EC 4060 COMPUTER AND DATA NETWORK ASSIGNMENT

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2020/E/122

GROUP C

SEMESTER 4

15 MAY 2023

OBJECTIVE

- Design computer network for blocks

Network diagram in cisco packet tracer

- The network design was developed by referencing the 3 tier type network design model.
- It consists of core layer with a router, distribution layer with multilayer switch and access layer with switches and end devices.

Network diagram

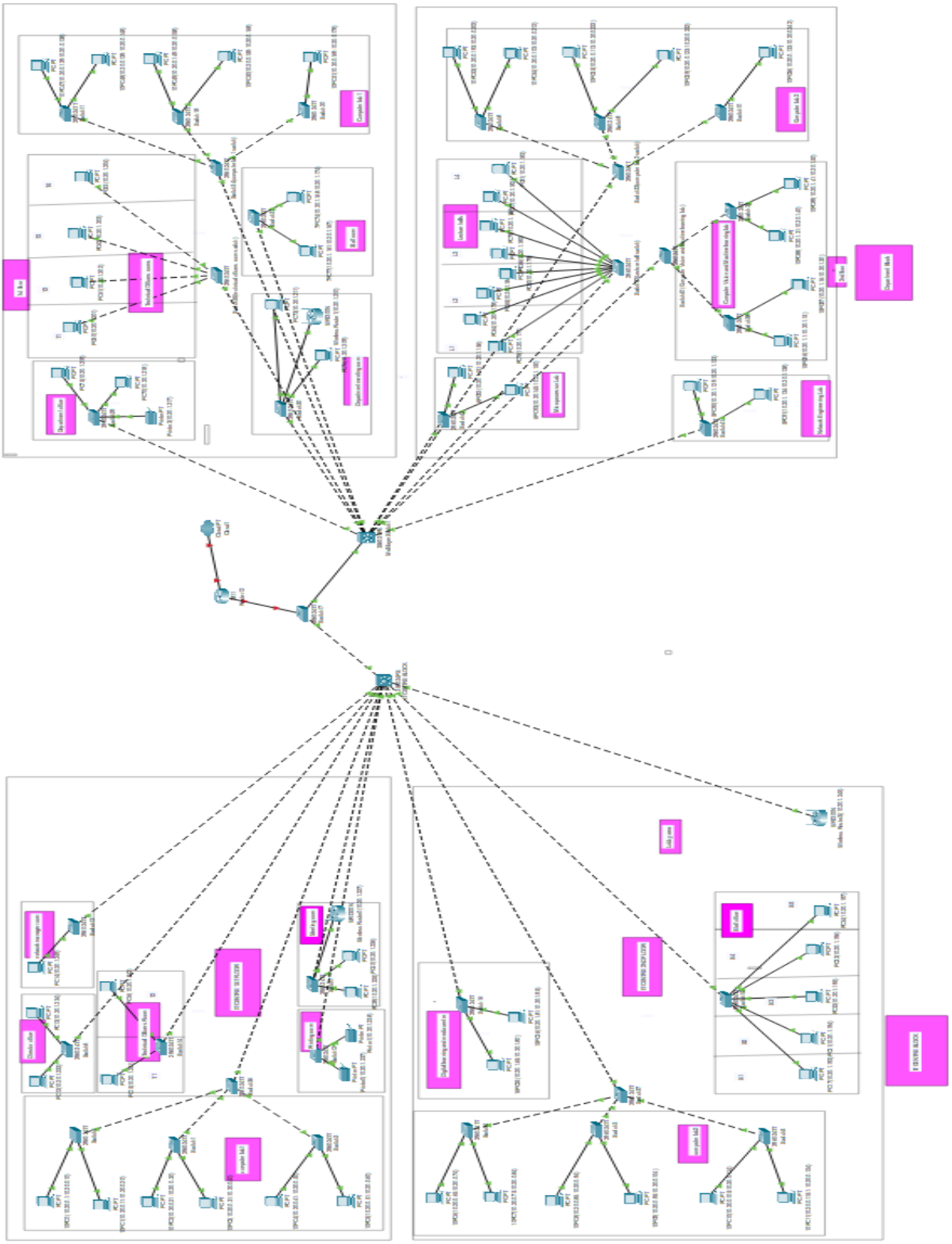
IT Centre block

Places	No of devices
1. Director Office	2 pc
2. Network Manager Room	1 pc
3. 2 Technical Officers Room	2 pc
4. Staff Office	5 pc
5. Meeting Room	2 data points + wifi
6. Computer Lab 1	60 pc
7. Computer Lab 2	60 pc
8. Digital Learning and Media Centre	30 pc + 1 printer
9. Printing Room	2 printers
10. Lobby area	wifi

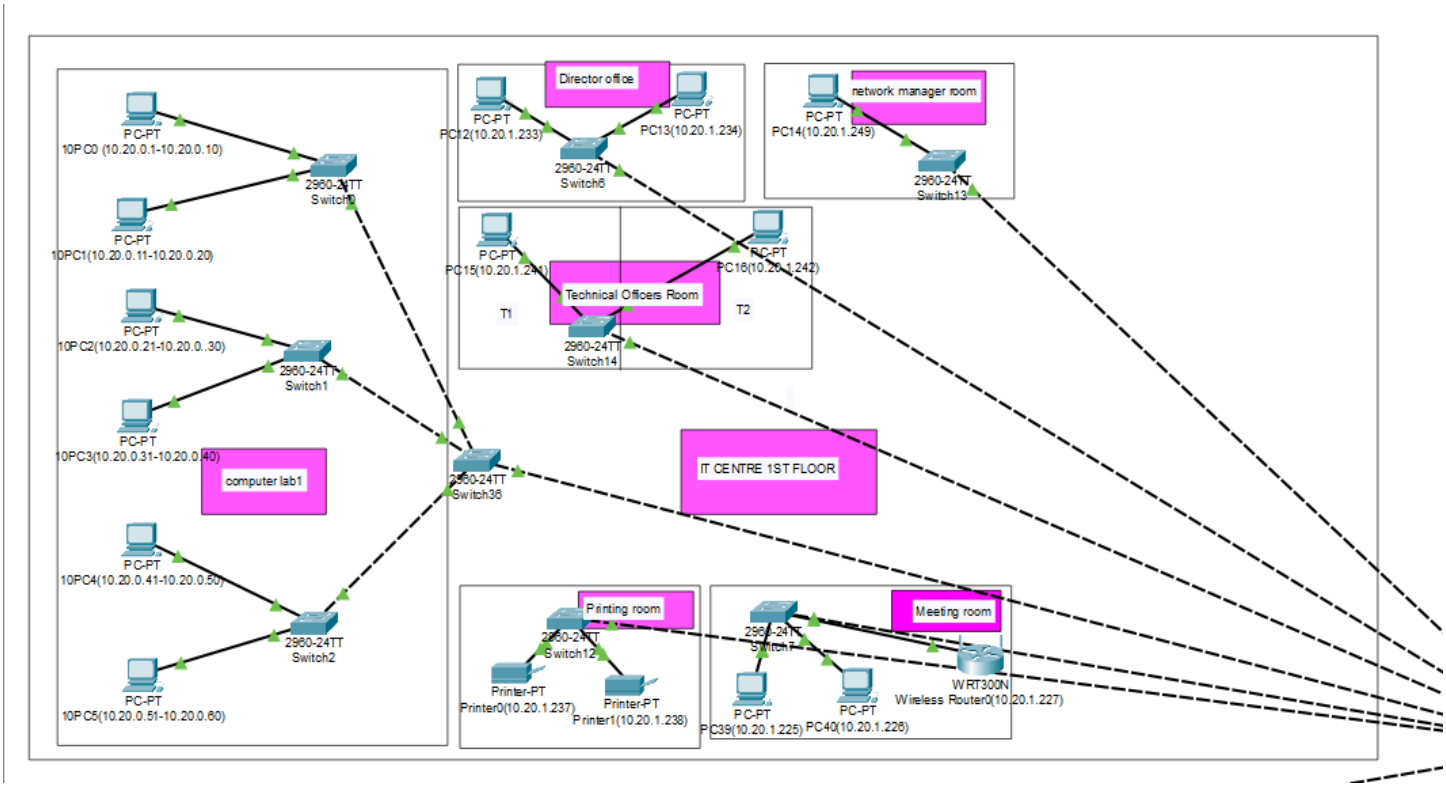
Department Block

Places	No of devices
1. 4 lecture halls	4 pc + 4 multimedia
2. 14 staff rooms	14 pc
3. 4 Technical Officers Rooms	4 pc
4. Department Meeting Room	2 data points + wifi
5. Computer Lab 1	50 pc
6. Computer Lab 2	50 pc
7. Network Engineering Lab	10 pc
8. Microprocessor Lab	12 pc
9. Computer Vision and Machine Learning Lab	50 pc
10. Department Office	2 pc+ 1 printer

