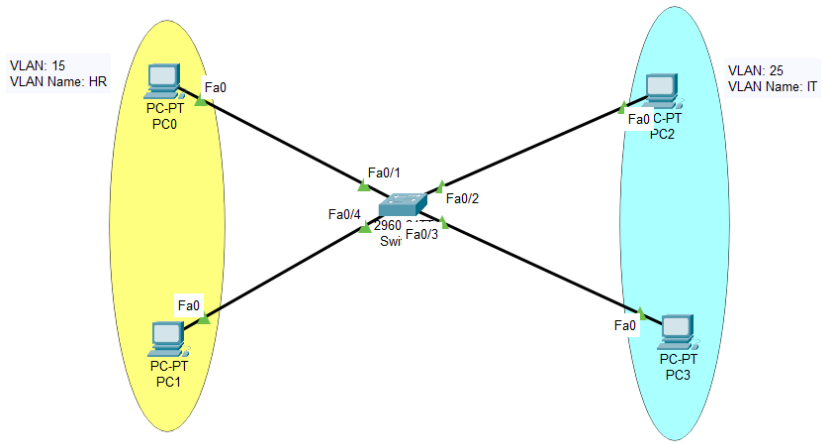
LAB 5.1 VLAN
UNDERSTANDING, CREATING, AND SIMULATING MULTIPLE VLANS IN A SINGLE SWITCH

OBJECTIVE: To understand and create multiple VLANS in a switch
TOOLS USED: Packet Tracer
BACKGROUND:

VLAN is a custom network which is created from one or more local area networks in order to limit access to a specified group of users by dividing workstations into different isolated VLAN.

TOPOLOGY

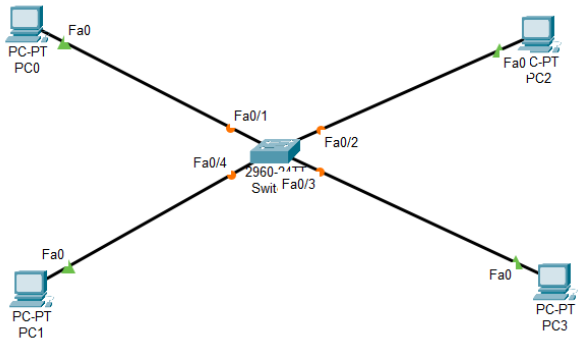


IP addressing Plan

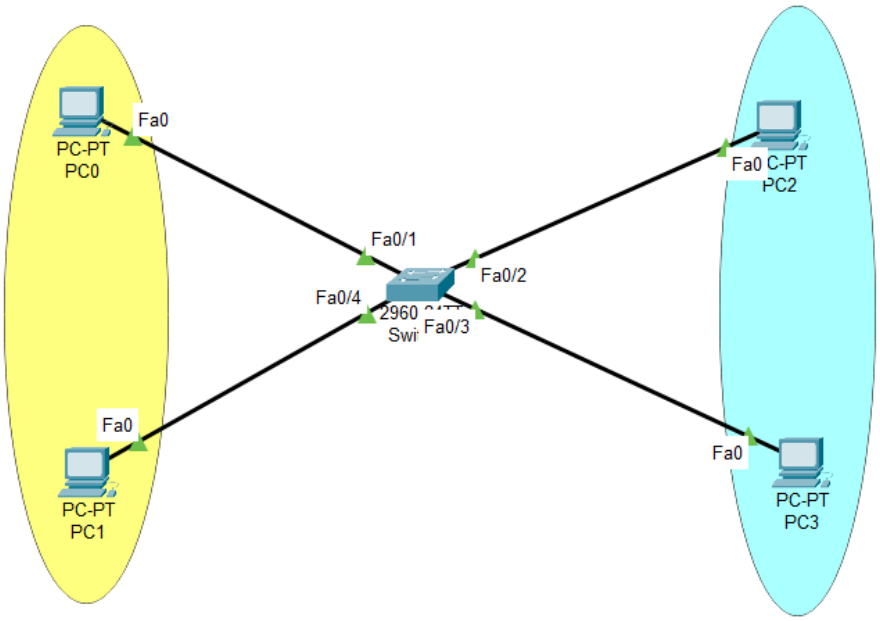
Device	Interface	IP Address	Subnetmask	VLAN	Default Gateway
PC0	NIC	192.168.11.1	255.255.255.0	15/HR	-
PC1	NIC	192.168.11.2	255.255.255.0	15/HR	-
PC2	NIC	192.168.11.3	255.255.255.0	25/IT	-
PC3	NIC	192.168.11.4	255.255.255.0	25/IT	-

