Bahria University, Islamabad

Department of Software Engineering

Computer Communication & Networking Lab

(Fall-2025)

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Enrollment: 01-131232-029

Lab Journal: 09

Date: 11/18/25

Task No:	Task Wise Marks		Documentation Marks		Total Marks (20)
	Assigned	Obtained	Assigned	Obtained	
1					
2					
3					
4					
5					

Comments:

Signature

LAB # 9

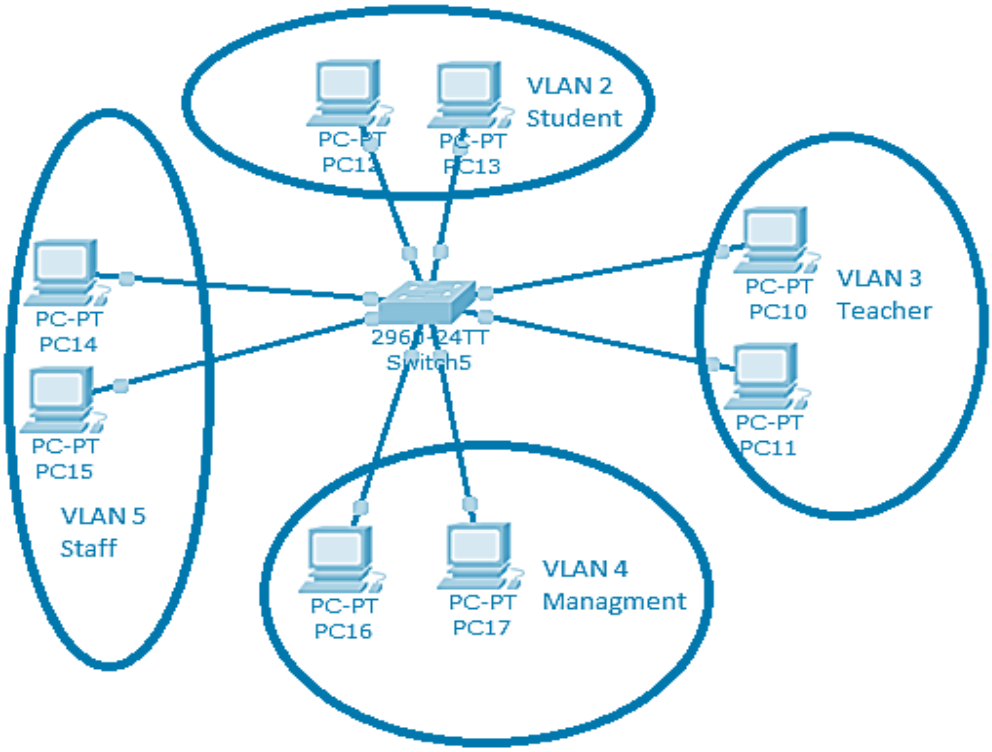
Building and Testing VLAN Network

Objective

To familiarize students with the design and construction of VLAN, and also with the tools that can be used to check the network

Introduction

A VLAN is a switched network that is logically segmented by functions, project teams, or applications without regard to the physical location of the users. For example several end stations might be grouped as a department, such as engineering or accounting. When the end stations are physically located close to one another, you can group them into a LAN segment. If any of the end stations are in different buildings (not the same physical LAN segment), you can group them into a VLAN.



VLAN Ranges (Cisco Standard)

- VLAN 0 & 4095: Reserved, not usable.
- VLAN 1: Default VLAN; all switch ports belong here initially. Cannot be deleted.
- VLAN 2–1001: Normal VLAN range (configurable, editable, deletable).
- VLAN 1002–1005: Reserved for legacy Token Ring and FDDI.
- VLAN 1006–4094: Extended VLAN range.

Problem

Designing VLAN

Equipment

1. Router,
2. Necessary cables
3. PC

Procedure:

Step 1: Create VLANs on switch S1.

