CS361

LABORATORY 7

NAME:

ARCHIT AGRAWAL

ROLL NO. :

202051213

SECTION:

2B

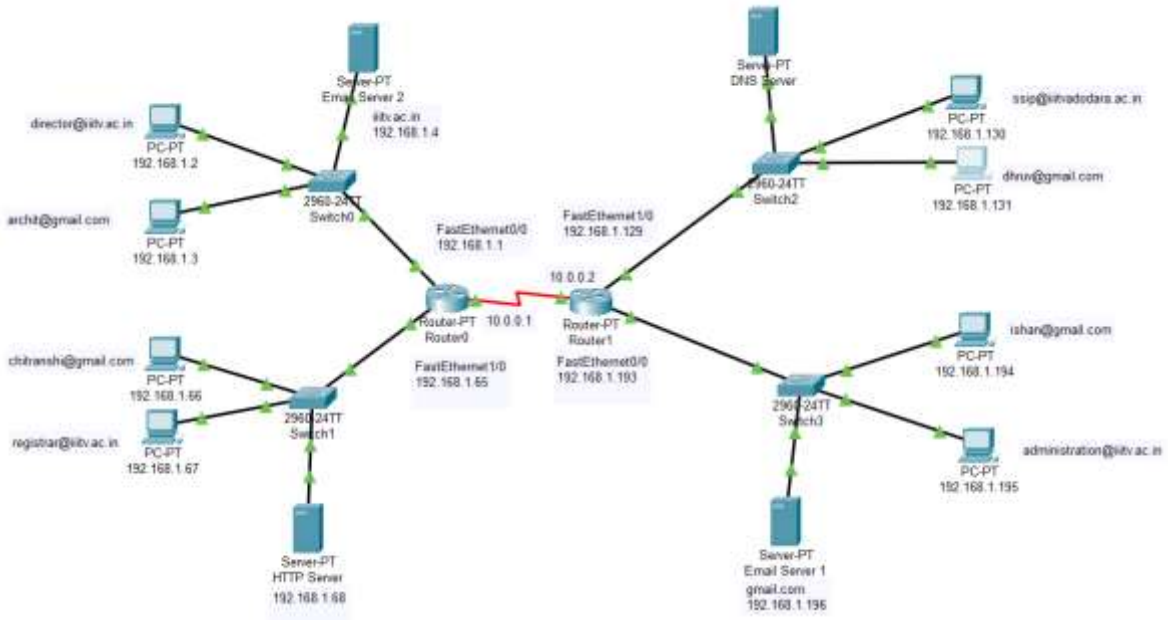
1. Define and differentiate between a server and a router.

A **server** is a computer **program or a device** that provides functionality for called clients which are other programs or devices. Servers can provide various functionalities called services. These services include **sharing data or resources** among multiple clients, or performing computation for a client. It accepts and responds to requests made over a network.

Routers are networking devices operating at layer 3 or a network layer of the OSI model. They are responsible for receiving, analysing, and forwarding data packets among the connected computer networks. When a data packet arrives, the router inspects the destination address, consults its routing tables to decide the optimal route and then transfers the packet along this route.

2. **Make a complex network (as discussed in lab) with multiple PCs, servers (HTTP and Mail), switches and routers. The network should have a minimum of 4 subnets with IP address subnetting. Each server may be in different subnet. Demonstrate transfer of emails between two different domains (eg: gmail and yahoo). Also show the response of HTTP request from a PC that is in different subnet from the HTTP server.**

   The network is shown in the figure below.



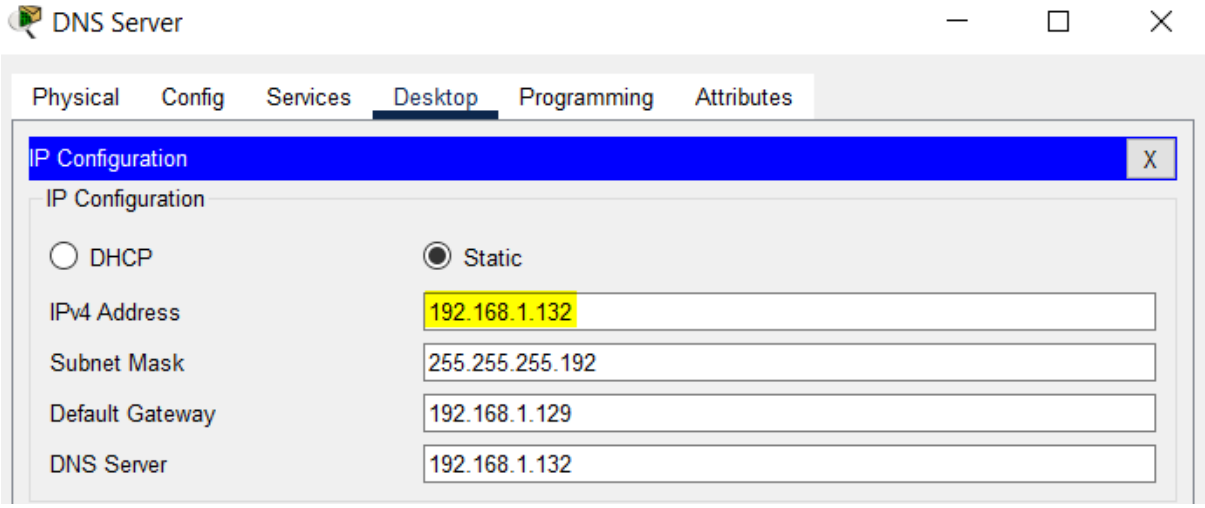
   Here, I have used the domain 192.168.1.0 and created four subnets using the subnet mask 255.255.255.192 or /26.

   The subnet ranges are:

