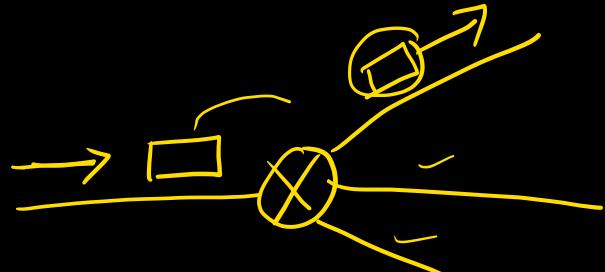


1) Switching:

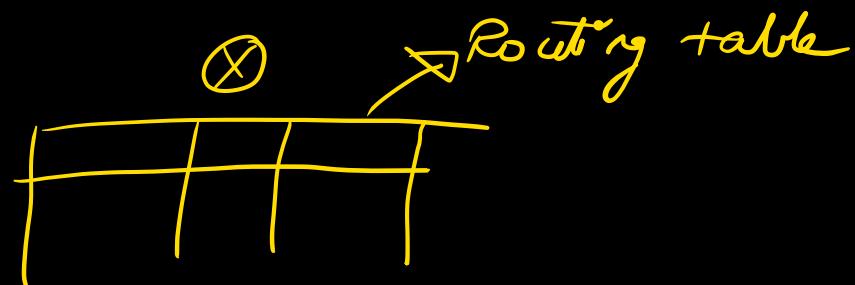


2) Routing:

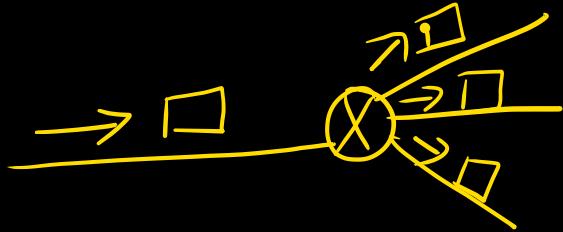
3) Flooding.

Taking an incoming packet and putting out on
an outgoing ~~packet~~ link is called Switching.

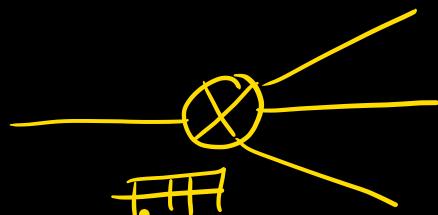
Routing: Creating Routing tables is called Routing



Flooding:



Taking an incoming packet and putting it on all the outgoing links is called flooding

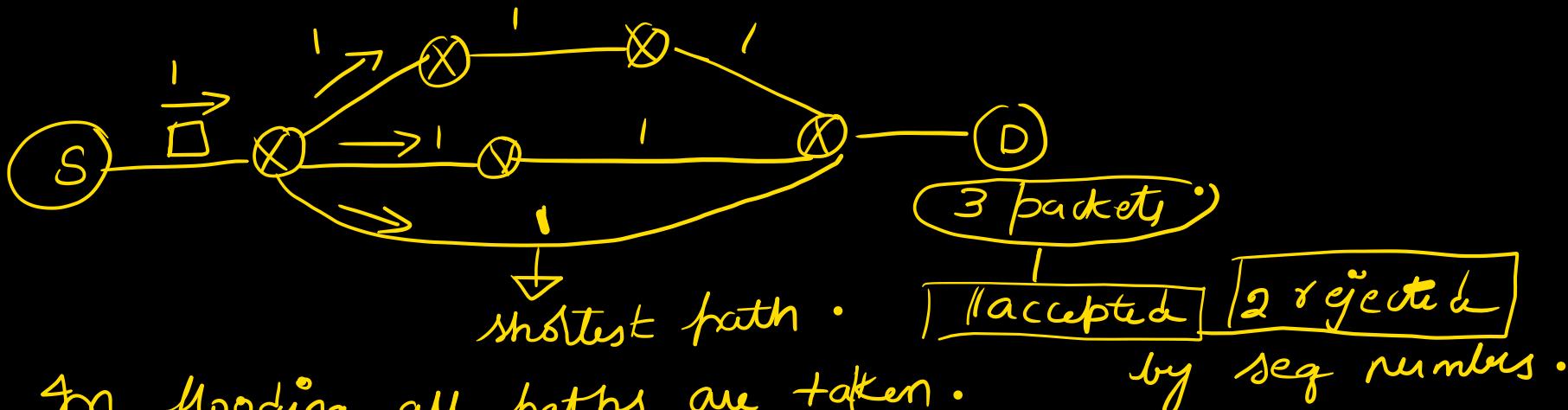


Also Switching uses routing tables if they are available, otherwise it uses flooding.

