1.

Step	N	D(B), p(B)	D(C), p(C)	D(D), p(D)	D(E), p(E)
0	{A}	5, A	1, A	∞	∞
1	{A,C}	3, C	1, A	2, C	∞
2	{A,C,D}	3, C		2, C	5, D
3	{A,C,D,B}	3, C			4, B
4	{A,C,D,B,E}				4, C

2.

Step0(one)

	A		B		C		D		E	
A	0		5	A	1	A	∞		∞	
B	5	B	0		2	B	∞		1	B
C	1	C	2	C	0		1	C	∞	
D	∞		∞		1	D	0		3	D
E	∞		1	E	∞		3	E	0	

Step1(two)

	A		B		C		D		E	
A	0		3	C	1	A	2	C	6	B
B	3	C	0		2	B	3	C	1	B
C	1	C	2	C	0		1	C	3	B
D	2	C	3	C	1	D	0		3	D
E	6	B	1	E	3	B	3	E	0	

Step2(three)

	A		B		C		D		E	
A	0		3	C	1	A	2	C	4	B
B	3	C	0		2	B	3	C	1	B
C	1	C	2	C	0		1	C	3	B
D	2	C	3	C	1	D	0		3	D
E	4	C	1	E	3	B	3	E	0	

3.

Dijkstra algorithm is more effective.

It can be seen that this problem is an undirected graph dealing with the positive weight of the single source point problem. Dijkstra algorithm is effective in dealing with single source node problem, and the time complexity is $O(n^2)$ Dijkstra is not suitable for values with negative weight edges, but this algorithm is suitable for undirected graphs and directed graphs.

Distance vector routing algorithm has more advantages in dealing with multi-source node problems. However, in each iteration, packets are exchanged between two adjacent neighbor nodes, so the time complexity depends on many factors. And the convergence speed is slow, and it is easy to encounter routing loop problems.

Through comparison, it can be found that the time complexity of Dijkstra algorithm is less than that of distance vector routing algorithm. Dijkstra algorithm is more suitable because it does not contain negative weight, has fewer nodes, and is not easy to encounter loop problems.

4.

Dijkstra algorithm:

(1) Initially, two sets are defined, N and D. N is the vertex of the shortest path that has been recorded, and D is the vertex of the shortest path that has not been recorded and the distance from the vertex to the starting point. The N set contains the starting point

A at the beginning, and D contains vertices other than A. For example, the distance of vertex v in D is (w, v) length. If w and v are not adjacent, the distance of V is infinite.

(2) Select "the shortest distance vertex v" from D, add vertex v to N, and delete vertex v from D.

(3) Update the distance from each vertex in D to the starting point A, because in the second step, it is determined that v is the vertex to find the shortest path, so v can be used to update the distance of other vertices.

(4) Repeat steps 2 and 3 until all vertices are traversed.

D-V algorithm:

(1) Each node resumes its own distance vector table and initializes it.

(2) Each node forwards the distance vector it maintains to its neighbor nodes.

(3) After receiving the distance vector table sent by the neighbor node, each node updates its own table with $Dx(Y, Z) = c(X, Z) + \min w\{ Dz(Y, w)\}$ based on the new information.

(4) When the distance vector table of the node changes, the new distance vector table is sent to the neighbor node. If it is the same as the previous vector table, it is not forwarded to its neighbor node until the distance vector expression of each node is stable.

5.

Distance vector routing algorithm is characterized by distribution, iteration and asynchrony. Because each node will receive the routing information from its directly adjacent node, perform routing calculation, and send the calculation results back to the directly adjacent node. In the iteration, only messages are exchanged between two adjacent neighbor nodes. When the link weight changes, the changed link weight is transmitted only when the lowest weight path of the node connected to the link changes. When some nodes in the network have problems, that is, after some topology changes, the network converges slowly and produces uncoordinated or contradictory routing entries, the routing loop problem may occur. When all nodes in the network have

problems, that is, all topologies have problems. It may not work at all, or there may still be a routing loop problem.

Resolvent:

(1) Define maximum

A maximum value is defined in the distance vector protocol. If the route update information is sent to the router in the route of the unreachable network more than or equal to this value, it will be considered that the network department is reachable, there is a fault, and will not receive any route update information from accessing the network.

(2) Trigger update

Once the route is invalid, the routes with the same or worse metrics reaching the agreed destination will be ignored within the suppression time. In this way, the trigger update will have time to spread throughout the network, so as to avoid the damaged route from being reinserted into the neighbor node that has received the departure update, which solves the routing loop problem.