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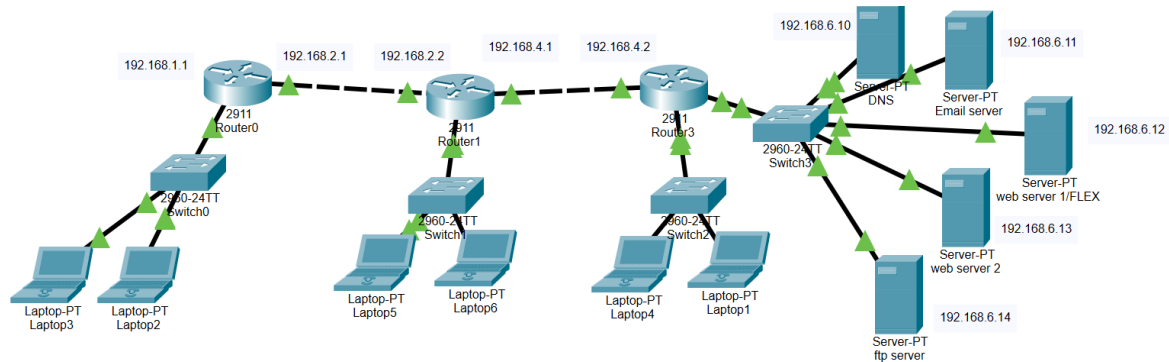
Course Name: Computer Networks LAB

Submitted to : Mam Hurmat Hidayat

Q1:

Step 1:

Build a Network topology.



Step 2

Configure the routers.

Router 1:

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0

GigabitEthernet0/1

GigabitEthernet0/2

GigabitEthernet0/0

Port Status ☒ On

Bandwidth ☐ 1000 Mbps ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 00D0.FFCE.0501

IP Configuration

IP Address 192.168.1.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Physical	Config	CLI	Attributes
<div> <div> GLOBAL <ul style="list-style-type: none"> Settings Algorithm Settings </div> <div> ROUTING <ul style="list-style-type: none"> Static RIP </div> <div> SWITCHING <ul style="list-style-type: none"> VLAN Database </div> <div> INTERFACE <ul style="list-style-type: none"> GigabitEthernet0/0 GigabitEthernet0/1 GigabitEthernet0/2 </div> </div>			
<div> <div>GigabitEthernet0/1</div> <div> <div> Port Status <input checked="" type="checkbox"/> On </div> <div> Bandwidth <div> <input type="radio"/> 1000 Mbps <input type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="radio"/> Auto </div> </div> <div> Duplex <div> <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto </div> </div> <div> MAC Address 00D0.FFCE.0502 </div> <div> <div> IP Configuration IP Address 192.168.2.1 Subnet Mask 255.255.255.0 </div> </div> <div> Tx Ring Limit 10 </div> </div> </div>			

Router 2

Physical	Config	CLI	Attributes
<div> <div> GLOBAL <ul style="list-style-type: none"> Settings Algorithm Settings </div> <div> ROUTING <ul style="list-style-type: none"> Static RIP </div> <div> SWITCHING <ul style="list-style-type: none"> VLAN Database </div> <div> INTERFACE <ul style="list-style-type: none"> GigabitEthernet0/0 GigabitEthernet0/1 GigabitEthernet0/2 </div> </div>			
<div> <div>GigabitEthernet0/0</div> <div> <div> Port Status <input checked="" type="checkbox"/> On </div> <div> Bandwidth <div> <input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="radio"/> Auto </div> </div> <div> Duplex <div> <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto </div> </div> <div> MAC Address 00E0.8F88.0701 </div> <div> <div> IP Configuration IP Address 192.168.3.1 Subnet Mask 255.255.255.0 </div> </div> <div> Tx Ring Limit 10 </div> </div> </div>			

