Networks and Distributed Systems	**Homework 3: Routing**
CS3700 Spring 2019	**January 10, 2019**

This homework is due at the beginning of class on February 14, 2019 and is worth 2% of your grade.

Name: _____

CCIS Username: _____

Problem	Possible	Score
1	35	
2	25	
3	30	
Total	90	

1. Suppose an IP router has the following initial routing table entries:

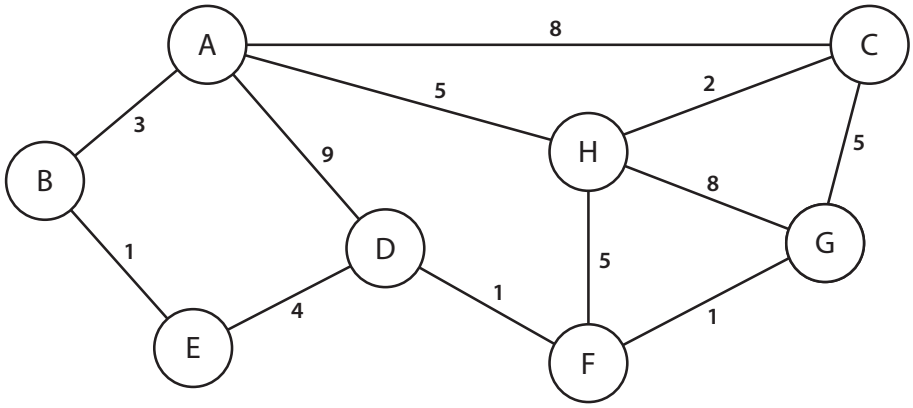
#	Address	Subnet Mask	Next Hop
1	129.10.112.0	255.255.255.0	R1
2	129.10.80.0	255.255.255.0	R1
3	129.10.0.0	255.255.0.0	R2
4	129.10.62.0	255.255.255.0	R4
5	129.10.63.0	255.255.255.0	R4
6	129.10.64.0	255.255.192.0	R3
7	129.10.65.0	255.255.255.0	R4
8	129.10.66.0	255.255.255.0	R4

Identify the set(s) of table entries that can be aggregated to reduce the table size. (15 pts)

1a. Show the final routing table entries after aggregation has been performed. (10 pts)

1b. What are the next hops that are used if the router is asked to forward a packet to (a) 129.10.7.3, (b) 129.10.97.4, (c) 129.10.80.2, and (d) 129.11.112.4? (10 pts)

2. Consider the networking of routers shown below, with the "link weight" for each link written next to the link:

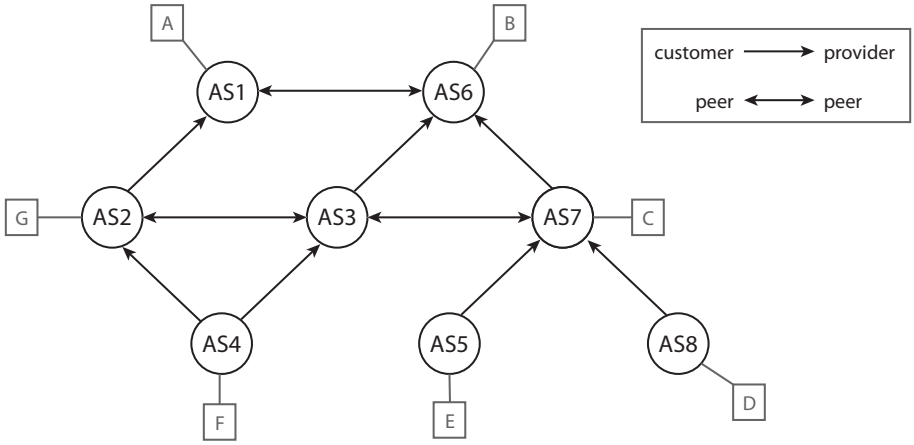


2a. Use Dijkstra's shortest-path algorithm to compute the shortest path from A to all other routers. Show how the algorithm works by filling out the table on the final page, showing both the current cost to each destination ($D(X)$) and the corresponding shortest path ($p(X)$). (15 pts)

2b. Name one way in which distance vector routing is better than link state routing. (5 pts)

2c. Name one in which link state routing is better than distance vector routing. (5 pts)

3. Consider the network shown in the following figure. Assume that if a customer has >1 choice of providers to send outbound traffic through, the customer will pick the provider with the lowest AS number.



3a. What path would host *F* take to reach host *B*? Justify your answer. (10 pts)

3b. What path would host *E* take to reach host *G*? Justify your answer. (10 pts)

3c. All traffic between *AS*5 and *AS*8 must transit through *AS*7. Suppose *AS*5 and *AS*8 want to avoid paying *AS*7 for this service. What could they do to reduce their cost? (10 pts)

Step	N'	D(B), p(B)	D(C), p(C)	D(D), p(D)	D(E), p(E)	D(F), p(F)	D(G), p(G)	D(H), p(H)
1	A							
2								
3								
4								
5								
6								
7								
8								