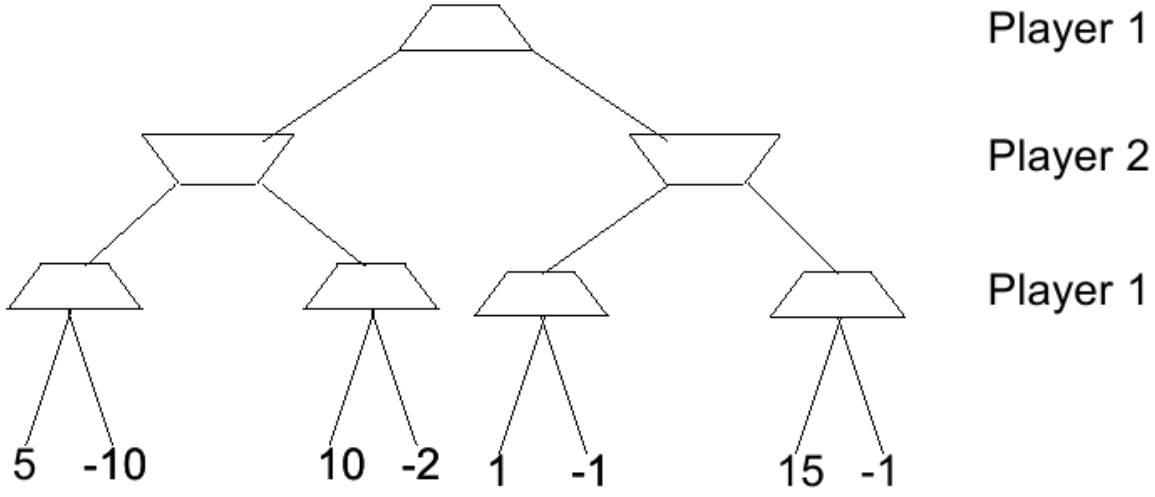
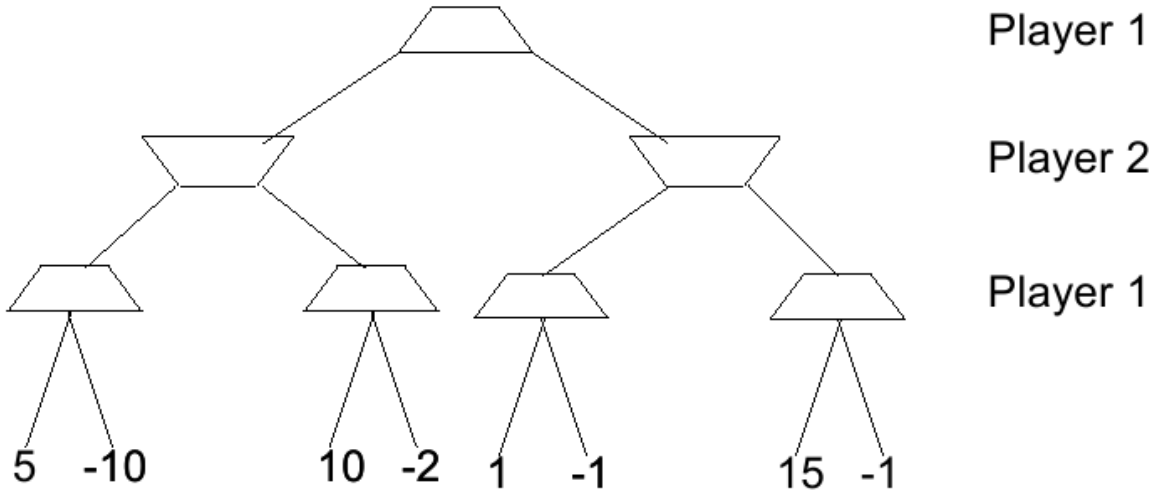
CS 6300 **Expectimax Practice** **February 4, 2021**

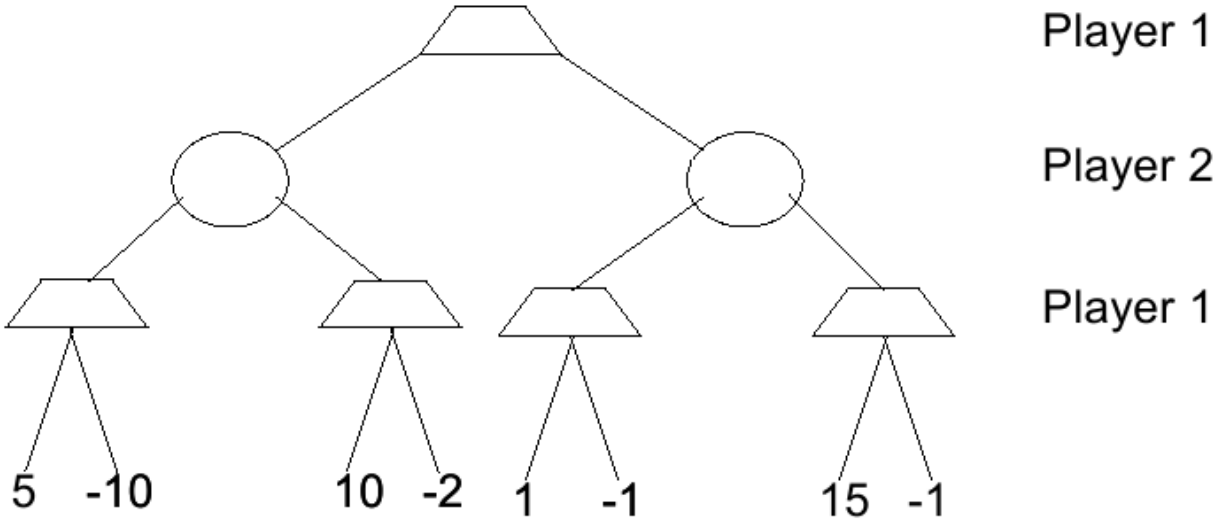
1. Consider the following zero-sum game with 2 players. At each leaf we have labeled the payoffs Player 1 receives. It is Player 1's turn to move. Assume both players play optimally at every time step (i.e., Player 1 seeks to maximize the payout, while Player 2 seeks to minimize the payout). Circle Player 1's optimal next move on the graph, and state the minimax value of the game.