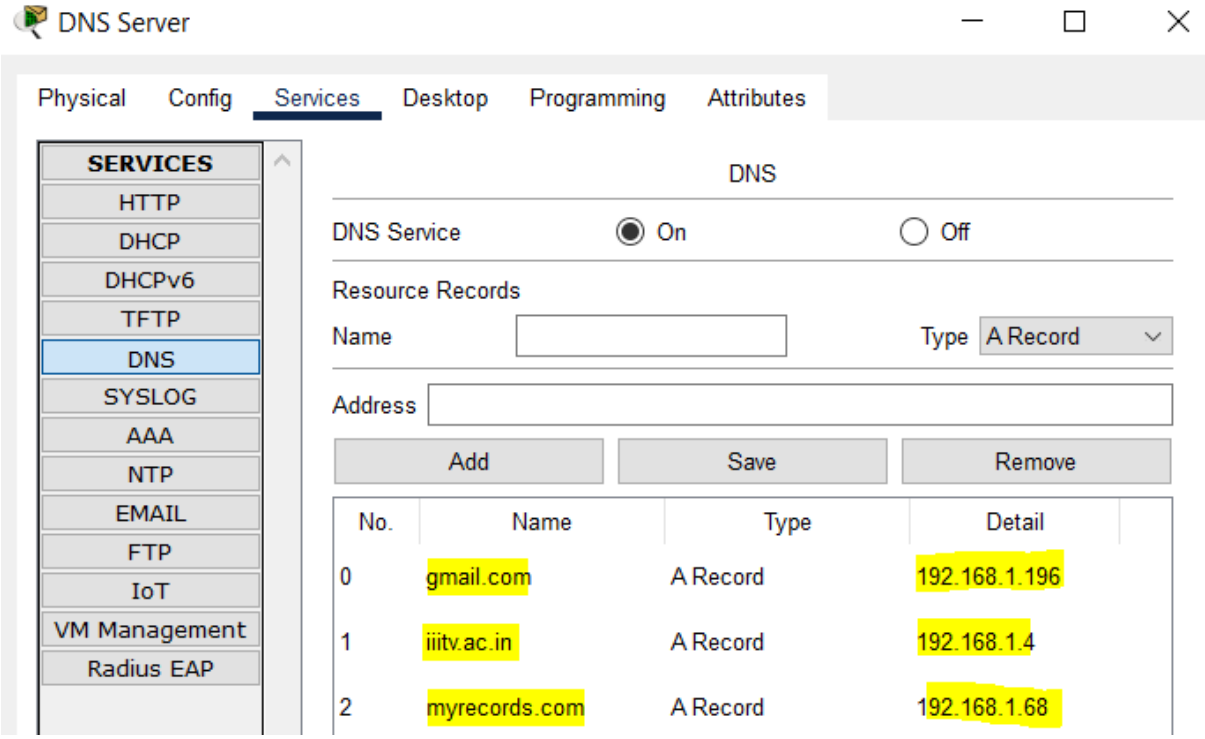
   a. 192.168.1.0 – 192.168.1.63
   b. 192.168.1.64 – 192.168.1.127
   c. 192.168.1.128 – 192.168.1.191
   d. 192.168.1.192 – 192.168.1.255

   The first and last address of each subnet are not used as they are reserves for network and broadcast address respectively.

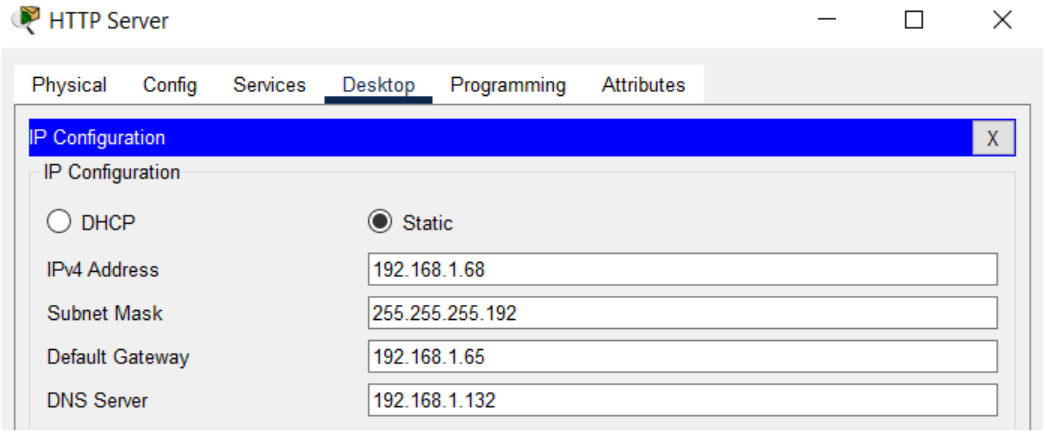
- Setting up the servers.
  a. **The DNS server**: It is setup in the subnet 192.168.1.128 – 192.168.1.192. The IP configuration of the DNS server is shown below.



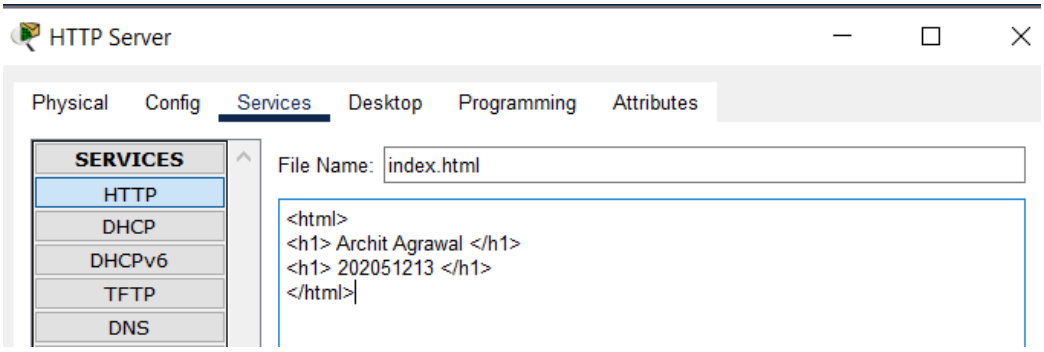
The other server addresses(set-up in next steps) and domain names are added in the DNS server.



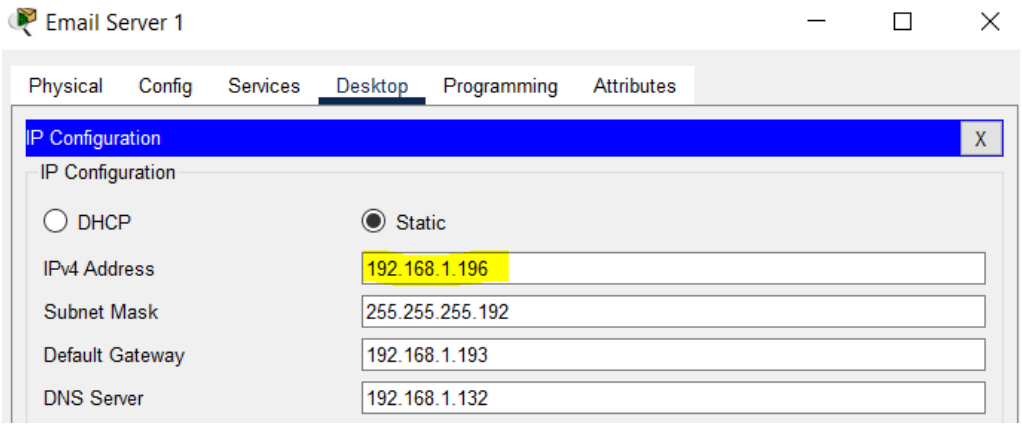
b. **The HTTP Server:** It is setup in the subnet 192.168.1.64 – 192.168.1.127. The IP configuration of the DNS server is shown below.



