

Data Communication and Networking

Lab (1 Credit Hour)



DCN Project Report

Project Title: **University Campus
Network**

Submitted by:

Sara Tariq 02-235221-032

Esha Zafar 02-235221-001

Submitted To:

Sir Zohaib

DEPARTMENT OF
COMPUTER SCIENCE

ABSTRACT

The University Campus Network Project aims to modernize the network infrastructure at Bahria University by upgrading and redesigning the existing system. The project addresses issues such as unreliable connectivity, inadequate security measures, and limited scalability. Key aspects of the project include network segmentation, access control, enhanced security measures, wireless connectivity, network services, redundancy, and high availability. Documentation, monitoring, and reporting are integral components to ensure efficient management and proactive issue resolution. The project's objective is to optimize network performance, promote secure communication and collaboration, and provide seamless access to resources for students, faculty, and staff, thereby enhancing the overall network experience at the university.

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1. Introduction:

This University Campus Network Scenario is about designing a network for a University in which various computers of different departments are set up so that they can interact and communicate with each other by interchanging data. To design a networking scenario for a University which connect various departments to each other's, it puts forward communication among different departments. Cisco Packet Tracer is used to design a systematic and well-planned network, satisfying all the necessities of the University Campus. Cisco Packet Tracer come up with a network with good performance. There are Main Block , Admin Block , Engineering Block, Sir Syed Block, Edhi Block, Iqbal Block, Quaid Block that can have access to have a communication.

2. Problem Statement:

The current network infrastructure at Bahria University is outdated and inadequate to meet the growing demands of the campus community. The network suffers from various issues, including unreliable connectivity, limited security measures, and insufficient capability. These problems hinder effective communication, collaboration, and access to resources for students, faculty, and staff. Therefore, there is a need to revamp and upgrade the university's network infrastructure to address these challenges and provide a robust, secure, and scalable network that meets the evolving needs of the campus community. The goal is to ensure reliable connectivity, enhanced network security, efficient traffic flow, and seamless access to network services across the campus.

3. Scope of Project:

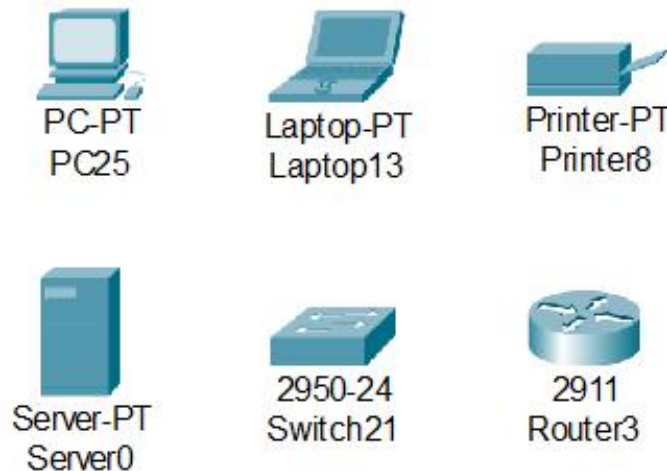
The scope of the project includes designing and configuring the network infrastructure, implementing network security measures, ensuring redundancy and high availability, setting up network services, documenting the network design and configurations, conducting testing and troubleshooting, and considering scalability and future expansion. The project aims to establish a reliable, secure, and scalable campus network that supports seamless connectivity, network

segmentation, user authentication, centralized services, and proactive monitoring. The scope may vary based on specific requirements and available resources.

4. Aims and Objectives:

The main objective of the proposed network is to update the existing network and also enhance its capabilities and increase the flexibility of the network which will eventually provide good security.

5. Devices Used:



6. Functionality:

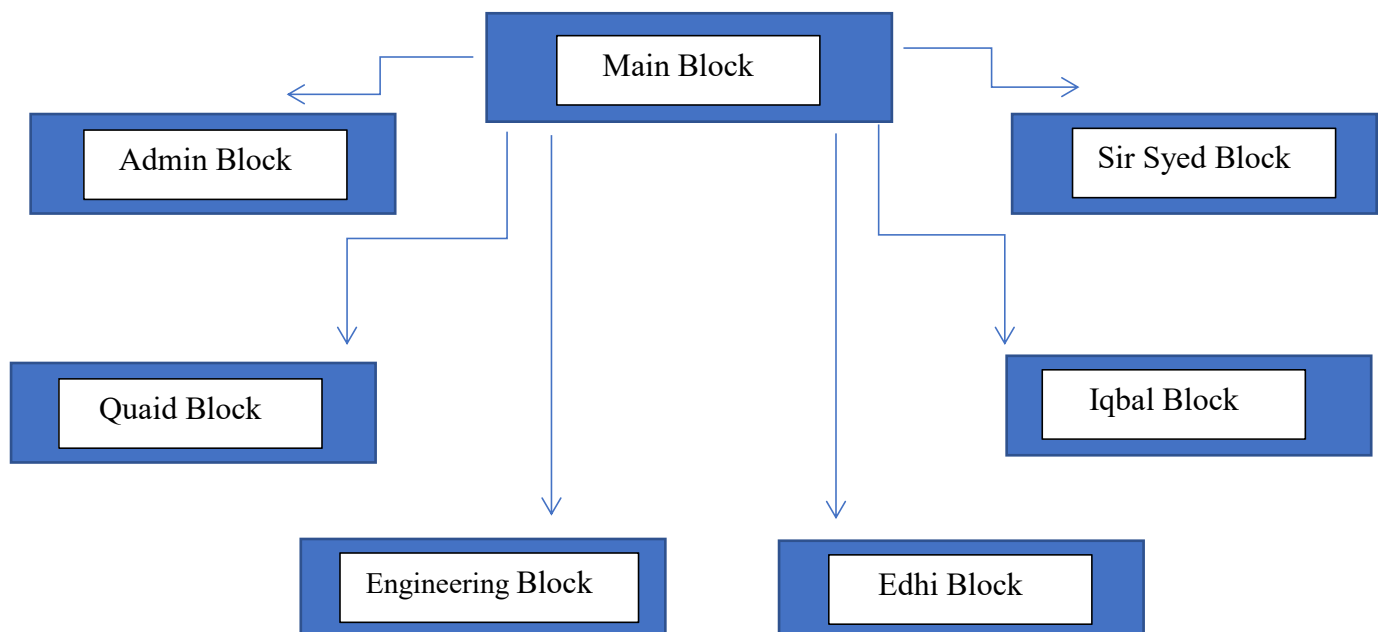
1. VLAN connectivity
2. ACL is applied.
3. Routers connectivity through RIP Trunking Port Enable.
4. Dynamic and static IP address is Applied.
5. Port Security.

6. Permanent Mac Address is applied.

7. Protected/ Secret Password.

7.Working:

Main Block have two router which is then divided into three rooms have two switch. First switch is have three room that is HOD, Teachers and Advisor. Second switch is have two switch which is then divided into two room that is Principal,Vice Principal and printer. And second router have one switch that is connected witch server to provide email services. We have given IPs to them dynamically and they are in VLAN 1 by default. ACL is applied on the second router by which student advisor cant communicate with email server and principal. Port is secured in Email server and PCs of the principal is static.Router of the main block is then connected to the router of **Web Server**. Secret and Privileged mode password is applied to web server.Server is then attached to **Admin** Block and given IPs to the PCs dynamically and then it is dub divided into admin office and reception and given port security and static IPs. **Engineering** Block is then divided into CS and IT department and they can communicate with each other. Port Security and permanent Mac address are applied to them. **Sir Syed** Block have two department EE and CE. Protective password is applied to them. **Quaid** Block have two departments that is English and BBA. Port security and protective password are applied to them.Similar is the case for **Edhi** bock and **Iqbal** block. Every Block can communicate with each other except for main block.

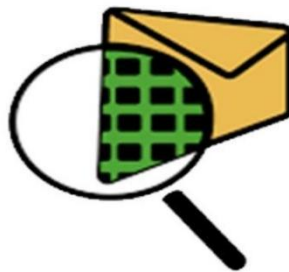


8. Tools/Technology:

8.1. Cisco Packet Tracer:

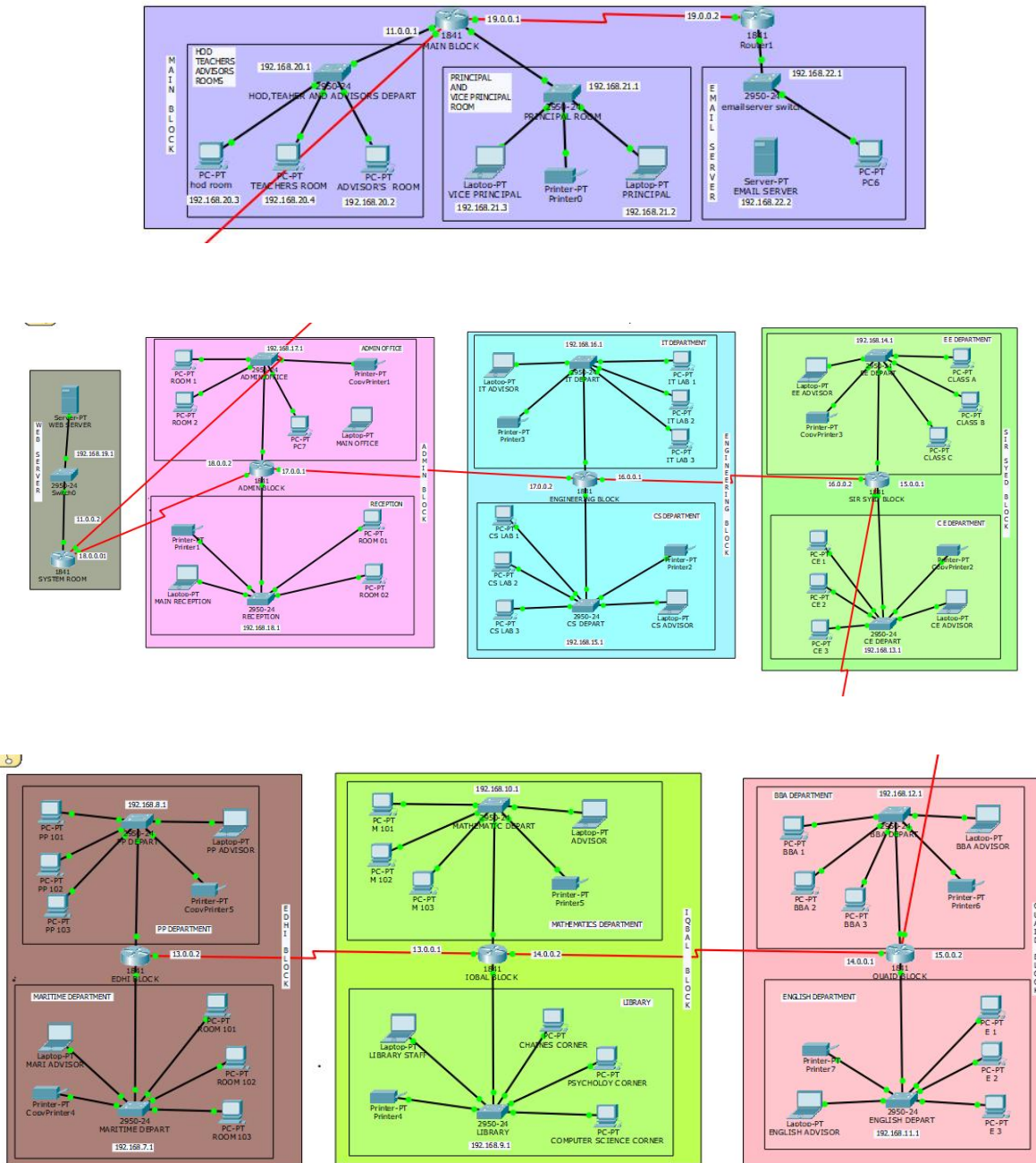
Cisco Packet Tracer is a network simulation and visualization tool designed by Cisco Systems. It is primarily used for educational and training purposes to simulate computer networks and their associated devices. Packet Tracer allows users to create virtual networks, configure network devices, and test network configurations in a simulated environment. It provides a hands-on learning experience for students and professionals to understand and practice networking concepts, such as routing, switching, and network protocols. Packet Tracer is widely used in networking courses and certifications to enhance understanding and skills development in the field of computer networking.

