HANOI UNIVERSITY
Faculty of Information Technology

CNE – Tutorial Guide

Week 2

LAN Configuration

(Simulation with Package Tracer)

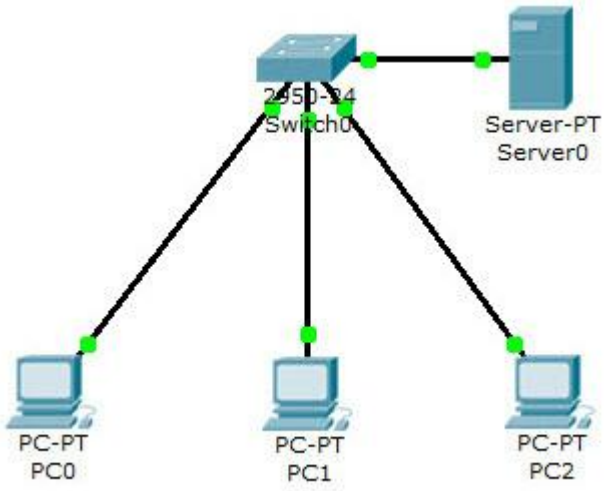
I. Getting to know with Package Tracer

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 from FIT Portal:
   http://fit.hanu.edu.vn/fitportal/course/view.php?id=17
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.

II. Tutorial Guide

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

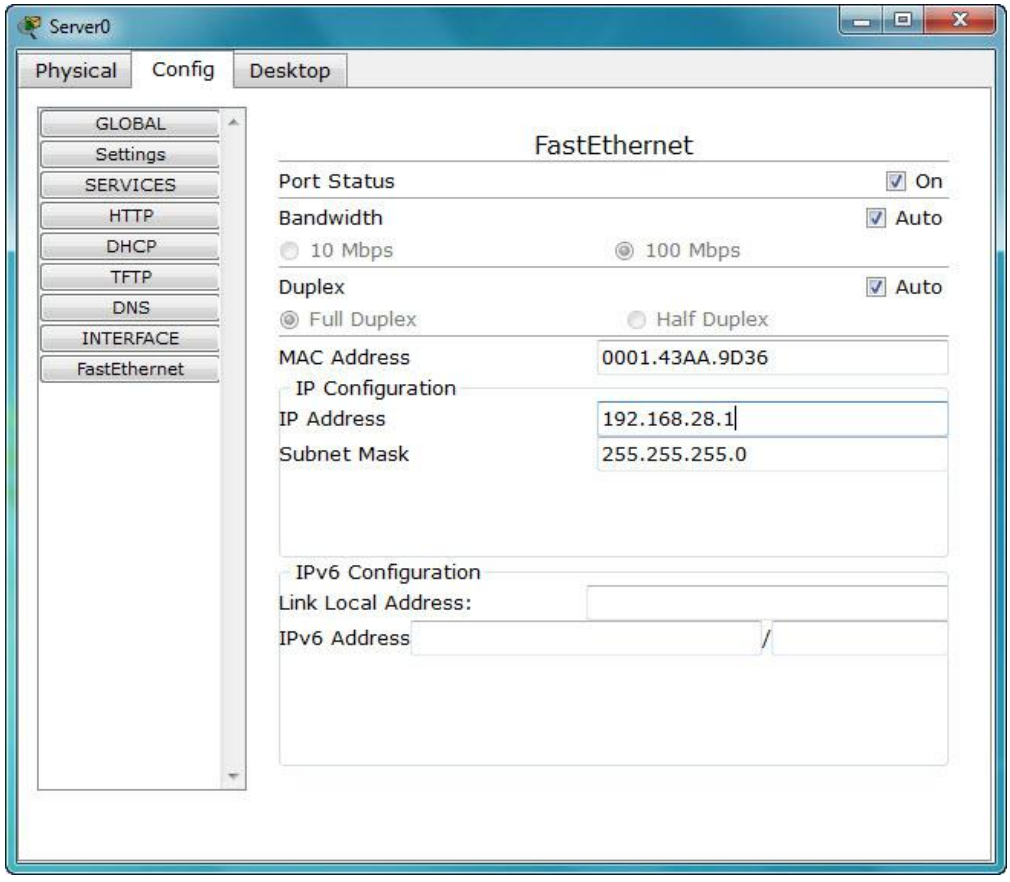
Scenario: Using Package Tracer to design a LAN which is star network. It has one central switch, 3 PCs and 1 server, copper straight-through cables to connect devices.

