Name : Ammaar Naeem Laghari

Roll No : 20P-0180

Section: BCS-5B

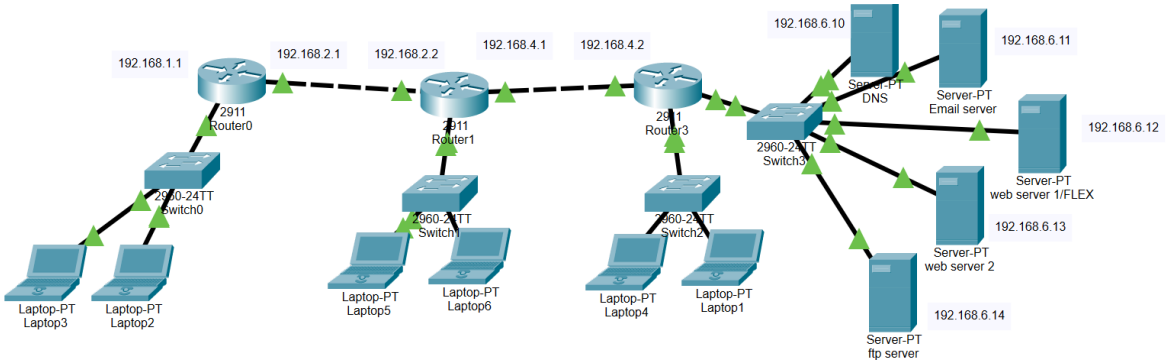
Course Name: Computer Networks LAB

Submitted to : Mam Hurmat Hidayat

Q1:

Step 1:

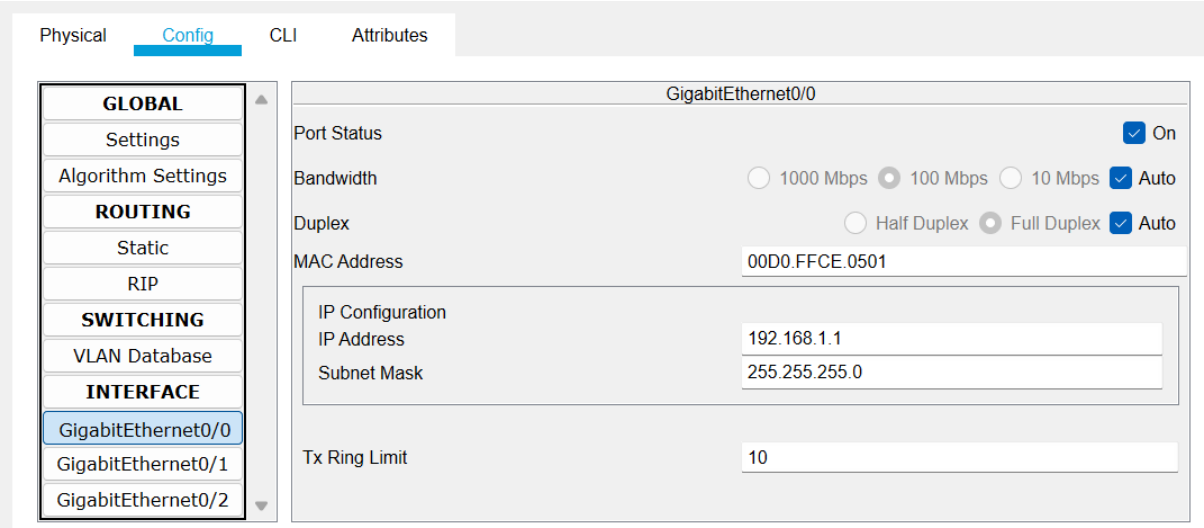
Build a Network topology.

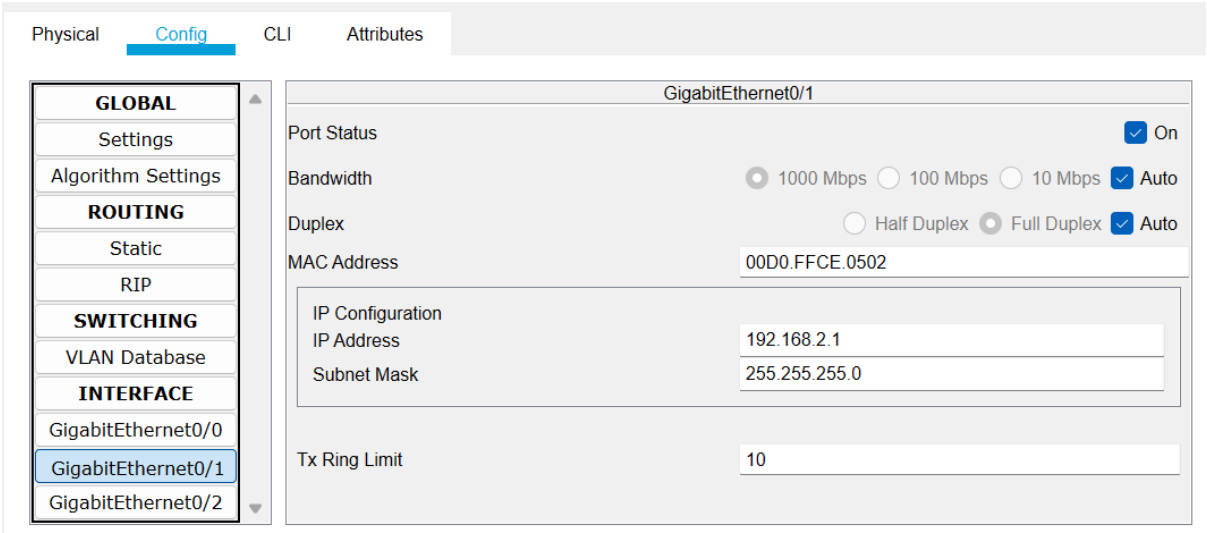


Step 2

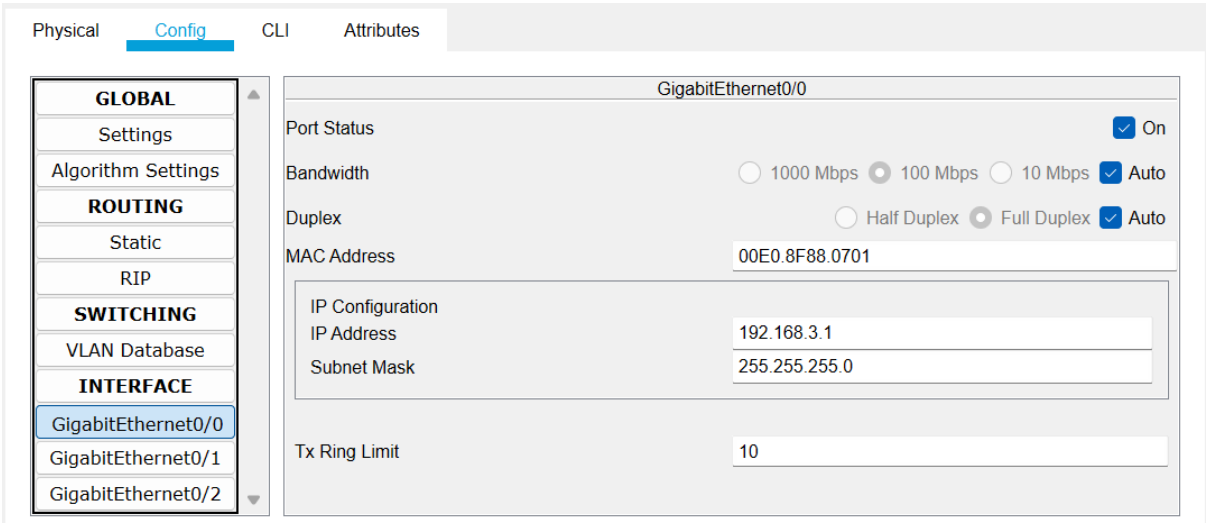
Configure the routers.

