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“JnanaSangama”, Belgaum -590014, Karnataka.



LAB REPORT

on

Computer Networks

Submitted by

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in partial fulfillment for the award of the degree of

BACHELOROFENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING



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**B. M. S. College of Engineering,
Bull Temple Road, Bangalore 560019**

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled “LAB COURSE **Computer Networks**” carried out by **ROHAN SATISH KUMAR (1BM21CS168)**, 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 **Computer Networks - (22CS4PCCON)** work prescribed for the said degree.

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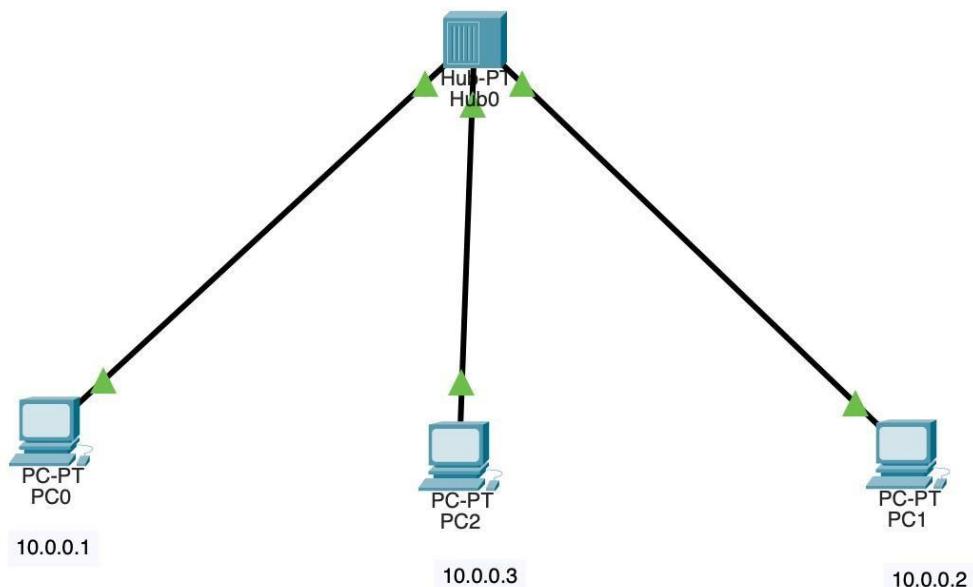
CYCLE 1

Experiment No. 1

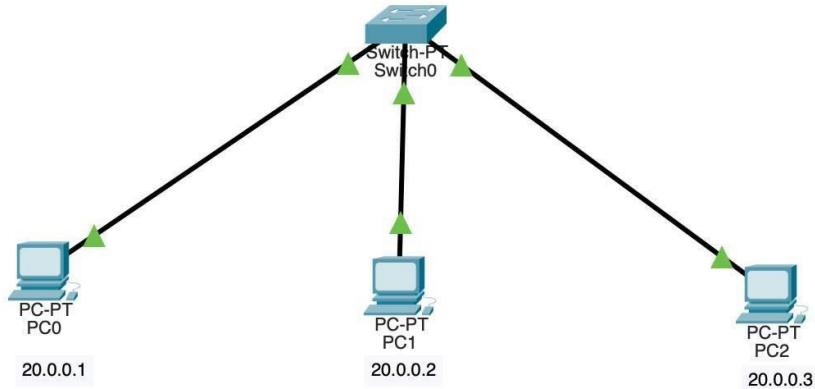
Title:

Create a topology with 3 or more end devices using

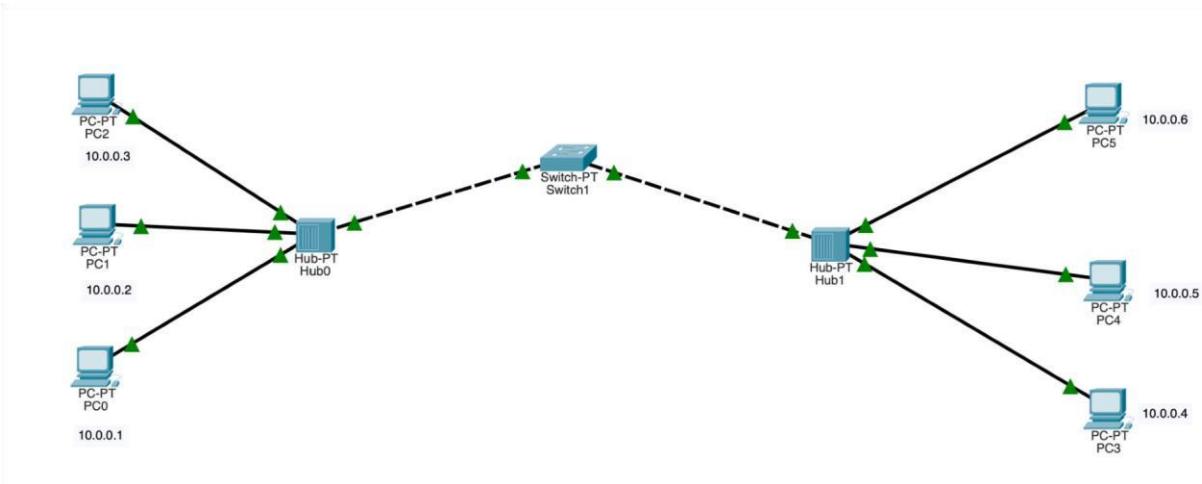
i)Hub ii)Switch iii)Hub & Switch Hybrid **Topology:**



i)Hub topology



ii) Switch topology



iii) Hub&Switch Hybrid topology

Pinging end devices:

i)

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time<1ms TTL=128
Reply from 10.0.0.1: bytes=32 time<1ms TTL=128
Reply from 10.0.0.1: bytes=32 time=18ms TTL=128
Reply from 10.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 18ms, Average = 4ms

C:\>
```

ii)

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 20.0.0.3

Pinging 20.0.0.3 with 32 bytes of data:

Reply from 20.0.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

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=128
Reply from 20.0.0.2: bytes=32 time=14ms TTL=128
Reply from 20.0.0.2: bytes=32 time<1ms TTL=128
Reply from 20.0.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 20.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 14ms, Average = 3ms
```

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1: bytes=32 time<1ms TTL=128

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 = 0ms, Average = 0ms

C:\>ping 20.0.0.3

Pinging 20.0.0.3 with 32 bytes of data:

Reply from 20.0.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

iii)

PC0

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.04

Pinging 10.0.0.04 with 32 bytes of data:

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 = 0ms, Average = 0ms

C:\>ping 10.0.0.6

Pinging 10.0.0.6 with 32 bytes of data:

Reply from 10.0.0.6: bytes=32 time=1ms TTL=128
Reply from 10.0.0.6: bytes=32 time=1ms TTL=128
Reply from 10.0.0.6: bytes=32 time<1ms TTL=128
Reply from 10.0.0.6: bytes=32 time=16ms TTL=128

Ping statistics for 10.0.0.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 16ms, Average = 4ms

C:\>
```

PC5

Physical Config Desktop Program

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

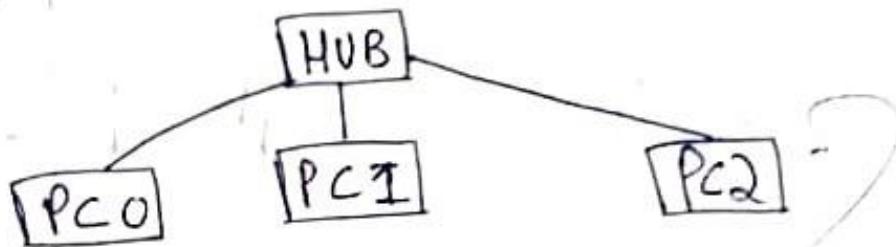
Reply from 10.0.0.3: bytes=32 time<1ms TTL=128

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

C:\>
```

Experiment 1

Create a repository consisting of 3 or more devices, connected with one help of a hub.

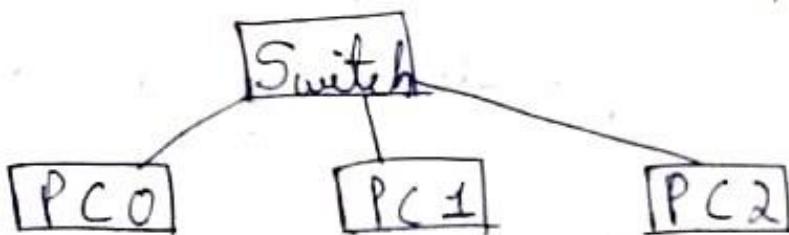


Place one hub and 3 end devices.

Observation:

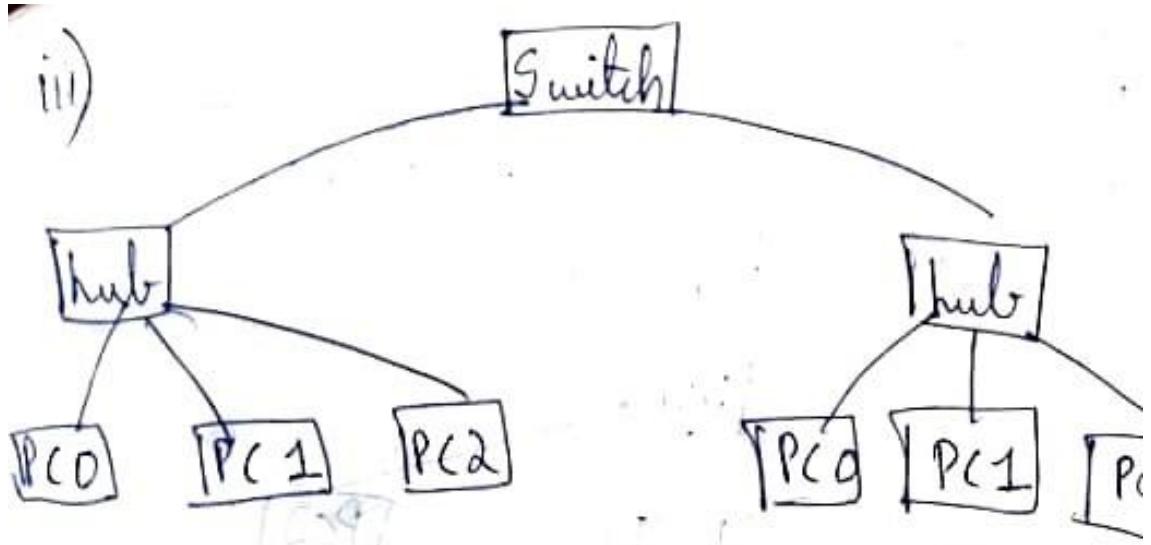
Whenever a source node sends data in a network, hub reverses the data in a network, hub and sends the data to all the surviving nodes. The node with matching destination address accepts the data.

II>



Observations :-

Here the difference is that when the source nodes sends data to other node like switch only sends to nodes whose address match.



Observation

Sending message from PC0 to PC3, if PC0 sends the message, HUB 1 receives the message and rejects the message as destination address does not match.

- i) Then switch transmits the message to the HUB 1, then HUB 2 sends it to the HUB 3, then HUB 3 sends it to the PC 3, laptop and server.
- ii) PC 3 accepts the message and acknowledge back.
Laptop and server rejects the message

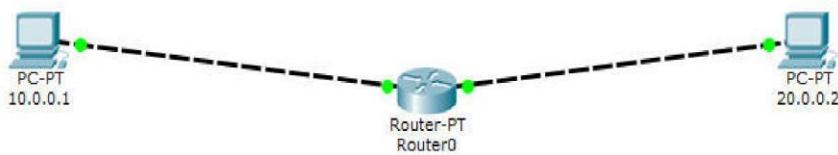
11/12

Experiment No. 2

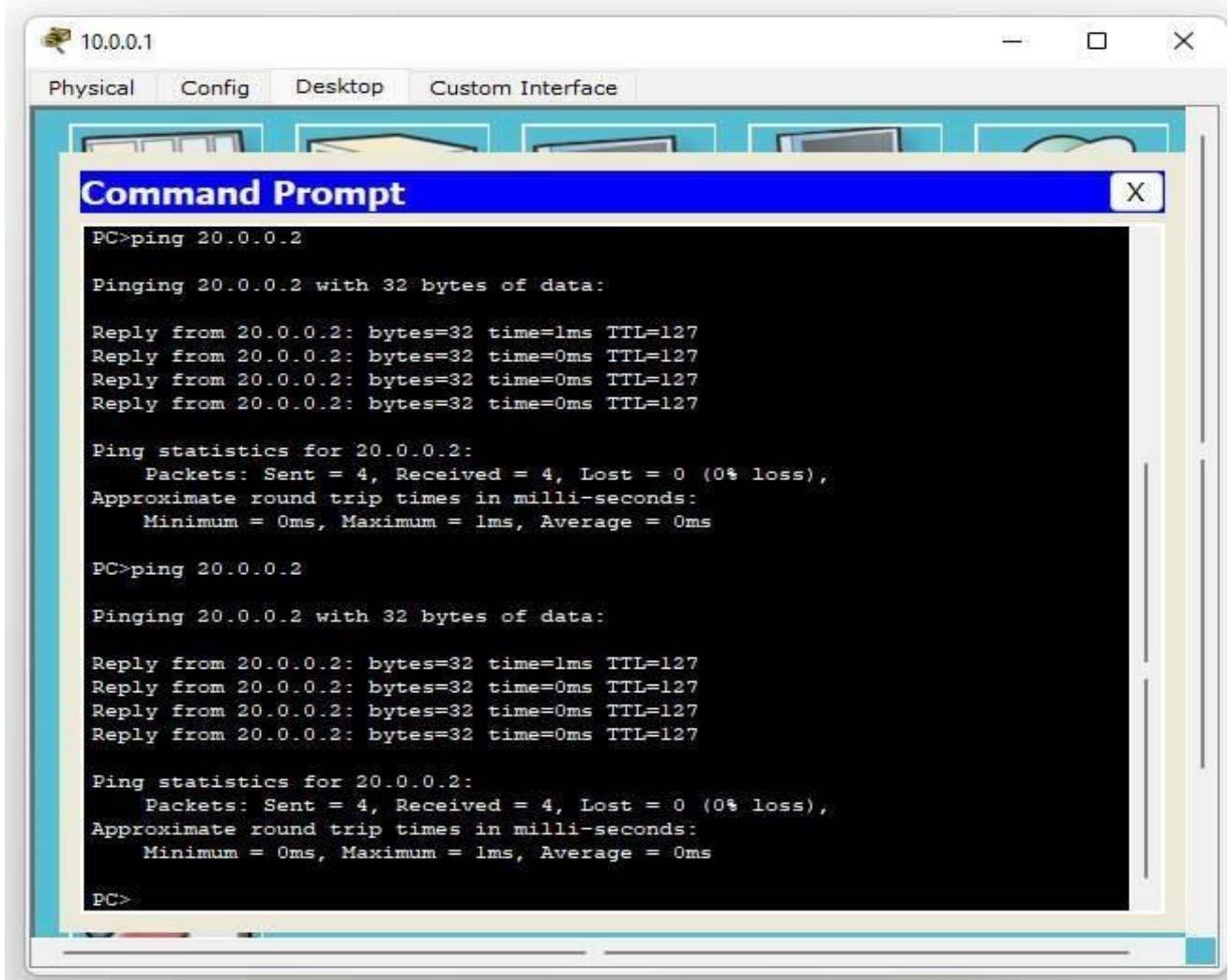
Title:

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

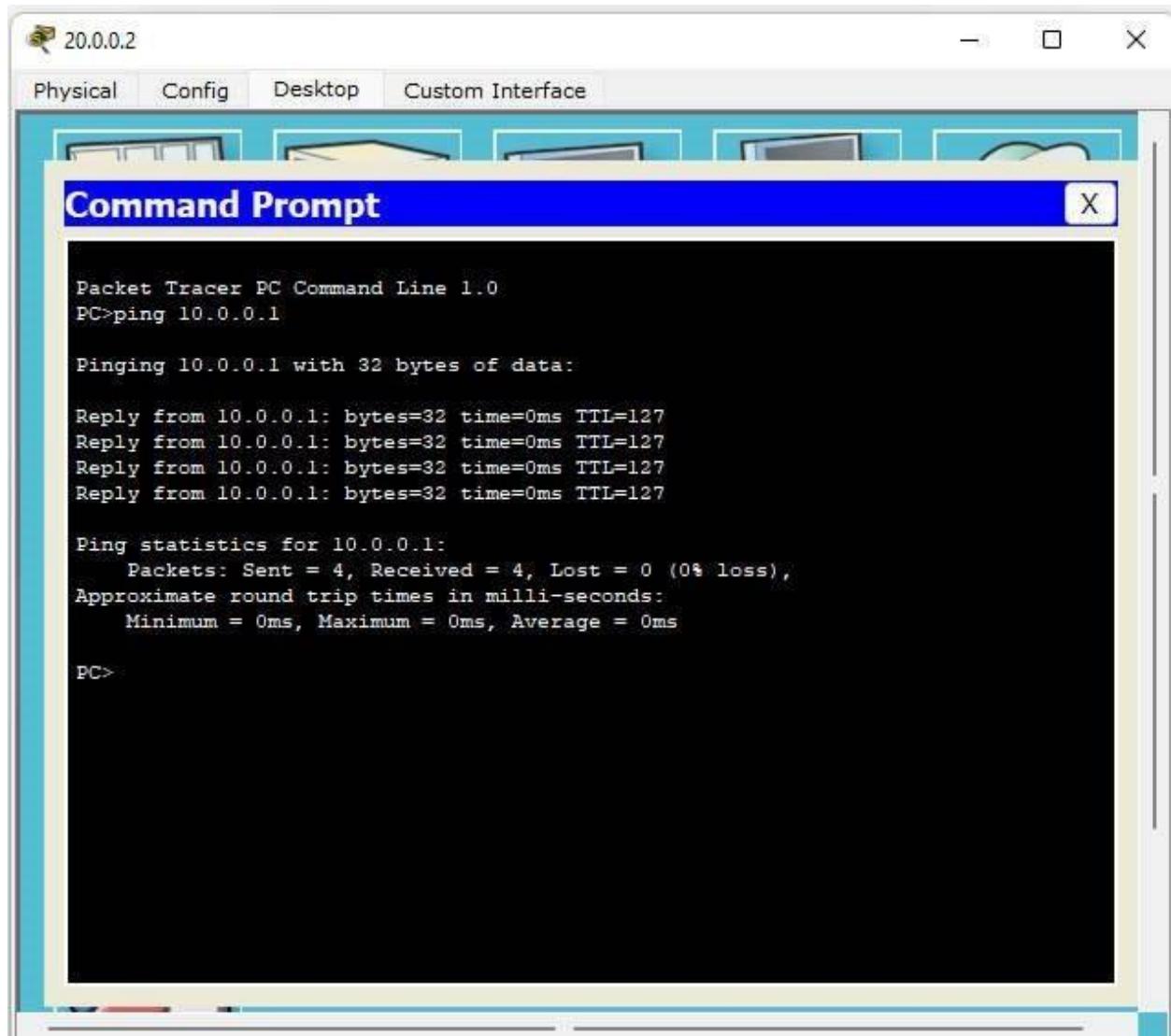
Topology: with single router



Pinging PC2 from PC1:



Pinging PC1 from PC2:



The screenshot shows a Cisco Packet Tracer interface. At the top, there's a toolbar with icons for Physical, Config, Desktop, and Custom Interface. Below the toolbar is a window titled "Command Prompt". Inside the window, the following text is displayed:

```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1

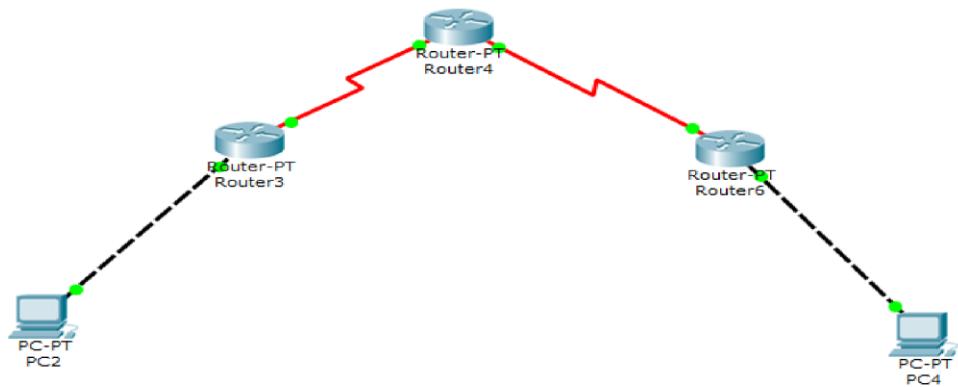
Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=0ms TTL=127

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>
```

Topology: with 3 Routers



Pinging end device - in different network before setting IP route

```
PC2
Physical Config Desktop Custom Interface
Command Prompt
X
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=255

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 = 0ms, Average = 0ms

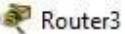
PC>ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

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

Ping statistics for 40.0.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
    n/a>
```

IP route - for all routers



Router3

Physical Config CLI

IOS Command Line Interface

```
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>
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#exit
Router(config)#exit
Router#
*SYS-5-CONFIG_I: Configured from console by console
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#
```

Physical Config CLI

IOS Command Line Interface

Press RETURN to get started.

```
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>
```



Physical Config CLI

IOS Command Line Interface

Press RETURN to get started.

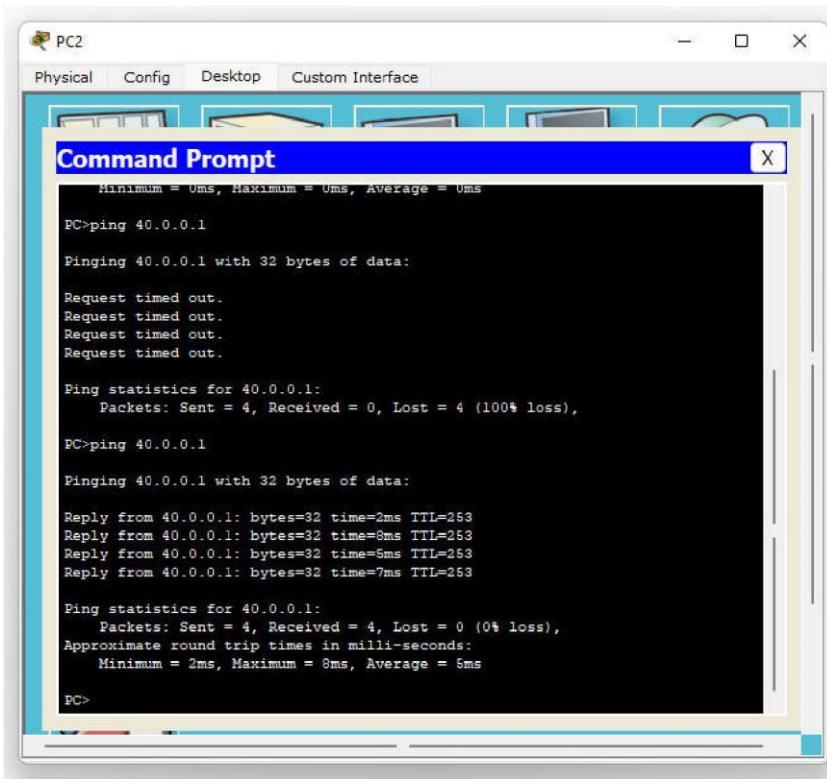
```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      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, Serial2/0
C    40.0.0.0/8 is directly connected, FastEthernet0/0
Router>
```

After setting IP route

Pinging PC4 from PC2

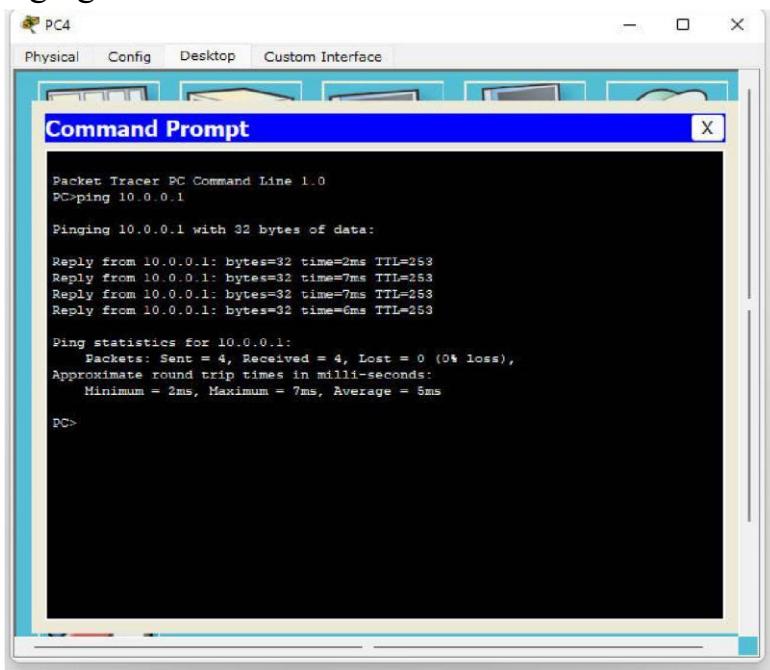


```
PC2
Physical Config Desktop Custom Interface
Command Prompt
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 40.0.0.1:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Reply from 40.0.0.1: bytes=32 time=2ms TTL=253
Reply from 40.0.0.1: bytes=32 time=8ms TTL=253
Reply from 40.0.0.1: bytes=32 time=5ms TTL=253
Reply from 40.0.0.1: bytes=32 time=7ms TTL=253

Ping statistics for 40.0.0.1:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 8ms, Average = 5ms
PC>
```

Pinging PC2 from PC4



```
PC4
Physical Config Desktop Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=2ms TTL=253
Reply from 10.0.0.1: bytes=32 time=7ms TTL=253
Reply from 10.0.0.1: bytes=32 time=7ms TTL=253
Reply from 10.0.0.1: bytes=32 time=6ms TTL=253

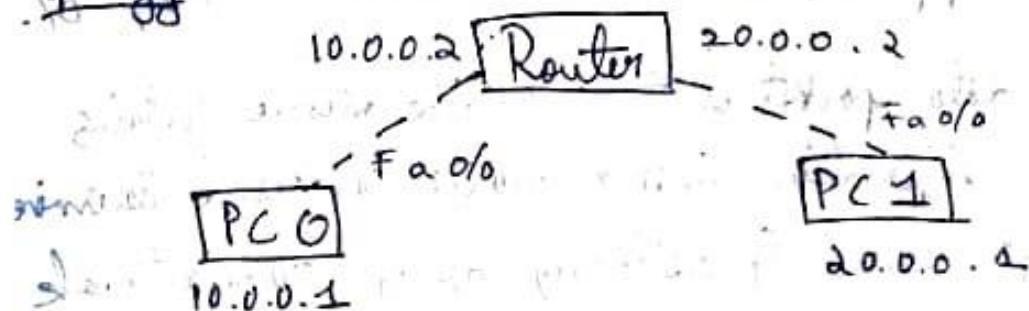
Ping statistics for 10.0.0.1:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 7ms, Average = 5ms
PC>
```

Q) Create a topology consisting of 2 devices connected with the help of a router

Ans:-

Aim :- To use one router and connect two end devices of different network

Topology :-



Procedure :-

- ① Place one router (Generic) & 2 end devices
- ② Connect the end devices to the Router with appropriate cable
- ③ Set IP address & default gateway to each end device
- ④ Configure the Router using the CLI, put IP address as respective gateway address for end device
- ⑤ Select PC 0 and open the command prompt and ping the PC 1 using its IP address

Result :- The PC 0 and PC 1 of different networks are connected using router with their respective gateways.

