Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2025-26

Class:	TE-AIDS	Semester:	V
Course Code:	CSC501	Course Name:	CN

Name of Student:	Divya Davane
Roll No. :	
Assignment No.:	1
Title of Assignment:	Apply the concekth of data communication.
Date of Submission:	
Date of Correction:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Completeness	5	04
Demonstrated Knowledge	3	03
Legibility	2	02
Total	10	09

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Completeness	5	3-4	1-2
Demonstrated Knowledge	3	2	1
Legibility	2	1	0

Checked by :

1/2025

CN Assignment 1.

Q.1 a) You are setting up a home network with both wired and wireless devices. Using the understanding of modern routers, and access points to design the setup, find devices that you will use and how they interact.

Ans. 1. To setup a home network that supports both wired and wireless devices, you need to use a combination of networking hardware that works together to provide stable and secure internet access throughout your home.

2. The core device is the modem, which connects directly to your Internet Service provider (ISP) via a cable, DSL or fibre line. Its main job is to bring internet to your home.

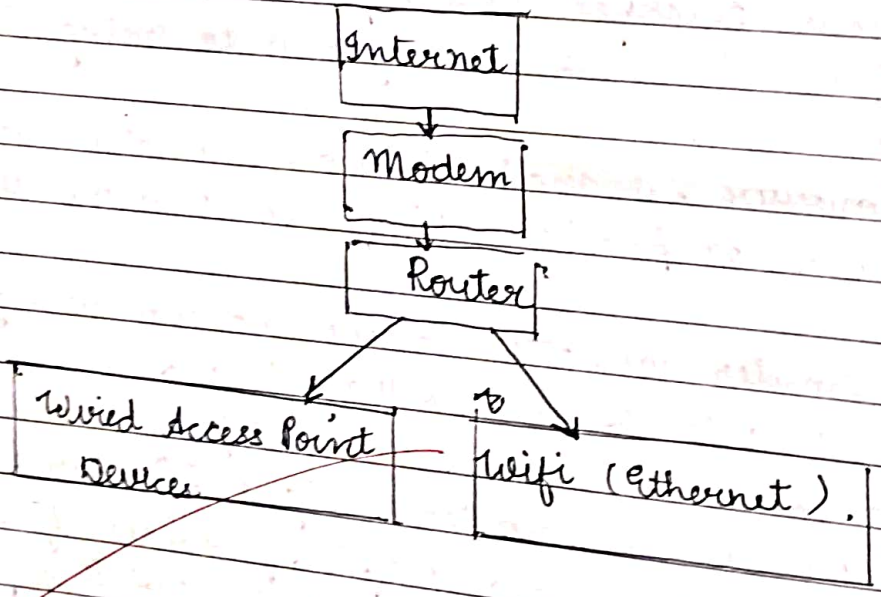
3. However, a modem alone cannot create a home network or provide Wi-fi. Thats where the router comes in.

4. The router connects to the modem using the ethernet cable. It acts as the central hub of your network, distributing internet access to multiple devices, both wired and wireless. The router assigns IP addresses to connected devices, manages data traffic, provides firewall protection and usually includes built-in Wi-fi capability for wireless devices like smartphones, tablets; and laptops.

5. For wired devices like desktops PC's, smart TV's, or gaming consoles, ethernet cables are used to connect them directly to router. If you need more ethernet ports than the router provides, you can use a network switch, which expands the number of wired connections available. A switch connects to the router and allows multiple additional devices to join the network via wired connections.

6. In larger homes or areas with peak wi-fi usage a wireless access point (WAP) can be added to extend the network's range. The access point connects to the router using a wired connection and broadcasts wifi to areas the main router can't reach effectively.

7. By integrating the modem, router and optional access points, you can create a seamless home network that ensures fast and reliable connectivity for both wired and wireless devices.



b. Given a network scenario with high traffic, which device would you use to manage data collisions effectively, and why? Apply your understanding of networking devices to justify your choice.

