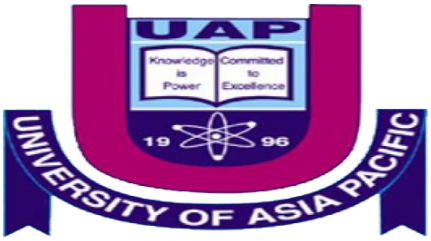

UNIVERSITY OF ASIA PACIFIC

Department of Computer Science & Engineering

Course Code : CSE 320

Course Title : Computer Networks Lab

Submitted by:

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Section : B (2)

Submitted To:

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Assistant Professor

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University of Asia Pacific

Project Small Office Home Office (SOHO) Case Study and Requirements:

XYZ company is a fast-growing company in Eastern Australia with more than 2 million customers globally. The company deals with selling and buying of food items, which are basically operated from the headquarters. The company is intending to open a branch near the local village Bonalbo. Thus, the company requires young IT graduates to design the network for the branch. The network is intended to operate separately from the HQ network. Being a small network, the company has the following requirements during implementation;

- One router and one switch to be used (all CISCO products).
- 3 departments (Admin/IT, Finance/HR and Customer service/Reception).
- Each department is required to be in different VIANS.
- Each department is required to have a wireless network for the users.
- Host devices in the network are required to obtain IPv4 address automatically.
- Devices in all the departments are required to communicate with each other.

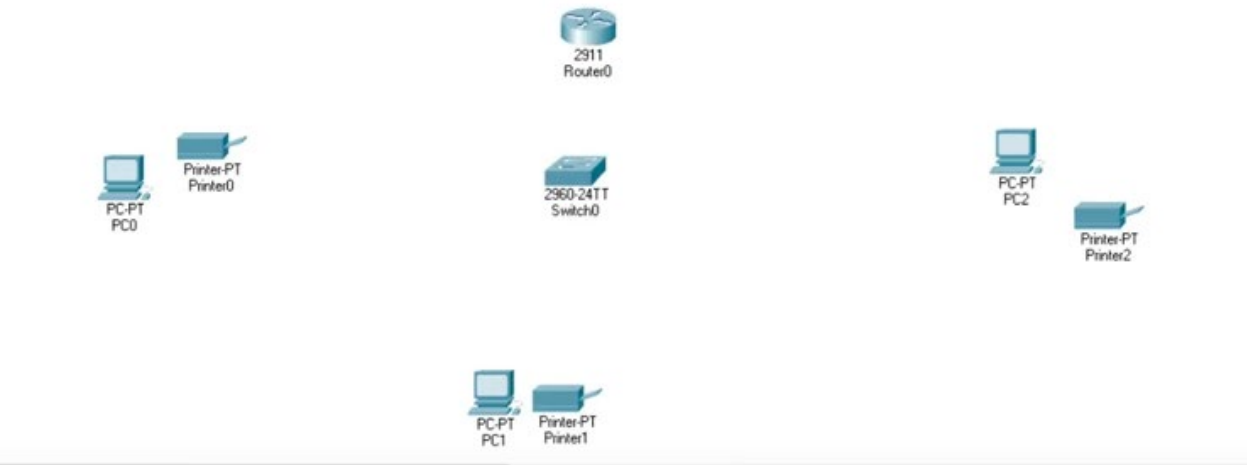
Assume the ISP gave out a base network of 192.168.1.0, you as the young network engineer who has been hired, design and implement a network considering the above requirements.

Technologies Implemented:

1. Creating a Simple Network using a Router and Access Layer Switch.
2. Connecting Networking devices with Correct cabling.
3. Creating VLANs and assigning ports VLAN numbers.
4. Subnetting and IP Addressing.
5. Configuring Inter-VLAN Routing (Router on a stick).
6. Configuring DHCP Server (Router as the DHCP Server).
7. Configuring WLAN or wireless network (Cisco Access Point).
8. Host Device Configurations.
9. Test and Verifying Network Communication.

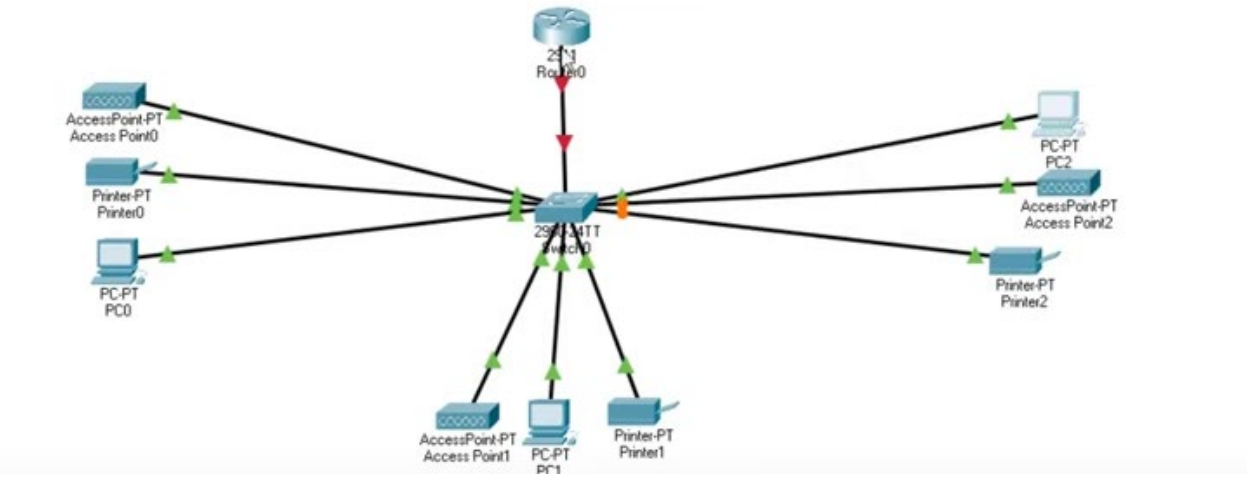
How to implement **SOHO**

Step-1: Open a project in Cisco Packet Tracer. Take a router, printer, access point & PC from the drop-down menu. The amount of these equipment's depends on the architecture of the project.

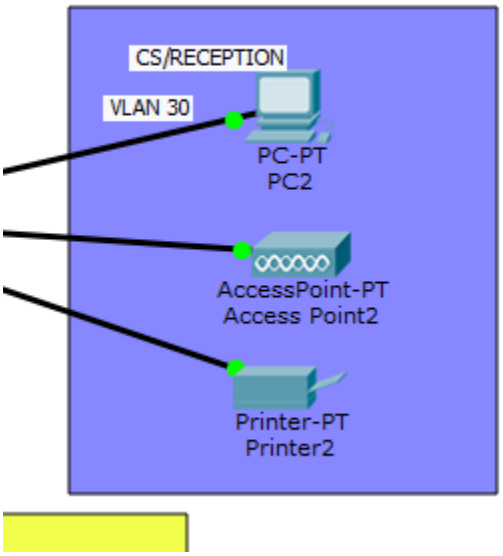


Step-2: Rename the equipment's to avoid confusion.

Step-3: Choose wires and give connections.



Step-4: Give section names and add colors.



Step-5: Give network ID subnet mask.

For admin/IT: **192.168.1.0/26**
For Finance/HR: **192.168.1.64/26**
For CS/Reception: **192.168.1.128/26**

Step-6: Configure the VLAN. Go to switch then terminal and write down-

enable
configure terminal
int range fa0/2-4
switchport mode access
switchport access vlan 10

Similar process for other ports:

enable
configure terminal
int range fa0/5-7
switchport mode access
switchport access vlan 20

enable
configure terminal
int range fa0/8-10
switchport mode access
switchport access vlan 30

