CS & IT ENGINEERING

Computer Networks

Routing Protocols

Lecture No.- 02

By- Ankit Doyla Sir

Recap of Previous Lecture

Topic One — Routing

Topic Two — Flooding

Topic Three — Distance Vector Routing

Topic Four

Topic Five

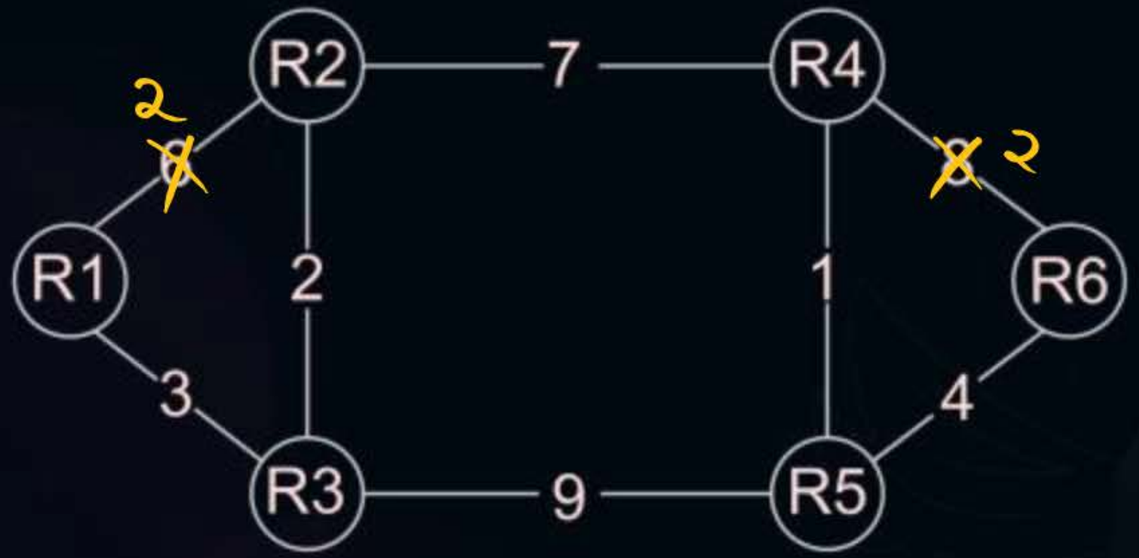
Topics to be Covered

Topic Routing Algorithm

Topic Distance Vector Routing

Gate 2010

Consider a network with 6 routers R1 to R6 connected with links having weights as shown in the following diagram



Topic : Problem Solving on DVR

Q. All the routers use the distance vector-based routing algorithm to update their routing tables. Each router starts with its routing table initialized to contain an entry for each neighbor with the weight of the respective connecting link. After all the routing tables stabilize, how many links in the network will never be used for carrying any data?

A. 4

B. 3

C. 2

D. 1

$R_1 \xrightarrow{6} R_2$ X

$R_4 \xrightarrow{8} R_6$ X

] Not used

Topic : Problem Solving on DVR

Q. Suppose the weights of all unused links in the previous question are changed to 2 and the distance vector algorithm is used again until all routing tables stabilize. How many links will now remain unused?

