Comp 408 Artificial Intelligence   Sprig 2015

1. our book AIMA, 3.7 (a,b)

Give the initial state, goal test, successor function, and cost function for each of the following. Choose a formulation that is precise enough to be implemented.

a. You have to color a planar map using only four colors, in such a way that no two adjacent regions have the same color.

b. A 3-foot-tall monkey is in a room where some bananas are suspended from the 8-foot ceiling. He would like to get the bananas. The room contains two stackable, movable, climbable 3-foot-high crates.

2. AIMA 3.8

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?

e. Does the answer to (c) suggest a reformulation of the problem that would allow you to solve the problem of getting from state 1 to a given goal state with almost no search?

3. AIMA , 3.12

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.