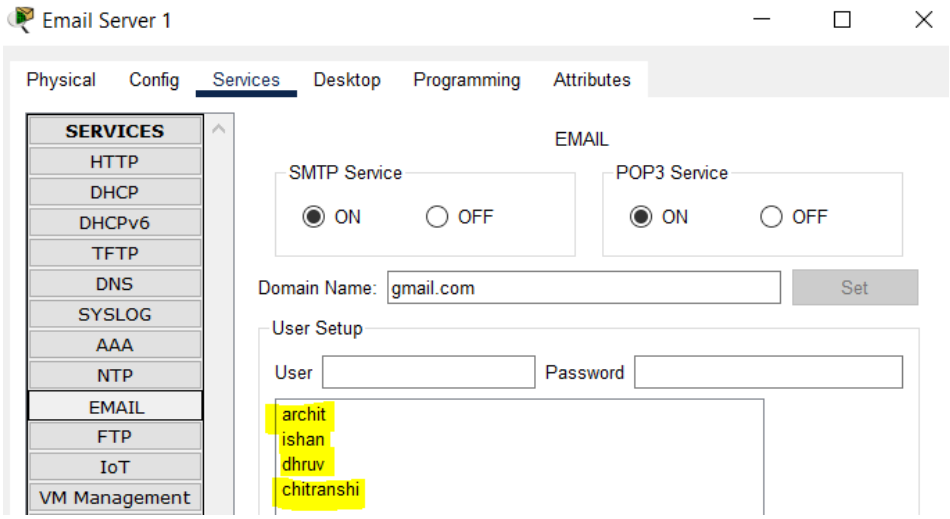
A webpage is set-up in the server that will be displayed on browser on hitting the IP or domain-name of this server.



c. **The Email Server 1 (domain name: gmail.com):** It is setup in the subnet 192.168.1.192 – 192.168.1.255.
The IP configuration of the DNS server is shown below.

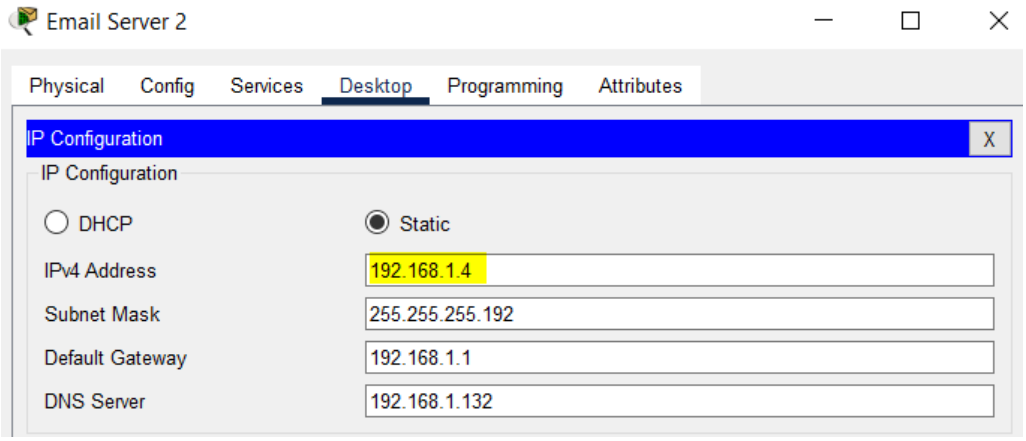


Some email accounts are added in this server.

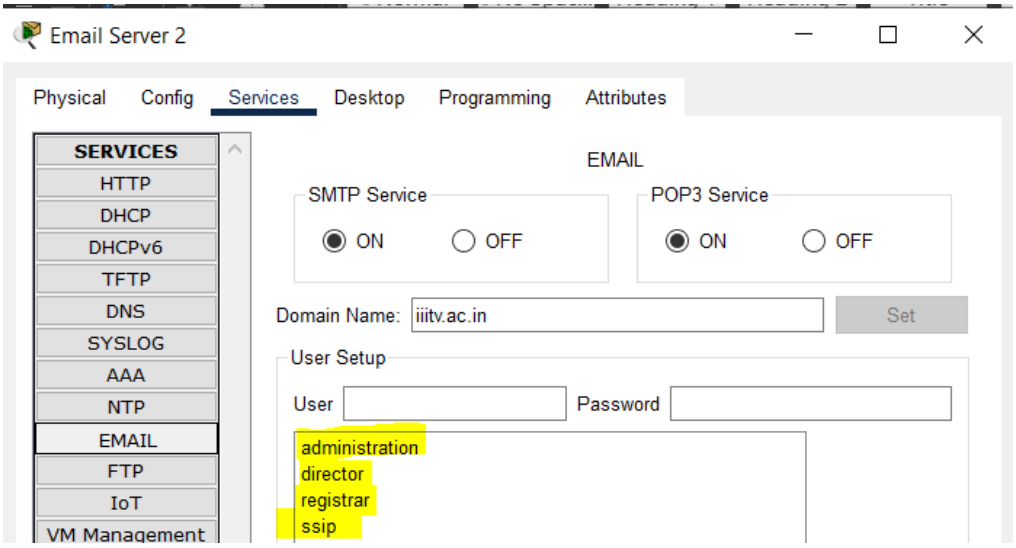


d. The Email Server 2 (domain name: iiitv.ac.in): It is setup in the subnet 192.168.1.0 – 192.168.1.63.

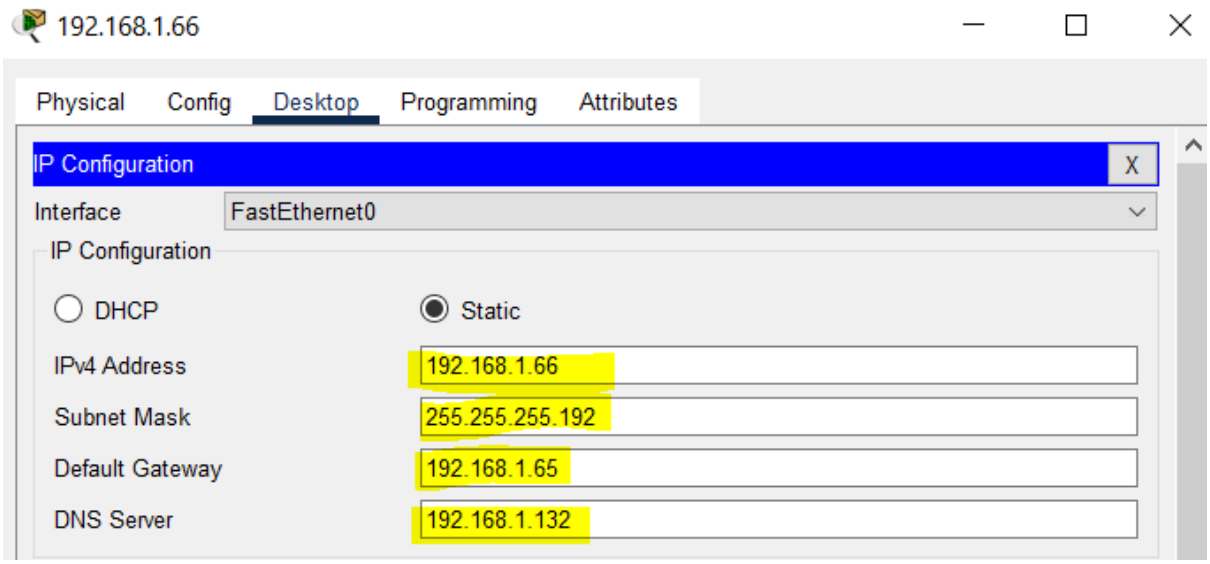
The IP configuration of the DNS server is shown below.



