VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

COMPUTER NETWORKS

Submitted by

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

B.M.S. COLLEGE OF ENGINEERING
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BENGALURU-560019
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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 "LAB COURSE **COMPUTER NETWORKS**" carried out by **AVANI KAMATH(1BM21CS036),** 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.

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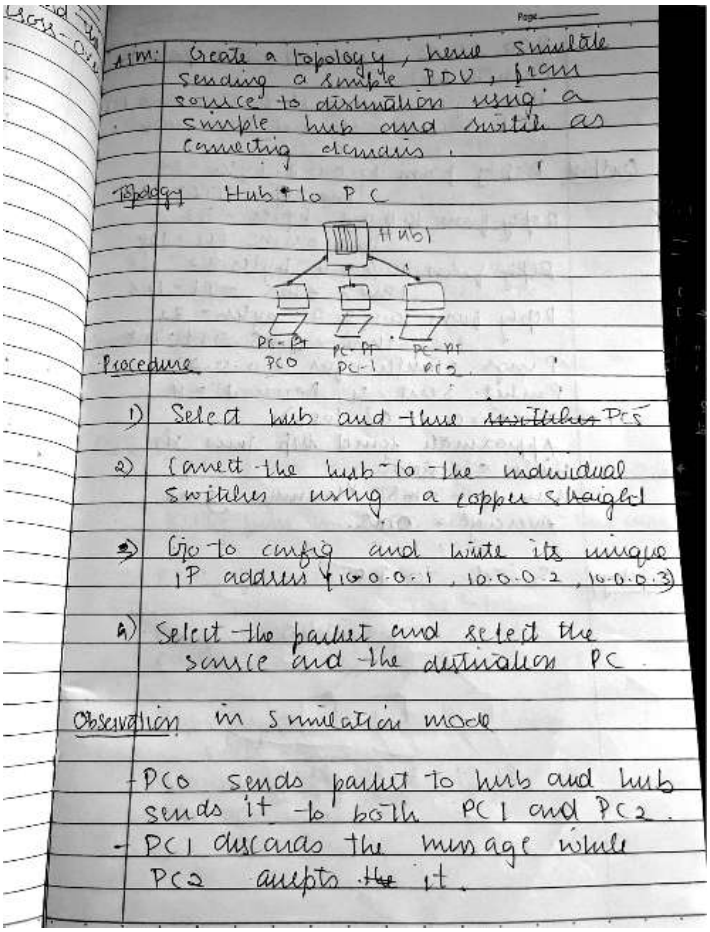
Experiment No 1

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

Observation:



Aim: Create a topology, hence simulate sending a simple PDU, from source to destination using a simple hub and switch as connecting devices.

Topology Hub to PC

Procedure

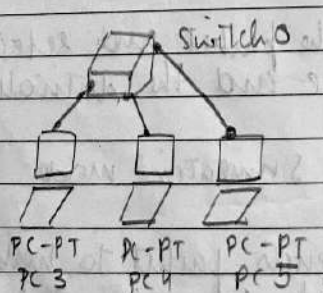
1) Select hub and three ~~switches~~ PCs
2) Connect the hub to the individual switches using a copper straight
3) Go to config and write its unique IP address (10.0.0.1, 10.0.0.2, 10.0.0.3)
4) Select the packet and select the source and the destination PC.

Observation in simulation mode

- PC0 sends packet to hub and hub sends it to both PC1 and PC2.
- PC1 discards the message while PC2 accepts ~~the~~ it.

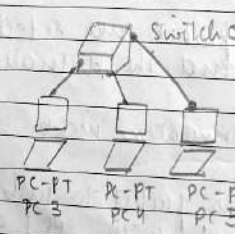
Output: Reply from 10.0.0.2: bytes = 32
time = 0ms TTL = 128
Reply from 10.0.0.2: bytes = 32
time = 0 ms TTL = 128
Reply from 10.0.0.2: bytes = 32
time = 3 ms TTL = 128
Reply from 10.0.0.2: bytes = 32
time = 0 ms TTL = 128
Pings statistics for 10.0.0.2:
Packet: Sent = 4, Received = 4,
lost = 0 (0% loss),
Approximate round trip times in
milli seconds:
minimum = 0 ms, Maximum = 3 ms,
Average = 0 ms.

Switch to PC.



lost = 0 (0% loss))
Approximate round trip time in milli seconds:
Minimum = 0ms, Maximum = 3
Average = 0ms.

Topology Switch to PC.



Date: / /
Page:

Procedure:
1) Select a switch and 3 PCs
2) Connect the switch to the individual PCs using a copper straight.
3) Select config and give the unique IP address (10.0.0.45, 10.0.0.5, 10.0.0.
4) Select the ~~Ruponet~~ and select the source and the destination PC.

~~Observation in simulation mode~~

- ~~PC 3 sends packet~~

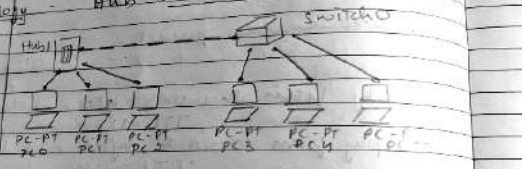
Output
Reply from 10.0.0.5: bytes = 32 time = 0m
TTL = 128
Reply from 10.0.0.5: bytes = 32 time = 0m
TTL = 128
Reply from 10.0.0.5: bytes = 32 time = 3
TTL = 128
Ping statistics for 10.0.0.5:
Packets: Sent = 4, Received = 4, Lost = 0
(0% loss),
Approximate round trip time in milli-seconds:
Minimum = 0ms, Maximum = 3ms,
Average = 0ms.

Observation in simulation

- PC 3 sends packet to switch and it sends to both PC 4 to PC 5 in first round.
- PC 4 reject PC 5 accepts and sends acknowledgement packet to PC 3 & PC 4 discards it. PC 3 accepts PC 4 discards it.

Now when PC 3 sends packet it sends only to PC 5.

Topology - Hub & switch and PC



Procedure

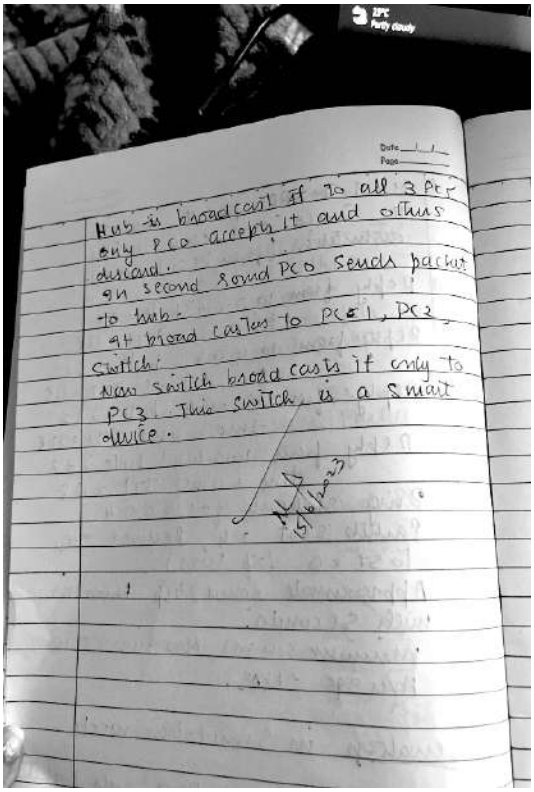
1) Connect the hub and the switch using a copper cross-over.
2) Connect the 3 PC each to hub and switch and give IP address (10.0.0.1, 10.0.0.2 ... 10.0.0.5)
3) Select a source PC from the one that is connected to the hub. Select a destination PC that is connected to the switch.

2) Select PDU packet and click the source and click on the destination. (from PC0 To PC4).

Output: Reply from 10.0.0.4: byte = 32 time = 0ms TTL = 128
Reply from 10.0.0.4: byte = 32 time = 0 ms TTL = 128
Reply from 10.0.0.4: byte = 32 time = 4ms TTL = 128
Reply from 10.0.0.4: byte = 32 time = 0ms TTL = 128
Ping statistics for 10.0.0.4:
Packets sent = 4, Received = 4, lost = 0 (0% loss),
Approximate round trip times in milli seconds:
Minimum = 0 ms, Maximum = 4 ms, Average = 1ms.

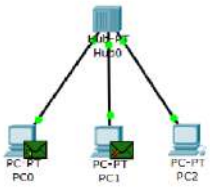
Observation in Simulation mode.

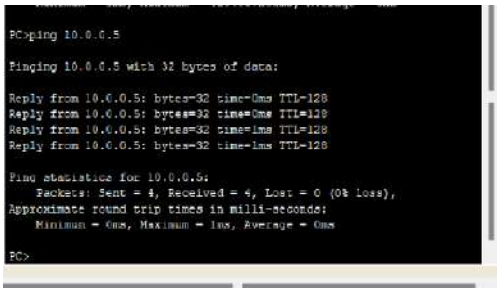
In simulation mode PC 0 sends packet to hub. Hub sends it to PC1, PC2 and switch.
Switch broadcasts it to PC3, PC4, PC5.
PC1, PC2, PC4 and PC5 discards them.
PC3 accepts and sends acknowledgement to the hub through switch.



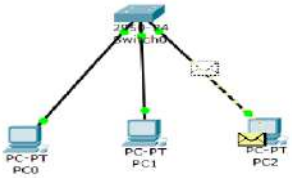
Hub is broadcast it to all 3 PCs
only PC0 accept it and others
discard.
In second round PC0 sends packet
to hub.
It broadcasts to PC1, PC2,
switch.
Now switch broadcasts it only to
PC3. This switch is a smart
device.

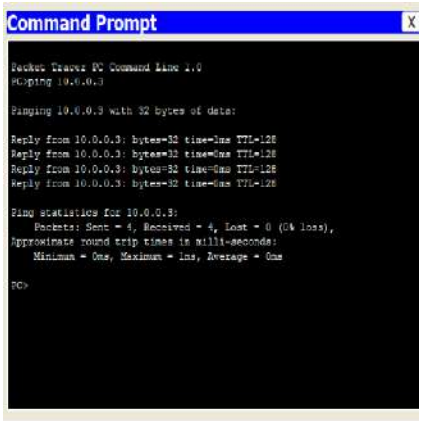
Output:
hub and pc



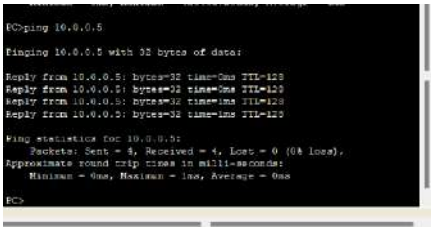


switch and pc





hub,switch and pc

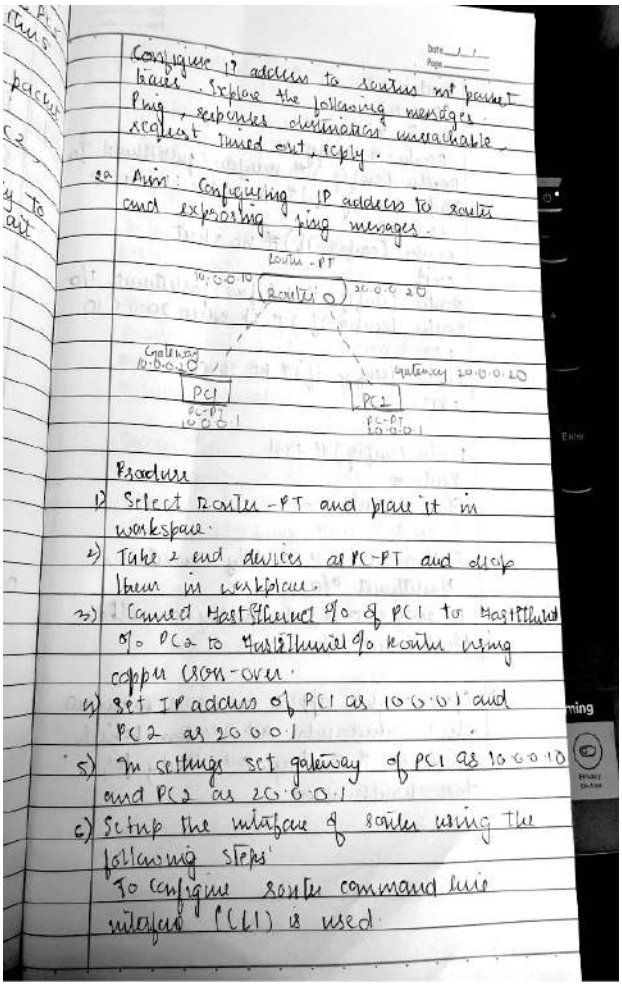


```
PC>ping 10.0.0.5

Pinging 10.0.0.5 with 32 bytes of data:

Reply from 10.0.0.5: bytes=32 time=0ms TTL=128
Reply from 10.0.0.5: bytes=32 time=0ms TTL=128
Reply from 10.0.0.5: bytes=32 time=1ms TTL=128
Reply from 10.0.0.5: bytes=32 time=1ms TTL=128

Ping statistics for 10.0.0.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>
```

EXPERIMENT 2

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

Observation:



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

2a Aim: Configuring IP address to router and exposing ping messages.

Router-PT

10.0.0.10 (Router 0) 20.0.0.20

Gateway 10.0.0.10 — PC1 — PC-PT 10.0.0.1

Gateway 20.0.0.20 — PC2 — PC-PT 20.0.0.1

Procedure

1) Select Router-PT and place it in workspace.
2) Take 2 end devices as PC-PT and drop them in workspace.
3) Connect FastEthernet 0/0 of PC1 to FastEthernet 0/0 PC2 to FastEthernet 0/0 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 10.0.0.10 and PC2 as 20.0.0.1
6) Setup the interface of router using the following steps:
To configure router command line interface (CLI) is used.

Router CLI
(Pun N)
Router > enable
Router # config t
Router (config) # interface fastEthernet 1/0
Router (config-if) # ip address 10.0.0.10
255.0.0.0
Router (config-if) # no shut
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
exit

Router (config) # exit
Router #
Show ip route

C 10.0.0.0/8 is directly connected,
FastEthernet 0/0
C 20.0.0.0/8 is directly connected,
FastEthernet 1/0

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

Ping output in 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 = 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

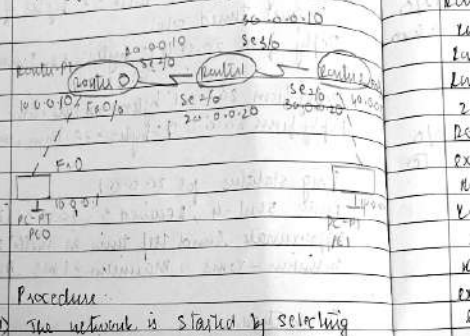
Ping statistics for 20.0.0.1
Packets: sent = 4, Received 3: loss = 1 (75% loss),
Approximate round trip times in milli seconds
Minimum = 0ms, Maximum = 1ms, Average

Observation
On pinging in PC0 for the first time there is a 25% loss.
From next ping there are no losses.

