Practical – 4

Institute of Computer And Technology

B.Tech – CSE(BDA)

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Sem:-   2

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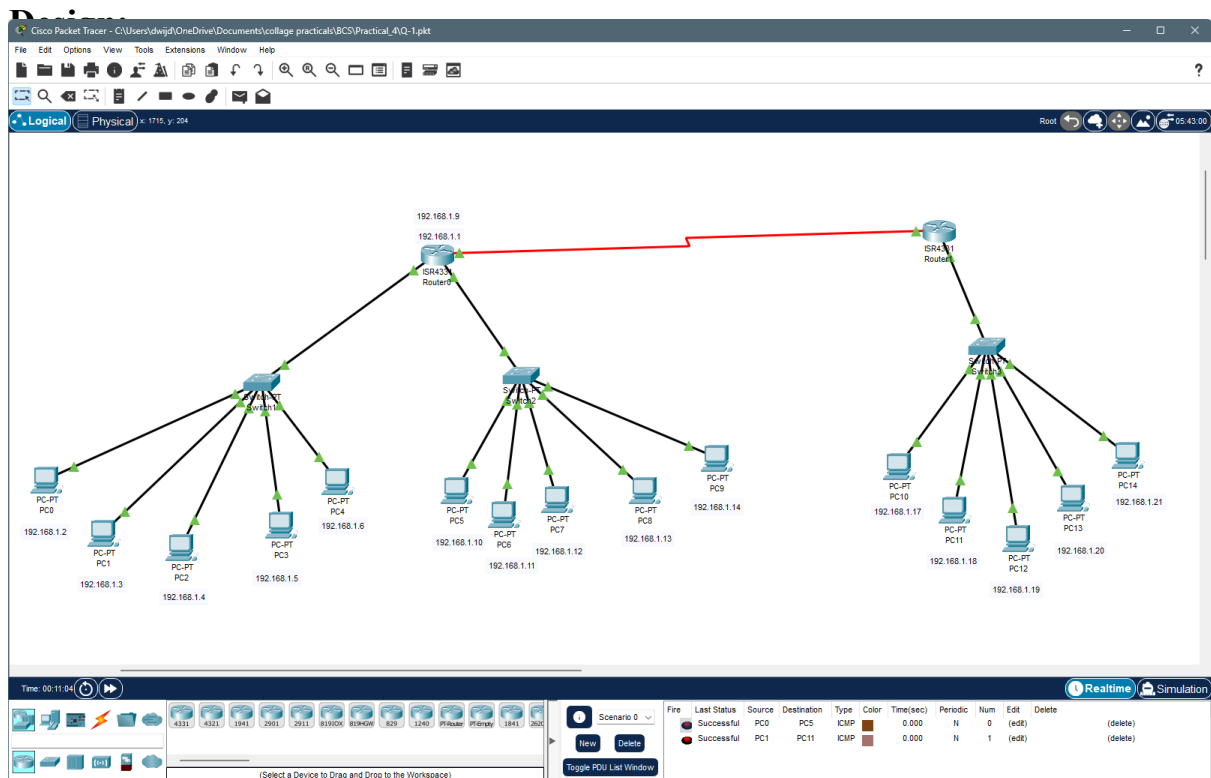**Aim:** Design a network using the subnetting concept.

Procedure:

Case 1: Alpha Enterprise has three departments: Admin, Production and Service. Each department contains five users. Design the network to provide connectivity between these three departments using subnetting concept.

Description :

To connect Alpha Enterprise's Admin, Production, and Service departments using subnetting, a Class C network (192.168.1.0/24) can be used. Each department will have its own subnet to manage IP addresses efficiently. Will be implemented to control and secure traffic between departments. Testing will be conducted to ensure proper connectivity, and monitoring tools will be used to manage network performance and security.

Design:

Device Configuration:

Router0

Physical | Config | CLI | Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/2/0
Serial0/2/1

