

Solutions for Chapter 24

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Solution to Exercise 23.1-2

Suppose there's an **acyclic** path from s to v being $\langle v_0, v_1, \dots, v_k \rangle$, where $v_0 = s$ and $v_k = v$. Similarly with the proof of lemma 24.2, the path has at most $|V| - 1$ edges, and so $k \leq |V| - 1$. Each of the $|V| - 1$ iterations of the **for** loop of lines 2-4 relaxes all E edges. Among the edges relaxed in the i th iteration, for $i = 1, 2, \dots, k$, is (v_{i-1}, v_i) , and $d[v_i]$ becomes finite. Therefore, $d[v_k] = d[v]$ will become finite no later than the k th iteration.

The opposite direction can be proved by appealing to the no-path property (Corollary 24.12).