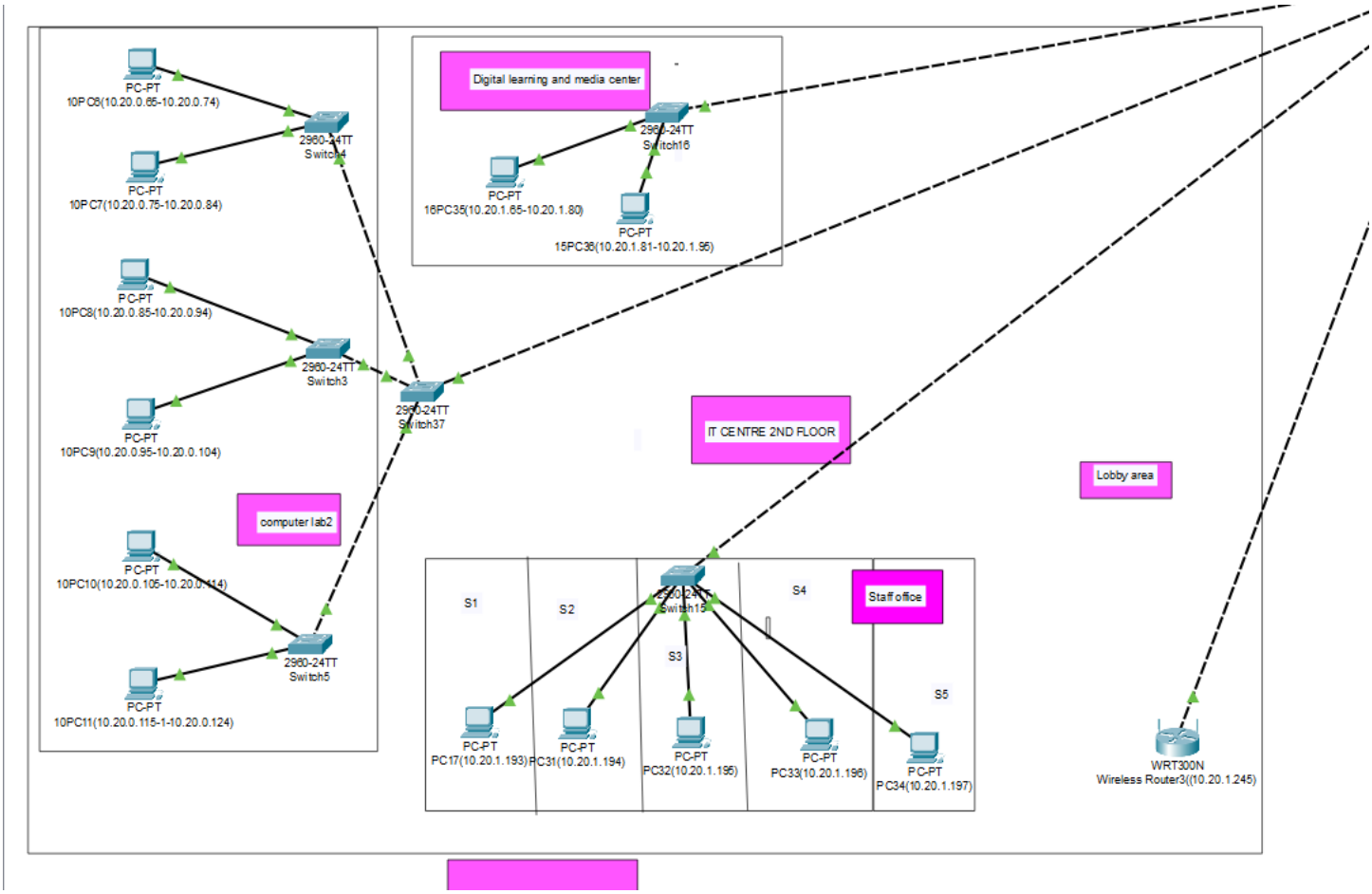
NETWORK DIAGRAM



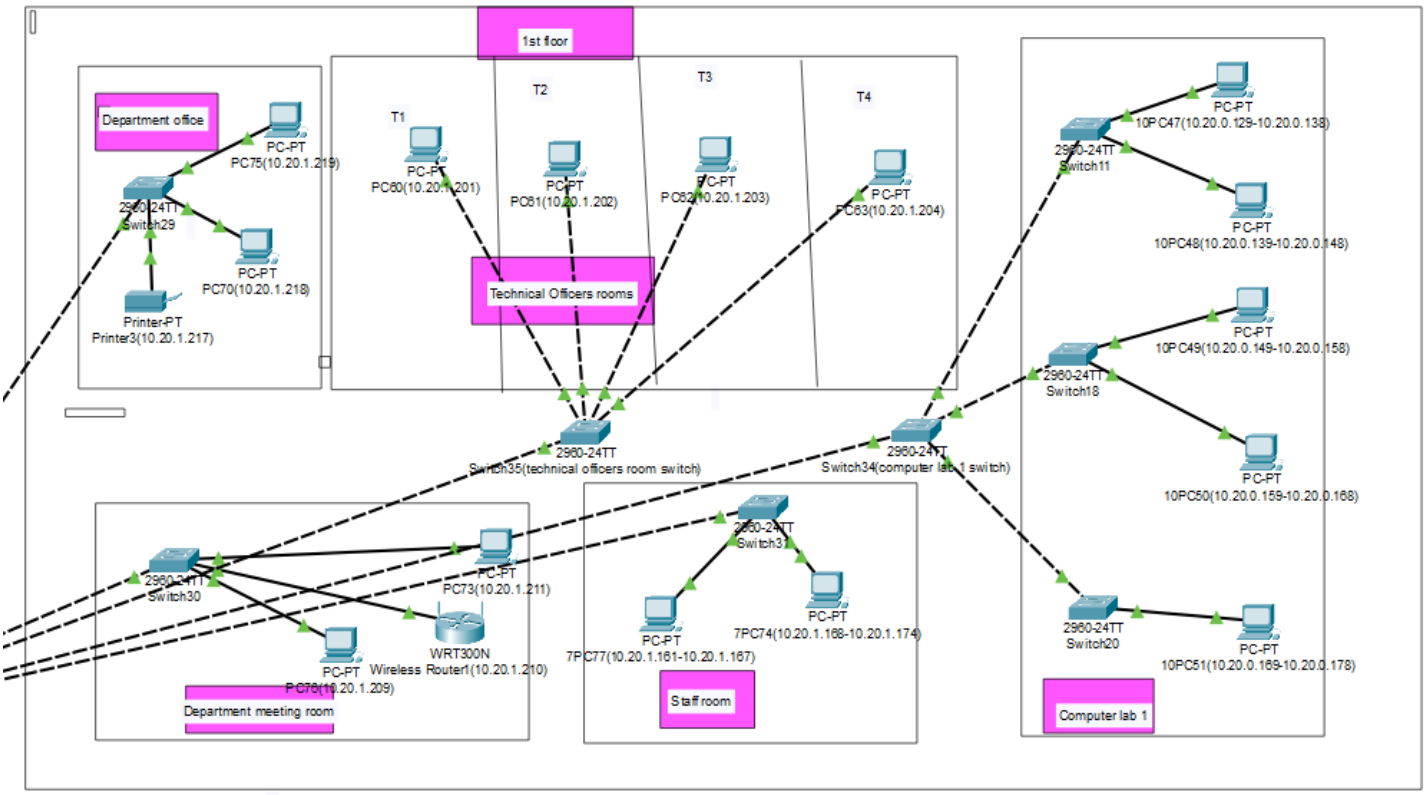
IT CENTRE BLOCK 1ST FLOOR



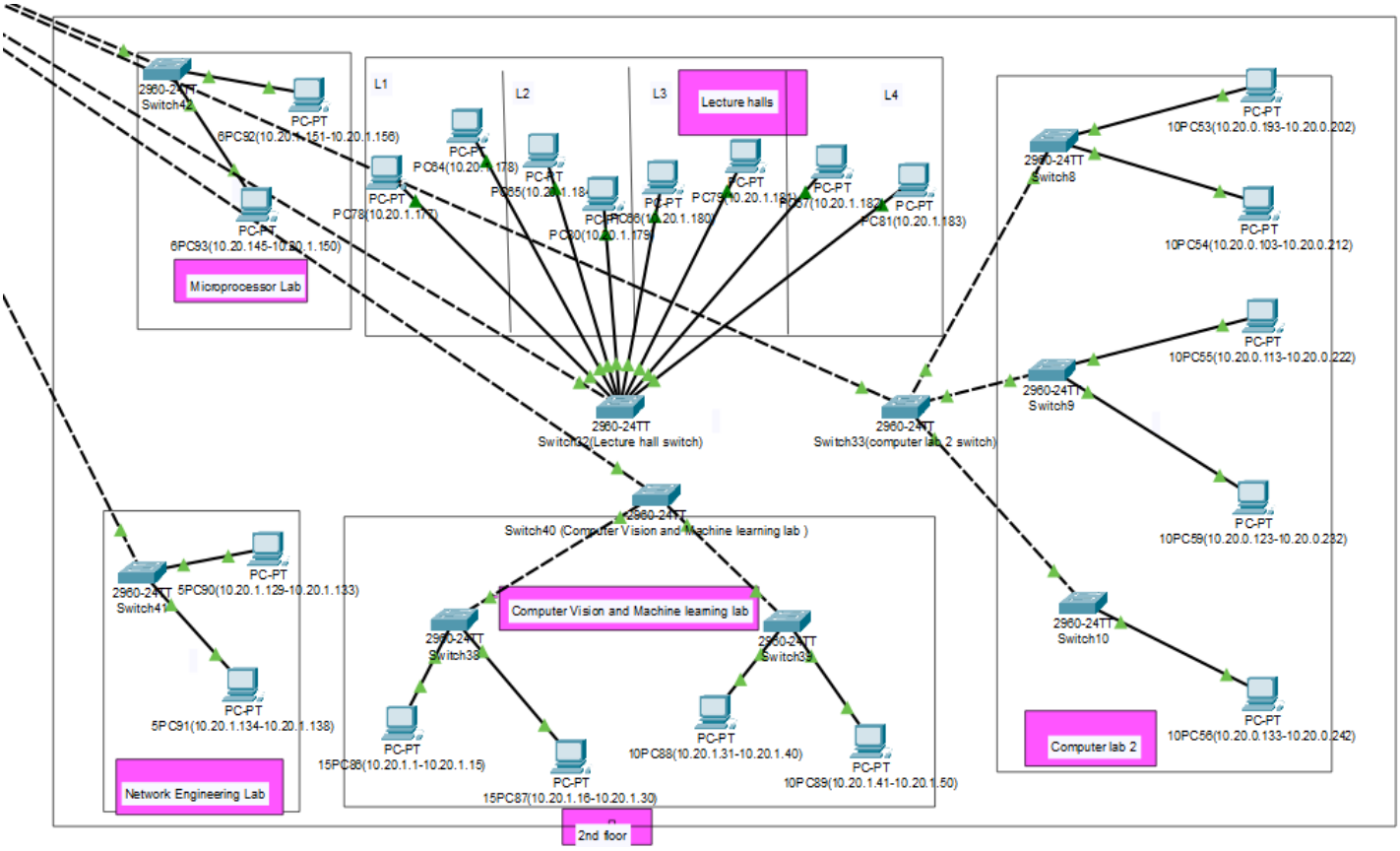
IT CENTRE BLOCK 2ND FLOOR



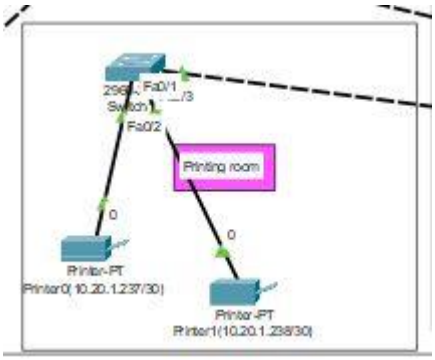
DEPARTMENT BLOCK 1ST FLOOR

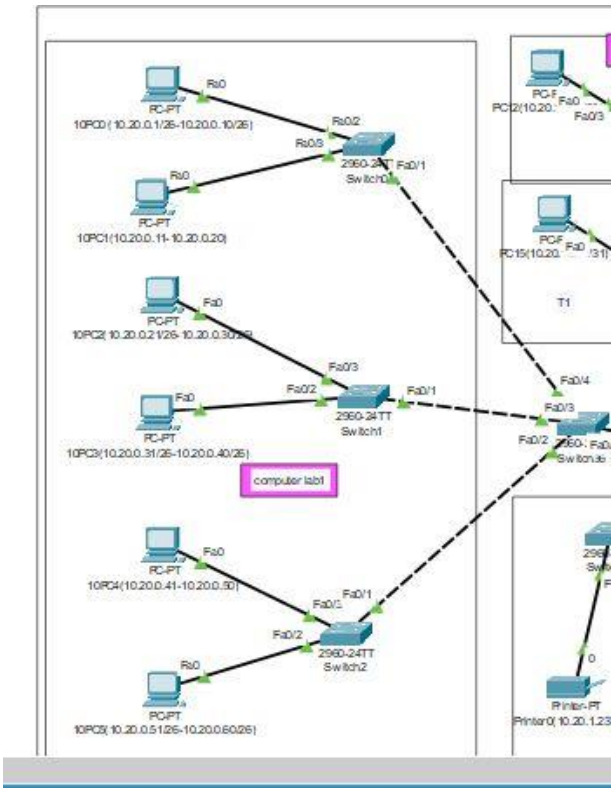


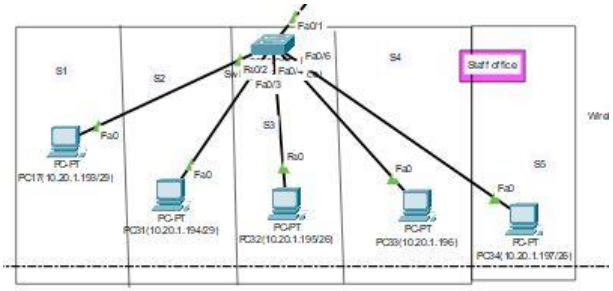
DEPARTMENT BLOCK 2ND FLOOR

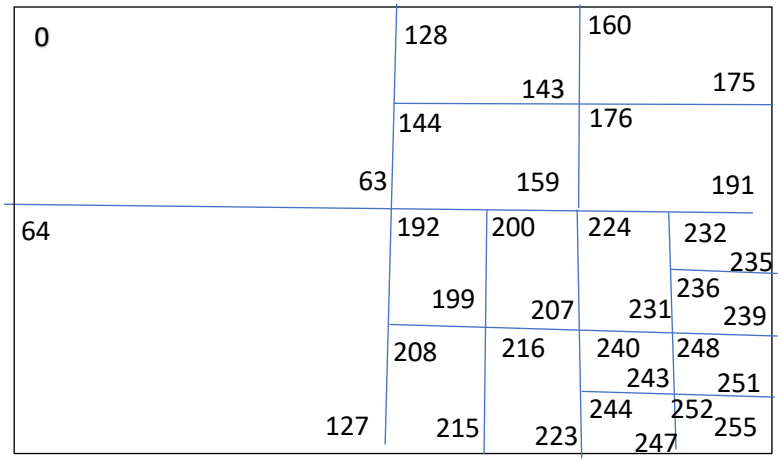


Vlans


Fa0/1
Fa0/2
Printing room
Printer-PT
Printer0(10.20.1.237/30)
Printer-PT
Printer1(10.20.1.238/30)


PC-PT
Fa0
Fa0/2
Fa0/3
2960-24TT
Switch0
Fa0/1
Switch1
Fa0/4
computer lab1
Switch2
T1


S1
S2
S3
S4
S5
Staff office
Fa0/1
Fa0/2
Fa0/3
Fa0/6
Fa0
PC-PT
PC31(10.20.1.194/29)
PC32(10.20.1.195/28)
PC33(10.20.1.196)


0
128
143
160
175
144
63
159
176
191
64
192
199
200
207
224
231
232
235
236
239
208
127
215
216
223
240
243
244
247
248
251
252
255

Box Method

The details of the subnet, devicecluded and IP addressing

BLOCK NAME	VLAN	REQUIRED SIZE	ALLOCATED SIZE	NETWORK ADDRESS	IP ADDRESS RANGE	BROADCAST	SUBNET MASK	CIDR
Computer Lab 1 (IT Centre)	1	60	62	10.20.0.0	10.20.0.1-10.20.0.62	10.20.0.63	255.255.255.192	/26
Computer Lab 2 (IT Centre)	2	60	62	10.20.0.64	10.20.0.65-10.20.0.126	10.20.0.127	255.255.255.192	/26
Computer Lab 1 (Department block)	4	50	62	10.20.0.128	10.20.0.129-10.20.0.190	10.20.0.191	255.255.255.192	/26
Computer Lab 2 (Department block)	3	50	62	10.20.1.192	10.20.0.193-10.20.0.254	10.20.1.255	255.255.255.192	/26
Computer Vision and Machine Learning Lab	5	50	62	10.20.1.0	10.20.1.1-10.20.1.62	10.20.1.63	255.255.255.192	/26
Digital Learning and Media Centre	6	31	62	10.20.1.64	10.20.1.65-10.20.1.126	10.20.1.127	255.255.255.192	/26
Network Engineering Lab	7	10	14	10.20.1.128	10.20.1.129-10.20.1.142	10.20.1.143	255.255.255.240	/28
Microprocessor Lab	8	12	14	10.20.1.144	10.20.1.145-10.20.1.158	10.20.1.159	255.255.255.240	/28
14 staff rooms	9	14	14	10.20.1.160	10.20.1.161-10.20.1.174	10.20.1.175	255.255.255.240	/28
4 lecture halls	10	8	14	10.20.1.176	10.20.1.177-10.20.1.190	10.20.1.191	255.255.255.240	/28
Staff Office	11	5	6	10.20.1.192	10.20.1.193-10.20.1.198	10.20.1.199	255.255.255.248	/29
4 Technical Officers Rooms	12	4	6	10.20.1.200	10.20.1.201-10.20.1.206	10.20.1.207	255.255.255.248	/29
Department Meeting Room	13	3	6	10.20.1.208	10.20.1.209-10.20.1.214	10.20.1.215	255.255.255.248	/29
Department office	14	3	6	10.20.1.216	10.20.1.217-10.20.1.222	10.20.1.223	255.255.255.248	/29
Meeting Room	15	3	6	10.20.1.224	10.20.1.225-10.20.1.230	10.20.1.231	255.255.255.248	/29
Director Office	16	2	2	10.20.1.232	10.20.1.233-10.20.1.234	10.20.1.235	255.255.255.252	/30
Printing Room	17	2	2	10.20.1.236	10.20.1.237-10.20.1.238	10.20.1.239	255.255.255.252	/30
2 Technical Officers Room	18	2	2	10.20.1.240	10.20.1.241-10.20.1.242	10.20.1.243	255.255.255.254	/31
Lobby area	19	1	2	10.20.1.244	10.20.1.245-10.20.1.246	10.20.1.247	255.255.255.254	/31
Network Manager Room	20	1	2	10.20.1.248	10.20.1.249 10.20.1.250	10.20.1.251	255.255.255.254	/31

The details of the VLAN created in the design

IT Centre Block

Places	VLANs
1. Director Office	16
2. Network Manager Room	20
3. 2 Technical Officers Room	18
4. Staff Office	11
5. Meeting Room	15
6. Computer Lab 1	1
7. Computer Lab 2	2
8. Digital Learning and Media Centre	6
9. Printing Room	17
10. Lobby area	19

Department Block

Places	V10LANs
1. 4 lecture halls	10
2. 14 staff rooms	9
3. 4 Technical Officers Rooms	12
4. Department Meeting Room	13
5. Computer Lab 1	4
6. Computer Lab 2	3
7. Network Engineering Lab	7
8. Microprocessor Lab	8
9. Computer Vision and Machine Learning Lab	5
10. Department Office	14

- IP allocation done by an efficient way as consider IT center block and Department block as a Whole. If we allocate it separately then it will be a waste of IP address allocation.
- To restrict the address of staff room and department office, it should be consider as separate VLANs.
- Passwords set for each node to restrict the access from others than administrators.

