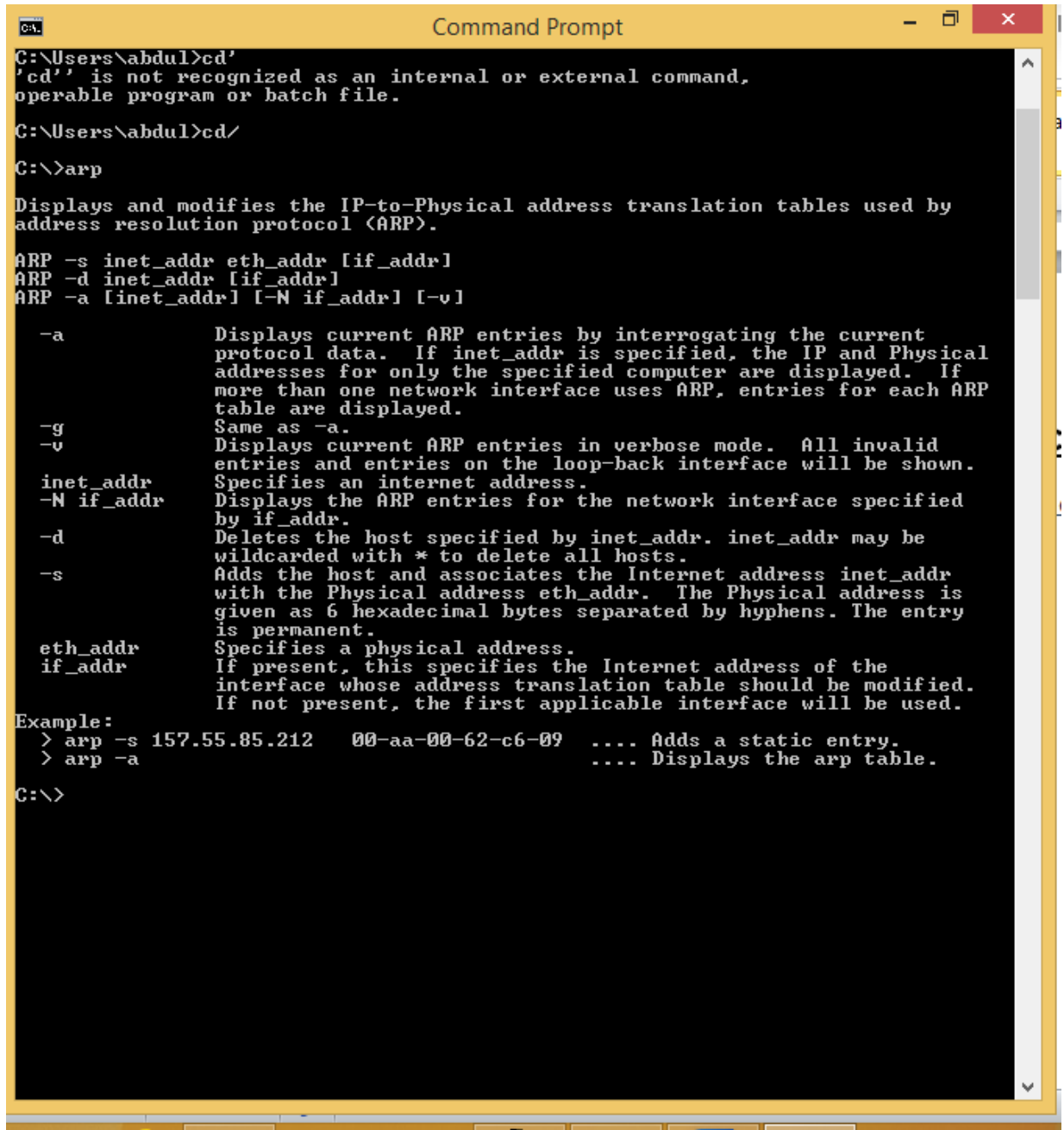


PRACTICAL NO 4

Using the various command utilities

- 1) arp : This diagnostic command displays and modifies the IP-to-Ethernet or Token Ring physical address translation tables used by the Address Resolution Protocol (ARP).



```
C:\Users\abdul>cd'
'cd' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\abdul>cd/

C:\>arp

Displays and modifies the IP-to-Physical address translation tables used by
address resolution protocol (ARP).

ARP -s inet_addr eth_addr [if_addr]
ARP -d inet_addr [if_addr]
ARP -a [inet_addr] [-N if_addr] [-v]

-a          Displays current ARP entries by interrogating the current
            protocol data. If inet_addr is specified, the IP and Physical
            addresses for only the specified computer are displayed. If
            more than one network interface uses ARP, entries for each ARP
            table are displayed.
-g          Same as -a.
-v          Displays current ARP entries in verbose mode. All invalid
            entries and entries on the loop-back interface will be shown.
inet_addr   Specifies an internet address.
-N if_addr  Displays the ARP entries for the network interface specified
            by if_addr.
-d          Deletes the host specified by inet_addr. inet_addr may be
            wildcarded with * to delete all hosts.
-s          Adds the host and associates the Internet address inet_addr
            with the Physical address eth_addr. The Physical address is
            given as 6 hexadecimal bytes separated by hyphens. The entry
            is permanent.
eth_addr    Specifies a physical address.
if_addr     If present, this specifies the Internet address of the
            interface whose address translation table should be modified.
            If not present, the first applicable interface will be used.

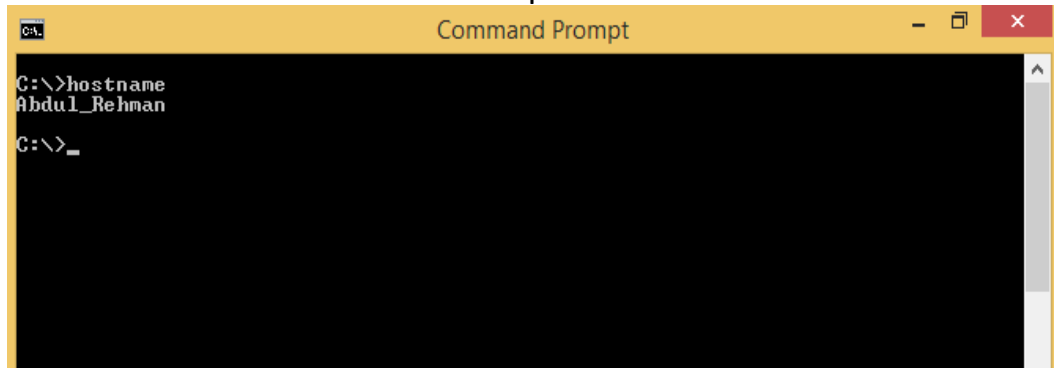
Example:
> arp -s 157.55.85.212 00-aa-00-62-c6-09 .... Adds a static entry.
> arp -a .... Displays the arp table.

C:\>
```

- 2) `hostname`: This diagnostic command prints the name of the host on which the command is used.

Syntax

`hostname` -- This command has no parameters.

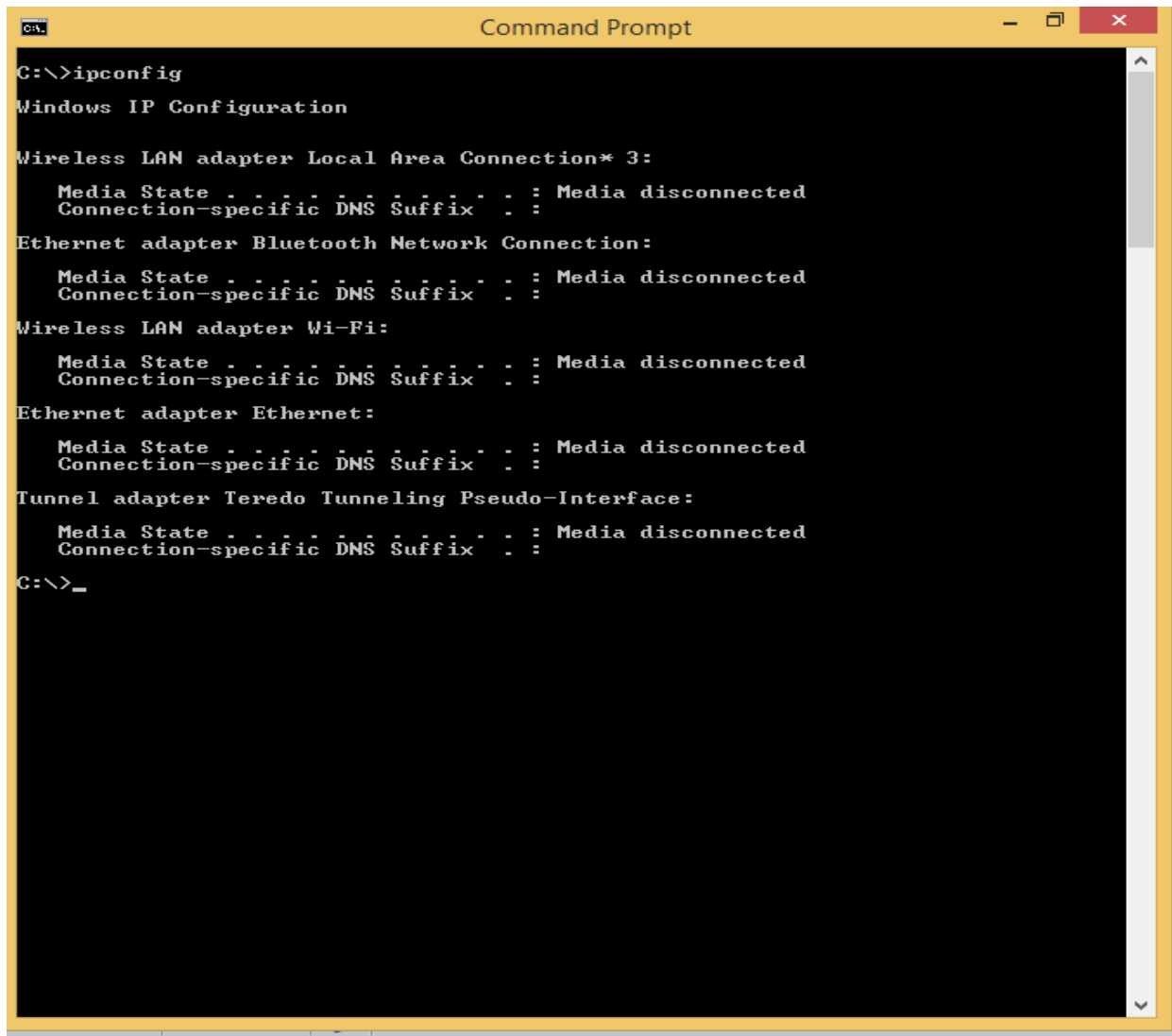
A screenshot of a Windows Command Prompt window. The title bar is yellow and says "Command Prompt". The window has a black background with white text. The text shows the command prompt "C:\>" followed by the command "hostname". The output of the command is "Abdul_Rehman". Below the output, the prompt "C:\>" is shown again with a cursor.

- 3) `ipconfig`:

This diagnostic command displays all current TCP/IP network configuration values. This command is useful on computers running DHCP because it enables users to determine which TCP/IP configuration values have been configured by DHCP. If you enter only `ipconfig` without parameters, the response is a display of all of the current TCP/IP configuration values, including IP address, subnet mask, and default gateway.

Syntax

`ipconfig [/all | /renew [adapter] | /release [adapter]`



```
C:\>ipconfig

Windows IP Configuration

Wireless LAN adapter Local Area Connection* 3:
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 
Ethernet adapter Bluetooth Network Connection:
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 
Wireless LAN adapter Wi-Fi:
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 
Ethernet adapter Ethernet:
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 
Tunnel adapter Teredo Tunneling Pseudo-Interface:
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 
C:\>_
```

4) netstat:

This diagnostic command displays protocol statistics and current TCP/IP network connection

Syntax

netstat [-a] [-e][-n][-s] [-p protocol] [-r] [interval]

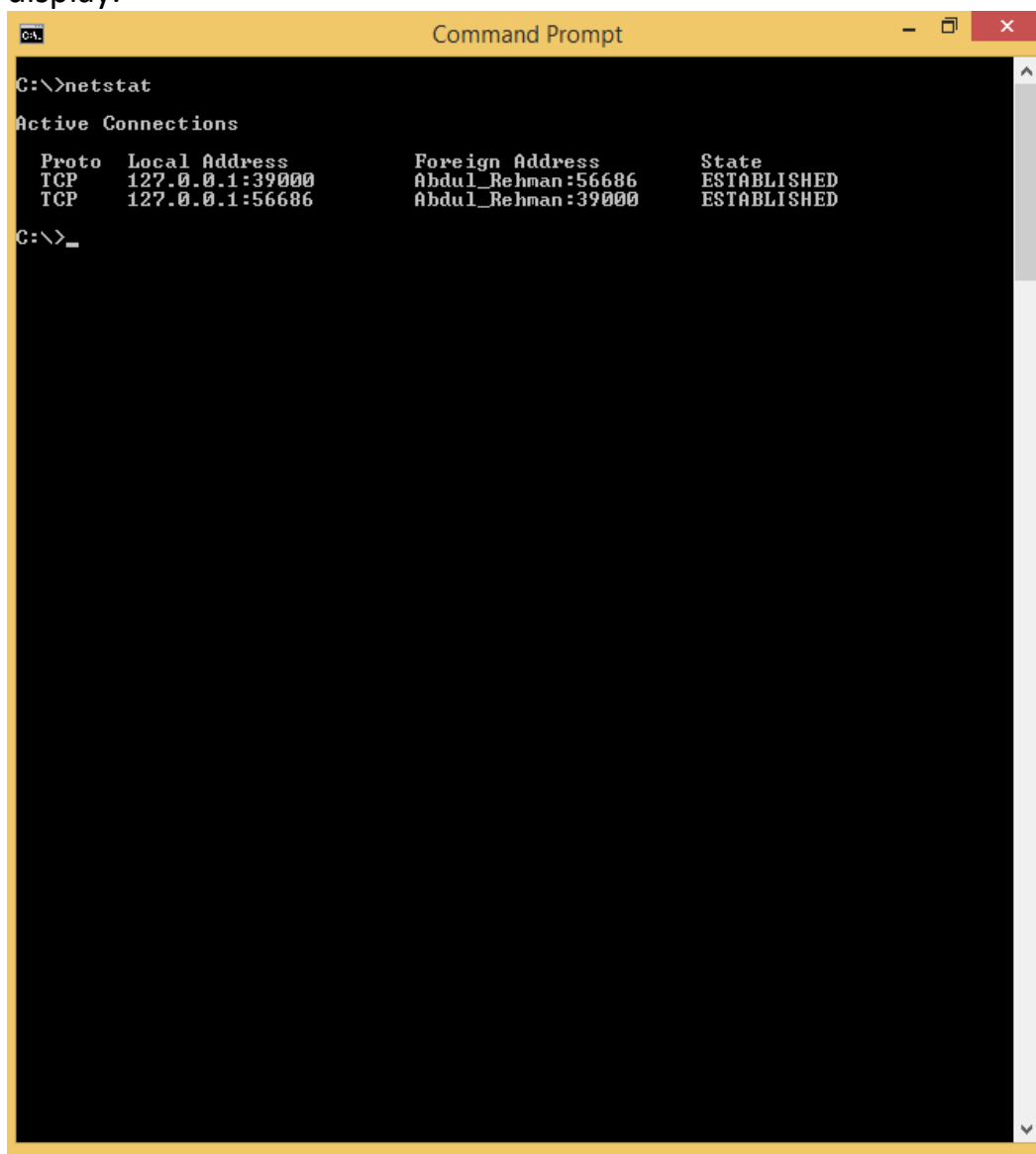
Parameters

-a Displays all connections and listening ports; server connections are usually not shown. -e Displays Ethernet statistics. This can be combined with the -s option. -n Displays addresses and port numbers in numerical form (rather than attempting name lookups). -s Displays per-protocol statistics. By default, statistics are shown for TCP, UDP, ICMP, and IP; the -p option can be used to specify a subset of the default.

-p protocol Shows connections for the protocol specified.

-r Displays the contents of the routing table.

Interval Redisplays selected statistics, pausing interval seconds between each display.



```
C:\>netstat

Active Connections

Proto Local Address           Foreign Address         State
TCP   127.0.0.1:39000          Abdul_Rehman:56686     ESTABLISHED
TCP   127.0.0.1:56686         Abdul_Rehman:39000     ESTABLISHED

C:\>_
```

- 5) ping: This diagnostic command verifies connections to one or more remote computers.

Syntax

ping [-t] [-a] [-n count] [-l length] [-f] [-i ttl] [-v tos] [-r count] [-s count] [[-j host-list] | [-k host-list]] [-w timeout] destination-list



```
C:\>ping

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
           [-r count] [-s count] [[-j host-list] | [-k host-list]]
           [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
           [-4] [-6] target_name

Options:
  -t             Ping the specified host until stopped.
                  To see statistics and continue - type Control-Break;
                  To stop - type Control-C.
  -a             Resolve addresses to hostnames.
  -n count       Number of echo requests to send.
  -l size        Send buffer size.
  -f             Set Don't Fragment flag in packet (IPv4-only).
  -i TTL         Time To Live.
  -v TOS         Type Of Service (IPv4-only. This setting has been deprecated
                  and has no effect on the type of service field in the IP
                  Header).
  -r count       Record route for count hops (IPv4-only).
  -s count       Timestamp for count hops (IPv4-only).
  -j host-list   Loose source route along host-list (IPv4-only).
  -k host-list   Strict source route along host-list (IPv4-only).
  -w timeout     Timeout in milliseconds to wait for each reply.
  -R            Use routing header to test reverse route also (IPv6-only).
                  Per RFC 5095 the use of this routing header has been
                  deprecated. Some systems may drop echo requests if
                  this header is used.
  -S srcaddr     Source address to use.
  -c compartment Routing compartment identifier.
  -p            Ping a Hyper-V Network Virtualization provider address.
  -4            Force using IPv4.
  -6            Force using IPv6.

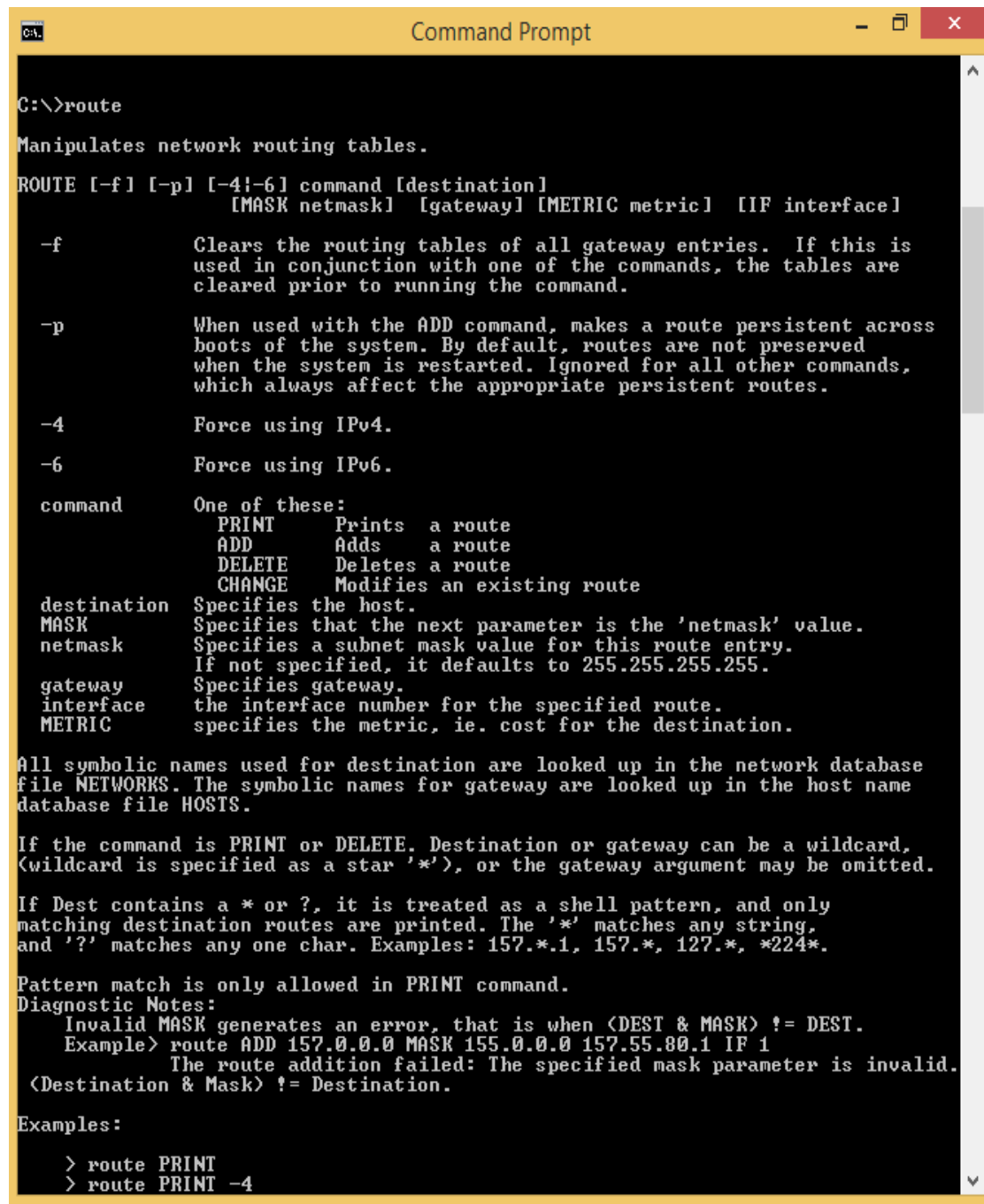
C:\>_
```

6) route:

This diagnostic command manipulates network routing tables.

