HOME WORK ASSIGNMENT#2
CS 4/59995 ST: INTERNET ENGINEERING

Fall 2007, Department of Computer Science, Kent State University

Due Date: ___OCT 11____ (7x100=700 points)

---

1. (MIRROR: ALGORITHM DESIGN) Optimum mirror/cache placement is a very useful problem in Internet systems- design since almost all content providers compete to reduce response time to their content. Study the paper by (Zamin, Jin et.al. 2001) in course Webbook. The author presents two algorithms- '**Min K-Center'** and '**L-Greedy'**. (a) Briefly outline each strategy (in a 4-5 sentence paragraph). (b) Consider an example 5x5 *torus* network (mesh with rings) network with *internet distance* between each node 1. Determine where you will place 3 mirrors to minimize the response time using L-greedy algorithm with zero backtracking. What's the average access time for this solution? Can you improve the results?

2. (LAN: Comers 11.4) Consider a Web page that contains a total of 6 megabytes of images. How long will it take to send the data across a T1 circuit? a T3 circuit, an OC-3 circuit, an OC-12 circuit, and an OC-48 circuit? (Ignore protocol oveehead).

3. (TCP: Comers 22.3) Suppose two programs use TCP to establish a connection, communicate, terminate the connection and then open a new connection. Further suppose a FIN message sent to Shut down the first connection is duplicated and delayed until the second connection has been established. If a copy of the old FIN is delivered, will TCP terminate the new connection? Explain.

4. (IP:) Show the communication scheme in an Ethernet when one IP hosts "sender" (IP address 197.15.3.2 and Ethernet address 0A:07:4B:12:82:36) initiates an Address Resolution Protocol (ARP) for resolving address of another host "target" (IP address 197.15.3.7 and Ethernet address 0A:77:81:0E:52:FA). Draw all the Ethernet packets that will be generated. Indicate all the Ethernet and ARP data fields, and show their content in hex format. (you can assume reasonable values for unspecified fields but state your assumption).

5. (IP: Comers 20.1) How many octets does the smallest possible IPv6 datagram contain? The largest?

6. (IP: Comers 20.5) What is the maximum number of fragments that can result from one Ipv6 datagram that contains only a base header? If it contains a base header plus a TCP header?

7. (IP: Comers 16-12) Instead of assigning one address per network connection, some protocols assign each computer a single address. What is the chief advantage of having single address for a router? What is the chief disadvantage?