HANOI UNIVERSITY
Faculty of Information Technology

CNE – Tutorial Guide

Week 1

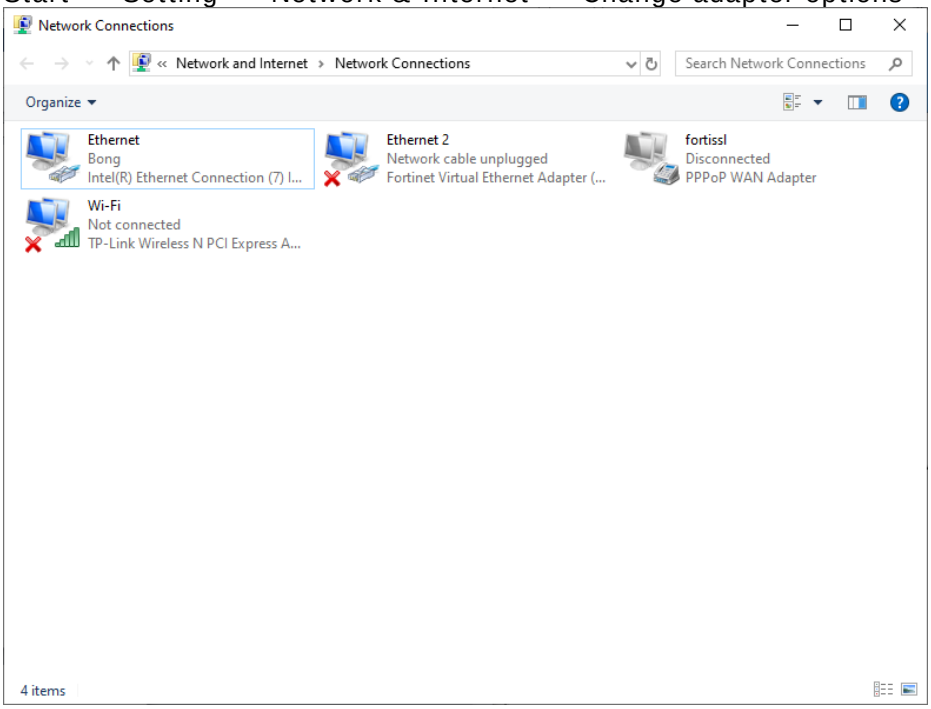
LAN Configuration

(Windows & Linux environment)

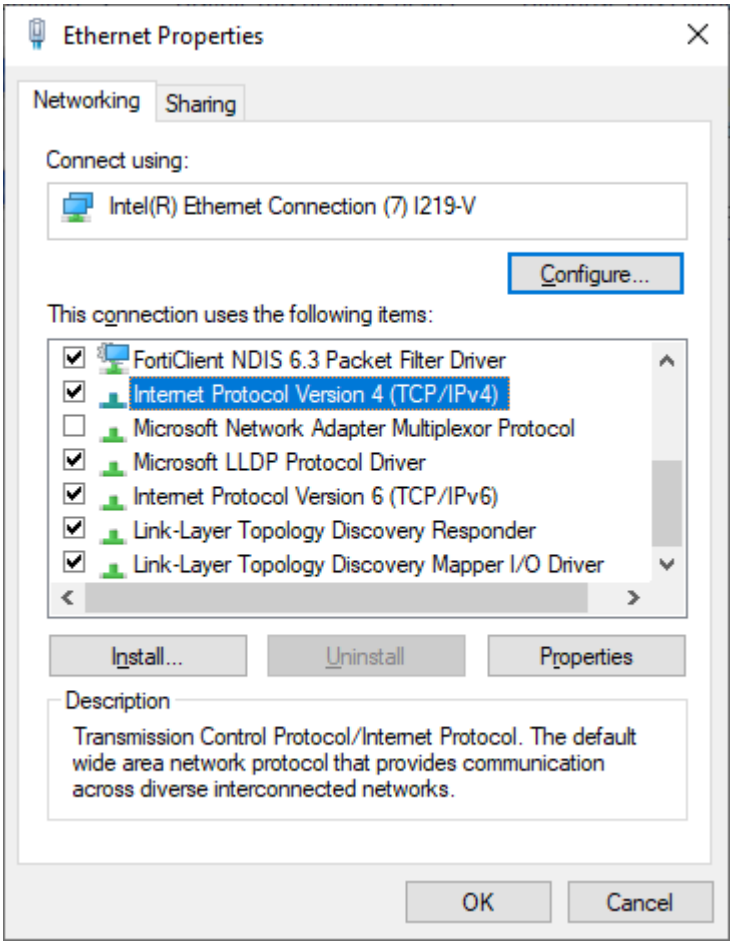
I. Configure your real PC in computer lab:

IP range (192.168.28.1 - 192.168.28.253)
Network mask (255.255.255.0)
Gateway (192.168.28.254)
DNS (192.168.100.2)

Start -> Setting -> Network & Internet -> Change adapter options

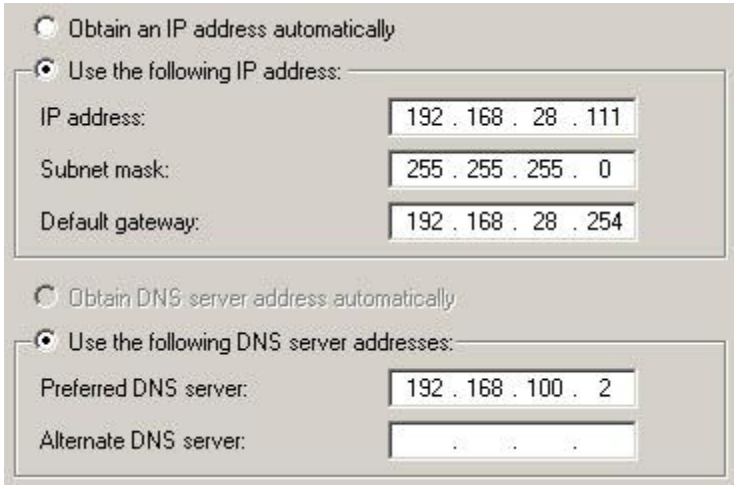


Right click on "Ethernet" then choose ***Properties***.



On Windows XP: Click on Network icon in the System Tray → choose ***Properties*** *or* ***Start*** → ***Control Panel*** → ***Network Connections*** →right click on "Local Area Network" then choose ***Properties***.

Double click on "Internet Protocol (TCP/IP)", fill in information then click OK.



