National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Electrical Engineering

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Semester:_____6ᵗʰ _____   **Section: _____D_____**

EE-357 Computer and Communication Networks
Experiment - 3
Connecting Local Area Networks (LANs) using Router

Name	Reg. No	PLO5/ CLO3	PLO5/ CLO3	PLO5/ CLO3	PLO5/ CLO3	PLO5/ CLO3
		Viva / Quiz / Lab Performance 5 Marks	Analysis of data in Lab Report 5 Marks	Modern Tool Usage 5 Marks	Ethics and Safety 5 Marks	Individual and Team Work 5 Marks
Myesha Khalil	305093					
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EXPERIMENT NO 3

Connecting Local Area Networks (LANs) using Router

1. Objective

This lab exercise is designed for understanding LAN and using Router to communicate two LANS.

2. Resources Required

- Computer
- Packet Tracer (version 5 or higher)
- ENSP

3. Introduction

A local area network (LAN) is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building and has its network equipment and interconnects locally managed.

For example here i have taken two IP from different networks. First IP is 192.168.1.100 from 192.168.1.0 network and other IP 192.168.2.100 from 192.168.2.0 network. Now these IP cannot ping each other using hub or switch because they belongs to two different networks.

So to make two machines from different network communicate each other we need to use router.

4. Procedure

1. Open Packet Tracer 5 and setup a network similar to the following network. Use Router and PCs
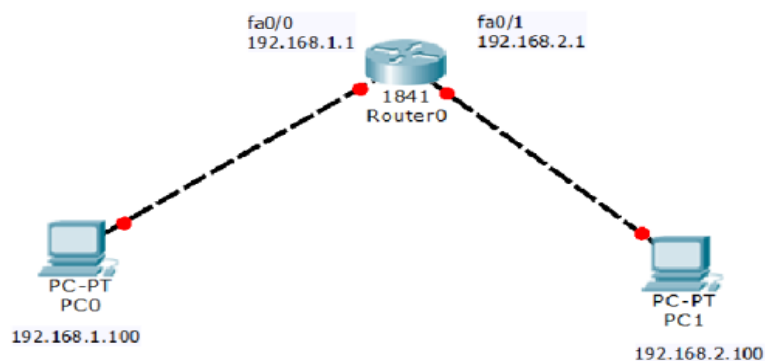
2. Double click the Router and goto CLI tab. Follow the steps below to complete the lab. You can do the same using a PC if you use a **console (one side is RS 232, other is RJ45—blue coloured in Packet Tracer)** cable for connection between PC and Switch. Go to PC's desktop then Terminal (equivalent of HyperTerminal), accept the default settings and login to the Router.

Step 1 Enter privileged mode

a. Privileged mode gives access to all the Router commands. Many of the privileged commands configure operating parameters. Therefore, privileged access should be password-protected to prevent unauthorized use. The privileged command set includes those commands contained in user EXEC mode, as well as the **configure** command through which access to the remaining command modes is gained.

Router>**enable**

Router#

b. Notice the prompt changed in the configuration to reflect privileged EXEC mode.

Step 2 Examine the current Router configuration

a. Examine the following current running configuration file:

Router# **show running-config**

b. How many interfaces does the Router have? _____3_____

Assign the IP address to Router Interface

Router#configure terminal

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

Router(config)#interface fa0/0

Router(config-if)#ip address 192.168.1.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#interface fa0/1

Router(config-if)#ip address 192.168.2.1 255.255.255.0

Router(config-if)#no shutdown

Step 3 Configure the hosts attached to the Router

Configure the hosts to use the same IP subnet for the address, mask and default-gateway.

Step 4 Verify connectivity

 a. To verify that hosts and Router are correctly configured, use ping

b. Were the pings successful?

_____yes_____

```
PC>ping 192.168.2.5

Pinging 192.168.2.5 with 32 bytes of data:

Reply from 192.168.2.5: bytes=32 time=0ms TTL=127
Reply from 192.168.2.5: bytes=32 time=0ms TTL=127
Reply from 192.168.2.5: bytes=32 time=0ms TTL=127
Reply from 192.168.2.5: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.2.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>
```

c. If the answer is no, troubleshoot the hosts and Router configurations.