Use the **vlan** *vlan-id* command in global configuration mode to add a VLAN to switch S1. There are four VLANS configured for this lab: VLAN 2 (Student); VLAN 3 (Teacher); VLAN 4 (Management); and VLAN 5 (Staff). After you create the VLAN, you will be in vlan configuration mode, where you can assign a name to the VLAN with the **name** *vlan name* command.

```
S1(config)#vlan 2
S1(config-vlan)#name Student
S1(config-vlan)#vlan 3
S1(config-vlan)#name Teacher
S1(config-vlan)#vlan 4
S1(config-vlan)#name management
S1(config-vlan)#vlan 5
S1(config-vlan)#name staff
S1(config-vlan)#end
S1#
```

Step 2: Verify that the VLANs have been created on S1.

Use the **show vlan brief** command to verify that the VLANs have been created.

```
S1#show vlan brief
VLAN Name Status Ports
---- -------------------------------- --------- ----------
1 default active Fa0/1, Fa0/2, Fa0/4, Fa0/5
Fa0/6, Fa0/7, Fa0/8, Fa0/9
Fa0/10, Fa0/11, Fa0/12, Fa0/13
Fa0/14, Fa0/15, Fa0/16, Fa0/17
Fa0/18, Fa0/19, Fa0/20, Fa0/21
Fa0/22, Fa0/23, Fa0/24, Gi0/1
Gi0/2
2 student active
3 teacher active
4 management active
5 staff active
```

Step 3: Assign switch ports to VLANs

Refer to the port assignment table on page 1. Ports are assigned to VLANs in interface configuration mode, using the **switchport access vlan** *vlan-id* command. You can assign each port individually or you can use the **interface range** command to simplify this task, as shown here. Save your configuration when done.

```
S1(config)#interface range fa0/1-4
```

```
S1(config-if-range)#switchport access vlan 2
S1(config-if-range)#interface range fa0/5-8
S1(config-if-range)#switchport access vlan 3
S1(config-if-range)#interface range fa0/9-12
S1(config-if-range)#switchport access vlan 4
S1(config-if-range)#interface range fa0/13-16
S1(config-if-range)#switchport access vlan 5

S1(config-if-range)#end
S1#copy running-config startup-config
Destination filename [startup-config]? [enter]
Building configuration...
[OK]
```

Step 4: Assign IP to all PC

Assign IP address to PC with same network address in same VLAN

Step 5: verify connection

Use command prompt to verify connection. Apply ping command to computer in same VLAN and in different VLAN. Which one is not successful?

Task:

1. Perform all the steps explained above and answer the questions that are being asked. Provide screen shots of results or observations where applicable.
2. Using the concepts learned in this lab, create four VLANs on switch S1 named Sales, HR, IT, and Finance. Assign appropriate switch ports to each VLAN as per your own logical design (minimum 3 ports per VLAN). Configure IP addresses on the PCs within each VLAN and verify communication within the same VLAN and between different VLANs.

