

P3

Step	N'	D(u), P(u)	D(w), P(w)	D(v), P(v)	w	y	z
0	x	$\infty$	$\infty$	3, x	6, x	6, x	8, x
1	xw	7, v	6, v	3, x	6, x	6, x	8, x
2	xvw	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 y	7, v	6, v	3, x	6, x	6, x	8, x
5	xvuw y z	7, v	6, v	3, x	6, x	6, x	8, x
6	xvuw y z	7, v	6, v	3, x	6, x	6, x	8, x

P1

$y-x-u$ ,  $y-x-v-u$ ,  $y-x-w-u$ ,  $y-x-w-v-u$ ,  $y-w-u$ ,  
 $y-w-v-u$ ,  $y-w-x-u$ ,  $y-w-x-v-u$ ,  $y-w-v-x-u$ ,  
 $y-z-w-u$ ,  $y-z-w-v-u$ ,  $y-z-w-x-u$ ,  $y-z-w-x-v-u$ ,  
 $y-z-w-v-x-u$ .

P7

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

b) ①  $c(x, w)$  changes, if  $c(x, w) = D \leq 1$ , the least cost to  $u$  still passes through  $w$ . its cost now is  $5 + D$ .  
 if  $c(x, w) = D > 6$ , the least cost path passes through  $y$ . its cost now is 11.

②  $c(x, y)$  changes, if  $c(x, y)$  changes,  $c(x, y) = D \geq 1$ , the least <sup>cost</sup> path still cost at least 7, so changes of  $c(x, y)$  won't make  $x$  to inform its neighborhoods about the change. if  $c(x, y) = D < 1$ , then the least cost path now is  $D + 6$ .

c) Any change of  $c(x, y)$  won't cause  $x$  to react.



P13

No, BGP won't choose the shortest AS-path all the time. As there are many issues to be considered in the route selection process, it's possible that a longer loop-free path is chosen to replace shorter loop-free path due to economic reason.

P19

A advise 2 routes to B. AS-paths, A-W and A-V.  
 A advise 1 route to C. A-V.  
 C receives AS paths: B-A-W, B-A-V, A-V.