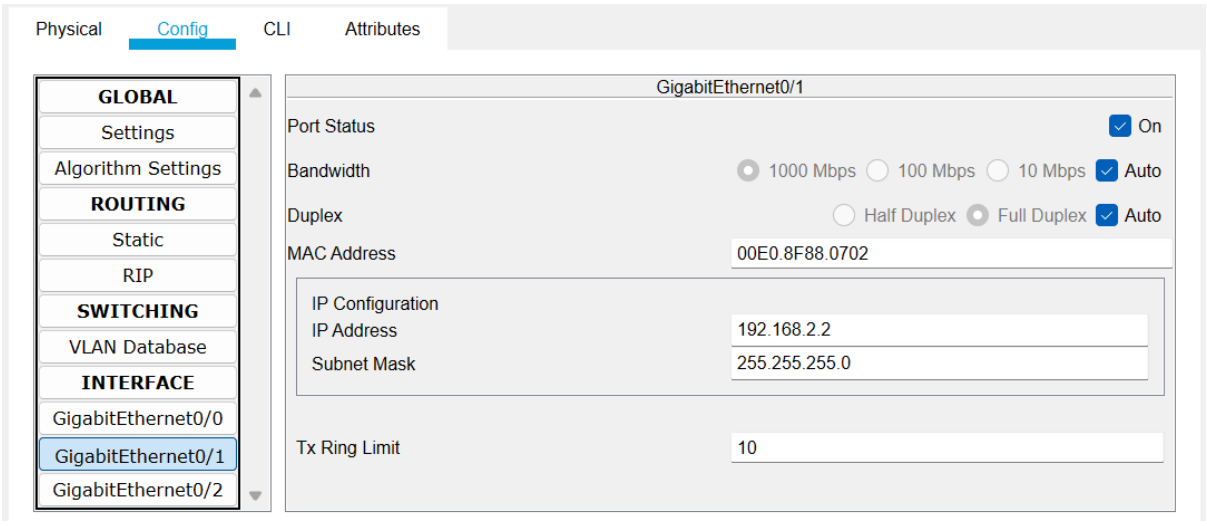
Router 1:

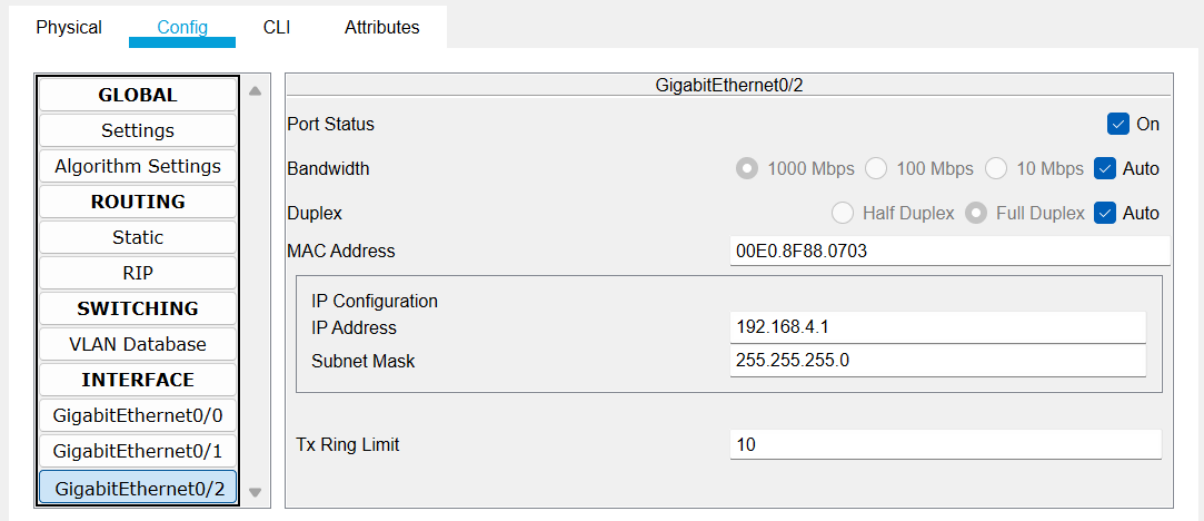



Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/1
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00D0.FFCE.0502
IP Configuration
IP Address
192.168.2.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10