Flooding: adv:

1) no routing → generally routing algorithms are costly.

2)



In flooding all paths are taken.

∴ shortest path is guaranteed.

3) Highly reliable.

Because multiple copies of same packet will go

Routing: disadvantages:

- Costly (Because of implementation of algorithms)
- Shortest path is not always guaranteed
- Not very reliable.

Flooding: disadvantages:

- Duplicate packets are received
- Traffic is very high.

Routing : adv:

- (i) NO Duplicate packets
- (ii) low traffic

Types of Routing algorithms

static

Dis: Routing tables doesn't change automatically due to changes in traffic and topology

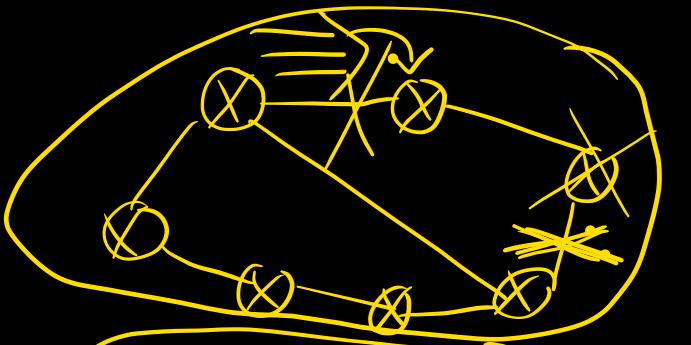
Shape

dynamic

Routing tables change based on Traffic and Topology

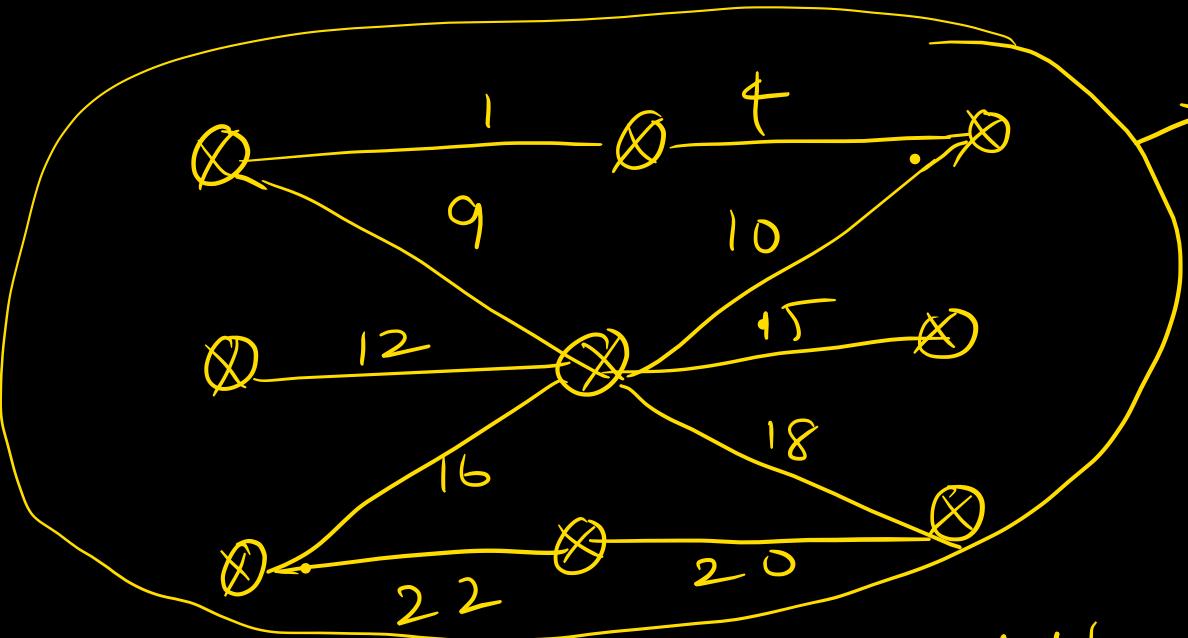
DVR

LSR



Traffic and Topology changes

RT must change.