Some email accounts are added in this server.

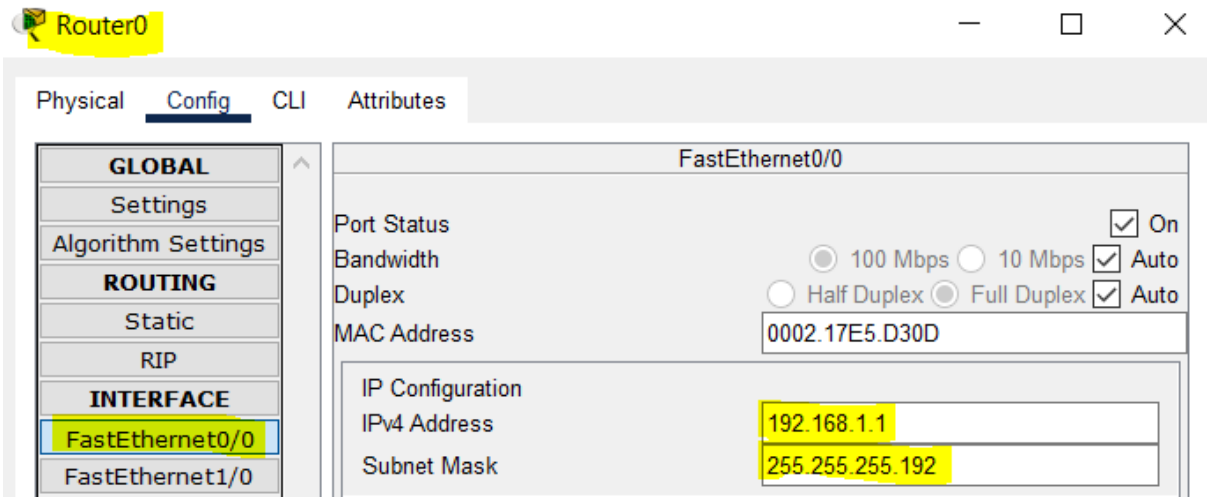


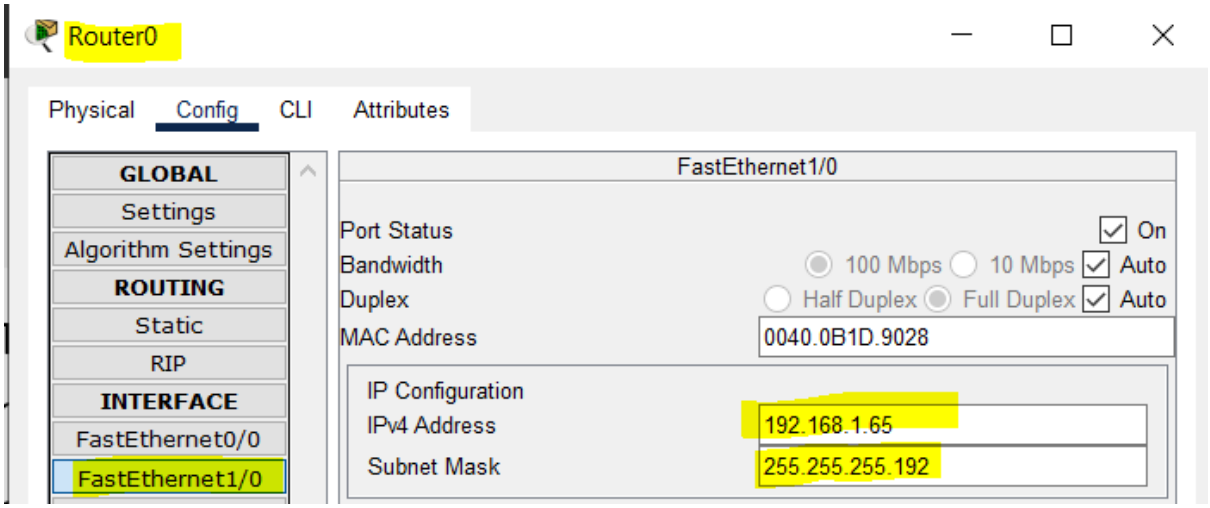
- Configuring the IP's for each PC.
  a. Each PC will have a unique IP in the subnet range of the subnet to which it belongs.
  b. Each PC will use the subnet mask 255.255.255.192 or /26.
  c. Each PC will have a default gateway address that will depend on the IP address of the router to which it is connected.
  d. Each PC will have a DNS Server address which will be 192.168.1.132, the IP address of DNS Server.

