VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

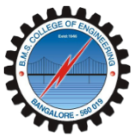
LAB REPORT
on

COURSE TITLE

Submitted by

CHAITANYA RAVINDRA(1BM21CS041)

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



B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019
JUN-2023 to SEP-2023

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

CERTIFICATE

This is to certify that the Lab work entitled **"COMPUTER NETWORKS"** carried out by **CHAITANYA RAVINDRA (1BM21CS041),** who is bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2023. The Lab report has been approved as it satisfies the academic requirements in respect of a **Computer Networks - (22CS4PCCON)** work prescribed for the said degree.

M Lakshmi Neelima
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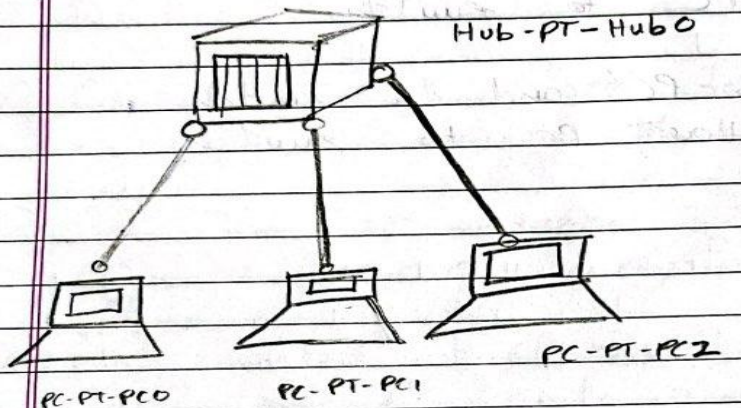
EXPERIMENT-1

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

Aim:- Create a topology hence simulate a simple PDU from source to destination using switch and hub as connecting domains

Topology Hub to PC's



Procedure

1) Select 3 PC's and a hub
2) Connect 3 PC's to hub using copper straight through wire
3) Set IP address of PC's as 10.0.0.1, 10.0.0.2, 10.0.0.3 respectively
4) Now select source and destination PC and send a PDU packet for ex:- from PC-0 to PC-2
5) The PDU packet will go from PC to PC-1 and PC-2 but will be accepted at PC-2 only

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Observation:-

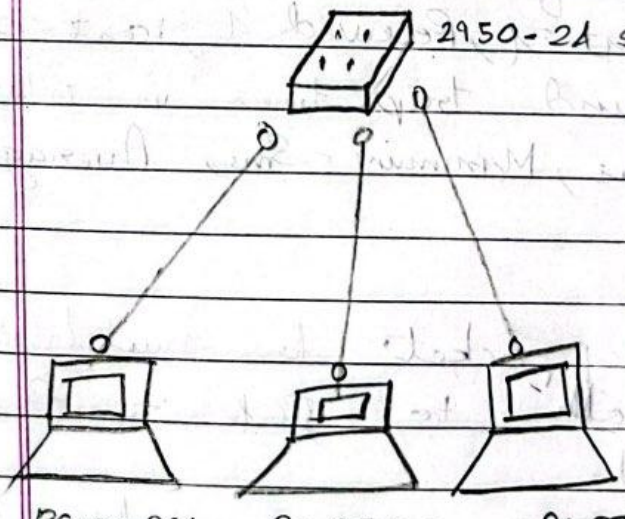
PDU packet is received at PC-2 as it is selected as destination PDU sent to PC-1 is discarded.

Output-

Reply from 10.0.0.2 : byte=32 time=5ms TTL=
Reply from 10.0.0.2 : byte=32 time=0ms TTL=120
Reply from 10.0.0.2 : byte=32 time=6ms TTL=120
Reply from 10.0.0.2 : byte=32 time=0ms TTL=120

Ping statistics for 10.0.0.2 :-
Packets : sent=4, Received=4, Lost=0
Approximate round trip times in millisec
Minimum=0ms, Maximum=3ms, Average=0ms

Topology Switch to PC's



1) Select three PC's and switch
2) Connect them using copper straight through wire
3) Set IP address as 10.0.0.4, 10.0.0.5, 10.0.0.6 respectively for the PC's
4) Now select source and destination PC for instance PC-3 to PC5 and send a packet.

Output

Reply from 10.0.0.6 : Bytes = 32 time = 0ms TTL = 120
Reply from 10.0.0.6: Bytes = 32 time = 0ms TTL = 120
Reply from 10.0.0.6: Bytes = 32 time = 0ms TTL = 120
Reply from 10.0.0.6 : Bytes = 32 time = 0ms TTL = 120

Ping statistics for 10.0.0.6
Package: Sent = 4, Received = 4, lost = 0
Approx round trip times in milli-seconds
Minimum = 0ms, Maximum = 3ms, Average = 0ms

Observation:-
PC3 sends packets to switch and it sends it both to PC4 to PC5 in first round
PC4 rejects PC5 accepts and send acknowledgement packet to both PC3 & PC5
R4 discards to PC3 and accepts it
Now when PC3 sends packets it

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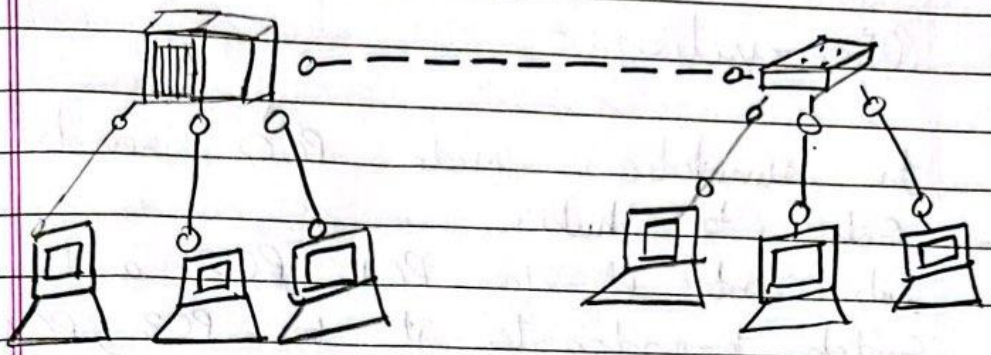
Topology PC, hub and switch



Procedure

1) Select 6 PC's and switch and hub
2) Connect 3 PC's to hub and 3 PC's to switch using copper straight through wire and connect switch and hub using copper cross-over wire.
3) Set IP address of all 6 PC's respectively as 10.0.0.1 and so on.
4) Now select source and destination and send a PDU packet from PC0 to PC-4

Output

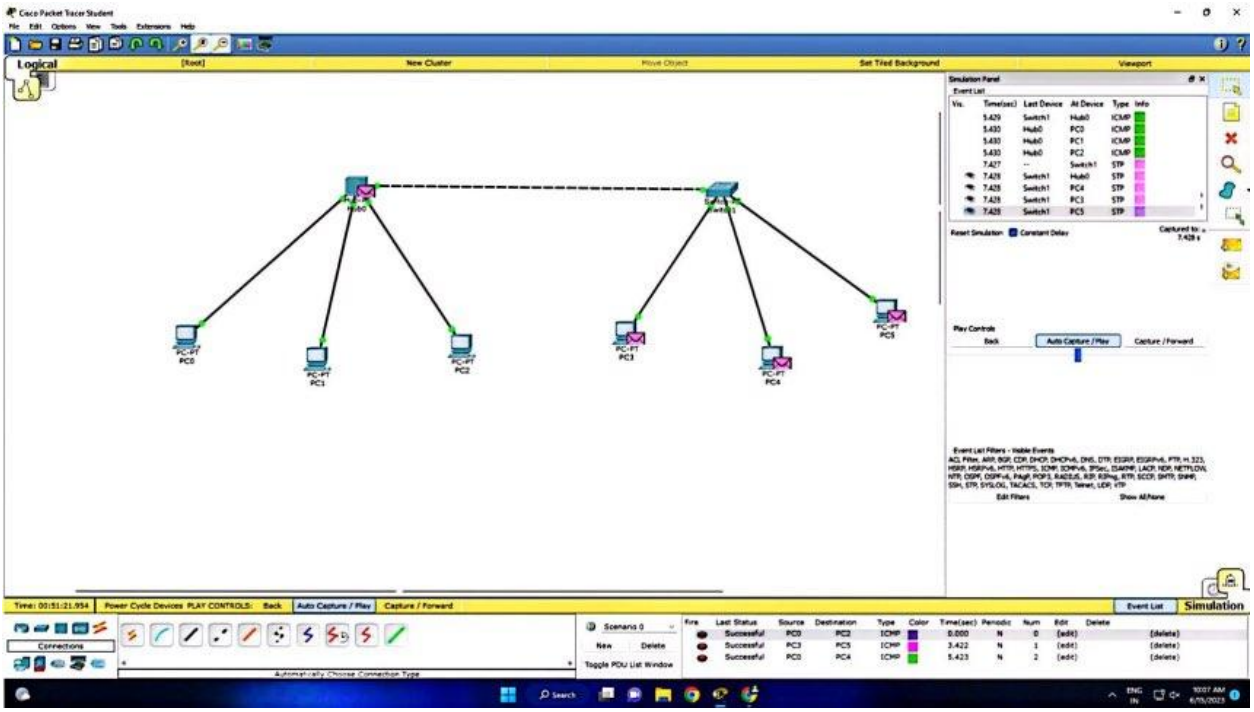
Reply from 10.0.0.4 : bytes=32 time=0ms TTL=120
Reply from 10.0.0.4 : bytes=32 time=0ms TTL=120
Reply from 10.0.0.4 : bytes=32 time=4ms TTL=120
Reply from 10.0.0.4 : bytes=32 time=0ms TTL=120

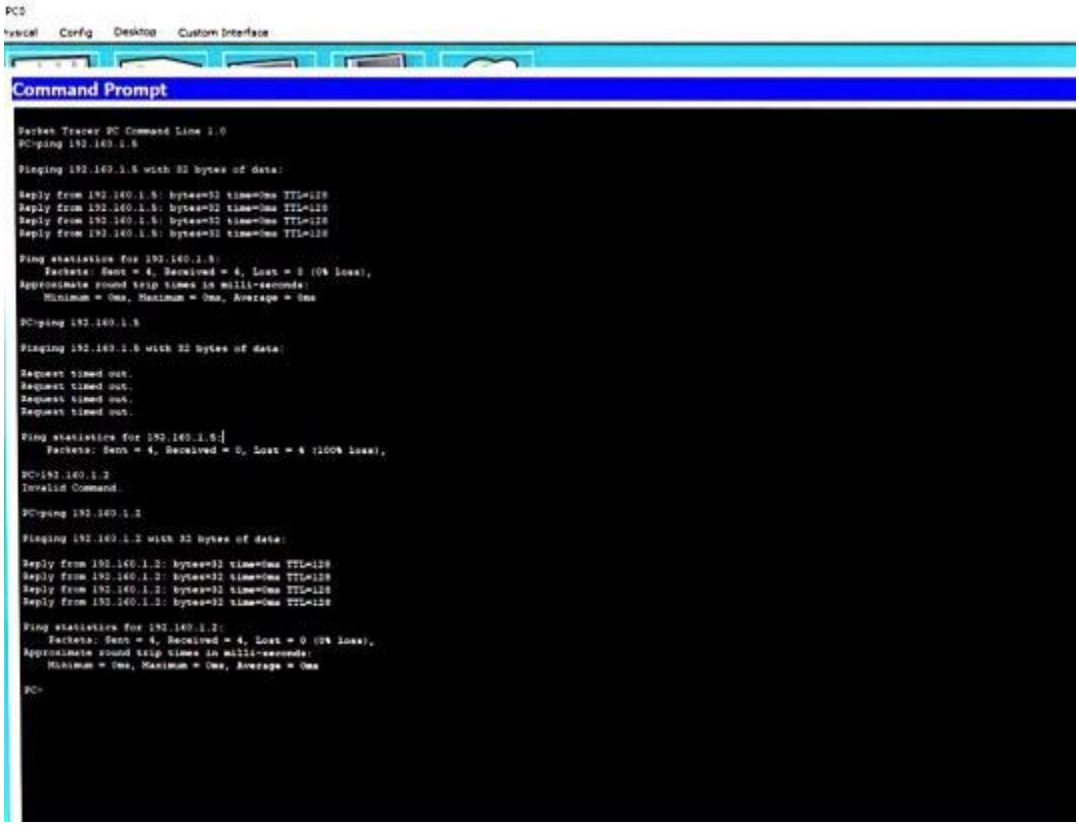
Minimum = 0ms, Maximum = 4ms, Average = 1.4

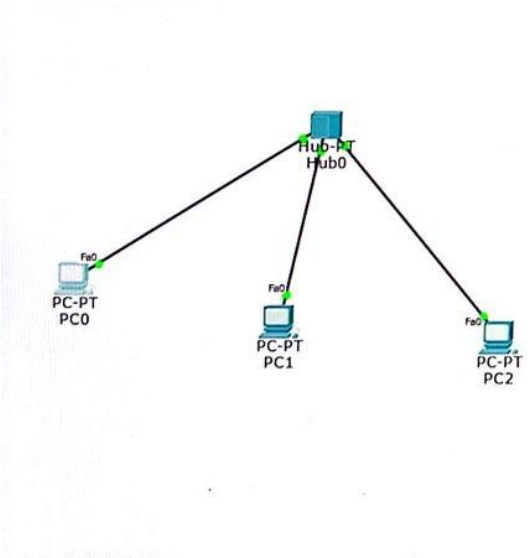
Observation :-

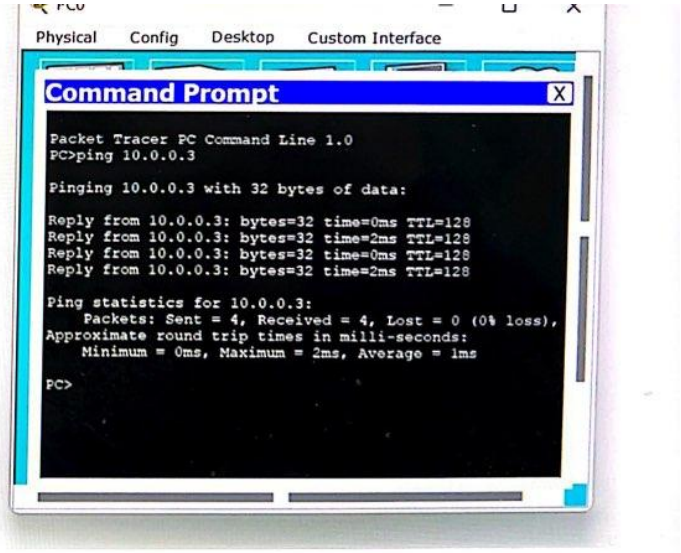
In simulation mode PC0 sends packet to hub.
hub sends it to PC1 PC2 and switch broadcasts it to PC3, PC4 and PC5
PC1, PC2, PC4 and PC5 discards them
PC3 accepts and sends acknowledgement to hub through switch
Only PC0 accepts others discard
In second round PC0 sends packet to hub it broadcasts to PC1, PC2, switch
Switch broadcasts only to PC3 thus its a smart device

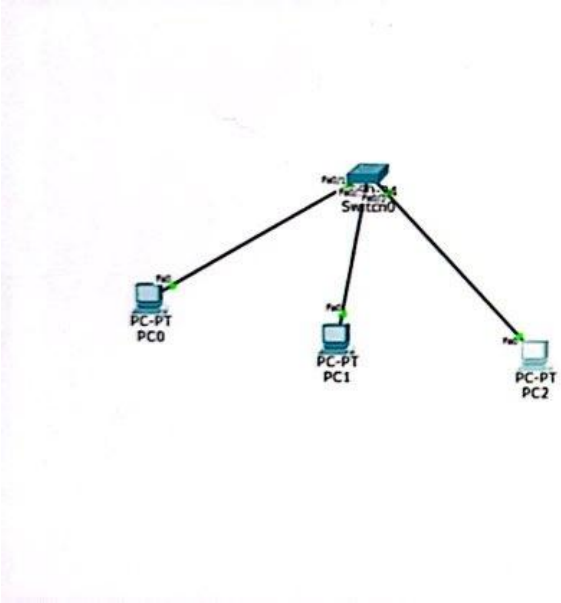
16/6/20

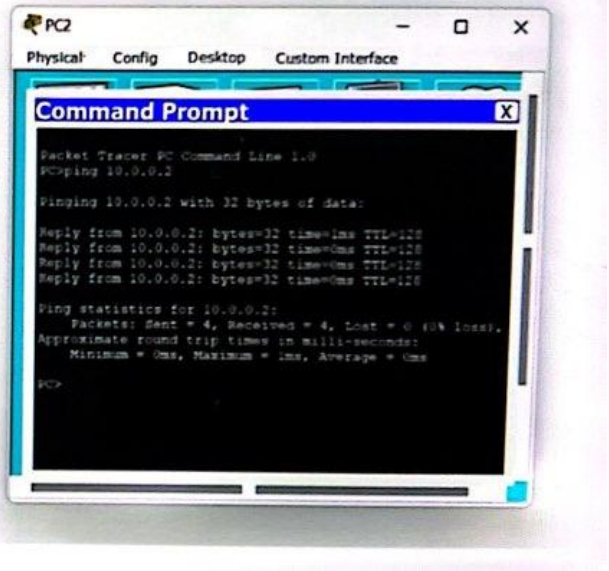

Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:51:21.954
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Successful
PC0
PC2
ICMP
0.000
N
0
(edit)
(delete)
Successful
PC3
PC5
ICMP
3.422
N
1
(edit)
(delete)
Successful
PC0
PC4
ICMP
5.423
N
2
(edit)
(delete)


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.5
Pinging 192.168.1.5 with 32 bytes of data:
Reply from 192.168.1.5: bytes=32 time=0ms TTL=128
Reply from 192.168.1.5: bytes=32 time=0ms TTL=128
Reply from 192.168.1.5: bytes=32 time=0ms TTL=128
Reply from 192.168.1.5: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.5:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 192.168.1.6
Pinging 192.168.1.6 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.1.6:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>192.168.1.2
Invalid Command.
PC>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time=0ms TTL=128
Reply from 192.168.1.2: bytes=32 time=0ms TTL=128
Reply from 192.168.1.2: bytes=32 time=0ms TTL=128
Reply from 192.168.1.2: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>


Hub-PT
Hub0
Fa0
PC-PT
PC0
Fa0
PC-PT
PC1
Fa0
PC-PT
PC2


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=2ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=2ms 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 = 2ms, Average = 1ms
PC>


Switch0
Fa0
PC-PT
PC0
Fa0
PC-PT
PC1
Fa0
PC-PT
PC2


PC2
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>

EXPERIMENT-2

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

PROGRAM 2.1

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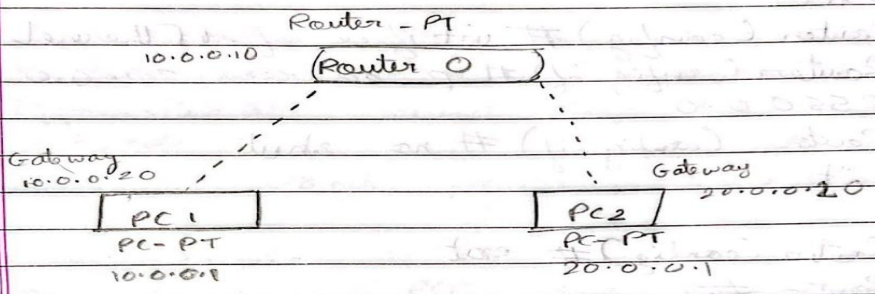
Configure ip address to routers in packet tracer. Explore the following messages. Ping, responses destination unreachable request timed out, reply.

Aim :- Configuring IP address to router and exploring ping messages



Procedure

1) Select router-PT and place in workspace
2) Take 2 end devices as PC-PT and drop them in workplace.
3) Connect fast ethernet o/p of PC1 to Fast ethernet o/p PC2 to fast ethernet o/p router using copper cross-over
4) Set IP address of PC1 as 10.0.0.1 and PC2 as 20.0.0.1
5) In settings set gateway of PC1 as 10.0.0.1 and PC2 as 20.0.0.1
6) Setup the interface of router using following steps.
   To configure router command line interface (CLI) is used.