QUESTION -
PC 1 replies 10.0.0.2 Byte = 32 times = 10 m/s

PC 1 replies 10.0.0.2 Byte = 32 times = 7 m/s

PC 1 replies 10.0.0.2 Byte = 32 times = 9 m/s

PC 1 replies from 10.0.0.2 Byte = 32 times = 5 m/s

Number of packets sent = 4 received = 4 Loss = 0%

* Each data packet sent across the network containing address information that a router can use to determine that source & destination are on same network

CLI for router:

- enable
- configure terminal
- Interface Fa0/0
- IP address 10.0.0.2 255.0.0.0
- no shut down
- exit

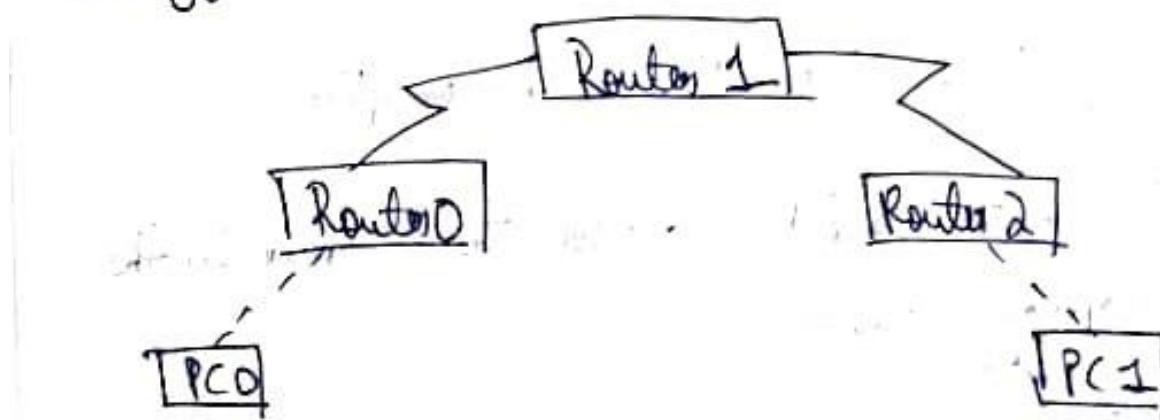
Title :

Topology consisting of 3 routers and 2 end devices

In

Connecting 3 routers together and end devices.

Topology:



Procedure

- ① Take 3 generic routers & 2 end devices
- ② Connect the end devices to the routers and b/w routers using suitable wire
- ③ Set IP address & default gateway to each end device of different networks
- ④ Configure the routers using the CLI, put IP address same as respective gateway address for end devices
- ⑤ Select PC0 and open the cmd prompt and ping PC1 with IP address

Result :-

The intermediate Router is connected with other two Routers properly with green signal b/w the 3 routers & end device.

Observation:-

Pinging PC 1 from PC 0 works unexpected

- * 3 routers & 2 PCs are connected as shown in the topology above
- * Pinging PC 2 from PC 0 shows destination host unreachable
- + Adding static routes to routers using IP route dest < subnet mask > < next hop > in enable config + terminal mode.

PC 0: to Router 1

>enable

config terminal

(config) # interface fa0/0

(config) # ip address 10.0.0.2 255.0.0.0

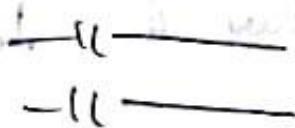
(config) # no shutdown

Tested Party :-

→ Pinging 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data

Replying from 10.0.0.1 destination host unreachable



Request timed out.

Packets : Sent : 4 - Received : 0

$$\text{Loss} = 4 \text{ (100%)} \quad \rightarrow$$

→ Adding Static Routes.

Router 0

Router(config)# ip route 30.0.0.0

255.0.0.0 20.0.0.2

Router(config)# ip route 40.0.0.2 255.0.0.0

20.0.0.1

→ Pinging 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data

Replying from 40.0.0.1 bytes = 3d times = 12ms

Replying from 40.0.0.1 bytes = 3d times = 7ms

Replying from 40.0.0.1 bytes = 3d times = 9ms

Replying from 40.0.0.1 bytes = 3d times = 5ms

Packet sent = 4 Received = 4 Lost = 0%

Oppon round trip time

min = 2ms Max = 12ms Avg = 7ms

Observation

RTT
avg 6.5?

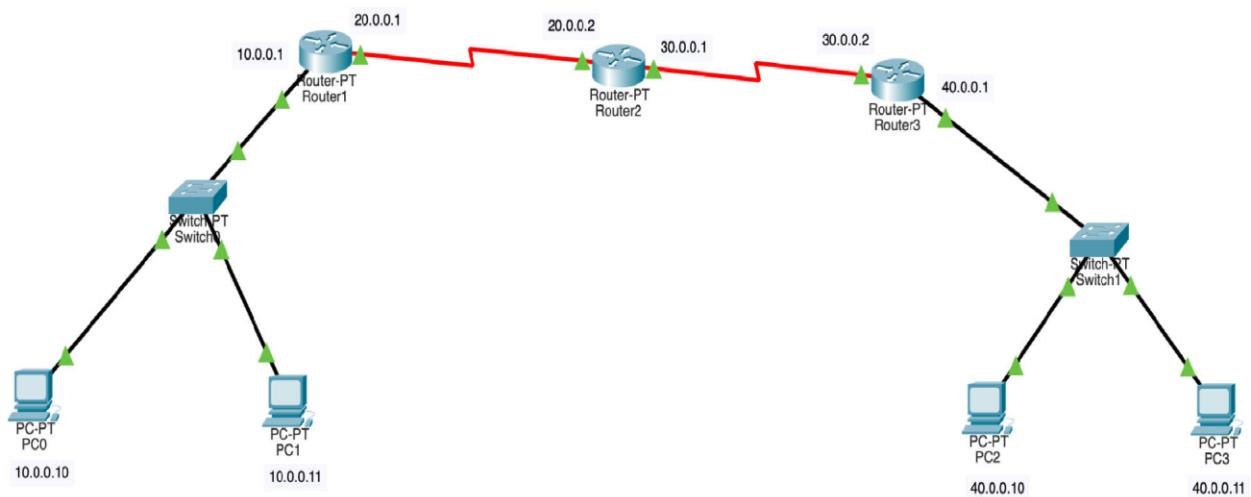
(5)

Experiment No. 3

Title:

Configure default route, static route to the Router

Topology:



IP Route for all routers:



The terminal window is titled "Router1". It displays the following configuration and route output:

```
%LINK-5-CHANGED: Interface Serial2/0, changed state to down
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
show ip route
^
% Invalid input detected at '^' marker.

Router(config-if)#exit
Router(config)#
Router#
%SYS-5-CONFIG_I: Configured from console by console
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

Router#
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
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
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#
```

Buttons: Copy | Paste



IOS Command Line Interface

```
Router(config-if)#  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface Serial3/0  
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  
show ip route  
^  
% Invalid input detected at '^' marker.  
  
Router(config-if)#exit  
Router(config)#exit  
Router#  
%SYS-5-CONFIG_I: Configured from console by console  
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    20.0.0.0/8 is directly connected, Serial3/0  
C    30.0.0.0/8 is directly connected, Serial2/0  
  
Router#  
Router#  
Router#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#  
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  
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, Serial3/0  
C    30.0.0.0/8 is directly connected, Serial2/0  
S    40.0.0.0/8 [1/0] via 30.0.0.2  
  
Router#
```

```

Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
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
show ip route
^
% Invalid input detected at '^' marker.

Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
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    30.0.0.0/8 is directly connected, Serial2/0
C    40.0.0.0/8 is directly connected, FastEthernet0/0

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

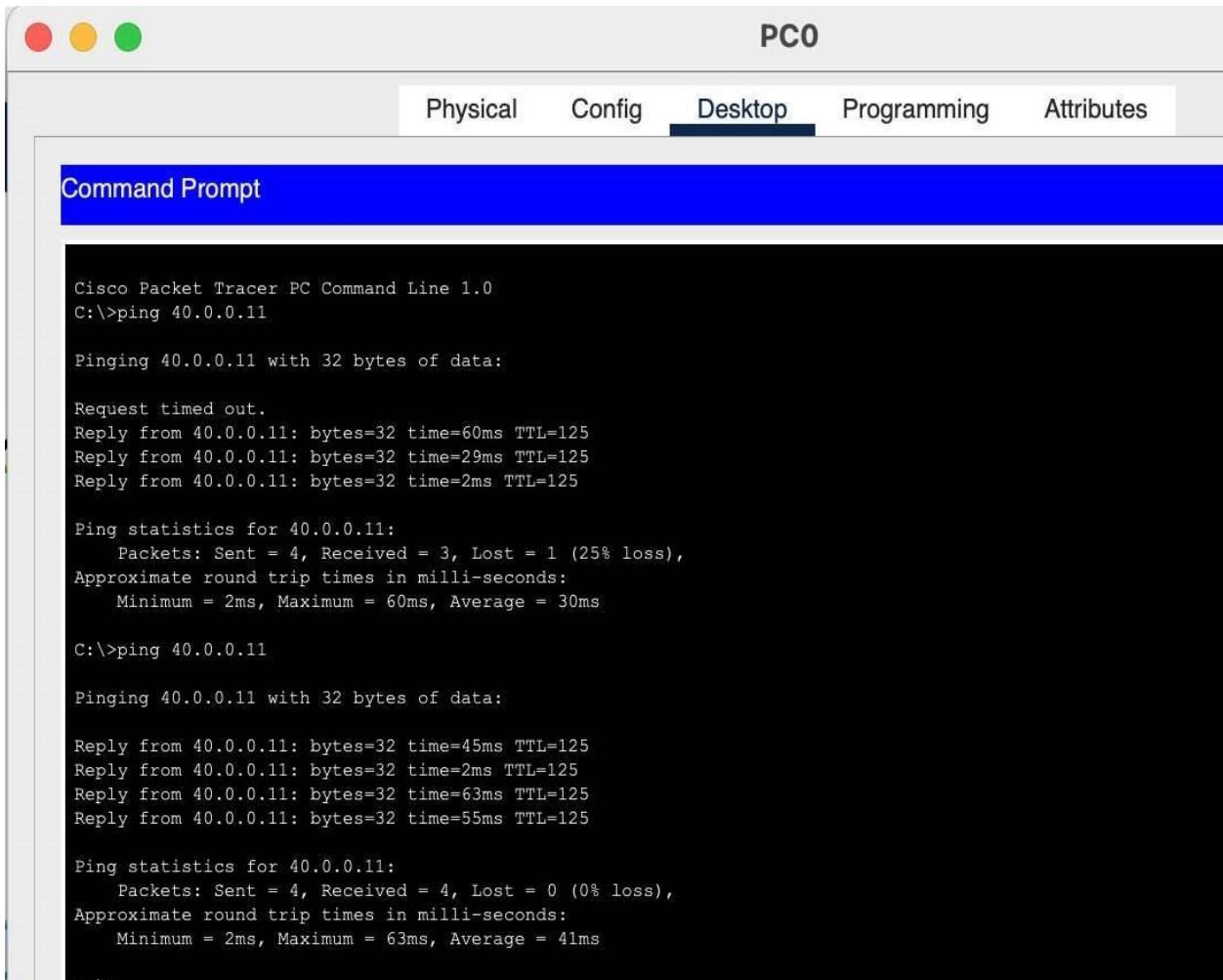
S    10.0.0.0/8 [1/0] via 30.0.0.1
S    20.0.0.0/8 [1/0] via 30.0.0.1
C    30.0.0.0/8 is directly connected, Serial2/0
C    40.0.0.0/8 is directly connected, FastEthernet0/0

Router#

```

Pinging end devices in different network:

Ping PC3 from PC0



PC0

Physical Config Desktop **Desktop** Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 40.0.0.11

Pinging 40.0.0.11 with 32 bytes of data:

Request timed out.
Reply from 40.0.0.11: bytes=32 time=60ms TTL=125
Reply from 40.0.0.11: bytes=32 time=29ms TTL=125
Reply from 40.0.0.11: bytes=32 time=2ms TTL=125

Ping statistics for 40.0.0.11:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 60ms, Average = 30ms

C:\>ping 40.0.0.11

Pinging 40.0.0.11 with 32 bytes of data:

Reply from 40.0.0.11: bytes=32 time=45ms TTL=125
Reply from 40.0.0.11: bytes=32 time=2ms TTL=125
Reply from 40.0.0.11: bytes=32 time=63ms TTL=125
Reply from 40.0.0.11: bytes=32 time=55ms TTL=125

Ping statistics for 40.0.0.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 63ms, Average = 41ms
```

Ping PC1 from PC2

The screenshot shows a window titled "PC2" with a tab bar at the top. The "Desktop" tab is selected, and the "Physical", "Config", "Desktop", and "Programming" tabs are visible. Below the tabs is a blue header bar labeled "Command Prompt". The main area of the window displays the output of a ping command. The text is as follows:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.11

Pinging 10.0.0.11 with 32 bytes of data:

Request timed out.
Reply from 10.0.0.11: bytes=32 time=2ms TTL=125
Reply from 10.0.0.11: bytes=32 time=2ms TTL=125
Reply from 10.0.0.11: bytes=32 time=3ms TTL=125

Ping statistics for 10.0.0.11:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 3ms, Average = 2ms

C:\>ping 10.0.0.11

Pinging 10.0.0.11 with 32 bytes of data:

Reply from 10.0.0.11: bytes=32 time=81ms TTL=125
Reply from 10.0.0.11: bytes=32 time=50ms TTL=125
Reply from 10.0.0.11: bytes=32 time=71ms TTL=125
Reply from 10.0.0.11: bytes=32 time=48ms TTL=125

Ping statistics for 10.0.0.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 48ms, Maximum = 81ms, Average = 62ms
```

Lab 3 Static Routing

Same topology as of Lab-2

Procedure

Adding Static Router

1) To router 1 for networks 20.0.0.0 and 40.0.0.0

Router (config)# ip route 40.0.0.0 255.0.0.0 30.0.0.1.

Router (config)# ip route 20.0.0.0 255.0.0.0 30.0.0.1

2) To router 3 for networks 100.0.0.0 & 30.0.0.0

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

3) To router 2 for networks 10.0.0.0 & 30.0.0.0

Router (config)# ip route 30.0.0.0 255.0.0.0 40.0.0.1

Router (config)# ip route 10.0.0.0 255.0.0.0 40.0.0.1

Observation

The IP routes have been added to each router which can be seen by running 'show ip route' command.

Router - 1

Show ip route

C 10.0.0.0/8 is directly connected Fast Ethernet 0/0

S 20.0.0.0/8 [1/0]

C 30.0.0.0/8

S 40.0.0.0/8 is directly connected serial 2/0
[1/0] via 30.0.0.1

Router 2

Show iproute

S 10.0.0.0 /₂ [1/0] via 40.0.0.1

C S 20.0.0.0 /₂ is directly connected FastEthernet 0/0

C S 30.0.0.0 /₂ [4/0] via 40.0.0.1

C 40.0.0.0 /₂ is directly connected 3/0

Router 3

S 10.0.0.0 /₂ [1/0] via 30.0.0.2

S 20.0.0.0 /₂ [1/0] via 40.0.0.2

C 30.0.0.0 /₂ [is directly connected Second 1/0]

C 40.0.0.0 /₂ [is directly connected Serial 3/0]

Output

The ping requests to all networks are successful.

From PC 0

→ Ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data

Replying from 20.0.0.1 bytes = 32 time = 10ms TTL = 125

Reply from 20.0.0.2 bytes = 32 time = 2 ms TTL = 125

Reply from 20.0.0.1 bytes = 32 time = 2 ms TTL = 125

Reply from 20.0.0.1 bytes = 32 time = 8 ms TTL = 125

Ping statistics for 20.0.0.1

Tickets : sent = 4 Received = 4, Loss = 0 [

0% loss]

⇒ Ping 40.0.0.2

Ping from 40.0.0.2 with 32 bytes of data

Reply from 40.0.0.2 bytes = 32 time = 7ms TTL = 253

Reply from 40.0.0.2 bytes = 32 time = 7ms TTL = 253

Reply from 40.0.0.2 bytes = 32 time = 7ms TTL = 253

Reply from 40.0.0.2 bytes = 32 time = 7ms TTL = 253

~~Ping statistics for 40.0.0.2~~

Packets: sent = 4, Received = 4, Lost = 0 (0% loss)

Approx.

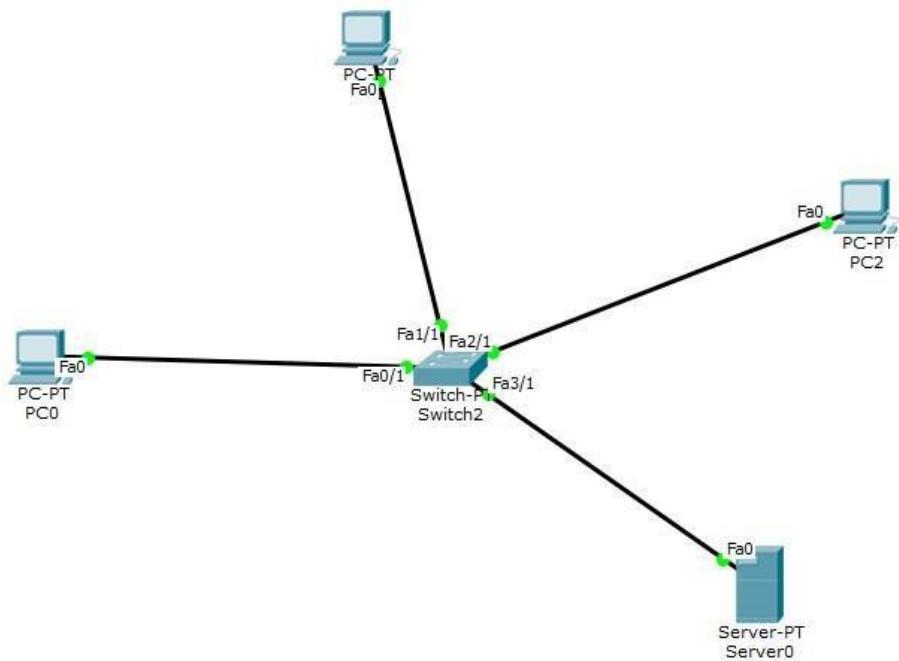
Experiment No. 4

Title:

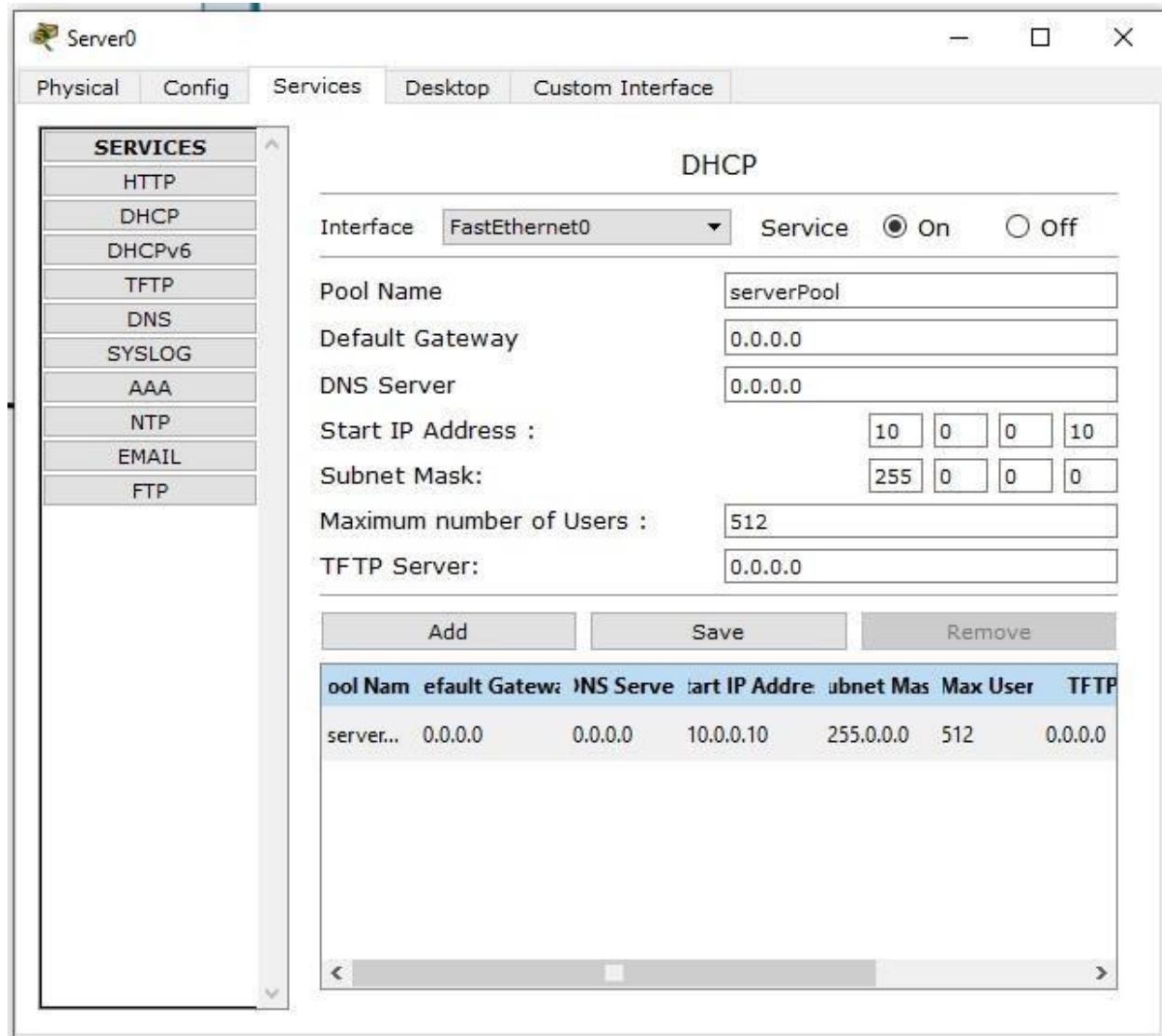
Configure DHCP within a LAN and outside LAN.

a) Within LAN

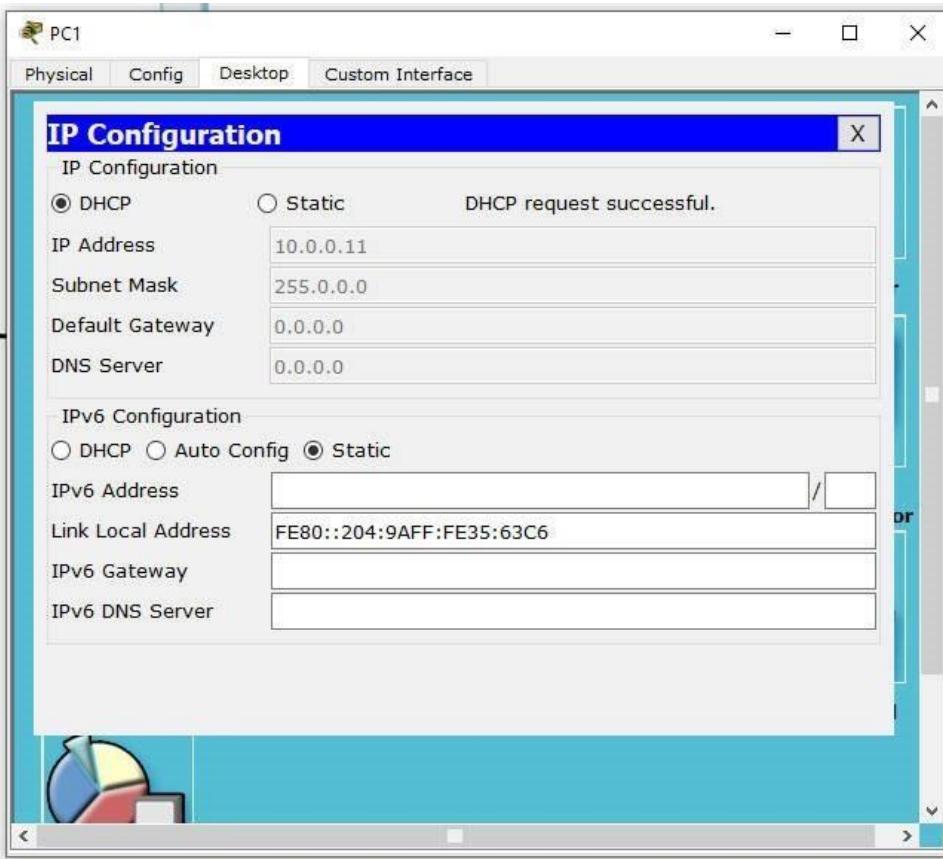
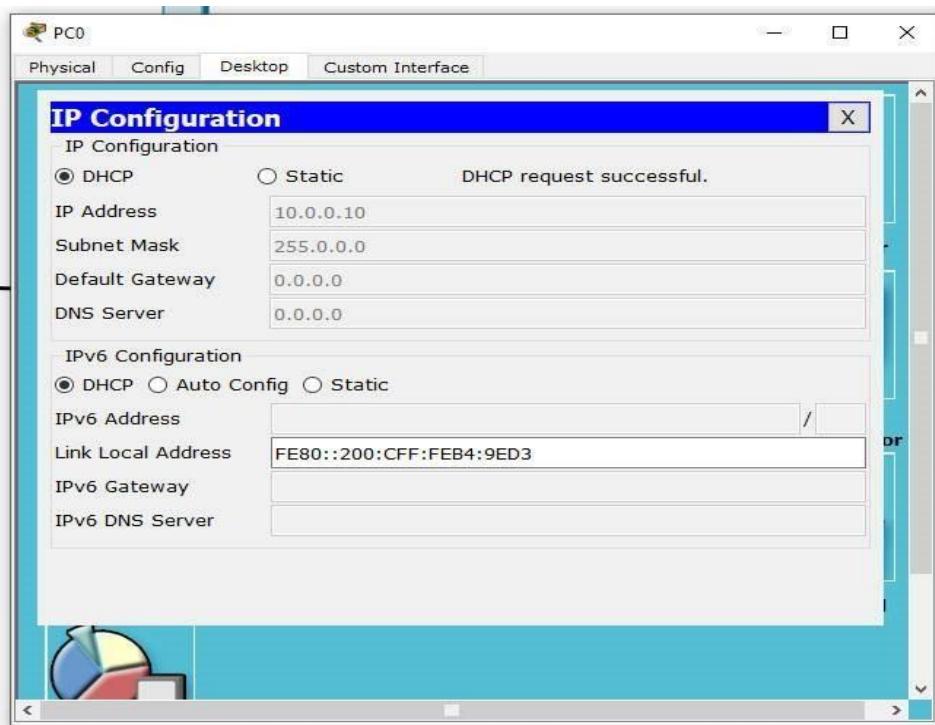
Topology:

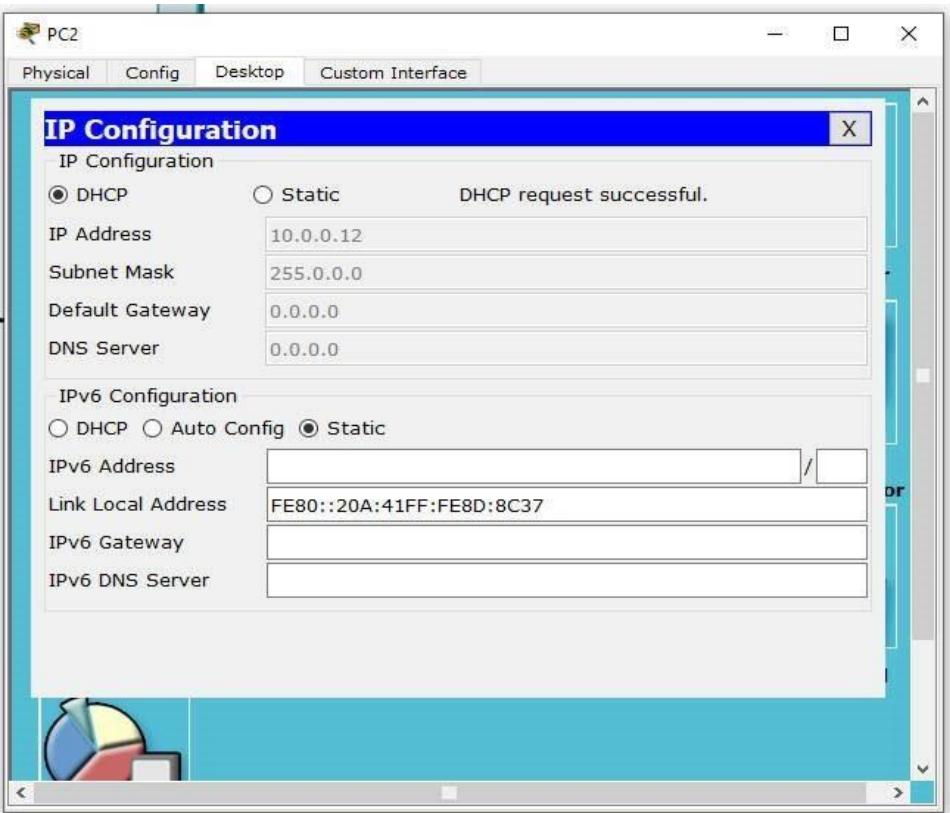


Server:



Obtaining IP:

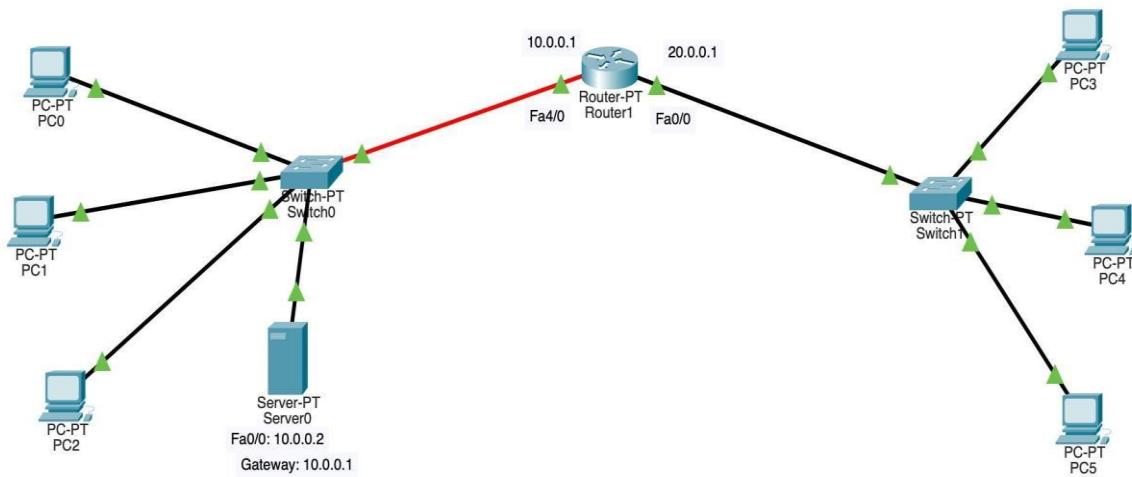




b)Outside LAN

I. Single

RouterTopology:



Server:

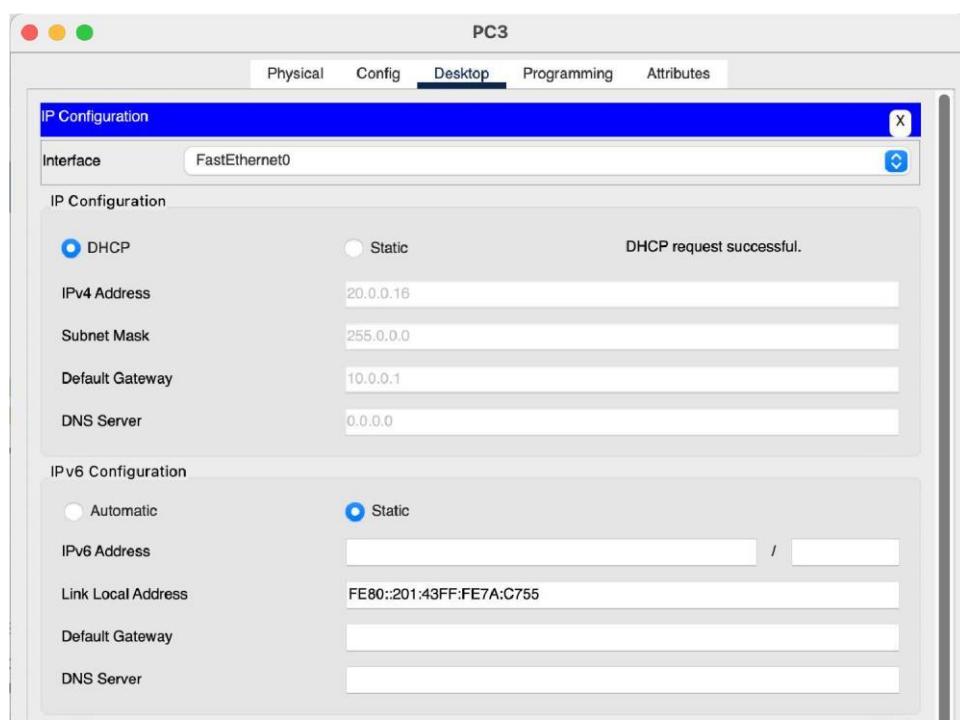
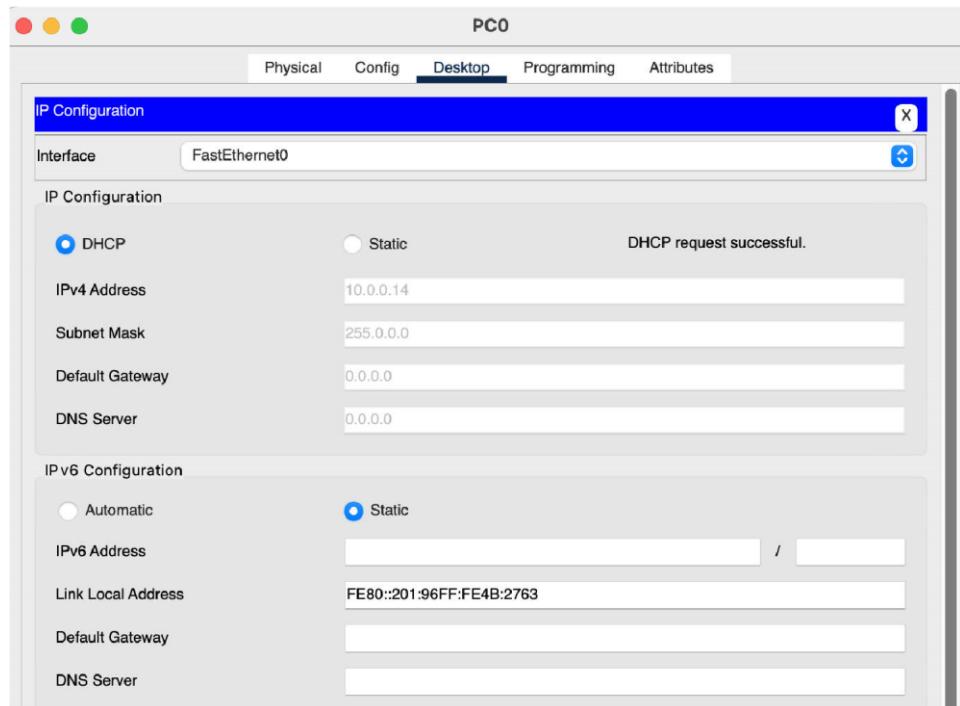
Server0

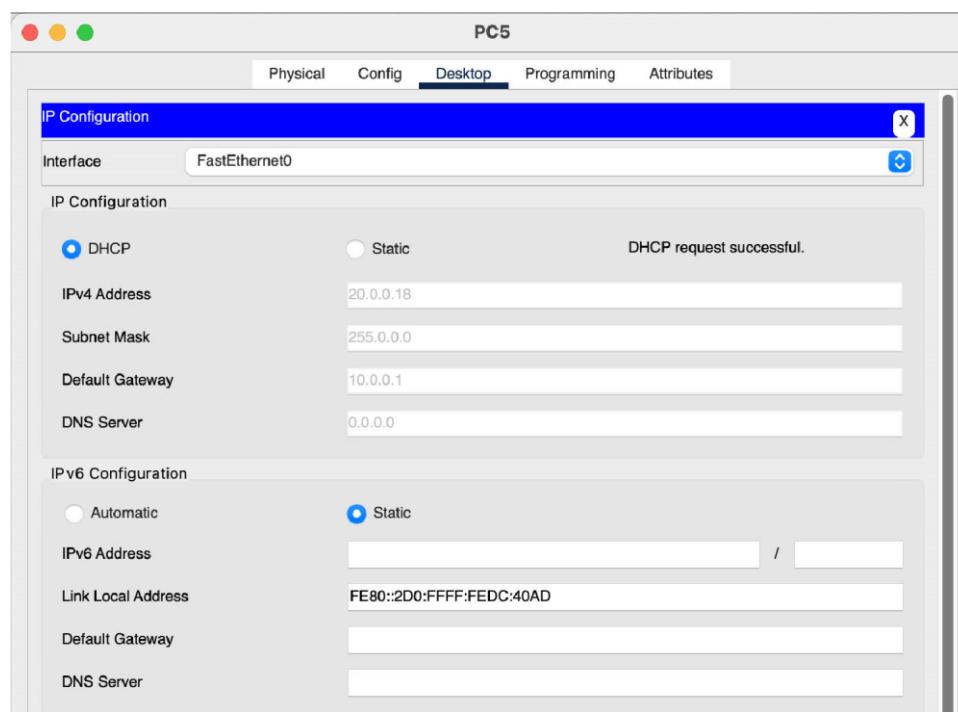
Physical Config Services Desktop Programming Attributes

SERVICES		DHCP								
HTTP		Interface	FastEthernet0	<input type="button" value="▼"/>	Service	<input checked="" type="radio"/> On	<input type="radio"/> Off			
DHCP		Pool Name	serverPool2							
DHCPv6		Default Gateway	10.0.0.1							
TFTP		DNS Server	0.0.0.0							
DNS		Start IP Address :	20	0	0	10				
SYSLOG		Subnet Mask:	255	0	0	0				
AAA		Maximum Number of Users :	512							
NTP		TFTP Server:	0.0.0.0							
EMAIL		WLC Address:	0.0.0.0							
FTP			<input type="button" value="Add"/>		<input type="button" value="Save"/>		<input type="button" value="Remove"/>			
IoT			Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
VM Management			serverPool2	10.0.0.1	0.0.0.0	20.0.0.10	255.0.0.0	512	0.0.0.0	0.0.0.0
Radius EAP			serverPool	0.0.0.0	0.0.0.0	10.0.0.10	255.0.0.0	512	0.0.0.0	0.0.0.0

Router:

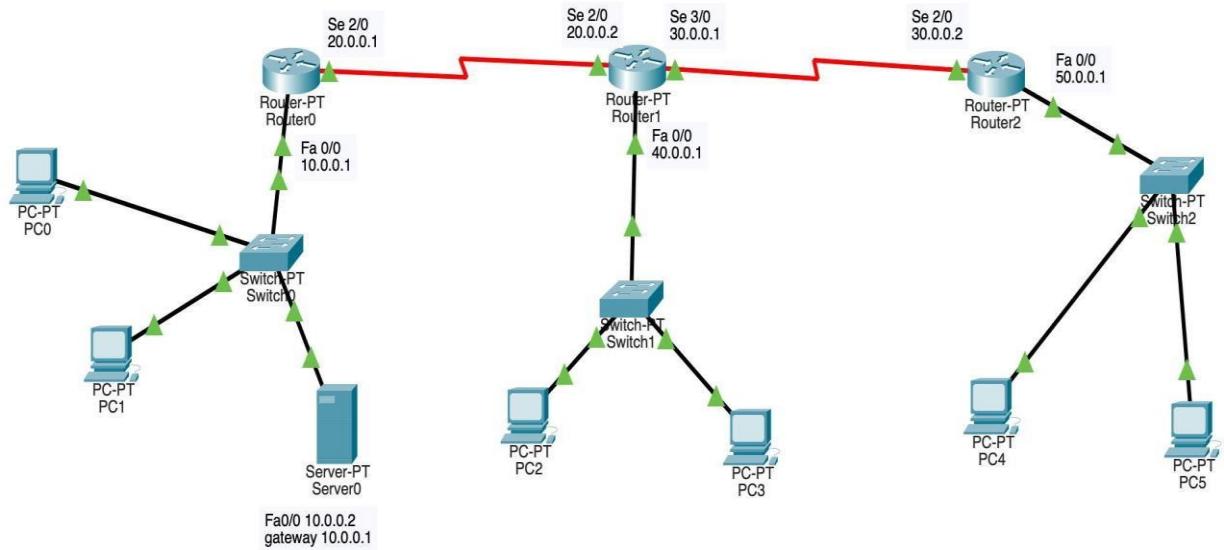
Obtaining IP:



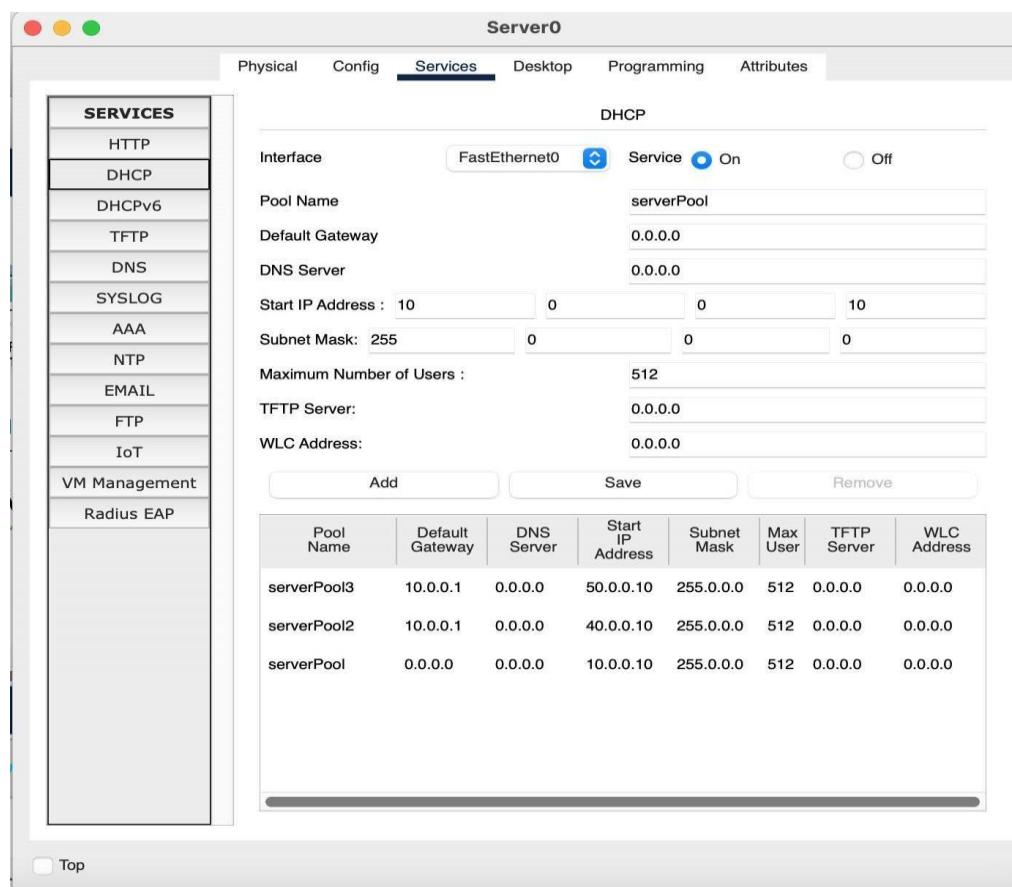


II. Multiple

Routers Topology:



Server:



Top

Router: setting IP route

```

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

Router>configure terminal
^
% Invalid input detected at '^' marker.

Router>
Router>
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
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)#ip route 50.0.0.0 255.0.0.0 20.0.0.2
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
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
S    50.0.0.0/8 [1/0] via 20.0.0.2

```

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Router>
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 50.0.0.0 255.0.0.0 30.0.0.2
Router(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.1
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#exit

Router con0 is now available

Press RETURN to get started.

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
C  40.0.0.0/8 is directly connected, FastEthernet0/0
S  50.0.0.0/8 [1/0] via 30.0.0.2

```

Router2

Enter configuration commands, one per line. End with CNTL/Z.

```

Router(config)#
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)#ip route 40.0.0.0 255.0.0.0 30.0.0.1
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
exit

Router con0 is now available

Press RETURN to get started.

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, Serial2/0
S  40.0.0.0/8 [1/0] via 30.0.0.1
C  50.0.0.0/8 is directly connected, FastEthernet0/0

```

Setting IP helper address-

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Press RETURN to get started.

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
C   40.0.0.0/8 is directly connected, FastEthernet0/0
S   50.0.0.0/8 [1/0] via 30.0.0.2

Router>
Router>
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip helper-address 10.0.0.2
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

```

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Press RETURN to get started.

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, Serial2/0
S   40.0.0.0/8 [1/0] via 30.0.0.1
C   50.0.0.0/8 is directly connected, FastEthernet0/0

Router>
Router>
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip helper-address 10.0.0.2
Router(config-if)^
% Invalid input detected at '^' marker.

