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)
        • CIDR

        • Autonomous System

        • Home Agent

        • Proxy ARP

        • iBGP

2. Routing

    (a) Why are sequence numbers required in Link State Update packets? (3 points)

    (b) What mechanisms do link state protocols use to reconcile updates from a router that fails and reboots? (3 points)

    (c) Under what circumstance(s) do Distance Vector protocols require periodic updates? Explain with an example (4 points)

3. Internet Protocol

   (a) How does the code implementing IP at a host determine which "process" to deliver an incoming datagram to? (1 point)

   (b) Why were subnets introduced? (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 200.0.0.0/24, and you split your addresses into equal size subnets, each with subnet mask ff ff ff 0f. How many subnets have you created? List the subnet, broadcast, and a host address for at least four of your subnets. (3 points) (Each incorrect value will lose $\frac{1}{2}$ point)

   Number of subnets: _____

Subnet Addr.	Broadcast Addr.	Host Address

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4. CIDR, BGP

    (a) (How) does CIDR help with the allocation of Class C addresses? (2 points)

    (b) (How) does CIDR help with the allocation of Class A addresses? (2 points)

    (c) What are "default-free" routers/routing tables? Why are they required? (2 points)

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

Miscl.

5. (a) What information does a DHCP server need to provide a DHCP client to allow the client to send and receive IP packets? (2 points)

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

(c) Suppose you want to write a single-process TCP server that responds (only) on port 80, services multiple clients simultaneously, and also monitors user inputs (using `getc`) every 30 milliseconds. Write the structure of this code in pseudo-code. Do not use multiple threads. (5 points)