

Task-8

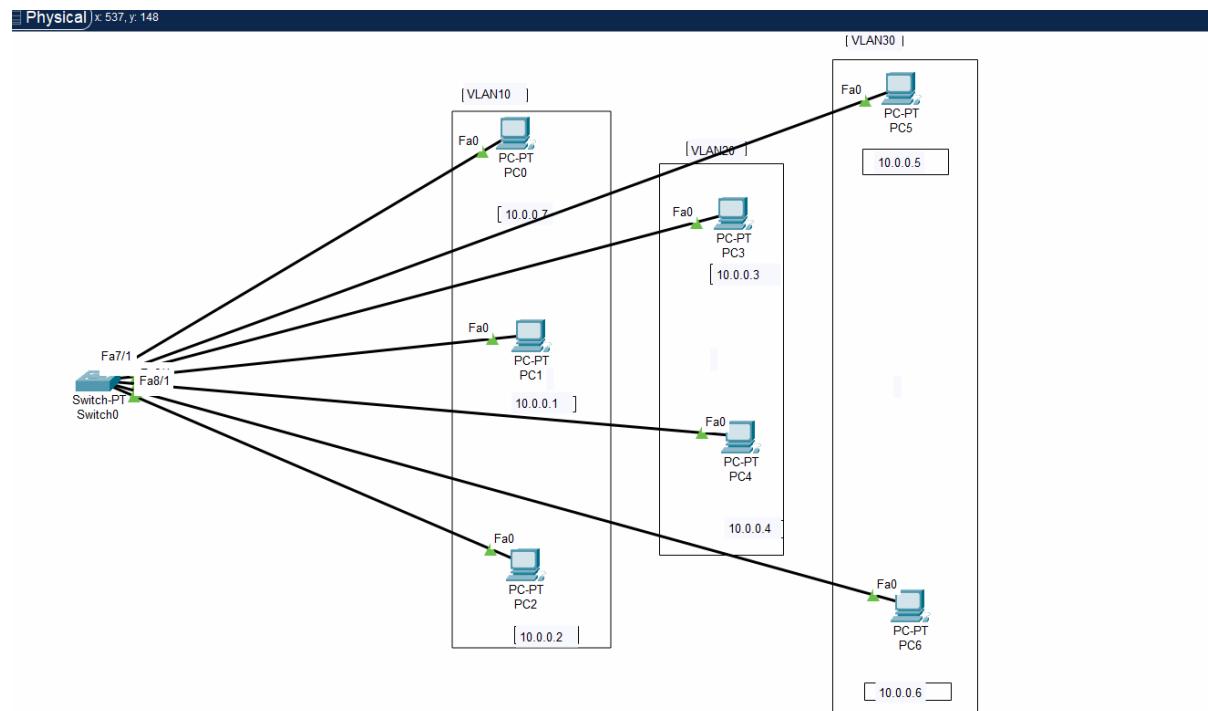
8a. Configure network topology to implement VLANs with using Packet Tracer software.

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
```

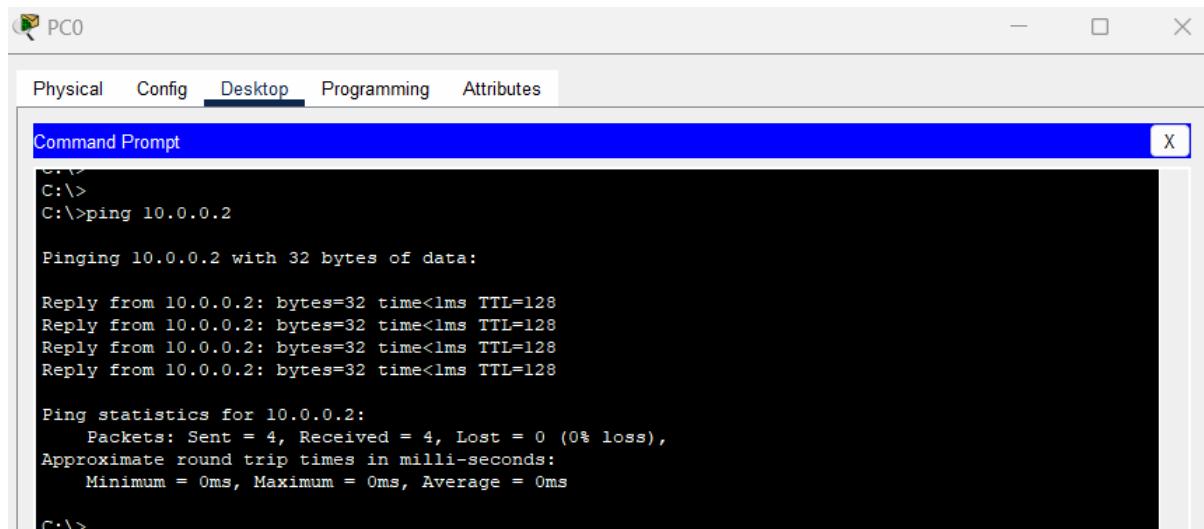
```
Switch(config-if)#vlan 20  
Switch(config-vlan)#int f3/1  
Switch(config-if)#switchport mode access  
Switch(config-if)#switchport access vlan 20  
Switch(config-if)#int f6/1  
Switch(config-if)#switchport mode access  
Switch(config-if)#switchport access vlan 20
```

```
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.



