CPE 400/600: Computer Communication Networks

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Midterm Sample Preview

NAME:_____

CPE400/600:_____Marks:_____

Instructions:

1) **Print your name above clearly.**
2) **You are expected to do your own work and must NOT discuss or collaborate with other students.**
3) **Show your steps as clearly and in as detail as possible. Remember, correct approach will always help you in getting better marks.**
4) **State your assumptions clearly if you make any explicit assumptions.**
5) **The exam is closed book.**
6) **You can use a basic calculator for the exam.**
7) **Please make sure you explain the answers clearly in the midterm answers so that it is clearly visible. If the answers are not readable, they cannot be graded and hence you will miss the marks.**
8) **If you cannot attend the class to take the midterm exam in-person for any reason, you must provide valid documentation and let the instructor know as soon as possible to arrange for an alternative exam.**

BEST OF LUCK!

1. Multiple choice questions
   (THIS IS A SAMPLE. In exam, approx. 10 MC questions will be there).

   A. Which one of the following is NOT a function of transport layer?
      a) routing
      b) flow-control
      c) congestion control
      d) All of the above

   B. Transport layer encapsulates data from _____
      a) network layer
      b) data link layer
      c) application layer
      d) physical layer

   C. User datagram protocol is called connectionless because
      a) all UDP packets are treated independently by transport layer
      b) it sends data as a stream of related packets
      c) both (a) and (b)
      d) none of the mentioned

Short answer questions: [Be specific and concise]
(THIS IS A SAMPLE. In exam, approx. 5 questions will be there).

2. a) What are the four components of delay in networking? b) Why does packet loss happen? c) In TCP estimated RTT calculation, under what circumstances, choosing α value close to 1 would be beneficial? Under what circumstances, choosing α value close to 0 would be beneficial?

3. a) What is the purpose of Wireshark? b) What is promiscuous mode in wireshark? c) Based on technology, legal and ethical principles what is the impact (advantages and threats) of wireshark (or similar tools)?

Numerical questions
(THIS IS A SAMPLE. In exam, approx. 3 questions will be there).

4. Two hosts are communicating using TCP communication protocol (TCP congestion control). At the beginning, the ssthreshold is set at 16. Sender starts with TCP slowstart process and continues for 7 transmissions when it encounters the first loss (perceived through timeout).

    a) At that stage what will be the current congestion window (cwnd) and ssthreshold?
    b) After this loss, how many successful transmissions will be required again such that the value of updated cwnd will be equal to the value of the current ssthreshold?
    c) At this stage, another loss is encountered (again perceived through timeout). What is the current cwnd and new ssthreshold now?

    Show your steps.

5. Suppose a source A is sending 3 packets to a destination B. There are 2 intermediate routers in the path from A to B. For each packet, size of the packet, L = 1000 bits. The transmission rate of each of the links connecting the source, router and the destination is 5000 bits per second. What is one hop transmission delay? Assume queuing delay at the routers as 100ms. What is the total delay for 3 packets to be transmitted from source and be received at destination? Assume zero propagation delay and zero nodal processing delay.

Transmission delay $\frac{L}{R} = \frac{1000 \text{ bits}}{5000 \text{ bits/sec.}} = 0.2$ sec.

queuing delay at each routers = 100 ms = 0.1 sec.