13/7/2023

2b) Aim: configure using 3 router and 2 PC

Topology:



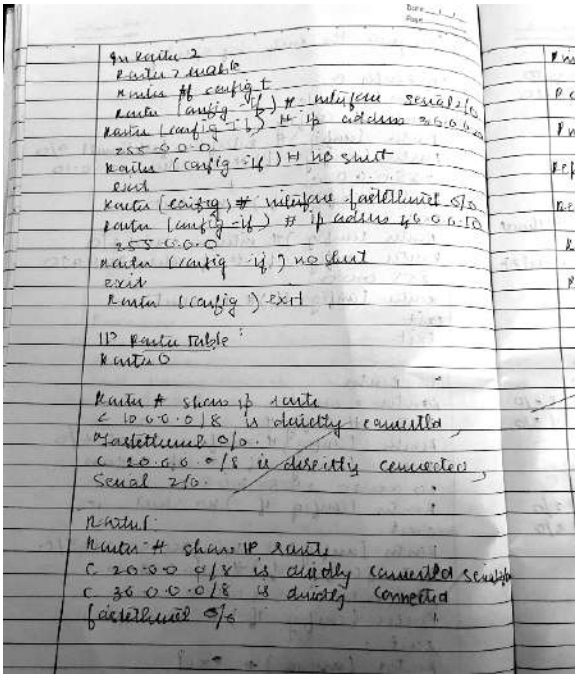
Procedure:

1) The network is started by selecting end devices PC0 to PC1 i.e generic PCs and placing them in work space.
2) Select 3 Router-PT and place them as Router 0, Router 1 and Router 2 in 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 10.0.0.1 PC1 to 10.0.0.1. Set gateway of PC0 as 10.0.0.20 PC1 as 20.0.0.10

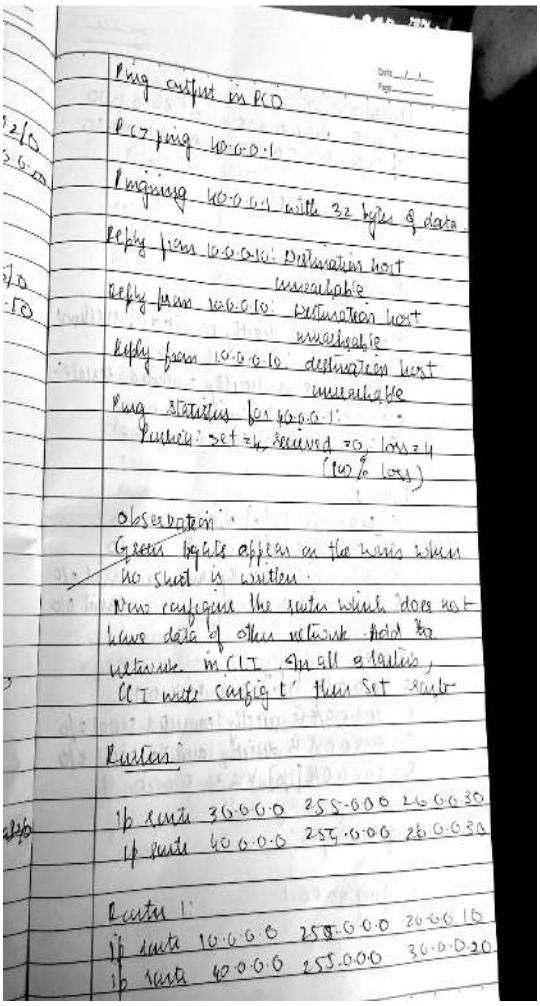
Configure the router by opening CLI

On 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)# interface serial 2/0
Router (config-if)# ip address 20.0.0.10
255.0.0.0
Router (config-if)# no shut
exit
exit

On Router 2
Router > enable
Router # config t
Router (config)# interface serial 2/0
Router (config-if)# ip address
20.0.0.20 255.0.0.0
Router (config-if) no shut
exit
Router (config)# interface serial 3/0
Router (config-if)# ip address
30.0.0.20 255.0.0.0
Router (config-if)# no shut
exit
Router (config)# exit



```
In router 2
Router > enable
Router # config t
Router (config)# interface serial 2/0
Router (config-if)# ip address 20.0.0.0
255.0.0.0
Router (config-if)# no shut
exit
Router (config)# interface fastethernet 0/0
Router (config-if)# ip address 40.0.0.10
255.0.0.0
Router (config-if) no shut
exit
Router (config) exit

IP Route Table:
Router 0

Router # 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 2/0.

Router 1:
Router # show IP route
C 20.0.0.0/8 is directly connected serial
C 30.0.0.0/8 is directly connected
fastethernet 0/0
```



```
Ping output in PC0
PC7 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
Ping statistics for 40.0.0.1:
Packets: sent = 4, received = 0, loss = 4
                (100% loss)

Observation:
Green lights appear on the hosts when
no shut is written.
Now configure the router which does not
have data of other network. Add the
network in CLI. In all 3 routers,
'CLI router config t' then set route

Routes:

ip route 30.0.0.0 255.0.0.0 20.0.0.30
ip route 40.0.0.0 255.0.0.0 20.0.0.30

Route 1:
ip route 10.0.0.0 255.0.0.0 20.0.0.10
ip route 40.0.0.0 255.0.0.0 30.0.0.20
```

Router 2:
ip route 10.0.0.0 255.0.0.0 30.0.0.10
ip route 20.0.0.0 255.0.0.0 30.0.0.10

show ip route table
exit

Router 0

C 10.0.0.0/8 is directly connected, Serial 0/0
C 20.0.0.0/8 is directly connected, Serial
S 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 2/0
C 40.0.0.0/8 is directly connected serial 3/0

Router 1:
S 10.0.0.0/8 [1/0] via 20.0.0.10
C 20.0.0.0/8 is directly connected serial 2/0
C 30.0.0.0/8 is directly connected serial 3/0
S 40.0.0.0/8 [1/0] via 30.0.0.20

Ping messages

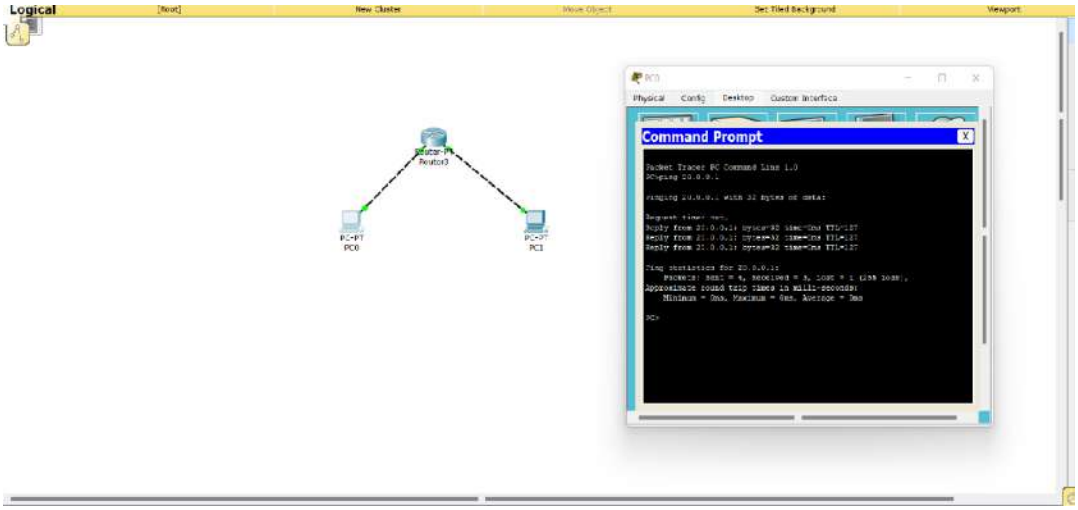
PC7 ping 40.0.0.1

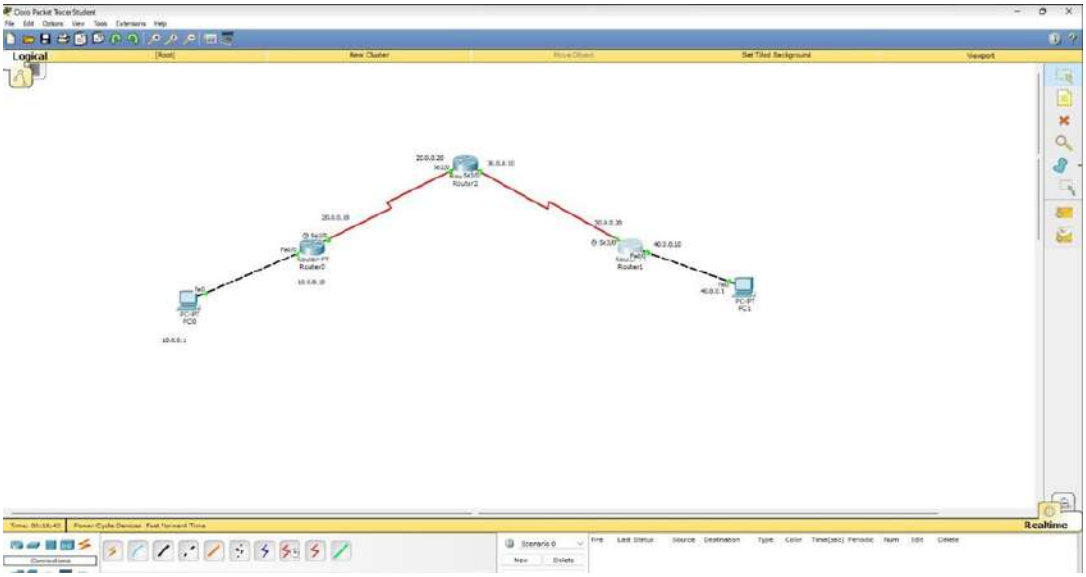
pinging 40.0.0.1 with 32 bytes of data.
Request timed out
Reply from 40.0.0.1: bytes = 32 time = 2ms
TTL = 125
Reply from 40.0.0.1: bytes = 32 time = 2ms
TTL = 125
Reply from 40.0.0.1: bytes = 32 time = 2ms
TTL = 125

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 = 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 got stuck or lost.
After this if route is explicitly
Now pinging there is 25% loss in first time, the following ones has no loss.

Output

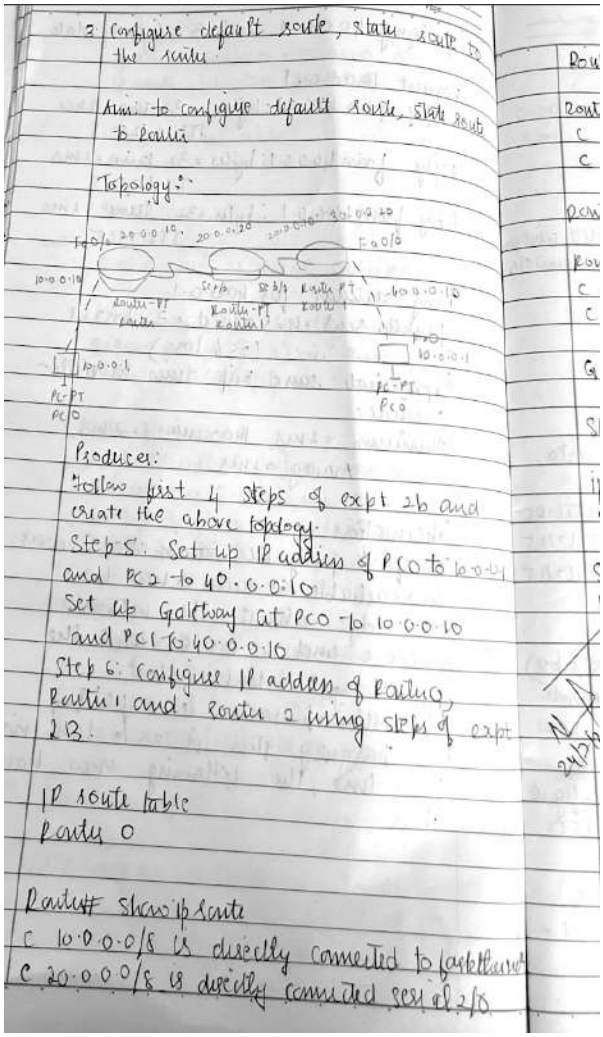




EXPERIMENT 3

Configure default route, static route to the Router

Observation



2 Configure default route, static route to the router

Aim: to configure default route, static route to router

Topology:

Procedure:

Follow first 4 steps of expt 2b and create the above topology.

Step 5. Set up IP address of PC0 to 10.0.0.1 and PC2 to 40.0.0.10

Set up Gateway at PC0 to 10.0.0.10 and PC1 to 40.0.0.10

Step 6: Configure IP address of Router0, Router1 and Router2 using steps of expt 2B.

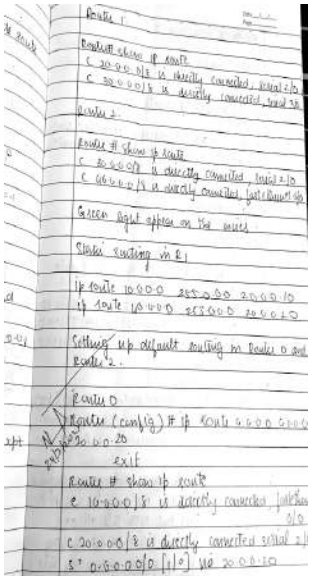
IP route table

Router 0

Router# show ip route

C 10.0.0.0/8 is directly connected to fastethernet

C 20.0.0.0/8 is directly connected serial 2/0



Router 1

Router# show ip route
C 30.0.0.0/8 is directly connected, serial 2/0
C 20.0.0.0/8 is directly connected, serial 2/0

Router 2

Router # show ip route
C 20.0.0.0/8 is directly connected, serial 2/0
C 40.0.0.0/8 is directly connected, fast ethernet 0/0

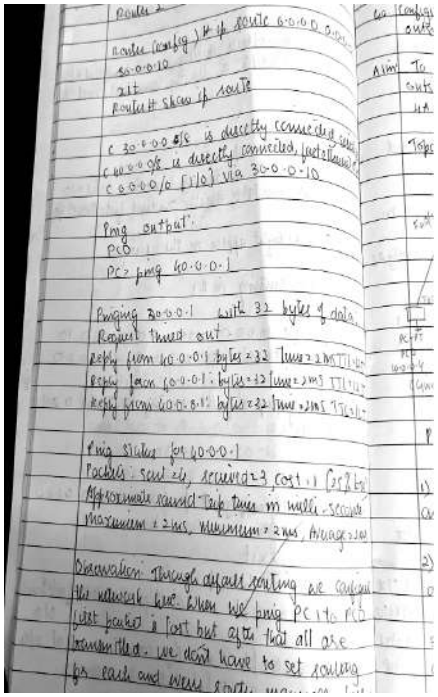
Green light appears on the cables

Static routing in R1

ip route 10.0.0.0 255.0.0.0 20.0.0.10
ip route 10.0.0.0 255.0.0.0 20.0.0.20

Setting up default routing on Router 0 and Router 2.

