

Dept. of Computer Science and Engineering

East West University

CSE 405 (Computer Networks)

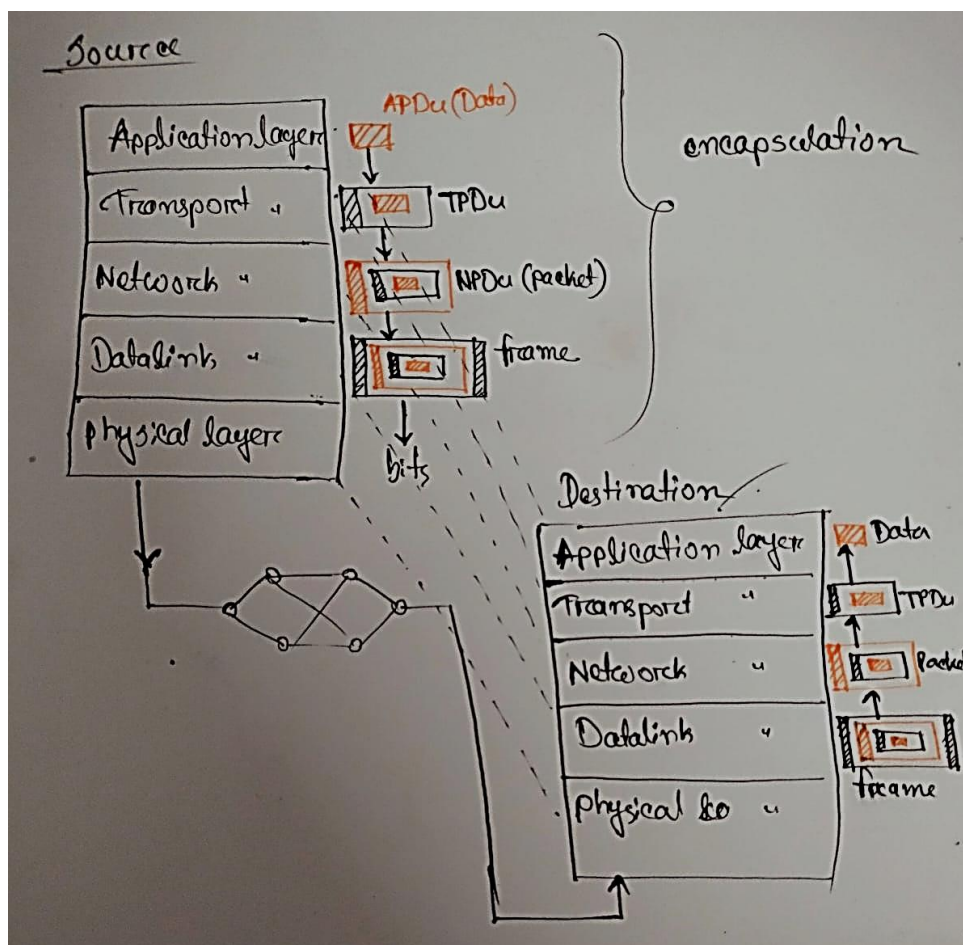
Quiz # 1

Points: 10 marks

Time: (20 min + 10 min) = 30 min

Please answer the following questions. (4\*2.5 = 10 marks)

1) Draw a diagram to show encapsulation and de-encapsulation processes between two hosts.



**2) What would be the bit pattern of the following bit stream after “Bit Stuffing”? Please indicate the stuffed bit.**

01010000001101111100001001011111001

**Solution:** After Bit Stuffing (assuming we stuff after 5 consecutive 1s):

01010000001101111100001001 0 11111001

**3) What would be the pattern of the following stream after “Byte Stuffing”? Please indicate the stuffed byte.**

B ESC Flag D ESC ESC

**Solution:** After Byte Stuffing (assuming ESC is the escape character):

B ESC ESC ESC Flag D ESC ESC ESC ESC

**4) Briefly explain how consecutive bits are identified in ‘physical layer coding violation’ framing technique.**

{{{In PLCV, the boundary of a frame is identified by a sequence of bits that violates the coding scheme. Typically, this involves transitioning from one type of bit (e.g., 0) to another (e.g., 1) or vice versa. For example, if a sequence of consecutive 1s or 0s is transmitted, it indicates the end of a frame.}}}

[[[In the physical layer coding violation (PLCV) framing technique, consecutive bits are identified by intentionally violating standard line code rules. These violations serve as markers for the start and end of each frame, enabling the receiver to accurately extract consecutive bits within the frame.]]]

