Department of Computer Science and Engineering
Islamic University of Technology (IUT)
A subsidiary organ of OIC

Laboratory Report

CSE 4412: Data Communication and Networking Lab

Name	**:Nazia Karim Khan Oishee**
Student ID	**:200042137**
Section	**:1A**
Semester	**:Summer**
Academic Year	**:2021-2022**
Date of Submission	**:04.02.2023**
Lab No	**:05**

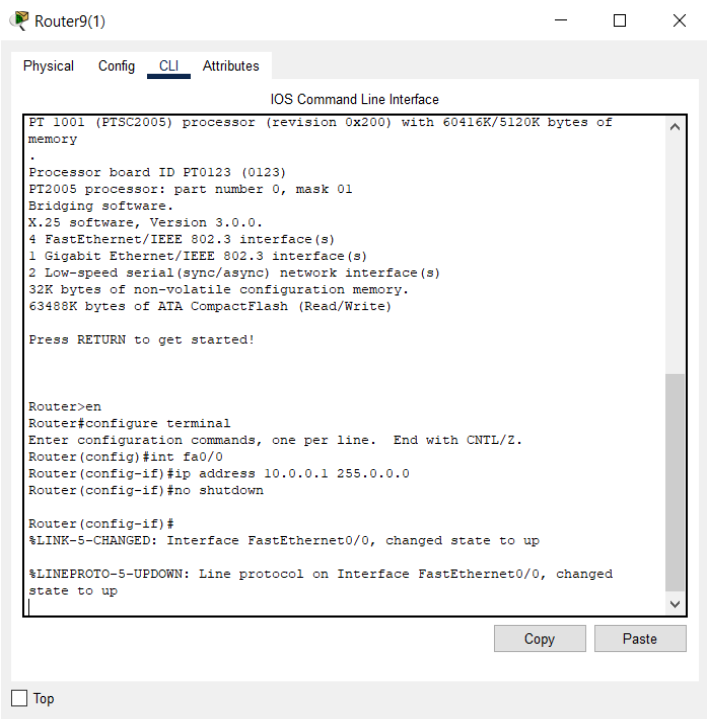
Title: Router Configuration and using static routing to connect multiple LANs in CISCO Packet Tracer.

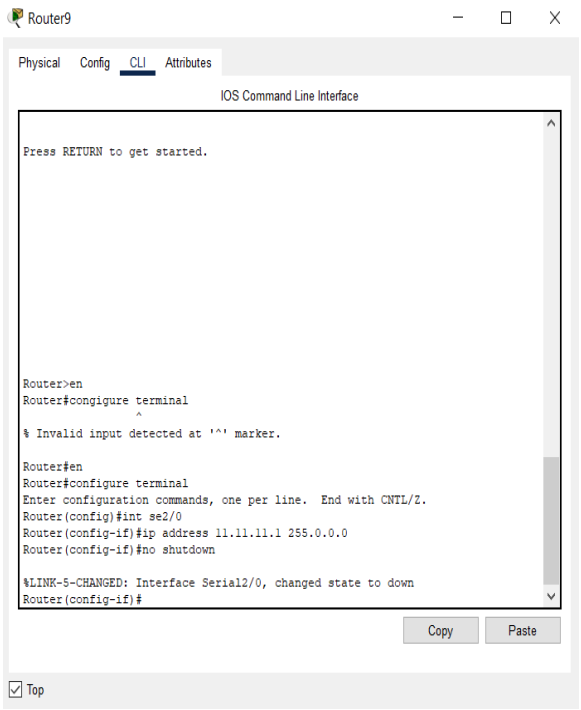
Objective:

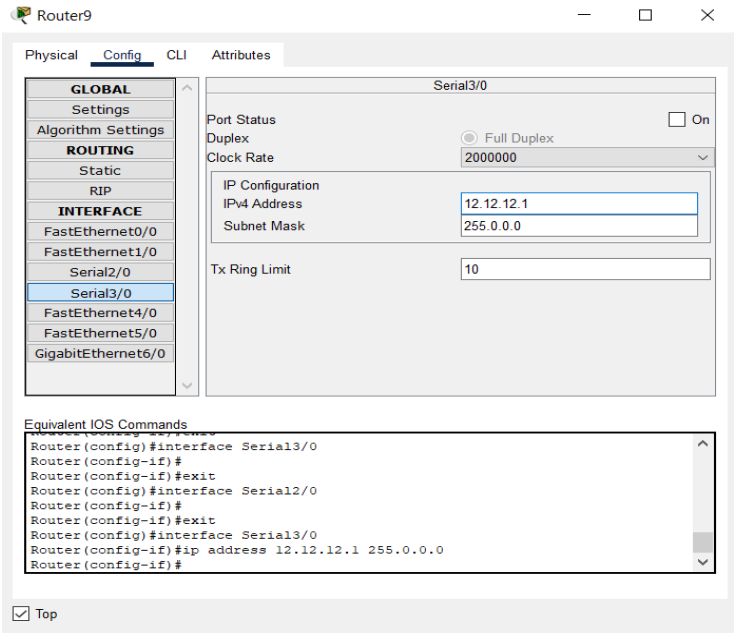
1. Understand Default Gateway
2. Difference between Switch and Router.
3. Router to Router Wiring [Using DCE and DTE Cables]
4. Static Routing Configuration
5. Default Route

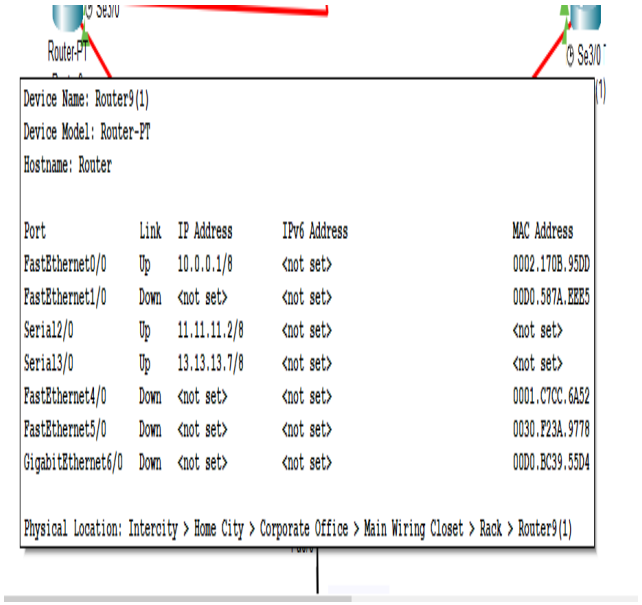
Devices/ software Used: Cisco Packet Tracer

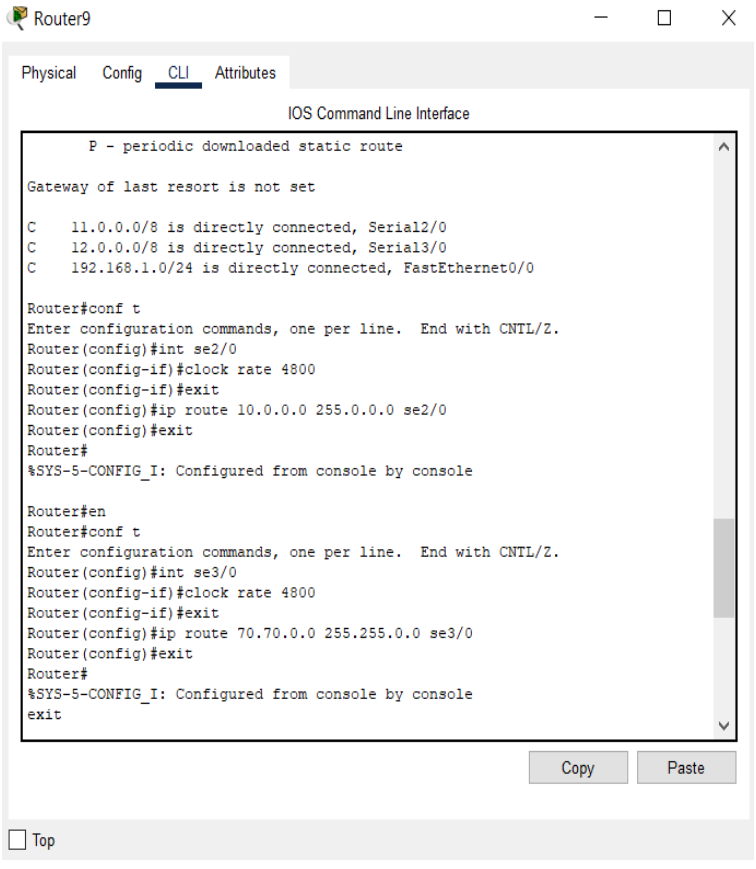
Diagram of the experiment:

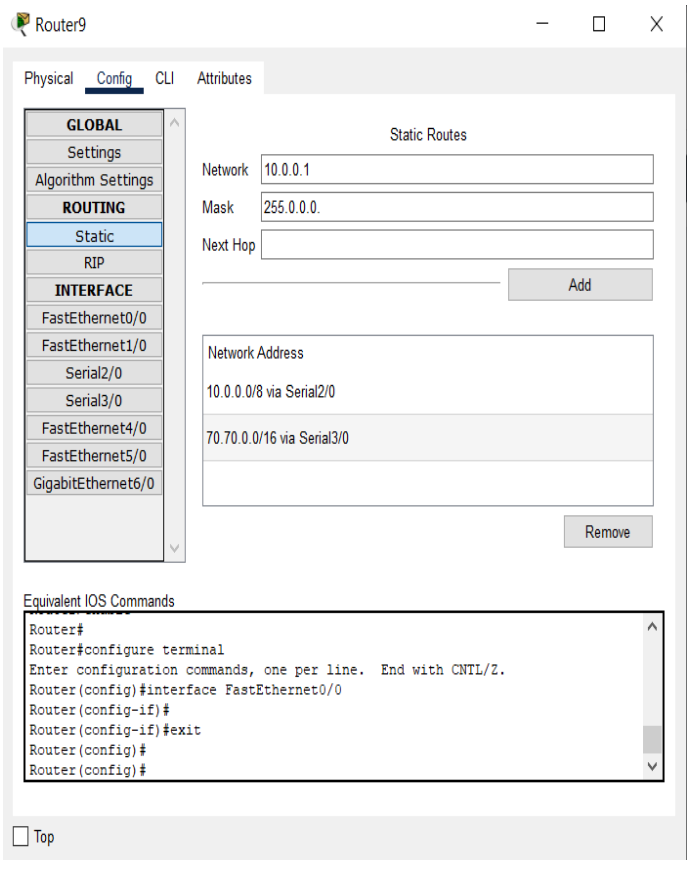


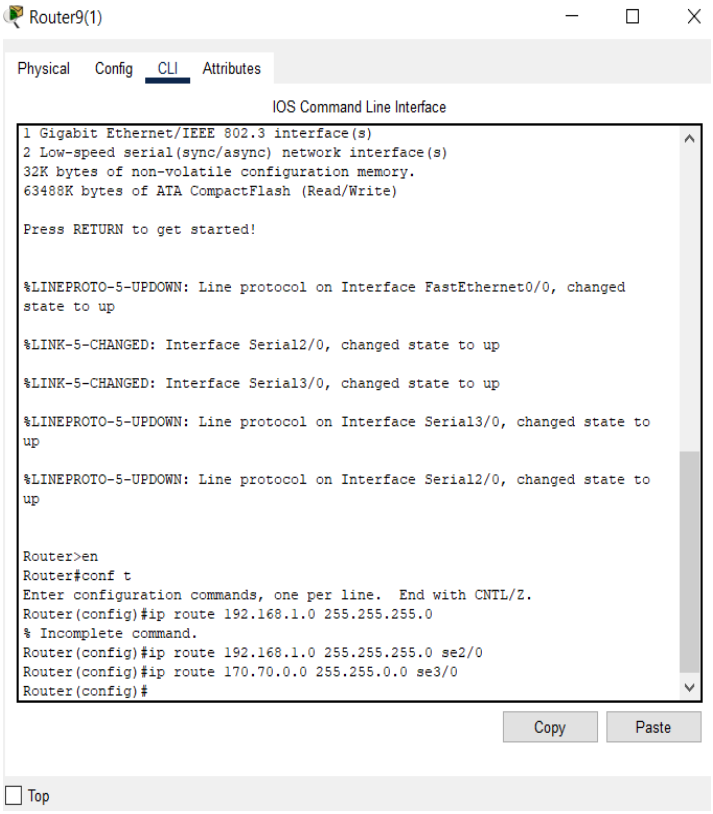


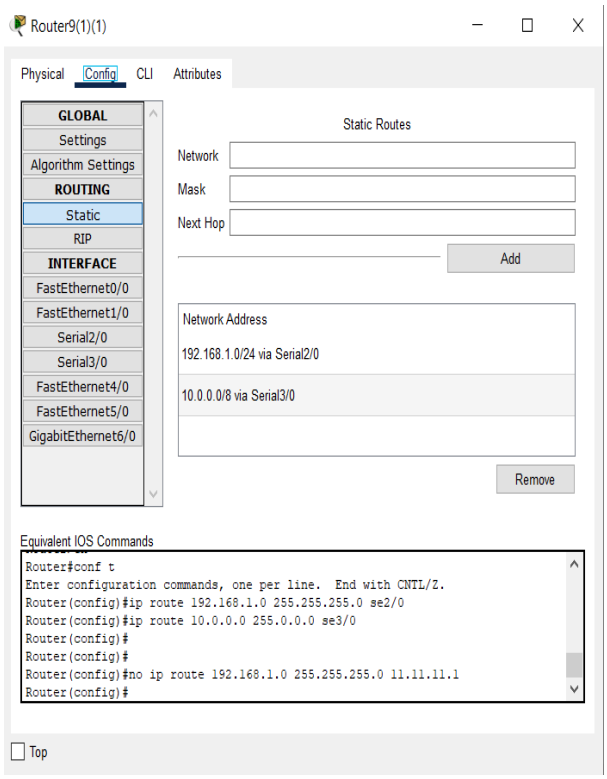

Router9
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
Serial2/0
Serial3/0
FastEthernet4/0
FastEthernet5/0
GigabitEthernet6/0
Serial3/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
12.12.12.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10
Equivalent IOS Commands
Router(config)#interface Serial3/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial3/0
Router(config-if)#ip address 12.12.12.1 255.0.0.0
Router(config-if)#
Top

