VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT

on

COMPUTER NETWORKS

Submitted by

Raaghib Abdul Rahim (1BM21CS153)

in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING

(Autonomous Institution under VTU)

BENGALURU-560019 JUNE-2023 to SEP-2023

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

CERTIFICATE

This is to certify that the Lab work entitled "**COMPUTER NETWORKS**" carried out by **Raaghib Abdul Rahim(1BM21CS153),** who is a bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2023. The Lab report has been approved as it satisfies the academic requirements in respect of a **Computer Networks - (22CS4PCCON)**work prescribed for the said degree.

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Professor and Head
Department of CSE
BMSCE, Bengaluru

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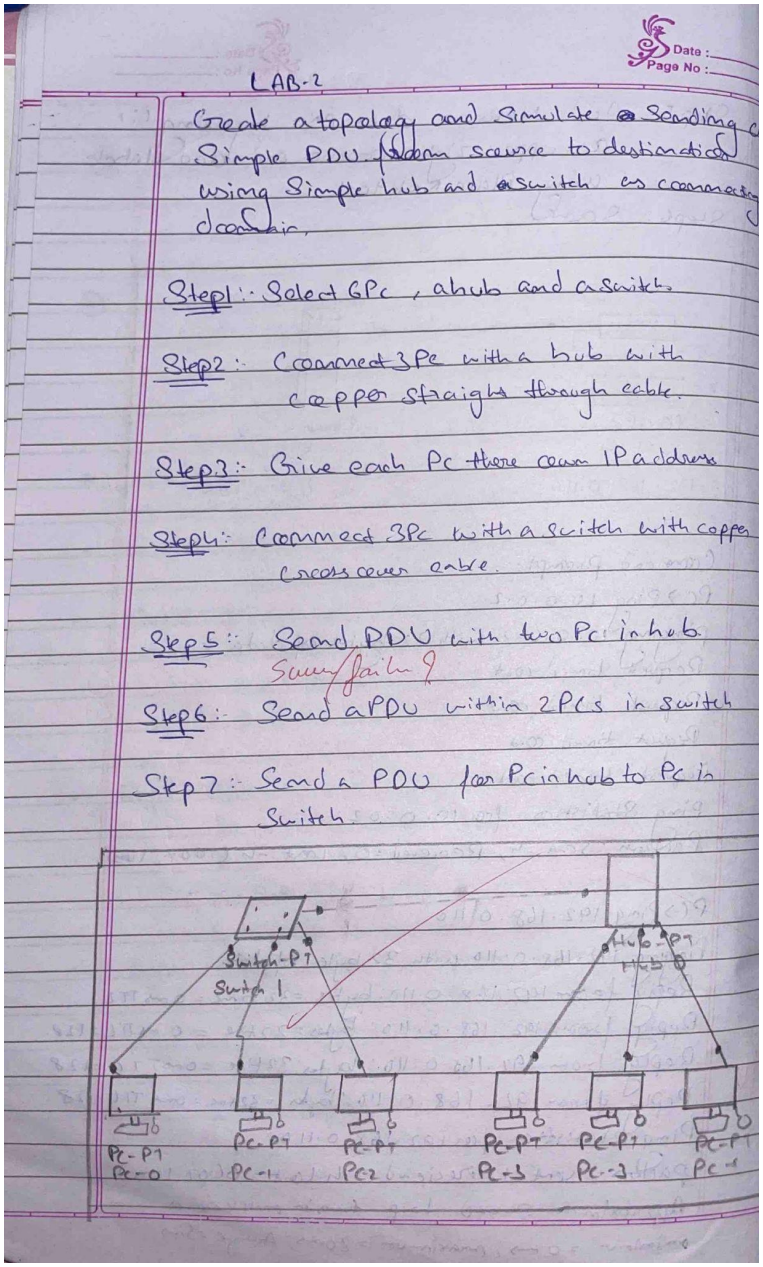
EXPERIMENT-1

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



Command Prompt

(i) Switch com

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 = 120
Reply from 10.0.0.3: bytes = 32 time = 4ms TTL = 120
Reply from 10.0.0.3 bytes = 32 time = 4ms TTL = 120
Reply from 10.0.0.3: bytes = 32 time = 4ms TTL = 120

Ping Statics for 10.0.0.3:
Packets: Sent = 4, Recieved = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 0ms, Average = 3ms

(ii) Switch cdl

PC> Ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data.

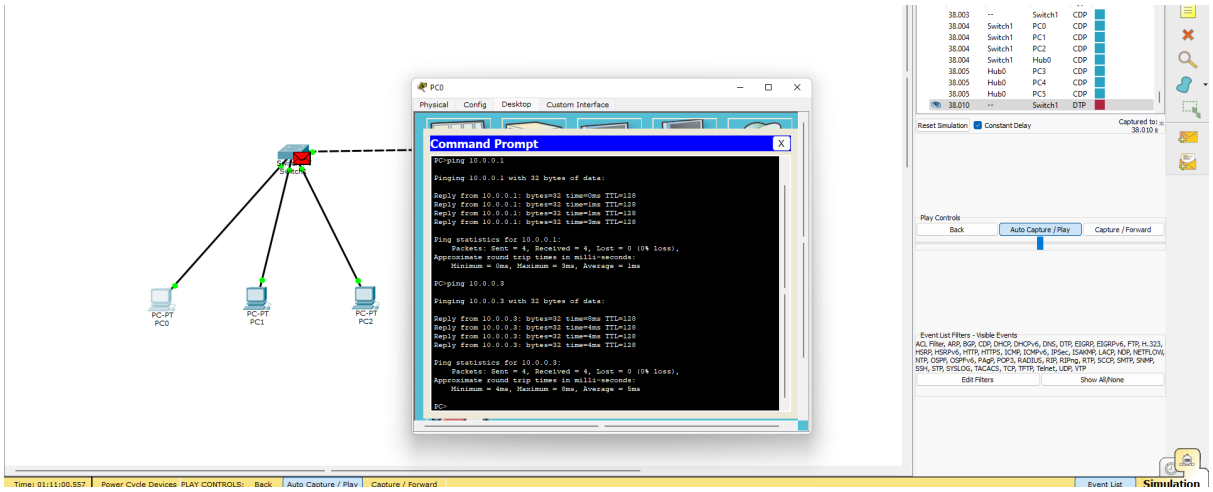
Request timed out.
Request timed out
Request timed out
Request timed out.

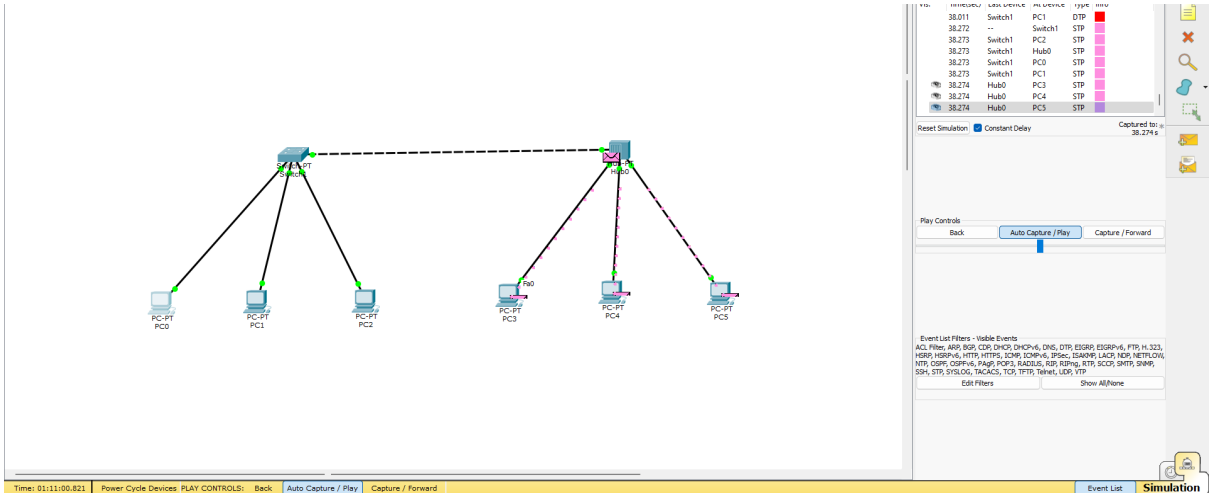
10/12

Ping Statics for 10.0.0.3
Packets: Sent = 4, recieved = 0, lost = 4, loss (100%).

TOPOLOGY & OUTPUT

1.Hub and PCs

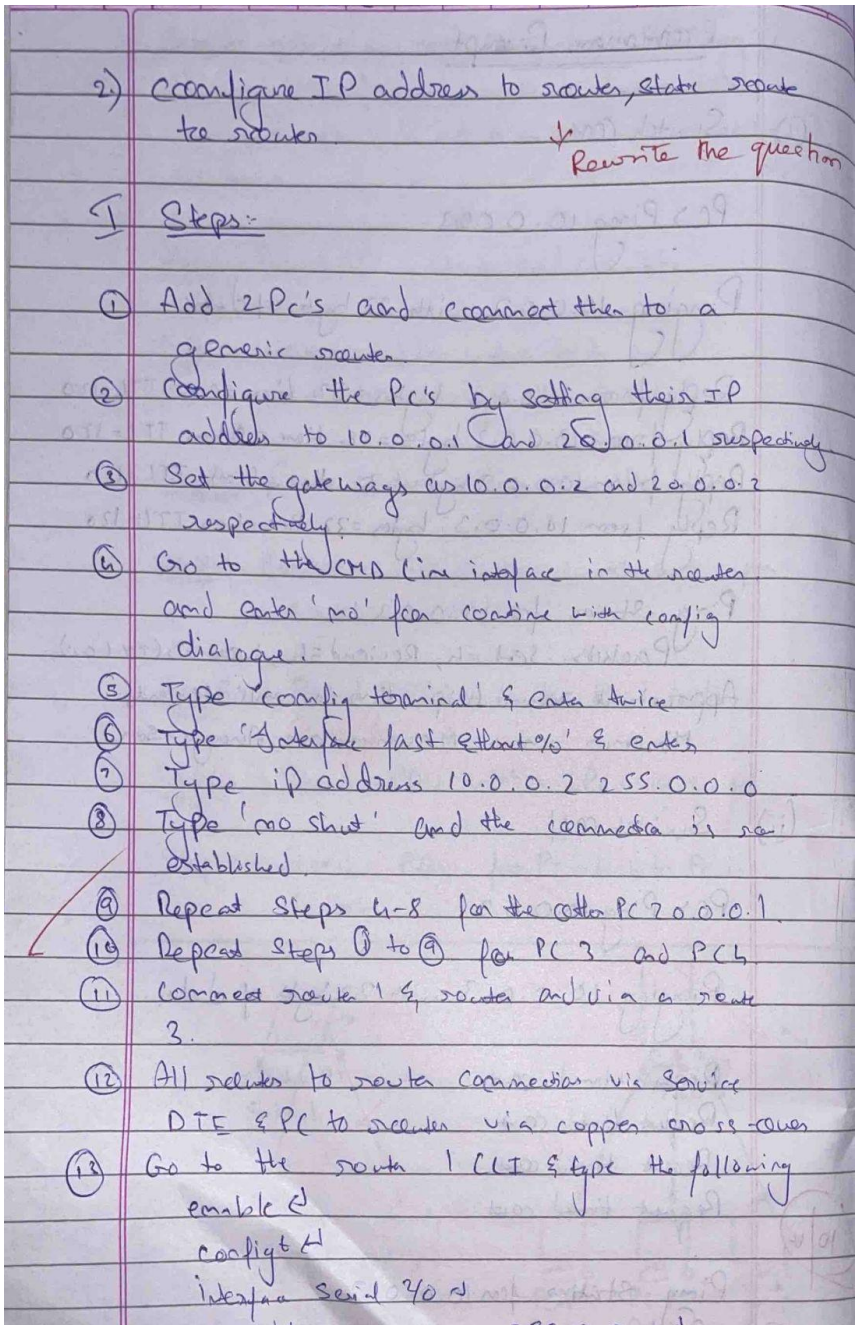




EXPERIMENT-2

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

PROGRAM 2.1



2) Configure IP address to routers, state route to router.

↓ Rewrite the question

I Steps:-

1. Add 2 Pc's and connect them to a generic router.
2. Configure the Pc's by setting their IP address to 10.0.0.1 and 20.0.0.1 respectively.
3. Set the gateways as 10.0.0.2 and 20.0.0.2 respectively.
4. Go to the CMD (in interface in the router and enter 'no' for continue with config' dialogue.
5. Type 'config terminal' & enter twice
6. Type 'Interface fast ethernet 0/0' & enter
7. Type ip address 10.0.0.2 255.0.0.0
8. Type 'no shut' and the connection is now established.
9. Repeat steps 4-8 for the other PC 20.0.0.1.
10. Repeat steps 0 to 9 for PC 3 and PC 4.
11. Connect router 1 & router and via a router 3.
12. All routers to router connection via Serial DTE & PC to router via copper cross-over
13. Go to the router 1 CLI & type the following
    enable ↵
    config t ↵
    interface Serial 4/0 ↵

(14) Go to the router 3 CLI & type:-
enable ↵
config t ↵
interface serial 4/0 ↵
ip address 50.0.0.1 255.0.0.0 ↵
no shut ↵
The connections b/w Router 1 & 3 is green now.

(15) Repeat Steps (13) & (14) for router 2 to 3 similarly.

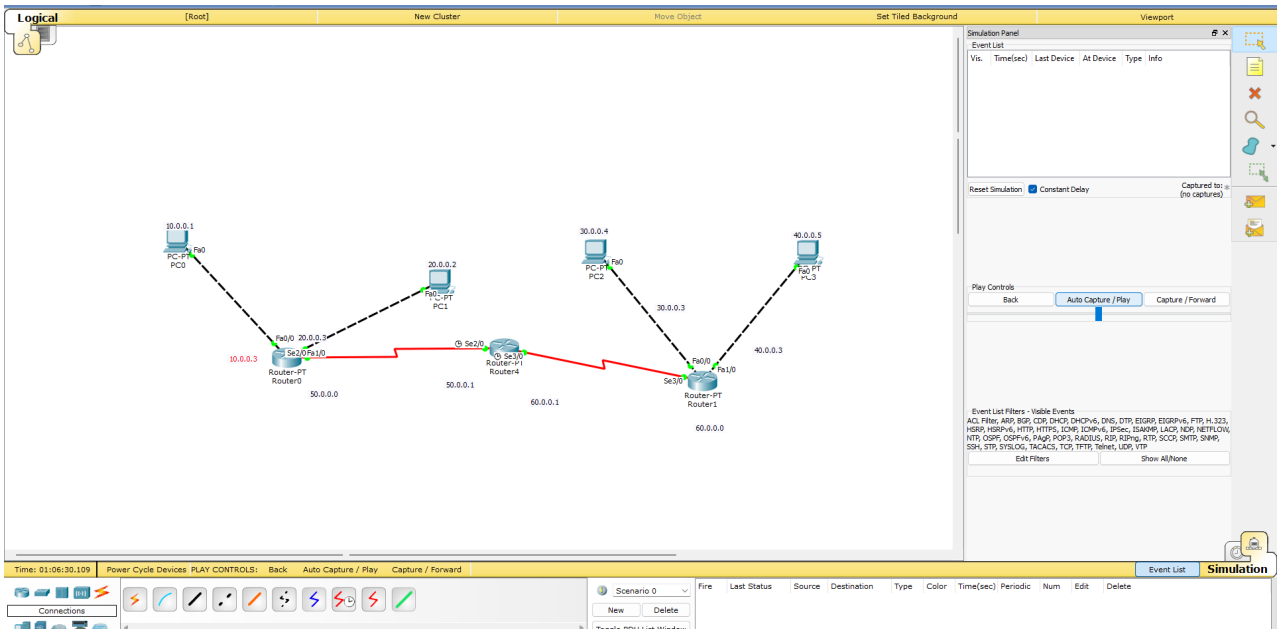
(16) (18) Go to router 1 CLI & type show ip route
It shows only the direct connection.

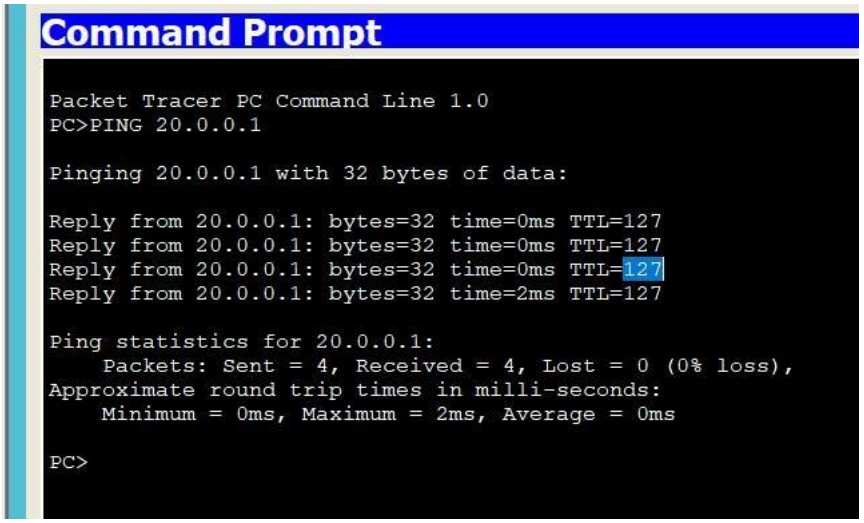
(17) We statically dominate routes to the PC's by typing the following in the CLI (for router 1):
ip route 30.0.0.0 255.0.0.0 50.0.0.1 ↵
ip route 40.0.0.0 255.0.0.0 60.0.0.1 ↵
(for router 2):
ip route 10.0.0.0 255.0.0.0 60.0.0.1 ↵
ip route 20.0.0.0 255.0.0.0 60.0.0.1 ↵
(for router 3):
ip route 10.0.0.0 255.0.0.0 50.0.0.1
ip route 20.0.0.0 255.0.0.0 50.0.0.1
ip route 30.0.0.0 255.0.0.0 60.0.0.1
ip route 40.0.0.0 255.0.0.0 60.0.0.1

(18) Now data transfer b/w PC's is succesful

(19) Before statically connecting route,
ping b/w PC's not directly connected unsuccessful.
PC>Ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data
Reply from 20.0.0.2: Destination host unreached
Reply from 20.0.0.2: Destination host unreached
Reply from 20.0.0.2: Destination host unreached
Reply from 20.0.0.2: Destination host unreached.

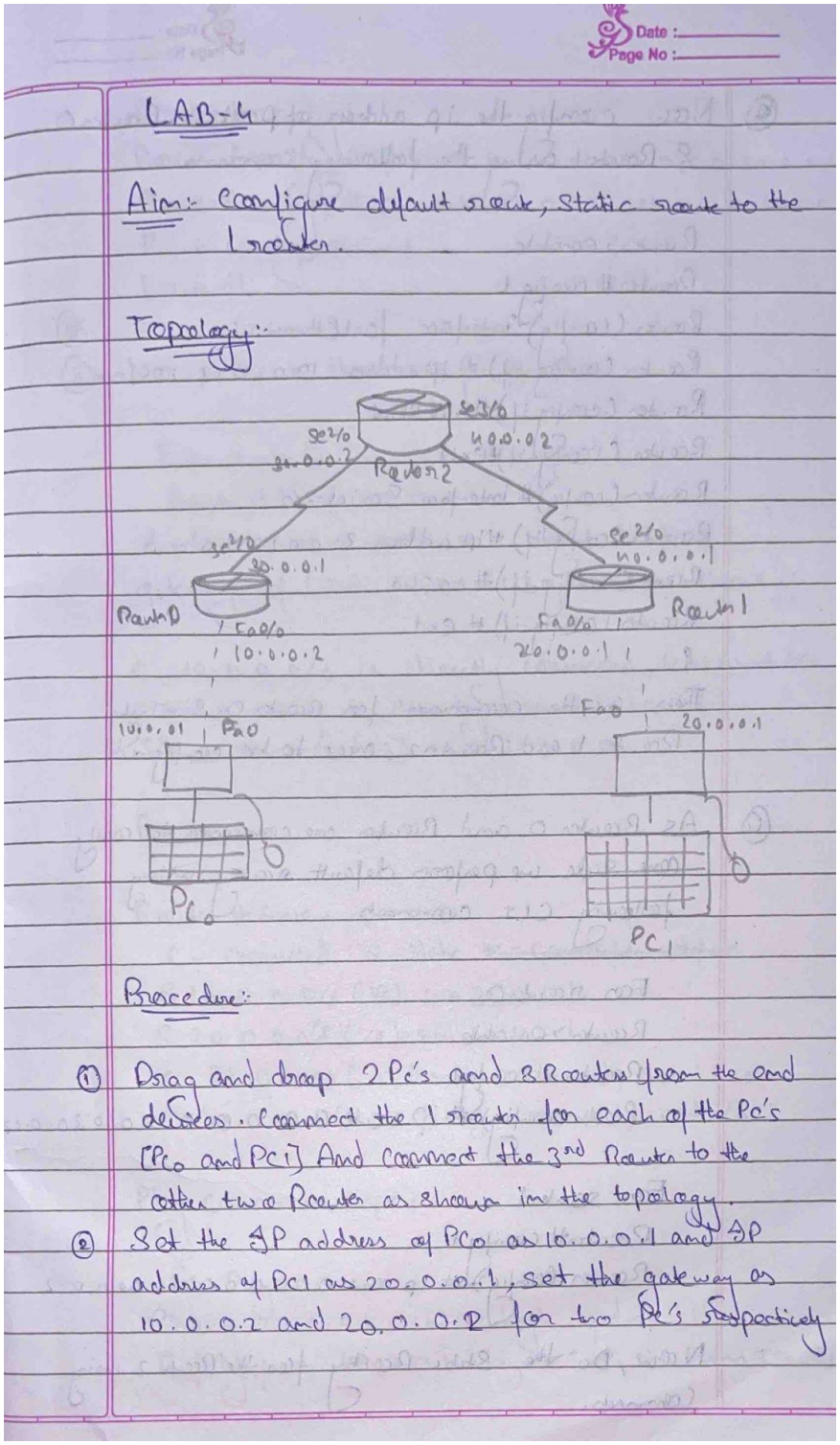
TOPOLOGY &OUTPUT


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
Info
Reset Simulation
Constant Delay
Captured to:
(no captures)
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
10.0.0.1
PC-PT PC0
Fa0
20.0.0.2
PC-PT PC1
30.0.0.4
PC-PT PC2
40.0.0.5
PC-PT PC_3
Router-PT Router0
Router-PT Router4
Router-PT Router1
50.0.0.0
50.0.0.1
60.0.0.1
60.0.0.0
30.0.0.3
40.0.0.3
10.0.0.3
Time: 01:06:30.109
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Scenario 0
New
Delete
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete


Command Prompt
Packet Tracer PC Command Line 1.0
PC>PING 20.0.0.1
Pinging 20.0.0.1 with 32 bytes of data:
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
Reply from 20.0.0.1: bytes=32 time=2ms TTL=127
Ping statistics for 20.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 2ms, Average = 0ms
PC>

EXPERIMENT-3

Q)Configure default route, static route to the Router



Date :
Page No :

(3) Now config the ip address of ports in Router 0 & Router 1 using the following commands

Router> enable
Router# config t
Router(config)# interface fastEthernet 0/0
Router(config-if)# ip address 10.0.0.2 255.0.0.0
Router(config-if)# no shut
Router(config-if)# exit
Router(config)# interface Serial 2/0
Router(config-if)# ip address 30.0.0.1 255.0.0.0
Router(config-if)# no shut
Router(config-if)# exit
&

These are the commands for Router 0. Similarly Router 1 and Router 2 need to be configured

(4) As Router 0 and Router one connected to only one side we perform default routing. Using following CLI commands.