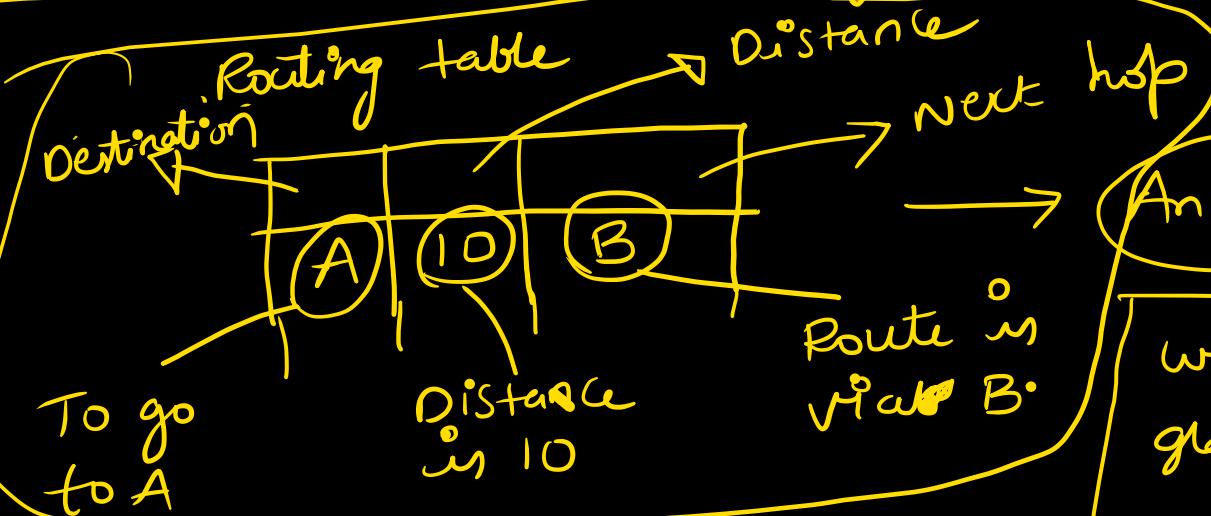
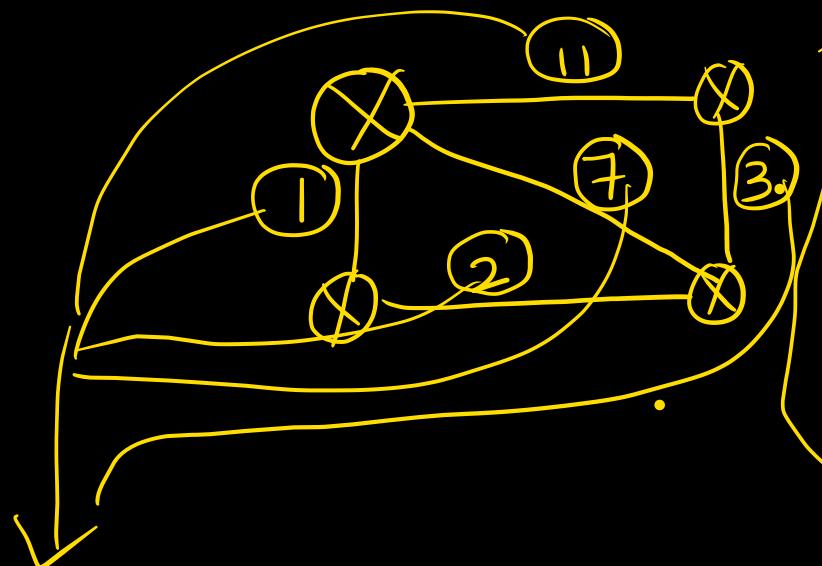


No one knows
graph of entire internet.
Every day new routers
are added and removed.

If we manually take the graph and compute
RTs for each router, then it is called static.
& manual

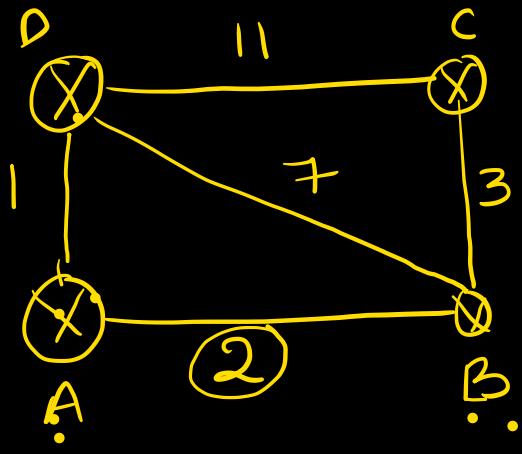
This is not possible for internet. only within an
organisation it is possible

DVR (Distance vector Routing)



number are weights. They may be hop delay or queuing delay or distance or cost or any other parameter. They depend on implementation.

weighted undirected graph.



