NST21022 - Practical for Network Switching and Routing

Department of Information and Communication Technology

Faculty of Technology

Lab sheet :10
Reg. Number: SEU/IS/20/ICT/084
Academic Year :2020/2021
Practical No :10

Title: IPv6 and IPv6 Subnetting

Aim:

IPv6 Subnetting Scheme
Configure IPv6 Subnetting

Task:

- Subnet the IPv6 address
- Assign IPv6 address to Network devices and verify connectivity

Use "NST21022 Labsheet 10.pka" file Activities

Exercise 01: Subnet the 2001:db8:1::/48 network into the appropriate subnets.

1. Discuss about link local address.

2. Based on the topology, how many subnets were needed?

    - 8 subnets

Exercise 02: Fill the subnet table.

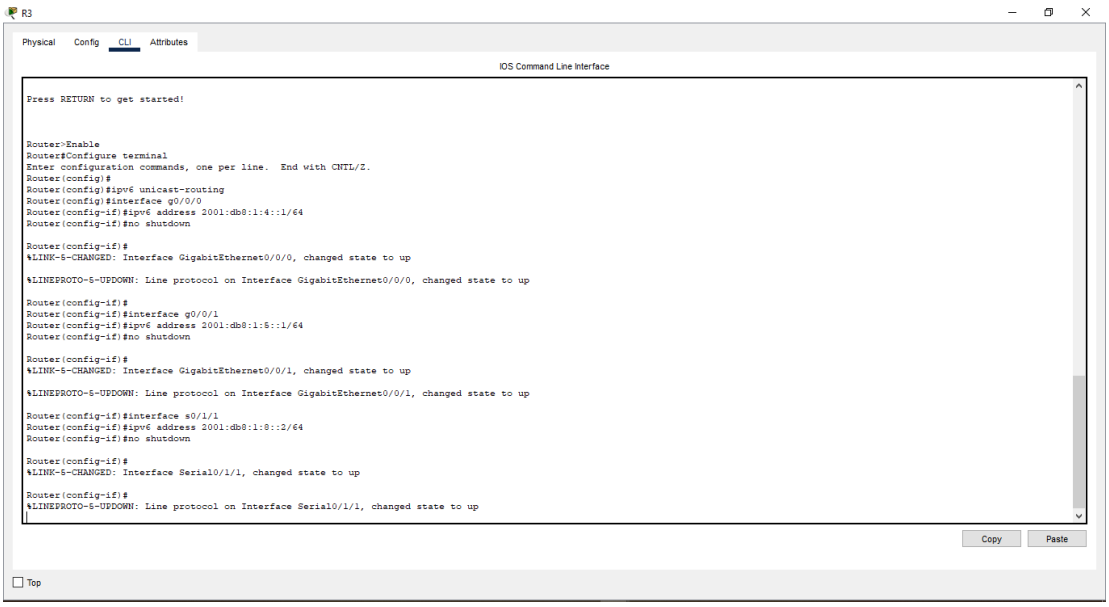
Subnet Number	Network Address	First Usable Host Address
A	**2001:db8:1:1:/64**	**2001:db8:1:1:0:0:0:1**
B	**2001:db8:1:2:/64**	**2001:db8:1:2:0:0:0:1**
C	**2001:db8:1:3:/64**	**2001:db8:1:3:0:0:0:1**
D	**2001:db8:1:4:/64**	**2001:db8:1:4:0:0:0:1**
E	**2001:db8:1:5:/64**	**2001:db8:1:5:0:0:0:1**
F	**2001:db8:1:6:/64**	**2001:db8:1:6:0:0:0:1**
G	**2001:db8:1:7:/64**	**2001:db8:1:7:0:0:0:1**

