

# Task-8

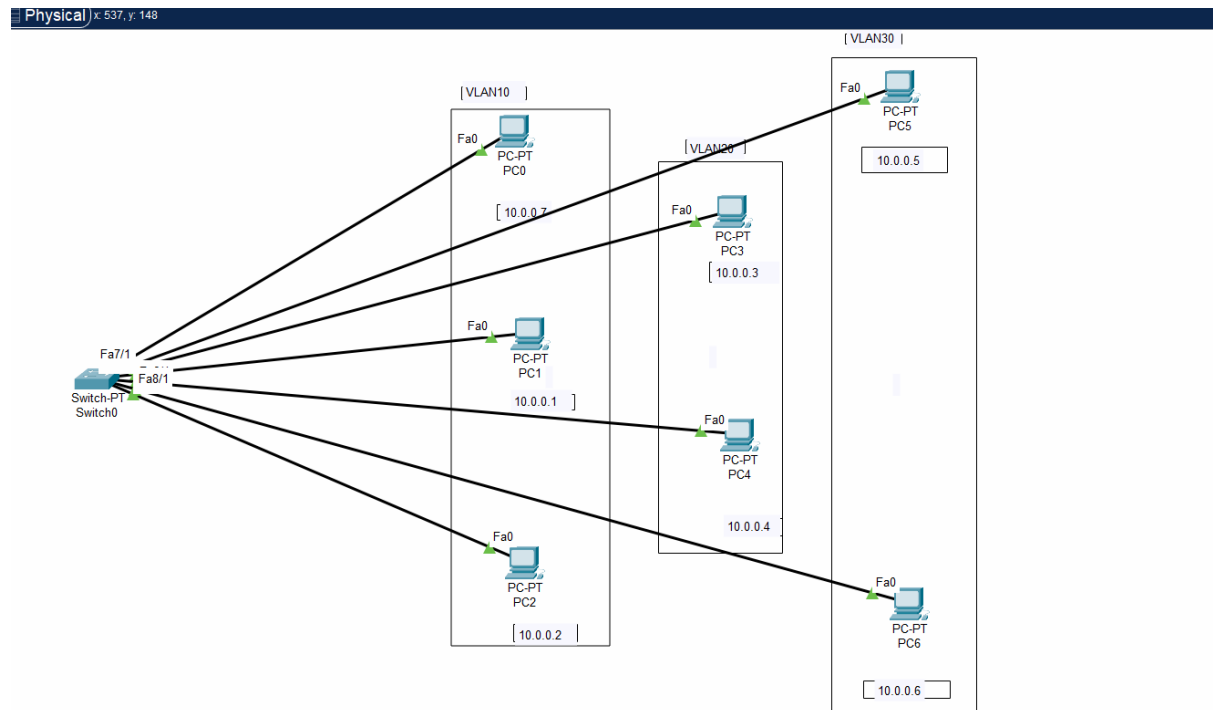
8a. Configure network topology to implement VLANs with using Packet Tracer software.

## 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
```

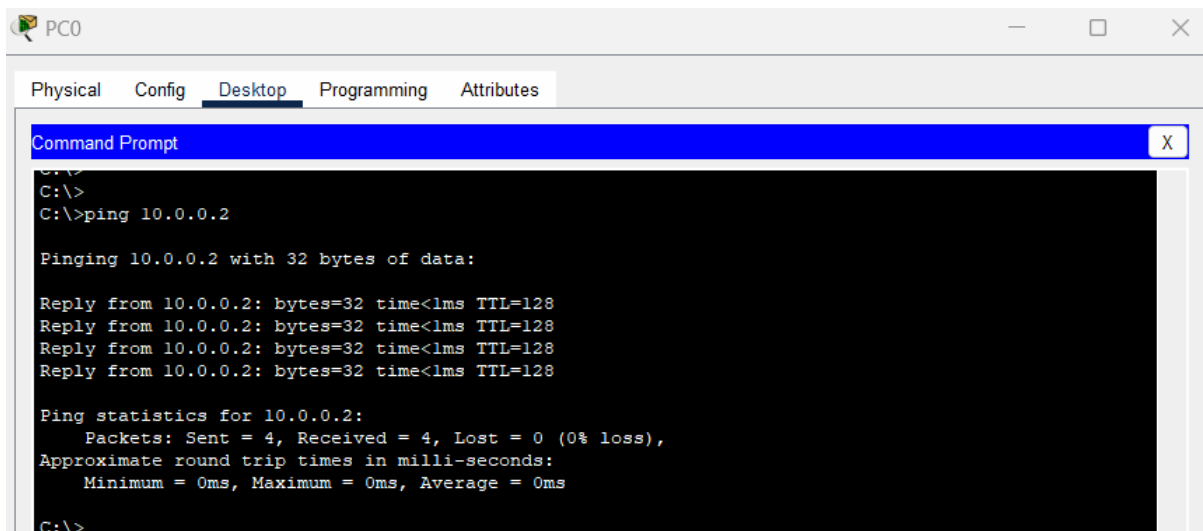
```
Switch(config-if)#end
```

```
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 a successful ping to 10.0.0.2. The output includes the command, the data being pinged, four successful replies, and the final statistics.