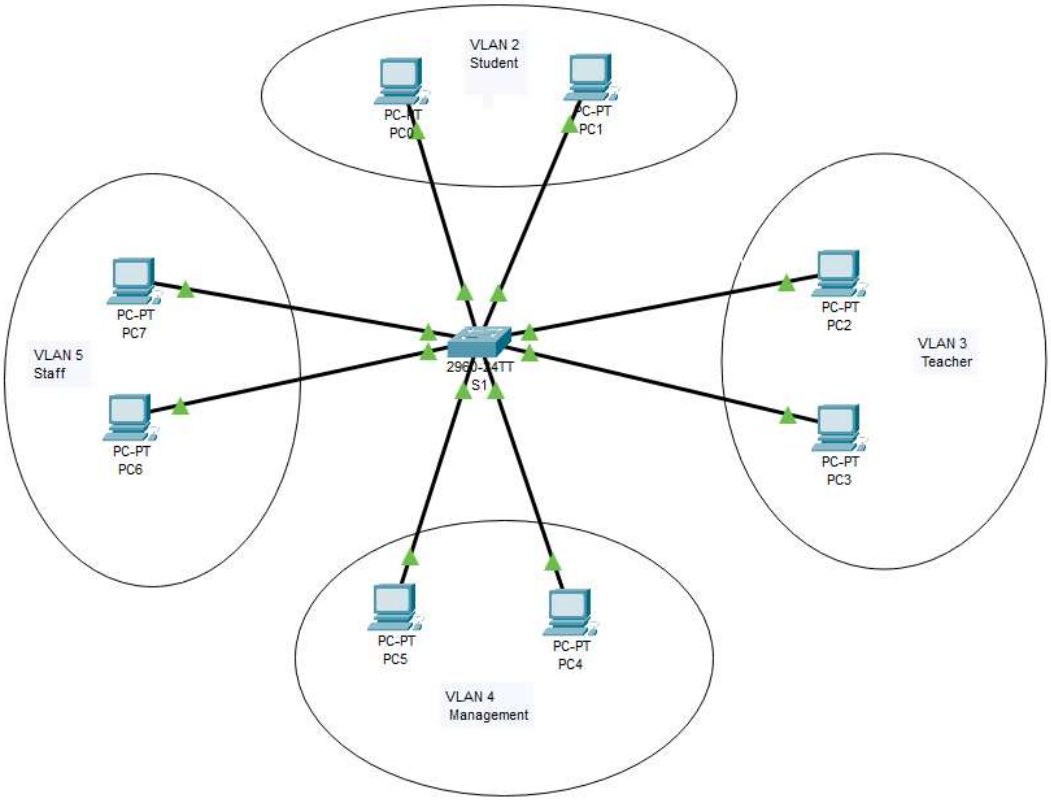
   Provide screenshots of:

   a. VLAN creation (show vlan brief)

   b. Port assignments

   c. Successful and unsuccessful ping results

Task 1 : Perform all the steps explained above and answer the questions that are being asked. Provide screen shots of results or observations where applicable.



Step 1

```
Switch>enable
Switch#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#name student
Switch(config-vlan)#exit
Switch(config)#vlan 3
Switch(config-vlan)#name teacher
Switch(config-vlan)#exit
Switch(config)#vlan 4
Switch(config-vlan)#name management
Switch(config-vlan)#vlan5
                     ^
% Invalid input detected at '^' marker.

Switch(config-vlan)#exit
Switch(config)#vlan 5
Switch(config-vlan)#name staff
Switch(config-vlan)#exit
```

