Department of Computer Science and Engineering

Islamic University of Technology (IUT)

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Laboratory Report

CSE 4512: Computer Networks Lab

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Section:2B

Semester:5th

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Title: VLAN configuration and Inter-VLAN routing.

Objective:

1. Define and describe the concept of VLAN
2. Describe the advantages of VLAN
3. Design and implement VLAN and inter-VLAN routing

Devices/ Software Used:

1. Cisco Packet Tracer

Theory:

VLAN Definition:

VLAN or Virtual LAN (Local Area Network) is a logical grouping of networking devices. When we create VLAN, we actually break a large broadcast domain into smaller broadcast domains. Consider VLAN as a subnet. Just as two different subnets cannot communicate with each other without a router, different VLANs also require a router to communicate

Usage of VLAN:

Imagine a company with three departments: **HR**, **Finance**, and **IT**. Each department needs to communicate with devices within its own department but should be isolated from others for security and performance reasons. Here's how VLANs can help:

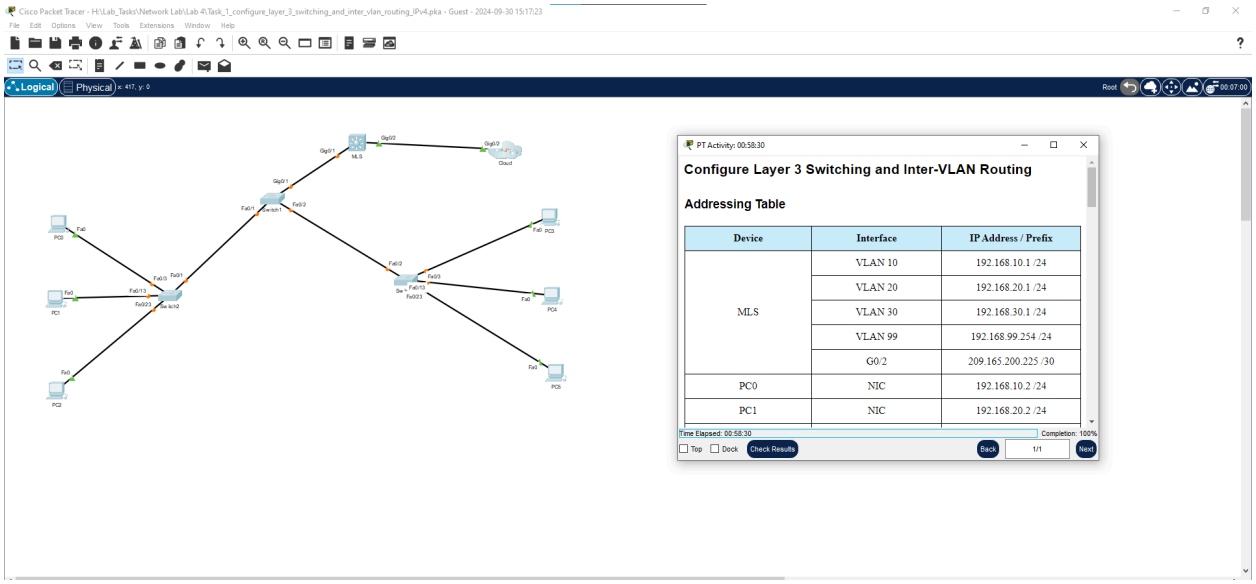
1. **Network Segmentation**: The IT department has its own VLAN (VLAN 10), the Finance department is on VLAN 20, and the HR department is on VLAN 30. This means that even though all departments share the same physical network, their traffic is logically separated.

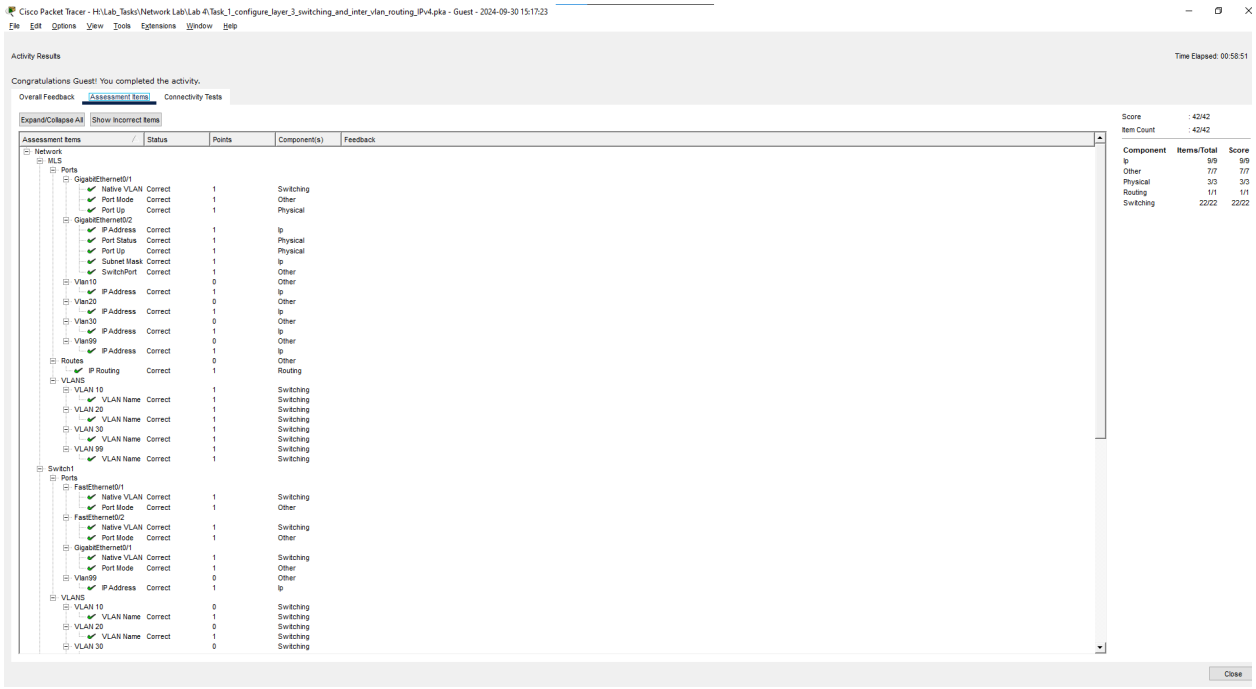
2. **Improved Security**: If an employee in the HR department tries to access resources in the Finance department, the VLAN configuration can prevent that unauthorized access, enhancing security.
3. **Efficient Resource Management**: By segmenting the network, the company ensures that HR's video conferencing traffic won't interfere with the Finance department's high-priority financial transactions, helping ensure smoother operations for both departments.
4. **Simplified Administration**: If the company expands to a new office, the IT department can assign the new devices to VLAN 10 without physically altering the network setup. VLANs make it easier to manage devices and traffic across multiple locations.

Inter VLAN Routing:
VLAN Configuration: VLANs (e.g., VLAN 10 for HR, VLAN 20 for Finance) are created on the switch, and ports are assigned to the respective VLANs.
Router or Layer 3 Switch Setup: A router or Layer 3 switch is configured with subinterfaces or SVIs for each VLAN (e.g., 192.168.10.1 for VLAN 10, 192.168.20.1 for VLAN 20).
Default Gateways Set: Default gateways are configured on devices in each VLAN to point to the IP address of the router's subinterface for that VLAN.
Routing Process: When a device in VLAN 10 wants to communicate with VLAN 20, the packet is sent to the router, where it is routed and forwarded to the destination device in VLAN 20.

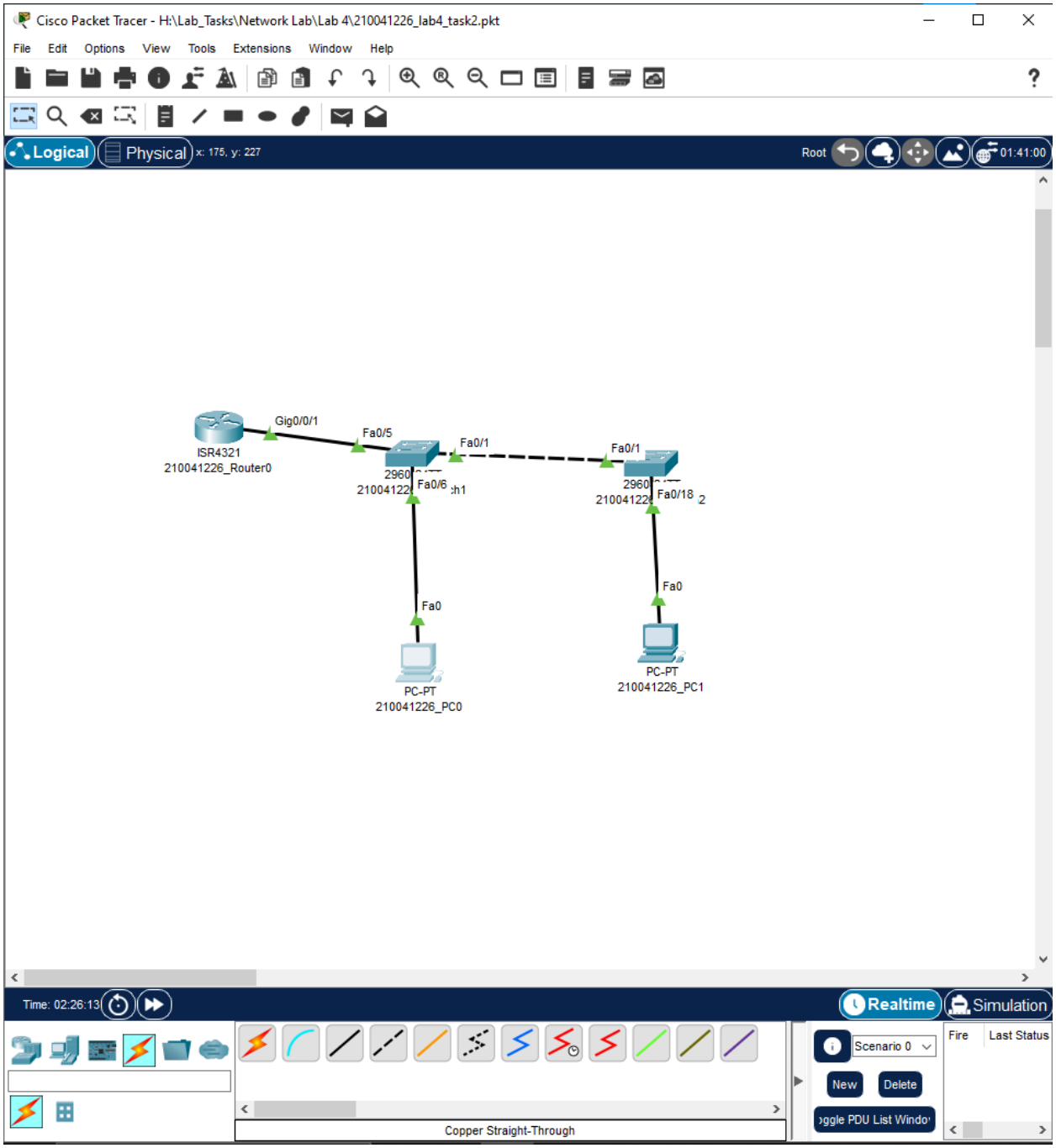
Diagram of the experiment:

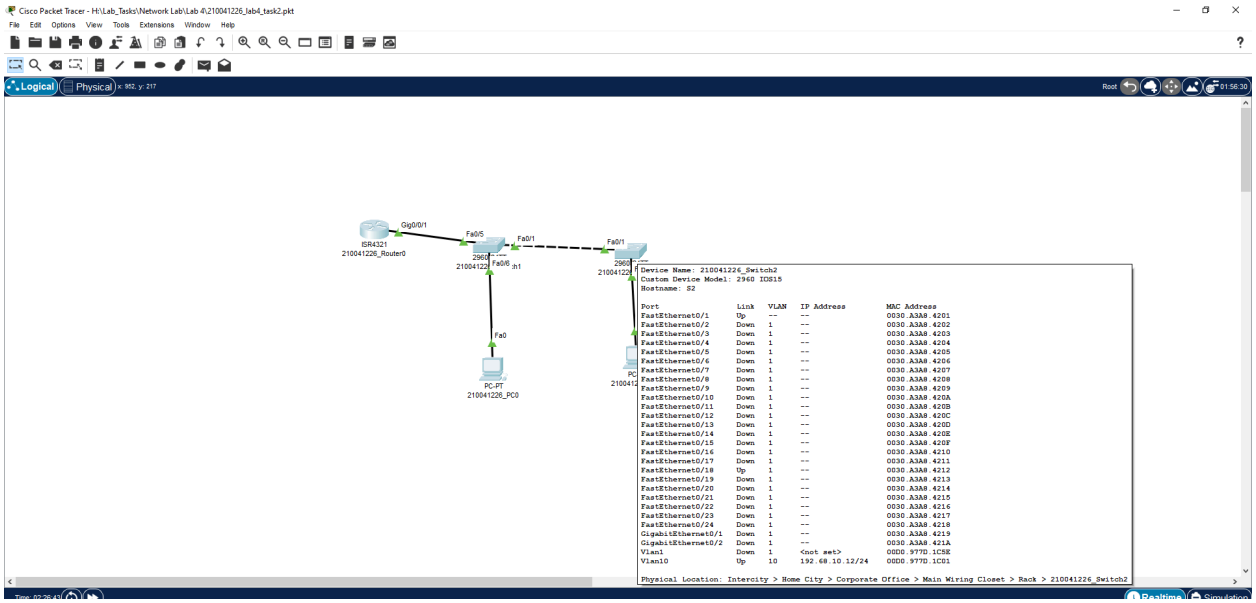
Task #01:

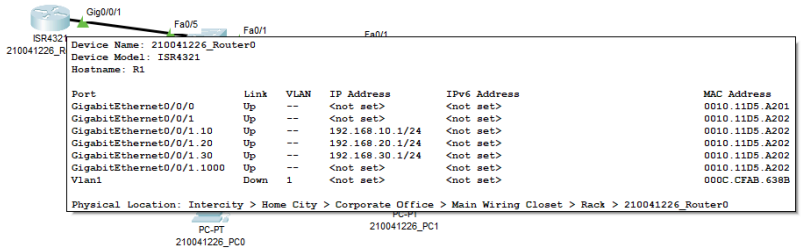

Logical
Physical
Root
MLS
Cloud
PC0
PC1
PC2
PC3
PC4
PC5
PT Activity: 00:58:30
Configure Layer 3 Switching and Inter-VLAN Routing
Addressing Table
Device
Interface
IP Address / Prefix
MLS
VLAN 10
192.168.10.1 /24
VLAN 20
192.168.20.1 /24
VLAN 30
192.168.30.1 /24
VLAN 99
192.168.99.254 /24
G0/2
209.165.200.225 /30
PC0
NIC
192.168.10.2 /24
PC1
NIC
192.168.20.2 /24
Time Elapsed: 00:58:30
Completion: 100%
Top
Dock
Check Results
Back
1/1
Next

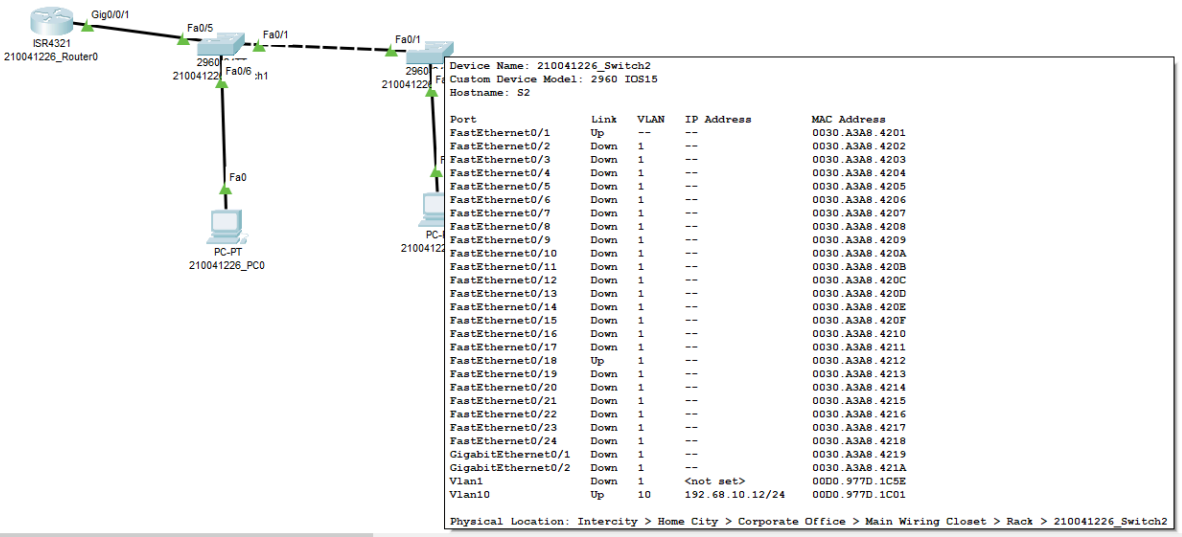

Activity Results
Time Elapsed: 00:58:51
Congratulations Guest! You completed the activity.
Overall Feedback
Assessment Items
Connectivity Tests
Expand/Collapse All
Show Incorrect Items
Assessment Items
Status
Points
Component(s)
Feedback
Score : 42/42
Item Count : 42/42
Component
Items/Total
Score
Ip 9/9 9/9
Other 7/7 7/7
Physical 3/3 3/3
Routing 1/1 1/1
Switching 22/22 22/22
Close

Task #02:

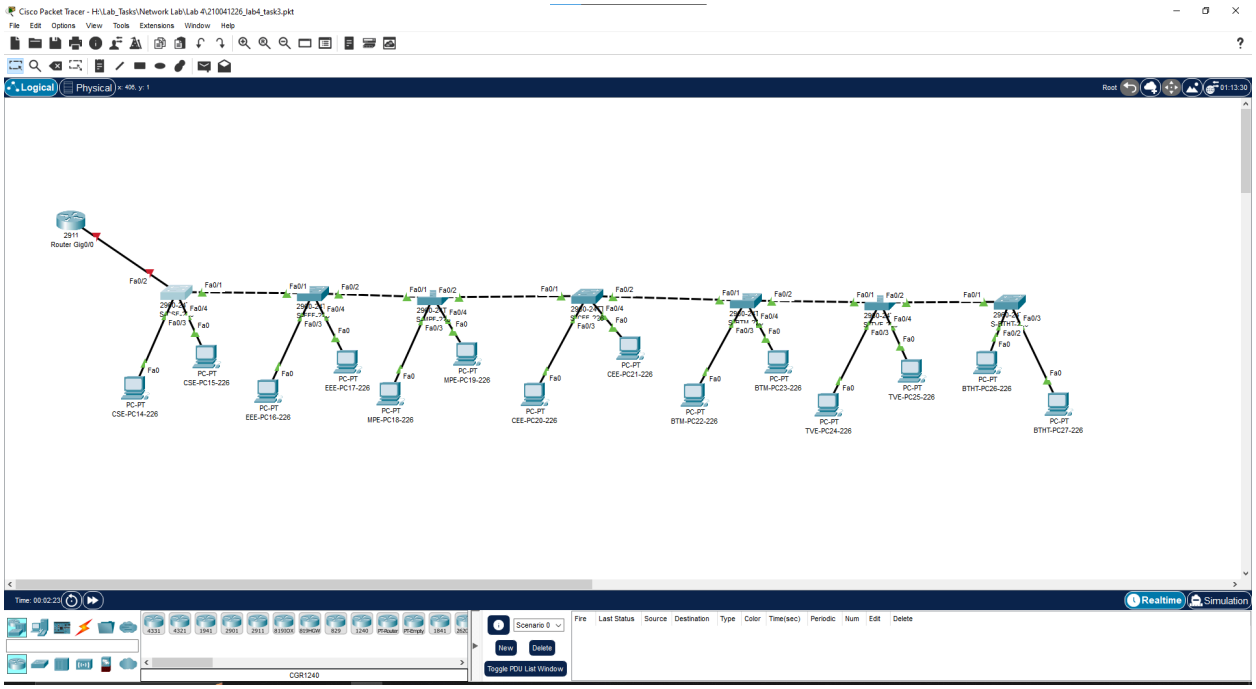

Cisco Packet Tracer - H:\Lab_Tasks\Network Lab\Lab 4\210041226_lab4_task2.pkt
File Edit Options View Tools Extensions Window Help
Logical
Physical
x: 175, y: 227
Root
01:41:00
Gig0/0/1
Fa0/5
Fa0/1
Fa0/1
Fa0/6
Fa0/18
Fa0
Fa0
ISR4321
210041226_Router0
PC-PT
210041226_PC0
PC-PT
210041226_PC1
Time: 02:26:13
Realtime
Simulation
Scenario 0
New
Delete
Fire
Last Status
Copper Straight-Through

