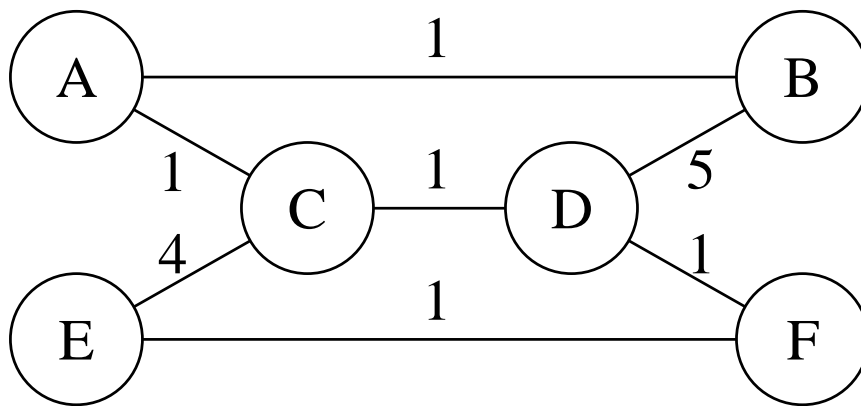


Distance Vector Algorithm Example

The figure below shows routers A, B, C, D, E and F connected by links with their associated costs.

Show how the routing tables (in terms of destination, cost, next hop) for each router is constructed if the routers are using the distance vector technique. Draw the tables after each round. You may assume that all routers exchange tables with their direct neighbours simultaneously in each round.



[15 marks]

Application

The specimen answer shows one method of calculating the tables, the student may use any method.

Routers initially know nothing about other routers.

Round 1: Routers send an echo to their neighbouring routers and thereafter have a cost associated with each of their neighbours, but not other routers for which they assume infinity cost. All routes are single-hop. [3 marks]

	A		B		C		D		E		F	
A	0	-	1	A	1	A	∞	-	∞	-	∞	-
B	1	B	0	-	∞	-	5	B	∞	-	∞	-
C	1	C	∞	-	0	-	1	C	4	C	∞	-
D	∞	-	5	D	1	D	0	-	∞	-	1	D
E	∞	-	∞	-	4	E	∞	-	0	-	1	E
F	∞	-	∞	-	∞	-	1	F	1	F	0	-

Round 2: Routers send their tables to their neighbours. Routers then update their tables if a better route is found. Changes represent 2-hop routes. [3 marks]

	A		B		C		D		E		F	
A	0	-	1	A	1	A	2	C	5	C	∞	-
B	1	B	0	-	2	A	5	B	∞	-	6	D
C	1	C	2	A	0	-	1	C	4	C	2	D
D	2	C	5	D	1	D	0	-	2	F	1	D
E	5	C	∞	-	4	E	2	F	0	-	1	E
F	∞	-	6	D	2	D	1	F	1	F	0	-

Round 3: Routers send their tables to their neighbours. Routers then update their tables if a better route is found. Changes represent 3-hop routes. [3 marks]

	A		B		C		D		E		F	
A	0	-	1	A	1	A	2	C	5	C	3	D
B	1	B	0	-	2	A	3	C	6	C	6	D
C	1	C	2	A	0	-	1	C	3	F	2	D
D	2	C	3	A	1	D	0	-	2	F	1	D
E	5	C	6	A	3	D	2	F	0	-	1	E
F	3	C	6	D	2	D	1	F	1	F	0	-

Round 4: Routers send their tables to their neighbours. Routers then update their tables if a better route is found. Changes represent 4-hop routes. [3 marks]

	A		B		C		D		E		F	
A	0	-	1	A	1	A	2	C	4	F	3	D
B	1	B	0	-	2	A	3	C	6	C	4	D
C	1	C	2	A	0	-	1	C	3	F	2	D
D	2	C	3	A	1	D	0	-	2	F	1	D
E	4	C	6	A	3	D	2	F	0	-	1	E
F	3	C	4	A	2	D	1	F	1	F	0	-

Round 5: Routers send their tables to their neighbours. Routers then update their tables if a better route is found. Changes represent 5-hop routes. [3 marks]

	A		B		C		D		E		F	
A	0	-	1	A	1	A	2	C	4	F	3	D
B	1	B	0	-	2	A	3	C	5	F	4	D
C	1	C	2	A	0	-	1	C	3	F	2	D
D	2	C	3	A	1	D	0	-	2	F	1	D
E	4	C	5	A	3	D	2	F	0	-	1	E
F	3	C	4	A	2	D	1	F	1	F	0	-