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

Pinging 10.0.0.2 with 32 bytes of data:

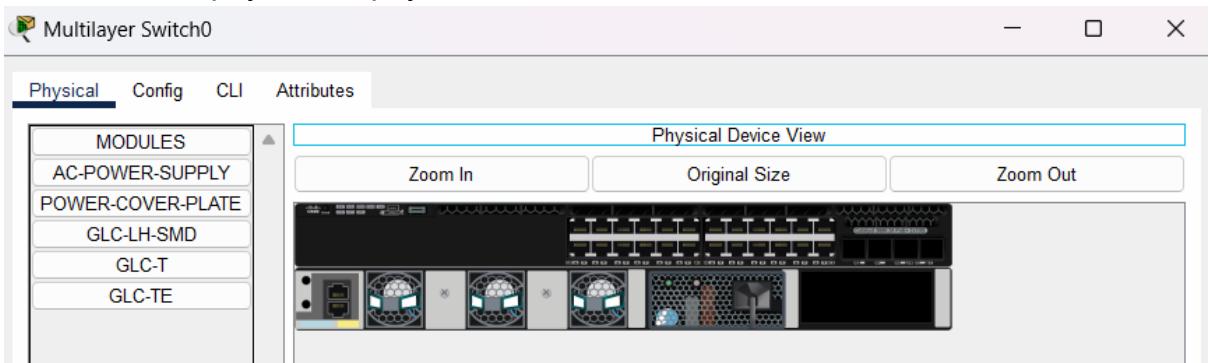
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128

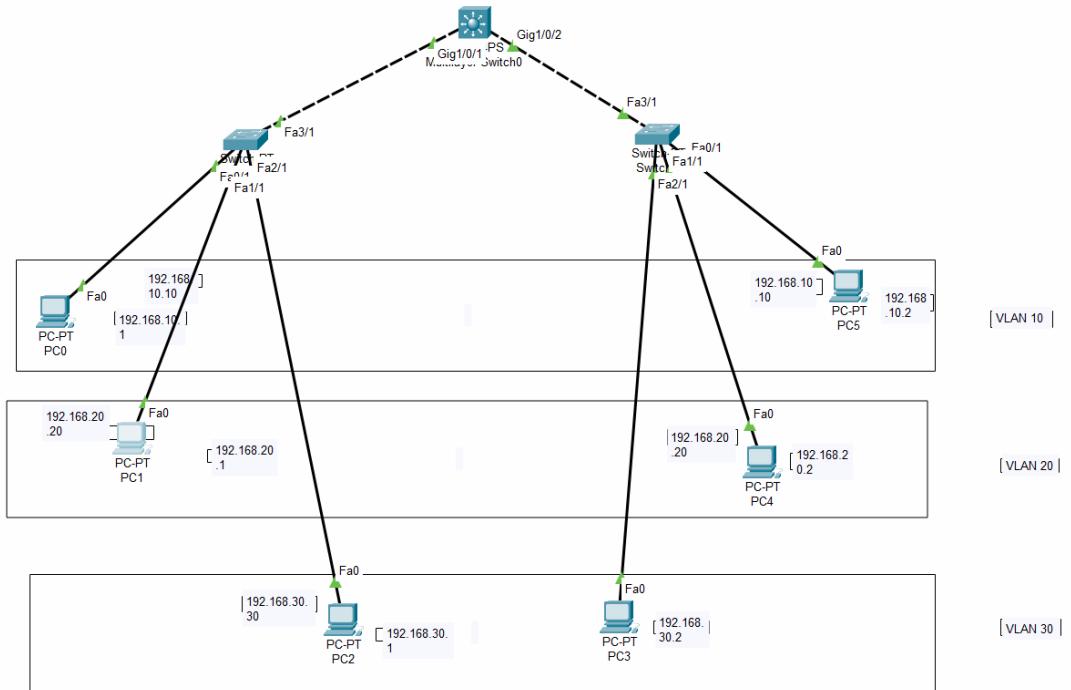
Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