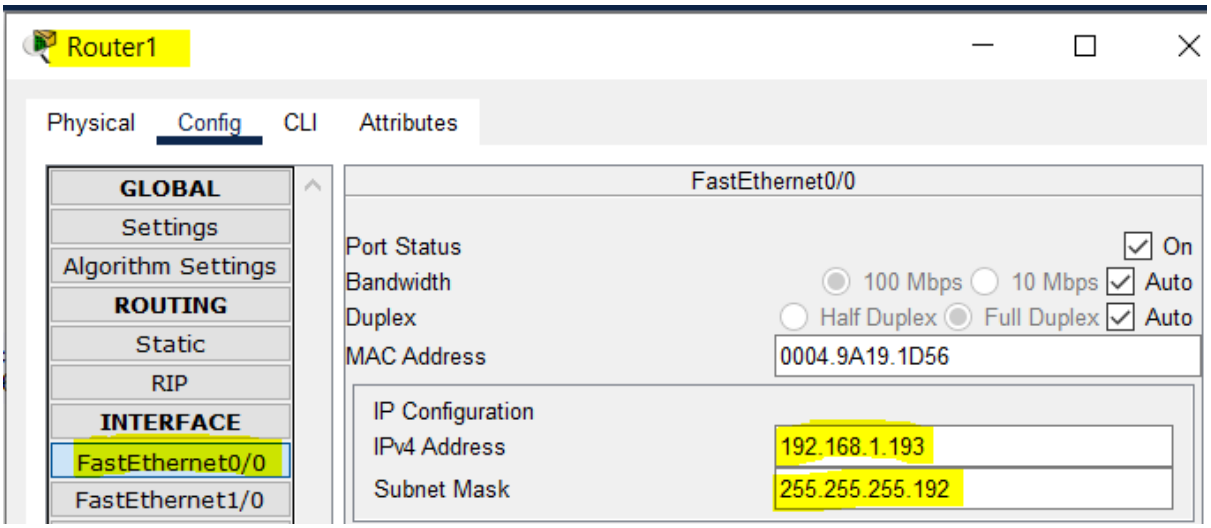


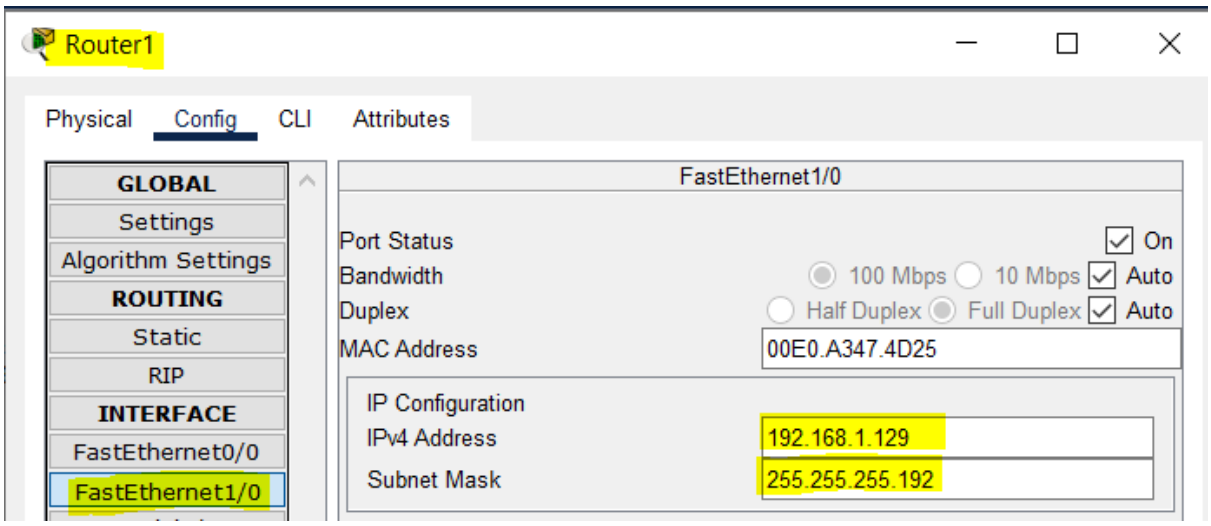
The IP address of each PC is written under the PC in the network image.

- Configuring the Router. Each router will use the subnet /26.

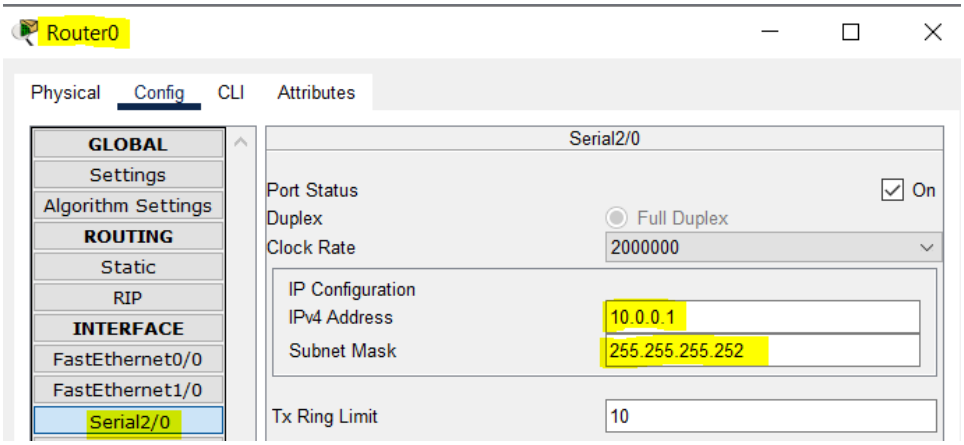


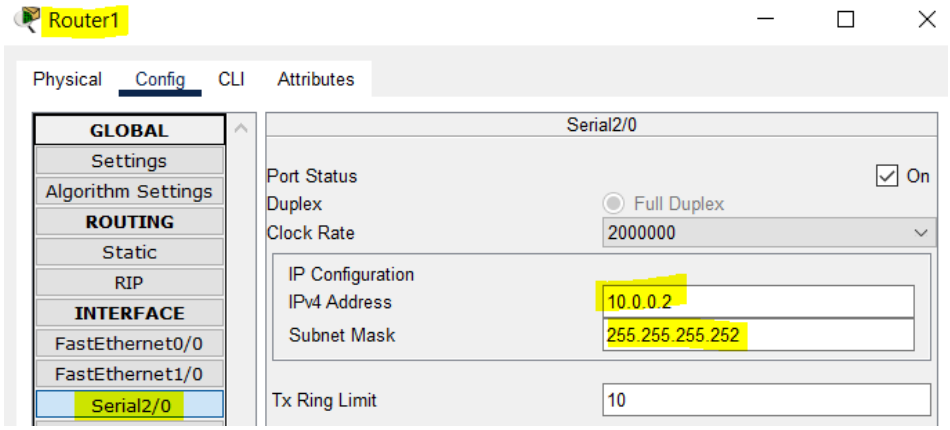

Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
FastEthernet1/0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0040.0B1D.9028
IP Configuration
IPv4 Address
192.168.1.65
Subnet Mask
255.255.255.192


Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
FastEthernet0/0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0004.9A19.1D56
IP Configuration
IPv4 Address
192.168.1.193
Subnet Mask
255.255.255.192

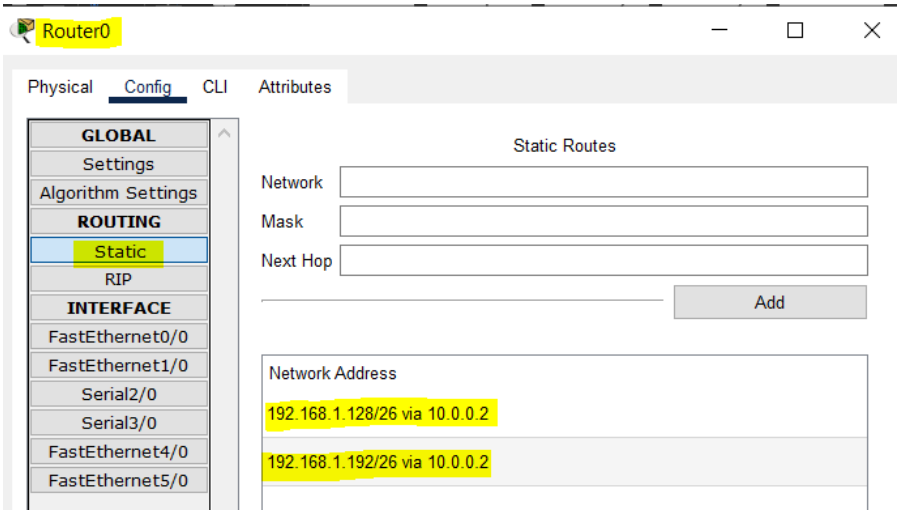

Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
FastEthernet1/0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.A347.4D25
IP Configuration
IPv4 Address
192.168.1.129
Subnet Mask
255.255.255.192