Cisco Packet Tracer



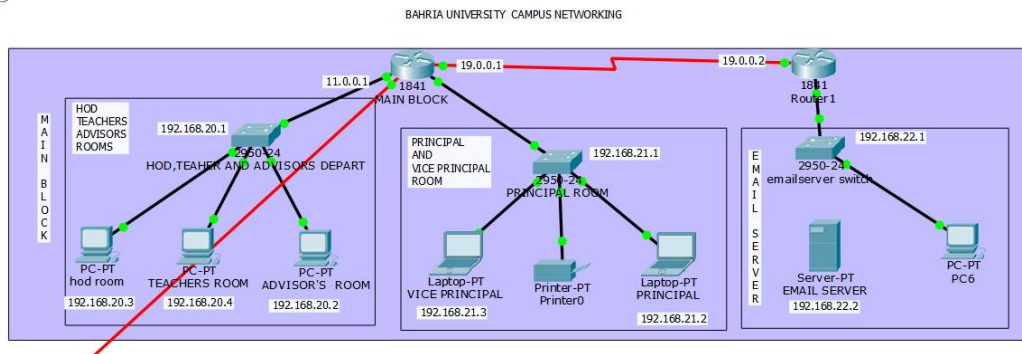
7.Project's Screenshot:

BAHRIA UNIVERSITY CAMPUS NETWORKING



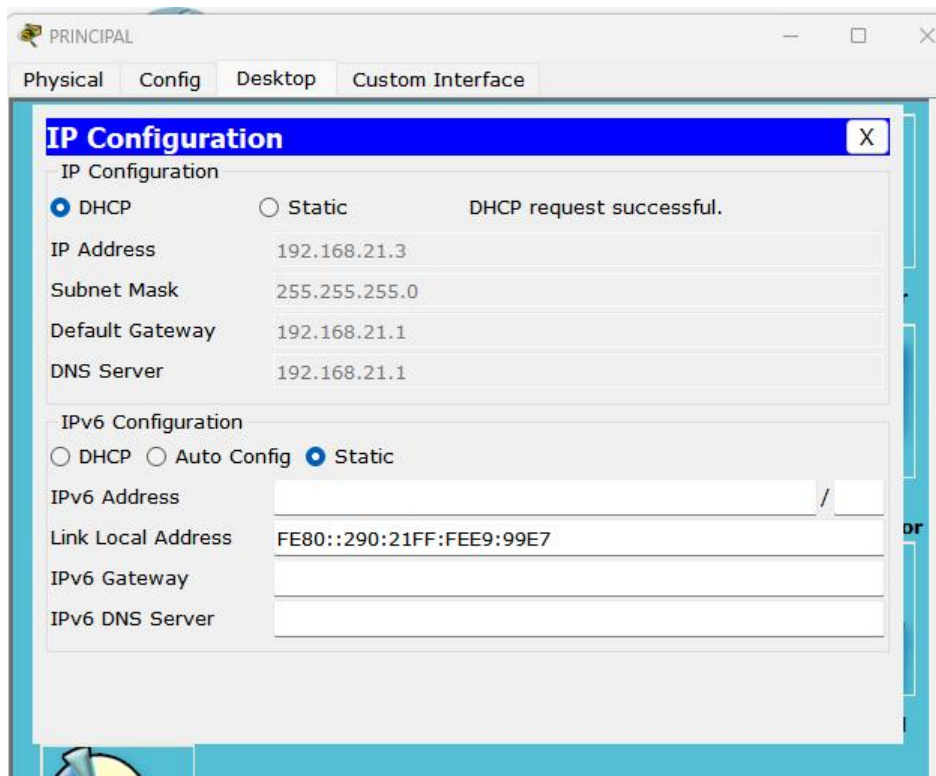
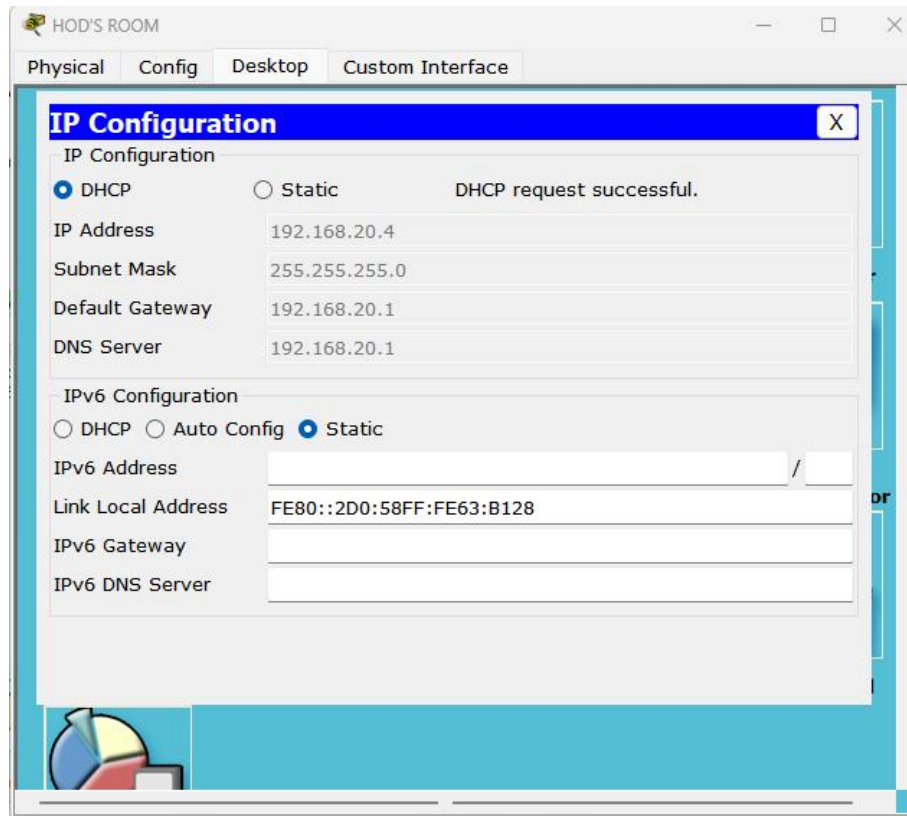
MAIN BLOCK:

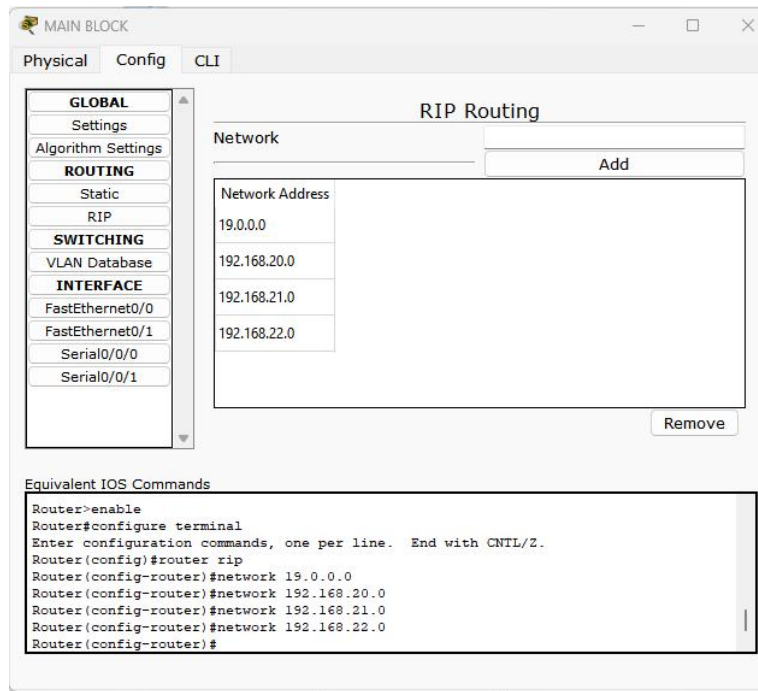
Main Block is divided into sub-department. One switch provides the HOD, Teacher and Adviser connection. Second switch provides the connectivity for Principal and Vice Principal. And the third switch provide the Email connectivity. Router are connected through RIP trunking mode. ACL is applied to.....



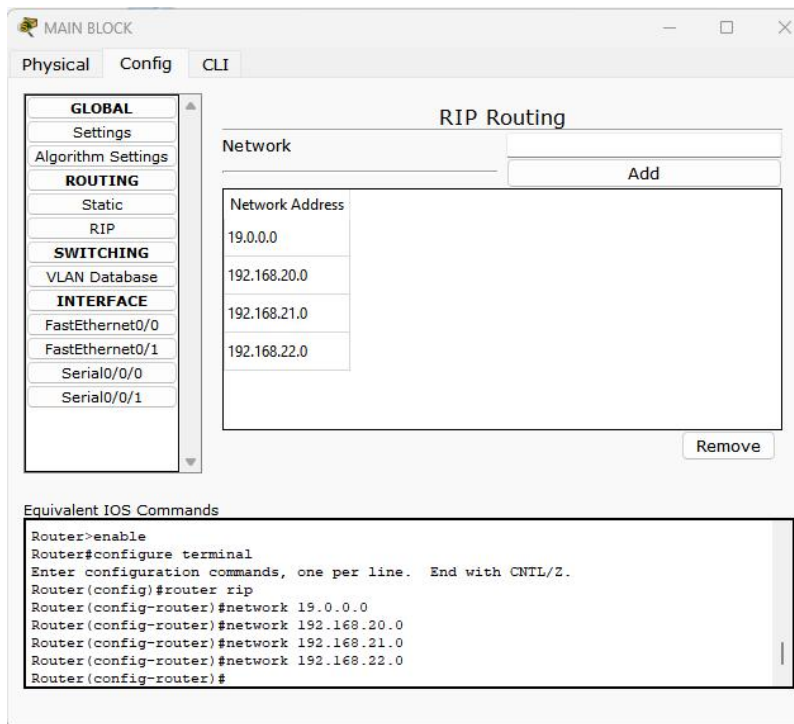
DYNAMIC IPS

```
MAIN BLOCK
Physical Config CLI
IOS Command Line Interface
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
Router(config-if)#
Router(config-if)#EX
Router(config)#EX
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#CONFIG T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp pool HTA-pool
Router(dhcp-config)#network 192.168.20.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.20.1
Router(dhcp-config)#dns-server 192.168.20.1
Router(dhcp-config)#ex
Router(config)#do wr
Building configuration...
[OK]
Router(config)#ip dhcp pool principal-pool
Router(dhcp-config)#network 192.168.21.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.21.1
Router(dhcp-config)#dns-server 192.168.21.1
Router(dhcp-config)#ex
```





APPLY ACL FOR THE DISCONNECTIVITY BETWEEN ADVISORS AND PRINCIPAL



APPLY ACL FOR THE DISCONNECTIVITY BETWEEN ADVISORS AND EMAIL SERVER

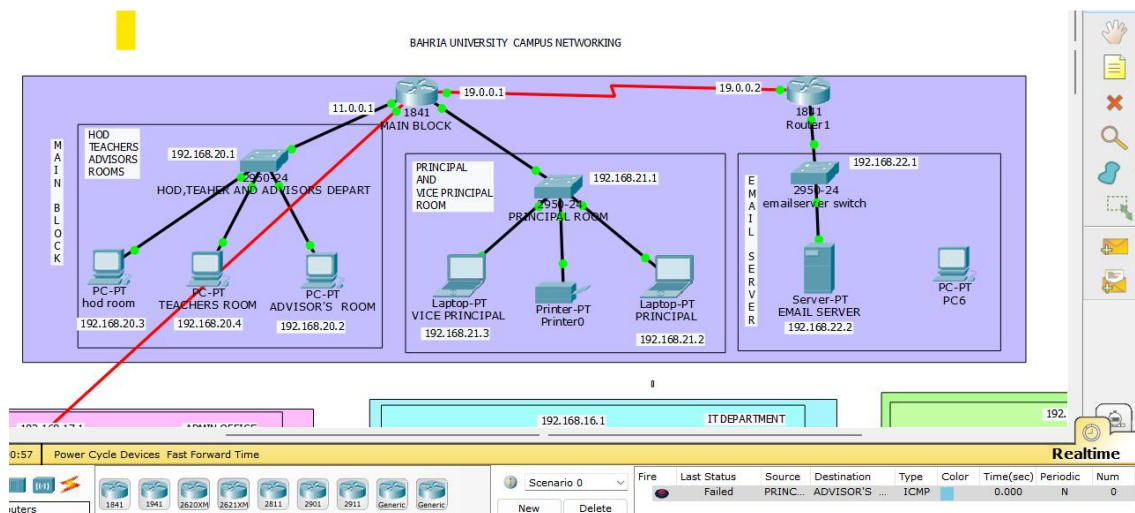
```

MAIN BLOCK
Physical Config CLI
IOS Command Line Interface
Router#enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 19.0.0.0
Router(config-router)#network 192.168.20.0
Router(config-router)#network 192.168.21.0
Router(config-router)#network 192.168.22.0
Router(config-router)#%DHCPD-4-PING_CONFLICT: DHCP address conflict: server
pinged 192.168.21.1.
%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 192.168.20.1.

Router(config-router)#
Router(config-router)#EX
Router(config)#access-list 10 deny 192.168.20.2
Router(config)#access-list 10 deny 192.168.21.2
Router(config)#access-list 10 permit any
Router(config)#int fa0/1
Router(config-if)#ip access-group 10 in
Router(config-if)#ex
Router(config)#ex
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#sh access-list
Standard IP access list 10
 10 deny host 192.168.20.2
 20 deny host 192.168.21.2
 30 permit any
Router#
Copy Paste

