Lab Mannual

by Mehdi Hassan

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UNIVERSITY OF BALTISTAN SKARDU

Lab manual

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Course: Networking

Degree: BSCS

Semester: 5th

LAB N0-01

IP ADDRESS

IP address refers to internet protocol, is the logical address of host which is used to uniquely identify over internet is the numeric value separated by dot. There are two types of IP which is IPV4 and IPV6.

IPV4 has the space of above 4 billion and IPV6 has address of trillion space.

IP are divided into classes.

Class A: IP addresses between 10.0.0.0 and 10.255.255.255

Class B: IP addresses between 172.16.0.0 and 172.31.255.255

Class C: IP addresses between 192.186.0.0 and 192.168.255.255

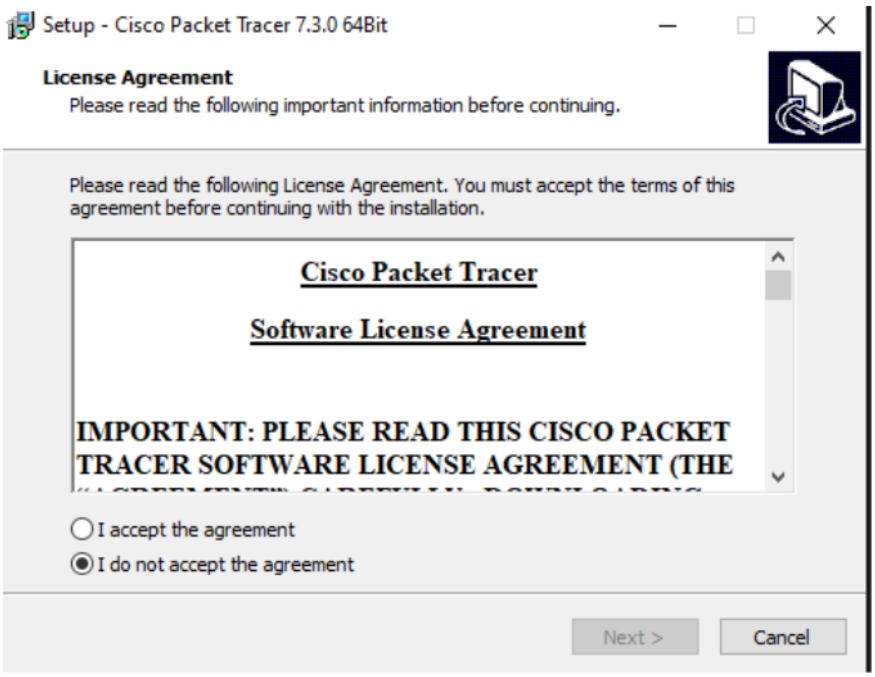
Class D IP addresses between 224.0.0.0 and 239.255.255.255

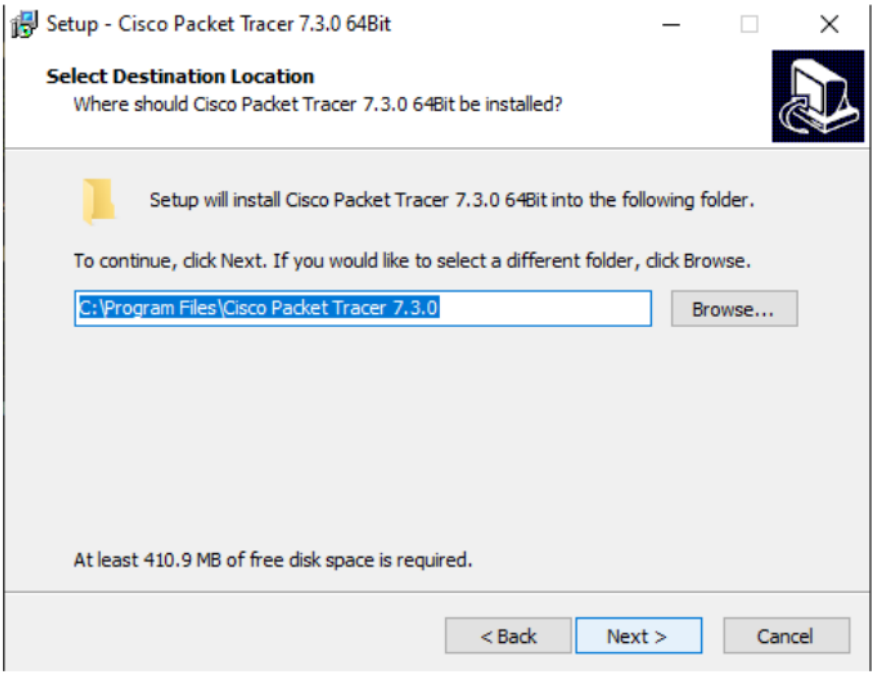
Class E IP addresses between 240.0.0.0 and 254.255.255.254

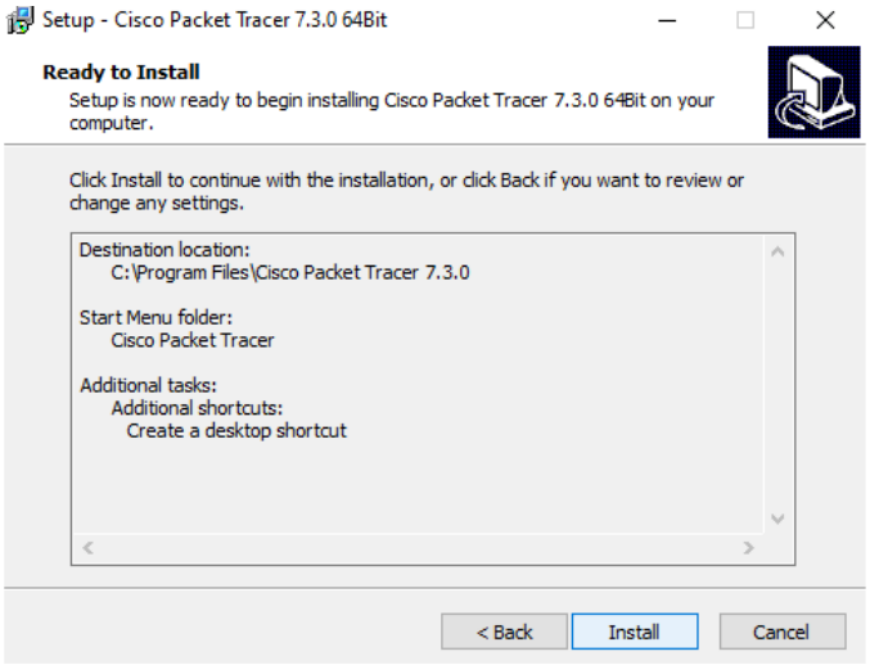
LAB N0-02

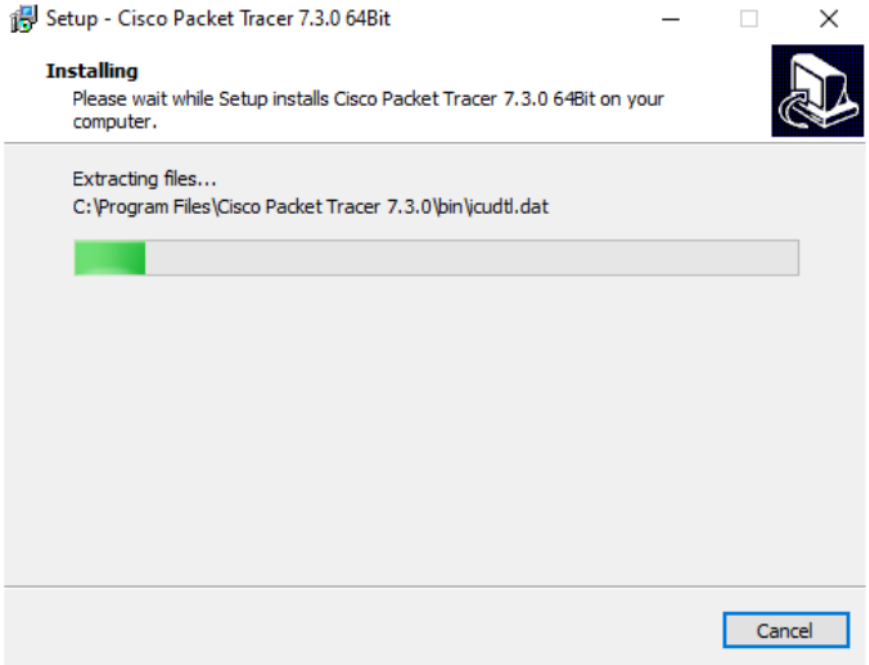
CISCO INSTALLATION:

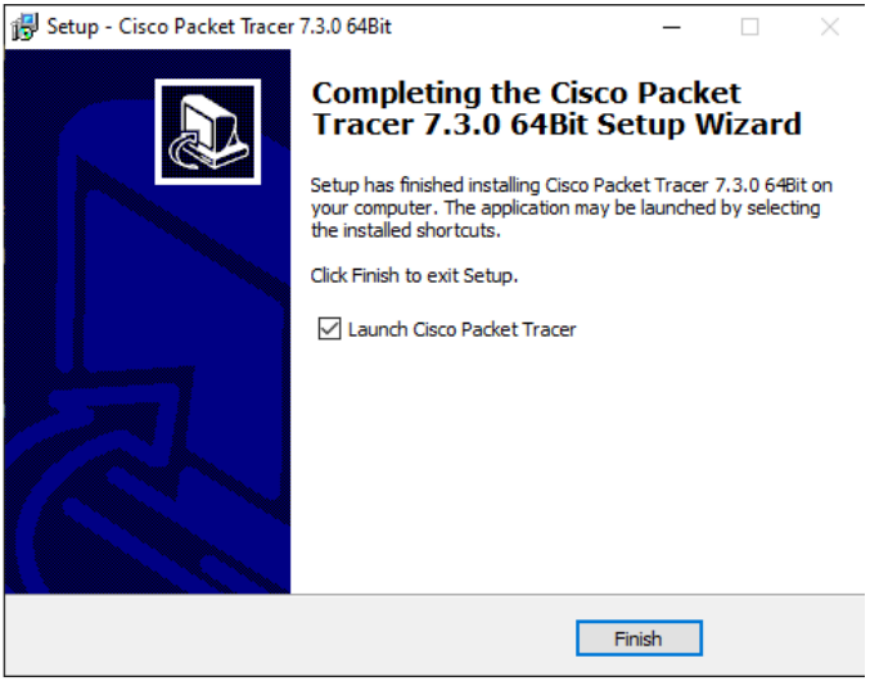
Cisco is a software contain computing devices to illustrate networking that how PC's are communicating visually.


Setup - Cisco Packet Tracer 7.3.0 64Bit
License Agreement
Please read the following important information before continuing.
Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.
Cisco Packet Tracer
Software License Agreement
IMPORTANT: PLEASE READ THIS CISCO PACKET TRACER SOFTWARE LICENSE AGREEMENT (THE
I accept the agreement
I do not accept the agreement
Next >
Cancel


Setup - Cisco Packet Tracer 7.3.0 64Bit
Select Destination Location
Where should Cisco Packet Tracer 7.3.0 64Bit be installed?
Setup will install Cisco Packet Tracer 7.3.0 64Bit into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Program Files\Cisco Packet Tracer 7.3.0
Browse...
At least 410.9 MB of free disk space is required.
< Back
Next >
Cancel


Setup - Cisco Packet Tracer 7.3.0 64Bit
Ready to Install
Setup is now ready to begin installing Cisco Packet Tracer 7.3.0 64Bit on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
C:\Program Files\Cisco Packet Tracer 7.3.0
Start Menu folder:
Cisco Packet Tracer
Additional tasks:
Additional shortcuts:
Create a desktop shortcut
< Back
Install
Cancel


Setup - Cisco Packet Tracer 7.3.0 64Bit
Installing
Please wait while Setup installs Cisco Packet Tracer 7.3.0 64Bit on your computer.
Extracting files...
C:\Program Files\Cisco Packet Tracer 7.3.0\bin\icudtl.dat
Cancel


Setup - Cisco Packet Tracer 7.3.0 64Bit
Completing the Cisco Packet Tracer 7.3.0 64Bit Setup Wizard
Setup has finished installing Cisco Packet Tracer 7.3.0 64Bit on your computer. The application may be launched by selecting the installed shortcuts.
Click Finish to exit Setup.
Launch Cisco Packet Tracer
Finish

Networking Academy
Cisco Packet Tracer
An innovative and powerful networking simulation tool used for practice, discovery and troubleshooting
Courses in 20+ Languages
Hands-On
Flexible Delivery
Supports Personalized Instruction
Simulations
Hackathons
Integral to the Skills-to-Jobs Learning Experience
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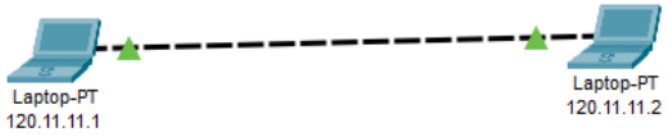
LAB N0-03

P2P

2

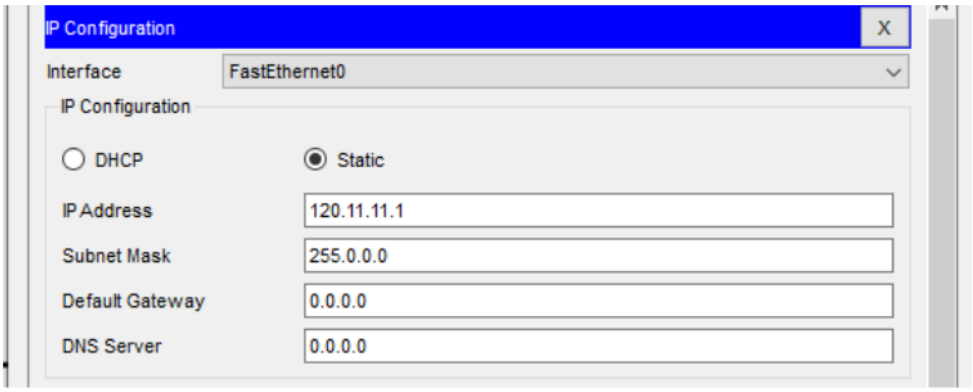
peer-to-peer

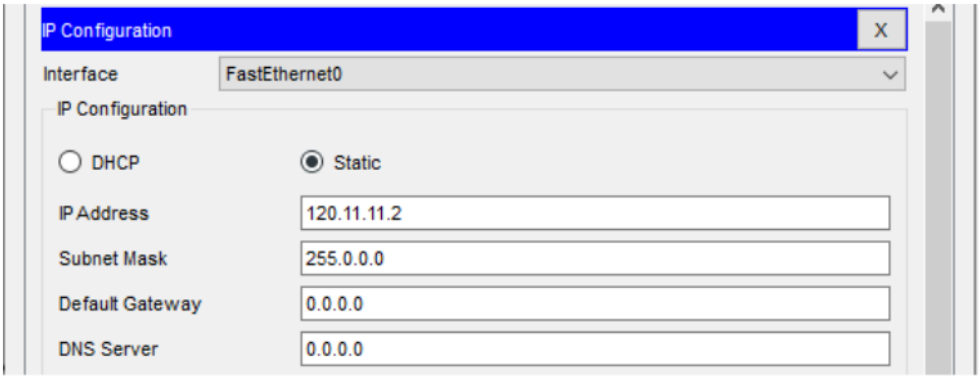
A peer-to-peer (P2P) service is a decentralized platform whereby two individuals interact directly with each other, without intermediation by a third party. Instead, the buyer and the seller transact directly with each other via the P2P service.