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

Pinging 10.0.0.2 with 32 bytes of data:

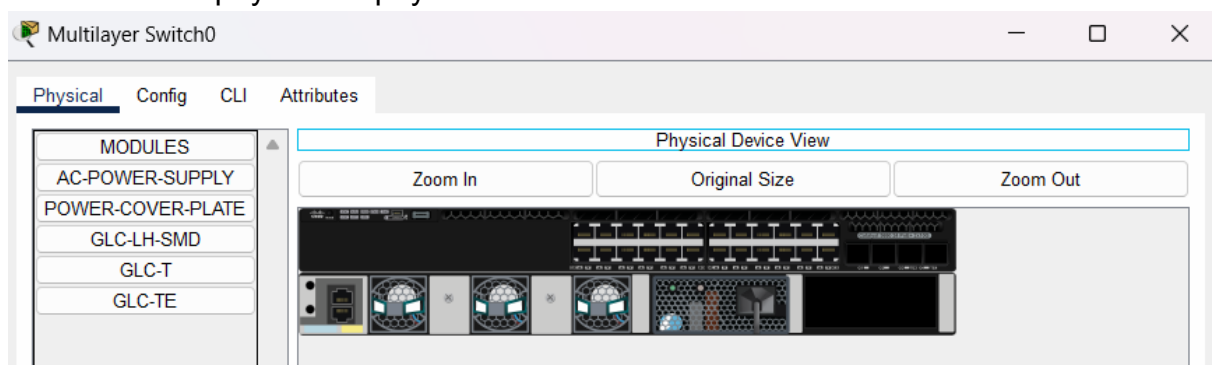
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128

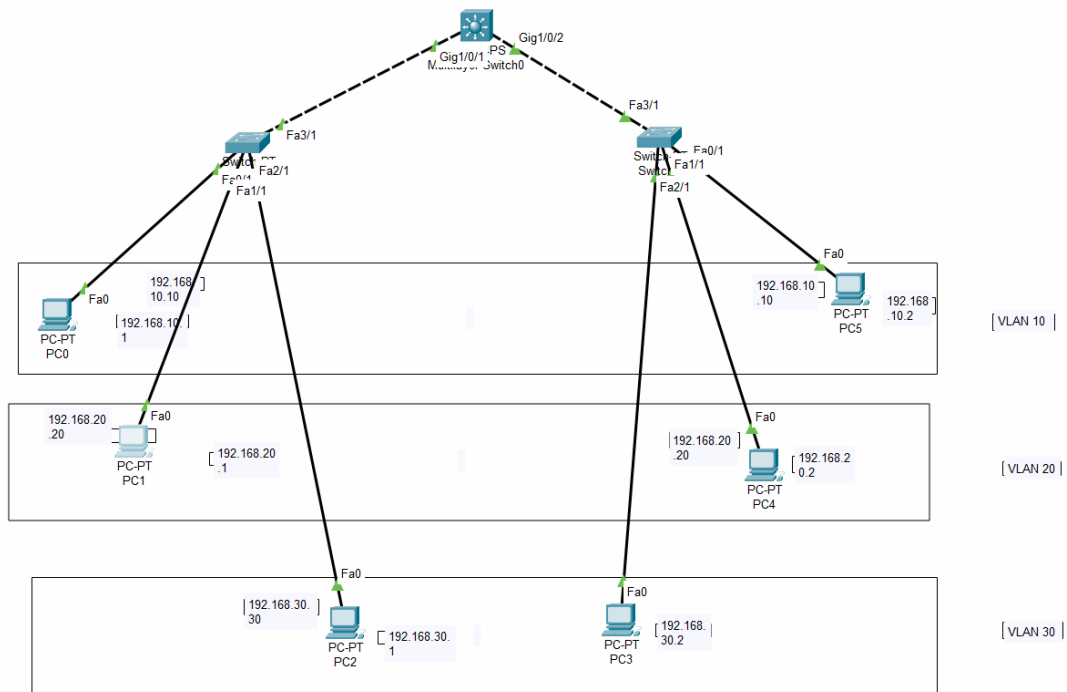
Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

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] <b>Switch#</b>	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] <b>SW2#</b>
---	--

