configure OSPF routing protocol

↔ Aim - To Configure OSPF routing protocol.



• Procedure

1. Create a network using 3 routers and 2 pc's as shown
2. Configure the PC's with the ip addresses and gateway as per the topology above
3. Configure each of the routers with the ip addresses as shown in the topology
4. Encapsulation ppp and clock rate needs to be set as done in ~~ppp~~ ppp protocol experiment.

In Router R1 (Enable routing by enabling OSPF protocol)

R1 (config)# router ospf 1
R1 (Config)# router-id 1.1.1.1
R1 (Config-router)# network 10.0.0.0 0.255.255.255 area 3
R1 (Config-router)# network 20.0.0.0 0.255.255.255 area 1
R1 (Config-router)# exit

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.

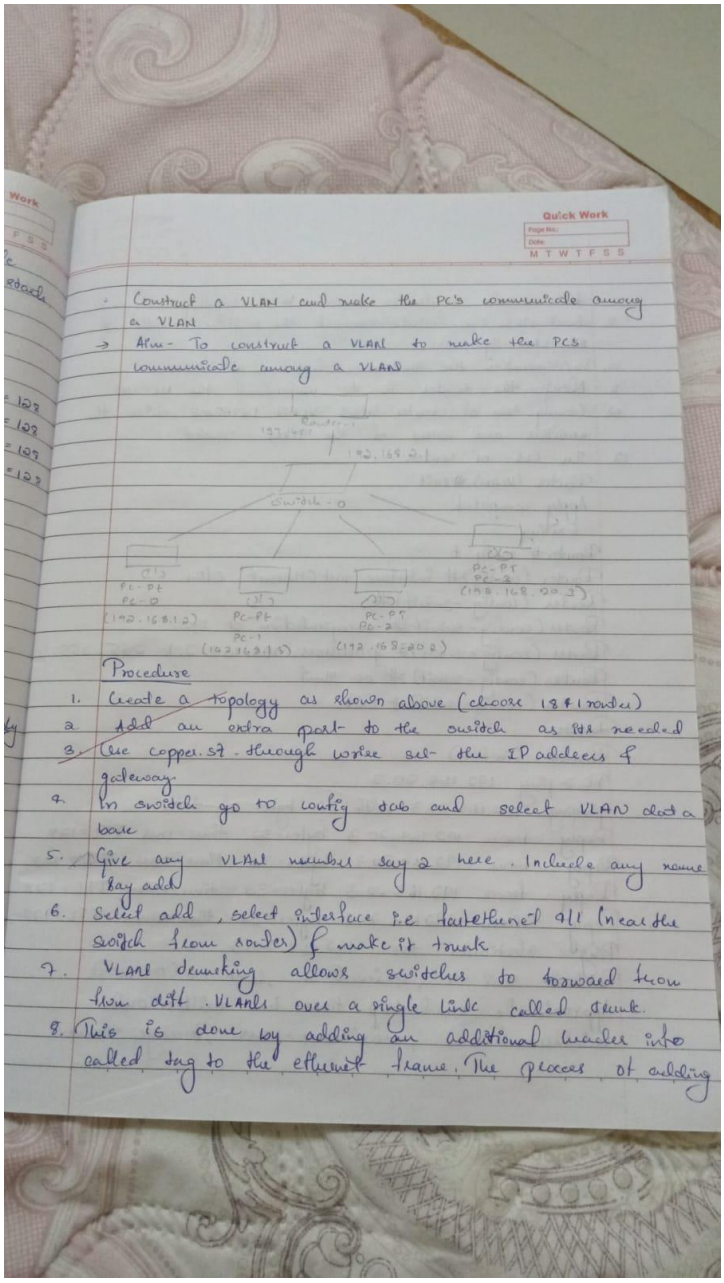
In Router R3
R3 (Config)# router ospf 1
R3 (Config-router)# router-id 3.3.3.3
R3 (Config-router)# network 30.0.0.0 0.255.255.255 area 0
R3 (Config-router)# network 40.0.0.0 0.255.255.255 area 2.
R3 (Config-router)# exit

6. Loopback (In Router 1's serial connection)
R1 (Config-if)# interface loopback 0
R1 (Config-if)# ip address 172.16.1.255.255.255.0.0
R1 (Config-if)# no shutdown
In Router 2's any of serial connection
R2 (Config-if)# interface loopback 0
R2 (Config-if)# ip address 172.16.1.253 255.255.0.0
R2 (Config-if)# no shutdown
In Router 3's Serial connection
R3 (Config-if)# interface loopback 0
R3 (Config-if)# ip address 172.16.1.254 255.255.0.0
R3 (Config-if)# no shutdown

Creating virtual link between R1, R2
In Router R1
R1 (Config)# router Ospf 1
R1 (Config-router)# area 1 virtual-link 2.2.2.2

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

Observation:



Quick Work

M T W T F S S

1. Construct a VLAN and make the PC's communicate among a VLAN

→ Aim - To construct a VLAN to make the PCs communicate among a VLAN

Switch - 0

PC-PT PC-0 (192.168.1.2)

PC-PT PC-1 (192.168.1.5)

PC-PT PC-2 (192.168.20.2)

PC-PT PC-3 (192.168.20.3)

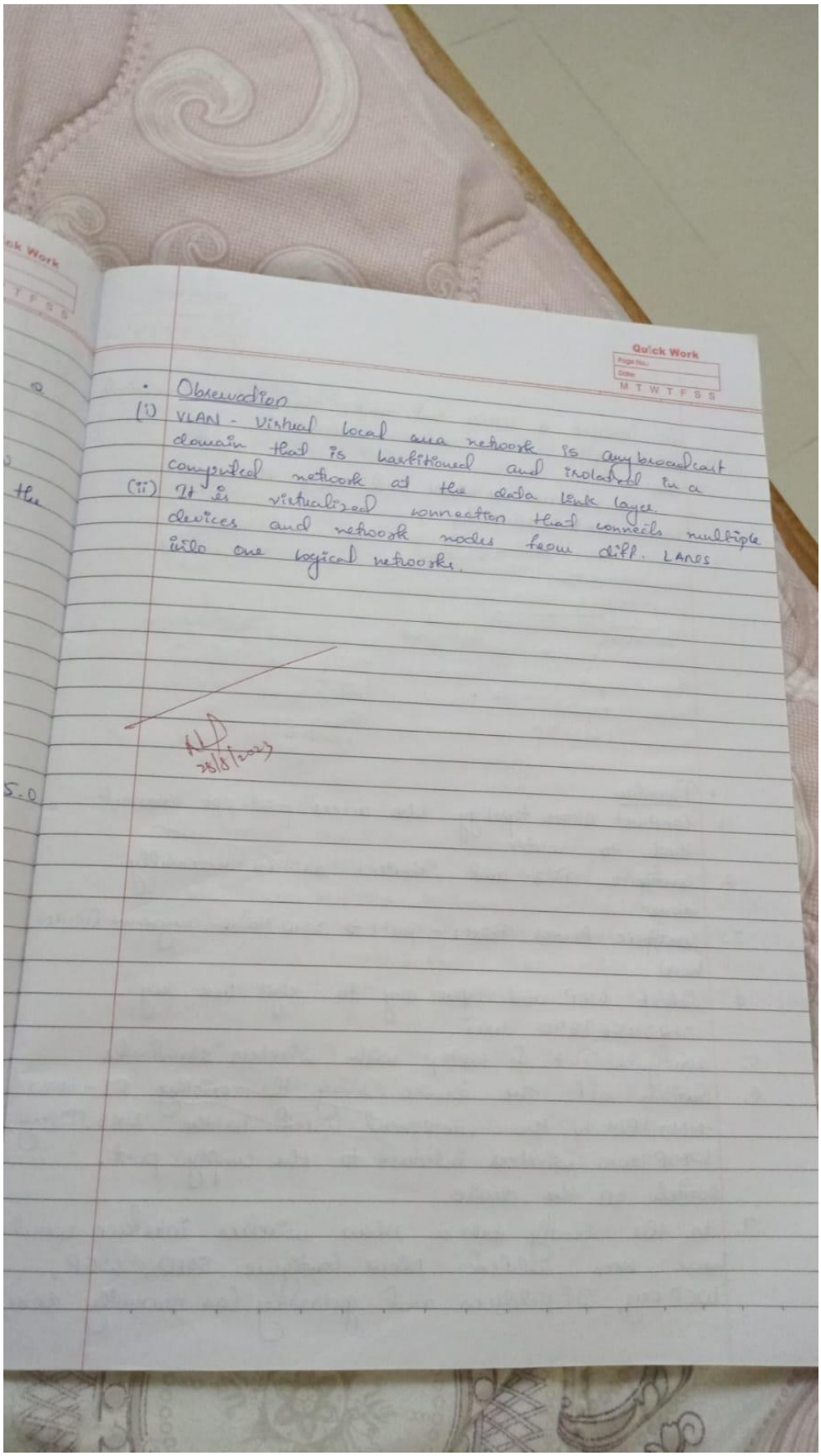
Procedure

1. Create a topology as shown above (choose 1841 router)
2. Add an extra port to the switch as PTs needed
3. Use copper st. through wire set the IP address of gateway
4. In switch go to config tab and select VLAN data base
5. Give any VLAN number say 2 here. Include any name say add
6. Select add, select interface i.e fastethernet 4/1 (near the switch from router) & make it trunk
7. VLAN trunking allows switches to forward from from diff. VLANs over a single link called trunk.
8. This is done by adding an additional header info called tag to the ethernet frame. The process of adding

this small header is called VLAN tagging.