Syntax

route [-f] [command [destination] [MASK netmask] [gateway] [METRIC metric]]



```
C:\>route

Manipulates network routing tables.

ROUTE [-f] [-p] [-4|-6] command [destination]
      [MASK netmask] [gateway] [METRIC metric] [IF interface]

-f          Clears the routing tables of all gateway entries.  If this is
            used in conjunction with one of the commands, the tables are
            cleared prior to running the command.

-p          When used with the ADD command, makes a route persistent across
            boots of the system.  By default, routes are not preserved
            when the system is restarted.  Ignored for all other commands,
            which always affect the appropriate persistent routes.

-4          Force using IPv4.

-6          Force using IPv6.

command    One of these:
            PRINT      Prints a route
            ADD        Adds a route
            DELETE     Deletes a route
            CHANGE     Modifies an existing route

destination Specifies the host.
MASK          Specifies that the next parameter is the 'netmask' value.
netmask       Specifies a subnet mask value for this route entry.
            If not specified, it defaults to 255.255.255.255.
gateway       Specifies gateway.
interface     the interface number for the specified route.
METRIC        specifies the metric, ie. cost for the destination.

All symbolic names used for destination are looked up in the network database
file NETWORKS.  The symbolic names for gateway are looked up in the host name
database file HOSTS.

If the command is PRINT or DELETE, Destination or gateway can be a wildcard,
(wildcard is specified as a star '*'), or the gateway argument may be omitted.

If Dest contains a * or ?, it is treated as a shell pattern, and only
matching destination routes are printed.  The '*' matches any string,
and '?' matches any one char.  Examples: 157.*.1, 157.*, 127.*, *224*.

Pattern match is only allowed in PRINT command.

Diagnostic Notes:
  Invalid MASK generates an error, that is when (DEST & MASK) != DEST.
  Example> route ADD 157.0.0.0 MASK 155.0.0.0 157.55.80.1 IF 1
           The route addition failed: The specified mask parameter is invalid.
  (Destination & Mask) != Destination.

Examples:
  > route PRINT
  > route PRINT -4
```

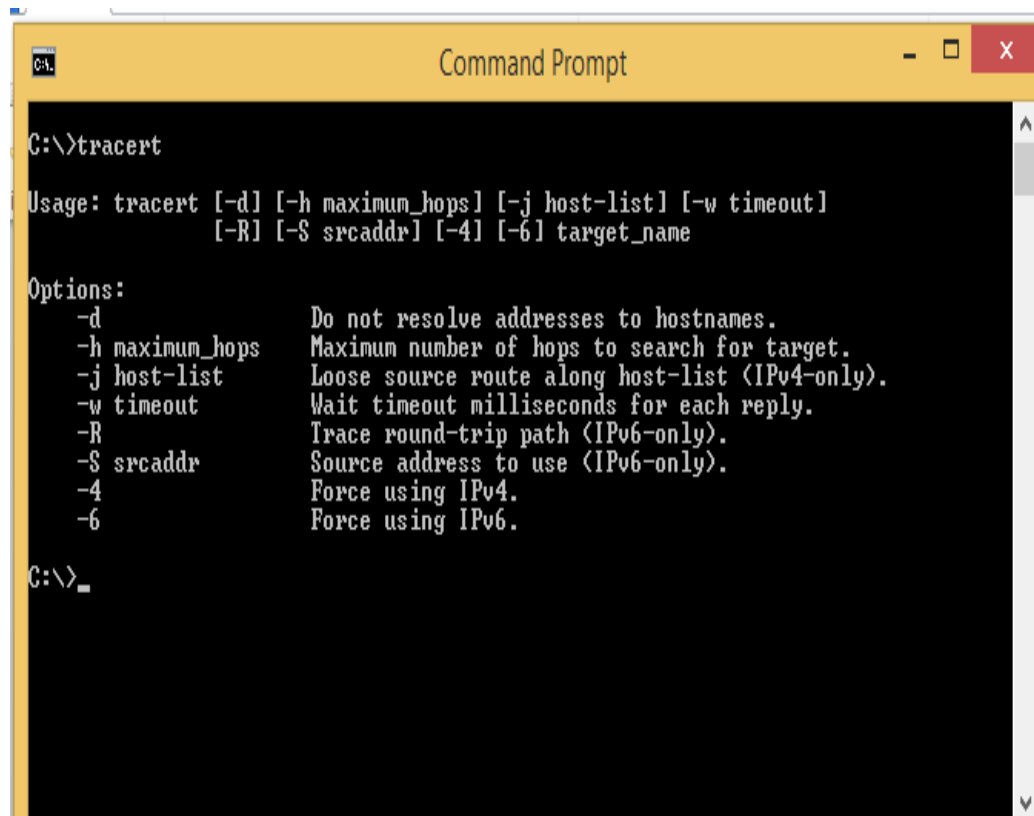
7) tracert:

This diagnostic utility determines the route taken to a destination by sending Internet Control Message Protocol (ICMP) echo packets with varying time-to-live (TTL) values to the destination. Each router along the path is required to decrement the TTL on a packet by at least 1 before forwarding it, so the TTL is effectively a hop count. When the TTL on a packet reaches 0, the router is supposed to send back an ICMP Time Exceeded message to the source computer.

tracert determines the route by sending the first echo packet with a TTL of 1 and incrementing the TTL by 1 on each subsequent transmission until the target responds or the maximum TTL is reached. The route is determined by examining the ICMP Time Exceeded messages sent back by intermediate routers. Notice that some routers silently drop packets with expired TTLs and will be invisible to tracert.

Syntax

tracert[-d] [-h maximum_hops] [-j host-list] [-w timeout] target_name



```
C:\>tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
               [-R] [-S srcaddr] [-4] [-6] target_name

Options:
    -d                Do not resolve addresses to hostnames.
    -h maximum_hops   Maximum number of hops to search for target.
    -j host-list       Loose source route along host-list (IPv4-only).
    -w timeout         Wait timeout milliseconds for each reply.
    -R                Trace round-trip path (IPv6-only).
    -S srcaddr         Source address to use (IPv6-only).
    -4                Force using IPv4.
    -6                Force using IPv6.

C:\>_
```

PRACTICAL NO 2

Static Routing

Static Route

1. Static routing method is most trusted by a router.
2. Static routing is not really a routing protocol.
3. Static routes do not dynamically adapt to network changes, are not particularly scalable, and require manual updating to reflect changes.

Static routing has the following advantages

1. There is no bandwidth usage between routers, which means you could possibly save money on WAN links.
2. There is no overhead on the router CPU, which means you could possibly buy a cheaper router than you would use if you were using dynamic routing.
3. It adds security because the administrator can choose to allow routing access to certain networks only.

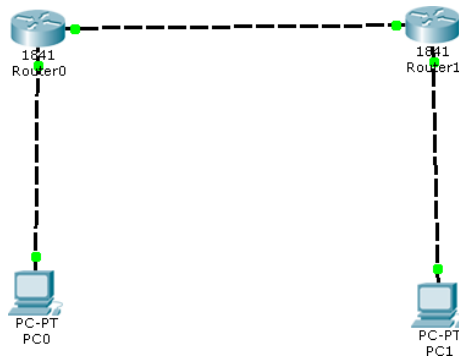
Static routing has the following disadvantages

1. Static routes don't dynamically adapt to network change.
2. If a network is added to the internet work, the administrator has to add a route to it on all routers—by hand.
3. It's not feasible in large networks because maintaining it would be a full-time job in itself.
4. With static routing, as your network grows, it can be difficult just keep adding static routes makes sure everybody can still get everything.
5. The administrator must really understand the internetwork and how each router is connected in order to configure routes correctly.

There are two different styles to configure an "ip route" command:

1. Using a next hop IP address
2. Using an outgoing interface

Consider the following network



We configure it as follows

Step 1: (CONFIGURE PC0)

SYIT43 Himanshu

PC0

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IP Address 10.0.0.2

Subnet Mask 255.0.0.0

Default Gateway 10.0.0.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::203:E4FF:FED0:93DD

IPv6 Gateway

IPv6 DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

☐ Top

Step 2: (CONFIGURE PC1)

SYIT43 Himanshu

PC1

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IP Address: 30.0.0.2

Subnet Mask: 255.0.0.0

Default Gateway: 30.0.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address: /

Link Local Address: FE80::2E0:B0FF:FE46:480A

IPv6 Gateway:

IPv6 DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

☐ Top

Step 3: (CONFIGURE Router0)

SYIT43 Himanshu

Router0

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

FastEthernet0/0

Port Status: ☒ On

Bandwidth: ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex: ☒ Half Duplex ☐ Full Duplex ☒ Auto

MAC Address: 0009.7C50.641E

IP Configuration

IP Address: 20.0.0.1

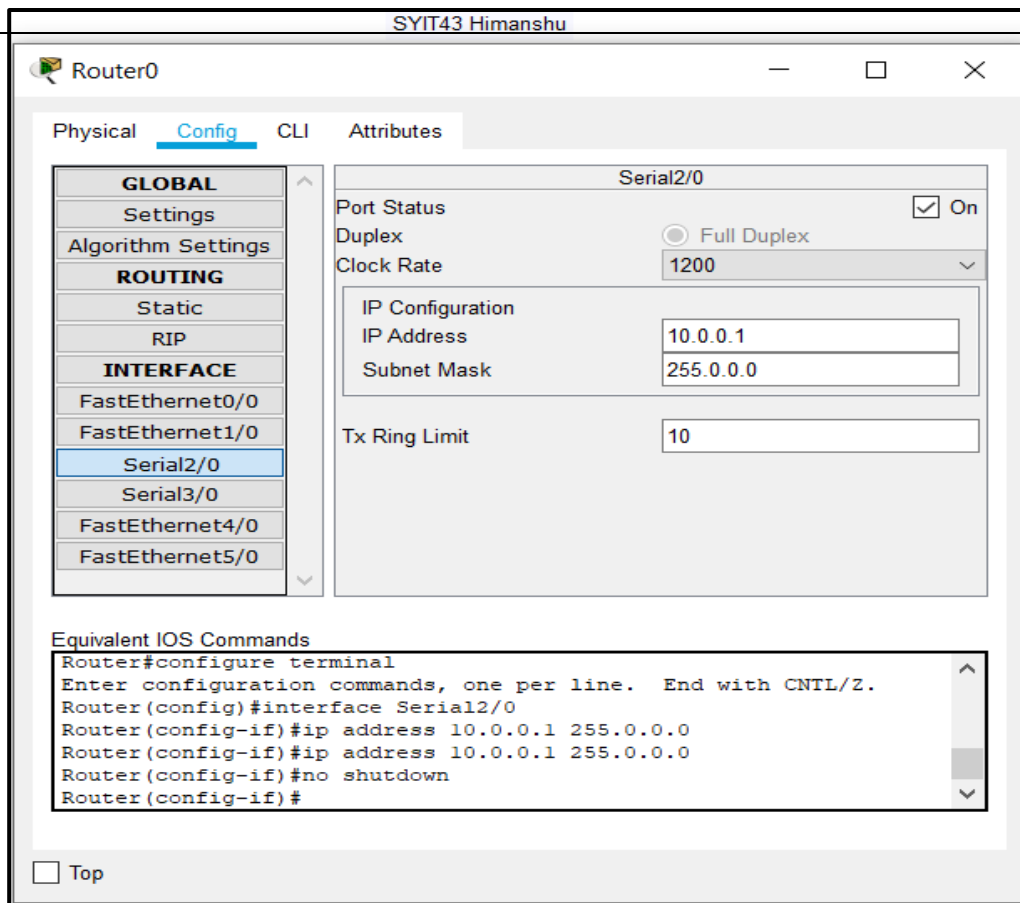
Subnet Mask: 255.0.0.0

Tx Ring Limit: 10

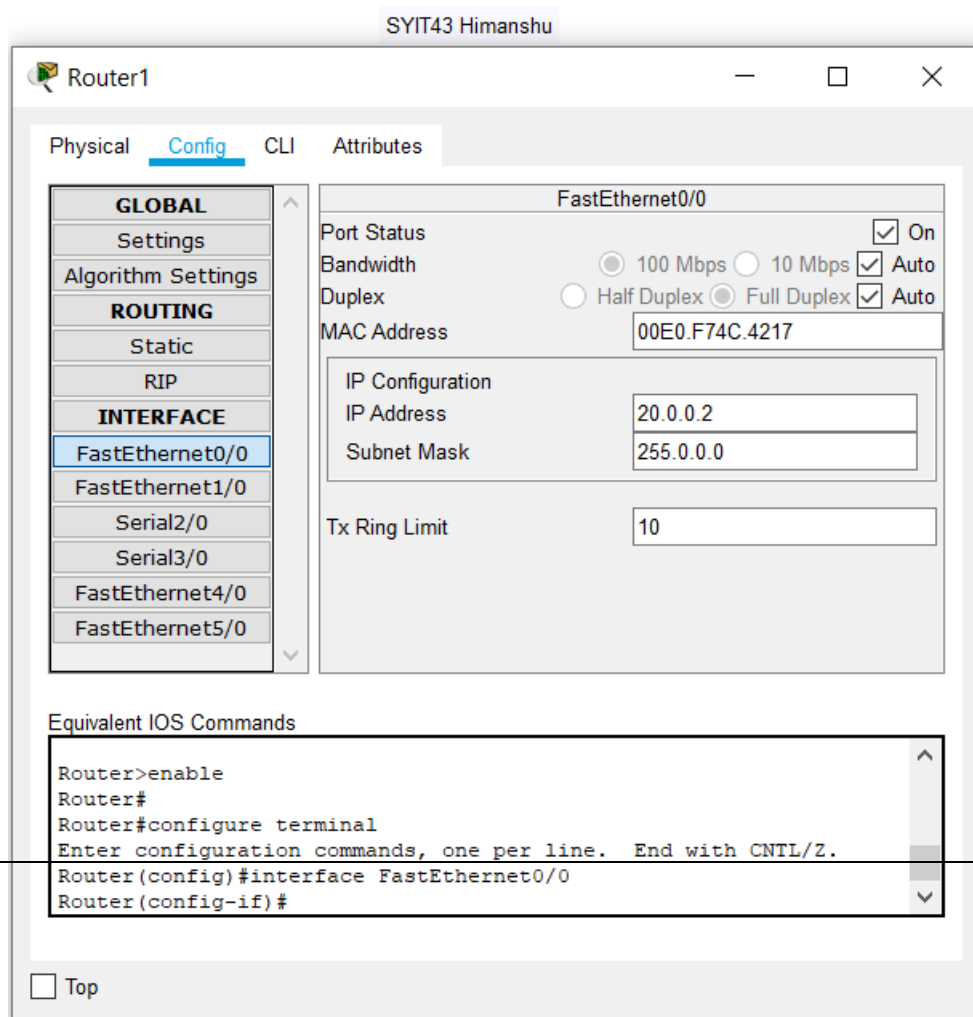
Equivalent IOS Commands

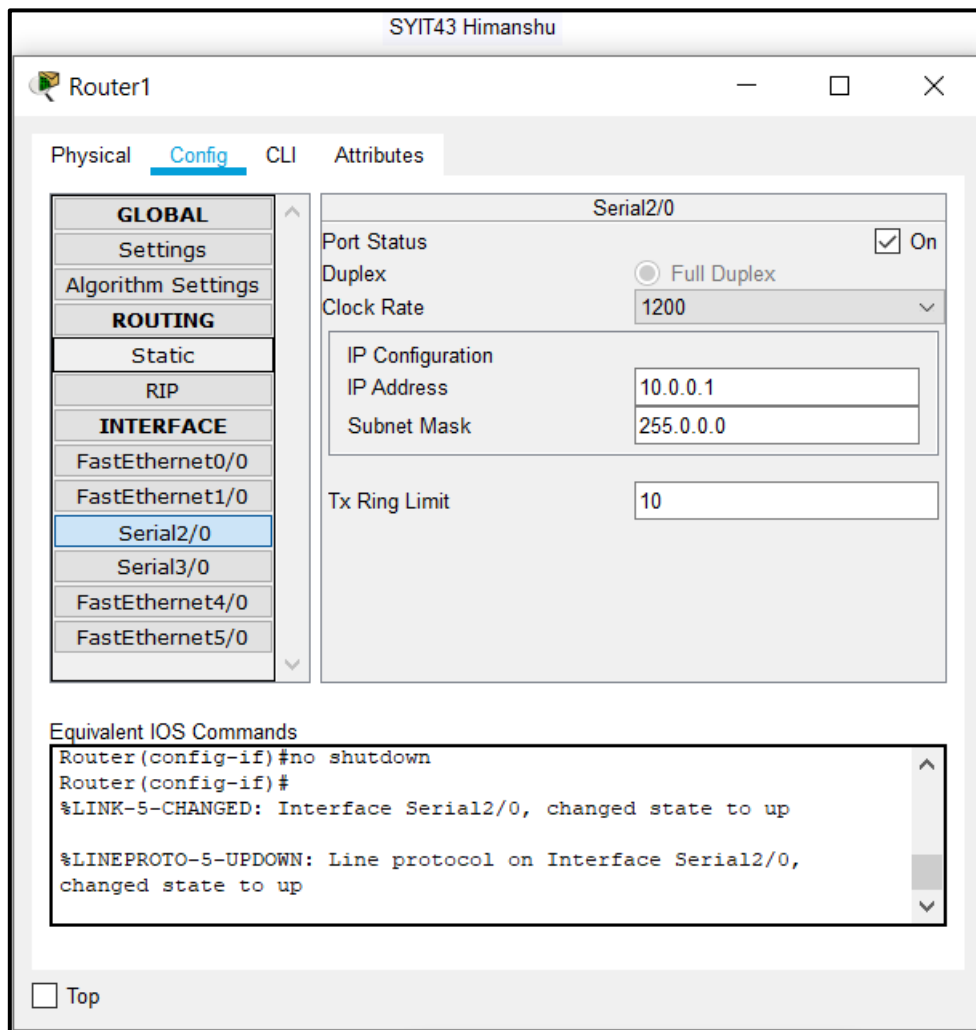
```
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
ip address 20.0.0.1 255.0.0.0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#
```

☐ Top



Step 4: (configure Router 1)





The routing table is configured in the following way

For router 0

Router0

PhysicalConfigCLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Static Routes

Network

Mask

Next Hop

Add

Network Address

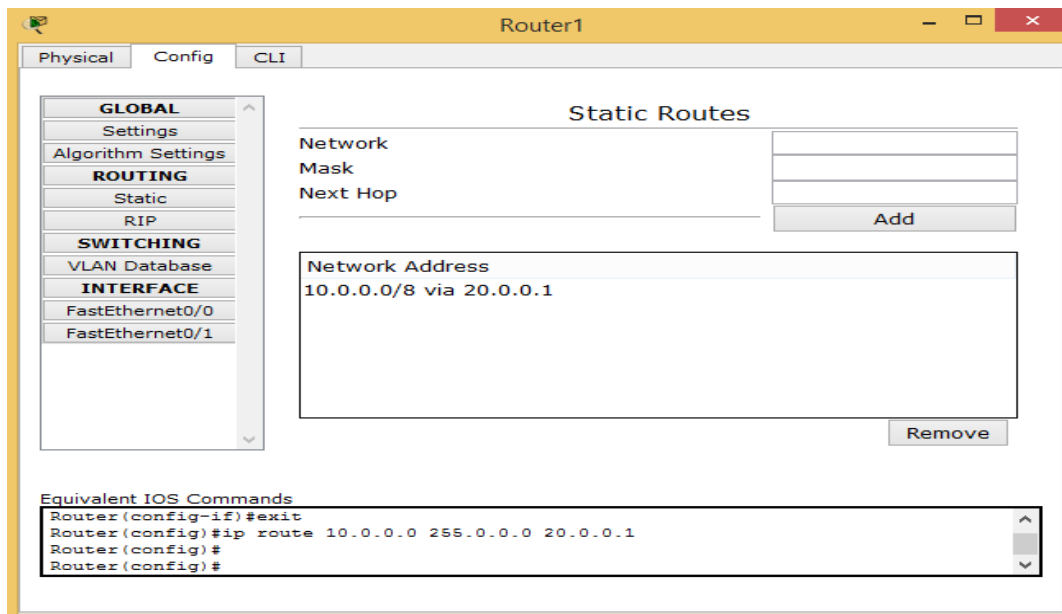
30.0.0.0/8 via 20.0.0.2

Remove

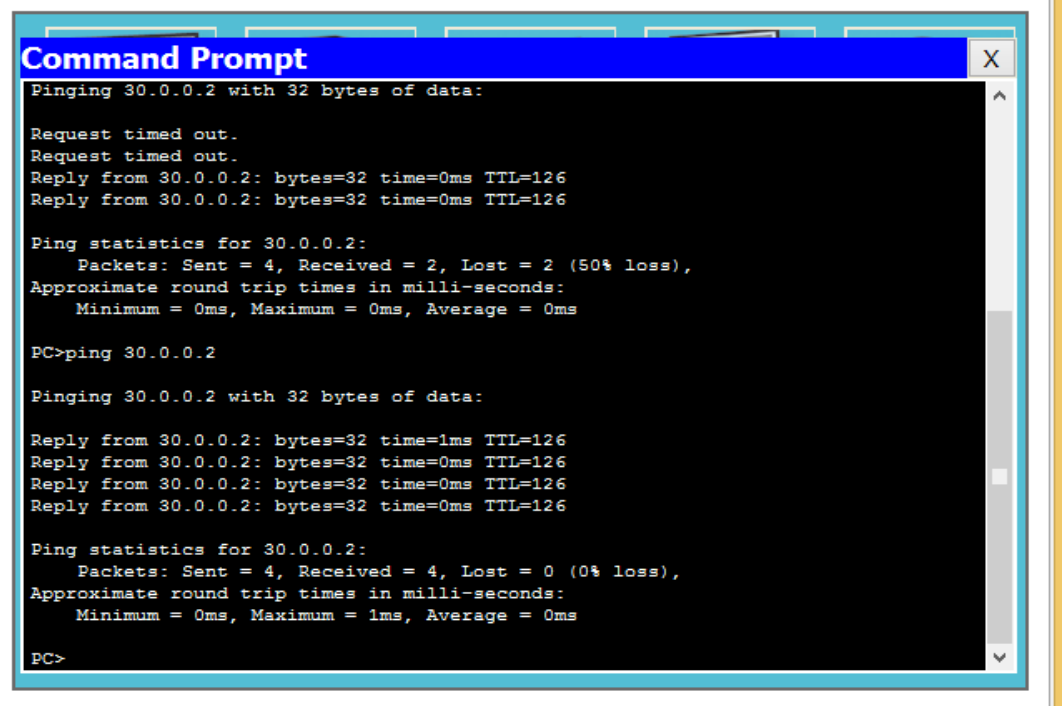
Equivalent IOS Commands

Router(config-if)#exit
Router(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2
Router(config)#
Router(config)#

