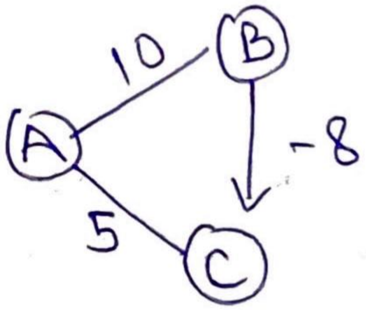
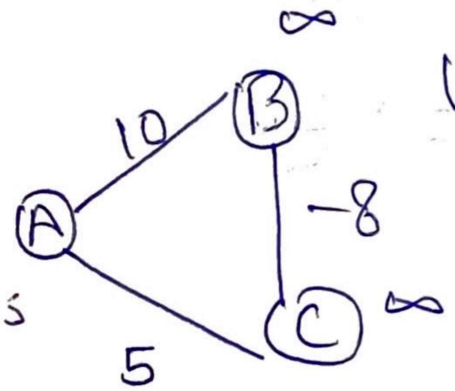
Bellmann Ford

Dijkstra



A	B	C
0	∞	∞
	10	5
AC	10	5
ACB	10	5

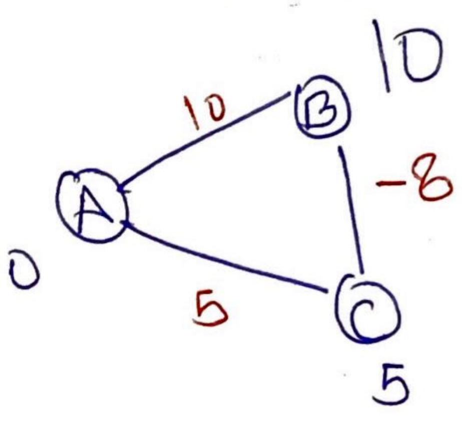


$(V-1) \Rightarrow v-1 = 2$

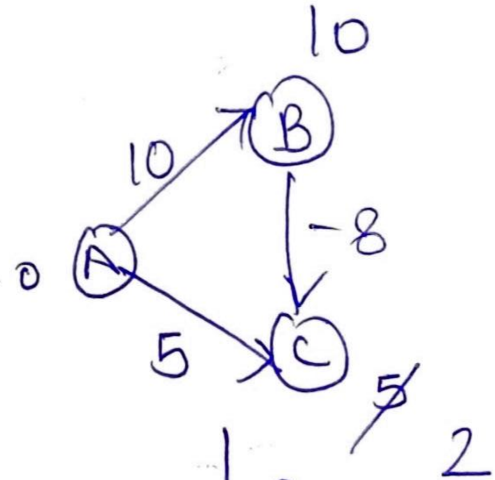
$3-1 = 2$

times relaxation

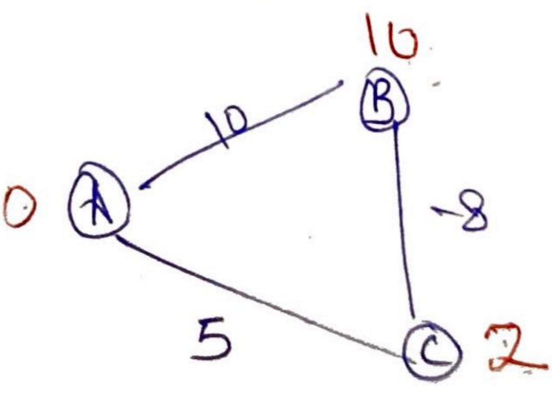