Router(LI)
(Press N)
Router > enable
Router # config t
Router (config)++ ip address 10.0.0.10
255.0.0.0
Router (config-if)## no shut
exit
Router (config) # interface fastEthernet
Router (config-if) # ip address 20.0.0.10
255.0.0.0
Router (config-if) # no shut
exit

Router (config) # exit
Router #
Show ip route

C 10.0.0.0/8 is directly connected,
Fast Ethernet 0/0
C 200.0.0.0/8 is directly connected,
Fast Ethernet 1/0

7) Green lights appear on wires when no shut commands are given which indicate that they are ready for data transmission

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Ping output on PC0:-

PC>ping 20.0.0.1
pinging 20.0.0.1 with 32 bytes of data
Request timed out
Reply from 20.0.0.1 : bytes = 32 time = 0 ms TTL=128
Reply from 20.0.0.1 : bytes = 32 time = 0ms TTL=128

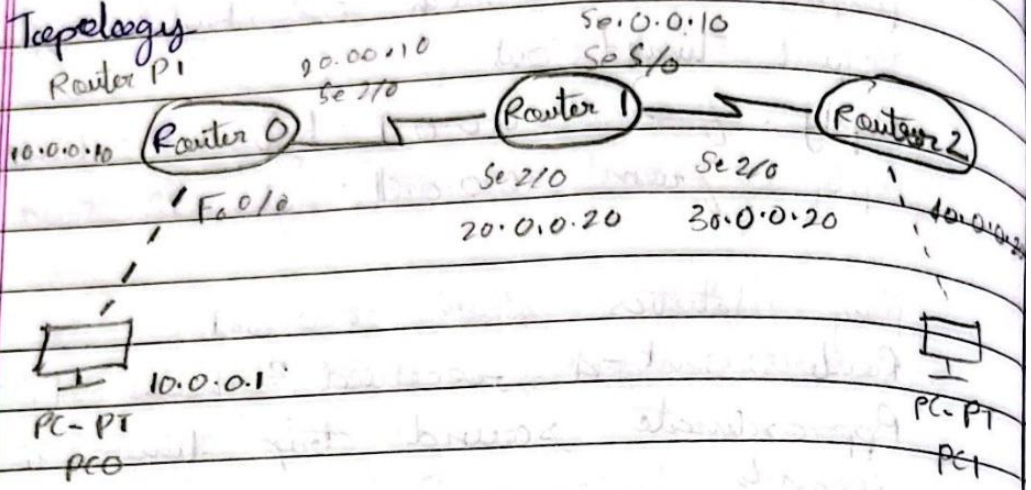
Ping statistics for 20.0.0.1
Packets:-Sent = 4, received 3: Loss = 1 (75% loss),
Approximate round trip times in milli seconds
Minimum:- 0ms, maximum = 1 ms, Average

Observations:-
On pinging on PC0 for the first time there is a 25% loss.
From next ping there are no losses.

NL
27/4/2023

2b) Aim configure using 3 router and 2 PC's

Topology



Procedure

1) The network is started by selecting end devices PC0 to PC1 is genuine PC's and placing them in work space.
2) Select 3 router-PT and place them as router 0, router 1 and router workspace
3) PC0 & PC1 are connected to router 0 and router 2 respectively using copper crossover
4) Connect router 0 to router 1, router 1 to router 2

5) Set up IP address of PC0 to

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Configure router by opening CLI

In Router 0
Router > enable
Router # config t
Router (config) # interface fastEthernet 0/0
Router (config-if) # ip address 10.0.0.10
255.0.0.0
Router (config-if) # no shut
exit
Router (config-if) # interface serial 2/0
Router (config-if) # ip address 20.0.0.10
255.0.0.0
Router (config-if) # ip address 20.0.0.10 no shut
exit
exit

In router 1
Router > enable
Router # config t
Router (config) # interface serial 2/0
Router (config-if) # ip address 20.0.0.20
to 255.0.0.0
Router (config-if) no shut
exit
Router (config) # interface serial
3/0
Router (config-if) # ip address
30.0.0.30 255.0.0.0

In router 2
Router > enable
Router # config t
Router (config-if) # interface serial 2/0
Router (config-if) # ip address 30.0.0.2
255.0.0.0
Router (config-if) # no shut
exit
Router (config-if) # interface fastEthernet
0/0
Router (config-if) # ip addres 40.0.0.10
255.0.0.0
Router (config-if) no shut
exit
Router (config) exit

IP Router table
Router 0

Router # show ip route
C 10.0.0.0/8 is directly connected, Fast Ethernet
C 20.0.0.0/8 is directly connected, Serial 2/0

Router 1
Router # show ip route
C 20.0.0.0/8 is directly connected
C 30.0.0.0/8 is directly connected

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Ping output is PC0

PC>Ping 10.0.0.1

Pinging 10.0.0.1 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

Ping statistics for 40.0.0.1

Packets: set=4, received=0, loss=4 (100% loss)

Observation:

Green lights appear on the wires when no shut is written.

New configure the router which does not have data of other network. Add the network in CLI. In all stations, CLI write config t. then set route

Routers

ip route 30.0.0.0 255000 20.0.0.30

ip route 40.0.0.0 254.000 20.0.0.30

Router 1

ip route 10.0.0.0 255.0.0.0 20.0.0.10

ip route 200.0.0.0 255.0.0.0 30.0.0.20

Router 2

new i/p router table
ent

Router 0:
C 10.0.0.0/8 is directly connected, fast ethernet 0/0
C 20.0.0.0/8 is directly connected, serial
C 30.0.0.0/8 [1/0] via 30.0.0.30
S 40.0.0.0/8 [1/0] via 20.0.0.20

Router 1:
S 10.0.0.0/8 [1/0] via 30.0.0.10
S 20.0.0.0/8 [1/0] via 30.0.0.10
C 30.0.0.0/8 is directly connected, serial 2/
C 40.0.0.0/8 is directly connected Serial 3/

Router 2:
S 10.0.0/8 [1/0] via 20.0.0.10
C 20.0.0.0/8 is directly connected serial 2/
C 30.0.0.0/8 is directly connected serial 3/
S 40.0.0.0/8 [1/0] via 30.0.0.20

Ping messages

PC > Ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data

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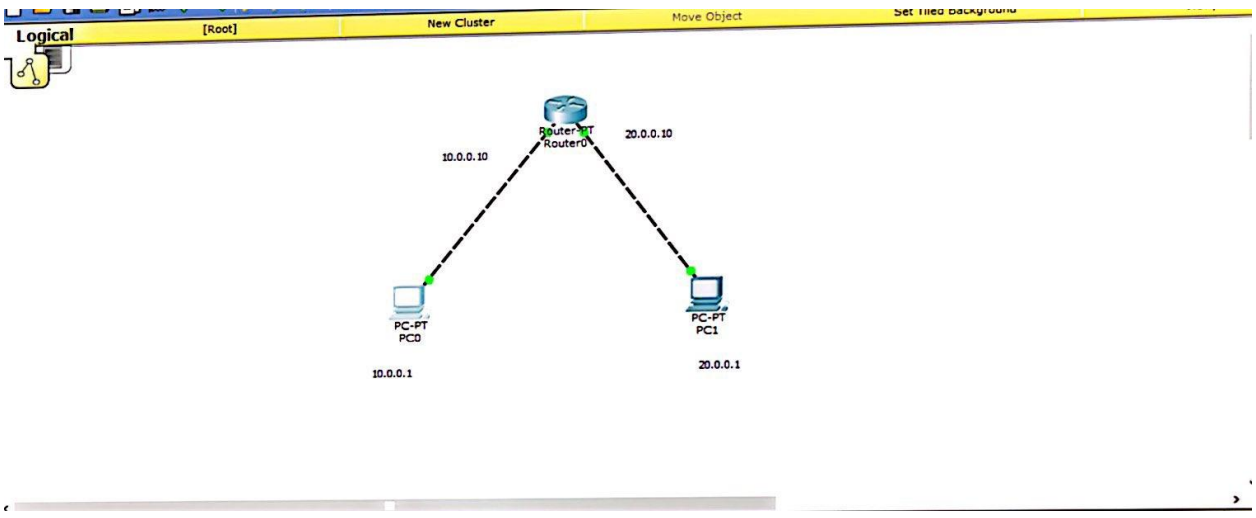
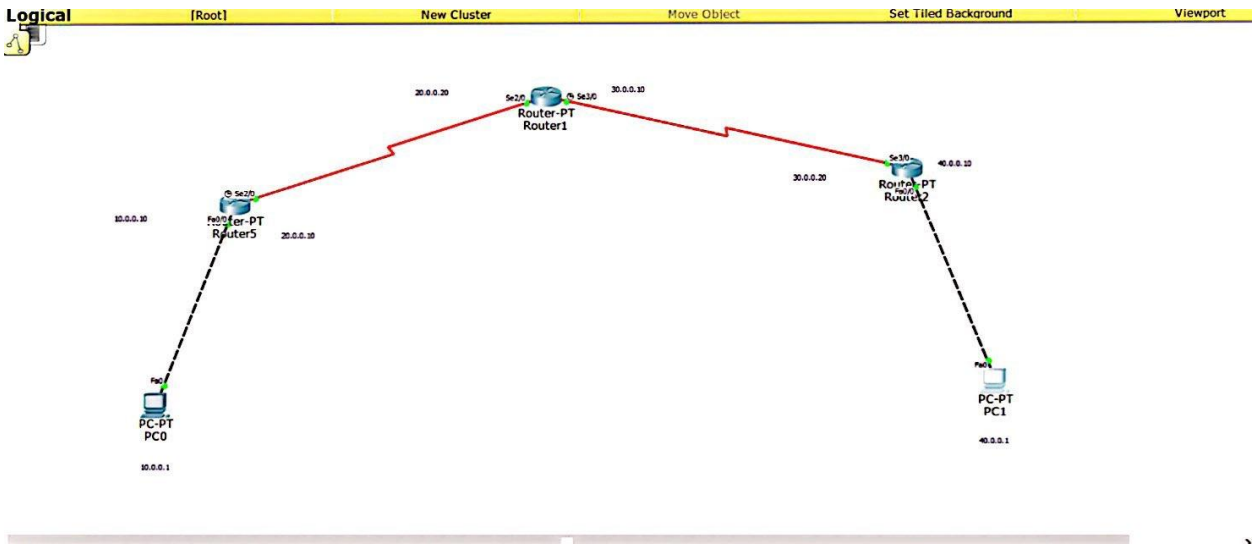
Reply from 40.0.0.1 : bytes = 32 time = 2ms
TTL = 125
Reply from 40.0.0.21 : bytes = 32 time = 2ms
TTL = 125
Ping statistics for 40.0.0.1
Packets sent = 4, received = 3, lost = 1
(25% loss)
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 2ms, Average = 2ms

Observation :-
In first ping destination host was unreachable as router 0 has no knowledge about the network 30.0.0.0 and 40.0.0.0 and the packets get stuck or lost
After this ip route is explicitly
Now pinging them is 25% loss in first time, the following ones have no loss

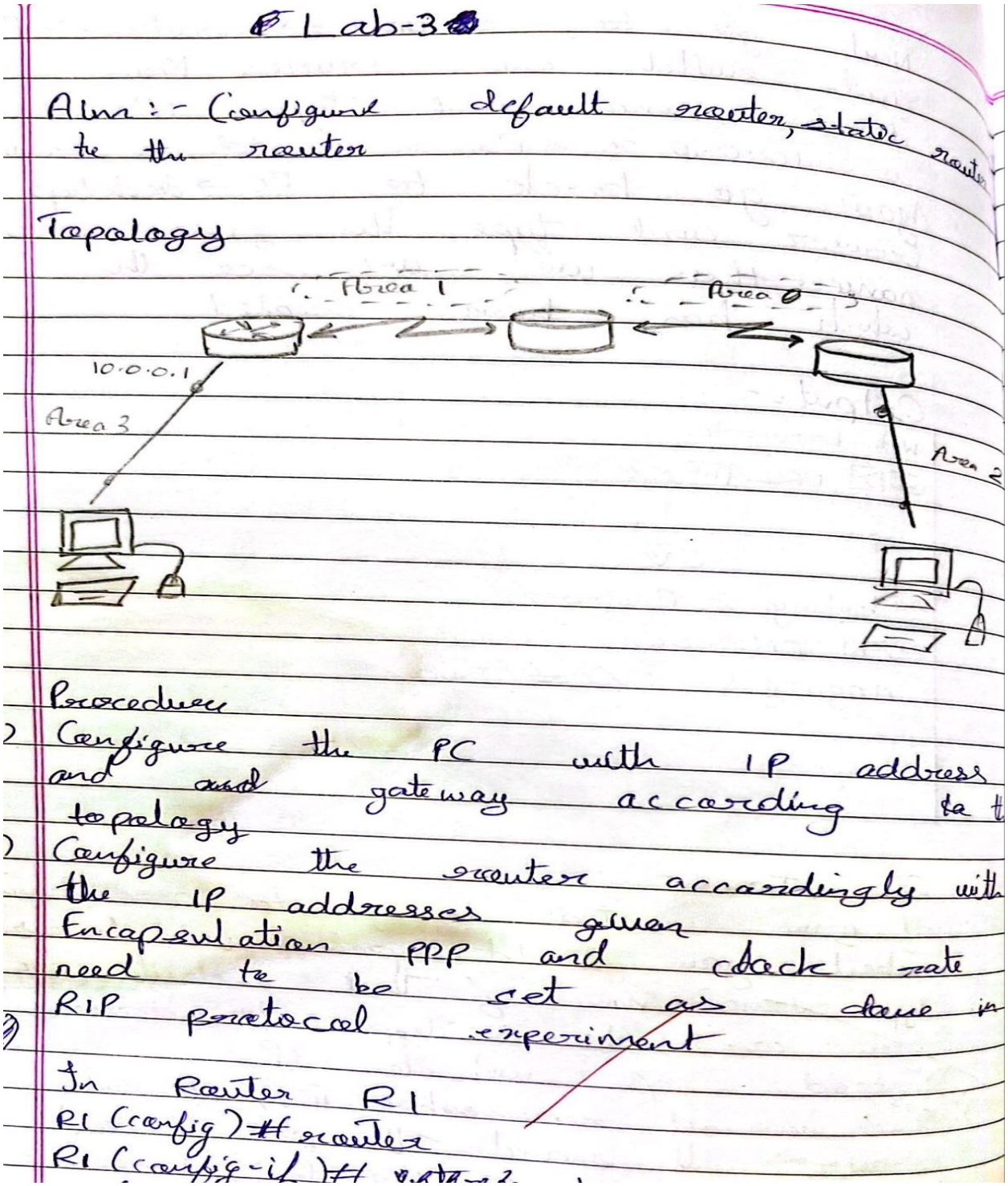
NLD
27/7/2023


Logical
[Root]
New Cluster
Move Object
Router-PT
Router0
10.0.0.10
20.0.0.10
PC-PT
PC0
PC-PT
PC1
10.0.0.1
20.0.0.1


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
Router-PT
Router5
Router-PT
Router2
PC-PT
PC0
PC-PT
PC1
10.0.0.10
20.0.0.10
30.0.0.10
30.0.0.20
40.0.0.10
10.0.0.1
40.0.0.1

EXPERIMENT-3

Q)Configure default route, static route to the Router



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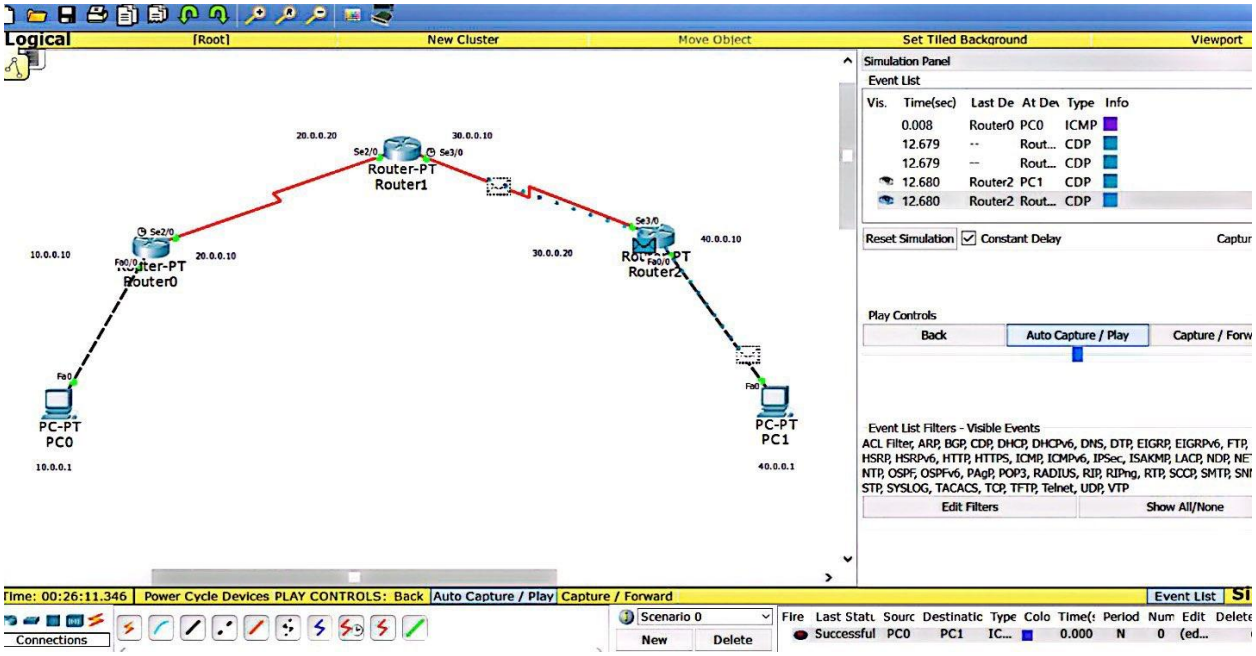
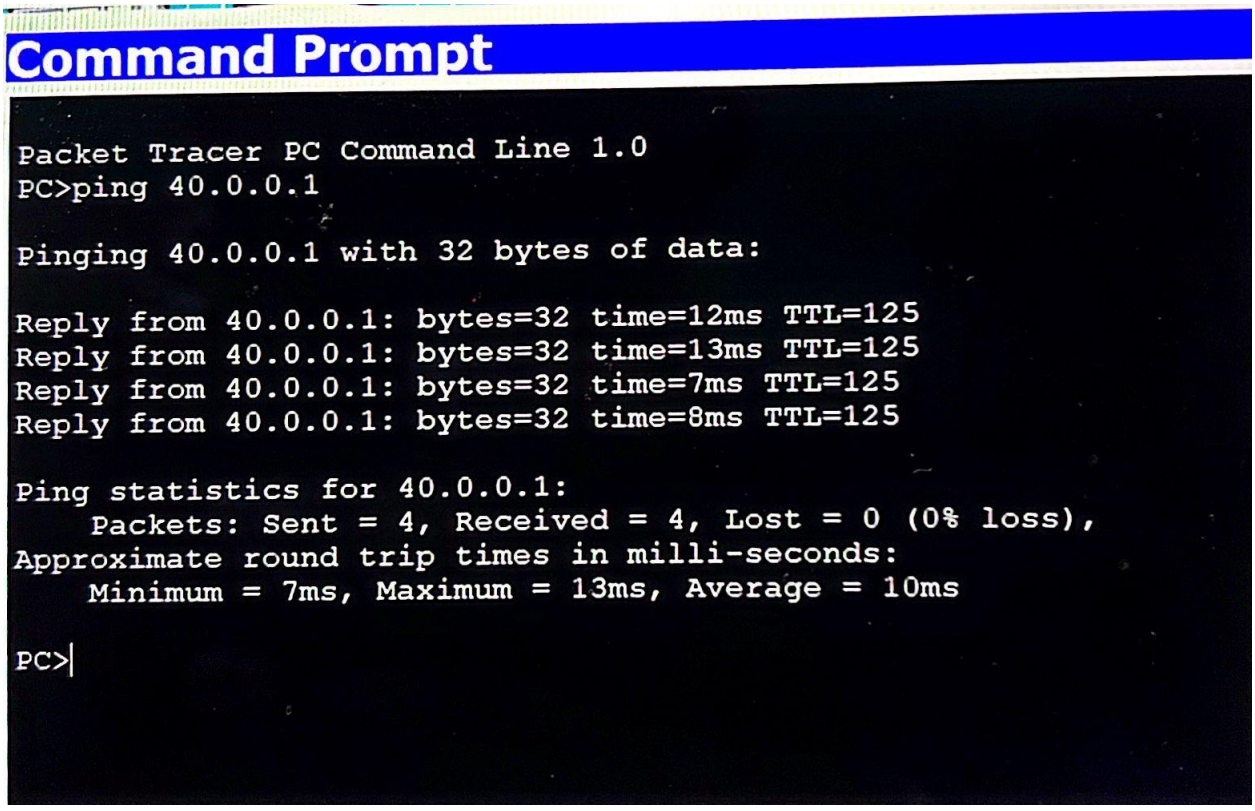
Reply from 40.0.0.1 : bytes = 32 time = 2ms
TTL = 125
Reply from 40.0.0.21 : bytes = 32 time = 2ms
TTL = 125
Ping statistics for 40.0.0.1
Packets sent = 4, received = 3, lost = 1
(25% loss)
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 2ms, Average = 2ms