For router 1



Now we can give the ping command as shown to check the connectivity



So static routing has been studied

PRACTICAL NO 5

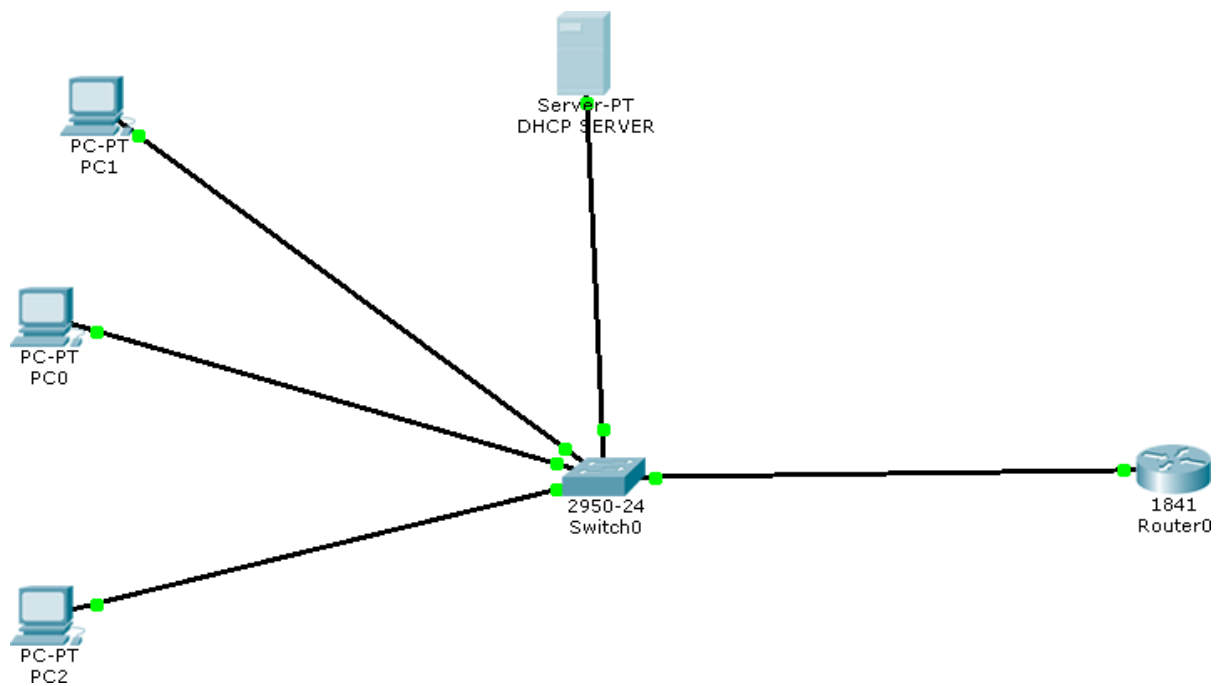
Configuring DHCP and DNS

DHCP

The Dynamic Host Configuration Protocol (DHCP) is a client/server protocol designed to provide the four pieces of information for a diskless computer or a computer that is booted for the first time. DHCP is a successor to BOOTP and is backward compatible with it. Although BOOTP is considered deprecated, there may be some systems that may still use BOOTP for host configuration. The part of the discussion in this chapter that does not deal with the dynamic aspect of DHCP can also be applied to BOOTP.

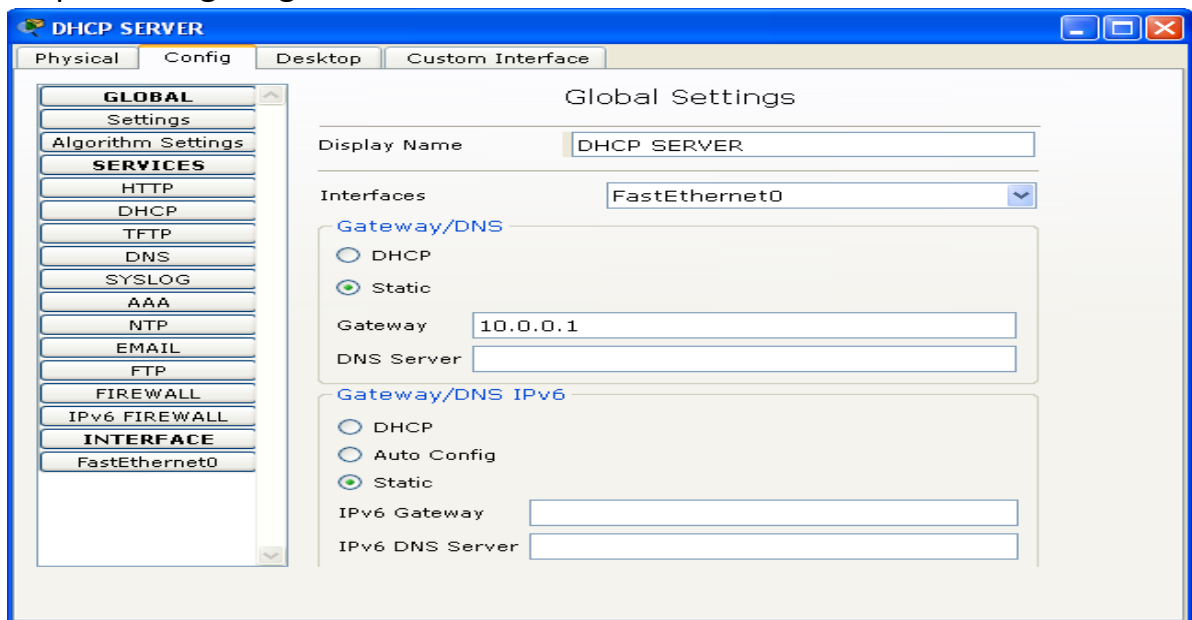
The DHCP client and server can either be on the same network or on different networks. When on same network it works as follows.

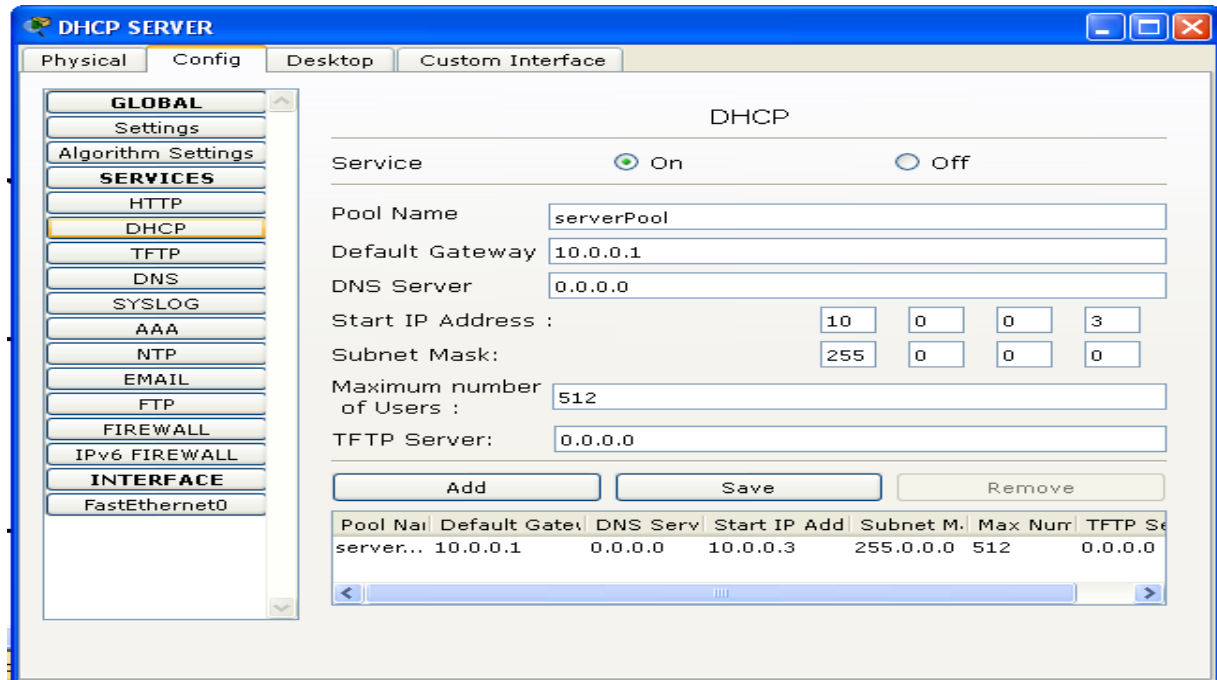
- i. The DHCP server issues a passive open command on UDP port number 67 and waits for a client.
- ii. A booted client issues an active open command on port number 68. The message is encapsulated in a UDP user datagram, using the destination port number 67 and the source port number 68. The UDP user datagram, in turn, is encapsulated in an IP datagram. The reader may ask how a client can send an IP datagram when it knows neither its own IP address (the source address) nor the server's IP address (the destination address). The client uses all 0s as the source address and all 1s as the destination address.
- iii. The server responds with either a broadcast or a unicast message using UDP source port number 67 and destination port number 68. The response can be unicast because the server knows the IP address of the client. It also knows the physical address of the client, which means it does not need the services of ARP for logical to physical address mapping. However, some systems do not allow the bypassing of ARP, resulting in the use of the broadcast address. We can study the working of DHCP using the cisco packet tracer using the following example.



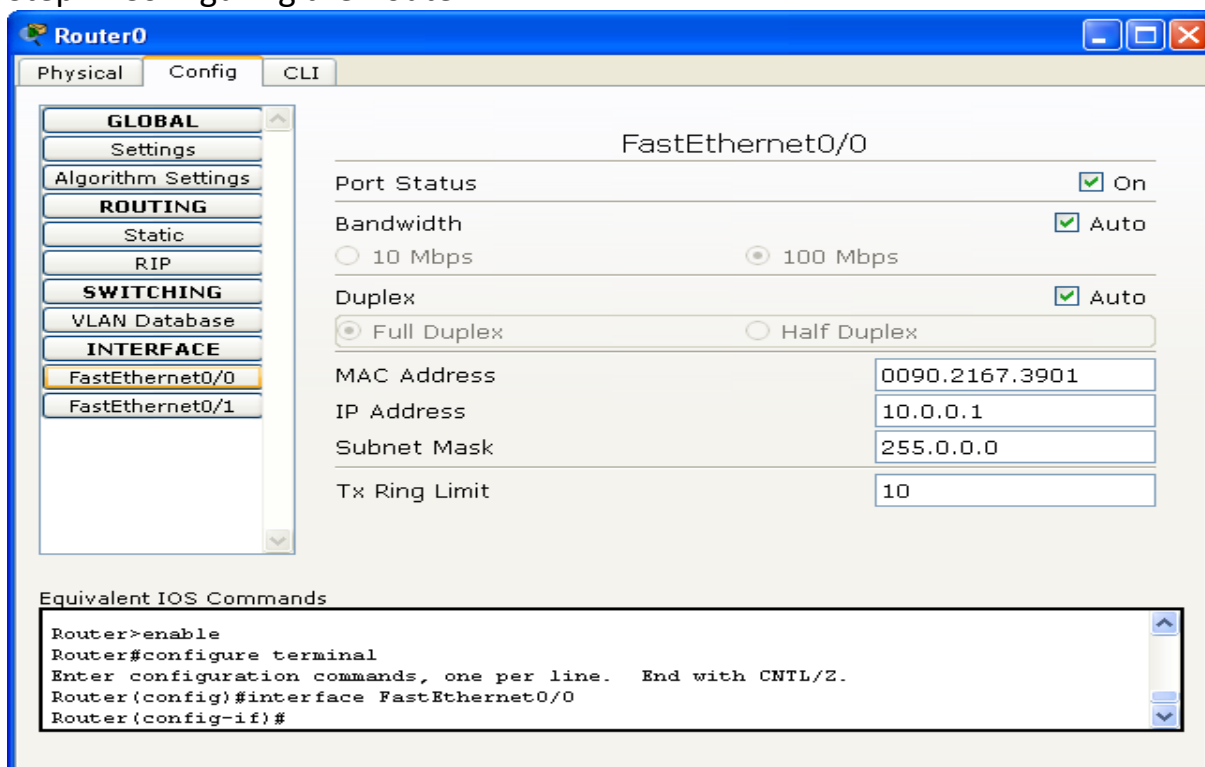
We configure the various components through the following steps

Step 1: Configuring the DHCP server



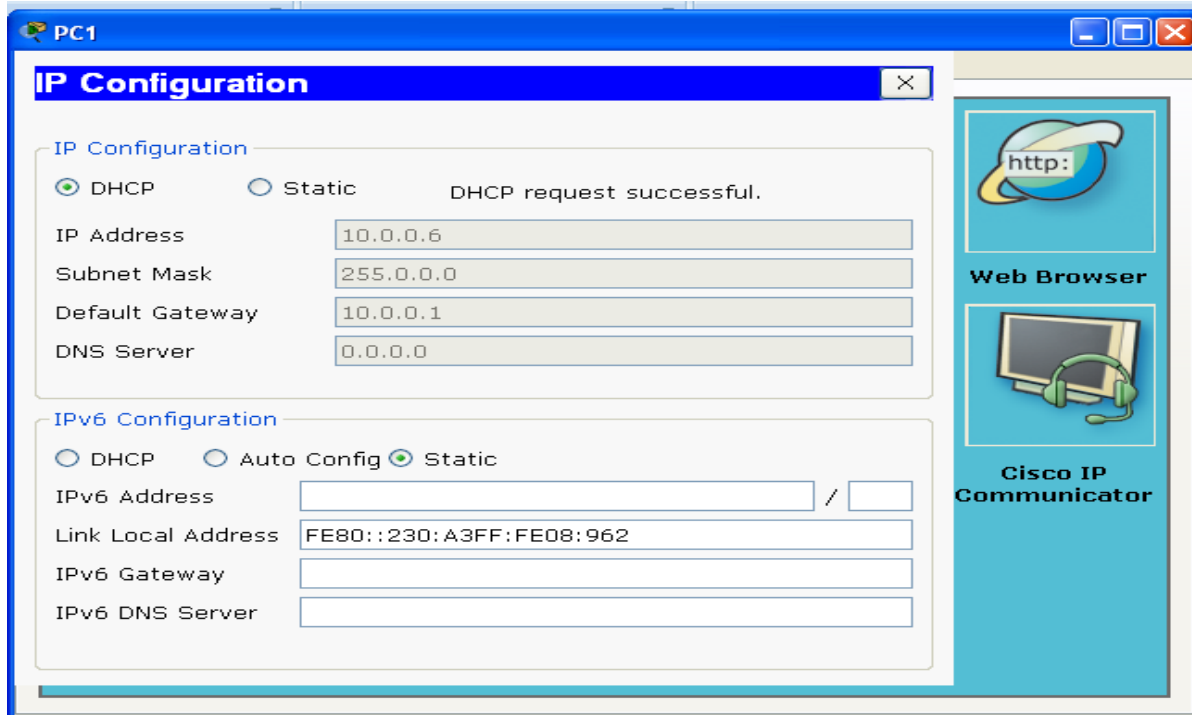


Step 2: Configuring the Router



Now we test the working of the DHCP server by sending a DHCP request from any of the PC as shown

Step 3: Sending DHCP request



Hence we have configured a DHCP server and also verified its operation

Practical No 4

Aim: Using Packet Tracer, create a basic network of one server and two computers and two mobile / movable devices using appropriate network wire. And verify the connectivity

Theory:

A Wireless Access Point (WAP) is a networking device that allows wireless-capable devices to connect to a wired network. Instead of using wires and cables to connect every computer or device in the network, installing WAPs is a more convenient, more secure, and cost-efficient alternative.

Setting up a wireless network provides a lot of advantages and benefits for you and your small business.

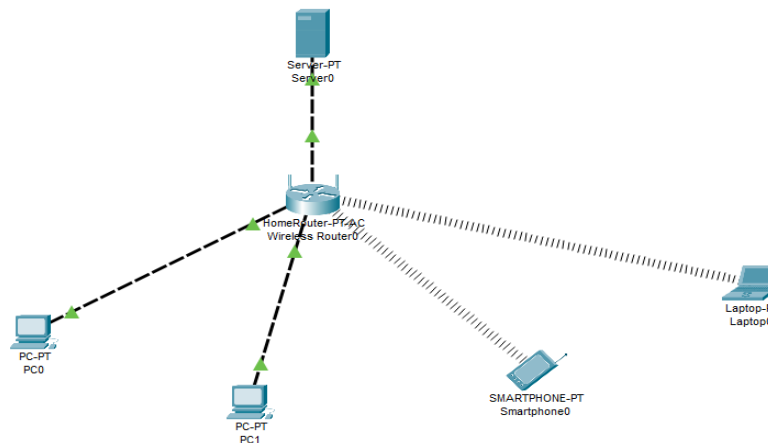
- 1) It is easier to set up compared to setting up a wired network.
- 2) It is more convenient to access.
- 3) It is less complicated to add new users in the network.
- 4) It gives users more flexibility to stay online even when moving from one area in the office to another.
- 5) Guest users can have Internet access by just using a password.
- 6) Wireless network protection can be set up even if the network is visible to the public by configuring maximum wireless security.
- 7) Segmentation of users, such as guests and employees, is possible by creating Virtual Local Area Networks (VLANs) to protect your network resources and assets.

There are different purposes of setting up a wireless network using a WAP.

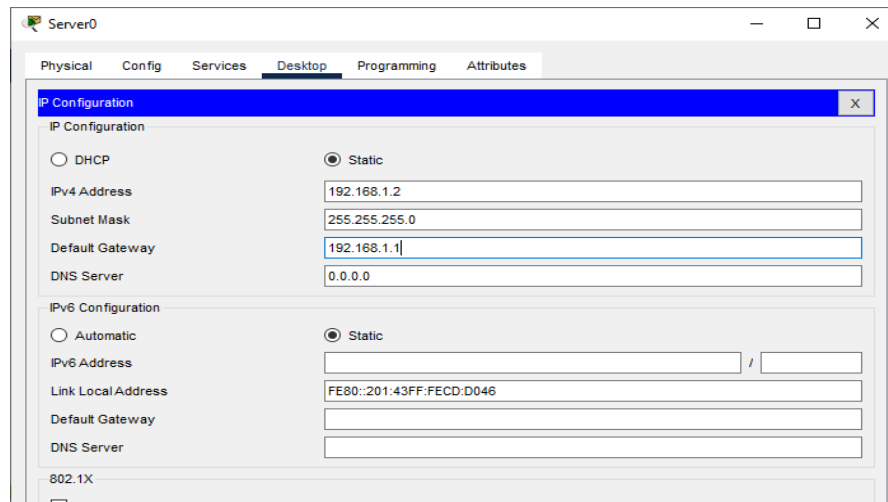
With a WAP, the following can be done:

- 1) Create a wireless network within your existing wired network.
- 2) Extend the signal range and strength of your wireless network to provide complete wireless coverage and get rid of dead spots especially in larger office spaces or buildings.
- 3) Accommodate wireless devices within a wired network.
- 4) Configure the settings of your wireless access points in one device.

