hw3_games_q5.1_nonzero_sum_games

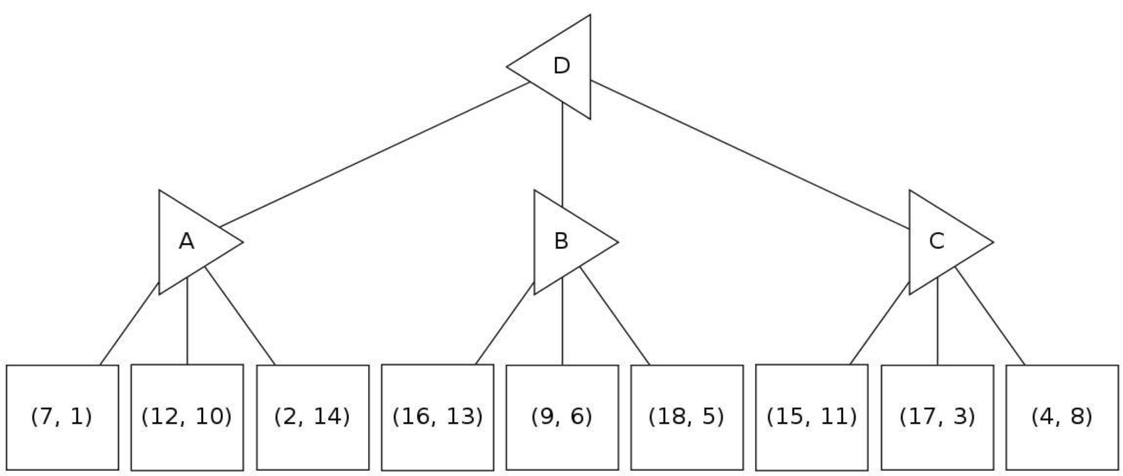
Question 5.1: Non-Zero-Sum Games

8/8 points (ungraded)

The standard minimax algorithm calculates worst-case values in a *zero-sum* two player game, i.e. a game for which in all terminal states s, the utilities for players A (MAX) and B (MIN) obey $U_A(s) + U_B(s) = 0$. In this zero-sum setting, we know that $U_A(s) = -U_B(s)$, so we can think of player B as simply minimizing U_A. In this problem, you will 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.

Consider the non-zero-sum game tree below. Note that left-pointing triangles (such as the root of the tree) correspond to player A, who maximizes the first component of the utility pair, whereas right-pointing triangles (nodes on the second layer) correspond to player B, who maximizes the second component of the utility pair. Propagate the terminal utility pairs up the tree using the appropriate generalization of the minimax algorithm on this game tree. In case of ties, choose the leftmost child. Select the correct values for the letter nodes below the tree.

Your answer should be in the format (X, Y), where X is the value of Player A and Y is the value of Player B at a node.



A	B	C	D
(2, 14) Correct!	(16, 13) Correct!	(15, 11) Correct!	(16, 13) Correct!

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Correct (8/8 points)