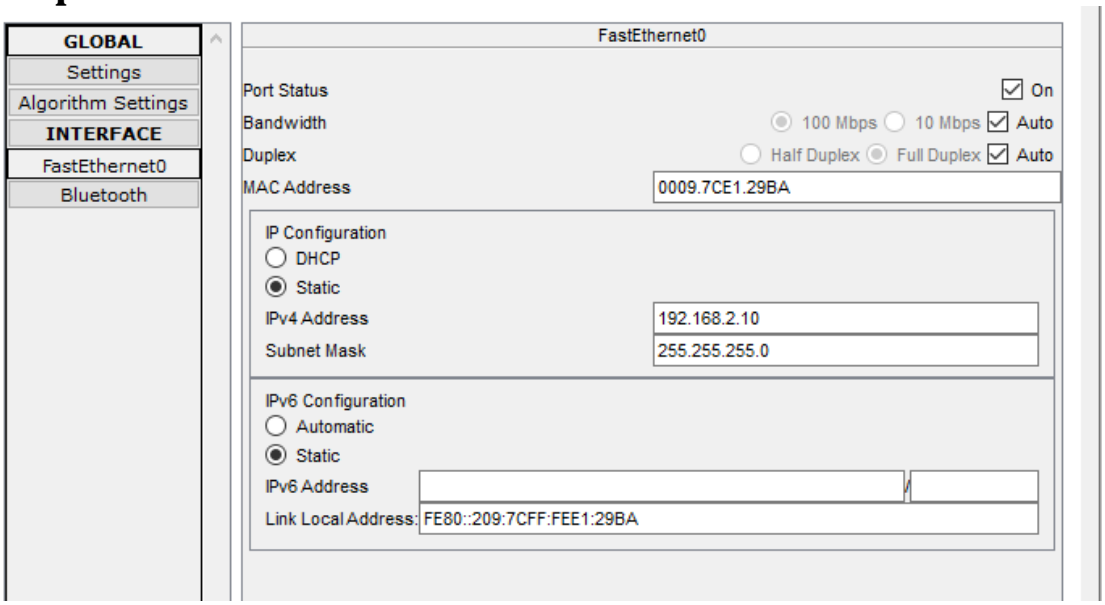
Step 2

```
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                Gig0/1, Gig0/2
2    student                          active
3    teacher                          active
4    management                       active
5    staff                            active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

Step 3

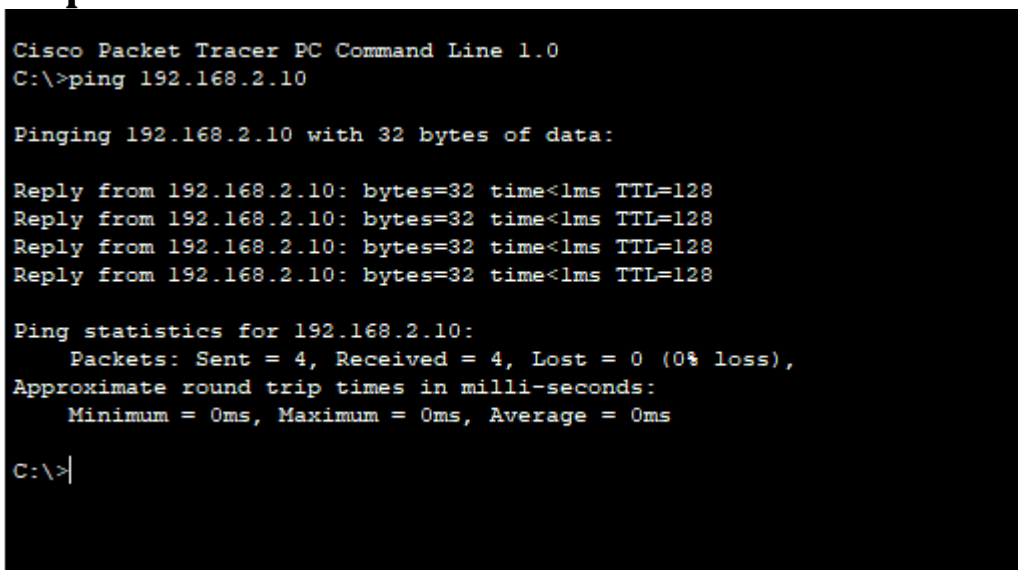
```
Switch#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface range fa0/1 - 4
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#exit
Switch(config)#interface range fa0/5-8
