

# **VISVESVARAYA TECHNOLOGICAL UNIVERSITY**

**“JnanaSangama”, Belgaum -590014, Karnataka.**



## **LAB RECORD**

### **Computer Network Lab (23CS5PCCON)**

*Submitted by*

**Vachan.D.H (1BM22CS314)**

*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**

**Academic Year 2024-25 (odd)**

# 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 Network (23CS5PCCON)” carried out by **Vachan.D.H(1BM22CS314)**, who is a bonafide student of **B.M.S. College of Engineering**. It is in partial fulfilment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum. The Lab report has been approved as it satisfies the academic requirements of the above-mentioned subject and the work prescribed for the said degree.

Sneha.P Associate Professor Department of CSE, BMSCE	Dr. Kavitha Sooda Professor & HOD Department of CSE, BMSCE
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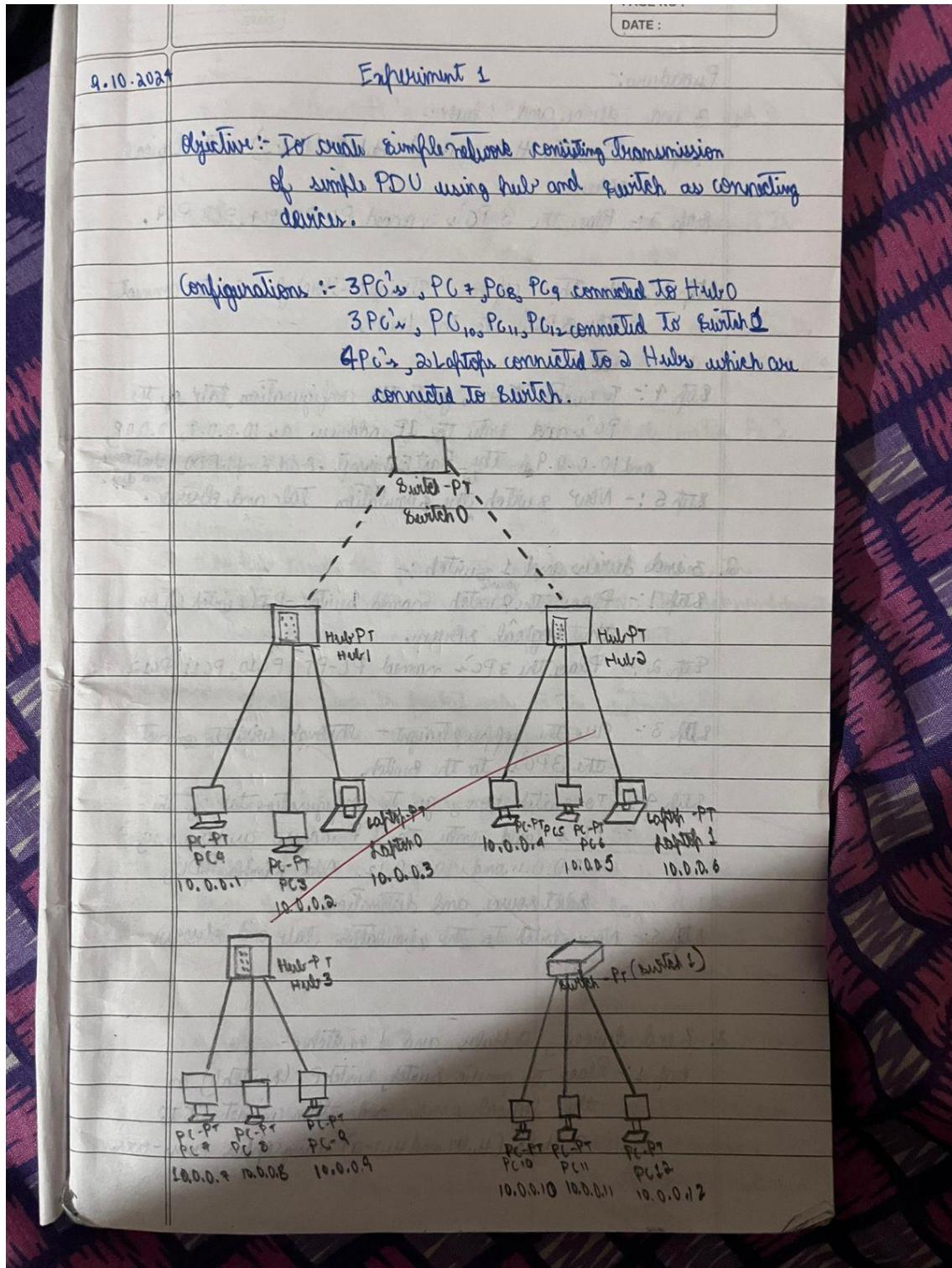
Github Link:

<https://github.com/Vachandh/CN-LAB.git>

## Program 1

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

### **Topology , Procedure and Observation:**



**Procedure:-****1. 3 end devices and 1 hub :-**

Step 1 :- Place The Hub named Hub-PT (Hub 3) on the Logical screen.

Step 2 :- Place the 3 PC's named PC-PT PC7, PC8, PC9.

Step 3 :- Use The Cables straight-through wire to connect the 3 PC's to The Hub.

Step 4 :- To switch it on, go to the configuration tab of the PC's and enter the IP address as 10.0.0.7, 10.0.0.8 and 10.0.0.9 in the Fast Ethernet. Add simple PDU, select both and diff.

Step 5 :- Now switch to the simulation Tab and observe.

**2. 3 end devices and 1 switch :-**

Step 1 :- Place The generic <sup>switch</sup> named Switch-PT (Switch 1) on the Logical screen.

Step 2 :- Place the 3 PC's named PC-PT PC10, PC11, PC12

Step 3 :- Use The cables straight-through wire to connect the 3 PC's to The Switch.

Step 4 :- To switch it on, go to configuration tab of the PC's and enter the IP address as 10.0.0.10, 10.0.0.11 and 10.0.0.12. Add simple PDU, select source and destination.

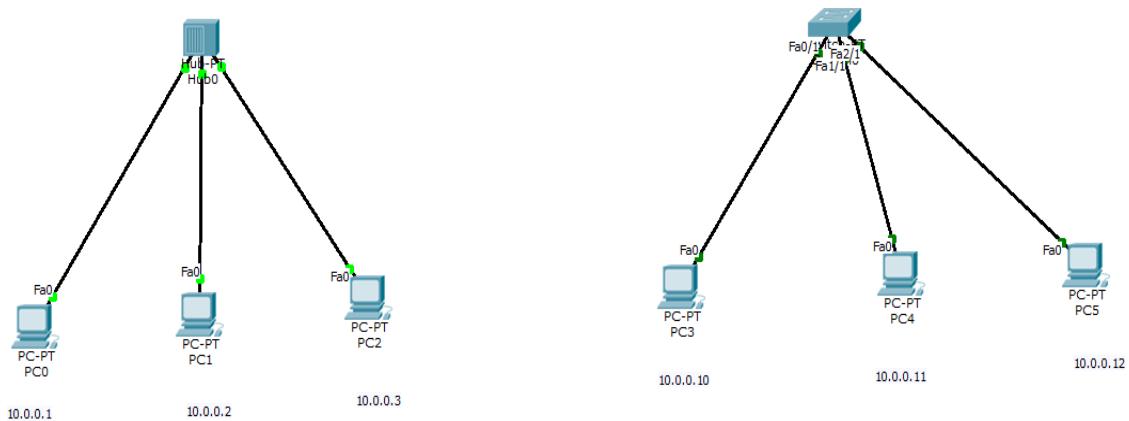
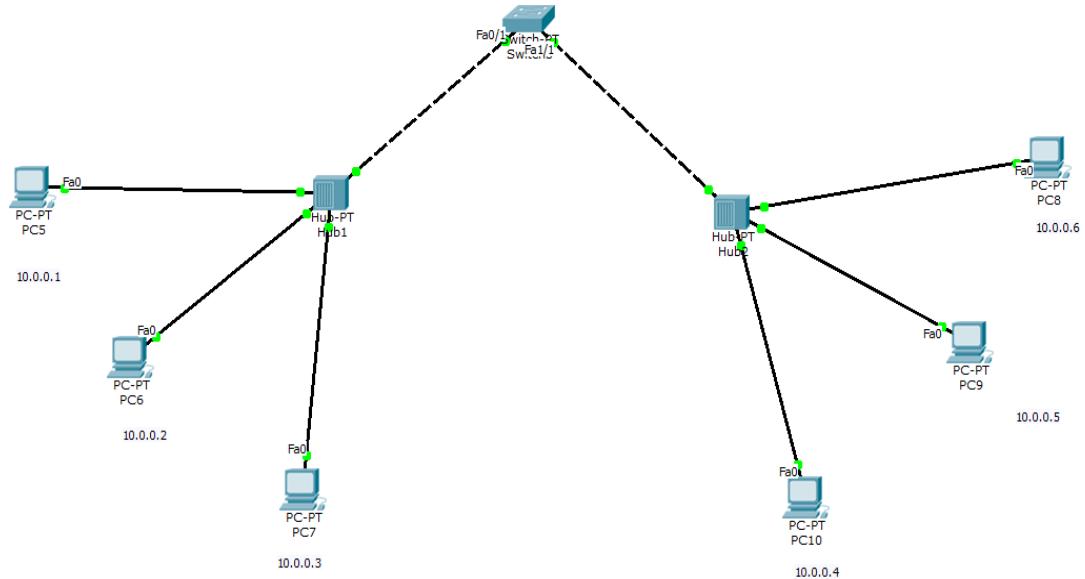
Step 5 :- Now switch to the simulation Tab and observe.

**3. 3 end devices, 2 Hubs and 1 switch :-**

Step 1 :- Place The generic switch, Switch-PT (switch 1) on the logical screen and then connect it to 2 Hubs (Hub1 and Hub2) using cables cross-over.

<p>Logical PC's of the switch and diff. HW.</p> <p>1. PC1</p> <p>2. PC2</p> <p>3. PC3</p> <p>4. PC4</p> <p>5. PC5</p> <p>6. PC6</p>	<p>PAGE NO. _____ DATE: _____</p> <p>wire.</p> <p>Step 2:- Place 6 PCs named PC<sub>1</sub>, PC<sub>2</sub>, PC<sub>3</sub>, PC<sub>4</sub> and 2 Laptops Laptop<sub>1</sub>, Laptop<sub>2</sub>.</p> <p>Step 3:- Use the copper straight-through wire to connect the 4 PCs and 2 laptops to Hubs 1 and 2.</p> <p>Step 4:- Go to the configuration tab of the PCs and enter its IP address as 10.0.0.1, 10.0.0.2, 10.0.0.3, 10.0.0.4, 10.0.0.5 and 10.0.0.6 respectively.</p> <p>Step 5:- Add simple PDU's, Select source and destination PCs.</p> <p>Step 6:- Go to simulation tab and observe.</p> <p><u>Observation:-</u></p> <ol style="list-style-type: none"> <li>1. The hub sends the packet to all available devices. The destination PC accepts the packet and sends the acknowledgement back. All the remaining PCs repeat the packet.</li> <li>2. The switch sends the packet only to the destination PC which accepts and sends back acknowledgement.</li> </ol> <p><u>Difference between Hub and Switch:-</u></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">Hub</th><th style="text-align: center; padding: 5px;">Switch</th></tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">→ Hub is operated on physical layers of OSI model.</td><td style="text-align: center; padding: 5px;">→ Switch is operated on Data link layer of OSI model.</td></tr> <tr> <td style="text-align: center; padding: 5px;">→ Hub is a broadcast type transmission.</td><td style="text-align: center; padding: 5px;">→ Switch is a unicast, multicast and broadcast type transmission.</td></tr> <tr> <td style="text-align: center; padding: 5px;">→ Hub has 4/12 ports</td><td style="text-align: center; padding: 5px;">→ Switch can have 2 to 48 ports.</td></tr> <tr> <td style="text-align: center; padding: 5px;">→ There is only one collision domain.</td><td style="text-align: center; padding: 5px;">→ Different ports have own collision domain.</td></tr> <tr> <td style="text-align: center; padding: 5px;">→ Hub can't be used as a repeater.</td><td style="text-align: center; padding: 5px;">→ Switch can be used as a repeater.</td></tr> </tbody> </table>	Hub	Switch	→ Hub is operated on physical layers of OSI model.	→ Switch is operated on Data link layer of OSI model.	→ Hub is a broadcast type transmission.	→ Switch is a unicast, multicast and broadcast type transmission.	→ Hub has 4/12 ports	→ Switch can have 2 to 48 ports.	→ There is only one collision domain.	→ Different ports have own collision domain.	→ Hub can't be used as a repeater.	→ Switch can be used as a repeater.
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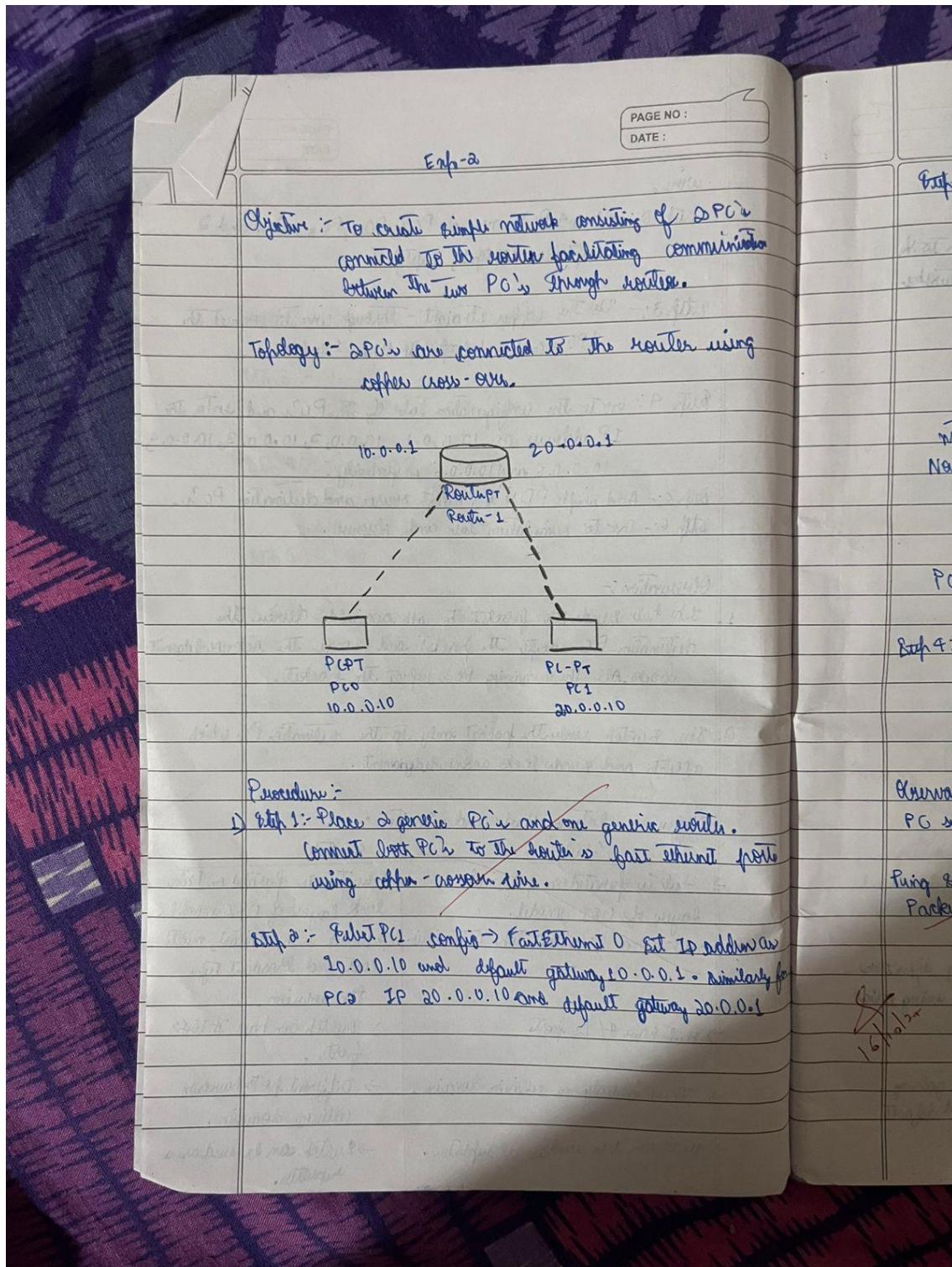
## Screen Shots:



## **Program 2**

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

### **Topology , Procedure and Observation:**



NO:

PAGE NO:  
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of DPC's  
communication  
use.