Router(config-if)#ip helper-address 10.0.0.2
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
|
```

Obtaining IP:

PC1

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0 X

IP Configuration

DHCP Static DHCP request successful.

IPv4 Address 10.0.0.11

Subnet Mask 255.0.0.0

Default Gateway 0.0.0.0

DNS Server 0.0.0.0

IPv6 Configuration

Automatic Static

IPv6 Address /

Link Local Address FE80::201:96FF:FE76:895D

Default Gateway

DNS Server

This screenshot shows the 'IP Configuration' dialog for a device named 'PC1'. The 'Desktop' tab is selected. The interface is set to 'FastEthernet0'. Under 'IP Configuration', the 'DHCP' radio button is selected, indicated by a blue outline, and a message 'DHCP request successful.' is displayed. The 'IPv4 Address' is set to '10.0.0.11', 'Subnet Mask' to '255.0.0.0', 'Default Gateway' to '0.0.0.0', and 'DNS Server' to '0.0.0.0'. Under 'IPv6 Configuration', the 'Static' radio button is selected. The 'IPv6 Address' field contains a placeholder '/'. The 'Link Local Address' is shown as 'FE80::201:96FF:FE76:895D'. There are also fields for 'Default Gateway' and 'DNS Server' which are currently empty.

PC3

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

DHCP Static DHCP request successful.

IPv4 Address 40.0.0.12

Subnet Mask 255.0.0.0

Default Gateway 10.0.0.1

DNS Server 0.0.0.0

IP v6 Configuration

Automatic Static

IPv6 Address /

Link Local Address FE80::205:5EFF:FE8C:2873

Default Gateway

DNS Server

PC5

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

DHCP Static DHCP request successful.

IPv4 Address 50.0.0.11

Subnet Mask 255.0.0.0

Default Gateway 10.0.0.1

DNS Server 0.0.0.0

IP v6 Configuration

Automatic Static

IPv6 Address /

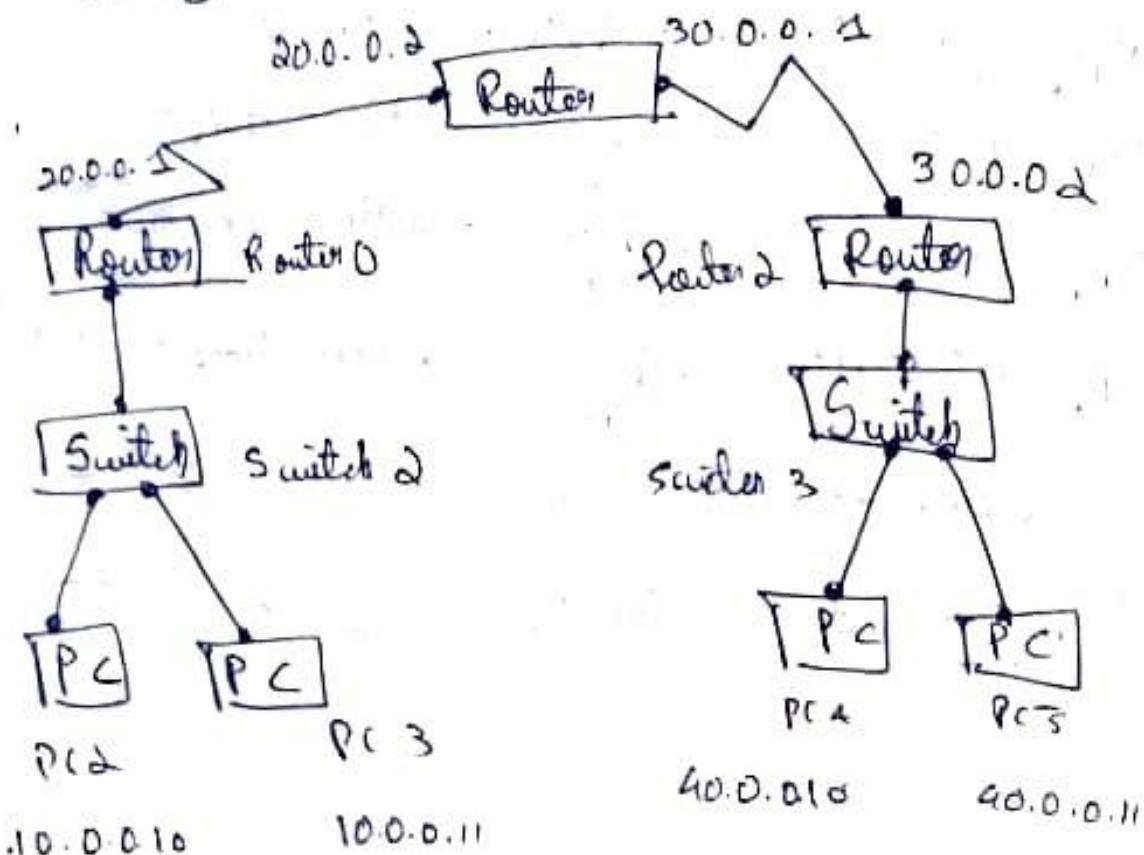
Link Local Address FE80::20C:85FF:FE78:42EC

Default Gateway

DNS Server

Default Routing

Topology



Procedure

Configuring default routes to routers Of Routers

Routine 1

Router (Config)# ip route 10.0.0.0 255.0.0.0.
20.0.0.1

Rate (config) ip route 40.0.0.0 255.0.0.0
30.0.0.2

Rata 0

Zeiter (Config) # : route 0.0.0.0 0.0.0.0 0.0.0.1

Rev. 2

Rate (Gbit) # i P rate 0.0.0 0.0.0 30.0.0.1
(excluding two static routes to satv.1)

Observation

The default route to Router 4 Serial 2 and the static route to route 1 have been added

Router 0

Show ip route

- C 10.0.0.0/8 is directly connected Fastethernet 0/0
- C 20.0.0.0/8 is directly connected Serial 2/0
- S* 0.0.0.0/0 [1/0] via 20.0.0.2

Router 2

Show ip route

- C 20.0.0.0/8 is directly connected . Serial 3/0
- C 40.0.0.0/8 is directly connected ,Fastethernet 0/0
- S* 0.0.0.0/0 [1/0] via 30.0.0.1

Router 1

Show ip route

- S 10.0.0.0/8 [1/0] via 20.0.0.1
- C 20.0.0.0/8 is directly connected ,Serial 2/0
- C 30.0.0.0/8 is directly connected ,Serial 3/0
- S 40.0.0.0/8 [1/0] via 30.0.0.2

Output

Ping requests : from PC5

→ Ping 10.0.0.11

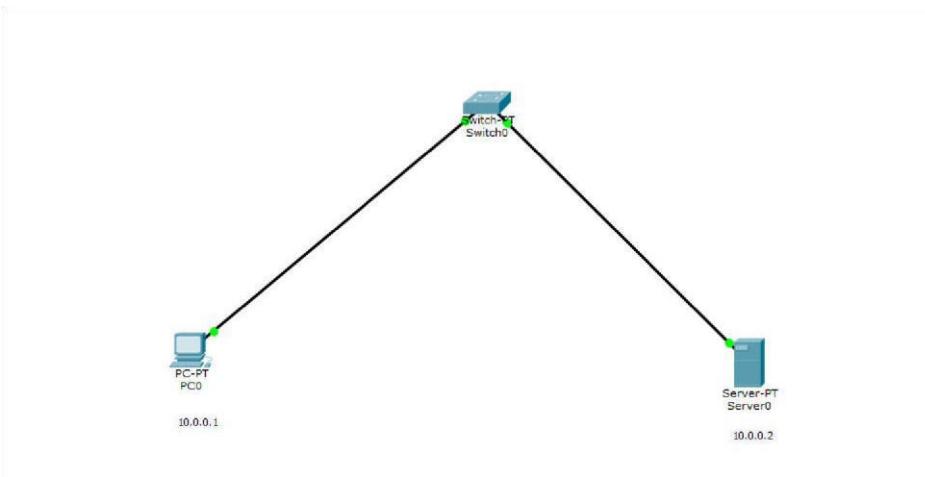
- Firing 10.0.0.11 with 32 bytes of data

Experiment No. 5

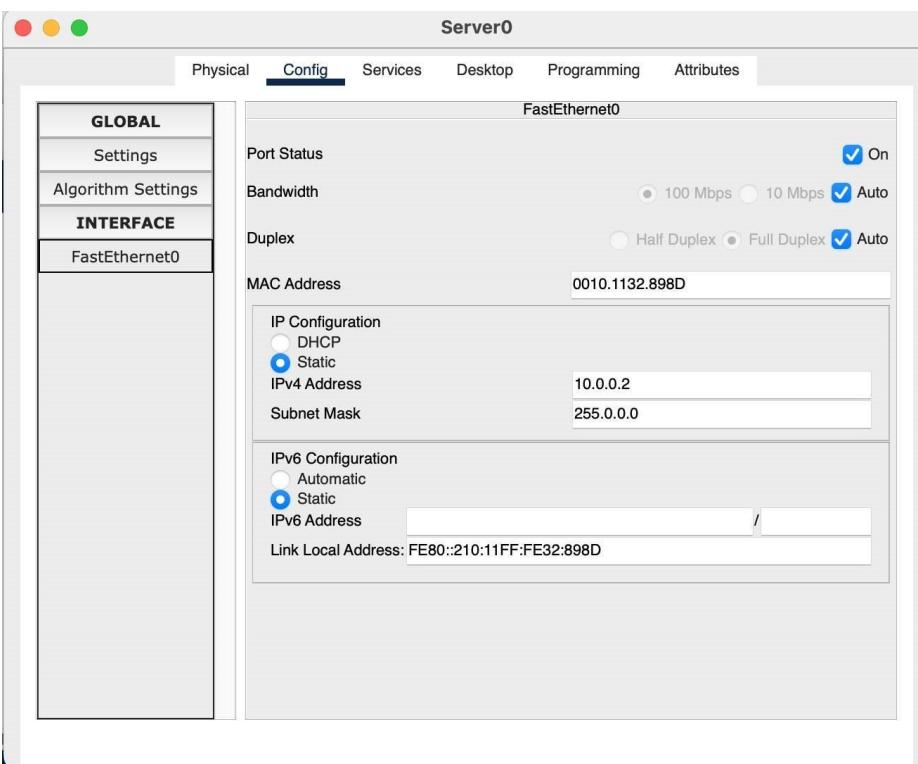
Title:

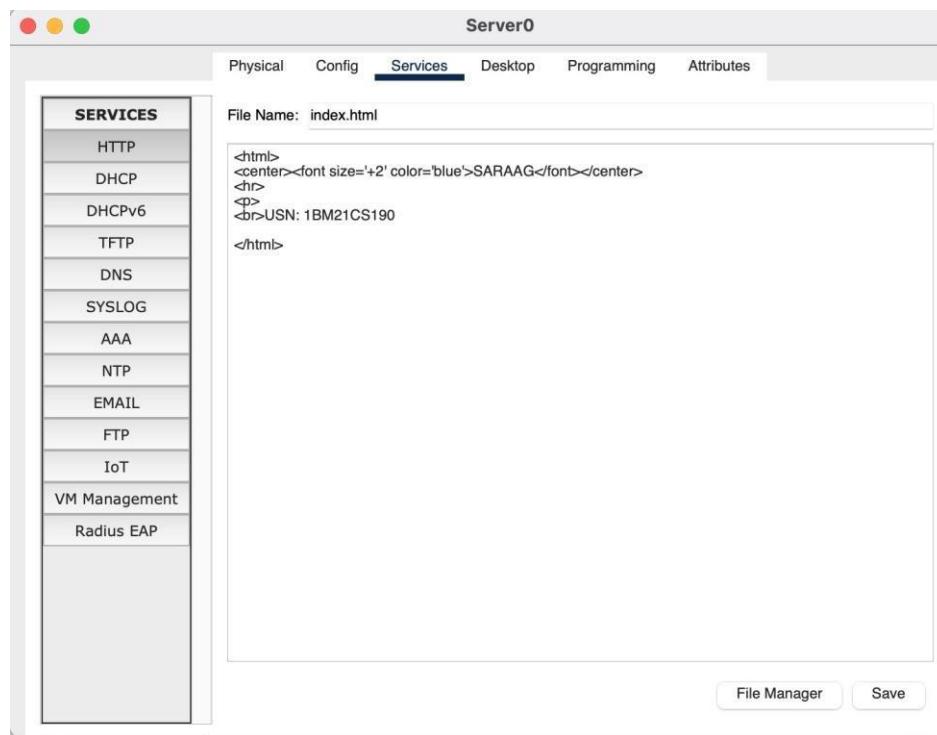
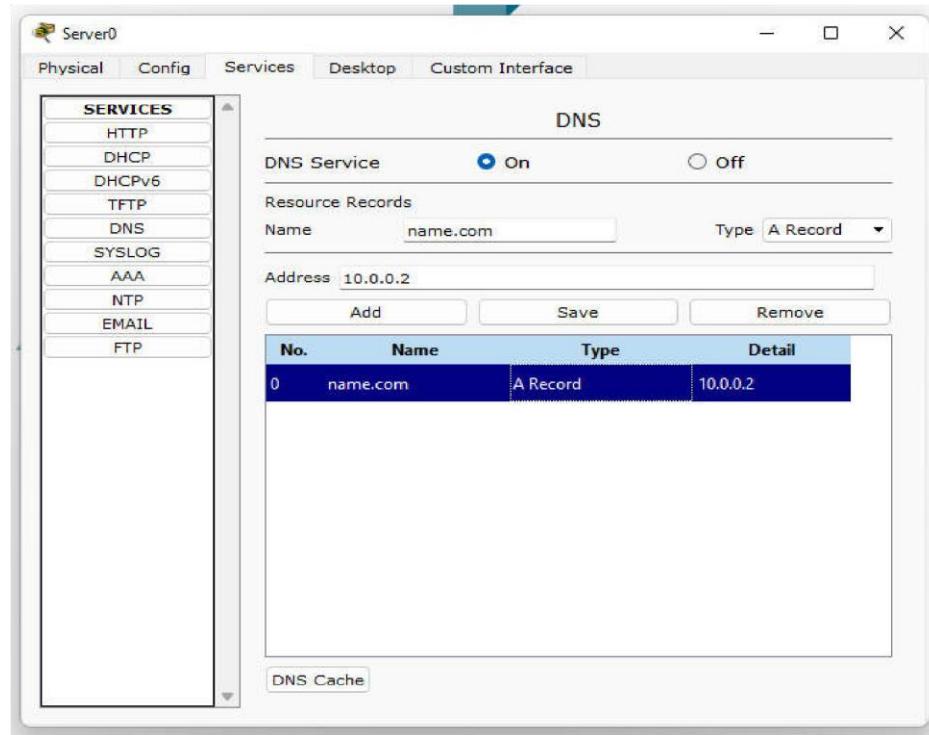
Configure Web Server, DNS within a LAN.

Topology:

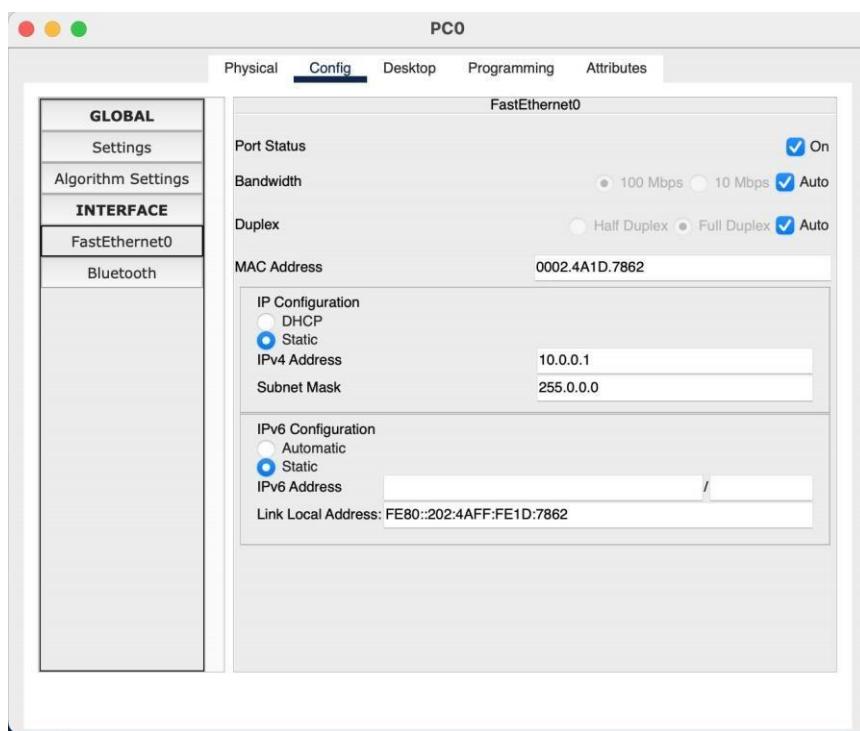


Server:





PC:

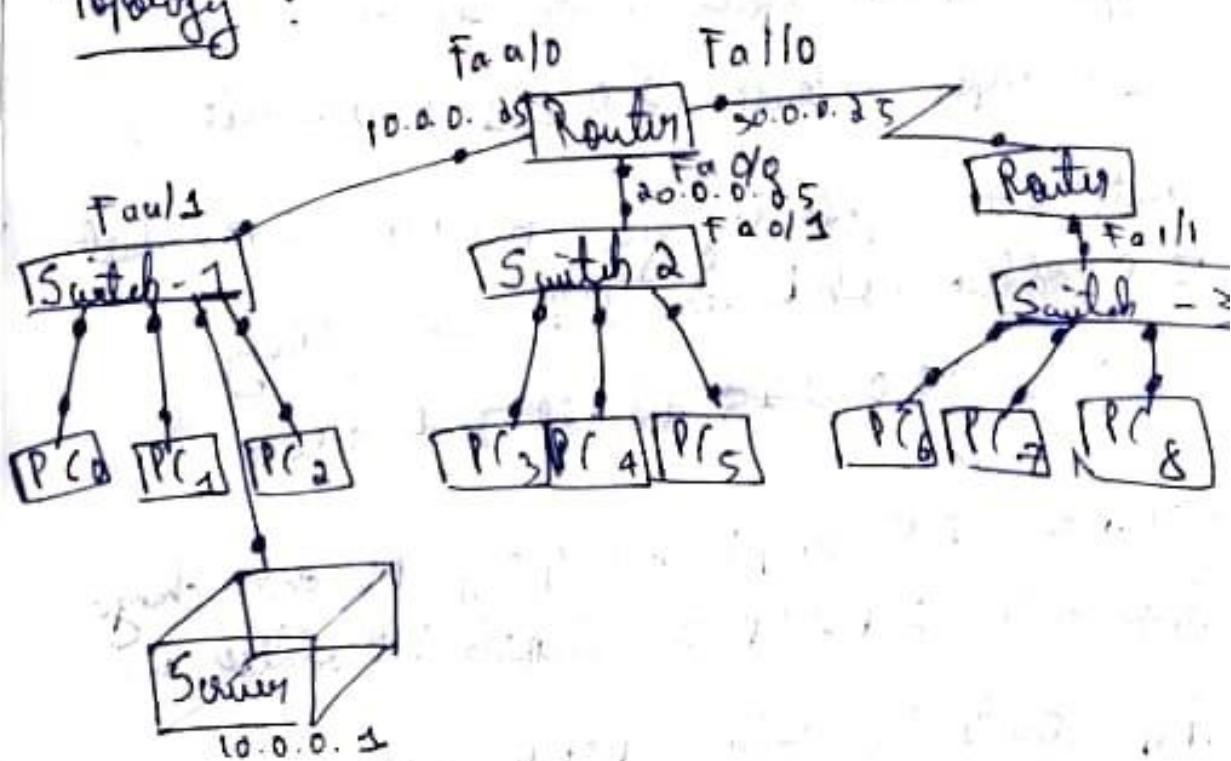


Lab - 5

Configure DHCP within a LAN and WAN

Aim: Dynamic host configuration protocol

Topology :



Procedure:

- Drag & drop a PC's, 3 switches, 1 server and 1 router (Connect every 3 PC's to one switch and connect the server to any switch). Connect all 3 switches to the router
- Set manually the IP address of the server, say 10.0.0.1 and Create a pool with start IP address 10.0.0.2 & save.

Say 10.0.0.23, 20.0.0.25, 30.0.0.25

- Use command IP helper address to connect PC's of different connectors/pools to the server
- IP helper addresses: 10.0.0.1 (server address)
- Create 3 other pools by giving new ranges & New subnet IP address each having the same gateway i.e., 10.0.0.25 and add to the server
- Go to IP Config tab of any PC and change from static to DHCP to allocate IP address automatically using DORA protocol

OBSERVATION :-

IP address are set automatically using DORA protocol by the server (discover, offer, request, acknowledge)

→ Interface serial 2/0 (~~Forwards~~)

IP Info 40.0.0.0 255.0.0.0 95.0.0.25

> Interface serial 2/0 (~~Forwards~~)

IP Info 100.0.0.0 255.0.0.0 30.0.0.26

IP Info 20.0.0.0 255.0.0.0 30.0.0.25

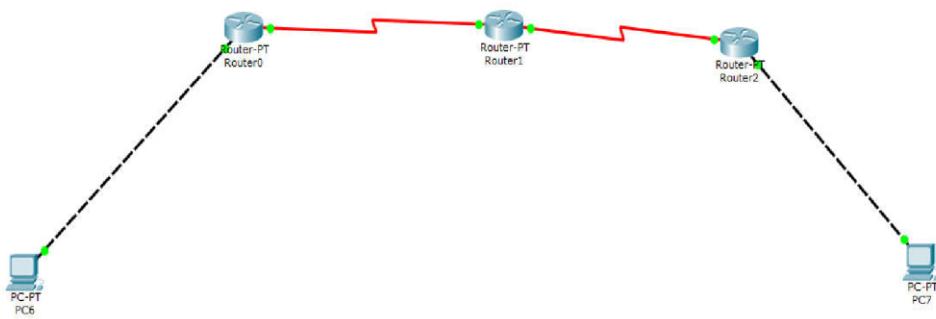
(Static Configuration Forwards),

Experiment No. 6

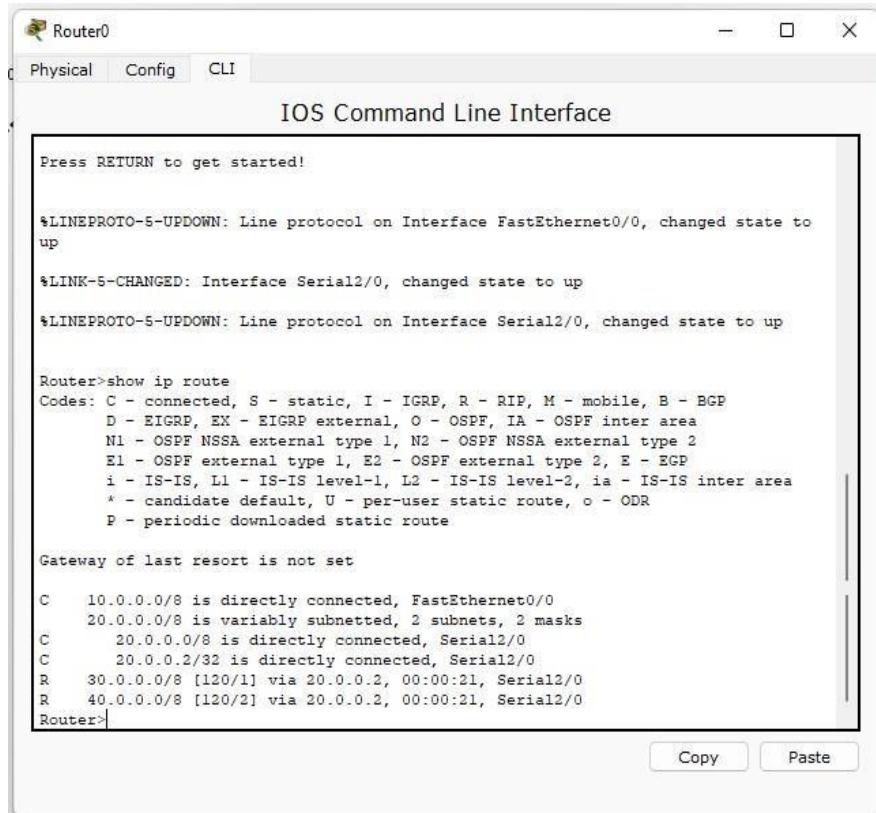
Title:

Configure RIP routing Protocol in Routers

Topology:



IP Route:



The image shows a screenshot of the Cisco IOS Command Line Interface (CLI) running on a device named "Router0". The window title is "IOS Command Line Interface". The tabs at the top are "Physical", "Config", and "CLI", with "CLI" being the active tab. The main text area displays the following output:

```
Press RETURN to get started!

*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
*LINK-5-CHANGED: Interface Serial2/0, changed state to up
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

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
     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
R    30.0.0.0/8 [120/1] via 20.0.0.2, 00:00:21, Serial2/0
R    40.0.0.0/8 [120/2] via 20.0.0.2, 00:00:21, Serial2/0
Router>
```

At the bottom of the CLI window, there are two buttons: "Copy" and "Paste".

Router1

Physical Config CLI

IOS Command Line Interface

```
*LINK-5-CHANGED: Interface Serial2/0, changed state to up
*LINK-5-CHANGED: Interface Serial3/0, changed state to up
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up

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 20.0.0.1, 00:00:14, Serial2/0
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      20.0.0.0/8 is directly connected, Serial2/0
C      20.0.0.1/32 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
R    40.0.0.0/8 [120/1] via 30.0.0.2, 00:00:11, Serial3/0
Router>
```

Copy Paste

Router2

Physical Config CLI

IOS Command Line Interface

```
Press RETURN to get started!

*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
*LINK-5-CHANGED: Interface Serial2/0, changed state to up
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

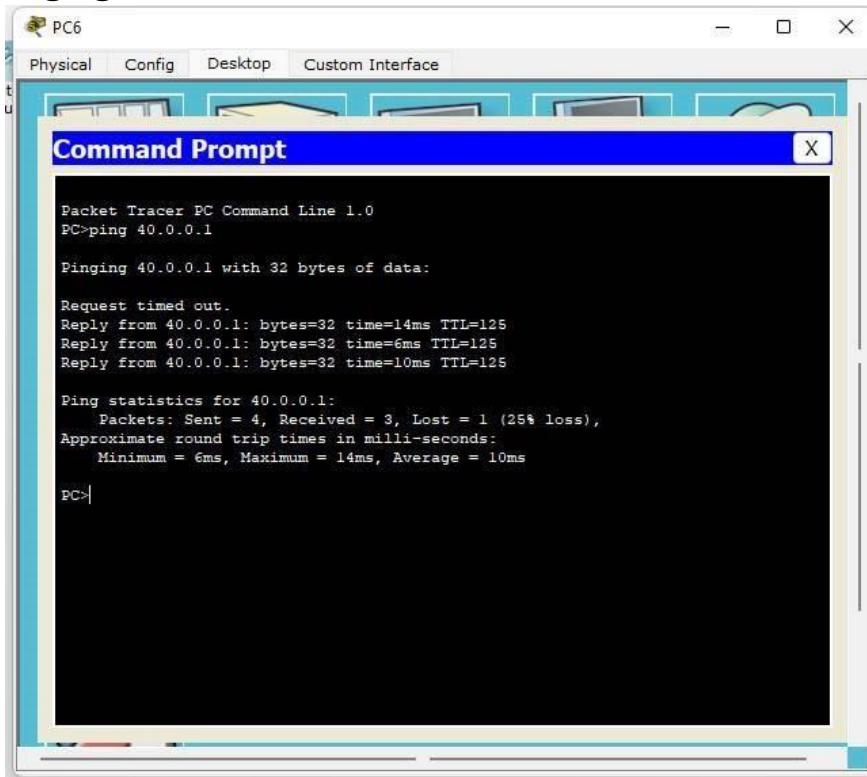
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      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 30.0.0.1, 00:00:16, Serial2/0
R    20.0.0.0/8 [120/1] via 30.0.0.1, 00:00:16, Serial2/0
     30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      30.0.0.0/8 is directly connected, Serial2/0
C      30.0.0.1/32 is directly connected, Serial2/0
C    40.0.0.0/8 is directly connected, FastEthernet0/0
Router>
```

Copy Paste

Pinging PC7 from PC6:



PC6

Physical Config Desktop Custom Interface

Command Prompt

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

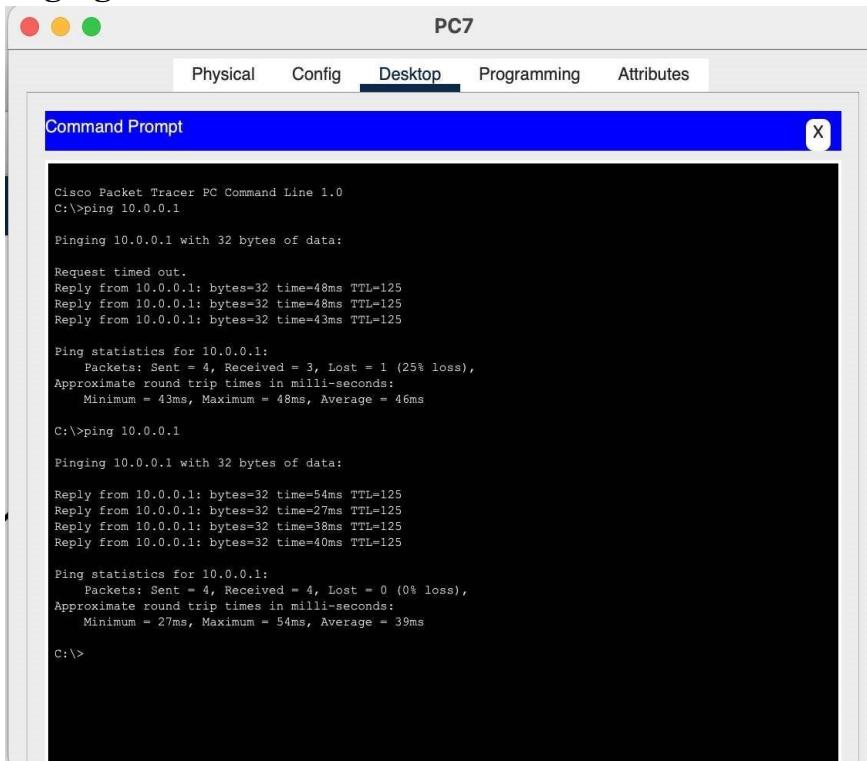
Pinging 40.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 40.0.0.1: bytes=32 time=14ms TTL=125
Reply from 40.0.0.1: bytes=32 time=6ms TTL=125
Reply from 40.0.0.1: bytes=32 time=10ms TTL=125

Ping statistics for 40.0.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 14ms, Average = 10ms

PC>
```

Pinging PC6 from PC7:



PC7

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 10.0.0.1: bytes=32 time=48ms TTL=125
Reply from 10.0.0.1: bytes=32 time=48ms TTL=125
Reply from 10.0.0.1: bytes=32 time=43ms TTL=125

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 43ms, Maximum = 48ms, Average = 46ms

C:>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=54ms TTL=125
Reply from 10.0.0.1: bytes=32 time=27ms TTL=125
Reply from 10.0.0.1: bytes=32 time=38ms TTL=125
Reply from 10.0.0.1: bytes=32 time=40ms TTL=125

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 27ms, Maximum = 54ms, Average = 39ms