Observation :-
In first ping destination host was unreachable as router 0 has no knowledge about the network 30.0.0.0 and 40.0.0.0 and the packets get stuck or lost
After this ip route is explicitly
Now pinging them is 25% loss in first time, the following ones have no loss

NLD
27/7/2023


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
Router-PT
Router0
Router-PT
Router2
PC-PT
PC0
PC-PT
PC1
10.0.0.10
10.0.0.1
20.0.0.20
20.0.0.10
30.0.0.10
30.0.0.20
40.0.0.10
40.0.0.1
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.008 Router0 PC0 ICMP
12.679 -- Rout... CDP
12.679 -- Rout... CDP
12.680 Router2 PC1 CDP
12.680 Router2 Rout... CDP
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forw
Event List Filters - Visible Events
Edit Filters
Show All/None
Time: 00:26:11.346
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Connections
Scenario 0
New
Delete
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit
Successful PC0 PC1 IC... 0.000 N 0

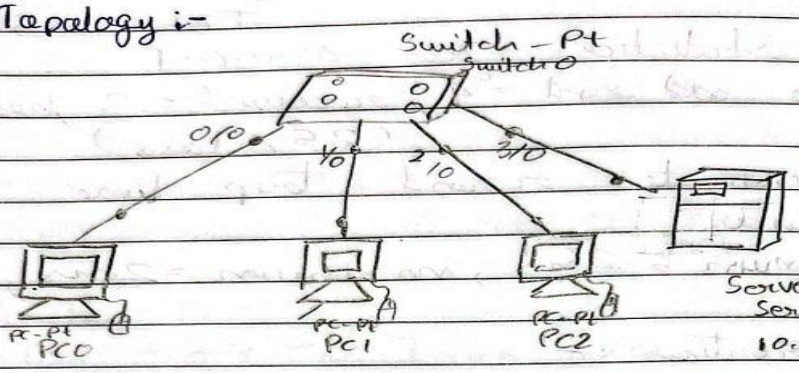

Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Reply from 40.0.0.1: bytes=32 time=12ms TTL=125
Reply from 40.0.0.1: bytes=32 time=13ms TTL=125
Reply from 40.0.0.1: bytes=32 time=7ms TTL=125
Reply from 40.0.0.1: bytes=32 time=8ms TTL=125
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 7ms, Maximum = 13ms, Average = 10ms
PC>

Experiment-4

Q) Configure DHCP within a LAN and outside LAN

Aim: Configure DHCP within a LAN and outside LAN

Topology :-



Procedure

1) Connect 3 PC's and 1 server to a switch using copper straight through cable
2) Click on server and go to services tab. Select DHCP and turn on the DHCP service
3) Set IP address of the start IP address as 10.0.0.1
4) Next click on PC0 and then go to desktop tab, click on config. Select DHCP here. It will request for an IP address and get DHCP request also sets IP address
5) Repeat step for other 2 PC's
6) To send a packet across PC's go to PC's command prompt and type destination address.

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Page

Ping Output
Packet tracer PC command line 10
PC > Ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data 4

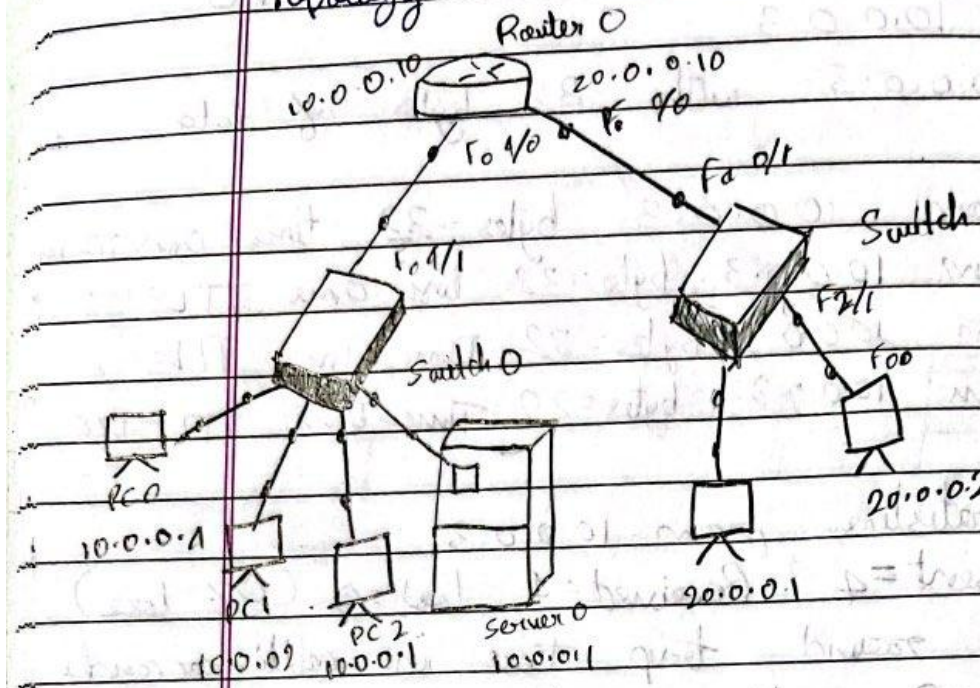
Reply from 10.0.0.3 bytes=32 time=0ms TTL=128
Reply from 10.0.0.3 : byte=32 Time=0ms TTL=128
Reply from 10.0.0.3 : bytes=32 Time=1ms TTL=128
Reply from 10.0.0.3 : bytes=32 Time=0ms TTL=128

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

Observation :-
DHCP is used to dynamically assign an IP address to any divid or node
It is a client-server protocol in which servers manage a pool of unique IP address & also about client config parameters. DHCP enabled clients sends a request to DHCP server.
DHCP server responds by providing config information prev specified by network admin

Outside of LAN

Topology :-



Procedure

- Follow previous steps pertaining to inside LAN by creating a 10.0.0.0 network with server IP address 10.0.0.1 and gateway
- Create another network with 2PC's and a switch and connect 2 networks using a router.
- Config the router to connect the 2 networks using router
- Config router to connect 2 networks through gateway

> enable
> config t
> interface fa 4/0
> ip address 10.0.0.20 255.0.0.0

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Page

>interface fa 4/0
>ip address 20.0.0.20 255.0.0.0
>no shut
>exit

Set another DHCP pool gateway to 20.0.0.10 and then the in the CLI commands of router set the server as a ip address: helper

The following are the 2 pools

Pool name	Default gateway	DNS servIP	Subnet mask	maxuser
Server pool	10.0.0.10	0.0.0.0	10.00.2	255.0.0.0	512
Server Pool	20.0.0.10	0.0.0.0	20.0.0.1	255.0.0.0	512

>config t
> interface fa 0/0
> ip helper addres < deserve ip address >
>no shut
exit

Ping from 10.0.0.2 to 20.0.0.2

Result

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

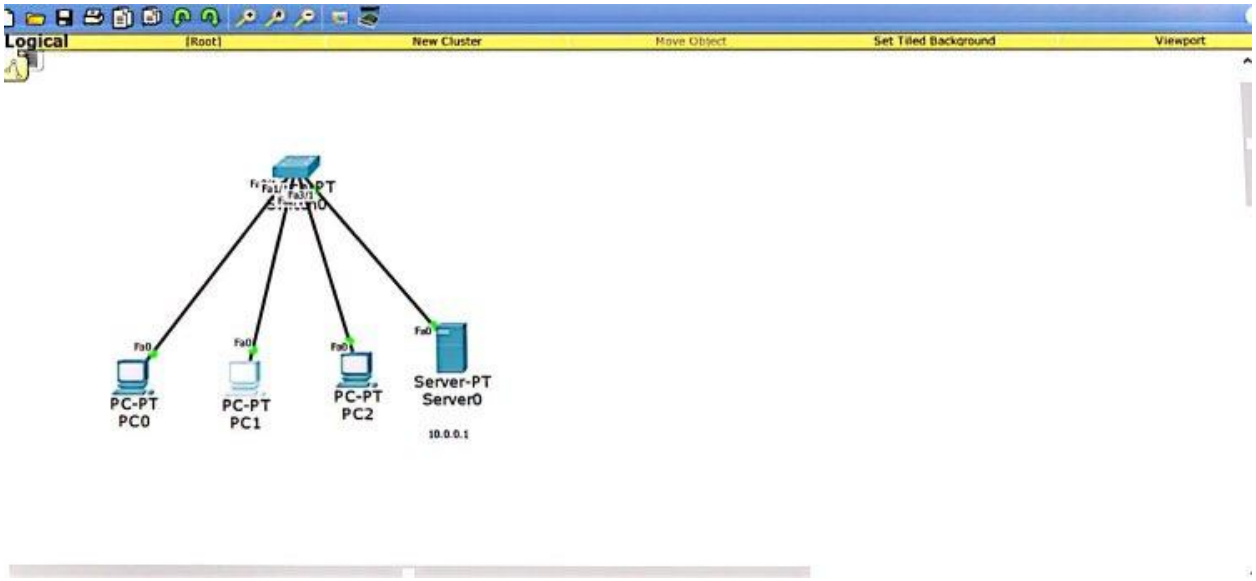
Ping statistics for 20.0.0.2
Packets sent = 4 Received = 3 Lost = 1
Approx time -
Minimum = 0 ms, Max = 4 ms, Average = 1 ms

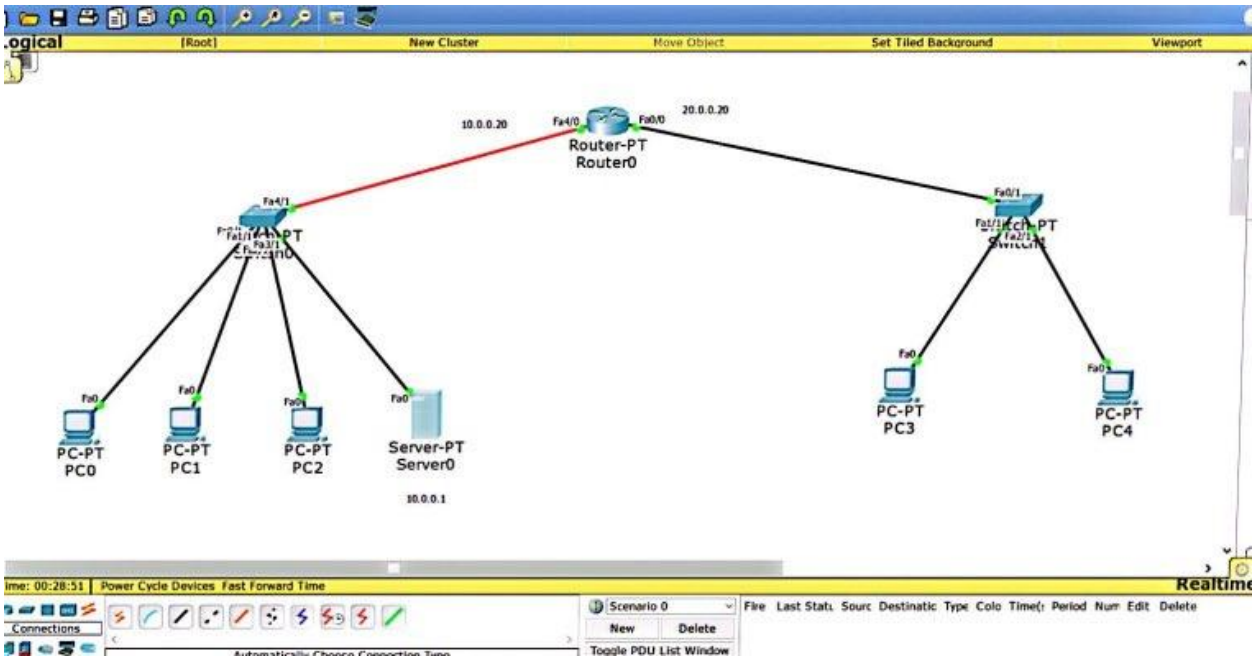
Observation :-
• The DHCP helps manage allocation of IP addresses to end users. The device connecting to access a network gets and IP address allocated dynamically to it by the user.

The allocated IP address is taken back when shutdown.

If the requesting device is outside the LAN then device IP address must be assigned to the router as the address helps see that it can automatically configure that device's IP address.

NP


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Server-PT
Server0
10.0.0.1


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
10.0.0.20
20.0.0.20
Router-PT
Router0
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Server-PT
Server0
10.0.0.1
PC-PT
PC3
PC-PT
PC4
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Scenario 0
New
Delete
Toggle PDU List Window

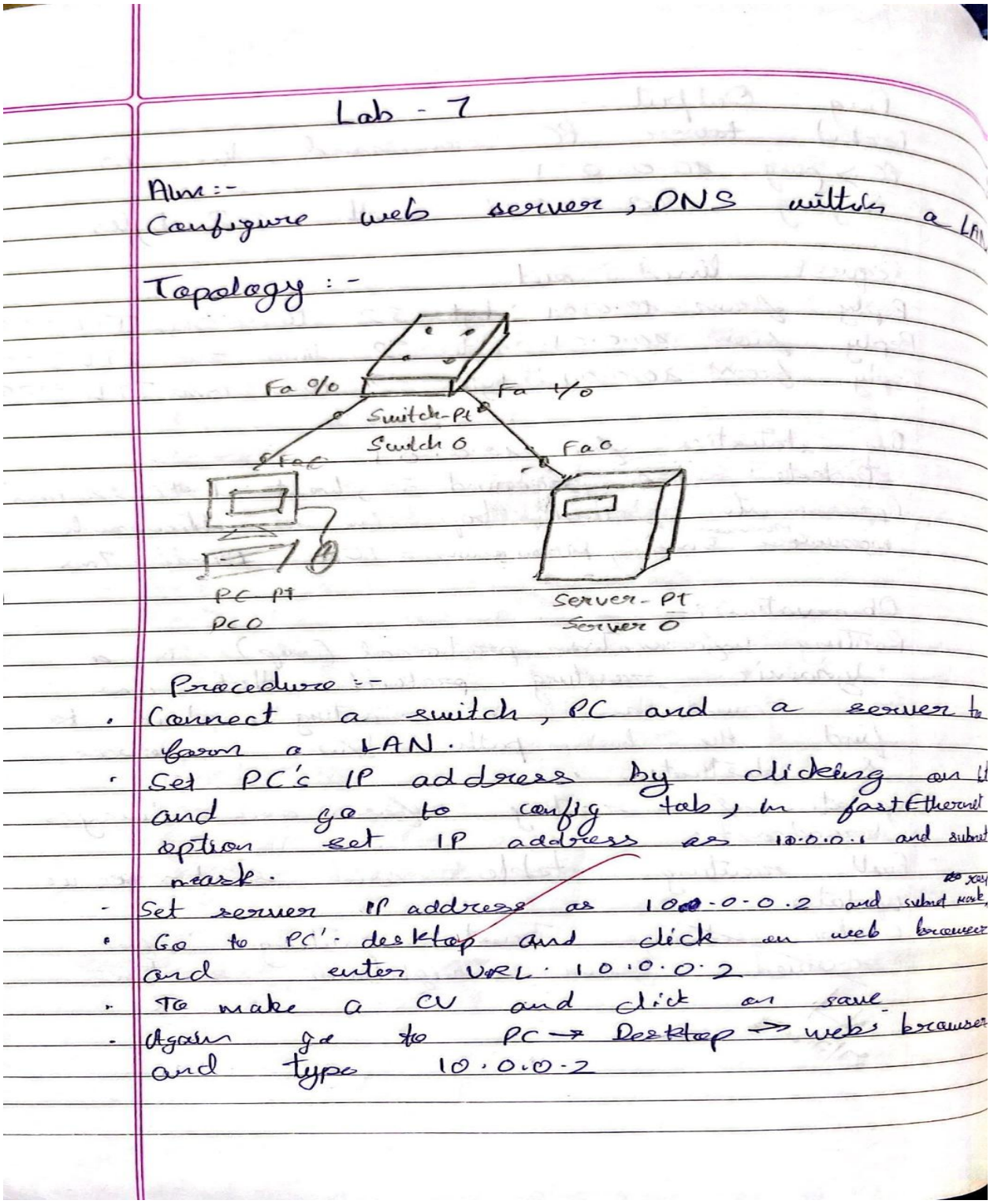
```
PC>ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:

Reply from 10.0.0.4: bytes=32 time=1ms TTL=128
Reply from 10.0.0.4: bytes=32 time=0ms TTL=128
Reply from 10.0.0.4: bytes=32 time=1ms 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 trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>
```