```



APPLY ACL FOR THE DISCONNECTIVITY BETWEEN ADVISORS AND EMAIL SERVER

```

Router1
Physical Config CLI
IOS Command Line Interface

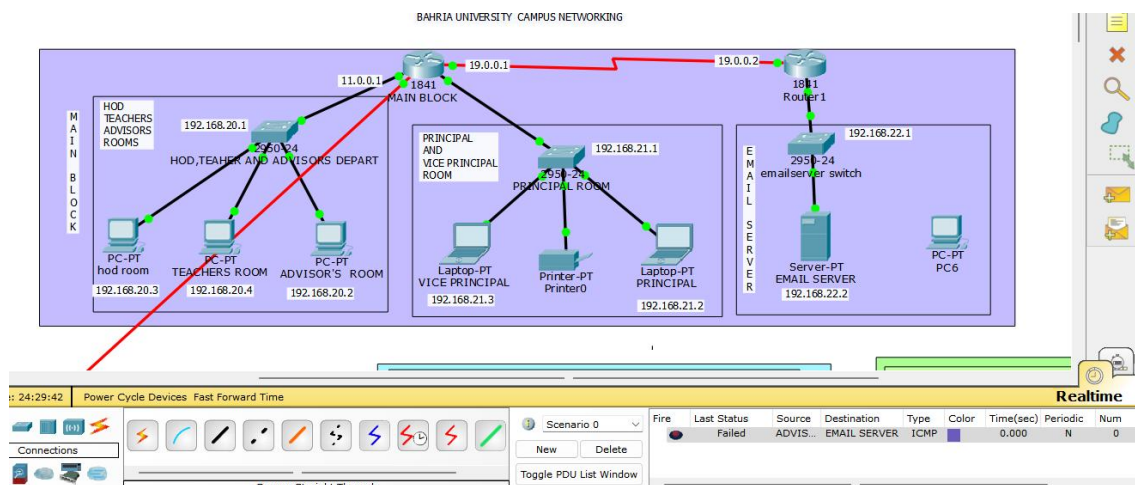
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 19.0.0.0
Router(config-router)#network 192.168.20.0
Router(config-router)#network 192.168.21.0
Router(config-router)#network 192.168.22.0
Router(config-router)#ex
Router(config)#access-list 30 deny 192.168.20.2
Router(config)#access-list 30 deny 192.168.22.2
Router(config)#access-list 30 permit any
Router(config)#int serial0/0/0
Router(config-if)#ip access-group 30 in
Router(config-if)#ex
Router(config)#ex
Router#

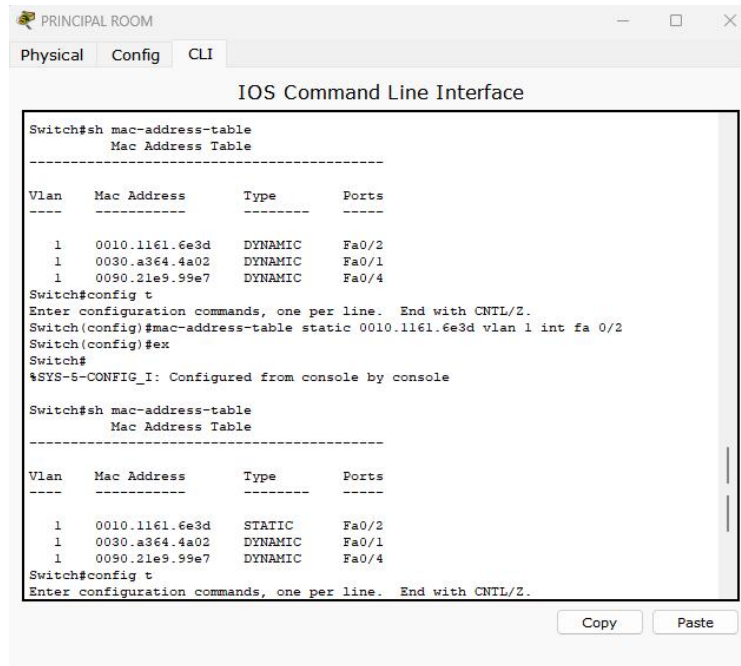
%SYS-5-CONFIG_I: Configured from console by console

Router#sh access-list
Standard IP access list 30
 10 deny host 192.168.20.2
 20 deny host 192.168.22.2
 30 permit any
Router#
  
```



MAC ADDRESS STATIC:

Principal and vice principal



PRINCIPAL ROOM

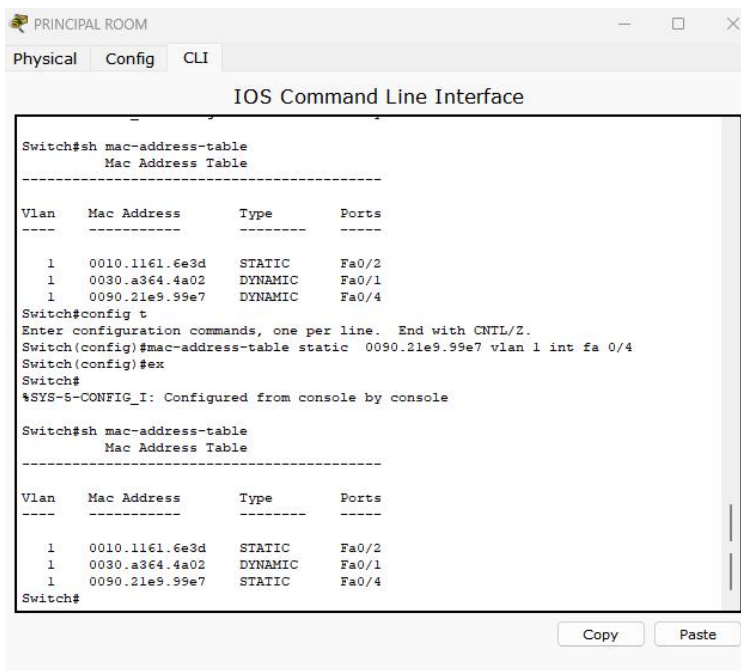
Physical Config CLI

IOS Command Line Interface

```
Switch#sh mac-address-table
Mac Address Table
-----
Vlan    Mac Address      Type    Ports
-----
1       0010.1161.6e3d   DYNAMIC Fa0/2
1       0030.a364.4a02   DYNAMIC Fa0/1
1       0090.21e9.99e7   DYNAMIC Fa0/4
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#mac-address-table static 0010.1161.6e3d vlan 1 int fa 0/2
Switch(config)#ex
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sh mac-address-table
Mac Address Table
-----
Vlan    Mac Address      Type    Ports
-----
1       0010.1161.6e3d   STATIC  Fa0/2
1       0030.a364.4a02   DYNAMIC Fa0/1
1       0090.21e9.99e7   DYNAMIC Fa0/4
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
```

Copy Paste



PRINCIPAL ROOM

Physical Config CLI

IOS Command Line Interface

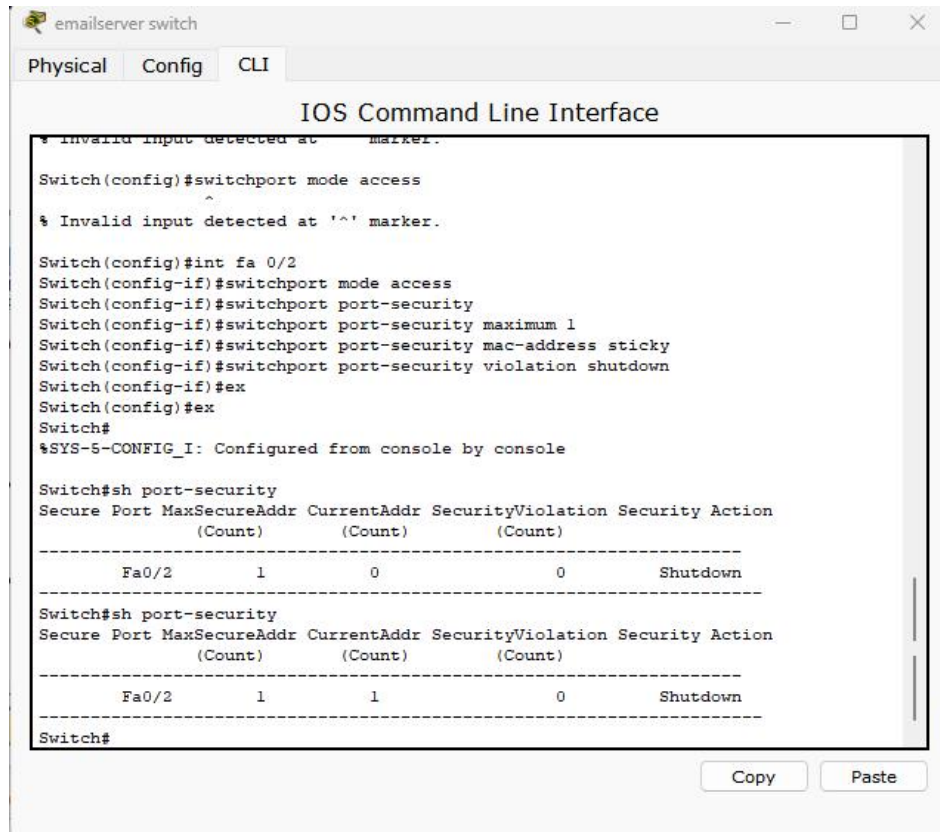
```
Switch#sh mac-address-table
Mac Address Table
-----
Vlan    Mac Address      Type    Ports
-----
1       0010.1161.6e3d   STATIC  Fa0/2
1       0030.a364.4a02   DYNAMIC Fa0/1
1       0090.21e9.99e7   DYNAMIC Fa0/4
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#mac-address-table static 0090.21e9.99e7 vlan 1 int fa 0/4
Switch(config)#ex
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sh mac-address-table
Mac Address Table
-----
Vlan    Mac Address      Type    Ports
-----
1       0010.1161.6e3d   STATIC  Fa0/2
1       0030.a364.4a02   DYNAMIC Fa0/1
1       0090.21e9.99e7   STATIC  Fa0/4
Switch#
```

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PORT SECURITY:

For Email Server:



The screenshot shows a Cisco IOS CLI window titled "emailserver switch". The CLI is in configuration mode, and the user has entered the following commands:

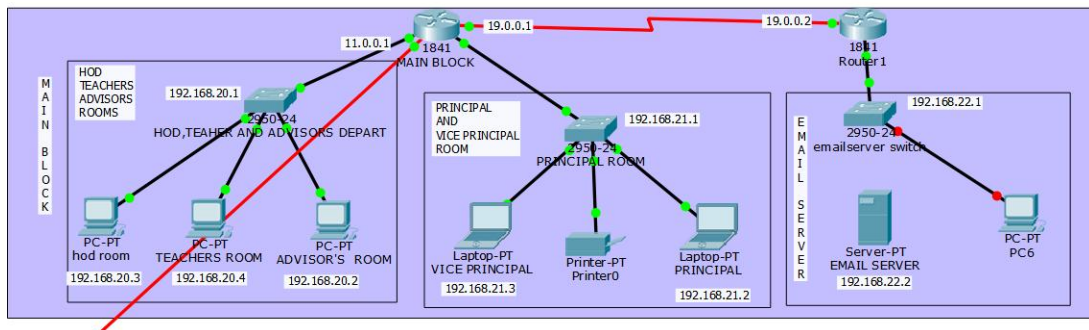
```
Switch(config)#switchport mode access
Switch(config-if)#switchport mode access
Switch(config-if)#switchport port-security
Switch(config-if)#switchport port-security maximum 1
Switch(config-if)#switchport port-security mac-address sticky
Switch(config-if)#switchport port-security violation shutdown
Switch(config-if)#ex
Switch(config)#ex
Switch#
```

The output of the `Switch#sh port-security` command is shown below:

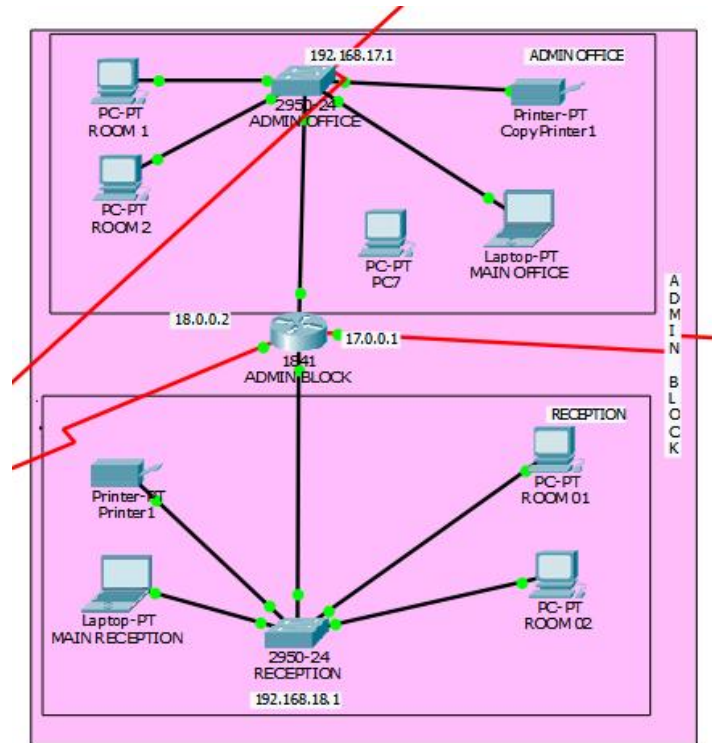
Secure Port	MaxSecureAddr (Count)	CurrentAddr (Count)	SecurityViolation (Count)	Security Action
Fa0/2	1	0	0	Shutdown

The output of the `Switch#sh port-security` command is shown below:

Secure Port	MaxSecureAddr (Count)	CurrentAddr (Count)	SecurityViolation (Count)	Security Action
Fa0/2	1	1	0	Shutdown



ADMIN BLOCK:



DYNAMIC IPS

```

ADMIN BLOCK
Physical Config CLI
IOS Command Line Interface
Router(config)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#EX
Router(config)#ip dhcp pool admin-pool
Router(dhcp-config)#network 192.168.18.0 255.255.255.0
^
% Invalid input detected at '^' marker.
Router(dhcp-config)#network 192.168.18.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.18.1
Router(dhcp-config)#dns-server 192.168.18.1
Router(dhcp-config)#ex
Router(config)#do wr
Building configuration...
[OK]
Router(config)#ip dhcp pool recetion-pool
Router(dhcp-config)#network 192.168.17.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.17.1
Router(dhcp-config)#dns-server 192.168.17.1
Router(dhcp-config)#ex
Router(config)#do wr
Building configuration...
[OK]
Router(config)#
  
