CS & IT ENGINEERING

Computer Networks

Routing Protocols

Lecture No.- 03

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Recap of Previous Lecture

Topic One DVR

Topic Two Problem Solving on DVR

Topics to be Covered

Topic — Disadvantage of DVR

Topic — Split Horizon concept

Disadvantage of DVR [Count to infinity problem]

1. Bad News spreads slow
2. Good News spreads Fast

1. Good News

Initially A
is Not connected
to B so

B to A = ∞

C to A = ∞

D to A = ∞

After some time
A is connected to
with the cost(1)

$$\overset{1}{(A)}\cdots\cdots\cdots\overset{}{(B)}\overset{1}{\longrightarrow}\overset{}{(C)}\overset{1}{\longrightarrow}\overset{}{(D)}$$

∞   ∞   ∞

1   ∞   ∞

1   2   ∞

1   2   3

Good News

Bad News

Count to infinity Problem

Dest.	Dis.	NH
A	~~1~~ ~~8~~ 3	A ~ C

Dest.	Dis.	NH
A	~~2~~ 4	B D

Dest.	Dis.	NH
A	3	C

$$A \xrightarrow{1} \times \quad B \xrightarrow{1} C \xrightarrow{1} D \rightarrow \text{Infinite looping}$$

1   2   3

8   2   3

3   4   3

Des.	Dis	NH
A	~~1~~ ~~2~~ 3	A ~~-~~ C

Des	Dis	NH
A	2	B
	4	D

Des.	Dis	NH
A	3	C

$$\text{(A)} \xrightarrow{\times \ 1} \text{(B)} \xrightarrow{1} \text{(C)} \xrightarrow{1} \text{(D)}$$

