

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



LAB RECORD

Computer Network Lab (23CS5PCCON)

Submitted by

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in partial fulfilment 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 **Shreyas Gouda M(1BM22CS270)**, who is 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.

| | |
|--|--|
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|--|--|

Index-Cycle-I

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| 2 | 18/10/2024 | Configure IP address to routers in packet tracer. Explore the following messages: ping responses, destination unreachable, request timed out, reply | 5 |
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| 4 | 08/11/2024 | Configure DHCP within a LAN and outside LAN. | 15 |
| 5 | 22/11/2024 | Configure RIP routing Protocol in Routers | 19 |
| 6 | 22/11/2024 | Configure OSPF routing protocol | 22 |
| 7 | 22/11/2024 | Demonstrate the TTL/ Life of a Packet | 38 |
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Github Link: <https://github.com/Shreyas-g-m/CN>

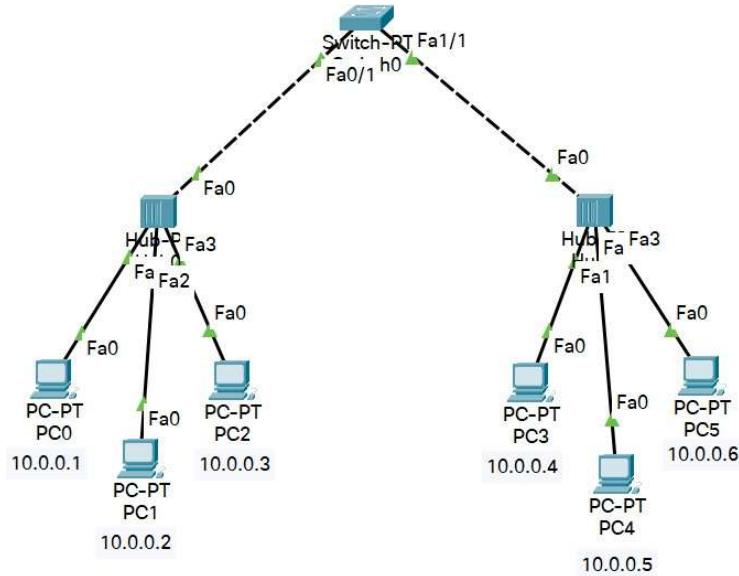
Index-Cycle-II

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|--------------------|-------------|---|---------------------|
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Cycle-I

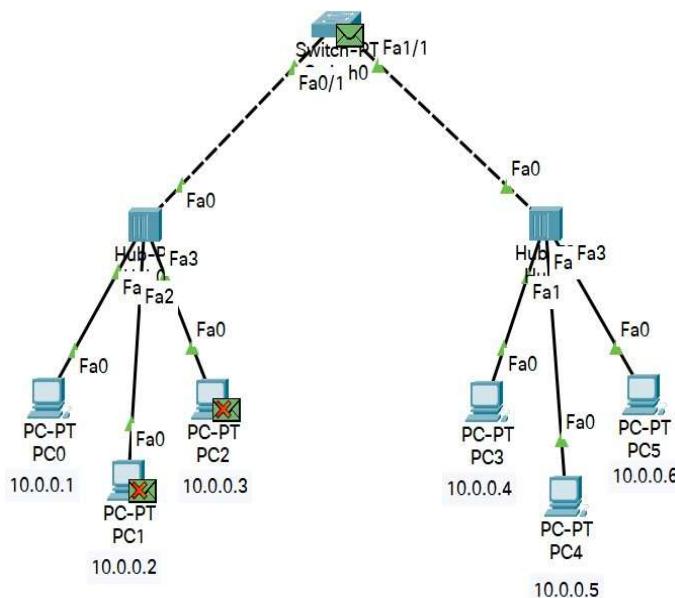
Program 1

- i. Create a topology involving multiple hubs and a switch connecting them to simulate with simple PDU.
- ii. Procedure along with the topology

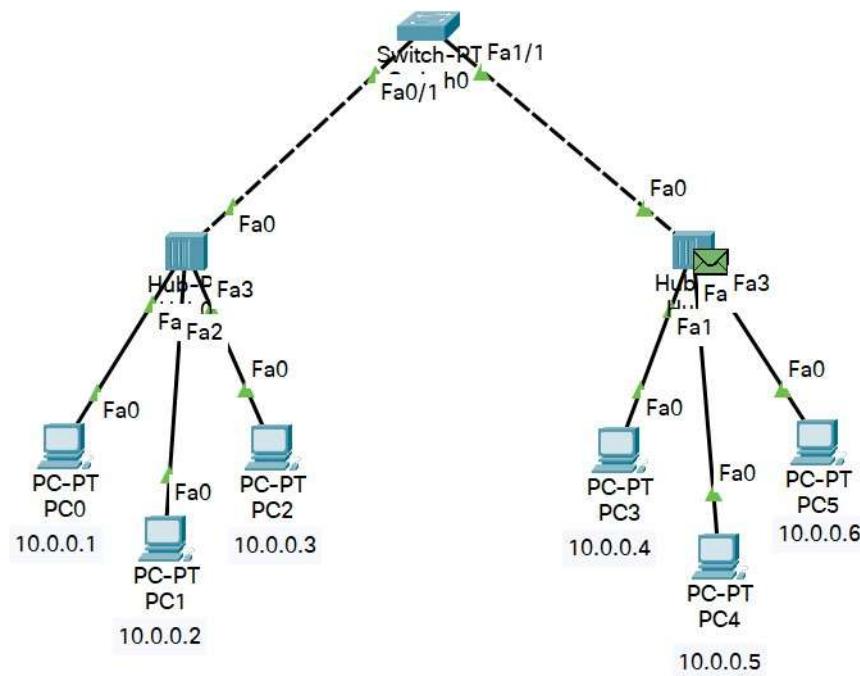


- iii. Screen shots/ output

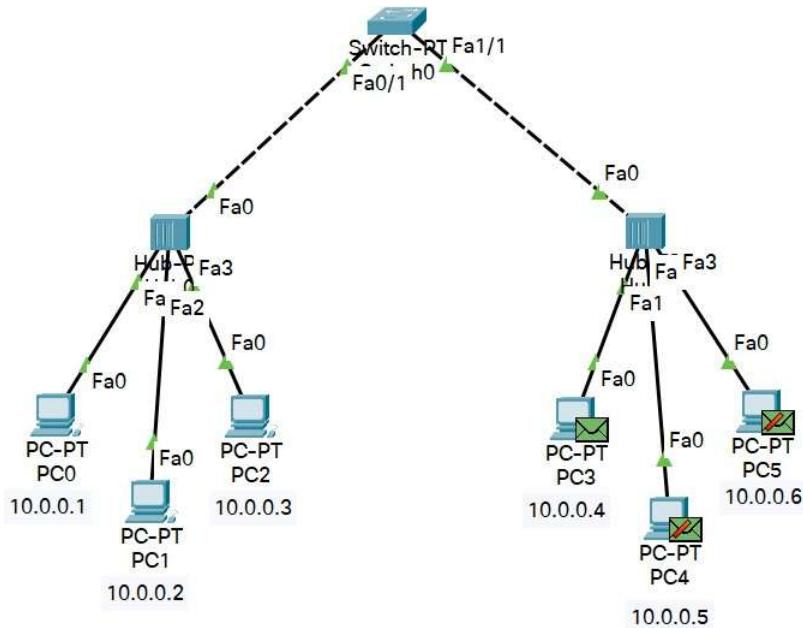
Hub behaviour at sending end



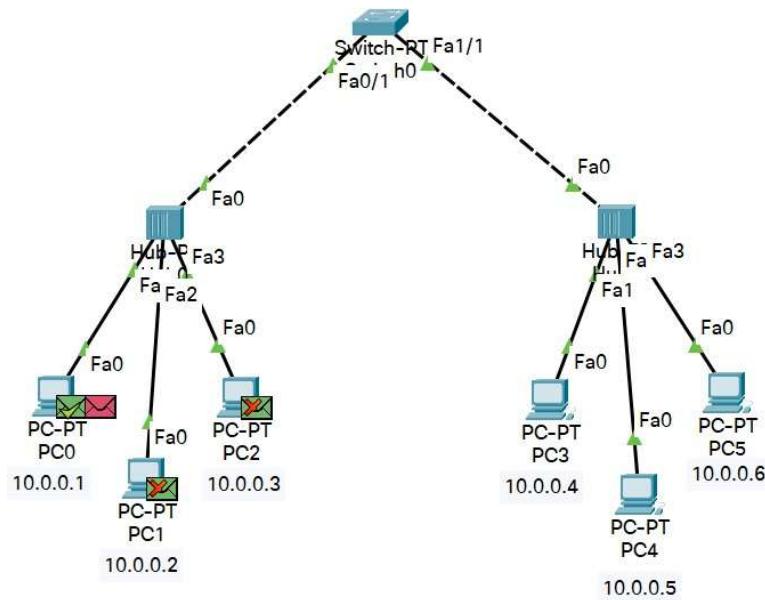
Switch behaviour



Hub behaviour at receiving end



Hub behaviour when back to sender



Ping command to connectivity

A screenshot of a Windows Command Prompt window titled "PC0". The window shows the output of a ping command from PC0 to PC4 (IP 10.0.0.4). The output is as follows:

```
Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:

Reply from 10.0.0.4: bytes=32 time<1ms TTL=128
Reply from 10.0.0.4: bytes=32 time<1ms TTL=128
Reply from 10.0.0.4: bytes=32 time=1ms TTL=128
Reply from 10.0.0.4: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

iv. Observation

Lab - I

Date 21.02.24
Page 1

SRS Document

I Hotel Management System

1. Introduction

Purpose of this document: Explore various features of a Hotel Management System

1.2 Scope: The HMS system will allow features like room management, guest management.

1.3 Overview: The system serves as a centralized platform for hotel management.

2 General description:

Fuctions: Room booking, Billing, check-in, check-out.

User: Front desk, Hotel Manager, guests.

Benefits: Enhanced operational efficiency.

3 Functional Requirements:

Booking System:

Allow customers to book online.

Room Management: Track room occupancy, availability etc.

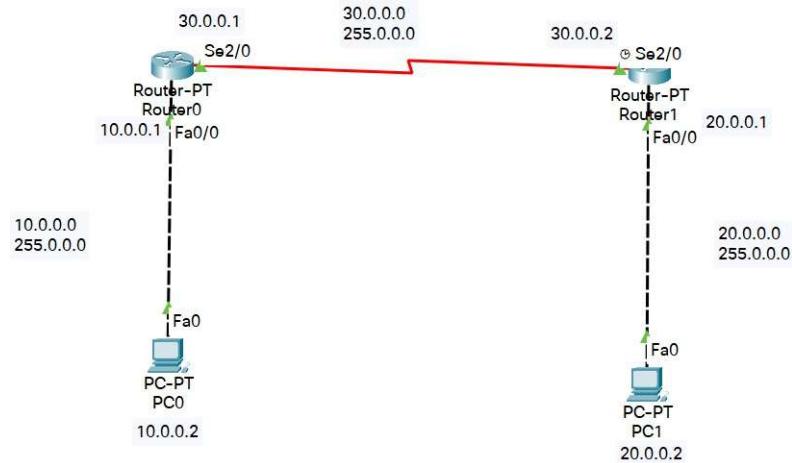
Billing System: Generate invoices make payments.

Guest Management: Store guest info, status.

Reporting: Create statistical reports.

Program 2

- i. Configure IP address to routers in packet tracer. Explore the following messages: ping responses, destination unreachable, request timed out, reply.
- ii. Procedure along with the topology



- iii. Screen shots/ output

Router0 configuration

```
Router0
Physical Config CLI
IOS Command Line Interface
Press RETURN to get started!

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Fa0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up

Router(config-if)#exit
Router(config)#interface Se2/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to
up

Ctrl+F6 to exit CLI focus           Copy   Paste
 Top
```

Router1 configuration



The image shows a screenshot of the Cisco IOS Command Line Interface (CLI) running on Router1. The window title is "Router1". The tab bar at the top has three tabs: "Physical", "Config", and "CLI", with "CLI" being the active tab. The main area of the window is titled "IOS Command Line Interface" and contains the following text:

```
Press RETURN to get started!

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Fa0/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up

Router(config-if)#exit
Router(config)#interface Se2/0
Router(config-if)#ip address 30.0.0.2 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to
up
```

At the bottom of the CLI window, there are buttons for "Ctrl+F6 to exit CLI focus", "Copy", and "Paste". There is also a checkbox labeled "Top".

Ip route command in Router0

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 20.0.0.0 255.0.0.0 30.0.0.2
Router(config)#End
```

Ip route command in Router1

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#ip route 10.0.0.0 255.0.0.0 30.0.0.1
Router(config)#End
```

Destination host Unreachable (Before establishing network Fully)

PC1

Physical Config Desktop Programming

Command Prompt X

```
Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 20.0.0.1: Destination host unreachable.

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Request Timed Out

PC2

Physical Config Desktop Programming

Command Prompt X

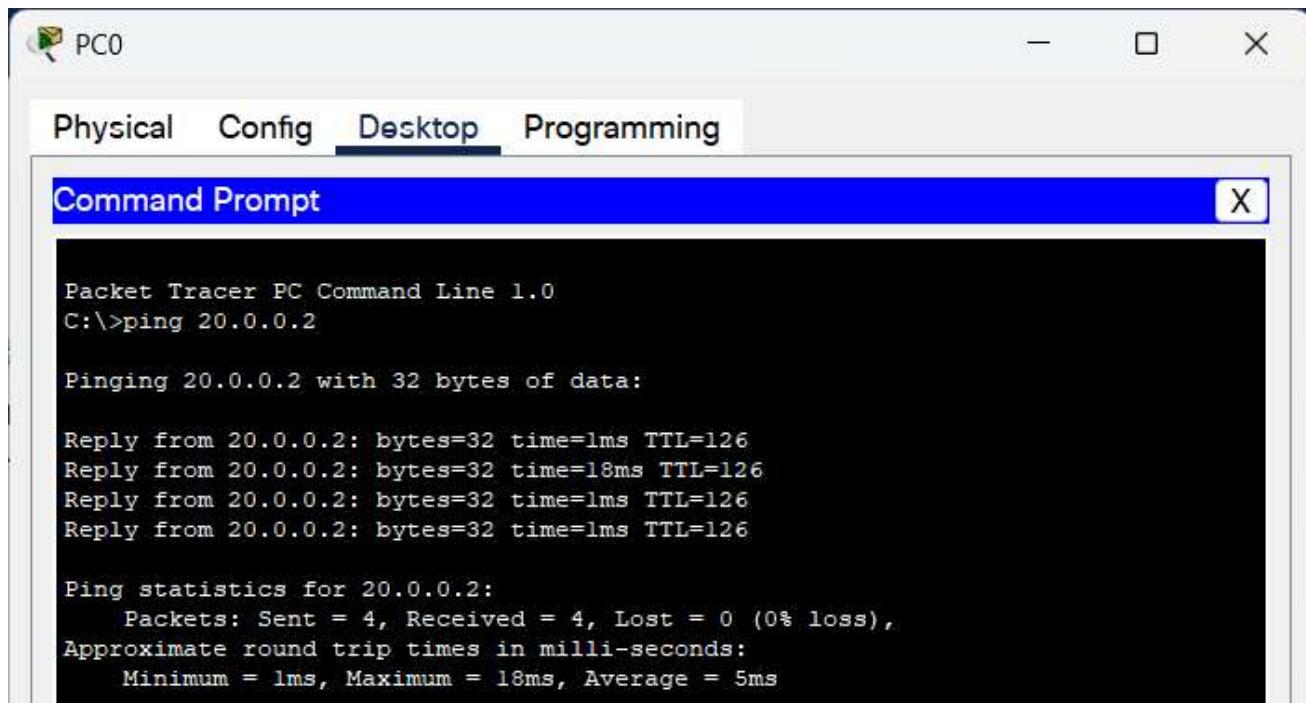
```
Packet Tracer PC Command Line 1.0
C:\>ping 20.0.0.2

Pinging 20.0.0.2 with 32 bytes of data:

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

Ping statistics for 20.0.0.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Reply from Destination



PC0

Physical Config Desktop Programming

Command Prompt X

```
Packet Tracer PC Command Line 1.0
C:\>ping 20.0.0.2

Pinging 20.0.0.2 with 32 bytes of data:

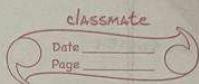
Reply from 20.0.0.2: bytes=32 time=1ms TTL=126
Reply from 20.0.0.2: bytes=32 time=18ms TTL=126
Reply from 20.0.0.2: bytes=32 time=1ms TTL=126
Reply from 20.0.0.2: bytes=32 time=1ms TTL=126

Ping statistics for 20.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 18ms, Average = 5ms
```

iv. Observation

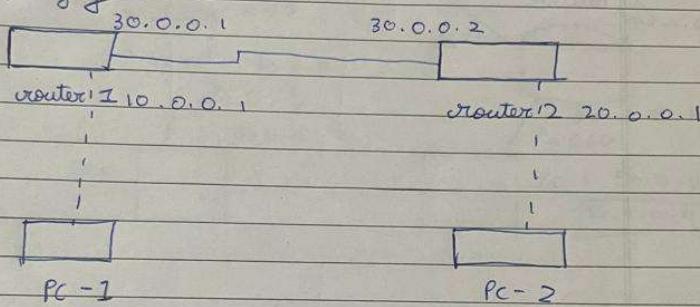
18/10/24

Lab - 3



1. After Configure IP address to routers in packet tracer explore the following
- 1) Ring response
 - 2) destination unreachable
 - 3) req timeout & reply

Topology:



Steps

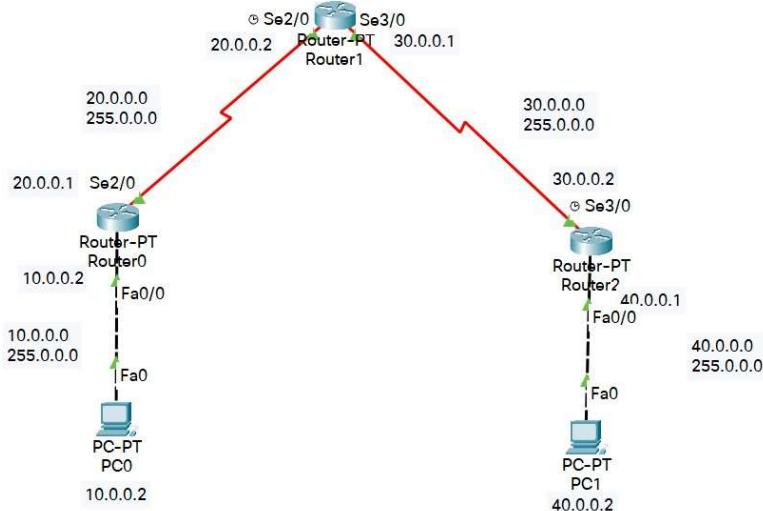
- 1) Place 2 PC's and two routers
- 2) Configure IP addresses for the two PC's
- 3) configure IP addresses for both routers
- 4) connect the PC's with different routers
- 5) connect both the routers
- 6) Make two network identify each with different IP address

Output:

ping 20.0.0.2
Request timed out
Request timed out
Request timed out
Request timed out
ping statistics for 20.0.0.2

Program 3

- i. Configure default route, static route to the router
- ii. Procedure along with the topology



- iii. Screen shots/ output

Router0 configuration

```
Router0
Physical Config CLI
IOS Command Line Interface
Would you like to enter the initial configuration dialog? [yes/no]: n
Press RETURN to get started!