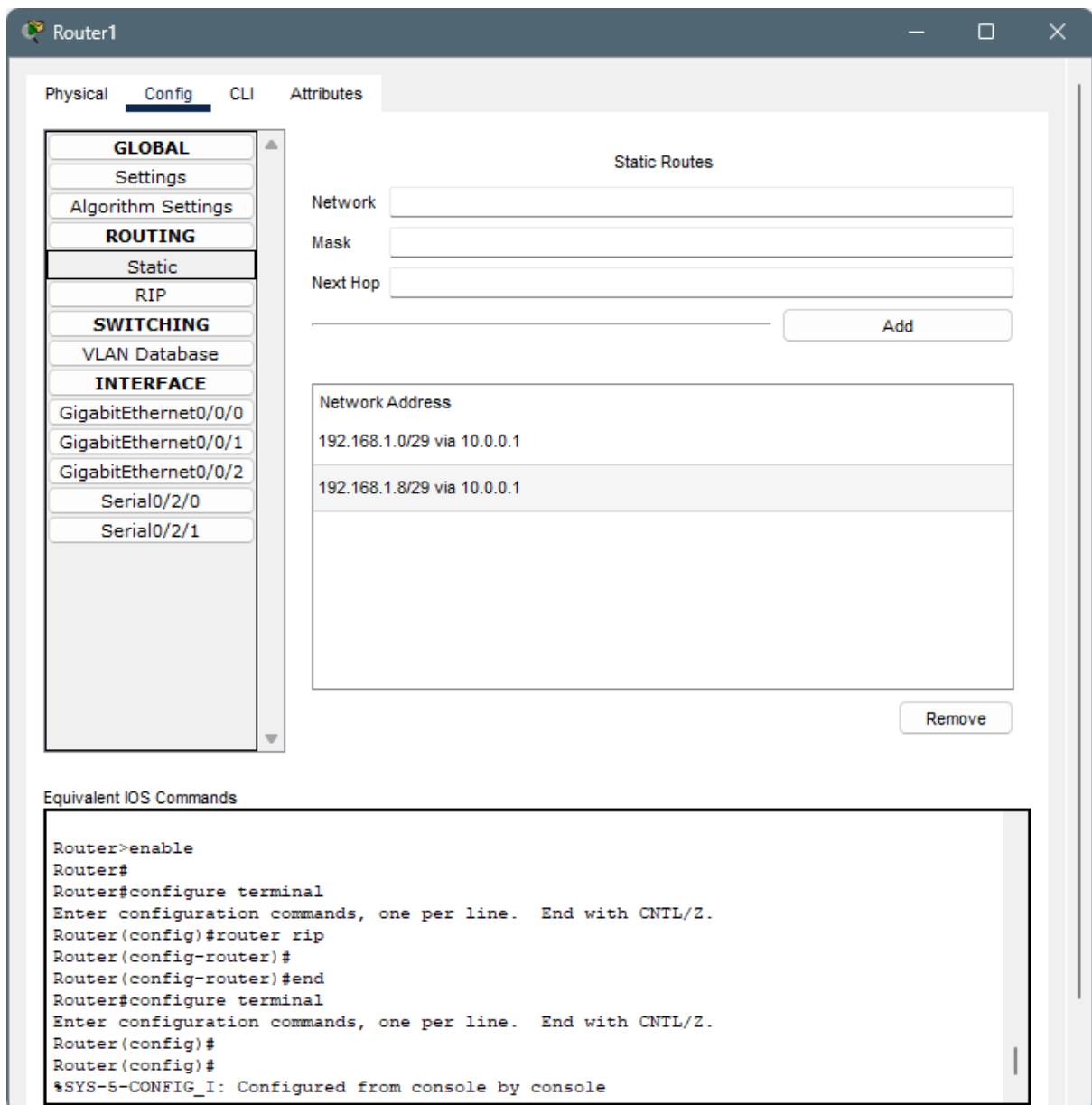## Static Routes

Network

Mask

Next Hop

Add

Network Address
192.168.1.16/29 via 10.0.0.2
192.168.1.24/29 via 10.0.0.2

Remove

Equivalent IOS Commands

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

Packet Transfer:

Fire		Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
		Successful	PC0	PC5	ICMP		0.000	N	0	(edit)	
		Successful	PC1	PC11	ICMP		0.000	N	1	(edit)	

2: Gamma Tech Pvt. Ltd. contains four departments: Admin, Production, Sales and R&D. Each department has five users. Design the network to provide connectivity between these four departments using subnetting concept.

Description :

To connect Gamma Tech Pvt. Ltd.'s four departments (Admin, Production, Sales, and R&D), each with five users, using subnetting, a Class C network (192.168.1.0/24) can be utilized. Assigning a unique subnet to each department allows for efficient IP address management. For example, the Admin department can use 192.168.1.0/29, Production 192.168.1.8/29, Sales 192.168.1.16/29, and R&D 192.168.1.24/29. A router will be configured to connect these subnets, enabling inter-departmental communication. Security measures such as firewall rules should be implemented to control and secure traffic. Testing the connectivity and using monitoring tools will help manage network performance and security.