For router 0
Router> enable
Router# config t
Router(config)# ip route 0.0.0.0 0.0.0.0 30.0.

For router 1
Router# config t
Router(config)# ip route 0.0.0.0 0.0.0.0 10.0.0.2

Now, Do the Static Routing for the Router 2 using Commands.

Router #config t
Router (config) #ip route 10.0.0.0 255.0.0.0 30.0.0.2
Router (config) #ip route 20.0.0.0 255.0.0.0 40.0.0.2
Router (config) #exit
Router #

(5) Now, check the routing information

For router 0
Router #show ip route
C - connected S - Static * - candidate default
gateway of last resort is 30.0.0.2 to network 0.0.0.0

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 30.0.0.2

Router 2

Router #show ip route
C - connected S - Static ~~* - candidate default~~
S 10.0.0.0/8 [1/0] via 30.0.0.1
S 20.0.0.0/8 [1/0] via 40.0.0.1
C 30.0.0.0/8 is directly connected, Serial 2/0
C 40.0.0.0/8 is directly connected, Serial 3/0.

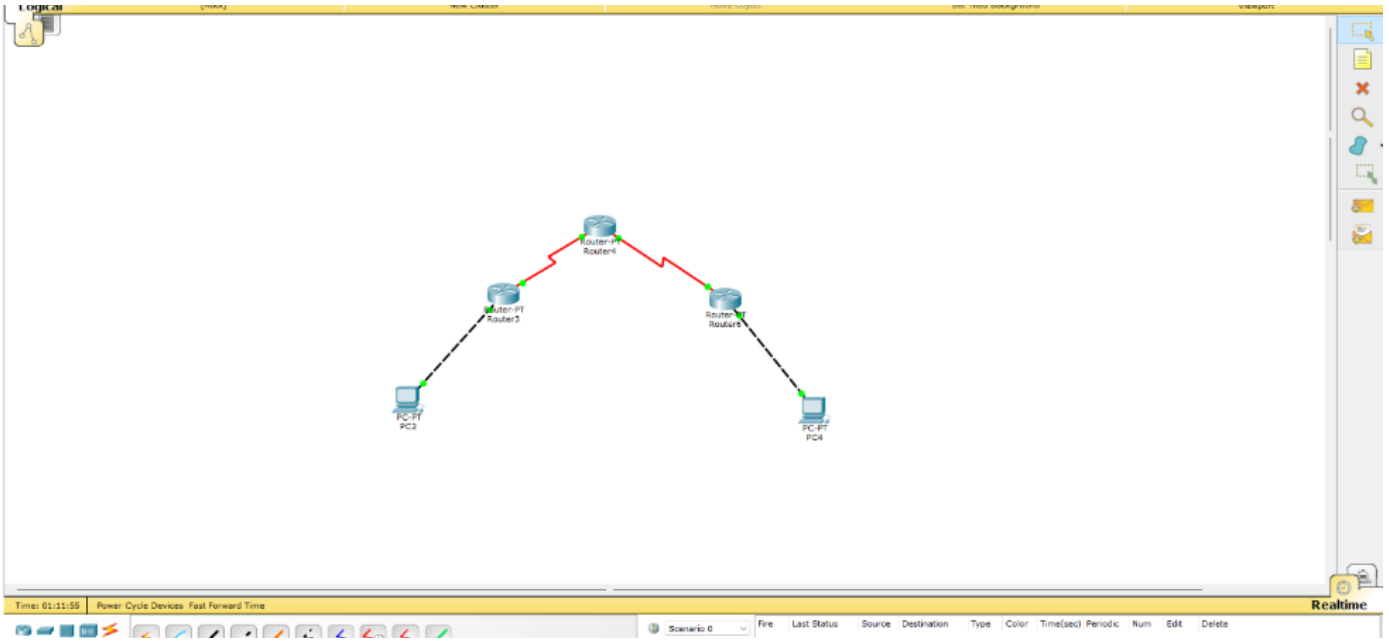
Ping commands (output):

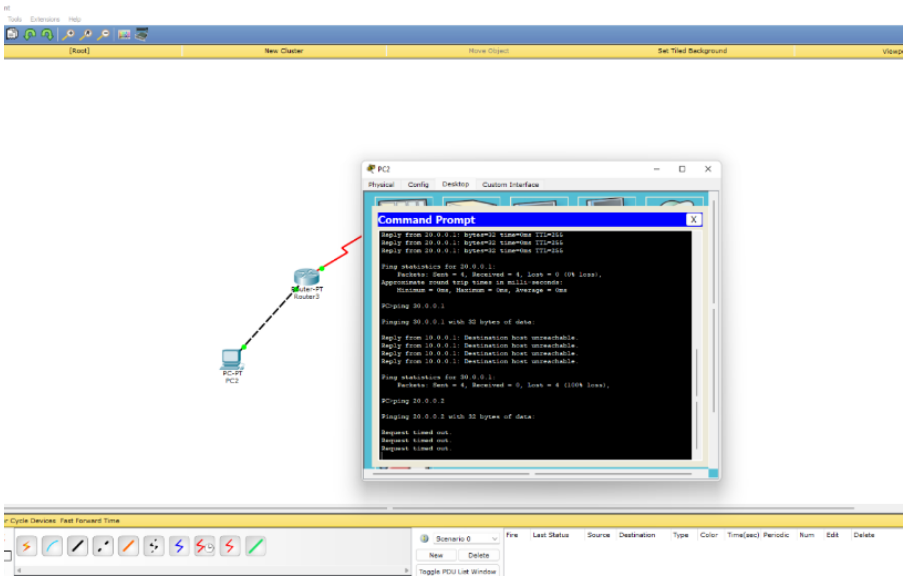
PC>Ping 20.0.0.1
Pinging 20.0.0.1 with 32 byte of data
Reply from 20.0.0.1 : byte = 32 time 4ms TTL:12

Reply from 20.0.0.1: bytes =32 time =18ms TTL=125
Reply from 20.0.0.1 =bytes=32 time =17ms TTL=125
Reply from 20.0.0.1 =bytes =32 time =25ms TTL=125

Ping statistics for 20.0.0.1:
Packets: Sent=4, Recieved=4, Lost=0 (0% loss)
Approximate round trip times in millie seconds
Minimum =16ms, Maximum =25ms, Average
16ms.

TOPOLOGY & OUTPUT

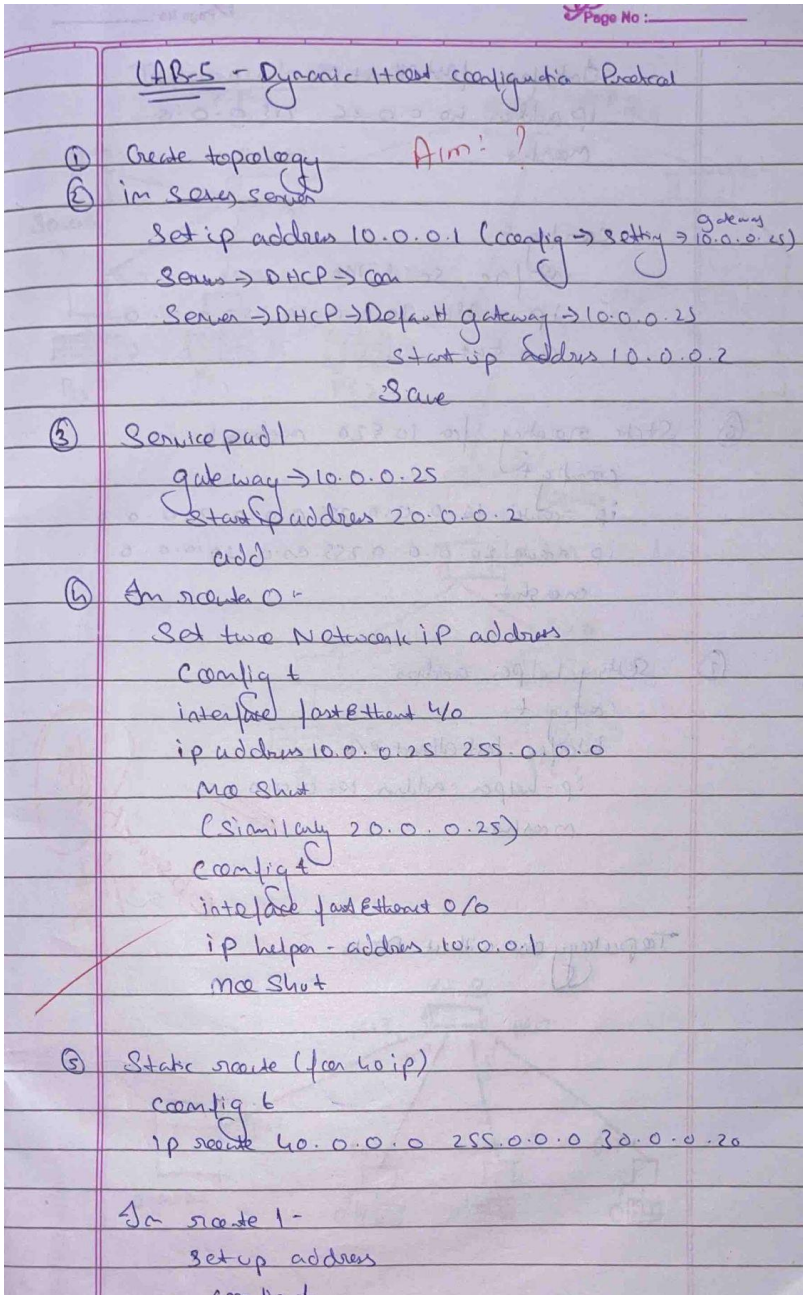




EXPERIMENT-4

Q) Configure DHCP within a LAN and outside LAN

PROGRAM 4.1



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LAB-5 - Dynamic Host configuration Protocol

Aim: ?

1. Create topology
2. in server server
   Set ip address 10.0.0.1 (config → setting → gateway 10.0.0.25)
   Server → DHCP → on
   Server → DHCP → Default gateway → 10.0.0.25
   Start ip address 10.0.0.2
   Save
3. Service pool
   gateway → 10.0.0.25
   Start ip address 20.0.0.2
   add
4. In router 0 -
   Set two Network ip address
   Config t
   interface fastEthernet 4/0
   ip address 10.0.0.25 255.0.0.0
   no shut
   (Similarly 20.0.0.25)
   Config t
   interface fastEthernet 0/0
   ip helper-address 10.0.0.1
   no shut
5. Static route (for 40 ip)
   Config t
   ip route 40.0.0.0 255.0.0.0 30.0.0.20

In router 1 -
   Set up address

Interface fastethernet 0/0
ip addres 40.0.0.26 255.0.0.0
noshut

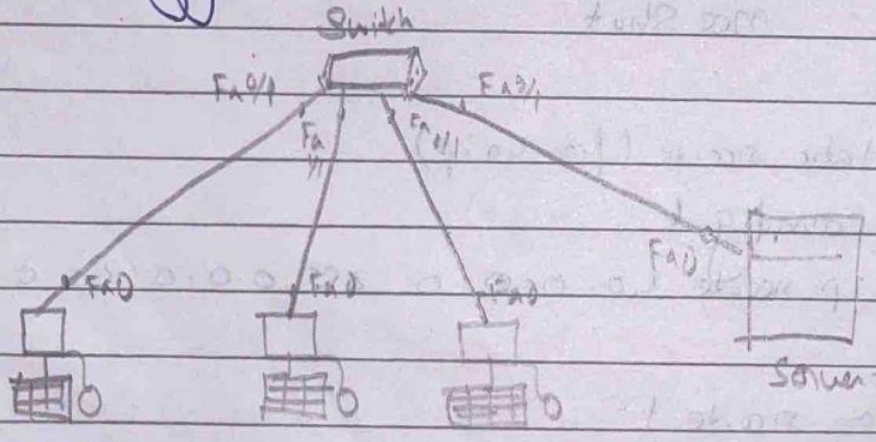
config t
interface serial 2/0
ip address 30.0.0.26 255.0.0.0
no shut.

⑥ Static routing for 10 & 20 network
config t
ip route 10.0.0.0 255.0.0.0 30.0.0.0
ip route 20.0.0.0 255.0.0.0 30.0.0.0
noshut

⑦ Setting helper address
config t
interface fastethernet 0/0
ip-helper-address 10.0.0.0
noshut.

Observation

Topology one without Router.



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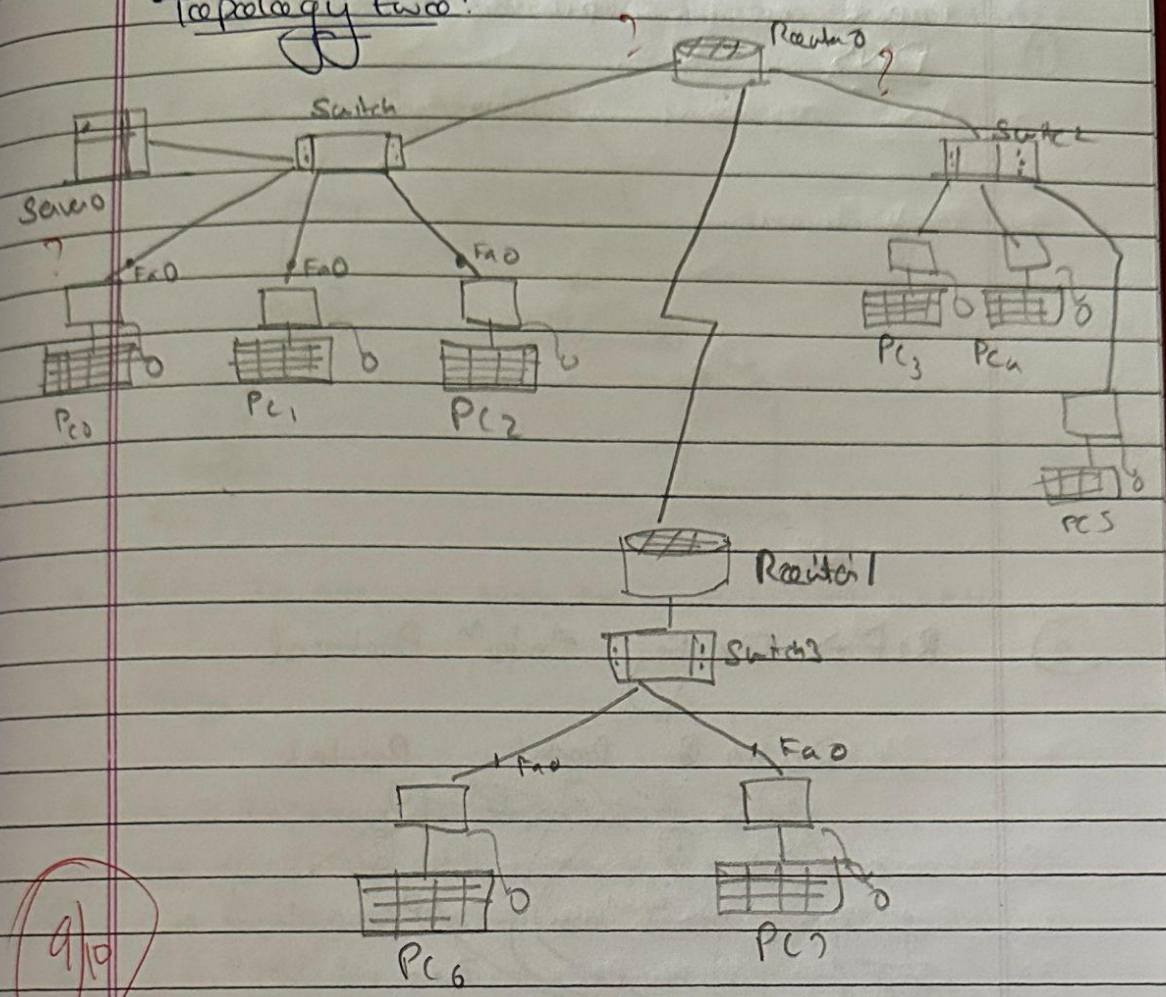
Topology two:



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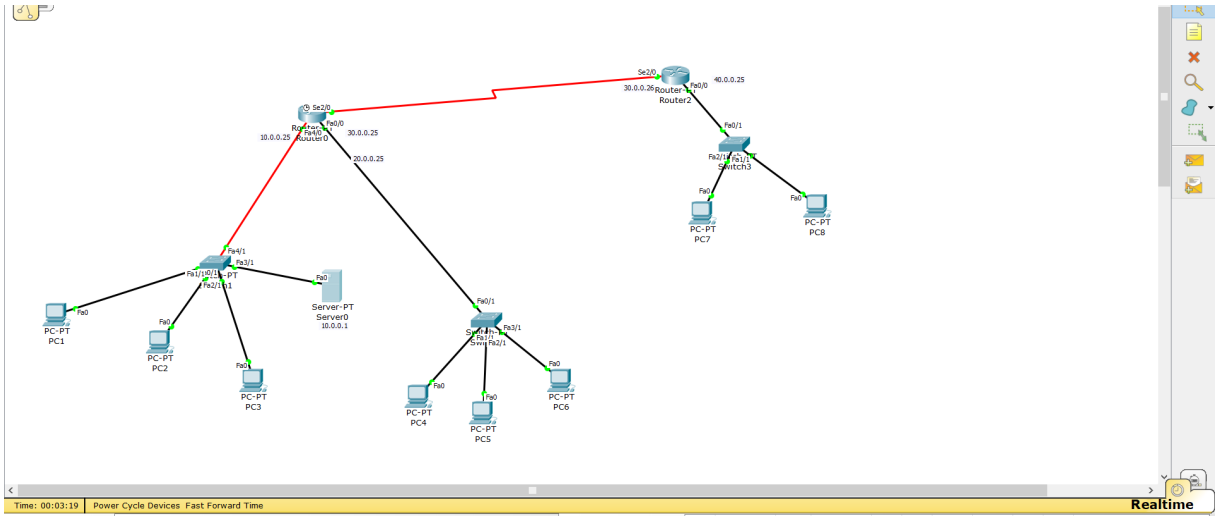
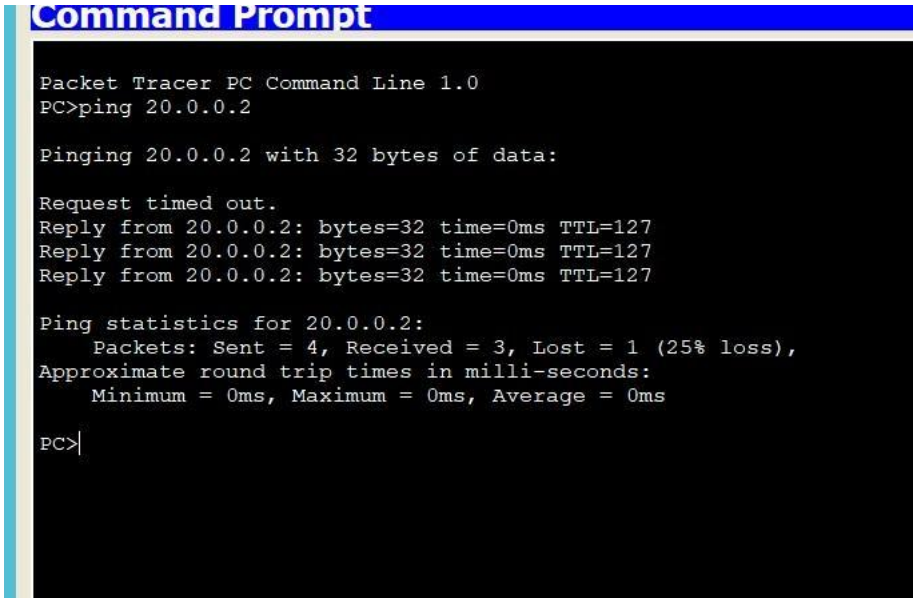
TOPOLOGY & OUTPUT

PROGRAM 4.1



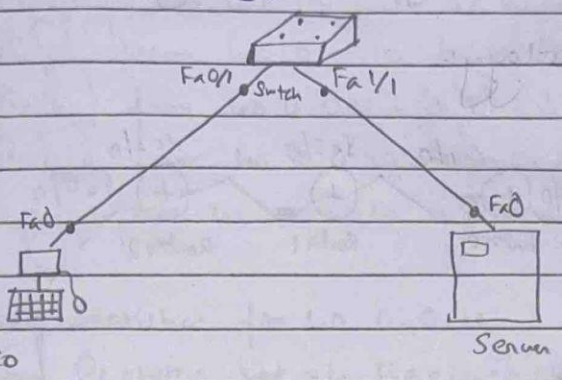


EXPERIMENT-5

Q) Configure Web Server, DNS within a LAN

LAB-6 : Configure web server, DNS, within LAN.