H	**2001:db8:1:8:/64**	**2001:db8:1:8:0:0:0:1**

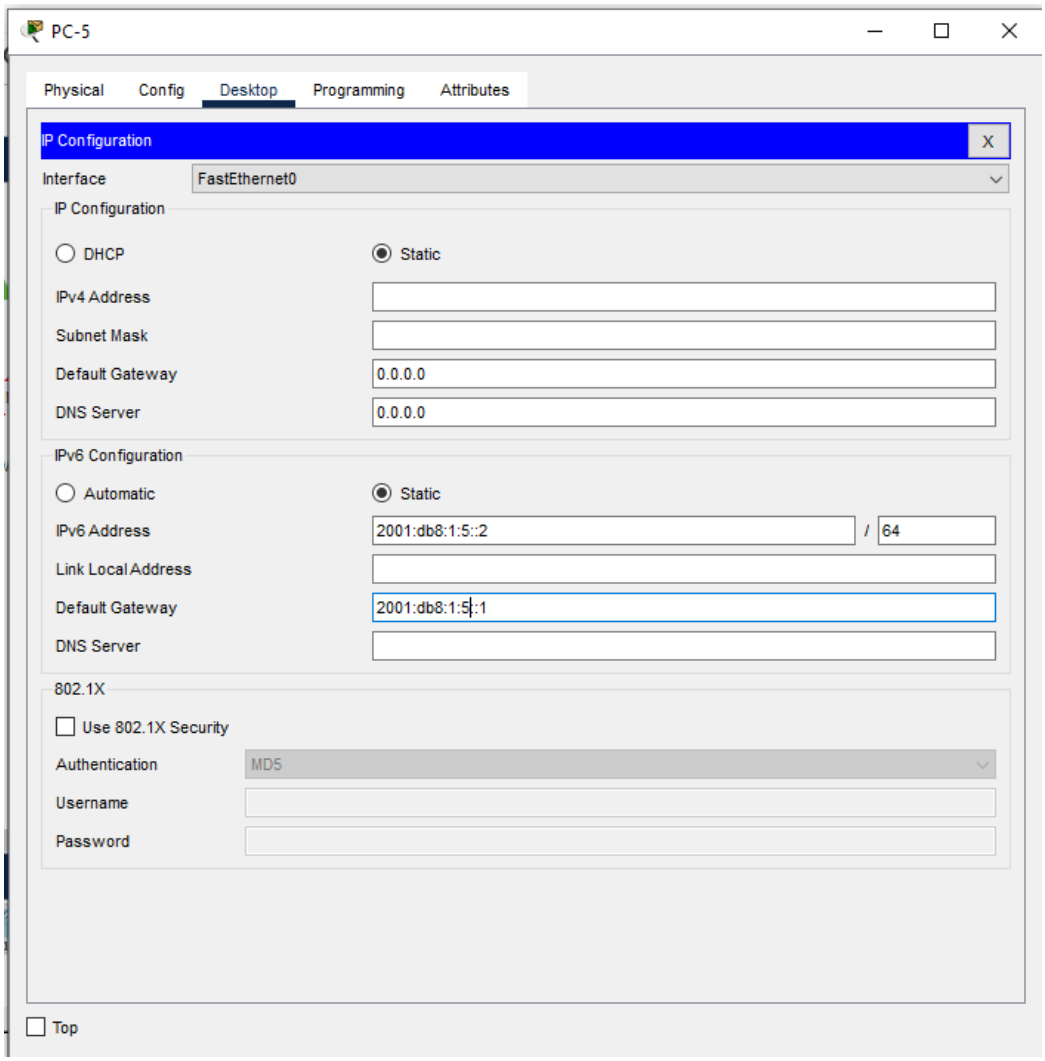
Exercise 03: Configure IPv6 address according to following criteria.

