

## Assignment – 1

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**Branch:** BE-CSE (LEET)

**Section/Group:** 809/A

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**Subject Name:** Computer Network

**Subject Code:** 20CSP-256

### 1. Aim/Overview of the practical:

Draw a diagram with networking devices required to do communication between two devices on two different networks.

### 2. Task to be done/ Which logistics used:

- Introduce the required devices used in Networking
- Steps to create the Network to do communication between two devices on two different networks(LANs).

### Theories:

**1. Repeater** – A repeater operates at the physical layer. Its job is to regenerate the signal over the same network before the signal becomes too weak or corrupted so as to extend the length to which the signal can be transmitted over the same network. An important point to be noted about repeaters is that they do not amplify the signal. When the signal becomes weak, they copy the signal bit by bit and regenerate it at the original strength. It is a 2-port device.

**2. Hub** – A hub is basically a multiport repeater. A hub connects multiple wires coming from different branches, for example, the connector in star topology which connects different stations. Hubs cannot filter data, so data packets are sent to all connected devices. In other words, the collision domain of all hosts connected through Hub remains one. Also, they do not have the intelligence to find out the best path for data packets which leads to inefficiencies and wastage.

### Types of Hubs

- **Active Hub:** - These are the hubs that have their own power supply and can clean, boost, and relay the signal along with the network. It serves both as a repeater as well as a wiring centre. These are used to extend the maximum distance between nodes.
- **Passive Hub:** - These are the hubs that collect wiring from nodes and power supply from the active hub. These hubs relay signals onto the network without cleaning and boosting them and can't be used to extend the distance between nodes.
- **Intelligent Hub:** - It works like active hubs and includes remote management capabilities. They also provide flexible data rates to network devices. It also enables an administrator to monitor the traffic passing through the hub and to configure each port in the hub.

**3. Bridge** – A bridge operates at the data link layer. A bridge is a repeater, with add on the functionality of filtering content by reading the MAC addresses of source and destination. It is also used for interconnecting two LANs working on the same protocol. It has a single input and single output port, thus making it a 2-port device.

### Types of Bridges

- **Transparent Bridges:** - These are the bridge in which the stations are completely unaware of the bridge's existence i.e., whether or not a bridge is added or deleted from the network, reconfiguration of the stations is unnecessary. These bridges make use of two processes i.e. bridge forwarding and bridge learning.
- **Source Routing Bridges:** - In these bridges, routing operation is performed by the source station and the frame specifies which route to follow. The host can discover the frame by sending a special frame called the discovery frame, which spreads through the entire network using all possible paths to the destination.

**4. Switch** – A switch is a multiport bridge with a buffer and a design that can boost its efficiency (a large number of ports imply less traffic) and performance. A switch is a data link layer device. The switch can perform error checking before forwarding data, which makes it very efficient as it does not forward packets that have errors and forward good packets selectively to the correct port only. In other words, the switch divides the collision domain of hosts, but broadcast domain remains the same.

**5. Routers** – A router is a device like a switch that routes data packets based on their IP addresses. The router is mainly a Network Layer device. Routers normally connect LANs and WANs together and have a dynamically updating routing table based on which they make decisions on routing the data packets. Router divide broadcast domains of hosts connected through it.