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Fa0/0
Router(config-if)#ip address 10.0.0.2 255.0.0.0
Router(config-if)#no shutdown

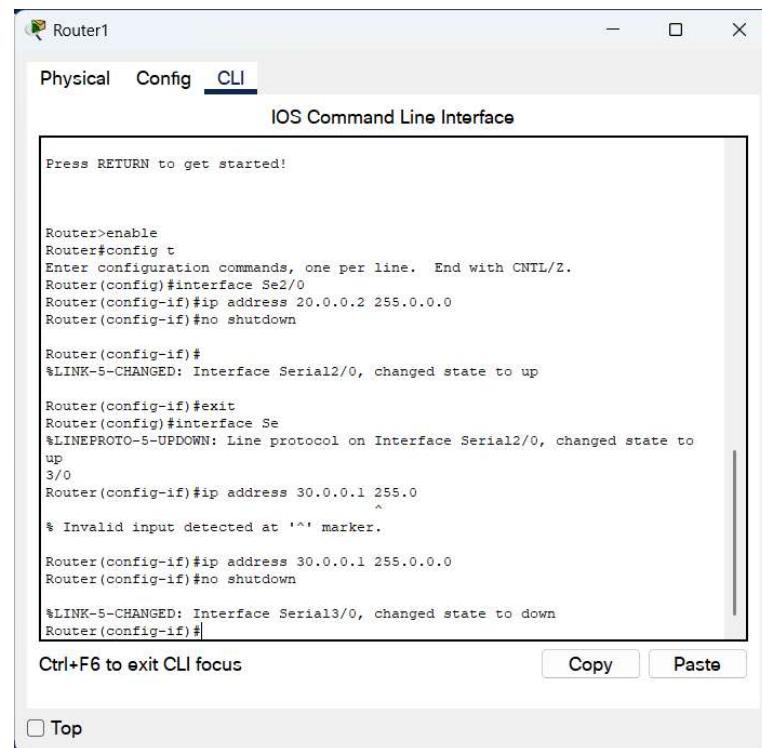
Router(config-if)#
$LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

$LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up
$IP-4-DUPADDR: Duplicate address 10.0.0.2 on FastEthernet0/0, sourced by
00C.CFC2.65B0

Router(config-if)#exit
Router(config)#interface Se2/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#no shutdown

$LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#
Ctrl+F6 to exit CLI focus
Copy Paste
Top
```

Router1 configuration



The screenshot shows the Cisco IOS Command Line Interface (CLI) for Router1. The window title is "Router1". The tab bar at the top has three tabs: "Physical", "Config", and "CLI", with "CLI" being the active tab. Below the tabs is a sub-header "IOS Command Line Interface". A message box says "Press RETURN to get started!". The main text area contains the following configuration commands:

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Se2/0
Router(config-if)#ip address 20.0.0.2 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

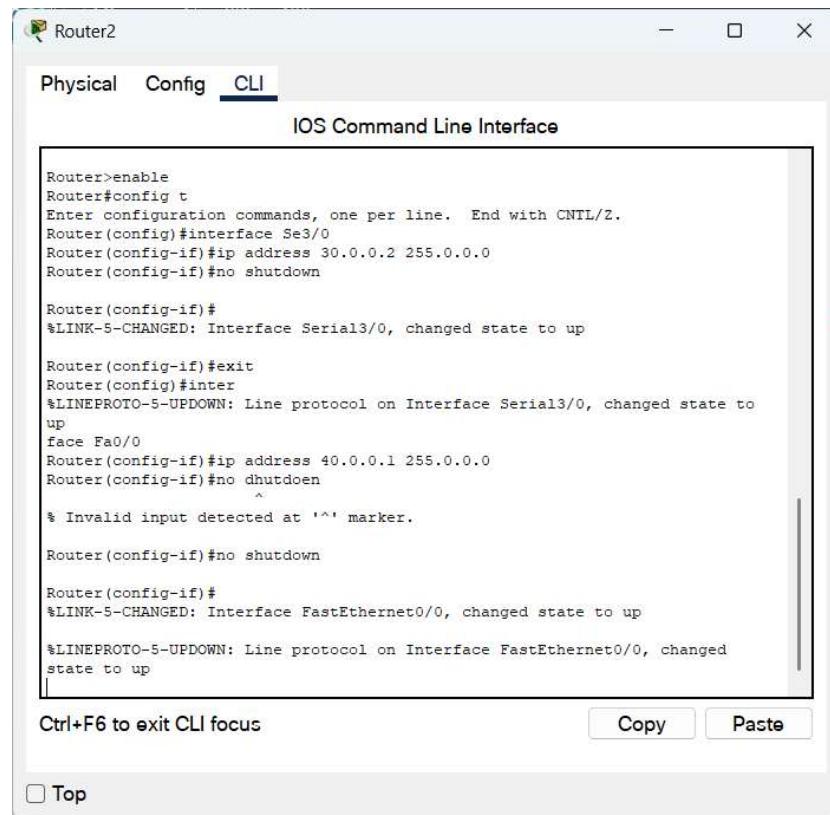
Router(config-if)#exit
Router(config)#interface Se
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to
up
3/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
^
% Invalid input detected at '^' marker.

Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial3/0, changed state to down
Router(config-if)#[
```

At the bottom of the text area, there is a note "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste". Below the text area is a checkbox labeled "Top".

Router2 configuration



The screenshot shows the Cisco IOS Command Line Interface (CLI) for Router2. The window title is "Router2". The tab bar at the top has three tabs: "Physical", "Config", and "CLI", with "CLI" being the active tab. Below the tabs is a sub-header "IOS Command Line Interface". A message box says "Press RETURN to get started!". The main text area contains the following configuration commands:

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Se3/0
Router(config-if)#ip address 30.0.0.2 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up

Router(config-if)#exit
Router(config)#inter
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to
up
face Fa0/0
Router(config-if)#ip address 40.0.0.1 255.0.0.0
Router(config-if)#no shutdown
^
% Invalid input detected at '^' marker.

Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up
```

At the bottom of the text area, there is a note "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste". Below the text area is a checkbox labeled "Top".

Static Routing:

Router0

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2
Router(config)#ip route 40.0.0.0 255.0.0.0 20.0.0.2
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#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
C 20.0.0.0/8 is directly connected, Serial2/0
S 30.0.0.0/8 [1/0] via 20.0.0.2
S 40.0.0.0/8 [1/0] via 20.0.0.2

Router#

Router1

Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.1
Router(config)#ip route 40.0.0.0 255.0.0.0 30.0.0.2
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#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

S 10.0.0.0/8 [1/0] via 20.0.0.1
C 20.0.0.0/8 is directly connected, Serial2/0
C 30.0.0.0/8 is directly connected, Serial3/0
S 40.0.0.0/8 [1/0] via 30.0.0.2

Router#

Router2

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 10.0.0.0 255.0.0.0 30.0.0.1
Router(config)#ip route 20.0.0.0 255.0.0.0 30.0.0.1
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#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

S  10.0.0.0/8 [1/0] via 30.0.0.1
S  20.0.0.0/8 [1/0] via 30.0.0.1
C  30.0.0.0/8 is directly connected, Serial3/0
C  40.0.0.0/8 is directly connected, FastEthernet0/0

Router#
```

Dynamic Routing:

Route0

```
Router0>enable
Router0#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router0(config)#ip route 0.0.0.0 0.0.0.0 20.0.0.2
Router0(config)#exit
Router0#
%SYS-5-CONFIG_I: Configured from console by console

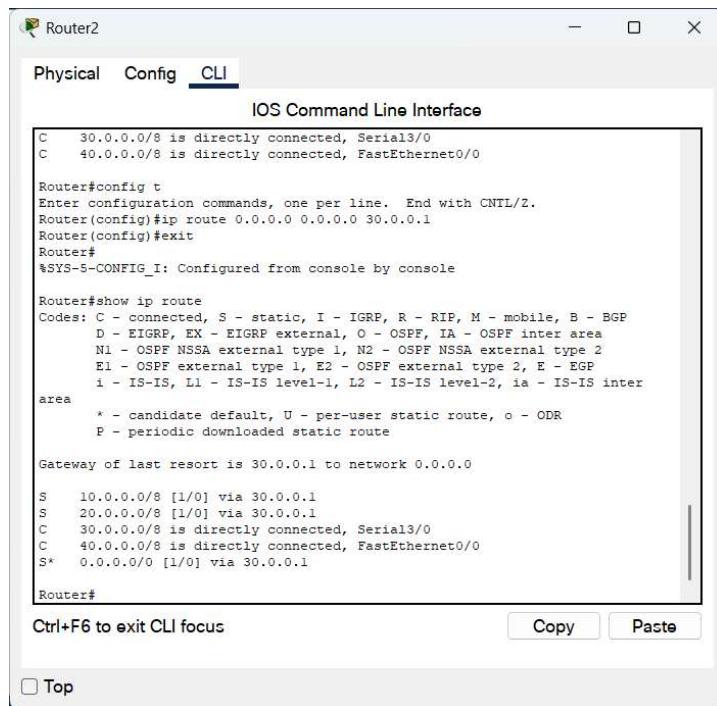
Router0#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      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 20.0.0.2 to network 0.0.0.0

C  10.0.0.0/8 is directly connected, FastEthernet0/0
C  20.0.0.0/8 is directly connected, Serial2/0
S  30.0.0.0/8 [1/0] via 20.0.0.2
S  40.0.0.0/8 [1/0] via 20.0.0.2
S* 0.0.0.0/0 [1/0] via 20.0.0.2

Router0#
```

Router2



The screenshot shows the Router2 CLI interface. The title bar says "Router2". The tabs at the top are "Physical", "Config", and "CLI", with "CLI" being the active tab. The main window title is "IOS Command Line Interface". The command-line area contains the following text:

```
C 30.0.0.0/8 is directly connected, Serial3/0
C 40.0.0.0/8 is directly connected, FastEthernet0/0

Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 30.0.0.1
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#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 30.0.0.1 to network 0.0.0.0

S 10.0.0.0/8 [1/0] via 30.0.0.1
S 20.0.0.0/8 [1/0] via 30.0.0.1
C 30.0.0.0/8 is directly connected, Serial3/0
C 40.0.0.0/8 is directly connected, FastEthernet0/0
S* 0.0.0.0/0 [1/0] via 30.0.0.1

Router#
```

At the bottom of the CLI window, there are "Copy" and "Paste" buttons. Below the window, there is a "Top" button.

Pinging:

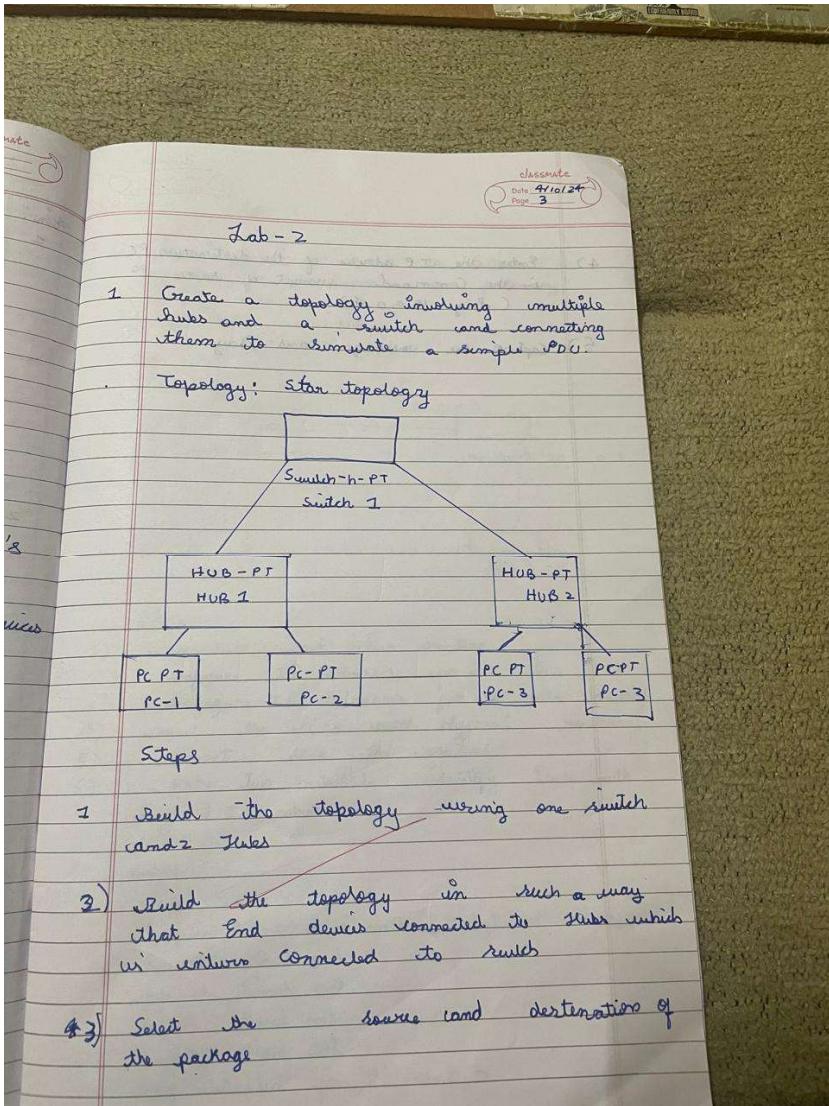
```
C:\>ping 40.0.0.2

Pinging 40.0.0.2 with 32 bytes of data:

Reply from 40.0.0.2: bytes=32 time=21ms TTL=125
Reply from 40.0.0.2: bytes=32 time=17ms TTL=125
Reply from 40.0.0.2: bytes=32 time=25ms TTL=125
Reply from 40.0.0.2: bytes=32 time=2ms TTL=125

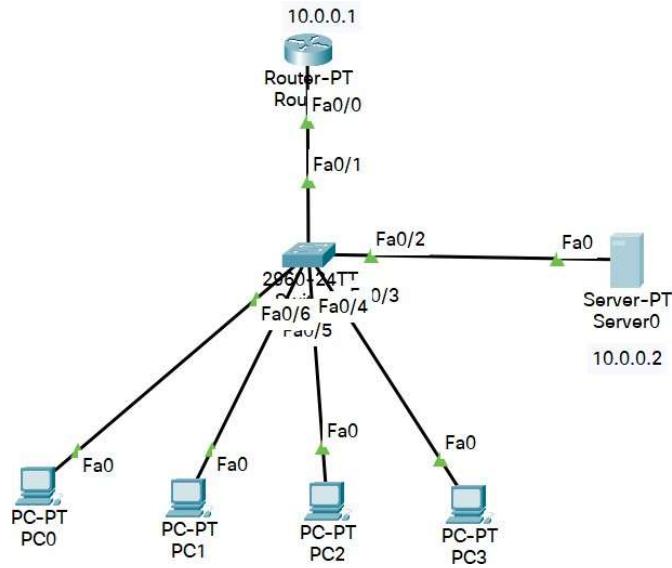
Ping statistics for 40.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 25ms, Average = 16ms
```

iv. Observation



Program 4

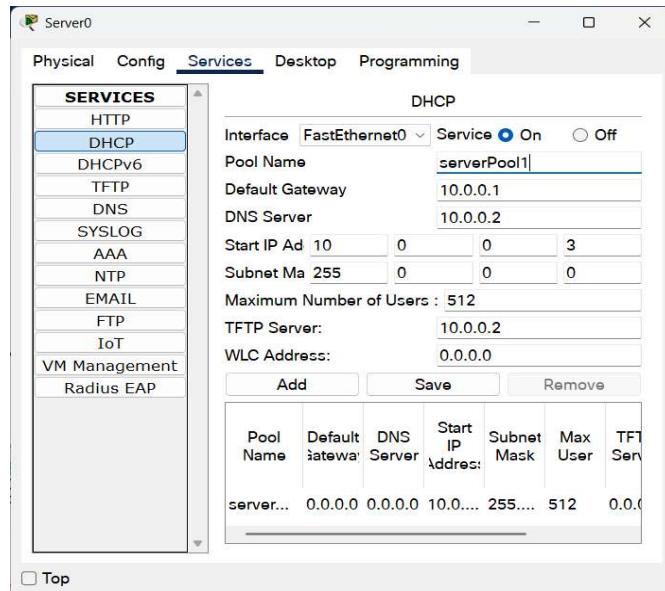
- i. Configure DHCP within a LAN and outside LAN.
- ii. Procedure along with the topology