Here I choose 192.168.28.111 for my PC's IP address. You can choose any IP from the IP range. However, to avoid IP conflict (because PCs in the same network cannot have the same IP), you can choose number based on your student ID number, for example: your student ID is 0501040101 so you can choose IP like: 192.168.28.101

Open **cmd** (***Start*** → ***Run*** → type `cmd`) and ping your own PC's IP and then your friend PC:

For example: `ping 192.168.28.111`

II. Work with some Commands.

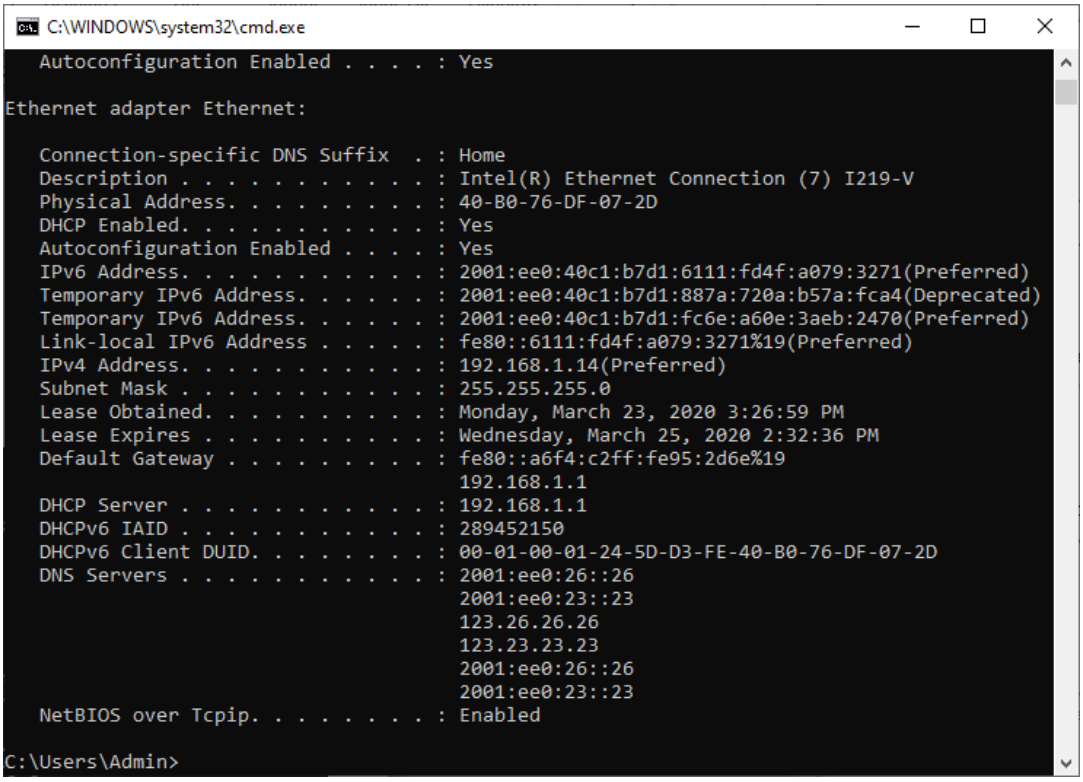
Open cmd on your PC to work with these commands.

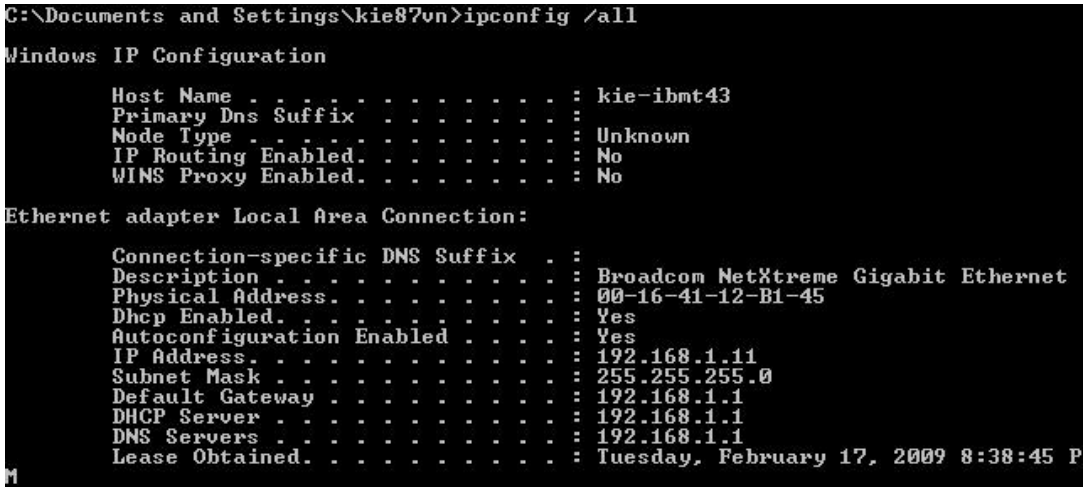
1. ipconfig

Configure IP (internet protocol configuration)

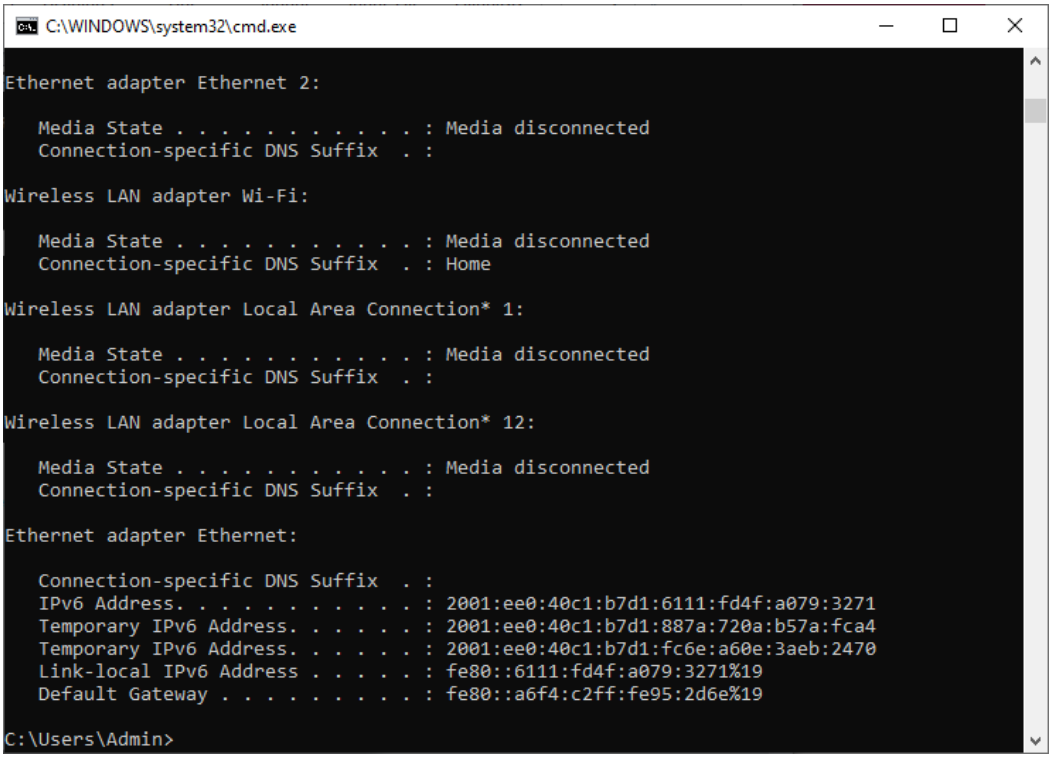
Syntax:

`ipconfig /all:` Display full configuration information.