5. Student activity

Now using above concept solve the below question. Take two different networks and configure router to make all those pc ping each other or communicate each other. Assign hostnames to router and switches too.
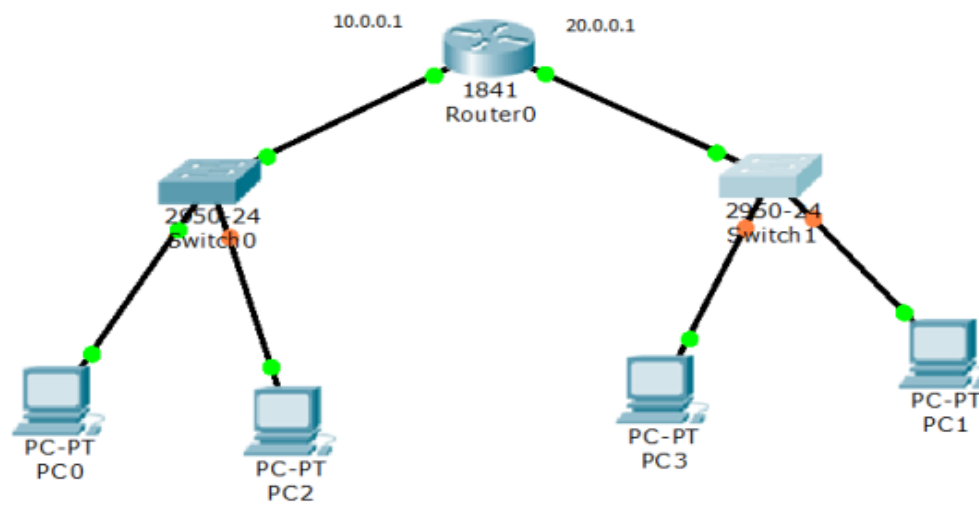
Note: You can only use ENSP for the following task. You may take help from the following website or any other source online.
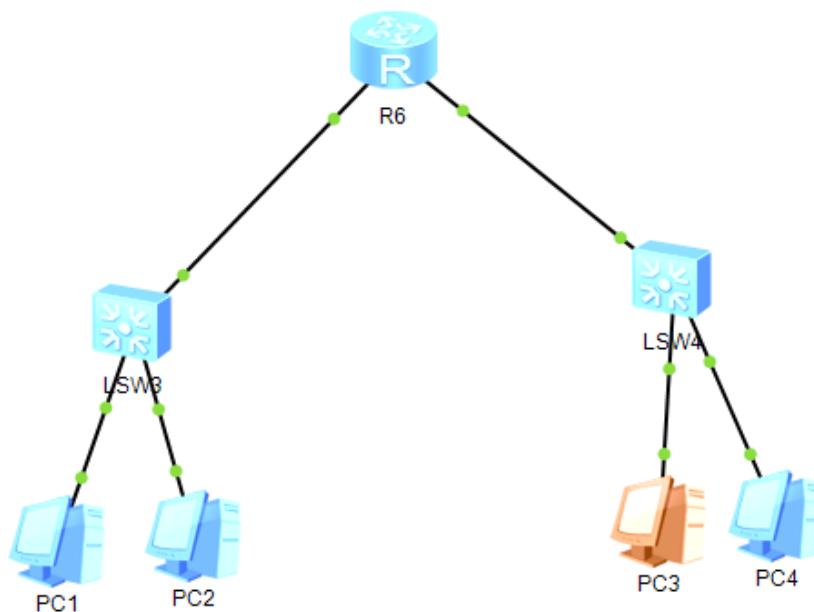
https://www.programmersought.com/article/51768506620/

Copy all the running configurations to start-up configurations and attach screenshots of start-up configurations.

```
R6
The device is running!

<Huawei>sy
Enter system view, return user view with Ctrl+Z.
[Huawei]int e0/0/0
[Huawei-Ethernet0/0/0]ip add 192.168.1.253 255.255.255.0
[Huawei-Ethernet0/0/0]
Feb 16 2022 11:54:20-08:00 Huawei %%01IFNET/4/LINK_STATE(1)[0]:The line protocol
 IP on the interface Ethernet0/0/0 has entered the UP state.
[Huawei-Ethernet0/0/0]
<Huawei>sy
Enter system view, return user view with Ctrl+Z.
[Huawei]
Feb 16 2022 11:54:28-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 1, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei]int e0/0/1
[Huawei-Ethernet0/0/1]ip add 192.168.2.253 255.255.255.0
[Huawei-Ethernet0/0/1]
Feb 16 2022 11:55:23-08:00 Huawei %%01IFNET/4/LINK_STATE(1)[1]:The line protocol
 IP on the interface Ethernet0/0/1 has entered the UP state.
Feb 16 2022 11:55:28-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 2, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-Ethernet0/0/1]
<Huawei>
```

Conclusion:

Pinging pc1 to pc2

```
PC>ping 192.168.1.2

Ping 192.168.1.2: 32 data bytes, Press Ctrl_C to break
From 192.168.1.2: bytes=32 seq=1 ttl=128 time=47 ms
From 192.168.1.2: bytes=32 seq=2 ttl=128 time=47 ms
From 192.168.1.2: bytes=32 seq=3 ttl=128 time=63 ms
From 192.168.1.2: bytes=32 seq=4 ttl=128 time=47 ms
From 192.168.1.2: bytes=32 seq=5 ttl=128 time=47 ms

--- 192.168.1.2 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 47/50/63 ms
```
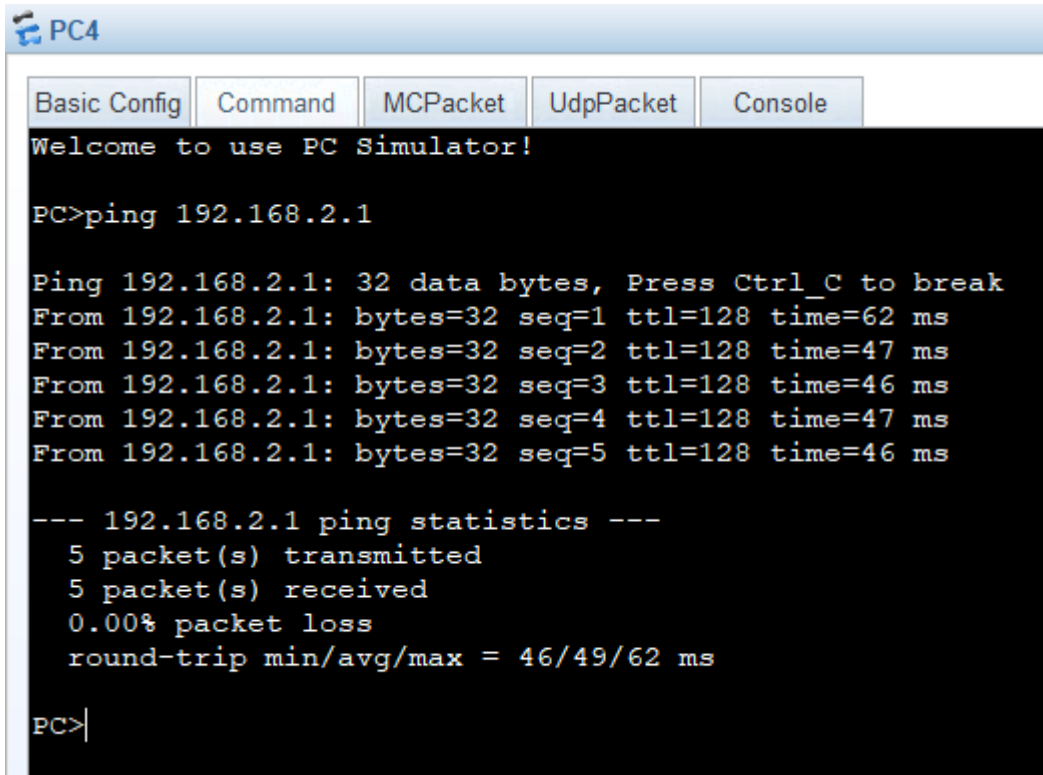
Pinging pc2 to pc 3

```
PC>ping 192.168.2.1

Ping 192.168.2.1: 32 data bytes, Press Ctrl_C to break
From 192.168.2.1: bytes=32 seq=1 ttl=127 time=125 ms
From 192.168.2.1: bytes=32 seq=2 ttl=127 time=93 ms
From 192.168.2.1: bytes=32 seq=3 ttl=127 time=94 ms
From 192.168.2.1: bytes=32 seq=4 ttl=127 time=109 ms
From 192.168.2.1: bytes=32 seq=5 ttl=127 time=94 ms

--- 192.168.2.1 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 93/103/125 ms
```

Pinging pc4 to pc3

PC4

| Basic Config | Command | MCPacket | UdpPacket | Console |

```
Welcome to use PC Simulator!

PC>ping 192.168.2.1

Ping 192.168.2.1: 32 data bytes, Press Ctrl_C to break
From 192.168.2.1: bytes=32 seq=1 ttl=128 time=62 ms
From 192.168.2.1: bytes=32 seq=2 ttl=128 time=47 ms
From 192.168.2.1: bytes=32 seq=3 ttl=128 time=46 ms
From 192.168.2.1: bytes=32 seq=4 ttl=128 time=47 ms
From 192.168.2.1: bytes=32 seq=5 ttl=128 time=46 ms

--- 192.168.2.1 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 46/49/62 ms

PC>
```