Physical	Config	CLI	Attributes
<div> <div> GLOBAL <ul style="list-style-type: none"> Settings Algorithm Settings </div> <div> ROUTING <ul style="list-style-type: none"> Static RIP </div> <div> SWITCHING <ul style="list-style-type: none"> VLAN Database </div> <div> INTERFACE <ul style="list-style-type: none"> GigabitEthernet0/0 GigabitEthernet0/1 GigabitEthernet0/2 </div> </div>			
<div> <div>GigabitEthernet0/1</div> <div> <div> Port Status <input checked="" type="checkbox"/> On </div> <div> Bandwidth <div> <input checked="" type="radio"/> 1000 Mbps <input type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="radio"/> Auto </div> </div> <div> Duplex <div> <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto </div> </div> <div> MAC Address 00E0.8F88.0702 </div> <div> <div> IP Configuration IP Address 192.168.2.2 Subnet Mask 255.255.255.0 </div> </div> <div> Tx Ring Limit 10 </div> </div> </div>			

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0

GigabitEthernet0/1

GigabitEthernet0/2

GigabitEthernet0/2

Port Status

☒ On

Bandwidth

☐ 1000 Mbps☐ 100 Mbps☐ 10 Mbps☒ Auto

Duplex

☐ Half Duplex☒ Full Duplex☒ Auto

MAC Address00E0.8F88.0703

IP Configuration

IP Address192.168.4.1

Subnet Mask255.255.255.0

Tx Ring Limit10

Router 3

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0

GigabitEthernet0/1

GigabitEthernet0/2

GigabitEthernet0/0

Port Status

☒ On

Bandwidth

☐ 1000 Mbps☒ 100 Mbps☐ 10 Mbps☒ Auto

Duplex

☐ Half Duplex☒ Full Duplex☒ Auto

MAC Address0002.4A33.8201

IP Configuration

IP Address192.168.6.1

Subnet Mask255.255.255.0

Tx Ring Limit10

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0

GigabitEthernet0/1

GigabitEthernet0/2

GigabitEthernet0/1

Port Status

☒ On

Bandwidth

☐ 1000 Mbps☒ 100 Mbps☐ 10 Mbps☒ Auto

Duplex

☐ Half Duplex☒ Full Duplex☒ Auto

MAC Address0002.4A33.8202

IP Configuration

IP Address192.168.5.1

Subnet Mask255.255.255.0

Tx Ring Limit10

Physical **Config** CLI Attributes

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

GigabitEthernet0/2

Port Status ☒ On

Bandwidth ☒ 1000 Mbps ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0002.4A33.8203

IP Configuration
IP Address 192.168.4.2
Subnet Mask 255.255.255.0

Tx Ring Limit 10

Step 3:

Web servers Configuration.

Web server 1:

Physical Config Services **Desktop** Programming Attributes

IP Configuration Configuration X

IP Configuration

☐ DHCP ☒ Static

IP Address 192.168.6.12

Subnet Mask 255.255.255.0

Default Gateway 192.168.6.1

DNS Server 192.168.6.10

Physical Config **Services** Desktop Programming Attributes

SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP

File Name: index.html

```

<html>
<center><font size="+2" color="blue">FLEX STUDENTS</font></center>
<hr>Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
<p>Quick Links:
<br><a href="helloworld.html">MARKS</a>
<br><a href="copyrights.html">Copyrights</a>
<br><a href="image.html">Image page</a>
<br><a href="cscoptlogo177x111.jpg">Image</a>
</html>

```

Web server 2:

PhysicalConfigServicesDesktopProgrammingAttributes

IP ConfigurationX

IP Configuration

☐ DHCP

☒ Static

IP Address

192.168.6.13

Subnet Mask

255.255.255.0

Default Gateway

192.168.6.1

DNS Server

192.168.6.10

PhysicalConfigServicesDesktopProgrammingAttributes

SERVICES

File Name: index.html

```
<html>
<center><font size='+2' color='blue'>SLATE STUDENTS</font></center>
<hr>Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
<p>Quick Links:
<br><a href='helloworld.html'>A small page</a>
<br><a href='copyrights.html'>Copyrights</a>
<br><a href='image.html'>Image page</a>
<br><a href='cscoptlogo177x111.jpg'>Image</a>
</html>
```

Step 4:

DNS server configuration.

