

### Problem 3

Step	$N'$	$D(t), p(t)$	$D(u), p(u)$	$D(v), p(v)$	$D(w), p(w)$	$D(y), p(y)$	$D(z), p(z)$
0	x	$\infty$	$\infty$	3,x	6,x	6,x	8,x
1	xv	7,v	6,v	3,x	6,x	6,x	8,x
2	xvu	7,v	6,v	3,x	6,x	6,x	8,x
3	xvuw	7,v	6,v	3,x	6,x	6,x	8,x
4	xvuw	7,v	6,v	3,x	6,x	6,x	8,x
5	xvuwyt	7,v	6,v	3,x	6,x	6,x	8,x
6	xvuwytz	7,v	6,v	3,x	6,x	6,x	8,x

### Problem 7

a)  $D(x) = 2, D(y) = 4, D(u) = 7$

b) First consider what happens if  $c(x,y)$  changes. If  $c(x,y)$  becomes larger or smaller (as long as  $c(x,y) \geq 1$ ), the least cost path from x to u will still have cost at least 7. Thus a change in  $c(x,y)$  (if  $c(x,y) \geq 1$ ) will not cause x to inform its neighbors of any changes.  
If  $c(x,y) = \delta < 1$ , then the least cost path now passes through y and has cost  $\delta + 6$ .

Now consider if  $c(x,w)$  changes. If  $c(x,w) = \varepsilon \leq 1$ , then the least-cost path to u continues to pass through w and its cost changes to  $5 + \varepsilon$ ; x will inform its neighbors of this new cost. If  $c(x,w) = \delta > 6$ , then the least cost path now passes through y and has cost 11; again x will inform its neighbors of this new cost.

c) Any change in link cost  $c(x,y)$  (and as long as  $c(x,y) \geq 1$ ) will not cause x to inform its neighbors of a new minimum-cost path to u .

### Problem 14

a) eBGP

b) iBGP

c) eBGP

d) iBGP

### Problem 16

One way for C to force B to hand over all of B's traffic to D on the east coast is for C to only advertise its route to D via its east coast peering point with C.

### Problem 18

BitTorrent file sharing and Skype P2P applications.

Consider a BitTorrent file sharing network in which peer 1, 2, and 3 are in stub networks W, X, and Y respectively. Due to the mechanism of BitTorrent's file sharing, it is quite possible that peer 2 gets data chunks from peer 1 and then forwards those data chunks to 3. This is equivalent to B forwarding data that is finally destined to stub network Y.

### Problem 19

A should advise to B two routes, AS-paths A-W and A-V.

A should advise to C only one route, A-V.

C receives AS paths: B-A-W, B-A-V, A-V.

<https://web.ugreen.cloud/web/#/share/7e3fbf19de1e4c5a926cac68aab7c7a9>

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