$R_5 \xrightarrow{4} R_6$ X] Not used

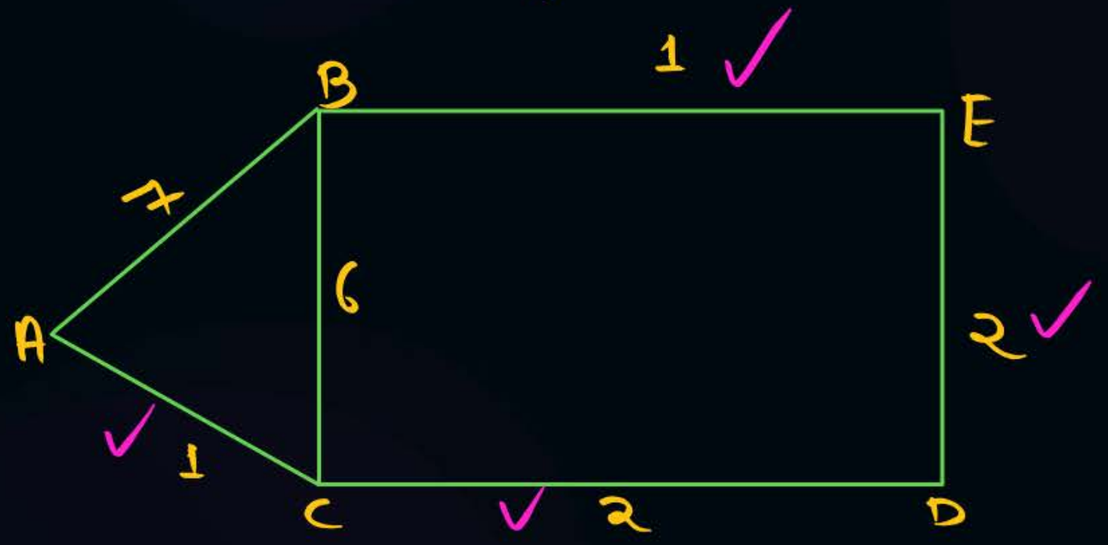
A. 0

B. 1

C. 2

D. 3

Q: Consider the Following subnet. If distance vector Routing is used



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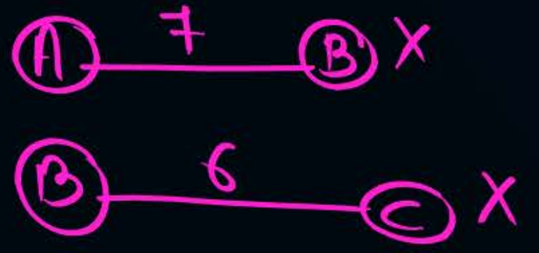
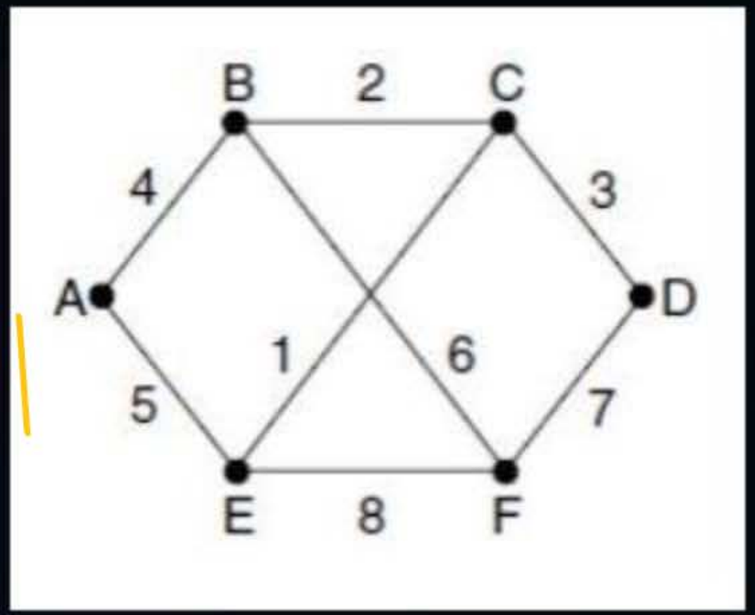


How many Links will Never be used after all the Routing table stablize ?