After using

Step 3:- Select switch and go to the CL1, execute the following commands.

```
# enable
# config Terminal
# interface Fast Ethernet 0/0
# ip address 10.0.0.1 255.0.0.0
# no shutdown
# exit
```

Notice PC0 and switch are successfully connected.

Now run for PC1

```
# interface fast Ethernet 1/0
# ip address 20.0.0.1 255.0.0.0
# no shutdown
```

PC1 is also successfully connected.

Step 4:- Select PC0 → Desktop → Command prompt &

ping PC1 by running command

→ ping 20.0.0.10

Observe the output.

Observation:-

PC successfully ping PC1 with 32 bytes of data

Ping statistics:-

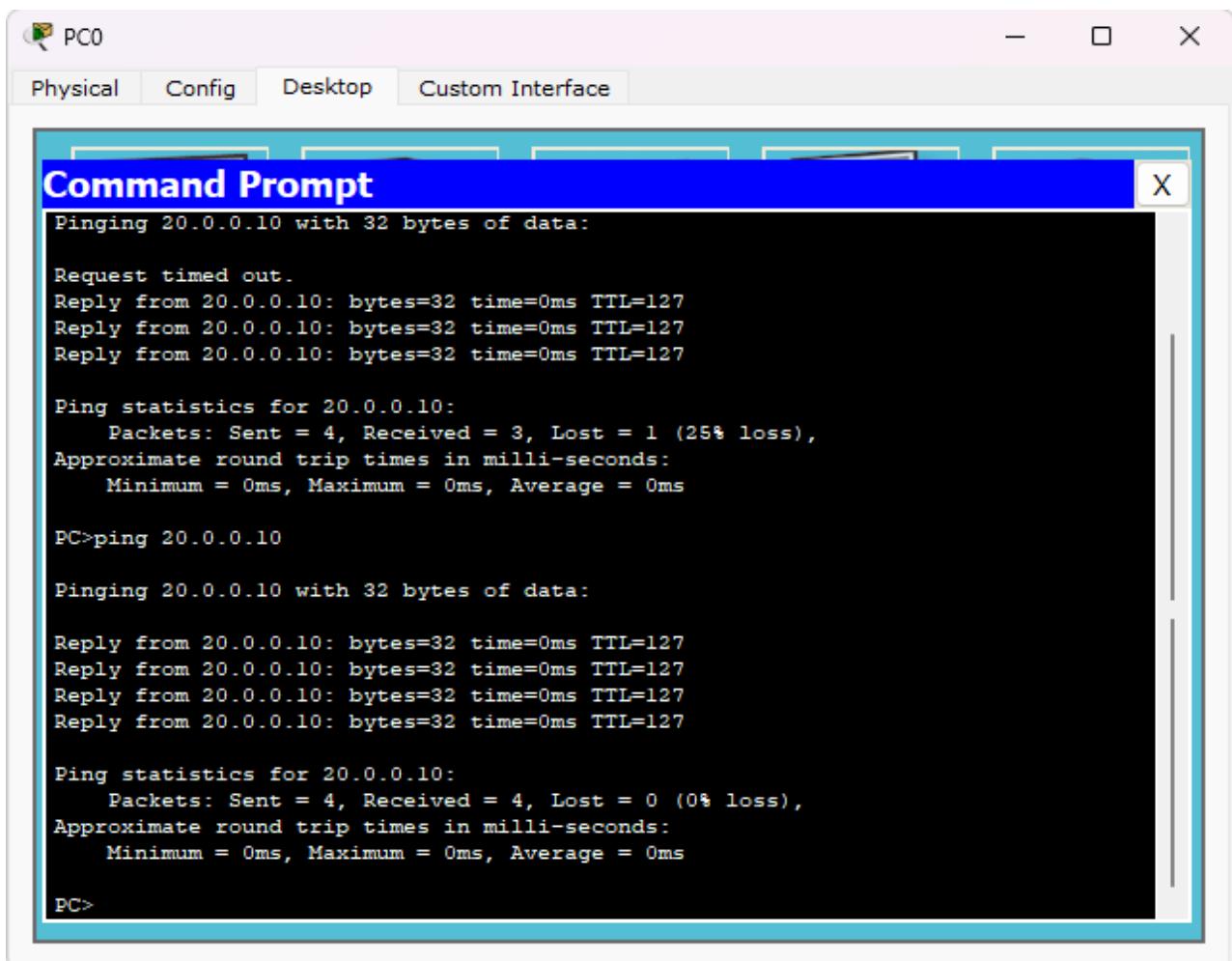
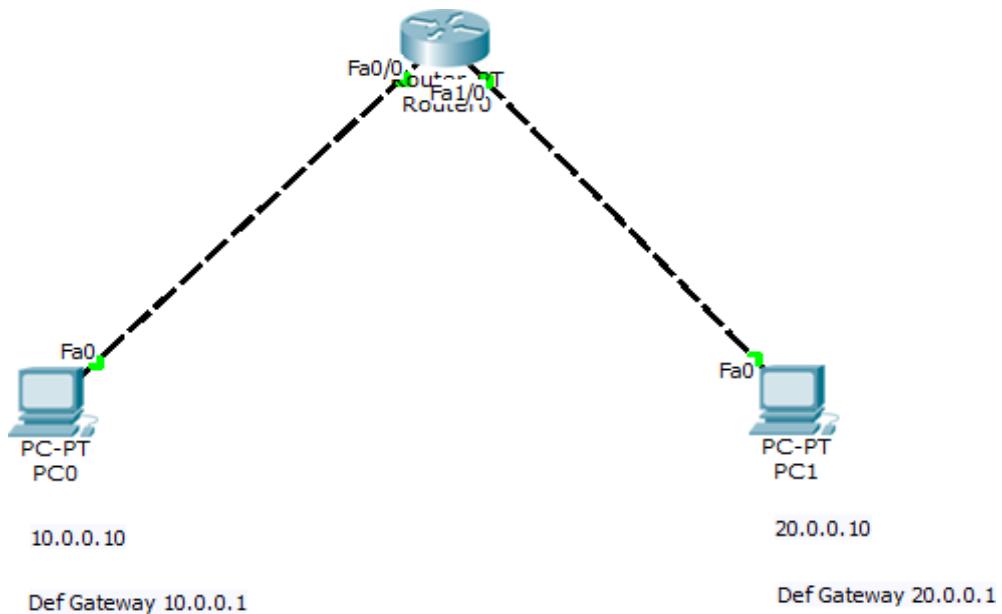
Packet:-

Sent=4, Received=4, Lost=0

(0% loss) approx. Time = 00:00:00.000

Time after change at 10:00:00

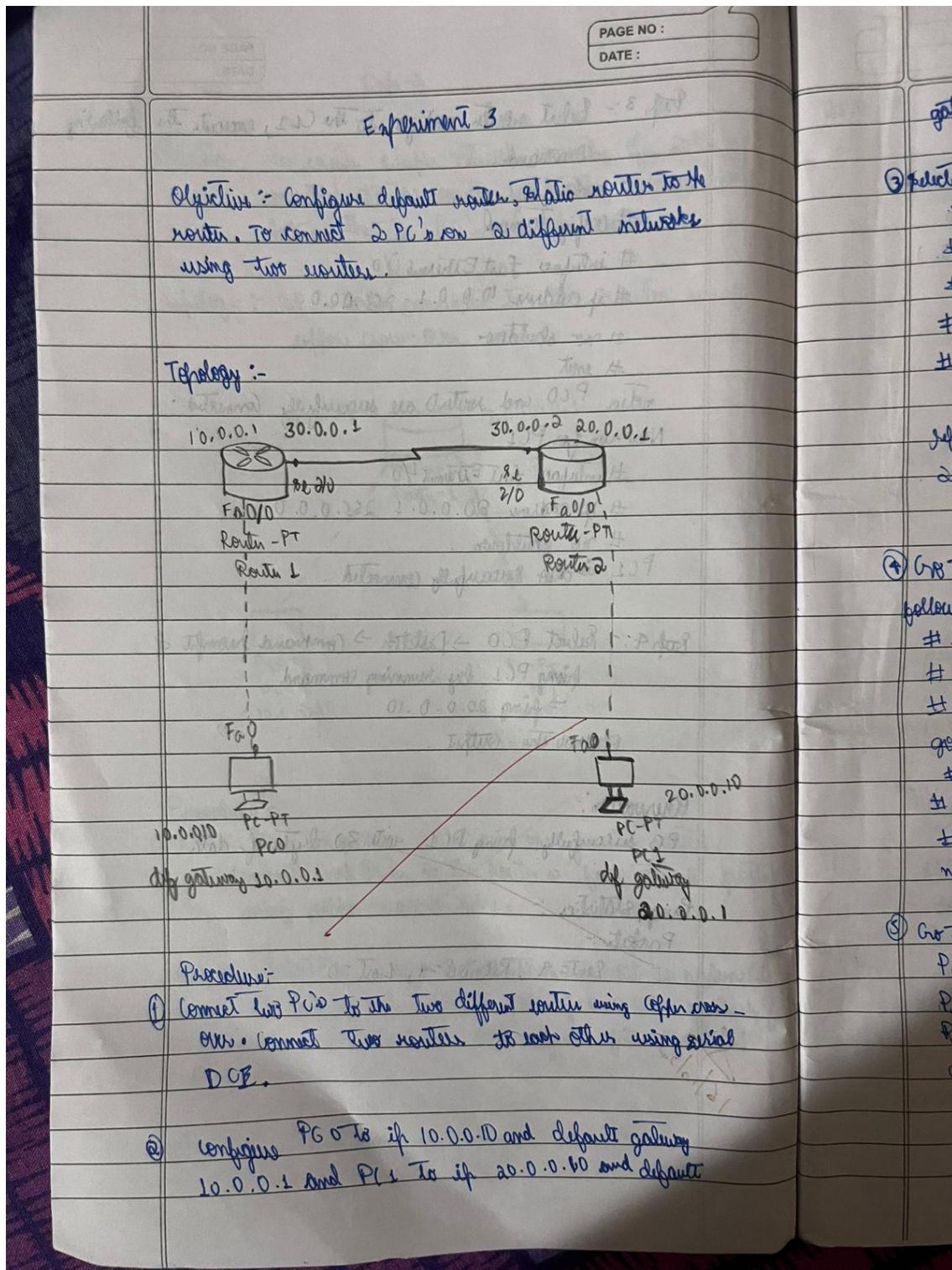
## Screen Shots:



### Program 3

Aim: Configure default route, static route to the Router(Part 1).

#### **Topology , Procedure and Observation:**



gateway 20.0.0.1.

③ Select router 0 → CLI and execute the following commands

> enable

# config terminal

# interface fast Ethernet 0/0

# ip address 10.0.0.1 255.0.0.0

# no shut

Notice PC 0 & router 0 are successfully connected

Select the same procedure for router 1 with ip address 20.0.0.1

255.0.0.0

Notice PC 1 & router 1 are also successfully connected.