(1) * Create topology:



* AIM: To configure web server, DNS, within a LAN.

* Steps -

(1) Create topology as shown in the figure
(2) Set the PC ip address as 10.0.0.10
(3) Set the Server ip address as 10.0.0.10
(4) Turn on the DNS in Services and add name and address name as ip address
(5) In HTTP go to index.html and using the necessary html commands add name and USN.

<HI> Raaghib A.R </HI>
<HI> 1BM21CS153 </HI>

(6) Goo to web browser in PC and enter the URL same as name of websites you saved in server.

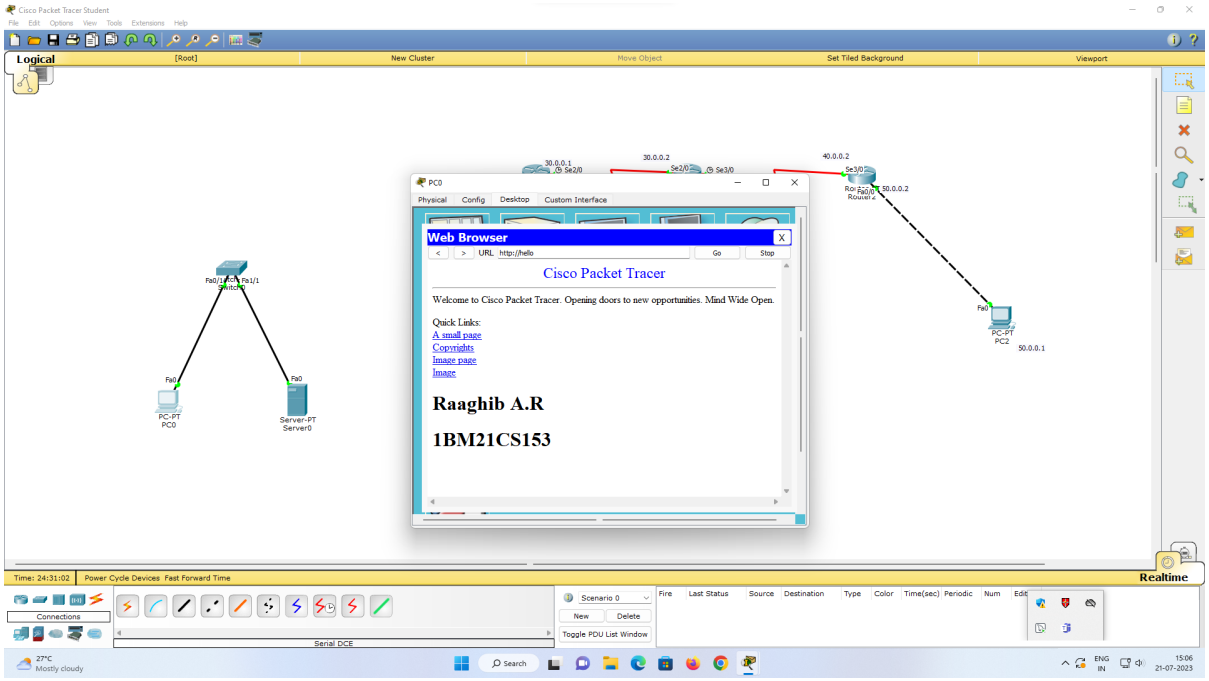
* Output:

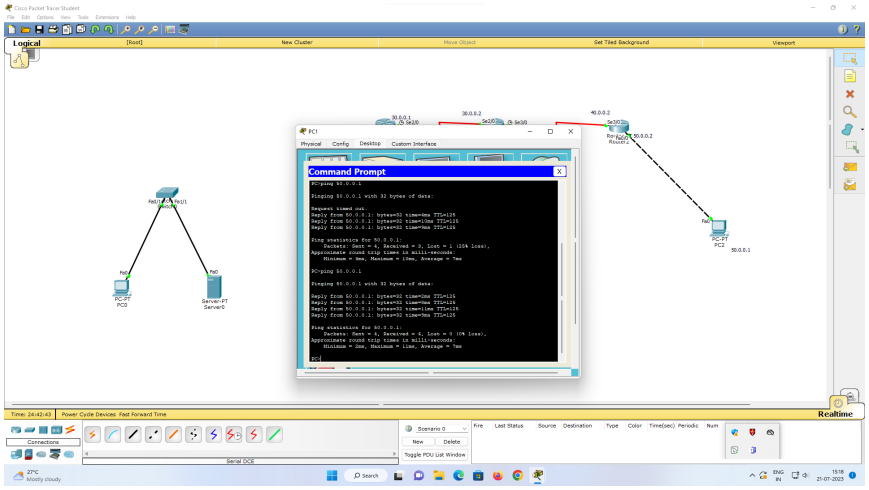
Cisco Packet Tracer

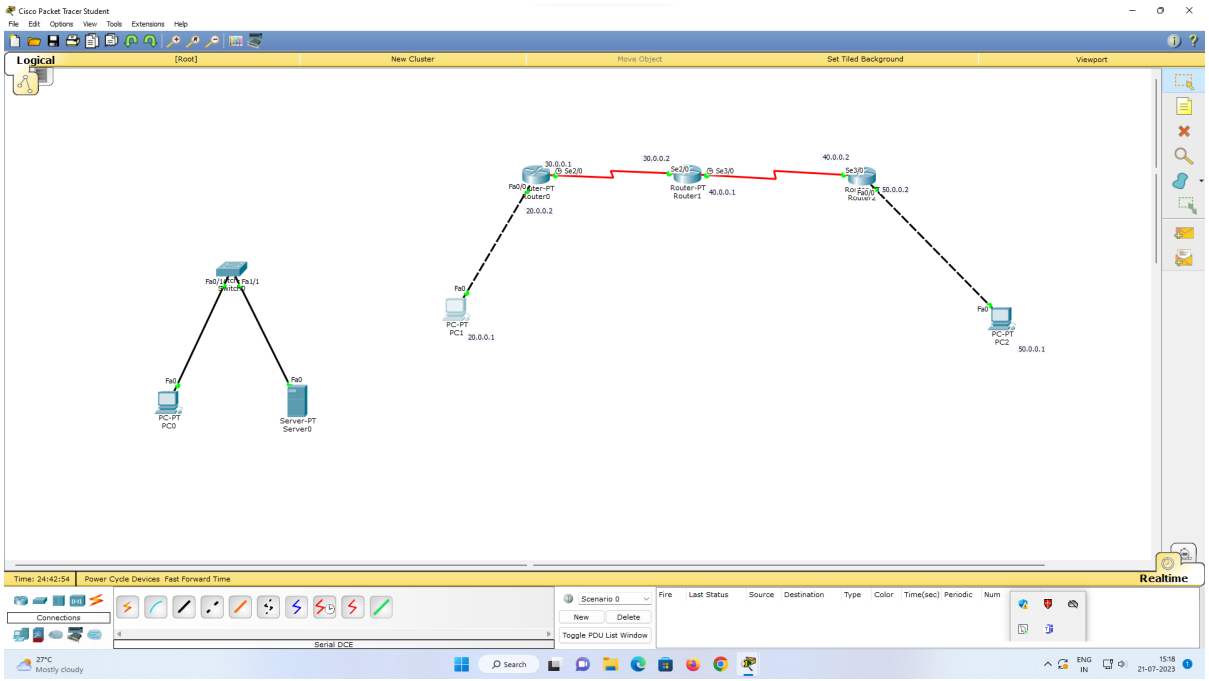
10/10

Raaghib A.R

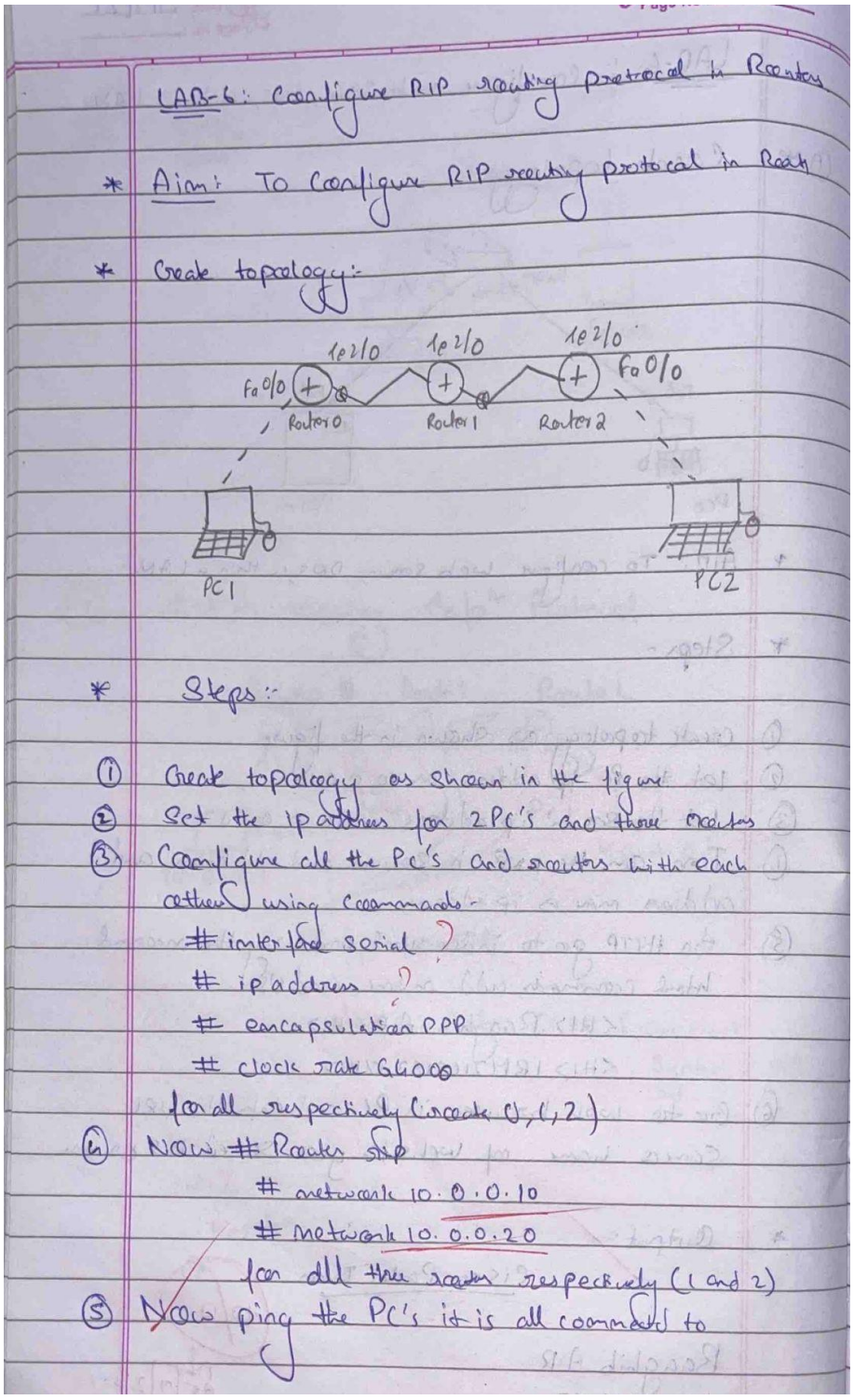
TOPOLOGY & OUTPUT






Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
30.0.0.1
Se2/0
30.0.0.2
Se2/0
Se3/0
40.0.0.2
Se3/0
Router-PT
Router0
20.0.0.2
Router-PT
Router1
40.0.0.1
50.0.0.2
Fa0
PC-PT
PC1
20.0.0.1
Fa0
PC-PT
PC2
50.0.0.1
Fa0/1
Fa1/1
Switch0
Fa0
PC-PT
PC0
Fa0
Server-PT
Server0
Time: 24:42:54
Power Cycle Devices Fast Forward Time
Realtime
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
27°C
Mostly cloudy
Search
ENG
IN
15:18
21-07-2023

Q) Configure RIP routing Protocol in Routers



LAB-6: Configure RIP routing protocol in Routers

* Aim: To Configure RIP routing protocol in Router

* Create topology:

* Steps:

(1) Create topology as shown in the figure
(2) Set the ip address for 2 PC's and three routers
(3) Configure all the PC's and routers with each other using commands.
  # interface serial ?
  # ip address ?
  # encapsulation PPP
  # clock rate 64000
  for all respectively (create 0, 1, 2)
(4) Now # Router rip
  # network 10.0.0.10
  # network 10.0.0.20
  for all three routers respectively (1 and 2)
(5) Now ping the PC's it is all connected to

Date :
Page No :

* Output:

PC> pinging 40.0.0.10
Pinging 40.0.0.10 with 32 byte of data:
Reply from 40.0.0.10 : bytes=32 time=4ms TTL=125
Reply from 40.0.0.10 : bytes=32 time=4ms TTL=125
Reply from 40.0.0.10 : bytes=32 time=4ms TTL=125
Reply from 40.0.0.10 : bytes=32 time=4ms TTL=125

Ping Statistics for 40.0.0.10:
Packets: sent=4, Received=4, lost=0 (0% loss)
Approximate round trip times in millie seconds:
Minimum=4ms, Maximum=7ms, Average=4ms

* ~~Commands~~ commands:

① Configure Router (plain ips):

Router> enable
Router# config t
interface fast ethernet 0/0
ip address 10.0.0.03 255.0.0.0
no shut
ip in-interface serial 2/0
ip address 20.0.0.1 255.0.0.0
no shut

9/10

25/7/23

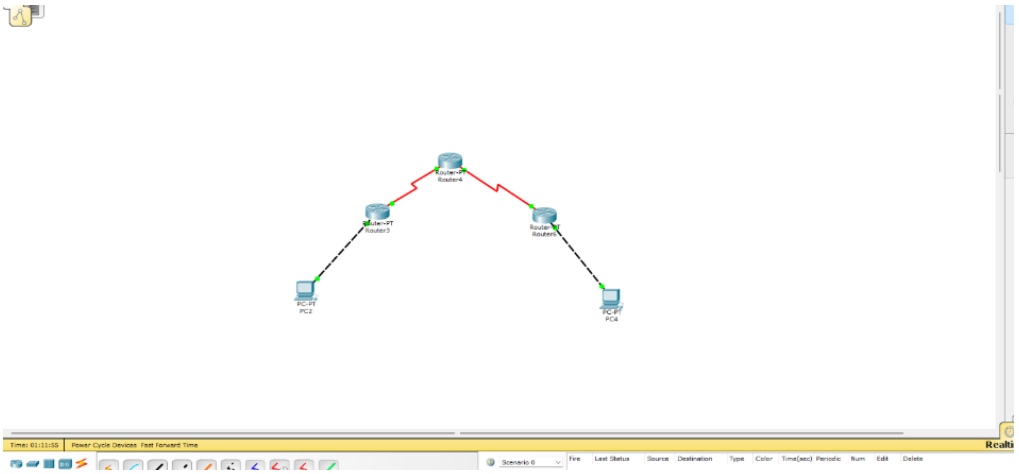
② encapsulation:

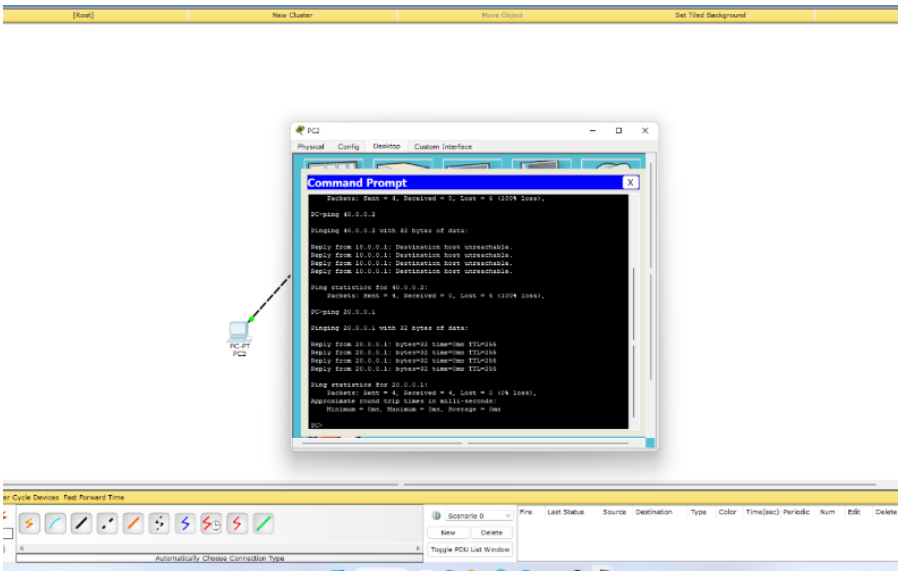
#interface serial 2/0
#encapsulation PPP
clock rate 64000
noshut

③ Route rip

router rip
network 10.0.0.0
network 20.0.0.0

TOPOLOGY & OUTPUT

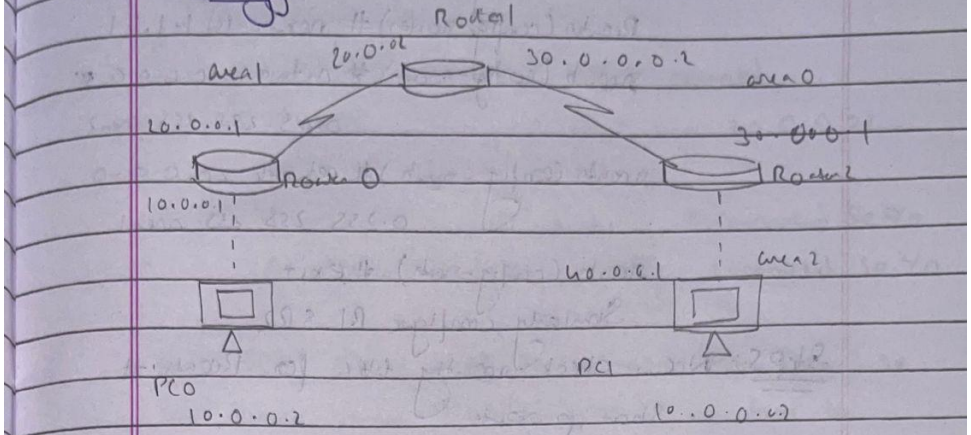




Q) Configure OSPF routing protocol

1) To configure OSPF routing protocol and connect pcs.

Topology:-



Procedure:-

Step1:- Create a topology as shown using 2 Pc's and a router.

Step2: Configure ip address and gateway for Pc as 10.0.0.2 & 10.0.0.1 for PC0 and 40.0.0.2 & 40.0.0.1 for PC1 respectively

Step3: Configure IP address to all router interface.

Router R0,

R0(config)# interface fastEthernet 0/0

R0(config-if)# ip address 10.0.0.1 255.0.0.0.

R0(config-if)# no shut

R0(config-if)# exit

Similarly, configure for R1 & R2.

Step4: Now, enable ip routing by configuring OSPF routing protocol in all routers

Router R0.

Router(config)# router ospf 1

Router(config-router)# router-id 1.1.1.1

router(config-router)# network 10.0.0.0 0.255.255.255 area 0

router(config-router)# network 20.0.0.0 0.255.255.255 area 0

router(config-router)# exit

Similarly configure R1 & R2

Step5: Now check routing table for Router #

show ip route

C-Connected

O-OSPF

C- 10.0.0.0/8 is directly connected Fa 0/0

C- 20.0.0.0/8 is directly connected Se2/0

O IA 40.0.0.0/8 via 20.0.0.0.2 Se2/0

O IA 30.0.0.0/8 via 20.0.0.0.2 00:07:29

Here R1 knows area 0 Network 20.0.0.0 connected to R1 from R0, So R0 learns network through this Network Router(config)# router ospf 1

1-) process id (2-65535)

there must be one network up to keep ospf process up. 0 is better to configure loopback address to router. if is a virtual interface never goes down once configured.

R0(config-if)# ip address 172.16.1.252
255.255.00

Step6: Now check routing table for R3

R3# show ip route

codes: O - ospf C - Connected

O IA 20.0.0.0/8 via 30.0.0.02,
00:18:58, se 2/0

C 40.0.0.0/8 directly connected se 4/0

C 30.0.0.0/8 directly connect se 2/0

Here R3 does not know about the area 3 so we know about the area 3 so we have to create virtual link b/w R0 & R1.

Step7: Create virtual link b/w R0, R1 by this we create a virtual link to connect are 3/0.

In R0

R0(config)# config ospf 1

R0(config-router)# area 1 virtual link 2.2.2.2

In R1

R1(config)# route ospf 1

R1(config router)# area 1 virtual link 1.1.1.1

Step8: R1 & R2 get updates about area 3

Now check routing table for R2.

C 40.0.0.0/8 is directly connected
fastEthernet 0/0.
O IA 10.0.0.0/8 via 30.0.0.2
00:01:56 se2/0

Step 4: Ping PC1 from PC0.

