Electrical, Computer, and Systems Engineering
ECSE-4670: CCN
Fall 1999

Problem Set 5- Due Monday, November 29th 1999

Your Name	

Notes:

1. Be brief and precise, but complete in your answers
2. A part of the homework credit is given to reading. Reading assignments will be quizzed in both informal and formal quizzes
3. Please write your answers on separate sheets and staple it along with the questions to facilitate easy grading.

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1	2	3	4	5	Total
20	10	10	10	10	60

TA Signature :___________________________________

1. ***Reading assignment:***
   Read the textbook (Tanenbaum) Chapter 4 (Network layer (internetworking), Transport layer). Summarize key concepts and issues NOT covered in class.
2. [Fragmentation] Explain why IP does reassembly at the destination host rather than at the routers. Suppose that a TCP message of 2048 bytes and 20 bytes of TCP header is passed to IP. The first network uses 14-byte headers and and MTU of 1024 bytes; the second uses 8-byte headers and an MTU of 512 bytes. Recall that IP has a 20-byte header. Schematically depict the packets delivered to the network layer at the destination for reassembly.
3. [Internetworking] The fundamental problems of internetworking are heterogeneity and scale. Explain how the IP approach to tackling this problem leads to the problem of address structure and allocation, fragmentation/reassembly, and address resolution.
4. [TCP] Explain why cumulative acks (in units of bytes) have been chosen in TCP over each of the other mechanisms such as NAKs, selective acks, bitmaps. Similarly explain why go-back-N is the default retransmission algorithm, though it is being improved today using selective retransmission. Also explain why timeout is the primary mechanism for detecting packet loss and not the triple-duplicate ack procedure.
5. [TCP Congestion] How is the problem of congestion control different from the problem of flow control ? Explain why static mechanisms like memory/bandwidth/processing capacity increase are insufficient to tackle the problem of congestion. Explain in your own words coherently (not copying from the slides) how TCP uses adaptive windows, adaptive timeouts and timer backoff to address this problem.