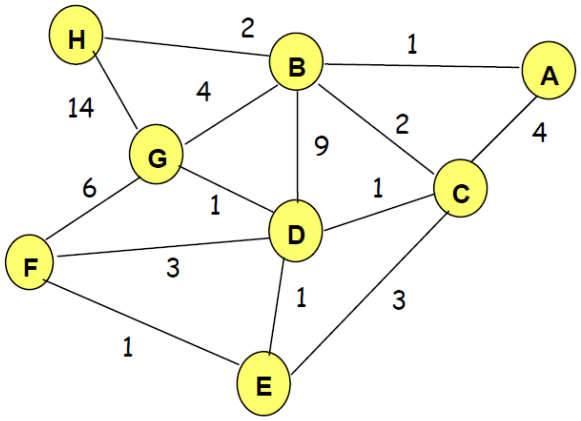
Answer for EE3315 Test 1 2017-2018B

1. Consider the following network: [20 marks]



If the cost between Node F and Node G becomes one, using Dijkstra's algorithm, compute and write down the shortest path from **Node E** to all network nodes. Use the table form below but work out the results in your answer book. If there is a tie, ***break it in favor of rightmost column***.

N	A	B	C	D	F	G	H
E	∞	∞	3, E	1, E	1, E	∞	∞
E,F	∞	∞	3, E	1, E		2, F	∞
E,F,D	∞	10, D	2, D			2, F	∞
E,F,D,G	∞	6, G	2, D				16, G
E,F,D,G,C	6, C	4, C					16, G
E,F,D,G,C,B	5, B						6, B
E,F,D,G,C,B,A							6, B
E,F,D,G,C,B,A,H							

The shortest path from Node E to
A; EDCBA
B: EDCB
C: EDC
D: ED
F: EF
G: EFG
H: EDCBH

2. In Figure Q.2, we assume that A,B,C are provider networks and X,W,Y are customers of provider networks. In addition, Border Gateway Protocol (BGP) is assumed to be used between networks. State whether the following statements are true or false. Explain your answer. [8 marks]

i) X is willing to advertise to B a route to C.
ii) A is willing to advertise to B the path AW
iii) B is willing to advertise to X the path BAW
iv) B is willing to advertise to C the path BAW

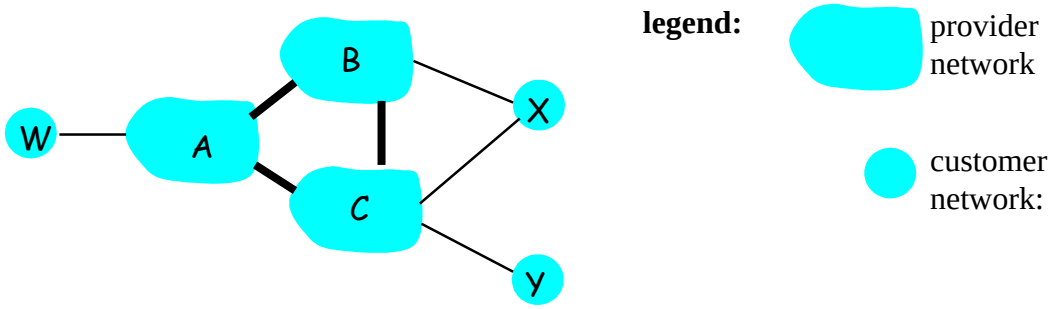


Figure Q.2 : A simple BGP scenario

i) False. X does not want to route from B via X to C since X gets no "revenue" for that.

ii) True. A gets "revenue" for routing BAW since W is A's customer.

iii) True. B gets "revenue" for routing XBAW since X is B's customer.

iv) False. B gets no "revenue" for routing CBAW since neither W (or A) nor C are B's customers

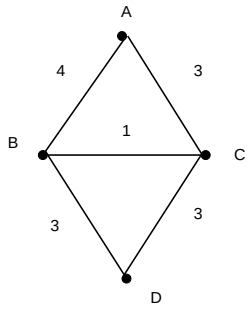


Figure Q.3

3. In Figure Q.3, assume that link AC has gone down for a long time. If B, C and D use split horizon with Poisoned Reverse. [26 marks]

i. What distance to A will D report to C? 7
ii. What distance to A will C report to D? 5
iii. What distance to A will B report to C? 4
iv. What distance to A will C report to B? ∞
Now, suppose the AB link goes down.
v. What distance to A will B report to D? ∞
vi. At the same time, what distance to A will D report to B? ∞
vii. At the same time, what is the distance to A that C reports to D? 5
viii. At the same time, what is the distance to A that C reports to B? ∞
ix. What does D then think the shortest path to A is? D-C-B-A
x. What does D then tell C about its distance to A? ∞
xi. What does D then tell B about its distance to A? 8
xii. What is B's route to A now? B-D-C-B-A
xiii. What does B then tell C the distance to A? 11