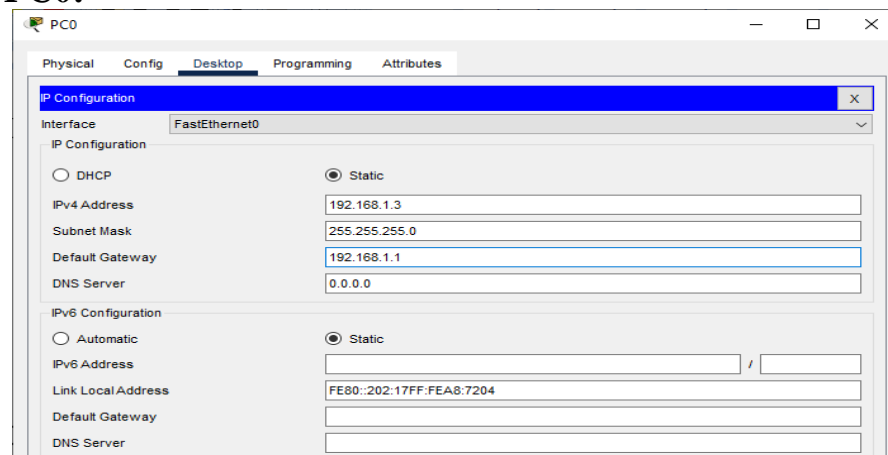
For the present case we use the following topology



Configure the Server:



Configure PC0:



Configure PC1:

The screenshot shows the 'PC1' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The fields are filled with the following values:

Field	Value
IPv4 Address	192.168.1.4
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::200:CFF:FE03:E39
Default Gateway	
DNS Server	

Configure Smartphone0:

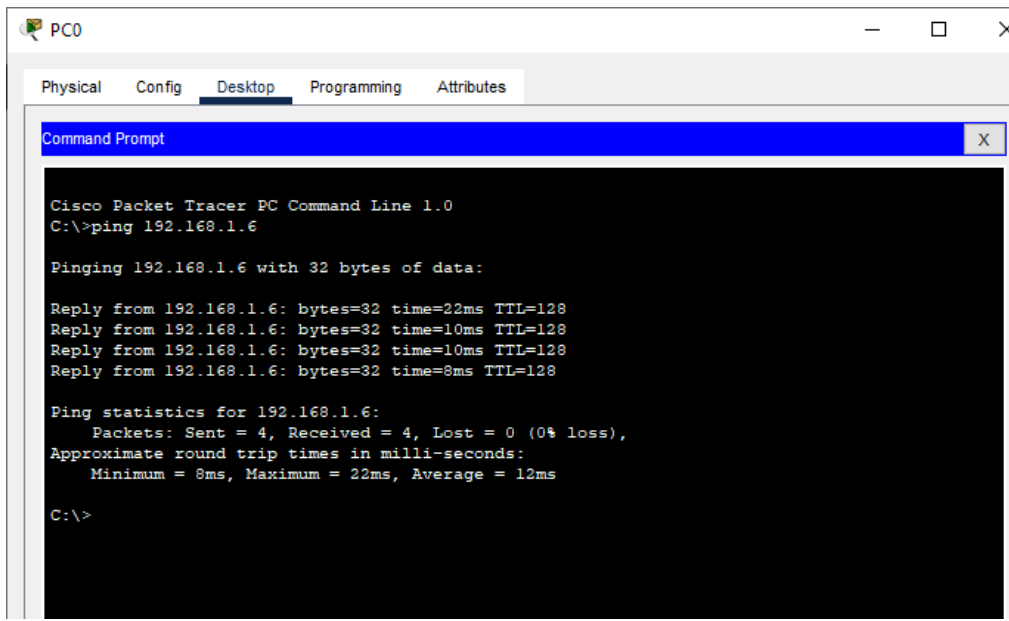
The screenshot shows the 'Smartphone0' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'Wireless0' interface. The 'Static' radio button is selected under 'IP Configuration'. The fields are filled with the following values:

Field	Value
IPv4 Address	192.168.1.5
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::2E0:F9FF:FE12:4387
Default Gateway	
DNS Server	

Configure Laptop0:

The screenshot shows the 'Laptop0' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'Wireless0' interface. The 'Static' radio button is selected under 'IP Configuration'. The fields are filled with the following values:

Field	Value
IPv4 Address	192.168.1.6
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::20A:F3FF:FE79:78EB
Default Gateway	
DNS Server	

Checking the connectivity (pinging laptop0 from PC0):

The screenshot shows a Cisco Packet Tracer interface for PC0. The 'Desktop' tab is selected, displaying a 'Command Prompt' window. The command prompt shows the execution of the 'ping 192.168.1.6' command, resulting in four successful replies with varying times and a 0% loss rate. The statistics show 4 packets sent and received.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.6

Pinging 192.168.1.6 with 32 bytes of data:

Reply from 192.168.1.6: bytes=32 time=22ms TTL=128
Reply from 192.168.1.6: bytes=32 time=10ms TTL=128
Reply from 192.168.1.6: bytes=32 time=10ms TTL=128
Reply from 192.168.1.6: bytes=32 time=8ms TTL=128

Ping statistics for 192.168.1.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 8ms, Maximum = 22ms, Average = 12ms

C:\>
```

Similarly the ping message can be checked for all the devices

Result:

Hence the Connectivity of the network has been verified.

Link for the video demonstration of the practical:

<https://youtu.be/zvBKvkY8-nA>

Practical No 5

Aim: Using Packet Tracer to create a network with three routers with RIPv1 and each router associated network will have minimum three PC and show the connectivity

Theory:

RIP is one of the dynamic routing protocols and the first distance-vector routing protocol that uses the hop count as a routing metric. A lower hop count is preferred.

Each router between the source and destination network is counted as one hop. RIP prevents routing loops by imposing a maximum number of hops on the path between source and destination.

In RIP, Every 30 seconds, each router broadcasts its entire routing table to its nearest neighbors.

Pros and Cons of RIP Protocol

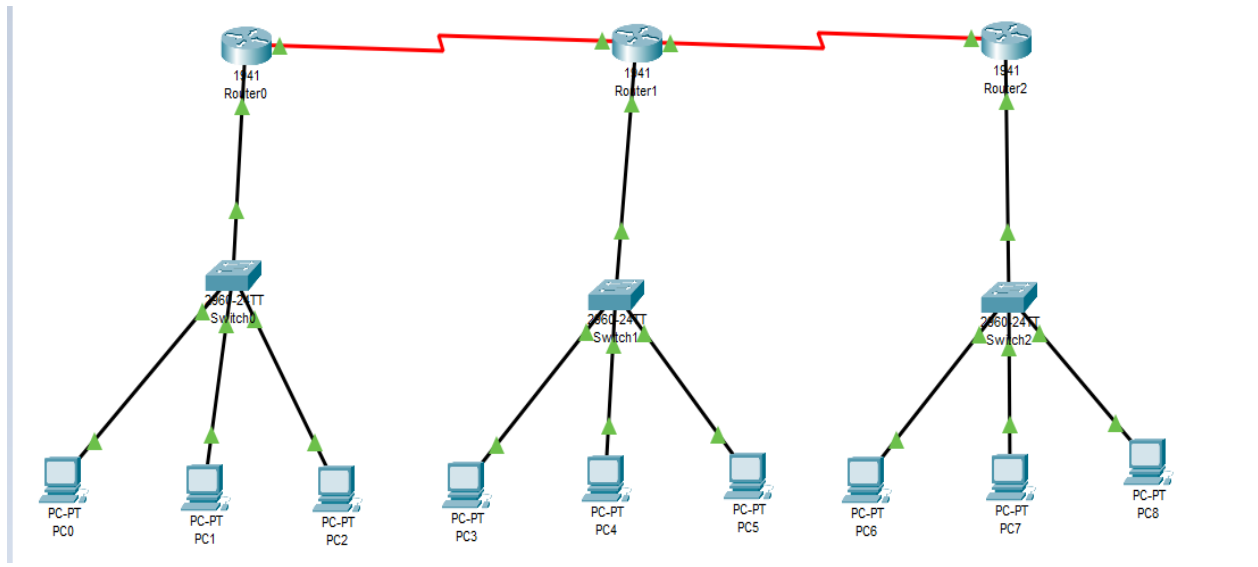
Pros:

1. The RIP protocol is ideal for small networks since it is simple to learn and configure.
2. RIP routing is guaranteed to work with nearly all routers.
3. When the network topology changes, RIP does not require an update.

Cons:

1. RIP does not support variable length subnet masks
2. RIP transmits updates every 30 seconds, which cause traffic and consumes bandwidth.
3. RIP hop counts are restricted to 15, hence any router beyond that distance is deemed infinity and becomes unreachable.
4. The rate of convergence is slow in RIP compared to other routing protocols. When a link fails, finding alternate network paths takes a long time.
5. RIP does not support multiple paths on the same route, which may result in extra routing loops.

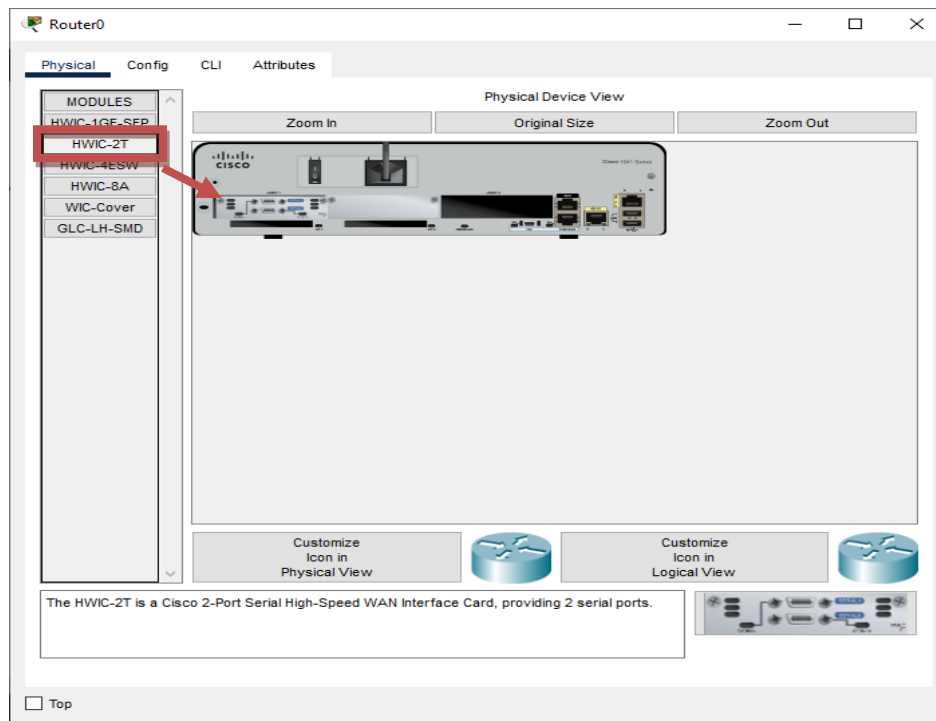
We use the following topology for the present case



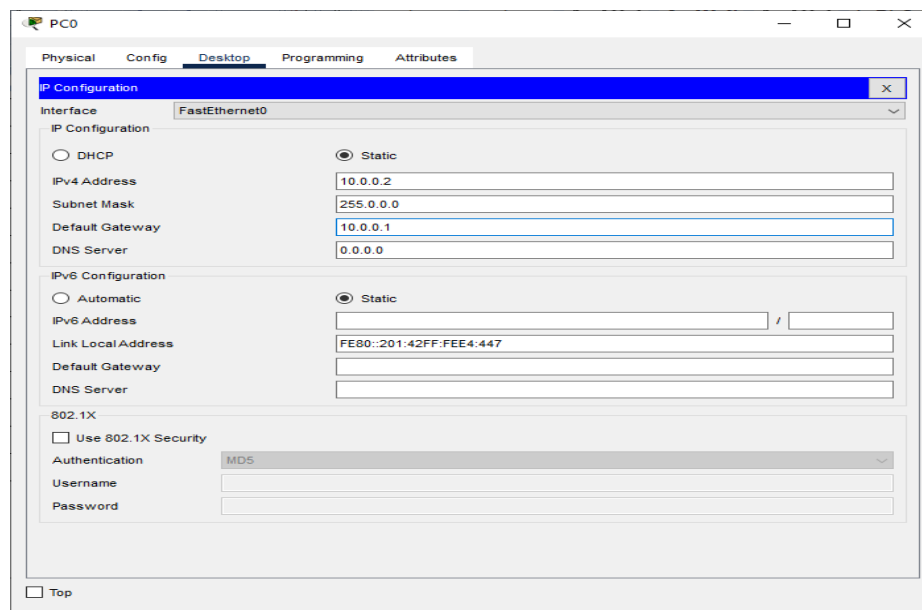
We configure the above network using the following IP addresses

Host	Interface	IP address	Network Address	Default Gateway
Router 0	G0/0	10.0.0.1	10.0.0.0	
	S0/1/0	192.168.0.1	192.168.0.0	
Router 1	G0/0	20.0.0.1	20.0.0.0	
	S0/1/0	192.168.0.2	192.168.0.0	
	S0/1/1	192.168.1.1	192.168.1.0	
Router 2	G0/0	30.0.0.1	30.0.0.0	
	S0/1/1	192.168.1.2	192.168.1.0	
PC0	FastEthernet0	10.0.0.2	10.0.0.0	10.0.0.1
PC1	FastEthernet0	10.0.0.3	10.0.0.0	10.0.0.1
PC2	FastEthernet0	10.0.0.4	10.0.0.0	10.0.0.1
PC3	FastEthernet0	20.0.0.2	20.0.0.0	20.0.0.1
PC4	FastEthernet0	20.0.0.3	20.0.0.0	20.0.0.1
PC5	FastEthernet0	20.0.0.4	20.0.0.0	20.0.0.1
PC6	FastEthernet0	30.0.0.2	30.0.0.0	30.0.0.1
PC7	FastEthernet0	30.0.0.3	30.0.0.0	30.0.0.1
PC8	FastEthernet0	30.0.0.4	30.0.0.0	30.0.0.1

Adding Serial Interface in each Router



Configuring PC0:



Configuring PC1:

The screenshot shows the 'PC1' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected for both IPv4 and IPv6 configurations. The IPv4 configuration includes an IP Address of 10.0.0.3, Subnet Mask of 255.0.0.0, Default Gateway of 10.0.0.1, and DNS Server of 0.0.0.0. The IPv6 configuration includes a Static IPv6 Address, Link Local Address of FE80::205:5EFF:FE88:E00C, and a Default Gateway. The 802.1X section is also visible, with 'Use 802.1X Security' unchecked, Authentication set to MDS, and empty fields for Username and Password.

PC1

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.0.0.3

Subnet Mask 255.0.0.0

Default Gateway 10.0.0.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address FE80::205:5EFF:FE88:E00C

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MDS

Username

Password

☐ Top

Configuring PC2:

The screenshot shows the 'PC2' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected for both IPv4 and IPv6 configurations. The IPv4 configuration includes an IP Address of 10.0.0.4, Subnet Mask of 255.0.0.0, Default Gateway of 10.0.0.1, and DNS Server of 0.0.0.0. The IPv6 configuration includes a Static IPv6 Address, Link Local Address of FE80::2D0:BAFF:FE8E:684C, and a Default Gateway. The 802.1X section is also visible, with 'Use 802.1X Security' unchecked, Authentication set to MDS, and empty fields for Username and Password. A warning message 'This address is already used in the network.' is displayed next to the IPv4 configuration.

PC2

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static This address is already used in the network.

IPv4 Address 10.0.0.4

Subnet Mask 255.0.0.0

Default Gateway 10.0.0.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address FE80::2D0:BAFF:FE8E:684C

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

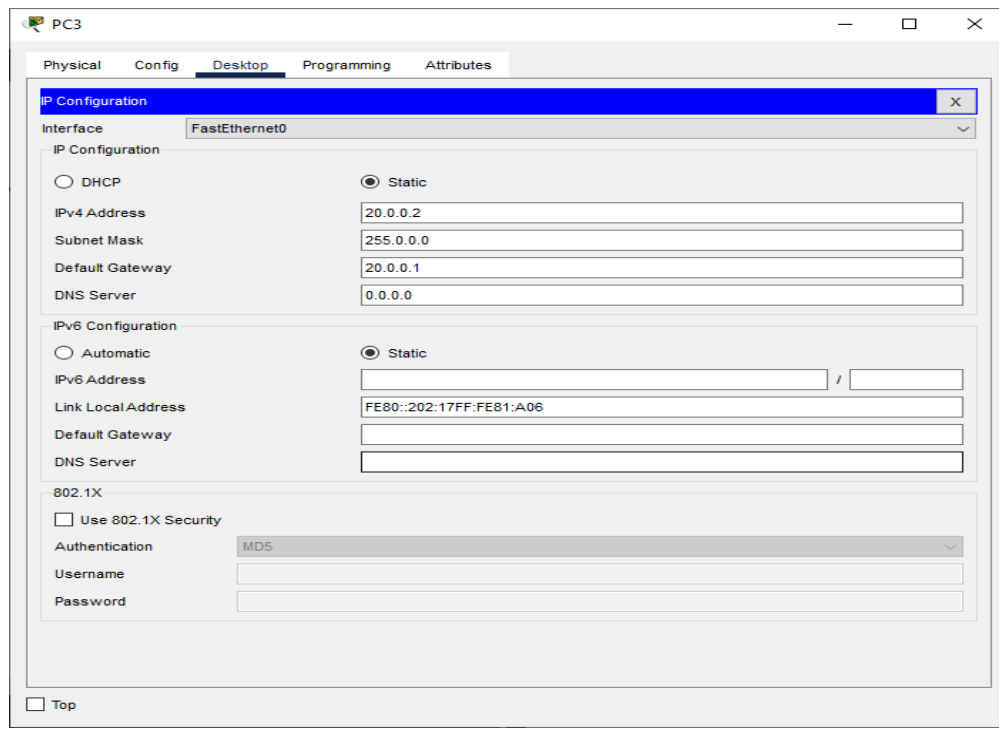
Authentication MDS

Username

Password

☐ Top

Configuring PC3:



The screenshot shows the configuration window for PC3. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 20.0.0.2, Subnet Mask to 255.0.0.0, Default Gateway to 20.0.0.1, and DNS Server to 0.0.0.0. Under 'IPv6 Configuration', the 'Static' radio button is also chosen. The IPv6 Address field is empty, and the Link Local Address is set to FE80::202:17FF:FE81:A06. The '802.1X' section has 'Use 802.1X Security' unchecked, and the Authentication is set to MD5. The Username and Password fields are empty.

PC3

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 20.0.0.2

Subnet Mask: 255.0.0.0

Default Gateway: 20.0.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::202:17FF:FE81:A06

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

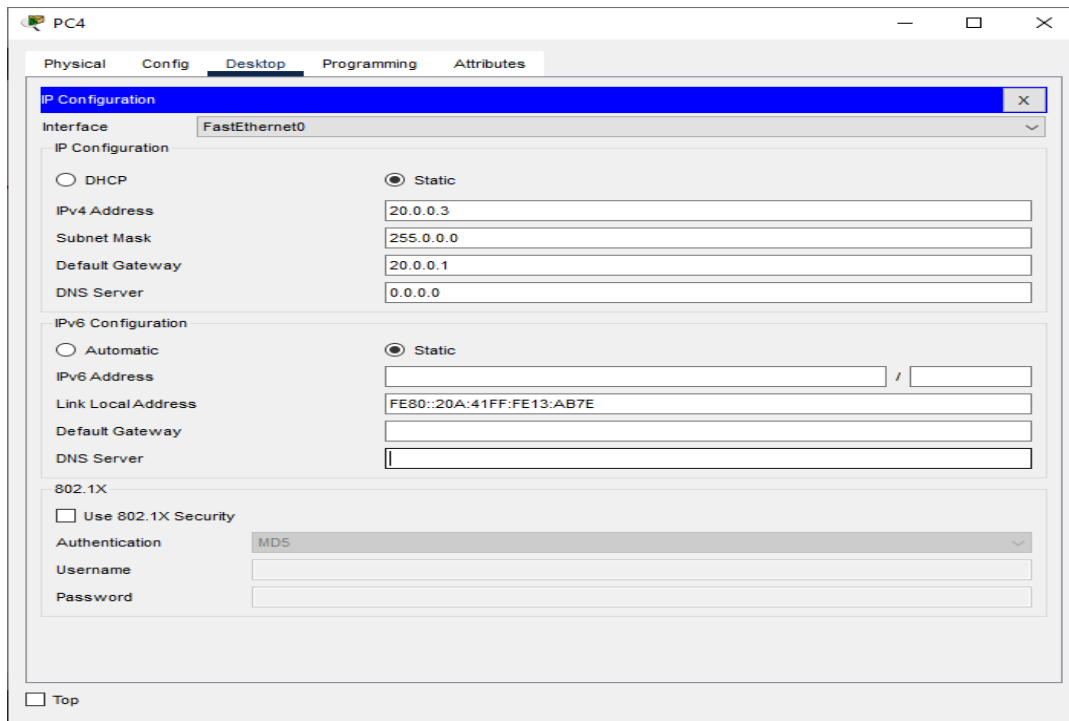
Authentication: MD5

Username:

Password:

☐ Top

Configuring PC4:



The screenshot shows the configuration window for PC4. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 20.0.0.3, Subnet Mask to 255.0.0.0, Default Gateway to 20.0.0.1, and DNS Server to 0.0.0.0. Under 'IPv6 Configuration', the 'Static' radio button is also chosen. The IPv6 Address field is empty, and the Link Local Address is set to FE80::20A:41FF:FE13:AB7E. The '802.1X' section has 'Use 802.1X Security' unchecked, and the Authentication is set to MD5. The Username and Password fields are empty.

PC4

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 20.0.0.3

Subnet Mask: 255.0.0.0

Default Gateway: 20.0.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::20A:41FF:FE13:AB7E

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top

Configuring PC5:

The screenshot shows the configuration window for PC5. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 20.0.0.4, Subnet Mask to 255.0.0.0, Default Gateway to 20.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section has 'Static' selected, with a Link Local Address of FE80::2E0:F9FF:FE0D:3AA. The 802.1X section is collapsed.

Field	Value
Interface	FastEthernet0
IP Configuration	Static
IPv4 Address	20.0.0.4
Subnet Mask	255.0.0.0
Default Gateway	20.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::2E0:F9FF:FE0D:3AA
Default Gateway	
DNS Server	
802.1X	Use 802.1X Security: <input type="checkbox"/>
Authentication	MD5
Username	
Password	

Configuring PC6:

The screenshot shows the configuration window for PC6. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 30.0.0.2, Subnet Mask to 255.0.0.0, Default Gateway to 30.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section has 'Static' selected, with a Link Local Address of FE80::2E0:F9FF:FE9A:D3AA. The 802.1X section is collapsed.

Field	Value
Interface	FastEthernet0
IP Configuration	Static
IPv4 Address	30.0.0.2
Subnet Mask	255.0.0.0
Default Gateway	30.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::2E0:F9FF:FE9A:D3AA
Default Gateway	
DNS Server	
802.1X	Use 802.1X Security: <input type="checkbox"/>
Authentication	MD5
Username	
Password	

Configuring PC7:

The screenshot shows the configuration window for PC7. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 30.0.0.3, Subnet Mask to 255.0.0.0, Default Gateway to 30.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section has 'Static' selected, with an empty IPv6 Address field, a Link Local Address of FE80::201:C9FF:FEDC:D846, and empty fields for Default Gateway and DNS Server. The 802.1X section has 'Use 802.1X Security' unchecked, 'Authentication' set to MDS, and empty fields for Username and Password. A 'Top' button is at the bottom left.

IP Configuration	
Interface: FastEthernet0	
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	30.0.0.3
Subnet Mask	255.0.0.0
Default Gateway	30.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::201:C9FF:FEDC:D846
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MDS
Username	
Password	

☐ Top

Configuring PC8:

The screenshot shows the configuration window for PC8. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 30.0.0.4, Subnet Mask to 255.0.0.0, Default Gateway to 30.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section has 'Static' selected, with an empty IPv6 Address field, a Link Local Address of FE80::260:3EFF:FE25:E1BE, and empty fields for Default Gateway and DNS Server. The 802.1X section has 'Use 802.1X Security' unchecked, 'Authentication' set to MDS, and empty fields for Username and Password. A 'Top' button is at the bottom left.

IP Configuration	
Interface: FastEthernet0	
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	30.0.0.4
Subnet Mask	255.0.0.0
Default Gateway	30.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::260:3EFF:FE25:E1BE
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MDS
Username	
Password	

☐ Top

Configuring Router 0 (using the CLI mode)

