HOME WORK ASSIGNMENT#5

Due Date Dec 3, 2007 (10x100=1000 points)

CS 4/55201 COMPUTER NETWORKS

Fall 2007, Department of Computer Science, Kent State University

1. (Chapter 6, Problem 5) Why does the maximum packet lifetime T, have to be large enough to ensure that not only the packet, but also its acknowledgements, have vanished?

2. (Chapter 6, Problem 7) Consider the problem of recovering from host crashes (i.e. Fig 6-18). If the interval between writing and sending an acknowledgement, or vice versa, can be made relatively small, what are the two best sender-receiver strategies for minimizing the chance of a protocol failure?

3. (Chapter 6, Problem 15) The maximum playload of a TCP segment is 65,495 bytes. Why was such a strange number chosen?

4. (Chapter 6, Problem 20) If the TCP round-trip time, RTT, is currently 30 msec and the following acknowledgements come in after 26, 32, and 24 msec, respectively, what is the new RTT estimate? Use $\alpha = 0.9$.

5. (Chapter 6, Problem 22) In a network that has a maximum TPDU size of 128 bytes, a maximum TPDU lifetime of 30 sec, and an 80bit sequence number, what is the maximum data rate per connection?

6. (Chapter 6, Problem 23) Why does UDP exist? Would it not have been enough to just let user processes send raw IP packets?

7. (Chapter 6, Problem 29) When a 1024-byte message is sent with AAL ¾ what is the efficiency obtained? In other words, what fraction of the bits transmitted are useful data bits? Repeat the problem for AAL 5.

8. (Chapter 6, Problem 31) A client sends a 128-byte request to a server located 100 km away over a 1-gibabit optical fiber. What is the efficiency of the line during the remote procedure call?

9. (Chapter 6, Problem 34) A CPU executes instructions at the rate of 100 MIPS. Data can be copied 64 bits at a time, with each word copied costing six instructions. If an coming packet has to be copied twice, can this system handle a 1-Gbps line? For simplicity, assume that all instructions, even those instructions that read or write memory, run at the full 100-MIPS rate.

10. (Chapter 6, Problem 37) For a 1-Gbps network operating over 4000km, the dely is the limiting factor, not the bandwidth. Consider a MAN with the average source and destination 20km apart. At what data rate does the round-trip delay due to the speed of light equal the transmission delay for a 1-KB packet?

All problems are from Computer Networks, Andrew S Tanenbaum, Third Edition. If there is any inconsistency please email TA (ydrabu@cs.kent.edu)