## 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.**

```

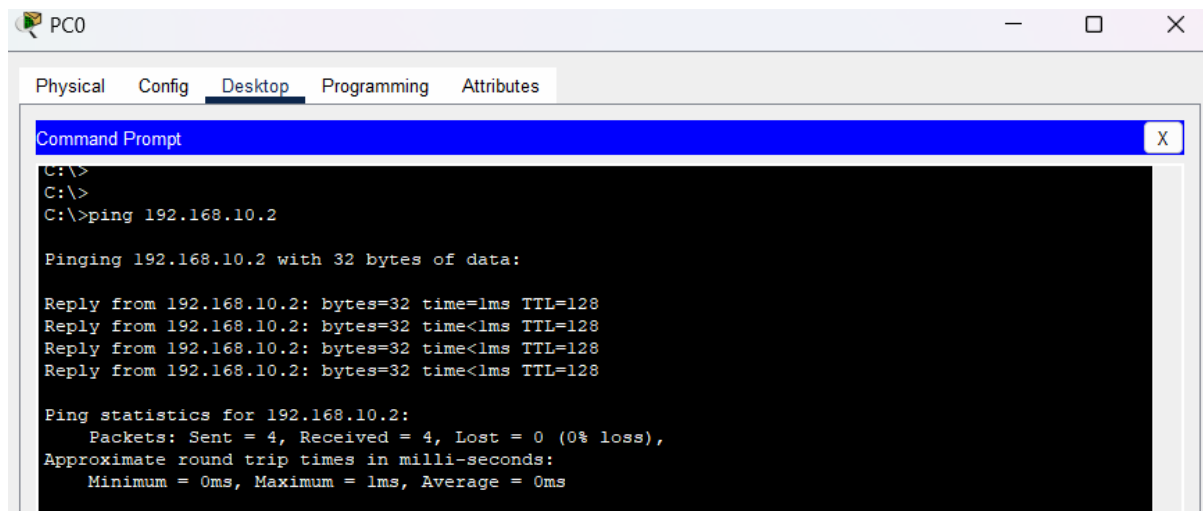
MLSW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MLSW(config)#
MLSW(config)#ip routing
MLSW(config)#int vlan 10
MLSW(config-if)#
MLSW(config-if)#ip add 192.168.10.10 255.255.255.0

```

<pre> MLSW(config-if-range)#switchport mode trunk MLSW(config-if-range)#end </pre> <p><b>After this you will be able to ping in between the same VLANs. But not other vlans.</b></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] <b>MLSW#</b> </pre>
---	--

## Test Configurations

- able to ping in between the same VLANs



The screenshot shows a window titled "PC0" with tabs for Physical, Config, Desktop, Programming, and Attributes. The "Desktop" tab is active, displaying a "Command Prompt" window. The command prompt shows the execution of the command "ping 192.168.10.2". The output indicates that the ping was successful, with four replies received from 192.168.10.2, each with a time of less than 1ms and a TTL of 128. The ping statistics show that all four packets were sent and received, with 0% loss.

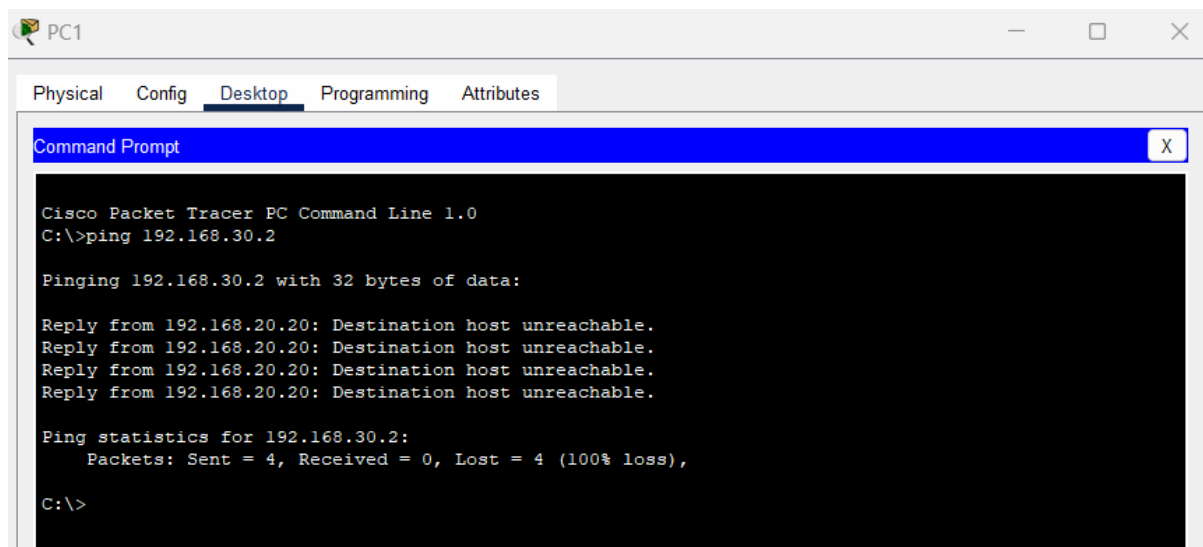
```
C:\>
C:\>
C:\>ping 192.168.10.2

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



The screenshot shows a window titled "PC1" with tabs for Physical, Config, Desktop, Programming, and Attributes. The "Desktop" tab is active, displaying a "Command Prompt" window. The command prompt shows the execution of the command "ping 192.168.30.2". The output indicates that the ping failed, with four replies received from 192.168.20.20, each with the message "Destination host unreachable". The ping statistics show that all four packets were sent, but none were received, resulting in a 100% loss.

```
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:\>
```