4. Consider a subnet with routers *A*, *B*, *C*, *D*, and *E*, distance vector routing is used; and the following vectors have just come in to router *C*: from *A* indicating the delay to routers *A*, *B*, *C*, *D*, and *E*: (0,6,3,2,4); from *B*: (6,0,8,11,6); from *D*: (16,2,6,0,7); and from *E*: (8,6,3,4,0). The measured delays from router *C* to its neighbours *A*, *B*, *D*, and *E*, are 3, 2, 3, and 5, respectively. Assume that *C*'s original routing table indicating the delay to routers *A*, *B*, *C*, *D*, and *E* (1,7,0,4,4) and the next routers to be used (*A*, *B*, –, *D*, *A*). What is *C*'s new routing table? Give both the next router to be used and the expected delay. [14 marks]

Going via *A* gives (3, 9, 6, 5, 7)
Going via *B* gives (8, 2, 10, 13, 8)
Going via *D* gives (19, 5, 9, 3, 10)
Going via *E* gives (13, 11, 8, 19, 5)
The original table is (1, 7, 0, 4, 5)

C's new routing table indicating the delay (3,2,0,3,5) and the next routers (*A*, *B*, –, *D*, *E*).

5. Consider the Vector-Distance update shown in the Fig. Q. 5 below. It shows an existing table i) in a gateway K, and update message ii) from another gateway J. Write down the changes in the table and give the reasons for those changes. Assume that the distance between gateway K and J is 2. [16 marks]

Destination	Distance	Route
Net 1	0	Direct
Net 2	0	Direct
Net 4	8	Gate L
Net 17	4	Gate M
Net 24	5	Gate J
Net 30	10	Gate Q
Net 42	4	Gate J

i) An existing routing table for a gateway K

Destination	Distance
Net 1	2
Net 4	2
Net 17	1
Net 24	4
Net 30	12
Net 40	4
Net 42	2

ii) An incoming routing update message from gateway J.

Figure Q. 5

Destination	Distance	Route
Net 4	4	Gate J
Net 17	3	Gate J
Net 24	6	Gate J
Net 40	6	Gate J

Figure Q. 5.1

For destination Net 4, it updates that a shorter distance resulting from routing via gateway J.

For destination Net 17, it updates that a shorter distance resulting from routing via gateway J.

For destination Net 24, it updates that if passing via gateway J, it will take longer route.

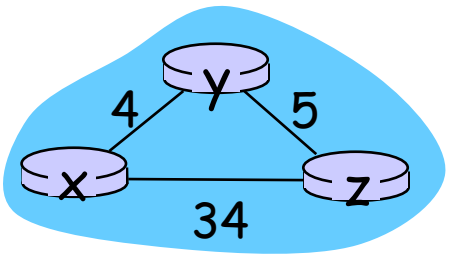
For destination Net 40, it updates that a new route is setup via gateway J.

6. Initially, we have the following distance vectors for the network below

Distance vector of y: (4, 0, 5)

Distance vector of x: (0, 4, 9)

Now link cost of y-z changes from 5 to 36. Using Distance Vector routing algorithm, write down the steps showing that node y and node x update their distance vectors until the routing algorithm converges. [16 marks]



Answer for Question 6:

1. y updates its vector:
   Dist. vector y: (4, 0, 13)
2. x updates its vector:
   Dist. vector x: (0, 4, 17)
3. y updates its vector:
   Dist. vector y: (4, 0, 21)
4. x updates its vector:
   Dist. vector x: (0, 4, 25)
5. y updates its vector:
   Dist. vector y: (4, 0, 29)
6. x updates its vector:
   Dist. vector x: (0, 4, 33)
7. y updates its vector:
   Dist. vector y: (4, 0, 36)
8. x updates its vector:
   Dist. vector x: (0, 4, 34)

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