1	2	3
∞	2	3
3	4	3
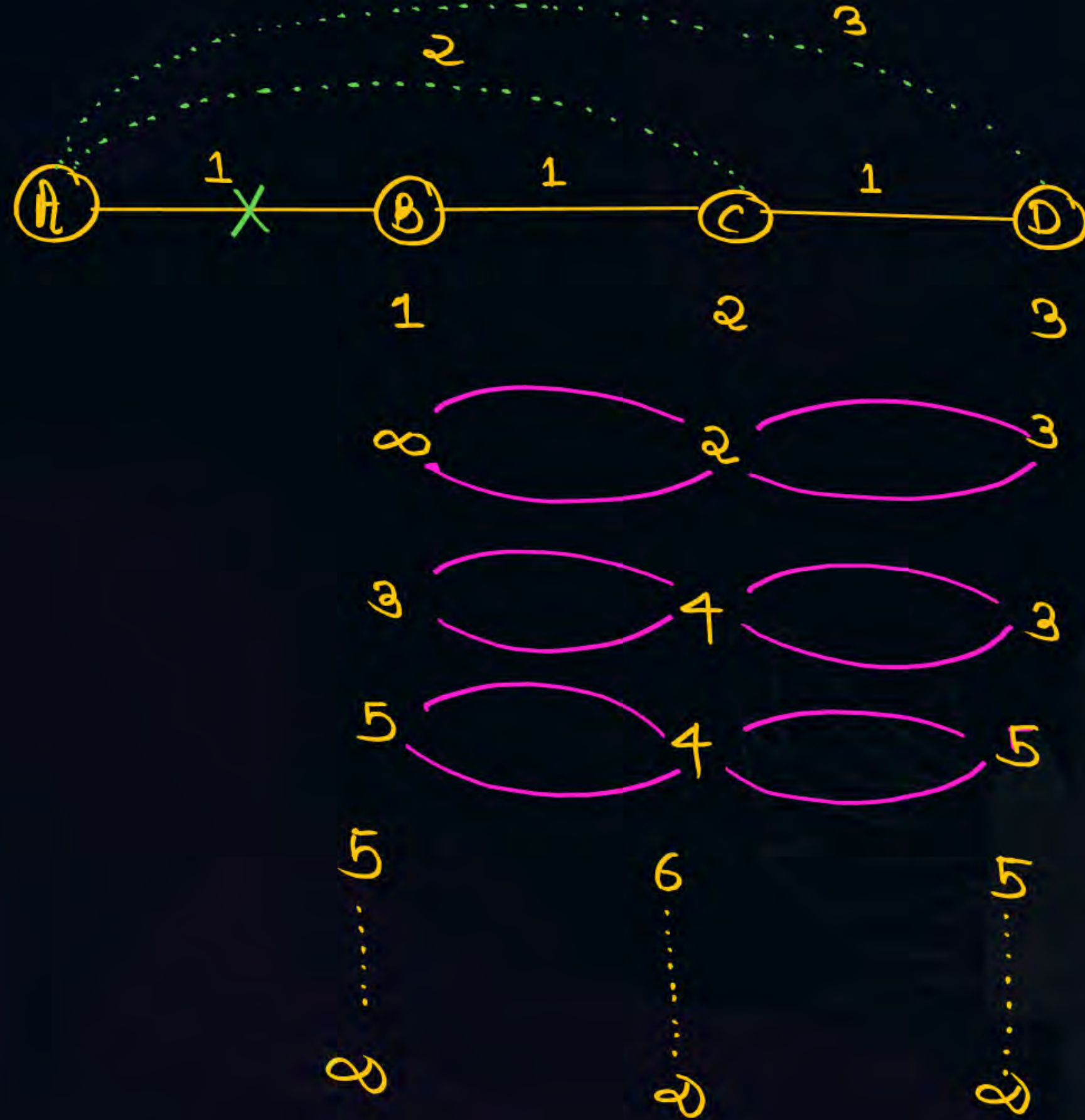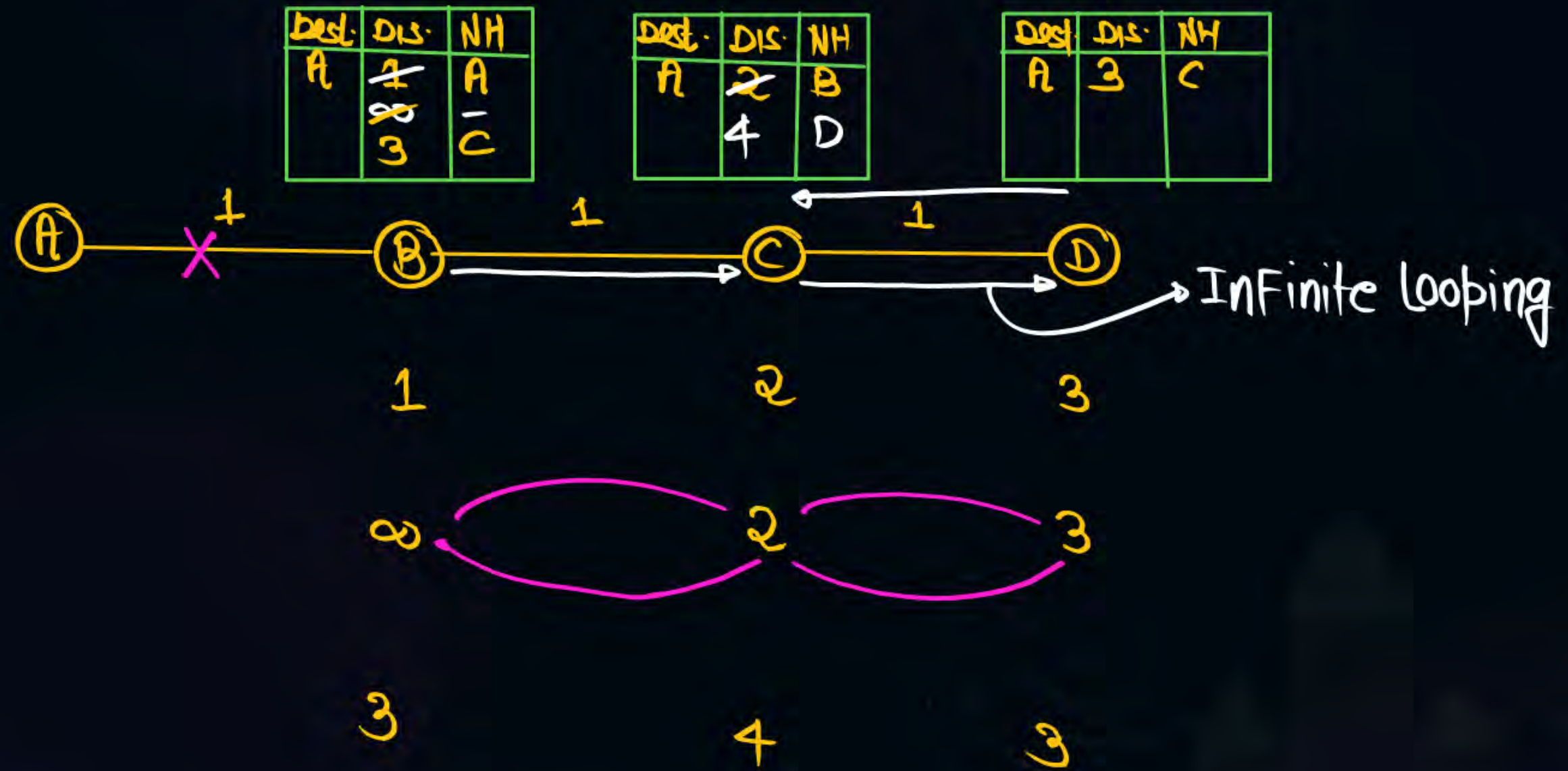
At B