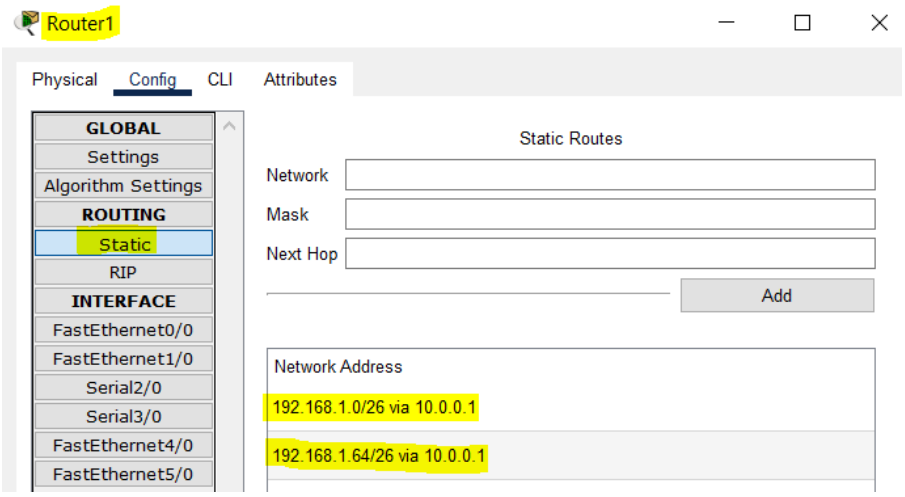
- Configuring the Serial Port of routers for inter-router connection. Each router uses a subnet mask /30 because it has a maximum of 3 devices connected to it (two switches and another router).



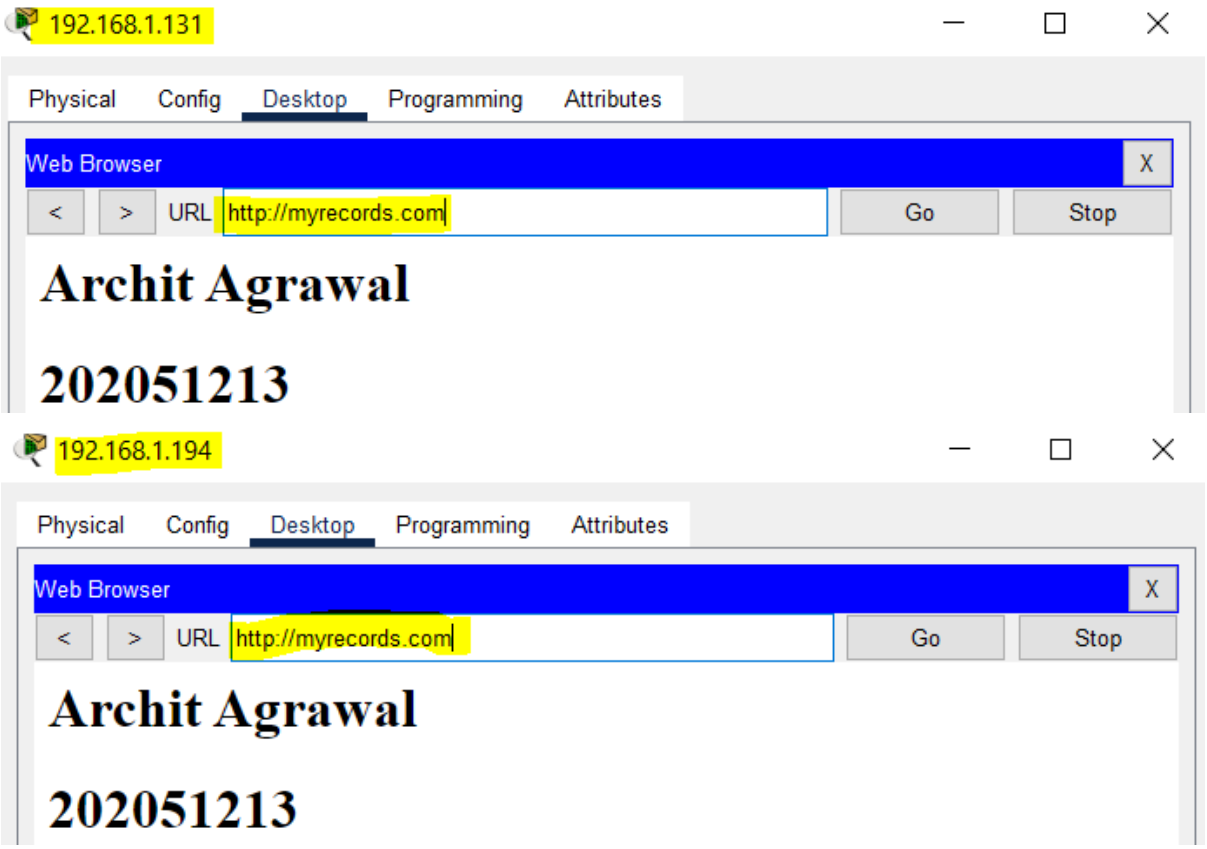


- For both routers, adding the networks connected to the other network in the static routing table.



