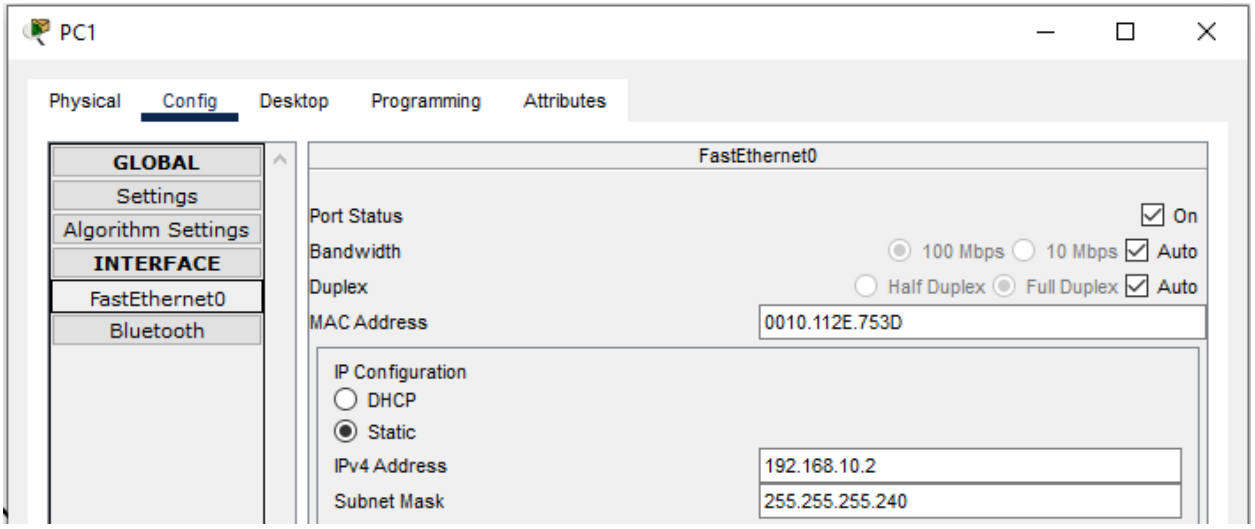
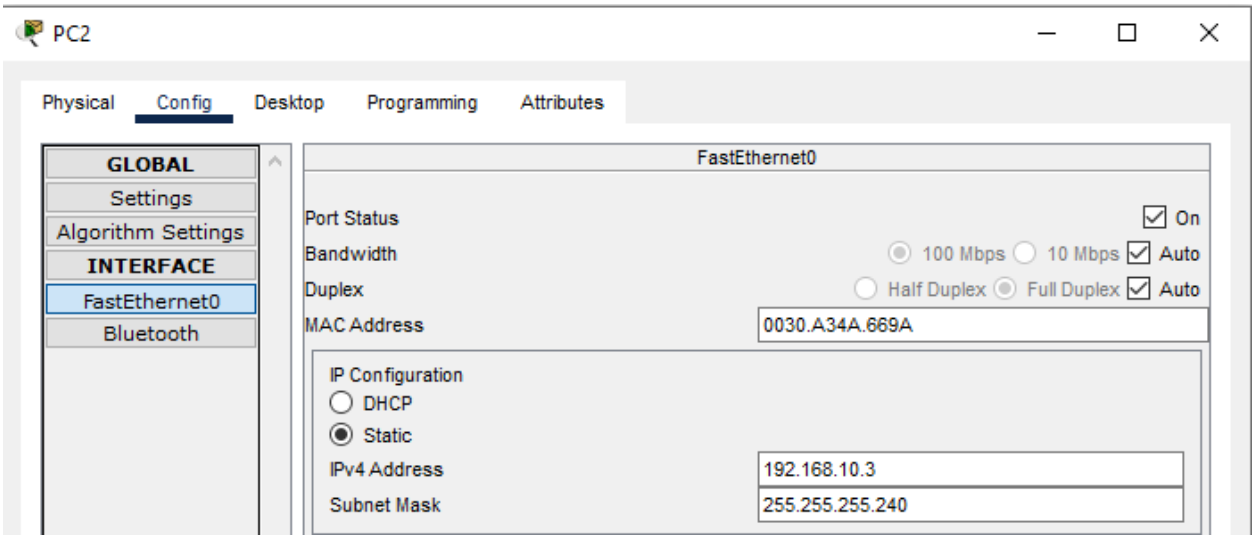
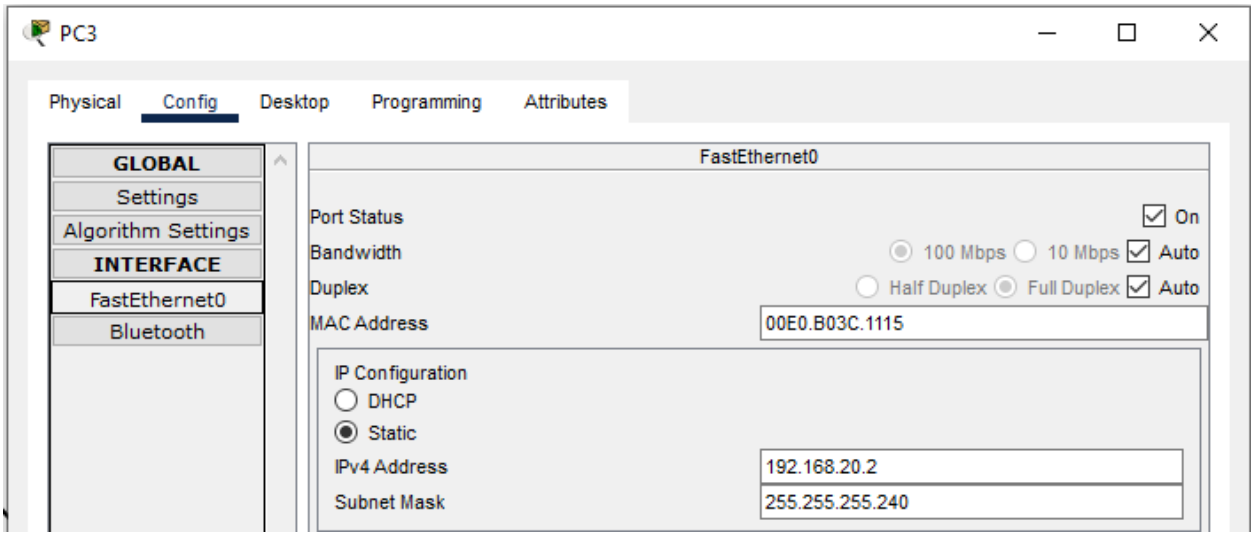
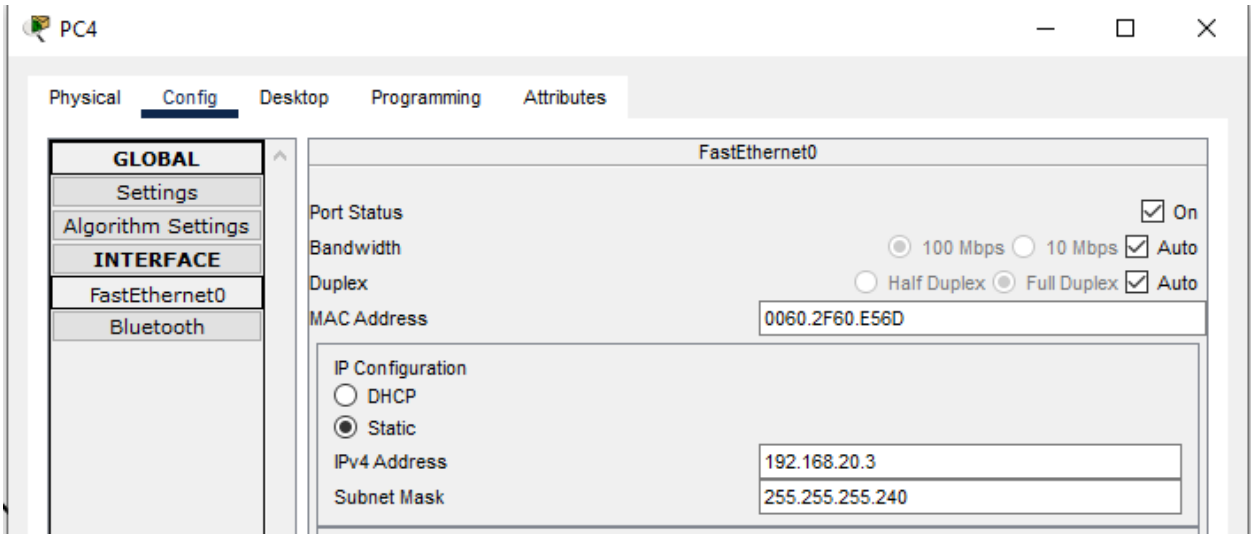
Lawton Pittenger
CNT 4703
Lab 6
LAB COMPLETED REMOTELY

