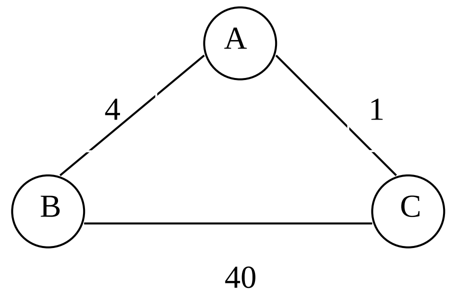
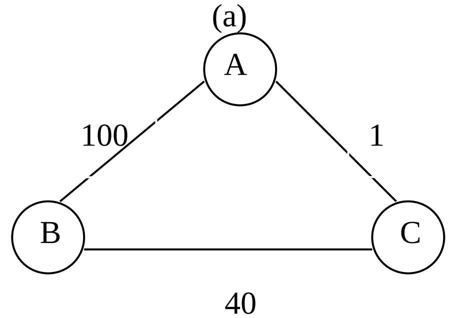
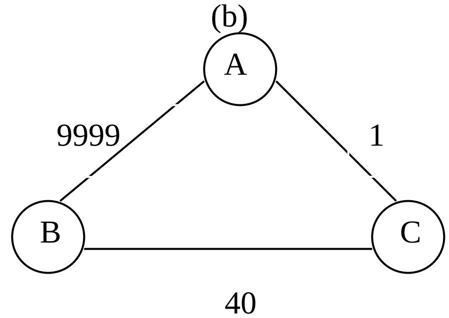
1. Suppose we are using Distance Vector Routing protocol.



(a)



(b)



(c)

(1) Please give the distance vector of A, B, and C as follows for scenario (a):

A to B: 4	A to C: 1
B to A: 4	B to C: 5
C to A: 1	C to B: 5

(2) What happens if link cost of AB becomes 100, as shown in scenario (b)?

A to B: 41	A to C: 1
B to A: 41	B to C: 40
C to A: 1	C to B: 40

(3) How many rounds it takes for the protocol to converge to the above actual minimum distance in part (2)?

Notation: cost(A,B) means the edge cost, cost(A->B) means distance vector estimated cost.

Before the change for AB from 4 to 100, cost(A->B) = 4, cost(C->B) = 5

Now, when the change occurs, cost(A->B) = min{cost(A,B), cost(C->B)+cost(A,C)} = min{100, 5+1} = 6. Since cost(A->B) changes, A broadcasts to neighbors.

When C receives the broadcast, cost(C,B) = min{cost(C,B), cost(A->B)+cost(C,A)} = min {40, 6+1} = 7. Since cost(C->B) changes, C broadcasts to neighbors.

When A receives the broadcast, cost(A->B) = min{cost(A,B), cost(C->B)+cost(A,C)} = min{100, 7+1} = 8. Since cost(A->B) changes, A broadcasts to neighbors.

When C receives the broadcast, cost(C,B) = min{cost(C,B), cost(A->B)+cost(C,A)} = min {40, 8+1} = 9. Since cost(C->B) changes, C broadcasts to neighbors.

…

This continues until cost(A->B) becomes 40, cost(C,B) = min{cost(C,B), cost(A->B)+cost(C,A)} = min {40, 40+1} = 40.

Then, A receives the broadcast, cost(A->B) = min{cost(A,B), cost(C->B)+cost(A,C)} = min{100, 40+1} = 41. Since cost(A->B) changes, A broadcasts to neighbors.

Now C receives the broadcast, cost(C,B) = min{cost(C,B), cost(A->B)+cost(C,A)} = min {40, 41+1} = 40. Since there is no change, C does not broadcast. The procedure stops.

How many rounds does it take? 40-6+1+1 = 36 broadcasts.

(4) What happens if link cost of AB changes from 100 to 9999, as shown in scenario (c)?

The minimum cost won't change since the shortest distance remains the same.

(5) What happens if link AB breaks, will the protocol be able to converge to some final minimum distance? If not, why?

Yes, there is still a path for C and B to reach A, so there is no count to infinity issue.