Ans. 1. In a high-traffic network scenario, the most effective device to manage data collisions is a network switch, especially a managed switch. Switches are designed to intelligently forward data to the exact device that needs it, using MAC addresses to identify each connected device. This targeted communic" prevents unnecessary data flooding across the network and reduces the risk of data collisions, which are common in simpler devices like hubs that broadcast data to all ports.

2. Each port on a switch creates it own collision domain, meaning devices connected to different ports can send and receive data simultaneously without interfering with each other. This is particularly important in high-traffic networks, such as offices, schools, or large homes with many connected devices streaming, downloading, or transferring files at the same time.

3. Managed switches provide even more control and efficiency. They allow network administrators to monitor traffic, limit bandwidth usage, and prioritize certain types of data through Quality of Service (QoS) settings. For eg. VoIP calls or video conferences can be given higher priority than background downloads, ensuring smooth performance during peak usage.

Q.2. During a network expansion, the existing bus topol... causes congestion. What changes would you make and why? Apply your understanding to modify the network de... effectively.

Ans In a bus topology, all devices share a single commu... cation line, As more devices are added,

- Traffic increases loading to frequent data collisions
- Devices must wait for the bus to be free before transmitting.
- Performance degrades significantly with high traffic

Old topology:
Bus topology.

New topology:
Star topology using a central switch or Router.

Why star topology?

i) Dedicated links to switch:
Eliminates collisions since each device has its own connection

ii) Scability:
Easy to add more deivces without affecting existing once.

iii) Performance:
High-speed switches support full-duplex and parallel transmission.

iv) Fault - isolation:
A fault in one cable or device doesn't affect the entire network

v) Easy management:
Centralized control through a switch simplifies trouble-shooting and monitoring

Devices needed to upgrade:

- Network Switch
- Ethernet cable
- Network Interface cards (NIC's)

