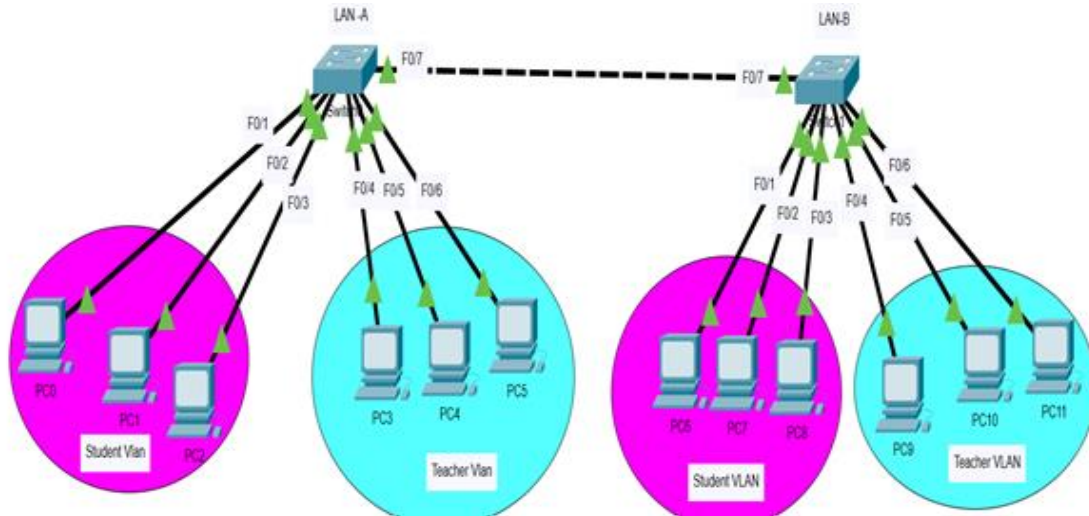


## VLAN Configuration:



## Topology:

Add **12 PCs** and **2 Switches (2960)** to the workplace.

## Cabling:

Select **copper straight through** to connect **PC s** to the **Switches**

Select **cross-over** to connect **Switch 0** to **Switch 1**. Select **Fast Ethernet 0/7** at **Switch 0** and **Fast Ethernet 0/7** at **Switch 1**

<b>PCs Interfaces</b>	<b>Switch0 Interfaces</b>
<b>PC0 (FastEthernet0)</b>	<b>Fast Ethernet 0/1</b>
<b>PC1 (FastEthernet0)</b>	<b>Fast Ethernet 0/2</b>
<b>PC2 (FastEthernet0)</b>	<b>Fast Ethernet 0/3</b>
<b>PC3(FastEthernet0)</b>	<b>Fast Ethernet 0/4</b>
<b>PC4 (FastEthernet0)</b>	<b>Fast Ethernet 0/5</b>
<b>PC5 (FastEthernet0)</b>	<b>Fast Ethernet 0/6</b>

<b>PCs Interfaces</b>	<b>Switch1 Interfaces</b>
<b>PC6 (FastEthernet0)</b>	<b>Fast Ethernet 0/1</b>
<b>PC7 (FastEthernet0)</b>	<b>Fast Ethernet 0/2</b>
<b>PC8 (FastEthernet0)</b>	<b>Fast Ethernet 0/3</b>
<b>PC9 (FastEthernet0)</b>	<b>Fast Ethernet 0/4</b>
<b>PC10 (FastEthernet0)</b>	<b>Fast Ethernet 0/5</b>
<b>PC11 (FastEthernet0)</b>	<b>Fast Ethernet 0/6</b>

<b>PC0:</b> <b>IP Address:192.168.1.1</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>	<b>PC3:</b> <b>IP Address:192.168.1.4</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>
<b>PC1:</b> <b>IP Address:192.168.1.2</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>	<b>PC4:</b> <b>IP Address:192.168.1.5</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>
<b>PC2:</b> <b>IP Address:192.168.1.3</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>	<b>PC5:</b> <b>IP Address:192.168.1.6</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>

### **Switch 0 Configuration:**

**Step 1:** At first, we create a LAN, LAN-A with 6 hosts. To create a LAN, we need one Layer 2 switch **Switch0(2960)** and **6 end devices(PC)**. Now we provide IP addresses to the hosts starting from 192.168.1.1 (you can provide any valid IP addresses). To provide an IP address to a host just select that **host** → **Desktop** → **IP Configuration** → **IPv4 Addresses** and provide an IP address and then **ENTER**, the Subnet Mask will be provided by default.