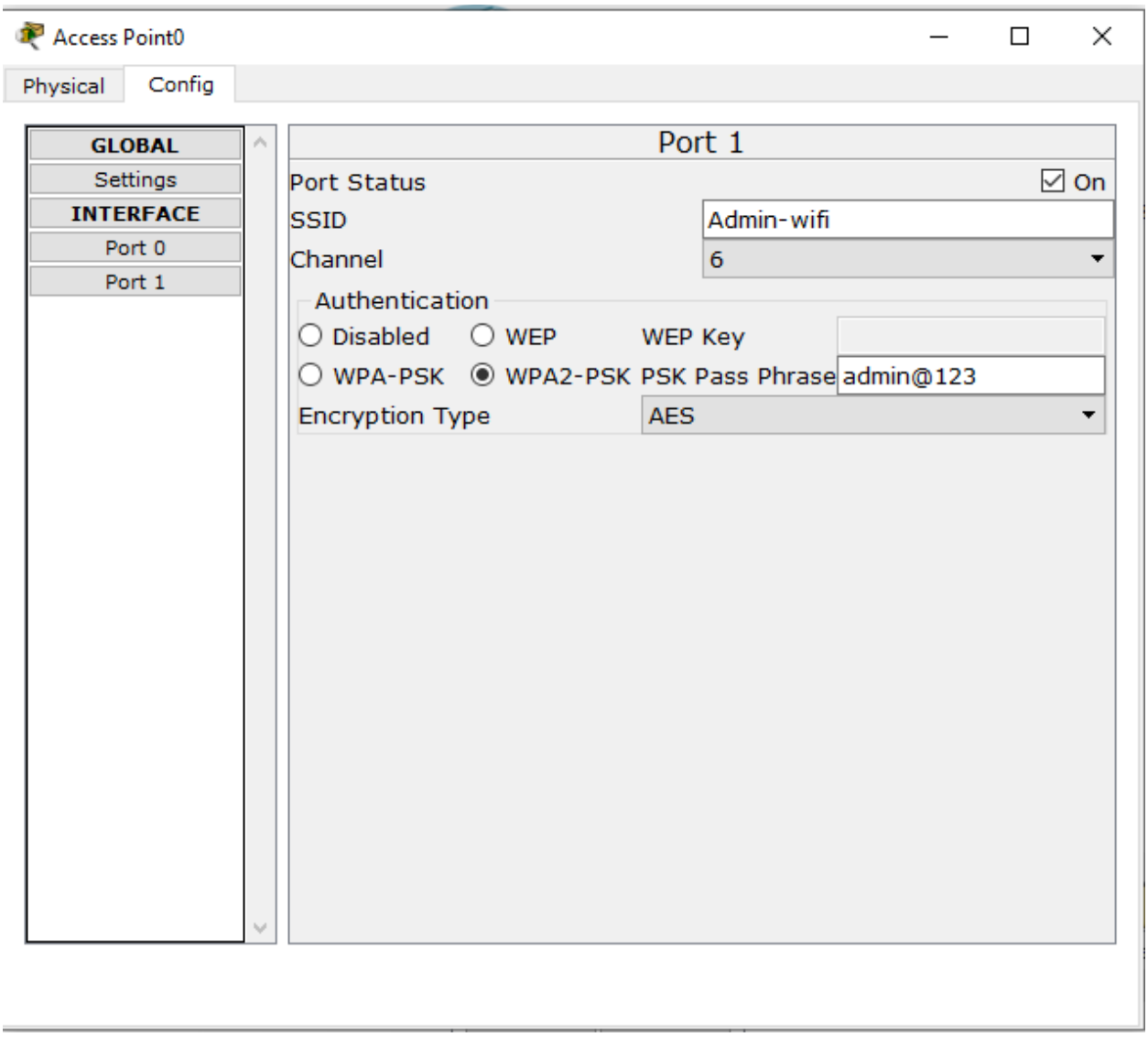
then,

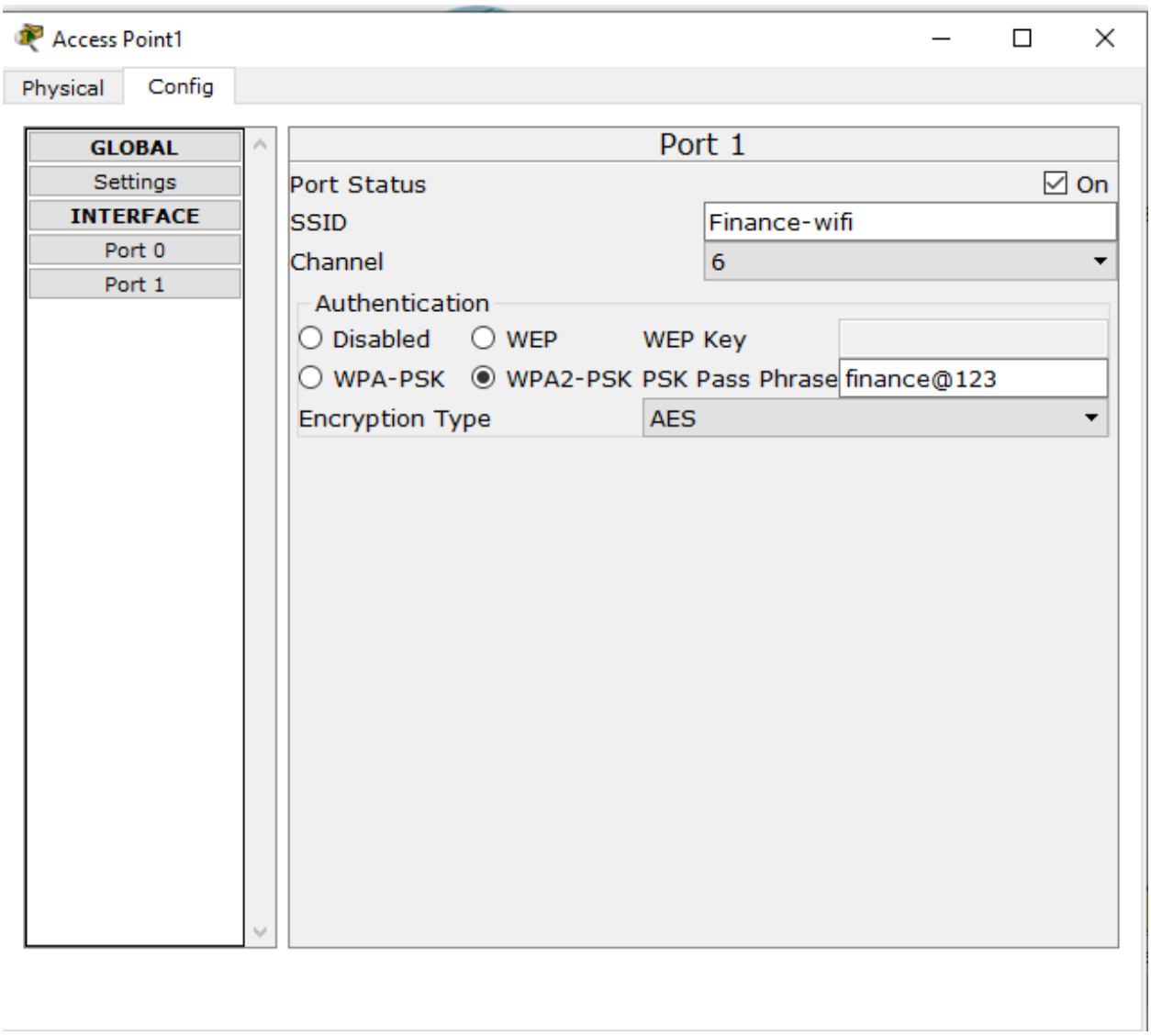
do write
exit
do show start

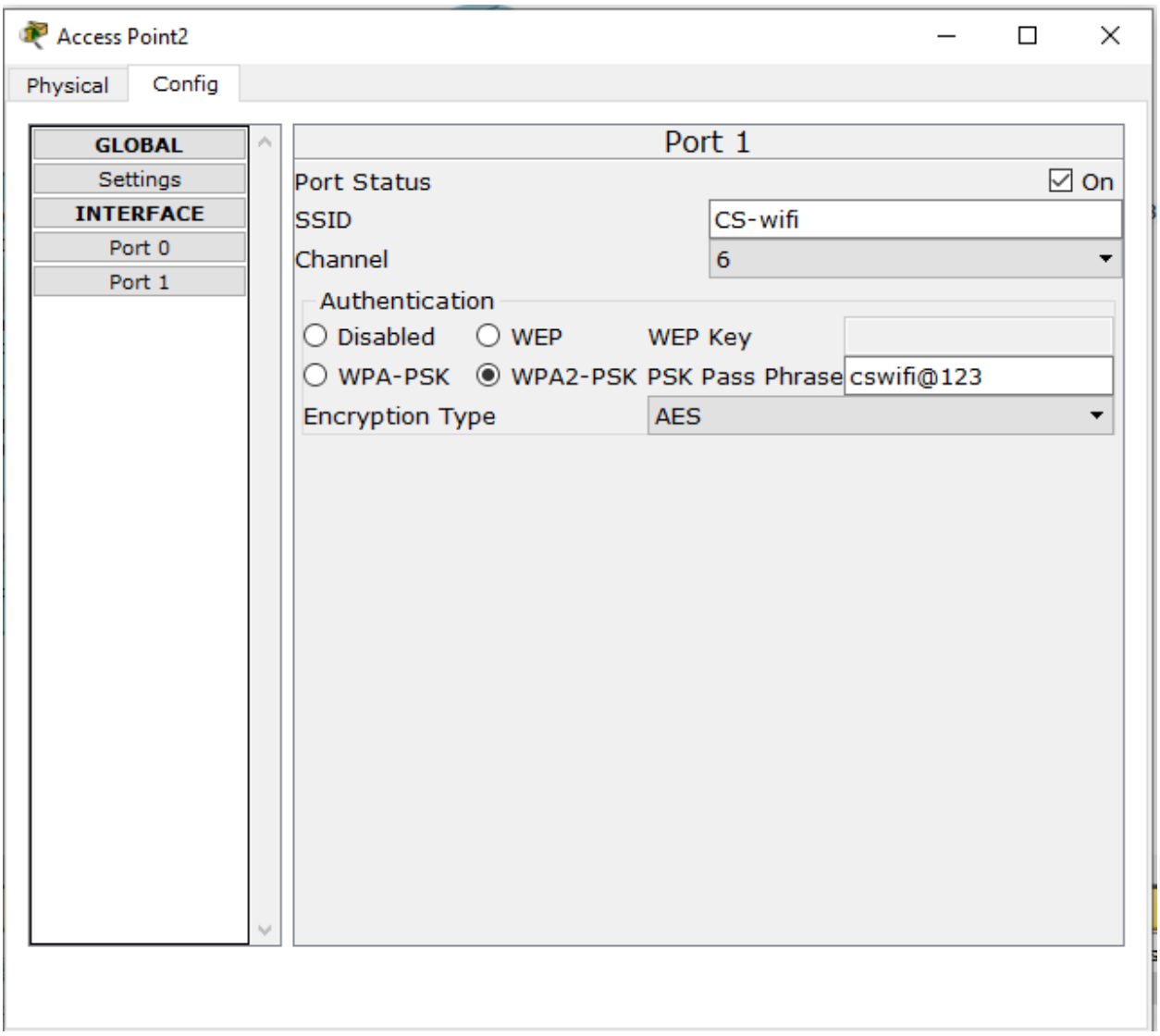
Interfaces will show-

```
 switchport mode access
!
interface FastEthernet0/5
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/6
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/7
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/8
 switchport access vlan 30
```

Step-7: Implement the access points-

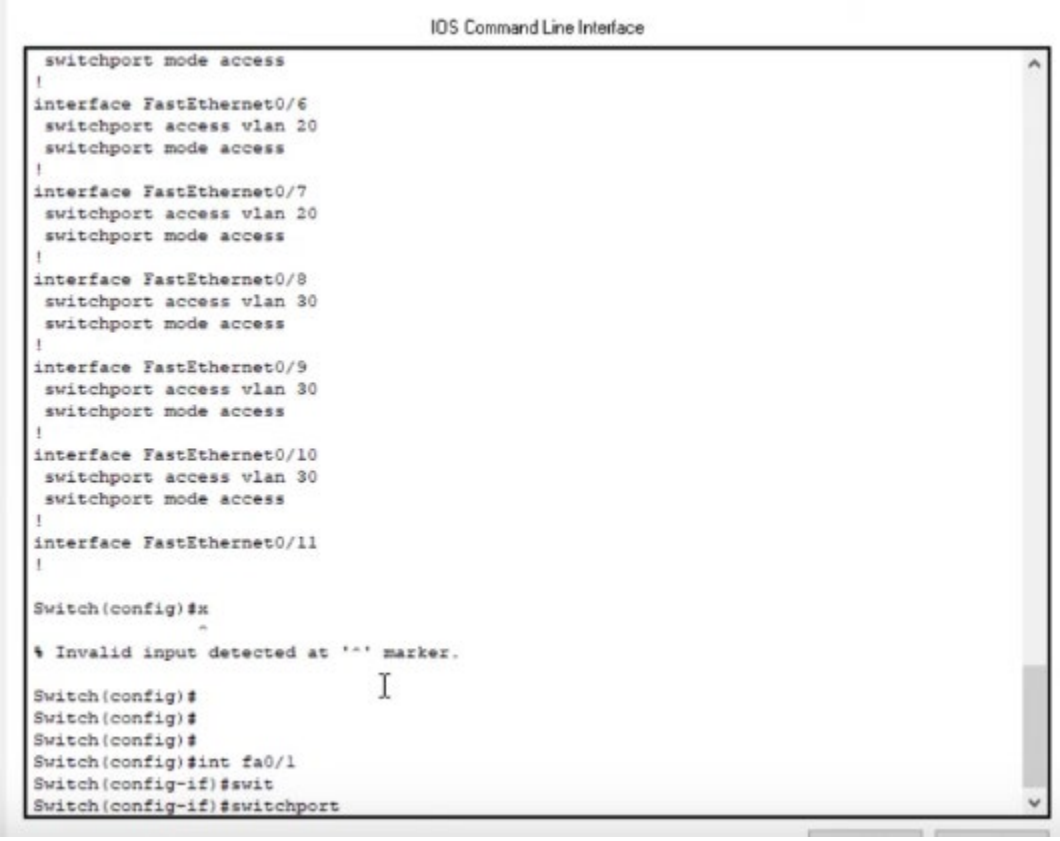

Access Point0
Physical
Config
GLOBAL
Settings
INTERFACE
Port 0
Port 1
Port 1
Port Status
On
SSID
Admin-wifi
Channel
6
Authentication
Disabled
WEP
WEP Key
WPA-PSK
WPA2-PSK
PSK Pass Phrase
admin@123
Encryption Type
AES


Access Point1
Physical
Config
GLOBAL
Settings
INTERFACE
Port 0
Port 1
Port 1
Port Status
On
SSID
Finance-wifi
Channel
6
Authentication
Disabled
WEP
WEP Key
WPA-PSK
WPA2-PSK
PSK Pass Phrase
finance@123
Encryption Type
AES


Access Point2
Physical
Config
GLOBAL
Settings
INTERFACE
Port 0
Port 1
Port 1
Port Status
On
SSID
CS-wifi
Channel
6
Authentication
Disabled
WEP
WEP Key
WPA-PSK
WPA2-PSK
PSK Pass Phrase
cswifi@123
Encryption Type
AES

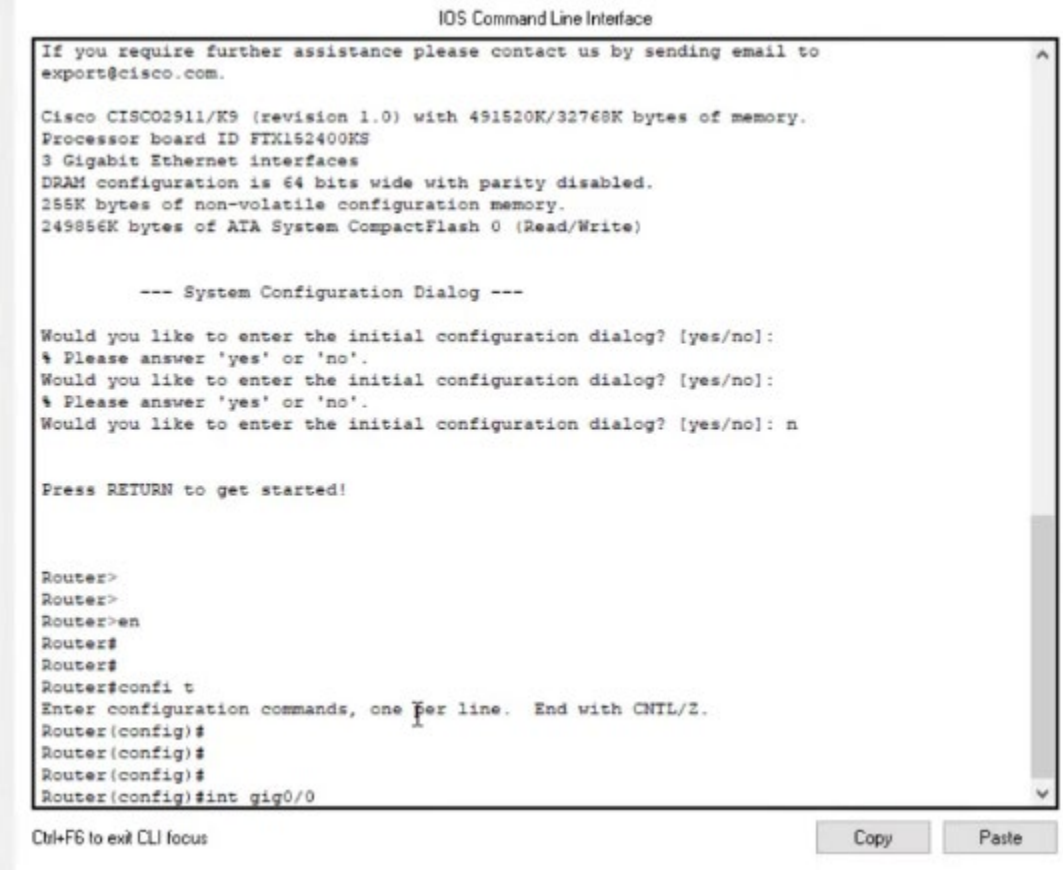
Step-8: Configure the router. Go to terminal and write-

int fa 0/1
switchport mode trunk
do write



Step-9: Configure the remaining router configuration. Go to terminal again and write-

enable
configure terminal
int gig0/0
no shut
do write



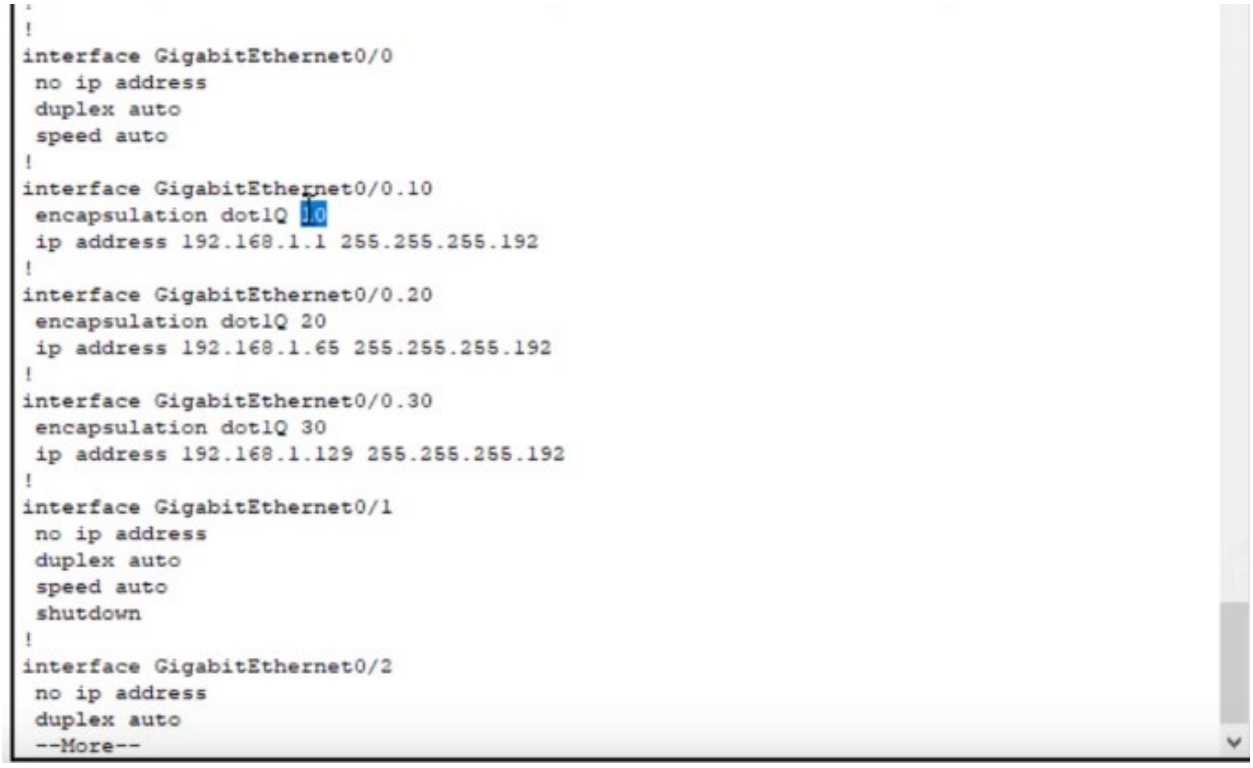
Step-10: Configure inter VLAN routing and DHCP server. Starting with creating sub interface, Go to router terminal and write-