PROCEDURE

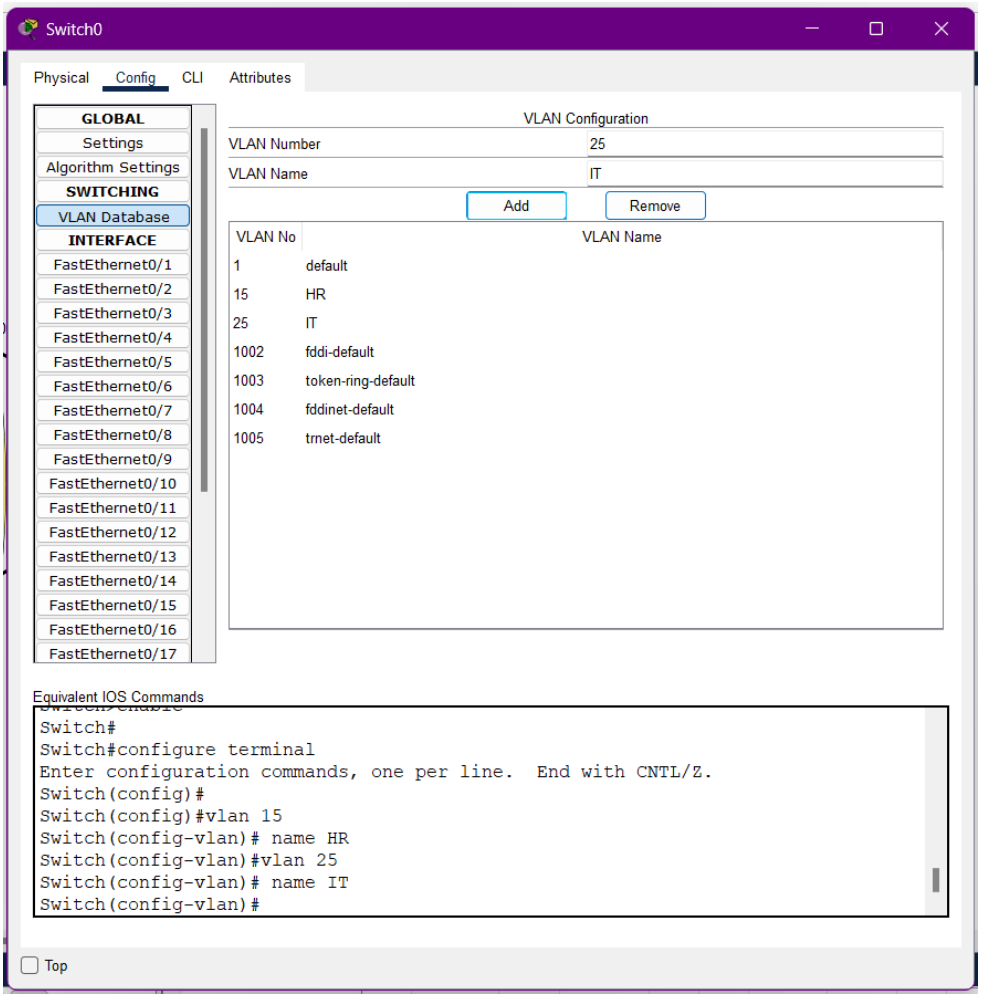
1. Create the topology as shown above



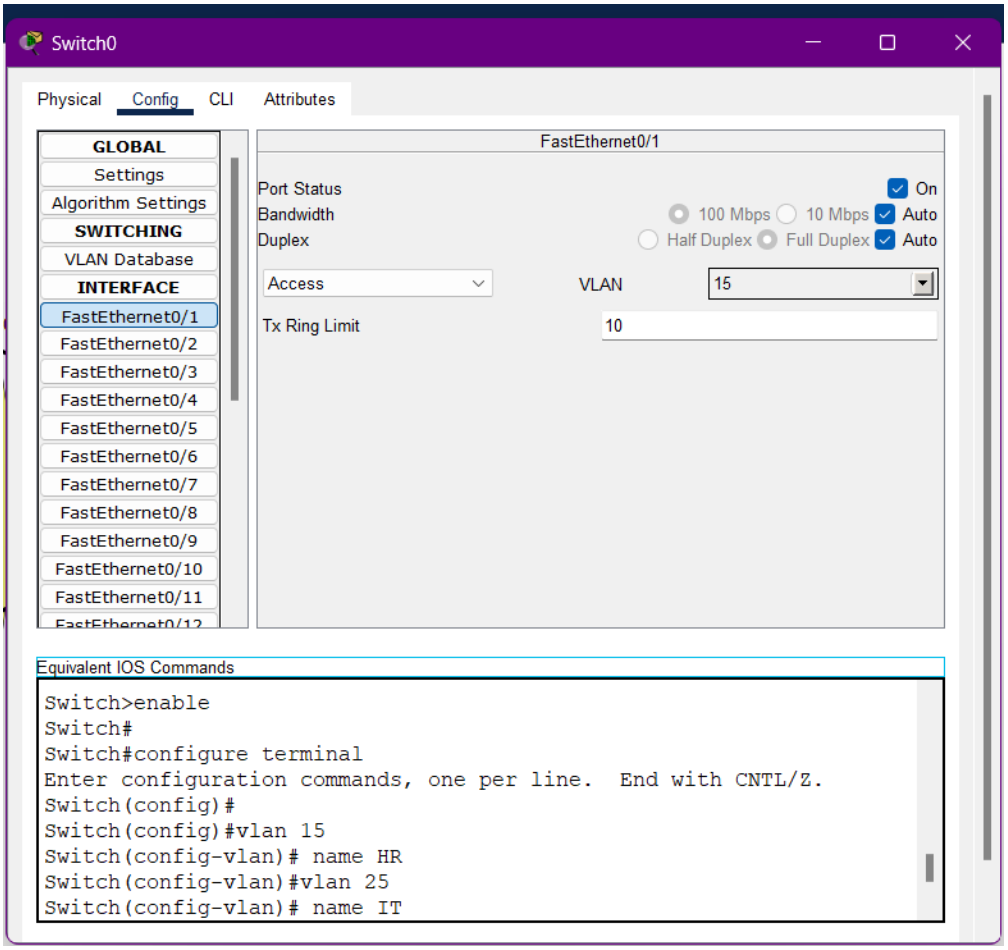
2. Assign the IP address to each PC as shown in IP addressing plan



