Rajat Sethi – ECE 4380 – HW 8

1a.)

A's Routing Table		
Destination	Cost	NextHop
B	7	B
C	14	B
D	15	B
E	12	B
F	14	B

1b.)

A's Routing Table		
Destination	Cost	NextHop
B	7	B
C	9	C
D	15	B
E	11	C
F	12	C

2a.)

Routing Vector (C to A)	
Destination	Distance
A	∞
B	1
C	0
D	11
E	5
F	4

| Routing Vector (C to B)	
Destination	Distance
A	2
B	∞
C	0
D	∞
E	∞
F	4

2b.)

No, the looping problem is not fixed. Split horizon only works on 2-hop loops, but the path to D is a 4-hop loop.

3.)

Step	Confirmed	Tentative	Comments
1	(A, 0, -)		A is the starting node, check LSP.
2	(A, 0, -)	(B, 2, B) (C, 8, C)	A has link with B and C, add nodes to tentative.
3	(A, 0, -) (B, 2, B)	(C, 8, C)	B has lowest cost, add to confirmed.
4	(A, 0, -) (B, 2, B)	(C, 7, B) (D, 4, B) (E, 5, B) (G, 9, B)	Check B's LSP. B has link with C, D, E, and G. Also, B has a faster route to C, which is updated in tentative.
5	(A, 0, -) (B, 2, B) (D, 4, B)	(C, 7, B) (E, 5, B) (G, 9, B)	D has lowest cost, add to confirmed.
6	(A, 0, -) (B, 2, B) (D, 4, B)	(C, 7, B) (E, 5, B) (G, 8, B)	Check D's LSP. D has a faster route to G, which is updated in tentative.
7	(A, 0, -) (B, 2, B) (D, 4, B) (E, 5, B)	(C, 7, B) (G, 8, B)	E has lowest cost, add to confirmed.
8	(A, 0, -) (B, 2, B) (D, 4, B) (E, 5, B)	(C, 6, B) (F, 12, B) (G, 8, B)	Check E's LSP. E has link with F. Also, E has a faster route to C, which is updated in tentative.
9	(A, 0, -) (B, 2, B) (C, 6, B) (D, 4, B) (E, 5, B)	(F, 12, B) (G, 8, B)	C has lowest cost, add to confirmed.
10	(A, 0, -) (B, 2, B) (C, 6, B) (D, 4, B) (E, 5, B)	(F, 11, B) (G, 8, B)	Check C's LSP. C has a faster route to F, which is updated in tentative.

11	(A, 0, -) (B, 2, B) (C, 6, B) (D, 4, B) (E, 5, B) (G, 8, B)	(F, 11, B)	G has lowest cost, add to confirmed.
12	(A, 0, -) (B, 2, B) (C, 6, B) (D, 4, B) (E, 5, B) (G, 8, B)	(F, 11, B)	G has no unconfirmed neighbors.
13	(A, 0, -) (B, 2, B) (C, 6, B) (D, 4, B) (E, 5, B) (F, 11, B) (G, 8, B)		F has lowest cost, add to confirmed. Algorithm complete.

4a.)
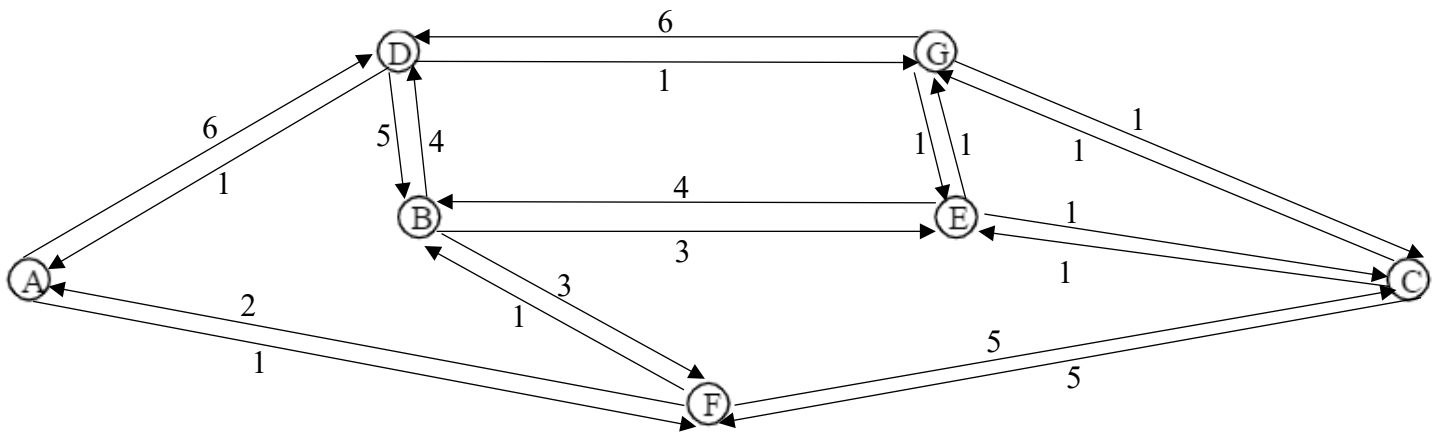
4b.)