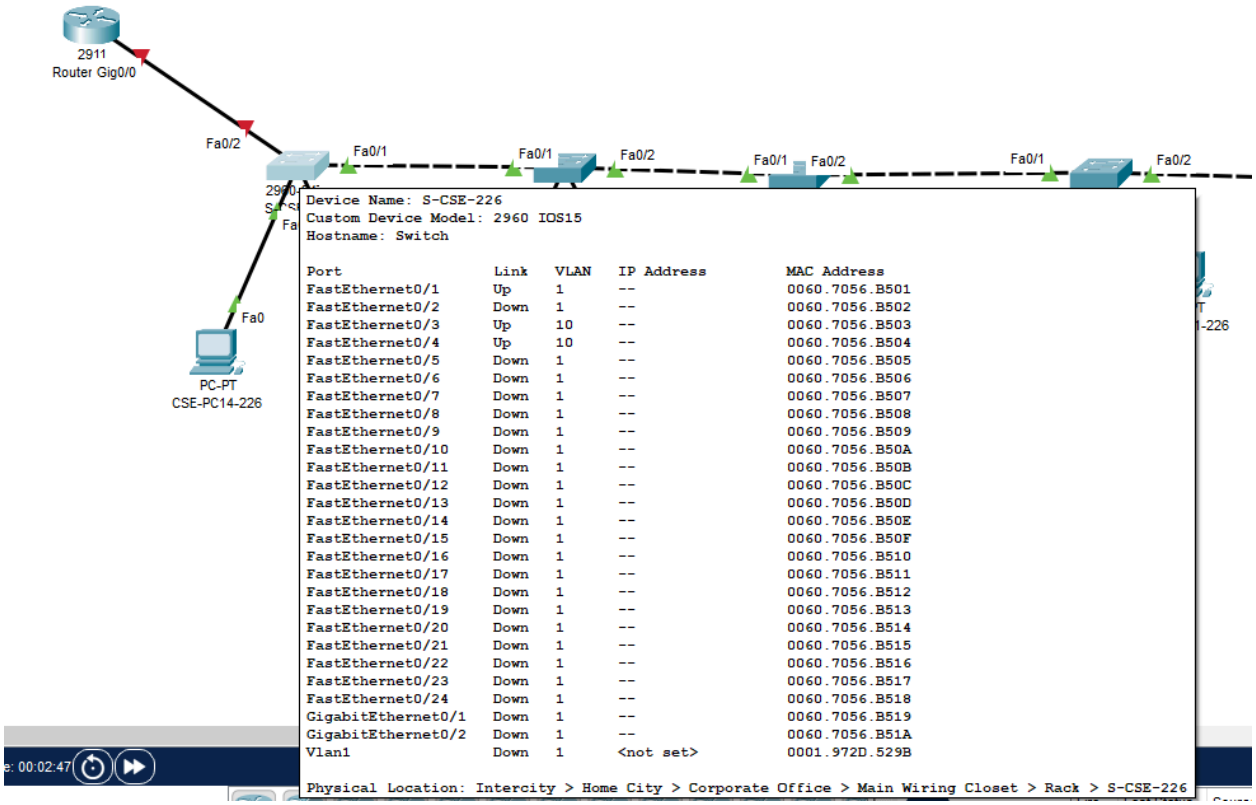

Cisco Packet Tracer - H:\Lab_Tasks\Network Lab\Lab 4\210041226_lab4_task2.pkt
File Edit Options View Tools Extensions Window Help
Logical Physical
ISR4321
210041226_Router0
Gig0/0/1
Fa0/5
Fa0/1
Fa0/6
Fa0
PC-PT
210041226_PC0
Device Name: 210041226_Switch2
Custom Device Model: 2960 IOS15
Hostname: S2
Port Link VLAN IP Address MAC Address
FastEthernet0/1 Up -- -- 0030.A3A8.4201
FastEthernet0/2 Down 1 -- 0030.A3A8.4202
FastEthernet0/3 Down 1 -- 0030.A3A8.4203
FastEthernet0/4 Down 1 -- 0030.A3A8.4204
FastEthernet0/5 Down 1 -- 0030.A3A8.4205
FastEthernet0/6 Down 1 -- 0030.A3A8.4206
FastEthernet0/7 Down 1 -- 0030.A3A8.4207
FastEthernet0/8 Down 1 -- 0030.A3A8.4208
FastEthernet0/9 Down 1 -- 0030.A3A8.4209
FastEthernet0/10 Down 1 -- 0030.A3A8.420A
FastEthernet0/11 Down 1 -- 0030.A3A8.420B
FastEthernet0/12 Down 1 -- 0030.A3A8.420C
FastEthernet0/13 Down 1 -- 0030.A3A8.420D
FastEthernet0/14 Down 1 -- 0030.A3A8.420E
FastEthernet0/15 Down 1 -- 0030.A3A8.420F
FastEthernet0/16 Down 1 -- 0030.A3A8.4210
FastEthernet0/17 Down 1 -- 0030.A3A8.4211
FastEthernet0/18 Up 1 -- 0030.A3A8.4212
FastEthernet0/19 Down 1 -- 0030.A3A8.4213
FastEthernet0/20 Down 1 -- 0030.A3A8.4214
FastEthernet0/21 Down 1 -- 0030.A3A8.4215
FastEthernet0/22 Down 1 -- 0030.A3A8.4216
FastEthernet0/23 Down 1 -- 0030.A3A8.4217
FastEthernet0/24 Down 1 -- 0030.A3A8.4218
GigabitEthernet0/1 Down 1 -- 0030.A3A8.4219
GigabitEthernet0/2 Down 1 -- 0030.A3A8.421A
Vlan1 Down 1 <not set> 00D0.977D.1C8E
Vlan10 Up 10 192.68.10.12/24 00D0.977D.1C01
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > 210041226_Switch2

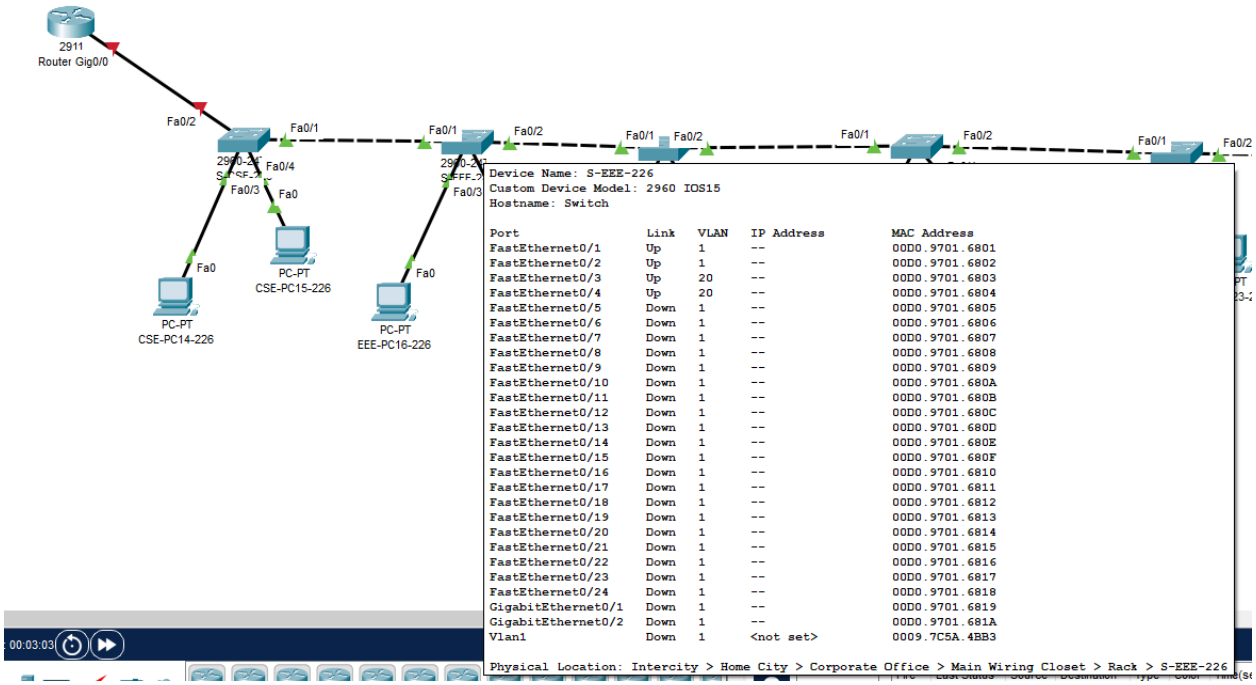

Gig0/0/1
Fa0/5
Fa0/1
Device Name: 210041226_Router0
Device Model: ISR4321
Hostname: R1
Port Link VLAN IP Address IPv6 Address MAC Address
GigabitEthernet0/0/0 Up -- <not set> <not set> 0010.11D5.A201
GigabitEthernet0/0/1 Up -- <not set> <not set> 0010.11D5.A202
GigabitEthernet0/0/1.10 Up -- 192.168.10.1/24 <not set> 0010.11D5.A202
GigabitEthernet0/0/1.20 Up -- 192.168.20.1/24 <not set> 0010.11D5.A202
GigabitEthernet0/0/1.30 Up -- 192.168.30.1/24 <not set> 0010.11D5.A202
GigabitEthernet0/0/1.1000 Up -- <not set> <not set> 0010.11D5.A202
Vlan1 Down 1 <not set> <not set> 000C.CFAB.638B
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > 210041226_Router0
PC-PT
210041226_PC0
210041226_PC1

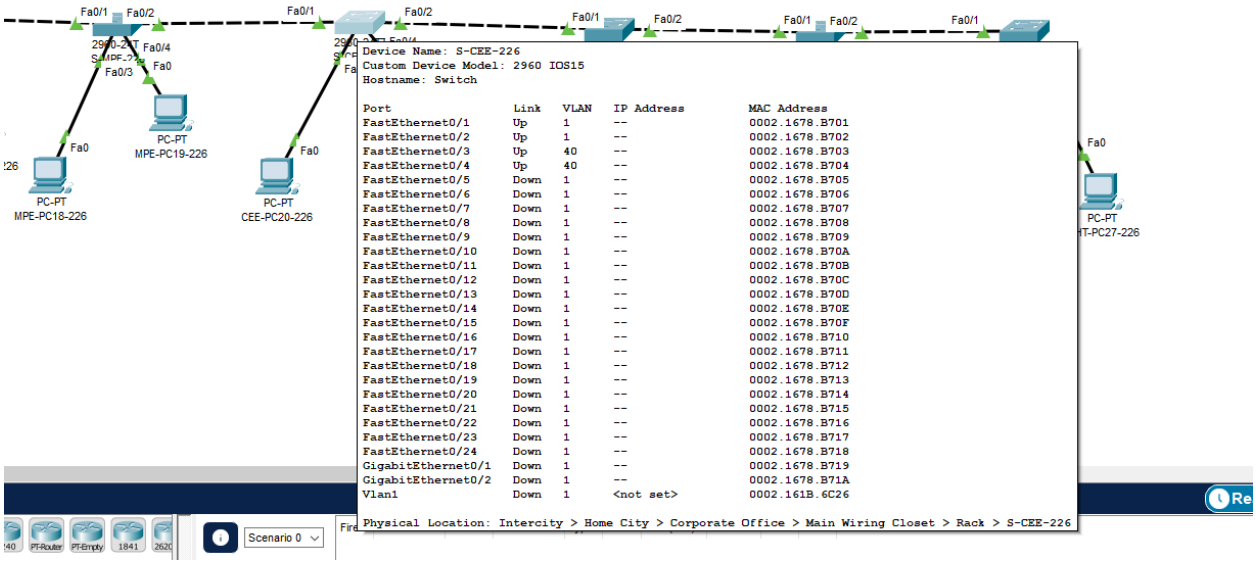

Gig0/0/1
ISR4321
210041226_Router0
Fa0/5
Fa0/1
Fa0/1
Fa0/6
Fa0
PC-PT
210041226_PC0
Device Name: 210041226_Switch2
Custom Device Model: 2960 IOS15
Hostname: S2
Port Link VLAN IP Address MAC Address
FastEthernet0/1 Up -- -- 0030.A3A8.4201
FastEthernet0/2 Down 1 -- 0030.A3A8.4202
FastEthernet0/3 Down 1 -- 0030.A3A8.4203
FastEthernet0/4 Down 1 -- 0030.A3A8.4204
FastEthernet0/5 Down 1 -- 0030.A3A8.4205
FastEthernet0/6 Down 1 -- 0030.A3A8.4206
FastEthernet0/7 Down 1 -- 0030.A3A8.4207
FastEthernet0/8 Down 1 -- 0030.A3A8.4208
FastEthernet0/9 Down 1 -- 0030.A3A8.4209
FastEthernet0/10 Down 1 -- 0030.A3A8.420A
FastEthernet0/11 Down 1 -- 0030.A3A8.420B
FastEthernet0/12 Down 1 -- 0030.A3A8.420C
FastEthernet0/13 Down 1 -- 0030.A3A8.420D
FastEthernet0/14 Down 1 -- 0030.A3A8.420E
FastEthernet0/15 Down 1 -- 0030.A3A8.420F
FastEthernet0/16 Down 1 -- 0030.A3A8.4210
FastEthernet0/17 Down 1 -- 0030.A3A8.4211
FastEthernet0/18 Up 1 -- 0030.A3A8.4212
FastEthernet0/19 Down 1 -- 0030.A3A8.4213
FastEthernet0/20 Down 1 -- 0030.A3A8.4214
FastEthernet0/21 Down 1 -- 0030.A3A8.4215
FastEthernet0/22 Down 1 -- 0030.A3A8.4216
FastEthernet0/23 Down 1 -- 0030.A3A8.4217
FastEthernet0/24 Down 1 -- 0030.A3A8.4218
GigabitEthernet0/1 Down 1 -- 0030.A3A8.4219
GigabitEthernet0/2 Down 1 -- 0030.A3A8.421A
Vlan1 Down 1 <not set> 00D0.977D.1C5E
Vlan10 Up 10 192.68.10.12/24 00D0.977D.1C01
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > 210041226_Switch2

Task #03:


Cisco Packet Tracer - H:\Lab_Tasks\Network Lab\Lab 4\210041226_lab4_task3.pkt
File Edit Options View Tools Extensions Window Help
Logical
Physical
2911
Router Gig0/0
PC-PT
CSE-PC14-226
CSE-PC15-226
EEE-PC16-226
EEE-PC17-226
MPE-PC18-226
MPE-PC19-226
CEE-PC20-226
CEE-PC21-226
BTM-PC22-226
BTM-PC23-226
TVE-PC24-226
TVE-PC25-226
BTHT-PC26-226
BTHT-PC27-226
Realtime
Simulation
CGR1240
Scenario 0
New
Delete
Toggle PDU List Window


2911
Router Gig0/0
Fa0/2
Fa0/1
Fa0/1
Fa0/2
Fa0/1
Fa0/2
Fa0/1
Fa0/2
Fa0
PC-PT
CSE-PC14-226
Device Name: S-CSE-226
Custom Device Model: 2960 IOS15
Hostname: Switch
Port Link VLAN IP Address MAC Address
FastEthernet0/1 Up 1 -- 0060.7056.B501
FastEthernet0/2 Down 1 -- 0060.7056.B502
FastEthernet0/3 Up 10 -- 0060.7056.B503
FastEthernet0/4 Up 10 -- 0060.7056.B504
FastEthernet0/5 Down 1 -- 0060.7056.B505
FastEthernet0/6 Down 1 -- 0060.7056.B506
FastEthernet0/7 Down 1 -- 0060.7056.B507
FastEthernet0/8 Down 1 -- 0060.7056.B508
FastEthernet0/9 Down 1 -- 0060.7056.B509
FastEthernet0/10 Down 1 -- 0060.7056.B50A
FastEthernet0/11 Down 1 -- 0060.7056.B50B
FastEthernet0/12 Down 1 -- 0060.7056.B50C
FastEthernet0/13 Down 1 -- 0060.7056.B50D
FastEthernet0/14 Down 1 -- 0060.7056.B50E
FastEthernet0/15 Down 1 -- 0060.7056.B50F
FastEthernet0/16 Down 1 -- 0060.7056.B510
FastEthernet0/17 Down 1 -- 0060.7056.B511
FastEthernet0/18 Down 1 -- 0060.7056.B512
FastEthernet0/19 Down 1 -- 0060.7056.B513
FastEthernet0/20 Down 1 -- 0060.7056.B514
FastEthernet0/21 Down 1 -- 0060.7056.B515
FastEthernet0/22 Down 1 -- 0060.7056.B516
FastEthernet0/23 Down 1 -- 0060.7056.B517
FastEthernet0/24 Down 1 -- 0060.7056.B518
GigabitEthernet0/1 Down 1 -- 0060.7056.B519
GigabitEthernet0/2 Down 1 -- 0060.7056.B51A
Vlan1 Down 1 <not set> 0001.972D.529B
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > S-CSE-226

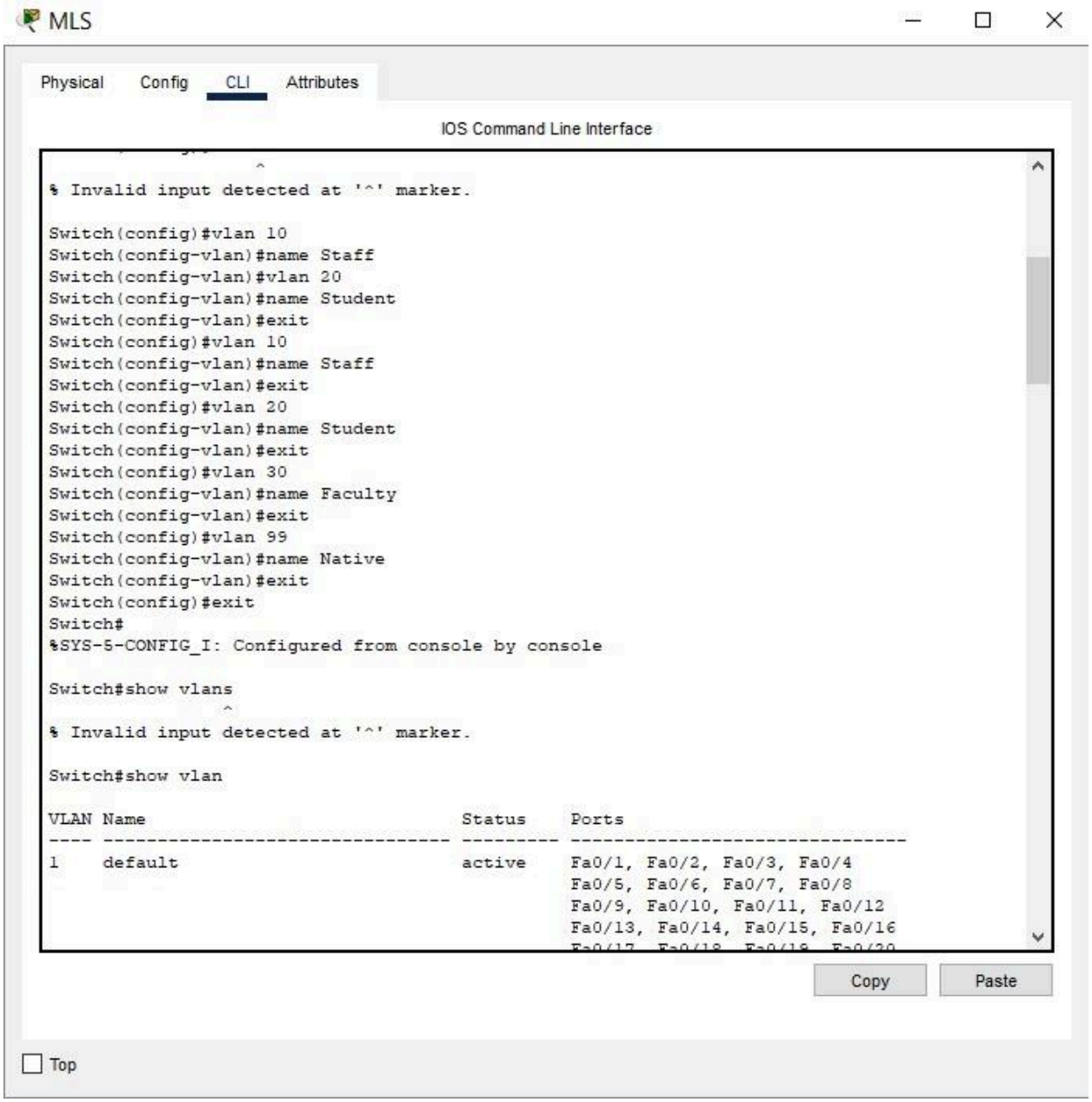

2911
Router Gig0/0
Fa0/2
Fa0/1
Fa0/1
Fa0/2
Fa0/1
Fa0/2
Fa0/1
Fa0/2
Fa0/1
Fa0/2
Fa0/4
Fa0/3
Fa0
Fa0
PC-PT
CSE-PC14-226
PC-PT
CSE-PC15-226
Fa0
PC-PT
EEE-PC16-226
Device Name: S-EEE-226
Custom Device Model: 2960 IOS15
Hostname: Switch
Port Link VLAN IP Address MAC Address
FastEthernet0/1 Up 1 -- 00D0.9701.6801
FastEthernet0/2 Up 1 -- 00D0.9701.6802
FastEthernet0/3 Up 20 -- 00D0.9701.6803
FastEthernet0/4 Up 20 -- 00D0.9701.6804
FastEthernet0/5 Down 1 -- 00D0.9701.6805
FastEthernet0/6 Down 1 -- 00D0.9701.6806
FastEthernet0/7 Down 1 -- 00D0.9701.6807
FastEthernet0/8 Down 1 -- 00D0.9701.6808
FastEthernet0/9 Down 1 -- 00D0.9701.6809
FastEthernet0/10 Down 1 -- 00D0.9701.680A
FastEthernet0/11 Down 1 -- 00D0.9701.680B
FastEthernet0/12 Down 1 -- 00D0.9701.680C
FastEthernet0/13 Down 1 -- 00D0.9701.680D
FastEthernet0/14 Down 1 -- 00D0.9701.680E
FastEthernet0/15 Down 1 -- 00D0.9701.680F
FastEthernet0/16 Down 1 -- 00D0.9701.6810
FastEthernet0/17 Down 1 -- 00D0.9701.6811
FastEthernet0/18 Down 1 -- 00D0.9701.6812
FastEthernet0/19 Down 1 -- 00D0.9701.6813
FastEthernet0/20 Down 1 -- 00D0.9701.6814
FastEthernet0/21 Down 1 -- 00D0.9701.6815
FastEthernet0/22 Down 1 -- 00D0.9701.6816
FastEthernet0/23 Down 1 -- 00D0.9701.6817
FastEthernet0/24 Down 1 -- 00D0.9701.6818
GigabitEthernet0/1 Down 1 -- 00D0.9701.6819
GigabitEthernet0/2 Down 1 -- 00D0.9701.681A
Vlan1 Down 1 <not set> 0009.7C5A.4BB3
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > S-EEE-226