3. Create two VLANs in a switch as

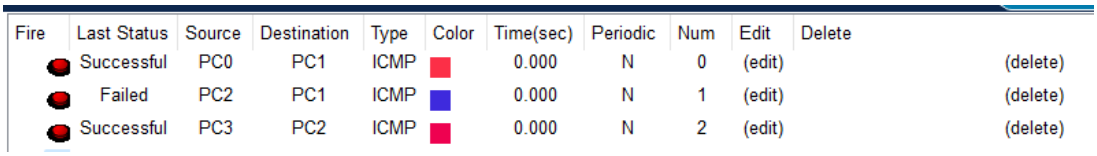


4. Assign the PC connected interface of switch into the VLAN you want to assign



VERIFICATION

1. Ping the PC as



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC1	ICMP		0.000	N	0	(edit)	(delete)
	Failed	PC2	PC1	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC3	PC2	ICMP		0.000	N	2	(edit)	(delete)

PC with in a VLAN gets communicated but PC present in different VLAN can not communicate.

2. View the details of VLANs created in switch as

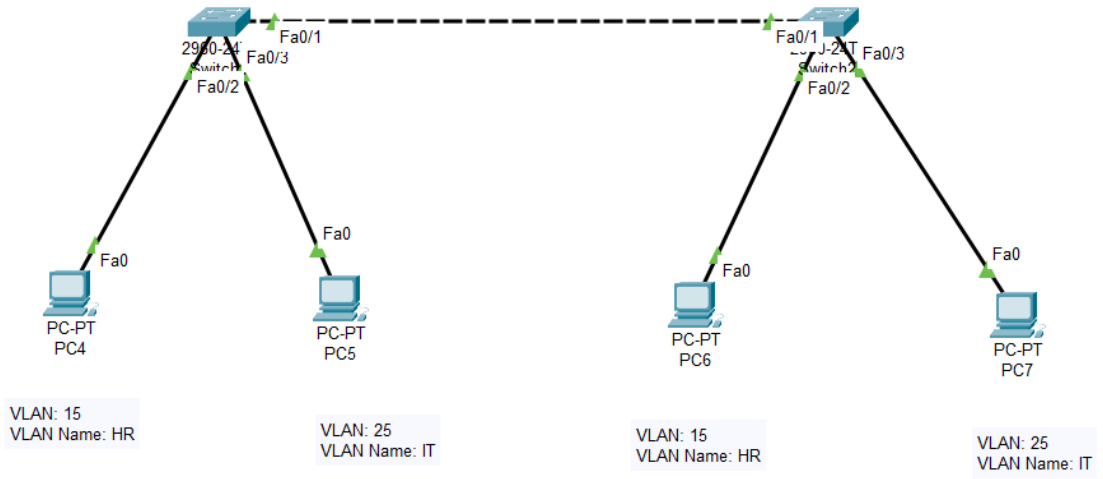
```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                 Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                 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
15   HR                                active    Fa0/1, Fa0/4
25   IT                                active    Fa0/2, Fa0/3
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
```

CONCLUSION

In this way we can create multiple VLANs within a LAN (in a Switch) so that broadcast domain can be divided and gets minimized in a LAN.