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

```

```
MLSW(config-if-range)#switchport mode trunk  
MLSW(config-if-range)#end
```

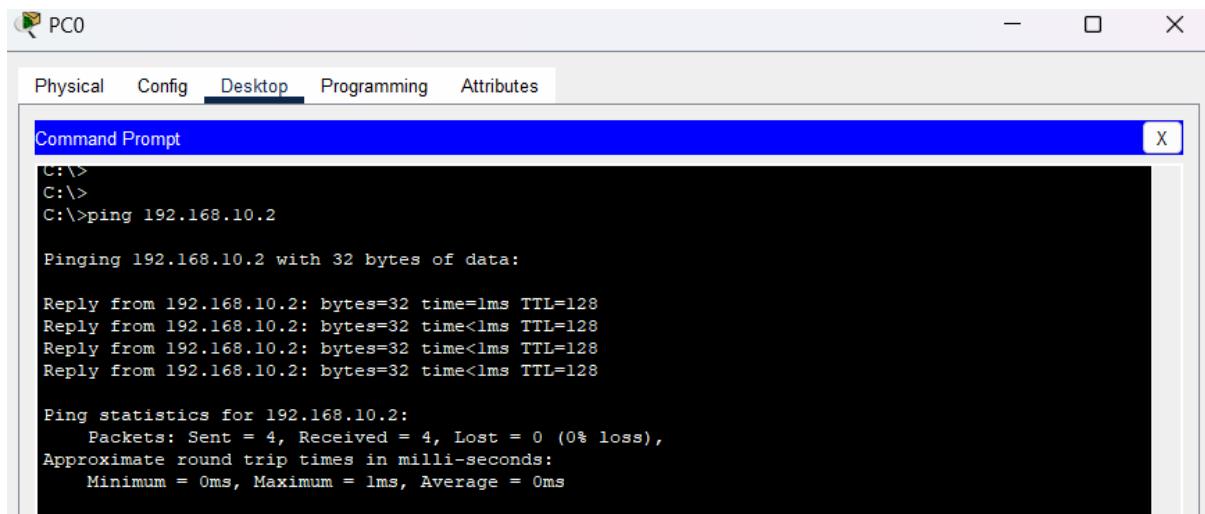
After this you will be able to ping in between the same VLANs. But not other vlans.

Ex: 192.168.10.1 to 10.2
But you cannot access
192.168.10.1 to 20.1

```
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#
```

Test Configurations

- **able to ping in between the same VLANs**



PC0

Physical Config Desktop Programming Attributes

Command Prompt X

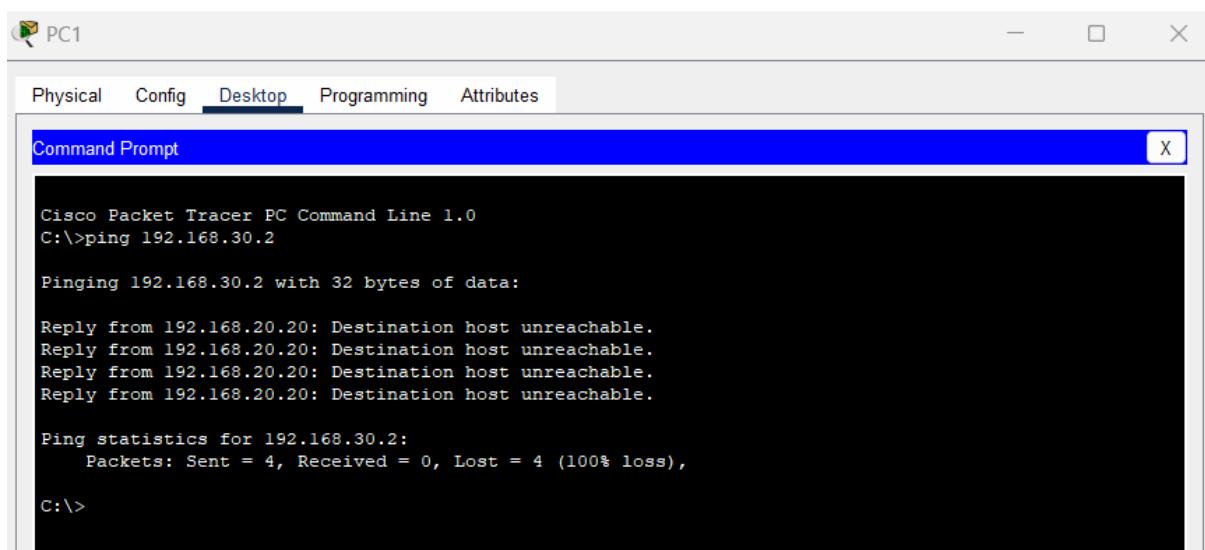
```
C:\>
C:\>
C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

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

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 X

```
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.

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