Experiment No.: 3

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Branch: ECE
Semester: 6th
Subject Name: Computer Networks Lab

UID: 20BEC1104
Section/Group: 1-A
Date of Performance: 27/02/2023
Subject Code: 20ECP-374

1. Aim/Overview of the practical: To study the following network devices such as Hub, Switch, Repeater, Bridge, Router, Gateway.

2. Apparatus/Tool Used: Cisco Packet Tracer.

3. Theory:

- **Repeater :** A repeater is a layer one device, having two ports, which means it operates at physical layer. It regenerates the signal in a single local area network. Repeaters donot amplify the signal, when the signal becomes weak, they copy the signal bit by bit and regenerate it at original strength.

- **Hub :** A hub is a local area network device and it operates at the physical layer means a layer one device. The main disadvantage of this device is that whatever it receives, it always does broadcasting. A hub is basically a multi-port repeater. Hubs cannot filter data, so data packets are sent to all connected devices. They donot have enough intelligence to find out the best path for data packets which leads to inefficiencies and wastage.

- **Switch :** A switch is a local area networking device and it connects devices in a single local area network. It is a 'layer-two' device which operates at the data link layer. Switch is an intelligent device and it stores the MAC address table. Unlike hub, switch does uni-casting, which means it can send the data to the exact recipient.

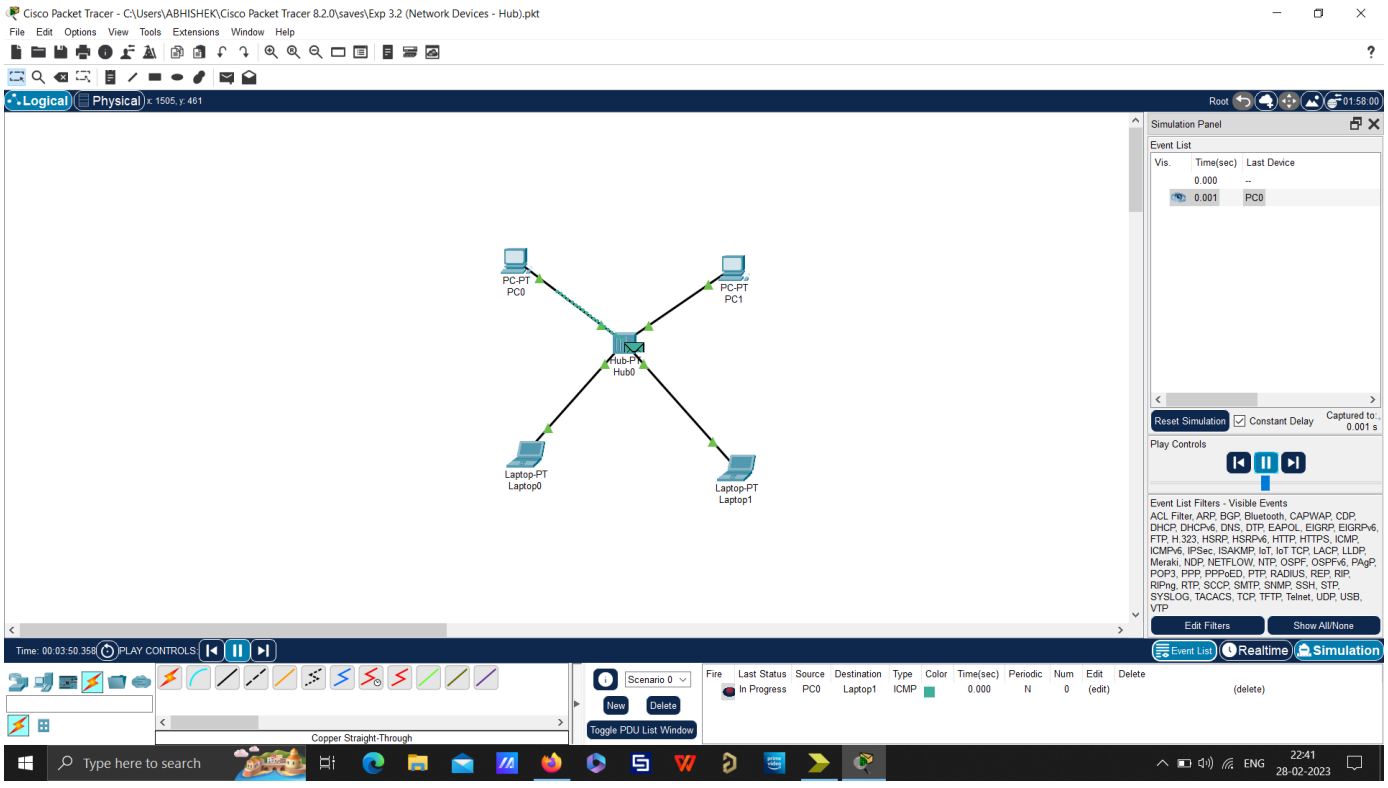
- **Bridge :** A bridge is a 'layer-two' device which operates at the data link layer. A bridge connects two local area network segments that are running with the same protocols. A bridge can also regenerate the signals because a bridge is a combination of a repeater and MAC address reading capability.

