

CS 447-002 Networks and Data Communications  
Spring 2024  
Quiz #7 on March 25, 2024 (**SOLUTIONS**)

Your Last Three Digits: \_\_\_\_\_  
(please do NOT write all of your student ID or your name)

Grade: \_\_\_\_\_

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(1) What are **the major problem** in IEEE-802.3 CSMA?

Since transmitting hosts are not able to detect collisions (when one happens), transmitting hosts need to wait for their timer to expire (because ACKs will not come back to transmitting hosts after a collision). This possibly long waiting time will slow down transmitting hosts in CSMA.

(2) What is the primary advantage of “1-persistent algorithm”? What is the primary disadvantage of “1-persistent algorithm”?

**Advantage:** Since a waiting host can start transmission immediately after the currently transmitting host finishes, 1-persistent algorithm is efficient (won't waste any time) if there is only one host to transmit (i.e., not busy LANs).

**Disadvantage:** Since all waiting hosts will start their transmissions at the same time as soon as the currently transmitting host finishes, 1-persistent algorithm will cause collisions when multiple hosts have something to transmit at the same time (i.e., busy LANs).

(3) What is “BEB (Binary Exponential Back-off) algorithm” for?

BEB algorithm is for avoiding (almost) guaranteed collision when two (or more) hosts retransmit after the CSMA/CD (at each of them) detects a collision.

(4) What particular problem in CSMA/CD does BEB solve and how?

Since two (or more) hosts will start their retransmissions (as soon as a collision is over) under CSMA/CD, their retransmissions are (almost) guaranteed to cause another collision.

BEB avoids a collision on retransmissions after a collision is detected by CSMA/CD by inserting randomly delay after a collision is over but a retransmission starts at a transmitting host.

(5) If you have (too) many packet collisions in your LAN, what should you do (to alleviate the negative impacts from a large number of packet collisions)? Tell me what. Tell me why it is a reasonable solution.

When a large number of packet collisions are (frequently) observed (taking place), the  $p$  value in the p-persistent algorithm (CSMA/CD uses the p-persistent algorithm by default) should be lowered.