**Step 2:** Let us create 2 VLANs where the name of the first VLAN is **VLAN-STUDENT** and the second VLAN is **VLAN-FACULTY**. To configure VLANs we have to go to the switch **Switch0(2960)** and move to **Config** → **SWITCHING** → **VLAN Database**. Now let us take the **VLAN Number** for **STUDENT** is **100** and for **Teacher** is **200** and **add** these numbers to **VLAN Database**.

Physical
Config
CLI
Attributes

GLOBAL

Settings

Algorithm Settings

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/1

FastEthernet0/2

FastEthernet0/3

FastEthernet0/4

FastEthernet0/5

FastEthernet0/6

FastEthernet0/7

FastEthernet0/8

FastEthernet0/9

FastEthernet0/10

FastEthernet0/11

FastEthernet0/12

VLAN Configuration

VLAN Number
100

VLAN Name
Student

Add
Remove

VLAN No	VLAN Name
1	default
100	Student
1002	fddi-default
1003	token-ring-default
1004	fddinet-default
1005	trnet-default

Equivalent IOS Commands

documentation for configuring VTP/VLAN in config mode.

```

Switch(vlan)#vlan 100 name Student
VLAN 100 modified:
  Name: Student
Switch(vlan)#

```

Physical
Config
CLI
Attributes

GLOBAL

Settings

Algorithm Settings

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/1

FastEthernet0/2

FastEthernet0/3

FastEthernet0/4

FastEthernet0/5

FastEthernet0/6

FastEthernet0/7

FastEthernet0/8

FastEthernet0/9

FastEthernet0/10

FastEthernet0/11

FastEthernet0/12

VLAN Configuration

VLAN Number
200

VLAN Name
Teacher

Add
Remove

VLAN No	VLAN Name
1	default
100	Student
200	Teacher
1002	fddi-default
1003	token-ring-default
1004	fddinet-default
1005	trnet-default

Equivalent IOS Commands

**Step 3:** Next we have to select the hosts under **VLAN-STUDENT**. Here I have put hosts with IP addresses from **192.168.1.1 to 192.168.1.3** under **VLAN-STUDENT**. To do so we have to select the switch **Switch0** → **Config** → **INTERFACE**, here we choose **FastEthernet0/1** corresponding to the host 192.168.1.1 which we consider to be in **VLAN-STUDENT**. Now we select the down arrow beside VLAN and select **100: STUDENT**, which is for **student VLAN**.

Similarly, we do this same process for **FastEthernet0/2** and **FastEthernet0/3**

The screenshot shows the Cisco IOS configuration interface for the **FastEthernet0/1** interface. The **Config** tab is selected. On the left, the **INTERFACE** section is expanded, and **FastEthernet0/1** is selected. The main configuration area shows the following settings:

- Port Status:** ☒ On
- Bandwidth:** ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex:** ☐ Half Duplex ☒ Full Duplex ☒ Auto
- Access:** ☐ Access ☒ VLAN 100
- Tx Ring Limit:** ☐ 1:default ☒ 100:Student ☐ 200:Teacher

Below the configuration area, the **Equivalent IOS Commands** are listed:

```
Switch>enable
Switch#
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface FastEthernet0/1
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#switchport access vlan 100
Switch(config-if)#
```

At the bottom left, there is a **Top** button.

**Step 4:** Now we have to configure the hosts under **VLAN-Teacher**. Here I have put hosts with IP addresses **192.168.1.4** to **192.168.1.6** under **VLAN-Teacher**. To do so, just follow the process mentioned in Step 3, but instead of selecting the VLAN Number **100:STUDENT**, select **200:Teacher** for **FastEthernet0/4**, **FastEthernet0/5**, and **FastEthernet0/6**.

Physical **Config** CLI Attributes

**GLOBAL**  
Settings  
Algorithm Settings  
**SWITCHING**  
VLAN Database  
**INTERFACE**  
FastEthernet0/1  
FastEthernet0/2  
FastEthernet0/3  
**FastEthernet0/4**  
FastEthernet0/5  
FastEthernet0/6  
FastEthernet0/7

### FastEthernet0/4

Port Status ☒ On  
Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto  
Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto  
Access  VLAN   
Tx Ring Limit  

☐ 1:default  
☐ 100:Student  
☒ 200:Teacher

#### Equivalent IOS Commands

```
Switch(config)#interface FastEthernet0/4
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#switchport access vlan 200
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/4
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/4
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/4
Switch(config-if)#
```

**Step 5:** Lastly, just change the switch port mode from **Access** to **Trunk** for **FastEthernet0/7**.

### Switch 1 Configuration:

**Step 6:** At first, we create a LAN, LAN-B with 6 hosts. To create a LAN, we need one Layer 2 switch **Switch0(2960)** and **6 end devices(PC)**. Now we provide IP addresses to the hosts starting from **192.168.1.7** (you can provide any valid IP addresses). To provide an IP address to a host just select that **host** → **Desktop** → **IP Configuration** → **IPv4 Addresses** and provide an IP address and then **ENTER**, the Subnet Mask will be provided by default.