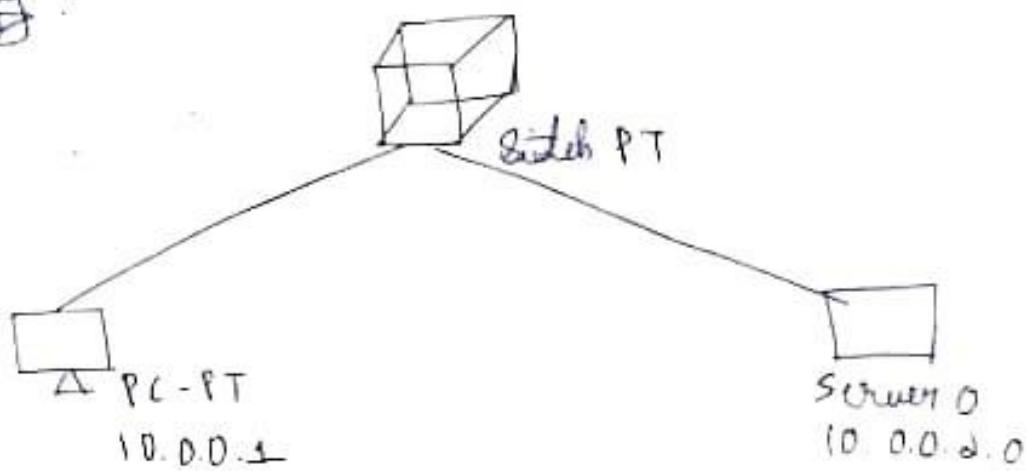
C:>
```

How to do

Procedure :-

- Create topology & set the ipAddress
- Config PC & Server
- Open web browser of PC to set ip address of server
- Config DNS of server with website name & ip address
- Edit index.html to display VSN & name

Topology :-

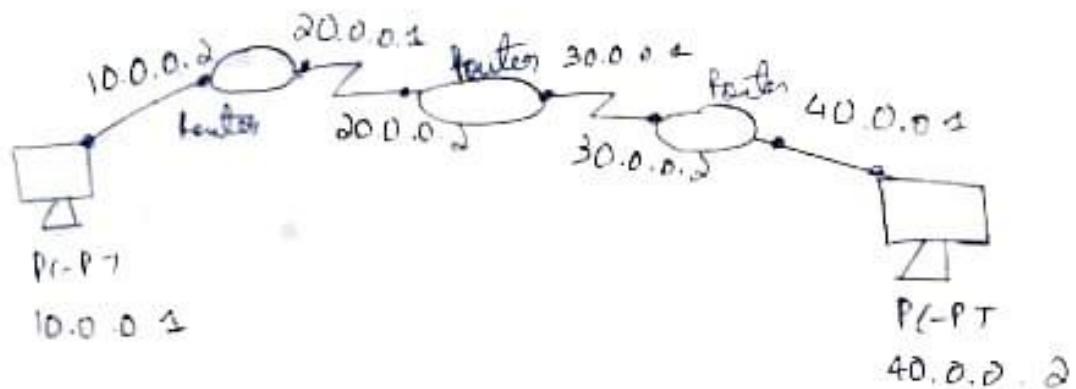


Output :-

Web Browser
URL http://Rohan.com
VSN : IBM21CS168
NAME : ROHAN S.K

Routing Interface Protocol (RIP).

Topology



PROCEDURE :-

- Create topology with 2 PCs & 3 routers
- Config PC with ip address and gateway
- Config routers :-

enable

config t

interface fastethernet 0/0

ip address 10.0.0.1 255.0.0.0

interface serial 2/0

ip address 10.0.0.2 255.0.0.0

encapsulation PPP

Demand 64000

→ Show ip route

Config #

router rip

network 10.0.0.0

network 20.0.0.0

Output

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 bytes - 8ms TTL=118

Reply from 20.0.0.2 bytes = 32 bytes - 7ms TTL=118

Reply from 20.0.0.2 bytes = 32 bytes - 7ms TTL=118

Ping statistics from 20.0.0.1

Packets received = 4 Lost = 4 Loss = 0 (0%)

RTT min/avg

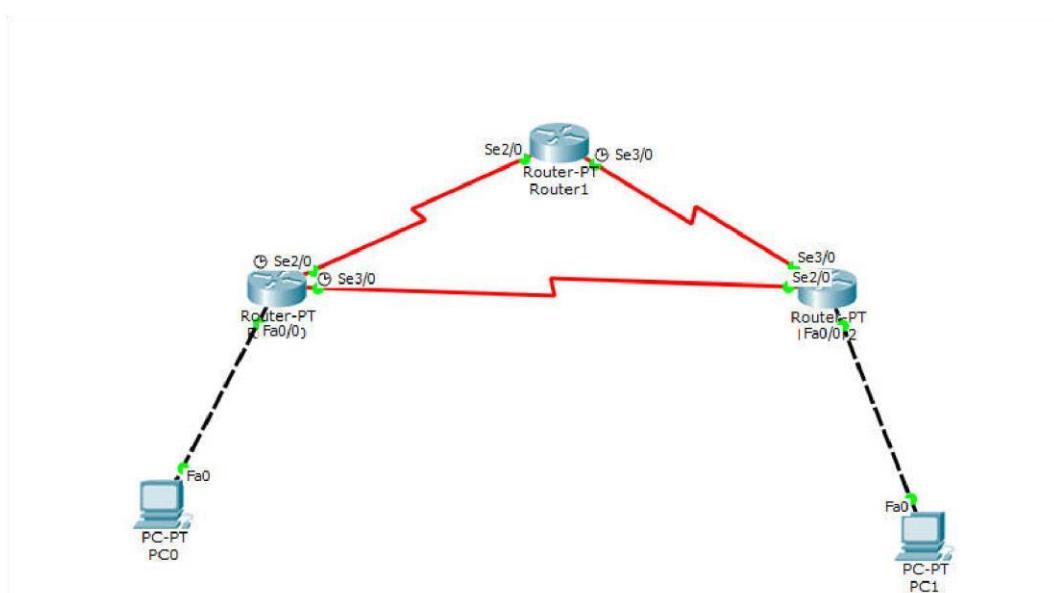
②

Experiment No. 7

Title:

Configure OSPF routing protocol

Topology:



Configure Routers:

Router0

Physical Config CLI

IOS Command Line Interface

```
$LINEPROTO-5-UPDOWN: Line protocol on Interface serial3/0, changed state to up
exit
Router(config)#router ospf 1
Router(config-router)#network 20.0.0.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 255.0.0.0 area 0
Router(config-router)#network 12.0.0.0 255.0.0.0 area 0
Router(config-router)#exit
Router(config)#show ip route
^
* Invalid input detected at '^' marker.

Router(config)#router ospf 1
Router(config-router)#network 12.0.0.0 255.0.0.0 area 0
Router(config-router)#network 12.0.0.0 255.0.0.0 area 0
Router#
*SYS-5-CONFIG_I: Configured from console by console
configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 20.0.0.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#network 12.0.0.0 0.255.255.255 area 0
Router(config-router)#exit
Router(config)#
00:08:52: %OSPF-5-ADJCHG: Process 1, Nbr 11.0.0.1 on Serial2/0 from LOADING to
FULL, Loading Done

00:10:40: %OSPF-5-ADJCHG: Process 1, Nbr 30.0.0.2 on Serial3/0 from LOADING to
FULL, Loading Done
```

Copy **Paste**

Router1

Physical Config CLI

IOS Command Line Interface

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

Router(config-if)#exit
Router(config)#interface Serial3/0
Router(config-if)#
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
no ip address
Router(config-if)#ip address 11.0.0.1 255.0.0.0
Router(config-if)#no shutdown

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

*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
exit
Router(config)#router ospf 1
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#
00:08:50: %OSPF-5-ADJCHG: Process 1, Nbr 20.0.0.2 on Serial2/0 from LOADING to
FULL, Loading Done

Router(config-router)#network 11.0.0.0 0.255.255.255 area 0
Router(config-router)#exit
Router(config)#
00:10:35: %OSPF-5-ADJCHG: Process 1, Nbr 30.0.0.2 on Serial3/0 from LOADING to
FULL, Loading Done
```

Copy **Paste**

Router2

Physical Config CLI

IOS Command Line Interface

```
Router(config-if)#ip address 12.0.0.2 255.0.0.0
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 Serial3/0
Router(config-if)#ip address 11.0.0.2 255.0.0.0
Router(config-if)#no shutdown

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up

Router(config-if)#router ospf 1
Router(config-router)#network 30.0.0.0 0.0.0.255 area 0
Router(config-router)#network 11.0.0.0 0.255.255.255 area 0
Router(config-router)#network 12.0.0.0 0.255.255.255 area 0
Router(config-router)#exit
00:10:33: *OSPF-5-ADJCHG: Process 1, Nbr 11.0.0.1 on Serial3/0 from LOADING to
FULL, Loading Done
it
Router(config)#
00:10:35: *OSPF-5-ADJCHG: Process 1, Nbr 20.0.0.2 on Serial2/0 from LOADING to
FULL, Loading Done
```

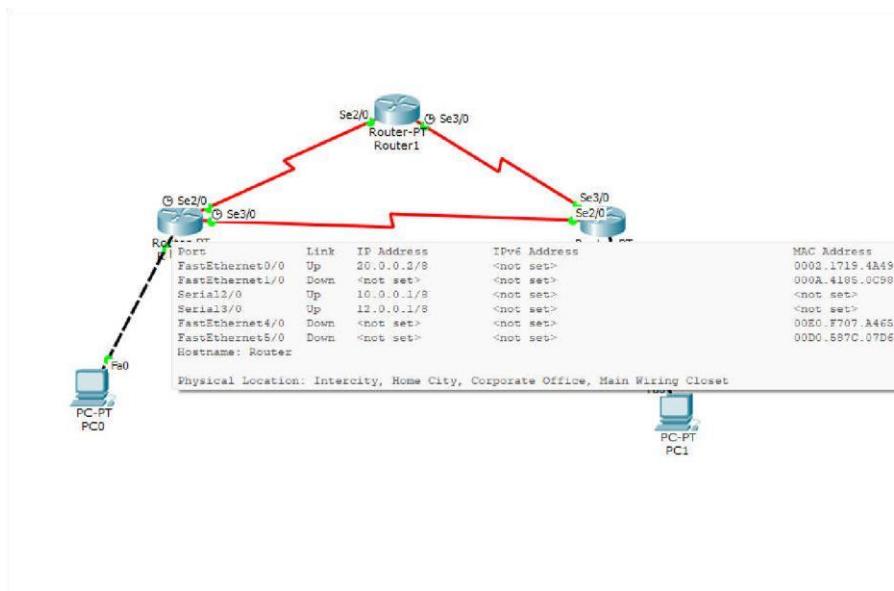
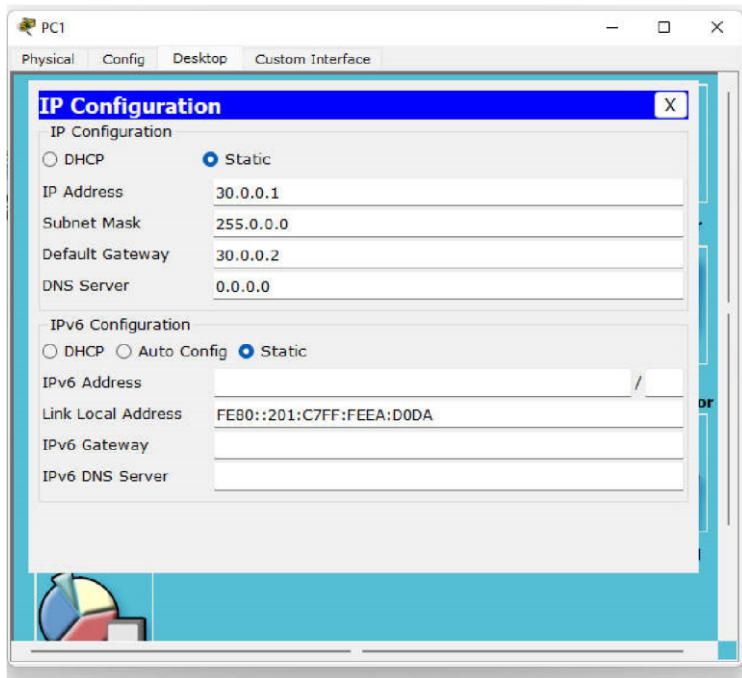
Copy Paste

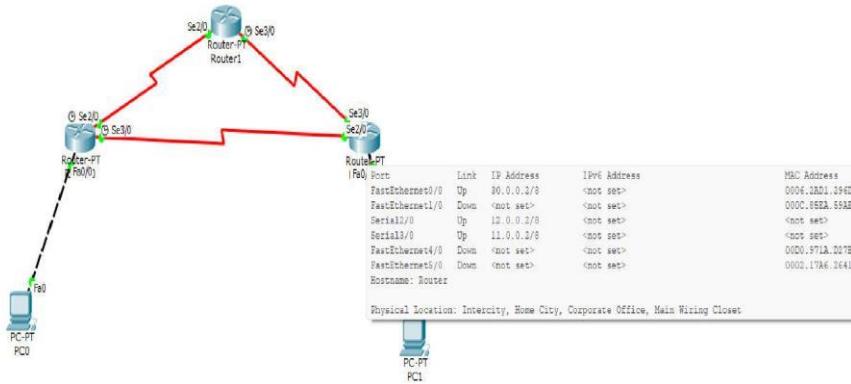
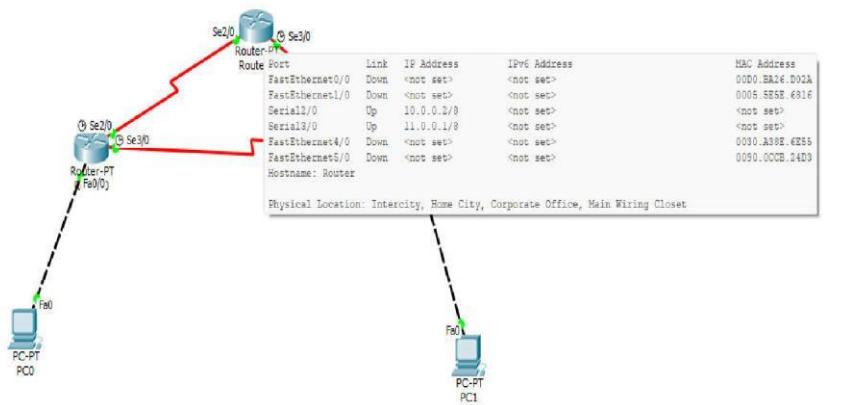
PC0

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration	<input type="radio"/> DHCP <input checked="" type="radio"/> Static
IP Address	20.0.0.1
Subnet Mask	255.0.0.0
Default Gateway	20.0.0.2
DNS Server	
IPv6 Configuration	<input type="radio"/> DHCP <input type="radio"/> Auto Config <input checked="" type="radio"/> Static
IPv6 Address	/
Link Local Address	FE80::260:3EFF:FE26:9A7
IPv6 Gateway	
IPv6 DNS Server	





Output:

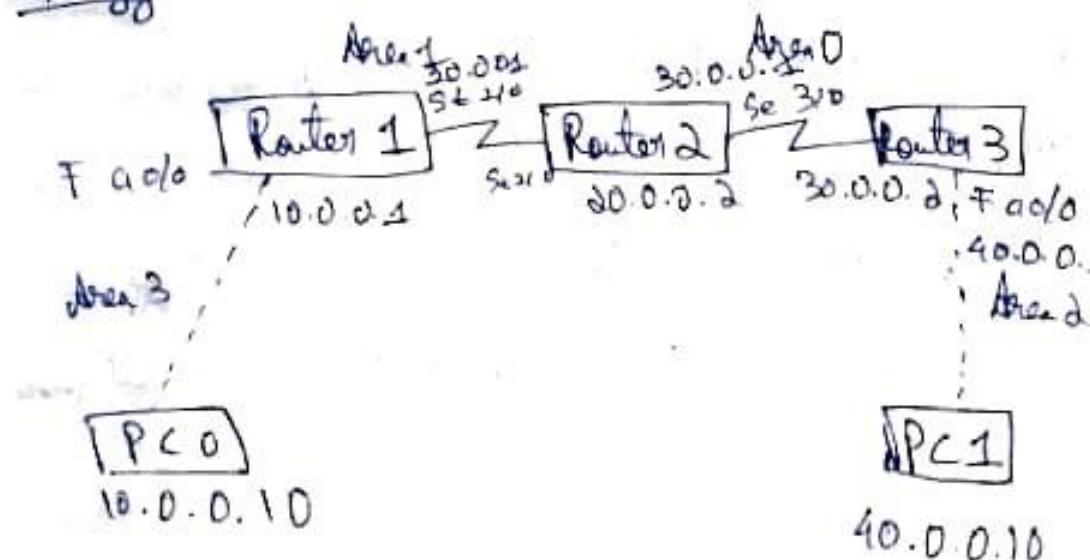
The screenshot shows a Cisco Packet Tracer interface with a "Command Prompt" window open. The window title is "Command Prompt". The content of the window is as follows:

```
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 6ms, Maximum = 6ms, Average = 6ms  
  
PC>ping 30.0.0.1  
  
Pinging 30.0.0.1 with 32 bytes of data:  
  
Reply from 30.0.0.1: bytes=32 time=6ms TTL=126  
Reply from 30.0.0.1: bytes=32 time=5ms TTL=126  
Reply from 30.0.0.1: bytes=32 time=10ms TTL=126  
Reply from 30.0.0.1: bytes=32 time=4ms TTL=126  
  
Ping statistics for 30.0.0.1:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 4ms, Maximum = 10ms, Average = 6ms  
  
PC>tracert 30.0.0.1  
  
Tracing route to 30.0.0.1 over a maximum of 30 hops:  
  
 1  0 ms      0 ms      0 ms      20.0.0.2  
 2  1 ms      2 ms      2 ms      12.0.0.2  
 3  7 ms      1 ms      1 ms      30.0.0.1  
  
Trace complete.  
  
PC>
```

④ OSPF routing protocol

Aim :- To understand how the configured OSPF routing protocol to find

Topology :-



Procedure:

- ① Create a topology as shown above
 - ② Configure each router with its IP address for required interfaces. Set up clock rate for interfaces having ② sync-dial

Rating 2

R2 (orig) # interface Serial 3/0

R2 (arbg) #1 ip address 30.0.0.1 255.0.0.0

R.J.(abrigit) H encapsulation 999

R2C working-# dark sets 67000

Ad Config-1) # no sketches

R2(config)# interface Se 2/0

R2(config-if)# ip address 20.0.0.2 255.0.0.0

R2(config-if)# encapsulation PPP

R2(config-if)# no shutdown

R2(config-if)# exit

③ Configure OSPF routing for each router

R1(config)# router OSPF 1

R1(config-router)# router-id 1.1.1.1

R1(config-router)# network 10.0.0.0 0.255.255.255 area 0

R1(config-router)# network 20.0.0.0 0.255.255.255 area 1

R1(config-router)# exit

④ There must be one interface up to keep OSPF processing. So it's better to configure loopback address to router. It is a virtual interface that never goes down.

R1(config)# interface Se 2/0

R1(config-if)# interface loopback0

R1(config-if)# ip address 172.16.1.253 255.255.255.0

R1(config-if)# no shutdown

O IA 20.0.0.0/8 via 30.0.0.1 Sc 1/0

C 40.0.0.0/8 directly connected Fa 1/0

C 30.0.0.0/8 directly connected Sc 2/0

So a virtual link b/w R1 & R2 must be created
to connect area 3 to area 0

R1 (Config) # Router OSPF 2

R1 (Config-router) # area 3, network-link 2.2.2.2

R1 (Config-router) # exit

No its same for R2

Ping R1# to R1# to check connectivity.

Result :-

R3 # show ip route

O IA 20.0.0.0/8 via 30.0.0.1 Sc 2/0

O IA 10.0.0.0/8 via 30.0.0.1 Sc 2/0

C 40.0.0.0/8 directly connected Fa 1/0

C 30.0.0.0/8 directly connected Sc 2/0

R2 # show ip route

C 20.0.0.0/8 directly connected Sc 2/0

C 30.0.0.0/8 directly connected Sc 3/0

C 192.161.0.1/0 directly connected loopback 0

R1 # show ip route

O IA 40.0.0.0/8 via 30.0.0.2 Sc 2/0

O 30.0.0.0/8 via 30.0.0.2 Sc 2/0

C 10.0.0.0/8 directly connected Fa 0/0

Ping PC0 - PC1

PC 1 > ping 100.0.1.0, begin = 32

Reply from 100.0.0.10, begin = 32 time=1ms TTL=125

Reply from 100.0.0.10, begin = 32 time=1ms TTL=125

Reply from 100.0.0.10, begin = 32 time=6ms TTL=125

Reply from 100.0.0.10, begin = 32 time=7ms TTL=125

Ping statistics

Packets : sent = 1, received = 1, lost 0 (0.0% loss)

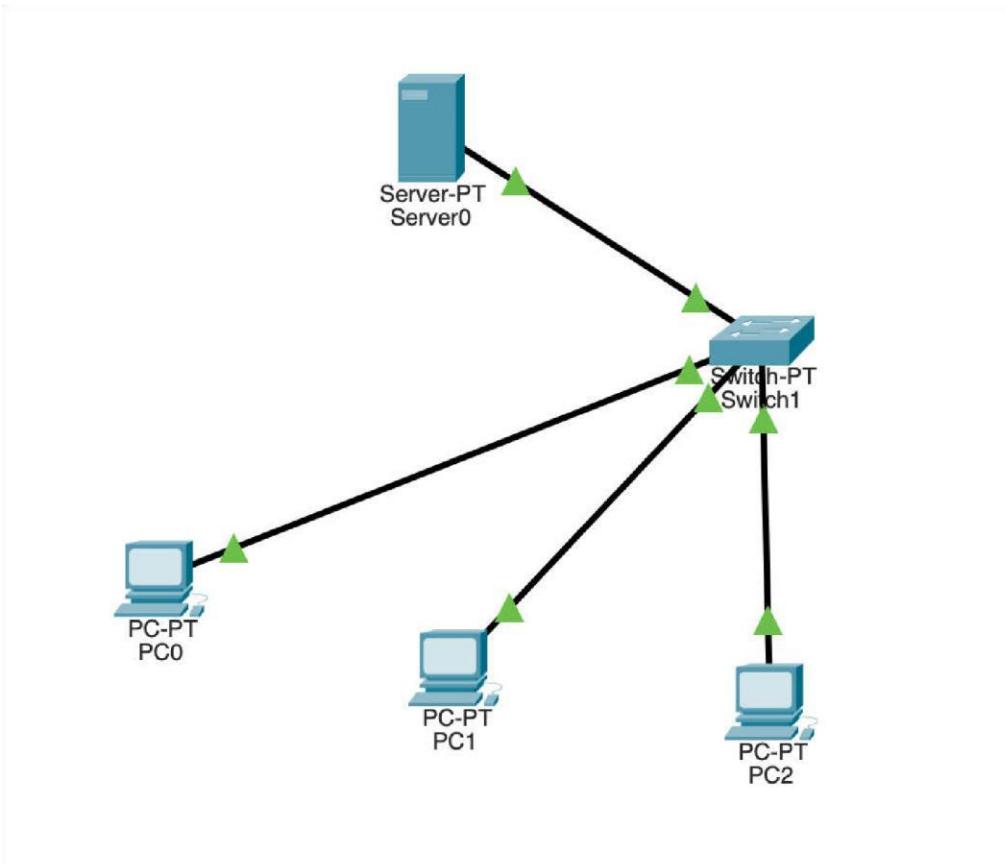
min = 6ms; max = 11ms, Avg = 9ms.