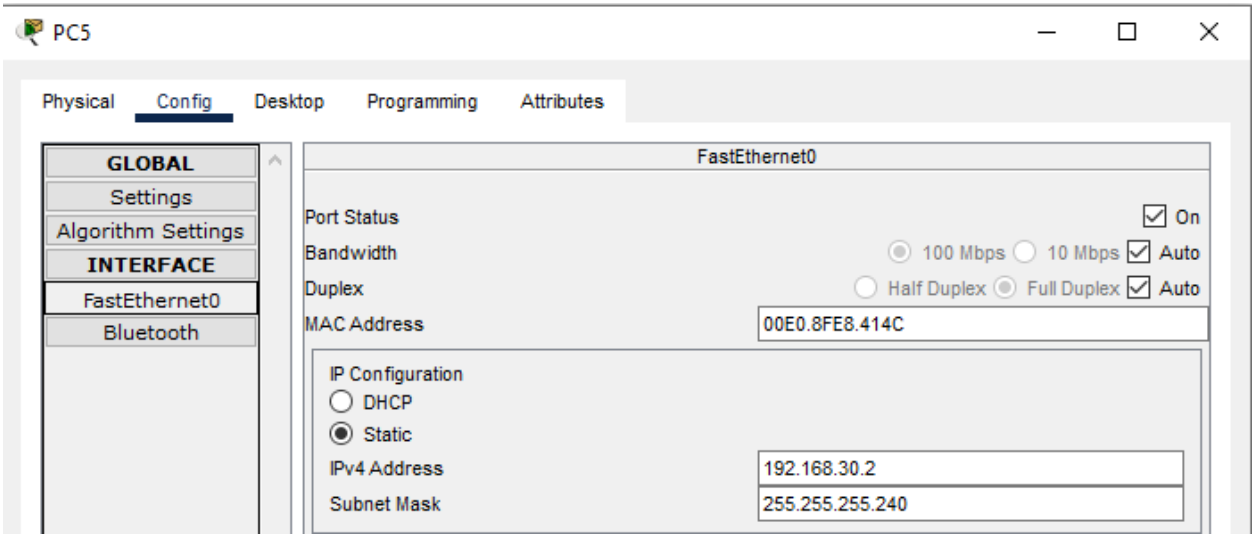
1. Cisco Packet Tracer file (attempt to complete prior to Lab)
2. Screen Shots of Workstation(s)
   a. IPv4 Configurations