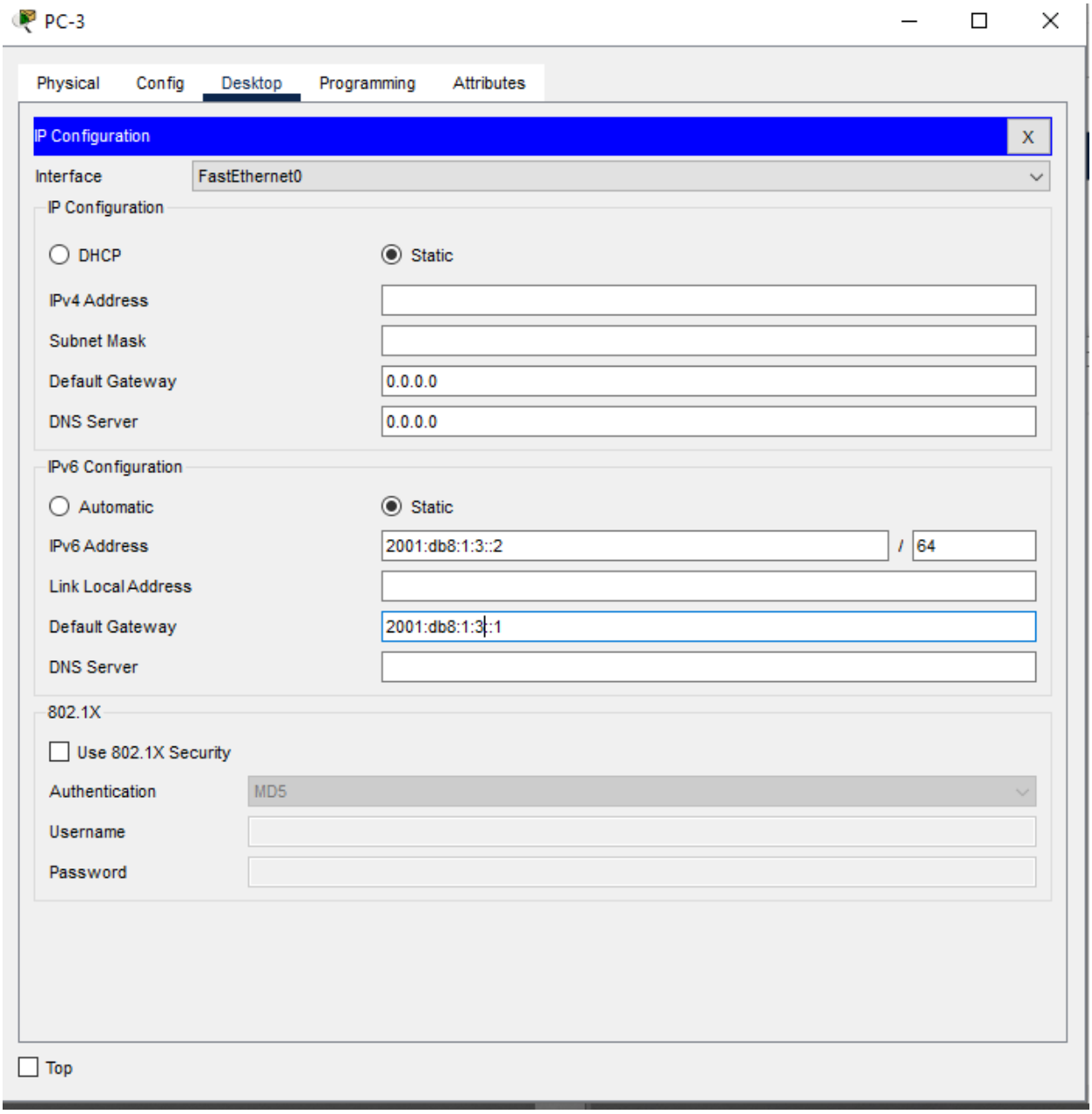
1. Fill the addressing table using following guidelines:
    a. Assign the first usable IPv6 addresses in each subnet to R1, R2, R3 for the LAN links and R1's WAN links.

