Midterm Exam

ARTIFICIAL INTELLIGENCE

Class: CS Honour 2008
Questions: 2 – Total mark: 10 – Time: 60 minutes
Open book

Question 1 (*5 marks*):

Consider the following two-player game:
- Given a pile of *N* tokens.
- Players take turn in dividing one pile into two under the condition: the two resulting piles are of different sizes. For example, a pile of 4 can be divided into two piles of 3 and 1, but not into two piles of 2 each.
- The player who cannot make another move loses.

Illustrate how a player would use Minimax algorithm in this game with *N* = 7, assuming that the other player takes the first turn.

Question 2 (*5 marks*):

Swapping the values in two memory cells can be considered as a planning problem using a sequence of assignment operations as a solution. That is, given two cells *A* and *B* with their initial values being *a* and *b*, respectively, the goal is to have *A* = *b* and *B* = *a* afterwards. The precondition of an assignment $X \leftarrow Y$ is that, if *X* contains one of the values in the two given cells, then that value must be already stored in another cell.

Apply Goal Stack planning to this problem using one temporary cell. Trace the steps followed to make a plan, showing the contents of the stack and the database in each step.

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