THADOMAL SHAHANI TSEC ENGINEERING COLLEGE

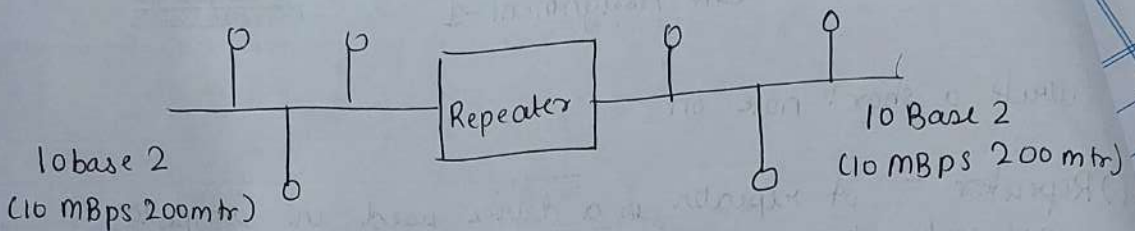
CN Assignment-1

Write a short note on:-

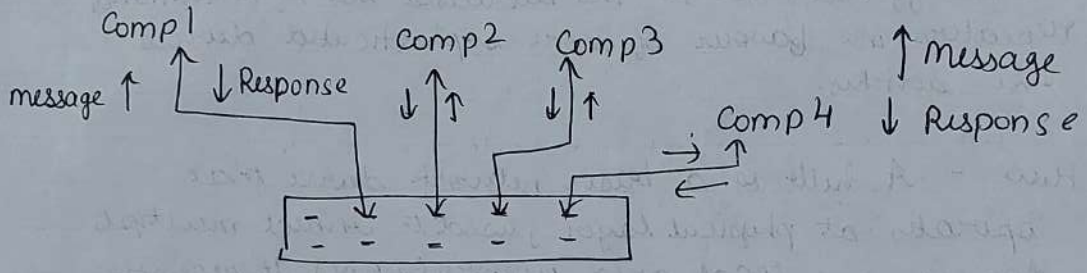
1.) Repeater:- A repeater is a device used in computer networks to amplify and retransmit signals, extending the network's reach. It operates the physical layer, transparently regenerating signals without escaining data content. However, advancement in networking technology have led to the decreased use of traditional repeaters in favour of more sophisticated devices like switches.

2.) Hub:- A hub is a basic network device that operates at physical layer, used to connect multiple devices in a local area network (LAN). It receives incoming data from one device and broadcast it all connected devices. Hubs create single collision domain, leading to data collisions and reduced network efficiency. Due to their limitation and lack of intelligence, hubs have become outdated in modern networks and have been replaced by switches, which provide better performance and segmentation of collision domains for more efficient data transmission.

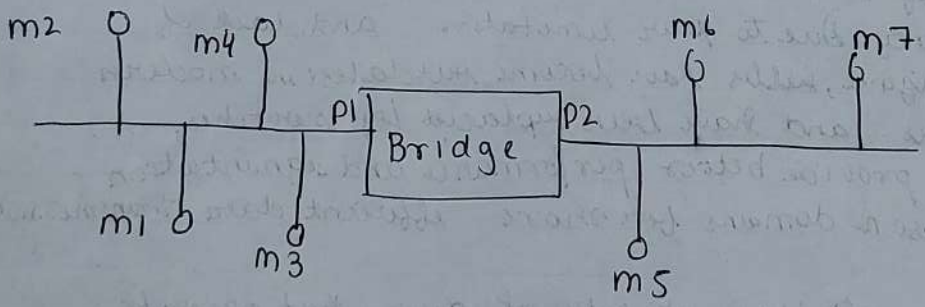
3.) Bridges:- Bridges are network devices that operate at data link layer (Layer 2) of the OSI model, used to interconnect two or more LAN segments. They examine the MAC addresses of incoming data frames and maintain a table of MAC addresses and their associated segments. When a frame destination