B Rcvd DV From C

From-C

$$\boxed{2}$$
$BC = 1$
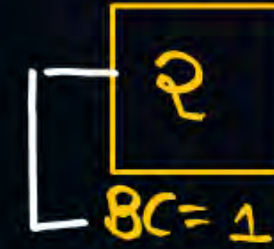
$2 + 1 = 3$

At C

C Rcvd DV From B, D

From-B

$$\boxed{\infty}$$
$CB = 1$
$\infty + 1 = \infty$

From-D

$$\boxed{3}$$
$CD = 1$
$3 + 1 = 4$
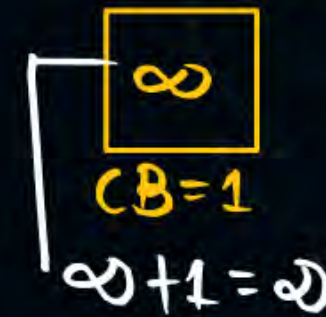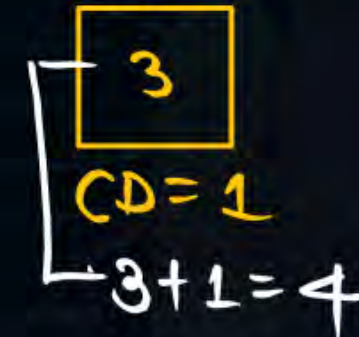
At D