CONFUGURING ROUTER

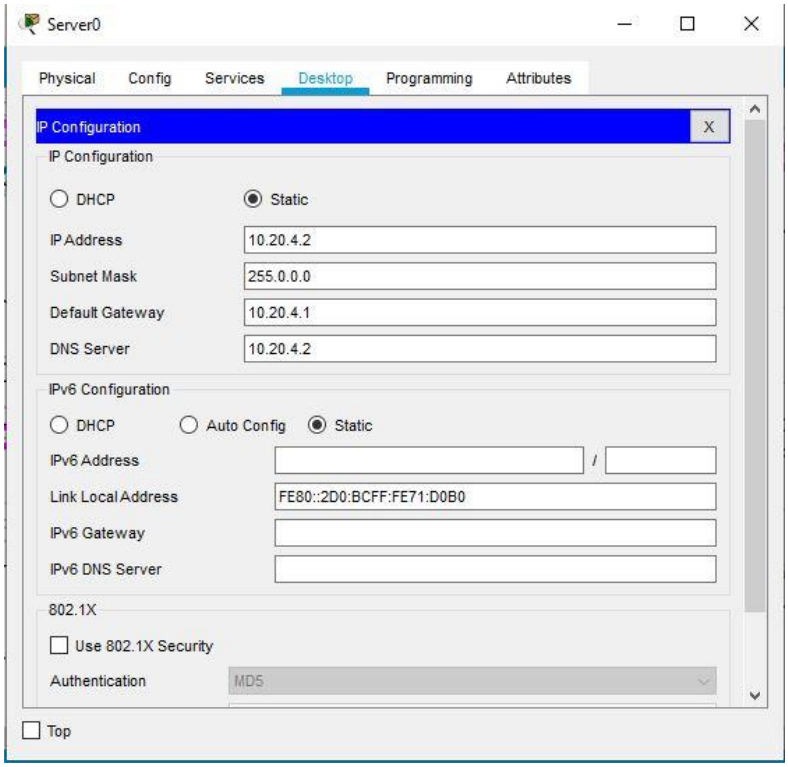
✓ giving password for the router password (2020E122)

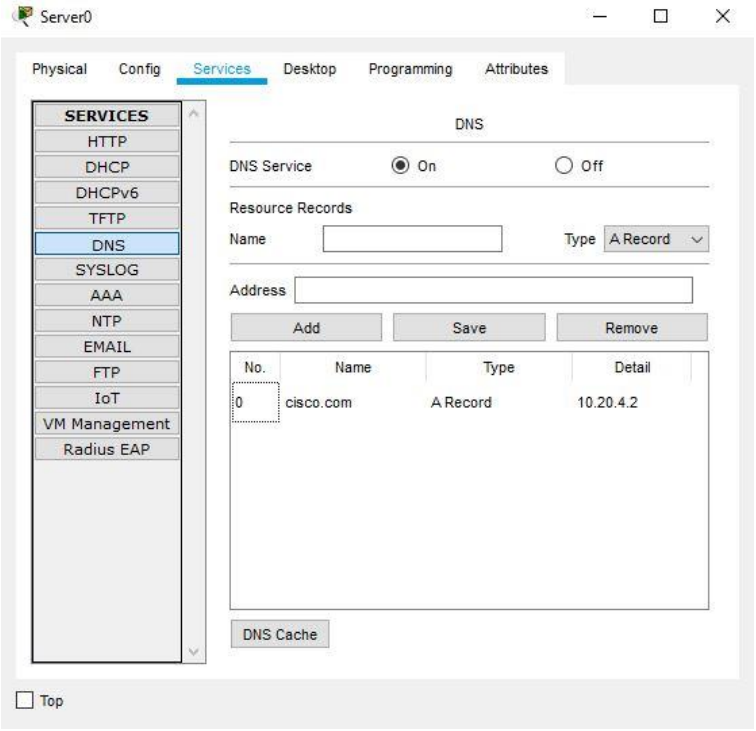
```
% Invalid input detected at '^' marker.

Router(config)#line vty 0 4
Router(config-line)#password 2020E122
Router(config-line)#login
Router(config-line)#exit
Router(config)#enable secret 2020E122
Router(config)#banner motd "No unauthorized entry!"
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fa0/0.1
Router(config-subif)#ip address 10.20.0.0 255.255.255.192

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.2
Router(config-subif)#10.20.0.64 255.255.255.192
                    ^
% Invalid input detected at '^' marker.

Router(config-subif)#ip address 10.20.0.64 255.255.255.192

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.3
Router(config-subif)#ip address 10.20.0.128 255.255.255.192

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.4
Router(config-subif)#ip address 10.20.0.192 255.255.255.192

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.
```