Ans: 2

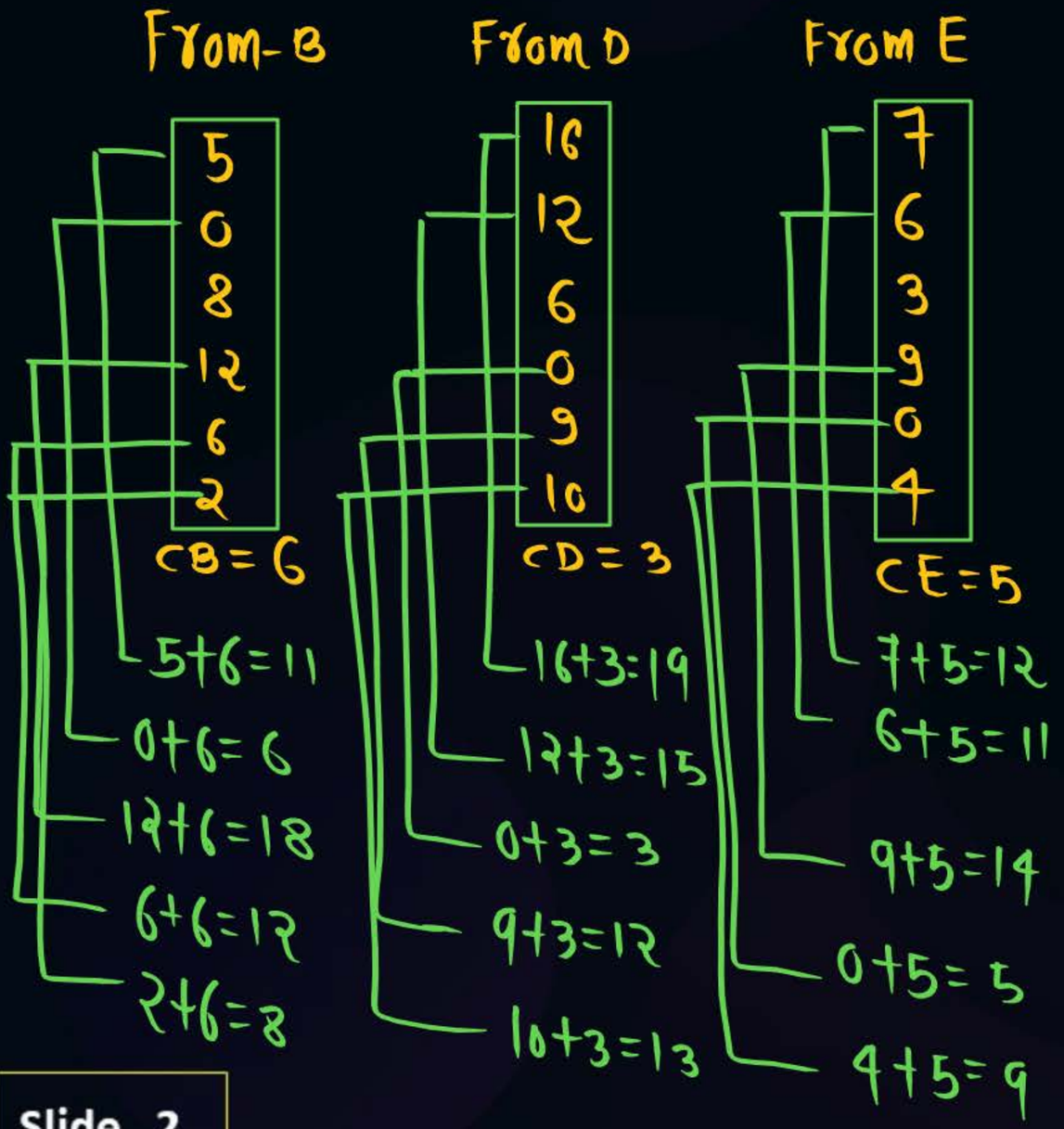
Topic : Problem Solving on DVR

Q. Consider the network of Figure. Distance vector routing is used, and the following vectors have just come in to router C: from B: (5, 0, 8, 12, 6, 2); from D: (16, 12, 6, 0, 9, 10); and from E: (7, 6, 3, 9, 0, 4). The cost of the links from C to B, D, and E, are 6, 3, and 5, respectively. What is C's new routing table? Give both the outgoing line to use and the cost



Slide

At C



New Routing table at C

Dest	Dis.	NH
A	11	B
B	6	B
C	0	C
D	3	D
E	5	E
F	8	B

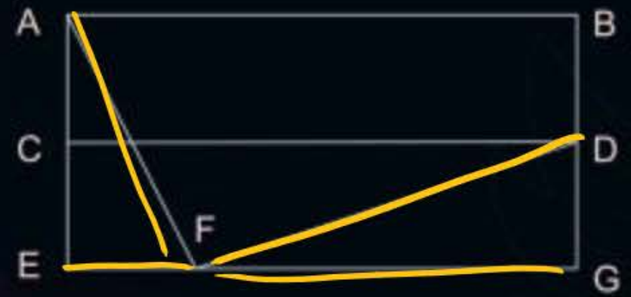
Topic : Problem Solving on DVR

#Q. For the network given in the figure below, the routing tables of the four nodes A, E, D and G are shown.

Suppose that F has estimated its delay to its neighbors, A, E, D and G as 8, 10, 12 and 6 msec respectively and updates its routing table using distance vector routing technique. New Routing table of F ?

Routing Table of A	
A	0
B	40
C	14
D	17
E	21
F	9
G	24

Routing Table of D	
A	20
B	8
C	30
D	0
E	14
F	7
G	22



Routing Table of E	
A	24
B	27
C	7
D	20
E	0
F	11
G	22

Routing Table of G	
A	21
B	24
C	22
D	19
E	22
F	10
G	0

a.

A	8
B	8
C	7
D	12
E	10
F	0
G	6

b.

A	21
B	8
C	7
D	19
E	14
F	0
G	22

c.

