CPSC 319

Assignment#4

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Tutorial: T10

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1. Describe the algorithm based on the graph traversal to find if there is a *loop* (a path of directed edges of the graph that starts and ends at the same node). Which traversal technique (breadth-first or depth-first) is more suitable? What is the worst-case complexity of this algorithm?

To find out if there is a loop we can describe the algorithm by first creating the graph with the given edges and vertices then we can make a recursive function that have the current vertex, visited array and parent node and mark the current node as visited. We then find the vertices that are not visited and that are adjacent to the current node and recursively call the function for them if the recursive function returns true then we will return true. If the adjacent node is not the parent node and we visited, we will return true.

A depth first traversal will be more suitable as the complexity for this algorithm will be O(V+E) where V is the vertices and E is the edges.

2. For a given query file, which traversal technique (breadth-first or depth-first) is more *efficient* in determining if the path exists between the given nodes? Use the provided input file and query file to help answer this question.

It will depend as if the query file contains vertices that are more reachable to one another then we would have the Breadth-first traversal as it is more efficient since it will find the shortest paths therefore, we can conclude that a Breadth-first traversal will be more efficient using the provided input file and query file as they are both used in each sorting algorithms.