Explanation about above design.

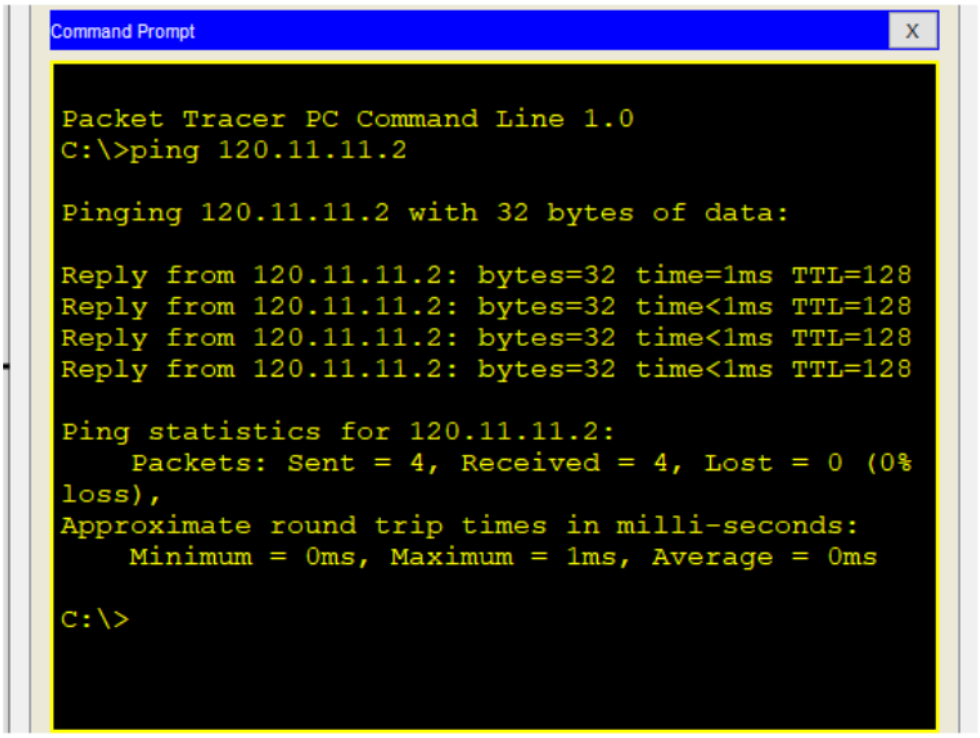
In the above design I have connected two computers with straight cable. After cabling I have assigned IP for both PC's of class C manually.





Explanation:

In the above image I have assigned C class IP for both PC's.

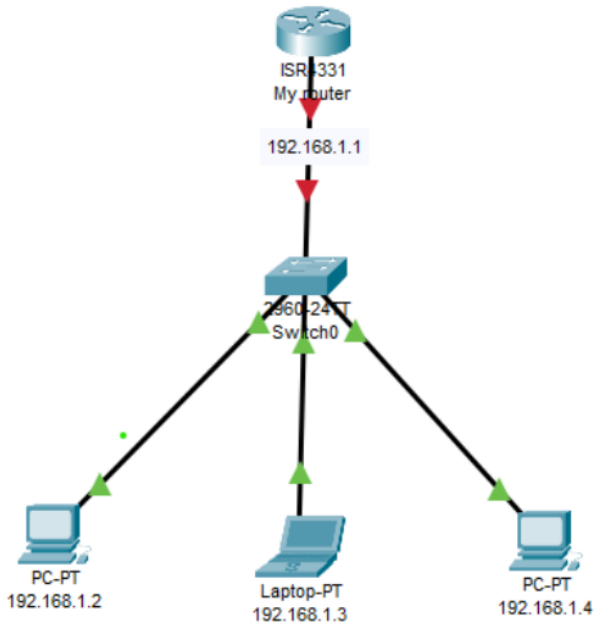


Explanation:

In the image I have pinged to test whether my PC's are communicating or not , and we can see that we have successfully communicate from one PC to another and no packet has been lost.

LAB N0-04

Telnet Configuration



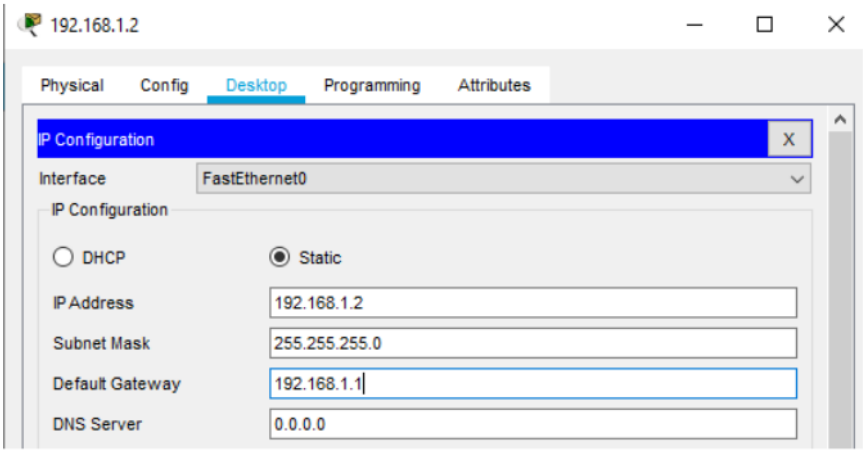
Here is the basic network design for telnet configuration.

What is TELNET?

Telnet, is a protocol that is used for remote login from one computer to another on same network. It work on port 23.

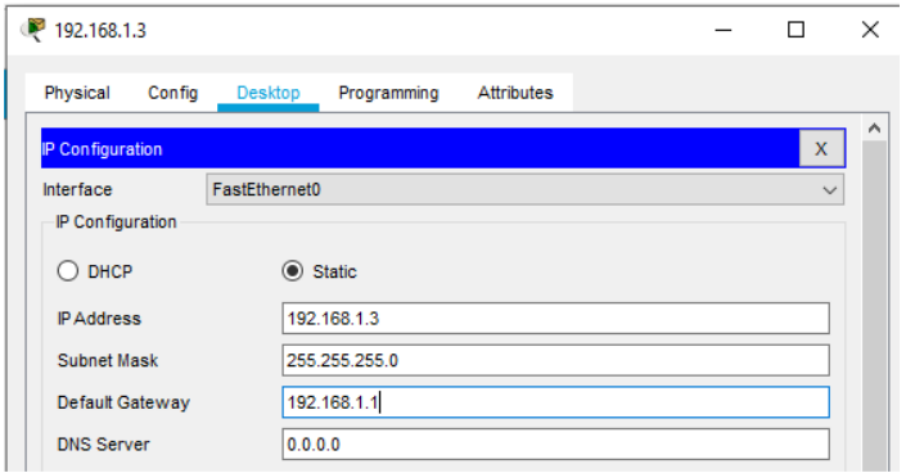
Explanation about above design.

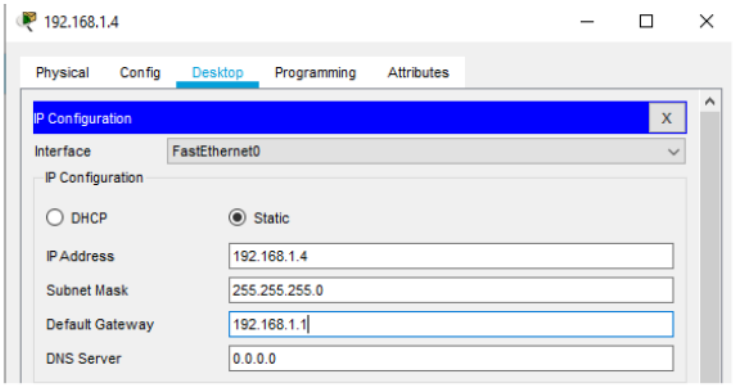
In the above design I have connected three PC's and assign them IP's of class C with same network but different host. These PC's are connected to a switch which also connected to a router. All PC's with switch and router are then connected to each other using automated cable.



Explanation: Here I have assigned IP address to the PC (192.168.1.2) with their subnet mask and also assign default gateway which is the IP of our router. Note that here I am assigning static IP address to my PC's.

I will repeat the same process for another PC's to assign static IP addresses.





Explanation:

```
Would you like to enter the initial configuration dialog? [yes/no]:
no


Press RETURN to get started!



Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0/0
Router(config-if)#ip add 192.168.1.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0,
changed state to up

Router(config-if)#
```

Command Explanation:

no: Use the command without the keyword no to reenable a disabled feature or to enable a feature that is disabled by default

en: enable into privilege mode and indicate with # sign in CLI

#config t: log into configuration mode to configure terminal

#int gig0/0/0: select int gigabyte0.0/0 to add IP

#ip add 192.168.1.1 255.255.255.0: here add IP to the interface

#no shut: Shuts the interface down (shutdown) or brings it up (no shutdown)

```
Router(config)#no ip domain lookup
Router(config)#sec
Router(config)#security password min
Router(config)#security password min-length 8
Router(config)#enable secret 123
% Password too short - must be at least 8 characters. Password not
configured.
Router(config)#enable secret router123
```

Command Explanation:

 # no ip domain lookup: to prevent the router from incorrect commands

 # security password min-length 8: set password length

 # enable secret 123: for encrypted password

 # enable secret router123

```
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show run
Router#show running-config
Building configuration...

Current configuration : 762 bytes
!
version 16.6.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
security passwords min-length 8
!
hostname Router
!
!
!
enable secret 5 $1$mERr$gd5/uBJc6J4YQ8wAzWX/I0
!
```

Command Explanation:

 # show run: display the current configuration of device.

```
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#line vty 0 3
Router(config-line)#login
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
Router(config-line)#pass
Router(config-line)#password telnet123
Router(config-line)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

Command Explanation:

 # config t: user configuration mode of the terminal

 # line vty 0 3: configure virtual terminal

 # login: enable password on a terminal or a line

 # password telnet123: set password

 # end: exit configuration mode

 # wr: save configuration

```
!
!
line con 0
!
line aux 0
!
line vty 0 3
 password telnet123
 login
line vty 4
 login
!
!
!
end
```

Explanation:

As we had already seen that when we were typing the command (enable secret). That command was saving our **password** in **encrypted** form but during assigning password to telnet, we just hit the command password, that's why it saved in **plane text.**

```
enable secret 5 $1$mERr$gd5/uBJc6J4YQ8wAzWX/I0
!
```

Explanation: The enable secret command save the password in encrypted form as we can see in the diagram. This is the password of our router.

```
Router(config)#service password-encryption
Router(config)#
```

Explanation:

This command will **encrypt** the **plane text** password into **encrypted** form.

```
line vty 0 3
 password 7 08354942071C11464058
```

Explanation:

Now our telnet password is in **encrypted form.**

Now its time to trying to get access form one of our connected PC to router using TELNET protocol.

```
Command Prompt                                                    X

Packet Tracer PC Command Line 1.0
C:\>telnet 192.168.1.1
Trying 192.168.1.1 ...Open


User Access Verification

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

Explanation:

telnet 192.168.1.1

here I am trying to access my router from remote PC using TELNET protocol. 192.168.1.1 is my routers IP (default gateway).

Password: asking for my telnet password as I assigned during configuration

The password will not show and finally I have got access to my router

en: used for privilege mode

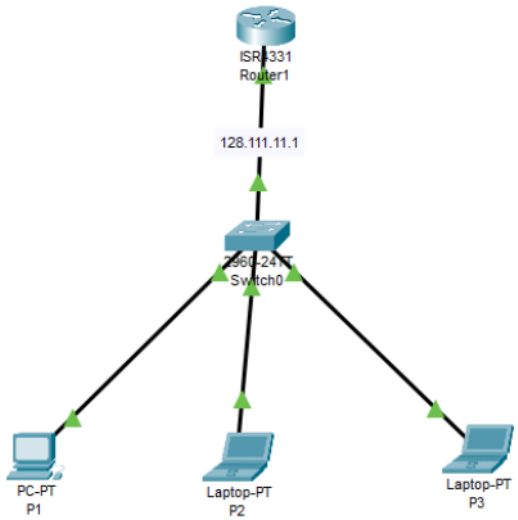
password: here I have to type my router password

NOW I HAVE FULLY GOT ACCESS TO MY ROUTER AND I CAN MAKE ANY CHANGES,

Here I am just changing my hostname to hacker.

LAB N0-05

DHCP Configuration



Here is the basic network design for DHCP configuration.

What is DHCP Pool?

DHCP is a network protocol that is used for dynamic ip addresses to PC's. DHCP pool is the collection of IP address through which the clients request for IP and then assign IP for each clients.

Explanation about above design.