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#exit
Switch(config)#interface range fa0/9-12
Switch(config-if-range)#swutchport mode access
                       ^
```

Step 4

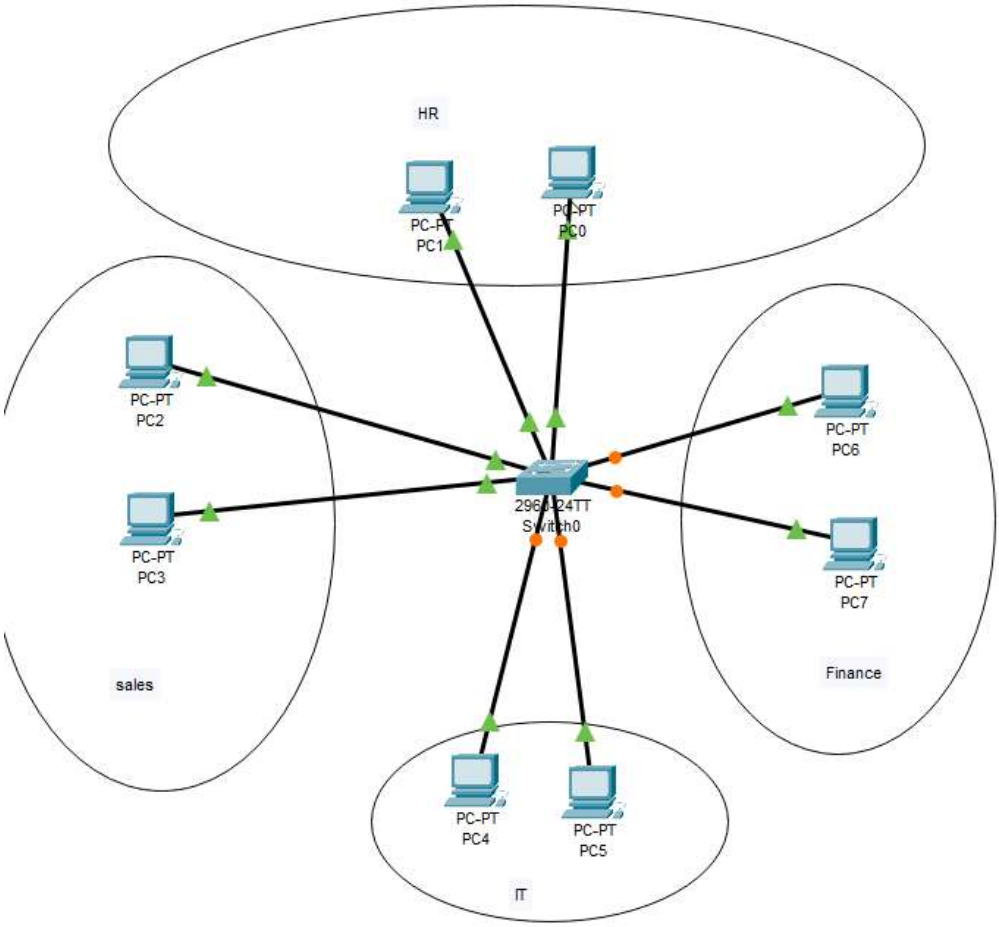


Ip assigned to all pcs from 192.168.2.10 to…….. 192.168.5.11

Step 5



Task 2: Using the concepts learned in this lab, create four VLANs on switch S1 named Sales, HR, IT, and Finance. Assign appropriate switch ports to each VLAN as per your own logical design (minimum 3 ports per VLAN). Configure IP addresses on the PCs within each VLAN and verify communication within the same VLAN and between different VLANs.



Step 1