④ Go To router 0 → CLI config terminal and execute the following

# interface serial 2/0

# ip address 30.0.0.1 255.0.0.0

# no shut

go To router 1 → CLI config terminal and execute

# interface serial 2/0

# ip address 30.0.0.2 255.0.0.0

# no shut

Notice router 0 & router 1 are successfully connected

⑤ Go to fcd → Desktop → Command prompt and run

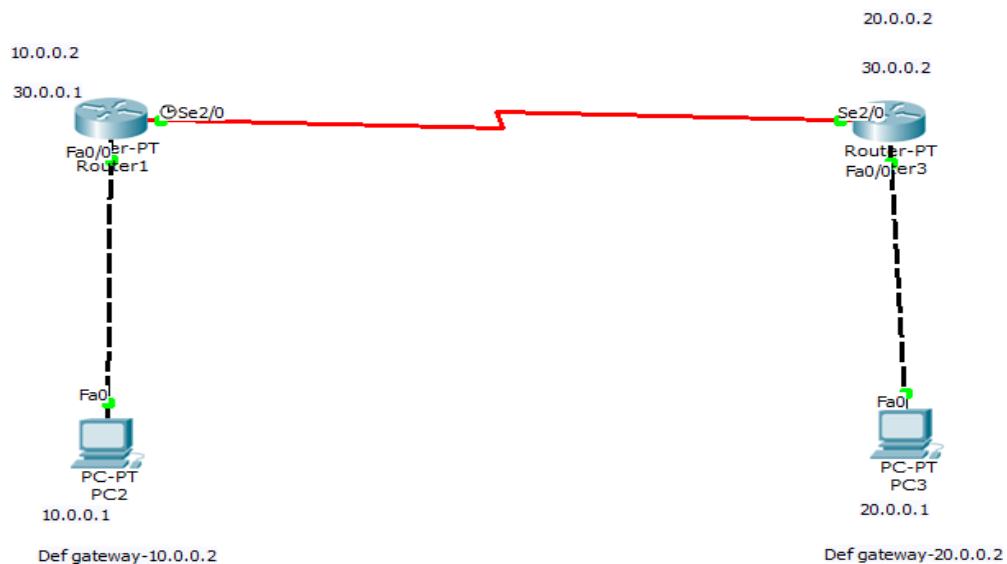
Ping 20.0.0.10

Ping 30.0.0.2

Ping 30.0.0.1

and observe the outputs

## Screen Shots:



PC2

Physical Config Desktop Custom Interface

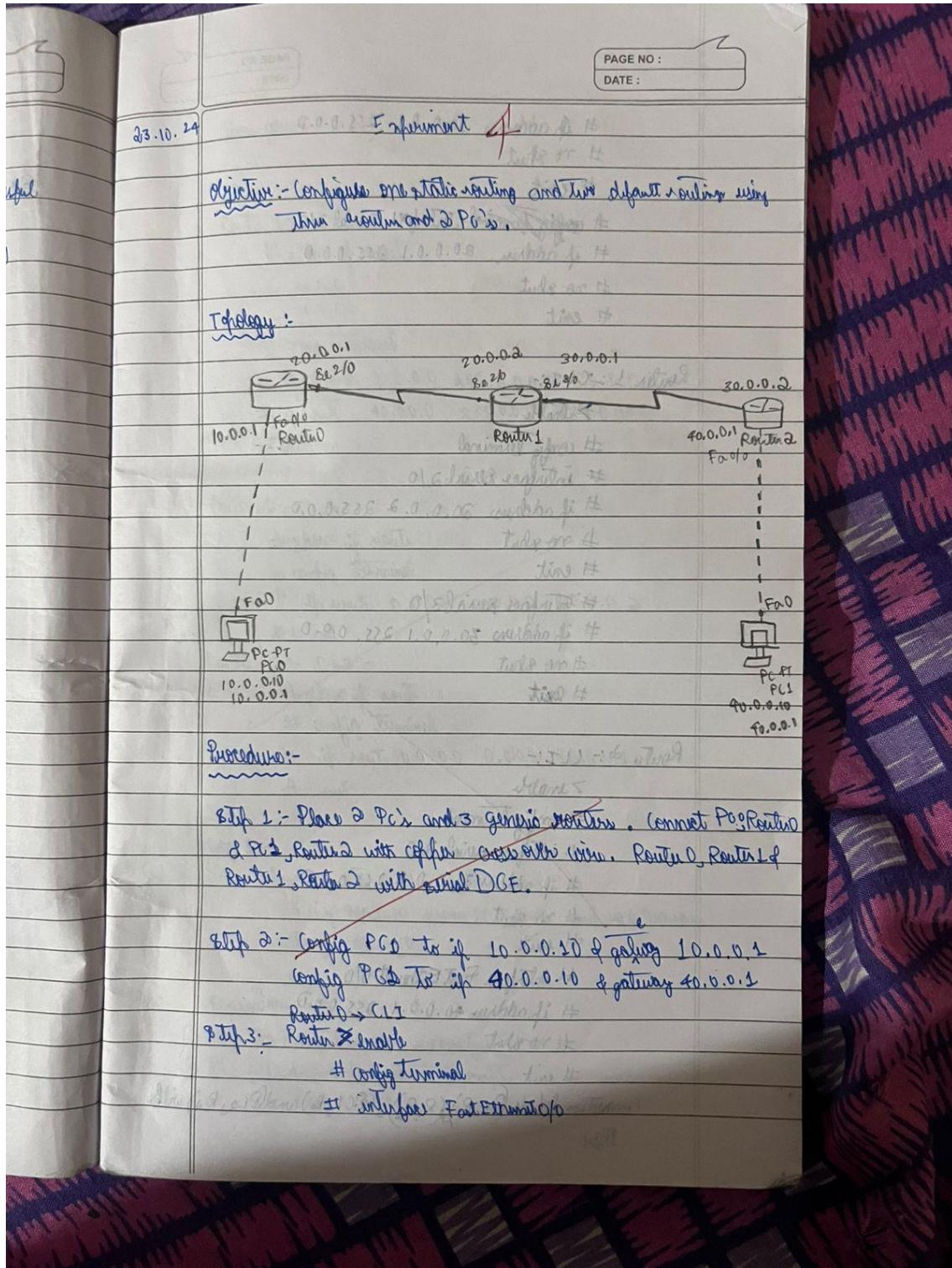
**Command Prompt**

```
Reply from 10.0.0.2: Destination host unreachable.  
Reply from 10.0.0.2: Destination host unreachable.  
Reply from 10.0.0.2: Destination host unreachable.  
  
Ping statistics for 20.0.0.1:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
  
PC>ping 20.0.0.1  
  
Pinging 20.0.0.1 with 32 bytes of data:  
  
Reply from 10.0.0.2: Destination host unreachable.  
  
Ping statistics for 20.0.0.1:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
  
PC>ping 20.0.0.2  
  
Pinging 20.0.0.2 with 32 bytes of data:  
  
Reply from 10.0.0.2: Destination host unreachable.  
  
Ping statistics for 20.0.0.2:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
  
PC>
```

## **Program 4**

**Aim:** Configure default route, static route to the Router(Part 2).

### **Topology , Procedure and Observation:**



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```

# ip address 10.0.0.1 255.0.0.0
# no shut
# exit
# config terminal
# interface serial 2/0
# ip address 20.0.0.1 255.0.0.0
# no shut
# exit

```

**Router 1 :- CLI :-**

```

> enable
# config terminal
# interface serial 2/0
# ip address 20.0.0.2 255.0.0.0
# no shut
# exit
# interface serial 3/0
# ip address 30.0.0.1 255.0.0.0
# no shut
# exit

```

**Router 2 :- CLI :-**

```

> enable
# config terminal
# interface serial 2/0
# ip address 30.0.0.2 255.0.0.0
# no shut
# exit
# interface Fast Ethernet 0/0
# ip address 40.0.0.1 255.0.0.0
# no shut
# exit

```

(connection b/w  $(R_1, R_2)$ ,  $(R_2, R_3)$ ,  $(R_1, R_3)$  and  $(P_1, R_2)$  will be shown)

Turn green.

Step 4:-

Router 1:- CLI :-

# show ip route

C 20.0.0.0

C 30.0.0.0

# config terminal

# ip route 10.0.0.0 255.0.0.0 20.0.0.1

# ip route 40.0.0.0 255.0.0.0 30.0.0.2

# exit

Router 0:-

CLI :-

# show ip route

# config terminal

# ip route 0.0.0.0 0.0.0.0 20.0.0.2

# exit

Router 2:- CLI :-

# show ip route

# config terminal

# ip route 0.0.0.0 0.0.0.0 30.0.0.1

# exit

Step 5:-

Show IP route in the Router

Ping 40.0.0.10 from 10.0.0.10 and vice versa.

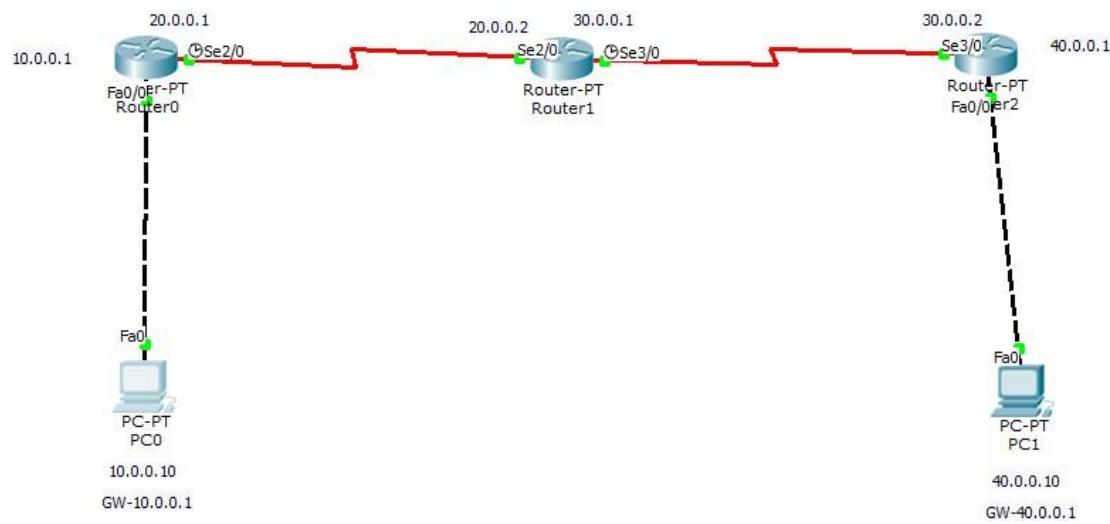
(Ping 10.0.0.10)

Observation :-

- ① All the connection are successful
- ② PC1 → Desktop → Command prompt

Ping 40.0.0.10 is successful

## Screen Shots:

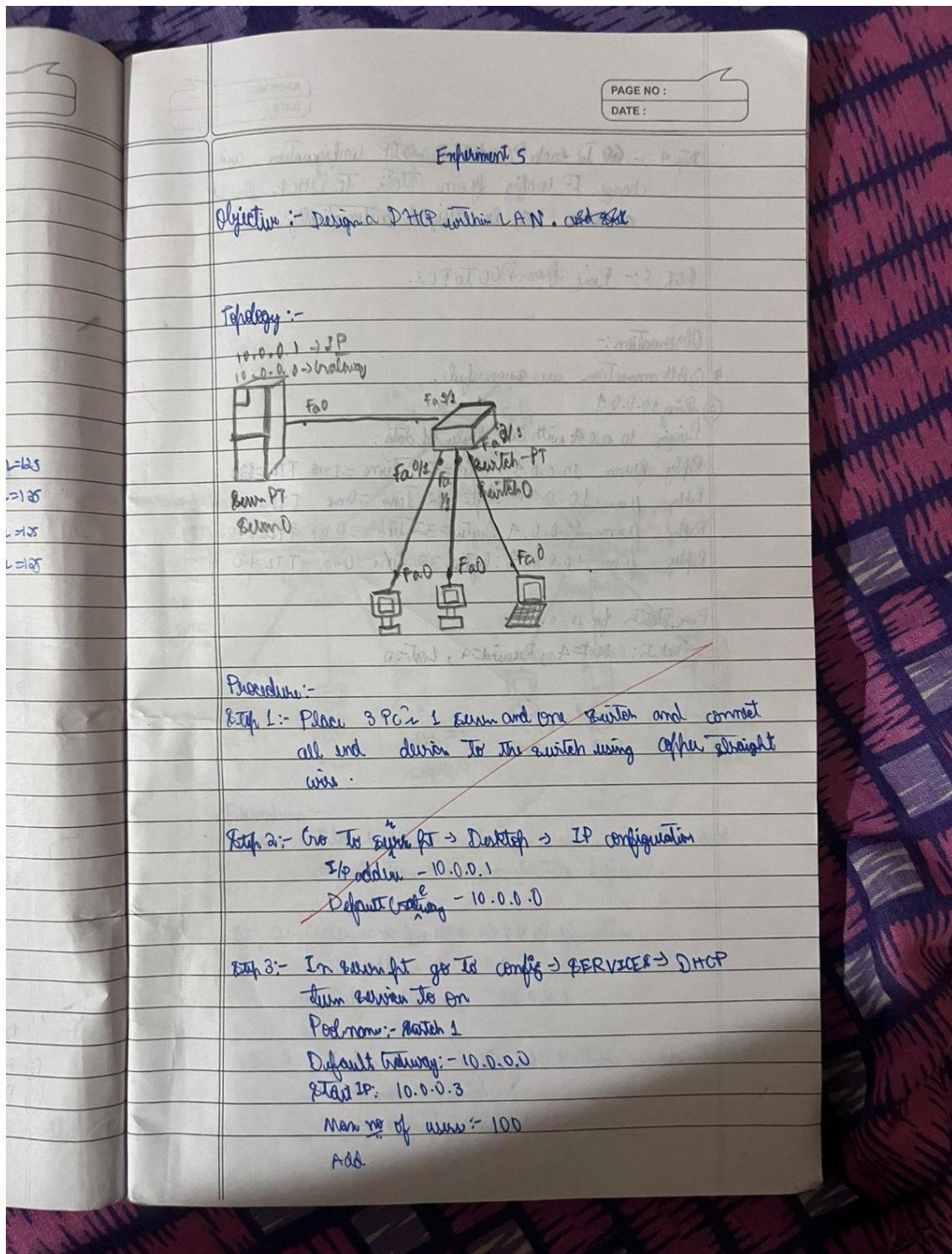


```
Pinging 40.0.0.10 with 32 bytes of data:  
  
Request timed out.  
Reply from 40.0.0.10: bytes=32 time=7ms TTL=125  
Reply from 40.0.0.10: bytes=32 time=6ms TTL=125  
Reply from 40.0.0.10: bytes=32 time=5ms TTL=125  
  
Ping statistics for 40.0.0.10:  
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 5ms, Maximum = 7ms, Average = 6ms  
  
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=8ms TTL=125  
Reply from 40.0.0.10: bytes=32 time=7ms TTL=125  
Reply from 40.0.0.10: bytes=32 time=9ms TTL=125  
Reply from 40.0.0.10: bytes=32 time=6ms 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 = 6ms, Maximum = 9ms, Average = 7ms  
  