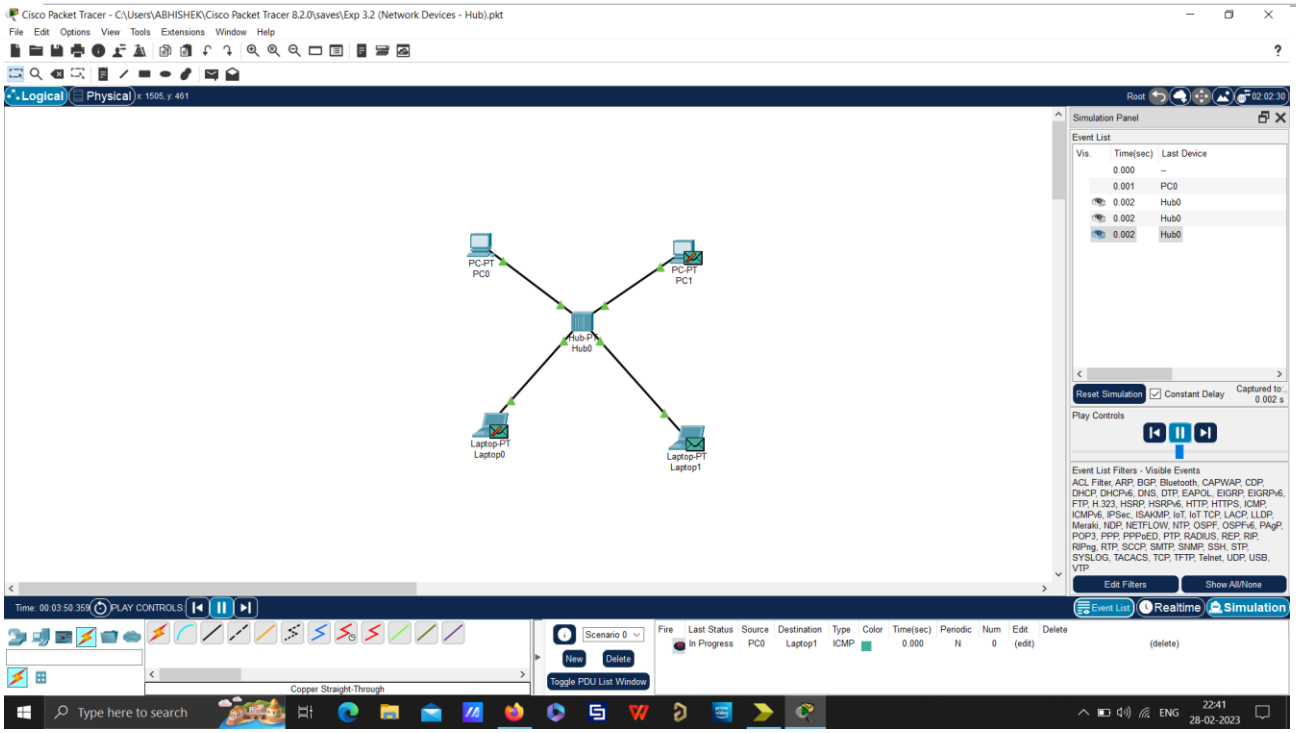
- **Router :** A router is a 'layer-three' device which operates at the network layer. Router takes forwarding decisions based on the IP addresses. It is a networking device that can connect two or more different LAN's that has two or more different protocols. For example, if one side it is Ethernet and another side it is Wi-Fi, then a router can connect these two technologies as well.