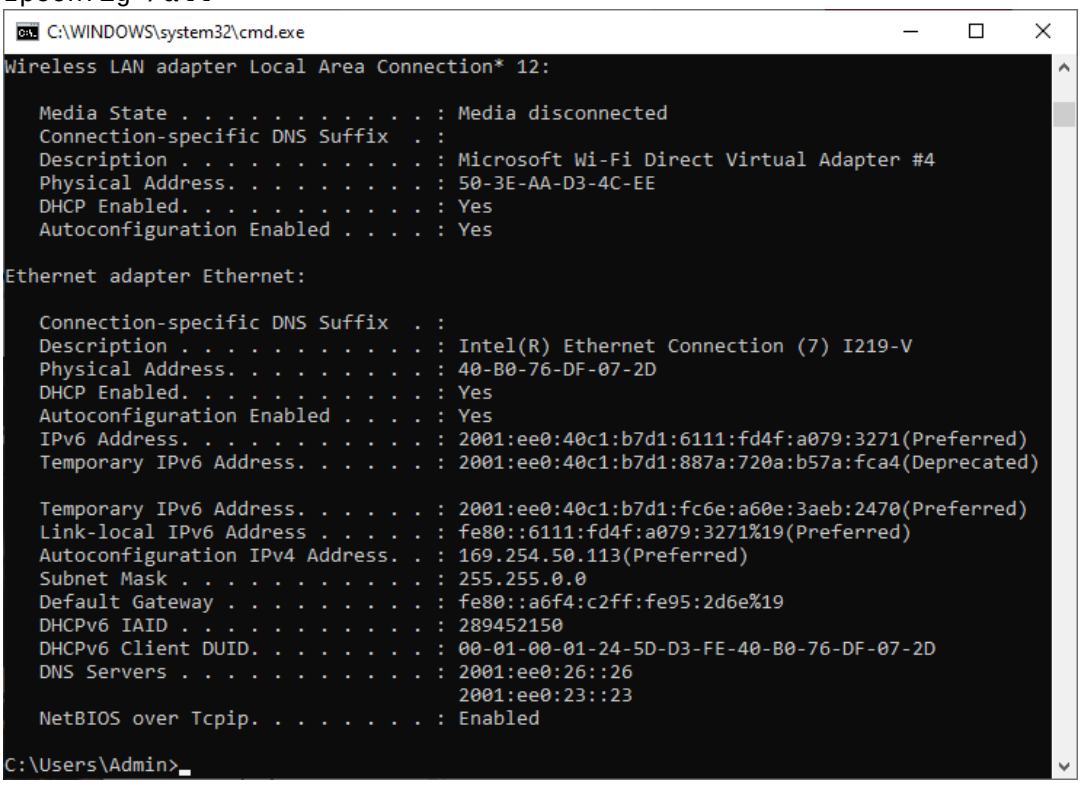




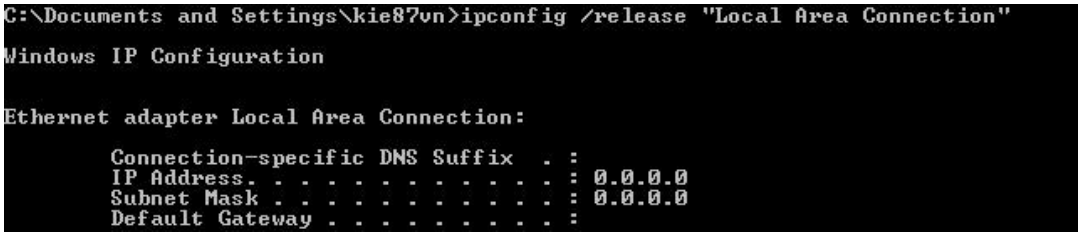
`ipconfig /release` [*adapter*]: Release the IP address for the specified adapter. For example: `ipconfig /release "Ethernet"`



Ipconfig /all

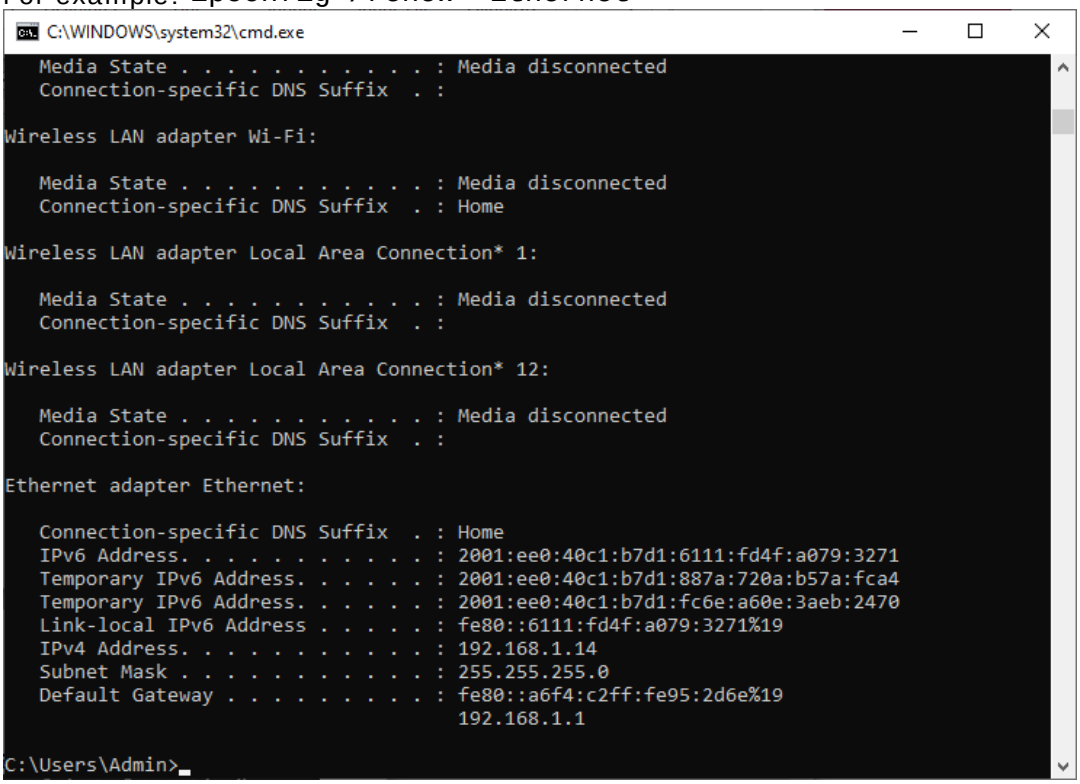


On Windows XP: ipconfig /release “Local Area Connection”

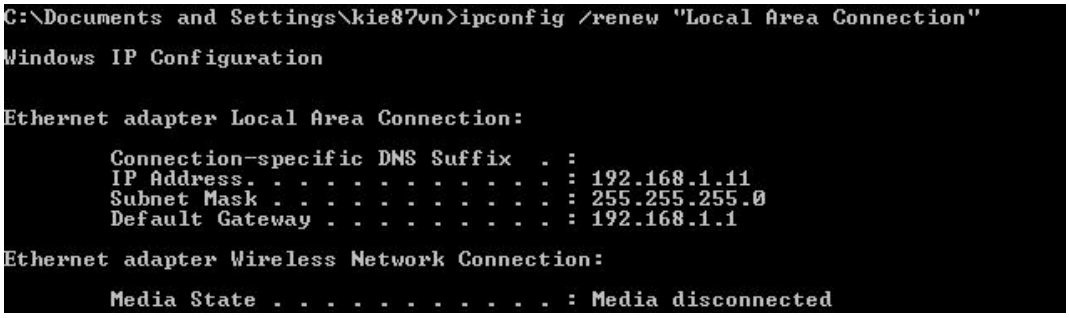


`ipconfig /renew` [*adapter*]: Renew the IP address for the specified adapter.

