

HOTEL MANAGEMENT NETWORKING PROJECT

|As a part of your end year networking project, you are required to design and implement Vic Modern Hotel network. The hotel has three floors; in the first floor there are three departments (Reception, Store and Logistics), in the second floor there are three departments (Finance, HR and Sales/Marketing), while the third floor hosts the IT and Admin. Therefore, the following are part of the considerations during the design and implementation.

1. There should be three routers connecting each floor (all placed in the server room in IT department).
2. All routers should be connected to each other using serial DCE cable.
3. The network between the routers should be 10.10.10.0/30, 10.10.10.4/30, 10.10.10.8/30
4. Each floor is expected to have one switch (placed in the respective floor).
5. Each floor is expected to have WIFI networks connected to laptops and phones.
6. Each department is expected to have a printer.
7. Each department is expected to be in different VLAN with the following details

1st Floor;

- Reception- VLAN 80, Network of 192.168.8.0/24
- Store- VLAN 70, Network of 192.168.7.0/24
- Logistics- VLAN 60, Network of 192.168.6.0/24

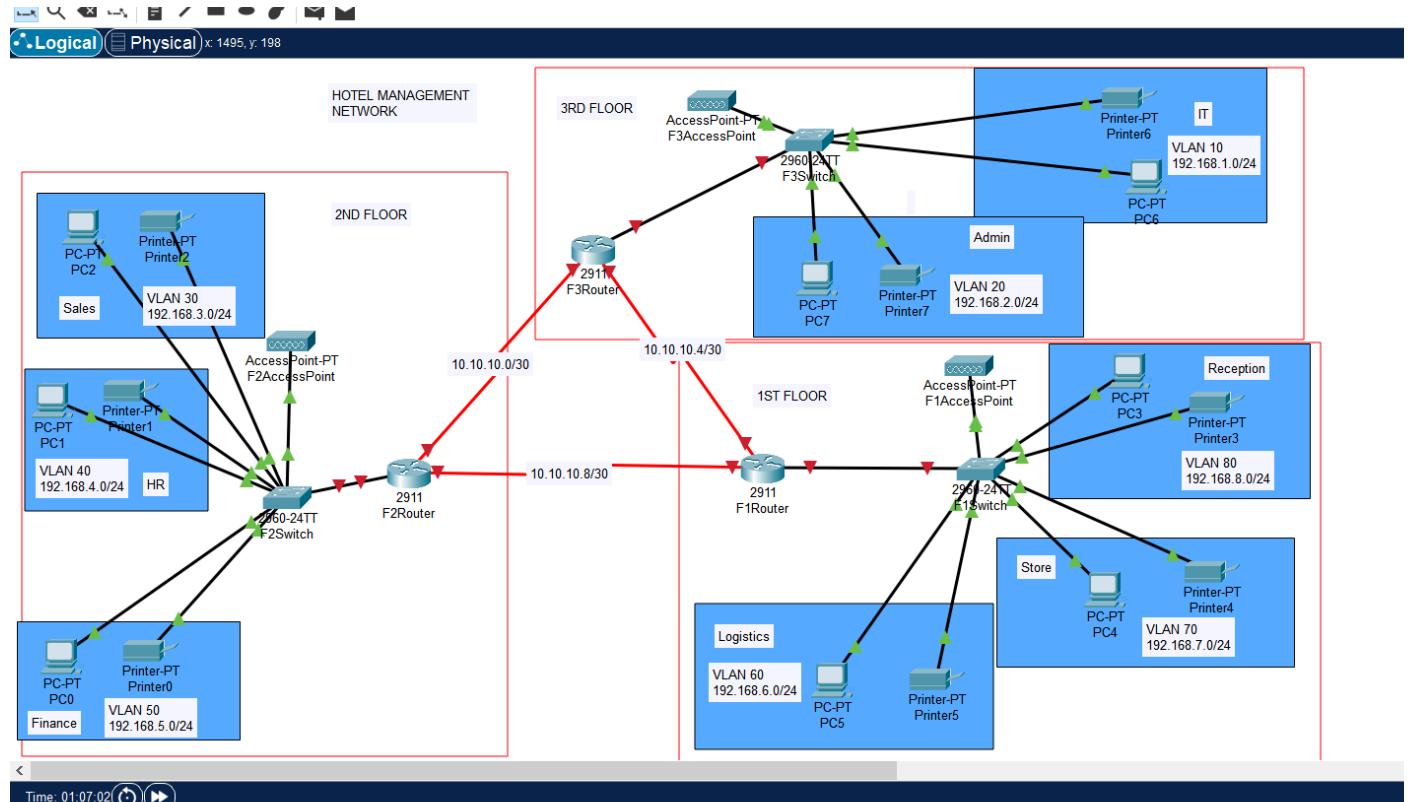
2nd Floor;

- Finance- VLAN 50, Network of 192.168.5.0/24
- HR- VLAN 40, Network of 192.168.4.0/24
- Sales- VLAN 30, Network of 192.168.3.0/24

3rd Floor;

- Admin- VLAN 20, Network of 192.168.2.0/24
 - IT- VLAN 10, Network of 192.168.1.0/24
8. Use OSPF as the routing protocol to advertise routes.
 9. All devices in the network are expected to obtain IP address dynamically with their respective router configured as the DHCP server.
 10. All the devices in the network are expected to communicate with each other.
 11. Configure SSH in all the routers for remote login.
 12. In IT department, add PC called Test-PC to port fa0/1 and use it to test remote login.
 13. Configure port security to IT-dept switch to allow only Test-PC to access port fa0/1 (use sticky method to obtain mac-address with violation mode of shutdown.)

Design



As per the instructions, the routers are connected to each other through serial DCE cables.

The 1st and 2nd floors have 3 departments each while the 3rd floor has 2 departments. Each department should have a PC and printer.

All floors should have Wi-Fi connection which means they each need an access point.

Configuration

Name the VLAN and assign their IPs as instructed in the problem above.

Since the routers are connected through serial DCE cables, we must enable clock rate at the serial DCE interfaces for them to forward packets.

To identify where the serial interface is, hover over the router, and if you see a clock icon with (this is an example of the format to look out for) **Se0/2/1** that is where the interface is.

Open F3 router CLI

En

Conf t

Interface se0/2/0

No shutdown

Int se0/2/1

No shutdown

Int gig0/0

No shutdown

Int se0/2/0

Clock rate ?