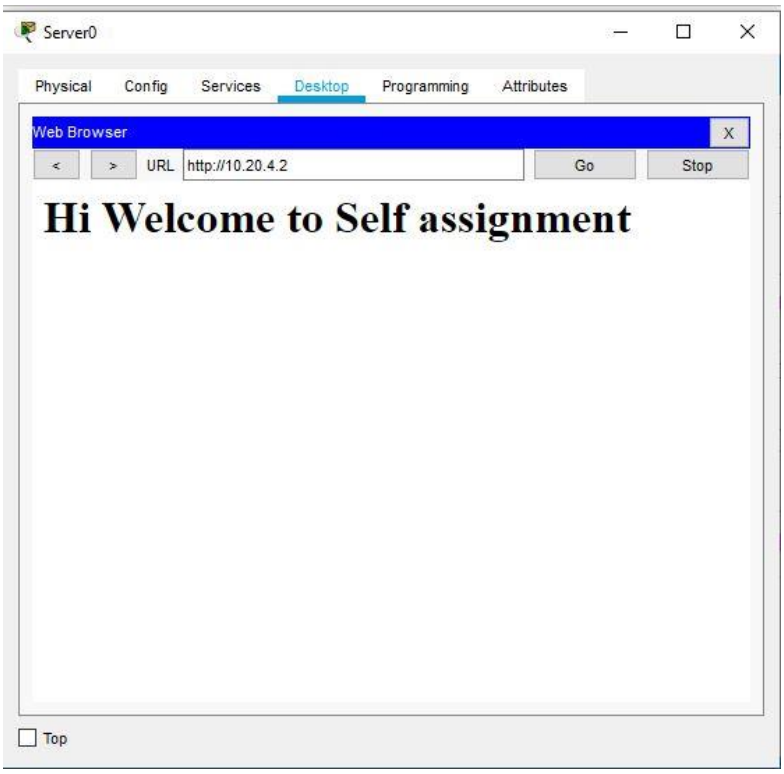
```
Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.5
Router(config-subif)#ip address 10.20.1.0 255.255.255.192

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.6
Router(config-subif)#ip address 10.20.1.64 255.255.255.192

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.7
Router(config-subif)#ip address 10.20.1.128 255.255.255.240

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.8
Router(config-subif)#ip address 10.20.1.144 255.255.255.240

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.9
Router(config-subif)#ip address 10.20.1.160 255.255.255.240

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.10
Router(config-subif)#ip address 10.20.1.176 255.255.255.240

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.11
Router(config-subif)#ip address 10.20.1.192 255.255.255.248
```

```
Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.18
Router(config-subif)#ip address 10.20.1.244 255.255.255.252

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.18
Router(config-subif)#ip address 10.20.1.244 255.255.255.254

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.19
Router(config-subif)#ip address 10.20.1.244 255.255.255.254

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.18
Router(config-subif)#ip address 10.20.1.240 255.255.255.254

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#interface fa0/0.20
Router(config-subif)#ip address 10.20.1.248 255.255.255.254

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#no shut
Router(config-subif)#exit
Router(config)#
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Server configuration

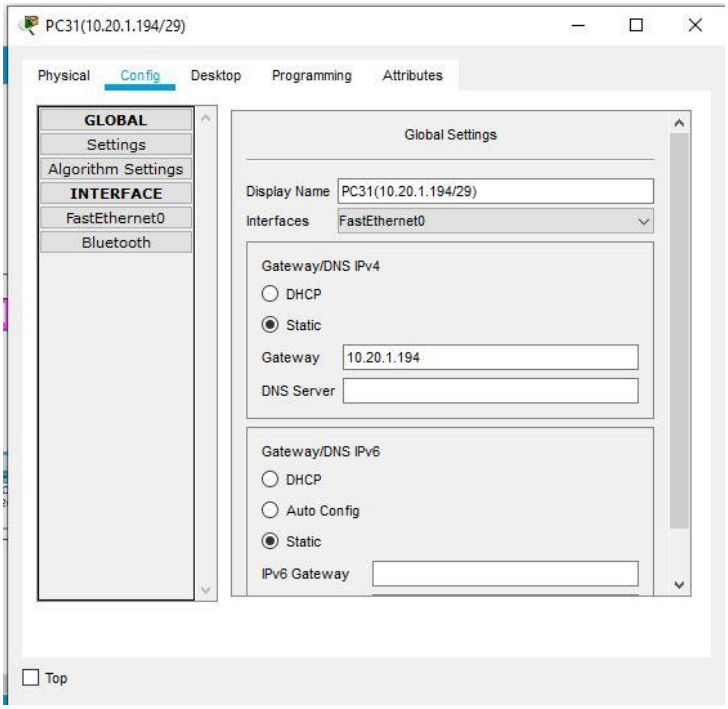


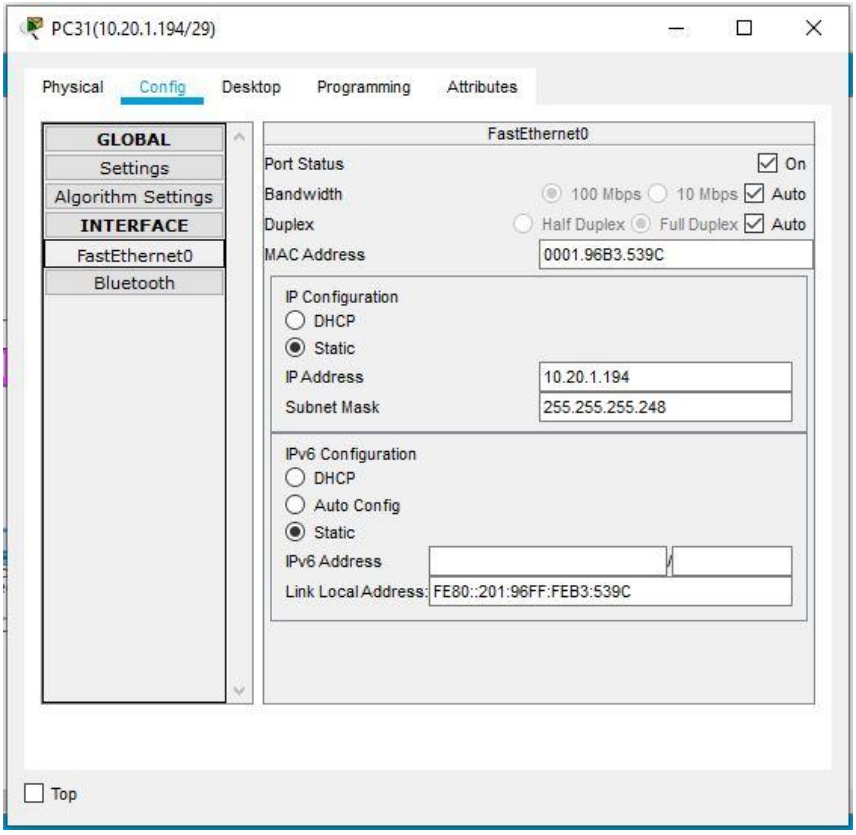


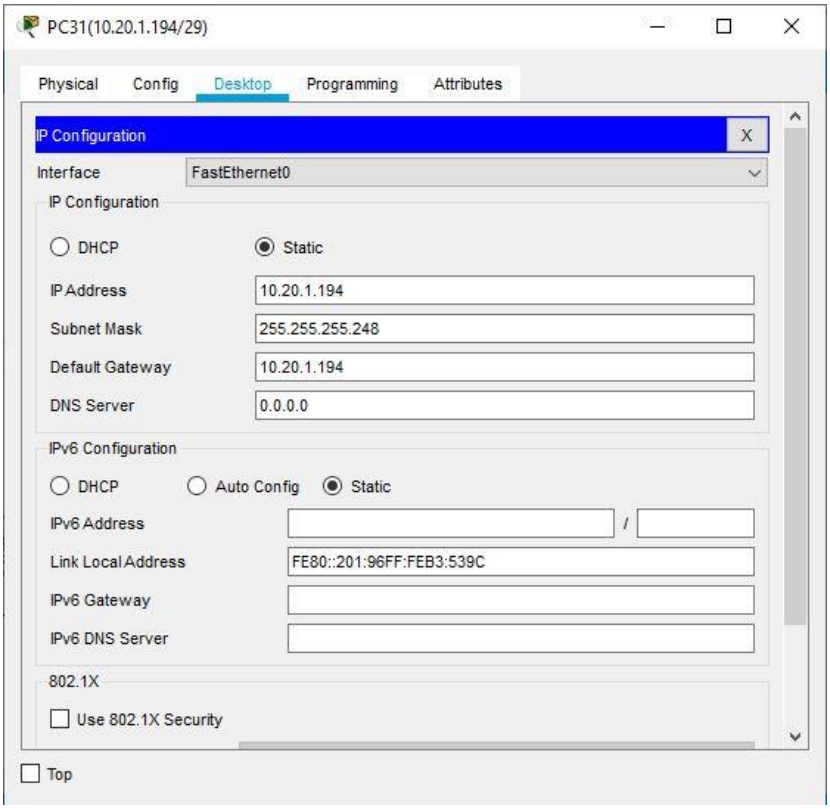


IP CONFIGURATION OF PC

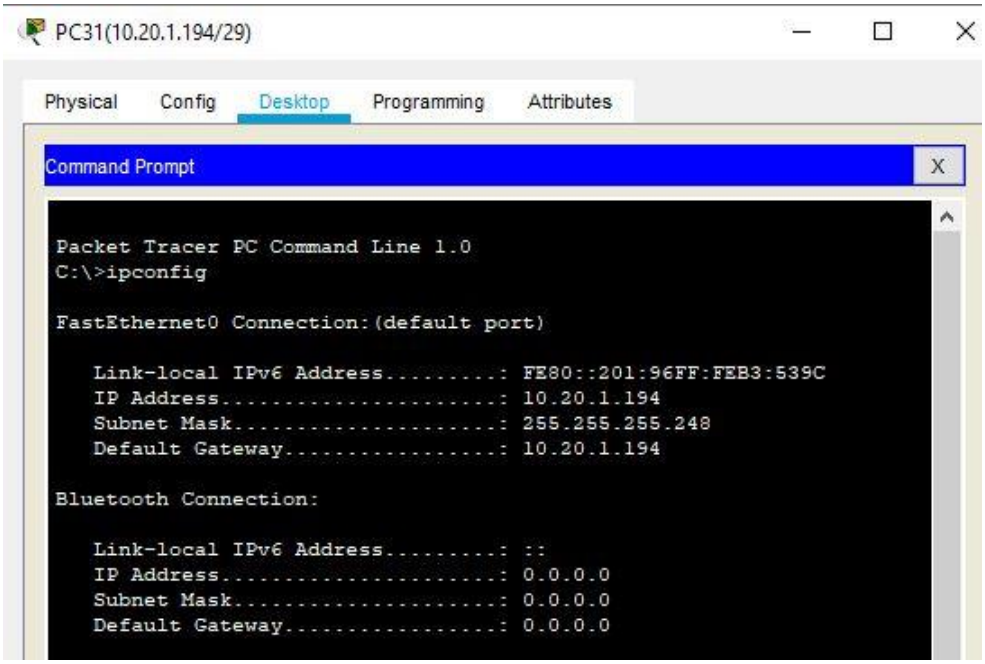
- Ex: staff office pc



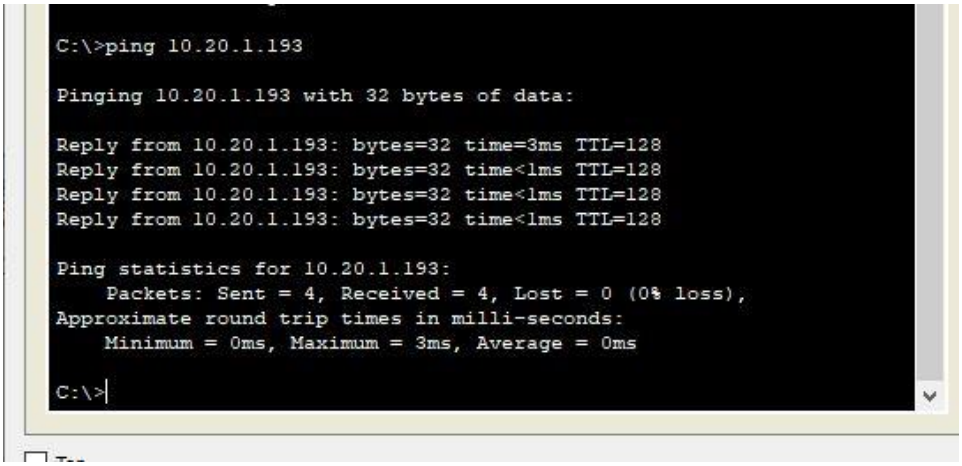

PC31(10.20.1.194/29)
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0001.96B3.539C
IP Configuration
DHCP
Static
IP Address
10.20.1.194
Subnet Mask
255.255.255.248
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address:
FE80::201:96FF:FEB3:539C
Top


PC31(10.20.1.194/29)
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
10.20.1.194
Subnet Mask
255.255.255.248
Default Gateway
10.20.1.194
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::201:96FF:FEB3:539C
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Top

Type ipconfig to show the details of ip configuration

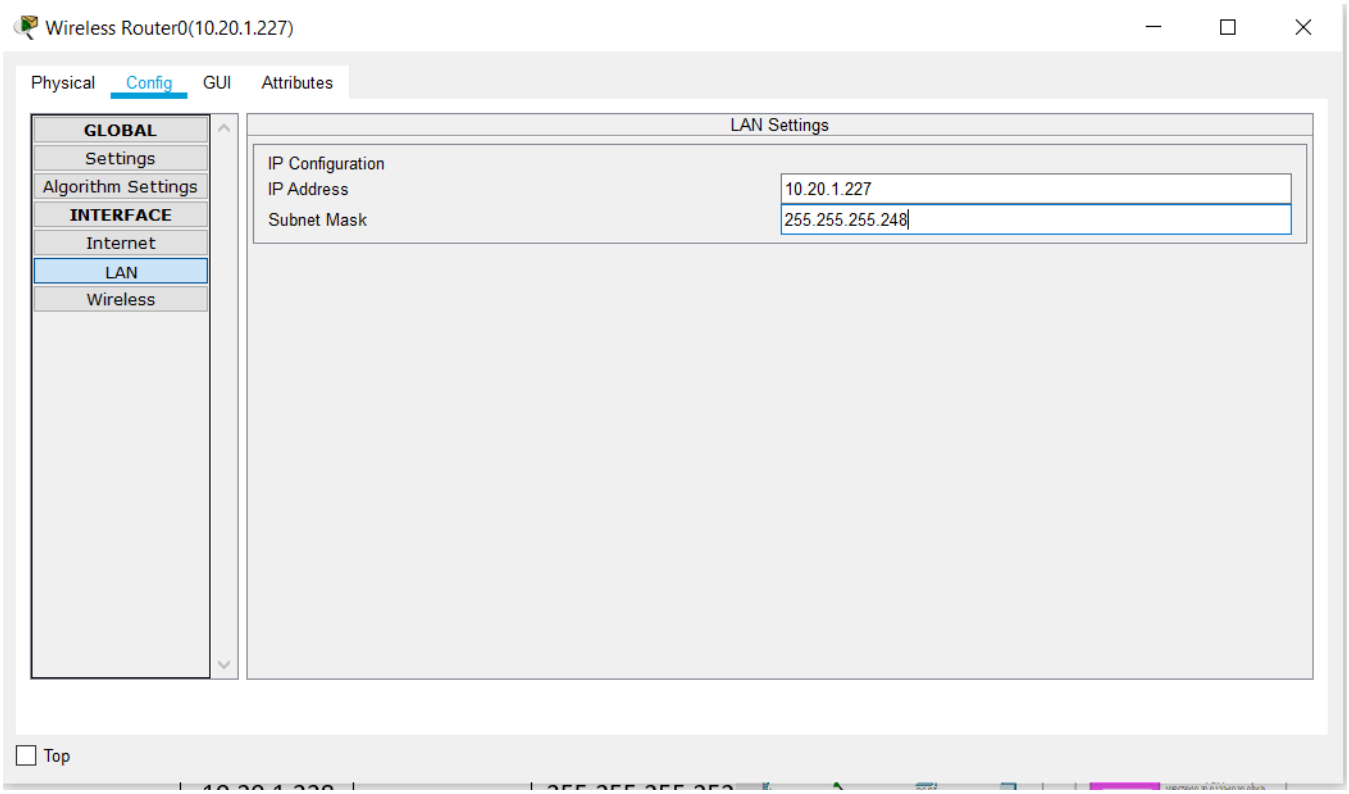


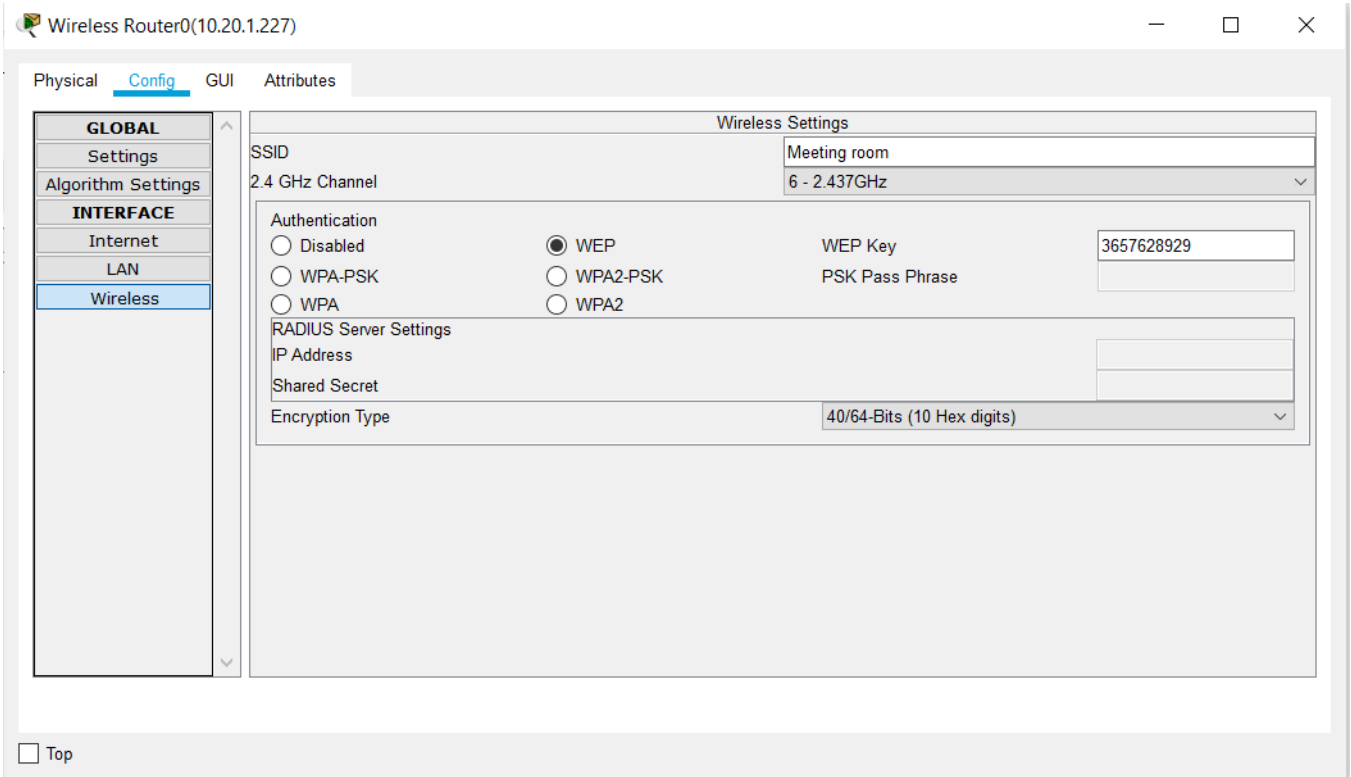
Ping the devices after ip configuration

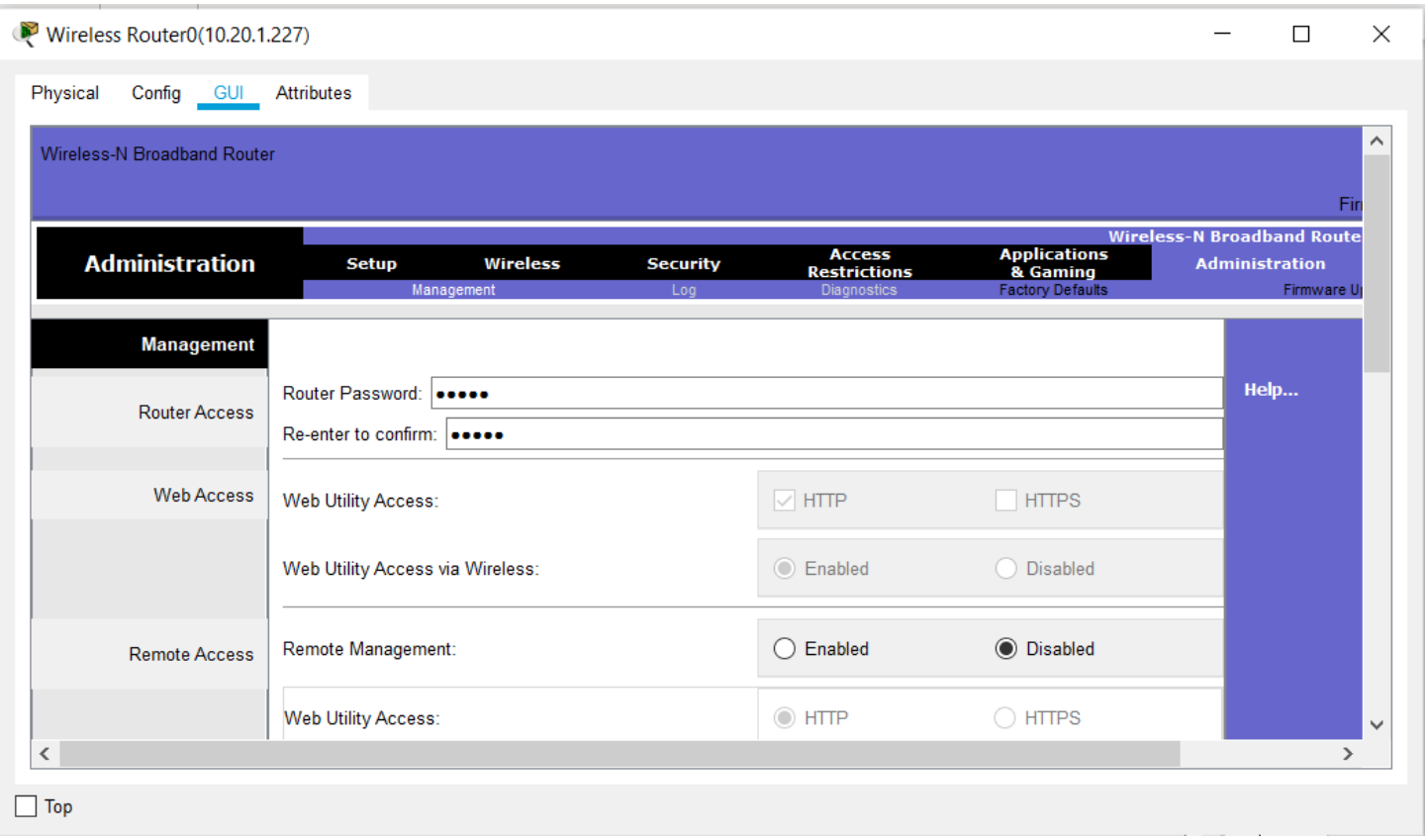


Configuring wireless router

- Setting IP address and setting password to the wireless router as it is only accessed by Administration

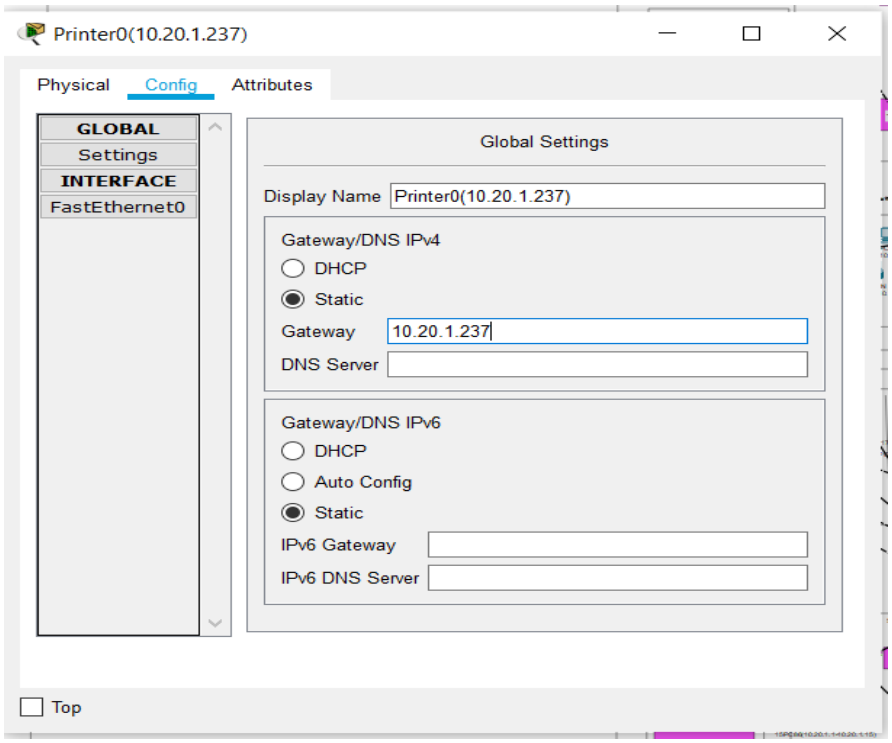


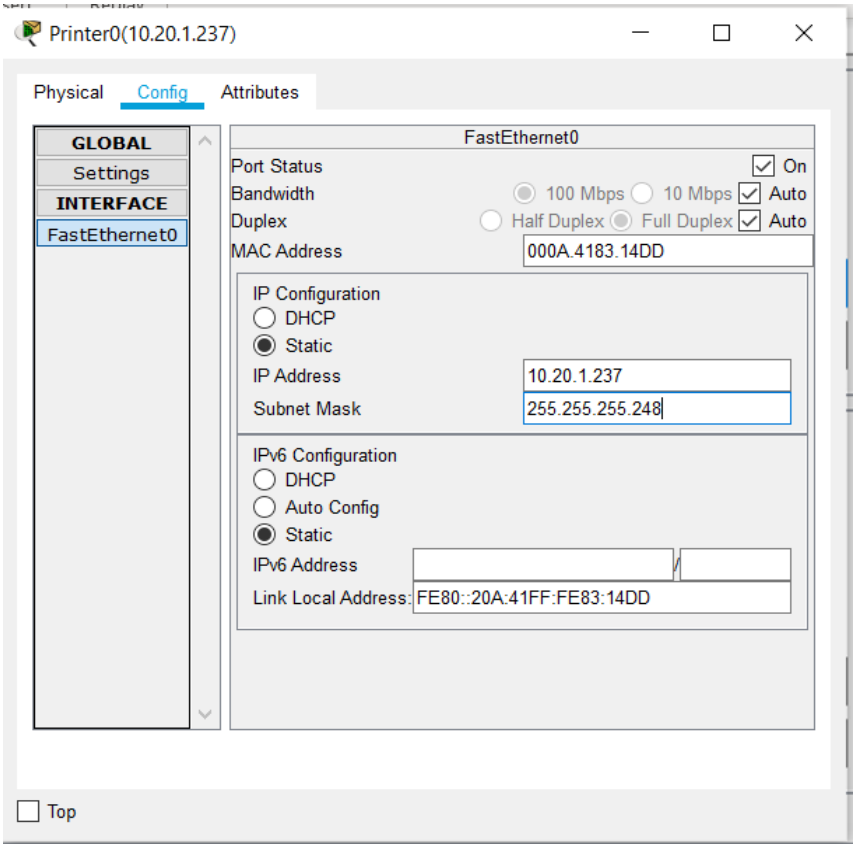




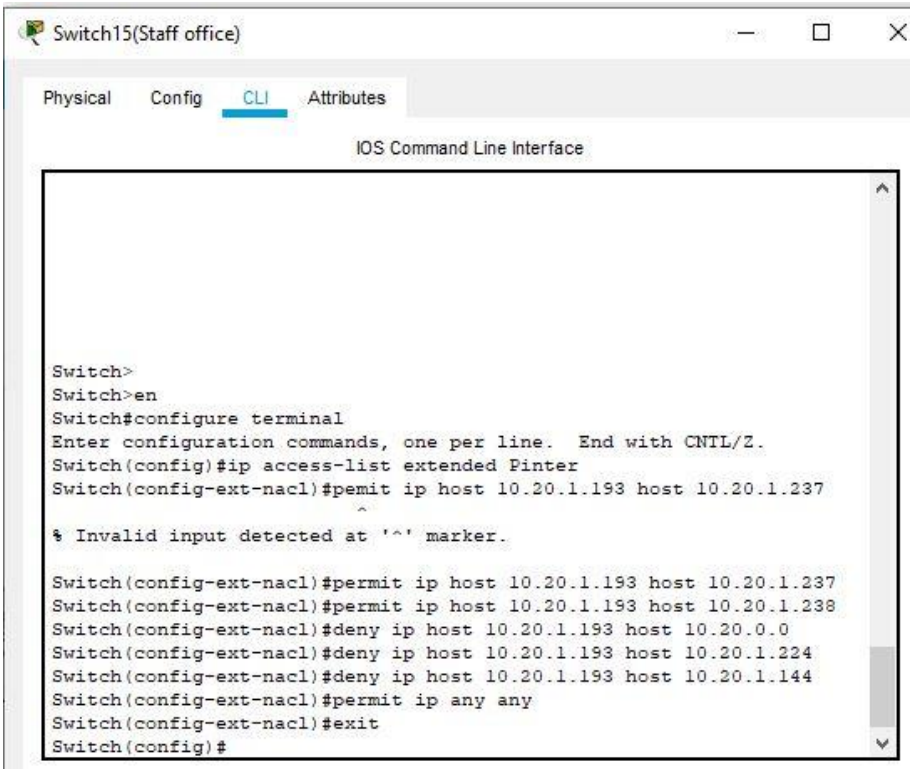
Ip configuration of printers

Ex: one printer from printer room in IT center block



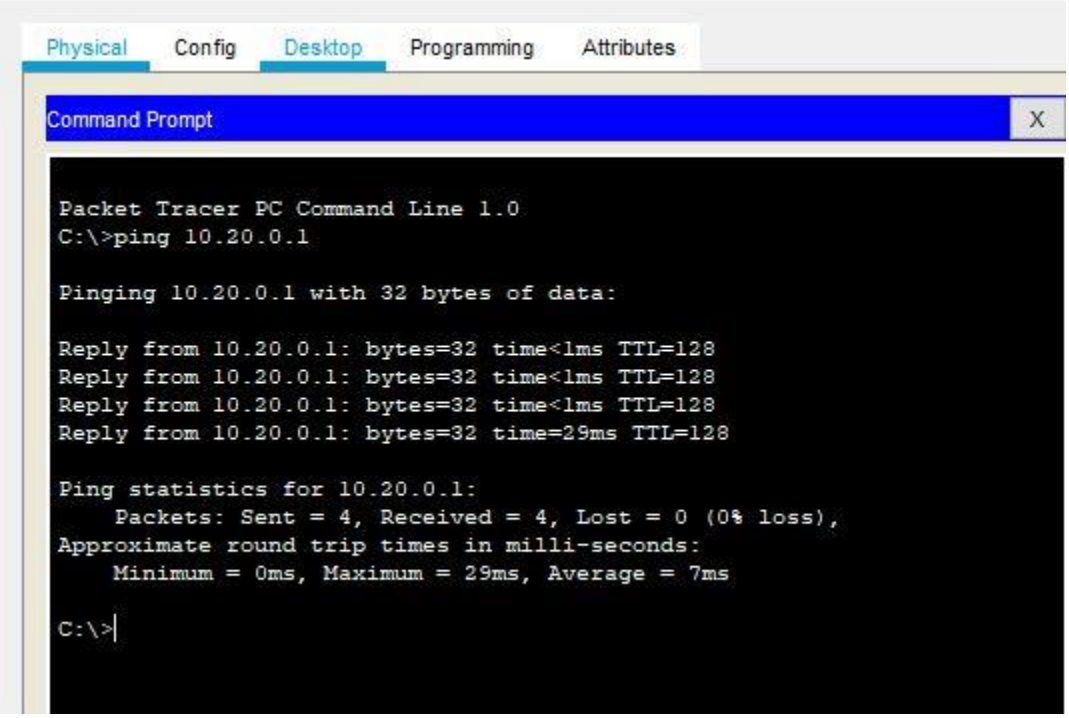


- Restrict access to printers by non-staff

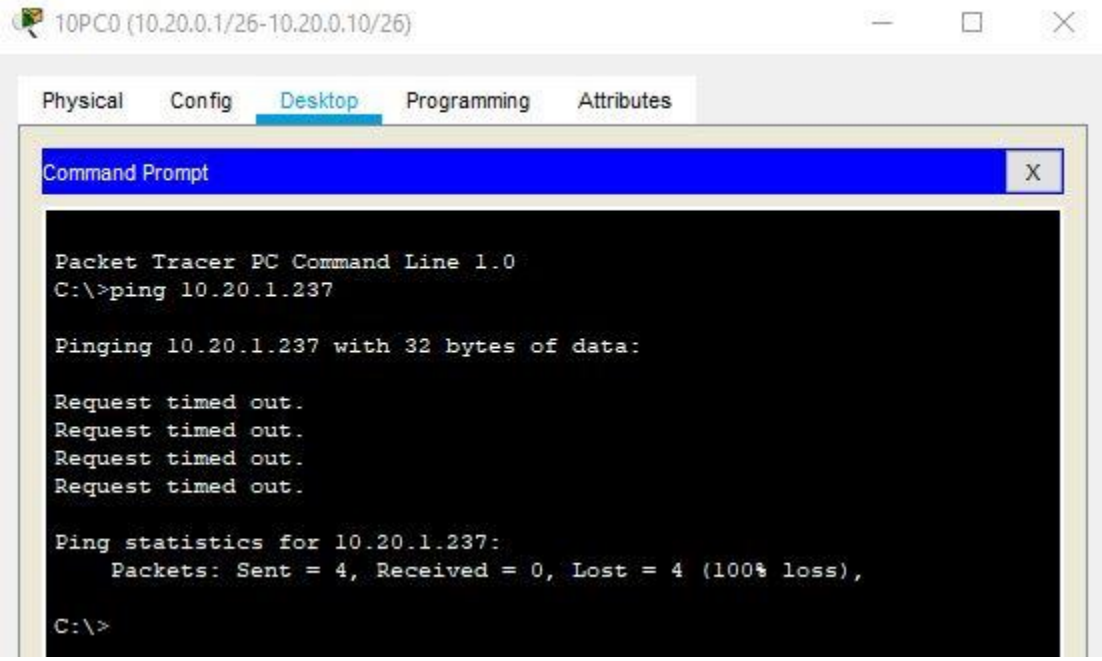


- To check if printer access are restricted or not ping the printer with pc.
