Algo HW 3

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1 Problem 3.15

a. Start at a random intersection, run a DFS on the graph of intersections(nodes) with the streets being edges. If this DFS fails to reach every intersection, then the graph is not strongly connected and there must be a case where an intersection is not accessible from a certain intersection. Otherwise, if every intersection is visited through the DFS then the graph is strongly connected and every intersection is accessible from every other intersection.

b. Start at the town hall, use a DFS to traverse every path out of the town hall, mark all of these nodes to go back to check them later. After all of these nodes have been marked, verify through a DFS that all of these nodes have a path back to the town hall. If there is not a path back from any one of these nodes to the town hall, the idea proposed is proven false, otherwise the proposition is true.

2   Problem 3.24

Linearize the graph, check if all consecutive nodes contain an edge. If there is a case where a node does not contain an edge to the node next to it in this linearized pattern, the graph does not contain a directed path that touches each vertex at exactly once. Otherwise if the test is passed, the graph does contain a directed path that touches each vertex exactly once.