

Task-8

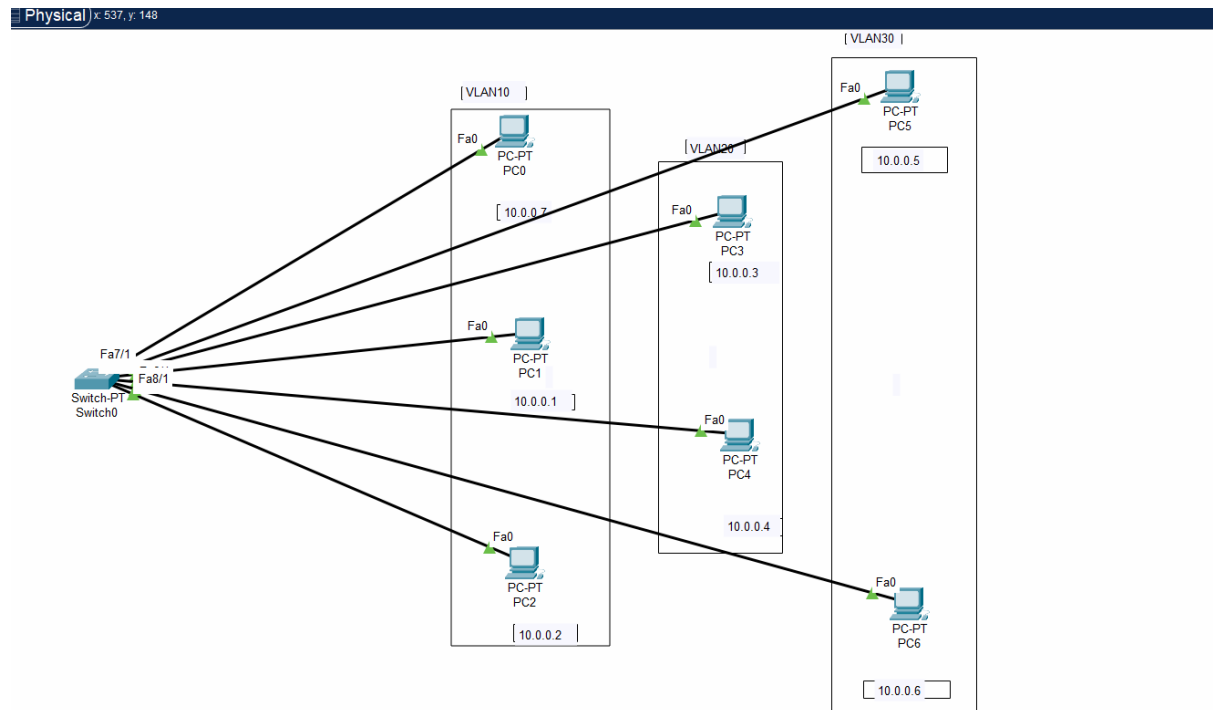
8a. Configure network topology to implement VLANs with using Packet Tracer software.

INTRA VLAN

- **Intra-VLAN** communication happens *within* the same VLAN, allowing devices assigned to that VLAN to communicate freely with each other.
- Devices in one VLAN cannot communicate with devices in another VLAN without additional configurations, such as **inter-VLAN routing**.

For example, in a network with VLAN 10 and VLAN 20:

- Devices in VLAN 10 can only communicate with other devices in VLAN 10.
- Devices in VLAN 20 can only communicate with other devices in VLAN 20.
- No communication happens between VLAN 10 and VLAN 20 without inter-VLAN routing.



1. Set Up the Devices

- **Drag and Drop Devices:** Use at least one switch and multiple PCs (or other end devices).
- **Topology:** Connect the PCs to the switch using Ethernet cables.

2. Access the Switch CLI

- **Open CLI on Switch:** Click on the switch, go to the CLI tab to configure VLANs.

3. Create VLANs

- Enter global configuration mode on the switch by typing:

switchport mode access: Configures the port as an access port.

