ICS 171, Summer 2000: Lecture 4 Homework

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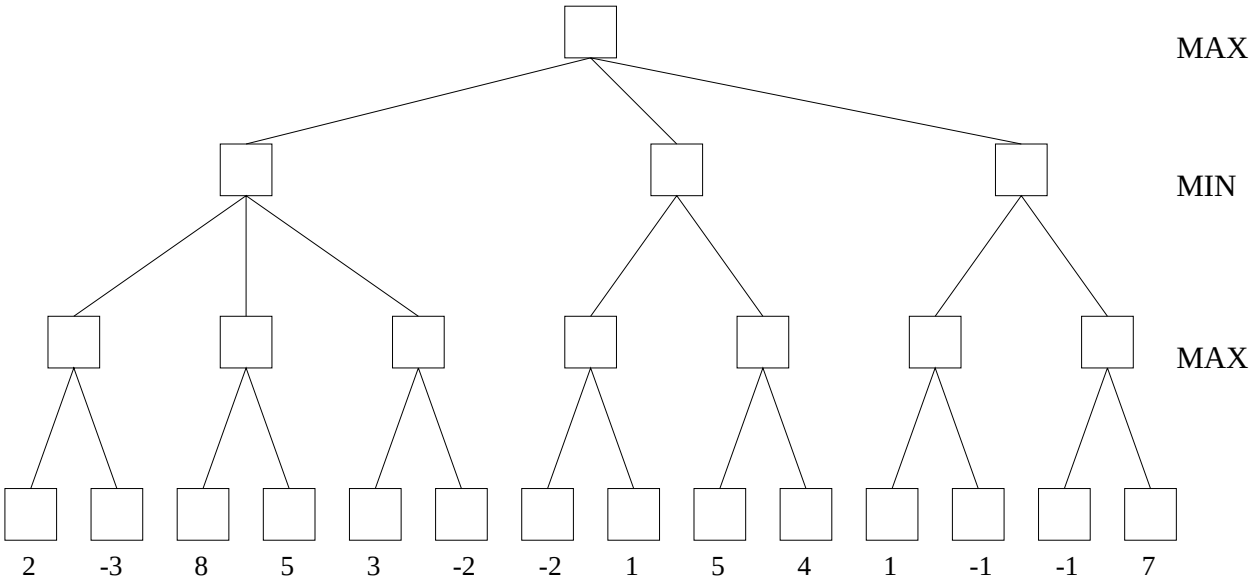
Due: August 24, 2000

(1) Design evaluation functions for any two of backgammon, chess, checkers, tic-tac-toe, othello, connect-4 or any two board games of your choice.

(2) Shown below is a game tree where the root node is a MAX node.

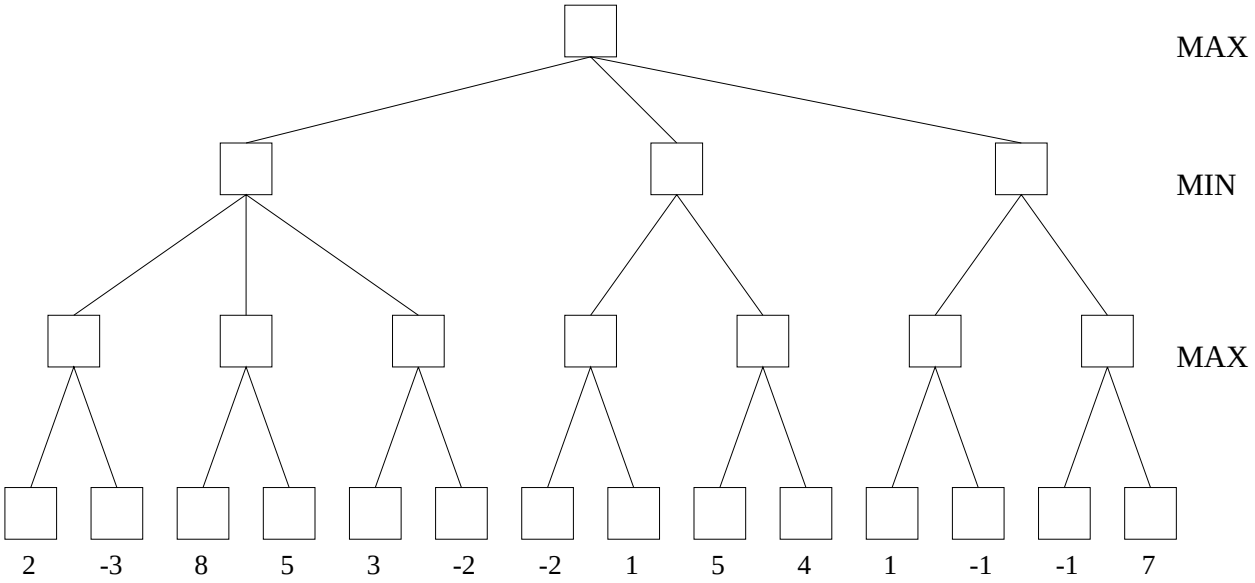


Assume that:

- the tree is explored by minimax (and alpha-beta) in a left to right manner
- the tree is explored to depth 3 and no further
- the numbers beneath the leaves of the tree are the evaluation function values for the corresponding states

Write in the boxes the minimax values for each state. Indicate the move chosen by MAX (the computer) as its first move.

(3) Shown below is the same game tree as in Question 2. Again, the root node is a MAX node. Which states will not be evaluated in minimax search with alpha-beta pruning? Show the nodes that are not evaluated by marking them with an **X**. By "not evaluate" we mean that no minimax values are calculated for that node.



(4) The minimax algorithm returns the best move for MAX under the assuption that MIN plays optimally. What happens when MIN plays suboptimally? (Russell & Norvig, page 148).