9. Look into the interfaces of the switches with a NEWLAN systems.
10. This makes the switch understand NEWVLAN
11. Next the router is to understand the NEWLAN
12. Config tab of router select VLAN DATABASE enter the number and name of the VLAN created.
13. In CLI of routers

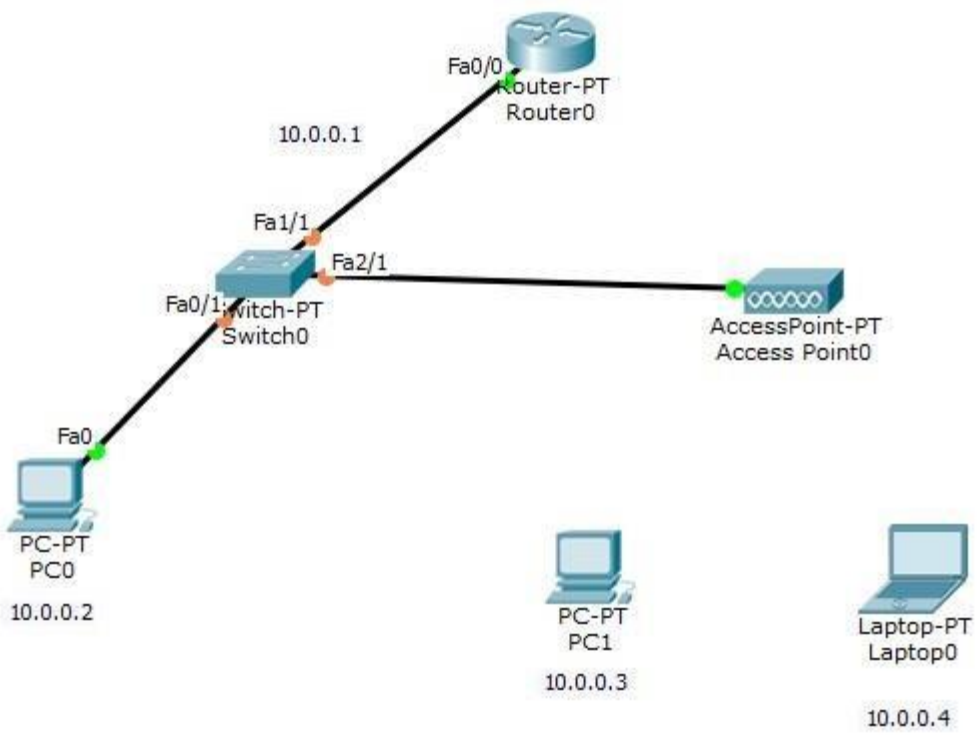
Router (VLAN) #exit
Apply completed
Exiting
Router# config t
Router (config)# interface fastEthernet 0/0.1
Router (config-subif)#
Router (config-subif)# encapsulation of 192.
Router (config-subif)# ipaddress 192.168.2.1 255.255.0
Router (config-subif) # no shut
Router (config-subif) # exit
~~Router~~
Result (in PC0)
PC > ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data.
Reply from 192.168.20.3 byte=32 time=1ms TTL=128
Reply from 192.168.20.3 bytes=32 time=0ms TTL=128
Reply from 192.168.20.3 bytes=32 time=0ms TTL=128
Reply from 192.168.20.3 bytes=32 time=0ms TTL=128
Ping statistics for 192.168.20.3
Packets send =4, recieved=4, lost =0 (0% loss)
Approximate round trip times in milliseconds
minimum=0ms, maximum=1ms, Average=0ms.


Quick Work
Observation
(i) VLAN - Virtual local area network is any broadcast domain that is bartitioned and isolated in a computer network at the data link layer.
(ii) It is virtualized connection that connects multiple devices and network nodes from diff. LANOS into one logical network.

LAB 11:

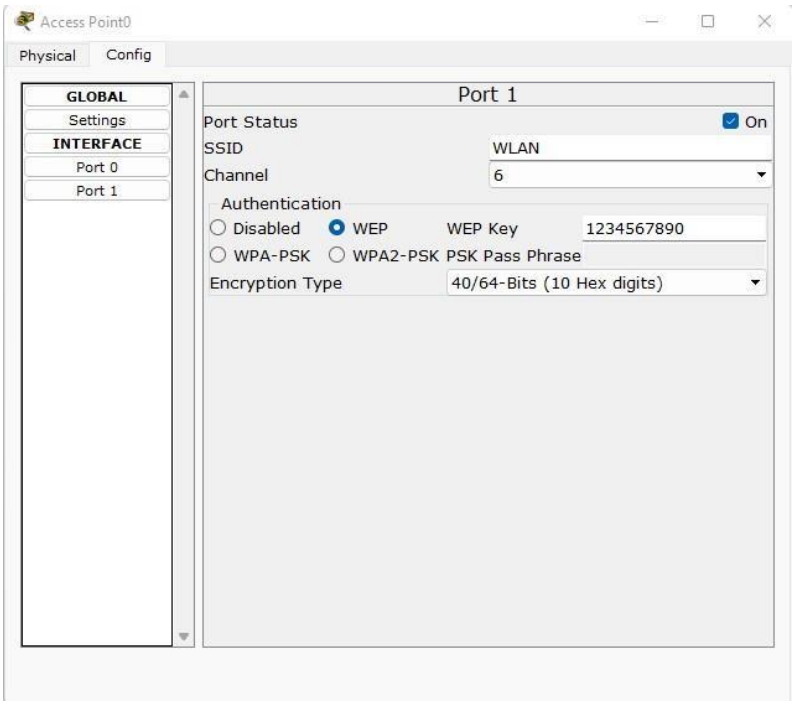
Aim : To construct a WLAN and make the nodes communicate wirelessly

Topology :



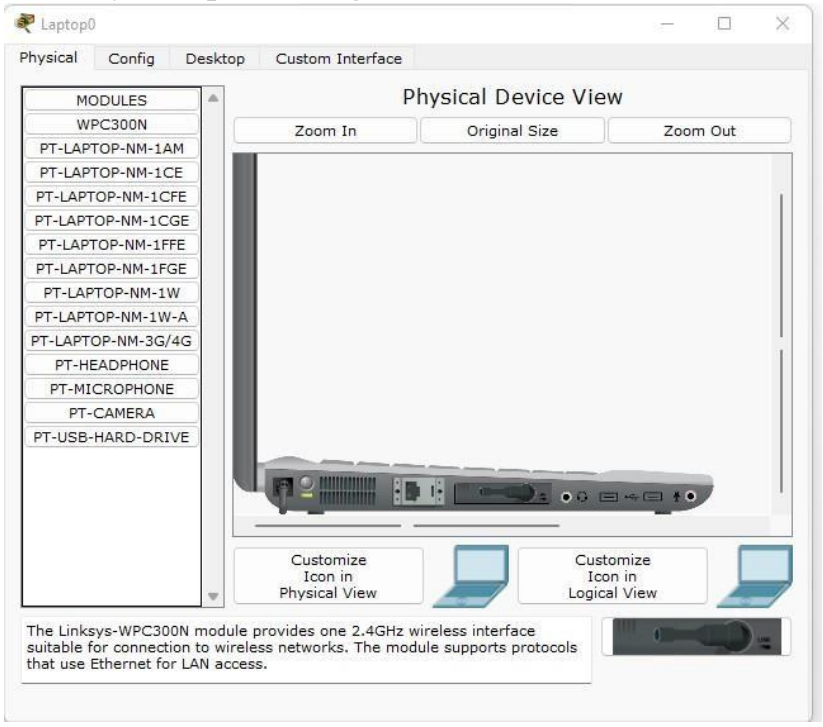
Configurations:

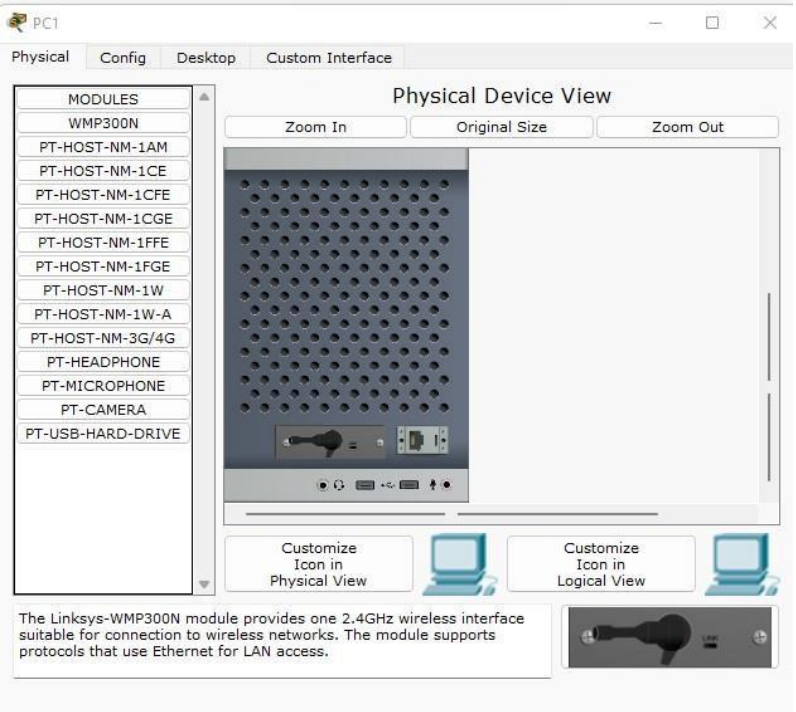
Access Point0:



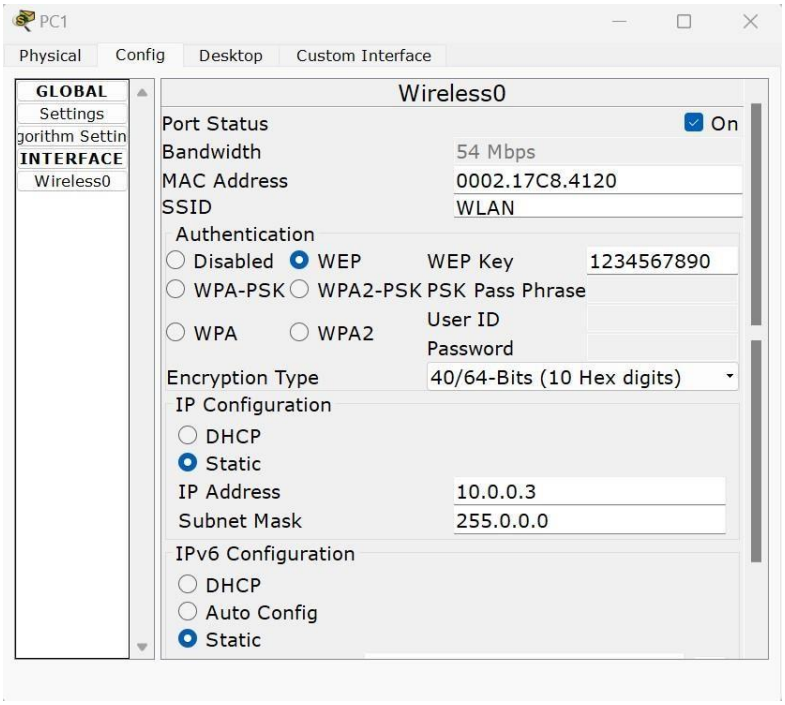
Laptop0 Physical port change:

PC0 Physical port change:

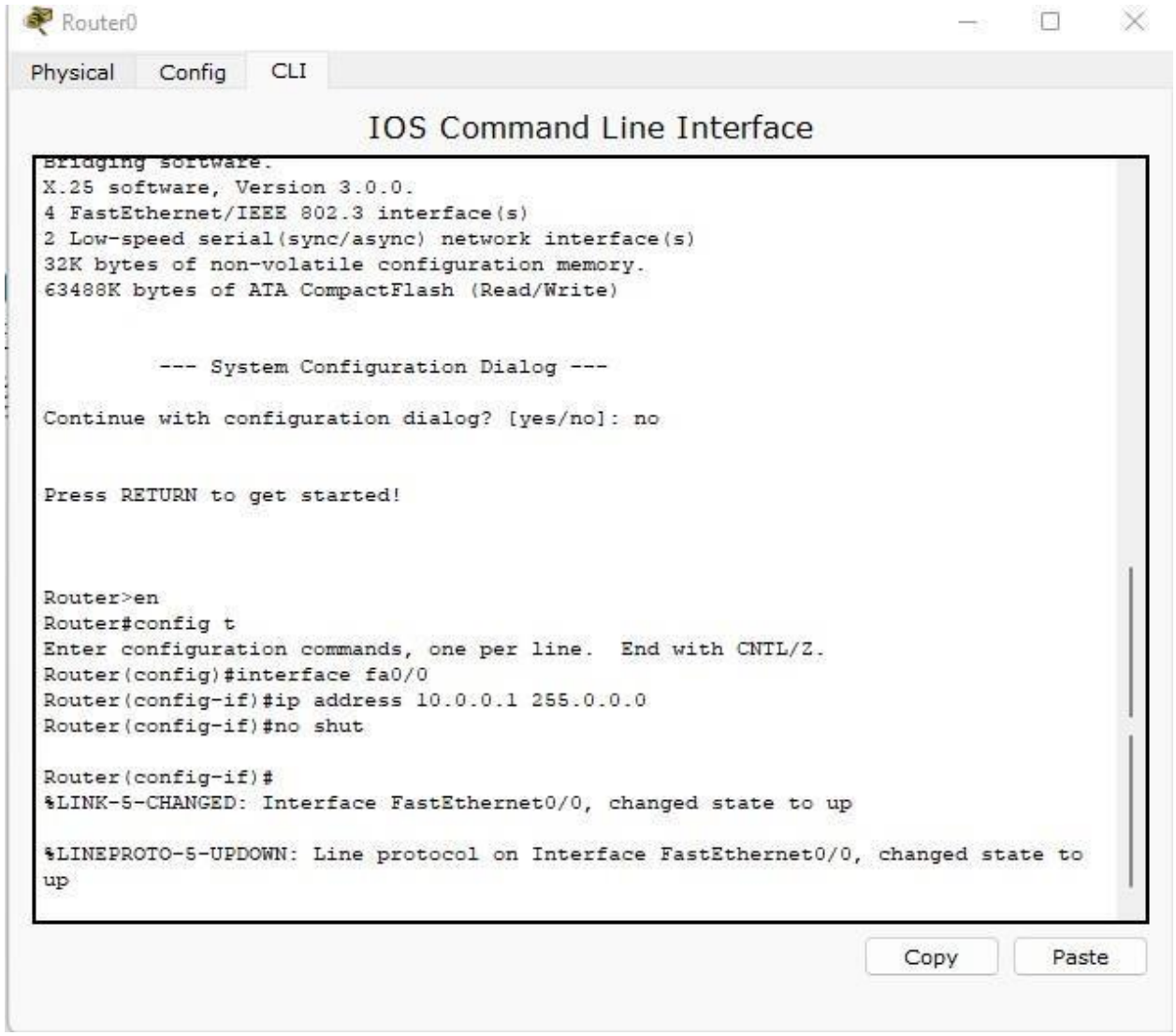




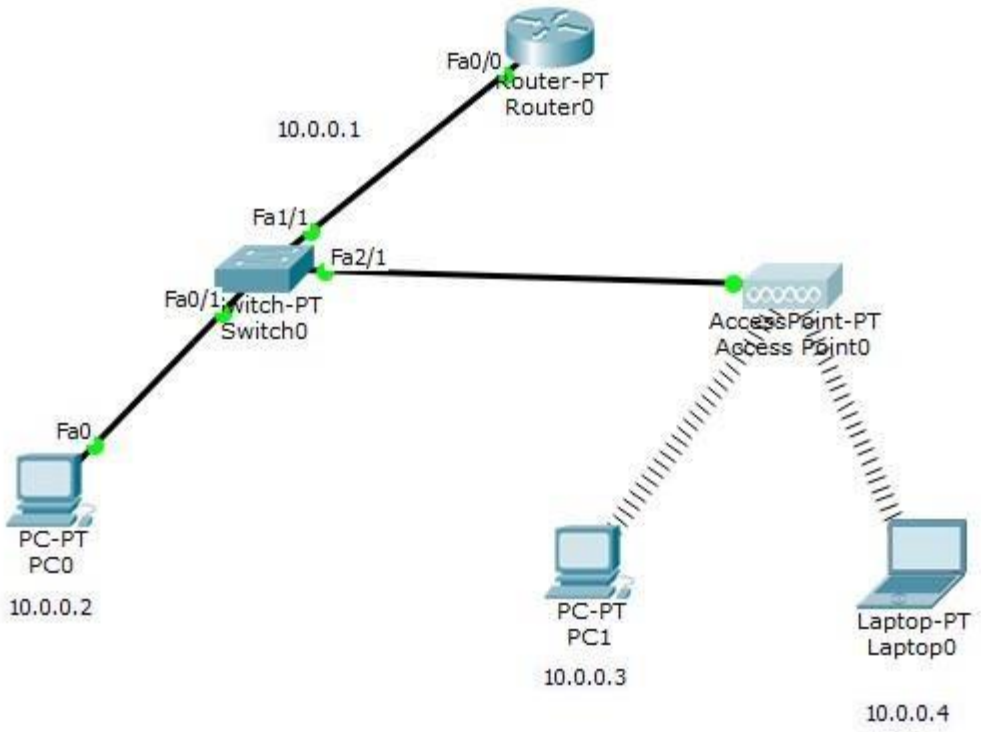
PC0 and Laptop0 Wireless configuration:



Router 0 CLI:

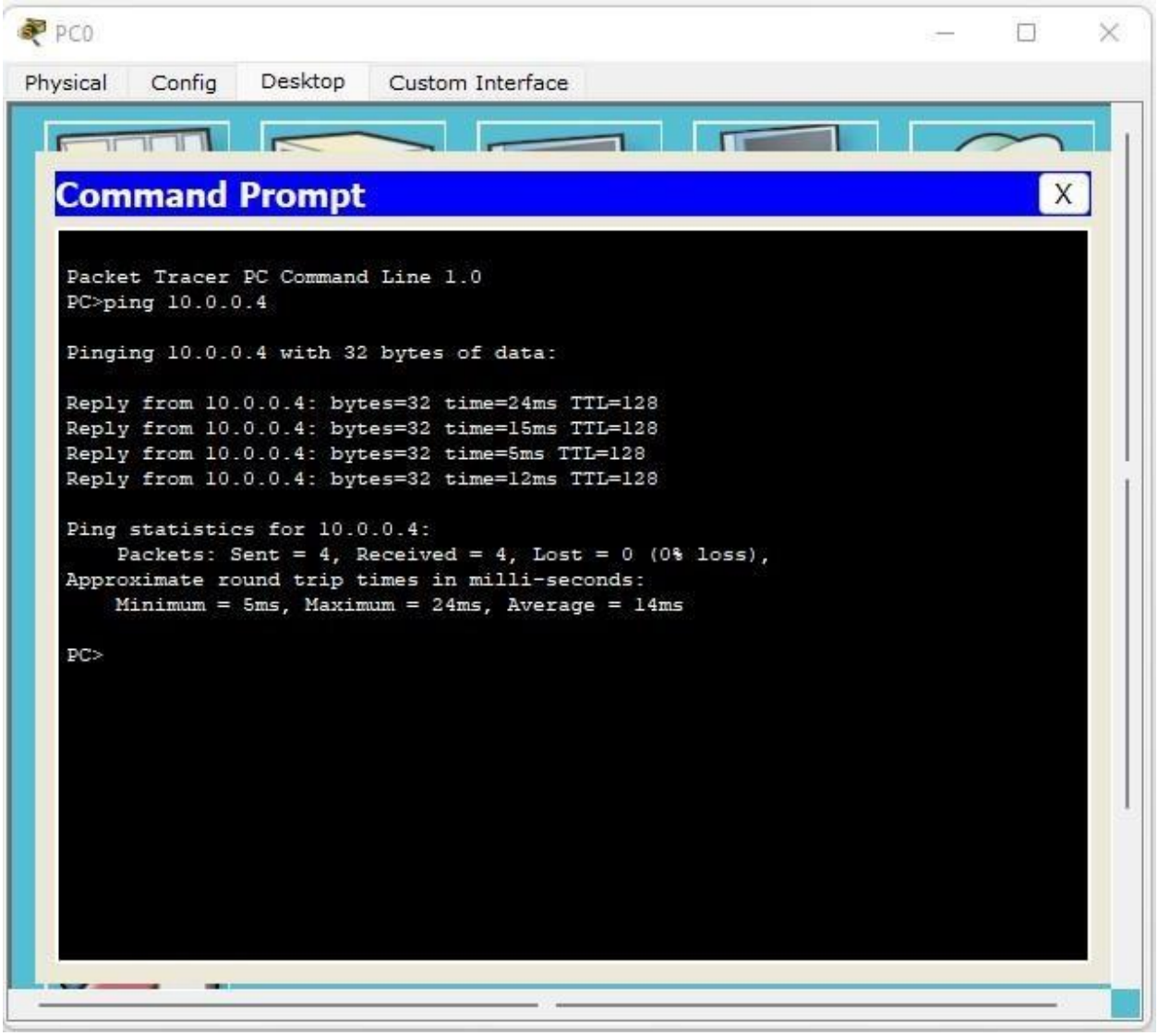


Final Topology:

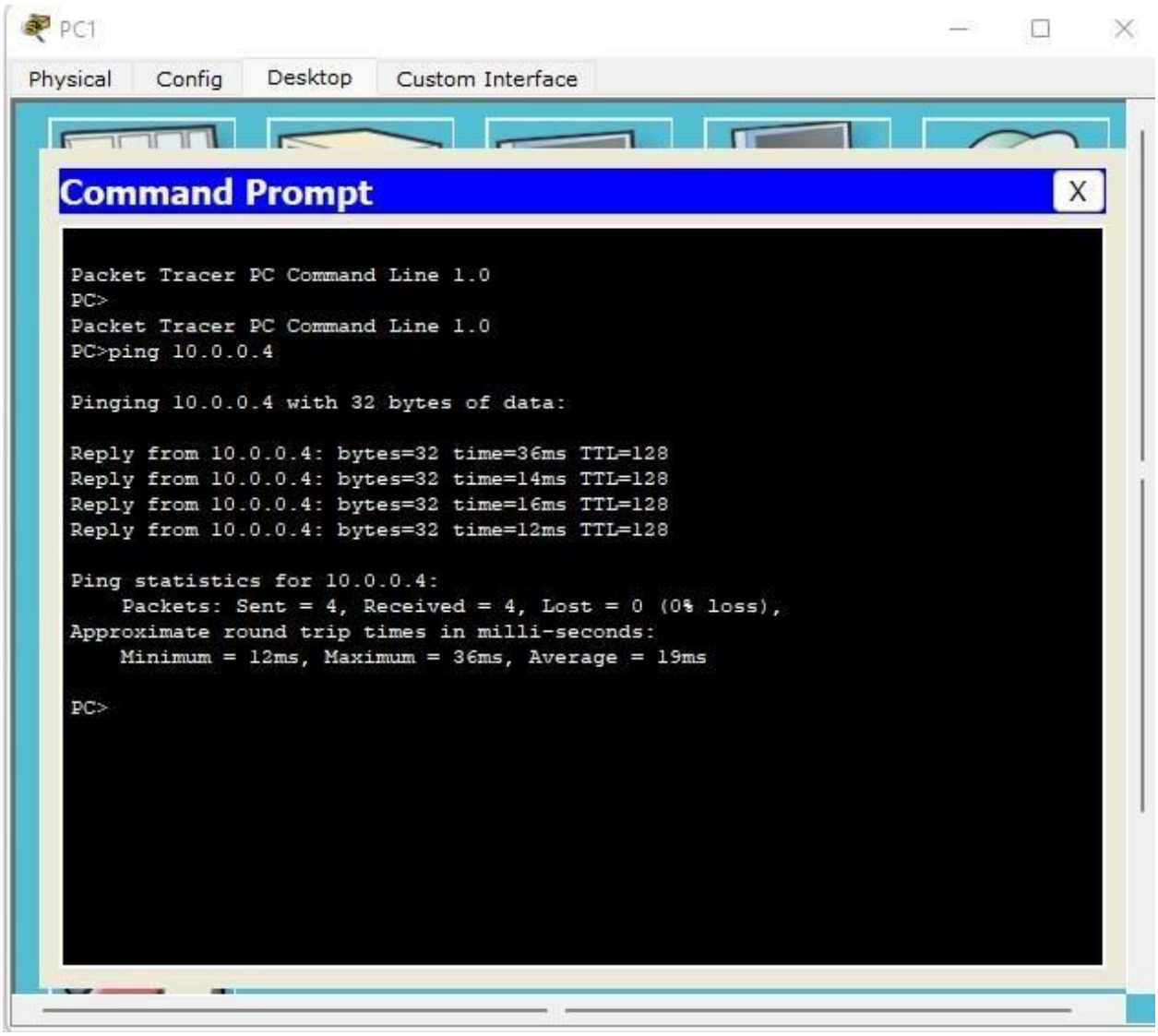


Command Prompt:

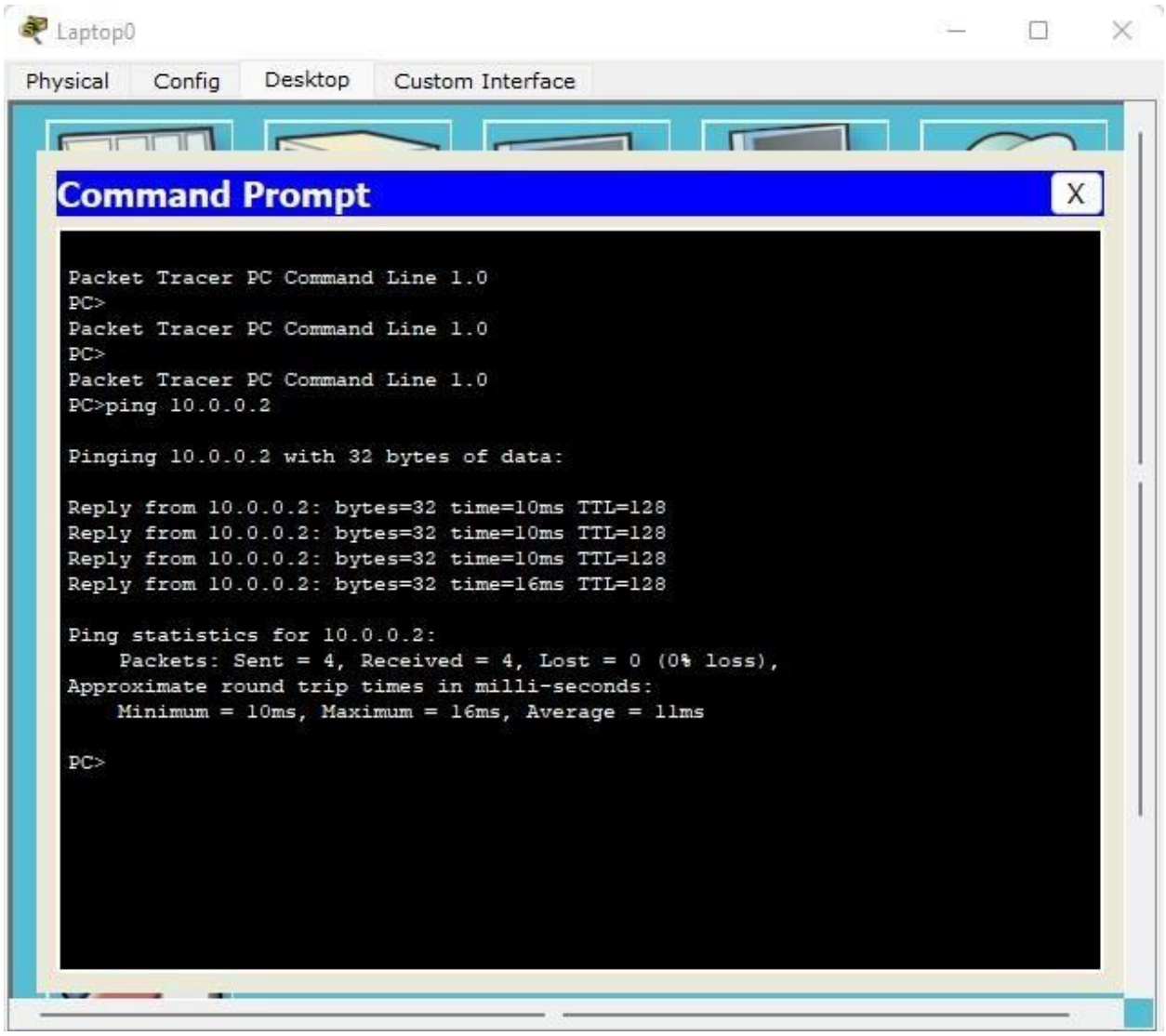
PC0 to Laptop0 :