LAB 5.2 VLAN
UNDERSTANDING, CREATING, AND SIMULATING MULTIPLE VLANS DISTRIBUTED IN MULTIPLE SWITCH

OBJECTIVE: To understand and create multiple VLANS distributed in multiple switch.
TOOLS USED: Packet Tracer
BACKGROUND
[write concept of VLAN Native, Trunk and Access VLAN]
TOPOLOGY

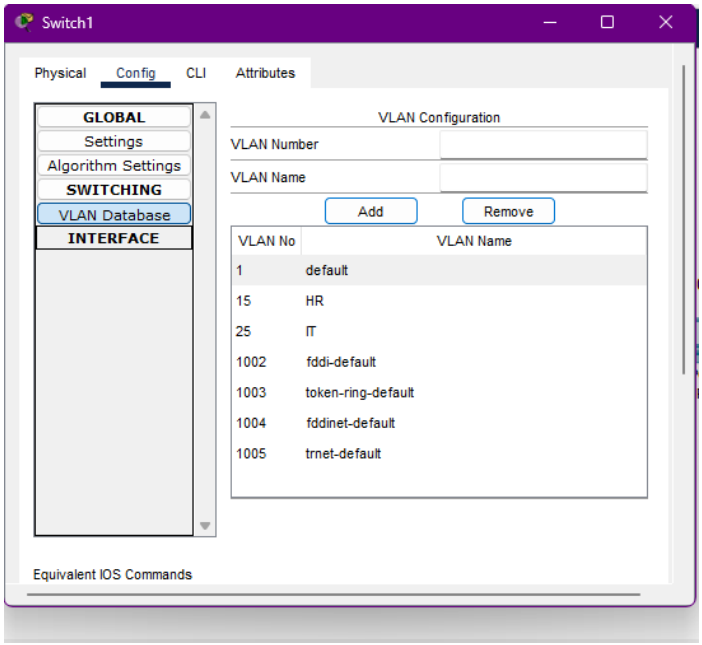


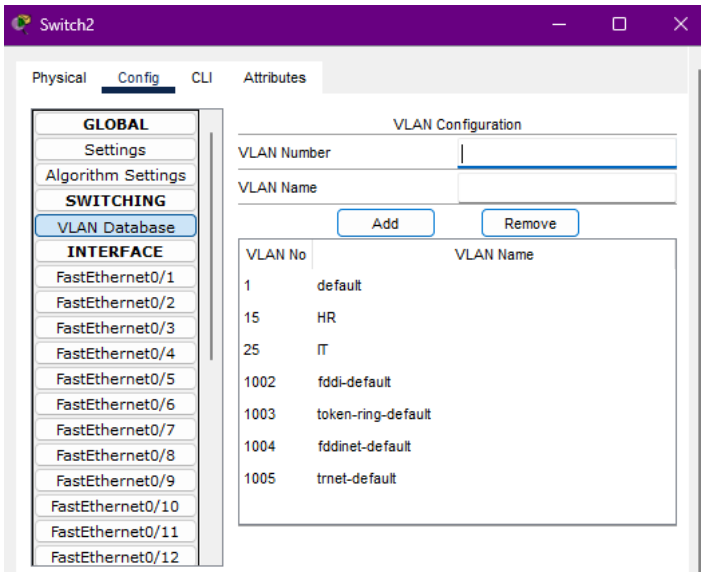
IP ADDRESSING PLAN

Device	Interface	IP Address	Subnetmask	VLAN	Default Gateway
PC4	NIC	192.168.12.1	255.255.255.0	15/HR	-
PC5	NIC	192.168.12.2	255.255.255.0	25/IT	-
PC6	NIC	192.168.12.3	255.255.255.0	15/HR	-
PC7	NIC	192.168.12.4	255.255.255.0	25/IT	-

PROCEDURE

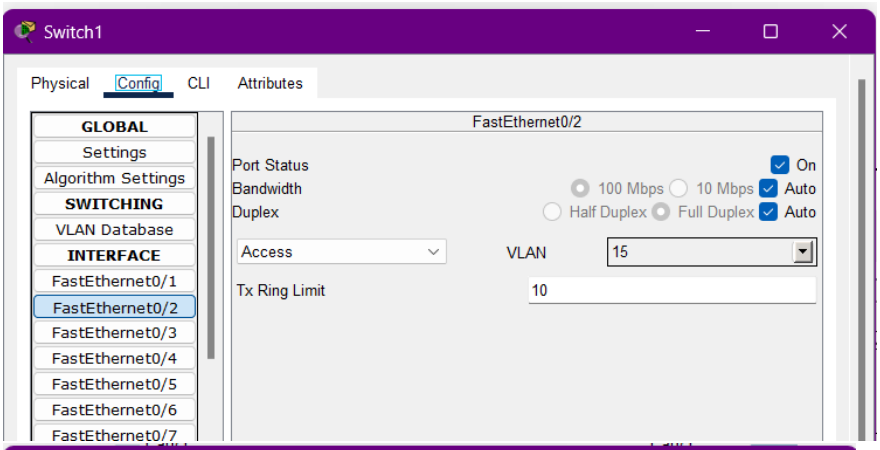
1. Create the topology as shown above
2. Assign the IP address to each PC as shown in IP addressing plan
3. Create two VLANs in each switch as