D Rcvd DV From C

From c

$$\boxed{2}$$
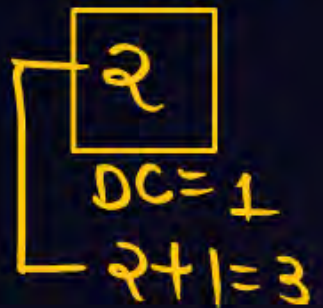$DC = 1$
$2 + 1 = 3$

Disadvantages of DVR

1. Count to infinity Problem

2. Infinite Looping Problem

3. Convergence is very slow

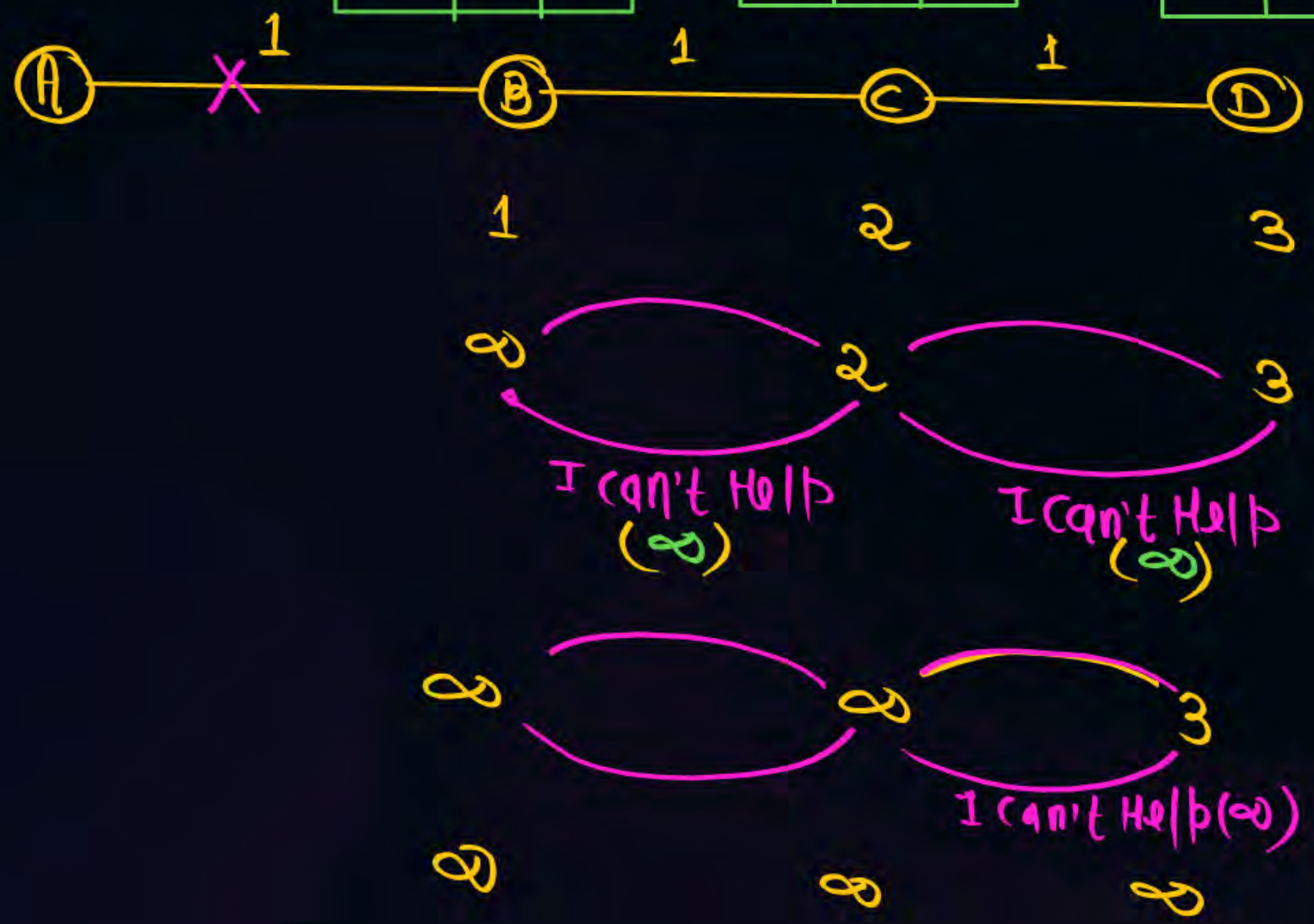Note: Solution of Count to infinity Problem is given by split Horizon.