PC1 to Laptop0 :



Laptop0 to PC0:


Laptop0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>
Packet Tracer PC Command Line 1.0
PC>
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:
Reply from 10.0.0.2: bytes=32 time=10ms TTL=128
Reply from 10.0.0.2: bytes=32 time=10ms TTL=128
Reply from 10.0.0.2: bytes=32 time=10ms TTL=128
Reply from 10.0.0.2: bytes=32 time=16ms TTL=128
Ping statistics for 10.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 10ms, Maximum = 16ms, Average = 11ms
PC>

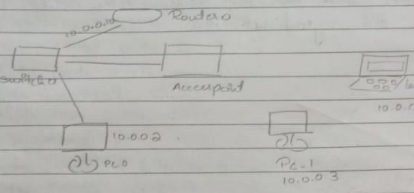
Quick Work

M T W T F S S

To Construct a WLAN and make the nodes communicate wirelessly.

– Aim –

To construct a WLAN and make the nodes communicate wirelessly



• Procedure

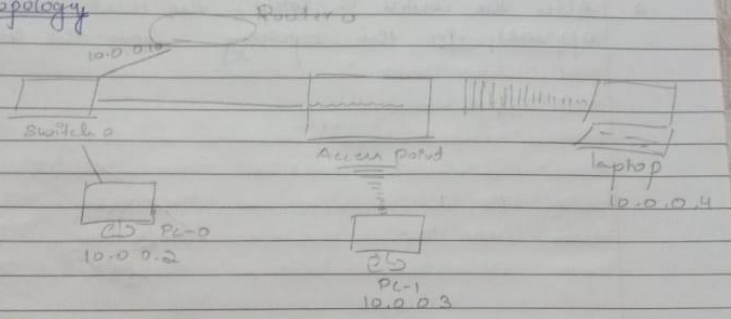
1. Construct above topology. Use access point-ppt connect that to router
2. Configure PC3 and Router1 as is normally done
3. Configure Access Point1 - Port1 → SSID Name- anyname (WLAN here)
4. Select WEP and give any 10 digit hex key -1234567890 here
5. Configure PC4 & laptop with wireless standards
6. Switch off the device. Drag the existing PT-HOST-NM-1AM to the component listed in the LHS. Drag WMP300N wireless interface to the empty port. Switch on the device
7. In the config tab a new wireless interface would have been added. Now configure SSID, WEP, WEP key, IP address and gateway (as normally done)

to the device}.

2. Ping from each device to every other device and see the result.

Result-

Topology



In PC (10.0.0.2)

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 = 11ms TTL = 120

Reply from 10.0.0.3 bytes = 32 time = 13ms TTL = 120

Reply from 10.0.0.3 bytes = 32 time = 6ms TTL = 120

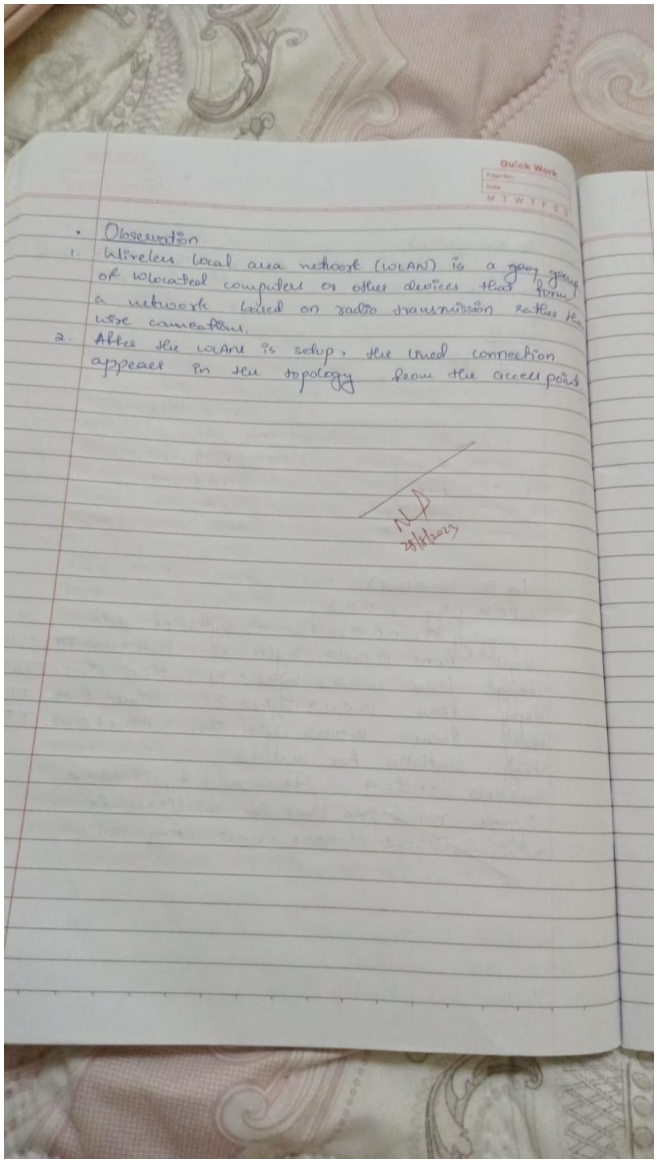
Reply from 10.0.0.3 bytes = 32 time = 0ms TTL = 120

Ping statistics for 10.0.0.3

Packets: sent = 4, Received = 4, Lost = 0

Approx round trip time in milliseconds

minimum = 6ms, Max = 21ms, Avg = 12ms.


Quick Work
M T W T F S S
• Observation
1. Wireless local area network (WLAN) is a group of interconnected computers or other devices that form a network based on radio transmission rather than wire connections.
2. After the WLAN is setup, the wired connection appears in the topology from the access point.

LAB-12

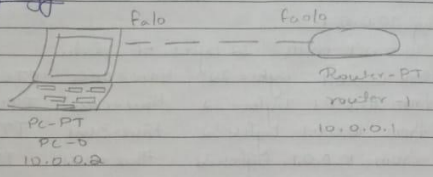
Quick Work

Page No.:
Date:
M T W T F S S

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

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

Topology



- Procedure

1. Create a topology as shown above
2. Configure the IP address & gateway of PC-0
3. Configure the router executing the following commands
   1. Enable
   2. Config T
   3. Host name S1
   4. enable secret P1
   5. Interface fastethernet 0/0
   6. IP address 10.0.0.1 255.0.0.0
   7. No shut
   8. line vty 05
   9. login
   10. password P0
   11. Exit. Exit
   12. WR

Ping message to router
password for user verification is p0
password for enable is p1
Accessing router cli from Pc
show ip router

- 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 byte = 32 time = 0ms TTL = 255
Reply from 10.0.0.1 byte = 32 time = 0ms TTL = 255
Reply from 10.0.0.1 byte = 32 time = 0ms TTL = 255
Reply from 10.0.0.1 byte = 32 time = 0ms TTL = 255

Ping statistics for 10.0.0.1
Packets sent = 4 received = 4 lost = 0 (0% loss)
Approx round trip times in milliseconds
minimum = 0ms, max = 0ms, Average = 0ms
PC> telnet 10.0.0.1
Typing 10.0.0.1 ... open
User access verification
password: P0
P1 > enable
password: P1
r1 # show ip route
L 10.0.0.0/8 is directly connected fa0/0

