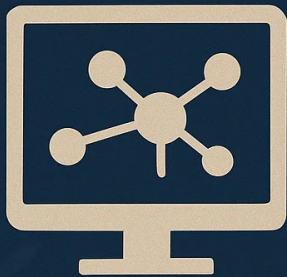


Computer Networks Lecture Notes

Posted in **9 Computer Science**



CHAPTER 6 INTRODUCTION TO COMPUTER NETWORKS [LECTURE 1 NOTES]

These lecture notes are prepared by **Salman Ahmad**, who is both a **teacher** and a **web developer**. The purpose of this material is to make the topic clear and useful for students of Class 9 Computer Science.

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Network or Computer Network

A computer network is a system where computers and other devices are connected so they can share data and work together.

Example: School Network

- Computers in a school are connected.
- Students can share files and use the same printer.
- Teachers can send assignments to all computers at once.
- This shows how devices work together in a network.

Main Components of a Network

- **Nodes:** Devices connected to the network, such as computers, smartphones, and printers.
- **Links:** The connections between devices. These can be wired (Ethernet cables) or wireless (Wi-Fi).
- **Switches:** Connects multiple devices in the same network to communicate efficiently.

How a Switch Works

- A switch works at Layer 2 (Data Link Layer) of the OSI model.
- It uses a hardware address called a MAC address.
- When a packet arrives, the switch reads the MAC address.
- It sends the packet only to the correct device, not to all devices.

Example: Using a Switch in an Office

Imagine you send a file to your colleague in another room.

- The file is broken into small parts called packets.
- Each packet has the address of your colleague's computer (MAC address).
- The packets go to the switch.
- The switch checks the address and sends the packets only to your colleague's computer.
- The computer puts all packets back together to form the original file.

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Routers

A router connects different networks and sends data from one network to another.

How a Router Works

Data travels in small parts called packets. Each packet contains the destination address. The router checks this address, chooses the best route, and forwards the packet to the right destination.

Example: Air Travel System

- Passengers are like data.
- They may travel in groups (packets).
- Each group has a ticket with the final destination (IP address).
- They may travel through different airports (routers).
- Finally, they reach the correct destination.

Objectives of Computer Networks

1. **Resource Sharing:** Networks allow devices to share resources like printers and storage.

Example: Many computers in an office can use one printer.

2. **Data Communication:** Networks allow people to send emails, messages, and make video calls.

Example: Employees can use Zoom or Microsoft Teams for meetings.

3. **Connectivity and Collaboration:** Networks connect devices so people can work together from different places.

Example: A team can work together on Google Drive at the same time.

Note: The Internet is the largest network in the world, connecting millions of networks globally.

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Fundamental Concepts in Data Communication

Data communication means sending data from one device to another.

Main components:

- **Sender:** The device that sends data (Example: a computer sending an email).
- **Receiver:** The device that receives data (example: a smartphone receiving the email)
- **Message:** Actual data being sent (Example: sending a text message, any video or any photo).
- **Protocol:** A protocol is a set of rules that devices follow to communicate with each other on a network. (Example: HTTP is a protocol used to load websites on the Internet.)
- **Medium:** Path through which data travels is called medium or communication medium or communication channel. It can be wired or wireless.

Networking Devices

Network devices are hardware devices that help connect computers and manage the flow of data in a network. They make sure devices can communicate with each other properly.

- **Switch:** Definition is already written above.
- **Router:** Definition is already written above.
- **Hub:** Connects multiple devices but sends data to all devices.
- **Access Point (AP):** An Access Point connects wireless devices to a wired network. It allows smartphones, laptops, and tablets to connect to the Internet wirelessly.

How an Access Point Works:

- It receives data from the wired network.
- Sends data wirelessly to devices like laptops, smartphones, tablets.
- Receives wireless data and sends it back to the wired network.

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15 Multiple Choice Questions (MCQs) on Computer Networks

1. What is a computer network?

- a. A single computer
- b. A system where computers and devices are connected
- c. A type of software
- d. A printer

Answer: b. A system where computers and devices are connected

2. Which of these is a networking node?

- a. Ethernet cable
- b. Computer
- c. Router
- d. Switch