Experiment No. 8

Title:

To construct simple LAN and understand the concept and operation of

Address Resolution Protocol (ARP) Topology:



Ping PC1 from PC0:



Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>arp
Cisco Packet Tracer PC ARP
Display ARP entries: arp -a
Clear ARP table: arp -d

C:\>arp -a
No ARP Entries Found
C:\>ping 10.0.0.11

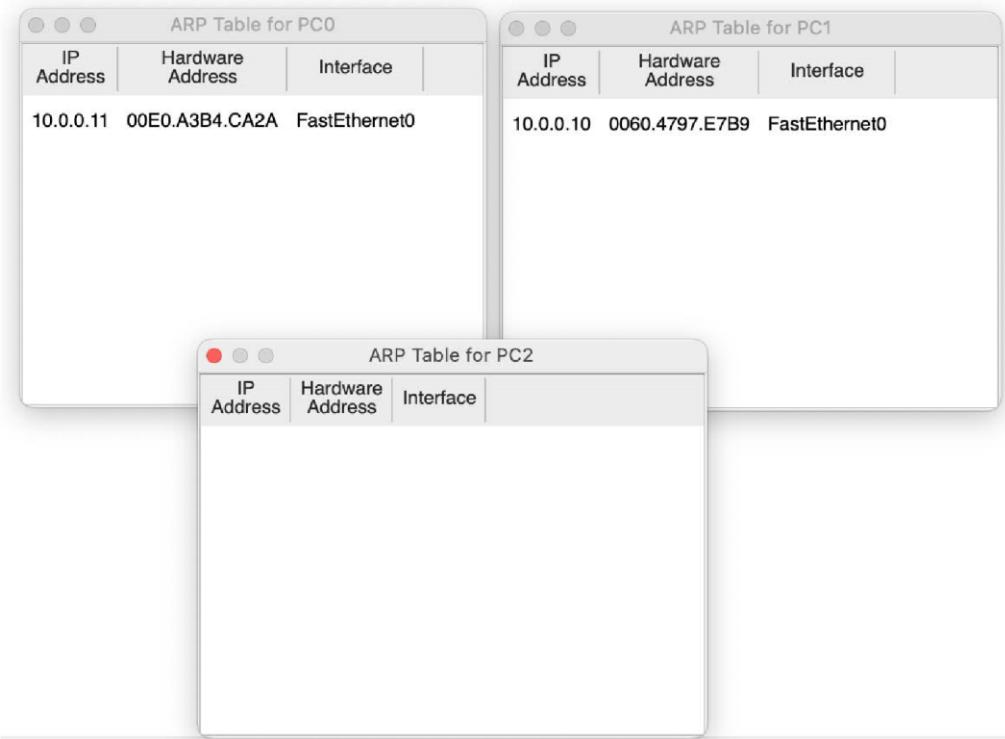
Pinging 10.0.0.11 with 32 bytes of data:

Reply from 10.0.0.11: bytes=32 time=1ms TTL=128
Reply from 10.0.0.11: bytes=32 time<1ms TTL=128
Reply from 10.0.0.11: bytes=32 time<1ms TTL=128
Reply from 10.0.0.11: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>arp -a
      Internet Address          Physical Address          Type
      10.0.0.11                00e0.a3b4.ca2a        dynamic
```

ARP table for all PCs:



Mac Address Table:

Switch1

```

Switch>show mac address-table
      Mac Address Table
-----
Vlan      Mac Address          Type      Ports
----      -----              -----      -----
Switch>show mac address-table
      Mac Address Table
-----
Vlan      Mac Address          Type      Ports
----      -----              -----      -----
      1      0060.4797.e7b9    DYNAMIC   Fa0/1
      1      00e0.a3b4.ca2a    DYNAMIC   Fa1/1
Switch>

```

Copy

Ping PC2 from PC0:



PC0

```
10.0.0.11          00e0.a3b4.ca2a      dynamic
C:\>ping 10.0.0.12

Pinging 10.0.0.12 with 32 bytes of data:

Reply from 10.0.0.12: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>arp -a
  Internet Address      Physical Address      Type
  10.0.0.11            00e0.a3b4.ca2a      dynamic
  10.0.0.12            0060.5c45.a275      dynamic

C:\>
```

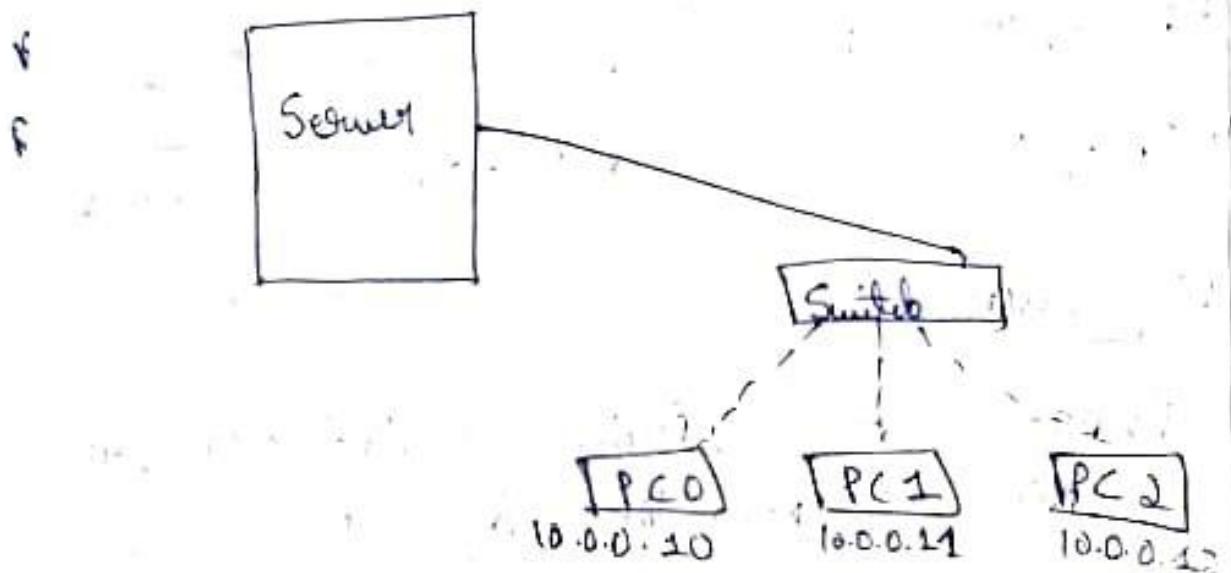
Switch1

```
Switch>show mac address-table
  Mac Address Table
  -----
  Vlan      Mac Address          Type      Ports
  ----      -----              -----      -----
  1        0060.4797.e7b9      DYNAMIC   Fa0/1
  1        0060.5c45.a275      DYNAMIC   Fa2/1
Switch>
```

and operation of ARP

Don't understand the concept & operation of ARP

Topology:



Procedure:

- ① Write topology as shown above
- ② Configure IP address for each end devices
- ③ Use the "inspot tool" to see ARP table and MAC table (a). Use the following commands

P C > arp -a

P C > show MAC address table

- ④ Go to simulation mode to send packets b/w end devices. Use "capture" button to go step by step to observe changes in ARP table, as and when communication system starts.

→ Result :-

Send packet from PC0 to PC1

Before sending packet

PC0 > arp-a

No ARP entries found

After sending packet

PC0 > arp-a

Internet address	Physical address	Type
10.0.0.11	00:00:43:b4:cada	dynamic

PC1 > arp -a

Internet address	Physical Address	Type
100.0.10	00:60:47:97:C7:63	dynamic

MAC address table in Switch

Switch > Show MAC address-table

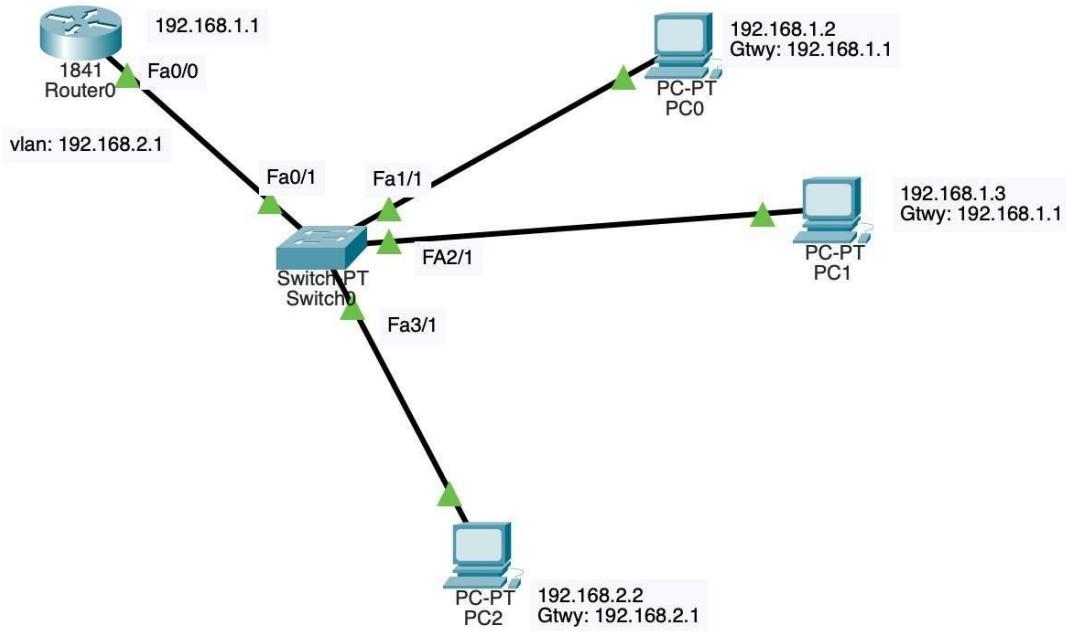
Vlan	MAC address	Type	Ports
1	00:60:47:97:C7:63	dynamic	F-0/1/2
1	00:00:43:b4:cada	dynamic	F-1/1/1

Experiment No. 9

Title:

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

Topology:



Create VLAN:

Switch0

Physical Config CLI Attributes

GLOBAL	
Settings	
Algorithm Settings	
SWITCHING	
VLAN Database	
INTERFACE	
FastEthernet0/1	
FastEthernet1/1	
FastEthernet2/1	
FastEthernet3/1	
FastEthernet4/1	
FastEthernet5/1	

VLAN Configuration

VLAN Number:

VLAN Name:

Add Remove

VLAN No	VLAN Name
1	default
20	NewVLAN
1002	fddi-default
1003	token-ring-default
1004	fddinet-default
1005	trnet-default

Trunking:

Switch0

Physical Config CLI Attributes

GLOBAL	
Settings	
Algorithm Settings	
SWITCHING	
VLAN Database	
INTERFACE	
FastEthernet0/1	
FastEthernet1/1	
FastEthernet2/1	
FastEthernet3/1	
FastEthernet4/1	

FastEthernet0/1

Port Status: On

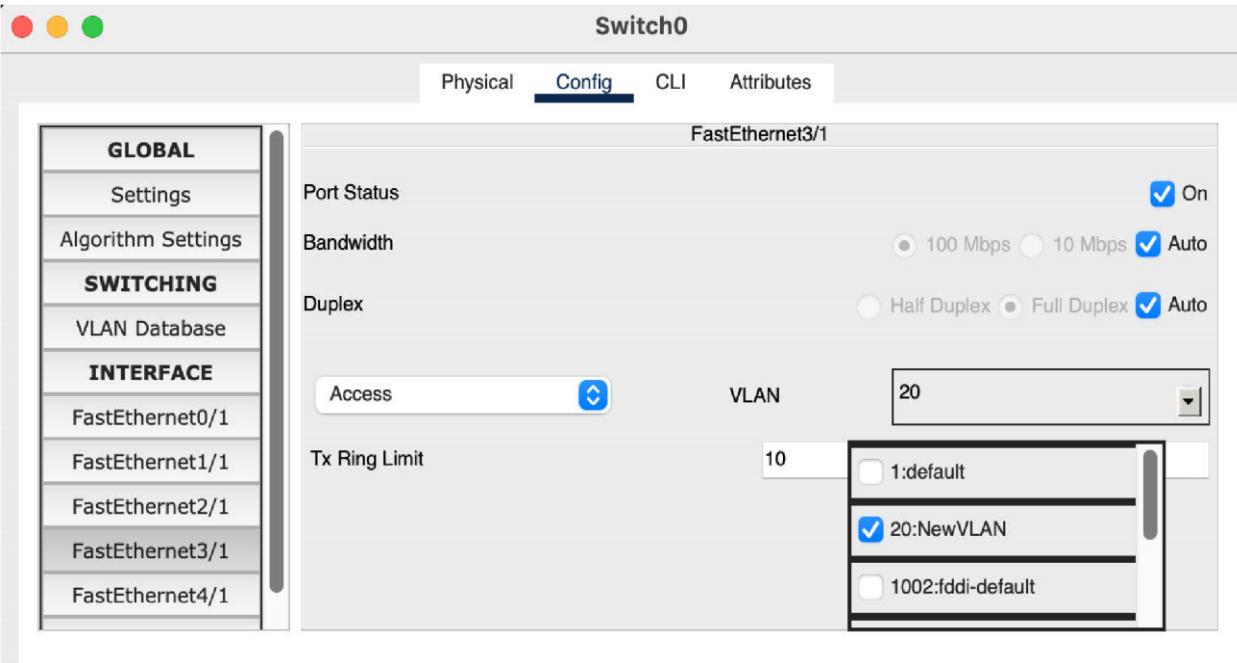
Bandwidth: 100 Mbps 10 Mbps Auto

Duplex: Half Duplex Full Duplex Auto

Trunk VLAN

Tx Ring Limit:

Add end devices to VLAN:



Router config:

The screenshot shows the 'Config' tab of the Router0 configuration interface. On the left is a navigation menu with sections: GLOBAL, Settings, Algorithm Settings, ROUTING, Static, RIP, SWITCHING, VLAN Database, INTERFACE, FastEthernet0/0, and FastEthernet0/1. The 'VLAN Database' section is currently selected. The main area is titled 'VLAN Configuration' and contains fields for 'VLAN Number' (set to 20) and 'VLAN Name' (set to NewVLAN). Below these are two buttons: 'Add' (highlighted with a blue border) and 'Remove'. A table lists existing VLANs with their numbers and names:

VLAN No	VLAN Name
1	default
20	NewVLAN
1002	fddi-default
1003	token-ring-default
1004	fddinet-default
1005	trnet-default

The screenshot shows the Router0 CLI terminal window. The command history displays the configuration steps taken to create VLAN 20 and assign it the name 'NewVLAN'. The configuration includes setting the VLAN name, applying the changes, and then entering interface configuration mode to set the IP address and encapsulation.

```
Router(vlan)#
Router(vlan)#exit
APPLY completed.
Exiting.....
Router#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Router(vlan)#vlan 20 name NewVLAN
VLAN 20 modified:
  Name: NewVLAN
Router(vlan)#
Router(vlan)#exit
APPLY completed.
Exiting.....
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastEthernet0/0.1
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 20
Router(config-subif)#ip address 192.168.2.1 255.255.255.0
Router(config-subif)#no shut
Router(config-subif)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Pinging PC2(in VLAN) from PC1:



Command Prompt

X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.2: bytes=32 time<1ms TTL=127
Reply from 192.168.2.2: bytes=32 time<1ms TTL=127
Reply from 192.168.2.2: bytes=32 time=2ms TTL=127

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time<1ms TTL=127

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

Pinging PC0 from PC2(in VLAN):



Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.1.2: bytes=32 time<1ms TTL=127
Reply from 192.168.1.2: bytes=32 time<1ms TTL=127
Reply from 192.168.1.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

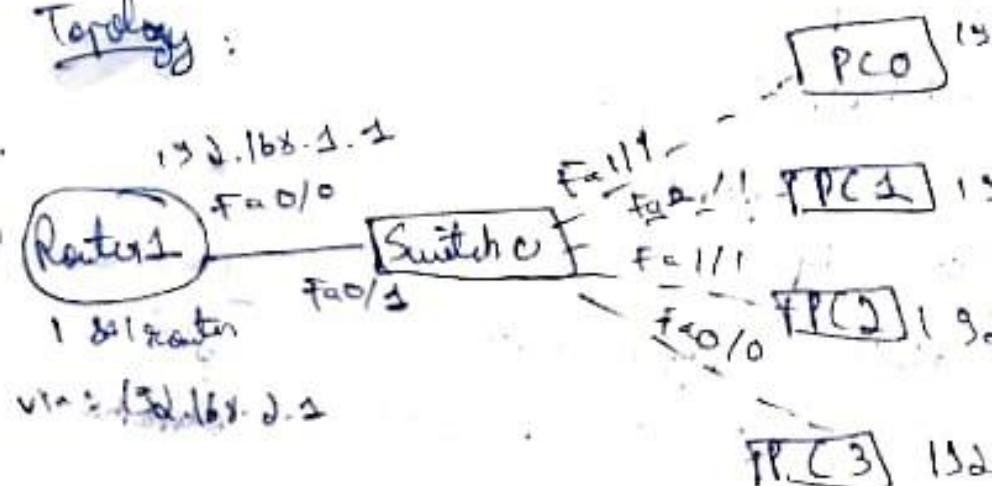
Reply from 192.168.1.2: bytes=32 time=20ms TTL=127
Reply from 192.168.1.2: bytes=32 time<1ms TTL=127
Reply from 192.168.1.2: bytes=32 time<1ms TTL=127
Reply from 192.168.1.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 20ms, Average = 5ms
```

- ⑨ To connect a VLAN and make the PCs communicate in VLAN

Ans :- Understand how to construct a VLAN

Topology :-



Procedure :-

- ① Get a topology as shown above
- User Router 18+1
- ② Use or switch 0 under config tab choose database
- ③ Turn click on add
- VLAN number : 0
- VLAN name : NewVLAN
- ④ Select the interface of the switch which connects Router, then F = 0/1 & mode is trunk
- ⑤ In the interface of the switch connecting Router PC2 & PC3 [end device]. Select 00: NewVLAN under VLAN. This makes the switch - that PC2 & PC3 also in NewVLAN

⑥ Click on Router under config tab select VLAN tab
- click Add the newly created VLAN by entering its
switch & name.

⑦ Open CLI in the router. Enter the following commands -

Router (VLAN) #exit

APPLY completed

Writing

Router# config t

Router (Config) # interface Fast Ethernet 0/0/1

Router (Config-subif) # encapsulation dot1q 30

Router (Config-subif) # ip address 192.168.2.3 255.255.255.0

Router (Config-subif) #exit

Router (Config) # exit

Ping the end device using end end device in VLAN &
physical LAN to check connection

Result:-

Ping from 192.168.2.2

Reply from 192.168.2.2 bytes = 32 time = 1 ms

TTL = 127

Reply from 192.168.2.2 bytes = 32 time = 1 ms

Reply from 192.168.2.2, bytes: 32 time <1ms
TTL = 127

Reply from 192.168.2.2, bytes: 32 time <1ms
TTL = 127

Packets: Sent: 4 Received: 4 Lost: 0% (0/4)

Round trip min ms

Min=0, Max=0 avg=0

PC 2 > ping 192.168.1.2

Reply from 192.168.1.2 bytes: 32 time=20ms
TTL = 127

Reply from 192.168.1.2 bytes: 32 time <1ms

TTL = 127

Reply from 192.168.1.2 bytes: 32 time <1ms
TTL = 127

Reply from 192.168.1.2 bytes: 32 time <1ms
TTL = 127

Packets: Sent = 4 , Received = 4 , Lost = 0 (0% loss)

Avg round trip time

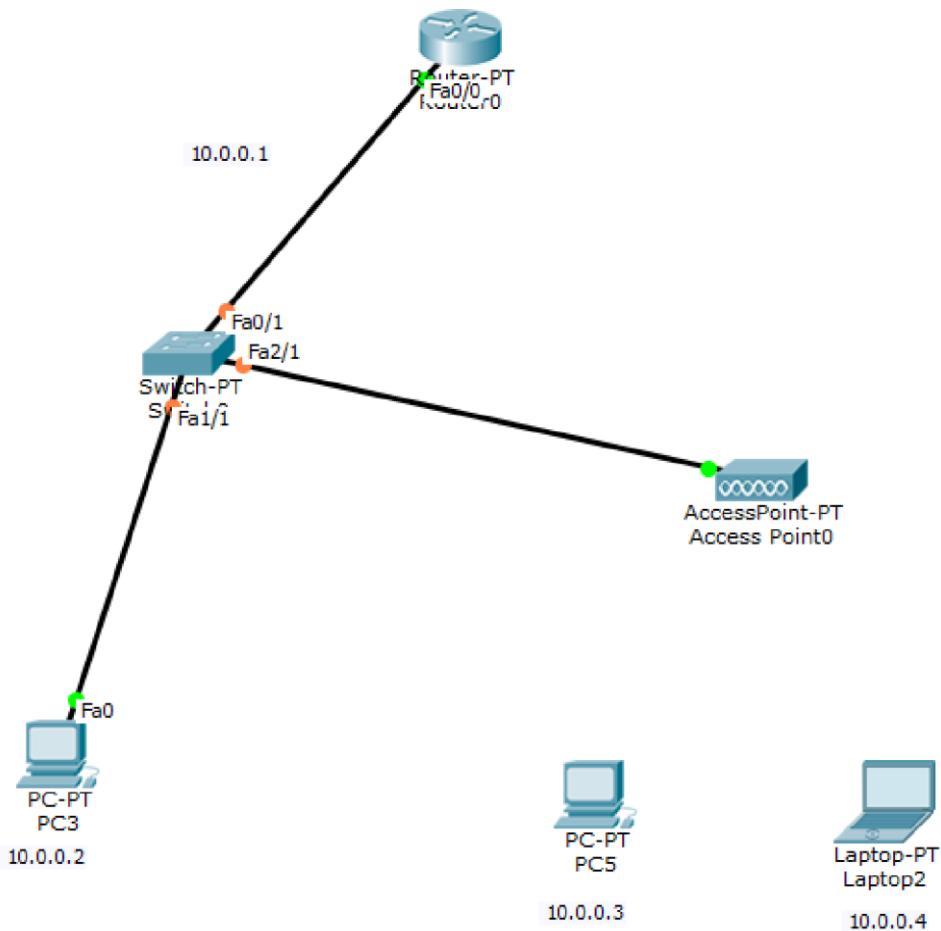
Avg: 5 Max: 20 Min: 0

Experiment No. 10

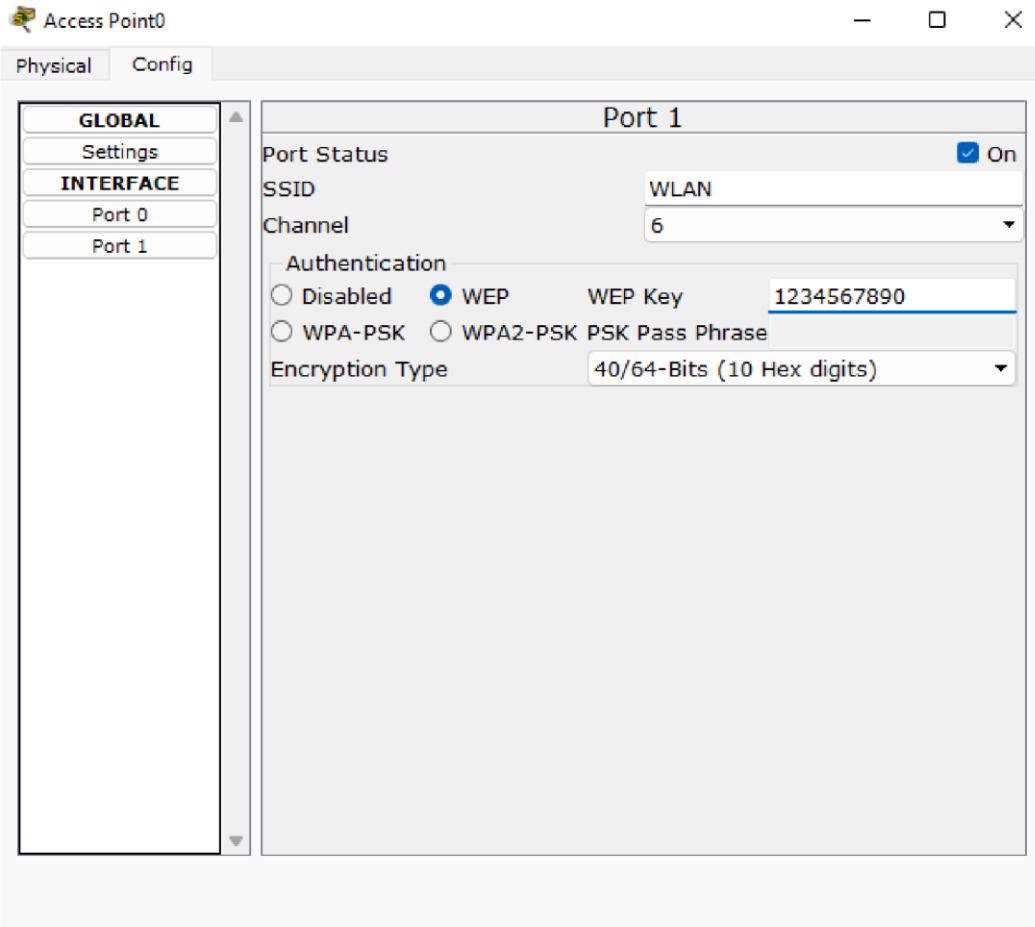
Title:

To construct a WLAN and make the nodes communicate wirelessly

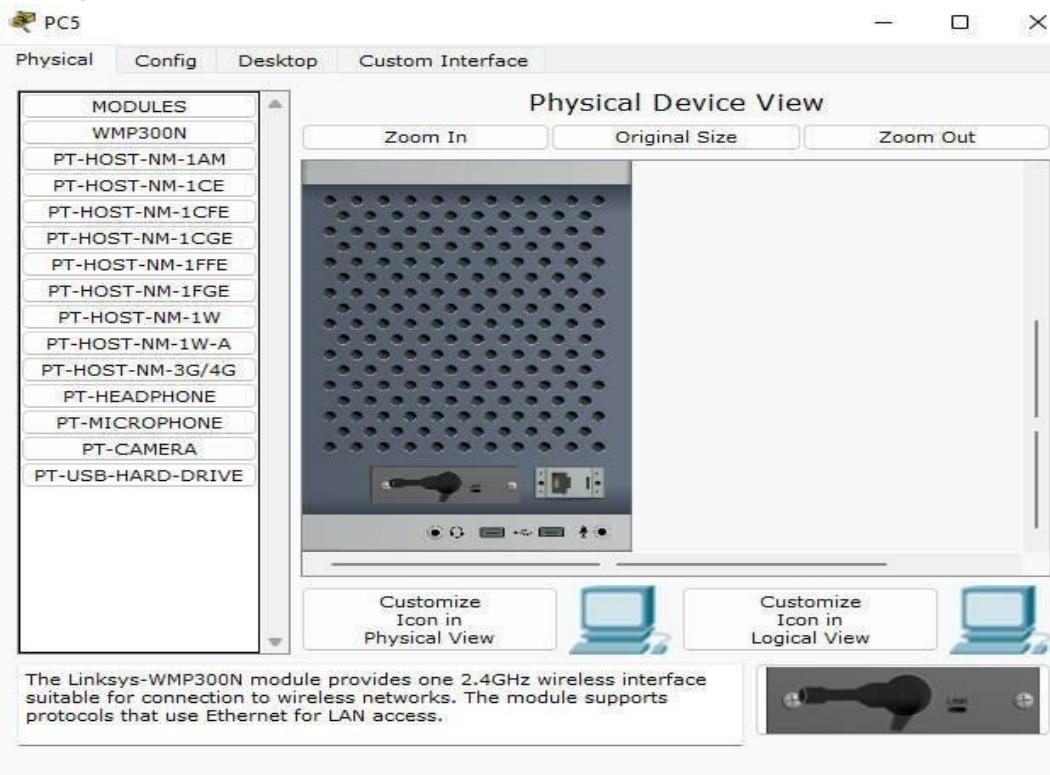
Topology:

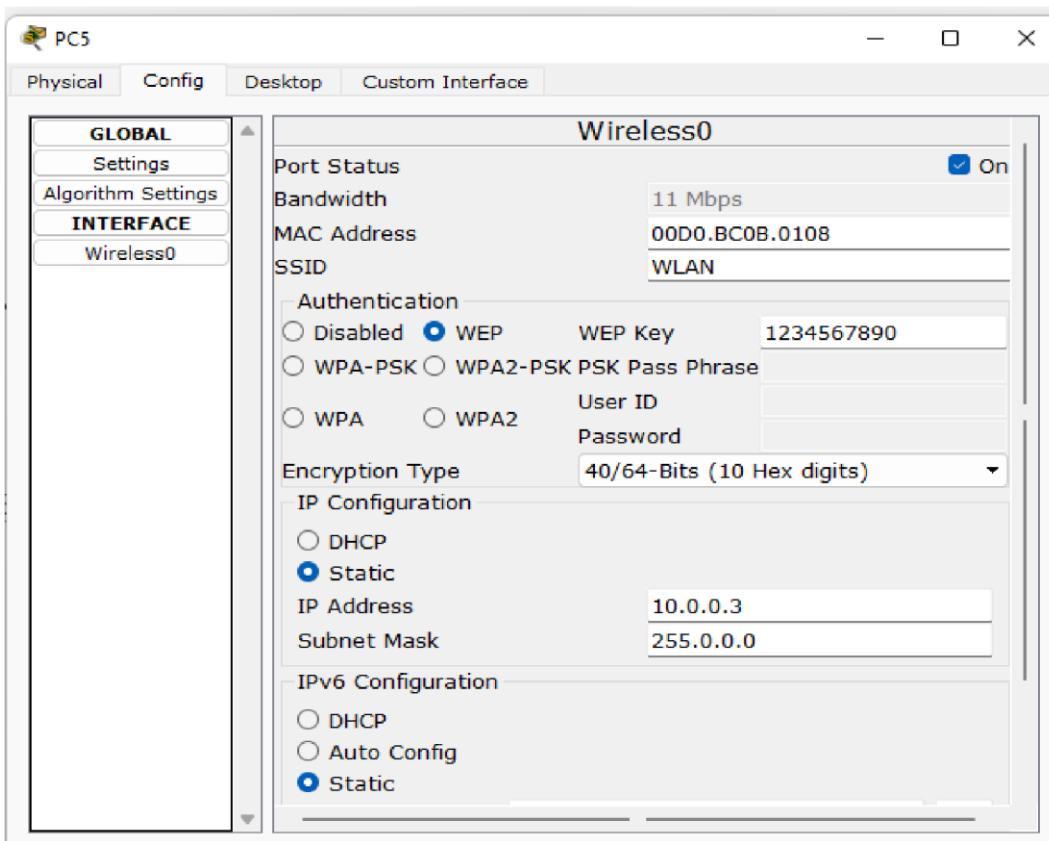


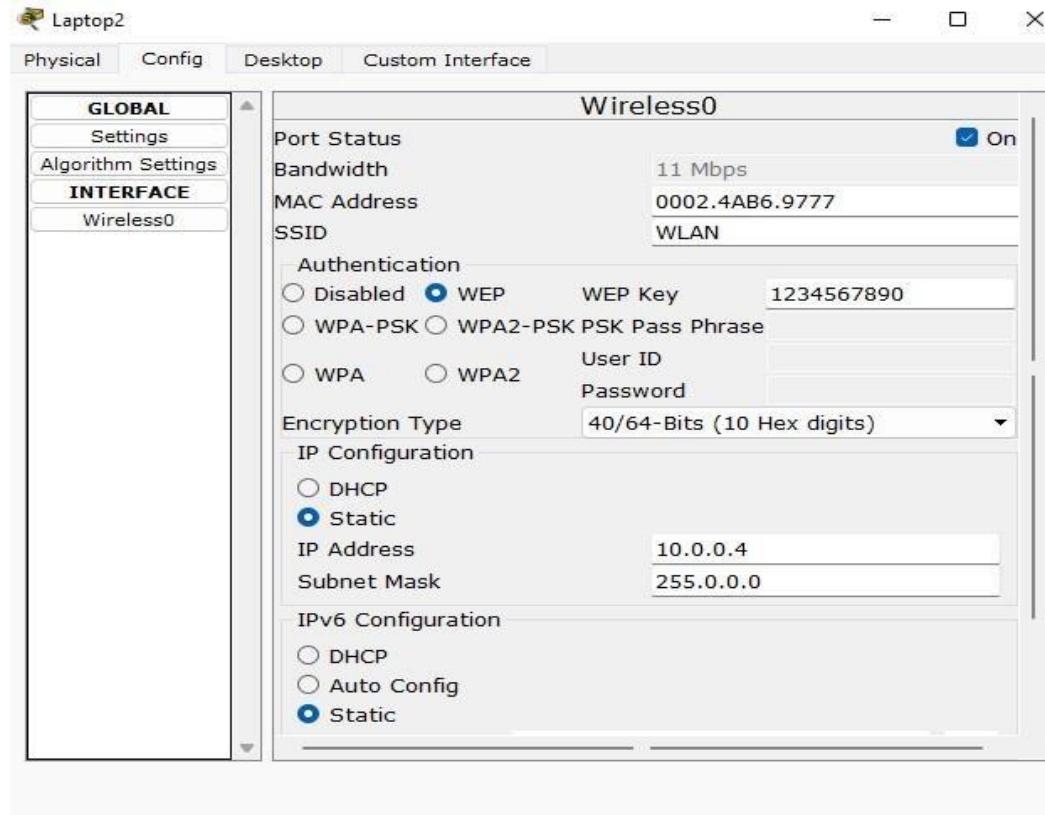
AccessPoint config:



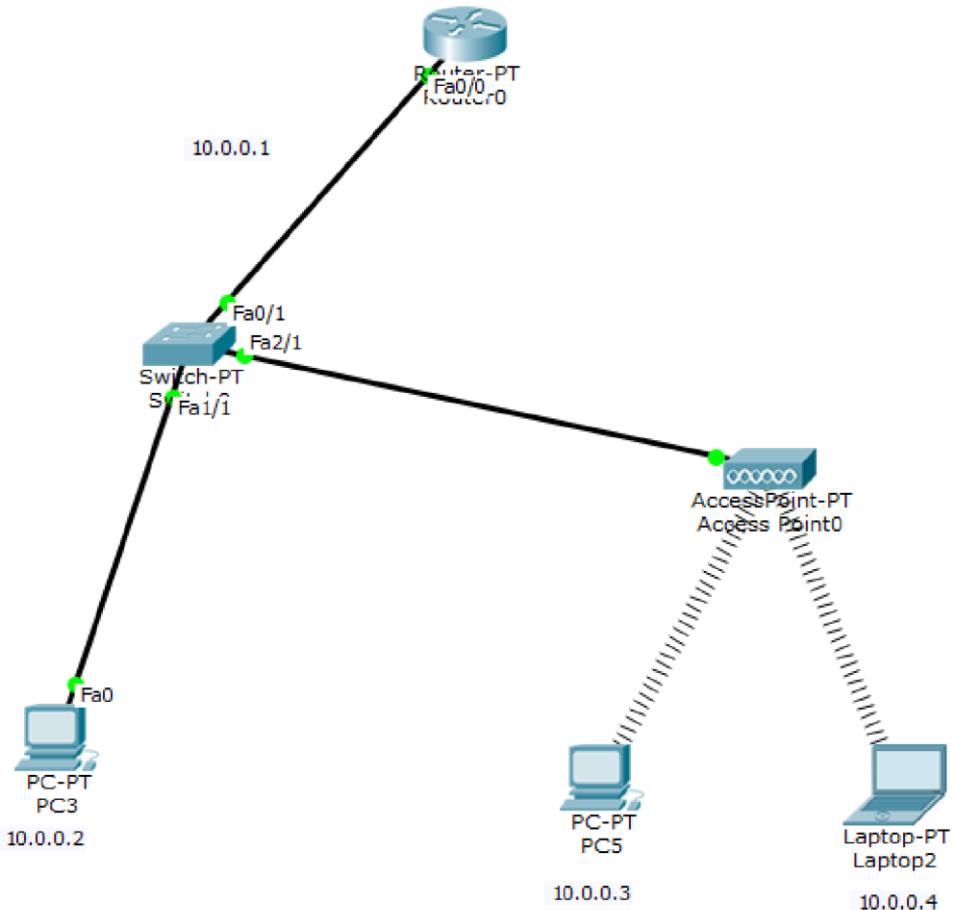
Configure wireless nodes:







Final Topology:



Pinging end devices:

Laptop2

Physical Config Desktop Custom Interface

Command Prompt X

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

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=22ms TTL=128
Reply from 10.0.0.2: bytes=32 time=13ms TTL=128
Reply from 10.0.0.2: bytes=32 time=11ms TTL=128
Reply from 10.0.0.2: bytes=32 time=12ms TTL=128

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 22ms, Average = 14ms

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=27ms TTL=128
Reply from 10.0.0.3: bytes=32 time=14ms TTL=128
Reply from 10.0.0.3: bytes=32 time=15ms TTL=128
Reply from 10.0.0.3: bytes=32 time=21ms 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 = 14ms, Maximum = 27ms, Average = 19ms

PC>
```