Design :

Device Configuration:

Router0 — □ ×

Physical   Config   CLI   Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/2/0
Serial0/2/1

Static Routes

Network [   ]

Mask   [   ]

Next Hop [   ]

_____   [Add   ]

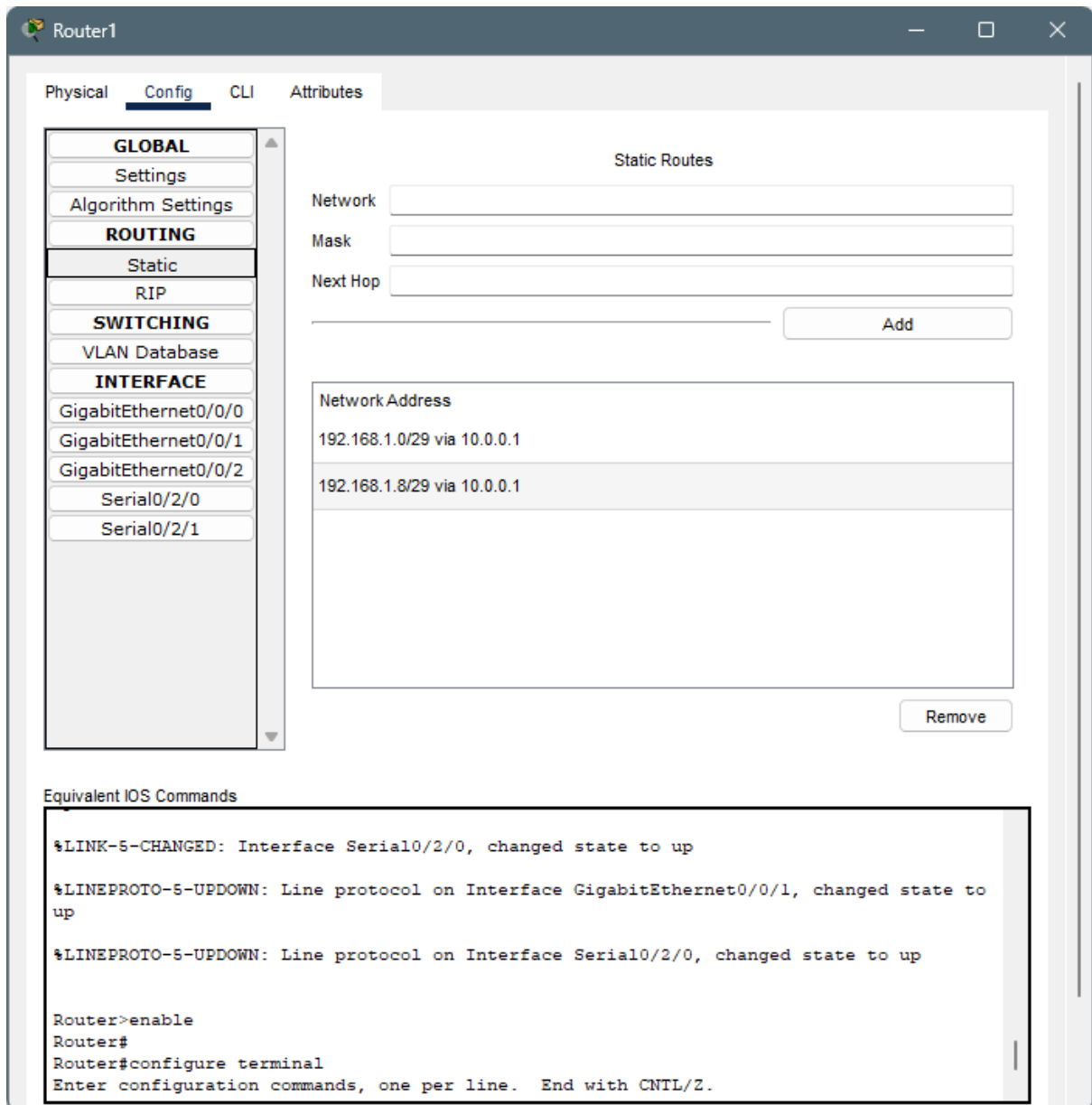| Network Address |
| --- |
| 192.168.1.16/29 via 10.0.0.2 |
| 192.168.1.24/29 via 10.0.0.2 |

[Remove   ]

