KFUPM - COMPUTER ENGINEERING DEPARTMENT

COE-341 – Data and Computer Communication

Quiz6 – Due Date June 5th, 2010

Problem 2:

It is desired to DESIGN a communication link from Qaurayyat (A) to Riyadh (B) and from Riyadh (B) to Dammam (C). The figure below shows three nodes: A, B, and C connected using two links. If links AB operates using a sliding window protocol with $W = 4$, while link BC operates using stop-and-wait protocol.

Assume: all links operate full-duplex lines and error free channels. Furthermore, T_{ack} and T_{proc} are negligible.

a) (50 point) For link BC, compute the utilization and link throughput (in bits per second and also in frames per second).

b) (50 point) For link AB, the transmission bit rate R_AB is to be designed. Provide a plot for the link AB throughput in frames per second as a function of the bit transmission rate R_AB in kb/s. Label the *x*- and *y*-axis properly and highlight the important points (or regions) where the efficiency is 100% and that where the efficiency is less than 100%. Also indicate on your plot the asymptotic throughput value in frames per second as R_AB approaches infinity.

c) (50 point) For the link in part (b), it is required to plot the utilization for the link AB as a function of the bit transmission rate R_AB in kb/s. Label the *x*- and *y*-axis properly and highlight the important points (or regions) where the efficiency is 100% and that where the efficiency is less than 100%. What is the asymptotic value for the utilization function as the transmission rate R_AB approaches infinity? Why?

d) (50 point) Using the curve produced in part (b), determine the maximum bit rate that can be assigned to link AB such that is DOES NOT overflow the link BC.