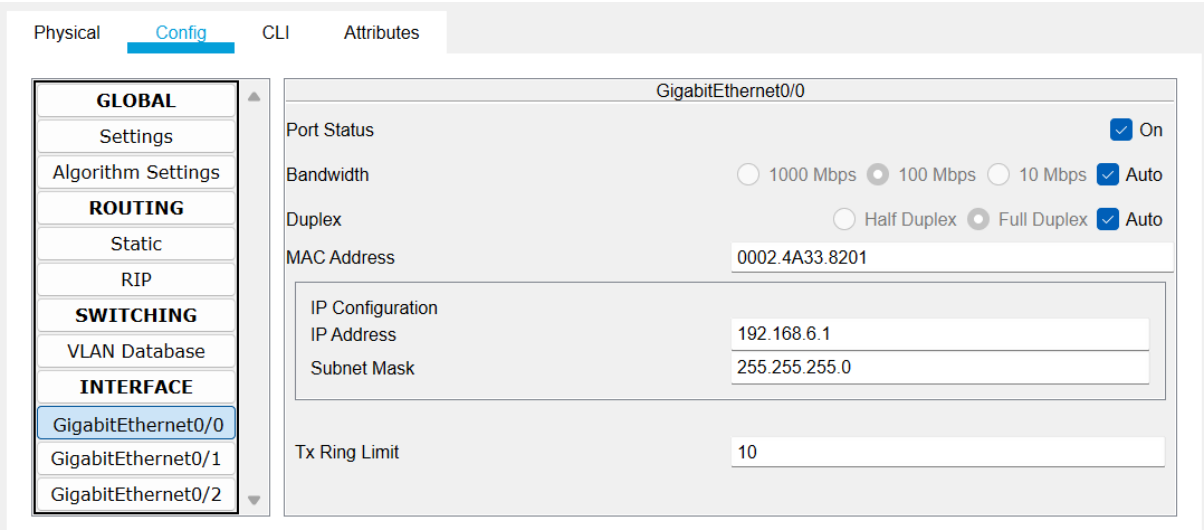
Router 2

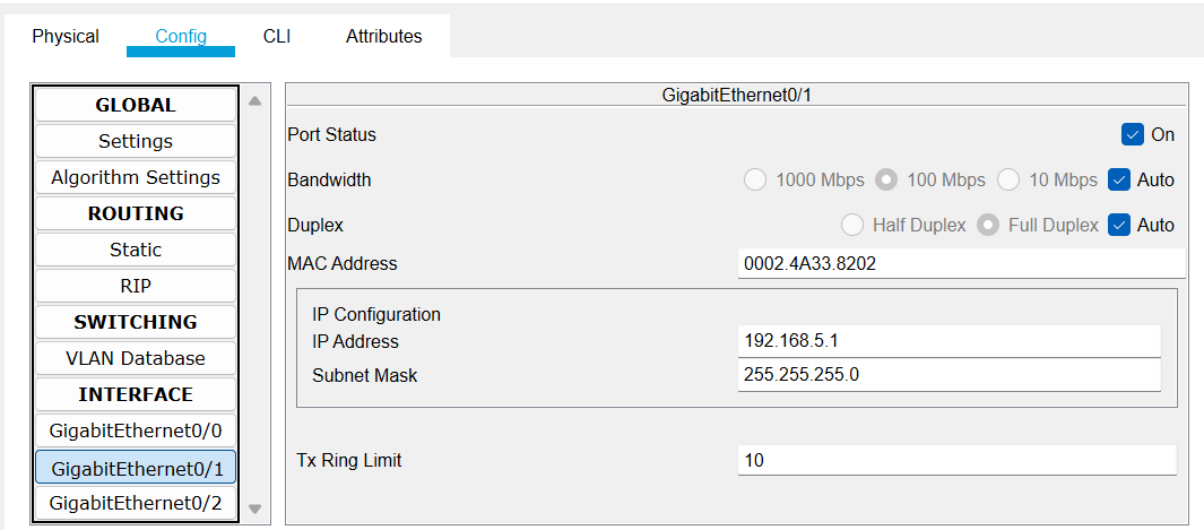

Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.8F88.0701
IP Configuration
IP Address
192.168.3.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10

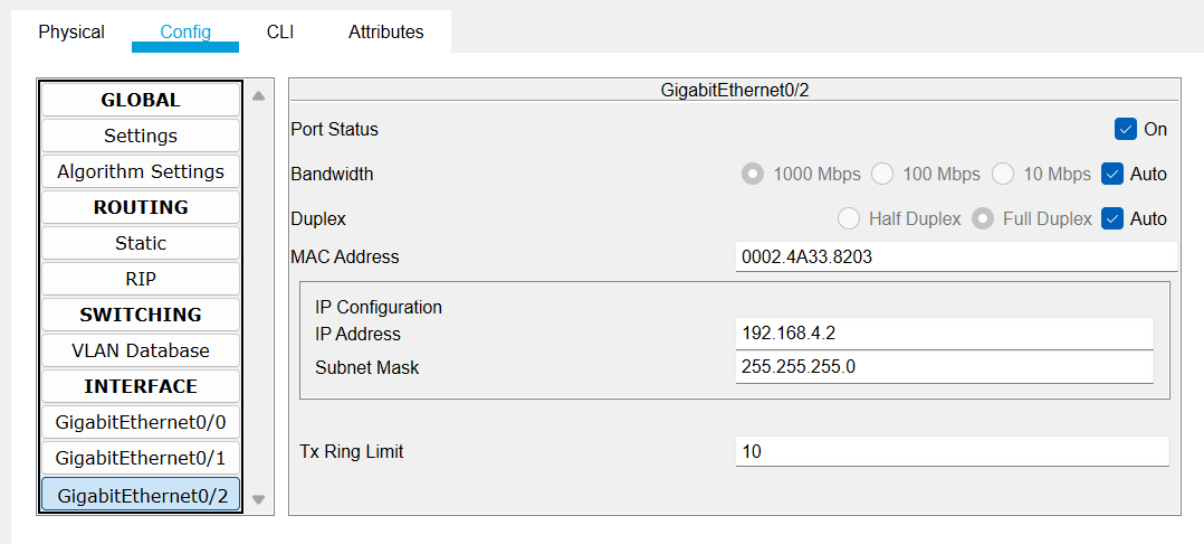

Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/1
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.8F88.0702
IP Configuration
IP Address
192.168.2.2
Subnet Mask
255.255.255.0
Tx Ring Limit
10


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
00E0.8F88.0703
IP Configuration
IP Address
192.168.4.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10

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 Address
0002.4A33.8201
IP Configuration
IP Address
192.168.6.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10

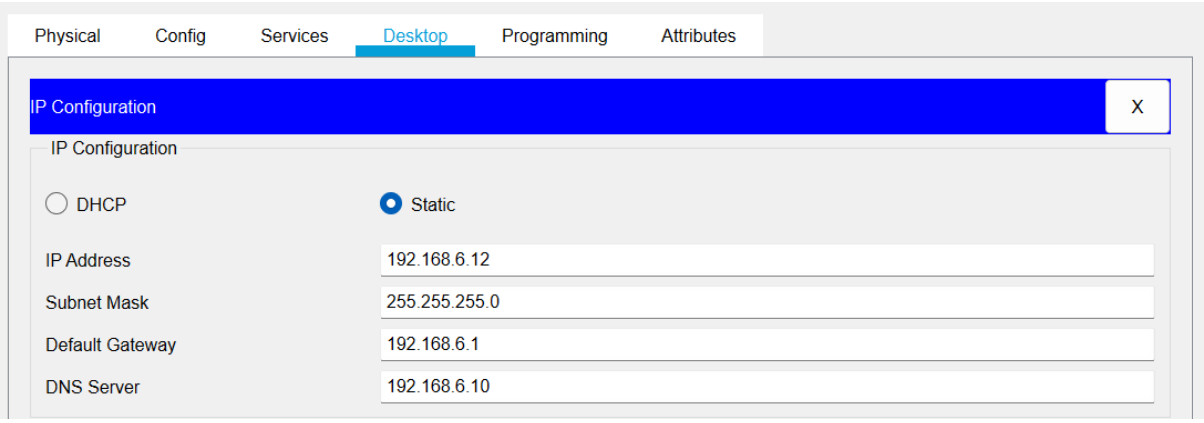

Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/1
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0002.4A33.8202
IP Configuration
IP Address
192.168.5.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10

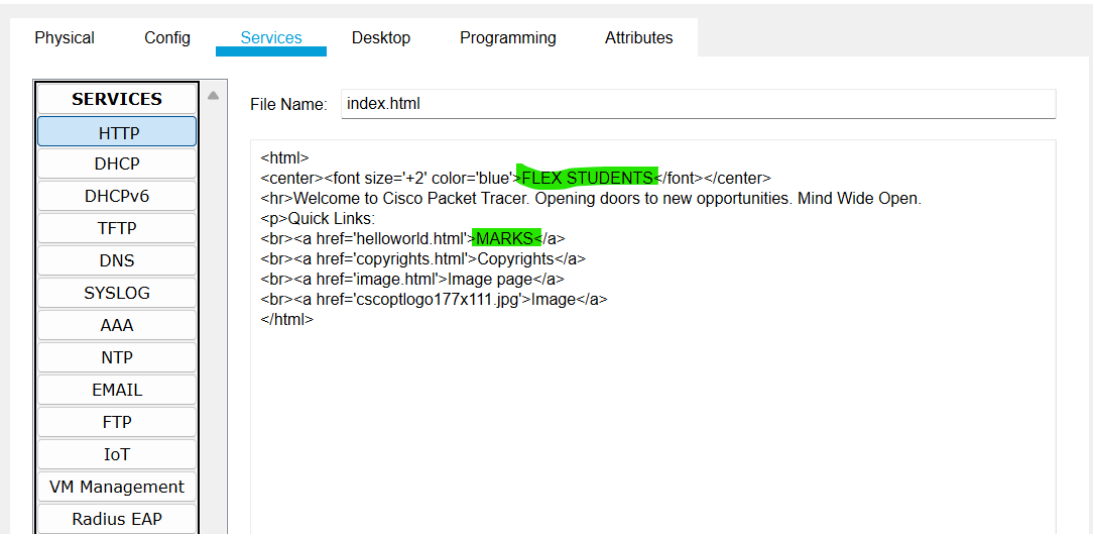


Step 3:

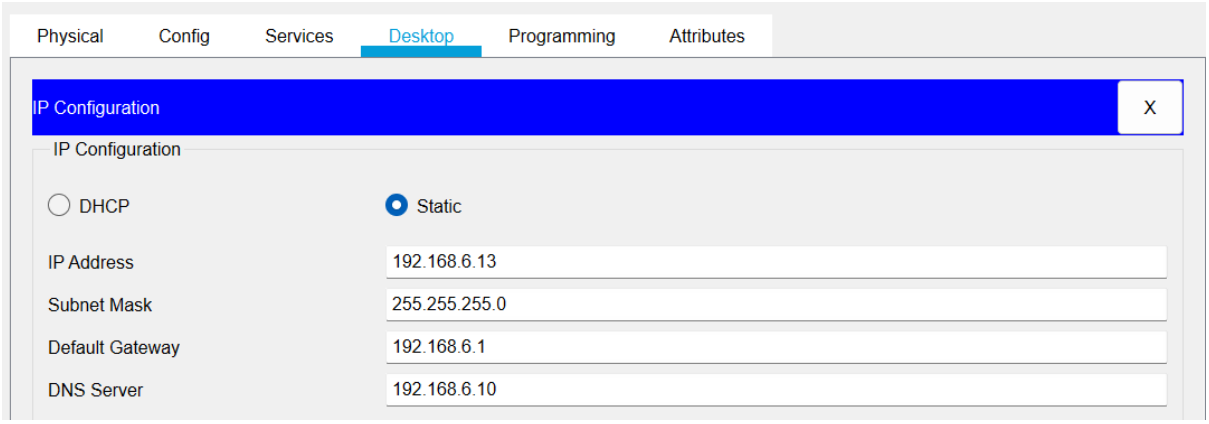
Web servers Configuration.

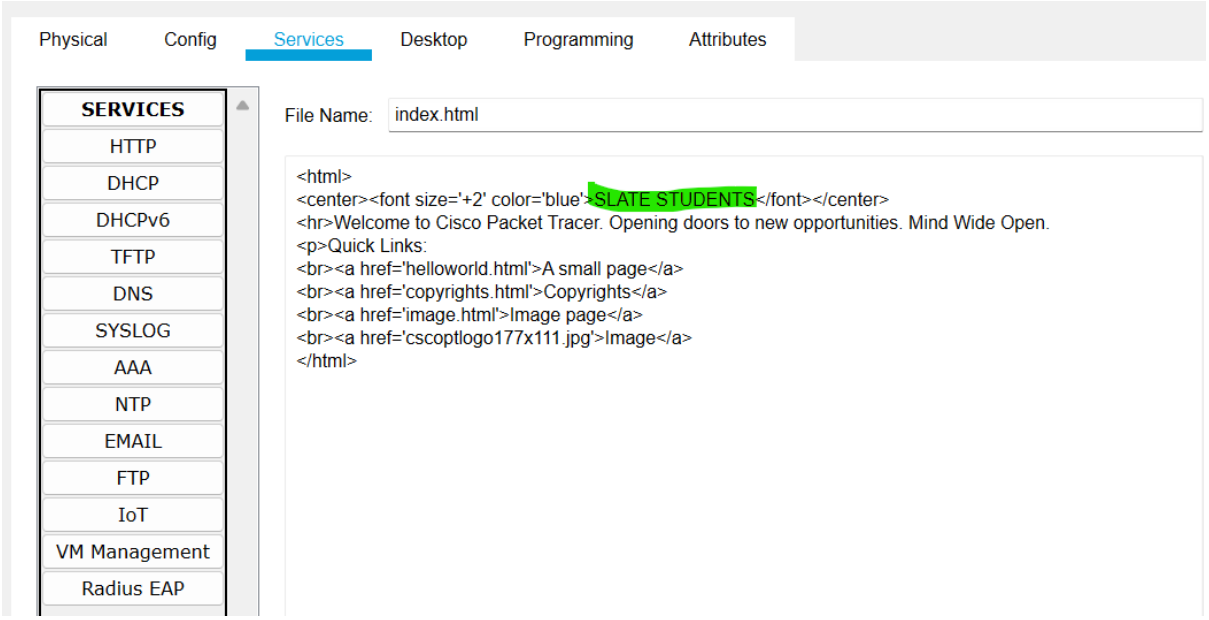
Web server 1:





Web server 2:


Physical
Config
Services
Desktop
Programming
Attributes
IP Configuration
X
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


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>
SLATE STUDENTS
<hr>Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
<p>Quick Links:

A small page

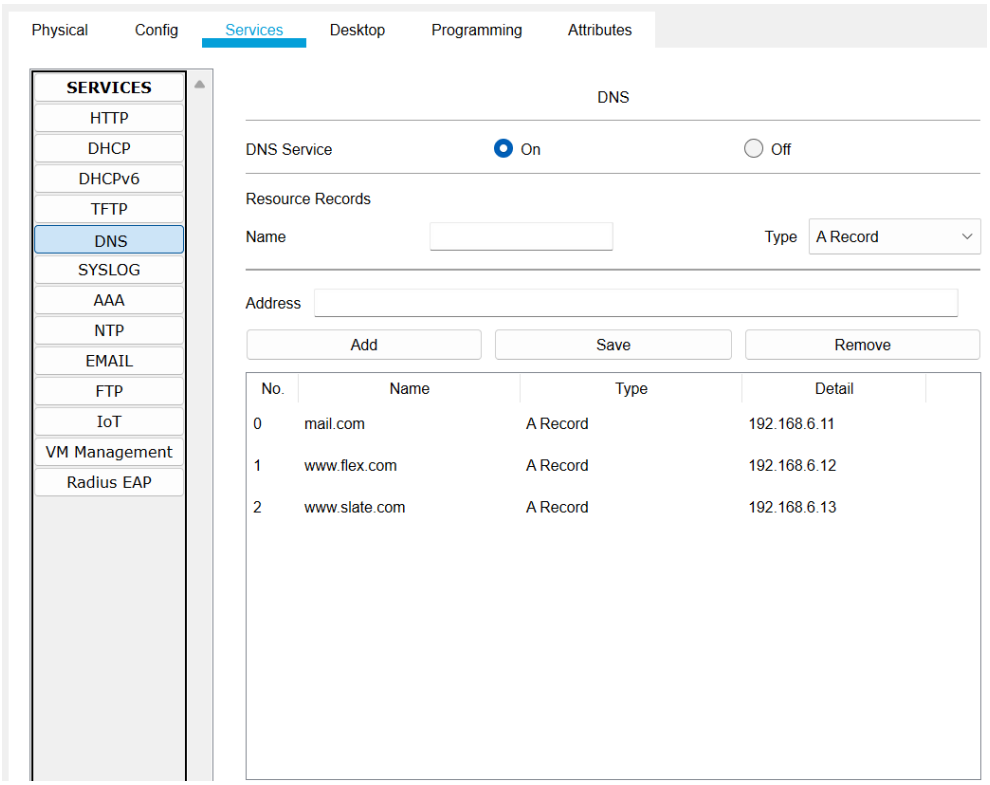
Copyrights

Image page

Image
</html>

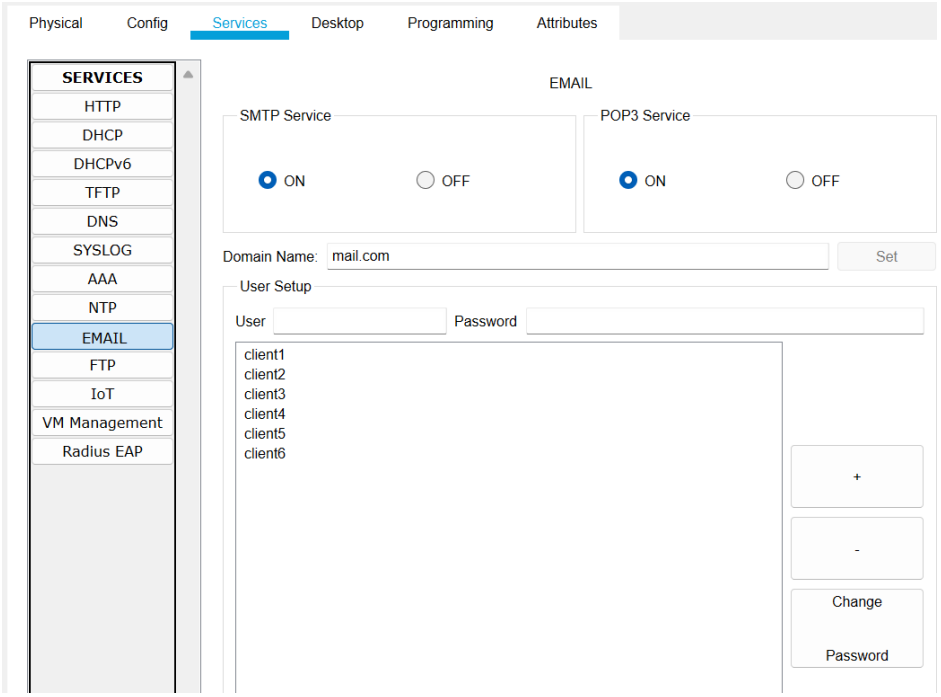
Step 4:

DNS server configuration.



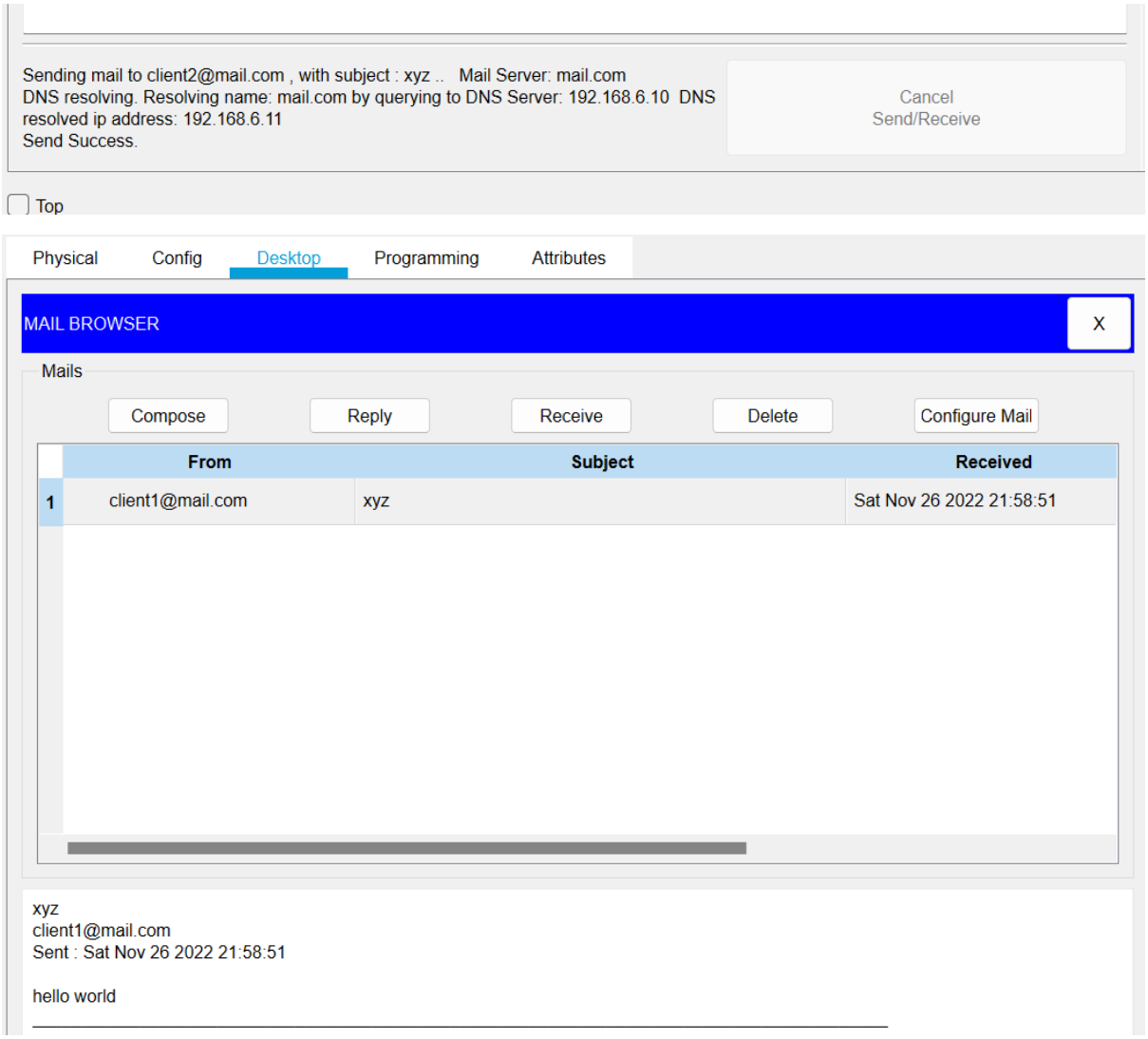
Step 5:

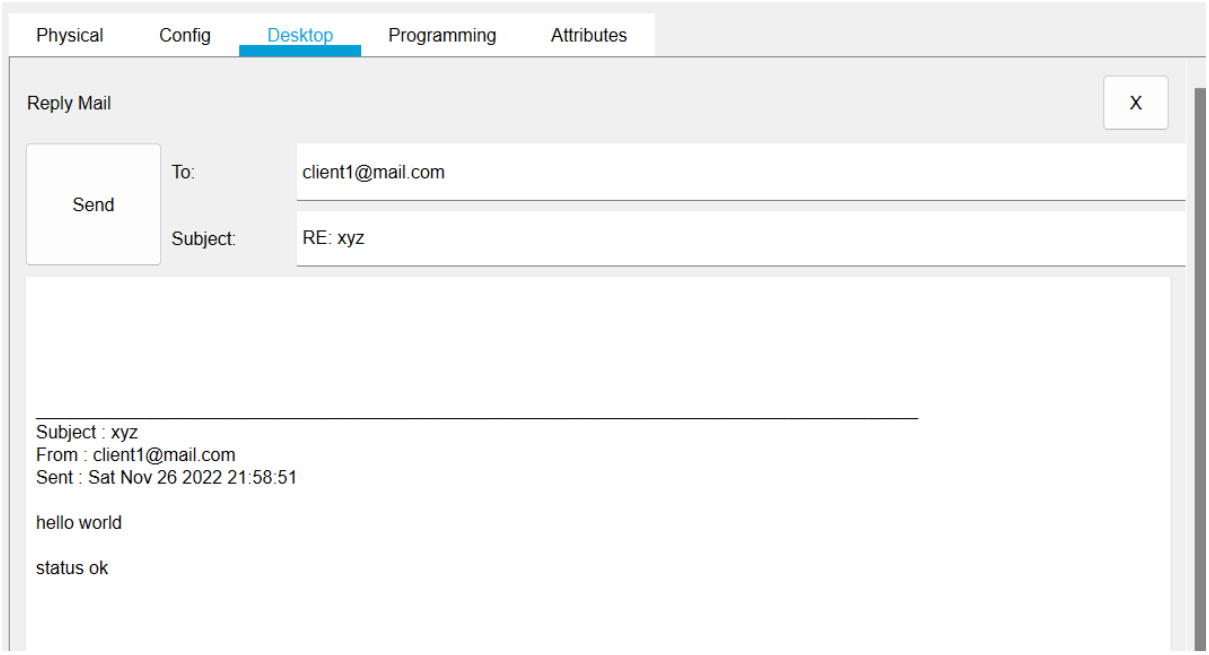
Email server configuration

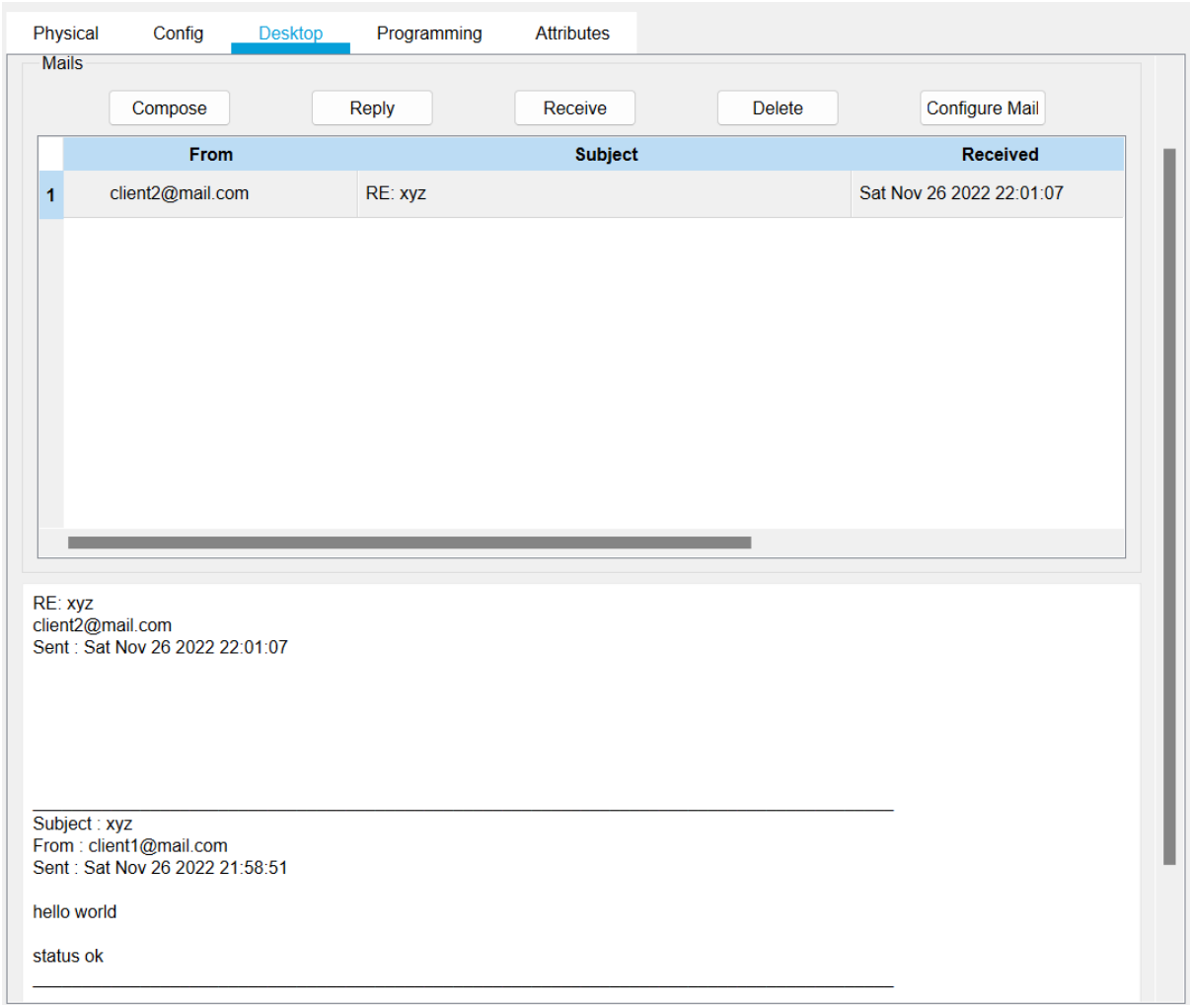


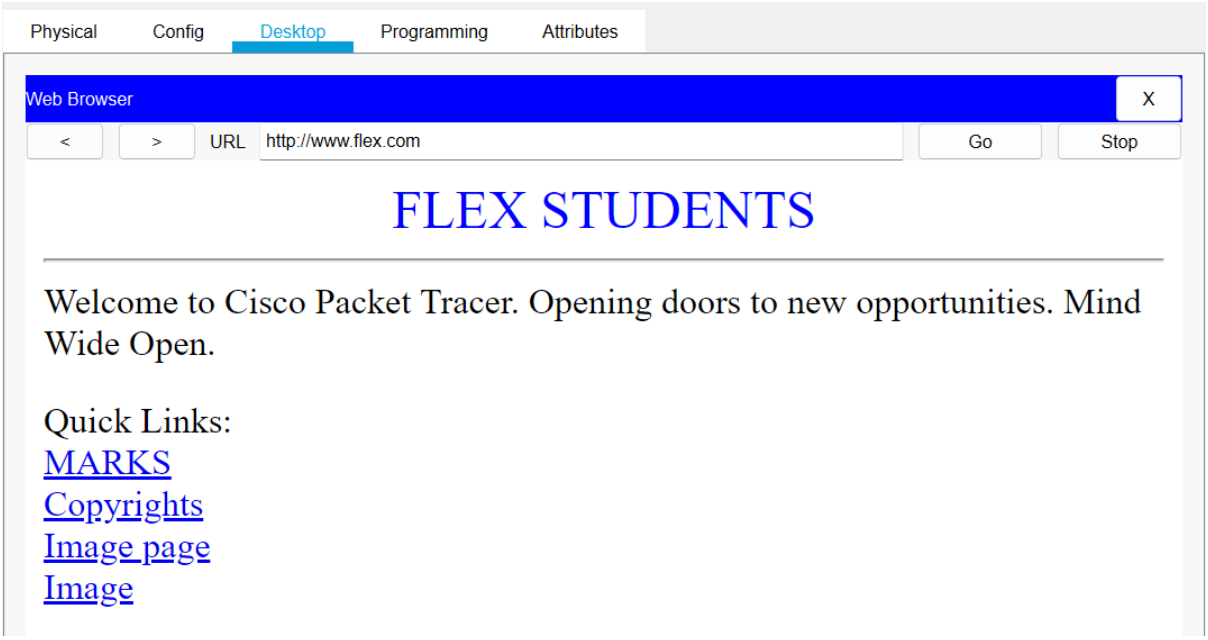
Step 6:

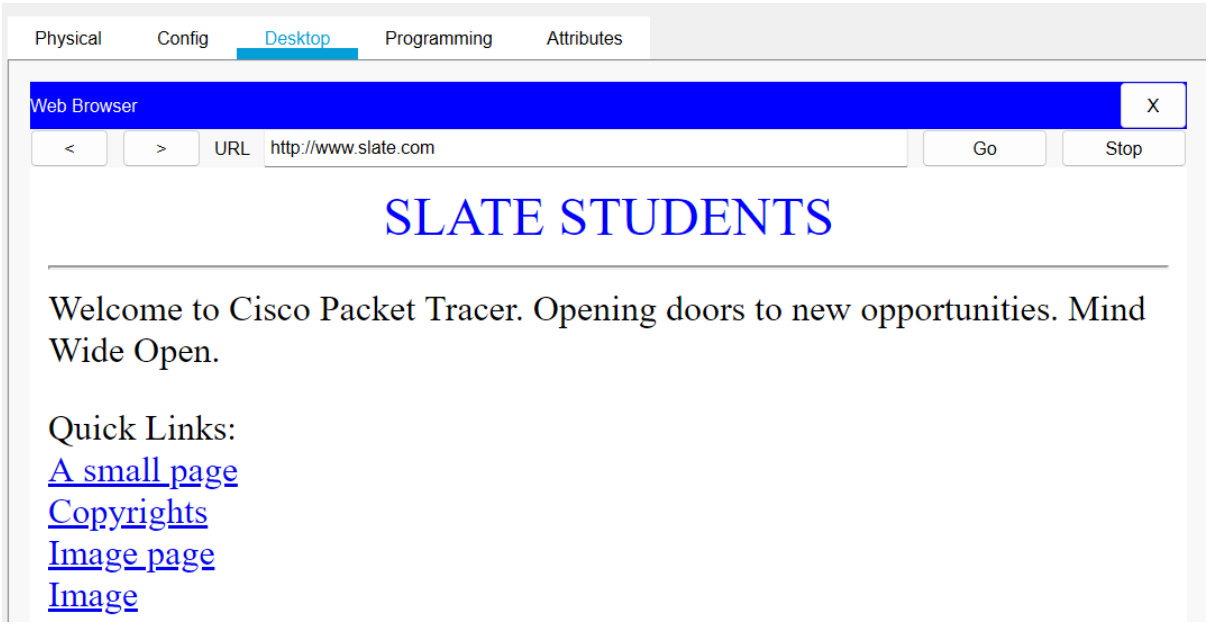
Check Email received and reply




Physical
Config
Desktop
Programming
Attributes
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


Physical
Config
Desktop
Programming
Attributes
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


Physical
Config
Desktop
Programming
Attributes
Web Browser
X
<
>
URL
http://www.flex.com
Go
Stop
FLEX STUDENTS
Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
MARKS
Copyrights
Image page
Image


Physical
Config
Desktop
Programming
Attributes
Web Browser
X
<
>
URL
http://www.slate.com
Go
Stop
SLATE STUDENTS
Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
A small page
Copyrights
Image page
Image

Step 7:

Making DHCP pool in router for assigning ip address dynamically.

Router 1:

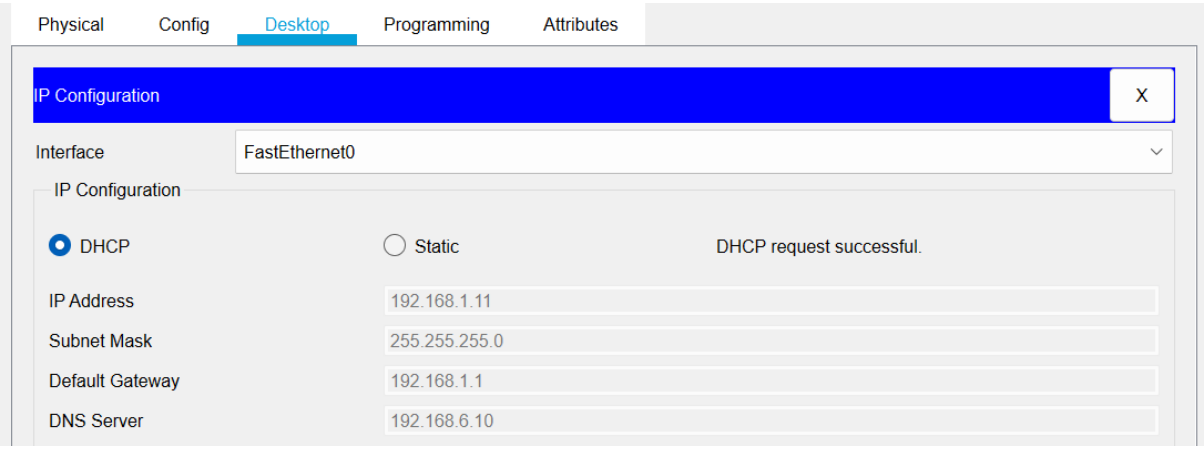
```
Router>
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip dhcp pool IPD
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#dns-server 192.168.6.10
Router(dhcp-config)#
Router(dhcp-config)#exit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

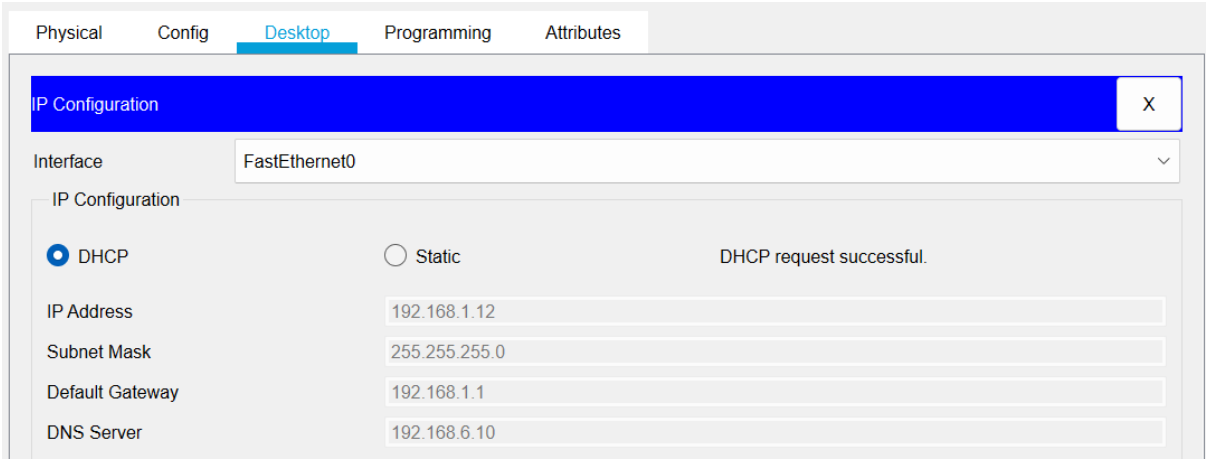
Router 2:

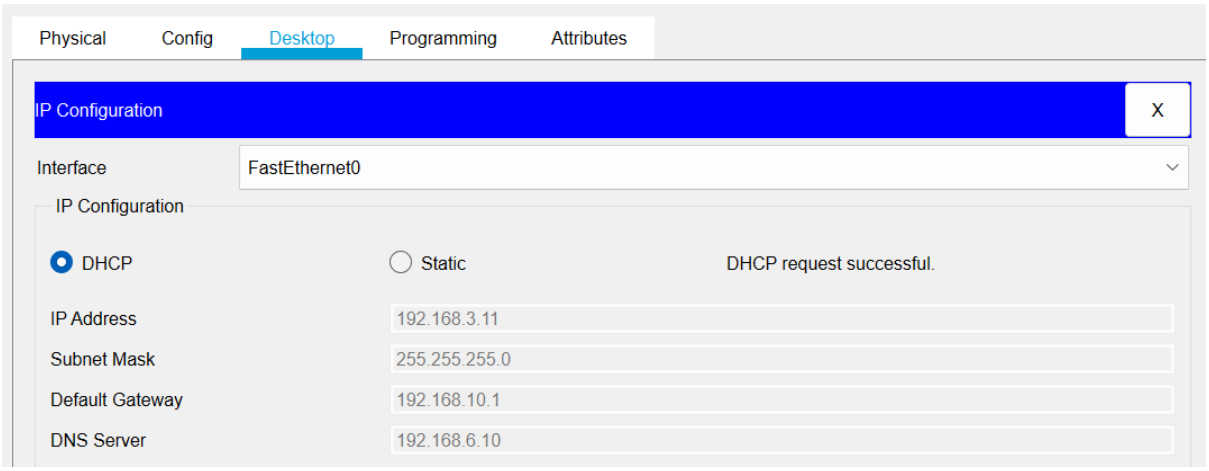
```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip dhcp pool IPD
Router(dhcp-config)#network 192.168.3.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.10.1
Router(dhcp-config)#dns-server 192.168.6.10
Router(dhcp-config)#exit
Router(config)#ip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