Equivalent IOS Commands

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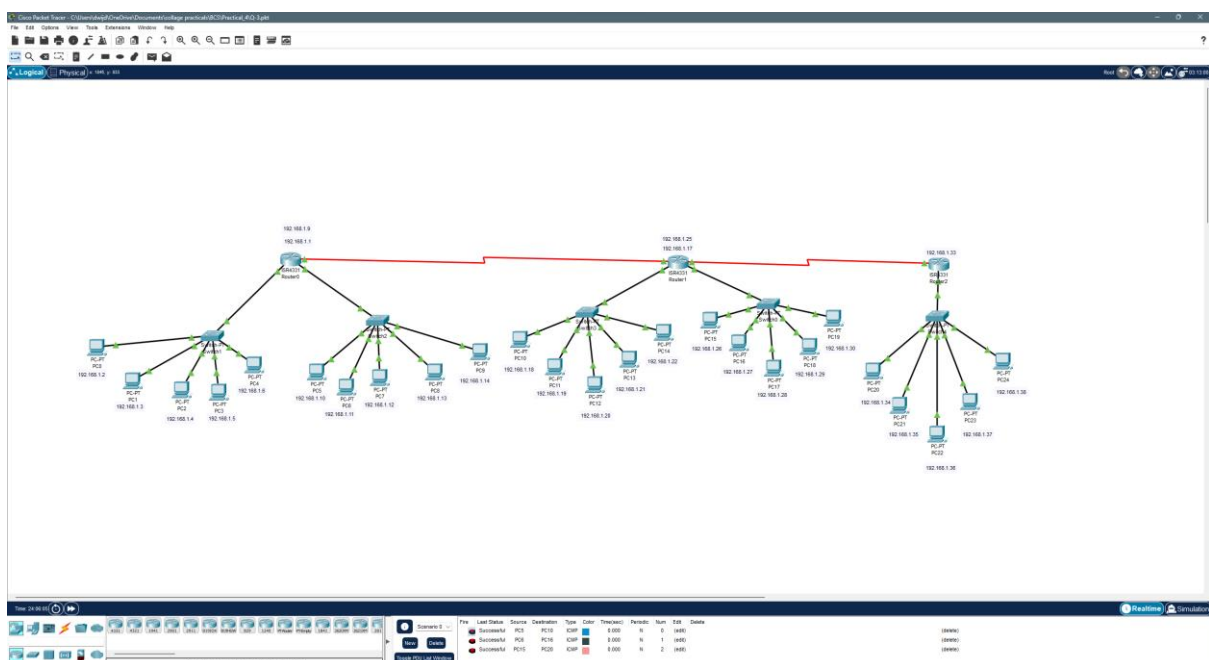
Packet Transfer :

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
●	Successful	PC0	PC5	ICMP		0.000	N	0	(edit)	(delete)
●	Successful	PC6	PC16	ICMP		0.000	N	1	(edit)	(delete)
●	Successful	PC5	PC10	ICMP		0.000	N	2	(edit)	(delete)

Case 3: Meta Solution Ltd. contains five departments: Production, Sales, Admin, R&D and Marketing. Each department has five users. You are appointed as Network Engineer in Sigma Solution Pvt. Ltd. Design the network to provide connectivity between these five departments using subnetting concept.

Description :

To connect Meta Solution Ltd.'s five departments (Production, Sales, Admin, R&D, and Marketing), each with five users, using subnetting, a Class C network (192.168.1.0/24) can be used. Assigning each department its own subnet allows for efficient IP address management. For example, Production can use 192.168.1.0/29, Sales 192.168.1.8/29, Admin 192.168.1.16/29, R&D 192.168.1.24/29, and Marketing 192.168.1.32/29. Configuring a router to connect these subnets enables inter-departmental communication. Implementing security measures such as firewall rules helps control and secure traffic. Testing connectivity and using monitoring tools ensure effective network management.

Design :

Device Configuration:

Router0

Physical | Config | CLI | Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/2/0
Serial0/2/1

Static Routes

Network

Mask

Next Hop

Add

Network Address

192.168.1.16/29 via 10.0.0.2

192.168.1.24/29 via 10.0.0.2

Remove

Equivalent IOS Commands

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 192.168.1.0
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
Router(config)#
%SYS-5-CONFIG_I: Configured from console by console
```

Router1

Physical | Config | CLI | Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/2/0
Serial0/2/1

Static Routes

Network

Mask

Next Hop

Add

Network Address

192.168.1.0/29 via 10.0.0.1

192.168.1.8/29 via 10.0.0.1

192.168.1.32/29 via 20.0.0.2

Remove

Equivalent IOS Commands

```
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/2/1
Router(config-if)#
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 20.0.0.0
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
Router(config)#
```

Router2

Physical | Config | CLI | Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/2/0
Serial0/2/1

Static Routes

Network

Mask

Next Hop

[Add]

Network Address

192.168.1.16/29 via 20.0.0.1

192.168.1.24/29 via 20.0.0.1

[Remove]

Equivalent IOS Commands

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 192.168.1.0
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
Router(config)#
%SYS-5-CONFIG_I: Configured from console by console
```

Packet Transfer:

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete	
	Successful	PC5	PC10	ICMP		0.000	N	0	(edit)		(delete)
	Successful	PC6	PC16	ICMP		0.000	N	1	(edit)		(delete)
	Successful	PC15	PC20	ICMP		0.000	N	2	(edit)		(delete)

Conclusion:

In conclusion, designing networks for companies like Alpha Enterprise, Gamma Tech Pvt. Ltd., and Meta Solution Ltd. involves subnetting to efficiently allocate IP addresses and provide connectivity between departments. By assigning each department its own subnet and configuring routers for inter-departmental communication, network engineers can ensure efficient IP address management and secure traffic flow. Testing connectivity and implementing security measures are crucial for effective network management.