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS**
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DNS

DNS Service ☒ On ☐ Off

Resource Records

Name Type **A Record** ▾

Address

No.	Name	Type	Detail
0	mail.com	A Record	192.168.6.11
1	www.flex.com	A Record	192.168.6.12
2	www.slate.com	A Record	192.168.6.13

Step 5:

Email server configuration

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL**
- FTP
- IoT
- VM Management
- Radius EAP

EMAIL

SMTP Service ☒ ON ☐ OFF

POP3 Service ☒ ON ☐ OFF

Domain Name:

User Setup

User Password

client1
client2
client3
client4
client5
client6

Step 6:

Check Email received and reply

Sending mail to client2@mail.com , with subject : xyz .. Mail Server: mail.com
DNS resolving. Resolving name: mail.com by querying to DNS Server: 192.168.6.10 DNS
resolved ip address: 192.168.6.11
Send Success.

Cancel
Send/Receive

☐ Top

PhysicalConfigDesktopProgrammingAttributes

MAIL BROWSER

X

Mails

ComposeReplyReceiveDeleteConfigure Mail

	From	Subject	Received
1	client1@mail.com	xyz	Sat Nov 26 2022 21:58:51

xyz
client1@mail.com
Sent : Sat Nov 26 2022 21:58:51

hello world

PhysicalConfigDesktopProgrammingAttributes

Reply Mail

X

Send

To:client1@mail.com

Subject:RE: xyz

Subject : xyz

From : client1@mail.com

Sent : Sat Nov 26 2022 21:58:51

hello world

status ok

PhysicalConfigDesktopProgrammingAttributes

Mails

Compose

Reply

Receive

Delete

Configure Mail

	From	Subject	Received
1	client2@mail.com	RE: xyz	Sat Nov 26 2022 22:01:07

RE: xyz

client2@mail.com

Sent : Sat Nov 26 2022 22:01:07

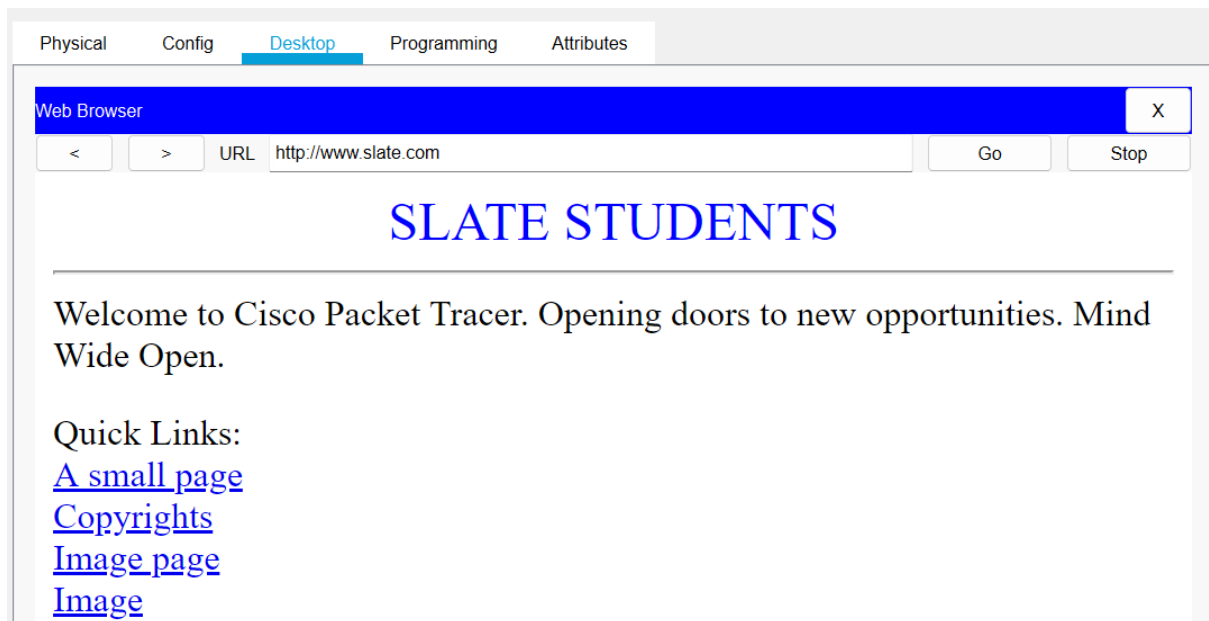
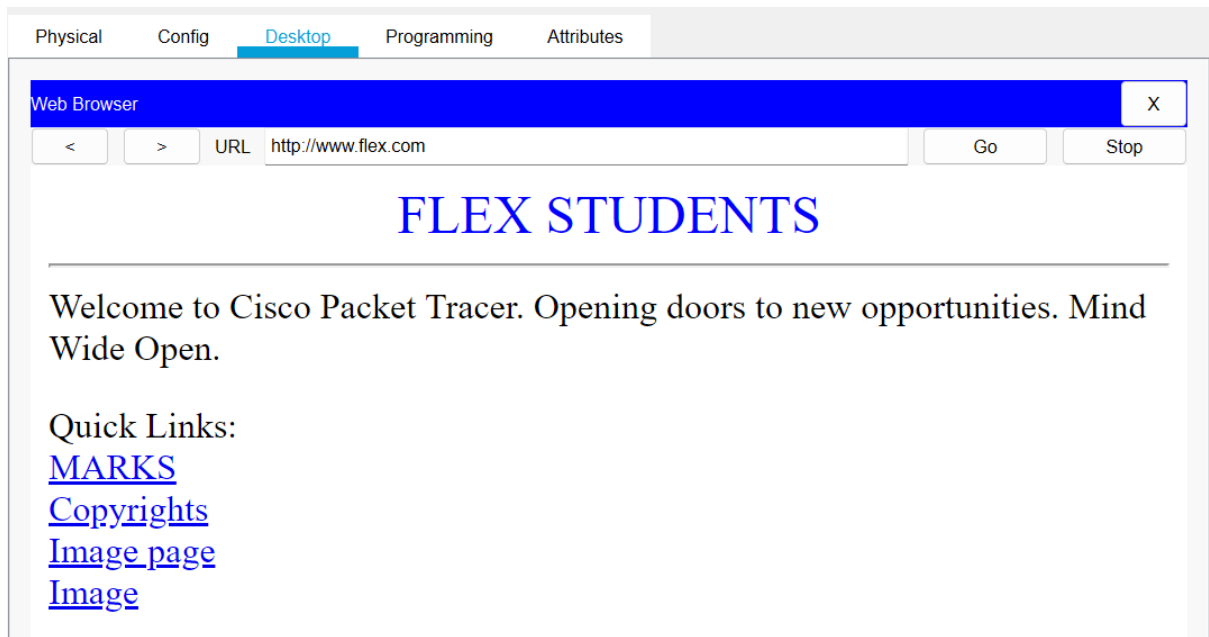
Subject : xyz

From : client1@mail.com

Sent : Sat Nov 26 2022 21:58:51

hello world

status ok



Step 7:

Making DHCP pool in router for assigning ip address dynamically.

Router 1:

```
Router>
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp pool IPD
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#dns-server 192.168.6.10
Router(dhcp-config)#
Router(dhcp-config)#exit
Router(config)#
Router(config)#ip dhcp excluded-address 192.168.1.1 192.168.1.10
```

Router 2:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp pool IPD
Router(dhcp-config)#network 192.168.3.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.10.1
Router(dhcp-config)#dns-server 192.168.6.10
Router(dhcp-config)#exit
Router(config)#ip dhcp excluded-address 192.168.3.1 192.168.3.10
```

Router 3:

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp pool IPD
Router(dhcp-config)#network 192.168.5.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.5.1
Router(dhcp-config)#dns-server 192.168.6.10
Router(dhcp-config)#
Router(dhcp-config)#exit
Router(config)#ip dhcp excluded-address 192.168.5.1 192.168.5.10
Router(config)#
```

The screenshot shows a network management interface with tabs for Physical, Config, Desktop, Programming, and Attributes. The 'Desktop' tab is active, displaying the 'IP Configuration' window. The window title is 'IP Configuration' with a close button (X). The 'Interface' dropdown is set to 'FastEthernet0'. Under 'IP Configuration', the 'DHCP' radio button is selected, and the 'Static' radio button is unselected. A message 'DHCP request successful.' is displayed. The configuration fields are as follows:

Field	Value
IP Address	192.168.1.11
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	192.168.6.10

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

Interface

FastEthernet0

▼

IP Configuration

☒ DHCP

☐ Static

DHCP request successful.

