Let $G = (V, E)$ be a DAG; A topological ordering of $V$ is a linear ordering $f : V \rightarrow \{1, 2, ..., n\}$ so that for any $xy \in E$, $f(x) < f(y)$.

Let $P = \{S_1, S_2, ..., S_k\}$ be a partition of $V$, where $S_1$ is the set of all sources in $G$, $S_2$ is the set of all sources obtained after removing $S_1$, etc. Then, we say $P$ is an ordered partition of $V$.

**Theorem**

Let $G$ be a DAG and let $P = \{S_1, S_2, ..., S_k\}$ be an ordered partition of $V$. Then, for $i = 1, 2, ..., k$, $S_i$ is an independent set. In addition, there is a path $q$ in $G$ of length $k-1$.

We conclude that $q$ in the above Theorem is a longest path, since its length equals to $|P|-1$. Note that an ordered partition, and a longest path in $G$, can be computed in $O(|V|+|E|)$ time, employing a slight modification of the topological ordering algorithm.