First Third-Term Exam

⊕ *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)
       - Subnetting

       - Route Reflector

       - Home Agent

       - Maximum Transmission Unit (MTU)

       - Foreign Agent

2. Routing

   (a) What is the difference between Split Horizon and Poisoned reverse?(2 points)

   (b) Are packet sequence numbers *required* for reliable flooding? Why or why not? (4 points)

   (c) After processing a routing update, the propagate step at node x in Distance Vector routing states:
       $\forall$ dest. y and neighbor w
              if $min_w D^x(y, w)$ changed, send $D^x(y, w)$ to all neighbors
       Show with an example why the min_w clause is required, i.e., incorrect routes are computed if updates are sent out without the minimum changing. (4 points)

3. Internet Protocol

   (a) How does a router resolve the MAC (e.g., ethernet) address for a host on a local subnet? (2 ponits)

   (b) What problems do the use of subnets solve? (2 points)

   (c) Suppose you need fragment a IP datagram (ident. set to 42) with 1280 payload bytes to be transmitted over a link that can transmit a 276 bytes IP datagram maximum. Fill in the values below assuming maximum sized fragments. Assume no datagrams contain IP options. (3 points) (Each incorrect value will lose $\frac{1}{2}$ point)

Identification	Offset	MF	DF	Total len.

   (d) Suppose you've been allocated 123.45.67.00/28. How would you split your addresses into four equal size subnets? List the subnet, broadcast, and a host address for each of your subnets. (3 points) (Each incorrect value will lose $\frac{1}{2}$ point)

Subnet Addr.	Broadcast Addr.	Host Address

4. CIDR, BGP

   (a) Why is CIDR required when we already have subnets? (2 points)

   (b) Give two examples of where BGP allows a network administrator to set policy that Link State does not. For each, name the mechanism in BGP that is being used. (4 points)

   (c) How do *weight*, *local preference*, and *multi-exit discriminator* differ? (4 points)

Miscl.

5. (a) AS36561 (YouTube) announces 208.65.152.0/22. On Sunday, 24 February 2008, 18:47 AS17557 (Pakistan Telecom) started announcing 208.65.153.0/24. What was the effect of AS17557's actions? Why? (2 points)

(b) On Sunday, 24 February 2008, 20:07 AS36561 started announcing 208.65.153.0/24. What was the effect of this update? Why? (3 points)

(c) In mobile IP, why should the mobile host not directly respond to the correspondent host? (3 points)

(d) Suppose you want to write a single-process TCP server that accepts new connections on socket s, services accepted clients using sockets $a_1, \ldots, a_n$, monitors user inputs on file descriptor d, and writes a log entry every second on file descriptor l. Write the `select` call (in pseudocode) that would multiplex your input descriptors and allow you to write to the log file. (2 points)