Solutions to Homework Questions on Network Layer (Routing)

Q1. Consider the network shown in Figure 1. Answer the following questions:

(a) Show the operation of Dijkstra's (Link State) algorithm for computing the least cost path from F (the rightmost node in the figure below) to all destinations. Show all the shortest path routes from F to all destinations that are the result of the algorithm's computation.

(b) Show the distance table that would be computed by the *distance vector* algorithm in B. (Note: you do not have to run the *distance vector* algorithm; you should be able to compute the table by inspection.)
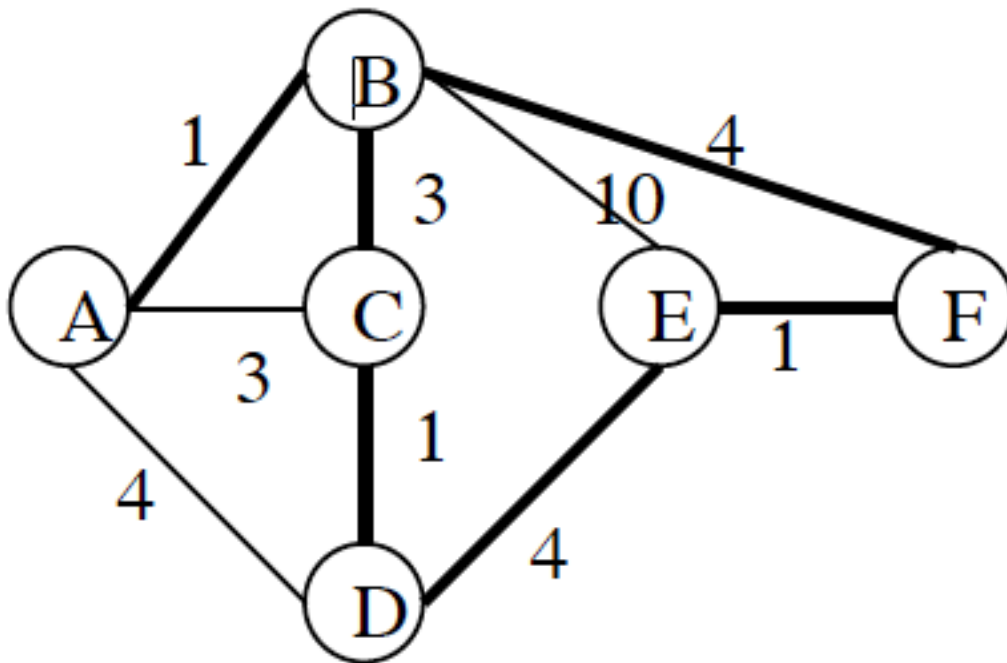

Figure 1 Network topology for Q1

A1.

    (a) The shortest path routes from F to all the destinations have been shown as *thick lines* in Figure 1 in the question. The operation of Dijkstra's algorithm is shown in the following table:

Step	N	D(A), p(A)	D(B), p(B)	D(C), p(C)	D(D), p(D)	D(E), p(E)
0	F	∞	4,F	∞	∞	1.F
1	FE	∞	4.F	∞	5,E	
2	FEB	5,B		7,B	5,E	
3	FEBD	5,B		6,D		
4	FEBDA			6,D		
5	FEBDAC					

(b) The destination table in B is shown below:

Cost to

A	C	D	E	F
1	3	4	5	4

Q2. Consider the network shown in Figure 2 and assume that each node initially knows the costs to each of its neighbours. Consider the *distance vector* algorithm and show the *distance table entries* at node z.
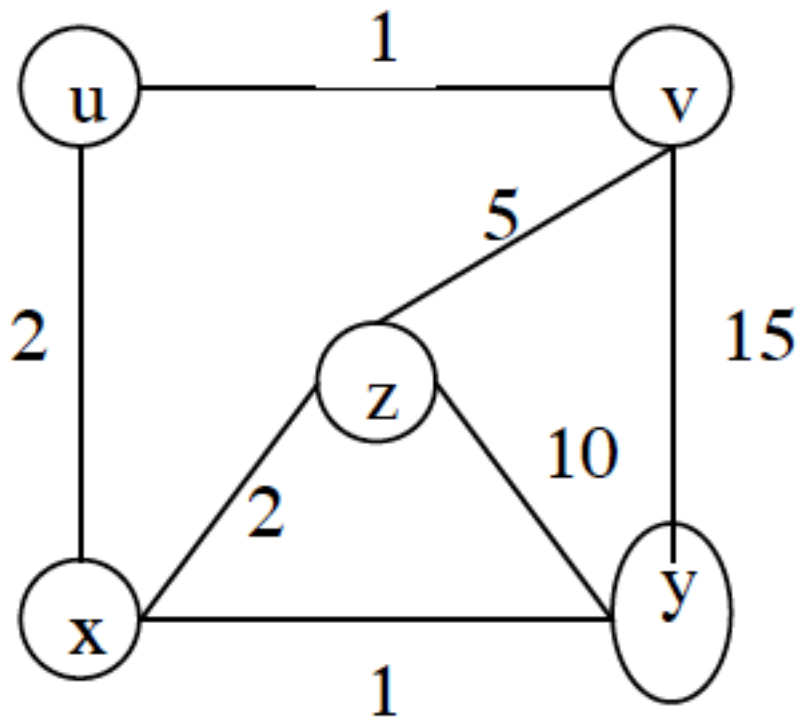

Figure 2 Network topology for Q2

A2. The distance table in z is:

<pre>
                              Cost to

                u   v   x   y   z
From   v   1   0   3   4   5
        x   2   3   0   1   2
        y   3   4   1   0   3
        z   4   5   2   3   0
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End of homework