

Homework Assignment 4 Solution

1. Link state algorithms: Computes the least-cost path between source and destination using complete, global knowledge about the network. Distance-vector routing: The calculation of the least-cost path is carried out in an iterative, distributed manner. A node only knows the neighbor to which it should forward a packet in order to reach given destination along the least-cost path, and the cost of that path from itself to the destination. (1 pt for each algorithm. For link state algorithm, the related key words include global, greedy and from a single source to all other nodes. For distance vector, the key words are distributed, decentralized, dynamic programming and distance between any two nodes.)

2.

Step	N'	$D(t),$ $p(t)$	$D(u),$ $p(u)$	$D(v),$ $p(v)$	$D(w),$ $p(w)$	$D(y),$ $p(y)$	$D(z),$ $p(z)$
0	x	∞	∞	3,x	6,x	6,x	8,x
1	xv	7,v	6,v	3,x	6,x	6,x	8,x
2	xvu	7,v	6,v	3,x	6,x	6,x	8,x
3	xvuw	7,v	6,v	3,x	6,x	6,x	8,x
4	xvuwy	7,v	6,v	3,x	6,x	6,x	8,x
5	xvuwyt	7,v	6,v	3,x	6,x	6,x	8,x
6	xvuwytz	7,v	6,v	3,x	6,x	6,x	8,x

(deduct 1 pt for each wrong step)

3.

		Cost to				
		u	v	x	y	z
From	v	∞	∞	∞	∞	∞
	x	∞	∞	∞	∞	∞
	z	∞	6	2	∞	0

		Cost to				
		u	v	x	y	z
From	v	1	0	3	∞	6
	x	∞	3	0	3	2
	z	7	5	2	5	0

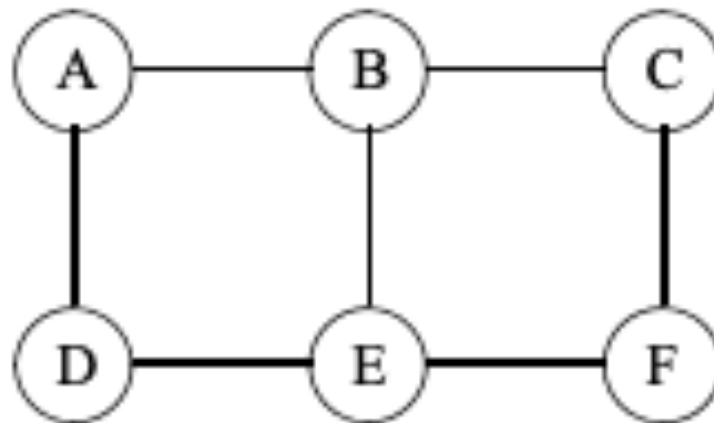
		Cost to				
		u	v	x	y	z
From	v	1	0	3	3	5
	x	4	3	0	3	2
	z	6	5	2	5	0

		Cost to				
		u	v	x	y	z
From	v	1	0	3	3	5
	x	4	3	0	3	2
	z	6	5	2	5	0

(deduct 1 pt for each wrong step. Also note that each step z could only have three distance vectors)

