
CHAPTER 13

Local Area Networks: Ethernet

Solutions to Odd-Numbered Review Questions and Exercises

Review Questions

1. The *preamble* is a 56-bit field that provides an alert and timing pulse. It is added to the frame at the physical layer and is not formally part of the frame. SFD is a one-byte field that serves as a flag.
3. A *multicast address* identifies a group of stations; a *broadcast address* identifies all stations on the network. A *unicast* address identifies one of the addresses in a group.
5. A *layer-2 switch* is an N-port bridge with additional sophistication that allows faster handling of packets.
7. The rates are as follows:

Standard Ethernet:	10 Mbps
Fast Ethernet:	100 Mbps
Gigabit Ethernet:	1 Gbps
Ten-Gigabit Ethernet:	10 Gbps

9. The common Fast Ethernet implementations are *100Base-TX*, *100Base-FX*, and *100Base-T4*.
11. The common Ten-Gigabit Ethernet implementations are *10GBase-S*, *10GBase-L*, and *10GBase-E*.

Exercises

13. The bytes are sent from left to right. However, the bits in each byte are sent from the least significant (rightmost) to the most significant (leftmost). We have shown the bits with spaces between bytes for readability, but we should remember that that bits are sent without gaps. The arrow shows the direction of movement.

← **01011000 11010100 00111100 11010010 01111010 11110110**

15. The first byte in binary is 01000011. The least significant bit is 1. This means that the pattern defines a multicast address. *A multicast address can be a destination address, but not a source address.* Therefore, the receiver knows that there is an error, and discards the packet.
17. The maximum data size in the Standard Ethernet is 1500 bytes. The data of 1510 bytes, therefore, must be split between two frames. The standard dictates that the first frame must carry the maximum possible number of bytes (1500); the second frame then needs to carry only 10 bytes of data (it requires padding). The following shows the breakdown:
 - Data size for the first frame: **1500 bytes**
 - Data size for the second frame: **46 bytes** (with padding)
19. We can calculate the propagation time as $t = (2500 \text{ m}) / (200,000,000) = 12.5 \text{ } \mu\text{s}$. To get the total delay, we need to add propagation delay in the equipment (10 μs). This results in **T = 22.5 μs** .