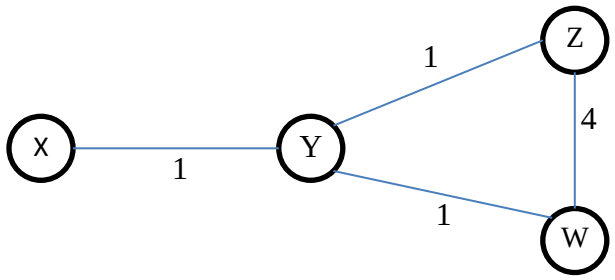
IS 504 – Exercise 5

Consider the following network. In this network, distance vector routing algorithm with poisoned reverse is used. A node sends its distance vector, which consists of <destination,distance> pairs for all destinations, to its neighbors whenever an adjacent link's cost or its distance vector changes.

a. What is the first advertisement sent by each node after the network is formed?
b. Give the distance tables in all nodes after the first advertisements given in part (a) are exchanged.
c. Give the distance tables in all nodes after the distance vector algorithm converges.
d. Suppose that after the algorithm converges, the cost of link (X, Y) changes to 120. What is the first advertisement message that is sent by Y to each of the neighbors after the link cost change?
e. Give the distance tables in Z and W just after they receive advertisement from Y in response to link cost change.
f. What is the first advertisement sent by Z after the link cost change?
g. What is the first advertisement sent by W after the link cost change?
h. Will there be a routing loop? If yes, indicate the destination and the nodes involved in the routing loop.



a)

X sends:

to Y:

Dest.	X	Y
Dist.	0	∞

Y sends:

to X:

Dest.	X	Y	Z	W
Dist.	∞	0	1	1

to Z:

Dest.	X	Y	Z	W
Dist.	1	0	∞	1

to W:

Dest.	X	Y	Z	W
Dist.	1	0	1	∞

Z sends:

to Y:

Dest.	Y	Z	W
Dist.	∞	0	4

to W:

Dest.	Y	Z	W
Dist.	1	0	∞

W sends:

to Y:

Dest.	Y	Z	W
Dist.	∞	4	0

to Z:

Dest.	Y	Z	W
Dist.	1	∞	0

b)

Distance Table in Node X		to node			
		X	Y	Z	W
from node	**X**	**0**	**1**	**2**	**2**
	Y	∞	**0**	**1**	**1**

Distance Table in Node Y		to node			
		X	Y	Z	W
from node	X	**0**	∞	∞	∞
	Y	**1**	**0**	**1**	**1**
	Z	∞	∞	**0**	4
	W	∞	∞	4	**0**

Distance Table in Node Z		to node			
		X	Y	Z	W
from node	Y	**1**	**0**	∞	**1**
	Z	**2**	**1**	**0**	**2**
	W	∞	1	∞	0

Distance Table in Node W		to node			
		X	Y	Z	W
from node	Y	**1**	**0**	**1**	∞
	Z	∞	1	0	∞
	W	**2**	**1**	**2**	**0**

c)

Distance Table in Node X		to node			
		X	Y	Z	W
from node	**X**	**0**	**1**	**2**	**2**
	Y	∞	**0**	**1**	**1**

Distance Table in Node Y		to node			
		X	Y	Z	W
from node	X	**0**	∞	∞	∞
	Y	**1**	**0**	**1**	**1**
	Z	∞	∞	**0**	∞
	W	∞	∞	∞	**0**

Distance Table in Node Z		to node			
		X	Y	Z	W
from node	Y	**1**	**0**	∞	**1**
	Z	**2**	**1**	**0**	**2**
	W	2	1	2	0

Distance Table in Node W		to node			
		X	Y	Z	W
from node	Y	**1**	**0**	**1**	∞
	Z	2	1	0	2
	W	**2**	**1**	**2**	**0**

d)

Distance table in node Y becomes:

Distance Table in Node Y		to node			
		X	Y	Z	W
from node	X	0	∞	∞	∞
	Y	**120**	**0**	**1**	**1**
	Z	∞	∞	0	∞
	W	∞	∞	∞	0

to X:

Dest.	X	Y	Z	W
Dist.	∞	0	1	1

to Z:

Dest.	X	Y	Z	W
Dist.	120	0	∞	1

to W:

Dest.	X	Y	Z	W
Dist.	120	0	1	∞

e)

Distance Table in Node Z		to node			
		X	Y	Z	W
from node	Y	120	0	∞	1
	Z	**6**	**1**	**0**	**2**
	W	2	1	2	0

Distance Table in Node W		to node			
		X	Y	Z	W
from node	Y	120	0	1	∞
	Z	2	1	0	2
	W	**6**	**1**	**2**	**0**

f)

to Y:

Destination	X	Y	Z	W
Distance	6	∞	0	∞

to W:

Destination	X	Y	Z	W
Distance	∞	1	0	2

g)

to Y:

Destination	X	Y	Z	W
Distance	6	∞	∞	0

to Z:

Destination	X	Y	Z	W
Distance	∞	1	2	0

h)

Yes, there is a routing loop.

Packets for destination X:

Z → W → Z →W → …