Problem Solving Review

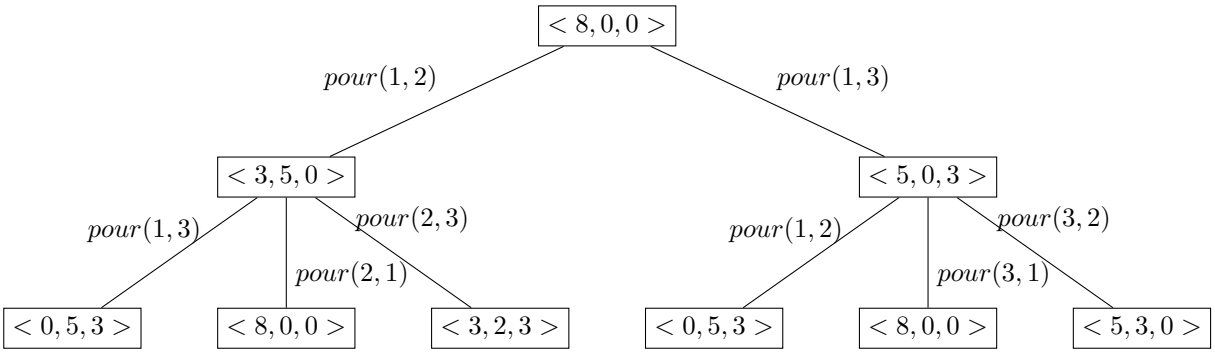
Artificial Intelligence

1. What is a planning problem?

2. Describe open-loop and closed-loop control.

3. Write a problem formulation for a world with three unmarked pitchers – an 8 L pitcher full of water, an empty 5 L pitcher, and an empty 3 L pitcher – where an agent must reallocate the water so that one of the pitchers contains exactly 4 L of water.

4. Consider the first two levels of a BFS search tree with a start state of $< 8, 0, 0 >$ where the $expand(problem, node)$ function always enumerates child nodes by choosing actions from "left to right", that is, choosing the leftmost source pitcher to pour from, and the leftmost target pitcher to pour to.



Discuss the implications of this child node expansion order for Depth-First Search.

5. Is Breadth-First Search subject to the same problems discussed in the previous question? Why, or why not?

6. Is Breadth-First Search complete? Why, or why not?

7. Is Depth-First Search complete? Why, or why not?

8. What is the simplest way to modify Depth-First Search so that it does not descend an infinite path?

9. Discuss the most important implication of modifying Depth-First Search so that it does not descend an infinite path.

10. Describe an algorithm that uses Depth-First Search but is complete.

11. What is the primary tradeoff between Bread-First Search and Depth-First Search?