

## ECE 6970: Homework 4

Due on April 10, 2007

(1) In this problem, we will investigate the workings of the VTCSMA-D algorithm in a 5-node system. Construct a situation (i.e., arrival times and deadlines) in which all packets are transmitted successfully if  $\eta = 10$ , but some packets miss their deadlines if  $\eta = 4$ .

Construct another situation in which all packets are transmitted successfully if  $\eta = 4$ , but where some packets miss their deadlines if  $\eta = 10$ .

Assume that the packet transmission time is 1 and the end-to-end network delay is 4. This means that to meet its deadline of  $d$ , a packet must start its transmission no later than  $d - 5$ .

(2) Consider the use of FDDI in the following situation. We have four nodes in the system. The real-time requirement is that node  $n_i$  should be able to put out up to  $b_i$  bytes over each period of duration  $P_i$ , where  $b_i$  and  $P_i$  are as given in the following table:

Node	$b_i$	$P_i$
$n_1$	1000	10 ms
$n_2$	3000	20 ms
$n_3$	1000	50 ms
$n_4$	1000	80 ms

Assume that all overheads are negligible (including the token-passing time), and that the system bandwidth is  $10^6$  bits per second. Assume the end-to-end transmission delay to be negligible.

Choose an appropriate value of TTRT and assign the number of bits of synchronous traffic that a node may put out per visit of the token.

(3) How would the efficiency of the CAN algorithm change as the bus length increases?