R_1

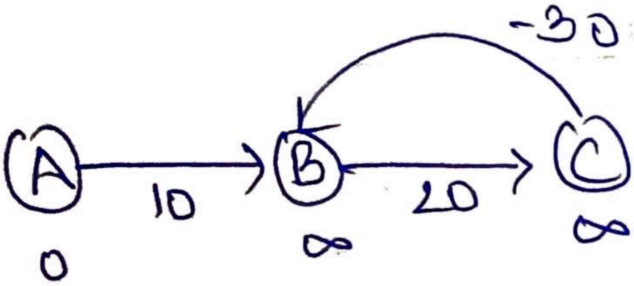


R_2



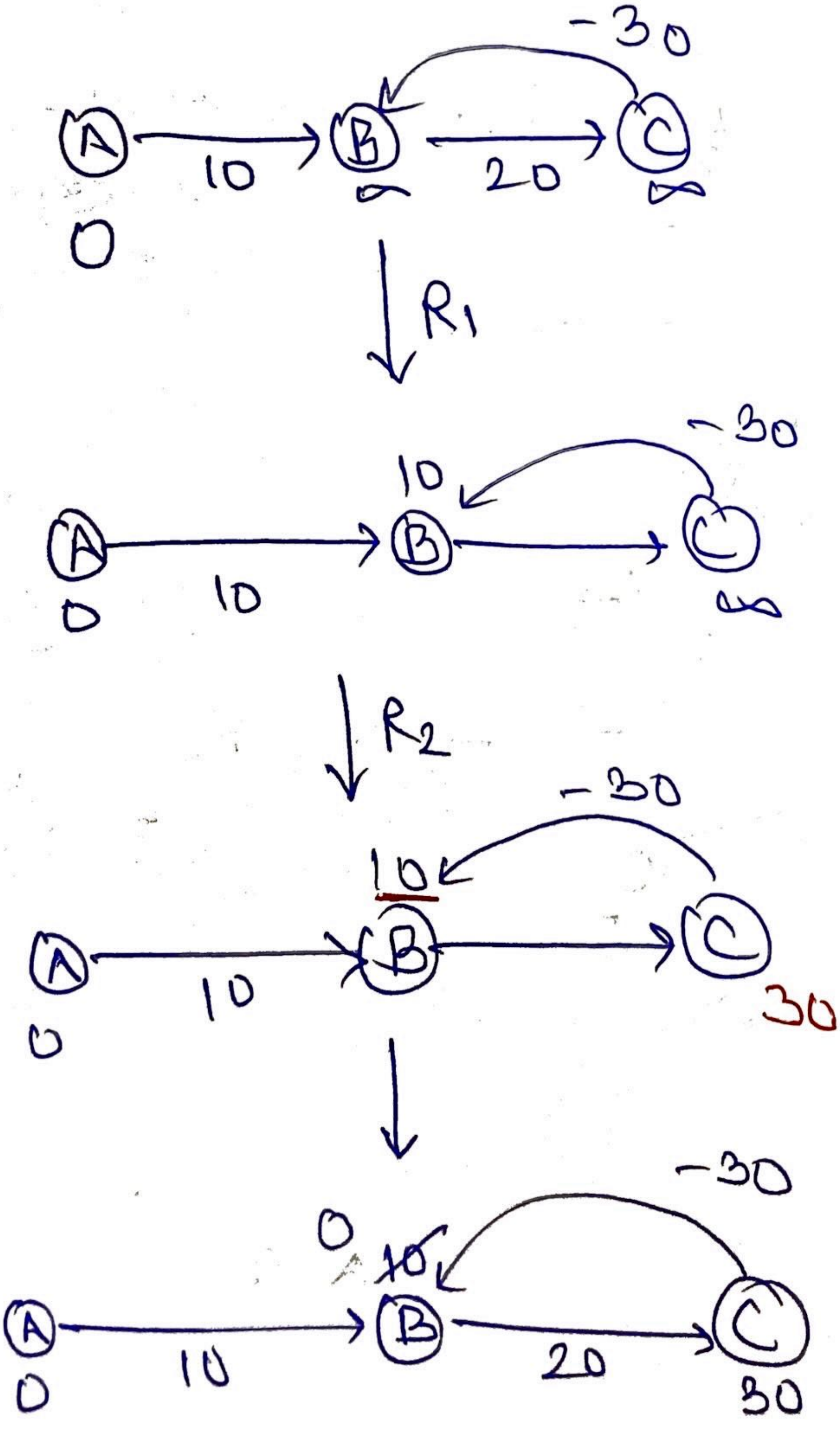
R_3



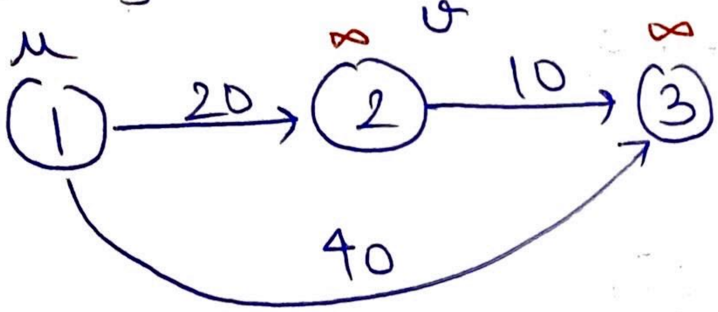


According to Bellmann Ford Algorithm, edge is relaxed $v-1$ times. Then,

$v-1 = 3-1 = 2$



Dijkstra's Algorithm
(Single Source Shortest Path)



