Chapter 4 Assignments

1. Consider building a CSMA/CD network running at 1 Gbps over a 1-km cable with no repeaters. The signal speed in the cable is 200,000 km/sec. What is the minimum frame size?

2. Let A and B be two stations attempting to transmit on an Ethernet. Each has a steady queue of frames ready to send; A's frames will be numbered A1, A2, and so on, and B's similarly. Let T = 51.2 μs be the exponential backoff base unit. Suppose A and B simultaneously attempt to send frame 1, collide, and happen to choose backoff times of 0 × T and 1 × T , respectively, meaning A wins the race and transmits A1 while B waits. At the end of this transmission, B will attempt to retransmit B1 while A will attempt to transmit A2. These first attempts will collide, but now A backs off for either 0 × T or 1 × T , while B backs off for time equal to one of 0 × T, ..., 3 × T .

(a) Give the probability that A wins this second backoff race immediately after this first collision; that is, A's first choice of backoff time k × 51.2 is less than B's.

(b) Suppose A wins this second backoff race. A transmits A3, and when it is finished, A and B collide again as A tries to transmit A4 and B tries once more to transmit B1. Give the probability that A wins this third backoff race immediately after the first collision.

3. Consider the extended LAN connected using bridges B1 and B2 in Fig. 4-1 . Suppose the MAC tables in the two bridges are empty. Give the MAC tables for each of the bridges after the following transmissions:

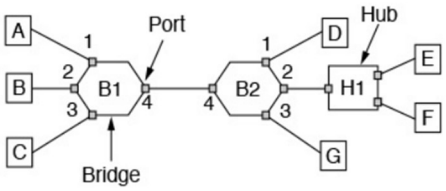

Fig. 4-1

(a) A sends to C.
(b) E sends to F.
(c) F sends to E.
(d) G sends to E.
(e) D sends to A.
(f) B sends to F.

4. Why is collision detection more complex in wireless networks than in wired networks such as Ethernet and How can hidden terminals be detected in 802.11 networks