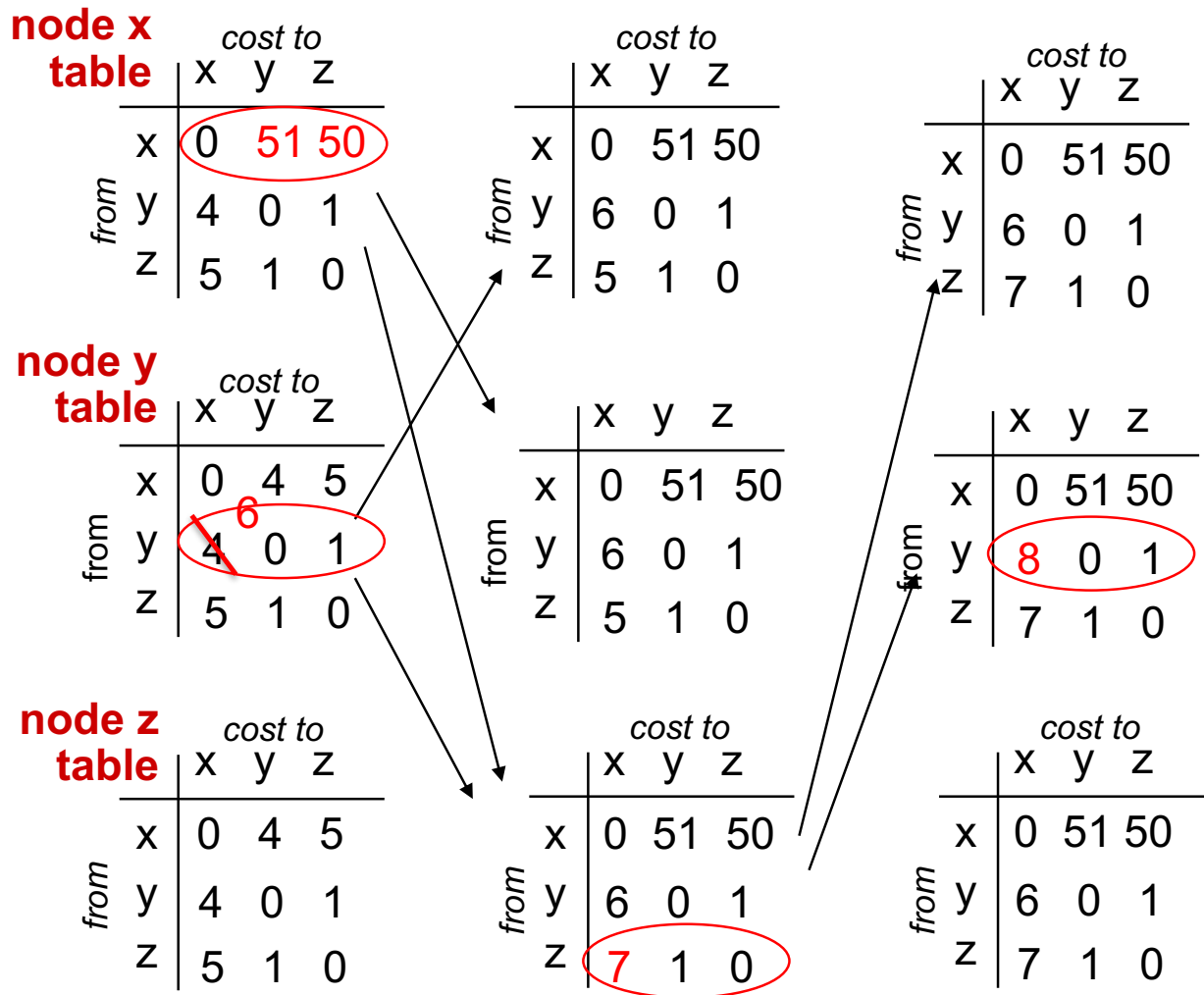
4.

The cost=1 links show A connects to B and D;
F connects to C and E. F reaches B through C at cost 2, so B
and C must connect.
F reaches D through E at cost 2, so D and E must connect.
A reaches E at cost 2 through B, so B and E must connect.
These give:



(no partial credits for this question)

5. Following are the steps for the algorithm to stabilize after the link cost changes. There are 44 iterations since When $D_z(x) = 50$, the algorithm will stabilize. The number of iterations equals to $50 - 6 = 44$.



(1pt for the explanation and 2 pts for the steps. The students may have used the wrong distance vector for node x from the previous slides. Do not deduct any point for this.)

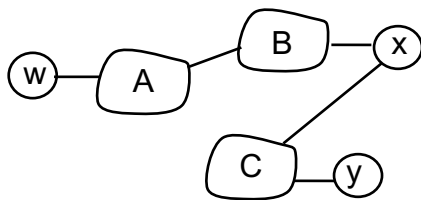
6.

- eBGP
- iBGP
- eBGP

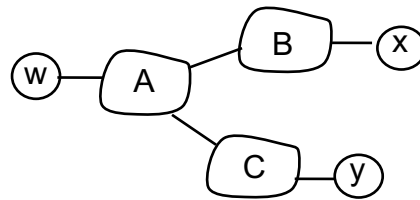
d. iBGP

(1pt for each answer)

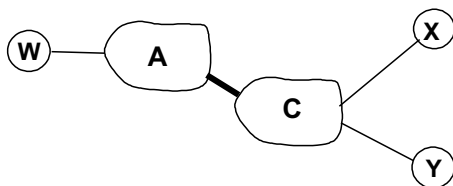
7.



X's view of the topology



W's view of the topology



X's view of the topology

(There are two possible topologies from x's point of view since the question did not mention where x receives the advertisement to w. Either topology view is fine. Although the textbook mentioned that x receives the advertisement from B. 2pts for each topology. Deduct 0.5 pt for each wrong link)