* Relaxation

if $d(u) + c(u, v) < d(v)$

$d(v) = d(u) + c(u, v)$

At 1 to 2

$d(u) = 0 \quad < d(v)$

$d(u, v) = 20 \quad < \infty$

$20 + 0 \quad < \infty$

Then, $d(v) = 0 + d(u, v)$

$= 20.$

At 1 to 3

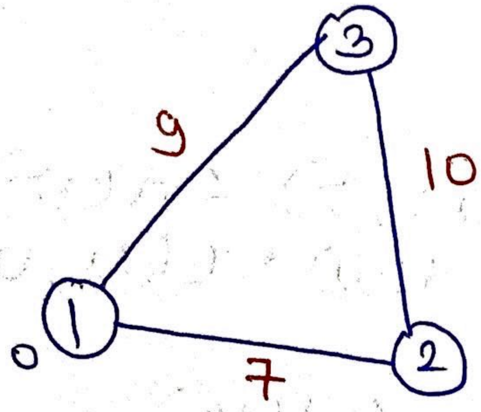
$40 < \infty$

For 2 to 3, we get,

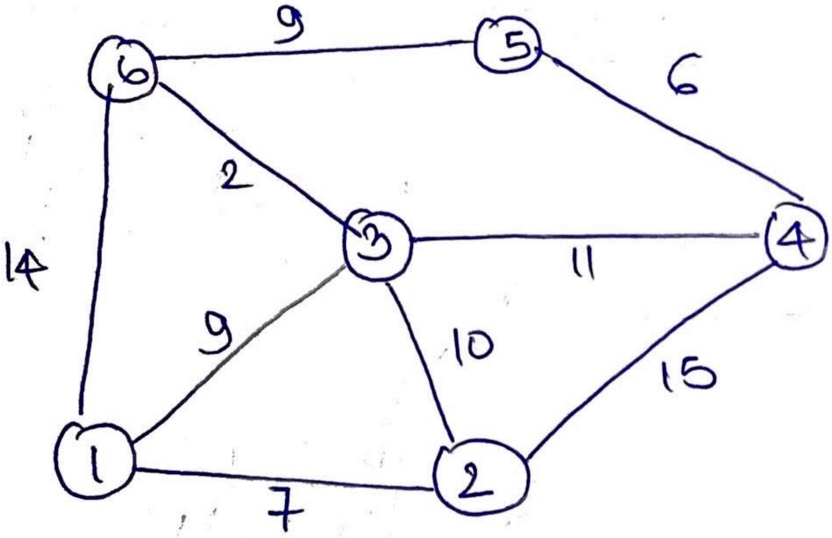