int gig0/0.10
encapsulation dot1Q 10
ip address 192.168.1.1 255.255.255.192
exit

int gig0/0.10
encapsulation dot1Q 20
ip address 192.168.1.65 255.255.255.192
exit

int gig0/0.30
encapsulation dot1Q 30
ip address 192.168.1.129 255.255.255.192
exit

do show start



Step-11: Configure DHCP server. Starting with creating sub interface, Go to router terminal and write-

service DHCP
dhcp pool Admin-pool
network 192.168.1.0 255.255.255.192
default-router 192.168.1.1
dns-server *192.168.1.1*
domain-name Admin.com

exit

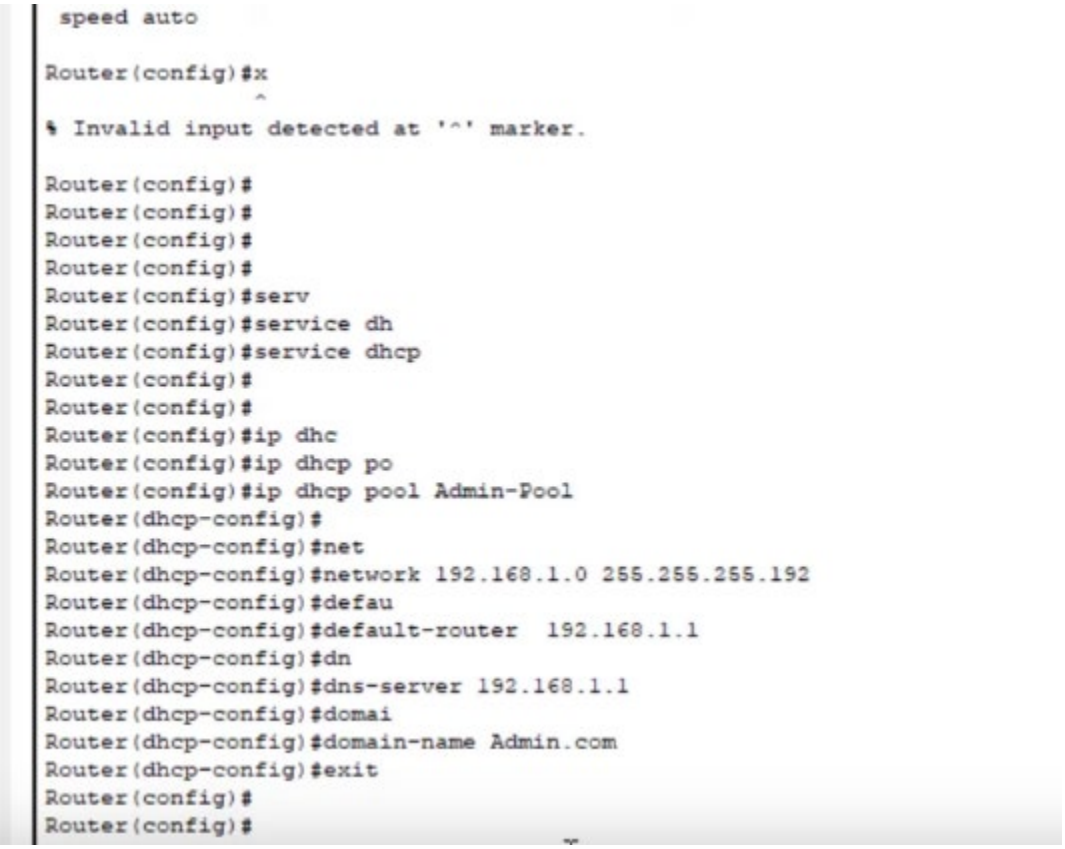
Similarly create another pool-

service DHCP
dhcp pool Finance-pool
network 192.168.1.64 255.255.255.192
default-router 192.168.1.65
dns-server *192.168.1.65*
domain-name Finance.com
exit

Similarly create another pool-

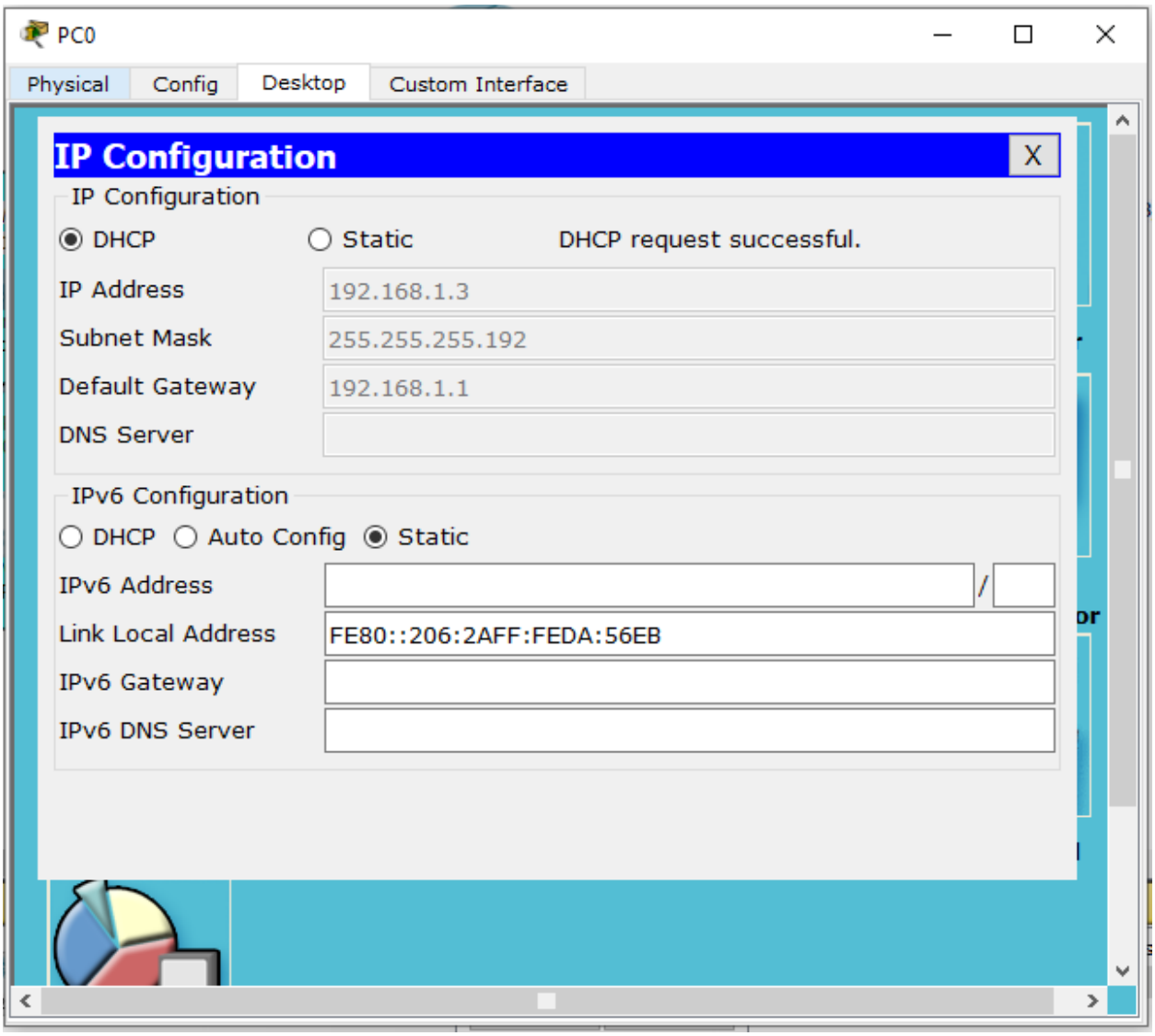
service DHCP
dhcp pool CS-pool
network 192.168.1.128 255.255.255.192
default-router 192.168.1.129
dns-server *192.168.1.129*
domain-name CS.com
exit