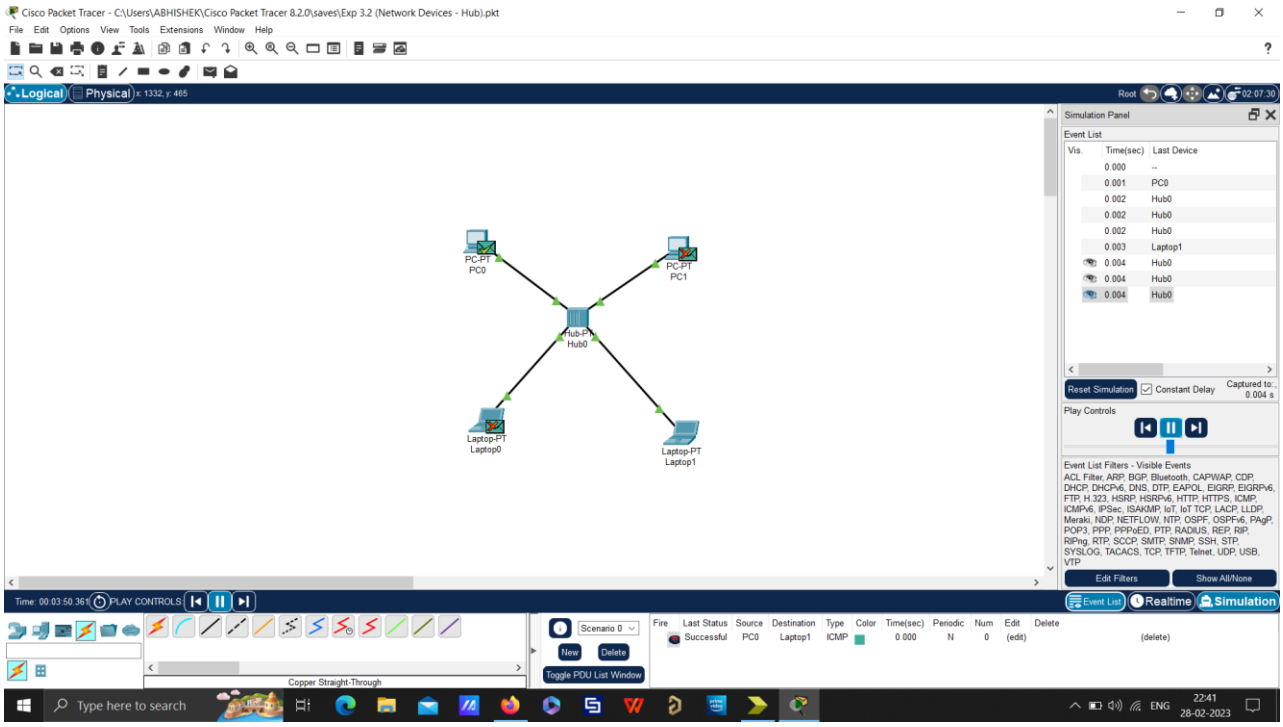
- **Gateway :** A gateway, as the name suggests, is a passage to connect two networks together that may work upon different networking models. They basically works as the messenger agents that take data from one system, interpret it and then transfer it to another system. Gateways are also called protocol converters and can also operate at any network layer. Gateways are generally more complex than a switch or a router.