$$20 + 10 < 40$$

$$30 < 40$$

Example



Source	Destination 2	3
1	∞	∞
1,2	7	9
	7	9
1,2,3		

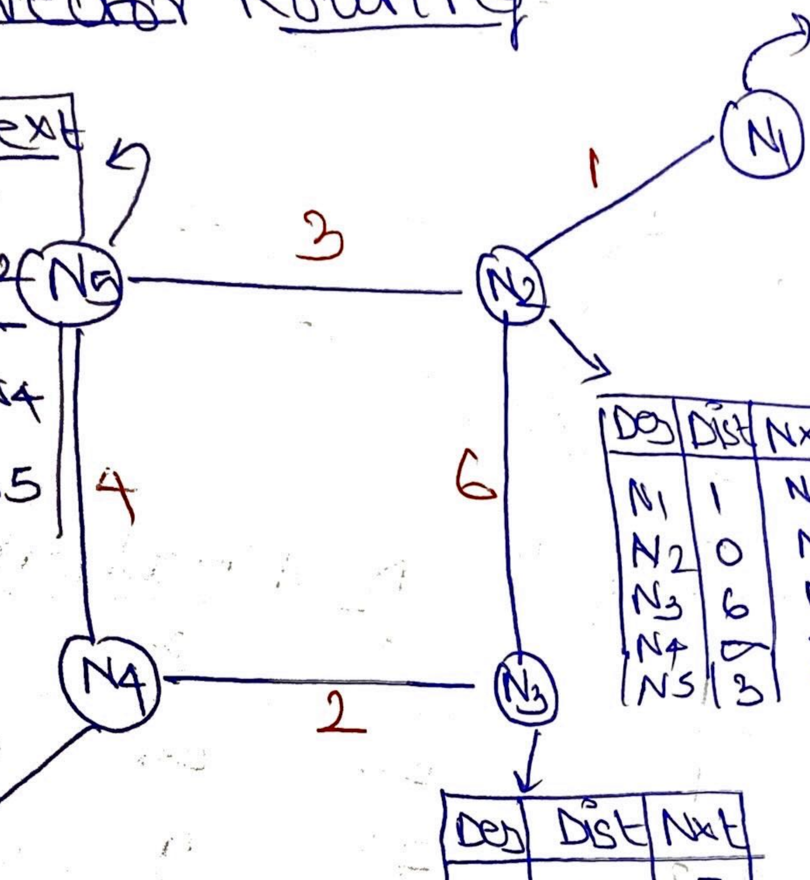


Source	Destination				
1	2	3	4	5	6
1	∞	∞	∞	∞	∞
1	7	9	∞	∞	14
1,2	7	9	22	∞	14
1,2,3	7	9	20	∞	11
1,2,3,6	7	9	20	20	11
1,2,3,6,4	7	9	20	20	11
1,2,3,6,4,5	7	9	20	20	11