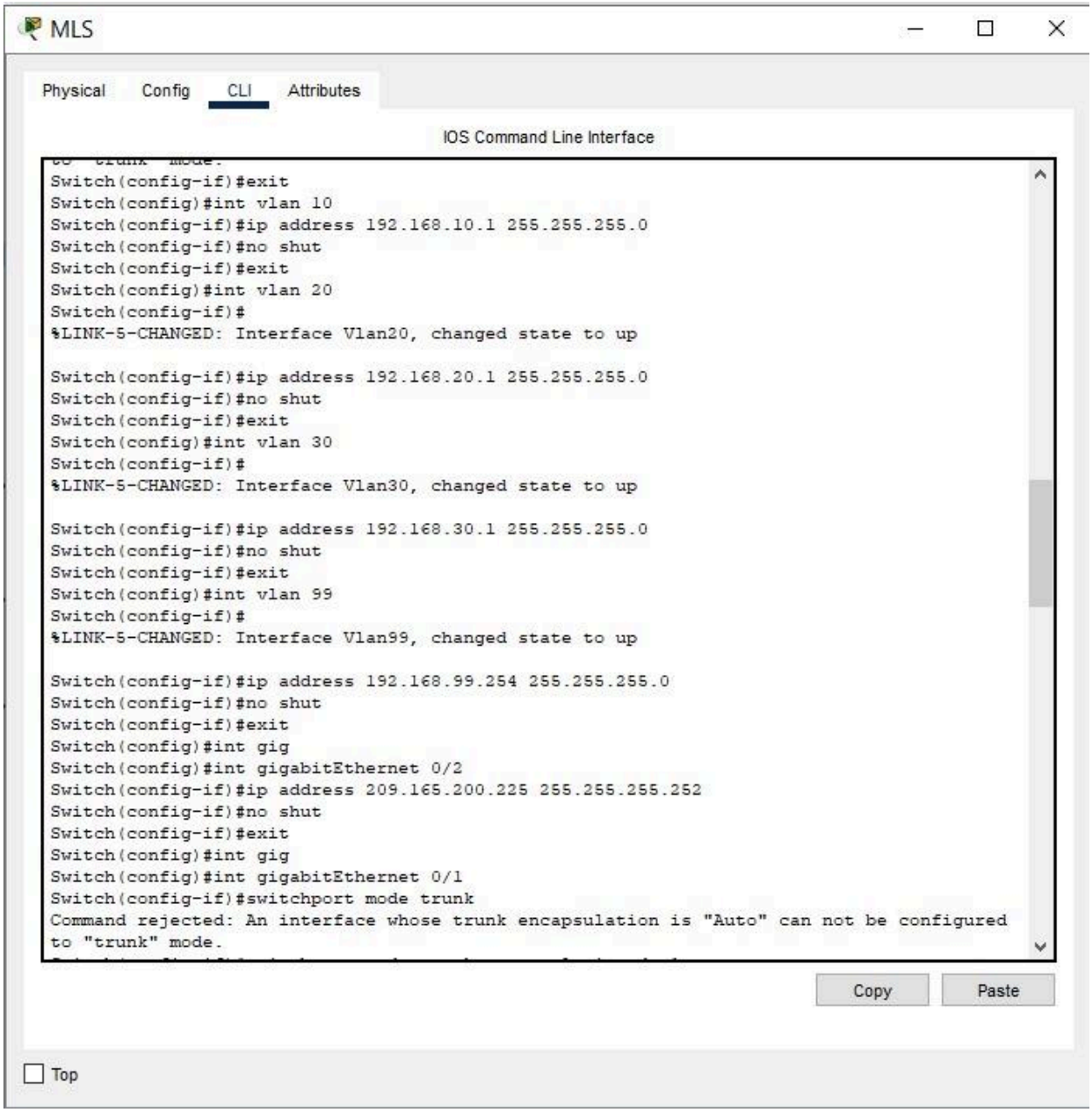


Working Procedure:

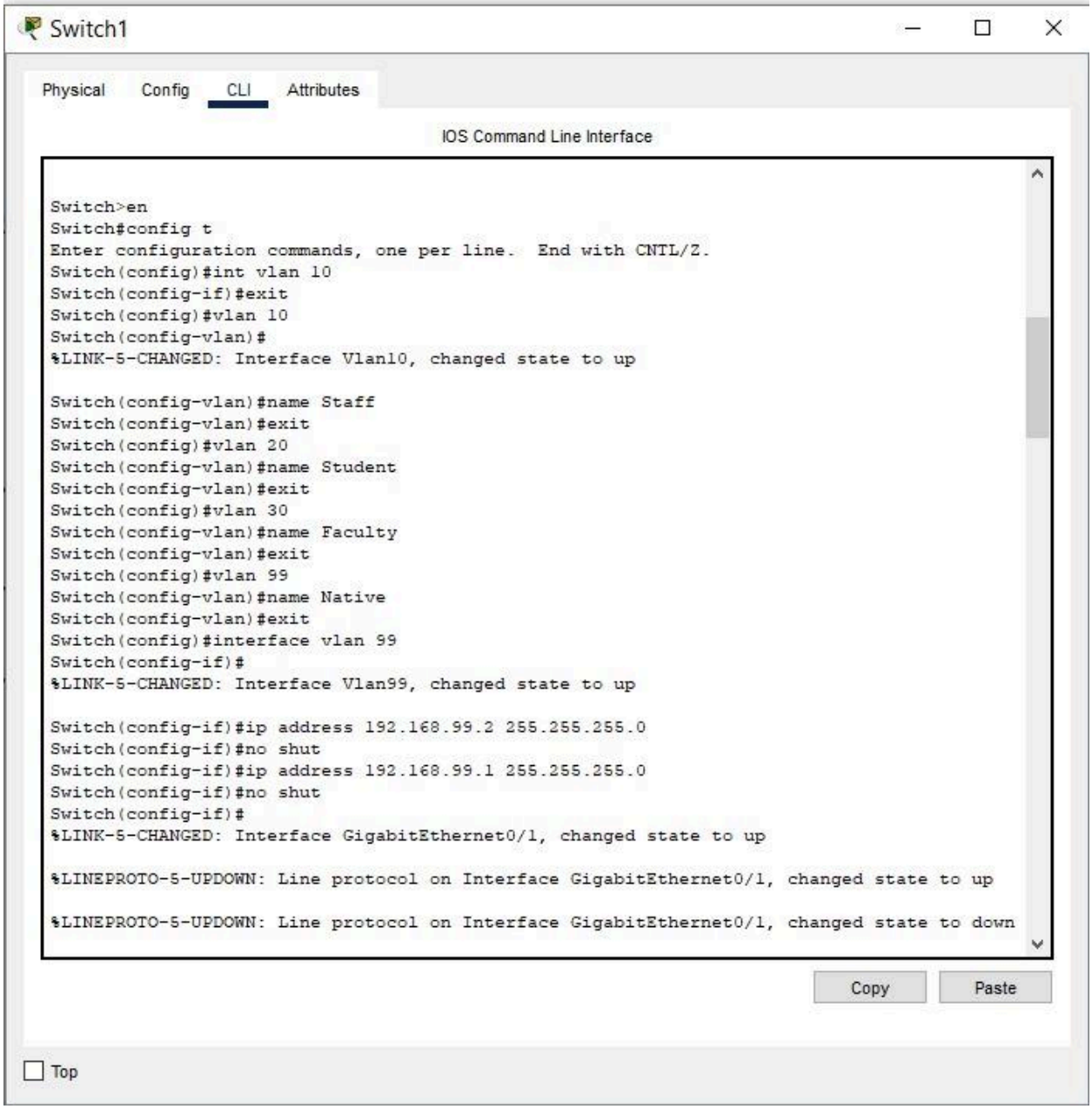
TASK #01:

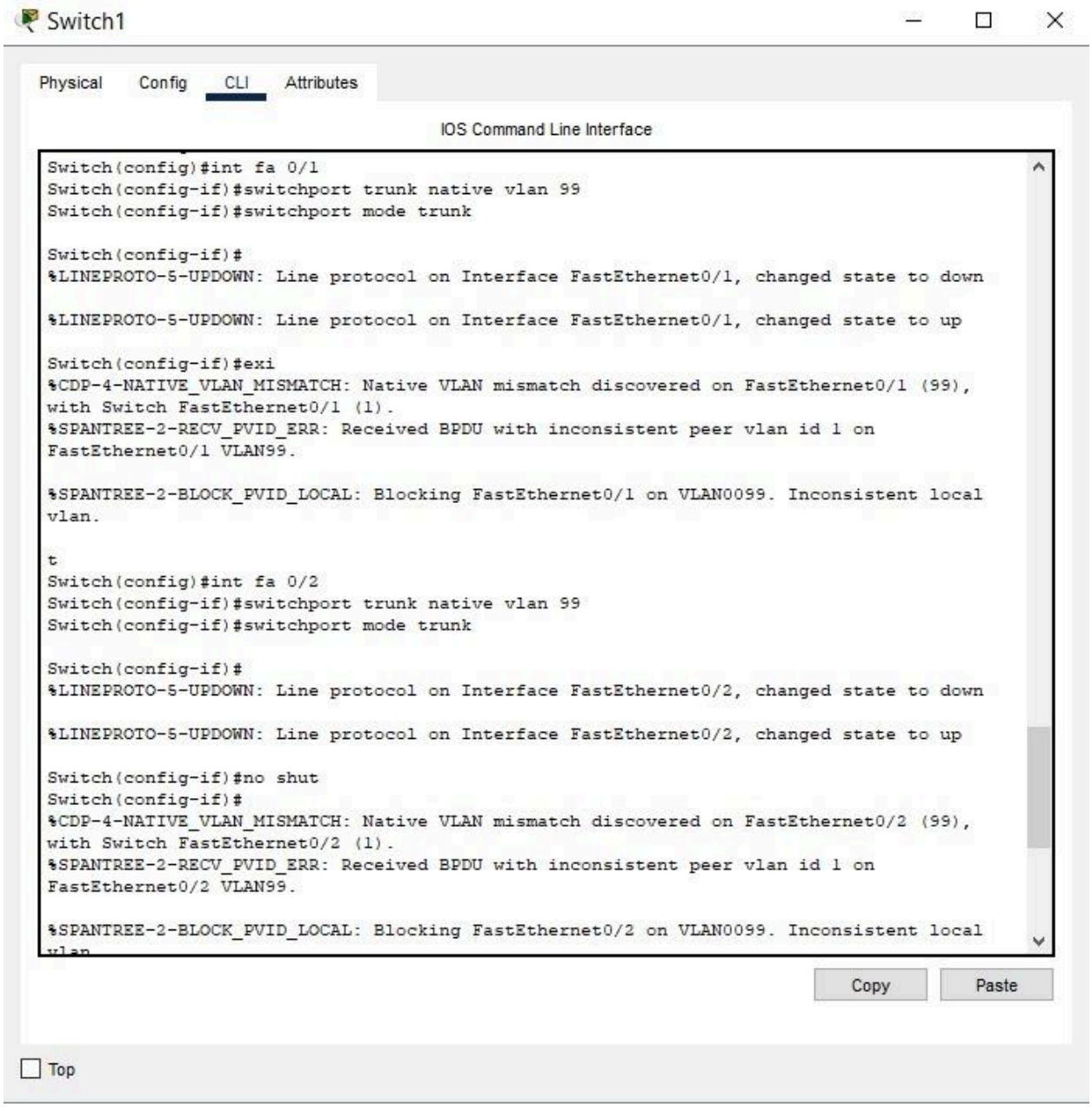
1. First the MLS Configuration


MLS
Physical
Config
CLI
Attributes
IOS Command Line Interface
% Invalid input detected at '^' marker.
Switch(config)#vlan 10
Switch(config-vlan)#name Staff
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name Student
Switch(config-vlan)#exit
Switch(config)#vlan 10
Switch(config-vlan)#name Staff
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name Student
Switch(config-vlan)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name Faculty
Switch(config-vlan)#exit
Switch(config)#vlan 99
Switch(config-vlan)#name Native
Switch(config-vlan)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#show vlans
% Invalid input detected at '^' marker.
Switch#show vlan
VLAN Name Status Ports
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/11, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
Copy
Paste
Top

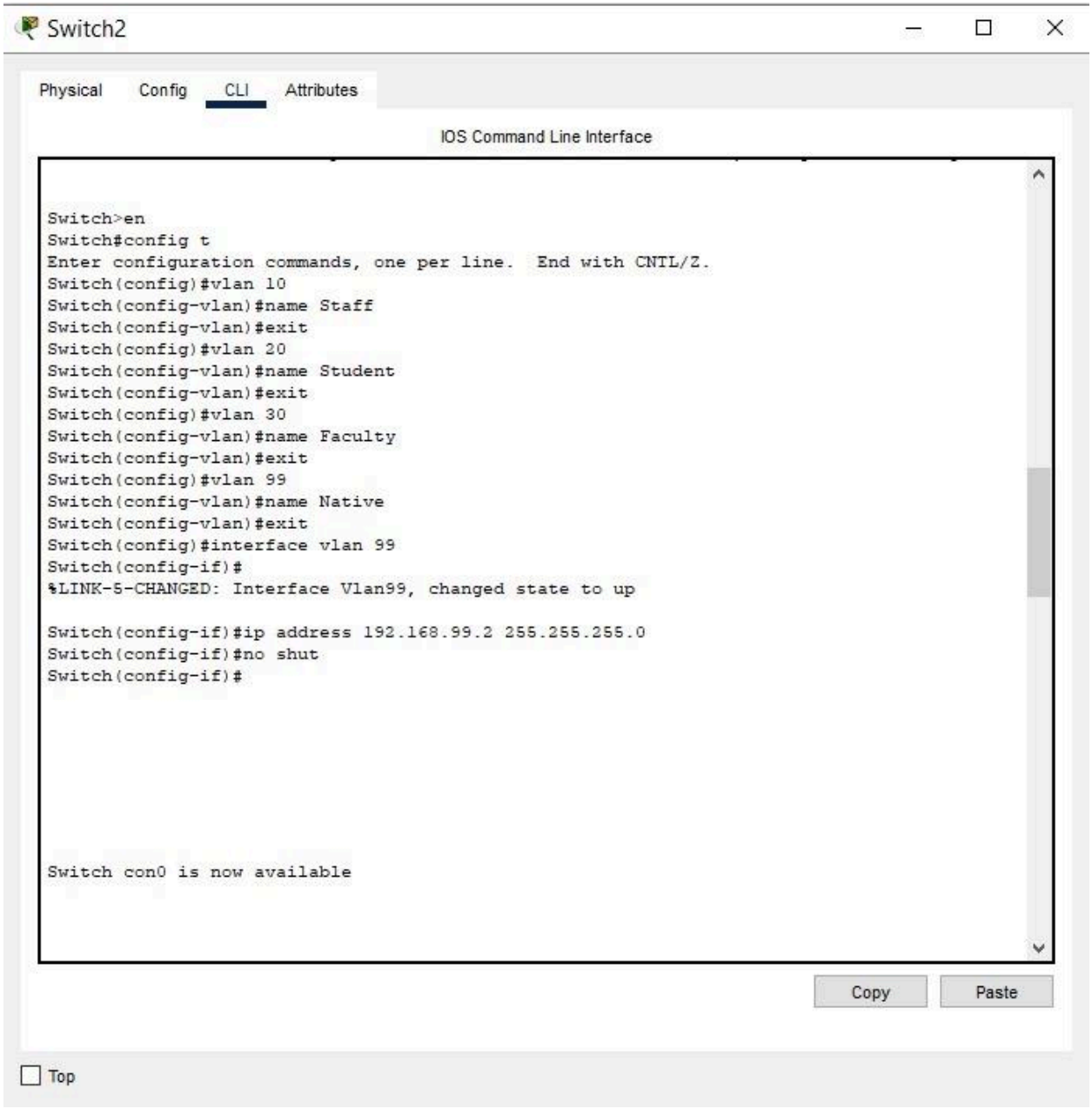


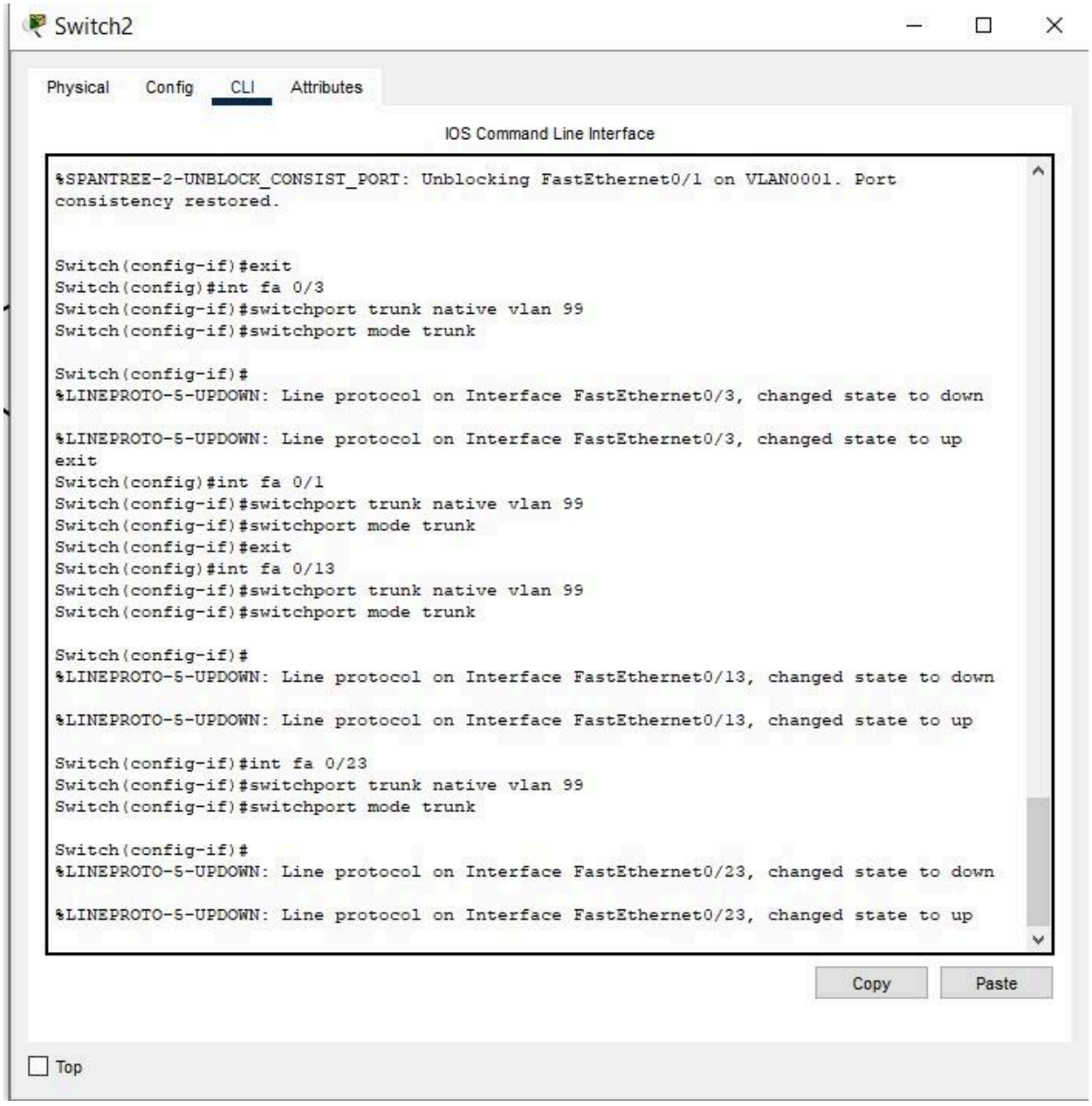
2. Switch 1 Configuration


Switch1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int vlan 10
Switch(config-if)#exit
Switch(config)#vlan 10
Switch(config-vlan)#
%LINK-5-CHANGED: Interface Vlan10, changed state to up
Switch(config-vlan)#name Staff
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name Student
Switch(config-vlan)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name Faculty
Switch(config-vlan)#exit
Switch(config)#vlan 99
Switch(config-vlan)#name Native
Switch(config-vlan)#exit
Switch(config)#interface vlan 99
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up
Switch(config-if)#ip address 192.168.99.2 255.255.255.0
Switch(config-if)#no shut
Switch(config-if)#ip address 192.168.99.1 255.255.255.0
Switch(config-if)#no shut
Switch(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
Copy
Paste
Top