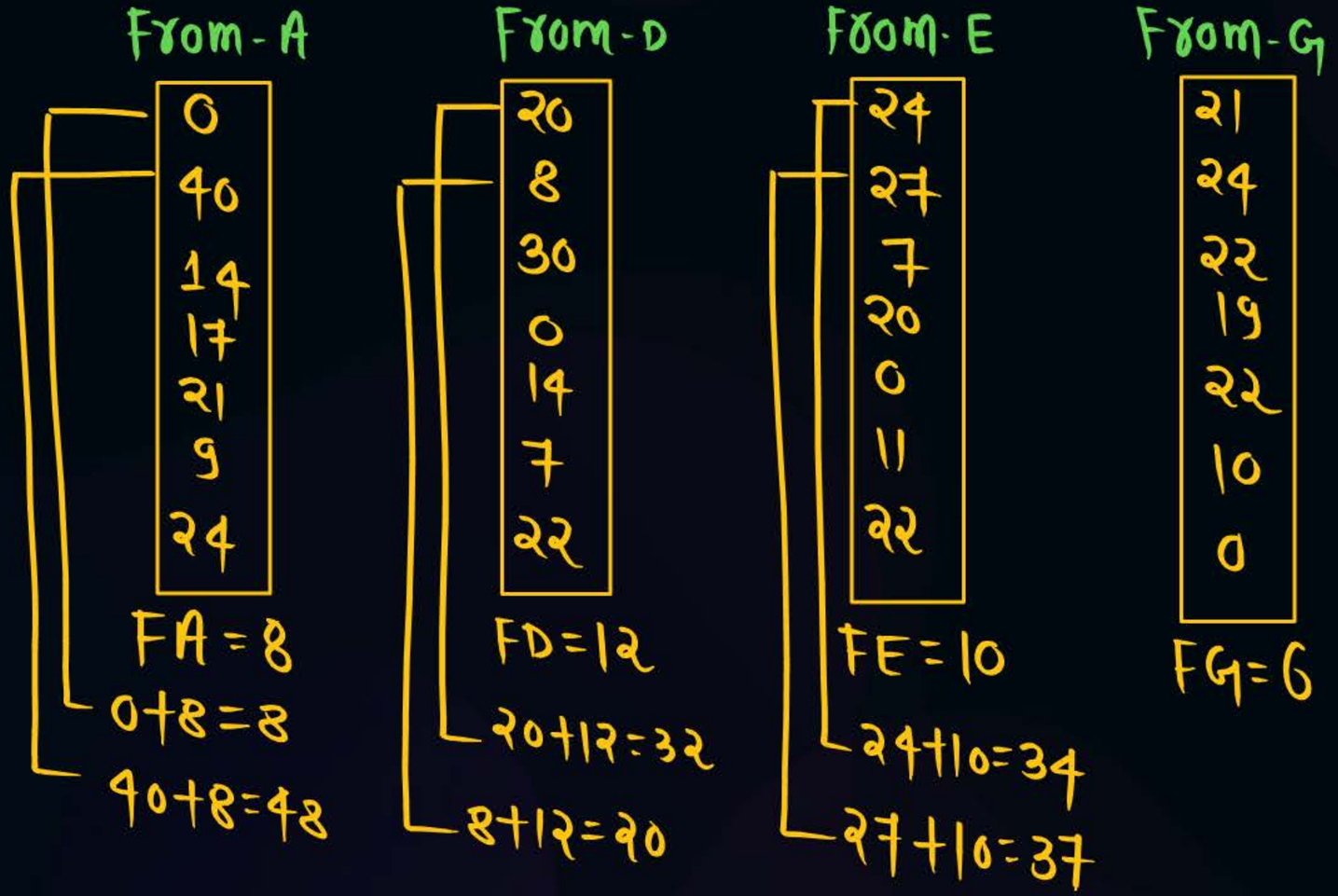
A	8
B	20
C	17
D	12
E	10
F	16
G	6

d.

A	8
B	20
C	17
D	12
E	10
F	0
G	6

At F

F Received DV From A, D, E, G



New Routing of 'F'

Dist.	Dis.	NH
A	8	A
B	20	D
C		
D		
E		
F	0	F
G		

Topic : Problem Solving on DVR

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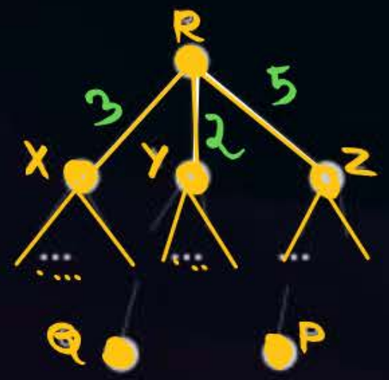
MSQ

#Q. Consider a computer network using the distance vector routing algorithm in its network layer. The partial topology of the network is as shown below.