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>
```

EXPERIMENT-5

Q) Configure Web Server, DNS within a LAN



Date
Page

- Next go to server → services → DNS and switch on services. Now add a domain name and type IP address as 10.0.0.2. Press add & save it
- Again go back to PC → desktop - web browser and type the given domain name. then we can see the CV which has been created

Output :-

Web browser

URL http://Chaitanya GO Stop

CV

Chaitanya Ravindra

VSN : 1BM21CS011

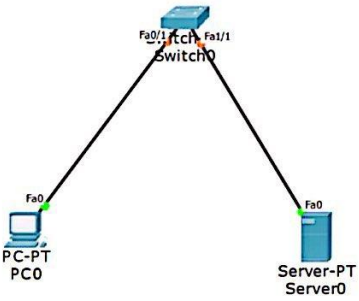
Languages : C/C#/Java

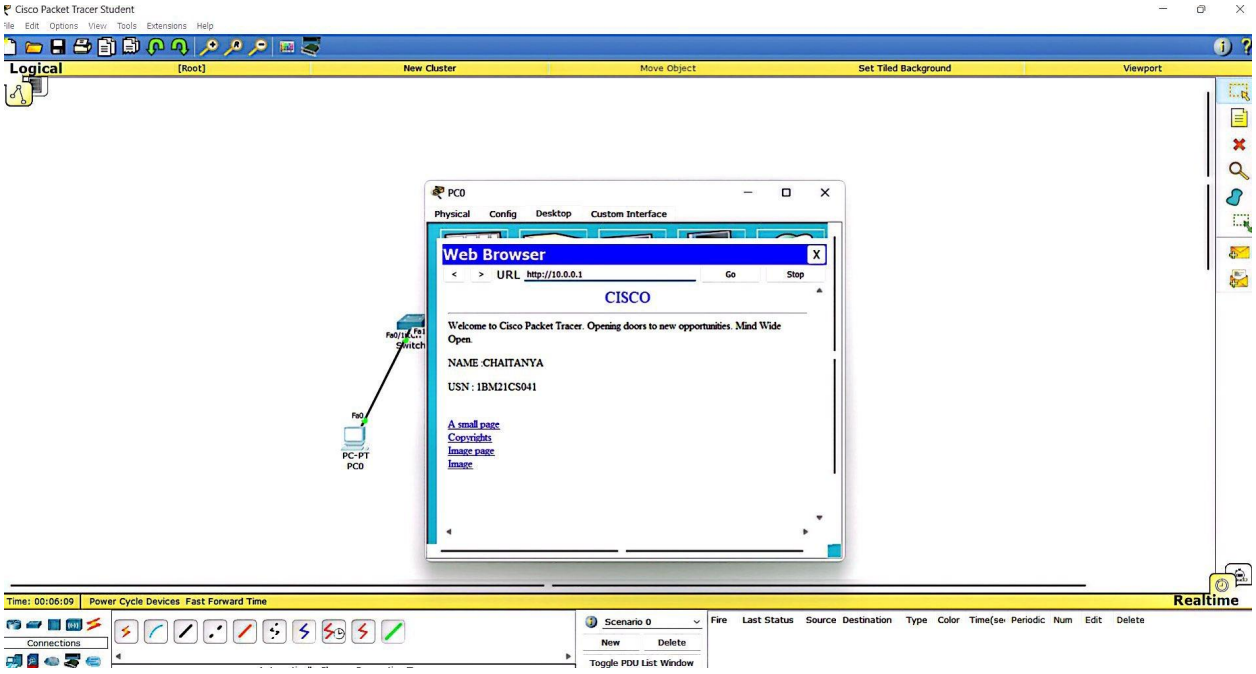
Image :-

Observation :-

- 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 IP address instead of website IP
- Since we can't remember IP of all websites DNS server will search through its cache to

27/12/2023


Fa0/1
Switch
Switch0
Fa1/1
Fa0
PC-PT
PC0
Fa0
Server-PT
Server0


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Web Browser
URL http://10.0.0.1
Go
Stop
CISCO
Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
NAME :CHAITANYA
USN : 1BM21CS041
A small page
Copyrights
Image page
Image
Time: 00:06:09
Power Cycle Devices Fast Forward Time
Realtime
Connections
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Periodic
Num
Edit
Delete

Experiment-6

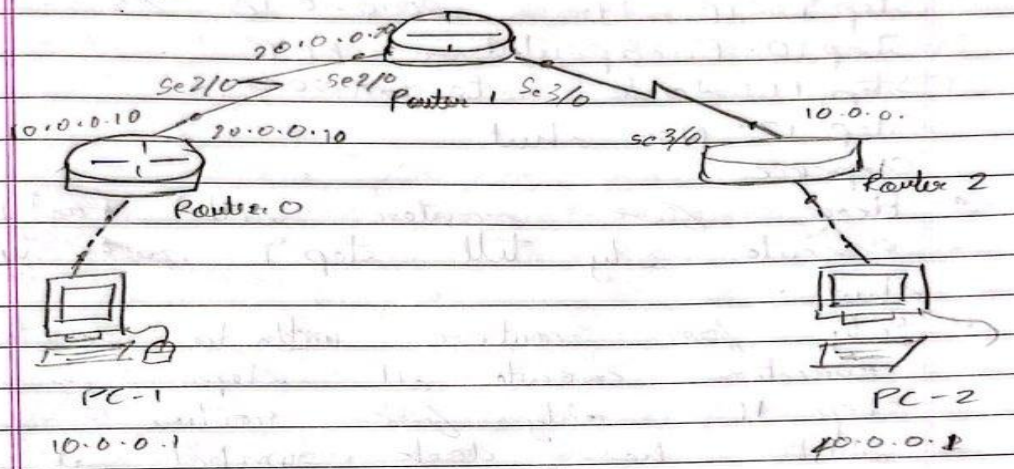
Q) Configure RIP routing Protocol in Routers

Date
Page

Lab 6

Aim:
Configure RIP routing protocol in routers

Topology:-



Procedure

- Create a network using 3 routers and 2 PC's Connect routers using serial DCE cable and PC to router using copper crossover cable.
- Set IP and gateway no for both PC's as 10.0.0.1 - IP 10.0.0.10 - gateway - PC0 respectively 40.0.0.1 - IP 40.0.0.10 - gateway - PC1 respectively
- Go to routers CLI mode and execute commands
  Step 1 - No
  Step 2 - Enable

Step 3:- config T
Step 4: Interface Fast Ethernet 0/0
Step 5: IP address 10.0.0.10 255.0.0.0
Step 6: No shut
Step 7: Exit
Step 8:- Interface se 2/0
Step 9: IP address 20.0.0.10 255.0.0.
Step 10: Encapsulation PPP
Step 11: clock rate 64000
Step 12: No shut
Step 13:

- Here for router with Fast Ether
  Execute only till step 9 and type
  shut.
- Only for router which is router
  connection execute all steps, execute
  step 11 only for router connect
  which has clock symbol at
  Repeat these steps for all router
- Again go to router 0 → CLI mode
  and type :-

Step 1 : config T
Step 2 :- router rip
Step 3 :- Network 10.0.0.0
Step 4 :- Network 20.0.0.0
Step 5 :- Exit

- Repeat these steps for all routers
- Now go to each router
  type show IP address
- Send message from PC0 to

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Ping Output :-

Packet tracer PC command line 10

PC > ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes

Request timed out

Reply from 40.0.0.1 : bytes = 32 time = 3ms TTL = 125

Reply from 40.0.0.1 : bytes = 32 time = 5ms TTL = 125

Reply from 40.0.0.1 : bytes = 32 time = 10ms TTL = 125

Ping statistics for 40.0.0.1

Packets : Sent = 4, received = 3, lost = 1 (25% loss)

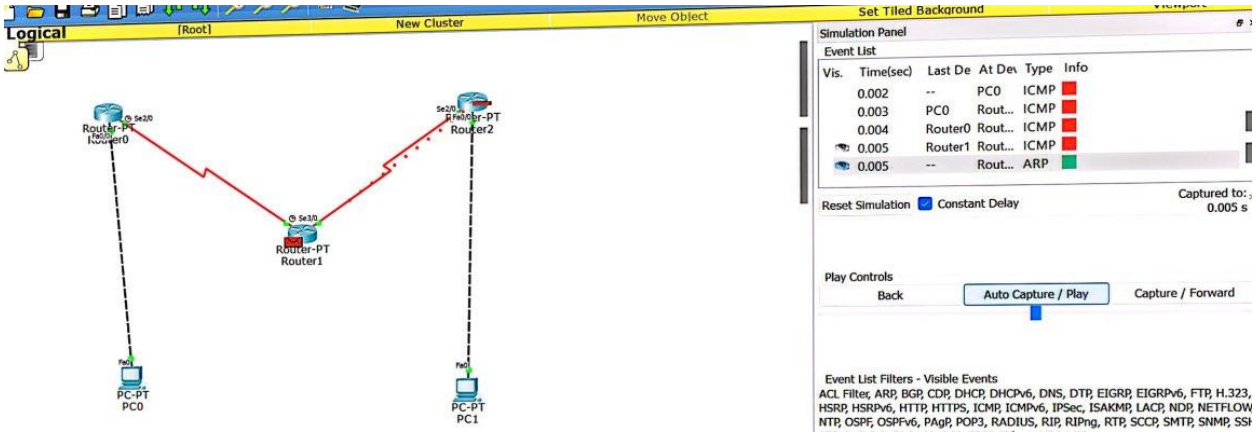
Approximate round trip time in milliseconds

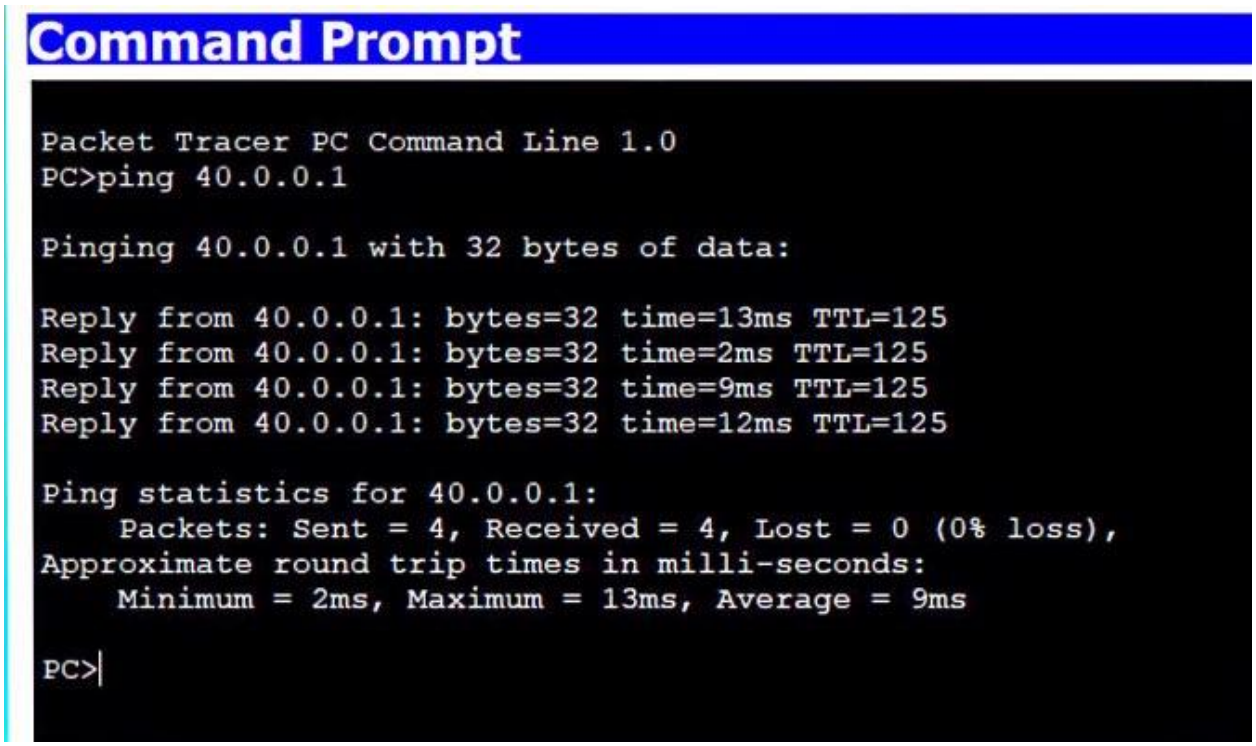
Minimum = 5ms, Maximum = 10ms, Average = 7ms

Observation :-

- Routing information protocol (rip) is a dynamic routing protocol that uses hop count as a routing metric to find the best path b/w source & destination.
- update of routing info are always broadcast.
- Full routing tables are sent in updates
- Router always trust routing info received from neighbour routers

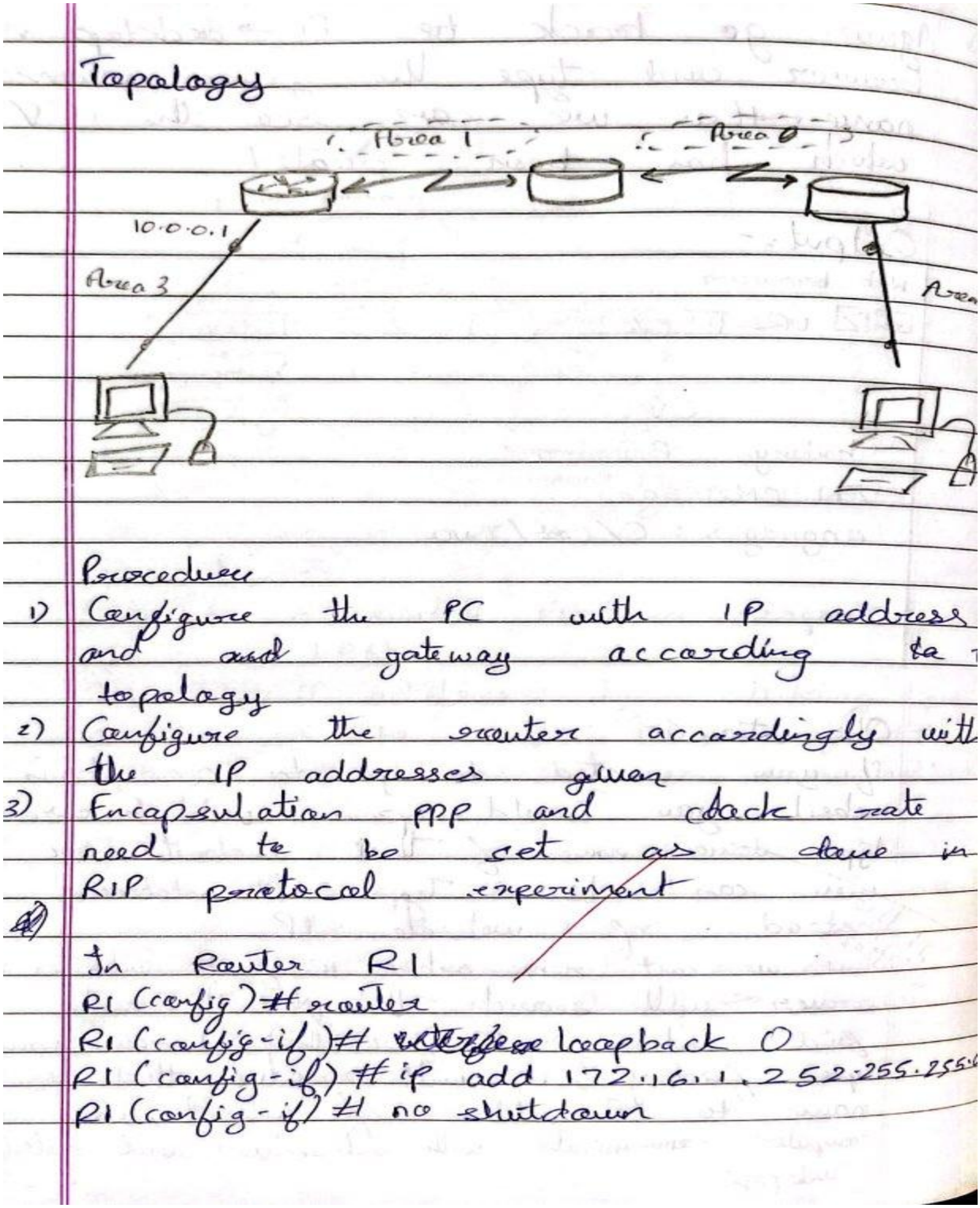
21/2/2023


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Router-PT
Router0
Router-PT
Router1
Router-PT
Router2
PC-PT
PC0
PC-PT
PC1
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.002 -- PC0 ICMP
0.003 PC0 Rout... ICMP
0.004 Router0 Rout... ICMP
0.005 Router1 Rout... ICMP
0.005 -- Rout... ARP
Reset Simulation
Constant Delay
Captured to:
0.005 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


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 40.0.0.1: bytes=32 time=13ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=9ms TTL=125
Reply from 40.0.0.1: bytes=32 time=12ms 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 = 13ms, Average = 9ms
PC>

Experiment-7

Q) Configure OSPF routing protocol



Procedure

1) Configure the PC with IP address and add gateway according to topology
2) Configure the router accordingly with the IP addresses given
3) Encapsulation PPP and clock rate need to be set as done in RIP protocol experiment

In Router R1

R1 (config)# router

R1 (config-if)# ~~interface~~ loopback 0

R1 (config-if)# ip add 172.16.1.252 255.255.

R1 (config-if)# no shutdown

Date
Page

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

In router R3

R3 (config)# router ostp 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

Set interface loopback

R1(config-if)# interface loopback 0
R1(config-if)# ip address 172.16.1.252 255.255.255.0
R1(config-if)# no shutdown

R2(config-if)# interface loopback 0
R2(config-if)# ip address 172.16.1.252 255.255.255.0
R2(config-if)# no shutdown

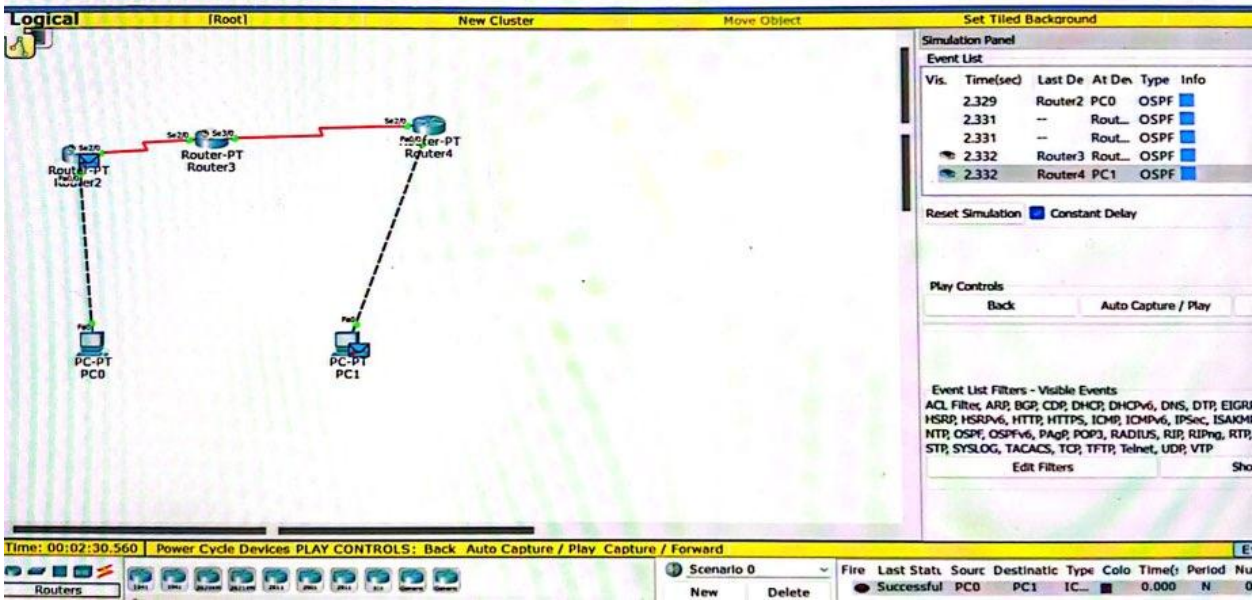
R3(config-if)# no shutdown

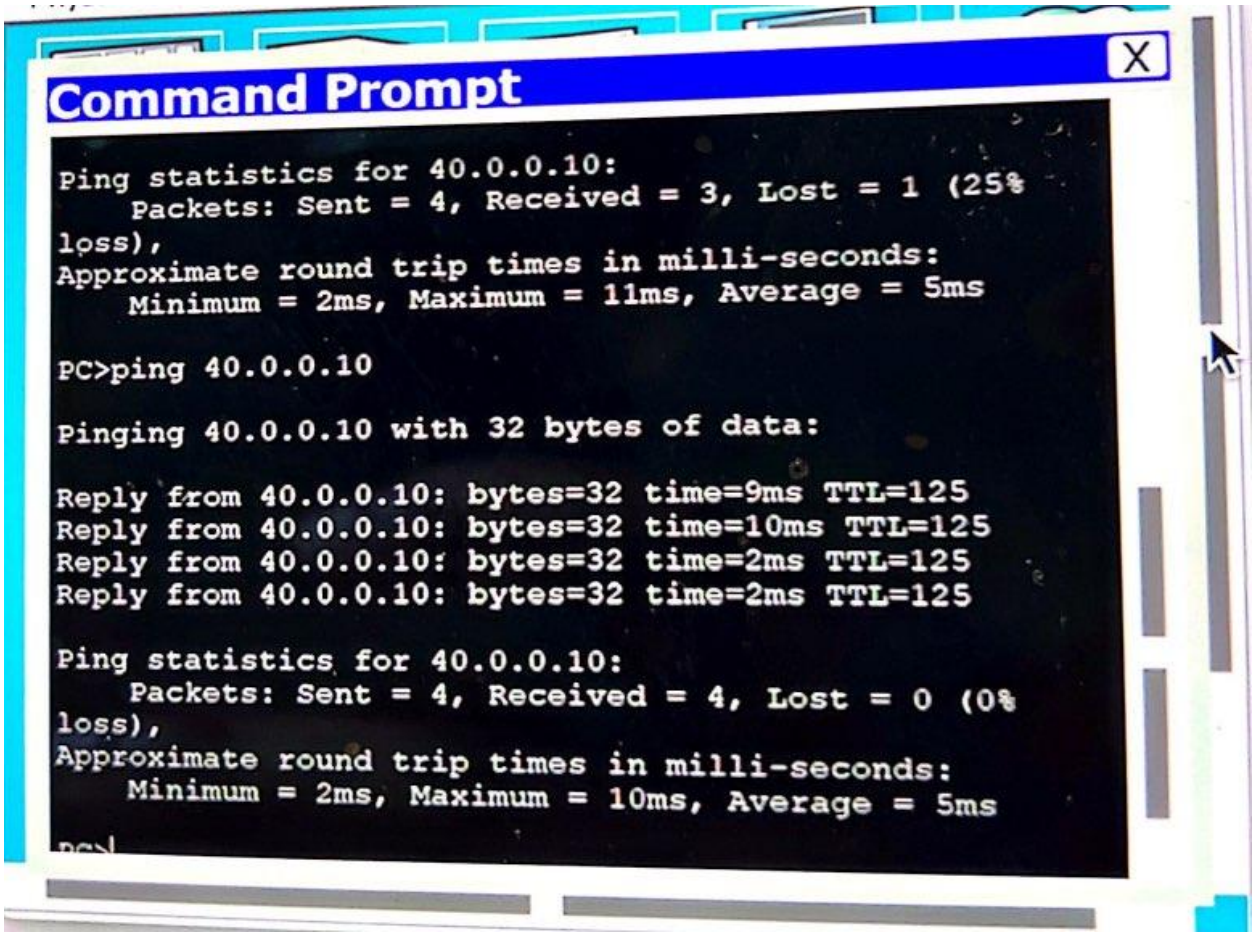
.) In router R1
R1(config)# router ospf 1
R2(config-router)# area 1 virtual
1.1.1.1
R2(config-router)# exit

) After this show IP route, it show
show all 4.

Ping output :-
Packet tracer PC command line 10
PC1 Ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of da
Request timed out
Reply from 40.0.0.10 bytes = 32 time = 11ms
Reply from 40.0.0.10 bytes = 32 time = 11ms
Reply from 40.0.0.10 bytes = 32 time = 8ms T

Ping statistics for 40.0.0.10
Packets sent = 4 received = 3 lost = 1
Approx round trip time in millisecond


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Router-PT
Router3
Router-PT
Router4
PC-PT
PC0
PC-PT
PC1
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
2.329 Router2 PC0 OSPF
2.331 -- Rout... OSPF
2.331 -- Rout... OSPF
2.332 Router3 Rout... OSPF
2.332 Router4 PC1 OSPF
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Event List Filters - Visible Events
Edit Filters
Time: 00:02:30.560
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Routers
Scenario 0
New
Delete
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Nu
Successful PC0 PC1 IC... 0.000 N 0


Command Prompt
X
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 3, Lost = 1 (25%
loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 11ms, Average = 5ms
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=9ms TTL=125
Reply from 40.0.0.10: bytes=32 time=10ms TTL=125
Reply from 40.0.0.10: bytes=32 time=2ms TTL=125
Reply from 40.0.0.10: bytes=32 time=2ms TTL=125
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0%
loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 10ms, Average = 5ms

EXPERIMENT-8

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

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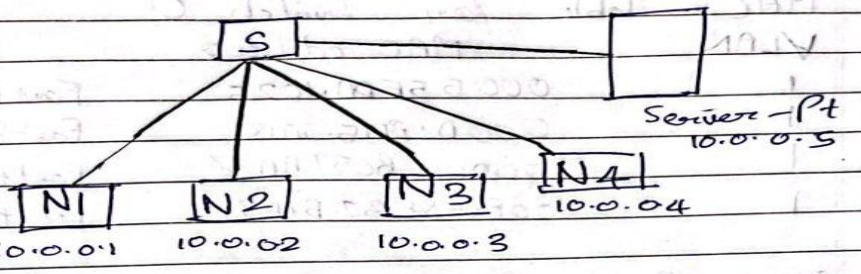
Construct Simple LAN and understand the concept and operations of address resolution Protocol (ARP)

Topology



Procedure :-

1) Create a topology of 4 PC's and a Server.
2) IP address assigned to all
3) ~~Connected~~ connect them through a switch
4) Use the inspect tool to click on PC to see ARP table