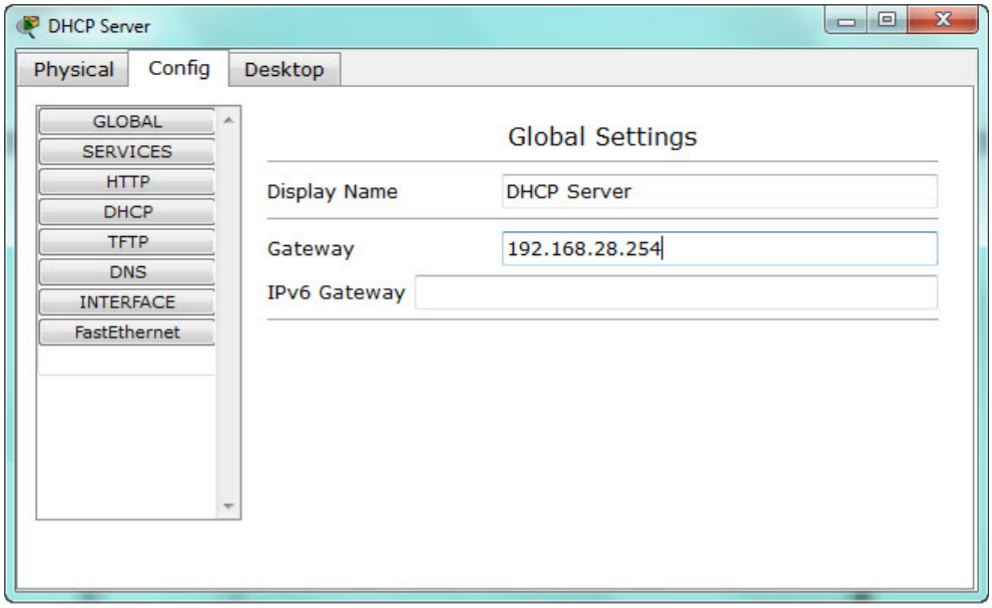


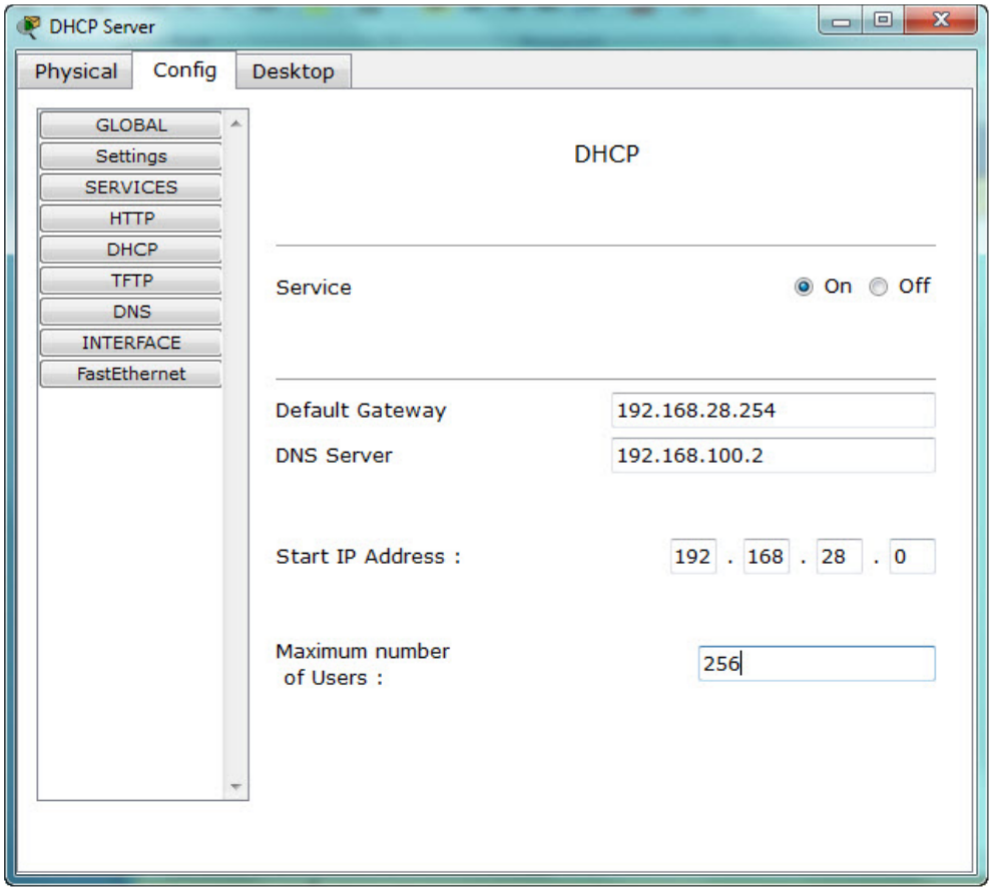
- IP range (192.168.28.1-253)
- Network mask (255.255.255.0)
- Gateway (192.168.28.254)
- DNS (192.168.100.2)

- Server: 192.168.28.1 mask 255.255.255.0
- Using DHCP to automatically assign IP for each PCs.