```
Router>en
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gigabitEthernet 0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface serial 0/1/0
Router(config-if)#ip address 192.168.0.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#
Router#
```

Configuring Router 1 (using the CLI mode)

```
Router>enable
Router#configure terminal
Router(config)#interface gigabitEthernet 0/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#exit

Router(config)#interface serial 0/1/0
Router(config-if)#ip address 192.168.0.2 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit

Router(config)#interface serial 0/1/1
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
```

Configuring Router 2 (using the CLI mode)

```
Router>enable
Router#configure terminal
Router(config)#interface gigabitEthernet 0/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#exit

Router(config)#interface serial 0/1/1
Router(config-if)#ip address 192.168.1.2 255.255.255.0
Router(config-if)#no shutdown
```

Setting the RIPv1 on Router 0

```
Router>enable
Router#configure terminal
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 192.168.0.0
Router(config-router)#exit
```

Setting the RIPv1 on Router 1

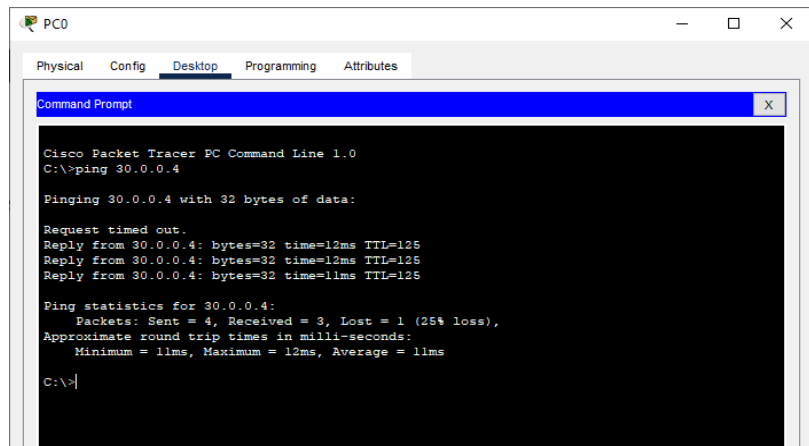
```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 192.168.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 192.168.1.0
Router(config-router)#exit
Router(config)#
Router#
```

Setting the RIPv1 on Router 2

```
Router>enable
Router#configure terminal
Router(config)#router rip
Router(config-router)#network 192.168.1.0
Router(config-router)#network 30.0.0.0
Router(config-router)#exit
Router(config)#
```

Checking the connectivity by using the ping command

Pinging PC8 (ip address 30.0.0.4) from PC0



```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 30.0.0.4

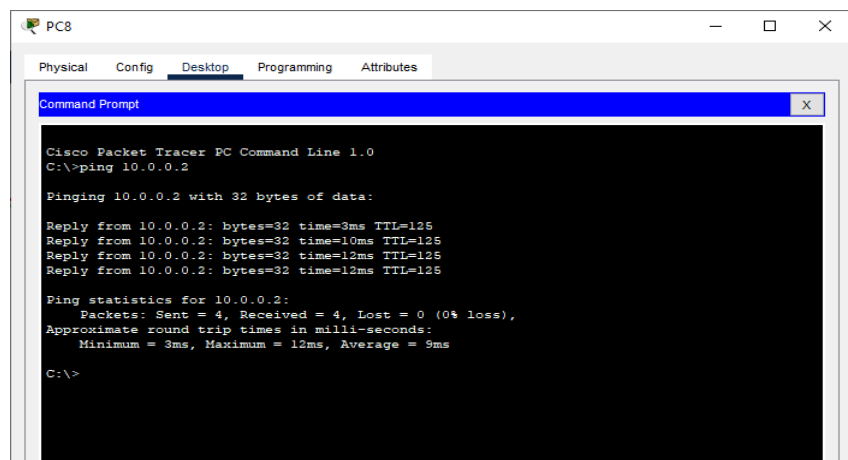
Pinging 30.0.0.4 with 32 bytes of data:

Request timed out.
Reply from 30.0.0.4: bytes=32 time=12ms TTL=125
Reply from 30.0.0.4: bytes=32 time=12ms TTL=125
Reply from 30.0.0.4: bytes=32 time=11ms TTL=125

Ping statistics for 30.0.0.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 12ms, Average = 11ms

C:\>
```

Pinging PC0 (ip address 10.0.0.2) from PC8



```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=3ms TTL=125
Reply from 10.0.0.2: bytes=32 time=10ms TTL=125
Reply from 10.0.0.2: bytes=32 time=12ms TTL=125
Reply from 10.0.0.2: bytes=32 time=12ms TTL=125

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 12ms, Average = 9ms

C:\>
```

Result:

Hence the RIPv1 has been studied and verified through the given network

Link for the video demonstration of the practical:

<https://youtu.be/DLMpobkrDGw>

Practical No 6

Aim: Using Packet Tracer to create a network with three routers with RIPv2 and each router associated network will have minimum three PC and show the connectivity

Theory:

RIPv2 is an enhancement to the original RIP protocol developed in 1994. RIPv2 is also a distance vector routing protocol but has a few enhancements to make it more efficient than RIPv1.

RIPv2 is more efficient than RIPv1, but is not suitable for larger, more complex networks. It simply provides more flexibility on smaller networks.

RIPv2 uses the same routing metric as RIPv1, the hop count. Updates with RIPv2 are sent via multicasts and not broadcasts. RIPv2 can also be configured to do classless routing. When configured for classless routing, RIPv2 will transmit subnet masks when it sends routing updates. This allows for the use of subnetting and discontinuous networks.

RIPv2 allows for authentication to be required for updates. When authentication is enabled, each router is configured with the RIP update password. The password sent with the RIP update must match the password configured on the destination router. If the passwords do not match, then the receiving router will not process the update.

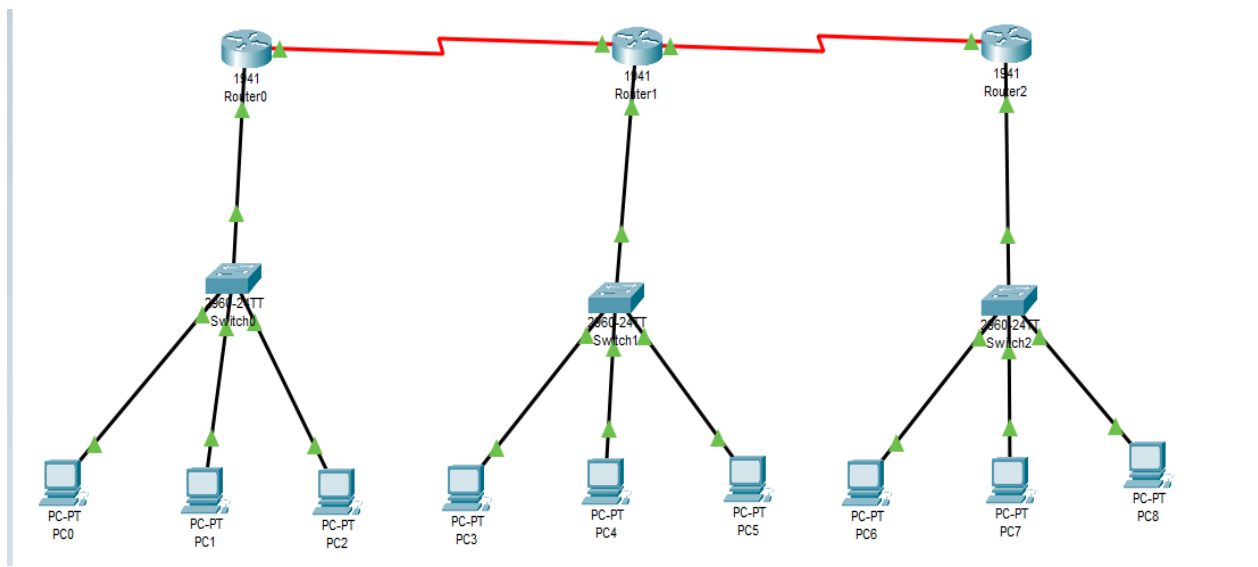
Advantages of RIPv2

- 1) It's a standardized protocol.
- 2) It's VLSM compliant.
- 3) Provides fast convergence.
- 4) It sends triggered updates when the network changes.
- 5) Works with snapshot routing – making it ideal for dial networks.

Disadvantage of RIPv2

- 1) Max hop count of 15, due to the 'count-to-infinity' vulnerability.
- 2) No concept of neighbors.
- 3) Exchanges entire table with all neighbors every 30 seconds (except in the case of a triggered update).

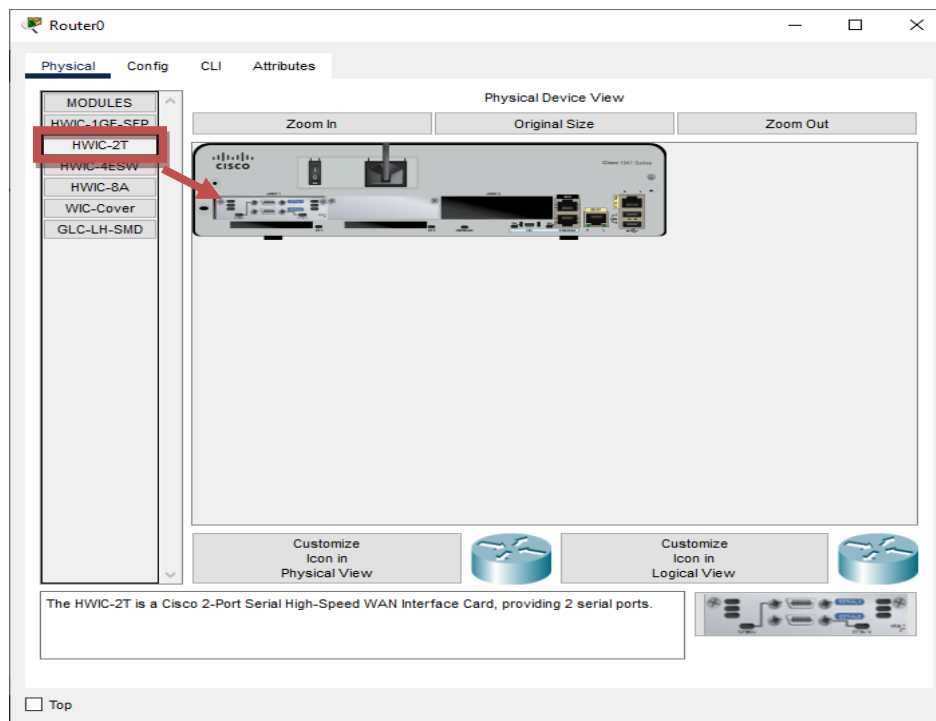
We use the following topology for the present case



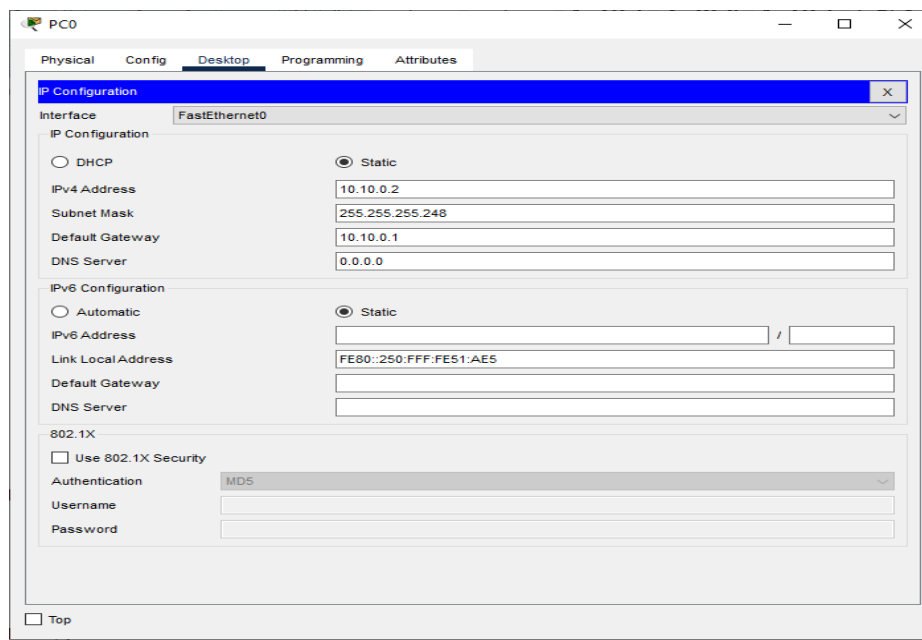
We configure the above network using the following IP addresses

Host	Interface	IP address	Subnet Mask	Network Address	Default Gateway
Router 0	G0/0	10.10.0.1	255.255.255.248	10.10.0.0	
	S0/1/0	192.168.0.1	255.255.255.252	192.168.0.0	
Router 1	G0/0	10.20.0.1	255.255.255.248	10.20.0.0	
	S0/1/0	192.168.0.2	255.255.255.252	192.168.0.0	
	S0/1/1	192.168.1.1	255.255.255.252	192.168.1.0	
Router 2	G0/0	10.30.0.1	255.255.255.248	10.30.0.0	
	S0/1/1	192.168.1.2	255.255.255.252	192.168.1.0	
PC0	FastEthernet0	10.10.0.2	255.255.255.248	10.10.0.0	10.10.0.1
PC1	FastEthernet0	10.10.0.3	255.255.255.248	10.10.0.0	10.10.0.1
PC2	FastEthernet0	10.10.0.4	255.255.255.248	10.10.0.0	10.10.0.1
PC3	FastEthernet0	10.20.0.2	255.255.255.248	10.20.0.0	10.20.0.1
PC4	FastEthernet0	10.20.0.3	255.255.255.248	10.20.0.0	10.20.0.1
PC5	FastEthernet0	10.20.0.4	255.255.255.248	10.20.0.0	10.20.0.1
PC6	FastEthernet0	10.30.0.2	255.255.255.248	10.30.0.0	10.30.0.1
PC7	FastEthernet0	10.30.0.3	255.255.255.248	10.30.0.0	10.30.0.1
PC8	FastEthernet0	10.30.0.4	255.255.255.248	10.30.0.0	10.30.0.1

Adding Serial Interface in each Router



Configuring PC0:



Configuring PC1:

The screenshot shows the 'PC1' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The 'IPv4 Address' is set to '10.10.0.3', 'Subnet Mask' to '255.255.255.248', 'Default Gateway' to '10.10.0.1', and 'DNS Server' to '0.0.0.0'. The 'IPv6 Configuration' section is also expanded, with 'Static' selected. The 'IPv6 Address' is empty, 'Link Local Address' is 'FE80::2D0:BAFF:FEA4:5B72', and 'Default Gateway' and 'DNS Server' are empty. The '802.1X' section is collapsed. A 'Top' button is at the bottom left.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	10.10.0.3
Subnet Mask	255.255.255.248
Default Gateway	10.10.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::2D0:BAFF:FEA4:5B72
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MDS
Username	
Password	

☐ Top

Configuring PC2:

The screenshot shows the 'PC2' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The 'IPv4 Address' is set to '10.10.0.4', 'Subnet Mask' to '255.255.255.248', 'Default Gateway' to '10.10.0.1', and 'DNS Server' to '0.0.0.0'. The 'IPv6 Configuration' section is also expanded, with 'Static' selected. The 'IPv6 Address' is empty, 'Link Local Address' is 'FE80::2D0:BCFF:FE33:A758', and 'Default Gateway' and 'DNS Server' are empty. The '802.1X' section is collapsed. A 'Top' button is at the bottom left.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	10.10.0.4
Subnet Mask	255.255.255.248
Default Gateway	10.10.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::2D0:BCFF:FE33:A758
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MDS
Username	
Password	

☐ Top

Configuring PC3:

The screenshot shows the configuration window for PC3. The 'Desktop' tab is selected. The 'IP Configuration' section is expanded, showing the 'FastEthernet0' interface. The 'Static' radio button is selected for both IPv4 and IPv6 configurations. The IPv4 address is 10.20.0.2, subnet mask is 255.255.255.248, default gateway is 10.20.0.1, and DNS server is 0.0.0.0. The IPv6 address is empty, link local address is FE80::2E0:8FFF:FE7E:6379, and default gateway and DNS server are empty. The '802.1X' section is also visible, with 'Use 802.1X Security' unchecked, authentication set to MD5, and empty fields for username and password.

PC3

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 10.20.0.2

Subnet Mask: 255.255.255.248

Default Gateway: 10.20.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::2E0:8FFF:FE7E:6379

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top

Configuring PC4:

The screenshot shows the configuration window for PC4. The 'Desktop' tab is selected. The 'IP Configuration' section is expanded, showing the 'FastEthernet0' interface. The 'Static' radio button is selected for both IPv4 and IPv6 configurations. The IPv4 address is 10.20.0.3, subnet mask is 255.255.255.248, default gateway is 10.20.0.1, and DNS server is 0.0.0.0. The IPv6 address is empty, link local address is FE80::2D0:FFFF:FE8B:2C17, and default gateway and DNS server are empty. The '802.1X' section is also visible, with 'Use 802.1X Security' unchecked, authentication set to MD5, and empty fields for username and password.

PC4

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 10.20.0.3

Subnet Mask: 255.255.255.248

Default Gateway: 10.20.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::2D0:FFFF:FE8B:2C17

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top

Configuring PC5:

The screenshot shows the configuration window for PC5. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 10.20.0.4, Subnet Mask to 255.0.0.0, Default Gateway to 10.20.0.1, and DNS Server to 0.0.0.0. Under 'IPv6 Configuration', the 'Static' radio button is also chosen. The IPv6 Address field is empty, and the Link Local Address is set to FE80::230:F2FF:FE77:CBE7. The '802.1X' section has 'Use 802.1X Security' unchecked, 'Authentication' set to MD5, and empty fields for Username and Password. A 'Top' button is at the bottom left.

Field	Value
Interface	FastEthernet0
IP Configuration	Static
IPv4 Address	10.20.0.4
Subnet Mask	255.0.0.0
Default Gateway	10.20.0.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::230:F2FF:FE77:CBE7
Default Gateway	
DNS Server	
802.1X	
Use 802.1X Security	<input type="checkbox"/>
Authentication	MD5
Username	
Password	

Configuring PC6:

The screenshot shows the configuration window for PC6. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 10.30.0.2, Subnet Mask to 255.255.255.248, Default Gateway to 10.30.0.1, and DNS Server to 0.0.0.0. Under 'IPv6 Configuration', the 'Static' radio button is also chosen. The IPv6 Address field is empty, and the Link Local Address is set to FE80::200:CFE:FE40:DCD0. The '802.1X' section has 'Use 802.1X Security' unchecked, 'Authentication' set to MD5, and empty fields for Username and Password. A 'Top' button is at the bottom left.

Field	Value
Interface	FastEthernet0
IP Configuration	Static
IPv4 Address	10.30.0.2
Subnet Mask	255.255.255.248
Default Gateway	10.30.0.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::200:CFE:FE40:DCD0
Default Gateway	
DNS Server	
802.1X	
Use 802.1X Security	<input type="checkbox"/>
Authentication	MD5
Username	
Password	

Configuring PC7:

The screenshot shows the configuration window for PC7. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Interface' is 'FastEthernet0'. The 'IP Configuration' section has 'Static' selected. The fields are: IPv4 Address: 10.30.0.3, Subnet Mask: 255.0.0.0, Default Gateway: 10.30.0.1, DNS Server: 0.0.0.0. The 'IPv6 Configuration' section has 'Static' selected. The fields are: IPv6 Address: (empty), Link Local Address: FE80::202:4AFF:FE4A:9D36, Default Gateway: (empty), DNS Server: (empty). The '802.1X' section has 'Use 802.1X Security' unchecked, Authentication: MD5, Username: (empty), Password: (empty). A 'Top' button is at the bottom left.

Configuring PC8:

The screenshot shows the configuration window for PC8. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Interface' is 'FastEthernet0'. The 'IP Configuration' section has 'Static' selected. The fields are: IPv4 Address: 10.30.0.4, Subnet Mask: 255.0.0.0, Default Gateway: 10.30.0.1, DNS Server: 0.0.0.0. The 'IPv6 Configuration' section has 'Static' selected. The fields are: IPv6 Address: (empty), Link Local Address: FE80::240:BFF:FE65:D944, Default Gateway: (empty), DNS Server: (empty). The '802.1X' section has 'Use 802.1X Security' unchecked, Authentication: MD5, Username: (empty), Password: (empty). A 'Top' button is at the bottom left.

Configuring IP addresses on Router 0

i) Interface G0/0

The screenshot shows the configuration window for Router0, specifically the 'Config' tab for the GigabitEthernet0/0 interface. The left sidebar shows a tree view with 'INTERFACE' expanded and 'GigabitEthernet0/0' selected. The main area displays the following settings:

- Port Status:** ☒ On
- Bandwidth:** ☐ 1000 Mbps ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex:** ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address:** 0090.0C15.A101
- IP Configuration:**
 - IPv4 Address:** 10.10.0.1
 - Subnet Mask:** 255.255.255.248
- Tx Ring Limit:** 10

ii) Interface S0/1/0

The screenshot shows the configuration window for Router0, specifically the 'Config' tab for the Serial0/1/0 interface. The left sidebar shows a tree view with 'INTERFACE' expanded and 'Serial0/1/0' selected. The main area displays the following settings:

- Port Status:** ☒ On
- Duplex:** ☒ Full Duplex
- Clock Rate:** 1200
- IP Configuration:**
 - IPv4 Address:** 192.168.0.1
 - Subnet Mask:** 255.255.255.252
- Tx Ring Limit:** 10

Configuring IP addresses on Router 1

i) Interface G0/0

The screenshot shows the configuration window for Router1, specifically the 'Config' tab for the GigabitEthernet0/0 interface. The left sidebar lists various configuration categories: GLOBAL, Settings, Algorithm Settings, ROUTING, Static, RIP, SWITCHING, VLAN Database, and INTERFACE. Under the INTERFACE category, GigabitEthernet0/0 is selected. The main configuration area for GigabitEthernet0/0 includes the following settings:

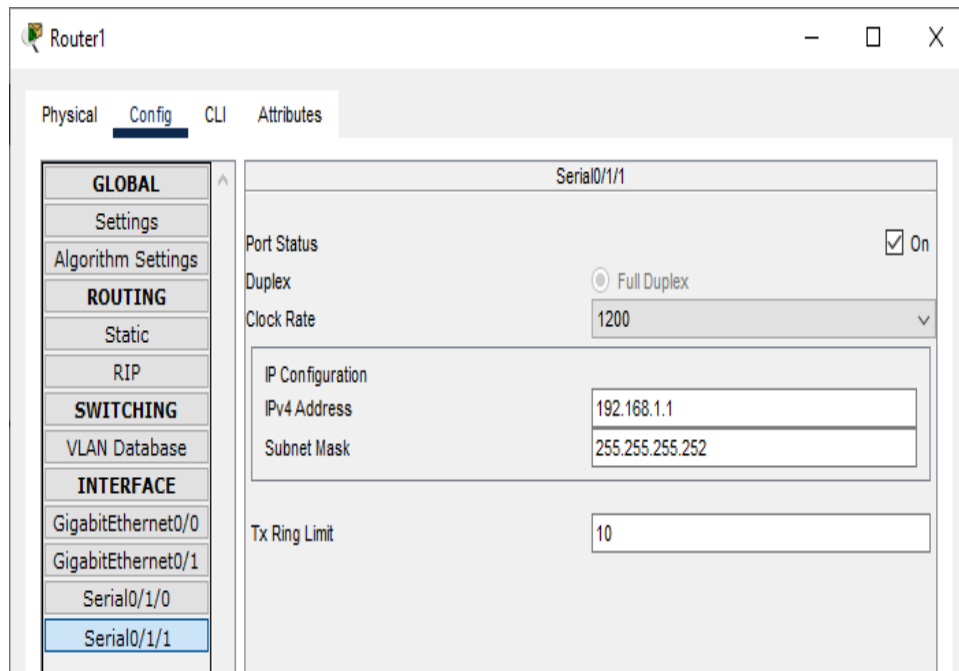
- Port Status: ☒ On
- Bandwidth: ☐ 1000 Mbps ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address: 0001.9670.9801
- IP Configuration:
 - IPv4 Address: 10.20.0.1
 - Subnet Mask: 255.255.255.248
- Tx Ring Limit: 10

ii) Interface S0/1/0

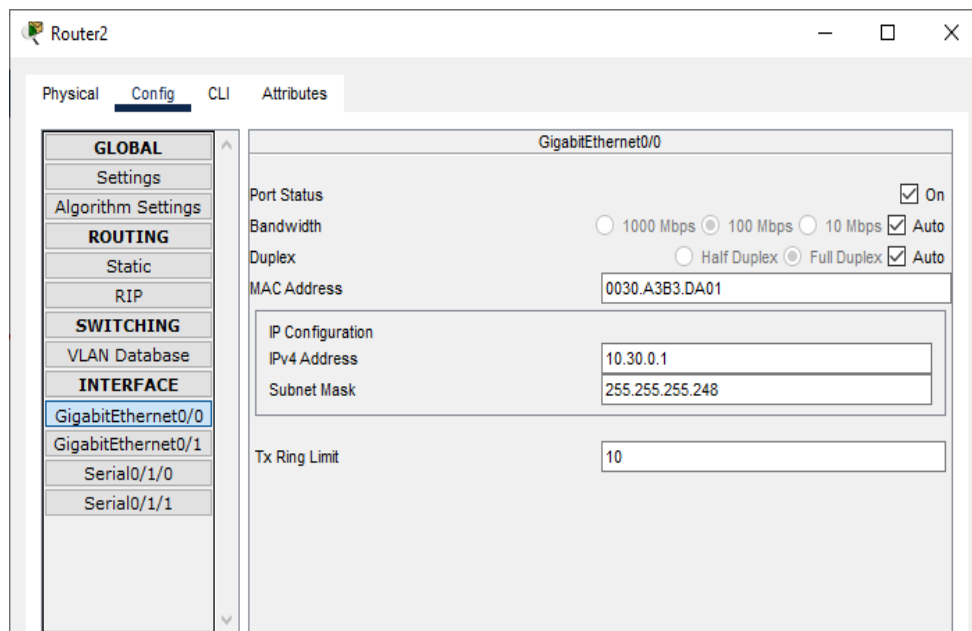
The screenshot shows the configuration window for Router1, specifically the 'Config' tab for the Serial0/1/0 interface. The left sidebar lists various configuration categories: GLOBAL, Settings, Algorithm Settings, ROUTING, Static, RIP, SWITCHING, VLAN Database, and INTERFACE. Under the INTERFACE category, Serial0/1/0 is selected. The main configuration area for Serial0/1/0 includes the following settings:

- Port Status: ☒ On
- Duplex: ☒ Full Duplex
- Clock Rate: 2000000
- IP Configuration:
 - IPv4 Address: 192.168.0.2
 - Subnet Mask: 255.255.255.252
- Tx Ring Limit: 10

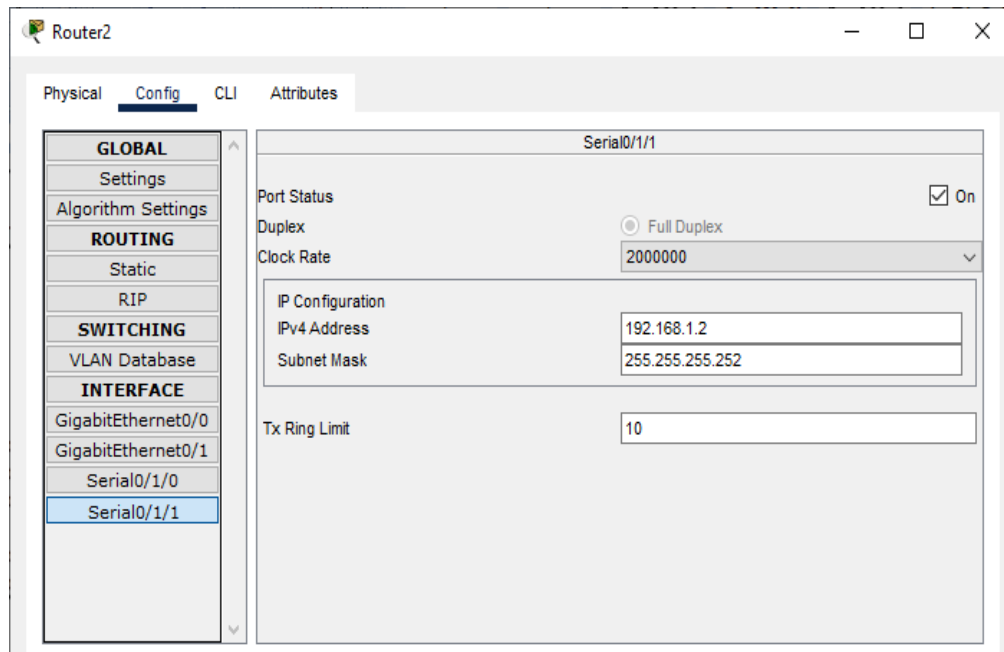
iii) Interface S0/1/1

**Configuring IP addresses on Router 2**

i) Interface G0/0



ii) Interface S0/1/1

**Configuring Router 0 for RIPv2 (using the CLI mode)**