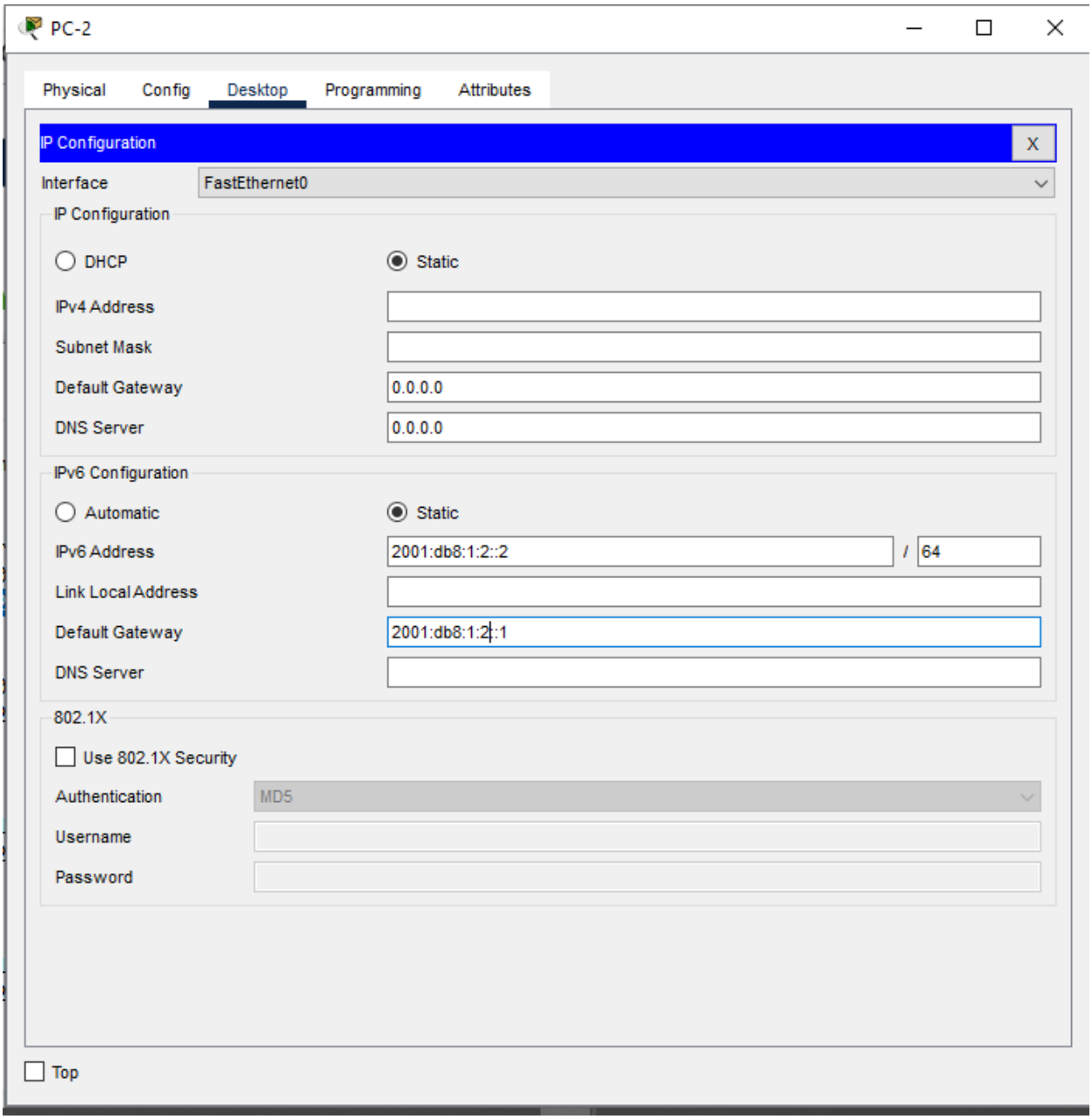
    b. Assign the second usable IPv6 addresses in subnet for the WAN links R2 and R3.

