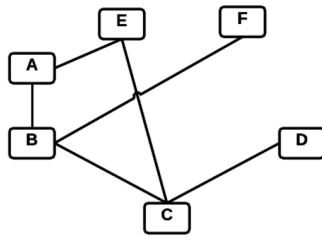


CSCI 3202 Introduction to Artificial Intelligence
Instructor: Hoenigman
Assignment 2
Due Sept 9, by 4pm
Submit answers on paper at the beginning of class.

Problems:

1. In an unweighted graph, which algorithm, DFS and/or BFS, is guaranteed to find the optimal shortest path? Include an example in your answer.
2. Consider a state space where the start state is the number 1 and the successor function for state n returns two states, $2n$ and $2n + 1$.
 - a. Draw the portion of the state space for states 1 to 15
 - b. For a goal state of 11, list the order in which nodes will be visited for BFS, DLS with limit 3, and iterative deepening search. (Use the iterative deepening algorithm that restarts at the root on each iteration.)
3. The DFS algorithm in the lecture notes includes a property called *visited* that is set on each node in the search tree. Explain the purpose of *visited* and show how the search tree changes if *visited* is not included in the algorithm. Use the following graph to provide an example. Choose any node as the root of the tree. You do not need to draw the entire tree, a few levels should be sufficient.



4. Iterative Deepening DFS restarts at the root of the tree on each iteration, resulting in repeat computation of top-level nodes. Explain how the algorithm could be modified to restart at the current search depth instead of the root. Your answer should include specific changes to the algorithm pseudo-code as well as an explanation of the changes.
5. Explain why the following statement is true or false: "Every node in the list of solved nodes in Dijkstra's algorithm is part of the final solution".