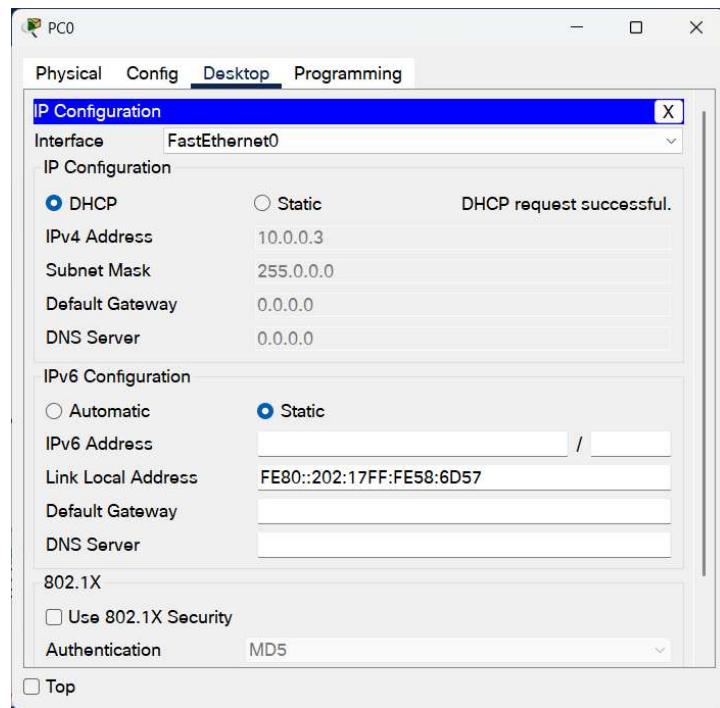
- iii. Screen shots/ output

DHCP Within LAN

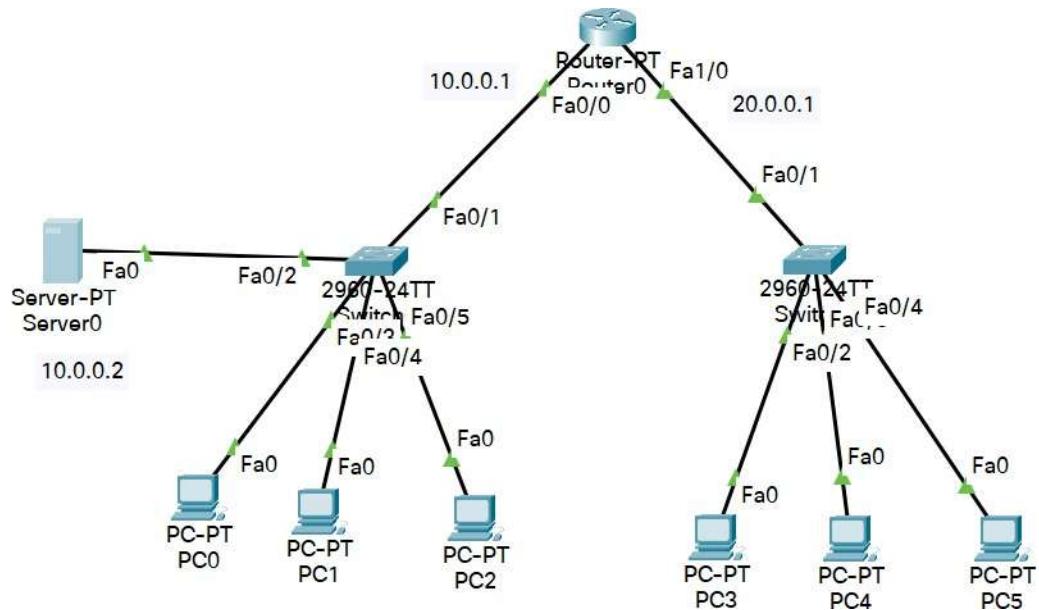
DHCP Configuration



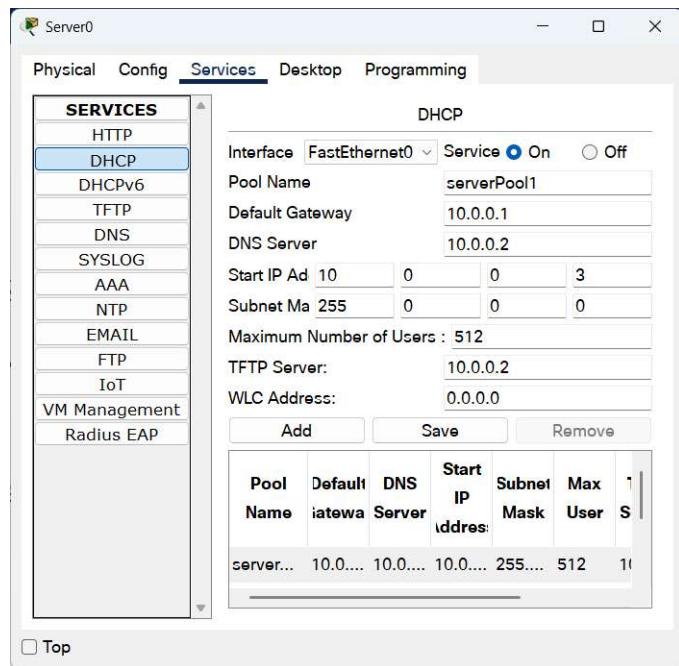
PC settings



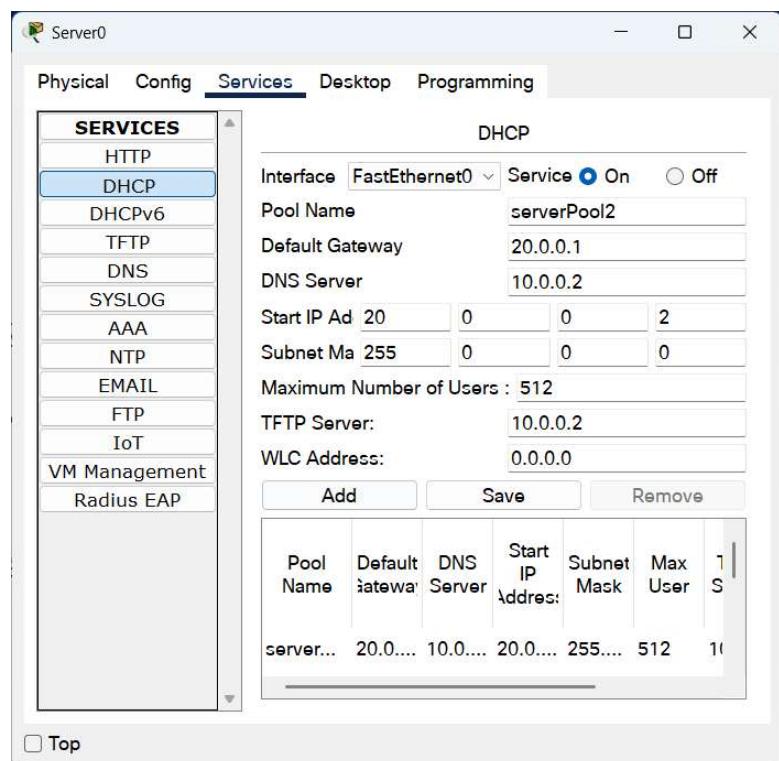
DHCP outside LAN:



DHCP configuration for inside LAN



DHCP configuration for outside LAN

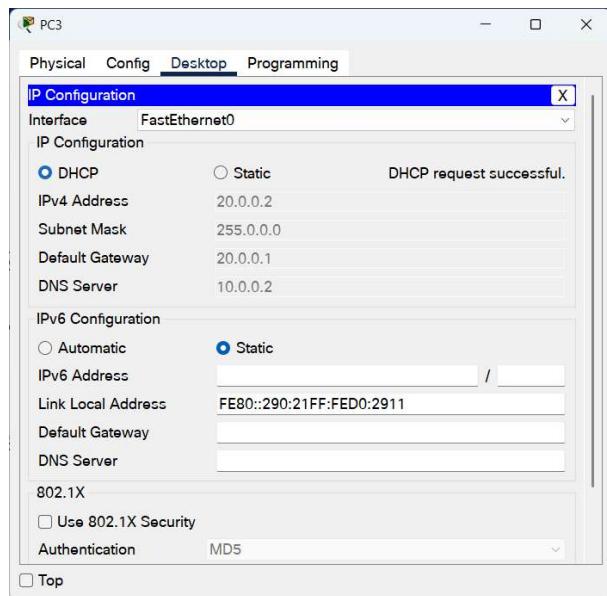


Ip helper command in Router

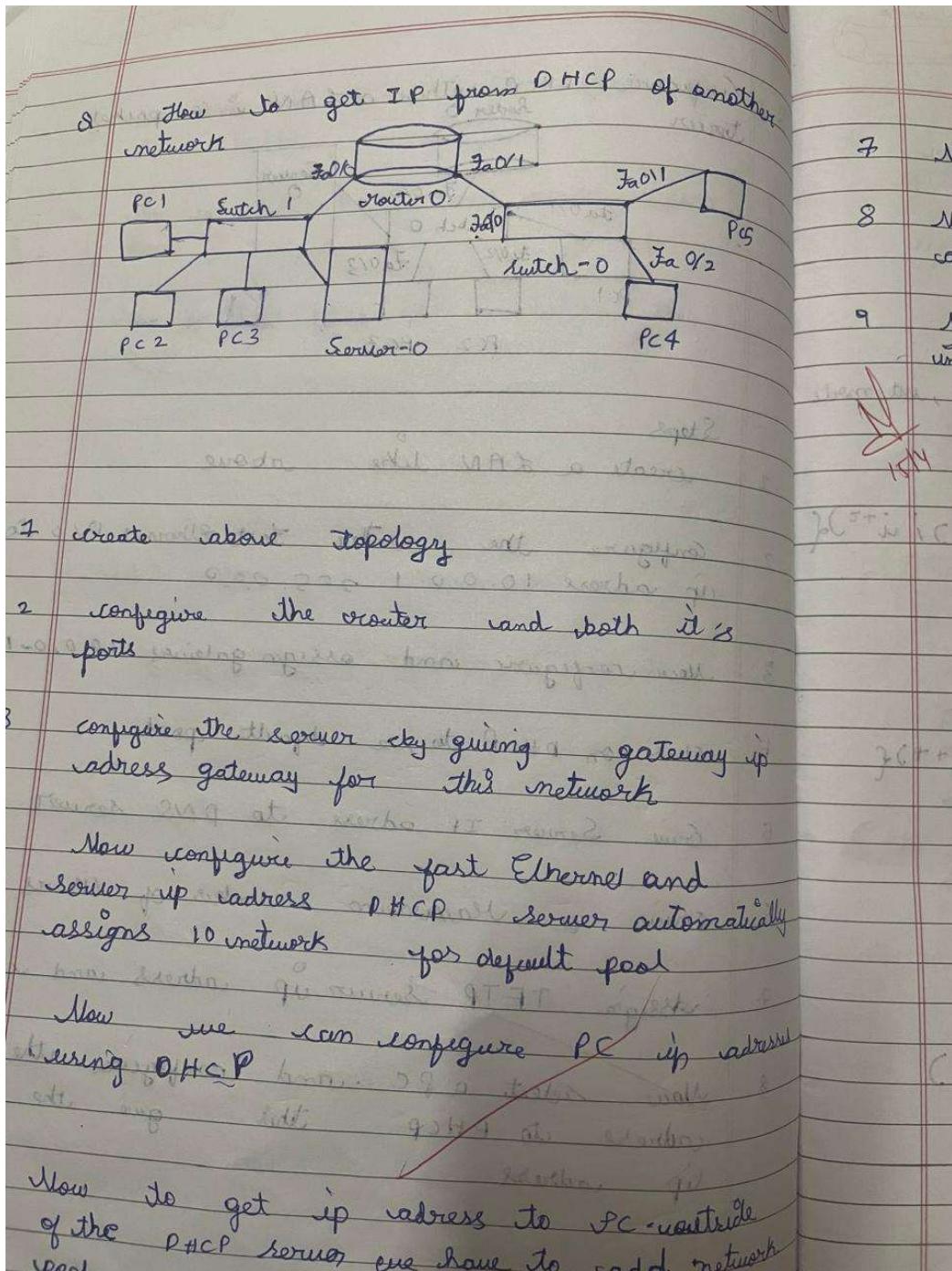
```
Router(config-if)#exit
Router(config)#interface Fa1/0
Router(config-if)#ip helper-address 10.0.0.2
Router(config-if)#

```

PC setting in another network

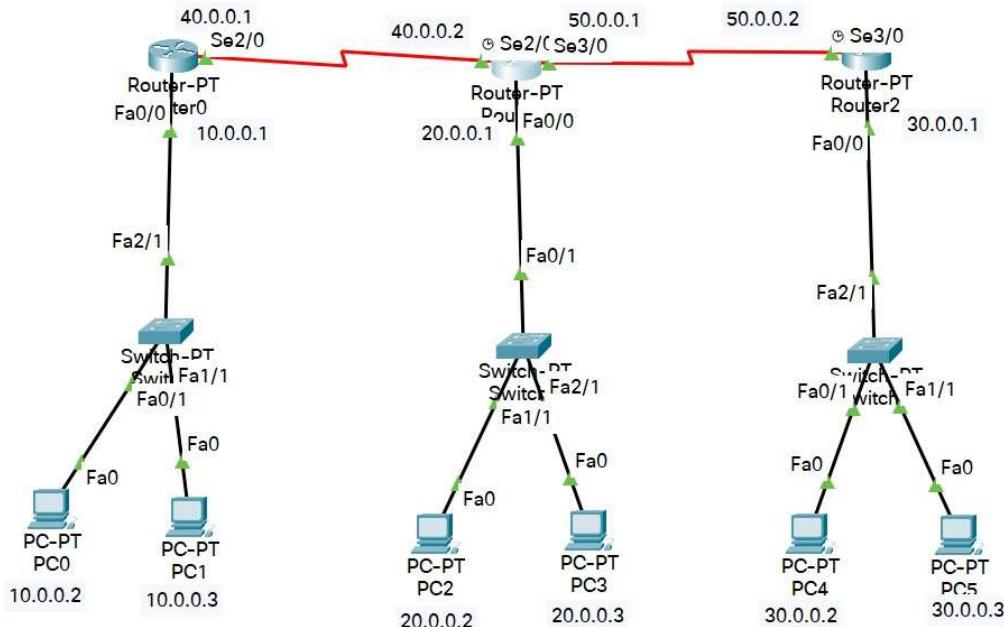


iv. Observation



Program 5

- i. Configure RIP routing Protocol in Routers
- ii. Procedure along with the topology



- iii. Screen shots/ output

Router0

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#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
C    40.0.0.0/8 is directly connected, Serial2/0
```

Router1

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 40.0.0.0
Router(config-router)#network 50.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#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

R    10.0.0.0/8 [120/1] via 40.0.0.1, 00:00:08, Serial2/0
C    20.0.0.0/8 is directly connected, FastEthernet0/0
R    30.0.0.0/8 [120/1] via 50.0.0.2, 00:00:10, Serial3/0
C    40.0.0.0/8 is directly connected, Serial2/0
C    50.0.0.0/8 is directly connected, Serial3/0
```

Router2

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 30.0.0.0
Router(config-router)#network 50.0.0.0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#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

