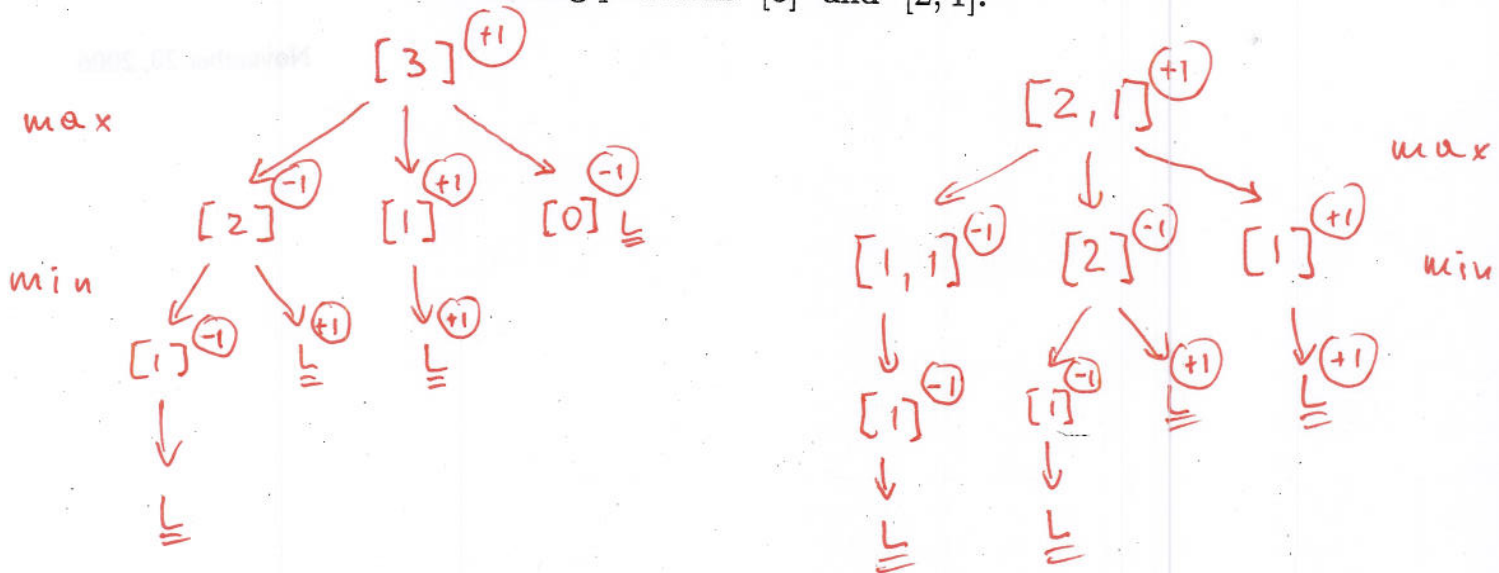


Write your name and code on the back.

Show your work!

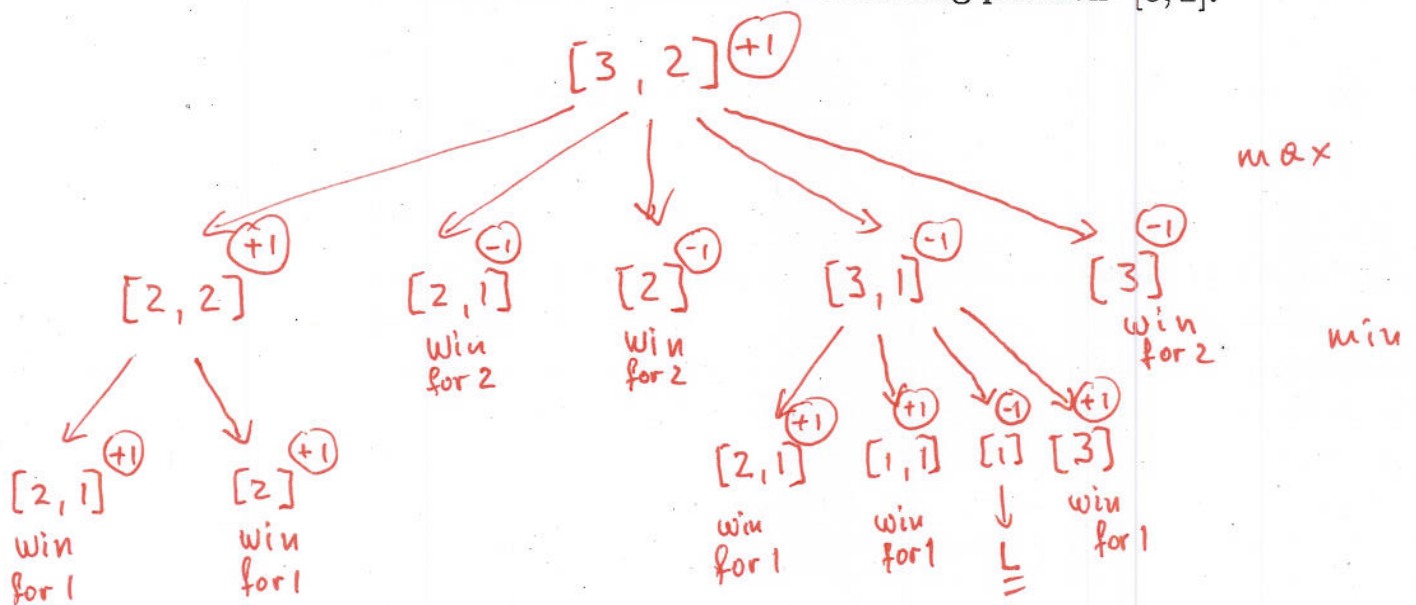
1. { 10 points } Draw a game tree for nim for the following starting positions. Find the value of each vertex of the game tree. Who wins the game if both players follow an optimal strategy?

(a) full tree for the starting positions [3] and [2, 1].



Player 1 wins in both cases

(b) partial tree using the above results for the starting position [3, 2].



Player 1 wins