A ↳ A:

Destination	Distance	next hop
A	0	A
B	2	B.
C	1	-
D	11	D.

$A \xrightarrow{=} A \cdot A \rightarrow B \xrightarrow{NO} \text{link directly to C}$

Step 1: All routers will create Routing tables using knowledge about their neighbours. only direct links are used.

A ↳ B			A ↳ C			A ↳ D		
Des	Dis	NH	Des	Dis	NH	Des	Dis	NH
A	2	B	A	0	-	A	1	A
B	0	C	B	3	B	B	7	B
C	3	D	C	0	C	C	11	C
D	7		D	11	D	D	0	D

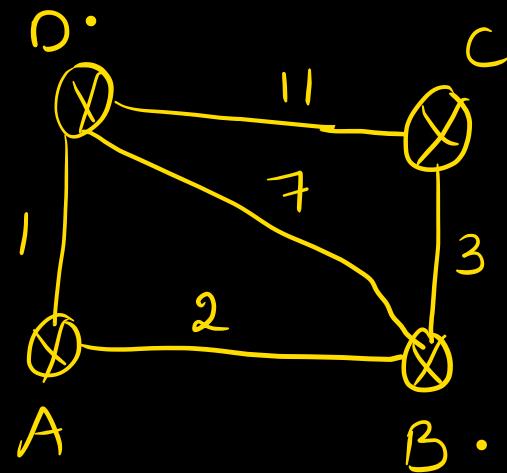
only one edge.

vector → direction → in physics.

→ array in CS.

Distance vector means distance array.

Step 2 of DVR: Exchange of Distance vectors between neighbours



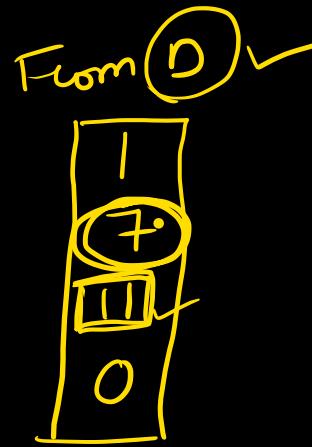
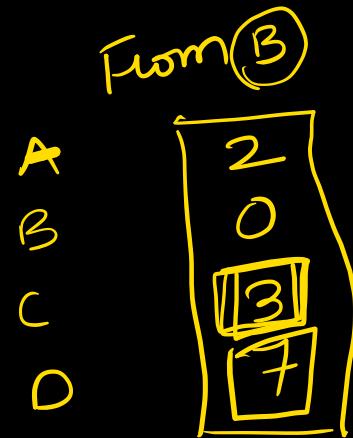
At A: DVs will be received from
D and B.

At B: A, D, C

At C: D, B

At D: A, B, C.

At A:

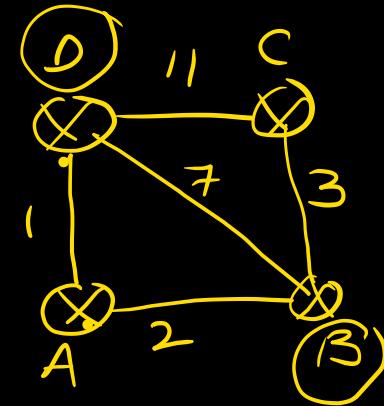


do RT at A

Des	Dis	NH
A	0	A
B	2	B
C	∞	-
D	1	D

New RT At A

Deg	Dis	NH
A	0	A
B	2	B
C	5	B
D	1	D



$$AB = \min \left\{ \begin{array}{l} A \xrightarrow{2} B + B \rightsquigarrow B \\ A \xrightarrow{1} D + D \rightsquigarrow B \end{array} \right\} = 2$$

$$AC = \left\{ \begin{array}{l} A \xrightarrow{2} B + B \xrightarrow{3} C \\ A \xrightarrow{1} D + D \xrightarrow{1} C \end{array} \right\} = 5$$

$$AD = \left\{ \begin{array}{l} A \xrightarrow{2} B + B \xrightarrow{7} D \\ A \xrightarrow{1} D + D \xrightarrow{0} D \end{array} \right\}$$

This called
Bellman Ford

Short cut?

2
1
Direct edges.