Router 0
Router (config) # ip route 0.0.0.0 0.0.0.0 30.0.0.20
exit
Router # show ip route
C 10.0.0.0/8 is directly connected, fastethernet 0/0
C 30.0.0.0/8 is directly connected serial 2/0
S* 0.0.0.0/0 [1/0] via 30.0.0.20



Router 2

Router (config) # ip route 0.0.0.0 0.0.0.0 30.0.0.10
exit
Router # show ip route

C 30.0.0.0/8 is directly connected serial 2/0
C 40.0.0.0/8 is directly connected, fast ethernet 0/0
C 0.0.0.0/0 [1/0] via 30.0.0.10

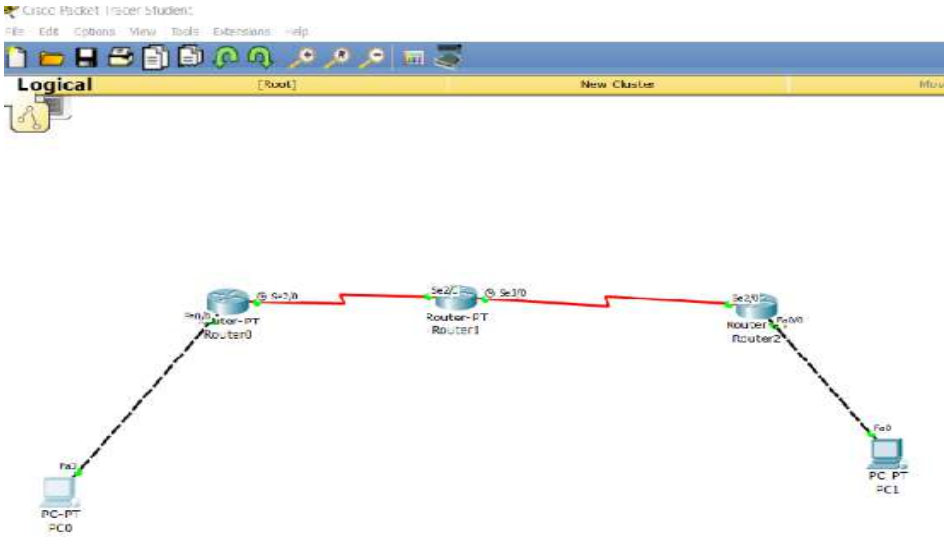
Ping output:
PC0
PC> ping 40.0.0.1

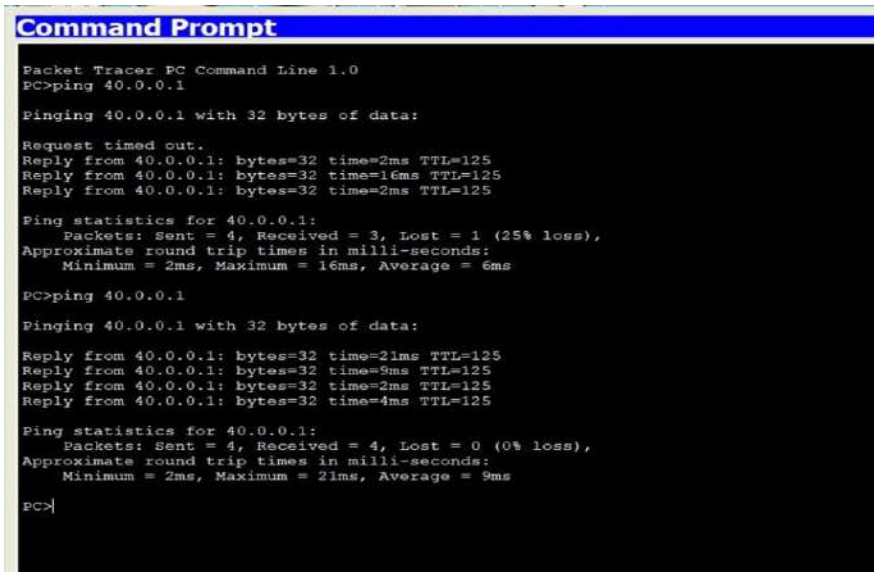
Pinging 30.0.0.1 with 32 bytes of data:
Request timed out
Reply from 40.0.0.1: bytes=32 time=2ms TTL=126
Reply from 40.0.0.1: bytes=32 time=2ms TTL=126
Reply from 40.0.0.1: bytes=32 time=2ms TTL=126

Ping Status for 40.0.0.1
Packets: sent=4, received=3, lost=1 (25% loss)
Approximate round trip times in milli-seconds:
Maximum = 2ms, Minimum = 2ms, Average = 2ms

Observation: Through default routing we configure the network here. When we ping PC1 to PC3 first packet is lost but after that all are transmitted. We don't have to set routing for each and every router manually

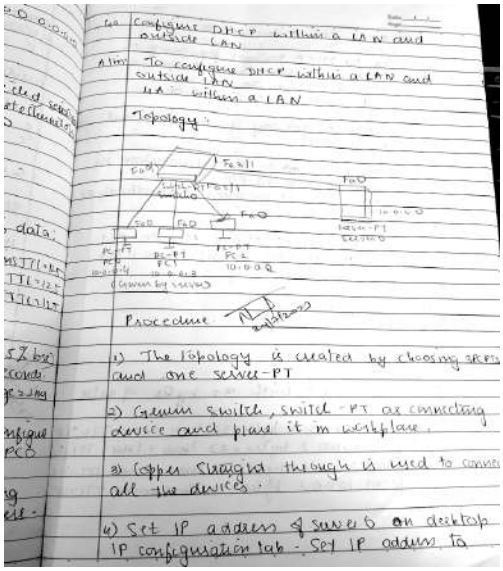
Output


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Router-PT
Router0
Router-PT
Router1
Router-PT
Router2
PC-PT
PC0
PC-PT
PC1


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>

EXPERIMENT 4

Configure DHCP within a LAN and outside LAN.



Configure DHCP within a LAN and outside LAN

Aim: To configure DHCP within a LAN and outside LAN
WA within a LAN

Topology:

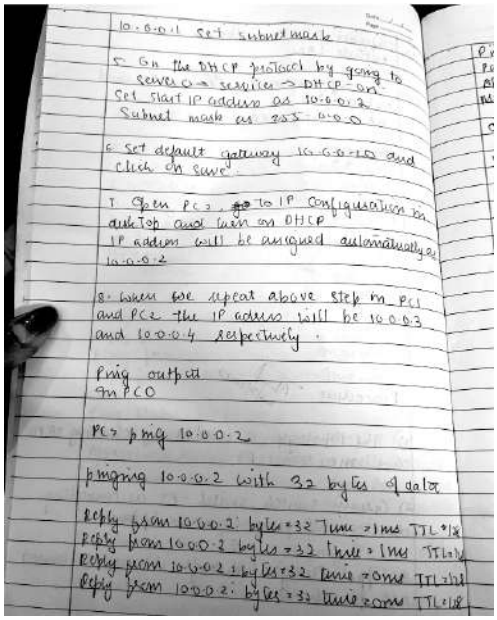
Procedure

1) The topology is created by choosing 3 PCs and one server-PT

2) Genuin switch, switch-PT as connecting device and place it in workplace.

3) Copper straight through is used to connect all the devices.

4) Set IP address of server 0 on desktop IP configuration tab. Set IP addrss to



10.0.0.1 set subnet mask

5. Go the DHCP protocol by going to server 0 → services → DHCP - on. Set start IP address as 10.0.0.2. Subnet mask as 255.0.0.0

6. Set default gateway 10.0.0.10 and click on save.

7. Open PC2, go to IP configuration in desktop and turn on DHCP. IP address will be assigned automatically as 10.0.0.2

8. When we repeat above step in PC1 and PC2 the IP address will be 10.0.0.3 and 10.0.0.4 respectively.

Ping output
on PC0

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=1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=0ms TTL=128
Reply from 10.0.0.2: bytes=32 time=0ms TTL=128

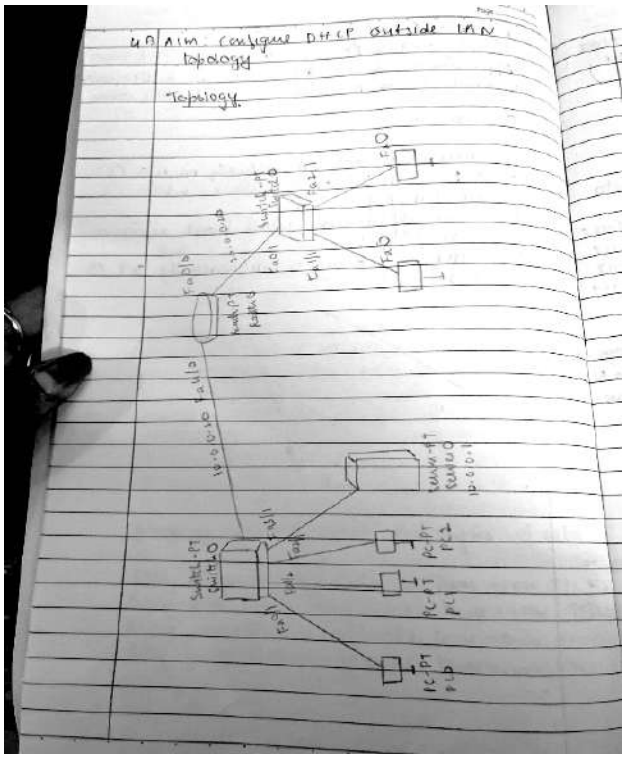
Ping statistics for 10.0.0.2:
Packets sent: 4 Received = 4, Lost = 0 (0% loss)
Approximate round trip times in milliseconds
minimum = 0ms Maximum = 1ms Average = 0ms

Observation

IP address are set automatically in PC0, PC1 and PC2 in the LAN network when we enable DHCP protocol.
This has application when large networks have 100s of PCs.
For all PCs gateway is automatically set to 10.0.0.20

4.) Aim: Configure DHCP outside LAN topology

Topology



Procedure:

1. To the topology created in 4A, connect a Generic Router (Router 0) using copper straight through wire.

2. Through Switch-PT switch 1 connect 2 PCs. PC3 and PC4 and connect switch 1 to Router 0.

3. In Router 0, set IP address using steps in previous experiments. Set IP address Fa 4/0 to 10.0.0.20 and Fa 0/0 to 20.0.0.20

4. In Router 0,
interface fastethernet 0/0
Router (config-if) # ip helper-address 10.0.0.1
Router (config-if) # no shut

5. In Server 0,
goto config > settings > Gateway
and set Gateway to 10.0.0.20

6. Set services to DHCP
poolName to serverPool1
Set default Gateway to 20.0.0.20
Start IP address to 20.0.0.2
Subnet mask to 255.0.0.0

Add it

7. In Desktop mode of PC3 and PC4 select DHCP and they will automatically be assigned IP address as 20.0.0.2 and 20.0.0.3

Ping output
PC0
PC> ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data

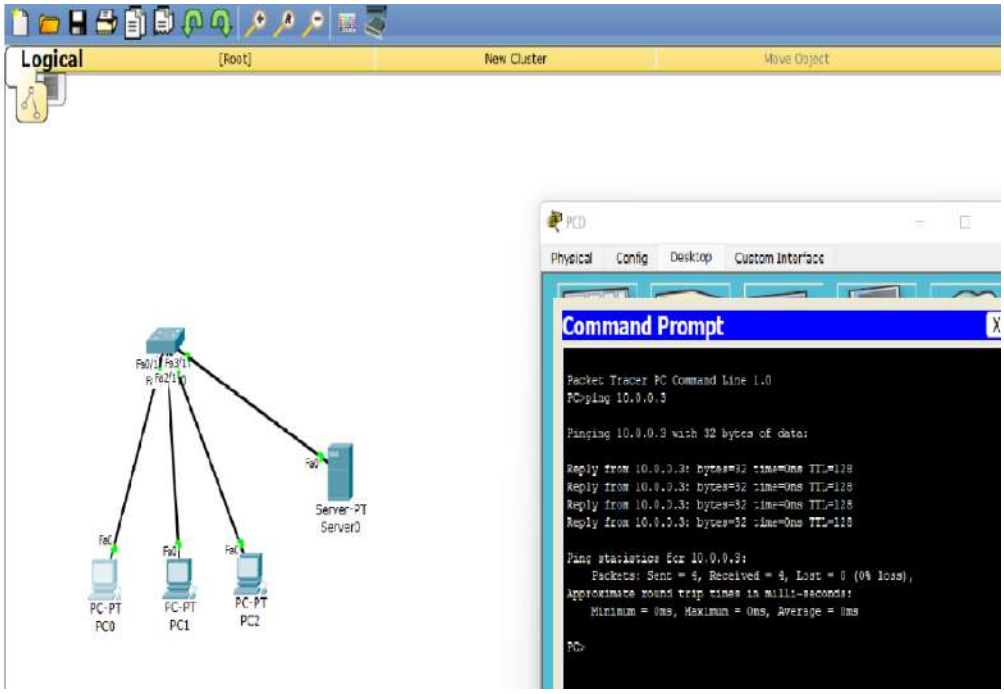
Reply from 20.0.0.2: bytes=32 time=1ms TTL=128
Reply from 20.0.0.2: bytes=32 time=0ms TTL=128
Reply from 20.0.0.2: bytes=32 time=0ms TTL=128
Reply from 20.0.0.2: bytes=32 time=0ms TTL=128

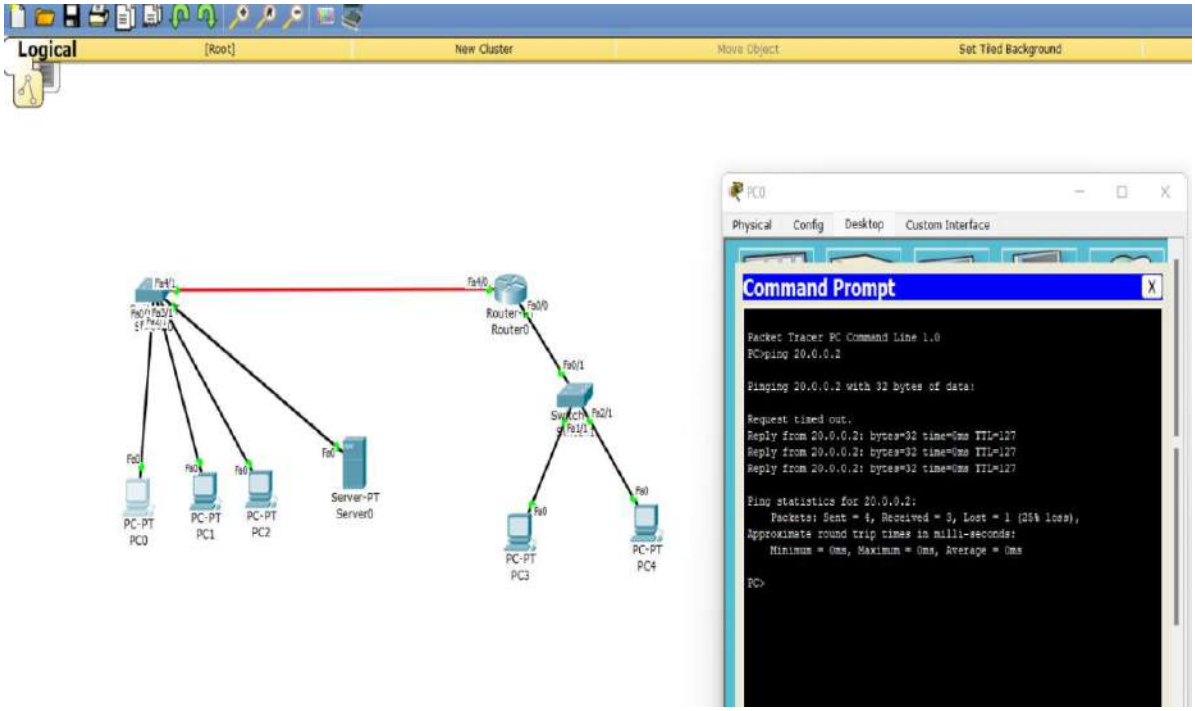
Pinging statistics for 20.0.0.2
Packets sent=4, Received=4, Lost=0 (0% loss)
Approximate round trip times in milli-seconds
Minimum=0ms maximum=1ms, Average=0ms

Observations
IP address of PC3 and PC4 are also automatically set by the server. IP address of PC3 to 20.0.0.2 and PC4 to 20.0.0.3
We could successfully ping PC3 from PC0 without any loss.

