Second Third-Term Exam

Open book and notes; In class *Wednesday, November 16th*

⊕ *Do not forget to write your name on the first page. Initial each subsequent page.*
⊕ *Be* **neat** *and* **precise**. **I will not grade answers I cannot read.**
⊕ *You should draw simple figures if you think it will make your answers clearer.*
⊕ *Good luck and remember, brevity is the soul of wit*

- All problems are mandatory

- I cannot stress this point enough: **Be precise**. If you have written something incorrect along with the correct answer, you should **not** expect to get all the points. I will grade based upon what you **wrote**, not what you **meant**.

- Maximum possible points: 50.

Name: _____

Problem	Max	Points
1	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

1. TCP, Reliable Protocols

   (a) What is "simultaneous close" in TCP? What is the set of state transitions during a simultaneous close? (4 points)

   (b) What is "conservation of packets" in TCP? How is the "ack clock" in TCP started? (3 points)

   (c) (How) can a reliable transmission protocol be built using NAKs? Explain. (3 points)

2. DNS, HTTP

    (a) What is a DNS *glue record*? Explain with an example. (3 points)

    (b) Explain why a persistent connection would improve HTTP/1.0 when the network is congested. (3 points)

    (c) What is an authoritative DNS reply? Describe a scenario when a non-authoritative reply is "not as good" as an authoritative reply. (4 points)

3. Chord, Congestion control

    (a) Explain, in your OWN words, what the *stabilization* protocol in Chord does. (5 points)

    (b) In Chord, why is replicating at k successors better than replicating using k independent hashes? (2 points)

    (c) Why is increasing link bandwidths not sufficient to alleviate all congestion? (3 points)

4. Multicast

   (a) How is broadcasting in DVMRP different than LS routing? (2 points)

   (b) What is an advantage and a disadvantage of a shared multicast distribution tree vs. a source-specific tree. (4 points)

   (c) Describe ways in which the shared tree in PIM-SM can be optimized. (4 points)

5. FTP, NAT

    (a) What is the `PORT` command in FTP used for? (2 points)

    (b) Describe a scenario when the `PASV` command in FTP is useful, and one in which it fails. (3 points)

    (c) Recall that a multi-homed domain is one that has multiple connections to the Internet (possibly using two different providers). Can NAT be used in multi-homed domains? Explain. (5 points)