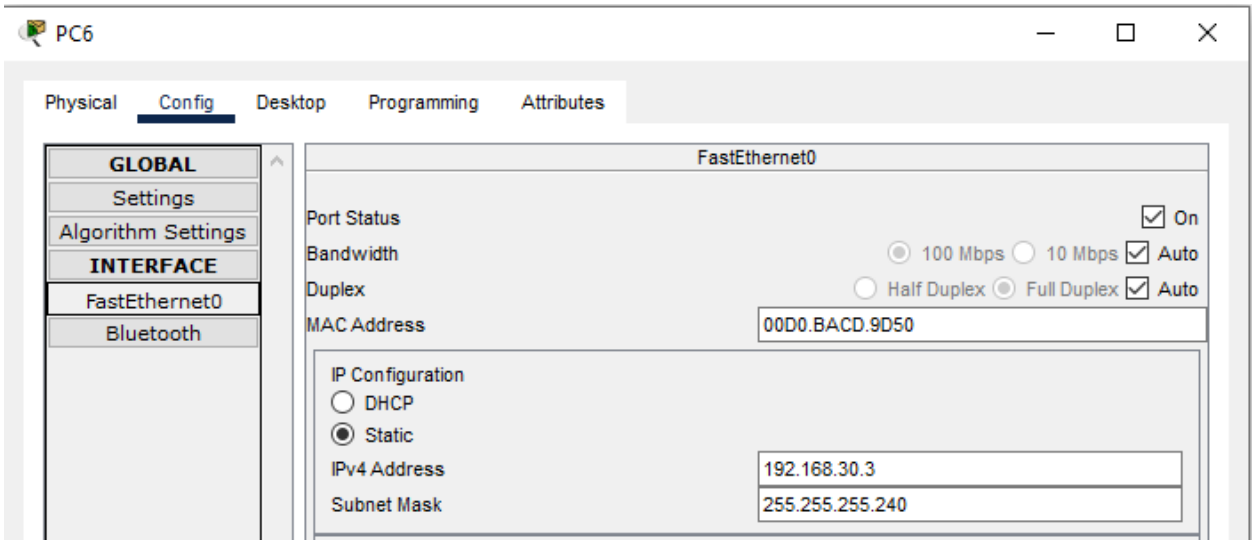


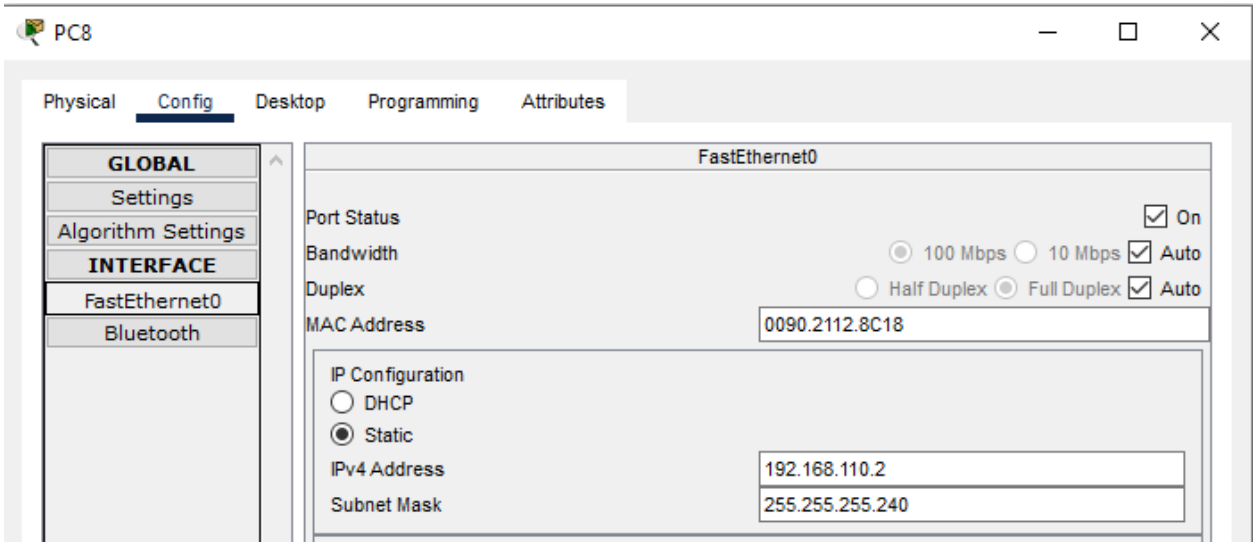


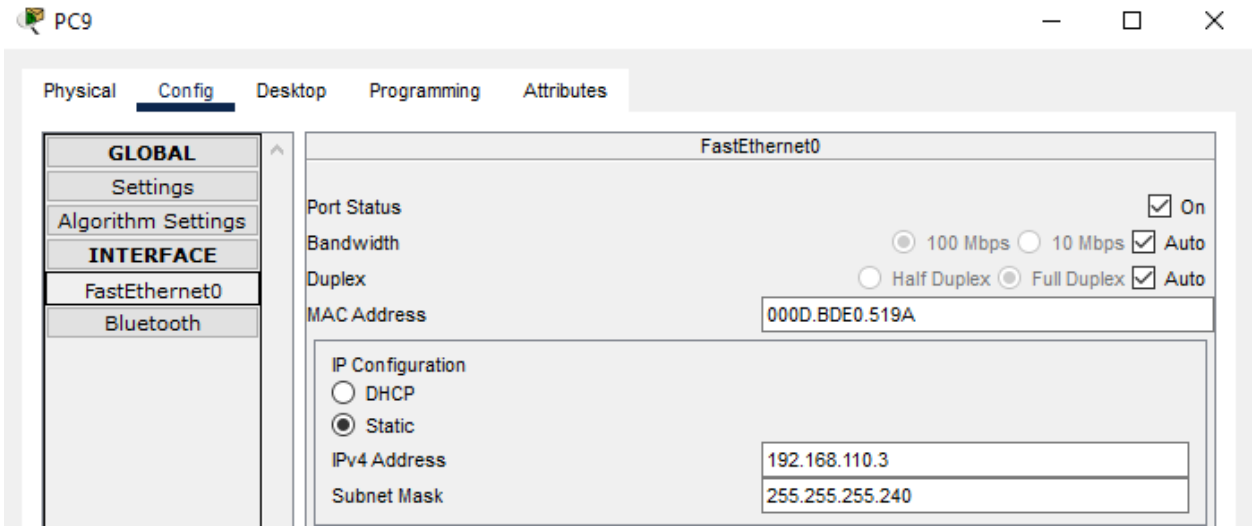

PC3
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.B03C.1115
IP Configuration
DHCP
Static
IPv4 Address
192.168.20.2
Subnet Mask
255.255.255.240

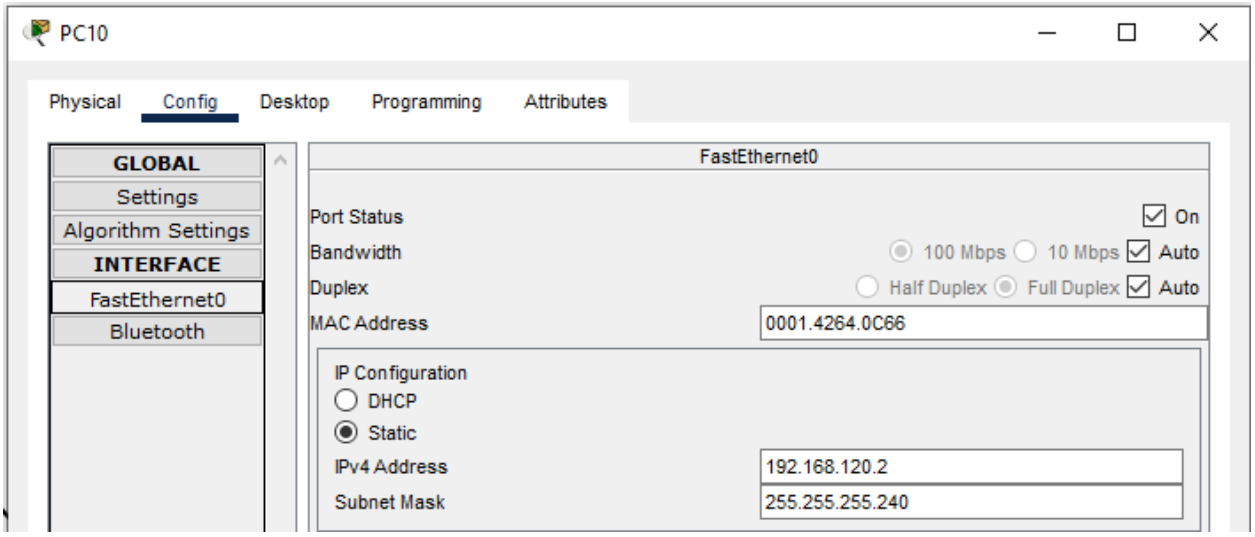

PC4
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0060.2F60.E56D
IP Configuration
DHCP
Static
IPv4 Address
192.168.20.3
Subnet Mask
255.255.255.240

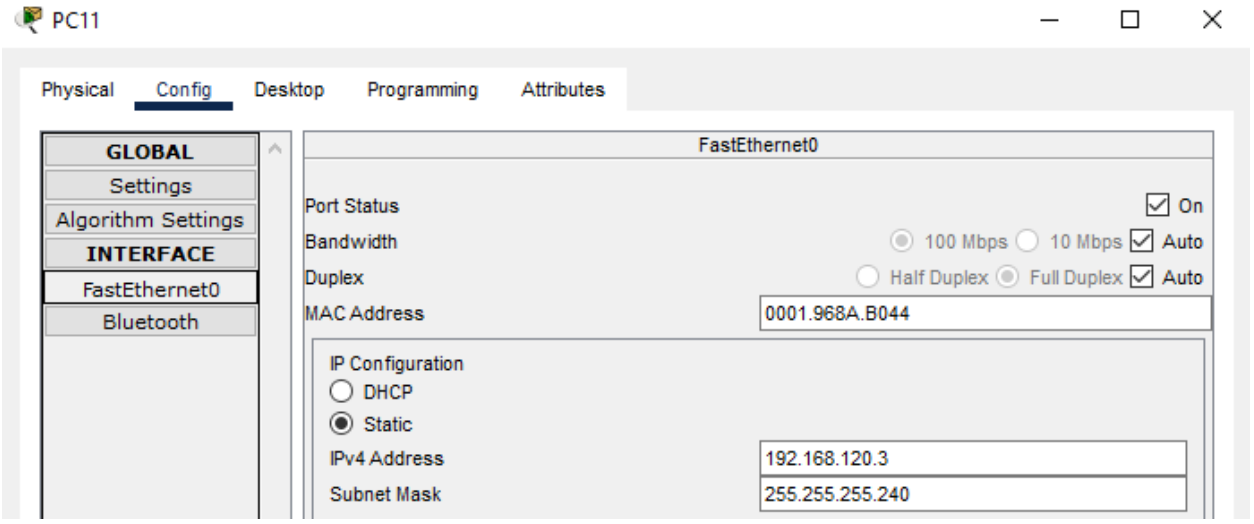

PC5
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.8FE8.414C
IP Configuration
DHCP
Static
IPv4 Address
192.168.30.2
Subnet Mask
255.255.255.240