- Printer can be accessed by staff room computer

We can access from staff office



we can’t access from any other VLANs



CONFIGURATION OF SWITCH

- Setting separate VLANs for each room and configure

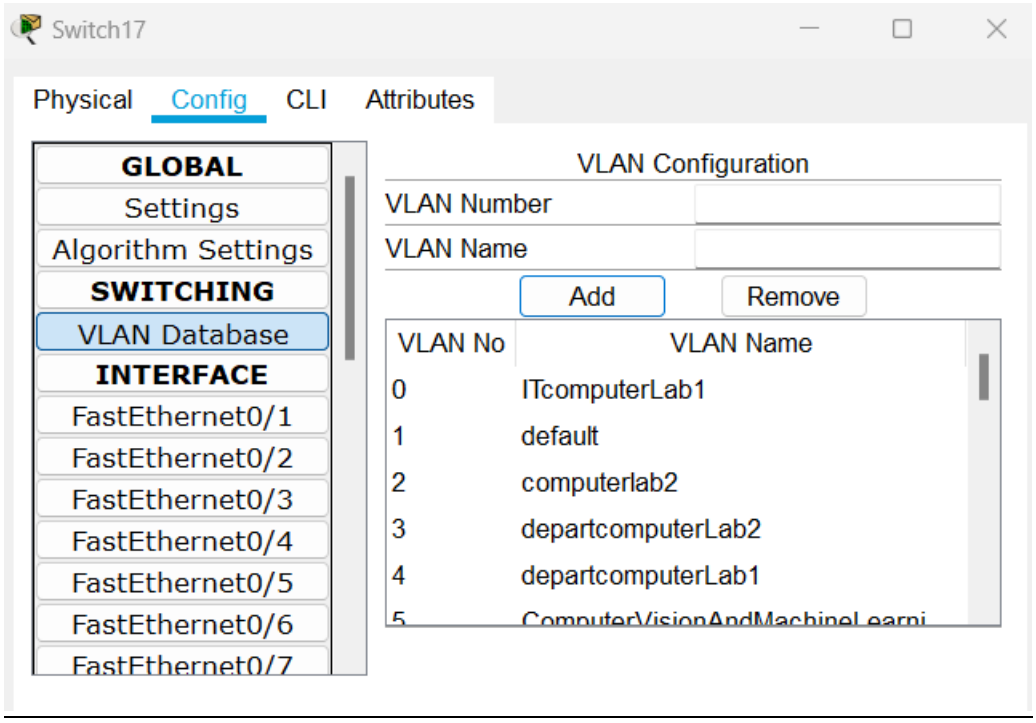
Physical Config CLI Attributes

IOS Commanc

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

%LINK-3-UPDOWN: Interface FastEthernet0/2, changed state to down

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

%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


Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 0
                  ^
% Invalid input detected at '^' marker.

Switch(config)#vlan 1
Switch(config-vlan)#ITcomputerLab1
                    ^
% Invalid input detected at '^' marker.

Switch(config-vlan)#computerLab1IT
                    ^
% Invalid input detected at '^' marker.

Switch(config-vlan)#name ITcomputerLab1
Default VLAN 1 may not have its name changed.
Switch(config-vlan)#vlan 2
Switch(config-vlan)#name ITcomputerLab2
Switch(config-vlan)#vlan 3
Switch(config-vlan)#name departcomputerLab2
Switch(config-vlan)#vlan 4
Switch(config-vlan)#name departcomputerLab1
Switch(config-vlan)#vlan 5
Switch(config-vlan)#name ComputerVisionAndMachineLearningLab
Switch(config-vlan)#vlan 6
Switch(config-vlan)#name DigitalLearningAndMediaCenter
Switch(config-vlan)#vlan 7
Switch(config-vlan)#NetworkEngineeringLab
                     ^
% Invalid input detected at '^' marker.

Switch(config-vlan)#name NetworkEngineeringLab
Switch(config-vlan)#vlan 8
Switch(config-vlan)#namw MicroprocessorLab
                     ^
```

```
Switch(config-vlan)#name MicroprocessorLab
Switch(config-vlan)#vlan 9
Switch(config-vlan)#name staffroom
Switch(config-vlan)#vlan 10
Switch(config-vlan)#name lecturehall
Switch(config-vlan)#vlan 11
Switch(config-vlan)#name staffoffice
Switch(config-vlan)#vlan 12
Switch(config-vlan)#name Technicalofficersroom
Switch(config-vlan)#vlan 13
Switch(config-vlan)#name departmentmeetingroom
Switch(config-vlan)#vlan 14
Switch(config-vlan)#name departmentOffice
Switch(config-vlan)#vlan 15
Switch(config-vlan)#name meetingRoom
Switch(config-vlan)#vlan 16
Switch(config-vlan)#name DirectorOffice
Switch(config-vlan)#vlan 17
Switch(config-vlan)#name PrintingRoom
Switch(config-vlan)#vlan 18
Switch(config-vlan)#name ItTechnicalOfficersRoom
Switch(config-vlan)#vlan 19
Switch(config-vlan)#name LobbyArea
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name NetworkManagerRoom
Switch(config-vlan)#exit
Switch(config)#interface FastEthernet0/1
Switch(config-if)#switchport mode trunk
Switch(config-if)#
Switch(config-if)#switchport trunk allowed vlan
% Incomplete command.
Switch(config-if)#%LINEPROTO-5-UPDOWN:Line protocol on Interface FastEthernet0/1 change state to down
                 ^
% Invalid input detected at '^' marker.

Switch(config-if)#%LINEPROTO-5-UPDOWN:Line protocol on Interface FastEthernet0/1, change state to down
                 ^
% Invalid input detected at '^' marker.

Switch(config-if)#switchport trunk allowed vlan 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/2
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down

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