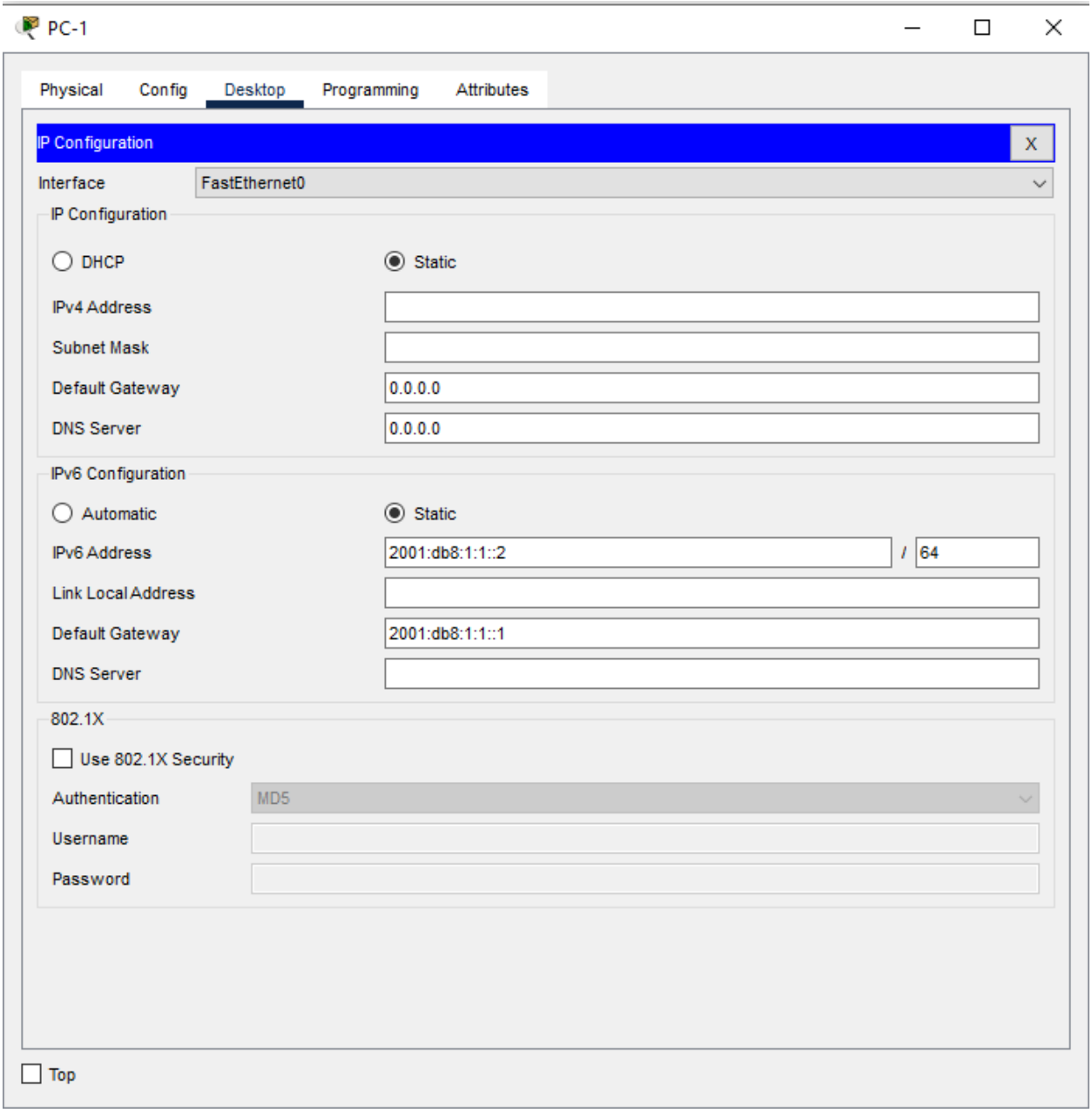


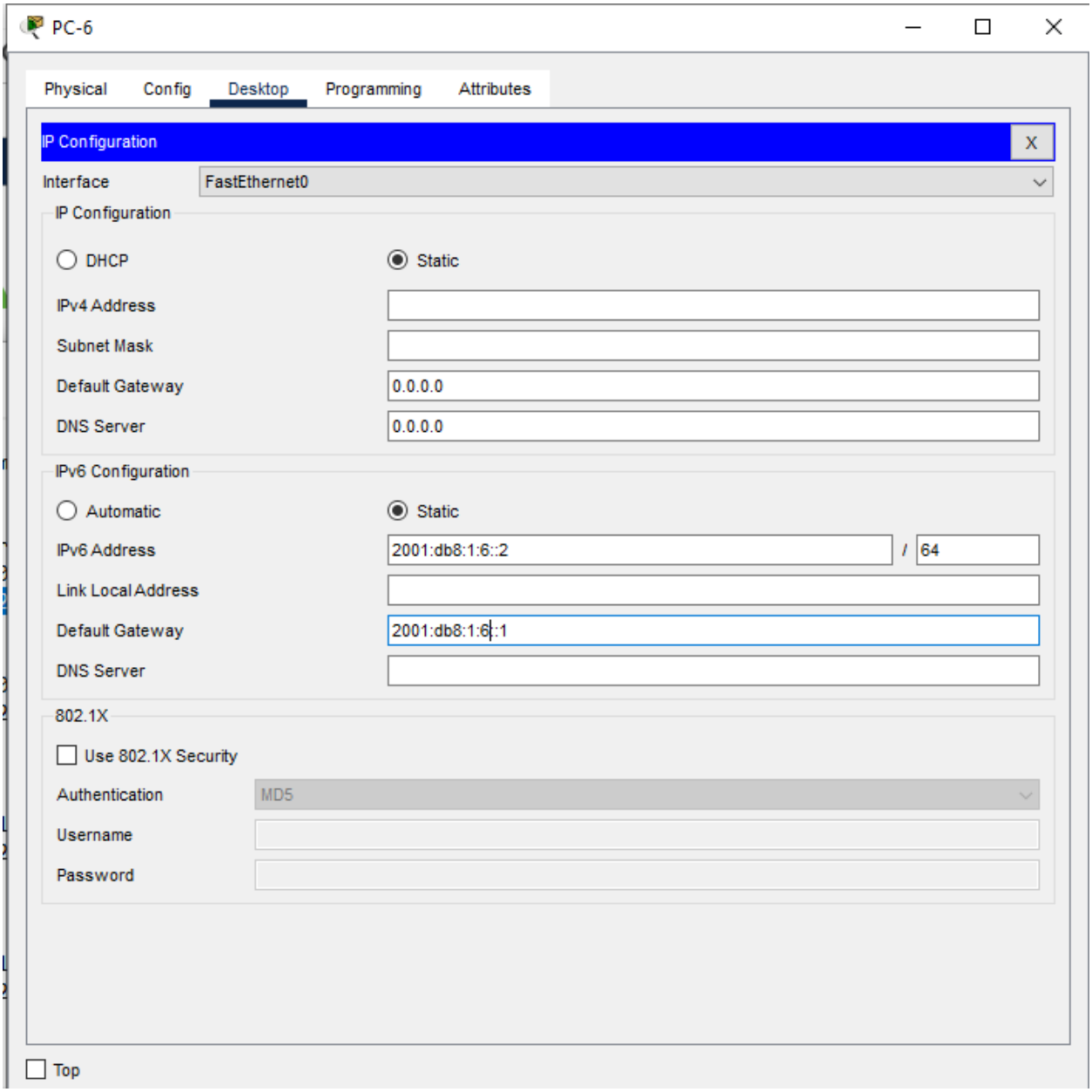
c. Assign the second usable IPv6 address to the PCs in each subnet


PC-5
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
Subnet Mask
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
2001:db8:1:5::2
/
64
Link Local Address
Default Gateway
2001:db8:1:5::1
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top


PC-3
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
Subnet Mask
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
2001:db8:1:3::2
/
64
Link Local Address
Default Gateway
2001:db8:1:3::1
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top


PC-2
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
Subnet Mask
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
2001:db8:1:2::2
/
64
Link Local Address
Default Gateway
2001:db8:1:2::1
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top


PC-1
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
Subnet Mask
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
2001:db8:1:1::2
/
64
Link Local Address
Default Gateway
2001:db8:1:1::1
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top