1. Configure server:

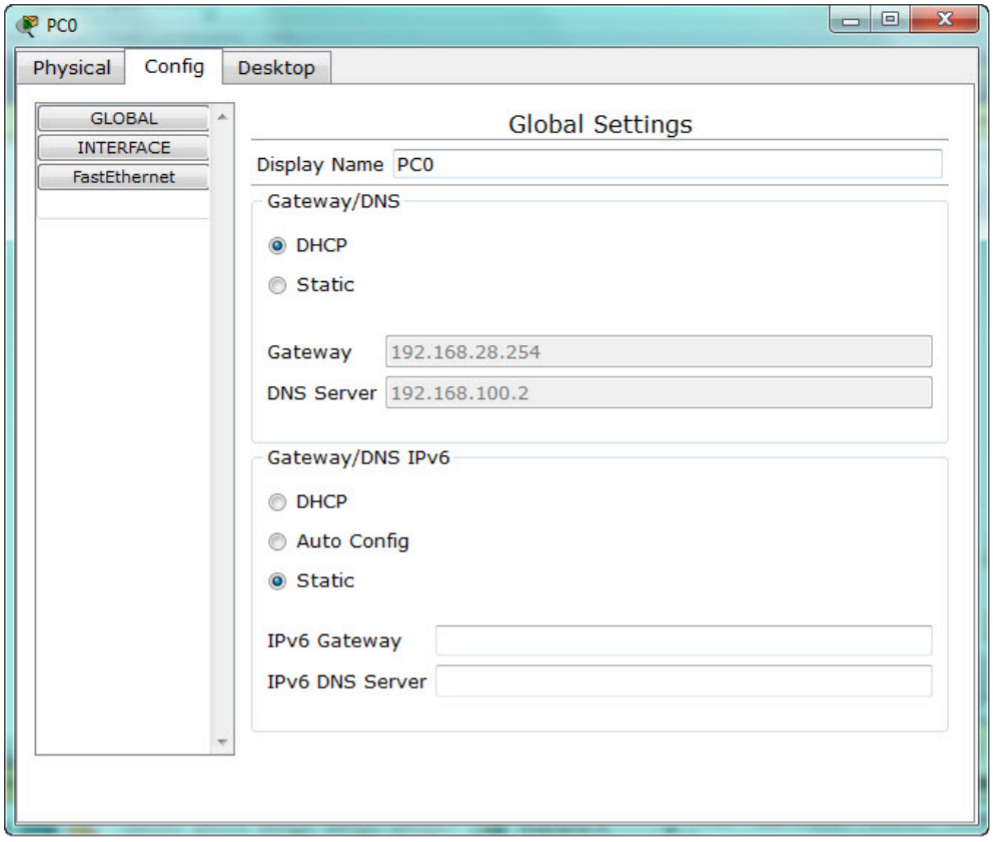