CYCLE-2

13. Write a program for error detecting code using CRCCCITT (16-bits).

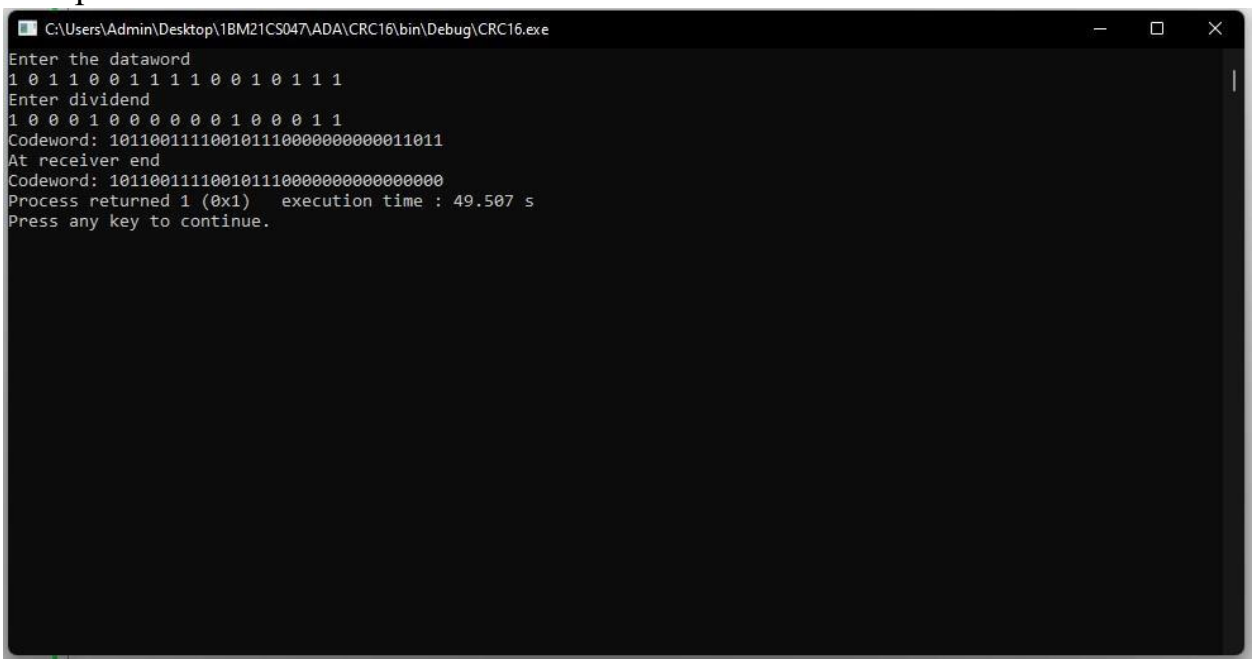
Code:

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

Output:



Observation:

Pl08/23

Lab - 13

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

```
#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 dataword in");
for(i=0; i<17; i++)
    scanf("%d", &div[i]);
for(i=17; i<33; i++)
    div[i]=0;
for(i=0; i<17; i++)
    ze[i]=0;
printf("Enter dividend");
  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("\n At 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:

Enter dataword

1 0 1 1 0 0 1 1 1 1 0 0 1 0 1 1 1

Enter dividend

1 0 0 0 1 0 0 0 0 0 0 1 0 0 0 1 1

Codeword: 10110011110010111000000000000011011

At receiver end.

Codeword: 10110011110010111 00000000000000000,

19/8/2023

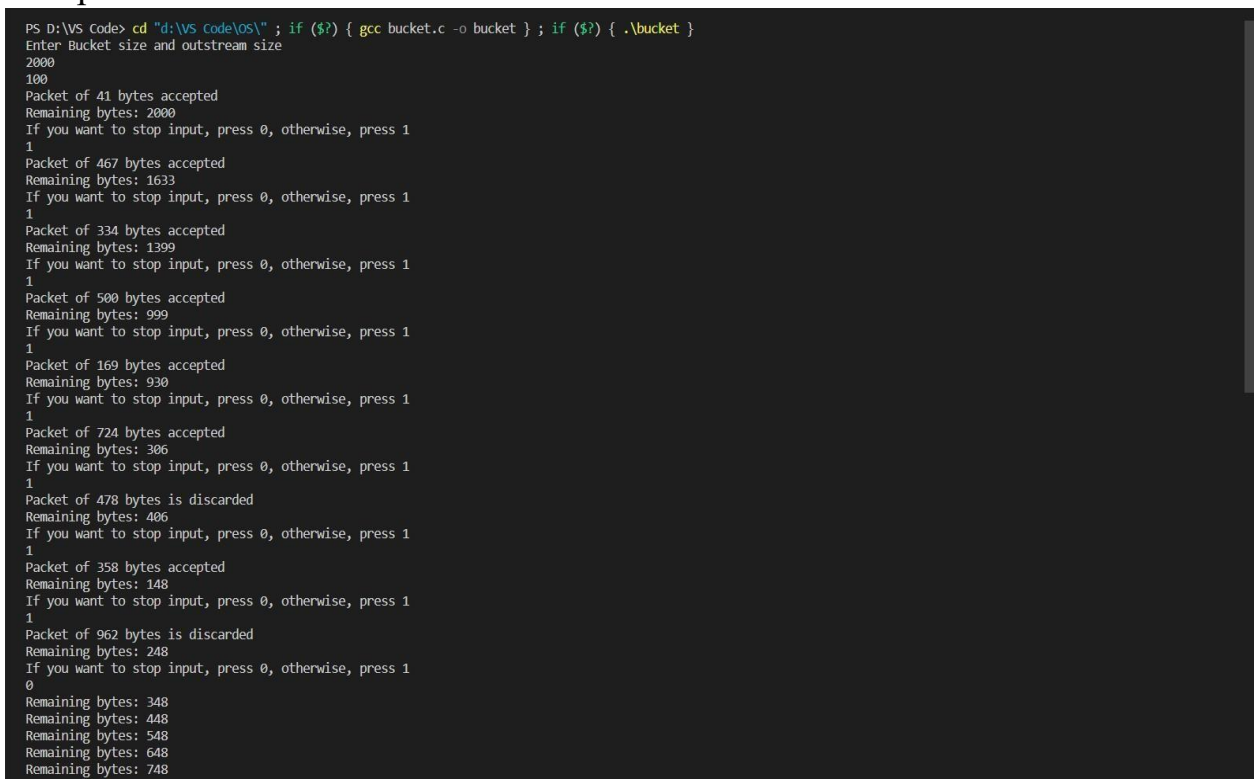
14. Write a program for congestion control using Leaky bucket algorithm.

Code:

```
#include <stdio.h>
#include <stdlib.h> // Include this for the rand() function


int main() { int buckets, outlets, k = 1,
num, remaining;


printf("Enter Bucket size and outstream
size\n"); scanf("%d %d", &buckets, &outlets);
remaining = buckets;


while (k)
{ num = rand() % 1000; // Generate a random number between 0
   and 999 if (num < remaining)
   { remaining = remaining - num; printf("Packet of %d bytes
      accepted\n", num); // Added missing variable
   } else
   { printf("Packet of %d bytes is discarded\n", num);
   } if (buckets - remaining >
   outlets)
   { remaining += outlets; // Fixed the calculation
   }
   else
      remaining = buckets;
   printf("Remaining bytes: %d \n", remaining);
   printf("If you want to stop input, press 0, otherwise,
   press 1\n"); scanf("%d", &k);
}


while (remaining < buckets) // Fixed the condition
{ if (buckets - remaining > outlets)
```

```
    { remaining += outlets; // Fixed the calculation
    } else
        remaining = buckets;
    printf("Remaining bytes: %d \n", remaining);
} return 0; // Added a return statement to indicate successful
                                                    completion
}
```

Output:



Observation:

17/08/23

Lab – 14.

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

Code:

```
#include <stdio.h>

void main(){
 int buckets, outlets, k=1, num, remaining;
printf("Enter Bucket Size & outstream size \n");
Scanf("%d %d", &buckets, &outlets);
remaining = buckets;
while(k){
 num = rand()%1000;
 if(num < remaining){
  remaining = remaining – num;
printf("Packet of %d bytes accepted \n", num);
 }
else
  printf("Packet of %d bytes is discarded \n", num);
 if (buckets – remaining > outlets)
     remaining += outlets;
else
     remaining = buckets;
printf("Remaining bytes: %d \n", remaining);
printf("If you want to Stop input. press 0, otherwise, \n");
Scanf("%d", &k);
}.
while (remaining < buckets){
  if (buckets – remaing > outlets.
        remaining += outlets;
  else
```

