CS3251 - Spring 2020

HW 1

Due January 31 at 11:00am (see late policy spelled out in syllabus). Please show all your work to receive full credit. Answers without work leading up to them will not receive any credit. Please submit PDF or Word file using Canvas.

1. Do the Wireshark Exercise in

   https://gaia.cs.umass.edu/wireshark-labs/Wireshark_Intro_v7.0.pdf

2. Do the Wireshark Exercise in

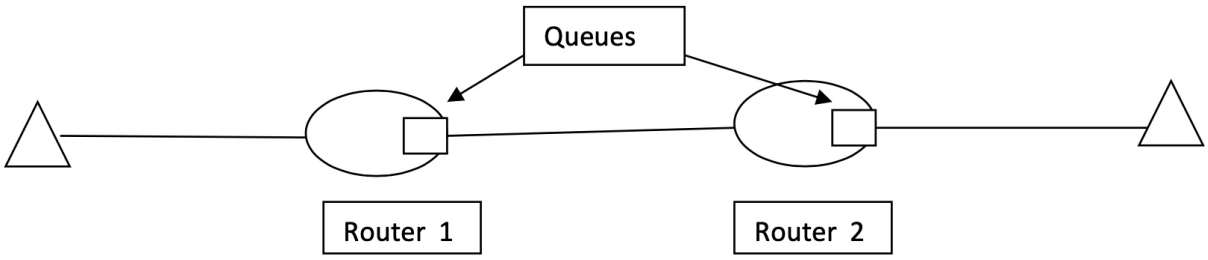
   https://www-net.cs.umass.edu/wireshark-labs/Wireshark_HTTP_v7.0.pdf

3. The path between two end systems consists of two routers and three links. The link between the routers has a data rate of 100Mbps and the two access links connecting the end systems to their corresponding routers have a data rate of 20Mbps. Assume all packets in the network are 10,000 bits (including headers). Compute the time it takes to send a packet from one system to the other under the following conditions:

   a) Propagation delays are negligible and all router queues are empty.

   b) Propagation delays are negligible and a packet encounters: 2 packets ahead of it when it arrives to the first queue and 3 packets ahead of it when it arrives to the second (see figure). In this case assume that the first packet in the queue is about to start transmission.

   c) All router queues are empty but propagation delays are not negligible. The three links have lengths 2000Km, 4000Km and 2000Km, respectively and the signal propagation speed is 200x10^6 m/sec.



4. From Kurose-Ross Ch1.

Consider a packet of length L which begins at end system A and travels over three links to a destination end system. These three links are connected by two packet switches.

Let d_i, s_i, and R_i denote the length, propagation speed, and the transmission rate of link i, for i = 1, 2, 3. The packet switch delays each packet by d_{proc}. Assuming no queuing delays, in terms of d_i, s_i, R_i, (i = 1,2,3), and L, what is the total end-to-end delay for the packet?

Suppose now the packet is 1,500 bytes, the propagation speed on all three links is $2.5 \cdot 10^8$ m/s, the transmission rates of all three links are 2 Mbps, the packet switch processing delay is 3 msec, the length of the first link is 5,000 km, the length of the second link is 4,000 km, and the length of the last link is 1,000 km. For these values, what is the end-to-end delay?