資訊網路與多媒體研究所

99. 3. 12

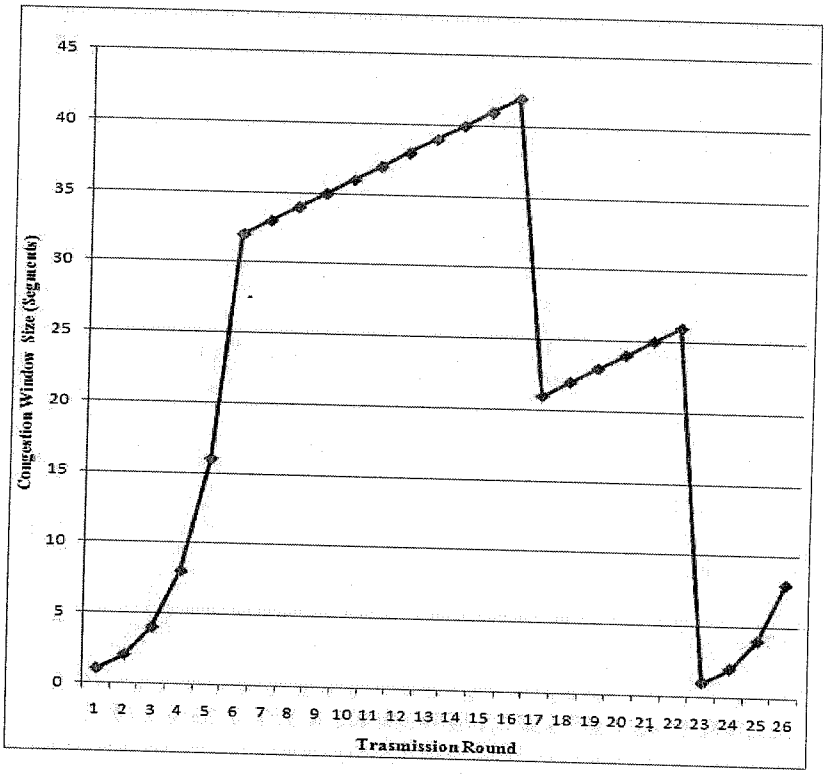
資格考試科目：高等計算機網路

1. (20%) Suppose users share a 2Mbps link. Also suppose each user requires 1 Mbps when transmitting, but each user transmits only 20 percent of the time.
   a. When circuit-switching is used, how many users can be supported?
   b. Suppose packet switching is used. Suppose now there are three users. Find the probability that at any given time, all three users are transmitting simultaneously. Find the fraction of time during which the queue grows.

2. (10%) How long does it take a packet of length 2,000 bytes to propagate over a link of distance 2,000 km, propagation speed $2x10^8$ m/s, and transmission rate 2 Mbps?

3. (20%) Consider the following plot of TCP window size as a function of time. Assuming TCP Reno is the protocol experiencing the behavior shown above, answer the following questions. In all cases, you should provide a short discussion justifying your answer.

   a. Identify the intervals of time when TCP slow start is operating.
   b. Identify the intervals of time when TCP congestion avoidance is operating.
   c. What is the initial value of Threshold at the first transmission round?



背面尚有試題

4. (15%) Stochastic Process
   a. Please describe the following properties, Independent Increment and Stationary Increment.
   b. Define a Stochastic Process that has neither independent nor stationary increments.

5. (15%) What is PASTA (Poisson Arrivals see Time Averages)? Please give a counter example for PASTA .

6. (20%) Stopping Times and Wald's Theorem
   a. Please formally define Stopping Times.
   b. Please give an example for Stopping Times.
   c. How Stopping Times are applied to Wald's Theorem?