R    10.0.0.0/8 [120/2] via 50.0.0.1, 00:00:28, Serial3/0
R    20.0.0.0/8 [120/1] via 50.0.0.1, 00:00:28, Serial3/0
C    30.0.0.0/8 is directly connected, FastEthernet0/0
R    40.0.0.0/8 [120/1] via 50.0.0.1, 00:00:28, Serial3/0
C    50.0.0.0/8 is directly connected, Serial3/0
```

Pinging:

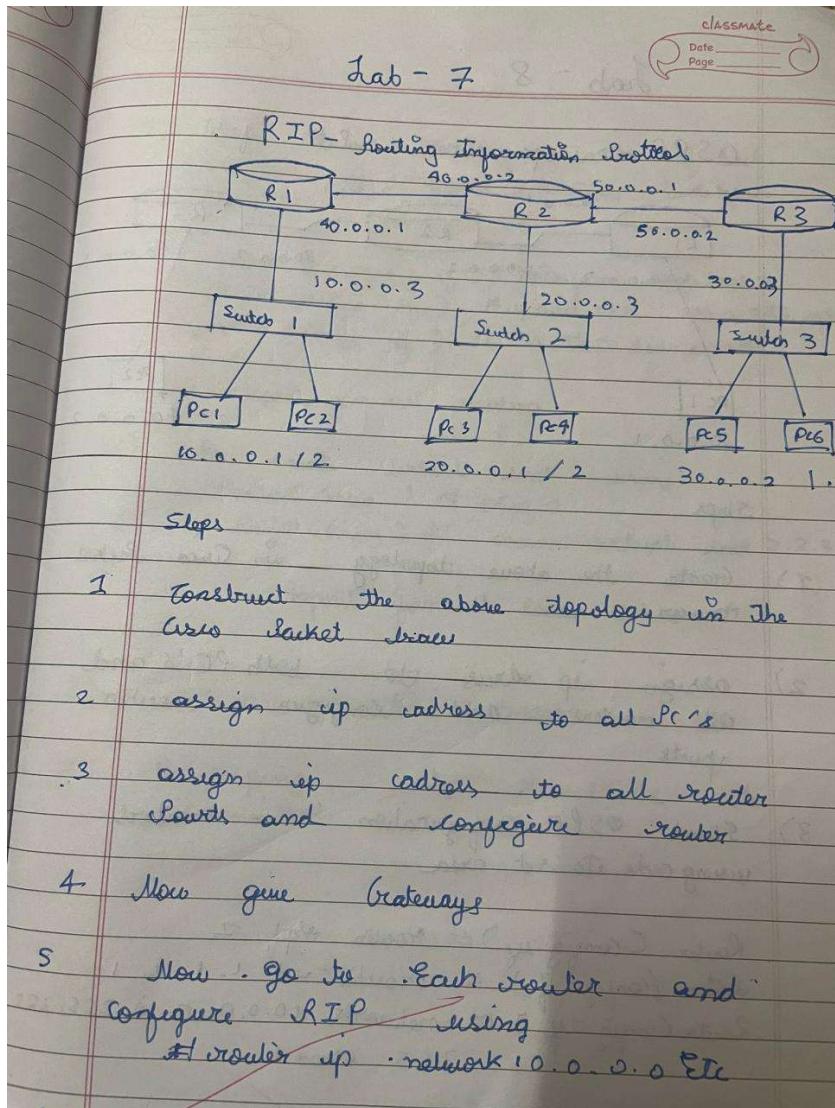
```
Packet Tracer PC Command Line 1.0
C:\>ping 20.0.0.2

Pinging 20.0.0.2 with 32 bytes of data:

Request timed out.
Reply from 20.0.0.2: bytes=32 time=9ms TTL=126
Reply from 20.0.0.2: bytes=32 time=1ms TTL=126
Reply from 20.0.0.2: bytes=32 time=9ms TTL=126

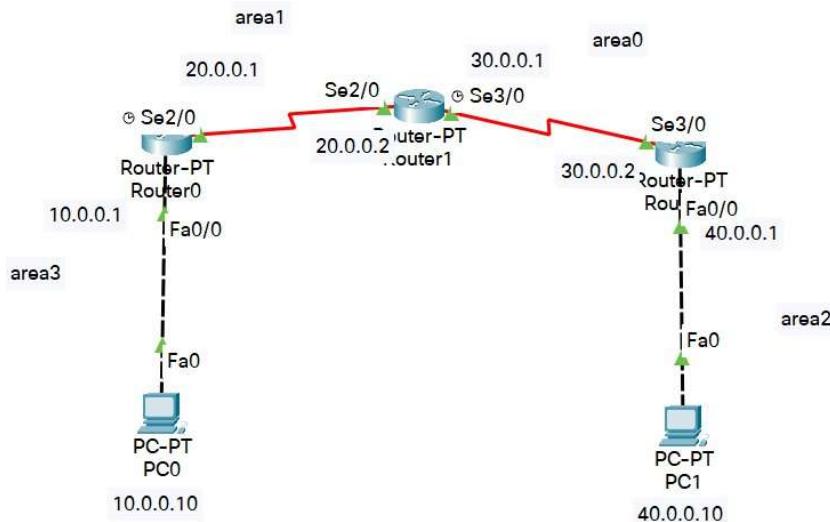
Ping statistics for 20.0.0.2:
  Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 9ms, Average = 6ms
```

iv. Observation



Program 6

- i. Configure OSPF routing protocol
- ii. Procedure along with the topology



- iii. Screen shots/ output

Encapsulation:

Router0

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Fa0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up

Router(config-if)#exit
Router(config)#interface Se2/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#clock rate 64000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit
Router(config)#

```

Router1

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Se2/0
Router(config-if)#ip address 20.0.0.2 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to
up

Router(config-if)#exit
Router(config)#interface Se3/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#clock rate 64000
Router(config-if)#no shutdown
^
% Invalid input detected at '^' marker.

Router(config-if)#no shutdown
```

Router2

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Fa0/0
Router(config-if)#ip address 40.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up
%IP-4-DUPADDR: Duplicate address 40.0.0.1 on FastEthernet0/0, sourced by
000D.BDDA.0123

Router(config-if)#exit
Router(config)#interface Se3/0
Router(config-if)#ip address 30.0.0.2 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to
up
```

OSPF Routing Protocol

Router0

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
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 3
Router(config-router)#network 20.0.0.0 0.255.255.255 area 1
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#sho
00:27:19: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial2/0 from LOADING to FULL, Loading Done
w 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
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        20.0.0.0/8 is directly connected, Serial2/0
C        20.0.0.2/32 is directly connected, Serial2/0
O  IA 30.0.0.0/8 [110/128] via 20.0.0.2, 00:00:02, Serial2/0
O  IA 40.0.0.0/8 [110/129] via 20.0.0.2, 00:00:02, Serial2/0
```

Router1

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#router-id 2.2.2.2
Router(config-router)#network 20.0.0.0 0.255.255.255 area 1
Router(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

00:26:21: %OSPF-5-ADJCHG: Process 1, Nbr 3.3.3.3 on Serial3/0 from LOADING to FULL, Loading Done
00:27:18: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial2/0 from LOADING to FULL, Loading Done

Router#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

     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        20.0.0.0/8 is directly connected, Serial2/0
C        20.0.0.1/32 is directly connected, Serial2/0
     30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        30.0.0.0/8 is directly connected, Serial3/0
C        30.0.0.2/32 is directly connected, Serial3/0
O  IA 40.0.0.0/8 [110/65] via 30.0.0.2, 00:02:00, Serial3/0
```

Router2

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#router-id 3.3.3.3
Router(config-router)#network 40.0.0.0 0.255.255.255 area 2
Router(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
00:26:19: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial3/0 from LOADING to FULL, Loading Done

Router#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

O IA 20.0.0.0/8 [110/128] via 30.0.0.1, 00:02:45, Serial3/0
  30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C     30.0.0.0/8 is directly connected, Serial3/0
C     30.0.0.1/32 is directly connected, Serial3/0
C     40.0.0.0/8 is directly connected, FastEthernet0/0
```

Configure Loopback address

Router0

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface loopback 0

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to
up

Router(config-if)#ip address 172.16.1.252 255.255.0.0
Router(config-if)#no shutdown
```

Router1

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface loopback 0

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to
up

Router(config-if)#ip address 172.16.1.253 255.255.0.0
Router(config-if)#no shutdown
Router(config-if)#

```

Router2

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface loopback 0

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to
up

Router(config-if)#ip address 172.16.1.254 255.255.0.0
Router(config-if)#no shutdown
Router(config-if)#+
```

Create Virtual Link

Router0

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#area 1 virtual-link 2.2.2.2
Router(config-router)#+
```

Router1

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
01:11:01: %OSPF-4-ERRRCV: Received invalid packet: mismatch area ID, from
backbone area must be virtual-link but not found from 20.0.0.2, Serial2/0

01:11:11: %OSPF-4-ERRRCV: Received invalid packet: mismatch area ID, from
backbone area must be virtual-link but not found from 20.0.0.2, Serial2/0

Router(config)#route
01:11:21: %OSPF-4-ERRRCV: Received invalid packet: mismatch area ID, from
backbone area must be virtual-link but not found from 20.0.0.2, Serial2/0
r ospf 1
Router(config-router)#
01:11:31: %OSPF-4-ERRRCV: Received invalid packet: mismatch area ID, from
backbone area must be virtual-link but not found from 20.0.0.2, Serial2/0

Router(config-router)#area 1 v
01:11:41: %OSPF-4-ERRRCV: Received invalid packet: mismatch area ID, from
backbone area must be virtual-link but not found from 20.0.0.2, Serial2/0
irtual-link 1.1.1.1
Router(config-router)#
01:11:56: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on OSPF_VL0 from LOADING to
FULL, Loading Done
```

Pinging

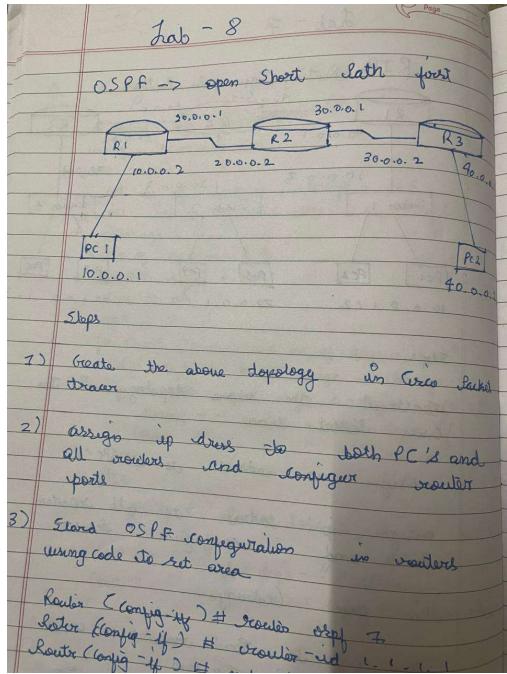
```
C:\>ping 40.0.0.10

Pinging 40.0.0.10 with 32 bytes of data:

Reply from 40.0.0.10: bytes=32 time=24ms TTL=125
Reply from 40.0.0.10: bytes=32 time=18ms TTL=125
Reply from 40.0.0.10: bytes=32 time=18ms TTL=125
Reply from 40.0.0.10: bytes=32 time=20ms TTL=125

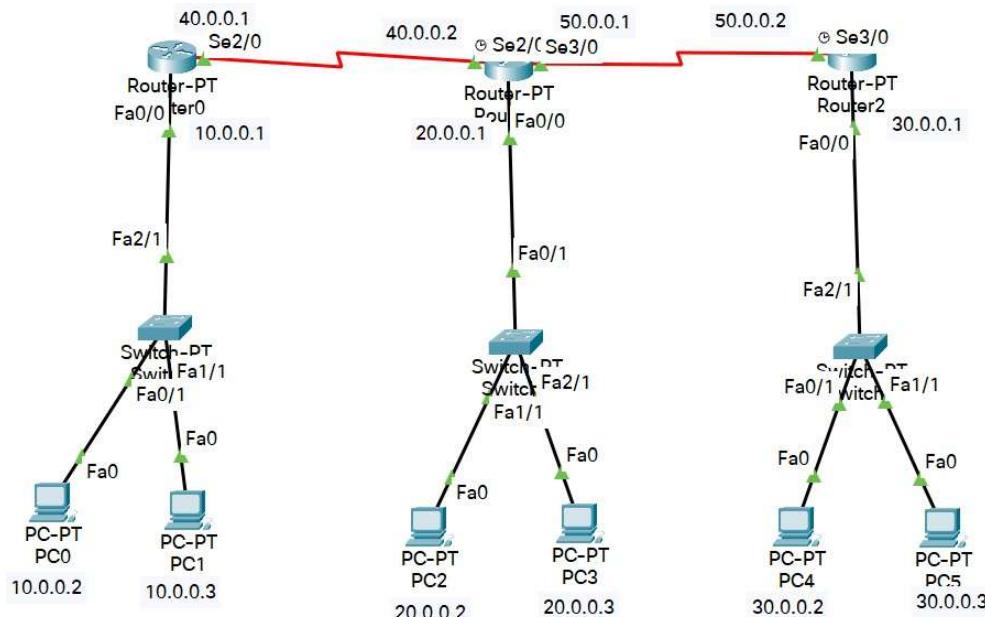
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 18ms, Maximum = 24ms, Average = 20ms
```

iv. Observation



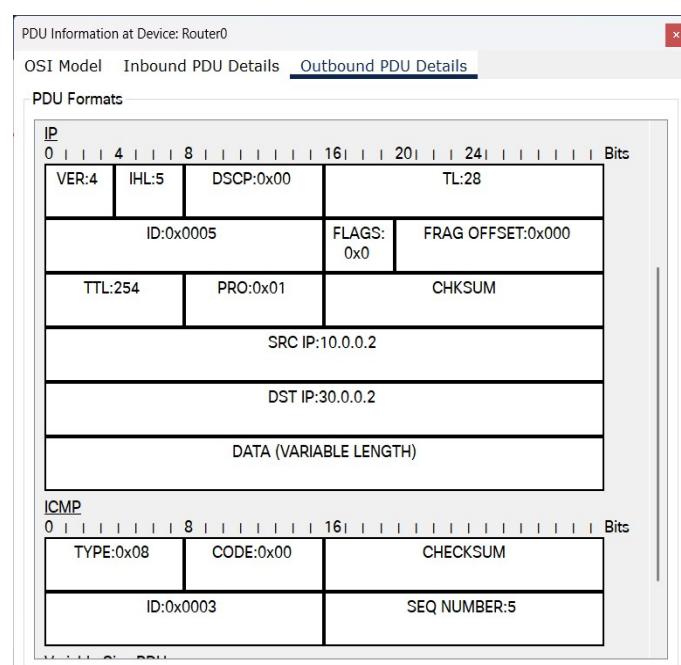
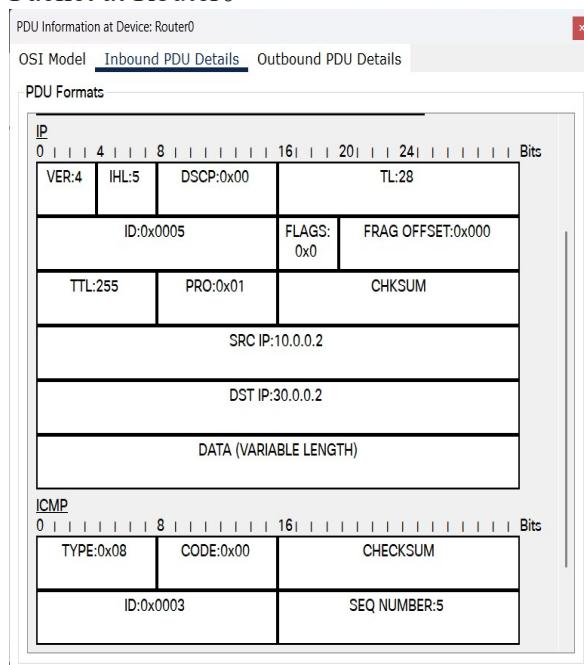
Program 7