Split Horizon Solution

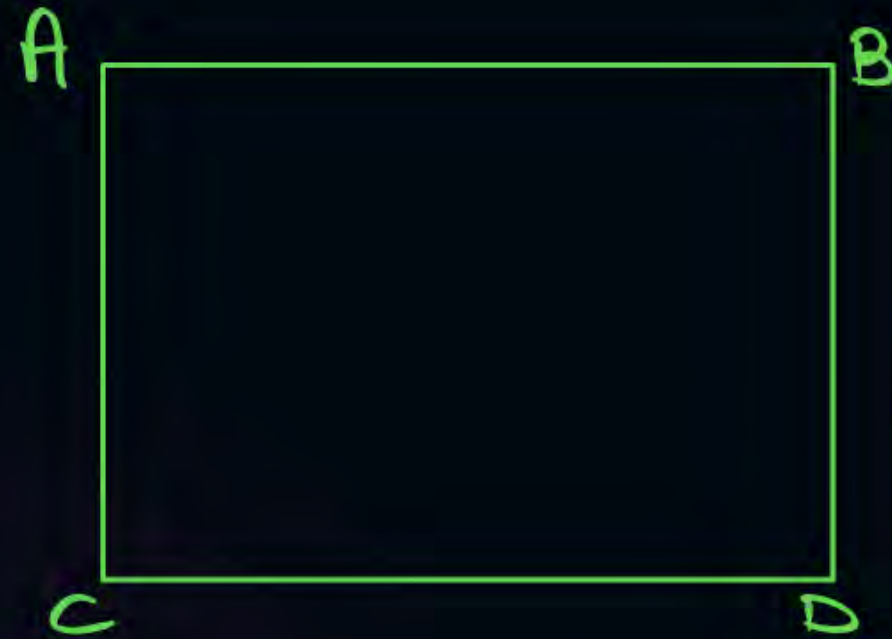| Des.	Dis	NH
A	~~1~~	A
	∞	-

Des.	Dis	NH
A	2	B

Des.	Dis.	NH
A	3	C

A —X— 1 — B — 1 — C — 1 — D

1   2   3

∞   2   3

I can't Help   I can't Help
(∞)   (∞)

∞   ∞   3

I can't Help(∞)

∞   ∞   ∞

$$\begin{bmatrix} \infty \\ 0 \\ \infty \\ 3 \end{bmatrix}$$

A   B

C   D

$$\begin{bmatrix} 2 \\ 0 \\ 4 \\ \infty \end{bmatrix}$$

Routing table

Des.	Dis.	NH
A	2	A
B	0	B
C	4	A
D	3	D —

What Distance Vector 'B' will share to 'A' and 'D' by using split Horizon concept ?

Note

- count to inFinity Problem
- inifinite Looping Problem

Solved By
split Horizon

- convergence Problem is Not solved by split Horizon
- To solve convergence Problem we use "Link state Routing"

Statement for 1 and 2 $4m = 2m + 2m$ "Common data"

Consider a network with five nodes, N1 to N5 as shown below.

The network uses a Distance Vector Routing Protocol. Once the routes have stabilized, the distance vectors at different nodes are as following.
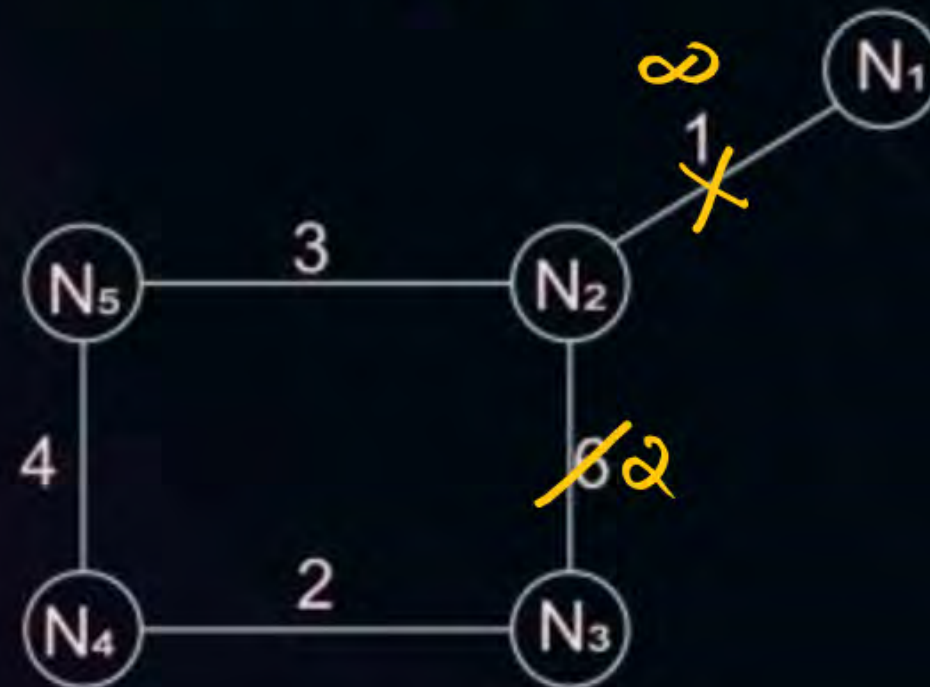
N1: (0, $\overset{\infty}{\cancel{1}}$, 7, 8, 4)

✓N2: ($\overset{\infty}{\cancel{1}}$, 0, $\overset{2}{\cancel{6}}$, 7, 3)

✓N3: (7, $\underset{2}{\cancel{6}}$, 0, 2, 6)

N4: (8, 7, 2, 0, 4)