1) Repeater



2.) Hub

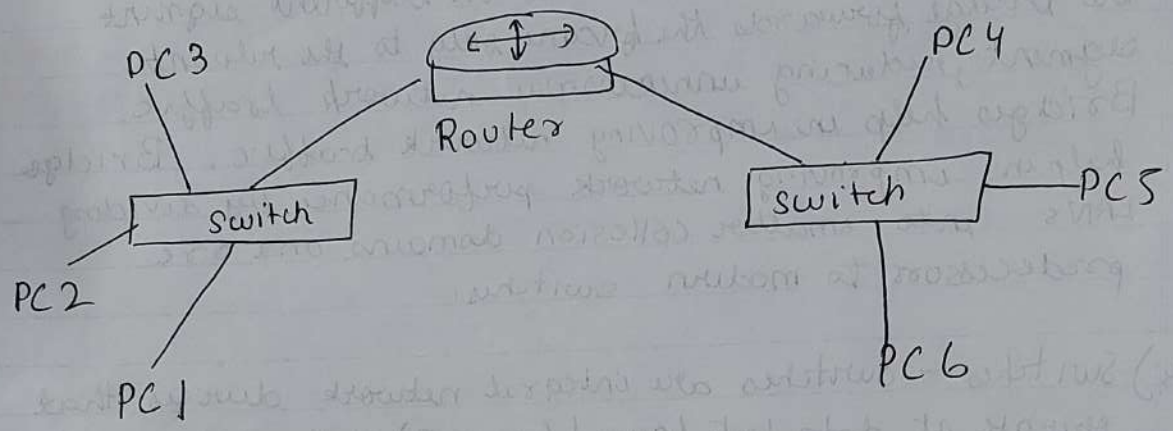


3.) Bridge

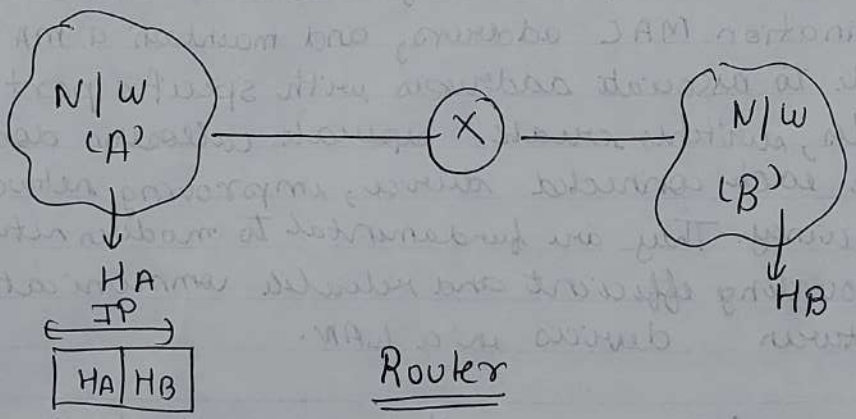
is on same segment as the source, the bridge filters the frame. If the distination is on different segment the bridge forwards the frame only to the relvant segment, reducing unnecessary network traffic. Bridges help in improving network traffic. Bridges help in improving network performance by dividing LANs into smaller collosion domains and are predecessors to modern switches.

4) Switches :- Switches are integral network devices that operate at data link layer (Layer 2) of the OSI model, used to connect multiple devices within a local area network (LAN). They examine incoming data frames, make forwarding decisions based on the distination MAC address, and maintain a MAC address table to associate addresses with specific port. Unlike hubs, switches create separate collosion domains for each connected device, improving network efficiency. They are fundamental to modern networking providing efficient and reliable communication between devices in a LAN.

5) Router :- A Router is a vital network device that operates at network layer (Layer 3) of the OSI model. It connects multiple networks and make intelligent data forwarding decisions based on distination IP addresses. They maintain routing table to determine best path for data transmission. By doing so, router enable efficient data exchange, ensure proper network segmentation, provide security by acting

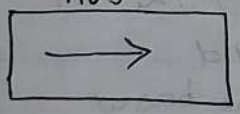


Connection through router and switch

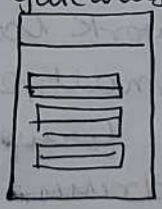


Router

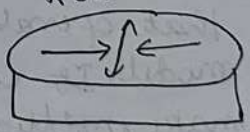
Hub

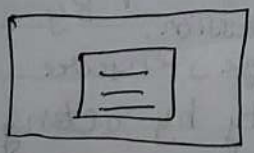


gateway



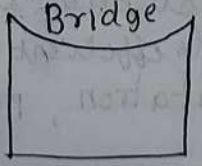
Router



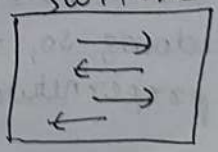


Repeater

Bridge



Switch



as a gateway between networks. Router plays a crucial role in directing data traffic and enabling communication across complex & interconnected networks.

6.) Gateway :- A gateway is network device that act as a interface between different networks, protocols, or communication technologies. They play a vital role in connecting LANs to the internet, enabling acces to external networks. Gateway can be hardware or software based and are essential for establishing communication between networks with distinct characteristics. In essence, gateway serve as bridges, allowing data to bormally between different network and ensuring interoperability in complex networking environments.

7.) Modem :- A modem, short for modulator-demodulator, is a network device used to convert digital data from computer or digital devices into analog signal suitable for transmission over analog communication channels. It also perform reverse procm. i.e converting incoming analog signal back to digital for receiving device. Modems are commonly used to provide internet acces via dial-up connections and are essential for connecting to the internet over telephone lines. With the rise of broadband and digital communication technologies, traditional dial up modems have become less common, but their role in early networking history was crucial for establishing internet connectivity.