switchport access vlan 10: Assigns the port to VLAN 10. Only traffic for VLAN 10 will be allowed on this port.

```
Switch>en
```

```
Switch#conf t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Switch(config)#vlan 10
```

```
Switch(config-vlan)#name project1
```

```
Switch(config-vlan)#int f0/1
```

```
Switch(config-if)#switchport mode access
```

```
Switch(config-if)#switchport access vlan 10
```

```
Switch(config-if)#int f2/1
```

```
Switch(config-if)#switchport mode access
```

```
Switch(config-if)#switchport access vlan 10
```

```
Switch(config-if)#int f1/1
```

```
Switch(config-if)#switchport mode access
```

```
Switch(config-if)#switchport access vlan 10
```

```
Switch(config-if)#vlan 20
```

```
Switch(config-vlan)#int f3/1
```

```
Switch(config-if)#switchport mode access
```

```
Switch(config-if)#switchport access vlan 20
```

```
Switch(config-if)#int f6/1
```

```
Switch(config-if)#switchport mode access
```

```
Switch(config-if)#switchport access vlan 20
```

```
Switch(config-if)#vlan 30
```

```
Switch(config-vlan)#name project3
```

```
Switch(config-vlan)#int f7/1
```

```
Switch(config-if)#switchport mode access
```

```
Switch(config-if)#switchport access vlan 30
```

```
Switch(config-if)#int f8/1
```

```
Switch(config-if)#switchport mode access
```

```
Switch(config-if)#switchport access vlan 30
```

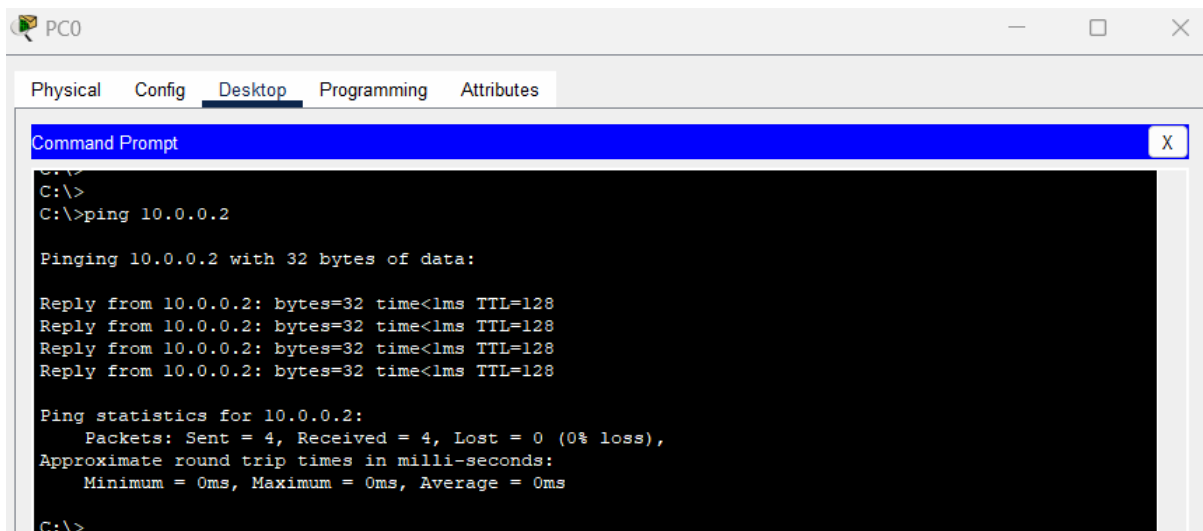
```
Switch(config-if)#end
```

```
Switch#
```

4. Testing Intra-VLAN Communication

PCs within the same VLAN should be able to communicate with each other but **not with devices in other VLANs**.

This verifies that VLANs are segmented and that only intra-VLAN communication is allowed.