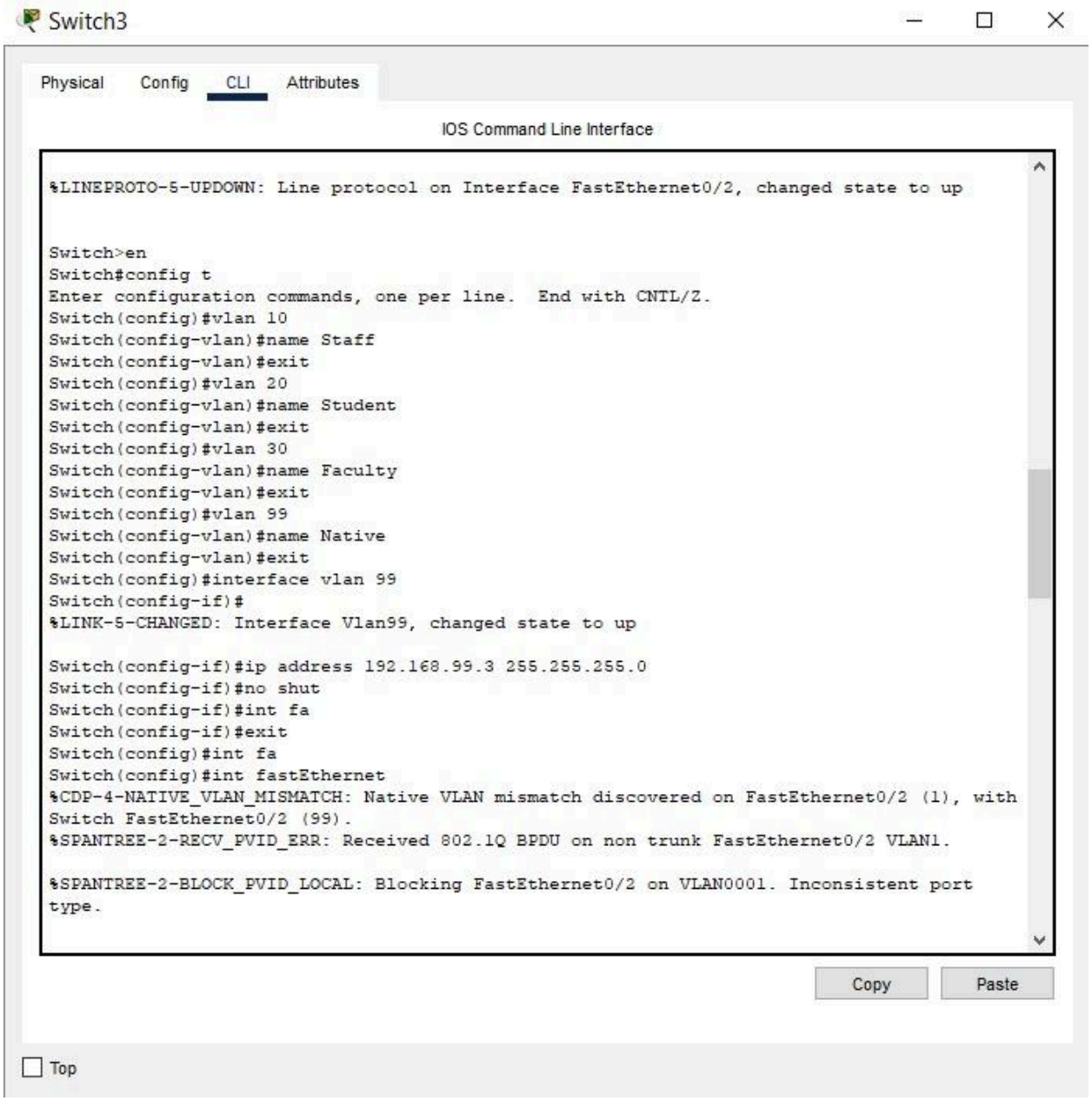


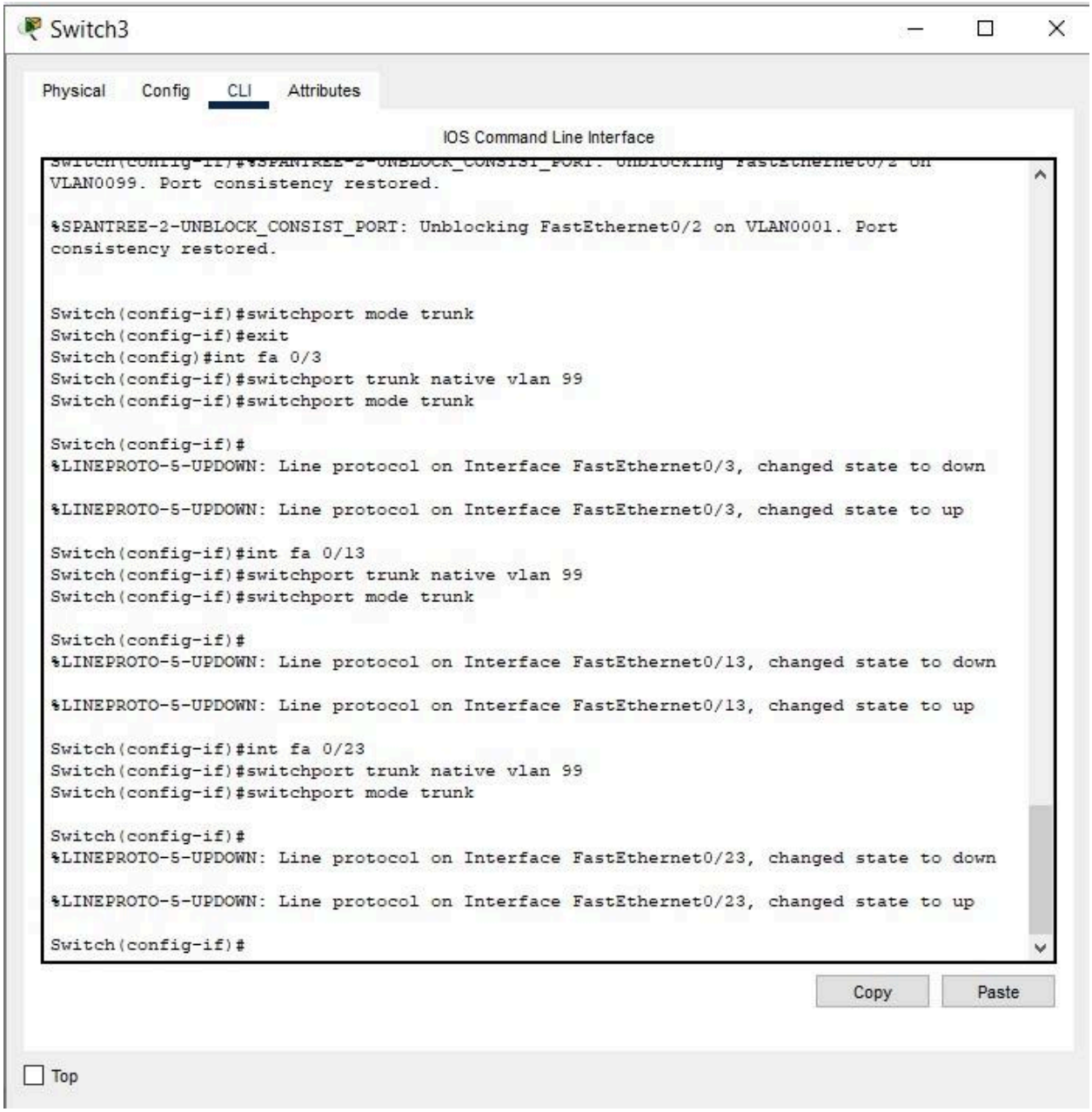
3. Switch 2 Configuration


Switch2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name Staff
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name Student
Switch(config-vlan)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name Faculty
Switch(config-vlan)#exit
Switch(config)#vlan 99
Switch(config-vlan)#name Native
Switch(config-vlan)#exit
Switch(config)#interface vlan 99
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up
Switch(config-if)#ip address 192.168.99.2 255.255.255.0
Switch(config-if)#no shut
Switch(config-if)#
Switch con0 is now available
Copy
Paste
Top

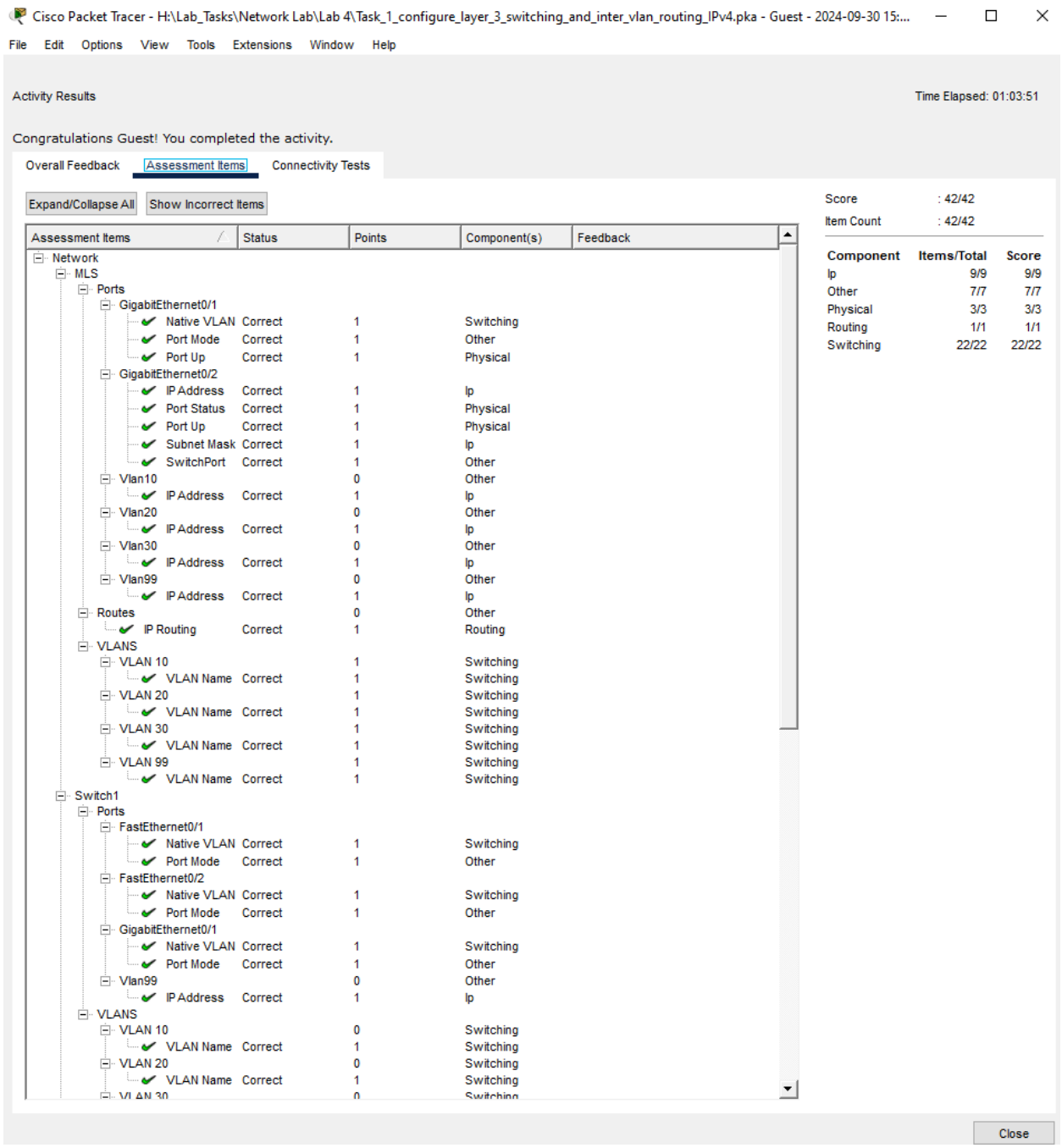


4. Switch 3 Configuration


Switch3
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name Staff
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name Student
Switch(config-vlan)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name Faculty
Switch(config-vlan)#exit
Switch(config)#vlan 99
Switch(config-vlan)#name Native
Switch(config-vlan)#exit
Switch(config)#interface vlan 99
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up
Switch(config-if)#ip address 192.168.99.3 255.255.255.0
Switch(config-if)#no shut
Switch(config-if)#int fa
Switch(config-if)#exit
Switch(config)#int fa
Switch(config)#int fastEthernet
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/2 (1), with
Switch FastEthernet0/2 (99).
%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk FastEthernet0/2 VLAN1.
%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/2 on VLAN0001. Inconsistent port
type.
Copy
Paste
Top

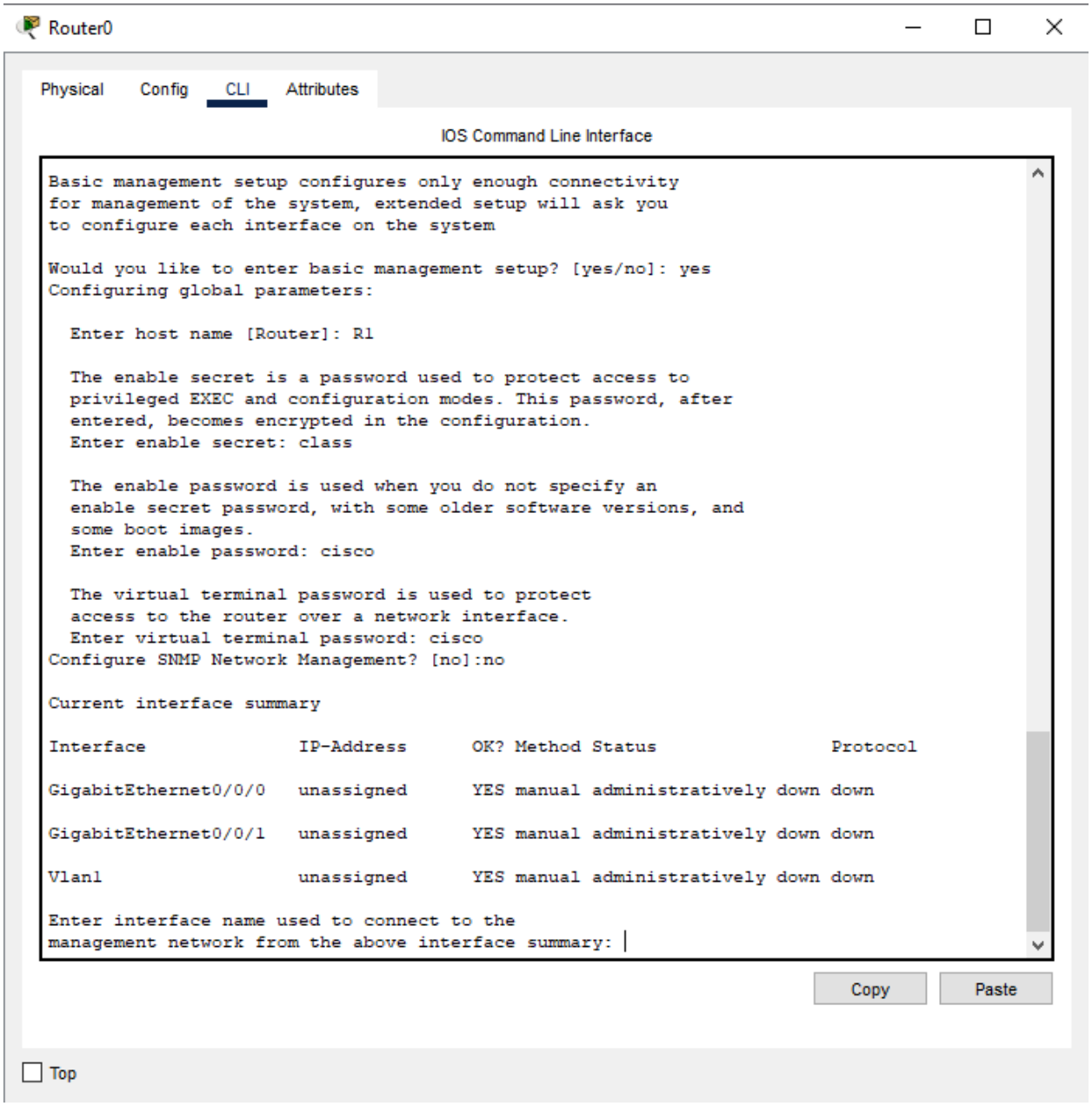

Switch3
Physical
Config
CLI
Attributes
IOS Command Line Interface
VLAN0099. Port consistency restored.
%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking FastEthernet0/2 on VLAN0001. Port consistency restored.
Switch(config-if)#switchport mode trunk
Switch(config-if)#exit
Switch(config)#int fa 0/3
Switch(config-if)#switchport trunk native vlan 99
Switch(config-if)#switchport mode trunk
Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
Switch(config-if)#int fa 0/13
Switch(config-if)#switchport trunk native vlan 99
Switch(config-if)#switchport mode trunk
Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/13, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/13, changed state to up
Switch(config-if)#int fa 0/23
Switch(config-if)#switchport trunk native vlan 99
Switch(config-if)#switchport mode trunk
Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/23, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/23, changed state to up
Switch(config-if)#
Copy
Paste
Top

5. Result



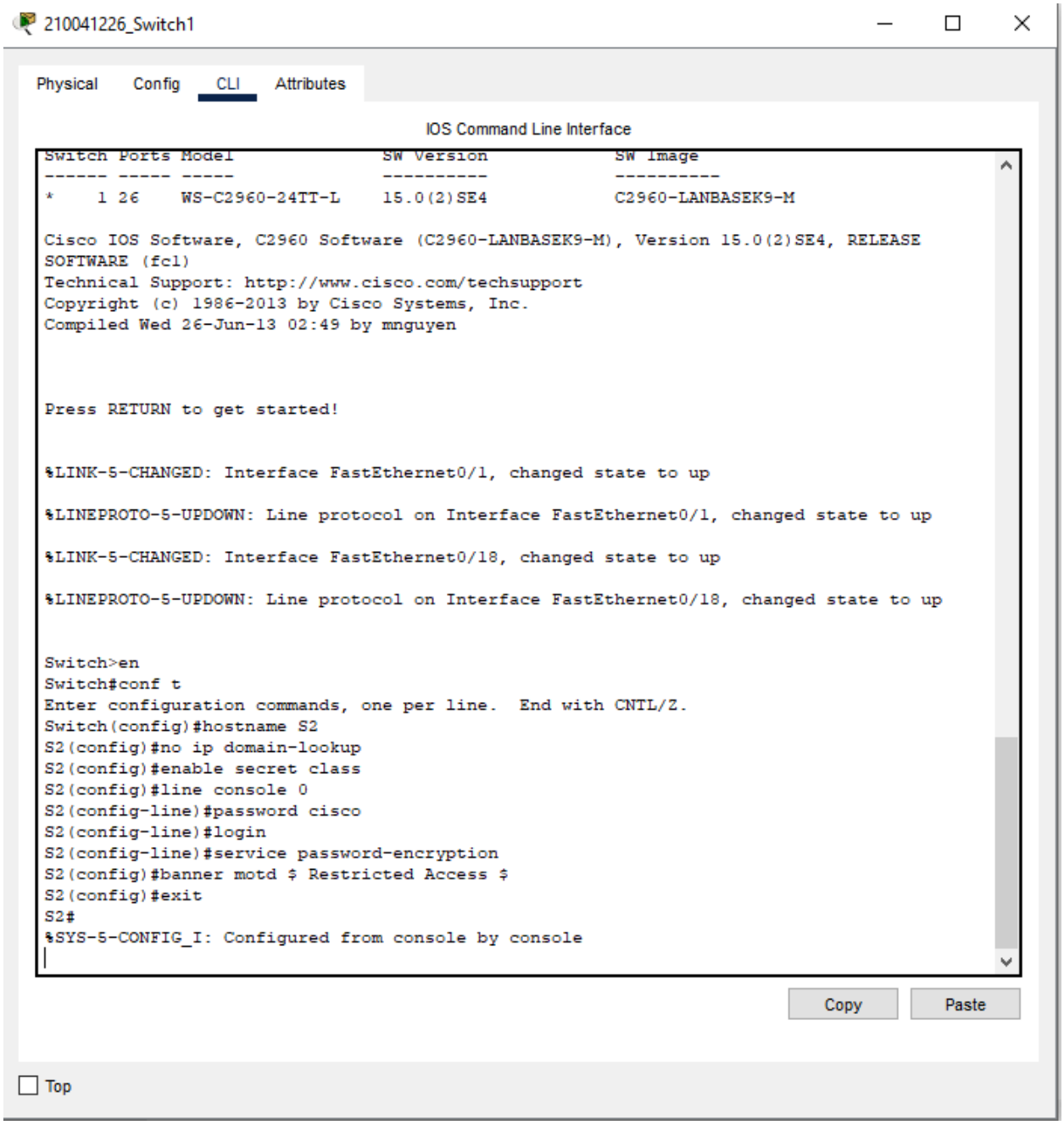
TASK #02:

1. Router0 Configuration

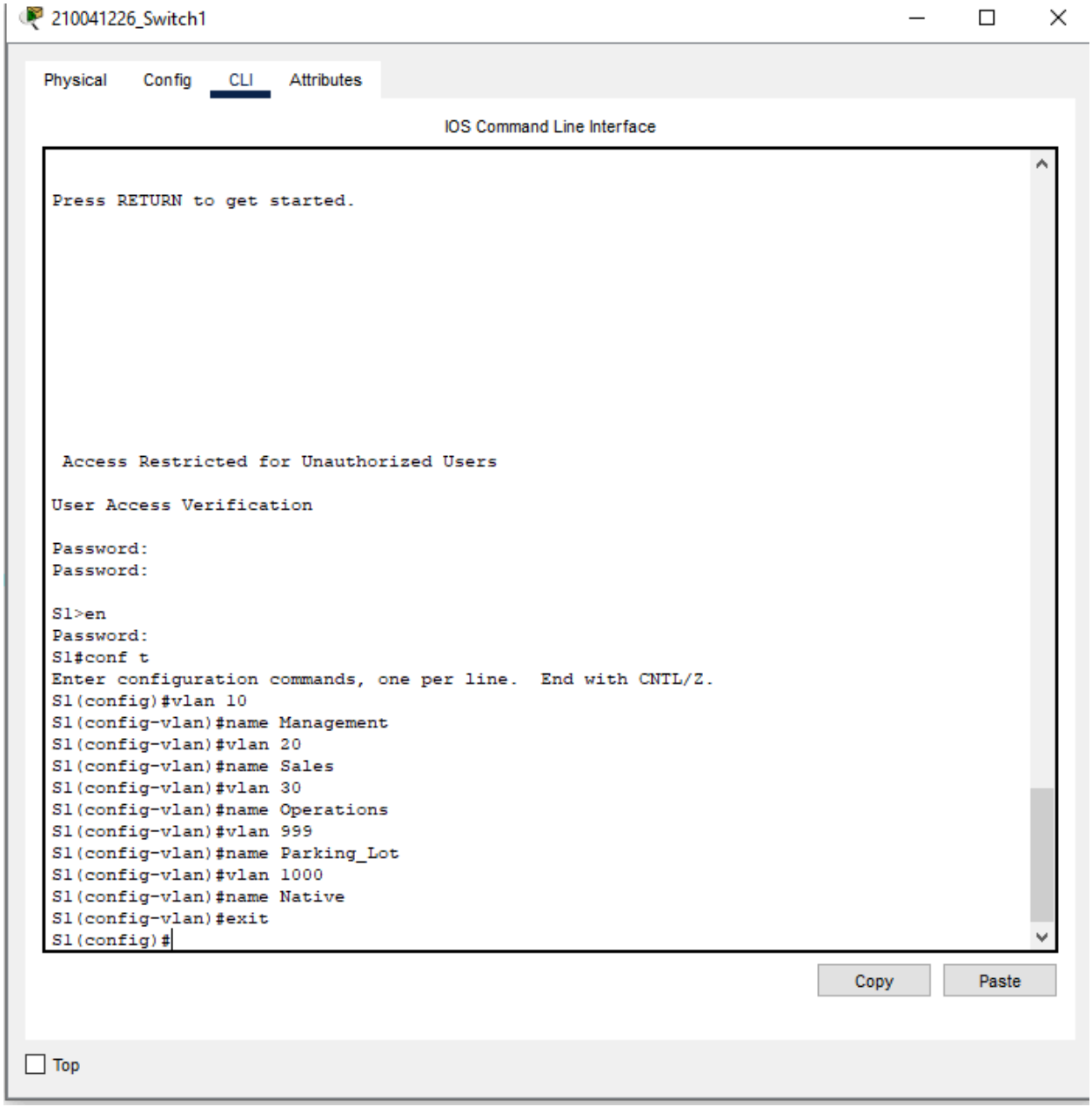

Router0
Physical
Config
CLI
Attributes
IOS Command Line Interface
Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system
Would you like to enter basic management setup? [yes/no]: yes
Configuring global parameters:
Enter host name [Router]: R1
The enable secret is a password used to protect access to
privileged EXEC and configuration modes. This password, after
entered, becomes encrypted in the configuration.
Enter enable secret: class
The enable password is used when you do not specify an
enable secret password, with some older software versions, and
some boot images.
Enter enable password: cisco
The virtual terminal password is used to protect
access to the router over a network interface.
Enter virtual terminal password: cisco
Configure SNMP Network Management? [no]:no
Current interface summary
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0/0 unassigned YES manual administratively down down
GigabitEthernet0/0/1 unassigned YES manual administratively down down
Vlan1 unassigned YES manual administratively down down
Enter interface name used to connect to the
management network from the above interface summary:
Copy
Paste
Top

```
The following configuration command script was created:

!
hostname R1
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
enable password cisco
line vty 0 4
password cisco
!
interface Vlan1
 shutdown
 no ip address
!
interface GigabitEthernet0/0/0
 no shutdown
 no ip address
!
interface GigabitEthernet0/0/1
 shutdown
 no ip address
!
end

[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]: 2
```