24/9/2022

Output

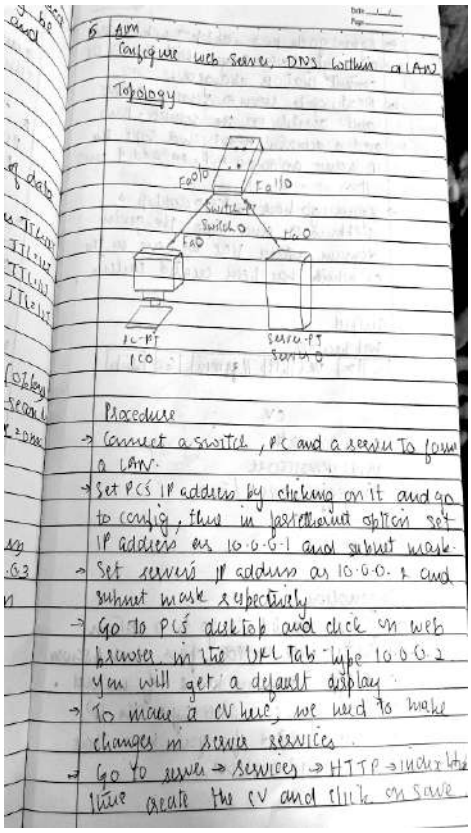

Logical
[Root]
New Cluster
Move Object
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>
Server-PT
Server0
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2

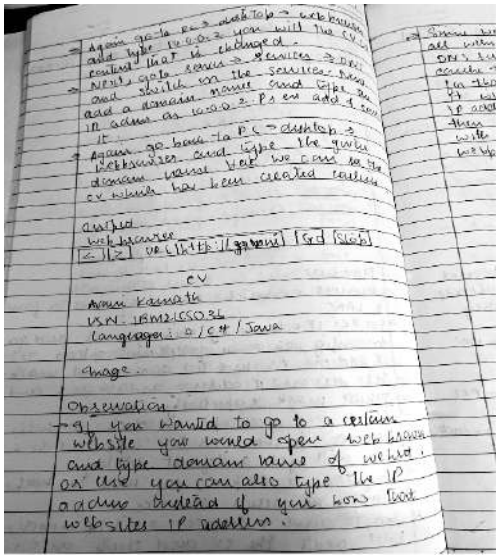

Logical
[Root]
New Cluster
Move Object
Set Tiled Background
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Request timed out.
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 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>
Router-PT
Router0
Server-PT
Server0
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
PC-PT
PC3
PC-PT
PC4

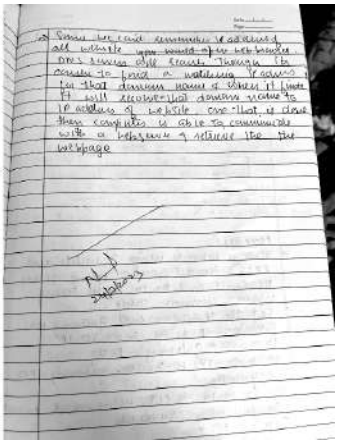
EXPERIMENT 5

Configure Web Server, DNS within a LAN

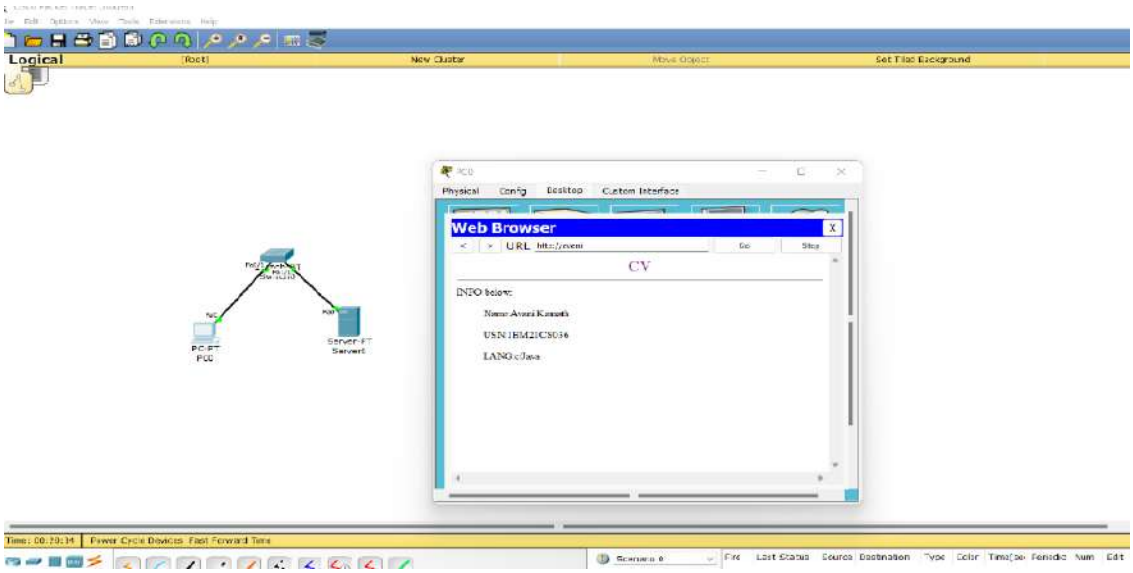
observation







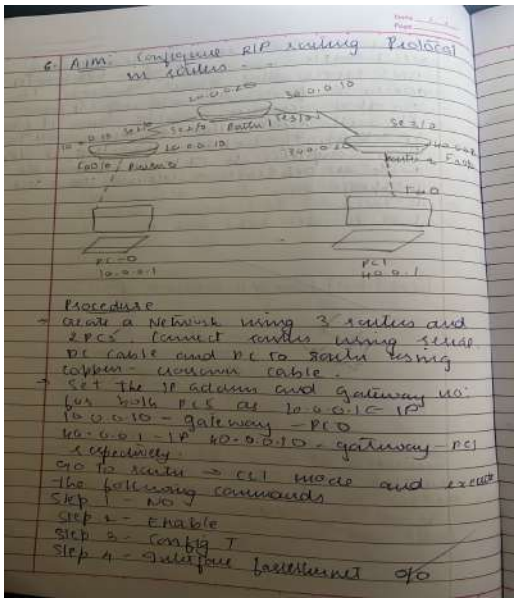
Output


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
PC0
Physical
Config
Desktop
Custom Interface
Web Browser
URL
CV
INFO below:
Name:Avani Kamath
USN:1BM21CS036
LANG:Java
PC-PT
PC0
Server-PT
Server0
Time: 00:20:14
Power Cycle Devices
Fast Forward Time

EXPERIMENT 6

Configure RIP routing Protocol in Routers

Observation



6. Aim: Configure RIP routing Protocol in routers.

Procedure

→ Create a Network using 3 routers and 2 PCs. Connect routers using serial DC cable and PC to router using copper - cross cable.

→ Set the IP address and gateway no: for both PCs as 10.0.0.10 - IP 10.0.0.10 - gateway - PC0 40.0.0.1 - IP 40.0.0.10 - gateway - PC1 respectively.

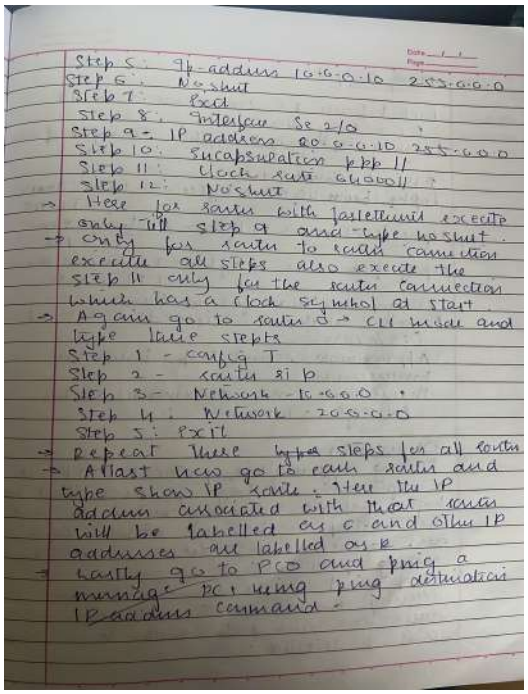
Go to router → CLI mode and execute the following commands

Step 1 - No

Step 2 - Enable

Step 3 - Config T

Step 4 - Interface fastethernet 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 20.0.0.10 255.0.0.0

Step 10: Encapsulation ppp

Step 11: Clock rate 64000

Step 12: No shut

→ Here for routers with fastethernet execute only till step 9 and type no shut.

→ 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.

→ Again go to router 0 → CLI mode and type these steps

Step 1 - Config T

Step 2 - router rip

Step 3 - Network 10.0.0.0

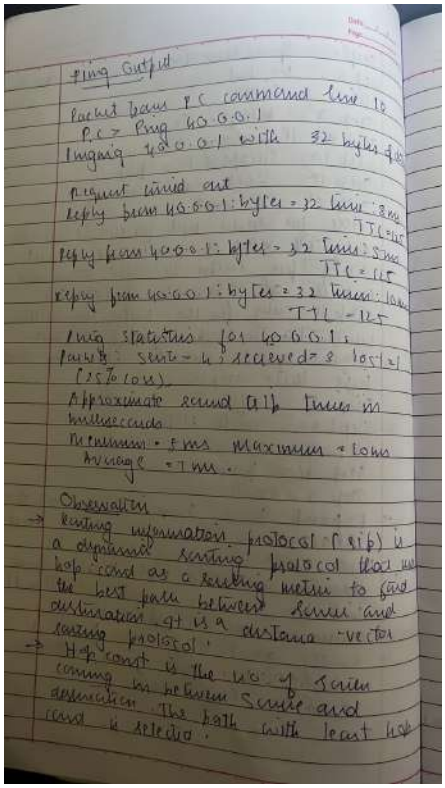
Step 4 - Network 20.0.0.0

Step 5: Exit

→ Repeat these steps for all routers

→ At last now go to each router and type show IP route. Here the IP address associated with that router will be labelled as C and other IP addresses are labelled as R.

→ Lastly go to PC0 and ping a message to PC1 using ping destination IP address command.

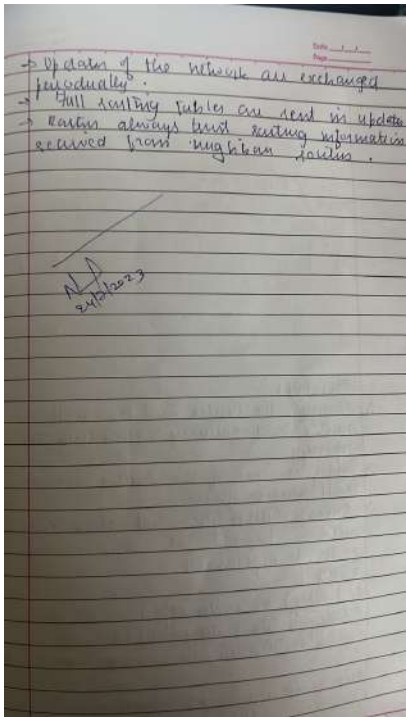


Ping Output

Packet been PC command line is
PC > Ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of

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: 1ms
TTL = 125
Ping statistics for 40.0.0.1:
Packets: sent = 4, received = 3 lost = 1
(25% loss)
Approximate round trip times in
milliseconds
Minimum = 1ms Maximum = 5ms
Average = 3ms.

Observation
→ Routing information protocol (RIP) 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.
→ Hop count is the no. of routers coming in between source and destination. The path with least hop count is selected.



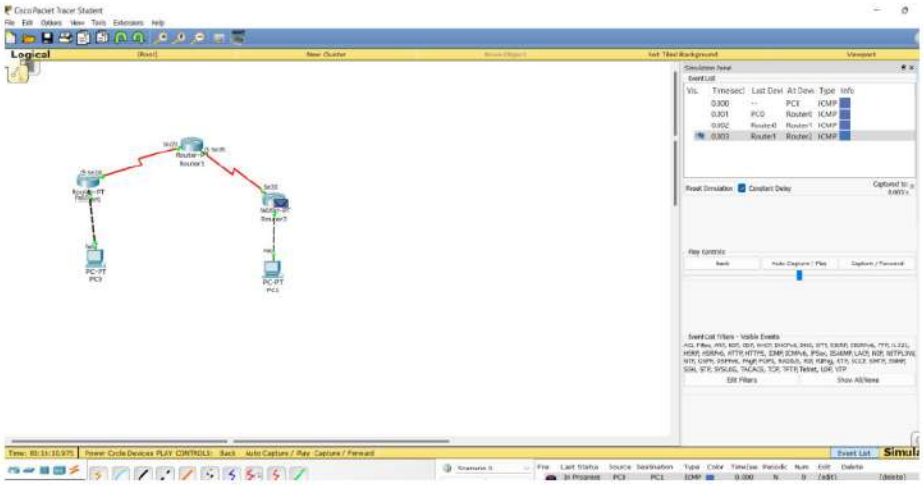
→ Updates of the network are exchanged periodically.
→ Full routing tables are sent in updates.
→ Routers always trust routing information received from neighbour routers.