The screenshot shows a window titled "PC0" with a tabbed interface. The "Desktop" tab is active, displaying a "Command Prompt" window. The command prompt shows the execution of a ping command to 10.0.0.2, which is successful. The output includes the number of bytes, time, and TTL for each of the four replies, as well as the overall statistics showing 0% loss.

```
C:\>
C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

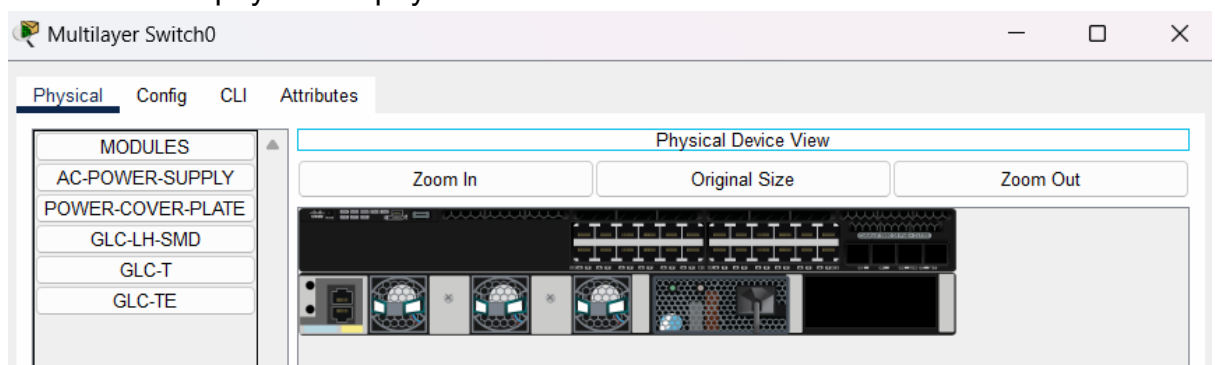
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128

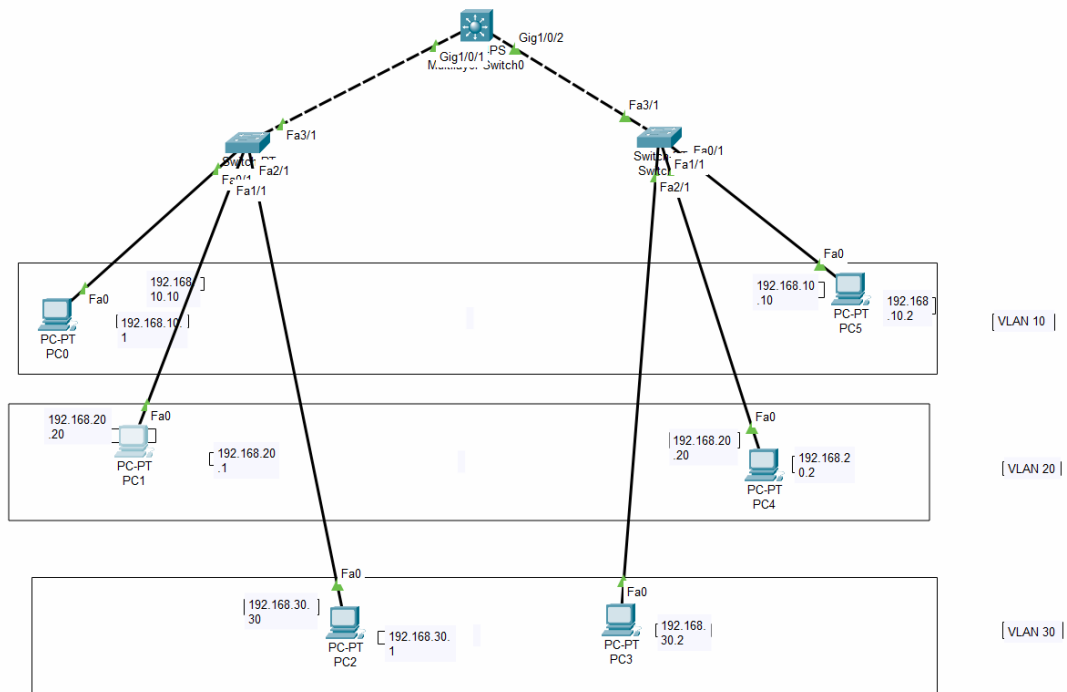
Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

INTER VLAN and Multilayer Switch Configuration.

- Inter-VLAN routing on a multilayer switch enables communication between different VLANs (Virtual Local Area Networks) within the same switch, bypassing the need for an external router. A multilayer switch combines the functions of a Layer 2 switch (which operates on MAC addresses) and a Layer 3 router (which uses IP addresses), allowing it to perform routing functions for VLANs internally.
- To configure **Inter-VLAN Routing** using a **multilayer switch**, we'll enable routing between VLANs on the switch itself.
- "Turn On" Multilayer Switch:
Drag and drop the multilayer switch (like the Cisco 3650-24PS) from the **Network Devices > Switches** section in Packet Tracer onto the workspace.
- Note: need to give power supply from physical(drag and drop **AC-POWER-SUPPLY** from physical to physical device view.





1. Configure VLANs
2. Assign Switch Ports to VLANs
3. Enable IP Routing on the Switch
5. Configure Trunk Ports

Switch2 configuration:

Switch2

Physical Config CLI Attributes

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#vlan 20
Switch(config-vlan)#vlan 30
Switch(config-vlan)#int f0/1
Switch(config-if)#no shut
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int f1/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int f2/1
Switch(config-if)#switch mode access
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#int f3/1
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/1, changed state to up

Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr
Building configuration...
[OK]
Switch#
```

Switch3 configuration:

Switch3

Physical Config CLI Attributes

IOS Command Line Interface

```

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#vlan 20
Switch(config-vlan)#vlan 30

Switch(config-vlan)#int f0/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int f1/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int f2/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#int f3/1
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/1, changed state to up

Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr
Building configuration...
[OK]
Switch#
Switch#

```

```

Switch>
Switch>EN
Switch#
Switch#conf t
Switch(config)#
Switch(config)#vlan 10
Switch(config-vlan)#vlan 20
Switch(config-vlan)#vlan 30

Switch(config-vlan)#int f0/1
Switch(config-if)#no shut
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int f0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int f0/3

```

```

Switch>
Switch>en
Switch#conf t
Switch(config)#hostname SW2
SW2(config)#
SW2(config)#vlan 10
SW2(config-vlan)#vlan 20
SW2(config-vlan)#vlan 30

SW2(config-vlan)#int f0/4
SW2(config-if)#switchport mode access
SW2(config-if)#switchport access vlan 30
SW2(config-if)#int f0/5
SW2(config-if)#switchport mode access
SW2(config-if)#switchport access vlan 20
SW2(config-if)#int f0/6
SW2(config-if)#switchport mode access

```

| | |
|---|--|
| Switch(config-if)#switchport mode access Switch(config-if)#switchport access vlan 30 Switch(config-if)#int g0/1 Switch(config-if)#switchport mode trunk Switch(config-if)#end Switch#wr Building configuration... [OK] Switch# | SW2(config-if)#switchport access vlan 10 SW2(config-if)#int g0/2 SW2(config-if)#sw SW2(config-if)#switchport mode trunk SW2(config-if)#end SW2#wr Building configuration... [OK] SW2# |
|---|--|

Multilayer Switch0 configuration:

switchport mode trunk: Configures the port as a trunk, allowing it to carry multiple VLANs with 802.1Q tagging.

Multilayer Switch0

Physical Config CLI Attributes

```

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#vlan 30
Switch(config-vlan)#exit
Switch(config)#int range g1/0/1-2
Switch(config-if-range)#switchport mode trunk
Switch(config-if-range)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#ip routing
Switch(config)#int vlan 10
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

Switch(config-if)#ip address 192.168.10.10 255.255.255.0
Switch(config-if)#no shut
Switch(config-if)#int vlan 20
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan20, changed state to up

Switch(config-if)#ip address 192.168.20.20 255.255.255.0
Switch(config-if)#no shut
Switch(config-if)#int vlan 30
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan30, changed state to up

Switch(config-if)#ip address 92.168.30.30 255.255.255.0
Switch(config-if)#no shut
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr
Building configuration...
Compressed configuration from 7383 bytes to 3601 bytes[OK]

```

```

Switch>
Switch>en
Switch#
Switch#conf t
Switch(config)#hostname MLSW
MLSW(config)#vlan 10
MLSW(config-vlan)#vlan 20
MLSW(config-vlan)#vlan 30
MLSW(config-vlan)#exit

MLSW(config)#
MLSW(config)#int range g1/0/1-2

```

Below conf. is to access from one pc to all PCs.

```

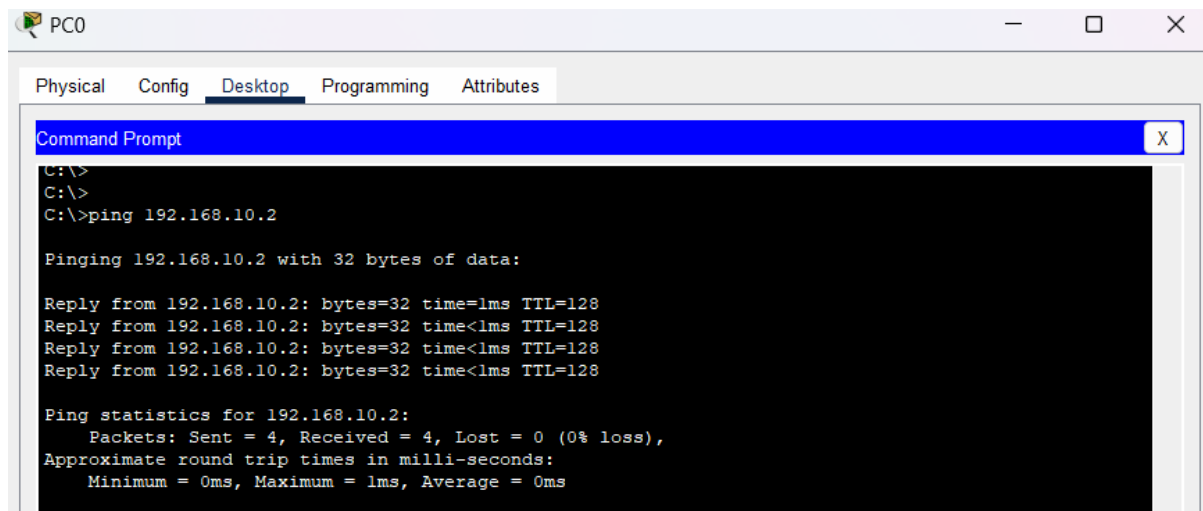
MLSW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MLSW(config)#
MLSW(config)#ip routing
MLSW(config)#int vlan 10
MLSW(config-if)#
MLSW(config-if)#ip add 192.168.10.10 255.255.255.0