Clock rate 64000

Int se0/2/1

Clock rate 64000

Do wr

Exit

For the F1 router:

En

conf t

Int se0/2/0

No sh

Int se0/2/1

No sh

Int gig0/0

No sh

Since theres no clock icon over it it does not need a clock rate

For the F2 router:

En

Conf t

Int se0/1/0

No sh

Int se0/1/1

No sh

Int gig0/0

No sh

Do wr

Int se0/1/1

Clock rate 64000

Do wr

Configuring VLANs on the switches:

1st floor switch:

En

Config t

Int range fa0/2-3

switchport mode access

switchport access vlan 80

Int range fa0/4-5

Switchport mode access

Switchport access vlan 70

Int range fa0/6-8

Switchport mode access

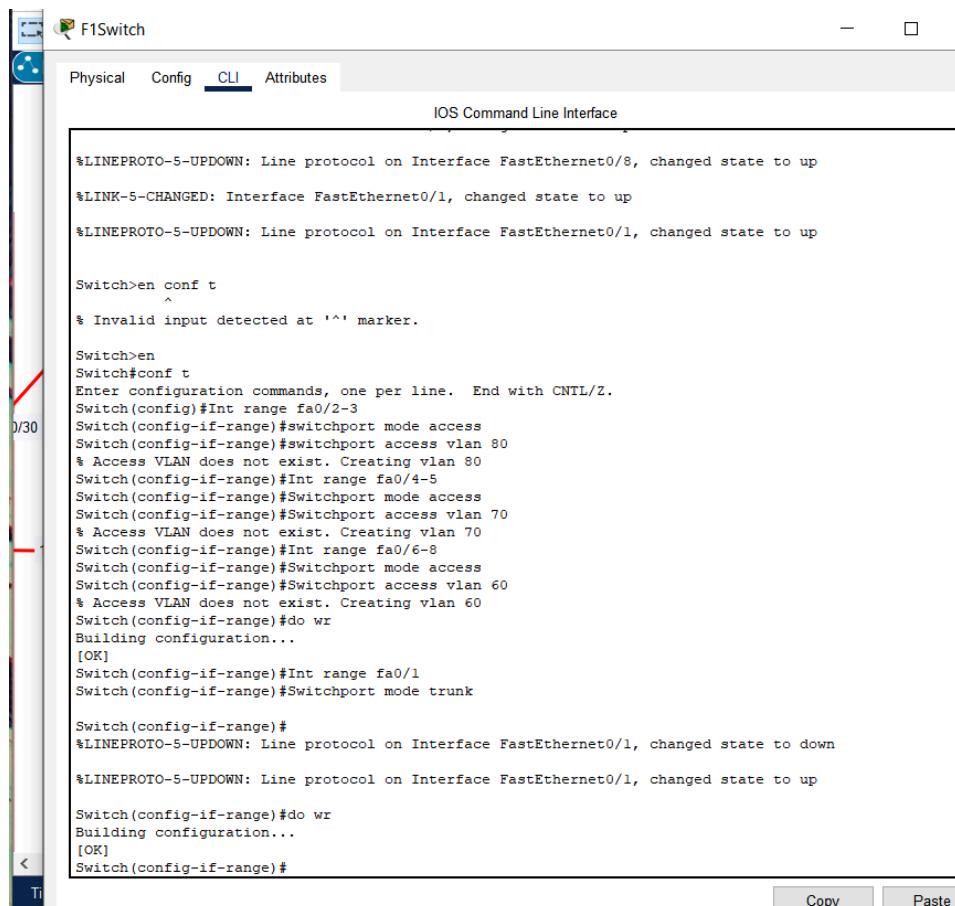
Switchport access vlan 60

Do wr

Int range fa0/1

Switchport mode trunk (to allow communication with all departments on every floor)

Do wr



The screenshot shows a software interface titled 'F1Switch' with a tab bar containing 'Physical', 'Config', 'CLI' (which is selected), and 'Attributes'. The main window is titled 'IOS Command Line Interface'. The terminal window displays the following configuration commands:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch>en conf t
      ^
* Invalid input detected at '^' marker.

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#Int range fa0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 80
* Access VLAN does not exist. Creating vlan 80
Switch(config-if-range)#Int range fa0/4-5
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 70
* Access VLAN does not exist. Creating vlan 70
Switch(config-if-range)#Int range fa0/6-8
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 60
* Access VLAN does not exist. Creating vlan 60
Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#Int range fa0/1
Switch(config-if-range)#switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#

```

2nd floor switch:

En

Config t

Int range fa0/2-3

switchport mode access

switchport access vlan 50

Int range fa0/4-5

switchport mode access

switchport access vlan 40

Int range fa0/6-8

switchport mode access

switchport access vlan 30

Do wr

int range fa0/1

Switchport mode trunk

Do wr

```

^
% Invalid input detected at '^' marker.

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#Int range fa0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 50
% Access VLAN does not exist. Creating vlan 50
Switch(config-if-range)#Int range fa0/4-5
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 40
% Access VLAN does not exist. Creating vlan 40
Switch(config-if-range)#Int range fa0/6-8
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 30
% Access VLAN does not exist. Creating vlan 30
Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#int range fa0/1
Switch(config-if-range)#Switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#

```

3rd floor switch:

En

config t

Int range fa0/2-3

switchport mode access

switchport access vlan 10

Int range fa0/4-6

switchport mode access

switchport access vlan 20

int range fa0/1

Switchport mode trunk

Do wr

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#Int range fa0/2-3
Switch(config-if-range)#Int range fa0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10
% Access VLAN does not exist. Creating vlan 10
Switch(config-if-range)#Int range fa0/4-6
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 20
% Access VLAN does not exist. Creating vlan 20
Switch(config-if-range)#int range fa0/1
Switch(config-if-range)#Switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#

```

Configuring IP addresses to the routers

F1 router:

Int se0/2/0

Ip address 10.10.10.5 255.255.255.252

Note that there are only 2 valid hosts on the network so f1 router will take .5 and F3 will take .6 for the first network. The same will be repeated to connect with f2 router.

Int se0/2/1

Ip address 10.10.10.9 255.255.255.252

Do wr

```
Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#Int se0/2/0
Router(config-if)#Ip address 10.10.10.5 255.255.255.252
Router(config-if)#Int se0/2/1
Router(config-if)#Ip address 10.10.10.9 255.255.255.252
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if) #
```

F2 router:

Int se0/2/0

Ip address 10.10.10.1 255.255.255.252

Int se0/2/1

Ip address 10.10.10.10 255.255.255.252

Do wr

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#Int se0/1/0
%Invalid interface type and number
Router(config)#Int se0/2/0
Router(config-if)#Ip address 10.10.10.1 255.255.255.252
Router(config-if)#Int se0/2/1
Router(config-if)#Ip address 10.10.10.10 255.255.255.252
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if) #
```

F3 router:

En

config t

Int se0/2/0

Ip address 10.10.10.6 255.255.255.252

Int se0/2/1

Ip address 10.10.10.2 255.255.255.252

Do wr

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#Int se0/2/0
Router(config-if)#Ip address 10.10.10.6 255.255.255.252
Router(config-if)#Int se0/2/1
Router(config-if)#Ip address 10.10.10.2 255.255.255.252
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#+
```

To solve problems (9) and (10) we need to first configure inter-VLAN routing then configure the DHCP server. inter-VLAN routing is done by creating sub-interfaces and assigning them with the VLAN number and respective IP addresses. The IP address acts as the default gateway to the respective VLAN.