- Demonstrate the TTL/ Life of a Packet
- Procedure along with the topology

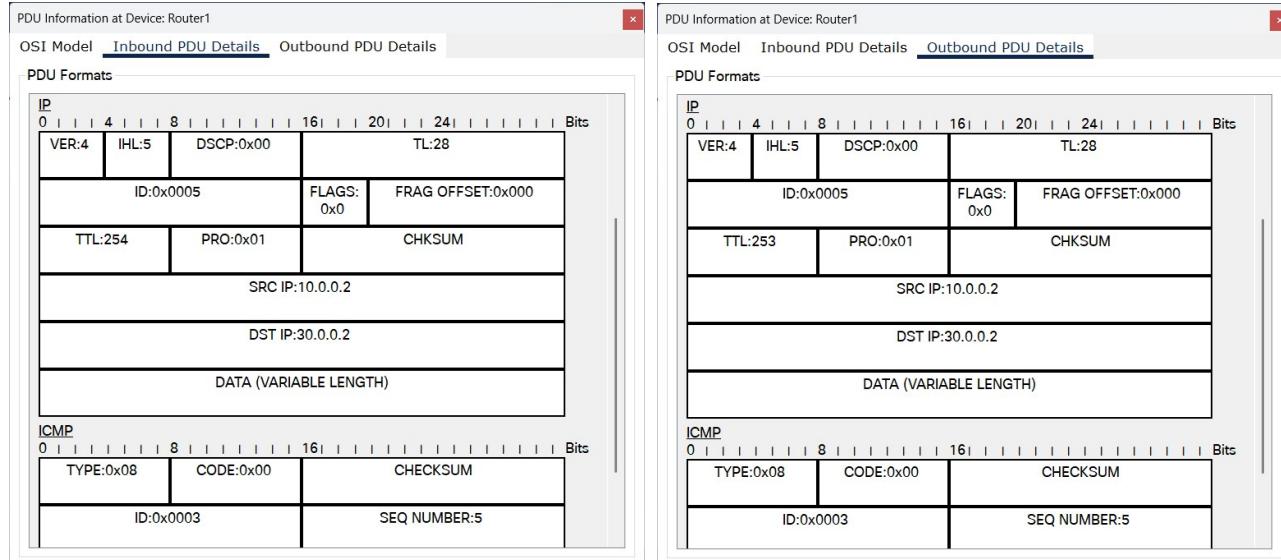


- Screen shots/ output

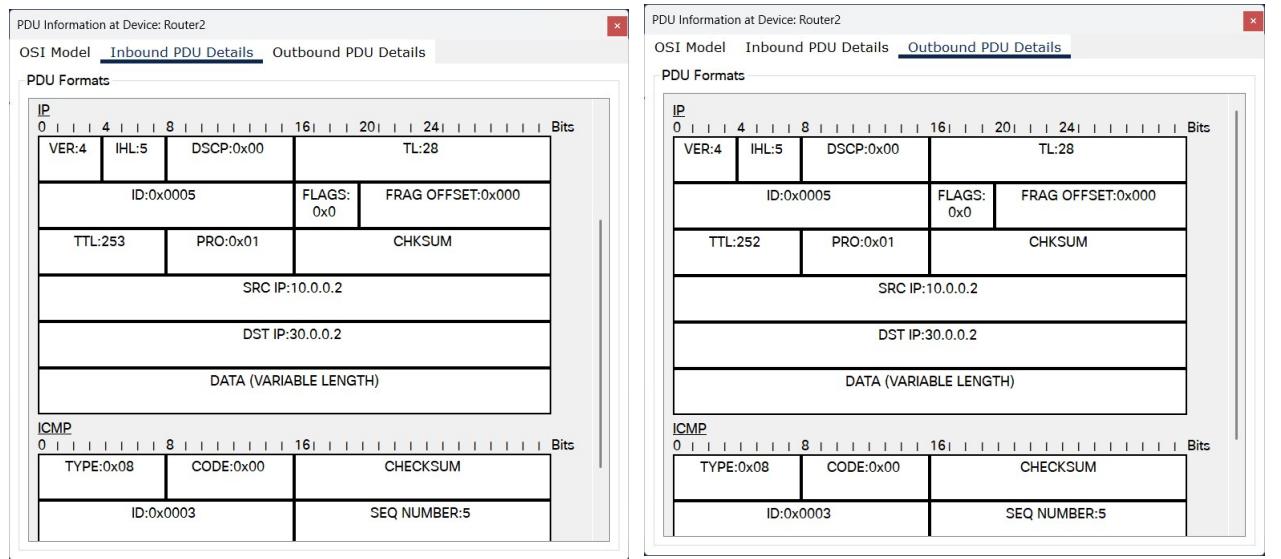
Packet at Router0



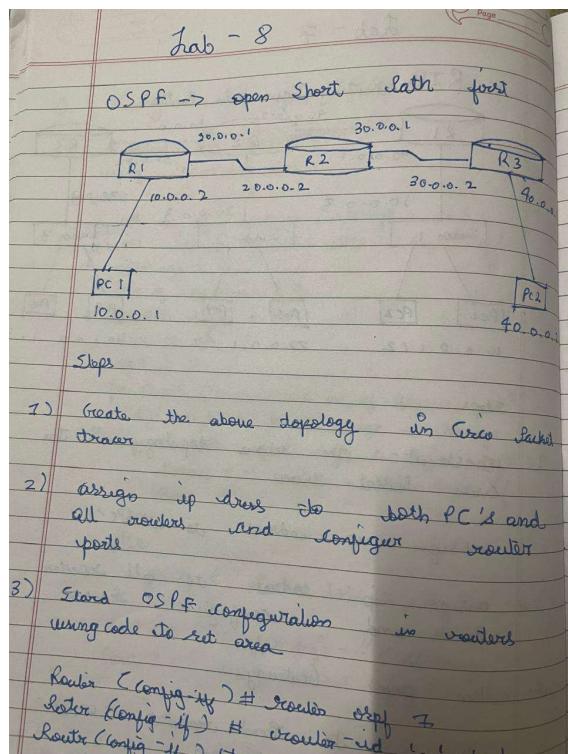
Packet at Router1



Packet at Router2

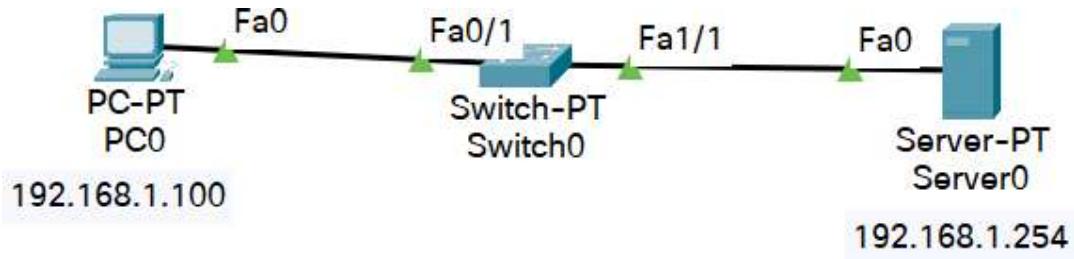


iv. Observation



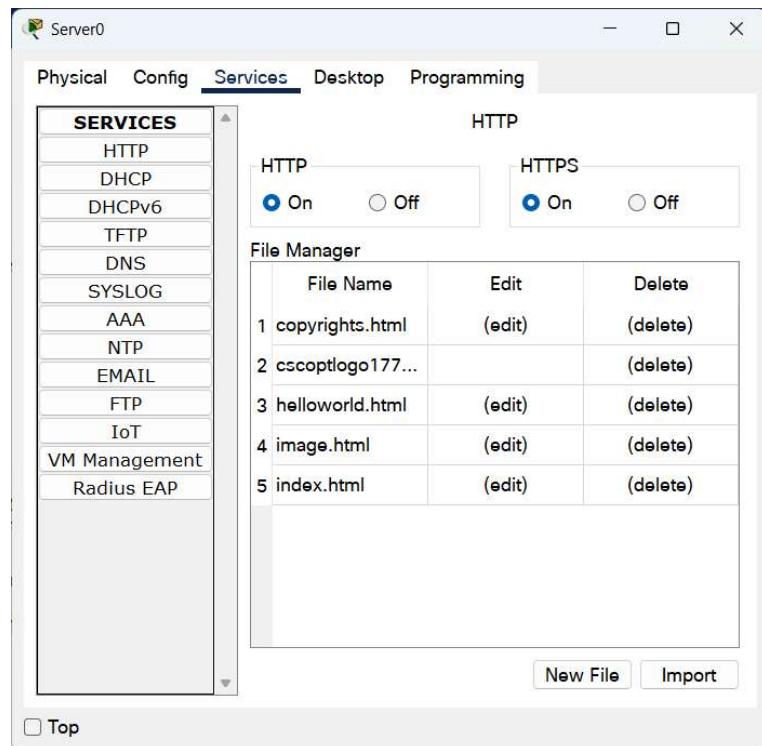
Program 8

- i. Configure Web Server, DNS within a LAN.
- ii. Procedure along with the topology

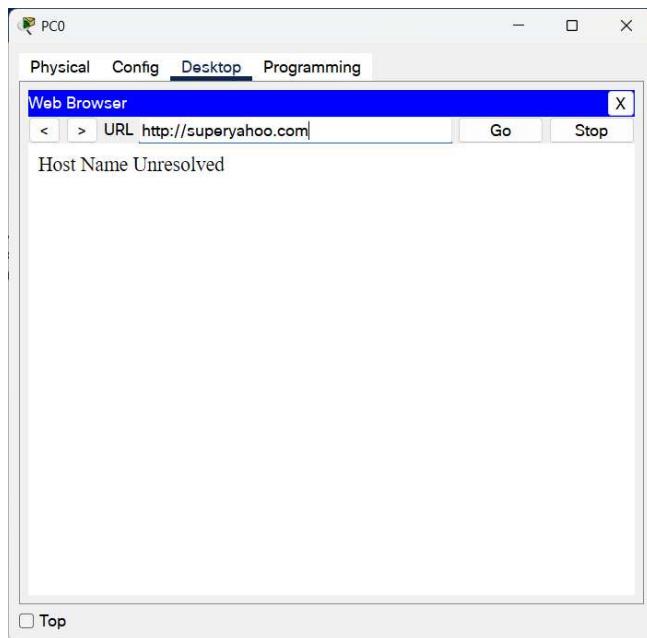
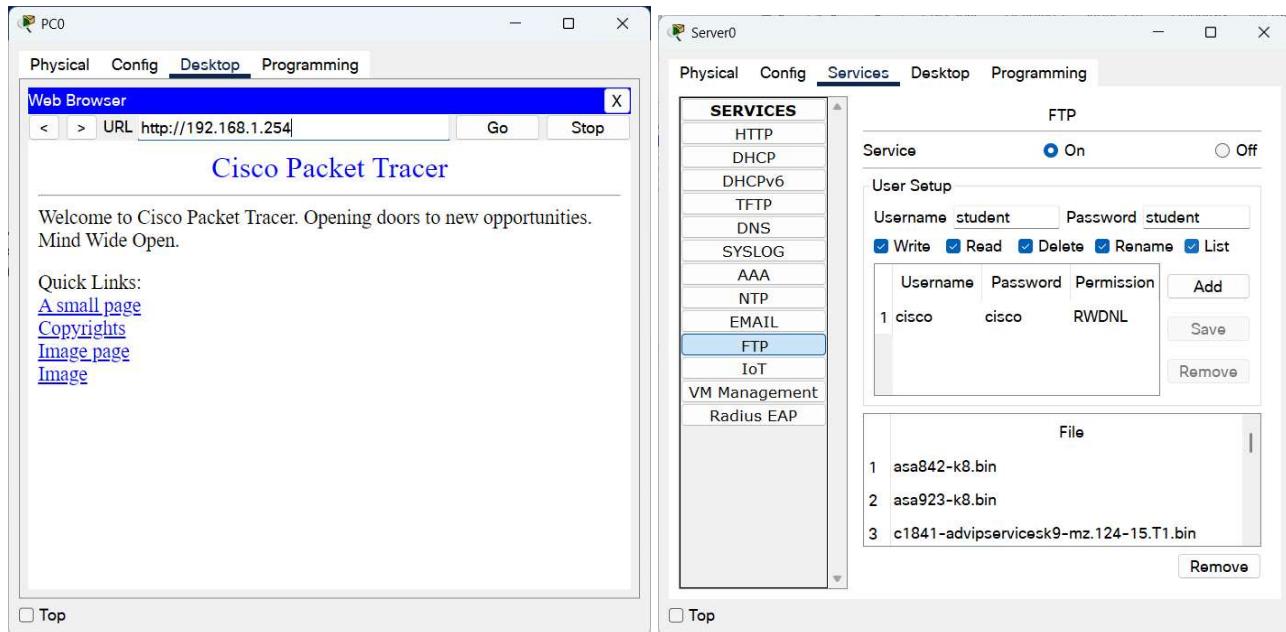


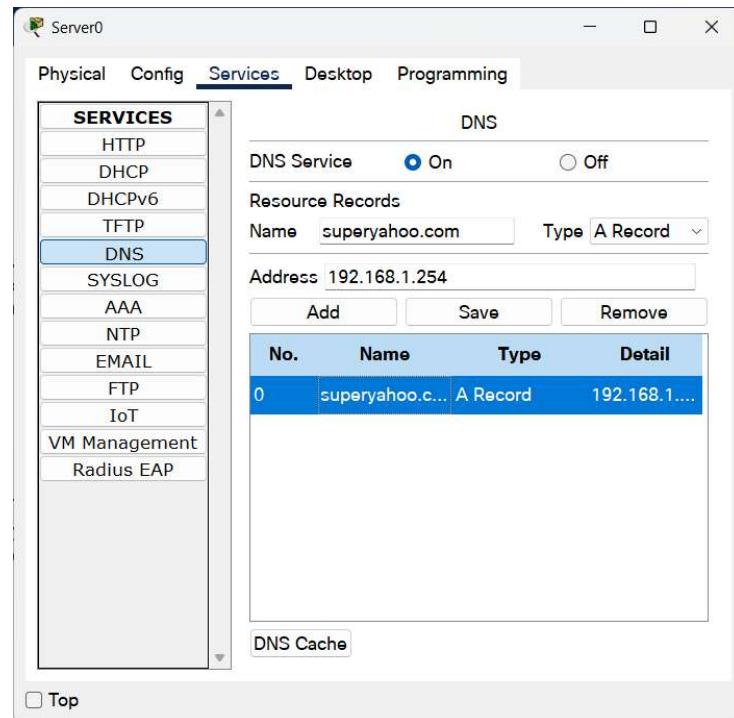
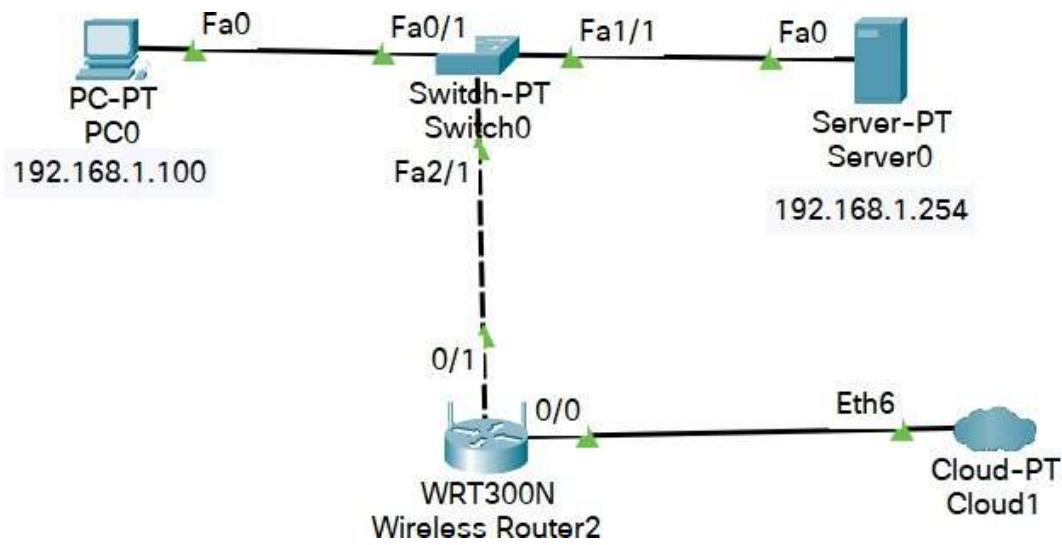
- iii. Screen shots/ output

Server's services



PC's Web Browser





iv. Observation

Lab - 5

Date: 8/11/24
Page:

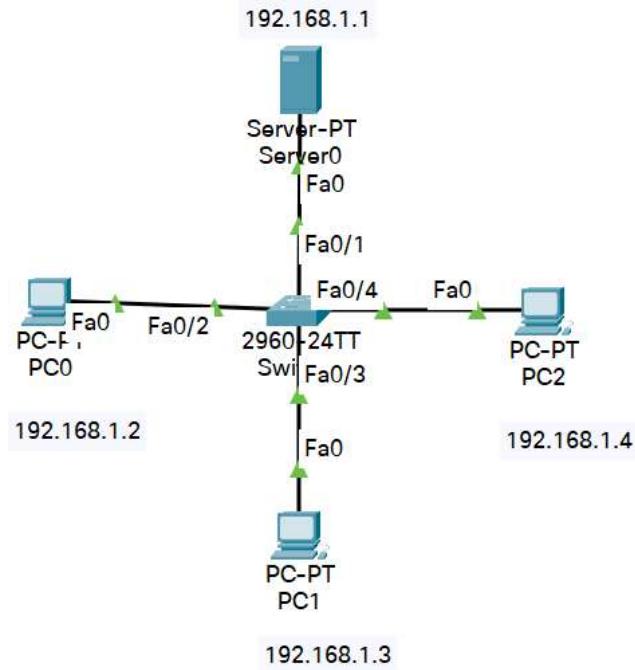
Q. Demonstrate Web Server and DNS using packet tracer.

