Artificial Intelligence

II Classroom Assignment

29-8-2015

1A. What are the different representations to model the components of an agent program? Briefly explain them with an example representation under each type.

1B. Taking a case study explain the significance of these representations in terms of complexity and expressive power.

2A. Distinguish between tree search and graph search algorithm.

2B. When is the goal test done for graph search and tree search algorithms and why is the goal test different for breadth first search algorithm?

3A. Define in your own words the following terms: state, state space, search tree, search node, goal, action, transition model and branching factor.

3B. Describe a state space in which Iterative Deepening search performs much worse than depth first search, for example O(n^2) vs. O(n).

4A. Compare different search strategies based on time and space complexity.

4B. Prove that uniform-cost search and breadth-first search with constant step costs are optimal when used with the GRAPH-SEARCH algorithm. Show a state space with varying step costs in which GRAPH-SEARCH using iterative deepening finds a suboptimal solution.

5. Consider a state space where the start state is number 1 and the successor function for state n returns two states, numbers 2n and 2n + 1.

   a. Draw the portion of the state space for states 1 to 15.

   b. Suppose the goal state is 11. List the order in which nodes will be visited for breadth-first search, depth-limited search with limit 3, and iterative deepening search.

   c. Would bidirectional search be appropriate for this problem? if so, describe in detail how it would work.

   d. What is the branching factor in each direction of the bidirectional search?