5) Initially the ARP table is empty
6) In CLI of switch → show MAC address table can be given on every transaction to see how the switch learns from transactions and build the address table.
7) Use the capture button to see the process step by step.

Result :-

PC > arp -a

Ip

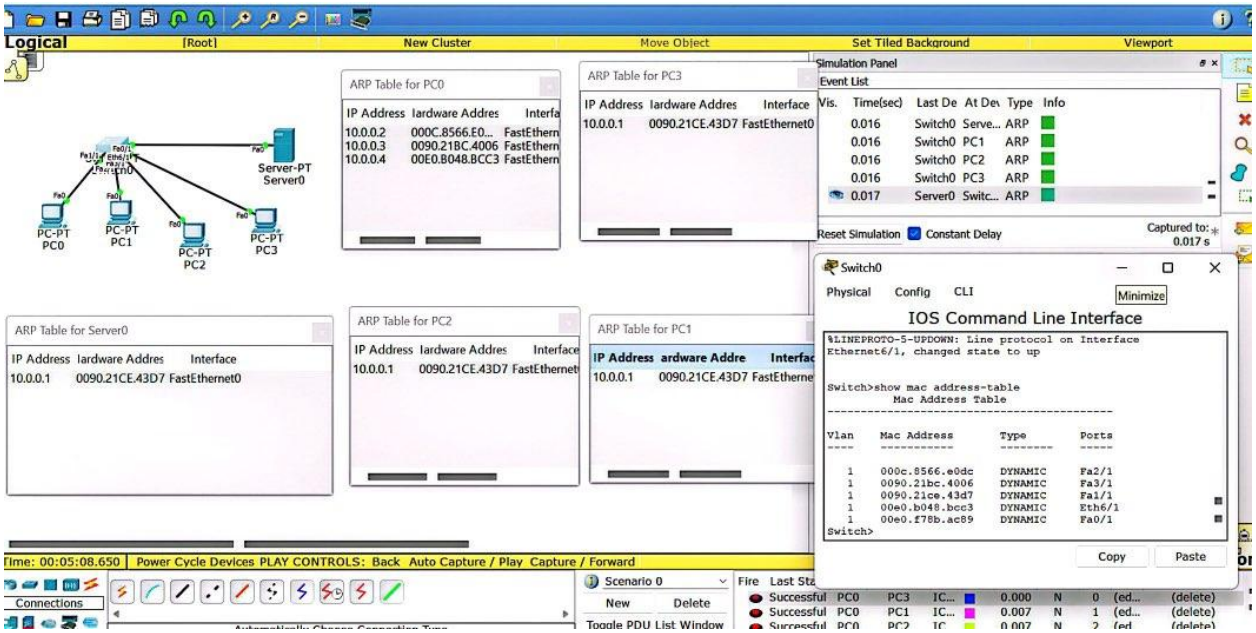
Internet address	Physical address	Type
10.0.0.2	0060.bd15.3a18	dyna
10.0.0.3	00e0.8fb7.b7e8	dyna
10.0.0.4	00d0.bc97.aa38	dyna

MAC Table for Switch 0

VLAN	MAC address	Port
1	0005.5EDA.1C25	FastEthernet 0/
1	0060.BD15.3A18	FastEthernet 2/
1	00D0.BC57.AA38	FastEthernet 1/
1	00E0.8FB7.B7E8	FastEthernet 3/

Observation :-

ARP is a protocal that uses IP addres
to find out the physical address (M
address


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Server-PT Server0
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
ARP Table for PC0
IP Address lardware Addres Interfa
10.0.0.2 000C.8566.E0... FastEthern
10.0.0.3 0090.21BC.4006 FastEthern
10.0.0.4 00E0.B048.BCC3 FastEthern
ARP Table for PC3
IP Address lardware Addres Interface
10.0.0.1 0090.21CE.43D7 FastEthernet0
Simulation Panel
Event List
Vis. Time(sec) Last De At Dev Type Info
0.016 Switch0 Serve... ARP
0.016 Switch0 PC1 ARP
0.016 Switch0 PC2 ARP
0.016 Switch0 PC3 ARP
0.017 Server0 Switc... ARP
Reset Simulation
Constant Delay
Captured to: 0.017 s
Switch0
Physical
Config
CLI
Minimize
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet6/1, changed state to up
Switch>show mac address-table
Mac Address Table
Vlan Mac Address Type Ports
1 000c.8566.e0dc DYNAMIC Fa2/1
1 0090.21bc.4006 DYNAMIC Fa3/1
1 0090.21ce.43d7 DYNAMIC Fa1/1
1 00e0.b048.bcc3 DYNAMIC Eth6/1
1 00e0.f78b.ac89 DYNAMIC Fa0/1
Switch>
Copy
Paste
ARP Table for Server0
IP Address lardware Addres Interface
10.0.0.1 0090.21CE.43D7 FastEthernet0
ARP Table for PC2
IP Address lardware Addres Interface
10.0.0.1 0090.21CE.43D7 FastEthernet
ARP Table for PC1
IP Address ardware Addre Interfac
10.0.0.1 0090.21CE.43D7 FastEtherne
Time: 00:05:08.650
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Connections
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Sta
Successful PC0 PC3 IC... 0.000 N 0 (ed... (delete)
Successful PC0 PC1 IC... 0.007 N 1 (ed... (delete)

EXPERIMENT-9

Q) To construct a VLAN and make the PC's communicate among a VLAN

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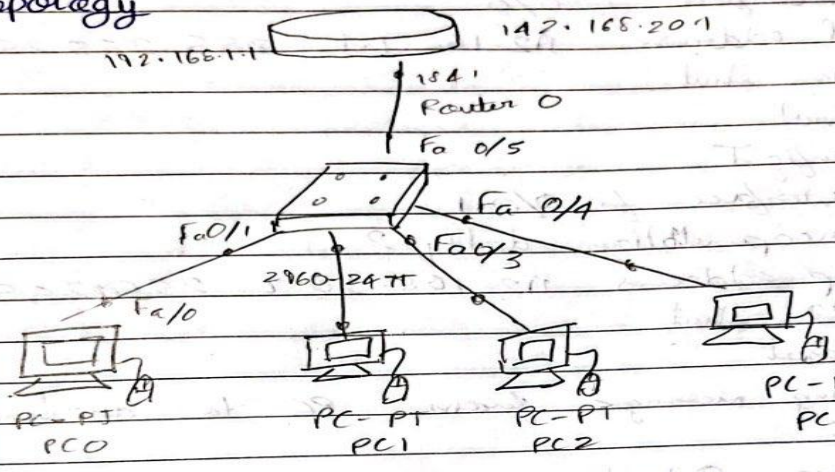
LAB-9

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

Topology



Procedure :-

- Create a topology as shown choose 1841 router and 2460-24TT switch
- Set IP address of the router and 4PC's respectively, we use class C type address also set gateways
- In switch go config table and select VLAN database, give any VLAN like 2 and name as VLAN
- Select the interface fastEthernet 4/1 and make it trunk.
- Select switches under 2nd interface which has interface 0/3 and 0/4 which on each of them set VLAN number 2

Go to router → config tab → and select VLAN database and enter name VLA and no 2 created.

⇒ Write following commands

1. Config T
2. Interface fa 0/0
3. IP address 192.168.1.1 255.255.255.0
4. No shut
5. Exit
6. Config T
7. Interface fa 0/0.1
8. encapsulation dot1q 2
9. ip address 192.168.20.2 255.255.255.0
10. No shut
11. Exit
12. Ping message from PC to another VLA PC

Ping Output:-

Packet tracer PC command line 1.0
PC> Ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of dat
Request timed out
Reply from 192.168.20.3 : bytes=32 time=0ms T
Reply from 192.168.20.3 : bytes=32 time=5ms TTL=
Reply from 192.168.20.3 : bytes=32 time=0ms TTL=
Ping statistics for 192.168.20.3
Packets sent = 4, Recieved = 3, lost = 1(25

Approximate round trip times in millise
minimum = 0ms, Maximum = 5ms, Average =

Date
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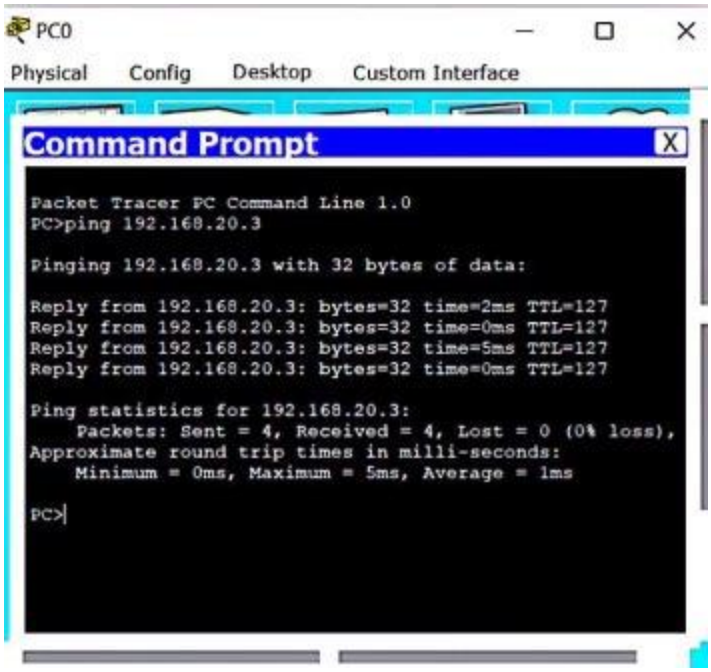
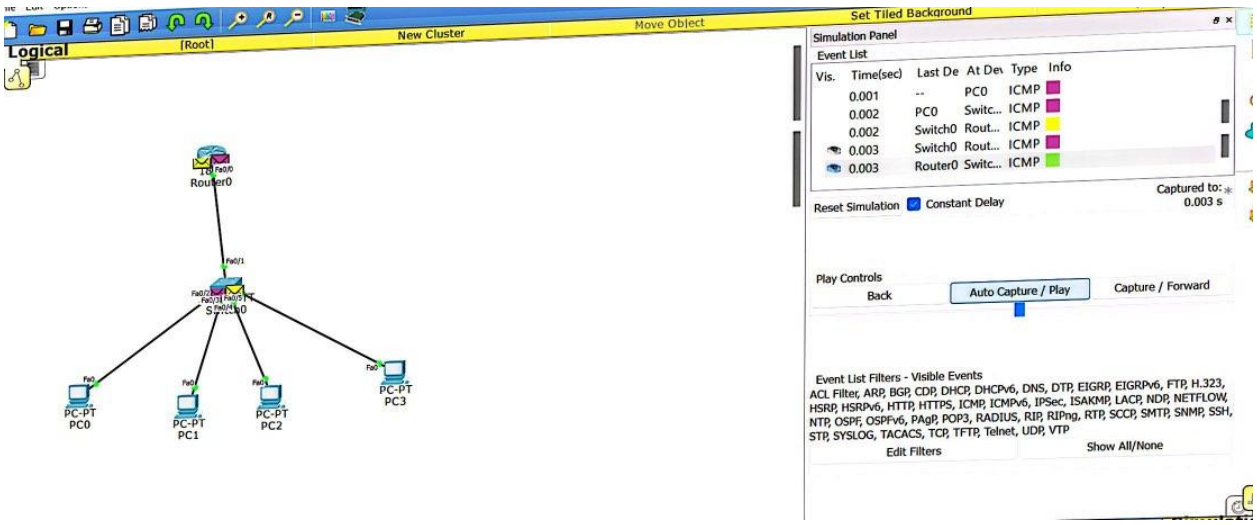
Observation :-

1) We can have one device on one VLAN and another VLAN connected to the same switch. They will only hear either broadcast traffic from within their VLANs, as if they were connected to two switches.
2) There VLAN's does not use IP address instead deal with subnets/ class C type address.
3) Inter VLAN routing gives a flexible tool to logically subdivide their networks that has potential to enhance security and performance

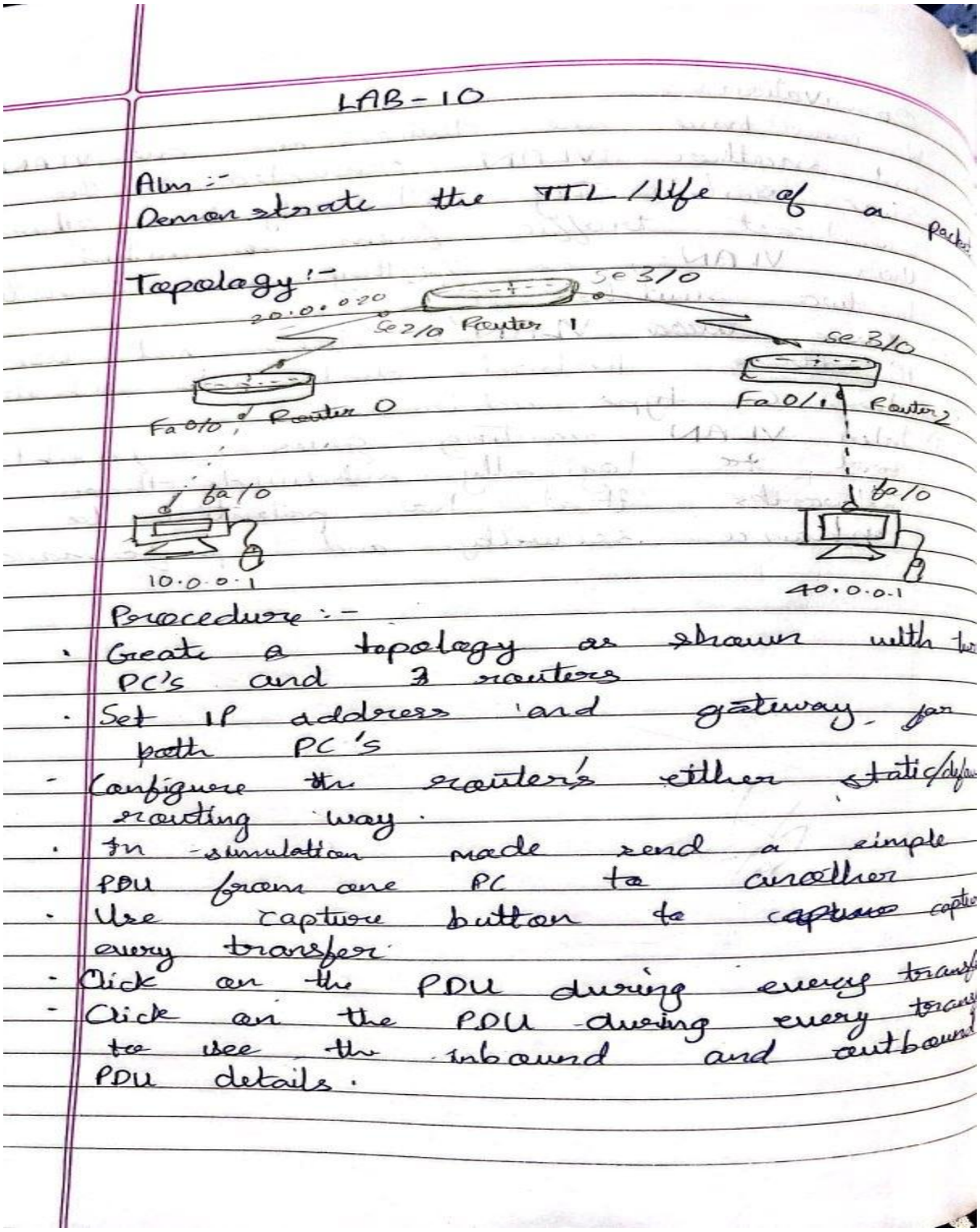
7/9/2023


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Reply from 192.168.20.3: bytes=32 time=2ms TTL=127
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 = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 5ms, Average = 1ms
PC>


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Router0
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.001 -- PC0 ICMP
0.002 PC0 Switc... ICMP
0.002 Switch0 Rout... ICMP
0.003 Switch0 Rout... ICMP
0.003 Router0 Switc... ICMP
Reset Simulation
Constant Delay
Captured to:
0.003 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

EXPERIMENT-10

Q) Demonstrate the TTL/ Life of a Packet



Date
Page

Output

IP

0 4 8 16 19 31

4 IHL DSCP TL: 28

IP: 0x6 0x 0x0

TTL: 255 PRO: 0x1 CHKSUM

SRC IP: 10.0.0.1

DST IP: A0.0.0.1

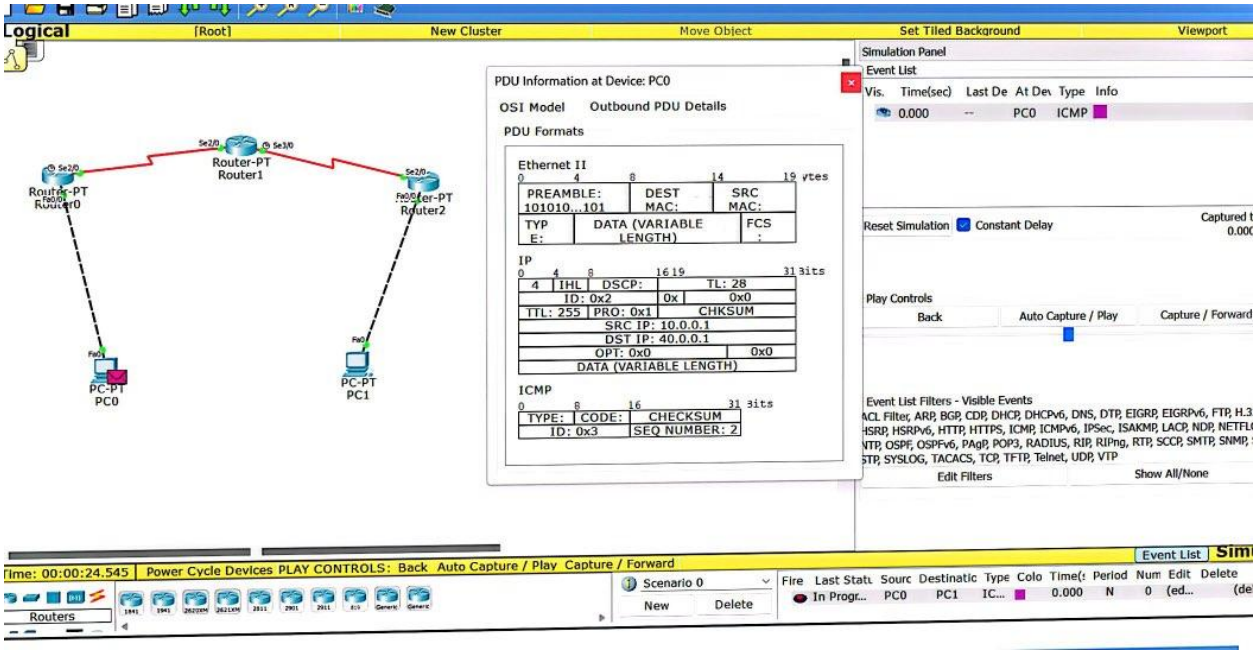
OPT 0x0 0x0

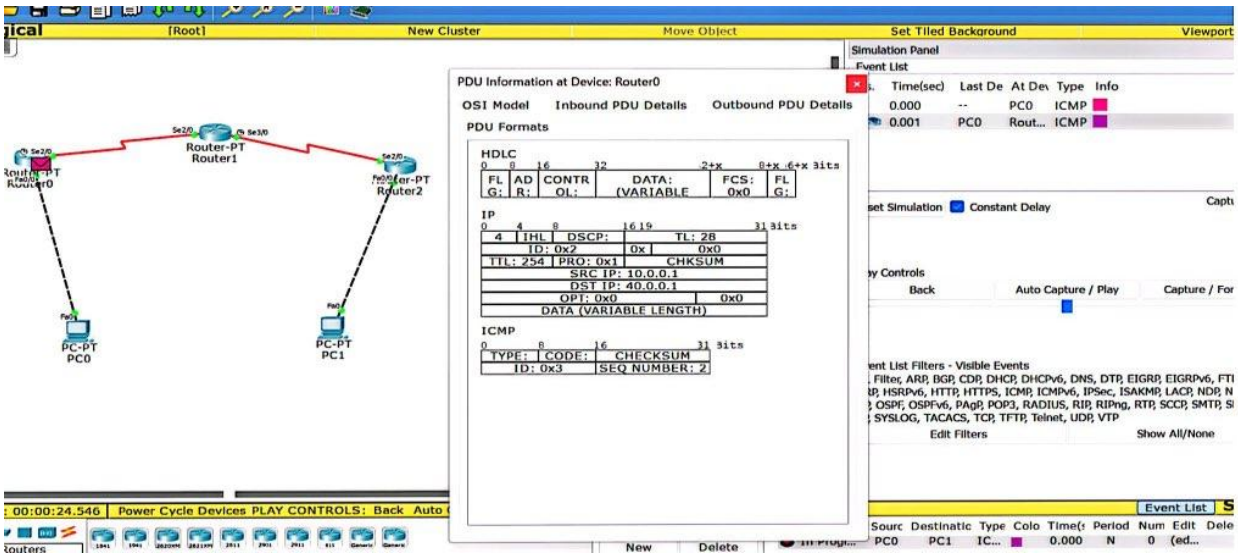
DATA (VARIABLE LENGTH)

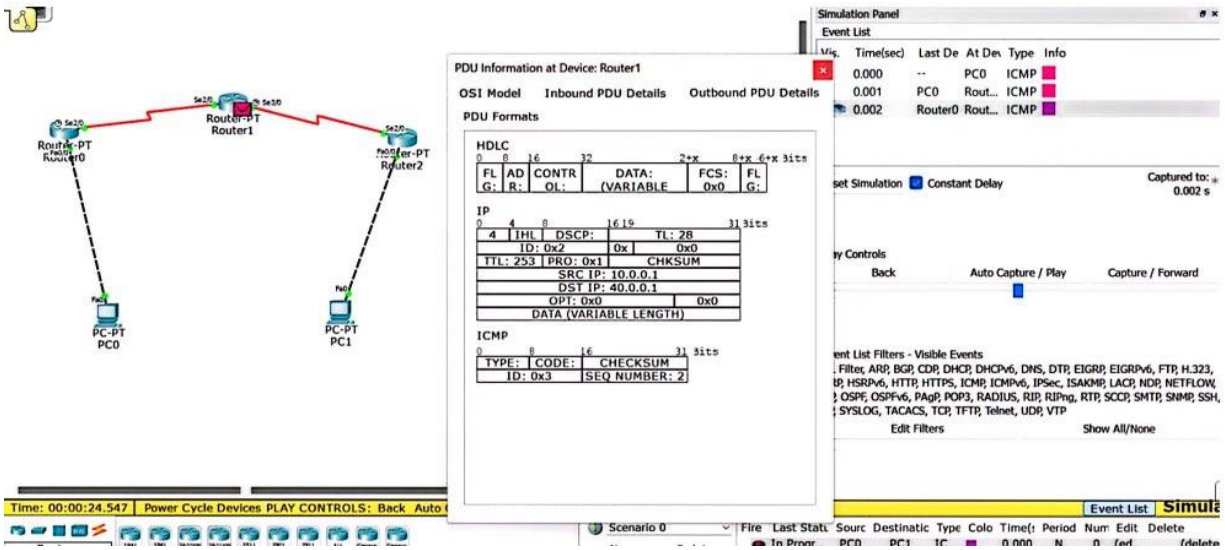
Observation :-

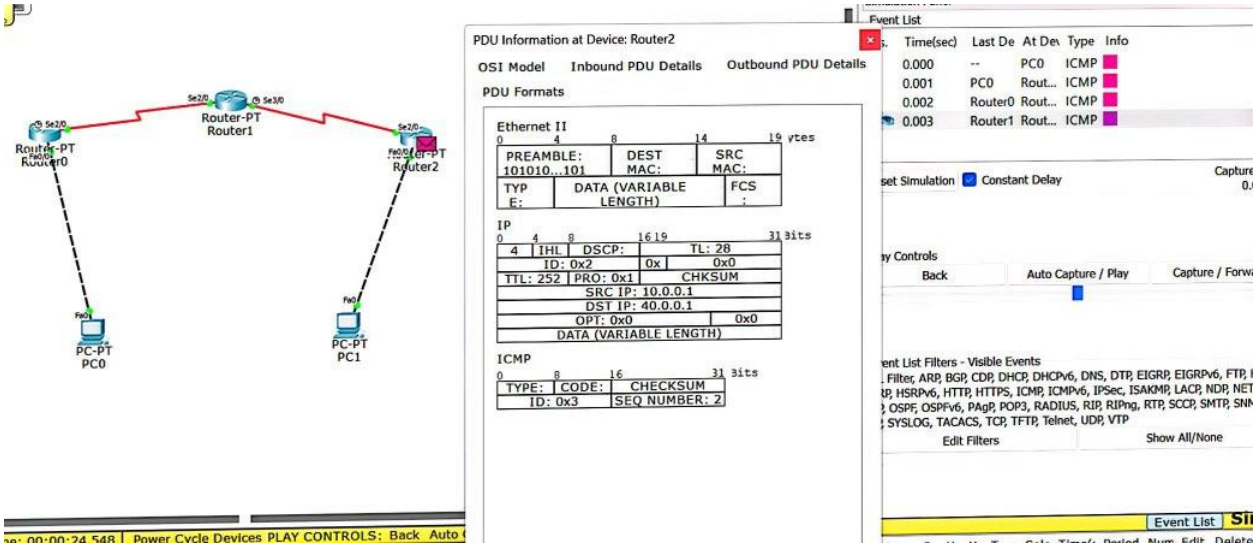
- The no of hops the packet b/fore being discarded as TTL
- Datagrams TTL field is set by the sender and reduced by each router along path to destination.
- The router reduces TTL value by one ~~stick~~ while forwarding the packets.
- When TTL value is 0, the router discards and sends an ICMP message

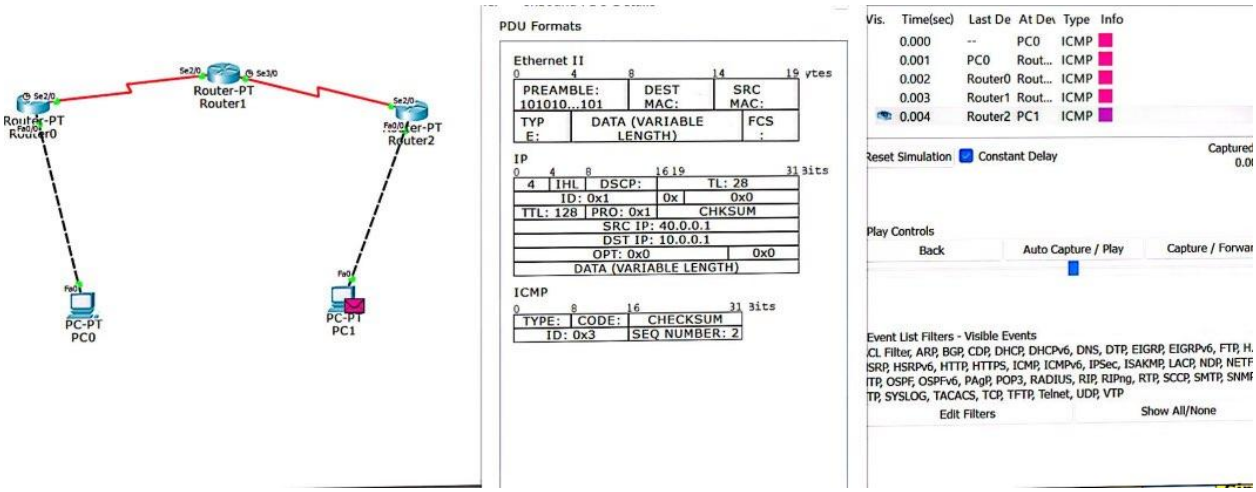
NH
1/9/2023


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: PC0
OSI Model
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...101
DEST MAC:
SRC MAC:
TYPE:
DATA (VARIABLE LENGTH)
FCS:
IP
IHL
DSCP:
TL: 28
ID: 0x2
0x
0x0
TTL: 255
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE:
CODE:
CHECKSUM
ID: 0x3
SEQ NUMBER: 2
Router-PT Router1
Router-PT Router0
Router-PT Router2
PC-PT PC0
PC-PT PC1
Simulation Panel
Event List
Vis.
Time(sec)
Last De
At Dev
Type
Info
0.000
PC0
ICMP
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Time: 00:00:24.545
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Routers
Scenario 0
New
Delete
Fire
Last Statu
Sourc
Destinatic
Type
Colo
Time(s
Period
Num
Edit
Delete
In Progr...
PC0
PC1
IC...
0.000
N
0
(ed...


[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router0
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
FLAG:
ADR:
CONTROL:
DATA: (VARIABLE
FCS: 0x0
IP
IHL
DSCP:
TL: 28
ID: 0x2
0x
0x0
TTL: 254
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE:
CODE:
CHECKSUM
ID: 0x3
SEQ NUMBER: 2
Router-PT Router1
Router-PT Router2
PC-PT PC0
PC-PT PC1
Simulation Panel
Event List
Time(sec)
Last De
At Dev
Type
Info
0.000
PC0
ICMP
0.001
PC0
ICMP
Constant Delay
Back
Auto Capture / Play
Edit Filters
Show All/None
Power Cycle Devices PLAY CONTROLS: Back
Routers
New
Delete
PC0
PC1
IC...
0.000
N
0


Router-PT
Router1
Router-PT
Router0
Router-PT
Router2
PC-PT
PC0
PC-PT
PC1
PDU Information at Device: Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
FL G:
AD R:
CONTR OL:
DATA: (VARIABLE
FCS: 0x0
FL G:
IP
4
IHL
DSCP:
TL: 28
ID: 0x2
0x