On the F1 router:

Exit

Int gig0/0.80

Encapsulation dot1Q 80

Ip address 192.168.8.1 255.255.255.0

exit

Int gig0/0.70

Encapsulation dot1Q 70

Ip address 192.168.7.1 255.255.255.0

Exit

Int gig0/0.60

Encapsulation dot1Q 60

Ip address 192.168.6.1 255.255.255.0

Do wr

Exit

```
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Int gig0/0.80
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.80, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.80, changed state to up
Router(config-subif)#
Encapsulation dot1Q 80
Router(config-subif)#
Ip address 192.168.8.1 255.255.255.0
Router(config-subif)#
exit
Router(config)#
Router(config)#
Int gig0/0.70
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.70, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.70, changed state to up
Router(config-subif)#
Encapsulation dot1Q 70
Router(config-subif)#
Ip address 192.168.7.1 255.255.255.0
Router(config-subif)#
exit
Router(config)#
Router(config)#
Int gig0/0.60
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.60, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.60, changed state to up
Router(config-subif)#
Encapsulation dot1Q 60
Router(config-subif)#
Ip address 192.168.6.1 255.255.255.0
Router(config-subif)#
do wr
Building configuration...
[OK]
Router(config-subif)#
exit
Router(config)#

```

On the same router let's configure the DHCP server:

Service dhcp

Ip dhcp pool Reception

Network 192.168.8.0 255.255.255.0

Default-router 192.168.8.1

Dns-server 192.168.8.1

Exit

Ip dhcp pool Store

Network 192.168.7.0 255.255.255.0

Default-router 192.168.7.1

Dns-server 192.168.7.1

Exit

Ip dhcp pool Logistics

Network 192.168.6.0 255.255.255.0

Default-router 192.168.6.1

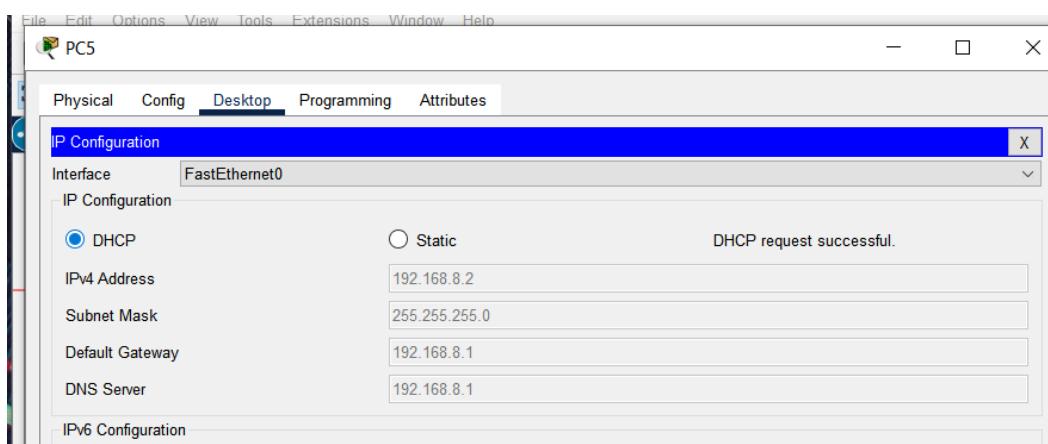
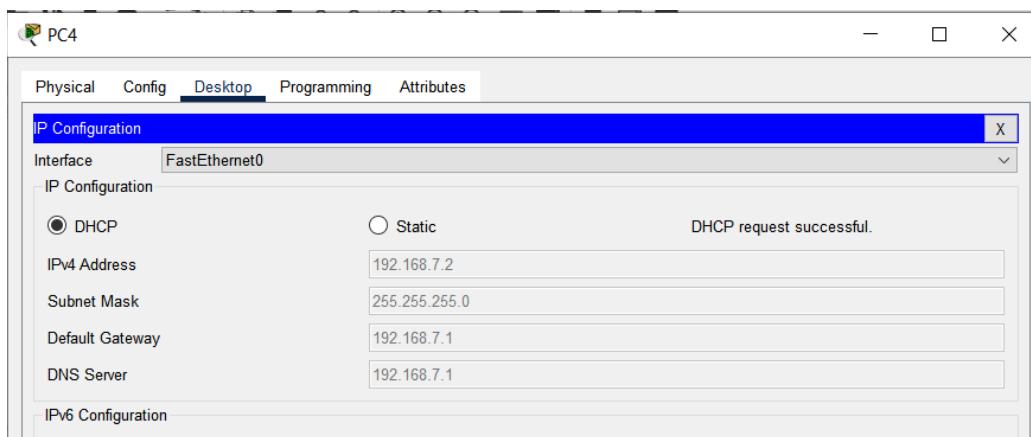
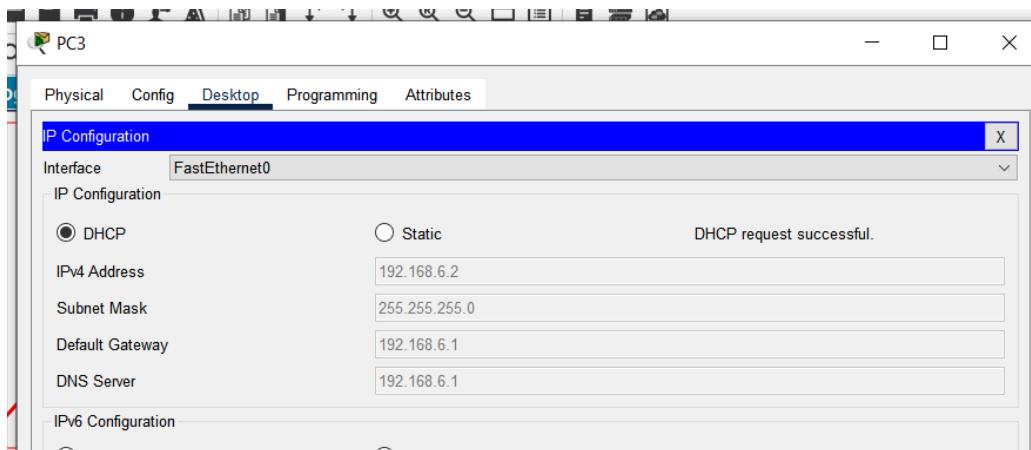
Dns-server 192.168.6.1