24/5/2023

Output

Command Prompt

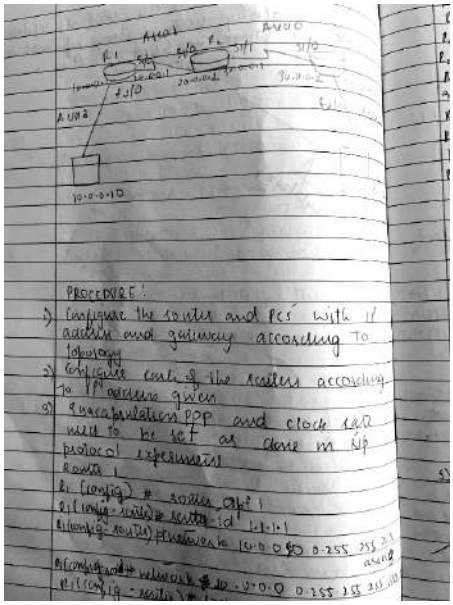
```
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 40.0.0.1: bytes=32 time=13ms TTL=125
Reply from 40.0.0.1: bytes=32 time=4ms TTL=125
Reply from 40.0.0.1: bytes=32 time=14ms 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 = 4ms, Maximum = 14ms, Average = 10ms

PC>
```

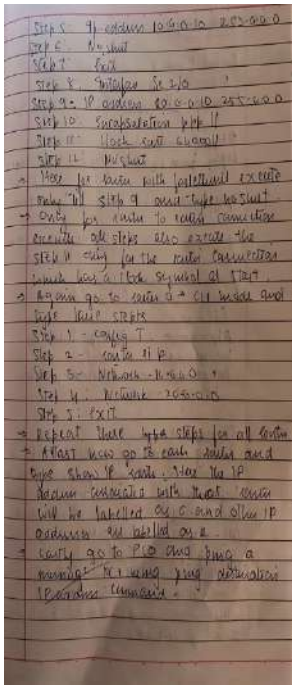


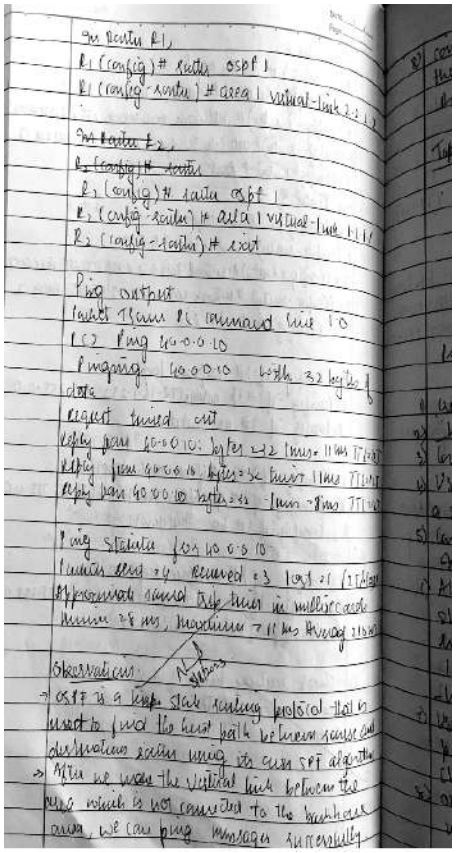
EXPERIMENT 7

Configure OSPF routing protocol

Observation







In router R1,
R1(config)# router ospf 1
R1(config-router)# area 1 virtual-link 2.2.2.2

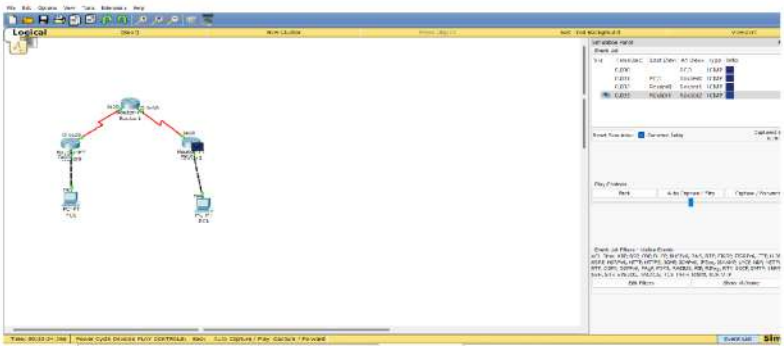
~~In router R2,~~
~~R2(config)# router~~
R2(config)# router ospf 1
R2(config-router)# area 1 virtual-link 1.1.1.1
R2(config-router)# exit

Ping output
Ctrl+Shift+Alt command line 10
C:\> 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=11ms TTL=127
Reply from 40.0.0.10: bytes=32 time=11ms TTL=127
Reply from 40.0.0.10: bytes=32 time=8ms TTL=127

Ping statistics for 40.0.0.10
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss)
Approximate round trip times in milliseconds:
Minimum = 8ms, Maximum = 11ms, Average = 10ms

Observation:
→ OSPF is a link state routing protocol that is used to find the best path between source and destination router using its own SPF algorithm.
→ After we make the virtual link between the area which is not connected to the backbone area, we can ping messages successfully.

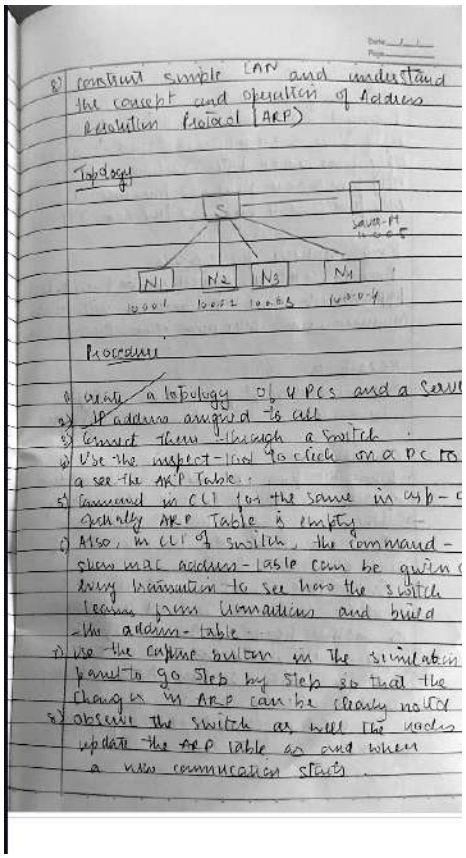
Output



EXPERIMENT 8

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

Observation



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

Topology

Procedure

1) create a topology of 4 PCs and a server
2) IP address assigned to all
3) Connect them through a switch.
4) Use the inspect-tool to click on a PC to see the ARP Table.
5) Command in CLI for the same in cyb-c
Initially ARP Table is empty
6) Also, in CLI of switch, the command - show MAC address-table can be given every transmission to see how the switch learns from transmission and build the address-table.
7) Use the capture button in the simulation panel to go step by step so that the changes in ARP can be clearly noted
8) observe the switch as well the nodes update the ARP table as and when a 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 trip times in milliseconds:

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

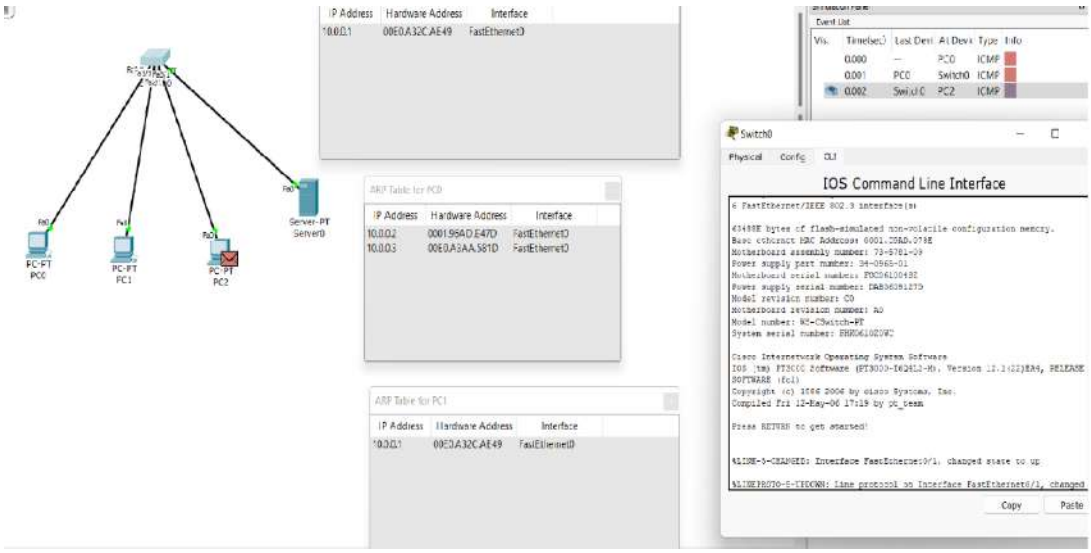
PC>arp -a

Internet address	physical address	Type
10.0.0.4	0060.2f00.32ed	dynamic

Observation

- When we ping PC and Server the address of server is known to PC & vice versa.
- When we ping between other two PCs simultaneously the addresses of each other are known.
- Every time a host request a MAC address in order to send a packet to another host in the LAN, it checks its ARP cache set if the IP to MAC address translation address already exists. If the translation doesn't exist perform ARP

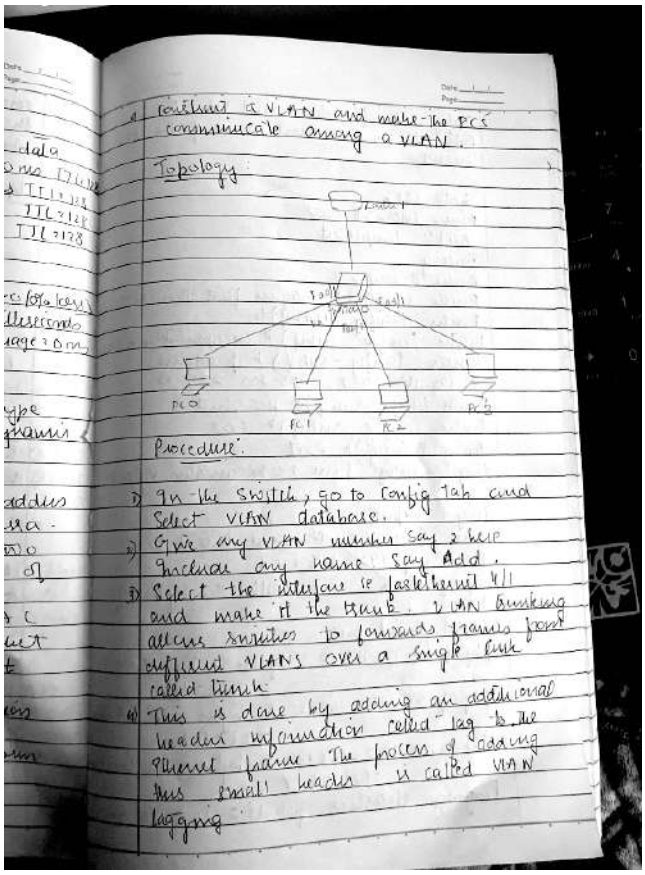
Output



EXPERIMENT 9

To construct a VLAN and make a pc communicate among VLAN

Observation

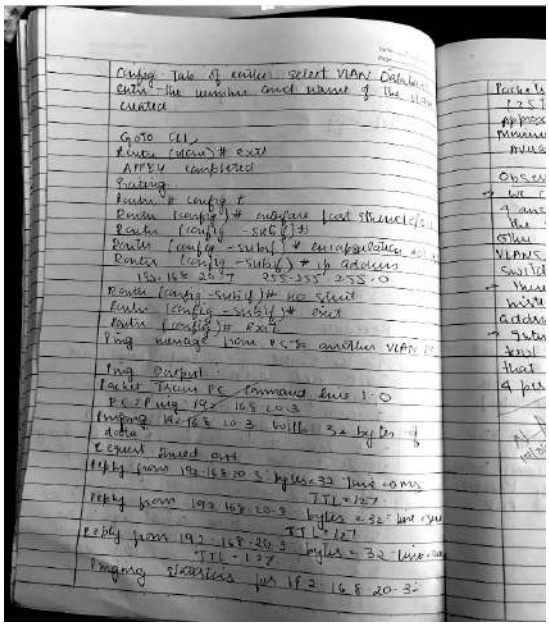


Construct a VLAN and make the PCs communicate among a VLAN.

Topology:

Procedure:

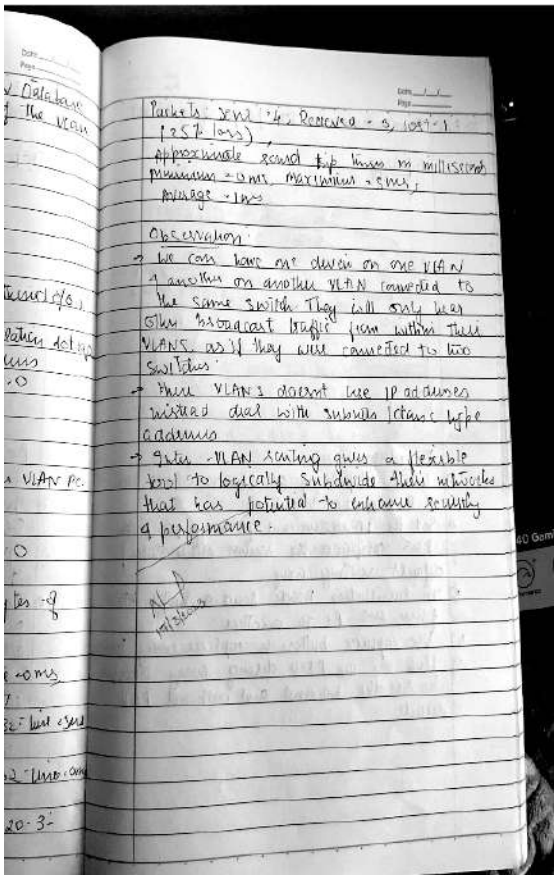
1) In the Switch, go to Config Tab and Select VLAN database.
2) Give any VLAN number say 2 here
Increase any name say Add.
3) Select the interface to fastEthernet 4/1 and make it the trunk. VLAN trunking allows switches to forward frames from different VLANs over a single link called trunk
4) This is done by adding an additional header information called tag to the Ethernet frame. The process of adding this small header is called VLAN tagging



Config. Take of router select VLAN Database enter the number and name of the VLAN created

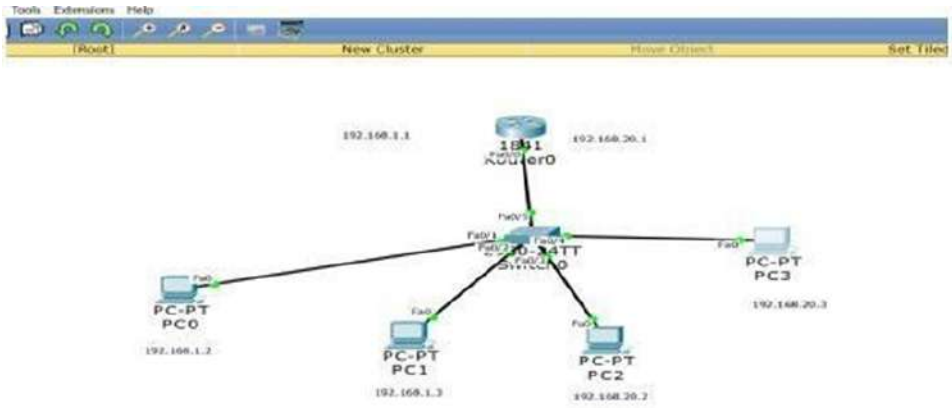
Goto CLI,
Router (vlan) # exit
APPLY completed
Routing
Router # config t
Router (config) # interface fast ethernet 0/0.1
Router (config-subif) #
Router (config-subif) # encapsulation dot1q
Router (config-subif) # ip address
192.168.20.7 255.255.255.0
Router (config-subif) # no shut
Router (config-subif) # exit
Router (config) # exit
Ping message from PC-5 to another VLAN PC

