

Artificial Intelligence - Assignment 2

Posted Tuesday, November 4, 2003, 2:30pm

Due Tuesday, November 11, 2003, in class

1. [30 points] **Planning**

Shakey the robot must move n boxes from room A to room B. He can perform two actions: MoveShakeyAndBoxA2B and MoveShakeyB2A. For the first action, Shakey picks up an available box and moves with it from room A to room B. In the second case, he moves back from room B to room A, without taking any boxes.

- (a) [10 points] Write down a STRIPS specification of the two actions
- (b) [10 points] Assume that we have two boxes, box1 and box2, both in room A, and Shakey is in room A. Write down the first three levels of the planning graphs for this problem (P_0, A_0, P_1). Show all propositions and all edges, marking delete edges with dashed lines. Write all mutex constraints under each level of the graph.
- (c) [10 points] Suppose there were n boxes in room A. How many levels in the planning graph will be expanded before a working solution is found? Count both action and propositional levels (e.g., in part b above, the number of levels is 3). What mutex relations will there be, in this case, between the propositions at level P_1 ?

2. [30 points] Russel and Norvig, Pg. 369 Problem 10.3.

3. [10 points] I have three urns labeled 1, 2 and 3. Urn 1 contains 6 white balls and 3 black balls. Urn 2 contains 4 white balls and 2 black balls. Urn 3 contains 1 white and 2 black balls. I will choose at random an urn, and draw a ball from it.

- (a) Find the probability of selecting urn 2 and drawing a black ball
- (b) Find the probability of drawing a black ball
- (c) Find the probability that urn 2 was selected, given that a black ball was drawn.

4. [10 points] Russell and Norvig, pg. 489 Problem 13.3.

5. [10 points] Russell and Norvig, pg. 490 Problem 13.11

6. [10 points] Russell and Norvig, pg. 491 Problem 3.16