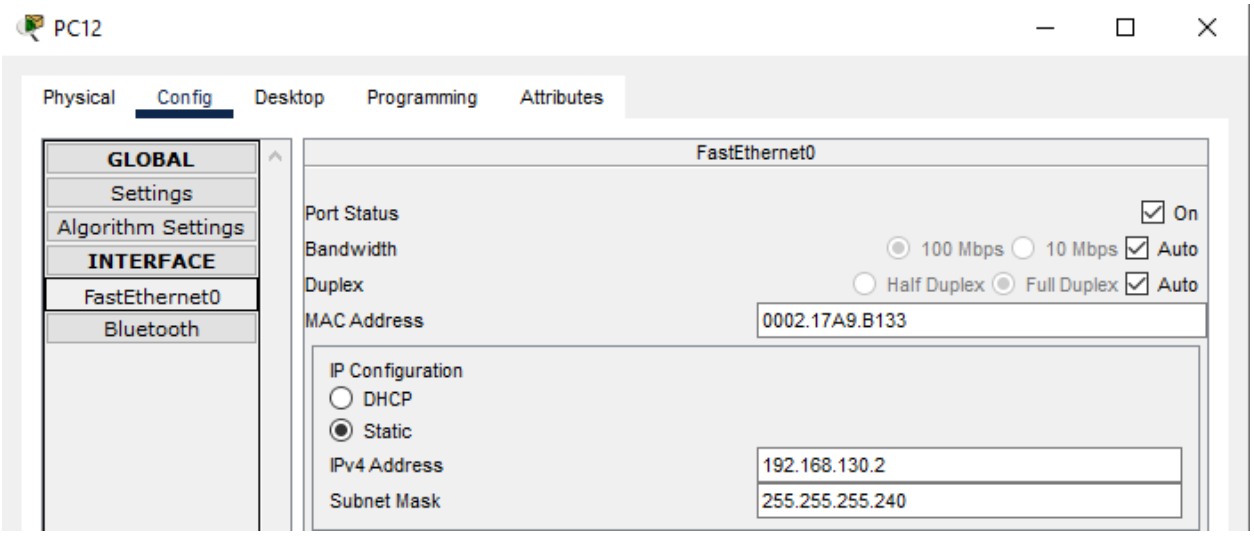

PC6
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00D0.BACD.9D50
IP Configuration
DHCP
Static
IPv4 Address
192.168.30.3
Subnet Mask
255.255.255.240

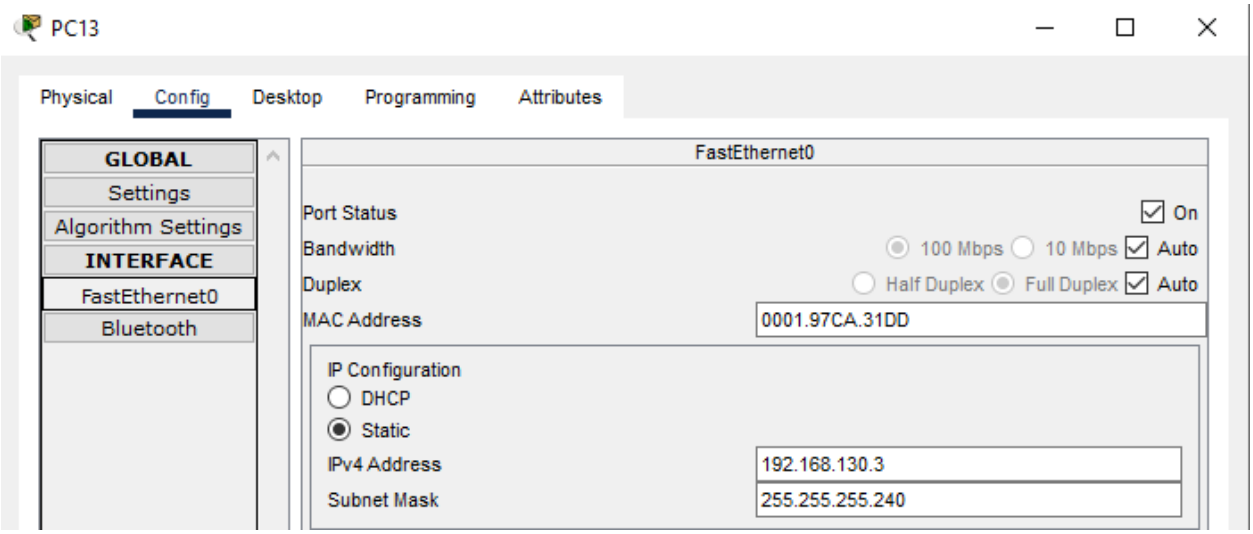

PC8
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0090.2112.8C18
IP Configuration
DHCP
Static
IPv4 Address
192.168.110.2
Subnet Mask
255.255.255.240


PC9
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
000D.BDE0.519A
IP Configuration
DHCP
Static
IPv4 Address
192.168.110.3
Subnet Mask
255.255.255.240

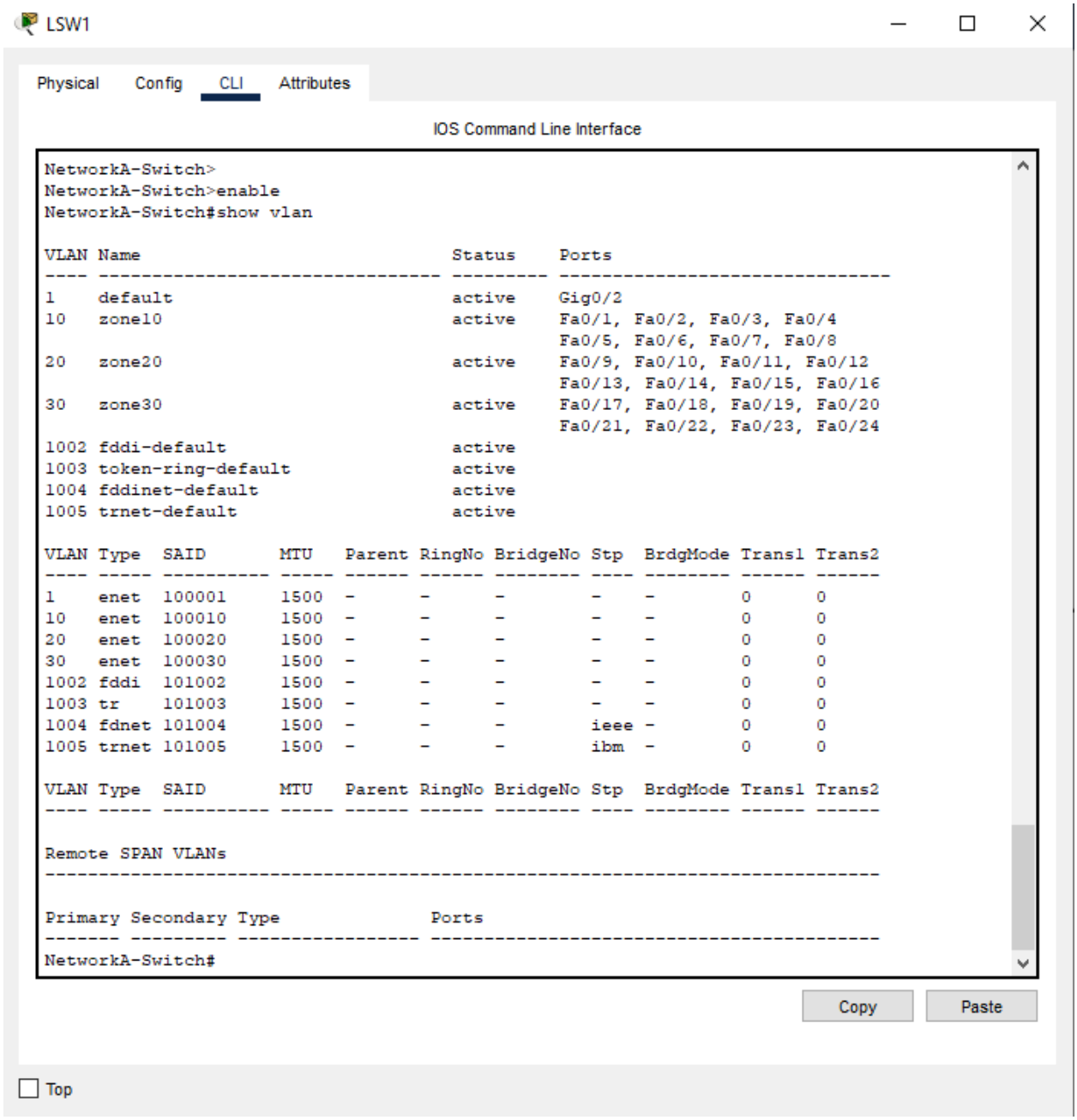

PC10
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0001.4264.0C66
IP Configuration
DHCP
Static
IPv4 Address
192.168.120.2
Subnet Mask
255.255.255.240

