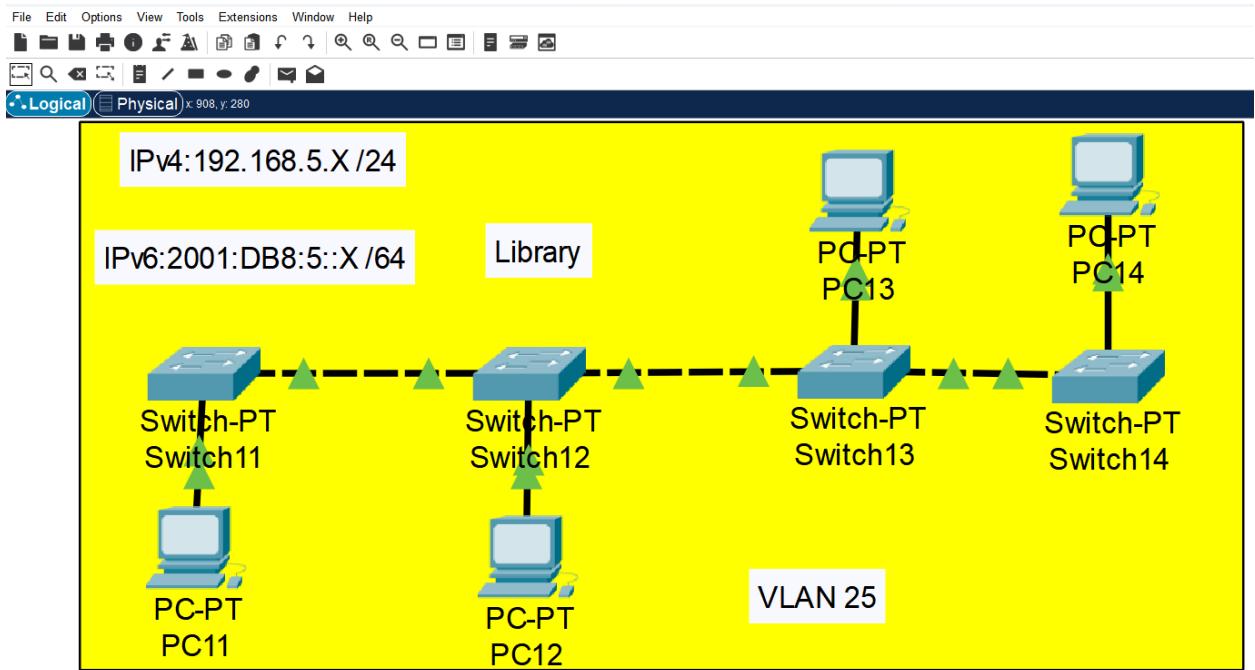


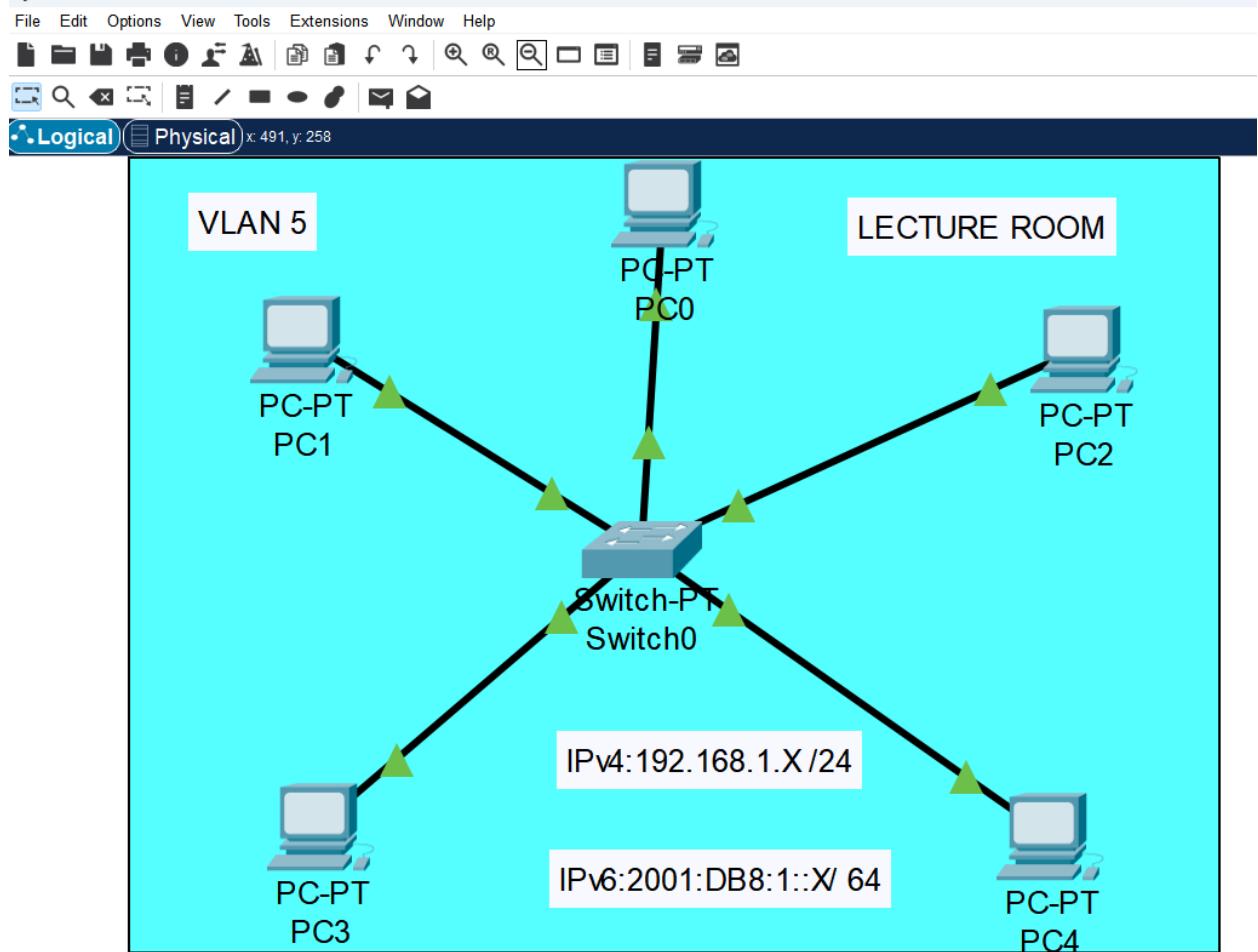
Network Topologies Project screenshot

5 topologies

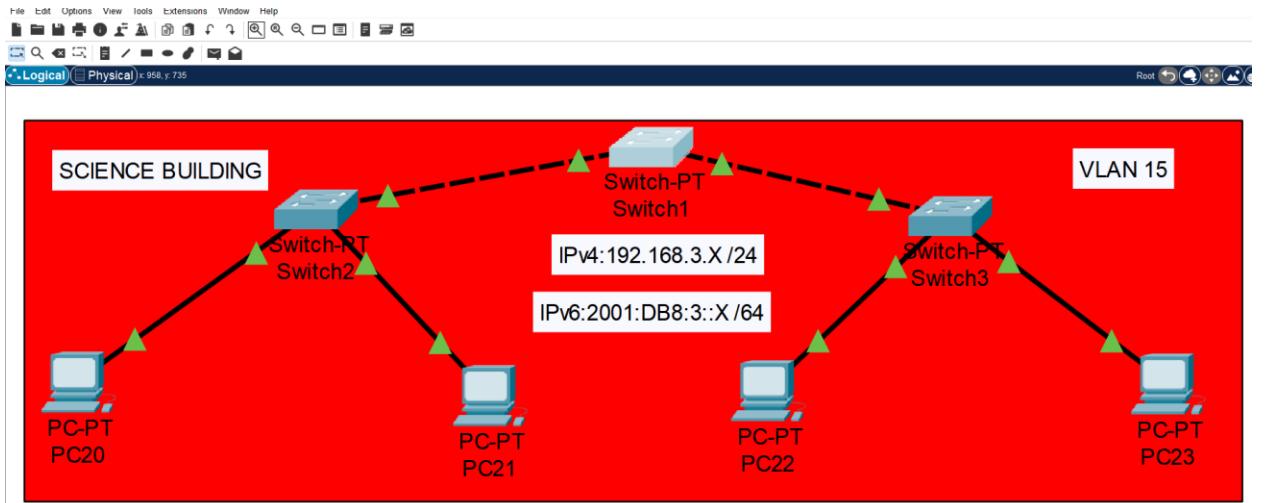
1. Bus



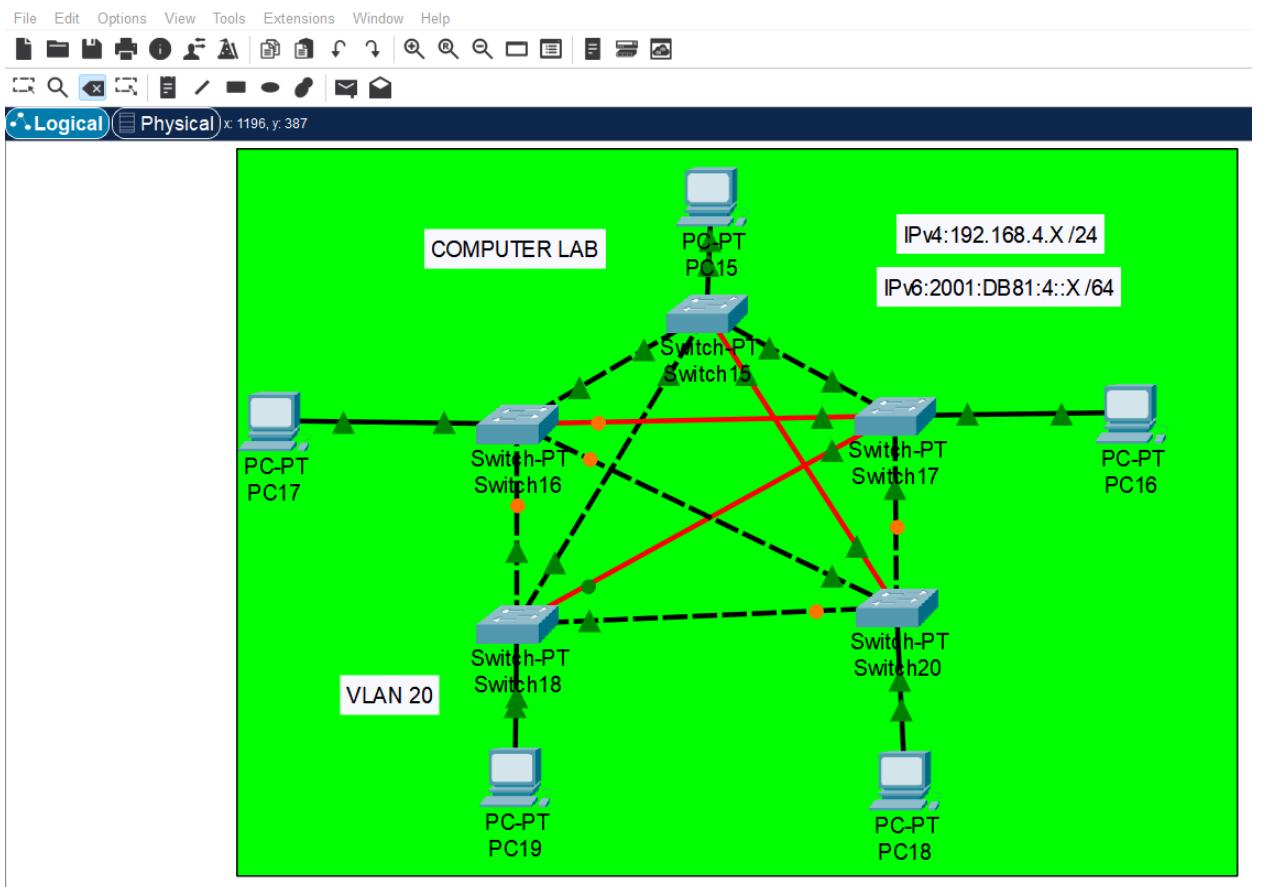
2. Star



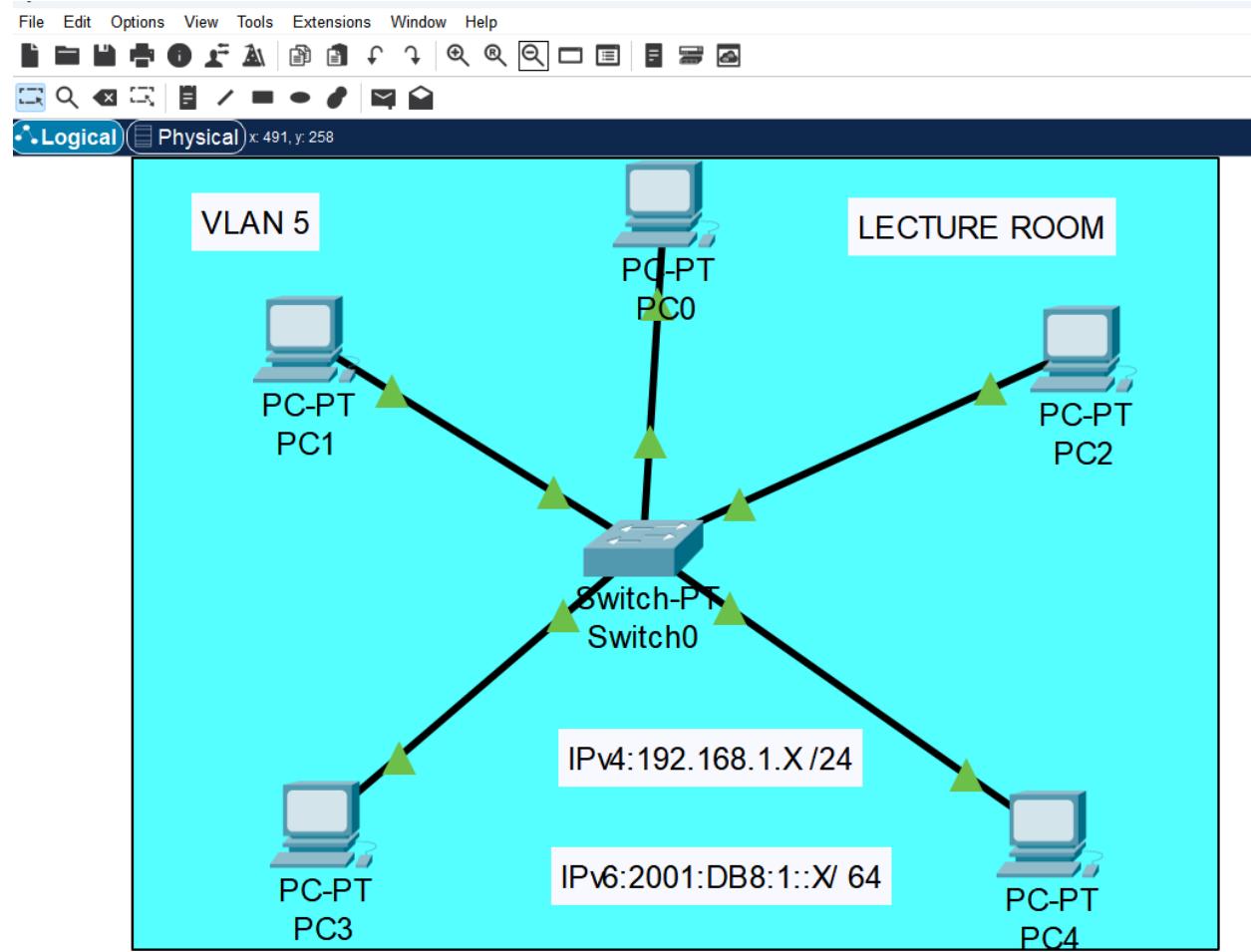
3. Extended star



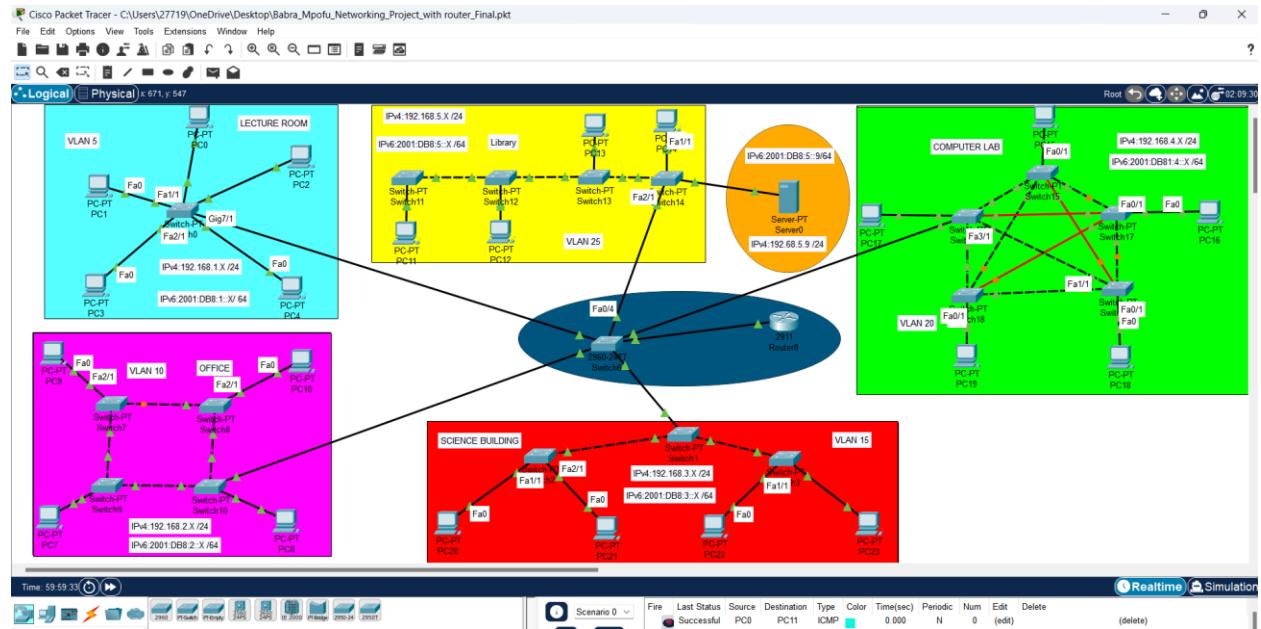