For example: `ipconfig /renew "Ethernet"`



On Windows XP: `ipconfig /renew "Local Area Connection"`



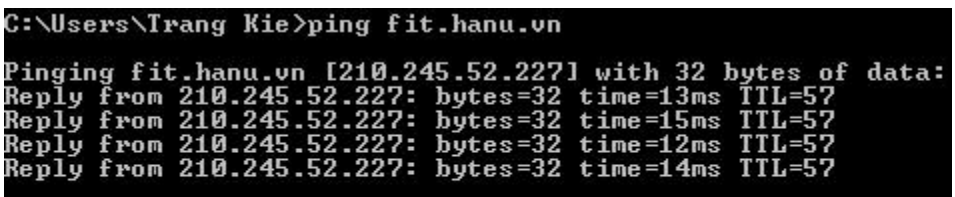
More @ http://www.ss64.com/nt/ipconfig.html

2. ping

Ping is used to test whether a particular host is reachable across an IP network or to self test the network interface card or as a speed test.

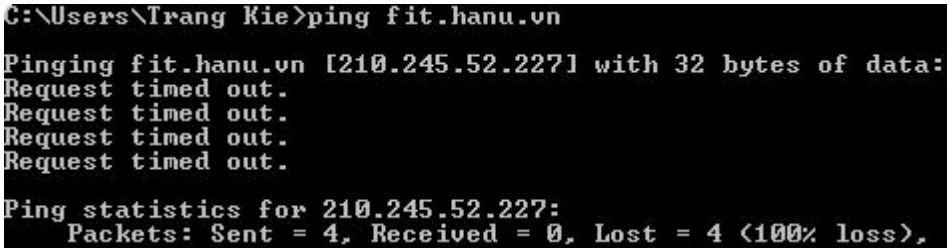
It works by sending ICMP echo request packets to the target host and listening for ICMP echo response replies.

Example:
In computer lab we may not ping fit.hanu.vn so just try pinging other PCs in lab or gateway. You can practice more at home.



210.245.52.227: IP address of fit.hanu.vn
byte=32: size of ping packet (32 bytes)
times=13ms: round trip times - The elapsed time for transit of a signal over a closed circuit, or time elapsed for a message to a remote place and back again.
TTL=57: is a limit on the period of time or number of iterations or transmissions in computer and computer network technology that a unit of data (e.g. a packet) can experience before it should be discarded.

When the host was down:



When the host was up:

```
C:\Users\Trang Kie>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:
Reply from 192.168.1.11: bytes=32 time=1ms TTL=128
Reply from 192.168.1.11: bytes=32 time=1ms TTL=128
Reply from 192.168.1.11: bytes=32 time=1ms TTL=128
Reply from 192.168.1.11: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

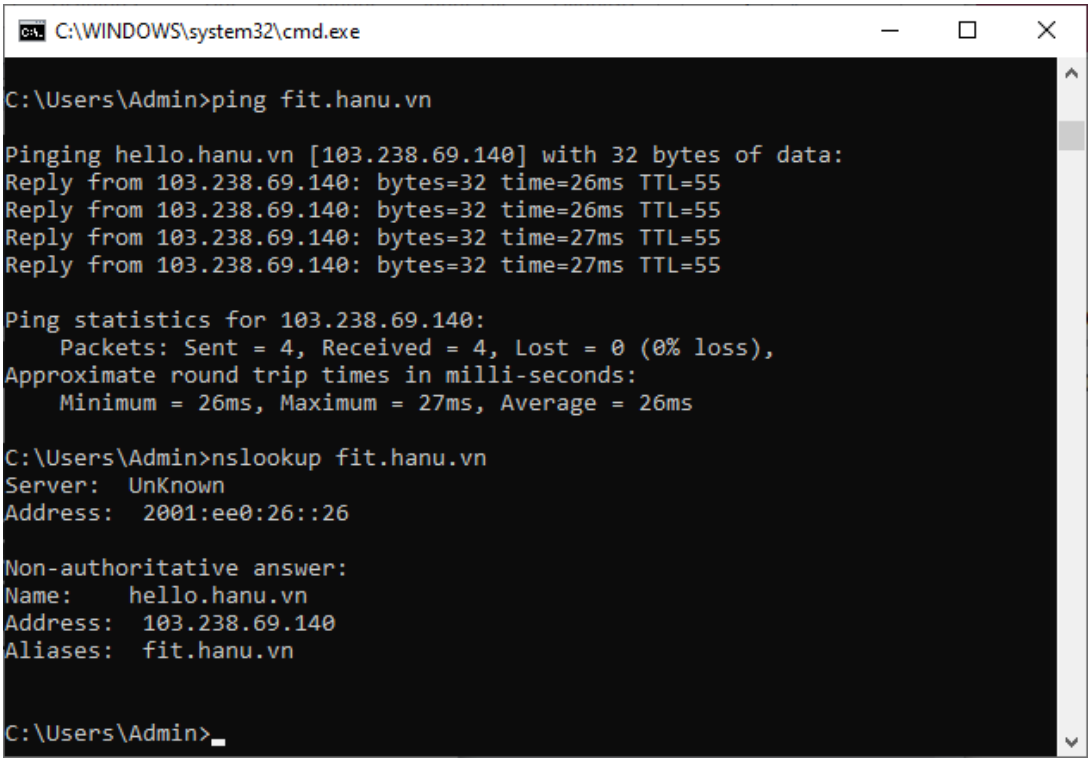
When IP address was out of range:

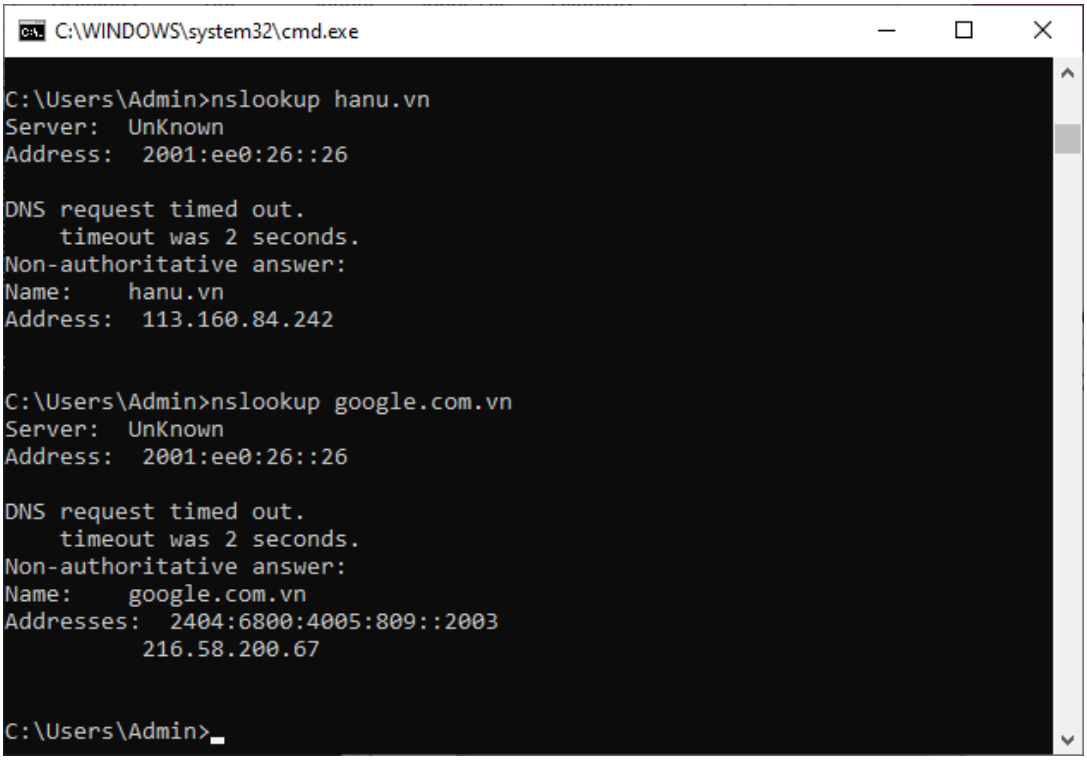
```
C:\Users\Trang Kie>ping 192.168.10.10