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

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=28ms TTL=128
Reply from 10.0.0.2: bytes=32 time=10ms TTL=128
Reply from 10.0.0.2: bytes=32 time=11ms TTL=128
Reply from 10.0.0.2: bytes=32 time=13ms TTL=128

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 28ms, Average = 16ms

PC>ping 10.0.0.4

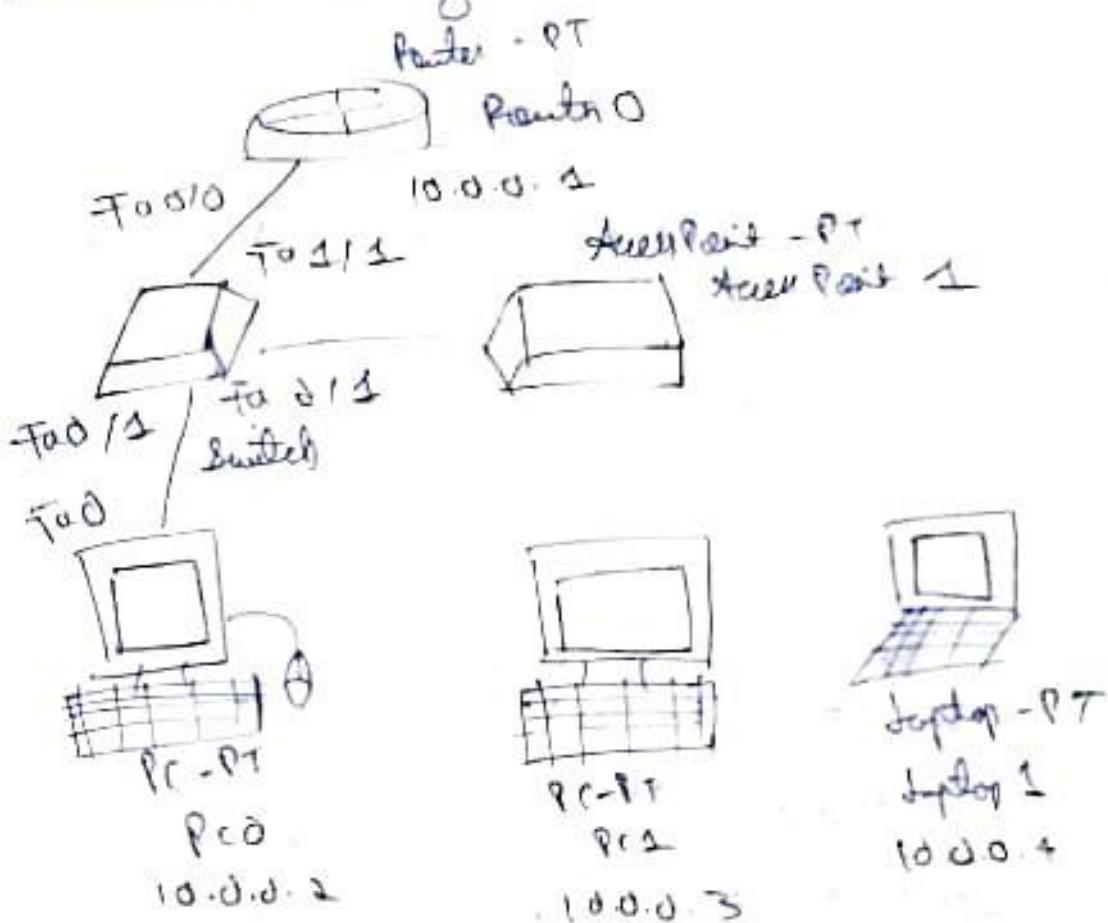
Pinging 10.0.0.4 with 32 bytes of data:

Reply from 10.0.0.4: bytes=32 time=18ms TTL=128
Reply from 10.0.0.4: bytes=32 time=17ms TTL=128
Reply from 10.0.0.4: bytes=32 time=14ms TTL=128
Reply from 10.0.0.4: bytes=32 time=21ms 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 = 14ms, Maximum = 21ms, Average = 17ms
```

Netflow

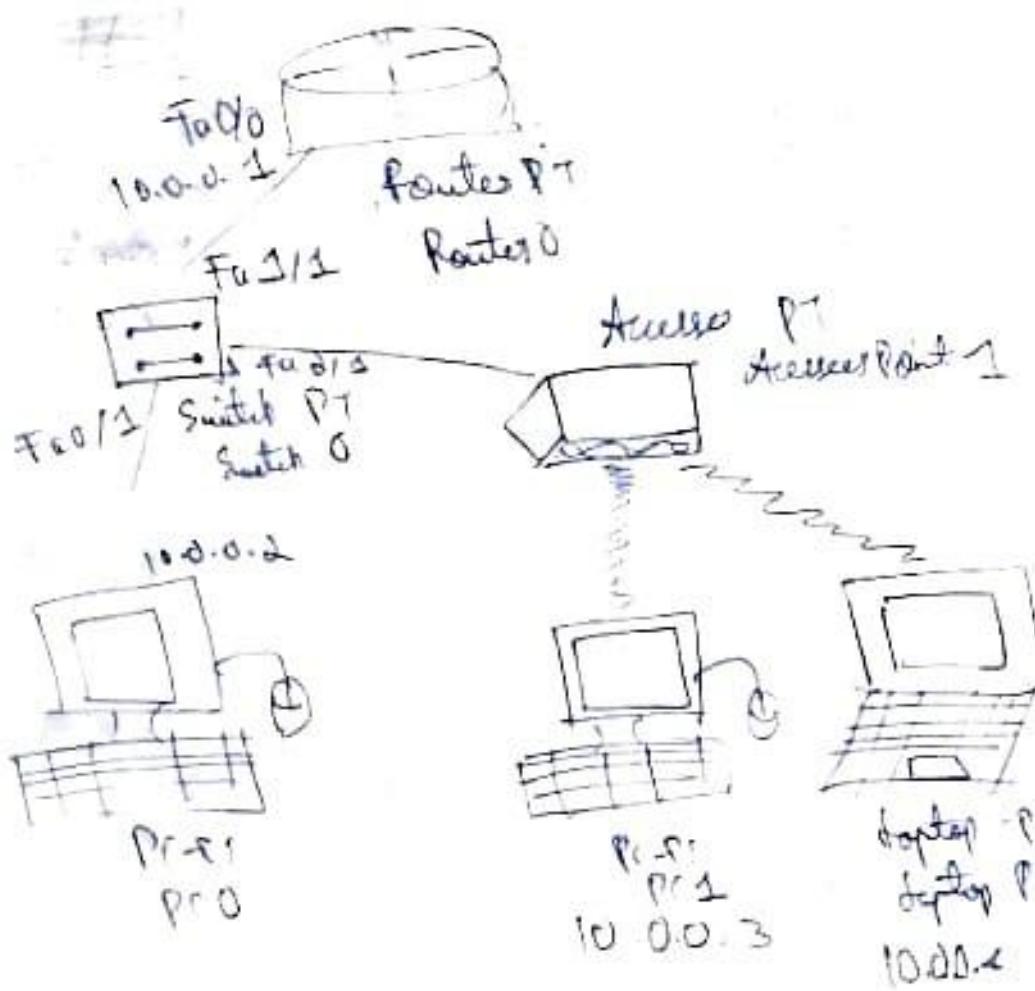
Aim To construct a WLAN and make the nodes communicate wirelessly



Procedure :-

- ① Create the topology as shown above with PC, switch, Router, access point and laptop.
- ② Configure PC0 and Router as normally done.
- ③ Configure the Access point, go to port 1 and give SSID name.
- ④ Select WEP and give any 10 digits key (1234567890 here). Configure PC-1 & laptop with wireless standards.

- ⑤ Switch off the device, drag the existing PT-HOST-NM to the component listed in the DHS. Plug WHP 300 wireless interface to the empty port. Switch on the device.
- ⑥ In the config tab a new wireless interface would have been added. Now configure, SSID, WEP key, IP address and Gateway (as normally done) to the Fair topology on Screen.



Now ping from PC0 to X1

- N from PC0 command prompt, 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 = 47 ms TTL = 128
Reply from 10.0.0.3, bytes = 32, time = 30 ms TTL = 128
Reply from 10.0.0.3, bytes = 32, time = 33 ms TTL = 128
Reply from 10.0.0.3, bytes = 32, time = 3 ms TTL = 128

Ping statistics from 10.0.0.3

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)

Approximate round trip time in milli seconds:

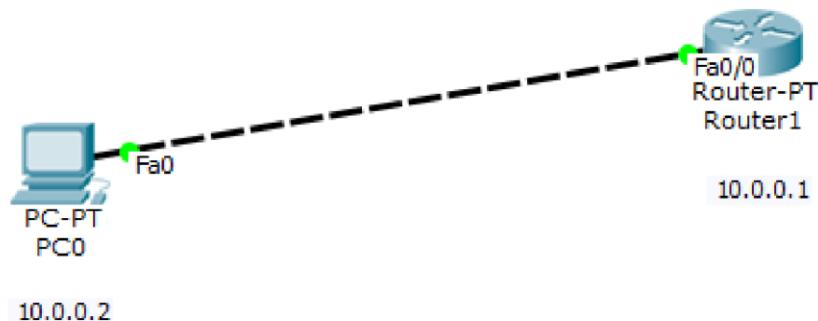
Min = 3 ms, Max = 47 ms, Average = 29 ms

Experiment No. 11

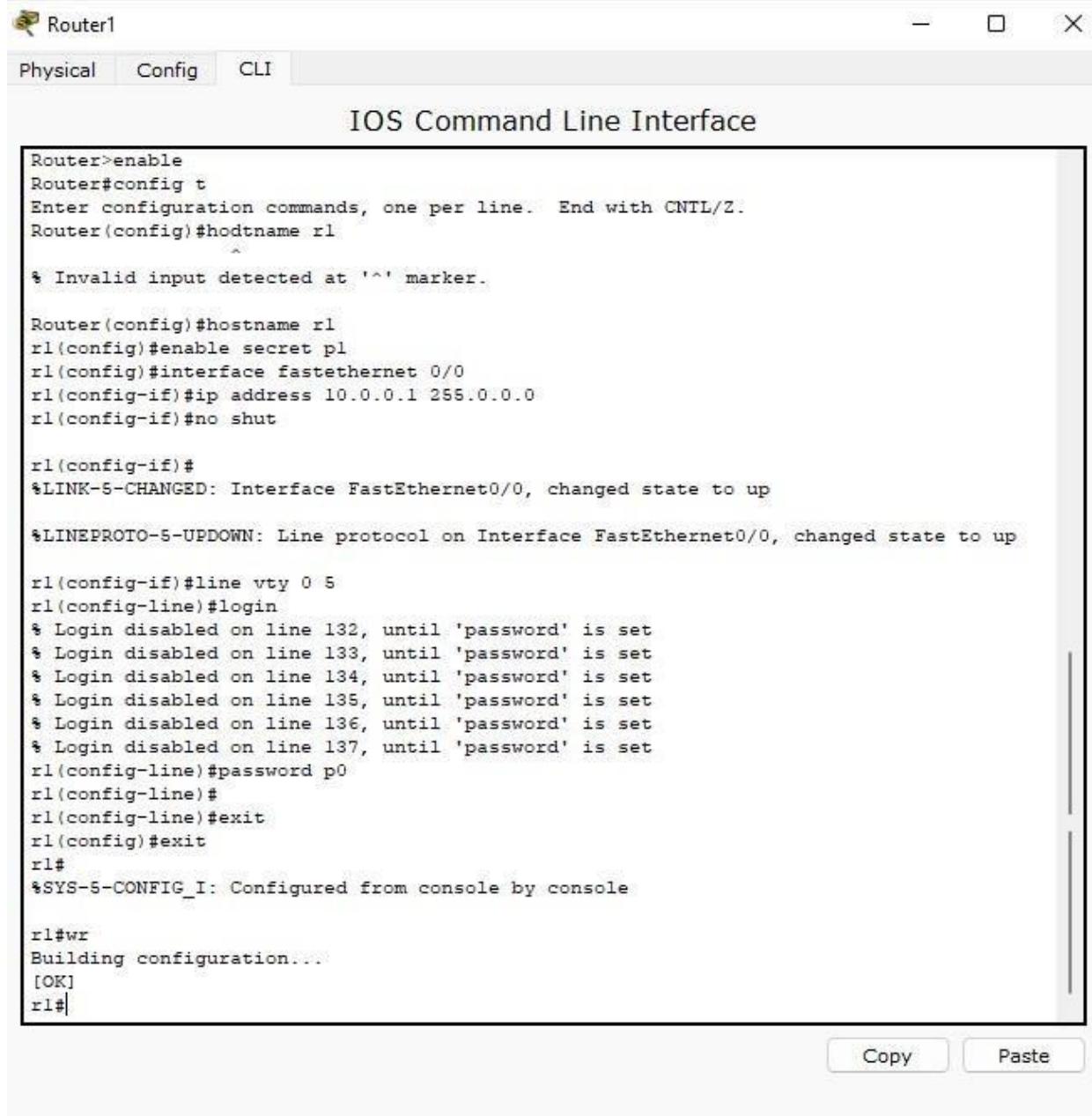
Title:

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

Topology:



Router config:



The image shows a software interface for configuring a Cisco router. The title bar says "Router1". The menu bar has "Physical", "Config", and "CLI" tabs, with "Config" being the active tab. The main area is titled "IOS Command Line Interface". It displays the following configuration commands:

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname rl
^
% Invalid input detected at '^' marker.

Router(config)#hostname rl
rl(config)#enable secret p1
rl(config)#interface fastethernet 0/0
rl(config-if)#ip address 10.0.0.1 255.0.0.0
rl(config-if)#no shut

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

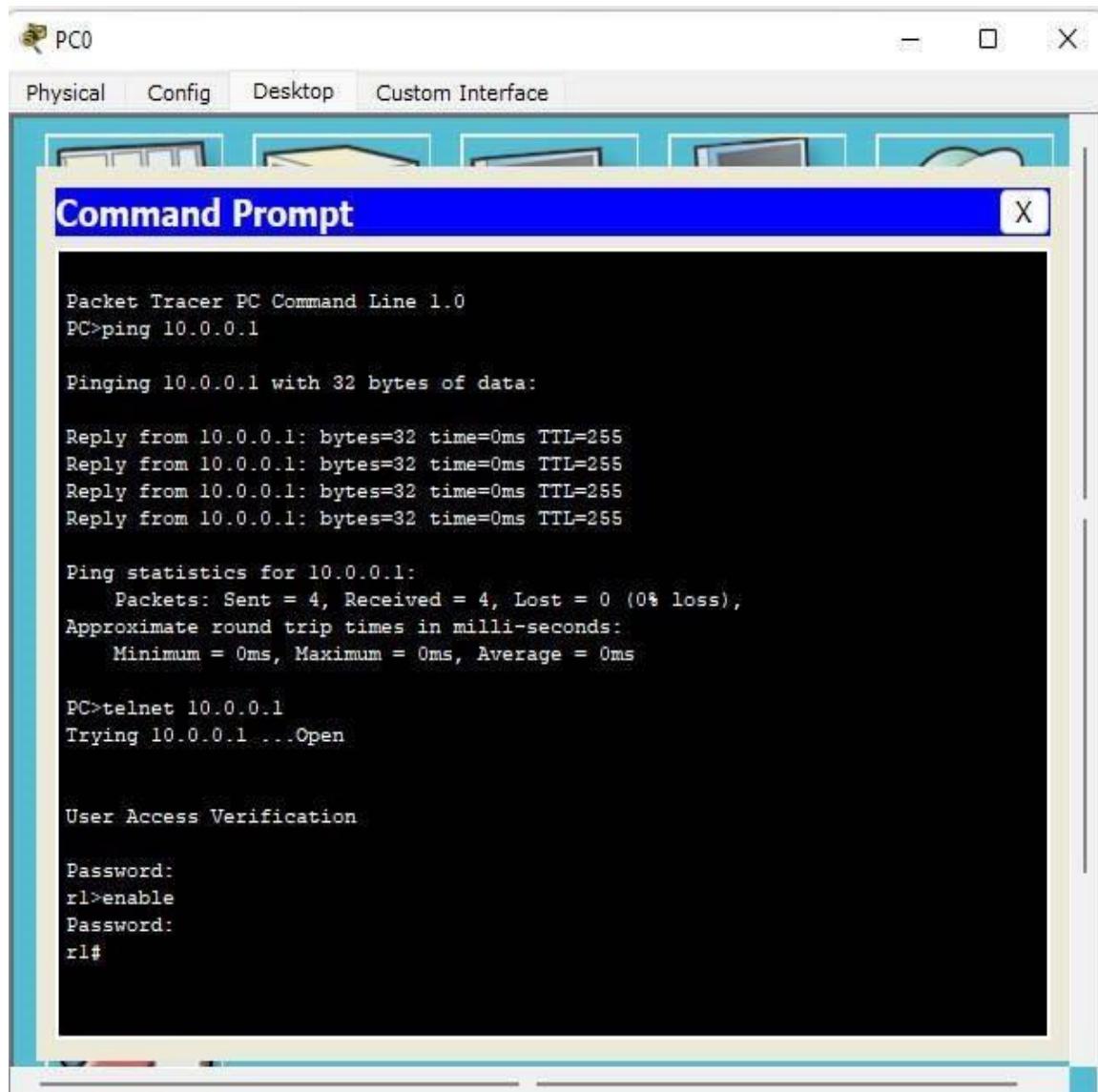
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

rl(config-if)#line vty 0 5
rl(config-line)#login
% Login disabled on line 132, until 'password' is set
% Login disabled on line 133, until 'password' is set
% Login disabled on line 134, until 'password' is set
% Login disabled on line 135, until 'password' is set
% Login disabled on line 136, until 'password' is set
% Login disabled on line 137, until 'password' is set
rl(config-line)#password p0
rl(config-line)#
rl(config-line)#exit
rl(config)#exit
rl#
%SYS-5-CONFIG_I: Configured from console by console

rl#wr
Building configuration...
[OK]
rl#|
```

At the bottom right of the main window are "Copy" and "Paste" buttons.