```
Switch(config)#interface FastEthernet0/4
Switch(config-if)#switchport mode trunk
Switch(config-if)#
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk allowed vlan 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/5-23
                                  ^
% Invalid input detected at '^' marker.

Switch(config)#int range fa0/5-23
Switch(config-if-range)#shut

%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/6, 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

%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
Switch(config-if-range)#exit
Switch(config)#
```



IT CENTRE BLOCK SWITCH CONFIGURATION

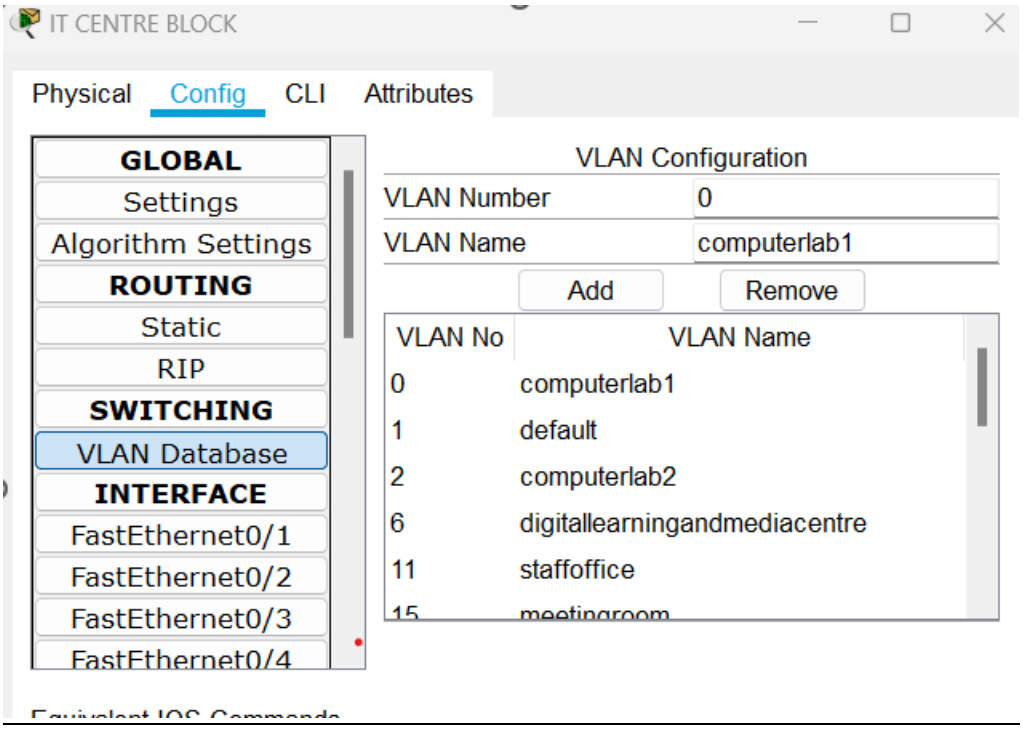
- Setting separate VLANs for each room in the IT center block

Physical Config CLI Attributes

IOS Command Line Interface

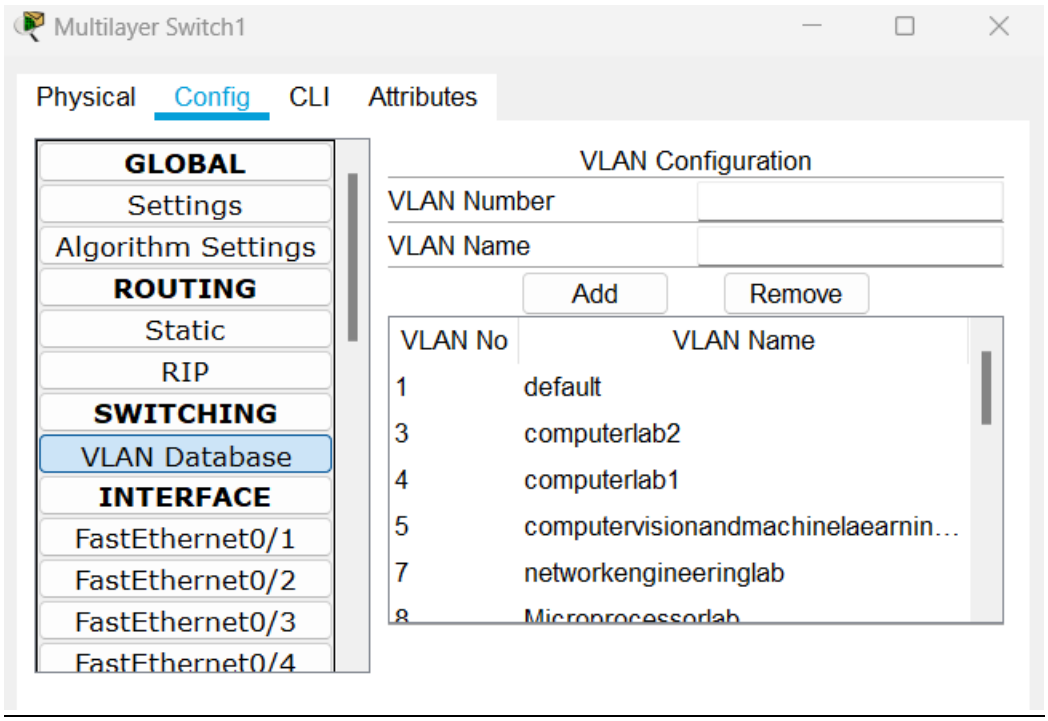
```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state
to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state
to up


Switch>en
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname ITCentreBlock
ITCentreBlock(config)#vlan 16
ITCentreBlock(config-vlan)#name Directoroffice
ITCentreBlock(config-vlan)#vlan 20
ITCentreBlock(config-vlan)#Networkmanagerroom
                           ^
% Invalid input detected at '^' marker.

ITCentreBlock(config-vlan)#name Networkmanagerroom
ITCentreBlock(config-vlan)#vlan 18
ITCentreBlock(config-vlan)#name technicalofficersroom
ITCentreBlock(config-vlan)#vlan 11
ITCentreBlock(config-vlan)#name staffoffice
ITCentreBlock(config-vlan)#vlan 15
ITCentreBlock(config-vlan)#name meetingroom
ITCentreBlock(config-vlan)#vlan 1
ITCentreBlock(config-vlan)#name computerlab1
Default VLAN 1 may not have its name changed.
ITCentreBlock(config-vlan)#vlan 2
ITCentreBlock(config-vlan)#name computerlab2
ITCentreBlock(config-vlan)#vlan 6
ITCentreBlock(config-vlan)#name digitallearningandmediacentre
ITCentreBlock(config-vlan)#vlan 17
ITCentreBlock(config-vlan)#name Printingroom
ITCentreBlock(config-vlan)#vlan 19
ITCentreBlock(config-vlan)#name Lobbyarea
ITCentreBlock(config-vlan)#exit
ITCentreBlock(config)#exit
ITCentreBlock#
%SYS-5-CONFIG_I: Configured from console by console
```

```
ITCentreBlock#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, Fa0/12, Fa0/13
                                                 Fa0/14, Fa0/15, Fa0/16, Fa0/17
                                                 Fa0/18, Fa0/19, Fa0/20, Fa0/21
                                                 Fa0/22, Fa0/23, Fa0/24, Gig0/1
                                                 Gig0/2
2    computerlab2                      active
6    digitallearningandmediacentre     active
11   staffoffice                       active
15   meetingroom                       active
16   Directoroffice                    active
17   Printingroom                      active
18   technicalofficersroom             active
19   Lobbyarea                         active
20   Networkmanagerroom                active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
 --More--
```



```
ITCentreBlock#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
ITCentreBlock(config)#interface FastEthernet0/1
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 20
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#interface FastEthernet0/2
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 16
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#interface FastEthernet0/3
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 18
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#interface FastEthernet0/4
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 1
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#interface FastEthernet0/5
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 17
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#interface FastEthernet0/6
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 15
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#interface FastEthernet0/7
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 6
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#interface FastEthernet0/8
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 2
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#interface FastEthernet0/9
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 11
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#interface FastEthernet0/10
ITCentreBlock(config-if)#switchport mode access
ITCentreBlock(config-if)#switchport access vlan 19
ITCentreBlock(config-if)#exit
ITCentreBlock(config)#exit
ITCentreBlock#
%SYS-5-CONFIG_I: Configured from console by console
```

```
ITCentreBlock#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/4, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24, Gig0/1, Gig0/2
2    computerlab2                      active    Fa0/8
6    digitallearningandmediacentre     active    Fa0/7
11   staffoffice                       active    Fa0/9
15   meetingroom                       active    Fa0/6
16   Directoroffice                    active    Fa0/2
17   Printingroom                      active    Fa0/5
18   technicalofficersroom             active    Fa0/3
19   Lobbyarea                         active    Fa0/10
20   Networkmanagerroom                active    Fa0/1
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
 --More--
```



DEPARTMENT BLOCK SWITCH CONFIGURATION

- Setting separate VLANs for each room in the department Block

```
Switch(config-if)#exit
Switch(config)#hostname DepartmentBlock
DepartmentBlock(config)#
DepartmentBlock(config)#interface FastEthernet0/1
DepartmentBlock(config-if)#
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/1
DepartmentBlock(config-if)#
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/1
DepartmentBlock(config-if)#
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#vlan 10
DepartmentBlock(config-vlan)#name Lecturehall
DepartmentBlock(config-vlan)#vlan 9
DepartmentBlock(config-vlan)#name staffroom
DepartmentBlock(config-vlan)#vlan 12
DepartmentBlock(config-vlan)#name technicalofficersroom
DepartmentBlock(config-vlan)#vlan 13
DepartmentBlock(config-vlan)#name departmentmeetingroom
DepartmentBlock(config-vlan)#vlan 4
DepartmentBlock(config-vlan)#name computerlab1
DepartmentBlock(config-vlan)#vlan 3
DepartmentBlock(config-vlan)#name computerlab2
DepartmentBlock(config-vlan)#vlan 7
DepartmentBlock(config-vlan)#name networkengineeringlab
DepartmentBlock(config-vlan)#vlan 8
DepartmentBlock(config-vlan)#name networkengineeringlab
VLAN #7 and #8 have an identical name: networkengineeringlab
DepartmentBlock(config-vlan)#name Microprocessorlab
DepartmentBlock(config-vlan)#vlan 5
DepartmentBlock(config-vlan)#name computervisionand machinelearninglab
                                                  ^
% Invalid input detected at '^' marker.