Pinging 192.168.10.10 with 32 bytes of data:
Reply from 203.113.158.134: TTL expired in transit.
Reply from 203.113.158.134: TTL expired in transit.
Reply from 203.113.158.134: TTL expired in transit.
Reply from 203.113.158.134: TTL expired in transit.

Ping statistics for 192.168.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

More @ http://en.wikipedia.org/wiki/Ping

3. nslookup

DNS (Domain Name System) is an internet system to translate names into IP addresses and **nslookup** (Name server lookup) is used to query DNS servers to find DNS details.

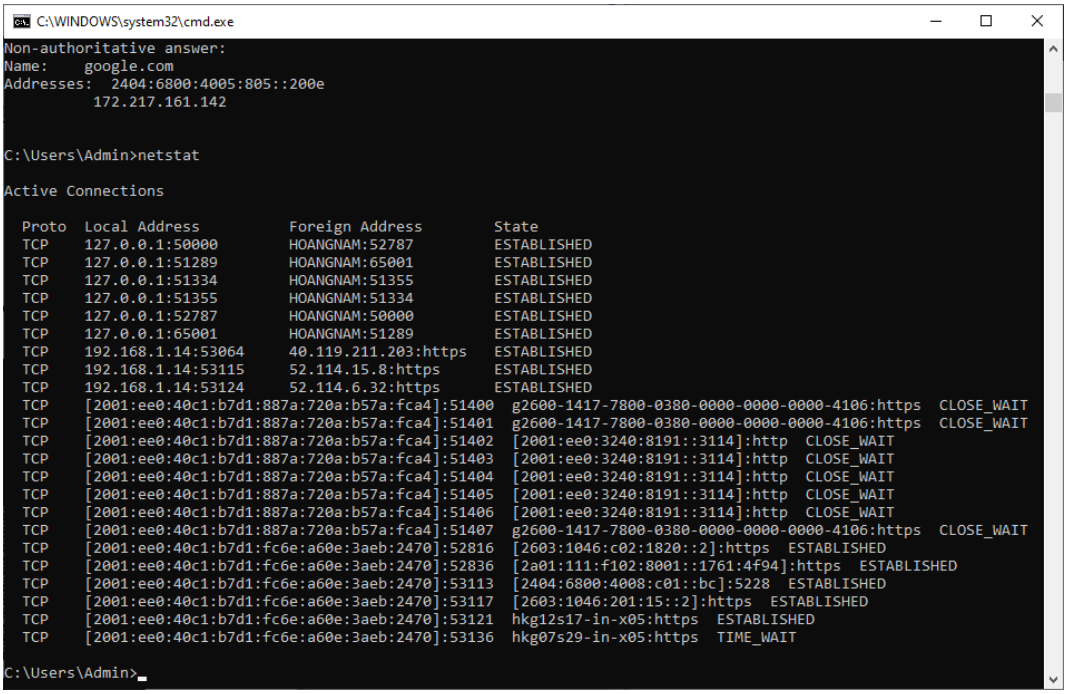




More @ http://en.wikipedia.org/wiki/Nslookup

4. netstat

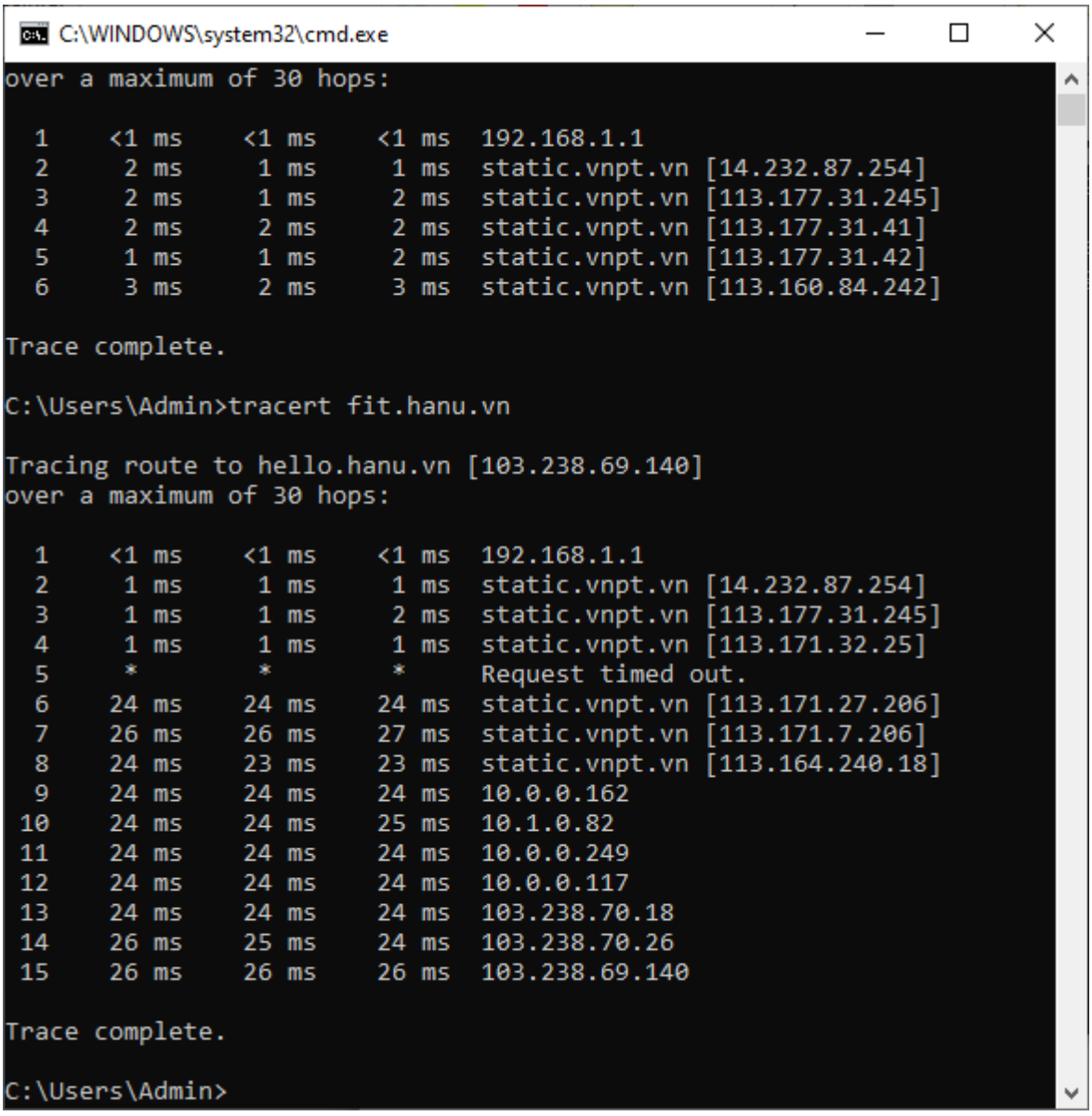
Netstat displays network connections (both incoming and outgoing), routing tables, and a number of network interface statistics.