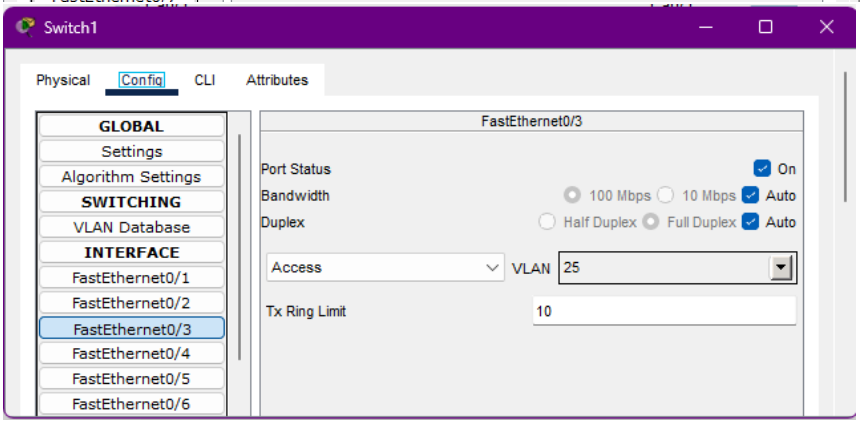




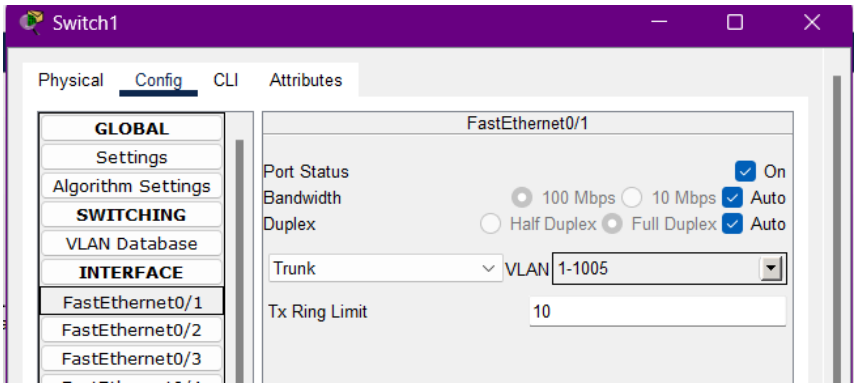
4. Assign the PC connected interface of switch into the VLAN you want to assign

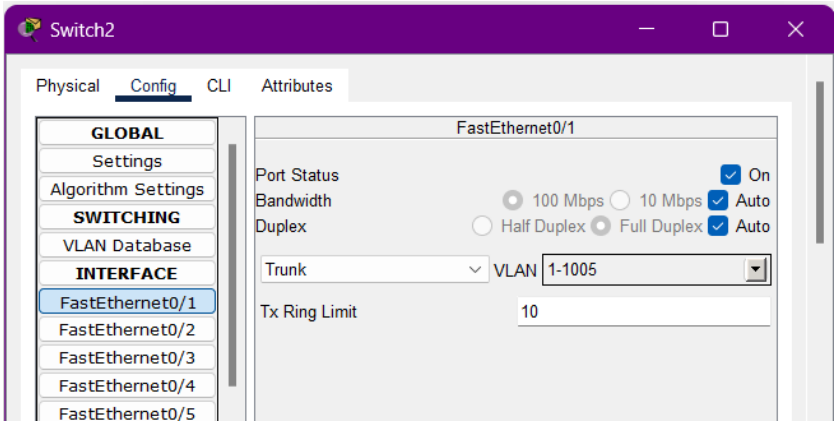
Switch1





Similarly for other interfaces in switch 1 and go to into switch2 and assign interface to each VLAN as shown above. During assignment fa 0/1 interface in each switch must make trunk other should be access.





VERIFICATION

1. Ping the PC as

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC4	PC6	ICMP		0.000	N	0	(edit)	
	Successful	PC5	PC7	ICMP		0.000	N	1	(edit)	
	Failed	PC5	PC6	ICMP		0.000	N	2	(edit)	
	Failed	PC4	PC7	ICMP		0.000	N	3	(edit)	

   PC present in Same VLAN gets communicated irrespective of their location and connection switch however, PC present in different VLAN cannot communicate.

2. View the details of VLANs created in switch as

```
Switch>show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    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
15   HR                                active    Fa0/2
25   IT                                active    Fa0/3
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch>
```

   In switch 1

```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    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
15   HR                                active    Fa0/2
25   IT                                active    Fa0/3
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch>
```

CONCLUSION

In this way we can create multiple VLANs distributed in multiple switches so that broadcast domain can be distributed in multiple locations.