4. Mesh



5. Ring



HYBRID



IPv4 Network

Topology	Location	Gateway	IP Range	SUBNET MUSK	VLAN
Star	Lecture room	192.168.1.1	192.168.1.2-192.168.1.6	255.255.255.0	5
Ring	Office	192.168.2.1	192.168.2.2-192.168.2.5	255.255.255.0	10
Extended Star	Science building	192.168.3.1	192.168.3.2-192.168.3.5	255.255.255.0	15
Mesh	Computer lab	192.168.4.1	192.168.4.2-192.168.4.6	255.255.255.0	20
Bus	Library	192.168.5.1	192.168.5.2-192.168.5.5	255.255.255.0	25

IPv6 Network

Topology	Location	Gateway	IP Range	Prefix	VLAN
Star	Lecture room	2001:DB8:1::1	2001:DB8:1::2-2001:DB8:1::6	/64	5
Ring	Office	2001:DB8:2::1	2001:DB8:2::2-2001:DB8:2::5	/64	10
Extended Star	Science building	2001:DB8:3::1	2001:DB8:3::2-2001:DB8:3::5	/64	15
Mesh	Computer lab	2001:DB8:4::1	2001:DB8:4::2-2001:DB8:4::6	/64	20
Bus	Library	2001:DB8:5::1	2001:DB8:5::2-2001:DB8:5::5	/64	25

Server IP Addresses

Server	Location	Topology	IPv4 Address	IPv6 Address
HTTP Server	Library	Bus	192.168.5.9	2001:DB8:5::9
DNS Server	Library	Bus	192.168.5.8	2001:DB8:5::8