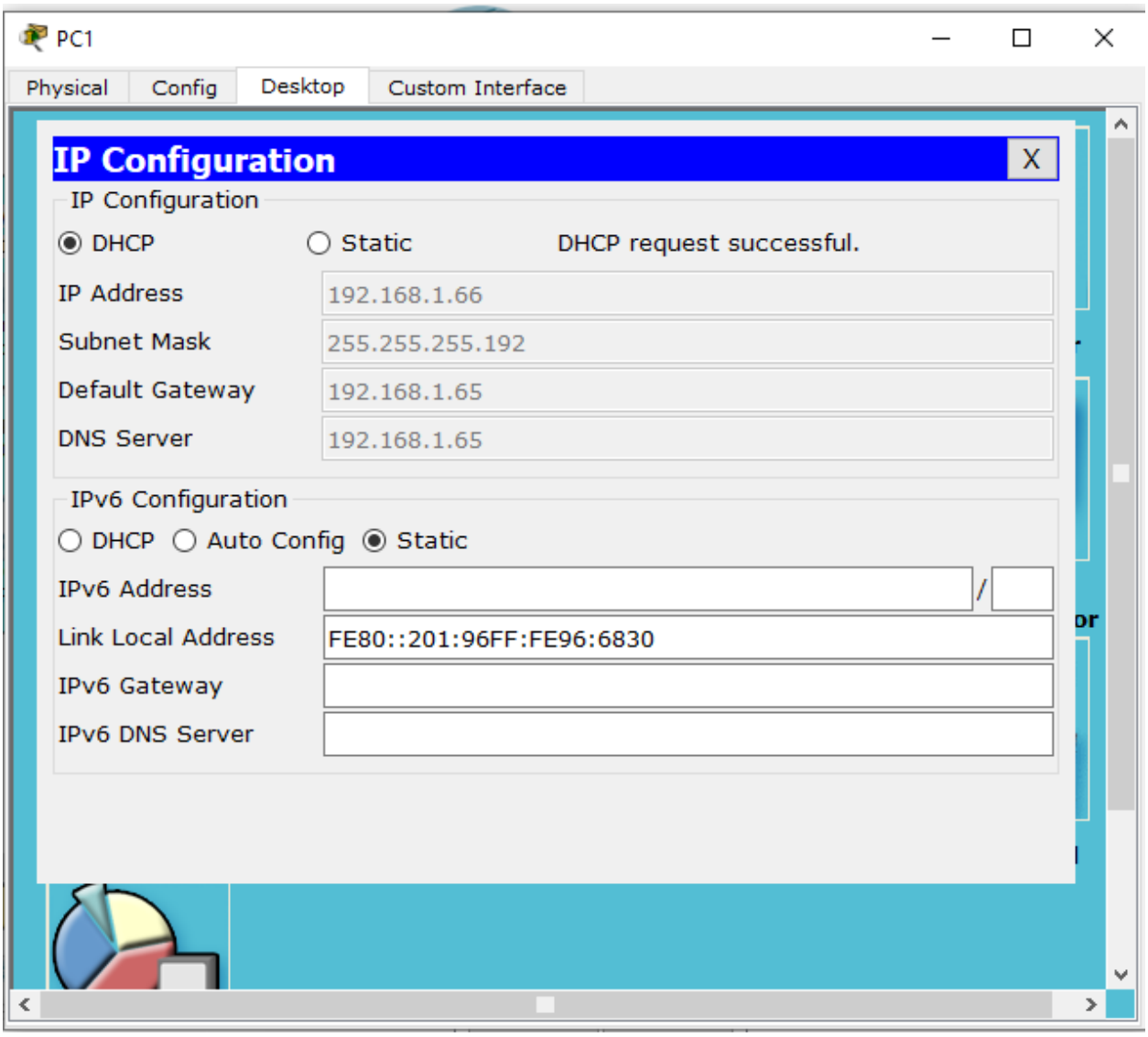
do write

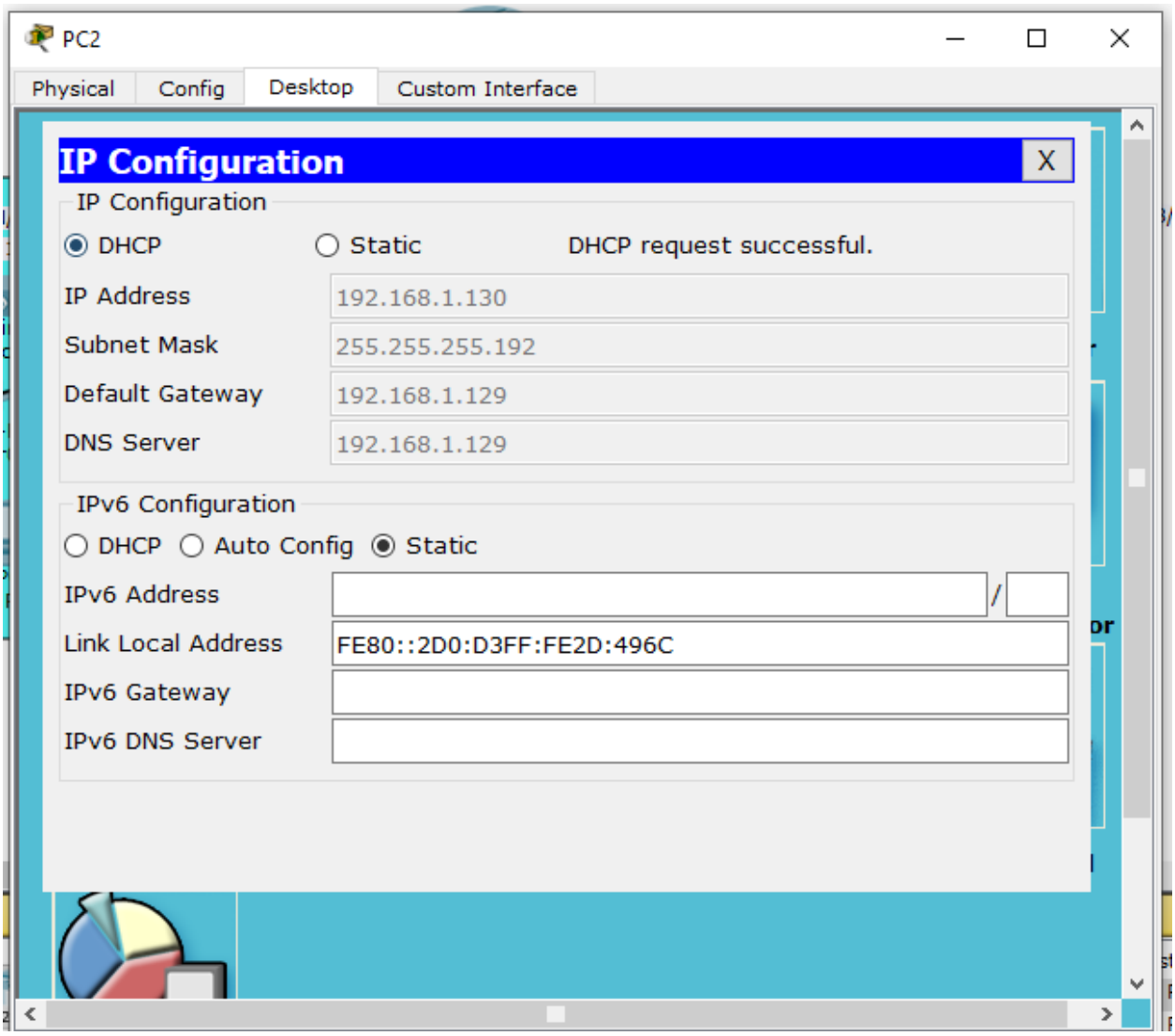


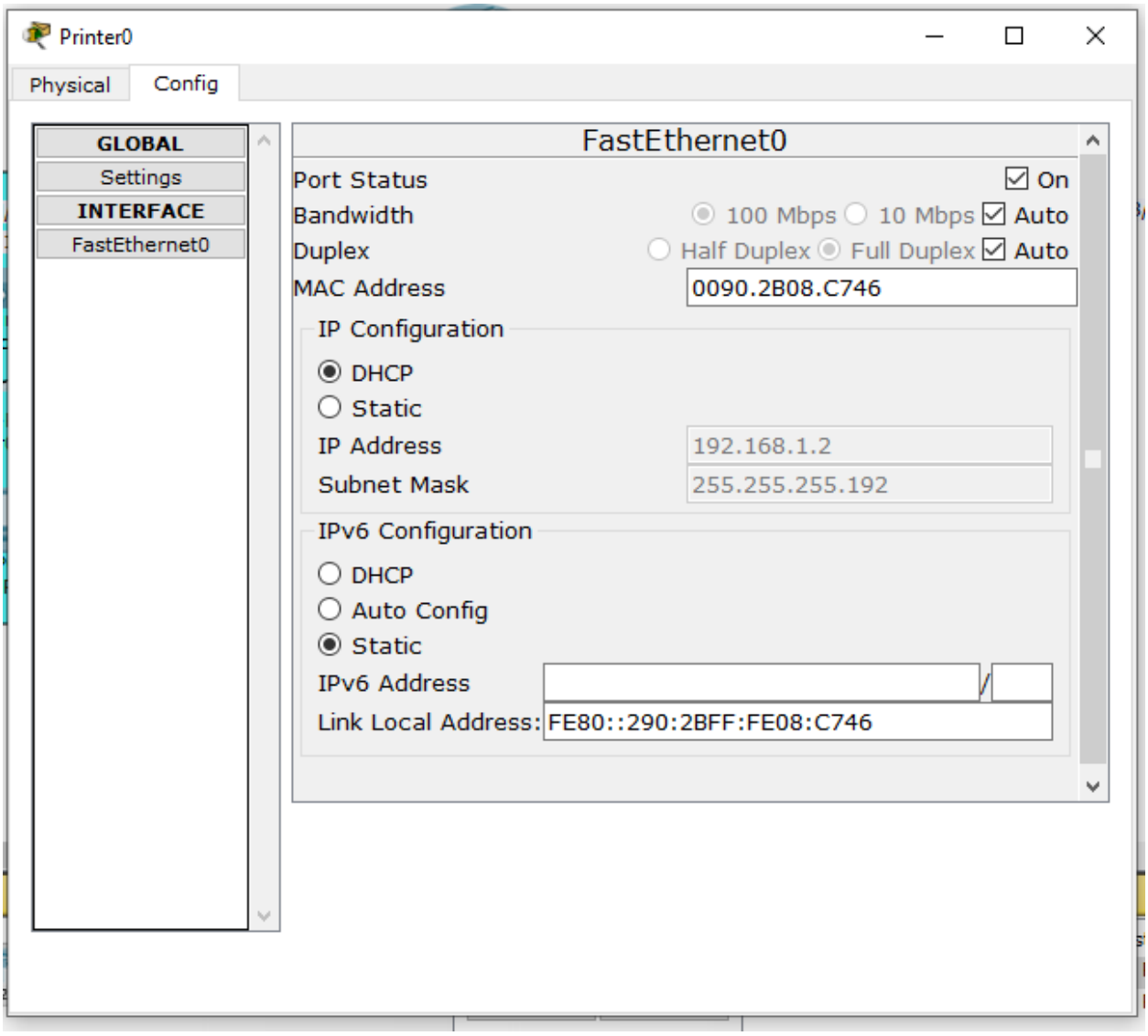
```
 speed auto

Router(config)#x
               ^
% Invalid input detected at '^' marker.

Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#serv
Router(config)#service dh
Router(config)#service dhcp
Router(config)#
Router(config)#
Router(config)#ip dhc
Router(config)#ip dhcp po
Router(config)#ip dhcp pool Admin-Pool
Router(dhcp-config)#
Router(dhcp-config)#net
Router(dhcp-config)#network 192.168.1.0 255.255.255.192
Router(dhcp-config)#defau
Router(dhcp-config)#default-router  192.168.1.1
Router(dhcp-config)#dn
Router(dhcp-config)#dns-server 192.168.1.1
Router(dhcp-config)#domai
Router(dhcp-config)#domain-name Admin.com
Router(dhcp-config)#exit
Router(config)#
Router(config)#
```

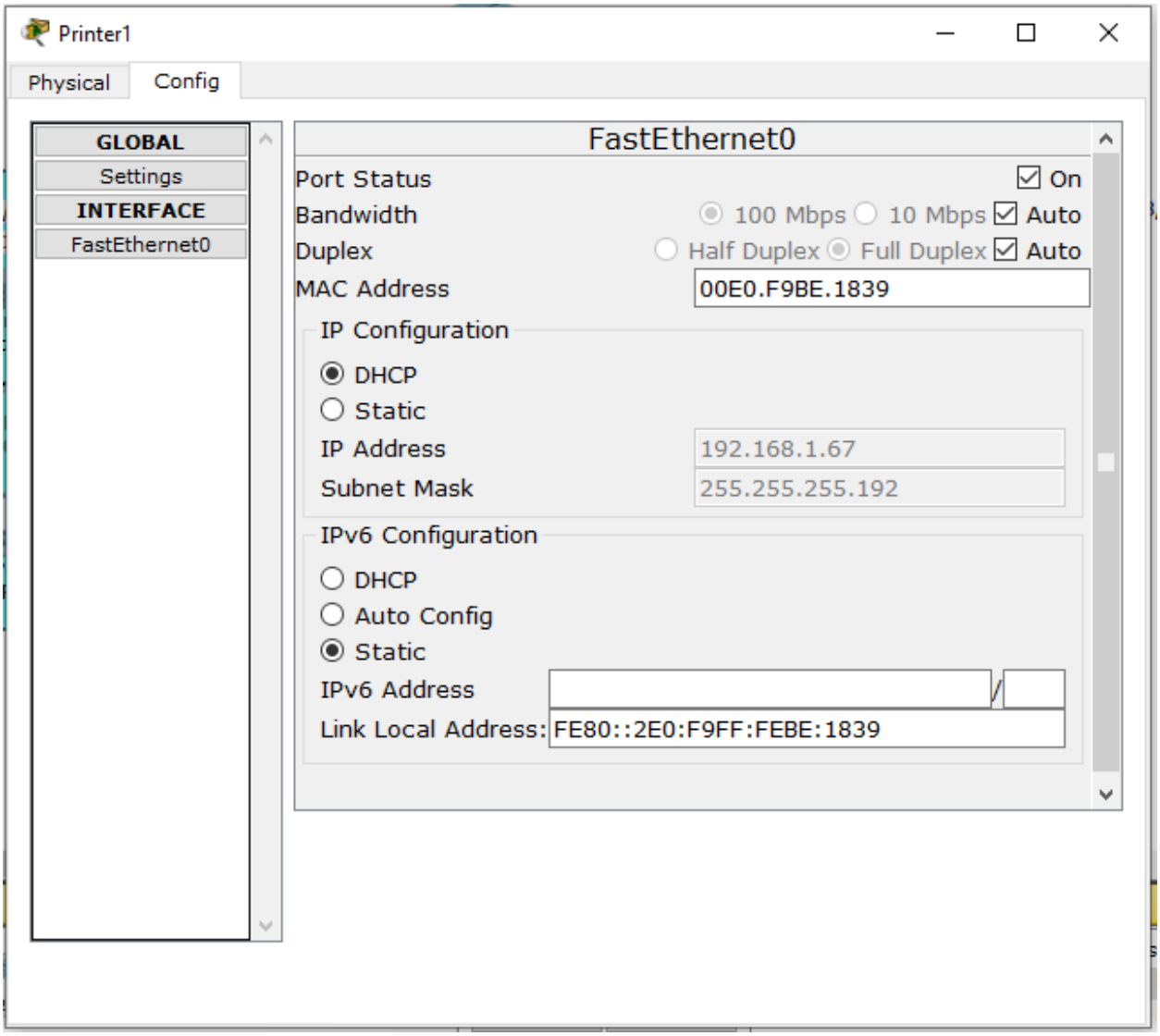
Step-12: Test communication. Select DHCP for PC and access points.

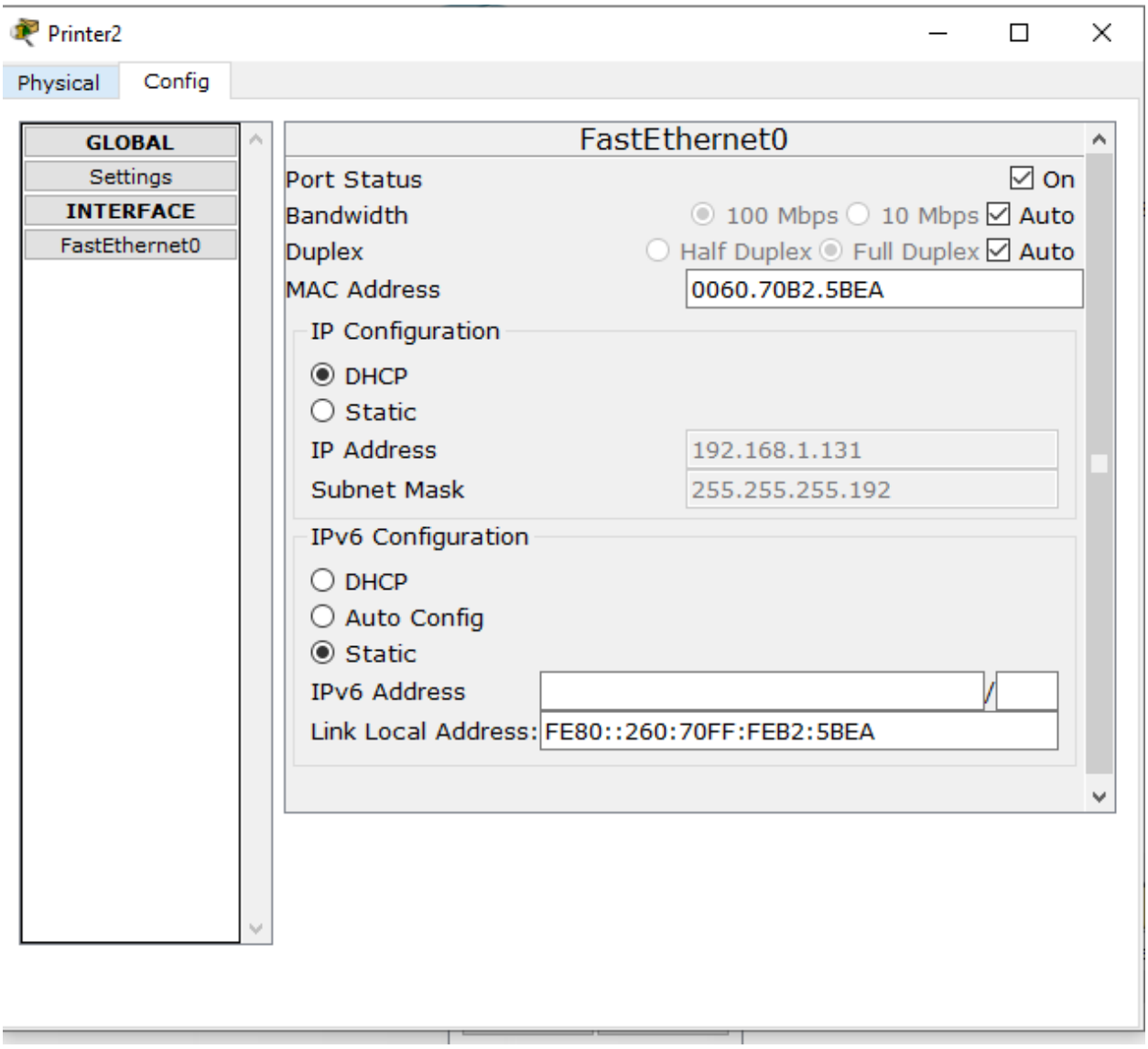

PC0
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
DHCP request successful.
IP Address
192.168.1.3
Subnet Mask
255.255.255.192
Default Gateway
192.168.1.1
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::206:2AFF:FEDA:56EB
IPv6 Gateway
IPv6 DNS Server