```


MAIN OFFICE

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.17.5

Subnet Mask 255.255.255.0

Default Gateway 192.168.17.1

DNS Server 192.168.17.1

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::201:64FF:FE2D:9973

IPv6 Gateway

IPv6 DNS Server

MAIN RECEPTION

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.18.4

Subnet Mask 255.255.255.0

Default Gateway 192.168.18.1

DNS Server 192.168.18.1

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::290:CFF:FE91:6690

IPv6 Gateway

IPv6 DNS Server

RIP ROUTING

ADMIN BLOCK

Physical Config CLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

RIP Routing

Network

Add

Network Address
15.0.0.0
16.0.0.0
17.0.0.0
18.0.0.0
192.168.11.0
192.168.12.0

Remove

Equivalent IOS Commands

```
$LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 192.168.18.1.
%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 192.168.17.1.

$LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to down
$LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down
```

SERIAL 0/0/0

ADMIN BLOCK

Physical Config CLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

Serial0/0/0

Port Status ☒ On

Duplex ☐ Full Duplex

Clock Rate 64000

IP Configuration

IP Address 18.0.0.2

Subnet Mask 255.0.0.0

Tx Ring Limit 10

Equivalent IOS Commands

```
Router(config)#router#exit
Router(config)#interface Serial0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#
```

SERIAL0/0/1

The screenshot shows the 'ADMIN BLOCK' window with the 'Config' tab selected. The left sidebar contains a tree view with categories: GLOBAL, ROUTING, SWITCHING, and INTERFACE. Under the INTERFACE category, 'Serial0/0/1' is selected. The main area displays the configuration for 'Serial0/0/1'. The 'Port Status' is 'On' (checked). 'Duplex' is set to 'Full Duplex'. 'Clock Rate' is set to '64000'. 'IP Configuration' shows 'IP Address' as '17.0.0.1' and 'Subnet Mask' as '255.0.0.0'. 'Tx Ring Limit' is set to '10'. Below the configuration fields, there is a section titled 'Equivalent IOS Commands' with a text area containing the following commands:

```
Router(config)#interface Serial0/0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/1
Router(config-if)#
```

PORT SECURE

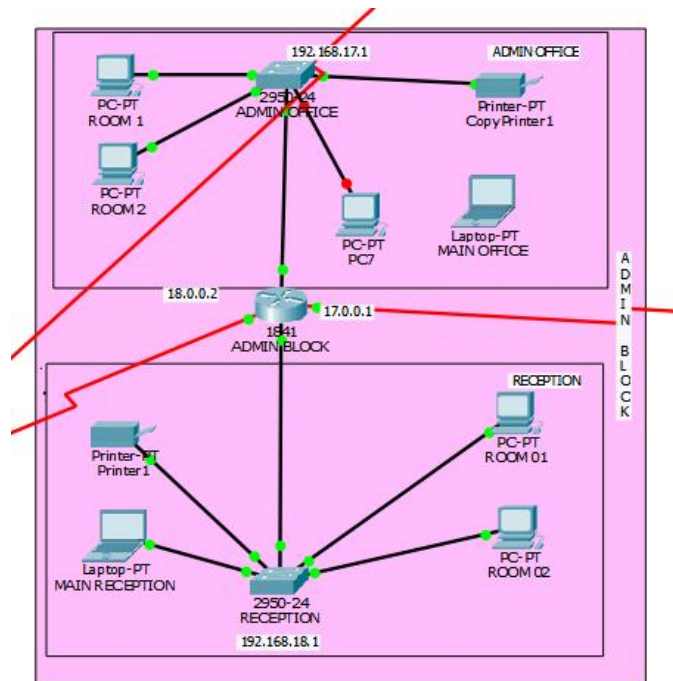
MAIN OFFICE:

The screenshot shows the 'ADMIN OFFICE' window with the 'CLI' tab selected. The main area displays the 'IOS Command Line Interface'. The text area shows the following commands and output:

```
% Invalid input detected at '^' marker.
Switch(config)#INT FA 0/5
Switch(config-if)#SWITCHPORT MODE ACCESS
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)#EX
Switch(config)#EX
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#SH MAC ADDRESS
      Mac Address Table
-----
Vlan    Mac Address      Type      Ports
----    -
1       0001.642d.9973   STATIC    Fa0/5
1       0009.7cb4.9a02   DYNAMIC   Fa0/1
Switch#SH PORT-SECURITY
Secure Port MaxSecureAddr CurrentAddr SecurityViolation Security Action
      (Count)              (Count)              (Count)
-----
Fa0/5      1              1              0      Shutdown
Switch#
```

At the bottom right of the text area, there are 'Copy' and 'Paste' buttons.



Realtime									
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	
	Failed	PC7	ROOM 2	ICMP		0.000	N	0	

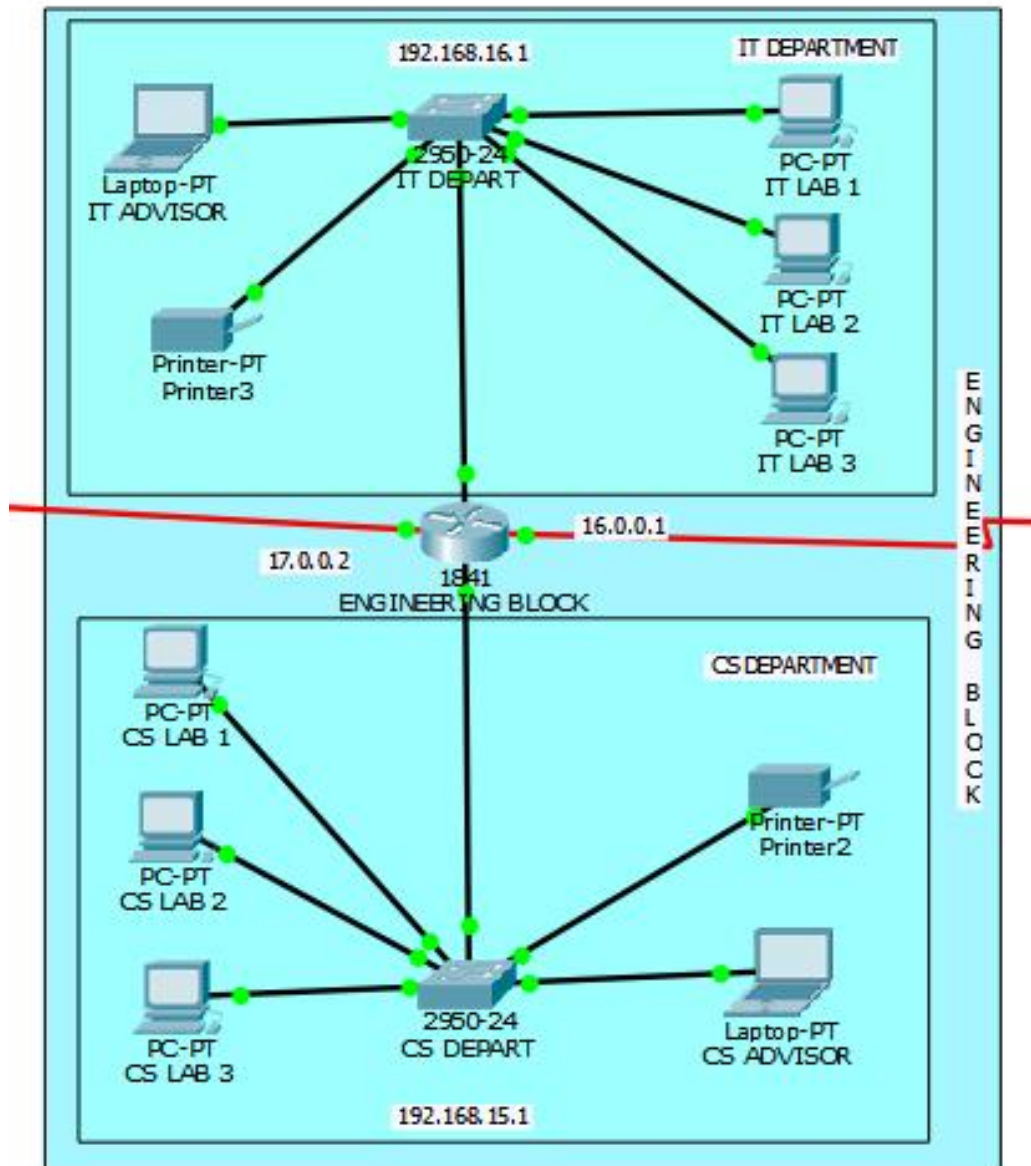
PERMENENT MAC ADDRESS OF MAIN RECEPTION:

```

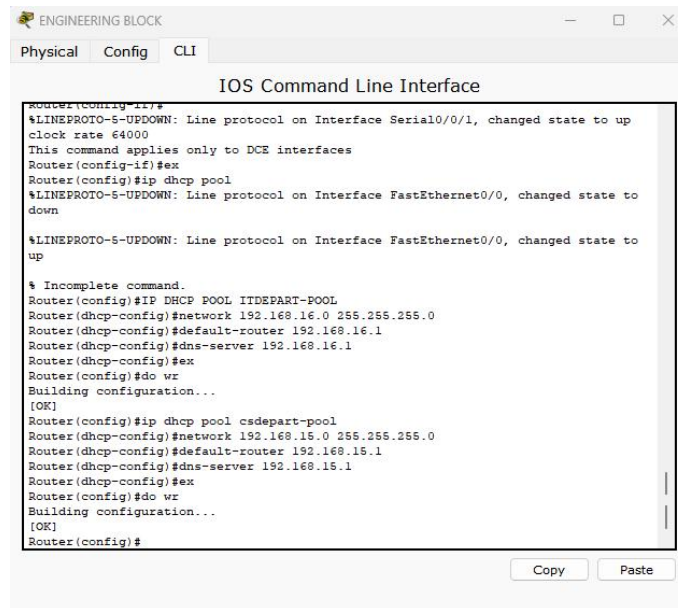
RECEPTION
Physical Config CLI
IOS Command Line Interface
Switch#show mac-address-table
Mac Address Table
-----
Vlan    Mac Address      Type      Ports
----
1       0009.7cb4.9a01   DYNAMIC   Fa0/1
1       0040.0b0d.67bd   DYNAMIC   Fa0/3
1       0090.0c91.6690   DYNAMIC   Fa0/5
1       0090.2bc5.87a6   DYNAMIC   Fa0/2
Switch#CONFIG T
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#MAC-ADDRESS-TABLE STATIC 0090.0c91.6690 VLAN 1 INT FA 0/5
Switch(config)#EX
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#SH MAC-ADDRESS-TABLE
Mac Address Table
-----
Vlan    Mac Address      Type      Ports
----
1       0009.7cb4.9a01   DYNAMIC   Fa0/1
1       0040.0b0d.67bd   DYNAMIC   Fa0/3
1       0090.0c91.6690   STATIC    Fa0/5
1       0090.2bc5.87a6   DYNAMIC   Fa0/2
Switch#
Copy Paste

```

ENGINEERING BLOCK:



DYNAMIC IPS:

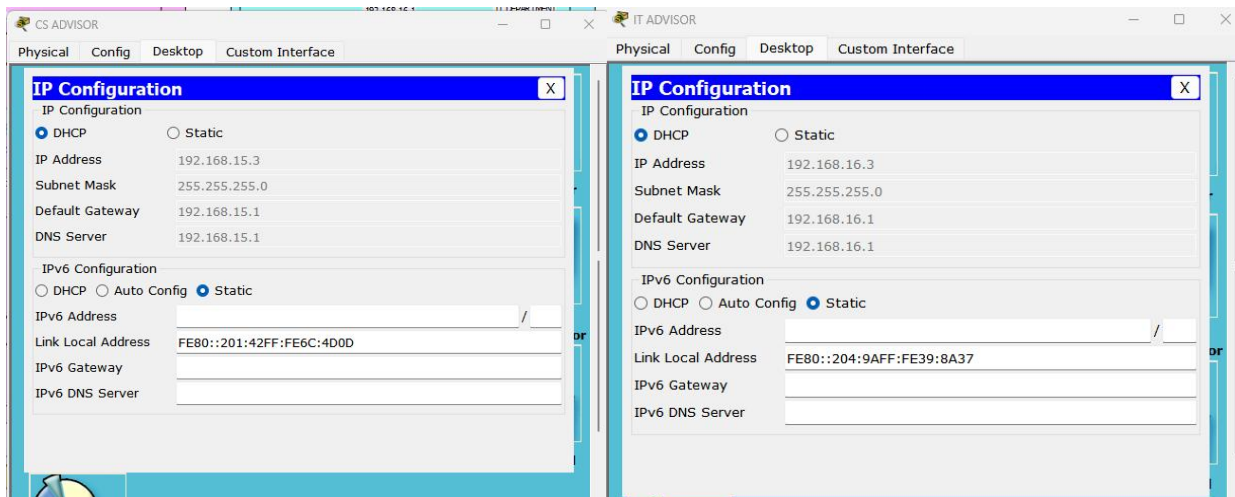


```
ENGINEERING BLOCK
Physical Config CLI
IOS Command Line Interface

Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
clock rate 64000
This command applies only to DCE interfaces
Router(config-if)#ex
Router(config)#ip dhcp pool
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
up

% Incomplete command.
Router(config)#IP DHCP POOL ITDEPART-POOL
Router(dhcp-config)#network 192.168.16.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.16.1
Router(dhcp-config)#dns-server 192.168.16.1
Router(dhcp-config)#ex
Router(config)#do wr
Building configuration...
[OK]
Router(config)#ip dhcp pool csdepart-pool
Router(dhcp-config)#network 192.168.15.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.15.1
Router(dhcp-config)#dns-server 192.168.15.1
Router(dhcp-config)#ex
Router(config)#do wr
Building configuration...
[OK]
Router(config)#
```