Router configuration

Router8

Physical Config **CLI** Attributes

IOS Command Line Interface

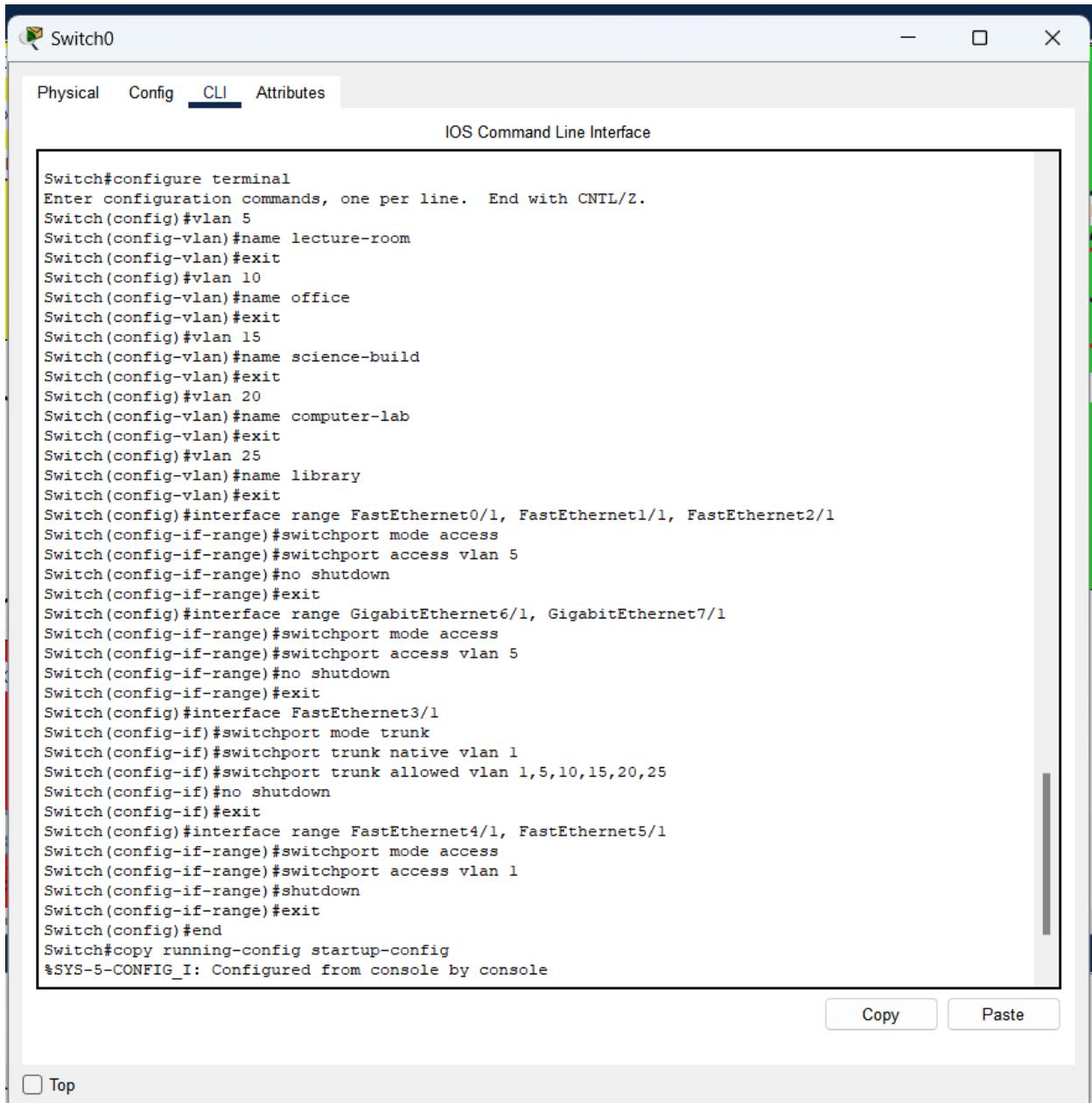
```
Router>enable
Password:
Password:
Router#enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0.5
Router(config-subif)#encapsulation dot1Q 5
Router(config-subif)#ip address 192.168.1.1 255.255.255.0
Router(config-subif)#ipv6 address 2001:DB8:1::1/64
Router(config-subif)#exit
Router(config)#interface GigabitEthernet0/0.10
Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#ip address 192.168.2.1 255.255.255.0
Router(config-subif)#ipv6 address 2001:DB8:2::1/64
Router(config-subif)#exit
Router(config)#interface GigabitEthernet0/0.15
Router(config-subif)#encapsulation dot1Q 15
Router(config-subif)#ip address 192.168.3.1 255.255.255.0
Router(config-subif)#ipv6 address 2001:DB8:3::1/64
Router(config-subif)#exit
Router(config)#interface GigabitEthernet0/0.20
Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip address 192.168.4.1 255.255.255.0
Router(config-subif)#ipv6 address 2001:DB8:4::1/64
Router(config-subif)#exit
Router(config)#interface GigabitEthernet0/0.25
Router(config-subif)#encapsulation dot1Q 25
Router(config-subif)#ip address 192.168.5.1 255.255.255.0
Router(config-subif)#ipv6 address 2001:DB8:5::1/64
Router(config-subif)#exit
Router(config)#end
Router#copy running-config startup-config
%SYS-5-CONFIG_I: Configured from console by console

Destination filename [startup-config]?
Building configuration...
[OK]
Router#
```

Top

Copy Paste

Vlan Configuration(Example in a star topology)



The screenshot shows a Windows application window titled "Switch0". The tab bar at the top has "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is the title "IOS Command Line Interface". The main area contains the following configuration script:

```
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 5
Switch(config-vlan)#name lecture-room
Switch(config-vlan)#exit
Switch(config)#vlan 10
Switch(config-vlan)#name office
Switch(config-vlan)#exit
Switch(config)#vlan 15
Switch(config-vlan)#name science-build
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name computer-lab
Switch(config-vlan)#exit
Switch(config)#vlan 25
Switch(config-vlan)#name library
Switch(config-vlan)#exit
Switch(config)#interface range FastEthernet0/1, FastEthernet1/1, FastEthernet2/1
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 5
Switch(config-if-range)#no shutdown
Switch(config-if-range)#exit
Switch(config)#interface range GigabitEthernet6/1, GigabitEthernet7/1
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 5
Switch(config-if-range)#no shutdown
Switch(config-if-range)#exit
Switch(config)#interface FastEthernet3/1
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk native vlan 1
Switch(config-if)#switchport trunk allowed vlan 1,5,10,15,20,25
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#interface range FastEthernet4/1, FastEthernet5/1
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 1
Switch(config-if-range)#shutdown
Switch(config-if-range)#exit
Switch(config)#end
Switch#copy running-config startup-config
%SYS-5-CONFIG_I: Configured from console by console
```

At the bottom right of the main window are "Copy" and "Paste" buttons. At the bottom left is a checkbox labeled "Top".

The Trunk Ports: Carry multiple VLANs between Switches and routers

```
Switch>show interfaces trunk
Port      Mode       Encapsulation  Status        Native vlan
Fa3/1    on         802.1q        trunking     1

Port      Vlans allowed on trunk
Fa3/1    1,5,10,15,20,25

Port      Vlans allowed and active in management domain
Fa3/1    1,5,10,15,20,25

Port      Vlans in spanning tree forwarding state and not pruned
Fa3/1    1,5,10,15,20,25

Switch>
```

Copy

Paste

Server0

Physical Config Services Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

HTTP

HTTP On Off

HTTPS

HTTPS On Off

File Manager

File Name	Edit	Delete
1 copyrights.html	(edit)	(delete)
2 cscoptlogo177x111.jpg		(delete)
3 helloworld.html	(edit)	(delete)
4 image.html	(edit)	(delete)
5 index.html	(edit)	(delete)