Exit

Do wr

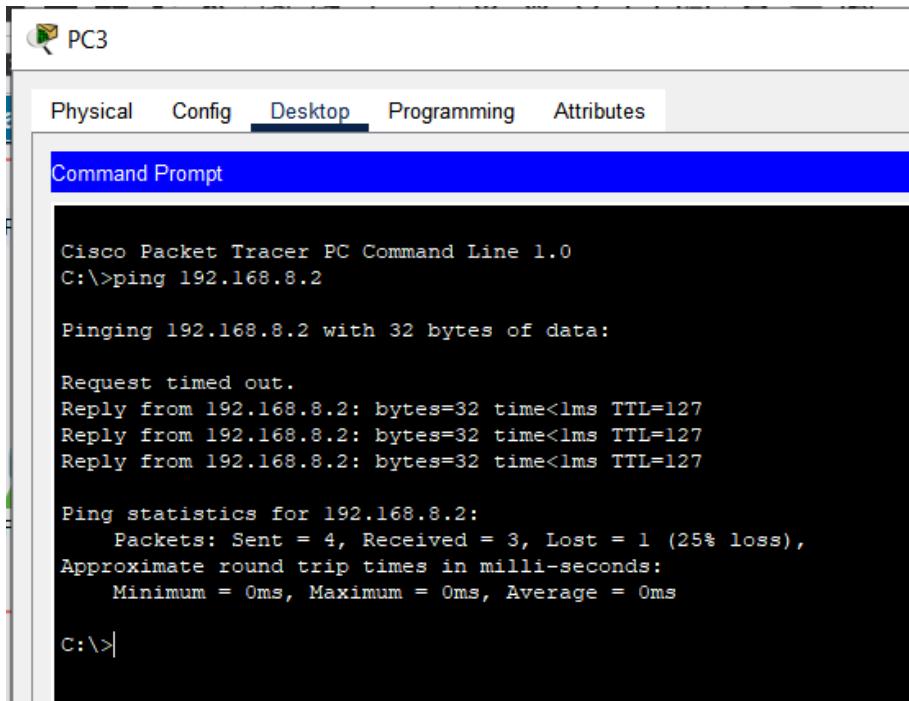
```
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#Service dhcp
Router(config)#Ip dhcp pool Reception
Router(dhcp-config)#Network 192.168.8.0 255.255.255.0
Router(dhcp-config)#Default-router 192.168.8.1
Router(dhcp-config)#Dns-server 192.168.8.1
Router(dhcp-config)#exit
Router(config)#
Router(config)#Ip dhcp pool Store
Router(dhcp-config)#Network 192.168.7.0 255.255.255.0
Router(dhcp-config)#Default-router 192.168.7.1
Router(dhcp-config)#Dns-server 192.168.7.1
Router(dhcp-config)#exit
Router(config)#
Router(config)#Ip dhcp pool Logistics
Router(dhcp-config)#Network 192.168.6.0 255.255.255.0
Router(dhcp-config)#Default-router 192.168.6.1
Router(dhcp-config)#Dns-server 192.168.6.1
Router(dhcp-config)#exit
Router(config)#do wr
Building configuration...
[OK]
Router(config)#
ar
```

To test if the devices are allocated the ip addresses correctly, go to one of the PCs on the floor and on Desktop >IP configuration > click on the dhcp radio button which will show the parameters. Do this for all the PCs on the floor.



Ping one of the PCs from the other to check whether they can communicate with each other using the command prompt.

On PC3: *ping 192.168.8.2*



PC3

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.8.2

Pinging 192.168.8.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.8.2: bytes=32 time<1ms TTL=127
Reply from 192.168.8.2: bytes=32 time<1ms TTL=127
Reply from 192.168.8.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.8.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

c:\>
```

We need to repeat this process on the other 2 routers.

F2 router:

Exit

Int gig0/0.30

Encapsulation dot1Q 30

Ip address 192.168.3.1 255.255.255.0

Exit

Int gig0/0.40

Encapsulation dot1Q 40

Ip address 192.168.4.1 255.255.255.0

Exit

Int gig0/0.50

Encapsulation dot1Q 50

Ip address 192.168.5.1 255.255.255.0

Exit

Do wr

Servicing DHCP:

Service dhcp

Ip dhcp pool Finance

Network 192.168.5.0 255.255.255.0

Default-router 192.168.5.1

Dns-server 192.168.5.1

Exit

Ip dhcp pool Reception

Network 192.168.8.0 255.255.255.0

Default-router 192.168.8.1

Dns-server 192.168.8.1

Exit

Ip dhcp pool HR

Network 192.168.4.0 255.255.255.0

Default-router 192.168.4.1

Dns-server 192.168.4.1

Exit

Do wr

Ip dhcp pool Sales

Network 192.168.3.0 255.255.255.0

Default-router 192.168.3.1

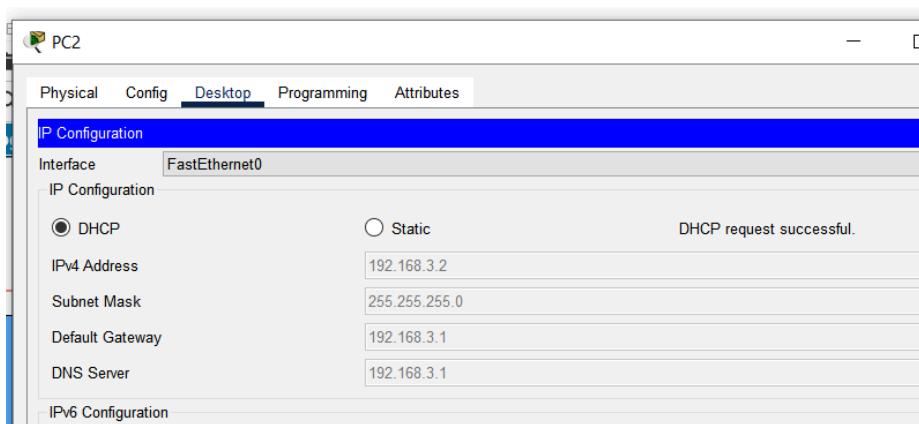
Dns-server 192.168.3.1

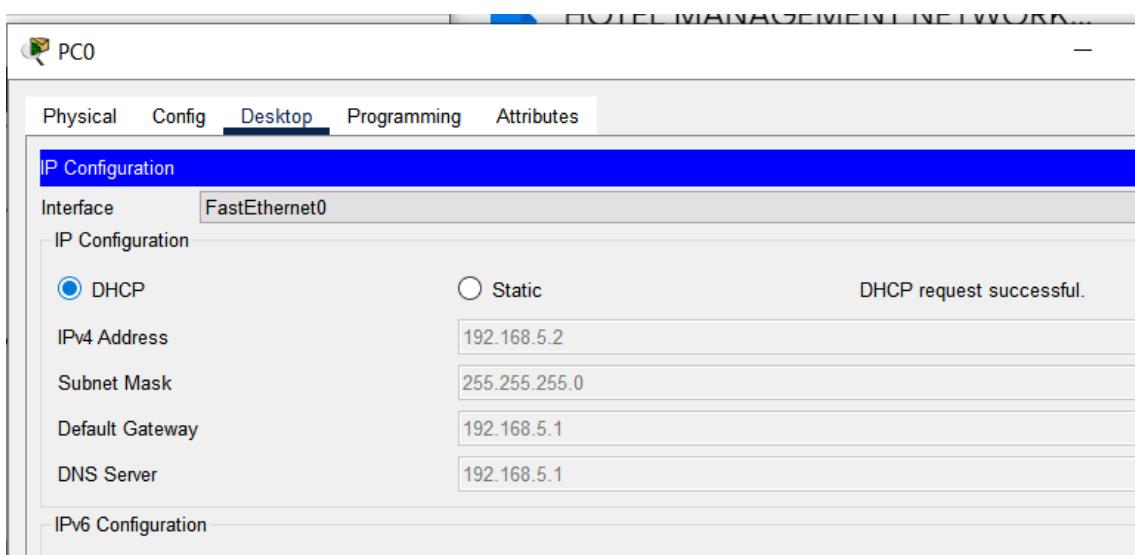
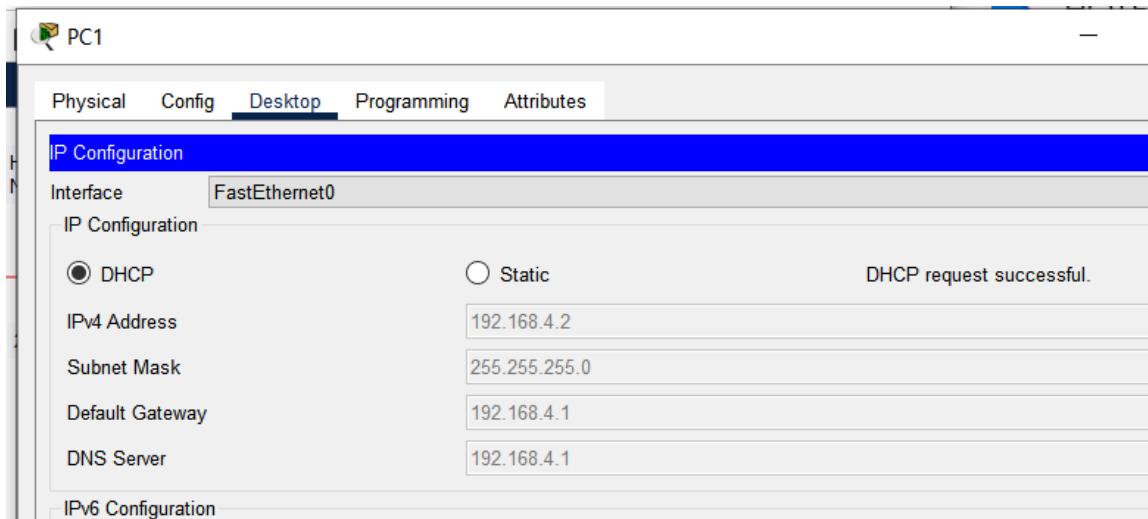
Exit

Do wr