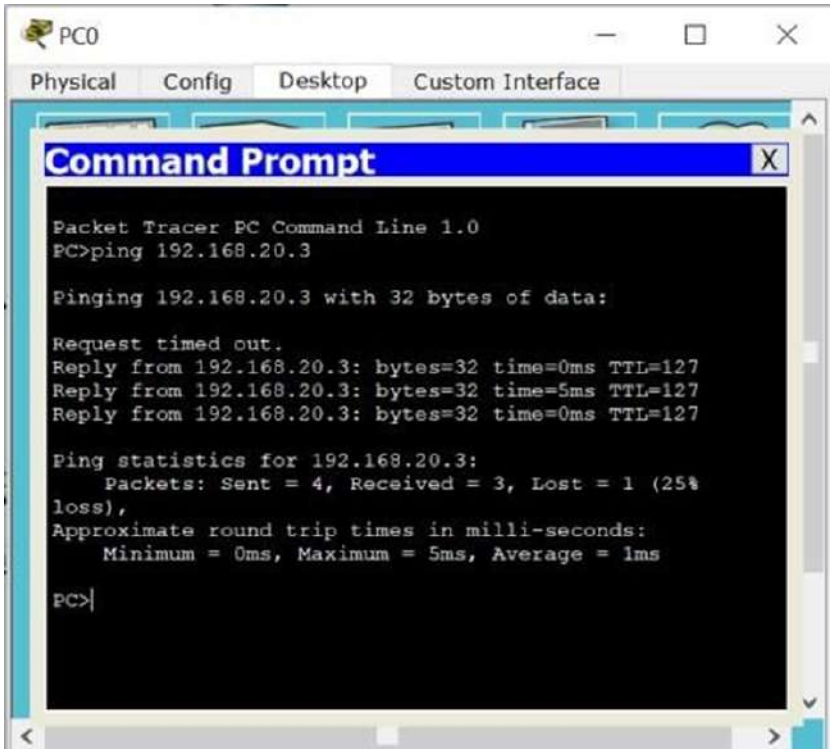
Ping output:
Packet Tracer PC Command Line 1.0
PC>Ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.3: bytes=32 time<0ms TTL=127
Reply from 192.168.20.3: bytes=32 time<1ms TTL=127
Reply from 192.168.20.3: bytes=32 time<0ms TTL=127
Pinging statistics for 192.168.20.3:



Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milliseconds:
Minimum = 0ms, Maximum = 1ms, Average = 1ms

Observation:
→ We can have one device on one VLAN & another on another VLAN connected to the same switch. They will only hear other broadcast traffic from within their VLANS, as if they were connected to two switches.
→ These VLANS doesn't use IP addresses instead deal with subnets (trunc type address)
→ Inter-VLAN routing gives a flexible tool to logically subdivide their networks that has potential to enhance security & performance.

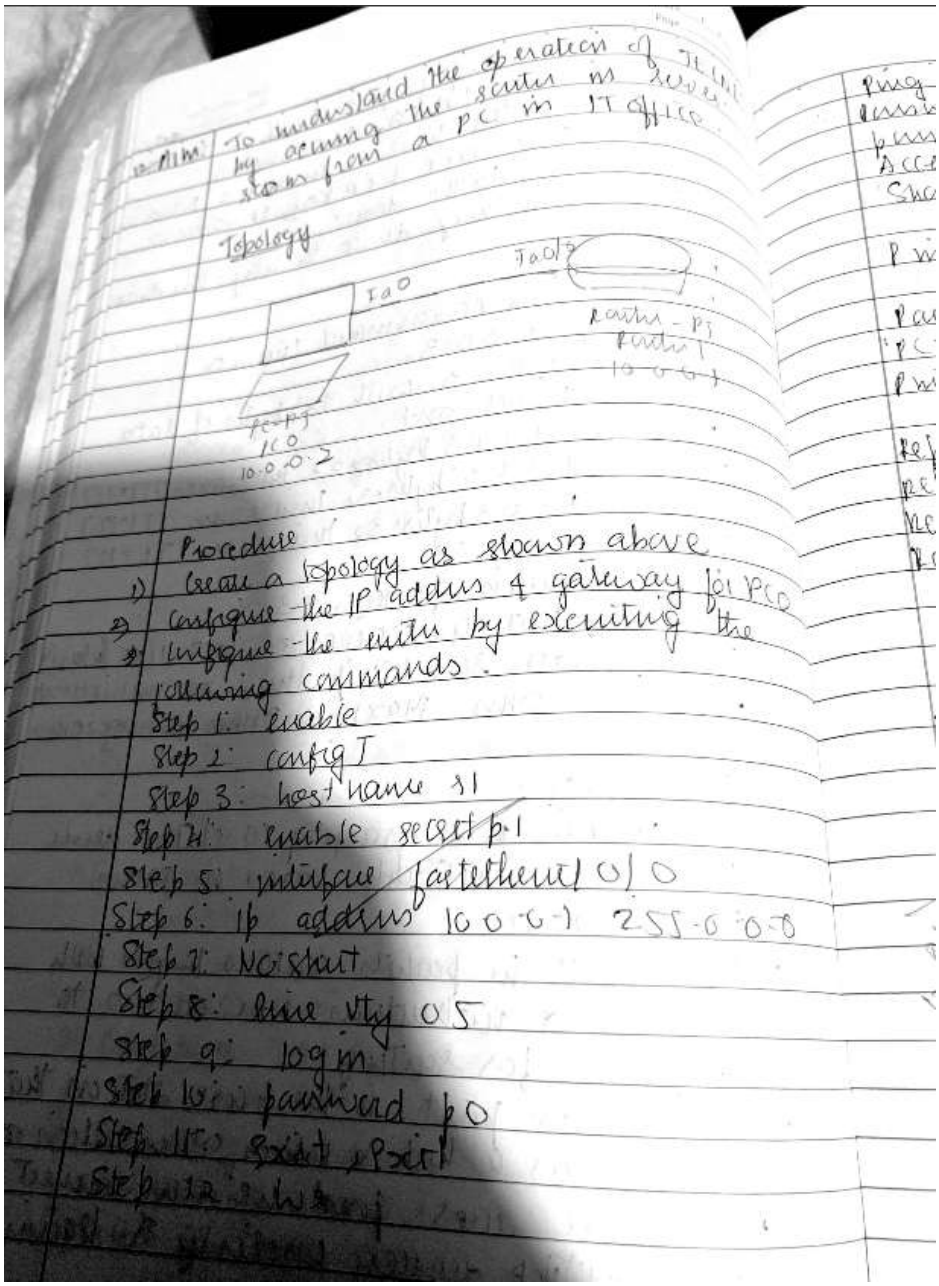

Tools Extensions Help
[Root]
New Cluster
Set Tiled
192.168.1.1
1841
Router0
192.168.20.1
PC-PT
PC0
192.168.1.2
PC-PT
PC1
192.168.1.3
PC-PT
PC2
192.168.20.2
PC-PT
PC3
192.168.20.3


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

EXPERIMENT 10

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

Observation



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 for PC0
3) Configure the router by executing the following commands.

Step 1: enable
Step 2: config T
Step 3: hostname r1
Step 4: enable secret p1
Step 5: interface fastethernet 0/0
Step 6: ip address 10.0.0.1 255.0.0.0
Step 7: No shut
Step 8: line vty 0 5
Step 9: login
Step 10: password p0
Step 11: exit, exit

Ping message to switch
Password for user verification is p0
password for enable is p1
Accessing switch CLI from PC
Show IP switch

Ping output

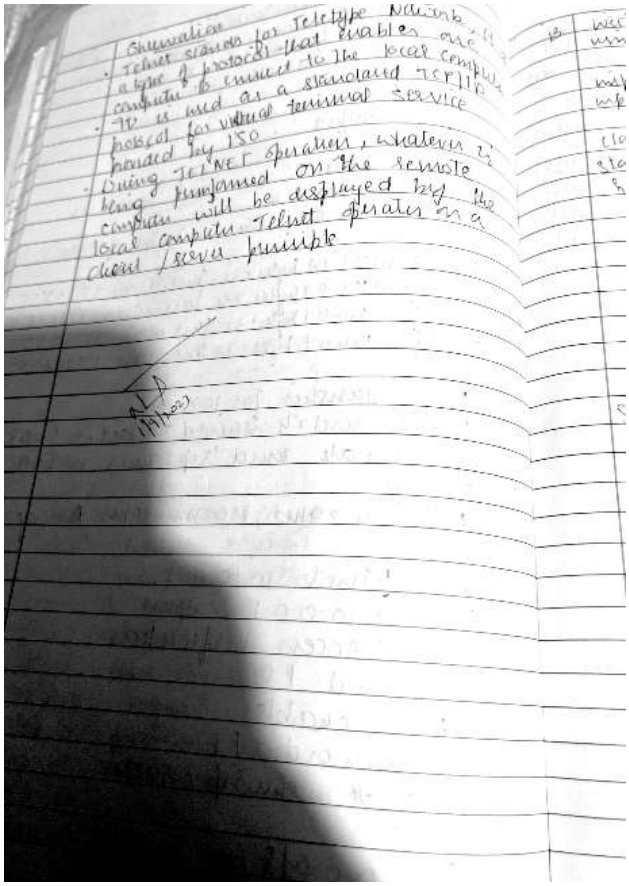
Packet tracer PC command line 1.0
PC>Ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data

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 milli seconds
Minimum=0ms, Maximum=0ms, Average=0

PC> telnet 10.0.0.1
Trying 10.0.0.1 ... open
User Access verification
Password: p0
P1> enable
Password: p1
S1# show ip switch

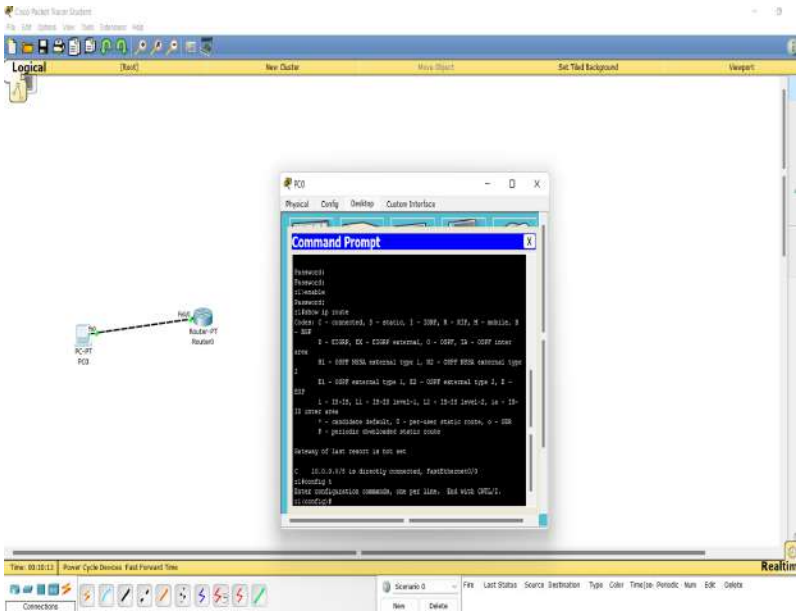
[10.0.0.0/8 is directly connected
[net 8 Ethernet 0/0



Simulation

- 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.
- Using TELNET operation, whatever is being performed on the remote computer will be displayed by the local computer. Telnet operates on a client/server principle.

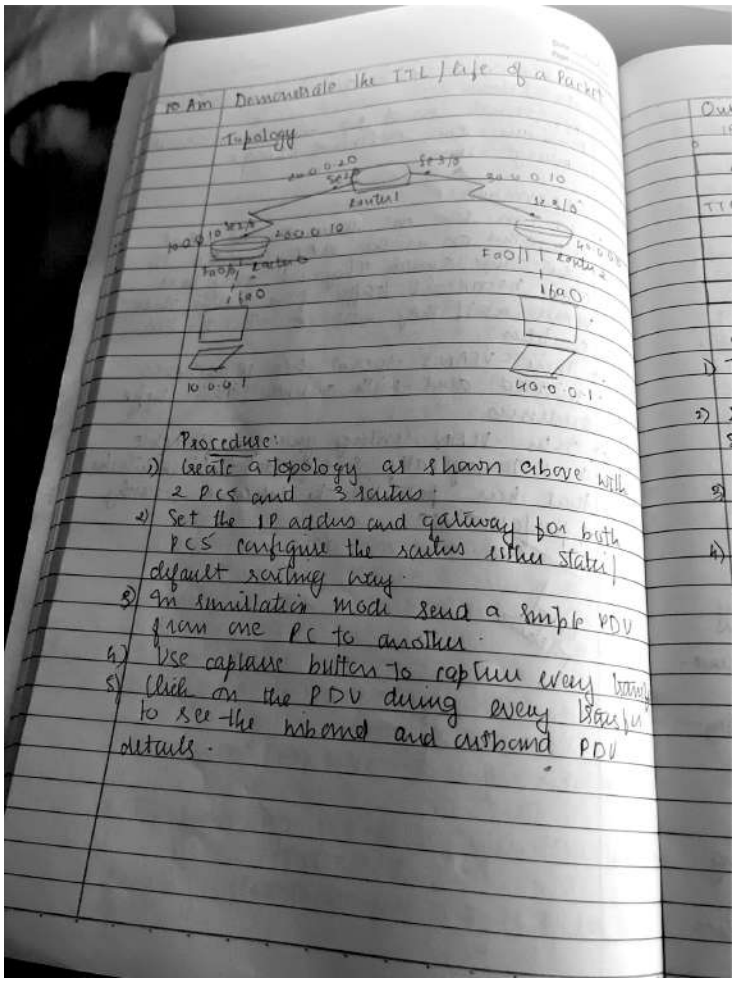
Output



EXPERIMTENT 11

Demonstrate the TTL/ Life of a Packet

Observation

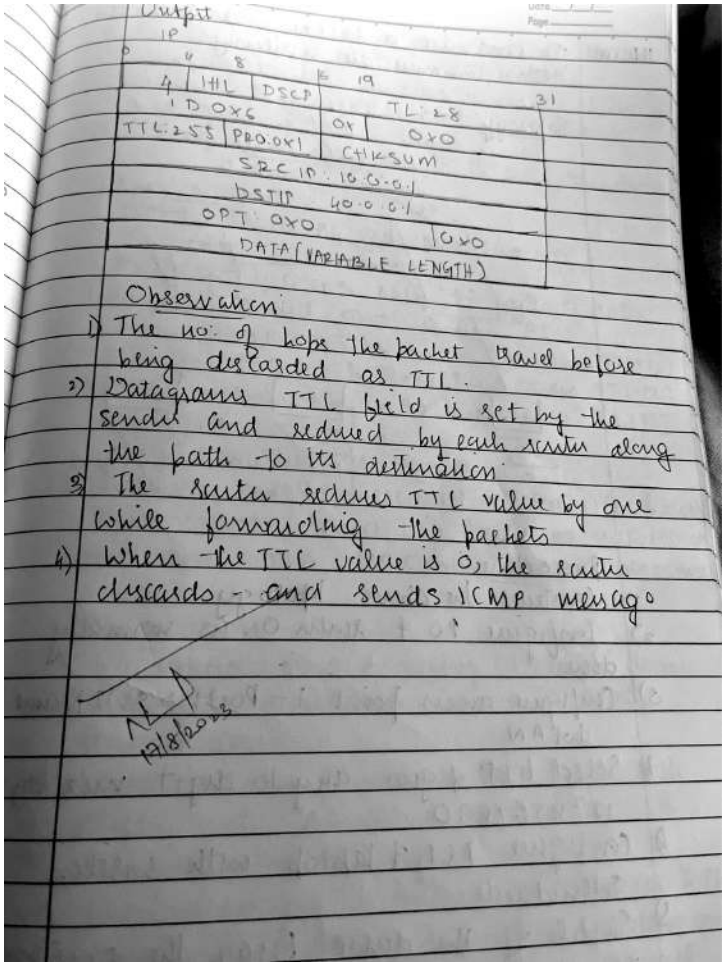


10 Am Demonstrate the TTL / Life of a Packet

Topology

Procedure:

1) Create a topology as shown above with 2 PCs and 3 routers.
2) Set the IP address and gateway for both PCs configure the routers either static/ default routing way.
3) In simulation mode send a simple PDU from one PC to another.
4) Use capture button to capture every hop.
5) Click on the PDU during every hop to see the inbound and outbound PDU details.



