INST346 Second Midterm Exam Fall 2017

You have 70 minutes to complete this exam. Time begins after we have all read through the exam questions together and time ends promptly 70 minutes later. You may not read the exam questions before we read them together, and you may not write anything while we are reading those questions together.

Please record your answers in a Word file, in a text file, or on a piece of paper (which could be the last page of this exam or any other paper). You can answer some questions one way (e.g., as Word) and others the other way (e.g., by writing on paper). At the top of every piece of paper or every file in which you write an answer, write your name and the date. If you answer any questions using Word or a text file, submit that file on ELMS and also email it to both oard@umd.edu and rashmi@umd.edu. If you answer any questions on paper, turn in that paper. Make sure your name is on everything that you turn in! And if you use both paper and a file, make a note on each about what can be found in the other so that we don't miss any of your answers.

You may use any information and software that existed before the start of this exam. This means (among other things) that you may search the Web. You may NOT communicate with any other person other than the instructor for any purpose during the exam period, either in person or in any other way, and you may not post anything to any location for any purpose during the exam period. Note that this means you may not have skype, email or any instant messaging application active on any device that you use during the exam, and that that even if you leave the exam room early you may not talk with anyone about anything, you may not send or receive any email, etc. until the exam period ends at 6:15 PM.

Hand write and sign (or, if you type your answers, hand type – no cut and paste – followed by your name) the honor pledge on this exam. (For reference, the honor pledge as stated at http://osc.umd.edu/Uploads/OSC/Honor%20Pledge.pdf, is: "I pledge on my honor that I have not given or received any unauthorized assistance on this exam.")

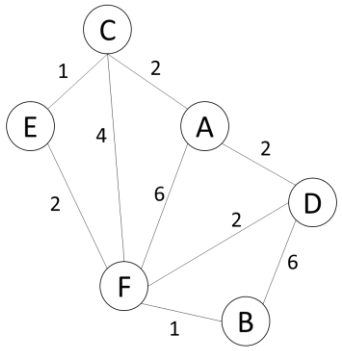
As strategies for completing the exam, keep the following in mind:

- If you find a question to be ambiguous, you may come to the front of the room to ask about it, but please do so in a way that other students can't hear. If you don't get an answer that resolves your question, then please explain your confusion and any reasonable assumptions that you have made in order to answer the question and include those with your answer so that they can be considered during grading.
- You are more likely to get partial credit for an incorrect answer if you show your work.
- **Be careful not to spend too much time on any one question.** The total available credit on this exam is 25 points. Plan ahead, and don't devote more time to a question than it is worth.

***** WRITE YOUR NAME! *****

Answer **all** of the following questions:

1. [10 points] Produce an optimal (i.e., shortest path) routing table for node A in the network shown in the following figure. Your routing table should show the next node on the optimal path to each possible destination node (i.e., for B, C, D, E, and F), together with the estimated total time to reach that destination node. The numbers adjacent to each link in the network indicate the estimated time required to traverse that link (including all delays: transmission, propagation, queueing, and processing).



2. [5 points] Both the 802.11b wireless protocol "frame" (i.e., packet) and the wired Ethernet frame include a Cyclic Redundancy Check (CRC), but the results of the CRC are used differently by Ethernet and 802.11b hosts. First, explain how an 802.11b host would use the CRC results (i.e., what they will do if the CRC passes, and what they will do if the CRC fails). Then explain how an Ethernet host would use the CRC results. Finally, explain why these two types of hosts use the CRC results differently.

3. [5 points] Explain how an Intrusion Detection System would detect a Distributed Denial of Service (DDoS) attack. A complete answer to this question would describe **how** and **why** you would expect the pattern of network traffic in a DDoS attack to differ from normal network traffic.

4. [5 points] Explain why cellular data networks (such as 4G networks) rely on indirect forwarding for what the book calls "mobility" (and what just about everyone else calls "roaming"). A complete answer to this question will explain both the advantages of indirect routing and the disadvantages of direct routing when the cellular terminal (i.e., the phone) is operating outside of its home network.

*** WRITE AND SIGN THE HONOR PLEDGE ***