CS ADVISOR

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.15.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.15.1

DNS Server 192.168.15.1

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address

Link Local Address FE80::201:42FF:FE6C:4D0D

IPv6 Gateway

IPv6 DNS Server

IT ADVISOR

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.16.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.16.1

DNS Server 192.168.16.1

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address

Link Local Address FE80::204:9AFF:FE39:8A37

IPv6 Gateway

IPv6 DNS Server

RIP ROUTING:

The screenshot shows the 'RIP Routing' configuration window in the Engineering Block. On the left, a sidebar lists configuration categories: GLOBAL, Settings, Algorithm Settings, ROUTING, Static, SWITCHING, VLAN Database, INTERFACE, FastEthernet0/0, FastEthernet0/1, Serial0/0/0, and Serial0/0/1. The main area is titled 'RIP Routing' and contains a 'Network' section with a table of network addresses. The table has two columns: 'Network Address' and 'Add'. The addresses listed are 15.0.0.0, 16.0.0.0, 17.0.0.0, 18.0.0.0, 19.0.0.0, and 192.168.11.0. A 'Remove' button is at the bottom right of the table. Below the table, there is a section for 'Equivalent IOS Commands' showing the following commands:

```

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#
  
```

TRUNKING PORT:

The screenshot shows the 'FastEthernet0/1' configuration window in the CS DEPART. The left sidebar lists configuration categories: GLOBAL, Settings, Algorithm Settings, SWITCH, VLAN Database, INTERFACE, FastEthernet0/1, FastEthernet0/2, FastEthernet0/3, FastEthernet0/4, FastEthernet0/5, FastEthernet0/6, FastEthernet0/7, FastEthernet0/8, FastEthernet0/9, and FastEthernet0/10. The main area is titled 'FastEthernet0/1' and contains a 'Port Status' section with a table of port status. The table has two columns: 'Port Status' and 'VLAN'. The status is 'On' and the VLAN is '1'. Below the table, there is a section for 'Equivalent IOS Commands' showing the following commands:

```

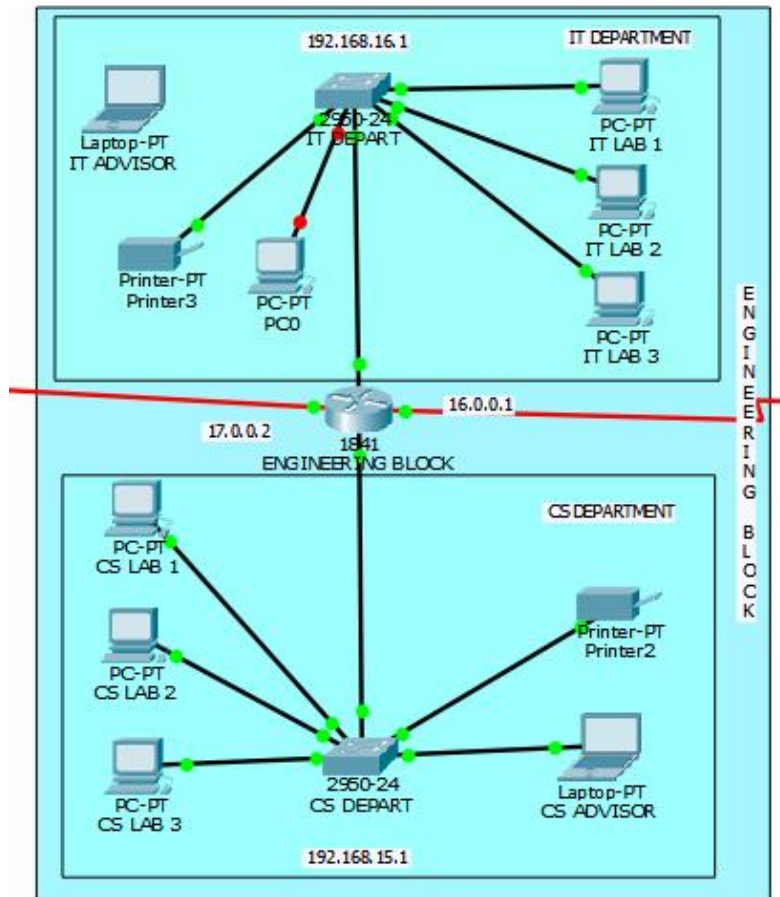
Switch(config-if)#
Switch(config-if)#switchport mode trunk
Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
  
```

PORT SECURE: IT ADVISOR

The screenshot shows the 'IOS Command Line Interface' window in the IT DEPART. The left sidebar lists configuration categories: Physical, Config, and CLI. The main area is titled 'IOS Command Line Interface' and contains a text area with the following commands and output:

```

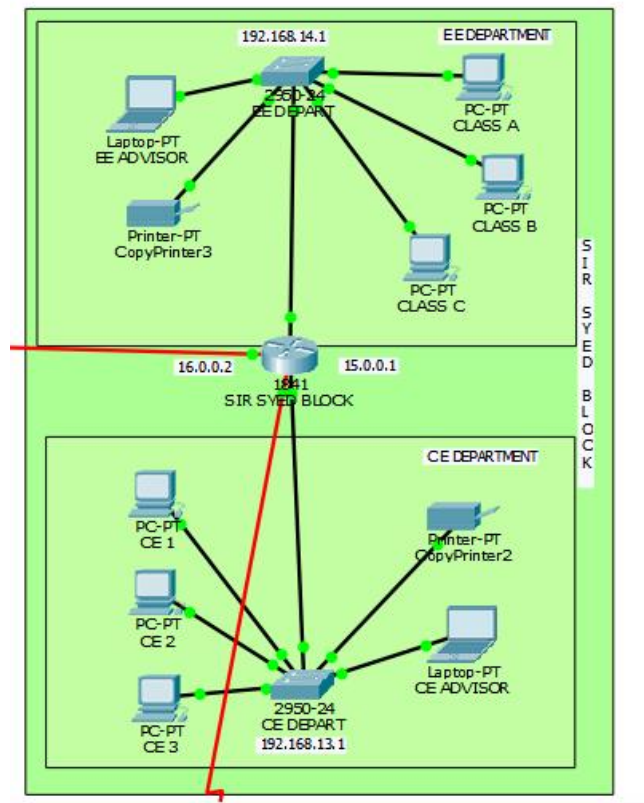
Switch#
Switch#CONFIG T
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#INT Fa0/5
Switch(config-if)#SWITCHPORT MODE ACCESS
Switch(config-if)#SWITCHPORT PORT-SECURITY
Switch(config-if)#SWITCHPORT PORT-SECURITY MAXIMUM 1
Switch(config-if)#SWITCHPORT PORT-SECURITY MAC-ADDRESS STICKY
Switch(config-if)#SWITCHPORT PORT-SECURITY VIOLATION SHUTDOWN
Switch(config-if)#EX
Switch(config)#EX
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#SH PORT-SECURITY
Secure Port MaxSecureAddr CurrentAddr Security/Violation Security Action
(Count) (Count)
-----
Fa0/5 1 0 0 Shutdown
Switch#SH PORT-SECURITY
Secure Port MaxSecureAddr CurrentAddr Security/Violation Security Action
(Count) (Count)
-----
Fa0/5 1 1 0 Shutdown
Switch#
  
```



Realtime

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Failed	PC0	IT LAB 1	ICMP		0.000	N	0

SIR SYED BLOCK:

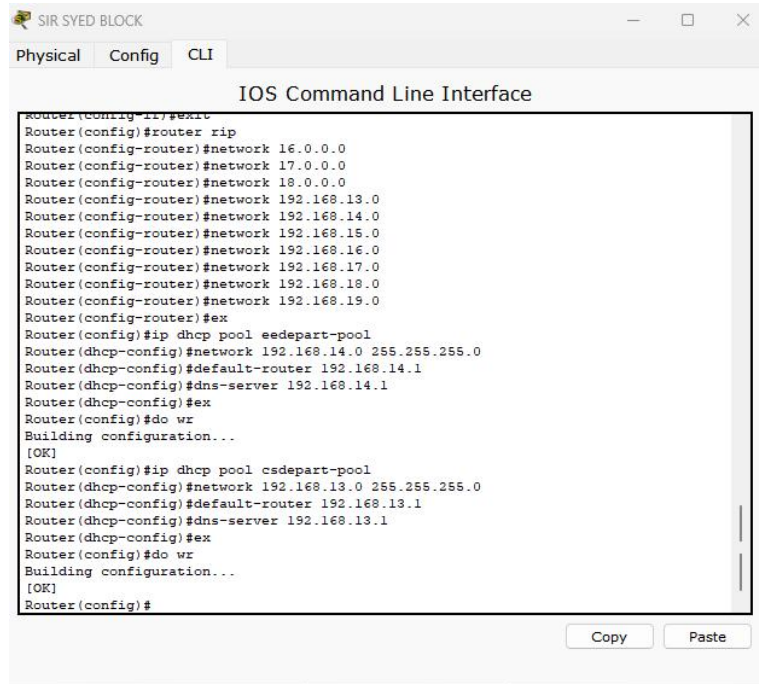


DYNAMIC IPS:

```
IOS Command Line Interface

Router(config-router)#
Router(config-router)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#EX
Router(config)#ip dhcp pool ee depart-pool
Router(dhcp-config)#network 192.168.14.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.14.1
Router(dhcp-config)#dns-server 192.168.14.1
Router(dhcp-config)#ex
Router(config)#do wr
Building configuration...
[OK]
Router(config)#ip dhcp pool ce depart-pool
Router(dhcp-config)#network 192.168.13.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.14.1
Router(dhcp-config)#default router 192.168.13.1
^
% Invalid input detected at '^' marker.
Router(dhcp-config)#default-router 192.168.13.1
Router(dhcp-config)#dns-server 192.168.13.1
Router(dhcp-config)#ex
Router(config)#do ve
Translating "ve"...domain server (255.255.255.255)
```

RIP ROUTING:

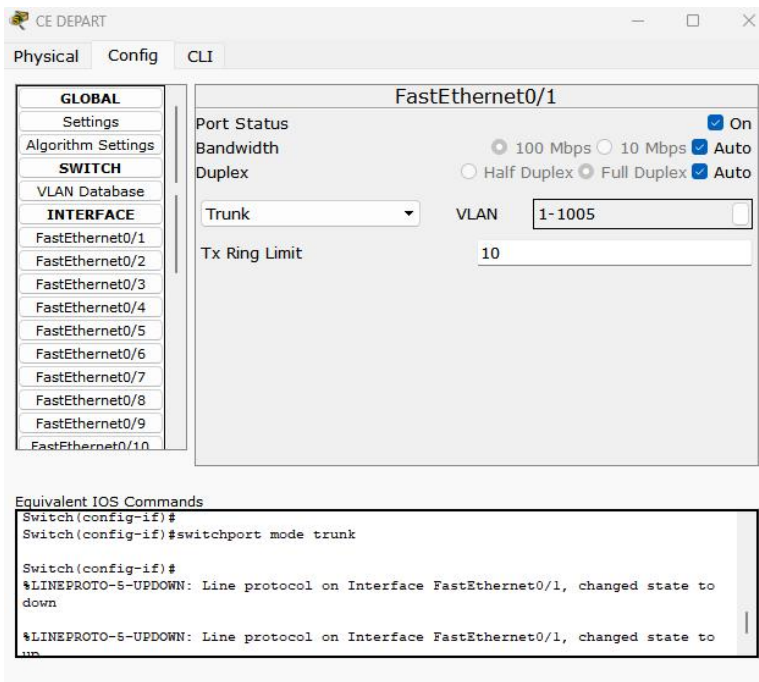


The screenshot shows the SIR SYED BLOCK IOS Command Line Interface. The CLI window displays the following commands and their outputs:

```
Router(config)#exit
Router(config)#router rip
Router(config-router)#network 16.0.0.0
Router(config-router)#network 17.0.0.0
Router(config-router)#network 18.0.0.0
Router(config-router)#network 192.168.13.0
Router(config-router)#network 192.168.14.0
Router(config-router)#network 192.168.15.0
Router(config-router)#network 192.168.16.0
Router(config-router)#network 192.168.17.0
Router(config-router)#network 192.168.18.0
Router(config-router)#network 192.168.19.0
Router(config-router)#ex
Router(config)#ip dhcp pool eedepart-pool
Router(dhcp-config)#network 192.168.14.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.14.1
Router(dhcp-config)#dns-server 192.168.14.1
Router(dhcp-config)#ex
Router(config)#do wr
Building configuration...
[OK]
Router(config)#ip dhcp pool csdepart-pool
Router(dhcp-config)#network 192.168.13.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.13.1
Router(dhcp-config)#dns-server 192.168.13.1
Router(dhcp-config)#ex
Router(config)#do wr
Building configuration...
[OK]
Router(config)#
```

Buttons for Copy and Paste are visible at the bottom right of the CLI window.

