Analysis assignment 3

To determine if an undirected graph is a tree, you need to check two main properties using either Depth-First Search (DFS) or Breadth-First Search (BFS):

1.The graph must be connected, meaning there is a path between every pair of vertices. You verify this by ensuring every vertex is visited during the DFS or BFS.

2. The graph must not contain any cycles. This is checked during DFS or BFS by ensuring there are no edges leading back to an already visited vertex (excluding the edge from the parent node in DFS).

If both these conditions are met, the graph is a tree. The algorithm for this check has a running time of O(V + E), where V is the number of vertices and E is the number of edges in the graph. This linear running time is due to the need to visit each vertex and examine each edge once during the traversal.