PC1
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
DHCP request successful.
IP Address
192.168.1.66
Subnet Mask
255.255.255.192
Default Gateway
192.168.1.65
DNS Server
192.168.1.65
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::201:96FF:FE96:6830
IPv6 Gateway
IPv6 DNS Server

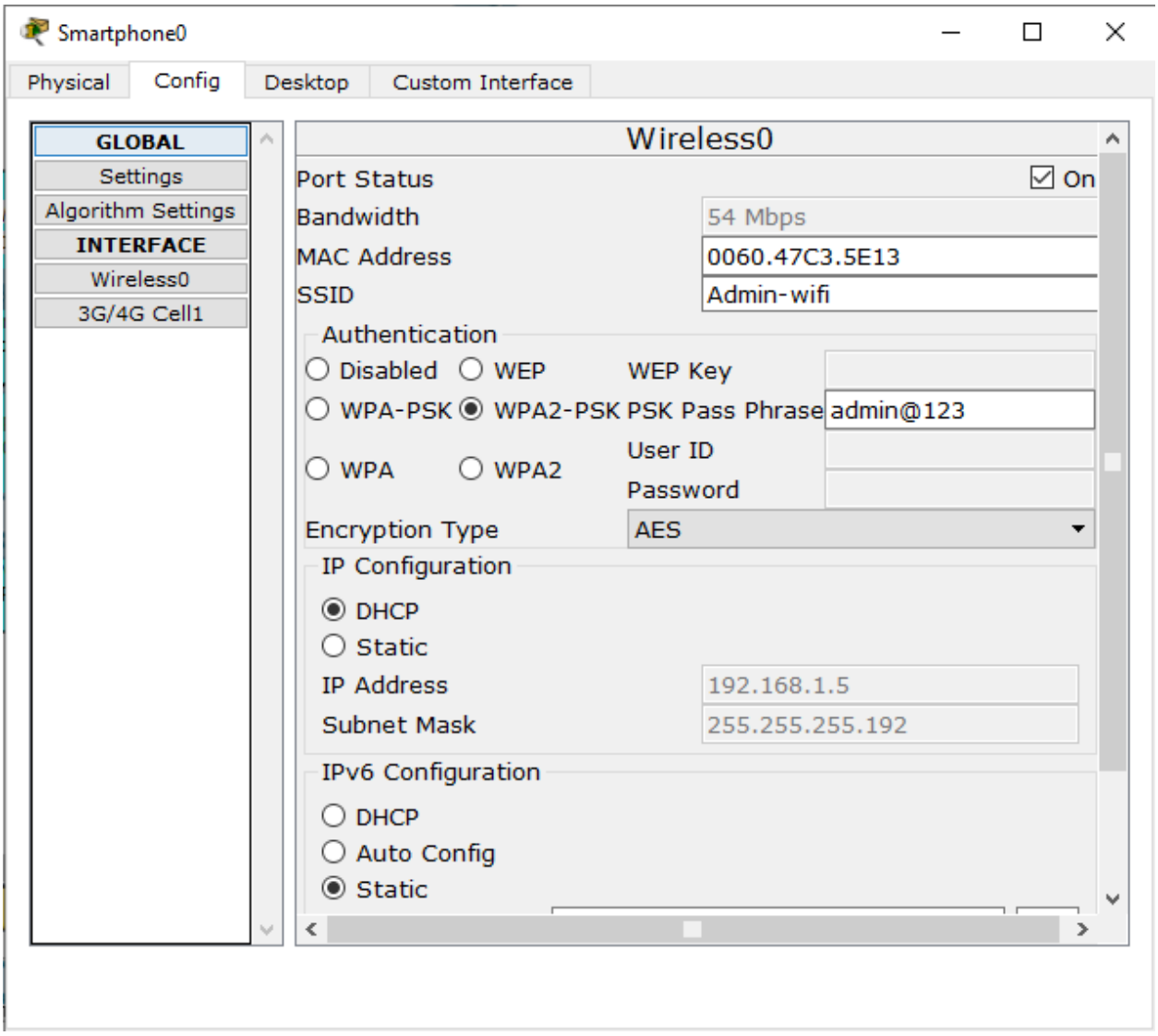

PC2
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
DHCP request successful.
IP Address
192.168.1.130
Subnet Mask
255.255.255.192
Default Gateway
192.168.1.129
DNS Server
192.168.1.129
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::2D0:D3FF:FE2D:496C
IPv6 Gateway
IPv6 DNS Server


Printer0
Physical
Config
GLOBAL
Settings
INTERFACE
FastEthernet0
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0090.2B08.C746
IP Configuration
DHCP
Static
IP Address
192.168.1.2
Subnet Mask
255.255.255.192
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address:
FE80::290:2BFF:FE08:C746

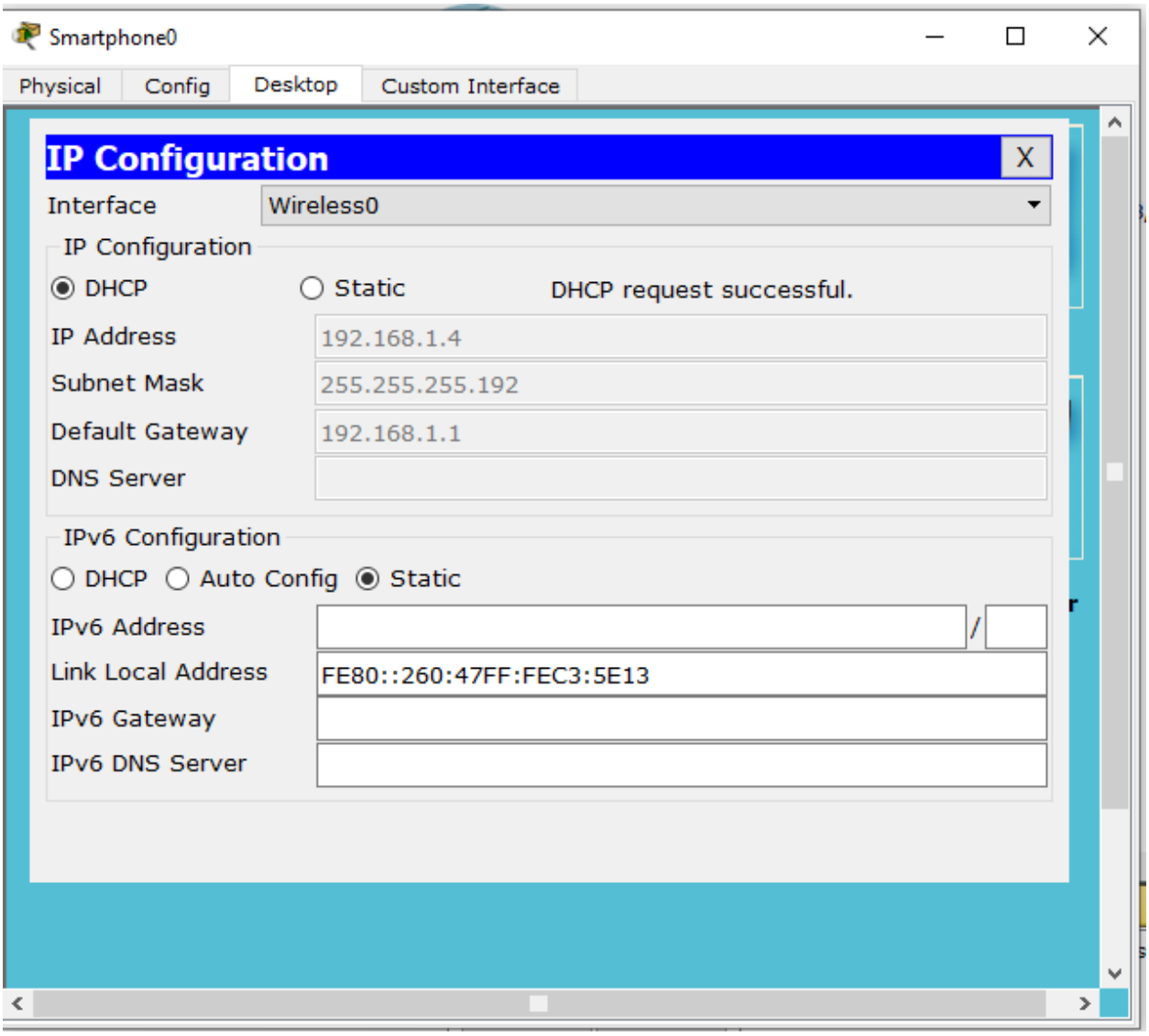

Printer1
Physical
Config
GLOBAL
Settings
INTERFACE
FastEthernet0
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.F9BE.1839
IP Configuration
DHCP
Static
IP Address
192.168.1.67
Subnet Mask
255.255.255.192
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address:
FE80::2E0:F9FF:FEBE:1839



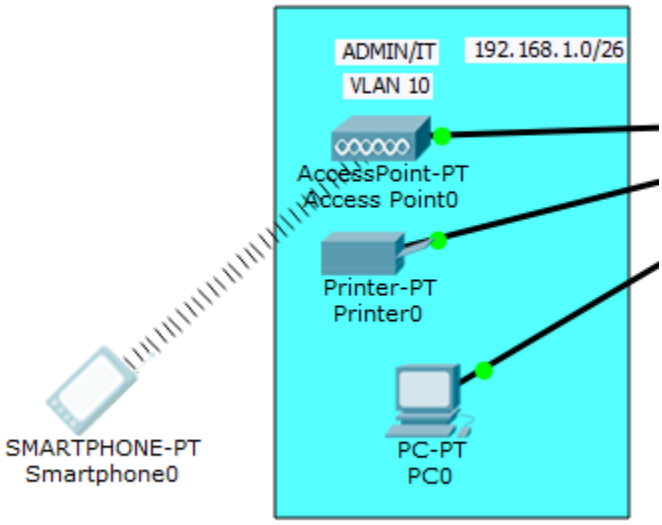
Step-13: Pick a smartphone and configure it-



