EECS 489 - WN 23

Discussion 8

Announcements

Assignment 3 is out.

Due date: **03/24 2023, 11:59 PM**

Lateday policy:

You have 3 group latedays in total for assignment 2 - 4.

Please compile your code in the VM and test it carefully.

Agenda

- A3 Hints
- Routing Protocol Questions

A3 Hints

WTP-base

Your sender and receiver should work given:

- Timeouts/Large amounts of latency (think 100s of ms)
- Packet loss
- Packet corruption
- Multiple file transfers for 1 receiver lifespan
- Large binary or text file transfers (A video file, a very long text file, etc.)

A3 Hints

WTP-opt

Your sender and receiver should work given:

- Same conditions as last slide
- ACKs should have precisely the same seq as what was sent
- Packets that have been ACK'd should not be retransmitted

i.e make sure the expected "optimizations" are observable

<u>**Do not use TCP sockets, the AG knows when you are doing this!**</u>

Routing Protocols

Link-State (LS) Routing

- Open Shortest Path First (OSPF)
- Dijkstra's Algorithm

Distance-Vector (DV) Routing

- Routing Information Protocol (RIP)
- Bellman-Ford Algorithm

Q1 True / False

- Link-State (LS) routing involves broadcasting its local knowledge of the network to everyone.
- Conversely, Distance-Vector routing involves telling only neighbors about its global view.
- Both routing methods involve finding least-cost paths to all other nodes

Q1 True / False

- Link-State (LS) routing involves broadcasting its local knowledge of the network to everyone.
- True; uses Dijkstra's for computation (OSPF).

- Conversely, Distance-Vector routing involves telling only neighbors about its global view.
- True; uses Bellman-Ford for computation (RIP).

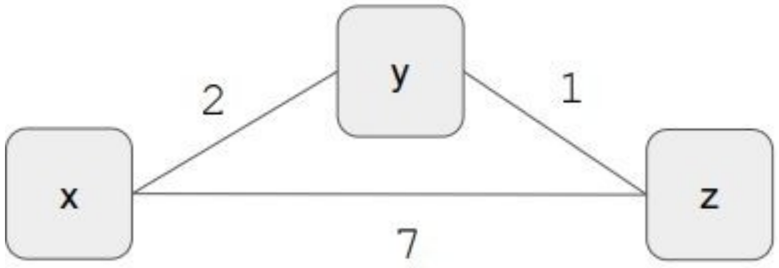
- Both routing methods involve finding least-cost paths to all other nodes
- True; allows easy metric to avoid loops.

Q2 Distance-Vector Properties

Yes / No:

- For DV routing, will the count-to-infinity problem occur if we decrease a link's cost?

- What about if we connect two previously unconnected nodes?

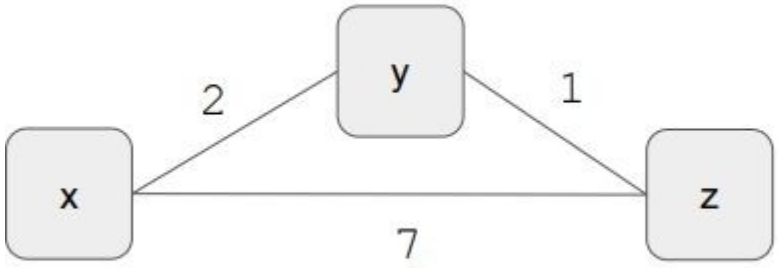


Q2 Distance-Vector Properties

Yes / No:

- For DV routing, will the count-to-infinity problem occur if we decrease a link's cost?
- No. Loops aren't caused by decreasing link cost

- What about if we connect two previously unconnected nodes?
- No. Loops potentially result from a removing a link



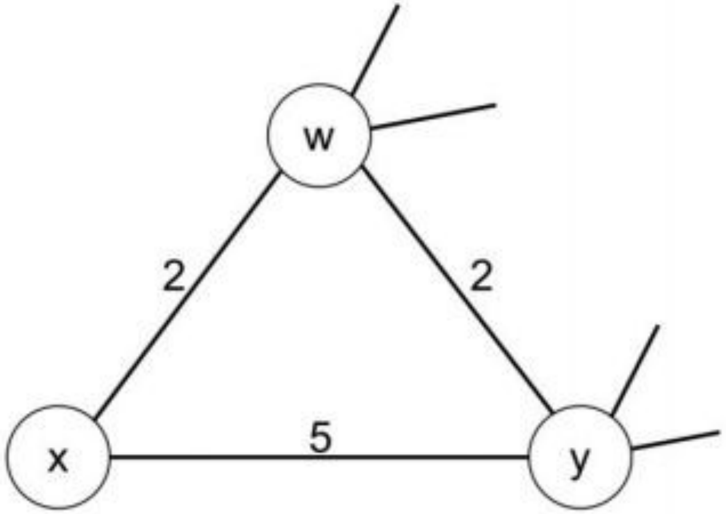
Count-to-infinity problem may occur when the cost of a link increases.