LAB 5.3 VLAN

UNDERSTANDING, CREATING, AND SIMULATING MULTIPLE VLANS DISTRIBUTED IN MULTIPLE SWITCH AND ROUTING AMONG VLANS

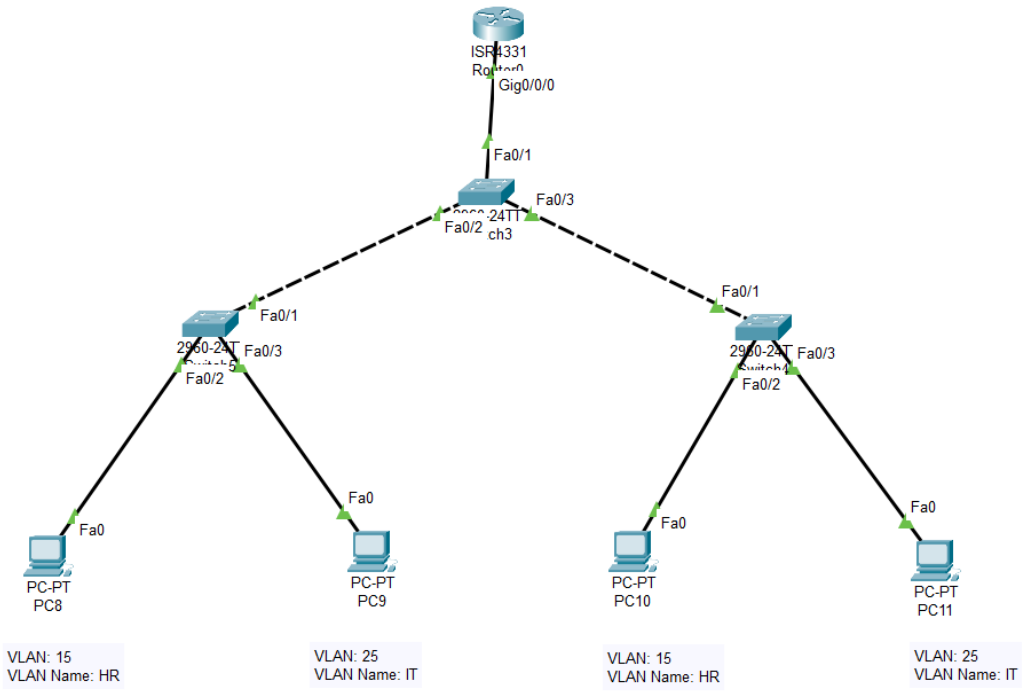
OBJECTIVE: To understand and create multiple VLANS distributed in multiple switch and routing among them

TOOLS USED: Packet Tracer

BACKGROUND

Virtual LANs (VLANS) are networks segments on a switched LAN. Inter-VLAN routing refers to the movement of packets across the network between hosts in different network segments. VLANs make it easier for one to segment a network, which improves the performance of the network and makes it more flexible, since they are logical connections. VLANs act as separate subnet on the network. To move packets from one VLAN to another and enable communications among hosts, the VLAN network should be configured.

