

Chapter4: 5, 6, 15 (Page190..)

1. Suppose that we are given a weighted, directed graph $G = (V, E)$ in which edges that leave the source vertex s may have negative weights, all other edge weights are nonnegative, and there are no negative-weight cycles. Argue that Dijkstra's algorithm correctly finds shortest paths from s in this graph.
2. Suppose you are given a directed graph $G = (V, E)$ in which each edge has a cost of either 0 or 1. Also suppose that G has a node r such that there is a path from r to every other node in G . You are also given an integer k . Give a polynomial-time algorithm that either constructs an arborescence rooted at r of cost *exactly* k , or reports (correctly) that no such arborescence exists.