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CISC 235

Assignment 5

Experiment Results:

Number of random graphs generated, k = 250

n = 20:

Average Percent Difference is 171.094 %

n = 30:

Average Percent Difference is 218.129 %

n = 40:

Average Percent Difference is 255.17 %

n = 50:

Average Percent Difference is 283.692 %

n = 60:

Average Percent Difference is 306.928 %

A k value of 250 was chosen because a value less than this returns higher percent differences and values above 250 does not show much of a variance from the results above. k=250 is the lowest value for which the average percent differences remain constant.

Regardless of the number of vertices, whether it is 20 or 60, the Breadth-first search (BFS) algorithm returns significantly higher total weights than Prim’s Algorithm. For example, on a randomly generated graph with 20 vertices, BFS total weight averages at 1000 whereas prim maintains a low 400. On the higher end of the experiment spectrum, a graph with 60 vertices resulted in BFS a total weight for the spanning tree of 3500 and Prim returned only 800. As the graph continues to grow, Prim continues to produce lower total weights.

BFS starts from any vertex and continues is way down at random, regardless of the new edges weight. Prim on the other hand, chooses the next edge based on the least-weighted cost. It is for this reason that Prim will always yield better results.

BFS’s main priority is simply graph traversal where as Prim’s looks to find the shortest path from point A to point B.

“I confirm that this submission is my own work and is consistent with the Queen's regulations on Academic Integrity.”