In the above design I have connected three PC's and still not assign IP's to PC's because we are going to assign dynamic IP's for them through DHCP pool.

```
Press RETURN to get started!



Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0/0
Router(config-if)#ip add 128.111.11.1 255.255.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0,
changed state to up

Router(config-if)#
```

Command Explanation:

en: enable into privilege mode and indicate with # sign in CLI

#config t: user configuration mode of the terminal

#Int gig0/0/0: select interface

#ip add 128.111.11.1 255.255.0.0: add ip to above selected interface

#no shut: Up the cisco router

```
Router(config-if)#exit
Router(config)#ip dhcp pool E19M120
Router(dhcp-config)#defaul
Router(dhcp-config)#default-router 128.111.11.1
Router(dhcp-config)#ne
Router(dhcp-config)#network 128.111.0.0 255.255.0.0
Router(dhcp-config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

Command Explanation:

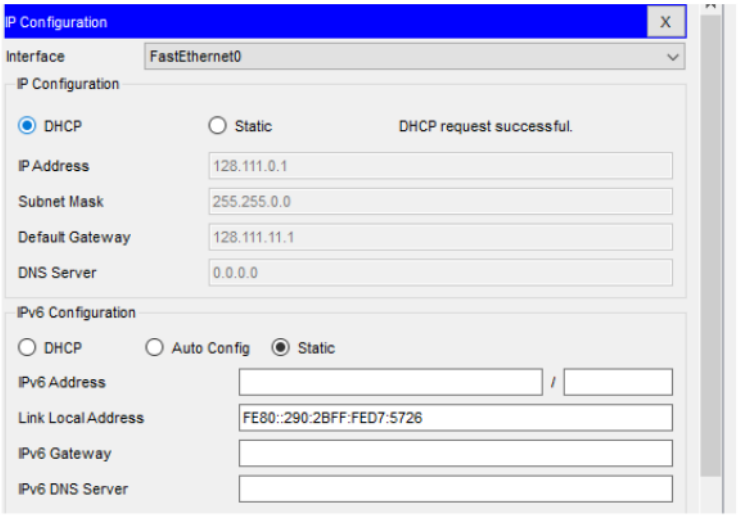
 # ip DHCP pool E19M120: name of the DHCP pool

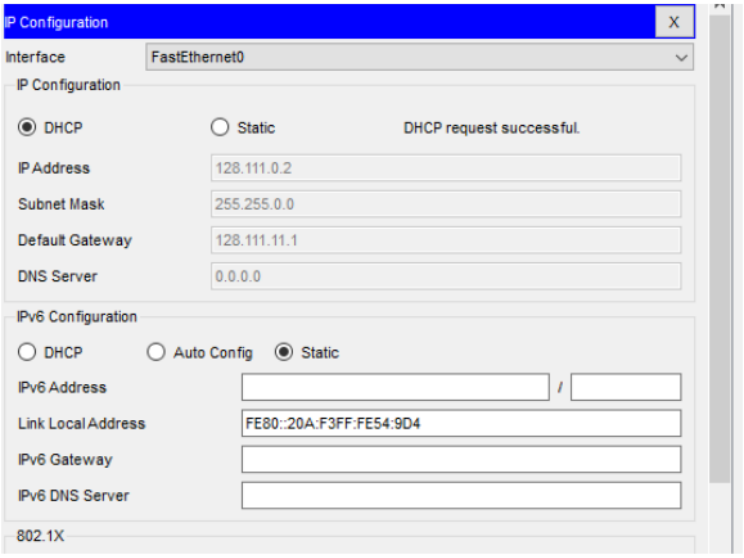
 # default-router 128.111.11.1: IP of default gateway

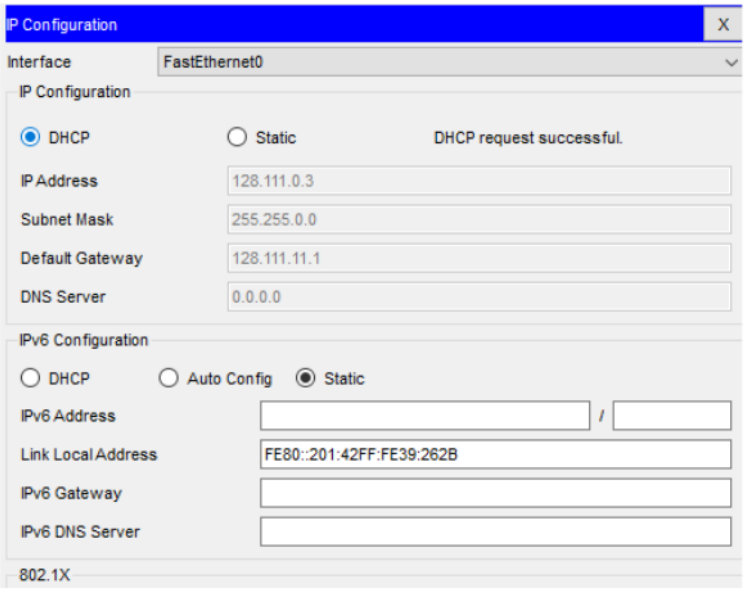
 # network 128.111.0.0 255.255.0.0 : network excluding host and add subnet mask

 # end: exit configuration mode

#wr: save configuration.


IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
DHCP request successful.
IP Address
128.111.0.1
Subnet Mask
255.255.0.0
Default Gateway
128.111.11.1
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::290:2BFF:FED7:5726
IPv6 Gateway
IPv6 DNS Server

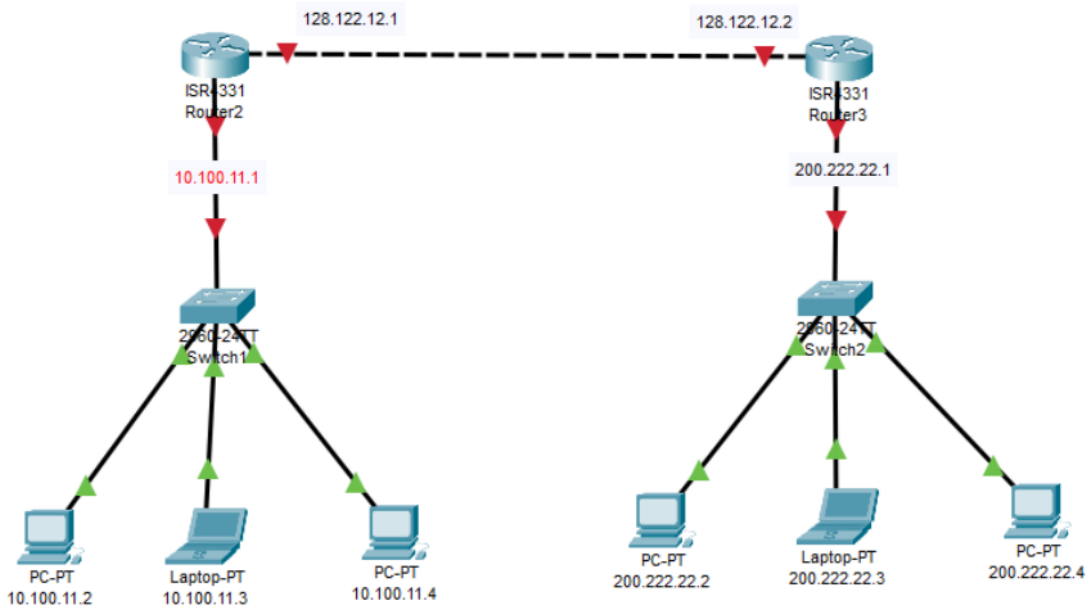




Explanation: In the above image, I have requested for IP address to my DHCP pool and it has assigned an IP having same network as my router.

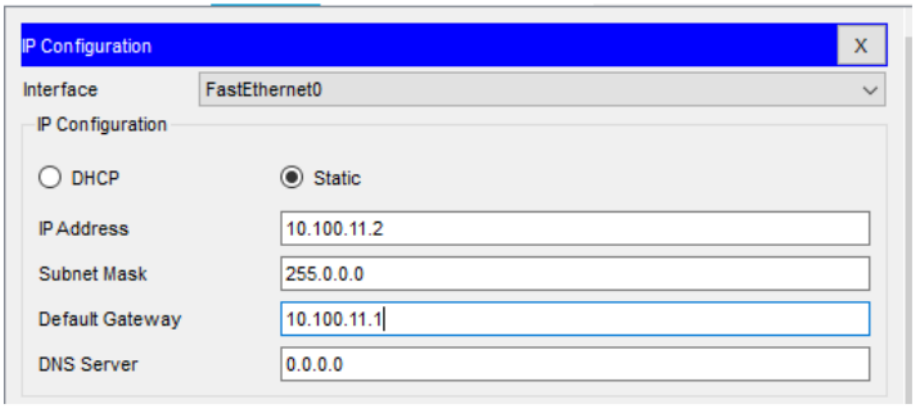
LAB N0-06

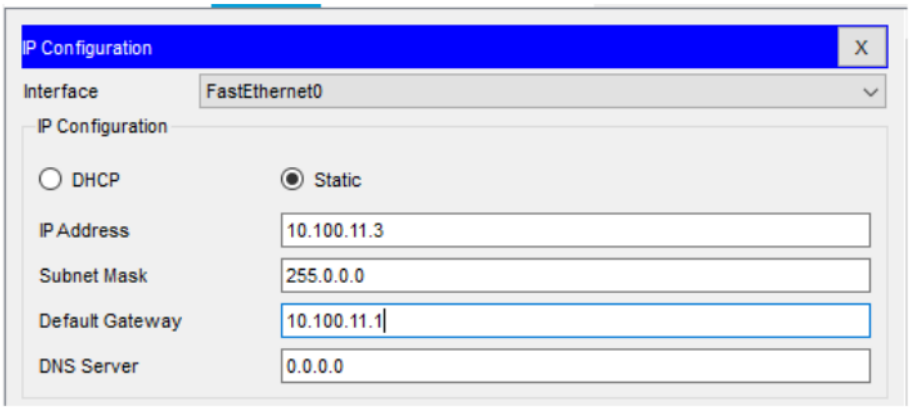
TWO ROUTERS

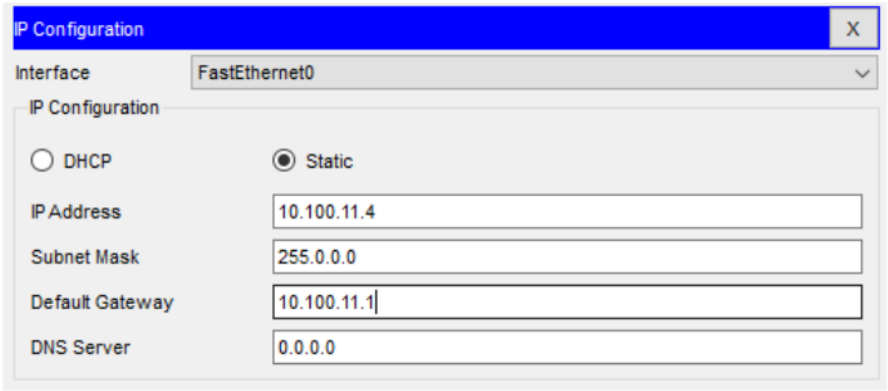


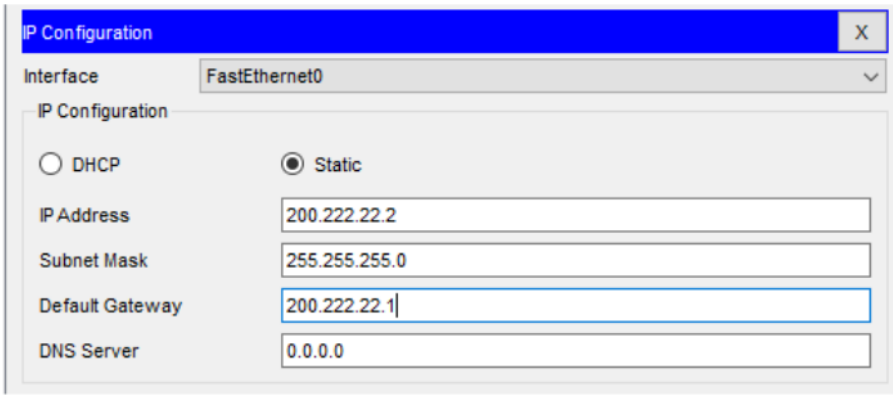
EXPLANATION:

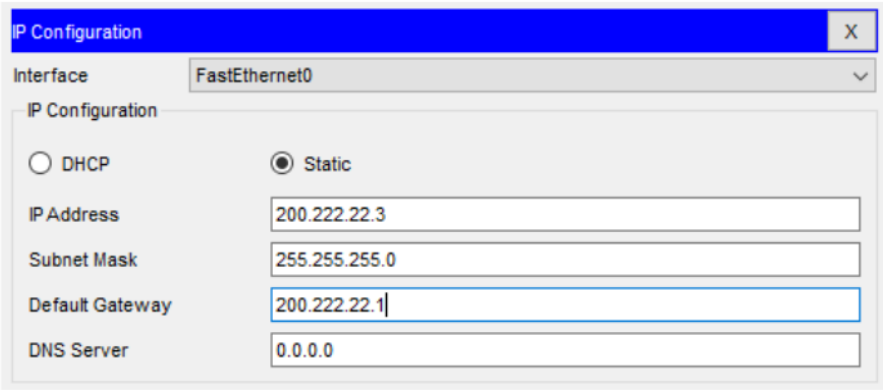
In the above image I have basically design two different networks. Each network has created with three PC's. Both the networks are connected to two switches and two routers. Typically this network contain three different networks and IP address of class A, class B and C class IP address.

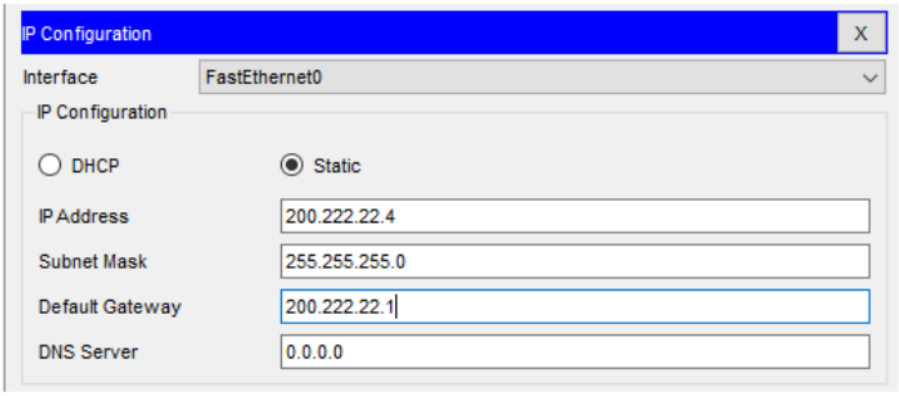



IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
10.100.11.3
Subnet Mask
255.0.0.0
Default Gateway
10.100.11.1
DNS Server
0.0.0.0


IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
10.100.11.4
Subnet Mask
255.0.0.0
Default Gateway
10.100.11.1
DNS Server
0.0.0.0


IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
200.222.22.2
Subnet Mask
255.255.255.0
Default Gateway
200.222.22.1
DNS Server
0.0.0.0





EXPLANATION:

In the above images I have assign IP addresses of two different network with IP address of class A and class C manually with default gateway.

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0/0
Router(config-if)#ip add 10.100.11.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0,
changed state to up

Router(config-if)#
```