N5: (4, 3, 6, 4, 0)

Each distance vector is the distance of the best known path at that instance to nodes, N1 to N5, where the distance to itself is 0. Also, all links are symmetric and the cost is identical in both directions. In each round, all nodes exchange their distance vectors with their respective neighbours. Then all nodes update their distance vectors. In between two rounds, any change in cost of a link will cause the two incident nodes to change only that entry in their distance vectors.
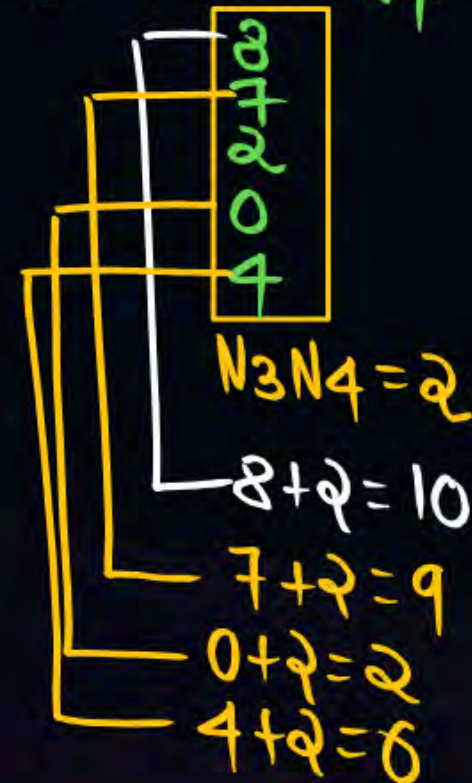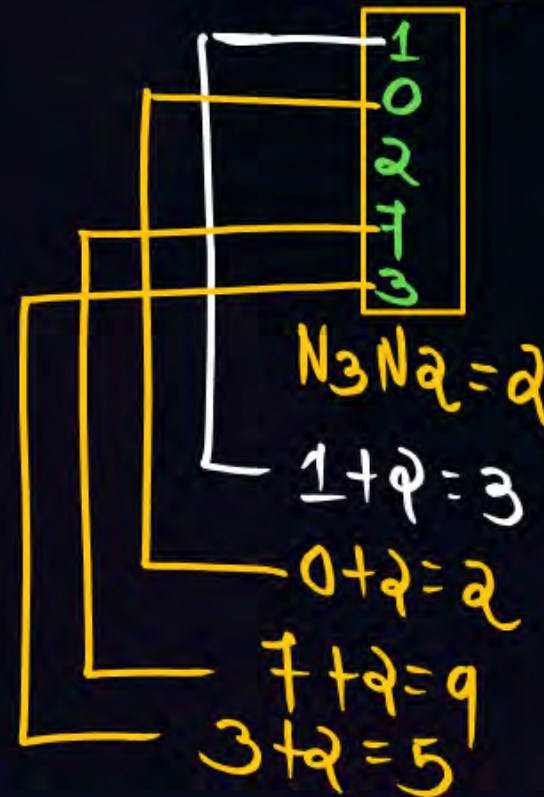
#Q.1 The cost of link N2-N3 reduces to 2 (in both directions). After the next round of updates, what will be the new distance vector at node, N3?

A. $(3, 2, 0, 2, 5)$

B. $(3, 2, 0, 2, 6)$

C. $(7, 2, 0, 2, 5)$

D. $(7, 2, 0, 2, 6)$

At N3

N3 Rcvd DV From N2, N4

From N2 , From N4

1		2
0		7
2		2
7		0
3		4

N3N2=2
1+2=3
0+2=2
7+2=9
3+2=5

N3N4=2
8+2=10
7+2=9
0+2=2
4+2=6

N3 New Routing table

Dest.	Dis.	NH
N1	3	N2
N2	2	N2
N3	0	N3
N4	2	N4
N5	5	N2

H·W

#Q.2 After the update in the previous question, the link N1-N2 goes down. N2 will reflect this change immediately in its distance vector as cost, ∞. After the NEXT ROUND of update, what will be the cost to N1 in the distance vector of N3?

A.   3

B.   9

C.   10

D.   ∞

Topic One

Disadvantage of DVR

Topic Two

Topic Three

Topic Four

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Topic Five

THANK - YOU