```
Router>enable
Router#configure terminal
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 10.10.0.0
Router(config-router)#network 192.168.0.0
Router(config-router)#exit
Router(config)#
```

Configuring Router 1 for RIPv2 (using the CLI mode)

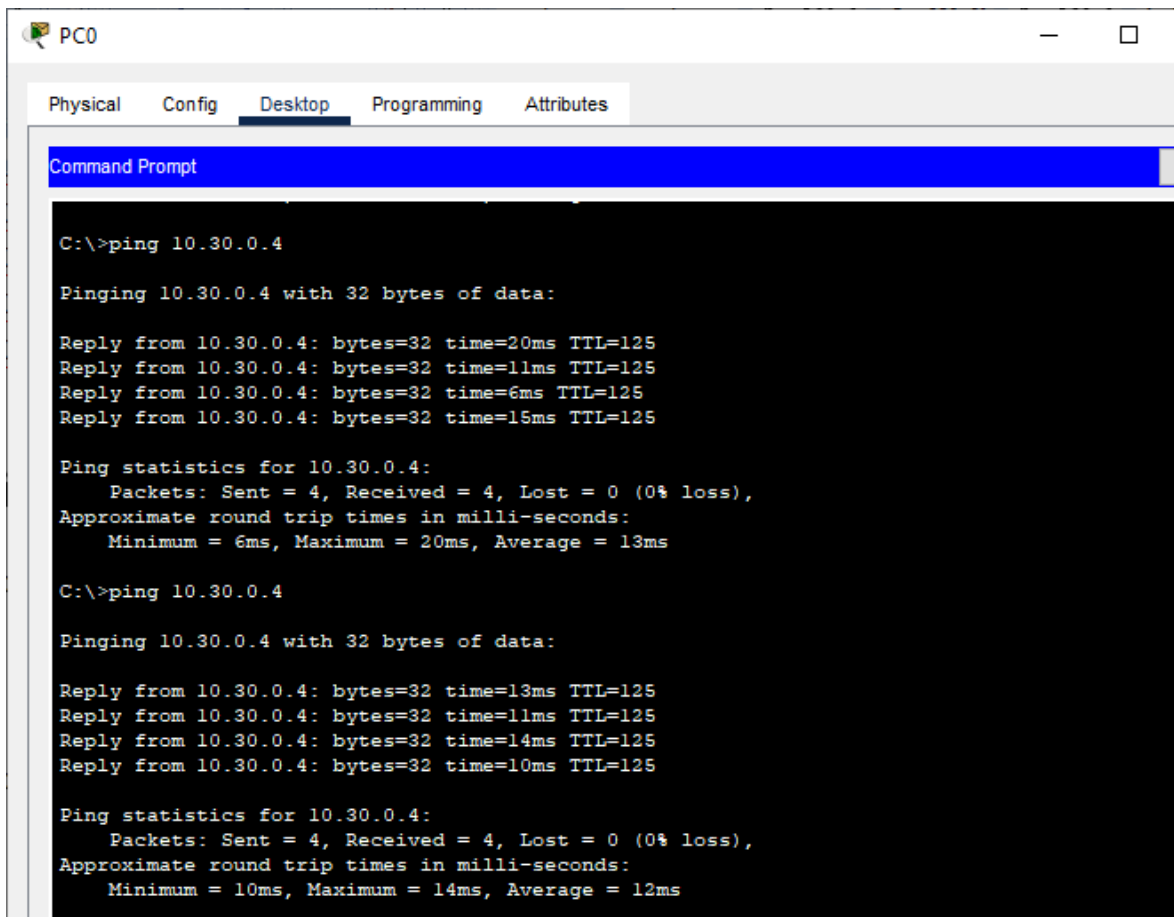
```
Router>enable
Router#configure terminal
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 10.20.0.0
Router(config-router)#network 192.168.0.0
Router(config-router)#network 192.168.1.0
Router(config-router)#exit
Router(config)#
```

Configuring Router 2 for RIPv2 (using the CLI mode)

```
Router>enable
Router#configure terminal
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 10.30.0.0
Router(config-router)#network 192.168.1.0
Router(config-router)#exit
Router(config)#
```

Checking the connectivity by using the ping command

- i) Pinging PC8 (ip address 10.30.0.4) from PC0



The screenshot shows a PC0 desktop environment with a window titled 'PC0'. The 'Desktop' tab is selected, displaying a 'Command Prompt' window. The command prompt shows two successful ping operations to the IP address 10.30.0.4. Each operation consists of four replies and a summary statistics block. The first ping shows a 0% loss with an average round trip time of 13ms. The second ping also shows a 0% loss with an average round trip time of 12ms.

```
C:\>ping 10.30.0.4

Pinging 10.30.0.4 with 32 bytes of data:

Reply from 10.30.0.4: bytes=32 time=20ms TTL=125
Reply from 10.30.0.4: bytes=32 time=11ms TTL=125
Reply from 10.30.0.4: bytes=32 time=6ms TTL=125
Reply from 10.30.0.4: bytes=32 time=15ms TTL=125

Ping statistics for 10.30.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 6ms, Maximum = 20ms, Average = 13ms

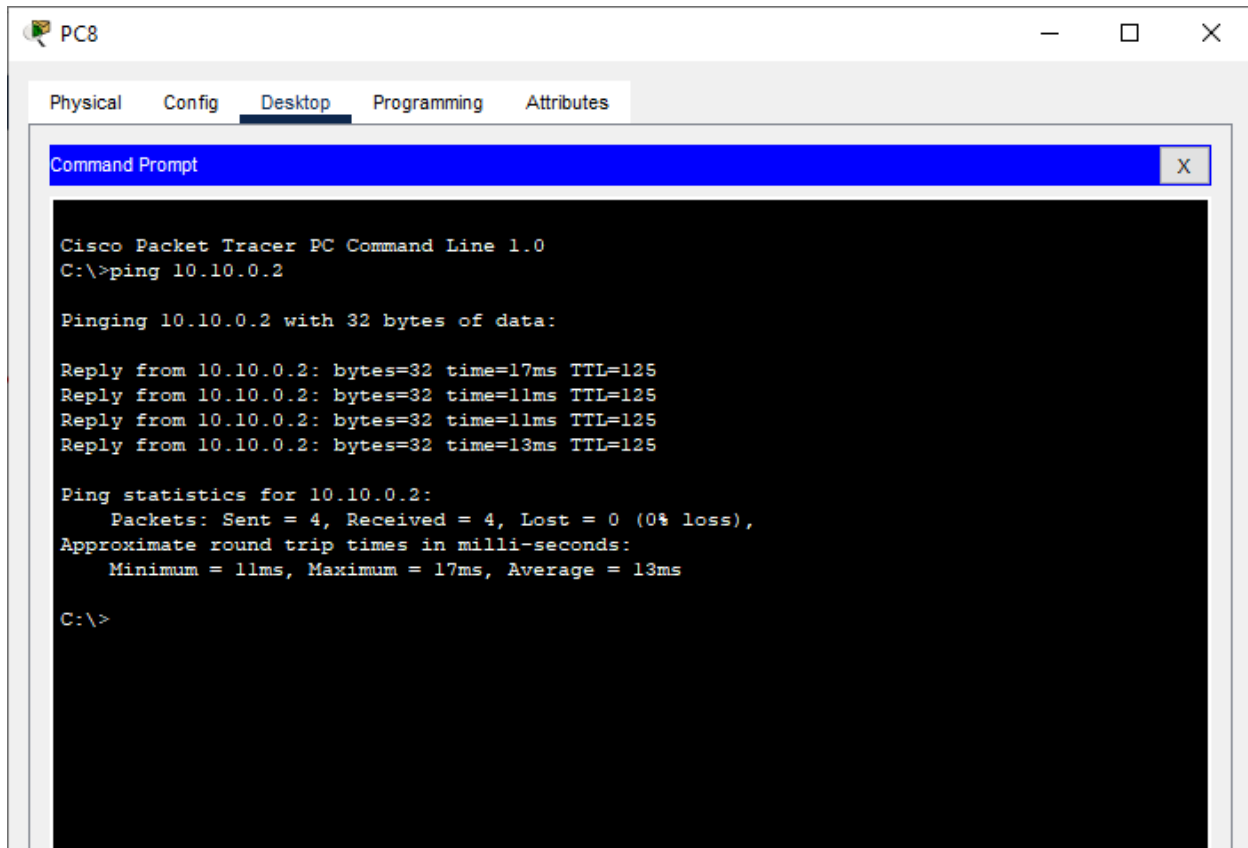
C:\>ping 10.30.0.4

Pinging 10.30.0.4 with 32 bytes of data:

Reply from 10.30.0.4: bytes=32 time=13ms TTL=125
Reply from 10.30.0.4: bytes=32 time=11ms TTL=125
Reply from 10.30.0.4: bytes=32 time=14ms TTL=125
Reply from 10.30.0.4: bytes=32 time=10ms TTL=125

Ping statistics for 10.30.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 14ms, Average = 12ms
```

ii) Pinging PC0 (ip address 10.10.0.2) from PC8



```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.10.0.2

Pinging 10.10.0.2 with 32 bytes of data:

Reply from 10.10.0.2: bytes=32 time=17ms TTL=125
Reply from 10.10.0.2: bytes=32 time=11ms TTL=125
Reply from 10.10.0.2: bytes=32 time=11ms TTL=125
Reply from 10.10.0.2: bytes=32 time=13ms TTL=125

Ping statistics for 10.10.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 17ms, Average = 13ms