At A :

Short Cut :

From B ✓

2	1
0	7
3	11
+	0

$$AB = 2 \quad AD = 1$$

From D ✓

DY	Dis	NH
A	0	A
B.	2	B
C	5	B
D	1	D

$$\begin{array}{r} 0 \quad 7 \\ 2 \quad 1 \\ \hline (2) \quad 8 \end{array}$$

$$\begin{array}{r} 3 \cancel{4} \quad 3 \cdot \quad 11 \\ 2 \quad \quad \quad \frac{1}{12} \\ (5) \end{array}$$

$$\begin{array}{r} 7 \quad 0 \\ 2 \quad 1 \\ \hline 9 \quad 1 \end{array}$$

At A :

At B

From A From C From D

0	00	1
2	3	7
00	0	11
1.	11	0

$$BA = \boxed{2} \quad BC = \boxed{3} \quad BD = \boxed{7}$$

at B.

Des	Ops	NH
A	2	A
B	0	B.
C	3	C
D	3	A

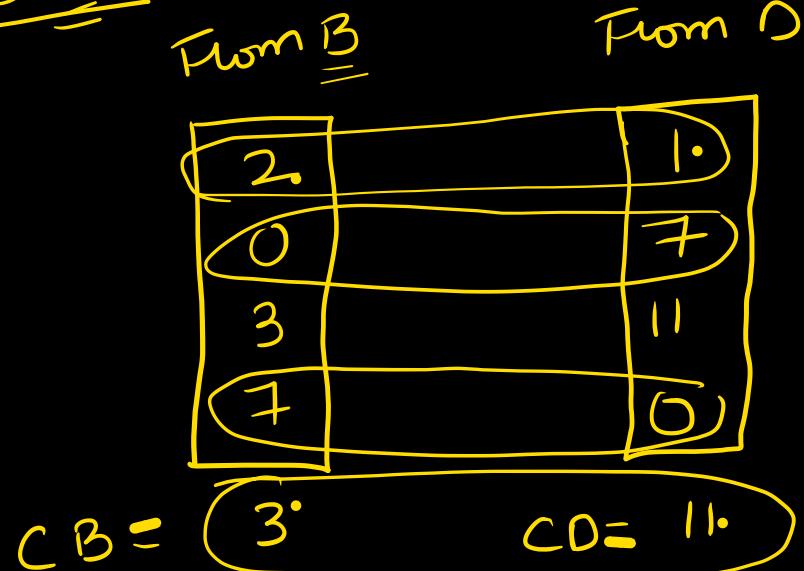
→ always do first

$B \rightarrow B$
 $A \rightarrow A$
 $C \rightarrow C$
 $D \rightarrow D.$

Not final.

Time to converge.

At C:



new routing table at C:

Des	Dis	NH
A	5	B
B	3	B
C	0	C
D	10	B

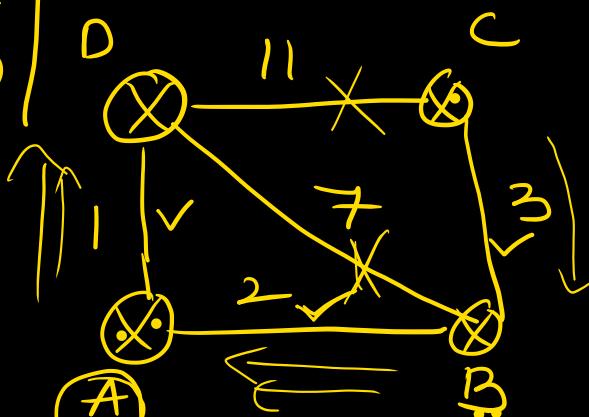
Summary:

- Step 1: Router will create RT using knowledge about neighbors
- Step 2: Distance vectors are exchanged and new routing tables are created

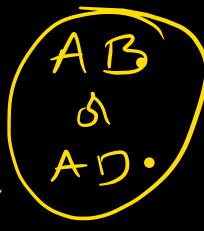
Step 2 → Repeated forever.
↓
If there are any changes in the n/w, routers will know.

In exam don't do this process. we can say Routing table directly.

D	D	NH
A	I	A
B	3	A
C	6	A
D	0	D



D	D	N
A	O	A
B	2	B
C	5	B
D	1	D



D	D	W
A	S	B
B	3	B
C	6	C
D	6	B

Final.

only 3 are used.