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

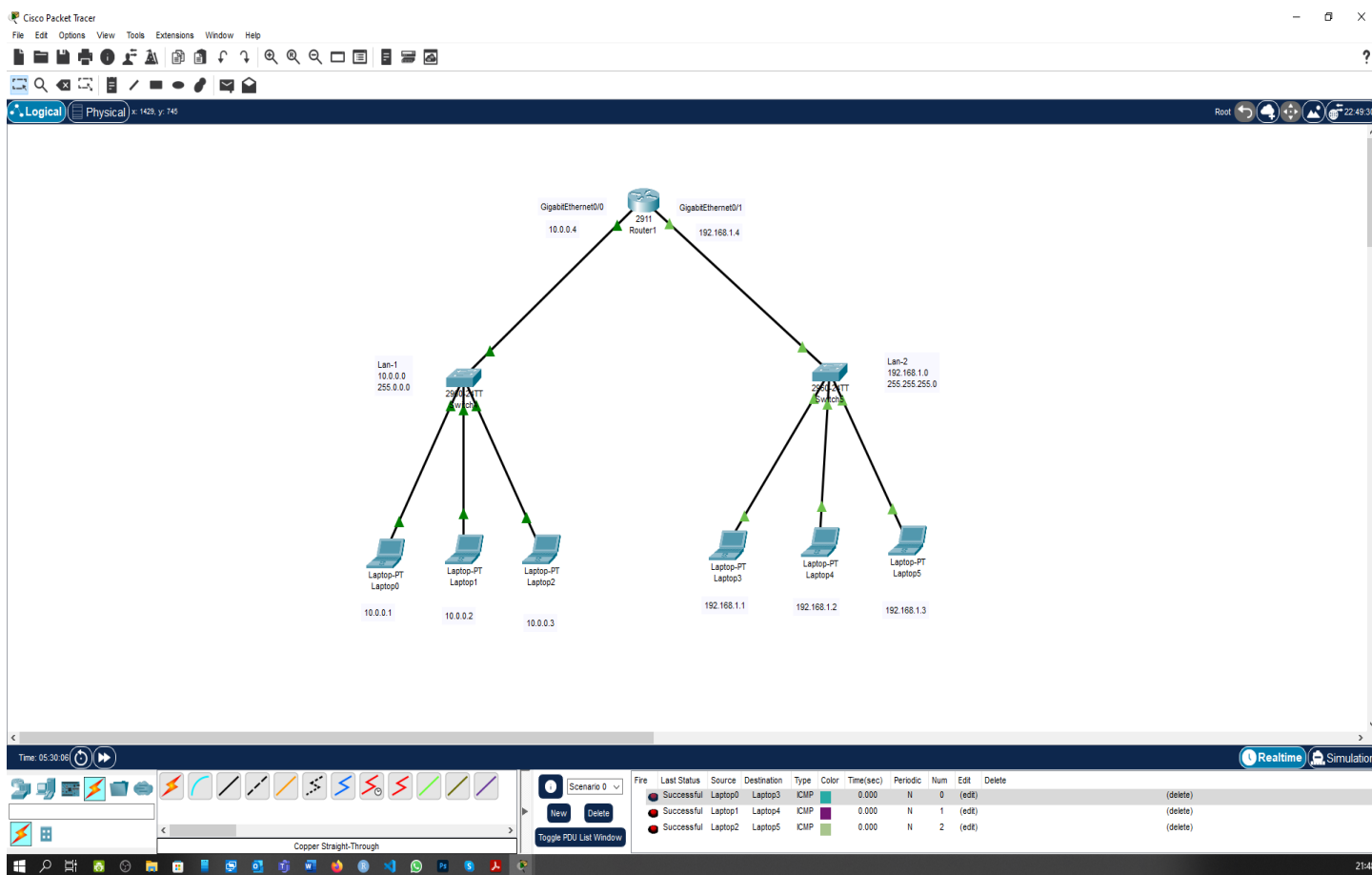
**7. Brouter** – It is also known as the bridging router is a device that combines features of both bridge and router. It can work either at the data link layer or a network layer. Working as a router, it is capable of routing packets across networks, and working as the bridge, it is capable of filtering local area network traffic.

**8. NIC** – NIC or network interface card is a network adapter that is used to connect the computer to the network. It is installed in the computer to establish a LAN. It has a unique id that is written on the chip, and it has a connector to connect the cable to it. The cable acts as an interface between the computer and router or modem. NIC card is a layer 2 device which means that it works on both physical and data link layer of the network model.