DHCP request is successful-

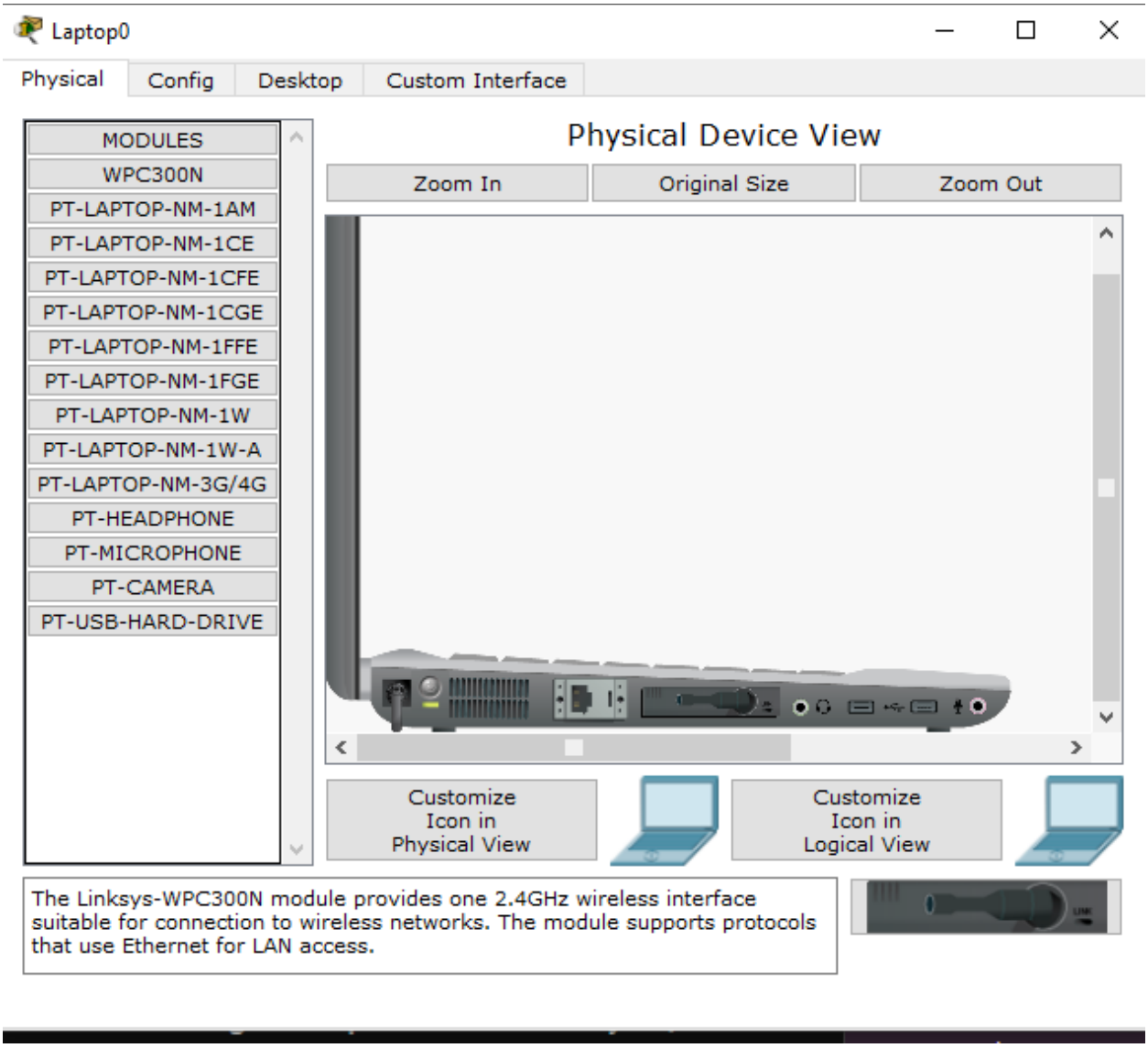


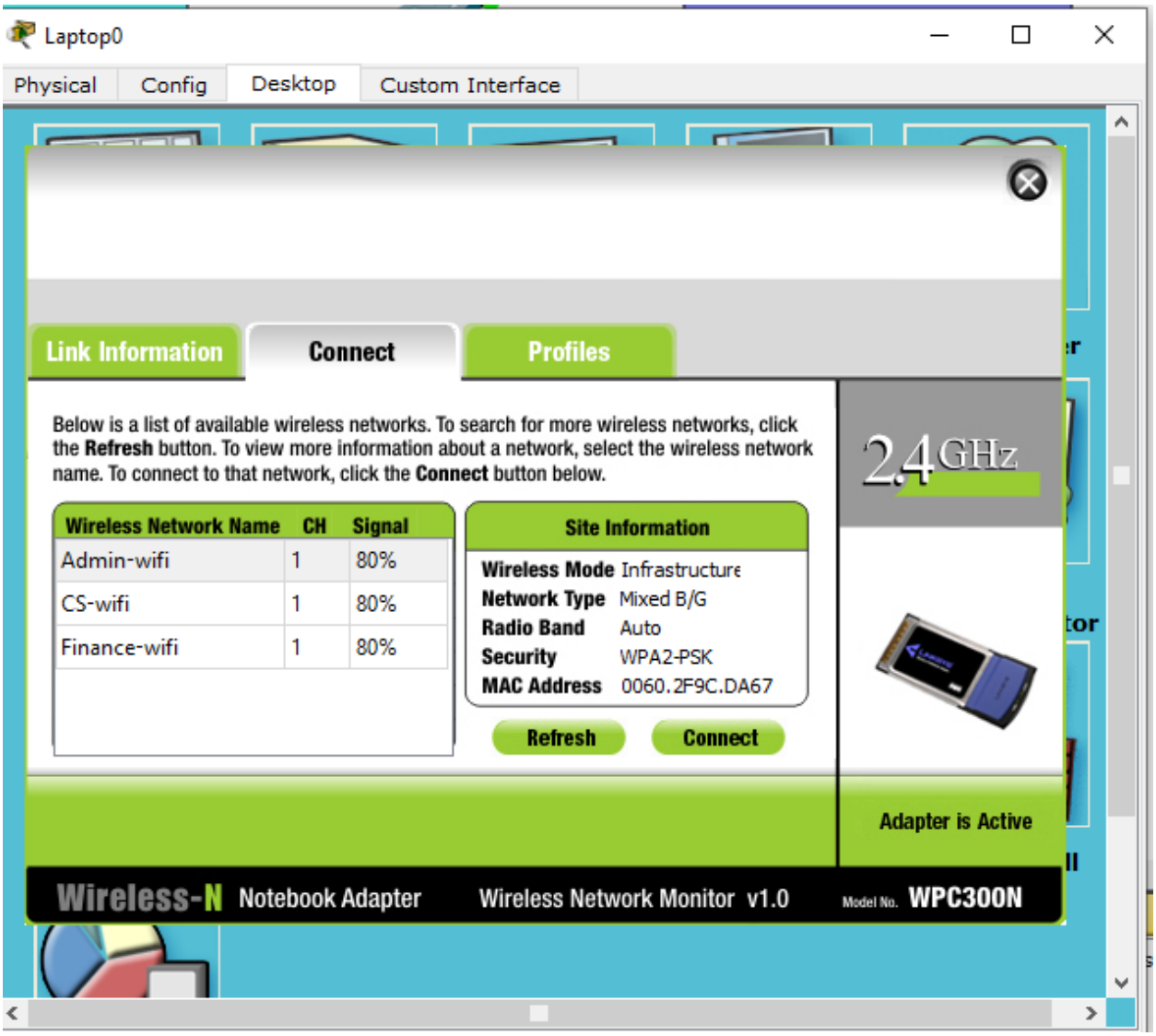
Now the smartphone is connected-

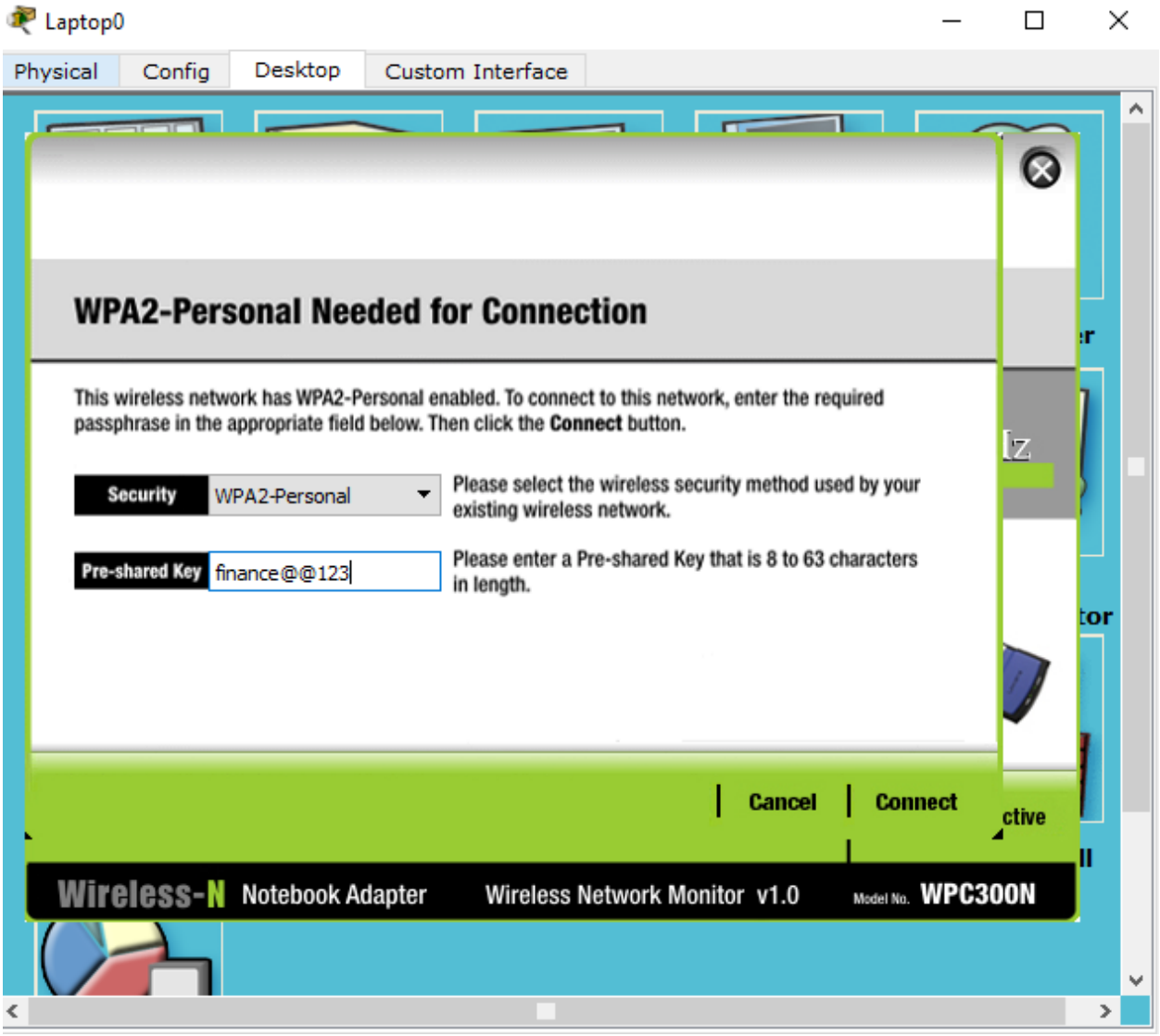


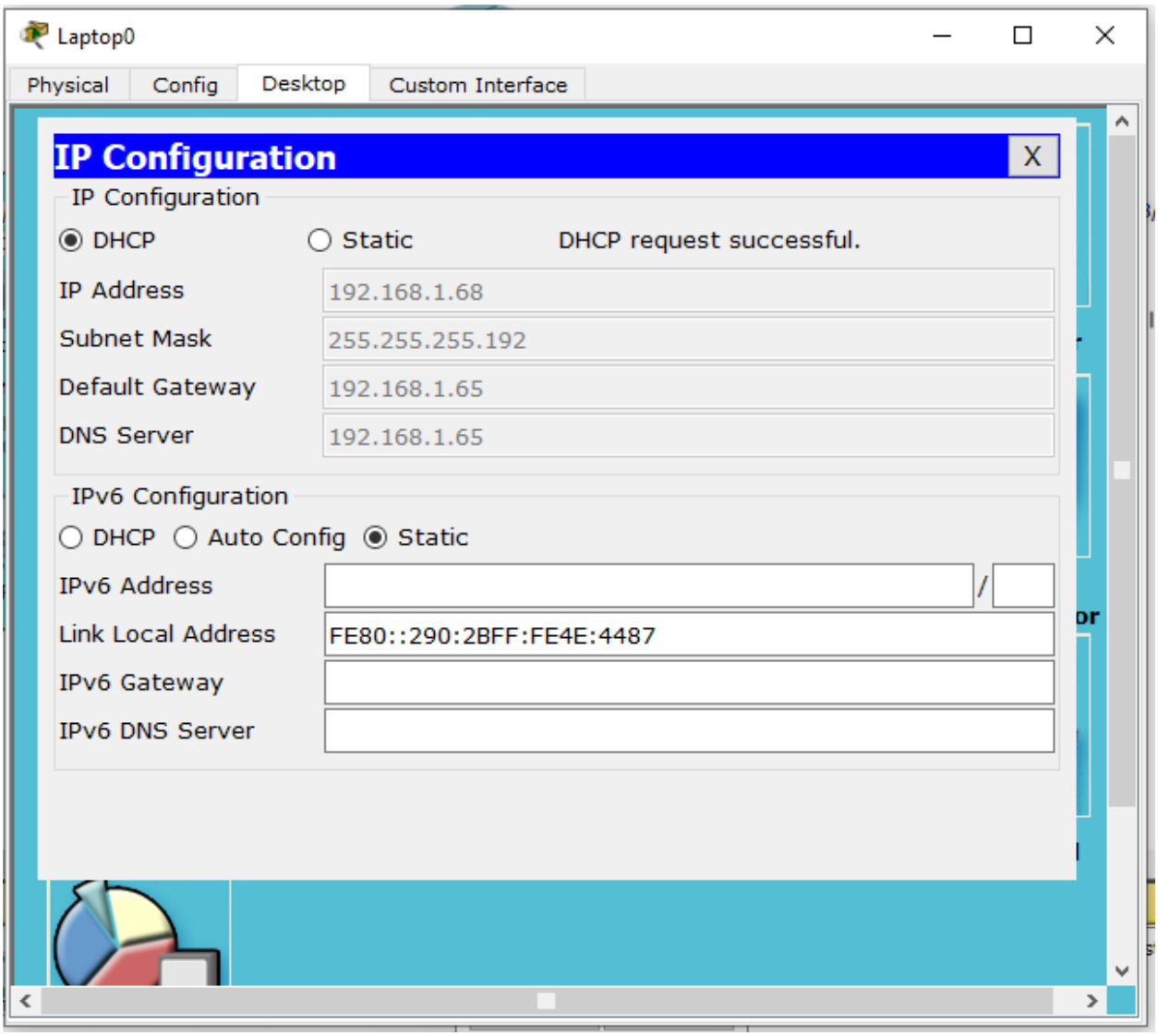
Similarly, take a laptop and configure it-

Turn off the laptop, remove existing and add WPC300N the turn on it-

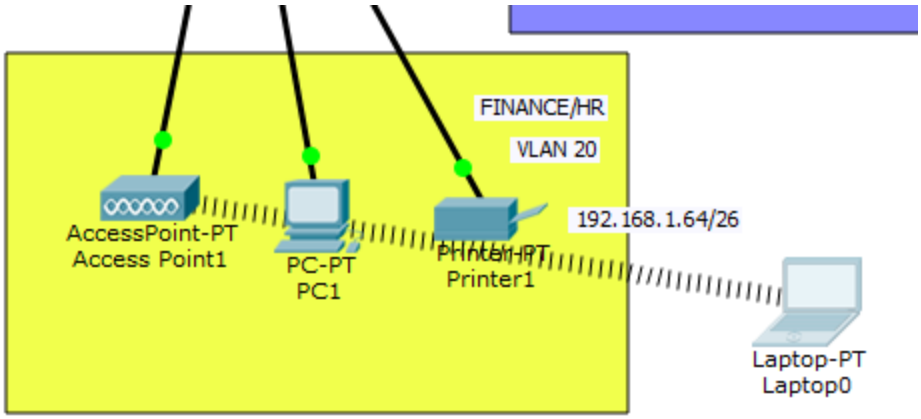

Laptop0
Physical
Config
Desktop
Custom Interface
MODULES
WPC300N
PT-LAPTOP-NM-1AM
PT-LAPTOP-NM-1CE
PT-LAPTOP-NM-1CFE
PT-LAPTOP-NM-1CGE
PT-LAPTOP-NM-1FFE
PT-LAPTOP-NM-1FGE
PT-LAPTOP-NM-1W
PT-LAPTOP-NM-1W-A
PT-LAPTOP-NM-3G/4G
PT-HEADPHONE
PT-MICROPHONE
PT-CAMERA
PT-USB-HARD-DRIVE
Physical Device View
Zoom In
Original Size
Zoom Out
Customize Icon in Physical View
Customize Icon in Logical View
The Linksys-WPC300N module provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.