PC>
```

## Program 5

**Aim:** Configure DHCP within a LAN and outside LAN.

### **Topology , Procedure and Observation:**



Step 4 :- Go To each PC desktop → IP Configuration and change IP config from static To DHCP. The IP addresses will be assigned automatically.

Step 5 :- Ping from PC0 To PC3.

Observation :-

- ↳ All connections are successful.
- ② 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=120

Reply from 10.0.0.4 : bytes=32 Time=0ms TTL=120

Reply from 10.0.0.4 : bytes=32 Time=0ms TTL=120

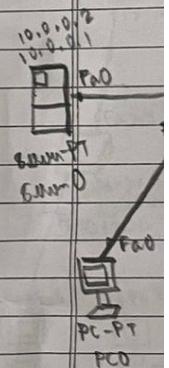
Reply from 10.0.0.4 : bytes=32 Time=0ms TTL=120

Ping statistics for 10.0.0.4

Packets: Sent=4 ; Received=4 , Lost=0

Objectiv

Poplog



Procedure

Step 1 :-

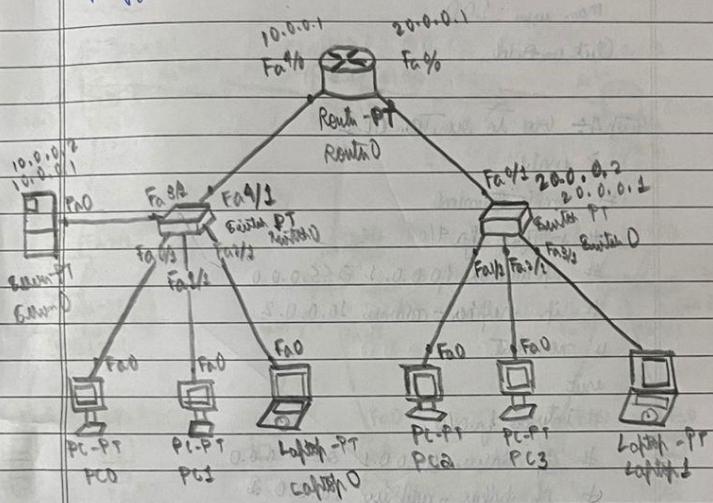
Step 2 :-

Step 3 :-

### Experiment - 6

Objective :- Design DHCP outside LAN

Topology :-



Procedure :-

Step 1 :- Place 6 PCs, 2 switch, Router, 1 router and connect them as shown in the figure.

Step 2 :- Router  $\Rightarrow$  Desktop  $\Rightarrow$  IP Configuration

IP address - 10.0.0.2

Default gateway - 10.0.0.1

Step 3 :- Config  $\Rightarrow$  Review  $\Rightarrow$  DHCP, Turn services ON

Pool range :- Switch 1

Default gateway :- 10.0.0.1

Start IP: 10.0.0.3

Mask size: 255.0.0.0

→ Click on Add.

Port name: switch 2

Default gateway: 20.0.0.1

Default start IP: 20.0.0.3

Mask size: 255.0.0.0

Click on add

Step 4: Go To Router CLI

> enable

# config terminal

# interface fa 0/0

# ip address 10.0.0.1 255.0.0.0

# ip helper-address 10.0.0.2

# no shutdown

exit

# interface fa 0/0

# ip address 20.0.0.1 255.0.0.0

# ip helper-address 10.0.0.2

# no shutdown

All router switch connection group

Step 5: Go to all 6 PCs and change IP configuration  
from static IP. DHCP address will be automatically  
assigned.

Step 6: Ping PC to PCs.

Observation: If all connection are successful

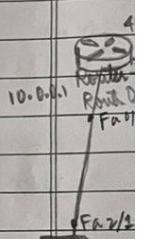
② All the PCs are assigned.

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Object

Topology



Procedure

Step 1:- PC

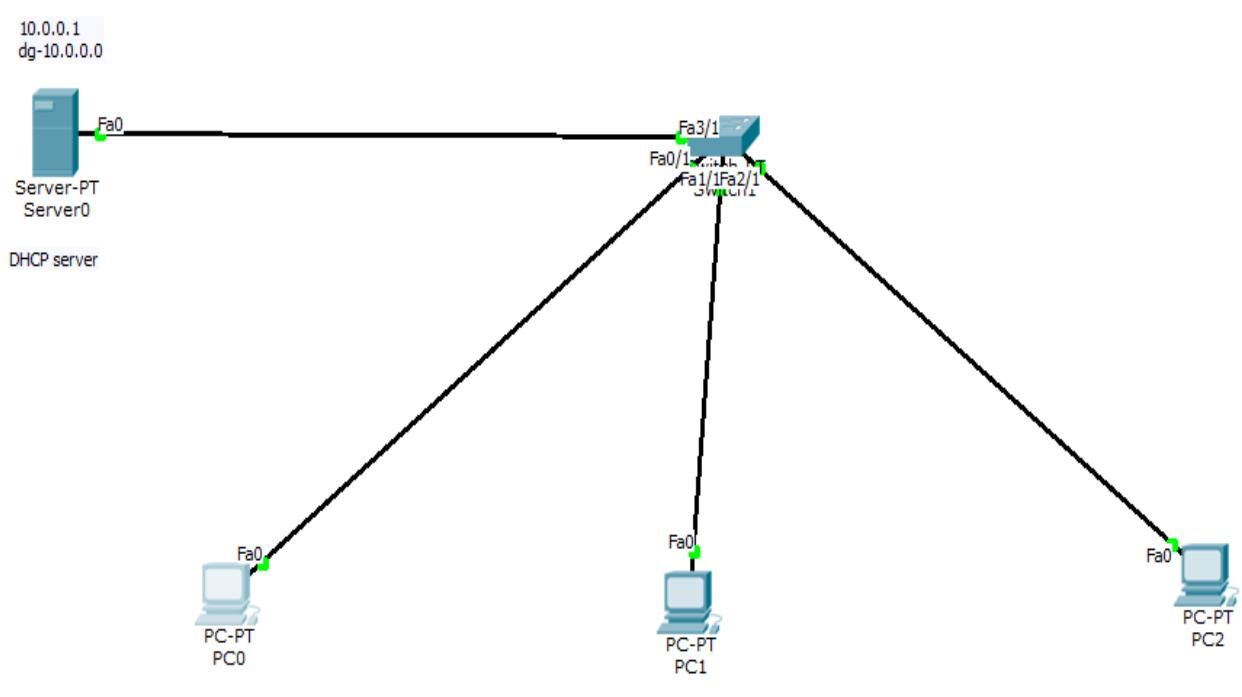
1.0

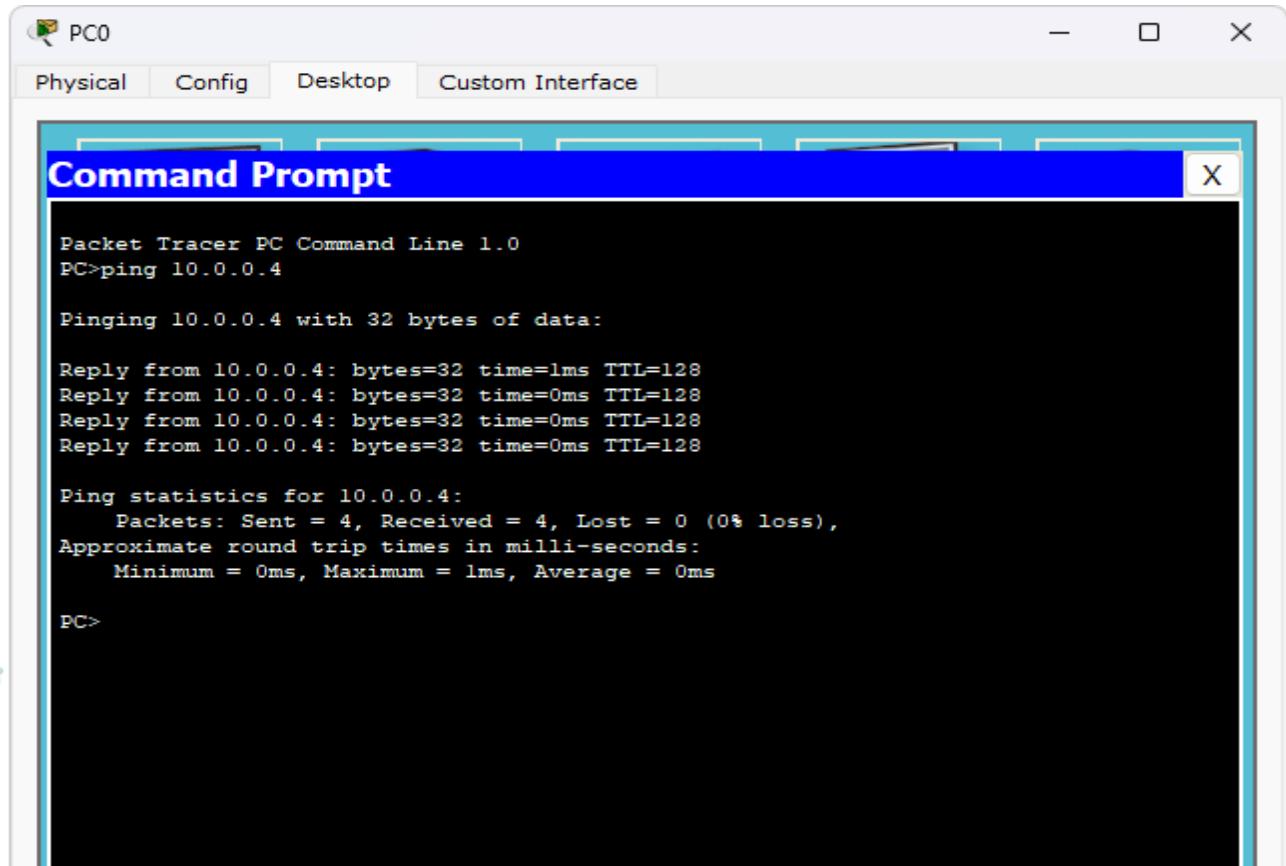
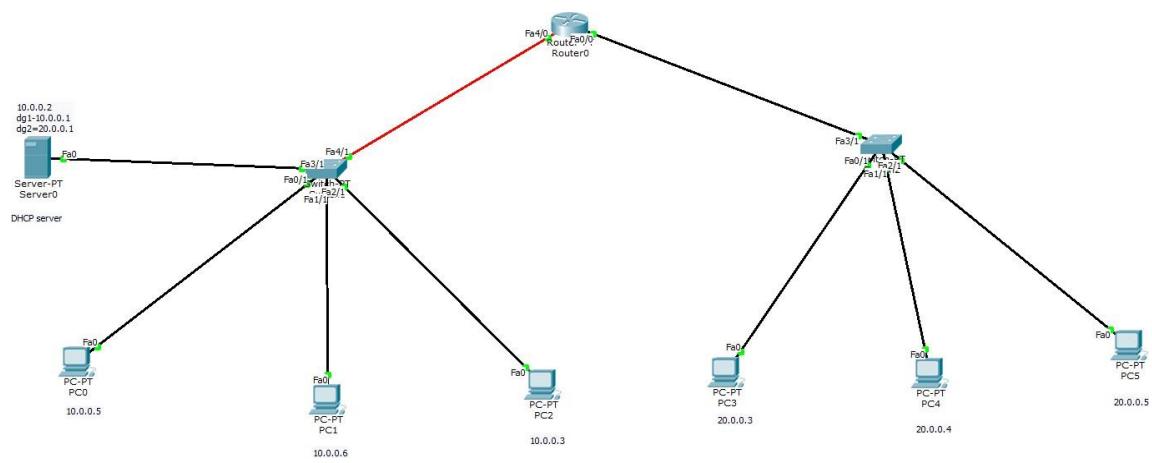
Step 2:- Con

1.0

and

## Screen Shots:





## Program 6

Aim: Configure RIP routing Protocol in Routers .

### **Topology , Procedure and Observation:**

PAGE NO :  
DATE :

Start IP : 10.0.0.3  
Mem size : 100  
Click on Add.

Port name: switch 2  
Default gateway : 20.0.0.1  
Default start IP : 20.0.0.3  
Mem size : 100  
Click on add

Step 4:- Go To Router CLI.  
 # enable  
 # config terminal  
 # interface fa 9/0  
 # ip address 10.0.0.1 255.0.0.0  
 # ip helper-address 10.0.0.2  
 # no shut  
 exit  
 # interface fa 0/0  
 # ip address 20.0.0.1 255.0.0.0  
 # ip helper-address 10.0.0.2  
 # no shut

All router switch connection go up

Step 5:- Go To all 6 PC's and change IP configuration from static IP DHCP address will be automatically assigned.

Step 6:- Bring PC To PCs.

**Observation:**  
 ① All connection are successful  
 ② All the PCs are assigned.

Step 3 - Configuring IP address of all Router  
 Router 0  $\rightarrow$  10.0.0.1 Fa0/0

Router 1  $\rightarrow$  10.0.0.2 Fa0/0

Router 1  $\rightarrow$  20.0.0.1 Fa0/0

20.0.0.2 Fa0/0

50.0.0.1  $\rightarrow$  Fa0/0

~~upkeep~~

Router 2  $\rightarrow$  30.0.0.1 Fa0/0

50.0.0.2 Fa0/0

Step 4: Router 0  $\rightarrow$  CLI

> enable

# config terminal

# router rip

# network 10.0.0.0

# network 40.0.0.0

Router 1  $\rightarrow$  CLI

> enable

# config terminal

# router rip

# network 20.0.0.0

# network 50.0.0.0

Router 2  $\rightarrow$  CLI

> enable

# config terminal

# router rip

# network 30.0.0.0

# network 50.0.0.0

Step 5:

classmate

1. All dev

2. Ping 3

done 0.9.0.0

problem with classmate

problem with

ITT for auton

Rin

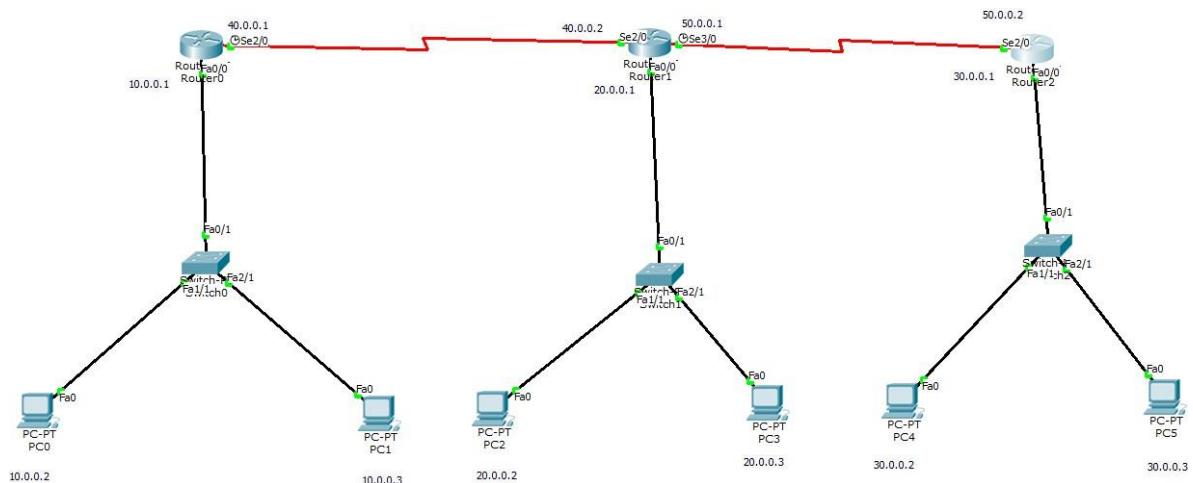
change from 0.9.0.0

to 0.9.0.1

error

done 0.9.0.1

## Screen Shots:



PC0

Physical    Config    Desktop    Custom Interface

**Command Prompt**

```

Pinging 30.0.0.2 with 32 bytes of data:

Request timed out.
Reply from 30.0.0.2: bytes=32 time=7ms TTL=125
Reply from 30.0.0.2: bytes=32 time=6ms TTL=125
Reply from 30.0.0.2: bytes=32 time=7ms TTL=125

Ping statistics for 30.0.0.2:
  Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 7ms, Average = 6ms

PC>ping 30.0.0.2

Pinging 30.0.0.2 with 32 bytes of data:

Reply from 30.0.0.2: bytes=32 time=4ms TTL=125
Reply from 30.0.0.2: bytes=32 time=7ms TTL=125
Reply from 30.0.0.2: bytes=32 time=7ms TTL=125
Reply from 30.0.0.2: bytes=32 time=7ms TTL=125

Ping statistics for 30.0.0.2:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 7ms, Average = 6ms

