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CSE 310

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Project 3 report

Graph 1 as a directed graph, formular 1 would be used. The density of directed graph 1 is $D = 0.25$, calculated using $E = 14$ and $V = 8$. As an undirected graph, formular 2 would be used. The density of undirected graph is $D = 0.5$.

Graph 2 as an undirected graph, formular 2 would be used. The density of graph 2 is $D = 1.16 \times 10^{-5}$, giving $V = 175813$ and $E = 179179$. As a directed graph, formular 1 would be used. The density of directed graph2 is $D = 5.80 \times 10^{-6}$. Adjacency lists are the better representation for the graphs in this project in terms of better space requirement. Adjacency matrix requires Big Theta(n^2) amount of space, which is more than adjacency lists (Big Theta($n + m$)).

After computing a depth-first search (DFS) of each graph used in the test cases. For graph 1, if it's regarded as a directed graph, it has 2 trees. If it's regarded as an undirected graph, it has 1 tree. For graph 2, it has only 1 tree regardless of whether directed or undirected.

The variant of Dijkstra's algorithm could take advantage of the results of a DFS starting from the source vertex under the best case, which is when the shortest path is the tree in alphabetically order.