Laptop0
Physical
Config
Desktop
Custom Interface
Link Information
Connect
Profiles
Below is a list of available wireless networks. To search for more wireless networks, click the Refresh button. To view more information about a network, select the wireless network name. To connect to that network, click the Connect button below.
2.4GHz
Wireless Network Name
CH
Signal
Admin-wifi
1
80%
CS-wifi
1
80%
Finance-wifi
1
80%
Site Information
Wireless Mode Infrastructure
Network Type Mixed B/G
Radio Band Auto
Security WPA2-PSK
MAC Address 0060.2F9C.DA67
Refresh
Connect
Adapter is Active
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
Model No. WPC300N

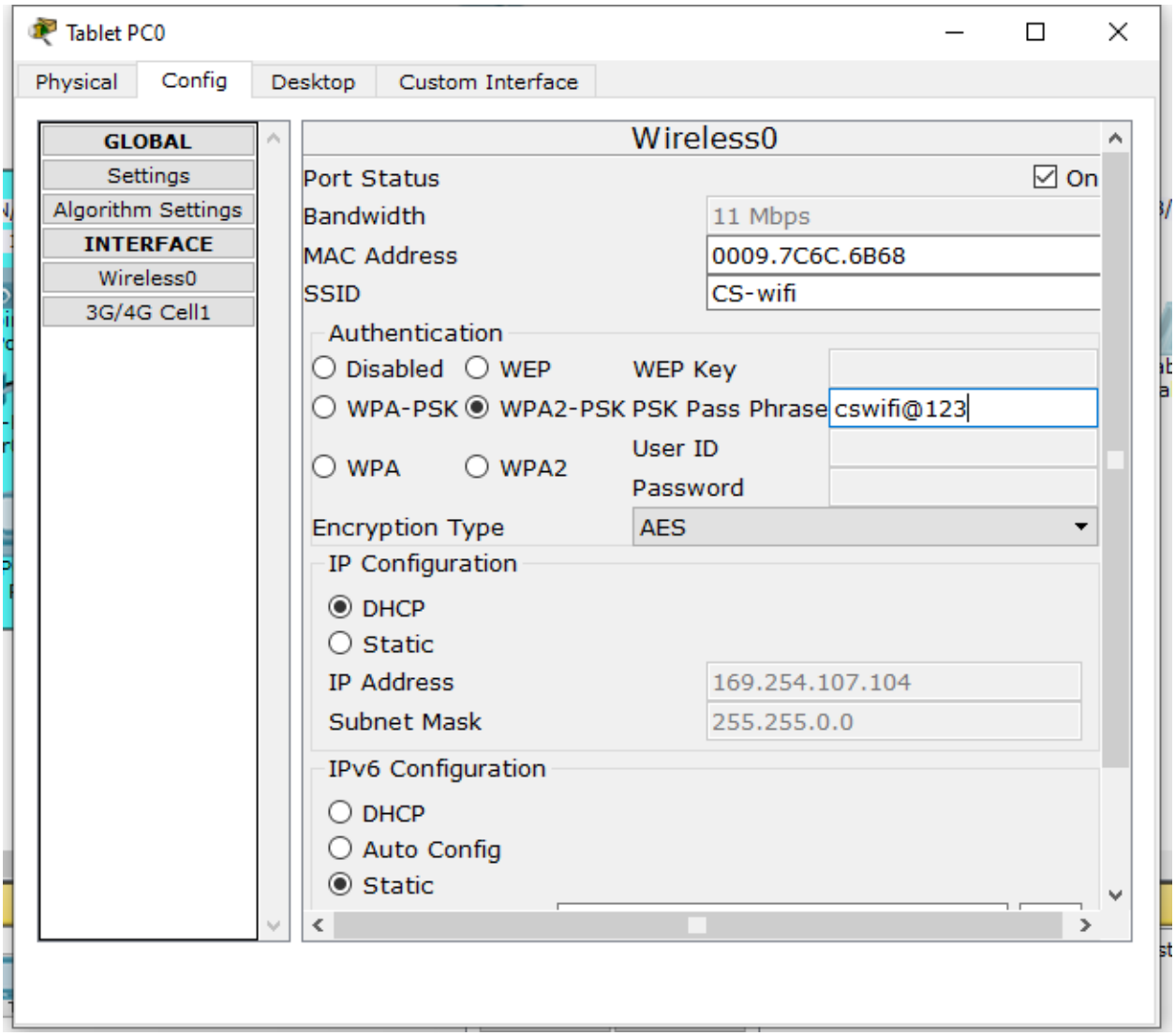

Laptop0
Physical
Config
Desktop
Custom Interface
WPA2-Personal Needed for Connection
This wireless network has WPA2-Personal enabled. To connect to this network, enter the required passphrase in the appropriate field below. Then click the Connect button.
Security
WPA2-Personal
Please select the wireless security method used by your existing wireless network.
Pre-shared Key
finance@@123
Please enter a Pre-shared Key that is 8 to 63 characters in length.
Cancel
Connect
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
Model No. WPC300N

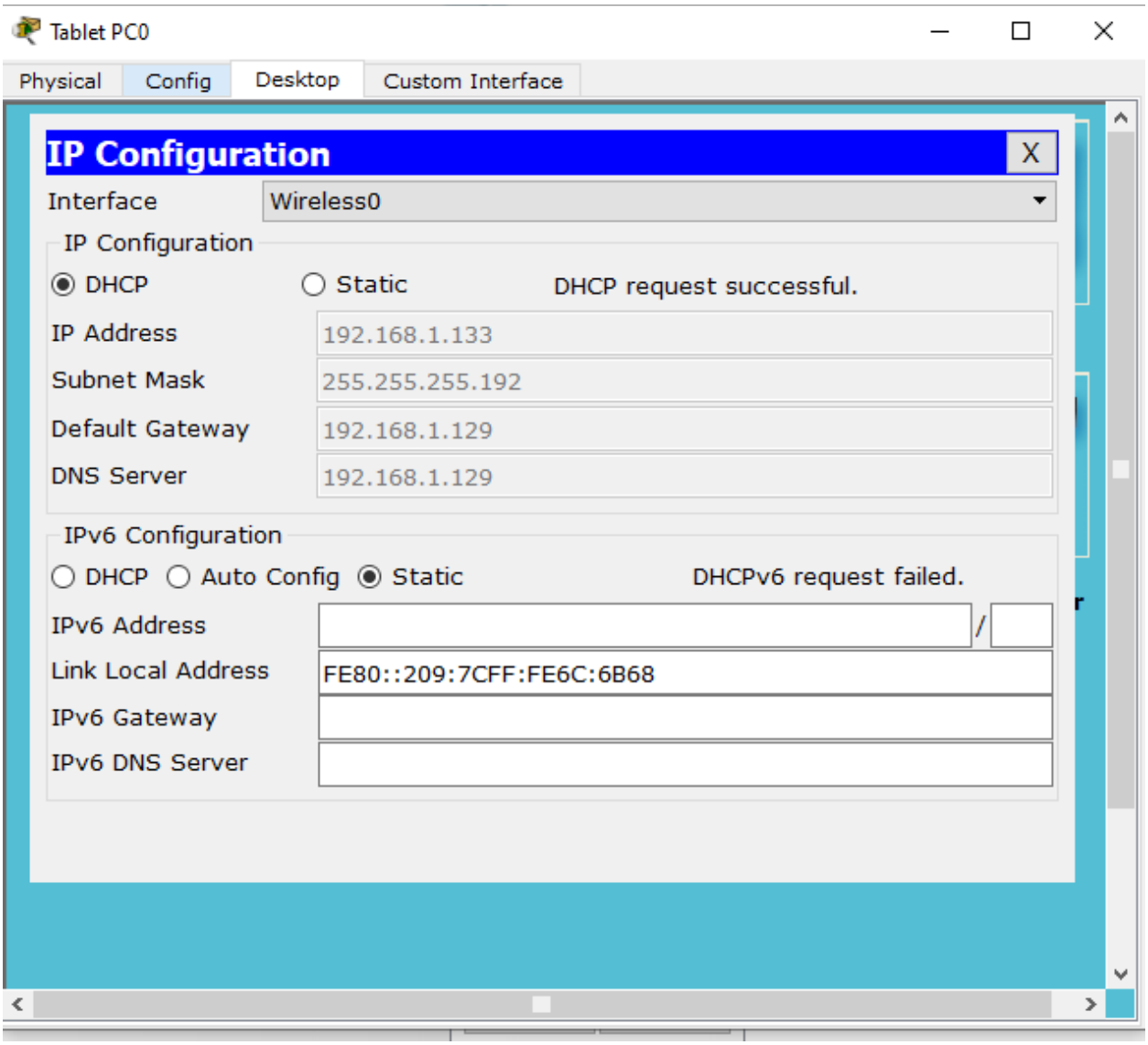


Laptop is connected-

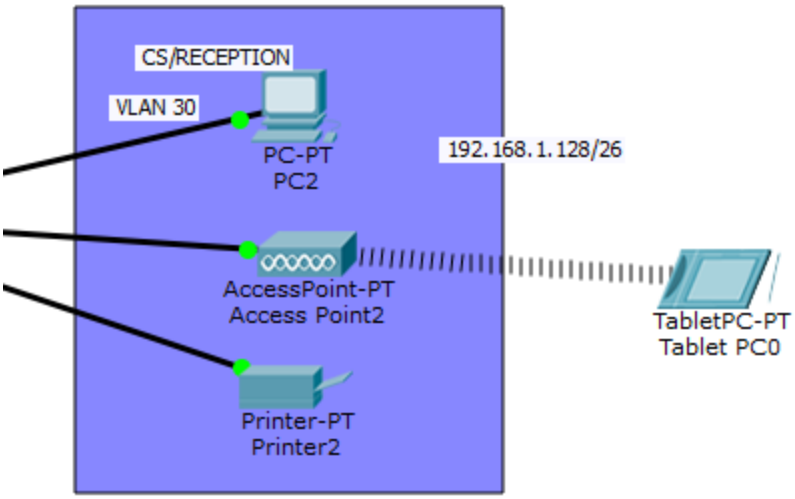


Similarly, connect a tab-

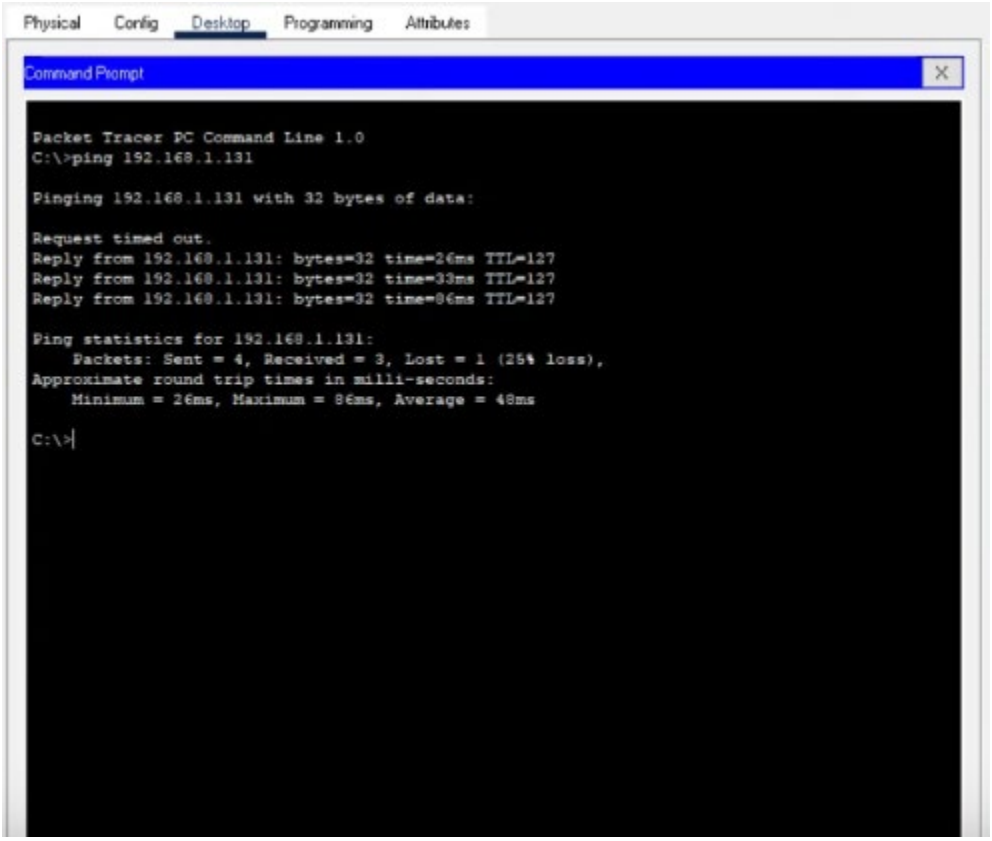

Tablet PC0
Physical
Config
Desktop
Custom Interface
GLOBAL
Settings
Algorithm Settings
INTERFACE
Wireless0
3G/4G Cell1
Wireless0
Port Status
On
Bandwidth
11 Mbps
MAC Address
0009.7C6C.6B68
SSID
CS-wifi
Authentication
Disabled
WEP
WEP Key
WPA-PSK
WPA2-PSK
PSK Pass Phrase
cswifi@123
User ID
WPA
WPA2
Password
Encryption Type
AES
IP Configuration
DHCP
Static
IP Address
169.254.107.104
Subnet Mask
255.255.0.0
IPv6 Configuration
DHCP
Auto Config
Static

