# Question 1

**3.Let $G = (V, E)$ be a directed graph, with source $s \in V$, sink $t \in V$, and nonegative edge capacities $\{c_e\}$. Give a polynomial-time algorithm to decide whether $G$ has a unique minimum $s - t$ cut(i.e., an $s - t$ of capacity strictly less than that of all other $s - t$ cuts).**

*Let G be an arbitrary flow network, with a source s, a sink t, and a positive integer capacity $c_e$ on every edge e; and let (A,B) be a minimum $s - t$ cut with respect to these capacitys$\{c_e : e \in E\}$. Now suppose we add 1 to every capacity; then (A,B) is still a minimum $s - t$ cut with respect to these new capacities $\{1 + c_e : e \in E\}$.*