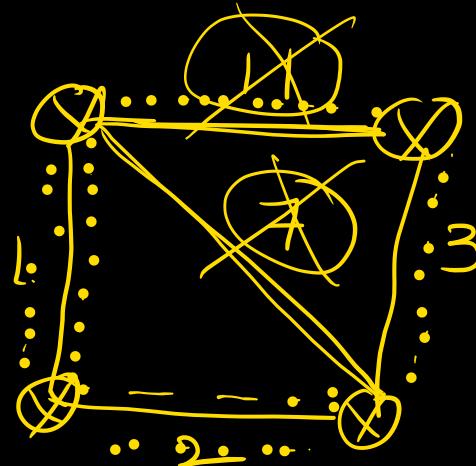
Redundant:
BD and DC. ✗

D	D	N
A	2	A
B	0	B
C	3	C
D	3	A

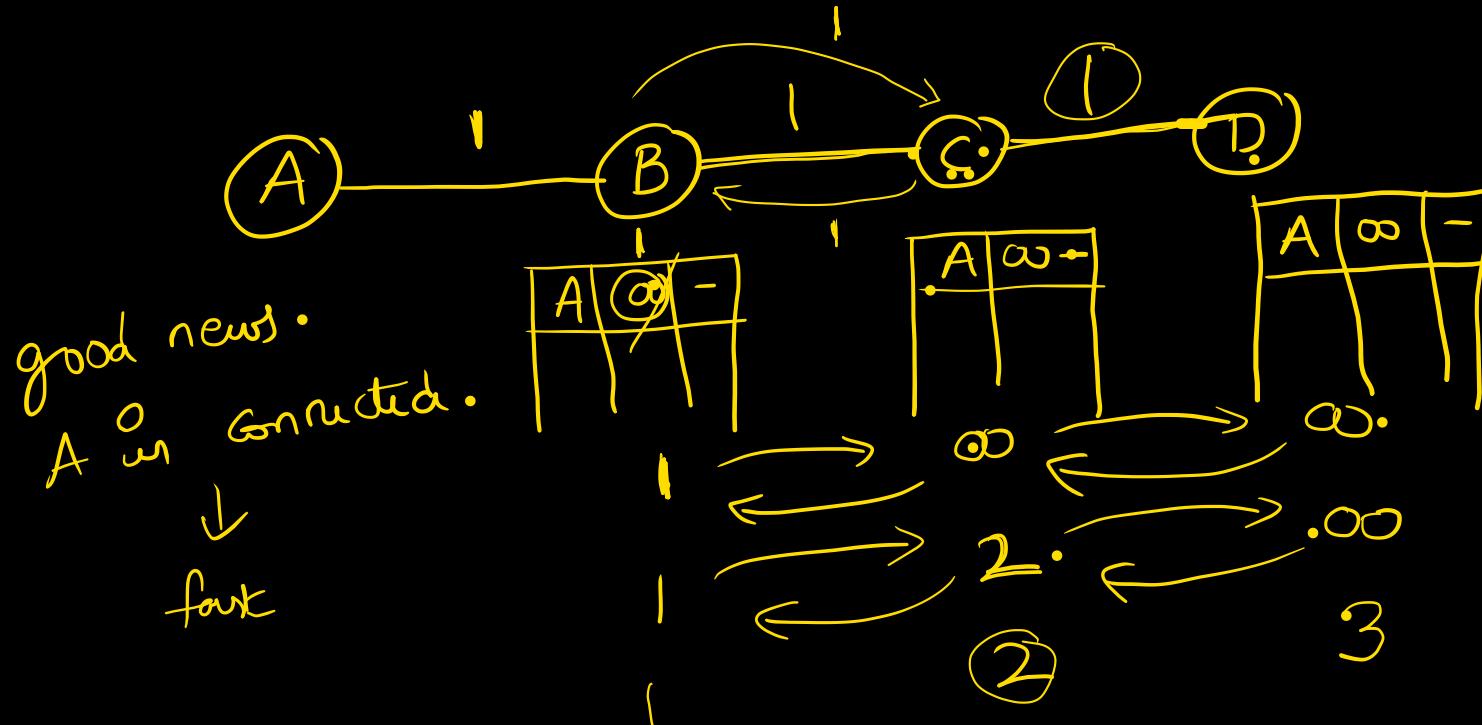


3 kinds of questions:

- 1) Given DVS, \rightarrow RT
- 2) Final RTS
- 3) Redundant edges.



In DVR good news spreads fast but bad
news spreads slow



Tommorrow
very difficult
Count to infinity.