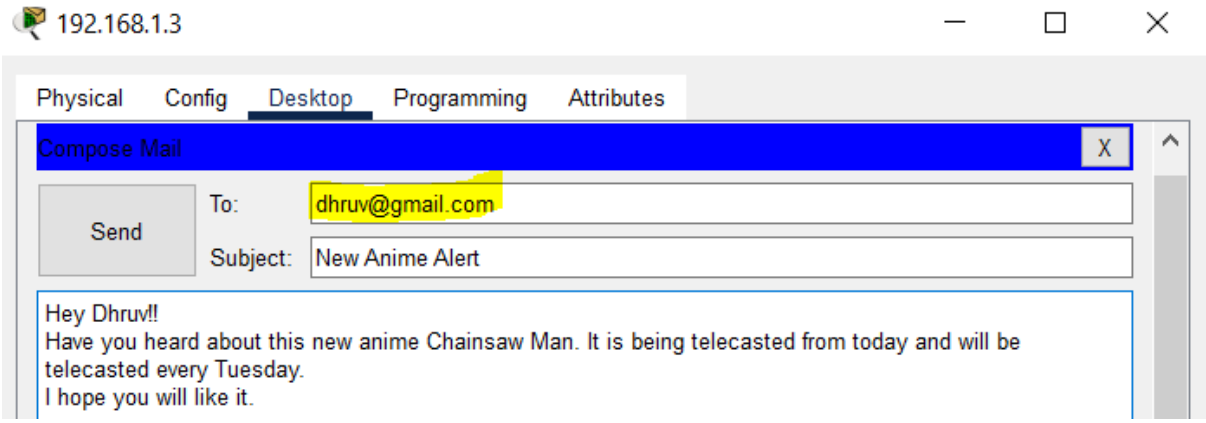


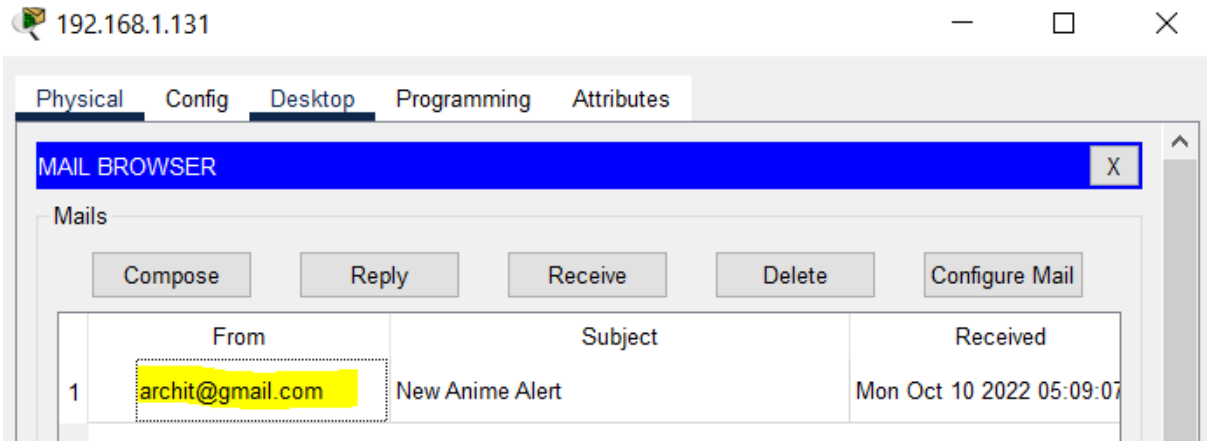
- The network is configured, now we can check if the servers are connected properly or not.
  a. Checking the HTTP server by hitting its domain name from a computer on each subnet.



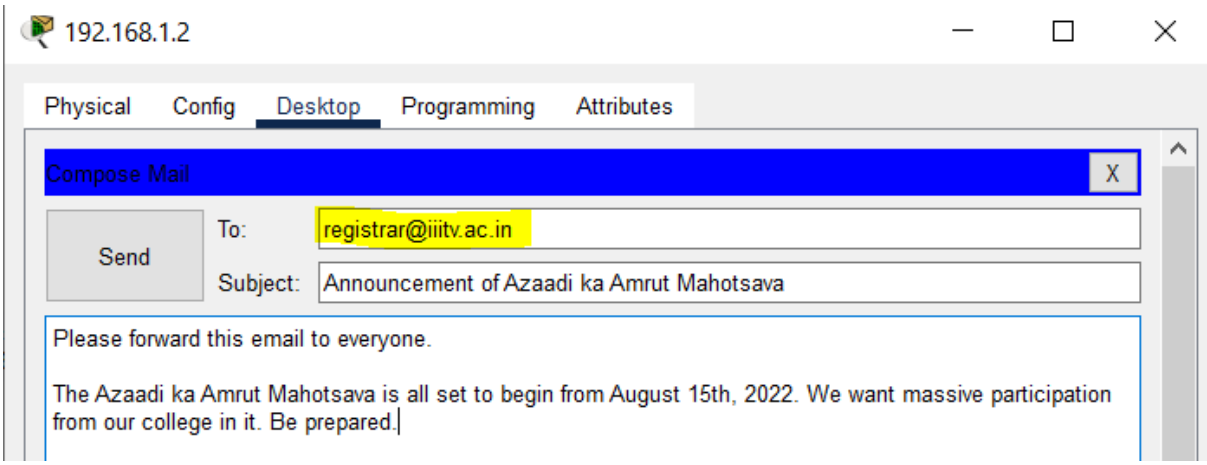
b. Checking email server by sending emails intra-domain and inter-domain. An email account is logged on each PC. The account that is logged on a PC is written near it in the network figure.

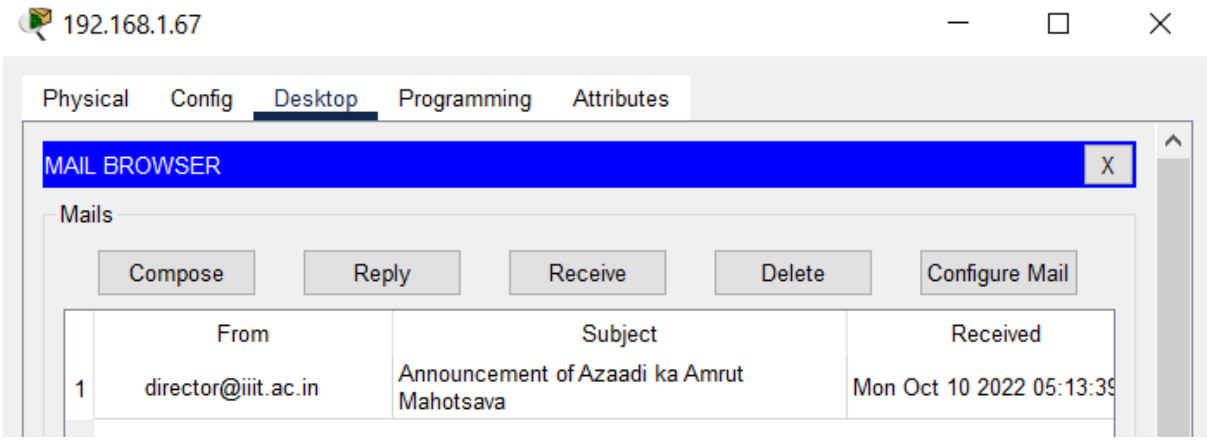
⇨ gmail.com to gmail.com (archit@gmail.com to dhruv@gmail.com)