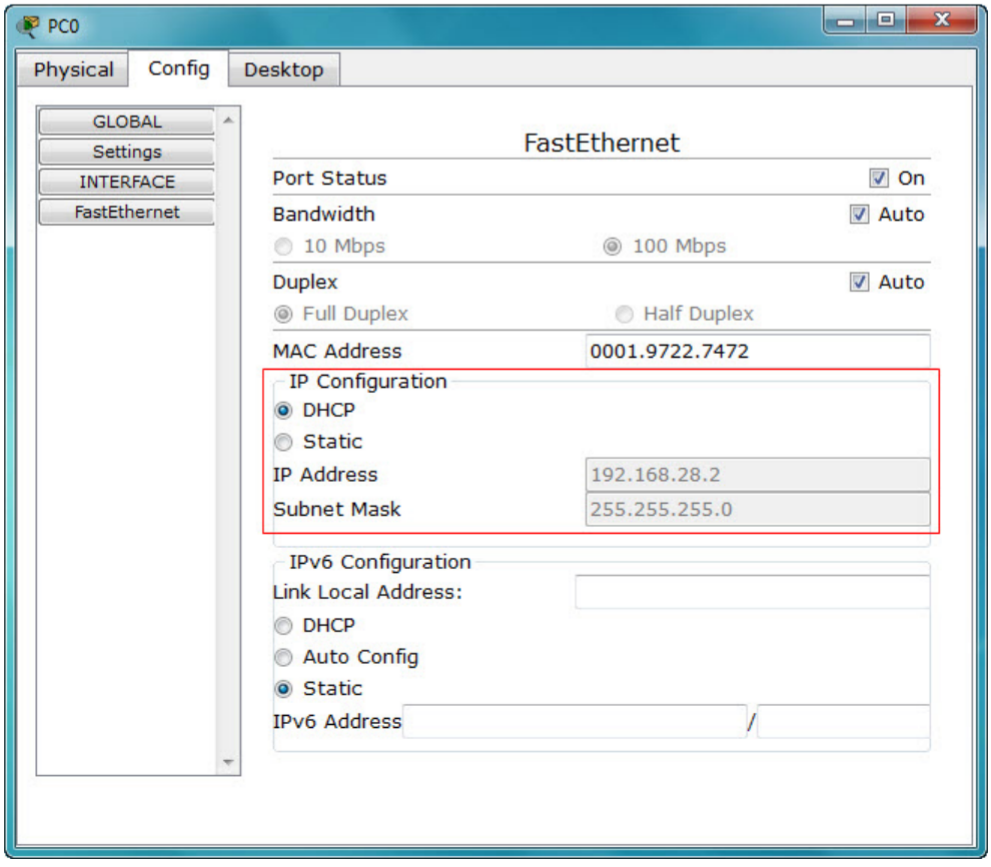




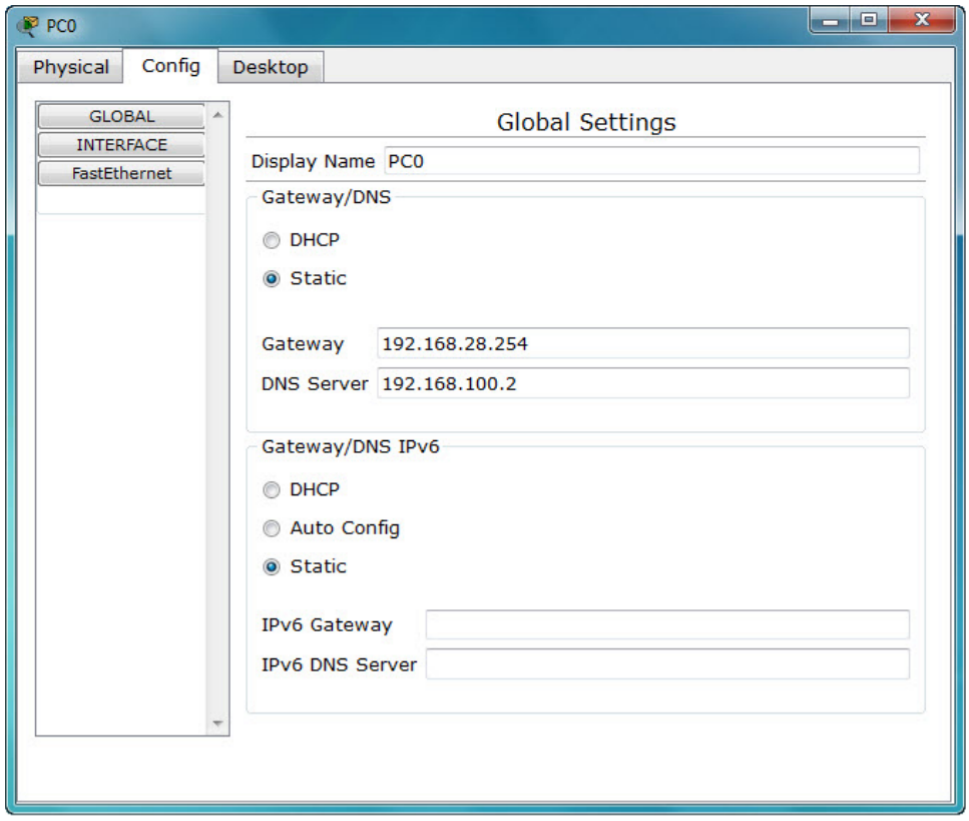
2. Configure PCs:

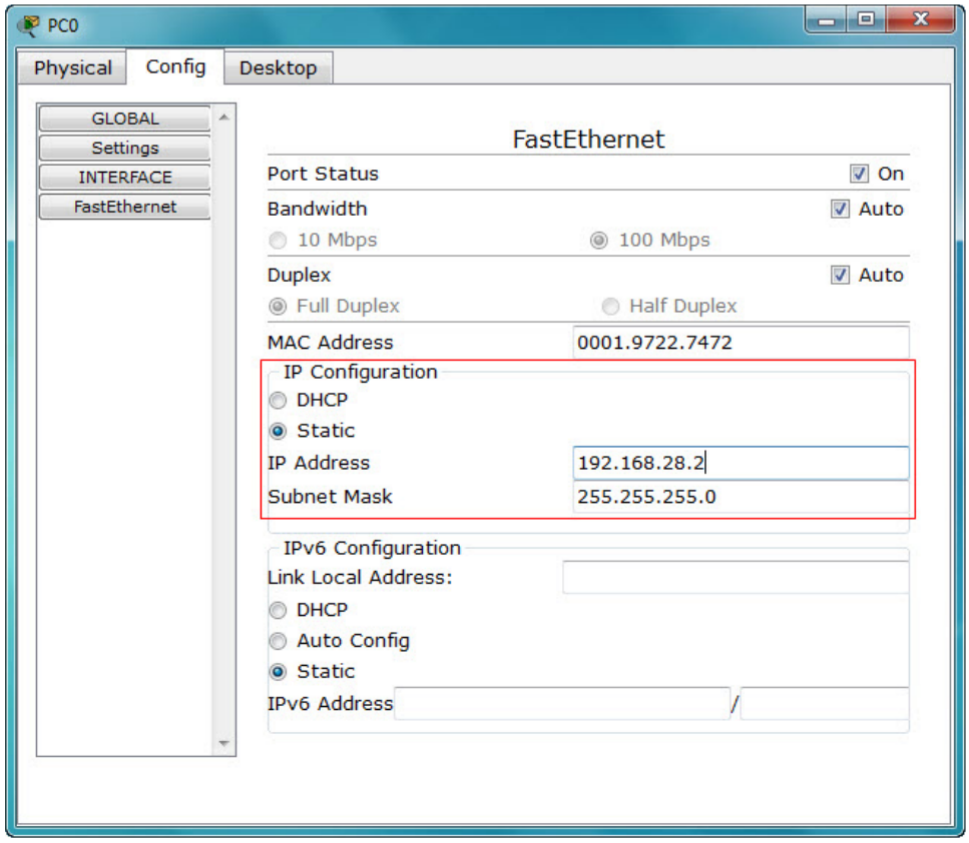
   2.1. DHCP


PC0
Physical
Config
Desktop
GLOBAL
INTERFACE
FastEthernet
Global Settings
Display Name
PC0
Gateway/DNS
DHCP
Static
Gateway
192.168.28.254
DNS Server
192.168.100.2
Gateway/DNS IPv6
DHCP
Auto Config
Static
IPv6 Gateway
IPv6 DNS Server

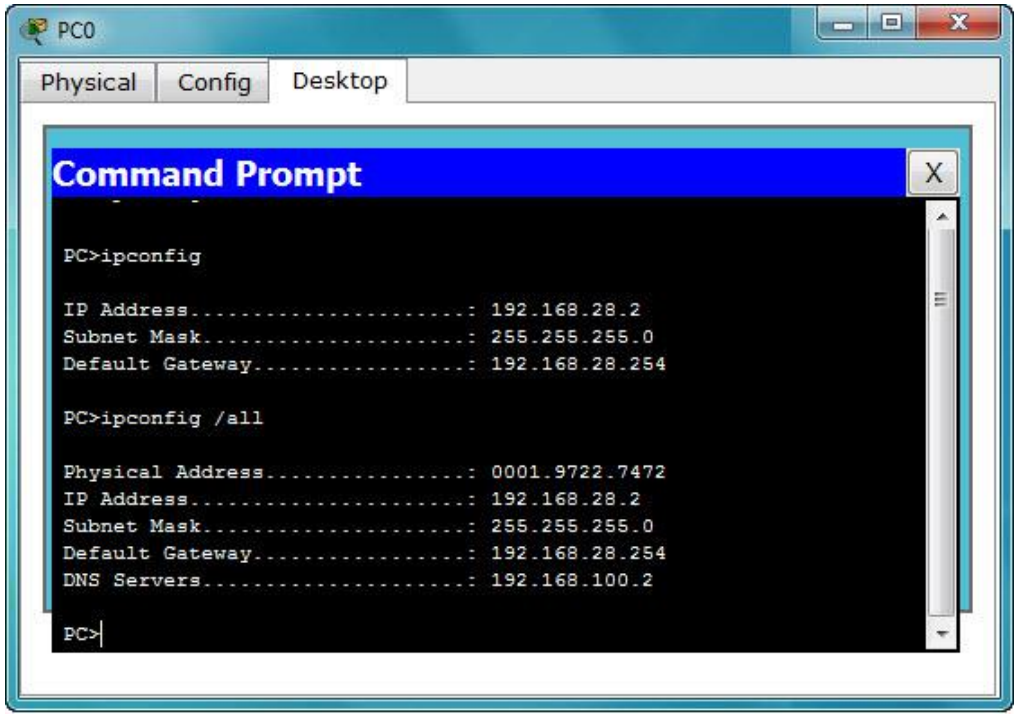

PC0
Physical
Config
Desktop
GLOBAL
Settings
INTERFACE
FastEthernet
FastEthernet
Port Status
On
Bandwidth
Auto
10 Mbps
100 Mbps
Duplex
Auto
Full Duplex
Half Duplex
MAC Address
0001.9722.7472
IP Configuration
DHCP
Static
IP Address
192.168.28.2
Subnet Mask
255.255.255.0
IPv6 Configuration
Link Local Address:
DHCP
Auto Config
Static
IPv6 Address