Distance vector Routing

Des	Dis	Nxt
N1	0	N1
N2	1	N2
N3	∞	–
N4	∞	–
N5	∞	–

Dest	Dist	Next
N_1	∞	–
N_2	3	N2
N_3	∞	–
N4	4	N4
N5	0	N5



Des	Dist	Nxt
N1	1	N1
N2	0	N2
N3	6	N3
N4	∞	–
N5	3	N5

Des	Dist	Nxt
N1	∞	–
N2	∞	–
N3	2	N3
N4	0	N4
N5	4	N5

Des	Dist	Nxt
N1	∞	–
N2	6	N3
N3	0	N3
N4	2	N4
N5	∞	–

1) Only negbours
2) only Distance vector

Now

At N_1, $\rightarrow N_2$

At N_2 $\rightarrow N_5, N_3$

At N_3 $\rightarrow N_4, N_2$

At N_4 $\rightarrow N_5, N_3$

At N_5 $\rightarrow N_4, N_2$

Only considering N_1,

N_2
1
0
6
∞
3

N_1 New RT

Dest	Dist	Next
N_1	0	N_1
N_2	1	N_3
N_3	7	N_2, N_3
N_4	∞	–
N_5	4	$N_2 N_5$

$N_1 \rightarrow N_2$ and $N_2 \rightarrow N_2$

$N_1 \rightarrow N_2$ and $N_2 \rightarrow N_3$
$1 + 6 = 7$

$N_1 \rightarrow N_2$ and $N_2 \rightarrow N_4$.
$1 + \infty = \infty$

$N_1 \rightarrow N_5$
$N_1 \rightarrow N_2$ & $N_2 \rightarrow N_5$
$1 + 3 = 4$

c N5,

N2	N4
1	∞
0	∞
6	2
9	0
3	4

Dist	Dist	Next
N1	4	N2
N2	3	N2
N3	6	N4
N4		
N5		

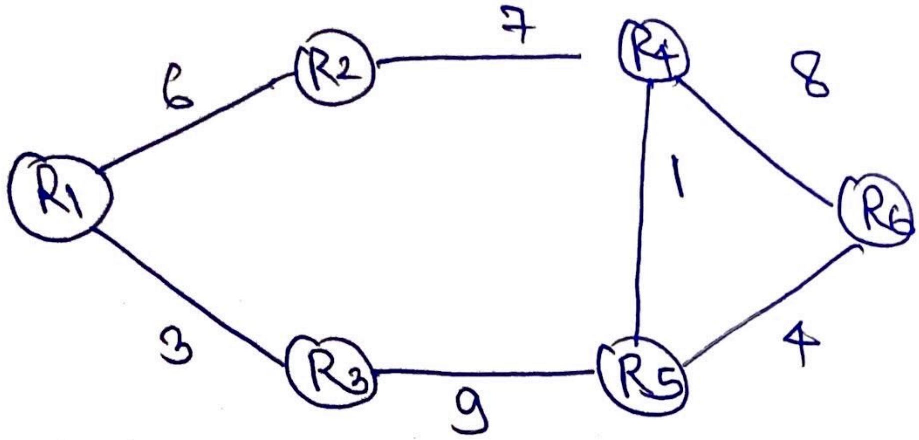
N5 → N1

$N5 \xrightarrow{} N2 \ \& \ N2 \rightarrow N1 = 4$
3 1

$N5 \rightarrow N4 \ \& \ N4 \rightarrow N1$
$4 + \infty = \infty$

N5 → N2

Link state Routing



R6	
R5	4
R4	8

R1	
R2	6
R3	3

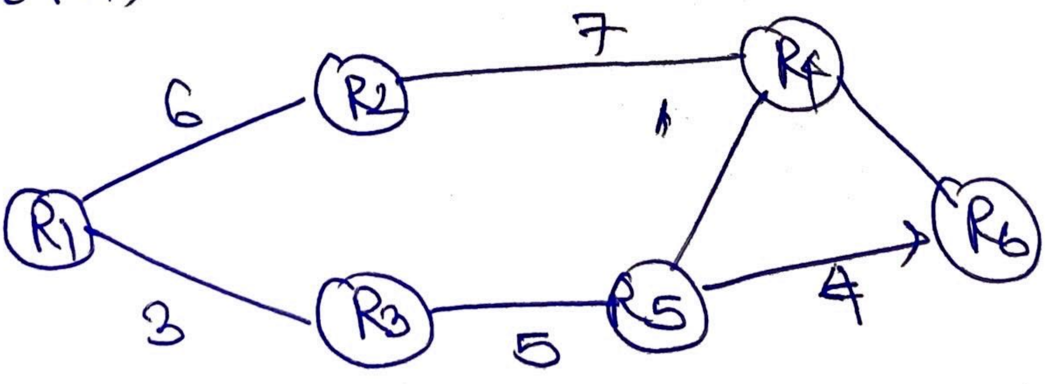
→ sequence no. & TTL

R3	
R1	3
R2	5
R5	9

R5	
R3	9
R4	1
R6	4

→ Flooding is used.

At R1,



Single Source Shortest path

R_1	R_2	R_3	R_4	R_5	R_6
R_1	6	3	∞	∞	∞
R_1R_3	5	3	∞	12	∞
$R_1R_2R_3$	5	3	12	12	∞
$R_1R\cancel{R_3}R_4$	5	3	12	12	21
$R_1R_2R_3R_4R_5$					16

