Assignment 6

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Problem 11

Let G be an undirected graph, $T = T'$ where T is the tree attained from BFS and T' be the tree attained from DFS. We prove that $G = T$ by contradiction. Assume that there is an edge (a, b) that exists in G but not in T. BFS finds a unique path from u to a and one from u to b, and so does DFS. If $T = T'$ then these unique paths are the same, hence there is only one unique path from u to a and u to b in G. If there is an edge (a, b) in G then this edge must be a part of the unique path in T' and therefore T, which contradicts the assumption that the edge (a, b) does not exist in T. Thus, G cannot contain any edges that do not belong to T if $T = T'$, and therefore $G = T$.