TOPOLOGY

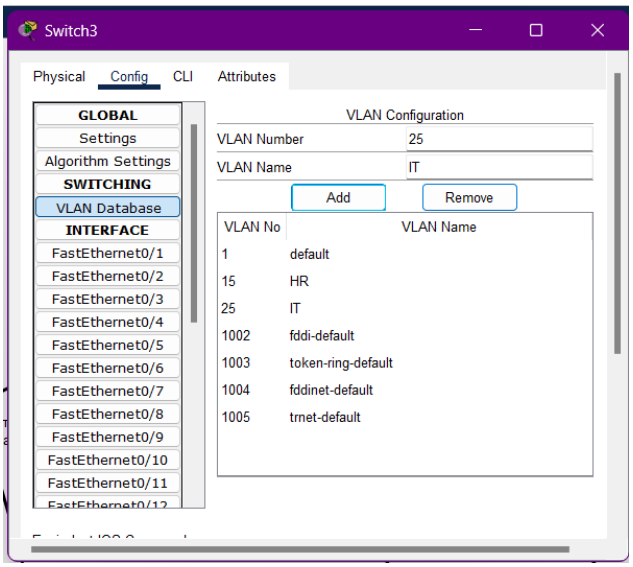


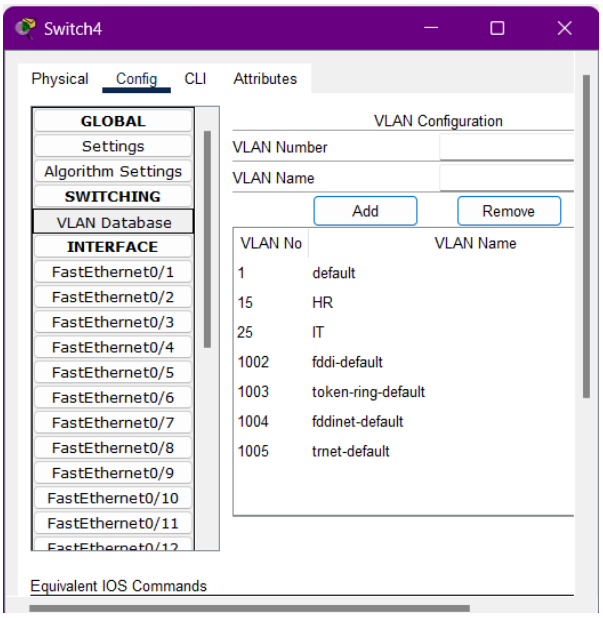
IP ADDRESSING PLAN

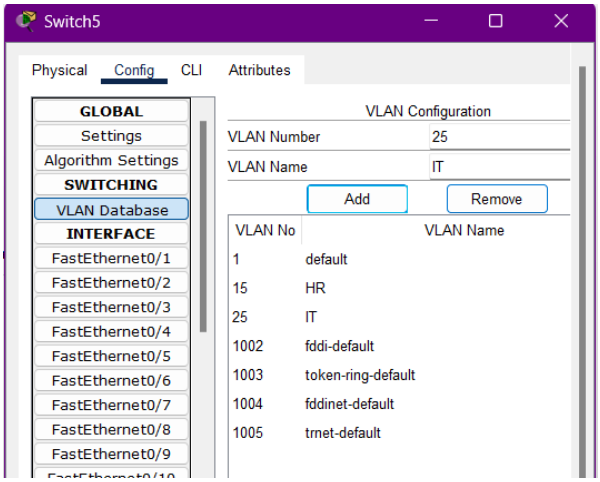
Device	Interface	IP Address	Subnetmask	VLAN	Default Gateway
PC8	NIC	192.168.7.2	255.255.255.0	15/HR	192.168.7.1
PC9	NIC	192.168.8.2	255.255.255.0	25/IT	192.168.8.1
PC10	NIC	192.168.7.3	255.255.255.0	15/HR	192.168.7.1
PC11	NIC	192.168.8.3	255.255.255.0	25/IT	192.168.8.1
Router		192.168.7.1	255.255.255.0	-	-
Router		192.168.8.1	255.255.255.0	-	-

PROCEDURE

1. Create the topology as shown above
2. Assign the IP address to each PC as shown in IP addressing plan
3. Create two VLANs in each switch as







And run the following additional command in switch 5 and switch 4

Switch>enable

Switch#config terminal

Switch(config)#vtp mode client

4. Perform the following configurations in router

    Router>enable

    Router#configure terminal

    Router(config)#interface GigabitEthernet0/0/0.7

    Router(config-subif)#encapsulation dot1Q 7

    Router(config-subif)#ip address 192.168.7.1 255.255.255.0

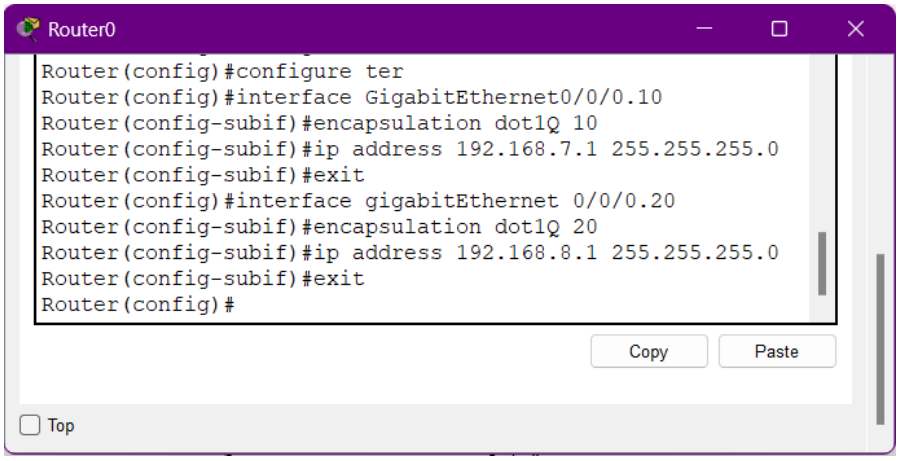
    Router(config-subif)#exit

    Router(config)#interface gigabitEthernet 0/0/0.8

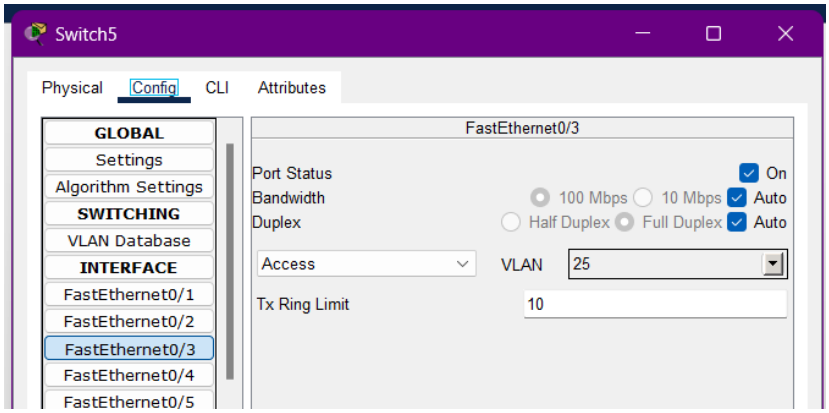
    Router(config-subif)#encapsulation dot1Q 8