Result:

In PC0

PC>ping 40.0.0.2

Pinging 40.0.0.2 with 32 bytes of data

Reply from 40.0.0.2 bytes=32 time = 2ms

" " " " " = 10ms

" " " " " = 14ms

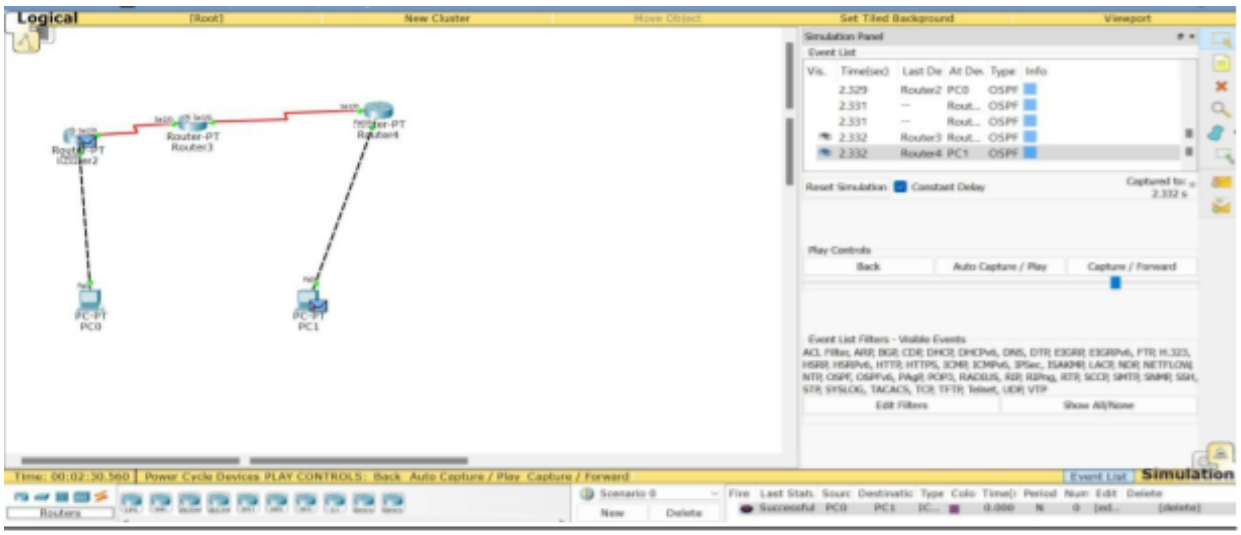
" " " " " = 2ms

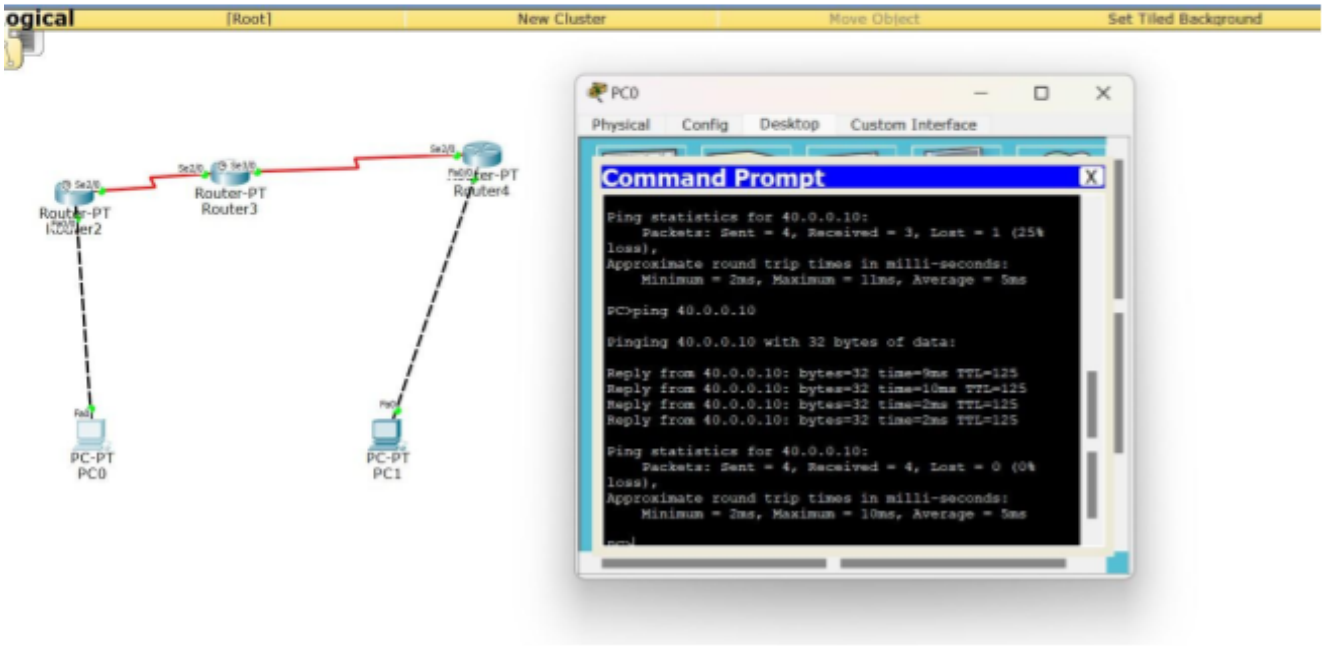
Ping stats for 40.0.0.2

Packets sent: 4, received = 4, lost = 0, approx round trip in ms: 2ms max = 14ms, avg = 7ms

2/9/23

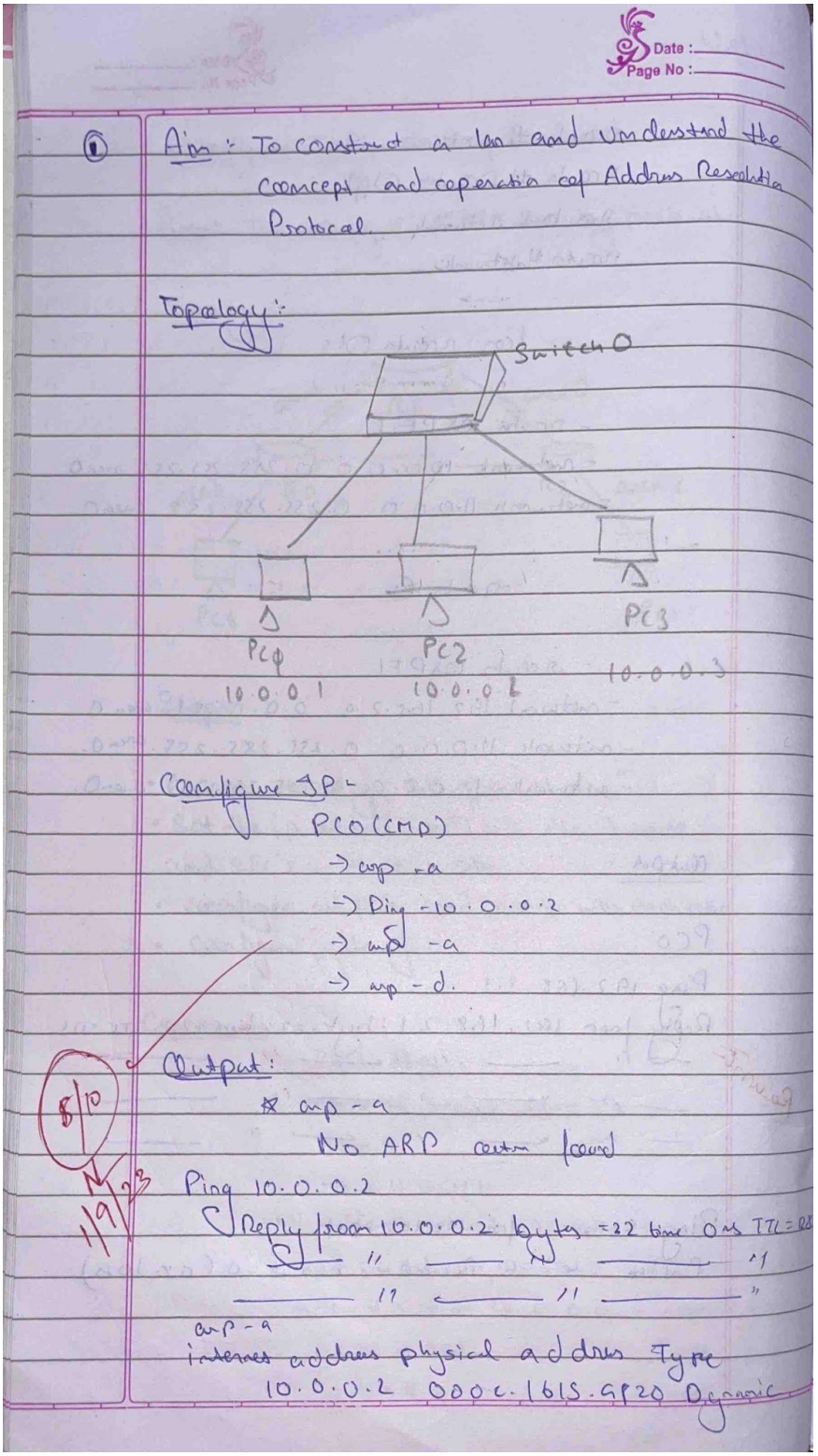
TOPOLOGY & OUTPUT



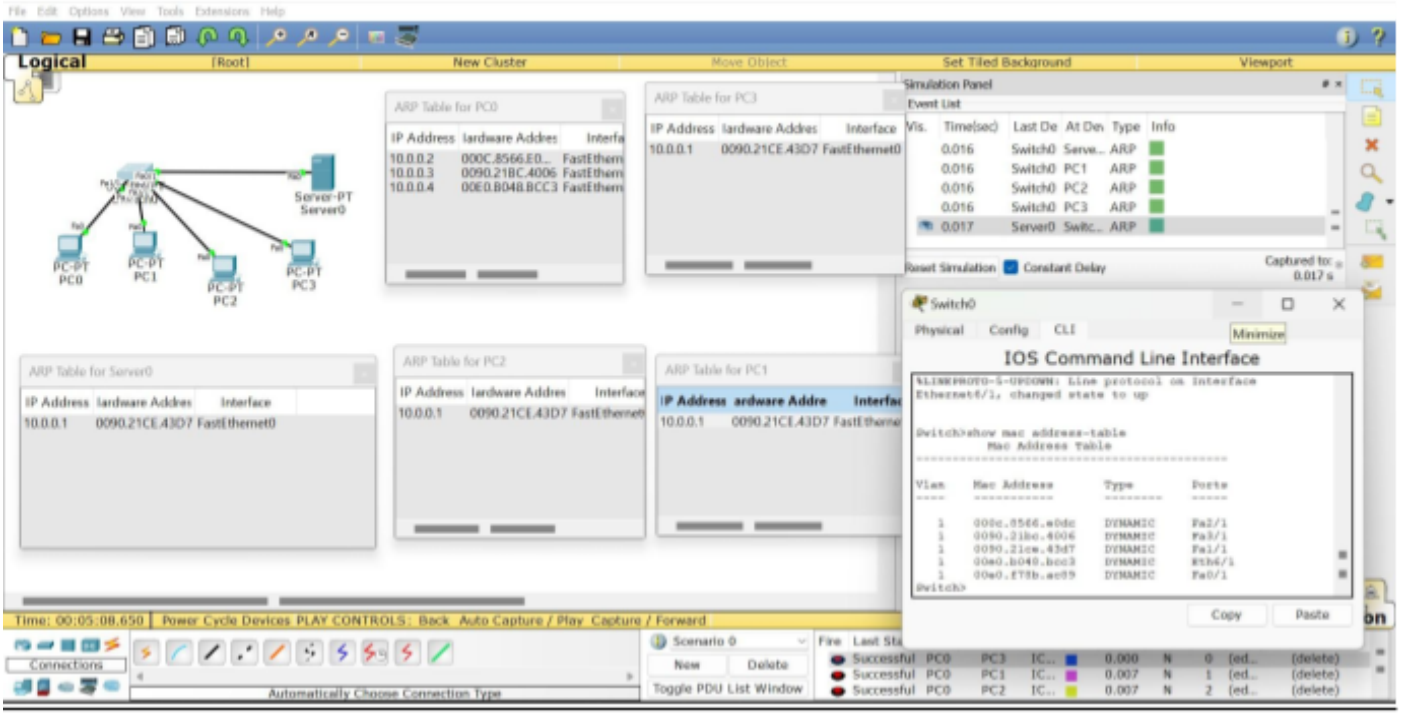


EXPERIMENT-8

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



TOPOLOGY & OUTPUT


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Server-PT
Server0
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
PC-PT
PC3
ARP Table for PC0
IP Address
Hardware Addres
Interface
10.0.0.2
10.0.0.3
10.0.0.4
ARP Table for PC3
10.0.0.1
0090.21CE.43D7
FastEthernet0
Simulation Panel
Event List
Vis.
Time(sec)
Last De
At Dev
Type
Info
0.016
Switch0
Serve...
ARP
PC1
PC2
PC3
0.017
Server0
Switc...
Reset Simulation
Constant Delay
Captured to:
0.017 s
ARP Table for Server0
ARP Table for PC2
ARP Table for PC1
Switch0
Physical
Config
CLI
Minimize
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Ethernet6/1, changed state to up
Switch>show mac address-table
Mac Address Table
Vlan
Mac Address
Type
Ports
1
000c.8566.e0dc
DYNAMIC
Fa2/1
0090.21bc.4006
Fa3/1
0090.21ce.43d7
Fa1/1
00e0.b040.bcc3
Eth6/1
00e0.f78b.ac09
Fa0/1
Switch>
Copy
Paste
Time: 00:05:08.650
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Successful
PC0
PC3
PC1
PC2
0.000
0.007
(edit)
(delete)

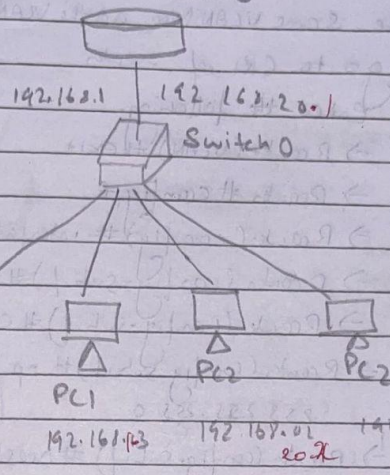
EXPERIMENT-9

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

LAB-8

Aim: To configure VLAN Database

Topology:



Procedure:

1) Connect 4 pc's with a switch (2960) and also connect a router (1841)
2) Ensure PC0 and PC1 are set as 192.168.1.2 and 192.168.1.3 and are placed towards the left side end of the switch and the router IP is set as 192.168.1.1
3) The PC2 and PC3 IP's are set as 192.168.2 and 192.168.20.3 and are placed at the right most end of switch.
4) Select switch and go to config tab and select a VLAN database
5) Enter the new VLAN number as 203 and name as CRVAN and add it to the database
6) Select the interface nearer to the fast Ethernet i.e. 4/0 and select trunk.

7) Now add the new VLAN database to the trunk options

8) Goto router and select the VLAN database and enter the same VLAN No and the VLAN name.

9) Now go to CLI of router and enter the following.

→ Router(VLAN)#exit
→ Router#config t
→ Router(config)#interface fa 0/0.1
→ Router(config-subif)#
→ Router(config-subif)#encapsulation dot1Q 30
→ Router(config-subif)#ip address 192.168.20.1 255.255.255.0
→ Router(config-subif)#no shut
→ Router(config-subif)#ext

10) Ensure all the database are selected then Ping from PC0 to PC3

Output:

PC> Ping 192.168.20.2
Pinging 192.168.20.2 with 32 byte of data
Request timed out
Reply from 192.168.20.2 bytes=32 time=0 TTL=127
" " " " " " " "
Ping Statistics for 192.168.20.2
Packets sent:4, recieved=3, lost=1 (25% loss)

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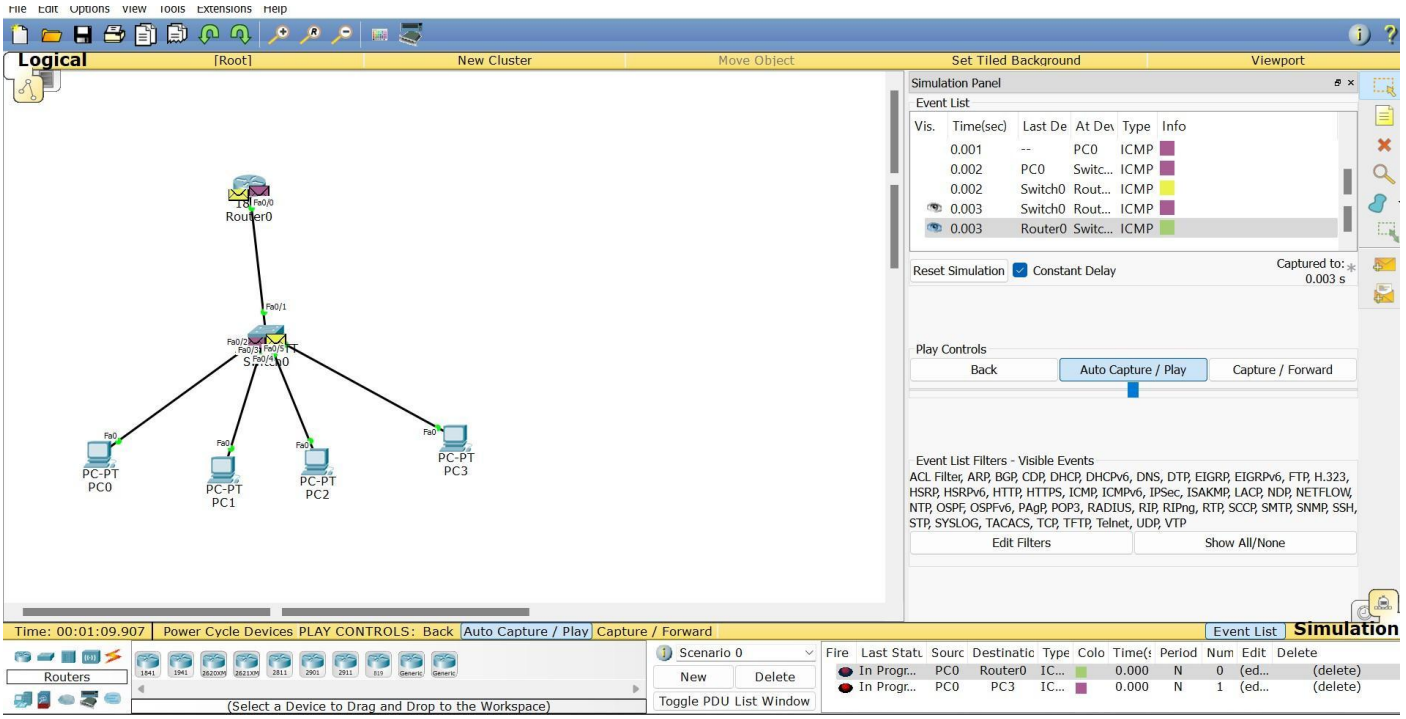
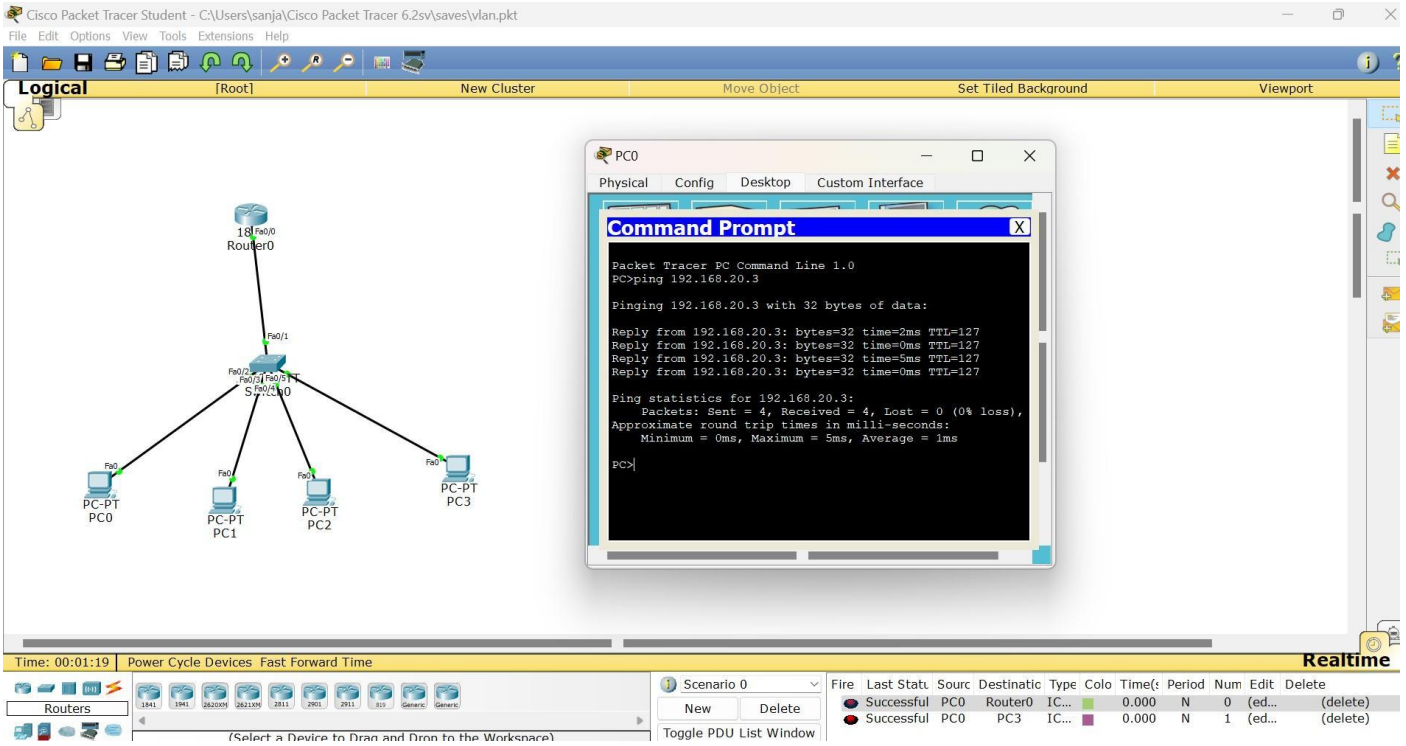
9/23