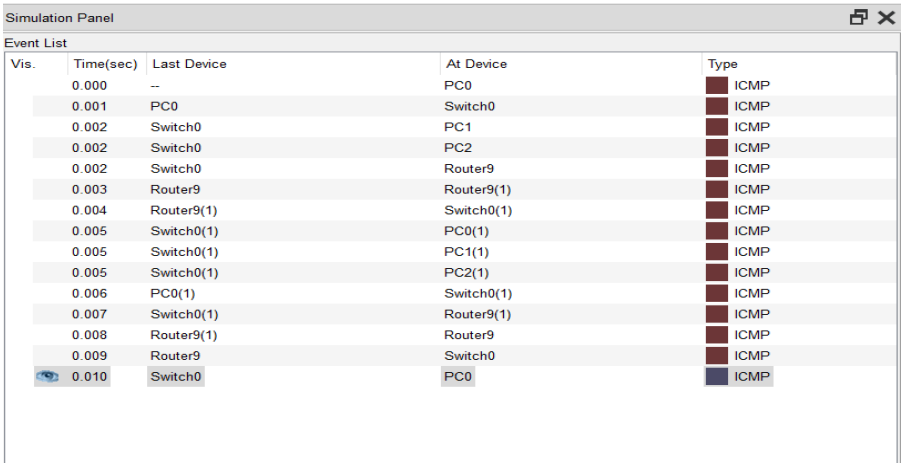

Router-PT
Device Name: Router9(1)
Device Model: Router-PT
Hostname: Router
Port Link IP Address IPv6 Address MAC Address
FastEthernet0/0 Up 10.0.0.1/8 <not set> 0002.170B.95DD
FastEthernet1/0 Down <not set> <not set> 00D0.587A.EEE5
Serial2/0 Up 11.11.11.2/8 <not set> <not set>
Serial3/0 Up 13.13.13.7/8 <not set> <not set>
FastEthernet4/0 Down <not set> <not set> 0001.C7CC.6A52
FastEthernet5/0 Down <not set> <not set> 0030.F23A.9778
GigabitEthernet6/0 Down <not set> <not set> 00D0.BC39.55D4
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > Router9(1)