COMMAND EXPLANATION:

en: enable into privilege mode and indicate with # sign in CLI

#config t: log into configuration mode to configure terminal

 # int gig0/0/0: selecting interface

 # ip add 10.100.11.1 255.0.0.0: add Ip to interface

```
Router(config-if)#exit
Router(config)#int gig0/0/1
Router(config-if)#ip add 128.122.12.1 255.255.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

COMMAND EXPLANATION:

 # exit: exit from configuration mode

 # int gig0/0/1: selecting another interface

 # ip add 128.122.12.1 255.255.0.0: add ip to interface

 # no shut: up the cisco router

 # end: end and return to privilege mode

 # wr: save all configurations

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0/0
Router(config-if)#ip add 200.222.22.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0,
changed state to up

Router(config-if)#
```

COMMAND EXPLANATION:

en: enable into privilege mode and indicate with # sign in CLI

 # config t: log into configuration mode to configure terminal

 # int gig0/0/0 selecting interface

 # ip add 200.222.22.1 255.255.255.0: add ip to interface

 # no shut: Up the cisco router

```
Router(config-if)#exit
Router(config)#int gig0/0/1
Router(config-if)#ip add 128.122.12.2 255.255.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1,
changed state to up

Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

COMMAND EXPLANATION:

 # exit: exit from configuration mode

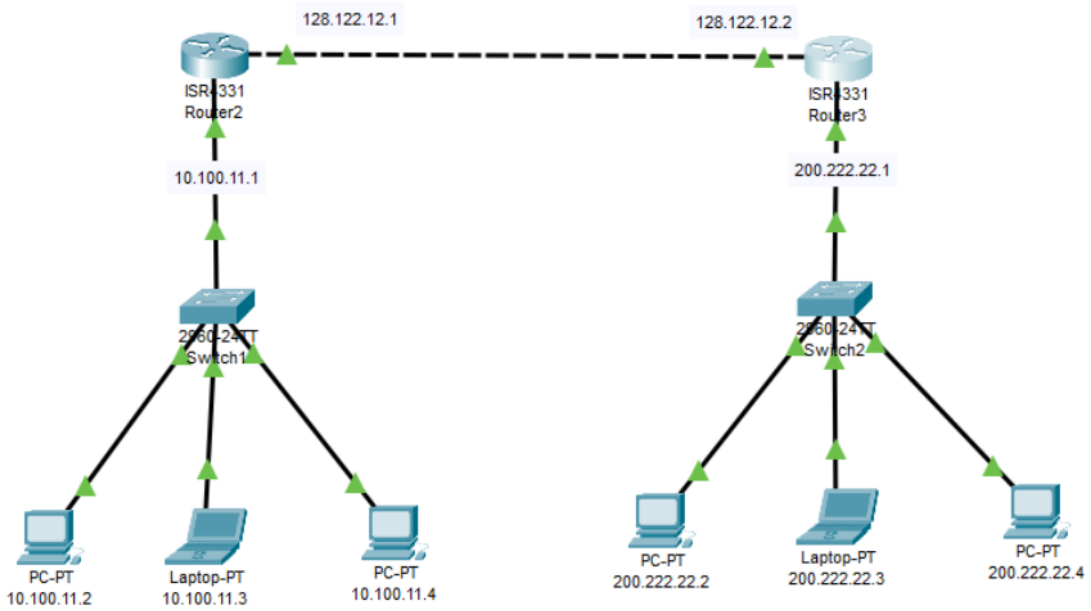
 # int gig0/0/1: selecting another interface

 # ip add 128.122.12.2 255.255.0.0: add ip to interface

 # no shut: Up the cisco router

 # end: end and return to privilege mode

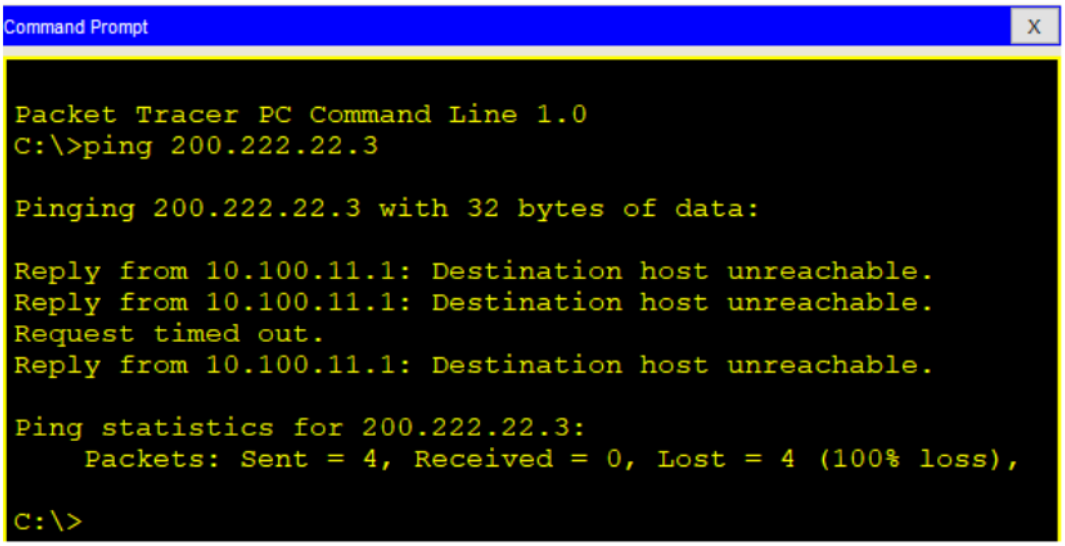
 # wr: save all configurations



EXPLANATION:

As we have already design the network in first image, in the above image I have assign IP addresses to all interfaces and created three different networks using different class IP's.

The green arrows indicated that I have successfully configure all interfaces.



EXPLANATION:

In the above images, I have tried to communicate between PC's of different networks but was not working because the PC's don't have idea about the routes and that's why it show destination host unreachable .

So the solution is that we have to define the routes to reach our destination.

```
Router#
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 200.222.22.0 255.255.255.0 128.122.12.2
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

EXPLANATION:

In this image, I have define the route for first router

COMMAND EXPLANTION:

 # config t: log into configuration mode to configure terminal

 # ip route 200.222.22.0 255.255.255.0 128.122.12.2: add static route on router

 # end: end and return to privilege mode

 # wr: save all configurations

```
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 10.0.0.0 255.0.0.0 128.122.12.1
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

EXPLANATION:

In this image, I have define the route for second router

COMMAND EXPLANTION:

 # config t: log into configuration mode to configure terminal

 # ip route 10.0.0.0 255.0.0.0 128.122.12.1: add static route on router on another router

 # end: end and return to privilege mode

 # wr: save all configurations

We have successfully defined the routes for both routers and now its time to ping form PC of one network to another network.

```
C:\>ping 200.222.22.4

Pinging 200.222.22.4 with 32 bytes of data:

Reply from 200.222.22.4: bytes=32 time=1ms TTL=126
Reply from 200.222.22.4: bytes=32 time<1ms TTL=126
Reply from 200.222.22.4: bytes=32 time<1ms TTL=126
Reply from 200.222.22.4: bytes=32 time=3ms TTL=126

Ping statistics for 200.222.22.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 1ms