Steps

- First we build the above Topology
- Configure the router by setting LAN IP
- Check the connection by pinging
- Now configure server and PC
- After the server is connected explore Web browser and web pages
- After all connections are checked using pinging
- ~~address~~ the router as default gateway
- Now we can explore web browser

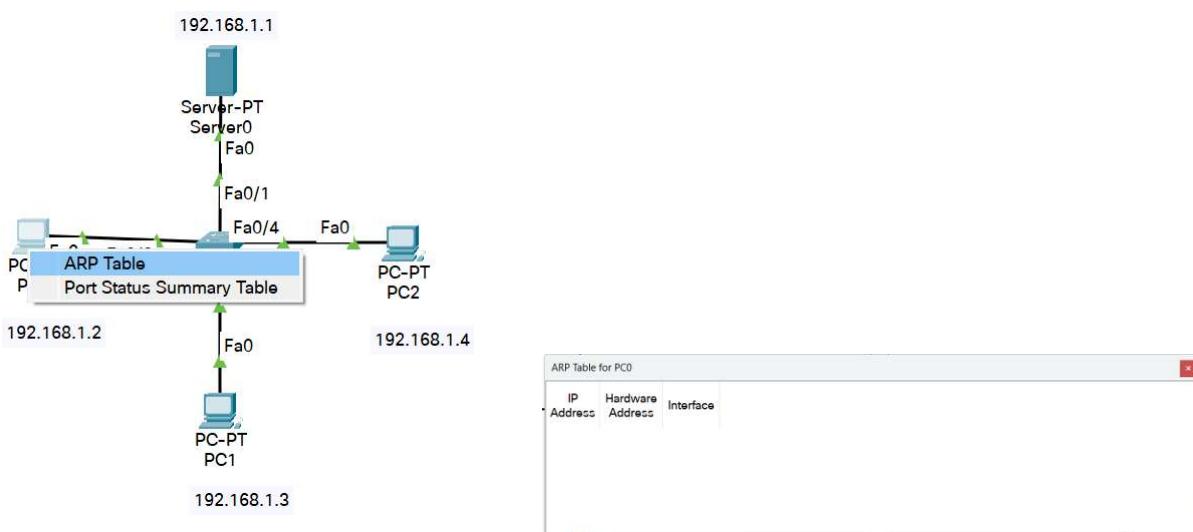
Program 9

- i. To construct simple LAN and understand the concept and operation of Address Resolution Protocol (ARP)
- ii. Procedure along with the topology

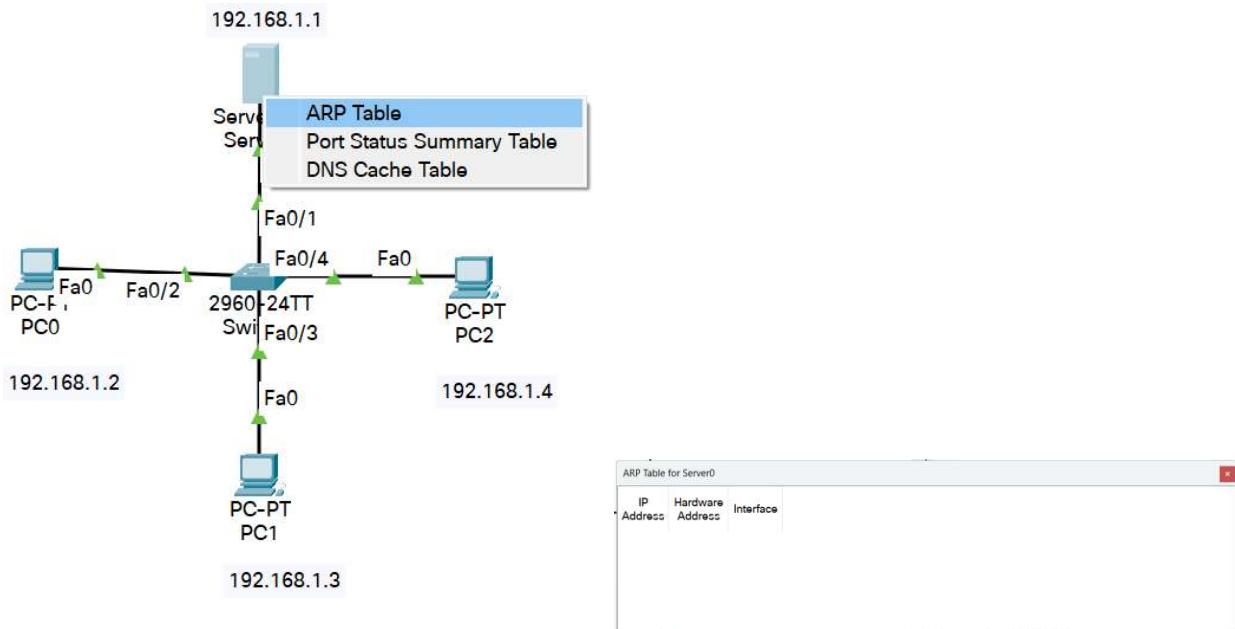


- iii. Screen shots/ output

ARP Table of PC



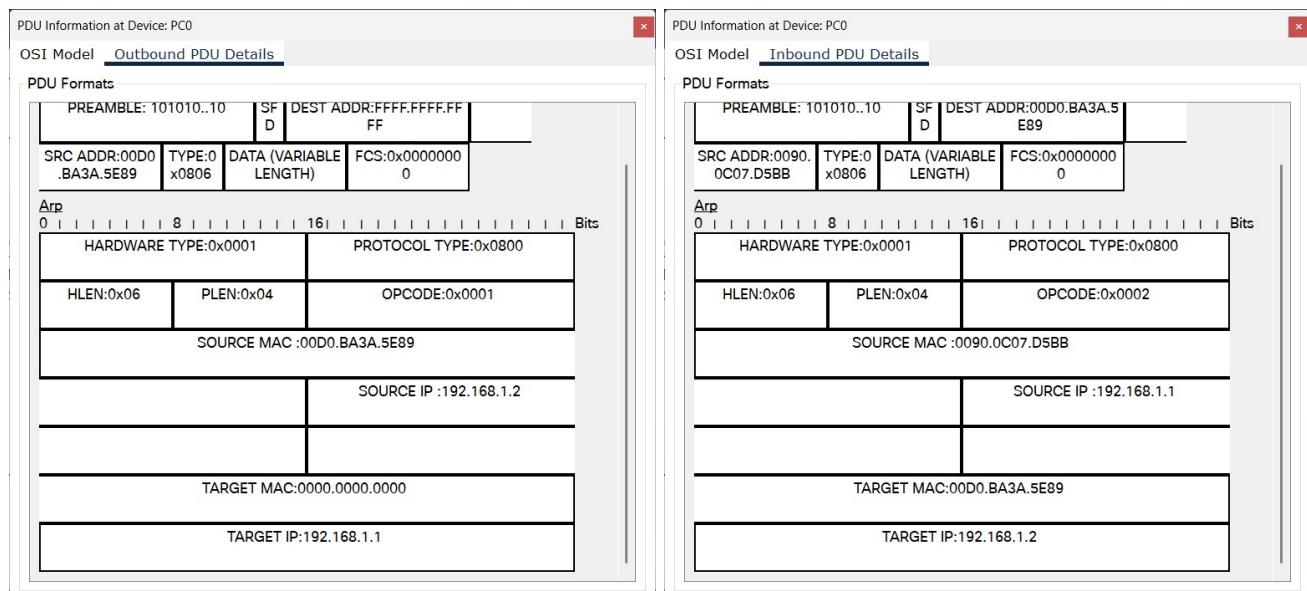
ARP Table of Server



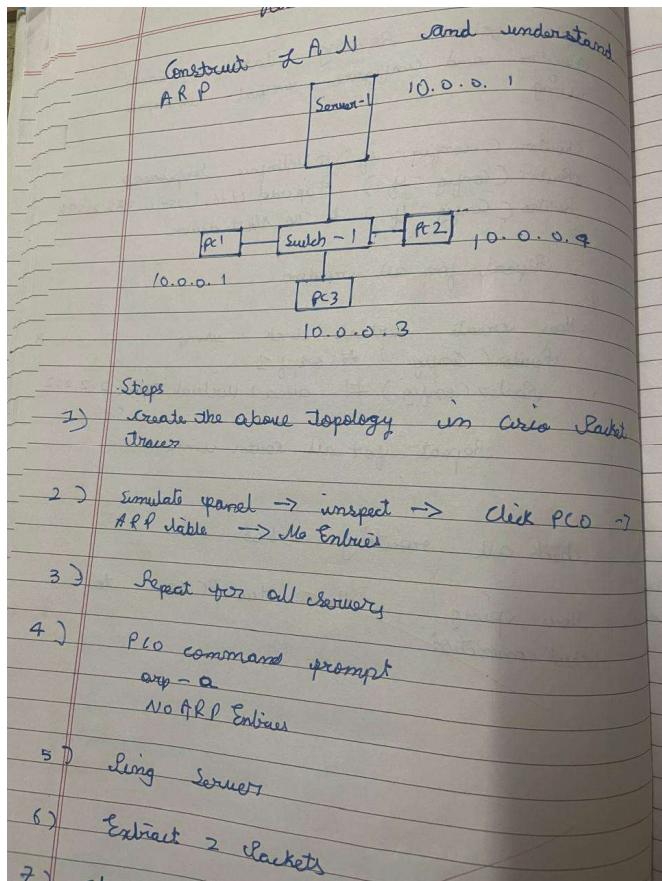
Command at PC

```
Packet Tracer PC Command Line 1.0
C:\>arp -a
No ARP Entries Found
C:\>
```

Pinging in Simulation Mode

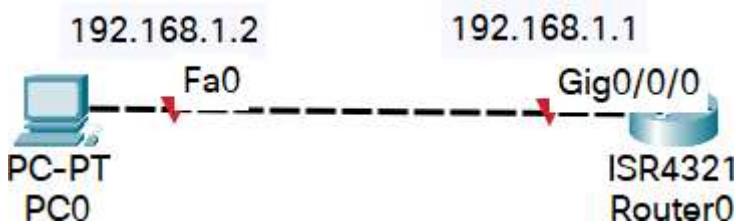


iv. Observation



Program 10

- i. To understand the operation of TELNET by accessing the router in server room from a PC in IT office.
- ii. Procedure along with the topology



- iii. Screen shots/ output

Router

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R1
R1(config)#enable secret hello
R1(config)#interface g0/0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown

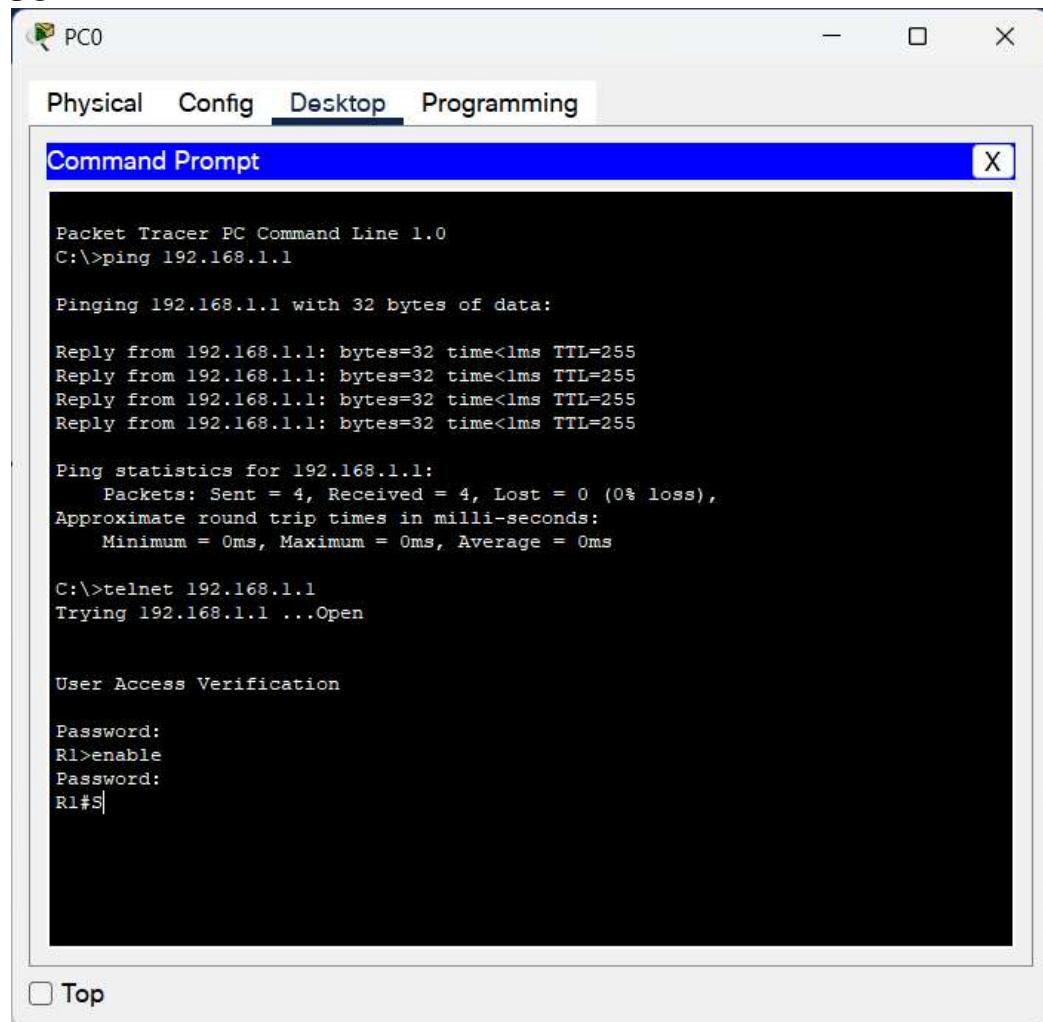
R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

R1(config-if)#line vty 0 5
R1(config-line)#login
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
% Login disabled on line 6, until 'password' is set
% Login disabled on line 7, until 'password' is set
R1(config-line)#password pass
R1(config-line)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
```

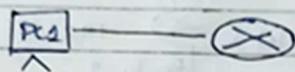
PC



iv. Observation

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

Topology:



192.168.1.2.

Procedure:

→ Assign IP address & Default gateway for PC0

→ Configure router via CLI

Router# config t

Router(config)# hostname R1

R1(config)# enable secret rp

R1(config-if)# ip add 192.168.1.1 255.255.255.0

R1(config-if)# no shutdown

→ Go to PC command prompt

C:\> telnet 192.168.1.1

Trying 192.168.1.1... Open

User access verification

Password:

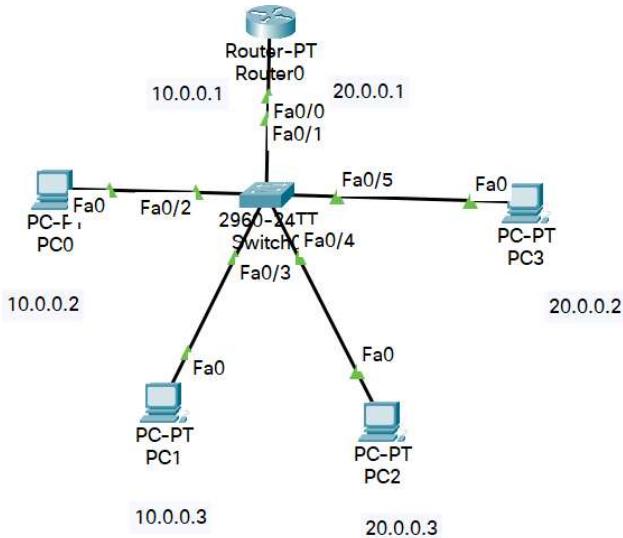
R1> en

Password:

R1# rp

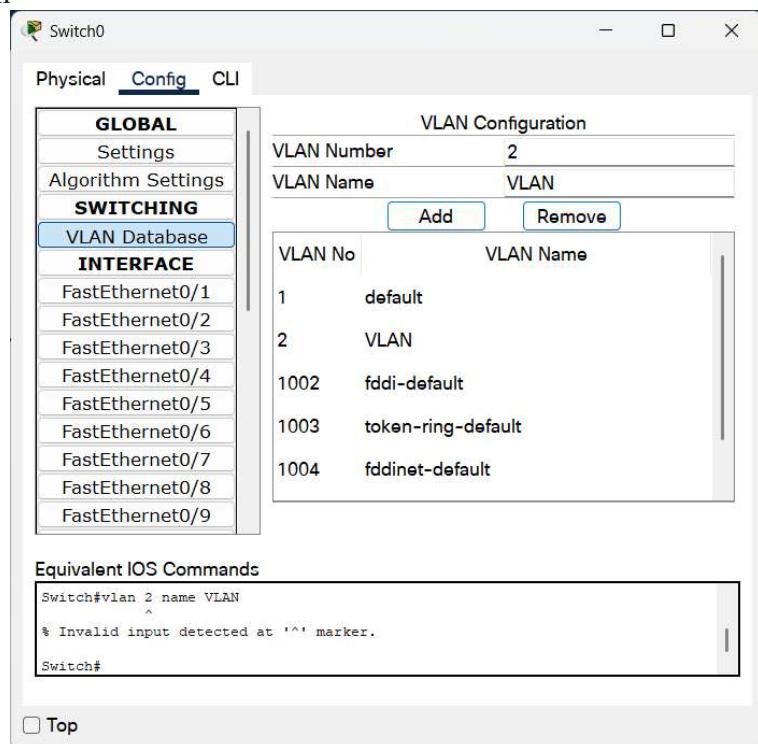
Program 11

- i. To construct a VLAN and make the PC's communicate among a VLAN
- ii. Procedure along with the topology

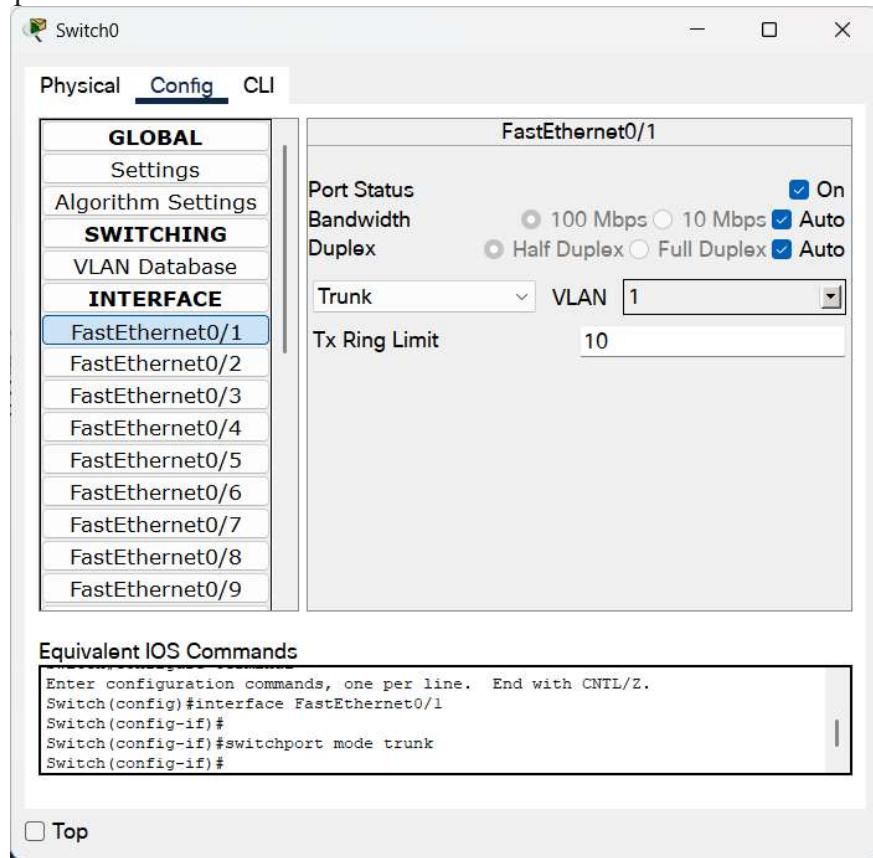


- iii. Screen shots/ output

Switch Configuration



Configuration of port connected to router



Configuration of ports connected to other networks

This screenshot shows the configuration interface for "Switch0" with two separate windows side-by-side.

Left Window (FastEthernet0/4 Configuration):

- Interface Selection:** FastEthernet0/4 is selected in the left sidebar.
- Port Status:** Port Status is set to "On" (checked).
- Bandwidth:** Bandwidth is set to "100 Mbps" (radio button selected).
- Duplex:** Duplex is set to "Full Duplex" (radio button selected).
- Access:** Access is set to "VLAN 2".
- Tx Ring Limit:** Tx Ring Limit is set to "10".
- Equivalent IOS Commands:**