```
Switch>enable
Switch#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#]name HR
                    ^
% Invalid input detected at '^' marker.

Switch(config-vlan)#name hr
Switch(config-vlan)#exit
Switch(config)#vlan 3
Switch(config-vlan)#name sales
Switch(config-vlan)#vlan 4
Switch(config-vlan)#name it
Switch(config-vlan)#vlan 5 name finance
                    ^
% Invalid input detected at '^' marker.

Switch(config-vlan)#name finance
Switch(config-vlan)#end
```

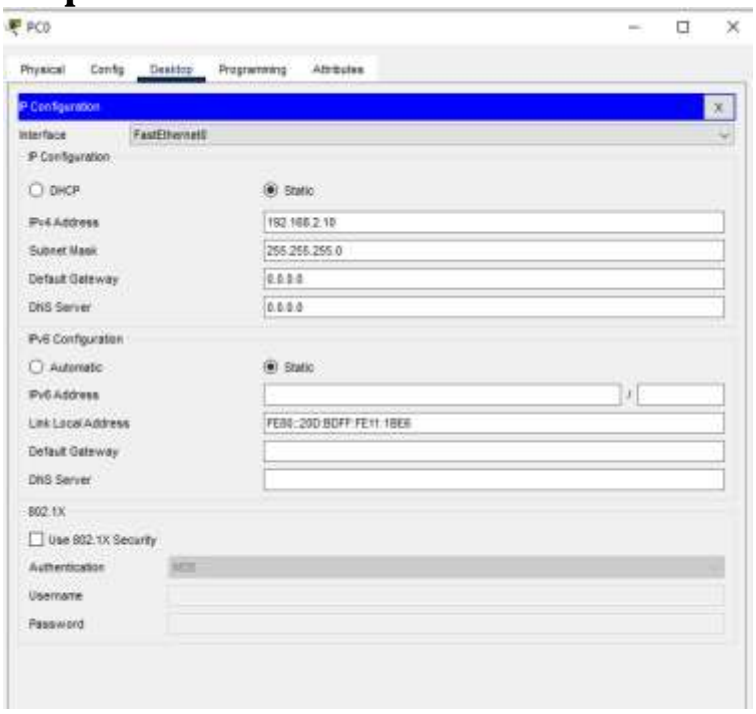
Step 2

```
S1#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                Gig0/1, Gig0/2
2    Student                          active
3    Teacher                          active
4    Management                       active
5    Staff                            active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S1#
```

Step 3

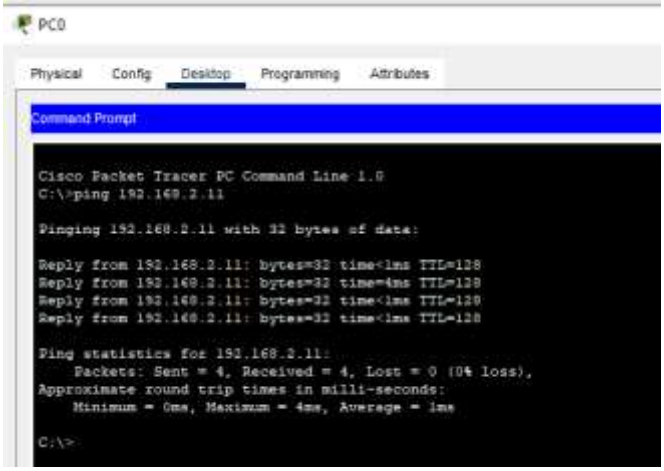
```
Switch(config)#interface range fa0/1-4
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#exit
Switch(config)#interface range fa0/5-8
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#exit
Switch(config)#interface range fa0/9-12
Switch(config-if-range)#switchport vlan4
                                      ^
% Invalid input detected at '^' marker.

Switch(config-if-range)#switchport vlan 4
                                      ^
% Invalid input detected at '^' marker.

Switch(config-if-range)#switchport vlan 4
                                      ^
% Invalid input detected at '^' marker.

Switch(config-if-range)#switchport access vlan 4
Switch(config-if-range)#exit
Switch(config)#interface range fa0/13-16
Switch(config-if-range)#switchport access vlan 5
% Access VLAN does not exist. Creating vlan 5
Switch(config-if-range)#
```

Step 4



Ip assigned to all pcs from 192.168.2.10 to…….. 192.168.5.11

Step 5


PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.11
Pinging 192.168.2.11 with 32 bytes of data:
Reply from 192.168.2.11: bytes=32 time<1ms TTL=128
Reply from 192.168.2.11: bytes=32 time=4ms TTL=128
Reply from 192.168.2.11: bytes=32 time<1ms TTL=128
Reply from 192.168.2.11: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.2.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 4ms, Average = 1ms
C:\>