TRUNKING PORT ENABLE:



The screenshot shows the CE DEPART configuration interface for FastEthernet0/1. The interface is configured as a Trunk port with the following settings:

- Port Status: ☒ On
- Bandwidth: ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- Trunk:
- VLAN:
- Tx Ring Limit:

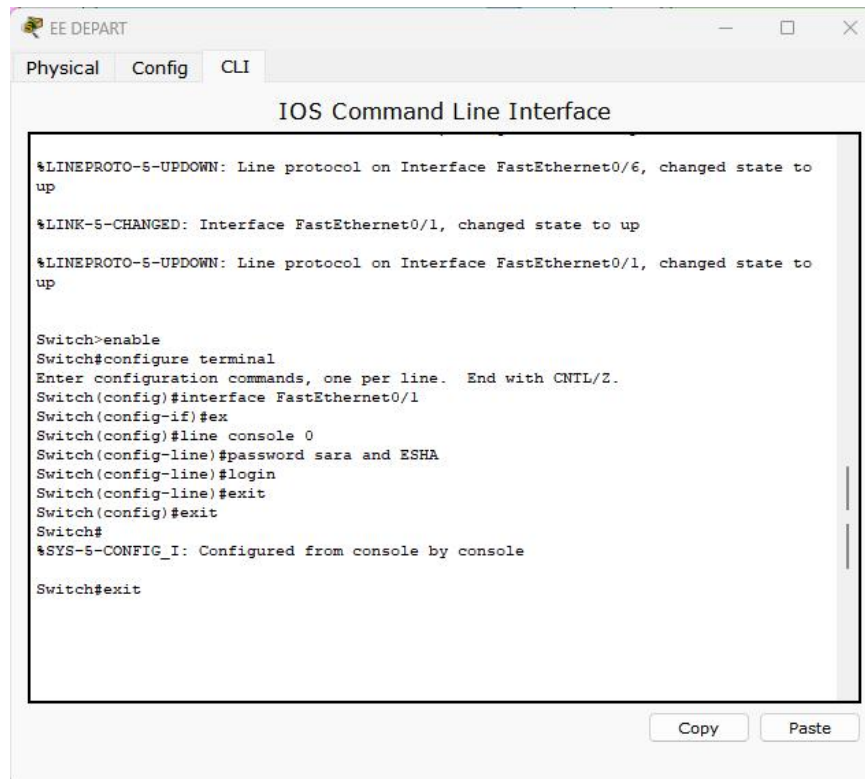
Equivalent IOS Commands:

```
Switch(config-if)#
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%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
```

Password protected department:



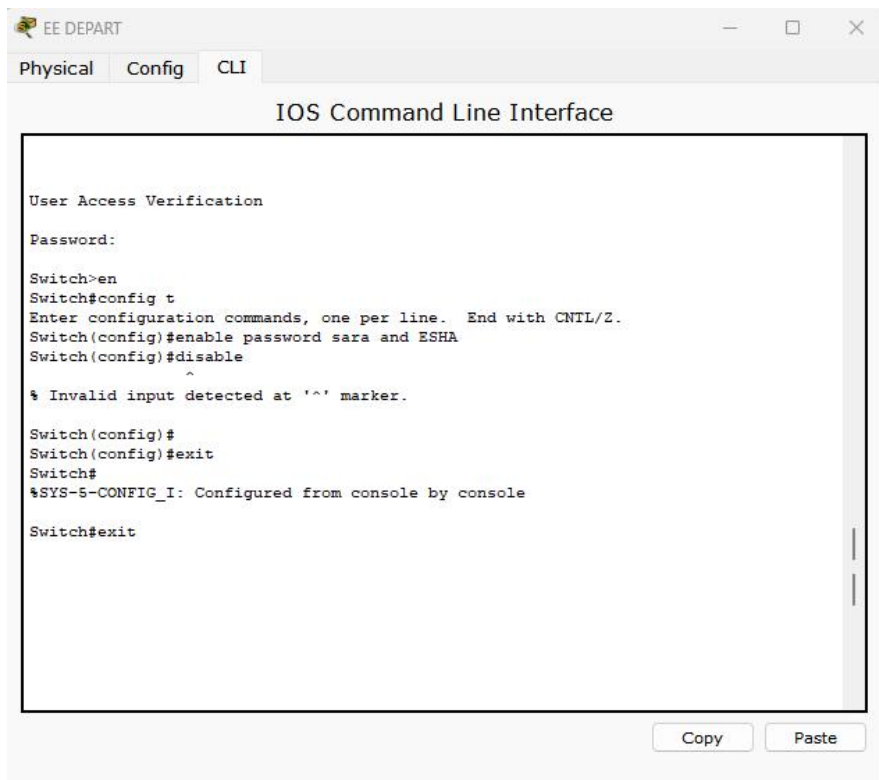
The screenshot shows the EE DEPART application window with the 'CLI' tab selected. The title bar includes a logo, the text 'EE DEPART', and standard window controls. Below the tabs, the text 'IOS Command Line Interface' is centered. The main text area contains the following output and commands:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, 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>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface FastEthernet0/1
Switch(config-if)#ex
Switch(config)#line console 0
Switch(config-line)#password sara and ESHA
Switch(config-line)#login
Switch(config-line)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#exit
```

At the bottom right of the text area, there are two buttons: 'Copy' and 'Paste'.



The screenshot shows the EE DEPART application window with the 'CLI' tab selected. The title bar includes a logo, the text 'EE DEPART', and standard window controls. Below the tabs, the text 'IOS Command Line Interface' is centered. The main text area contains the following output and commands:

```
User Access Verification

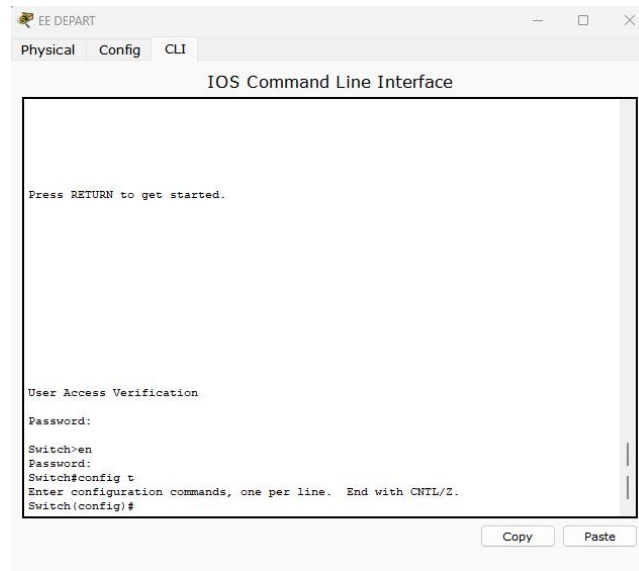
Password:

Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#enable password sara and ESHA
Switch(config)#disable
^
% Invalid input detected at '^' marker.

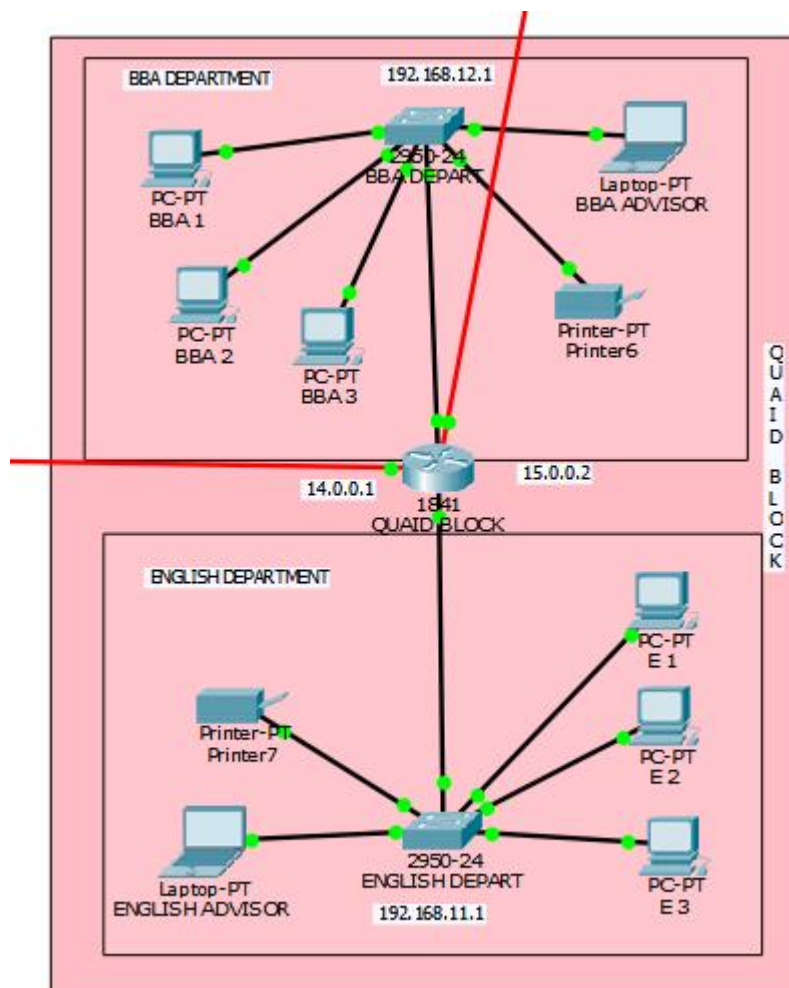
Switch(config)#
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#exit
```

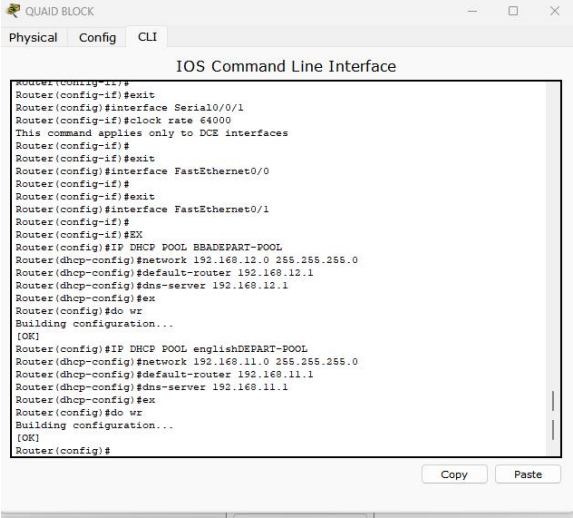
At the bottom right of the text area, there are two buttons: 'Copy' and 'Paste'.



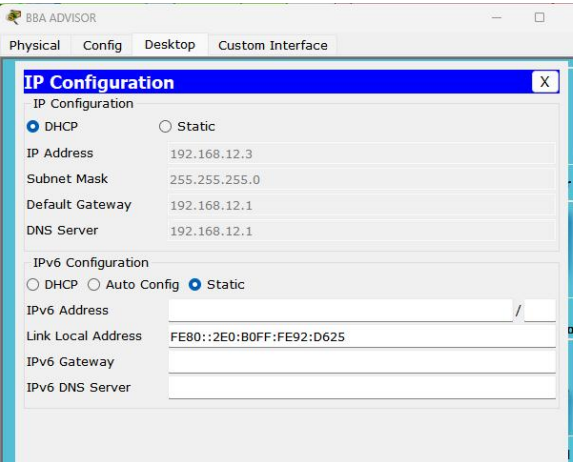
QUAID BLOCK:



Dynamic ips:



```
Router(config)#  
Router(config-if)#exit  
Router(config)#interface Serial0/0/1  
Router(config-if)#clock rate 64000  
This command applies only to DCE interfaces  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface FastEthernet0/0  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface FastEthernet0/1  
Router(config-if)#  
Router(config-if)#  
Router(config)#  
Router(config)#IP DHCP POOL BBADEPART-POOL  
Router(dhcp-config)#network 192.168.12.0 255.255.255.0  
Router(dhcp-config)#default-router 192.168.12.1  
Router(dhcp-config)#dns-server 192.168.12.1  
Router(dhcp-config)#  
Router(config)#do wr  
Building configuration...  
[OK]  
Router(config)#IP DHCP POOL englishDEPART-POOL  
Router(dhcp-config)#network 192.168.11.0 255.255.255.0  
Router(dhcp-config)#default-router 192.168.11.1  
Router(dhcp-config)#dns-server 192.168.11.1  
Router(dhcp-config)#  
Router(config)#do wr  
Building configuration...  
[OK]  
Router(config)#
```



IP Configuration

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.12.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.12.1

DNS Server 192.168.12.1

IPv6 Configuration

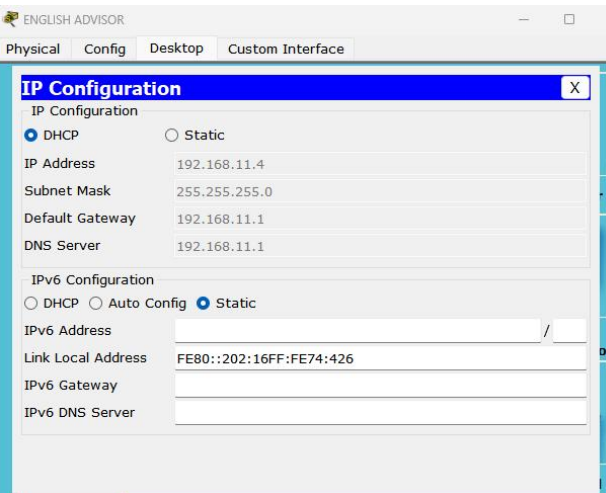
☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::2E0:B0FF:FE92:D625

IPv6 Gateway

IPv6 DNS Server



IP Configuration

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.11.4

Subnet Mask 255.255.255.0

Default Gateway 192.168.11.1

DNS Server 192.168.11.1

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

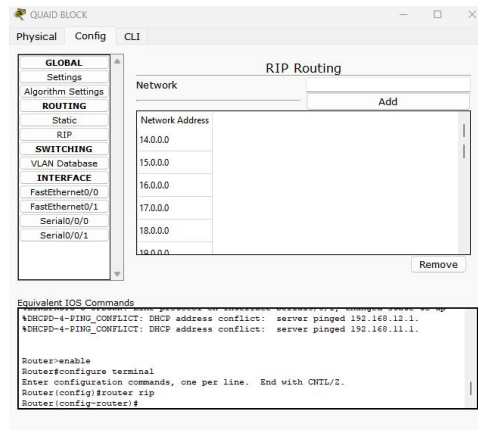
IPv6 Address /

Link Local Address FE80::202:16FF:FE74:426

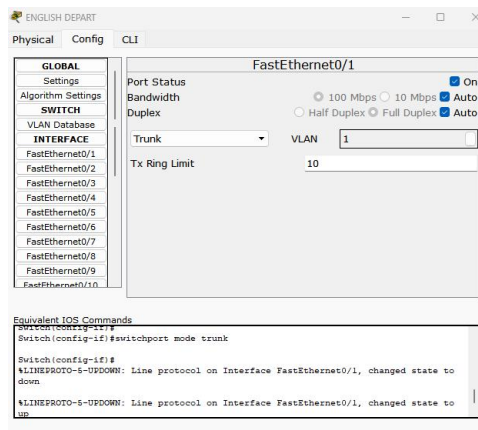
IPv6 Gateway

IPv6 DNS Server

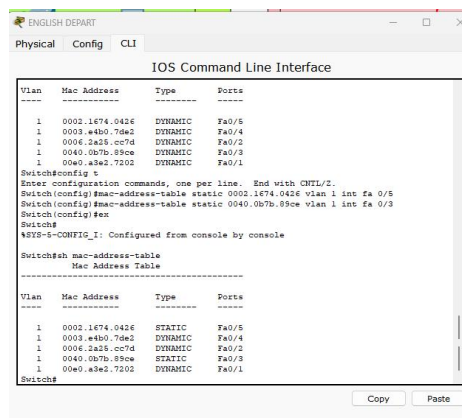
Rip routing:



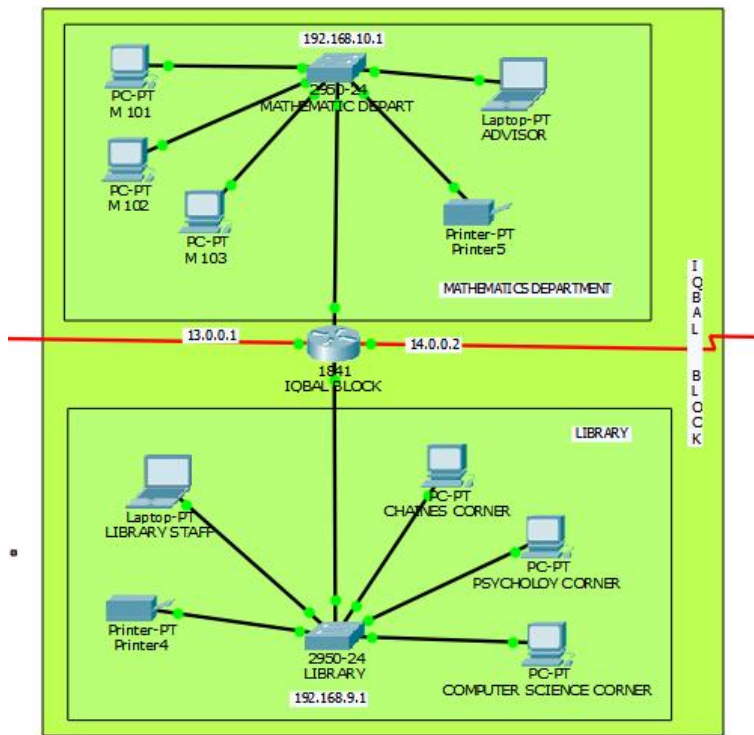
Trunking port enable:



Permanent mac address table:



IQBAL BLOCK:



Dynamic ips:

```

IOS Command Line Interface

Router(config)#interface FastEthernet0/1
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to
up
Ip address 192.168.9.1 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#EX
Router(config)#IP DHCP POOL MATHDEPART-POOL
Router(dhcp-config)#NETWORK 192.168.10.0 255.255.255.0
Router(dhcp-config)#DEFAULT-ROUTER 192.168.10.1
Router(dhcp-config)#DNS-SERVER 192.168.10.1
Router(dhcp-config)#EX
Router(config)#DO WR
Building configuration...
[OK]
Router(config)#IP DHCP POOL LIBRARY-POOL
Router(dhcp-config)#NETWORK 192.168.9.0 255.255.255.0
Router(dhcp-config)#DEFAULT-ROUTER 192.168.9.1
Router(dhcp-config)#DNS-SERVER 192.168.9.1
Router(dhcp-config)#EX
Router(config)#DO WR
Building configuration...
[OK]
Router(config)#
  
```


ADVISOR

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.10.5

Subnet Mask 255.255.255.0

Default Gateway 192.168.10.1

DNS Server 192.168.10.1

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::20B:BEFF:FE7A:91A5

IPv6 Gateway

IPv6 DNS Server

LIBRARY STAFF

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.9.5

Subnet Mask 255.255.255.0

Default Gateway 192.168.9.1

DNS Server 192.168.9.1

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::2E0:F9FF:FEE1:70EE

IPv6 Gateway

IPv6 DNS Server

Rip routing:

IQBAL BLOCK

Physical Config CLI

RIP Routing

Network

Add

Network Address
13.0.0.0
14.0.0.0
15.0.0.0
16.0.0.0
17.0.0.0
18.0.0.0

Remove

Equivalent IOS Commands

```

%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 192.168.10.1.
%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 192.168.9.1.

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#
  
```


IQBAL BLOCK

Physical Config CLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

FastEthernet0/0

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0060.476C.2299

IP Configuration

IP Address 192.168.10.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```

Router(config)#interface Serial0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#

```

IQBAL BLOCK

Physical Config CLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

FastEthernet0/1

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0001.6361.A76C

IP Configuration

IP Address 192.168.9.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```

Router(config)#interface Serial0/0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#

```

IQBAL BLOCK

Physical Config CLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

Serial0/0/0

Port Status ☒ On

Duplex ☒ Full Duplex

Clock Rate 64000

IP Configuration

IP Address 14.0.0.2

Subnet Mask 255.0.0.0

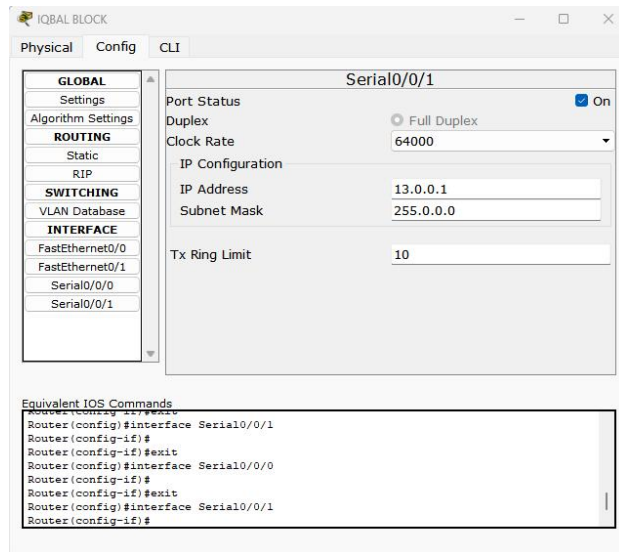
Tx Ring Limit 10

Equivalent IOS Commands

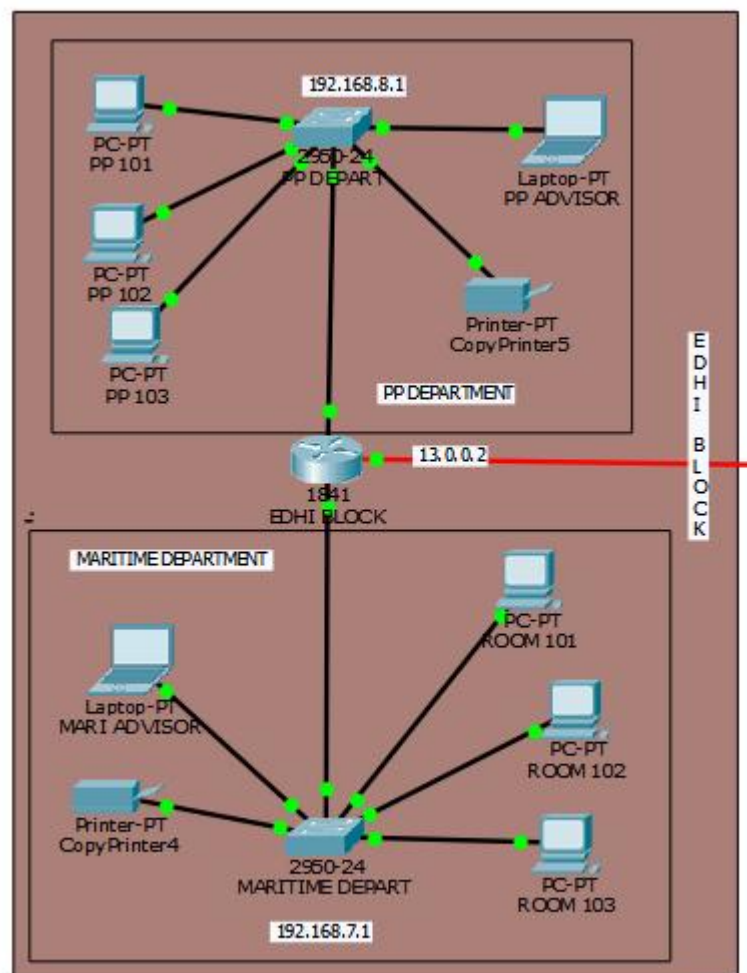
```

Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#

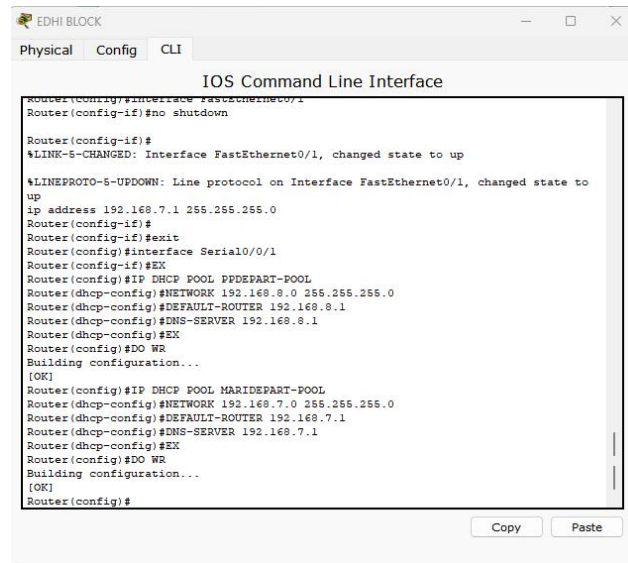
```



EDHI BLOCK:



Dynamic ips:



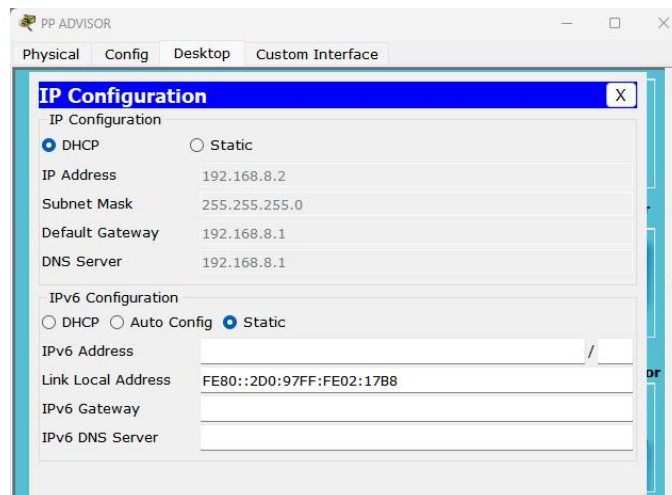
EDHI BLOCK

Physical Config CLI

IOS Command Line Interface

