Homework#11 Network flow

Textbook:

16.4. Prove or disprove the following statement. If all capacities in a network are distinct, then there exists a unique flow function that gives the maximum flow.

16.10. Give an efficient algorithm to find a path of maximum bottleneck capacity in a given directed acyclic graph.

16.15. Let $G = (V, E)$ be an undirected weighted graph with two distinguished vertices $s, t \in V$. Give an efficient algorithm to find a minimum weight cut that separates s from t.

Maxflow with vertex capacities. Suppose that, in addition to edge capacities, a flow network has *vertex capacities*. That is each vertex has a limit on how much flow can pass though. Show how to transform a flow network G = <V, E> with vertex capacities into an equivalent flow network G' = <V', E'>without vertex capacities, such that a maximum flow in G' has the same value as a maximum flow in G. How many vertices and edges does G' have?

Maximum flow in |E| steps of augmenting. Show how to find a maximum flow in a network G = <V,E> by a sequence of at most |E| augmenting paths. (*Hint:* Determine the paths *after* finding the maximum flow.)