2.2. Static IP


PC0
Physical
Config
Desktop
GLOBAL
INTERFACE
FastEthernet
Global Settings
Display Name PC0
Gateway/DNS
DHCP
Static
Gateway 192.168.28.254
DNS Server 192.168.100.2
Gateway/DNS IPv6
DHCP
Auto Config
Static
IPv6 Gateway
IPv6 DNS Server


PC0
Physical
Config
Desktop
GLOBAL
Settings
INTERFACE
FastEthernet
FastEthernet
Port Status On
Bandwidth Auto
10 Mbps 100 Mbps
Duplex Auto
Full Duplex Half Duplex
MAC Address 0001.9722.7472
IP Configuration
DHCP
Static
IP Address 192.168.28.2
Subnet Mask 255.255.255.0
IPv6 Configuration
Link Local Address:
DHCP
Auto Config
Static
IPv6 Address /

3. From the command prompt of each PCs (similar to cmd of Win), type **ipconfig**



or **ipconfig /all** for more information but the most information I want you to see is the IP address.

4. From the Command Prompt of PC0, ping the IP address of PC1 and PC2.

```
PC>ping 192.168.28.3

Pinging 192.168.28.3 with 32 bytes of data:

Reply from 192.168.28.3: bytes=32 time=20ms TTL=128
Reply from 192.168.28.3: bytes=32 time=11ms TTL=128
Reply from 192.168.28.3: bytes=32 time=14ms TTL=128
Reply from 192.168.28.3: bytes=32 time=11ms TTL=128

Ping statistics for 192.168.28.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 11ms, Maximum = 20ms, Average = 14ms
```

```
PC>ping 192.168.28.4

Pinging 192.168.28.4 with 32 bytes of data:

Reply from 192.168.28.4: bytes=32 time=19ms TTL=128
Reply from 192.168.28.4: bytes=32 time=10ms TTL=128
Reply from 192.168.28.4: bytes=32 time=11ms TTL=128
Reply from 192.168.28.4: bytes=32 time=14ms TTL=128

Ping statistics for 192.168.28.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 19ms, Average = 13ms
```

III. The difference between Hub and Switch

Hub	Switch
- *Functions*: It provides a central point for cables in a network and receives data from many directions and then forwards it to one or more destinations.	- *Functions*: It serves as an entrance to another network, and vice-versa.
- *Layer*: Physical Layer	- *Layer*: Data Link Layer / Network Layer
- Allow the interconnection of nodes and create a physically attached network.	- Allow simultaneous communication between two or more nodes at a time.
- When a hub receives a packet of data at one of its ports from a PC on the network, it transmits the packet to all of its ports and, thus, to all of the other PCs on the network. If two or more PCs on the network try to send packets at the same time a collision is said to occur.	- When the switch receives a packet, it reads the destination address from the header information in the packet, establishes a temporary connection between the source and destination ports, sends the packet on its way, and then terminates the connection.
- Broadcast traffic across all ports, which basically means that each port on a hub gets shared bandwidth.	- Route traffic directly between ports, which basically means that each port on a switch gets dedicated bandwidth.
- Should be used in a small network (less than 30 users) where the amount of traffic on the network is lower than medium level.	- We may need to use a switch to divide the groups of hubs when the network gets larger (about 50 users). If the traffic is constantly high, you may need to divide up the network using a switch.

IV. Self-study

Download file **HubVsSwitch.pka** from FIT Portal. Follow the steps of instruction. After completing all steps, you should write what you find out, for example the differences between switch and hubs, on your experimental report.