Output

0 4 8 16 19 31

4	HL	DSCP	TL: 28
ID 0x6			
TTL: 255	PRO: 0x1	0x	0x0
SRC IP: 10.0.0.1			
DSTIP 40.0.0.1			
OPT 0x0			0x0
DATA (VARIABLE LENGTH)			

Observation

1) The no. of hops the packet travel before being discarded as TTL.
2) Datagram TTL field is set by the sender and reduced by each router along the path to its destination.
3) The router reduces TTL value by one while forwarding the packets
4) When the TTL value is 0, the router discards and sends ICMP message

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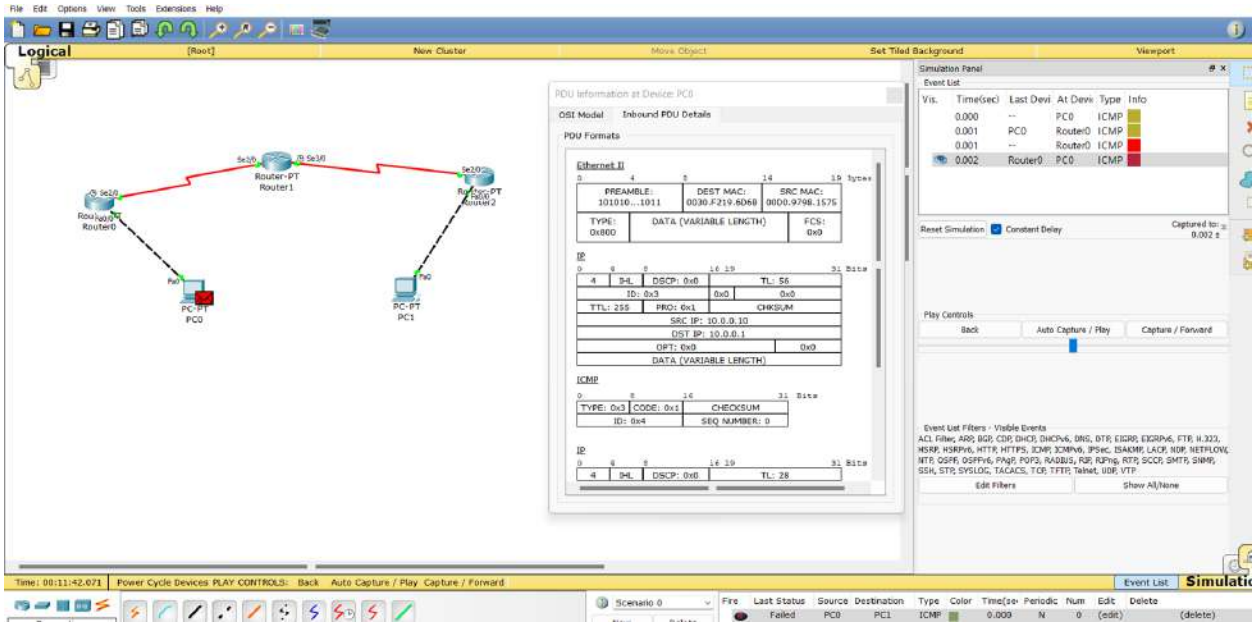
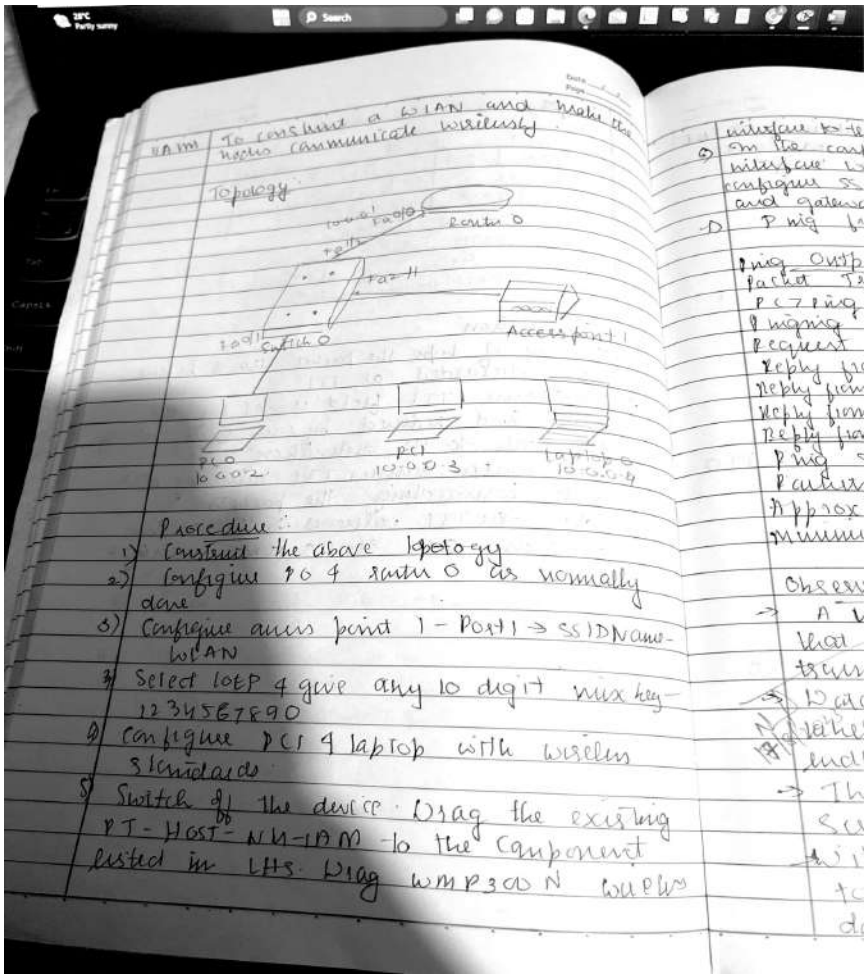
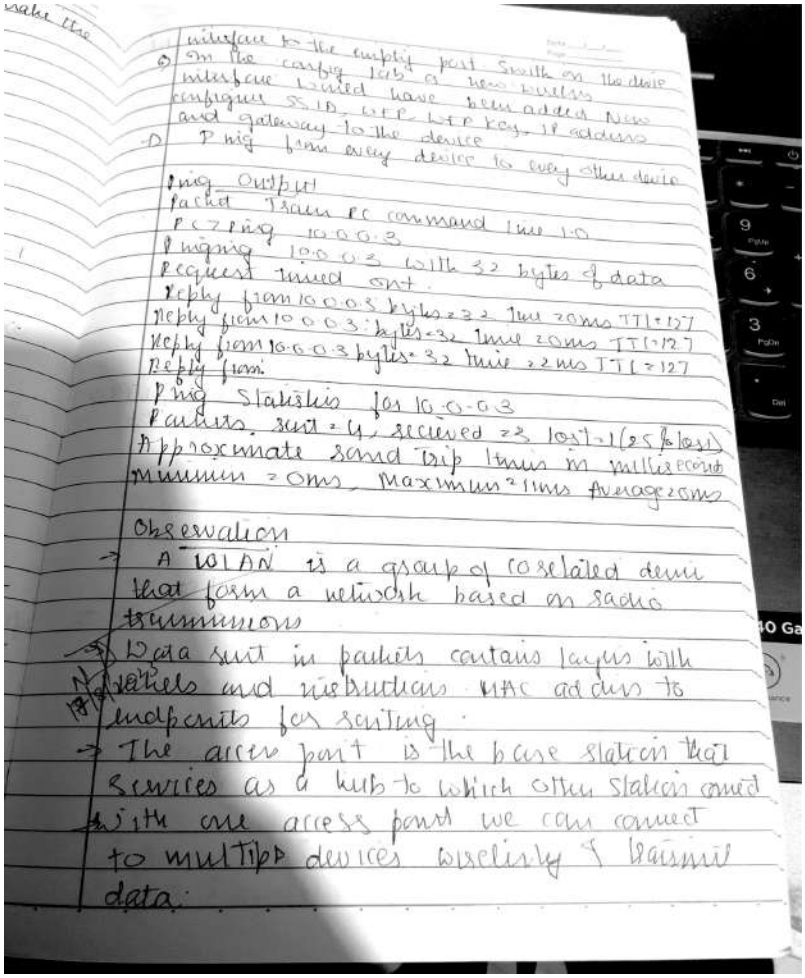

File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
Router0
Router2
PC-PT
PC0
PC1
PDU Information at Device: PC0
OSI Model
Inbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 0030.F219.6D6B
SRC MAC: 0000.9798.1575
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
DSCP: 0x0
TL: 56
ID: 0x3
TTL: 255
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.10
DST IP: 10.0.0.1
OPT: 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x3
CODE: 0x1
CHECKSUM
ID: 0x4
SEQ NUMBER: 0
TL: 28
Simulation Panel
Event List
Vis. Time(sec) Last Devi At Devi Type Info
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.001 -- Router0 ICMP
0.002 Router0 PC0 ICMP
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:11:42.071
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulati
Scenario 0
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Failed PC0 PC1 ICMP 0.000 N 0 (edit) (delete)

EXPERIMENT 12

To construct a WLAN and make the nodes communicate wirelessly.

Observation



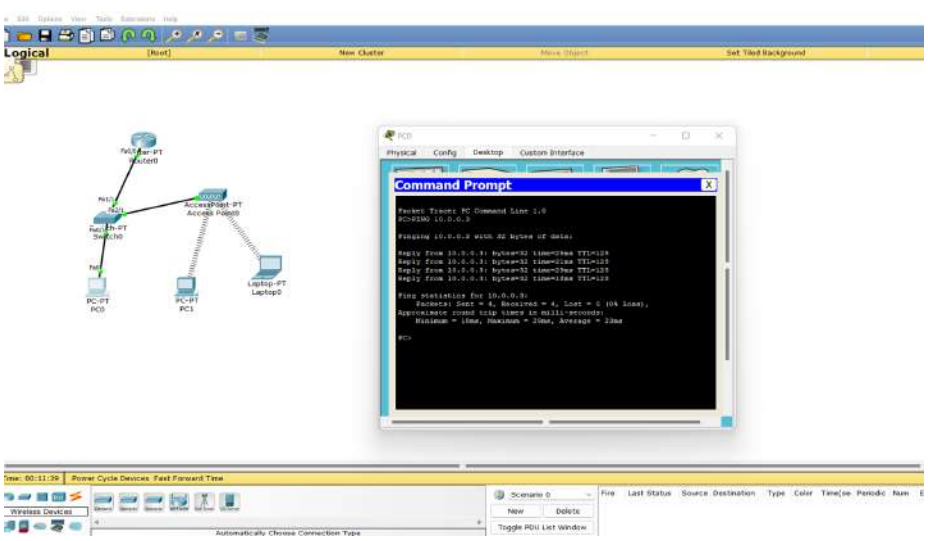


interface to the empty port Switch on the device
In the config tab a new wireless interface tabled have been added New configure SSID, WEP, WPA key, IP address and gateway to the device
Ping from every device to every other device

Ping Output
Packet Tracer PC command line 1.0
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data
Request timed out.
Reply from 10.0.0.3 bytes=32 time=0ms TTL=127
Reply from 10.0.0.3 bytes=32 time=0ms TTL=127
Reply from 10.0.0.3 bytes=32 time=0ms TTL=127
Reply from
Ping Statistics for 10.0.0.3
Packets: sent = 4, received = 3, lost = 1 (25% loss)
Approximate round trip times in milliseconds
Minimum = 0ms, Maximum = 1ms Average = 0ms

Observation
→ A WLAN is a group of connected devices that form a network based on radio transmissions
→ Data sent in packets contains layers with headers and destination MAC address to endpoints for routing.
→ The access point is the base station that serves as a hub to which other stations connect with one access point we can connect to multiple devices wirelessly & transmit data.