DepartmentBlock(config-vlan)#name computervisionandmachinelaearninglab
DepartmentBlock(config-vlan)#vlan 14
DepartmentBlock(config-vlan)#name departmentoffice
DepartmentBlock(config-vlan)#exit
DepartmentBlock(config)#exit
DepartmentBlock#
%SYS-5-CONFIG_I: Configured from console by console
```

```
DepartmentBlock#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
                                                 Fa0/10, Fa0/11, Fa0/12, Fa0/13
                                                 Fa0/14, Fa0/15, Fa0/16, Fa0/17
                                                 Fa0/18, Fa0/19, Fa0/20, Fa0/21
                                                 Fa0/22, Fa0/23, Fa0/24, Gig0/1
                                                 Gig0/2
3    computerlab2                      active
4    computerlab1                      active
5    computervisionandmachinelaearninglab active
7    networkengineeringlab             active
8    Microprocessorlab                 active
9    staffroom                         active
10   Lecturehall                       active
12   technicalofficersroom             active
13   departmentmeetingroom             active
14   departmentoffice                  active
1002 fddi-default                      active
1003 token-ring-default                active
 --More--
```

```
DepartmentBlock(config)#interface FastEthernet0/1
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 14
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/2
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 12
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/3
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 4
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/3
DepartmentBlock(config-if)#interface FastEthernet0/4
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 9
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/5
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 13
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/6
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 8
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/7
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 810
% Access VLAN does not exist. Creating vlan 810
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/8
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 3
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/7
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 10
DepartmentBlock(config-if)#exit
```

```
interface FastEthernet0/9
DepartmentBlock(config-if)#interface FastEthernet0/9
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 5
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#interface FastEthernet0/10
DepartmentBlock(config-if)#switchport mode access
DepartmentBlock(config-if)#switchport access vlan 7
DepartmentBlock(config-if)#exit
DepartmentBlock(config)#exit
DepartmentBlock#
%SYS-5-CONFIG_I: Configured from console by console
```

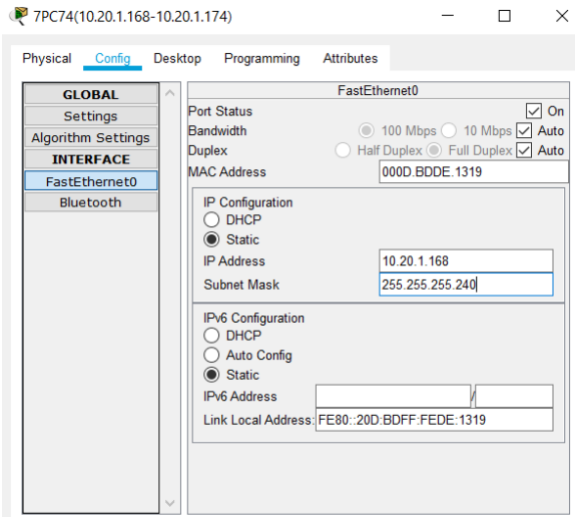
```
DepartmentBlock#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24, Gig0/1, Gig0/2
3    computerlab2                      active    Fa0/8
4    computerlab1                      active    Fa0/3
5    computervisionandmachinelaearninglab active    Fa0/9
7    networkengineeringlab             active    Fa0/10
8    Microprocessorlab                 active    Fa0/6
9    staffroom                         active    Fa0/4
10   Lecturehall                       active    Fa0/7
12   technicalofficersroom             active    Fa0/2
13   departmentmeetingroom             active    Fa0/5
14   departmentoffice                  active    Fa0/1
810  VLAN0810                          active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
 --More--
```

- Ip configuration to staff room pc for set restrictions

```
Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Link-local IPv6 Address.....: FE80::203:E4FF:FEE3:C83
   IP Address.....: 10.20.1.161
   Subnet Mask.....: 255.255.255.240
   Default Gateway.....: 10.20.1.161

Bluetooth Connection:

   Link-local IPv6 Address.....: ::
   IP Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: 0.0.0.0
```

- Computer in staff room can be accessed by another computer in staff room

```
C:\>ping 10.20.1.168

Pinging 10.20.1.168 with 32 bytes of data:

Reply from 10.20.1.168: bytes=32 time=22ms TTL=128
Reply from 10.20.1.168: bytes=32 time=1ms TTL=128
Reply from 10.20.1.168: bytes=32 time<1ms TTL=128
Reply from 10.20.1.168: bytes=32 time<1ms TTL=128

Ping statistics for 10.20.1.168:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 22ms, Average = 5ms

C:\>
```



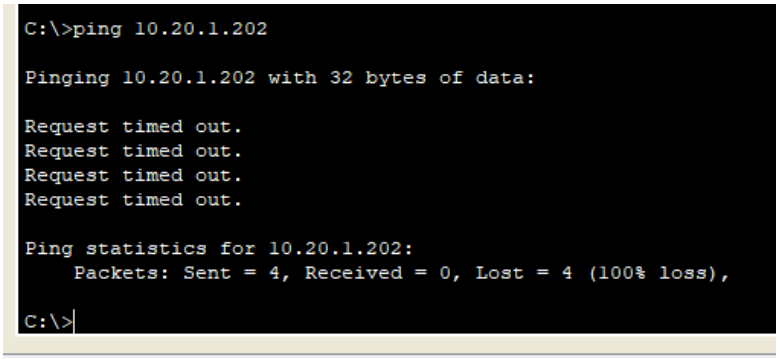
Physical Config CLI Attributes

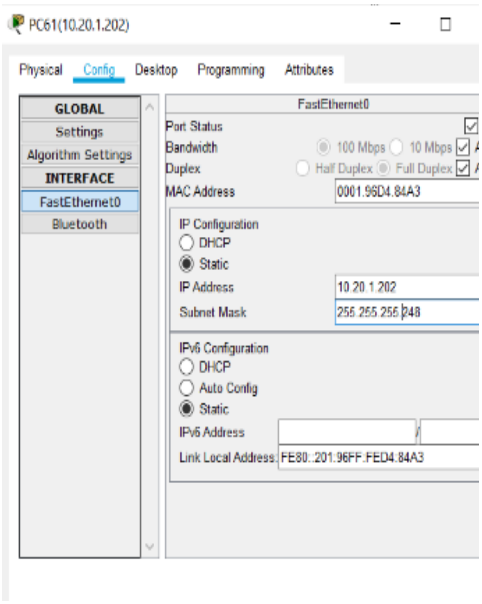
IOS Command Line Interface

```
No unauthorized entry!

User Access Verification

Password:

Router>enable
Password:
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip access-list standard staffroom
Router(config-std-nacl)#deny 10.20.1.160 255.255.255.240
Router(config-std-nacl)#permit deny
                        ^
% Invalid input detected at '^' marker.