Q3 Distance-Vector Situations

Consider this network fragment:

- **w**'s least-cost path to **u** (not shown) of 5
- **y** has least cost path to **u** of 6
- Complete paths from **w** and **y** to **u** not shown
- All links have strictly positive costs

What is x's distance vector for **w**, **y**, and **u**?



$$D_w(u) = 5$$
$$D_y(u) = 6$$

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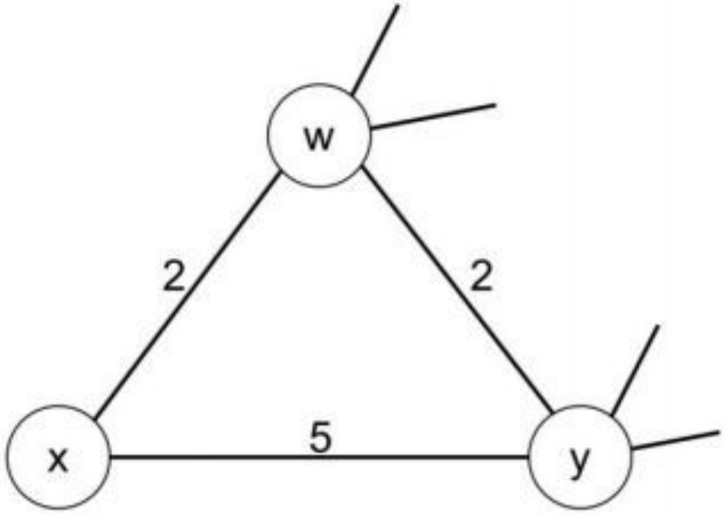
```
Dx(w) = 2
Dx(y) = 4    x -> w -> y
Dx(u) = 7    x -> w -> … -> u
```



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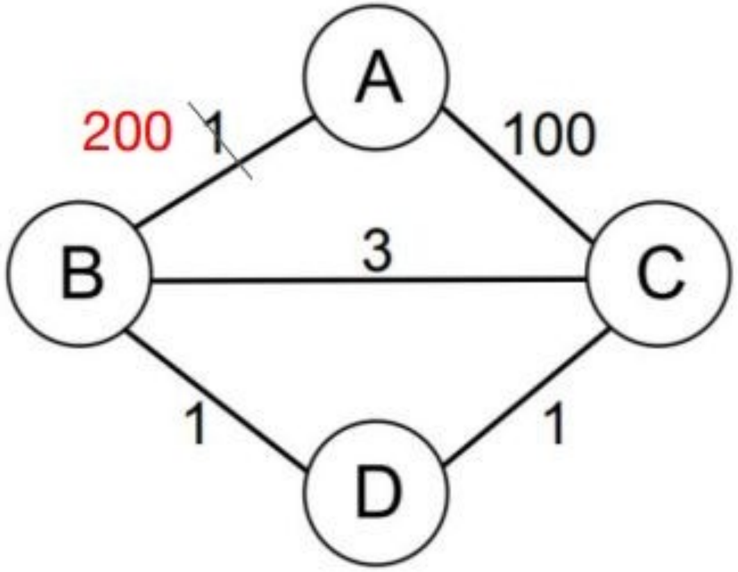
Q4 Poisoned Reverse

Consider this network fragment Assume the following events:

- DV is used with **poisoned reverse**
- Routing state has stabilized
- c(A, B) goes from 1 to 200 very suddenly

Will count to infinity occur?



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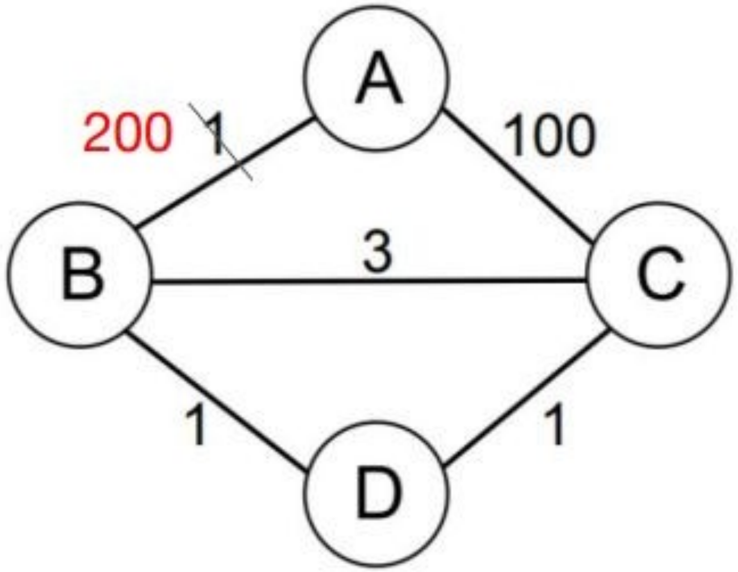


Will count to infinity occur?