PC2

Physical Config Desktop Programming Attributes

Command Prompt X

```
Minimum = 0ms, Maximum = 155ms, Average = 0ms

C:\>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

Reply from 192.168.3.1: bytes=32 time<1ms TTL=255
Reply from 192.168.3.1: bytes=32 time<1ms TTL=255
Reply from 192.168.3.1: bytes=32 time=63ms TTL=255
Reply from 192.168.3.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 63ms, Average = 15ms

C:\>ping 192.168.4.1

Pinging 192.168.4.1 with 32 bytes of data:

Reply from 192.168.4.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.5.1

Pinging 192.168.5.1 with 32 bytes of data:

Reply from 192.168.5.1: bytes=32 time<1ms TTL=255
Reply from 192.168.5.1: bytes=32 time=1ms TTL=255
Reply from 192.168.5.1: bytes=32 time<1ms TTL=255
Reply from 192.168.5.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.5.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Top

Router8

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Press RETURN to get started!

User Access Verification

Password:
Password:
Password:
% Bad passwords

Press RETURN to get started!

User Access Verification

Password:
Password:

Router>enable
Password:
Router#
Router#
```

Top

Copy Paste

PC2

Physical Config Desktop Programming Attributes

Command Prompt X

```
Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 2001:DB8:2::2

Pinging 2001:DB8:2::2 with 32 bytes of data:

Reply from 2001:DB8:2::2: bytes=32 time=48ms TTL=127
Reply from 2001:DB8:2::2: bytes=32 time=13ms TTL=127
Reply from 2001:DB8:2::2: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:2::2: bytes=32 time=12ms TTL=127

Ping statistics for 2001:DB8:2::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 48ms, Average = 18ms

C:\>ping 2001:DB8:3::1

Pinging 2001:DB8:3::1 with 32 bytes of data:

Reply from 2001:DB8:3::1: bytes=32 time<1ms TTL=255

Ping statistics for 2001:DB8:3::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 2001:DB8:4::1

Pinging 2001:DB8:4::1 with 32 bytes of data:

Reply from 2001:DB8:4::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:4::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:4::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:4::1: bytes=32 time=58ms TTL=255

Ping statistics for 2001:DB8:4::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 58ms, Average = 14ms

C:\>
```

Top

NETWORK TOPOLOGY PART 2:

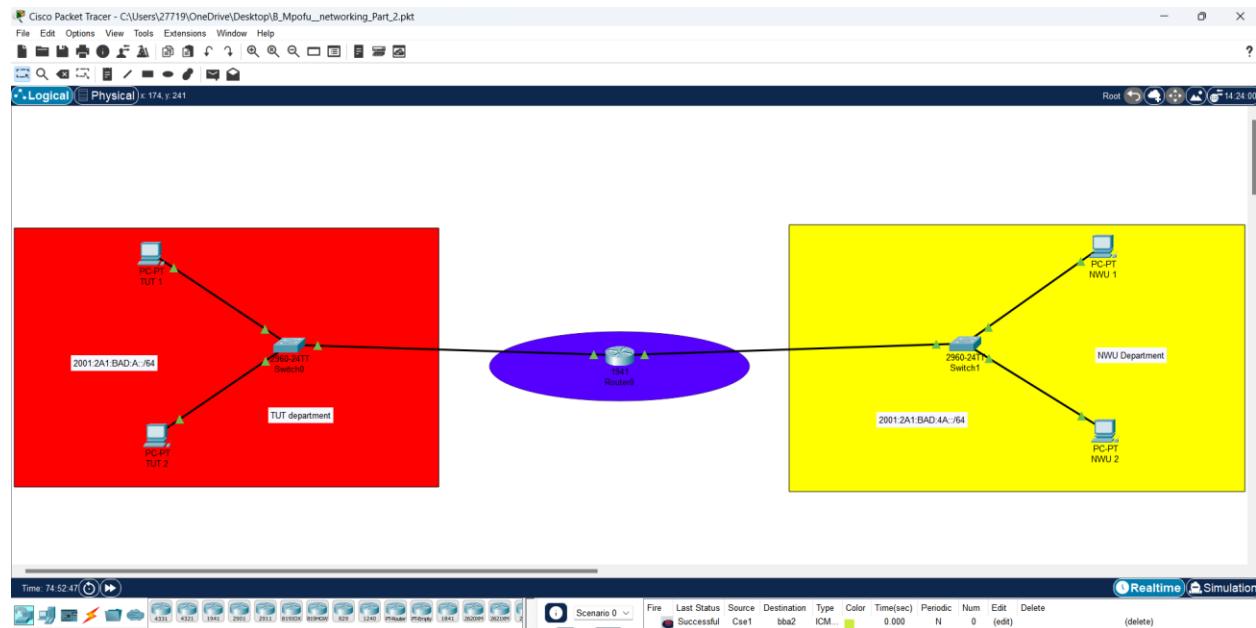
Applying IPv6 Subnetting SCREENSHOTS

IP Address Tables

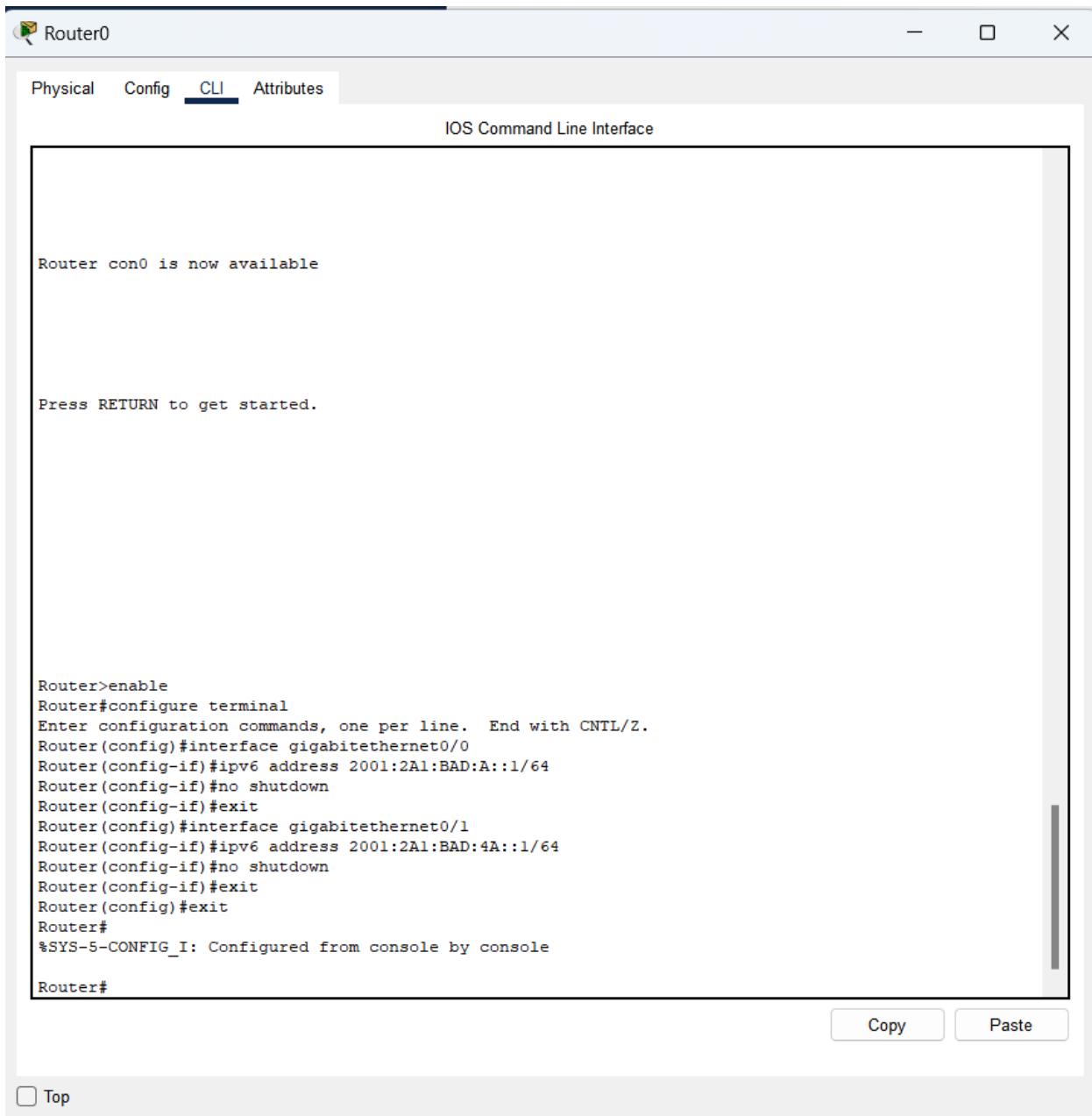
Device	department	Subnet	Ipv6	Interface	Cable type
PC1 (TUT 1)	TUT	2001:2A1:BAD::A::/64	2001:2A1:BAD::A::2/64	FastEthernet 0/1	Copper Straight-through
PC2 (TUT 2)	TUT	2001:2A1:BAD::A::/64	2001:2A1:BAD::A::3/64	FastEthernet 0/2	Copper Straight-through
PC3 (NWU 1)	NWU	2001:2A1:BAD:4A::/64	2001:2A1:BAD:4A::2/64	FastEthernet 0/2	Copper Straight-through
PC 4 (NWU 2)	NWU	2001:2A1:BAD:4A::/64	2001:2A1:BAD:4A::3/64	FastEthernet 0/1	Copper Straight-through

Device	Department	Subnet	Ipv6 Address	Interface
Switch 1	TUT	2001:2A1:BAD::A::/64	N/A	Multiple Ports
Switch 2	NWU	2001:2A1:BAD:4A::/64	N/A	Multiple Ports
Router	N/A	2001:2A1:BAD::A::/64	2001:2A1:BAD::A::1/64	FastEthernet 0/0
		2001:2A1:BAD:4A::/64	2001:2A1:BAD:4A::1/64	FastEthernet 0/1

Network Topology



Ipv6 configuration



The screenshot shows a Cisco IOS Command Line Interface (CLI) window titled "Router0". The window has tabs for "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area displays the following text:

```
Router con0 is now available

Press RETURN to get started.

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gigabitethernet0/0
Router(config-if)#ipv6 address 2001:2A1:BAD:A::1/64
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface gigabitethernet0/1
Router(config-if)#ipv6 address 2001:2A1:BAD:4A::1/64
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#
```

At the bottom right of the CLI window are "Copy" and "Paste" buttons. At the bottom left is a "Top" button.