Output



EXPERIMENT 13

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

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);

 }

}
```

Observation

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Page _____

13 Write a program for error detecting code using CRC

```
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("10", "0"), tmp);
    return tmp;
}

Static void encode (String data,
String key)
{ int rkey = key.length();
```

```
String append_data = (data + new String
(new char[key - 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();
encode Data (data, key);
    }
}
```

Output

```
Enter dataword: 1100101011100101
Calculated CRC: 1110100101100
```

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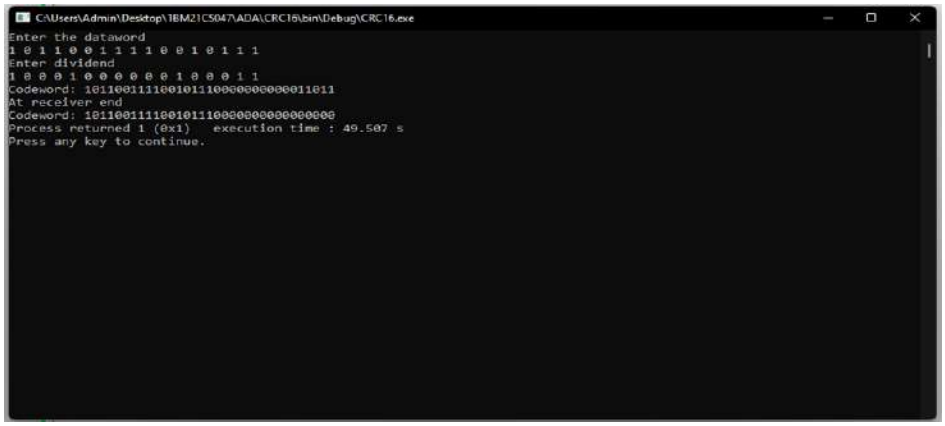
Output


C:\Users\Admin\Desktop\1BM21CS047\ADA\CRC16\bin\Debug\CRC16.exe
Enter the 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: 10110011110010111000000000011011
At receiver end
Codeword: 10110011110010111000000000000000
Process returned 1 (0x1) execution time : 49.507 s
Press any key to continue.

EXPERIMENT 14

Write a program for congestion control using Leaky bucket algorithm.

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;
}
 }
 }
```

Observation

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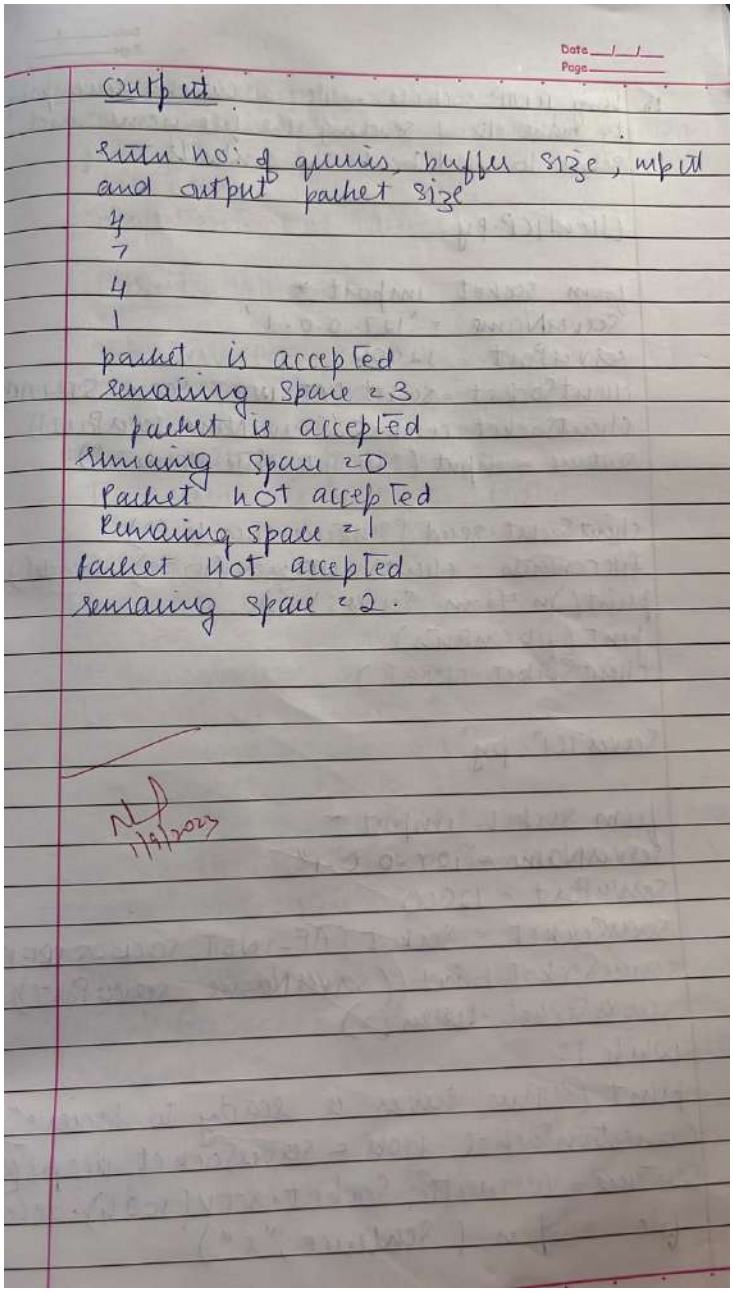
Page _____

14 Write a program for congestion control using leaky bucket algorithm

```
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 b = 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;
}
}
```



Output

Enter no: of queues, buffer size, input and output packet size

4
7
4
1

packet is accepted
remaining space = 3
packet is accepted
remaining space = 0
Packet not accepted
Remaining space = 1
packet not accepted
remaining space = 2.

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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
```

EXPERIMENT 15

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

ClientTCP.py

```
from socket import *
serverName=
&#39;127.0.0.1&#39;
serverPort = 12000
clientSocket=socket(AF_INET,
SOCK_STREAM)
clientSocket.connect((serverName,server
Port)) sentence = input(&quot;\nEnter file
name:                                  &quot;)
clientSocket.send(sentence.encode())
filecontents=
clientSocket.recv(1024).decode()  print
(&#39;\nFromServer:\n&#39;)
print(filecontents)

clientSocket.close()
```

ServerTCP.py

```
from      socket      import*
serverName=&quot;127.0.0
.1&quot; serverPort= 12000
serverSocket=
socket(AF_INET,SOCK_STREAM)
```

```
serverSocket.bind((serverName,server
Port)) serverSocket.listen(1)
while 1:
print (&quot;The server is ready to
receive&quot;) connectionSocket, addr=
serverSocket.accept()sentence=
connectionSocket.recv(1024).decode()


file=open(sentence,&quot
;r&quot;) l=file.read(1024)
connectionSocket.send(l.e
ncode())
print (&#39;\nSent contents of &#39; +
sentence) file.close()
connectionSocket.close()
```

Observation

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Page

15 Using TCP/IP sockets, write a client-server program to make client sending the file name and server to send back the contents.

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('\n From Server:\n')
print (fileContents)
clientSocket.close ()
```

ServerTCP.py

```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
serverSocket = Socket (AF_INET, SOCK_STREA
serverSocket.bind ((serverName, serverPort)
serverSocket.listen (1)
while 1:
print ("The server is ready to recieve
connectionSocket, addr = serverSocket.accept
sentence = connectionSocket.recv(1024).de
file = open (sentence, "r")
```

```
l = file.read(1024)
connectionSocket.send(l.encode())
print('\n Sent contents of ' + sentence)
file.close()
connectionSocket.close()
```

Output

~~The~~ Servertcp.py:-
The server is ready to receive

send contents of servertcp.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 = socket(AF_INET, SOCK_STR
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)
```

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```
connectionSocket.send(b.encode())
print("\n Sent contents of + sentence)
file.close()
connectionSocket.close()
```

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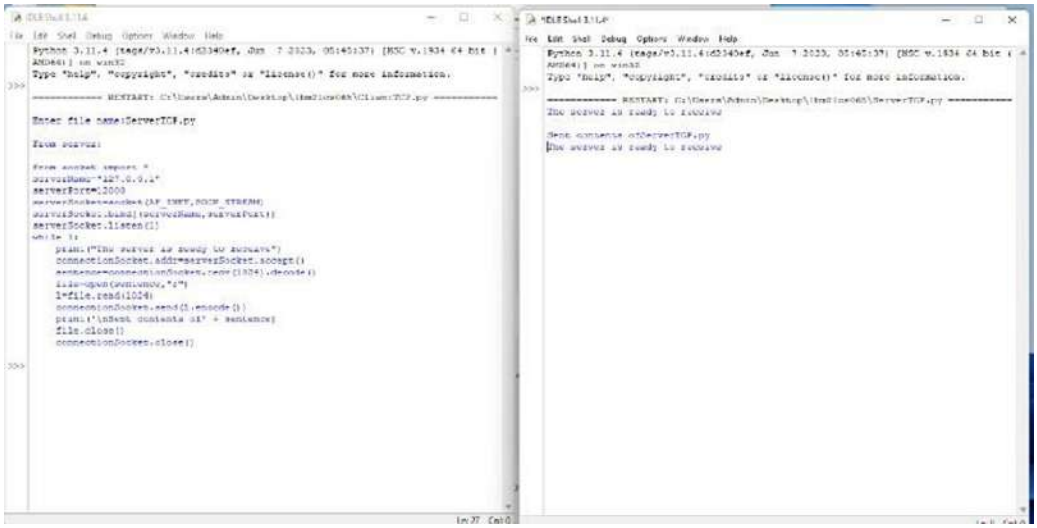
Output


File Edit Shell Debug Options Window Help
Python 3.11.4 (tags/v3.11.4:d2340ef, Jun 7 2023, 05:45:37) [MSC v.1934 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Admin\Desktop\Ins2lab065\Client TCP.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()
>>>
File Edit Shell Debug Options Window Help
Python 3.11.4 (tags/v3.11.4:d2340ef, Jun 7 2023, 05:45:37) [MSC v.1934 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Admin\Desktop\Ins2lab065\ServerTCP.py ==========
The server is ready to receive
Sent contents of ServerTCP.py
The server is ready to receive

EXPERIMENT 16

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.

code

ClientUDP.py

```
from socket import *

serverName =

&quot;127.0.0.1&quot;

serverPort = 12000

clientSocket = socket(AF_INET,

SOCK_DGRAM) sentence =

input(&quot;\nEnter file name: &quot;)

clientSocket.sendto(bytes(sentence,&quot;utf-8&quot;),(serverNa

me, serverPort)) filecontents,serverAddress =

clientSocket.recvfrom(2048)

print (&#39;\nReply from

Server:\n&#39;) print

(filecontents.decode(&quot;utf-8

&quot;)) # for i in filecontents:

# print(str(i), end =

&#39;&#39;)

clientSocket.close()

clientSocket.close()
```

ServerUDP.py

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

con=file.read(2048)
serverSocket.sendto(bytes(con,&quot;utf-8&quot;
),clientAddress) print (&#39;\nSent contents of
&#39;, end = &#39; &#39;)
print (sentence)
# for i in sentence:
# print (str(i), end =
&#39;&#39;)
file.close()
```

Observation

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16 Using UDP sockets, write a client - server program to make sending the file name and the server to send back to 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 ("in Enter file name: ")

clientSocket.sendto (bytes (sentence, "utf-8"),
        (serverName, serverPort))
fileContents, serverAddress = clientSocket.
        recvfrom (2048)
print ('in 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
erverSocket = socket (AF_INET, SOCK_DG
erverSocket.bind (("127.0.0.1", serverPort
int ("The server is ready to receive")
```

```
while 1:
sentence, clientAddress = serverSocket.recvfrom(2048)
sentence = sentence.decode("utf-8")
file = open(sentence, "r")
con = file.read(2048)

serverSocket.sendto(bytes(con, "utf-8"),
                    clientAddress)
print("\n Sent contents of", end = " ")
print(sentence)
# for i in sentence:
#     print(str(i), end = "")
file.close()
```

Output

serverUDP.py
The server is ready to receive

Sent contents of serverUDP.py
The server is ready to receive

clientUDP.py

Enter file name: serverUDP.py

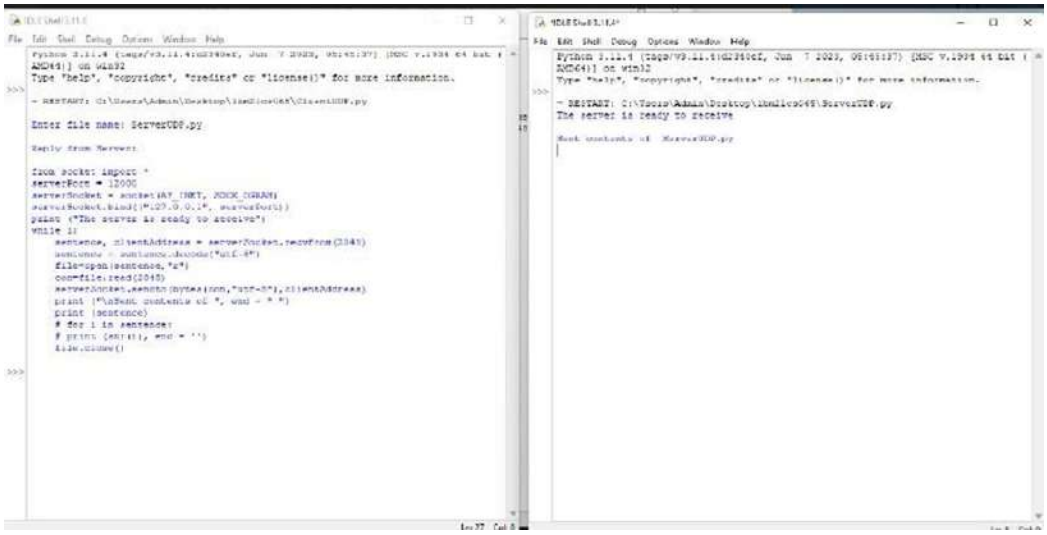
Reply from Server:

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

```
While 1:
print ("The server is ready to receive")
sentence, clientaddress = serverSocket.
                          recvfrom (2048)
sentence = sentence.decode ("utf-8")
file = open (sentence, "r")
con = file.read (2048)

serverSocket.sendto(bytes (con, "utf-8"),
                    clientAddress)
print ("\n Sent contents of ", end = "")
print (sentence)
  # for i in sentence
  # print (str (i), end = "")
  file.close()
```

Output


File Edit Shell Debug Options Window Help
Type "help", "copyright", "credits" or "license()" for more information.
Enter file name: ServerUDP.py
Reply from Server:
The server is ready to receive

EXPERIMENT 17

Wireshark

Observation

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17 Tool Exploration - Wireshark

Wireshark is an open source packet analyzer which is used for education analysis, software development communication protocol development and network troubleshooting. It is used to track packets so that each one is filtered to meet our specific needs. It is commonly called as a sniffer network protocol analyzer, network analyzer. It is also used by network security engineers to examine security problems.

Wireshark is a free application used to apprehend data back and forth. It is also called as free packet sniffer computer application, puts through network card into a unselective mode, i.e. to accept all packets which it receives.

Uses :-

- It is used by network security engineers to examine security problem.
- It is used by network engineers to troubleshoot network issues.
- It is also used to analyze dropped packets.

It helps to troubleshoot latency issues, malicious activities on the network.

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→ It helps us to know how all ~~demand~~ devices like laptop, mobile phones, desktop, switch, routers communicate in a network or the rest of the world.

Functionality of wireshark:

It is similar to a TCP dump in networking. It has a graphic end and filtering functions. It also monitors the incoming traffic which is not sent to network's MAC address interface. The port mirroring is a method to monitor network traffic. When it is enabled switch sends copies of all network packets present at one port to another port.

Feature of wireshark:

→ It is a multi platform software, i.e, it can run on Linux, Windows, OSX, Free BSD, Net BSD etc.
→ It is a standard three pane packet browser
→ It performs deep inspection of protocols.
→ It even has sort and filter options which make ease to user to view the data
→ It can capture raw USB traffic
→ It is useful in IP analysis
→ It also allows live analysis, it from different types of network like Ethernet, loopback etc through which we can read live data.