For using parameters guide, please see more @ http://en.wikipedia.org/wiki/Netstat

5. tracert

Tracert (similar to **traceroute** in Linux) allows you to determine the route packets take through a network to reach a particular host that you specify.


C:\WINDOWS\system32\cmd.exe
over a maximum of 30 hops:
1 <1 ms <1 ms <1 ms 192.168.1.1
2 2 ms 1 ms 1 ms static.vnpt.vn [14.232.87.254]
3 2 ms 1 ms 2 ms static.vnpt.vn [113.177.31.245]
4 2 ms 2 ms 2 ms static.vnpt.vn [113.177.31.41]
5 1 ms 1 ms 2 ms static.vnpt.vn [113.177.31.42]
6 3 ms 2 ms 3 ms static.vnpt.vn [113.160.84.242]
Trace complete.
C:\Users\Admin>tracert fit.hanu.vn
Tracing route to hello.hanu.vn [103.238.69.140]
over a maximum of 30 hops:
1 <1 ms <1 ms <1 ms 192.168.1.1
2 1 ms 1 ms 1 ms static.vnpt.vn [14.232.87.254]
3 1 ms 1 ms 2 ms static.vnpt.vn [113.177.31.245]
4 1 ms 1 ms 1 ms static.vnpt.vn [113.171.32.25]
5 * * * Request timed out.
6 24 ms 24 ms 24 ms static.vnpt.vn [113.171.27.206]
7 26 ms 26 ms 27 ms static.vnpt.vn [113.171.7.206]
8 24 ms 23 ms 23 ms static.vnpt.vn [113.164.240.18]
9 24 ms 24 ms 24 ms 10.0.0.162
10 24 ms 24 ms 25 ms 10.1.0.82
11 24 ms 24 ms 24 ms 10.0.0.249
12 24 ms 24 ms 24 ms 10.0.0.117
13 24 ms 24 ms 24 ms 103.238.70.18
14 26 ms 25 ms 24 ms 103.238.70.26
15 26 ms 26 ms 26 ms 103.238.69.140
Trace complete.
C:\Users\Admin>

For using parameters guide, type: `tracert /?`

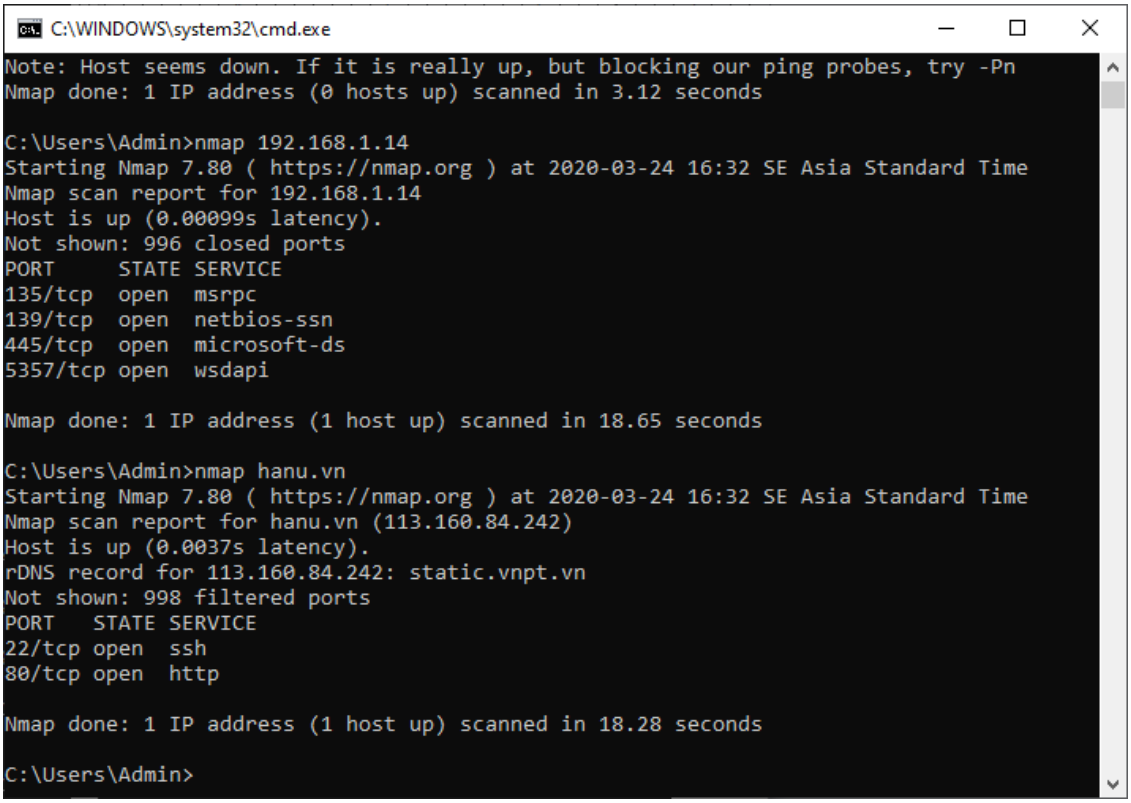
More @ http://www.windowsnetworking.com/articles_tutorials/Using-Tracert.html

6. nmap

Download and install nmap for Windows. After installing, read the instruction on executing Nmap on Windows: http://nmap.org/book/inst-windows.html

Nmap (Network Mapper) is a security scanner used to discover computers and services on a computer network.

`nmap [ <Scan Type> ...] [ <Options> ] { <target specification> }`



Reference Guide for using Nmap: http://nmap.org/book/man.html

III. LAN configuration with Packet Tracer

1. *What is Package Tracer*?
   - A standalone, medium-fidelity, simulation-based learning environment for networking novices to design, configure, and troubleshoot computer networks at a CCNA-level of complexity.

- Supports student and instructor creation of simulations, visualizations, and animations of networking phenomena.

