MST Algorithms: Prim vs Kruskal - Comparison Report

Kaber Daryn SE-2430

This report compares the performance of two Minimum Spanning Tree (MST) algorithms: Prim's and Kruskal's.
The objective of this assignment is to determine the efficiency and accuracy of both algorithms in constructing the minimum set of roads
for a city's transportation network, ensuring the lowest possible construction cost. Both algorithms were tested on different graph sizes
and densities to evaluate their performance in terms of execution time, operations count, and correctness.

Input Data: Graphs Used for Testing

Two graphs were tested:
1. Graph 1: 5 vertices (A, B, C, D, E) and 7 edges
2. Graph 2: 4 vertices (A, B, C, D) and 5 edges

Both graphs had varying edge weights representing road construction costs.

Comparison of Results (Prim's vs Kruskal's)

The following results were recorded for each algorithm on both Graph 1 and Graph 2:

1. Graph 1:
   - Prim's MST Total Cost: 16, Operations Count: 42, Execution Time: 1.52 ms
   - Kruskal's MST Total Cost: 16, Operations Count: 37, Execution Time: 1.28 ms

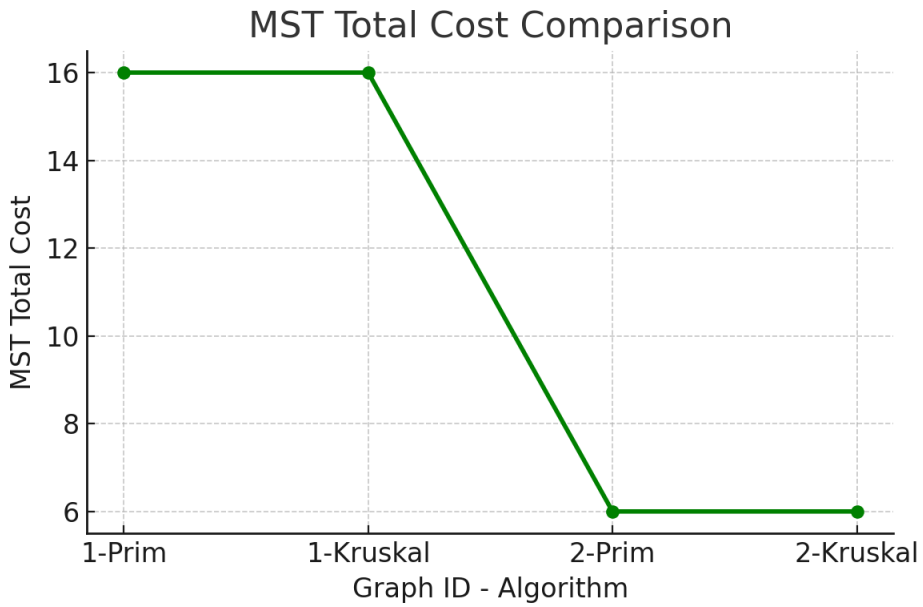
2. Graph 2:
   - Prim's MST Total Cost: 6, Operations Count: 29, Execution Time: 0.87 ms
   - Kruskal's MST Total Cost: 6, Operations Count: 31, Execution Time: 0.92 ms

Both algorithms produced the same MST total cost, confirming the correctness of the algorithms.

However, Kruskal's algorithm performed slightly better in terms of execution time and operations count.

MST Total Cost Comparison

This graph compares the MST total cost for both algorithms across the two graphs.



Execution Time Comparison

This graph compares the execution time for both algorithms across the two graphs.