## Practical Output:

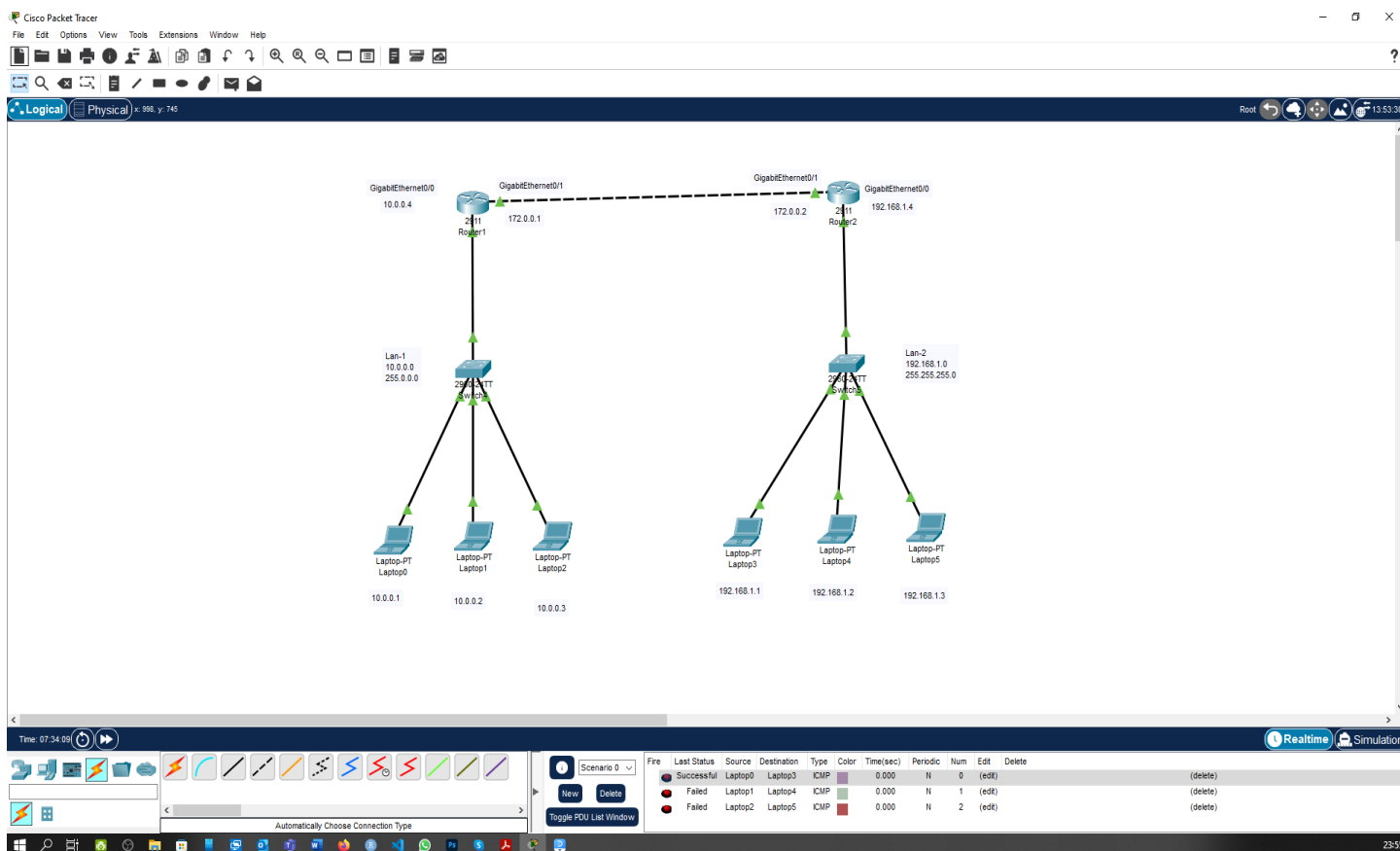
### Using Single Router:

1. Create the two pairs of 3 end devices.
2. Connect with 2 separate switches.
3. Create one Router and Connect with the both switches with specific Giga Ethernet port.
4. Assign the Ip addresses of all end devices with different classes to separate the network.
5. Assign the Left-side port of the Router with the Left LAN Ip class. And Right-side Port with the Right LAN Ip class.
6. Check the all-wire connection properly. Of forward the Time to quick setup.
7. Open the Terminal of LAN-1 end device and Run the Command:  
ping <Ip address of another LAN end device>
8. If connections are proper, it will give the successful message.
9. If connection is not proper then please check your all LAN IP classes and wire connections.
10. After Connection is establish Select the Simple PDU and send from any end device of LAN-1 to another end device of LAN-2.
11. You will get the Message successful sent message in the Realtime Section.
12. To check the Complete process step by step, Go to Simulation section and play.



### Using Two Router:

1. Create the two pairs of 3 end devices.
2. Connect with 2 separate switches.
3. Create two Router and Connect with the both router with switches via specific Giga Ethernet port.
4. Connect the Both router with Cross Over wire.
5. Assign the Ip addresses of all end devices with different classes to separate the network.
6. Assign the Left-side port of the Router with the Left LAN Ip class. And Right-side Port with the Right LAN Ip class.
7. Assign the Different Ip class to make a network between both routers.
8. Create the Static Routes in Router 1 with the network Ip address, Mask address, and Hop Ip address.
9. Repeat the same in Router 2 also.
10. Check the all-wire connection properly. Of forward the Time to quick setup.
11. Open the Terminal of LAN-1 end device and Run the Command:  
*ping <Ip address of another LAN end device>*
12. If connections are proper, it will give the successful message.
13. If connection is not proper then please check your all LAN IP classes and wire connections.
14. After Connection is establish Select the Simple PDU and send from any end device of LAN-1 to another end device of LAN-2.
15. You will get the Message successful sent message in the Realtime Section.
16. To check the Complete process step by step, Go to Simulation section and play.



**Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):**

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			