C:\>
```

EXPLANATION:

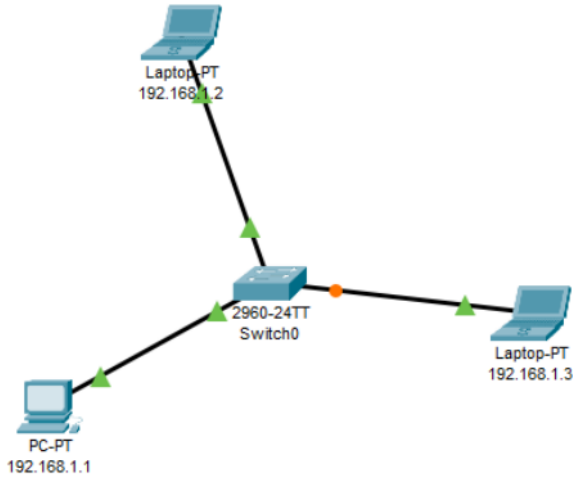
In this image I have pinged from A class network to C class network (different) by using ping command and we have got 100% reply without lost any packet from four packers.

LAB N0-07

CONNECT SWITCH

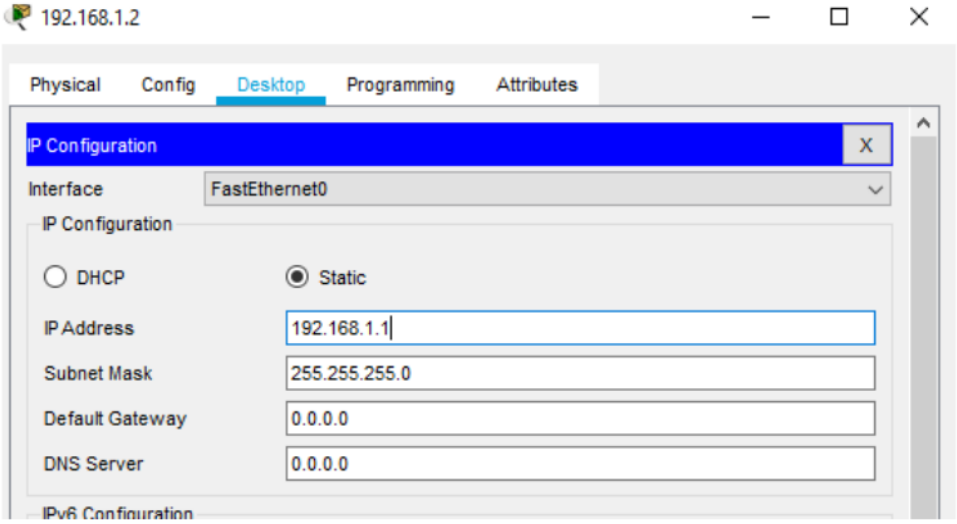
What is switch???

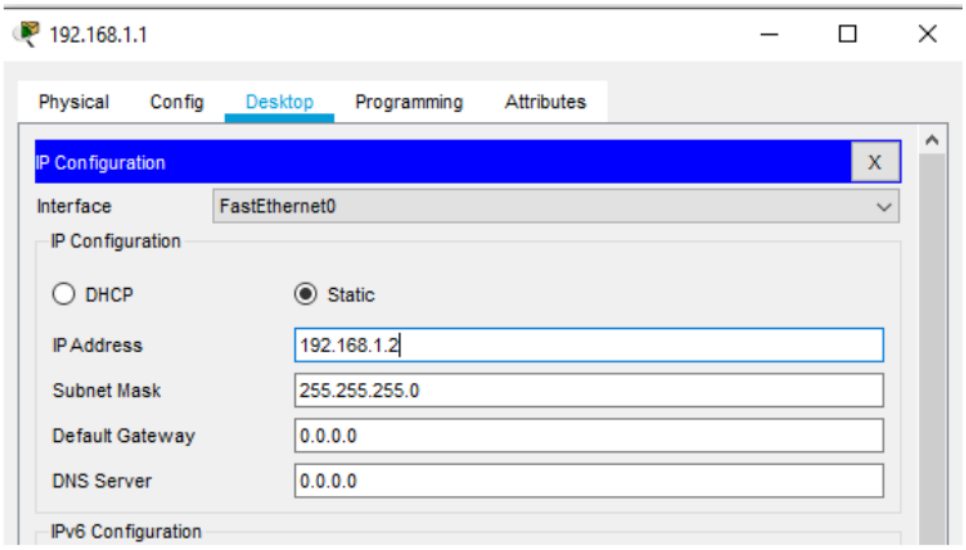
Switch is a networking device that allow to connect multiple clients within a LAN and allow to communicate each other. It can connect 24 clients.

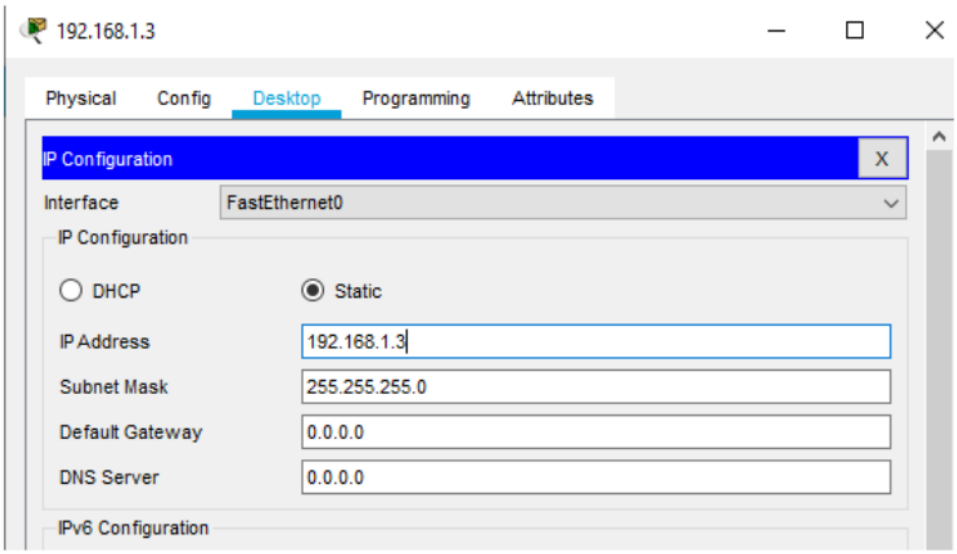


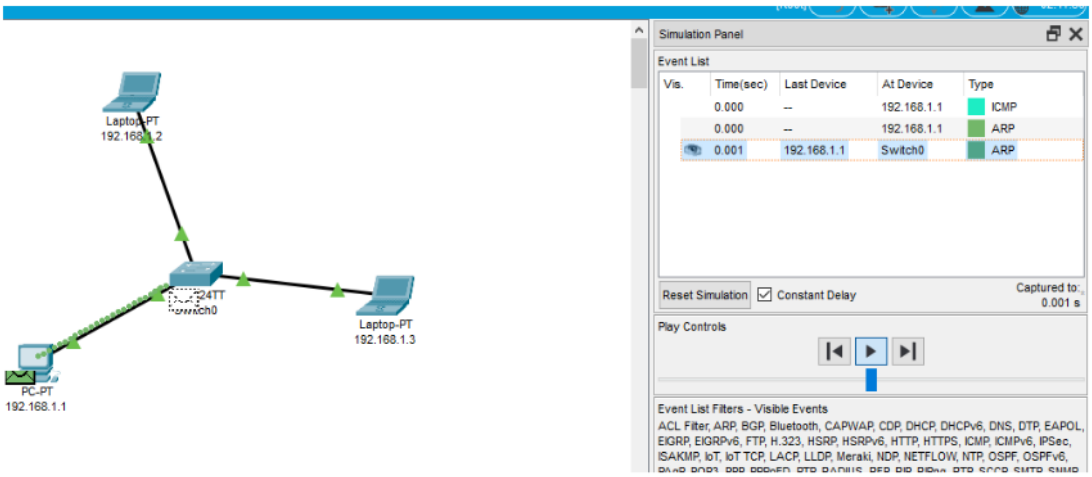
EXPLANATION:

In the above images I have assigned IP's to all PC's of class C with their subnet mask.



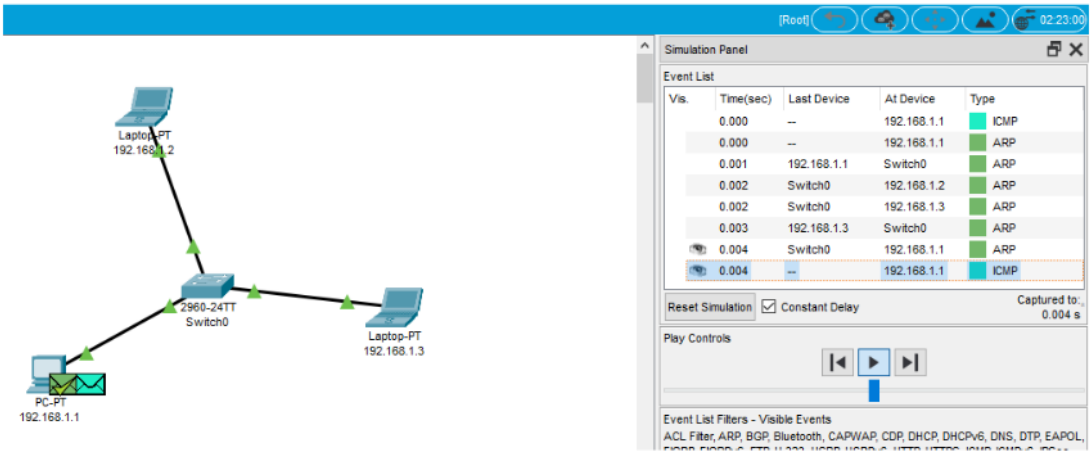

192.168.1.1
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
192.168.1.2
Subnet Mask
255.255.255.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration


192.168.1.3
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
192.168.1.3
Subnet Mask
255.255.255.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration



EXPLANATION:

Here we can see that one PC has start sending message to another through switch



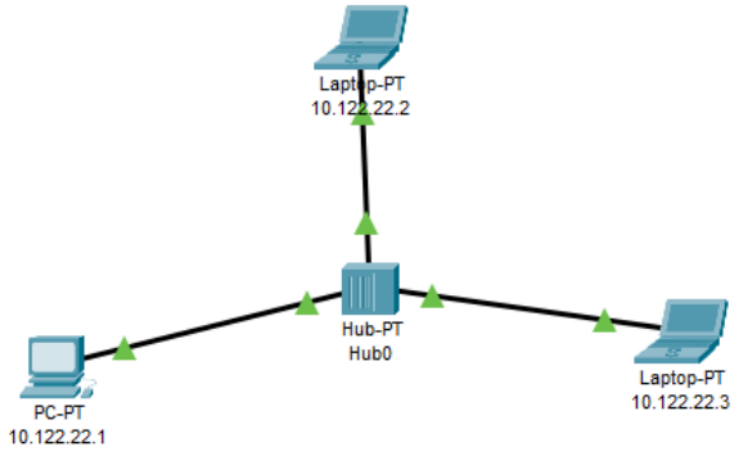
EXPLANATION:

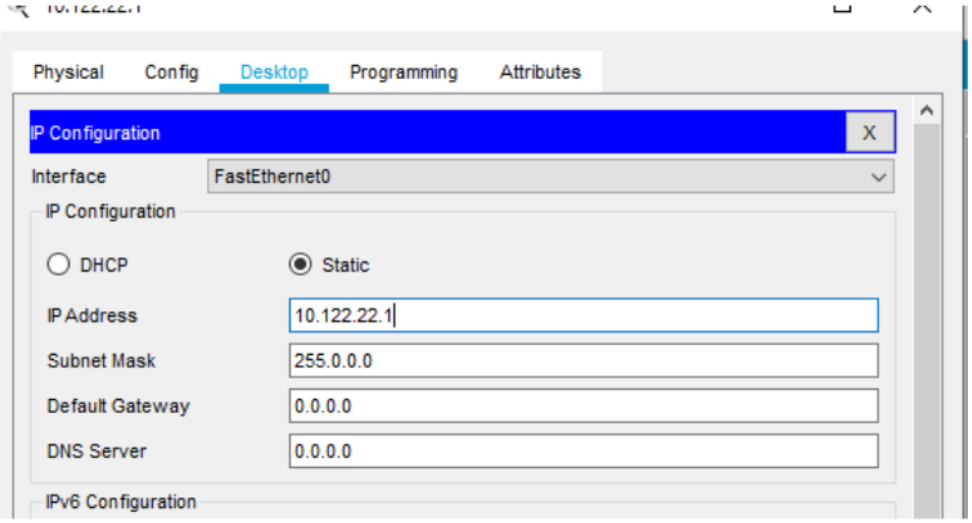
Switch don't broadcast the message and received to the correct reviver.

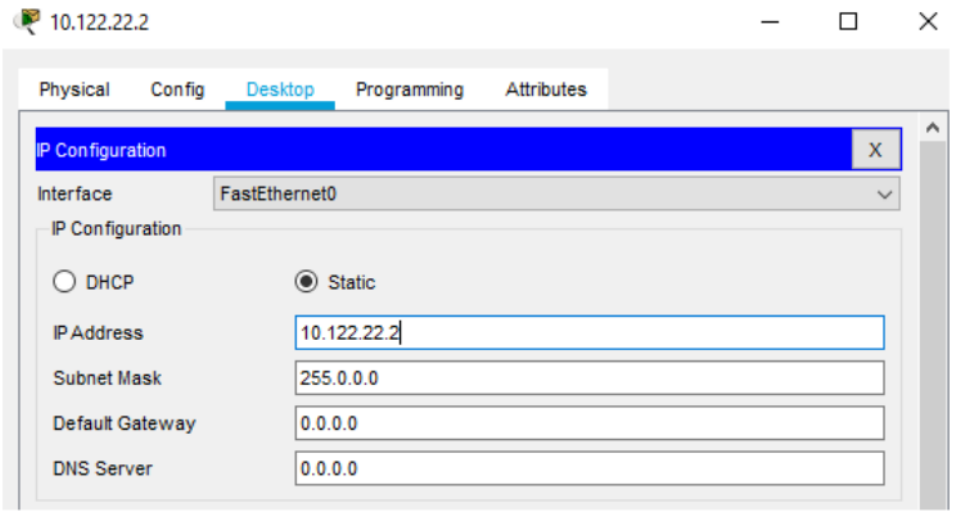
LAB N0-08

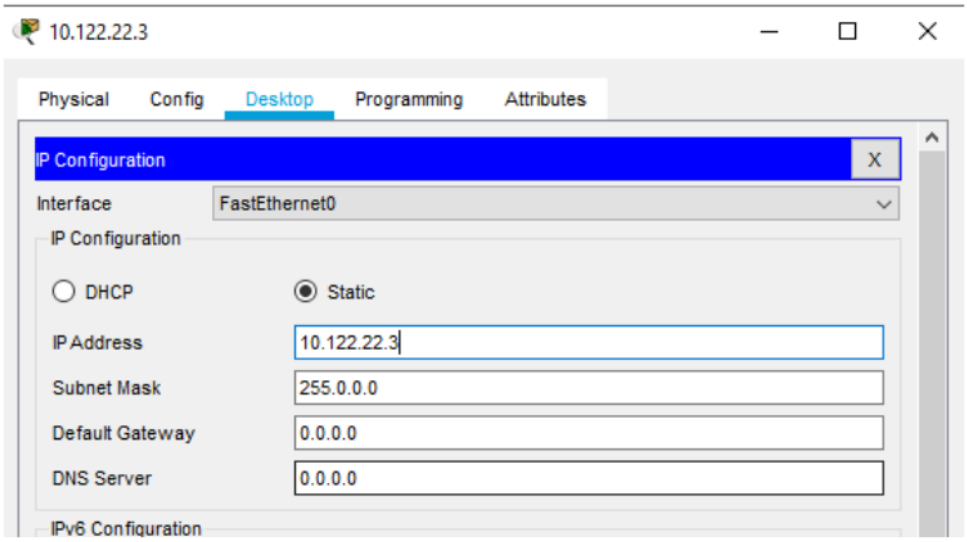
CONNECT HUB

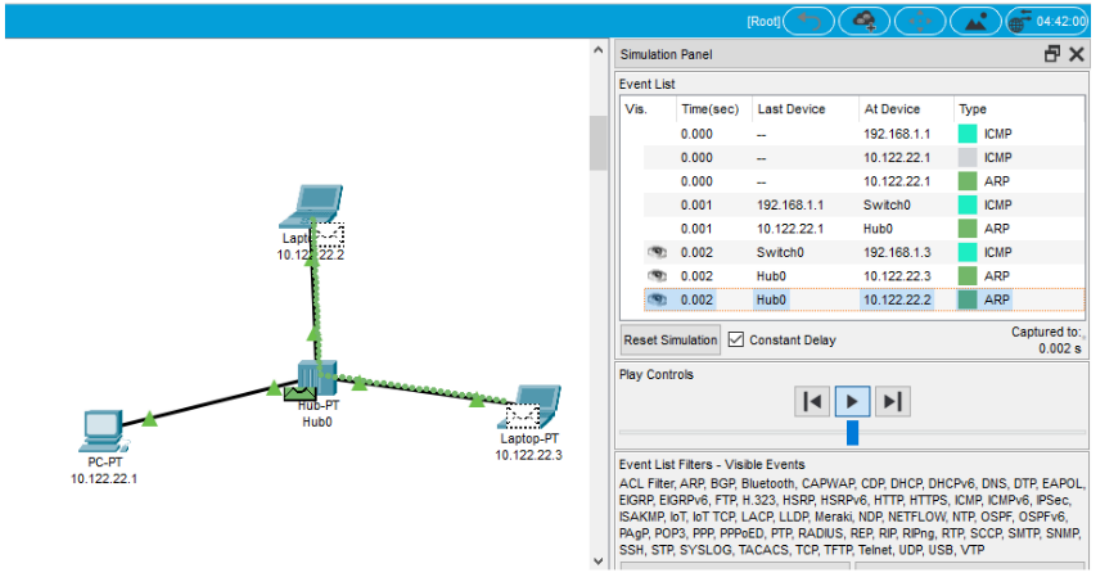
It is a networking device that connect multiple computers and it broadcast the message to all. It don't contain any table of receivers address.


Laptop-PT
10.122.22.2
Hub-PT
Hub0
PC-PT
10.122.22.1
Laptop-PT
10.122.22.3


Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
10.122.22.1
Subnet Mask
255.0.0.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration

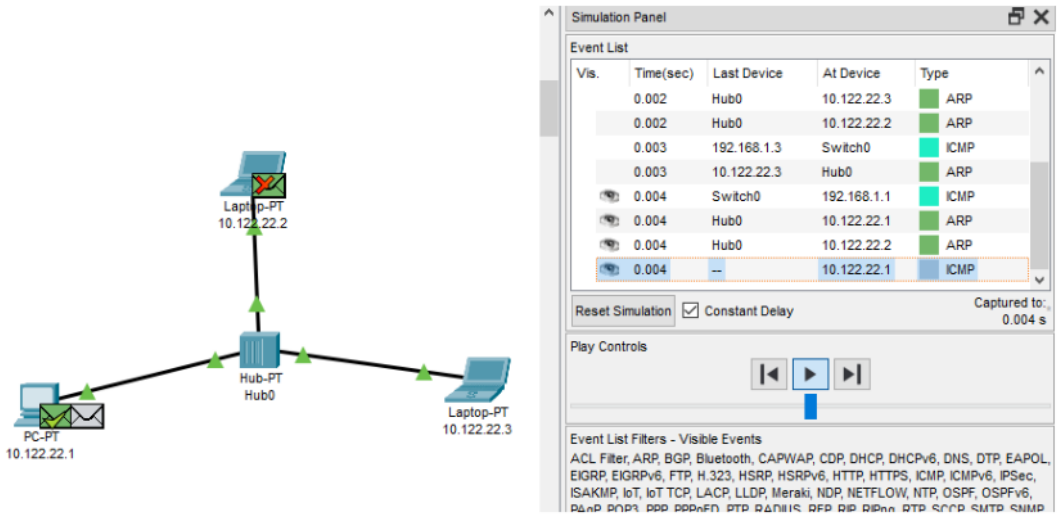

10.122.22.2
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
10.122.22.2
Subnet Mask
255.0.0.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0


10.122.22.3
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
10.122.22.3
Subnet Mask
255.0.0.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration



EXPLANATION:

As we can see in our image that it has broadcast the message to all connected devices



EXPLANATION:

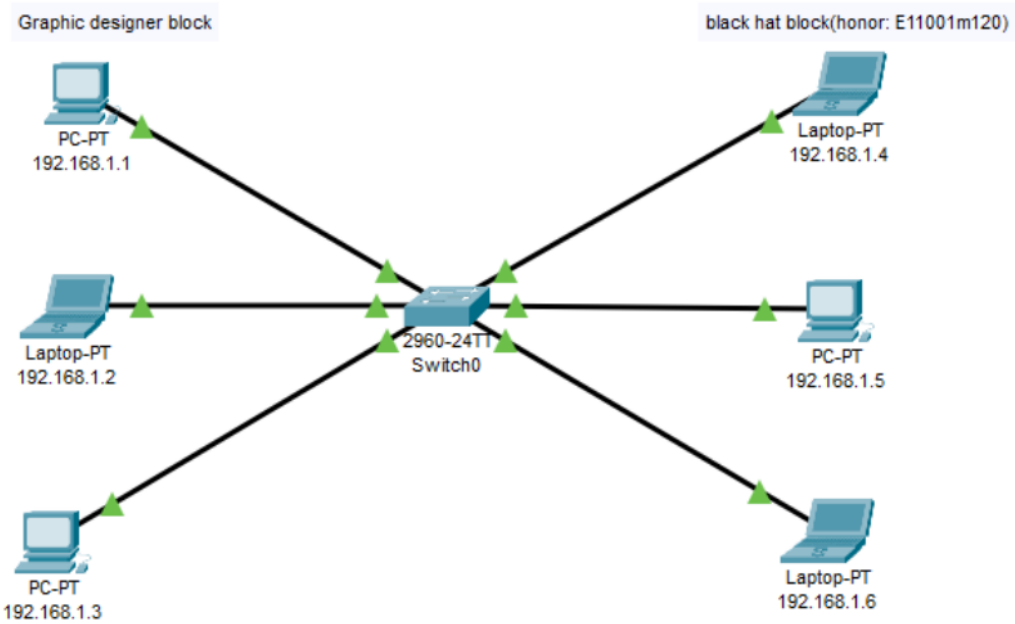
After broadcasting the recipient has received the message

LAB N0-09

VLAN CONFIGURATON

What is VLAN???

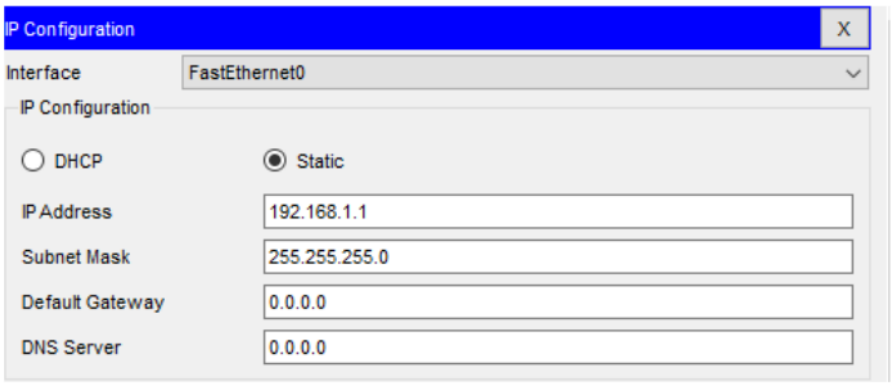
VLAN is the logical group of devices in same network which improve traffic management and security.

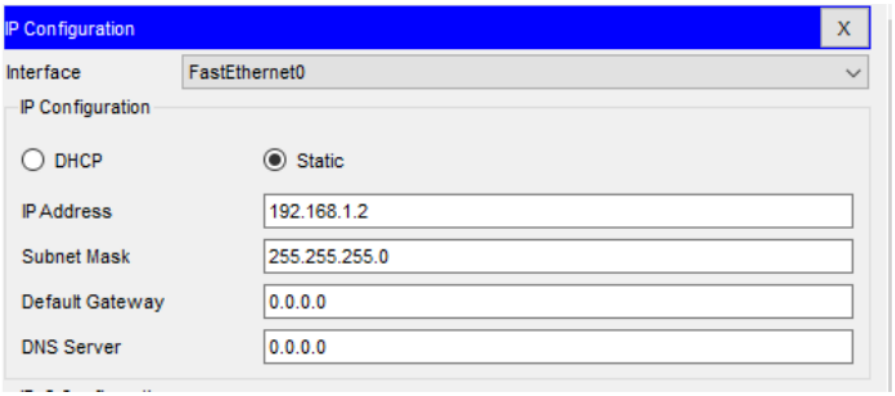


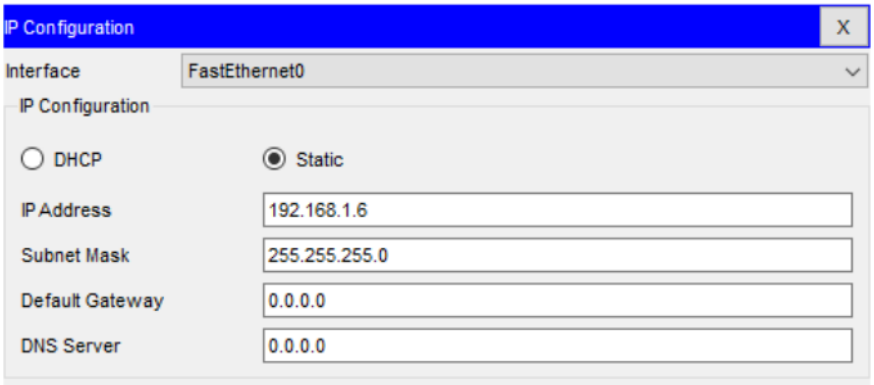
EXPLANATION:

In the above network I have attached 6 PC's with same IP addresses and attach them to a switch and we are not using router because we are not making different netwoks.

I have named Graphic designer block and black hat block(E11001M120).

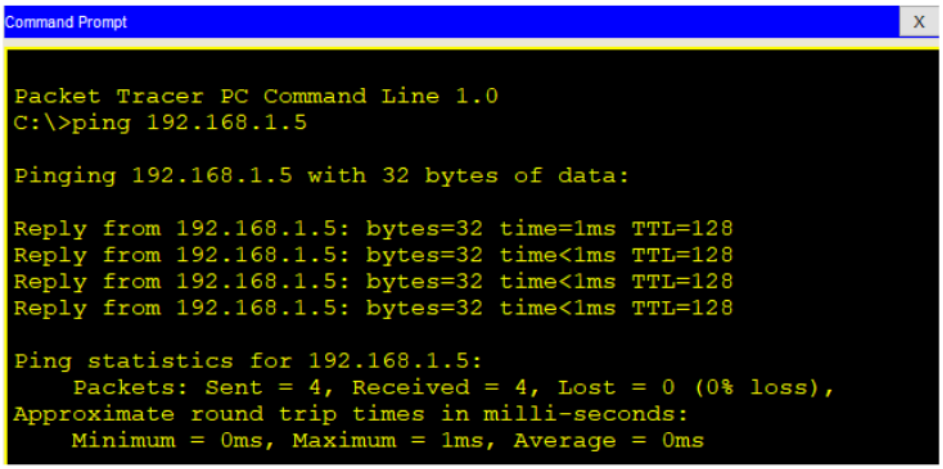






EXPLANATION:

In above images I have assign IP's for PC's of both blocks (C class IP)



EXPLANATION:

The above image illustrates that both blocks are communicating from graphic block PC to hacker block PC. Now I don't have to communicate between these two blocks, to achieve that I have to make VLAN. Before configuring VLAN both the block is communicating because both blocks in same network.

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 999
Switch(config-vlan)#name graphic
Switch(config-vlan)#vlan 1001
Switch(config-vlan)#name E11001M120
Switch(config-vlan)#
```