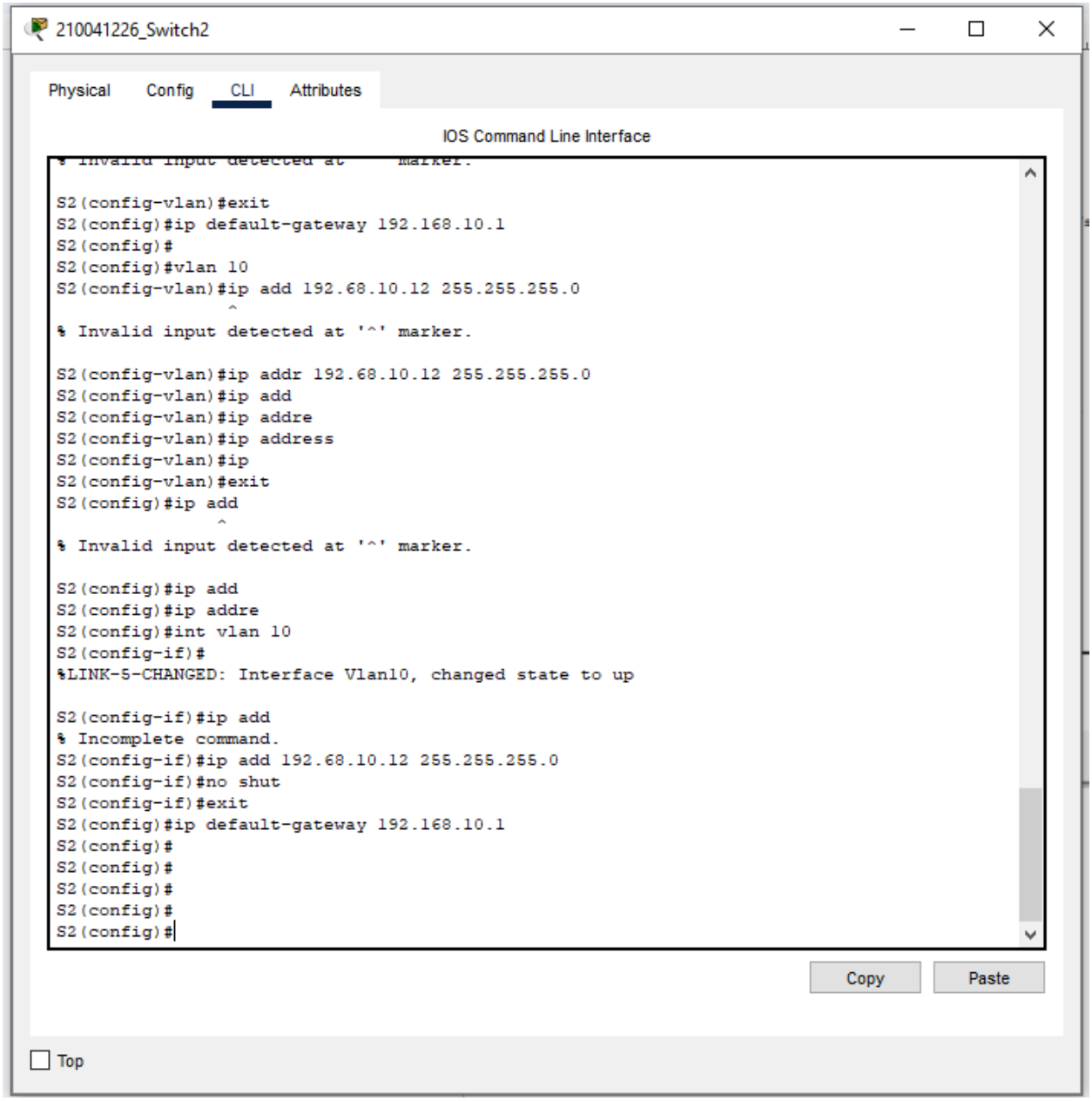
2. Both Switches Configuration



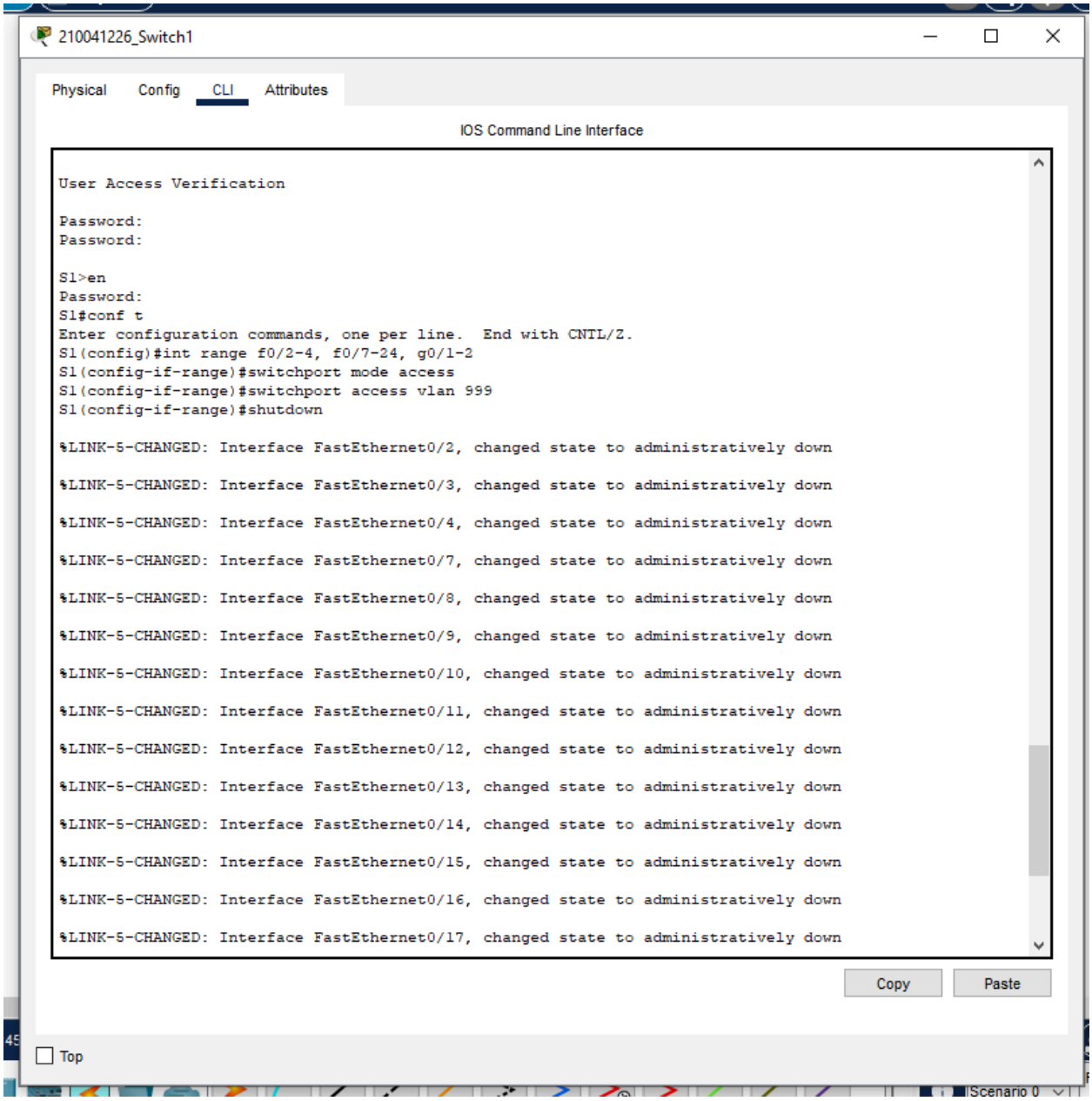
3. Switch 1 Vlan Configuration

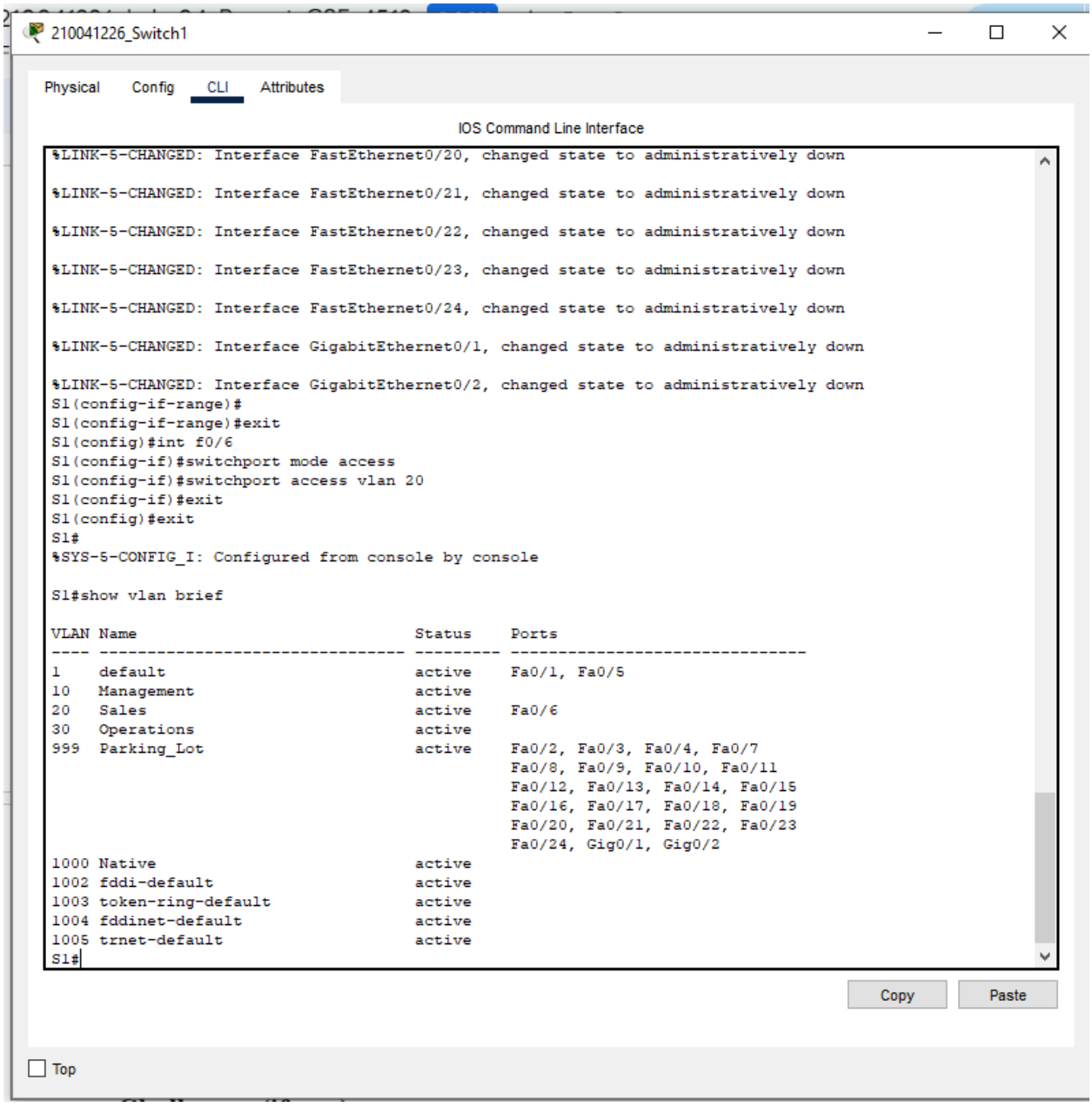
4. 

5. Switch 2 Vlan Configuration

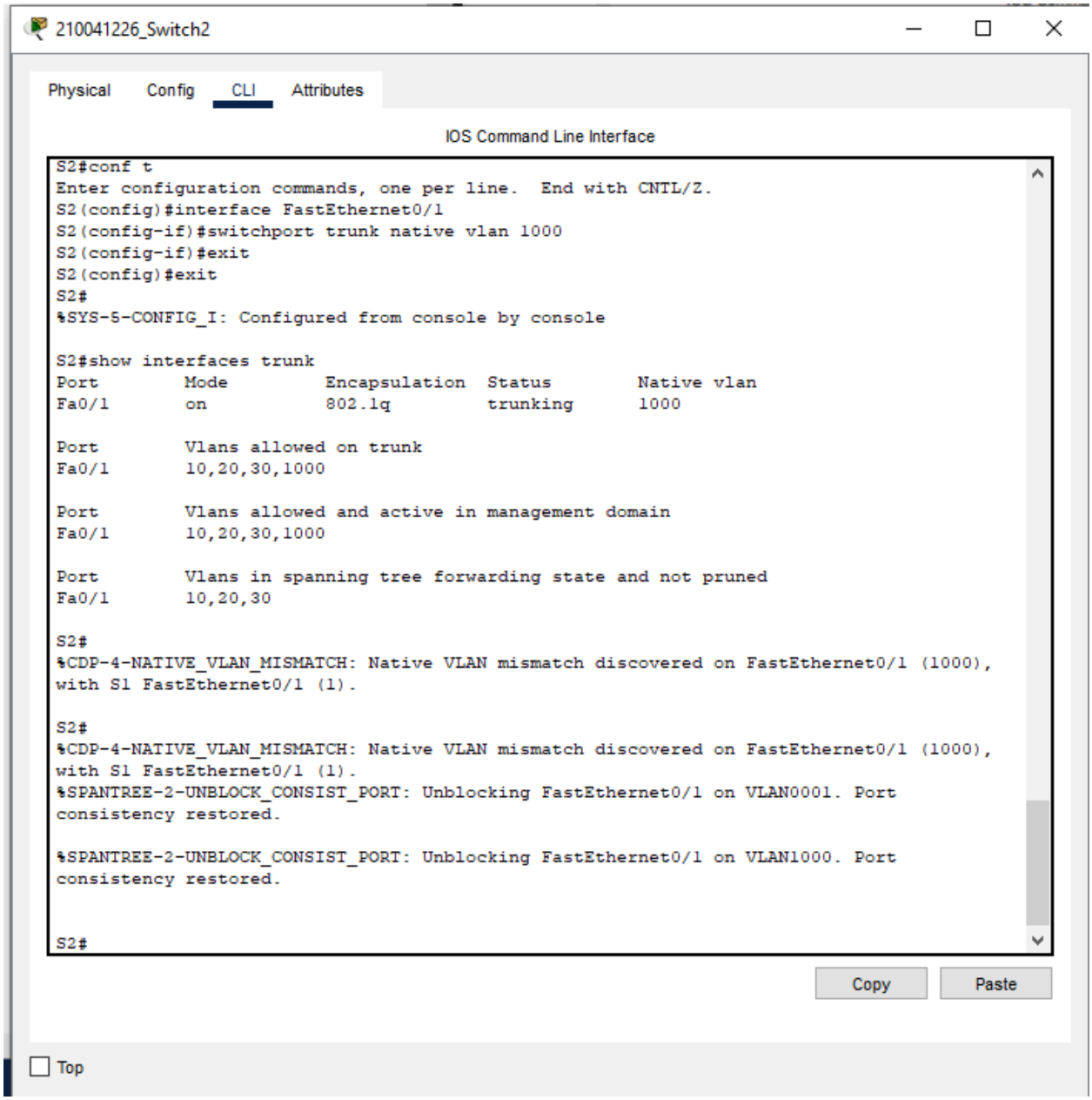


6. Vlan 999 for Switch 1

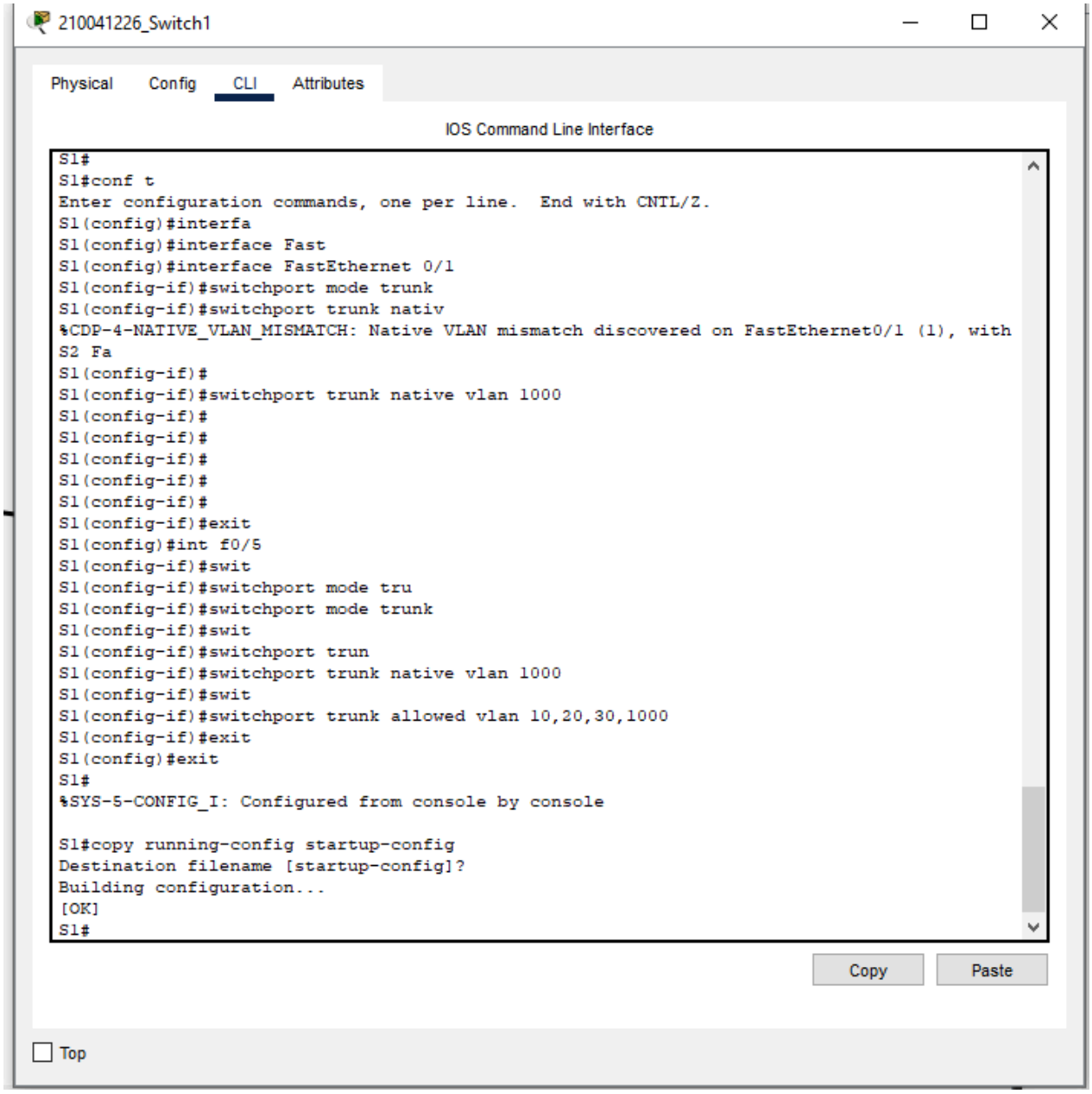

210041226_Switch1
Physical
Config
CLI
Attributes
IOS Command Line Interface
User Access Verification
Password:
Password:
S1>en
Password:
S1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int range f0/2-4, f0/7-24, g0/1-2
S1(config-if-range)#switchport mode access
S1(config-if-range)#switchport access vlan 999
S1(config-if-range)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down
Copy
Paste
Top
Scenario 0



