

hw3_games_q5.2_properties_of_nonzero_sum_games

Question 5.2: Properties of Non-Zero-Sum Games

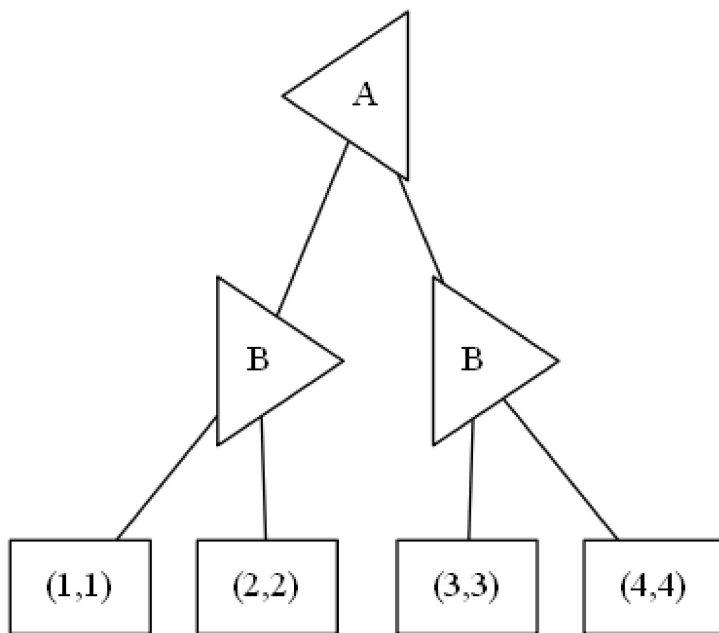
0.0/6.0 points (graded)

In this problem, you will again consider the non-zero-sum generalization, in which the sum of the two players' utilities are not necessarily zero. The leaf utilities are now written as pairs (U_A, U_B) . In this generalized setting, A seeks to maximize U_A , the first component, while B seeks to maximize U_B , the second component.

Assume that your generalization of the minimax algorithm calculates a value (U_A, U_B) for the root of the tree. Assume no utility value for A or for B appears more than once in the terminal nodes (this means there will be no need for tie-breaking). Which of the following statements are true?

- ☒ Assuming A and B both play optimally, player A's outcome is guaranteed to be exactly U_A . ✓
- ☒ Assuming A and B both play optimally, player B's outcome is guaranteed to be exactly U_B . ✓
- ☐ Assuming B plays sub-optimally (but A plays optimally), A's outcome is guaranteed to be at least U_A .

The generalized algorithm finds the value assuming that each player plays optimally. However, because of the non-zero sum settings, sub-optimal play by one player does not necessarily improve the result for the other player. Consider the following case where all utilities are the same for both players.



If both players play optimally, they would both end with a score of 4. However, if B plays sub-optimally, they both end up with a score of 3.

Submit

i Answers are displayed within the problem