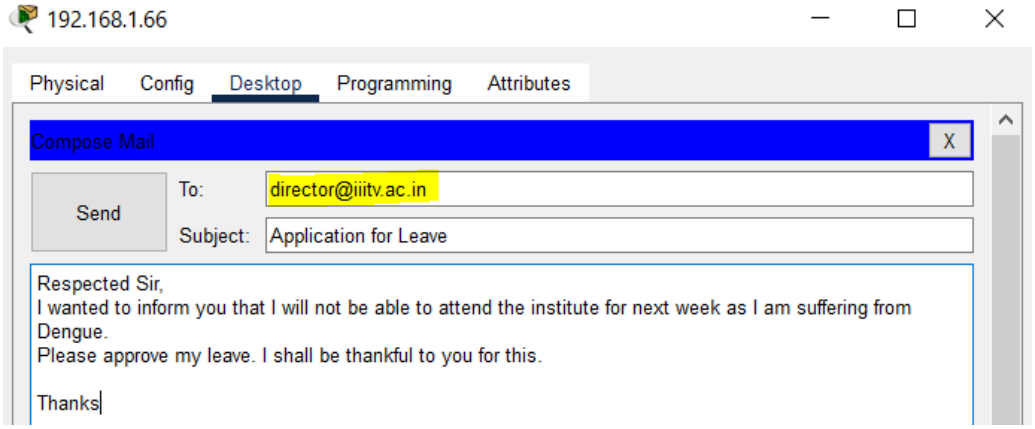


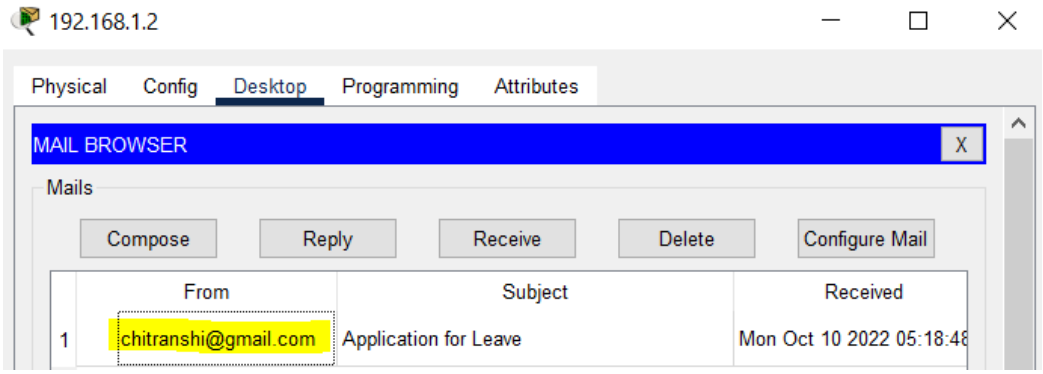
⇨ iiitv.ac.in to iiitv.ac.in (director@iiitv.ac.in to registrar@iiitv.ac.in)



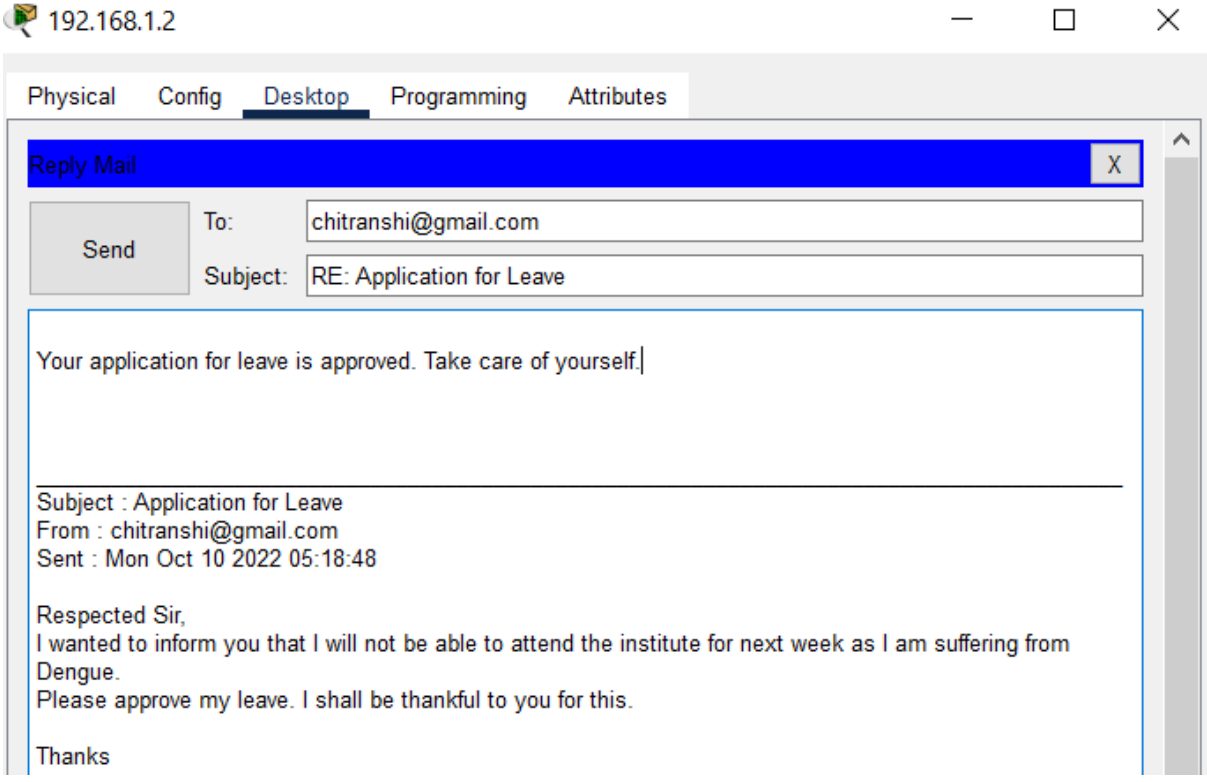


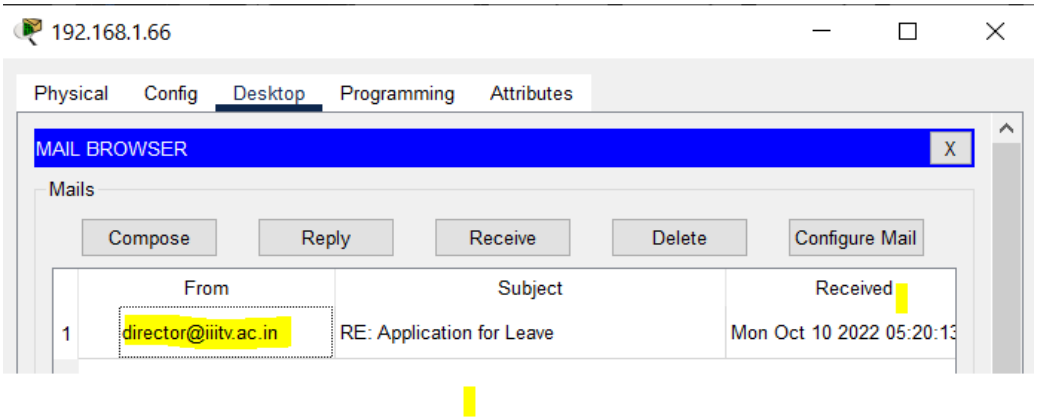
⇨ gmail.com to iiitv.ac.in (chitranshi@gmail.com to director@iiitv.ac.in)





⇨ iiitv.ac.in to gmail.com (director@iiitv.ac.in to chitranshi@iiitv.ac.in)





c. Since the emails are sent properly and also by hitting the domain name of webserver, webpage is loaded, hence, the DNS server is working properly.