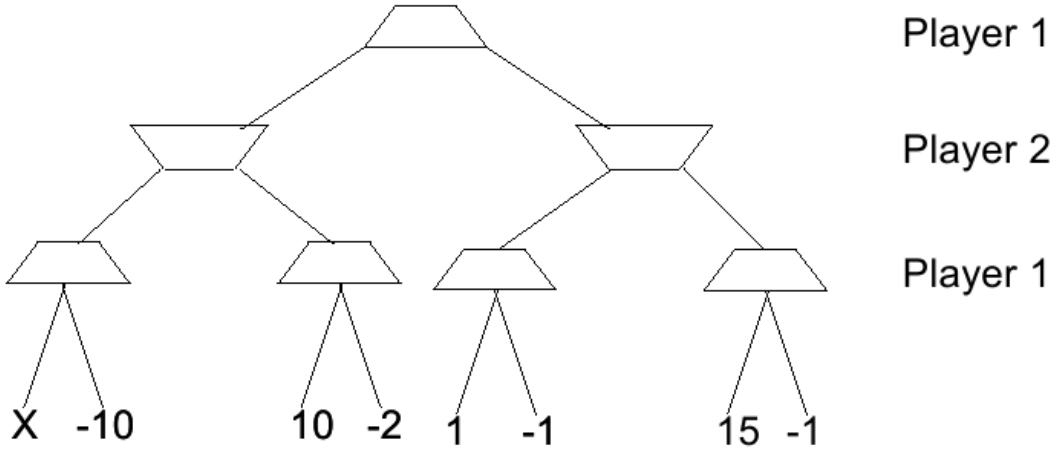
2. For the same game tree, player 1 again moves first and attempts to maximize the expected payoff. Player 2 moves second, and attempts to minimize the expected payoff. Expanding nodes left to right, cross out nodes pruned by alpha-beta pruning.



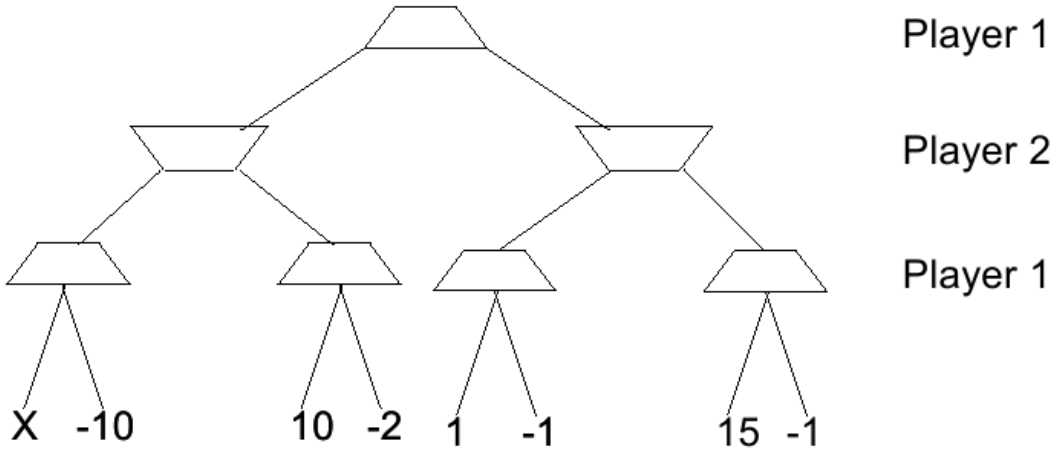
3. Now assume that Player 2 chooses an action uniformly at random every turn (and Player 1 knows this). Player 1 still seeks to maximize the payoff. Circle Player 1's optimal next move, and give the expected payoff.



4. Consider the following modified game tree, where one of the leaves has an unknown payoff x. Player 1 moves first, and attempts to maximize the value of the game. Assume player 2 is a minimizing agent (and Player 1 knows this). For what values of x does Player 1 choose the action to reach node with x?



5. Assume Player 2 chooses actions at random (and Player 1 knows this). For what values of x does Player 1 choose the action to reach node with x?



6. For what values of x is the minimax value of the tree worth more than the expectimax value of the tree?