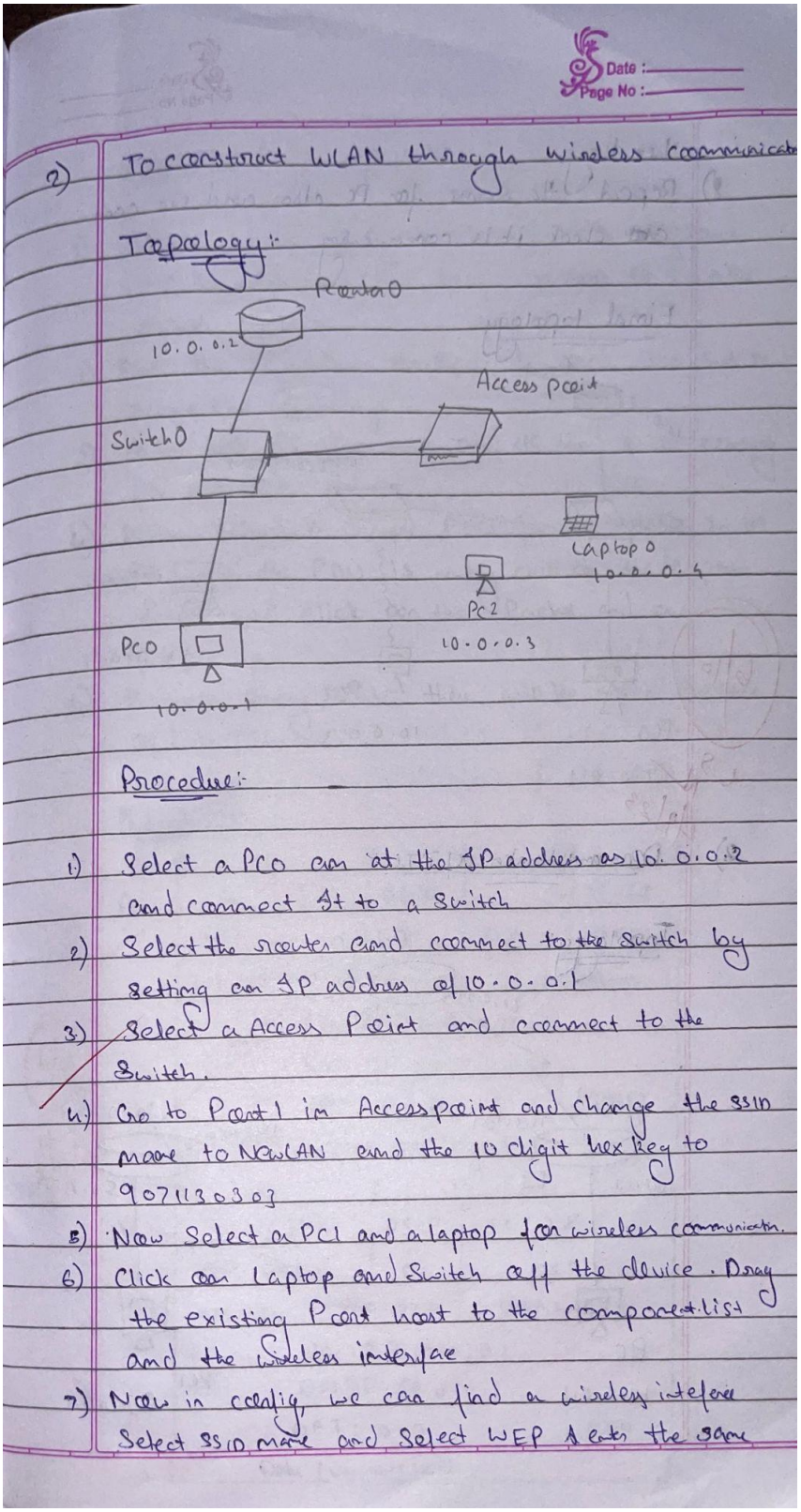
TOPOLOGY & OUTPUT





EXPERIMENT-10

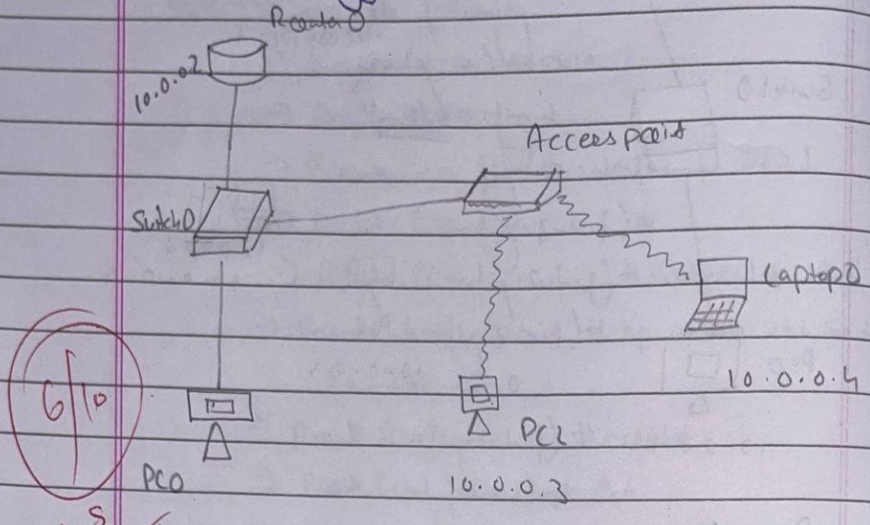
Q) To construct a WLAN and make the nodes communicate wirelessly and Demonstrate the TTL/ Life of a Packet



hex key.

8) Repeat the same for PC also and we can check it is communicating

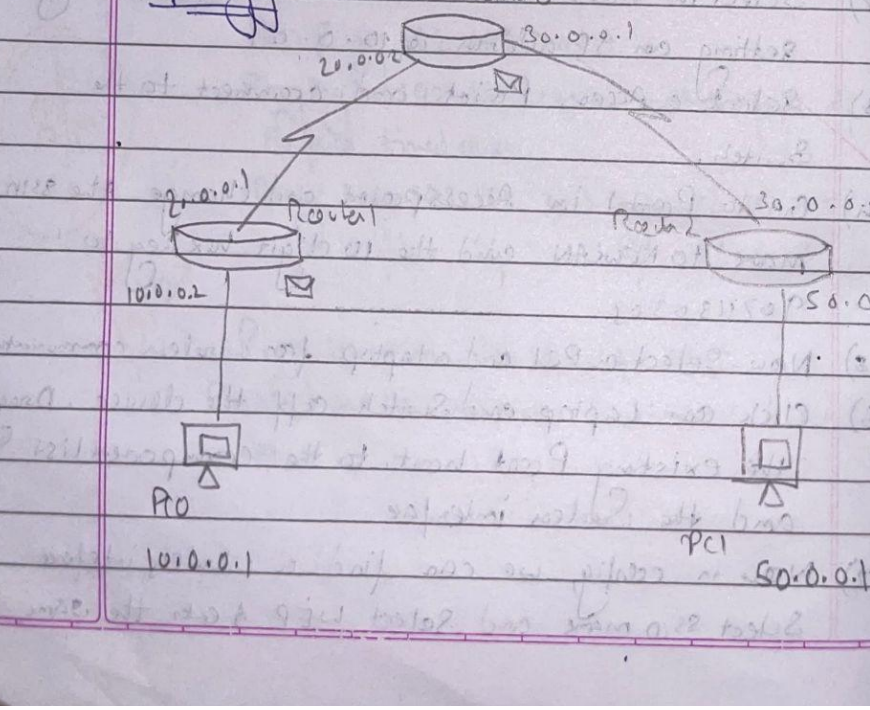
Final topology:



2/9/23

2) Demonstration of TTL

Topology:



Date :
Page No :

Procedure :-

1) Select 2 PC's and connect them to different routers. Connect the two routers to another router.
2) Enter the IP address to each PC and also set the respective gateways
3) Also set the dynamic and all the static routing for all PC's.
4) Now select a simple PDU from one PC to the PC while the PDU is reading click on the Capture first and click on the Packet and a window pops up.
5) Between every router there will be a time difference of 1 in TTL.

Output : IP

1)

0	4	8	16	19	31
4	IHL	DSCP		TL : 28	
IP : 0x6			0X	0X0	
TTL : 255		PRO : 0x1		CHKSum	
SRC IP : 10 : 0 : 0 : 1					
DST IP : 50 : 0 : 0 : 1					
OPT : 000				0X0	
Data (variable length)					

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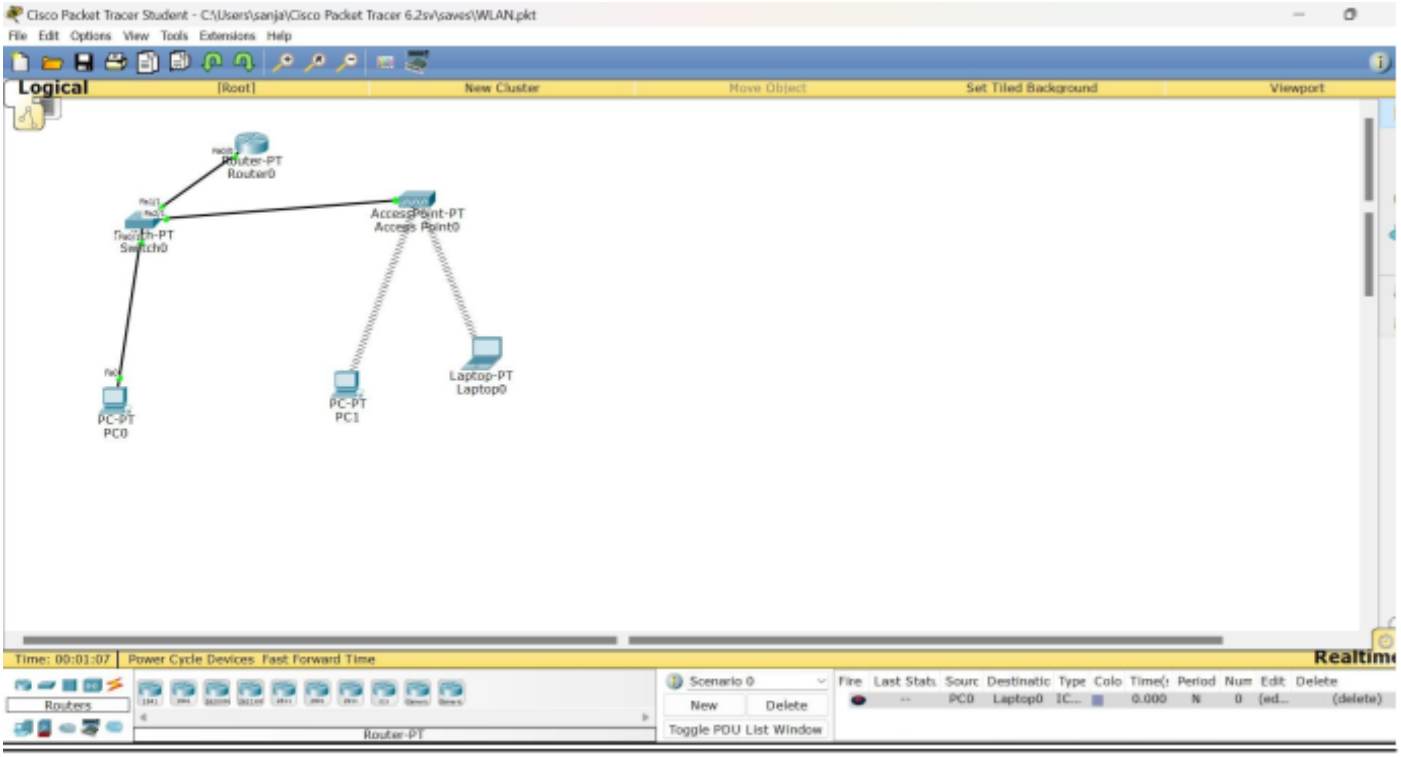
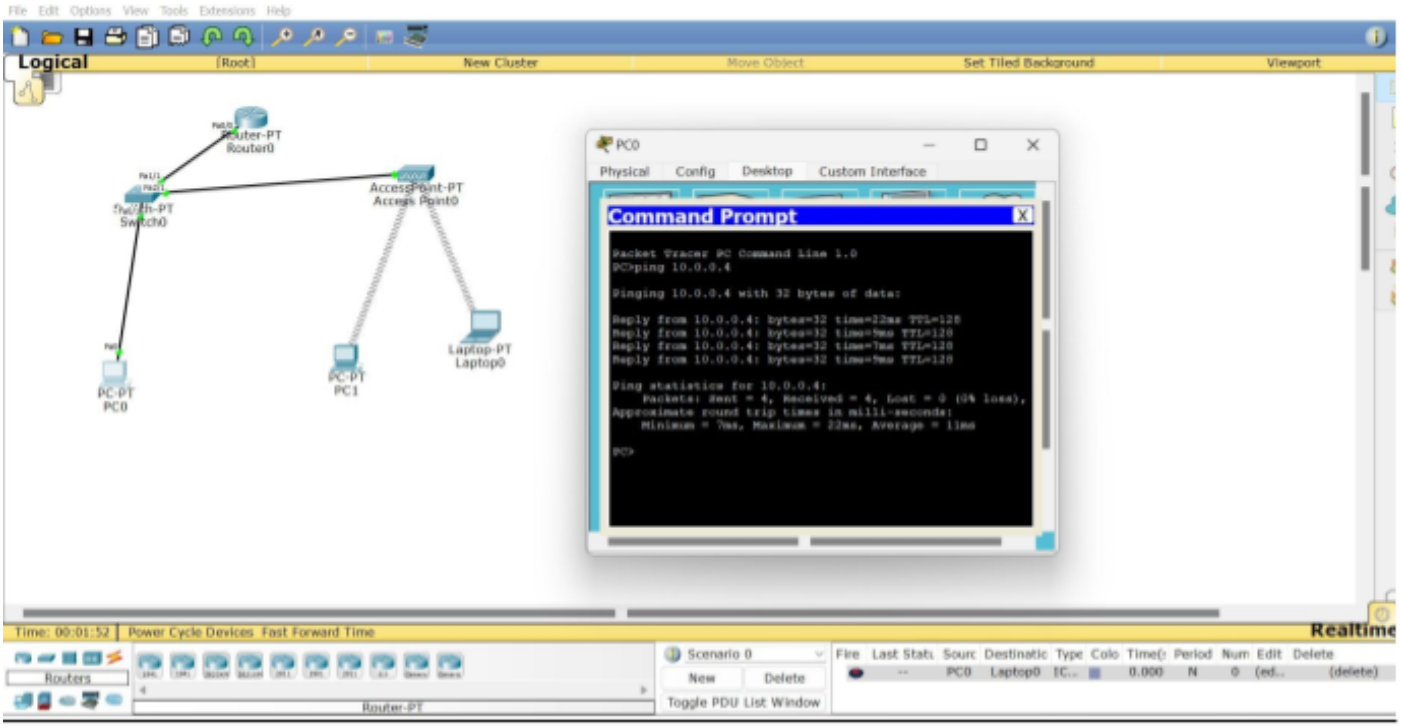
2)

0	4	8	16
4	IHL	DSCP	TL : 28
IP : 0x6		0	0x0
TTL : 254		PRO : 0x0	Checksum
SRC : IP : 10 : 0 : 0.1			
DST IP : 50.0.0.1			
DPT : 0x0			0x0
Data (variable length)			

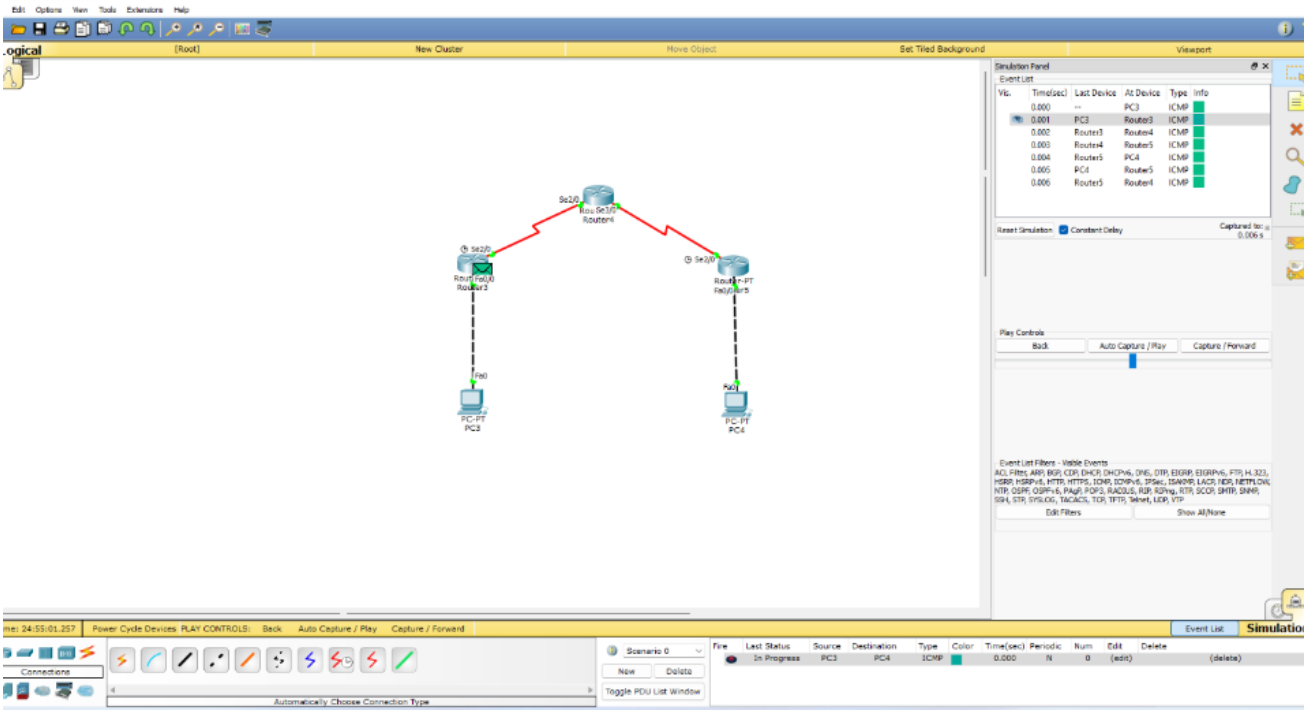
N 2/9/23

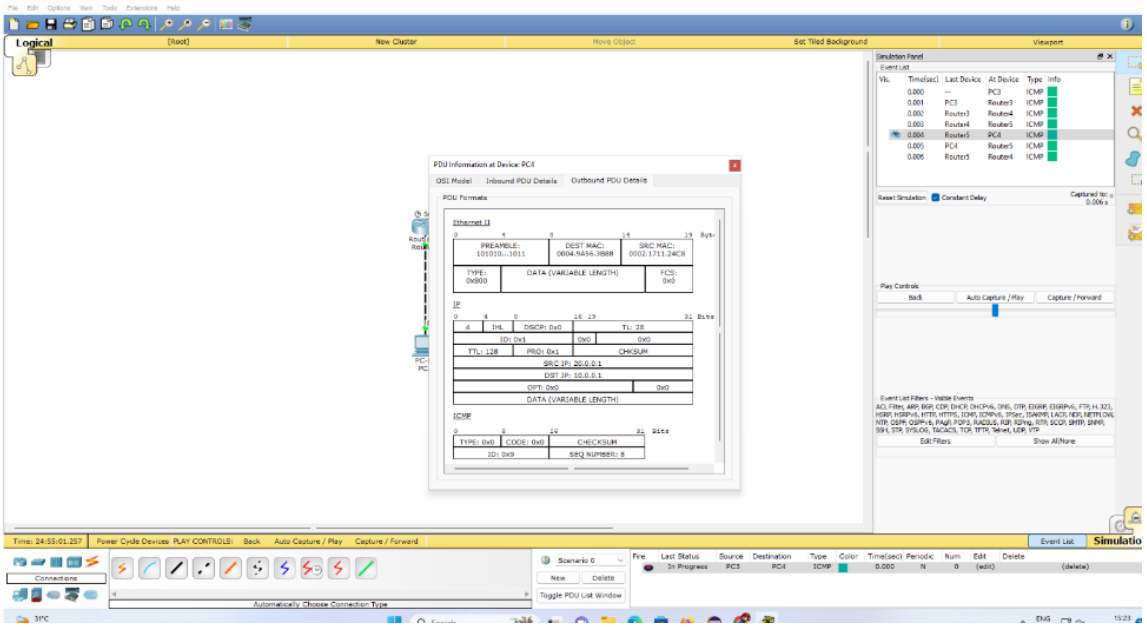
TOPOLOGY & OUTPUT (WLAN)

