EE122, Fall 1992
Midterm #2
Professor F. Wu

Problem #1 (multiple choice)
(1 pt.) In comparing efficiency n of automatic repeat request protocols, let us assume SRP and GO-BACK-N have the same window size.
a. n(ABP) < n(SRP) < n(GO-BACK-N)
b. n(ABP) < n(GO-BACK-N) < n(SRP)
c. n(SRP) < n(ABP) < n(GO-BACK-N)

Problem #2 (multiple choice)
(1 pt.) Under a high load, which of the following MAC protocols has the smallest media access time?
a. Slotted ALOHA
b. Token ring
c. Ethernet

Problem #3 (multiple choice)
(1 pt.) Consider the slotted ALOHA protocol; suppose there is one successful transmission every 4 time slots on the average. What is the average number of transmission attempts during this period?
a. 1.38x4 (note: e^(-1.38) = 1/4)
b. 0.35x4 (note: 0.35e^(-.035) = 1/4)
c. 0.69x4 (note: e^-2(0.29) = 1/4)

Problem #4 (multiple choice)
(1 pt.) In a token bus network, the next station to which the token is passed should be
a. physically closest to the station holding the token, with the exception
of the station at the end of the bus
b. determined by the physical address of the stations
c. the next station in a logical ring determined during a membership setup
stage

Problem #5 (multiple choice)
(1 pt.) The efficiency of an Ethernet with 100 computers is determined to be 70%. The average packet length is 1000 bits. How many packets can each computer send every second, on the average?
a. 100
b. 70
c. ____

Problem #6 (multiple choice)
(1 pt.) In a FDDI network, suppose the token rotation time TRT is less than the target token rotation time TTRT, then the station may send
a. synchronous traffic only
b. asynchronous traffic only up to (TTRT- TRT) seconds

c. all of the above

Problem #7 (multiple choice)

(1 pt.) Consider the content of the request counters (RC) of two adjacent stations A and B in a DQDB network, denoted by RC(A) and RC(B),
a. RC(A) = RC(B)
b. RC(A) and RC(B) are independent
c. The difference between RC(A) and RC(B) depends on the number of packets in transit between A and B

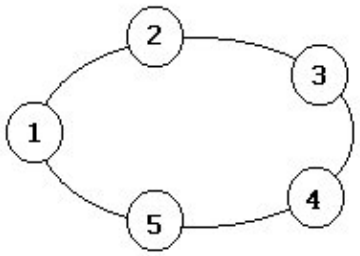
Problem #8

(2 pts.) Draw a state transition diagram of CSMA-CD protocol. Define the following states: idle, transmission, wait, jammed channel, receive packet. Indicate input which causes the transition on the diagram.

For the remainder of the problem, assume R = L = C = 1, so that the differential equation becomes: (d^2v)/(dt^2) + (dv)/(dt) + v = (di)/(dt).

Problem #9

(3 pts.) In this problem you will analyze the RAR protocol modified to retransmit packets that are not received correctly. The protocol is as follows: to transmit a packet, a station waits for the token, then modifies it into a start of frame, appends its packet, then waits for the packet to come back. The destination station indicates at the end of the fram whether it got the packet correctly or not. If the frame comes back to the transmitting station without the indication that it was correctly received by the destination station, then the transmitting station retransmits the packet. If the frame indicates that the packet was correctly received, then the transmitting station releases the token. Assume that there are five stations on the ring so that PROP = 1 ms, TRANSP = 1 ms, that TRANST and the processing times are negligible.



Problem #9a

What is the efficiency of the protocol, assuming that there are no transmission errors?

Problem #9b

Assume that the probability that a packet is received incorrectly p = 5%. Calculate the efficiency.