The objective is to find the shortest-cost path from the router R to routers P and Q. Assume that R does not initially know the shortest routes to P and Q. Assume that R has three neighbouring routers denoted as X, Y, and Z. During one iteration, R measures its distance to its neighbours X, Y, and Z as 3, 2, and 5, respectively. Router R gets routing vectors from its neighbours that indicate that the distance to router P from routers X, Y, and Z are 7, 6, and 5, respectively.

R ⟶ P

R ⟶ Q



Topic : Problem Solving on DVR

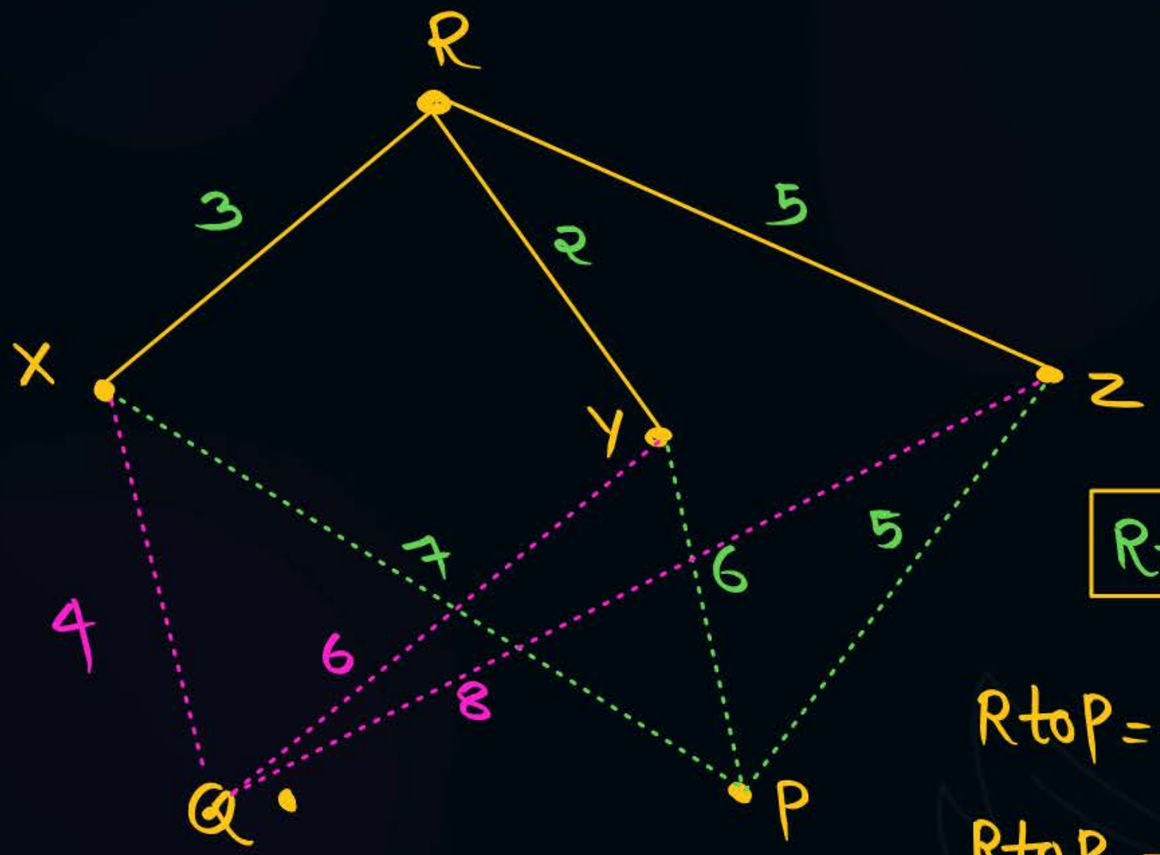
The routing vector also indicates that the distance to router Q from routers X, Y, and Z are 4, 6, and 8, respectively. Which of the following statement(s) is/are correct with respect to the new routing table of R, after updation during this iteration?

A. The distance from R to P will be stored as 10.

B. The next hop router for a packet from R to P is Y.

C. The next hop router for a packet from R to Q is Z.

D. The distance from R to Q will be stored as 7.



R to P

$$R\text{to}P = \min\{\overset{3+7}{R\text{-}X\text{-}P}, \overset{2+6}{R\text{-}Y\text{-}P}, \overset{5+5}{R\text{-}Z\text{-}P}\}$$

$R\text{to}P = 8$ (Through Y)

$$R\text{to}Q = \min\{\overset{3+4}{R\text{-}X\text{-}Q}, \overset{2+6}{R\text{-}Y\text{-}Q}, \overset{5+8}{R\text{-}Z\text{-}Q}\}$$

$R\text{to}Q = 7$ (Through X)

THANK - YOU