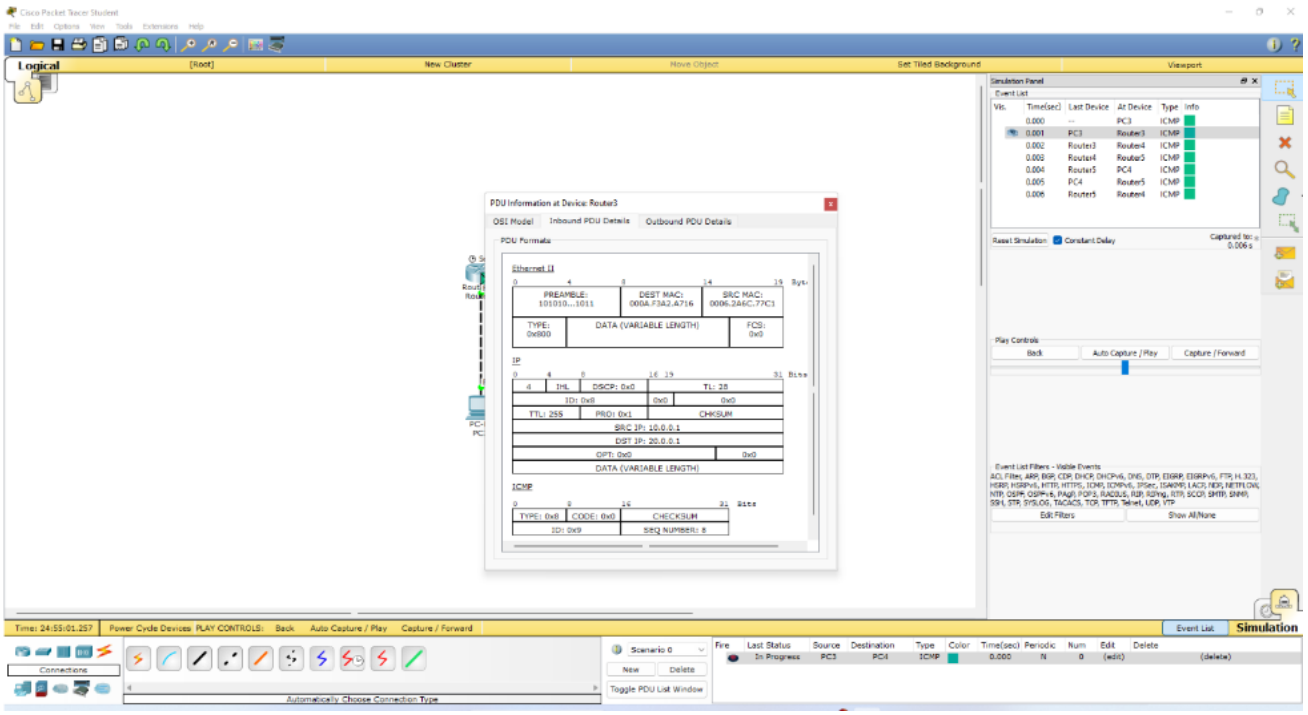


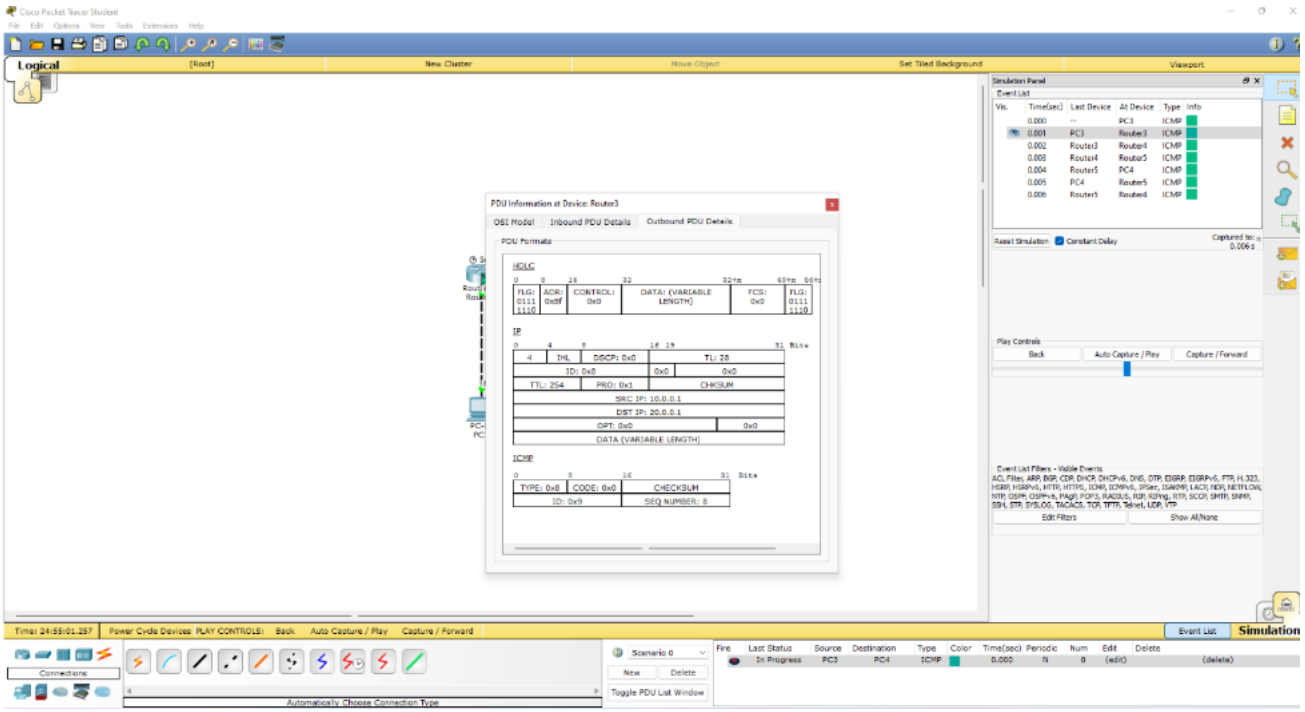


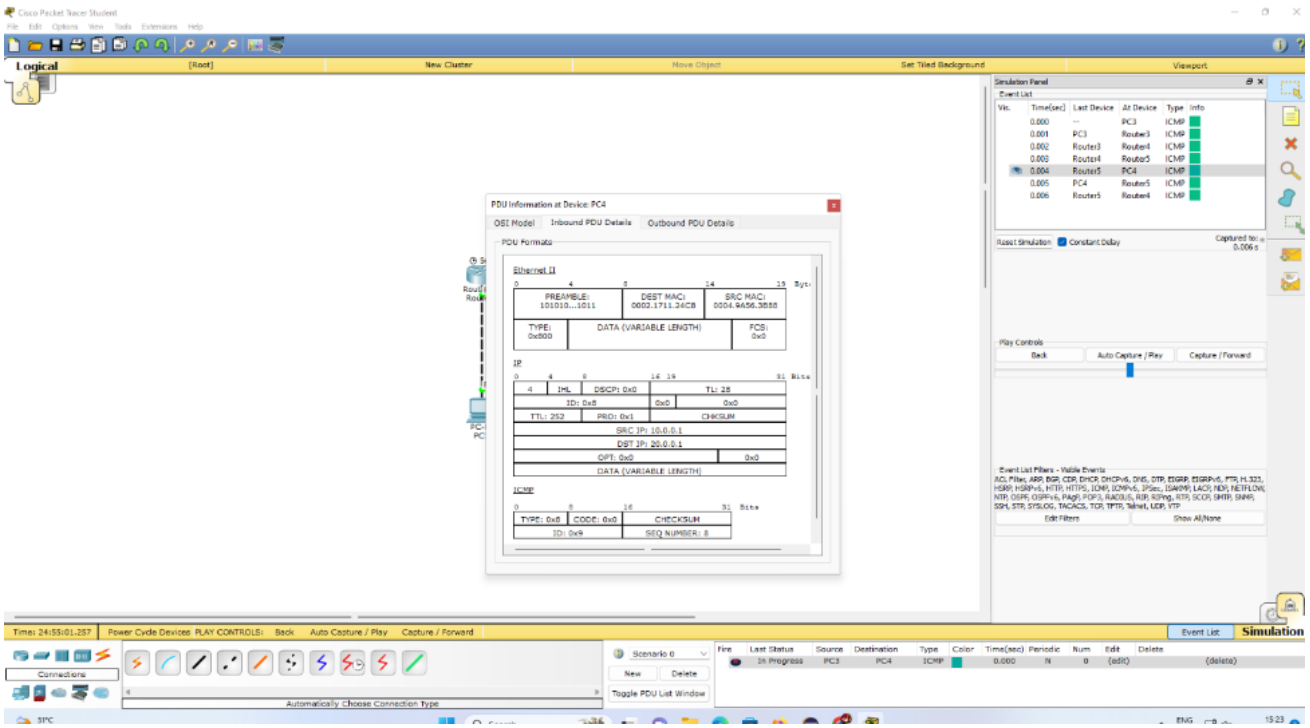
TOPOLOGY & OUTPUT (TTL)


Edit Options View Tools Extensions Help
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.000 -- PC3 ICMP
0.001 PC3 Router3 ICMP
0.002 Router3 Router4 ICMP
0.003 Router4 Router5 ICMP
0.004 Router5 PC4 ICMP
0.005 PC4 Router5 ICMP
0.006 Router5 Router4 ICMP
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
In Progress
PC3
PC4
ICMP
0.000
N
0
(edit)
(delete)



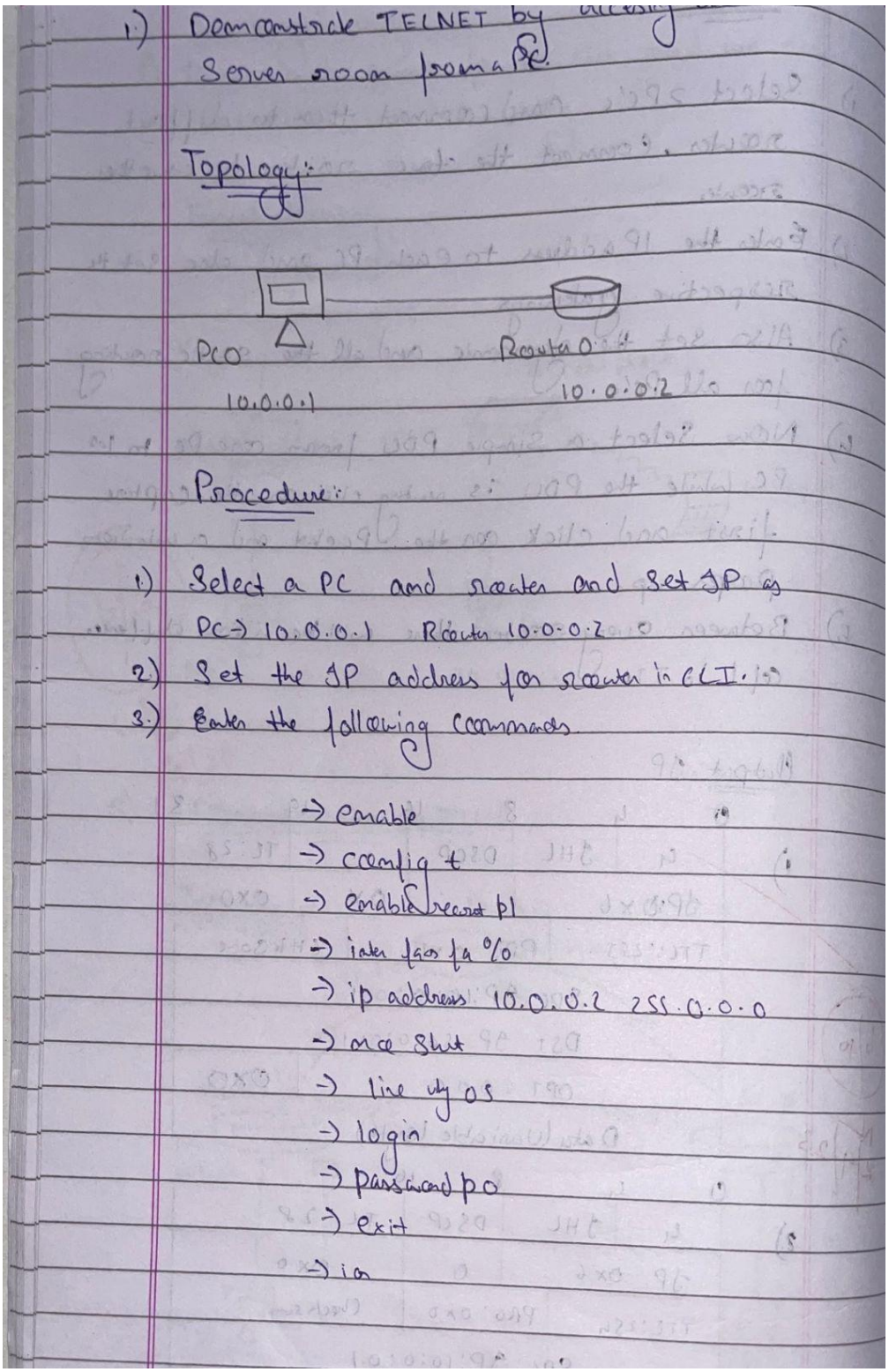



Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router3
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
IP
ICMP
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Power Cycle Devices
PLAY CONTROLS:
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: PC4
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
IP
ICMP
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Power Cycle Devices
PLAY CONTROLS:
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window

EXPERIMENT-11

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



Date :
Page No :

Output:

PC> ping 10.0.0.1

Trying 10.0.0.1 .. 0/ms

User Access Verification

Password : p0

R1> enable

Password : p1

R1# show IP route

Gateway of last

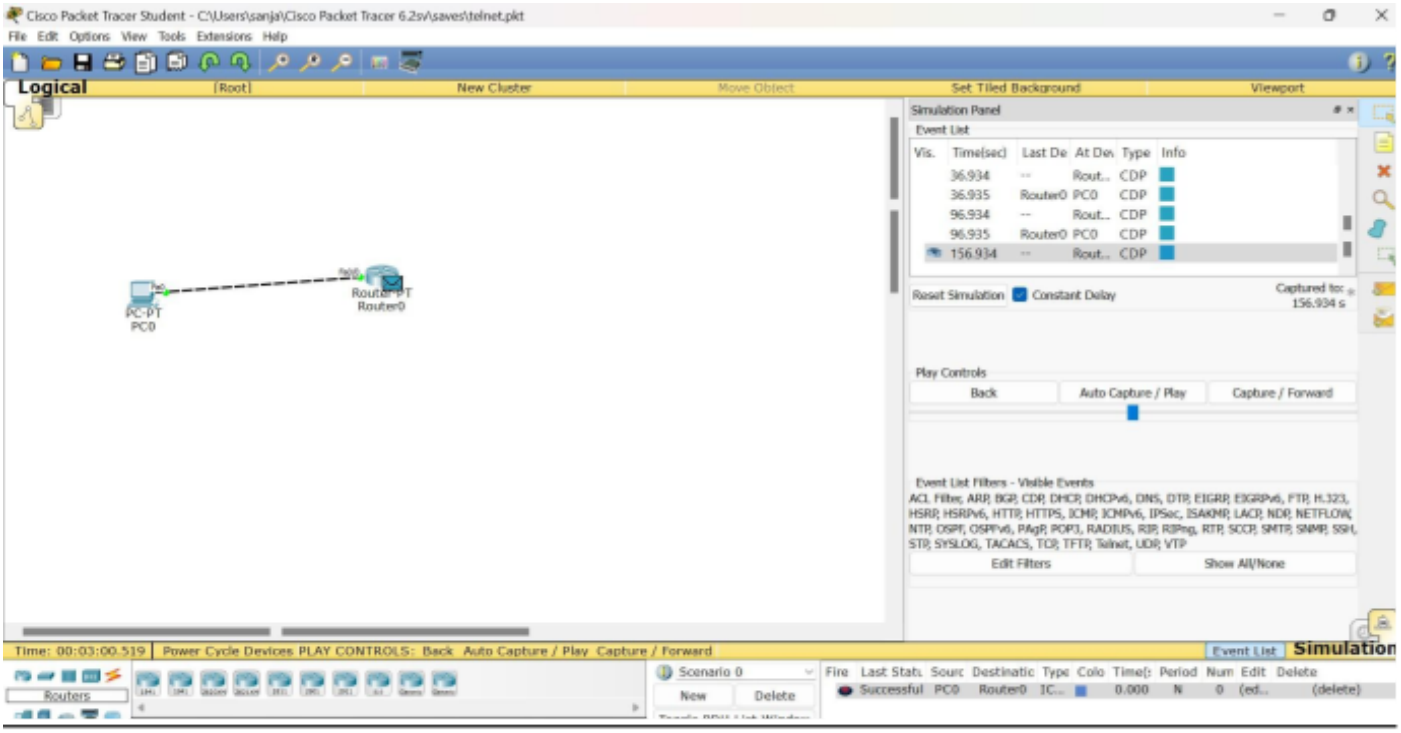
C 10.0.0.0/8 is directly connected, Fa 0/0

