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CS 5V81.012 IMPLEMENTATION OF DATA STRUCTURES AND ALGORITHMS

MANDATORY PROJECT 3

Performance Comparison between Prim1 and Prim2:

Prim 1: Prim with edges in the Priority Queue

Prim 2: Prim with vertices in the indexed heap

Input File	Number of Vertices	Number of edges	Running time for Prim1(msecs)	Running time for Prim2(msecs)
g1.txt	50	140	4	6
g2.txt	100	284	8	6
g3.txt	200	580	10	10
g4-big.txt	10000	9070678	1261	7000

From the comparison chart, it is seen that Prim1 performs as equally as Prim 2 for graphs with small number of vertices and edges. It beats the performance of Prim 2 for large graphs.

TSP:

The approximation algorithm implemented works only for complete graph wherein there exists an edge between every pair of vertices.

- The algorithm finds the MST (minimum spanning tree) starting with the given source vertex.
- It runs DFS on the MST found
- TSP order is the order in which the vertices are visited during DFS.

TSP Verification:

The verification algorithm implemented to check if the tour returned by the TSP is valid or not checks for the following:

- Every Vertex in the graph is visited

- Each vertex in the graph is visited exactly once, except for the source vertex that is visited twice.
- The tour starts and ends with the source vertex
- There exists an edge between every pair of adjacent vertices in the tour.