

MCS-236 Non-textbook Homework Exercise 10

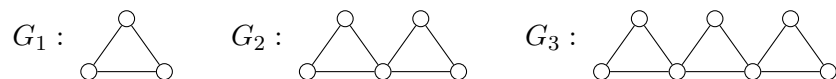
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Kruskal's Algorithm and Prim's Algorithm are efficient ways to find a minimum spanning tree of a graph. Larger graphs require more work than small graphs, but not dramatically more. Even quite large graphs can be processed in a reasonable amount of time.

In this exercise, you will consider the efficiency of an alternative algorithm. Here is an outline of the algorithm: construct all spanning trees of the graph, calculate the weight of each one, and choose one of minimum weight.

Consider the following sequence of graphs:



A graph G_k could be constructed for any positive integer k by following the same pattern. This graph has order $2k + 1$ and size $3k$; it consists of a chain of k triangles.

Write a paragraph or two in which you explain how many spanning trees G_k has and what this suggests about the efficiency of the algorithm outlined above.