```

Switch(config)#interface FastEthernet0/4
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#switchport access vlan 2
Switch(config-if)#

```

Right Window (FastEthernet0/5 Configuration):

- Interface Selection:** FastEthernet0/5 is selected in the left sidebar.
- Port Status:** Port Status is set to "On" (checked).
- Bandwidth:** Bandwidth is set to "100 Mbps" (radio button selected).
- Duplex:** Duplex is set to "Full Duplex" (radio button selected).
- Access:** Access is set to "VLAN 2".
- Tx Ring Limit:** Tx Ring Limit is set to "10".
- VLAN Assignment:** The "VLAN" dropdown for FastEthernet0/5 shows three entries: "1:default" (unchecked), "2:VLAN" (checked), and "1002:fddi-default" (unchecked).
- Equivalent IOS Commands:**

```

Switch(config)#interface FastEthernet0/5
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#switchport access vlan 2
Switch(config-if)#

```

Configuartion of Router

The screenshot shows the Cisco IOS CLI interface for a router named 'Router0'. The window title is 'Router0' and the tab selected is 'CLI'. The main area displays the following configuration commands:

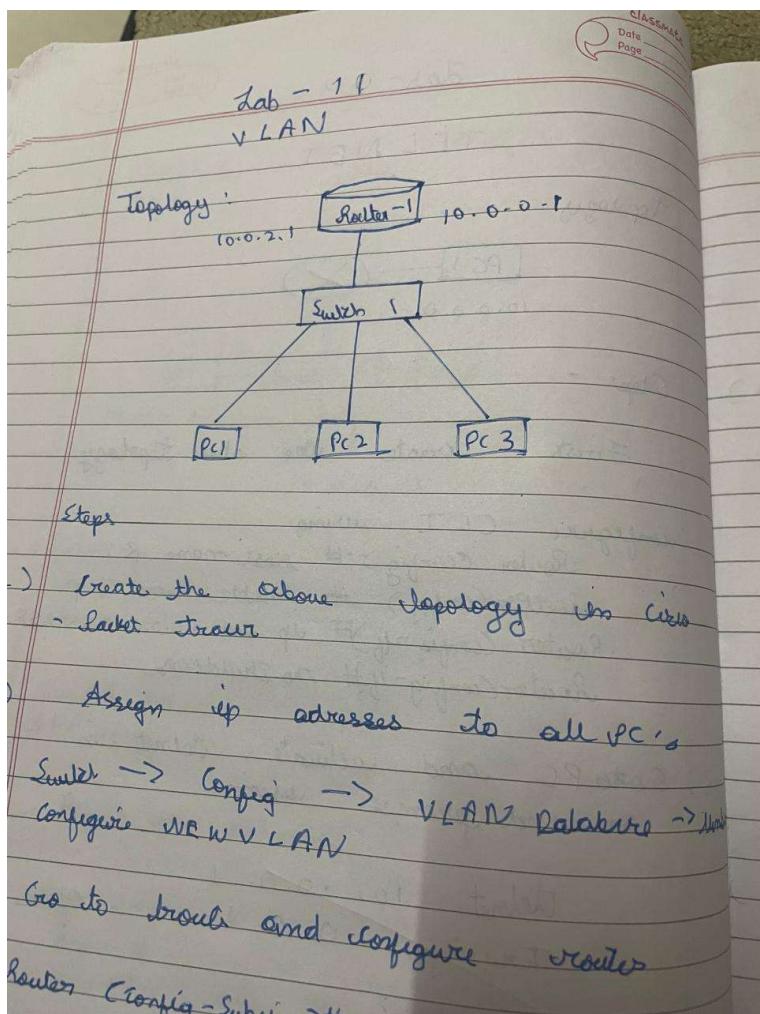
```

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Fa0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up
Router(config-if)#exit
Router(config)#interface Fa0/0.1
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed
state to up
Router(config-subif)#encapsulation dot1q 2
Router(config-subif)#ip address 20.0.0.1 255.0.0.0
Router(config-subif)#no shutdown
Router(config-subif)#exit
Router(config)#

```

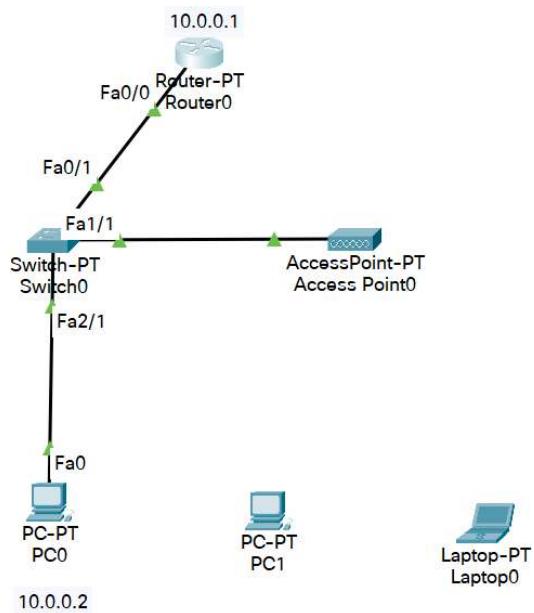
At the bottom of the window, there are 'Copy' and 'Paste' buttons, and a 'Top' button.

iv. Observation

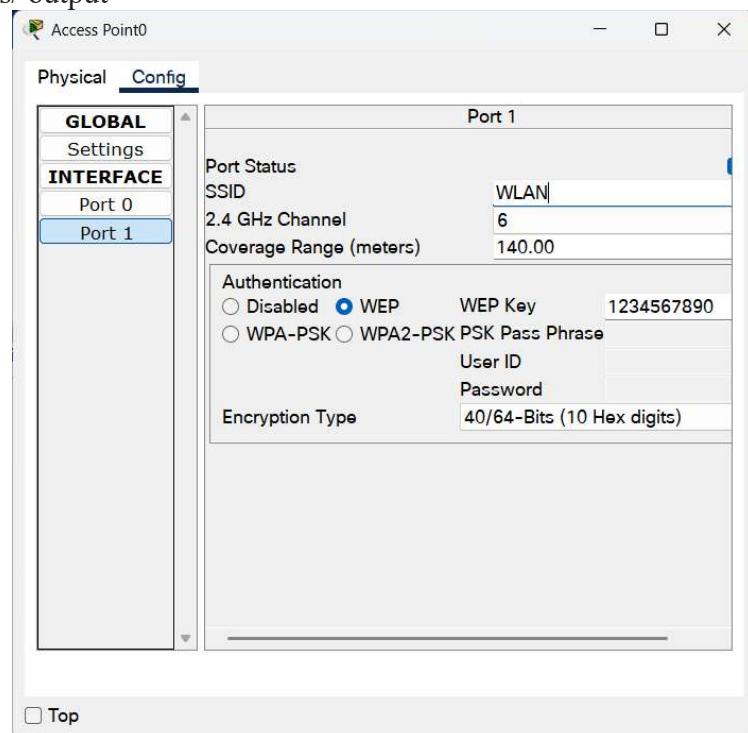


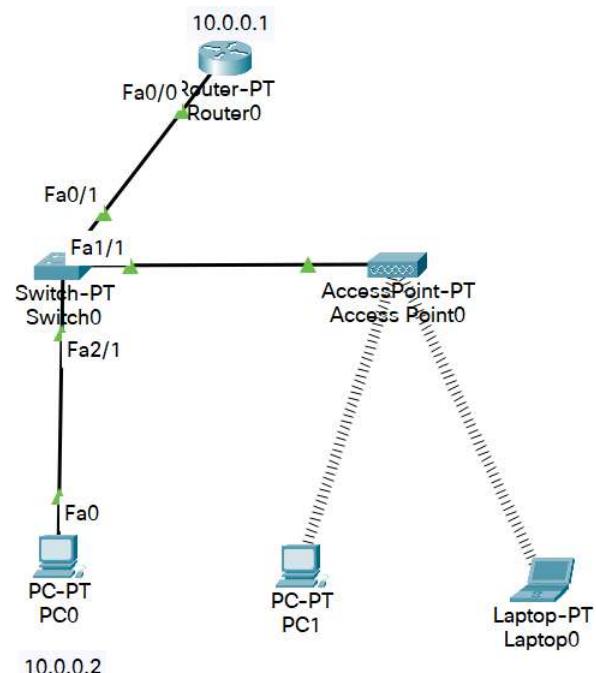
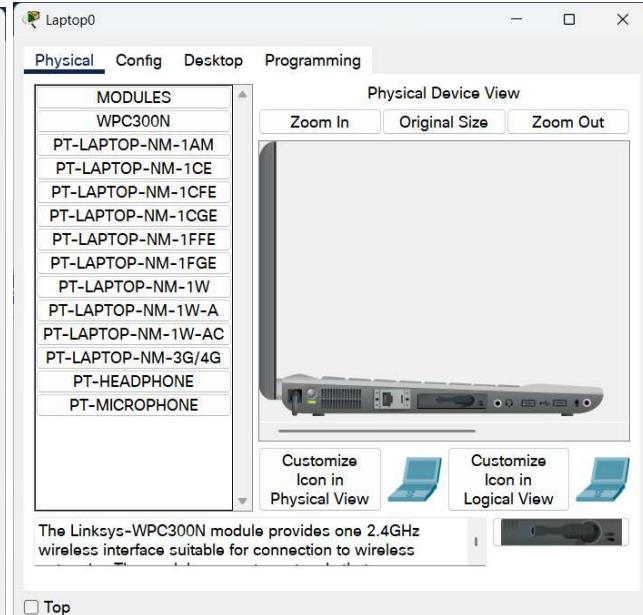
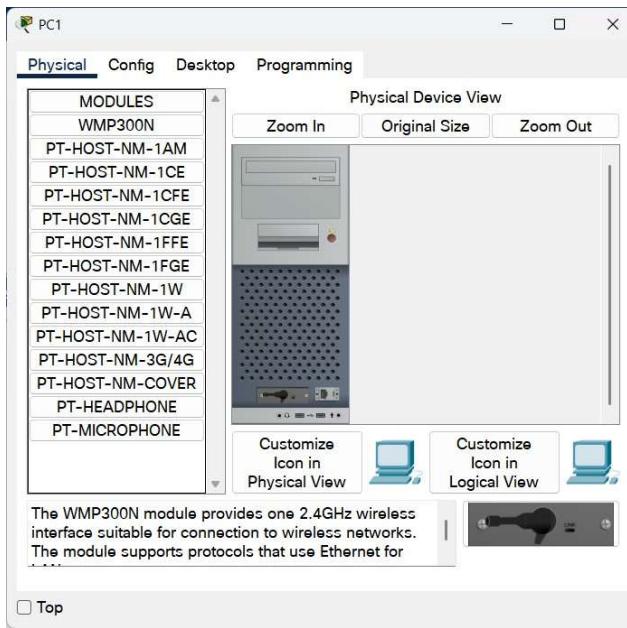
Program 12

- i. To construct a WLAN and make the nodes communicate wirelessly.
- ii. Procedure along with the topology



- iii. Screen shots/ output





Ping:

```
Laptop0
Physical Config Desktop Programming
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>

C:\>ping 10.0.0.3

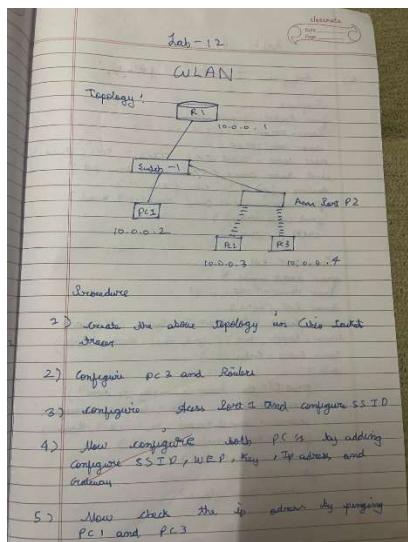
Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes=32 time=40ms TTL=128
Reply from 10.0.0.3: bytes=32 time=25ms TTL=128
Reply from 10.0.0.3: bytes=32 time=26ms TTL=128
Reply from 10.0.0.3: bytes=32 time=24ms 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 = 24ms, Maximum = 40ms, Average = 28ms

C:\>
```

iv. Observation



Cycle-II

Program 1

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

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

int crc(char *ip, char *op, char *poly, int mode) {
    strcpy(op, ip);

    if (mode) {
        for (int i = 1; i < strlen(poly); i++) {
            strcat(op, "0");
        }
    }

    // Perform XOR on the message with the selected polynomial
    for (int i = 0; i < strlen(ip); i++) {
        if (op[i] == '1') {
            for (int j = 0; j < strlen(poly); j++) {
                if (op[i + j] == poly[j])
                    op[i + j] = '0';
                else
                    op[i + j] = '1';
            }
        }
    }

    // Check for errors. Return 0 if error detected
    for (int i = 0; i < strlen(op); i++) {
        if (op[i] == '1')
            return 0;
    }

    return 1;
}

int main() {
    char ip[50], op[50], recv[50];
    char poly[] = "1000100000100001";

    printf("Enter the input message in binary: ");
    scanf("%os", ip);
```

```

        crc(ip, op, poly, 1);

        printf("The transmitted message is: %s%s\n", ip, op + strlen(ip));

        printf("Enter the received message in binary: ");
        scanf("%s", recv);

        if (crc(recv, op, poly, 0)) {
            printf("No error in data\n");
        } else {
            printf("Error in data transmission has occurred\n");
        }

        return 0;
}

```

iii. Screen shots/ output

```

D:\cpp\Untitled1.exe      X + ▾

Enter the input message in binary: 11111
The transmitted message is: 111111110001111011110
Enter the received message in binary: 1111
Error in data transmission has occurred

Process returned 0 (0x0) execution time : 7.354 s
Press any key to continue.
|
```

```

D:\cpp\Untitled1.exe      X + ▾

Enter the input message in binary: 11111
The transmitted message is: 111111110001111011110
Enter the received message in binary: 11111
No error in data

Process returned 0 (0x0) execution time : 7.201 s
Press any key to continue.
|
```

iv. Observation

Date _____
Page _____

classmate
Date _____
Page _____

Lab - 8

Q. Write a program for Error detection using CRC CITT (16 bits)

Code

```

#include <iostream.h>
#include <string.h>

int main() {
    char up[50], op[50], recv[50];
    char poly[17] = "100010000001000";
    cout << "Enter input : ";
    cin >> up;
    cout << "OP : ";
    cin >> op;
    cout << "Poly : ";
    cin >> poly;
    cout << endl;
    cout << "Enter received message : ";
    cin >> recv;
    if (recv == up) {
        cout << "No Error ";
    } else {
        cout << "Error in transmitted message";
    }
}

```

Output :

Input message 11111
 transmitted message 11111110000111
 Enter received message 11111
 No Error