4. CIRCUIT DIAGRAM & SIMULATION:

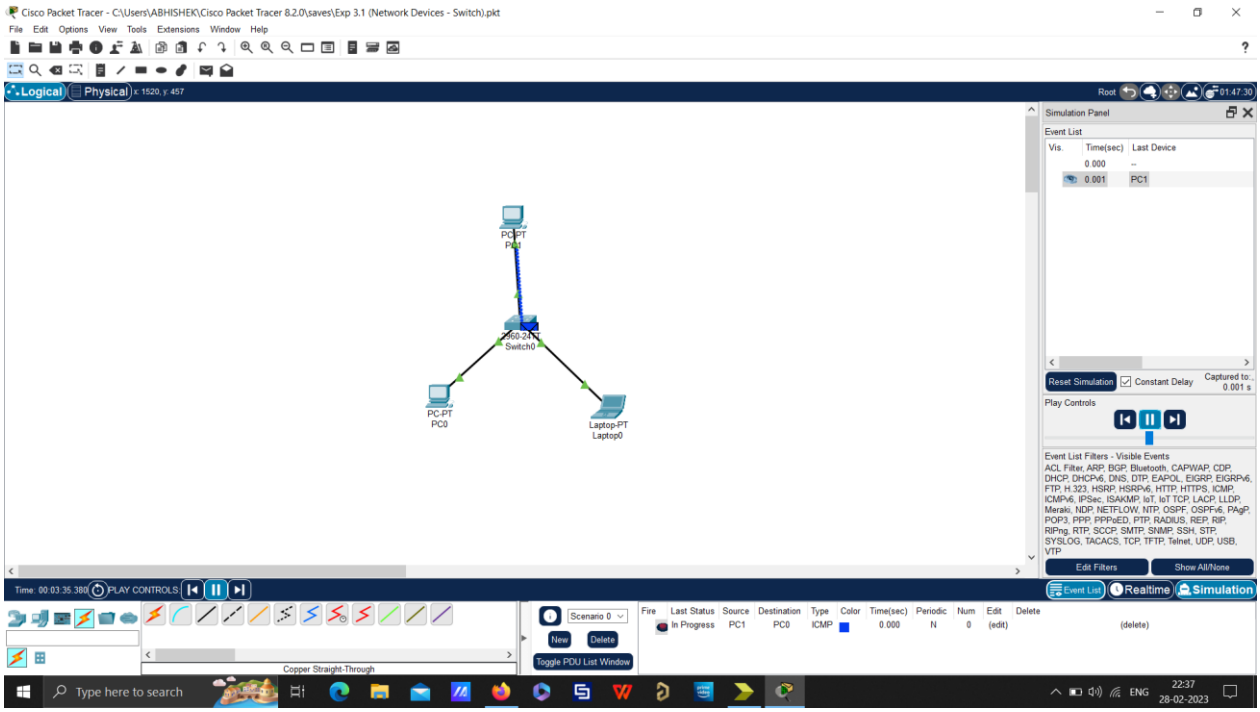
HUB :-

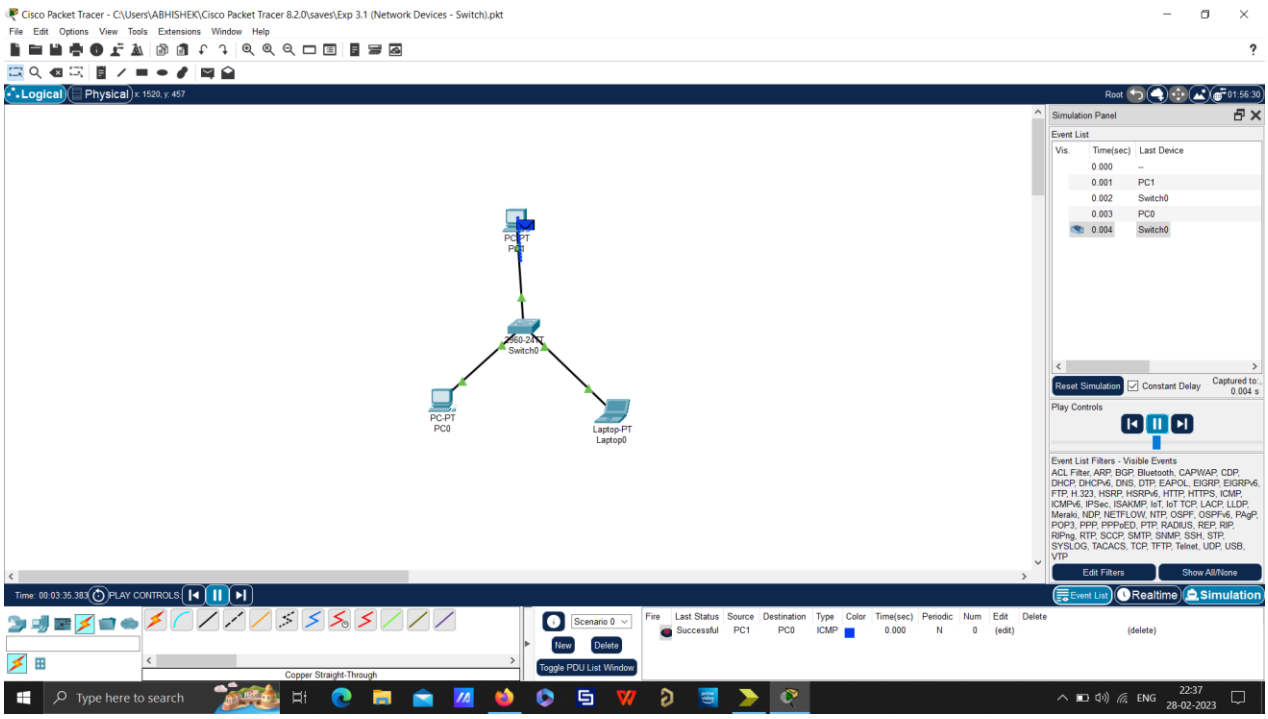



Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp 3.2 (Network Devices - Hub).pkt
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1505, y: 461
Root 02:02:30
PC-PT PC0
PC-PT PC1
Hub-PT Hub0
Laptop-PT Laptop0
Laptop-PT Laptop1
Simulation Panel
Event List
Vis. Time(sec) Last Device
0.000 --
0.001 PC0
0.002 Hub0
0.002 Hub0
0.002 Hub0
Reset Simulation Constant Delay Captured to: 0.002 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters Show All/None
Time: 00:03:50.359 PLAY CONTROLS:
Event List Realtime Simulation
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
In Progress PC0 Laptop1 ICMP 0.000 N 0 (edit) (delete)
Copper Straight-Through
Type here to search
