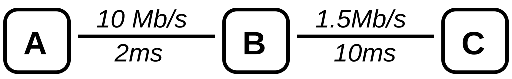
CS 461 - Homework 2 Prof. Tom Anderson
Win 1998

All questions are equally weighted (10 points a piece) so make sure you get the easy ones right. You are free to discuss this assignment with other students and the TAs, but you must each individually write up and submit your own solutions.

Due: firi 1/23

1. *Rate/Delay Concepts.*

   Suppose three computers (A, B, and C) are interconnected by two links as follows:

   The bit-rate of the link between A and B is 10Mb/s, while the bit-rate between B and C is 1.5Mb/s. The propagation delays are 2ms and 10ms respectively.

   (a) How long does it take for A to send an 8KB packet to B and for B to fully receive that packet (1KB = 8192 bits, 1Mb/s = 10^6 b/s).

   (b) How long does it take for A to send an 8KB packet to C (via B) and for C to fully receiver that packet. Assume that B must receive the entire packet before forwarding it on to C (i.e., B must receive the last bit of the packet from A before it starts sending the transmitting the first bit to C — this is called "store and forward").

   (c) Assume now that A sends packets to C continuously (i.e., back to back) at a rate dictated by the link between A and B. Assume that B can queue up at most 10 packets at any given time. How long after A starts blasting packets will B be forced to drop a packet? Beyond that point, how often will B drop packets? If B's queue size is increased to 20 packets, how often will it drop packets (assuming A still sends continuously)?

   (d) Now, instead, assume A sends packets back-to-back until it receives an "acknowledgment" from C, at which time it immediately stops sending. Assume that C generates this acknowledgment as soon as it receives the last bit of the first packet from A. How many packets will A send? Does the queue at B overflow?

2. Peterson and Davie, Ch 3, Problem 12

3. Peterson and Davie, Ch 3, Problem 13

4. Peterson and Davie, Ch 3, Problem 14

5. Peterson and Davie, Ch 6, Problem 5

6. Peterson and Davie, Ch 6, Problem 8