✓

Program 2

- i. Write a program for congestion control using Leaky bucket algorithm
- ii. Procedure

```
#include <stdio.h>

int main() {
    int no_of_queries, storage, output_pkt_size;
    int input_pkt_size, bucket_size, size_left;
    storage = 0;
    no_of_queries = 4;
    bucket_size = 10;
    input_pkt_size = 4;
    output_pkt_size = 1;

    for (int i = 0; i < no_of_queries; i++) {
        size_left = bucket_size - storage;

        if (input_pkt_size <= size_left) {
            // Update storage
            storage += input_pkt_size;
        } else {
            printf("Packet loss = %d\n", input_pkt_size);
        }

        printf("Buffer size = %d out of bucket size = %d\n",
               storage, bucket_size);

        // Packets leaving the bucket
        storage -= output_pkt_size;

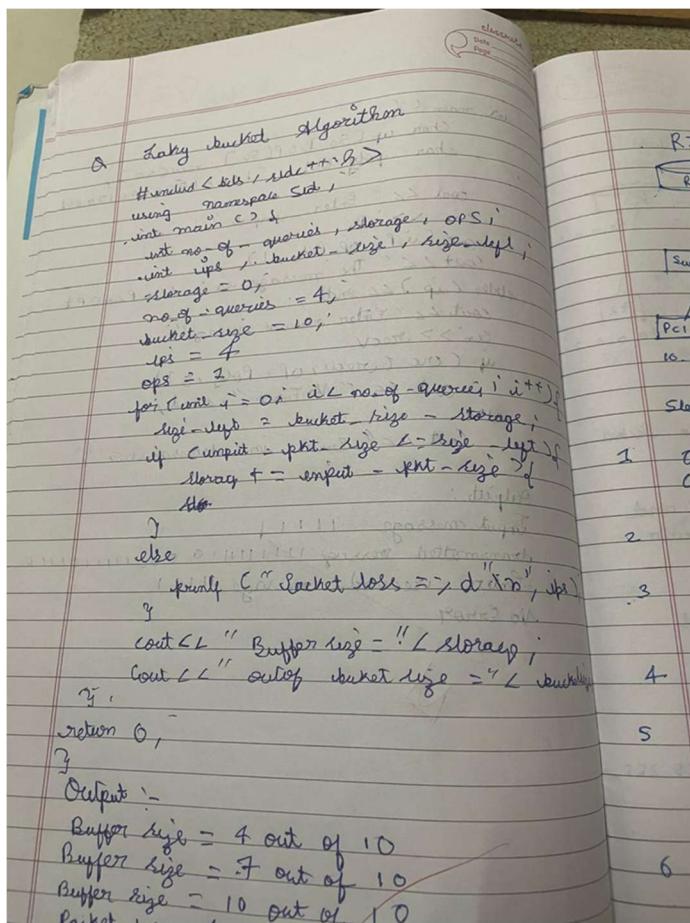
        // Ensure storage doesn't go negative
        if (storage < 0) {
            storage = 0;
        }
    }

    return 0;
}
```

iii. Screen shots/ output

```
D:\cpp\Untitled1.exe × + ▾  
Buffer size = 4 out of bucket size = 10  
Buffer size = 7 out of bucket size = 10  
Buffer size = 10 out of bucket size = 10  
Packet loss = 4  
Buffer size = 9 out of bucket size = 10  
  
Process returned 0 (0x0) execution time : 0.059 s  
Press any key to continue.  
|
```

iv. Observation



Program 3

- i. 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.
- ii. Procedure

```
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()
```

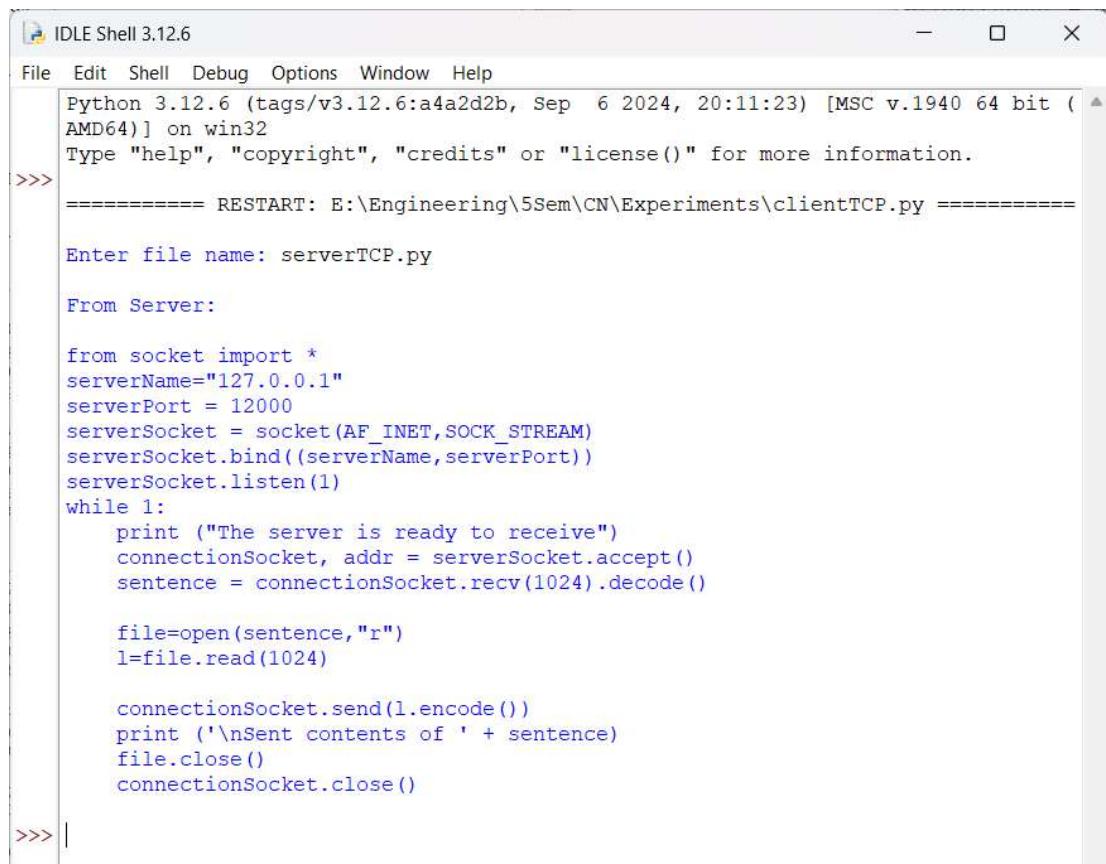
```
serverTCP.py
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_STREAM)
serverSocket.bind((serverName, serverPort))
serverSocket.listen(1)
while 1:
    print ("The server is ready to receive")
    connectionSocket, addr = serverSocket.accept()
  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

iii. Screen shots/ output

Client



```
IDLE Shell 3.12.6
File Edit Shell Debug Options Window Help
Python 3.12.6 (tags/v3.12.6:a4a2d2b, Sep 6 2024, 20:11:23) [MSC v.1940 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

>>> ===== RESTART: E:\Engineering\5Sem\CN\Experiments\clientTCP.py =====

Enter file name: serverTCP.py

From Server:

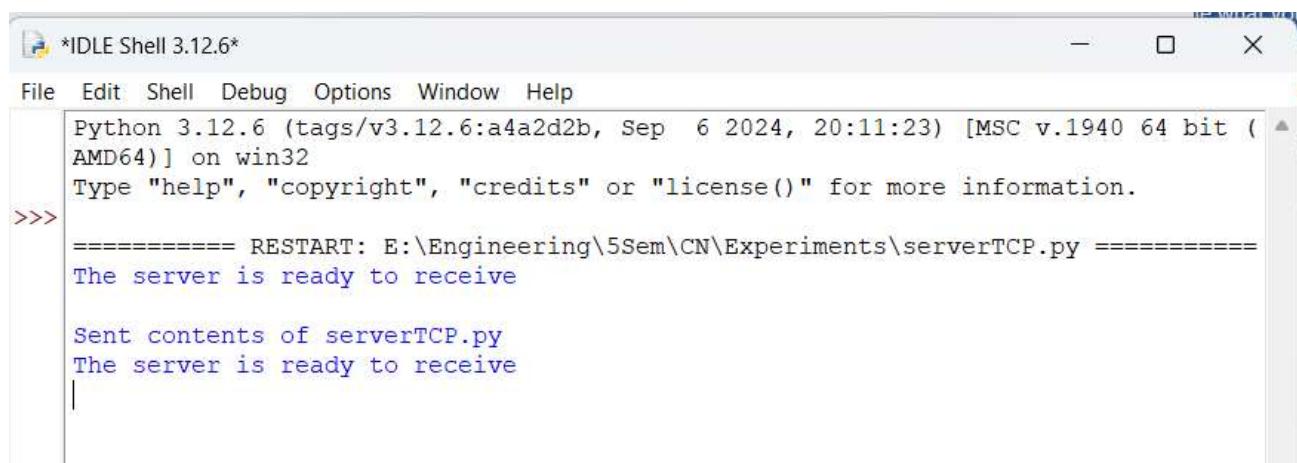
from socket import *
serverName="127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_INET,SOCK_STREAM)
serverSocket.bind((serverName,serverPort))
serverSocket.listen(1)
while 1:
    print ("The server is ready to receive")
    connectionSocket, addr = serverSocket.accept()
    sentence = connectionSocket.recv(1024).decode()

    file=open(sentence,"r")
    l=file.read(1024)

    connectionSocket.send(l.encode())
    print ('\nSent contents of ' + sentence)
    file.close()
    connectionSocket.close()

>>> |
```

Server



```
*IDLE Shell 3.12.6*
File Edit Shell Debug Options Window Help
Python 3.12.6 (tags/v3.12.6:a4a2d2b, Sep 6 2024, 20:11:23) [MSC v.1940 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

>>> ===== RESTART: E:\Engineering\5Sem\CN\Experiments\serverTCP.py =====
The server is ready to receive

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

iv. Observation

NAB

c) Configure TCP/IP ports

```

Programs:
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName, serverPort))
connectionSocket = socket(AF_INET, SOCK_STREAM)
connectionSocket.bind((serverName, serverPort))
connectionSocket.listen(1)
while True:
    print("The Server is ready to receive")
    connectionSocket.settimeout(10)
    connectionSocket.accept()
    file = open("deneme.txt", "r")
    fileContent = file.read()
    file.close()
    connectionSocket.send(fileContent)
    connectionSocket.close()

```

Distro

Server TCP IP

The server is ready to receive
Get request of server TCP IP
The server is ready to receive
Client IP

Enter file name Server TCP IP

From Server:
from socket import *

connectionSocket = socket(AF_INET, SOCK_STREAM)

Program 4

- i. 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.
- ii. Procedure

```
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)
```

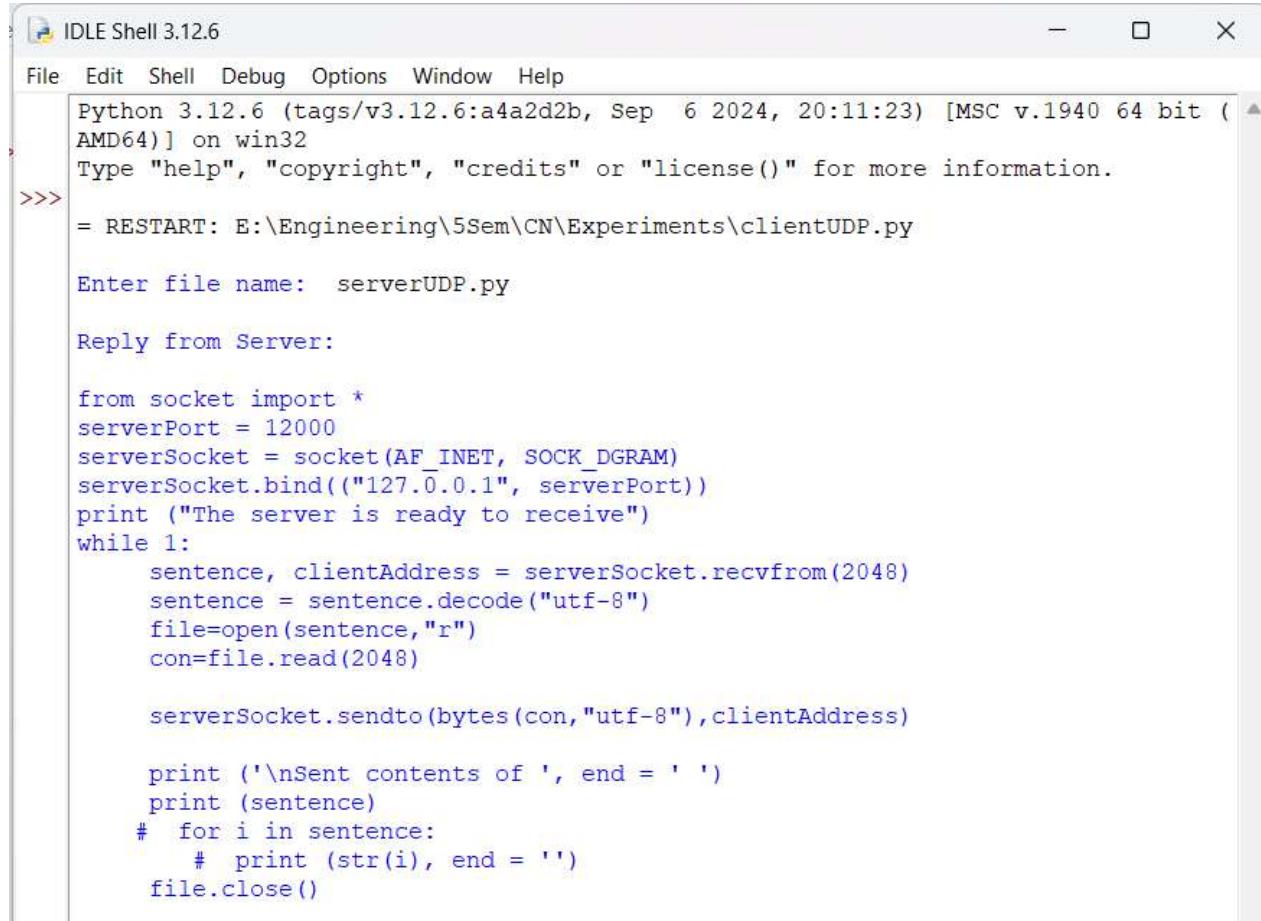
```
serverSocket.sendto(bytes(con, "utf-8"), clientAddress)
```

```
print ('\nSent contents of', end = ' ')
print (sentence)
# for i in sentence:
```

```
# print (str(i), end = "")
file.close()
```

iii. Screen shots/ output

Client



```
IDLE Shell 3.12.6
File Edit Shell Debug Options Window Help
Python 3.12.6 (tags/v3.12.6:a4a2d2b, Sep 6 2024, 20:11:23) [MSC v.1940 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

>>> = RESTART: E:\Engineering\5Sem\CN\Experiments\clientUDP.py

Enter file name: serverUDP.py

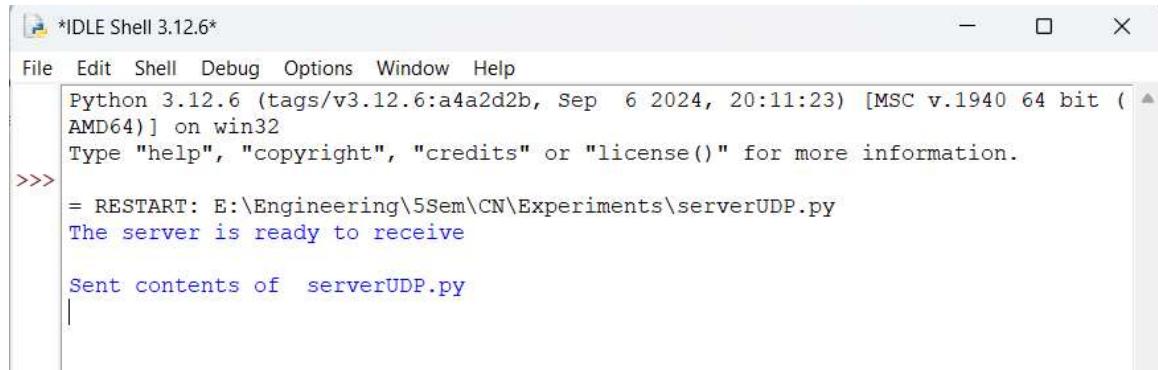
Reply from Server:

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

    serverSocket.sendto(bytes(con,"utf-8"),clientAddress)

    print ('\nSent contents of ', end = ' ')
    print (sentence)
#   for i in sentence:
#       print (str(i), end = '')
    file.close()
```

Server



```
*IDLE Shell 3.12.6*
File Edit Shell Debug Options Window Help
Python 3.12.6 (tags/v3.12.6:a4a2d2b, Sep 6 2024, 20:11:23) [MSC v.1940 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

>>> = RESTART: E:\Engineering\5Sem\CN\Experiments\serverUDP.py
The server is ready to receive

Sent contents of  serverUDP.py
```

iv. Observation

Log:

```

67 (Background) got client ServerName
using local socket
        DatagramSocket
Client UDP port
from socket import *
serverName = "127.0.0.1"
serverPort = 1234
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind((serverName, serverPort))
print("Server is ready to receive")
print("Socket closed")
serverSocket.close()

```

Server UDP port

```

from socket import *
serverPort = 1234
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort))
print("Server is ready to receive")
while True:
    sentence = clientSocket.recv(1024).decode("utf-8")
    if sentence == "q": break
    print(sentence)
    clientSocket.send(sentence + " " + str(len(sentence)))
    print(str(len(sentence)))
    clientSocket.close()

```

Output:

```

Server UDP port
The server is ready to receive
Sent request of Server UDP port
The client is ready to receive
Client UDP port
Printed echo message: Server UDP port
Reply from server
from socket import *

```

↓

File module (?)