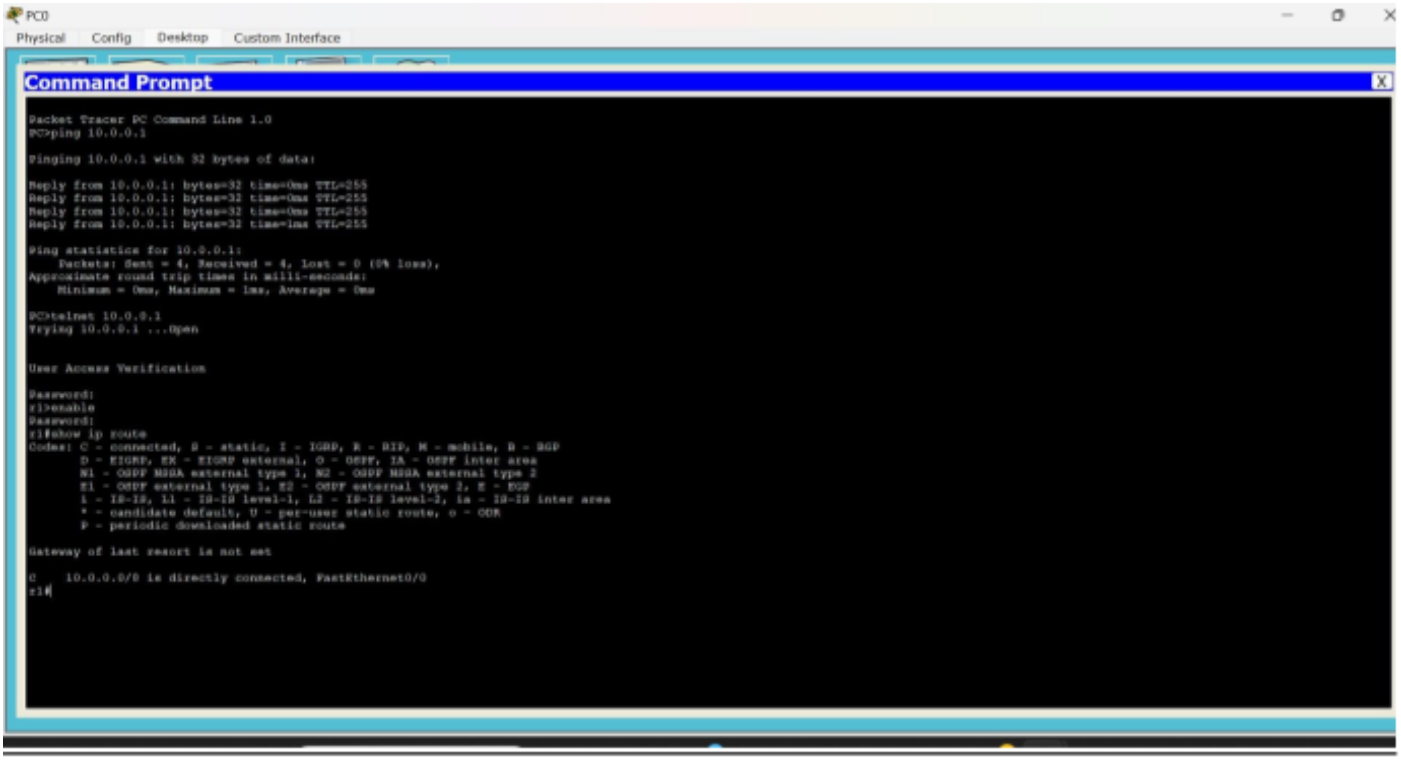
LS

6/10

2/9/23

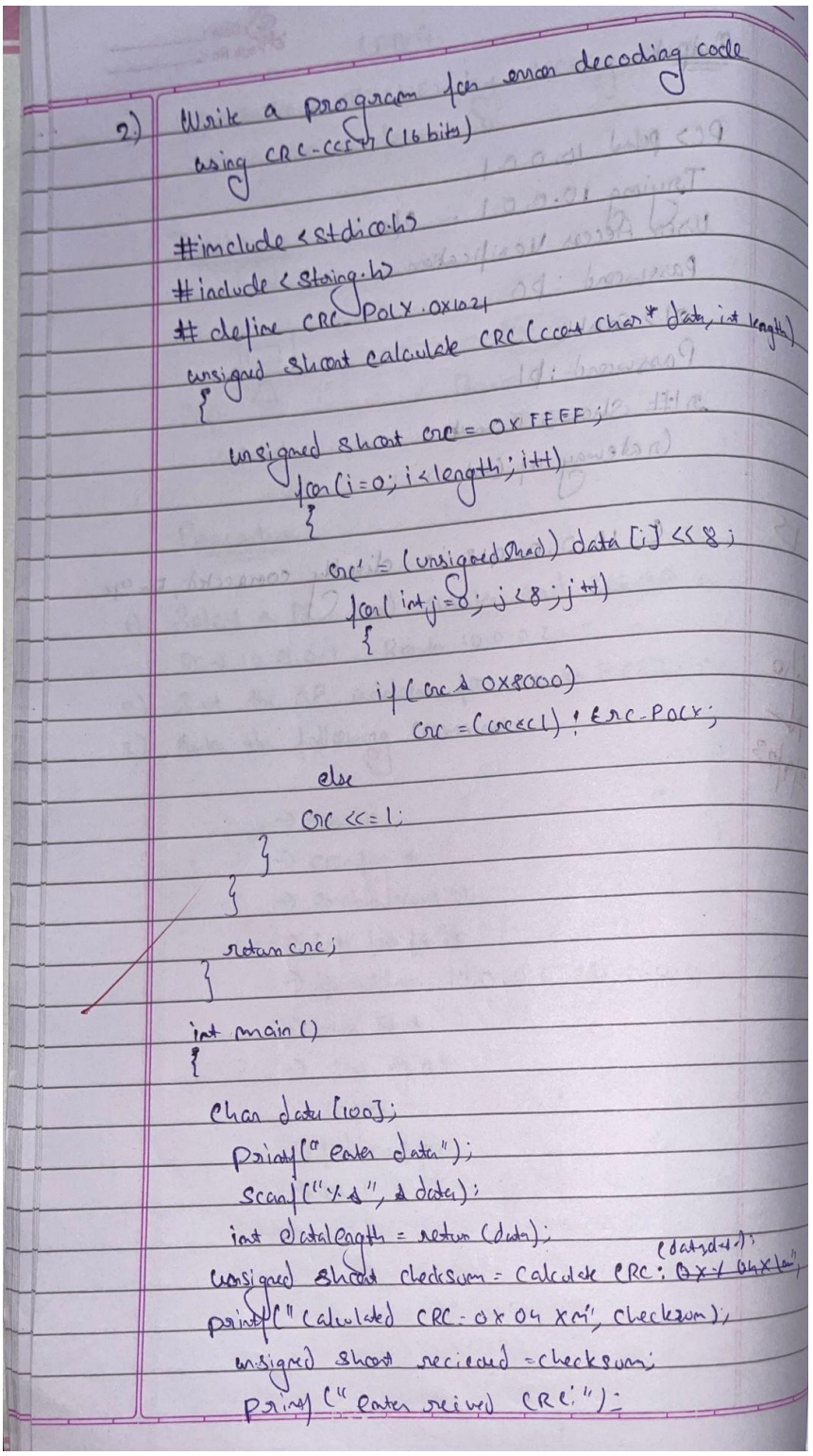
TOPOLOGY & OUTPUT





EXPERIMENT-12

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



```
2) Write a program for error decoding code
using CRC-CCITT (16 bits)

#include <stdio.h>
#include <string.h>
#define CRC_POLY 0x1021
unsigned short calculate CRC (const char * data, int length)
{
  unsigned short crc = 0xFFFF;
  for(i=0; i<length; i++)
  {
    crc = (unsigned short) data[i] << 8;
    for( int j=0; j<8; j++)
    {
      if (crc & 0x8000)
        crc = (crc<<1) ^ CRC_POLY;
      else
        crc <<= 1;
    }
  }
  return crc;
}
int main()
{
  char data[100];
  printf(" enter data");
  scanf("%s", &data);
  int datalength = strlen(data);
  unsigned short checksum = calculate CRC: 0x%04x\n", (data,d+1);
  printf(" calculated CRC = 0x%04x\n", checksum);
  unsigned short recieved = checksum;
  printf(" enter recived CRC:");
```

```
Sscanf("%x", &recieved checksum);
if(recieved checksum == checksum);
    printf("Data is error-free\n"); else
    printf("Data contains error\n");
}
}
```

Output:-

```
Enter frame bits: 1011
Message after appending 0's: 1011 0000 0000 0000 0000
Generator: 10001 0000 0001 00001
Quotient: 1011
Transmitted frame: 1011 1011 0001 0110 1011
Enter route 1011 1011 0001 0110 1011
Checksum: 0000 0000 0000 0000
Data is error-free
```

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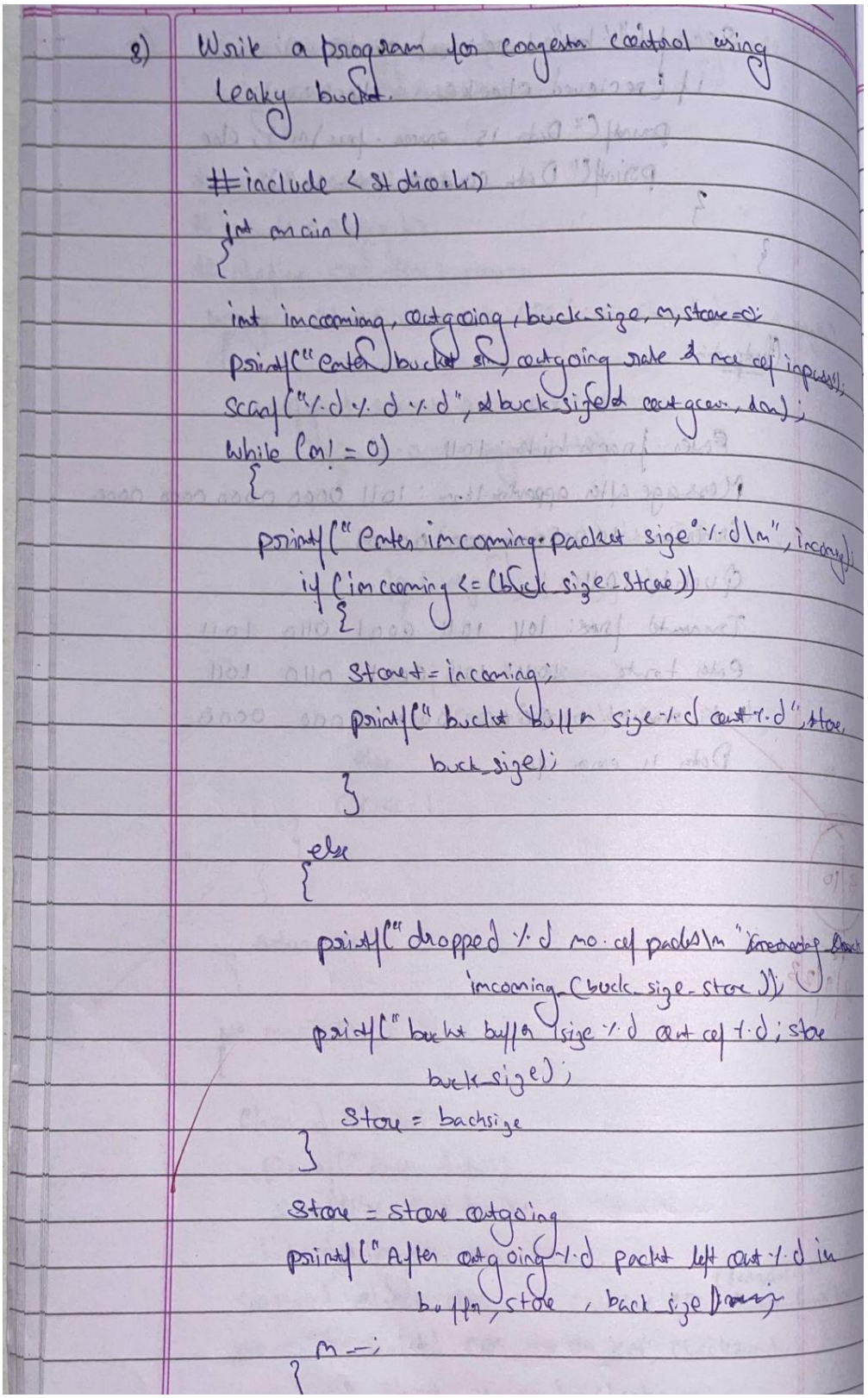
OUTPUT

```
Enter the frame bits:1011
Message after appending 16 zeros:1011000000000000000
generator:10001000000100001


quotient:1011
transmitted frame:10111011000101101011
Enter transmitted frame:10111011000101101011
CRC checking


last remainder:0000000000000000

Received frame is correct
Process returned 0 (0x0)   execution time : 14.468 s
Press any key to continue.
```

EXPERIMENT-14

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



8) Write a program for congestion control using leaky bucket.

```
#include <stdio.h>
int main()
{
int incoming, outgoing, buck_size, n, store=0;
printf("enter bucket size, outgoing rate & no of inputs");
scanf("%d %d %d", &buck_size, &outgoing, &n);
while (n!=0)
{
printf("Enter incoming packet size %d\n", incoming);
if (incoming <= (buck_size-store))
{
store = incoming;
printf("bucket buffer size %d out %d", store,
buck_size);
}
else
{
printf("dropped %d no of packs\n"
incoming (buck_size-store));
printf("bucket buffer size %d out of %d; store
buck_size);
store = bachsize
}
store = store outgoing
printf("After outgoing %d packet left out %d in
buffer, store, back_size);
n--;
}
```

Date :
Page No :

Output1:-

Enter bucket size, outgoing rate and no of inputs
20 10 2

Enter incoming packet size = 30
incoming packet = 30
Dropped 10 no of packets
bucket buffer size 0 out of 20
After outgoing 10 packet left 20 in buffer

Enter incoming packet size: 10
incoming packet size 10
bucket buffer size 10 out of 20
After outgoing 10 packs left 20 in buffer

Output2: Enter bucket size, outgoing & no of i/p.

8/10

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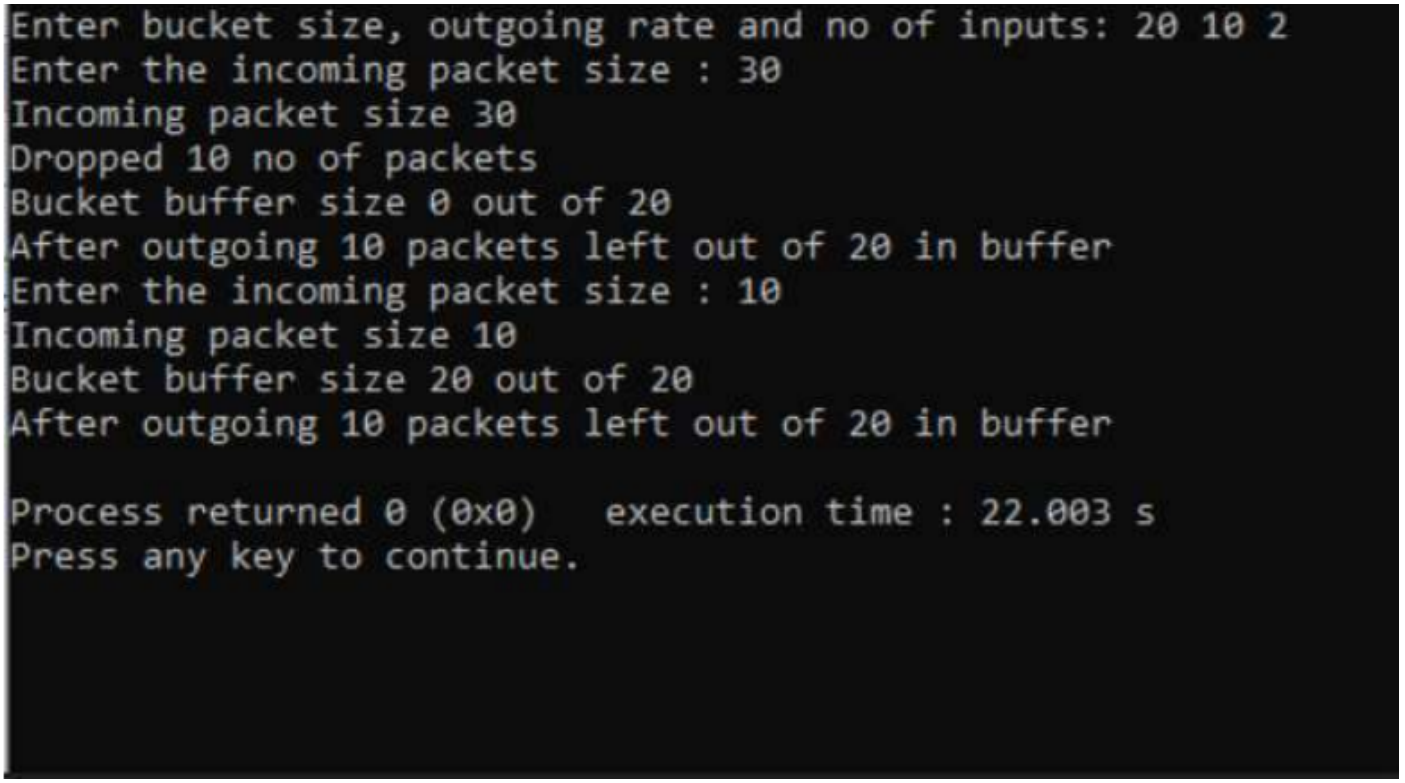
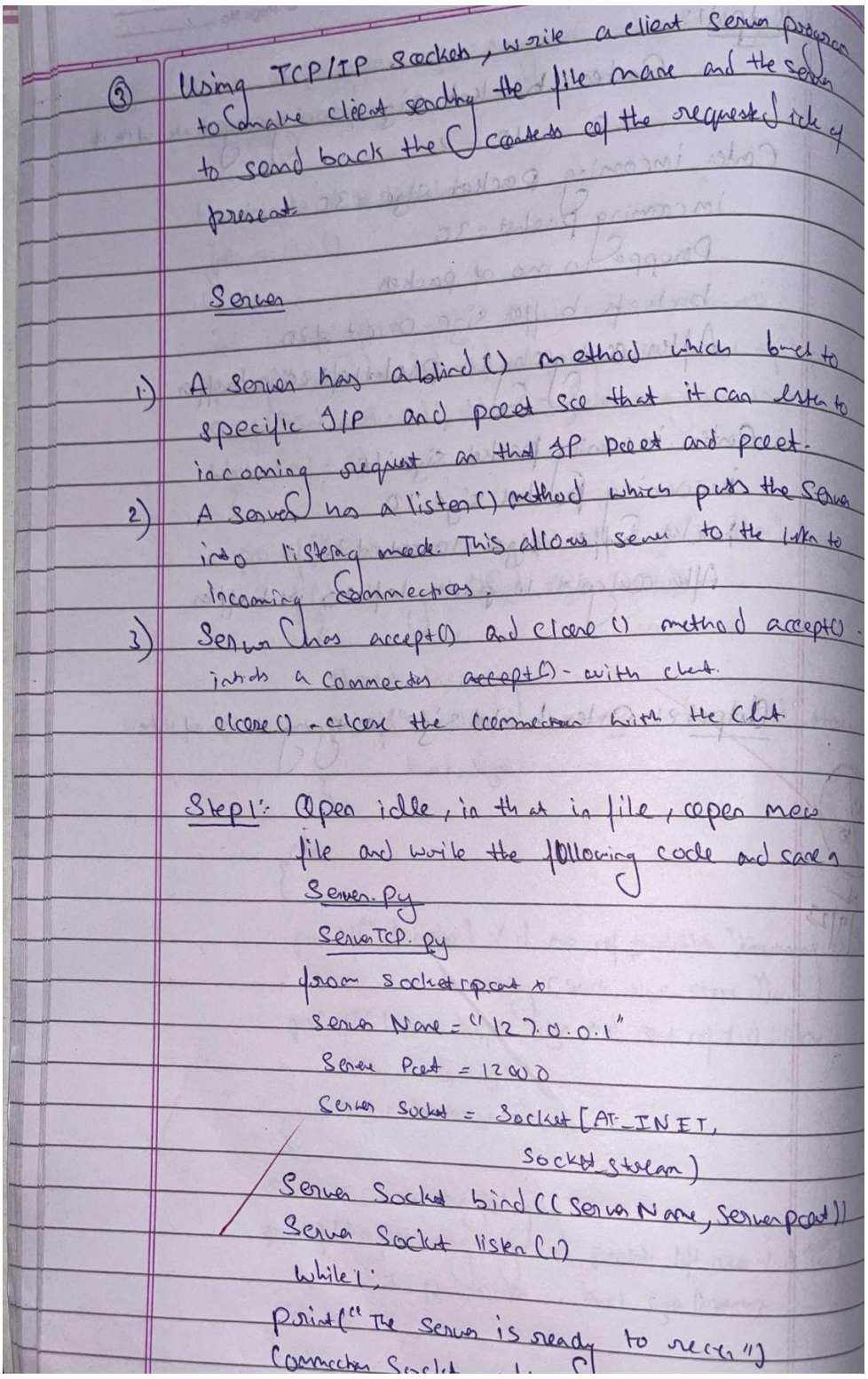
OUTPUT


Enter bucket size, outgoing rate and no of inputs: 20 10 2
Enter the incoming packet size : 30
Incoming packet size 30
Dropped 10 no of packets
Bucket buffer size 0 out of 20
After outgoing 10 packets left out of 20 in buffer
Enter the incoming packet size : 10
Incoming packet size 10
Bucket buffer size 20 out of 20
After outgoing 10 packets left out of 20 in buffer
Process returned 0 (0x0) execution time : 22.003 s
Press any key to continue.

EXPERIMENT-15

Q) 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.



③ 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

Server

1) A server has a bind() method which bind to specific IP and port so that it can listen to incoming request on that IP port and port.
2) A server has a listen() method which puts the server into listening mode. This allows server to the listen to incoming connections.
3) Server has accept() and close() method accept() - accepts a connection accept() - with client.
close() - close the connection with the Client

Step1: Open idle, in that in file, open new file and write the following code and save as

Server.py

ServerTCP.py

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

file = open (sentence, "r")
l = file.read (1024)
connectionSocket.send (l.encode())
print("\n Sent contents of " + sentence)
file.close()
connectionSocket.close()

Step2: Run the file server.py

O/P ⇒ The server is ready to second. This shows that server is working

Client:

Step1: Make a Socket object

Step2: Establish a connection with server and lastly we will read data from the server and close the function.

Step3: Open idle and open new file and write the following code and save as "client.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 (file contents)
Client Socket . Close ()

Run the file client.py

Client O/P =) enter file name . server.py

Server O/P =) the server is ready to receive sent
the contents of sam . py.
The server is ready to receive.

4) Using UDP Sockets, write client . Server Program to make client sending the file name and the server to send back the contents of requested file if present.

10/10

2/9/23

CODE-

ClientTCP.py

```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName,serverPort))
sentence = input("\nEnter file name:")

clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print ("\nFrom Server:\n")
print(filecontents)
clientSocket.close()
```