```
        remaining = buckets;
        printf("Remaining bytes: %d \n", remaining);
    }
}
```

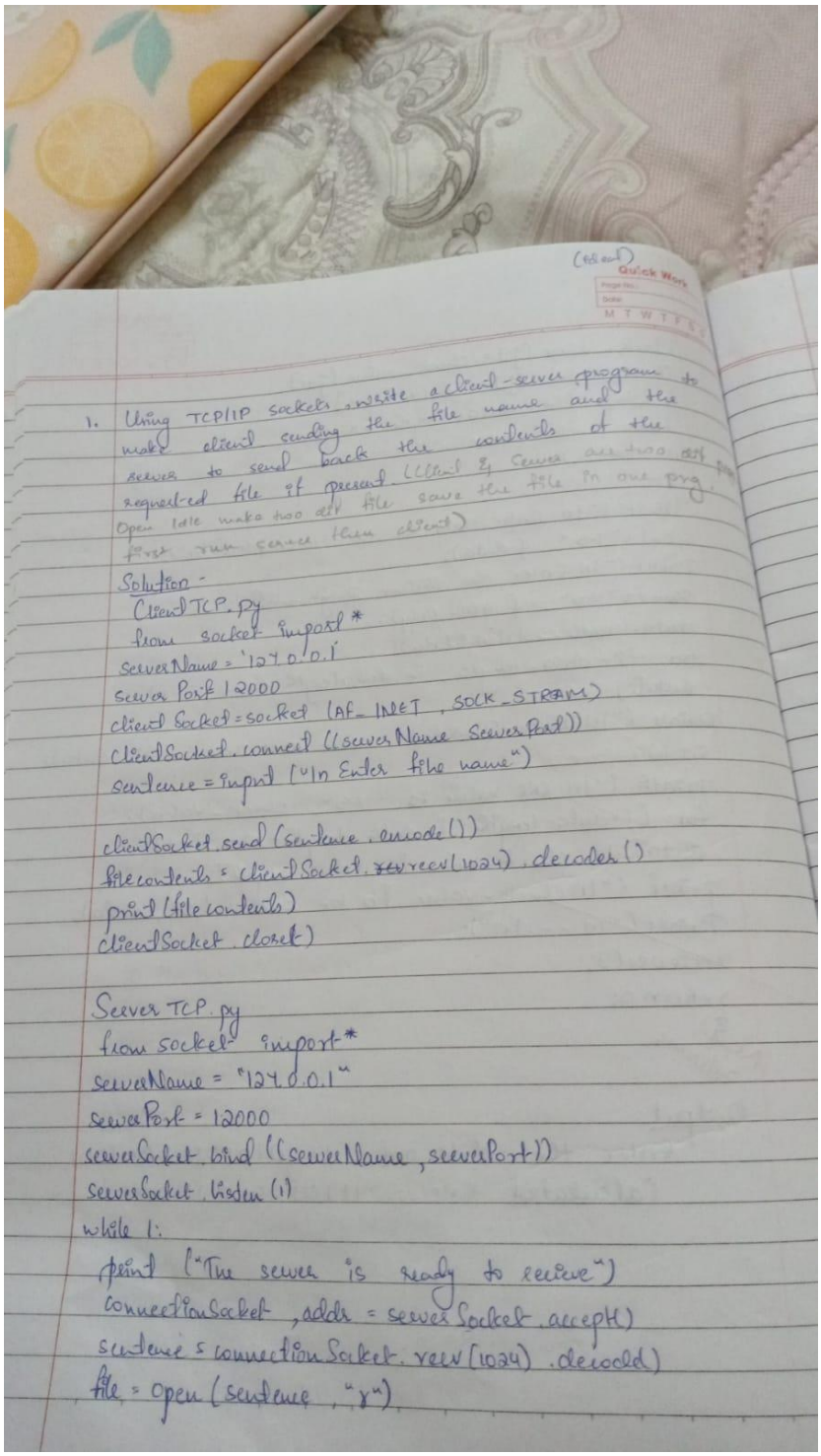
Output:

Enter Bucket size & outstream size 2000 100.
Packet of 41 bytes accepted.
Remaining bytes: 2000
If you want to stop input, press 0, otherwise, press 1.
Packet of 467 bytes accepted. 1
Packet of 334 bytes accepted
Remaining bytes: 1399. 0.
Remaining bytes: 1499
Remaining bytes: 1599
Remaining bytes: 1699
Remaining bytes: 1799
Remaining bytes: 1899
Remaining bytes: 1999
Remaining bytes: 2000.

19/8/2023

LAB 15:

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



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 (Client & Server are two diff. Open Idle make two diff file save the file in one prg. first run server then client)

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 ("\n Enter file name")

clientSocket.send (sentence.encode())
fileContents = clientSocket. recv(1024).decode()
print (fileContents)
clientSocket.close()
```

ServerTCP.py

```
from socket import*
serverName = "127.0.0.1"
serverPort = 12000
serverSocket.bind ((serverName , serverPort))
serverSocket.listen (1)
while 1:
  print ("The server is ready to recieve")
  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

Restart : C:/Users/Admin/AppData/Local/Programs/Python/Python310/server-tcp.py

The server is ready to receive

Sent contents of server-tcp.py

The server is ready to receive

= Restart : C:/Users/Admin/AppData/Local/Programs/Python/Python310/client-tcp.py

Enter file name: server-tcp.py

from socket import

Server Name = "127.0.0.1"

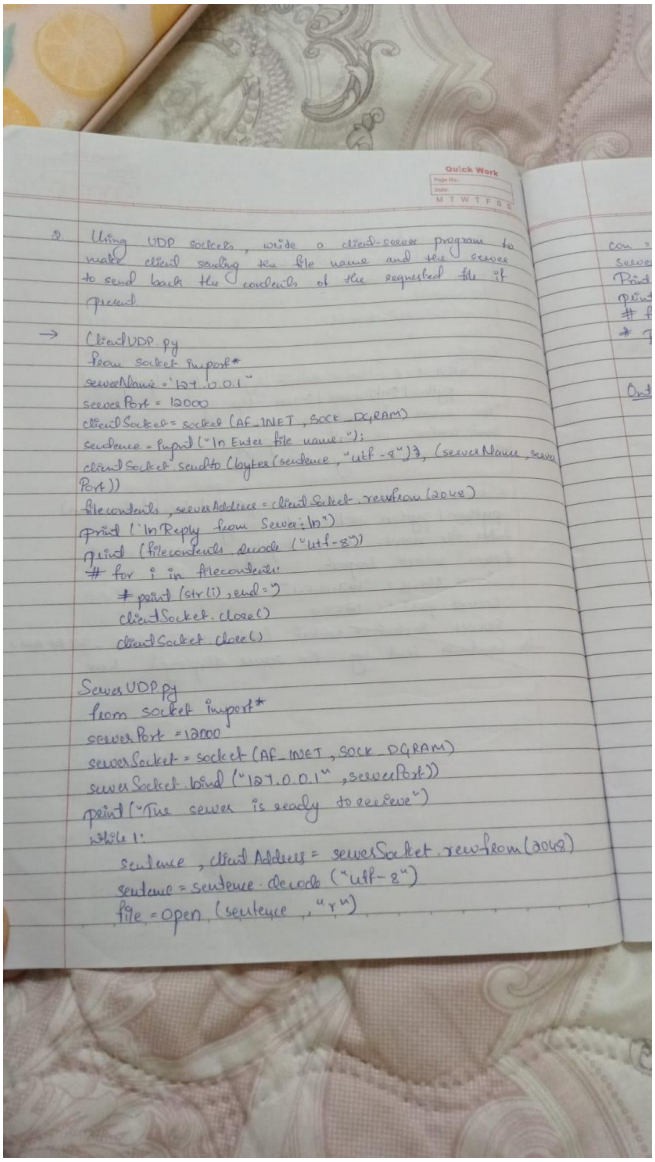
Server port = 12000

Server Socket = socket (AF_INET, SOCK_STREAM

= Contents sent by the server displayed here

LAB 16:

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



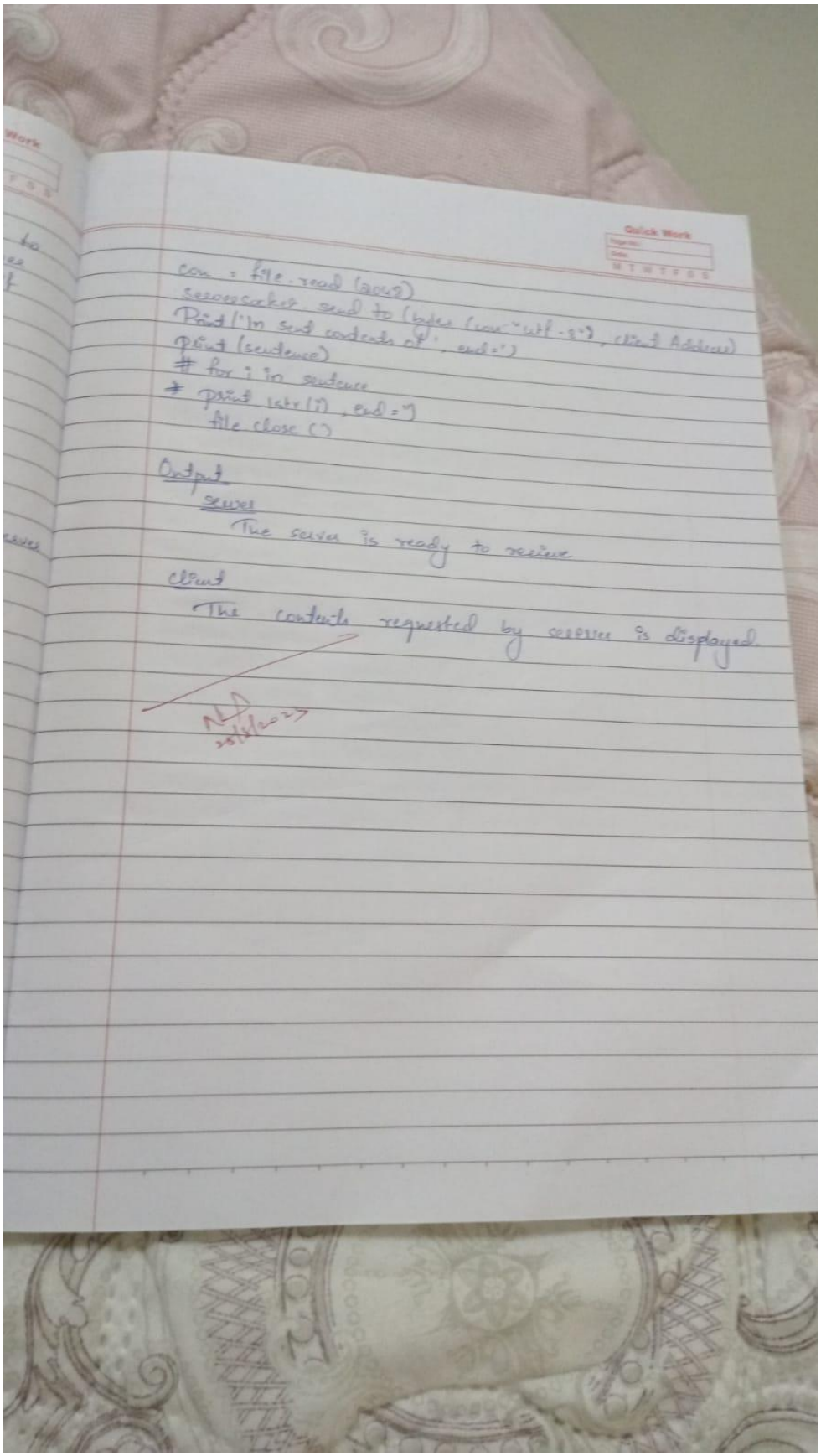
Using UDP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.

→ ClientUDP.py

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

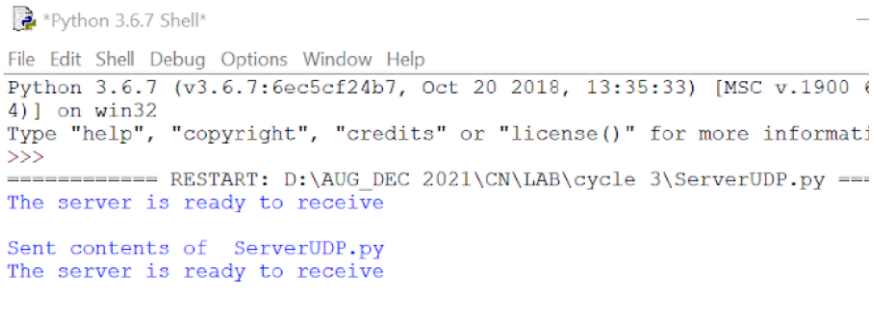
ServerUDP.py