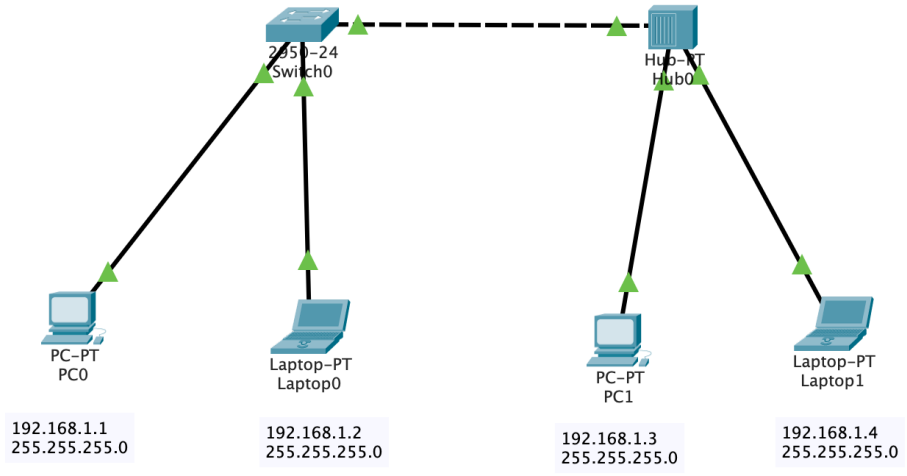
2. Download Package Tracer (choose Student version or 6.x version, with 7.x or 8.x version you need to have an account): https://drive.google.com/file/d/14LX4Okdtcq2GGSjbgZ3mowqpWxHW_G6Z/view?usp=share_link (Packet Tracer 6.2)

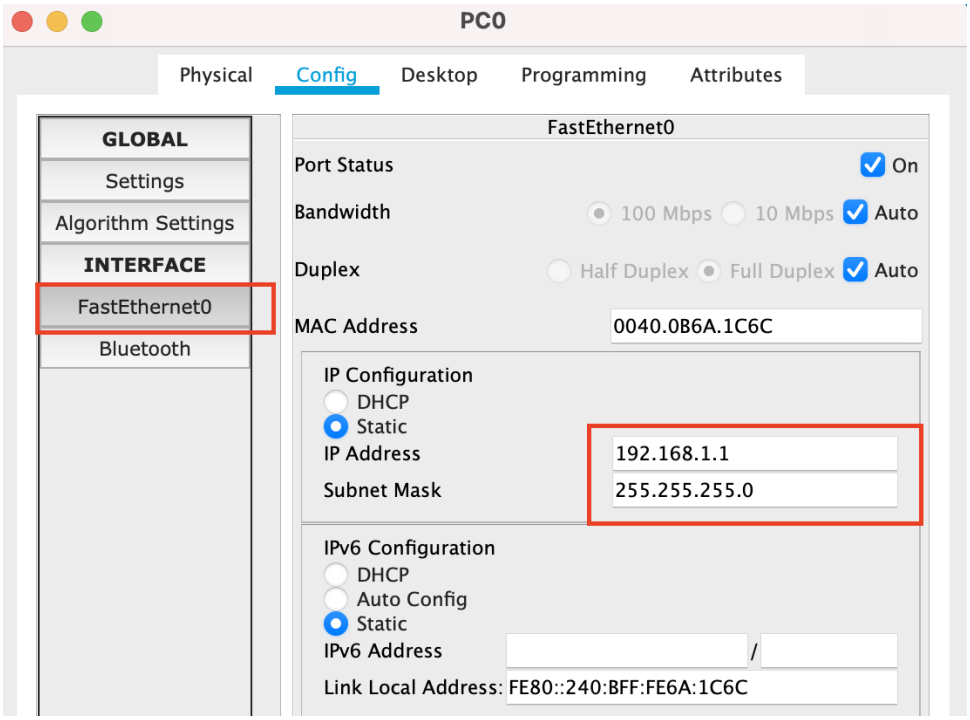
3. Learn how to use Package Tracer:
   - **Help → Contents...** (or press F1): The help files are designed to familiarize users with the Packet Tracer interface, functions, and features.
   - **Help → Tutorials** (or press F11): The tutorials demonstrate the basic functions, features, and aspects of Packet Tracer.

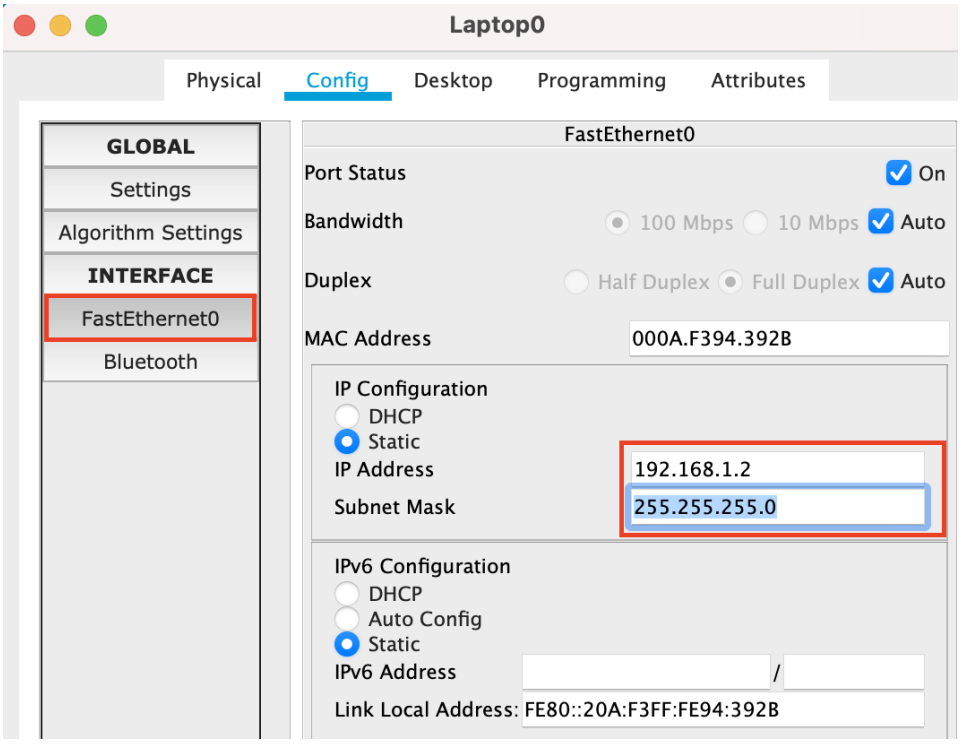
4. Tutorial guide:

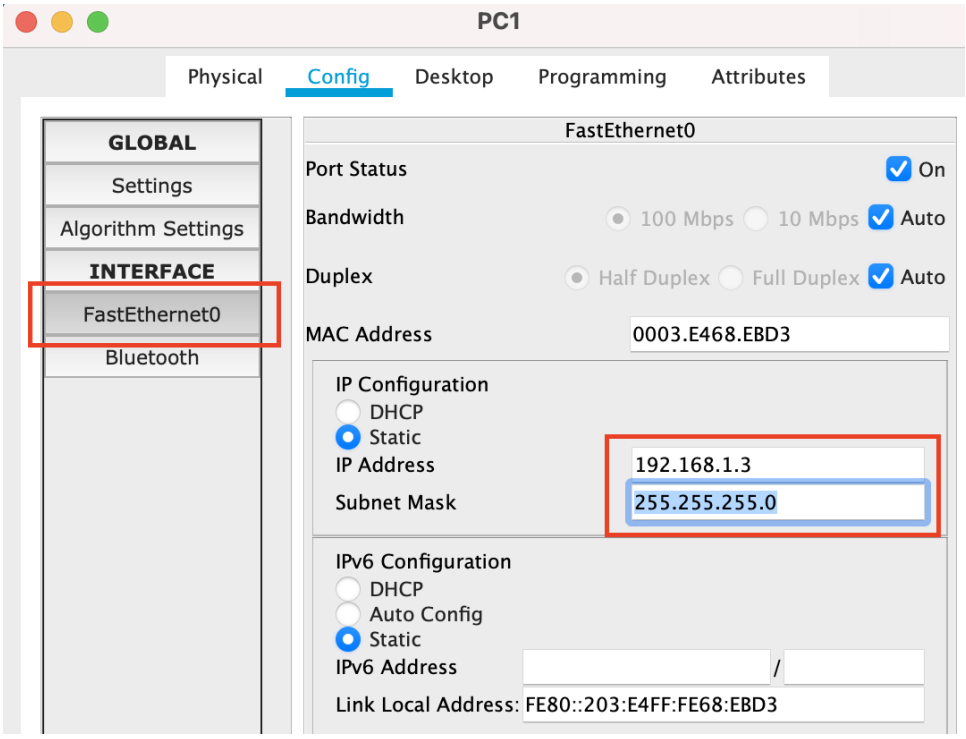
In this tutorial section, you will use Package Tracer to set up a Local Area Network (LAN).

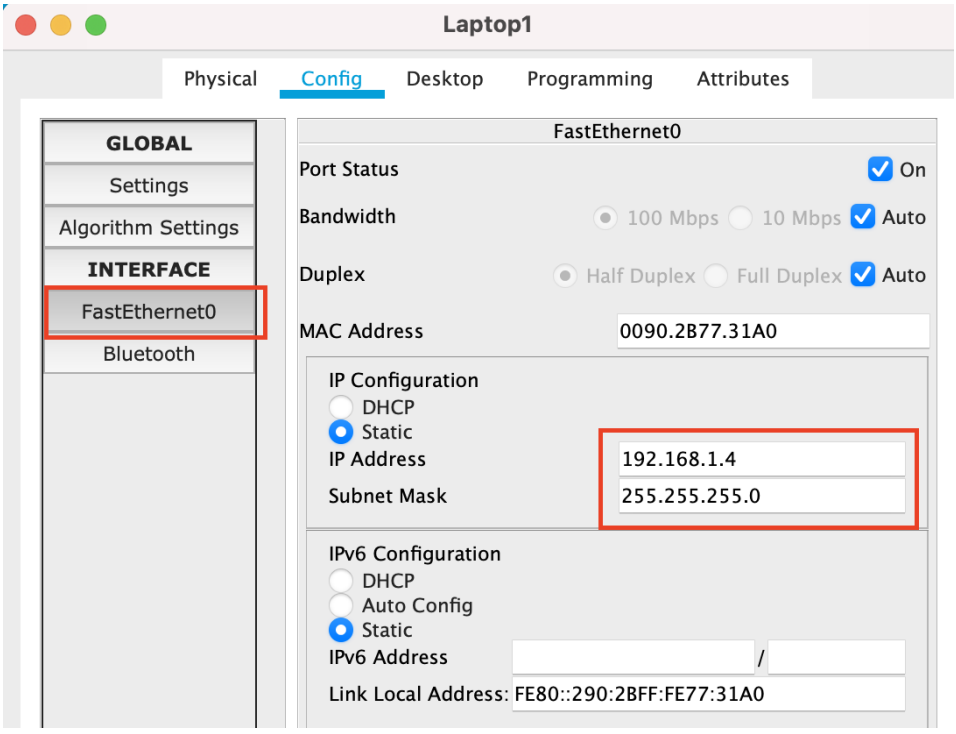
Scenario: Using Package Tracer to design a LAN using 1 switch and 1 hub, cross-over cable to connect switch - hub, copper straight-through cables to connect switch/hub – computer/laptop.



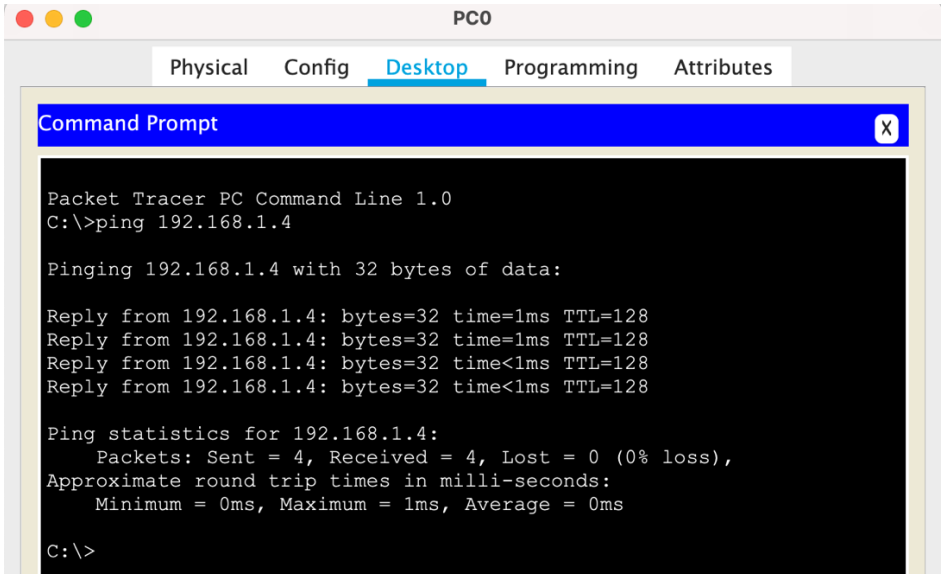

PC0
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0040.0B6A.1C6C
IP Configuration
DHCP
Static
IP Address
192.168.1.1
Subnet Mask
255.255.255.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address:
FE80::240:BFF:FE6A:1C6C


Laptop0
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
000A.F394.392B
IP Configuration
DHCP
Static
IP Address
192.168.1.2
Subnet Mask
255.255.255.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address:
FE80::20A:F3FF:FE94:392B





Now you can ping successfully from PC0 to Laptop1:



IV. EXTRA: Network configuration in Linux (Debian)

Login Debian using this account:

User: fit

Password: fit

Using graphic interface: Open network configuration tool in the top bar at ***System → Administration → Network***

or

Using command line (recommended): Open terminal tool in the top bar at ***Applications → Accessories → Terminal***

If you use command line, follow these steps:

+ Switch to root account: type in the terminal this command: **`su root`**, then type the password, which is: fithanu (for example)

+ Open and edit interface file, type this into the terminal:
  `nano /etc/network/interfaces`

+ by default you'll see something like this:

```
# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface - use DHCP to find
our address
auto eth0
iface eth0 inet dhcp
```

+ And if you want to fix your IP, modify it to:

```
# The loopback network interface
auto lo
iface lo inet loopback

# The primary network
interface auto eth0
iface eth0 inet static
address  192.168.28.101
gateway  192.168.28.254
netmask 255.255.255.0
```

+ After changes are made, don't forget to restart the networking by running **`/etc/init.d/networking restart`** in the terminal.

To see the IP address of your machine, in the terminal (using root account) type: `ifconfig` (in Windows, it is `ipconfig`, don't be confused).

Ping from other PC to check your network configuration.

Self-study

Try configuring network in some other distributions of Linux.