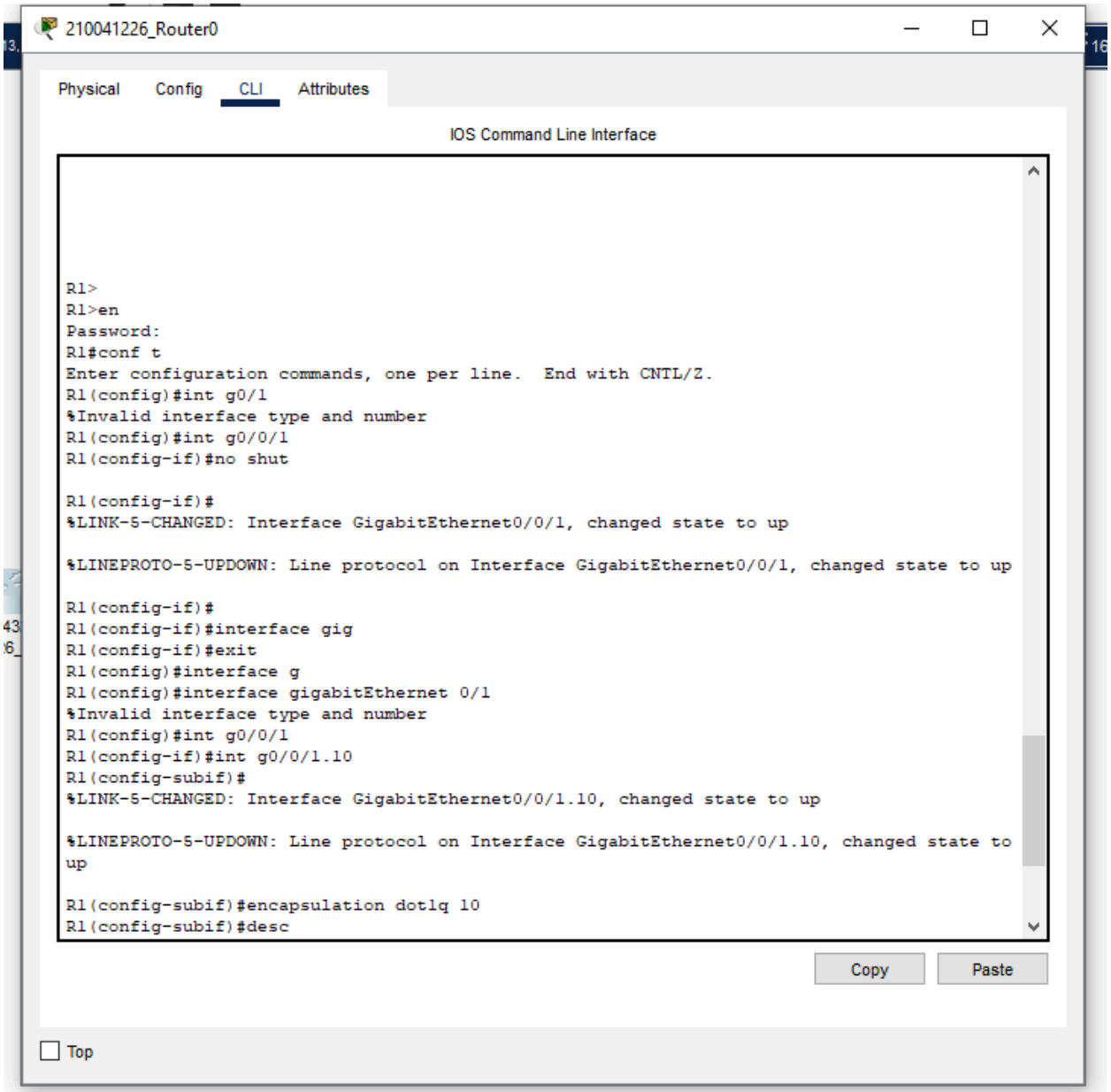
7. Switch 2 Vlan Configuration

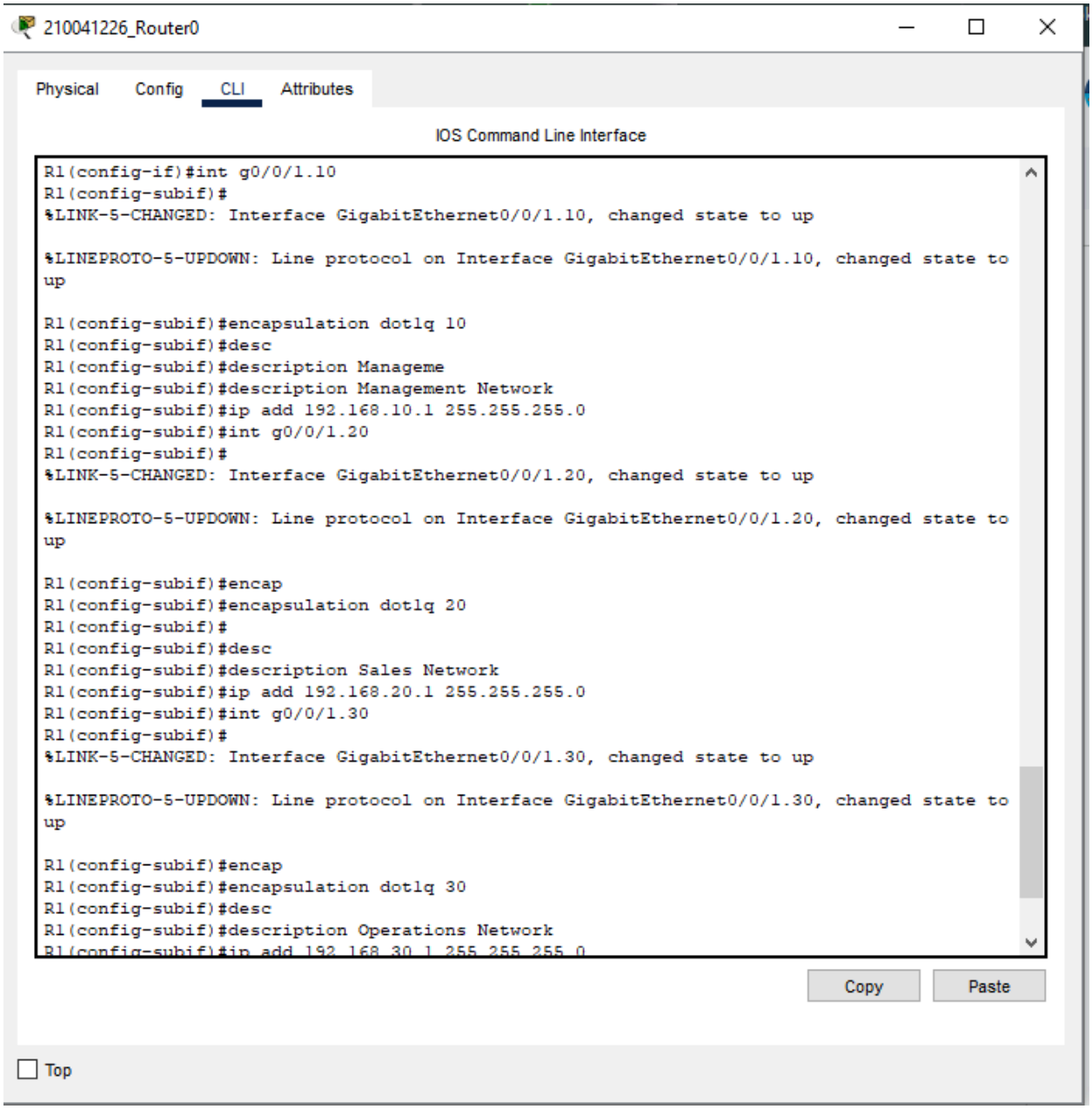


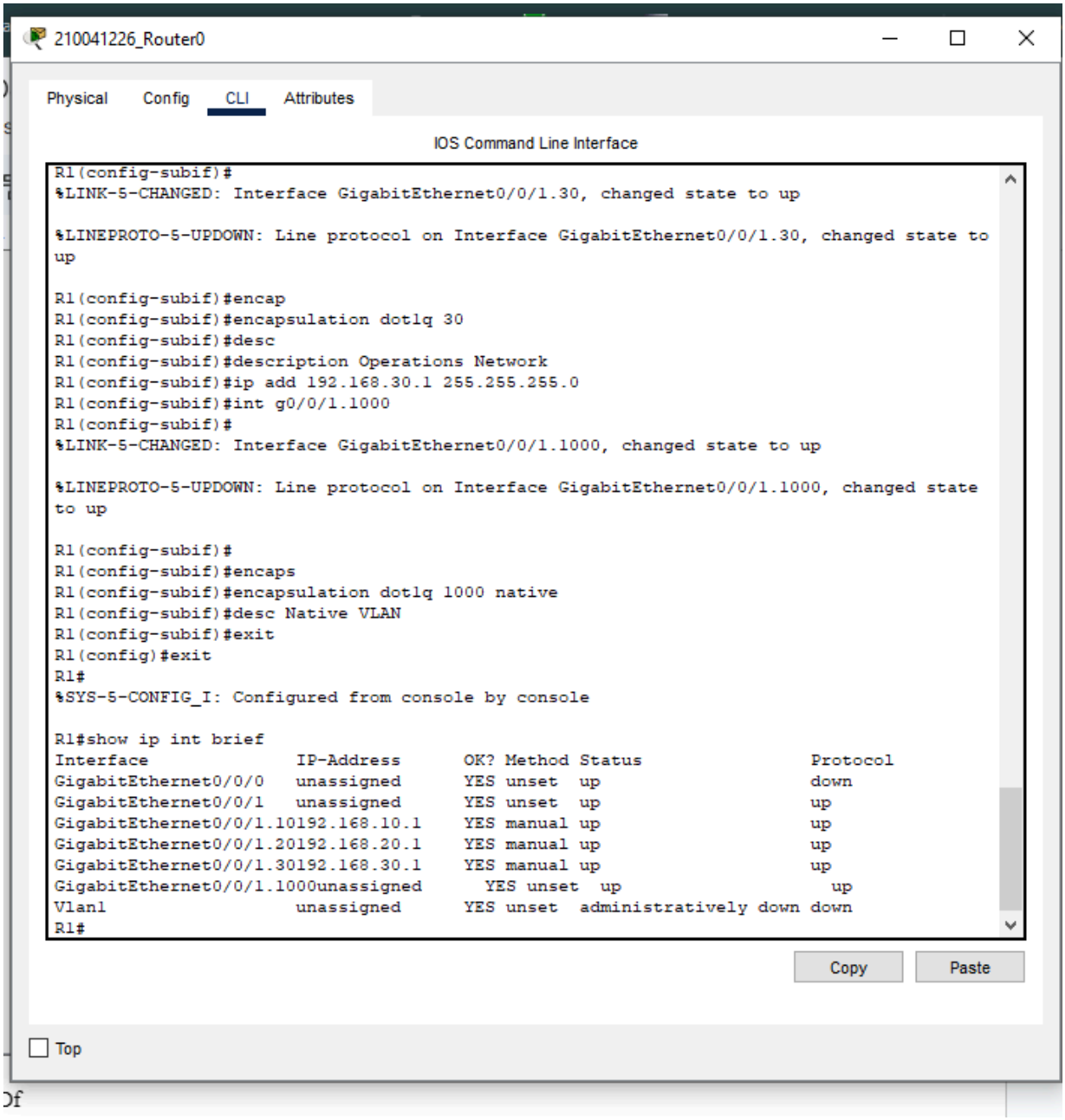
8. Switch 1 Vlan Configuration



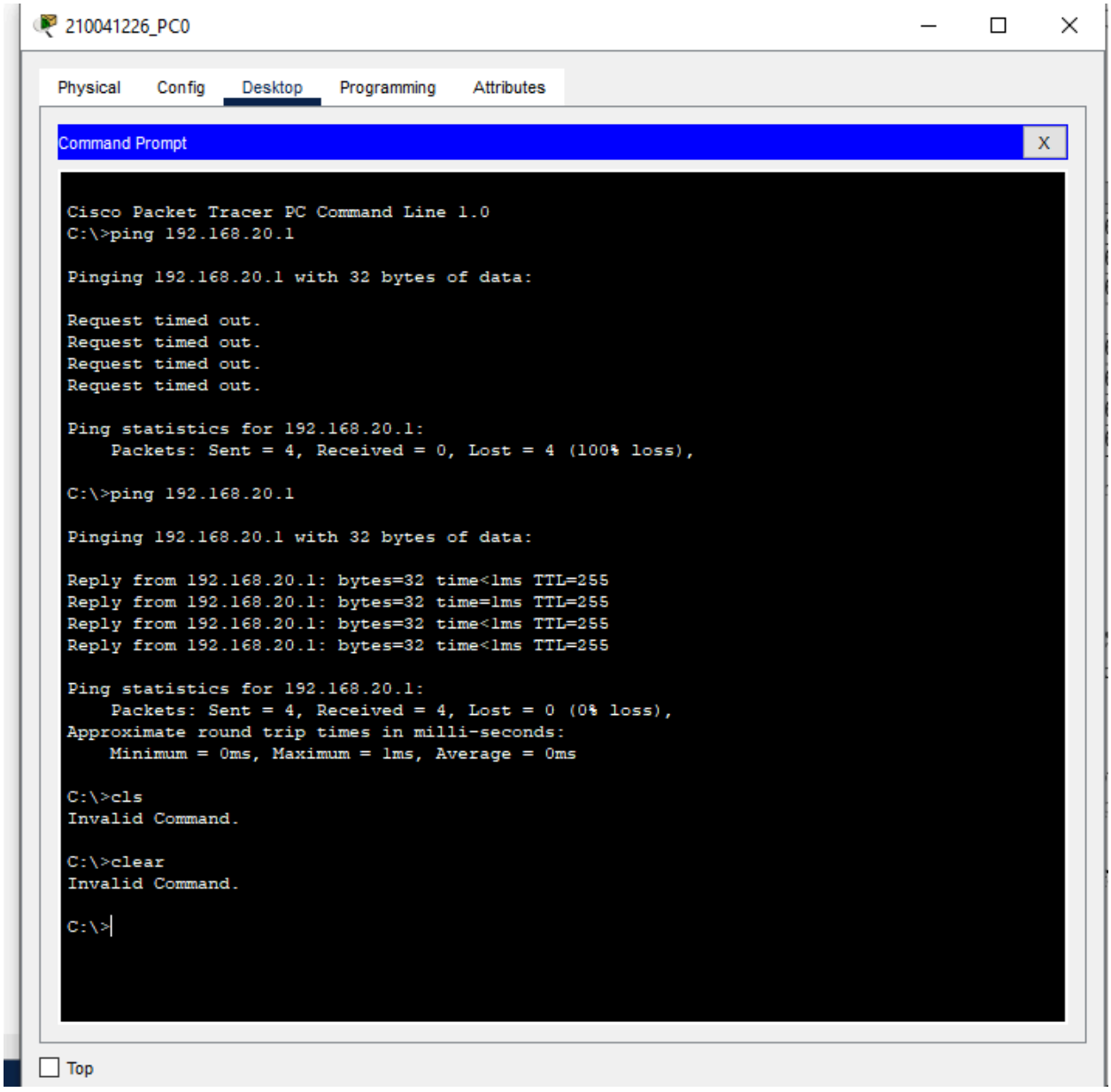
9. Router0 Vlan Configuration

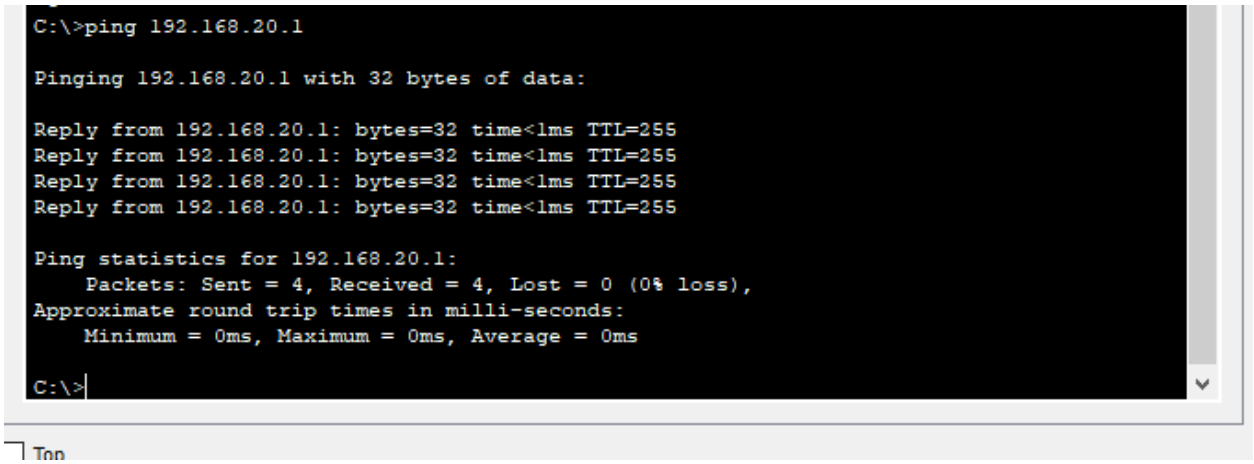

210041226_Router0
Physical
Config
CLI
Attributes
IOS Command Line Interface
R1>
R1>en
Password:
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int g0/1
%Invalid interface type and number
R1(config)#int g0/0/1
R1(config-if)#no shut
R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up
R1(config-if)#
R1(config-if)#interface gig
R1(config-if)#exit
R1(config)#interface g
R1(config)#interface gigabitEthernet 0/1
%Invalid interface type and number
R1(config)#int g0/0/1
R1(config-if)#int g0/0/1.10
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1.10, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1.10, changed state to up
R1(config-subif)#encapsulation dot1q 10
R1(config-subif)#desc
Copy
Paste
Top


210041226_Router0
Physical
Config
CLI
Attributes
IOS Command Line Interface
R1(config-if)#int g0/0/1.10
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1.10, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1.10, changed state to up
R1(config-subif)#encapsulation dot1q 10
R1(config-subif)#desc
R1(config-subif)#description Manageme
R1(config-subif)#description Management Network
R1(config-subif)#ip add 192.168.10.1 255.255.255.0
R1(config-subif)#int g0/0/1.20
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1.20, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1.20, changed state to up
R1(config-subif)#encap
R1(config-subif)#encapsulation dot1q 20
R1(config-subif)#
R1(config-subif)#desc
R1(config-subif)#description Sales Network
R1(config-subif)#ip add 192.168.20.1 255.255.255.0
R1(config-subif)#int g0/0/1.30
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1.30, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1.30, changed state to up
R1(config-subif)#encap
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#desc
R1(config-subif)#description Operations Network
R1(config-subif)#ip add 192.168.30.1 255.255.255.0
Copy
Paste
Top



10. After setting up the IP address of the PC different locations were pinged and they were successful

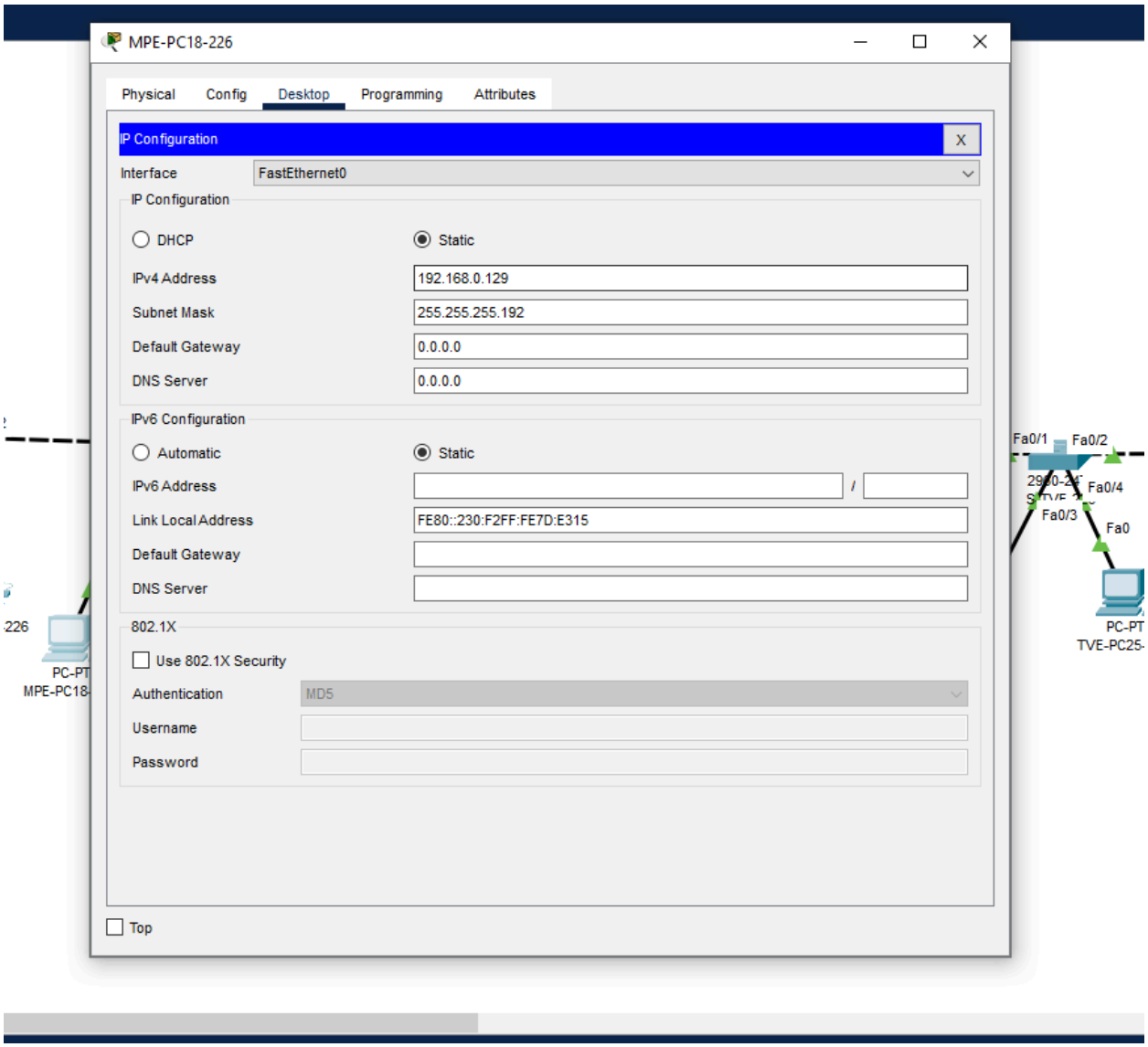

210041226_PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.20.1
Pinging 192.168.20.1 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.20.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.168.20.1
Pinging 192.168.20.1 with 32 bytes of data:
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Reply from 192.168.20.1: bytes=32 time=1ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Ping statistics for 192.168.20.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>cls
Invalid Command.
C:\>clear
Invalid Command.
C:\>
Top