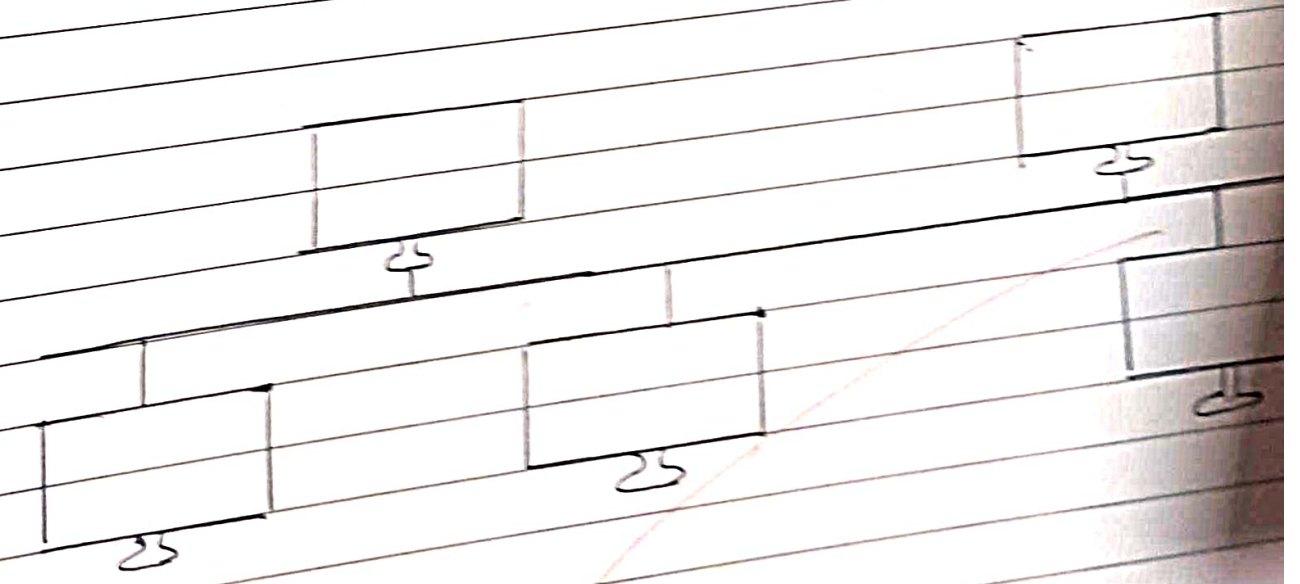
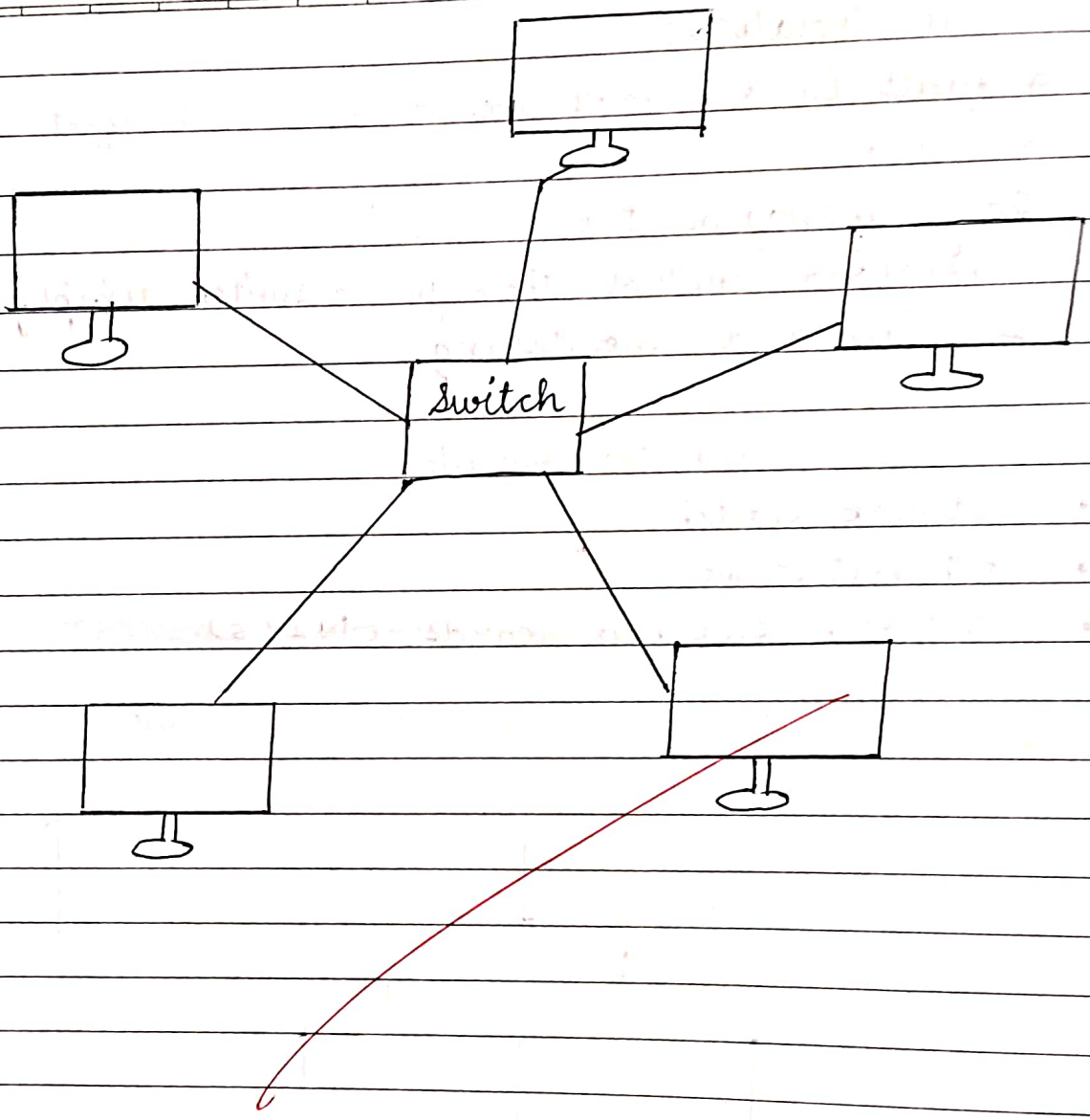


Fig: Bus topology


switch