Homework 5

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1.选做5道

P1. Looking at Figure 5.3, enumerate the paths from y to u that do not contain any loops.

Answer:

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

P2. Repeat Problem P1 for paths from x to z, z to u, and z to w.

Answer:

x to z:

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

z to u:

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

z to w:

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

P9. Can the poisoned reverse solve the general count-to-infinity problem? Justify your answer.

Answer:

NO, this is because that decreasing link cost won't cause a loop (caused by the next-hop relation of between two nodes of that link). Connecting two nodes with a link is equivalent to decreasing the link weight from infinite to the finite weight.

P10. Argue that for the distance-vector algorithm in Figure 5.6, each value in the distance vector D(x) is non-increasing and will eventually stabilize in a finite number of steps.

Answer:

At each step, each updating of a node's distance vectors is based on the Bellman-Ford equation, i.e., only decreasing those values in its distance vector. There is no increasing in values. If no updating, then no message will be sent out. Thus, D(x) is non-increasing. Since those costs are finite, then eventually distance vectors will be stabilized in finite steps.

P12. What is the message complexity of LS routing algorithm?

Since full AS path information is available from an AS to a destination in BGP, loop detection is simple – if a BGP peer receives a route that contains its own AS number in the AS path, then using that route would result in a loop