A → F → B → E → G (Cost: 6)

4c.)

Yes, the path changes to:

A → F → B → D → G (Cost: 4)

4d.)

The path changes to:

A → F → B → D → A → F → B → D … (Infinite Loop)

This occurs because B does not update its forwarding table and continuously sends packets to D, and D sends packets to A expecting the packet to go from A→F→B→E→G.

5a.)

4	Node B generates triggered update with DV (dest=D, cost=6)	Node C had these DVs for D before receiving triggered update. Via A (dest=D, cost=1) Via B (dest=D, cost=4) After changes to C's DV table Via B (dest=D, cost=6)
5	Node C generates triggered update with DV (dest=D, cost=7)	Node B had these DVs for D before receiving triggered update. Via A (dest=D, cost=1) Via C (dest=D, cost=5) After changes to B's DV table Via C (dest=D, cost=7)
6	Node B generates triggered update with DV (dest=D, cost=8)	Node C had these DVs for D before receiving triggered update. Via A (dest=D, cost=1) Via B (dest=D, cost=6) After changes to C's DV table Via B (dest=D, cost=8) Node C's best route to D: next=A, cost=8 (cost increased from 7 to 8)
7	Node C generates triggered update with DV (dest=D, cost=8)	Node B had these DVs for D before receiving triggered update. Via A (dest=D, cost=1) Via C (dest=D, cost=7) After changes to B's DV table Via C (dest=D, cost=8) Node B's best route to D: next=C, cost=9 (cost increased from 8 to 9)
8	Node B generates triggered update with DV (dest=D, cost=9)	Node C had these DVs for D before receiving triggered update. Via A (dest=D, cost=1) Via B (dest=D, cost=8) After changes to C's DV table

		Via B (dest=D, cost=10)
		Node C does not change route to D, so no triggered update and sequence done.

5b.)

1	Link cost increase from 1 to 10	Node B had these DVs for Destination D before change. Via A (dest=D, cost=1) Via C (dest=D, cost=∞) After increase in link cost: Node B's best route to D: next=A, cost=11
2	Node B generates triggered update with DV (dest=D, cost=11)	Node C had these DVs for Destination D before receiving triggered update. Via A (dest=D, cost=1) Via B (dest=D, cost=∞) After changes to C's DV table Via B (dest=D, cost=12) Node C's best route to D: next=A, cost=8
3	Node C generates triggered update with DV (dest=D, cost=8)	Node B had these DVs for Destination D before receiving triggered update. Via A (dest=D, cost=1) Via C (dest=D, cost=∞) After changes to B's DV table Via C (dest=D, cost=8) Node B's best route to D: next=C, cost=9
4	Node B generates triggered (poisoned) update with DV (dest=D, cost=∞)	Node C had these DVs for Destination D before receiving triggered update. Via A (dest=D, cost=8) Via B (dest=D, cost=∞) Node C does not change the route to D, so no triggered update and sequence done.

6a.)

ISP-1	
Address	Next Hop
D2.0.0.0/8	ISP-2
D3.0.0.0/8	ISP-3
D1.A3.0.0/16	Cust-1
D1.B0.0.0/12	Cust-2

ISP-2	
Address	Next Hop
D1.0.0.0/8	ISP-1
D3.0.0.0/8	ISP-3
D2.0A.0.0/16	Cust-3
D2.0B.0.0/16	Cust-4

ISP-3	
Address	Next Hop
D1.0.0.0/8	ISP-1
D2.0.0.0/8	ISP-2

6b.)

ISP-1	
Address	Next Hop
D2.0.0.0/8	ISP-2
D3.0.0.0/8	ISP-3
D1.A3.0.0/16	Cust-1
D1.B0.0.0/12	Cust-2
D2.0A.0.0/16	Cust-3

ISP-2	
Address	Next Hop
D1.0.0.0/8	ISP-1
D3.0.0.0/8	ISP-3
D1.A0.0.0/12	Cust-1
D2.0A.0.0/16	Cust-3
D2.0B.0.0/16	Cust-4

ISP-3	
Address	Next Hop
D1.0.0.0/8	ISP-1

D2.0.0.0/8	ISP-2

6c.)

ISP-1	
Address	Next Hop
D2.0.0.0/8	ISP-2
D3.0.0.0/8	ISP-3
D1.B0.0.0/12	Cust-2

ISP-2	
Address	Next Hop
D1.0.0.0/8	ISP-1
D3.0.0.0/8	ISP-3
D2.A0.0.0/12	Cust-1
D2.0B.0.0/16	Cust-4

ISP-3	
Address	Next Hop
D1.0.0.0/8	ISP-1
D2.0.0.0/8	ISP-2
D3.0A.0.0/16	Cust-3

7.) I have no idea how to solve this problem.