Pinging & accession Router CLI from PC:



The screenshot shows a "Command Prompt" window within the Packet Tracer interface. The window title is "Command Prompt". The content of the window is as follows:

```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

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

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open

User Access Verification

Password:
rl>enable
Password:
rl#
```

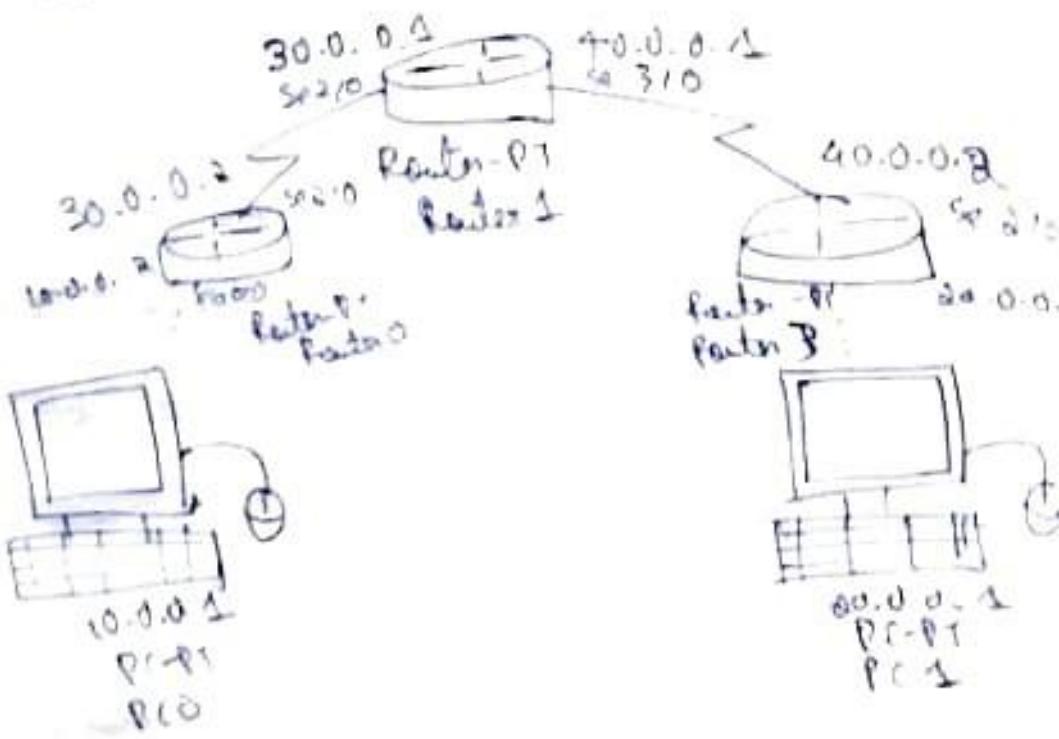
Command Prompt

X

```
Ping statistics for 10.0.0.1:  
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
 Approximate round trip times in milli-seconds:  
    Minimum = 0ms, Maximum = 0ms, Average = 0ms  
  
PC>telnet 10.0.0.1  
Trying 10.0.0.1 ...Open  
  
User Access Verification  
  
Password:  
rl>enable  
Password:  
rl#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  
rl#|
```

Aim :- To demonstrate the TELNET by a project.

Topology :-



Procedure :

Step 1 :- Create a topology with 2 PCs & 3 routers as shown above

Step 2 - Configure their IP addresses as 10.0.0.14
- 1 for PC0 & PC1 respectively

Step 3 - Configure the IP address for routers & follow

Jobberg

Router 0 :-

Router # config t

Router (config) # interface fastEthernet 0/0

Router (config) # no shutdown

Router (config) # exit

Porter (Config #) therefore serial 210
Porter (Config - 21) # ip address 3000 2 055000

Porter (Config - 2) # is slot

Porter (Config 2) # port

Porter (Config) # ip 2000 00000000 3000 4

Porter (Config) offload

Similarly configure for slots 3 & 4 later

Step 4 -

In Simulation mode, send a single PDU from one
PC to another

Step 5.

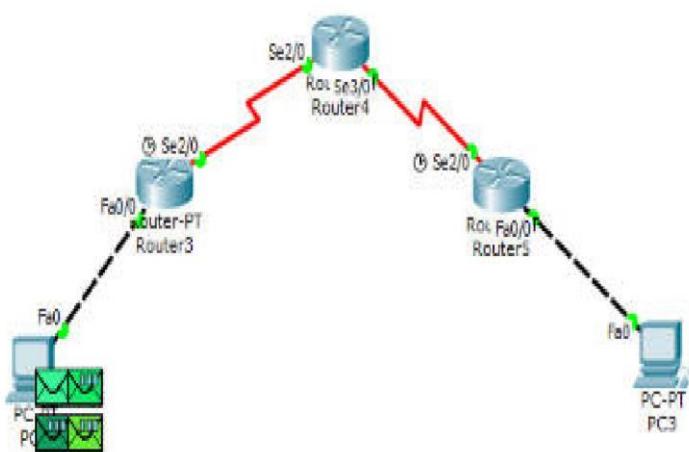
Click on PDC during every transfer to see the network
& without PDU details use capture button to
capture every transfer

Experiment No. 12

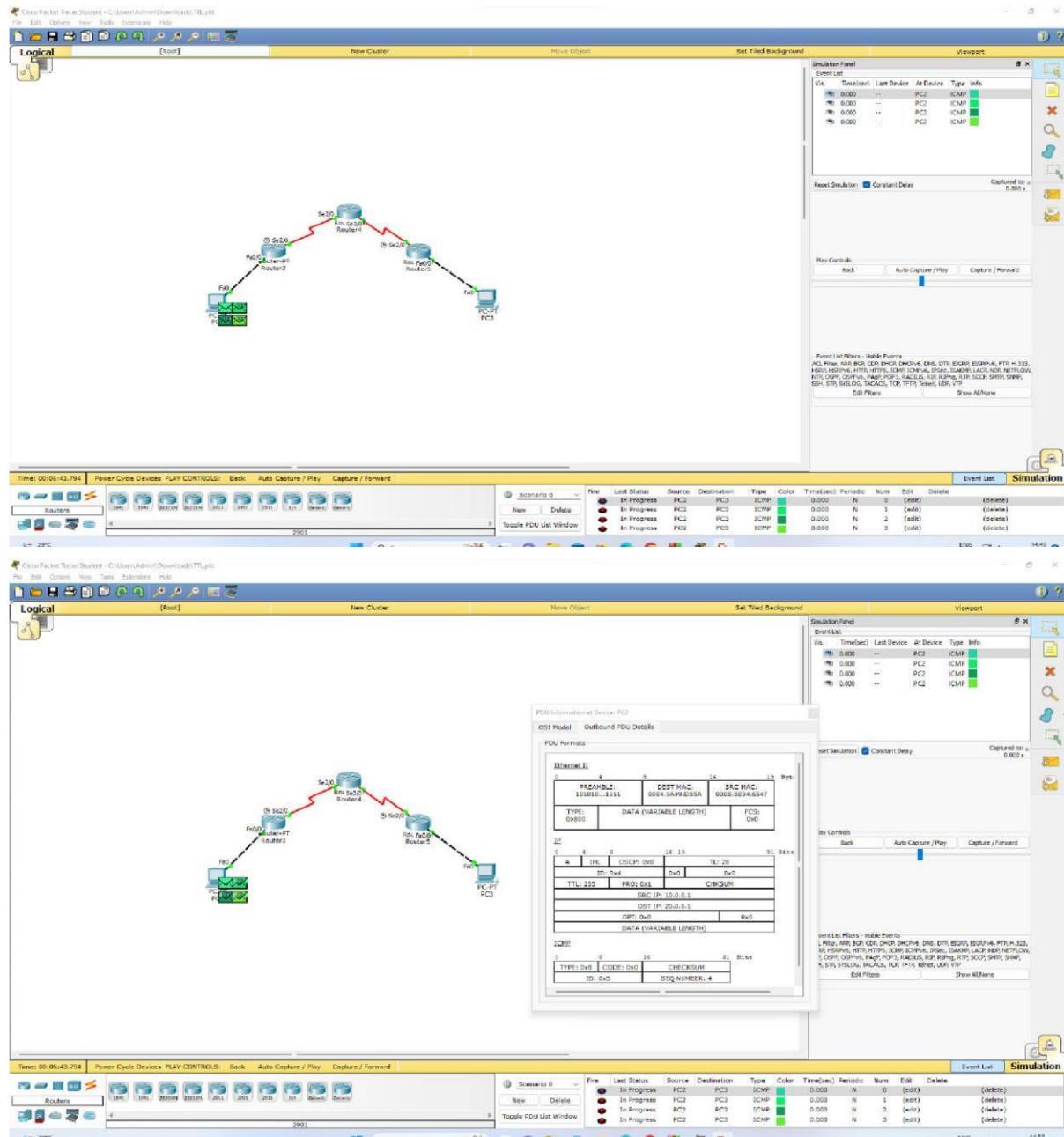
Title:

Demonstrate the TTL/ Life of a Packet

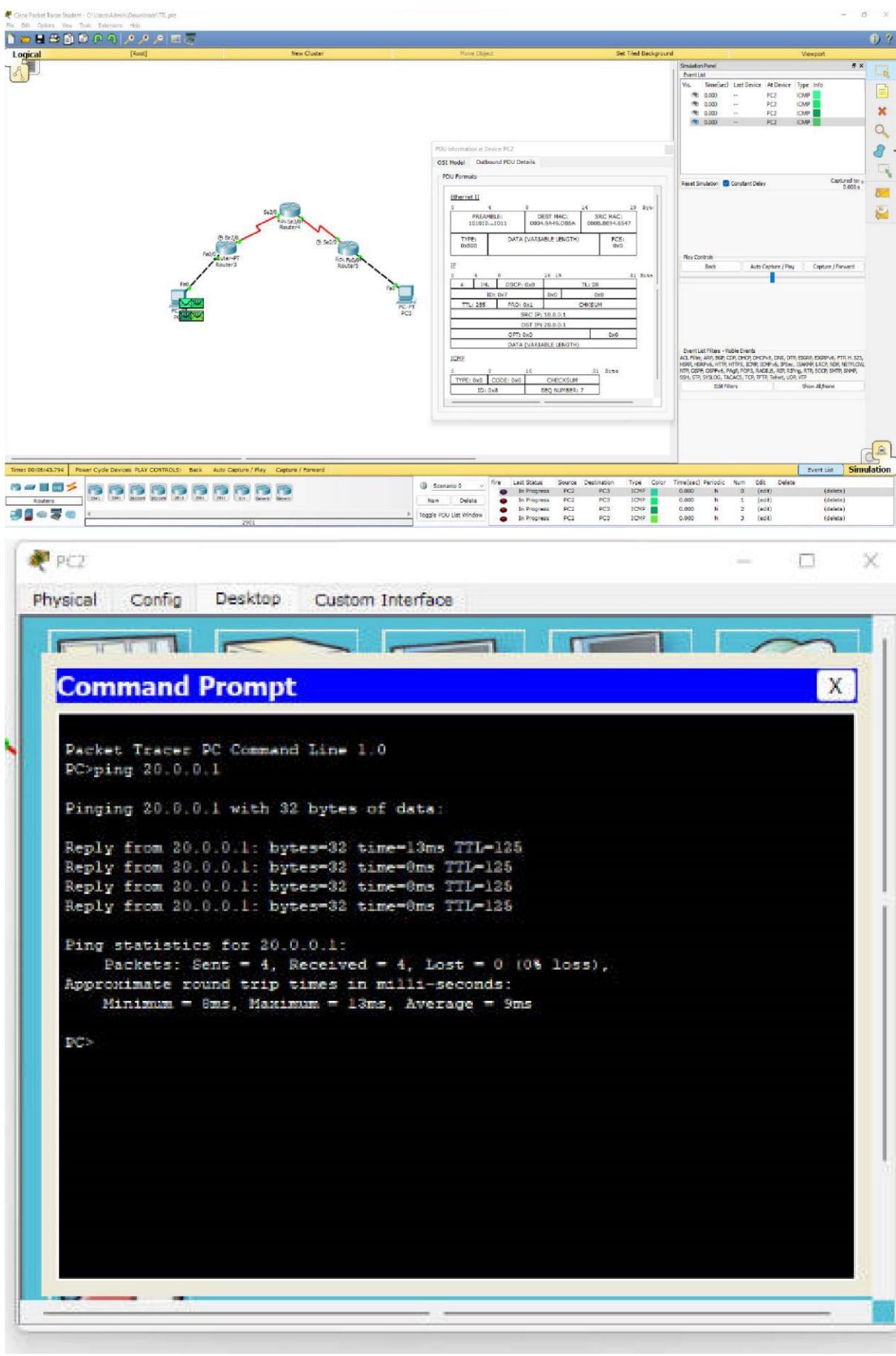
Topology:



Sending PDU from one PC to another:







(1)

Aim :-

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

Topology:-



Procedure:-

- ① Construct a topology as shown above
- ② Configure the PC with IP address 10.0.0.2
- ③ In Router 1 open CLI and enter the following commands

Router # config #

Router # (Config) # host name

1 (config) # enable secret R1

1 (config) # interface fastethernet 0/0

1 (config-if) # ip address 10.0.0.1 255.0.0.0

1 (config-if) # no shutdown

1 (config-if) timer 0 5 [to allow user for 60

1 (config-if) # login

② 91 > (config-line) # password : p0

91 > 1 (config-line) # exit

91 > (config) # exit

91 # w^x [to save changes in router]

④ Router 0's CLI can be opened from R0's command prompt using following commands > R0 > Telnet 10.0.0.1

password

R0 > enable

password

R0 #

Result :- R0 > Telnet 10.0.0.1

Type 10.0.0.1 ... Open

User access Verification

password : p0

R0 > enable

password : p1

R0 # Show ip route

(10.0.0.0/8) is directly connected Fa0/0

Observation :- By using the line vty 0 5 command virtual access to the router and the no of user having this access can be set. The enable secret command is used to set the password for enabling the router (identification line) # password

CYCLE 2

Experiment No. 1

Title:

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

Code:

```
#include<stdio.h>
char m[50],g[50],r[50],q[50],temp[50];
void caltrans(int); void crc(int); void
calram(); void shiftl(); int main() { int
n,i=0; char ch,flag=0; printf("Enter the
frame bits:");
while((ch=getc(stdin))!='\n')
m[i++]=ch; n=i; for(i=0;i<16;i++)
m[n++]='0'; m[n]='\0';
printf("Message after appending 16 zeros:%s",m);
for(i=0;i<=16;i++) g[i]='0';
g[0]=g[4]=g[11]=g[16]='1';g[17]='\0';
printf("\ngenerator:%s\n",g); crc(n);
printf("\n\nquotient:%s",q);
caltrans(n);
printf("\ntransmitted frame:%s",m);
printf("\nEnter transmitted
freme:");
scanf("\n%s",m);
printf("CRC checking\n"); crc(n);
printf("\n\nlast remainder:%s",r);
for(i=0;i<16;i++) if(r[i]!='0')
flag=1; else continue; if(flag==1)
printf("Error during transmission");
else printf("\n\nReceived freme is
correct"); } void crc(int n) {
int i,j;
for(i=0;i<n;i++)
temp[i]=m[i];
```

```

for(i=0;i<16;i++)
r[i]=m[i]; for(i=0;i<n-
16;i++) {
if(r[0]=='1'
) { q[i]='1';
calram(); }
else {
q[i]='0';
shiftl();
} r[16]=m[17+i];
r[17]='\0';
for(j=0;j<=17;j++
) temp[j]=r[j]; }
q[n-16]='\0'; }
void calram() {
int i,j;
for(i=1;i<=16;i++)
r[i-1]=((int)temp[i]-48)^((int)g[i]-48)+48;
} void
shiftl()
{
int i;
for(i=1;i<=16;i++) r[i-1]=r[i];
} void caltrans(int n) { int i,k=0; for(i=n-
16;i<n;i++)
m[i]=((int)m[i]48)^((int)r[k++]-48)+48; m[i]='\0';
} Output:

```

```
Enter the frame bits:1011
Message after appending 16 zeros:101100000000000000000000
generator:1000100000100001
```

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

```
last remainder:0000000000000000
```

```
Received freme is correct
```

```
Enter the frame bits:1011
Message after appending 16 zeros:101100000000000000000000
generator:1000100000100001
```

```
quotient:1011
transmitted frame:10111011000101101011
Enter transmitted freme:101
CRC checking
```

```
last remainder:000100000100001 Error during transmission
```

Socket Programming (Using TCP/IP sockets, write a client server program to make client sending the file name to the server to download the contents of the requested file)

① Client TCP

clientTCP.py
(ab present)

from socket import *

serverName = "127.0.0.1"

serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)

clientSocket.connect((serverName, serverPort))

sentence = input("Enter file name:")

clientSocket.send(sentence.encode())

fileContents = clientSocket.recv(1024).decode()

print("Received from server:\n")

print(fileContents)

clientSocket.close()

② Server TCP

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, "w")
```

```
    l = file.readline(1024)
```

```
    connectionSocket.send(l.encode())
```

```
    print('In send contents of '+ sentence)
```

```
    file.close()
```

```
    connectionSocket.close()
```

Output :-

Server TCP

```
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()
```

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.readline(1024)

connectionSocket.send(l.encode())

print ("I am sent contents of "+ sentence)

file.close()

connectionSocket.close()

Output :-

ServerTCP

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.txt')
l = file.read(1024)
connectionSocket.send(l.encode())
print("Sent contents of sentence")
file.close()
connectionSocket.close()
```

The server is ready to receive.

② Client TCP.py

From socket input

serverName = '127.0.0.1'

serverPort = 12000

clientSocket = socket(AF_INET, SOCK_STREAM)

clientSocket.connect((serverName, serverPort))

sentence = input("Enter file Name: ")

clientSocket.send(sentence.encode())

fileContents = clientSocket.recv(1024).decode()

print("File from Server: ")

print(fileContents)

clientSocket.close()

Curr file Name : Server TCP.py

From Server :

from socket import *

serverIP = "127.0.0.1"

serverPort = 12000

serverSocket = socket(AF_INET, SOCK_STREAM)

serverSocket.bind((serverName, serverPort))

serverSocket.listen(4)

while(1):-

print("The server is ready to receive")

connectionSocket, addr = serverSocket.accept()

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

file = open("textfile.txt", "w")

l = file.read(1024)

connectionSocket.send(l.encode())

print("In the contents of", sentence)

file.close()

connectionSocket.close()

Experiment No. 2

Title:

Write a program for congestion control using Leaky bucket algorithm.

Code:

```
#include<stdio.h> int main() { int incoming, outgoing,
buck_size, n, store = 0; printf("Enter bucket size, outgoing
rate and no of inputs: "); scanf("%d %d %d", &buck_size,
&outgoing, &n); while (n != 0) { printf("Enter the incoming
packet size : "); scanf("%d", &incoming);

    printf("Incoming packet size %d\n", incoming); if
    (incoming <= (buck_size - store)) {
        store += incoming; printf("Bucket buffer size %d out of
        %d\n", store, buck_size);
    } else { printf("Dropped %d no of packets\n", incoming - (buck_size - store));
        printf("Bucket buffer size %d out of %d\n", store, buck_size); store =
        buck_size;
    }
    store = store - outgoing;
    printf("After outgoing %d packets left out of %d in buffer\n", store,
buck_size); n--
    ;
}
}
```

Output:

```
Enter bucket size, outgoing rate and no of inputs: 8 6 4
Enter the incoming packet size : 3
Incoming packet size 3
Bucket buffer size 3 out of 8
After outgoing -3 packets left out of 8 in buffer
Enter the incoming packet size : 3
Incoming packet size 3
Bucket buffer size 0 out of 8
After outgoing -6 packets left out of 8 in buffer
Enter the incoming packet size : 4
Incoming packet size 4
Bucket buffer size -2 out of 8
After outgoing -8 packets left out of 8 in buffer
Enter the incoming packet size : 3
Incoming packet size 3
Bucket buffer size -5 out of 8
After outgoing -11 packets left out of 8 in buffer
```

```
file = open('sentence.txt')
l = file.read(1024)
clientSocket.send(l.encode())
print('In sent contents of' + sentence)
file.close()
clientSocket.close()
```

The server is ready to receive.

② Client TCP.py

From socket import *

serverName = '127.0.0.1'

serverPort = 12000

clientSocket = socket(AF_INET, SOCK_STREAM)

clientSocket.connect((serverName, serverPort))

sentence = input("Enter file Name: ")

clientSocket.send(sentence.encode())

fileContents = clientSocket.recv(1024).decode()

print('In file contents: \n')

print(fileContents)

clientSocket.close()

Client file Name : server.py

Server socket :

from socket import *

serverIP = "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("server.txt", "w")

l = file.read(1024)

connectionSocket.send(l.encode())

print('The file contents of '+ sentence)

file.close()

connectionSocket.close()

Q) Using UDP sockets, write a client server program to make client send file names & the server to send back the contents of requested file as present.

Client UDP.py

from socket import *

serverName = "127.0.0.1"

serverPort = 12000

clientSocket = socket (AF_INET, SOCK_DGRAM)

sentence = input ("Enter file Name")

clientSocket.sendto (bytes (sentence, "utf-8"), (serverName, serverPort))

fileContentsServerAddress = clientSocket.recvfrom (1024)

print ("Reply from Server: ", fileContentsServerAddress[0])

print (fileContentsServerAddress[1].decode ("utf-8"))

for i in fileContents:

print (str(i))

clientSocket.close()

Server UDP.py

from socket import *

serverPort = 12000

serverSocket = socket (AF_INET, SOCK_DGRAM)

print ("The server is ready to receive")

while 1:

server, clientAddress = socketServer.accept() (do + 8)

sentence = sentence.decode ("utf-8")

file = open (sentence, "r")

con = file.read (do + 8)

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

print ("I'm sending contents of", end = '')

print (sentence)

for loop sentence :

print (str (i) end = '')

file.close()

Output

① The server is ready to receive

② Enter file name: Seven TUPP my

Reply from server:

Seven socket input *

Seven Read : 12000

serverSocket = socket (AF_INET, SOCK_STREAM)

serverSocket.bind ("192.0.0.1", serverPort)

while 1:

print ("The server is ready to receive")

sentence, clientAddress = serverSocket.recvfrom (2048)

```
file = open('sentences.txt')
```

```
l = file.read(2048)
```

```
sentences = l.split("\n")
```

```
print("In list contents of", end="")
```

```
print(sentences)
```

```
# for i in sentences:
```

```
# print(str(i), end="")
```

```
file.close()
```

Experiment No. 3

Title:

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

Code:

```
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:

```
/Users/mac/PycharmProjects/cn-lab/venv/bin/python /Users/mac/PycharmProjects/cn-lab/ServerTCP.py
The server is ready to receive
```

```
/Users/mac/PycharmProjects/cn-lab/venv/bin/python /Users/mac/PycharmProjects/cn-lab/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()
```

```
Process finished with exit code 0
```

```
/Users/mac/PycharmProjects/cn-lab/venv/bin/python /Users/mac/PycharmProjects/cn-lab/ServerTCP.py
The server is ready to receive
```

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

Congestion Management

Dekky Bucket Algorithm

#include <stdio.h>

int main()

{ int incoming, outgoing, bucket_size = 0, store = 0;

printf ("Enter bucket size outgoing and incoming: ");

scanf ("%d %d", &incoming, &outgoing);

while (n != 0)

printf ("Storing packet size: ");

scanf ("%d", &store);

printf ("Storing packet size %d in %d\n", store);

if (incoming <= (bucket_size - store)) {

store += incoming;

printf ("Bucket buffer size %d out of %d\n",

store, bucket_size);

} else {

printf ("Dropped %d to of packets\n", incoming -

(bucket_size - store));

printf ("Bucket buffer size %d added %d\n", store,

bucket_size);

store = bucket_size;

} else = store - outgoing;

printf ("After outgoing %d packets left which %d in buffer

Outpus

Der Lunker - size 10, Outpus 3000 m auf engals:

8, 6, 4

oder der örtl. patel size: 2

Borket halbes size 2 oder 8

Büffeln Outpus - 4 patelheit liefert oft 8 ein Büffeln

Experiment No. 4

Title:

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

Code:

ClientUDP.py from

```
socket import *
serverName =
"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()
```

Output:

```
/Users/mac/PycharmProjects/cn-lab/venv/bin/python /Users/mac/PycharmProjects/cn-lab/ServerUDP.py
The server is ready to receive
```

```
/Users/mac/PycharmProjects/cn-lab/venv/bin/python /Users/mac/PycharmProjects/cn-lab/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()
```

```
Process finished with exit code 0
```

```
/Users/mac/PycharmProjects/cn-lab/venv/bin/python /Users/mac/PycharmProjects/cn-lab/ServerUDP.py  
The server is ready to receive  
Sent contents of ServerUDP.py
```

WAP for ever deleting consecutive 0's - (C - 1177)

#include < stdio.h >

char n [50], g [50], s [50], q [50], temp [50]

void rot () :

void collap () :

void shift () :

void main () {

int n, i = 0,

char ch, flag = 0;

printf ("Enter the frame lists : ") ;

while ((ch = getc (stdin)) != '\n') ;

m [int + i] = ch,

i = i + 1;

for (i = 0, j < 16 ; j++)

m [n + i] = '0' ;

m [n] = '0' ;

printf ("Message after appending 16 zeros : %s\n"),

for (i = 0, j < 16, i++)

g [i] = 0;

g [0] = g [1] = g [2] = g [3] = g [4] = '1' ;

g [5] = '0' ;

match ("in Gentler's slo", g);

or (n);

match ("in Gentler's slo", g);

or (n);

match ("in a question : / . s \ n ", g));

carries (n);

match ("transmitted from : / . s \ n ", m));

match ("After transmitted from: " 1)

scrub (" / . s ", m));

match ("(PC directory 1 n")

or (n);

match ("last recorded : / . s ", s);

for (s = 0, ; < 16 ; i +)

 if (s[0] != 10')

 flag = 1;

else

 continue;

 if (flag == 1)

 match ("User during transmission");

 else

 match ("Revised file is correct");

 }

 exit or (g);

int i, j;

for(i=0; i<n; i++)

temp[i] = m[i];

for(i=0; i<16; i++)

d[i] = m[i];

for(i=0; i<n-16; i++) {

if (d[0] == '1') {

q[i] = '1';

else q[i] = '0';

else

q[i] = '0';

else q[i] = '1';

d[16] = q[i];

d[17] = '0';

for(j=0; j<17; j++)

temp[j] = d[j];

q[r+16] = '0';

next calson();

int i, j;

for(j=1; j<16; j++)

d[i=1] = ((int)temp[i]-48)*(int)q[i]

- 48+48);

Year 5000 ()

{

int i,

for(i=1; i<=16; i++)

 d[i-1], i=16; i++)

 d[i-1] + d[i];

}

void calAns (int d)

{

 int i, k=0;

 for(i= n-16; i<n; i++)

 m[i] = ((d[k]) * m[i] - 48) / 16 + d[n+k];

 m[i] = 100' ,

}

Output

Enter four bits : 1011

Message after appending 16 zeros :-

1011 000 000000 0000

Generation

10001 000000 10001

Question : 1011

Last

Re

derainder : 00 00 00 00 00 00 00 00 00 00 00 00

new year is Collect