

Tutorial 8: CS21003 Algorithms I

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March 27, 2021

1. Given an unweighted undirected graph and a start node, present a breadth-first search based traversal algorithm to find the lengths of the shortest length path from start to all other nodes reachable from start. Analyze the time complexity of the algorithm. Prove its correctness.
2. Given an unweighted directed graph, present a depth-first search based traversal algorithm that detects the presence of a cycle and outputs one such cycle. Analyze the time complexity of your algorithm.
3. Given a weighted directed acyclic graph, present a depth-first search based traversal algorithm that finds the lengths of the longest directed paths between every pair of nodes. If no directed path exists, indicate it by -1 . Analyze the time and space complexities of your algorithm.