COMMAND EXPLANTION:

en: enable into privilege mode and indicate with # sign in CLI

 # config t: log into configuration mode to configure terminal

 # vlan 999: vlan name

 # name graphic

 # vlan 1001 vlan name

 # name E11001M120

```
Switch#sh
Switch#show vlan br

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                Gig0/1, Gig0/2
999  graphic                          active
1001 E11001M120                       active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

COMMAND EXPLANTION:

 # show vlan br: this command show brief about our vlan names and respective ports assign to them and also show they are active or not.

In the image I have marked that we have created two VLAN's 999 and 1001 and named them as graphic and E11001M120 and both ports are open but still I did not assign any ports to them that's why they are empty as I have marked.

Now lets assign ports to our VLAN's.

```
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int range fa0/1-3
Switch(config-if-range)#swi
Switch(config-if-range)#switchport acce
Switch(config-if-range)#switchport access vlan 999
Switch(config-if-range)#int range fa0/4-6
Switch(config-if-range)#switchpot acc
Switch(config-if-range)#switchport access vlan 1001
Switch(config-if-range)#
```

COMMAND EXPLANTION:

 # config t: log into configuration mode to configure terminal

 # int range fa0/1-3: select range of interface select for vlan 999

 # switchport access vlan 999: allow above selected ports to access vlan999

 # int range fa0/4-6: select another range of interface for another vlan

 # switchport access vlan 1001: above ports will access 1001

```
Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Fa0/24, Gig0/1, Gig0/2
999  graphic                          active    Fa0/1, Fa0/2, Fa0/3
1001 E11001M120                       active    Fa0/4, Fa0/5, Fa0/6
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

COMMAND EXPLANTION:

In this image we can see that we had successfully assign ports to our vlan and set PC's of fast ethernet 0 to 3 will belongs to graphic block and fast ethernet 4 to 6 will belongs to E11001M120. Now both blocks will not communicate to each other.

Let's check by pinging.

```
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.5

Pinging 192.168.1.5 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.5:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

EXPLANTION:

In our first illustration we was pinging from one block to another block but in this image we can see that they are not communicating and all packets has been lost

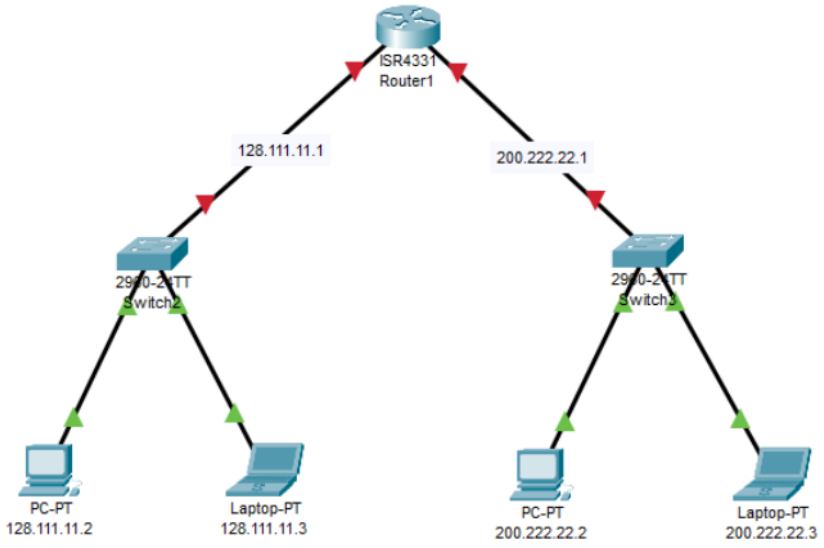
so we have successfully created VLAN.

LAB N0-10

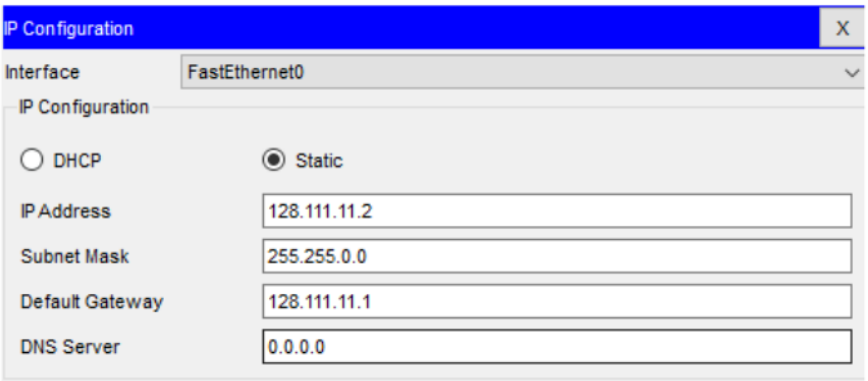
DIFFERENT NETWORK

EXPLANATION:

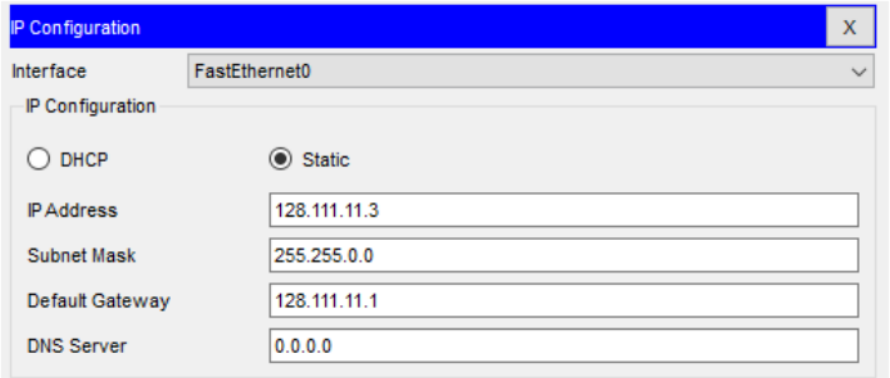
In this lab are going to connect PC's of different network using a router.

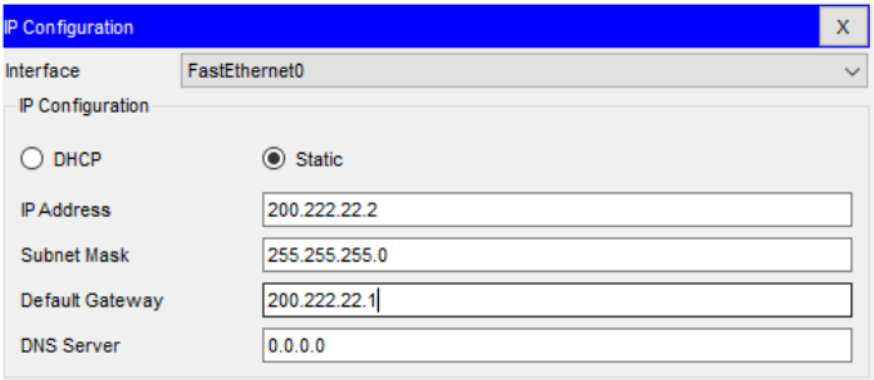


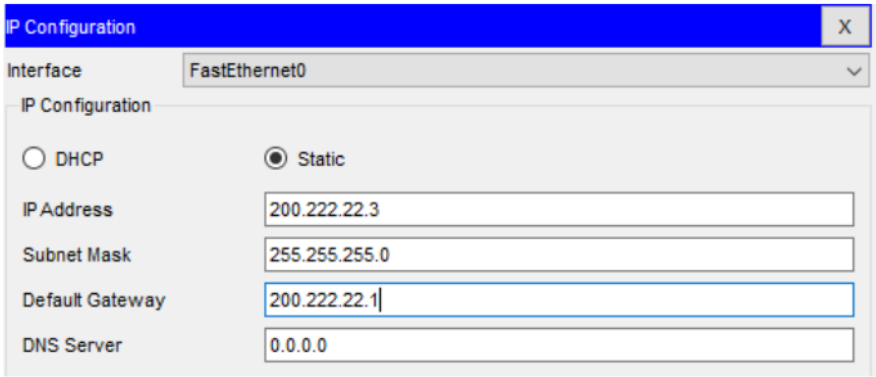
EXPLANATION: In the above image I design two different networks with IP address of class B, and Class C. Both the networks are connected to two and switches and both are also connected to a router.



EXPLANATION: here I have assigned IP address to PC of first network of class B IP address and also assign the default gateway. I am going to assign IP addresses for all PC's connected to network.







EXPLANATION: I have successfully assigned IP addresses with subnet mask and default gateway to all my PC's.

