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

COE 344 – Computer Networks (T122)

Homework # 05 (*due date & time: Monday 06/05/2013 during class period*)
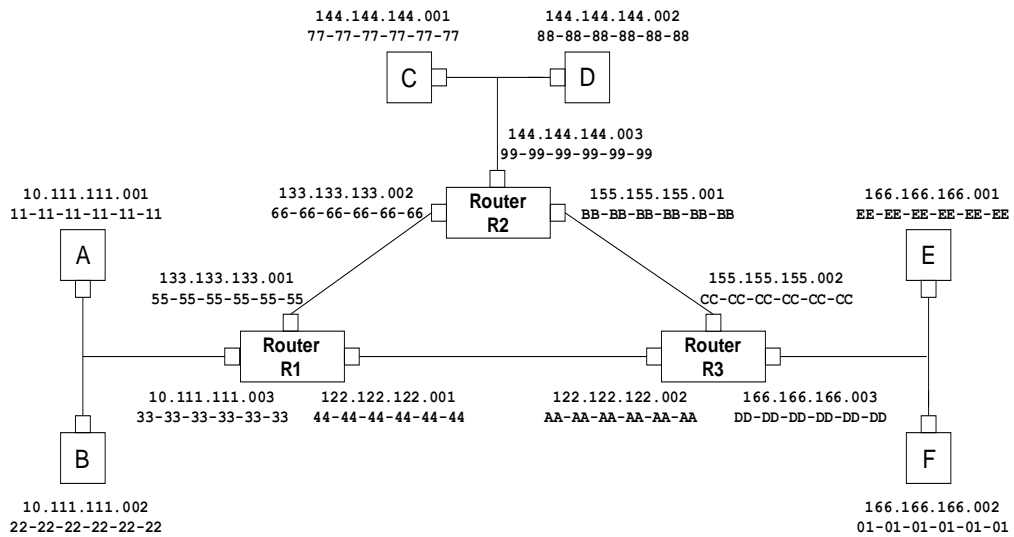
<mark>**Late homework submission will NOT be accepted**</mark>

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

Problem # 1 (55 points): Consider the following exchange of Ethernet frames between nodes *A* and *B* over the same Ethernet segment. Assume the propagation delay between the two nodes is 200 bit times, and that both *A*'s frame and *B*'s frame have a size equal to 576 bits. Assume further that when a collision occurs that $K_A = 1$ and $K_B = 0$.
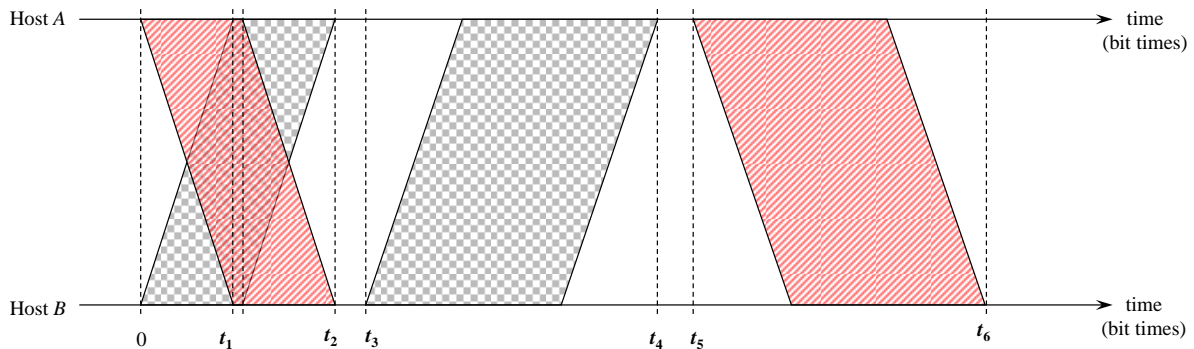
a) **(5 points)** Calculate when *B* senses a collision (i.e., t_1).
b) **(10 points)** Calculate when the last bit of *A*'s jam signal reaches *B* (i.e., t_2).
c) **(5 points)** Calculate when *B* starts retransmission of the frame (i.e., t_3).
d) **(10 points)** Calculate when the last bit of *B*'s retransmitted frame reaches *A* (i.e., t_4).
e) **(15 points)** Calculate when *A* starts sensing the channel for retransmission.
f) **(5 points)** Calculate when *A* starts retransmission of the frame (i.e., t_5).
g) **(5 points)** Calculate when the last bit of *A*'s retransmitted frame reaches *B* (i.e., t_6).

Problem # 2 (45 points): Consider the following network where host **B** wants to send a TCP segment to host **C**. The TCP segment sent by host **B** will pass through R1, then R3, then R2 before reaching host **C**. Assume that all ARP tables are complete <u>except for router R1 (i.e., router R1 ARP table is *empty*)</u>. Complete the following table pertaining to the TCP segment sent from **B** to **C**. Note that the possible frame types are ***ARP Query***, ***ARP Response***, and ***data***. Note also that the source and destination IP addresses refer to the IP addresses <u>contained in the payload</u> of each frame. (***Hint:*** *There are a total of 6 frames that will be generated*)

Frame	Frame type	Source MAC	Destination MAC	Source IP	Destination IP
①	data	22-22-22-22-22-22	33-33-33-33-33-33	10.111.111.002	144.144.144.001
②	ARP Query	44-44-44-44-44-44	FF-FF-FF-FF-FF-FF	122.122.122.001	122.122.122.002
③	ARP Response	AA-AA-AA-AA-AA-AA	44-44-44-44-44-44	122.122.122.002	122.122.122.001
④	data	44-44-44-44-44-44	AA-AA-AA-AA-AA-AA	10.111.111.002	144.144.144.001
⑤	data	CC-CC-CC-CC-CC-CC	BB-BB-BB-BB-BB-BB	10.111.111.002	144.144.144.001
⑥	data	99-99-99-99-99-99	77-77-77-77-77-77	10.111.111.002	144.144.144.001