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
TYPE:
CODE:
CHECKSUM
ID: 0x3
SEQ NUMBER: 2
Simulation Panel
Event List
Time(sec)
Last De
At Dev
Type
Info
0.000
--
PC0
ICMP
0.001
PC0
Rout...
ICMP
0.002
Router0
Rout...
ICMP
Constant Delay
Captured to:
0.002 s
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Event List
Time: 00:00:24.547
Power Cycle Devices
PLAY CONTROLS:
Back
Auto


Router-PT
Router1
Router-PT
Router0
Router-PT
Router2
PC-PT
PC0
PC-PT
PC1
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...101
DEST MAC:
SRC MAC:
TYP E:
DATA (VARIABLE LENGTH)
FCS
IP
4
IHL
DSCP:
TL: 28
ID: 0x2
0x
0x0
TTL: 252
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE:
CODE:
CHECKSUM
ID: 0x3
SEQ NUMBER: 2
Event List
Time(sec)
Last De
At Dev
Type
Info
0.000
--
PC0
ICMP
0.001
PC0
Rout...
ICMP
0.002
Router0
Rout...
ICMP
0.003
Router1
Rout...
ICMP
Constant Delay
Back
Auto Capture / Play
Edit Filters
Show All/None
Event List
PLAY CONTROLS:
Back
Auto Capture / Play


Router-PT
Router1
Router-PT
Router0
Router-PT
Router2
PC-PT
PC0
PC-PT
PC1
PDU Formats
Ethernet II
PREAMBLE: 101010...101
DEST MAC:
SRC MAC:
TYP E:
DATA (VARIABLE LENGTH)
FCS
IP
4
IHL
DSCP:
TL: 28
ID: 0x1
0x
0x0
TTL: 128
PRO: 0x1
CHKSUM
SRC IP: 40.0.0.1
DST IP: 10.0.0.1
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE:
CODE:
CHECKSUM
ID: 0x3
SEQ NUMBER: 2
Vis.
Time(sec)
Last De
At Dev
Type
Info
0.000
--
PC0
ICMP
0.001
PC0
Rout...
ICMP
0.002
Router0
Rout...
ICMP
0.003
Router1
Rout...
ICMP
0.004
Router2
PC1
ICMP
Constant Delay
Back
Auto Capture / Play
Edit Filters
Show All/None

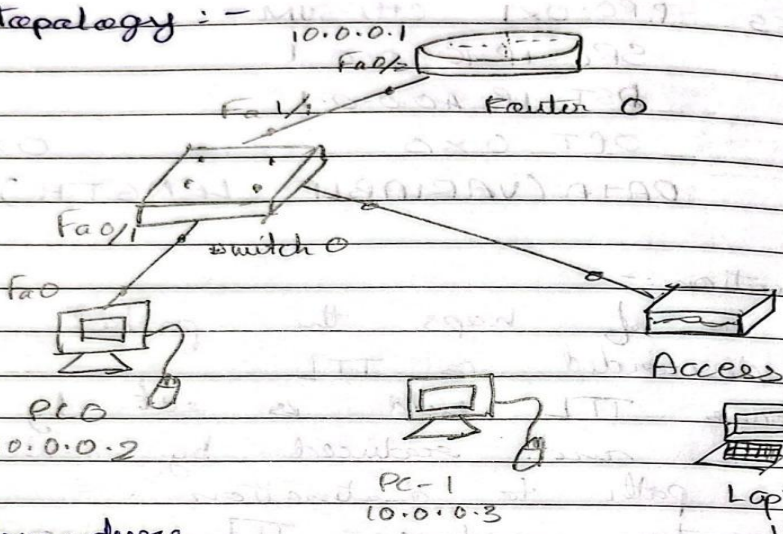
EXPERIMENT-11

Q) To construct a WLAN and make the nodes communicate wirelessly

Lab - 11

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

Topology :-



Procedure

- Construct the above topology
- Configure PC and router 0 as done.
- Configure access point 1 - Port 1 → SSID Name - WLAN
- Select to EP & give any 10 digit hex key - 1234567890
- Config PC1 & Laptop with wireless standards.
- Switch off the device - Drag existing PT-HOST-NM-1AM to the component listed in LHS. Drag WMP300N wireless interface to the empty port. Switch on the device

Date
Page

In the config tab a new wireless interface would have been added. Now configure SSID, WEP, WEP key IP address and gateway to the device.

- Ping from every device to every other device.

Ping Output :-

Packet tracer PC command line 10

PC> Ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data

Request timed out TTL=127

Reply from 10.0.0.3 : bytes = 32 time = 0ms

Reply from 10.0.0.3 : bytes = 32 time = 0ms TTL = 127

Reply from 10.0.0.3 : bytes = 32 time = 0ms TTL = 127

Ping statistics for 10.0.0.3

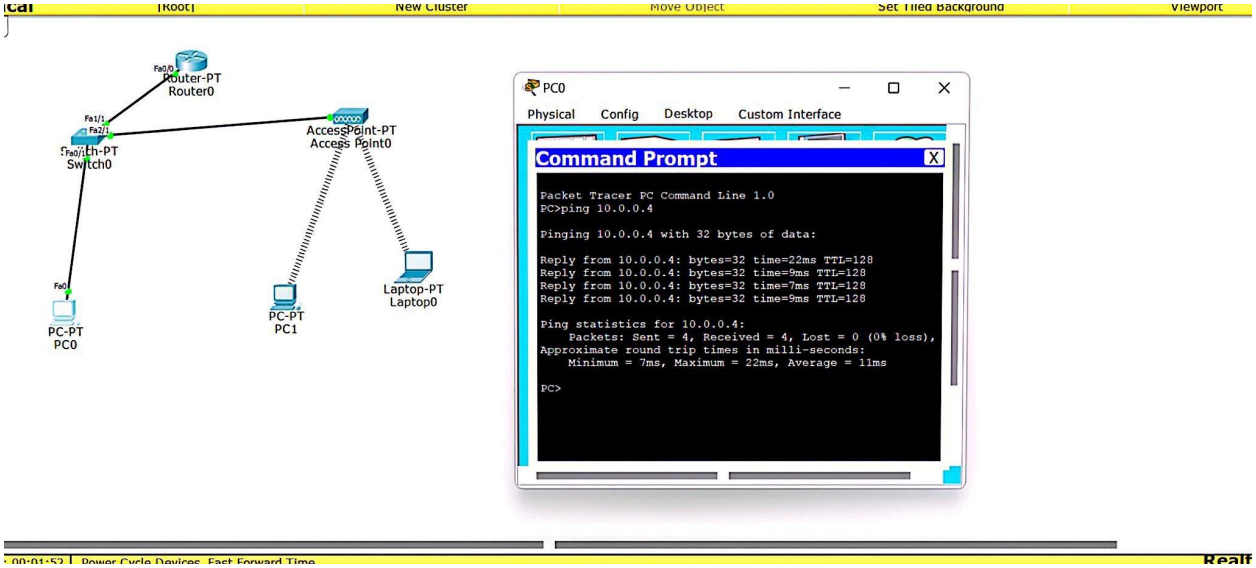
Packet : sent = 4, Received = 3, Lost = 1 (25% loss)

Approximate round trip times in milliseconds :

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

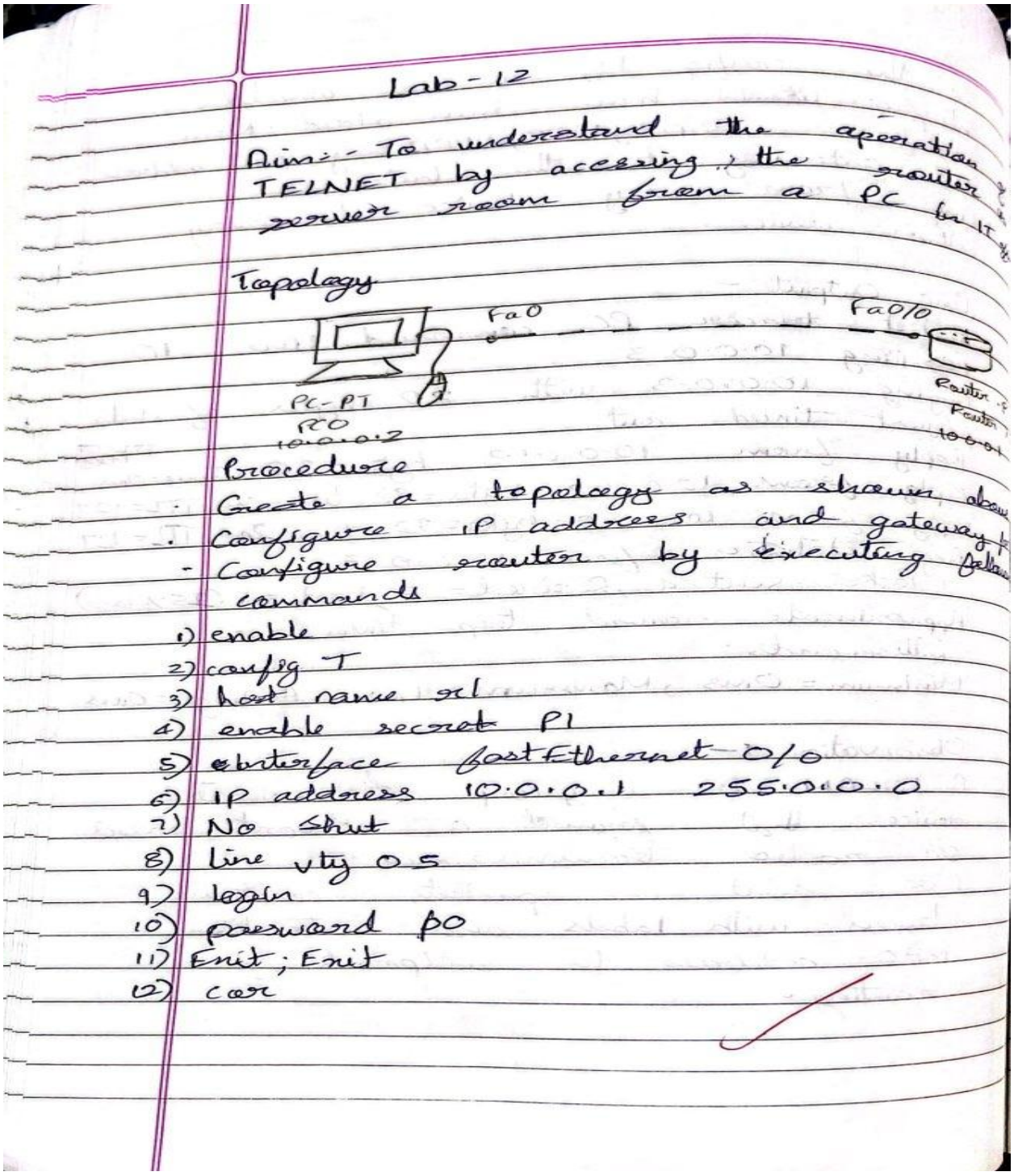
Observation :-

- A LOLAN is a group of colocated devices that formed a network based on radio transmissions.
- Data sent in packets contain layers with labels and instruction MAC address to endpoints for routing.


Router-PT
Router0
Switch-PT
Switch0
Access Point-PT
Access Point0
PC-PT
PC0
PC-PT
PC1
Laptop-PT
Laptop0
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.4
Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=22ms TTL=128
Reply from 10.0.0.4: bytes=32 time=9ms TTL=128
Reply from 10.0.0.4: bytes=32 time=7ms TTL=128
Reply from 10.0.0.4: bytes=32 time=9ms TTL=128
Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 7ms, Maximum = 22ms, Average = 11ms
PC>

EXPERIMENT-12

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



Lab - 12

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

Topology

Procedure

- Create a topology as shown above
- Configure IP address and gateway
- Configure router by executing following commands

1) enable
2) config T
3) host name r1
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 0 5
9) login
10) password P0
11) Exit; Exit
12) copy

Date
Page

ping message to router
password for user Pass verification is p0
Password for enable is P1
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

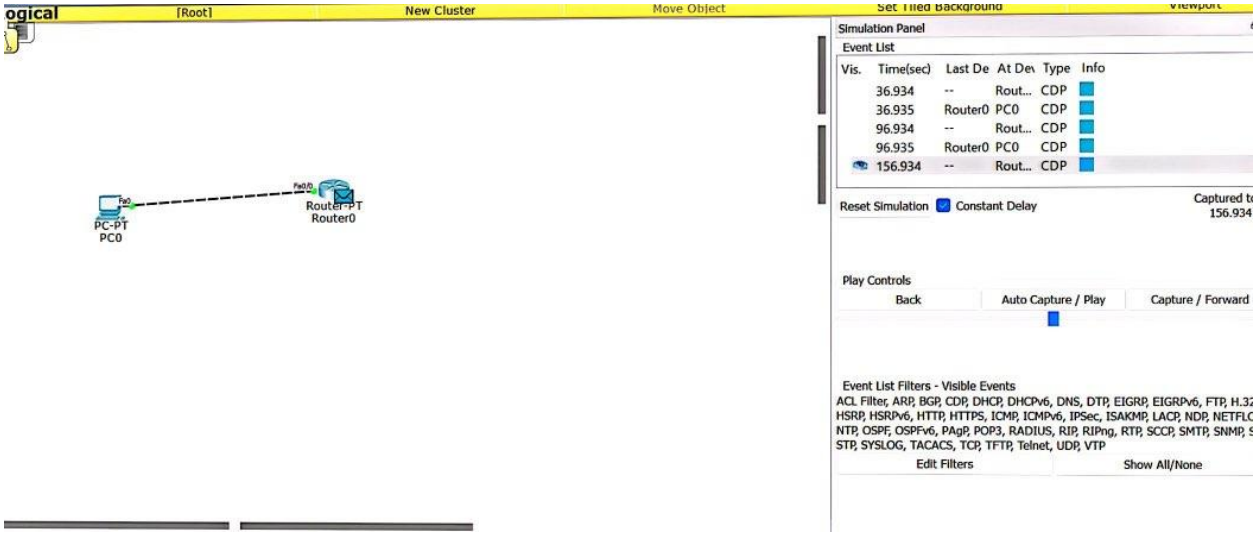
Reply from 10.0.0.1 : bytes = 32 time = 0ms TTL = 255
Reply from 10.0.0.1 : bytes = 32 time = 0ms TTL = 255
Reply from 10.0.0.1 : bytes = 32 time = 0ms TTL = 255
Reply from 10.0.0.1 : bytes = 32 time = 0ms TTL = 255

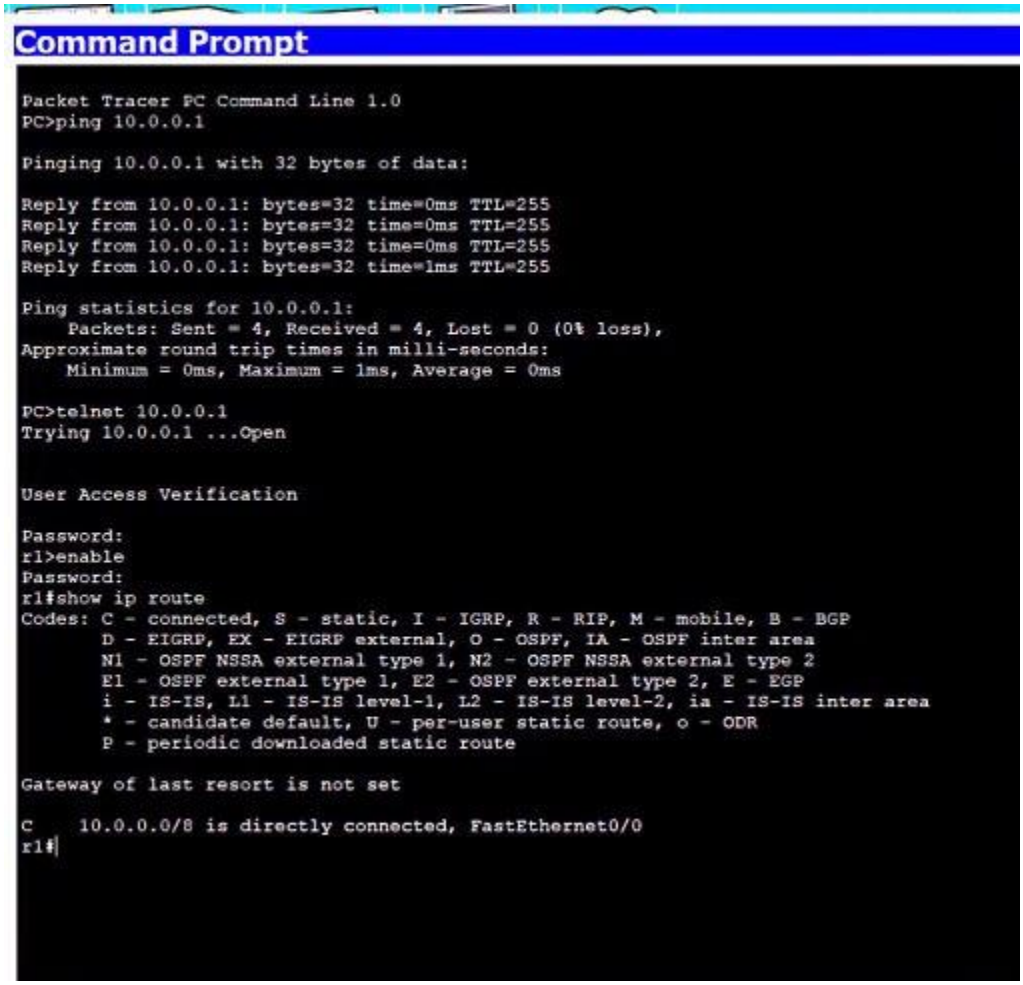
Ping statistics for 10.0.0.1
Packets sent = 4, Received = 4 lost = 0 (0% loss)
Approximate round trip times in millisecond
Minimum = 0ms, Maximum = 0ms Average = 0ms

PC > telnet 10.0.0.1
Typing 10.0.0.1 .... open
User acvs verification
Password: P0
P1 > enable

Observation :-

- TELNET stands for teletype Network. It is a type of protocol that enables one computer to connect to the local computer.
- It is used as a standard TCP/IP protocol for virtual terminal service provided by ISO.
- During TELNET operation, whatever being performed on the remote computer will be displayed by the local computer.


ogical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
36.934 -- Rout... CDP
36.935 Router0 PC0 CDP
96.934 -- Rout... CDP
96.935 Router0 PC0 CDP
156.934 -- Rout... CDP
Reset Simulation
Constant Delay
Captured t
156.934
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.32
HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLO
NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, S
STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Fa0
PC-PT
PC0
Fa0/0
Router-PT
Router0


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=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
Reply from 10.0.0.1: bytes=32 time=1ms 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:
r1>enable
Password:
r1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set
C 10.0.0.0/8 is directly connected, FastEthernet0/0
r1#

EXPERIMENT-13

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

Date
Page

Lab 14

Aim:- WAP for error detecting code using CRC

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

void binaryXOR(char *result, const char *a,
const char *b){
  for(int i=0; i<16; i++ ){
    result[i] = (a[i] == b[i]) ? '0' :
'1';
  }
  result[16] = '\0';
}
void calculateCRC(const char *data, int
 length, char *checksum)
{
  char crc[17];
  for (int i=0; i<16; i++){
    crc[i] = '0';
  }
  crc[16] = '\0';
  for (int i=0; i< length; i++){
    for (int j=0; j<8; j++){
        char msb = crc[0];
    for (int k=0; k<16; k++){
      crc[k] = crc[k+1];
    }
    crc[15] = '0';
```

```
        if(msb == '1'){
            char temp[17];
            binaryXOR(temp, crc, "10001000000100001");
            CRC_POLY in binary
            strcpy(crc, temp);
        }
    }
    crc[15] = (data[i] == '1') ? '1' : '0';

    strcpy(checksum, crc);
}
int main(){
    char data[100];
    printf("Enter data in binary: ");
    scanf("%s", data);
    int dataLength = strlen(data);
    char checksum[17];
    calculateCRC(data, dataLength, checksum);
    char receivedChecksum[17];
    printf("Enter received CRC: ");
    scanf("%s", receivedChecksum);

    if(strcmp(receivedChecksum, checksum) == 0){
        printf("Data is error free\n");
    } else {
        printf("Data contains errors\n");
    }

    return 0;
}
```