**5. Briefly describe the uses of 3 special IPs with example.**

1. **Loopback IP (127.0.0.1):** This IP is used to test network interface functionality without requiring physical connection to a network.
2. **Broadcast IP (e.g., 255.255.255.255):** Broadcast IP is used to send data packets to all devices on a specific network segment.
3. **Multicast IP (e.g., 224.0.0.1):** Multicast IP is used to send data packets to a group of selected recipients.

**6. The following character encoding is used in a data link protocol:**

B: 01000011; D: 11111000; Flag: 01111110; Esc: 10001111

Identify the bit sequence transmitted in binary for the following six-character data. when 'bit stuffing' framing method is used. Please indicate the stuffed bits.

B Esc Esc Flag Flag D

**Solution:**

B: 01000011    D: 11111000            Flag: 01111110            Esc: 10001111

Data: B Esc Esc Flag Flag D

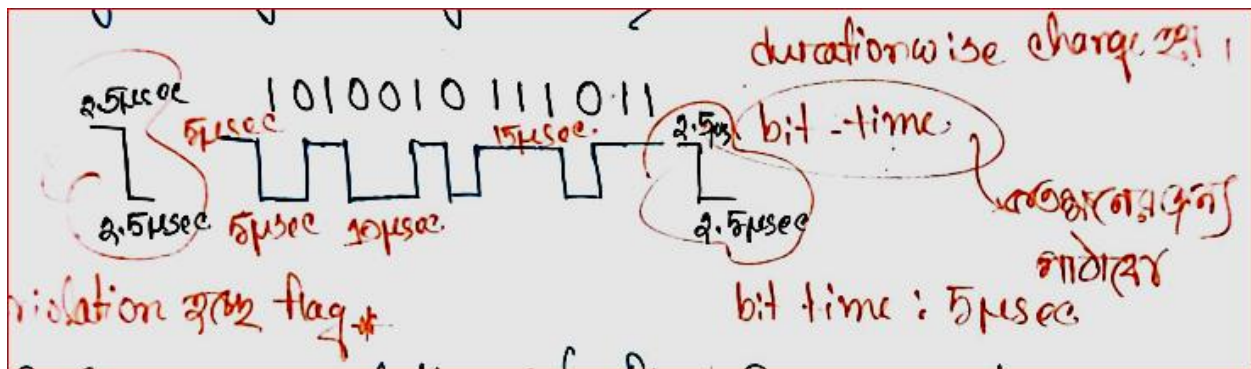
After bit stuffing (assuming we stuff after 5 consecutive 1s):

01000011 10001111 10001111 01111110 01111110 11111000

2. How nodes determine the boundary of a frame in Physical layer coding violation method? If a bit sequence 100101011 is transmitted following physical layer coding violation; analyze how receiver would determine consecutive 0s or 1s.

Solution:

In PLCV, the receiver identifies consecutive bits by monitoring changes in the bit stream. For example, in the sequence 100101011, the receiver identifies consecutive 1s and 0s by detecting transitions between the two. So, the receiver would recognize the consecutive 0s or 1s based on these transitions.



Why we use  $2T$  (Tau) propagation delay in csma/cd?

**Ans-**In CSMA/CD, we use " $2T$ " to give signals enough time to travel to the farthest point in the network and back. This helps nodes detect collisions reliably, ensuring smooth communication.

The  $2T$  (Tau) propagation delay is used in CSMA/CD to allow stations to detect collisions by accounting for the round-trip time it takes for signals to propagate through the network medium.

Why we calculate propagation delay in the farthest node?

{{ans-We calculate the propagation delay based on the farthest node to ensure that every part of the network is considered when determining how long it takes for signals to travel. By accounting for the longest possible distance a signal could travel in the network, we guarantee that all nodes have sufficient time to detect collisions and avoid transmitting at the same time, which helps in maintaining efficient communication.}}

[[[In CSMA/CD (Carrier Sense Multiple Access with Collision Detection), calculating the propagation delay based on the farthest node is important for ensuring that all stations on the network have enough time to detect collisions and respond accordingly.

Overall, calculating the propagation delay based on the farthest node ensures that CSMA/CD operates effectively and fairly, allowing all stations on the network to detect collisions promptly and manage network access efficiently.]]]]