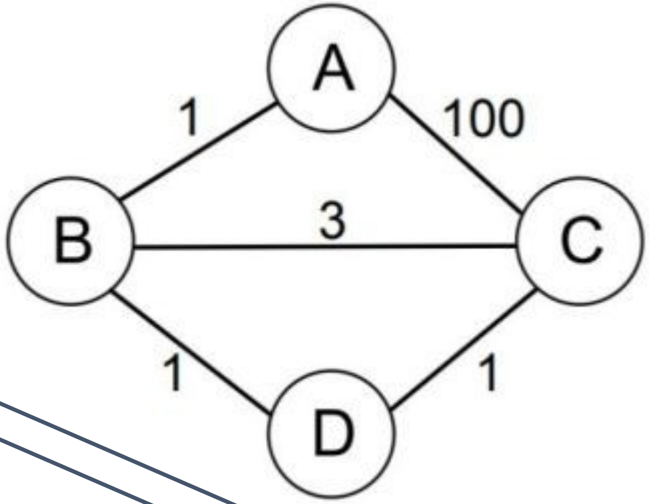
No.

In general, if x goes to z through y, then x will tell y the cost from x to z is infinity.

Poisoned Reverse Explained

	A	B	C	D
A	0	1(B)	inf	inf
B	1(A)	0	**2(D)**	1(D)
C	inf	2(D)	0	1(D)
D	**inf**	1(B)	1(C)	0

DistanceVectors @ B



	A	B	C	D
A	0	1(B)	inf	2(B)
B	1(A)	0	**inf**	1(D)
C	inf	inf	0	1(D)
D	**2(B)**	1(B)	1(C)	0

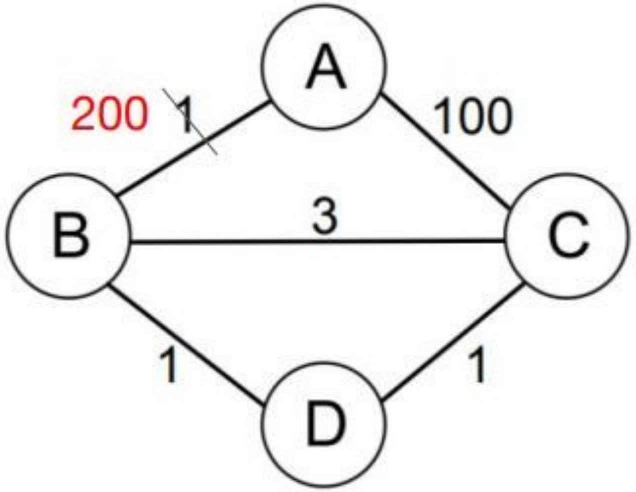
DistanceVectors @ D

Initial steady state

Poisoned Reverse Explained

	A	B	C	D
A	0	1(B)	inf	inf
B	200(A)	0	**2(D)**	1(D)
C	inf	2(D)	0	1(D)
D	inf	1(B)	1(C)	0

DistanceVectors @ B



Some time later

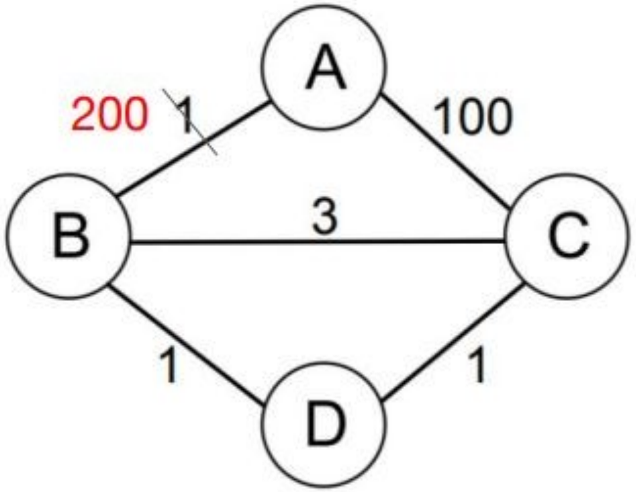
	A	B	C	D
A	0	1(B)	inf	2(B)
B	200(A)	0	**inf**	1(D)
C	100(A)	inf	0	1(D)
D	101(C)	1(B)	1(C)	0

DistanceVectors @ D

Poisoned Reverse Explained

	A	B	C	D
A	0	102(C)	100(C)	101(D)
B	102(D)	0	2(D)	1(D)
C	100(A)	2(D)	0	1(D)
D	101(C)	1(B)	1(C)	0

DistanceVectors @ B



Finally

	A	B	C	D
A	0	inf	100(C)	101(D)
B	inf	0	inf	1(D)
C	100(A)	inf	0	1(D)
D	101(C)	1(B)	1(C)	0

DistanceVectors @ D

Thanks

Have a good one!