Ipv6 unicast-routing

The screenshot shows a Cisco IOS Command Line Interface (CLI) window titled "Router0". The window has tabs at the top: "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is labeled "IOS Command Line Interface".

```
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#exit

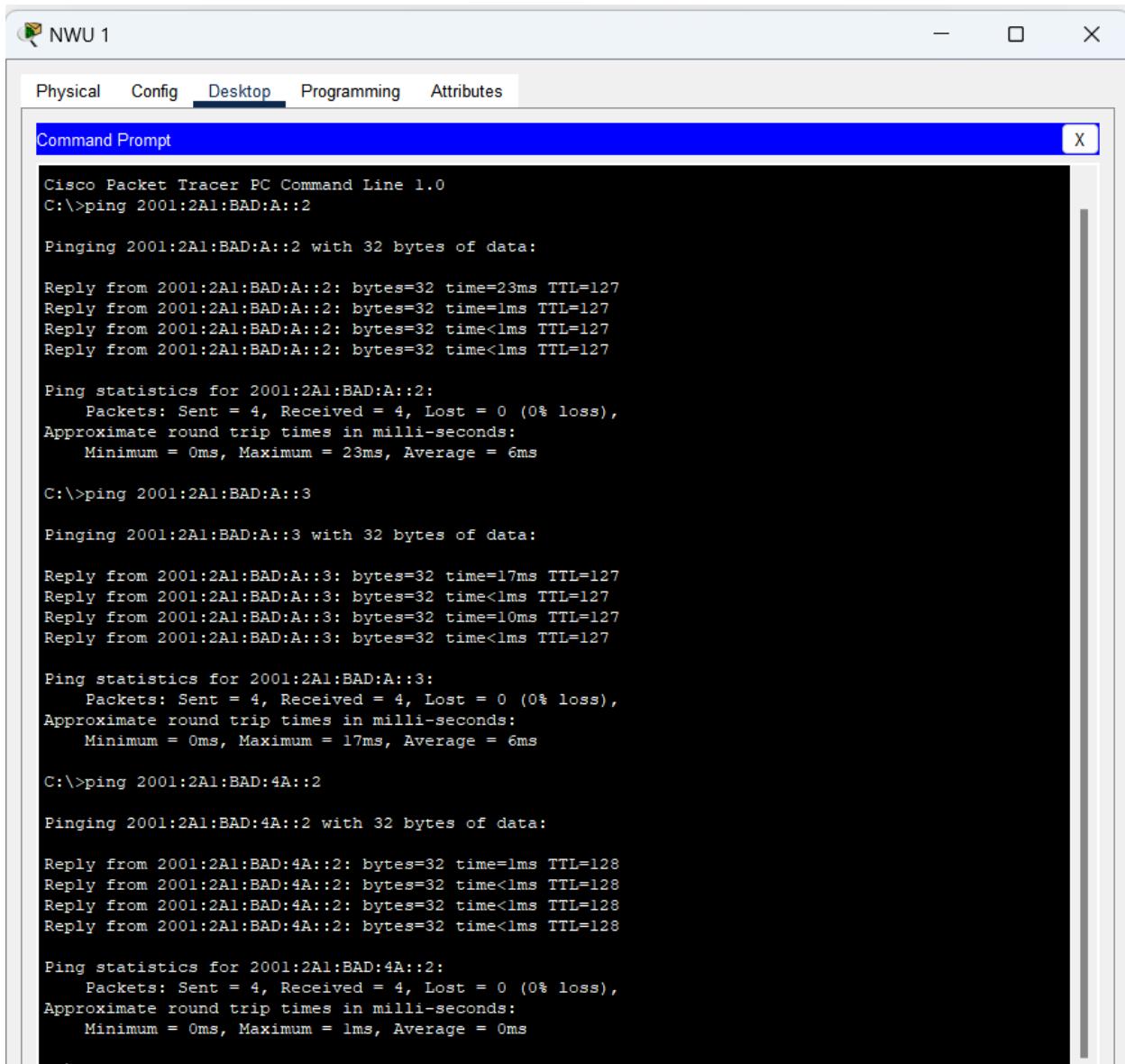
Router con0 is now available

Press RETURN to get started.

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ipv6 unicast-routing
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

At the bottom right of the window are "Copy" and "Paste" buttons. At the bottom left is a "Top" button with a checkbox.

Ipv6 Testing



The screenshot shows a Cisco Packet Tracer window titled "NWU 1". The tab bar at the top has tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". Below the tabs is a "Command Prompt" window with a blue header bar containing the text "Command Prompt" and a close button "X". The main area of the Command Prompt window displays the output of several ping commands. The output is as follows:

```
Cisco Packet Tracer PC Command Line 1.0
C:>ping 2001:2A1:BAD:A::2

Pinging 2001:2A1:BAD:A::2 with 32 bytes of data:

Reply from 2001:2A1:BAD:A::2: bytes=32 time=23ms TTL=127
Reply from 2001:2A1:BAD:A::2: bytes=32 time=lms TTL=127
Reply from 2001:2A1:BAD:A::2: bytes=32 time<lms TTL=127
Reply from 2001:2A1:BAD:A::2: bytes=32 time<lms TTL=127

Ping statistics for 2001:2A1:BAD:A::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 23ms, Average = 6ms

C:>ping 2001:2A1:BAD:A::3

Pinging 2001:2A1:BAD:A::3 with 32 bytes of data:

Reply from 2001:2A1:BAD:A::3: bytes=32 time=17ms TTL=127
Reply from 2001:2A1:BAD:A::3: bytes=32 time<lms TTL=127
Reply from 2001:2A1:BAD:A::3: bytes=32 time=10ms TTL=127
Reply from 2001:2A1:BAD:A::3: bytes=32 time<lms TTL=127

Ping statistics for 2001:2A1:BAD:A::3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 17ms, Average = 6ms

C:>ping 2001:2A1:BAD:4A::2

Pinging 2001:2A1:BAD:4A::2 with 32 bytes of data:

Reply from 2001:2A1:BAD:4A::2: bytes=32 time=lms TTL=128
Reply from 2001:2A1:BAD:4A::2: bytes=32 time<lms TTL=128
Reply from 2001:2A1:BAD:4A::2: bytes=32 time<lms TTL=128
Reply from 2001:2A1:BAD:4A::2: bytes=32 time<lms TTL=128

Ping statistics for 2001:2A1:BAD:4A::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = lms, Average = 0ms
```