PC>
  
```

## Program 7

Aim: Demonstrate the TTL/ Life of a Packet .

### **Topology , Procedure and Observation:**

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

Procedure :-

Step 1 :- Construct the given topology. E.O.O.08 part 8

Step 2 :- Create a packet with a simple PDU source : PC0 and destination : PC5. Go to simulation frame by double clicking it. Step 8.0.0.25

Step 3 :- Click Auto capture / Play and select the packet when it reaches monitor. Check the value of TTL inbound PDU, Outbound PDU.

Step 4 :- Continue to press Auto capture / play and check the same when packet reaches all router.

Observation :-

- ⇒ Routers contain information on packet till here.
- ⇒ TTL value decreases as it passes each router.

Router 0 :-

inbound PDU	outbound PDU
TTL: 255	TTL: 254

S/10x  
2011/08

(config)  
(config)  
(config)

## Screen Shots:

PDU Information at Device: Router0

OSI Model   Inbound PDU Details   Outbound PDU Details

At Device: Router0  
Source: PC0  
Destination: PC3

**In Layers**

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 10.0.0.2, Dest. IP: 20.0.0.3 ICMP Message Type: 8
Layer 2: Ethernet II Header 000A.41E3.E33A >> 0010.11A0.4697
Layer 1: Port FastEthernet0/0

**Out Layers**

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 10.0.0.2, Dest. IP: 20.0.0.3 ICMP Message Type: 8
Layer 2: HDLC Frame HDLC
Layer 1: Port(s): Serial2/0

1. FastEthernet0/0 receives the frame.

Challenge Me   << Previous Layer   Next Layer >>

PDU Information at Device: Router0

OSI Model   Inbound PDU Details   Outbound PDU Details

PDU Formats

Ethernet II

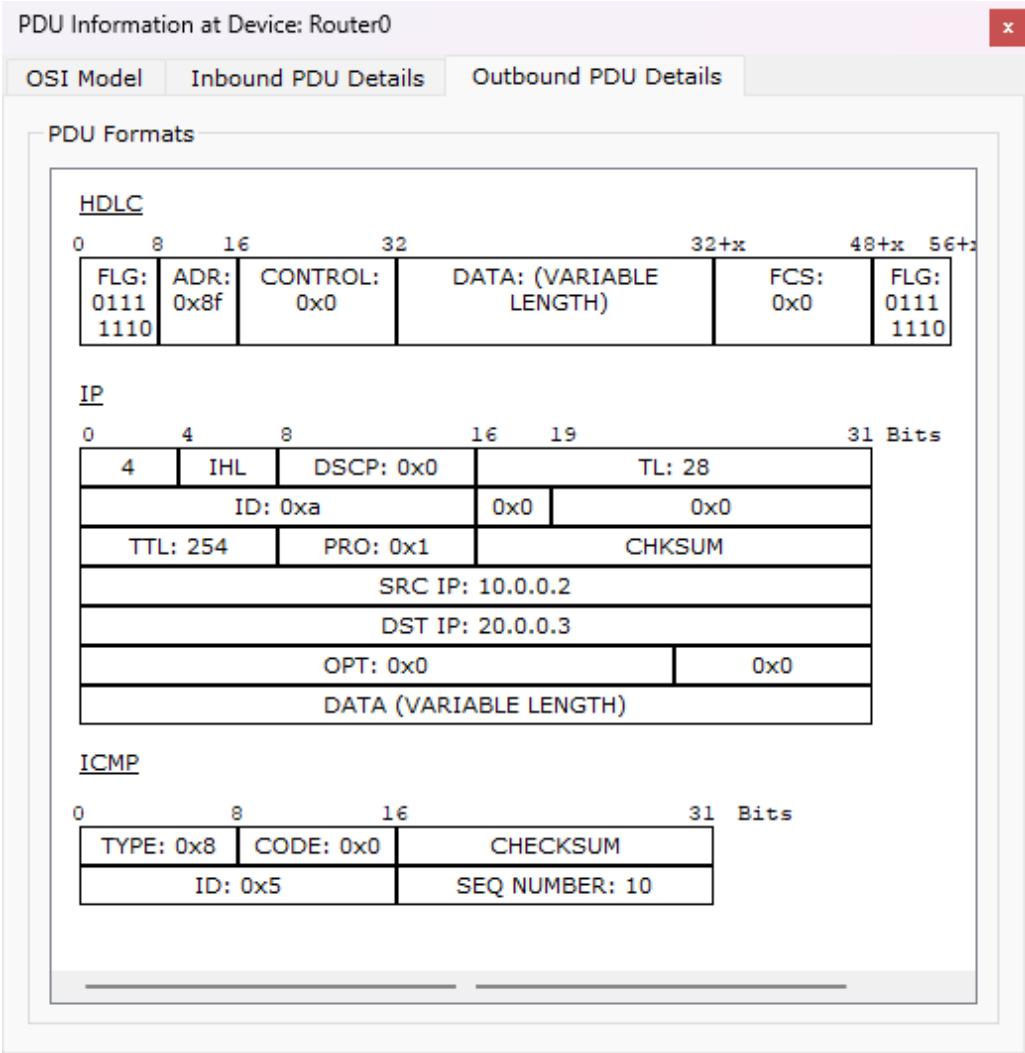
0	4	8	14	19	Bytes
PREAMBLE: 101010...1011		DEST MAC: 0010.11A0.4697		SRC MAC: 000A.41E3.E33A	
TYPE: 0x800		DATA (VARIABLE LENGTH)			FCS: 0x0

IP

0	4	8	16	19	31 Bits
IHL		DSCP: 0x0		TL: 28	
ID: 0xa		0x0	0x0		
TTL: 255		PRO: 0x1		CHKSUM	
SRC IP: 10.0.0.2					
DST IP: 20.0.0.3					
OPT: 0x0				0x0	
DATA (VARIABLE LENGTH)					

ICMP

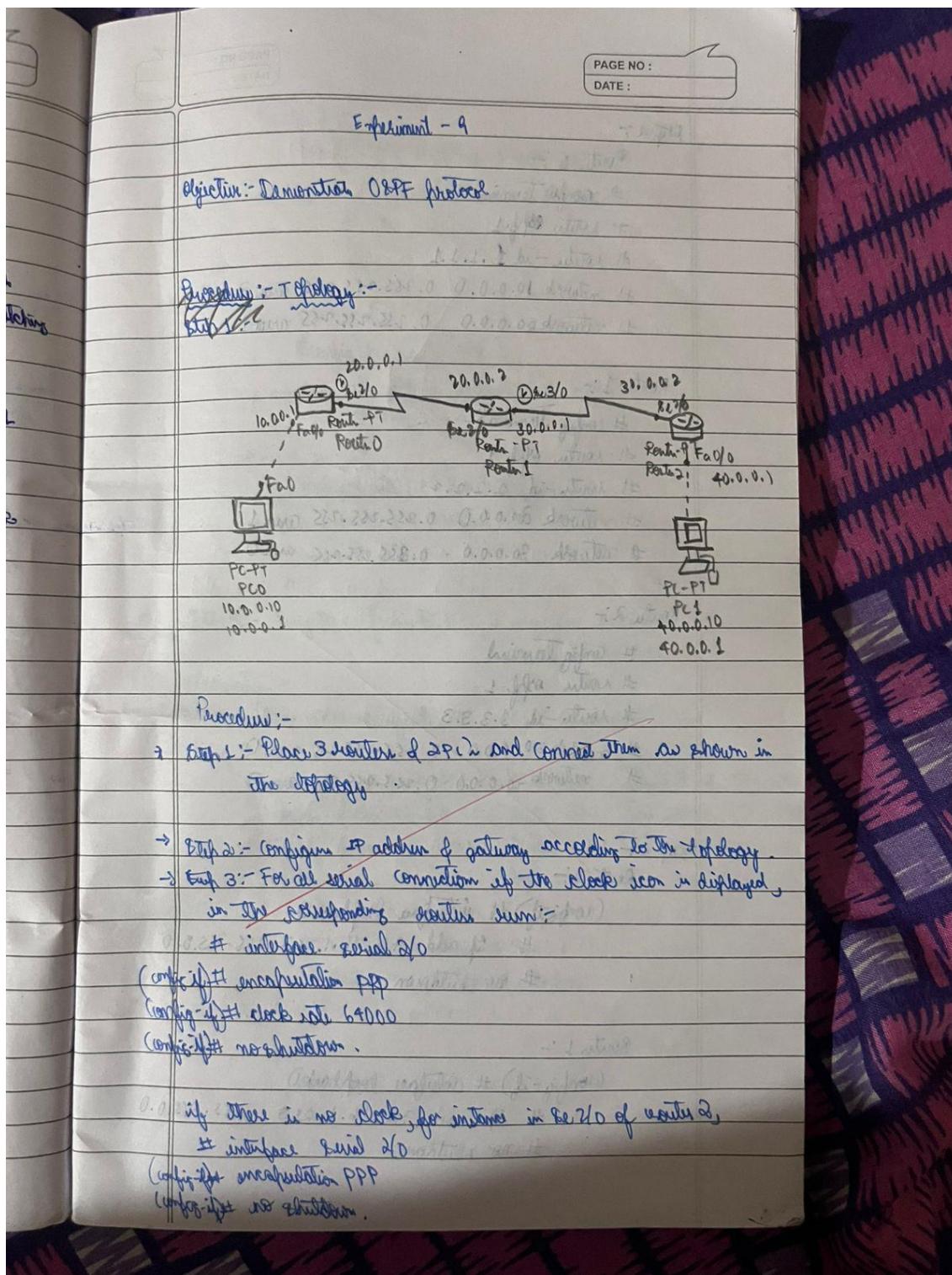
0	8	16	31 Bits
TYPE: 0x8		CODE: 0x0	CHECKSUM
-----			



## Program 8

Aim: Configure OSPF routing protocol .

### **Topology , Procedure and Observation:**



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**Step 4 :-**

**Routu 0 :-**

- # config terminal
- # Router off 1
- # Router-id 1.1.1.1
- # network 10.0.0.0 0.255.255.255 area 3
- # network 20.0.0.0 0.255.255.255 area 1

**Routu 1 :-**

- # config Terminal
- # Router off 1
- # Router-id 2.2.2.2
- # network 30.0.0.0 0.255.255.255 area 1
- # network 30.0.0.0 0.255.255.255 area 0

**Routu 2 :-**

- # config Terminal
- # Router off 1
- # Router-id 3.3.3.3
- # network 30.0.0.0 0.255.255.255 area 0
- # network 40.0.0.0 0.255.255.255 area 2

**Step 5 :-**

**Routu 0 :-**

(config) # interface loopback0

- # ip add 172.16.1.252 255.255.0.0
- # no shutdown

**Routu 1 :-**

(config-if) # interface loopback0

- # ip add 172.16.1.253 255.255.0.0
- # no shutdown

**Step 6 :-**

**Step 7 :-**

**Router**

- ① All con
- ② Pung

**Step 8 :-**

**Step 9 :-**

Router 2 :-

(config-if) # interface fastethernet 0  
# ip add 172.16.1.254 255.255.0.0  
# no shutdown.

Step 6 :-

Router 0 :-

(config) # route 1  
(config-route) # area 1 virtual-link 2.2.2.2  
# exit

Router 1 :-

R1 (config-route) # route 0.0.0.1  
(config-route) # area 1 virtual-link 1.1.1.1  
# exit interface 1 bandwidth 1, 39 + 1027

distance-vector neighbor 1.1.1.1 39 + 1027

distance-vector neighbor 2.2.2.2 39 + 1027

Step 9 :- Ping PC 5 from PC 07 is successful 9.3.1.68

39.1027 ms

Observation :-

