

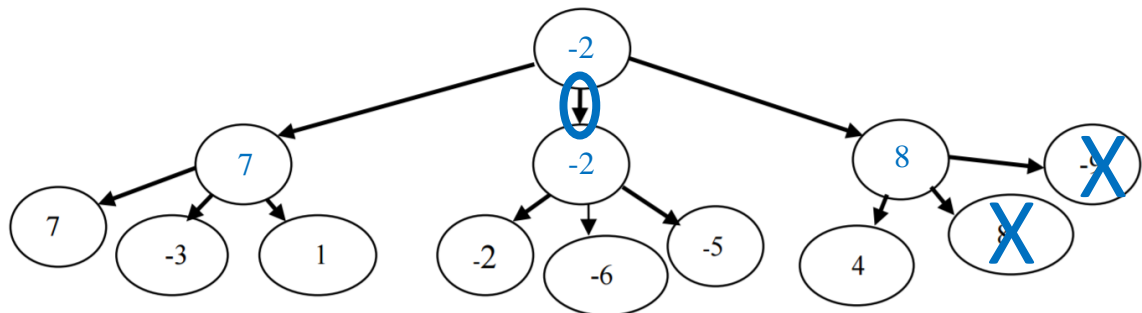
CS 4700: Foundations of Artificial Intelligence
 Spring 2020
 Prelim Prep Questions
 Quiz 3

1. True/False Questions:

- f. Alpha-beta pruning will never result in a different move being selected compared to plain minimax search, but the value it generates for the current state may differ from that of plain minimax search.

False. Alpha-beta pruning returns the correct move and value (where “current state” refers to the state being evaluated – lower nodes might pass up an incorrect value, but only when that value crossed the relevant alpha or beta bound, thereby signaling that search should never wind up there).

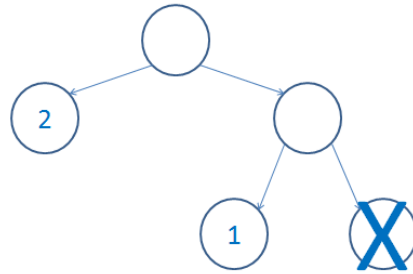
8. Apply the minimax algorithm to the game tree below, where it is the **opponent’s** turn to move next and the leaf nodes are terminal nodes whose values are given in each node in the figure. Process this game tree working left-to-right.



- Write the values that minimax gives the intermediate nodes inside their circles.
 - Circle the outgoing arc of the root node that represents the move that minimax search would select for this game.
 - Put X’s through the nodes that would be pruned by alpha-beta pruning.
9. Is the worst-case time complexity for minimax search and minimax search using alpha-beta pruning the same? Please explain your answer.

Yes. In the worst case alpha beta does no pruning and the two are identical.

10. Give the smallest game tree you can for which alpha-beta pruning would prune at least one node. Please include the following:



11. Give the smallest game tree you can for which alpha-beta pruning would prune at least two nodes that have different parent nodes above it.