C:\>
```

Result:

Hence the RIPv2 has been studied and verified through the given network

Link for the video demonstration of the practical:

<https://youtu.be/qrBpjsxSkZY8>

Practical No 7

Aim: Using Packet Tracer, create a network with three routers with OSPF and each router associated network will have minimum three PC and show Connectivity

Theory:

Open shortest path first (OSPF) is a link-state routing protocol that is used to find the best path between the source and the destination router using its own shortest path first (SPF) algorithm. A link-state routing protocol is a protocol that uses the concept of triggered updates, i.e., if there is a change observed in the learned routing table then the updates are triggered only, not like the distance-vector routing protocol where the routing table is exchanged at a period of time.

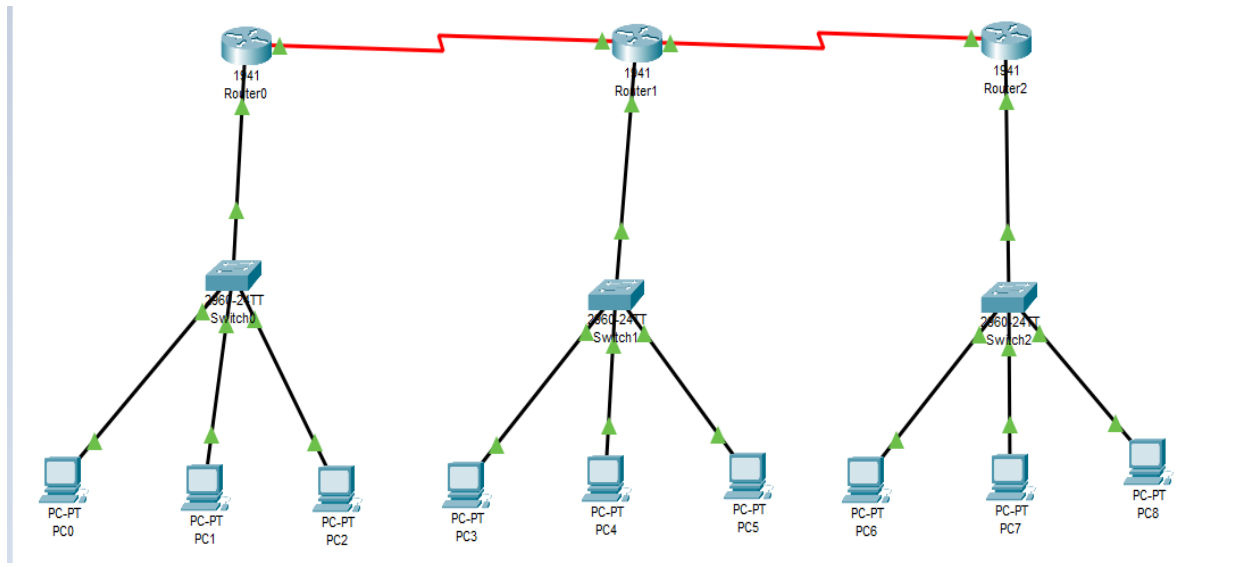
Open shortest path first (OSPF) is developed by Internet Engineering Task Force (IETF) as one of the Interior Gateway Protocol (IGP), i.e., the protocol which aims at moving the packet within a large autonomous system or routing domain.

OSPF advantages –

1. Both IPv4 and IPv6 routed protocols
2. Load balancing with equal-cost routes for the same destination
3. Unlimited hop counts
4. Trigger updates for fast convergence
5. A loop-free topology using SPF algorithm
6. Run-on most routers
7. Classless protocol

There are some disadvantages of OSPF like, it requires an extra CPU process to run the SPF algorithm, requiring more RAM to store adjacency topology, and being more complex to set up and hard to troubleshoot.

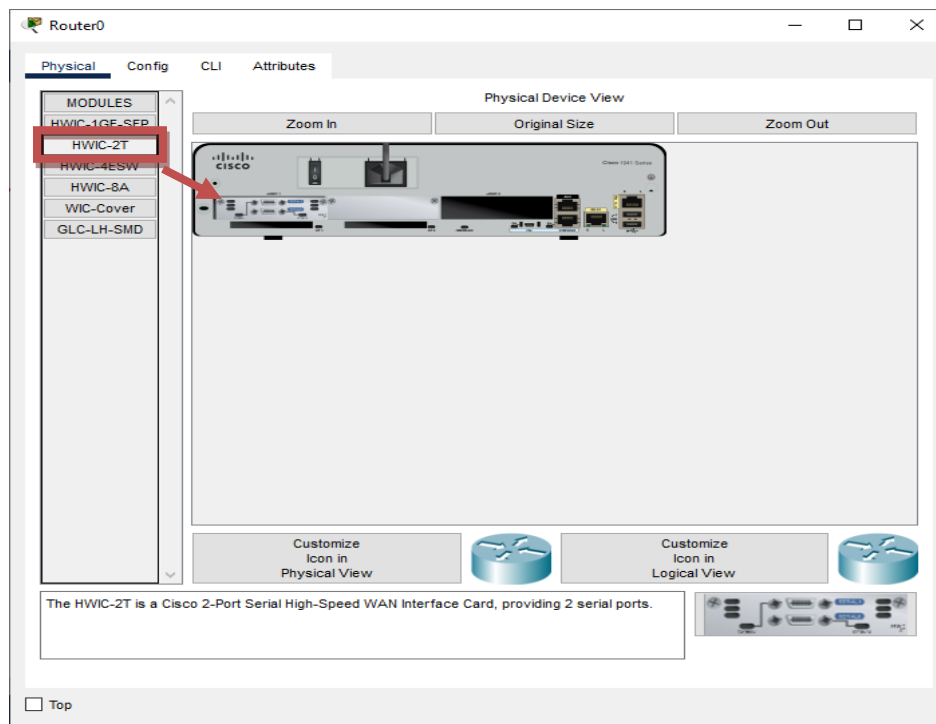
We use the following topology for the present case



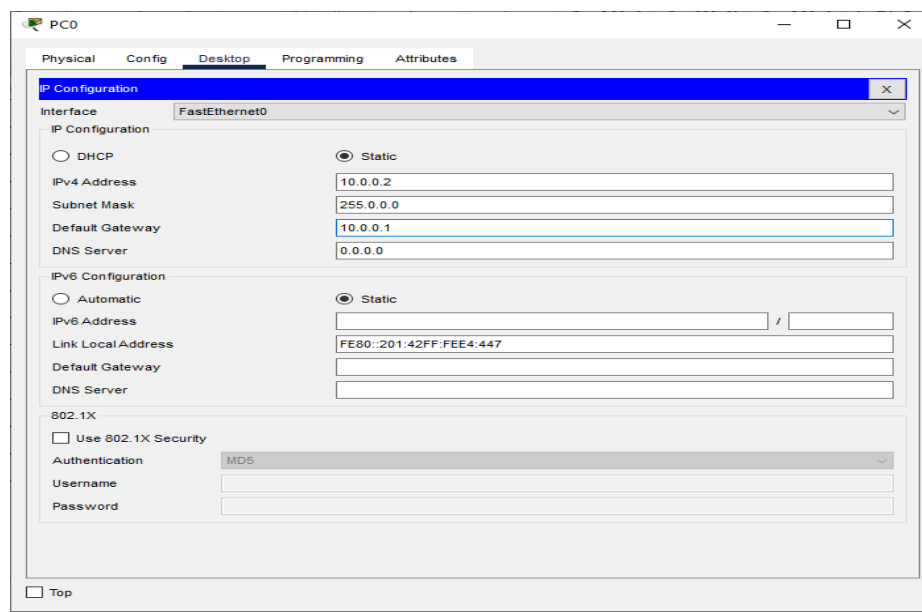
We configure the above network using the following IP addresses

Host	Interface	IP address	Default Gateway	Subnet Mask	Wildcard Mask
Router 0	G0/0	10.0.0.1		255.0.0.0	0.255.255.255
	S0/1/0	40.0.0.1			
Router 1	G0/0	20.0.0.1			
	S0/1/0	40.0.0.2			
	S0/1/1	50.0.0.1			
Router 2	G0/0	30.0.0.1			
	S0/1/1	50.0.0.2			
PC0	FastEthernet0	10.0.0.2	10.0.0.1		
PC1	FastEthernet0	10.0.0.3			
PC2	FastEthernet0	10.0.0.4			
PC3	FastEthernet0	20.0.0.2	20.0.0.1		
PC4	FastEthernet0	20.0.0.3			
PC5	FastEthernet0	20.0.0.4			
PC6	FastEthernet0	30.0.0.2	30.0.0.1		
PC7	FastEthernet0	30.0.0.3			
PC8	FastEthernet0	30.0.0.4			

Adding Serial Interface in each Router



Configuring PC0:



Configuring PC1:

The screenshot shows the 'PC1' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The IPv4 Address is set to 10.0.0.3, Subnet Mask to 255.0.0.0, Default Gateway to 10.0.0.1, and DNS Server to 0.0.0.0. The 'IPv6 Configuration' section also has 'Static' selected, with an empty IPv6 Address field, a Link Local Address of FE80::205:5EFF:FE88:E00C, and empty fields for Default Gateway and DNS Server. The '802.1X' section is collapsed, showing 'Use 802.1X Security' as unchecked, 'Authentication' as 'MD5', and empty fields for Username and Password. A 'Top' button is at the bottom left.

Configuring PC2:

The screenshot shows the 'PC2' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The IPv4 Address is set to 10.0.0.4, Subnet Mask to 255.0.0.0, Default Gateway to 10.0.0.1, and DNS Server to 0.0.0.0. A message 'This address is already used in the network.' is displayed next to the IPv4 Address field. The 'IPv6 Configuration' section also has 'Static' selected, with an empty IPv6 Address field, a Link Local Address of FE80::2D0:BAFF:FE8E:684C, and empty fields for Default Gateway and DNS Server. The '802.1X' section is collapsed, showing 'Use 802.1X Security' as unchecked, 'Authentication' as 'MD5', and empty fields for Username and Password. A 'Top' button is at the bottom left.

Configuring PC3:

The screenshot shows the configuration window for PC3. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 20.0.0.2, Subnet Mask to 255.0.0.0, Default Gateway to 20.0.0.1, and DNS Server to 0.0.0.0. Under 'IPv6 Configuration', the 'Static' radio button is also chosen. The IPv6 Address field is empty, and the Link Local Address is set to FE80::202:17FF:FE81:A06. The '802.1X' section has 'Use 802.1X Security' unchecked, 'Authentication' set to MD5, and empty fields for Username and Password. A 'Top' button is at the bottom left.

IP Configuration	
Interface: FastEthernet0	
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	20.0.0.2
Subnet Mask	255.0.0.0
Default Gateway	20.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::202:17FF:FE81:A06
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

☐ Top

Configuring PC4:

The screenshot shows the configuration window for PC4. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 20.0.0.3, Subnet Mask to 255.0.0.0, Default Gateway to 20.0.0.1, and DNS Server to 0.0.0.0. Under 'IPv6 Configuration', the 'Static' radio button is also chosen. The IPv6 Address field is empty, and the Link Local Address is set to FE80::20A:41FF:FE13:AB7E. The '802.1X' section has 'Use 802.1X Security' unchecked, 'Authentication' set to MD5, and empty fields for Username and Password. A 'Top' button is at the bottom left.

IP Configuration	
Interface: FastEthernet0	
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	20.0.0.3
Subnet Mask	255.0.0.0
Default Gateway	20.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::20A:41FF:FE13:AB7E
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

☐ Top

Configuring PC5:

The screenshot shows the configuration window for PC5. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 20.0.0.4, Subnet Mask to 255.0.0.0, Default Gateway to 20.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section has 'Static' selected, with a Link Local Address of FE80::2E0:F9FF:FE0D:3AA. The 802.1X section is collapsed.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	20.0.0.4
Subnet Mask	255.0.0.0
Default Gateway	20.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::2E0:F9FF:FE0D:3AA
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

Configuring PC6:

The screenshot shows the configuration window for PC6. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 30.0.0.2, Subnet Mask to 255.0.0.0, Default Gateway to 30.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section has 'Static' selected, with a Link Local Address of FE80::2E0:F9FF:FE9A:D3AA. The 802.1X section is collapsed.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	30.0.0.2
Subnet Mask	255.0.0.0
Default Gateway	30.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::2E0:F9FF:FE9A:D3AA
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

Configuring PC7:

The screenshot shows the configuration window for PC7. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 30.0.0.3, Subnet Mask to 255.0.0.0, Default Gateway to 30.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section has 'Static' selected, with a Link Local Address of FE80::201:C9FF:FEDC:D846. The 802.1X section is collapsed.

Field	Value
Interface	FastEthernet0
IP Configuration	Static
IPv4 Address	30.0.0.3
Subnet Mask	255.0.0.0
Default Gateway	30.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::201:C9FF:FEDC:D846
Default Gateway	
DNS Server	
802.1X	Use 802.1X Security: <input type="checkbox"/>
Authentication	MDS
Username	
Password	

Configuring PC8:

The screenshot shows the configuration window for PC8. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Static' radio button is chosen. The IPv4 Address is set to 30.0.0.4, Subnet Mask to 255.0.0.0, Default Gateway to 30.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section has 'Static' selected, with a Link Local Address of FE80::260:3EFF:FE25:E1BE. The 802.1X section is collapsed.

Field	Value
Interface	FastEthernet0
IP Configuration	Static
IPv4 Address	30.0.0.4
Subnet Mask	255.0.0.0
Default Gateway	30.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	Static
IPv6 Address	
Link Local Address	FE80::260:3EFF:FE25:E1BE
Default Gateway	
DNS Server	
802.1X	Use 802.1X Security: <input type="checkbox"/>
Authentication	MDS
Username	
Password	

Configuring IP addresses on Router 0

i) Interface G0/0

The screenshot shows the configuration window for Router0, specifically for the GigabitEthernet0/0 interface. The left sidebar has tabs for Physical, Config (selected), CLI, and Attributes. Under the Config tab, there is a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (GigabitEthernet0/0, GigabitEthernet0/1, Serial0/1/0, Serial0/1/1). The GigabitEthernet0/0 interface is selected. The main configuration area shows the following settings:

- Port Status: ☒ On
- Bandwidth: ☐ 1000 Mbps ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address: 0030.A3E4.1201
- IP Configuration:
 - IPv4 Address: 10.0.0.1
 - Subnet Mask: 255.0.0.0
- Tx Ring Limit: 10

ii) Interface S0/1/0

The screenshot shows the configuration window for Router0, specifically for the Serial0/1/0 interface. The left sidebar has tabs for Physical, Config (selected), CLI, and Attributes. Under the Config tab, there is a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (GigabitEthernet0/0, GigabitEthernet0/1, Serial0/1/0, Serial0/1/1). The Serial0/1/0 interface is selected. The main configuration area shows the following settings:

- Port Status: ☒ On
- Duplex: ☒ Full Duplex
- Clock Rate: 1200
- IP Configuration:
 - IPv4 Address: 40.0.0.1
 - Subnet Mask: 255.0.0.0
- Tx Ring Limit: 10

Configuring IP addresses on Router 1

i) Interface G0/0

The screenshot shows the configuration window for Router1, specifically for the GigabitEthernet0/0 interface. The left sidebar contains a tree view with categories: GLOBAL, Settings, Algorithm Settings, ROUTING, Static, RIP, SWITCHING, VLAN Database, and INTERFACE. Under the INTERFACE category, GigabitEthernet0/0 is selected. The main panel displays the configuration for GigabitEthernet0/0. The Port Status is checked (On). Bandwidth is set to 100 Mbps (selected from 1000 Mbps, 100 Mbps, 10 Mbps). Duplex is set to Full Duplex (selected from Half Duplex, Full Duplex). MAC Address is 0001.C711.B701. IP Configuration shows IPv4 Address as 20.0.0.1 and Subnet Mask as 255.0.0.0. Tx Ring Limit is set to 10.

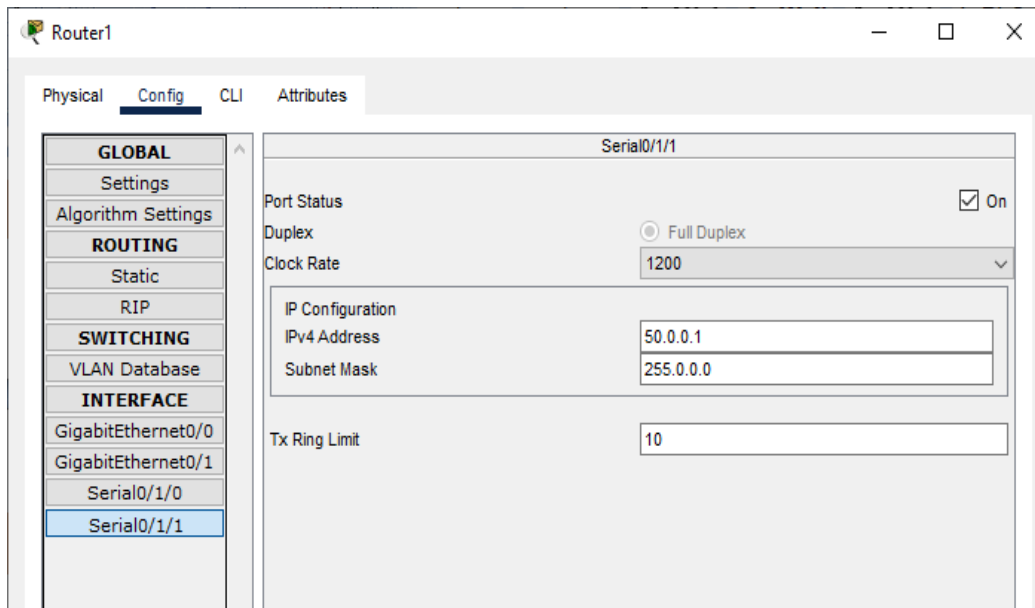
GigabitEthernet0/0	
Port Status	<input checked="" type="checkbox"/> On
Bandwidth	<input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto
Duplex	<input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto
MAC Address	0001.C711.B701
IP Configuration	
IPv4 Address	20.0.0.1
Subnet Mask	255.0.0.0
Tx Ring Limit	10

ii) Interface S0/1/0

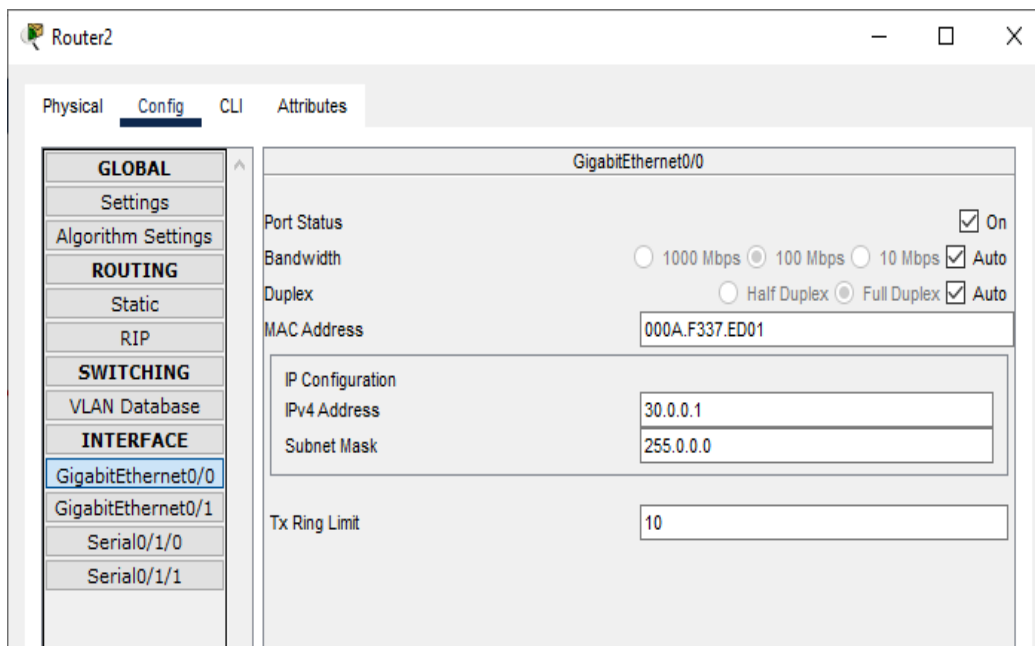
The screenshot shows the configuration window for Router1, specifically for the Serial0/1/0 interface. The left sidebar is the same as in the previous screenshot, but Serial0/1/0 is selected under the INTERFACE category. The main panel displays the configuration for Serial0/1/0. The Port Status is checked (On). Duplex is set to Full Duplex (selected from Full Duplex). Clock Rate is set to 2000000. IP Configuration shows IPv4 Address as 40.0.0.2 and Subnet Mask as 255.0.0.0. Tx Ring Limit is set to 10.

Serial0/1/0	
Port Status	<input checked="" type="checkbox"/> On
Duplex	<input checked="" type="radio"/> Full Duplex
Clock Rate	2000000
IP Configuration	
IPv4 Address	40.0.0.2
Subnet Mask	255.0.0.0
Tx Ring Limit	10

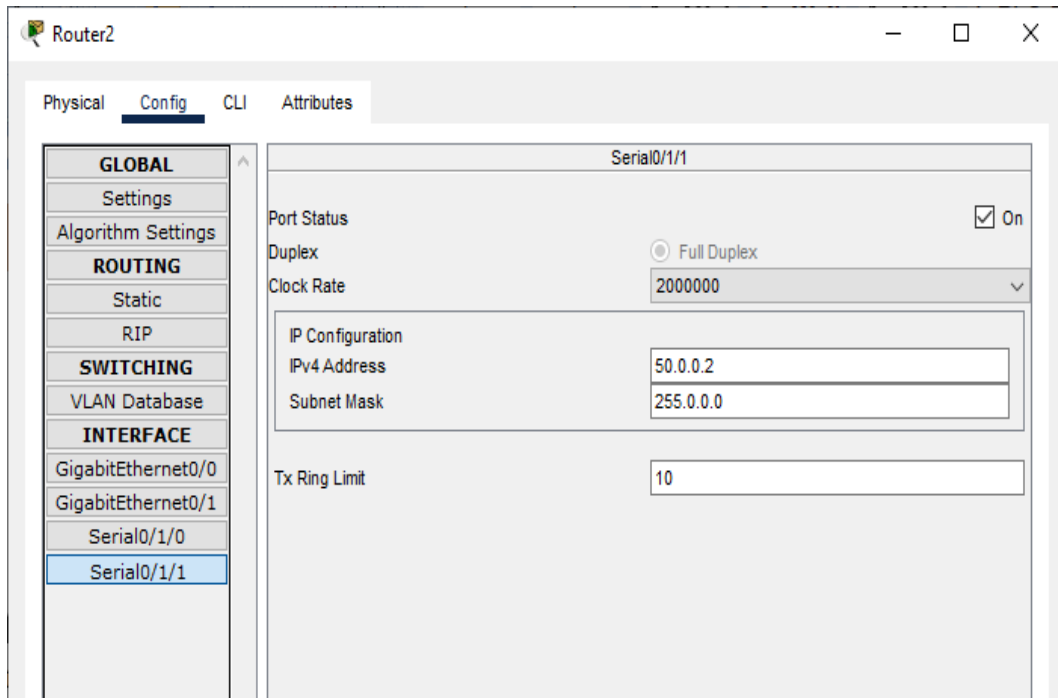
iii) Interface S0/1/1

**Configuring IP addresses on Router 2**

i) Interface G0/0



ii) Interface S0/1/1

**Configuring Router 0 for OSPF (using the CLI mode)**