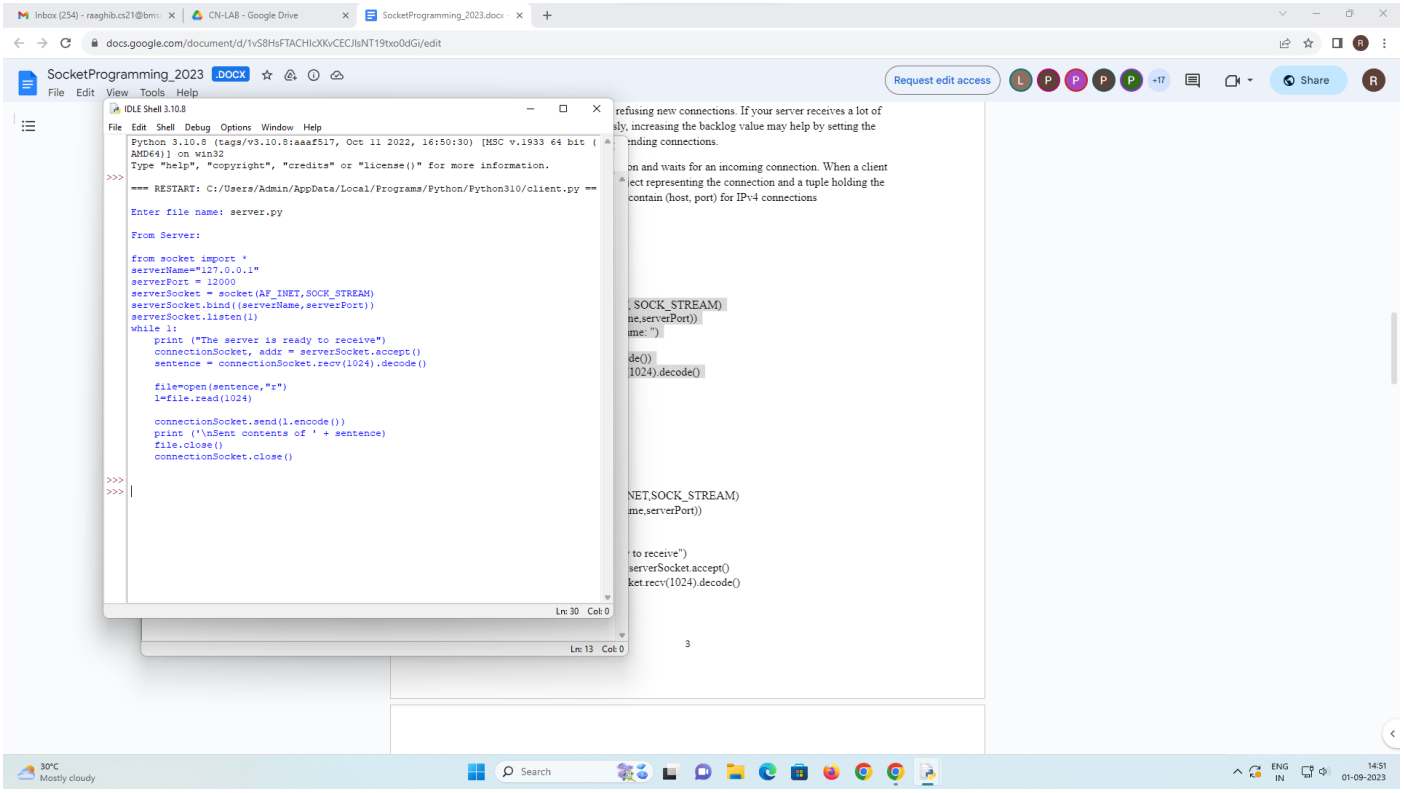
ServerTCP.py

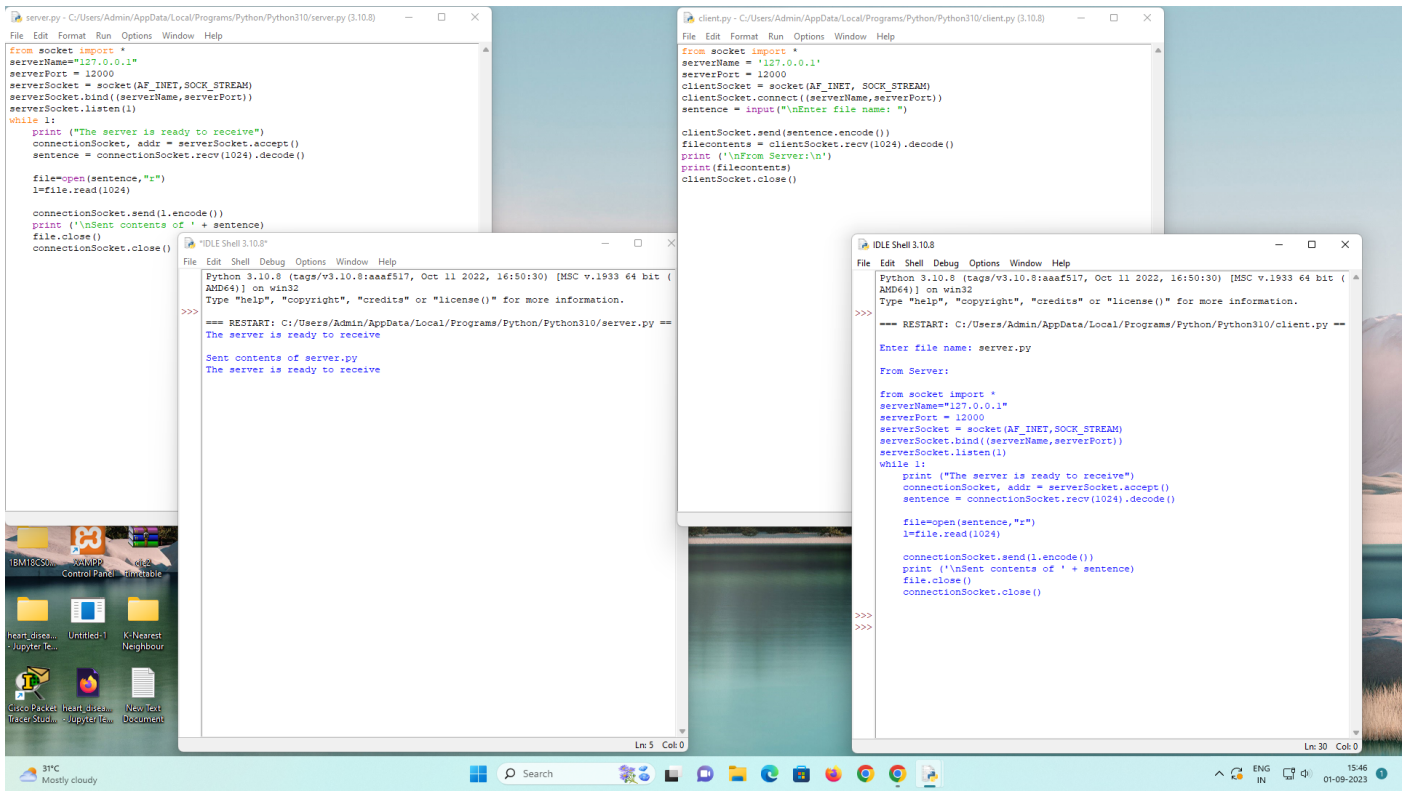
```
from socket import *

serverName='127.0.0.1'

serverPort = 12000

serverSocket = socket(AF_INET,SOCK_STREAM)

serverSocket.bind((serverName,serverPort))

serverSocket.listen(1)

while 1:

  print("The server is ready to receive")

  connectionSocket, addr = serverSocket.accept()

  sentence = connectionSocket.recv(1024).decode()


  file=open(sentence,"r")

  l=file.read(1024)


  connectionSocket.send(l.encode())

  print ("\nSent contents of " + sentence)
```

file.close()

connectionSocket.close()

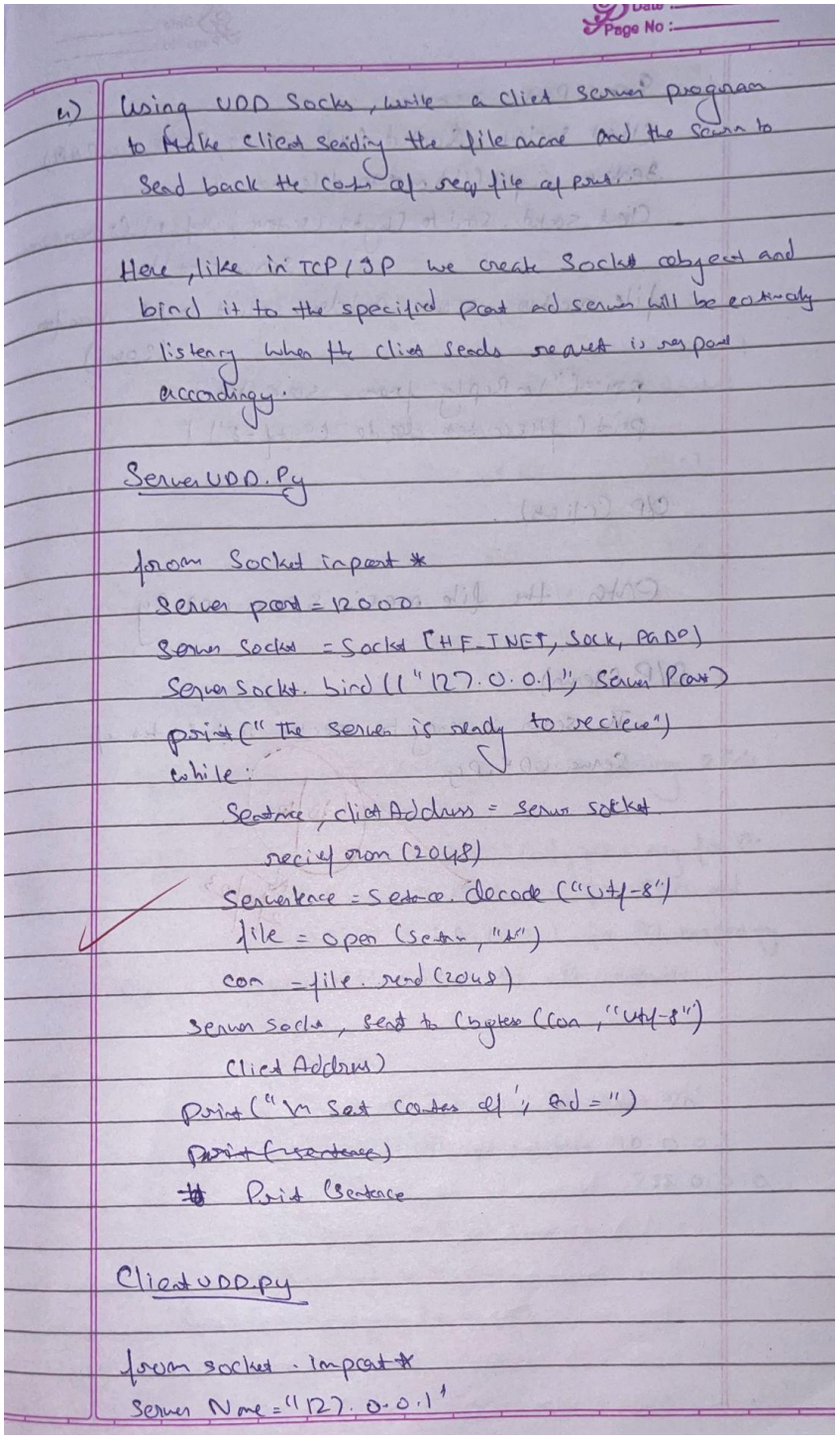
OUTPUT





EXPERIMENT-16

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



Page No :

a) Using UDP Socks, write a client server program to make client sending the file name and the server to send back the contents of requested file at port.

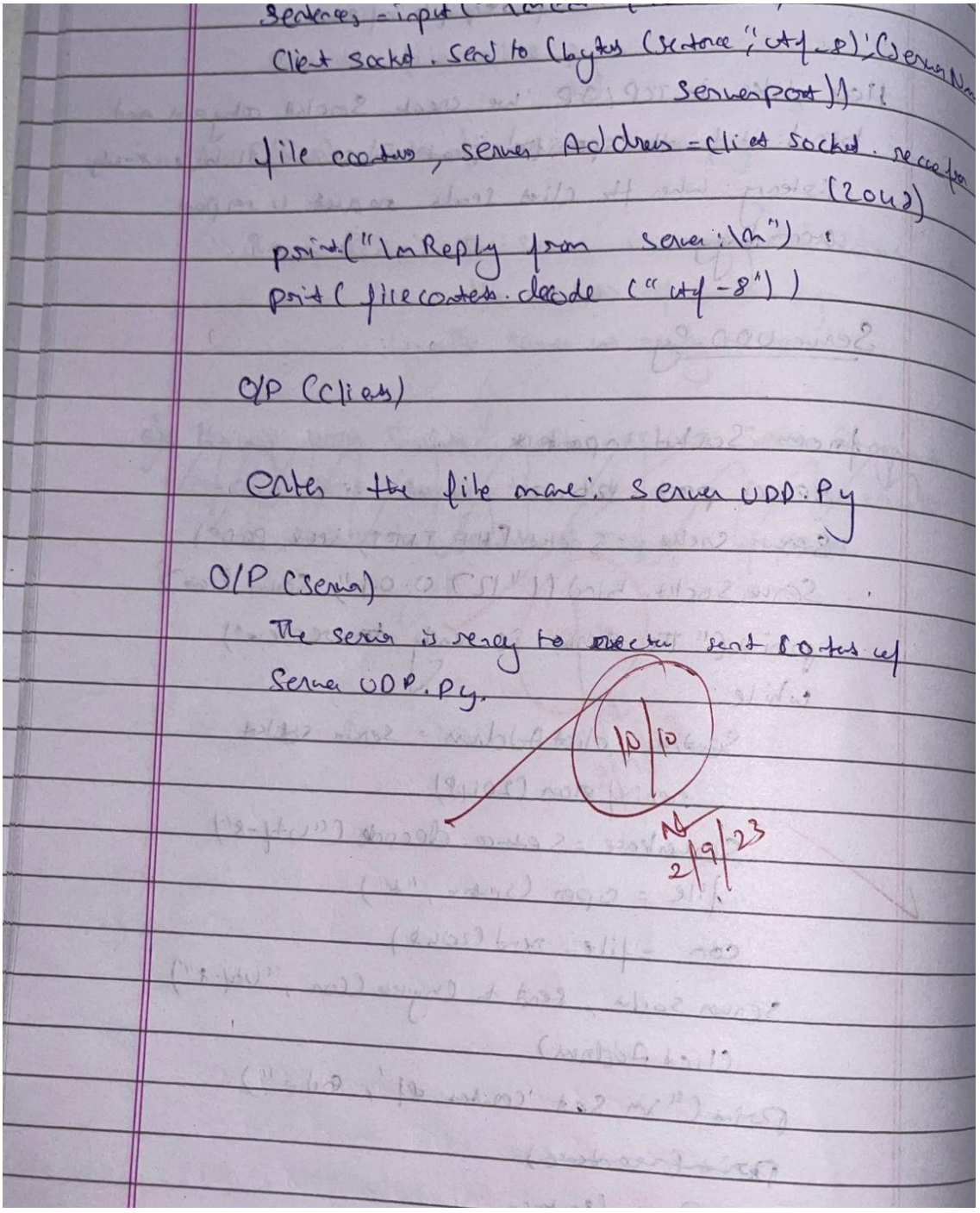
Here, like in TCP/IP we create Socket object and bind it to the specified port and server will be continously listening when the client sends request it responds accordingly.

Server UDP.Py

```
from Socket import *
Server port = 12000
Server Socket = Socket (HF_INET, Sock, PGDG)
Server Socket. bind (("127.0.0.1", Server Port))
print ("The server is ready to recieve")
while:
    Sentence, client Address = server socket
      recieve from (2048)
    Sentence = Sentence. decode ("utf-8")
    file = open (sentence, "r")
    con = file. read (2048)
    Server Socket, Sent to (bytes (con, "utf-8")
      Client Address)
    Print ("\n Sent contents of ', end = '')
    Print (sentence)
    Print Sentence
```

Client UDP.py

```
from socket . Import *
Server Name = ('127). 0.0.1'
```



CODE-

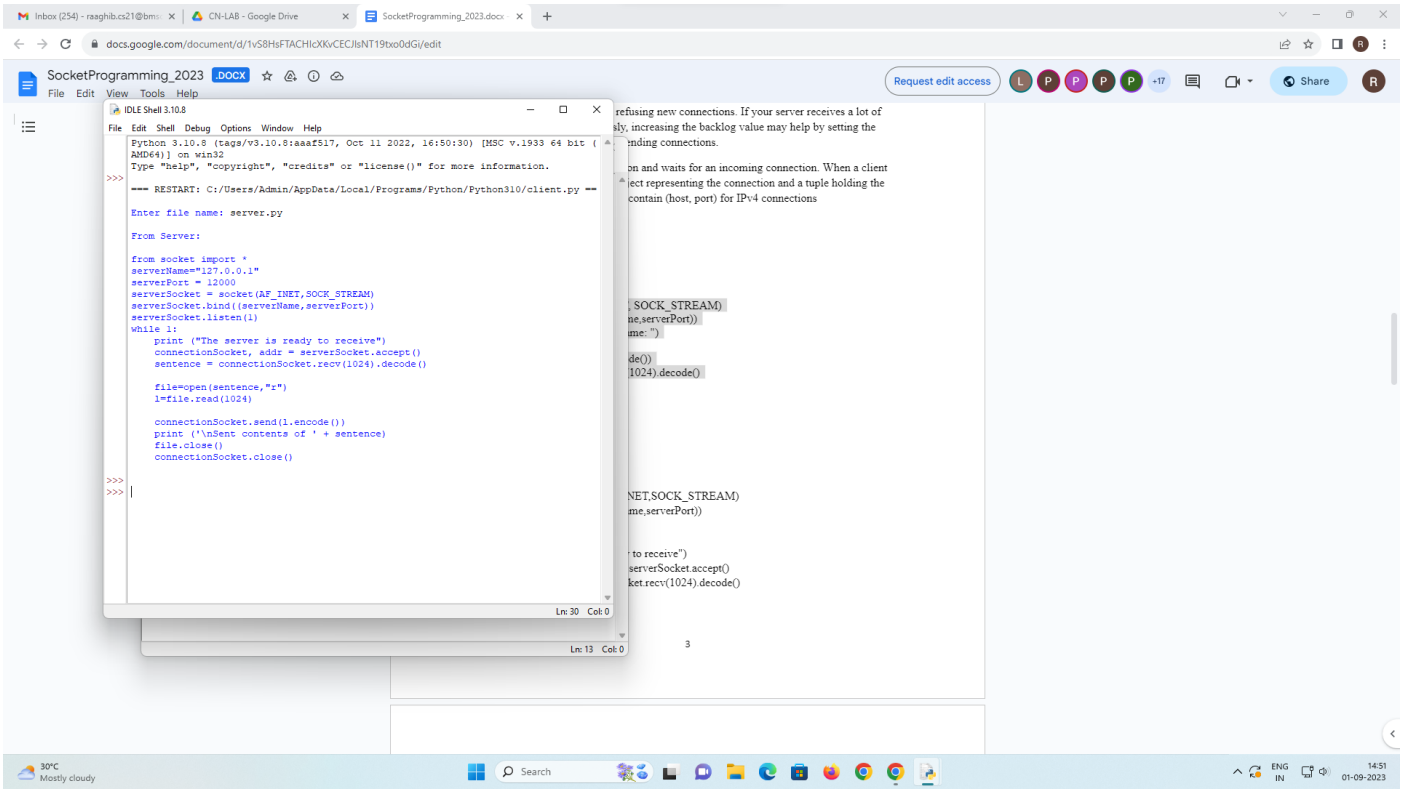
ClientUDP.py

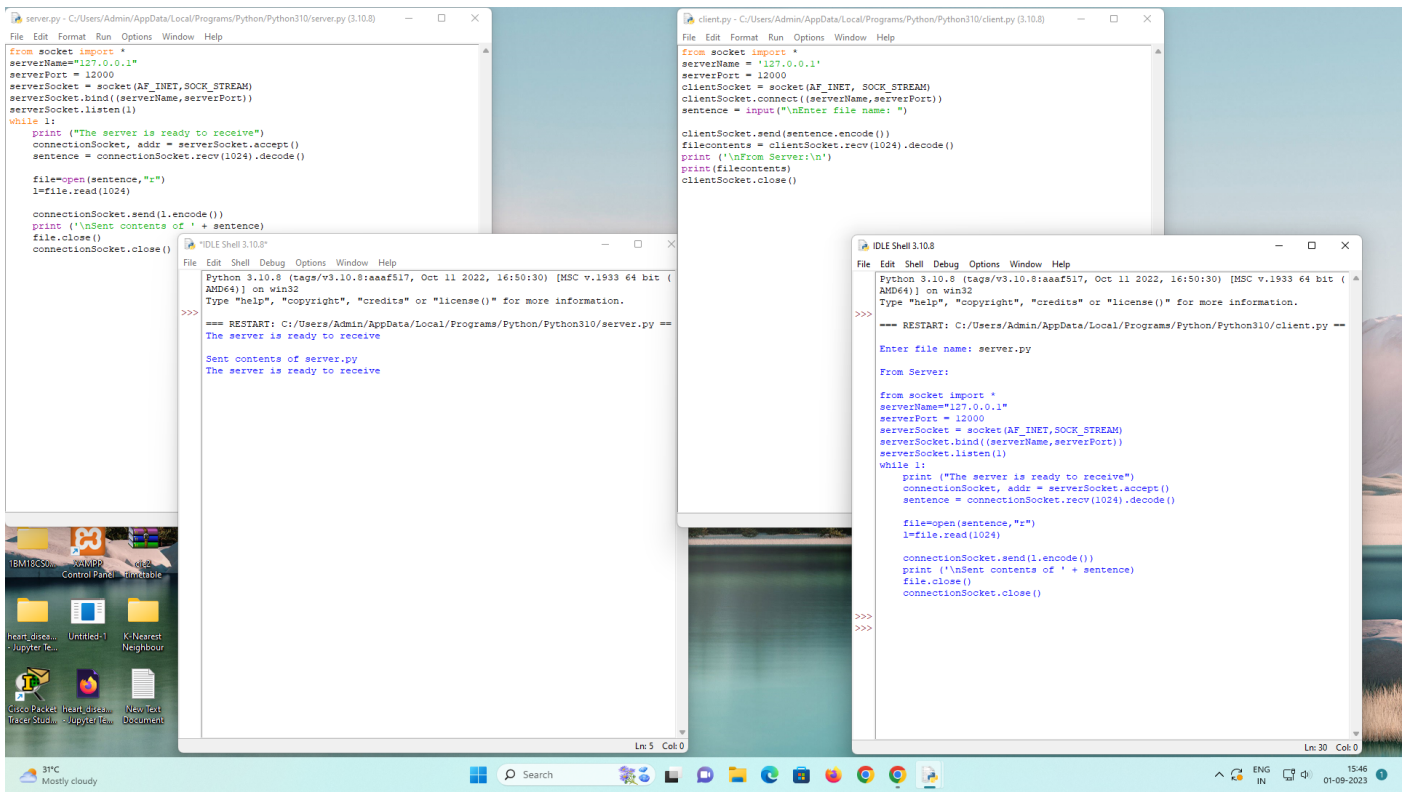
```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_DGRAM)
sentence = input("\nEnter file name:")


clientSocket.sendto(bytes(sentence,"utf-8"),(serverName, serverPort))
filecontents,serverAddress = clientSocket.recvfrom(2048)
print ("\nReply from Server:\n")
```

```
print (filecontents.decode("utf-8"))
#for i in filecontents:
  #print(str(i), end ='')
clientSocket.close()
clientSocket.close()
```

ServerUDP.py

```
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort))
print ("The server is ready to receive")
while 1:
   sentence, clientAddress = serverSocket.recvfrom(2048)
   sentence = sentence.decode("utf-8")
   file=open(sentence,"r")
   con=file.read(2048)
   serverSocket.sendto(bytes(con,"utf-8"),clientAddress)
   print ("nSent contents of ", end = "")
   print (sentence)
   # for i in sentence:
     # print (str(i), end = '')
   file.close()
```


SocketProgramming_2023
IDLE Shell 3.10.8
Python 3.10.8 (tags/v3.10.8:aaaf517, Oct 11 2022, 16:50:30) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> === RESTART: C:/Users/Admin/AppData/Local/Programs/Python/Python310/client.py ==
Enter file name: server.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()


server.py - C:/Users/Admin/AppData/Local/Programs/Python/Python310/server.py (3.10.8)
client.py - C:/Users/Admin/AppData/Local/Programs/Python/Python310/client.py (3.10.8)
IDLE Shell 3.10.8
Python 3.10.8 (tags/v3.10.8:aaaf517, Oct 11 2022, 16:50:30) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> === RESTART: C:/Users/Admin/AppData/Local/Programs/Python/Python310/server.py ==
The server is ready to receive
Sent contents of server.py
The server is ready to receive
>>> === RESTART: C:/Users/Admin/AppData/Local/Programs/Python/Python310/client.py ==
Enter file name: server.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()