① All computations are successful.

② Ping 40.0.0.10

Reply from 40.0.0.10 bytes: 32 Time=7ms TTL=25

Reply from 40.0.0.10 bytes: 32 Time=6ms TTL=125

Reply from 40.0.0.10 bytes: 32 Time=7ms TTL=125

Reply from 40.0.0.10 bytes: 32 Time=7ms TTL=125

loss = 0, round trip avg = 819.8 ms - min = 6 ms - max = 25 ms

Ping statistics Received = 4 bytes total number

lost = 0 , lost = 0 (0% loss)

RTT min = 6 ms, reward = 0 & punish = 0 RTT avg = 819.8 ms

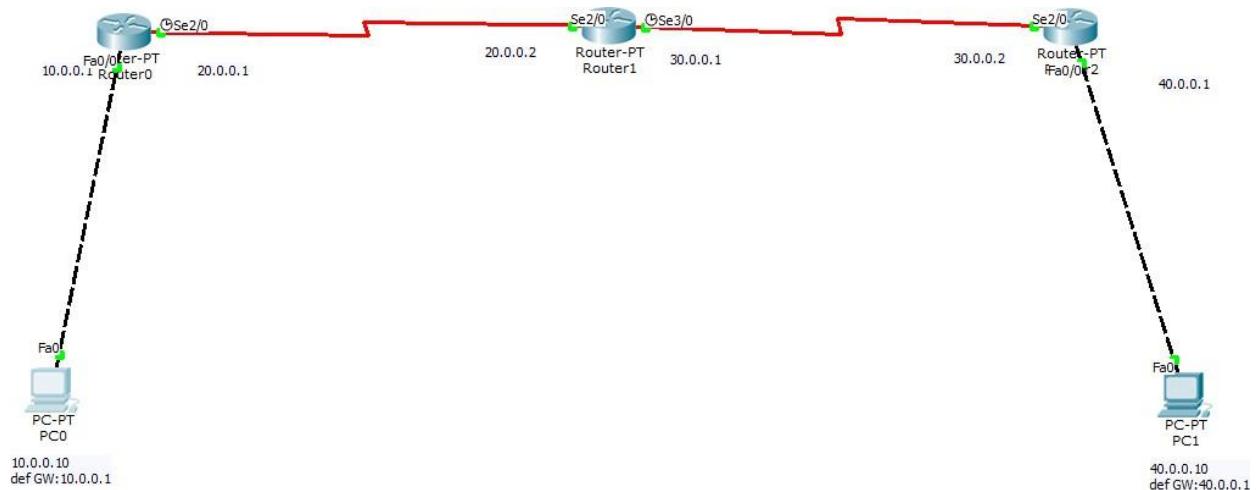
RTT max = 25 ms, RTT stdev = 0 ms

alive in your browser

0.0

5.0.0

## Screen Shots:



PC> ping 40.0.0.10

Pinging 40.0.0.10 with 32 bytes of data:

Request timed out.

Reply from 40.0.0.10: bytes=32 time=7ms TTL=125

Reply from 40.0.0.10: bytes=32 time=7ms TTL=125

Reply from 40.0.0.10: bytes=32 time=8ms TTL=125

Ping statistics for 40.0.0.10:

Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),

Approximate round trip times in milli-seconds:

Minimum = 7ms, Maximum = 8ms, Average = 7ms

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=7ms TTL=125

Reply from 40.0.0.10: bytes=32 time=6ms TTL=125

Reply from 40.0.0.10: bytes=32 time=6ms 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:

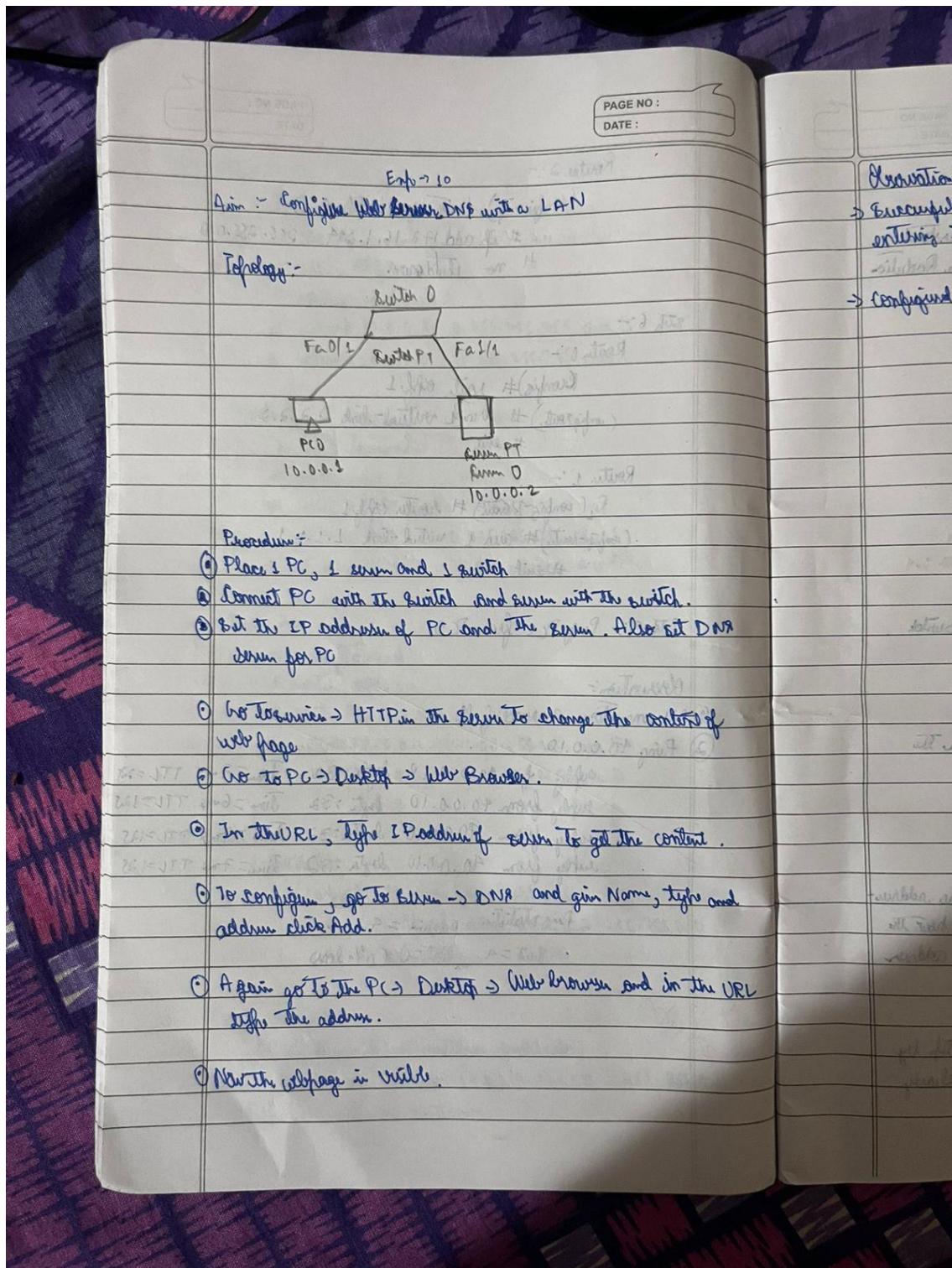
Minimum = 6ms, Maximum = 9ms, Average = 7ms

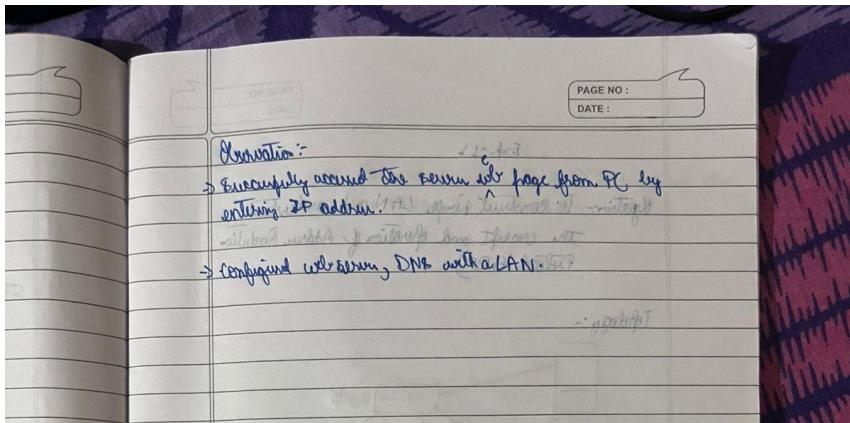
PC>

## **Program 9**

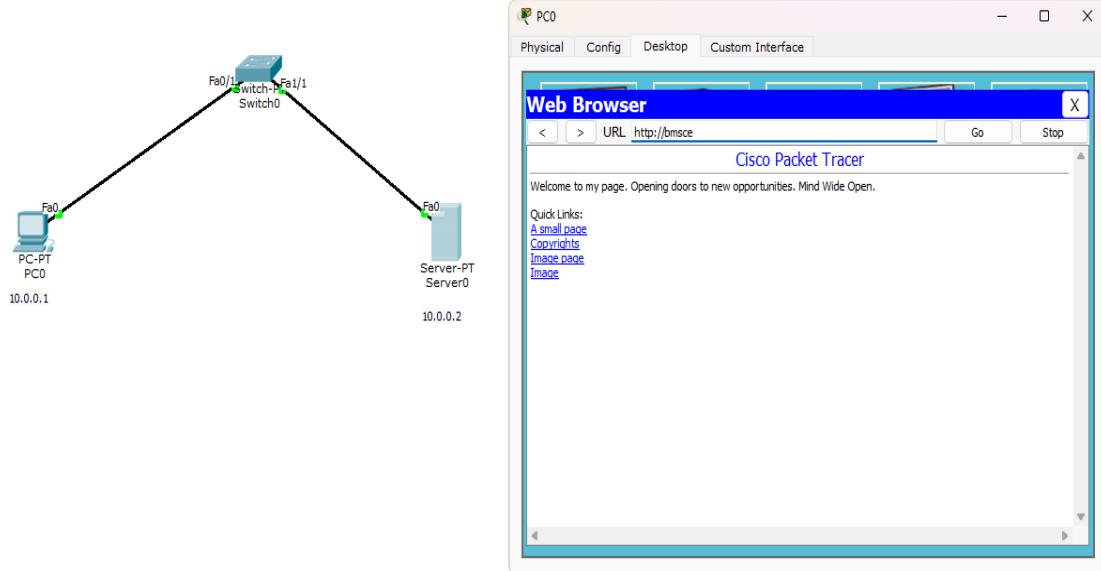
**Aim:** Configure Web Server, DNS within a LAN.

### **Topology , Procedure and Observation:**





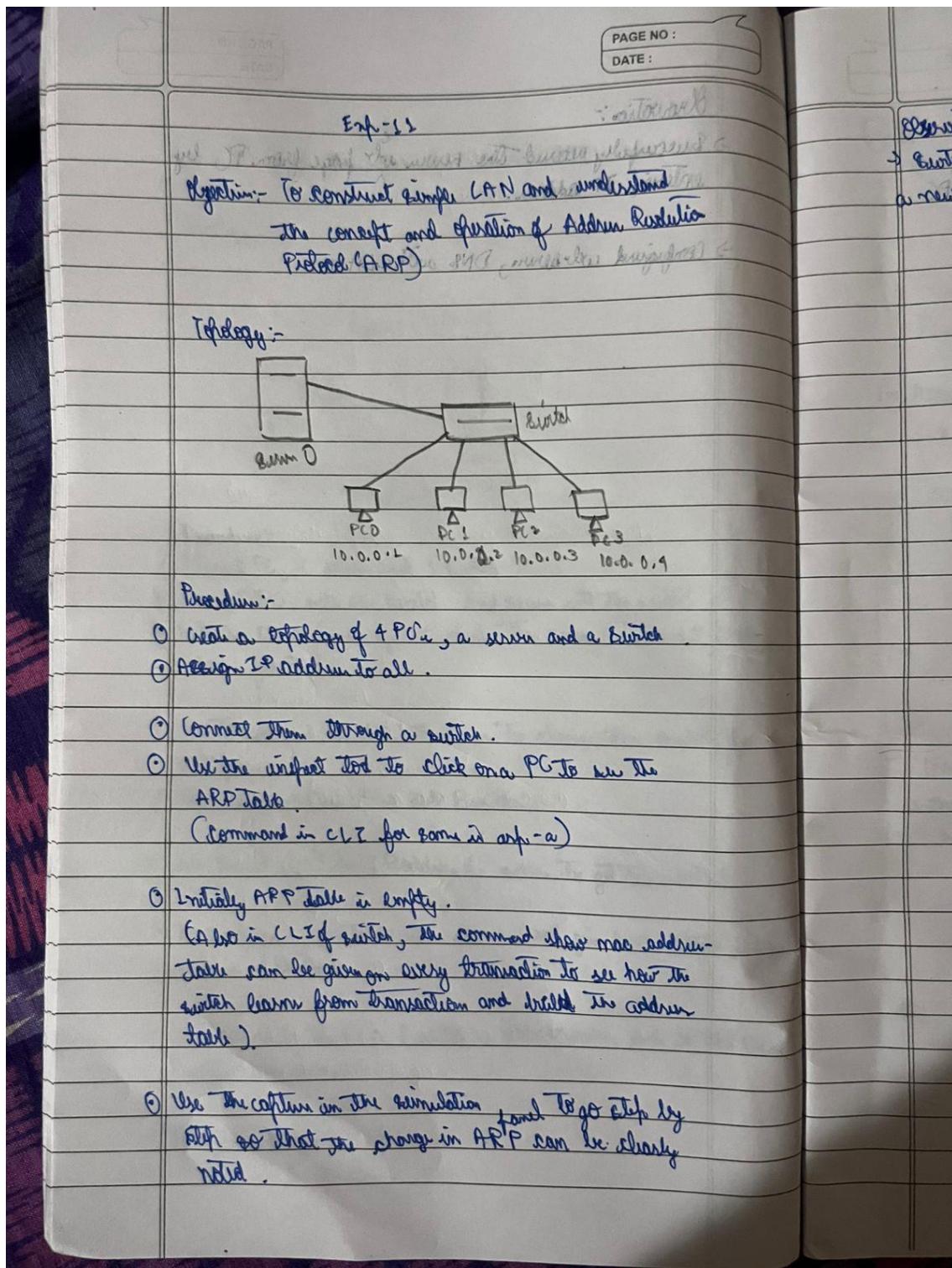
## Screen Shots:



## **Program 10**

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

### **Topology , Procedure and Observation:**



Observation :-

→ Watch an cellular phone update the ARP table as and when a new communication starts.

17.03.2012

→ ~~mobile~~

17.03.2012

→ ~~mobile~~

Mobile action for new neighbour update in ARP

→ Mobile's broadcast (ii)

17.03.2012

Source address #

192.168.1.100 #

192.168.1.101 #

Op transmission request #

0.0.0.255 1.0.0.0.01 subnet id #

17.03.2012

Op broadcast #

17.03.2012

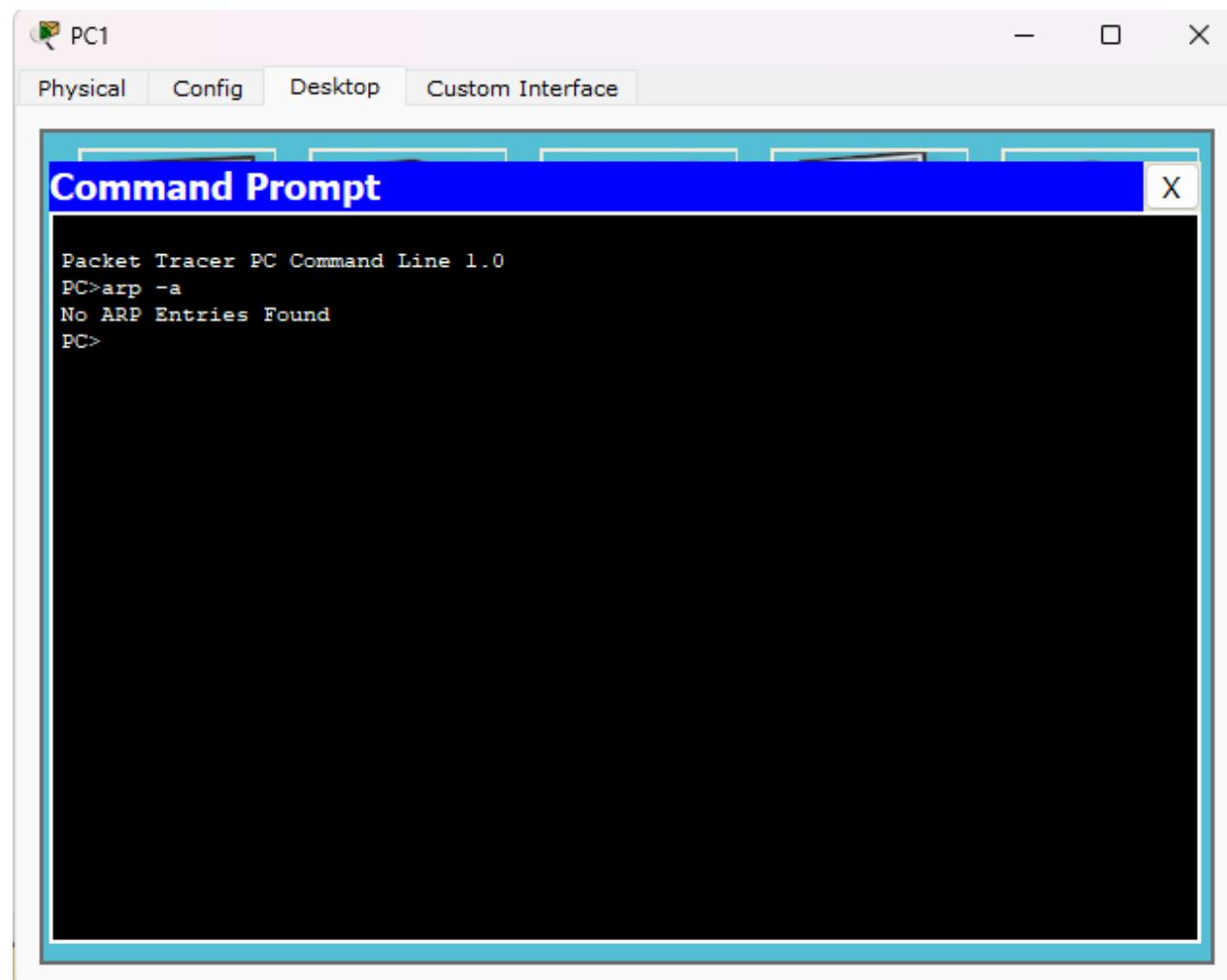
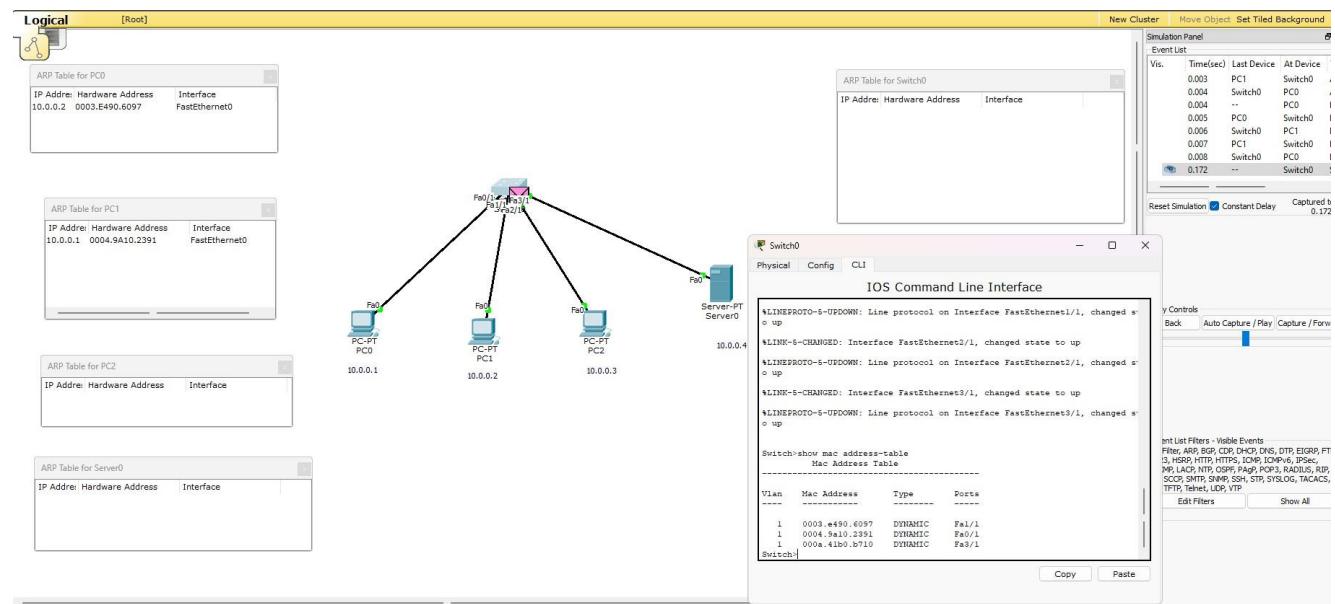
Op broadcast #

17.03.2012

17.03.2012

→ Broadcast message to 192.168.1.101

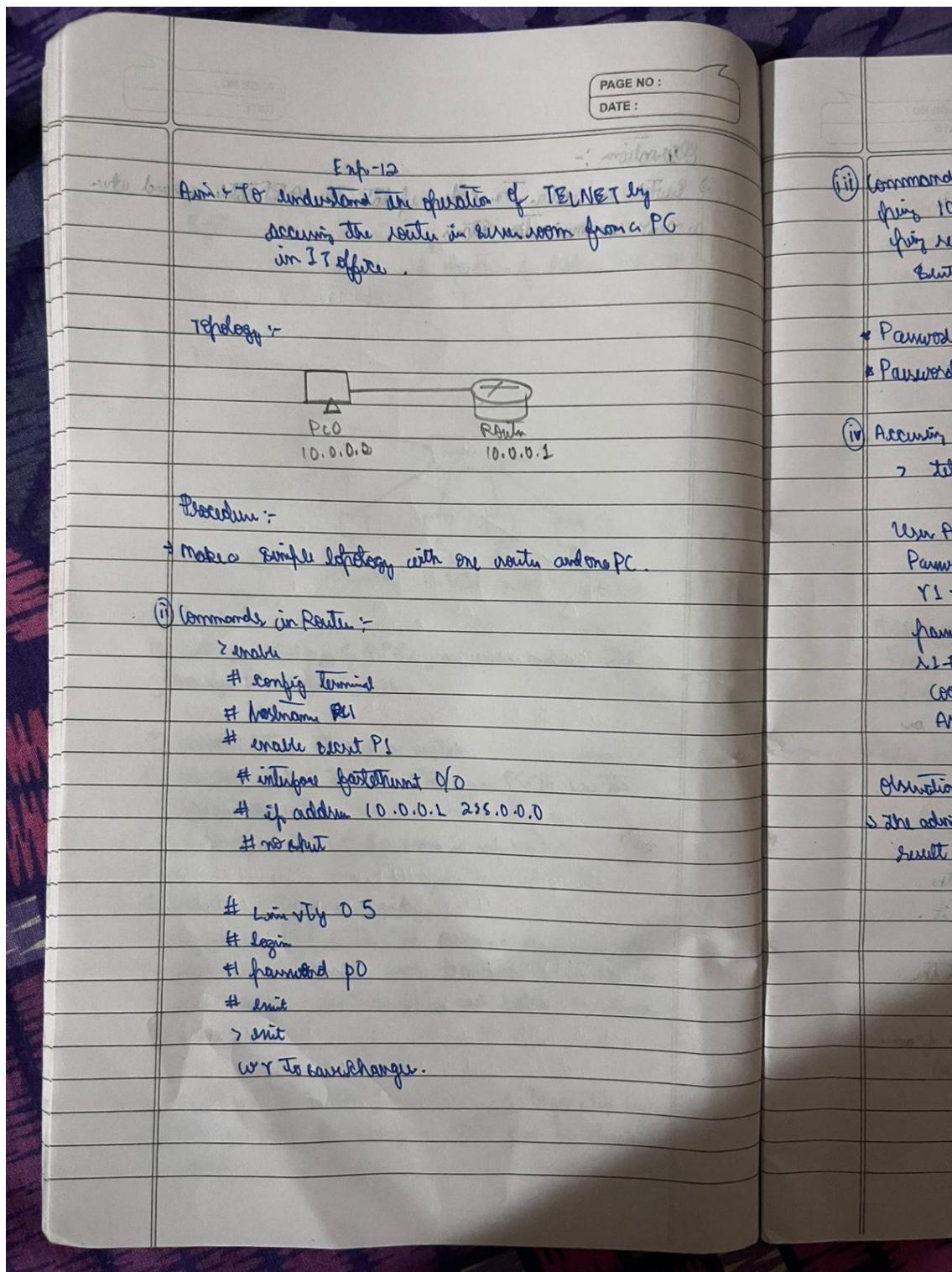
## Screen Shots:



## Program 11

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

### **Topology , Procedure and Observation:**



(ii) Commands in PC

ping 10.0.0.1 from host 1114 & return at 0.0ms  
ping result :- (host 1114 is up (no answer))  
Sent = 1, Received 1, Lost = 0 (0% loss)

\* Password for user access verification in PO

\* Password for enable in P1

(iv) Accessing switch CLI from PC

> Telnet 10.0.0.1

User Access Verification

Password :

YI > answe

password :

11 # show ip route

Codes

Area

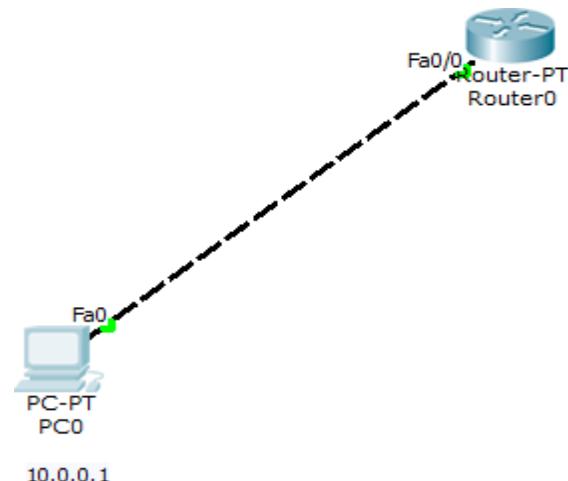
Observation :-

The admin in PC is ~~not~~ able to run commands and see the result from PC.

at window it will give error message  
. telnet session is not available - telnet

at switch 1 it is telling no configuration file found  
. switch telnet by default config status  
config already exist, so no need to config  
(still better said this is not switch)

## Screen Shots:



10.0.0.1

### Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=0ms TTL=255

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>telnet 10.0.0.2
Trying 10.0.0.2 ...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

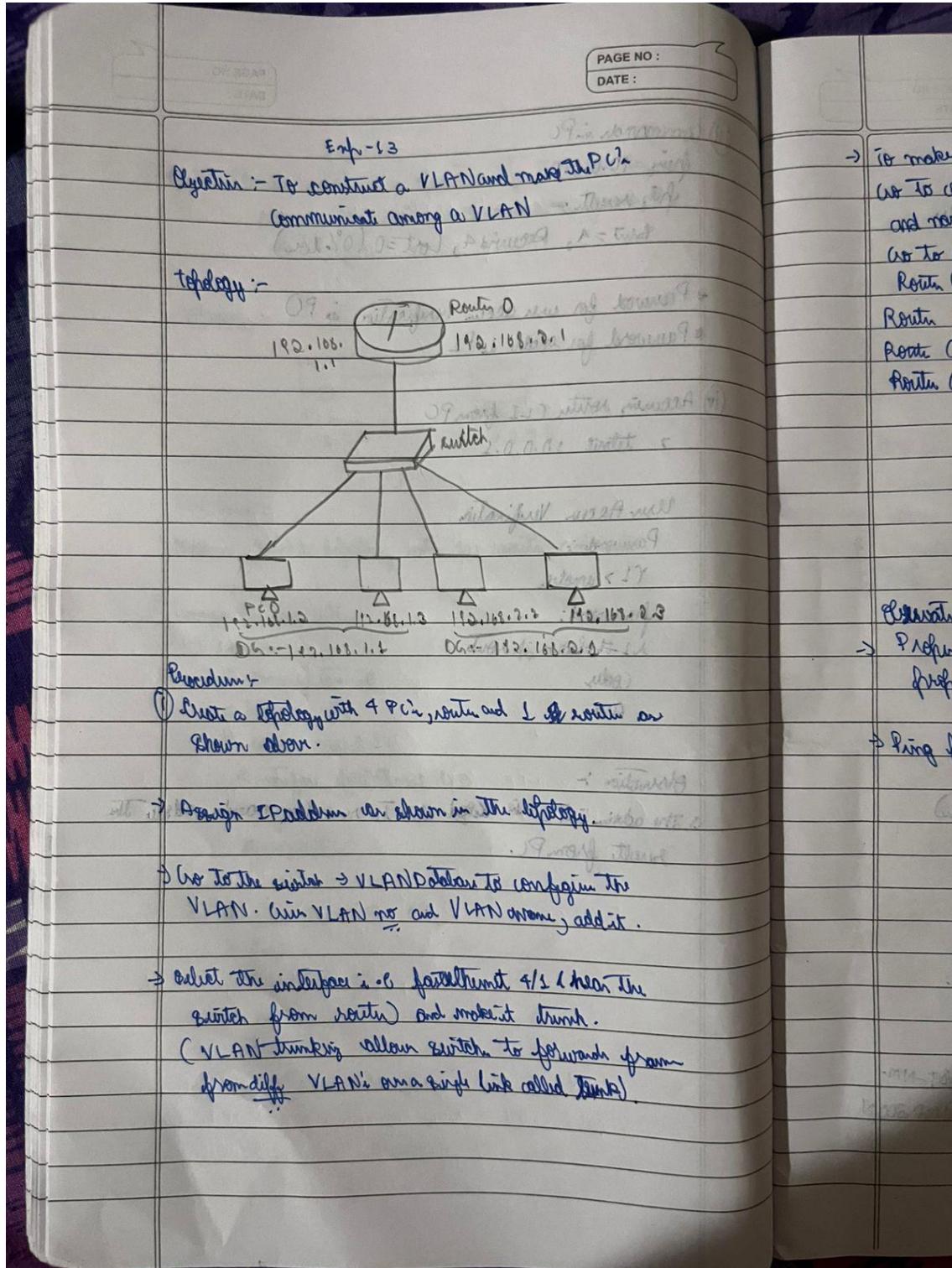
Gateway of last resort is not set

C    10.0.0.0/8 is directly connected, FastEthernet0/0
R1#
```