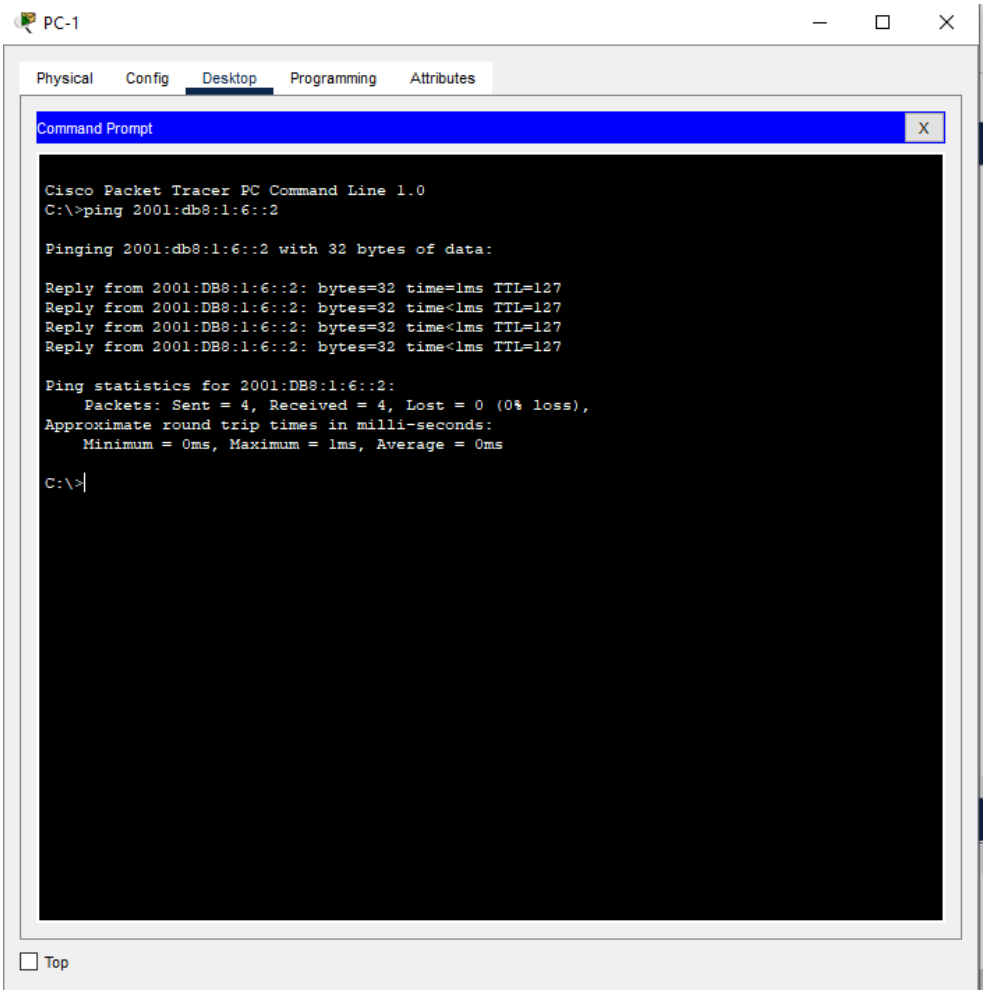


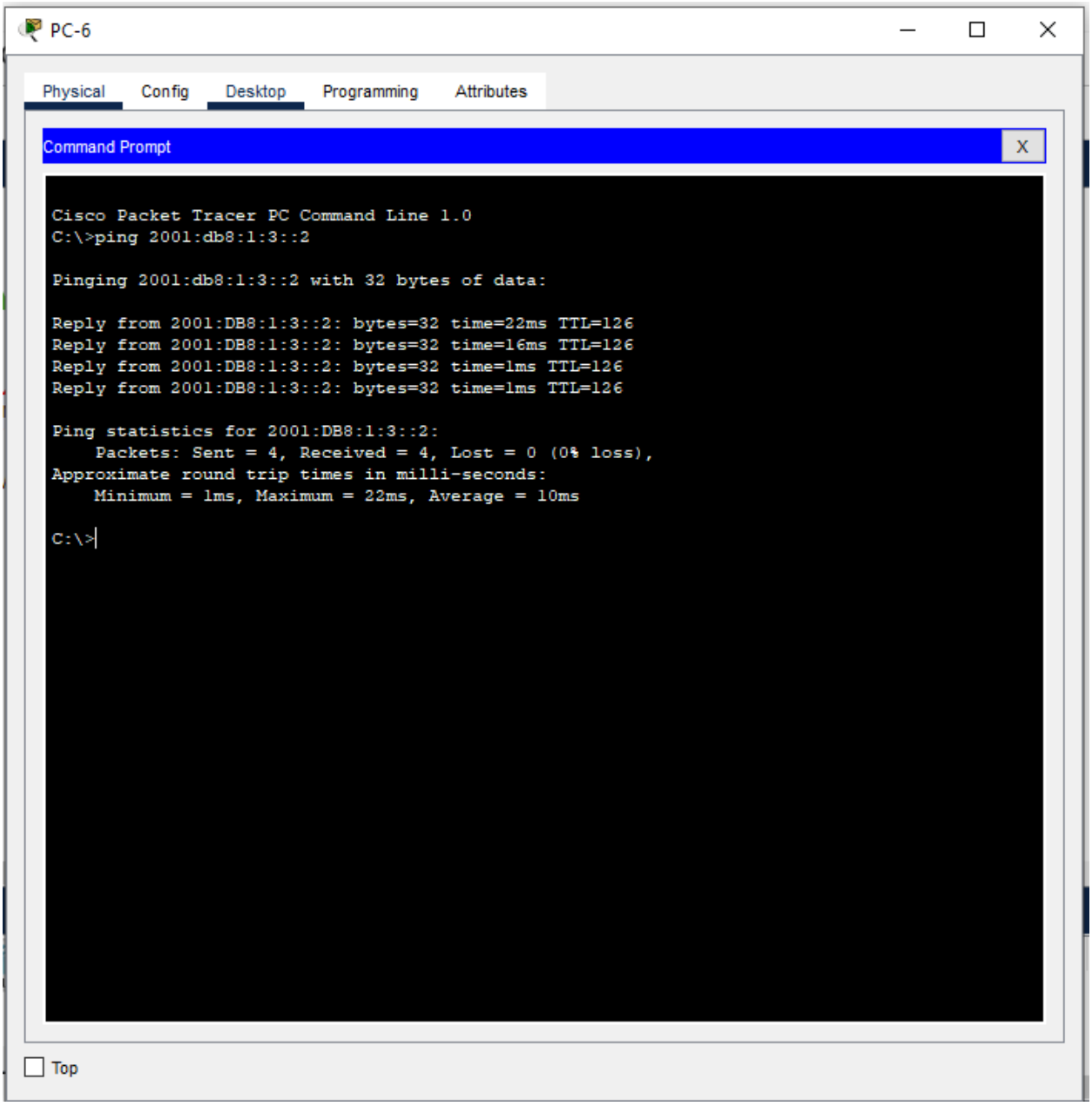
Addressing Table

Devices	Interfaces	IPv6 Addresses/Prefix	Default Gateway
R1	G0/0/0	2001:db8:1:1:0:0:0:1/64	
	G0/0/1	2001:db8:1:6:0:0:0:1/64	
	S0/1/0	2001:db8:1:7:0:0:0:1/64	
	S0/1/1	2001:db8:1:8:0:0:0:1/64	
R2	G0/0/0	2001:db8:1:2:0:0:0:1/64	
	G0/0/1	2001:db8:1:3:0:0:0:1/64	

	S0/1/0	**2001:db8:1:7:0:0:0:2/64**	
R3	**G0/0/0**	**2001:db8:1:4:0:0:0:1/64**	
	G0/0/1	**2001:db8:1:5:0:0:0:1/64**	
	S0/1/0	**2001:db8:1:7:0:0:0:2/64**	
PC-1	**NIC**	**2001:db8:1::1:0:0:2/64**	**2001:db8:1:1:0:0:0:1**
PC-2	**NIC**	**2001:db8:1:6:0:0:0:2/64**	**2001:db8:1:6:0:0:0:1**
PC-3	**NIC**	**2001:db8:1::2:0:0:2/64**	**2001:db8:1:2:0:0:0:1**
PC-4	**NIC**	**2001:db8:1:3:0:0:0:2/64**	**2001:db8:1:3:0:0:0:1**
PC-5	**NIC**	**2001:db8:1:4:0:0:0:2/64**	**2001:db8:1:4:0:0:0:1**
PC-6	**NIC**	**2001:db8:1:5:0:0:0:2/64**	**2001:db8:1:5:0:0:0:1**

3. Assign IPv6 addresses to network devices and verify connectivity




PC-6
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 2001:db8:1:3::2
Pinging 2001:db8:1:3::2 with 32 bytes of data:
Reply from 2001:DB8:1:3::2: bytes=32 time=22ms TTL=126
Reply from 2001:DB8:1:3::2: bytes=32 time=16ms TTL=126
Reply from 2001:DB8:1:3::2: bytes=32 time=1ms TTL=126
Reply from 2001:DB8:1:3::2: bytes=32 time=1ms TTL=126
Ping statistics for 2001:DB8:1:3::2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 22ms, Average = 10ms
C:\>
Top

Discussion

- In this lab session, we focused on IPv6 subnetting and configuring IPv6 addresses on network devices. The main objective was to create an efficient IPv6 subnetting scheme. We began by subnetting the IPv6 address, dividing the network into smaller, manageable subnets based on the given requirements. After designing the subnets, we assigned IPv6 addresses to network devices such as routers, switches, and hosts. Finally, we verified the connectivity by testing communication between the devices within the same subnet and across different subnets. This session provided valuable hands-on experience in configuring and managing IPv6 networks, ensuring seamless communication across devices.