Router9
Physical
Config
CLI
Attributes
IOS Command Line Interface
P - periodic downloaded static route
Gateway of last resort is not set
C 11.0.0.0/8 is directly connected, Serial2/0
C 12.0.0.0/8 is directly connected, Serial3/0
C 192.168.1.0/24 is directly connected, FastEthernet0/0
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int se2/0
Router(config-if)#clock rate 4800
Router(config-if)#exit
Router(config)#ip route 10.0.0.0 255.0.0.0 se2/0
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int se3/0
Router(config-if)#clock rate 4800
Router(config-if)#exit
Router(config)#ip route 70.70.0.0 255.255.0.0 se3/0
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
exit
Copy
Paste
Top


Router9
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
Serial2/0
Serial3/0
FastEthernet4/0
FastEthernet5/0
GigabitEthernet6/0
Static Routes
Network
10.0.0.1
Mask
255.0.0.0
Next Hop
Add
Network Address
10.0.0.0/8 via Serial2/0
70.70.0.0/16 via Serial3/0
Remove
Equivalent IOS Commands
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
Top







Theory:

Default Gateway:

The default gateway in a network device depicts the ip address of the network router that acts as the first hop.

A network packet has to pass through multiple network devices to reach its destination system from its source. Each time a packet passes through a network device, it is said to be a hop.
So, a PC uses the default route to send data to another network if the destination end system is not a part of the local network.

(If it is not set, what may happen?)

If the default gateway is not set, then the end system will not be able to communicate with other end systems belonging to different networks. The device then would be able to communicate with the devices belonging only to the same local network.

Difference between Switch and Router:
Switches and routers both are different network devices but a switch operates on OSI layer 2 whereas a router operates on OSI layer 3.
A switch is used to connect devices within a local network, while a router is used to connect multiple networks.
A switch uses MAC addresses of devices to manage network traffic, while a router uses IP addresses to manage network traffic.

Router to Router Wiring [Using DCE and DTE Cables]
Both types of cables can be used to connect routers. The difference is that DCE cables are used to connect DTE devices to DTE devices, while DTE cables are used for connecting DTE devices to other DTE devices.
DCE devices provide clocking and flow control for the communication link. The clocking signal ensures that the communication is smooth and synchronized and that the data is transmitted efficiently.
DTE cables transmit data one bit at a time in a serial manner.

Static Route
Static route is a manually configured route which provides a specific path for network traffic. They are useful and suited to simple networks. They are less error prone than dynamic routing protocols. As static routes do not

dynamically adapt to changes in network traffic, they are not suitable for large and complex networks.

Default Route

A default route is also known as default gateway which is the route that is used to direct network traffic to a specific destination when no other route can be found. When a device wants to send a packet to a destination that is not enlisted in the routing table, it sends it to the default gateway.

Configuration of Routers:

First, I went to the router's CLI option and pressed enter. After that , I wrote en and pressed enter. Then write conf t and enter.

After that to set the ip address of the ports I selected a port through the command: int [poort_name] and wrote the following:
ip address [network id of the connecting network] [subnet mask]. Then I wrote no shutdown.

After that I selected a router and assigned IP addresses to the serial ports. To do so I followed the steps as previous and I wrote no shutdown in the CLI to activate them.

Now to configure the routing I entered these commands :
ip route [destination network id] [subnet mask] [serial port number].
Here in the destination network id ,I put the ip address' first 3 octets as it is and put the last octet as 0. Because the first 3 octets determine network id and 4th octet determines host id.

I followed the steps for every router and for each serial port in the router.

Observation:

The default gateway determines a PC's first hop. So when we ping to a PC of a different network the packet is sent to the router. Each router is connected to other networks. When a packet arrives at a router, it reads the packet's destination address and forwards it to the appropriate network. The other routers do the same and eventually deliver the packet to the destination. When the destination PC receives the packet, it sends a confirmation message to the sender PC through network devices i.e. routers.

Challenges:

While configuring the routers, I faced most difficulties during the task . I was putting the whole IP address ignorantly. So it took me some time to realize that a router connects to another network only. So we don't need to put the last octet of the IP address.