## Program 12

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

### **Topology , Procedure and Observation:**



→ To make switch understand VLAN.

→ To config Trunk of switch, select VLAN database with the no and name of VLAN created.

To To CLI

Router (Vlan) # exit

Router # config Terminal

Router (config)# interface fastethernet 0/0.1

Router (config)#

# encapsulation dot1Q 2

# ip address 192.168.2.1.255.255.255.0

# no shutdown

# exit

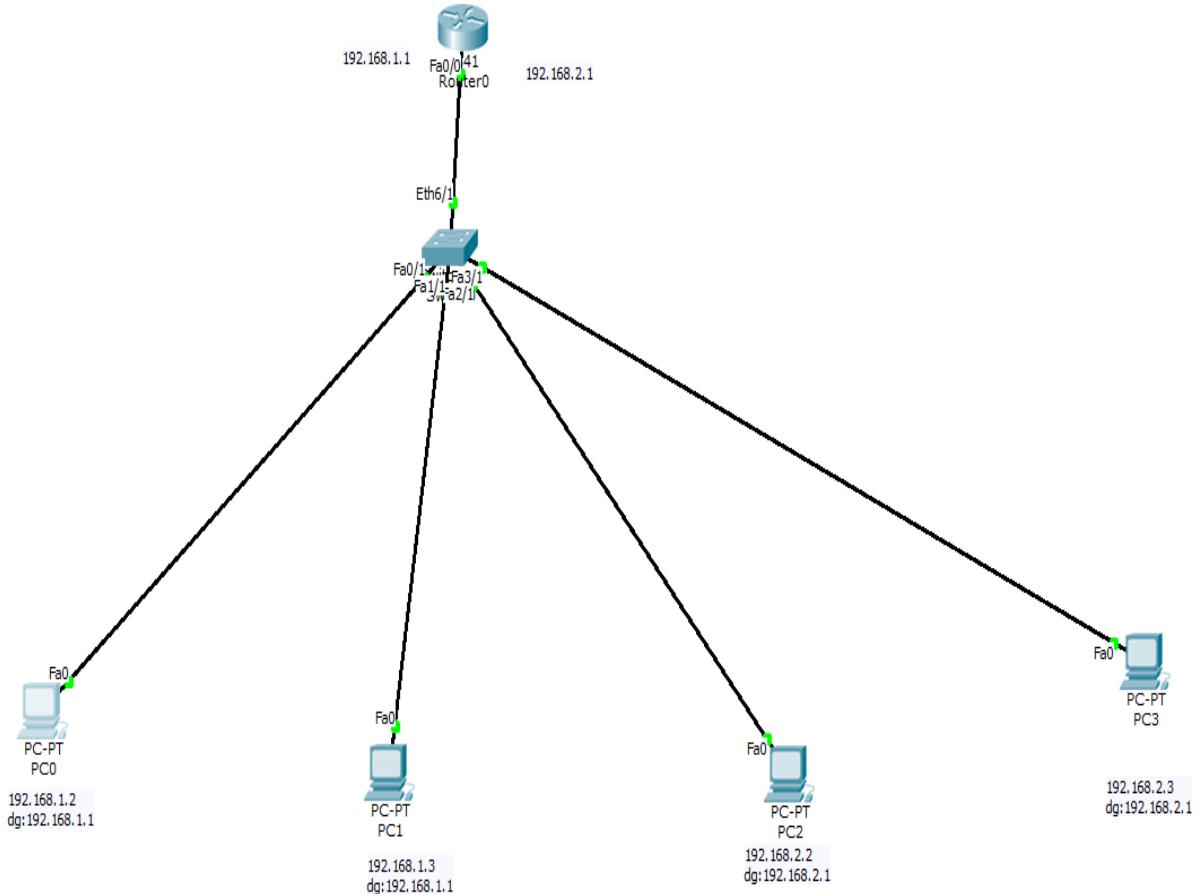
# end

Observation:-

→ Proper trunk configuration is established To make VLAN work properly.

→ Trunk from one VLAN to another works properly.

## Screen Shots:



## Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=4ms TTL=127

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 4ms, Average = 1ms

PC>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=2ms TTL=127
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

PC>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.3: bytes=32 time=3ms TTL=127
Reply from 192.168.2.3: bytes=32 time=2ms TTL=127
Reply from 192.168.2.3: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 3ms, Average = 2ms

PC>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Reply from 192.168.2.3: bytes=32 time=0ms TTL=127
Reply from 192.168.2.3: bytes=32 time=0ms TTL=127
Reply from 192.168.2.3: bytes=32 time=2ms TTL=127
Reply from 192.168.2.3: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

PC>
```

## Program 13

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

### **Topology , Procedure and Observation:**

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Expt: 14 To construct WLAN and make the nodes communicate wirelessly.

**Objectives :-** To construct WLAN and make the nodes communicate wirelessly.

**Topology :-**