ENG 22:41 28-02-2023

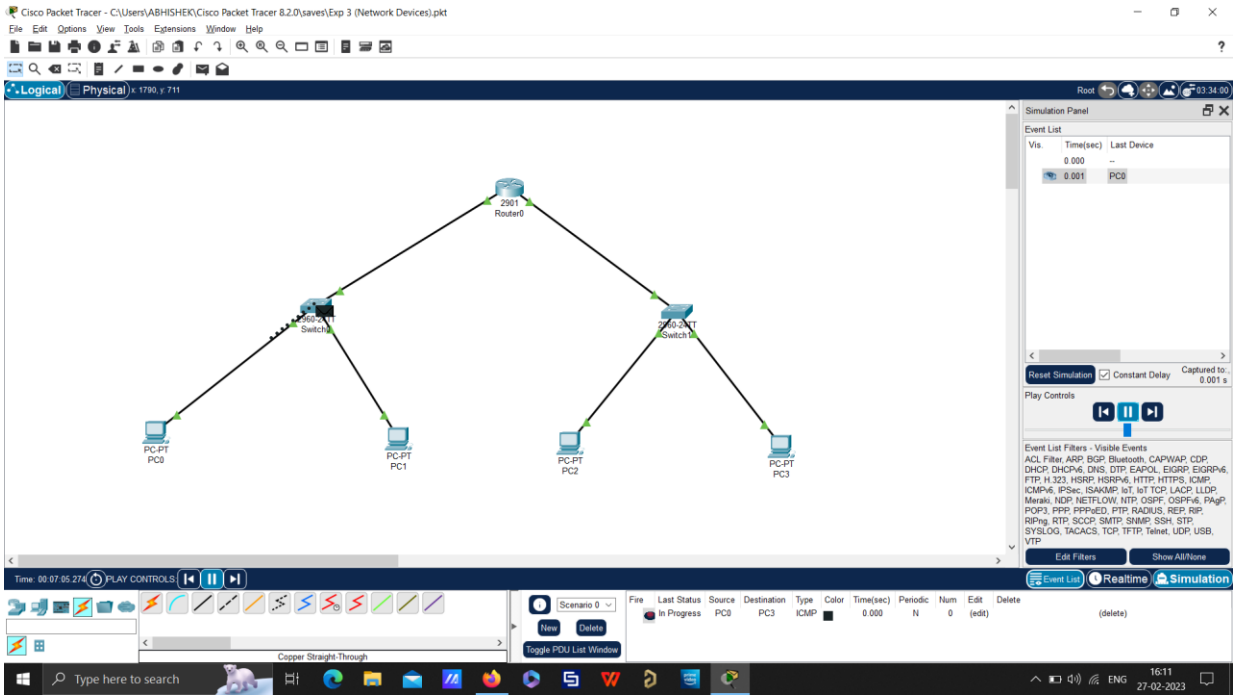

Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp 3.2 (Network Devices - Hub).pkt
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1332, y: 465
Root 02:07:30
PC-PT PC0
PC-PT PC1
Hub-PT Hub0
Laptop-PT Laptop0
Laptop-PT Laptop1
Simulation Panel
Event List
Vis. Time(sec) Last Device
0.000 --
0.001 PC0
0.002 Hub0
0.002 Hub0
0.002 Hub0
0.003 Laptop1
0.004 Hub0
0.004 Hub0
0.004 Hub0
Reset Simulation Constant Delay Captured to: 0.004 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters Show All/None
Time: 00:03:50.361 PLAY CONTROLS:
Event List Realtime Simulation
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 Laptop1 ICMP 0.000 N 0 (edit) (delete)
Copper Straight-Through
Type here to search
ENG 22:41 28-02-2023

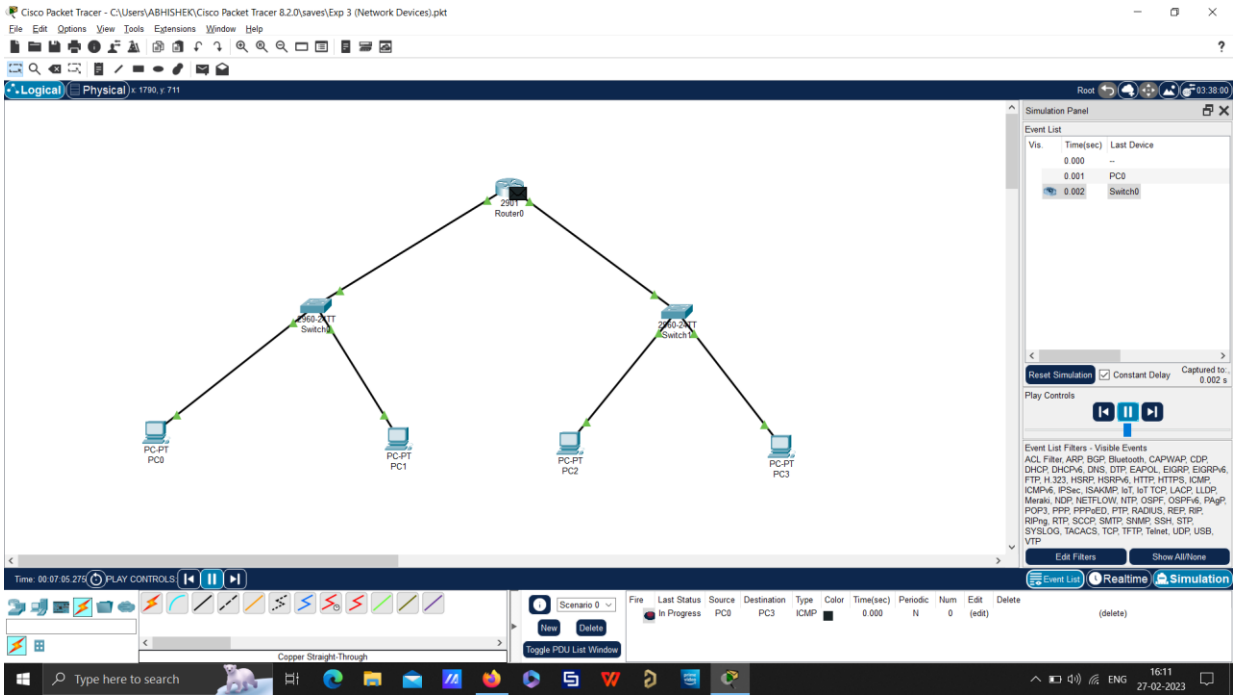
Switch :-

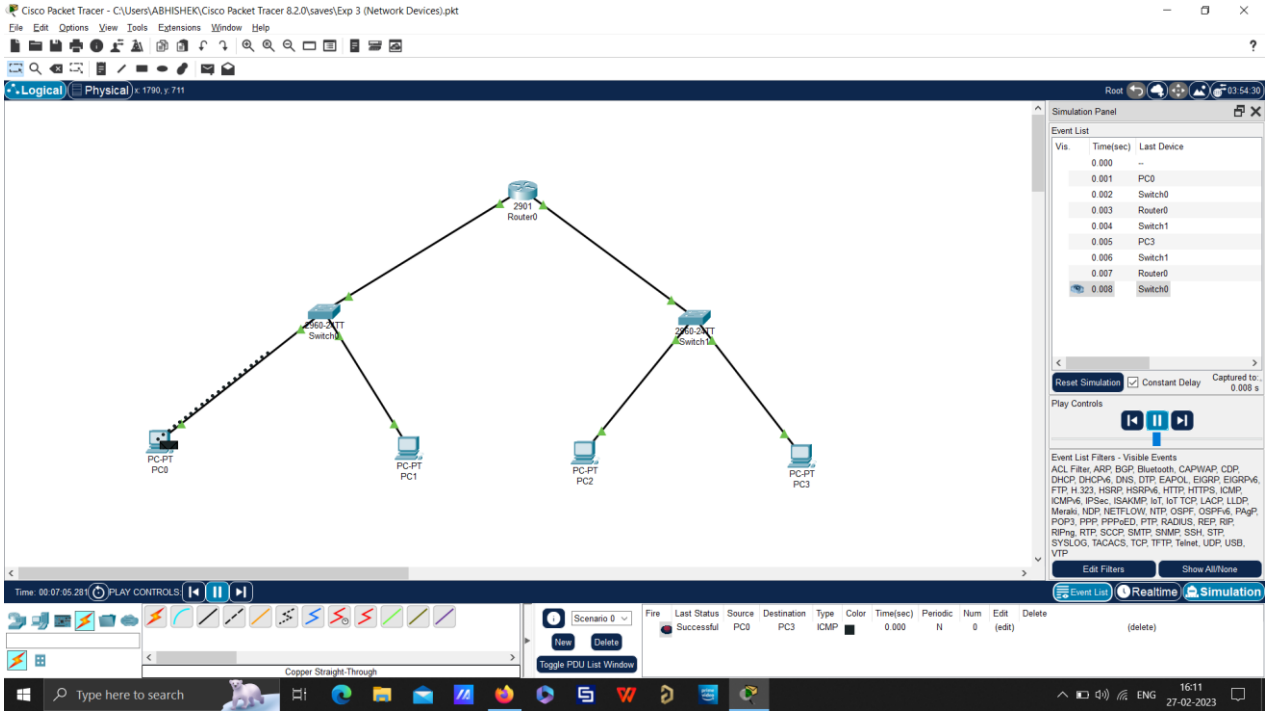

Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp 3.1 (Network Devices - Switch).pkt
Logical
Physical
Simulation Panel
Event List
PC-PT PC1
2960-24TT Switch0
PC-PT PC0
Laptop-PT Laptop0
Reset Simulation
Constant Delay
Play Controls
Edit Filters
Show All/None
Realtime
Simulation
Copper Straight-Through
Type here to search
ENG
22:37
28-02-2023

