AI Algorithm Exploration

Q1: Is this a fair game?
Ans:

I think it's fair as it is a symmetric game, and for wolves and sheep, they have a fixed number of pieces and the same amount of space to move on the game board. The game is also turn-based, meaning that each player takes turns to make a move.

However, the game may not be fair in terms of the balance of power between the wolves and the sheep. In general, the wolves seem have an advantage in the game, as they are stronger, and they can eat sheep. In addition, the wolves can eat multiple sheep in a single move, but the sheep can only win by blocking all the way of the two wolve, which it's not easy. Therefore, the game may be biased towards the wolves, and it may be more difficult for the sheep to win the game.

However, the sheep has advantage on quantity, 2:10 make sheep have more chance to win.

By analyzing two player side, I found if we don't use any strategy, for example, we just use random choice, it's hard for sheep to win, as the sheep need several sheep together to block the wolf, but the wolf can eat sheep one by one. However, with the appropriate strategy, sheep can win more than wolf, which means wolf is easier for beginner, but sheep can win more for the sophisticated.

Hence, I think in general, it's a fair game.

Q2: Can the designed AI algorithm work if we change the number of pieces (as shown in figure 1, 2)?

I think it can work in the figure 1, as the rate of wolf and sheep is 3:15 = 2:10, and the initial location make the wolf has more chance to eat sheep at early stage, and for sheep, they still have advantage on the quantity. But the empty space is smaller. And my AI algorithm doesn't fix the number of sheep and wolf. By using my heuristic evaluation, it would evaluate the scores for sheep and win according to the situation flexibly. Hence, I think it would still work. But it may need more rounds to win for the wolf.