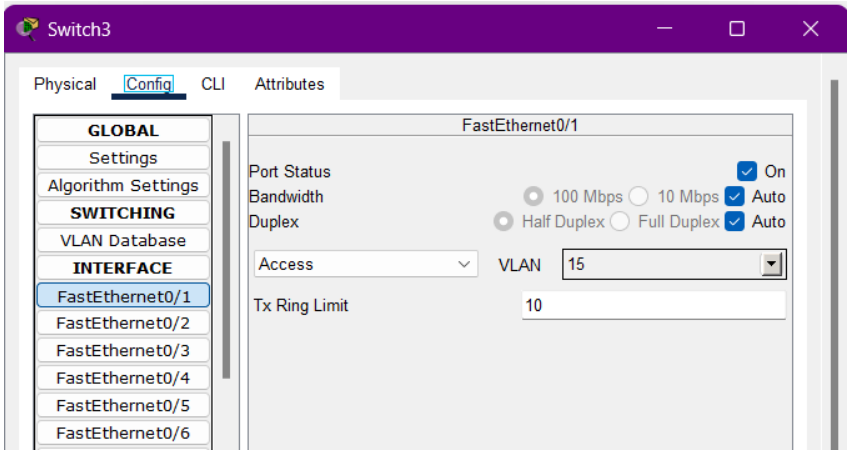
    Router(config-subif)#ip address 192.168.8.1 255.255.255.0

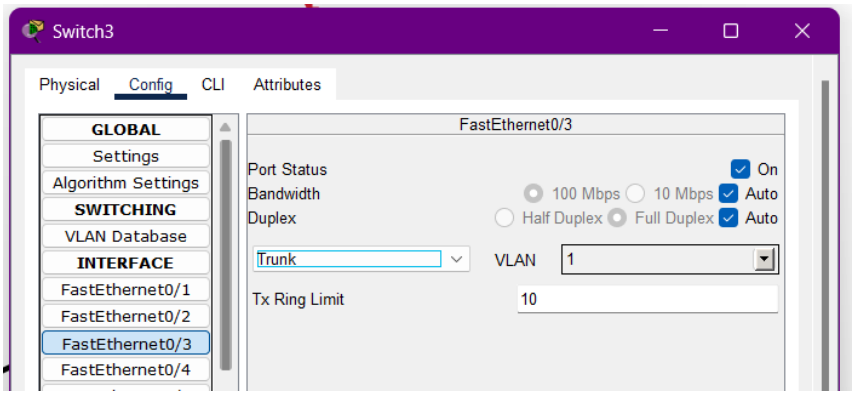
    Router(config-subif)#exit



5. Assign the PC connected interface of switch into the VLAN you want to assign



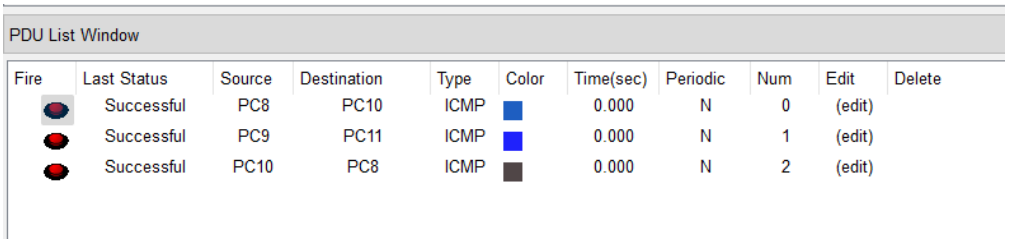




Similarly for other interfaces in switch 5 and go to into switch1 and assign interface to each VLAN as shown above. During assignment fa 0/1 interface in switch 5 and switch 4 must make trunk other should be access. Similarly, all the interfaces 1 to 3 in switch 3 must be trunk.

VERIFICATION

1. Ping the PC as



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC8	PC10	ICMP		0.000	N	0	(edit)	
	Successful	PC9	PC11	ICMP		0.000	N	1	(edit)	
	Successful	PC10	PC8	ICMP		0.000	N	2	(edit)	

2. View the details of VLANs created in switch as Switch 3

```
Switch>show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    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
15   HR                                active
25   IT                                active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch>
```

Switch 5

```
Switch>show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    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
15   HR                               active    Fa0/2
25   IT                               active    Fa0/3
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch>
```

Switch 6

```
Switch>show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    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
15   HR                               active    Fa0/2
25   IT                               active    Fa0/3
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
```

CONCLUSION

n this way we can create multiple VLANs distributed in multiple switches and also perform the inter-VLAN routing in order to make communication possible among VLANs.