Exercise 6.9: A tree $T$ is a connected finite graph without a cycle. It follows that $T$ has at least one vertex; and if it has two or more vertices then at least one of them is of degree 1. Otherwise the conditions “connected” and “finite” imply $T$ has a cycle.

We prove that $\alpha_0(T) = \alpha_1(T) + 1$. This is true when $\alpha_0(T) = 1$. Now suppose that $\alpha_0(T') = \alpha_1(T') + 1$ is true for any tree $T'$ with $\alpha_0(T') < \alpha_0(T)$. Let $uv$ be an edge in $T = [V, E]$ such that the degree of $u$ is 1. The graph $G = [V \setminus \{u\}, E \setminus \{uv\}]$ is a connected finite graph without a cycle, i.e. $G$ is a tree. So we have $\alpha_0(G) = \alpha_1(G) + 1$. Note that $\alpha_0(T) = \alpha_0(G) + 1$ and $\alpha_1(T) = \alpha_1(G) + 1$. So we have $\alpha_0(T) = \alpha_1(T) + 1$. 