```
Router(config)#
Router(config)#router ospf 1
Router(config-router)#network 10.0.0.0 0.0.0.255 area 1
Router(config-router)#network 40.0.0.0 0.0.0.255 area 1
Router(config-router)#exit
Router(config)#
```

Configuring Router 1 for OSPF (using the CLI mode)

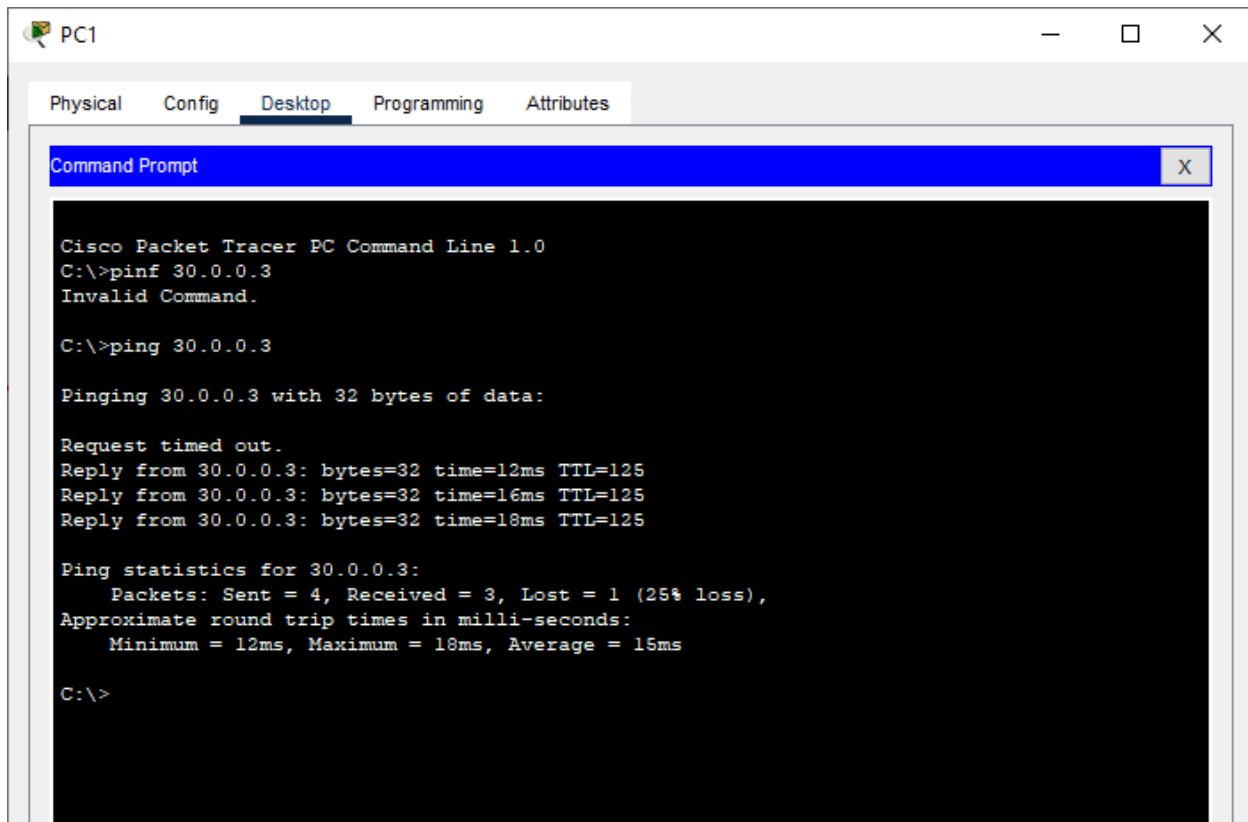
```
Router(config)#
Router(config)#router ospf 1
Router(config-router)#
Router(config-router)#network 20.0.0.0 0.0.0.255 area 1
Router(config-router)#network 40.0.0.0 0.0.0.255 area 1
Router(config-router)#network 50.0.0.0 0.0.0.255 area 1
Router(config-router)#exit
Router(config)#
```


Configuring Router 2 for OSPF (using the CLI mode)

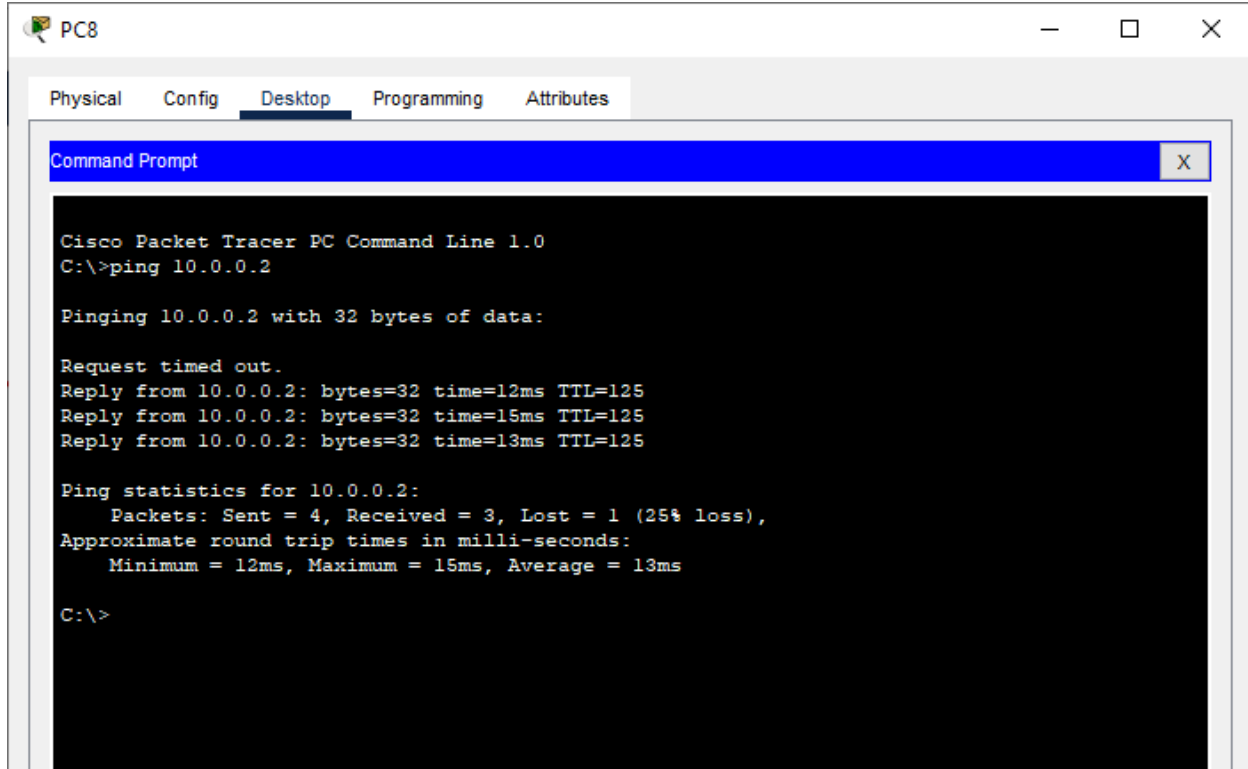
```
Router(config)#  
Router(config)#router ospf 1  
Router(config-router)#  
Router(config-router)#network 30.0.0.0 0.0.0.255 area 1  
Router(config-router)#network 50.0.0.0 0.0.0.255 area 1  
Router(config-router)# exit  
Router(config)#
```

Checking the connectivity by using the ping command

- i) Pinging PC8 (ip address 10.30.0.4) from PC1



ii) Pinging PC0 (ip address 10.10.0.2) from PC8



Result:

Hence the OSPF has been studied and verified through the given network

Link for the video demonstration of the practical:

<https://youtu.be/PVaQ3M-Jiq8>

Practical No 9

Aim: Using Packet Tracer, create a wireless network of multiple PCs using appropriate access point

Theory:

A Wireless Access Point (WAP) is a networking device that allows connecting the devices with the wired network. A Wireless Access Point (WAP) is used to create the WLAN (Wireless Local Area Network), it is commonly used in large offices and buildings which have expanded businesses.

A wireless AP connects the wired networks to the wireless client. It eases access to the network for mobile users which increases productivity and reduces the infrastructure cost.

Advantages of Wireless Access Point (WAP):

- 1) More User Access
- 2) Broader Transmission Range
- 3) Flexible Networking

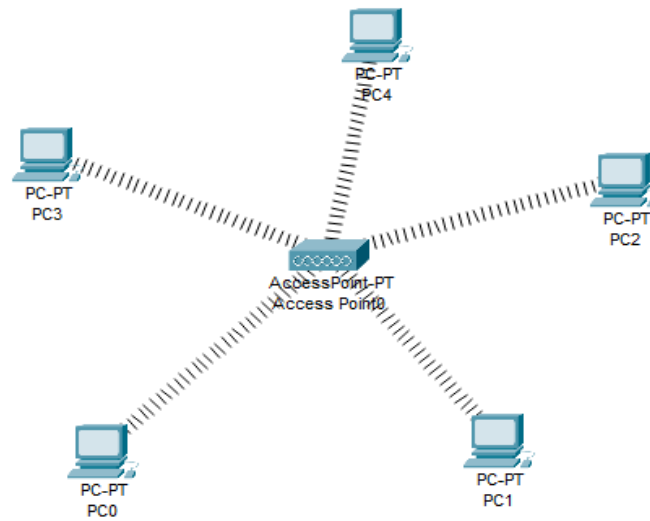
Disadvantages of Wireless Access Point (WAP):

- 1) High cost
- 2) Poor stability
- 3) Less Secure

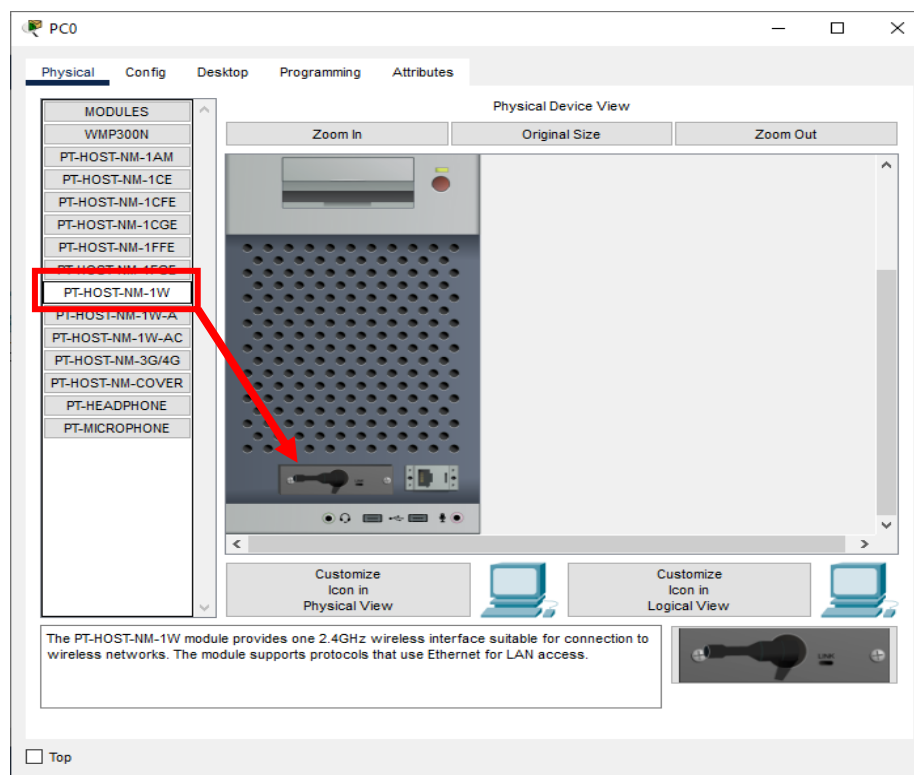
Application of Wireless Access Point:

- 1) It is a device that creates a WLAN (Wireless Local Area Network) in large enterprises.
- 2) It is used to extend the coverage area of the network so that it can't disconnect which allows more users to connect to the network easily.
- 3) An access point connects a switch, Ethernet cable, wired router, and Wi-fi to designate the particular area.
- 4) It is used to provide connectivity to the users in large offices or enterprises which allows users to roam easily anywhere in the office and be connected to a network.
- 5) LANs can also be provided in public places such as coffee shops, restaurants, airports, etc.

We use the following topology for the present case (5PCs and an Access Point)

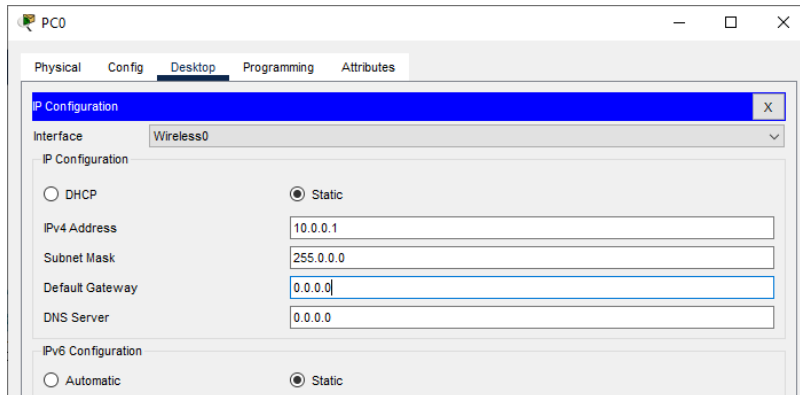


Add a Wireless interface to each PC as follows

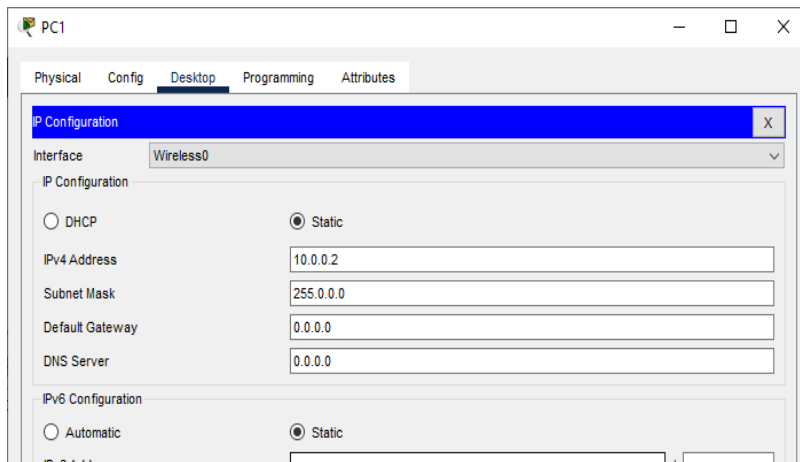


Assigning IP Address to each PC (select Static)

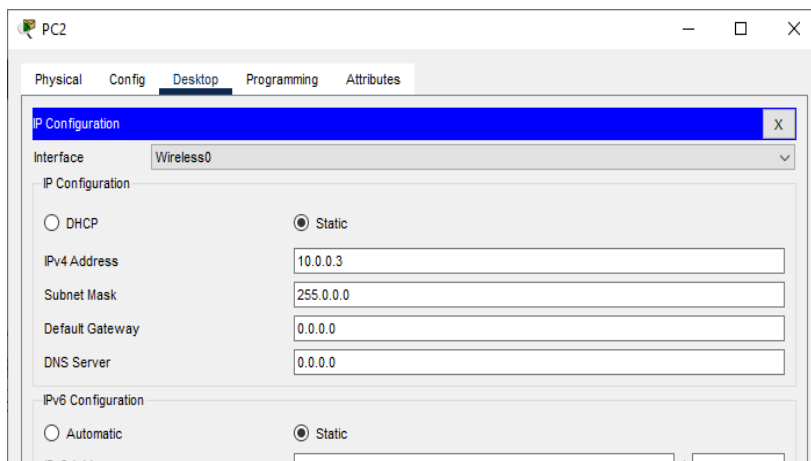
1) PC0 :



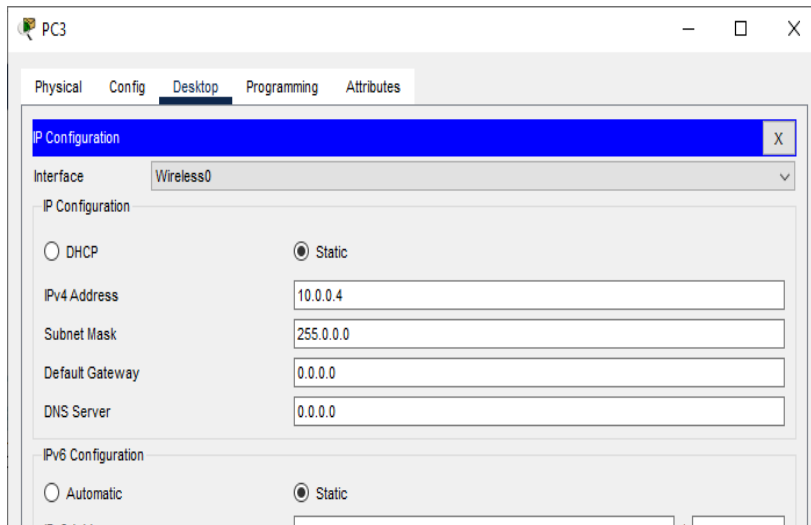
2) PC1 :



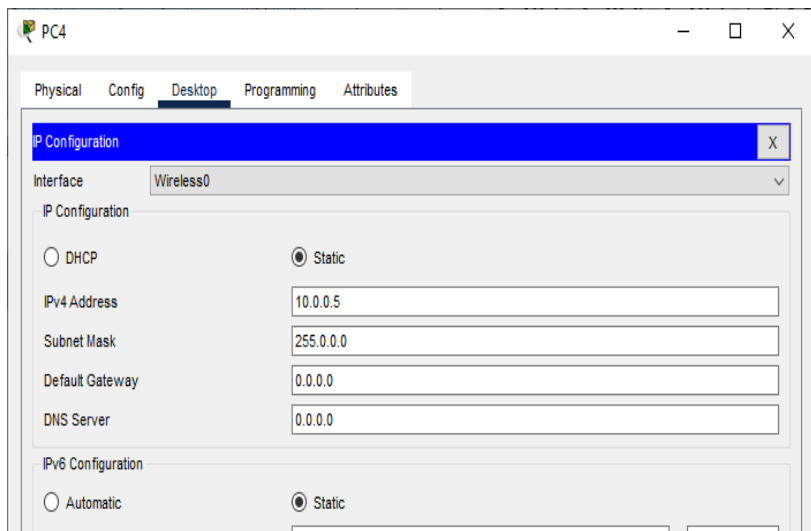
3) PC2 :



4) PC3 :



5) PC4 :

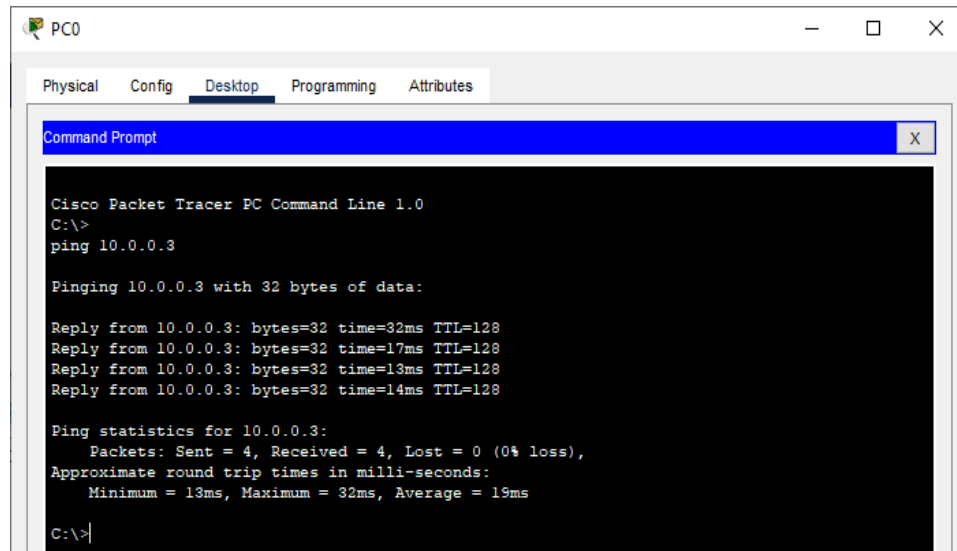


The IP addresses assigned are

Host	IP address
PC0	10.0.0.1
PC1	10.0.0.2
PC2	10.0.0.3
PC3	10.0.0.4
PC4	10.0.0.5

We verify the connectivity by sending ping message from any PC to any other PC

Pinging PC2 (10.0.0.3) from PC0 (10.0.0.1)



```
Cisco Packet Tracer PC Command Line 1.0
C:\>
ping 10.0.0.3

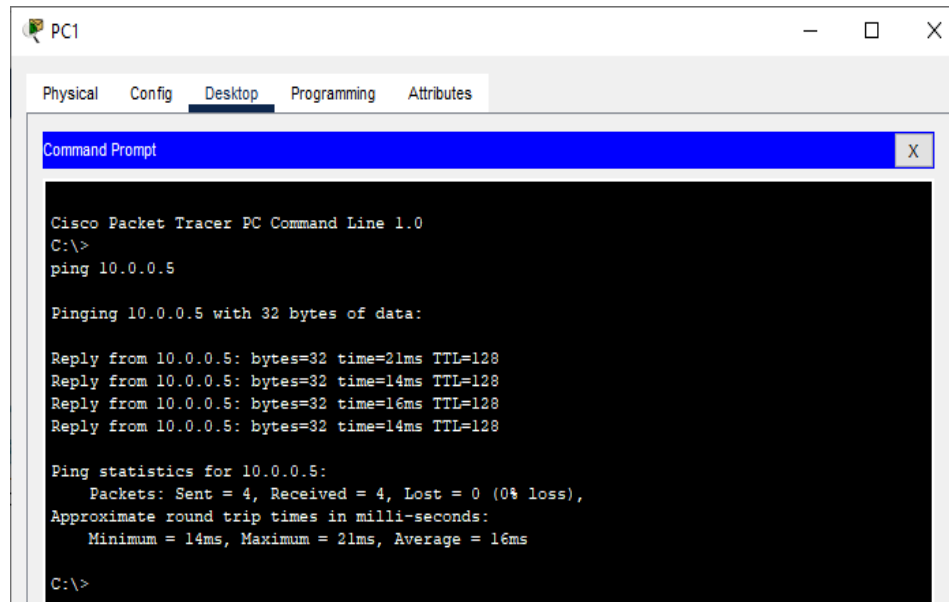
Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes=32 time=32ms TTL=128
Reply from 10.0.0.3: bytes=32 time=17ms TTL=128
Reply from 10.0.0.3: bytes=32 time=13ms TTL=128
Reply from 10.0.0.3: bytes=32 time=14ms TTL=128

Ping statistics for 10.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 13ms, Maximum = 32ms, Average = 19ms

C:\>
```

Pinging PC4 (10.0.0.5) from PC1 (10.0.0.2)



```
Cisco Packet Tracer PC Command Line 1.0
C:\>
ping 10.0.0.5

Pinging 10.0.0.5 with 32 bytes of data:

Reply from 10.0.0.5: bytes=32 time=21ms TTL=128
Reply from 10.0.0.5: bytes=32 time=14ms TTL=128
Reply from 10.0.0.5: bytes=32 time=16ms TTL=128
Reply from 10.0.0.5: bytes=32 time=14ms TTL=128

Ping statistics for 10.0.0.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 14ms, Maximum = 21ms, Average = 16ms

C:\>
```

For the video demonstration of the given practical click on the following link:

<https://youtu.be/c91hCh01DCA>