Router(config-std-nacl)#permit any
Router(config-std-nacl)#exit
Router(config)#ip access-list standard departmentoffice
Router(config-std-nacl)#deny 10.20.1.216 255.255.255.248
Router(config-std-nacl)#permit any
Router(config-std-nacl)#exit
Router(config)#
```

- To restrict network here we made access list in the router
- Access list-A network access control list (ACL) is made up of rules that either allow access to a computer environment or deny it.

- After resistriction Computer in staff room can not accessed by another computer in vlan

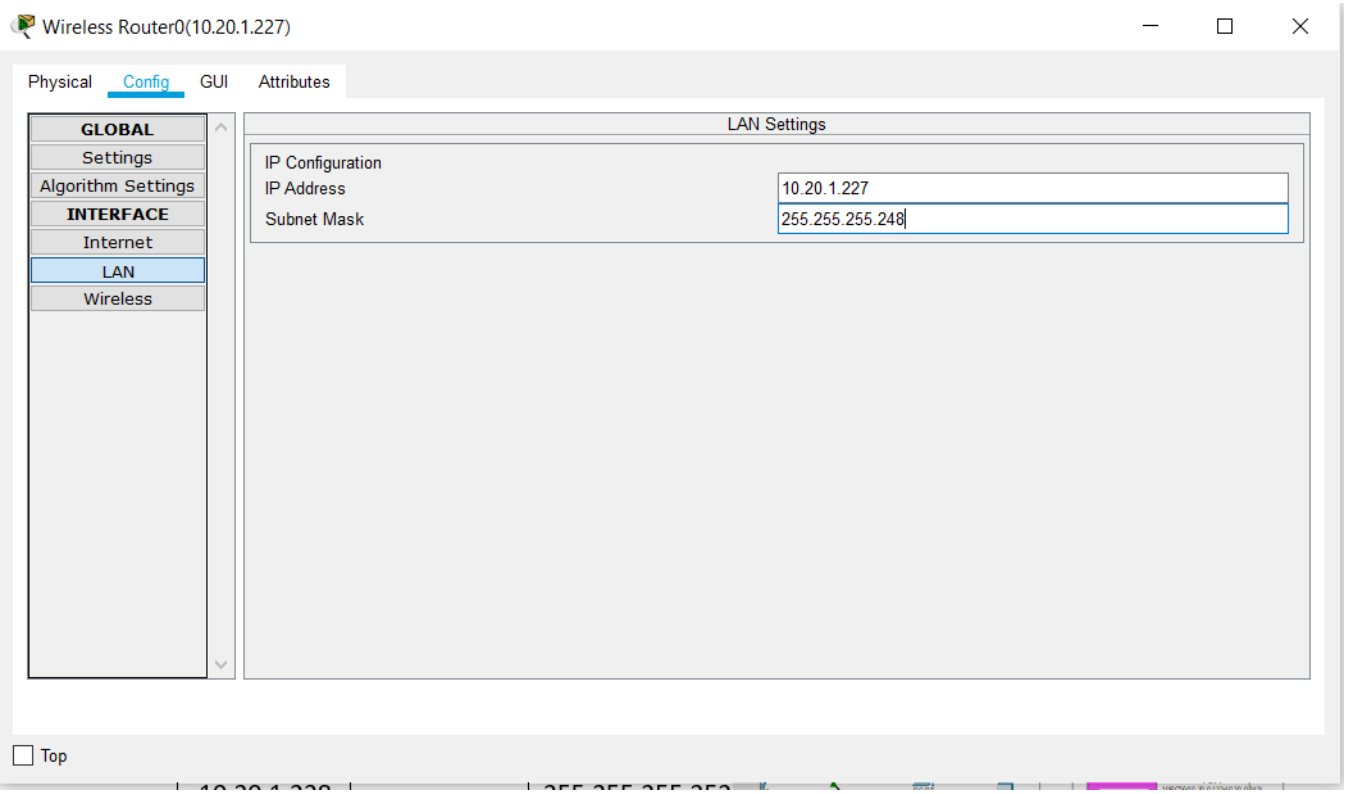


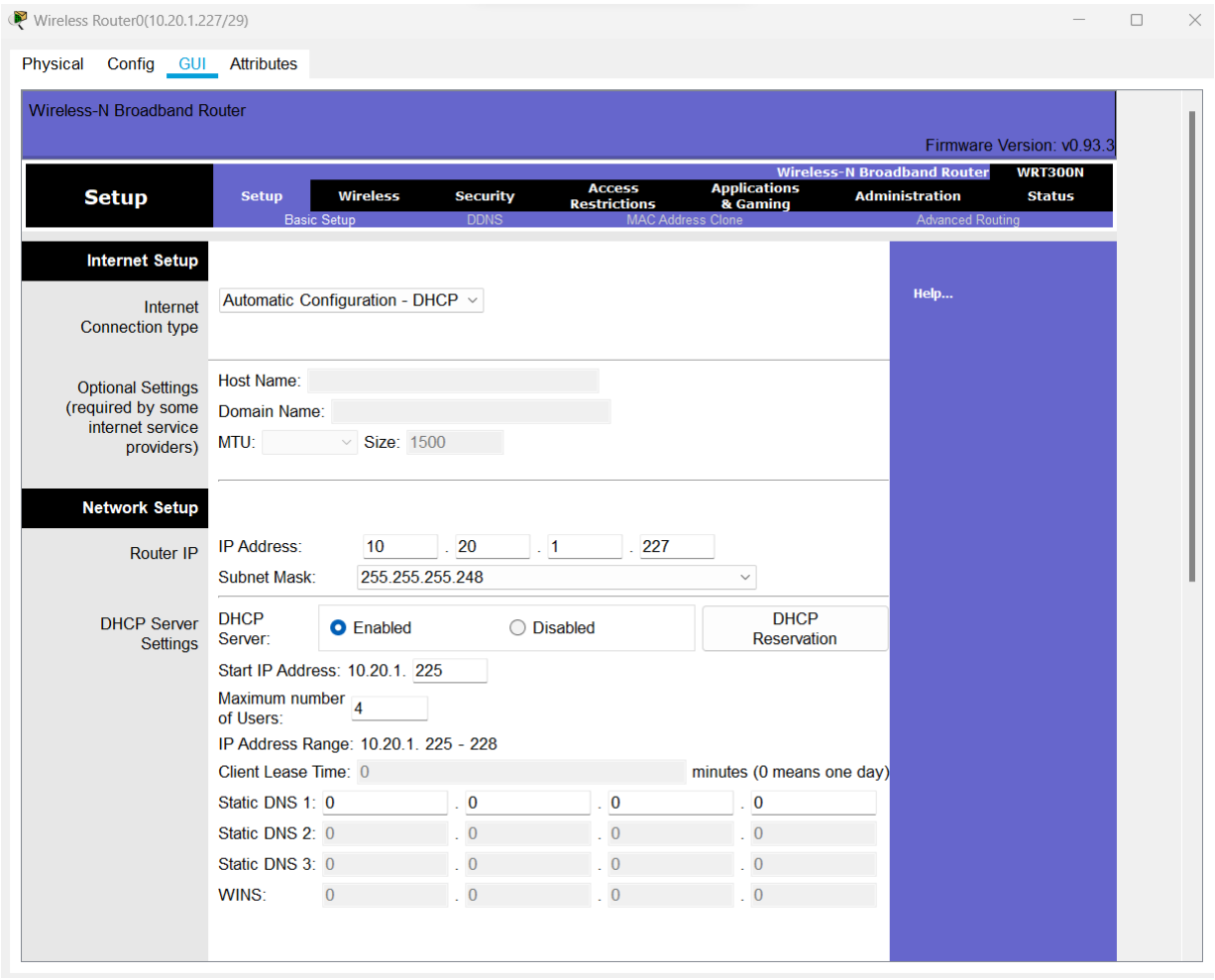


WiFi access point configuration

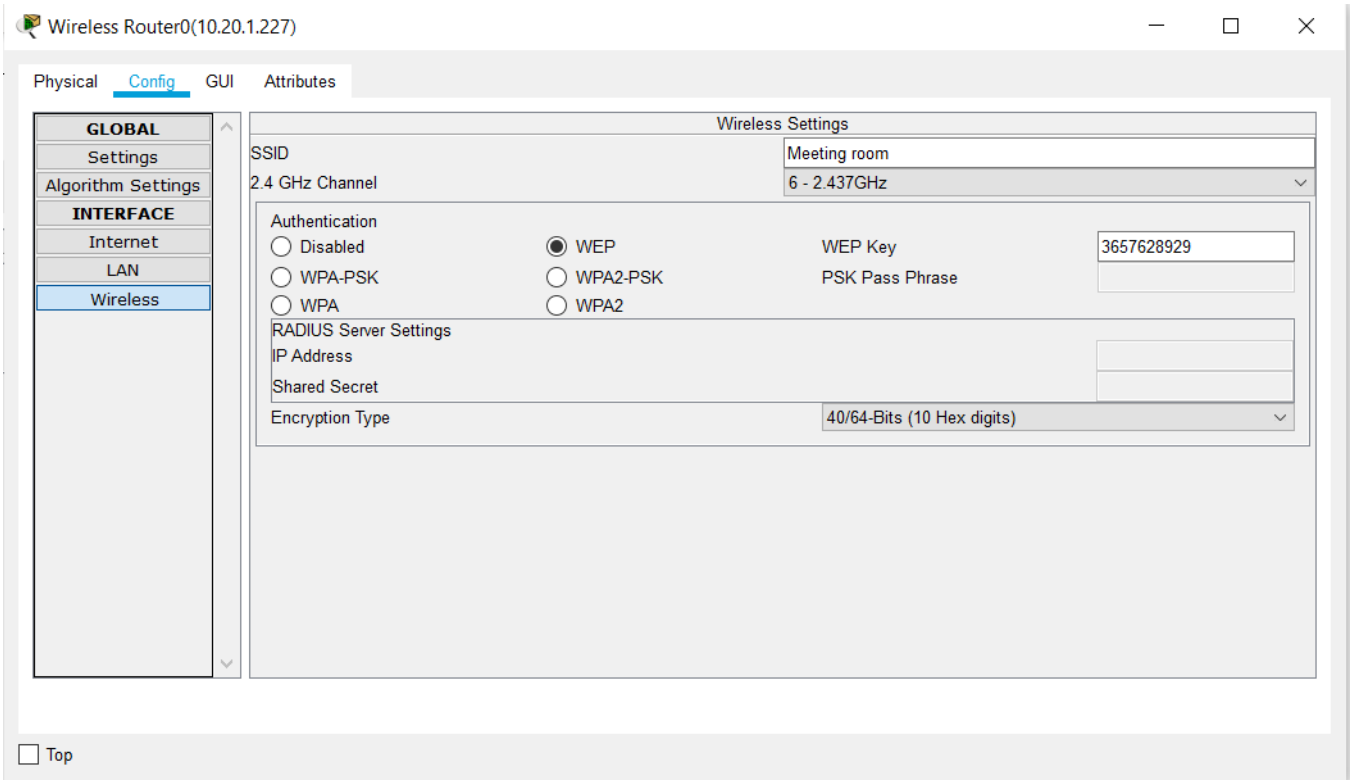
Steps

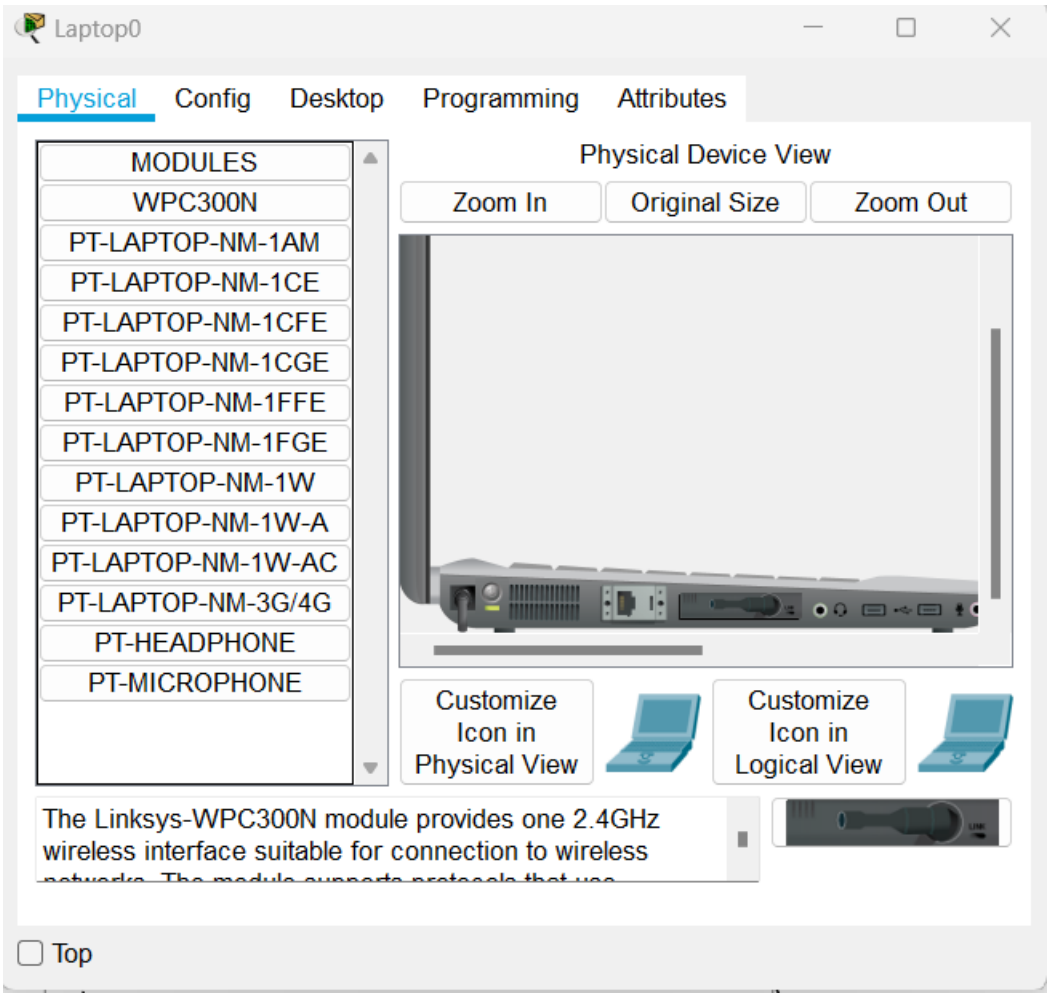
- Assigning static ipv4 address and subnet mask according to the vlsm table.
- Assigning start ip address and maximum no.of users.
- Assigning web key and SSID if required.
- Configure laptop for wifi connection.


Wireless Router0(10.20.1.227)
Physical
Config
GUI
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
Internet
LAN
Wireless
LAN Settings
IP Configuration
IP Address
10.20.1.227
Subnet Mask
255.255.255.248
Top


Wireless Router0(10.20.1.227/29)
Physical
Config
GUI
Attributes
Wireless-N Broadband Router
Firmware Version: v0.93.3
Setup
Wireless
Security
Access Restrictions
Applications & Gaming
Administration
Status
WRT300N
Basic Setup
DDNS
MAC Address Clone
Advanced Routing
Internet Setup
Internet Connection type
Automatic Configuration - DHCP
Optional Settings (required by some internet service providers)
Host Name:
Domain Name:
MTU:
Size:
1500
Network Setup
Router IP
IP Address:
10 . 20 . 1 . 227
Subnet Mask:
255.255.255.248
DHCP Server Settings
DHCP Server:
Enabled
Disabled
DHCP Reservation
Start IP Address: 10.20.1.
225
Maximum number of Users:
4
IP Address Range: 10.20.1. 225 - 228
Client Lease Time:
0
minutes (0 means one day)
Static DNS 1:
Static DNS 2:
Static DNS 3:
WINS:
Help...

V


Wireless Router0(10.20.1.227)
Physical
Config
GUI
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
Internet
LAN
Wireless
Wireless Settings
SSID
Meeting room
2.4 GHz Channel
6 - 2.437GHz
Authentication
Disabled
WEP
WEP Key
3657628929
WPA-PSK
WPA2-PSK
PSK Pass Phrase
WPA
WPA2
RADIUS Server Settings
IP Address
Shared Secret
Encryption Type
40/64-Bits (10 Hex digits)
Top


Laptop0
Physical
Config
Desktop
Programming
Attributes
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-1W-AC
PT-LAPTOP-NM-3G/4G
PT-HEADPHONE
PT-MICROPHONE
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
Top


Laptop0
Physical
Config
Desktop
Programming
Attributes
Link Information
Connect
Profiles
More Information
Infrastructure Mode
2.4GHz
You have successfully connected to the access point
Signal Strength
Link Quality
Adapter is Active
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
Model No. WPC300N
Top


Laptop0
Physical
Config
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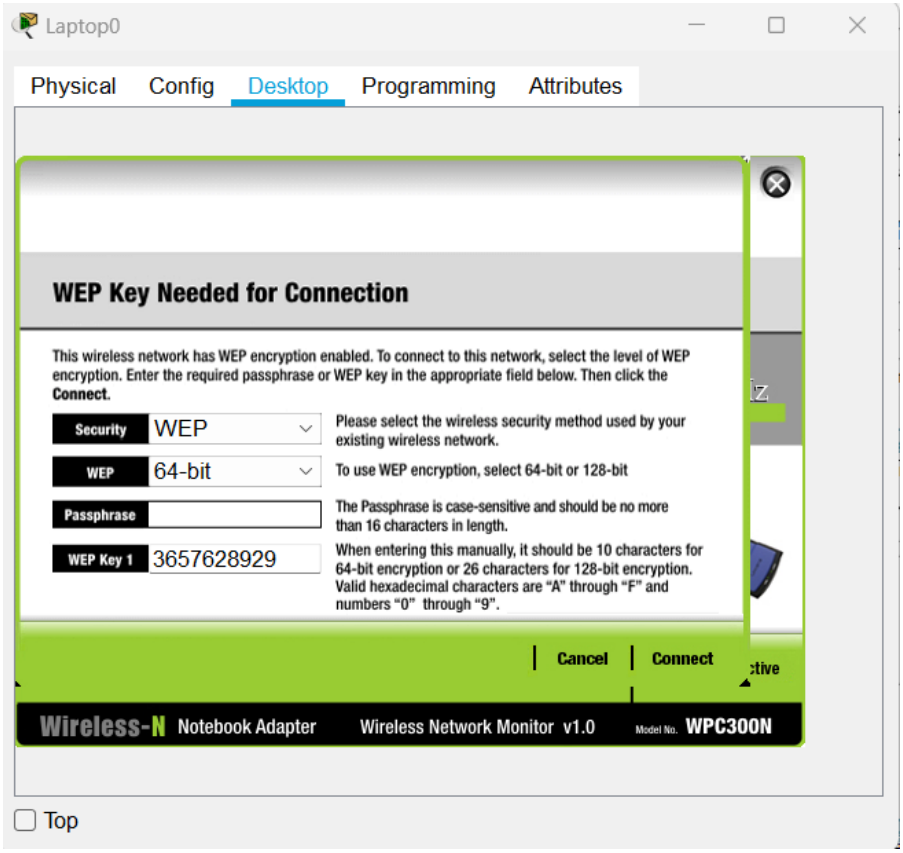
Link Information
Connect
Profiles
Below is a list of available wireless networks. To search for more wireless networks, click the Refresh button. To view more information about a network, select the wireless network name. To connect to that network, click the Connect button below.
2.4GHz
Wireless Network Name
CH
Signal
Default
1
54%
Default
1
51%
Meeting room
1
68%
Site Information
Wireless Mode Infrastructure
Network Type Mixed B/G/N
Radio Band Auto
Security Disable
MAC Address 0001.C7B0.5206
Refresh
Connect
Adapter is Active
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
Model No. WPC300N
Top



After WiFi access