IP Address

192.168.1.12

Subnet Mask

255.255.255.0

Default Gateway

192.168.1.1

DNS Server

192.168.6.10

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

Interface

FastEthernet0

▼

IP Configuration

☒ DHCP

☐ Static

DHCP request successful.

IP Address

192.168.3.11

Subnet Mask

255.255.255.0

Default Gateway

192.168.10.1

DNS Server

192.168.6.10

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

Interface

FastEthernet0

▼

IP Configuration

☒ DHCP

☐ Static

DHCP request successful.

IP Address

192.168.3.12

Subnet Mask

255.255.255.0

Default Gateway

192.168.10.1

DNS Server

192.168.6.10

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

Interface

FastEthernet0

IP Configuration

DHCP

Static

DHCP request successful.

IP Address

192.168.5.12

Subnet Mask

255.255.255.0

Default Gateway

192.168.5.1

DNS Server

192.168.6.10

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

Interface

FastEthernet0

IP Configuration

DHCP

Static

DHCP request successful.

IP Address

192.168.5.14

Subnet Mask

255.255.255.0

Default Gateway

192.168.5.1

DNS Server

192.168.6.10

Q2: you are given the network address of 172.31.1.0 /24 to subnet and provide the IP addressing for the network shown in the Topology. The required host addresses for each WAN and LAN link are labelled in the topology.

1. Based on the topology, how many subnets are needed?

Ans : there will be 7 subnets needed.

2. How many bits must be borrowed to support the number of subnets in the topology table?

Ans : 4 bits must be borrowed to support the number of the subnets.

3. How many subnets does this create?

Ans : This creates 16 subnets.

4. Calculate the binary value for the first five subnets?

Net 0: 172.31.1.0 0 0 0 0 0 0 0 0

Net 1: 172.31.1.0 0 0 0 1 0 0 0 0

Net 2: 172.31.1.0 0 1 0 0 0 0 0 0

Net 3: 172.31.1.0 0 1 1 0 0 0 0 0

Net 4: 172.31.1.0 1 0 0 0 0 0 0 0

5. Calculate the binary and decimal value of the new subnet mask

11111111.11111111.11111111. 1 1 1 1 0 0 0 0

255.255 .255 .240

6. Complete the Subnet Table, listing all available subnets, the first and last usable host address, and the broadcast address.

Subnet number	Subnet IP	First usable host IP	Last usable host IP	Broadcast Address
0	172.31.1.0	172.31.1.1	172.31.1.14	172.31.1.15
1	172.31.1.16	172.31.1.17	172.31.1.30	172.31.1.31
2	172.31.1.32	172.31.1.33	172.31.1.46	172.31.1.47
3	172.31.1.48	172.31.1.49	172.31.1.62	172.31.1.63
4	172.31.1.64	172.31.1.65	172.31.1.78	172.31.1.79
5	172.31.1.80	172.31.1.81	172.31.1.94	172.31.1.95
6	172.31.1.96	172.31.1.97	172.31.1.110	172.31.1.111
7	172.31.1.112	172.31.1.113	172.31.1.126	172.31.1.127
8	172.31.1.128	172.31.1.129	172.31.1.142	172.31.1.143
9	172.31.1.144	172.31.1.145	172.31.1.158	172.31.1.159
10	172.31.1.160	172.31.1.161	172.31.1.174	172.31.1.175
11	172.31.1.176	172.31.1.177	172.31.1.190	172.31.1.191
12	172.31.1.192	172.31.1.193	172.31.1.206	172.31.1.207
13	172.31.1.208	172.31.1.209	172.31.1.222	172.31.1.223
14	172.31.1.224	172.31.1.225	172.31.1.238	172.31.1.239
15	172.31.1.240	172.31.1.241	172.31.1.254	172.31.1.255