		via
R_1	0	R_1
R_2	5	R_1
R_3	3	R_1
R_4	12	R_3R_2
R_5	12	R_3
R_6	16	R_3R_5

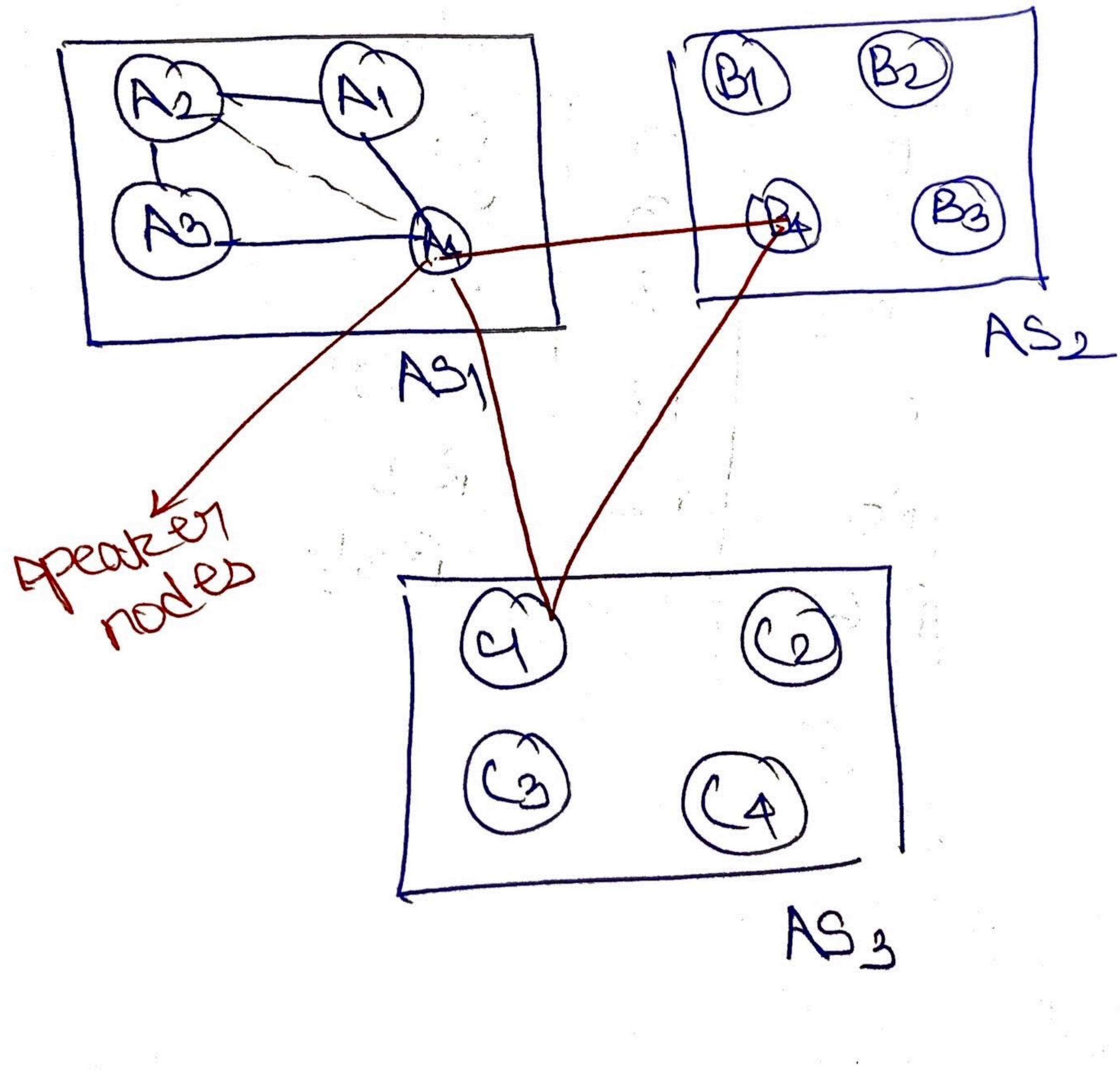
Path Vector Routing

→ It is an exterior routing protocol proved to be useful inter domain or inter AS Routing

→ In this routing a router has list of N/Ws that can be reached with path to reach each one

→ it tells us the path

→ only speaker nodes can communicate



Routing Table for A4

Destination	Path
A_1	AS_1
A_2	AS_1
A_3	AS1
A4	AS1

Routing Table

A path vector Routing table for each router can be created if AS share their rechability list with each other.

Dest	Path
A1	AS1
⋮	
A4	AS1
B1	AS1 - AS2
⋮	AS1 - AS2
B4	
C4	AS1 - AS3