Output :-

Enter dataword: 1100101011100100

Calculated CRC : 1110100101111001

CODE-

```
import java.util.Scanner; import java.util.Arrays;

class Program {
static String Xor(String a, String b) {

String result = "";
int n = b.length();
for (int i = 1; i < n; i++) {

result=(a.charAt(i) == b.charAt(i))?0:1;

}

return result; }

static String Div(String data, String key) { int pick = key.length();
String tmp = data.substring(0, pick);
```

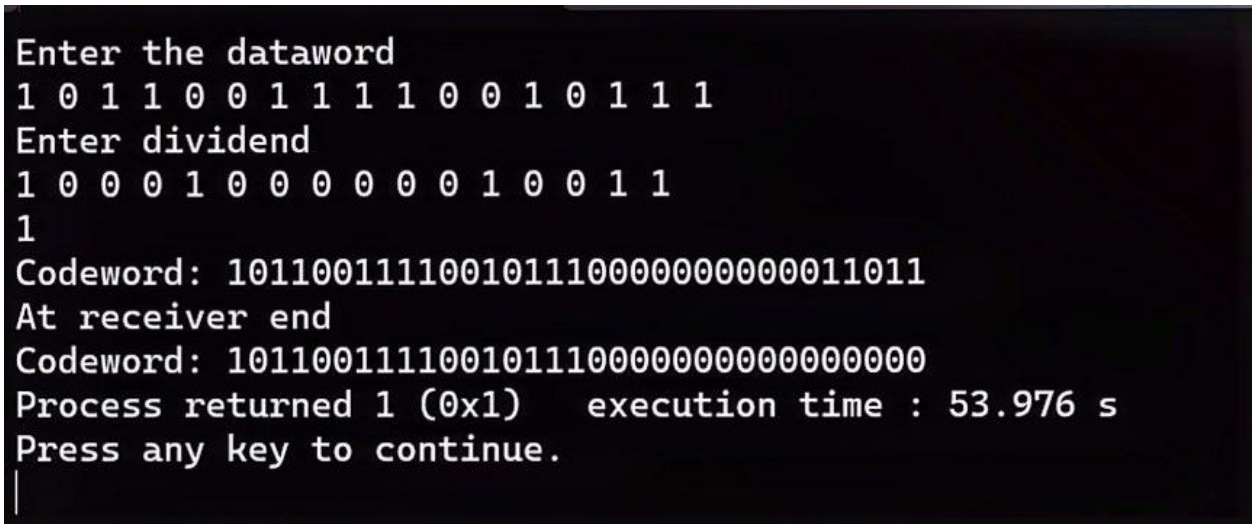


```
int n = data.length(); while (pick < n) {

if (tmp.charAt(0) == '1')
tmp = Xor(data, tmp) + data.charAt(pick);

else
tmp = Xor(new String(new char[pick]).replace("\0", "0"), tmp) +
data.charAt(pick);

pick += 1; }

if (tmp.charAt(0) == '1') tmp = Xor(divisor, tmp);

else
tmp = Xor(new String(new char[pick]).replace("\0", "0"), tmp);

return tmp; }
```

```
static void Encode(String data, String key) {
int lkey = key.length();
String appended_data = (data + new String(new char[lkey - 1]).replace("\0",
"0")); String remainder = Mod2Div(appended_data, key);
String codeword = data + remainder;
System.out.println("Remainder : " + remainder);
System.out.println("Encoded Data (Data + Remainder) :" + codeword + "\n");

}

public static void main(String[] args) { Scanner s = new Scanner(System.in);
```



```
System.out.println("enter dataword and key"); String data = s.next();
String key = s.next();

EncodeData(data, key); }

}
```



EXPERIMENT-14

Q) Write a program for congestion control using Leaky bucket algorithm

Date
Page

LAB - 13

Aim :- WAP for congestion control using bucket algorithm

Procedure :-

```
#include <stdio.h>
#include <stdlib.h>
#define capacity 50
void main() {
  int timeLimit = 10;
  int bucketCapacity = 0, outputRate = 5;

while (timeLimit < 20) {
    int newPacket;
    pf("enter new packet size :");
    scanf("%d", &newPacket);

  if (newPacket < capacity ) {
    bucketCapacity = bucketCapacity + newPacket;
    pf(" bucket Capacity currently : %d",
        bucketCapacity );
    bucketCapacity = bucketCapacity - outputRate;
  pf(" bucket capacity after output : %d",
      bucketCapacity );
  timeLimit ++;
  }
  else if (newPacket > capacity || (newPacket +
  bucketCapacity) > capacity) {
  pf("New packet cannot be added
      to bucket");
```

```
bucketCapacity = bucketCapacity - outputRate;
Pf("after output: %d", bucketCapacity);
}
else if (bucketCapacity < 0) {
    bucketCapacity = 0;
    Pf("bucket capacity after output:
    bucketCapacity);
    timeLimit++
    exit(0)
}
}
}
```

Output

Enter no. of queries, buffer size, input

output packet size

4

7

4

1

Packet accepted

remaining space = 3

packet is accepted

remaining space = 0

Packet not accepted

remaining space = 1

remaining space = 2

CODE-

```
import java.util.*; class Leakybucket {

public static void main(String[] args) {

int rem;
Scanner sc=new Scanner(System.in); int s= 0;

System.out.println("enter no of queries,buffer size,input and output packet size "); int
q=sc.nextInt();

int bs=sc.nextInt(); int ip=sc.nextInt();

int op=sc.nextInt(); for (int i = 0; i < q; i++) {

rem=bs-s;
if (ip <= (rem)) {

System.out.println("packet is accepted"); s+=ip;

}
else {

System.out.println("Packet not accepted "); }

System.out

.println("remaining space="+(bs-s)); s -= op;

}

65

} }
```

OUTPUT


enter no of queries,buffer size,input and output packet size
4 10
6
1
packet is accepted
remaining space=4
Packet not accepted
remaining space=5
packet is accepted
remaining space=0
Packet not accepted
remaining space=1
PS C:\Users\sanja\OneDrive\Documents>

EXPERIMENT-15

Q) 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.