<b>PC6:</b> <b>IP Address:192.168.1.7</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>	<b>PC9:</b> <b>IP Address:192.168.1.10</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>
<b>PC7:</b> <b>IP Address:192.168.1.8</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>	<b>PC10:</b> <b>IP Address:192.168.1.11</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>
<b>PC8:</b> <b>IP Address:192.168.1.9</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>	<b>PC11:</b> <b>IP Address:192.168.1.12</b> <b>Subnet mask:255.255.255.0</b> <b>Default Gateway:0.0.0.0</b>

**Step7:** Let us create 2 VLANs where the name of the first VLAN is **VLAN-STUDENT** and the second VLAN is **VLAN-FACULTY**. To configure VLANs we have to go to the switch **Switch1 (2960)** and move to **Config** → **SWITCHING** → **VLAN Database**. Now let us take the **VLAN Number** for **STUDENT** is **100** and for **Teacher** is **200** and **add** these numbers to **VLAN Database**.

Physical
Config
CLI
Attributes

**GLOBAL**  
Settings  
Algorithm Settings  
**SWITCHING**  
**VLAN Database**  
**INTERFACE**  
FastEthernet0/1  
FastEthernet0/2  
FastEthernet0/3  
FastEthernet0/4  
FastEthernet0/5  
FastEthernet0/6  
FastEthernet0/7  
FastEthernet0/8  
FastEthernet0/9  
FastEthernet0/10  
FastEthernet0/11  
FastEthernet0/12

VLAN Configuration  
VLAN Number 100  
VLAN Name Student  
Add Remove  

VLAN No	VLAN Name
1	default
100	Student
1002	fdi-default
1003	token-ring-default
1004	fdinet-default
1005	trnet-default

Equivalent IOS Commands  

```

documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#vlan 100 name Student
VLAN 100 modified:
  Name: Student
Switch(vlan)#

```

Physical
Config
CLI
Attributes

GLOBAL
Settings
Algorithm Settings
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/1
FastEthernet0/2
FastEthernet0/3
FastEthernet0/4
FastEthernet0/5
FastEthernet0/6
FastEthernet0/7
FastEthernet0/8
FastEthernet0/9
FastEthernet0/10
FastEthernet0/11
FastEthernet0/12

VLAN Configuration
VLAN Number: 200
VLAN Name: Teacher
Add Remove

VLAN No	VLAN Name
1	default
100	Student
200	Teacher
1002	fdi-default
1003	token-ring-default
1004	fdinet-default
1005	trnet-default

Equivalent IOS Commands

**Step8:** Next we have to select the hosts under **VLAN-STUDENT**. Here I have put hosts with IP addresses from **192.168.1.7 to 192.168.1.9** under **VLAN-STUDENT**. To do so we have to select the switch **Switch1** → **Config** → **INTERFACE**, here we choose **FastEthernet0/1** corresponding to the host 192.168.1.1 which we consider to be in **VLAN-STUDENT**. Now we select the down arrow beside VLAN and select **100:STUDENT**, which is for **student VLAN**.

Similarly, we do this same process for **FastEthernet0/2** and **FastEthernet0/3**

Physical
Config
CLI
Attributes

GLOBAL
Settings
Algorithm Settings
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/1
FastEthernet0/2
FastEthernet0/3
FastEthernet0/4
FastEthernet0/5
FastEthernet0/6
FastEthernet0/7

FastEthernet0/1
Port Status: On
Bandwidth: 100 Mbps
Duplex: Full Duplex
Access: Access
VLAN: 100
Tx Ring Limit: 100

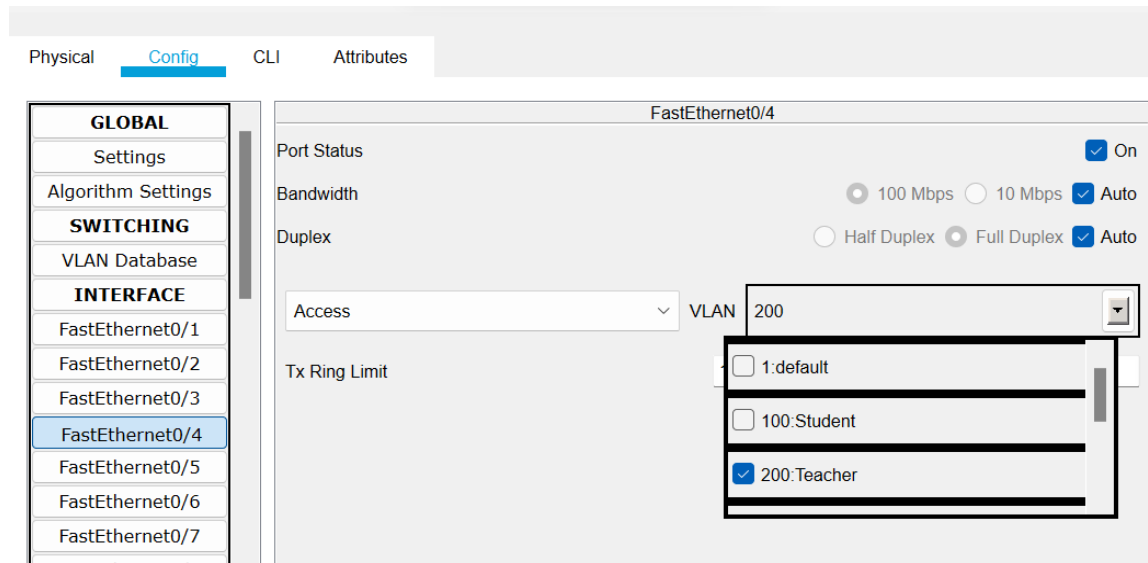
☐ 1:default
☒ 100:Student
☐ 200:Teacher

Equivalent IOS Commands

Switch>enable
Switch#
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface FastEthernet0/1
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#switchport access vlan 100
Switch(config-if)#

Top

**Step9:** Now we have to configure the hosts under **VLAN-Teacher**. Here I have put hosts with IP addresses **192.168.1.10** to **192.168.1.12** under **VLAN-Teacher**. To do so, just follow the process mentioned in Step 3, but instead of selecting the VLAN Number **100: STUDENT**, select **200: Teacher** for **FastEthernet0/4**, **FastEthernet0/5**, and **FastEthernet0/6**.



**Equivalent IOS Commands**

```
Switch(config)#interface FastEthernet0/4
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#switchport access vlan 200
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/4
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/4
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/4
Switch(config-if)#
```

**Step10:** Lastly, just change the switch port mode from **Access** to **Trunk** for **FastEthernet0/7**.

**Checking Connectivity:**

Now our VLAN configuration is ready, and we can check this by sending data packets from one host to another under LAN-A. Let us ping from **192.168.1.1** to **192.168.1.3**. To do so, we have to select the host with IP **192.168.1.1** and then select **Desktop** → **Command Prompt**. Now run the following command to ping **192.168.1.3**.

**ping 192.168.1.3**



**Note: The Connectivity is Successful. Because PC0(192.168.1.1) PC1(192.168.1.2) and PC2(192.168.1.3) belong to the same VLAN (VLAN -Student) so devices that are in same VLAN can communicate and sending data without time out**

```
C:\>
C:\>
C:\>Ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Now its time to check connectivity between PCs that are belong to the different VLANs for example **PC 0 (192.168.1.1)** belongs to the **Student VLAN** but **PC 3(192.168.1.4)** belongs to the **Teacher VLAN** so they can not connect to each other the connectivity request **was timed out**

```
C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Now it's time to check connectivity between PCs that are belong to the same VLANs but at the different switches for example **PC 0 (192.168.1.1)** belongs to the **Student VLAN** and **PC 6(192.168.1.7)** belongs to the **Student VLAN** same VLANs but at different switches can communicate with each other even they belong to the different switches.

```
C:\>ping 192.168.1.7

Pinging 192.168.1.7 with 32 bytes of data:

Reply from 192.168.1.7: bytes=32 time<1ms TTL=128
Reply from 192.168.1.7: bytes=32 time=1ms TTL=128
Reply from 192.168.1.7: bytes=32 time<1ms TTL=128
Reply from 192.168.1.7: bytes=32 time=9ms TTL=128

Ping statistics for 192.168.1.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 9ms, Average = 2ms

C:\>
```