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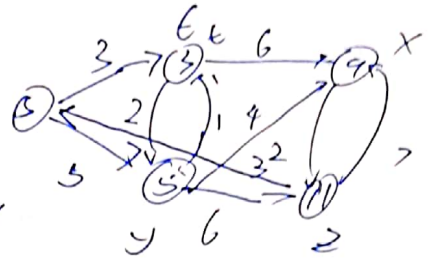
24.3-1

Using Dijkstra's algorithm, we can easily have.



Use s as the source:

there are 5 iterations in total

d: s: 0 0 0 0 0 x: ∞ 9 9 9 9

t: 3 3 3 3 3 y: 5 5 5 5 5

z: ∞ ∞ 11 11 11

π: s: all NIL t: all s.

x: NIL t t t y: NIL s s s

z: NIL NIL y y y

z as the source:

d: s: 3 3 3 3 3 x: 7 7 7 7 z: 0 0 0 0

t: ∞ 6 6 6 y: ∞ 8 8 8

π: s: z z z z y: NIL s s s z: all NIL.

t: NIL s s s x: z z z z

24-1

a. the index of G_f and G_b are either monotonically increasing or monotonically decreasing, there's no way we can find a loop within G_f and G_b since it's in its topological sort.

b. Suppose we are trying to find the shortest path from s to v. then the vertex of the shortest path

$V_1, V_2, V_3 \dots V_m$. Any increasing sequence of vertices will be in E_b, so is any decreasing sequence will be in E_b. A vertex set with length $|V|$ can only change direction at most $|V_2|$ times

C. It didn't, but it changes $O(EV)$ to $O(\frac{1}{2}EV)$