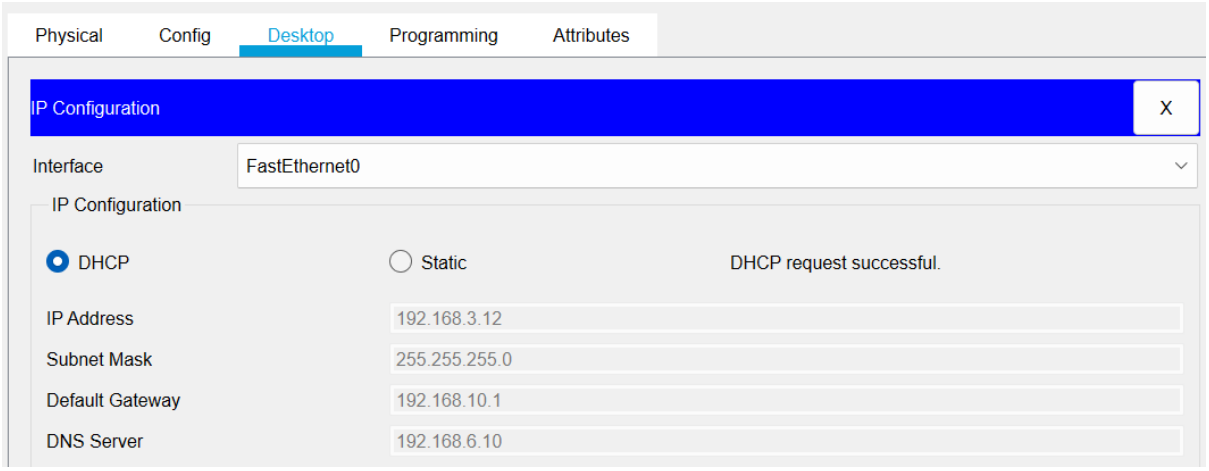
Router 3:

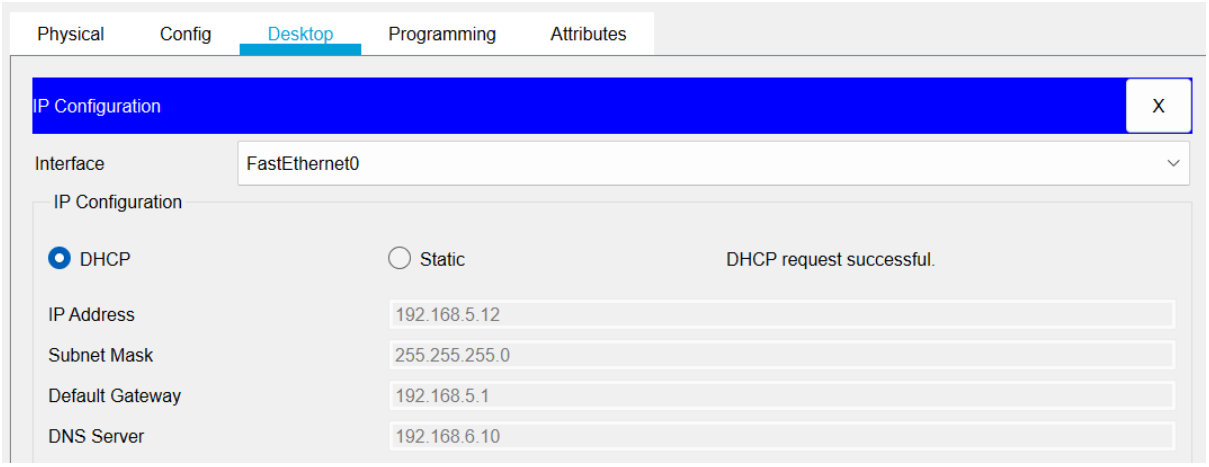
```
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip dhcp pool IPD
Router(dhcp-config)#network 192.168.5.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.5.1
Router(dhcp-config)#dns-server 192.168.6.10
Router(dhcp-config)#
Router(dhcp-config)#exit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

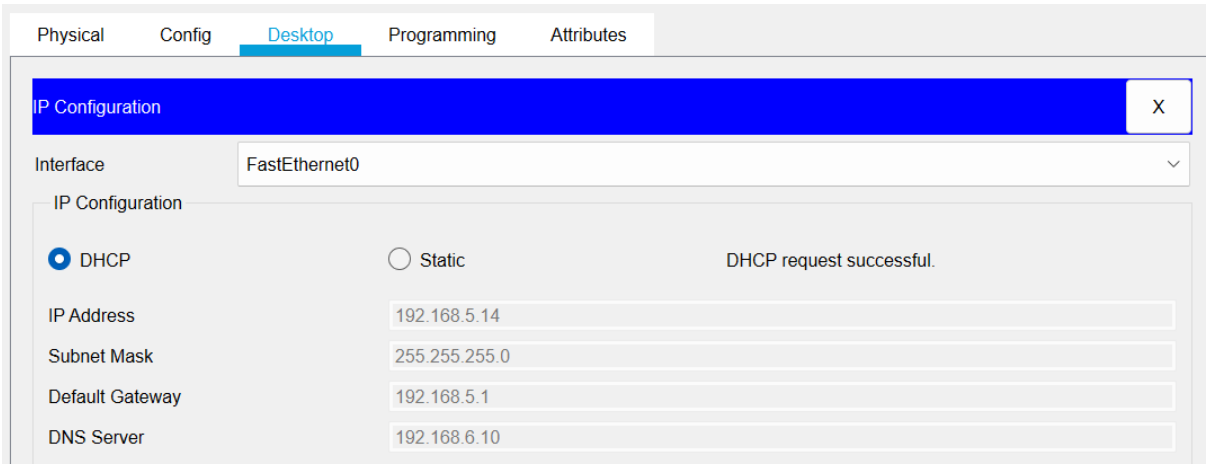



Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
DHCP request successful.
IP Address
192.168.1.12
Subnet Mask
255.255.255.0
Default Gateway
192.168.1.1
DNS Server
192.168.6.10


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

Net 1: 172.31.1.0 0 0 1 0 0 0 0

Net 2: 172.31.1.0 0 1 0 0 0 0 0

Net 3: 172.31.1.0 0 1 1 0 0 0 0

Net 4: 172.31.1.0 1 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	172.31.163
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