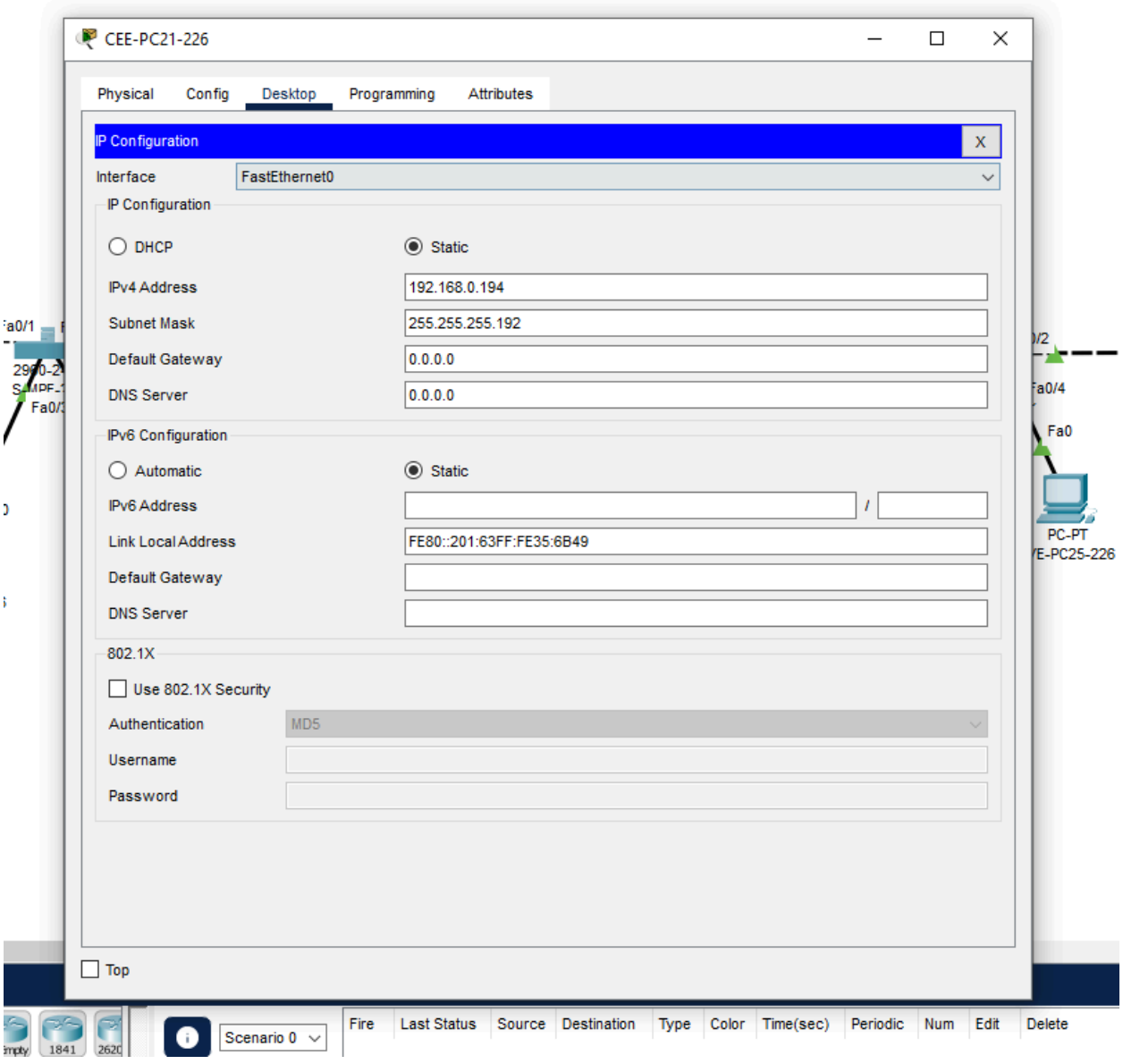

C:\>ping 192.168.20.1
Pinging 192.168.20.1 with 32 bytes of data:
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Ping statistics for 192.168.20.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
Top

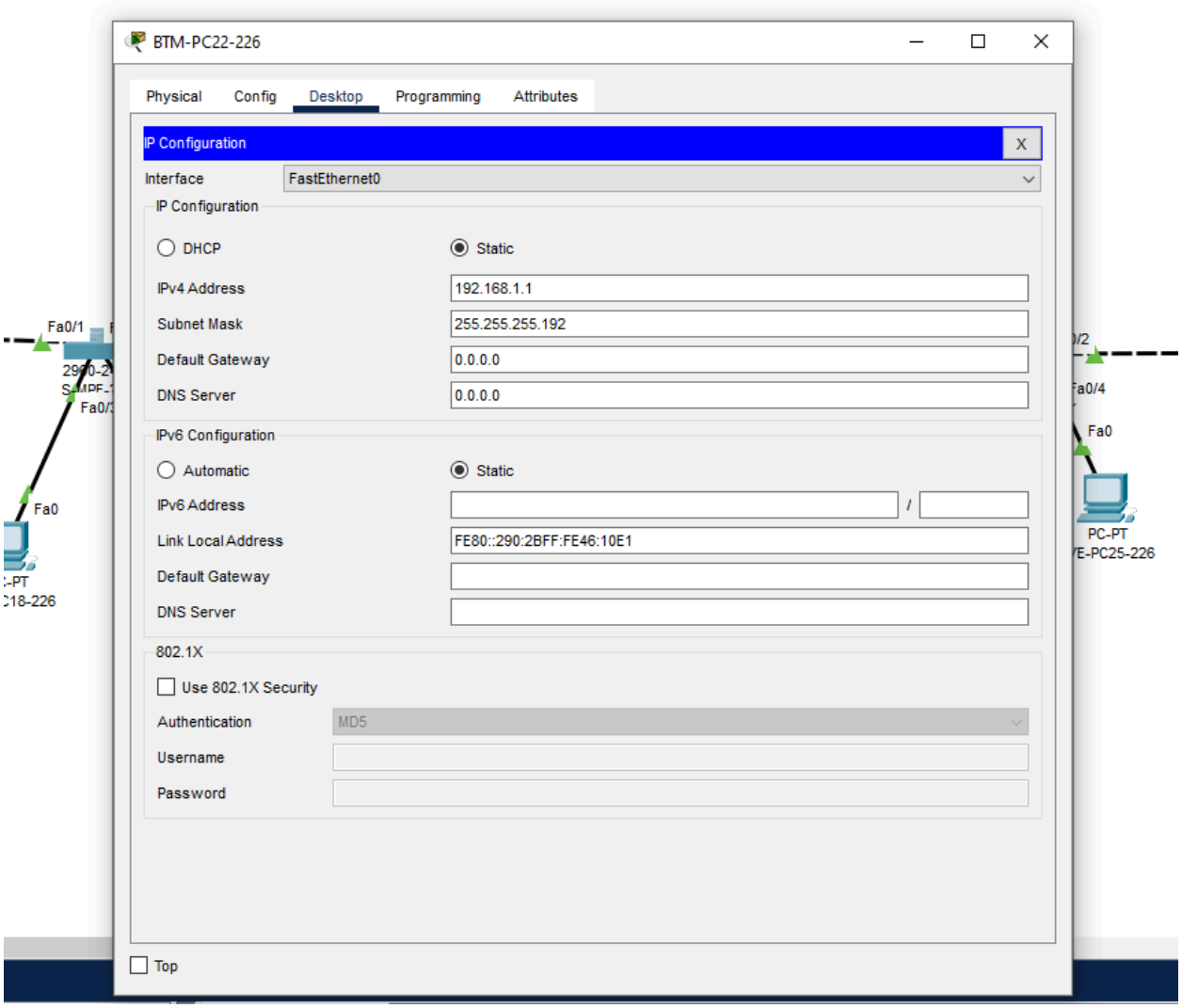
11.

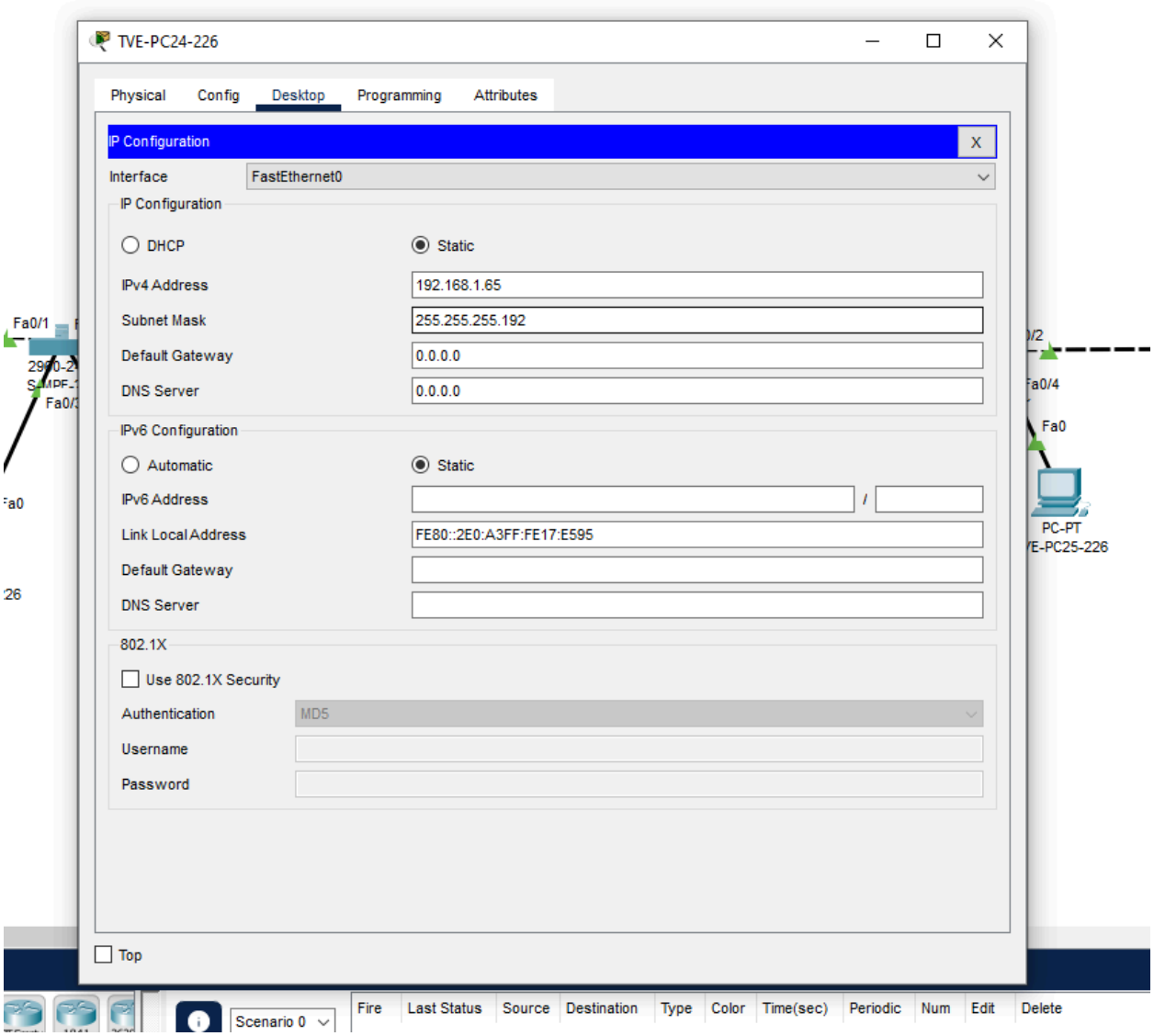
TASK #03:

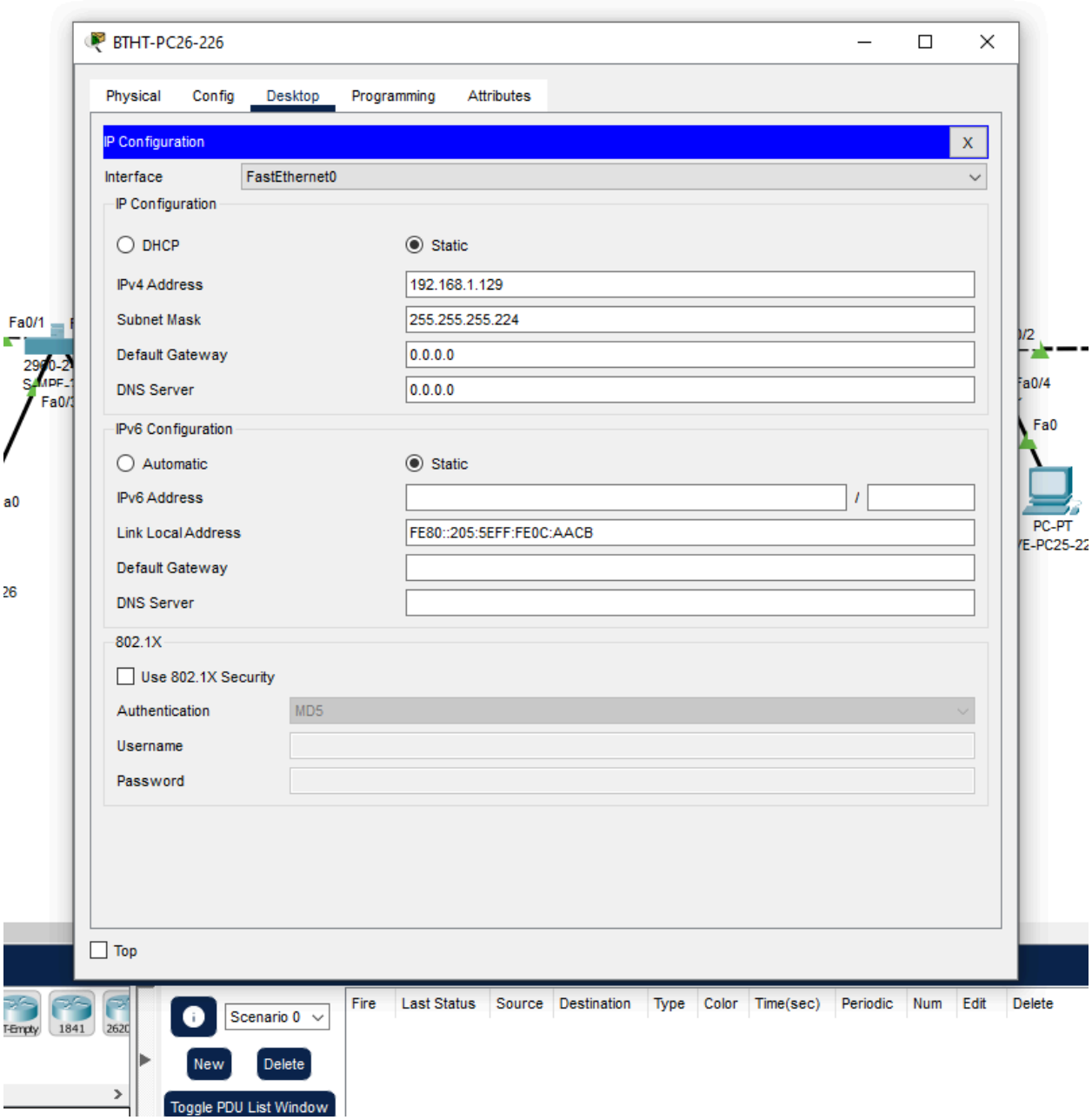
1. First calculated the subnet mask for all the departments and set the PC's IP address and subnet masks

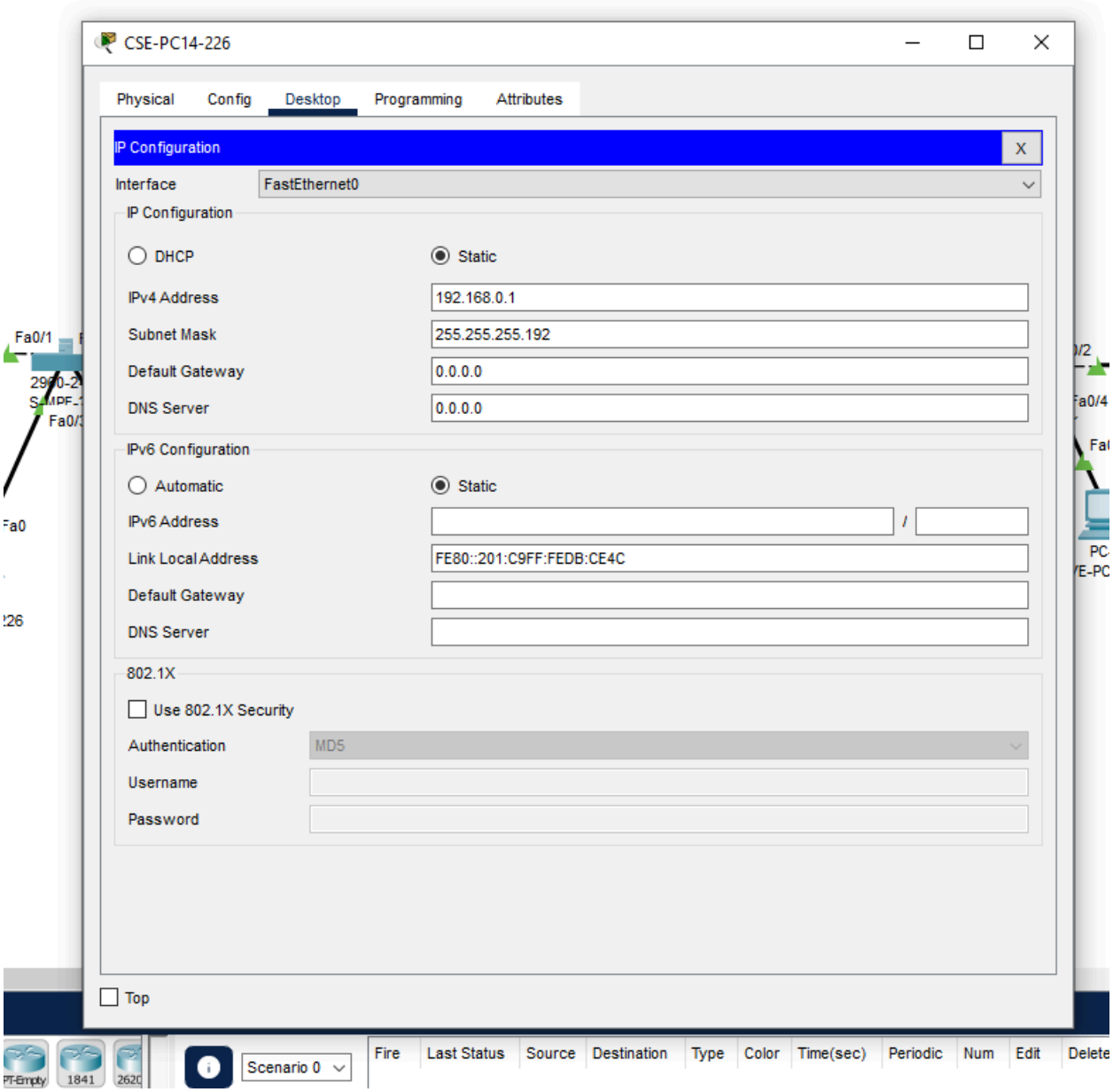


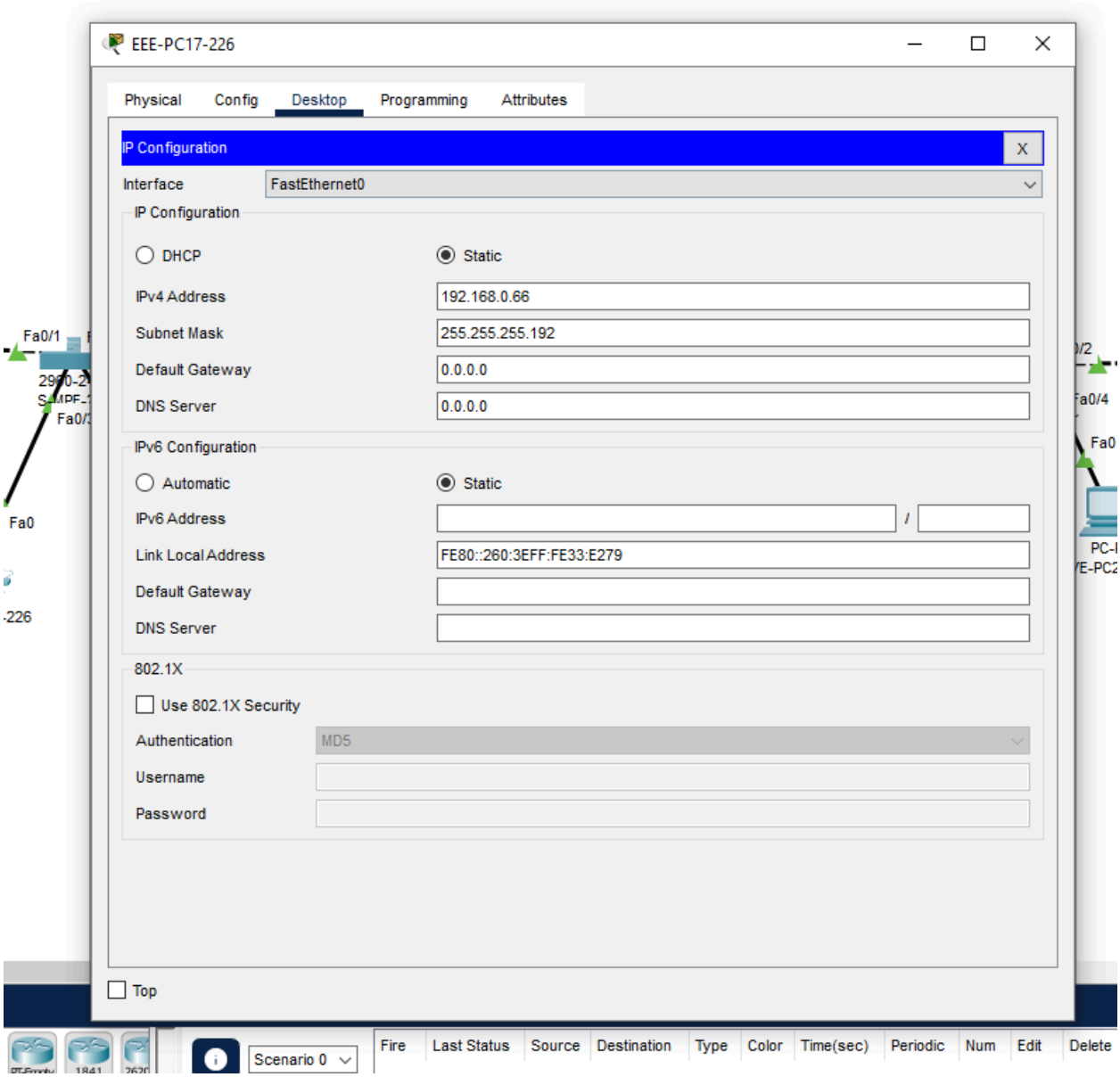

CEE-PC21-226
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.0.194
Subnet Mask
255.255.255.192
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::201:63FF:FE35:6B49
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Fa0/1
Fa0/4
Fa0
PC-PT
Scenario 0
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete


BTM-PC22-226
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.1
Subnet Mask
255.255.255.192
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::290:2BFF:FE46:10E1
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Fa0/1
Fa0
Fa0/4
PC-PT

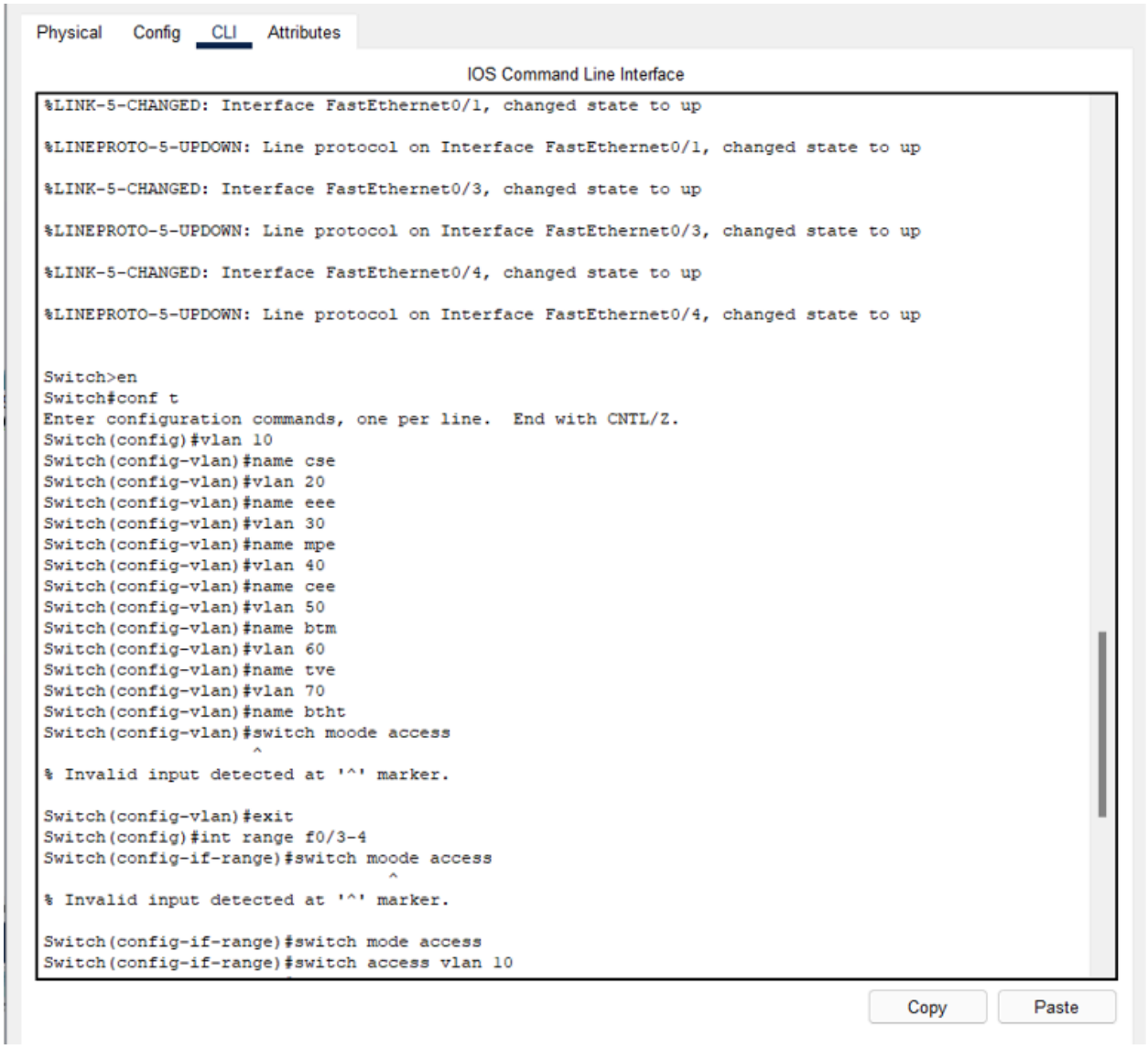

TVE-PC24-226
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.65
Subnet Mask
255.255.255.192
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::2E0:A3FF:FE17:E595
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Fa0/1
Fa0/4
Fa0
PC-PT
Scenario 0
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete


BTHT-PC26-226
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.129
Subnet Mask
255.255.255.224
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::205:5EFF:FE0C:AACB
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Fa0/1
Fa0/4
Fa0
PC-PT
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete


CSE-PC14-226
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.0.1
Subnet Mask
255.255.255.192
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::201:C9FF:FEDB:CE4C
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Fa0/1
Fa0/4
Scenario 0
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete

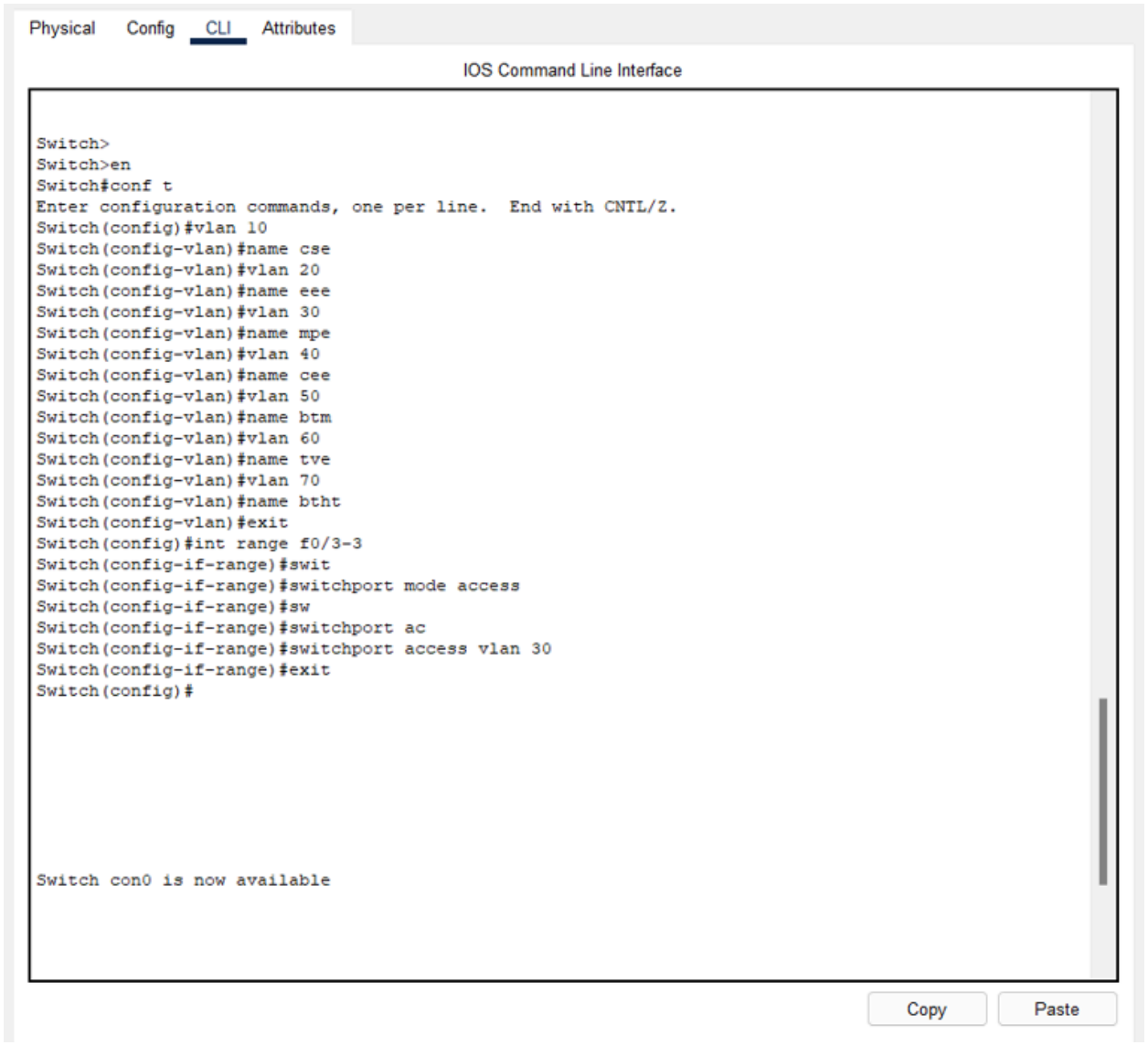


2. Then configured the switches for all departments and the sub interfaces of the routers


Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name cse
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name eee
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name mpe
Switch(config-vlan)#vlan 40
Switch(config-vlan)#name cee
Switch(config-vlan)#vlan 50
Switch(config-vlan)#name btm
Switch(config-vlan)#vlan 60
Switch(config-vlan)#name tve
Switch(config-vlan)#vlan 70
Switch(config-vlan)#name btht
Switch(config-vlan)#switch moode access
^
% Invalid input detected at '^' marker.
Switch(config-vlan)#exit
Switch(config)#int range f0/3-4
Switch(config-if-range)#switch moode access
^
% Invalid input detected at '^' marker.
Switch(config-if-range)#switch mode access
Switch(config-if-range)#switch access vlan 10
Copy
Paste

IOS Command Line Interface

```
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up


Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name cse
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name eee
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name mpe
Switch(config-vlan)#vlan 40
Switch(config-vlan)#name cee
Switch(config-vlan)#vlan 50
Switch(config-vlan)#name btm
Switch(config-vlan)#vlan 60
Switch(config-vlan)#name tve
Switch(config-vlan)#vlan 70
Switch(config-vlan)#name btht
Switch(config-vlan)#ecit
                    ^
% Invalid input detected at '^' marker.

Switch(config-vlan)#exit
Switch(config)#int range f0/3-4
Switch(config-if-range)#switch mode access
Switch(config-if-range)#switch access valn 20
                                          ^
% Invalid input detected at '^' marker.

Switch(config-if-range)#switch access vlan 20
```


Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name cse
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name eee
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name mpe
Switch(config-vlan)#vlan 40
Switch(config-vlan)#name cee
Switch(config-vlan)#vlan 50
Switch(config-vlan)#name btm
Switch(config-vlan)#vlan 60
Switch(config-vlan)#name tve
Switch(config-vlan)#vlan 70
Switch(config-vlan)#name btht
Switch(config-vlan)#exit
Switch(config)#int range f0/3-3
Switch(config-if-range)#swit
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#sw
Switch(config-if-range)#switchport ac
Switch(config-if-range)#switchport access vlan 30
Switch(config-if-range)#exit
Switch(config)#
Switch con0 is now available
Copy
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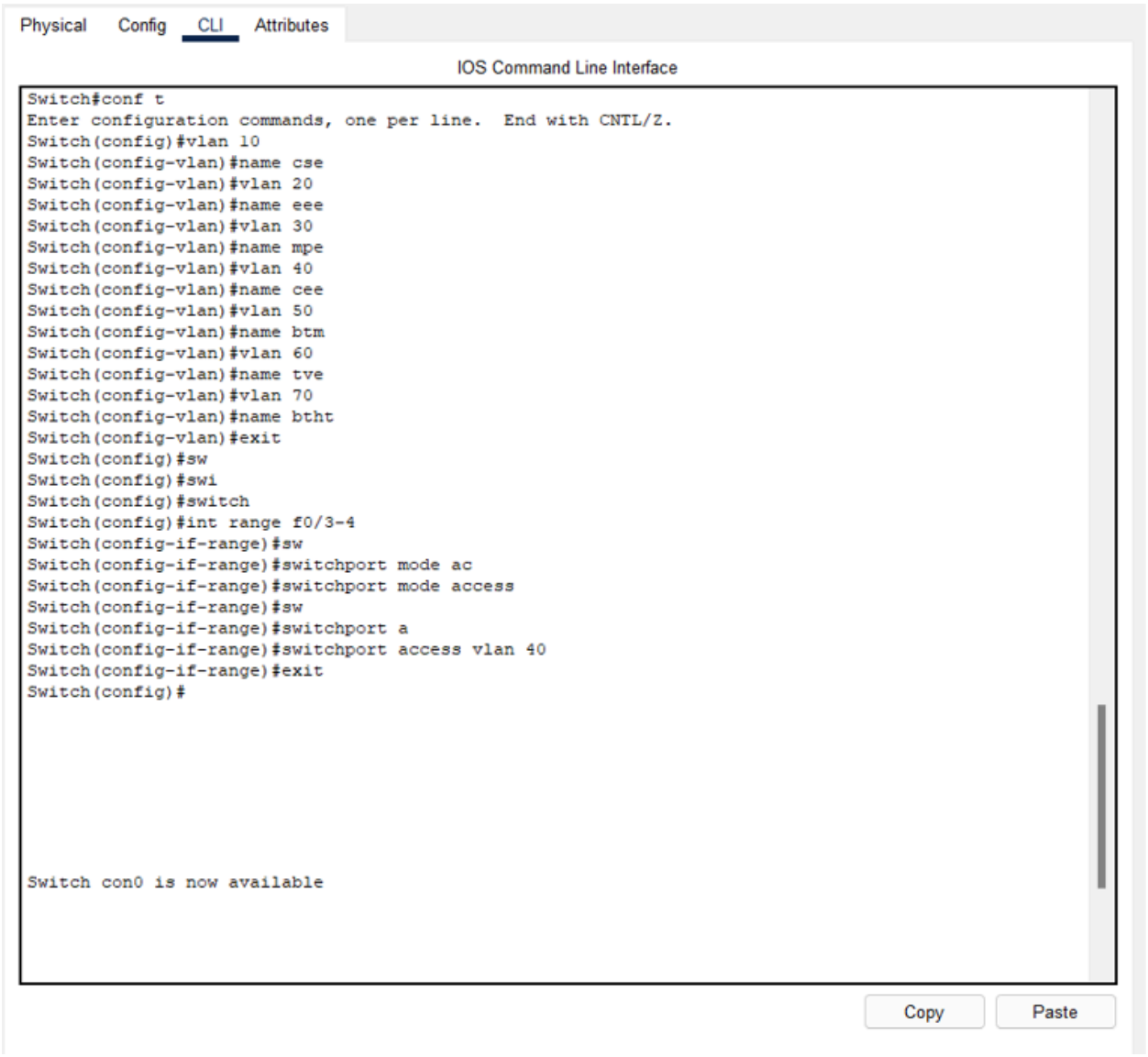
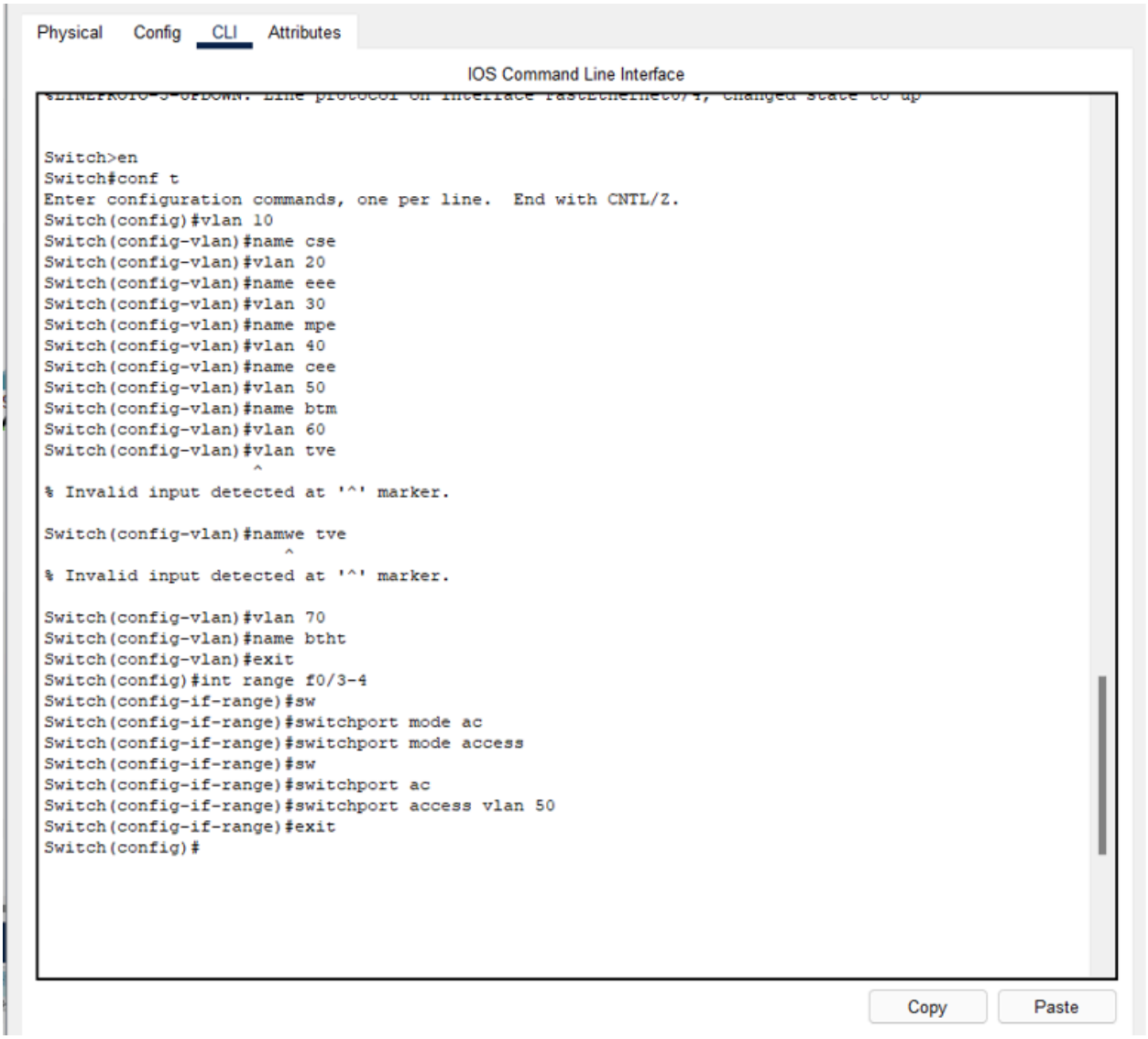

Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name cse
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name eee
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name mpe
Switch(config-vlan)#vlan 40
Switch(config-vlan)#name cee
Switch(config-vlan)#vlan 50
Switch(config-vlan)#name btm
Switch(config-vlan)#vlan 60
Switch(config-vlan)#name tve
Switch(config-vlan)#vlan 70
Switch(config-vlan)#name btht
Switch(config-vlan)#exit
Switch(config)#sw
Switch(config)#swi
Switch(config)#switch
Switch(config)#int range f0/3-4
Switch(config-if-range)#sw
Switch(config-if-range)#switchport mode ac
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#sw
Switch(config-if-range)#switchport a
Switch(config-if-range)#switchport access vlan 40
Switch(config-if-range)#exit
Switch(config)#
Switch con0 is now available
Copy
Paste


Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name cse
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name eee
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name mpe
Switch(config-vlan)#vlan 40
Switch(config-vlan)#name cee
Switch(config-vlan)#vlan 50
Switch(config-vlan)#name btm
Switch(config-vlan)#vlan 60
Switch(config-vlan)#vlan tve
^
% Invalid input detected at '^' marker.
Switch(config-vlan)#namwe tve
^
% Invalid input detected at '^' marker.
Switch(config-vlan)#vlan 70
Switch(config-vlan)#name btht
Switch(config-vlan)#exit
Switch(config)#int range f0/3-4
Switch(config-if-range)#sw
Switch(config-if-range)#switchport mode ac
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#sw
Switch(config-if-range)#switchport ac
Switch(config-if-range)#switchport access vlan 50
Switch(config-if-range)#exit
Switch(config)#
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```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up


Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name cse
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name eee
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name mpe
Switch(config-vlan)#vlan 40
Switch(config-vlan)#name cee
Switch(config-vlan)#vlan 50
Switch(config-vlan)#name btm
Switch(config-vlan)#vlan 60
Switch(config-vlan)#name tve
Switch(config-vlan)#vlan 70
Switch(config-vlan)#name btht
Switch(config-vlan)#exit
Switch(config)#int range f0/3-4
Switch(config-if-range)#sw
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#sw
Switch(config-if-range)#switchport a
Switch(config-if-range)#switchport access vlan 60
Switch(config-if-range)#exit
Switch(config)#
```

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Observation:

1. Task 1 was about how MLS performs the operations of both Layer 2 and 3 . Here we implemented inter VLAn communication
2. Task 2 was about inter vlan routing by router on a stick method and Task 3 was about the same concept just more manual and practical

Challenges (if any):

1. There were so many trial and errors
2. Errors like native vlan mismatch was hard to debug
3. Calculation difficulty in determining the subnet and the ip addresses of all the PCs

4. There were also other difficulties in understanding the concepts of vlan and other theories necessary here