```

| | |
|---|--|
| <pre> MLSW(config-if-range)#switchport mode trunk MLSW(config-if-range)#end </pre> <p>After this you will be able to ping in between the same VLANs. But not other vlans.</p> <p>Ex: 192.168.10.1 to 10.2 But you cannot access 192.168.10.1 to 20.1</p> | <pre> MLSW(config-if)#no shut MLSW(config-if)#int vlan 20 MLSW(config-if)# MLSW(config-if)#ip add 192.168.20.20 255.255.255.0 MLSW(config-if)#no shut MLSW(config-if)# MLSW(config-if)#int vlan 30 MLSW(config-if)# MLSW(config-if)#ip add 192.168.30.30 255.255.255.0 MLSW(config-if)#no shut MLSW(config-if)# MLSW(config-if)#end MLSW# MLSW#wr Building configuration... [OK] MLSW# </pre> |
|---|--|

Test Configurations

- able to ping in between the same VLANs



PC0

Physical Config Desktop Programming Attributes

Command Prompt

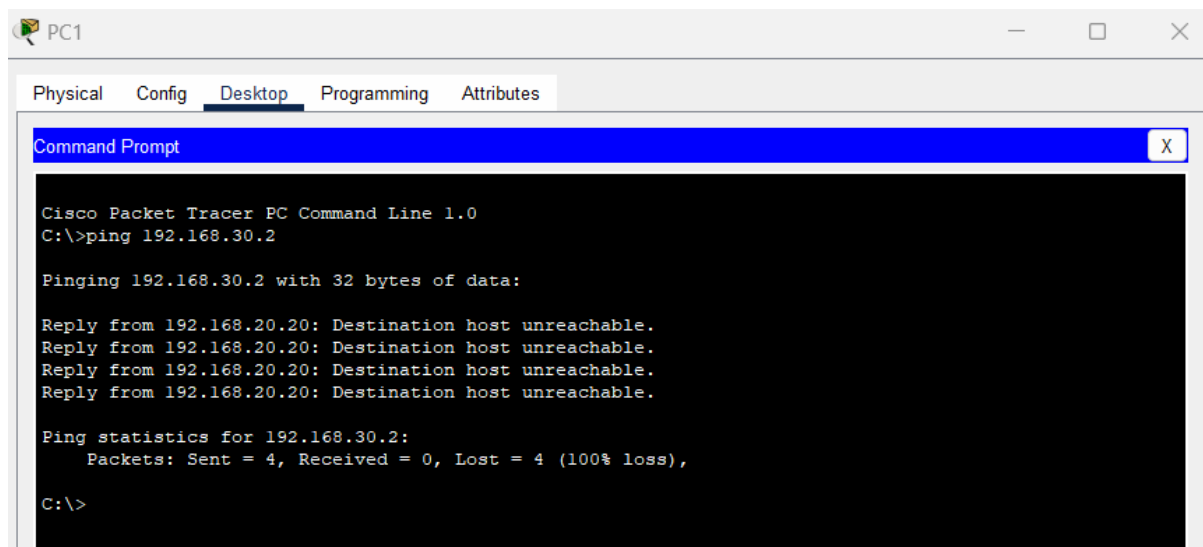
```
C:\>
C:\>
C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time=1ms TTL=128
Reply from 192.168.10.2: bytes=32 time<1ms TTL=128
Reply from 192.168.10.2: bytes=32 time<1ms TTL=128
Reply from 192.168.10.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- able to ping from one PC to all other PCs VLANs



PC1

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.2

Pinging 192.168.30.2 with 32 bytes of data:

Reply from 192.168.20.20: Destination host unreachable.
Reply from 192.168.20.20: Destination host unreachable.
Reply from 192.168.20.20: Destination host unreachable.
Reply from 192.168.20.20: Destination host unreachable.

Ping statistics for 192.168.30.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```