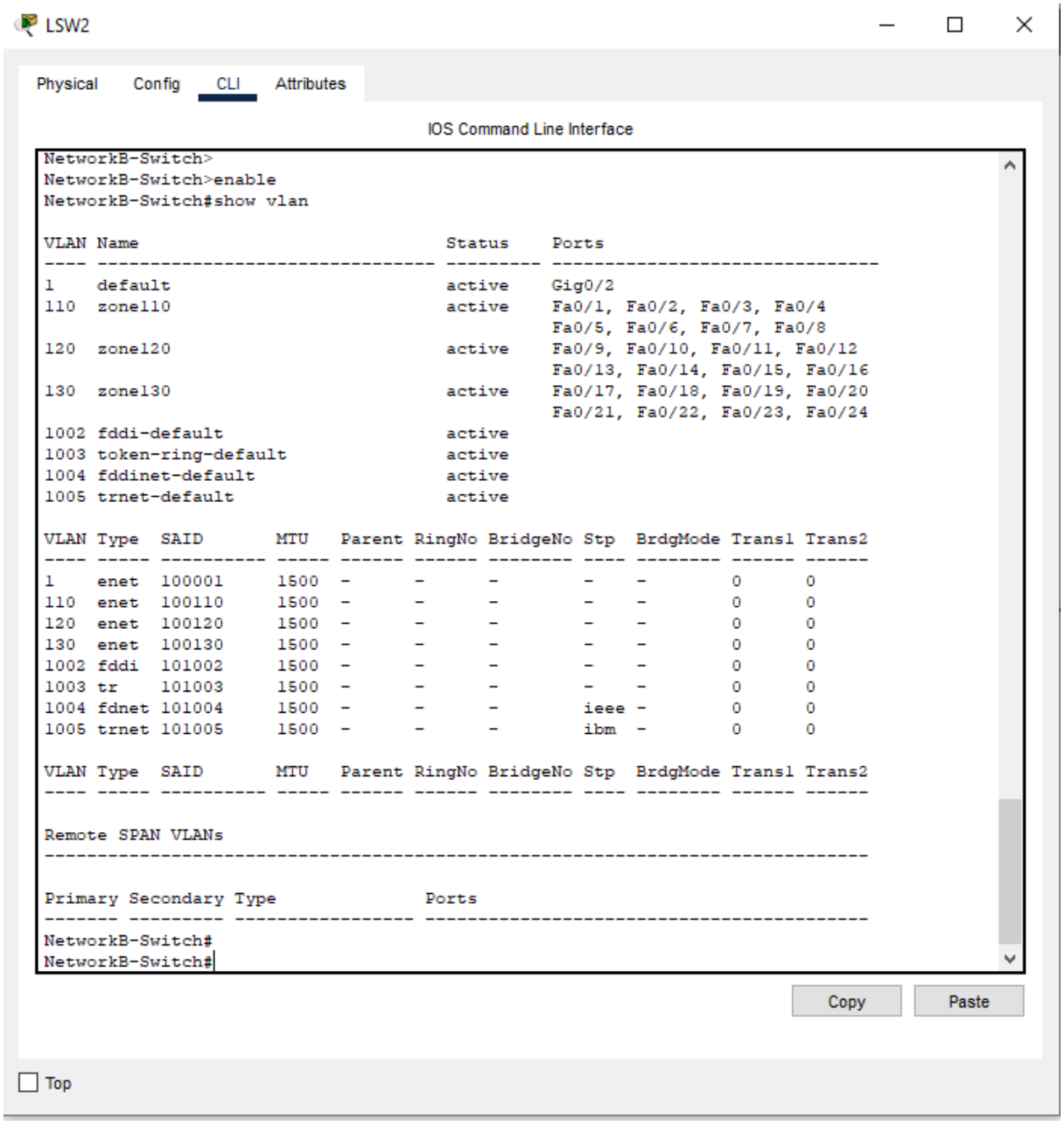

PC11
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0001.968A.B044
IP Configuration
DHCP
Static
IPv4 Address
192.168.120.3
Subnet Mask
255.255.255.240


PC12
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0002.17A9.B133
IP Configuration
DHCP
Static
IPv4 Address
192.168.130.2
Subnet Mask
255.255.255.240



3. Screenshots of Switch A/B
   a. #show vlan


LSW1
Physical
Config
CLI
Attributes
IOS Command Line Interface
NetworkA-Switch>
NetworkA-Switch>enable
NetworkA-Switch#show vlan
VLAN Name Status Ports
---- -------------------------------- --------- -------------------------------
1 default active Gig0/2
10 zone10 active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
20 zone20 active Fa0/9, Fa0/10, Fa0/11, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
30 zone30 active Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Fa0/24
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1 enet 100001 1500 - - - - - 0 0
10 enet 100010 1500 - - - - - 0 0
20 enet 100020 1500 - - - - - 0 0
30 enet 100030 1500 - - - - - 0 0
1002 fddi 101002 1500 - - - - - 0 0
1003 tr 101003 1500 - - - - - 0 0
1004 fdnet 101004 1500 - - - ieee - 0 0
1005 trnet 101005 1500 - - - ibm - 0 0
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
Remote SPAN VLANs
Primary Secondary Type Ports
NetworkA-Switch#
Copy
Paste
Top