```
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")
```

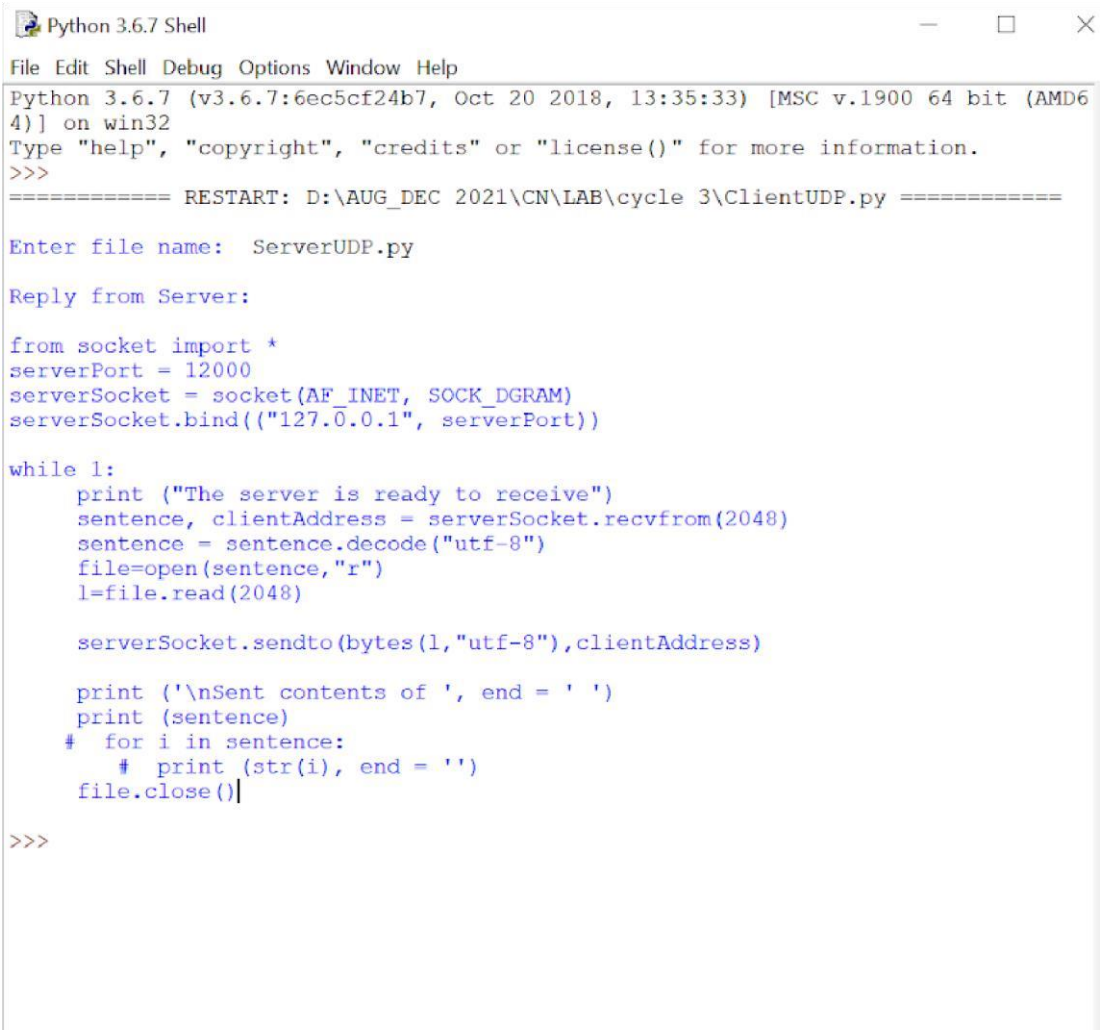


Output :

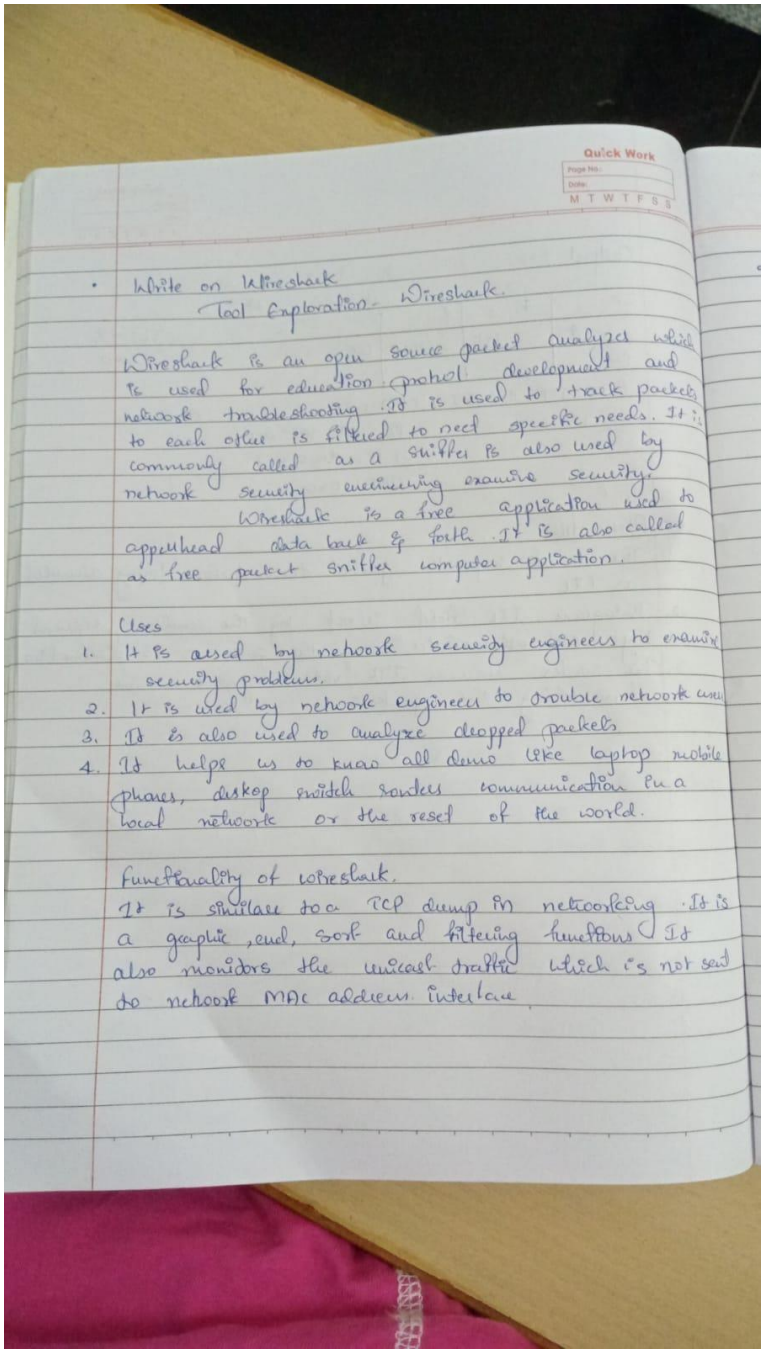
Server instance :



Client instance :



WIRESHARK



Quick Work
Page No.:
Date:
M T W T F S S

- Write on Wireshark
  Tool Exploration - Wireshark.

Wireshark is an open source packet analyzer which is used for education protocol development and network troubleshooting. It is used to track packets to each other is filtered to meet specific needs. It is commonly called as a sniffer is also used by network security engineering examine security. Wireshark is a free application used to applihead data back & forth. It is also called as free packet sniffer computer application.

Uses

1. It is used by network security engineers to examine security problems.
2. It is used by network engineers to trouble network issues.
3. It is also used to analyze dropped packets
4. It helps us to know all device like laptop mobile phones, desktop switch routers communication in a local network or the reset of the world.

Functionality of wireshark.

It is similar to a TCP dump in networking. It is a graphic, cmd, sort and filtering functions. It also monitors the unicast traffic which is not sent to network MAC address interface.

Quick Work

- Features of Wireshark.
- It is a multiplatform software i.e it can run on the linux, windows, osx, True BSD, net BSD etc
- It is a standard three pane packet browser
- It performs deep inspection of hunk of protocols
- It even can capture raw USB traffic
- It is useful in IP analysis