Homework 8: Q3

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1 Proof of Correctness Idea

Since prim algorithm is a greedy algorithm, to find a MST on the graph, we always want to return the node with the minimum cost. For prim algorithm or any algorithm that want to find the MST for giving any arbitrary input, during each iteration it will find only one node that is with the minimum cost, and so it will at least iterate at n time or any giving number of input time. During each iteration when we finding the minimum cost, we are also interest in the cost of all the node and make sure that it is the minimum cost, and we did that by comparing with all the adjacent nodes. Also, because the input is adjacent matrix, which mean it will take up to O(n) time. We need to make sure that the MST we find have the minimum weight number. So, the lower bound for this algorithm is $O(n^2)$.

2 Proof Details