**CME 451 – Transport Networks – Winter 2017**
**Assignment 4**
**Due Date: March 20, 2017**

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This assignment contains 10 problems. Completed assignments must be submitted on the specified due date by 4:30pm in the CME451 assignment box (second floor, across Room 2C94E). Late assignments will not be marked, and will be given a mark of zero.

Marking scheme:

- 30% completion mark
- 70% based on a selected set of problems (to be determined by the marker)

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1. Read chapters 5 (Iniewski textbook); 2, 20, 23 (Forouzan textbook).
2. For a UDP datagram, what is the: (a) minimum size; (b) maximum size? When are these values encountered?
3. Explain why, as a transport protocol, UDP is described to be: (a) connectionless and (b) unreliable.
4. The following is a dump of a UDP header in hexadecimal format:
   06 11 00 15 00 1C E2 17
   Show your calculations in answering the following questions.
   (a) What are the source and destination ports?
   (b) What is the total length of the user datagram? What is the length of the data?
   (c) Is the packet from a client to a server, or from a server to a client? Explain.
5. What is the maximum size of a TCP header? What is the minimum size of the TCP header? How is this size specified in the TCP protocol (i.e., what is the syntax)?
6. How is the TCP window size determined in receiver-based flow control?
7. What is the value of the receiver window for host A, if the receiver, host B, has a buffer size of 6500 bytes and 2100 bytes of received and unprocessed data?
8. What is the rationale of the transmitter-based flow control in TCP? Describe a possible scheme for flow control (Hint: you may consider the simple slow-start scheme).
9. Discuss the PROs and CONs of SCTP as a transport layer protocol.
10. Describe at least 3 features found in SCTP, but not in previous transport layer protocols. For each feature, explain which relevant issue is being addressed.