Online Assignement-1

Course Code:	CAP 276	Course Title:	Data Communication and Networking-Laboratory
Course Instructor: Avinash Bhagat			
Student's Roll no:	RD2112B56	Student's Reg. no:	12107974
Name: Sirjanpreet Kaur			

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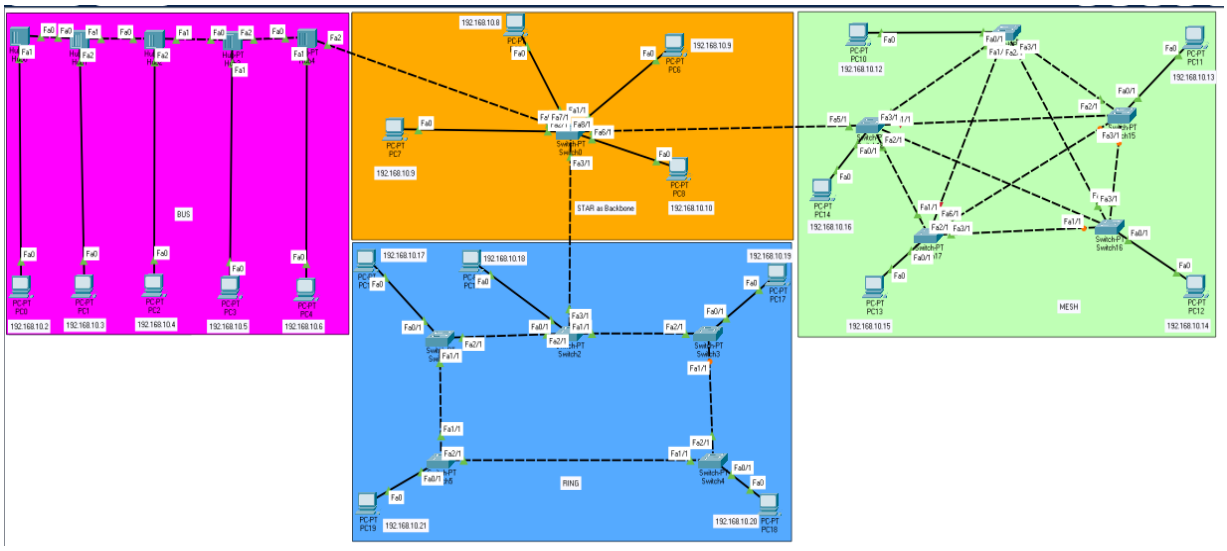
Design a network topology with a star backbone connected to bus, ring and mesh topologies.

1.Objective:

The objective of this practical is to design a network topology by using various topologies and pass packets between PCs. In this we are going to connect bus topology, ring topology and mesh topology with the star topology that will act as a backbone. Backbone means that all the packets are going to pass through the Star topology then further passes to another topologies. The connection is established using networking devices like hubs and Switch. Through networking devices, the packets are passed from one PC to another .

2.Network Snapshot with proper labelling:



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3.Initial IP Configuration:

Device	Interface	IP Configuration	Connected with
PC0	Fa0	192.168.10.2	Hub0
PC1	Fa0	192.168.10.3	Hub1
PC2	Fa0	192.168.10.4	Hub2
PC3	Fa0	192.168.10.5	Hub3
PC4	Fa0	192.168.10.6	Hub4
Hub0	Fa0	----------	Hub1
Hub1	Fe1	----------	Hub2
Hub2	Fa1	----------	Hub3
Hub3	Fa2	----------	Hub4
Hub4	Fa2	----------	Switch0
PC5	Fa0	192.168.10.7	Switch0
PC6	Fa0	192.168.10.8	Switch0
PC7	Fa0	192.168.10.9	Switch0
PC8	Fa0	192.168.10.10	Switch0
Switch0	Fa8/1	----------	Switch18
PC10	Fa0	192.168.10.12	Switch14
PC11	Fa0	192.168.10.13	Switch15
PC12	Fa0	192.168.10.14	Switch16
PC13	Fa0	192.168.10.15	Switch17
PC14	Fa0	192.168.10.16	Switch18
Switch14	Fa2/1	----------	Switch15
Switch15	Fe1/1	----------	Switch16
Switch16	Fa1/1	----------	Switch17
Switch17	Fa1/1	----------	Switch18
Switch18	Fa1/1	----------	Switch14
PC15	Fa0	192.168.10.17	Switch1
PC16	Fa0	192.168.10.18	Switch2
PC17	Fa0	192.168.10.19	Switch3
PC18	Fa0	192.168.10.20	Switch4
PC19	Fa0	192.168.10.21	Switch5
Switch1	Fa2/1	----------	Switch2
Switch2	Fa1/1	----------	Switch3
Switch3	Fa1/1	----------	Switch4

Device	Interface	IP Configuration	Connected with
Switch4	Fa1/1	----------	Switch5
Switch5	Fa1/1	----------	Switch1
Switch2	Fa3/1	----------	Switch0
Switch0	Fa3/1	----------	Switch2
Switch0	Fa7/1	----------	Hub4
Switch0	Fa6/1	----------	Switch18

4.Process Description:

In this, we are going to design four topologies and pass packets between them using Star Topology as Backbone. This process is going to take place in the following steps : -

Step 1: We first create Bus Topology using 5 PCs -PC0,PC1,PC2,PC3 and PC4 and assign IP address es to each PC. Then we connect 5 Hubs to 5 PCs individually using automatically choose connection type. Then we connect Hubs. Hubs are used to broadcast the packets to each and every PC of the network and the appropriate PC will accept the packet.

Step2 : Now the connections are established between hubs like -Hub to Hub1,Hub1 to Hub2,Hub2 to Hub 3,Hub3 to Hub4 using automatic connection wire using fast ethernet. We can connect any two devices by simply selecting automatic connection cable. This cable will on its own select the required wire whether it is straight through or cross over as per the devices need to be connected.

Step 3: Now we are going to create star topology using a Switch i.e. Switch0 and 4 PCs-PC5,PC6,PC7 and PC8 placing Switch in centre and connecting it to all PCs available in network. Switch is used to pass the packet to the appropriate PC that forming a Star like structure and it will serve as a backbone for complete network. Switch is a networking device that is used to send packets to PCs according to the need. It terminate the connection according to need.

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Step 4: Then we create Mesh topology. In Mesh Topology, each PC is connected to every other PCs in the network using appropriate cable. Now there are 5 PCs-PC10, PC11, PC12, PC13 and PC14 and we place 5 switches that is connected to every other PC in the network like PC10 is connected to Switch14, PC11 to Switch15, PC12 to Switch15, PC13 to Switch17, PC14 to Switch18.Now each PC is connected to every other PC using Switch in the network. Like Switch14 is connected to Switch15,Switch15 to Switch16,Switch16 to Switch17,Switch17 to Switch18 and Swith18 to switch14.In this way Mesh Topology is created.

Step 5: Now we create Ring Topology using 5 PCs-PC15, PC16, PC17, PC18 and PC19.Now we place 5 switches that is connected to each PC in the network. In Ring Topology, every PC is connected to the next PC and the last PC is connected to the first PC forming a ring like structure. In a ring network, packets of data travel from one device to the next until they reach their destination. In this, PC15 is connected to Switch1, PC16 to Switch2, PC17 to Switch3, PC18 to Switch4 and PC19 to Switch5.Now each switch is connected to another switch like Switch1 is connected to Switch2, Switch2 to Switch3, Switch3 to Switch 4 and Switch 5 to Switch1 forming a Ring. The connections are established using Fast Ethernet.

Step 6: Now we are going to connect the topologies for passing information between PCs. Now the Hub4 of Bus Topology is connected to the Switch 0 of Star Topology using Fast Ethernet. By doing this, we can pass packets of Bus Topology to another PCs in the network. Now the PCs of Bus topology are connected to the Star topology through Hub and Switch.

Step 7: Now switch 0 of Star topology is connected to the Switch18 of Mesh Topology. By doing this, the connection is established between Star Topology and Mesh Topology. In this way the Mesh Topology is connected to the Star Topology and packets of PCs are passed to other topologies that are connected to Star Topology.

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Step 8: Then switch 0 of Star Topology is connected to the Switch2 of Ring Topology. By doing this, the connection is established between Star Topology and Ring Topology. Now packets are passed from Ring Topology to other topologies through the Star Topology.

Step 9: All the topologies are connected to the Star topology. All Topologies are connected to switch of star topology using hubs and switches of other topologies. Because Star topology acts as a backbone. So all the packets will move though the Star Topology and then further reach to their destination PC.

Step 10: When PC of one packet wants to pass information or packets to another PC of another topology then, firstly it goes to the star topology then Switch of Star topology pass the packets to the PC to which it is for. Switch passes the packet to the appropriate topology. Hence the packets reached to their destination.

So in this way networks are connected to each other and packets are passed between them.