```

graph LR
    Router((Router)) --- WEP[Wireless Access Point]
    WEP --- PC1[PC1]
    WEP --- PC2[PC2]
    WEP --- Laptop[Laptop]
    WEP --- Printer[Printer]
    Router --- PC1
    Router --- PC2
    Router --- Laptop
    Router --- Printer
  
```

**Procedure:-**

- ① Construct the above topology.
- Configuring PC1 and printer are normally done.
- ② Configure access point → port → SSID name  
→ any name (WLAN here)
- ③ Set WEP and give any 10 digit key  
(#1234567890 here)
- ④ Configure PC1 and laptop with wireless standards.
- ⑤ In PC1,

Switch off the device. Open the setting PI-HUB-NM-14.7 to the component used in LHS. Drag WMP300N wireless interface to the empty port.  
Switch on the device.

**Observation:-**

- ① Router will change IP address.
- ② Signal strength.
- ③ Ping is successful.

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- ⑦ In the config file a new wireless interface would have been added. New configuration BSSID, WEP key, IP address and gateway (or normally alone) to the device.
- ⑧ Do similar in laptop.

⑨ Ping from my device to my other laptop. The result.

"Data bytes sent  
2.0.0.FE1": omitted

Observation:-

00081 = 1007 ...

- ① Device could connect to WLAN along with they are in the network range. (different wireless networks, taking traffic)
- ② Signal strength decrease with increase in distance.
- ③ Ping is successful.

(Chennai, station 2) Data bytes sent

(Chennai, station 1) Data bytes sent 1007

(Chennai, station 2) Data bytes sent

(Chennai, station 1) Data bytes sent

(Chennai, station 2) Data bytes sent

ff.71 Data bytes sent

"Data bytes sent  
6.0.0.FE1": omitted

00081 = 1007 ...

1007 (Data bytes sent) Data bytes sent

((Data bytes sent)) Data bytes sent

(Data bytes sent)

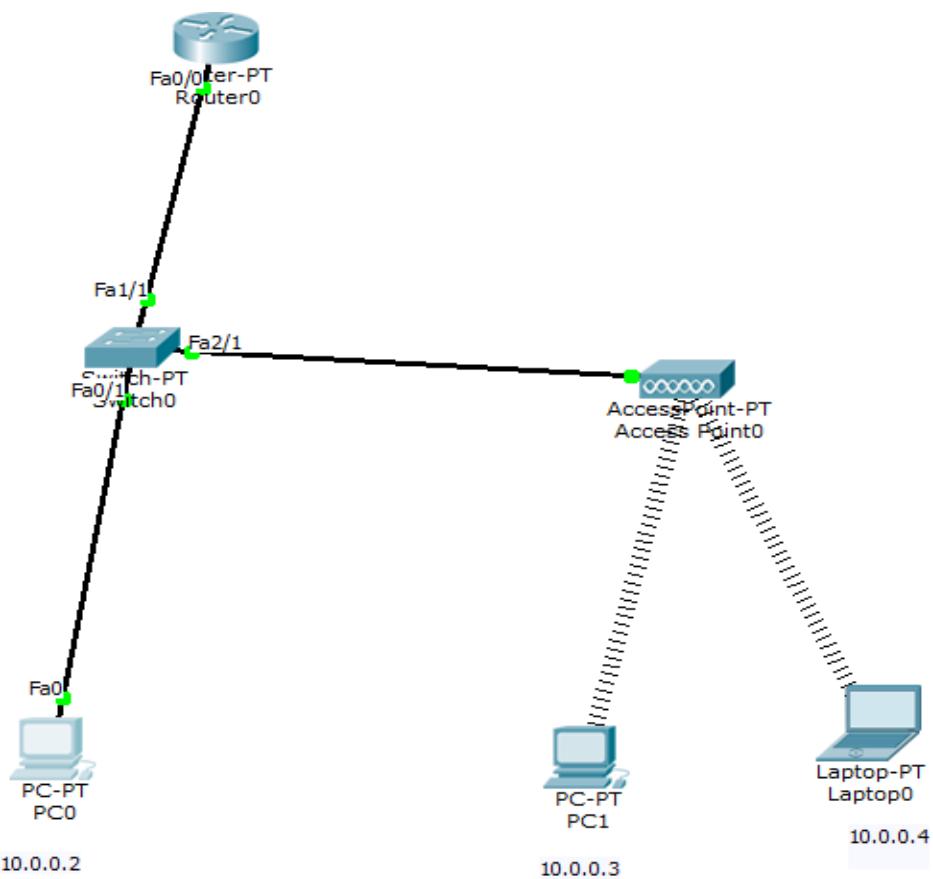
: 2 lines

((Data bytes sent)) Data bytes sent

(((Data bytes sent))) Data bytes sent

(((Data bytes sent))) Data bytes sent

## Screen Shots:



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=22ms TTL=128
Reply from 10.0.0.3: bytes=32 time=6ms TTL=128
Reply from 10.0.0.3: bytes=32 time=3ms TTL=128
Reply from 10.0.0.3: bytes=32 time=7ms 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 = 3ms, Maximum = 22ms, Average = 9ms

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=19ms TTL=128
Reply from 10.0.0.4: bytes=32 time=5ms TTL=128
Reply from 10.0.0.4: bytes=32 time=6ms TTL=128
Reply from 10.0.0.4: bytes=32 time=7ms 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 = 5ms, Maximum = 19ms, Average = 9ms

PC>

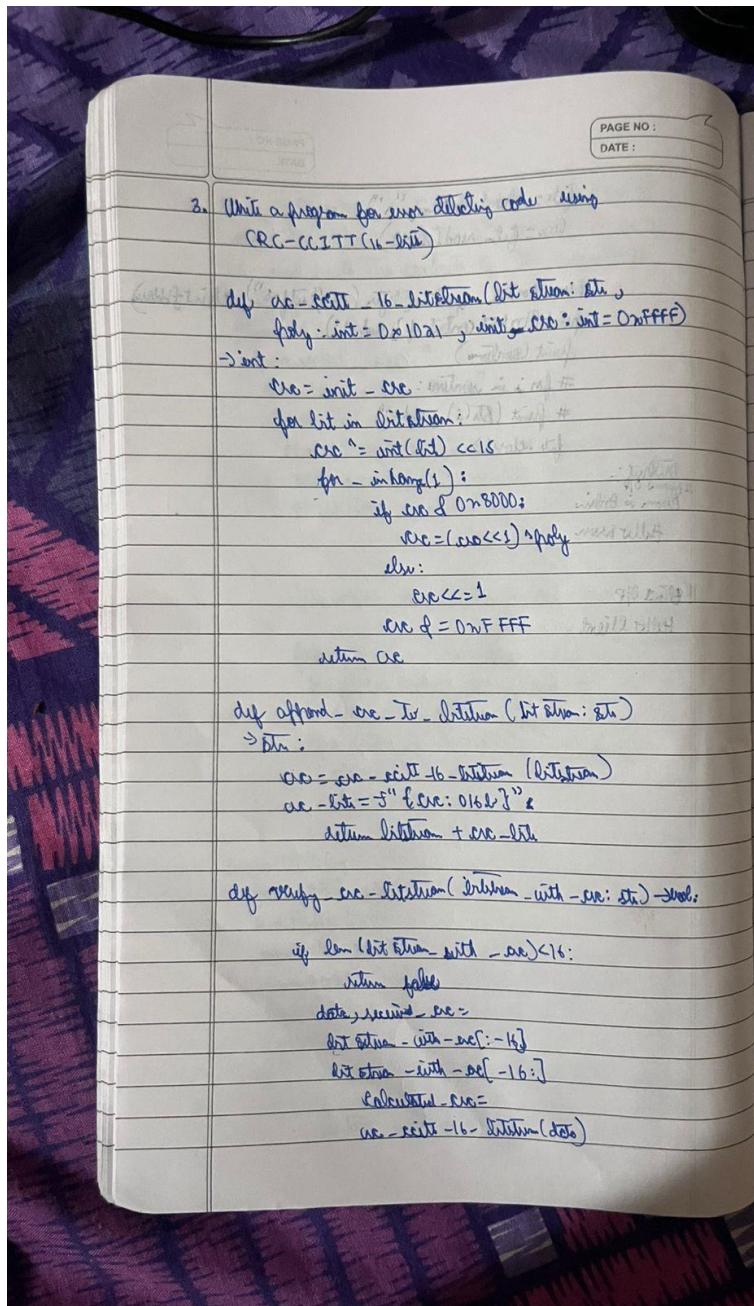
```

## PART-B

### Program 14

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

#### Code and Output:



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return calculated - error = - ; return ideal  
int (received - src, 2)

Output :-

Enter message

111101

The transmitted message is : 1111110101011111

Enter the received message in binary : 111101

No error in data

(Simplest error detection method)

return - ideal = result - result

ideal - result = > 0 - > 0 = no error found  
ideal - result = < 0 - < 0 = error found

(if result - ideal > 0 or result - ideal < 0 then error)

Transmitter sends = 10111101111111111111111111111111

channel noise

(noise)

result = 10111101111111111111111111111111

ideal - result = 00000000000000000000000000000000

- result

result - ideal = 00000000000000000000000000000000

ideal - result

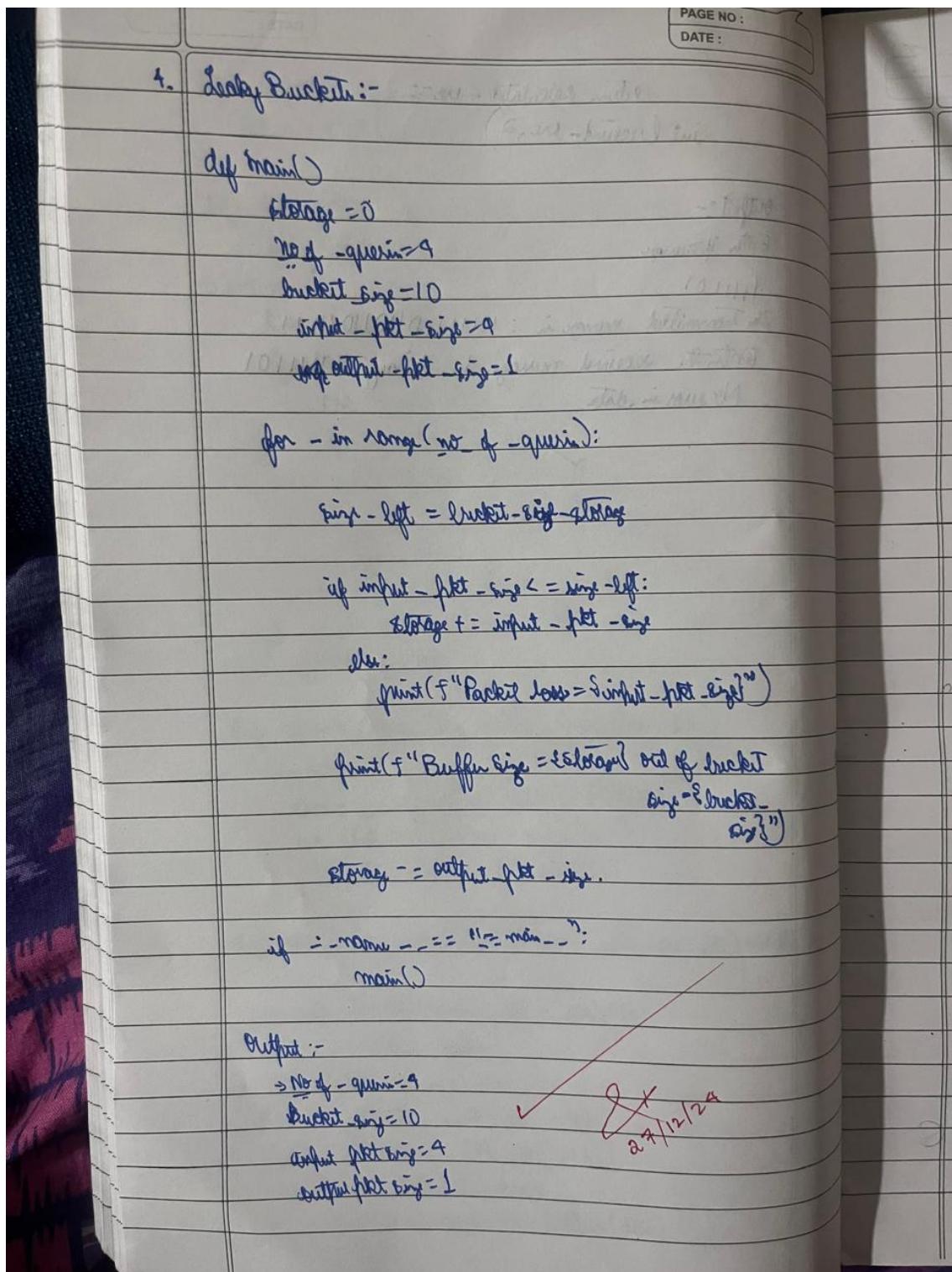
result - ideal = 00000000000000000000000000000000

ideal - result

## Program 15

Write a program for congestion control using Leaky bucket algorithm.

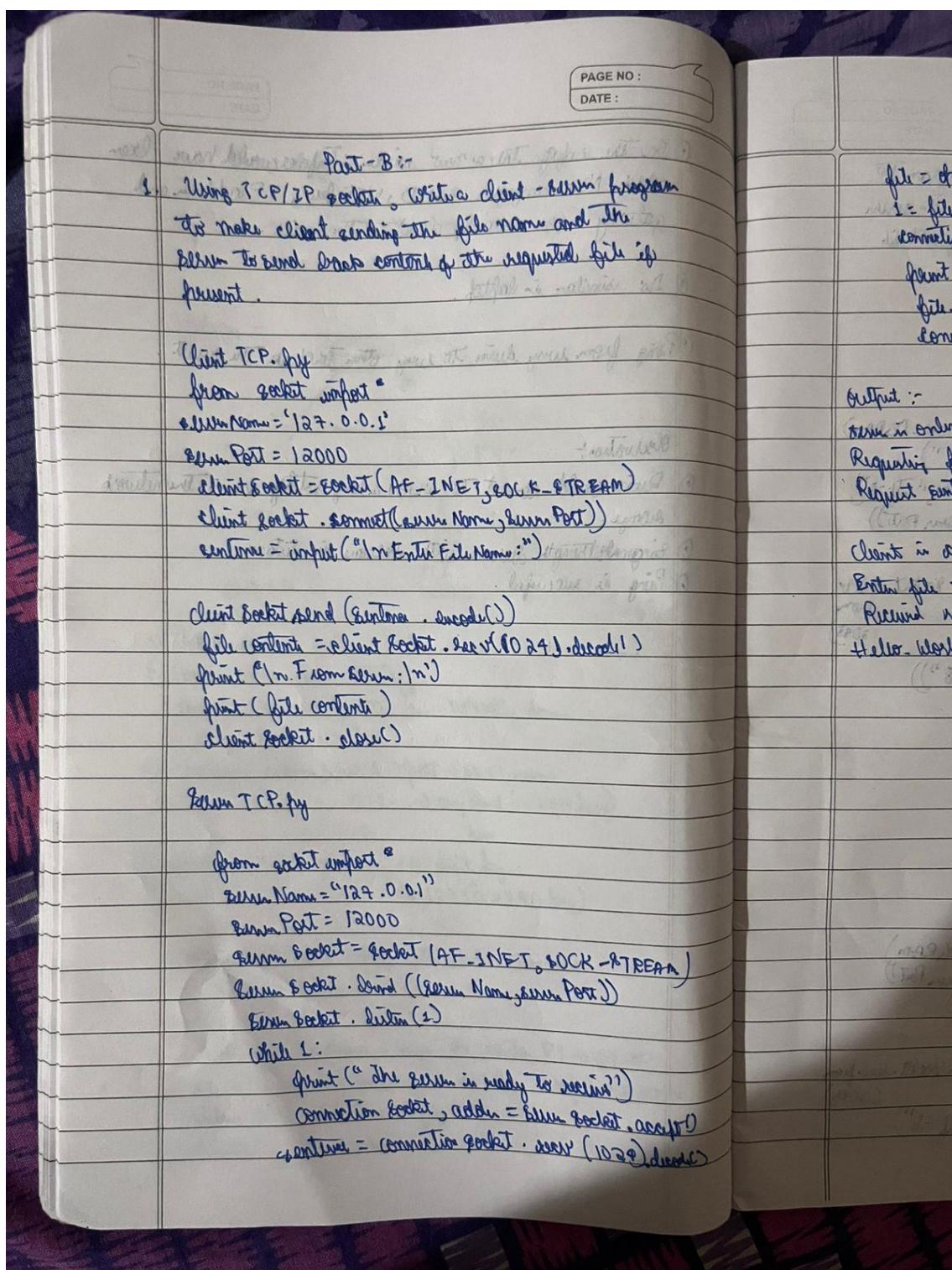
### **Code and Output:**



## **Program 16**

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

### **Code and Output:**



file = open('content.txt', 'r')  
f = file.read(1024)  
connectionSocket.send(f)  
print("In sent contents of "+content)  
file.close()  
connectionSocket.close()

Output :-

serve in order

Request for file : test.txt

Request sent

Client is connected to server

Enter file name : test.txt

Received response

Hello World

(("3-11") .read .read (1024) .recv)

: connection is established

(("4-11") .read .read (1024) .recv)

: connection is established

(("5-11") .read .read (1024) .recv)

: connection is established

20.971 sec

"Typing takes more

600.0 / = Test.txt

(("6-11") .read .read (1024) .recv)

(("7-11") .read .read (1024) .recv)

: connection is established

revision. This will be useful for this, nothing

(1024)

(("8-11") .read .read (1024) .recv)

## Program 17

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

## Code and Output:

