Department of Electronics and Telecommunication

Engineering

Semester	T.E. Semester VI – EXTC Engineering
Subject	Computer Communication Network (CCN)
Laboratory Teacher:	Prof. Beena R Ballal

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Grade and Subject Teacher's Signature		

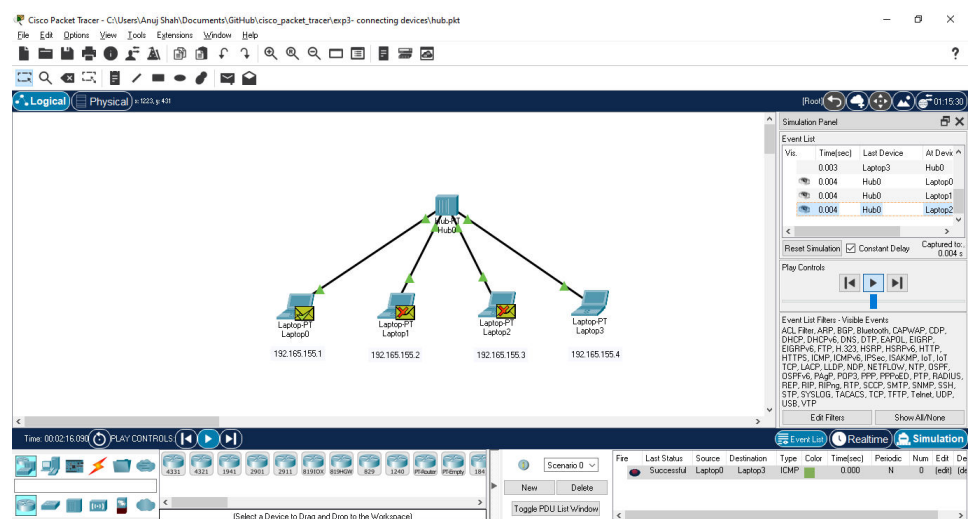| Experiment Number	03
Experiment Title	Analyze operations of the network using different connecting devices such as Hub, Switch and Router
Aim	To establish LAN using different connecting devices such as such as Hub, Switch and Router and verify communication between end devices using PING command
Resources / Apparatus Required	Hardware: Internet Connected PC	Software: Cisco Packet Tracer
Theory:	Students will Write brief theory about Router,Hub and switch Router: • Definition: A router is a device that finds the best path for the packets based on their IP addresses. • Operation: Router is mainly a network layer device. It normally connects LANs and WANs together. It has a dynamically updating routing table based on which it can make decisions on routing the data packets. It divides broadcast domains of hosts connected through it. Hub: • Definition: An active hub is a multiport repeater. • Operation: It is normally used to create connections between stations in a physical star topology. Hubs can also be used to create multiple levels of hierarchy. Switch: • Definition: A switch is a multiport bridge with a buffer in it • Operation: A switch is a data-link layer device. It can perform error checking before forwarding data, which makes it very efficient. In other words, a switch divides collision domain of hosts, but broadcast domain remains the same.
Procedure :	1.Open Cisco Packet Tracer 2. Establish a network using hub,Copper straight through cables as connectors. 3. Assign IP addresses to all the end devices selected 4. In real time environment use the Ping command to ping other end device and verify the reply from the other end device 5. In simulation environment see the journey of Simple PDU from source to destination end device and verify its acknowledgment in the form of Tick mark

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	6. Repeat above steps for Switch as well as Router.For the router use two different networks with IP Addresses of different classes 7.For the router configuration give default gateway to the router on both sides of the network
Screenshots of the Output(Response)	**Network connected using Hub** **Communication established between 2 End devices in a Network with Acknowledgement received Using Hub** **Communication established between 2 End devices in a Network Using Ping Command**
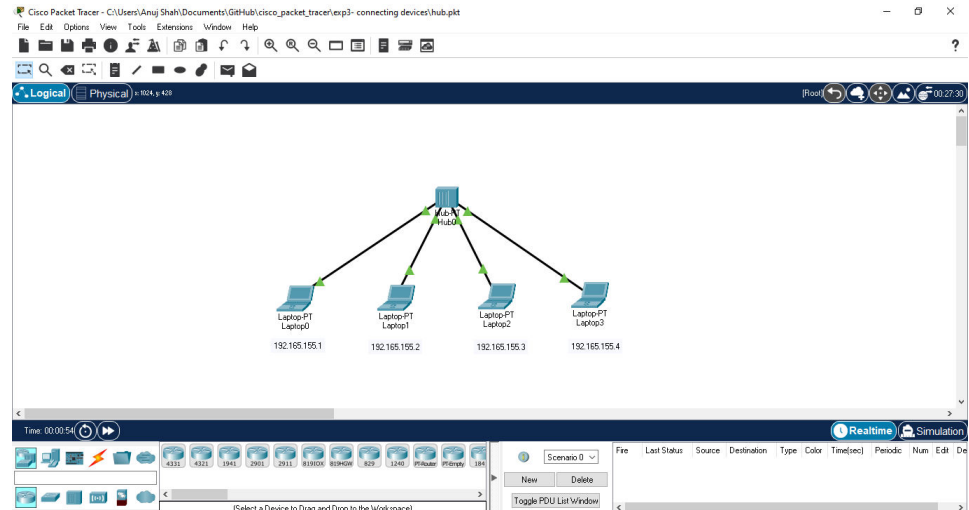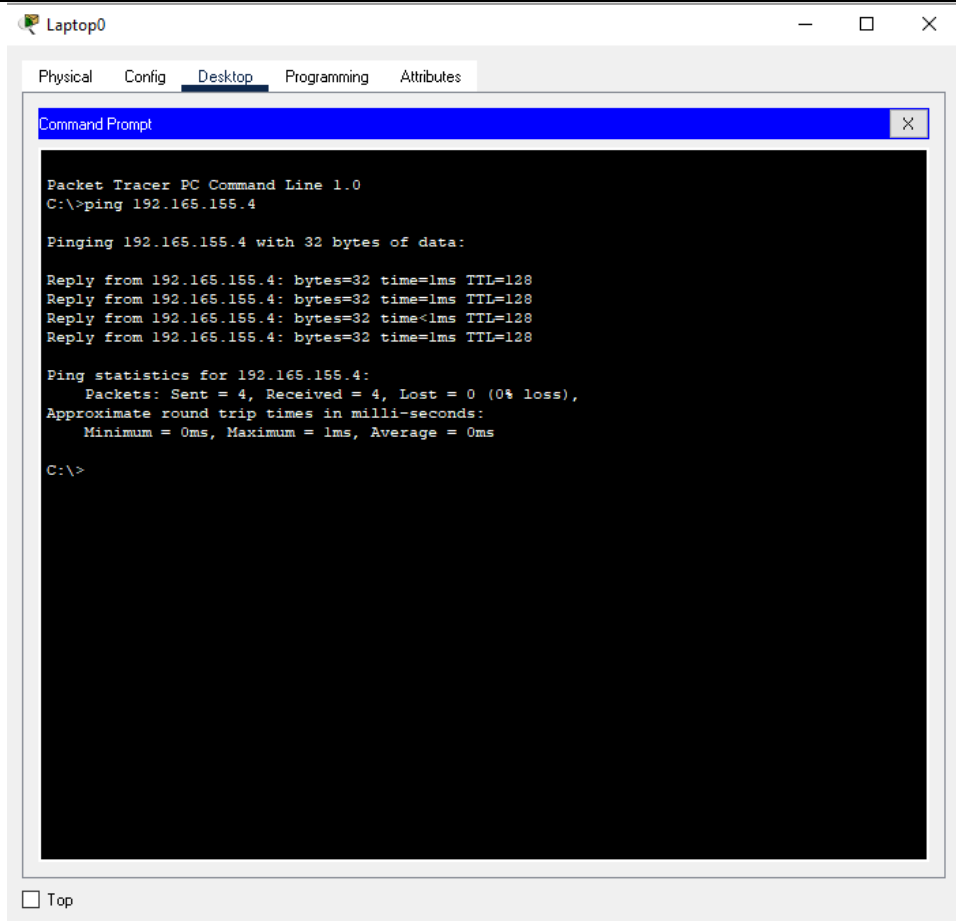
Network connected using Switch
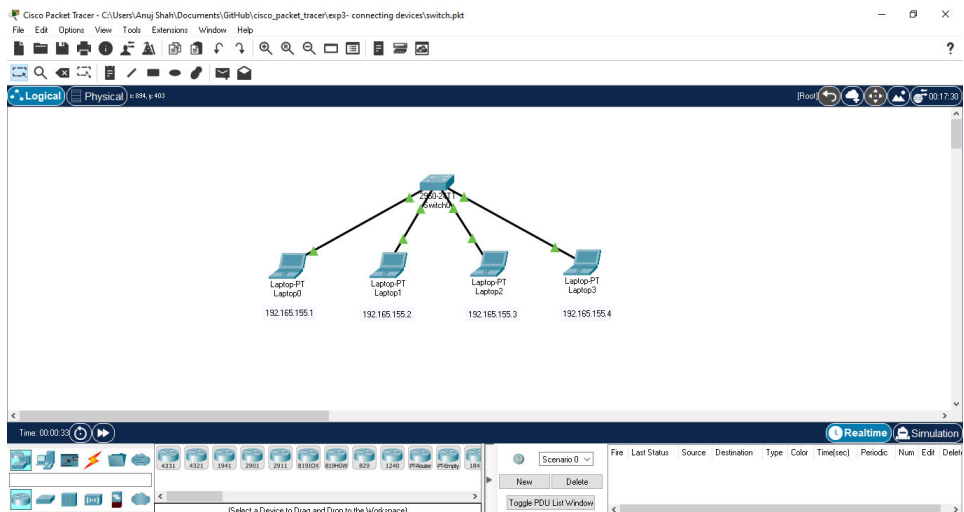
Communication established between 2 End devices in a Network with Acknowledgement received Using Switch
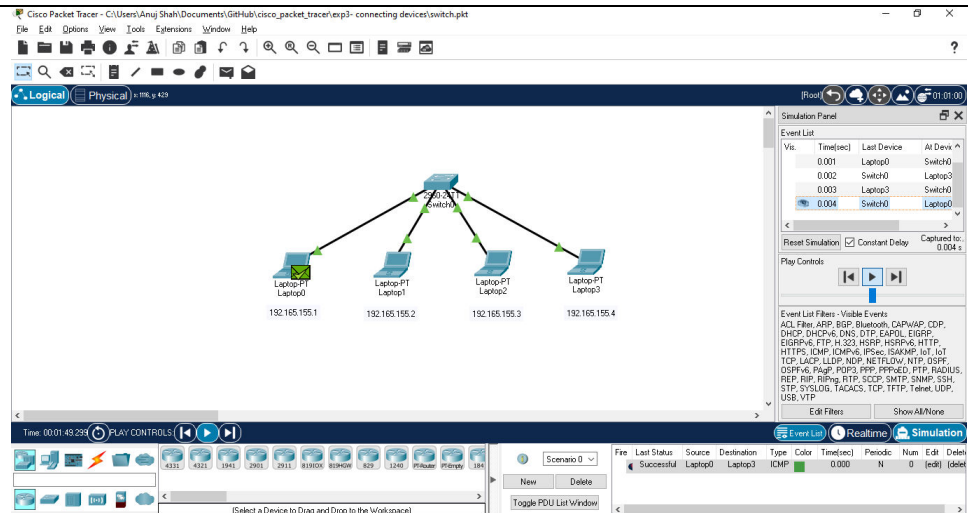
Communication established between 2 End devices in a Network Using Ping Command


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Packet Tracer PC Command Line 1.0
C:\>ping 192.165.155.4

Pinging 192.165.155.4 with 32 bytes of data:

Reply from 192.165.155.4: bytes=32 time<1ms TTL=128
Reply from 192.165.155.4: bytes=32 time<1ms TTL=128
Reply from 192.165.155.4: bytes=32 time<1ms TTL=128
Reply from 192.165.155.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.165.155.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```
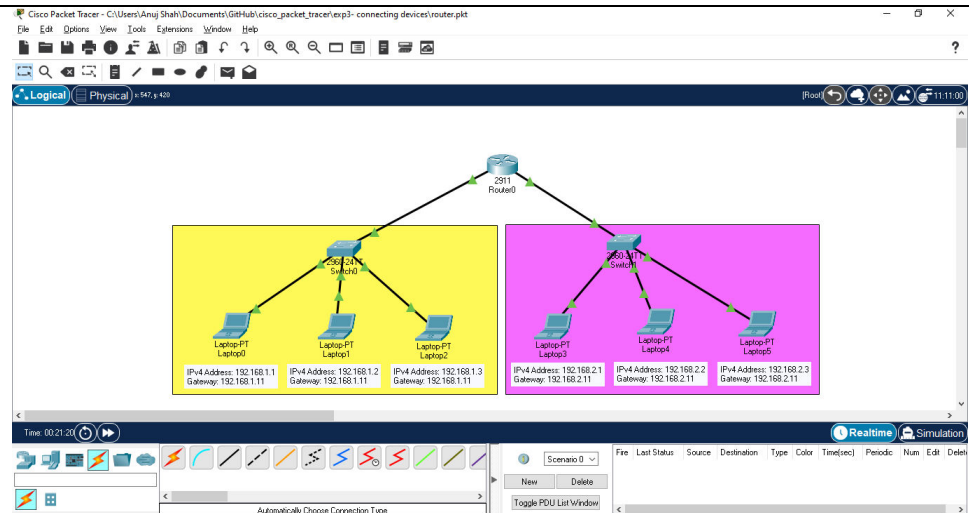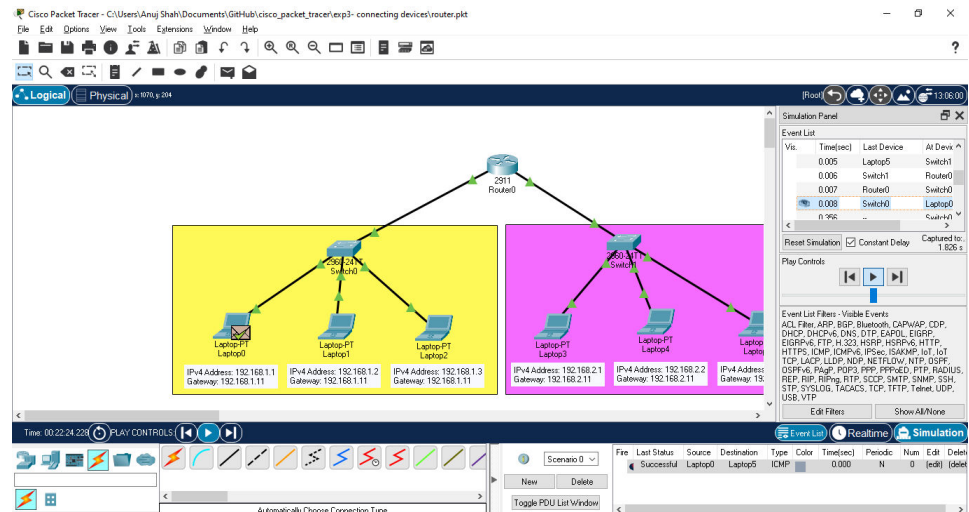
Network connected using Router

Communication established between 2 End devices in a Network with Acknowledgement received Using Router

Communication established between 2 End devices in a Network Using Ping Command

Conclusion:	In this experiment, we learned how to set up networks using the hub, the switch, and the router.	
Post Lab Questions:	1. What is the difference between a Hub and a Switch. 2. At which layer of OSI is a Router present? 3. At which layer of OSI is a Hub present? 4. What is the need for networking devices?	

Hub vs Switch

DIFFEREBCE BETWEEN HUB SWITCH AND ROUTER

S.No	HUB	SWITCH	ROUTER
1.	Works in Half Duplex mode	Full Duplex	Full Duplex
2.	Sends data in form of bits	Sends data in form of frames	Sends data in form of packets
3.	Broadcast Device	Multicast device	Routing Device
4.	Works in physical layer of OSI model	Works in Data link / Network layer of OSI model	Works in Network layer of OSI model
5.	Used to connect devices to the same network.	Used to connect devices to the network.	Used to connect two networks.
6.	Does not store any MAC address of a node in the network.	Stores MAC address and IP address of nodes in the network.	Stores MAC address and IP address of nodes in the network.
7.	Types are :- Active hub, Passive hub and Intelligent hub.	Types are Layer 2 and layer 3 switch.	Types are Broadband router, Wireless router, Edge router, core router.
8.			

Source: https://www.learnpick.in/prime/documents/notes/details/4601/difference-between-hub-switch-and-router

OSI layers
- Router: It operates on the third layer of the OSI model, the Network layer.

	• Router: It operates on the first layer of the OSI model, the Physical layer. **Need for networking devices** Here's what these connectivity devices (bridge, hub, switch, router), working together, are primarily responsible for: • Controlling traffic. Large networks need a way to filter and isolate data traffic. • Connectivity. These devices can connect different types of networks using different types of network protocols. • Hierarchical addressing. Segmenting the network with connectivity devices provides an actual (physical) example of delivering actual data to the right destination through the IP address's network ID and host ID. Source: https://whatismyipaddress.com/network-devices