```
[OK]
Router(config)#
Router(config)#
Router(config)#Service dhcp
Router(config)#Ip dhcp pool Finance
Router(config)#Network 192.168.5.0 255.255.255.0
Router(dhcp-config)#Default-router 192.168.5.1
Router(dhcp-config)#Dns-server 192.168.5.1
Router(dhcp-config)#exit
Router(config)#
Router(config)#Ip dhcp pool Reception
Router(dhcp-config)#Network 192.168.8.0 255.255.255.0
Router(dhcp-config)#Default-router 192.168.8.1
Router(dhcp-config)#Dns-server 192.168.8.1
Router(dhcp-config)#exit
Router(config)#
Router(config)#Ip dhcp pool HR
Router(dhcp-config)#Network 192.168.4.0 255.255.255.0
Router(dhcp-config)#Default-router 192.168.4.1
Router(dhcp-config)#Dns-server 192.168.4.1
Router(dhcp-config)#exit
Router(config)#do wr
Building configuration...
[OK]
Router(config)#
Router(config)# Ip dhcp pool Sales
Router(dhcp-config)#Network 192.168.3.0 255.255.255.0
Router(dhcp-config)#Default-router 192.168.3.1
Router(dhcp-config)#Dns-server 192.168.3.1
Router(dhcp-config)#exit
Router(config)#do wr
Building configuration...
[OK]
Router(config)#[
```

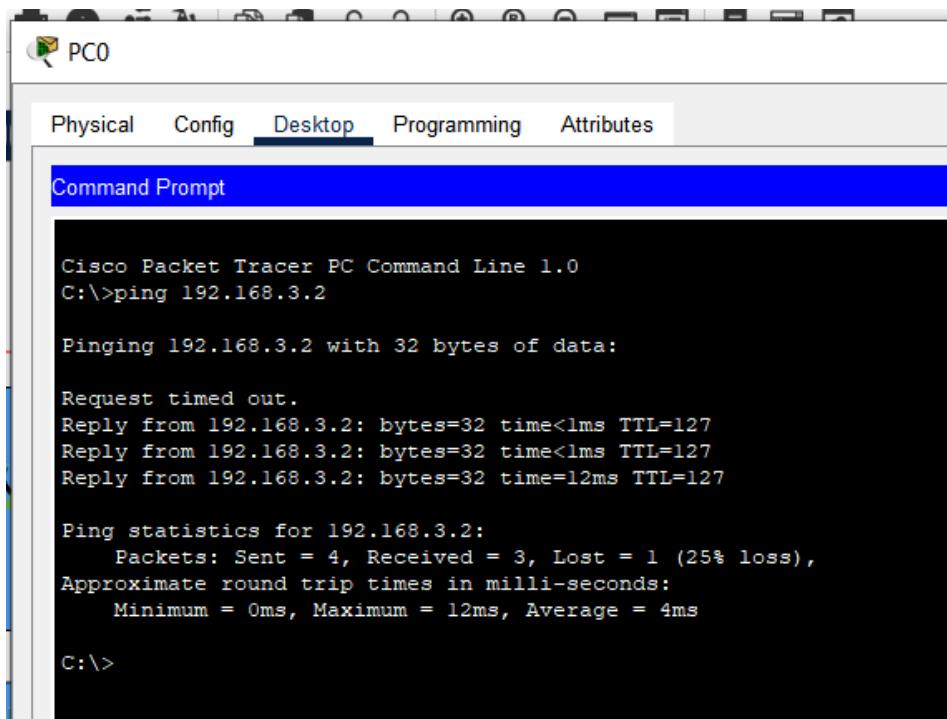
Use PCs to check if the dhcp configurations have been assigned.





Ping to test communication

Ping 192.168.3.2



The screenshot shows a Cisco Packet Tracer window titled "PC0". The tab bar at the top has tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". Below the tabs is a blue header bar labeled "Command Prompt". The main area of the window is a black terminal window displaying the output of a ping command. The output is as follows:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.3.2: bytes=32 time<1ms TTL=127
Reply from 192.168.3.2: bytes=32 time<1ms TTL=127
Reply from 192.168.3.2: bytes=32 time=12ms TTL=127

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 12ms, Average = 4ms

C:\>
```

For F3 router:

Exit

Config t

Int gig0/0.10

Encapsulation dot1Q 10

Ip address 192.168.1.1 255.255.255.0

Exit

Int gig0/0.20

Encapsulation dot1Q 20

Ip address 192.168.2.1 255.255.255.0

Exit

Configure DHCP server:

Service dhcp

Ip dhcp pool IT

Network 192.168.1.0 255.255.255.0

Default-router 192.168.1.1

Dns-server 192.168.1.1

Exit

Ip dhcp pool Admin

Network 192.168.2.0 255.255.255.0

Default-router 192.168.2.1

Dns-server 192.168.2.1

Exit

Do wr

F3Router

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#Int gig0/0.10
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.10, changed state to up

