King Fahd University of Petroleum and Minerals
College of Computer Sciences and Engineering
Department of Computer Engineering

COE 344 – Computer Networks (T092)

Homework # 05 (*due date & time: Sunday 30/05/2010 during class period*)

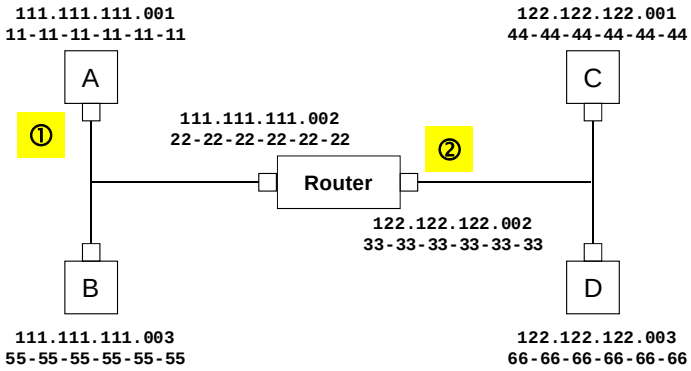
***** Show all your work. No credit will be given if work is not shown! *****

Problem # 1 (20 points): Suppose nodes *A* and *B* are on the same Ethernet segment. Suppose further that at time t = 0 bit times *A* starts transmitting a frame to *B*. Suppose that the maximum propagation delay between nodes *A* and *B* is 280 bit times. What is the **minimum** size of the frame that can be sent between nodes *A* and *B* such that *A* will detect a collision if *B* starts to send a frame to *A* before *A* finishes the transmission of its own frame?

Problem # 2 (40 points): Suppose nodes *A* and *B* are on the same 10 Mbps Ethernet bus, and the propagation delay between the two nodes is 230 bit times. Suppose *A* and *B* send frames at the same time, the frames collide, and then *A* and *B* choose different values of *K* in the CSMA/CD algorithm. Assuming no other nodes are active, can the retransmissions from *A* and *B* collide? For our purposes it suffices to work out the following example. Suppose *A* and *B* begin transmission at t = 0 bit times. They both detect collisions at t = 230 bit times. They finish transmitting a jam signal at t = 230 + 48 = 278 bit times. Suppose K_A = 1 and K_B = 0. At what time does *A* schedule its retransmission? At what time does *B* begin transmission? (*Note*: The nodes must wait for an idle channel after returning to Step 2–see protocol.) At what time does *B*'s signal reach *A*? Does *A* refrain from transmitting at its scheduled retransmission time?

Problem # 3 (40 points):

i. **(20 points)** Consider the following network where host *A* wants to send a TCP segment to host *D*. Assuming that all ARP tables are *complete*, complete the following table regarding the two data link frames shown in the figure (i.e. frame ① going out of host *B* and frame ② going out of the router) that are associated with the TCP segment sent from *A* to *D*.



Frame	*Source MAC*	*Destination MAC*	*Source IP*	*Destination IP*
①				
②				

ii. **(20 points)** Repeat part (i) but assume that hosts *A*, *B*, *C*, and *D*'s ARP tables are *complete* whereas the router's ARP tables are *empty*.

Frame	*Source MAC*	*Destination MAC*	*Source IP*	*Destination IP*
①				
②				