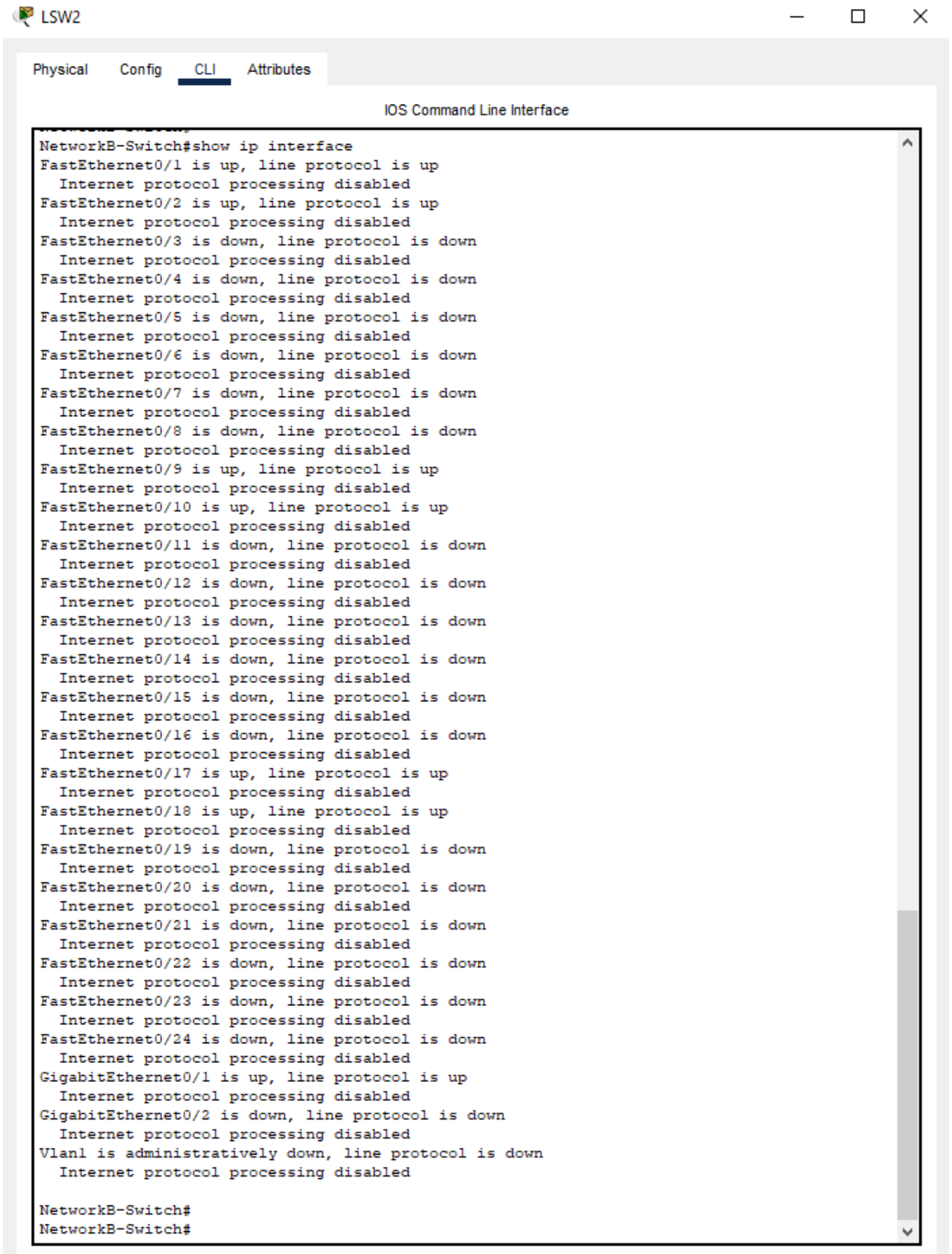
b. #show ip interface

LSW1

Physical Config CLI Attributes

IOS Command Line Interface

```
Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
NetworkA-Switch#show ip interface
FastEthernet0/1 is up, line protocol is up
  Internet protocol processing disabled
FastEthernet0/2 is up, line protocol is up
  Internet protocol processing disabled
FastEthernet0/3 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/4 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/5 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/6 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/7 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/8 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/9 is up, line protocol is up
  Internet protocol processing disabled
FastEthernet0/10 is up, line protocol is up
  Internet protocol processing disabled
FastEthernet0/11 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/12 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/13 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/14 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/15 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/16 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/17 is up, line protocol is up
  Internet protocol processing disabled
FastEthernet0/18 is up, line protocol is up
  Internet protocol processing disabled
FastEthernet0/19 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/20 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/21 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/22 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/23 is down, line protocol is down
  Internet protocol processing disabled
FastEthernet0/24 is down, line protocol is down
  Internet protocol processing disabled
GigabitEthernet0/1 is up, line protocol is up
  Internet protocol processing disabled
GigabitEthernet0/2 is down, line protocol is down
  Internet protocol processing disabled
Vlan1 is administratively down, line protocol is down
  Internet protocol processing disabled

NetworkA-Switch#
NetworkA-Switch#
```



c. Front of Switch w/Cables Connected

4. Screenshots of Router A/B
    a. Router 1 & 2: Running Configuration
        i. [host]#show run

LAB-R1

Physical Config CLI Attributes

```
Network-A-Router#show run
Building configuration...

Current configuration : 1221 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Network-A-Router
!
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO2901/K9 sn FTX152429SS-
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface GigabitEthernet0/1
 ip address 172.168.1.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1.1
 encapsulation dot1Q 1 native
 ip address 192.168.1.1 255.255.255.0
!
interface GigabitEthernet0/1.10
 encapsulation dot1Q 10
```

```
interface GigabitEthernet0/1.10
 encapsulation dot1Q 10
 ip address 192.168.10.1 255.255.255.240
!
interface GigabitEthernet0/1.20
 encapsulation dot1Q 20
 ip address 192.168.20.1 255.255.255.240
!
interface GigabitEthernet0/1.30
 encapsulation dot1Q 30
 ip address 192.168.30.1 255.255.255.240
!
interface Serial0/0/0
 ip address 10.10.10.1 255.255.255.252
 clock rate 2000000
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
ip classless
ip route 0.0.0.0 0.0.0.0 10.10.10.2
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end


Network-A-Router#
Network-A-Router#
```

LAB-R2

Physical Config CLI Attributes

```
Network-B-Router>enable
Network-B-Router#show run
Building configuration...

Current configuration : 1211 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Network-B-Router
!
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO2901/K9 sn FTX15244C6W-
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface GigabitEthernet0/1
 ip address 172.168.2.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1.1
 encapsulation dot1Q 1 native
 ip address 192.168.200.1 255.255.255.0
!
interface GigabitEthernet0/1.110
```

```
interface GigabitEthernet0/1.110
 encapsulation dot1Q 110
 ip address 192.168.110.1 255.255.255.240
!
interface GigabitEthernet0/1.120
 encapsulation dot1Q 120
 ip address 192.168.120.1 255.255.255.240
!
interface GigabitEthernet0/1.130
 encapsulation dot1Q 30
 ip address 192.168.130.1 255.255.255.240
!
interface Serial0/0/0
 ip address 10.10.10.2 255.255.255.252
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
ip classless
ip route 0.0.0.0 0.0.0.0 10.10.10.1
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end


Network-B-Router#
Network-B-Router#
Network-B-Router#
Network-B-Router#
```