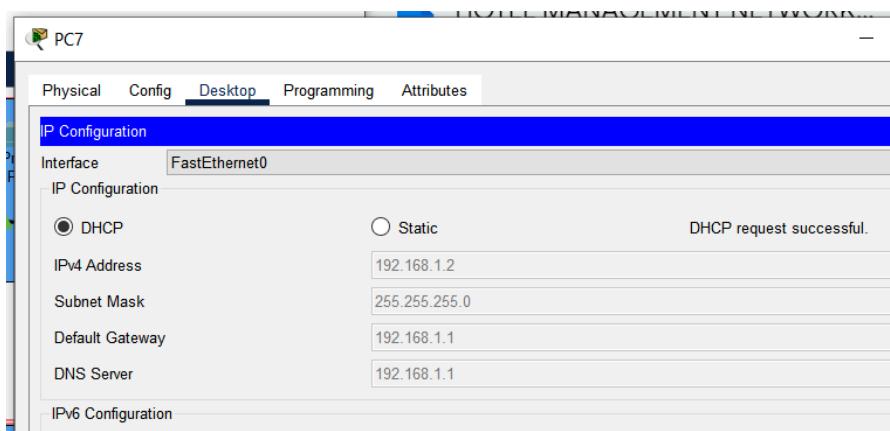
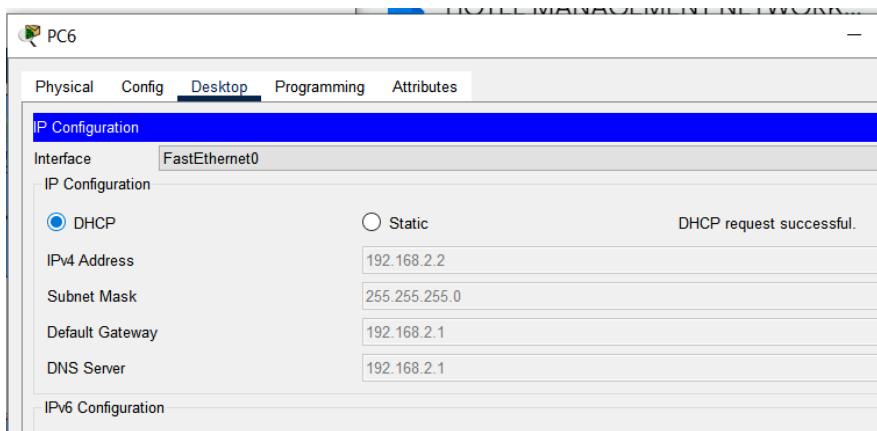
Router(config-subif)#Encapsulation dot1Q 10
Router(config-subif)#Ip address 192.168.1.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
Router(config)#Int gig0/0.20
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.20, changed state to up

Router(config-subif)#Encapsulation dot1Q 20
Router(config-subif)#Ip address 192.168.2.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
Router(config)#
Router(config)#
Router(config)$Service dhcp
Router(config)#Ip dhcp pool IT
Router(dhcp-config)#Network 192.168.1.0 255.255.255.0
Router(dhcp-config)#Default-router 192.168.1.1
Router(dhcp-config)#Dns-server 192.168.1.1
Router(dhcp-config)#exit
Router(config)#
Router(config)#Ip dhcp pool Admin
Router(dhcp-config)#Network 192.168.2.0 255.255.255.0
Router(dhcp-config)#Default-router 192.168.2.1
Router(dhcp-config)#Dns-server 192.168.2.1
Router(dhcp-config)#exit
Router(config)#do wr
Building configuration...
[OK]
Router(config)#

```

Test Configuration



Ping 192.168.2.2

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.2: bytes=32 time=1ms TTL=127
Reply from 192.168.2.2: bytes=32 time<1ms TTL=127
Reply from 192.168.2.2: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

As of now, a PC on a different floor cannot communicate with one on another floor because the routing protocol for the communication has not been configured. This has to be done on all the routers.

On F1 router:

En

Config t

Router ospf 10

Network 10.10.10.4 255.255.255.252 area 0

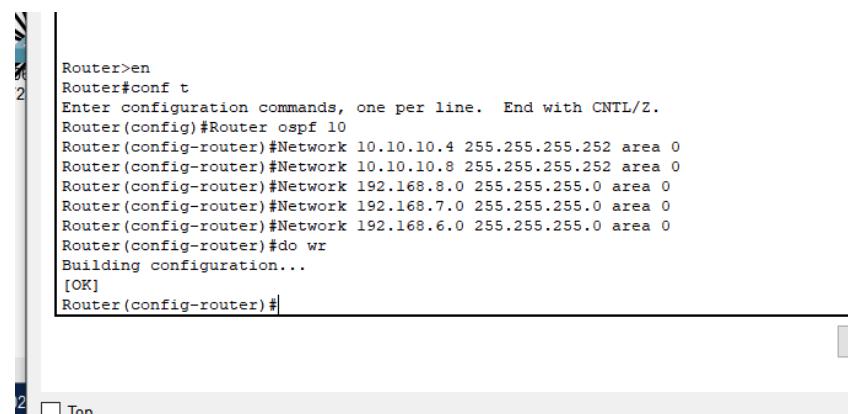
Network 10.10.10.8 255.255.255.252 area 0

Network 192.168.8.0 255.255.255.0 area 0

Network 192.168.7.0 255.255.255.0 area 0

Network 192.168.6.0 255.255.255.0 area 0

Do wr



```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#Router ospf 10
Router(config-router)#Network 10.10.10.4 255.255.255.252 area 0
Router(config-router)#Network 10.10.10.8 255.255.255.252 area 0
Router(config-router)#Network 192.168.8.0 255.255.255.0 area 0
Router(config-router)#Network 192.168.7.0 255.255.255.0 area 0
Router(config-router)#Network 192.168.6.0 255.255.255.0 area 0
Router(config-router)#do wr
Building configuration...
[OK]
Router(config-router)#[/]
```

On the F2 router:

Router ospf 10

Network 10.10.10.0 255.255.255.252 area 0

Network 10.10.10.8 255.255.255.252 area 0

Network 192.168.3.0 255.255.255.0 area 0

Network 192.168.4.0 255.255.255.0 area 0

Network 192.168.5.0 255.255.255.0 area 0

Do wr

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#Router ospf 10
Router(config-router)#Network 10.10.10.0 255.255.255.252 area 0
Router(config-router)#Network 10.10.10.8 255.255.255.252 area 0
Router(config-router)#
02:26:18: %OSPF-5-ADJCHG: Process 10, Nbr 192.168.8.1 on Serial0/2/1 from LOADING to FULL, Loading
Done

Router(config-router)#Network 192.168.3.0 255.255.255.0 area 0
Router(config-router)#Network 192.168.4.0 255.255.255.0 area 0
Router(config-router)#Network 192.168.5.0 255.255.255.0 area 0
Router(config-router)#do wr
Building configuration...
[OK]
Router(config-router)#

```

On F3 router:

Router ospf 10

Network 10.10.10.0 255.255.255.252 area 0

Network 10.10.10.4 255.255.255.252 area 0

Network 192.168.1.0 255.255.255.0 area 0

Network 192.168.2.0 255.255.255.0 area 0

Do wr

```
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#
02:27:27: %OSPF-5-ADJCHG: Process 10, Nbr 192.168.5.1 on Serial0/2/1 from LOADING to FULL, Loading
Done

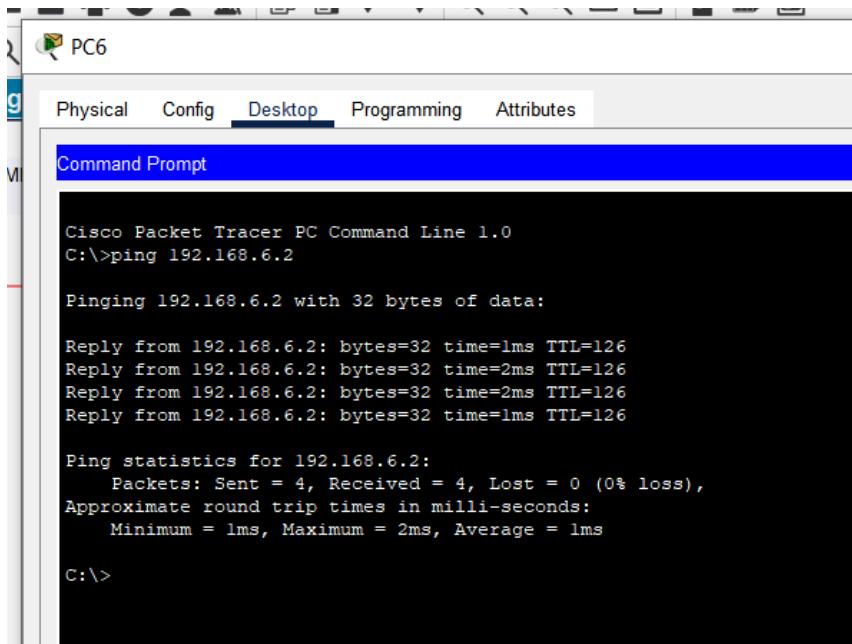
02:27:29: %OSPF-5-ADJCHG: Process 10, Nbr 192.168.8.1 on Serial0/2/0 from LOADING to FULL, Loading
Done

Router(config-router)#Network 192.168.1.0 255.255.255.0 area 0
Router(config-router)#Network 192.168.2.0 255.255.255.0 area 0
Router(config-router)#do wr
Building configuration...
[OK]
Router(config-router)#

```

Now to test communication we will ping PC0 on the first floor from PC6 on the 3rd floor.

Ping 192.168.6.2



```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.6.2

Pinging 192.168.6.2 with 32 bytes of data:

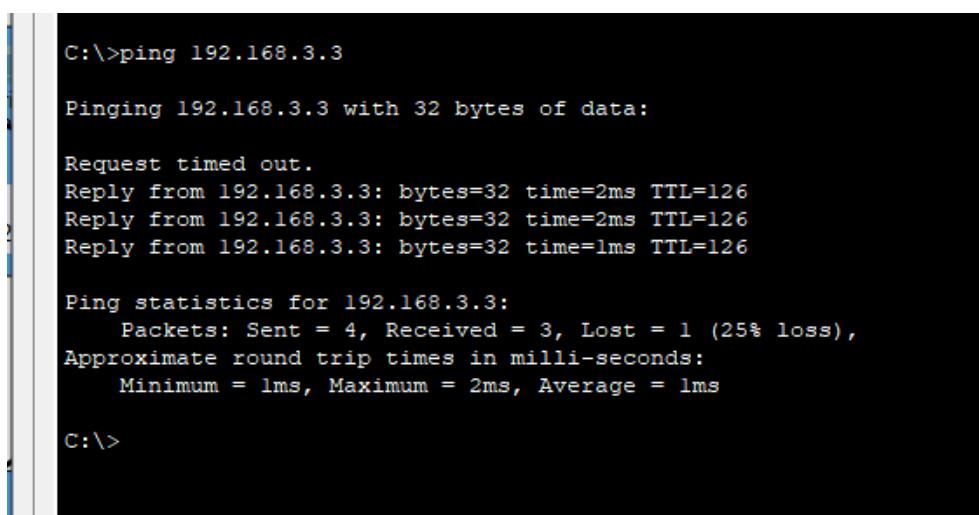
Reply from 192.168.6.2: bytes=32 time=1ms TTL=126
Reply from 192.168.6.2: bytes=32 time=2ms TTL=126
Reply from 192.168.6.2: bytes=32 time=2ms TTL=126
Reply from 192.168.6.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.6.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>
```

We can also ping a printer from the second floor just turn on the dhcp radio button on the printer before pinging.

Ping 192.168.3.3



```
C:\>ping 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.3.3: bytes=32 time=2ms TTL=126
Reply from 192.168.3.3: bytes=32 time=2ms TTL=126
Reply from 192.168.3.3: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.3.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

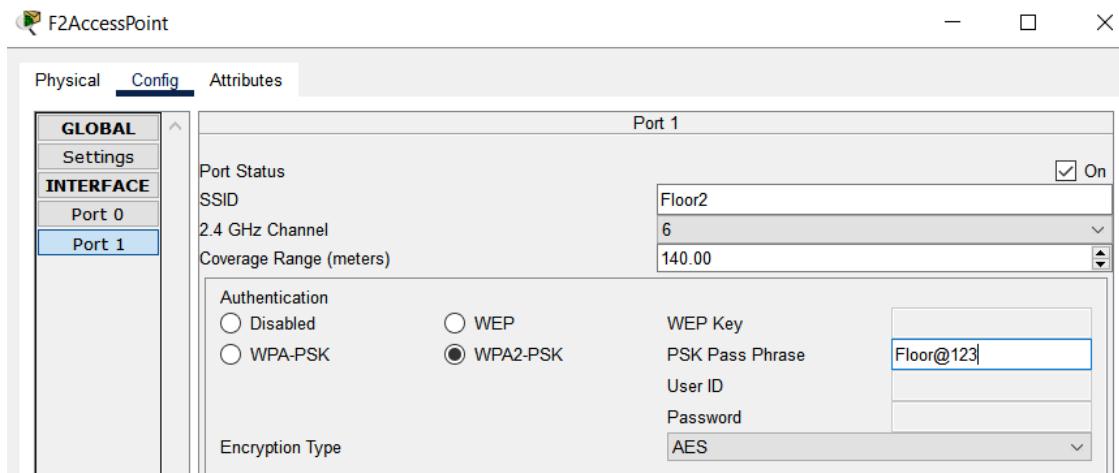
C:\>
```

To configure Wi-Fi

First add wireless devices like smartphones, tablets and laptops to the design then replace the module on the laptop with the WPC module.