```
Press RETURN to get started!



Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0/0
Router(config-if)#ip add 128.111.11.1 255.255.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0,
changed state to up

Router(config-if)#
```

COMMAND EXPLANATION:

en: enable into privilege mode and indicate with # sign in CLI

 # config t: log into configuration mode to configure terminal

 # int gig0/0/0: selecting the interface

 # ip add 128.111.11.1 255.255.0.0: add ip to interface

 # no shut: up the cisco router

```
Router(config)#int gig0/0/1
Router(config-if)#ip add 200.222.22.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1,
changed state to up

Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

COMMAND EXPLANATION:

 # int gig0/0/0: selecting another interface

 # ip add 200.222.22.1 255.255.255.0: add ip to interface

 # no shut: up the router

 # end: end and return to privilege mode

 # wr: save above configration

```
C:\>ping 200.222.22.2

Pinging 200.222.22.2 with 32 bytes of data:

Reply from 200.222.22.2: bytes=32 time=1ms TTL=127
Reply from 200.222.22.2: bytes=32 time=3ms TTL=127
Reply from 200.222.22.2: bytes=32 time<1ms TTL=127
Reply from 200.222.22.2: bytes=32 time<1ms TTL=127

Ping statistics for 200.222.22.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 1ms

C:\>
```

EXPLANATION:

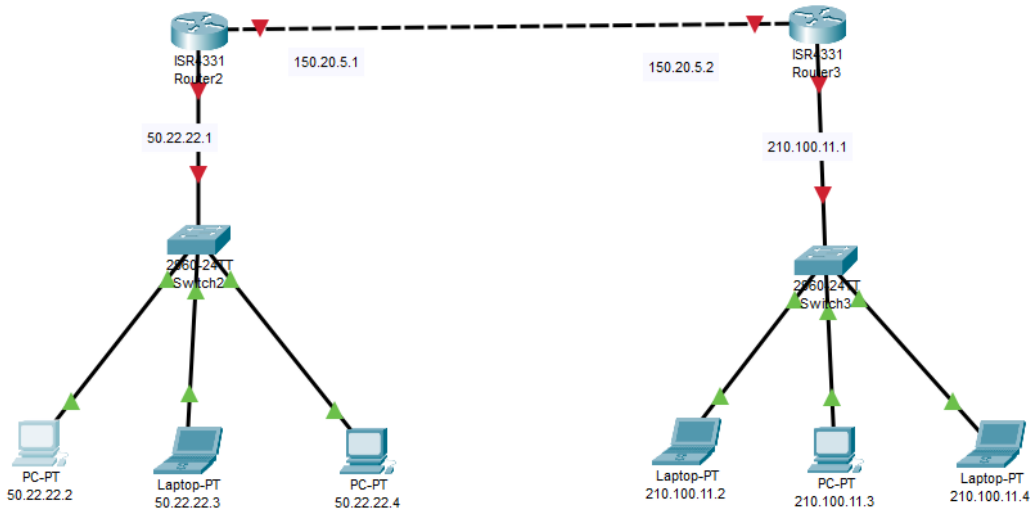
Here I have pinged form one network to another network and we can see that I have successfully got full reply form the destination and no packet has been lost.

LAB N0-11

RIP configuration

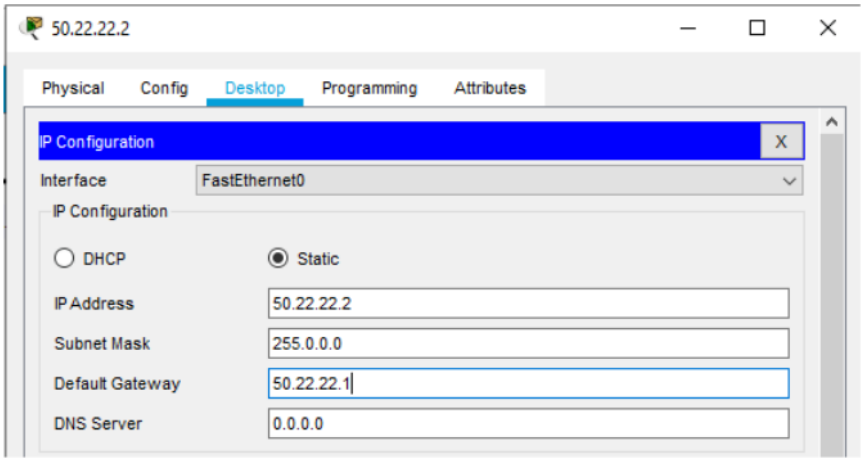
EXPLANATION:

RIP stands for routing information protocol.is a distance vector routing protocol and it use a simple metric to calculate the shortest path to every destination. In RIP the max no of hops is 15 because it prevents routing loop from source to destination.



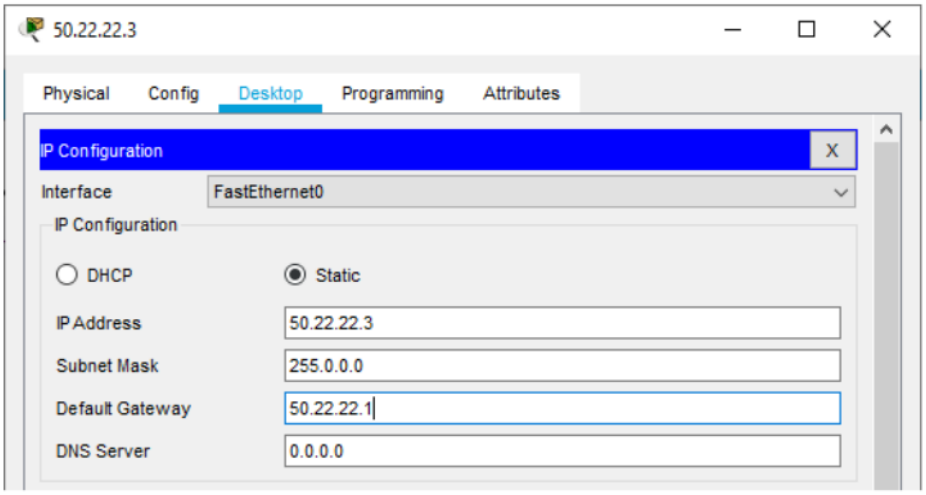
EXPLANATION:

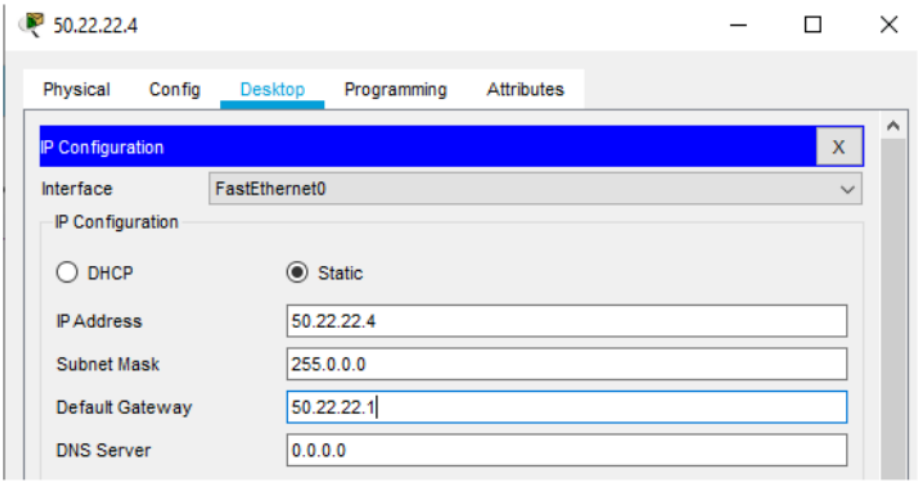
In above diagram I have design three different networks with three different IP addresses of class A ,B, and C.

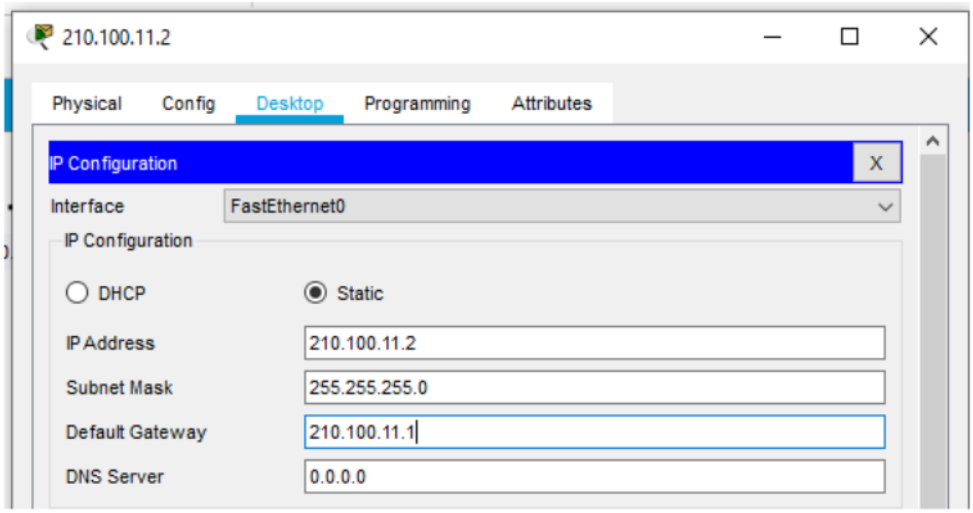


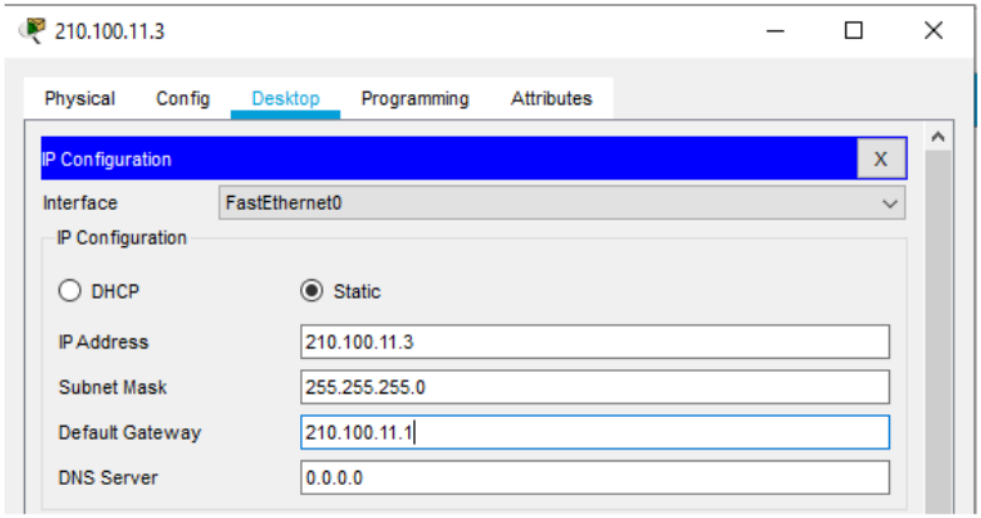
EXPLANATION:

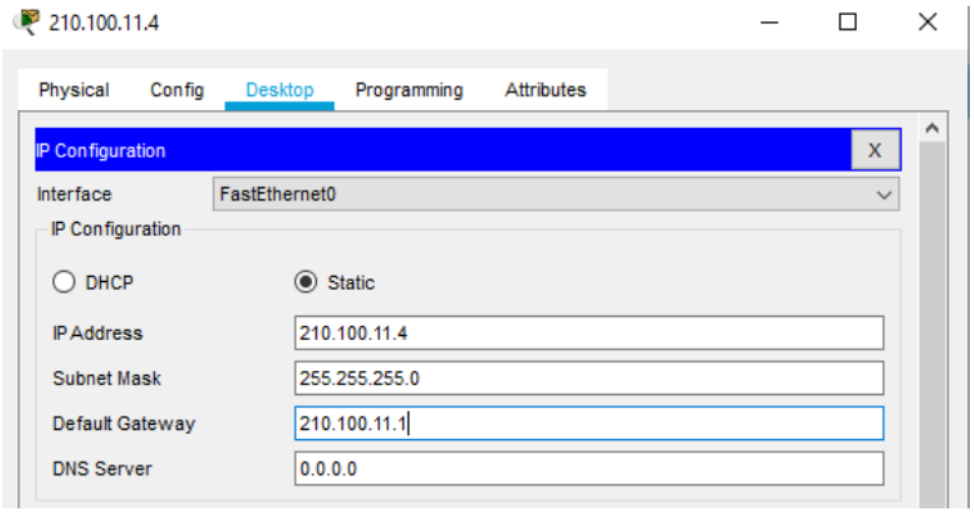
Here I have assigned static IP to my PC which are connected to a network. Same like this I will assign IP address to all my PC and make two different networks.






