

1. 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. A 2 km long broadcast LAN has 10^7 bps bandwidth and uses CSMA/CD. The signal travels along the wire at $2 * 10^8$ m/s. What is the minimum packet size that can be used on this network?
3. Suppose two nodes, A and B are attached to opposite ends of the cable with propagation delay of 12.5 ms. Both nodes attempt to transmit at time $t = 0$. Frames collide and after first collision, A draws $k = 0$ and B draws $k = 1$ in the exponential backoff protocol. Ignore the jam signal. At what time (in seconds) is A's packet completely delivered at B, if bandwidth of the link is 10 Mbps and packet size is 1000 bits.