Tutorial 4: Data Link Layer (OSI Model)

Q1. (a) Give a term that related to upper sublayer of layer two and briefly describe that term.(3 marks)

Logical Link Control. This upper sublayer communicates with the network layer. It is defined as IEEE 802.2. It is the driver of PC NIC

(b) The following figure shows a frame of data link layer.

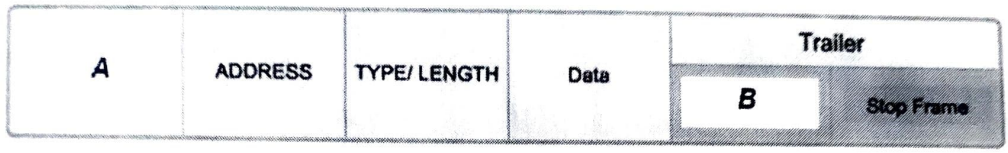


Figure 1: A structure of a frame

(i) Identify a header of a frame that labeled as "A" from Figure 1 and state the function of that flag. (2 marks)

Frame Start. It is used to mark and indicate the beginning of a frame.

(ii) Based on Figure 1, identify a frame trailer that had indicated as "B". List a role of that flag. (2 marks)

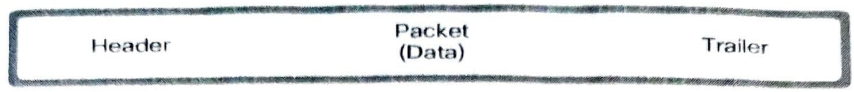
Error detection. A logical or mathematical summary of bits used to determine whether the frame has arrived without error.

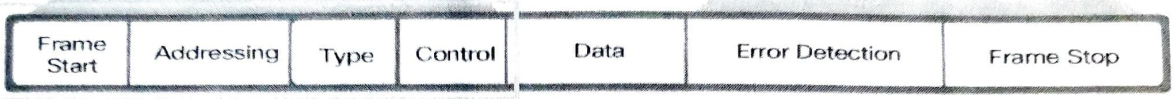
(c) Protocol Data Unit (PDU) of a message in Data Link Layer is called frame. A frame consists of three portions. There are referred to header, data and trailer.

(i) Identify a sublayer of Data Link Layer that defines the media access processes performed by the hardware. (1 mark)

Media Access Control (MAC)

(ii) Identify and briefly describe **TWO (2)** fields that related to the header of a frame. (6 marks)





Frame Start field indicates the beginning of the frame. Addressing field indicates the source and destination nodes on the media.

(iii) What is the purpose of stop frame that located at the trailer of a frame? (2 marks)

Stop frame indicates the end of the frame when ~~submitted~~ transmitted.

Q2. The Figure 2 shows a network topology on how computers can communicate across LAN and WAN via different types of physical media and Layer 2 protocols. Answer the following question based on the Figure 2.

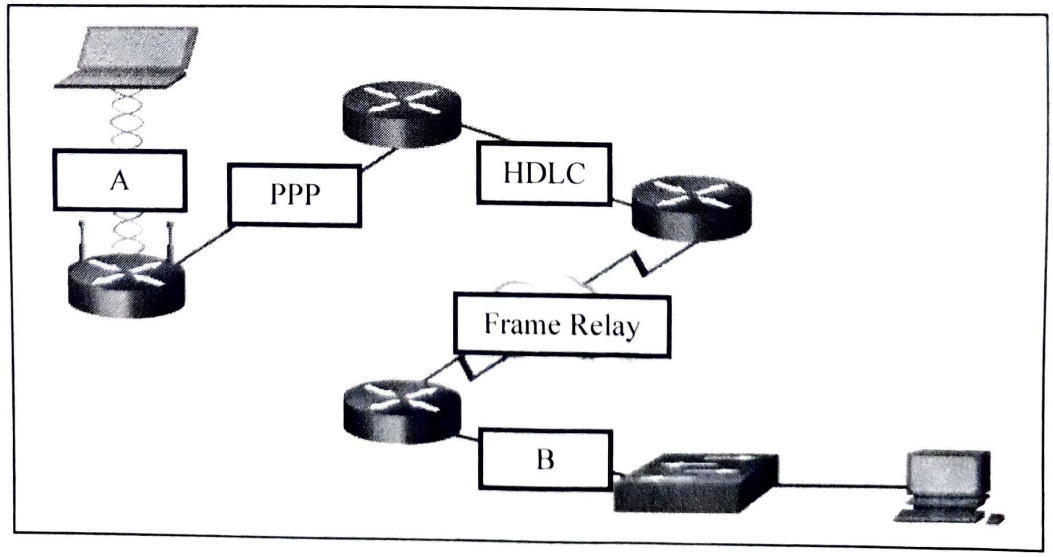


Figure 2

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(i) "A" and "B" are two different popular network connection methods for LAN. Identify the type of connecting media and the IEEE Networking Standard of LAN "A" and "B" respectively. (4 marks)

Label	Connecting media	IEEE Networking Standard
A	Wireless	802.11 : WLAN & Mesh
B	Copper cable	802.3 : Ethernet

(ii) There are two types of access method in LAN topology. Which access method is used for both "A" and "B"? (1 mark)

Contention-based access.

(b) If the data link layer didn't exist, what changes would be required of a network layer protocol such as Internet Protocol (IP)? (6 marks)

Without data link layer, network layer protocol such as Internet Protocol (IP) would have to make provisions for connecting to every type of media that could exist along a delivery path. Moreover, IP would have to adapt every time when a new network technology or medium was developed. This process would hamper protocol and network media innovation and development. This is a key reason for using a layered approach to networking.