Second Third-Term Exam

Closed book and notes; In class   *Tuesday, November 12th*

⊕ *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	Points
1	
2	
3	
4	
5	
Total	

1. Nomenclature

    (a) Describe the following terms: (2 points each)
        - DNS Zone

        - Congestion Avoidance

        - Multi-Exit Discriminator

        - Slow start

        - Authoritative Answer

2. BGP/Reliable Transfer

   (a) How are *route reflectors* used? (2 points)

   (b) What are community attributes in BGP?? What is the difference between the `no-export` and `no-advertise` community attribute? (3 points)

   (c) Upper bound (within 10%) the fraction of a 800Mbps 250ms RTT link that a Stop-and-Wait sender that sends 1000 byte packets can occupy. Show your work. (2 points)

   (d) Give an example where a sliding window transfer protocol that uses 8 sequence numbers fails when RWS = SWS=5 but only one packet is lost. (3 points)

TCP Details

3. (a) Identify a situation when a Nagle transmitter will buffer data. (2 points)

   (b) When might you disable Nagle's algorithm? (2 points)

   (c) Suppose a TCP connection has started and data has been exchanged. Upon detecting loss, when can a sender perform *fast recovery* vs. having to employ slow start? (2 points)

   (d) Explain TCP simultaneous close with a space-time diagram. Identify the sequence of segment exchanges that causes simultaneous close and the state maintained by each end point. (4 points)

4. DNS

   (a) How would you look up the DNS name corresponding to the IP address 128.8.126.63? (2 points)

   (b) What is a zone transfer? How is it commonly used in DNS? (2 points)

   (c) How are nameservers related to zones? Explain with examples. (3 points)

   (d) Suppose the `cs.umd.edu` nameserver administrator wants to delegate a new domain `home.cs.umd.edu`. Describe the steps required to enable this new domain. (3 points)

5. Design (Choices)

   (a) Assume your host at home receives a DHCP address from your provider, and that you wish to access this host from the Internet using a name. Design (don't just name) a protocol to allow this. State what other hosts you may need, what software runs where/when, and what information is carried by protocol messages. (3 points)

   (b) Write the pseudocode that you use to advance the sender window for the partial reliable transfer project. Define your variables clearly. (2 points)

   (c) You administer 128.8.128/24 and host a popular server at 128.8.128.18. You wish to split the load on your servers such that roughly half the requests (say those from Europe) to go a host located in Frankfurt, DE, and the rest to a different host located in Springfield, USA. Describe how you would accomplish this. (5 points)

   Bonus: What is Google's default TTL for the www.google.com A record?