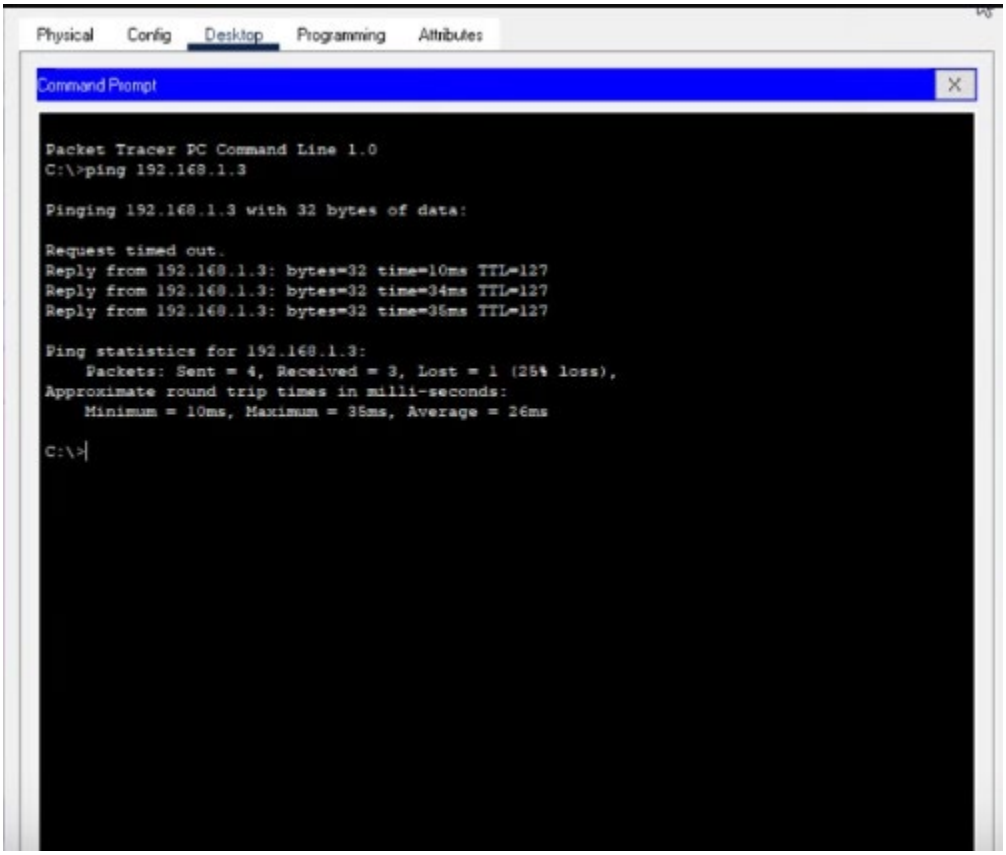


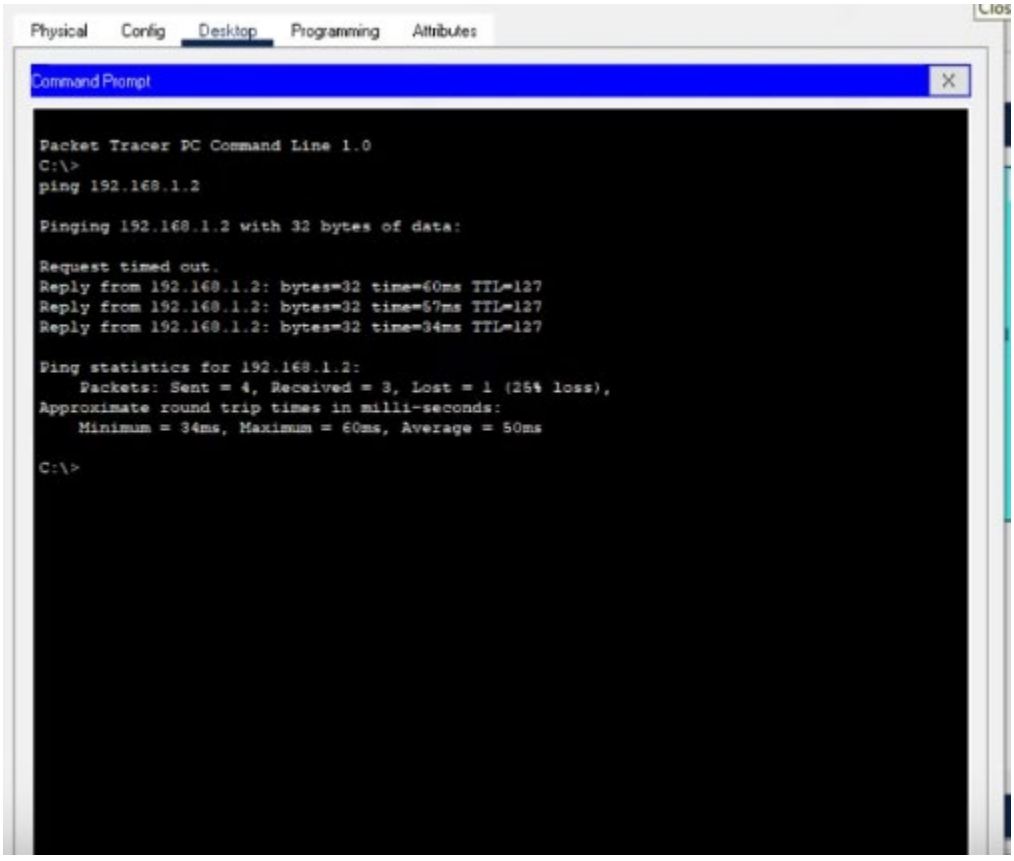
Tab is connected-



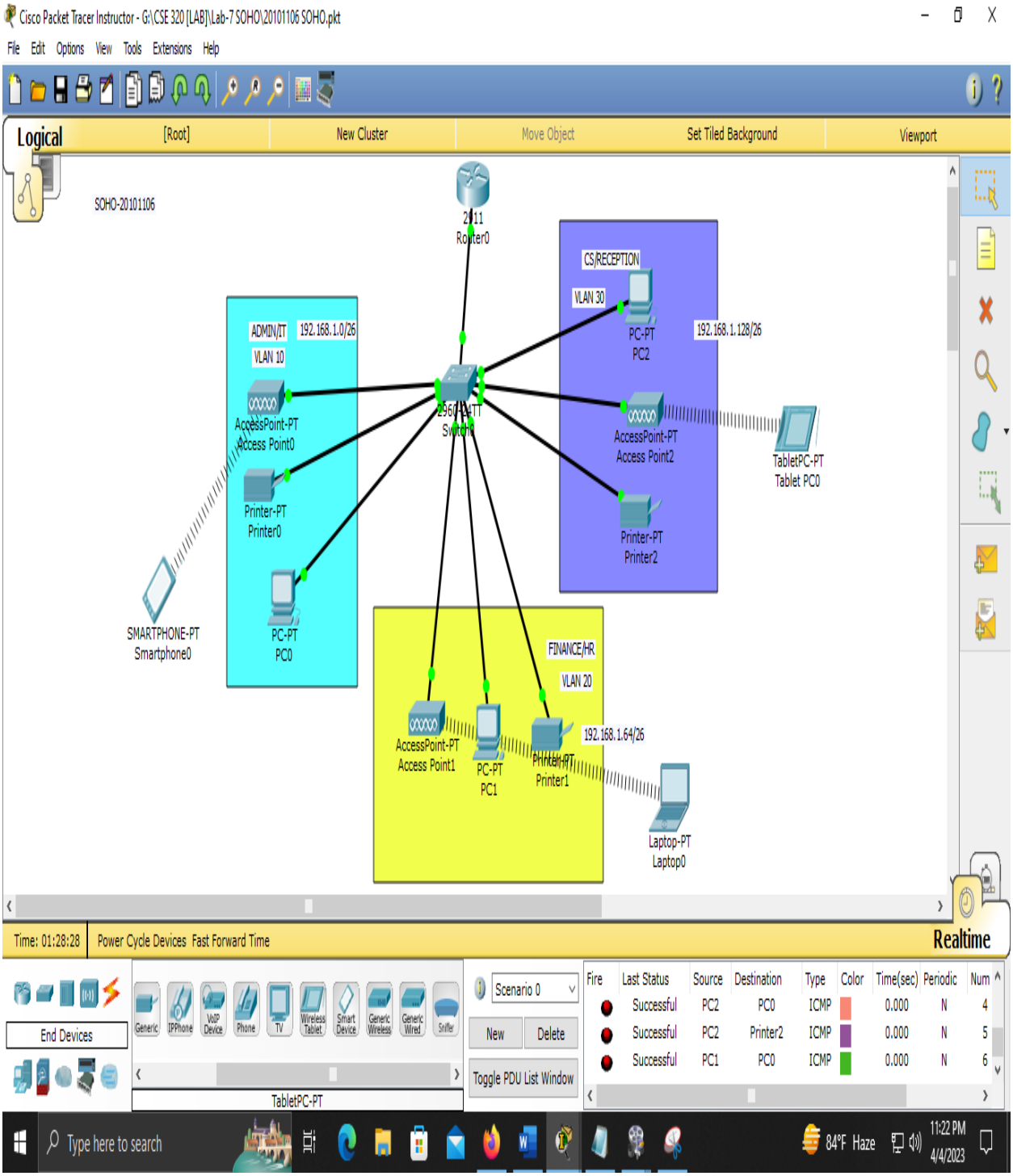
Step-14: Test communication. It should succeed-



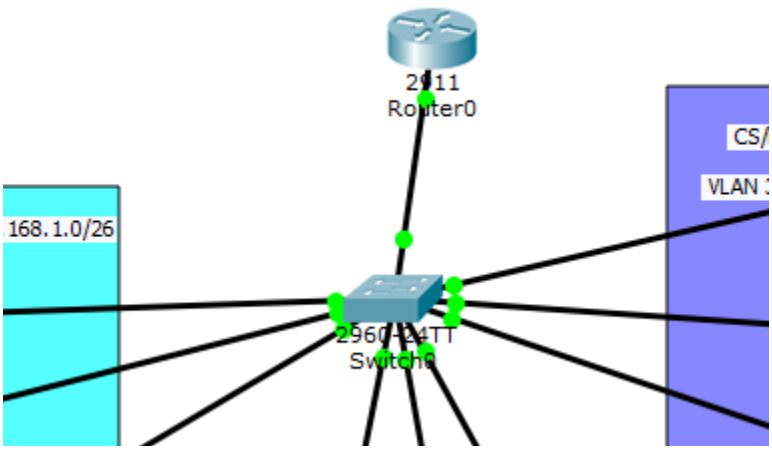

Physical
Config
Desktop
Programming
Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3
Pinging 192.168.1.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.1.3: bytes=32 time=10ms TTL=127
Reply from 192.168.1.3: bytes=32 time=34ms TTL=127
Reply from 192.168.1.3: bytes=32 time=35ms TTL=127
Ping statistics for 192.168.1.3:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 10ms, Maximum = 35ms, Average = 26ms
C:\>

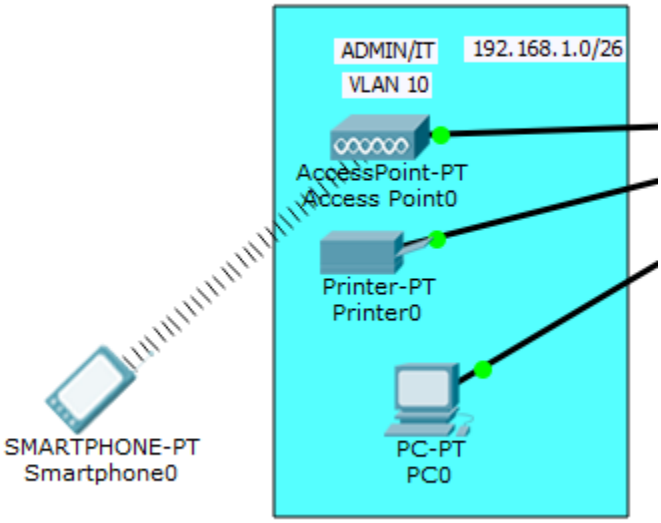

Physical
Config
Desktop
Programming
Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>
ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.1.2: bytes=32 time=60ms TTL=127
Reply from 192.168.1.2: bytes=32 time=57ms TTL=127
Reply from 192.168.1.2: bytes=32 time=34ms TTL=127
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 34ms, Maximum = 60ms, Average = 50ms
C:\>

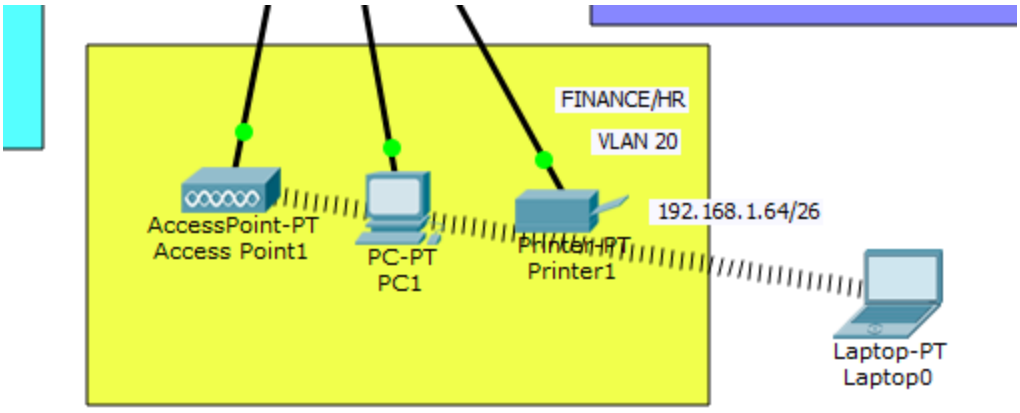
Overall screenshot of the whole architecture-

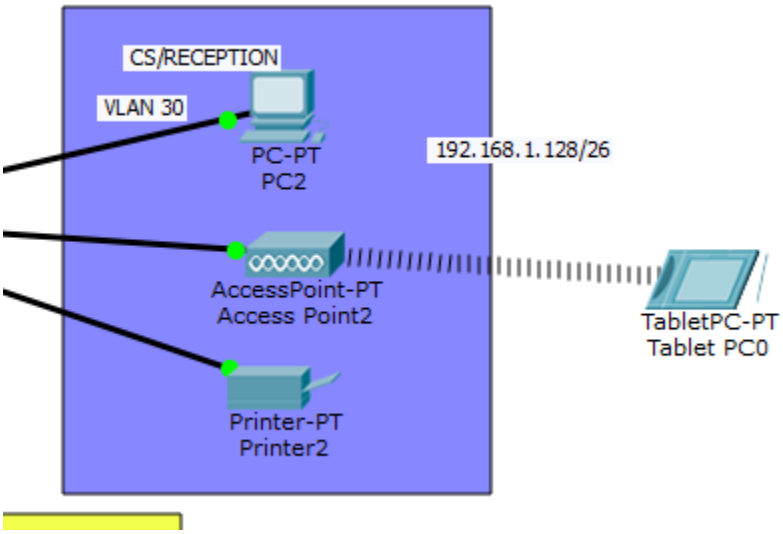


Detailed view-









----------THANK YOU FOR READING----------