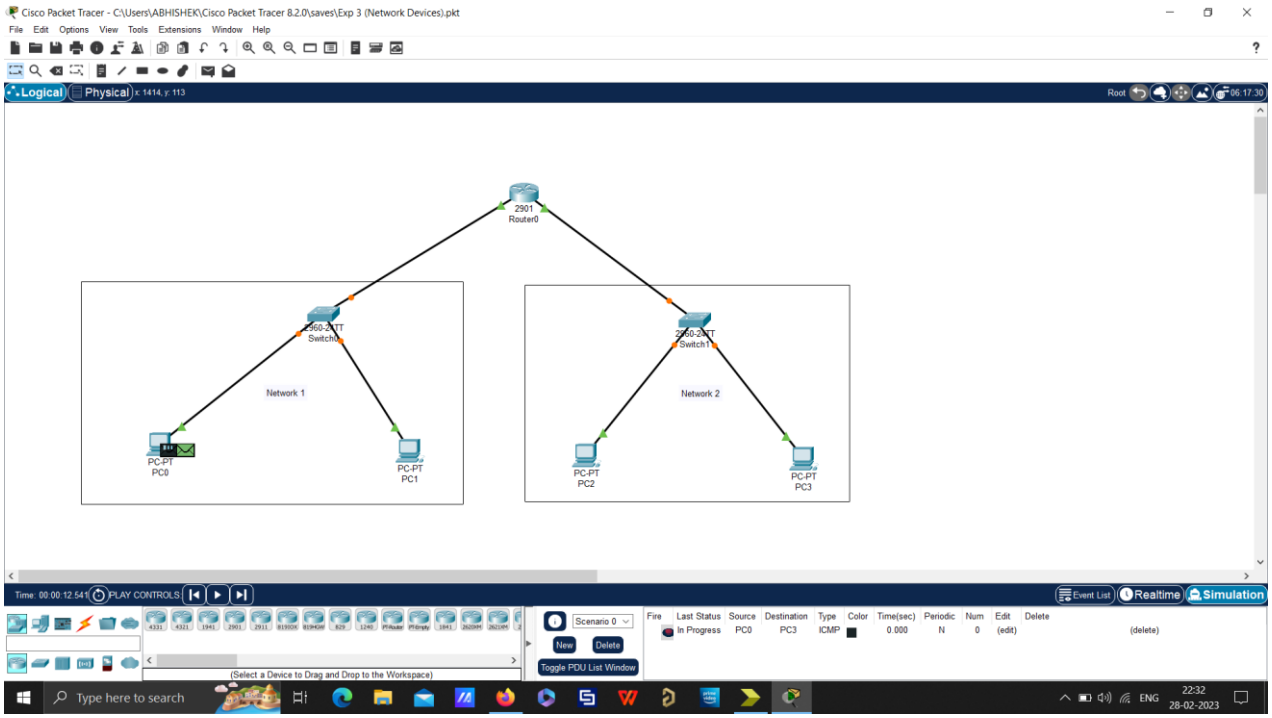

Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp 3.1 (Network Devices - Switch).pkt
Logical
Physical
Simulation Panel
Event List
PC-PT PC1
2960-24TT Switch0
PC-PT PC0
Laptop-PT Laptop0
Reset Simulation
Constant Delay
Play Controls
Edit Filters
Show All/None
Realtime
Simulation
Copper Straight-Through
Type here to search
ENG
22:37
28-02-2023

Router :-


Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp 3 (Network Devices).pkt
Logical
Physical
2901 Router0
2960-24TT Switch0
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Realtime
Simulation
Copper Straight-Through
Type here to search
ENG
16:11
27-02-2023


Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp 3 (Network Devices).pkt
Logical
Physical
2901 Router0
2960-24TT Switch0
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Realtime
Simulation
Copper Straight-Through
Type here to search
ENG
16:11
27-02-2023


Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp 3 (Network Devices).pkt
Logical
Physical
2901 Router0
2960-24TT Switch0
2960-24TT Switch1
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Copper Straight-Through
Realtime
Simulation
Type here to search
16:11
27-02-2023


Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp 3 (Network Devices).pkt
Logical
Physical
2901 Router0
2960-24TT Switch0
2960-24TT Switch1
Network 1
Network 2
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
(Select a Device to Drag and Drop to the Workspace)
Realtime
Simulation
Type here to search
22:32
28-02-2023

5. **Working difference:** When we are working with hub, since it is a broadcast device, therefore it will send the information to all the other devices connected to it, when one tries to contact with another. It is upon the end devices connected whether they reject the information signal or accept the information signal (generally reject it). This is a major drawback working with a hub.

   However, in switch this does not happen. When any data packet is received at a switch from any end device of a network, then it observes the destination address and hence send the information to that particular address only. Hence, no other devices connected will be able to receive the message which a user might not want to share with others.

   For routers, it is a layer-three network device which joins network that may or may not be of same type. For if we are connecting two networks, then we have to give different IP addresses based on their class. This is done so because we are providing a gateway to both the networks.

6. Steps for experiment/practical:

1. Open Cisco Packet Tracer and then login with your register id.
2. Then click on end devices and select the PC and place it in the logical window.
3. Now click on network device and select required devices.
4. Then click on connection and make the required connection for PC's with the network devices.
5. Now change the IP addresses of each and every PC. Remember to give unique IP to the devices.
6. Now we can add simple PDU in between the PC's.
7. Check the movement of packets in simulation.
8. Repeat the same process for other devices too.
9. Now in simulation window we can run the network.
10. Check for errors (if any).

7. Result and Summary:

- We have learned about CISCO packet racer.
- We have also learned about the components in CISCO packet tracer.
- We have learnt the concepts of various types of network devices.
- We have observed practically how the data is being transferred from one device to another when connected with other network devices.

8. Additional Creative Inputs (If Any):

NA

9. Learning outcomes (What I have learnt):

- Learnt about various networking devices.
- Learnt about working of routers, hub and switch.
- Learnt about the difference between devices.

Evaluation Grid (To be filled by Faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.	Worksheet completion including writing learning objectives/Outcomes. (To submit at the end of the day)		
2.	Viva		
3.	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.		
	Signature of Faculty (with Date):	**Total Marks Obtained:**	