## 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 | ∞ | ∞ | 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 | xvuwy | 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 4

a)

| *Step* | *N'* | *D(x), p(x)* | *D(u),p(u)* | *D(v),p(v)* | *D(w),p(w)* | *D(y),p(y)* | *D(z),p(z)* |
|---|---|---|---|---|---|---|---|
| 0 | t | ∞ | 2,t | 4,t | ∞ | 7,t | ∞ |
| 1 | tu | ∞ | 2,t | 4,t | 5,u | 7,t | ∞ |
| 2 | tuv | 7,v | 2,t | 4,t | 5,u | 7,t | ∞ |
| 3 | tuvw | 7,v | 2,t | 4,t | 5,u | 7,t | ∞ |
| 4 | tuvwx | 7,v | 2,t | 4,t | 5,u | 7,t | 15,x |
| 5 | tuvwxy | 7,v | 2,t | 4,t | 5,u | 7,t | 15,x |
| 6 | tuvwxyz | 7,v | 2,t | 4,t | 5,u | 7,t | 15,x |

## Problem 5

| | Cost to u | v | x | y | z |
|---|---|---|---|---|---|
| | v | ∞ | ∞ | ∞ | ∞ | ∞ |
| From | x | ∞ | ∞ | ∞ | ∞ | ∞ |
| | z | ∞ | 6 | 2 | ∞ | 0 |

| | | Cost to | | | |
|---|---|---|---|---|---|
| | u | v | x | y | Z |
| v | 1 | 0 | 3 | ∞ | 6 |
| From x | ∞ | 3 | 0 | 3 | 2 |
| z | 7 | 5 | 2 | 5 | 0 |

| | | Cost to | | | |
|---|---|---|---|---|---|
| | u | v | x | y | z |
| v | 1 | 0 | 3 | 3 | 5 |
| From x | 4 | 3 | 0 | 3 | 2 |
| z | 6 | 5 | 2 | 5 | 0 |

| | | Cost to | | | |
|---|---|---|---|---|---|
| | u | v | x | y | z |
| v | 1 | 0 | 3 | 3 | 5 |
| From x | 4 | 3 | 0 | 3 | 2 |
| z | 6 | 5 | 2 | 5 | 0 |

## Problem 7

a) Dx(w) = 2, Dx(y) = 4, Dx(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) >=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)>=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) >=1) will not cause x to inform its neighbors of a new minimum-cost path to u .

## Problem 15

a) I1 because this interface begins the least cost path from 1d towards the gateway router 1c.

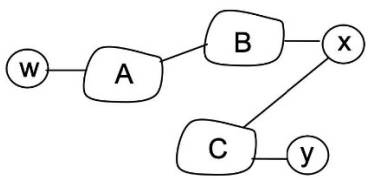
b) I2. Both routes have equal AS-PATH length but I2 begins the path that has the closest NEXT-HOP router.

c) I1. I1 begins the path that has the shortest AS-PATH.

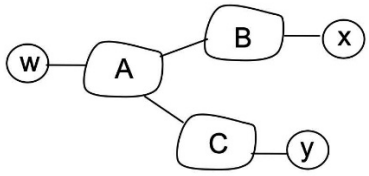
## Problem 16

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 17




X's view of the topology




W's view of the topology

In the above solution, X does not know about the AC link since X does not receive an advertised route to w or to y that contain the AC link (i.e., X receives no advertisement containing both AS A and AS C on the path to a destination.