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Lab 15

Aim:-
Using TCP/IP sockets, Write a client server program to make client sending the file name and server to send back the contents

Client TCP.py

```
from socket import *
ServerName = '127.0.0.1'
ServerPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((ServerName, ServerPort))
Sentence = input("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 = 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("In Sent contents of:" + sentence)
file.close()
connectionSocket.close()

Output:-

ServerTCP.py
The server is ready to receive

send contents of server.TCP.py
The server is ready to receive

ClientTCP.py
Enter file name: ServerTCP.py

from server
from socket import *
ServerName = "127.0.0.1"
ServerPort = 12000
ServerSocket.bind((ServerName, ServerPort))
Server.Socket.listen(1)
while 1
print("The server is ready to receive
sentence = ConnectionSocket.recv(1024)
file = open("sentence", "r")
R = file.read(1024)
ConnectionSocket.send(l.encode())
print("Sent contents of" + sentence)
file.close()
Connection Socket.close()

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)
```



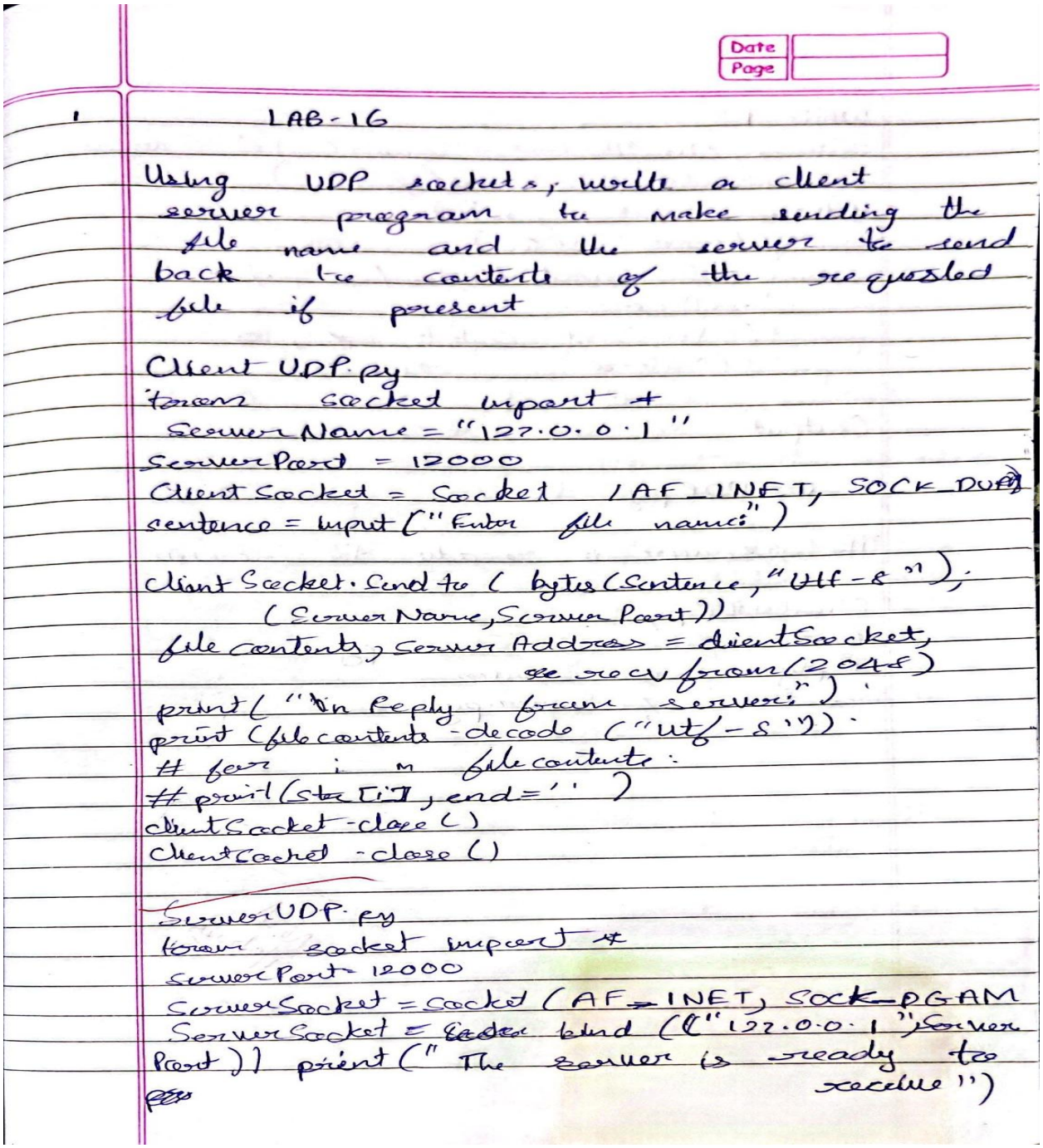
```
file.close() connectionSocket.close()
```

```
Enter file name:ServerTCP.py

========== RESTART: C:/Users/sanja/OneDrive/Documents/ClientTCP.py =========

Enter file name:ServerTCP.py

========== RESTART: C:/Users/sanja/OneDrive/Documents/ClientTCP.py =========

Enter file name:
========== RESTART: C:/Users/sanja/OneDrive/Documents/ClientTCP.py =========

Enter file name:ServerTCP.py

From Server:

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()
```

```
The server is ready to receive
The server is ready to receive
The server is ready to receive

========== RESTART: C:/Users/sanja/OneDrive/Documents/ServerTCP.py =======

The server is ready to receive

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

EXPERIMENT-16

Q) 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



LAB-16

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

Client UDP.py

```
from socket import *
ServerName = "127.0.0.1"
ServerPort = 12000
ClientSocket = socket(AF_INET, SOCK_DGRAM)
sentence = input("Enter file name:")

ClientSocket.sendto(bytes(Sentence,"utf-8"),
        (ServerName,ServerPort))
fileContents, ServerAddress = clientSocket.
                    recvfrom(2048)
print("In Reply from server:")
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(
sentence = sentence = decode("utf-8")
file = open(sentence, "r")
con=file.read(2048)
serverSocket.sendto(bytes(con, "utf-8"),
    clientAddress.
print("\n Send Contents of ", end="")
print(sentence)
```

Output

ServerUDP.py

The server is ready to receive

Client-UDP.py
Enter file name : Server.py
Reply from server
contents of Server.py

NP
1/9/2023

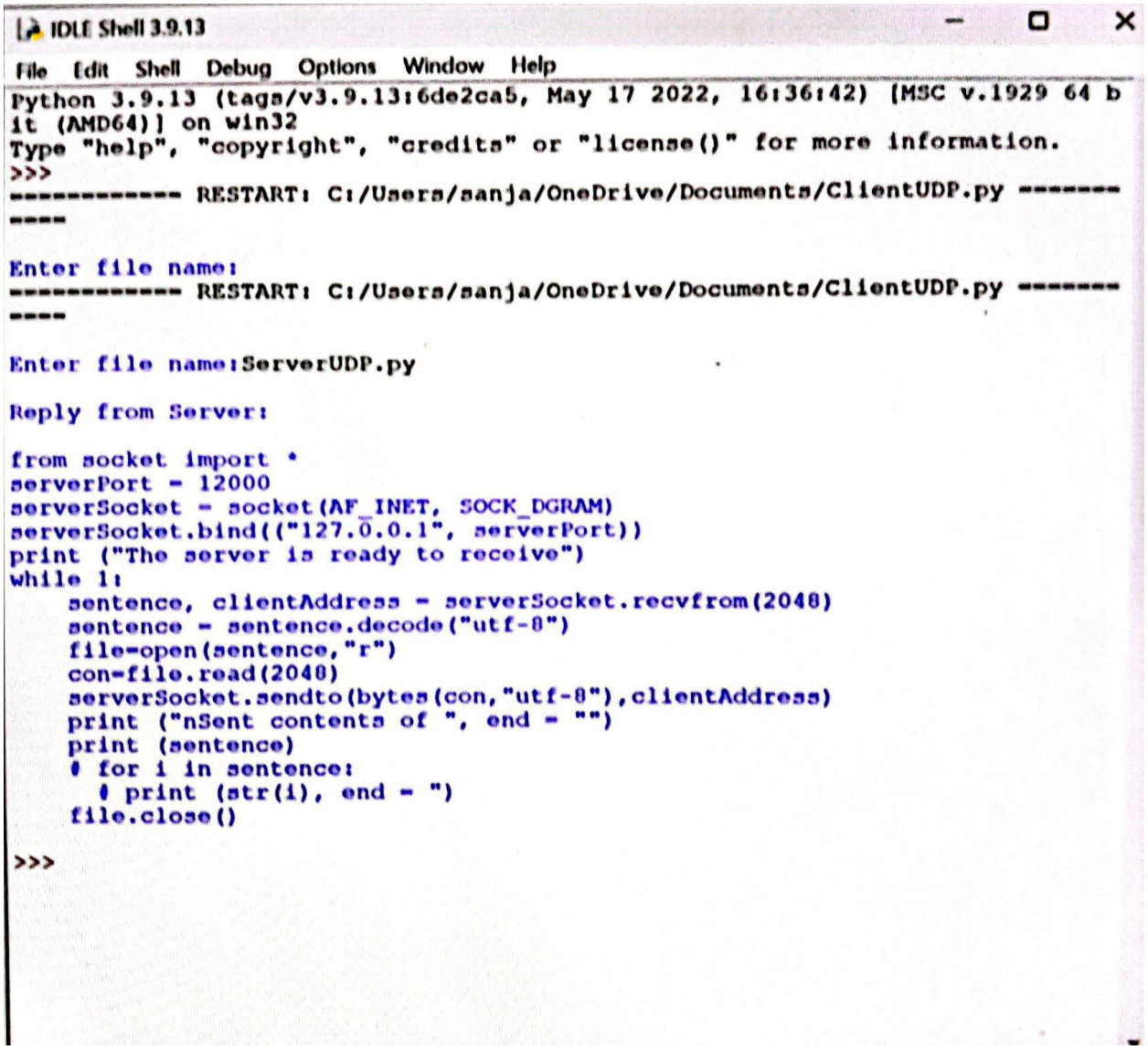
CODE-

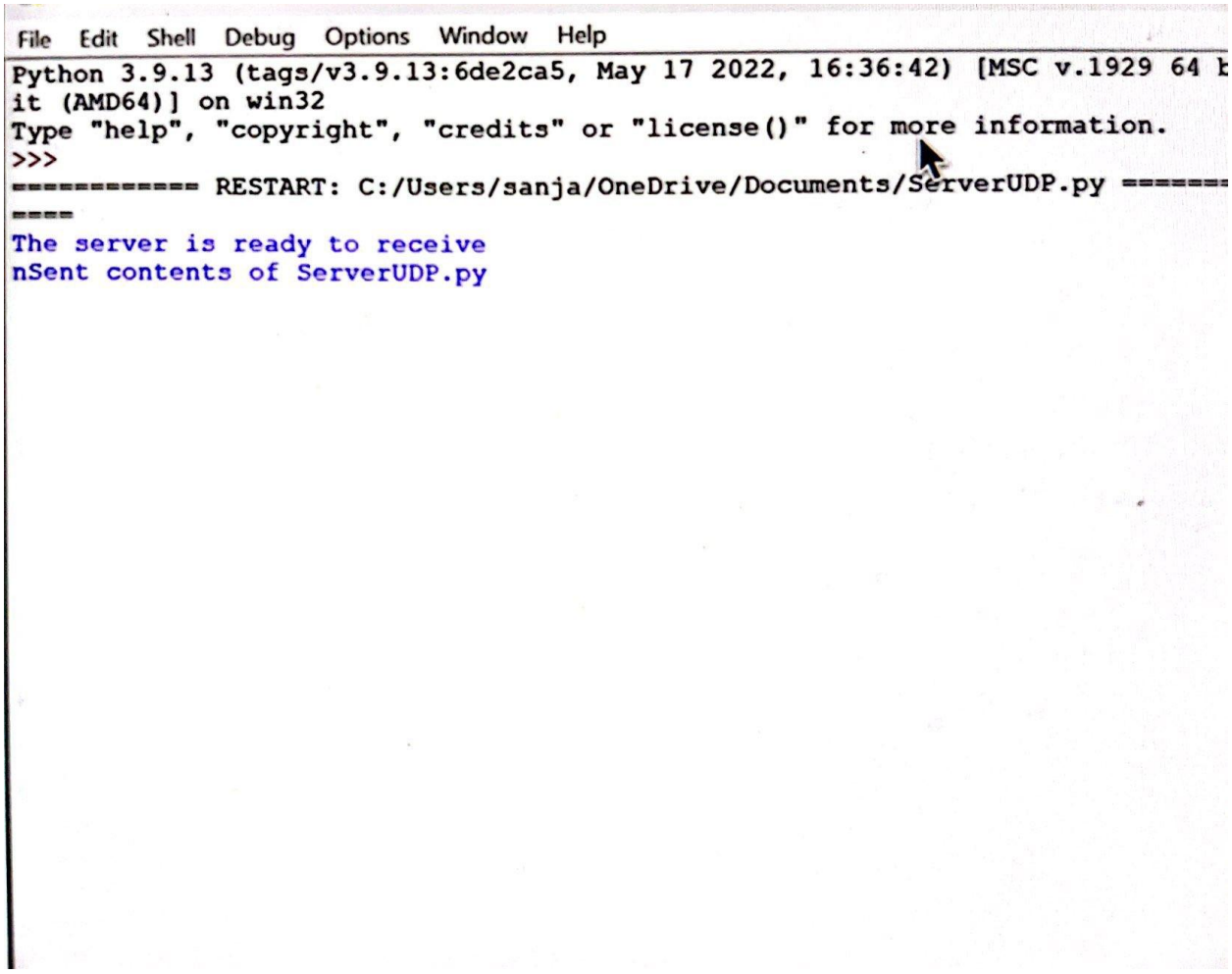
ClientUDP.py

```
from socket import * serverName = "127.0.0.1"

72

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

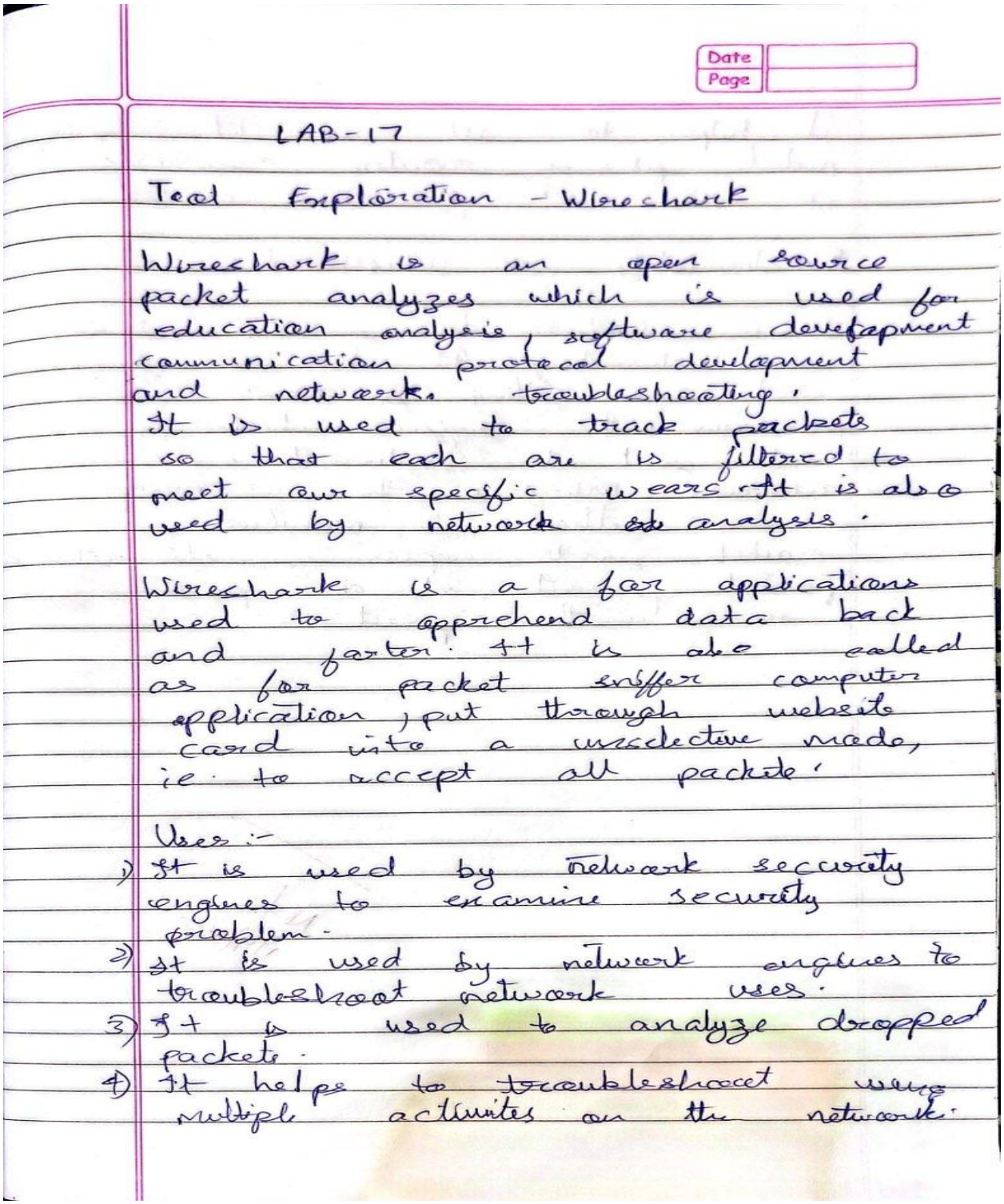
```
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM) serverSocket.bind(("127.0.0.1", serverPort))
print ("The server is ready to receive")
while 1:

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()
```


IDLE Shell 3.9.13
File Edit Shell Debug Options Window Help
Python 3.9.13 (tags/v3.9.13:6de2ca5, May 17 2022, 16:36:42) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:/Users/sanja/OneDrive/Documents/ClientUDP.py ==========
Enter file name:
========== RESTART: C:/Users/sanja/OneDrive/Documents/ClientUDP.py ==========
Enter file name:ServerUDP.py
Reply from Server:
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort))
print ("The server is ready to receive")
while 1:
sentence, clientAddress = serverSocket.recvfrom(2048)
sentence = sentence.decode("utf-8")
file=open(sentence,"r")
con=file.read(2048)
serverSocket.sendto(bytes(con,"utf-8"),clientAddress)
print ("nSent contents of ", end = "")
print (sentence)
# for i in sentence:
# print (str(i), end = ")
file.close()
>>>


File Edit Shell Debug Options Window Help
Python 3.9.13 (tags/v3.9.13:6de2ca5, May 17 2022, 16:36:42) [MSC v.1929 64 b
it (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:/Users/sanja/OneDrive/Documents/ServerUDP.py =======
====
The server is ready to receive
nSent contents of ServerUDP.py

EXPERIMENT-17

Q) Tool Exploration -Wireshark



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Page

LAB-17

Tool Exploration - Wireshark

Wireshark is an open source packet analyzes which is used for education analysis, software development communication protocol development and network troubleshooting.
It is used to track packets so that each are is filtered to meet our specific wears. It is also used by network analysis.

Wireshark is a for applications used to apprehend data back and forter. It is also called as for packet sniffer computer application, put through website card into a usscdective mode, ie. to accept all packets.

Uses :-
1) It is used by network seccurity engines to examine seccurity problem.
2) It is used by network engines to troubleshoot network uses.
3) It is used to analyze dropped packets.
4) It helps to troubleshoot wang multipl activites on the network.

It helps to all on the laptop, mobile phones, router communicate in or the rest of the world.

Functionality of Wireshark

It is similar to a TCP developer in networking. It has a graphical end and setting functions. It also monitors the traffic which is not sent to networks. MAC address interface the narrowing is a method to monitor. switch sends copies of all network packets present at one port to another port.

11/9/2023