```
Router(config)#interface FastEthernet0/1
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
ip address 192.168.7.1 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/1
Router(config-if)#EX
Router(config)#IP DHCP POOL PPDEPART-POOL
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)#EX
Router(config)#DO WR
Building configuration...
[OK]
Router(config)#IP DHCP POOL MARIDEPART-POOL
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)#EX
Router(config)#DO WR
Building configuration...
[OK]
Router(config)#
```

Copy Paste



PP ADVISOR

Physical Config Desktop Custom Interface

IP Configuration X

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.8.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.8.1

DNS Server 192.168.8.1

IPv6 Configuration

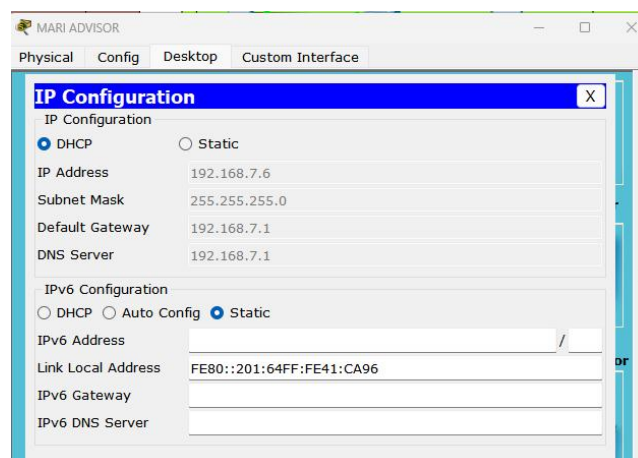
☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::2D0:97FF:FE02:17B8

IPv6 Gateway

IPv6 DNS Server



MARI ADVISOR

Physical Config Desktop Custom Interface

IP Configuration X

IP Configuration

☒ DHCP ☐ Static

IP Address 192.168.7.6

Subnet Mask 255.255.255.0

Default Gateway 192.168.7.1

DNS Server 192.168.7.1

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

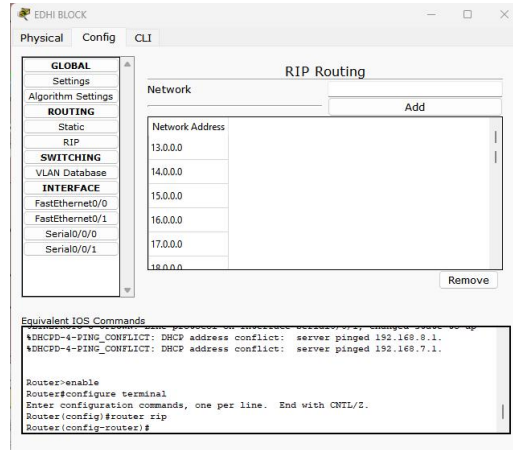
IPv6 Address /

Link Local Address FE80::201:64FF:FE41:CA96

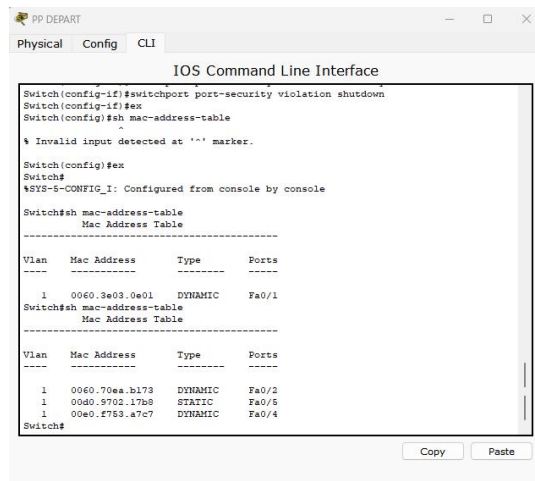
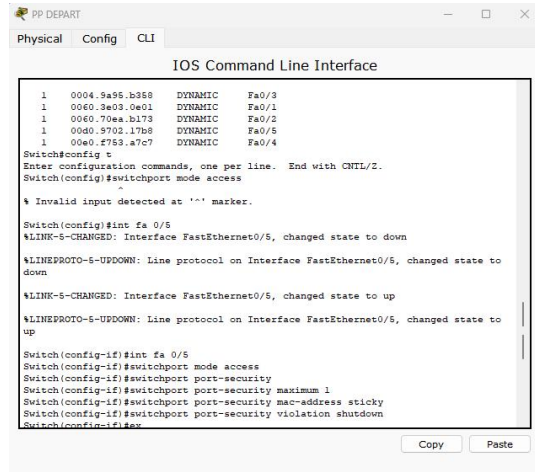
IPv6 Gateway

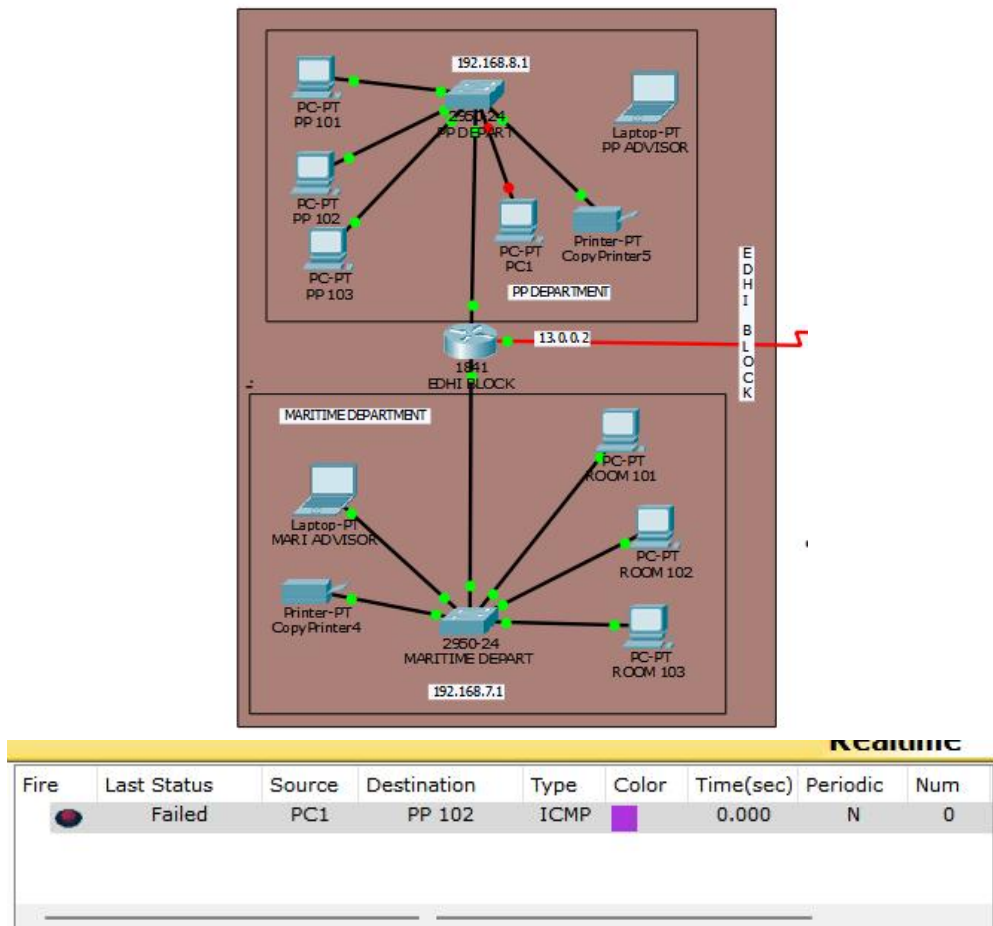
IPv6 DNS Server

Rip routing:

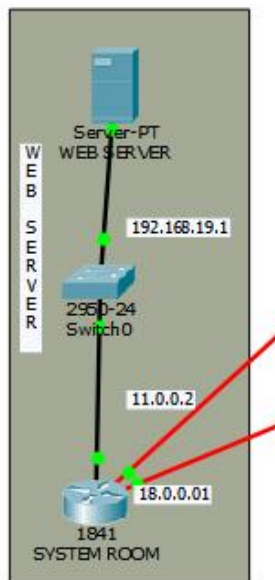


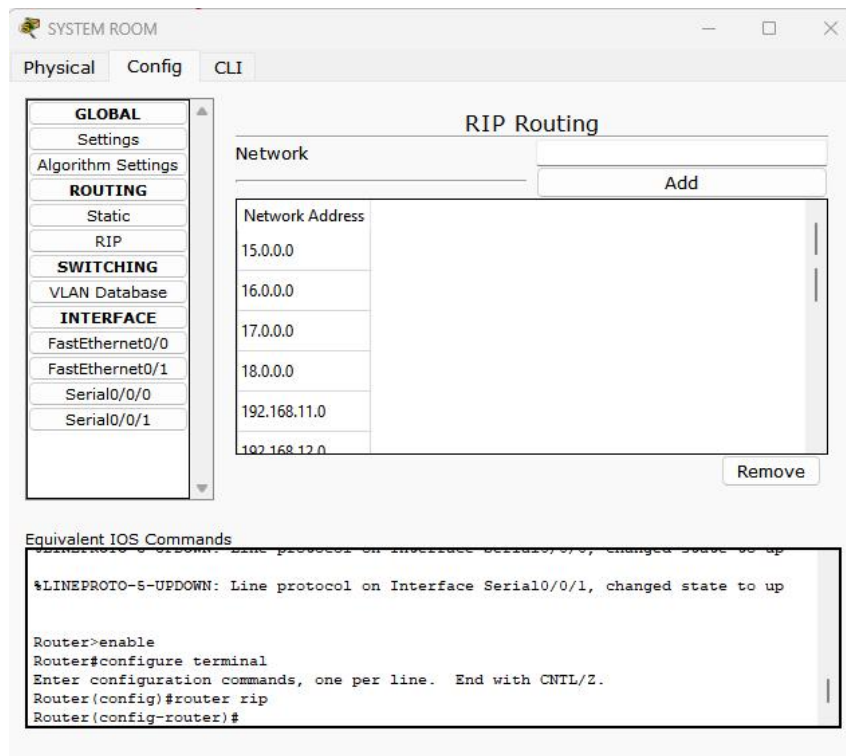
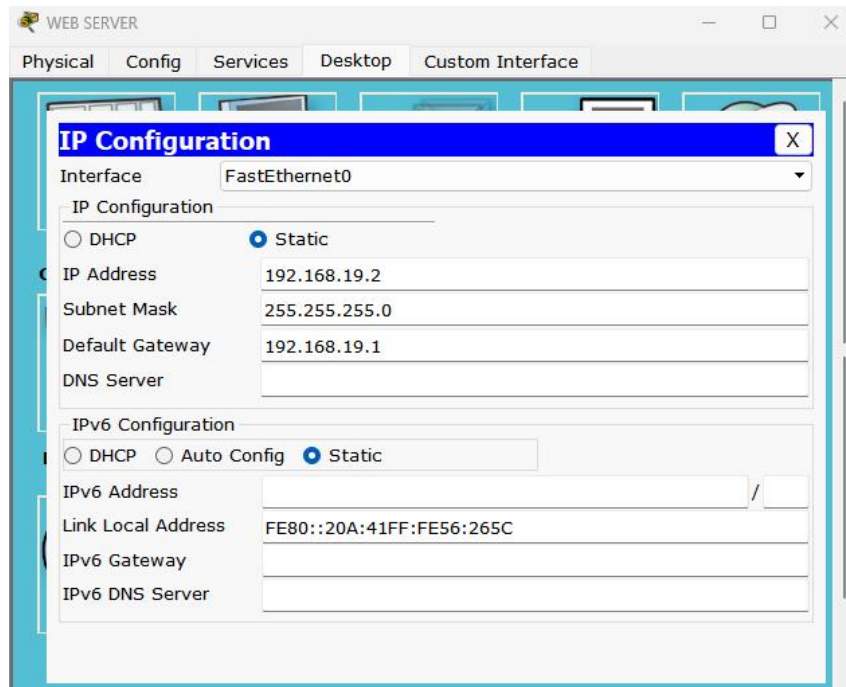
Port security for pp advisor:



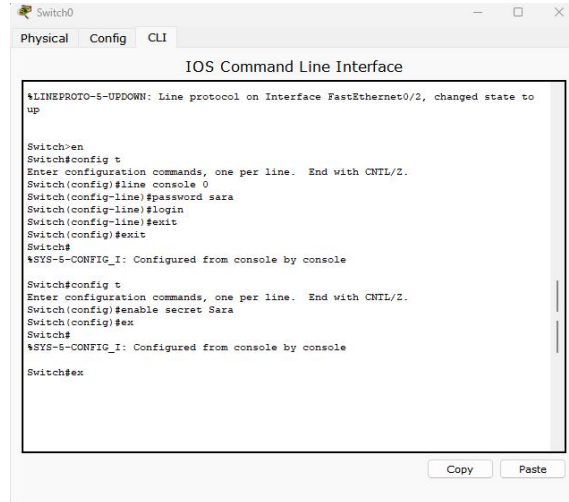


System room:





Password protective:



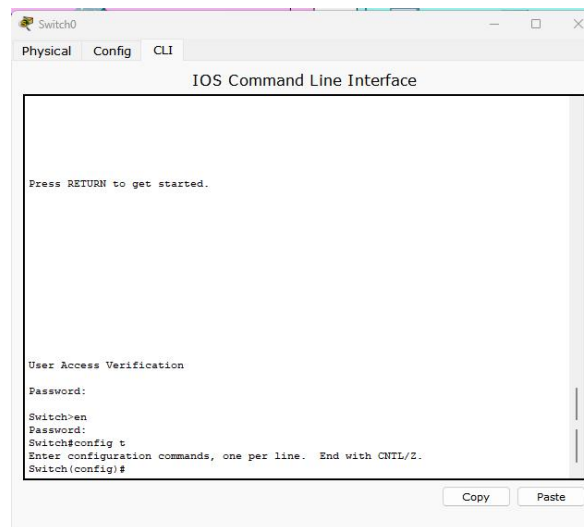
```
Switch0
Physical Config CLI
IOS Command Line Interface

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

Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#line console 0
Switch(config-line)#password sara
Switch(config-line)#login
Switch(config-line)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#enable secret Sara
Switch(config)#ex
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#ex
```



```
Switch0
Physical Config CLI
IOS Command Line Interface

Press RETURN to get started.

User Access Verification

Password:

Switch>en
Password:
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
```

9. Conclusion:

The designed University campus network in Cisco Packet Tracer provides a robust, secure, and scalable infrastructure to meet the networking needs of Bahria University. It ensures reliable connectivity, efficient traffic flow, and enhanced network security. The network design promotes effective communication and collaboration across various departments and offers a seamless user experience for students, faculty, and staff.

