

**FAST NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES
KARACHI CAMPUS**

**Spring 2024
Computer Networks (CS 3001)**



**Assignment No. 1
"Networking Fundamentals and Application"**

Date: 06/02/2024

Maximum mark: 50

Submission Guidelines:

- Assignment should be completed neatly in handwritten and submitted in pdf format.
- Write your name, roll number and section on top of the first page of the assignment.
- Submission deadline by 20th Feb 2024. All the submission will be via Google Class Room.
- Email submission will not be considered
- Plagiarism will be treated strictly. Marks will be reduced for assignment that have found in plagiarism.
- Penalties for late submission of assignment:
 - 50% reduction will be applied for submissions made 24 hours after the deadline
 - No awards will be granted 48 hours past the deadline.

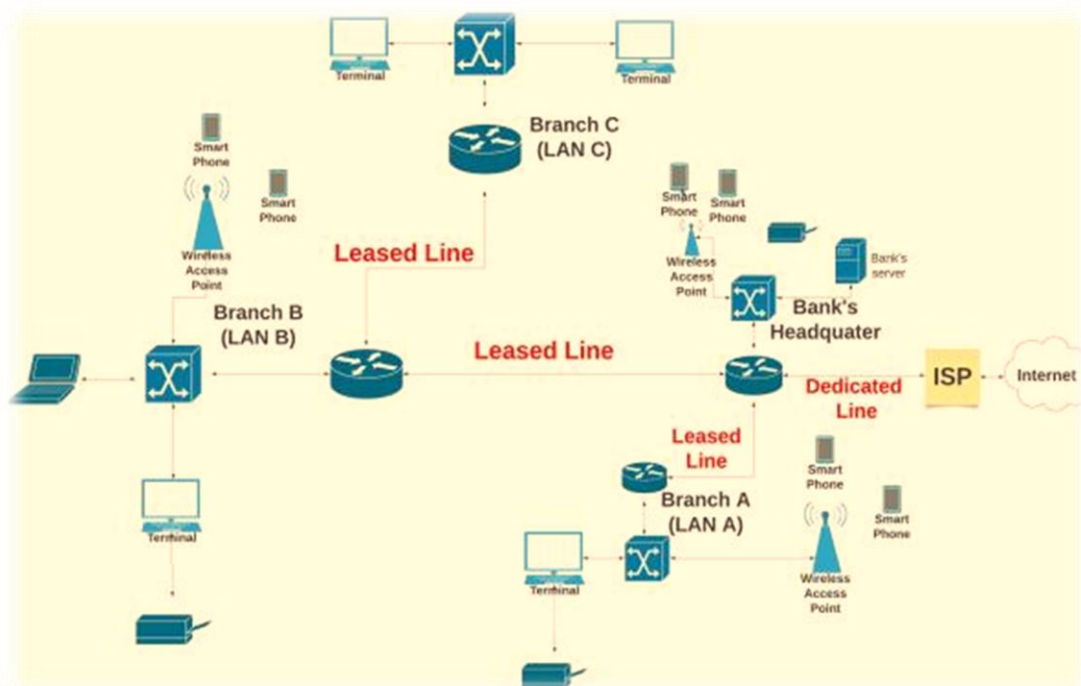
Question 1: [Conceptual understanding of Computer Network]

- i. A telecommunications company is planning to upgrade its core network infrastructure to handle the increasing data traffic from mobile users. Explain how the principles of packet switching can be applied in the core network to enhance scalability and manage the growing demand for data services.
- ii. A company is expanding its network infrastructure to support many employees working in different departments. The network administrator is considering the OSI model for efficient communication. Explain how the OSI layers would be involved in the packet-switched communication within the company's network.
- iii. Explain the concept of packet loss in a network. How does it affect the reliability of data transmission, and what measures can be taken to minimize it?
- iv. Explain the key concepts of HTTP (Hypertext Transfer Protocol) and how it facilitates communication between web clients and servers.
- v. Explain the role of web caching in enhancing the performance and efficiency of web applications.

- vi. What role do protocols play in computer networks, and how do they facilitate communication between devices? Can you relate it to human protocol?

Question 2: [Networking scenario analysis and troubleshooting]

- i. A large corporation is planning a significant upgrade to its computer network infrastructure. During the transition, employees report various issues, including slow internet speeds, intermittent connectivity, and disruptions in accessing shared resources. Identify the possible causes for each issue, propose solutions, and outline a comprehensive plan for troubleshooting and ensuring a smooth network upgrade
- ii. A company relies on a single ISP for internet connectivity, and sudden outages disrupt daily operations. Identify the potential causes for ISP-related issues, propose solutions, and outline troubleshooting steps to minimize downtime and ensure a more reliable internet connection.
- iii. A company heavily relies on video conferencing for remote collaboration, but employees report issues such as poor video and audio quality during meetings. Identify the possible causes for video conferencing quality problems, propose solutions, and outline troubleshooting steps to improve the overall quality of virtual meetings.
- iv. Delta Corp is a small company that is expanding its office network due to business growth. The current network setup includes a traditional Ethernet LAN with a single router, a few switches, and a wireless access point. The company has around 30 employees who use desktop computers connected via Ethernet, and a separate Wi-Fi for laptops and mobile devices for their work. Identify and explain the network challenges faced by Delta Corp, the goals of the expansion of the company, propose solutions to address the network congestion issue and suggest strategies to improve Wi-Fi coverage in different areas.
- v. Consider a following a bank scenario and answer the following:



- a. Identify the edge devices, core devices, protocols, and applications used in the given scenario.
- b. Share examples of edge network, Web cache, P2P and HTTP that could be applied in addressing challenges or optimizing systems within the given bank scenario.
- c. Discuss specific skills and knowledge that contribute to your professional growth.
- d. Consider how staying informed and adapting to new developments in networking can contribute to your professional success.

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