ii. [host]#show ip int brief

```
Network-A-Router#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  administratively down down
GigabitEthernet0/1     172.168.1.1     YES manual up                    up
GigabitEthernet0/1.1   192.168.1.1     YES manual up                    up
GigabitEthernet0/1.10  192.168.10.1    YES manual up                    up
GigabitEthernet0/1.20  192.168.20.1    YES manual up                    up
GigabitEthernet0/1.30  192.168.30.1    YES manual up                    up
Serial0/0/0            10.10.10.1      YES manual up                    up
Serial0/0/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

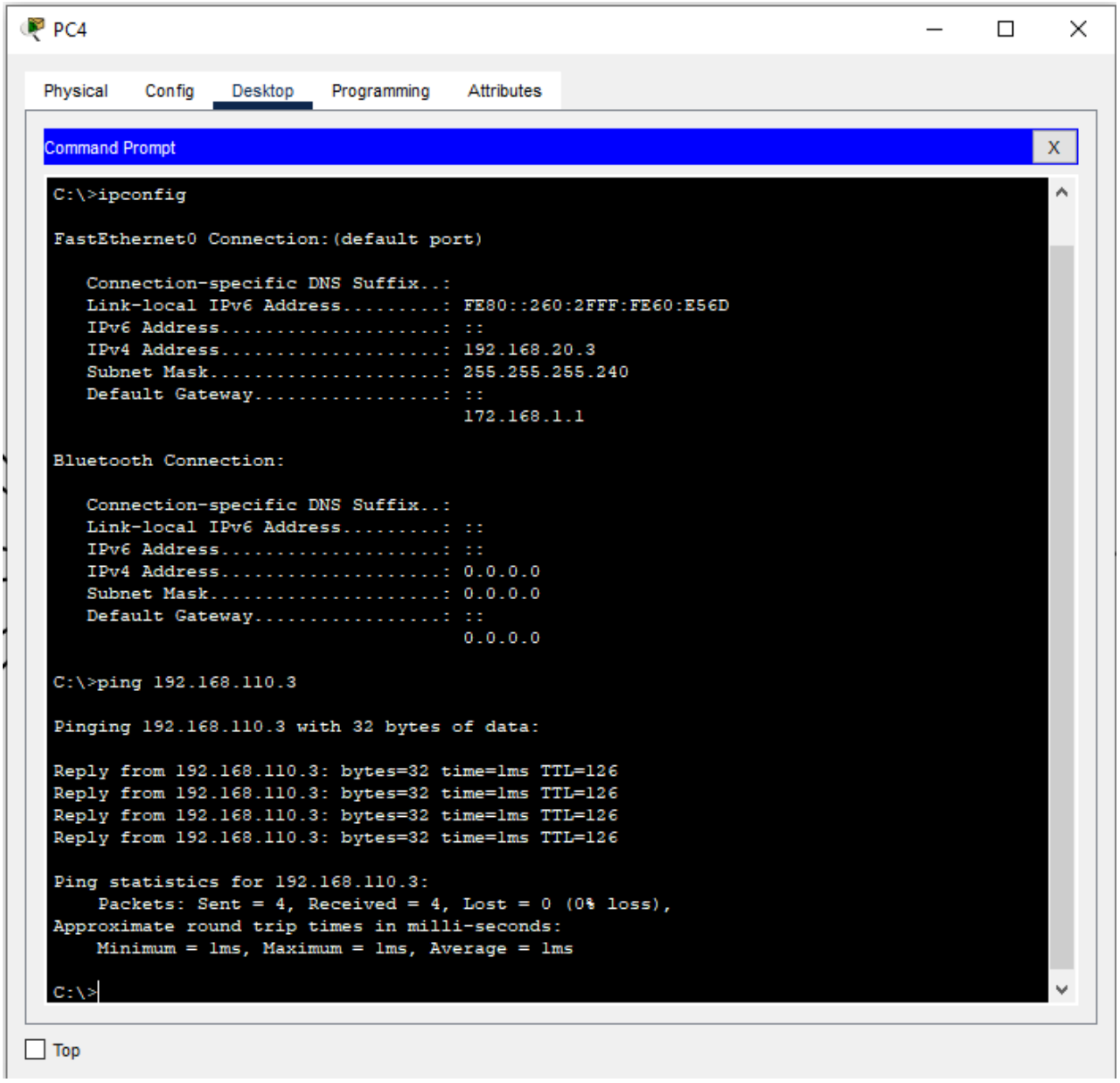
```
Network-B-Router#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  administratively down down
GigabitEthernet0/1     172.168.2.1     YES manual up                    up
GigabitEthernet0/1.1   192.168.200.1   YES manual up                    up
GigabitEthernet0/1.110 192.168.110.1   YES manual up                    up
GigabitEthernet0/1.120 192.168.120.1   YES manual up                    up
GigabitEthernet0/1.130 192.168.130.1   YES manual up                    up
Serial0/0/0            10.10.10.2      YES manual up                    up
Serial0/0/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
Network-B-Router#
```

iii. [host]#show ip route

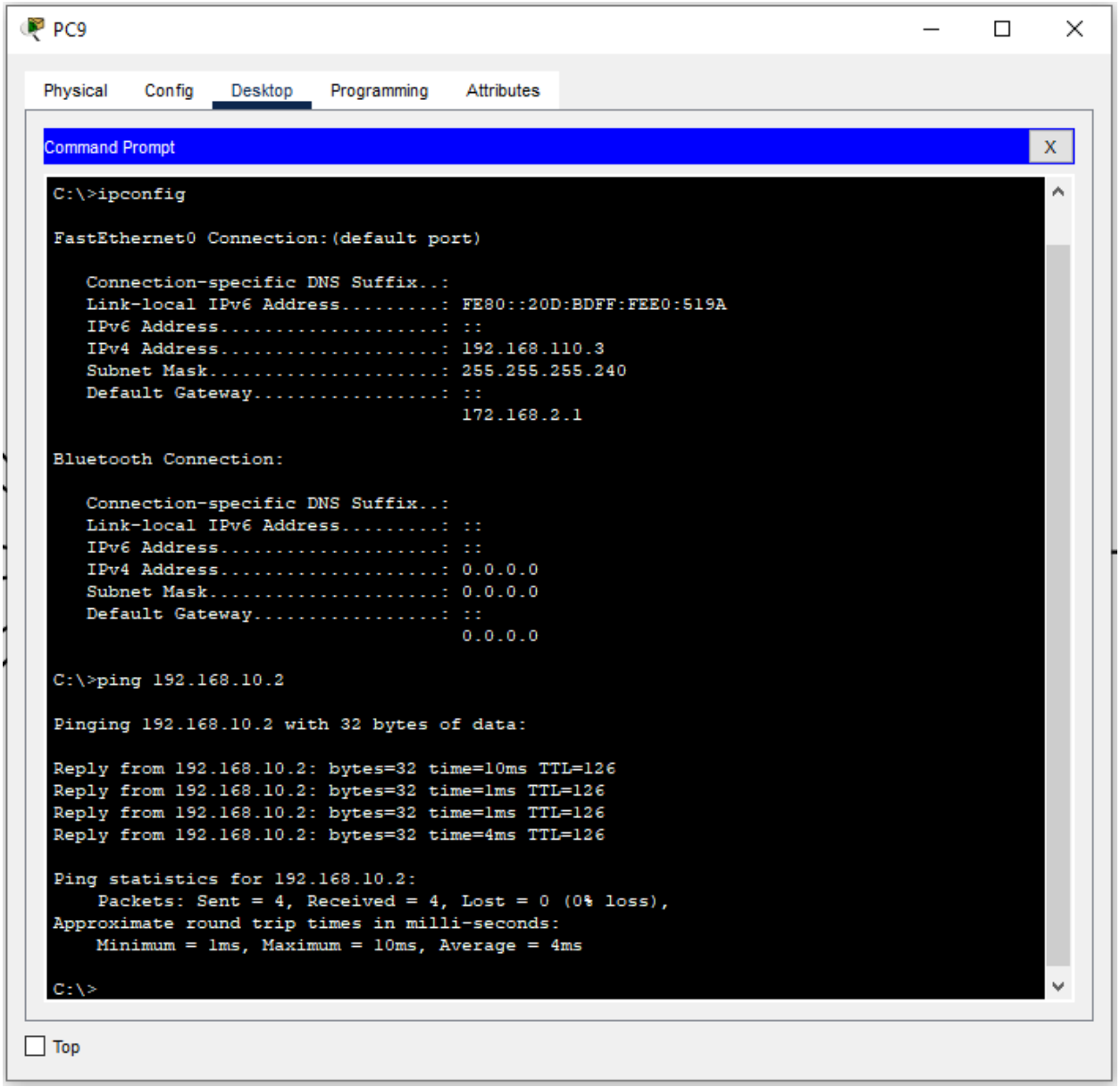
```
Network-A-Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external 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 10.10.10.2 to network 0.0.0.0

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.10.10.0/30 is directly connected, Serial0/0/0
L       10.10.10.1/32 is directly connected, Serial0/0/0
     172.168.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.168.1.0/24 is directly connected, GigabitEthernet0/1
L       172.168.1.1/32 is directly connected, GigabitEthernet0/1
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/1.1
L       192.168.1.1/32 is directly connected, GigabitEthernet0/1.1
     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/28 is directly connected, GigabitEthernet0/1.10
L       192.168.10.1/32 is directly connected, GigabitEthernet0/1.10
     192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.20.0/28 is directly connected, GigabitEthernet0/1.20
L       192.168.20.1/32 is directly connected, GigabitEthernet0/1.20
     192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.30.0/28 is directly connected, GigabitEthernet0/1.30
L       192.168.30.1/32 is directly connected, GigabitEthernet0/1.30
S*   0.0.0.0/0 [1/0] via 10.10.10.2