210.100.11.2
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
210.100.11.2
Subnet Mask
255.255.255.0
Default Gateway
210.100.11.1
DNS Server
0.0.0.0


210.100.11.3
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
210.100.11.3
Subnet Mask
255.255.255.0
Default Gateway
210.100.11.1
DNS Server
0.0.0.0



EXPLANATION:

Finally I have successfully assigned IP addresses to all of my connected PC's in different networks now its time to make another network of two routers and assign IP addresses to their interfaces.

```
        --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: n


Press RETURN to get started!



Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#ip address 50.22.22.1 255.0.0.0
Router(config-if)#ip address 50.22.22.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
```

EXPLANATION:

Here I have selected the interfaces of the first router and assign them an IP address of class A

COMMAND EXPLANATION:

Enable: enable into privilege mode and indicate with # sign in CLI

 # Configure terminal: log into configuration mode to configure terminal

 # interface gigabyte 0/0/0 selecting the interface

 # ip address 50.22.22.1.255.0.0.0 add ip to interface

 # no shutdown: up the cisco router

```
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/1
Router(config-if)#ip address 150.20.5.1 255.255.0.0
Router(config-if)#ip address 150.20.5.1 255.255.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up
```

COMMAND EXPLANATION:

 # exit: exit from current mode

 # interface gigabyte 0/0/1: select another interface

 # ip address 150.20.5.1: add ip to interface

```
         --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: n


Press RETURN to get started!



Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#ip address 210.100.11.1 255.255.255.0
Router(config-if)#ip address 210.100.11.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
```

EXPLANATION:

Here I have selected another router and start configuring to assign IP address to their interfaces

COMMAND EXPLANATION:

Enable: enable into privilege mode and indicate with # sign in CLI

 # Configure terminal: log into configuration mode to configure terminal

 # interface gigabyte 0/0/0 selecting the interface

 # ip address 210.100.11.1 255.255.255.0 add ip to interface

 # no shutdown: up the cisco router from sleeping mode

```
Packet Tracer PC Command Line 1.0
C:\>ping 210.100.11.3

Pinging 210.100.11.3 with 32 bytes of data:

Reply from 50.22.22.1: Destination host
unreachable.
Reply from 50.22.22.1: Destination host
unreachable.
Reply from 50.22.22.1: Destination host
unreachable.
Reply from 50.22.22.1: Destination host
unreachable.

Ping statistics for 210.100.11.3:
    Packets: Sent = 4, Received = 0, Lost = 4
(100% loss),

C:\>
```

EXPLANATION: in this image I have tried to ping from one network host to another network host by sending 4 packets and we can see that all of my packets has been lost. For now our destination host is unreachable because we had not define the routes, now we are to define the routes using RIP protocol.

```
Router(config)#router rip
Router(config-router)#ver 2
Router(config-router)#auto-summary
Router(config-router)#network 150.20.0.0
Router(config-router)#network 210.100.11.0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
Router#wr
Building configuration...
[OK]
Router#
```

COMMAND EXPLANATION:

 # router rip: configure RIP process

 # ver 2: version of RIP

 # auto-summary: for automatic summarization in RIP ver2

 # network 150.20.0.0: network address of one router

 # network 210.100.11.0: network address of another router

 # end: end and return to privilege mode

same configuration on router 2 will be implemented

```
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#ner 2
                      ^
% Invalid input detected at '^' marker.

Router(config-router)#ver 2
Router(config-router)#au
Router(config-router)#auto-summary
Router(config-router)#net
Router(config-router)#network 150.20.0.0
Router(config-router)#n
Router(config-router)#net
Router(config-router)#network 50.0.0.0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
```

COMMAND EXPLANATION:

 # router rip configure RIP process

 # ver 2 version of RIP

 # auto-summary for automatic summarization in RIP ver2

 # network 150.20.0.0 network address of one router

 # network 50.0.0.0 network address of another router

 # end end and return to privilege mode

 # wr save configuration.

Now we have successfully configured the routes on both of our routers, let's ping from one PC to another of different network.

```
C:\>ping 210.100.11.4

Pinging 210.100.11.4 with 32 bytes of data:

Reply from 210.100.11.4: bytes=32 time<1ms TTL=126
Reply from 210.100.11.4: bytes=32 time=1ms TTL=126
Reply from 210.100.11.4: bytes=32 time=1ms TTL=126
Reply from 210.100.11.4: bytes=32 time=6ms TTL=126

Ping statistics for 210.100.11.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 6ms, Average = 2ms

C:\>
```

EXPLANATION:

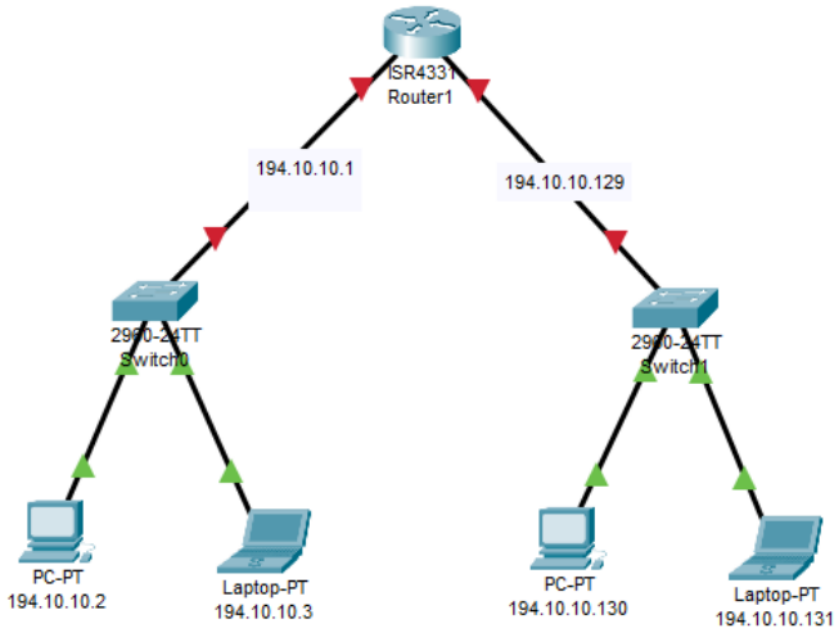
As we can see that this time, when we ping from one PC to another PC we have got full reply from destination and 0 packets has been lost .

LAB N0-12

SUBNETTING

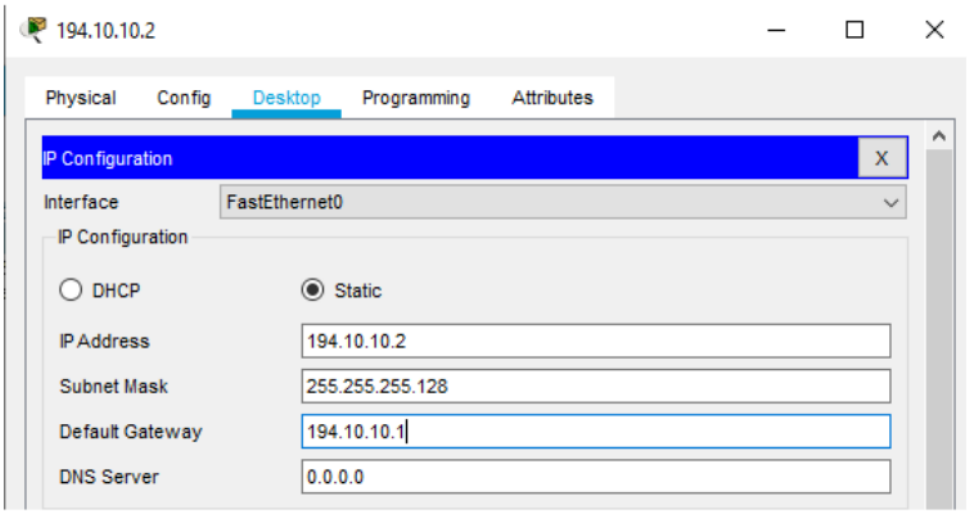
EXPLANATION:

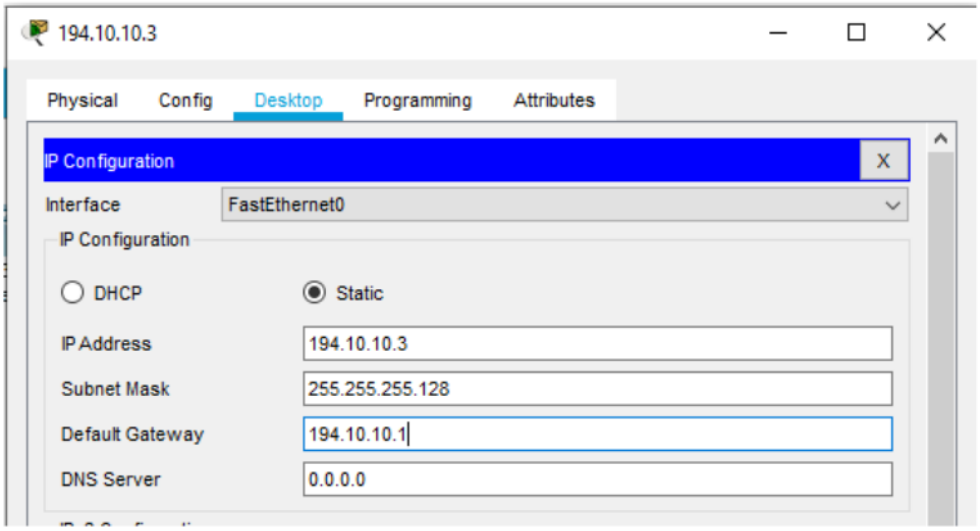
Subnetting is the mechanism of creating network inside another network in which we borrow some bits from host to network hence we can utilize our hosts efficiently.

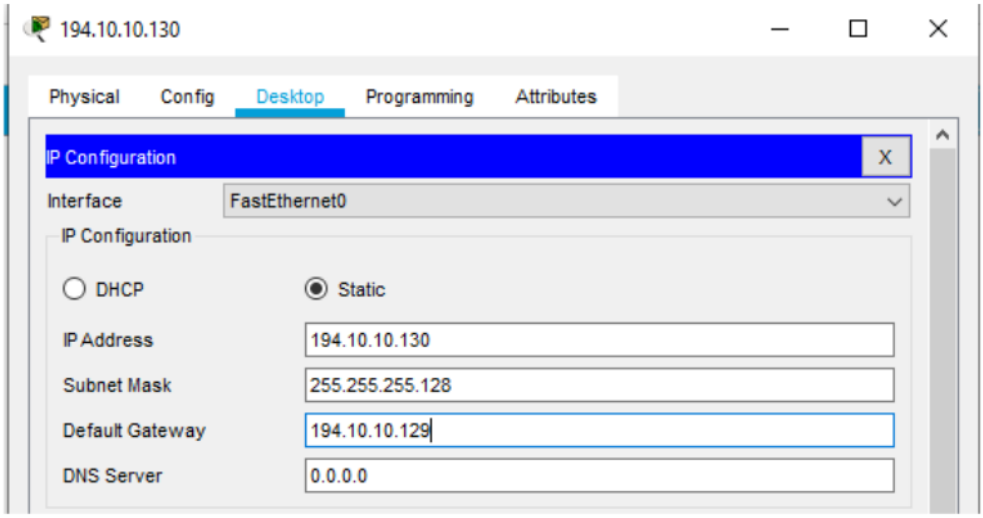


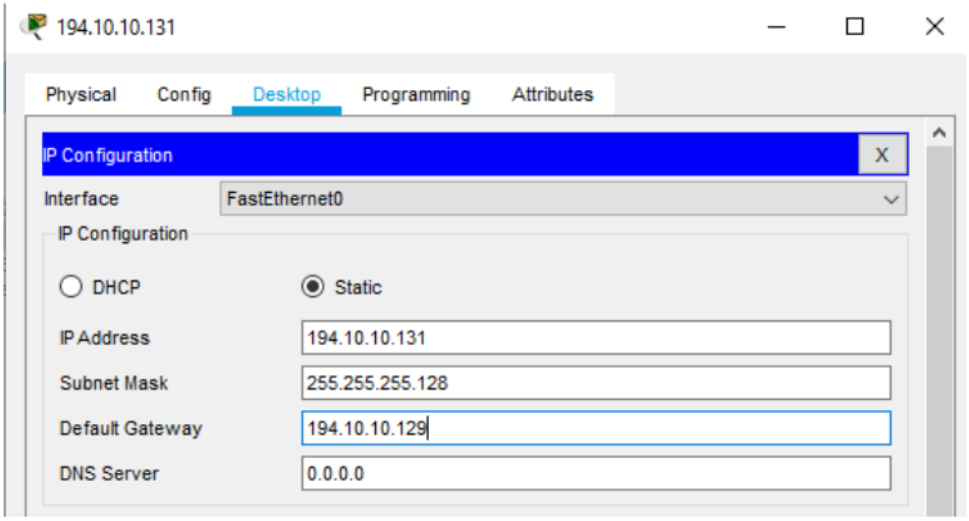
EXPLANATION:

In the above design I have connected four PC's with two switches and one router for the purpose of subnetting.









EXPLANATION:

Here I have assigned IP of class C with subnet mark and default gateway.

```
Router>en
Router#config
Configuring from terminal, memory, or network [terminal]? con
?Must be "terminal", "memory" or "network"
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0/0
Router(config-if)#ip add 194.10.10.1 255.255.255.128
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0,
changed state to up

Router(config-if)#exit
Router(config)#int gig0/0/1
Router(config-if)#ip add 194.10.10.129 255.255.255.128
Router(config-if)#no shut
```

COMMAND EXPLANATION:

en: enable into privilege mode and indicate with # sign in CLI

 # config t: log into configuration mode to configure terminal

 # int gig0/0/0: selecting interface

 # IP add 194.10.10.1 255.255.255.128: add IP to interface

Here I have add IP starting host from 0 and subnet mask to 128 because the first subnet mask start from 128.

 # no shut: up the cisco router from sleeping mode

```
changed state to up

Router(config-if)#exit
Router(config)#int gig0/0/1
Router(config-if)#ip add 194.10.10.129 255.255.255.128
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1,
changed state to up

Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

COMMAND EXPLANATION:

 # exit: exit from current mode

 # int gig0/0/1: select another interface

 # ip add 194.10.10.129 255.255.255.128: add IP to interface

Here I have add IP starting host from 129 and subnet mask to 128 because the first subnet mask start from 128.

********** **thank you so much**********

Lab Mannual

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FINAL GRADE

GENERAL COMMENTS

10 /10

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Comment 1

Detail explanation of lab work. Good job

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