Go to the access point:

On config > port status: Floor1 > WPA2-PSK selected > PSK pass phrase : Floor@123

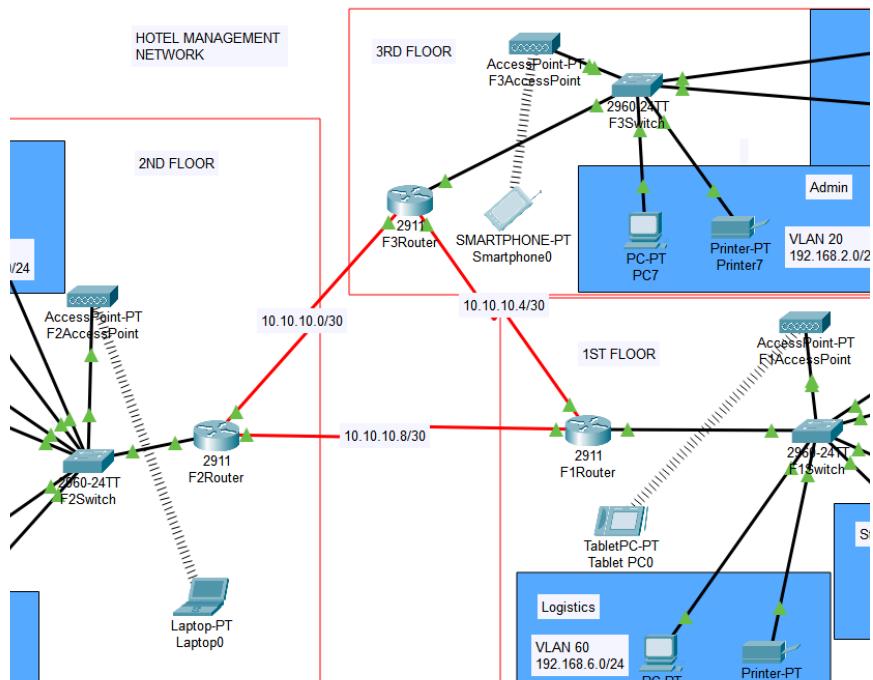


On the laptop > desktop > pc wireless >refresh to find wireless networks available > select > connect



On other wireless devices (tablet and smartphone) > config > wireless0 > SSID: Floor1 > WPA2-PSK > PSK Pass phrase: Floor@123

This should be done for all access points and wireless devices.



Configuring SSH for remote login

This is done on the router CLI:

F3 router:

Exit

Hostname F3-router

Ip domain-name gtech

Username gtech password gtech

Crypto key generate rsa

1024

Line vty 0 15

Login local

Transport input ssh

Do wr

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#Hostname F3-router
F3-router(config)#Ip domain-name gtech
F3-router(config)#Username gtech password gtech
F3-router(config)#Crypto key generate rsa
The name for the keys will be: F3-router.gtech
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

F3-router(config)#Line vty 0 15
*Mar 1 2:41:12.557: %SSH-5-ENABLED: SSH 1.99 has been enabled
F3-router(config-line)#Login local
F3-router(config-line)#Transport input ssh
F3-router(config-line)#do wr
Building configuration...
[OK]
F3-router(config-line)#

```

F2 router:

Hostname F2-router

Ip domain-name gtech

Username gtech password gtech

Crypto key generate rsa

1024

Line vty 0 15

Login local

Transport input ssh

Do wr

F1 router:

Hostname F1-router

Ip domain-name gtech

Username gtech password gtech

Crypto key generate rsa

1024

Line vty 0 15

Login local

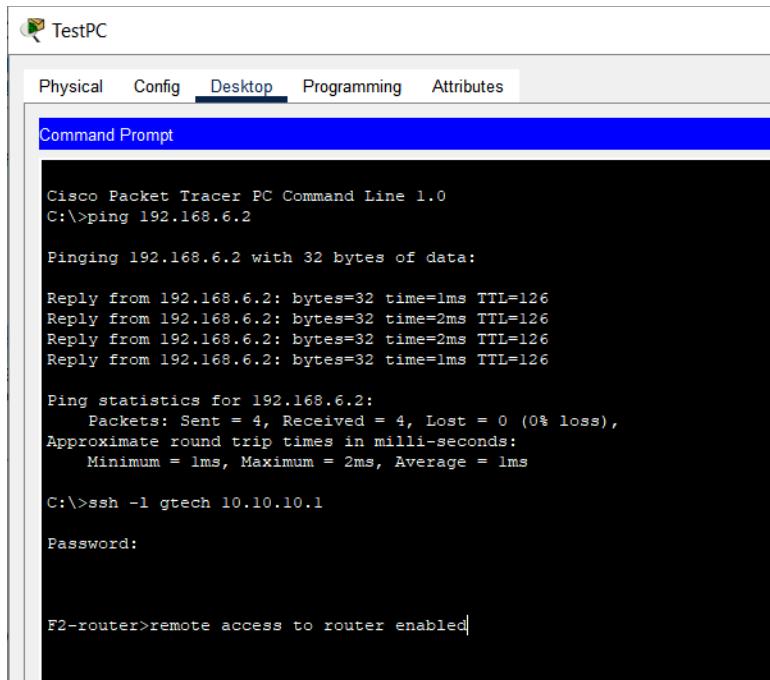
Transport input ssh

Do wr

Exit

For **problem (12)**, we will just change the name of PC6 to TestPC and use it to test remote login. To do this just click the PC > command prompt > ssh -l gtech (*username*) 10.10.10.1 (*ip address of f2 router*) > gtech (*password*) > exit

This should give you remote access to the router



The screenshot shows a Windows-style desktop environment titled "TestPC". The taskbar has icons for Physical, Config, Desktop, Programming, and Attributes. The "Desktop" tab is selected. A "Command Prompt" window is open, showing the following terminal session:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.6.2

Pinging 192.168.6.2 with 32 bytes of data:
Reply from 192.168.6.2: bytes=32 time=lms TTL=126
Reply from 192.168.6.2: bytes=32 time=2ms TTL=126
Reply from 192.168.6.2: bytes=32 time=2ms TTL=126
Reply from 192.168.6.2: bytes=32 time=lms TTL=126

Ping statistics for 192.168.6.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = lms, Maximum = 2ms, Average = lms

C:\>ssh -l gtech 10.10.10.1

Password:

F2-router>remote access to router enabled|
```

For problem (13), we go to the F3 switch to configure port security to enable only the TestPC.

On the CLI:

En

Config t

Int fa0/2

Switchport port-security

Switchport port-security maximum 1

Switchport port-security mac-address sticky

Switchport port-security violation shutdown

Do wr

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#Int fa0/2
Switch(config-if)#Int fa0/2
Switch(config-if)#Switchport port-security
Switch(config-if)#Switchport port-security maximum 1
Switch(config-if)#Switchport port-security mac-address sticky
Switch(config-if)#Switchport port-security violation shutdown
Switch(config-if)#do wr
Building configuration...
[OK]
Switch(config-if)#

```

To verify **port security**, on the CLI:

Do sh start

Do sh port-security

```
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#do sh port-security
Secure Port MaxSecureAddr CurrentAddr SecurityViolation Security Action
(Count) (Count) (Count)
-----
Fa0/2 1 0 0 Shutdown
-----
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#

```

Time:

Ton

To verify **SSH** and **OSPF** on the router CLI:

En

Do sh start

```
line con 0
!
line aux 0
!
8/ line vty 0 4
    login local
    transport input ssh
line vty 5 15
    login local
    transport input ssh
!
!
!
end

F3-router(config)#
F3-router(config)#
F3-router(config)#
F3-router(config)#
```

All Done!!

