Problem 1: Complexity of Iterative Deepening Search

Analyze the complexity of iterative deepening search. Compare your result to the complexity of breadth-first search. Which one is better? Explain your conclusions.

Problem 2: Analysis of Depth-first and Breadth-first Search

Consider the graph given in Figure 1 and derive a precise analytical expression for the following both for depth-first and for breadth-first search. In both cases, carry out your analysis both when the algorithm is maintaining a visited list and when it is not. You should only provide upper and lower bounds for breadth-first search without a visited vertices list.

i. the number of paths that are examined (time complexity),
ii. the largest number of paths that will be under consideration at any given time, (i.e., queue size) (space complexity),
iii. the length of the path returned (quality of the solution).

Figure 1: Graph for Problem 1. Goal vertex is marked with a double circle.