

Homework 3

CS 5233 – Fall 2007

Tom Bylander, Instructor

assigned September 12, 2007

due September 19, 2007

1. (50 pts.) Do Exercise 6.1 in the book, but use the evaluation function described in the lecture (and notes). You do not need to duplicate symmetric positions, e.g., the first move is a move to the middle, a corner, or a side.
2. (25 pts.) Repeat Exercise 6.1.e, but apply alpha-beta pruning to a depth 3 search in the following manner. Order the nodes at depth 1 and depth 2 according to the evaluation function (maximum at left to minimum at right for MAX's moves; minimum at left to maximum at right for MIN's moves). You should not have to draw the whole depth 3 tree.
3. (25 pts.) In real games, there is often a time limit. One way to be sure to have a move when the time limit runs out is to run minimax with alpha-beta pruning with increasing depths. That is, first we run minimax at depth 1, then depth 2, and so on. If the algorithm is working on depth d when the time limit runs out, it returns the move determined during the depth $d - 1$ search. Assuming minimax without alpha-beta pruning and branching factor b , how many positions would be generated by a search of this type?
4. (Shared Extra Credit, 100 pts.) Most computer players perform search while the opponent is thinking. In less than 200 words, describe a strategy that would take advantage of this situation. You must convince me that it will be better than simply waiting for the opponent to make a move.