Network-A-Router#
```

```
Network-B-Router#show ip route
Codes: L - local, C - connected, S - static, 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 10.10.10.1 to network 0.0.0.0

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.10.10.0/30 is directly connected, Serial0/0/0
L       10.10.10.2/32 is directly connected, Serial0/0/0
     172.168.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.168.2.0/24 is directly connected, GigabitEthernet0/1
L       172.168.2.1/32 is directly connected, GigabitEthernet0/1
     192.168.110.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.110.0/28 is directly connected, GigabitEthernet0/1.110
L       192.168.110.1/32 is directly connected, GigabitEthernet0/1.110
     192.168.120.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.120.0/28 is directly connected, GigabitEthernet0/1.120
L       192.168.120.1/32 is directly connected, GigabitEthernet0/1.120
     192.168.130.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.130.0/28 is directly connected, GigabitEthernet0/1.130
L       192.168.130.1/32 is directly connected, GigabitEthernet0/1.130
     192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.200.0/24 is directly connected, GigabitEthernet0/1.1
L       192.168.200.1/32 is directly connected, GigabitEthernet0/1.1
S*   0.0.0.0/0 [1/0] via 10.10.10.1

Network-B-Router#
```

Ping from Network A to Network B



Ping from Network B to Network A


PC9
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
C:\>ipconfig
FastEthernet0 Connection:(default port)
Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: FE80::20D:BDFF:FEE0:519A
IPv6 Address.....: ::
IPv4 Address.....: 192.168.110.3
Subnet Mask.....: 255.255.255.240
Default Gateway.....: ::
172.168.2.1
Bluetooth Connection:
Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
0.0.0.0
C:\>ping 192.168.10.2
Pinging 192.168.10.2 with 32 bytes of data:
Reply from 192.168.10.2: bytes=32 time=10ms TTL=126
Reply from 192.168.10.2: bytes=32 time=1ms TTL=126
Reply from 192.168.10.2: bytes=32 time=1ms TTL=126
Reply from 192.168.10.2: bytes=32 time=4ms TTL=126
Ping statistics for 192.168.10.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 10ms, Average = 4ms
C:\>
Top

Lab Questions

1. What does TCP/IP stand for?

- Transmission Control Protocol / Internet Protocol
    - TCP/IP are a set of networking protocols that define how data is transmitted over the internet. TCP is responsible for ensuring that data is transmitted reliably from one device to another, while IP is responsible for addressing and routing the data to its destination. Together, TCP/IP provides the foundation for communication on the internet.

2. What does UDP stand for?

- User Datagram Protocol
    - It is a transport layer protocol in the TCP/IP suite, similar to TCP. However, UDP is a connectionless protocol, meaning it doesn't establish a dedicated end-to-end connection between the sender and receiver before transmitting data. Instead, it sends data packets, called datagrams, to the recipient without any guarantee that they will be received or in the correct order. This makes UDP faster than TCP but less reliable, which makes it a better choice for applications that can tolerate data loss, such as online gaming, live video streaming, and voice-over-IP (VoIP) applications.

3. How does TCP differ from UDP?

- As mentioned in #2, TCP and UDP differ in the following ways:
    1. Connection-oriented vs. connectionless: TCP is a connection-oriented protocol, which means it establishes a dedicated end-to-end connection between the sender and receiver before transmitting data. UDP, on the other hand, is connectionless, which means it doesn't establish a connection before transmitting data.
    2. Reliability: TCP is a reliable protocol, which means it guarantees that all data is transmitted correctly and in the correct order. It does this by using acknowledgments, retransmissions, and flow control mechanisms. UDP is an unreliable protocol, which means it doesn't guarantee that all data is transmitted correctly or in the correct order.
    3. Overhead: TCP has more overhead than UDP, which means it requires more resources to establish a connection and maintain reliability. UDP, on the other hand, has less overhead, which makes it faster and more efficient.
    4. Applications: TCP is typically used for applications that require reliable data transmission, such as file transfers, email, and web browsing. UDP is typically used for applications that can tolerate some data loss, such as online gaming, live video streaming, and VoIP.
- Overall, TCP and UDP are both important protocols that serve different purposes. TCP is ideal for applications that require reliable data transmission, while UDP is ideal for applications that require fast, efficient data transmission but can tolerate some data loss.

    a. How are these protocols similar?

    - TCP and UDP are both transport layer protocols in the TCP/IP suite, and they share some similarities:
        - Packet structure: Both TCP and UDP use packets to transmit data over the network. These packets include header information that identifies the source and destination IP addresses and ports, as well as the length and checksum of the data.

    - Network layer protocols: Both TCP and UDP rely on the underlying IP protocol for routing and addressing. They both use IP addresses to identify the source and destination of the data, and they both rely on routers to forward the packets to their destination.
    - Used in client-server communication: Both TCP and UDP are used in client-server communication, where a client sends a request to a server and the server responds with data.
    - Provide multiplexing: Both TCP and UDP use ports to provide multiplexing, which allows multiple applications to run on the same device and communicate over the network.
    - Part of the TCP/IP suite: Both TCP and UDP are part of the TCP/IP suite, which is a set of protocols that define how data is transmitted over the internet.
- Despite their differences, both TCP and UDP play important roles in networking and are essential protocols for communication over the internet.

b. List some characteristics of both.

- Here are some key characteristics of TCP and UDP:

  TCP:
    - Connection-oriented protocol
    - Reliable data transmission with error detection, retransmission, and flow control mechanisms
    - Slower than UDP due to overhead from establishing connections and maintaining reliability
    - Uses a three-way handshake to establish a connection
    - Guarantees that all data is transmitted correctly and in the correct order
    - Ideal for applications that require reliable data transmission, such as file transfers, email, and web browsing
    - Uses window-based flow control mechanism to manage data transmission speed between sender and receiver

  UDP:
    - Connectionless protocol
    - Unreliable data transmission with no error detection, retransmission, or flow control mechanisms
    - Faster than TCP due to lower overhead
    - Does not establish a connection before transmitting data
    - Does not guarantee that all data will be transmitted correctly or in the correct order
    - Ideal for applications that can tolerate some data loss, such as online gaming, live video streaming, and VoIP
    - Simple and lightweight, which makes it more efficient for certain applications
    - Does not use window-based flow control mechanism, rather it provides simple congestion avoidance mechanisms based on datagram loss statistics.

4. Explain the use of 0.0.0.0 in setting the static routes in this assignment. (use complete sentences)

- In the context of setting static routes for a router, the IP address 0.0.0.0 is often used as a default route or gateway of last resort. This means that if a router receives a packet with a destination IP address that it does not have a specific route for, it will forward the packet to the default gateway at 0.0.0.0. The default gateway is typically a router or switch that connects to a higher-level network, such as the internet.
- Using 0.0.0.0 as a default route is useful for routers that need to send packets to destinations outside of their local network. For example, if a router has multiple network interfaces and needs to forward packets to destinations that are not on any of its directly connected networks, it can use 0.0.0.0 as the default route to forward those packets to a gateway that can route them to their final destination.
- It's worth noting that 0.0.0.0 is not a valid destination IP address, so when a router receives a packet with 0.0.0.0 as the destination IP address, it knows that the packet is meant for the default gateway. By setting a default route to 0.0.0.0, a router can ensure that all packets that don't match any of its specific routes are forwarded to the correct gateway, which allows for more efficient and effective routing of network traffic.

5. What does the statement "Gateway of last resort is not set" mean?

- This statement means that your default route has not been set.

  a. Why would this matter when sending packets outside a network?

  - This would matter when sending packets outside a network because with no default route, the router won't know to send packets outside of its network, and all packets meant for external networks will be dropped.