

# Introduction to Computer Networks

Midterm Exam#2

May 14, 2004

**Important Note: Do not copy directly from the textbook. Use your own words in stating your answers.**

1. Problem 26 of our textbook on page 287. (18%)
2. We see that Reno TCP waits until it has received three duplicate ACK before performing a fast retransmit and enters a fast recovery phase after the fast transmit. Why do you think the TCP designers chose not to perform a fast retransmit after the first duplicate ACK for a segment is received? (6%) Why the slow-start is canceled in the fast recovery phase? (6%)
3. Consider a general network topology and a synchronous version of the distance vector algorithm. Suppose that at each iteration, a node exchanges its minimum costs with its neighbors and receives their minimum costs. Assuming that the algorithm begins with each node knowing only the costs to its immediate neighbors, what is the maximum number of iterations required before the distributed algorithm converges? Justify your answer. (10%)
4. Suppose an application generates chunks of 40 bytes of data every 20 msec, and each chunk gets encapsulated in a TCP segment and then an IP datagram. What percentage of each datagram will be overhead, and what percentage will be application data. (10%)
5. Give three solutions to the IP address depletion (shortage) problem and Explain briefly. (15%)
6. Problem 21 of our textbook on page 412. (10%)
7. Give two reasons why the Cyclic Redundancy Check (CRC) is most commonly used in data communications for error detection. (10%) Explain why CRC cannot detect all errors. (5%)
8. Explain why a CSMA protocol generally has higher throughput than the ALOHA protocol and lower throughput than the CSMA/CD protocol at heavy load. (10%)